

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.

<p style="text-align: center;">Licensee</p> <p>1. National Aeronautics & Space Administration John H. Glenn Research Center at Lewis Field</p> <p>2. 21000 Brookpark Road Cleveland, Ohio 44135</p>	<p>In accordance with letter dated May 15, 2013,</p> <p>3. License number 34-00507-16 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date October 31, 2014</p> <hr/> <p>5. Docket No. 030-05626 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. Cesium-137	A. Sealed sources (NBS or Isotope Products, Inc.)	A. Two sources not to exceed 15 microcuries each for a total of 30 microcuries
B. Any byproduct material with atomic number 3 - 83 inclusive	B. Activated materials and components	B. Not to exceed 200 millicuries per isotope
C. Strontium-90	C. Sealed source (Isotope Products, Inc.)	C. One source not to exceed 1 microcurie
D. Americium-241	D. Plated Foil (Isotope Products Laboratories Model AFR Series)	D. One source not to exceed 100 microcuries
E. Americium-241	E. Foil sources (Manufactured by AEA Technologies, Inc. and Nycomed Amersham Plc Model AMM.1001H)	E. 20 sources not to exceed 1 microcurie each for a total of 20 microcuries
F. Promethium-145	F. Sealed source (NEN X-2 X-Ray Reference Source)	F. One source not to exceed 1 microcurie
G. Cesium-137	G. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license.	G. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. Total possession not to exceed 9 millicuries.

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| H. Americium-241 | H. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license. | H. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. Total possession not to exceed 44 millicuries. |
| I. Nickel-63 | I. Foil sources (Nuclear Radiation Developments, Inc. Model N-1001, and Eckert & Ziegler Isotope Products Model NER-004) | I. No single source to exceed 15 millicuries (Model N-1001) or 50 millicuries (Model NER-004). Total possession not to exceed 2.5 curies. |
| J. Any byproduct material with atomic number 1 - 83 inclusive | J. Environmental Samples | J. Total possession not to exceed 11 microcuries. No single isotope to exceed 1.4 microcuries |
| K. Uranium-234 | K. Environmental Samples | K. 47 nanoocuries |
| L. Uranium-238 | L. Environmental Samples | L. 47 nanoocuries |
| M. Plutonium-238 | M. Environmental Samples | M. 47 nanocuries |
| N. Plutonium-239 | N. Environmental Samples | N. 47 nanocuries |
| O. Americium-241 | O. Environmental Samples | O. 47 nanocuries |
| P. Americium-241 | P. Sand Matrix | P. Ten sources not to exceed 0.2 microcuries each for a total of 2 microcuries |
| Q. Cesium-137 | Q. Sand Matrix | Q. Ten sources not to exceed 0.06 microcuries each for a total of 0.6 microcuries |
| R. Europium-152 | R. Sand Matrix | R. Ten sources not to exceed 0.5 microcuries each for a total of 5 microcuries |

9. Authorized use:

A., C., D., E., and I. For research and development as described in 10 CFR 30.4.

B. For research and development as described in 10 CFR 30.4. Possession incident to the radiological characterization surveys of a shut-down cyclotron. Includes collection and analysis of samples and interference removal of activated equipment and infrastructure associated with the licensee's cyclotron facility.

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- F. Possession and storage only with intent to dispose.
- G. and H. To be used for research and development as described in 10 CFR 30.4 in Troxler Model No. 3440 Plus portable gauging devices measuring physical properties of materials.
- J. **through O. For use in Radiological and Environmental Sciences Laboratory (RESL) Mixed Analyte Performance Program (MAPEP) samples with gamma spectroscopy systems in support of decommissioning tasks.**
- P. **through R. For use in Eckert and Ziegler Analytics, Inc., custom sources for instrument calibration.**

CONDITIONS

10. A. Subitems 6.A. through 6.F., and 6.I. **through 6.R.** may be used and stored at John H. Glenn Research Center at Lewis Field, 21000 Brookpark Road, Cleveland, Ohio, and Plum Brook Station at 6100 Columbus Avenue, Sandusky, Ohio.
- B. Subitems 6.G. and 6.H. may be used and stored at John H. Glenn Research Center at Lewis Field, 21000 Brookpark Road, Cleveland, Ohio, and Plum Brook Station at 6100 Columbus Avenue, Sandusky, Ohio, and may be used at temporary job sites of the licensee anywhere in the United States.
11. A. Licensed material shall only be used by, or under the supervision of, Christopher Blasio.
- B. Before using subitems 6.G. and 6.H., authorized users will have successfully completed one of the training courses described in Criteria in the section entitled "Training for Individuals Working In or Frequenting Restricted Areas" in NUREG-1556, Vol. 1, Rev. 1, dated November 2001.
12. The Radiation Safety Officer (RSO) for this license is Christopher Blasio.
13. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
14. The licensee shall conduct a physical inventory every six months 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 radionuclides, quantities, manufacturer's name and model numbers, and the date of the inventory.
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. Sealed sources, detector cells, or foil sources containing licensed material shall not be opened or sources removed from source holders by the licensee.

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17. A. Sealed sources, detector cells, and foil sources shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified by the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or under equivalent regulations of an Agreement State.
- 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, detector cell or foil source received from another person shall not be put into use until tested and the test results received.
- 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 not 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 leak 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 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.
- F. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the U.S. Nuclear Regulatory 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.
18. 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."
19. Except for maintaining labeling as required by 10 CFR Part 20 or 71, the licensee shall obtain authorization from NRC before making any changes in the sealed source, device, or source-device combination that would alter the description or specifications as indicated in the respective Certificates of Registration issued either by the Commission pursuant to 10 CFR 32.210 or by an Agreement State.

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20. Each portable nuclear gauge shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The gauge or its container must be locked when in transport. A minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever the portable gauge is not under the control and constant surveillance of the licensee are required.
21. Any cleaning, maintenance, or repair of the gauges that requires detaching the source or source rod from the gauge shall be performed only by the manufacturer or other persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.
22. A. If the licensee uses unshielded sealed sources extended more than three feet below the surface, the licensee shall use surface casing that extends from the lowest depth to 12 inches above the surface and other appropriate procedures to reduce the probability of the source or probe becoming lodged below the surface. If it is not feasible to extend the casing 12 inches above the surface, the licensee shall implement procedures to ensure that the cased hole is free of obstruction before making measurements.
- B. If a sealed source or a probe containing sealed sources becomes lodged below the surface and it becomes apparent that efforts to recover the sealed source or probe may not be successful, the licensee shall notify the U. S. Nuclear Regulatory Commission and submit the report required by 10 CFR 30.50(b)(2) and (c). The licensee shall not abandon the sealed source or probe without obtaining the Commission's prior written consent.
23. The licensee shall submit a Decommissioning Plan in accordance with 10 CFR 30.36(g)(1) within 18 months of December 4, 2012 as described in letter dated December 4, 2012.

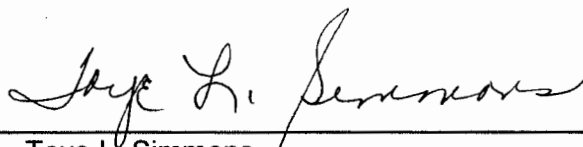
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24. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear 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 June 29, 2004;
- B. Letters dated August 13, 1999, February 7, 2001, January 8, 2004, February 12, 2004, October 29, 2004, November 10, 2004, February 4, 2005, April 15, 2005, September 9, 2004, December 15, 2004, May 23, 2005, May 25, 2005, June 8, 2006, April 20, 2007, June 7, 2007, January 23, 2008, May 28, 2008, October 28, 2008, March 6, 2009, September 17, 2010, September 30, 2010, October 20, 2010 and Procedure CP-7, Revision 1, Radiation Work Permits, September 2, 2011 (excluding the attached Radiation Protection for Radioactive Materials manual), December 2, 2011, April 11, 2012, May 1, 2012 (excluding issue related to potential tritium production which remains under review), December 4, 2012, **May 15, 2013**, and **June 24, 2013**; and
- C. Facsimiles dated March 21, 2005, March 25, 2008, and February 22, 2013.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date JUL 29 2013

By

Toye L. Simmons
Materials Licensing Branch
Region III