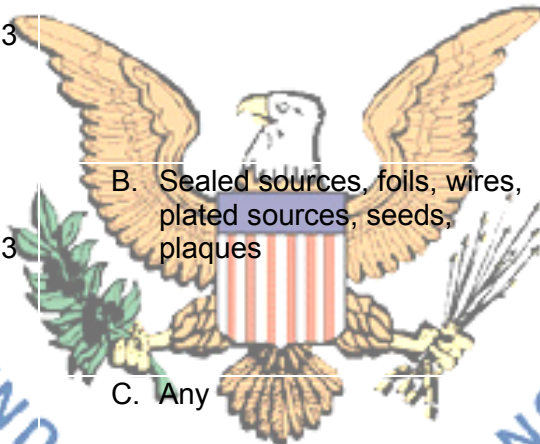


MATERIALS LICENSE

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 1. University of South Dakota 2. 414 East Clark Street Vermillion, South Dakota 57069-2390	In accordance with letter dated June 12, 2012 3. License number 40-02331-19 is amended in its entirety to read as follows: 4. Expiration date September 30, 2014 5. Docket No. 030-15186 Reference No.
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6. Byproduct, source, and/or special nuclear material A. As specified in Section 33.100, Schedule A, Column I of 10 CFR Part 33 (Type B Broad Scope License) B. As specified in Section 33.100, Schedule A, Column I of 10 CFR Part 33 (Type B Broad Scope License) C. Phosphorus-33 D. Californium-252 E. Cesium-137	7. Chemical and/or physical form A. Any, except sealed sources B. Sealed sources, foils, wires, plated sources, seeds, plaques C. Any D. Electrolytic deposition on a target disc obtained from Oak Ridge National Laboratory E. Sealed source (Industrial Reactor Lab (Series 2); 3M Co. (Models 193 & 225); Amersham (CDC.800 series); J.L. Shepherd & Associates (Model 6810); New England Nuclear/Du Pont Merck Pharmaceuticals (Models NER-570 Series & NER-580 Series))	8. Maximum amount that licensee may possess at any one time under this license A. See condition 11 B. 500 millicuries C. 10 millicuries D. 1 microgram E. 160 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
F. Americium-241:Be	F. Sealed neutron source (QSA Global, Inc., product code AMNB3423 [drawing VZ-342]; Eckert & Ziegler Model GF-241-D)	F. 90 microcuries per source and 431 microcuries total
G. Rubidium-83	G. Any	G. 10 microcuries
H. Barium-133	H. Sealed Source (Eckert & Ziegler Model GF-133-D)	H. 10 microcuries per source and 30 microcuries total
I. Thorium-228	I. Sealed Source (Eckert & Ziegler Model GF-228-D)	I. 1 microcurie per source and 7 microcuries total
J. Thorium-228	J. Custom Sealed Source (Eckert & Ziegler Model VZ-3631-001)	J. 0.28 microcurie per source and 1.68 microcuries total
K. Sodium-22	K. Sealed Source (Eckert & Ziegler Model GF-22-M)	K. 1 microcurie per source and 1 microcurie total
L. Barium-133	L. Sealed Source (Eckert & Ziegler Model GF-133-M)	L. 3 microcuries per source and 3 microcuries total
M. Cesium-137	M. Sealed Source (Eckert & Ziegler Model GF-137-M)	M. 3 microcuries per source and 3 microcuries total
N. Californium-252	N. Sealed Source (Eckert & Ziegler Model AF-252-A1)	N. 0.1 microcurie per source and 0.3 microcurie total
O. Americium-241:Be	O. Sealed Neutron Source (QSA Global Model AMNB3423 [Drawing VZ-342])	O. 1 microcurie per source and 1 microcurie total

9. Authorized Use:

- A. through D. To be used in research and development as defined in 10 CFR 30.4, animal studies and student training.
- E. To be used in the calibration of licensee's survey instruments using a J.L. Shepherd & Associates Model 10 calibrator.

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F. through O. To be used as a calibration source in research and development as defined by 10 CFR 30.4.

CONDITIONS

10. Licensed material shall be used only at:
- A. The University of South Dakota, Vermillion, South Dakota,
 - B. The University of South Dakota School of Medicine Health Science Center, 1400 West 22nd Street, Sioux Falls, South Dakota, and
 - C. South Dakota Science and Technology Authority (Homestake Mine), 630 East Summit Street, Lead, South Dakota (only sealed sources identified in Items 6.B., 6.F. through 6.O.)
11. If only one radionuclide is possessed, the possession limit is the quantity specified for that radionuclide in 10 CFR 33.100, Schedule A, Column 1. If two or more radionuclides are possessed, the possession limit is determined as follows: For each radionuclide, determine the ratio of the quantity possessed to the applicable quantity specified in 10 CFR 33.100, Schedule A, Column 1, for that radionuclide. The sum of the ratios for all radionuclides possessed under the license shall not exceed unity.
12. A. Licensed material shall be used by or under the supervision of individuals designated in writing by the Radiation Safety Officer.
- B. The Radiation Safety Officer for this license is Laura J. Jenski, Ph.D.
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 and detector cells 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 the intervals 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 and the test results received.
- D. Sealed sources need not be 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.
- E. 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.

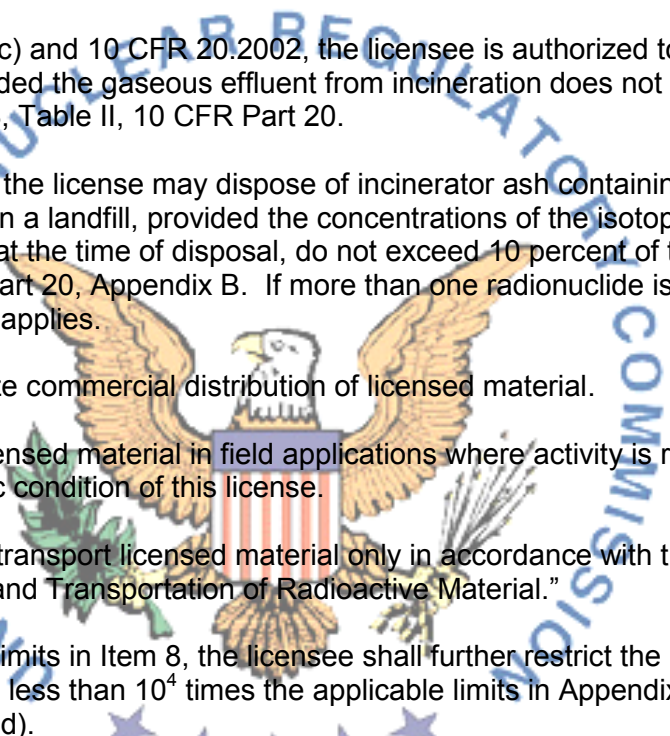
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- F. The leak test shall be capable of detecting the presence of 0.005 microcuries (185 becquerels) of radioactive material on the test sample. If the test reveals the presence of 0.005 microcuries (185 becquerels) or more of removable contamination, 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. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region IV, 1600 East Lamar Blvd., Arlington, Texas 76011, ATTN: Director, Division of Nuclear Materials Safety. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- G. The licensee is authorized to collect leak test samples for analysis by the licensee. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
- H. 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. A. Detector cells containing a titanium tritide foil or a scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents the foil temperature from exceeding that specified in the certificate of registration referred to in 10 CFR 32.210.
- B. When in use, detector cells containing a titanium tritide foil or a scandium tritide foil shall be vented to the outside.
16. The licensee shall conduct a physical inventory every 6 months to account for all 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. Licensed material shall not be used in or on human beings.
18. Experimental animals, or the products from experimental animals, that have been administered licensed materials shall not be used for human consumption.
19. The licensee is authorized to hold byproduct material with a physical half-life of less than or equal to 120 days for decay-in-storage before disposal without regard to its radioactivity if the licensee:
- A. Monitors byproduct material at the surface before disposal and determines that its radioactivity cannot be distinguished from the background radiation level with an appropriate radiation detection survey meter set on its most sensitive scale and with no interposed shielding; and

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- B. Removes or obliterates all radiation labels, 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; and
- C. Maintains records of the disposal of licensed materials for 3 years. The record must include the date of the disposal, the survey instrument used, the background radiation level, the radiation level measured at the surface of each waste container, and the name of the individual who performed the disposal.
20. Pursuant to 10 CFR 20.1302(c) and 10 CFR 20.2002, the licensee is authorized to dispose of licensed material by incineration, provided the gaseous effluent from incineration does not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20.
21. Pursuant to 10 CFR 20.2002, the license may dispose of incinerator ash containing hydrogen-3 and carbon-14 as ordinary waste in a landfill, provided the concentrations of the isotopes, expressed in microcuries per gram of ash, at the time of disposal, do not exceed 10 percent of the values listed in Table II, Column 2, 10 CFR Part 20, Appendix B. If more than one radionuclide is present in the ash, then the sum of fractions rule applies.
22. This license does not authorize commercial distribution of licensed material.
23. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
24. The licensee is authorized to transport licensed material only in accordance with the provision of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
25. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of unsealed licensed material to quantities less than 10^4 times the applicable limits in Appendix B of 10 CFR Part 30, as specified in 10 CFR 30.35(d).
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26. 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 22, 2004 | (ML041960106) |
| B. Letter dated July 6, 2007 | (ML072070587) |
| C. Letter received October 15, 2008 | (ML083290288) |
| D. Letter dated January 9, 2009 | (ML090140153) |
| E. Letter dated April 3, 2009 | (ML091410526) |
| F. Letter dated July 15, 2009 | (ML092160976) |
| G. Letter dated April 20, 2010 | (ML102460676) |
| H. Letter and application dated November 15, 2010 | (ML103640032) |
| I. Letter dated May 10, 2011 | (ML11137A185) |
| J. Letter dated July 27, 2011 | (ML11214A056) |



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: September 10, 2012

By: /RA/
Jacqueline D. Cook, Senior Health Physicist
Nuclear Materials Safety Branch B
Region IV
Arlington, Texas 76011-4511