U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 27

# 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 letter dated August 29, 2016, | 4. Expiration Date: July 31, 2019 |
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| 1. Dow AgroSciences<br><br>2. 9330 Zionsville Road<br>306 Building, E2-1010<br>Indianapolis, IN 46268-1054 | 3. License number: 13-26398-01 is amended in its entirety to read as follows: | 5. Docket No.: 030-32714<br>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 | 9. Authorized use |
|---|---|---|---|
| A. Any byproduct material between atomic numbers 3 and 83 with exceptions | A. Any | A. 25 millicuries per radionuclide and 1 curie total | A. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009 (limited to any byproduct material that has a 10 CFR Part 20 Appendix C value of 100 microcuries or more). |
| B. Hydrogen-3 | B. Any | B. 4 curies total | B. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |

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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 | 9. Authorized use |
|---|---|---|---|
| C. Carbon-14 | C. Any | C. 9 curies total | C. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |
| D. Phosphorus-32 | D. Any | D. 100 millicuries total | D. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |
| E. Phosphorus-33 | E. Any | E. 100 millicuries total | E. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |
| F. Sulfur-35 | F. Any | F. 100 millicuries total | F. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |
| G. Iodine-125 | G. Any | G. 50 millicuries total | G. Research and development, as defined in Section 30.4 of 10 CFR Part 30, and distribution of research samples to specific licensees, as described in application dated February 25, 2009. |
| H. Any byproduct material between atomic numbers 3 and 83 | H. Sealed, Plated, or Foil Sources | H. 25 millicuries per source and 1 curie total | H. For use in analytical and measuring devices registered with the NRC pursuant to Section 32.210 of 10 CFR Part 32 or an Agreement State. |

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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 | 9. Authorized use |
|---|---|---|---|
| I. Carbon-14 | I. Pesticide Formulations | I. 30 millicuries total | I. For possession incident to disposal as waste products generated from studies involving C-14 labeled pesticide formulations conducted at Dow AgroSciences' U.S. field research stations and/or U.S. contract laboratories. |

CONDITIONS

10. A. Licensed material may be used or stored at Dow AgroSciences, LLC facilities located at 9330 Zionsville Road, Indianapolis, Indiana, which have been evaluated and approved by the licensee's Radiation Safety Committee.
    B. Carbon-14 labeled compounds may be used in field applications at the Dow AgroSciences, LLC, Midwest Field Research Station, 1736 N. 1200 E., Fowler, Indiana (Benton County) in accordance with letters referenced in application dated February 25, 2009.

11. The Radiation Safety Officer (RSO) for this license is Kevin P. Smith.

12. A. Licensed material shall only be used by, or under the supervision of, individuals designated by the Radiation Safety Committee, Nicholas (Nick) Irvine, Ph.D., Chairperson. The licensee shall maintain records of individuals designated as users for 3 years after the individual's last use of licensed material.

    B. Individuals authorized to use licensed material by the Radiation Safety Committee shall have as a minimum, training equivalent to Section 33.15(b) of Part 33 of Title 10 of the Code of Federal Regulations (CFR).

13. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the limits specified in 10 CFR 30.72 which require consideration of the need for an emergency plan for responding to a release of licensed material.

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14. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 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. In the absence of a registration certificate, sealed sources shall be tested for leakage and/or contamination at intervals not to exceed 6 months, or at such other intervals as specified.

B. Not withstanding Paragraph A of this Condition, sealed sources designed to primarily 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.

F. Tests for leakage and/or contamination, including leak test sample collection and analysis, shall be performed by the licensee or 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 becquerels (microcuries) and shall be maintained for 3 years.

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15. The licensee shall conduct a physical inventory every 6 months, or at other intervals approved by the U.S. Nuclear Regulatory Commission, to account for all sealed sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 3 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.

16. A. Detector cells containing a titanium tritide foil or 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 issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations from an Agreement State.

    B. When in use, detector cells containing a titanium tritide foil or scandium tritide foil shall be vented to the outside.

17. Sealed sources or detector cells containing licensed material shall not be opened or the foil sources removed from the detector cell by the licensee.

18. 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.

19. This license does not authorize commercial distribution of licensed material.

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20. The licensee shall not use the licensed material in or on humans.

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

22. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of unsealed byproduct material or readily dispersible source material to quantities less than 10E5 of the applicable limits in Appendix B of 10 CFR Part 30 as specified in 10 CFR 30.35(d).

23. The licensee is authorized to receive sealed containers of carbon-14 (C-14) waste material generated by contract laboratories performing research and field studies for the licensee provided:

    A. The waste material shall only be received at the licensee's Indianapolis, Indiana, Research and Development Facility;

    B. Only waste material that contains or is contaminated with C-14 that was originally provided to the contract laboratories by the licensee shall be received by the licensee. No materials (waste, or otherwise) from any other than the licensee's study shall be shipped to the licensee;

    C. In any calendar year, no more than 30 millicuries of C-14 waste material shall be returned to the licensee from contract laboratories; and,

    D. The licensee provides detailed instructions to the contract laboratories that: clearly indicate that the licensee will only accept waste materials that contain or are contaminated with radioactive materials supplied by the licensee; and that provide adequate instructions for complying with regulations for packaging and transport of licensed materials.

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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. 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. Application dated February 25, 2009 (excluding pages 2 and 4) (ML090610231)
    B. Letter dated July 22, 2009 (excluding the "Note" section concerning field studies) (ML092020525)
    C. Letter dated April 28, 2010 (ML101400573)
    D. Letter dated October 12, 2012 (ML12313A481)
    E. Letter dated November 13, 2012 (ML12334A040)
    F. Letter dated February 8, 2016 (ML16062A423)
    G. Letter dated February 19, 2016 (ML16062A429)
    H. Letter dated August 29, 2016 (ML16250A563)

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: November 16, 2016

By: _____
Cassandra F. Frazier
Region III