NRC FORM 374

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 May 02, 2018.	4. Expiration Date: August 31, 2022
1. E. I. du Pont de Nemours and Company, Inc. Experimental Station		5. Docket No.: 030-20681 Reference No.:
2. 200 Powder Mill Road PO Box 8352 Wilmington, DE 19803	3. License number: 07-13441-02	

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 with Atomic Numbers 1 through 83 with Exceptions	A. Any	A. 10 millicuries per radionuclide and 200 millicuries total	A. For research and development as defined in 10 CFR 30.4, including animal studies.
B. Hydrogen-3	B. Any	B. 20 curies total	B. For research and development as defined in 10 CFR 30.4, including animal studies.
C. Carbon-14	C. Any	C. 20 curies total	C. For research and development as defined in 10 CFR 30.4, including animal studies.
D. Phosphorus-32	D. Any	D. 1 curie total	D. For research and development as defined in 10 CFR 30.4, including animal studies.
E. Phosphorus-33	E. Any	E. 1 curie total	E. For research and development as defined in 10 CFR 30.4, including animal studies.

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F. Sulfur-35	F. Any	F. 5 curies total	F. For research and development as defined in 10 CFR 30.4, including animal studies.
G. Krypton-85	G. Any	G. 50 millicuries total	G. For research and development as defined in 10 CFR 30.4, including animal studies.
H. Iodine-125	H. Any	H. 1 curie total	H. For research and development as defined in 10 CFR 30.4, including animal studies.
I. Iodine-131	I. Any	I. 1 curie total	I. For research and development as defined in 10 CFR 30.4, including animal studies.
J. Iron-55	J. Sealed Sources (QSA Global, Model IEC.A1; Amersham/Searle, Model 696-696782, IEC, IEC.A1, and IEC.D1; DuPont, Model NER-460A; Eckert and Ziegler dba Isotope Products Laboratories, Model IEC.Dx series; Isotope Products, Model XFB; Texas Nuclear, Model 696-696782, 696-696803, and 696942)	J. 750 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U. S. Nuclear Regulatory Commission or an Agreement State	J. To be used for calibration of and/or sample analysis in x-ray analyzer, x-ray spectrophotometric, or x-ray fluorescence devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.

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K. Nickel-63	K. Foils (AEA Technology, Model custom; DuPont Merck, Model custom; Isotope Products Laboratories, Model custom; Radiochemical Centre Amersham, Model NBC)	K. 1 curie total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	K. To be used for sample analysis in gas chromatography devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.
L. Krypton-85	L. Sealed Sources (3M, Model 3B4G; AEA Technology, Model custom; DuPont Merck, Model custom; Isotope Products Laboratories, Model NER-8295, NER-8285, or NER-8275; Isotope Products, Inc., Model custom; Radiochemical Centre Amersham, Model NBC)	L. 200 millicuries and no single source to exceed the maximum activity specified in the certificate of registration issued by the U. S. Nuclear Regulatory Commission or an Agreement State	L. To be used for static charge elimination in devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.

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M. Cadmium-109	M. Sealed Sources (Amersham/Searle, Model CUC; DuPont, Model NER-465; Isotope Products Laboratories, Model XFB-3; QSA Global, Model CUC.D1 and CUC.P1; Texas Nuclear, Model 696-696782, 570-057371B, 570-57242B, 696-696782, and 696-696803)	M. 200 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	M. To be used for calibration of and/or sample analysis in x-ray analyzer, x-ray spectrophotometric, or x-ray fluorescence devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.
N. Cesium-137	N. Sealed Sources (3M, Model 4D6P, 4F6S, 4FST, and 4F6P; Amersham, Model CDC.711M, CDC.700, CDC.PE2, CDC.93, CDC.800, CKC.P1, and CKC.P4; Amersham/Searle, Model CDC.701; Gamma Industries, Model VDHP; Isotope Products Laboratory, Model GFS-3, 225, and A-3402)	N. 700 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	N. For use in Ronan, Model Nos. CS200 and SA1 fixed gauging devices for controlling industrial processes.

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O. Cesium-137	O. Sealed Sources (Amersham/Searle, Model CDC.701; Isotope Products Laboratory, Model GFS-3)	O. 50 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	O. For use in Ludlum Model No. 299 series portable gauging devices for measuring physical properties of materials.
P. Americium-241	P. Sealed Sources (Amersham/Searle, Model AMC and AMC.D1; DuPont Merck, Model NER-478; Isotope Products Laboratory, Model XFB-4, GFS, and XFB; Nuclear Radiation Developments (NRD), Model A-001; QSA Global, Model AMCL, AMM1001, and AMC.P4; Texas Nuclear, Model 696-696782, 696-696280, and 696-696803)	P. 500 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	P. To be used for calibration of and/or sample analysis in x-ray analyzer, x-ray spectrophotometric, or x-ray fluorescence devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.

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Q. Curium-244	Q. Sealed Sources (Amersham, Model CLCL; Isotope Products Laboratory, Model XFB)	Q. 200 millicuries total and no single source to exceed the maximum activity specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State	Q. To be used for calibration of and/or sample analysis in x-ray analyzer, x-ray spectrophotometric, or x-ray fluorescence devices that have been registered either with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with a Commission or Agreement State specific license authorizing distribution to persons specifically authorized by a Commission or Agreement State license to receive, possess, and use the devices.

CONDITIONS

10. A. Licensed material may be used or stored at the licensee's facilities located at:
A. Stine-Haskel Research Center, 1090 Elkton Road, Newark, Delaware, 19714
B. Experimental Station, 200 Powder Mill Road, Wilmington, Delaware, 19803
C. Chestnut Run Plaza, 4417 Lancaster Pike, Wilmington, Delaware, 19805

B. Licensed material in Items 6.J, 6.M, 6.P, and 6.Q may be used at temporary job sites of the licensee anywhere in the United States where the U.S. Nuclear Regulatory Commission maintains jurisdiction for regulating the use of licensed material, including areas of exclusive Federal jurisdiction within Agreement States. If the jurisdiction status of a Federal facility within an Agreement State is unknown, the licensee should contact the Federal agency controlling the job site in question to determine whether the proposed job site is an area of exclusive Federal jurisdiction. Authorization for use of radioactive materials at job sites in Agreement States not under exclusive Federal jurisdiction shall be obtained from the appropriate state regulatory agency.

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11. A. Licensed material shall only be used by, or under the supervision of, individuals designated, in writing, by the Radiation Safety Committee. The licensee shall maintain records of individuals designated as users for 3 years after the individual's last use of licensed material.

    B. Licensed material listed in Items.6.J, 6.K, 6.L, 6.M, 6.P, and 6.Q shall only be used by, or under the supervision of, individuals who have received the training described in the application dated April 21, 2012, Revision 2 (July 26, 2012), and have been designated in writing by the Radiation Safety Officer. The licensee shall maintain records of individuals designated as users for 3 years following the last use of licensed material by the individual.

12. The Radiation Safety Officer (RSO) for this license is John M. Brisbin.

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

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

15. Experimental animals, or the products from experimental animals, that have been administered licensed material shall not be used for human consumption.

16. 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.

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C. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to any use or transfer as a sealed source.

D. 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.

E. 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.

F. 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.

G. The leak test shall be capable of detecting the presence of 185 becquerels (0.005 microcuries) of radioactive material on the test sample. If the test reveals the presence of 185 becquerels (0.005 microcuries) 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.

H. 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.

I. Records of leak test results shall be kept in units of becquerels (microcuries) and shall be maintained for 3 years.

17. Sealed sources, source rods, foil sources, or detector cells containing licensed material shall not be opened or sources removed from source holders or detached from source rods, or foil sources removed from detector cells by the licensee, except as specifically authorized.

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18. 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.

19. 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 U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

20. 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.

21. A. Each gauge shall be tested for the proper operation of the on-off mechanism (shutter) and indicator, if any, at intervals not to exceed 6 months or at such longer intervals as specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or the equivalent regulations of an Agreement State.

    B. Notwithstanding the periodic on-off mechanism (shutter) and indicator test, the requirement does not apply to gauges that are stored, not being used, and have the shutter lock mechanism in a locked position. The gauges exempted from this periodic test shall be tested before use. Records of test results shall be maintained for 3 years from the date of each test.

22. The following services shall not be performed by the licensee: installation, initial radiation surveys, relocation, removal from service, dismantling, alignment, replacement, disposal of the sealed sources, and non-routine maintenance or repair of components related to the radiological safety of the gauge. These services shall be performed only by persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

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23. The licensee may initially mount a gauge, if permitted by the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State, and under the following conditions:

    A. The gauge must be mounted in accordance with written instructions provided by the manufacturer.

    B. The gauge must be mounted in a location compatible with the Conditions of Normal Use and Limitations and/or Other Considerations of Use in the certificate of registration issued by the U.S. Nuclear Regulatory Commission or an Agreement State.

    C. The on-off mechanism (shutter) must be locked in the off position, if applicable, or the source must be otherwise fully shielded.

    D. The gauge must be received in good conditions (e.g., the package was not damaged).

    E. The gauge must not require any modification to fit in the proposed location.

    F. Mounting does not include electrical connection, activation, or operation of the gauge. The source must remain fully shielded, and the gauge may not be used until it is installed and made operational by a person specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such operations.

24. A. The licensee may maintain, repair, or replace device components that are not related to the radiological safety of the device containing licensed material and that do not result in the potential for any portion of the body to come into contact with the primary beam or result in increased radiation levels in accessible areas.

    B. The licensee may not maintain, repair, or replace any of the following device components: the sealed source, the source holder, source drive mechanism, on-off mechanism (shutter), shutter control, shielding, or any other component related to the radiological safety of the device, except as provided otherwise by specific condition of this license.

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25. Prior to initial use and after installation, relocation, dismantling, alignment, or any other activity involving the source or removal of the shielding, the licensee shall assure that a radiological survey is performed to determine radiation levels in accessible areas around, above, and below the gauge with the shutter open. This survey shall be performed only by persons authorized to perform such services by the U.S. Nuclear Regulatory Commission or an Agreement State.

26. The licensee shall operate each device containing licensed material within the manufacturer's specified temperature and environmental limits such that the shielding and shutter mechanism of the source holder are not compromised.

27. The licensee shall assure that the shutter mechanism of each device containing licensed material is locked in the closed position during periods when a portion of an individual's body may be subject to the direct radiation beam. The licensee shall review and modify, as appropriate, it's "lock-out" procedures whenever a new device is obtained to incorporate the device manufacturer's recommendations.

28. 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 or storage, or when not under the direct surveillance of an authorized user.

29. Any cleaning, maintenance, or repair of the gauge(s) that requires detaching the source or source rod from the gauge shall be performed only by the manufacturer or by other persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

30. 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.

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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.

31. 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 of Table II, in Appendix B of 10 CFR Part 20.

32. Pursuant to 10 CFR 20.2002, the licensee may dispose of incinerator ash containing radioactive materials with Atomic Nos. 1 through 83, except as identified below, as ordinary waste in a landfill, provided that the concentration of radionuclides (in microcuries per gram of ash) at the time of disposal are no greater than the values of Table II, Column 2 in Appendix B of 10 CFR Part 20. For hydrogen-3, carbon-14, aluminum-26, chlorine-36, silver-108m, niobium-94, iodine-129, technetium-99, and thallium-204, the concentration can be no greater than one-tenth of the value of Table II, Column 2 in Appendix B of 10 CFR Part 20. If more than one radionuclide is present in the ash, the sum of fractions rule applies.

33. Notwithstanding 10 CFR 20.2001, the licensee may dispose of hydrogen-3 and carbon-14 in plant and soil material as normal waste, if the plant and soil material contains less than 0.002 microcurie per gram averaged over the weight of the plant and soil material, and the quantity per disposal does not exceed 100 microcuries for hydrogen-3 and 10 microcuries for carbon-14.

34. Notwithstanding the requirements of License Condition 36, the licensee is authorized to make program changes and changes to procedures specifically identified in the condition, which were previously approved by the U.S. Nuclear Regulatory Commission and incorporated into the license without prior Commission approval as long as:

A. The proposed revision is documented, reviewed, and approved by the licensee's Radiation Safety Committee in accordance with established procedures prior to implementation;

B. The revised program is in accordance with regulatory requirements, will not change the license conditions, and will not decrease the effectiveness of the Radiation Safety Program;

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C. The licensee's staff is trained in the revised procedures prior to implementation; and

D. The licensee's audit program evaluates the effectiveness of the change and its implementation.

35. 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 dated March 15, 2002 (ML020800049)

B. Letter dated July 26, 2012 with the application dated April 27, 2012, Revision 2 (July 26, 2012) (ML12223A045)

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: February 13, 2019

By: _____

Stephen Hammann
Region 1