

## MATERIALS LICENSE

Amendment No. 14

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, 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. Virginia Polytechnic Institute  
and State University

2. Blacksburg, Virginia 24061

In accordance with application dated  
May 15, 19873. License number 45-09475-30 is amended  
in its entirety to read as follows:

4. Expiration date June 30, 1992

5. Docket or  
Reference No. 009-113136. Byproduct, source, and/or  
special nuclear material7. Chemical and/or physical  
form8. Maximum amount that licensee  
may possess at any one time  
under this licenseA. Any byproduct material  
with atomic numbers  
3 through 83

A. Any

A. Not to exceed 250  
millicuries per  
radionuclide and 5  
curies total except:  
Carbon 14 - 1 curie

B. Hydrogen 3

B. Any

B. curies

C. Uranium 235

C. Any

C. 100 milligrams

D. Molybdenum 99/  
technetium 99mD. Aqueous solution in  
generatorsD. 1 curie of each  
radionuclide

E. Technetium 99m

E. Any

E. 1 curie

F. Cobalt 60

F. Sealed sources

F. Not to exceed 10  
millicuries per source  
and 30 millicuries  
total

G. Americium 241

G. Sealed sources

G. Not to exceed 1 curie  
per source and 10  
curies total

H. Cesium 137

H. Sealed sources

H. Not to exceed 500  
millicuries per source  
and 5 curies total

I. Strontium 90

I. Sealed sources

I. Not to exceed 5  
millicuries per source  
and 25 millicuries  
total8801220077 870714  
REG2 LIC30  
45-09475-30 PDR

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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 |
| J. Nickel 63  | J. Foils or plated sources in detector cells | J. Not to exceed 20 millicuries per source or foil and 500 millicuries total   |
| K. Krypton 85   | K. Sealed sources                            | K. Not to exceed 10 millicuries per source and 25 millicuries total            |
| L. Uranium 235  | L. Encapsulated as fission foils             | L. 12 grams  |
| M. Plutonium 239                                      | M. Encapsulated as fission foils             | M. 15 grams  |
| N. Plutonium 239                                      | N. Sealed neutron source                     | N. 81 grams  |
| O. Plutonium 239                                      | O. Plated alpha source                       | O. 0.1 microcurie  |

## 9. Authorized use

- A. and B. For use in research and development as defined in 30.4(q), 10 CFR Part 30 and for educational purposes.
- C. Tracer studies in minerals and rocks.
- D. Elution of technetium 99m as pertechnetate.
- E. Diagnostic studies in animals at the Veterinary Hospital.
- F. For use in the calibration of instruments and for use as check sources.
- G. For storage only or used as instrument calibration sources, in density/moisture gauges and x-ray fluorescence devices and for use in other research and educational programs.
- H. For use in the calibration of instruments, in density/moisture gauges and for use in other research and educational programs.
- I. For use in the calibration of instruments and as check sources.
- J. For use in gas chromatographs for sample analysis.
- K. and L. For storage only.
- M. For storage only or used as instrument calibration sources or for use in research and educational programs.

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## CONDITIONS

10. Licensed material may be used at locations and in facilities authorized by the licensee's Radiation Safety Committee at the Virginia Polytechnic Institute and State University, Blacksburg, Virginia; at the University of Virginia Mountain Lake Biological Station, Giles County Virginia; and 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.
11. A. Licensed material shall be used by, or under the supervision of, individuals designated by the licensee's Radiation Safety Committee, A. Keith Furr, Chairman.
- B. The Radiation Protection Officer for the activities authorized by this license is Douglas C. Smiley.
12. A. (1) Each sealed source acquired from another person and containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for contamination and/or leakage before use. In the absence of a certificate from a transferor indicating that a test has been made within 6 months before the transfer, a sealed source received from another person shall not be put into use until tested.
- (2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting materials or 10 microcuries or less of alpha emitting material.
- (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage before any use or transfer to another person unless they have been leak tested within 6 months before the date of use or transfer.
- B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.
- C. Each sealed source containing licensed material, other than hydrogen 3, with a half-life greater than 30 days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed 6 months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed 3 months.

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- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission. Records may be disposed of following Commission inspection.
- E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within 5 days of the date the leak test result is known with the U. S. Nuclear Regulatory Commission, Region II, Division of Radiation Safety and Safeguards, Nuclear Material Safety Section, 101 Marietta Street, Suite 2900, Atlanta, Georgia 30323, describing the equipment involved, the test results, and the corrective action taken.
13. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), of 10 CFR Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.
14. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.
15. Detector cells containing scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 325 degrees Centigrade.
16. Pursuant to Title 10, Chapter 1, Code of Federal Regulations, Part 40, 'Domestic Licensing of Source Material,' the licensee is authorized to possess, use, transfer, and import up to 999 kilograms of depleted uranium contained as shielding material in the molybdenum-99/technetium-99m generators authorized by this license.
17. The licensee may transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
18. The licensee is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal in ordinary trash provided:
- A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.



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- B. Before disposal as normal waste, radioactive waste shall be surveyed to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
- C. Generator columns shall be segregated so that they may be monitored separately to ensure decay to background levels prior to disposal.
19. Licensed material shall not be used in or on human beings.
20. 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 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 May 15, 1987  
B. Letter dated June 23, 1987

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

PAUL R. GUINN

Date JUL 14 1987

By

*Paul R. Guinn*  
Region II, Nuclear Materials  
Safety Section  
101 Marietta Street, Suite 2900  
Atlanta, GA 30323