



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

September 18, 2007

Department of the Interior
Geological Survey, Western Region
ATTN: Daniel J. Cain
Radiation Safety Officer
345 Middlefield Road, MS 465
Menlo Park, CA 94025-3561

SUBJECT: LICENSE AMENDMENT

Please find enclosed Amendment No. 50 to License No. 04-06674-07 **authorizing the use of U-232 in sample analysis of rocks and minerals as requested in your letter dated September 7, 2007.** An environmental assessment for this action is not required, since this action is categorically excluded under 10 CFR 51.22(c)(14)(v). You should review this license carefully and be sure that you understand all conditions. If you have any questions, you may contact me at 817-860-8189.

NRC expects licensees to conduct their programs with meticulous attention to detail and a high standard of compliance. Because of the serious consequences to employees and the public that can result from failure to comply with NRC requirements, you must conduct your radiation safety program according to the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate by NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Notify NRC in writing of any change in mailing address.
3. By 10 CFR 30.36(d) and/or license condition, notify NRC, promptly, in writing, and request termination of the license:
 - a. When you decide to terminate all activities involving materials authorized under the license whether at the entire site or any separate building or outdoor area;
 - b. If you decide not to acquire or possess and use authorized material; or
 - c. When no principal activities under the license have been conducted for a period of 24 months.
4. Request and obtain a license amendment before you:
 - a. Change Radiation Safety Officers;

- b. Order byproduct material in excess of the amount, radionuclide or form authorized on the license;
 - c. Add or change the address(es) of use identified on the license; or
 - d. Change the name or ownership of your organization.
5. Submit a complete renewal application or termination request at least 30 days before the expiration date on your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of radioactive material after your license expires is a violation of NRC regulations.

NRC will periodically inspect your radiation safety program. Failure to conduct your program according to NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC may result in enforcement action against you. This could include issuance of a notice of violation; imposition of a civil penalty; or an order suspending, modifying, or revoking your license as specified in the Enforcement Policy. The NRC Enforcement Policy is available on the following internet address: <http://www.nrc.gov/what-we-do/regulatory/enforcement/enforc-pol.pdf>.

The NRC no longer publishes the NRC Rules and Regulations loose leaf supplements. However, an electronic version of the NRC's regulations is available on the NRC Web site at www.nrc.gov. To view these regulations, highlight "Electronic Reading Room" and choose "Regulations" on the drop down menu. An electronic version of the NUREG-1556 Series publications is also available on the NRC Web site. To view these guidance documents, highlight "Electronic Reading Room"; choose "All Collections" on the drop down menu; choose "NUREGS (NRC Reports)"; and select "Publications Prepared by the NRC Staff". Then, choose "NUREG-1556" from the table and select the appropriate volume(s) for your license type.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Thank you for your cooperation.

Sincerely,

/RA/

Roberto J. Torres, Senior Health Physicist
Nuclear Materials Licensing Branch

Docket: 030-13620
License: 04-06674-07
Control: 471503

Enclosure: As stated

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.

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| <p style="text-align: center;">Licensee</p> <p>1. Department of the Interior Geological Survey, Western Region</p> <p>2. 345 Middlefield Road, MS 465 Menlo Park, California 94025-3561</p> | <p>In accordance with facsimile dated September 7, 2007</p> <p>3. License number 04-06674-07 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date April 30, 2015</p> <hr/> <p>5. Docket No. 030-13620 Reference No.</p> |
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| <p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Any byproduct material with atomic numbers 3 through 83, except for Strontium-90 and Iodine-129</p> <p>B. Hydrogen-3</p> <p>C. Carbon-14</p> <p>D. Phosphorus-32</p> <p>E. Sulphur-35</p> <p>F. Uranium-235</p> <p>G. Uranium-235</p> <p>H. Nickel-63</p> <p>I. Americium-241</p> <p>J. Lead-205</p> | <p>7. Chemical and/or physical form</p> <p>A. Any</p> <p>B. Any</p> <p>C. Any</p> <p>D. Any</p> <p>E. Any</p> <p>F. Any</p> <p>G. NBS standards</p> <p>H. Foils or plated sources (Isotope Products Laboratory, Model NER-004; Amersham Model NBC; or Nuclear Radiation Development Model N-1001)</p> <p>I. Any</p> <p>J. Any</p> | <p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. Not to exceed 25 millicuries per radionuclide or 2 curies total</p> <p>B. 200 millicuries</p> <p>C. 200 millicuries</p> <p>D. 100 millicuries</p> <p>E. 50 millicuries</p> <p>F. 20 microcuries</p> <p>G. 15 microcuries</p> <p>H. 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> <p>I. 1 microcurie</p> <p>J. 1 microcurie</p> |
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| <p>6. Byproduct, source, and/or special nuclear material</p> <p>K. Cesium-137</p> <p>L. Uranium-233</p> <p>M. Uranium-236</p> <p>N. Thorium-228</p> <p>O. Thorium-229</p> <p>P. Uranium-232</p> | <p>7. Chemical and/or physical form</p> <p>K. Sealed source (Isotope Products Laboratories Model HEG-XXX-Series, formerly Model 225)</p> <p>L. Any</p> <p>M. Any</p> <p>N. Any</p> <p>O. Any</p> <p>P. Any</p> | <p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>K. 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> <p>L. 20 microcuries</p> <p>M. 20 microcuries</p> <p>N. 20 microcuries</p> <p>O. 20 microcuries</p> <p>P. 20 microcuries</p> |
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9. Authorized use

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| <p>A. through G. and L.</p> <p>H.</p> <p>I.</p> <p>J.</p> <p>K.</p> <p>M. through P.</p> | <p>Research and development as defined in 10 CFR 30.4; animal studies.</p> <p>For use in gas chromatographs for sample analysis.</p> <p>For instrument calibration.</p> <p>For use in sample analysis of rocks and minerals.</p> <p>For use in Schultheiss Geotek Multi-Sensor Whole Core Logger for measurement of the density of marine sediment cores.</p> <p>For use in sample analysis of rocks and minerals.</p> |
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CONDITIONS

10. Licensed material may be used at the facilities of the licensee located at:
- A. 345 Middlefield Road, Menlo Park, California.
 - B. Licensed material described in Item 6.L. may also be used aboard USGS research vessels, or other vessels whose owners have granted authorization in writing prior to transfer of the licensed material to the vessel.

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- C. Temporary job sites of the licensee anywhere in the United States and aboard USGS vessels, or other vessels whose owners have granted authorization in writing prior to transfer of the licensed material to the vessel for sealed sources and a maximum of 5 millicuries each of hydrogen-3, carbon-14, phosphorus-32, phosphorus-33, sulphur-35, iron-59, copper-64, zinc-65, arsenic-73, selenium-75 and mercury-203.
11. A. Licensed material shall only be used by or under the supervision of individuals designated in writing by the Radiation Safety Committee, Daniel J. Cain, Chairman.
- B. The Radiation Safety Officer for this license is Daniel J. Cain.
12. Licensed material shall not used in or on human beings.
13. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
14. Experimental animals, or the products from experimental animals, that have been administered licensed materials shall not be used for human consumption.
15. This license does not authorize commercial distribution of licensed material.
16. A. Sealed sources 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 under equivalent regulations of an Agreement State.
- B. Notwithstanding 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. 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 under equivalent regulations of 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.

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- 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 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. 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, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Materials Safety. The report shall specify the source or detector cell involved, the test results, and corrective action taken.
- H. Tests for leakage and/or contamination, including leak test sample collection and analysis, 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.
- I. Records of leak test results shall be kept in units of microcuries and shall be maintained for 3 years.
17. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
18. The licensee shall not acquire licensed material in a sealed source or device unless the source or device has been registered with the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.210 or equivalent regulations of an Agreement State.
19. The licensee shall conduct a physical inventory every six months to account for all sealed sources and devices containing licensed material received and possessed under the license.
20. 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.
21. 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.

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22. 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:
- 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
 - Removes or obliterates all radiation labels, except for radiation labels on materials that are within containers and that will be managed as ordinary waste after they have been released from the licensee; and
 - 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.
23. Radioactive waste generated shall be stored and disposed in accordance with the statements, representations, and procedures included in the Radiation Safety Manual described in the licensee's application dated November 24, 2004.
24. 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."
25. Each source holder or logging tool containing radioactive material shall bear a legible and visible marking as specified in 10 CFR 39.31(a). The label must be on the smallest component that contains the licensed material which is transported as a separate piece of equipment.
26. The licensee shall not vacate or release a field office or storage location whose address is identified in Condition 10 for unrestricted use, without prior U.S. Nuclear Regulatory Commission approval. Reports of residual levels of facility contamination or other information concerning facility status may be required.
27. Individuals involved in operations which utilize, at any one time, more than 100 millicuries of hydrogen-3 in a non-contained form, other than metallic foil, shall have bioassays performed within one week following a single operation and at early intervals for continuing operations.
28. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of unsealed byproduct material to quantities less than 10^5 as specified in 10 CFR 30.35(d).
29. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of special nuclear material to quantities less than 10^4 as specified in 10 CFR 70.25(d).
30. 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 that require consideration of the need for an emergency plan for responding to a release of licensed material.

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31. 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 November 24, 2004 (ML043630424)
- B. Letter dated March 24, 2005 (ML051040213)
- C. Letter dated April 4, 2005 (ML051040213)
- D. Letter dated April 13, 2005 (ML051040213)



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/Date: September 18, 2007By: _____
Roberto J. Torres, Senior Health Physicist
Nuclear Materials Licensing Branch
Region IV
Arlington, Texas 76011