



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

June 8, 2008

University of Alaska Fairbanks
Environmental Health, Safety and Risk Management
ATTN: Tracey Martinson, Ph.D.
Radiation Safety Officer
P.O. Box 758145
Fairbanks, AK 99775-8145

SUBJECT: LICENSE AMENDMENT AND REQUEST FOR ADDITIONAL INFORMATION

Please find enclosed Amendment No. 49 to NRC License No. 50-02430-07. This license amendment authorizes the possession-only of the incinerator located in the Arctic Health Research Building (AHRB) in License Condition 10.G. This incinerator has been taken out of service pending dismantlement and decommissioning, at some time in the future. Please recognize that in accordance with 10 CFR 30.36(d), if the licensee permanently ceases principal activities in a separate building, then the licensee must submit a decommissioning plan within 12 months of the notification that principal activities have ceased. Please clarify to this office within 30 days of receipt of this letter, whether any other principal activities continue to be conducted in the Arctic Health Research Building, other than the storage of the incinerator.

The NRC has also reviewed the licensee's revised Appendix F, "Conditions of Incineration" which was submitted as an enclosure to your letter dated March 3, 2008, for a new incinerator located at the Biological Research & Diagnostic Facility. The NRC review compared the licensee's submittal to the guidance provided in Appendix V of NUREG-1556, Volume 11, "Program Specific Guidance About Licensees of Broad Scope" and the NRC Policy and Guidance Directive 8-10, "Disposal of Incineration Ash as Ordinary Waste." Based on the NRC review, the following deficiencies were identified. Please provide a response within 30 days from the date of this letter, so that the NRC can continue its review of your request.

1. Please clarify whether the incinerator airflow rate is 2.3 cm^3 as specified in your cover letter or 2.3 m^3 as specified in Appendix F.
2. The revised Appendix F states in part under item (2) "Concentrations of Radioactive Materials Released" that the quantity of a radioactive material in the proposed incinerator waste will be determined by the 1% contamination rule. The NRC Policy and Guidance Directive 8-10, states that the licensee may determine the average concentration of licensed materials in the ash for tritium, by assuming that all the tritium that was in the incinerator feed is converted to $^3\text{H}_2\text{O}$ and released via the stack as an air effluent with none remaining in the ash. In addition, the licensee may assume that 5 percent of the ^{14}C contained in the incinerator feed remains in the ash, with the balance being converted to $^{14}\text{CO}_2$ and released via the stack as an air effluent. Please revise your Appendix F to reflect the average concentration of licensed material in the ash as based in the generic dose assessment for disposal of incinerator ash in a landfill as documented in the NRC Policy and Guidance Directive 8-10, which ensures compliance with the ash release limits.

3. Dilution of incinerator ash produced from incineration of waste containing licensed material with ash from non-radioactive burns prior to determination of compliance with the release limits is not permitted. The concentrations required to show compliance must be determined prior to mixing with other materials for disposal. The reason for this position is that the generic studies on which the NRC policy is based assume a certain total activity being disposed annually in a landfill. Permitting dilution with clean waste before showing compliance with the release limits could increase the total activity received by the landfill by a substantial margin, thereby invalidating the NRC generic study. The NRC reviewed the calculations in the revised Appendix F. It appears that the incinerator operational period was based on the total operation of the incinerator on an annual basis, in lieu of the operational period for radioactive waste only. Please calculate the average concentration in stack effluent for the period of incinerating radioactive wastes only. Additionally, please clarify whether the burn period is 24 hours or 3 days (72 hours).
4. Pursuant to 10 CFR 20.2002, licensees may dispose of incinerator ash containing radioactive materials with Atomic Nos. 1-83, except those noted as ordinary waste in a landfill, provided the concentrations of the radionuclides at the time of disposal, when expressed in units of uCi per gram of ash, are numerically no greater than the values in Table II, Column 2, 10 CFR Part 20. However, for hydrogen-3 and carbon-14, the corresponding disposal limits are 10 percent of the values listed in Table II, Column 2, 10 CFR Part 20. Therefore, tritium has an annual limit of 100 pCi/g and carbon-14 has an annual limit of 3 pCi/g. In applying the liquid effluent values to solid ash, NRC equated uCi/ml to uCi/g. The technical basis for this approach was that a milliliter of water has a mass of about 1 gram. In addition, the effluent concentration values in Appendix B, Table II, Column 2, were generally established based on the assumption that a member of the public would not receive an annual whole body (or organ) dose equivalent in excess of 0.5 mrem if that individual ingested two liters of drinking water per day, with the radionuclide at the stated concentration. Using this approach, ingesting two liters drinking water per day was assumed to be roughly the equivalent of ingesting 2000 g of ash a day. Because the likelihood of such ingestion occurring was considered extremely remote, NRC believed that applying the Appendix B values for release of ash would ensure adequate protection of the public. Please recalculate the value for tritium and carbon-14 to include: (1) concentration of radioactivity averaged over the weight of the material to be incinerated (microcuries per gram of waste medium); (2) total radioactivity of each isotope per burn, and (3) total number of burns per year, based on an annual limit of 100 pCi/g and 3 pCi/g, respectively.
5. Please state how the concentration of radionuclides released, both as airborne effluent and as any liquid effluent from scrubbers, condenser, or associated systems, will be measured or otherwise determined. Describe any stack monitoring that is planned.
6. The revised Appendix F procedure for handling ash residue details the use of a G-M type survey meter to survey the ash. Please describe the purpose of the G-M type survey meter since it does not have the detection capability for tritium and carbon-14 radioisotopes.

Please reference the license number, document number and control number below in your response. If you have any questions regarding this request, please contact me at (817) 276-6552.

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,

A handwritten signature in cursive script that reads "Rachel S. Browder".

Rachel S. Browder, Health Physicist
Nuclear Materials Safety Branch B

Docket: 030-01179
License: 50-02430-07
Control: 471736

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.

Licensee	In accordance with letter dated March 3, 2008
1. University of Alaska Fairbanks Environmental Health, Safety, and Risk Management	3. License number 50-02430-07 is amended in its entirety to read as follows:
2. 1000 University Avenue, Room 155 P.O. Box 758145 Fairbanks, Alaska 99775-8145	4. Expiration date March 31, 2010
	5. Docket No. 030-01179 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
A. As specified in 10 CFR 33.100, Schedule A (Type B Broad Scope)	A. Any	A. See Condition 12
B. Cobalt-60	B. Sealed source (ICN Chemical and Radioisotope Division)	B. 100 microcuries total.
C. Hydrogen-3	C. Foils contained in electron capture detectors	C. 200 microcuries total.
D. Nickel-63	D. Foils contained in electron capture detectors	D. 120 microcuries total.
E. Cesium-137	E. Sealed source (Mount Sorpris Model GC375)	E. 5 millicuries total.
F. Americium-241	F. Sealed source (Mount Sorpris Model NN976)	F. 1 curie total.
G. Americium-241	G. Sealed source (Campbell Pacific Nuclear CPN-131)	G. 50 millicuries total.
H. Cesium-137	H. Sealed source (Campbell Pacific Nuclear CPN-131)	H. 10 millicuries total.
I. Cesium-137	I. Sealed source (Isotope Products Laboratories Model HEG-137-30)	I. 60 millicuries total. Not to exceed 30 millicuries per source

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Amendment No. 49

9. Authorized Use:

- A. Research and development as defined in 10 CFR 30.4. In vitro and in vivo studies in plants and animals
- B. For calibration of the licensee's survey instruments.
- C. and D. For use in gas chromatographs for sample analysis
- E. and F. For storage only.
- G. and H. For storage only.
- I. For calibration of the licensee's survey instruments and for physics laboratory demonstrations.

CONDITIONS

10. A. Licensed material shall be used only at the licensee's facilities located at

- 1. University of Alaska, Fairbanks Campus, Fairbanks, Alaska
 - 2. University of Alaska, Seward Marine Center, 201 Railway Avenue, Seward, Alaska
 - 3. Alaska Sealife Center, 301 Railway Avenue, Seward, Alaska
 - 4. Large Animal Research Station, Mile 1, Yankovich Road, Fairbanks, Alaska
 - 5. Toolik Lake Field Station, North Slope Borough, Alaska
- B. Licensed material described in Items C., D., G., and H., may also be used anywhere in the State of Alaska and at temporary job sites of the licensee where the U.S. Nuclear Regulatory Commission maintain jurisdiction for regulating the use of licensed material under the following conditions:
- 1. Specific approval is given by the University of Alaska Fairbanks Radiation Safety Officer.
 - 2. The licensee obtains written permission to use radioactive materials at the proposed site from the appropriate authorities (or persons) who maintain administrative control over the property.
- C. Hydrogen-3 and carbon-14 may be used at the Large Animal Research Station, Fairbanks, Alaska, as described in the application dated August 26, 1999, for studies of metabolism and body processes of reindeer/caribou (*Rangifer tarandus*) and muskoxen (*Ovibos moschatus*).
- D. Carbon-14 may be used at the Toolik Lake Field Station, North Slope Borough, Alaska, in accordance with letters dated June 27, 2000, April 16, 2001, and December 1, 2001.
- E. Licensed material described in Items A. and D. may be used aboard the R/V Alpha Helix, home port at the University of Alaska, Seward Marine Center, Seward, Alaska.
- F. Hydrogen-3 may be used on St. Paul Island and Bogoslof Island, Alaska, in accordance with the letter dated March 21, 2005.
- G. The incinerator for hydrogen-3 and carbon-14 located at the Arctic Health Research Building as described in Appendix F to letter dated March 10, 2000, has been taken out of service pending dismantlement and decommissioning of the incinerator.

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11. A. Licensed materials shall only 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 Tracey Martinson, Ph.D.
12. For Item 8.A, 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.
13. This license does not authorize disposal of licensed material at sea.
14. 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. 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.
- C. Sealed sources need not be leak 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 no more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material.
- D. 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.
- E. 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, 612 E. Lamar Blvd., Suite 400, Arlington, Texas 76011, ATTN: Director, Division of Nuclear Materials Safety. The report shall specify the source involved, the test results, and corrective action taken.

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- F. Tests for leakage and/or contamination, limited to leak test sample collection, 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.
- G. Records of leak test results shall be kept in units of microcuries and shall be maintained for 3 years.
15. 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.
16. 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, unless the cells are used in a mobile laboratory situation in the field.
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. This license does not authorize commercial distribution of licensed material.
20. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific conditions of this license.
21. 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."
22. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
23. The licensee shall not acquire licensed material in a sealed source or device that contains a sealed source unless the source or device has been registered with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.
24. The licensee shall conduct a physical inventory every 6 months to account for all sealed sources and/or devices received and possessed under the license.
25. In addition to the possession limits in item 8, the licensee shall further restrict the possession of unsealed byproduct materials to quantities less than 10^4 of the applicable limits in Appendix B of 10 CFR Part 30, as specified in 10 CFR 30.35(d).

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26. The licensee is authorized to hold radioactive material with a physical half-life of less than 120 days for decay-in-storage before disposal in ordinary trash provided:
- 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
 - 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.
27. Radioactive waste generated shall be stored in accordance with the statements, representation, and procedures included with the waste storage plan described in the licensee's application dated August 26, 1999, and letter dated March 10, 2000.
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, storage, or when not under the direct surveillance of an authorized user.
29. Upon completion of each carbon-14 field study identified in License Condition 10.D., the licensee shall notify the NRC Region IV office identified in 10 CFR 30.6 and submit a copy of the baseline and final decommissioning surveys of the affected subplots.

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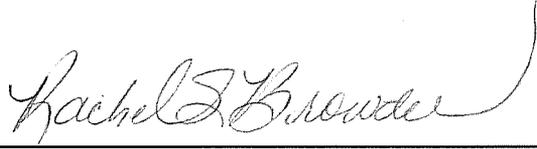
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30. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The U.S. Nuclear 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 August 26, 1999
 - B. Letter dated March 10, 2000
 - C. Letter dated April 18, 2000
 - D. Letter dated June 27, 2000
 - E. Letter dated April 16, 2001
 - F. Letter dated December 1, 2001
 - G. Letter dated March 21, 2005

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: June 8, 2008

By: _____


Rachel S. Browder, Health Physicist
Nuclear Materials Safety Branch B
Region IV
Arlington, Texas