

# WESTERN MICHIGAN UNIVERSITY



Office of the Vice President for Research

November 23, 2011

Materials Licensing Branch  
United States Nuclear Regulatory Commission  
Region III  
2443 Warrenville Road Ste 210  
Lisle, Illinois 60532-4352

Dear Sir or Madam:

The following is a request for a renewal of NRC Material Licenses No. 21-03336-10, a Limited Scope for Education and Research license issued to Western Michigan University (WMU). License No. 21-03336-10 expires December, 2011.

This application does not contain any new or major changes to WMU's Radiation Safety Program. The materials use, storage, and security has been within the safety standards set forth in the regulations.

Please refer any questions or concerns with this amendment request to Mr. John G. Center, Radiation Safety Officer, at (269) 387-5933 or FAX (269) 387-5888.

Sincerely,

Daniel M. Litynski  
Vice President for Research

Enclosures: NRC Form 313 Application For Material License 21-0336-10  
Associated documents required for the license renewal application

Walwood Hall, Kalamazoo, MI 49008-5456  
PHONE: (269) 387-8298 FAX: (269) 387-8264

RECEIVED DEC 05 2011

<b>NRC FORM 313</b> (3-2009) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>APPROVED BY OMB: NO. 3150-0120</b>	<b>EXPIRES: 3/31/2012</b>						
<b>APPLICATION FOR MATERIALS LICENSE</b>		Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to <a href="mailto:infocollects.resource@nrc.gov">infocollects.resource@nrc.gov</a> , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.							
<b>INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.</b>									
<b>APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:</b>  OFFICE OF FEDERAL & STATE MATERIALS AND ENVIRONMENTAL MANAGEMENT PROGRAMS DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20555-0001  <b>ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:</b>  <b>IF YOU ARE LOCATED IN:</b>  ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:  LICENSING ASSISTANCE TEAM DIVISION OF NUCLEAR MATERIALS SAFETY U.S. NUCLEAR REGULATORY COMMISSION, REGION I 475 ALLENDALE ROAD KING OF PRUSSIA, PA 19406-1415		<b>IF YOU ARE LOCATED IN:</b>  ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:  MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION III 2443 WARRENVILLE ROAD, SUITE 210 LISLE, IL 60532-4352  ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:  NUCLEAR MATERIALS LICENSING BRANCH U.S. NUCLEAR REGULATORY COMMISSION, REGION IV 612 E. LAMAR BOULEVARD, SUITE 400 ARLINGTON, TX 76011-4125							
<b>PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.</b>									
1. THIS IS AN APPLICATION FOR (Check appropriate item)  <input type="checkbox"/> A. NEW LICENSE  <input type="checkbox"/> B. AMENDMENT TO LICENSE NUMBER _____  <input checked="" type="checkbox"/> C. RENEWAL OF LICENSE NUMBER <u>21-03336-10</u>		2. NAME AND MAILING ADDRESS OF APPLICANT (Include ZIP code)  <b>Western Michigan University</b> <b>Office of the Vice President for Research</b> <b>1903 West Michigan Avenue</b> <b>Kalamazoo, MI 49008</b>							
3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED  <b>Western Michigan University Campus</b> <b>1903 West Michigan Avenue</b> <b>Kalamazoo, MI 49008</b>		4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION  <b>John G. Center</b>  TELEPHONE NUMBER  <b>(269) 387-5933</b>							
SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.									
5. RADIOACTIVE MATERIAL a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.		6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.							
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.		8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.							
9. FACILITIES AND EQUIPMENT.		10. RADIATION SAFETY PROGRAM.							
11. WASTE MANAGEMENT.		12. LICENSE FEES (See 10 CFR 170 and Section 170.31) <table style="width: 100%;"> <tr> <td style="width: 70%;">FEE CATEGORY</td> <td style="width: 10%;">AMOUNT</td> <td style="width: 20%;">\$</td> </tr> <tr> <td></td> <td>ENCLOSED</td> <td></td> </tr> </table>		FEE CATEGORY	AMOUNT	\$		ENCLOSED	
FEE CATEGORY	AMOUNT	\$							
	ENCLOSED								
13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.  THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.  WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.									
CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE <b>Daniel M. Litynski, VP for Research</b>		SIGNATURE <i>Daniel M. Litynski</i> DATE <b>29 NOV 11</b>							
<b>FOR NRC USE ONLY</b>									
TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED	CHECK NUMBER	COMMENTS				
			\$						
APPROVED BY				DATE					

**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.

<p style="text-align: center;">Licensee</p> <p>1. Western Michigan University Office of the Vice President for Research</p> <p>2. 1903 West Michigan Avenue Kalamazoo, MI 49008</p>	<p>In accordance with letter dated <b>February 11, 2011,</b></p> <p>3. License number 21-03336-10 is amended in its Entirety to read as follows:</p> <hr/> <p>4. Expiration date December 31, 2011</p> <hr/> <p>5. Docket No. 030-35835 Reference No.</p>	
<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Americium-241</p> <p>B. Cesium-137</p> <p>C. Krypton-85</p> <p>D. Cesium-137</p> <p>E. Promethium-147</p>	<p>7. Chemical and/or physical form</p> <p>A. Sealed neutron sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license</p> <p>B. Sealed sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gauging device as specified in Item 9 of this license.</p> <p>C. Sealed sources (ABB Process Automation Model S-II)</p> <p>D. Sealed sources (APTEC-NRC, Inc., formerly Nuclear Research Corp., Model 2-6)</p> <p>E. Sealed sources (Amersham Model No. PHC.C1)</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. <b>Not to exceed a total of 180 millicuries.</b></p> <p>B. No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. <b>Not to exceed a total of 50 millicuries</b></p> <p>C. One source not to exceed <b>250 millicuries</b></p> <p>D. One source not to exceed <b>50 millicuries</b></p> <p>E. Two sources, not to exceed a total of 1000 millicuries</p>

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SUPPLEMENTARY SHEET**

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F. Nickel-63

F. Foils or plated sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gas chromatograph as specified in Item 9 of this license

F. **Five sources, not to exceed a total of 55 millicuries**

G. Hydrogen-3

G. Foils or plated sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gas chromatograph

G. **100 millicuries**

H. Americium-241

H. Foil or point discs

H. **Not to exceed a total of 850 microcuries**

I. Polonium-210

I. Sealed sources

I. **250 microcuries**

J. Plutonium-239

J. Pu-Be neutron sources

J. **80 grams**

K. Any byproduct material

K. Activation products

K. **Not to exceed 5 millicuries**

L. Nickel- 63

L. **Foils or plated sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated in a compatible gas chromatograph**

L. **10 millicuries**

**9. Authorized use**

A. and B. **To be used in Troxler Electronics Laboratories, Inc. Model 3216 and CPN Model 503DR portable gauging devices for measuring physical properties of materials.**

C., D. and E. For use in fixed gauging devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess and use the devices, including the ABB Process Automation Model TG-1, APTEC-NRC, Inc. Model LS101 and Impact Systems Model 4400/4401 devices, respectively.

F. and G. **To be used in Shimadzu Models GC Mini2EC and Varian Model 3400 gas chromatography devices for sample analysis.**

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- H. and I. To be used for research and development, as defined in 10 CFR 30.4, laboratory research studies, teaching and training of students and instrument calibration/standardization.
- J. To be used in a Monsanto Research Corporation neutron howitzer for laboratory experiments and student instruction.
- K. Possession incident to the performance of irradiation experiments utilizing the Pu-Be source. To be used for student instruction.
- L. Possession in a Shimadzu Model 15A incident to disposal.

CONDITIONS

10. A. Licensed material in Subitem Nos. 6.A. and 6.B. may be used and stored at the facilities on the campus of Western Michigan University, Kalamazoo, Michigan, including, but not limited to, the Physical Plant and Rood Hall; and 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.
- B. Licensed material in Subitem Nos. 6.C., 6.D. and 6.E. may be installed, used and stored at the facilities on the campus of Western Michigan University, Kalamazoo, Michigan, including, but not limited to, McCracken Hall, Kohrman Hall and the Paper and Printing Science Pilot Plant at the Parkview Campus.
- C. Licensed material in Subitem Nos. 6.F., 6.G., 6.H. and 6.I. shall be used at the facilities on the campus of Western Michigan University, Kalamazoo, Michigan, including, but not limited to, McCracken Hall, Kohrman Hall, Rood Hall, Leslie Wood Hall, Haenicke Hall and the Paper and Printing Science Pilot Plant at the Parkview Campus.
- D. Licensed material in Subitem Nos. 6.J. and 6.K. shall be used in Rood Hall on the campus of Western Michigan University, Kalamazoo, Michigan.
11. The Radiation Safety Officer (RSO) for this license is John G. Center, Jr.
12. A. Licensed material shall only be used by, or under the supervision and in the physical presence of, individuals who have received the training described in the application dated September 18, 2001, and the letters dated September 18, 2001, and December 19, 2001.
- B. Licensed material in Subitem Nos. 6.J. and 6.K. shall only be used by, or under the supervision and in the physical presence of, Asgher Kayani, Ph.D. or John G. Center, Jr.
13. 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 NRC under 10 CFR 32.210 or by an Agreement State.
- B. In the absence of a certificate from a transferor indicating that a leak test has been made within the

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intervals specified in the certificate of registration issued by NRC under 10 CFR 32.210 or by an Agreement State prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

C. Sealed sources need not be leak tested if:

- (i) they contain only hydrogen-3; or
- (ii) they contain only a radioactive gas; or
- (iii) the half-life of the isotope is 30 days or less; or
- (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
- (v) they are not designed to emit alpha particles, 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 or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

D. Sealed sources and detector cells 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.

F. Tests for leakage and/or contamination shall be performed by persons specifically licensed by the Commission or an Agreement State to perform such services. In addition, the licensee is authorized to collect leak test samples but not perform the analysis: analysis of leak samples must be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

G. Tests for leakage and/or contamination shall be performed by the licensee or other persons specifically licensed by the Commission or an Agreement State to perform such services. In addition, the licensee is authorized to collect leak test samples for analysis by persons specifically licensed by the Commission or an Agreement State to perform such services.

14. Sealed sources or source rods containing licensed material shall not be opened or sources removed or detached from source rods or gauges by the licensee, except as specifically authorized.

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15. Except for maintaining labeling as required by 10 CFR Part 20 or 71, the licensee shall obtain authorization from NRC before making any changes in the sealed source, device, or source-device combination that would alter the description or specifications as indicated in the respective Certificates of Registration issued either by the Commission pursuant to 10 CFR 32.210 or by an Agreement State.
16. 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 5 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.
17. 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."
18. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
19. 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. A minimum of two independent physical controls that form tangible barriers to secure portable gauges from unauthorized removal whenever the portable gauge is not under the control and constant surveillance of the licensee are required.
20. Any cleaning, maintenance, or repair of the gauges that requires detaching the source or source rod from the gauge shall be performed only by the manufacturer or other persons specifically licensed by the Commission or an Agreement State to perform such services.
21. A. If the licensee uses unshielded sealed sources extended more than 3 feet below the surface, the licensee shall use surface casing that extends from the lowest depth to 12 inches above the surface and other appropriate procedures to reduce the probability of the source or probe becoming lodged below the surface. If it is not feasible to extend the casing 12 inches above the surface, the licensee shall implement procedures to ensure that the cased hole is free of obstruction before making measurements.  
  
B. If a sealed source or a probe containing sealed sources becomes lodged below the surface and it becomes apparent that efforts to recover the sealed source or probe may not be successful, the licensee shall notify the U. S. Nuclear Regulatory Commission and submit the report required by 10 CFR 30.50(b)(2) and (c). The licensee shall not abandon the sealed source or probe without obtaining the Commission's prior written consent.
22. Detector cells containing licensed material shall not be opened or the foil sources removed from the detector cell by the licensee.
23. 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.

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24. Sealed sources containing licensed material shall not be opened or sources removed from source holders by the licensee, except as specifically authorized.
25. 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.
26. 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 source and non-routine maintenance or repair of components related to the radiological safety of the gauge (i.e., the sealed source, the source holder, source drive mechanism, on-off mechanism (shutter), shutter control, shielding). 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.
27. 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 condition (i.e., package was not damaged); and
- E. the gauge must not require any modification to fit in the proposed location.

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. Regulatory Commission or an Agreement State to perform such operations.

28. A. The licensee may maintain, repair, or replace device components that are not related to the radiological safety of the device containing byproduct material and that do not result in the potential for any portion of the body to come into contact with the primary beam or 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, or 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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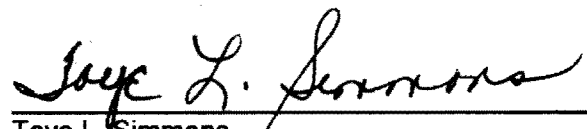
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29. Prior to initial use and after installation, relocation, dismantling, alignment, or any other activity involving the source or removal of the shielding, the licensee shall assure that a radiological survey is performed to determine radiation levels 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. Regulatory Commission or an Agreement State.
30. 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.
31. The licensee shall assure that the shutter mechanism of each device 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, its "lock-out" procedures whenever a new device is obtained to incorporate the device manufacturer's recommendations.
32. Except for maintaining labeling as required by 10 CFR Part 20, or 71, the licensee shall obtain authorization from the U.S. Nuclear Regulatory Commission before making any changes in the sealed source, device or source-device combination that would alter the description or specifications as indicated in the respective certificate of registration issued either by the Commission pursuant to 10 CFR 32.210 or by an Agreement State.
33. Licensed material shall not be used in or on humans except as provided otherwise by specific condition of this license.
34. Except for plutonium contained in a medical device designed for individual human application, no plutonium, regardless of form, shall be delivered to a carrier for shipment by air transport or transported in an aircraft by the licensee except in packages the design of which NRC has specifically approved for transport of plutonium by air.
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. 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 September 18, 2001; and,
- B. Letters dated September 18, 200 and December 19, 2001 (excluding references to animal studies), February 11, 2011, April 13, 2011, April 14, 2011 and May 12, 2011.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date MAY 16 2011

By

  
Toy L. Simmons  
Materials Licensing Branch  
Region III

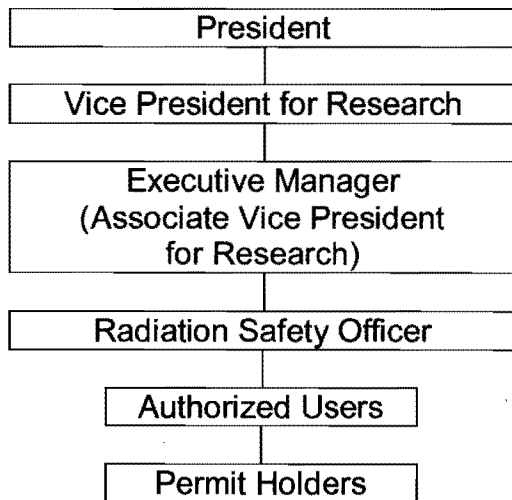
**ITEM No. 5 Radioactive Material**

<b>Radioisotope</b>	<b>Chemical and/or physical form</b>	<b>Quantity</b>
A. Americum-241	Sealed neutron sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated into a compatible gauging device.	No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. Not to exceed a total of 180 millicuries.
B. Cesium-137	Sealed neutron sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated into a compatible gauging device.	No single source to exceed the maximum activity specified in the certificate of registration issued by NRC or an Agreement State. Not to exceed a total of 50 millicuries.
C. Krypton-85	Sealed sources (ABB Process Automation Model S-II)	One source not to exceed 250 millicuries
D. Cesium-137	Sealed sources (APTEC-NRC, Inc. formerly Nuclear Research Corp., Model 2-6)	One source not to exceed 50 millicuries.
E. Promethium-147	Sealed sources (Amersham Model No. PHC.C1)	Two sources not to exceed a total of 1000 millicuries.
F. Nickel-63	Foils or plated sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated into a compatible gas chromatograph.	Five sources not to exceed a total of 55 millicuries.
G. Hydrogen-3	Foils or plated sources registered either with NRC under 10 CFR 32.210 or with an Agreement State and incorporated into a compatible gas chromatograph.	Not to exceed 100 millicuries.
H. Americum-241	Foil or point discs.	Not to exceed a total 850 microcuries.
I. Polonium-210	Sealed sources	250 microcuries.
J. Plutonium-239	Pu-Be neutron sources.	80 grams
K. Any byproduct material	Activation products.	Not to exceed 5 millicuries.

**ITEM No. 6 Purpose(s) for which Licensed Material will be used**

**Item no. 5 Purpose**

- A. and B. To be used in Troxler Electronics Laboratories, Inc. Model 3216 and Campbell Pacific Nuclear (CPN) Model 503DR portable gauging devices for measuring physical properties of materials.
- C., D. and E. For use in fixed gauging devices that have been registered with either NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess and use the devices, including the ABB Process Automation Model TG-1, APTEC-NRC, Inc. Model LS101 and Impact Systems Model 4400/4401 devices, respectively.
- F. and G. To be used in Shimadzu Models GC Mini2EC and Varian Model 3400 gas chromatography devices for sample analysis. Possession in a Shimadzu Model 15A incident to disposal.
- H. and I. To be used for research and development, as defined in 10 CFR 30.4, laboratory research studies, teaching and training of students and instrument calibration/standardization.
- J. To be used in a Monsanto Research Corporation neutron howitzer for laboratory experiments and student instruction.
- K. Possession incident to the performance of irradiation experiments utilizing the Pu-Be source. To be used for student instruction.

**ITEM No. 7 Individuals Responsible for Radiation Safety****Radiation Safety Organization Chart****Executive Manager and Management Team**

The Executive Management team for this license consists of the President, Vice President for Research, and the Associate Vice President for Research. **The Associate Vice President for Research has been designated as the Executive Manager.** The Executive Manager has been given the authority and means to make prompt decisions without having to consult with higher management, particularly in case of an emergency concerning radiation. This authority includes permission to take whatever actions are necessary to ensure all radiation safety practices are in compliance with the rules and regulations governing the use of radioactive material or radiation producing machines.

**Radiation Safety Officer (RSO)**

The Radiation Safety Officer reports directly to the Executive Manager. **Our Radiation Safety Officer (RSO) is John G. Center.** WMU hired Mr. Center in November, 2010 to assume the responsibilities as our Full-time Radiation Safety Officer.

Summary of Mr. Center's training and experience:

Dates	Facility	Training and Experience
2011	Western Michigan University	<b>Radiation Safety Officer (RSO)</b> has effectively assumed duties of the RSO. He has been the RSO of record for NRC Material License

21-03336-09 and NRC Material License 21-03336-10 since February, 2011.

2010	Nevada Technical Associates, Inc	<b>Radiation Safety Officer</b> (RSO) training course consisting of 40 hours of classroom and practical training on fundamental principles of radiation, licensing requirements, transportation and security, instrumentation, and more.
2010	Western Michigan University	<b>Assistant Radiation Safety Officer</b> (RSO) has effectively assumed duties of the RSO under the precepts of James F. Center, licensed RSO. Specifically, coordination of routine radiation safety duties such as surveys and training, conducted a turnover audit to ensure nothing is left to question, drafted a number of procedures, policies, and guidelines for use and handling of licensed material.
2009	Western Michigan University	<b>Completed WMU's Authorized User</b> training program. This 40 hour course of training consisting of classroom and practical application of radiation safety fundamentals, including site specific use of all procedures and policies that govern the safe use of licensed material at the University.
2008	Western Michigan University	<b>Completed WMU's Basic User</b> training program. This 8 hour course of training consisting of classroom and practical application of radiation safety fundamentals, including site specific use of all procedures and policies that govern the safe use of licensed material at the University.
1992 to 1994	U.S. Navy, USS Abraham Lincoln, CVN-72	<b>Reactor Mechanical Operator</b> responsible for the implementation, evaluation, and improvement of the ship's nuclear training program. As a qualified Mechanical Operator, Mr. Center was accountable for the radiological controls, training of junior personnel and oversaw the routine and casualty operations (including acting as on-scene leader for radiological spills and contaminated persons), and corrective and preventative maintenance programs.
1990 to 1992	U.S. Navy, Naval Nuclear Power School and Prototype	<b>Student</b> One year of classroom (theoretical) and on-the-job (practical) training in the maintenance, operation, and safe conduct radiologically and environmentally of a nuclear power propulsion and electrical generation plant. An additional time was spent assigned to temporary duties, such as Leading Petty Officer of the Navy Legal Service Office Detachment in Orland, FL allowing him to read and understand legal documents, the Code of Federal Regulations and United States Code, in addition to the Uniform Code of Military Justice.

Duties and Responsibilities of the RSO shall include, but are not limited to, the following:

1. Ensure compliance with the rules, regulations, and procedures governing radiation and its use.
2. Serve as a liaison between WMU and all regulatory agencies on matters pertaining to radiation.
3. Direct the Quality Control Program.
  - a. Compile the results of the subprogram audits for an overall assessment of the entire RP Program (Annual Audit).

4. Direct the Radiological Control Program.
5. Direct the Administrative Controls Program, including:
  - a. Review and approve proposed uses, users, and rooms.
  - b. Maintain all documentation required by the Radiation Safety Program.
6. Develop and implement the Radiation Safety Training Program.
7. Direct the Source Inventory and Control Program.
8. Direct the Instrumentation and Dosimetry Program.
9. Direct the Radioactive Waste Program.
10. Direct the Transportation of Radioactive Material/Waste Program.
11. Direct and/or conduct the phases of corrective actions to prevent recurrence of incidents involving radiation or radioactive material.
  - a. Investigate all identified conditions adverse to quality.
  - b. Determine the causes of each incident.
  - c. Develop corrective actions to prevent recurrence.
  - d. Implement the prescribed actions.
12. Supervise and assign duties to the Radiation Safety Coordinator and other relevant personnel.
13. Approve temporary Radiation Safety Representatives (RSR) when notified that the RSR will be absent for greater than two (2) weeks.
14. Update and distribute the Emergency Plan information.
15. Notify the Nuclear Regulatory Commission, Radiation Safety Committee, State Regulators, and the Executive Management team 30 days prior to termination of employment.

**ITEM 8 Training For Individuals Working in Or Frequenting Restricted Areas**

We will implement the model training program published in Appendix J to NUREG-1556, Volume 7, "Consolidated Guidance About Material Licenses: Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope" dated December 1999.

**ITEM 9 Facilities and Equipment**

We will ensure that the location of each fixed gauge meets the Criteria in the section entitled "Facilities and Equipment" in NUREG-1556, Vol. 4, dated October 1998.



## ITEM 10 Radiation Safety Program

### Radiation Monitoring Instruments

The Instrumentation and Dosimetry Program consists of the procedures and practices used to obtain accurate exposure measurements. The Instrumentation portion of the program delineates the requirements for use and calibration of all instruments used to perform dose estimates and surveys.

The RSO selects radiation monitoring instruments based on the radioisotopes being used and the type, i.e. radiation or contamination, of monitoring needed. Currently, we are using and replacing outdated instruments with the following:

Multi-purpose instruments, such as,

1. The Ludlum Model 3 with a G-M detector.  
Used in the areas with a need to monitor  $\beta$ - $\gamma$  contamination and radiation levels.
2. The Ludlum Model 14 C with a G-M detector.  
Used in the areas with a need to monitor  $\beta$ - $\gamma$  contamination and radiation levels.

Single purpose instruments, such as,

1. The Ludlum Model 14 B with a G-M detector.  
Used in the areas with a need to monitor  $\beta$ - $\gamma$  radiation levels.
2. The Ludlum Model 12 with a proportional detector.  
Used in areas to monitor neutron radiation levels.
3. The Ludlum Model 21 with a ZnS(Ag) probe.  
Used to count wipes for  $\alpha$  contamination.
4. Packard 1600 TR Scintillation Counter  
Used to count prepared samples for low energy  $\beta$ - $\gamma$  contamination.

The RSO maintains a listing of all instruments and their calibration dates. In addition, each user has been instructed to verify the instrument is in calibration by reviewing an attached calibration sticker as part of the pre-operational checks.

Calibrations will be conducted by, either

- a. A vendor licensed by the Nuclear Regulatory Commission or an Agreement State to perform instrument calibrations, or
- b. Internal procedures reflective of and containing the requirements of the model instrument calibration program specified in Appendix O to NUREG-1556, Volume 11, "Consolidated Guidance About Material Licenses: Program - Specific Guidance About Licenses of Broad Scope" dated April 1999.

Calibration Frequency

- a. Annually.
- b. Prior to initial use.
- c. Post maintenance evolutions that may effect the calibration.

## Occupational Dose

We are implementing a number of means to ensure that we are in compliance with the requirements for monitoring occupational exposure.

The first means is that all Authorized Users and Permit holders are approved to use the type and quantity before they are allowed to use material. Within this approval process is an evaluation of the potential radiation hazards associated with the materials use.

The second means is the performance of routine radiological surveys and the wearing of personal dosimetry devices. All surveys are conducted with instruments that have been calibrated and verified operational by the completion of pre-operation checks. A certified vendor will supply, process, and calibrate our personal dosimetry. This vendor will provide WMU with reports consistent with requirements of NRC Forms 4 and 5.

The third means of ensuring we are in compliance is the investigation of unplanned exposures that exceed our established action levels. We will investigate why the exposure occurred and why the exposure was not previously planned and develop an action plan to prevent reoccurrence. The action levels we are using:

	WMU Level 1	WMU Level 2
Whole Body	250 mREM/qtr	500 mREM/qtr
Lens of the Eye	2,500 mREM/qtr	5,000 mREM/qtr
Skin	5,000 mREM/qtr	10,000 mREM/qtr
Extremities	5,000 mREM/qtr	10,000 mREM/qtr
Declared Pregnant Woman	N/A	Same as Level 1
Minor ( $\leq 18$ yrs) Whole Body	N/A	75 mREM/qtr
Skin and Extremities	N/A	100 mREM/qtr

## Surveys

We will survey our facility and maintain levels in accordance with the contamination survey frequencies and levels published in Appendix S to NUREG-1556, Volume 11, "Consolidated Guidance About Material Licenses: Program-Specific Guidance About Licenses of Broad Scope" dated April 1999. However, we will not be implementing the bioassay portions.

## Leak Tests

Leak test will be performed at intervals approved by the NRC or an Agreement State and specified in the Sealed Source and Device Registration Certificate. Leak tests will be performed using the model procedure for leak tests in Appendix T to NUREG-1556, Volume 11, "Consolidated Guidance About Material Licenses: Program-Specific

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Guidance About Licenses of Broad Scope" dated April 1999 or by an organization authorized by the NRC or an Agreement State to provide leak testing services to other licensees or in accordance with the leak test kit supplier's instructions when using a leak test kit supplied by an organization authorized by the NRC or an Agreement State to provide leak test kits to other licensees.

**ITEM No. 11 Waste Management**

We have modeled our Radioactive Waste Program after Appendix V to NUREG-1556, Volume 11, "Consolidated Guidance About Material Licenses: Program-Specific Guidance About Licenses of Broad Scope" dated April 1999, "Model Waste Management Procedures." A copy our radioactive waste program procedure is attached



17 January 2011

## MEMORANDUM

**THRU** John M. Dunn, President  
Timothy J. Greene, Provost and Vice President for Academic Affairs  
Lowell P. Rinker, Vice President for Business and Finance  
Diane K. Anderson, Vice President for Student Affairs

**FOR** See Distribution

**FROM:** Daniel M. Litynski, Vice President for Research

**SUBJECT:** Delegation of Authority to the Radiation Safety Officer (RSO)

1. Reference: Western Michigan University Radiation Safety Policy, Rev. 3, 07/04/07, <http://www.wmich.edu/research/pdf/compliance/radiation/radiation-safety.pdf>.
2. Mr. John G. Center, Jr. has been appointed Radiation Safety Officer (RSO) and is hereby delegated the authority necessary to meet these responsibilities.
3. The RSO reports to the Associate Vice President for Research and is responsible for the development, maintenance, and enforcement of the WMU Radiation Safety Program. This includes but is not limited to: a) ensuring compliance with regulations and safety in the use of radioactive byproduct material, b) managing the radiation safety program, c) identifying radiation safety problems, d) initiating, recommending, or providing corrective actions, and e) verifying implementation of corrective actions.
4. The RSO has the authority to alter, modify, suspend, or terminate any use of licensed or registered material that in his judgment is a threat to health, safety, environment, or a violation of any rules, regulations, or conditions of the license or registrations issued by the Nuclear Regulatory Commission (NRC) that govern our use of such material.

A handwritten signature in cursive script that reads "Daniel M. Litynski".

Daniel M. Litynski, Ph.D.  
Vice President for Research

**Distribution:** Deans, Chairs, Directors  
All personnel in facilities or on property owned or controlled by WMU and utilizing radioactive materials or radiation producing devices including but not limited to Faculty, Staff, Researchers, Students, Visiting Scientists, etc.

**CF:** Paula D. Kohler, Associate Vice President for Research  
John G. Center, Jr., Radiation Safety Officer

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