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**CERTIFIED MAIL – RETURN RECEIPT REQUESTED:
7005 3110 0003 0609 8658**

February 4, 2011

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

Subject: **License Amendment Application**
License No. 21-00627-02

To whom it may concern:

Please find enclosed the Application for the amendment of the BASF Wyandotte, Michigan Site Material License. This submittal contains NRC Form 313 and the required information for items 5 - 11. Listed below are the requested modifications:

- 1) Remove the Ohmart Model 2000 source from our current license. The ownership of this source was transferred to QSA Global in 2009. BASF maintains the proper records showing QSA Global received and accepted ownership of these sources.
- 2) Revise Item # 17 on license regarding prohibition on non-routine maintenance activities such as: installation, initial radiation surveys, relocation, removal from service, alignment, replacement and disposal of sealed source. RSOs have completed training and provided non-routine maintenance procedures that comply with guide lines set forth in Appendix N of NUREG 15567. We request that Derek Hetes and Dan Hannewald be given authority to provide the above services for nuclear sources located at the Wyandotte site. Please see provided supporting information for approval of amendment request.

You can reach me at (734) 324-5282 or email me at derek.hetes@basf.com with any questions or concerns.

Sincerely,

Derek Hetes
Radiation Safety Officer/ EHS Team Member
BASF- Wyandotte Site

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Exhibit Items Addressing Parts 5 - 11 Of Material License Application (NRC Form 313)

Table B.1 Items 5 & 6: Materials To Be Possessed and Proposed Uses

Yes	No	Radioisotope	Manufacturer Model No.	Quantity	Use as Listed on SSD Certificate	Other uses not listed on SSD Certificate
	X	Cesium-137	Ohmart Model 2000	300 mCi	No [x] Specific description of the gauge use: <u>Gauge has been removed from site and transferred to xxx for disposal.</u>	[x] Not applicable
X		Cesium-137	Kay-Ray/ Sensall Model # 7062B (TX-0634-D-172-B)	25 mCi	Yes [x] Specific description of the gauge use: <u>Used in Kay-Ray level gauging system.</u>	[x] Not applicable
X		Cesium-137	Kay-Ray/ Sensall Model # 7062B (TX-0634-D-172-B)	25 mCi	Yes [x] Specific description of the gauge use: <u>Used in Kay-Ray level gauging system.</u>	[x] Not applicable
X		Cesium-137	Kay-Ray/ Sensall Model # 7062B (TX-0634-D-172-B)	10 mCi	Yes [x] Specific description of the gauge use: <u>Used in Kay-Ray level gauging system.</u>	[x] Not applicable
X		Cesium-137	Kay-Ray/ Sensall Model # 7062B (TX-0634-D-172-B)	10 mCi	Yes [x] Specific description of the gauge use: <u>Used in Kay-Ray level gauging system.</u>	[x] Not applicable
X		Cesium-137	Thermo Fisher Scientific/ TN Technologies Model 5205A (TX-0634-D-142-B)	5 mCi	Yes [x] Specific description of the gauge use: <u>Used in Thermo Fisher Scientific/ TN Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Thermo Fisher Scientific/ TN Technologies Model 5205A (TX-0634-D-142-B)	5 mCi	Yes [x] Specific description of the gauge use: <u>Used in Thermo Fisher Scientific/ TN Technologies level gauging system.</u>	[x] Not applicable



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Table B.1 Items 5 & 6: Materials To Be Possessed and Proposed Uses

Yes	No	Radioisotope	Manufacturer Model No. (SSDR)	Quantity	Use as Listed on SSD Certificate	Other uses not listed on SSD Certificate
X		Cesium-137	Thermo Fisher Scientific/ TN Technologies Model 5205A (TX-0634-D-142-B)	5 mCi	Yes[x] Specific description of the gauge use: <u>Used in Thermo Fisher Scientific/ TN Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Thermo Fisher Scientific/ TN Technologies Model 5205A (TX-0634-D-142-B)	5 mCi	Yes[x] Specific description of the gauge use: <u>Used in Thermo Fisher Scientific/ TN Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Berthold Technologies Model LB300LP (TN-1031-D-104-B)	50 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Berthold Technologies Model LB300LP (TN-1031-D-104-B)	50 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Berthold Technologies Model LB300LP (TN-1031-D-104-B)	50 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Berthold Technologies Model LB300LP (TN-1031-D-104-B)	50 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cesium-137	Berthold Technologies Model LB300LP (TN-1031-D-104-B)	50 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable



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Yes	No	Radioisotope	Manufacturer Model No. (SSDR)	Quantity	Use as Listed on SSD Certificate	Other uses not listed on SSD Certificate
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.459 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.3510 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.3510 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.3510 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.622 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.459 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.459 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable



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X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.622 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.459 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable
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X		Cobalt-60	Berthold Technologies Model LB300L (TN-1031-D-104-B)	0.459 mCi	Yes[x] Specific description of the gauge use: <u>To be used in Berthold Technologies level gauging system.</u>	[x] Not applicable



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Table B.2 Items 7 through 10: Training, Experience, Facilities and Equipment and Radiation Safety Program

	Training & Experience	Yes	Alternative Procedures Attached
7. Individuals Responsible for Radiation Safety Program and Their Training Experience 7.1 Radiation Safety Officer: Derek Hetes Alternate: Dan Hannewald	The RSOs have completed Radiation Safety Training consistent with criteria in NUREG-1556 Vol. 4, October 1998. AND Before being named RSO, future RSO's will have successfully completed training consistent with criteria in NUREG-1556 Vol. 4, October 1998. Within 30 days of naming a new RSO, we will submit the new RSO's name to NRC to include in our License.	[X]	[X] Training certificates for Non-Routine Maintenance Activities from Manufacturer provided for both RSOs.
7. Individuals Responsible for Radiation Safety Program and Their Training and Experience 7.2 Authorized Users	PROPOSED AUTHORIZED USERS: Before using licensed materials, authorized users will have successfully completed the training described in Criteria in the section titled Authorized Users in NUREG-1556, Vol. 4 dated October 1998.	[X]	[]
8. Training for Individuals in the Course of Employment are Likely to Receive doses in Excess of 100 mRem/ yr	BASF Wyandotte Site employees who in the course of employment are likely to receive occupational doses of radiation in excess of 1 mSv (100 mrem) in a year shall receive training according to 10 CFR 19.12.	[X]	
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.	[X]	[]
10. Radiation Safety Program - Survey Instruments	We will use instruments that meet the Criteria in the section entitled "Radiation Safety Program - Instruments" in NUREG-1556, Vol. 4 dated October 1998 and each survey meter will be calibrated by the manufacturer or other person authorized by the NRC or an Agreement State to perform survey meter calibrations.	[X]	[]
10. Radiation Safety Program - Material Receipt and Accountability	Physical inventories will be conducted at intervals not to exceed 6 months or at other intervals approved by the NRC, to account for all sealed sources and devices received and possessed under the license.	[X]	[]



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Table B.2 Items 10 through 11: Radiation Safety Program and Waste Disposal

	Training & Experience	Yes	Alternative Procedures Attached
10. Radiation Safety Program - Occupational Dosimetry	We will perform a prospective evaluation demonstrating that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10CFR Part 20 or we will provide dosimetry that meets the Criteria in the section entitled, " Radiation Safety Program - Occupational Dosimetry," in NUREG-1556, Vol. 4 dated October 1998.	[X]	[]
10. Radiation Safety Program - Operating and Emergency Procedures	Operating and emergency procedures have been developed, implemented, maintained and distributed that meet Criteria in the section entitled "Radiation Safety Program - Operating and Emergency Procedures" in NUREG-1556, Vol. 4 dated October 1998.	[X]	[]
10. Radiation Safety Program - Leak Test	Leak tests will be performed at intervals approved by the NRC and specified in the Sealed Source and Device Registration Certificate. Leak tests will be performed by using a leak test kit supplied by an organization authorized by NRC to provide leak test kits to other licenses and according to the kit supplier's instructions.	[X]	[]
10. Radiation Safety Program - Maintenance	<p><u>ROUTINE MAINTENANCE</u> We have implemented and maintain procedures for routine maintenance of our fixed gauges according to each manufacturers or distributor's written recommendations and instructions.</p> <p><u>NON-ROUTINE OPERATIONS</u> The gauge manufacturer, distributor or other person authorized by NRC or an Agreement State will perform non-routine operations such as installation, initial radiation survey, repair, and maintenance of components related to the radiological safety of the gauge, gauge relocation, replacement, and disposal of sealed sources, alignment, or removal of a gauge from service</p>	[X]	[X] Included are attachments to address Appendix N guide lines for non-routine activity requests.
10. Radiation Safety Program - Fixed Gauge Use at Temporary Sites	Not applicable to our Program		[X] Not Applicable
11. Waste Mgmt.	No response required.		



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Appendix N Items

1) Describe the types of work, maintenance, cleaning, repair that involve:

- Installation, relocation, or alignment of the gauge.

Expected Activity: Level gauges installed, relocated or aligned on chemical process equipment and reactors by RSOs or Resins Maintenance Techs under direct supervision of authorized RSO.

- Components, including electronics, related to the radiological safety of the gauge (e.g., the source, source holder, source drive mechanism, shutter, shutter control, or shielding).

Expected Activity: None

- Replacement and disposal of sealed sources.

Expected Activity: Level gauges removed from service on chemical process equipment and reactors by RSOs or Resins Maintenance Techs under direct supervision of authorized RSO.

- Removal of a gauge from service.

Expected Activity: Level gauges removed from service on chemical process equipment and reactors by RSOs or Resins Maintenance Techs under direct supervision of authorized RSO.

- A potential for any portion of the body to come into contact with the primary radiation Beam.

Expected Activity: Level gauges on chemical process equipment and reactors will be locked out according to Site Procedure prior to any handling activities. Nonroutine maintenance activities will only be done or directly supervised by authorized RSOs. Potential for contact with unshielded beam is practically nonexistent.

- Any other activity during which personnel could receive radiation doses exceeding NRC limits.

Expected Activity: There are no activities that will be done on site in which BASF personnel will exceed an NRC exposure limit.

2) Identify who will perform non-routine operations and their training and experience.

Acceptable training would include manufacturer's or distributor's courses for non-routine operations or equivalent.

Primary- Site Radiation Safety Officer: **Derek Hetes**

- Successful completion of 40 hour radiation safety course. **Qualification: Completed initial 40- hr. RSO course by Nevada Technical Associates Dec. 1 – 6, 2002.**

Completed refresher 40-hr. RSO course by Engelhardt & Associates May 14- 18, 2007. Certificate included.

- Successful completion of a fixed gauge manufacturer's course for users. **Qualification: Completed fixed gauge course of non-routine maintenance activities including: gauge installation, initial radiation surveys, removal and alignment by Berthold Technologies Nov 19, 2010. Certificate included.**

- Hands-on experience with fixed gauges. **Qualification: Back up or primary RSO for five years at current location. > 80 hrs. Hands on experience performing wipe testing, radiological surveys, shutter checks, observing and participating in gauge installations and removals by authorized NRC person.**



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Alternate- Radiation Safety Officer: **Dan Hannewald**

- Successful completion of 40 hour radiation safety course. **Qualification: Completed initial 40- hr. RSO course by ThermoFisher Scientific March 17, 2007. Certificate included.**

- Successful completion of a fixed gauge manufacturer's course for users. **Qualification: Completed fixed gauge course of non-routine maintenance activities including: gauge installation, initial radiation surveys, removal and alignment by Berthold Technologies Nov 19, 2010. Certificate included.**

- Hands-on experience with fixed gauges. **Qualification: Back up or primary RSO for four years at current location and previous employer. > 80 hrs. Hands on experience performing wipe testing, radiological surveys, shutter checks, observing and participating in gauge installations and removals by authorized NRC person.**

- 3) Submit procedures for non-routine operations. These procedures should ensure the following:
- doses to personnel and members of the public are within regulatory limits and ALARA (e.g., use of shielded containers or shielding);
 - the source is secured against unauthorized removal or access or under constant surveillance;
 - appropriate labels and signs are used;
 - manufacturer's or distributor's instructions and recommendations are followed;
 - any non-manufacturer/non-distributor supplied replacement components or parts, or the use of materials (e.g., lubricants) other than those specified or recommended by the

The following procedures are specific to non-routine maintenance activities. They are only to be carried out or supervised by an authorized RSO. Whether the activities are installation, initial radiation surveys, gauge relocation, replacement and disposal of sealed sources, alignment, or removal of a gauge from service; all of these activities will follow one of the procedures below. Included is supporting documentation for non-routine activities such as survey form, site standard with ALARA provisions.

NON-ROUTINE MAINTENANCE PROCEDURES

REMOVAL OF A NUCLEAR GAUGE FROM SERVICE

Removal of devices containing radioactive materials shall only be performed by or under the direct supervision of a Radiation Safety Officer (RSO) or persons specifically authorized by the USNRC to perform such tasks.

All removal activities must be documented on the Nuclear Gauge Survey and Lockout form.

To remove a nuclear gauge from service and transport from one location to another such as moving to a storage location, the following procedure must be adhered to:

1. Remove all guarding enclosing the gauge, as necessary, to allow for unhindered removal of the unit.
2. Secure the device following the Nuclear Gauge Lockout procedure as outlined in 5.8.



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3. Before removing the gauge retaining bolts, ensure that the source is securely strapped and protected against falling or unexpected movements.
4. Once the gauge is removed, ensure it is properly labeled, sealed and transported to a controlled and locked storage location. Refer to section 5.6 for storage requirements.
5. Upon completion of removal and transfer activities, the site RSO shall update Nuclear Source Inventory Log and file Survey record.

INSTALLATION OF A NUCLEAR GAUGE

Installation and initial radiation surveys of devices containing radioactive materials shall only be performed by or under the direct supervision of a Radiation Safety Officer (RSO), or persons specifically authorized by the USNRC to perform such tasks.

Installations shall be documented on the Nuclear Gauge Survey and Lockout form.

Prior to transport of the device from its storage location, the RSO shall ensure the device is locked out and perform a radiation survey of the source.

If radiation readings >10 mrem/hr at 12" are observed, further investigation is necessary to determine if there is leakage or contamination present.

If radiation levels are satisfactory, the RSO shall remove the device from its current storage location and ensure it is properly transported to its service location.

Install the gauge in a manner consistent with its defined conditions of normal use outlined in the Sealed Source Device Registry information and ensure that it is secured to prevent unauthorized removal.

Ensure that the unit has the proper labeling visible and the area is posted, as necessary, provided per 5.1.1.

Unlock the gauge and perform an initial radiation survey of the device.

Install guarding to prevent access to unshielded beam, as necessary.

Prior to returning to routine service, conduct a wipe test for leakage on the gauge using a NLTC Leak Test Kit and ensure it is tested to verify that it functions as designed.

Upon completion of installation activities, the site RSO shall update Nuclear Source Inventory Log and file Survey record.



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Excerpt form Site Standard regarding ALARA policy

4. ALARA PHILOSOPHY

4.1. In keeping with radiation protection philosophy and current regulatory requirements, BASF will maintain all exposures to personnel and the environment ALARA. Exposures will be maintained ALARA by minimizing source strength, using sufficient shielding, minimizing personnel time spent near the sources and by maximizing the distance from radioactive sources.

4) Confirm that individuals performing non-routine operations on gauges will wear both whole body and extremity monitoring devices or perform a prospective evaluation demonstrating that unmonitored individuals performing non-routine operations are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits.

See dose evaluation below for a Resins plant Maintenance Tech working under the direct supervision of an authorized RSO.

Occupational Dose Evaluation

Licensee's Name **BASF Corporation**

License No. **21-00627-02**

Evaluation for Maintenance Tech Model Berthold LB 300 LP Gauge 50 mCi Cs137 ⁽¹⁾

Time needed to perform the entire maintenance procedure. (Installation/removal of both point source gauges on side of 1200 train reactor- #1203.)	<u>180</u> minutes/60	<u>3</u> hour
Expected whole body dose rate received by the individual, determined using exposure rates measured at 12 in. from the gauge while the sealed source is in the unshielded position. ⁽²⁾		<u>7.8</u> mrem/hr
Time the hands were exposed to the shielded source.	<u>90</u> minutes/60	<u>1.5</u> hour
Expected extremity dose rate received by the individual, determined using measured exposure rates for the unshielded source on contact with the lead housing. ⁽³⁾		<u>50</u> mrem/hr

Whole Body Dose Formula*: (3 hours in Row A) x (7.8 m/hr in Row B) x (2 activities- one removal and one subsequent installation) = **47 Expected Whole Body Dose mrem**

Extremity Dose Formula:** (1.5 hours in Row C) x (50 mrem/hr in Row D) x (2 activities- one removal and one subsequent installation) = **150 Expected Extremity Dose mrem**



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- *Expected Whole Body Doses less than 500 mrem requires no dosimetry
 - ** Expected Extremity Doses less than 5000 mrem requires no dosimetry
 - **Based on the above calculations, no dosimetry will be required for non-routine maintenance activities.**
-

Notes:

1) It is highly unlikely that a Technician would perform more than one removal and one installation in any given year. It is more than likely that they will go several years in between any type of non-routine maintenance activities. Therefore, only a maximum frequency of two activities per year will be accounted for in both dose formulas. One activity is the removal of a gauge from service and placing it in storage. The other is retrieving gauge from storage and re-installing. Both activities should take about the same time to complete and will be the reverse operation of the other.

2) Installation scenario is with highest activity source on site. One foot distance was used as a conservative estimate of average Technician position relative to gauge. Although it is highly likely that the average distance would be greater over the course of the maintenance activity which would reduce actual amount of exposure. No data was available for one-foot exposure rate with source shielded and locked out which is required condition for this maintenance. Therefore an overly conservative higher value for exposure rate at 12 inches with the source in an unshielded position will be used for whole body calculation since we have actual field data on this measurement. One-foot dose rate 7.8 mR/h verified by field survey with Victoreen 290 by RSO on 10/15/2009.

3) Exposure represents actual amount of contact time for hands with gauge for Technician. Handling will be done with gauge in shielded and locked out position. Therefore, using the on contact exposure rate in an unshielded position is likely a conservative over estimate for the extremity calculation. The unshielded source on contact dose rate 50 mR/h was verified by field survey with Victoreen 290 by RSO on 10/15/2009.

5) Verify possession of at least one survey instrument that meets the criteria in "Radiation Safety Program - Instruments in NUREG-1556, Vol. 4, 'Consolidated Guidance about Materials Licenses: Program-Specific Guidance about Fixed Gauges Licenses,' dated October 1998."

The site has three calibrated survey meters on site to use for non-routine maintenance activities. The calibration certificate for the one most likely to be used for such activities is included.

6) Describe steps to be taken to ensure that radiation levels in areas where non-routine operations will take place do not exceed 10 CFR 20.1301 limits. For example, applicants can do the following:

- commit to performing surveys with a survey instrument (as described above);
- specify where and when surveys will be conducted during non-routine operations; and
- commit to maintaining, for 3 years from the date of the survey, records of the survey (e.g., who performed the survey, date of the survey, instrument used, measured radiation levels correlated to location of those measurements), as required by 10 CFR 20.2103.



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Per the site lock out and non-routine procedures, a calibrated survey meter must always be used during such activities. Also as an additional safety precaution, we are considering purchasing a personal radiation dosimeter for monitoring during non-routine activities. All survey records are kept for at least 5 years per site records retention policy.