Document Revision Change Table

Revision Number	Revision Description	Revised By	Revision Date
1	Updated RSO Information	Gregg Dawson	5/27/2014
2	Updated Procedure	Gregg Dawson	5/23/2017
3	Revised document format and updated content, added table of contents (TOC), revised attachments and updates.	Gregg Dawson	1/22/2021
4	Updated *4.2 Receipt and Storage* section to inform warehouse employees on requirements for receiving licensed radioactive materials after normal working hours.	Gregg Dawson	5/17/2021

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1. PURPOSE

To establish safe work procedures when working with or around radioactive sources at the Beaumont Site and to assure that radiation exposures to employees and members of the public are kept As Low as Reasonably Achievable (ALARA).

2. DEFINITIONS

2.1. Radiation Safety Officer (RSO)

The person named in the license who is responsible for ensuring compliance with all applicable regulations and license requirements. The current RSO is Gregg Dawson (409) 981-5057.

In addition to minimum duties listed in 25 TAC 289.252(f)(3), the RSO is responsible for the following:

- Overseeing the Radiation Protection Program.
- Annually auditing the Radiation Protection Program.
- Posting RC Form 203-1, “Notice to Employees”.
- Verifying that only trained personnel operate the fixed gauges and PMI analyzers.
- Maintaining documentation required by the regulations and the sites specific license conditions.

2.2. Authorized Designee

Person specifically authorized in writing by the RSO to perform specifically authorized tasks in the absence of the RSO. Contact the Radiation Safety Officer for current Authorized Designee. Other authorizations will be assigned temporarily by the RSO, as necessary.

2.3. Nuclear Gauge Operator

Personnel who have been trained (8-hour biennially), certified, and authorized by the RSO to operate radiation devices/gauges.

2.4. PMI X-Ray Operator

Personnel who have been trained, certified and authorized to operate hand-held portable X-Ray machines used to PMI (positive material identification) equipment. All authorized users must wear a whole body and ring radiation badge when operating he PMI X-Ray Machine.

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2.5. **Fixed Radiation Gauge**

A device (shield) containing a radioactive source that emits gamma radiation through a piece of equipment to a detector on the opposite side of the piece of equipment.

2.6. **Member of the General Public**

Any individual that is not a radiation worker Contractor Employee.

2.7. **Radiation Worker**

A person authorized by the RSO to work with radioactive material or PMI Analyzer after completing radiation safety training Confined Spaces.

2.8. **TDSHS**

Texas Department of State Health Services, http://www.dshs.state.tx.us.

2.9. **Authorized Designee**

Person specifically authorized in writing by the RSO to perform specifically authorized tasks in the absence of the RSO. Other authorizations will be assigned temporarily by the RSO, as necessary. The current RSO designee is Gregg Dawson (409) 981-5057 or (409) 658-2015.

2.10. **Dose Assessments**

Dose Assessments are performed annually by the RSO as part of the annual Radiation Protection Program (RPP) audit. These assessments are located in the radiation safety files.



NOTE:
Radiation workers and members of the general public dose assessments have been performed using portable radiation survey meters and calculating the occupancy times for radiation workers and members of the general public. It is unlikely a radiation worker will exceed 10% of the annual dose limit: Although personnel badges are not required due to the results indicated in the dose assessments results, personnel monitoring badges may still be continued as determined by the RSO. Dose assessments are part of the Annual RPP audit.

3. SCOPE

This procedure establishes the minimum requirements for the proper handling and use of radioactive devices installed at the Beaumont site. This standard is designed to protect employees and enable BASF to comply with applicable government regulations, particularly the requirements of the Texas Administrative Code (TAC) §289.202. This can be obtained at the following web address: http://www.dshs.state.tx.us/radiation/rules.shtm.

4. PROCEDURE

4.1. Procurement

4.1.1. Written approval of the site RSO must be obtained prior to purchasing radioactive materials and/or radiation producing devices. Information to be provided to the RSO relating to the proposed procurement must include source activity, isotope, manufacturer, model, planned use and any special requirements. (See Attachment A for approval form.) Prior to receiving and possessing the Radioactive Material, the RSO shall notify the TDSHS of the intended possession, by submission of an addendum to the site license.

4.2. Receipt and Storage

4.2.1. The RSO or Authorized Designee shall be notified upon receipt of all radioactive material. The RSO or Authorized Designee will conduct a radiation level survey and complete the Receiving Form and place in the radiation safety files.

Note: If radioactive material arrives after normal working hours ensure that it is secured in the warehouse in a fenced location (locked). Once RSO or Authorized Designee arrives on site they will conduct the radiation level survey and complete the Receiving Form.

4.2.2. If the container is damaged or leaking, notify the RSO or Authorized Designee immediately. Hold the shipper and do not move the container until released by the RSO or Authorized Designee.

4.2.3. Immediate notification will be made to the final delivery carrier and the agency (TDSHS) in the event an external radiation level exceeds the package type.

- White Ⅰ shipping label external surface reading of 0.5 mR/hr.
- Yellow Ⅱ shipping label external surface reading of 50 mR/hr.
- Yellow Ⅲ shipping label external surface reading of 200 mR/hr.

4.2.4 If short-term storage of the device is necessary, prior to installation, the RSO or Authorized Designee will designate a secure area at receiving. The RSO or Authorized Designee will provide any necessary signs or labeling.

4.2.5 25 TAC 289.252(x)(11) limits the amount of time a licensee can possess unused or stored radioactive material on-site to 24-months; without a TDSHS approved future use plan for the radioactive material.

4.3. Installation/Removal or Moving of Devices

4.3.1. The RSO or Authorized Designee must supervise any installations, removals, or any other moving of installed radiation devices;

- When a new gauge arrives at the plant facility, receiving personnel contact the RSO and perform an initial survey prior to transferring the gauge for installation or temporary storage. If a gauge is to be removed, a before (and after) removal survey and inspection must be conducted by or under the supervision of the RSO or Authorized Designee.
- If the gauge is to be installed immediately, the RSO or Authorized Designee accompanies the gauge to its staging area. If the gauge is to be stored for later installation, the RSO or Designee accompanies the gauge to temporary storage building.
- The gauge is installed at the designated location. The RSO or designee performs a radiation survey and leak test at the time of commissioning of the gauge. A record of the survey will be kept in the radiation files along with the Leak Test Certificates.
- Installations and removals may only be performed by personnel specifically licensed by NRC, DSHS or reciprocal state agency. Site personnel <u>are not trained or authorized to install, remove, relocate or perform maintenance</u> on any radioactive sealed sources, source housings, or any instruments that may generate radiation.
- Identification labels (e.g. source serial no., etc.) in addition to those supplied by the manufacturer, are affixed to the gauge as well as “Caution: Radioactive Materials” signs.
- A source will be taken out of service should the inspection reveal that the shutter is inoperable, shielding is found to be inadequate, or the mounting mechanism needs repaired.

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4.4. Procedures for Installed Devices

4.4.1. An approved radiation sign must be posted on or as close as practical to all installed radiation devices. The symbol shall be magenta or purple on yellow. Signs are available from the RSO, Authorized Designee or the On-Site Vallen Store.

4.4.2 A "Radiation Area" sign will be posted in the case that there is any area accessible to individuals, in which radiation levels could result in an individual receiving a dose ≥ 5 mRem in 1 hour at 30 centimeters (1-foot) from the source of radiation or from any surface that the radiation penetrates.

4.4.3 All radiation devices must have an engraved plaque attached to the source housing. The plaque contains manufacturer's information including the type of radioisotope, activity in millicuries, date of manufacture, model number, precautions, and has the radiation symbol (magenta or purple on yellow). This plaque must not be painted, covered, or otherwise defaced in any manner that makes any of its information illegible. Contact the RSO or Authorized Designee if a replacement plaque is needed.

4.4.4 All routine cleaning and maintenance of source holders will be done in accordance with the manufacturers' instructions.

4.5. Shipping Radioactive Material

4.5.1. **THE R.S.O. MUST BE NOTIFIED AT LEAST 7 DAYS PRIOR TO ANY PLANS TO SHIP ANY RADIOACTIVE MATERIAL(S).**

4.5.2. All shipments of radioactive material from the plant must be reviewed and approved by the RSO or designee. The RSO shall ensure that a copy of all shipping papers, receipts, transfer papers, bills of lading, etc. will be filed in radiation files for TDSHS review.

4.5.3. The RSO or the Authorized Designee will ensure that proper packaging, labeling, shipping instructions are carried out and all radiological surveys are conducted per 49 CFR Parts 100-185.

4.5.4. The RSO will ensure that a "Radioactive Material Shipment/Receiving" form is completed and placed in the radiation files.

4.6. Isolating and Locking Out Devices

4.6.1. Radiation devices must be mechanically locked out into the Closed/Off position and confirmed as locked out by the RSO or Authorized Designee prior to entry into any vessel, which is equipped with a radiation device. Lockout/Shuttering of the device must be verified using a radiation survey

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meter by taking a reading in the beam path to determine whether the level of radiation has decreased accordingly from shuttering the device.

4.6.2. The RSO or the Authorized Designee must sign off on the initial vessel entry permit. Subsequent vessel entry permits may reference the initial entry permit.

4.6.3. Only the RSO, Authorized Designees, or Certified Gauge Operators may operate the shutter that locks out the radiation device.

4.6.4. Documentation shall be maintained by the RSO.

4.7. Training

4.7.1. Any employees working in an area of the plant that has installed radiation devices or whose job may require entry into areas where installed radiation devices are located shall receive annual Radiation Awareness Training. Records of this safety training shall be maintained by the Training Department.

4.7.2. All personnel who operate or may be expected to operate radiation device lockout shutters must receive Specific training from the manufacturer and a periodic refresher. This training will be scheduled, and records will be maintained by the Training Department.

4.7.3. All Procurement personnel must be trained upon job assignment and annually thereafter, on the procurement requirements of this standard. Records documenting this training must be forwarded to the Training Department.

4.7.4. All Receiving personnel must be trained on the receipt and storage requirements of this standard. Records documenting this training must be forwarded to the Training Department.

4.8. Emergencies

In the event of an incident or accident involving radioactive materials or radiation producing devices, the area Shift Supervisor must be notified immediately, shift supervisor notifies the RSO and use of the gauge must be suspended.

Name	Phone #	Cell #
Gregg Dawson (RSO)	(409) 981-5057	(409) 658-2015
Suntrac Services, Inc. (Radiological Safety Consultant)	(281) 338-2133	
TDSHS 24HR Radiological Emergency	(512) 458-7460	

4.8.1 The area around the gauge will be secured until the situation can be assessed and radiation levels known. If personnel are injured perform first aid and remove them from the area when it is medically safe to do so.

4.8.2 Isolate the gauge until it is determined there is no radioactive contamination present. All potentially contaminated individuals should not leave the scene until emergency assistance arrives**.**

4.8.3 Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person (RSO, Nuclear Gauge Operator, local emergency responder or Radiological Safety Consultant) using appropriate radiation detection instrumentation. The purpose of the survey is to accurately assess the radiation danger, the person performing the survey must be competent in the use of the radiation survey meter.

4.8.4 In the case of fire or explosion involving areas where radioactive materials are present, fire fighters must be informed of the location of radioactive materials that may be affected. See Attachment C for a map of the locations of radioactive materials. All equipment used in the area must remain until released by the RSO or Authorized Designee.

4.8.5 Lost or misplaced radioactive sources shall be reported immediately to The Area Shift Supervisor. The RSO or Authorized Designee will then report the incident to all internal parties and the TDSHS in cases of fire, loss, leaking sources, etc. A subsequent confirming letter will be sent within thirty (30) days defining the details of the incident. In addition, the RSO will comply with 25 TAC 289.202 (ww) and (xx) in the event of a lost, stolen, missing source or an incident involving radioactive material.

4.8.6 Radiography contractors are responsible for responding to all incidents involving radioactive materials they bring on site. The contractor's response must minimize exposure to BASF employees and other members of the public. The contractor must notify The Area Shift Supervisor immediately of an incident with an industrial radiography source.

4.9 Record Availability

4.9.1 All radiation records and reports are on file and may be reviewed at any time by contacting the RSO or Authorized Designee.

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5. RESPONSIBILITIES

5.1. Radiation Safety Officer (RSO)

Responsibility to:

- Maintain the Radioactive Material License, Registrations, and other required records;
- Ensure compliance with all license requirements;
- Audit plant compliance with this standard.

5.2. Procurement Team

Responsibility to comply with the procurement, and applicable training requirements of this standard.

5.3. Receiving Department

Responsibility to comply with the receipt and storage, and applicable training requirements of this standard.

5.4. Operations Managers Service Managers

Responsibility to ensure unit compliance with this standard.

6. RELATED DOCUMENTS

Attachment A – Radioactive Material and Radiation Producing Device Procurement Authorization Form.

Attachment B – Radiation Source List.

Attachment C – Radioactive device location map Beaumont Site.

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RADIOACTIVE MATERIAL
AND RADIATION PRODUCING DEVICE PROCUREMENT AUTHORIZATION FORM
Attachment A

Date: _____

BMEHS 002.035

Section 1	**Personnel Information**	
Name of person requesting procurement:	Name:	Phone #:
	Department:	
Briefly describe requested device. * include a sketch if available		

Section 2	**Device Information**	
Device manufacturer:		Source Holder Model #:
Isotope:	Activity:	
X-ray tube rating:	Max. kVp:	Max. mA:
Location and nature of intended use: * include a sketch if available		

Section 3	**Arrival Information**
Proposed arrival date:	
Radiation Safety Officer (RSO):	
Approved: ☐ Yes ☐ No ☐ N/A	Signature:
RSO Comments:	

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BASF Beaumont

List of Radiation Sources and Locations

	SOURCE	SERIAL #	BASF Loop #	ACTIVITY	HOLDER Model	LOCATION
1	Cs-137	M-3045	LT-D201A-A	20 mCi	SHD	Dicamba
2	Cs-137	M-3046	LT-D201A-B	20 mCi	SHD	Dicamba
3	Cs-137	M-3047	LT-D201B-A	20 mCi	SHD	Dicamba
4	Cs-137	M-3048	LT-B201B-B	20 mCi	SHD	Dicamba
5	Cs-137	M-4665	LT-B203	80 mCi	SHD	Dicamba
6	Cs-137	5563CR	LT-D205	10 mCi	SHLD1	Dicamba
7	Cs-137	5564CR	LT-D205	10 mCi	SHLD1	Dicamba
8	Cs-137	M-4436	LT-D220A	20 mCi	SHD	Dicamba
9	Cs-137	M-4437	LT-D220B	20 mCi	SHD	Dicamba
10	Cs-137	7245CP		20 mCi	SH-FIA	Dicamba
11	Cs-137	A1-2214		3 mCi	FQC60	Dicamba
12	Cs-137	A1-2215		3 mCi	FQC60	Dicamba
13	Cs-137	6785CR	LT-C-1316	500 mCi	SHF2	DMTA
14	Cs-137	M-5913	LT-D1461A	120 mCi	SHD-45	DMTA
15	Cs-137	M-5802	LT-D1461B	50 mCi	SHD-30	DMTA
16	Cs-137	M-5803	LT-D1461C	50 mCi	SHD-30	DMTA
17	Cs-137	M-5805	LT-B1818A	50 mCi	SH-F1A-45	DMTA
18	Cs-137	M-5806	LT-B1818B	50 mCi	SH-F1A-45	DMTA
19	Cs-137	G0191/19		100 mCi	Tracerco 400	Dicamba
20	Cs-137	G0192/19		100 mCi	Tracerco 400	Dicamba
21	Cs-137	G0193/19		100 mCi	Tracerco 400	Dicamba
22	Cs-137	G0194/19		100 mCi	Tracerco 400	Dicamba
23	Cs-137	G0195/19		100 mCi	Tracerco 400	Dicamba
24	Cs-137	G0196/19		100 mCi	Tracerco 400	Dicamba
25	Cs-137	G0197/19		100 mCi	Tracerco 400	Dicamba
26	Cs-137	*See SN's below		65 mCi	SHLM	Dicamba

*5 @ 10mCi: 3792CR, 3793CR, 3794CR, 3800CR, 3785CR
*3 @ 5mCi: 3685CR, 3686CR, 3687CR

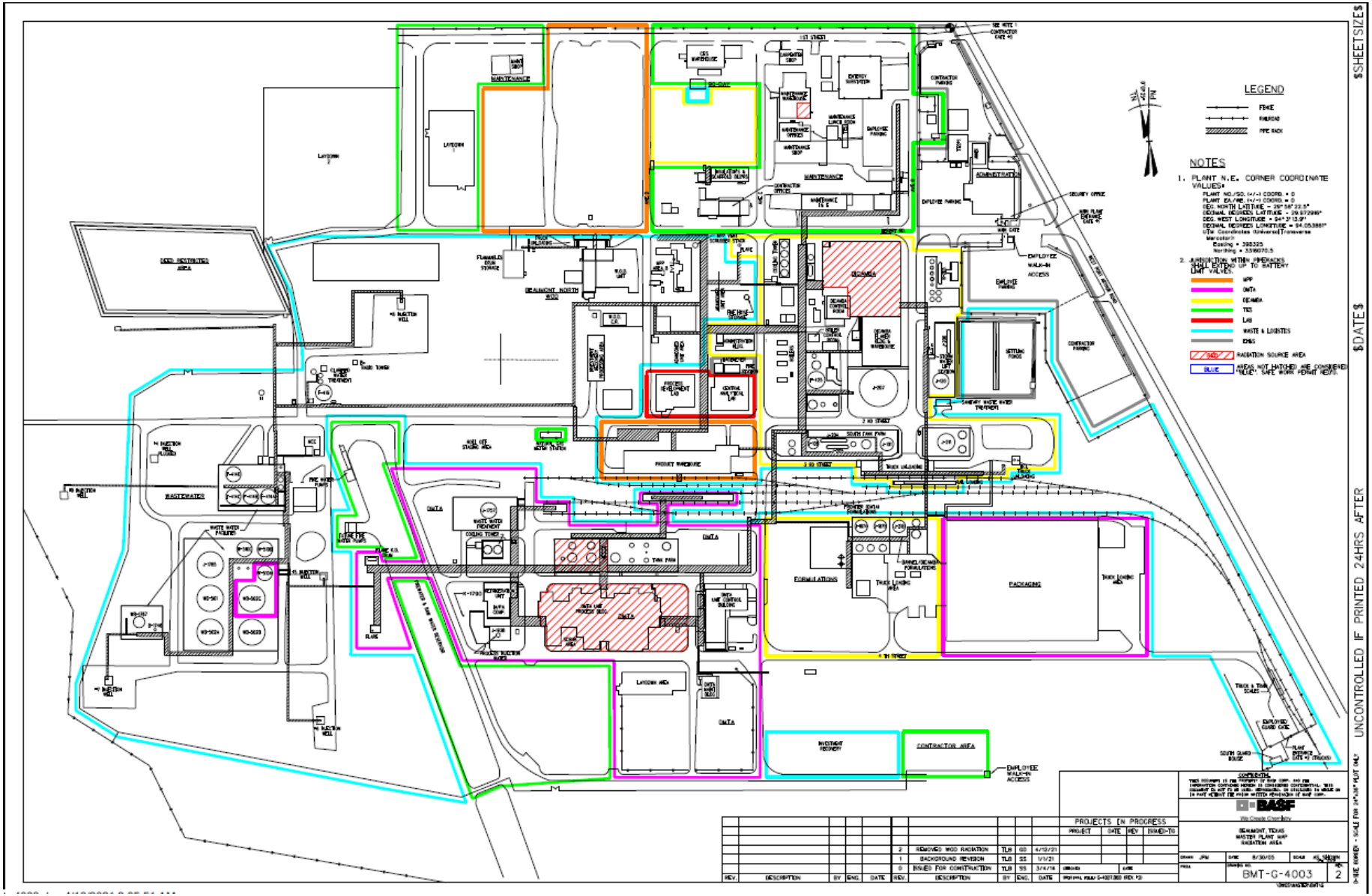
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Beaumont Site

Radiation Sources Plot Map

Attachment C

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