

**LSUHSC School of Dentistry – Environmental Health and Safety Policies**

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<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 10/27/2009	Updated: 8/10/2021	Policy #: EHS-100.01
<b>Radiation Safety Committee Charter</b>		

**1.0 PURPOSE:**

This charter document defines the membership, authority, responsibilities and operating rules of the Radiation Safety Committee at Louisiana State **University** Health Science Center (LSUHSC).

**2.0 SCOPE:**

The Radiation Safety Committee is the governing body for all aspects of radiation protection at LSUHSC, including all affiliated research, clinical, instructional and service units using ionizing and non-ionizing radiation sources or devices (collectively referred to as “radiation sources”) in facilities owned or controlled by LSUHSC.

**3.0 RESPONSIBILITIES:**

**3.1 Radiation Safety Committee shall:**

- Report annually to the LSU System-wide Radiation Protection Committee.
- Ensure all possession, use and disposition of radiation sources or devices by LSUHSC personnel comply with pertinent federal and state regulations and within specific conditions of Radiation Material License LA-0001-L01.
- Establish radiation safety policies, training procedures and criteria.
- Review and approve, modify or deny any application for ionizing radiation use and set conditions of use for permits proposed by the Radiation Safety Office.
- Ensure only qualified individuals are permitted to use radiation sources.
- Enforce compliance within the program, including imposition of sanctions for non-compliance.

**3.2 Radiation Safety Committee Chair shall:**

- Hold quarterly Committee meetings and develop meetings agendas.
- Implement the control functions of the Committee.

- Work with the Radiation Safety Officer to ensure that the Radiation Safety Office implements the directives of the Committee.
- Provide technical support as required.

### **3.2 Radiation Safety Officer shall:**

- Assist Committee Chair with development of meeting agendas.
- Inform the Committee of any radiation safety incidents/violations and recommend action.
- Record and disseminate meeting minutes.

## **4.0 IMPLEMENTATION**

### **4.1 Membership**

- Dr. Dennis Paul, Chairperson
- Dr. Ashok Aiyar
- Dr. Hamid Boulares
- Ms. Samantha Lindsey
- Dr. Li Shen
- Dr. John Frazier
- Mr. Darren Burkett

### **4.2 Frequency of Meetings**

The committee will meet no less than quarterly.

### **4.3 Minutes**

Meeting minutes will include:

- Date, time, and location of meeting
- Members present and absent
- Report of actions taken as a result of previous meetings
- Summary of deliberations and discussions, and recommended action items.
- New business

## **5.0 RECORDKEEPING:**

Meeting minutes will be maintained by EH&S for a minimum of six years

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 08/29/2009		Policy # EHS-100.02
<b>Radiation Survey Meter Policy and Operation Procedure</b>		

**1.0 PURPOSE:**

Radiation survey meters are used at LSUHSC to indicate any contamination of radioactive particles subsequent to radiation work. This policy identifies the different types of meters used for the appropriate nuclide and basic operating procedures for these meters.

**2.0 SCOPE:**

Radiation survey meters shall be used in every LSUHSC radiation-labeled laboratory to detect the presence of one or more of the following isotopes:

- Cr 51
- I 125
- P 32
- S 35

These meters are used to perform surveys of experiments in areas of possible radioactive contamination by trained lab employees and by the Radiation Safety Officer when receiving isotope shipments and while performing quarterly lab inspections.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health and Safety Department Radiation Safety Officer shall:**

- Perform annual meter calibrations.
- Retain all survey meter inventories for a minimum of three years.
- Provide training on survey meter use during the initial Radiation Safety course.

**3.2 Principal Investigators (PI) shall:**

- Purchase appropriate survey meters for every lab that has the potential to use one of the radioactive isotopes listed in Section 2.0 above. Notify Radiation Safety for choice selection assistance.
- Inform the Radiation Safety Officer of any purchase or disposal of survey meters to ensure inventory control.
- Ensure only properly trained lab employees use survey machines.

**3.3 Lab Employees shall:**

- Notify the Radiation Safety Officer or PI if survey meter is not up to date with current calibration.
- Perform battery check on all survey meters before use.

**4.0 IMPLEMENTATION REQUIREMENTS:**

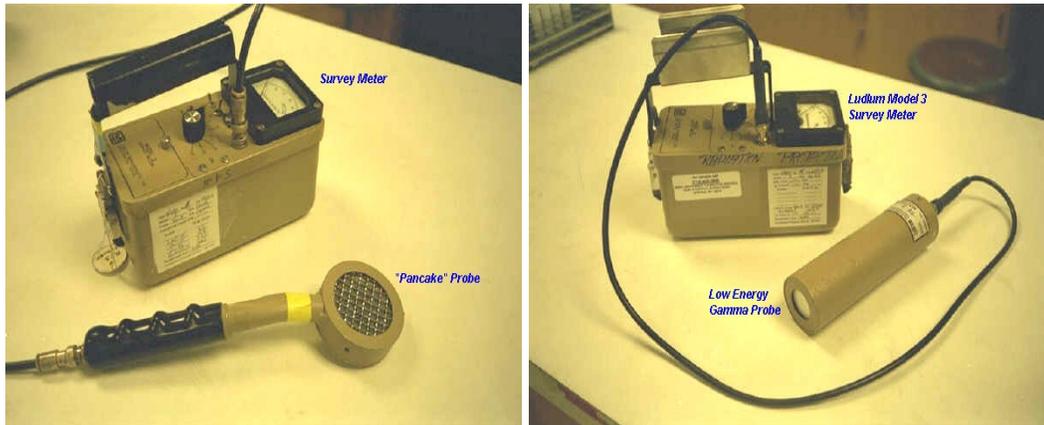
**4.1 Instrumentation**

Two sensor probes are to be used to detect different isotopes as shown in the table below:

<p style="text-align: center;"><b>Geiger Mueller (GM)</b></p> 	<p style="text-align: center;"><b>Scintillating (NaI)</b></p> 
<p>a) Generally used for detecting Beta Emitters.</p> <p>b) This model is also known as “Pancake” probe.</p> <p>c) Detects radiation via the ionization of a gas contained inside the probe.</p> <p>d) Capable of detecting alpha and gamma radiation but with very low efficiencies.</p> <p><b>Commonly used to detect:</b></p> <ul style="list-style-type: none"> <li>- C 14</li> <li>- P 32</li> <li>- S 35</li> </ul>	<p>a) Generally used for detecting Gamma Emitters.</p> <p>b) Detects radiation via the interaction of ionizing radiation with a scintillating crystal containing Sodium Iodine (NaI).</p> <p>c) Obtain a NaI probe when working with I-125.</p> <p><b>Commonly used to detect:</b></p> <ul style="list-style-type: none"> <li>- I 125</li> <li>- Cr 51</li> </ul>

## 4.2 Operation

Both Geiger Mueller (GM) and Scintillating (NaI) type probes can be used with the same meter. See images below.



### Steps:

- 1) Make sure meter calibration sticker is up to date. If not, notify the Radiation Safety Officer.
- 2) Ensure that the probe you are using is capable of detecting the radioisotope you are utilizing. If unsure, contact the Radiation Safety Officer.
- 3) Turn on meter and perform a battery check to make sure batteries are good (replace if necessary).
- 4) Make sure the sound switch is on.
- 5) Select the lowest scale available. Example scales on meters are generally (.1x) (1x) (10x) and (100x).
- 6) If a F/S (Fast/Slow) switch is available, move to Fast Mode. The Slow Mode is used for calibration purposes only.
- 7) Go into a contamination-free room or hall and measure the normal background counts per minutes (CPM) or millirem per hour (mR/hr) and record as background standard information.
- 8) Go to the desired area of concern and slowly take appropriate probe and scan the area about 1/2" from surface area and visually/audibly notice the response for any indications of contamination. Record this information.

- 9) Generally if the counts per minutes (CPM) are over three times background, the area should be cleaned of contamination and the survey should be performed again until the readings are below this standard. See helpful reading chart below.

**Survey Meter Readings**

0-150 cpm  
150-450 cpm  
  
>450 cpm

**Assessment of Measurements**

General background readings  
Suspect contamination  
(Generally 3x background)  
Contamination

- 10) Remember to turn off the survey meter once the work is completed.  
11) Contact the Radiation Safety Officer for further assistance.

**5.0 EMPLOYEE TRAINING AND EDUCATION:**

**5.1 Initial Training**

Survey meter operation is taught during initial Radiation Safety Course Training. Includes meter differences, operation and different scale readings.

**5.2 Training Elements**

See specific vendor survey meter operating manual.

**6.0 RECORDKEEPING:**

The Radiation Safety Officer shall keep all calibration, inspection and inventory records. Records shall be maintained for a minimum of three years.

**7.0. INSPECTIONS AND PROGRAM REVIEW:**

The Radiation Safety Officer shall inspect radiation survey meters during routine quarterly lab inspections to ensure proper functionality.



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 09/01/2009		Policy # EHS-100.03
<b>Radiation Survey Meter Calibration Procedure</b>		

**1.0 PURPOSE:**

Radiation survey meters are used at LSUHSC to indicate the presence of any contamination from radioactive particles. The proper calibration of these instruments assures that all meters are working correctly. Annual and semi-annual calibrations are required by the Louisiana State Department of Environmental Quality (DEQ) per Title 33.

**2.0 SCOPE:**

The Radiation Safety Officer will perform calibrations on all survey meters. In-house calibration shall use the Victoreen manufactured Cs-137 sealed source serial number # S-188 to calibrate all radiation survey meters used at LSUHSC.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health and Safety Department Radiation Safety Officer shall:**

- Perform annually calibrations on lab survey meters.
- Perform bi-annual calibrations on Environmental Health and Safety Department survey meters.
- Maintain all calibration records for a minimum of three years.

**3.2 Principal Investigators (PI) shall:**

- Notify the Radiation Safety Officer of any new purchase or disposal of survey meters.

**3.3 Lab Employees shall:**

- Operate only properly calibrated survey meters.
- Notify the Radiation Safety Officer if a survey meter calibration is out of date.



**4.0 IMPLEMENTATION REQUIREMENTS:**

**4.1 General**

- Calibrations are to be conducted in an isolated area of the facility where background radiation is low.
- The individual conducting the calibration shall wear a dosimetry badge.
- A calibrated survey meter should be used as a referenced standard to ensure that unexpected changes in exposure rates are identified.
- A radioactive sealed point source shall contain a nuclide which emits a strong enough radiation field of similar type and energy that would be seen in labs.
- Records shall be kept of each survey performed, and will include owner of instrument; manufacturer's name, model number and serial number; signature of individual who performed the calibration; date the calibration was performed; and next expected calibration date.
- The survey meter calibration should be considered successful if the exposure rate differs from the calculated rate by less than 20%.

**4.2 Calibration Procedures**

To calibrate what the activity should be on the day of calibration, use the meter calibration spreadsheet located on the L: drive. Follow these steps:

- 1) Calculate the exposure amounts to detect using the calculation equation by filling in the calibration date. The exposure amount (mR/h) results will indicate the desired distance from the Cs-137 point source to meter probe (in meters). Example provided below in table 1:

Calibration of 137 Cs source				
5/1/1976				
Enter today's date				
4/8/2008				
Number of days decayed				
11665	31.96 yrs.			
Activity as of today				
46.79				
15.44 mR/hr@1 m				
0.74 mR/hr@1 with plug				
Scale	Reading	mR/H	Distance (meters)	
0.1	0.5	0.05	3.83	with plug
	1.5	0.15	2.21	with plug
1	0.5	0.5	1.21	with plug
	1.5	1.5	0.70	with plug
10	0.5	5	1.76	without plug
	1.5	15	1.01	without plug
100	0.2	20	0.88	without plug
	0.5	50	0.56	without plug

Table 1



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New Orleans**

- 2) Find a clean non-radioactive contaminated room to perform the calibration.
- 3) Place a sealed point source at a stationary origin point in the closed position.
- 4) Place marks on floor referenced from the point source stationary location to the desired distance for expected reading amounts. See figure 1 below.



**Figure 1**

- 5) Place survey meter at furthest calculated distance from point source.
- 6) Turn on survey meter to proper calibrating scale.



**Health Sciences Center  
New Orleans**

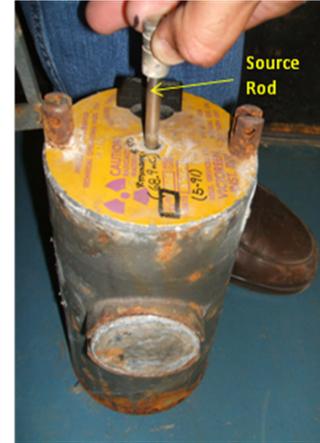
- 7) Unlock the safety lock, lift the lock bar, then raise the source rod on top to expose the point source towards the meter. See figures 2, 3 and 4 below.



**Figure 2**



**Figure 3**



**Figure 4**

- 8) Monitor exposure readings and adjust calibration screws to desired expected readings if necessary. See figure 5 below.



**Figure 5**

- 9) To reduce exposure amounts to calibrator, make sure control rod is in the closed position when not in use.
- 10) Perform all steps, complete meter calibration certification label and place on meter. See figure 6 below.

		<b>Meter Calibration</b>	
PI _____		Cal Date _____	
Serial # _____		Cal Due _____	
Calibrated by _____			
.1x <input type="checkbox"/>	1x <input type="checkbox"/>	10x <input type="checkbox"/>	100x <input type="checkbox"/>

**Figure 6**



**5.0 EMPLOYEE TRAINING AND EDUCATION:**

**5.1 Initial Training**

The Radiation Safety Officer will obtain training from either a certified survey meter manufacturer school or witness and perform a survey meter calibration in the presence of the LSUHSC Radiation Systems Officer.

**6.0 RECORDKEEPING:**

The Radiation Safety Officer shall keep all records of calibration results for at least three years.

**7.0 REFERENCES:**

L:\Radiation Safety\Radiation - All\Radiation - Survey Meters\Calibration Procedures\ Calibration Equation.xls

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 11/05/2009	Updated: 02/28/2022	Policy #: EHS-100.04
<b>Radiation Spill Response Procedure</b>		

**1.0 PURPOSE:**

This procedure is used to guide LSU Health Sciences Center personnel for rapid, appropriate, and safe response to liquid and dry powder radioisotopes releases.

**2.0 SCOPE:**

These procedures address the proper response to incidents involving minor or major spills, leaks, or accidental discharges of liquid or dry powder radioisotopes.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health & Safety (EH&S) shall:**

- Provide assistance, additional clean-up materials, and personal protective equipment (PPE) as needed to personnel to safely clean up minor spills in their work areas.
- Respond to and assess all major spills and perform decontamination tasks.

**3.2 Principal Investigators/Supervisors shall:**

- Ensure employees understand these radiation spill procedures.
- Ensure that appropriate and adequate PPE supplies and cleaning materials are readily available.

**3.3 Employees shall:**

- Be trained on the proper use and handling of radioisotope liquids and dry powders.
- Wear prescribed PPE while working with all radioisotope liquids and dry powders.
- Promptly report all major radioisotope spills to University Police at 568-8999, who will then notify EH&S.

**4.0 SPILL PROCEDURES**

**4.1 Minor Spill Classification and Response**

Incidents which involve the release or spillage of less than 100 microcuries (uCi) of a radionuclide in a nonvolatile form can generally be regarded as a **minor spill**.

Actions to take by lab personnel:

- Alert personnel in the immediate area to evacuate pending spill clean-up.
- Wear protective equipment, including safety goggles, disposable gloves, shoe covers, and long-sleeve lab coat during clean-up.

- Place absorbent paper towels over liquid spill. Place towels dampened with water or decontaminant cleaner over spills of solid materials.
- Use forceps or gloved hand to place towels in plastic bag. Dispose of plastic bag into a radiation waste container.
- Monitor area, hands, and shoes for contamination with an appropriate survey meter. Repeat cleanup until contamination is no longer detected.
- If needed, contact the Radiation Safety Officer at 568-6586 or [safety@lsuhsc.edu](mailto:safety@lsuhsc.edu).
- Complete the Radiation Decontamination Survey form, Appendix A. Ensure that lab schematic areas are drawn and labeled numerically. Record initial wipe test results and then final wipe test results after decontamination. Ensure that all survey readings are less than 200 DPM / 100 square centimeters. Forward a copy to the EH&S Department and save the record within laboratory files.
- Complete proper incident/accident reporting as per [EHS 400.06 - Incident / Accident Reporting](#) procedures.

#### 4.2 Major Spill Classification and Response

Incidents that involve the release or spillage of more than 100 microcuries (uCi) of a radionuclide in a nonvolatile form are **major spills**.

Actions to take by lab personnel:

- Attend to injured or contaminated persons and remove them from exposure.
- Direct personnel in the laboratory to evacuate.
- Close the doors and prevent entrance into affected area.
- Call the Campus police at 568-8999, who will then notify EH&S.
- Document names of potentially contaminated personnel and have them stay in one area, away from the spill, until they have been monitored and shown free of contamination. As necessary, remove contaminated clothing and wash contaminated skin with warm, soapy water, being careful to not damage the skin.

Upon arrival at the scene, EH&S shall:

- Assist with decontamination of any personnel exposed to radioactive contaminants.
- Perform decontamination of lab areas and equipment.
- Assist with completion of the Radiation Decontamination Survey form, Appendix A.
- Provide a written report within three working days to the LSU Radiation Safety Systems Officer detailing the of the incident and decontamination actions taken.
- Complete proper reporting as per [EHS 400.06 - Incident / Accident Reporting](#) procedures.

#### 5.0 TRAINING

##### 5.1 Environmental Health and Safety personnel shall:

Provide Radiation User Safety Training. Develop and provide/participate in periodic spill response drills.

**5.2 Principal Investigators and personnel working with radioisotopes shall:**  
Be trained on laboratory-specific radiation spill clean-up training at initial mandatory Radiation Safety training required of all personnel who handle radioisotopes.

**6.0 RECORD KEEPING**

**6.1 Radiation Safety Officer shall:**  
Maintain all spill documentation indefinitely.

**6.2 Employees**  
Principle Investigators/Laboratory Employees will document all minor radiation spill incidents and provide copy to Radiation Safety Officer.

**7.0 APPENDIX**

Appendix A. Radiation Decontamination Survey Form

# Appendix A – Radiation Decontamination Survey Form

PI: \_\_\_\_\_ Department: \_\_\_\_\_ Building & Lab #: \_\_\_\_\_

Gamma Counter - Manufacturer/Model/Serial #: \_\_\_\_\_

LSC – Manufacturer/Model/Serial #: \_\_\_\_\_  
Note: LSC must be used to protect H<sub>2</sub> & C<sub>14</sub>.

Survey Meter – Manufacturer/Model/Serial # \_\_\_\_\_

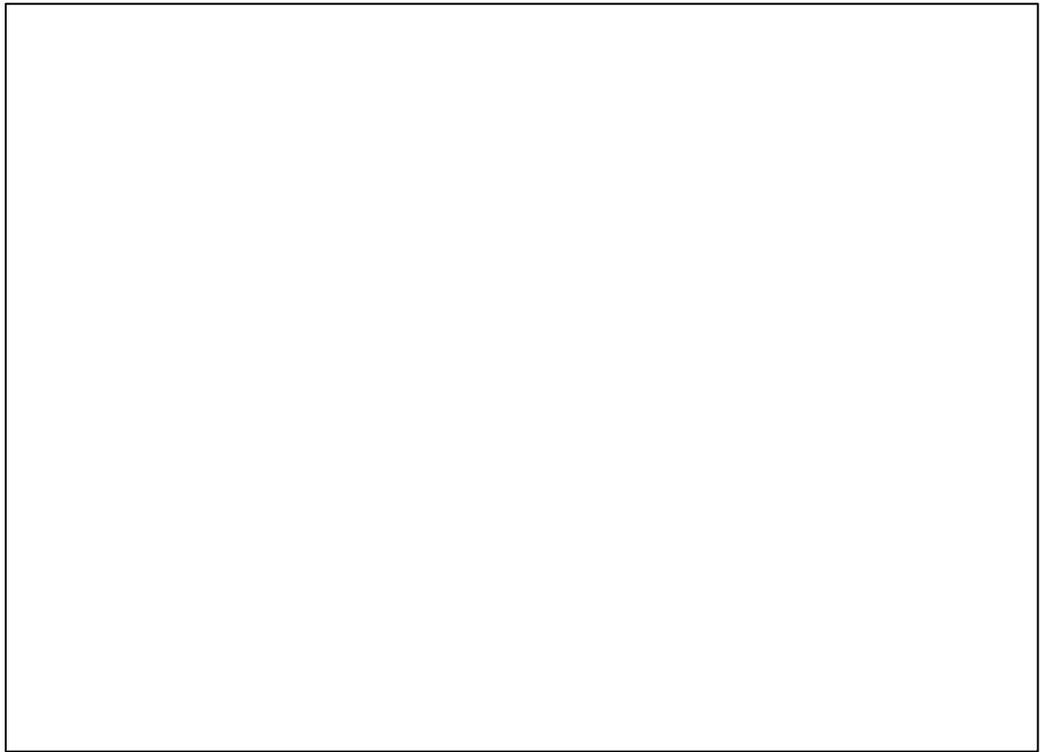
Background: \_\_\_\_\_ mR/Hr or cpm Battery Check: \_\_\_\_\_ Calibration Date: \_\_\_\_\_

Counter Information Type (Check one)  gamma counter or  LSC:

Isotopes used in Lab: (Check all that apply)  
 C-14  Ch-51  H-3  P-32  I-125  S-35  \_\_\_\_\_

### Area Schematic:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20



Rewipe of # \_\_\_\_\_ Rewipe of # \_\_\_\_\_

**\* Results should read less than twice background in cpm.**  
Inform the Radiation Safety Officer if it exceeds this amount.  
(Contaminated areas must be decontaminated immediately and documented)

Performed By: \_\_\_\_\_ Date: \_\_\_\_\_

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 12/08/2009	Updated: 1/6/2012	Policy #: EHS-100.05
<b>X-Ray Machine Inspection Policy</b>		

**1.0 PURPOSE:**

To ensure all X-ray machines at LSUHSC are properly inspected in accordance with radiation protection regulations and campus radiation safety committee guidance.

**2.0 SCOPE:**

This policy informs the X-Ray machine operator/inspectors/owners what items are to be addressed during the required inspection and before a Louisiana State Department of Environmental Quality (DEQ) X-ray machine audit.

**3.0 RESPONSIBILITIES:**

**3.1 Radiation Safety Officer shall:**

- Perform all dental and veterinarian X-ray machine inspections every 3 years.
- Perform all medical X-ray machine inspections annually.
- Maintain all inventory records of X-Ray devices and inspection results.

**3.2 X-Ray machine owners shall:**

- Notify Radiation Safety Officer on any new X-ray machine purchase to ensure proper DEQ registration.
- Notify Radiation Safety Officer on any X-ray machine removal.

**4.0 IMPLEMENTATION REQUIREMENTS:**

**4.1 Inspection Requirements**

- Inspections shall be performed at quoted intervals and after any X-ray machine modification or repair.
- The following placard signage is required for every X-ray unit:
  - Copy of DEQ Registration License
  - Copy of DRC-3 form
  - Technique chart which indicates what time duration (ms) and milliamp (ma) values are used for different patient sizes and/or body parts.
  - Warning Label posted on machine.

- Exposure indication of a visual or audible type when X-rays are produced.
- Shielding to protect the patient from scatter X-rays. A lead apron should be worn except for direct focused dental machines.
- Operator shall stand at least 12 feet from tube housing while making exposures or shall stand behind approved leaded glass shield.

#### **4.2 X-Ray machine annual inspection specific tasks**

- Ensure the DEQ registration license is correct (e.g., serial #, model #).
- Ensure operator is located at least 12 feet from tube housing while making inspection exposures. Operator may stand behind glass leaded shield.

Tasks include:

1. Exposure Duration (Time) Reproducibility test (use 4 timing tests)
2. Exposure Reproducibility test (use 4 exposures made in one hour)
3. Linearity test (if equipment allows choice of X-Ray current settings)
4. Accuracy test (no more than 10% error from one reading to another)
5. Use Appendix A, Form RS 04, X-ray Annual Inspection Form, to record results.

#### **5.0 RECORDKEEPING:**

Copies of all inspections must be on file at units' location and with the RSO and be monitored for the current fiscal year and the previous three fiscal years.

#### **6.0 INSPECTIONS AND PROGRAM REVIEW:**

This procedure shall be performed at quoted schedule or whenever there are any modifications or repairs to the X-ray machine.

#### **7.0 REFERENCE:**

LA DEQ Title 33, Part XV - Sections 603, 604 and 608

#### **8.0 APPENDIX:**

- A. Radiation X-ray Inspection Form

## LSU-HSC Radiation Safety Office X-Ray Machine Inspection

Facility Name \_\_\_\_\_ Facility Location \_\_\_\_\_ Date \_\_\_\_\_  
 Building Name \_\_\_\_\_ Room # \_\_\_\_\_ Specific location \_\_\_\_\_  
 Unit Type \_\_\_\_\_ (Dental, Medical, etc.) **State DEQ Registration #** \_\_\_\_\_  
 Manufacturer \_\_\_\_\_ Model \_\_\_\_\_ Serial # \_\_\_\_\_  
 Max kVp \_\_\_\_\_  
 Person Interviewed \_\_\_\_\_

Most Frequent Exam Setting  
 kVp \_\_\_\_\_ mA \_\_\_\_\_ time \_\_\_\_\_

\*Note: Instruments used for measurements \_\_\_\_\_ Scatter Survey Instrument \_\_\_\_\_

**TIMER/EXPOSURE REPRODUCIBILITY TEST** Based on settings: \_\_\_\_\_ kVp \_\_\_\_\_ mA \_\_\_\_\_ mSec

$(T_{max} - T_{min}) \leq 0.1 T_{avg}$  (needs to be less than 10% error)     
  $(E_{max} - E_{min}) \leq 0.10 E_{avg}$  (needs to be less than 10% error)

	Dose Reading (mR)	Time (mS)	(kVp)	(Hvl)
1				
2				
3				
Avg				

**Scatter Radiation Measurements**

Operator @ 12 feet = \_\_\_\_\_  $\mu$ R/ exp

Design Operating Range System	Measured Potential (kVp)	Dental Intraoral Manufactured before 8/1/74 and on or before 12/1/80	All Other Diagnostic X-ray Half-Value Layer (mm of Aluminum)
Below 51	30	N/A	0.3
	40	N/A	0.4
	50	1.5	0.5
51 to 70	51	1.5	1.2
	60	1.5	1.3
	70	1.5	1.5
Above 70	71	2.1	2.1
	80	2.3	2.3
	90	2.5	2.5
	100	2.7	2.7
	110	3.0	3.0
	120	3.2	3.2
	130	3.5	3.5
140	3.8	3.8	
150	4.1	4.1	

**Facility Equipment and Design**

- \_\_\_ Registration Certificate                      \_\_\_ DRC 3 Posted                      \_\_\_ Technique Chart Posted
- \_\_\_ Adequate Signs Posted                      \_\_\_ Shielding/Aprons provided
- \_\_\_ Dead man Type Exposure Switch                      \_\_\_ Exposure Switch Located Adequate  $\geq$  10 feet from tube

\_\_\_ **NO VIOLATIONS FOUND**                      \_\_\_ **VIOLATIONS FOUND**

Comments:

Inspection performed by \_\_\_\_\_ DATE \_\_\_\_\_



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 11/30/2010		Policy # EHS-100.06
<b>Radiation Survey Meter - Scan Procedures</b>		

**1.0 PURPOSE:**

To enable quick identification of radioactive contamination with a hand held survey meter and take corrective actions if required.

**2.0 SCOPE:**

The Radiation Safety Officer will use a survey meter and scan radiation packages entering the campus by mail delivery and while performing all quarterly lab inspections. All lab employees will perform survey meter scans on any high energy beta or any gamma emission isotope used at LSUHSC, to include Cr51, I125 and P32.

**3.0 RESPONSIBILITIES:**

**3.1 Radiation Safety Officer shall:**

- Perform meter scans during quarterly lab inspections and maintain these records for the current year and previous three fiscal years.
- Perform meter scans while checking-in all packages containing radioactive material.

**3.2 Principal Investigators shall:**

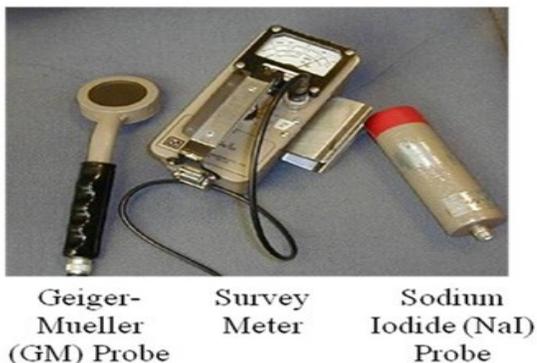
Ensure lab employees are performing meter scans and properly documenting the results.

**3.3 Lab Employees shall:**

Perform meter scans and properly document the results in a binder which will be made available to the Radiation Safety Officer and any requesting inspector from the Louisiana State Department of Environmental Quality (DEQ). Results shall be kept for the current year and the previous three fiscal years.

#### 4.0 OPERATING PROCEDURES:

##### 4.1 Selection of Survey Meter Probe

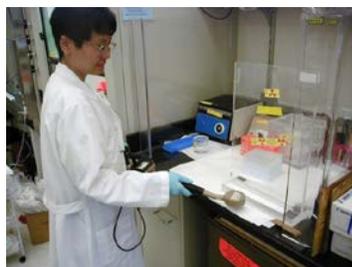


Which Isotope?	Which Probe ?
P-32	(GM)
Cr-51	(GM) or (NaI)
I-125	(NaI) or (GM)
C-14, H-3, S-35	Wipe Test only

##### 4.2 Operation of Survey Meter

- 1) Check calibration date (not older than 12 months) – **Contact RSO if calibration is needed.**
- 2) Perform battery check by turning the selector switch to the BAT position. Insert fresh batteries in the instrument if needed.
- 3) Adjust the response control by flipping the toggle switch to F (fast).
- 4) Turn the selector switch to the x.01 scale range initially to obtain background counts.
- 5) Perform background count rate. Go to a non-contaminated area and perform a background check and record on Appendix A, RS 06 – Radiation Survey – Meter Scan - Form.
- 6) Scan all areas in which contamination may likely be found such as:

##### Work Areas



##### Floors



##### Radiation Equipment



##### Personal Protective equipment



- 7) Record all values on RS 06 – Radiation Survey – Meter Scan – Form.
- 8) If greater than 3x background value your area is considered contaminated. Clean and perform survey again until values are below 3x.

#### **5.0 EMPLOYEE TRAINING AND EDUCATION:**

Radiation Safety Officer shall provide initial training in the required Radiation Safety Course.

#### **6.0 RECORDKEEPING:**

All meter scan records using the RS 06 – Radiation Survey – Meter Scan – Form shall be kept in the laboratories in which they were taken and stored in a folder for review for the current year and the three previous fiscal years.

#### **7.0 APPENDIX:**

A. Radiation Survey – Meter Scan – Form

# Radioactive Material Laboratory Survey and Meter Scan Form

PI: \_\_\_\_\_ Department: \_\_\_\_\_ Building & Lab #: \_\_\_\_\_

Gamma Counter - Manufacturer/Model/Serial #: \_\_\_\_\_

LSC – Manufacturer/Model/Serial #: \_\_\_\_\_

Note: LSC must be used to protect H<sub>2</sub> & C<sub>14</sub>.

Survey Meter – Manufacturer/Model/Serial # \_\_\_\_\_

Background: \_\_\_\_\_ mR/Hr or cpm Battery Check: \_\_\_\_\_ Calibration Date: \_\_\_\_\_

Counter Information Type (Check one)  gamma counter or  LSC:

Isotopes used in Lab: (Check all that apply)

C-14  Ch-51  H-3  P-32  I-125  S-35  \_\_\_\_\_

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Rewipe of # \_\_\_\_\_ Rewipe of # \_\_\_\_\_

**(\* Results should read less than twice background in cpm.**

Inform the Radiation Safety Officer if it exceeds this amount.

(Contaminated areas must be decontaminated immediately and documented)

Performed By: \_\_\_\_\_ Date: \_\_\_\_\_

**Environmental Health & Safety Policy Manual**

Issue Date: 11/12/2010

Policy # EHS-100.07

**Radiation Survey – Wipe Test Policy and Procedures**

**1.0 PURPOSE:**

To provide guidance on conducting routine wipe test surveys to ensure no radiation contamination is present in labs.

**2.0 SCOPE:**

All laboratory personnel who use radioactive materials must be familiar with and adhere to this policy.

**3.0 RESPONSIBILITIES:**

**3.1 Radiation Safety Officer shall:**

- Perform quarterly wipe tests in all labs labeled for radioisotope use.
- Keeps records of the lab inspections for Louisiana State Department of Environmental Quality (DEQ) audits.

**3.2 Principal Investigators shall:**

- Ensure wipe test surveys are being performed.

**3.3 Lab Personnel shall:**

- Perform wipe test after each radioisotope experiment use.
- Maintain all wipe test survey records for the current fiscal year and the previous three fiscal years.

**4.0 OPERATING PROCEDURES:**

**4.1 Frequency**

Wipe Tests are performed:

- Upon receipt of package deliveries to Radiation Safety Office by Radiation Safety Officer (RSO).
- After use of **H3, C14 and S35** in laboratory experiments (**mandatory** due to low beta emission).
- During quarterly lab inspections performed by RSO

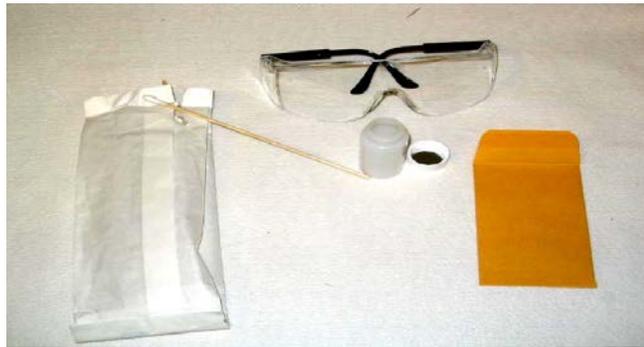
#### 4.2 Instrumentation needed

Wipe Tests are performed using the following items:

- Scintillation vials to place samples into
- Pen Marker and Gloves
- Scintillation machine

#### 4.3 Procedure

- 1) A cotton swab or filter paper should be used to wipe the surface of the target area. Gloves and eye protection are required to perform the survey safely. Plastic scintillation vials are recommended.



- 2) Perform the wipe test on all designated areas of concern using a new swab/filter paper for each location.
- 3) Use Appendix A, Radiation Survey Wipe Test Form, for documentation. Complete the form and draw schematic on where wipes are to be performed and label locations.
- 4) Moisten the swab/filter paper and wipe approximately 100 cm<sup>2</sup>. (Note: this is equivalent to a 4" x 4" square or a large S motion with your arm)



- 5) Place the swabs/filter papers into scintillation vials and label cap top with location number.



- 6) After obtaining all samples, add biodegradable scintillation fluid to each vial.



- 7) Place a zero background sample/standard in the tray bay first then add rest of vials and count using a counting window program appropriate for the nuclear substance for which you are surveying if assistance is needed, contact the RSO.



- 8) Reviewing the **(DPM) disintegrations per minute** data recorded is the preferable means to analyze true radiation contamination by the scintillation machine. If not available, **CPM (counts per minute)** will have to suffice.
- 9) An area must be cleaned and retested if the removable contamination level exceeds **200 DPM**, or if the exposure rate exceeds approximately **three times CPM** of background reading (see Appendix A, Example Scintillation Report).
- 10) Record all values on the Appendix B, Radiation Survey and Wipe Test Form, and keep in a folder located in the lab available for RSO and DEQ review.

## **5.0 RECORDKEEPING:**

All wipe test records for the current fiscal year and the previous three fiscal years shall be kept in the laboratories in which they were taken and stored in a folder for review.

## **6.0 APPENDICES:**

- A. Example Scintillation Report
- B. Radiation Survey and Wipe Test Form

**Example Scintillation Report**

```

ID:H3 - C14 DPM
USER: 4 COMMENT:
PRESET TIME : 3.00
DATA CALC : DL DPM H# :YES SAMPLE REPEATS: 1 PRINTER :EDIT
COUNT BLANK : YES IC# : NO REPLICATES : 1 RS232 : OFF
TWO PHASE : NO AQC :YES CYCLE REPEATS : 1
SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 3H %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0
ISOTOPE 2: 14C %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: Off

Quench Limits Low:18.520 High:321.90
  
```

SAM NO	POS	TIME MIN	H#	3H		14C		3H DPM	14C DPM	3H		14C		RATIO	LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR			EFF-1	EFF-2	EFF-1	EFF-2			
B1	1-1	3.00	1.6	16.67	28.28	5.00	51.64	22.70	6.03	68.57	0.82	18.24	79.86	3.766	0.45	3.55
B2	1-2	3.00	35.6	37.00	18.98	5.00	51.64	58.32	5.89	61.59	0.70	18.32	78.02	9.905	50.94	7.27
B3	1-3	3.00	55.7	26.33	22.50	7.00	43.64	43.37	8.71	57.01	0.66	18.43	77.10	4.979	55.09	10.88
B4	1-4	3.00	57.9	23.00	24.00	9.33	37.80	36.85	11.01	56.51	0.65	18.44	77.01	3.121	47.67	14.48
B5	1-5	3.00	38.1	24.00	15.57	5.67	48.51	88.15	6.49	61.04	0.69	18.33	77.90	13.577	14.28	18.05
B6	1-6	3.00	61.0	32.00	20.41	6.67	44.72	54.65	8.21	55.78	0.65	18.46	76.87	6.656	40.85	21.65
B7	1-7	3.00	38.9	24.67	23.25	7.67	41.70	37.67	9.51	60.85	0.69	18.33	77.85	3.960	34.22	25.23
B8	1-8	3.00	38.7	24.00	23.57	5.33	50.00	37.44	6.52	60.91	0.69	18.33	77.87	5.745	23.85	28.80
B9	1-9	3.00	51.4	21.00	25.20	6.33	45.88	33.68	7.91	58.03	0.66	18.40	77.29	4.261	32.79	32.39
B10	1-10	3.00	47.3	15.67	29.17	7.67	41.70	23.55	9.69	58.97	0.67	18.38	77.47	2.429	28.82	35.97
B11	1-11	3.00	41.8	22.00	24.62	6.00	47.14	34.28	7.42	60.21	0.68	18.35	77.72	4.620	25.35	39.56
B12	1-12	3.00	43.9	19.00	26.49	4.67	53.45	30.04	5.75	59.75	0.68	18.36	77.63	5.224	30.89	43.25
B13	1-13	3.00	42.3	20.33	25.61	4.00	57.74	32.35	4.86	60.09	0.68	18.35	77.70	6.651	44.83	46.83
B14	1-14	3.00	49.5	17.67	27.47	5.67	48.51	27.99	7.00	58.47	0.67	18.39	77.37	3.952	23.95	50.42
B15	1-15	3.00	52.9	26.00	22.65	7.33	42.64	42.16	9.14	57.68	0.66	18.41	77.22	4.615	28.23	53.99
B16	1-16	3.00	52.9	16.67	28.28	8.67	39.22	25.38	11.01	57.68	0.66	18.41	77.22	2.306	27.17	57.59
B17	1-17	3.00	47.6	17.67	27.47	5.67	48.51	27.79	7.00	58.89	0.67	18.38	77.46	3.928	21.95	61.17
B18	1-18	3.00	38.4	12.33	32.88	11.33	34.30	15.90	14.41	60.96	0.69	18.33	77.88	1.103	20.21	64.84
B19	1-1	3.00	71.3	39.00	18.49	7.33	28.57	65.94	20.82	53.29	0.64	18.52	76.45	3.168	42.43	68.58
B20	1-2	3.00	44.7	15.00	29.81	4.67	53.45	23.40	5.81	59.55	0.68	18.37	77.59	4.027	21.39	72.14
B21	1-3	3.00	38.8	13.33	31.62	6.33	45.88	19.51	7.96	60.88	0.69	18.33	77.86	2.450	17.48	75.82
B22	1-4	3.00	39.4	14.00	30.86	8.00	40.82	20.00	10.10	60.75	0.69	18.34	77.83	1.980	15.81	79.39
B23	1-5	3.00	36.9	18.33	26.97	5.00	51.64	28.07	6.16	61.30	0.69	18.32	77.95	4.553	18.34	82.96
				Blank Average DPM for 3H :		36.05		COEF. OF VAR:		47.117						
				Blank Average DPM for 14C :		8.62		COEF. OF VAR:		40.563						
2	1-8	3.00	-1.3	61059.57	0.47	669.67	4.46	88312.35	-92.94	69.13	0.83	18.24	80.04	-950.2	0.00	86.90
				WARNING: QUENCH VALUE IS OUTSIDE QUENCH LIMIT												
3	1-9	1.40	1.4	7620.00	1.94	34044.29	0.92	-260.59	42615.93	68.63	0.82	18.24	79.87	-0.006	0.00	89.17
				WARNING: QUENCH VALUE IS OUTSIDE QUENCH LIMIT												

**Radioactive Material Laboratory Survey and Wipe Test Form**

PI: \_\_\_\_\_ Department: \_\_\_\_\_ Building & Lab #: \_\_\_\_\_

Gamma Counter - Manufacturer/Model/Serial #: \_\_\_\_\_

LSC – Manufacturer/Model/Serial #: \_\_\_\_\_

Note: LSC must be used to protect H<sub>2</sub> & C<sub>14</sub>.

Survey Meter – Manufacturer/Model/Serial # \_\_\_\_\_

Background: \_\_\_\_\_ mR/Hr or cpm Battery Check: \_\_\_\_\_ Calibration Date: \_\_\_\_\_

Counter Information Type (Check one)  gamma counter or  LSC:

Isotopes used in Lab: (Check all that apply)

C-14  Ch-51  H-3  P-32  I-125  S-35  \_\_\_\_\_

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20

Rewipe of # \_\_\_\_\_ Rewipe of # \_\_\_\_\_

**(\* Results should read less than twice background in cpm.**

Inform the Radiation Safety Officer if it exceeds this amount.

*(Contaminated areas must be decontaminated immediately and documented)*

Performed By: \_\_\_\_\_ Date: \_\_\_\_\_

Environmental Health & Safety Policy Manual

Issue Date: 02/03/2011

Updated: 11/04/2022

Policy # EHS-100.08

**Radiation Safety – Perkin Elmer Liquid Scintillation Counter Use Procedures**

**1.0 PURPOSE:**

This procedure document is to provide operating instructions for scintillation machine usage at LSUHSC in order to detect the activity of particulate emitting beta ( $\beta$ ) radioactive samples and auger electrons emitted from gamma particles. The following common use isotopes with their emission type may be analyzed:

- Beta emission: C-14, H-3 (tritium), P-32, P-33, S-35
- Gamma emission: (auger electrons) Cr-51, Cs-137, I-125

**2.0 SCOPE:**

The Radiation Safety Officer (RSO) utilizes the scintillation machine for wipe tests taken during quarterly lab inspections and potential release events. EH&S staff may use the scintillation machine to assist RSO as needed such as spill response testing. Also, lab personnel that use H-3 (tritium), C-14 or S-35 shall perform wipe test surveys (see [EHS-100.07 - Wipe Test Procedures and Policy](#)) and use scintillation machine to analyze results.

**3.0 EQUIPMENT DESCRIPTION:**

One of the scintillation machines used at LSUHSC, located in the EH&S Radiation Lab, is the Perkin Elmer Liquid Scintillation Detectors, Tri-Carb LSC 4810TR110 V. All information presented is based on this model but may be referenced for other machines as respective use procedures are similar.

*Image 1: 2022 Perkin Elmer Liquid Scintillation Detector*



### 3.1 Instrument Specifications:

Table 1:

<b>Manufacturer:</b>	Perkin Elmer	
<b>Model:</b>	Tri-Carb LSC 4810TR110 V	
<b>Sample Vial Capability:</b>	336 Standard vials 648 Miniature vials	
<b>Calculation types:</b>	Counts per minute (CPM) Disintegrations per minute (DPM)	
<b>Scintillation Efficiencies:</b>	<b>Isotope</b>	<b>LSC efficiency</b>
	C-14	96%
	H-3	65%
	P-32 & P-33	100%
	S-35	97%
	Cr-51	35%
	Cs-137	100%
	I-125	78%
<b>Small check source:</b>	Cs-137 @ 30 uci (microcuries)	
<b>Printer:</b>	Brothers	
<b>CRT:</b>	Color black and off white	
<b>Reference samples:</b>	Background Standard (BKG) H3 standard and C14 standard	
<b>Product Dimensions:</b>	<b>Width:</b>	103 cm in (without side monitor shell)
	<b>Height:</b>	47 cm
	<b>Depth:</b>	81 cm
<b>Weight: 217 kg Minimum Power Requirements:</b>	120 V	3.0 A
	240 V	1.5 A

### 3.2 Scintillation Machine Operation Overview - How it works

Liquid scintillation counting (LSC) is the standard laboratory method to quantify the radioactivity of low energy radioisotopes, mostly beta-emitting and alpha-emitting isotopes. The sensitive LSC detection method requires specific cocktails to absorb the energy into detectable light pulses. In order to efficiently transfer the emitted energy into light, LSC cocktails must consist of two basic components:

- The aromatic organic solvent.
- The scintillator(s) or fluors.

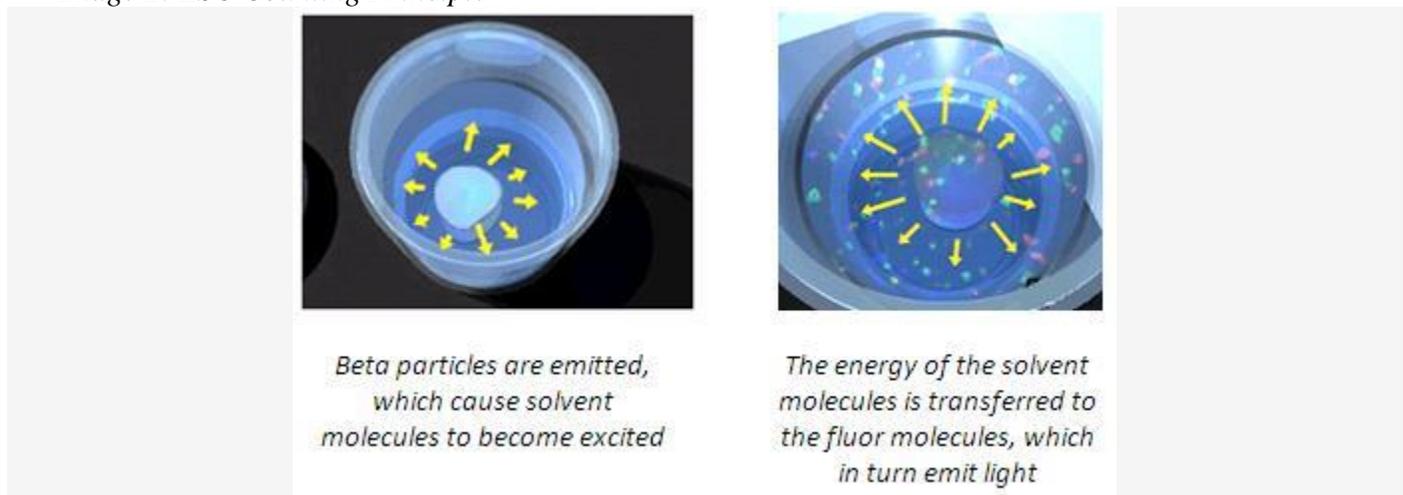
As most samples applied in LSC are aqueous-based, most of the LSC cocktails consist of:

- The aromatic, organic solvent.
- The scintillator(s) or fluors.
- The surfactants.

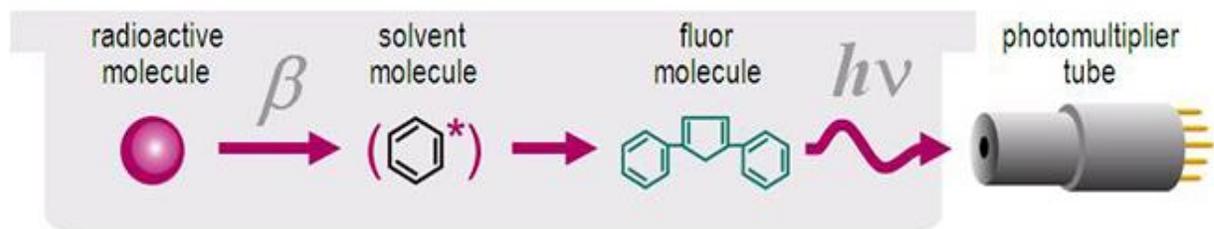
### 3.2.1 Principles of LSC

After excitation of the aromatic solvent molecules through the energy released from a radioactive decay, the energy is next transferred to the scintillator (also sometimes referred to as the "phosphor" or "fluor"). The energy absorbed through the scintillators produces excited states of the electrons, which decay to the ground state and produce a light pulse characteristic for the scintillator. The light is detected by the photomultiplier tube (PMT) of the liquid scintillation counter.

*Image 2: LSC Counting Principle*



*Image 3: Simplified schematic overview of the scintillation process.*



### 3.2.2 Perkin Elmer – Operating Instructions

Below is a guide on collecting wipe samples and operating the Perkin Elmer found in the LSUHSC Radiation Lab:

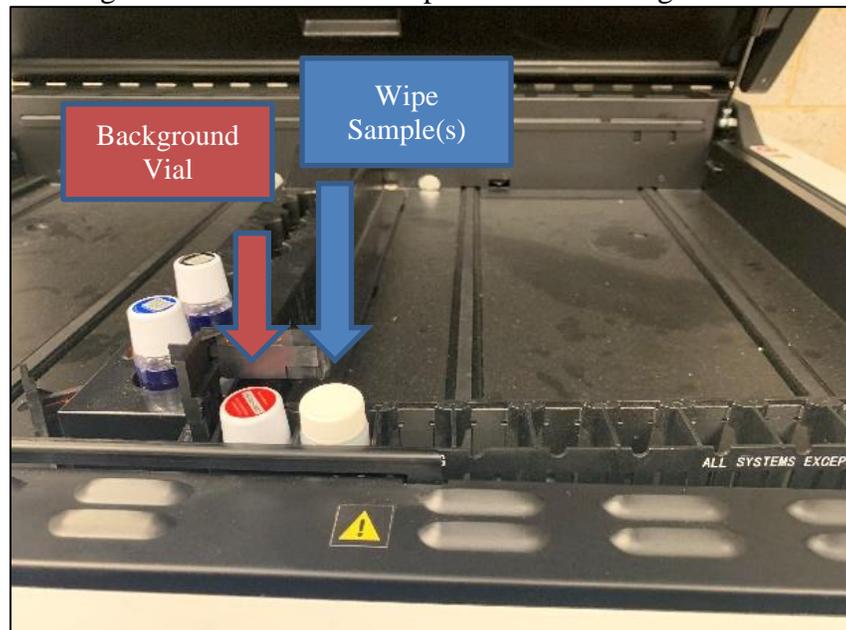
**1) Prep Samples:** Obtain Samples by completing wipe testing (refer to EHS-100.07 Radiation Survey – Wipe Test Policy and Procedures for instructions on how to complete wipe test). Prep Samples by filling with approved biodegradable cocktail fluid ensuring sample is completely covered with fluid.

*Image 4: Prepping samples with LSC fluid.*



- 2) **Loading Samples into LSC:** Next, load samples into rack in the following order: background vile first with all wipe test loaded samples behind background.

*Image 5: Vials loaded in sample rack with background first.*

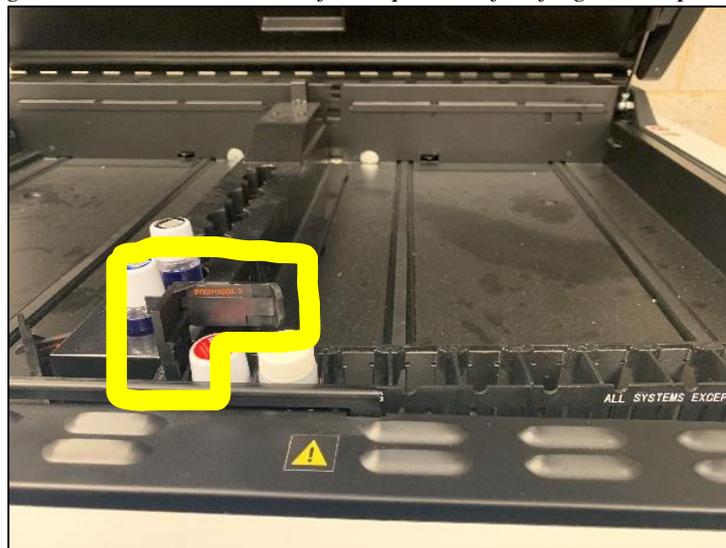


- 3) **Place Isotope Flag Marker on Vial Rack:** Insert the correct isotope identifier flag in the front slot of the rack with the background and sample(s) vials. Each flag is labeled with the isotopes programmed in to the LSC equipment.

*Image 6: Container of isotope identifier flags.*

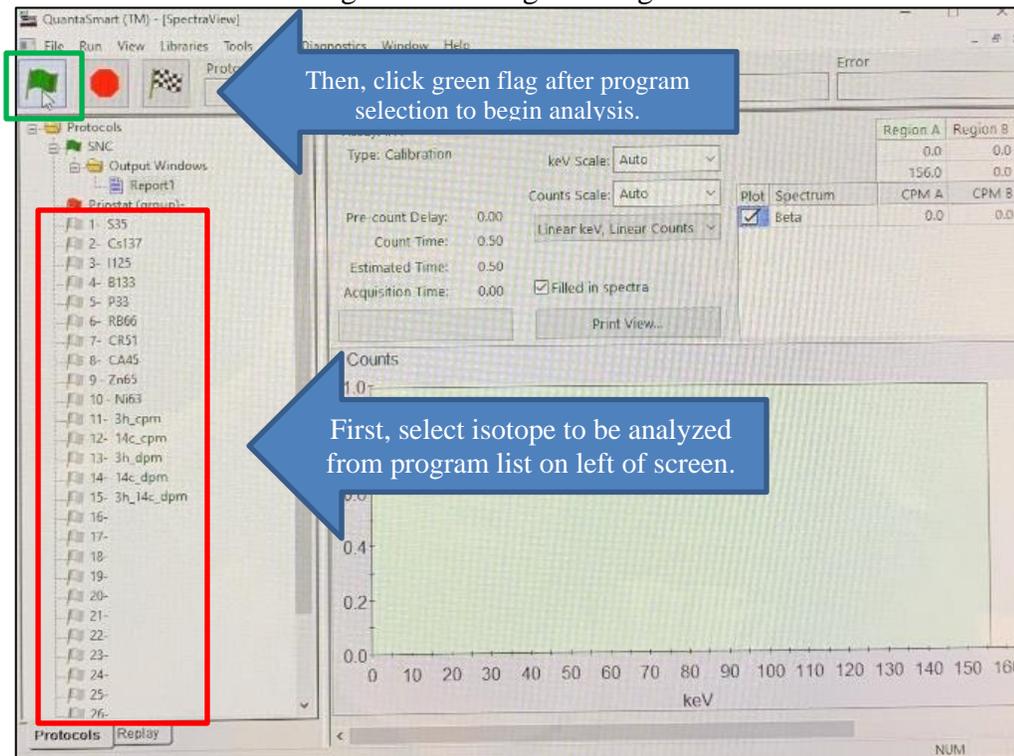


*Image 7: Placement location of isotope identifier flag on sample rack.*



- 4) **Select Isotope On LSC Screen To Begin Analysis:** Once the proper isotope is loaded in the rack with the proper isotope flag selected, highlight the User Program number with corresponding isotope on the LSC computer screen. Close the sample area cover. Next, click the green flag at the top left-hand corner of the screen to begin analysis.

Image 8: LSC Programming Screen



**Table 2: List of LSC Isotope User Program Selections**

User Program	Isotope	Unit type
1	S-35	CPM (counts per minute)
2	Cs-137	CPM
3	I-125	CPM
4	B-133	CPM
5	P32	CPM
6	Rb-66	CPM
7	Cr-51	CPM
8	Ca-45	CPM
9	Zn-65	CPM
10	Ni-63	CPM
11	H-3	CPM
12	C-14	CPM
13	H-3	DPM (disintegrations per minute)
14	C-14	DPM
15	H-3 & C-14	DPM

Note: Other future isotope user programs may be created or edited. Please contact EH&S for additional programing information.

- 5) **Report Generation:** Once the sample analysis is complete, a report will be generated on screen. Additionally, you may print this report by selecting at the printer icon at the top left-center of the report screen.

Image 9: Print report icon location.

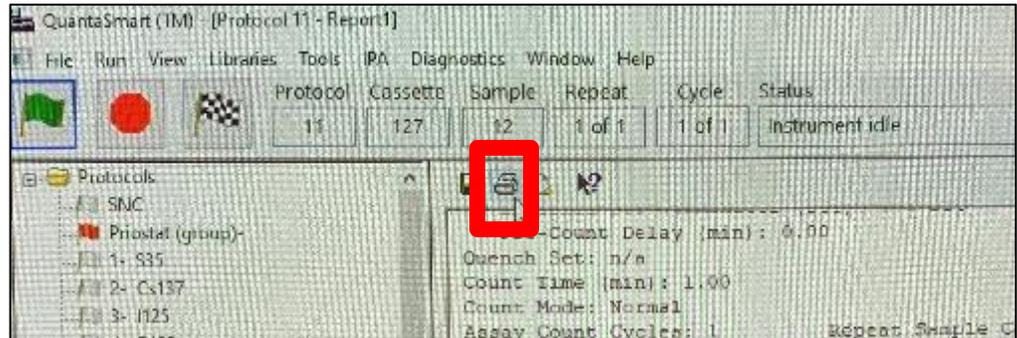
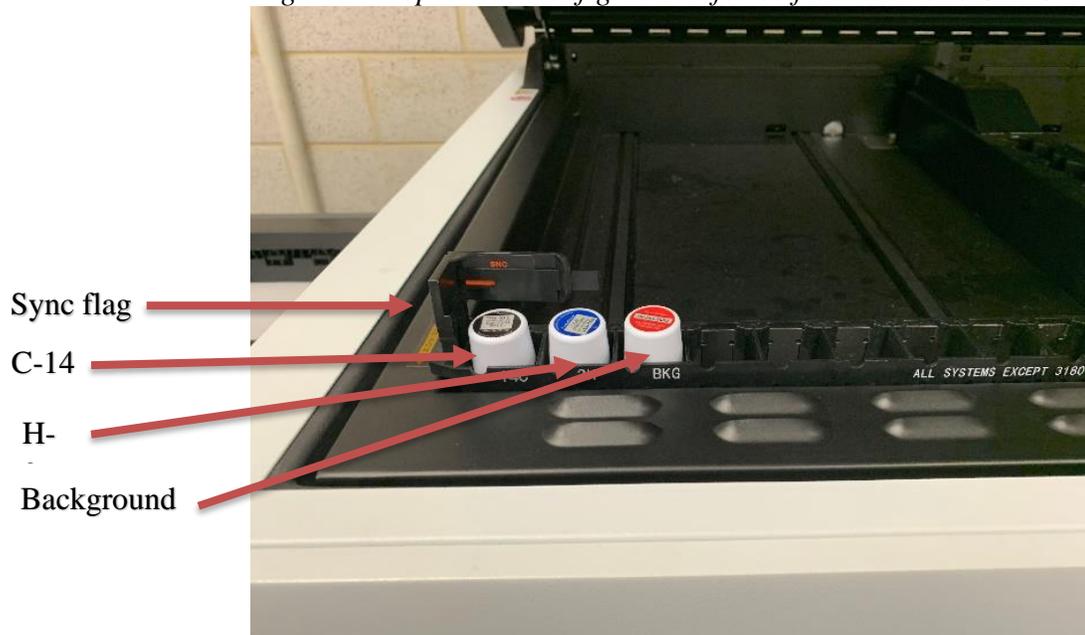


Image 10: Example Analysis Report

8/5/2022 11:25:10 PM		QuantaSmart (TM) - 5.2 - Serial# SGLO11221807		Page 1		
Protocol# 11 - 3H_CPM.lsa				User: Default		
<b>Assay Definition</b>						
Assay Description: Basic CPM assay Assay Type: CPM Report Name: Report1 Output Data Path: C:\Packard\Tricarb\Results\Default\3h_cpm\20220805_2321 Raw Results Path: C:\Packard\Tricarb\Results\Default\3h_cpm\20220805_2321\20220805_2321.results Assay File Name: C:\Packard\TriCarb\Assays\3h_cpm.lsa						
<b>Count Conditions</b>						
Nuclide: 3H Quench Indicator: tSIE/AEC External Std Terminator (sec): 0.5 2s* Pre-Count Delay (min): 0.00 Quench Set: n/a Count Time (min): 1.00 Count Mode: Normal Assay Count Cycles: 1      Repeat Sample Count: 1 Number of Vials/Sample: 1      Calculate % Reference: Off						
<b>Background Subtract</b>						
Background Subtract: Off Low CPM Threshold: Off 2 Sigma % Terminator: Off						
Regions	LL	UL				
A	0.0	18.6				
B	2.0	18.6				
C	0.0	0.0				
<b>Count Corrections</b>						
Static Controller: On		Luminescence Correction: Off		GCT: n/a		
Colored Samples: n/a		Heterogeneity Monitor: n/a		PAC: n/a		
Coincidence Time (nsec): 18		Delay Before Burst (nsec): 75		PAC Strength: n/a		
Auxiliary Spectrum: n/a						
<b>Cycle 1 Results</b>						
S#	Count Time	CPMA	CPMB	SIS	tSIE	MESSAGES
WARNING: Instrument not normalized.						
1	1.00	14	12	1032.67	995.27	
2	1.00	173538	155246	18.75	1000.38	

- 6) **Reset Equipment for Self-Calibration:** Once analysis is complete and vials have been discarded properly in the Rad Lab, reset the sample rack for the equipment's automatic self-calibration. To do this, place the SYNC identifier flag back at the front slot of the rack and insert the C-14, H-, and background vials, in that order, back into the rack.

*Image 11: Proper rack configuration for self-calibration / SYNC.*



**Note:** the equipment runs a self-calibration, or a “SYNC” cycle at specified frequency to ensure the equipment is calibrated. You can also perform a manual calibration at any time.

#### 4.0 REFERENCES:

EHS-100.07 Radiation Survey – Wipe Test Policy and Procedures

Environmental Health & Safety Policy Manual		
Issue Date: 3/9/2011		Policy # EHS-100.09
<b>Radiochemical Use Application Policy</b>		

**1.0 PURPOSE:**

To ensure that all those who apply for radiochemical use meet all requirements for safe operation, shielding, monitoring, surveying and storage of radioactive isotopes and waste.

**2.0 SCOPE:**

This policy applies to all LSUHSC personnel who use radiochemicals.

**3.0 RESPONSIBILITIES:**

**3.1 Radiation Safety Committee shall:**

- Review and approve of Appendix A, RS08 - Radiochemical Use Application.

**3.2 Radiation Safety Officer shall:**

- Ensure that the approved applicant has the required radiation safety materials and training needed before isotope orders are received.
- Provide a three hour basic Radiation Safety Course to all those who use radiochemicals.
- Perform quarterly laboratory inspections.
- Maintain quarterly laboratory inspections results for the current year and the last three fiscal years. Records are subject to review by LA-DEQ.

**3.3 Applicants shall:**

- Complete Appendix A and submit to the Radiation Safety Committee Chairman.
- Ensure all lab personnel have completed Radiation Safety Course.
- Submit request to Radiation Safety Committee Chairman for renewal at least one month before license expiration date.



#### **4.0 PROCEDURES:**

##### **4.1 Procedures:**

- 1) Applicant complete Appendix A and forward to Radiation Safety Committee Chairman.
- 2) Radiation Committee Chairman grants interim approval or returns Appendix A to applicant if more information is required.
- 3) Review and approve application at next Radiation Safety Committee meeting.
- 4) Forward approval to applicant.
- 5) Renewals are required every three years.
- 6) An amendment to the license is required if activity amounts change or if radiochemicals are added or removed.
- 7) Full compliance with all radiological safety policies and procedures is required to maintain the license.

#### **5.0 RECORDKEEPING:**

Radiation Safety Officer shall keep all required license documentation indefinitely.

#### **6.0 APPENDICES:**

- A. Radiochemical Use Application Form



## RADIOCHEMICAL USE PERMIT APPLICATION

**INSTRUCTIONS:** You can fill in this ADOBE Form by tabbing to the various sections. If you do not use Adobe to fill in the form, it must be typed. Return the completed form to Radiation Safety Committee Chairman, Dr. Dennis Paul, Department of Pharmacology, Campus Mail Box # P7-1, Medical Education Building, LSUHSC. Any section that is not applicable to your project should be marked "*Not applicable.*" Do not leave any section blank. If you need assistance in completing this form, call 568-6585 and ask to speak to the Radiation Safety Officer.

<b>Applicant's Name:</b>	
<b>Department:</b>	<b>Building:</b>
<b>Telephone Number(s):</b>	<b>E-mail:</b>

<b>1. List all radiochemicals to be used, the chemical form (e.g. <sup>3</sup>H-thymidine, etc) of each, and the maximum amount (in microCuries [<math>\mu</math>Ci] or milliCuries [mCi]) which you will have in your laboratory at any one time. Also, estimate the total amount of each isotope to be ordered during your three-year license approval.</b>		
Radiochemical(s)/chemical form (e.g., <sup>3</sup> H-thymidine, etc.)	Maximum amount to be on hand at any one time	Estimated amount to be ordered for 3 years

<b>2. List the applicant's qualifications for radiochemical use. (Specify experience [dates] and formal training of the applicant in radiochemical use.)</b>

3. Describe how radiochemicals will be used in experiments with emphasis on waste disposal. Limit to 300 words or less. (Example: After oligonucleotide labeling with  $^{32}\text{P}$ , the unincorporated radiochemical will be collected in a liquid waste vessel for disposal. Solids such as towels, pipettor tips, syringes, needles, plastic bags, etc. which come in contact with  $^{32}\text{P}$  will be bagged, labeled, and disposed of in the appropriate solid waste container for pickup by the Radiation Safety Officer.)

4. List all other individuals under your supervision who will handle radiochemicals.

Name	Title

5. Location of Radiochemical Storage (Building & Room #):

6. Method of Chemical Storage:

7. Location of Radiochemicals Use if Different from Storage Room:

8. Safety procedures for individuals working with radiochemicals and safety equipment that will be used (e.g., hood, shield, gloves):

9. Method of monitoring work areas for contamination, (wipe tests, Geiger counter) for each radiochemical:

**If Radiochemicals Will Be Used in Animals in This Project Complete A, B & C.**

- A. Has the appropriate institutional review form been filed with the Institutional Animal Care and Use Committee (IACUC)?**
- 
- B. List species (e.g., mouse, rat, etc.) of animal and the approximate number that will be disposed of weekly/monthly.**
- 
- C. List the approximate amount of radiochemical per animal and where animals will be housed during the experiments.**

**CERTIFICATE**

The applicant certifies that he/she and appropriately trained co-investigators, fellows, students, and technicians, etc. will comply with the UNIVERSITY BROAD SCOPE RADIOACTIVE MATERIAL LICENSE requirements and regulations published in the LSUHSC-NO Radiation Safety Manual and that the project will be conducted as described herein and that there will be no use of radioisotopes in humans. Approvals are granted for 3 years.

<b>Name of Applicant:</b>	<b>Signature:</b>	<b>Date:</b>
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**DEPARTMENTAL AUTHORIZATION**

I acknowledge that the department will be responsible for notifying the Radiation Safety Officer regarding disposal of radiochemicals remaining after departure of the above-named faculty member.

<b>Signature of Department Chairman:</b>	<b>Date:</b>
------------------------------------------	--------------

**FOR RADIATION SAFETY OFFICE USE ONLY**

<b>APPROVED:</b> <input type="checkbox"/> YES <input type="checkbox"/> NO	<b>APPROVAL NUMBER:</b>
<b>SIGNATURE:</b>	<b>DATE:</b>

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 12/08/2009	Updated: 3/16/2018	Policy #: EHS-200.01
<b>Chemical Safety Committee Charter</b>		

**1.0 PURPOSE:**

This charter document defines the membership, authority, responsibilities and operating rule of the Chemical Safety Committee at Louisiana State University Health Sciences Center (LSUHSC).

**2.0 SCOPE:**

The Committee will address issues related to the safe receipt, use, storage, and disposal of hazardous materials at LSUHSC. The Committee will also function on behalf of the University to ensure compliance with current federal, state, and local regulations concerning hazardous materials.

**3.0 RESPONSIBILITIES:**

**3.1 Chemical Safety Committee shall:**

- Report to the Executive Committee for Environmental Health and Safety.
- Ensure that LSUHSC operations are in compliance with all chemical safety regulations.
- Serve as a forum to gather and address chemical safety concerns.
- Serve as a forum to keep the LSUHSC community informed of new or proposed changes to chemical safety regulations.

**3.2 Chemical Safety Committee Chair shall:**

- Hold quarterly Committee meetings and develop meetings agendas.
- Work with the Chemical Safety Officer to ensure that the Environmental Health & Safety Department implements the directives of the Committee.
- Provide technical support as required.

**3.3 Chemical Safety Officer shall:**

- Assist Committee Chair with development of meeting agendas.
- Record and disseminate meeting minutes.
- Inform the Committee of any significant chemical safety incidents/violations and overall trends and recommend action.
- Perform periodic inspections of laboratories and other operations that use chemicals.

**4.0 IMPLEMENTATION:**

**4.1 Membership**

- Dr. Thomas Lallier, Chairperson
- Dr. Leslie Birke
- Dr. David Worthylake
- Dr. Katherine Carter
- Dr. Li Shen
- Mr. Robert Fahey
- Mr. Taylor Kriete
- Mr. Patrick Dugais

**4.2 Frequency of Meetings**

The committee will meet no less than quarterly.

**4.3 Minutes**

Meeting minutes will include:

- Date, time, and location of meeting
- Members present and absent
- Report of actions taken as a result of previous meetings
- Summary of deliberations and discussions, and recommended action items
- New business

**5.0 RECORD KEEPING:**

Meeting minutes will be maintained by EH&S for a minimum of six years.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 10/30/09	Updated: 5/16/2022	Policy # EHS-200.02
<b>Chemical Spill Response Policy and Procedures</b>		

### **1.0 PURPOSE:**

A wide variety of chemicals are used throughout the LSU Health Sciences Center. This document addresses the necessary preparation for and response to spills, leaks, or discharges of these chemicals.

### **2.0 SCOPE:**

The policy and procedures identified in this document apply to all LSUHSC employees, students, and contractors. This procedure provides guidance on determining the hazard severity of a spill and the procedures that shall be implemented based on the determined hazard severity.

### **3.0 RESPONSIBILITIES:**

#### **3.1 Environmental Health & Safety (EH&S) shall:**

- Provide a chemical spill kit to each laboratory and work area that uses hazardous chemicals.
- Provide assistance and additional clean-up materials to personnel to safely clean up minor spills in their work areas.
- Respond to, assess, and support the clean-up of major chemical spills.
- Hold reoccurring drills to ensure proficiency for minor and major spill responses.

#### **3.2 Principal Investigators/Supervisors shall:**

- Ensure employees understand the policy and procedure requirements of this document and any relevant chemical-specific spill response procedures.
- Maintain Safety Data Sheets (SDS), as directed by [EHS-400.12, Hazard Communication Program](#), for all chemicals.
- Review SDS and handling procedures for all chemicals with employees and maintain training records.
- Ensure that appropriate and adequate spill response and personal protective equipment (PPE) supplies are maintained and available for use at all times.

#### **3.3 Employees shall:**

- Understand the policy and procedure requirements of this document and any relevant chemical-specific spill response procedures.
- Promptly and appropriately respond to chemical spills.

- Do not use chemicals if not adequately trained.
- Wear PPE as directed by this or other relevant spill response procedures.

#### 4.0 IMPLEMENTATION

In many cases, chemical spills involve small quantities of materials and, if precautions are taken, present minimal hazards. The responsible party is the most appropriate group to clean up their spills as they are more likely to be familiar with the spilled material's hazardous characteristics, can respond rapidly, is aware of other potential hazards or complicating factors in their work area, including familiarity with the proper cleanup techniques for a particular spill. However, some spills will require contacting the EH&S Department, and potentially the use of outside assistance, because of the spill's size or hazards.

To prepare for spills, each PI/Supervisor shall: (1) be familiar with the hazards of the chemicals that are under their control; (2) be familiar with these general chemical spill response procedures and, as necessary, develop specific procedures for any chemicals that require special measures; and (3) ensure the availability of equipment and completion of training necessary to follow those procedures.

Spills can occur during a chemical's storage, transportation, or transfer, as well as in actual use. Spill prevention should be a major component of a spill response plan. Adherence to the [LSUHSC Chemical Hygiene Plan](#) and its guidance on the safe and proper use, handling, and storage of hazardous chemicals will help to minimize the potential for chemical spills.

#### 4.1 Spill Hazard Severity

At LSUHSC, two possible spill conditions have been identified: 1) minor spills, which can be managed and cleaned by the individual who has caused/identified the spill; 2) major spills, which require the support of EH&S or outside assistance.

Three factors primarily determine if a hazardous materials spill is minor or major.

1. Amount spilled - if the amount of the material spilled is more than 100 ml/10 grams of an [OSHA regulated chemical carcinogen](#), high hazard chemical, or 1 liter/100 grams of a volatile or flammable solvent, reactive or corrosive (acid or base) liquid/solid, it is considered a major spill.  
**Note** – the high hazard chemical list is available in [EHS-200.09, High Hazard Chemical Policy](#).
2. Hazards of material spilled - if the spill is below the above identified thresholds, but, in any way, presents an immediate danger to health, safety or the environment, is unknown, or is an immediate fire hazard, it is considered a major spill. All mercury spills are considered major and require the implementation of the major spill response procedures.
3. Spill Location - if the spill is outside of the laboratory or outside of the area where the material is normally used, and/or there is no trained person available to clean up the spill, it is considered a major spill.

The hazards associated with specific and general chemical classes, along with guidance on spill response, PPE use, waste management, etc., can be identified through consult of published data such as SDSs and chemical dictionaries.

#### 4.2 Minor Spill Response Procedures

In the event of a **minor spill** the following steps should be taken:

- Immediately isolate and control access to the spill area. Personnel not directly involved should be kept out of the spill area until clean-up has been completed.
- If the spill involves flammable materials, remove ignition sources and unplug nearby electrical equipment.
- Establish exhaust ventilation, if possible, by turning on fume hoods.
- Locate the chemical spill kit. Briefly inventory the contents to ensure that all necessary items are available as listed in section 4.6. Contact EHS if a spill kit is not available.
- Choose appropriate PPE (goggles, face shield, impervious gloves, lab coat, apron, etc.). The minimum chemical protective clothing used should include chemical glasses, gloves, booties, and lab coat. Ensure that all skin surfaces are covered. It is recommended that two sets of gloves be worn: one as the primary barrier, the second as a thin inner liner in the event the primary barrier fails. Chemical splash goggles shall be used for clean-up of chemicals that are caustic or whose gases/vapors are hazardous to the eyes. PPE use, to include training responsibilities, shall be in accordance with [EHS-400.03 Personal Protective Equipment Policy](#).
- If the spill is a liquid, confine and contain the spill by placing the container upright and covering or surrounding the spill with appropriate absorbent material. Absorbents should be added first to the spill's outer edges working toward the center. Do not use items with poor absorbent properties, such as newspaper and sand.
- Collect spill pads and place in double layers of plastic disposal bags.
- If the spill involves a solid granular or powdered material, place the container upright and sweep spilled material into a plastic dust pan. Transfer the collected material into a plastic disposal bag. Take caution to not create dust during the clean-up process. As possible, dust may be controlled by misting with water or other appropriate liquid. Consult the SDS or other references to identify compatible materials.
  - Acids/bases and some highly hazardous chemicals will need to be appropriately neutralized prior to clean-up. The chemical specific clean-up procedure, [high hazard chemical page](#), and/or the quick reference guide (appendix A) should be used to identify the appropriate absorbent and neutralization materials.
  - Caution should be used as the neutralization process is often vigorous, causing splashes and yielding large amounts of heat.
- Once the majority of the chemical has been collected, wet wipe the spill area.
- Appropriately decontaminate the spill area and all non-disposable equipment. A spill of certain highly hazardous chemicals may require special decontamination procedures, which should be pre-planned as per the high hazard chemical SOPs. At minimum, decontamination should include a full cleaning with soap and water. Determination of the appropriate completion of cleaning of acids/bases should include

- a pH measurement, which can be performed EH&S.
- Put all single use contaminated items (gloves, clothing, cleaning supplies, etc.) into a plastic disposal bag.
- Double layer and seal all disposal bags (twist the open top and wrap with duct tape) and, as possible, contain in the original spill kit container (5-gallon white bucket). Label the container with the name of the spilled material, date, and the words “hazardous waste.”
- When the cleanup is completed, wash hands and other potentially affected skin surfaces with soap and water.
- Request an EH&S Hazardous Waste Pickup. See [EHS-200.04 Chemical Waste Management Procedures](#) for details regarding hazardous waste management.
- Principle Investigators shall investigate and report all chemical spill events in accordance with the requirements of [EHS-400.06, Incident/Accident Investigation and Reporting Policy](#).

#### 4.3 Major Spill Response Procedures

In the event of a **major spill** the following steps should be taken:

- Immediately isolate and control access to the spill area.
- Notify University Police at (504) 568-8999, who will contact EH&S to respond to the spill.
  - **In case of a fire**, first pull the nearest fire alarm pull station and then call the University Police when you are in a safe location away from the area.
  - Provide the following information:
    - Name and telephone number of caller
    - Building and room number where the incident occurred
    - Name and type of material
    - Known hazard of the materials
    - Amount of material spilled
    - Explanation of what happened
    - Condition of any injured personnel
    - Status of area
- Communicate the condition and assist with evacuating, as necessary, all potentially impacted personnel. Potentially impacted personnel are those that could be exposed to hazardous concentrations of the spilled chemical and may include persons in the specific room containing the spill, immediately adjacent rooms, building floor, or the whole building/area. The extent of impact will be based primarily on the toxicity and amount spilled of the chemical, location of the spill, and other building related considerations, such as characteristics of the HVAC system. If it is believed that spill could affect the safety and health of the occupants of the entire floor or building, **pull the nearest fire alarm pull station**. Otherwise, University Police and EH&S will assess the conditions and determine the necessary extent of evacuation.
- Remain at the evacuation point/area of refuge until University Police or EH&S are available and identify yourself as the person who reported the chemical emergency. Be prepared to answer questions that may assist with the response and clean-up

- process. Do not leave the scene until released by authorized personnel.
- EH&S shall:
    - Respond to the emergency and assess the situation.
    - For most major spills, EH&S is anticipated to be capable of adequately managing the spill response with on-site resources. If this is confirmed through assessment of the spill condition, EH&S will commence clean-up operations.
    - The potential exists for some spill scenarios to require outside support in order to complete an adequate clean-up. As necessary, EH&S will contact the New Orleans Fire Department Hazardous Materials Unit or an outside spill response company for spill remediation as needed.
  - EH&S will make the determination as to when response is complete and will notify University Police when the area is determined to be safe for occupancy.

#### **4.4 Spills Involving Personnel Injury or Chemical Exposure**

If the accident involves personal injury or chemical contamination, follow the above procedures for a minor/major spill response, and at the same time:

- Move the victim from the immediate area of fire, explosion, or spill (if this can be done without further injury to the victim or you).
- Locate the nearest emergency eyewash or safety shower.
- Remove any contaminated clothing from the victim and flush all areas of the body contacted by chemicals with copious amounts of water for 15 minutes (unless chemical is water reactive or if directed otherwise by SDS). See [EHS-400.08 Emergency Shower and Eyewash Policy](#) for details regarding the appropriate use of emergency showers and eyewashes.
- Seek medical attention.

#### **4.5 Chemical-Specific Spill Response Procedures**

Certain chemicals or chemical classes may require special consideration and/or materials to perform a clean-up of their spill; a chemical-specific spill response procedure should be developed in these instances. The procedure should detail the initial steps to take when a spill occurs and include such elements as staff responsibilities, evacuation zones, communication methods, instructions on using spill response equipment, spill cleanup and residue disposal, and first aid procedures that might be required. It is recommended that any chemical-specific spill response procedures be included as a part of overall chemical-specific use procedure. For several high hazard chemicals used at LSUHSC, chemical-specific [standard operating procedures \(SOP\)](#) have been developed; they include spill response guidance.

#### **4.6 Spill Kit Equipment**

Spill Kits are the primary tool used to manage spills and required in all areas where chemicals are used or stored. The EH&S department will distribute the spill kits as requested.

- Spill Kits include
  - spill pads

- two plastic disposal bags
- glasses
- gloves (light weight latex and heavy Sol-vex)
- two booties
- two coveralls

Spill kits shall be strategically located for ease of accessibility in an emergency. Basic spill kits are provided by the EH&S Department and can be requested through a [Maintenance Connection System Work Order](#). A quick reference guide identifying recommended clean-up materials is included as Appendix A.

#### **4.7 Spill Reporting Requirements and Procedures**

Even a small spill can result in a harmful exposure to you or others or can result in hazards that are not obvious. If at any time during the execution of these procedures, an increase in the associated hazards is suspected, signs and/or symptoms of exposure to chemicals are exhibited, or the persons performing the clean-up begins to feel uncomfortable or loses confidence in their ability to adequately clean the spill, immediately stop the clean-up process, secure and exit the spill area, and contact the EH&S Department at 568-6585 for assistance.

LSUHSC is required to report certain releases/discharges of hazardous substances to the Louisiana Departments of Public Safety and Environmental Quality (DEQ). In order help ensure compliance with regulatory obligations, the EH&S Department shall evaluate all large chemical spills, and based on the results of evaluation, will implement appropriate response actions.

### **5.0 TRAINING**

#### **5.1 Environmental Health and Safety Personnel**

All EH&S personnel are required to:

- Attend 40 hour Emergency Responder Technician Training Class
- Attend an eight hour Emergency Responder Technician Refresher Class annually
- Participate in periodic routine spill response drills

#### **5.2 Employees**

Principal Investigators/Laboratory Supervisors are responsible to provide laboratory-specific training on chemical spill clean-up procedures and the proper use of personal protective equipment for chemicals used in their laboratory/laboratories. EH&S will assist upon request.

### **6.0 RECORD KEEPING**

#### **6.1 Environmental Health and Safety**

Each EH&S staff member shall maintain their own training records for the current fiscal year plus the previous three fiscal years.

## **6.2 Employees**

Principle Investigators/Laboratory Supervisors shall keep their employee's training records for the current fiscal year plus the past three fiscal years.

## **7.0 INSPECTIONS AND PROGRAM REVIEW**

Program effectiveness will be assessed annually by the Environmental Health and Safety Department. Furthermore, program compliance will be evaluated at the Chemical Safety Committee meetings and during routine laboratory inspections.

## **8.0 REFERENCES**

- Louisiana Administrative Code Title 33 Environmental Quality, Part I, Subpart II, Chapter 39; Reportable Quantities for Notification of unauthorized discharge
- Office of Risk Management General Safety Program Guidance

## **9.0 APPENDICES**

Appendix A – Spill Response Quick Reference

### SPILL CLEANUP QUICK REFERENCE

This table provides a synopsis of clean-up materials recommended for use in cleaning up spills of various chemical types. This list should be expanded to add any chemicals that are not listed or that require special procedures. The Material Safety Data Sheet ([MSDS](#)) for the particular chemical spilled is a preferable reference and will take precedence over this reference, if different.

Chemical Spilled	Clean-Up Procedures
Acids, organic	Apply sodium bicarbonate. Adsorb with spill pillow or vermiculite.
Acids, inorganic	Apply sodium bicarbonate/Calcium Oxide or sodium carbonate/calcium oxide. Adsorb with spill pillow or vermiculite. NOTE: Hydrofluoric acid is an exception to the general practice, see below.
Acid Chlorides	Do not use water. Absorb with sand or sodium bicarbonate.
Aldehydes	Absorb with spill pillow or vermiculite.
Aliphatic Amines	Apply sodium bisulfite. Adsorb with spill pillow or vermiculite.
Aromatic Amines	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Aromatic Halogenated Amines	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Azides	Absorb with spill pillow or vermiculite. Neutralize with 10% ceric ammonium nitrate solution.
Bases (caustic alkalis)	Neutralize with acid, citric acid, or commercial chemical neutralizers. Absorb with spill pillow or vermiculite.
Carbon Disulfide	Adsorb with spill pillow or vermiculite.
Chlorohydrins	Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Cyanides	Cover solids with damp paper towel and push onto dust pan or use a HEPA filter vacuum to collect the solids. Absorb liquids with spill pillow or vermiculite.
Halides, organic or inorganic	Apply sodium bicarbonate.
Halogenated Hydrocarbons	Absorb with spill pillows or vermiculite.
Hydrazine	Avoid organic matter. Apply "slaked lime". Adsorb with spill pillow or vermiculite.
Hydrofluoric Acid	Absorb with calcium carbonate (limestone) or lime (calcium oxide) rather than sodium bicarbonate. Using sodium bicarbonate leads to the formation of sodium fluoride, which is considerably more toxic than calcium fluoride. Take care using spill pillows to absorb the acid. Some pillows contain silicates which are incompatible with hydrofluoric acid.

Inorganic Solutions	Salt	Apply soda ash
Mercaptans/Organic Sulfides		Neutralize with calcium hypochlorite solution. Absorb with spill pillow or vermiculite.
Nitriles		Sweep up solids. Absorb liquids with spill pillows or vermiculite.
Nanoparticles		Pick up particles with a HEPA or ULPA filtered vacuum.
Nitro compounds/Organic Nitriles		Absorb with spill pillow or vermiculite. Avoid skin contact or inhalation.
Oxidizing Agents		Apply sodium bisulfite.
Peroxides		Absorb with spill pillow or vermiculite.
Phosphates, organic and related		Absorb with spill pillow or vermiculite.
Reducing Substances		Apply soda ash or sodium bicarbonate.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 5/29/2009	<i>Updated: 10/28/2014</i>	Policy # EHS-200.03a
<b>Compressed Gas Policy</b>		

**1.0 PURPOSE:**

Provide guidelines concerning the safe handling and use of portable compressed gas cylinders. Compressed gases are unique in that they represent both physical and potential chemical hazards. The gases contained in these cylinders vary in chemical properties, ranging from inert and harmless to toxic and explosive. The high pressures of the gases constitute a serious hazard in the event that the cylinders sustain physical damage and/or are exposed to high temperatures.

**2.0 SCOPE:**

All laboratories and other areas (e.g., Facility Services shops) where compressed gas cylinders are used. This policy and EHS-200.3b (Cryogenic Liquid Policy) supersede EHS-200.3, Compressed and Liquefied Gas Cylinder Policy.

**3.0 RESPONSIBILITIES:**

**Environmental Health & Safety Department (EH&S) shall:**

- Provide technical assistance when necessary.
- Assess compressed gas cylinder safety during routine inspections.

**Principal Investigators/Supervisors shall:**

- Ensure that employees understand the contents of this policy are instructed on the means of implementation and are provided with equipment and controls.
- Ensure that appropriate personal protective equipment (PPE) supplies are maintained.

**Employees shall:**

- Handle compressed gas cylinders only if properly trained.
- Check the identity of the gas labeling before use. If the cylinder content is not identified, if hydrostatic test date is past due, or if the cylinder is in any way damaged, the cylinder should be returned to the supplier (Airgas) at 568-6543 or <mailto:gas@lsuhsc.edu>
- Not modify, tamper with, paint, deface, obstruct, remove or repair any part of the cylinder, including the pressure relief device, the container valve, or the valve protection device.

#### 4.0 HAZARDS ASSOCIATED WITH COMPRESSED GASES:

Many hazards are associated with compressed gas use. Gases have properties which, if proper precautions are not followed, may cause injury, and possibly death. Special storage, use, and handling precautions are necessary in order to control these hazards. It is imperative that users read and understand the compressed gases' associated Material Safety Data Sheets (MSDS, also known as Safety Data Sheets (SDS)). Compressed gases that are used, or have the potential to be used at LSUHSC are listed below, and include hyperlinks to their associated Airgas MSDS. If you need additional information, consult the [OSHA standards](#) and/or contact EH&S for assistance.

- **Asphyxiating gas:** Is usually inert, that may cause suffocation by displacing the oxygen in the air necessary to sustain life. Examples: [Acetylene](#), [Argon](#), [Carbon Dioxide](#), [Helium](#), [Hydrogen](#), [Liquid Nitrogen](#), [Methane](#), [Nitrous Oxide](#)
- **Flammable gas:** A gas which, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less, or a gas which at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12 percent by volume, regardless of the lower limit, or one for which the DOT requires their red flammable gas label. Examples: [Acetylene](#), [Carbon Monoxide](#), [Hydrogen](#), [Methane](#)
- **Oxidizer gas:** A gas that is nonflammable but can support and vigorously accelerate combustion in the presence of an ignition source and fuel or is labeled by the DOT as an oxidizer. Examples: [Compressed air](#), [Nitrous Oxide](#), [Oxygen](#).
- **Toxic gas:** A gas that has a lethal concentration (LC 50) in air of 2000 ppm or less by volume of gas (Highly Toxic has an LC 50 of 200 ppm or less). Example: [Carbon Monoxide](#)

#### 5.0 PERSONNEL PROTECTIVE EQUIPMENT (PPE):

Perform a hazard assessment to determine appropriate PPE when working with a compressed gas. Potential PPE includes:

- **Safety Glasses (preferably with a face shield):** Use especially when connecting and disconnecting gas regulators and lines.
- **Foot Protection:** Closed-toed shoes are a laboratory requirement. They provide protection when moving cylinders.
- **Gloves and Clothing:** To protect against frostbite and corrosives.
- **Ear Plugs/Muffs:** To protect from loud pressure sounds.

## 6.0 SPECIAL HANDLING PROCEDURES:

The following precautions shall be taken when handling the following classes of gases:

### Flammable Gases

- Separate these cylinders (empty or full) from cylinders containing oxidizing gases. Separate via a minimum distance of 20 feet or by use of a noncombustible barrier at least five feet high having a fire-resistance rating of at least one-half hour. (OSHA standard 1926.350(a)(10))
- Storage in a ventilated, fire resistant enclosure is recommended.
- The quantity held in a laboratory/workspace should be kept to a minimum.

### Oxygen and Oxidizing Gases

- Do not permit oil or grease to come in contact with compressed oxidizing gases. Regulators and tubing used with oxidizing gases must be specially cleaned to remove oil and other reducing agents. Explosions may occur when pressurized oxidizers come into contact with grease or oil.
- Separate these cylinders (empty or full) from cylinders containing flammable gases.
- Do not store cylinders near flammable solvents, combustible materials or near unprotected electrical connections, heat sources or sources of ignition.

### Corrosive Gases

- Cylinders should be checked periodically to ensure that the valve has not corroded. If a cylinder or valve is noticeably corroded, contact Airgas, the LSUHSC supplier, immediately.
- The user should be cautious if flow does not immediately start when a valve is opened slightly, as there could be a plug in the valve. If there is a plug in the valve and the valve is opened more, the plug could clear suddenly, with unexpected excessive flow.

### Poison Gases

- Cylinders must be stored in ventilated enclosure.
- The quantity of poison gas in a laboratory should be kept to a minimum.
- Flow restrictors should be on poison gas cylinders.
- Ensure that pressure-relief devices vent directly to a laboratory exhaust system.

## 7.0 TRANSPORTATION, STORAGE, USE AND DISPOSAL:

### Transportation

- The valve-protection cap should be placed on the cylinder before transporting it and left on until it has been secured and is ready to use.
- Cylinders should not be:

- moved by dragging, rolling or sliding. Use a suitable hand truck or similar device with the cylinder secured for transporting.
- dropped or permitted to strike against each other or against other surfaces violently.
- moved with the cylinder valve open, and a regulator or gauge attached. Always close the cylinder valve when not in use.
- Do not transport compressed gases in closed vehicles. Cylinders must be chained or otherwise secured during transport. All gas cylinders should be secured with a strap or chain, whether at rest or in transit.

### **Storage**

- Cylinders should be stored in an upright position in a well-ventilated area away from sparks, flames or any source of heat or ignition.
- Cylinder should not be stored:
  - near exits, stairways, or areas normally intended for safe exit of people.
  - near flammable or combustible substances, or near corrosive chemicals.
  - where they may become part of an electric circuit.
- Cylinders can be stored on cylinder carts if they are properly secured.
- Full and empty cylinders should be stored separately.
- Where gases of different types are stored at the same location, cylinders should be grouped by types of gases, and the groups arranged to take into account the gases contained; for example, flammable gases must be separated from oxidizing gases.
- Inert gases can be stored with any other types of gases.
- Cylinders should be used by the “first in, first out” guideline.
- All medical grade gases, (e.g., nitrous oxide) should be under lock and key. Contact EH&S or Airgas at 568-6543 or email [gas@lsuhsc.edu](mailto:gas@lsuhsc.edu) should you have unsecured medical grade gas in your area.

### **Use and Disposal**

- Cylinders must always be secured against falling over.
- Cylinder caps should be kept in place until time for connecting cylinder to equipment.
- Cylinders should be clearly marked with the identity of the gas. Cylinder color should not be relied upon for content identification.
- Eye protection should be worn when changing regulators or manipulating tubing or equipment potentially under pressure.
- Regulators, gauges, hoses, and other appliances provided for use with a particular gas or group of gases should not be used on cylinders containing gases having different chemical properties unless information obtained from the supplier indicates that this can be done safely.
- Before connecting a valve gauge or other fitting to a cylinder valve outlet, “crack” the valve for an instant to clear the opening of particles of dust or dirt.
- Before a regulator is removed from a cylinder, the cylinder valve shall be closed and the pressure removed from the regulator/gauges.

- Keep connections to piping, regulators, and other appliances tight to prevent leakage. If leakage occurs, first close cylinder valve tightly before attempting to stop the leak.
- Cylinder valves should be opened slowly with the valve outlets and face of the gauge pointed away from yourself and other persons.
- A cylinder valve should never be forced. If a valve cannot be opened by hand, the cylinder should be returned and another obtained.
- Cylinders not having a hand wheel valve should be opened with a spindle key, special wrench, or other tool provided or approved by the gas supplier.
- Connections that do not fit should not be forced.
- Do not attempt to repair or alter cylinder, valves, or attachments. This work must be performed by the current vendor.
- Never tamper with safety devices in valves or cylinders.
- Once a cylinder is empty, it should immediately be capped, marked **EMPTY** and reported to the Airgas technician at 568-6543 for pickup and disposal.

## **8.0 TRAINING:**

Personnel who use compressed gases shall receive site-specific training that addresses proper storage, use, and any special precautions. This training shall be documented in writing and be retained for the duration of employment.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 5/29/2009	<i>Updated: 10/28/2014</i>	Policy # EHS-200.03b
<b>Cryogenic Liquid Policy</b>		

**1.0 PURPOSE:**

Working with cryogenic liquids involves significant health and safety hazards. This policy identifies health hazards, safe work methods, safe handling, transport, storage, and emergency spill response information to assist personnel with reducing the risk of working with cryogenic liquids.

**2.0 SCOPE:**

All personnel who use cryogenic liquids. This policy and EHS-200.3a (Compressed Gas Policy) supersede EHS-200.3, Compressed and Liquefied Gas Cylinder Policy.

**3.0 RESPONSIBILITIES:**

**Environmental Health & Safety (EH&S) shall:**

- Provide technical assistance when necessary.

**Principal Investigators/Supervisors shall:**

- Ensure that employees understand the contents of this policy, are instructed on the means of implementation, and are provided with equipment and controls.
- Ensure that appropriate personal protective equipment (PPE) supplies are maintained.

**Employees shall:**

- Handle cryogenic liquids only if properly trained.
- Review hazard information detailed on Material Data Sheets (MSDS, also known as Safety Data Sheets (SDS)) before beginning work with cryogens.

**4.0 HAZARDS ASSOCIATED WITH CRYOGENS AND DRY ICE:**

Consider the following hazards during the handling, transportation and storage of cryogens and dry ice.

- **Burns and Frostbite:** Skin contact with a cryogen, dry ice or non-insulated equipment parts can cause cold burn and frostbite. Eye contact with a cryogen or dry ice can cause permanent damage. Always wear the proper PPE when working with or around cryogens and dry ice.
- **Asphyxiation:** When cryogenic liquids form a gas, the gas is very cold and usually heavier than air. Small amounts of liquid can evaporate into very large volumes of gas. This gas can accumulate near the floor and displace air, resulting in the threat of

asphyxiation. This potential for oxygen deficiency is an especially serious hazard in enclosed or confined spaces.

- **Fire and Explosion Hazards:** Liquid nitrogen and helium are not flammable. However, they can condense oxygen out of the air by evaporation creating an oxygen-rich environment. Flammable materials can ignite in the presence of condensed oxygen.
- **Over-pressurization Hazards:** Cryogenic systems must be equipped with pressure-relief devices that must be kept clear of blockages.
- **Dewars** have an insulating vacuum space in between their double walls. If a dewar becomes damaged, air or liquid can leak into the vacuum space. This will reduce its insulating properties and can greatly increase the pressure inside the dewar. Dewars and storage vessels are equipped with pressure-relief devices that prevent high pressure from developing (liquid nitrogen dewars have one valve and one bursting disc, liquid helium dewars have two valves and one disc, and dewar flasks are equipped with loose-fitting lids or specially vented stoppers.) Air or liquid that leaks into a vacuum space can freeze. If the space is rapidly warmed after starting a transfer, the pressure-relief valve will vent the gas that is generated, preventing an explosion. Never cover a pressure relief valve that is venting.

## 5.0 PERSONNEL PROTECTIVE EQUIPMENT (PPE):

Perform a hazard assessment to determine appropriate PPE when working with cryogenic liquids. Potential PPE for use when filling dewars or when removing specimens or samples from a dewar include:

- Cryo-gloves
- Face shield
- Safety goggles
- Lab coat
- Long pants

The following should be worn when handling dry ice:

- Cryo-gloves
- Lab coat
- Long pants

Cryogenic Gas Material Data Sheets below additionally assist in PPE selection:

- [MSDS for Carbon Dioxide – Dry Ice \(Airgas, Inc.\)](#)
- [MSDS for Liquid Nitrogen \(Airgas, Inc.\)](#)

## 6.0 SPECIAL HANDLING PROCEDURES:

- Always work with cryogenics and dry ice in well ventilated spaces, especially when filling dewars. Adequate ventilation is essential since a small amount of liquid can rapidly convert to a large volume of gas that can displace air.

- Remove metal jewelry on your hands and wrists before working with cryogenics. If exposed to cryogenic liquids or boil-off gases, jewelry can freeze to the skin.
- Cryogenic containers are designed and made of materials that can withstand rapid changes and extreme temperature differences encountered in working with cryogenics. However, fill containers slowly to minimize internal stresses.
- If feasible, use chemical fume hoods when working with cryogenics.
- Never allow any unprotected part of the body to touch exposed pipes/vessels containing cryogenic liquids; skin coming in contact with the cold metal may adhere to it and tear when attempting to withdraw. Wear long sleeve shirt and pants.
- Exercise caution when adding a cryogenic liquid to a dewar at room temperature or when adding an object at room temperature to a cryogenic liquid. Both will cause the liquid to boil and splash vigorously.
- Always employ a retrieval device or tongs to recover items submerged in liquid nitrogen. Cryo gloves do not protect against liquid nitrogen penetration; only against exposure to cold surfaces.
- Report any leaks or improperly set relief valves immediately to the supplier (Airgas) at 568-6543 or <mailto:gas@lsuhsc.edu>.
- Periodically inspect equipment and remove ice and frost blockages from openings to prevent over pressurization.

**Special precautions for the Use of Cryotubes:**

- Cryotubes containing samples stored under liquid nitrogen may explode without warning. Tube explosions are caused by liquid nitrogen entering the tube through minute cracks and then expanding rapidly as the tube thaws after removal from dewars.
- Cryotubes are designed for vapor phase storage in the extremely cold nitrogen gas that sits just above the reservoir of liquid nitrogen in the bottom of the freezer or dewar. If the freezer/dewar is overfilled with liquid nitrogen and the vials are immersed, leakage of liquid nitrogen into the vial occurs. To avoid this problem, do not overfill the freezer/dewar with liquid nitrogen and visually check each cryotube prior to filling to ensure there are no defects around the rim.
- PPE for thawing cryotubes should include safety glasses, face shield, insulated heavy gloves, a buttoned lab coat, closed toe shoes and pants.
- As a precaution, slowly remove vials from the dewar, holding the vial in the neck of the dewar for a moment before bringing them into room atmosphere. A tube that is going to explode will usually do so early in the warm-up process.
- Keep cryotubes in a heavy, walled container or behind a safety shield while warming.
- Cryotubes should never be re-used.

**7.0 STORAGE AND TRANSPORTATION:**

- Never store cryogenic liquids in walk-in cold rooms as they are confined spaces.

- Use and store liquid hydrogen and helium away from flammable materials and ignition sources. (These gases can condense oxygen out of the air by evaporation, creating localized oxygen enriched environment.)
- For liquid helium and hydrogen storage systems, check the pressure relief and inspect the system for leaks regularly.
- Periodic equipment inspections, removal of ice blockages, and replacement of damaged or old storage units will reduce the probability of the catastrophic failure of a storage unit. Ice blockages that prevent the container from venting properly can cause an explosion hazard. Contact the supplier Airgas immediately at 568-6543 if ice blockages are observed.
- Store and transport cryogenic materials only in dewars or cryogenic liquid cylinders designed for that particular cryogen.
- Post a “No Open Flames” sign in liquid oxygen storage areas.
- **LSUHSC personnel may transport cryogenics in freight elevators only if no Passengers travel in the elevator.**

There are two ways to accomplish this:

1. Contact Facility Services and request the elevator be moved, via the Liftnet software, from the originating floor to the destination floor without stopping at any interim floor. Load the car with dewars and send to the destination floor where a coworker waits to remove them. Due to operating demands, schedule the move in advance with Facility services, especially if moving the dewars to rally points in advance of a hurricane.
2. Station co-workers at each elevator floor (prior to moving the elevator) to prevent personnel from entering the elevator on an interim floor.

## **8.0 EMERGENCY PROCEDURES:**

Liquid nitrogen is the most commonly used cryogenic liquid. The failure of a large cryogenic liquid cylinder could spill 165 to 180 Liters of liquid nitrogen gas. This will completely displace all oxygen in a 21x21x10 ft. room. A much smaller spill in the same room could still create a safety hazard. Simply reducing the oxygen content in a room below 19.5 percent is considered an oxygen deficient environment. Oxygen depletion resulting from nitrogen gas (odorless, colorless and tasteless) may occur rapidly with no warning. A person entering an oxygen deficient environment may become disoriented and unable to respond properly.

### **Should a spill occur:**

- If a spill occurs *immediately exit* the area. With adequate ventilation it may be appropriate to return to the area after thirty minutes. For large spills contact University Police immediately; University Police will contact Environmental Health and Safety to respond to monitor oxygen levels in the area and determine when it is safe to re-enter.

- If experiencing symptoms such as lightheadedness, dizziness, or confusion, immediately seek fresh air and receive medical attention.
- If an individual becomes unconscious in a cryogenic liquid storage area, contact 911 immediately; they should only be retrieved by personnel using proper protective equipment. Over half of the deaths associated with asphyxiation in confined spaces occur to would-be rescuers.

**In the event of contact with cryogenic gases or liquid:**

- Immediately remove any clothing that has been contaminated. In the event of clothing contamination with oxygen, hydrogen, or carbon monoxide, it is important to remove clothing, evacuate personnel from the facility, and keep away from ignition sources.
- Flush or soak the area with warm water (no greater than 105 F).
- Do not apply dry heat or rub damaged flesh or eyes.
- Employees should notify their supervisor of injuries and seek medical attention.

**9.0 DEFINITIONS:**

**Cryogenic liquid:** Liquid with a normal boiling point below -130 F. Common industrial gases transported, handled and stored in the liquid state at cryogenic temperatures are Argon, Helium, Hydrogen, Nitrogen, and Oxygen.

**Cryotubes:** Plastic biological sample tubes able to stand very low temperatures.

**Dewars:** Liquid dewar flasks are non-pressurized, vacuum-jacketed vessels, similar to a Thermos bottle. Dewars are designed with either loose-fitting caps or pressure relief valves, that prevents air and moisture from entering, yet allows excess pressure to vent.

**Dry Ice:** Dry ice is the solid form of carbon dioxide, non-combustible, available in flakes, pellets or block form. Dry ice will vaporize directly to the gas state at a temperature of -78.5C (-109.3 F) or higher.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 02/15/2010	Updated: 12/10/2021	Policy # EHS-200.04
<b>Chemical Waste Management Procedures</b>		

**1.0 PURPOSE:**

Hazardous and nonhazardous chemical wastes are generated by a variety of activities at LSUHSC. Proper handling and disposal of these chemical wastes reduce the threat to human health and the environment.

**2.0 SCOPE:**

These procedures provide guidance to all LSUHSC personnel who generate and handle hazardous and nonhazardous chemical waste.

**3.0 RESPONSIBILITIES:**

**Environmental Health and Safety Department (EH&S) shall:**

- Develop and implement procedures for the proper handling and safe disposal of hazardous and nonhazardous chemical waste.
- Provide safe storage of hazardous chemical waste pending final disposal.
- Comply with all government regulations regarding hazardous waste management.
- Prepare, submit, and maintain all records, reports, and manifests as required by government regulations.

**Principal Investigators and Supervisors shall:**

- Ensure their personnel have received training as described by these procedures.
- Ensure the appropriate disposal of hazardous and nonhazardous chemical wastes generated by work performed under their supervision
- Develop and implement more stringent procedures following the identification of any specific risks relevant to the handling and disposal of hazardous chemical waste.

**Staff and Students shall:**

- Comply with institutional policies and procedures.

- Notify your PI/Supervisor in the event of a chemical/chemical waste spill. Refer to [Chemical Spill Response Policy and Procedures](#) for spill management.

#### 4.0 IMPLEMENTATION

This section provides guidance on the procedures for general chemical waste management, waste classification, separation, containerization, labeling, and collection information for hazardous and nonhazardous chemical waste.

Faculty and staff are responsible for the administration of safe work practices within their respective areas. The cooperation of all supervisors and personnel is necessary to make laboratories and areas where chemicals are utilized safe places to learn and work. Faculty and staff working with chemical and/or hazardous waste must coordinate proper disposal of chemical wastes with EH&S. The following information provides guidance for safe handling procedures for hazardous and nonhazardous chemicals wastes.

Waste minimization should be first-line waste management procedure on the LSUHSC Campus. As a result, departments shall prioritize their operations to adhere to the guidance of the [LSUHSC Waste Minimization Program](#).

##### **Waste Classifications**

According to the EPA, solid waste materials are identified by the Environmental Protection Agency (EPA) and Louisiana Department of Environmental Quality (LDEQ) as being hazardous waste either by being listed by chemical names or by having certain physical and chemical characteristics. The “listed chemicals” can be found in the Louisiana Administrative Code (LAC) 33 Volume 4901 and the “characteristic” categories in LAC 33 Volume 4903. In addition, hazardous wastes may include byproducts and wastes from chemical reactions or unwanted commercial products and chemicals. Hazardous waste determinations are not always straight forward; therefore, EH&S may be enlisted to assist with guidance for handling and proper disposal.

Safety Data Sheets (SDS) which may be found online or printed out from the manufacturer of the material or chemical, are a good source of information for determining whether a particular material meets criteria to be designated as hazardous. SDSs must be accessible and available in laboratories or other spaces that store or utilize chemicals. All chemicals must be labeled properly and stored properly in appropriate containers.

##### **Waste Accumulation and Storage**

- Appropriate personal protective equipment (eye protection, gloves, aprons, etc.) must be worn when dealing with chemical waste materials. The chemical’s SDS and [Personal Protective Equipment Policy Manual](#) should be referenced for PPE use guidance.

- Compatible waste streams may be collected in a single container. Use of SDS sheets or [chemical compatibility charts](#) may be used to assist with compatibility determinations. Never mix incompatible wastes, as mixing incompatible wastes may cause a chemical reaction and/or increase disposal costs. It may be necessary to have different waste containers accumulating materials.
- Waste material must be compatible with the collection container, e.g., corrosives must not be stored/collected in metal containers. When possible, plastic containers are preferred to glass, as they are less likely to break if knocked over. Do not use containers with capacities exceeding one gallon unless granted written permission from the EH&S Department.
  - Chemical/hazardous must be collected in good condition, leak-proof containers, that are compatible with the type of waste stored and kept closed except when adding waste.
  - Waste containers may not be left open or open with funnels.
  - Stopped glassware or beakers are not appropriate waste collection containers.
  - The chemical's original container can be used for disposal if it is not damaged and can be securely resealed; however, do not reuse the original container if the waste's physical characteristics have been significantly changed. For example, if a flammable solvent has also been made corrosive by the addition of an acid, then a metal container would no longer be suitable for this waste.
  - Do not place hazardous waste in an unwashed container that previously held an incompatible material.
  - Do not overfill a container; always leave an at least a two-inch air gap.
- Chemical/Hazardous waste should be stored near the point of generation or in the lab in which it is generated. Waste should be consolidated in one place in the lab – not spread out in several different cabinets and counter tops.
  - Waste containers and any chemical container must not be stored in a location where a spill could potentially cause a release to the environment.
  - Containers should not be stored next to sinks and ideally not in hoods with sinks.
  - Containers should not be stored on the floor where they can be kicked over, particularly in rooms with floor drains.
  - Waste should not be removed from the labs or room, with the exception of transport for final disposal.

### **Labeling**

Label all hazardous chemical waste containers with the words “Hazardous Waste”, the principle chemical constituents and their approximate percentages, and the date the waste is first placed within the container. EH&S upon collection of waste materials will provide final regulatory labeling.

If empty commercial chemical containers are used to collect waste, the old chemical label must be obliterated and a new label affixed to the container to avoid possible confusion as to the contents.

### **Waste Disposal**

The disposal of chemical waste via the sink or trash and the use of fume hoods to intentionally evaporate chemicals or abandonment of chemicals/chemical wastes is prohibited on campus.

Please reference the [Waste Disposal Procedures](#) for management of Pharmaceuticals and Controlled Substances wastes.

Chemical waste pick-ups are a service provided by the EH&S Department. Chemical waste pick-ups are held weekly on Thursdays; a service request must be submitted for every chemical waste pick-up. Authorized individuals must use the [bob.lushsc.edu](http://bob.lushsc.edu) service request system. To have a chemical waste pick-up done by Thursday, submit a service request no later than Wednesday at 4:00 p.m.

## **5.0 TRAINING**

PI/Supervisors of staff and students shall ensure that [KDS General and Laboratory Safety Training](#) has been completed prior to assignment of duties managing chemical/hazardous wastes.

All EH&S personnel who handle hazardous chemical waste must complete 40-hour Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) training and annual HAZWOPER refresher training.



## **Environmental Health & Safety Policy Manual**

Issue Date: 04/09/2010

Updated: 11/4/2022

Policy # EHS-200.05

### **Chemical Ordering and Storage Procedures**

#### **1.0 PURPOSE:**

The improper storage and handling of chemicals can result in a fire, explosion, or personal injury. These procedures provide general guidance for the ordering and proper storage of chemicals. More specific storage instructions on chemicals may be obtained from safety data sheets (SDS), container labels, and chemical reference books.

#### **2.0 SCOPE:**

This procedure applies to all LSU Health Sciences Center personnel that generate, accumulate, store, or handle chemicals.

#### **3.0 RESPONSIBILITIES:**

##### **3.1 Environmental Health and Safety Department (EH&S) shall:**

- Provide technical assistance with the safe handling and storage of chemicals.
- Provide evaluation of facilities, work practices, and investigation of potential exposure situations or events.
- Provide chemical spill kits and fire extinguishers for chemical storage areas.
- Maintain an inventory of all chemicals on the [SafetyStratus](#) web-based system.
- Perform random laboratory inventory checks to ensure that the laboratory inventory on hand matches the inventory in [SafetyStratus](#).

##### **3.2 Principal Investigator/Laboratory Supervisor shall:**

- Ensure that good work practices, containment systems, and engineering controls are fully implemented when chemicals are handled and stored.
- Maintain chemical inventory on [SafetyStratus](#) database.

- Maintain SDS for all chemicals handled and stored. The SDS are to be kept on the computer hard drive or in hard copy. [SafetyStratus](#) provides an SDS library that can be used to gather needed SDS materials.

### **3.3 Employees and students who work with chemicals shall:**

- Understand the proper handling and storage of chemicals by reading the container labels and SDS.
- Know where the chemical spill kit, fire extinguishers, emergency showers and eye wash stations are located.
- Report unsafe storage conditions to the immediate supervisor.

## **4.0 IMPLEMENTATION:**

### **4.1 General Operating Procedures:**

The following procedures are intended to reduce risks associated with hazardous chemicals, minimize the amount of chemicals held in laboratories and storage areas; maintain a current chemical inventory; and provide safety data sheets for all chemicals.

### **4.2 Ordering Chemicals:**

- Order only what is needed; EH&S recommends maximum of a six-month supply.
- Check inventory regularly and dispose of outdated or unnecessary chemicals.
- Avoid maintaining an excess of unused chemicals.
- Order solvents in safety cans rather than glass bottles; metal containers provide more protection against breakage and spillage.

### **4.3 Chemical Storage Area Guidelines:**

- Maintain chemical spill kits and fire extinguishers in all chemical storage areas.
- Ensure storage areas are well ventilated.
- Store chemicals away from direct sunlight and any other heat sources.
- Store chemicals no closer than 18" to the ceiling so that the effectiveness of the automatic sprinkler system is not impacted.
- Provide adequate shelving to prevent chemicals from becoming overcrowded or inaccessible. Never store chemicals on the floor.
- Ensure that shelves used in chemical storage area are:
  - Secured to a permanent structure and strong enough to support the weight of all the containers
  - Fitted with a raised lip or tilted backward slightly so the containers won't slip off the edge
  - Painted or covered with chemical resistant materials.
- Never stack chemical containers on top of each other.
- Always place heavy chemical containers on lower shelves or at the bottom of cabinets.
- Never use laboratory fume hoods and bench tops for chemical storage areas.

- Always store hazardous liquid in secondary containment trays that are made with chemical resistant materials.
- Store quantities of 10 gallons or more of flammable materials in an approved Underwriter Laboratory (UL) or Factory Mutual (FM) listed flammable storage cabinet that meets OSHA 29CFR 1910.106 and NFPA 30 specifications.
- Store flammable materials needing refrigeration in an approved UL or FM listed flammable storage refrigerator that meets NFPA 45 and NFPA 70 guidelines.
- Label chemical storage refrigerators with the words “Caution-Do Not Store Food or Beverages in this Refrigerator”.
- All chemical containers must be:
  - Constructed of a material that is compatible with the chemical.
  - Labeled with the contents in English and the date of receipt.
  - In good condition with no rusting, bulging, or chemical encrustation.
  - Properly capped.
  - Periodically inspected for signs of deterioration and for label integrity.

## **4.5 SPECIFIC CHEMICAL STORAGE GUIDELINES**

To avoid interaction between incompatible chemicals, all chemicals should be separated into compatible hazard groups then placed alphabetically within each group. For examples of incompatible chemicals, see Appendix A. Since many chemicals present multiple hazards, consult the SDS to determine the “primary” hazard class of the chemical. The following guidelines are provided for the safe storage of chemicals in accordance with their hazard group:

### **4.5.1 General Use Chemicals**

- Store chemicals that pose no health risks and that do not have any significant incompatibilities together in an alphabetical system.
- Separate solids from liquids.

### **4.5.2 Acids**

- Store in acid cabinets with other noncombustible materials.
- Separate oxidizing acids, organic acids, and mineral acids.
- Use secondary containment trays to provide separate areas in the same cabinet.
- Keep separate from incompatible materials such as bases, cyanides, sulfides, reactive metals, flammables, and combustible materials.

### **4.5.3 Bases**

- Store in corrosive cabinets.
- Store in a dry place.
- Store concentrated bases on lower shelves in secondary containment trays.
- Keep separate from acids.

#### **4.5.4 Flammables**

- Store in UL or FM listed cans or cabinets that meet OSHA and NFPA specifications.
- Store away from any source of ignition.
- Use only explosion-proof or intrinsically safe refrigerators and freezers that are UL or FM listed and meet NFPA 45 and NFPA 70 guidelines.
- Keep separate from oxidizing acids and oxidizers.

#### **4.5.5 Oxidizers**

- Store in cabinets of noncombustible materials.
- Store in a cool dry place.
- Keep separate from flammables, combustibles, and reducing agents such as zinc, alkali metals, and formic acid.

#### **4.5.6 Toxics**

- Keep quantities on hand at a minimum.
- Store according to the nature of the chemical, using appropriate security when necessary.

#### **4.5.7 Cyanides**

- Store in a secure cabinet that can only be accessed by authorized personnel.
- Store away from acids and oxidizers.

#### **4.5.8 Water Reactive Chemicals**

- Store in a cabinet in a cool, dry place.
- Do not store under sinks, near water baths, or under sprinkler heads.
- Keep a class D fire extinguisher available when working with specific water reactive chemicals. Contact the Environmental Health and Safety Department if a Class D fire extinguisher is needed.

#### **4.5.9 Pyrophoric Substances**

- Store in a cool, dry place making provisions for an airtight seal.
- Store away from sources of ignition.
- Keep separate from flammables.

#### **4.5.10 Peroxide Forming Chemicals**

- Store in airtight containers in a dark, cool, and dry place.
- Label containers with receiving, opening, and disposal dates.
- Periodically check containers for formation of peroxides.
- For examples of common peroxide forming chemicals, see Appendix B.

## **5.0 EMPLOYEE TRAINING:**

### **5.1 Initial Training**

The Principal Investigator/Laboratory Supervisor is responsible to provide laboratory-specific training to all laboratory workers on chemical hazards before they handle, use, or store hazardous chemicals.

### **5.2 Training Elements**

Training elements should include how to understand an Safety Data Sheet, the proper handling and storage of the different chemical hazard groups, and the location and how to use emergency equipment in the event of a spill.

## **6.0 RECORD KEEPING:**

Principal Investigators/Laboratory Supervisors shall maintain their employee's training records for the current fiscal year and the previous three fiscal years.

## **7.0 INSPECTIONS:**

Chemical storage areas should be inspected by a laboratory employee on a monthly basis for the following:

- Chemical container and label integrity.
- Outdated chemicals.
- Compounds that show signs of crystallization or discoloration.
- Adequate emergency equipment.

## **8.0 DEFINITIONS:**

- **Acid** is a corrosive substance that when dissolved in water increases the concentration of hydrogen ions, H<sup>+</sup>. The strength of an acid solution is usually measured in terms of pH. Strongly acidic solutions have low pHs (0-3); while weakly acidic solutions have pHs in the range 3-6.
- **Base** is a corrosive substance that when dissolved in water increases the concentration of hydroxide ions, OH<sup>-</sup>. The strength of a base solution is usually measured in terms of pH. Strongly basic solutions will be in the range of 11-14.
- **Corrosives** are materials which cause destruction or irreversible damage to living tissue at the site of contact.
- **FM** is the acronym for Factory Mutual. FM conducts tests to investigate different fire situations and ways to reduce loss. FM employs engineers and scientists to conduct third-party testing and certification and is recognized by OSHA.

- **Safety Data Sheet (SDS)** is designed to provide both workers and emergency personnel with the procedures for handling or working with a particular chemical. SDS's include information such as physical data, toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill/leak procedures.
- **NFPA 30** is the National Fire Protection Association standard, "Flammable and Combustible Liquids".
- **NFPA 45** is the National Fire Protection Association standard, "Fire Protection for Laboratories using Chemicals".
- **NFPA 70** is the National Fire Protection Association standard, "National Electric Code".
- **OSHA** is the acronym for Occupational Safety and Health Administration.
- **Oxidizers** are chemicals that give off oxygen, thus causing or enhancing the combustion of other materials.
- **Pyrophoric Chemicals** are liquids or solids that, even in small quantities and without an external ignition source, can ignite within five minutes after coming into contact with air.
- **UL** is the acronym for Underwriters Laboratory. UL is a privately owned and operated independent, third-party product safety testing and certification organization which is approved by OSHA.
- **Water Reactive Chemicals** are chemicals that when in contact with water, are liable to become spontaneously flammable or emit flammable or toxic gases.

## 9.0 APPENDICES:

- Appendix A – Incompatible Chemicals Guide
- Appendix B – Peroxide Forming Compounds

## **INCOMPATIBLE CHEMICALS GUIDE**

Provide separate storage areas for “incompatible chemicals”, which may react together and create hazardous conditions. Some examples of incompatible chemicals are:

<b><u>CHEMICAL</u></b>	<b><u>KEEP OUT OF CONTACT WITH</u></b>
<b>Acetic acid</b>	Chromic acid, Nitric acid, hydroxyl compounds, Ethylene glycol, Perchloric acid, peroxides, permanganates
<b>Acetylene</b>	Copper (tubing), Fluorine, Bromine, Chlorine I, Iodine, silver, mercury or their compounds
<b>Alkaline metals (powdered Aluminum, Magnesium, Sodium, Potassium)</b>	Water, Carbon tetrachloride, Carbon dioxide, or other chlorinated halogens
<b>Ammonia, anhydrous</b>	Mercury, Chlorine, Calcium hypochlorite, Iodine, Bromine, Hydrofluoric acid
<b>Ammonium nitrate</b>	Acids, metal powders, flammable liquids, chlorates, nitrates, Sulphur, and finely divided organics or other combustibles
<b>Aniline</b>	Nitric acid, Hydrogen Peroxide, or other strong oxidizing agents
<b>Bromine</b>	Ammonia, Acetylene, Butadiene, Butane, Hydrogen, Sodium carbide, Turpentine, or finely divided metals
<b>Chlorates</b>	Ammonium salts, acids, metal powders, sulfur, carbon, finely divided metals or other combustibles
<b>Chromic acid</b>	Acetic acid, Naphthalene, Camphor, alcohol, Glycerin, Turpentine, and other flammable liquids
<b>Chlorine</b>	Ammonia, Acetylene, Butadiene, Benzene and other petroleum fractions, Hydrogen sodium carbides, Turpentine, and finely divided metals
<b>Cyanides</b>	Acids

<b>Hydrogen peroxide</b>	Copper, Chromium, Iron, most metals and their respective salts, flammable liquids, and other combustible materials, Aniline, and Nitromethane
<b>Hydrogen Sulfide</b>	Nitric acid, oxidizing gases
<b>Hydrocarbons, generally</b>	Fluorine, Chlorine, Bromine, Chromic acid, Sodium peroxide
<b>Iodine</b>	Acetylene, Ammonia
<b>Mercury</b>	Acetylene, Fulminic acid, Hydrogen
<b>Nitric acid</b>	Acetic acid, Chromic acid, Hydrocyanic acid, Aniline, Carbon, Hydrogen sulfide, flammable liquids or gases, or materials which are easily nitrated
<b>Oxygen</b>	Oils, Grease, Hydrogen, flammable liquids, solids, and gases
<b>Oxalic</b>	Silver, Mercury
<b>Perchloric acid</b>	Acetic anhydride, Bismuth, and its alloys, alcohol, paper, wood, and other organic materials
<b>Phosphorus pentoxide</b>	Water
<b>Potassium permanganate</b>	Glycerin, Ethylene glycol, Benzaldehyde, Sulfuric acid
<b>Sulfuric acid</b>	chlorates, perchlorates, permanganates, and water

## **PEROXIDE FORMING COMPOUNDS**

### **DISPOSAL RECOMMENDATION OF PEROXIDE FORMING COMPOUNDS**

ACETAL	ISOPROPYL ETHER
CUMENE	METHYLACETYLENE
CYCLOHEXENE	METHYL CYCLOPENTANE
DIACETYLENE	METHYLISOBUTYLKETONE
DICYCLOPENTADIENE	POTASSIUM METAL
DIOXANE	SODIUM AMIDE
DIVINYL ACETYLENE	TETRAHYDROFURAN
ETHYL ETHER	TETRHYDRONAPHTHALENE
ETHYLENE GLYCOL DIMETHYL ETHER (GLYME)	VINYLDENE CHLORIDE
	VINYL ETHERS

### **LIST A (DISCARD AT 3 MONTHS)**

#### PEROXIDE HAZARD FROM STORAGE

- DIVINYL ACETYLENE
- ISOPROPYL ETHER
- POTASSIUM METAL
- SODIUM AMIDE
- VINYLDENE CHLORIDE (1,1-Dichloroethylene)

### **LIST B (DISCARD AT 12 MONTHS)**

#### PEROXIDE HAZARD FROM CONCENTRATION OR PEROXIDE INITIATION OF POLYMERIZATION

- ACETAL
- BUTADINENE\*
- CHLOROPRENE\*
- CUMENE
- CYCLOHEXENE
- CYCLOOCTENE
- CYCLOPENTENE
- DECALIN (decahydronaphthalene)
- DIACETYLENE
- DICYCLOPENTADIENE
- DIETHYLENE GLYCOL DIMETHYL ETHER (DIGLYME)
- DIOXANE (1,4-DIOXANE)
- ETHYL ETHER (DIETHYL ETHER)

- FURAN
- METHYLACETYLENE
- METHYLCYCLOPENTANE
- METHYL ISOBUTYL KETONE
- STYRENE
- TETRAFLUOROETHYLENE\*
- TETRAHYDROFURAN
- VINYL ACETATE
- VINYL CHLORIDE
- VINYL PYRIDINE

\*When stored as a liquid, the peroxide-forming potential increases and the chemical should then be considered a List A compound.

**Environmental Health & Safety Policy Manual**

Issue Date: 04/09/2010

Policy # EHS-200.06

**Chemical Signage and Labeling Policy**

**1.0 PURPOSE:**

Proper door signs and accurate labeling of hazardous material containers enhance safety by providing at-a-glance information on chemical hazards and appropriate personal protective equipment (PPE).

**2.0 SCOPE:**

Signs and label information procedures are intended to provide warnings and information about hazardous materials to all LSUHSC faculty, staff, and students.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health and Safety (EH&S) shall:**

- Assess compliance with this policy through routine building and laboratory inspections.

**3.2 Principal Investigators shall:**

- Determine the hazards associated with the laboratory and ensure that proper warning signs are posted on the laboratory doors.
- Ensure that all original and secondary chemical containers are labeled properly.
- Provide training to all laboratory personnel on the specific hazards of the chemicals used and ensure that the correct hazard designations on labels for secondary containers are used.

**3.3 Employees shall:**

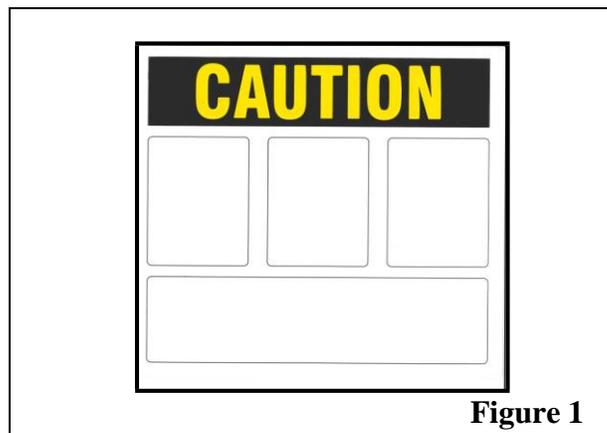
- Understand the safe handling and proper labeling of hazardous chemicals.
- Ensure that all original containers and secondary containers of hazardous chemicals are labeled properly.

**4.0 IMPLEMENTATION:**

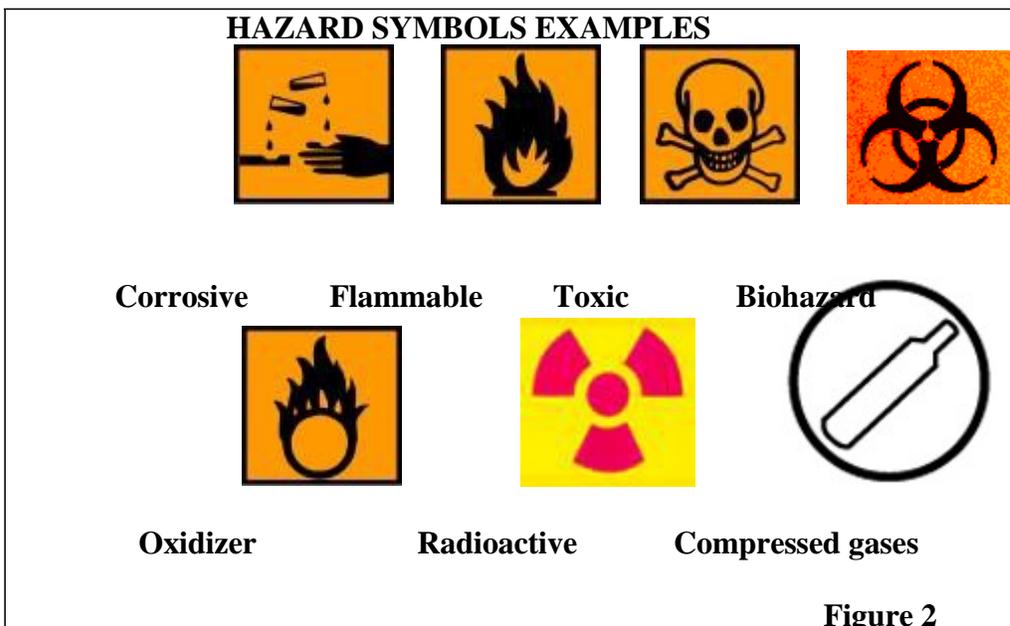
**4.1 Door Signs:**

Signs on laboratory doors are used to communicate the hazards associated with a laboratory to workers or visitors before they enter the laboratory. Door signs also communicate who to contact in the event of an emergency. All laboratories shall have a standard door sign as shown in figure 1. If PPE is required, the items required should be posted. The following information should be included on all laboratory door signs:

- Laboratory personnel responsible for the laboratory.
- Contact numbers for responsible laboratory personnel.
- Icons showing the hazards associated with a laboratory (Figure 2).
- Words or icons showing any necessary PPE that is to be worn in the laboratory (Figure 3).



**Figure 1**



**Figure 2**



## 4.2 Labels

### 4.2.1 Manufacturer's Label:

- In addition to a Material Safety Data Sheet (MSDS), the manufacturer's label is a primary source of information concerning identification, hazards, and storage requirements of a hazardous material.
- If the hazardous material is received without a manufacturer's label or if the label is unreadable, the chemical should not be accepted and it should be returned to the manufacturer.
- All manufacturer labels should include the following information:
  - Name of chemical or material.
  - Manufacturer's name and address.
  - Primary hazard(s) of the material.

### 4.2.2 Secondary Container Labels:

- When hazardous materials are transferred from original containers to other containers or if solutions of hazardous chemicals are prepared in the laboratory, proper labeling of the secondary containers are required if:
  - The chemical or chemical solution is for other than immediate use.
  - The chemical that is transferred or the prepared chemical solution is intended for use by someone other than the person doing the transfer or making up the chemical solution.
- Information that is required on secondary container labels:
  - Name of chemical or compound.
  - Primary hazard information.
  - Date.
- To label secondary containers, information may be hand printed on the containers or preprinted commercial labels may be used. Two examples of preprinted commercial labels that are acceptable are the National Fire Protection Association (NFPA) 704 diamond and the National Paint and

Coatings Association, inc. Hazardous Materials Identification System (HMIS).

- National Fire Protection Association (NFPA) 704 Diamond (Appendix A).  
The NFPA 704 diamond is a fire protection system designed to provide rapid, clear information to emergency responders on materials under conditions of fire, chemical spills, and other emergencies.
- Hazardous Materials Information System Label (HMIS) (Appendix B).  
The HMIS label provides workers with at-a-glance information to identify the hazards of a chemical and the appropriate PPE if necessary.

## **5.0 EMPLOYEE TRAINING:**

### **5.1 Initial Training**

The Principal Investigator/Laboratory Supervisor will provide laboratory-specific training to all laboratory workers on the use of proper signs and hazard warning labels.

### **5.2 Training elements**

- Location of MSDSs and how to understand the hazard information presented on the MSDS.
- Proper selection of the pictograms and icons to represent different hazards of the chemicals used in the laboratory and the required PPE if needed.

## **6.0 RECORDKEEPING:**

Principal Investigators/Laboratory Supervisors shall maintain employee training records for the current fiscal year and the previous three fiscal years.

## **7.0 REFERENCES:**

- OSHA Regulation 29 CFR 1910.1200; Hazard Communication
- OSHA Regulation 29 CFR 1910.1450; Occupational Exposure to Hazardous Chemicals in Laboratories
- Prudent Practices in the Laboratory Handling and Disposal of Chemicals; National Research Council

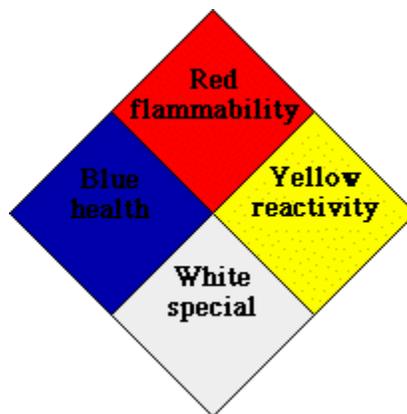
## **8.0 APPENDICES:**

- Appendix A –NFPA 704 Diamond
- Appendix B – HMIS Label

**National Fire Protection Association (NFPA) 704 Diamond**

The NFPA 704 diamond is a fire protection system designed to provide rapid, clear information to emergency responders on materials under conditions of fire, chemical spills, and other emergencies.

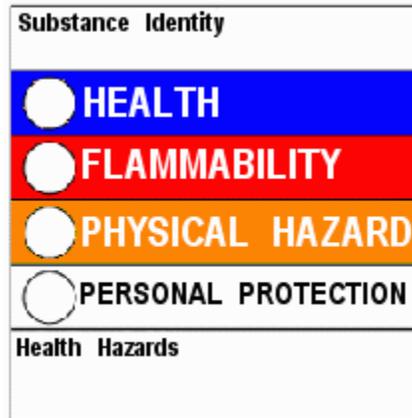
- It addresses health, flammability, instability, and related hazards that may be presented as short term, acute exposures that are most likely to occur as a result of fire, spill, etc.
- Its objectives are to provide appropriate signals to the types of hazards present.



- The NFPA 704 system for identifying hazards and their severity is a standardized color coded diamond representing four different hazards and numbers to rank the degree for each type of hazard.  
Blue=Health  
Red=Flammability  
Yellow= Reactivity  
White=Special hazards such as water reactive or corrosivity  
  
4=Extreme hazard  
3=Serious hazard  
2=Moderate hazard  
1=Slight hazard  
0=No or minimal hazard

**Hazardous Materials Information System Label (HMIS)**

The HMIS label provides workers with at-a-glance information to identify the hazards of a chemical and the appropriate PPE if necessary.



The HMIS system is a standardized labeling system for identifying hazards and their severity by using:

- Standardized color-coded horizontal bars to represent Health, Flammability, and Physical hazards
  - numbers to rank the degree of each hazard: 4=Extreme hazard  
3=Serious hazard  
2=Moderate hazard  
1=Slight hazard  
0=No or minimal hazard
  - Letters and/or icons are used to indicate the types of PPE that is required.
    - A= Safety glasses
    - B = Safety glasses and glove
    - C = Safety glasses, gloves, and an apron
    - D=Face shield, gloves, and an apron E=Safety glasses, gloves, and a dust respirator
    - F=Safety glasses, gloves, apron and a dust respirator
    - G=Safety glasses, a vapor respirator
    - H=Splash goggles, gloves, apron, and a vapor respirator
    - I=Safety glasses, gloves, and a dust/vapor respirator
    - J=Splash goggles, gloves, apron, and a dust/vapor respirator
    - K=Airline hood or mask, gloves, full suit, and boots
    - L-Z=Custom PPE specified by employer



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 5/24/2010	Updated: 11/4/2022	Policy # EHS - 200.07
<b>Chemical Procurement, Inventory and Security Policy</b>		

## **1.0 PURPOSE**

To implement accountability and security measures for “High Risk” chemicals, establish chemical inventory requirements, and ensure compliance with Federal reporting requirements.

A “High Risk” chemical, as defined in this policy, includes any chemical identified on the “Highly Toxic” (Appendix A) or Department of Homeland Security (DHS) Chemicals of Interest (COI) (Appendix B) lists, or that otherwise possesses at least one of the following characteristics:

- LD<sub>50</sub> equal or less than 50 mg/kg (oral, albino rat)
- LD<sub>50</sub> equal or less than 200 mg/kg (topical 24 hours, albino rabbit)
- LC<sub>50</sub> equal or less than 200 ppm, or 2 mg/L (continuous inhalation for one hour, albino rat)

## **2.0 SCOPE**

This policy applies to all LSUHSC personnel who are involved in the procurement and/or use of hazardous chemicals.

## **3.0 RESPONSIBILITIES**

### **3.1 Environmental Health & Safety Department (EH&S) shall:**

- As part of laboratory inspections, review the chemical inventory for safety issues (e.g., installation of proper containment, SOPs for high hazard chemicals).
- Use the chemical inventory to validate compliance with EPA Superfund Amendments and Reauthorization Act (SARA) Tier II and DHS Chemical Facility Anti-Terrorism Standards (CFATS) reporting requirements.

### **3.2 Principal Investigators (PI)/Supervisors shall:**

- Issue prior approvals for purchases of “High Risk” chemicals through Medical Center Stores and review for legitimacy of chemical purchases made via Purchase Cards.
- Maintain their chemical inventory using EH&S Compliance Software, [SafetyStratus](#). Update the chemical inventory when a new chemical is added to the inventory, a chemical is no longer maintained in the laboratory, and when there is more than a twofold increase in a chemical’s quantity. Update the chemical inventory review statement on SafetyStratus at least every 12 months.
- Report loss or theft of a high-risk chemical in accordance with section 4.3.2.
- Implement procedures to ensure proper control of “High Risk” chemicals.
- Comply with Export Administration Regulations for overseas shipments.

### **3.3 Medical Center Stores (MCS) shall:**

- Ensure prior approval form(s) are submitted for the purchase of “High Risk” chemicals.
- Provide EH&S with notice of purchase of all “High Risk” chemicals.

## **4.0 IMPLEMENTATION**

### **4.1 Chemical Procurement**

The purchase and use of “High Risk” chemicals can potentially create significant health and safety hazards, security concerns, and regulatory reporting requirements for the University. Before ordering a “High Risk” chemical:

- Verify a legitimate lab research need.
- Ensure that a minimum quantity is purchased consistent with the rate of use (EH&S recommends users order only what will be used within a six-month period). This can minimize chemical waste if processes or research changes and previously purchased chemicals are no longer needed.
- Ensure that other, less hazardous, chemicals are considered as alternatives. At minimum, review the product Safety Data Sheet (SDS) and perform a preliminary chemical hazard assessment to ensure that the laboratory facilities in which the substance will be handled are adequate and that those who will handle the substance have received the proper information and training.

#### **4.1.1 “High Risk” Chemical Purchases through MCS**

- The purchaser must be an LSUHSC employee (no students).
- Prior approval from the PI/Supervisor or designated proxy must be obtained

by completing the “Approval for Purchase of High-Risk Chemical” form (Appendix C). This form will accompany the standard MCS required Order Form.

- MCS shall review chemical purchase requests to ensure that all necessary prior approvals are submitted.
- MCS shall forward a copy of all completed “Approval for Purchase of High-Risk Chemical” forms to the Chemical Hygiene Officer via fax (568-5185), email ([safety@lsuhsc.edu](mailto:safety@lsuhsc.edu)), or hard copy through LSUHSC Campus Correspondence.

#### **4.1.2 “High Risk” Chemical Purchases via the Purchase Card**

Procurement of “High Risk” chemicals made via laboratory Purchase Card (P-Card) do not require a prior approval. However, all chemical purchases made via laboratory P-Card should be reviewed for legitimacy in accordance with the LaCarte Program User Guide.

Laboratories shall provide notice to the EH&S Biological and Chemical Safety Officer of “High Risk” chemical purchases made via laboratory Purchase Card (P-Card). Although prior approval is not required, notification subsequent to purchase shall be through the submission of a completed “Approval for Purchase of High Risk Chemical” form to the EH&S department via fax (568-5185), email ([safety@lsuhsc.edu](mailto:safety@lsuhsc.edu)), or hard copy through LSUHSC Campus Correspondence.

#### **4.2 Chemical Inventory**

PIs/Supervisors are responsible for placing the inventory of all chemicals in their possession into the EH&S Compliance Software, [SafetyStratus](#). Use of a complete and up-to-date inventory facilitates identifying and managing potential safety and health hazards, emergency planning activities, and EPA SARA Tier II and DHS CFATS reporting requirements.

The maintenance/updating of chemical inventories shall occur when:

- New chemicals are added to the inventory.
- A chemical is no longer maintained in the laboratory.
- When there is a twofold increase in a chemical’s quantity.

### **4.3 Chemical Security**

#### **4.3.1 Laboratory Access and Chemical Storage Controls**

To reduce the probability of theft and improper use high-risk chemicals, the following actions should be taken:

- Prevent all un-authorized access to laboratory/chemical storage area(s).
- Secure “High Risk” chemicals in locked freezers, refrigerators, storage cabinets, or other appropriate containers when they are not in use.
- Do not leave “High Risk” chemicals unattended or unsecured at any time.
- Use a log to sign “High Risk” chemicals in and out of secure storage and take their periodic inventory.
- Be aware of all materials that are being ordered (see section 4.1) and used in the laboratory. Know what materials are being removed from the laboratory area and consider tracking the use and disposal of hazardous materials. Although EH&S collects and manages the appropriate disposal of hazardous waste generated on Campus, these materials are not inventoried and tracked per lab.

#### **4.3.2 Chemical Loss/Theft Reporting Requirements**

Intentional or unintentional security breaches in the laboratory, either by personnel or by outside agents, pose significant risks. Possible breaches include theft or diversion of chemicals that may be used for illegal activities, accidental or intentional release of or exposure to hazardous materials, and unauthorized laboratory experimentation.

Periodic inventory audits of all “High Risk” chemicals should be performed. Immediately report any missing “High Risk” chemicals to the Department Head, University Police, and EH&S.

#### **4.3.3 Commerce Control List (CCL)**

Export control laws are federal regulations that control the conditions under which certain information, technologies, and commodities can be transmitted overseas to anyone. The laws are implemented by the Department of Commerce through its Export Administration Regulations (EAR). The laws prohibit the

unlicensed export of certain materials or information for reasons of national security or protection of trade. The CCL is a list of items which includes commodities, software, and technology that are found in the EAR subject to the jurisdiction of the Department of Commerce. In order to comply with EAR, any LSUHSC employee that plans to ship chemicals overseas must validate that the chemical is not on the [CCL](#). If the chemical is on the CCL, then check for any special conditions or license requirements on the [Export Administration Regulations Database](#) before shipping the listed chemical overseas. Coordinate with EH&S before shipping any chemicals on the CCL.

#### **4.3.4 Chemicals of Interest (COI)**

The COI, which are listed in Appendix B, is a list of chemicals and threshold quantities that must be reported to DHS. The [CFATS](#) regulation requires all facilities that use, handle, or store any of these chemicals at or above the threshold quantities to file a “Top Screen Report”. The Top Screen Report is used by DHS to determine the risk level of a facility and whether or not the facility is required to implement a security plan. EH&S will monitor the levels of the total quantity of any COI present on the [SafetyStratus](#) inventory. If a threshold quantity is reached, EH&S will notify the Associate Vice Chancellor, Property and Facilities, then submit a Top Screen Report to DHS.

### **5.0 TRAINING**

Direction on the use of the [SafetyStratus](#) can be found on the system site. Further training assistance can be provided by EH&S on request.

### **6.0 RECORDKEEPING**

EH&S shall maintain all “Approval for Purchase of High Risk Chemical” forms for a period of three years.

### **7.0 REFERENCES**

National Research Council, *Prudent Practices in the Laboratory*

### **8.0 APPENDICES**

- Appendix A, Highly Toxic Chemicals List
- Appendix B, DHS Chemicals of Interest List
- Appendix C, Approval for Purchase of High Risk Chemical Form

**“Highly Toxic” Chemical List**

<u>Chemical Name</u>	<u>Alternate Name(s)</u>	<u>CAS No.</u>
Abrin	Toxalbumin; Rosary Pea	1393-62-0
Acrolein	2-Propen-1-one	107-02-8
Acrylonitrile	2-Propenenitrile; Cyanoethylene	107-13-1
Actinomycin	Actinomycin C; Oncostatin	1402-38-6
Actinomycin D	Oncostatin K	50-76-0
Activated Factor X	Factor X Activating Enzyme from Russell's Viper Venom	9002-05-5
Aflatoxin B1		1402-88-2
Aldicarb	Propanal, 2-methyl-2-(methylthio)-, O-((methylamino)carbonyl)oxime	116-06-3
Aldrin		309-00-2
Allyl iodide	Iodopropene, 3-	556-56-9
Amanitine, alpha-	Amatoxin, alpha-	23109-05-9
Aminopterin	Aminofolic Acid, 4-	54-62-6
Aminopyridine, 3-	Aminopyridine, m-	462-08-8
Aminopyridine, 4-	Aminopyridine, p-	504-24-5
Amiton		78-53-5
Amiton Oxalate	Tetram Monooxalate	3734-97-2
Amphetamine Sulfate, d-	Benzedrine Sulfate, d-	51-63-8
Amphetamine, d-	Amphetamine, (+)-	51-64-9
Antimony Hydride	Stibine	7803-52-3
Antimycin A	Virosin	1397-94-0
Arsenic Acid	Orthoarsenic Acid	7778-39-4
Arsenic(III) Chloride	Arsenic Trichloride	7784-34-1
Arsenic(III) Fluoride	Arsenic Trifluoride	7784-35-2
Arsenic(III) Oxide	Arsenic Trioxide; Arsenious Oxide	1327-53-3
Arsenic(III) Sulfide	Arsenic Trisulfide	1303-33-9
Arsenic(V) Oxide	Arsenic Pentoxide	1303-28-2
Arsenic(V) Sulfide	Arsenic Pentasulfide	1303-34-0
Arsine	Hydrogen Arsenide	7784-42-1
Azinphos-Methyl	Guthion	86-50-0
Beryllium (powdered)		7440-41-7
Beryllium Sulfate Tetrahydrate	Sulfuric acid, beryllium salt (1:1), tetrahydrate	7787-56-6
Bidrin	Dipadrin; Dicrotphos	141-66-2
Bis(2-chloroethyl)-N-nitrosourea, N,N'	BCNU; Carmustin	154-93-8
Bis(chloromethyl) Ether	BCME	542-88-1
Bis(dimethylamido)fluorophosphate	Dimefox	115-26-4
Boron Tribromide	Boron Bromide	10294-33-4

<u>Chemical Name</u>	<u>Alternate Name(s)</u>	<u>CAS No.</u>
Boron Trichloride	Boron Chloride	10294-34-5
Boron Trifluoride	Boron Fluoride	7637-07-2
Botulinum Toxin B	Botulinum Toxin E	93384-44-2
Bromadiolone	Bromatrol	28772-56-7
Bungarotoxin, b-		
Butyronitrile	Cyanopropane, 1-	109-74-0
Calcium Arsenate	Arsenic Acid, Calcium Salt (2:3)	7778-44-1
Calcium Cyanide	Calcid; Cyanogas	592-01-8
Capsaicin	6-Nonenamide, 8-methyl-N-vanillyl-, (E)-	404-86-4
Carbachol Chloride	Doryl	51-83-2
Carbofuran	Yaltox	1563-66-2
Carbonyl Cyanide m-Chlorophenylhydrazone	Carbonyl Cyanide 3-Chlorophenyl Hydrazone	555-60-2
Carbophenothion	Acarithion	786-19-6
Chlorfenvinphos	Apachlor	470-90-6
Chlormephos	S-Chloromethyl-o,o-diethylphosphorodithioate	24934-91-6
Chlorophacinone		3691-35-8
Chlorthiophos		21923-23-9
Cholecalciferol	Quintox	67-97-0
Cholera Toxin		9012-63-9
Cisplatin		15663-27-1
Colchicine		64-86-8
Copper Acetoarsenite	C.I. Green 21	12002-03-8
Coumaphos		56-72-4
Crimidine	Crimitox	535-89-7
Cyanide		57-12-5
Cyanogen Chloride	Chlorine Cyanide	508-77-4
Cyanuric Fluoride	Trifluorotriazine	675-14-9
Cycloheximide	Actidione	66-81-9
Cytochalasin D	Zygosporin A	22144-77-0
Demecolcine	Colcemid	477-30-5
Dialifor		10311-84-9
Diborane	Boroethane	19287-45-7
Dibutyltin Diacetate		1067-33-0
Dichloroacetylene		7572-29-4
Dichloro-N-methyldiethylamine Hydrochloride, 2,2'-	Nitrogen Mustard Hydrochloride	55-86-7
Dichlorophenylarsine	Phenyl Dichloroarsine	696-28-6
Dichlorvos	DDVP	62-73-7
Dieldrin		60-57-1
Diethyl 4-Nitrophenol Phosphate	Ethyl Paraoxon	311-45-5
Diethyl Chlorophosphate		814-49-3
Digitoxin		71-63-6
Digoxigenin		1672-46-4
Digoxin		20830-75-5
Diisopropyl Fluorophosphate	Isopropyl Phosphorofluoridate	55-91-4
Dimethyl Sulfate	Methyl Sulfate	77-78-1
Dimethylmercury	Methyl Mercury	593-74-8
Dimetilan		644-64-4
Dinitrobutylphenol	DNBP; 2-sec-butyl-4,6-Dinitrophenol	88-85-7
Dinitro-o-Cresol, 4,6-		534-52-1
Dinitrophenol, 2,4-	Aldifen; DNP, 2,4-	51-28-5
Dioxathion		78-34-2
Diphtheria Toxin		
Disulfoton		298-04-4

<u>Chemical Name</u>	<u>Alternate Name(s)</u>	<u>CAS No.</u>
Di-tert-butyl Dicarboxylate	BOC-Anhydride	24424-99-5
Dithiobiuret, 2,4-	DTB	541-53-7
Doxorubicin (Free Base)	Adriamycin (Free Base)	23214-92-8
Emetine Dihydrochloride		316-42-7
Endosulfan Sulfate		1031-07-8
Endothion		2778-04-3
Endrin	Hexadrin	72-20-8
Ergocalciferol	Vitamin D2	50-14-6
Ergosterol	Provitamin D2	57-87-4
ERL 4221	Chissonox 221 monomer	2386-87-0
Ethion		563-12-2
Ethoprophos	Ethoprop	13104-48-4
Ethylene Fluorohydrin	Fluoroethanol, 2-	371-62-0
Ethyleneimine	Aziridine	151-56-4
Ethylmercuric Phosphate		2235-25-8
Ethyl-p-nitrophenylbenzenethiophosphate	EPN	2104-64-5
Etorphine	Immobilon	14521-96-1
Fenamiphos		22224-92-6
Fensulfothion	Dasanit	115-90-2
Fluometil		4301-50-2
Fluoride ion		16984-48-8
Fluorine		7782-41-4
Fluoroacetamide		840-19-7
Fluoroacetic Acid		144-49-0
Fonofos		944-22-9
Formaldehyde (gas)	Methyl Aldehyde	50-00-0
Formaldehyde Cyanohydrin	Glycolonitrile	107-16-4
Formetanate Hydrochloride		23422-53-9
Formparanate		17702-57-7
Gitoxin		4562-36-1
Heptachlor		76-44-8
Heptachlor Epoxide		1024-57-3
Hexaethyl Tetraphosphate		757-58-4
Hydrazine		302-01-2
Hydrogen Cyanide	Hydrocyanic Acid	74-90-8
Hydrogen Selenide	Selenium Hydride	7783-07-5
Hygromycin B	Antihelmucin	31282-04-9
Iron Pentacarbonyl		13463-40-6
Isobenzan	Telodrin	297-78-9
Isobutyronitrile	Isopropyl Cyanide	78-82-0
Isocyanatoethyl Methacrylate, 2-		30874-80-7
Isodrin		465-73-6
Lactonitrile		78-97-7
Lannate	Methomyl	16752-77-5
Leptophos		21609-90-5
Lewisite		541-25-3
Malonitrile	Malononitrile	109-77-3
Mephosfolan		950-10-7
Mercaptosfos	Demeton	8065-48-3
Mercury(II) Acetate	Mercuric Acetate	1600-27-7
Mercury(II) Bromide	Mercuric Bromide	7789-47-1
Mercury(II) Chloride	Mercuric Chloride	7487-94-7
Mercury(II) Cyanide	Mercuric Cyanide	592-04-1

<u>Chemical Name</u>	<u>Alternate Name(s)</u>	<u>CAS No.</u>
Mercury(II) Iodide	Mercuric Iodide	7774-29-0
Mercury(II) Nitrate	Mercuric Nitrate	10045-94-0
Mercury(II) Oxide	Mercuric Oxide	21908-53-2
Mercury(II) Thiocyanate	Mercuric Sulfocyanate	592-85-8
Methacrolein Diacetate		10476-95-6
Methamidophos		10265-92-6
Methanesulfonyl Fluoride	Mesyl Fluoride; Fumette	558-25-8
Methodathion	Supracide	950-37-8
Methiocarb	Mecaptodimethur	2032-65-7
Methoxyethylmercuric Acetate		151-38-2
Methoxyethylmercuric Chloride		123-88-6
Methoxyflurane	Metofane; Penthrane	76-38-0
Methyl Chloroformate	Methyl Chlorocarbonate	79-22-1
Methyl Fluoroacetate	Fluoroacetic Acid, Methyl Ester	453-18-9
Methyl Isocyanate		624-83-9
Methyl Lactonitrile, 2-	Acetone Cyanohydrin	75-86-5
Methyl Phosphonic Dichloride		676-97-1
Methylaziridine, 2-	Propyleneimine	75-55-8
Methylhydrazine		60-34-4
Mevinphos	Phosdrin	7786-34-7
Mexacarbate		315-18-4
Mitomycin C	Ametycin	50-07-7
Monensin Sodium	Coban	22373-78-0
Monochrotophos		6923-22-4
Muscimol	Pantherin; Aminomethyl-3-isoxazole, 5-	2763-96-4
Mustard Gas	Bis(2-Chloroethyl)sulfide	505-60-2
Naphthylthiourea, alpha-	ANTU	86-88-4
Nickel Carbonyl	Nickel Tetracarbonyl	13463-39-3
Nickel Cyanide	Dicyanonickel	557-19-7
Nicotine		54-11-5
Nicotine Sulfate		65-30-5
Nitric Acid (Red Fuming)		7697-37-2
Nitric Oxide	Nitrogen Monoxide	10102-43-9
Nitrobenzotrile, p-		619-72-7
Nitrogen Dioxide		10102-44-0
Nitrogen Mustard	Dichloro-N-methyldiethylamine, 2,2'-	51-75-2
Nitrogen Tetroxide		10544-72-6
Nitrosodimethylamine, N-	Dimethylnitrosamine	62-75-9
Nitrosomethylvinylamine, N-		4549-40-0
Norbormide		991-42-4
Ochratoxin A		303-47-9
Octamethyldiphosphoramidate	Octamethylpyrophosphoramidate	152-16-9
Osmium Tetroxide		20816-12-0
Ouabain	Acocantherin	630-60-4
Oxamyl		23135-22-0
Oxidiphenoxarsine, 10,10'-	Vinadine	58-36-6
Oxtremorine		70-22-4
Oxygen Difluoride	Fluorine Oxide; Oxygen Fluoride	7783-41-7
Parathion	Phosphostigmine	56-38-2
Parathion-Methyl	Methyl Parathione; Metaphor	298-00-0
Pentaborane(9)	Nonahydropentaborane	19624-22-7
Pentachlorophenol		87-86-5
Phalloidin	Phalloidon from Amanita Phalloides	17466-45-4

<u>Chemical Name</u>	<u>Alternate Name(s)</u>	<u>CAS No.</u>
Thallium Malonate	Thalious Malonate	2757-18-8
Thallium Sulfate		10031-59-1
Thallium(I) Acetate	Thalious Acetate	563-68-8
Thallium(I) Carbonate	Thalious Carbonate	6533-73-9
Thallium(I) Chloride	Thalious Chloride	7791-12-0
Thallium(I) Nitrate	Thalious Nitrate	10102-45-1
Thallium(I) Sulfate	Thalious Sulfate	7446-18-6
Thallium(III) Oxide	Thallic Oxide	1314-32-5
Thiocarbazine	Thiocarbohydrazide - TCH	2231-57-4
Thiodan	Endosulfan	115-29-7
Thiofanox	Dacamox	39196-18-4
Thionazin		297-97-2
Thiosemicarbazide	Thiocarbamylhydrazine	79-19-6
Tirpate	2,4-Dimethyl-1,3-dithiolane-2-carboxaldehyde O-(methylcarbamoyl)oxime	26419-73-8
Toluene Diisocyanate	Methyl-m-phenylene Diisocyanate	26471-62-5
Toluene-2,4-Diisocyanate		584-84-9
Toxaphene	Campechlor	8001-35-2
Triamiphos		1031-47-6
Tricarbonylmethylcyclopentadienyl Manganese		12108-13-3
Trichloronate	Agrisil; Phytosol	327-98-0
Trimethylopropane Phosphite		824-11-3
Trimethyltin Chloride	Chlorotrimethylstannate	1086-45-1
Triphenyltin Hydroxide		76-87-9
Tris(1-aziridinyl)phosphine Sulfide	Thiotepa	52-24-4
Tris(2-chloroethyl)amine		555-77-1
Tubocurarine	Tubocurarine Hydrochloride	57-94-3
Tungsten Hexafluoride	Tungsten(VI) Fluoride	7783-82-6
Uracil Mustard	5-(Bis-(2-chloroethyl)-amino)-uracil	66-75-1
Valinomycin, (+)-	Valinomycin	2001-95-8
Vanadium(V) Oxide	Vanadium Pentoxide	1314-62-1
Warfarin		81-81-2
Warfarin Sodium	Sodium Coumadin	129-06-6
Yohimbine Hydrochloride		65-19-0
Zinc Phosphide		1314-84-7
Zinc Silicofluoride	Zinc Fluorosilicate	16871-71-9

**DHS Chemical Facility Anti-Terrorism Standards (CFATS) - Chemicals Of Interest (COI) List**

<b>Chemical Name</b>	<b>Synonym</b>	<b>CAS</b>
Acetone cyanohydrin, stabilized		75-86-5
Acetyl bromide		506-96-7
Acetyl chloride		75-36-5
Acetyl iodide		507-02-8
Allyltrichlorosilane, stabilized		107-37-9
Aluminum bromide, anhydrous		7727-15-3
Aluminum chloride, anhydrous		7446-70-0
Aluminum phosphide		20859-73-8
Amyltrichlorosilane		107-72-2
Antimony pentafluoride		7783-70-2
Arsenic trichloride	[Arsenous trichloride]	7784-34-1
Arsine		7784-42-1
1,4-Bis(2-chloroethylthio)-n-butane		142868-93-7
Bis(2-chloroethylthio)methane		63869-13-6
Bis(2-chloroethylthiomethyl)ether		63918-90-1
1,5-Bis(2-chloroethylthio)-n-pentane		142868-94-8
1,3-Bis(2-chloroethylthio)-n-propane		63905-10-2
Boron tribromide		10294-33-4
Boron trichloride	[Borane, trichloro]	10294-34-5
Boron trifluoride	[Borane, trifluoro]	7637-07-2
Bromine chloride		13863-41-7
Bromine pentafluoride		7789-30-2

Bromine trifluoride		7787-71-5
Butyltrichlorosilane		7521-80-4
Calcium hydrosulfite	[Calcium dithionite]	15512-36-4
Calcium phosphide		1305-99-3
Carbonyl fluoride		353-50-4
Chlorine dioxide	[Chlorine oxide, (ClO <sub>2</sub> )]	10049-04-4
Chlorine pentafluoride		13637-63-3
Chlorine trifluoride		7790-91-2
Chloroacetyl chloride		79-04-9
2-Chloroethylchloro-methylsulfide		2625-76-5
Chlorosarin	[o-Isopropyl methylphosphonochloridate]	1445-76-7
Chlorosoman	[o-Pinacolyl methylphosphonochloridate]	7040-57-5
Chlorosulfonic acid		7790-94-5
Chromium oxychloride		14977-61-8
Cyanogen	[Ethanedinitrile]	460-19-5
Cyanogen chloride		506-77-4
Cyclohexyltrichlorosilane		98-12-4
DF	Methyl phosphonyl difluoride	676-99-3
Diborane		19287-45-7
Dichlorosilane	[Silane, dichloro-]	4109-96-0
N,N-(2-diethylamino)ethanethiol		100-38-9
Diethyldichlorosilane		1719-53-5
o,o-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate		78-53-5
Diethyl methylphosphonite		15715-41-0

N,N-Diethyl phosphoramidic dichloride		1498-54-0
N,N-(2-diisopropylamino)ethanethiol	N,N-diisopropyl-(beta)-aminoethane thiol	5842-07-9
N,N-Diisopropyl phosphoramidic dichloride		23306-80-1
N,N-(2-dimethylamino)ethanethiol		108-02-1

Dimethyldichlorosilane	[Silane, dichlorodimethyl-]	75-78-5
N,N-Dimethyl phosphoramidic dichloride	[Dimethylphosphoramido-dichloridate]	677-43-0
Dinitrogen tetroxide		10544-72-6
Dipenyldichlorosilane		80-10-4
N,N-(2-dipropylamino)ethanethiol		5842-06-8
N,N-Dipropyl phosphoramidic dichloride		40881-98-9
Dodecyltrichlorosilane		4484-72-4
Ethyl phosphonyl difluoride		753-98-0
Ethylphosphonothioic dichloride		993-43-1
Ethyltrichlorosilane		115-21-9
Fluorine		7782-41-4
Fluorosulfonic acid		7789-21-1
Germane		7782-65-2
Germanium tetrafluoride		7783-58-6
Hexafluoroacetone		684-16-2
Hexyltrichlorosilane		928-65-4
HN1 (nitrogen mustard-1)	[Bis(2-chloroethyl)ethylamine]	538-07-8
HN2 (nitrogen mustard-2)	[Bis(2-chloroethyl)methylamine]	51-75-2
HN3 (nitrogen mustard-3)	[Tris(2-chloroethyl)amine]	555-77-1
Hydrogen cyanide	[Hydrocyanic acid]	74-90-8

Hydrogen fluoride (anhydrous)		7664-39-3
Hydrogen selenide		7783-07-5
Hydrogen sulfide		7783-06-4
Iodine pentafluoride		7783-66-6
Isopropylphosphonothioic dichloride		1498-60-8
Isopropylphosphonyl difluoride		677-42-9
Lewisite 1	[2-Chlorovinyl]dichloroarsine]	541-25-3
Lewisite 2	[Bis(2-chlorovinyl)chloroarsine]	40334-69-8
Lewisite 3	[Tris(2-chlorovinyl)arsine]	40334-70-1
Lithium amide		7782-89-0
Lithium nitride		26134-62-3
Magnesium diamide		7803-54-5
Magnesium phosphide		12057-74-8
Methylchlorosilane		993-00-0
Methyldichlorosilane		75-54-7
Methylphenyldichlorosilane		149-74-6
Methylphosphonothioic dichloride		676-98-2
Methyltrichlorosilane	[Silane, trichloromethyl-]	75-79-6
Sulfur mustard (Mustard gas (H))	[Bis(2-chloroethyl)sulfide]	505-60-2
O-Mustard (T)	[Bis(2-chloroethylthioethyl)ether]	63918-89-8
Nitric oxide	[Nitrogen oxide (NO)]	10102-43-9
Nitrogen mustard hydrochloride	[Bis(2-chloroethyl)methylamine hydrochloride]	55-86-7
Nitrogen trioxide		10544-73-7
Nitrosyl chloride		2696-92-6
Nonyltrichlorosilane		5283-67-0

Octadecyltrichlorosilane		112-04-9
Octyltrichlorosilane		5283-66-9
Oxygen difluoride		7783-41-7
Perchloryl fluoride		7616-94-6
Phenyltrichlorosilane		98-13-5
Phosgene	[Carbonic dichloride] or [carbonyldichloride]	75-44-5
Phosphine		7803-51-2
Phosphorus pentabromide		7789-69-7
Phosphorus pentachloride		10026-13-8
Phosphorus pentasulfide		1314-80-3
Phosphorus trichloride		7719-12-2
Potassium cyanide		151-50-8
Potassium phosphide		20770-41-6
Propylphosphonothioic dichloride		2524-01-8
Propylphosphonyl difluoride		690-14-2
Propyltrichlorosilane		141-57-1
QL	[o-Ethyl-o-2-diisopropylaminoethyl methylphosphonite]	57856-11-8
Sarin	[o-Isopropyl methylphosphonofluoridate]	107-44-8
Selenium hexafluoride		7783-79-1
Sesquimustard	[1,2-Bis(2-chloroethylthio)ethane]	3563-36-8
Silicon tetrachloride		10026-04-7

Silicon tetrafluoride		7783-61-1
Sodium cyanide		143-33-9
Sodium hydrosulfite	[Sodium dithionite]	7775-14-6
Sodium phosphide		12058-85-4
Soman	[o-Pinacolyl methylphosphonofluoridate]	96-64-0
Stibine		7803-52-3
Strontium phosphide		12504-16-4
Sulfur tetrafluoride	[Sulfur fluoride (SF <sub>4</sub> ), (T-4)-]	7783-60-0
Sulfuryl chloride		7791-25-5
Tabun	[o-Ethyl-N,N-dimethylphosphoramido-cyanidate]	77-81-6
Tellurium hexafluoride		7783-80-4
Thiodiglycol	[Bis(2-hydroxyethyl)sulfide]	111-48-8
Thionyl chloride		7719-09-7
Titanium tetrachloride	[Titanium chloride (TiCl <sub>4</sub> ) (T-4)-]	7550-45-0
Trichlorosilane	[Silane, trichloro-]	10025-78-2
Trifluoroacetyl chloride		354-32-5
Trimethylchlorosilane	[Silane, chlorotrimethyl-]	75-77-4
Tungsten hexafluoride		7783-82-6
Vinyltrichlorosilane		75-94-5
VX	[o-Ethyl-S-2-diisopropylaminoethyl methyl phosphonothiolate]	50782-69-9
Zinc hydrosulfite	[Zinc dithionite]	7779-86-4



**Approval for Purchase of High Risk Chemicals Form**

<b>Approval for Purchase of High Risk Chemicals</b>		
<b>Date:</b>	<b>Phone:</b>	<b>E-Mail Address:</b>
<b>Department:</b>	<b>Research Group:</b>	<b>Lab Room Number:</b>
<b>Chemical name and most common synonyms:</b>		
<b>CAS Number:</b>	<b>Manufacturer:</b>	<b>Product Number:</b>
<b>Signature:</b> _____		
<b>Approving PI Name/Title:</b> _____		

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 08/30/2010	Updated: 2/8/2011	Policy # EHS-200.08
<b>Respiratory Protection Program</b>		

**1.0 PURPOSE:**

To provide a comprehensive respiratory protection program with required worksite-specific protection and elements for required respirator use.

**2.0 SCOPE:**

This policy applies to all employees and students who wear respirators designed to protect them from workplace hazards. Respirators as defined by this policy include N95 particulate, Half and Full Face Air Purifying, Powered and Supplied Air Respirators. Simple white gauze type dust masks are not included.

**3.0 RESPONSIBILITIES:**

**3.1 Designated physician or other licensed health care professional (PLHCP) shall:**

- Perform initial medical evaluations using Appendix A, Respirator Medical Evaluation Questionnaire, and provide a recommendation concerning an employee's ability to wear a respirator using Appendix B, Respirator Authorization Use Form.
- Ensure that the physical examination criteria conform to OSHA protocols.
- Recommend the need, if any, for follow-up medical evaluations.

**3.2 Department Heads/Supervisors shall:**

- Perform initial Hazard Assessments for all potentially hazardous operations/tasks to identify those where respiratory protection is required.
- Report suspected air contaminant hazards to EH&S.
- In coordination with EH&S, develop strategies to control or eliminate exposure to hazardous air contaminants in their work areas.
- Implement recommended or corrective engineering controls and work practices to control or eliminate exposure to hazardous air contaminants.
- Identify all personnel who have the potential to wear respirators and ensure they are medically evaluated and fit-tested prior to respirator use.
- Provide respirators to all users and fund all medical evaluations, consultations and diagnostic procedures.

- Ensure that employees required to use respiratory protection equipment attend scheduled medical appointments, respiratory training and fit testing.
- Ensure that all personnel under their supervision or direction adhere to the applicable provisions of this program.
- Provide instructions to employees on the type of respirator to be used for each specific operation where respirators are required.
- Establish a location and provide scheduled time for employees to clean, inspect and maintain their respirators.
- Maintain a current list of employees with respirator certifications.
- In addition to the initial fit test, fit tests are also required at least annually and when a different respirator face piece is used. Furthermore, fit tests are required whenever the employee reports, or the employer or PLHCP makes visual observations of changes in the employee's physical condition that could affect respirator fit (e.g., facial scarring, dental changes, cosmetic surgery, or obvious change in body weight).
- Maintain records of PLHCP's recommendations and fit tests.
- Provide lab or site specific training to augment training provided by EH&S per section 5.1, and provide refresher training per section 5.2.

**3.3 Environmental Health and Safety Department (EH&S) shall:**

- Perform Health Hazard Evaluations (HHE) to assist in the determination of requirements for respiratory protection.
- Provide consultation to the Department Heads/Supervisors on respirator selection for specific uses.
- Ensure implementation of this procedure and revisions to this procedure based on changes to referenced documents or a determination of deficiencies in work processes, procedures, and/or behavior.
- Provide oversight of the Respiratory Protection Program.
- Provide fit tests for each respirator having a face piece-to-face seal.
- Provide initial and refresher training for those who wear respirators.

**3.4 Employees and students shall:**

- Report suspected chemical exposures to their supervisors.
- Notify their supervisor of areas, operations, or equipment which may be a source of air contaminants.
- Advise their supervisors of changes in their health status, which may affect their ability to safely use respiratory protection. Notify their supervisor when a change in medical condition requires an updated medical evaluation.
- Care for their respirators as trained, including the proper storage, proper cleaning and proper wear which include being clean shaven where the face piece meets the face.
- Stop any job if conditions are significantly different than anticipated and respiratory protection is in question.
- Understand the respiratory protection requirements for their work areas.
- Wear respirators according to manufacturer's instructions

## **4.0 IMPLEMENTATION**

Proper selection of respirators, medical evaluations, fit testing, training, and the proper assessment of when respirator use is required is critical to a sound respiratory program.

### **4.1 Respiratory Hazards**

Air contaminants can be in the form of a gas, vapor, mist, aerosol, and/or fumes. They can enter the body by inhalation, skin absorption, and/or ingestion. Definitions follow:

- Gases are substances that become airborne at room temperature, such as releasing gaseous nitrogen in a room. They can enter the body by inhalation.
- Vapors are substances that evaporate from a liquid or solid, such as opening a can of paint. They can enter the body by inhalation or skin absorption.
- Dusts are formed when solid materials are broken down, such as by drilling, or grinding. They can enter the body by inhalation or ingestion.
- Fumes occur when a metal or plastic is heated then quickly cooled. They can enter the body by inhalation.
- Mists are tiny liquid droplets usually created by spraying operations. They can enter the body by inhalation, skin absorption, or ingestion.
- Oxygen deficiency (inhalation hazard) occurs in confined spaces, whenever the normal percentage is too low. Oxygen deficiency can be caused by a chemical reaction, fire, or an inert gas (e.g., gaseous helium or nitrogen).

### **4.2. Workplace Monitoring**

- An initial Hazard Assessment of potentially hazardous operations/tasks shall be conducted when any information or observation shows that an employee may be exposed to hazardous air contaminants. This includes, but is not limited to, data from monitoring of similar operations; MSDS and procedure reviews; the potential for skin and eye contacts; and employee complaints of unusual odors, irritations, or other signs or symptoms of potential exposures.
- The initial hazard assessment shall involve identification and preliminary evaluation to gather data in support of the HHE that will be conducted by EH&S.
- A HHE shall be conducted where there is a reasonable potential for employee exposure to the hazardous material or condition and shall be performed to evaluate and document employee exposures to hazardous materials or physical agents.
- When the HHE shows that any employee or group of employees may be exposed to hazardous levels of air contaminants, EH&S will determine the need for the performance of area and/or personal exposure monitoring.
- Monitoring which is representative of the exposure of employees in the work area shall be repeated as determined necessary by EH&S or whenever any changes to facilities, equipment, work practices, procedures, or engineering control measures alter the rate or type of air contaminant generation.

#### **4.3 Engineering Control of Respiratory Hazards**

- The primary objective to protect LSUHSC personnel from respiratory hazards is to eliminate or control the hazards by implementing engineering and work practice controls. Some of the controls may consist of substitution of a less hazardous material, process enclosure, and the use of effective exhaust ventilation systems, or by modifying the process to reduce the generation of hazardous air contaminants.
- Where feasible, facilities and equipment shall be procured, designed, operated, and/or modified to prevent the generation or provide for the control of hazardous atmospheres.
- Respiratory protection is required when:
  - Work controls are not effective;
  - Engineering controls cannot be implemented;
  - Engineering controls are not feasible to control a hazardous atmosphere or;
  - Until effective engineering controls can be implemented.

#### **4.4 Procedures for Selecting Respirators**

- The selection of the respiratory protection equipment for use in any operation shall be in accordance with Appendix C, unless otherwise specified on the MSDS or in the substance specific standards of 29 CFR 1910 Subpart Z and 29 CFR 1926.
- All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and be used in compliance with the conditions of its certification. Where exposure cannot be identified or reasonably estimated, the atmosphere shall be considered immediately dangerous to life or health (IDLH).
- No LSUHSC personnel shall perform work in or enter into an area identified as containing an IDLH atmosphere. University Police and EH&S shall be notified immediately upon the identification of an actual or potential IDLH environment.
- Respirators that are acceptable for use in non-IDLH atmospheres:
  - For protection against gases and vapors use:
    - An atmosphere-supplying respirator or
    - An air-purifying respirator, provided that the respirator is equipped with an end-of service-life indicator (ESLI) certified by NIOSH for the contaminant. The alternative is to implement a change schedule for canisters/cartridges that will ensure that they are changed before the end of their service life.
  - For protection against particulates use:
    - An atmosphere-supplying respirator
    - An air-purifying respirator equipped with high efficiency particulate air (HEPA) filters certified by NIOSH or filters certified for particulates.
    - An air-purifying respirator equipped with any filter certified for particulates by NIOSH for contaminants consisting primarily of particles with mass median aerodynamic diameters of at least two micrometers.
  - Air-purifying respirators shall not be used for a hazardous chemical with poor or inadequate warning properties unless one of the following situations exists:

- Their use is specifically approved under the provisions of a substance-specific OSHA standard; or,
- The odor or irritation threshold does not exceed the regulated exposure level; there are not associated ceiling limits; and available information indicates that an undetected exposure between one and three times the regulated exposure level would not cause serious or irreversible health effects; or,
- The respirator has an end-of-service-life indicator approved by NIOSH/MSHA for use with the specific chemical; or,
- A change schedule has been implemented to assure that air-purifying elements are replaced when 10 percent breakthrough occurs.

#### **4.5 Medical Evaluations**

##### **4.5.1 The following medical evaluation requirements must be met before an employee can wear a respirator:**

- A physician or other licensed health care professional (PLHCP) perform medical evaluations using Appendix A and provide a written recommendation using Appendix B, PLHCP - Respirator Authorization Use Form, regarding the employee's ability to use the respirator.
- Additional follow-up medical evaluations are required if:
  - Employee reports medical signs or symptoms related to ability to use a respirator.
  - PLHCP, program administrator, or supervisor recommends re-evaluation.
  - If an employee gives a positive response to any question among questions 1 through 8 in Part A, Section 2 of Appendix A, or whose initial medical examination demonstrates the need for a follow-up medical examination. Follow-up exams may include medical tests, consultations, or diagnostic procedures.
- Administer the medical questionnaire and evaluations during the employee's normal working hours or at a time and place convenient to the employee.
- Follow-up medical evaluations, consultations or diagnostic procedures for faculty/staff and students will be performed by the Health Care Network located at 2820 Napoleon Ave., New Orleans, LA (504-412-1100) and LSUHSC Student Health Clinic, respectively.

##### **4.5.2 PLHCP medical determination should provide the following information:**

- Whether or not an employee is medically able to use the respirator.
- Any limitations on respirator use related to the employee's medical condition or relating to the workplace conditions where the respirator will be used.
- Complete Appendix B and present to employee for review and signage.

## **4.6 Fit Testing**

### **4.6.1 Procedures**

Before any employee can wear a respirator with a negative or positive pressure tight-fitting face piece, the employee must be fit tested with the same make, model, style, and the size of respirator that will be used. The following specifies the kinds of fit test allowed, the procedures for conducting them, and how to use the results of the fit tests.

- Fit testing is required prior to initial use, whenever a different respirator face piece is used, and at least annually thereafter.
- An additional fit test is required whenever the employee reports, or the employer or PLHCP makes visual observations of changes in the employee's physical condition that could affect respirator fit (e.g., facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight).
- If after passing a QLFT or QNFT, the employee subsequently notifies the program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator face piece and to be retested.
- Unless otherwise specified by substance-specific OSHA health standards, respirators may be fit tested using qualitative and quantitative fit-test procedures which have been accepted by OSHA.
- Fit-test results shall be related to Assigned Protection Factors (APF) as follows:
  - Half-mask and filtering face piece air-purifying respirators may be worn in atmospheres no greater than 10 times the established exposure limit when the respirator passes the qualitative fit test; or when the respirator passed the quantitative fit test with a minimum fit factor of greater than 100.
  - Full-face air purifying respirators may be worn in atmospheres no greater than 10 times the established exposure limit, when the respirator passes the qualitative fit test (QLFT); or, in atmospheres no greater than 50 times the established exposure limit when the respirator passes a quantitative fit test (QNFT) with a minimum fit factor greater than 500.
  - Tight-fitting powered air-purifying respirators shall be fit tested under negative pressure. This shall be accomplished by using the face piece equipped with air purifying elements in place of supplied-air attachments. If the respirator face piece passes the test, then the same respirator face piece (i.e., make, model, and size) available on a NIOSH/MSHA approved, supplied air respirator may be used in atmospheres no greater than allowed by the Assigned Protection Factor for that respirator listed in Appendix C.

### **4.6.2 Fit Test Records**

Qualitative and quantitative fit tests records shall include:

- The name and LSUHSC identification number of the person being fit tested.
- Type of fit test performed.
- Specific make, model, style, and size of respirator tested.

- Date of test.
- The pass/fail result for QLFTS or the fit factor and strip chart recording or other recording of the test results for QNFTs.

#### **4.6.3 Qualifications of Fit Tester**

- Qualitative and quantitative fit tests shall be performed only by qualified individuals specifically trained and assigned the responsibility for providing respirator fit tests.
- Persons performing fit-tests shall be familiar with the fit-test protocols identified in Appendix D of this document and be able to demonstrate proficiency at preparation of test solutions, calibration of test equipment, performance of qualitative and quantitative fit tests, and recognition and maintenance of test equipment.

#### **4.7 Procedures for Proper Respirator Use**

- Tight-fitting respirators shall not be worn by employees who have facial hair or any condition that interferes with the face-to-face piece seal or valve function.
- Personal protective equipment shall be worn in such a manner that does not interfere with the seal of the face piece to the face of the user.
- Where employees must wear protective glasses or goggles with a half-face respirator or quarter face respirator, they shall be worn in a manner that does not interfere with the face piece-to-face seal.
- Employees shall perform a user seal check each time they put on a tight-fitting respirator using procedures in Appendix D or equally effective manufacturer's procedures.
- Respirators which are not in proper working condition shall be removed from service and either repaired according to manufacturer's instructions, or discarded or replaced.
- Disposable respirators, which cannot be cleaned or disinfected, shall be discarded at the end of each task or at the end of the work shift, whichever comes first. Disposable respirators, which can be cleaned and disinfected, shall be disposed of after their service life has been reached.

#### **4.8 Procedures for Proper Maintenance, Inspection and Storage**

- Clean and disinfect respirators using the procedures provided by 29 CFR 1910.134 Appendix B-2, Respirator Manufacturers, or Appendix E of this document, or equally effective manufacturer's procedures at the following intervals:
  - Before being worn by different individuals when issued to more than one employee.
  - After each use for emergency use respirators and those used in fit testing and training.
- Respirators used in non-emergency circumstances shall be inspected by the wearer before each use, during cleaning, and after each use.
- As a minimum, the wearer of the respirator shall check respirator function, tightness of connections or condition of face piece, head straps, valves, connecting tube, and

cartridges, canisters or filters; and check the rubber or elastomeric parts for pliability and signs of deterioration.

- Remove from service respirators which fail to pass inspection.
- Repairs are to be made only by persons appropriately trained and assigned the responsibility to perform such repairs, using parts designated for the respirator.
- Perform repairs following the manufacturer's recommended methods, utilizing the manufacturer's replacement parts designated for the respirator being repaired.
- Reducing valves or regulators shall be returned to the manufacturer or manufacturer's designated representative for adjustment or repair.
- All respiratory protection equipment shall be stored in a manner that protects them from dust, sunlight, extreme temperatures, excessive moisture, damaging chemicals, biological contaminants and mechanical damage.
- Store routinely used respirators, such as air purifying respirators, in a plastic bag or the bag that comes with it, or otherwise protected from contamination and damage. Respirators shall not be stored in such places like lockers or tool boxes unless they are in carrying cases or cartons. Respirators shall be packed or stored face piece up and in a manner to prevent deformation of the face piece or exhalation valve.

#### **4.9 Voluntary Use of Respirators**

Voluntary respirator use applies if the employees are not exposed to hazardous agents above the permissible exposure limits, they are not emergency responders, or they are not required by procedure. Voluntary users should refer to information in Appendix F, Information for Employees Using Respirators When Not Required under the Standard.

#### **5.0 EMPLOYEE TRAINING:**

##### **5.1 Initial Training**

EH&S will provide initial training during fit testing. Training will include:

- Why the respirator is necessary and how improper fit, use, or maintenance can compromise the protective effect of the respirator.
- Limitations and capabilities of the respirator.
- Use in emergency situations.
- How to inspect, put on and remove, use, and check the seals.
- Procedures for maintenance, inspection and storage.
- Recognition of medical signs and symptoms that may limit or prevent effective use.

##### **5.2 Refresher Training**

EH&S will provide refresher training during annual fit testing and when:

- Workplace conditions change.
- A new type of respirator is used.
- There is reason to believe that there are deviations from or inadequacies in the employee's knowledge in the proper use or care of a respirator.



## 6.0 RECORD KEEPING:

Maintain medical evaluations/recommendations for the duration of the employee's employment plus 30 years. EH&S shall retain records of fit tests until the next fit test

## 7.0 INSPECTION AND PROGRAM REVIEW:

Program effectiveness will be assessed annually by the Environmental Health and Safety Department. Furthermore, program compliance will be evaluated at the General Safety Committee meetings and during routine laboratory inspections.

## 8.0 REFERENCES:

OSHA 29 CFR 1910.134	Respiratory Protection Standard
OSHA 29 CFR 1910.94	Ventilation
OSHA 29 CFR 1910.1020	Employee Exposure/Medical Records
OSHA 29 CFR 1910.1200	Hazard Communication
OSHA 29 CFR 1910 Subpart Z	Toxic and Hazardous Substances
OSHA 29 CFR 1926	Construction Industry

## 9.0 DEFINITIONS

**Adequate Warning Properties** means detectable characteristics of a hazardous air contaminant including odor, taste, and/or irritation effects, which are detectable and persistent at concentrations at or below the Occupational Exposure Limit and do not cause olfactory fatigue.

**Air-purifying respirator** means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

**Assigned protection factor (APF)** means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program.

**Atmosphere Supplying Respirator** means a respirator which supplies the user with a source of breathing air that is independent of the immediately surrounding atmosphere, and includes supplied-air respirators and self-contained breathing apparatus units.

**Canister or cartridge** means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminant from the air passed through the container.

**Demand respirator** means an atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

**Disposable respirator** means a respiratory protective device, which does not have replaceable filters or cartridges and is discarded after its useful service life is reached.

**End-of-service-life indicator (ESLI)** means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

**Fit factor** means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

**Fit test** means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

**Filter or air purifying element** is a component used in respirators to remove solid or liquid aerosols from the air.

**Filtering face piece (dust mask)** means a negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

**Hazardous Atmosphere** means an atmosphere that contains a contaminant in excess of its exposure limits or is oxygen deficient/enriched.

**Hazardous Chemical** means a substance that meets the definition of a health hazard under the OSHA Hazard Communication Standard (29 CFR 1910.1200(c)).

**High efficiency particulate air filter (HEPA)** means a filter that is at least 99.97% efficient in removing particles of 0.3 micrometers in diameter.

**Immediately dangerous to life or health (IDLH)** means an atmosphere that poses an immediate threat to life, cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

**Negative pressure respirator (tight fitting)** means a respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

**Physician or other licensed health care professional (PLHCP)** means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by 29 CFR 1910.134(e), Medical evaluation section.

**Positive pressure respirator** means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

**Pressure demand respirator** means a positive atmosphere-supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.

**Qualitative fit test (QLFT)** means a pass/fail fit test to assess the adequacy of a respirator fit that relies on the individual's response to the test agent.

**Quantitative fit test (QNFT)** means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

**Self-contained breathing apparatus (SCBA)** means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

## 10.0 APPENDICES:

Appendix A – Respirator Medical Evaluation Questionnaire

Appendix B – PLHCP – Respirator Authorization Use Form

Appendix C – Assigned Protection Factors

Appendix D – (FIT Test) - User Seal and Smoke/Scent Test Procedures and Record Form

Appendix E – Respirator Cleaning Procedures

Appendix F – Information for Employees Using Respirators When Not Required Under this Standard



**OSHA Respirator Medical Evaluation Questionnaire (Mandatory)**

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes / No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

**Part A. Section 1. (Mandatory)** *The following information must be provided by every employee who has been selected to use any type of respirator (please print).*

1. Today's date: \_\_\_\_\_
2. Your name: \_\_\_\_\_
3. Your age (to the nearest year): \_\_\_\_\_
4. Sex (circle one): Male/Female
5. Your height: \_\_\_\_\_ ft. \_\_\_\_\_ in.
6. Your weight: \_\_\_\_\_ lbs.
7. Your job title: \_\_\_\_\_
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): \_\_\_\_\_
9. The best time to phone you at this number: \_\_\_\_\_
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
  - a. \_\_\_\_\_ Disposable respirator (filter-mask, non-cartridge type only).
  - b. \_\_\_\_\_ Other type (for example, half- or full-face piece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No  
If "yes," what type(s): \_\_\_\_\_



**Part A. Section 2. (Mandatory)** Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle “yes” or “no”)

1. Do you **currently** smoke tobacco, or have you smoked tobacco in the last month? Yes/No
  
2. Have you **ever had** any of the following conditions?
  - a. Seizures (fits): Yes/No
  - b. Diabetes (sugar disease): Yes/No
  - c. Allergic reactions that interfere with your breathing: Yes/No
  - d. Claustrophobia (fear of closed-in places): Yes/No
  - e. Trouble smelling odors: Yes/No
  
3. Have you **ever had** any of the following pulmonary or lung problems?
  - a. Asbestosis: Yes/No
  - b. Asthma: Yes/No
  - c. Chronic bronchitis: Yes/No
  - d. Emphysema: Yes/No
  - e. Pneumonia: Yes/No
  - f. Tuberculosis: Yes/No
  - g. Ilicosis: Yes/No
  - h. Pneumothorax (collapsed Lung): Yes/No
  - i. Lung cancer: Yes/No
  - j. Broken ribs: Yes/No
  - k. Any chest injuries or surgeries: Yes/No
  - l. Any other lung problem that you’ve been told about: Yes/No
  
4. Do you **currently** have any of the following symptoms of pulmonary or lung illness?
  - a. Shortness of breath: Yes/No
  - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Shortness of breath: Yes/No
  - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
  - d. Have to stop for breath when walking at you own pace on level ground: Yes/No
  - e. Shortness of breath when washing or dressing yourself: Yes/No
  - f. Shortness of breath that interferes with your job: Yes/No
  - g. Coughing that produces phlegm (thick sputum): Yes/No
  - h. Coughing that wakes you early in the morning: Yes/No
  - i. Coughing that occurs mostly when you are lying down: Yes/No
  - j. Coughing up blood in the last month: Yes/No

- k. Wheezing: Yes/No
  - l. Wheezing that interferes with your job: Yes/No
  - m. Chest pain when you breathe deeply: Yes/No
  
  - n. Any other symptoms that you think may be related to lung problems: Yes/No
5. Have you **ever had** any of the following cardiovascular or heart problems?
- a. Heart attack: Yes/No
  - b. Stroke: Yes/No
  - c. Angina: Yes/No
  - d. Heart failure: Yes/No
  - e. Swelling in your legs or feet (not caused by waling): Yes/No
  - f. Heart arrhythmia (heart beating irregularly): Yes/No
  - g. High blood pressure: Yes/No
  - h. Any other heart problem that you've been told about: Yes/No
6. Have you **ever had** any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes/No
  - b. Pain or tightness in your chest during physical activity: Yes/No
  - c. Pain or tightness in your chest that interferes with your job: Yes/No
  - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
  - e. Heartburn or indigestion that is not related to eating: Yes/No
  - f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No
7. Do you **currently** take medication for any of the following problems?
- a. Breathing or lung problems: Yes/No
  - b. Heart trouble: Yes/No
  - c. Blood pressure: Yes/No
  - d. Seizures (fits): Yes/No
8. If you've used a respirator, have you **ever had** any of the following problems? (Circle all that apply) (If you've never used a respirator, go to question 9 )
- a. Eye irritation: Yes/No
  - b. Skin allergies or rashes: Yes/No
  - c. Anxiety: Yes/No
  - d. General weakness or fatigue: Yes/No
  - e. Any other problem that interferes with you use of a respirator: Yes/No
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

*Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.*

10. Have you **ever lost** vision in either eye (temporarily or permanently): Yes/No
11. Do you **currently** have any of the following vision problems?
- a. Wear contact lenses: Yes/No
  - b. Wear glasses: Yes/No
  - c. Color blind: Yes/No
  - d. Any other eye or vision problem: Yes/No
12. Have you **ever had** an injury to your ears, including a broken ear drum: Yes/No
13. Do you **currently** have any of the following hearing problems:
- a. Difficulty hearing: Yes/No
  - b. Wear a hearing aid: Yes/No
  - c. Any other hearing or ear problem: Yes/No
14. Have you **ever had** a back injury: Yes/No
15. Do you **currently** have any of the following musculoskeletal problems:
- a. Weakness in any of your arms, hands, legs, or feet: Yes/No
  - b. Back pain: Yes/No
  - c. Difficulty fully moving your arms and legs: Yes/No
  - d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
  - e. Difficulty fully moving your head up or down: Yes/No
  - f. Difficulty fully moving your head side to side: Yes/No
  - g. Difficulty bending at your knees: Yes/No
  - h. Difficulty squatting to the ground: Yes/No
  - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
  - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No



**Part B. Section 2.**

*Any of the following questions, and other questions not listed may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.*

1. What type of respirator(s) will you use (circle all that apply to them)?

Types:      N95                      Half Face                      Full Face                      Supplied Air

2. How often are you expected to use the respirator(s) (circle “yes” or “no” for all answers that apply to them)?

- a. Escape only (no rescue): Yes/No
- b. Emergency rescue only: Yes/No
- c. Less than 5 hours **per week**: Yes/No
- d. Less than 2 hours **per day**: Yes/No
- e. 2 to 4 hours per day: Yes/No
- f. Over 4 hours per day: Yes/No
- g. Other \_\_\_\_\_

3. During the period of you are using the respirator(s), is your work effort:

a. **Light** (less than 200 kcal per hour): Yes/No

If “yes,” how long does this period last during the average shift:    hrs. \_\_\_\_ mins.

Examples of a light work effort are **sitting** while writing, typing, drafting, or performing light assembly work; or **standing** while operating a drill press (1-3 lbs) or controlling machines.

b. **Moderate** (200 to 350 kcal per hour): Yes/No

If “yes,” how long does this period last during the average shift:    hrs. \_\_\_\_ mins.

Examples of moderate work effort are **sitting** while nailing or filing; driving a truck or bus in urban traffic; **standing** while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; **walking** on a level surface about 2 mph or down a 5-degree grade about 3mph; or **pushing** a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. **Heavy** (above 350 kcal per hour): Yes/No

If “yes,” how long does this period last during the average shift:    hrs. \_\_\_\_ mins.

Examples of heavy work are **lifting** a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; **shoveling; standing** while bricklaying or chipping castings; walking up an 8 degree grade about 2 mph; **climbing** stairs with a heavy load (about 50 lbs.).



4. Will you be wearing protective clothing and/or equipment (other than the respirator) when using their respirator: Yes/No

If “yes,” describe this protective clothing and/or equipment:

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5. Will you be working under hot conditions?  
(Temperatures exceeding 77 deg. F): Yes/No

6. Will you be working under humid conditions: Yes/No

7. Describe the work you’ll be doing while using this respirator(s):

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8. Describe any special or hazardous conditions you might encounter when you’re using your respirator(s) (for example, confined spaces, life-threatening gases):

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9. Provide the following information, if you know it, for each toxic substance that you’ll be exposed to when you’re using your respirator(s):

Name of the first toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of second toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

Name of third toxic substance: \_\_\_\_\_

Estimated maximum exposure level per shift: \_\_\_\_\_

Duration of exposure per shift: \_\_\_\_\_

The name of any other toxic substances that you will be exposed to while using their respirator:

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10. Describe any special responsibilities you’ll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

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**PLHCP – Respirator Authorization Use Form**

**Note:** *Physician or licensed health care professional will complete this form and employee must present this completed form at FIT testing.*

**Select ONE of the following:**

I have reviewed this medical questionnaire and I do not recommend further examination be performed. The employee is authorized to wear \_\_\_\_\_ respirator.  
(type, model)

I have reviewed this medical questionnaire and recommend further examination be performed.

\_\_\_\_\_  
**PLHCP Name – Print**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**PLHCP Signature**

\_\_\_\_\_  
**Employee Signature**

**Assigned Protection Factors<sup>2</sup>**

- Air purifying respirators may not be used in oxygen deficient atmospheres.
- Only full facepiece respirators are to be used in contaminant concentrations that produce eye irritation.
- Only a full facepiece pressure demand SCBA or combination full facepiece pressure demand SAR with auxiliary self contained air supply may be used in unknown IDLH or oxygen deficient atmospheres.

Type of Respirator <sup>1,2</sup>	Quarter Mask	Half Mask	Full Facepiece	Helmet/Hood	Loose-Fitting Facepiece
1. Air-Purifying Respirator	5	10 <sup>3</sup>	50	—	—
2. Powered Air-Purifying Respirator (PAPR)	—	50	1,000	25/1,000 <sup>4</sup>	25
3. Supplied-Air Respirator (SAR) or Airline Respirator	—	10	50	—	—
• Demand mode	—	50	1,000	25/1,000 <sup>4</sup>	25
• Continuous flow mode	—	50	1,000	—	—
• Pressure-demand or other positive-pressure mode	—	50	1,000	—	—
4. Self-Contained Breathing Apparatus (SCBA)	—	10	50	50	—
• Demand mode	—	—	10,000	10,000	—
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	—	—	10,000	10,000	—

**Notes:**

<sup>1</sup> Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

<sup>2</sup> The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

<sup>3</sup> This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

<sup>4</sup> The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

<sup>5</sup> These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

### **(Fit Test) - User Seal Check Procedures**

#### Face piece Positive and/or Negative Pressure Checks

- There can be no facial hair between respirator sealing surface and skin on the face.
- To perform a positive pressure check: close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators, this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.
- To perform a negative pressure check: close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seals(s), inhale gently so that the face piece collapsed slightly, and hold the breath for ten seconds. The design or the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

#### Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

### **(Fit Test) – Smoke or Scent Test Exercise**

During this test, follow the instructions of the Tester, and keep your eyes closed. The testing smoke or scent may be irritating and is designed to test the seal of the respirator to your face, but it can also irritate your eyes and nasal passages. A proper seal ensures your safety when using the respirator. You should only use the type and size respirator you have approved fit testing results. The Tester will ask you to do the following; if at any time you taste or smell the scent or smoke, or become uncomfortable, notify the Tester.

1. Place respirator on
2. Perform a user seal check
3. Test exercises (scent or smoke will be introduced at this time)
  - a) Normal Breathing
  - b) Deep Breathing
  - c) Turning head side to side
  - d) Moving head up and down
  - e) Talking (Rainbow Passage)
  - f) Bending over
  - g) Normal Breathing



**Respirator Fit Test – Record Form**

This is to certify that a Qualitative Fit Test, according to OSHA 29 CFR 1910.134 respiratory protection standard was performed on the below individual using a 3M-10 fit Test Kit.

The following type of PPE was provided:

Respiratory Manufacturer:  3M  North  Other \_\_\_\_\_

Model: \_\_\_\_\_

Type: \_\_\_\_\_

Size:  Small  Medium  Large  X-Large  Other \_\_\_\_\_

Outcome:  Pass  Fail

**OSHA requires a physician or other licensed health care professional (PLHCP) perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information found in the medical questionnaire in sections 1 and 2, Part A in Appendix C of 29 CFR 1910.134.**

Employee ID Number: \_\_\_\_\_

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*\*\*\*

Tests used:  Seal Test  Smoke  Sweet  Bitter

Test Performed by:

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

## Respirator Cleaning Procedures

### Procedures for Cleaning Respirators:

- Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- Wash components in warm (43 deg. C (110 deg. F) maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
- Rinse components in warm (43 deg. C (110 deg. F) maximum), preferably running water. Drain.
- When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
  - Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F).
  - Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliter of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F).
  - Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
- Rinse components thoroughly in clean, warm (43 deg. C (110 deg. F) maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
- Components should be hand-dried with a clean lint-free cloth or air-dried.
- Reassemble face piece, replacing filters, cartridges, and canisters where necessary.
- Test the respirator to ensure that all components work properly.

### **Information for Employees Using Respirators When Not Required Under the Standard**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- Keep track of your respirator so that you do not mistakenly use someone else's respirator.



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 2/23/2011	Updated: 2/7/2022	Policy # EHS-200.09
<b>High Hazard Chemical Policy</b>		

**1.0 PURPOSE:**

To minimize hazardous exposures to high hazard chemicals as defined by OSHA which include select carcinogens, reproductive/developmental toxins, and chemicals that have a high degree of toxicity.

**2.0 SCOPE:**

The procedures provide guidance to all LSUHSC personnel who work with high hazard chemicals.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health and Safety (EH&S) shall:**

- Provide technical assistance with the proper handling and safe disposal of high hazard chemicals.
- Maintain a list of high hazard chemicals used at LSUHSC, see Appendix A.
- Conduct exposure assessments and evaluate exposure control measures as necessary. Maintain employee exposure records.
- Provide emergency response for chemical spills.

**3.2 Principle Investigator (PI) /Supervisor shall:**

- Develop and implement a laboratory specific standard operation plan for high hazard chemical use per [OSHA 29CFR 1910.1450 \(e\)\(3\)\(i\); Occupational Exposure to Hazardous Chemicals in Laboratories](#). Plans shall include the development of chemical specific standard operating procedures (SOP). A set of pre-developed SOP for select chemical agents and blank SOP template is available at the [High Hazard Chemicals page](#) of the EH&S website.
- Notify EH&S of the addition of a high hazard chemical not previously used in the laboratory.



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- Ensure personnel are trained on specific chemical hazards present in the lab. This shall include ensuring an awareness and understanding by the users of each high hazard chemical SOP.
- Maintain Safety Data Sheets (SDS) for all chemicals, either on the computer hard drive or in hard copy.
- Coordinate the provision of medical examinations, exposure monitoring and recordkeeping as required.

### **3.3 Employees:**

- Complete all necessary training before performing any work.
- Observe all safety rules and regulations.
- Know where the chemical spill kit, fire extinguishers, emergency showers and eye wash stations are located.
- Immediately report unsafe or unhealthy work conditions and any mishaps.

### **4.0 IMPLEMENTATION:**

#### **4.1 General Operating Procedures:**

The OSHA Laboratory Standard [OSHA 29 CFR 1910.1450](#) requires that special handling procedures be employed for certain chemicals identified as “particularly hazardous substances.” Particularly hazardous substances are high hazard chemicals, which include select carcinogens, reproductive/developmental toxins, and chemicals that have a high degree of acute toxicity.

#### **4.2. Handling:**

- Only laboratory personnel trained to work with high hazard chemicals shall perform the work within the designated area.
- Designated areas (e.g., chemical hoods, lab benches, outside rooms, etc.) for material use must be established and the area identified by signs or postings. For more information on signs and labeling see [EHS 400.12, Hazard Communication Program](#).
- Written procedures for the safe use of the material, waste removal and decontamination procedures must be established prior to use.
- When working with high hazard chemicals of moderate/high chronic or high toxicity, maintain records of the date the chemical was used, the amount of chemical used, names of users, and the disposal dates.



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- When working with chemicals of high chronic toxicity, decontaminate the designated working area per SOP requirements before normal work is resumed.
- If a vacuum line is used, protect the vacuum line with an absorbent liquid or liquid trap and HEPA filter. If a volatile high hazard chemical is used, use a separate vacuum pump or other device placed in a chemical fume hood.
- Work surfaces, including chemical fume hoods and biological safety cabinets, should have a removable liner of absorbent plastic-backed paper to help contain spilled materials and to simplify subsequent cleanup and disposal.
- Use double containment to protect against spills and breakage when moving a high hazard chemical out of a laboratory to another location.

### 4.3 Personal Protective Equipment (PPE):

- Consult the SDS for recommendations. EH&S is available for additional consultation.
- At a minimum, goggles/safety glasses with side shields, laboratory coats, and closed-toe shoes should be worn.
- When methods for decontaminating clothing are unknown, disposable protective clothing should be worn.
- Gloves must be selected on the basis of their chemical resistance to the material being handled, their suitability for the procedures being conducted, and their resistance to wear and temperature extremes.
- If a respirator is required, contact EH&S in advance. The wearing of a respirator requires medical clearance, a fit test and training.

### 4.4 Ordering and Storage:

- Only the minimum quantity of the high hazard chemical necessary to conduct the research should be ordered.
- High hazard chemicals must be stored in a designated storage area which must be clearly marked with the appropriate hazard warning signs.
- All high hazard chemical containers must be clearly labeled with the chemical name or mixture components and the appropriate hazard warning information. For more information on signs and labeling see [EHS 400.12, Hazard Communication Program](#).
- High hazard chemicals should be stored in unbreakable, well-labeled, impervious secondary containers.



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- Additional storage precautions (e.g., refrigerator, chemical fume hood, or flammable liquid storage cabinet) may be required for certain compounds based upon other properties. For more information on chemical storage see [EHS 200.05, Chemical Ordering and Storage Procedures](#).

### 4.5 Disposal:

- Place dry materials contaminated with a high hazard chemical in a secure plastic bag. Liquid waste should be placed in containers that are compatible for the waste, in good condition, and have tight fitting lids.
- Label the contaminated waste material with the following:
  - The words “Hazardous Waste”.
  - The principle chemical constituents and the approximate percentage of each.
  - The date the waste was first placed in the container.
- Submit a service request to EH&S for removal.
- For more information on chemical waste disposal see [EHS 200.04, Chemical Waste Management Procedures](#).

### 4.6 Medical Surveillance

Medical surveillance may be required if:

- Significant quantities of high hazard chemicals are used on a regular basis.
- An individual develops signs or symptoms associated with a hazardous chemical.
- Where airborne exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the Permissible Exposure Limit) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
- Whenever an event such as a spill, leak, explosion or other occurrences takes place and results in the likelihood of an exposure to a hazardous chemical.

### 4.7 Exposure Monitoring

- Regular environmental monitoring is not usually practical in labs because chemicals are typically used for relatively short time periods and in small quantities. However, exposure monitoring as required by 29 CFR 1910.1450 will be provided when:
  - Significant quantities of hazardous chemicals are used over an extended period of time.



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- When regular use of an OSHA regulated substance is believed to be in excess of an action level (AL) or permissible exposure limits (PEL). AL and PELs for OSHA regulated substances can be found in [29 CFR 1910.1000 subpart Z](#).
- When laboratory personnel exhibit signs and symptoms of exposure to chemicals used or stored in their areas.

### 4.8 Spills:

- High hazard chemical spills that occur in the chemical fume hood may be cleaned by trained lab personnel.
- For all high hazard chemical spills that occur outside the chemical fume hood:
  - Evacuate the area.
  - Close door to laboratory.
  - Immediately, notify University Police at 568-8999 and EH&S at 568-6585.
  - Re-entry to the spill area is not permitted until EH&S responders have cleaned the area and verified that it is safe to reenter the lab.

### 5.0 TRAINING

The Principal Investigator/Laboratory supervisor will provide laboratory-specific training to all laboratory workers on chemical hazards before handling, using, or storing high hazard chemicals. Training elements should include how to understand an MSDS, selecting the correct PPE, and proper decontamination and disposal procedures.

### 6.0 RECORD KEEPING:

- 6.1 **Principal Investigators/Laboratory Supervisors** shall keep their employee's training records for the current fiscal year and the previous three fiscal years.
- 6.2 **EH&S** will maintain accurate records of any measurements taken to monitor an employee exposures required by OSHA 1910.1450, Occupational Exposure to Hazardous Chemicals in the Laboratories, for the current year plus ten calendar years.

### 7.0 INSPECTIONS:

#### 7.1 PI/Laboratory Supervisor



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Recurring assessments of high hazard chemical work and storage areas should be completed by laboratory personnel, to include a review chemical container and label integrity, good housekeeping practices, and emergency equipment.

### 7.2 EH&S

Overall compliance will be assessed by the Environmental Health and Safety Department as part of recurring laboratory inspections.

### 8.0 DEFINITIONS:

- **Action level** means a concentration designated in 29 CFR Part 1910 for a specific substance, calculated as an eight-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.
- **Acute toxic chemicals** are chemicals with a high level of acute toxicity that have the ability to cause harmful local and systemic effects, or death after a single exposure. In general, acute toxic chemicals have an oral LD50 of <50 mg (rats, per kg), skin contact LD 50 of <200 mg (rabbits, per kg). For inhalation, a median lethal concentration LC50 in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each. See Appendix B for a list of acute toxic chemicals.
- **Carcinogens** are chemicals or physical agents that cause cancer or tumor development after repeated or chronic exposure. Their effects only become evident after a long period and may cause no immediate harmful effects. Some examples are Di-methyl mercury, Benzo-a-pyrene, and n-Nitrosodiethylamine.
- **Chronic Toxicity** is when harmful effects are produced through repeated or continuous exposure to a substance over an extended period of time. Some examples are carcinogens, reproductive toxins, and certain heavy metals.
- **Lethal Concentration 50 (LC50)** is the concentration of an air contaminant that will kill 50% of the test animals in a group during a single exposure.
- **Lethal Dose 50 (LD50)** is the dose of a substance or chemical that will kill 50% of the test animals in a group within the first 30 days following exposure.



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- **Permissible Exposure Limit (PEL)** is the maximum concentration averaged over 8 hour to which 95% healthy adults can be repeatedly exposed for 8 hours per day, 40 hours per week.
- **Reproductive/developmental toxins** are substances that cause chromosomal damage or genetic alterations with lethal or teratogenic effects in a developing fetus or embryo. Some examples are lead compounds, organomercurial compounds, arsenic trioxide, benzene, and formamides. See Appendix C for a list of reproductive/developmental toxins.
- **Select Carcinogen** is any substance found on the following lists:
  - OSHA Carcinogen List.
  - The Annual Report on Carcinogens published by the National Toxicity Program, including all the substances listed as “known to be carcinogens” and some substances listed as “reasonably anticipated to be carcinogens”.
  - All of Group I “Carcinogen to humans” and some in Group 2A and 2B, “reasonably anticipated to be carcinogens” listed by the International Agency for Research on Cancer (IARC)See Appendix D for a listing of Select Carcinogens.

### 9.0 APPENDICES

- Appendix A, High Hazard Chemicals Used at LSUHSC-NO
- Appendix B, Acute Toxic Chemicals List
- Appendix C, Reproductive/Developmental Toxins List
- Appendix D, Select Carcinogens List



## APPENDIX A

### HIGH HAZARD CHEMICALS USED AT LSUHSC

**Acrolein** – flammable, toxic  
**Acrylamides** – toxic  
**Aminopterin** - toxic  
**Arsenic acid** – toxic – moisture sensitive  
**Benzene** - flammable  
**Benzidine** based dyes - toxic  
**Cadmium compounds** - toxic  
**Carbon tetrachloride** – toxic  
**Catechol** – toxic, corrosive  
**Chloroform** - toxic  
**Colchicine** - toxic  
**Cyclophosphamide** – toxic  
**Diaminobenzidine** - toxic  
**Dimethyl sulfate** – toxic, corrosive  
**Dioxane, 1,4-** - flammable  
**Ethylene glycol monomethyl ether**  
**Formaldehyde** – flammable, (formalin is not considered flammable)  
**Hexane** - flammable  
**Hydrazine** – corrosive – moisture sensitive  
**Iodomethane** – toxic – moisture sensitive  
**Lead compounds** - toxic  
**Mercury and mercury compounds** - toxic  
**Nicotine** - toxic  
**Osmium tetroxide** - toxic  
**Phenol** – toxic  
**Phenylmethanesulfonylfluoride** – toxic – moisture sensitive  
**Picrotoxin** - toxic  
**Potassium cyanide** – toxic – moisture sensitive  
**Sodium azide** - toxic  
**Sodium cyanide** – toxic – moisture sensitive  
**Strychnine** - toxic  
**Styrene** - flammable  
**Thiophenol** - toxic  
**Thiosemicarbazide** - toxic  
**Thiourea** - toxic  
**Toluene** - flammable  
**Urethane (ethyl carbamate)** - toxic  
**Warfarin** - toxic



## APPENDIX B

### ACUTE TOXIC CHEMICALS LIST

<b>Chemical Name</b>	<b>Alternate Names</b>	<b>CAS#</b>
Acrolein	2-Propen-1-one	107-02-8
Acrylonitrile	2-Propenenitrile; Cyanoethylene	107-13-1
Actinomycin	Actinomycin C; Oncostatin	1402-38-6
Actinomycin D	Oncostatin K	50-76-0
Aflatoxin B1		1402-68-2
Aldicarb	Propanal, 2-methyl-2-(methylthio)-, O-((methylamino)carbonyl)oxime	116-06-3
Aldrin		309-00-2
Allyl iodide	Iodopropene, 3-	556-56-9
Aminopterin	Aminofolic Acid, 4-	54-62-6
Aminopyridine, 3-	Aminopyridine, m-	462-08-8
Aminopyridine, 4-	Aminopyridine, p-	504-24-5
Amiton		78-53-5
Amiton oxalate	Tetram Monooxalate	3734-97-2
Amphetamine sulfate, d-	Benzedrine sulfate, d-	51-63-8
Antimony hydride	Stibine	7803-52-3
Antimycin A	Virosin	1397-94-0
Arsenic Acid	Orthoarsenic acid	7778-39-4
Arsenic(III) chloride	Arsenic trichloride	7784-34-1
Arsenic(III) fluoride	Arsenic trifluoride	7784-35-2
Arsenic(III) oxide	Arsenic trioxide; Arsenious Oxide	1327-53-3
Arsenic(III) sulfide	Arsenic trisulfide	1303-33-9
Arsenic(V) oxide	Arsenic pentoxide	1303-28-2
Arsenic(V) sulfide	Arsenic pentasulfide	1303-34-0
Arsine	Hydrogen arsenide	7784-42-1
Azinphos-Methyl	Guthion	86-5—0
Beryllium (powdered)		7440-41-7
Bis(2-chloroethyl)-N-nitrosourea, N, N-	BCNU; Carmustin	154-93-8
Bis(chloromethyl) Ether	BCME	542-88-1
Boron tribromide	Boron bromide	10294-33-4
Boron trichloride	Boron chloride	10294-34-5
Boron trifluoride	Boron fluoride	7637-07-2
Botulinum Toxin B	Botulinum Toxin E	93384-44-2
Bungarotoxin, b-		
Butyronitrile	Cyanopropane, 1-	109-74-0



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Calcium arsenate	Arsenic Acid, Calcium Salt (2:3)	7778-44-1
Calcium cyanide	Calcid; Cyanogas	592-01-8
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Carbachol chloride	Doryl	51-83-2
Carbofuran	Yaltox	1563-66-2
Carbophenothion	Acarithion	786-19-6
Cholera Toxin		9012-63-9
Cisplatin		15663-27-1
Colchicine		64-86-8
Copper acetoarsenite	C.I. Green 21	12002-03-8
Coumaphos		56-72-4
Cyanide		57-12-5
Cyanogen chloride	Chlorine cyanide	506-77-4
Cyanuric fluoride	Trifluorotriazine	675-14-9
Cycloheximide	Actidione	66-81-9
Cytochalasin D	Zygosporin A	22144-77-0
Dibutyltin diacetate		1067-33-0
Dichloroacetylene		7572-29-4
Dichlorophenylarsine	Phenyl dichloroarsine	696-28-6
Dichlorvos	DDVP	62-73-7
Dieldrin		60-57-1
Diethyl 4-Nitrophenol phosphate	Ethyl Paraoxon	311-45-5
Diethyl chlorophosphate		814-49-3
Digitoxin		71-63-6
Digoxigenin		1672-46-4
Digoxin		20830-75-5
Diisopropyl fluorophosphate	Isopropyl phosphorofluoridate	55-91-4
Dimethyl sulfate	Methyl sulfate	77-78-1
Dimethylmercury	Methyl mercury	592-74-8
Dimetilan		644-64-4
Dinitrobutylphenol	DNBP; 2-sec-butyl-4, 6-Dinitrophenol	88-85-7
Dinitro-o-Cresol, 4, 6-		534-52-1
Dinitrophenol, 2, 4-	Aldifen; DNP, 2, 4-	51-28-5
Dioxathion		78-34-2
Diphtheria Toxin		
Disulfoton		298-04-4
Di-tert-butyl dicarbonate	DOC-Anhydride	24424-99-5
Dithiobiuret, 2, 4-	DTB	541-53-7
Doxorubicin (Free Base)	Adriamycin (Free Base)	23214-92-8
Emetine dihydrochloride		316-42-7
Endosulfan sulfate		1031-07-8



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Endothion		2778-04-3
Endrin	Hexadrin	72-20-8
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Ergocalciferol	Vitamin D2	50-14-6
Ergosterol	Provitamin D2	57-87-4
Ethion		563-12-2
Ethopropos	Ethoprop	13194-48-4
Ethylene fluorohydrin	Fluroethanol, 2-	371-62-0
Ethyleneimine	Aziridine	151-56-4
Ethylmercuric phosphate		2235-25-8
Etorphine	Immobilon	14521-96-1
Fenamiphos		22224-92-6
Fensulfothion	Dasanit	115-90-2
Fluenetil		4301-50-2
Fluoride ion		16984-48-8
Fluorine		7782-41-4
Fluoroacetamide		640-19-7
Fluoroacetic acid		144-49-0
Formaldehyde	Methyl aldehyde	50-00-0
Formaldehyde cyanohydrin	Glycolonitrile	107-16-4
Fometanate hydrochloride		23422-53-9
Formparanate		17702-57-7
Gitoxin		4562-36-1
Heptachlor		76-44-8
Heptachlor epoxide		102405703
Hexaethyl tetraphosphate		757-58-4
Hydrazine		302-01-2
Hydrogen cyanide	Hydrocyanic acid	74-90-8
Hydrogen selenide	Selenium hydride	7783-07-5
Hygromycin B	Antihelmucin	31282-04-9
Iron pentacarbonyl		13463-40-6
Isobenzan	Telodrin	297-78-9
Isobutyronitrile	Isopropyl cyanide	78-82-0
Isocyanatoethyl methacrylate, 2-		30674-80-7
Isodrin		465-73-6
Lactonitrile		78-97-7
Lannate	Methomyl	16752-77-5
Leptophos		21609-90-5
Lewisite		541-25-3
Malonitrile	Malononitrile	109-77-3
Mephosfolan		950-10-7
Mercaptofos	Demeton	8065-48-3



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Mercury (II) acetate	Mercuric acetate	1600-27-7
Mercury (II) bromide	Mercuric bromide	7789-47-1
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Mercury (II) chloride	Mercuric chloride	7487-94-7
Mercury (II) cyanide	Mercuric cyanide	592-04-1
Mercury (II) iodide	Mercuric iodide	7774-29-0
Mercury (II) nitrate	Mercuric nitrate	10045-94-0
Mercury (II) oxide	Mercuric oxide	21908-53-2
Mercury (II) thiocyanate	Mercuric sulfocyanate	592-85-8
Methacrolein diacetate		10476-95-6
Methamidophos		10265-92-6
Methanesulfonyl fluoride	Mesyl fluoride; Fumette	558-25-8
Methidathion	Supracide	950-37-8
Methiocarb	Mecaptodimethur	2032-65-7
Methoxyethylmercuric acetate		151-38-2
Methoxyethylmercuric chloride		123-88-6
Methoxyflurane	Metofane; Penthrane	76-38-0
Methyl chloroformate	Methyl chlorocarbonate	79-22-1
Methyl fluoroacetate	fluoroacetic acid, Methyl ester	453-18-9
Methyl isocyanate		624-83-9
Methyl lactonitrile, 2-	Acetone cyanohydrin	75-86-5
Methyl phosphonic dichloride		676-97-1p
Methylaziridine, 2-	Propyleneimine	75-55-8
Methylhydrazine		60-34-4
Mevinphos	Phosdrin	7786-34-4
Mexacarbate		315-18-4
Mitomycin C	Ametycin	50-07-7
Monensin Sodium	Coban	22373-78-0
Monochrotophos		6923-22-4
Naphthylthiourea, alpha-	ANTU	86-88-4
Nickel carbonyl	Nickel tetracarbonyl	13463-39-3
Nickel cyanide	Dicyanonickel	557-19-7
Nicotine		54-11-5
Nicotine sulfate		65-30-5
Nitric Acid (red fuming)		7697-37-2
Nitric Oxide	Nitrogen monoxide	10102-43-9
Nitrobenzotrile, p-		619-72-7
Nitrogen dioxide		10102-44-0
Nitrogen tetroxide		10544-72-6
Nitrosodimethylamine, N-	Dimethylnitrosamine	62-75-9
Nitrosomethylvinylamine		4549-40-0
Norbormide		991-42-4



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Ochratoxin A 303-47-9  
Osmium tetroxide 20816-12-0

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Ouabain	Acocantherin	630-60-4
Oxamyl		23135-22-0
Oxidiphenoxarsine, 10, 10-	Vinadine	58-36-6
Oxotremorine		70-22-4
Oxygen difluoride	Fluorine oxide; Oxygen fluoride	7783-41-7
Parathion	Phosphostigmine	56-38-2
Parathion-Methyl	Methyl parathion; Metaphor	298-00-0
Pentaborane (9)	Nonahydropentaborane	19624-22-7
Pentachlorophenol		87-86-5
Phalloidin	Phalloidin from Amanita Phalloides	17466-45-4
Phenyl mercaptan	Thiophenol; Benzenethiol	108-98-5
Phenylmercuric acetate	Phenylmercury acetate	62-38-4
Phenylmercuric triethanolamine		23319-66-6
Lactate		
Phenylphosphine		638-21-1
Phenylsilatrane		2097-19-0
Phenylthiocarbamide	Phenyl-2-thiourea, 1-	103-85-5
Phorate		298-02-2
Phosacetim		4104-14-7
Phosfolan		947-02-4
Phosgene	Carbonyl chloride	75-44-5
Phosphamidon		13171-21-6
Phosphine	Hydrogen phosphide	7803-51-2
Phosphorus oxychloride	Phosphoryl chloride	10025-87-3
Phosphorus trichloride	Phosphorous chloride	7719-12-2
Phosphorus, yellow	Phosphorus, white	7723-14-0
Physostigmine	Eserine	57-47-6
Physostigmine salicylate	Eserine salicylate	57-64-7
Physostigmine sulfate	Eserine sulfate	64-47-1
Picrotoxin	Cocculin	124-87-8
Potassium arsenite	Arsenenous acid, Potassium Salt	10124-50-2
Potassium azide		20762-60-1
Potassium cyanide		151-50-8
Potassium silver cyanide	Silver potassium cyanide	506-61-6
Promecarb		2631-37-0
Propanenitrile	Propionitrile; Ethyl cyanide	107-12-0
Propargyl alcohol		107-19-7
Propiolactone, beta	Propiolactone, 1, 3-	57-57-8
Puromycin	Achromycin	53-79-2



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Ricin 90009-86-3  
Sarin Isopropylmethane fluorophosphate 107-44-8

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Selenium dioxide	Selenium (IV) dioxide	7446-08-4
Sodium arsenate	Arsenic acid, sodium salt	7631-89-2
Sodium azide		26628-22-8
Sodium cyanide		143-33-9
Sodium dichromate		10588-01-9
Sodium fluoroacetate	Fluoroacetic acid, sodium salt	62-74-8
Sodium meta arsenite		7784-46-5
Sodium selenate	Selenic acid, disodium salt	13410-01-0
Sodium selenite	Selenious acid, disodium salt	10102-18-8
Streptonigrin	Bruneomycin	3930-19-6
Strychnine		57-24-9
Strychnine sulfate	Vampirol	60-41-3
Sulfur pentafluoride	Sulfur decafluoride	5714-22-7
Sulfur tetrafluoride		7783-60-0
Tetraethyl dithiopyrophosphate	Sulfotep; TEDP	3689-24-5
Tetraethyl pyrophosphate	Vapatone	107-49-3
Tetraethyltin	Tetraethyl stannate	597-64-8
Tetrodotoxin	Tetrodotoxin citrate	4368-28-9
Thallium malonate	Thallos malonate	2757-18-8
Thallium sulfate		10031-59-1
Thallium (I) acetate	Thallos acetate	563-68-8
Thallium (I) carbonate	Thallos carbonate	6533-73-9
Thallium (I) chloride	Thallos chloride	7791-12-0
Thallium (I) nitrate	Thallos nitrate	10102-45-1
Thallium (I) sulfate	Thallos sulfate	7446-18-6
Thiocarbazide	Thiocarbohydrazide – TCH	2231-57-4
Thiosemicarbazide	Thiocarbamyldiazine	79-19-6
Toluene diisocyanate	Methyl-m-phenylene diisocyanate	26471-62-5
Toxaphene	Camphechlor	8001-35-2
Trimethyltin chloride	Chlorotrimethylstannate	1066-45-1
Triphenyltin hydroxide		76-87-9
Tubocurarine	Tubocurarine hydrochloride	57-94-3
Tungsten hexafluoride	Tungsten (VI) fluoride	7783-82-6
Valinomycin, (+)-	Valinomycin	2001-95-8
Vanadium (V) oxide	Vanadium pentoxide	1314-62-1
Warfarin		81-81-2
Warfarin sodium	Sodium coumadin	129-06-6
Yohimbine hydrochloride		65-19-0
Zinc phosphide		1314-84-7



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Zinc silicofluoride

Zinc fluorosilicate

1687-71-9



APPENDIX C

REPRODUCTIVE/DEVELOPMENTAL TOXINS LIST

<u>Chemical Name</u>	<u>CAS#</u>
1-(2-chloroethyl)-3-cyclohexyl-1-Nitrosourea (CCNU)	13010-47-4
1, 2-Dibromo-3-chloropropane (DBCP)	96-12-8
1, 3-Butadiene	106-99-0
1, 4-Butanediol dimethanesulfonate (Busulfan)	55-98-1
1-Bromopropane	106-94-5
2, 3, 7, 8-Tetrachlorodibenzo-p- dioxin (TCDD)	1746-01-6
2, 4-D butyric acid	94-82-6
2, 4-Dinitrotoluene	121-14-2
2, 6-Dinitrotoluene	606-20-2
2-Bromopropane	75-26-3
Acetazolamide	59-66-5
Acetohydroxamic acid	546-88-3
Actinomycin D	50-76-0
All-trans Retinoic acid	302-79-4
Alprazolam	28981-97-7
Altretamine	645-05-6
Amantadine hydrochloride	665-66-7
Amikacin sulfate	39831-55-5
Aminoglutethimide	125-84-8
Aminoglycosides	-----
Aminopterin	54-62-6
Amiodarone hydrochloride	19774-82-4
Amitraz	33089-61-1
Amoxoapine	14028-44-5
Anabolic Steroids	-----
Angiotensin Converting Enzyme (ACE) Inhibitors	-----
Anisindione	117-37-3
Arsenic (inorganic oxides)	-----
Atenolol	29122-68-7
Auranofin	34031-32-8
Azathioprine	446-86-6
Barbituates	-----
Beclomethasone dipropionate	5534-09-8



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Benomyl	17804-35-2
Benzene	71-43-2
Benzodiazepines	-----
Benzphetamine hydrochloride	-----
Bischloroethyl nitrosourea (BCNU)	154-93-8
Bromacil lithium salt	3404-19-6
Bromoxynil	1689-84-5
Bromoxynil octanoate	1689-99-2
Butabarbital sodium	143-81-7
Butyl Benzyl phthalate	85-68-7
Cadmium	-----
Carbamazepine	298-46-4
Carbon Disulfide	75-15-0
Carbon Monoxide	630-08-0C
Carboplatin	41575-94-4
Chenodiol	474-25-9
Chinomethionat (Oxythioquinox)	2439-01-2
Chlorambucil	305-03-3
Chlorcyclizine hydrochloride	1620-21-9
Chlordecone (Kepone)	143-50-0
Chlordiazepoxide	58-25-3
Chlordiazepoxide hydrochloride	438-41-5
Chlorsulfuron	64902-72-3
Cidofovir	113852-37-2
Cladribine	4291-62-8
Clarithromycin	81103-11-9
Clobetasol propionate	25122-46-7
Clomiphene citrate	50-41-9
Clorazepate dipotassium	57109-90-7
Cocaine	50-36-2
Codeine phosphate	52-28-8
Colchicine	64-86-8
Conjugated Estrogens	-----
Cyanazine	21725-46-2
Cycloate	1134-23-2
Cycloheximide	66-81-9
Cyclophosphamide (anhydrous)	50-18-0
Cyclophosphamide (hydrated)	6055-19-2
Cyhexatin	13121-70-5
Cytarabine	147-94-4
Decarbazine	4342-03-4
Danazol	17230-88-5
Daunorubicin hydrochloride	23541-50-6



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Demeclocycline hydrochloride	64-73-3
Di(2-ethylhexyl)phthalate	117-81-7
Diazepam	439-14-5
Diazoxide	364-98-7
Dichlorophene	97-23-4
Dichlorphenamide	120-97-8
Diclofop Methyl	51338-27-3
Dicumarol	66-76-2
Diethylstilbestrol (DES)	56-53-1
Diflunisal	22494-42-4
Dihydroergotamine mesylate	6190-39-2
Diltiazem hydrochloride	33286-22-5
Di-n-butyl phthalate (DBP)	84-74-2
Di-n-hexyl phthalate (DNHP)	84-75-3
Dinitrotoluene (technical grade)	-----
Dinocap	39300-45-3
Dinoseb	88-85-7
Diphenylhydantoin (Phenytoin)	57-41-0
Disodium cyanodithioimidocarbonate	138-93-2
Doxorubicin hydrochloride	23214-92-8
Doxycycline calcium	94088-85-4
Doxycycline hydrate	24390-14-5
Doxycycline monohydrate	17086-28-1
Endrin	72-20-8
Epichlorohydrin	106-89-8
Ergotamine tartrate	379-79-3
Estropipate	7280-37-7
Ethionamide	536-33-4
Ethyl dipropylthiocarbamate	759-94-4
Ethylene dibromide	1 06-93-4
Ethylene glycol monoethyl ether	110-80-5
Ethylene glycol monoethyl ether acetate	111-15-9
Ethylene glycol monomethyl ether	109-86-4
Ethylene glycol monomethyl ether acetate	110-49-6
Ethylene oxide	75-21-8
Ethylene thiourea	96-45-7
Etodolac	41340-25-4
Etoposide	33419-42-0
Etretinate	54350-48-0
Fenoxaprop ethyl	66441-23-4
Filgrastim	121181-53-1
Fluazifop butyl	69806-50-4
Flunisolide	3385-03-3



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Fluorouracil	51-21-8
Fluoxymesterone	76-43-7
Flurazepam hydrochloride	1172-18-5
Flurbiprofen	5104-49-4
Flutamide	13311-84-7
Fluticasone propionate	80474-14-2
Fluvalinate	69409-94-5
Ganciclovir sodium	82410-32-0
Gemfibrozil	25812-30-0
Goserelin acetate	65807-02-5
Halazepam	23092-17-3
Halobetasol propionate	66852-54-8
Haloperidol	52-86-8
Halothane	151-67-7
Heptachlor	76-44-8
Hexachlorobenzene	118-74-1
Hexamethylphosphoramide	680-31-9
Hydramethylnon	67485-29-4
Hydroxyurea	127-07-1
Idarubicin hydrochloride	57852-57-0
Ifosfamide	3778-73-2
Iodine-131	10043-66-0
Isotretinoin	4759-48-2
Lead	-----
Leuprolide acetate	74381-53-6
Levodopa	59-92-7
Linuron	330-55-2
Lithium carbonate	554-13-2
Lithium citrate	919-16-4
Lorazepam	846-49-1
Lovastatin	75330-75-5
Dinitrobenzene, m-	99-65-0
Mebendazole	31431-39-7
Medroxyprogesterone acetate	71-58-9
Megestrol acetate	595-33-5
Melphalan	148-82-3
Menotropins	9002-68-0
Meprobamate	57-53-4
Mercaptopurine	6112-76-1
Mercury and mercury compounds	-----
Methacycline hydrochloride	3963-95-9
Metham sodium	137-42-8
Methazole	20354-26-1



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Methimazole	60-56-0
Methotrexate	59-05-2
Methotrexate sodium	15475-56-6
Methyl chloride	74-87-3
Methyl mercury	-----
Methyltestosterone	58-18-4
Metiram	9006-42-2
Midazolam hydrochloride	59467-96-8
Minocycline hydrochloride	13614-98-7
Misoprostol	5122-46-2
Mitoxantrone hydrochloride	70476-82-3
Myclobutanil	88671-89-0
Nabam	142-59-6
Nafarelin acetate	86220-42-0
Neomycin sulfate	1405-10-3
Netilmicin sulfate	56391-57-2
Nickel carbonyl	13463-39-3
Nicotine	54-11-5
Nifedipine	21829-25-4
Nimodipine	66085-59-4
Nitrapyrin	1929-82-4
Nitrofurantoin	67-20-9
N-Methylpyrrolidone	872-50-4
Norethisterone (Norethindrone)	68-22-4
Norethisterone acetate	51-98-9
Norgestrel	6533-00-2
o-Dinitrobenzene	52-82-90
Oxadiazon	19666-30-9
Oxazepam	604-75-1
Oxydemeton methyl	301-12-2
Oxymetholone	434-07-1
Oxytetracycline	79-57-2
Oxytetracycline hydrochloride	2058-46-0
Paclitaxel	33069-62-4
Paramethadione	115-67-3
p-Dinitrobenzene	100-25-4
Penicillamine	52-67-5
Pentobarbital sodium	57-33-0
Pentostatin	53910-25-1
Phenacemide	63-98-9
Phenprocoumon	435-97-2
Pimozide	2062-78-4
Pipobroman	54-91-1



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Plicamycin	18378-89-7
Polybrominated biphenyls	-----
Polychlorinated biphenyls	-----
Potassium dimethyldithiocarbamate	12-80-30
Pravastatin sodium	81131-70-6
Prednisolone sodium phosphate	125-02-0
Procarbazine hydrochloride	366-70-1
Propargite	2312-35-8
Propylthiouracil	51-52-5
Pyrimethamine	58-14-0
Quazepam	36735-22-5
Quizalofop-ethyl	76578-14-8
Resmethrin	10453-86-8
Ribivarin	36791-04-5
Rifampin	13292-46-1
Secobarbital sodium	309-43-3
Sermorelin acetate	-----
Sodium dimethyldithiocarbamate	128-04-1
Sodium fluoroacetate	62-74-8
Streptomycin sulfate	3810-74-0
Streptozocin (streptozotocin)	18883-66-4
Sulfasalazine	599-79-1
Sulindac	38194-50-2
Tamoxifen citrate	54965-24-1
Temazepam	846-50-4
Teniposide	29767-20-2
Terbacil	5902-51-2
Testosterone cypionate	58-20-8
Testosterone enanthate	315-37-7
Tetracycline (internal use)	60-54-8
Tetracycline hydrochloride (internal use)	64-75-5
Thalidomide	50-35-1
Thioguanine	154-42-7
Thiophanate methyl	23564-05-8
Tobramycin sulfate	49842-07-1
Toluene	108-88-3
Triadimefon	43121-43-3
Triazolam	28911-01-5
Tributyltin methacrylate	2155-70-6
Trientine hydrochloride	38260-01-4
Triforine	26644-46-2
Trilostane	13647-35-3
Trimethadione	127-48-0



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Trimetrexate glucuronate	82952-64-5
Triphenyltin hydroxide	76-87-9
Uracil mustard	66-75-1
Urethane (ethyl carbamate)	51-79-6
Urofollitropin	97048-13-0
Valproate (Valproic acid)	99-66-1
Vinblastine sulfate	143-67-9
Vinclozolin	50471-44-8
Vincristine sulfate	2068-78-2
Warfarin	81-81-2
Zileuton	111406-87-2



APPENDIX D

**SELECT CARCINOGENS LIST**

Aziridine  
Benz(a)anthracene  
Benzene  
Benzidine  
Benzidine –based dyes (technical grade)  
    Direct Black 38  
    Direct Blue 6  
    Direct Brown 95  
  
Benzo(a)pyrene  
Benzo(b)fluoranthene  
Benzo(i)fluoranthene  
Benzo(k)fluoranthene  
Benzofuran  
Benzotrichloride  
Benzyl violet 4B  
Beryllium and beryllium compounds  
Betel quid with tobacco  
Betel quid without tobacco  
Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine), N,N-Bis(chloromethyl)ether  
Bis(bromomethyl)propane-1, 3-diol, 2, 2-  
Bischloroethyl nitrosourea (BCNU)  
Bis(chloromethyl) ether  
Bitumens, extracts of steam-refined and air-refined  
Bleomycins  
Bracken fern  
Bromodichloromethane  
Butadiene, 1, 3-  
Butanediol dimethanesulphonate (myleran), 1, 4-  
Butanediol dimethylsulfonate (myleran), 1, 4-  
Butylated hydroxyanisole (BHA)  
Butyrolactone, beta-  
C.I. Basic Red 9 monohydrochloride  
Cadmium and certain cadmium compounds  
Caffeic acid  
Captafol  
Carbon black extract  
Carbon tetrachloride  
Carrageenan, degraded  
Catechol



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Ceramic fibers (respirable size)  
Chlorambucil  
Chloramphenicol  
Chlordane  
Chlordecone (kepone)  
Chlorendic acid  
Chloro-4-(dichloromethyl)5-hydroxy-2(5H)-furanone, 3-  
Chloroaniline, para  
Chloroethyl)-3-cyclohexy-1-nitrosourea (CCNU), 1-(2-  
Chloroethyl)-3-4-methylcyclohexyl-1 nitrosourea, 1-(2-  
Chlorinated paraffins (C12, 60% Chlorine)  
Chlorinated toluenes, alpha-  
Chlornaphazine  
Chloro-2-methylpropene, 1-  
Chloro-2-methylpropene, 3-  
Chloro-o-phenylenediamine, 4-  
Chloro-ortho-toluidine, para  
Chloroform  
Chloromethyl ether  
Chloromethyl methyl ether (technical gradw)  
Chlorophenols and their sodium salts  
Chlorophenoxy herbicides  
Chloroprene  
Chlorothalonil  
Chlorozotocin  
Chromium compounds, hexavalent  
CI Acid Red 114  
CI Basic Red 9  
CI Direct Blue 15  
Cisplatin  
Citrus Red No. 2  
Coal tar pitches  
Coal tars  
Cobalt and cobalt compounds  
Cobalt metal with tungsten carbide  
Cobalt metal without tungsten carbide  
Cobalt (II) sulfate and other soluble cobalt (II) salts  
Coffee (bladder)  
Conjugated estrogens  
Creosotes  
Cresidin, para  
Cupferron  
Cycasin



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Cyclophosphamide  
Cyclosporin A  
Dacarbazine  
Danthron (1, 8-dihydroxyanthraquinone)  
Daunomycin  
DDT  
Diacetylbenzidine, N. N-  
Diaminoanisole, 2, 4-  
Diaminodiphenyl ether, 4, 4-  
Diaminotoluene, 2, 4'  
Diazoaminobenzene  
Dibenz(a, h)acridine  
Dibenz(a, h)anthracene  
Dibenz(a, j)acridine  
Dibenzo(a, e)pyrene  
Dibenzo(a, h)pyrene  
Dibenzo(a, i)pyrene  
Dibenzo(a, l)pyrene  
Dibenzo(c, g)carbazole, 7H-  
Dibromo-3-chloropropane, 1, 2-  
Dibromoethane (EDB), 1, 2-  
Dibromopropan-1-ol, 2, 3-  
Dichloroacetic acid  
Dichlorobenzene, para-  
Dichlorobenzene, 1, 4-  
Dichlorobenzidine, 3, 3'-  
Dichloro-4, 4'-diaminodiphenyl ether, 3, 3'-  
Dichloroethane, 1,2-  
Dichloromethane (methylene chloride)  
Dichloropropene (technical grade), 1, 3-  
Dichlorvos  
Diepoxybutane  
Diesel engine exhaust  
Di(2-ethylhexyl)phthalate  
Diethyl sulphate  
Diethylhydrazine, 1, 2-  
Diethylstilbestrol  
Diglycidyl resorcinol ether  
Dihydrosafrole  
Diisopropyl sulfate  
Dimethoxybenzidine, 3, 3'-  
Dimethoxybenzidine (ortho-dianisidine), 3, 3'-  
Dimethyl Sulphate



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Dimethylaminoazobenzene, para  
[(Dimethylamino)methylamino]-5-2-(5-nitro-2, trans-2-  
Dimethylaniline, 2, 6- (2, 6-xylidene)  
Dimethylbenzidine, 3, 3'-  
Dimethylcarbamoyl chloride  
Dimethylhydrazine, 1, 1-  
Dimethylhydrazine, 1, 2-  
Dimethylvinyl chloride  
Dinitrofluoroanthrene, 3, 7-  
Dinitrofluoroanthrene, 3, 9-  
Dinitropyrene, 1, 6-  
Dinitropyrene, 1, 8-  
Dinitrotoluene, 2, 4-  
Dinitrotoluene, 2, 6-  
Diocyl phthalate [Di(2-ethylhexyl)phthalate]  
Dioxane, 1, 4-  
Direct Black 38  
Direct Blue 6  
Direct Brown 95  
Disperse Blue I  
Epichlorohydrin  
Epoxybutane, 1, 2-  
Erionite  
Estrogens (not conjugated); estradiol-17  
Estrogens (not conjugated); estrone  
Estrogens (not conjugated); mestranol  
Estrogens (not conjugated); ethinylestradiol  
Ethylbenzene  
Ethyl acrylate  
Ethyl methanesulphonate  
Ethyl-N-nitrosourea, N-  
Ethylene oxide  
Ethylene thiourea  
Ethylene dibromide  
Ethyleneimine  
Etoposide  
Etoposide in combination with cisplatin and bleomycin  
Formaldehyde  
Formylhydrazino)-4-(5-nitro-2-furyl) thiazole, 2-(2-  
Fuel oils (residual, heavy)  
Furan  
  
Furyl)-3-(5-nitro-2-furyl)acrylamide], AF-2[2-



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Fusarium moniliform (toxins derived from)  
    Fumonisin B1  
    Fumonisin B2  
    Fusarin C

Gallium arsenide  
Gamma radiation (ionizing radiation)  
Gasoline  
Gasoline engine exhausts  
Glasswool (respirable size)  
Glu-P-1 (2-amino-6-methyldipyrdo[1, 2-a:3', 2'-d] imidazole)  
Glu-P-2 (2-aminodipyrdo[1,2-a:3', 2'-d] imidazole)  
Glycidaldehyde  
Glycidol  
Griseofulvin  
HC blue No 1  
Heptachlor  
Hexachlorobenzene  
Hexachlorocyclohexanes  
Hexachloroethane  
Hexamethylphosphoramide  
Hydrazine and hydrazine sulfate  
Hydrazobenzene  
Hydroxyanthroquinone, 1-  
Indeno(1, 2, 3-cd) pyrene  
Indium phosphide  
IQ (2-amino-3-methylimidazo[4, 5-f] quinoline)  
Iron dextran complex  
Isoprene  
Kepone (chlordecone)  
Lasiocarpine  
Lead  
Lead acetate and lead phosphate  
Lead compounds, inorganic  
Lindane and other hexachlorocyclohexane isomers  
Magenta (containing CI Basic Red 9)  
Man-made mineral fibers (glasswool, rockwool, slagwool, and ceramic fibers), respirable size  
MeA-alpha-C(2-amino-3-methyl-9H-pyrido[2, 3-b] indole)  
MeIQ (2-amino-3, 4-dimethylimidazo[4, 5-f] quinoxaline)  
Medroxyprogesterone acetate  
Melphalan  
  
Merphalan



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Methoxsalen with ultraviolet A therapy (PUVA)  
Methoxypsoralen, 8- plus ultraviolet radiation  
Methoxypsoralen, 5-  
Methyl mercury compounds (methylmercuric chloride)  
Methyl methanesulphonate  
Methyl chloromethyl ether  
Methyl-1-nitroanthraquinone, 2-  
Methyl-N'-nitro-N-nitrosoguanidine, N- (MNNG)  
Methyl-N-nitrosourethane, N-  
Methyl-N-nitrosourea, N-  
Methylaziridine (propyleneimine), 2-  
Methylazoxymethanol and its acetate  
Methylchrysene, 5-  
Methylene bis (2-methylaniline), 4, 4'-  
Methylene bis (N,N-dimethyl) benzenamine, 4, 4'-  
Methylene bis (2-chloroaniline) (MBOCA), 4, 4'-  
Methylene chloride (dichloromethane)  
Methylenedianiline, 4, 4'- and its dihydrochloride  
Methyleugenol  
Methylthiouracil  
Metronidazole  
Michler's Ketone  
Mirex  
Mitoxantrone  
Mitomycin C  
Monocrotaline  
MOPP and other combined chemotherapy for cancer  
Morpholinomethyl)-3-[5-nitrofurfurylidene) amino]-2-oxazolidinone, 5-(  
Mustard gas (sulphur mustard)  
Nafenopin  
Naphthalene  
Naphthalamine, alpha-  
Naphthalamine, beta  
Neutrons (ionizing radiation)  
Nickel and certain nickel compounds  
Niridazole  
Nitrilotriacetic acid and its salts  
Nitroacenaphthene  
Nitroanisole, 2-  
Nitrobenzene  
Nitrobiphenyl, 4-  
  
Nitrochrysene, 6-



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Nitrofen  
Nitrofluorene, 2-  
Nitrofurfurylidene) amino]-2-imidazolidinone, 1-[(5-  
Nitro-2-furyl)-2-thiazolyl] acetamide, N-[4-(5-  
Nitrogen mustard N-oxide  
Nitrogen mustard hydrochloride  
Nitrogen mustard  
Nitrolotriacetic acid and its salts  
Nitromethane  
Nitropropane, 2-  
Nitropyrene, 1-  
Nitropyrene, 4-  
Nitroso-N-ethylurea, N-  
Nitroso-N-methylurea, N-  
Nitrosodi-n-butylamine, N-  
Nitrosodi-n-propylamine, N-  
Nitrosodiethanolamine, N-  
Nitrosodiethylamine, N-  
Nitrosomethylamino)propionitrile, 3-(N-  
Nitrosomethylamino)-1(3-pyridyl)-1-butanone (NNK), 4-(N-  
Nitrosomethylethylamine, N-  
Nitrosomethylvinylamine, N-  
Norethisterone  
Ocratoxin A  
Oestrogen-progestogen therapy, postmenopausal  
Oestrogens, nonsteroidal  
Oestrogens, steroidal  
Oil Orange SS  
Oral contraceptives, sequential or combined  
Oxazepam  
Oxydianiline, 4, 4-  
Oxymetholone  
Panfuran S (containing dihydroxymethylfuratrizine)  
Phenacetin  
Phenazopyridine hydrochloride  
Phenobabital  
Phenolphthalein  
Phenoxybenzamine hydrochloride  
Phenyl glycidyl ether  
Phenytoin  
Polybrominated biphenyls (PCBs)  
  
Polychlorinated biphenyls (PCBs)



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Polycyclic aromatic hydrocarbons (PAHs)  
Ponceau MX  
Ponceau 3R  
Potassium bromated  
Procarbazine hydrochloride  
Progesterone  
Progestins  
Propanesultone-propiolactone, 1, 3-  
Propane sultone, 1, 3-  
Propiolactone, beta  
Propylene oxide  
Propylthiouracil  
Refractory ceramic fibers  
Reserpine  
Riddlelline  
Safrole  
Selenium sulfide  
Silica (crystalline)  
Sodium ortho-phenylphenate  
Sterigmatocystin  
Streptozotocin  
Styrene  
Styrene oxide (styrene-7, 8-oxide)  
Sulfallate  
Sulphuric acid  
Talc containing asbestiform fibers  
Tamoxifen  
Tenopside  
Tetrachlorodibenzo-p-dioxin (TCDD), 2, 3,7, 8-  
Tetrachloroethylene (perchloroethylene)  
Tetrafluoroethylene  
Tetranitromethane  
Thioacetamide  
Thiodianiline, 4,4'-  
Thiotepa [tris(1-azinidiny) phosphine sulfide]  
Thiouracil  
Thiourea  
Thorium dioxide  
Toluene diisocyanates  
Toluidine, ortho- (3, 3-Dimethylbenzidine)  
Toluidine hydrochloride, ortho-  
  
Toxaphene (polychlorinated camphenes)



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Trans-2[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]- (Treosulphan)  
Trichloroethylene  
Trichlormethine (Trimustine hydrochloride)  
Trichlorophenol, 2, 4, 6-  
Trichloropropane, 1, 2, 3-  
Tris(2, 3-dibromopropyl) phosphate  
Trp-P-1(3-Amino-1, 4-dimethyl-5H-pyrido[4,3-b]indole)  
Trp-P-2(3-Amino-1-methyl-5H-pyrido[4,3-b]indole)  
Trypan blue  
Uracil mustard  
Urethane  
Vanadium pentoxide  
Vinyl acetate  
Vinyl bromide  
Vinyl chloride  
Vinyl fluoride  
Vinylcyclohexene, 4-  
Vinylcyclohexene diepoxide, 4-  
Wood dust  
Zalcitabine  
Zidovudine (AZT, retrovir)



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 10/22/2019		Policy # EHS-200.10
<b>Laboratory Safety Committee Charter</b>		

**1.0 PURPOSE:**

This charter document defines the membership and responsibilities of the Laboratory Safety Committee at Louisiana State University Health Sciences Center New Orleans.

**2.0 SCOPE:**

The Committee is charged with fostering and ensuring a culture of laboratory safety on campus. The Committee will assess the adequacy of existing training and other protections related to laboratory safety; and ensure the university’s compliance with federal and state regulations and University policies regarding laboratory activities.

**3.0 RESPONSIBILITIES:**

- Serve as a forum to gather and address laboratory safety concerns, and to keep the LSUHSC community informed of new or proposed changes to laboratory safety regulations.
- Review safety/health policies and training established by the University pertaining to laboratory safety not within the purview of the Institutional Biosafety and Radiation Safety Committees.
- Review incidents involving work-related fatalities, injuries, illnesses and near misses related to laboratory safety.
- Review summary reports from Environmental Health and Safety laboratory inspections and make recommendations to improve compliance.

**4.0 MEMBERSHIP**

- Executive Director, Office of Research Services, Chairperson
- Associate Dean of Research, School of Medicine
- Associate Dean of Research, School of Dentistry
- Executive Director, Environmental Health and Safety
- Chemical and Biological Safety Officer, Environmental Health and Safety



## **5.0 MEETINGS AND MINUTES**

The committee will meet no less than twice annually. Meeting minutes will be maintained by Environmental Health and Safety for a minimum of six years and will include:

- Date, time, and location of meeting.
- Members present.
- Report of actions taken as a result of previous meetings.
- Summary of deliberations and discussions, and recommended action items. •  
New business.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 11/20/09	Updated 5/5/2022	Policy # EHS-300.2
<b>Biological and rDNA Spill Response Procedures</b>		

## **1.0 PURPOSE**

A wide variety of biohazardous materials are used throughout the LSU Health Sciences Center. These biological spill procedures are a general guidance for a rapid, appropriate, and safe response.

## **2.0 SCOPE**

These procedures address the proper response to incidents involving spills, leaks, or discharges of biohazardous materials and/or recombinant DNA (rDNA).

## **3.0 RESPONSIBILITIES:**

### **3.1 Environmental Health & Safety (EH&S) shall:**

- Provide assistance, additional clean-up materials, and personal protective equipment (PPE) as needed to personnel to safely clean up minor spills (under 50mL) in their work areas.
- Respond to and assess major spills (over 50mL).
- Hold recurring drills to ensure proficiency on spill response.
- Maintain back-up spill response kits.

### **3.2 Principal Investigators/Supervisors shall:**

- Develop and maintain spill response procedures based on the biosafety level (see Appendix A) of the area-specific biohazardous materials. These procedures will be made available to all employees.
- Ensure all employees are properly trained to respond safely to a hazardous biological spill or release in their area.
- Ensure that a biological spill response kit (with components as shown in Appendix B) and PPE are available and accessible.
- Report large biological spills (greater than 50mL) of Biosafety Level (BSL)-1 and BSL-2 materials immediately to University Police and EH&S.
- Report all spills involving BSL-3 or any rDNA materials immediately to EH&S. If EH&S is unavailable, or if the spill occurs after hours, contact University Police.
- In the event of a spill or release, follow incident/accident reporting procedures outlined in EHS - 400.06, Incident/Accident Reporting and Investigation Policy.

- Immediately notify the Biological Safety Officer (BSO) of all rDNA exposures. Work with the BSO to report rDNA accidents to the Office of Biotechnology Activities as required by National Institutes of Health (NIH) guidelines.

### **3.3 Employees shall:**

- Be trained on the proper use, handling, and spill response procedures regarding biohazardous materials.
- Wear PPE and use spill control equipment in the proper manner.
- Promptly report all biohazardous spills to their supervisor.

## **4.0 BIOLOGICAL SPILL CLEAN-UP PROCEDURES**

The response to a biohazardous material spill varies based on several factors, including the actual agent and the associated risks, the agent's biosafety level, the amount of material spilled, type of spill and the location of the spill. These biological spill procedures are general guidance for a rapid, appropriate, and safe response to a biohazardous spill. Each lab working with biohazardous material must develop area-specific spill response procedures.

Minimizing personnel exposure shall take priority over clean-up. If any person is exposed to biohazardous materials, they should immediately remove contaminated clothing or PPE and wash the affected areas with soap and water. If medical assistance is needed, immediately contact University Police at 568-8999.

Note that if the spill involves large amounts (greater than 50mL) of BSL-1 or 2 material, or any amount of BSL-3 or rDNA material, immediately call the BSO. Follow incident/accident reporting procedures outlined in EHS - 400.06, Incident/Accident Reporting and Investigation Policy.

### **4.1 Procedures for Spills Inside the Laboratory**

- Notify other employees and clear area immediately, closing the lab door upon exiting. Wait at least 30 minutes for aerosol to settle before entering spill area.
- Remove all contaminated clothing and place in biohazard bag. Run the bag through an autoclave at a later time.
- Put on necessary PPE including disposable gown, safety glasses and gloves.
- Place dry paper towels on the spill then layer a second set of disinfectant-soaked paper towels over the spill.
- Encircle the spill with additional disinfectant being careful to minimize aerosolization while assuring adequate contact. Allow a minimum of 20 minutes contact time to ensure germicidal action of disinfectant.
- Wipe up spill, working from the edges to the center. After initial clean-up, do a final clean-up of spill areas with fresh paper towels soaked in disinfectant.
- Decontaminate all non-disposable items within the spill area; disinfect all

mops and cleaning tools.

- Discard contaminated disposable materials using appropriate biohazardous waste disposal procedures.
- Wash hands thoroughly with soap and water immediately after the clean-up is complete.

#### **4.2 Procedures for Biosafety Level 3 Spills**

- For BSL-3 spill procedures, contact the current lab manager of the BSL-3 lab, or the BSO at 504-568-6585 and/or [safety@LSUHSC.edu](mailto:safety@LSUHSC.edu).
- For a general understanding of how to craft procedures for a BSL-3 lab, contact Environmental Health & Safety at 504-568-6585 and/or [safety@LSUHSC.edu](mailto:safety@LSUHSC.edu).

#### **4.3 Procedures for Spills Inside the Biological Safety Cabinet**

- Wear laboratory coat, eye protection, and gloves during clean-up.
- Allow cabinet to continue running during clean-up.
- Apply approved disinfectant (one part bleach to nine parts water is acceptable for most small spills; apply concentrated disinfectant for large spills) and allow a minimum of 15 minutes contact time.
- Wipe up spillage with disposable disinfectant-soaked cloth or tissue.
- Wipe the walls, work surface, and any equipment in the cabinet with a disinfectant-soaked cloth.
- Discard contaminated disposable materials in appropriate hazardous biological waste container(s) and autoclave before discarding as waste.
- Place contaminated reusable items in biohazard bags or in autoclavable pans with lids before autoclaving and cleanup.
- Expose non-autoclavable materials to disinfectant and allow 15 minutes contact time before removing from the biological safety cabinet.
- Remove protective clothing used during cleanup and place in a biohazard bag for autoclaving if necessary.
- Wash your hands thoroughly with soap and water immediately after the clean-up is complete.
- Run cabinet at least 15 minutes after cleanup before resuming work or turning cabinet off.

#### **4.4 Procedures for Spills Inside the Centrifuge**

- Ensure centrifuge is closed. Notify other employees and clear area immediately, closing the lab door upon exiting. Wait at least 30 minutes for aerosol to settle before entering spill area.
- Put on necessary PPE including a laboratory coat, eye protection, and gloves during cleanup.
- Remove rotors and buckets to nearest biological safety cabinet for clean-up.
- Thoroughly disinfect inside of centrifuge, rotors, and buckets by applying an approved disinfectant (one part bleach to nine parts water is acceptable for small spills; apply concentrated disinfectant for large spills) and allow a minimum of 15 minutes contact time.

- After thorough disinfection of rotor or rotor cups, remove contaminated debris and place in appropriate hazardous biological waste container(s) and autoclave before disposing as infectious waste.

#### **4.5 Procedures for Spills Outside the Laboratory, In Transit**

- Prior to transporting biohazardous materials, secure materials in an unbreakable, well-sealed primary container placed inside of a second unbreakable, lidded container (cooler, plastic pan or pail). Label the outer container with the biohazard symbol if material is BSL or Risk Group 2 or higher.
- Should a spill occur in a public area, do not attempt to clean it up without appropriate PPE. Contact University Police immediately and notify EH&S to assist in the clean-up.
- Secure the area, keeping all personnel clear of the spill.
- As an interim measure, wear gloves and place paper towels, preferably soaked in disinfectant, directly on spilled materials to prevent spread of contamination. To assure adequate contact, surround the spill with disinfectant, if available, taking care to minimize aerosols.
- Wash your hands thoroughly with soap and water immediately after the clean-up is complete.
- Stand by during spill response and cleanup activity to provide information and assistance.

#### **4.6 Procedures for Biological Spills Involving rDNA**

- Follow directions outlined in 4.2 through 4.5, depending on location of the spill.
- If microorganisms are present, select appropriate decontaminant and contact time.
- Report the spill to your supervisor. Notify the BSO at EH&S immediately.

#### **4.7 Procedures for Biological Spills Involving Radioactive Materials**

When a biohazardous spill also involves radioactive materials, cleanup procedures may have to be modified. The extent of the modification will depend on the level of radiation and the nature of the isotope involved. The Radiation Safety Officer should be called immediately at 504-568-6586 and/or [safety@LSUHSC.edu](mailto:safety@LSUHSC.edu).

### **5.0 TRAINING**

Environmental Health and Safety personnel shall participate in periodic routine spill response drills. Principal Investigators/Laboratory Supervisors are responsible to provide laboratory-specific training on biohazardous spill clean-up procedures.

## **6.0 RECORDKEEPING**

Principle Investigators/Supervisors shall keep their employee's training records for the current fiscal year plus the past three fiscal years. EH&S shall maintain records of all drills and significant spills.

## **7.0 INSPECTIONS AND PROGRAM REVIEW**

Program effectiveness will be assessed annually by the Environmental Health and Safety Department. Furthermore, program compliance will be evaluated at the Institutional Biosafety Committee meetings and during routine laboratory inspections.

## **8.0 REFERENCES**

- Centers for Disease Control and Prevention – Office of Health and Safety
- National Institutes for Health – Office of Biotechnology Activities
- World Health Organization – Laboratory Biosafety Manual 3<sup>rd</sup> Edition

## **9.0 APPENDICES**

Appendix A - Biosafety Risk Groups  
Appendix B - Biological Spill Kit Components

### **Biosafety Risk Groups**

It is critical to determine the biosafety level of the biohazardous material prior to cleaning and/or containing biological spills. Biosafety Risk Groups are as follows:

**Biosafety Level 1 (BSL 1)** - Organisms are well-characterized agents not known to cause disease in healthy adult humans and are of minimal potential hazard to laboratory personnel or to the environment. Examples include *B. subtilis*, *E. coli*, and *L. acidophilus*.

**Biosafety Level 2 (BSL 2)** - Organisms are agents of moderate potential hazard to laboratory personnel and the environment. Examples include Salmonellae, Hepatitis B virus, bloodborne pathogens, and human body fluids (particularly when visibly contaminated with blood).

**Biosafety Level 3 (BSL 3)** - Organisms are indigenous or exotic agents which may cause serious or potentially lethal disease and present the potential for aerosol transmission. Examples include H5N1 Influenza virus, *Bacillus anthracis*, *Yersinia pestis*, *Burkholderia*, *Francisella tularensis*, *Brucella*, *Clostridium botulinum*, *Mycobacterium tuberculosis*, *Coxiella burnetii*, Hantavirus, and West Nile virus.

### **Biological Spill Response Kit Components**

All laboratories working with biohazardous materials shall have at minimum, the following spill response supplies:

- Disinfectant solution\*
- Forceps, tongs, broom, dustpan
- PPE: safety glasses, goggles, or face shield, utility gloves, wrap-around lab coat, shoe covers (optional)
- Red biohazard bag and sharps container
- Paper towels or other absorbent
- Broken glass receptacle(s) should also be available.

\*Generally, a one-part dilution of household bleach to nine parts water prepared fresh daily is effective in most situations. Contact EH&S for more information about selection of disinfectants, particularly for any organisms suspected of being atypical in their sensitivity to disinfectants.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 06/01/2010	Updated: 10/26/2022	Policy # EHS-300.03
<b>Biological Materials Inventory and Control Policy</b>		

## **1.0 PURPOSE**

Biological materials are defined as any biologically-derived materials or materials which, either by accident or design, contain biological agents. Examples include bacteria, fungi, parasites, rickettsial agents, viral agents, prions, genetically modified organisms/micro-organisms, toxins of biological origin, transgenic animals or plants, human blood and body fluids, cell cultures, recombinant DNA, or any other biological agents which might pose a risk to health and safety or the environment.

Federal regulations, along with public concern over security of biohazardous materials, make it necessary for the University to maintain an up-to-date inventory of biological materials. This biological inventory will assist select University personnel in determining the risks that are present in research laboratories on campus in the event of an emergency or accident and ensure compliance with applicable federal regulations and guidelines.

## **2.0 SCOPE**

This policy applies to all LSUHSC personnel who work with or store biological materials.

## **3.0 RESPONSIBILITIES**

### **3.1 Environmental Health & Safety Department (EH&S) shall:**

- Provide technical support and training to assist departments with data entry into the biological inventory database.
- As part of laboratory inspections, review inventory for any safety issues (e.g., proper storage).
- Assist departments in complying with all applicable federal rules and regulations.

### **3.2 Principal Investigators (PI)/Supervisors shall:**

- Designate one or more laboratory personnel to be trained and responsible for the laboratory's biological materials inventory.
- Update/delete authorized users.
- Maintain the biological inventory in [SafetyStratus](#). Update the inventory when biological material is added, when a biological material is no longer used, or when there is more than a twofold increase in quantity of any biological material. Update the biological inventory review statement in SafetyStratus at least every 12 months.

## **4.0 IMPLEMENTATION**

### **4.1 Inventory Overview**

SafetyStratus is a web-based inventory database that allows personnel to access and manage their biological materials inventory. PIs/Supervisors and other authorized users can access and monitor their own biological materials inventory via the EH&S website and log onto the SafetyStratus site by using their LSUHSC username and password

### **4.2 Authorized Users**

To access [SafetyStratus](#), the PI will provide a list of authorized users to EH&S and update this list as users are added or deleted. EH&S will assign security settings for each PI/Supervisor to have access limited to only their biological materials inventory. It is recommended there is one lab designee allowed per PI to access SafetyStratus.

### **4.3 Inventory Maintenance**

Update the inventory when biological material is added, when a biological material is no longer used, or when there is more than a twofold increase in quantity of any biological material. Update the biological inventory review statement on SafetyStratus at least every 12 months.

## **5.0 TRAINING**

Training on data input onto SafetyStratus is available on the EH&S Department website under [SafetyStratus Resources](#). EH&S can provide additional assistance if needed.

## **6.0 REFERENCES**

- CDC, Biosafety in Microbiological and Biomedical Laboratories, 5<sup>th</sup> Edition
- NIH Guidelines for Research Involving rDNA Molecules
- U.S. Patriot Act, U.S. H.R. 3162, Public Law 107-56
- OSHA, Occupational Exposure to Bloodborne Pathogens, 29 CFR 1910.1030

Environmental Health & Safety Policy Manual		
Issue Date: 8/30/2010	Updated: 12/7/2020	Policy # EHS-300.04
<b>Bloodborne Pathogens – Exposure Control Plan</b>		

**1.0 PURPOSE:**

This Exposure Control Plan (ECP) is designed to minimize occupational exposure to bloodborne pathogens at LSUHSC. The ECP complies with the State of Louisiana Office of Risk Management’s Loss Prevention Manual, reference A, and OSHA Standard 29 CFR 1910.1030, reference B.

**2.0 SCOPE:**

This policy applies to all faculty, staff, and students who are determined to have occupational exposure to blood or other potentially infectious materials (OPIM).

**3.0 RESPONSIBILITIES:**

**3.1 Deans, Department Heads, and Directors shall:**

- Ensure employees and students determined to have occupational exposure to blood or OPIM comply with the procedures and work practices outlined in this ECP.
- Ensure the currency of all employee exposure determinations and required vaccinations. Maintain Consent/Declination form records.
- The Dean of the School of Dentistry will ensure all personnel also comply with the requirements of the [LSUSD Exposure Control Plan](#), reference C.
- Fund hepatitis B vaccinations for employees.

**3.2 Principle Investigators, Supervisors, and Faculty shall:**

- Follow the procedures outlined in [EHS - 400.06 Incident/Accident Reporting and Investigation Policy](#) to report exposures to blood or other potentially infectious materials, and ensure proper testing and medical treatment is provided.
- Validate that employees are properly assessed for risk level, receive initial and recurring Bloodborne Pathogens training, and that all high risk employees are offered the hepatitis B vaccination. If the employee’s risk level changes, notify the Biosafety Officer so that the proper training can be assigned.
- Ensure each employee is trained on area-specific work practice controls and engineering devices.

- Ensure employees are provided with PPE, worn as required, and trained in the proper wearing and use.
- Establish area-specific biohazardous spill response and decontamination procedures and training.

**3.3 Environmental Health and Safety (EH&S) shall:**

- Maintain, review, and update this ECP when necessary.
- Provide training to personnel via the on-line Knowledge Delivery System on bloodborne pathogens and hepatitis B vaccinations.

**4.0 DEFINITIONS:**

- **Blood:** human blood, human blood components, and products made from human blood.
- **Bloodborne Pathogens:** pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).
- **Decontamination:** the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.
- **Disinfection:** the process of reducing a contaminant load of microorganisms on a surface or object using bleach, ethanol, or another appropriate chemical.
- **Exposure Incident:** a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of a person's duties.
- **Needleless systems:** a device that does not use needles for the collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established.
- **Occupational Exposure:** reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of a person's duties.
- **Other Potentially Infectious Materials (OPIM):** materials other than human blood that can contain bloodborne pathogens and be potentially infectious. These include the following human body fluids: semen, vaginal

secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; any unfixed tissue or organ (other than intact skin) from a human (living or dead); HIV-containing cell or tissue cultures, organ cultures, and HIV or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

- **Parenteral:** the piercing of mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.
- **Source Individual:** any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee or student. Examples include, but are not limited to, hospital and clinic patients, clients in institutions for the developmentally disabled, trauma victims, clients of drug and alcohol treatment facilities, residents of hospices and nursing homes, human remains, and individuals who donate or sell blood or blood components.
- **Sterilize:** the use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.
- **Standard Precautions:** is the use of personal protective equipment (PPE) to prevent exposure to both bloodborne and airborne pathogens.
- **Universal Precautions:** is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

## **5.0 EMPLOYEE EXPOSURE DETERMINATIONS:**

Due to the nature of work performed at LSUHSC, all employees are considered potentially at risk to bloodborne pathogens. Risk levels for occupational exposures are determined by reviewing tasks and procedures associated with exposure to human blood, body fluids, or OPIMs without regard to the use of personal protective equipment. The Office of Compliance makes the initial determination of employee risk level for all personnel based on job title and department. It is the duty of the supervisor to verify that the risk level is correct for the position.

### **5.1 High Risk Determination**

- Personnel shall be classified high risk if they perform:
  - Direct patient care activities likely to result in direct or indirect exposure to patient's blood or body fluids.
  - Processing or handling human blood, body fluids, tissues or organs.
  - Processing or handling of equipment, materials or waste that may have been contaminated with human blood, body fluids or OPIMs.
  - Routine administration of first aid.
  - Other likely or anticipated exposure to blood, body fluids or OPIMs, including physicians, dentists, laboratory workers, healthcare workers, plumbers and custodial staff, shelter workers, child welfare workers, police officers and others who carry weapons, first responders, firefighters, kitchen staff (that may handle sharp equipment), and public safety workers.
- All students are considered high risk, except for those enrolled in the Schools of Public Health and Graduate Studies.

### **5.2 Low Risk Determination**

Employees shall be classified low risk if they do not perform any activity listed in Section 5.1.

## **6.0 ENGINEERING AND WORK PRACTICE CONTROLS:**

Engineering controls and work practice controls are used to minimize exposures to personnel. Engineering and work practice controls shall be examined and maintained on a regular schedule. These practice controls create the basis of the Universal Precaution approach to infection control. In accordance with Universal Precautions, all personnel handling any type of human blood, human blood components, and materials made from human blood, or OPIM shall be treated and handled as if known to be infectious for HIV, HBV or other bloodborne pathogens. For more information on Universal Precautions, visit the NIH/CDC website [Fundamentals of Infection Prevention](#).

### **6.1 Engineering Controls**

Engineering Controls include equipment and devices used to protect against bloodborne pathogens. Contaminated equipment (biosafety cabinets, mechanical pipetting devices, splash guards, etc.) must be decontaminated at the end of the workday and after a spill occurs.

### **6.2 Biological Safety Cabinets (BSCs)**

BSCs are a primary means of containment developed for working safely with infectious microorganisms. BSCs can provide containment of infectious aerosols, isolate the operator from the agent, and protect other personnel in the room. BSCs must be certified annually, whenever moved, or after repair work has been

performed. Contact EH&S for assistance with cabinet selection, certification and decontamination procedures, and proper placement in the laboratory.

### **6.3 Sharps Containers**

- Sharps containers must be used for disposing all needles, scalpels, broken glass, and other sharps. Sharps must be placed in an appropriate sharps container immediately following usage and shall be placed as close to the procedure area as possible. Sharps containers must be non-breakable, puncture resistant, leak proof, sealable/closeable and labeled with the universal biohazard symbol.
- Sharps containers must be properly maintained and disposed of when  $\frac{3}{4}$  full.

### **6.4 Sharps with Engineered Sharps Injury Protection (SESIPs) and Needleless Systems**

SESIPs and needleless systems are recommended for work involving blood, OPIMs, and material that potentially contain bloodborne pathogens.

### **6.5 Splash Guards and Plastic Backed Absorbent Pads**

- Splash guards and plastic backed absorbent pads must be used to contain the spread of blood and potentially infectious material in the laboratory.
- Contaminated plastic backed absorbent pads shall be removed immediately or as soon as feasible after any spill of blood or OPIM and at the end of the workday.

### **6.6 Sealed Rotor Heads and Centrifuge Cups**

Sealed rotor heads and centrifuge cups shall be used to avoid accidental spills and generation of aerosols while performing routine centrifuge operation with material that potentially contains bloodborne pathogens.

### **6.7 Mechanical Pipetting Devices**

Mechanical pipetting devices must be used. Mouth pipetting is prohibited.

### **6.8 Work Practice Controls**

Work practice controls are modifications of work procedures to reduce the likelihood of occupational exposure to blood or other potentially infectious materials. The following work practice controls will be used:

### **6.9 Personal Protective Equipment (PPE)**

- As is consistent with the practice of standard precautions, choose PPE based on the anticipated exposure to blood or OPIM. The protective equipment will be considered appropriate only if it does not permit blood or OPIM to pass through or reach the person's clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time that the protective equipment will be used.

- PPE shall be provided without cost to all employees who are at risk of occupational exposure to bloodborne pathogens. Soiled PPE must not be taken home to launder. All garments that are penetrated by blood shall be removed as soon as feasible.
- All personnel shall wear appropriate gloves when there is reasonable anticipation of hand contact with blood or OPIM and when handling or touching contaminated items. Never wash or decontaminate disposable gloves for reuse. Replace gloves if they are torn, contaminated, or if their ability to function as a barrier is compromised.
- All personnel shall wear appropriate face and eye protection when splashes, sprays, splatters, or droplets of blood or OPIM pose a hazard to the eye, nose, or mouth. Remove as soon as feasible any garment contaminated by blood or OPIM, in such a way as to avoid contact with the outer surface.
- For more information regarding PPE, visit LSUHSC [EHS - 400.03, Personal Protective Equipment Policy](#).

#### **6.10 Hand Washing**

Hand washing facilities must be readily accessible to all personnel who incur exposure to blood or other potentially infectious materials. If hand washing facilities are not readily available, the principle investigator, supervisor, or instructor is required to provide either an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. If these alternatives are used, then the hands are to be washed with soap and running water as soon as feasible. Additionally, all laboratories must have sinks for hand washing.

#### **6.11 Sharps, Needles, and Contaminated Glassware**

- Contaminated sharps, needles, and other contaminated sharps must not be bent, recapped, removed, sheared or purposely broken. If a medical procedure requires that the contaminated needle be recapped or removed and no alternative is feasible, the recapping or removal of the needle must be done by the use of a mechanical device or a one-handed scoop method.
- Any broken glassware which may be contaminated must not be picked up directly with bare or gloved hands. It must be removed by mechanical means such as tongs and/or dustpans and broom and placed in an appropriate infectious waste sharps container.

#### **6.12 Work Area Restrictions**

- In work areas where there is a reasonable likelihood of exposure to blood or OPIM, personnel shall not eat, drink, apply cosmetics or lip balm, or handle contact lenses.
- Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets, or on counter tops or bench tops where blood or OPIM are present.
- All procedures will be conducted in a manner that will minimize splashing, spraying, splattering, and generation of droplets of blood or OPIM.

### **6.13 Specimen Handling and Transport**

- Place blood and OPIM in a container that prevents leakage during the collection, handling, processing, storage, and transport of the specimen. The container will be labeled or color coded in accordance with 29 CFR 1910.1030, reference B, requirements and closed prior to handling.
- Any specimens that could puncture a primary container will be placed within a puncture-resistant secondary container.

### **6.14 Disinfection**

- A 1:9 dilution (for a high organic load (e.g., blood spill)) or a 1:99 dilution (for surface decontamination) of household bleach made fresh daily is recommended for use in most circumstances.
- Disinfect all contaminated work surfaces after completing procedures, immediately after any spill of blood or OPIM, and at the end of the workday if the surface may have become contaminated since the last cleaning.
- Lab personnel must be prepared to respond to spills of potentially infectious materials in their areas.

### **6.15 Decontamination**

- Decontamination requires stronger chemical microbicides to ensure a more complete removal of microbial burdens
- Most decontaminations are performed with heat, steam and pressure, provided by an autoclave. An [SOP for the safe use of autoclaves](#) is available on the EH&S website.
- Aqueous solutions such as blood, urine, or microbial cultures must be autoclaved prior to disposal.

### **6.16 Housekeeping**

- Regulated waste is placed in containers which are closable, constructed to contain all contents and prevent leakage, and appropriately labeled.
- Regulated waste shall be placed in a red bag lined biohazard box.
- Contaminated sharps are discarded immediately or as soon as possible in containers that are closable, puncture-resistant, leak proof on sides and bottoms, and appropriately labeled or color-coded (sharps disposal containers are available at Campus Office Stores).
- Bins and pails (e.g., wash or emesis basins) shall be cleaned and decontaminated as soon as feasible after visible contamination.
- Broken glassware that may be contaminated can only be picked up by mechanical means, such as a brush and dustpan.

### **6.17 Laundry Procedures**

- Place wet contaminated laundry in leak-proof, labeled or color-coded containers before transport.
- Apparel contaminated with blood or OPIM shall be handled as little as possible. Such apparel will be decontaminated, preferably by autoclaving, before it is sent to a laundry for cleaning. Such apparel will not be sorted or rinsed in the area of use.
- All employees who handle contaminated apparel will use PPE to prevent contact with blood or OPIM.

### **6.18 Signs and Labels**

- Biohazard warning signs shall be posted at the entrance to HIV/HBV research laboratories and other work areas in which biohazards are used.
- Attach biohazard warning labels to containers of regulated waste, refrigerators and freezers containing blood or OPIM, lab equipment in which biohazards are stored or used (e.g., incubators, centrifuges, etc.), and other containers used to transport or ship blood or OPIM.
- Labels shall include the universal biohazard symbol and be fluorescent orange, orange-red, or predominantly so with lettering or symbols in a contrasting color.
- Notify EH&S if you discover regulated waste containers, refrigerators containing blood, contaminated equipment, or any OPIM containers without proper labels.

## **7.0 HIV AND HBV RESEARCH LABORATORY REQUIREMENTS**

Research laboratories engaged in the culture, production, concentration, experimentation and manipulation of HIV and HBV shall follow the special requirements included in this section. This section does NOT apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues or organs. The requirements listed here apply in addition to other requirements of this plan.

### **7.1 HIV AND HBV Research Laboratories shall:**

- Contain hand and eye washing facilities, and an autoclave must be available for the decontamination of all waste and other materials.
- Conducted HIV and HBV procedures in a BSC or appropriate containment device. No work with HIV or HBV shall be conducted on the open bench.
- Protect vacuum lines with liquid disinfectant traps and HEPA filters. These vacuum lines must be routinely maintained and replaced as necessary.
- Use appropriate combinations of PPE and physical containment devices in conjunction with all HIV or HBV activities that involve the threat of droplet, aerosol or spill exposures.

- Close doors while HIV or HBV work is in progress and post biohazard signage that states “Caution: Work with HIV or HBV in progress.”
- Transport infectious or contaminated materials in durable, leak proof, and labeled container that is closed prior to removal from work area.
- Limit work area access to authorized personnel. Written policies and procedures shall be established whereby only persons who have been advised of the potential biohazard meet special entry requirements and those who comply with all entry and exit procedures will be allowed in the work area.
- Wear lab coats, gowns, gloves, and other appropriate PPE in the work area. PPE shall not be worn outside of the work area and shall be decontaminated before being laundered.
- Wear gloves when handling infected animals and OPIM. Take special care to avoid skin contact with HIV or HBV cultures or contaminated materials.
- Use hypodermic needles and syringes only for parenteral injection and aspirations of fluids from lab animals and diaphragm bottles.
- Never bend, shear, or recap needles and substitute, whenever possible, safer sharps devices. Place needles in a puncture resistant, leak proof sharps container and inactivate (via steam or chemical sterilization) prior to disposal.
- Each individual should have a baseline serum sample be collected and banked prior to HIV or HBV research or production.

## **7.2 Additional Training Requirements for HIV and HBV Research Laboratories**

Prior to working in these laboratories, the PI or supervisor shall ensure that:

- Personnel demonstrate proficiency in standard microbiological practices, techniques, and in the practices and operations specific to the laboratory prior to being allowed to work with HIV or HBV.
- Personnel have prior experience in the handling of human pathogens or tissue cultures prior to working with HIV or HBV.
- Training programs are provided to personnel who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The principal investigator shall ensure that personnel participate in work activities which involve infectious agents only after proficiency has been demonstrated.

## **8.0 HEPATITIS B VACCINATION SERIES**

- The hepatitis B vaccination series is available at no cost after initial employee training to all employees identified as “high risk.” The vaccination is encouraged unless documentation exists that the employee has previously received the series, antibody testing reveals that the employee is immune, or medical evaluation shows that vaccination is contraindicated.

- Employees that decline or have already taken the hepatitis B vaccination must sign a hepatitis B Vaccination Consent/Declination form (appendix A). A copy of the form should be retained by the employee's supervisor. Employees who decline may request and obtain the vaccination at a later date at no cost.
- Hepatitis B vaccination is mandatory for all students prior to beginning of classes, except for the schools of Graduate Studies and Public Health. If a School of Graduate Studies or Public Health student works with blood or OPIMs and is therefore classified as "High Risk", that student will obtain the hepatitis B vaccination or complete appendix A indicating that they decline the vaccination. Provide the immunization records or a signed appendix A to Student Health.
- The hepatitis B vaccination series is administered by the School of Nursing. Employees should contact their department Business Manager or supervisor to make arrangements for the vaccination. The School of Nursing will contact the employee's department Business Manager to arrange payment.

## **9.0 POST-EXPOSURE ACTIONS AND FOLLOW-UP**

Upon exposure, it is critical that the individual is administered first aid and receives immediate medical treatment ([see HIV Post-Exposure Prophylaxis Quickguide](#)). Response actions are described below.

### **9.1 First Aid**

- The following immediate actions should be taken following an exposure:
  - Administer initial first aid. The exposed person should immediately wash the needlestick or cut with soap and hot water.
  - If exposure is by splashes of infectious materials to the nose, mouth, or eyes, the affected area should be flushed extensively with water, saline or sterile irrigating solution.
  - Document the routes of exposure, the biological material of exposure, and how the incident occurred.
  - Seek medical attention as soon as possible. HIV prophylaxis is most effective if started within two hours of the exposure.
- Provide the treating physician with:
  - Route(s) of exposure.
  - Circumstances of exposure and, if possible, the results of the source individual's blood test and relevant employee medical records, including vaccination status. See section 9.6 below.
  - For exposures to HIV or HBV cultures or experimental conditions, identify and document the strain and titer of the virus to which the employee was exposed (see appendix B, Bloodborne Pathogens Post-Exposure Checklist). Appendix B should be used to guide personnel through the post-exposure process.

- The employee or student should be provided with evaluating health care professional's written opinion within 15 days after completion of the evaluation.

## 9.2 Employee Exposure

- After a blood or body fluid exposure, alert the supervisor, and go directly to the closest Emergency Room department for evaluation of the event and initiation of post-exposure prophylaxis if necessary. The treating physician will provide initial counseling about the exposure and any medications prescribed. Identify yourself as an LSUHSC employee. Keep any paperwork that you receive from the Emergency Department, as your follow-up physician will want to have these for review.
- The employee is entitled to seek his/her medical care of choice under Worker's Compensation. After being treated by the healthcare provider, Emergency Room staff will contact Tasha Treuil at (504)-568-7780 to fax the paperwork for a Worker's Compensation claim to be filed. The employee's supervisor will fill out the applicable form.
- If you encounter any problems obtaining treatment, contact Tasha Treuil during working hours. After working hours contact University Police (504) 568-8999; the police will contact Human Resources (HR).
- Approval for after working-hours treatment is not required; the Emergency Room will provide a three day supply of medication if you require HIV prophylaxis. To fill after-hours prescriptions report to the Walgreen's pharmacy at 900 or 4001 Canal Street. Identify yourself as a LSUHSC employee and the pharmacy will contact HR for a Worker's Compensation coverage of medications.
- Make an appointment with your healthcare provider as soon as possible for appropriate follow-up. Tell the scheduler that you have had a blood or body fluid exposure. The provider will perform follow-up studies and further counseling.

## 9.3 Student Exposure

- The student should report to a nearby Blue Cross Blue Shield Louisiana emergency room. The LSU Healthcare Network Clinic at 3700 St. Charles Ave., New Orleans ((504) 412-1366) is also available.
- See [Student Insurance for Needle Sticks](#) for information on where to receive treatment and the blood monitoring schedule.
- Follow up lab studies for all students are handled through the LSU Healthcare Network Clinic.
- Students have a limited amount of insurance to cover costs of lab work that may be necessary as a result of exposure. Specific information about this insurance may be obtained directly from the Student Health Office.

- Students in their rotations that experience an exposure at an off-site location should be referred to the institutional infection control office. This is usually the institution's employee health service.

#### **9.4 Resident Exposure**

Residents should follow the procedures of for LSUHSC employees. Go to the emergency room at the hospital of residency. Following treatment, contact Tasha Treuil at Human Resources to process Worker's Compensation reimbursement. Claims need to be filed within 30 days. See [LSUHSC Needle Stick Instructions](#)

#### **9.5 School of Dentistry Employee/Student Exposure**

Dental School employees and students shall follow post-exposure policies and procedures outlined in reference C, [LSUSD Exposure Control Plan](#).

#### **9.6 Requirements in Exposures with a Source Individual**

- Identify, document, and test the source individual (unless it is determined that identification is infeasible or prohibited by state or local law).
  - If it is unknown whether the source individual has HIV, HCV, or HBV, have the source patient tested. First, obtain source patient consent using the Post-Exposure Evaluation Source Consent form, appendix C. Next, make arrangements to have the source individual tested as soon as possible to determine HIV, HCV, and HBV infectivity. Document that the source individual's test results were conveyed to the employee's health care provider.
  - If the source individual is already known to be HIV, HCV and/or HBV positive, new testing need not be performed.
- If an employee/student experiences an exposure event involving a source patient's blood or body fluids, assure that the exposed employee is provided with the source individual's test results and with information about applicable disclosure laws and regulations concerning the identity and infectious status of the source individual (e.g., laws protecting confidentiality).
  - The exposed employee/student's blood should be collected as soon as possible after exposure incident. First, obtain consent using the Post-Exposure Evaluation Employee Consent form (appendix D). Next, the exposed employee's blood should be tested for HBV and HIV serological status.
  - If the employee does not give consent for HIV serological testing during collection of blood for baseline testing, preserve the baseline blood sample for at least 90 days; if the exposed employee elects to have the baseline sample tested during this waiting period, perform testing as soon as feasible.

### **9.7 Counseling**

Counseling for employees and students is available through Campus Assistance Program (504) 568-8888. Students may also contact the Student Health Mental Health Counselors. The Student Health Clinic can provide access to the Expert Review Panel on behalf of students.

### **9.8 Incident Reporting**

Following an exposure incident, the employee's supervisor must immediately notify University Police and complete the appropriate an Incident/Accident Reporting Form(s) as described in [EHS - 400.06 Incident/Accident Reporting and Investigation Policy](#).

## **10.0 TRAINING**

All LSUHSC employees and students receive bloodborne pathogen training. High risk employees complete training annually, while low risk employees complete training every five years. High risk employees will be provided with training on the epidemiology, symptoms, and transmission of bloodborne pathogen diseases. The training will address:

- Explanation of the OSHA bloodborne pathogen standard.
- LSUHSC's ECP.
- Methods to recognize tasks and other activities that may involve exposure to blood and OPIM, including what constitutes an exposure incident.
- The use and limitations of engineering controls, work practices, and PPE.
- PPE types, uses, location, removal, handling, decontamination, and disposal.
- The hepatitis B vaccine, including information on its efficacy, safety, method of administration, and the benefits of being vaccinated.
- Reporting incidents and procedures to follow if an exposure incident occurs.
- Post-exposure evaluation and follow-up.
- An explanation of the signs and labels and/or color coding required by the standard and used at LSUHSC.

## **11.0 RECORDKEEPING**

EH&S shall maintain a copy of all training records on file for the current fiscal year and the previous five years.

## **12.0 INSPECTIONS AND PROGRAM REVIEW:**

Program effectiveness will be assessed annually by EH&S.



### **13.0 REFERENCES:**

- A. [State of Louisiana Office of Risk Management Loss Prevention Manual](#)
- B. [OSHA Health and Safety, 29 CFR 1910.1030](#)
- C. [LSUSD Exposure Control Plan](#)

### **14.0 APPENDICES**

- A. Hepatitis B Vaccination Consent/Declination Form
- B. Bloodborne Pathogen Post-Exposure Checklist
- C. Post-Exposure Evaluation Source Consent Form
- D. Post-Exposure Evaluation Employee Consent Form



**Hepatitis B Consent/Declination**

Date: \_\_\_\_\_

Employee Name: \_\_\_\_\_ Emplid Number: \_\_\_\_\_

School and Department: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Gender: M or F

I understand that all employees who are reasonably anticipated to come into contact with human blood or other potentially infectious materials during their normal duties are at risk for acquiring hepatitis B (HBV). I acknowledge that I have been provided with a copy of the CDC Hepatitis B Vaccine Information Statement. I have read and understand the information provided to me.

Please answer the following questions:

- Do you have a known allergy to yeast or yeast products? Yes \_\_\_\_\_ No \_\_\_\_\_
- Any previous adverse reaction to any type of vaccination? Yes \_\_\_\_\_ No \_\_\_\_\_  
If yes, explain: \_\_\_\_\_
- Any fever or illness in the last 48 hours? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, explain: \_\_\_\_\_
- Are you presently taking any type of antibiotic or steroid? Yes \_\_\_\_\_ No \_\_\_\_\_
- If female, are you pregnant or nursing? Yes \_\_\_\_\_ No \_\_\_\_\_ I am Male \_\_\_\_\_

Based upon this information, I acknowledge the following (please check only **one** of the following boxes):

**I consent to the hepatitis B vaccination series through LSUHSC School of Nursing.** I understand this includes three injections at prescribed intervals over a 6-month period and it is my responsibility to follow the prescribed injection schedule. I understand that there is no guarantee that I will become immune to hepatitis B (HBV) and that I might experience an adverse side effect as the result of the vaccination. Adverse side effects include but are not limited to: discomfort at the injection site, fatigue, fever, redness and swelling, shortness of breath, swelling of the throat and/or tongue, abdominal discomfort, diarrhea or constipation, and swelling of the lymph nodes. There is a possibility that any of these reactions could increase in severity with each successive vaccination. I understand that I can call **504-568-4217** if I have any questions or concerns prior to or after receiving my vaccination. I understand that after leaving the LSUHSC School of Nursing it will be my responsibility to seek medical attention if I experience any allergic reactions or severe side effects.

**I have already received the hepatitis B vaccination series.**

**I have received antibody testing to confirm immunity to hepatitis B.**

**I do not wish to receive the hepatitis B vaccine.** I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccination, I continue to be at risk of acquiring hepatitis B, a serious disease.

Employee Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Vaccination	No. in Series	Type of Vaccine		Lot Number	Vaccine Expiration Date (mo/yr)	Date given (mo/day/yr)	Funding Department	Site RA or LA	Vaccine Information Statement (VIS) Date	Vaccinator Signature and Credentials	Return Date for Next in Series
		Mfr.	Name								
Hep B											



**Bloodborne Pathogen Post-Exposure Checklist**

<b><u>Activity</u></b>	<b><u>Date Completed</u></b>	<b><u>Employee's Initials</u></b>
Employee reports exposure	_____	_____
Incident/Accident report form(s) completed	_____	_____
Source individual is identified	_____	_____
NAME: _____ ADDRESS: _____ PHONE NUMBER: _____ If unknown explain why: _____		
Source individual consent form completed	_____	_____
Employee consent form completed	_____	_____
Employee sent to healthcare provider for testing and treatment deemed appropriate by physician _____		
Documentation forwarded to healthcare professional: <input type="checkbox"/> Bloodborne Pathogens Standard. <input type="checkbox"/> Description of exposed employee's duties. <input type="checkbox"/> Description of exposure incident, including routes of entry. <input type="checkbox"/> Result of source individual's blood testing (if applicable). <input type="checkbox"/> Culture titer and strain (if applicable). <input type="checkbox"/> Employee's medical records.		
Source individual tested for HIV, HBV, HCV _____		
Note: If consent is not obtained, contact Counsel.		
Employee informed of test results of source individual _____		
Follow-up provided by physician _____		



**LSUHSC Post-Exposure Evaluation Source Consent Form**  
**Testing for HIV, HBV, and HCV Infectivity**

**This form should be reviewed and signed by the source patient and provided to the health care provider responsible for the post-exposure evaluation.**

**Exposed Individual's Information**

Name (Please Print): \_\_\_\_\_

Contact Number: \_\_\_\_\_

Exposure Date: \_\_\_\_\_

**Source Patient Statement of Understanding**

I understand that my consent is required by law for HIV, hepatitis B (HBV), and hepatitis C (HCV) infectivity testing if someone is exposed to my blood or bodily fluids. I understand that a student or employee member of LSUHSC has been accidentally exposed to my blood or bodily fluids and that testing for HIV, HBV, and HCV infectivity is being requested. I understand that I am not required to give my consent, but if I do, my blood will be tested for these viruses at no expense to me. I have been informed that the test to detect whether or not I have HIV antibodies is not completely reliable. This test can produce a false positive result when an HIV antibody is not present and that follow-up tests may be required. I understand that the results of these tests will be kept confidential and will only be released to medical personnel directly responsible for my care and treatment, to the health care provider responsible for the exposed student or employee to ensure appropriate medical evaluation and care, and to others only as required by law.

**Consent or Refusal**

I consent to HIV, HBV, and HCV testing \_\_\_\_.

I refuse consent to HIV, HBV, and HCV testing \_\_\_\_.

**Source Individual Identification**

Source patient's printed name: \_\_\_\_\_

Source patient's signature: \_\_\_\_\_

Relationship (if signed by someone other than the source patient): \_\_\_\_\_

Date signed: \_\_\_\_\_



**LSUHSC Post-Exposure Evaluation Employee Consent Form**  
**Testing for HIV, HBV, and HCV Infectivity**

**This form should be reviewed and signed by the employee and provided to the health care provider responsible for the post-exposure evaluation.**

**Employee's Information**

Name (Please Print): \_\_\_\_\_

Contact Number: \_\_\_\_\_

Exposure Date: \_\_\_\_\_

**Employee Statement of Understanding**

I understand that my consent is required by law for HIV, hepatitis B (HBV), and hepatitis C (HCV) infectivity testing due to an exposure to a source individual's blood or bodily fluids. I understand that HIV, HBV, and HCV infectivity is being requested. I understand that I am not required to give my consent, but if I do, my blood will be tested for these viruses at no expense to me. I have been informed that the test to detect whether or not I have HIV antibodies is not completely reliable. This test can produce a false positive result when an HIV antibody is not present and that follow-up tests may be required. I understand that the results of these tests will be kept confidential and will only be released to medical personnel directly responsible for my care and treatment, to the health care provider responsible for the exposed student or employee to ensure appropriate medical evaluation and care, and to others only as required by law.

**Consent or Refusal**

I consent to HIV, HBV, and HCV testing \_\_\_\_.

I refuse consent to HIV, HBV, and HCV testing \_\_\_\_.

**Employee Identification**

Employee's printed name: \_\_\_\_\_

Employee's signature: \_\_\_\_\_

Date signed: \_\_\_\_\_



## **Environmental Health & Safety Policy Manual**

Date: 5/16/2011

Updated: 3/8/2021

Policy # EHS-300.05

### **Shipping Biological Materials Policy**

#### **1.0 PURPOSE**

To ensure compliance with domestic and international transport regulations which govern the transport and shipment of biological materials. A list of transport regulations can be found in [Appendix A](#).

#### **2.0 SCOPE**

This policy applies to all LSUHSC personnel involved in the shipment, transport, and receipt of biological materials.

#### **3.0 RESPONSIBILITIES**

##### **3.1 Environmental Health & Safety Department (EH&S) shall:**

- Provide technical support to those who ship or receive biological materials.
- Provide training to personnel involved in the shipment of biological materials.
- Maintain training records.
- Conduct periodic audits to ensure compliance with this policy.

##### **3.2 Department Heads and Directors shall:**

- Ensure personnel involved in the shipment of biological materials comply with this policy.

##### **3.3 Personnel who ship Biological Materials shall:**

- Complete Shipping Biological Material Training every two years. See section 5.0 for directions training enrollment details.
- Maintain copy of shipping records for a period of two years after material is accepted by initial carrier [[49 CFR 172.201\(4\)\(e\)](#)].
- Ensure all hazardous materials are identified, classified, packaged, marked, labeled, documented, and shipped safely and in accordance with applicable shipping regulations.

##### **3.4 Personnel who Receive Biological Material Shipments shall:**

- Inspect package before opening for damage or leakage. Immediately report leakage or incident involving infectious substances to EH&S at 568-6585.



- Open infectious substances using appropriate containment practices, personal protective equipment, and adequate ventilation.
- Very itemized list of contents then notify shipper that materials arrived intact or if there were any discrepancies.

## **4.0 SHIPMENT AND RECEIPT OF BIOLOGICAL MATERIALS**

### **4.1 Shipment**

- Specific instruction on classifying, packaging, labeling, and documentation of biological materials is provided in the [Shipping Biological Materials Manual, Appendix B](#).
- Packages containing regulated biological materials shall not be left unattended (e.g., left outside the FEDEX drop-off box or on a loading dock). Packages [containing](#) regulated biological materials shall not be placed inside the FEDEX drop-off box. Note [non-infectious liquid clinical samples](#) should not be placed in a FEDEX drop-off box.
- Contact the carrier (e.g., FEDEX and UPS) to schedule a pickup directly from laboratory or clinic.
- FEDEX requires that a dangerous goods account be established prior to the shipment of dangerous goods. Proof of dangerous goods training is required to establish this dangerous goods account. LSUHSC “Shipping Biological Material” training satisfies their training requirement for shipping biological materials classified as dangerous goods. Contact FEDEX at 1-800-463-3339 to establish a dangerous goods account.

### **4.2 Receiving**

- Packages are received by LSUHSC Receiving personnel and delivered to laboratories and clinics.
- For any packages containing biological materials delivered directly to laboratory or clinic, ensure compliance with responsibilities outlined in section 3.4 above.

### **4.3 Import and Export Permits**

- Shipping and receiving biological materials may require the approval of federal agencies, both domestic and foreign. An [import](#) or [export](#) permit may be required when shipping biological materials internationally.
- All shipments entering the United States are processed by the U.S. Bureau of Customs and Border Protection. Import permits are required from the CDC and other regulators for importation of extremely infectious Select Agents, etiologic agents, toxins, hosts or vectors of human disease, international shipments and materials shipped by rail or vessel.
- Export control laws are federal regulations that control the conditions under which certain information, technologies, and commodities can be transmitted



overseas. The laws are implemented by the Department of Commerce through its Export Administration Regulations (EAR). The laws prohibit the unlicensed export of certain materials or information for reasons of national security or protection of trade. The Commerce Control List (CCL) is a list of items which includes commodities, software, and technology that are found in the EAR subject to the jurisdiction of the Department of Commerce. In order to comply with EAR, personnel must consult the [CCL](#) prior to shipping biological materials overseas. Coordinate with EH&S before shipping any biological materials on the CCL.

- For a summary of the transportation regulations that apply to Select Agents and the import or export of biological materials, consult [Appendix A](#).

## **5.0 TRAINING**

- Personnel who ship biological materials classified as dangerous goods must complete training which meets the requirements of the U. S. Department of Transportation (DOT), and if shipped by air, the requirements of the International Air Transport Association (IATA). Training must be designed to satisfy the General Awareness, Security Awareness, Function-Specific, and Safety requirements of [49 CFR 172.704](#).
- EH&S offers training that meets DOT and IATA requirements via the University's Knowledge Delivery System (KDS). Contact Genean Mathieu, Office of Compliance Programs, at [gmathi@lsuhsc.edu](mailto:gmathi@lsuhsc.edu) or 568-8652 to request enrollment into this training.

## **6.0 RECORDKEEPING**

- Personnel who ship biological materials will maintain a copy of shipping records for a period of two years after material is accepted by initial carrier.
- EH&S will maintain a copy of training records.

## **7.0 INSPECTIONS AND PROGRAM REVIEW**

Program effectiveness will be assessed annually by EH&S.

## **8.0 APPENDICES**

[Appendix A](#) – Transportation Regulations

[Appendix B](#) – Shipping Biological Materials Manual



## **TRANSPORTATION REGULATIONS**

There are several agencies which govern the shipment of biological materials. Most shipments at LSUHSC are shipped domestically by either ground or air and adhere to DOT and IATA regulations. Additional regulations apply to the shipment of extremely infectious Select Agents, international shipments, and materials shipped by rail or vessel. Below is a summary of the domestic and international agencies which regulate the shipment of biological materials:

- **U.S. Department of Transportation (DOT) 49 CFR 100-185**  
DOT is a U.S. federal agency which regulates the transport dangerous goods. These [regulations](#) apply to the shipment of infectious substances in commercial transportation within the United States. Violations of any hazardous materials regulations may be subject to a civil penalty of up to \$50,000 per violation, a criminal penalty up to \$500,000 in certain cases, and/or imprisonment for up to 5 years (49 CFR 107.329 and 107.333). Penalties double when the violation results in serious injury or death.
- **U.S. Postal Service (USPS) 39 CFR 20**  
Regulations on transporting infectious substances through the USPS are codified in Section 601.10.17 of the Domestic Mail Manual and Section 135 of the International Mail Manual. A copy of the Domestic and International Mail Manuals may be obtained from the U.S. Government Printing Office or at the USPS website: <http://bookstore.gpo.gov/>.
- **Occupational Health and Safety Administration (OSHA) 29 CFR 1910.1030**  
[Occupational Exposure to Bloodborne Pathogens](#) standard provides minimal packaging and labeling for blood and body fluids when transported within a laboratory or outside of it.
- **International Civil Aviation Organization (ICAO)**  
The *Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO TI)* applies to the shipment of infectious substances by air and is recognized in the United States and by most countries worldwide. A copy of these regulations may be obtained from the ICAO Document Sales Unit or from the ICAO Web site: <http://www.icao.int>.
- **International Air Transport Association (IATA)**  
IATA is an association of airlines, including American couriers such as Fed Ex and UPS, which work to increase efficiency and safety in air transport. Airlines that are members of IATA use the *Dangerous Goods Regulations (DGR)* which incorporates the ICAO TI but adds further restrictions. A copy of these regulations is available at:

APPENDIX A



<http://www.iata.org/index.htm> or <http://www.who.int/en> .

### **IMPORTATION OF ETIOLOGIC AGENTS**

- **Centers for Disease Control and Prevention (CDC) 42 CFR 71**  
This regulation requires an import permit from the CDC for importation of etiologic agents, hosts or vectors of human disease. The regulation, application form, and additional guidance is available at the CDC Web site: <http://www.cdc.gov/od/eaipp>.
- **U.S. Department of Agriculture (USDA) 9 CFR 122**  
The USDA, APHIS, Veterinary Services (VS) requires that a permit be issued prior to the importation or domestic transfer (interstate movement) of etiologic disease agents of livestock, poultry, other animals. Information may be obtained at (301) 734-5960, or from the USDA Web site: [http://www.aphis.usda.gov/animal\\_health](http://www.aphis.usda.gov/animal_health).
- **CDC Importation of Etiologic Agents of Human Disease 42 CFR 71**  
This regulation requires an import permit from the CDC for importation of etiologic agents, hosts or vectors of human disease. The regulation, application form, and additional guidance is available at the CDC Web site: <http://www.cdc.gov/od/eaipp>.
- **USDA Importation of Etiologic Agents and Other Materials of Livestock, Poultry 9 CFR 122**  
The USDA, APHIS, Veterinary Services (VS) requires that a permit be issued prior to the importation or domestic transfer (interstate movement) of etiologic disease agents of livestock, poultry, other animals. Information may be obtained from the USDA Web site: [http://www.aphis.usda.gov/animal\\_health](http://www.aphis.usda.gov/animal_health).
- **USDA Importation of Plant Pest 7 CFR 330**  
This regulation requires a permit for movement into or through the United States, or interstate any plant pest or a regulated product, article, or means of conveyance in accordance with this part. Information can be obtained at the USDA Web site: <http://www.aphis.usda.gov/permits>.

### **EXPORTATION OF ETIOLOGIC AGENTS**

- **Department of Commerce (DoC) 5 CFR 730-799**  
This regulation requires that exporters of a wide variety of etiologic agents of human, plant and animal diseases, including genetic material, and products which might be used for culture of large amounts of agents, will require an export license. Information may be obtained by calling the DoC Bureau of Export Administration at (202) 482-4811, or at the DoC Web site: <http://www.ntis.gov/products/export-regs.aspx>; or at <http://www.access.gpo.gov/bis/index.html>; and <http://www.bis.doc.gov>.



## **TRANSFERS**

- **Transfer of CDC Select Agents and Toxins 42 CFR Part 73**  
The CDC regulates the possession, use, and transfer of select agents and toxins that have the potential to pose a severe threat to public health and safety. The regulations, Select Agent Program forms, and additional guidance is available at the CDC Web site: [www.selectagents.gov](http://www.selectagents.gov).
- **Transfer of USDA Select Agents and Toxins 9 CFR 121**  
The USDA, APHIS, VS regulates the possession, use, and transfer of select agents and toxins that have the potential to pose a severe threat to animal health or animal products. The VS Select Agent Program oversees these activities and registers all laboratories and other entities in the U.S. that possess, use, or transfer a VS select agent or toxin. The regulations, Select Agent Program forms, and additional guidance is available at the APHIS Web site:  
[http://www.aphis.usda.gov/programs/ag\\_selectagent/index.shtml](http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml).
- **Transfer of USDA Plant Pests**  
The movement of Plant Pests is regulated under two distinct and separate regulations: (1) 7 CFR Part 331. Agricultural Bioterrorism Protection Act of 2002; Possession, Use, and Transfer of Biological Agents and Toxins; and (2) 7 CFR Part 330 Federal Plant Pest Regulations; General; Plant Pests; Soil; Stone and Quarry Products; Garbage. Information can be obtained at the USDA Web site:  
[http://www.aphis.usda.gov/programs/ag\\_selectagent/index.shtml](http://www.aphis.usda.gov/programs/ag_selectagent/index.shtml).



# **SHIPPING BIOLOGICAL MATERIALS MANUAL**

**April 25, 2011**



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## **1.0 INTRODUCTION**

The LSUHSC-NO Shipping Biological Materials Manual is designed to aid personnel shipping biological materials domestically and internationally. Certain biological materials are regulated under the Department of Transportation (DOT) and the International Air Transit Authority (IATA) as dangerous goods and require specific packaging, labeling, and documentation. Prior to the shipment of biological materials, personnel must complete training which meets the requirements of DOT and IATA.

EH&S offers training which meets the DOT and IATA requirements via On Site, a web-based training software. To access the training, use your LSUHSC user name and password to login at <http://172.20.240.20:1568/>. Contact EH&S at [Safety@lsuhsc.edu](mailto:Safety@lsuhsc.edu) to establish an account or request assistance.

The purpose of shipping regulations, this manual, and training is to ensure packages arrive at their destination safely in good condition and to ensure compliance with domestic and international transport regulations which govern the transport and shipment of biological materials. For a list of federal and domestic regulations which regulate the shipment of biological materials both domestically and internally, including information on Select Agents and import or export permits, please see the [Shipping Biological Materials Policy, Appendix A](#).

The steps to properly ship biological materials are as follows:

- Classification
- Packaging
- Marking and Labeling
- Documentation

It is the shipper's responsibility for proper classification, identification, packaging, marking and labeling, and documentation of the material they wish to ship. It is the responsibility of the recipient to inspect the package before opening to detect damage or leaks. This manual provides instruction on how to perform each of these tasks. To begin, use the [classification flow chart](#) in section 2.0 to determine the shipment category. After you've identified the material, find the material's corresponding section for instruction on packaging, labeling, and documentation. Use [Appendix A](#), Shipping Checklist, as an additional guide.

Packages [containing](#) regulated biological materials shall not be left unattended (e.g., left outside the FEDEX drop-off box or on a loading dock) and shall not be placed inside the FEDEX drop-off box. Note [non-infectious liquid clinical samples](#) should not be placed in a FEDEX drop-off box. Contact the carrier to schedule a pickup directly from the laboratory or clinic. If you do not have a dangerous goods account with FEDEX, you will need to establish one by contacting them at 1-800-463-3339.



## **2.0 CLASSIFYING BIOLOGICAL MATERIALS FOR SHIPMENT**

There are nine classes of dangerous goods. Biological materials are found in hazard class 6, division 2, or "Division 6.2." Division 6.2 materials include material that is known or reasonably expected to contain a pathogen. Pathogens are microorganisms (e.g. bacteria, virus, parasites, rickettsiae, fungi), recombinant microorganisms, or other agents, such as prions, that can cause disease in humans or animals. Pathogens are not subject to shipping requirements if they are unlikely to cause human or animal disease. Infectious substances are subject to the regulations only if they are capable of spreading disease when exposure to them occurs. These materials are classified for transportation under the following categories:

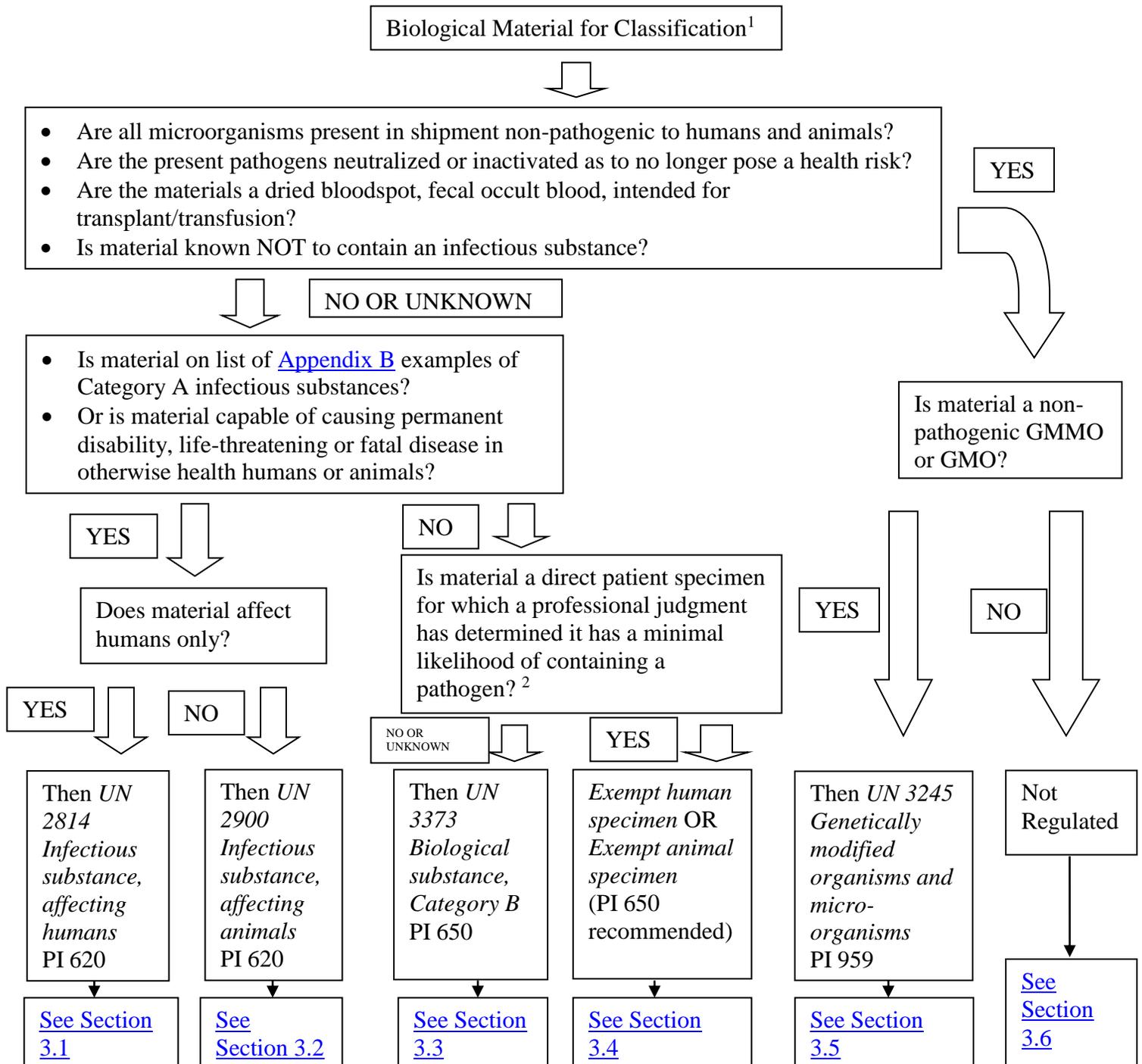
- Category A Infectious Substances
  - Infectious Substances Affecting Humans
  - Infectious Substances Affecting Animals
- Category B Biological Substances
- Exempt Human and Exempt Animal Specimens
- Genetically Modified Microorganisms (GMMOs) and Genetically Modified Organisms (GMOs)
- Non-Regulated Biological Materials

Use the classification flow chart on the next page to determine the category of the material for transport. Afterwards, use the corresponding section for instruction on packaging the material.



**CLASSIFICATION FLOW CHART**

*Note: Flowchart is to be used as a guide only and should not be construed as exact classification method.*



1. Anyone who attempts to classify an infectious substance must be trained and certified.
2. Professional judgment shall be used and based on patient medical history, symptoms, and individual circumstances of the source, human or animal, and endemic local conditions.



### 3.0 PREPARING BIOLOGICAL SHIPMENTS

#### 3.1 CATEGORY A INFECTIOUS SUBSTANCES AFFECTING HUMANS SHIPPING INSTRUCTIONS

##### Category A Infectious Substances

- A Category A infectious substance is a substance which is transported in a form that is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals if exposure occurs.
- Category A infectious substances are divided into two groups. This section describes *UN 2814 Infectious substances, affecting humans*. Substances that are infectious to both humans and animals must be classified as *UN 2814 Infectious substances, affecting humans*.
- [Appendix B](#) includes the types of substances that are considered Category A substances. This list is not exhaustive. Infectious substances, including new or emerging pathogens, which meet the criteria above, must be classified and shipped as Category A Infectious Substances. Your own judgment should be used based on your knowledge of the material you are shipping when deciding how to classify it. If there is any question regarding whether or not the substance warrants inclusion in Category A, then it must be shipped as Category A.

##### Category A IATA Table

- Below are the packing and labeling instructions from the IATA Dangerous Goods Regulations (DGR):

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN2814	<i>Infectious substance, affecting humans</i>	6.2	<i>Infectious subst.</i>	-	E0	620	50 mL or 50 g	4L or 4 kg

\* PG = Packing Group \*\*EQ = Excepted Quantities

##### Category A Packaging

- Category A substances must be packed according packing instructions 620 of the IATA DGR (described below).
- The material must be placed inside a leak proof primary receptacle. This primary receptacle then must be placed in a leak proof secondary receptacle. Either the primary or secondary receptacle must be able to withstand 95 kPa of pressure and temperatures from – 40o C to 55o C. A Vacutainer<sup>tm</sup> fulfills this requirement as a primary container and some polyethylene bags fulfill the pressure and temperature requirements as a secondary container. Infectious shipper systems



require secondary and outer components meet these pressure and temperature requirements.



- The secondary receptacle is placed inside of an outer container. You must not consolidate inner packages containing infectious substances with inner packages containing unrelated materials. This poses a risk of cross contamination should the inner packages release the infectious substance. For example do not pack primary containers of healthy human blood with samples containing pathogens. The secondary container is placed inside of an outer container. The secondary container must be secured inside the outer container so it does not shift during transport. If you are using a refrigerant make sure the secondary container is braced by some means so that as the refrigerant dissipates or melts the secondary container remains braced.
- Place an itemized list of contents between the secondary and outer container. This can be attached to the outside of the secondary container.
- The outer container must meet specific quality tests and bear UN specific markings confirming it is constructed to meet these requirements. Boxes that meet these requirements will have a marking similar to this:



- This marking confirms that the package meets the UN certification requirements for class 6.2 infectious materials. The marking must show “CLASS 6.2” otherwise it was constructed for different specifications. Markings must be printed on the box not hand written. Make sure no labels are placed over this marking. These markings must be on the outer package of the triple package system. They are not necessary on the outside of an overpack if one is used.



- The maximum amount per outer package is 4 kg / 4 L. This does not apply to body parts or whole bodies.
- No other dangerous goods are allowed inside the outer package unless they are necessary for maintaining the viability of the material during shipment, for example a refrigerant (dry ice) or a preservative (formalin).

### **Category A Infectious Shipping Systems**

There are several commercially available Category A manufactured infectious shipping systems. These systems consist of secondary and outer packages that meet the above specifications and in most cases contain the appropriate hazard labels, absorbent material, and a mechanism to secure the secondary container within the outer package. A representative vendor list is available in [Appendix C](#).



### **Category A Labeling**

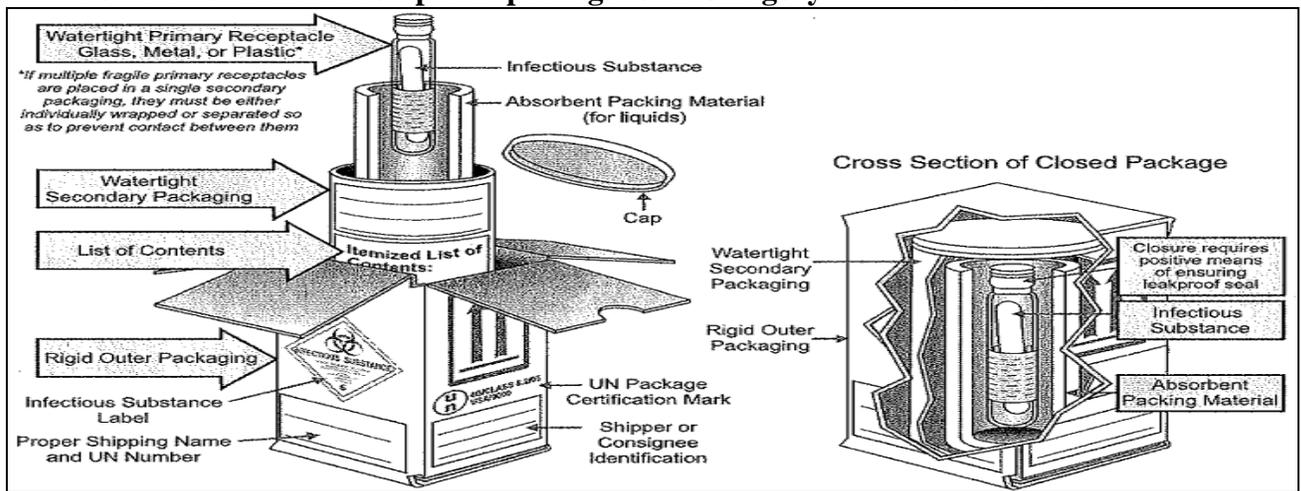
- Category A shipments must have a class 6 infectious substance label.
- If a package contains more than 50mL or 50g of a Category A infectious material then a “Cargo Aircraft Only” label is needed.



- All labels must be flat on one side of the package. Labels should not go around edges or cover up other relevant markings on the package. Be sure that no labels are covering up the UN marking on the box.



- Write or attach a label with the shipper’s name, address, and telephone number and the consignee’s name and address on the outside of the package.
- The outside of the box should be marked as follows:
  - **Infectious substance, affecting humans, UN2814, \_\_\_ mL/ kg** or
- If the substance is a liquid, use orientation arrows on the outside of the box or the word “THIS END UP” to specify the correct position in order to prevent leakage.
- Be sure to account for any other hazardous materials (ex. Dry ice) contained in the package with the proper labels and markings on the box.
- **Below demonstrates a completed package for a Category A infectious substance:**



**Category A Documentation**

- Category A infectious substances require a Declaration for Dangerous Goods for each shipment.
- Use the information from the IATA table to fill out the Nature and Quantity section of the Dangerous Goods Declaration.

NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization
UN2814	Infectious substance, affecting humans (Dengue virus cultures)	6.2		1 x fibreboard box x 15 ml	620	

- Note that the proper shipping name must be supplemented with the technical name in parentheses on the Declaration for Dangerous Goods. For example, a shipment of Dengue virus cultures you would type *Infectious substance, affecting humans (Dengue virus cultures)*.



- On the air waybill the **Handling Information** must read: *Dangerous Goods as per attached Shipper's Declaration*. For most carriers this is a box you would check on the side of the document.
- If applicable, the **Nature and Quantity** box on the air waybill should read: *Infectious substance affecting humans*.

#### **Preservatives**

- A quantity of 30 mL or less of dangerous goods from class 3 (Flammable liquids), 8 (Corrosives), or 9 (Miscellaneous Dangerous Goods) may be packed in each primary receptacle to maintain the viability, stability, or prevent degradation of the substances while in transit. Provided these materials are under 30 mL and packed for these purposes, no additional requirements need to be met regarding labeling or documenting these additional dangerous goods.
- Hazardous chemicals in larger amounts must be accounted for on the Dangerous Goods Declaration and with the proper labels on the outside of the package.

#### **Category A Carrier Information**

- Always confirm with the carrier before they pick up your shipment that they are able to transport a Category A infectious substance.
- FedEx and World Courier will transport Category A infectious substances. The US Postal Service and UPS may not.



### 3.2 CATEGORY A INFECTIOUS SUBSTANCES AFFECTING ANIMALS SHIPPING INSTRUCTIONS

#### Category A Infectious Substances

- Category A infectious substances affecting animals fall under *UN 2900 Infectious substances, affecting animals*. Substances that are infectious to both humans and animals must be classified as *UN 2814 Infectious substances, affecting humans*.
- [Appendix B](#) includes the types of substances that are considered Category A infectious substances affecting animals. This list is not exhaustive. If there is any question regarding whether or not the substance warrants inclusion in Category A, then it must be shipped as Category A.

#### Category A IATA Table

- Below are the packing and labeling instructions from the IATA DGR:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN2900	<i>Infectious substance, affecting animals</i>	6.2	<i>Infectious subst.</i>	-	E0	620	50 mL or 50 g	4L or 4 kg

\* PG = Packing Group \*\*EQ = Excepted Quantities

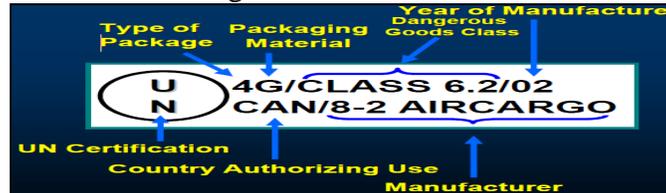
#### Category A Packaging

- Category A substances must be packed according packing instructions 620 of the IATA DGR (described below).
- The material must be placed inside a leak proof primary receptacle. This primary receptacle then must be placed in a leak proof secondary receptacle. Either the primary or secondary receptacle must be able to withstand 95 kPa of pressure and temperatures from – 40o C to 55o C. A Vacutainer™ fulfills this requirement as a primary container and some polyethylene bags fulfill the pressure and temperature requirements as a secondary container. Infectious shipper systems require secondary and outer components meet these pressure and temperature requirements.





- The secondary receptacle is placed inside of an outer container. You must not consolidate inner packages containing infectious substances with inner packages containing unrelated materials. This poses a risk of cross contamination should the inner packages release the infectious substance. For example do not pack primary containers of healthy human blood with samples containing pathogens. The secondary container is placed inside of an outer container. The secondary container must be secured inside the outer container so it does not shift during transport. If you are using a refrigerant make sure the secondary container is braced by some means so that as the refrigerant dissipates or melts the secondary container remains braced.
- Place an itemized list of contents between the secondary and outer container. This can be attached to the outside of the secondary container.
- The outer container must meet specific quality tests and bear UN specific markings confirming it is constructed to meet these requirements. Boxes that meet these requirements will have a marking similar to this:



- This marking confirms that the package meets the UN certification requirements for class 6.2 infectious materials. The marking must show “CLASS 6.2” otherwise it was constructed for different specifications. Markings must be printed on the box not hand written. Make sure no labels are placed over this marking. These markings must be on the outer package of the triple package system. They are not necessary on the outside of an overpack if one is used.
- The maximum amount per outer package is 4 kg / 4 L. This does not apply to body parts or whole bodies.
- No other dangerous goods are allowed inside the outer package unless they are necessary for maintaining the viability of the material during shipment, for example a refrigerant (dry ice) or a preservative (formalin).

### **Category A Infectious Shipping Systems**

There are several commercially available Category A manufactured infectious shipping systems. These systems consist of secondary and outer packages that meet the above specifications and in most cases contain the appropriate hazard labels, absorbent material, and a mechanism to secure the secondary container within the outer package. A representative vendor list is available in [Appendix C](#).



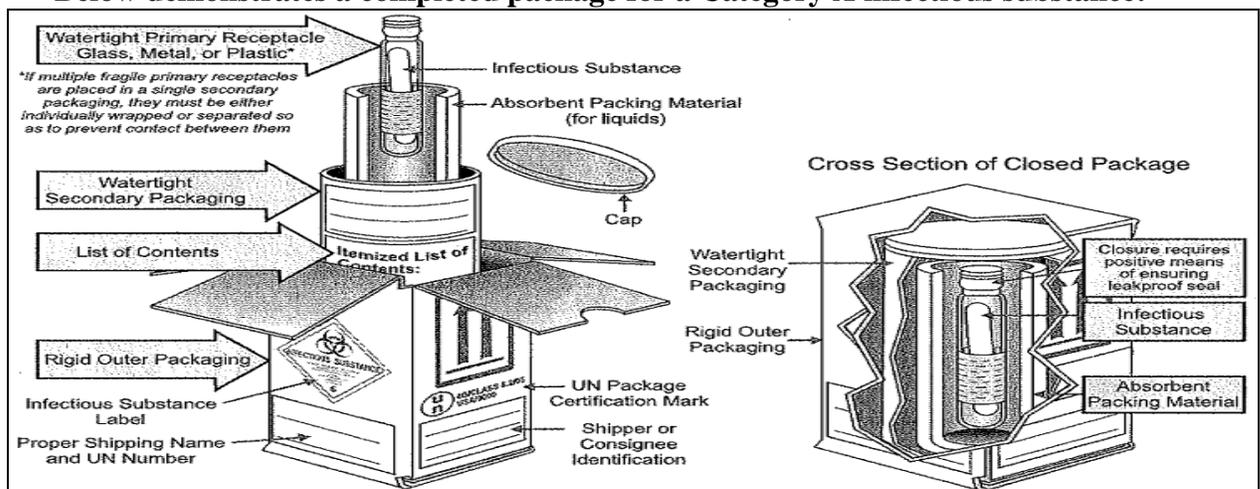


### Category A Labeling

- Category A shipments must have a class 6 infectious substance label.
- If a package contains more than 50mL or 50g of a Category A infectious material then a “Cargo Aircraft Only” label is needed.



- All labels must be flat on one side of the package. Labels should not go around edges or cover up other relevant markings on the package. Be sure that no labels are covering up the UN marking on the box.
- Write or attach a label with the shipper’s name, address, and telephone number and the consignee’s name and address on the outside of the package.
- The outside of the box should be marked as follows:
  - **Infectious substance, affecting animals, UN2900, \_\_\_ kg/ mL**
- If the substance is a liquid, use orientation arrows on the outside of the box or the word “THIS END UP” to specify the correct position in order to prevent leakage.
- Be sure to account for any other hazardous materials (ex. Dry ice) contained in the package with the proper labels and markings on the box.
- **Below demonstrates a completed package for a Category A infectious substance:**





**Category A Documentation**

- Category A infectious substances require a Declaration for each shipment.
- Use the information from the IATA table to fill out the Nature and Quantity section of the Dangerous Goods Declaration.

NATURE AND QUANTITY OF DANGEROUS GOODS							
Dangerous Goods Identification							
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization	
UN2814	Infectious substance, affecting humans (Dengue virus cultures)	6.2		1 x fibreboard box x 15 ml	620		
UN2900	Infectious substance, affecting animals (Rinderpest virus cultures)	6.2		1 x fibreboard box x 15 ml	620		

- Note that the proper shipping name must be supplemented with the technical name in parentheses on the Declaration for Dangerous Goods. For example, a shipment of
- On the air waybill the **Handling Information** must read: *Dangerous Goods as per attached Shipper's Declaration*. For most carriers this is a box you would check on the side of the document.
- If applicable, the **Nature and Quantity** box on the air waybill should read: *Infectious substance affecting animals*.

**Preservatives**

- A quantity of 30 mL or less of dangerous goods from class 3 (Flammable liquids), 8 (Corrosives), or 9 (Miscellaneous Dangerous Goods) may be packed in each primary receptacle to maintain the viability, stability, or prevent degradation of the substances while in transit. Provided these materials are under 30 mL and packed for these purposes, no additional requirements need to be met regarding labeling or documenting these additional dangerous goods.
- Hazardous chemicals in larger amounts must be accounted for on the Dangerous Goods Declaration and with the proper labels on the outside of the package.

**Category A Carrier Information**

- Always confirm with the carrier before they pick up your shipment that they are able to transport a Category A infectious substance.
- FedEx and World Courier will transport Category A infectious substances. The US Postal Service and UPS may not.



### 3.3 CATEGORY B BIOLOGICAL SUBSTANCE SHIPPING INSTRUCTIONS

#### Category B Biological Substance

- Category B biological substances are those that are not in a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure to it occurs. This includes Category B infectious substances transported for diagnostic or investigational purposes. Examples include Hepatitis B infected blood, adenoviral vectors, or body fluids being shipped to diagnose an unknown (non-life threatening) illness. Regulated medical waste which does not contain Category A materials is also considered Category B. Category B infectious substance must be described as "Biological substance, category B" and assigned identification number UN3373.
- A Biological Substance, Category B contains pathogens but does not meet the criteria for inclusion in Category A. In other words, these are less severe infectious materials than Category A. Category B substances are assigned to UN 3373 *Biological substance, Category B*.

**NOTE:** Unknown samples of infectious substances shipped for analysis and diagnosis may be transported in accordance with requirements for Category B infectious substances. For situations where the identity of the agent or pathogen is not known, but sufficient information is available to strongly suspect a Category A infectious substance, the material should be shipped in accordance with all requirements for Category A infectious substances.

#### Category B IATA Table

- Below are the packing and labeling instructions from the IATA DGR:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN3373	<i>Biological substance, Category B</i>	6.2	<i>See below</i>	-	E0	650	<i>See packaging section</i>	<i>See packaging section</i>

\* PG = Packing Group \*\*EQ = Excepted Quantities

- No hazard label is listed on the IATA table. However, a package containing a Category B substance must have a diamond shaped label that reads “UN3373” (more details in labeling section).
- There is no limitation for passenger air carriage. Cargo aircraft only labels do not apply to Category B shipments.



### **Category B Packaging**

- Category B substances must be packed according packing instructions 650 of the IATA DGR (described below).
- The material must be placed inside a leak proof primary receptacle. This primary receptacle then must be placed in a leak proof secondary receptacle.
- Either the primary or secondary receptacle must be able to withstand 95 kPa of pressure and temperatures from – 40° C to 55° C. A Vacutainer™ fulfills this requirement as a primary container and some polyethylene bags fulfill the pressure and temperature requirements as a secondary container.
- The secondary container is placed inside of an outer container. The secondary container must be secured inside the outer container so it does not shift during transport. If you are using a refrigerant make sure the secondary container is braced by some means so that as the refrigerant dissipates or melts the secondary container remains braced.
- Place an itemized list of contents between the secondary and outer container. This can be attached to the outside of the secondary container.
- The outer container does not need the specific UN markings like on a Category A box. The outer container must be of good quality and be able to withstand the shocks and pressures of transit.
- **For liquid substances:** primary receptacles cannot contain more than 1 L; outer packages cannot contain more than 4 L (excluding dry ice, wet ice, or liquid nitrogen).
- **For solid substances:** outer packages cannot contain more than 4 kg (excluding dry ice, wet ice, or liquid nitrogen). This does not apply when the package contains body parts, organs, or whole bodies. You must not pack other dangerous goods inside the outer package unless they are necessary for maintaining the viability of the material during shipment, for example a refrigerant (dry ice) or a preservative (formalin).

### **Category B Labeling**

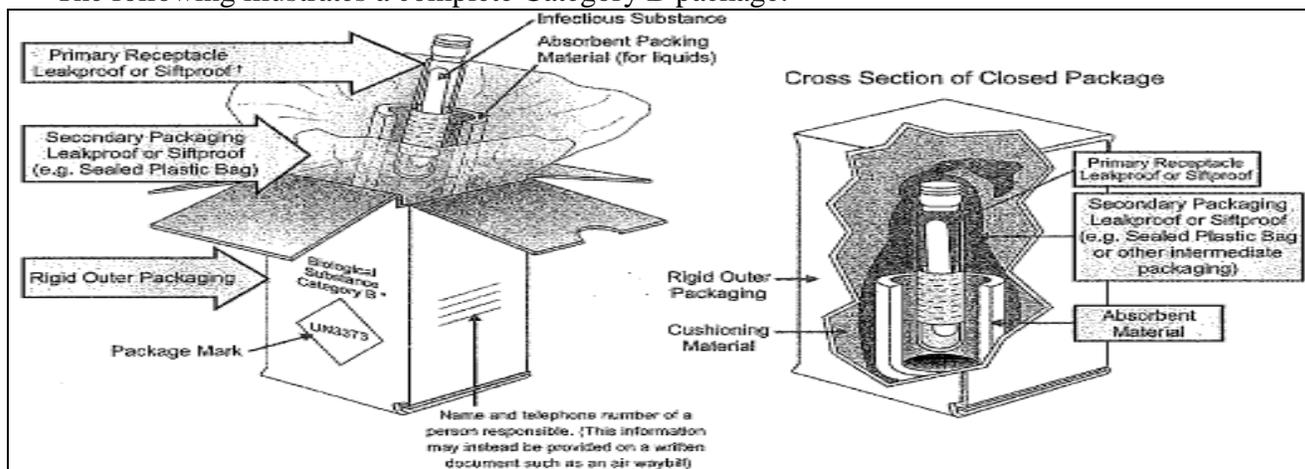
- A Biological Substance, Category B shipment must have the below label on the outside of the outer package. The label must be of a contrasting color to the package, clearly visible and legible. The label must be at least 2 in x 2 in.



- All labels must be flat on one side of the package. Labels should not go around edges or cover up other relevant markings on the package.
- The proper shipping name: “**Biological Substance, Category B**” must be marked on the outer packaging adjacent to this label.
- Write or attach a label with the shipper’s name, address, and telephone number and the consignee’s name and address on the outside of the package.



- Be sure to account for any other hazardous materials (ex. dry ice) contained in the package with the proper labels and markings on the box.
- The following illustrates a complete Category B package:



### Category B Documentation

- A Declaration for Dangerous Goods is not required for Category B substances. You will need to specify when filling out the shipment information that this is a dangerous goods shipment but no shipper's declaration is required. Usually this is a box to check on your air waybill.
- If applicable, the "Nature and Quantity of Goods" section of the air waybill must be marked with "BIOLOGICAL SUBSTANCE, CATEGORY B" and "UN 3373".

### Preservatives

A quantity of 30 mL or less of dangerous goods from class 3 (Flammable Liquids), 8 (Corrosives), or 9 (Miscellaneous Dangerous Goods) may be packed in each primary receptacle to maintain the viability, stability, or prevent the degradation of the substances while in transit. Provided these materials are under 30 mL and packed for these purposes, no additional requirements need to be met regarding labeling or documenting these additional dangerous goods.



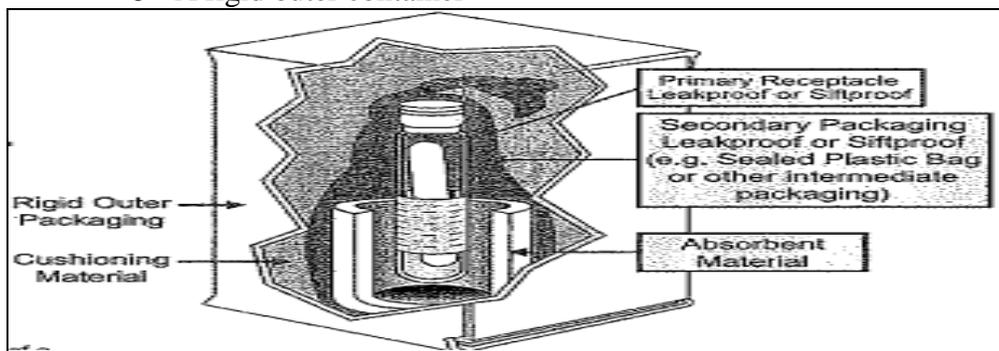
### 3.4 EXEMPT HUMAN AND EXEMPT ANIMAL SPECIMENS

#### Exempt Human or Exempt Animal Specimens

- Exempt Human or Animal specimens are specimens taken directly from a human or animal subject and transported for research, diagnosis, investigational activities, or disease treatment or prevention and have a minimal likelihood of containing pathogens. Patient specimens include excreta, secretions, blood and its components, tissue and tissue swabs, body parts, and specimens in transport media. Professional judgment is critical in determining the probability of pathogens being present in a specimen. The judgment should be based on the medical history of the source, symptoms and circumstances of the source, and endemic conditions of the local area.
- Examples of exempt specimens include blood or urine tests to monitor cholesterol, glucose, or hormone levels, or tests to monitor organ functions such as heart, liver, or kidney for humans or animals with non-infectious diseases. Also included in this provision are specimens for drug monitoring purposes, pregnancy tests, and biopsies for cancer detection or antibody detection.
- An example of a patient specimen not considered exempt: a patient in equatorial West Africa has become sick after being bitten by a wild rodent. You want to send a blood sample to a lab in the U.S. for diagnosis. You also know Monkeypox virus is endemic to the area. Since there is a good possibility this patient is infected with Monkeypox virus, you cannot ship a sample of his body fluid as an exempt human specimen, it must ship as a Category A substance.

#### Exempt Human and Animal Specimens Packaging

- Exempt human and animal specimens are packed according to the basic triple packing method:
  - A leak proof primary receptacle
  - A leak proof secondary receptacle
  - A rigid outer container



#### Exempt Human and Animal Specimens Packaging

The outer package must be marked with the words “EXEMPT HUMAN SPECIMEN” or “EXEMPT ANIMAL SPECIMEN”.



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New Orleans**

**Documenting Exempt Human and Animal Specimens:**

No Declaration for Dangerous Goods is needed as this classification is not considered a dangerous good. You will list the items on the air waybill by their technical name. For example: Human blood samples.



### 3.5 GENITICALLY MODIFIED MICROORGANISMS (GMMOs) AND GENITICALLY MODIFIED ORGANISMS (GMOs)

#### Genetically Modified Microorganisms (GMMOs) and Genetically Modified Organisms (GMOs)

Genetically Modified Micro-Organisms and Genetically Modified Organisms are organisms that do not meet the definition of infectious substances but are capable of altering animals, plants or microbiological substances in a way that is not normally the result of natural reproduction. GMMOs and GMOs that pose a risk of infection must be classified as Category A or Category B substances as appropriate. These materials must be assigned to UN 3245.

#### GMMOs and GMOs IATA Table

Below are the packing and labeling instructions from the IATA DGR:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN3245	Genetically modified organisms	9	Miscellaneous	-	E0	959	No limit	No limit
UN3245	Genetically modified micro-organisms	9	Miscellaneous	-	E0	959	No limit	No limit

\*PG = Packing Group      \*\*EQ = Excepted Quantities

#### GMMOs and GMOs Packaging

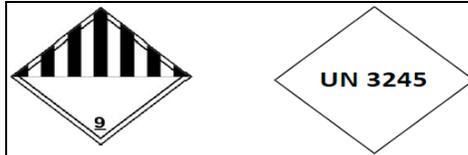
- GMMOs and GMOs follow packing instruction 959 of the IATA DGR (described below).
- The material must be placed inside a leak proof primary receptacle. This primary receptacle then must be placed in a leak proof secondary receptacle. The maximum amount per primary receptacle is 100 mL or 100 g.
- Either the primary or secondary receptacle must be able to withstand 95 kPa of pressure and temperatures from – 40° C to 55° C. A Vacutainer™ fulfills this requirement as a primary container and some polyethylene bags fulfill the pressure and temperature requirements as a secondary container.
- The secondary container is placed inside of an outer container. The secondary container must be secured inside the outer container so it does not shift during transport. If you are using a refrigerant make sure the secondary container is braced by some means so that as the refrigerant dissipates or melts the secondary container remains braced.
- Place an itemized list of contents between the secondary and outer container. This can be attached to the outside of the secondary container.



- No other dangerous goods are allowed inside the outer package unless they are necessary for maintaining the viability of the material during shipment, for example a refrigerant (dry ice) or a preservative (formalin).

**GMMOs and GMOs Labeling**

- You will need a class 9 (miscellaneous) label and a diamond shaped UN 3245 label:



- Write or attach a label with the shipper’s name, address, and telephone number and the consignee’s name and address on the outside of the package.
- The outside of the box should be marked with: **Genetically Modified Micro-Organisms, UN 3245, \_\_\_\_ml/g or Genetically Modified Organisms, UN 3245 \_\_\_\_ ml/g.**
- Be sure to account for any other hazardous materials (ex. dry ice) contained in the package with the proper labels and markings on the box.

**GMMOs and GMOs Documentation**

- GMMOs and GMOs require a Declaration for Dangerous Goods. Use the information from the IATA table to fill out the Declaration.

NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization
UN3245	Genetically modified micro organisms	9		1 x fibreboard box x 15 ml	959	

- On the Air Waybill, the **Handling Information** must read: Dangerous Goods as per attached Shipper’s Declaration. For most carriers this is a box you would check on the side of the document.

If applicable, the Nature and Quantity box should read: *Genetically Modified Organisms* or *Genetically Modified Microorganisms*.



### **3.6 NON-REGULATED BIOLOGICAL MATERIALS**

#### **Non-Regulated Biological Materials**

Not all biological materials are considered hazardous under IATA and DOT shipping regulations. Biological substances that do not contain pathogens or substances in which any present pathogens have been neutralized and do not meet the criteria of Exempt Human or Animal Specimens are not subject to IATA/DOT regulations unless they warrant inclusion in another class (i.e., GMMOs and GMOs). Examples of unregulated materials include:

- Substances containing microorganisms that are not pathogenic to humans or animals.
- Substances in a form that any present pathogens have been neutralized or inactivated so that they no longer pose a health risk.
- Environmental samples which are not considered to pose a significant risk of infection (e.g. food, water, or plant samples).
- Dried blood spots.
- Fecal occult blood screening tests.
- Blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation. Note blood or blood products must be labeled with a Biohazard symbol on the primary and secondary containers. Do not place a biohazard symbol on the outside of the package.
- Tissues or organs intended for use in transplantation.

[Appendix D](#) contains the DOT/IATA exceptions list. Note IATA has slightly different exclusions from DOT.



## **4.0 OTHER REGULATED MATERIALS**

### **Other Regulated Materials**

- Dry ice is often packaged with infectious substances and diagnostic specimens. Dry ice falls into hazard class 9. Instructions for packaging dry ice can be found in [Section 4.1](#).
- Liquid nitrogen is classified as a non flammable gas and cryogenic liquid. Liquid nitrogen falls into hazard class 2.2. Instructions for packaging materials containing liquid nitrogen can be found in [Section 4.2](#).
- Formaldehyde solutions may fall into class 3, 8, or 9, depending on the concentration and other materials present. Specimens shipped in formalin solutions containing between 10-25% formaldehyde would be considered hazard class 9. Solutions containing less than 10% formaldehyde, and which contain no other hazardous material, are not regulated as a hazardous material.
- Wet ice and gel packs are other options for refrigerants. These two options are not subject to any dangerous goods regulations (unless other dangerous goods are in the package). Wet ice and gel packs keep items cold for shorter amounts of time and do not maintain as low of a temperature as dry ice or liquid nitrogen. When using wet ice be sure package is leak proof. Any type of leak, even if it is only water, will cause problems for your shipment.
- Preservatives used to ship biological materials to enhance product stability. For Category A infectious substances, Category B biological substances, and Genetically Modified Organisms and Microorganisms, a quantity of 30 mL or less of dangerous goods in Classes 3 (flammable liquids), 8 (corrosives), or 9 (miscellaneous) may be packed in each primary receptacle to maintain the substance's viability, stability, or to prevent its degradation. Provided the material is less than 30 mL, is from one of the specified classes, and used for these purposes no other requirements need to be met. If you are using a larger amount of preservative, you need to contact EHS for further training on how to pack, label and document that particular chemical.



#### 4.1 DRY ICE SHIPPING INSTRUCTIONS

##### Dry Ice

Dry Ice is considered a dangerous good under DOT and IATA regulations.

##### Dry Ice IATA Table

Below are the packing and labeling instructions from the IATA DGR:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN1845	Carbon dioxide, solid	9	Miscellaneous		E0	954	200 kg	200 kg

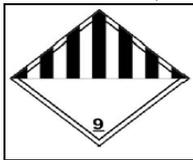
\*PG = Packing Group \*\*EQ = Excepted Quantities

##### Dry Ice Packaging

- Dry ice is packed according to packing instructions 954 in the IATA DGR (described below).
- Dry ice must be packaged in a container that will not be adversely affected by the low temperature. The package must not fail due to freezing.
- Do **NOT** completely seal packages containing dry ice. Packages must be vented or constructed to release CO<sub>2</sub> gas so as not to build up pressure and rupture.
- Any items being shipped on dry ice must be secured inside the package so they do not shift around after the dry ice dissipates. Inner packages should be braced by some means within the outer package.

##### Dry Ice Labeling

- Outer packages need a class 9 (miscellaneous) label



- Outer packages need to be marked with: **UN1845 Carbon dioxide, solid \_\_\_\_\_ kg** (*net weight of dry ice only*).
- Write or attach a label with the shipper's name, address, and telephone number and the consignee's name and address on the outside of the package.
- These outer markings are in addition to any other hazardous materials contained inside the package.



**Dry Ice Documentation**

- If dry ice is the only hazardous item in the package then a Declaration for Dangerous Goods is not required. If this is the case then you need to have the following in the Nature and Quantity of Goods section of the air waybill:

UN 1845  
Carbon dioxide, solid  
Class 9 1 x \_\_\_\_ kg

- If there are other dangerous goods in the package then you will fill out the Dangerous Goods Declaration as follows:

NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization
UN2814	Infectious substance, affecting humans (Monkeypox virus)	6.2		15 ml	620	
UN1845	Carbon dioxide, solid	9		10 kg	954	
				All packed in one fibreboard box		



## 4.2 LIQUID NITROGEN PACKAGING INSTRUCTIONS

### Liquid Nitrogen

Liquid nitrogen is classified as a non flammable gas and cryogenic liquid.

### Liquid Nitrogen IATA Table

- Below are the packing and labeling instructions from the IATA DGR:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG*	EQ**	Packing Inst	Max Qty. for passenger air carriage	Max Qty. for cargo only air carriage
UN1977	<i>Nitrogen, refrigerated liquid</i>	2.2	<i>Non-flamm. gas &amp; cryogenic liquid</i>		E1	202	50 kg	500 kg

\*PG = Packing Group    \*\*EQ = Excepted Quantities

- If the amount of liquid nitrogen you are shipping is 30 mL or less then you can ship under the excepted quantity rule. Packages must be adequately insulated and have venting mechanisms to prevent bursting.

### Liquid Nitrogen Packaging, Labeling, and Documentation

There are extensive regulations pertaining to shipping liquid nitrogen in open and closed cryogenic receptacles. If you wish to ship liquid nitrogen in an open or closed cryogenic receptacle, contact EH&S for details on packing, labeling, and documenting a liquid nitrogen shipment.

### Transporting Liquid Nitrogen in a Vapor Shipper

- You also have the option of using a Vapor Shipper to transport materials using liquid nitrogen as a refrigerant. Liquid nitrogen is not subject to these regulations if it is shipped in an approved Vapor Shipper. A Vapor Shipper is an insulated package containing liquid nitrogen fully absorbed in a porous material and is intended for transport at low temperatures of non- dangerous products. A Vapor Shipper must be constructed so it does not allow pressure to build up within the container and will not permit the release of liquid nitrogen regardless of how the package is oriented.
- A Vapor Shipper is specifically constructed for shipping materials. A small liquid nitrogen Dewar is not acceptable unless it is specified as a Vapor Shipper.
- If you are using a Vapor Shipper the words “Not Restricted” and special provision number A152 must be included in the description on the air waybill.
- Not all Vapor Shippers are constructed to transport infectious substances. If you are shipping an infectious or potentially infectious substance make sure the Vapor Shipper you have selected is properly constructed to contain infectious materials.



## 5.0 SHIPPER'S DECLARATION FOR DANGEROUS GOODS

- Packages may require a shipper to complete a legal document, or shipper's declaration, for shipments of dangerous goods (see section 5.1 for example form).
- Division 6.2 shipments containing UN 3373 Biological substances, Category B and Exempt Human/Animal Specimens do not require a shipper's declaration.
- For UN 1845 Dry Ice, a shipper's declaration is only required when it is used as a refrigerant for dangerous goods which require a shipper's declaration.
- If the shipment does not require a shipper's declaration, the information must be included on the waybill.
- The shipper must print the shipper's declaration form in color and sign it. Include two signed copies in the document pouch on the outside of your package. Keep one copy for your records.
- FEDEX will only accept dangerous goods declarations that were created using either their specific software or software from an approved vendor. This software can be obtained at <http://fedex.com/us/ship-manager/software/downloads.html>.

### 5.1 Example Shipper's Declaration For Dangerous Goods Form

Below is an example shipper's declaration form (see below form for descriptions):

SHIPPER'S DECLARATION FOR DANGEROUS GOODS						
Shipper LSU Health Sciences Center Jon Doe 123 Paved Avenue New Orleans, LA USA Tel: 5045681234				Air Waybill No. Page 1 of 1 Pages Shipper's Reference Number (optional)		
Consignee Sam Doe 321 South Street Baton Rouge, LA Tel: 111-111-1111						
Two completed and signed copies of this Declaration must be handed to the operator.				WARNING		
TRANSPORT DETAILS						
This shipment is within the limitations prescribed for: <i>(delete non-applicable)</i>				Airport of Departure		
PASSENGER AND CARGO AIRCRAFT		CARGO AIRCRAFT ONLY				
Airport of Destination				Shipment Type <i>(delete non-applicable)</i>		
				NON-RADIOACTIVE		
NATURE AND QUANTITY OF DANGEROUS GOODS						
Dangerous Goods Identification						
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instructions	Authorization
UN2814	Infectious substance, affecting humans (Monkeypox virus)	6.2		15 ml	620	
UN 1845	Carbon dioxide, solid (Dry Ice)	9	III	0.5 kgts All packed in one fiberboard box	904	
Additional Handling Information						
Emergency Telephone Number 504-111-1111						
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to the applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.				Name/Title of Signatory Jon Doe HAZMAT Manager Place and Date New Orleans, LA 1/14/2011 Signature		



**A. Shipper**

The name, address, and telephone number for the person sending this shipment. This telephone number is your office number, not a 24-hour emergency contact.

**B. Consignee**

The name and address of the person receiving this shipment.

**C. Passenger or Cargo Only Aircraft**

According to the information provided in the IATA table, specify if this shipment can be put on a passenger or cargo only aircraft

**D. Radioactive/Non-Radioactive**

Specify if this shipment is radioactive or not.

**E. Nature and Quantity of Dangerous Goods**

Using the information from the IATA table, fill in the required information for each dangerous good in this section.

**F. Emergency Response**

You must include a 24-hour emergency response contact on the dangerous goods declaration.

**G. Name, Title, Signature and Date**

- Type your name, title, place and date when you prepare this document. You may type all information but you must sign this form by hand, stamp, or facsimile. A typed signature is not allowed.
- When you have completed this form be sure to print 3 copies and sign them. Two copies must be in color (showing red hatchmarks on the sides) and the other is for your records. Place two copies in the clear document pouch on the outside of your package. Keep your copy for two years (domestic) or five years (international) from the date of the shipment.



## **6.0 PACKING TEST REQUIREMENTS FOR INFECTIOUS SUBSTANCES**

Packages designed for the shipment of Category A and Category B substances must be tested to ensure it can withstand a reasonable amount of damage without allowing the material to be exposed on the exterior of the outer package. Personnel must triple package the EQ shipment using a leak proof primary container, a leak proof secondary container (including absorbent materials if your material is a liquid), and a rigid outer container. Each completed EQ package must be able to pass the drop, load, and puncture tests described below and have documentation that a sample package has been tested. Personnel must test a complete package as prepared for transport (triple packaged) using a sample item of the same physical characteristics as the item you intend to ship. Tests may be performed on different but identical package components to the ones you will use to ship. Primary containers must be filled to at least 98% capacity with the sample item.

- **Drop Test:** Before the drop tests can be performed, the completed package must be pre conditioned. Preconditioning includes:
  - Water spray of 5 cm/hr for at least one hour.
  - Environment of -18C for a period of 24 hours. Drop test must be performed within 15 minutes after removal from environment.
  - If package allows for dry ice as refrigerant, the completed package must be filled with dry ice. When all dry ice has dissipated, the package is subjected to a drop test in the worst case orientation

Five identical packages must be used for the drop test and each one must be dropped in a different orientation after preconditioning:

- One drop flat on the bottom
- One drop flat on the top
- One drop flat on the long side
- One drop flat on the short side
- One drop on a corner

The complete package must be able to sustain the following drops from no less than 9 m (Category A) or 1.2 m (Category B) onto a rigid, non-resilient flat and horizontal surface without breaking or leaking of inner containers or substantial damage to the outer package.

- **Load Test:** Complete package must be able to sustain a load test consisting of a force equal to the mass of identical size and weight packages stacked to a height of 3 m (10 feet) applied to the top of the test package for 24 hours.
- **Puncture test:** Puncture tests are only required for Category A packages.
- **Criteria for passing:** No leakage or breakage of the inner containers and no significant reduction in effectiveness of any of the 3 layers of packaging. Personnel must complete these drop and load tests on each type of complete package used. You do not need test every package you send as long as you have documentation of testing the specific type of containers you are using.



**7.0 LIMITED AND EXCEPTED QUANTITIES**

**7.1 Limited Quantities**

Other dangerous goods (e.g., dry ice) shipped with infectious substances that exceed the 30 mL limit may be shipped as a “Limited Quantity”. The quantity of the material determines whether it can be shipped as a limited quantity. Contact EH&S for more information if dangerous goods in excess of 30 mL.

**7.2 Excepted Quantities**

- Small amounts of some dangerous goods can be shipped under the Excepted Quantity (EQ) rule. Hazardous biological materials do not have an Excepted Quantity exemption.
- The EQ column on the IATA dangerous goods table refers to excepted quantities allowed for each item. Some items, such as class 6.2 infectious materials, are not permitted to ship under the excepted quantity rules and have “E0” in this column.
- Other materials which are permitted under Excepted Quantities will have E1 through E5 in the EQ column of the IATA table. See below for EQ codes:

UN / ID no.	Proper shipping name	Class or Div. (Sub Risk)	Hazard Label(s)	PG	EQ	Packing Inst	Max Qty. for passenger air carriage
UN1264	Paraldehyde	3	Flamm. liquid	III	E1	355	60 L

EQ codes are explained in this table:

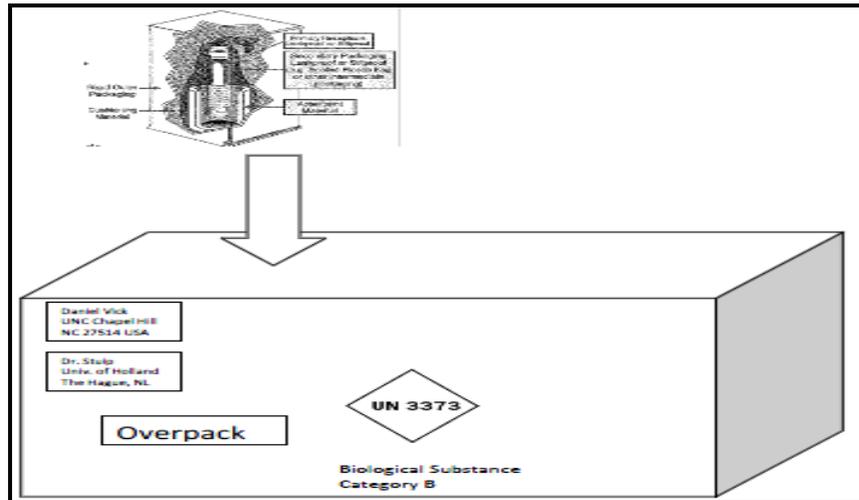
Code	Maximum Quantity per inner packaging	Maximum quantity per outer packaging
E0	Not permitted as Excepted Quantity	
E1	30g/30mL	1kg/1L
E2	30g/30mL	500 g/500mL
E3	30g/30mL	300g/300mL
E4	1g/1mL	500g/500mL
E5	1g/1mL	300g/300mL

- If your material fits within the limits of its EQ allotment then it can be shipped using an excepted quantities label instead of hazard labels and will not require a dangerous goods declaration for that material.
- The “Nature and Quantity of Goods” information on the air waybill should include the phrase “Dangerous Goods in Excepted Quantities.”



## 8.0 OVERPACKS

- Completed dangerous goods packages can be placed inside a larger package called an overpack. Overpacks are useful when there is not enough room for a refrigerant inside the outer package or if you want to ship multiple dangerous goods packages as one piece to save on cost.
- Every package contained in an overpack must be packed and labeled as if it were shipping by itself. The inner package markings must be reproduced on the outside of the overpack. The outer package must be clearly marked “OVERPACK”.
- The overpack must not contain packages of different substances that may react dangerously with each other or substances that must be segregated from other materials.





## **9.0 OTHER BIOLOGICAL MATERIAL DEFINITIONS**

- **Biological Product**

Biological product means a virus, therapeutic serum, toxin, antitoxin, vaccine, blood, blood component or derivative, allergenic product, or analogous product, or arsphenamine or derivative of arsphenamine (or any other trivalent arsenic compound) applicable to the prevention, treatment, or cure of a disease or condition in human beings or animals, unless otherwise excepted, a biological product known to reasonably expected to contain a pathogen that meets the definition of a Category A or B infectious substance must be assigned the identification number UN2814 or UN2900.

- **Culture**

Culture means an infectious substance containing a pathogen that is intentionally propagated. This definition does not include a human or animal patient specimen.

- **Patient Specimen**

Patient specimen means human or animal material collected directly from humans or animals and transported for research, diagnosis, investigational activities, or disease treatment or prevention. Patient specimen includes excreta, secreta, blood and its components, tissue and tissue fluid swabs, body parts, and specimens in transport media (e.g., transwabs, culture media, and blood culture bottles).



**SHIPPING CHECKLIST**

**I. Packaging:**

Use the following checklist to properly prepare package:

1. Follow manufacturer's instructions	<input type="checkbox"/>	8. Outer package displays UN specification mark (CATEGORY A ONLY)	<input type="checkbox"/>
2. Packaging materials in good condition	<input type="checkbox"/>	9. Rigid outer packaging (N/A to Exempt patient specimens)	<input type="checkbox"/>
3. Primary receptacles sealed and leakproof	<input type="checkbox"/>	10. Adequate minimum external area of outer package (all dimensions):	
4. Multiple primaries wrapped individually	<input type="checkbox"/>	• Category A – At least 100 mm	<input type="checkbox"/>
5. Adequate absorbent inside each secondary	<input type="checkbox"/>	• Category B – Two surfaces at least 100 mm x 100 mm	<input type="checkbox"/>
6. Primary or secondary receptacle 95 kPa compliant (N/A to Exempt patient specimens)	<input type="checkbox"/>	• GMOs – At least 100 mm	<input type="checkbox"/>
7. Itemized list of contents between secondary and outer packaging (N/A to Exempt patient specimens)	<input type="checkbox"/>	• Exempt patient samples – One surface at least 100 mm x 100 mm	<input type="checkbox"/>

**II. Marking and Labeling:**

Use to properly mark and label package (Note only marking on Exempt patient sample package is *Exempt human specimen* or *Exempt animal specimen*):

1. Shipper's address	<input type="checkbox"/>	5. Proper shipping name <sup>2</sup>	<input type="checkbox"/>
2. Recipient's address	<input type="checkbox"/>	6. Technical name (for CATEGORY A ONLY – optional on package)	<input type="checkbox"/>
3. Appropriate Hazard label/mark on package <sup>1</sup>	<input type="checkbox"/>	7. Quantity of dangerous goods (N/A for Category B)	<input type="checkbox"/>
4. UN number (Note: Category B already has UN # on label)	<input type="checkbox"/>	8. Responsible person name and telephone number (Note: Category B optional if on waybill; N/A for Dry ice)	<input type="checkbox"/>

1. <b>Labels:</b> <b>Category A:</b>	<b>Category B:</b>	<b>GMOs/Dry Ice:</b>
2. <b>Technical Names:</b> <b>Category A</b> – <i>Infectious substance affecting humans OR Infectious substance affecting animals</i> ; <b>Category B</b> – <i>Biological substance, Category B</i> ; <b>GMOs</b> – <i>Genetically modified organism OR Genetically modified microorganism</i> ; <b>Dry ice</b> – <i>Dry ice OR Carbon dioxide solid.</i>		



**III. Documentation:**

For Category A and GMO shipments, use the following checklist for completion of shipper’s declaration form.

<b>Transport Information</b>	
1. Shipper’s address (same as on package)	<input type="checkbox"/>
2. Recipient’s address (same as on package)	<input type="checkbox"/>
3. Page 1 of 1 Pages	<input type="checkbox"/>
4. (Optional) Air waybill number (if known)	<input type="checkbox"/>
5. (Optional) Airport/city of departure (if known)	<input type="checkbox"/>
6. (Optional) Airport/city of destination (if known)	<input type="checkbox"/>
7. Strike-out non-applicable shipment type (Radioactive)	<input type="checkbox"/>
8. Strike-out non-applicable aircraft limitation box	<input type="checkbox"/>
<b>Nature and Quantity of Dangerous Goods</b>	
1. UN number (i.e., UN 2814, UN 2900, UN 1845, UN 3245)	<input type="checkbox"/>
2. Proper shipping name (e.g., <i>Biological substance, Category B</i> )	<input type="checkbox"/>
3. Technical name (CATEGORY A ONLY)	<input type="checkbox"/>
4. Class or Division (i.e., 6.2 and 9)	<input type="checkbox"/>
5. Type and number of package (e.g., 1 Fiberboard box)	<input type="checkbox"/>
6. Quantity (same as on package, volume or weight)	<input type="checkbox"/>
7. Packing instructions (i.e., 620, 954, 959)	<input type="checkbox"/>
8. Authorization (special provision A28)	<input type="checkbox"/>
<b>Additional Handling Information</b>	
1. Responsible person name and phone number	<input type="checkbox"/>
2. 24-hour emergency response telephone number (as required)	<input type="checkbox"/>
3. Name and title of personnel signing the declaration	<input type="checkbox"/>
4. Place and date of signature (printed or stamped only)	<input type="checkbox"/>
5. Certification statement	<input type="checkbox"/>
<b>Additional Considerations</b>	
1. Maintain three copies (one for shipper and two given to transporter)	<input type="checkbox"/>
2. Any changes: single line cross-out and certifier’s full signature	<input type="checkbox"/>
3. IATA DGR compliant form (i.e., red hatchings, UN number in first column)	<input type="checkbox"/>



**EXAMPLES OF CATEGORY A INFECTIOUS SUBSTANCES**

**Category A Infectious Substances**

**UN 2814 Infectious Substances Affecting Humans**

<i>Bacillus anthracis</i> (cultures only)	Japanese Encephalitis virus (cultures only)
<i>Brucella abortus</i> (cultures only)	Junin virus
<i>Brucella melitensis</i> (cultures only)	Kyasanur Forest disease virus
<i>Brucella suis</i> (cultures only)	Lassa virus
<i>Burkholderia mallei</i> - <i>Pseudomonas mallei</i> - Glanders (cultures only)	Machupo virus
<i>Burkholderia pseudomallei</i> - <i>Pseudomonas pseudomallei</i> (cultures only)	Marburg virus
<i>Chlamydia psittaci</i> - avian strains (cultures only)	Monkeypox virus
<i>Clostridium botulinum</i> (cultures only)	<i>Mycobacterium tuberculosis</i> (cultures only)
<i>Coccidioides immitis</i> (cultures only)	Nipah virus
<i>Coxiella burnetii</i> (cultures only)	Omsk hemorrhagic fever virus
Crimean-Congo hemorrhagic fever virus	Poliovirus (cultures only)
Dengue virus (cultures only)	Rabies virus (cultures only)
Eastern equine encephalitis virus (cultures only)	<i>Rickettsia prowazekii</i> (cultures only)
<i>Escherichia coli</i> , verotoxigenic (cultures only)	<i>Rickettsia rickettsii</i> (cultures only)
Ebola virus	Rift Valley fever virus (cultures only)
Flexal virus	Russian spring-summer encephalitis virus (cultures only)
<i>Francisella tularensis</i> (cultures only)	Sabia virus
Guanarito virus	<i>Shigella dysenteriae</i> type 1 (cultures only)
Hantaan virus	Tick-borne encephalitis virus (cultures only)
Hantavirus causing hemorrhagic fever with renal syndrome	Variola virus
Hendra virus	Venezuelan equine encephalitis virus (cultures only)
Hepatitis B virus (cultures only)	West Nile virus (cultures only)
Herpes B virus (cultures only)	<i>Yersinia pestis</i> (cultures only)
Human immunodeficiency virus (cultures only)	Yellow fever virus (cultures only)
Highly pathogenic avian influenza virus (cultures only)	



**UN 2900 Infectious Substances Affecting Animals**

African swine fever virus (cultures only)  
Avian paramyxovirus Type 1 - Velogenic Newcastle disease virus (cultures only)  
Classical swine fever virus (cultures only)  
Foot and mouth disease virus (cultures only)  
Lumpy skin disease virus (cultures only)  
*Mycoplasma mycoides* - Contagious bovine pleuropneumonia (cultures only)  
Peste des petits ruminants virus (cultures only)  
Rinderpest virus (cultures only)  
Sheep-pox virus (cultures only)  
Goatpox virus (cultures only)  
Swine vesicular disease virus (cultures only)  
Vesicular stomatitis virus (cultures only)

Infectious substances meeting these criteria which cause disease in humans or both in humans and in animals must be assigned to UN 2814. Infectious substances which cause disease only in animals must be assigned to UN 2900. Assignment to UN2814 or UN 2900 must be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgment concerning individuals circumstances of the source human or animal.

**NOTE:** The previous lists are not exhaustive. Infectious substances, including those containing new or emerging pathogens, which do not appear in the list but which meet the same criteria, must also be considered Category A. If there is doubt as to whether or not a substance meets the criteria it should be included in Category A.



**LIST OF MANUFACTURERS OF SHIPPING CONTAINERS FOR INFECTIOUS  
SUBSTANCES AND DRY ICE**

<p>Air Sea Atlanta 1234 Logan Circle Atlanta GA 30318 Phone: 404-351-8600 <a href="http://www.airseatlanta.com">http://www.airseatlanta.com</a></p>	<p>All-Pak, Inc. Corporate One West 1195 Washington Pike Bridgeville, PA 15017 Phone: 800-245-2283 <a href="http://www.all-pak.com">http://www.all-pak.com</a></p>	<p>CARGOpak Corporation 3215-A Wellington Court Raleigh, NC 27615 Phone: 800-266-0652 <a href="http://www.cargopak.com">http://www.cargopak.com</a></p>
<p>DG Supplies, Inc. 5 Boxal Drive Cranbury, NJ 08512 Phone: 800-347-7879 <a href="http://www.dgsupplies.com">http://www.dgsupplies.com</a></p>	<p>EXAKT Technologies, Inc. 7416 N Broadway Ext., Suite E Oklahoma City, OK 73116 Phone: 800-923-9123 <a href="http://www.exaktpak.com">http://www.exaktpak.com</a></p>	<p>HAZMATPAC, Inc 5301 Polk St., Bldg 18 Houston, TX 77023 Phone: 800-347-7879 <a href="http://www.hazmatpac.com">http://www.hazmatpac.com</a></p>
<p>Inmark, Inc. 220 Fisk Drive S.W. Atlanta, GA 30336-0309 Phone: 800-646-6275 <a href="http://www.inmarkinc.com">http://www.inmarkinc.com</a></p>	<p>JIT Certified, Inc. 1740 Fenpark Drive Fenton, MO 63026 Phone: 800-962-8636 <a href="http://www.jitcertifed.com">http://www.jitcertifed.com</a></p>	<p>Polyfoam Packers Corporation 2320 S. Foster Avenue Wheeling, IL 60090 Phone: 888-765-9362 <a href="http://www.polyfoam.com">http://www.polyfoam.com</a></p>
<p>SAF-T-PAK, Inc. 10807 - 182 Street Edmonton, Alberta, Canada, T5S 1J5 Phone: 800-814-7484 <a href="http://www.saftpak.com">http://www.saftpak.com</a></p>	<p>Source Packaging of New England, Inc. 405 Kilvert St. Warwick, RI 02886 Phone: 800-200-0366 <a href="http://www.sourcepak.com">http://www.sourcepak.com</a></p>	<p>Therapak Corporation 1440 Arrow Highway, Unit A Irwindale, California 91706 Phone: 888-505-7377 <a href="http://www.therapak.com">http://www.therapak.com</a></p>



## **ITEMS EXEMPT FROM INFECTIOUS SUBSTANCE SHIPPING REGULATIONS**

The following are not subject to the DOT requirements as Division 6.2 materials:

- A material that does not contain an infectious substance or that is unlikely to cause disease in humans or animals.
- Non-infectious biological materials from humans, animals, or plants. Examples include non-infectious cells, tissue cultures, blood or plasma from individuals not suspected of having an infectious disease, DNA, RNA or other non-infectious genetic material.
- A material containing microorganisms that are non-pathogenic to humans or animals.
- A material containing pathogens that have been neutralized or inactivated such that they no longer pose a health risk.
- A material with a low probability of containing an infectious substance, or where the concentration of the infectious substance is at a level naturally occurring in the environment so it cannot cause disease when exposure to it occurs. Examples of these materials include: Foodstuffs; environmental samples, such as water or a sample of dust or mold; and substances that have been treated so that the pathogens have been neutralized or deactivated, such as a material treated by steam sterilization, chemical disinfection, or other appropriate method, so it no longer meets the definition of an infectious substance.
- A biological product, including an experimental or investigational product or component of a product, subject to Federal approval, permit, review, or licensing requirements, such as those required by the Food and Drug Administration of the U.S. Department of Health and Human Services or the U.S. Department of Agriculture.
- Blood collected for the purpose of blood transfusion or the preparation of blood products; blood products; plasma; plasma derivatives; blood components; tissues or organs intended for use in transplant operations; and human cell, tissues, and cellular and tissue-based products regulated under authority of the Public Health Service Act (42 U.S.C. 264–272) and/or the Food, Drug, and Cosmetic Act (21 U.S.C. 332 et seq.).
- Blood, blood plasma, and blood components collected for the purpose of blood transfusion or the preparation of blood products and sent for testing as part of the collection process, except where the person collecting the blood has reason to believe it contains an infectious substance, in which case the test sample must be shipped as a Category A or Category B infectious substance, as appropriate.
- Dried blood spots or specimens for fecal occult blood detection placed on absorbent filter paper or other material.
- A Division 6.2 material, other than a Category A infectious substance, contained in a



patient sample being transported for research, diagnosis, investigational activities, or disease treatment or prevention, or a biological product, when such materials are transported by a private or contract carrier in a motor vehicle used exclusively to transport such materials. Medical or clinical equipment and laboratory products may be transported aboard the same vehicle provided they are properly packaged and secured against exposure or contamination.

- A human or animal sample (including, but not limited to, secreta, excreta, blood and its components, tissue and tissue fluids, and body parts) being transported for routine testing not related to the diagnosis of an infectious disease, such as for drug/alcohol testing, cholesterol testing, blood glucose level testing, prostate specific antibody testing, testing to monitor kidney or liver function, or pregnancy testing, or for tests for diagnosis of non-infectious diseases, such as cancer biopsies, and for which there is a low probability the sample is infectious.

Note that live animals may not be used to transport infectious substances unless such substances cannot be sent by any other means. An animal containing or contaminated with an infectious substance must be transported under terms and conditions approved by the DOT Associate Administrator for Hazardous Materials Safety.

The shipping names "Diagnostic specimens" and "Clinical specimens" will no longer be permitted. Keep in mind that routine shipment of human or animal blood or tissue samples which are not known or suspected of containing a pathogen, and which are not being sent for pathogen testing, **are not considered infectious substances for shipping purposes and are therefore not regulated by DOT**. It is best to call these sorts of materials "patient specimens".

### **IATA Exceptions for Division 6.2 – IATA DGR 3.6.2.2.3**

The following substances are exempt from Division 6.2 materials as per the IATA Dangerous Goods Regulations:

- Substances that are not likely to cause disease in humans or animals.
- Substances containing micro-organisms which are not pathogenic to humans or animals.
- Substances in a form that any present pathogens have been neutralized or inactivated to the extent they no longer pose a health risk.
- Environmental samples (including food and water samples) which are not considered to pose a significant risk of infection.

Dried blood spots, collected by applying a drop of blood onto absorbent material, or fecal occult blood screening tests, and blood or blood components collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for transplantation.



- There is also an exception for patient specimens for which there is minimal likelihood that pathogens are present. This exception does require special packaging and package marking.

<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 10/31/2014	Updated: 7/6/2020	Policy # EHS-300.06
<b>Select Agents Policy</b>		

**1.0 PURPOSE:**

To ensure compliance with Federal regulations for researchers using Select Agents. Select Agents are toxins and pathogens that pose a severe threat to human, animal, and plant health. The lists of these agents are defined by the CDC and USDA, and are included in Appendix A. Certain genetic materials that could be used to produce Select Agents are also regulated – refer to Genetic Regulations citation in Section 7.0.

**2.0 SCOPE:**

This policy applies to all researchers and laboratories at LSUHSC that intend to acquire and work with Select Agents. LSUHSC does not have a registered Select Agents program currently, but will initiate a program if it becomes necessary. The consequences for failing to adhere to Select Agent regulations and this policy may include termination of research projects and dismissal of position at LSUHSC.

**3.0 RESPONSIBILITIES:**

**Principal Investigators (PI) shall:**

- Contact the Biological Safety Officer if planning to obtain Select Agents below the exempt quantities. Submit a Declaration of Toxin Use (Appendix B) and standard operating procedure (SOP) to Environmental Health and Safety for approval. Standard operating procedures shall designate containment equipment, PPE, laboratory hygiene, proper handling of Select Agents, health effects, decontamination, and disposal.
- Contact the Institutional Biosafety Committee (IBC), the Director of the Office of Research Services, and the Biological Safety Officer in writing if planning to obtain Select Agents above the exempt quantities. Note that it can take up to six months for Federal approval to be granted to LSUHSC.
- Register all Select Agents and personnel with the Responsible Official.
- Provide proper training to laboratory personnel using Select Agents.
- Ensure adequate containment equipment and personal protective equipment (PPE) is available.

**Institutional Biosafety Committee shall:**

- Prior to obtaining Select Agents in excess of exempt quantities, register LSUHSC with the Federal Select Agents Program and designate a Responsible Official and an Alternate Responsible Official using the Federal Select Agents Program [Registration Form](#).
- Review research applications that intend to use Select Agents, toxins, and DNA molecules that encode Select Agent toxins and ensure laboratory facilities are properly equipped for the research.

**Environmental Health and Safety Department (EHS) shall:**

- Provide technical advice and recommend safety precautions for labs working with Select Agents.

**Responsible Official (RO) shall:**

- Be accountable for LSUHSC's compliance with the Select Agent regulations.
- Be approved by the Federal Select Agents Program, be familiar with the regulations, have the authority to act on behalf of LSUHSC, maintain and submit the required records, and conduct annual inspections.
- Create and maintain site-specific plans for the biosecurity, biocontainment, biosafety, and incident response of Select Agents and toxins at LSUHSC.
- Undergo a Security Risk Assessment (renewed every three years) and a suitability assessment process if research using Tier 1 Select Agents is to be performed.
- Serve as the main point of contact for all Select Agent registration, reporting, and compliance issues.

**Personnel who work with Select Agents shall:**

- Be authorized and registered with the RO, and submit to a Security Risk Assessment.
- Complete required training to work with Select Agents.
- Maintain laboratory security.

**4.0 PROCEDURES FOR REPORTING, INVESTIGATING, AND ANALYSIS:**

Once designated, the Responsible Official makes all reports to the Federal Select Agent Program and conducts investigations. The RO coordinates with the IBC and EHS to manage the LSUHSC Select Agent Program.

**5.0 EMPLOYEE TRAINING AND EDUCATION:**

The Principal Investigator will provide laboratory-specific training to all laboratory workers on potential hazards before handling, using, or storing Select Agents. Training elements should include awareness of pathogenic effects, selecting the correct PPE, proper decontamination, and standard operating and disposal procedures.

## 6.0 EXEMPTIONS

### Excluded agents and toxins:

Attenuated strains of a Select Agent and inactivate forms of a select toxin, which are excluded from the requirements of Select Agent Regulations. Use of these materials must be declared in the IBC application for research. For more information, see [Select Agent and Toxin Exclusions](#).

### Exempt quantities of toxins:

Research laboratories using the following toxins are not required to register with the Select Agent Program, as long as the quantity of toxin is does not exceed the amounts indicated in the table below. Check the [Permissible Amounts](#) to verify there are no changes to the list.

HHS Toxins [§73.3(d)(7)]	Amount
Abrin	1000 mg
Botulinum neurotoxins	1 mg
Short, paralytic alpha conotoxins	100 mg
Diacetoxyscirpenol (DAS)	10,000 mg
Ricin	1000 mg
Saxitoxin	500 mg
Staphylococcal Enterotoxins (Subtypes A, B, C, D, and E)	100 mg
T-2 toxin	10,000 mg
Tetrodotoxin	500 mg

- The PI is required to declare the toxin in their IBC application and submit a standard operating procedure to EHS for review and approval.
- The PI is required to keep the toxin under lock and key and keep the laboratory locked when not present.
- The PI must maintain accurate inventory of the toxin to record any purchase, transfer, use, and destruction, and include the toxin with their current [online chemical inventory](#).

## **7.0 REFERENCES:**

- <http://www.selectagents.gov/>
- Select Agents – Genetic Regulations  
<http://www.selectagents.gov/guidance-regulation.html>
- [CDC - Possession, Use, and Transfer of Select Agents and Toxins](#)  
(42 CFR 73) 
- [USDA - Possession, Use, and Transfer of Biological Agents and Toxins](#)  
(7 CFR 331) 
- [Bioterrorism Preparedness and Response Act of 2002](#)  
(HR 3448, Public Act 107-188) 

## **8.0 DEFINITIONS:**

Responsible Official (RO) – The individual designated by LSUHSC with the authority to ensure compliance with the Select Agent Regulations at LSUHSC.

Security Risk Assessment – Background check conducted prior to Select Agent registration for personnel working with agents and RO.

Tier 1 Select Agents and Toxins – A subset of select agents and toxins designated in the select agent regulations as “Tier 1” because these agents and toxins are considered to present the greatest risk of deliberate misuse and the most significant potential for mass casualties or deleterious effects on the economy, critical infrastructure or public confidence.

## **9.0 APPENDICES:**

- Appendix A – Select Agent List
- Appendix B – Declaration of Toxin Use

**Appendix A – Select Agent List**

Note: Refer to: <https://www.selectagents.gov/SelectAgentsandToxinsList.html> for the most recent list.

**HHS and USDA Select Agents and Toxins  
7CFR Part 331, 9 CFR Part 121, and 42 CFR Part 73**

The following biological agents and toxins have been determined to have the potential to pose a severe threat to both human and animal health, to plant health, or to animal and plant products. An attenuated strain of a select agent or an inactive form of a select toxin may be excluded from the requirements of the Select Agent Regulations. Here is a list of [excluded agents and toxins](#).

**HHS SELECT AGENTS AND TOXINS**

1. Abrin<sup>5</sup>
2. *Bacillus cereus* Biovar *anthracis*\*
3. Botulinum neurotoxins<sup>\*,5</sup>
4. Botulinum neurotoxin producing species of *Clostridium*\*
5. Conotoxins (Short, paralytic alpha conotoxins containing the following amino acid sequence X<sub>1</sub>CCX<sub>2</sub>PACGX<sub>3</sub>X<sub>4</sub>X<sub>5</sub>X<sub>6</sub>CX<sub>7</sub>)<sup>1,5</sup>
6. *Coxiella burnetii*
7. Crimean-Congo haemorrhagic fever virus
8. Diacetoxyscirpenol<sup>5</sup>
9. Eastern Equine Encephalitis virus<sup>3,4</sup>
10. Ebola virus\*
11. *Francisella tularensis*\*
12. Lassa fever virus
13. Lujo virus
14. Marburg virus\*
15. Monkeypox virus<sup>3</sup>
16. Reconstructed replication competent forms of the 1918 pandemic influenza virus containing any portion of the coding regions of all eight gene segments (Reconstructed 1918 Influenza virus)
17. Ricin<sup>5</sup>
18. *Rickettsia prowazekii*
19. SARS-associated coronavirus (SARS-CoV)<sup>4</sup>
20. Saxitoxin<sup>5</sup>
- **South American Haemorrhagic Fever viruses:**
  21. Chapare
  22. Guanarito
  23. Junin
  24. Machupo
  25. Sabia
26. Staphylococcal enterotoxins (subtypes A,B,C,D,E)<sup>5</sup>
27. T-2 toxin<sup>5</sup>
28. Tetrodotoxin<sup>5</sup>
- **Tick-borne encephalitis complex (flavi) viruses:**
  29. Far Eastern subtype<sup>4</sup>
  30. Siberian subtype<sup>4</sup>
31. Kyasanur Forest disease virus<sup>4</sup>
32. Omsk hemorrhagic fever virus<sup>4</sup>

33. Variola major virus (Smallpox virus)\*
34. Variola minor virus (Alastrim)\*
35. *Yersinia pestis*\*

#### OVERLAP SELECT AGENTS AND TOXINS

36. *Bacillus anthracis*\*
37. *Bacillus anthracis* Pasteur strain
38. *Brucella abortus*
39. *Brucella melitensis*
40. *Brucella suis*
41. *Burkholderia mallei*\*
42. *Burkholderia pseudomallei*\*
43. Hendra virus
44. Nipah virus
45. Rift Valley fever virus
46. Venezuelan equine encephalitis virus<sup>3,4</sup>

#### USDA SELECT AGENTS AND TOXINS

47. African horse sickness virus
48. African swine fever virus
49. Avian influenza virus<sup>3</sup>
50. Classical swine fever virus<sup>4</sup>
51. Foot-and-mouth disease virus<sup>\*,4</sup>
52. Goat pox virus
53. Lumpy skin disease virus
54. *Mycoplasma capricolum*<sup>3</sup>
55. *Mycoplasma mycoides*<sup>3</sup>
56. Newcastle disease virus<sup>2,3</sup>
57. Peste des petits ruminants virus
58. Rinderpest virus\*
59. Sheep pox virus
60. Swine vesicular disease virus<sup>4</sup>

#### USDA PLANT PROTECTION AND QUARANTINE (PPQ) SELECT AGENTS AND TOXINS

61. *Coniothyrium glycines* (formerly *Phoma glycinicola* and *Pyrenochaeta glycines*)
62. *Peronosclerospora philippinensis*  
(*Peronosclerospora sacchari*)
63. *Ralstonia solanacearum*
64. *Rathayibacter toxicus*
65. *Sclerophthora rayssiae*
66. *Synchytrium endobioticum*
67. *Xanthomonas oryzae*

\*Denotes Tier 1 Agent

<sup>1</sup> C = Cysteine residues are all present as disulfides, with the 1st and 3rd Cysteine, and the 2nd and 4th Cysteine forming specific disulfide bridges; The consensus sequence includes known toxins  $\alpha$ -MI and  $\alpha$ -GI (shown above) as well as  $\alpha$ -GIA, Ac1.1a,  $\alpha$ -CnIA,  $\alpha$ -CnIB; X1 = any amino acid(s) or Des-X; X2 = Asparagine or Histidine; P = Proline; A = Alanine; G = Glycine; X3 = Arginine or Lysine; X4 = Asparagine, Histidine, Lysine, Arginine, Tyrosine, Phenylalanine or Tryptophan; X5 = Tyrosine, Phenylalanine, or Tryptophan; X6 = Serine, Threonine, Glutamate, Aspartate, Glutamine, or Asparagine; X7 = Any amino acid(s) or Des X and; "Des X" = "an amino acid does not have to be present at this position." For example if a peptide sequence were XCCHPA then the related peptide CCHPA would be designated as Des-X.

<sup>2</sup> A virulent Newcastle disease virus (avian paramyxovirus serotype 1) has an intracerebral pathogenicity index in day-old chicks (*Gallus gallus*) of 0.7 or greater or has an amino acid sequence at the fusion (F) protein cleavage site that is consistent with virulent strains of Newcastle disease virus. A failure to detect a cleavage site that is consistent with virulent strains does not confirm the absence of a virulent virus.

<sup>3</sup> Select agents that meet any of the following criteria are excluded from the requirements of this part: Any low pathogenic strains of avian influenza virus, South American genotype of eastern equine encephalitis virus, west African clade of Monkeypox viruses, any strain of Newcastle disease virus which does not meet the criteria for virulent Newcastle disease virus, all subspecies *Mycoplasma capricolum* except subspecies *capripneumoniae* (contagious caprine pleuropneumonia), all subspecies *Mycoplasma mycoides* except subspecies *mycoides* small colony (Mmm SC) (contagious bovine pleuropneumonia), and any subtypes of Venezuelan equine encephalitis virus except for Subtypes IAB or IC, provided that the individual or entity can verify that the agent is within the exclusion category.

<sup>4</sup> For determining the regulatory status of nucleic acids that are capable of producing infectious forms of select agent viruses, please reference guidance at <https://www.selectagents.gov/na-guidance.html>.

<sup>5</sup> For determining the regulatory status of Recombinant and/or Synthetic nucleic acids that encode for the toxic form(s) of any select toxins if the nucleic acids (i) can be expressed in vivo or in vitro, or (ii) are in a vector or recombinant host genome and can be expressed in vivo or in vitro; please reference guidance at <https://www.selectagents.gov/na-guidance.html>.



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date: 11/20/2009	Updated: 4/18/2018	Policy # EHS-400.01
<b>General Safety Committee Charter</b>		

## **1.0 PURPOSE:**

The committee will promote a safe and healthy workplace for all LSUHSC personnel and ensure compliance with Office of Risk Management guidance.

## **2.0 SCOPE:**

The committee will address issues related to general safety, to include accident/incident trends, fire safety, driving safety, and laboratory/building safety. Furthermore, the committee will serve as a forum to gather information from and distribute critical safety information to the LSUHSC community.

## **3.0 RESPONSIBILITIES:**

### **3.1 General Safety Committee shall:**

- Report to the Executive Committee for Environmental Health and Safety.
- Review incidents involving work-related fatalities, serious injuries, and significant near misses.
- Assess accident/incident trends and direct the development of Job Safety Analyses (JSAs) if required.
- Serve as a forum to gather and address safety concerns.
- Implement new procedures and/or training requirements to improve LSUHSC's safety posture.
- Serve as a forum to keep the LSUHSC community informed of new or proposed changes to safety regulations

### **3.2 Executive Director, Environmental Health & Safety (EH&S) shall:**

- Develop meeting agendas.
- Record and disseminate meeting minutes. Ensure they are posted on the EH&S web site.
- Provide current accident/incident trend analysis to the committee and assist with the development of JSAs that result from that trend analysis.
- Provide technical support as required.

## **4.0 IMPLEMENTATION**

### **4.1 Membership**

- Mr. Robert Fahey, EH&S, Chairperson
- Ms. Annette Arboneaux, Human Resources
- Chief William Joseph, University Police
- Mr. Maurice Coman, Facility Services
- Dr. Wayne Backes, School of Medicine
- Dr. Marsha Bennett, School of Nursing
- Dr. John Gallo, School of Dentistry
- Ms. Daesy Behrhorst, School of Public Health
- Dr. Jerald James, School of Allied Health Professions
- Dr. Angela Amedee, School of Graduate Studies
- Mr. James Davis, EH&S

### **4.2 Frequency of Meetings**

The committee will meet no less than quarterly.

### **4.3 Minutes**

Meeting minutes will include date, time, and location of meeting; attendance; report of actions taken as a result of previous meetings; and new business.

## **5.0 RECORDKEEPING:**

Meeting minutes will be maintained by EH&S for a minimum of six years.

## **6.0 REFERENCES:**

Office of Risk Management General Safety Program Guidance

<b>Environmental Health and Safety Policy Manual</b>		
Issue Date: 10/29/ 2009	<i>Updated: 8/26/2014</i>	Policy # EHS 400.02
<b>Confined Space Policy</b>		

## 1.0 PURPOSE

This policy is intended to protect LSUHSC personnel from the hazards of confined spaces.

## 2.0 SCOPE

This procedure applies to all employees and contractors performing work at LSUHSC. **Note that no LSUHSC employee will make entry into a confined space where the hazards cannot be adequately controlled or eliminated throughout the entry timeframe. In these instances, an adequately qualified and trained contractor will be hired to accomplish the work. Note that due to the specific hazards associated with sewer lines, no LSUHSC personnel are permitted to enter sewers.**

## 3.0 RESPONSIBILITIES

### 3.1 Environmental Health and Safety Department (EHS) shall:

- Perform hazard evaluation of confined spaces on LSUHSC property and provide evaluation to FS for record maintenance.
- Designate, based on the results of the hazard evaluation, each confined space as permit or non-permit required spaces.
- Develop and maintain policy and procedures for safe and effective confined space entry.
- Perform monitoring for potential atmospheric hazards and assist FS with development of control measures during confined space entries as described in this policy.
- Assist with efforts to reduce the hazard classification of permit required spaces.
- Assist entry supervisors in the selection of PPE.
- Assist entry supervisors with preparation of entry permits by using entry procedures established within completed hazard assessment evaluations
- Develop, maintain and provide confined space training.
- Perform program review and revisions as required by this policy.

### 3.2 Facility Services Department (FS) Supervisors shall:

- Identify and maintain an inventory of confined spaces on LSUHSC property, with associated hazard assessments and approved entry requirements.
- Request the performance of confined space hazard evaluations by EHS.

- Post danger signs at the entrance(s) to designated permit required confined spaces.
- Ensure all personnel who are assigned duties and responsibilities as entry supervisors, attendants, and entrants are properly trained and understand the requirements of this policy and their associated duties.
- Provide required equipment to support entry into confined spaces.
- Notify EHS prior confined space entry operations as required by this policy.
- Maintain copies of all issued Confined Space Entry Permits as required by this policy.
- When applicable, apprise contractors that the workplace contains permitted spaces and that permit space entry is allowed only through compliance with a confined space program meeting OSHA requirements.
- Review contractor's Confined Space program and plans with the assistance of EHS.

### **3.3 Authorized entrants shall:**

- Must have received the required training and be authorized by the Entry Supervisor to enter the confined space
- Follow all direction provided by the Entry Supervisor and Attendant(s).
- Fully understand all procedures, safeguards, and emergency egress and (or) rescue procedures associated with entry.
- Be aware of all hazards which may be encountered and the associated signs/symptoms of exposure.
- Use assigned personal protective equipment and entry tools and supplies.
- Be prepared and able to notify the attendant, and exit from the space upon identification of suspect hazardous conditions.

### **3.4 Attendants shall:**

- Have received the required training and be aware of hazards that may be encountered during a confined space entry including the mode, signs or symptoms and consequences of exposure.
- Remain at the attendant's post and perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.
- Maintain continuous communication with all authorized entrants within the permitted space by voice, radio, telephone, visual observation, or other effective means.
- Order entrants to exit the confined space at the first indication of a non-permitted condition.
- Coordinate rescue support as directed by this policy.

### **3.5 Entry supervisors shall:**

- Be responsible for the overall entry operations and coordinate all monitoring, permits, equipment and other relevant activities.
- Verify that entrants and attendants are properly trained, qualified in the safe operation of their task, and aware of emergency and safe egress procedures.

- Determine, with assistance from EHS, that acceptable conditions are present at a permit space consistent with hazard assessment requirements.
- Brief workers on the hazards of entry (i.e., previous chemicals in space, the effects of inhalation of vapors, what safety and health hazards are inherent in space or operation being performed, etc.).
- Verify that all appropriate entries have been made on the permit, air monitoring results are recorded, hazards are eliminated, and necessary equipment has been made available before signing the permit and authorizing entry.
- Terminate the entry and cancel the permit when entry operations are complete.

### **3.6 Facility Services Department Supervisors and Construction Coordinators shall:**

- When applicable, apprise contractors that the workplace contains permitted spaces and that permit space entry is allowed only through compliance with a confined space program meeting OSHA requirements.
- Review contractor's Confined Space program and plans with the assistance of EHS.
- Notify EHS prior confined space entry operations as required by this policy.
- Work with FS and EHS to review new construction projects in order to identify, record and classify newly created confined spaces.

## **4.0 IMPLEMENTATION REQUIREMENTS**

This section describes the steps to be taken to ensure the safe entry into confined spaces at LSUHSC.

### **4.1 Identification and Classification of Confined Spaces**

- FS, with assistance from EHS, shall identify, evaluate, classify, and maintain an inventory (Appendix A) of each confined space.
- Basic OSHA requirements for a confined space are when 1) the space is large enough to enter; 2) the space has restricted egress; and 3) the space is primarily designed for other than human occupancy.
- Confined spaces can be classified as either permit or non-permit required.
  - Permit-required confined spaces may contain significant safety and/or health hazards or has a potential for or contains a hazardous atmosphere (flammable, toxic vapors, oxygen deficient or enriched content, etc.).
  - Non-permit confined spaces do not contain, or with respect to atmospheric hazards, have the potential to contain, significant safety and/or health hazards. Permits and signs are not required with non-permit spaces; however, all entries are to be documented (logged) and maintained by FS.
- EHS shall perform a hazard evaluation of confined spaces for classification. Such evaluations shall include, but are not necessarily limited to, the following considerations:
  - The contents or previous contents of the space that may result in the presence of flammables, toxic materials, or oxygen-deficient or enriched atmospheres.

- The location and configuration of the space, including restricted access, obstructions, remoteness, etc., which may inhibit or interfere with movement, ventilation, rescue efforts, or firefighting efforts.
- Potential hazards from the external environment which could affect the atmosphere within the confined space.
- The types of operations that are conducted within the space, particularly those which by the very nature of the process produce toxic materials, flammables, oxygen depletion or enrichment, or ignition sources.
- Fixtures, devices, or equipment within the space that may create or contribute to hazardous conditions including piping systems, conduits, ducts, machinery, pressurized lines, etc.
- The presence of other hazards such as slippery surfaces, deteriorated or unstable portable ladders, irritant or caustic materials, etc.
- If permit-required confined spaces are identified and employees may enter, EHS shall provide a report of the hazard assessment evaluation. The report shall include permit entry requirements and procedures.
- If there are confined spaces designated as permit-required and workers and other employees could inadvertently enter, personnel shall be informed of the existence, location, and the danger of the permit space by the posting of danger signs. The signs shall be posted and maintained by FS and state “DANGER — PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER” or a commercially available equivalent. Confined spaces where personnel cannot inadvertently enter, such as those protected by heavy manhole covers which require tools to remove, need not be posted.

#### **4.2 Atmospheric Testing and Monitoring**

- Pre-entry atmospheric testing of confined spaces, also called verification testing, shall be accomplished prior to entry into permit-required confined spaces. EHS shall perform this testing from outside the space using a calibrated direct-reading instrument and record results on Appendix B, Air Monitoring Log. Testing shall be performed in the following sequence:
  - Oxygen Content: Many combustible gas indicators and (or) explosive meters require oxygen for proper operation (generally 10- to 30-percent oxygen by volume). Corrections for known flammable components, if different from the calibration gas, will be made according to the manufacturer’s instructions
  - Flammable Hazard: Combustible gases are tested after tests for oxygen content because the threat of fire or explosion is more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors.
  - Toxic Materials: For the determination of initial confined space classification, chemical substances known or expected to be present shall be measured and evaluated for their potential to produce a hazardous atmosphere.
- No entry will be authorized when the confined space has exceeded the following levels:
  - oxygen content below 19.5 percent or above 23.5 percent;

- flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- airborne combustible dust at a concentration that meets or exceeds its LFL or obscures vision at a distance of five feet or less;
- any other atmospheric condition immediately dangerous to life or health.
- Many operations may generate hazardous conditions and may require atmospheric monitoring as the work progresses to ensure safe conditions are maintained. The frequency and types of testing are dependent upon prevailing conditions and the nature of the operations. EHS shall establish the frequency and type of tests for atmospheric monitoring and shall issue these requirements as part of the initial hazard assessment and enter on the entry permit. The continuous monitoring of oxygen levels, flammable vapor levels, and toxicity levels should be considered for all permit-required confined space operations. The entry supervisor with appropriate assistance as stated above shall carefully evaluate the following types of operations for continuous atmospheric monitoring:
  - Work that has the potential of generating hazardous concentrations of toxic materials. (Examples: welding, cutting, brazing, soldering, etc.)
  - Application of preservatives, paints, epoxies, solvents, etc., which may involve hazardous concentrations of toxic or flammable vapors.
  - Any similar operations that possess the potential for producing or releasing toxic, flammable, or asphyxiating atmospheres or material into the space.
- Monitoring equipment shall be sent to the manufacturer for calibration. The user shall field check equipment according to the manufacturer's instructions, immediately before testing the confined space. Equipment shall not be used that cannot be calibrated or which fails the field check, until it is repaired and the calibration and (or) field check is successfully accomplished.

#### **4.3 Entry into Permit Required Confined Spaces**

- LSUHSC employees shall enter a permit-required confined space ONLY after a confined space entry permit has been completed. The permit is an authorization and approval in writing that specifies the location and type of work to be done. It certifies an evaluation of all existing hazards and that necessary protective measures have been taken to ensure the safety and health of each worker.
- Entry permit shall be submitted by FS to EHS for review at least 24-prior to any confined space entry. The permit will be posted and available for review prior to the confined space entry so that all entrants can verify that the pre-entry preparations have been completed.
- The Entry Permit shall include the name of the confined space being entered, purpose, date and duration of the entry permit, the names of the authorized entrants and attendants, entry supervisor, the hazards of the space, and available equipment.
- Pre-entry atmospheric testing results will be added to the permit on the day of entry, immediately prior to the entry. The permit shall be fully processed and signed by the Facility Services designated entry supervisor and EHS prior to entry into a permit

- required confined space. The entry supervisor's signature to the permit authorizes entry.
- Entry permits allow entry into a specific confined space, for a specific purpose, by a specific work crew, for a period not to exceed a single shift or as determined jointly by EHS and FS entry supervisor. If the space is unattended at any time after the permit has been issued, a new permit shall be required.
  - Entry by LSUHSC personnel shall not be permitted into immediately dangerous to life and health (IDLH) spaces.
  - Where air contaminations are caused by materials or conditions within the space, the cause or source of the contamination shall be identified and removed to the maximum degree possible by cleaning, ventilating, or other such treatments.
  - Where the operations to be conducted within the space introduce (or have the potential to introduce) additional hazards, the entry supervisor shall ensure these hazardous conditions and operations are covered by the permit and take action consistent with the requirements of the hazard assessment to control the hazards and maintain safe conditions within the space.
  - Where air contaminants are or may be introduced into the space, below IDLH concentrations, personnel working within the space shall be provided with NIOSH-approved respiratory protective equipment and other PPE as determined necessary to protect against skin contact suitable for the exposure.
  - Entry supervisors shall ensure personnel entering a permit-required confined space are suited with a harness and lifeline to a retrieval system suitable to permit extraction of the person (without becoming a hindrance to the extraction) from the space. They shall also ensure the lifeline is securely attached to the harness and adequate attachment points outside the confined space are available and used. **NOTE:** When the space is so configured that the use of a lifeline would present additional hazards, they shall not be used.
  - Completed permits shall be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means; so that the entrants can confirm that pre-entry preparations have been completed.
  - An attendant shall be assigned by the entry supervisor to remain at the entry post and not leave for any reason (except self-preservation) during entry operations unless replaced by an equally qualified individual.
  - The attendant shall order entrants to exit the confined space at the first indication of a non-permitted condition, an unexpected hazard, indication of a toxic reaction, if a situation occurs outside the space that could pose a hazard to the entrants, or if the attendant must leave, for any reason, and there is no replacement.
  - Entry supervisors and attendants are responsible to remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
  - The entry supervisor shall revoke the entry permit, terminate the entry, and secure the site when becoming aware of prohibited or unexpected circumstances. A new entry permit must be processed prior to re-entry subsequent to revocation of the initial permit.

- Entry permits are cancelled by the entry supervisor upon completion of the task or end of shift by initialing and entering the time in the appropriate permit form locations.
- Any problems encountered during an entry operation shall be noted on the permit and immediately communicated to EHS upon completion of the entry so that necessary revisions can be made to the confined space program.
- Each completed entry permit, including those that are canceled or revoked, shall be maintained by FS for at least four years and readily available for review.

#### **4.4 Entry into Non-Permit Required Spaces**

- In order to facilitate program review requirements, entries into non-permit confined spaces shall require the completion of an entry permit prior to entry. As the space is not expected to contain or have the potential for atmospheric hazards, pre-entry atmospheric monitoring is not required for completion of the entry permit.
- An attendant shall be used for all non-permit required confined space entries.
- Non-permit confined spaces shall be evaluated at least annually to ensure conditions have not changed which could result in a potential for hazards and a change in confined space classification. A non-permit confined space will be reevaluated any time a known change in process occurs or new construction is planned which may affect the space or the area immediately adjacent to the space.

#### **4.5 Rescue and Emergency Services**

- The hazard assessment and/or entry permit shall include emergency and rescue procedures consistent with the nature of each known operation that requires entry into a permit-required confined space.
- Self-Rescue employees are trained to exit from the confined space according to requirements of this policy.
- Entry supervisors shall ensure the inspection, testing, maintenance, and documentation of any necessary safety and rescue equipment are accomplished according to Manufacturer's literature.
- LSUHSC employees shall not enter into a confined space to perform rescue operations. If in the course of duty outside a confined space, an attendant becomes aware that entrant(s) needs assistance in escaping from the space, the attendant shall summon rescue by contacting University Police at 568-8999 and the designated rescue service. The entry supervisor shall inform the rescue group of the hazards they may confront when called upon to perform a permit-required confined space rescue.
- The entry supervisor shall coordinate with and contact the designated rescue service (e.g., New Orleans Fire Department) prior to permit-required confined space entries.

#### **4.6 Contractors**

When a contractor performs work that involves a permit-required confined space entry, the Contract Manager shall:

- Notify the contractor that work will be performed in a permit-required confined space;



- Brief the contractor on the contents of the space and known hazards that make the space permit-required (subcontractors who want to perform their own hazard assessment are permitted to do so, provided it is performed by a technically qualified individual [per OSHA requirements] and equipment is properly calibrated and documented);
- Review contractor's Confined Space program and plans with the assistance of EHS.
- Coordinate entry operations and procedures with the contractor and EHS and use the LSUHSC permit confined space entry system.

## **5.0 EMPLOYEE TRAINING AND EDUCATION**

### **5.1 Initial Training**

EHS shall train all employees designated by FS to serve as entrants, attendants or entry supervisors. Employees may not participate in confined space operations until they have been trained and are authorized by the FS director. Appendix D, Confined Space Employee Training Form, will be used to identify trained employees for confined space entry.

### **5.2 Refresher Training**

Refresher training will be provided to all personnel annually and when:

- There is a change with an employee's job assignment
- There is a change in a machine, equipment or process that presents a new hazard to the confined space
- There is a change in the confined space procedure
- There is reason to believe that there are deviations from or inadequacies in the employee's knowledge of the procedures

### **5.3 Training Elements**

Training will include general confined space principles and consist of:

- Recognition of confined spaces
- Recognition of confined space hazards and toxic effects or symptoms of exposure to anticipated hazardous
- Procedures for entering into a confined space
- Roles and responsibilities of authorized entrants, attendants, and supervisor duties
- Requirements of the confined space non-permit and permit entries
- Personal protective and rescue equipment
- Air monitoring and testing

Training will additionally include specific information related to the confined spaces and associated hazards to be encountered at LSUHSC.



## 6.0 RECORDKEEPING

FS shall maintain copies of entry permits, documented on the Permit Entry Form (Appendix C), for the current fiscal year and three previous fiscal years and ensure that copies of inspections are provided to EHS at the end of each fiscal year.

An attendance roster (Appendix D) will be used to document initial and annual refresher training. A record of these rosters shall be permanently maintained by the FS department.

## 7.0 INSPECTIONS AND PROGRAM REVIEW:

FS Supervisors shall perform evaluation of employee knowledge and understanding of the program procedures and requirements as part of each confined space entry.

EHS shall complete an annual review of cancelled permits to ensure that employees participating in entry operations are protected from permit space hazards. If no entry is performed during the calendar year, no review is necessary.

Program review shall also be performed as a result of any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and/or employee complaints about the effectiveness of the program. Program procedures shall be revised to correct deficiencies found to exist before subsequent entries are authorized.

## 8.0 REFERENCES:

Occupational Safety & Health Association (OSHA) Standards for General Industry, 29 CFR Part 1910.146, Permit-Required Confined Spaces.

## 9.0 DEFINITIONS:

**Acceptable entry conditions** - conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

**Attendant** – a trained employee stationed outside the confined space that monitors the authorized entrants and who performs all attendants’ duties as outlined in this policy.

**Authorized entrant** - an employee who is authorized by the employer to enter a permit space.

**Confined space** - a space that:

- (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- (3) Is not designed for continuous employee occupancy.

**Eliminate** - To abate all hazards in the confined space in such a manner that shall ensure the hazards cannot be introduced in the confined space during entry. This shall include but is not limited to lockout/tagout of energy, blanking/blinding of a pipe, duct or line; double block and bleed a line, duct or pipe.

**Emergency** - any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

**Engulfment** - the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

**Entry** – an action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

**Entry permit (permit)** - Written authorization for entry into a confined space for a stated purpose, during a specified time, and under defined conditions.

**Entry supervisor** - a person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

**Hazardous atmosphere** - an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit;

NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

(5) Any other atmospheric condition that is immediately dangerous to life or health.

NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, section 1910.1200 of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

**Hot work permit** – written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

**Immediately dangerous to life or health (IDLH)** - any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space. NOTE: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

**Inerting** – displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.

**Oxygen deficient atmosphere** - an atmosphere containing less than 19.5 percent oxygen by volume.

**Oxygen enriched atmosphere** - an atmosphere containing more than 23.5 percent oxygen by volume.

**Permit-required confined space (permit space)** - a confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

**Permit-required confined space program (permit space program)** - is means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

**Permit system** - the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

**Rescue service** – personnel designated to rescue employees from permit spaces.

**Retrieval System** - Specialized equipment including a retrieval line, chest or full body harness, wristlets (if appropriate) and a lifting device or anchor used for non-entry rescue of persons from permit space.

**Testing** - the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space. NOTE: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

## **10.0 Appendices:**

- Appendix A, Confined Spaces Inventory
- Appendix B, Confined Space Air Monitoring Log
- Appendix C, Confined Space Entry Permit
- Appendix D, Confined Space Employee Training Roster



## **Updated list of confined spaces at LSUHSC as of 10/14/2009**

### **CSRB**

#### **First Floor**

1. Tunnel for pipeline that runs under CSRB: engulfment/cave-in, elevated voc, lel, CO, decreased O2 – Infrequent entry only for repairs

#### **Second Floor**

2. Irradiator – not in service; Hazards: radiation, elevated voc, lel, CO, decreased O2 – Never enter

#### **Penthouse**

3. Incinerator – never placed in operation; Hazards biological, soot, silicates, elevated voc, lel, CO, decreased O2 – Never enter

#### **Roof Top**

4. Cooling Tower – Roof top; Hazards: primarily water, guarding issues, and LOTO. Secondary and very low probability - voc, lel, CO, decreased O2. Infrequent entry – for repairs only.

5. Exhaust Fan System No. 1 Hazards: electrical/LOTO, asbestos, dust, mold, fiberglass particles, silicates, elevated CO, decreased O2. Infrequent entry – for repairs only.

6. Exhaust Fan System No. 2 Hazards: electrical/LOTO, asbestos, dust, mold, fiberglass particles, silicates, elevated CO, decreased O2. Infrequent entry – for repairs only.

7. Exhaust Fan System No. 3 Hazards: electrical/LOTO, asbestos, dust, mold, fiberglass particles, silicates, elevated CO, decreased O2. Infrequent entry – for repairs only.

8. Exhaust Fan System No. 4 Hazards: electrical/LOTO, asbestos, dust, mold, fiberglass particles, silicates, elevated CO, decreased O2. Infrequent entry – for repairs only.

### **LIONS EYE** – no identified confined spaces

### **MEB**

9. Boiler #1 – 300 hp; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only; entry by boiler maintenance contractor.

10. Boiler #2 – 300 hp; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only; entry by boiler maintenance contractor.

11. Crematory incinerator; Hazards: biological, soot, silicates, elevated voc, lel, CO, decreased O2 – Never enter.

12. Salt tank; Hazards: elevated voc, lel, CO, decreased O2

13. (2) Condensation Tank –

### **RESIDENCE HALL**

14. Boiler #1 - small boiler; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only; entry by boiler maintenance contractor.

15. Boiler #2 - small boiler; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only; entry by boiler maintenance contractor.

16. Cooling tower; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.



### **CLINICAL EDUCATION BUILDING, 1542 TULANE**

17. Tunnel #1 (short run); Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
18. Tunnel #2 (long run); Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
19. Salt Tank – not in service; Hazards: elevated voc, lel, CO, decreased O2. Never enter.
20. Cooling Tower – 5th floor roof, not in service; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
21. Elevator shaft – not in service Hazards: caught in/between moving parts, elevator or platform collapse, struck by elevator or counterweights, electrical/LOTO, fall protection
22. Auditorium Access Panel; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
23. (3) Sump Pit; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
24. Attic Crawl Spaces and pipe chases; Hazards: fall protection, asbestos. Infrequent entry – for repairs only.

### **CENTRAL PLANT**

25. Domestic hot water tank #1; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
26. Domestic hot water tank #2; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.

### **DENTAL SCHOOL POWERHOUSE**

27. Tunnel from the Powerhouse to the Basement of Clinic; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry – for repairs only.
28. Boiler #1, out of service; Hazards: soot, elevated voc, lel, CO, decreased O2 – never enter.
29. Boiler #2, out of service; Hazards: soot, elevated voc, lel, CO, decreased O2 – never enter.
30. Boiler #3, out of service; Hazards: soot, elevated voc, lel, CO, decreased O2 – never enter.
31. Temporary Boiler #1, in service, located behind Powerhouse, 350 hp; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry only for repairs; entry by boiler service contractor.
32. Temporary Boiler #2, in service, located behind Powerhouse, 350 h; Hazards: natural gas, nitrogen, soot, elevated voc, lel, CO, decreased O2. Infrequent entry only for repairs; entry by boiler service contractor.
33. Radiation Incinerator, in service; Hazards: radiation, soot, silicates, natural gas, elevated voc, lel, CO, decreased O2. Never enter.
34. Cooling Tower; Hazards: elevated voc, lel, CO, decreased O2. Infrequent entry only for repairs.
35. Salt Tank, out of service; Hazards: elevated voc, lel, CO, decreased O2. Never enter.
36. De-ionized water tank- 500 gallons; Hazards: Never enter.
37. Zeolite tanks; Hazards
38. Condensate tank, out of service; Hazards: Never enter.



### **DENTAL SCHOOL CLINIC**

39. Sump Pit; Hazards: elevated voc, lel, CO, decreased O2 Infrequent entry only for repairs.

### **SISTER STANISLAUS**

40. Sump Pit; Hazards: elevated voc, lel, CO, decreased O2 Infrequent entry only for repairs.

### **UPTOWN CAMPUS**

41. Crawl Spaces (under entire floor area of all Uptown Campus buildings), multiple entry locations on exteriors and interiors of buildings; Hazards: wildlife (snakes, spiders, ect.), electrical, entrapment

42. Main Hospital Pipe Chases (four per floor (associated with each wing of central branch); no hazards identified

43. Main Hospital Elevator Pits and Shafts; Hazards: contact with hazardous energy, physical contact with elevator/elevator equipment

44. Main Hospital Kitchen Dumb Waiter; Hazards:

45. Main Hospital Central Branch Wing Ceiling Plenums (four total access points on second floor; two access points on third floor (east side)); Hazards: entrapment, electrical hazard, fall hazard.

46. Power Plant Boilers; Hazards: heat strain, contact with hot surfaces, explosive environment (natural gas supply); O2 deficiency potential

47. Campus Cooling Tower; Hazards: contact with moving parts, fall hazards, slip/trip

48. Utility Building Smoke Stack; Hazards: non-active space

### **CAMPUS WIDE**

49. All underground utility areas; Hazards: elevated voc, lel, CO, decreased O2

50. All elevator shafts; Hazards: caught in/between moving parts, elevator or platform collapse, struck by elevator or counterweights, electrical/LOTO, fall protection

51. HVAC Units; Hazards: electrical/LOTO, dust, mold, fiberglass particles, silicates, elevated CO, decreased O2 Infrequent entry only for repairs.

52. Ceiling Crawl Spaces; Hazards: mold, dust, asbestos, fiberglass particles, silicates, electrical/LOTO



**LSU HEALTH SCIENCE CENTER  
ENVIRONMENTAL HEALTH AND SAFETY  
CONFINED SPACE ENTRY PERMIT**

Instructions: This form must be completed by the LSUHSC Facility Services Supervisor and EHS prior to performing any confined space work on LSUHSC campus. This permit must remain at the job site until work is completed. After work is completed a copy of the permit shall be maintained by FS for a minimum period of one year. The completed LSUHSC Air Monitoring Log shall be attached to this document prior to issuance of permit.

**PERMIT MUST REMAIN POSTED AT JOB SITE AT ALL TIMES**

**PROJECT NAME:**

**CONFINED SPACE DESCRIPTION:**

**LOCATION OF CONFINED SPACE:**

**PURPOSE OF ENTRY:**

**DATE OF ENTRY:**

**PERMIT EXPIRATION DATE:**

**ENTRY TIME:**

**EXIT TIME:**

**AUTHORIZED SUPERVISOR NAME/SIGNATURE:**

**NAMES OF AUTHORIZED ENTRANTS:**

**NAMES OF AUTHORIZED ATTENDANTS:**

**Known Hazards and Special Precautions:**

**TYPES OF HAZARDS**

<input type="checkbox"/>	<b>Oxygen-Deficient Atmosphere</b>	<input type="checkbox"/>	<b>Chemical Spills</b>	<input type="checkbox"/>	<b>Energized Electrical Equipment</b>
<input type="checkbox"/>	<b>Oxygen-Enriched Atmosphere</b>	<input type="checkbox"/>	<b>Engulfment</b>	<input type="checkbox"/>	<b>Steam</b>
<input type="checkbox"/>	<b>Elevated VOC above PEL</b>	<input type="checkbox"/>	<b>Entrapment/Asphyxiation hazards</b>	<input type="checkbox"/>	<b>Falling/Tripping hazards</b>
<input type="checkbox"/>	<b>Elevated H2S</b>	<input type="checkbox"/>	<b>Airborne Dust (asbestos, silicate hazards)</b>	<input type="checkbox"/>	<b>Rodents, snakes, spiders</b>
<input type="checkbox"/>	<b>Elevated CO</b>	<input type="checkbox"/>	<b>Grinding/Welding/Cutting/Mulching</b>	<input type="checkbox"/>	<b>Wind or weather</b>
<input type="checkbox"/>	<b>Elevated LEL</b>	<input type="checkbox"/>	<b>Agitators, other moving parts</b>	<input type="checkbox"/>	<b>other</b>

**Note: Grinding/Welding/Cutting/Mulching requires a Hot Work Permit.**

<b>Required Special Precautions</b>	<b>Yes</b>	<b>No</b>	<b>Required Personal Protective Equipment</b>	<b>Yes</b>	<b>No</b>
LOTO			Protective Clothing/Coveralls		
Ventilation – Purging, inerting, flushing			Footwear – (Safety Shoes, Boots)		
Secure Area – Post and Barricade			Face/Eye Protection (Safety Glasses, Face Shield)		
Engineering Controls to Secure Confine Space			Hearing Protection		
<b>Equipment</b>			Gloves		
Lighting			Dust Masks		
Communication Equipment (2-way radio, cell phone)			Hard Hats		
Fall Protection (harness)					
Fire Extinguisher (ABC, CO, or Halon)					

**Permit Authorization**

<b>First, Last Name</b>	<b>Signature</b>	<b>Date</b>	<b>Time</b>
<b>Entry Supervisor</b>			
<b>EHS Representative</b>			



<b>Environmental Health &amp; Safety Policy Manual</b>		
Issue Date 8/24/2009	<i>Updated: 5/8/2018</i>	Policy # EHS-400.03
<b>Personal Protective Equipment</b>		

**1.0 PURPOSE:**

In order to protect the health of employees and students, and to maintain compliance with local, state, and federal guidelines, appropriate personal protective equipment (PPE) is required in areas where there is a risk of injury or exposure to hazardous substances.

The PPE program provides the LSU Health Sciences Center community (LSUHSC) with the necessary information to identify work situations that require the use of PPE, and information on the procurement, use, maintenance, and disposal of PPE.

**2.0 SCOPE:**

The use of appropriate PPE applies to all faculty, staff, students, visitors, contractors and volunteers. PPE includes all clothing and work accessories designed to protect employees from workplace hazards.

Where possible, all personnel should work to develop engineering and/or administrative controls to reduce dependency on PPE.

**3.0 RESPONSIBILITIES:**

**3.1 Environmental Health and Safety Department (EHS) shall:**

- Provide technical support and assist departments in implementing an effective PPE program.
- Provide training for PPE instruction as needed.
- Review/ revise the PPE program for compliance with applicable regulations.

**3.2 Supervisors/ Principal Investigators (PI) shall:**

- Conduct assessments of operations where a reasonable expectation of exposure to hazards is anticipated. When the assessment identifies that a hazard exists then implement appropriate protective measures, including engineering/administrative controls and/or PPE.
- Determine required PPE and order adequate supplies.

- Train employees on the proper use, care and cleaning of PPE. Maintain records of this training.
- Ensure employees wear the correct PPE for each job.
- Properly maintain all PPE. Replace defective or damaged PPE immediately.

### **3.3 Faculty, Staff, Students, Visitors and Volunteers shall:**

- Wear required PPE.
- Maintain and store PPE in a clean and sanitary condition.
- Ensure PPE is always in good operating condition; never wear defective PPE.
- Report unsafe or unhealthy work conditions and job related injuries/illnesses immediately.

## **4.0 IMPLEMENTATION REQUIREMENTS:**

### **4.1 General**

There are three general methods for controlling exposure to hazardous substances: engineering controls, administrative controls, and PPE.

- Engineering controls eliminate or reduce exposure to a chemical or physical hazard through the use or substitution of engineered machinery or equipment. Some examples include self-capping syringe needles, ventilation systems such as fume hoods, sound damping materials to reduce noise levels, safety interlocks, and radiation shielding.
- Administrative controls, also known as work practice controls, are changes in work procedures, such as written safety policies, rules, supervision schedules, and training, with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations.
- PPE includes all clothing and work accessories designed to protect employees from workplace hazards.

The preferred method for reducing exposures is the use of engineering controls, with administrative controls as the second option. If neither is sufficient to reduce exposures to an acceptable level, PPE shall be used.

Protective equipment, including PPE for eyes, face, ears, head, and extremities; protective clothing; respiratory devices; and protective shields and barriers shall be provided and used in the following circumstances:

- Where determined by a Supervisor/PI or Safety Specialist that PPE is necessary to protect the health and safety of employees from hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.
- Where determined by a Supervisor/PI that engineering and/or administrative controls do not reduce exposure potential to a safe level.

- Where development or installation of engineering controls are pending.
- During short term, non-routine operations where engineering controls are not practical.
- During emergency situations such as spills, ventilation malfunctions, etc.

#### **4.2 Assessment to Determine Required PPE**

The Supervisor/PI will assess jobs to determine the hazards and then develop engineering controls, administrative controls, and/or PPE to reduce risk to an acceptable level. To facilitate this assessment, a Job Safety Analysis (JSA) can be performed. A JSA is a systematic method of identifying hazards and control measures to safely perform a specific task. For more information, refer to the [Job Safety Analysis Policy, EHS-400.04](#). If it is determined that hazards are present or are likely to be present which necessitate the use of PPE, then the supervisor/PI shall:

- Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified.
- Communicate selection decisions to each affected employee.
- Provide PPE that properly fits each affected employee.

#### **4.3 PPE Selection**

Selection of PPE shall be based upon the body part that needs protection and on provision of a level of protection greater than the minimum required to protect the exposed employee from the potential or observed hazards. Defective or damaged personal protective equipment shall not be used at any time, and will be repaired or disposed of immediately.

##### **4.3.1 Maintenance and Disposal of PPE**

Maintain and disposed of PPE in accordance with manufacturer's guidelines.

##### **4.3.2 Eye and Face Protection**

The Supervisor/PI shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, bioaerosols, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious radiation.

##### **4.3.3 Head Protection**

The Supervisor/PI shall ensure that each affected employee wears a protective helmet when working in areas with a potential for injury to the head from falling objects, penetration, overhead beams/pipes, and overhead loads. Other head hazards that would require the use of protective headwear include extreme cold, chemicals, and electrical shock.

##### **4.3.4 Foot Protection**

The Supervisor/PI shall ensure that each affected employee uses protective footwear when working in areas with a danger of foot injuries due to falling or rolling objects, objects piercing the sole, and where employee's feet are exposed to electrical hazards. Wet conditions and chemicals are hazards that should also be considered when choosing protective footwear.

#### **4.3.5 Hand Protection**

The Supervisor/PI shall select and require employees to use appropriate hand protection when employee hands are exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burn, thermal burn, and harmful temperature extremes. The EHS chemical safety web page provides useful [links](#) on laboratory glove selection.

The Supervisor/PI shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration or use, and the hazards and potential hazards identified.

#### **4.3.6 Hearing Protection**

PIs/Supervisors will contact EHS if any employee works in an area where sound levels equal or exceed a time weight average (TWA) of 85 decibels or in which sound levels exceed 115 dB at any time to ensure the employee is enrolled in a hearing conservation program.

#### **4.3.7 Respiratory Protection**

The Supervisor/PI will ensure that all employees are provided with respirators when such equipment is necessary to protect the health of the employees. Use of a respirator requires a medical evaluation and a fit test. EHS conducts fit tests. See [EHS - 200.08, Respiratory Protection Program](#) for more information.

#### **4.4.1 Payment for Protective Equipment**

LSUHSC will provide all PPE at no cost to employees. LSUHSC must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE. LSUHSC is not required to pay for:

- Non-specialty PPE (e.g., safety toe protective footwear and non-specialty prescription safety eyewear) if the employee wears such items off the job-site.
- Everyday clothing, such as long-sleeve shirts, long pants, street shoes, normal work boots or ordinary clothing.
- Items used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen.

Where an employee voluntarily provides adequate protective equipment he or she owns, LSUHC may allow the employee to use it and is not required to reimburse the employee for that equipment, or pay to replace the equipment. However, the Supervisor/PI must ensure the equipment is properly maintained.



## **5.0 EMPLOYEE TRAINING AND EDUCATION:**

### **5.1 Initial Training**

Prior to conducting work requiring the use of personal protective equipment, employees must be trained on the basics of PPE use. Any training format may be used as long as a hands-on session is incorporated.

### **5.2 Refresher Training**

When a Supervisor/PI has a reason to believe that an affected employee who has already been trained does not have the understanding and skill required, the employee shall be retrained. Circumstances where retraining is required include, but are not limited to the below circumstances:

- Changes in the workplace render previous training obsolete.
- Changes in the types of PPE to be used render previous training obsolete.
- Inadequacies in an affected employee's knowledge or use of assigned PPE.

### **5.3 Training Elements**

Initial training shall include the following:

- When PPE is necessary.
- What type of PPE is necessary.
- How to properly don, doff adjust and wear the PPE.
- Limitations of the particular PPE.
- The proper care, maintenance, useful life and disposal of the PPE.

Document training using Appendix B, PPE Training Certification Form.

## **6.0 RECORDKEEPING:**

Supervisor/PI shall maintain a copy of employee training records for a minimum of three years.

## **7.0 REFERENCES:**

OSHA Regulation 29 CFR 1910 Subpart I - Personal Protective Equipment  
1910.132- General Requirements  
1910.133- Eye and Face Protection  
1910.135- Head Protection  
1910.136- Occupational Foot Protection  
1910.137- Electrical Protective Devices  
1910.138- Hand Protection

## **8.0 APPENDICES:**

- Appendix A - JSA 1-00, State of Louisiana
- Appendix B - PPE Training Certification





**APPENDIX B  
LSUHSC Personal Protective Equipment Training Certification**

\_\_\_\_\_, has received and demonstrated

Printed Name of Employee and Employee ID number

Understanding of the PPE training given by: \_\_\_\_\_

Name of Trainer

\_\_\_\_\_  
Signature of Trainer

\_\_\_\_\_  
Date

The following personal protective equipment are available and have been assigned for use	
Check Applicable boxes	Identify specific assigned PPE
<input type="checkbox"/> Eye and Face Protection	
<input type="checkbox"/> Head Protection	
<input type="checkbox"/> Foot Protection	
<input type="checkbox"/> Hand Protection	
<input type="checkbox"/> Respiratory Protection	
<input type="checkbox"/> Other Protection	