Welcome

Terry Alexander, PE, CIH
Executive Director, Occupational Safety & Environmental Health
and Office of Campus Sustainability

Safety Coordinator Conference
May 31, 2016
Laboratory Audit Update

Danielle Sheen, CIH, CSP
Associate Director, Research & Operations Safety

Safety Coordinator Conference
May 31, 2016
U-M Laboratory and Research Safety Committee (LRSC)

Karl Jepsen

Safety Coordinator Conference
May 31, 2016
Where is our current safety culture?

Basic safety knowledge (e.g., waste, labeling, acids/bases....)

0% Compliance
No clue

100% Compliance
Inspection ready 24/7/365

Safety behavior (e.g., food/drink, shorts, sandals, glasses)

0% Compliance
No clue

100% Compliance
Inspection ready 24/7/365
Where do we want our safety culture to be?

Basic safety knowledge (e.g., waste, labeling, acids/bases....)

0% Compliance  100% Compliance
No clue  Inspection ready 24/7/365

Safety behavior (e.g., food/drink, shorts, sandals, glasses)

0% Compliance  100% Compliance
No clue  Inspection ready 24/7/365
Incidents
- Reported?
- Did not report?

Near Misses
- Reported?
- Did not report?
Concerns:

General concern that safety is not a core value at UM
Lack of robust accountability and governance structure
UM needs more coordinated effort to ensure uniform compliance with general safety standards.
Historical facility lab design and infrastructure does not always provide efficient means to be safety compliant under current regulatory requirements.
## Laboratory and Research Safety Committee (LRSC)

- Jack Hu, PhD
  Vice President for Research
- Kevin Hegarty
  Executive Vice President and Chief Financial Officer

### LRSC Membership

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Compliance</th>
<th>OSEH</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Medical School</td>
<td>- UMOR</td>
<td>- Executive Director</td>
</tr>
<tr>
<td>- School of Nursing</td>
<td>- Provost Office</td>
<td>- Laboratory Safety Manager</td>
</tr>
<tr>
<td>- Kinesiology</td>
<td>- Medical School</td>
<td>- IBC Manager</td>
</tr>
<tr>
<td>- College of Engineering</td>
<td></td>
<td>- Associate Director of Research and Operations Safety</td>
</tr>
<tr>
<td>- School of Dentistry</td>
<td></td>
<td>- Laboratory Safety Project Manager</td>
</tr>
<tr>
<td>- LS&amp;A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- School of Public Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- College of Pharmacy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trainees</th>
</tr>
</thead>
<tbody>
<tr>
<td>- UROP Program Officer</td>
</tr>
<tr>
<td>- Undergraduate student</td>
</tr>
<tr>
<td>- Postdoctoral fellow</td>
</tr>
</tbody>
</table>
The only thing constant in life is change

Great research / academics + safe practices

Leader in research and educational excellence
Primary Goal of the LRSC

Strengthen the culture of safety at the University of Michigan through enhanced oversight and accountability in the academic and research settings.
Strengthening the culture of safety

1. Commitment
   Safety as a core value

2. Communication
   Education, Feedback, Near miss and incident reporting

3. Consistency
   OSEH inspections, Self-inspections

4. Cooperation
   OSEH is your friend

5. Community
   It takes a village to create a strong culture

6. Compliance
   Inspection ready 24/7/365

7. Accountability
   Defined responsibilities
Strengthening the culture of safety

Too little oversight
- No change
- Continued potential for harm

Too much oversight
- Police state
- Burden
- Blame and train

Balance oversight and burden
Non-punitive information
Education
Cooperation
Increased productivity
Ultimate Target: Inspection Ready 24/7/365

Academic / Research setting
- Faculty, Staff, Trainees
- Safety Coordinators

Unit-Level Safety Committee

LRSC

OSEH
- Inspections
- Metrics of success
- Incidents
- Near miss reports

Institutional Leadership
- Jack Hu, VP Research
- Kevin Hegarty, VPF-CFO
- President Schlissel
Success of this approach depends on sharing information

We are in this together (community)
Defined and shared responsibilities (cooperation)

Non-punitive information
Report near misses
Feedback on strengths and weaknesses
Share best practices
Identify/communicate barriers to compliance

Adaptive strategy for strengthening the culture of safety

Success is our goal!!
Primary Goal of the LRSC

*Strengthen the culture of safety at the University of Michigan through enhanced oversight and accountability in the academic and research settings.*
Why Safety Culture

There is a direct correlation between how safe you work and how productive you are.
Why Safety Culture

There is a direct correlation between how safe you work and how productive you are.

We hear you

- Inconsistent safety leadership
- Lack of management commitment to safety
- Breakdowns in communication
- Infrastructure and resources
Instinct Stage

- Instinctual/reactive
- Compliance-focused
- Responsibilities are delegated
- Individual based involvement

* Adapted from Dupont
Instinct Stage
-Research staff, faculty, and trainees

“Accidents will happen, no amount of management will defy fate”

- Instinctual/reactive
- Compliance-focused
- Responsibilities are delegated
- Individual based involvement

* Adapted from Dupont
Instinct Stage
-Research staff, faculty, and trainees

“Accidents will happen, no amount of management will defy fate”

Safety is not a responsibility but a matter of chance and “get it over with attitude”

But...you are not alone!
- OSEH staff
- OSEH inspectors
- Emergency Personnel
- UM Administrative support
- Collaborations

Instinctual/reactive
Compliance-focused
Responsibilities are delegated
Individual based involvement

* Adapted from Dupont
Dependent Stage

- Committed Departments
- Proper Training
- Faculty Driven Goals/Emphasis
- Condition of Employment
- Fear/Discipline

Instinct  Dependent

Reactive  Proactive

* Adapted from Dupont
Dependent Stage

Clearly defined rules from management
- Research staff, faculty, and trainees
This stage **ONLY** works with motivated and focused individuals (not sustainable or practical)
Dependent Stage

Clearly defined rules from management
-Research staff, faculty, and trainees
This stage ONLY works with motivated and focused individuals (not sustainable or practical)

“Safety is about following the rules”
“If everyone would just follow the rules, that would be great”

But what are the rules?

* Adapted from Dupont
Dependent Stage

- Commitment from the president
- Commitment from the UM Office of Research
- Commitment from OSEH
- Commitment from Deans, Directors, and Department Chairs
- Commitment from LRSC

-....and most importantly, a commitment from you!

Instinct  Dependent

Reactive  Proactive

* Adapted from Dupont
What about your voice?

-Campus-wide research community survey
-Outreach programs
-Focus groups
-Lab meeting visits
-One-on-one meetings
-Laboratory safety evaluations
-Specific Programming meetings
-UM Communications
-Steering committees
-Organization/unit specific committee meetings

Contact your OSEH inspector and staff
Committed Departments
Proper Training
Faculty Driven
Goals/Emphasis
Condition of Employment
Fear/Discipline

- Architecture and Urban Planning
- Art and Design
- Business
- Center for Human Growth and Development
- Dentistry
- Education
- Energy Institute Engineering
- Functional Magnetic Resonance Imaging
- Graduate Studies
- Information
- Institute for Research on Labor Employment and the Economy
- Institute for Research on Women and Gender
- Institute for Social Research
- Kinesiology
- Law
- Libraries
- Life Science Institute
- LSA
- Medicine
- Mobility
- Transformation Center
- Music, Theatre, and Dance
- Natural Resources
- Nursing
- Pharmacy
- Public Health
- Public Policy
- Social Work
- Transportation Research Institute
- UM Dearborn
- UM Flint

Instinct
Dependent
Reactive
Proactive

* Adapted from Dupont
Independent Stage

- Personal knowledge, commitment, and standards
- Personal value
- Care for yourself and others
- Identifying good habits
- Individual recognition

* Adapted from Dupont
Independent Stage

Individuals take responsibility for themselves
Your actions are personal and you can make a difference

- Personal knowledge
- Commitment and standards
- Personal value
- Care for yourself
- Practice good habits
- Individual recognition

* Adapted from Dupont
Interdependent Stage

- How can you help others
- Being each others keeper
- Mentorship
- Practicing good habits
- Planning
- Organizational pride

* Adapted from Dupont
Interdependent Stage

Through continued input from the research community

Teams/Labs feel ownership for safety, and take responsibility for themselves and others.

- How can you help others
- Being each others keeper
- Mentorship
- Practicing good habits
- Planning
- Organizational pride

* Adapted from Dupont
Interdependent Stage

Through continued input from the research community

- Teams/Labs feel ownership for safety, and take responsibility for themselves and others.

- People do not accept low standards and risk-taking.

- They actively converse with others to understand their point of view.

- They believe true improvement can only be achieved as a group.

- How can you help others
- Being each others keeper
- Mentorship
- Practicing good habits
- Planning
- Organizational pride

* Adapted from Dupont
Reactive

• Inconsistent safety leadership
• Lack of management commitment to safety
  • Breakdowns in communication
• Infrastructure and resources

Proactive

• Infrastructure from the trainee to the President
• Partnered leadership with UMOR/OSEH/Provost/President: LRSC oversight advocates for resources and provides consultation on maintaining accountability
• Inconsistent safety leadership
• Lack of management commitment to safety
  • Breakdowns in communication
• Infrastructure and resources

- Infrastructure from the trainee to the President

- Partnered leadership with UMOR/OSEH/Provost/President: LRSC oversight advocates for resources and provides consultation on maintaining accountability

- Unit-level Safety Committees have a priority to preserve autonomy and provide information
  - Commitment at multiple levels

- More frequent and more impactful presence of safety
  - OSEH efforts for increased communication opportunities both formal and informally

- Continue to listen and work together!
Lasers at the University of Michigan

Russ Garcia
Laser Safety Officer
Radiation Safety Service

Safety Coordinator Conference
May 31, 2016
OSEH’s Laser Safety Program Update:

• Inspected laser labs across campus

788 Class 3B and Class 4 lasers

39 buildings

228 rooms

137 Lab Directors
Departments

- Aerospace Eng
- Biomedical Eng
- Chemistry
- Elec & Comp Eng
- Materials Science & Eng
- Mechanical Eng
- Physics
- Psychology
- Internal Medicine
- 23 Others
Blinking reflex is no longer an adequate safety measure with Class 3B and Class 4 laser radiation.

**Class 3B:** Eye hazard, hazardous under direct and specular reflection viewing, not a significant fire or diffuse viewing hazard, 5 mW – 500 mW

**Class 4:** > 500 mW, hazardous to eye and skin from direct viewing, potential diffuse viewing hazard, potential fire hazard
Control Measures reviewed:

• Engineering
• Administrative
• Personal Protective Equipment
• Signs and Labels
Most common Laser Safety Deficiencies:

- Training
  (online Laser Safety Training- MyLINC BLS005w)

- SOPs

- Including written alignment procedures in those SOPs
Other most common deficiencies:

- ANSI-required door signs
- Laser curtains
DANGER

Class 4 Laser Controlled Area

Avoid eye or skin exposure to direct or scattered radiation

Do not enter when light is illuminated

Laser protective eyewear required

CLASS 4 LASER PRODUCT
Not all curtains are created equally.

There are ‘Blackout curtains’ and there are ‘Laser curtains’.

If their purpose is to block laser radiation and potentially protect others outside the curtains, then they are ‘Laser Curtains’ and must be labeled appropriately per the ANSI Standard.
This Flex-Guard™ Plus Power laser containment system complies with and is tested in accordance with ANSI Z136.1, Z136.7-2008 and EN 12254:2010. This product has been shown to withstand laser energy levels up to 250W/cm² for at least 100 seconds. This product complies with NFPA-701-2010 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films. Made in the U.S.A.
Lasers can be fun, but safety is serious business. Take necessary precautions.
Radioactive Material and Contamination Surveys

Stan Uitti
Radiation Safety Service

Safety Coordinator Conference
May 31, 2016
Controlled Substance Monitoring Program

Kelli Christman & Erin Czarniak

Controlled Substance Oversight Monitors
University of Michigan Office of Research
Purchasing And Ordering
• Screening
• Authorized Personnel
• Authorized Agents
Must be anchored down!

No Wheels!
<table>
<thead>
<tr>
<th>Required Inventories</th>
<th>Common Use Logs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>Multi-dose</td>
</tr>
<tr>
<td>Annual State of Michigan</td>
<td>Diluted Solution</td>
</tr>
<tr>
<td></td>
<td>DEA Form 41</td>
</tr>
</tbody>
</table>
Waste

- Do not put waste in the sink.
- Do not inject live animals.
- Do not inject live animals with drugs.
- Do not use cat litter for waste disposal.

Rx Destroyer Pharmaceutical Disposal
Disposal
<table>
<thead>
<tr>
<th>When...</th>
<th>How...</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have a controlled substance question</td>
<td>Phone:</td>
</tr>
<tr>
<td>The DEA arrives for an inspection</td>
<td>Kelli 734-764-2003</td>
</tr>
<tr>
<td>You suspect a theft or loss</td>
<td>Erin 734-764-2004</td>
</tr>
<tr>
<td>You need compliance help</td>
<td>Email:</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:CS-Monitors@med.umich.edu">CS-Monitors@med.umich.edu</a></td>
</tr>
<tr>
<td></td>
<td>Visit us online:</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.Research-Compliance.umich.edu">www.Research-Compliance.umich.edu</a></td>
</tr>
<tr>
<td></td>
<td>EMERGENCIES:</td>
</tr>
<tr>
<td></td>
<td>Page 31685</td>
</tr>
<tr>
<td></td>
<td>Located in NCRC Building 520 1168C/D</td>
</tr>
</tbody>
</table>
WHAT CAN’T I POUR DOWN THE DRAIN?
AND WHAT CAN I DO WITH IT?
• DRAIN DISPOSAL, OR “SANITARY DISCHARGES” ARE REGULATED BY THE FEDERAL, STATE, AND LOCAL GOVERNMENT.

• IT IS UNLAWFUL TO DISPOSE HAZARDOUS MATERIALS AND HAZARDOUS WASTE BY DUMPING THEM DOWN THE DRAIN.
WHAT CAN’T I POUR DOWN THE DRAIN?

- ALCOHOLS AND SOLVENTS
- USED OIL
- ANTI-FREEZE
- ACIDS (PH <5)
- BASES (SUCH AS SODIUM HYDROXIDE) (PH>10)
- ETHIDIUM BROMIDE
- PHOTO-CHEMICALS
- PAINTS INCLUDING LATEX PAINT
- PAINT THINNER AND MINERAL SPIRITS
- HAZARDOUS WASTE OF ANY TYPE
- RADIONUCLIDES
WHAT CAN’T I POUR DOWN THE DRAIN?

- Metals, or solutions containing them cannot be poured down the drain. Solutions containing the following metals must not be poured down the drain:
  - Arsenic
  - Barium
  - Beryllium
  - Cadmium
  - Chromium
  - Copper
  - Lead
  - Mercury
  - Selenium
  - Silver
  - Zinc

Those listed in bold are regulated by the EPA as toxic.
WHY NOT POUR IT DOWN THE DRAIN?
WHY NOT POUR IT DOWN THE DRAIN?
• ANN ARBOR SEWER USE ORDINANCE
  • BOD AND COD (CHEMICAL AND OXYGEN DEMAND)
    • GLYCOLS AND OTHER ORGANIC COMPOUNDS
  • FAT OILS AND GREASES (FOG)
    • THE LIMIT TO THE DISCHARGE OF FOG IS 50 PARTS PER MILLION
    • DISCHARGES OF FOG ALSO INCREASE THE BOD AND COD AMOUNTS.

• FOR QUESTIONS REGARDING DRAIN DISPOSAL PLEASE CONTACT OSEH ENVIRONMENTAL PROTECTION AND PERMITTING AT 763-6973
HAZARDOUS WASTES

HAZARDOUS CHEMICAL WASTES ARE THOSE WASTES WHICH ARE REGULATED BY THE FEDERAL OR STATE GOVERNMENT WHICH HAVE ANY OF THE FOLLOWING CHARACTERISTICS:

- FLAMMABLE (FLASH POINT LESS THAN 140 DEGREES F)
- CORROSIVE (PH LESS THAN 2 OR GREATER THAN 12.5)
- REACTIVE
  - WATER REACTIVE
  - SPONTANEOUSLY COMBUSTIBLE
  - CYANIDES OR SULFIDES
- OXIDIZING, OR ORGANIC PEROXIDES (E.G., SODIUM NITRATE, BENZOYL PEROXIDE)
- TOXIC – (E.G., SODIUM AZIDE, PHENOL, MERCURIC CHLORIDE),
- OR ARE LISTED BY THE EPA OR STATE OF MICHIGAN AS HAZARDOUS (P-CODES AND U-CODES)
- OTHER UNUSED OR EXPIRED SOLID CHEMICALS
KITCHEN GREASE

• KITCHEN GREASE IS REGULATED AS WELL
  • FAT, OILS, AND GREASES MUST BE CAPTURED IN A GREASE INTERCEPTOR SYSTEM THAT SLOWS THE FLOW OF WATER SO THE OILS AND GREASES FLOAT TO THE TOP, ALLOWING THE WATER TO FLOW TO THE SANITARY SYSTEM.
  • THE CLEANING OF GREASE INTERCEPTORS AND DISPOSAL OF THEIR CONTENTS IS COORDINATED BY OSEH-HAZARDOUS MATERIALS MANAGEMENT.
  • THE LARGEST GREASE INTERCEPTOR ON CAMPUS HAS A CAPACITY OF 30,000 GALLONS.
WHAT CAN I POUR DOWN THE DRAIN?

• CONSUMABLE PRODUCTS
  • SODA
  • COFFEE
  • GEL-RED ON A CONDITIONAL BASIS
WHAT DO I DO WITH IT IF I CAN’T POUR IT DOWN THE DRAIN?

- MANY OF THE MATERIALS THAT CANNOT BE DRAIN DISPOSED ARE REGULATED AS EITHER HAZARDOUS WASTE OR MICHIGAN LIQUID INDUSTRIAL BY-PRODUCT.

- COLLECTION AND DISPOSAL OF THESE MATERIALS SHOULD BE COORDINATED BY OSEH-HAZARDOUS MATERIALS MANAGEMENT

- RADIONUCLIDES - THESE ARE COLLECTED BY OSEH-HMM. TO REQUEST COLLECTION OF RADIOACTIVE MATERIALS CALL OSEH-HMM AT 763-4568
HAZARDOUS WASTES
HAZARDOUS WASTES

• HAZARDOUS WASTES MUST BE COLLECTED BY OSEH-HAZARDOUS MATERIALS MANAGEMENT FOR PROPER DISPOSAL.

• PRIOR TO COLLECTION, GENERATORS MUST MANAGE THE WASTES IN COMPLIANCE WITH STATE AND FEDERAL REGULATIONS.

• THE UNIVERSITY IS REGULARLY INSPECTED BY THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY (MDEQ) AND ENVIRONMENTAL PROTECTION AGENCY (EPA).
HAZARDOUS WASTE

• CONTAINERS
  • ALL WASTE CONTAINERS MUST BE KEPT AT THE POINT OF GENERATION
  • ALL WASTE CONTAINERS SHOULD BE KEPT IN A “SECONDARY CONTAINMENT” DEVICE CAPABLE OF COLLECTING 100% OF THE TOTAL VOLUME
  • ALL WASTE CONTAINERS MUST BE KEPT CLOSED UNLESS YOU ARE ACTIVELY ADDING WASTE
  • CONTAINERS MUST BE IN GOOD CONDITION AND COMPATIBLE WITH THE WASTE
  • ALL INCOMPATIBLE CHEMICALS MUST BE SEGREGATED
  • CONTAINERS OF HAZARDOUS WASTE MUST BE STORED IN A SECURE LOCATION TO PREVENT VANDALISM OR THEFT AND SHOULD NEVER BE STORED IN A HALLWAY. WASTE LABELS SHOULD BE CLEARLY VISIBLE FOR INSPECTION.
HAZARDOUS WASTES

• LABELING
  • ALL CONTAINERS MUST HAVE A COMPLETED HAZARDOUS WASTE LABEL ATTACHED TO THE CONTAINER BEFORE YOU BEGIN GENERATING THE WASTE
  • USE HAZARDOUS WASTE LABELS UNLESS OTHERWISE DIRECTED BY OSEH-HMM
  • EVEN UNUSED CHEMICALS THAT YOU NO LONGER WANT, MUST HAVE A COMPLETED HAZARDOUS WASTE LABEL
  • LABELS CAN BE ORDERED WITH YOUR CONTACT INFORMATION AND EPA ID # PRE-PRINTED ON THE LABEL OR COMPLETELY BLANK
  • ORDER LABELS BY CALLING OSEH’S HAZARDOUS MATERIALS MANAGEMENT (HMM) PROGRAM AT 763-4568
HAZARDOUS WASTES

• LABELING
  • OSEH HAS BEGUN TRANSITIONING TO A NEW HAZARDOUS WASTE LABELING SYSTEM
  • ALLOWS PRINTING IN HOUSE TO ASSIST WASTE GENERATORS WHILE CONTROLLING COSTS
  • CAN EASILY UPDATE INFORMATION AS REGULATIONS CHANGE
  • REFORMATTED TO FIT A LARGER VARIETY OF BOTTLE SIZES
  • USING OLDER VERSION OF THE HAZARDOUS WASTE LABEL IS ACCEPTABLE UNTIL SUPPLIES RUN OUT
LIQUID INDUSTRIAL BY-PRODUCT (FORMERLY LIQUID INDUSTRIAL WASTE)

• THOSE WASTES WHICH CANNOT BE DRAIN DISPOSED, BUT ARE NOT REGULATED AS “HAZARDOUS” BY THE FEDERAL GOVERNMENT, THESE ARE, HOWEVER REGULATED BY THE STATE OF MICHIGAN.

• THESE MUST BE COLLECTED BY OSEH-HMM FOR PROPER MANAGEMENT AND DISPOSAL.

• THESE INCLUDE (BUT ARE NOT LIMITED TO):
  • USED OIL
  • ANTI-FREEZE AND GLYCOL SOLUTIONS
  • HEATING WATERS
  • BOILER TREATMENT CHEMICALS
  • BUFFERS
  • ETHIDIUM BROMIDE SOLUTIONS
  • KITCHEN GREASE TRAP WASTES (FAT OILS GREASES “FOG”)
  • CLEANING CHEMICALS (UNLESS BEING USED FOR THEIR INTENDED PURPOSE)
  • LATEX PAINT
LIQUID INDUSTRIAL BY-PRODUCT (FORMERLY LIQUID INDUSTRIAL WASTE)

- USED OIL

Includes natural and synthetic oils that have been used and as a result has been contaminated by physical or chemical impurities.

- All containers of used oil must be marked with the words “used oil”.
- Order used oil labels by calling OSEH-HMM at 763-4568
- Containers must be kept closed except when adding or removing waste.
- Use compatible waste containers intended for liquid wastes such as waste jugs or carboys.

- Contact OSEH-HMM at 763-4568 to coordinate the collection of used oil.
LIQUID INDUSTRIAL BY-PRODUCT (FORMERLY LIQUID INDUSTRIAL WASTE)

• OTHER LIQUID INDUSTRIAL BY-PRODUCTS
  • IN CONTAINERS
    • CONTAINERS MUST BE IN GOOD CONDITION AND COMPATIBLE WITH THE CONTENTS.
    • CONTAINERS SHOULD ALWAYS BE KEPT CLOSED UNLESS ACTIVELY ADDING WASTE.
  • CONTAINERS MUST LABELED WITH CONTENTS IDENTIFIED ON THE LABEL.
  • LIQUID INDUSTRIAL BY PRODUCT CONTAINERS MUST BE KEPT IN SECONDARY CONTAINMENT.
• ALL WASTES COLLECTED BY OSEH-HMM FOR DISPOSAL MUST BE DOCUMENTED ON A HAZARDOUS WASTE MANIFEST.

---

<table>
<thead>
<tr>
<th>WASTE MANIFEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIVERSITY OF MICHIGAN - OCCUPATIONAL SAFETY &amp; ENVIRONMENTAL HEALTH</td>
</tr>
<tr>
<td>1605 DEAN ROAD, ANN ARBOR, MI 48109-2159</td>
</tr>
</tbody>
</table>

**HAZARDOUS / CHEMICAL WASTES**

<table>
<thead>
<tr>
<th>CHEMICAL DESCRIPTION (Do Not Abbreviate or Use Formulas)</th>
<th>Date</th>
<th>Type</th>
<th>Qty</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Descriptions: Safety Precautions for materials listed above

**UNIVERSAL WASTES (Enter quantity)**

<table>
<thead>
<tr>
<th>Batteries:</th>
<th>Boxes</th>
<th>Pails</th>
<th>Drums</th>
<th>Auto/Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizers:</td>
<td>Boxes</td>
<td>Pails</td>
<td>Drums</td>
<td>Bags</td>
</tr>
<tr>
<td>Pesticides:</td>
<td>Boxes</td>
<td>Pails</td>
<td>Drums</td>
<td>Bags</td>
</tr>
<tr>
<td>Lamp Recycling:</td>
<td>Fluorescent: 4’</td>
<td>8’</td>
<td>Compact</td>
<td>HID</td>
</tr>
<tr>
<td>Mercury:</td>
<td>Thermostat(s)</td>
<td>Thermometer(s)</td>
<td>Switch(es)</td>
<td>Devices (describe)</td>
</tr>
</tbody>
</table>

**GENERATOR INFORMATION & CERTIFICATION**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERATOR’S CERTIFICATION: I hereby declare that the contents of this assignment are fully and accurately described above by chemical description and are marked, labeled, and are in all respects in proper condition for transport.

GENERATOR’S CERTIFICATION: OSEH ONLY

**Transporter 1 Acknowledgement of Receipt of Materials**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

IN CASE OF EMERGENCY

CONTACT PUBLIC SAFETY

(24 HOURS): (734)763-1131

WASTE MANIFEST

UNIVERSITY OF MICHIGAN - OCCUPATIONAL SAFETY & ENVIRONMENTAL HEALTH
UNUSED CHEMICALS

• AS AN ALTERNATIVE TO DISPOSAL, MANY UNUSED CHEMICAL PRODUCTS CAN BE RE-DISTRIBUTED TO OTHERS ON CAMPUS WHO MAY HAVE A USE FOR THEM.

• FOR INFORMATION REGARDING THE CHEMICAL REDISTRIBUTION PROGRAM, GO TO: HTTP://WWW.OSEH.UMICH.EDU/HAZMATS/CHEM-REUSE.SHTML

• OR, CONTACT DR. SUDHAKAR REDDY AT 763-4615
Animal Handler Safety Program Update

Jessica Bunn
Biological Safety

Safety Coordinator Conference
May 31, 2016
New Personnel

• OSEH Personnel
  – Ingrid Walstad
    • Protocol Reviews
    • Lab Inspections
  – Bob Robke
    • Safety projects
      – Monitoring
    • Protocol Reviews
    • Inspections
Safety Program Liaisons

• Kathy Leach
  – ACUO office
    • IBC/IACUC protocol congruency
    • Pre-view of protocols
      – All hazards in protocol identified

• Lisa Steiner
  – ULAM Safety Coordinator
Lab Inspections

• Inspections with the IACUC
  – Semi-annual
  – Locations (approx. 1400)
    • Housing
    • Vivarium
    • Lab locations where live animals go
Common Inspection Findings

• Personal Protection Equipment
  – Not wearing proper PPE
    • Animal Handler PPE chart
      [link](http://www.oseh.umich.edu/pdf/Protective_Clothing_for_Animal_Care_and_Use.pdf)
    • General lab safety requirements
      – Lab Coat, Safety glasses, gloves

• Sharps
  – Containers not dated
  – Containers over 90 days
  – Overfilled containers
  – Recapped needles
Common Inspection Findings

• Eyewash stations not checked monthly
• Fire extinguisher not checked monthly by Plant
• Electrical
  – Permanent extension cord use
  – Damaged cords
  – Daisy Chaining
Focus Areas

• **Allergy Awareness**
  – Providing poster to labs
  – Updating Medical Surveillance Questionnaire
  – Awareness to personnel in labs
  – Vacuums need HEPA filters (shop vacs, etc)

• **Drop Jar Isoflurane**
  – Need to use ventilation controls (fume hood, snorkel, etc)
  – Monitoring available
    • Contact OSEH to schedule
Medical School Research Services
Value and Margin Improvement

**Sterilization**

Preston Smith
Joe Zogaib

Safety Coordinator Conference
May 31, 2016

Working Team:
Carrie Anderson
Bonnie Brown
Kevin Donovan
AJ Dziak
Maryellen LeBlanc
Mark Sedmak
Mary Tresh
Background

Scope

- One of the team’s focus areas was sterilization practices within the Medical School, North Campus Research Complex, and the Life Sciences Institute
- This current state analysis for sterilization includes:
  - (1) The sterilization of biohazardous waste prior to disposing into the general waste stream (“Dirty autoclaving”)
  - (2) The sterilization of lab items for use in research (“Clean autoclaving”)
  - (3) The washing of glassware for use in research (“Glass wash”)

- The goal of the Current State Analysis is to create a baseline of support data that illustrates areas of opportunity, which will be further formed during the Visioning and Future State part of the project
Background

Hypotheses

- Not autoclaving waste will do the following:
  - Save money on utilities
  - Maximize equipment life
  - Allow re-assignment of lab personnel
  - Reduce SF required for autoclaves (increase SF for staging dirty material)
  - Reduce operating costs
  - Provide cleaner space
  - Minimize risks
  - Reduce replacement / capital costs
- Redistribution of existing number of autoclaves will minimize user travel
Medical School and LSI Current State: Amount of Equipment

- The number of pieces of equipment within each geographical area are as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Hill Area*</th>
<th>NCRC</th>
<th>LSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Autoclaves</td>
<td>82</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Clean Autoclaves**</td>
<td>41</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Dirty Autoclaves**</td>
<td>41</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Glass Washers</td>
<td>55</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Glass Dryers</td>
<td>30</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note 1: Hill Area numbers represent the pieces of equipment owned and maintained by Medical School Facilities Services

**Note 2: The data gathered thus far shows that ~50% of cycles that run through Hill Area and LSI autoclaves are waste cycles. NCRC does not have any autoclaves dedicated to dirty autoclaving.
Current State – Cost to Own and Operate Autoclaves

- **Capital**
  - $60 – 100K purchase and installation per autoclave
    - $3-4K/year (20-25 year life expectancy)

- **Operating**
  - ~$3K/year per machine utility cost
    - Idle cost is approximately the same as in use cost
  - $2-4K/year per machine in maintenance - damage repairs often extra
  - Utility cost alone for an autoclave is not recovered by Med School resource intense rent rate, even when autoclave is idle

- **Total cost ranges from ~$7-26 per cycle**
  - Equivalent waste cost $1.52 (8 lbs x $0.19)
From This...
...To This
Autoclave Observations Thus Far

- Utility cost alone for an autoclave is not recovered by Med School resource intense rent rate, even when autoclave is idle

- Waste generation from MSRB I, II, and III 3/15/16 – 5/5/16 (8 weeks)
  - 774 Tubs, 8,537 lbs, $1622 in disposal costs
    - ~55,000 lbs, ~$10,500 annually
    - Compared to $8-11,000 annually per autoclave

- Feedback
  - Change has been generally well accepted
  - Concerns over reliability
  - Demand pressures for clean autoclaving
  - Most feedback is about “what goes into the bin”
## Waste Service Phasing

<table>
<thead>
<tr>
<th>Order</th>
<th>Hubs</th>
<th>Estimated Timing of Waste Service Rollout</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>MSRB, LSI</td>
<td>March 15, 2016</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>BSRB</td>
<td>June 6, 2016</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Cancer Center</td>
<td>Mid/End of July, 2016</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Med Sci, Brehm/Kellogg, MBNI</td>
<td>August-September, 2016</td>
</tr>
</tbody>
</table>
Bio Un safe Practices

Stuff you should already know...

Sheya Martin
Crystal O’Donnell
Biological Safety

Safety Coordinator Conference
May 31, 2016
Silly? Or Serious!
Biosafety Regulations

• The (BMBL) Biosafety in Microbiological and Biomedical Laboratories
  – First published in 1984
  – Centers for Disease Control and Prevention and National Institutes of Health
  – Most recent revision 2009, the 5th edition
    • No significant changes to standard microbiological practices
    • No significant changes to personal protective equipment
Lab Wear- PPE Requirements
Dressed for Lab Work?
True PPE Practice...for some labs
Glove Reuse
PPE Outside of Lab
Food in the Lab...refrigerator
Lab Barista
More Coffee in the lab
Where is every one?
Lunch Time...outside of the lab?
Pets, Plants, and Other stuff not allowed
Clutter and other stuff in the Lab
Waste Handling

Biohazard bag disposed of in hallway gondola

Way too overfilled biohazard waste in lab
Biohazardous Waste too close to PPE
Blocked Door in Lab
Lab Hygiene Practices
Improper Sharps Disposal
Glass Pasteur & Plastic Pipette
Secondary Container?
Ready for Transport!
CHP Update

Jon Lillemoen, CIH
Manager, Research Health & Safety

Safety Coordinator Conference
May 31, 2016
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
DIRECTOR'S OFFICE

OCCUPATIONAL HEALTH STANDARDS

Filed with the Secretary of State on January 9, 1992 (as amended July 28, 2003) (as amended January 10, 2014)

These rules become effective immediately upon filing with the Secretary of State unless adopted under section 33, 44, or 45a(6) of 1969 PA 306.

Rules adopted under these sections become effective 7 days after filing with the Secretary of State.


R 325.70101, R 325.70103, R 325.70107, R 325.70109, R 325.70110, and R 325.70111 of the Michigan Administrative Code are amended, and R 325.70102a is added, and R 325.70113 and R 325.70114 are rescinded, as follows:

PART 431. HAZARDOUS WORK IN LABORATORIES

Table of Contents:

R 325.70101 Scope; effective date of subrule (2) .................. 1 
R 325.70102 Application .......................................... 2 
R 325.70102a Referenced standards and appendices. 2 
R 325.70103 Definitions ........................................... 2 
R 325.70104 Permissible exposure limits ....................... 4 
R 325.70109 Hazard identification .............................. 6 
R 325.70110 Use of respiratory protection ..................... 6 
R 325.70111 Recordkeeping ....................................... 6 

Appendix A - National Research Council
Chemical Hygiene Plan updates for 2016

## Table of Contents

### 1.0 Laboratory Safety Management System
1.1 Policy Statement
1.2 Scope
1.3 Responsibilities
1.4 Authority to Grant/Request Work
1.5 Respiratory Protection
1.6 Hand-Held Sensors
1.7 Laboratory Safety Compliance
1.8 Resources

### 2.0 Identification and Evaluation of Chemical and Physical Hazards
2.1 Flammable and Combustible Liquids
2.2 Corrosive Materials
2.3 Oxidizers
2.4 Highly Reactive/Unstable Materials
2.5 Peroxide Forming
2.6 Explosives (Highly energetic Compounds)
2.7 Cyano Compounds
2.8 Compressed Gases
2.9 Particulate Hazardous Substances
2.10 Biologicals
2.11 Insecticides
2.12 Biohaazard
2.13 Radioactive Materials and Radiation-Producing Devices
2.14 Biological Agents and Toxins
2.15 Control of Substances
2.16 Storage Areas
2.17 Airline Safety

### 3.0 Control to Reduce Exposure to Hazardous Chemicals
3.1 Engineering Controls
3.2 Administrative Controls
3.3 Personal Protective Equipment
3.4 Special Procedural Details
3.5 Chemical Exposure Assessment
3.6 Instructional Laboratory Operations

### 4.0 Standard Operating Procedures, Emergency Plan Approval, and Special Precautions
4.1 Written SOP and Lab Risk Assessment Tool
4.2 Restricted Chemicals Requiring Prior Approval
4.3 Special Precautions for Other Hazardous Chemicals and Operations

### 5.0 Chemical Procurement, Labeling, Storage, and Inventory
5.1 Chemical Procurement
5.2 Chemical Labeling
5.3 Chemical Storage
5.4 Chemical List
5.5 Restricted Chemicals
• Synchronized responsibilities with the new Academic Laboratory and Research Safety Policy.
• New information on best practices for instructional labs.
• New Standard Operating Procedures.
• New information on Laboratory Commissioning and Laboratory Modification.
• Information on handling utility outages.
• Changed PI designation to Lab Director throughout the document.
U-M CHP is an Online Document

- No need to print
- Review periodically
Incident and Near Miss Review

Will Dawson
Research Health & Safety

Safety Coordinator Conference
May 31, 2016
There have been several incidents in the last calendar year. Incidents and Near Misses range from eye splash, to spills, to fires. They have been on campus and other high profile cases from other Universities.
Eye splash from human serum. The technician reported that as she set a tube of human serum back in the rack after aliquoting she felt a splash of material in her right eye. The technician was not wearing safety glasses at the time of the incident. The lab reviewed the SOP along with changes on how to perform the work along with a renewed focus on using safety glasses.
A custodian walked into room unaware that a laser was operating. Upon noticing the laser, the custodian left the room and contacted his supervisor. By the time the supervisor contacted the researcher from the lab had contacted their professor about the incident. It was determined there was no ocular concern for the custodian. The laser in use sign outside of the lab was not illuminated at the time of the incident. There were no injuries.
The Employee was preparing media and was using a syringe filter to filter sterilize an antibiotic made in distilled deionized water. The syringe filter became stuck in the 15ml conical tube. The syringe slipped off of the syringe filter and then splashed contents onto the employee's face missing the eyes. The employee promptly washed her face with soap and water. This employee was not wearing PPE and was not following lab practices. There were no injuries from this incident.
A researcher was received a needle stick to thumb while working with materials in a BSC. The researcher had not noticed the needle had become bent. There was concern that the needle was contaminated. There are a couple of contributing factors for this incident. The needle was potentially bent on deck of BSC while moving it. The researcher was working very late in the lab and was working alone. The researcher admitted to not using the sink in lab due to fear other lab users were not cleaning up properly and fear of further contamination by using lab sink.
Vacuum chamber with beryllium window failed due to age-related stresses and was sucked into the chamber. The window that imploded was 15 years old and had been subjected to vacuum stresses repeatedly during that time. There was a lengthy clean up due to potential beryllium exposure outside of the chamber. There were no injuries from this incident.
Hexane bottle fell off of counter top as researcher left for day. Contents spilled across the floor, found ignition source and causing lab fire. When leaving the lab the researcher had ear buds in and was unaware the bottle fell to the floor. This incident may have been prevented if the researcher was able to hear the bottle fall and clean it up before a fire could have occurred.
In a machine shop area in an enclosed room a fire occurred on a milling machine. Dust and chips were building up due to the vacuum system not adequately pulling chips away allowing a build up of material around the tool causing friction and ultimately a fire. The position of the vacuum hose was not properly placed however worked well enough to pull embers and burning material into the collection bin and filter causing those items to burn.

A couple of contributing factors for this incident: The operator was watching outside of the room, the speed of the drill speed and feed rate, location of vacuum system hose was not secure for operation.
University of Hawaii had an incident that made national news. This incident resulted from an inappropriate piece of equipment and unheeded warnings. A visiting research fellow was transferring hydrogen, oxygen and carbon dioxide into a low pressure gas cylinder to be used a bacterial growth medium. The explosion was the result of a electric pressure gauge sparking, setting off the flammable gas mixture. The switch inside the guage sparked when it was operated, and ignited the gas that came out of the pressure gauge.
The fire department report states that just days before the accident researcher had conducted another experiment, using a smaller tank nearly identical to the one that failed, that resulted in a small internal explosion. That incident apparently went unaddressed. The researcher that was injured claimed to have complained to the professor about receiving static shocks when touching the air tank during prior experiments, but said he told her not to worry about it. Another potential contributing factor could be inconsistent of lab safety practices between researcher and the professor who are from different countries.
Procedure on reporting any Near Miss or Accident
LABORATORY INCIDENT AND NEAR-MISS REPORT

Author of Report: ___________________________ Date: 01/07/14
Email Address: ___________________________
Principal Investigator (or Lab Director if no PI): ___________________________
Department: ___________________________
Date and Time of Incident: ___________________________
Location of Incident: Building __________ Room Number __________
Personnel Involved: ___________________________

☐ Accident/Incident? ☐ Near-Miss?

What happened? Describe in detail the lab process, chemicals and activities involved in the incident.

☐ Is there a written SOP for the procedure being performed? ☐ Yes ☐ No

Were there any injuries? ☐ Yes ☐ No Describe below.

Did anyone seek medical treatment as a result of this incident? ☐ Yes ☐ No

Was there any building damage? ☐ Yes ☐ No Describe below.
Peroxide Forming Chemicals

Raquel Huffman, B.S.
Research Health & Safety

Safety Coordinator Conference
May 31, 2016
What are they?

- Peroxide-forming chemicals can undergo auto oxidation to form organic peroxides that can become explosive with impact, heat or friction. These chemicals will become more hazardous as they age; peroxides may form even when the container has not been opened.
Peroxide forming chemicals

- Requirements for peroxide-forming materials:
  - **Date** all peroxide formers upon receipt and again after opening.
  - Store away from heat and light.
  - Maintain the **smallest amount** necessary for ongoing work.
  - Use proper antioxidant **inhibitors**.
  - Materials beyond expiration, but have been tested and have no detectable peroxides or peroxide concentrations less than 100 PPM, may be retained but should be tested at required intervals (see Table 2 of [SOP](#)). If the test is positive, treat to remove peroxides or call OSEH Hazardous Materials Management for disposal.
  - Never open a bottle that has solid formation around the lid. Friction from removing the cap can cause an explosion.
Levels of Hazard

- **12 Months**
  - Acrylic Acid, Vinyl Acetate

- **12 Months**
  - Tetrahydrofurane, Diethyl Ether, Dioxane

- **3 Months**
  - Isopropyl Ether, Potassium Metal, Sodium Amide
Testing
Laboratory Standard Operating Procedure for:

Peroxide Forming Chemicals

Principal Investigator (PI) Approval is Required Prior to Performing this Procedure

Description

This standard operating procedure outlines the handling and use of peroxide forming chemicals. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when handling peroxide forming chemicals.
Everything You Never Even Knew You Wanted to Know About Spill Kits

Lisa Stowe, CIH
Sr. Industrial Hygienist
OSEH Research Health & Safety
NCRC Laboratories
Don’t Attempt to Clean Up a Spill When..

• Very volatile / Very toxic
• HF - outside of a hood, “larger quantity” or is concentrated
• Other hazards in the area make it unsafe to remain in the lab
  – i.e. Flammable liquid spill with ignition sources in area
• You are not confident that it can be done safely
  – Call 911 to get OSEH-HMM involved

❖ Prepare ahead to know how to react – you can clean up only what you are prepared to clean up!
**Minor Spill**: Laboratory staff can handle safely without the assistance of safety & emergency personnel

Less than 1 of this:

Or less than 3 of these (total):


2. **One Liter Glass Bottle.** Used to collect liquid wastes. Available in increments of 12.
First things First:

*Protect People*

- Assist anyone with personal exposure
  - Get them into shower/eyewash
  - Call for help
- Alert others in the area
- Turn off Ignition Sources
- Open Windows
- Close Doors
  - Labs typically under negative pressure to protect surrounding areas
Don Appropriate PPE and Gather Spill Cleanup Supplies

What Kind of Spill Kit To Use??
Lots of Options Available
Spifyter™ Cellulose-Based Sorbent Pillow-in-a-Pan Kits

Contained absorbent makes cleanup quick and easy

Manufacturer: NPS Corporation 150215

Specifications

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Sorbent Pillow</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Use With (Application)</td>
<td>Easily absorbs oil, coolants, solvents and water, large surface area with high capacity and fast wicking filler, contain spills and prevents migration, compact design to absorb spills in tight spaces for industrial use</td>
</tr>
</tbody>
</table>
Manufacturer indicates these have a 3-year shelf life
Specifications

- **Capacity (English):** 0.26 gal.
- **Capacity (Metric):** 1L
- **Product Type:** Caustic Spill Kit
- **For Use With (Application):** For labs
- **Includes:** 1 instruction sheet/MSDS, 2 vinyl exam gloves, two 9 x 16 in. polybags, 2 twist ties, 2 blank shipping tags, 1 dust pan and brush, 1 bag vermiculite absorbent, 1 bag neutralizing mixture
Specifications

- Capacity (English): 0.26 gal.
- Capacity (Metric): 1L
- Product Type: Solvent Spill Kit
- For Use With (Application): For labs
- Includes: 1 instruction sheet/MSDS, 2 vinyl exam gloves, two 9 x 16 in. polybags, 2 twist ties, 2 blank shipping tags, 1 dust pan and brush, 1 bag diatomaceous earth
ANSUL™ SPILL-X™ Agents in Shaker Bottles

Free-flowing dry agent to treat acid, caustic, solvent or formaldehyde spills

$132.59 - $446.36

Specifications

| For Use With (Application) | Free-flowing dry agent to treat acid, caustic, solvent or formaldehyde spills |

Catalog No. 17-200-2A

$132.59 / Pack of 6

Qty Check Availability

In Stock

Estimated Delivery 4/21/2016

Add to Cart

Add to List
Safetec Spill Leader Kit™

Multipurpose, wall-mounted, hazardous fluid control kit featuring Red Z™

Designed for employee protection while handling, cleaning up, or disposing of hazardous liquids. The solid solutions neutralize, stabilize and solidify a variety of aqueous spills.

Includes:
- One 5 oz. bottle of Red-Z (for solidifying and deodorizing biohazardous spills)
- One 5 oz. bottle of Green-Z
- One 5 oz. bottle of Acid Lock solidifier (for encapsulating and neutralizing acids)
- One 5 oz. bottle of Alky solidifier (for encapsulating and neutralizing alkali spills)
- Six 9 x 12 in. zip-pack bags
- Three pairs of nitrile gloves
- Two hazardous waste D.O.T. labels
- Two nonhazardous D.O.T. labels
- Six pick-up scoops with scraper
- One 2 oz. bottle Petro Lock absorbent
- Instructions and MSDS information
- Six individually packaged kits per box
- Each kit absorbs 0.6 gal. (2.3L)
- Lightweight, high-capacity particulate sorbent (also available separately) is nonbiodegradable, inert, noncorrosive, nontoxic and nonflammable
- Instantly absorbs oils, acids (except hydrofluoric acid), bases, chemicals and toxic liquids
• Special case
• *Cannot* use most sorbents
  – Potential to generate silicon tetrafluoride...
### Hazard statement(s)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H280</td>
<td>Contains gas under pressure, may explode if heated.</td>
</tr>
<tr>
<td>H290</td>
<td>May be corrosive to metals</td>
</tr>
<tr>
<td>H300</td>
<td>Fatal if swallowed.</td>
</tr>
<tr>
<td>H310</td>
<td>Fatal in contact with skin</td>
</tr>
<tr>
<td>H330</td>
<td>Fatal if inhaled.</td>
</tr>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage.</td>
</tr>
</tbody>
</table>
*Each 2 lb. container absorbs ½ liter of HF
According to manufacturer, the product has a 1 year shelf life
Laboratory Commissioning and Laboratory Modifications

Introduction of OSEH’s *final* Hazard Guideline (*Lab Commissioning*) and *draft* Lab Modification Form

Rick M. Wasalaski, MS, CIH
Research Health & Safety

Safety Coordinator Conference
May 31, 2016
Rick M. Wasalaski, MS, CIH
Senior OSEH Representative

Areas: “All” Campuses, Museums, (odd) Studios, etc.

Programs:
• EHSA Chemical Tracking System,
• Shops & Studios,
• LEV,
• GoldFFX’s SDS DB

Buildings:
• Art & Architecture,
• Auxiliary Services,
• CSSB,
• CCRB,
• School of Education,
• Eisenhower Commerce Ctr.,
• Newberry Hall,
• North Hall,
• Ruthven,
• UMTRI,
• Varsity Drive,
• Kelsey Museum,
• Mcity
SCOPE:

• The “LC” Guideline applies to any researcher moving into laboratory space.

• This includes moving to another building on campus or relocating to another laboratory within the same building.

• It also applies to new rooms added to a current lab and/or non-lab space repurposed as lab space.

• *Note that this does not apply to U-M Hospital clinical laboratories.*
This guideline requires:

The commissioning of all newly assigned laboratory space by the U-M department of Occupational Safety & Environmental Health (OSEH) in conjunction with the University department responsible for the space.

The purpose is to foster safe and healthy laboratory work environments and ensure regulatory compliance.
This laboratory commissioning process will ...

1) **identify** the applicable EH&S and other requirements and

2) **provide resources** to meet the goals of the program.

It also provides an opportunity for all researchers, facility personnel or administrators to **raise questions or concerns on various H&S topics**.
Laboratory Directors / Authorized Users:

• Notify OSEH (734-647-1143) **two weeks** prior to occupying and beginning research within a University laboratory or relocating/expanding into other laboratory space within the university.

• Submit a [Room Commissioning Checklist Form](#).
After completion & submittal of the **Lab Commissioning Checklist**, OSEH will schedule a meeting with you to discuss university policies, safety guidelines and training requirements related to your research.

You may contact OSEH at 734-647-1143 or go to our website at [http://www.oseh.umich.edu/index.shtml](http://www.oseh.umich.edu/index.shtml) for additional information or should you have any questions.
Where is it Located?
We look forward to working with you to promote a safe laboratory working environment.

To begin the process, we ask that you please complete the following Laboratory Commissioning Checklist as soon as possible after assignment of laboratory space and prior to conducting research. This Checklist will help us determine the types of hazards you may be working with and assign appropriate staff to assist you. After receiving your submittal, OSEH will schedule a consulting visit to discuss university policies, safety guidelines and training requirements related to your research. You may contact us at 647-1143 or visit our website at www.oshe.umich.edu for questions or additional information.

**PI Name:**

<table>
<thead>
<tr>
<th>Department</th>
<th>Phone #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email:</td>
<td></td>
</tr>
</tbody>
</table>

**Date Expected to Begin Operations:**

**Date Submitted:** 05/31/16

Please mark yes or no to each item. Hyperlinked text provides quick access to information about a particular topic or document.

**Will you be:**

<table>
<thead>
<tr>
<th>Chemical Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Using/storing hazardous chemicals such as flammables, combustibles, corrosives, oxidizers, carcinogens, nanoparticles, reproductive toxins, cryogenic liquids, etc.?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Working with recombinant materials or biological agents (DNA, viral vectors, bacteria, viruses, protozoa, parasite, prion, rickettsia, etc.), biological toxins, or human or non-human primate blood, cells or tissues?</td>
</tr>
<tr>
<td>3 Working with research animals?</td>
</tr>
<tr>
<td>4 Administering rDNA, infectious agents or hazardous chemicals (including FDA approved or experimental pharmaceutical products, laboratory chemicals and inhalation anesthetics) to live animals?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Radiation / Lasers</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Working with ionizing radioactive materials, radioactive sealed sources/equipment with sealed sources, or any radiation-producing devices, such as, an x-ray machine, neutron generator, etc.?</td>
</tr>
<tr>
<td>6 Working with Class IIIB or Class IV Lasers?</td>
</tr>
<tr>
<td>7 Working with other non-ionizing radiation, such as UV, IR, or microwaves?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEA Controlled Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Do you plan to possess/use controlled substances that are regulated by the Drug Enforcement Agency (DEA)?</td>
</tr>
</tbody>
</table>

Do you have any other safety or environmental concerns or questions to discuss during our visit?

Please submit a completed Checklist by clicking on one of the buttons above.

Use the “SAVE” button to save the Checklist and then email it as an attachment to OSEH-LabSafety@umich.edu. **Please include the Building Name in the subject line of your email.**

Use the “PRINT” button to print a completed Checklist and fax it to 734-763-1185.
Two Parts ...

1) Current background info. about the space.

2) 14 questions re: proposed mod’s to the space, e.g., adding new equip./operations/chem’s, electrical/plumbing/architectural/life safety, etc.

Form will be reviewed by OSEH, AEC & Construction Services.
For More Information:

http://www.oseh.umich.edu/index.shtml
Cold Rooms

Shannon Weger
Research Health & Safety

Safety Coordinator Conference
May 31, 2016
COLD ROOMS
Topics of Concern

• Ventilation
• Mold
Ventilation

• Types of ventilation in cold rooms
  1. Exhausting
  2. Recirculating

• Exhausting
  – provides complete air changes

• Recirculating
  – closed air-circulation system
What Type is Found on Campus?

• Most buildings have cold rooms with recirculating ventilation

• Newer buildings do have cold rooms with exhausting ventilation (such as Brehm, BSRB, LBME, and LSI)
Why Do We Care about Ventilation?

• No air changes = No fresh air
• What is released into the air stays in the air
Hazards

• Volatile and Flammable Chemicals
  1. Vapors can build up
  2. Cold room temps can be higher than the flash points of flammable liquids
  3. Electrical sparks can ignite flammable vapors
  4. Volatile acids can corrode aluminum coils
Hazards (continued)

• Compressed and Liquid Gases, and Dry Ice
  Displace oxygen resulting in an oxygen deficient atmosphere
Therefore

- Volatile or Flammable Chemicals
- Compressed or Liquid Gases
- Dry Ice

Are **NOT** allowed in *cold rooms* with recirculating ventilation
NOTICE

THIS ROOM HAS A RECIRCULATING VENTILATION SYSTEM.

**DO NOT** STORE DRY ICE, GASES, OR VOLATILE OR FLAMMABLE CHEMICALS WITHIN THIS ROOM.
What we do **NOT** like to see!

Volatile flammables in cold rooms with recirculating ventilation
What we do NOT like to see!

Compressed gas cylinder in cold room with recirculating ventilation
Mold Growth

• Concerns
  1. Condensation
  2. Moisture (humidity)
  3. Materials that contribute to mold growth
Why Do We Care about Mold?

• All mold is potentially dangerous
• Mold can have adverse affects on:
  1. Health
  2. Research
Preventing Mold Growth

Can be achieved by:

1. Controlling condensation and moisture
2. Removing materials that contribute to mold growth
3. Decontaminating regularly
What You Can Do

• Report all mechanical issues
• Keep door firmly shut
• Immediately clean up liquid spills
• Promptly dispose of wet or damp organic materials
• Store cardboard and paper products in sealed plastic bags or containers
Cleaning Cold Rooms

Small Isolated Areas (10 square feet or less) – e.g. ceiling tiles, small areas on walls AND Medium-Sized Isolated Areas (10 – 100 square feet)

• Don appropriate PPE - lab coat, gloves, and eye protection. Respiratory protection is recommended (e.g., N-95 disposable respirator)

• Promptly remove and discard contaminated items in sealed plastic bags.
Cleaning Cold Rooms (continued)

• Wipe down surfaces with 1:10 dilution of household bleach and water. Ensure sure all surfaces are wiped dry of excess cleaning solution using a dry cloth.

• Do not wet wipe electrical fixtures or components. A damp cloth is all that is needed for cleaning, be careful not to use too much liquid.

• Call OSEH at 647-1143 for any questions or concerns.
Severe Case of Mold in Cold Room
Shelving with Mold
Mold on Wood Shelving and Benchtop
Mold on Apparatus and Benchtop
Mold Growth on Boxes
Mold Growth on Boxes
Industrial Hygiene
Air Sampling Study

David M. Laird, MS, CSP
Research Health & Safety

Safety Coordinator Conference
May 31, 2016
• Roche Pharmaceutical contacted the Lab Director to request testing of tablets for two highly potent (toxic) active pharmaceutical ingredients (API’s).

• Lab performs various engineering tests and analysis of active pharmaceutical ingredients (API’s).

• Pharmacy Lab Director contacted OSEH to conduct air sampling and provide recommendations during the lab’s engineering property testing.
College of Pharmacy

- Roche requirement - safely perform all tests while maintaining employee exposures below occupational exposure limits (OEL).

- Occupational Exposure Limits (OEL’s) reported by Roche for their two API’s were 1 μg/m3 and 10 μg/m3.

- Challenge – collaborate on implementation of engineering controls, administrative controls, and PPE with minimal cost and impact to current operations.
Project Needs

• Identify steps and potential exposure routes for each of the five work stations.

• Make recommendations to control exposures at each station (engineering controls, administrative, PPE).

• Identify a surrogate material to sample at each station with same physical properties as most API’s – lactose.

• Conduct air monitoring at each work station and personal exposure monitoring for those performing the task.
Weighing – moved from bench to fume hood and included sticky mat.
Tablet Press – position snorkel over sample and included sticky mat.
Powder Density Testing – positioned snorkel over sample chamber.
Quasi-static and tensile strength testing – position snorkel over sample and included sticky mat on bottom.
Impact Testing – enclose remaining area with Lexan and attach snorkel.
Results

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Concentration (µg/m³)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1 (Shift 1)</td>
<td>Personal air sample – Nick Waltz</td>
<td>0.102</td>
</tr>
<tr>
<td></td>
<td>Density instrument</td>
<td>0.176</td>
</tr>
<tr>
<td></td>
<td>Tablet press</td>
<td>0.0867</td>
</tr>
<tr>
<td>Day 2 (Shift 2)</td>
<td>Personal air sample – Nick Waltz</td>
<td>0.835</td>
</tr>
<tr>
<td></td>
<td>Quasi-static and Tensile Strength instrument</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>Impact instrument</td>
<td>3.49</td>
</tr>
</tbody>
</table>

*OEL used for comparison is 1 µg/m³. This is the most protective OEL provided by Roche.
Four work stations were monitored (weighing in fume hood was not necessary).

Personal exposures were below 1 ug/m3 OEL.

All four stations monitored were below 10 ug/m3 OEL.

Two of the four monitored were also below 1ug/m3.

The two work stations with exposure levels above 1 ug/m3 will require additional controls to work with APIs at 1 ug/m3 OEL.
Results (con.’t)

• Lab visit by Roche to review engineering controls and written SOP for each work station.

• New research funding of six-figures with additional future funding ☺️
Safety Coordinator Conference
May 31\textsuperscript{st}, 2016
Thank You for Coming!