Saint Louis University
Laboratory Inspections
Why Are Inspections Important?

- Ensure a safe work environment for SLU employees, students, and visitors
- Determine compliance with federal, state, and local regulations
  - OSHA, NIOSH, EPA, MoDNR, CDC, USDA, NRC and others
- Identify hazards and areas of concern before incidents occur
- Identify corrective actions
- Identify best practices to address concerns
- Lab personnel are encouraged to proactively perform self-inspections
# Types of Laboratory Inspections

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<th>Inspection</th>
<th>Relevant Laboratories</th>
<th>Frequency</th>
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<td>Environmental Safety</td>
<td>All laboratories.</td>
<td>Annually</td>
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<tr>
<td>Biological Safety</td>
<td>Labs using biological agents (BSL-2 agents or higher, recombinant or synthetic nucleic acid molecules (rsNA), or toxins).</td>
<td>Annually</td>
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<tr>
<td>Radiation Safety</td>
<td>Laboratories approved for radioactive materials use.</td>
<td>Quarterly</td>
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General Safety

All inspections look for common general safety items to ensure safe work practices.

- Training
  - Lab Safety, Lab-Specific (general and biosafety), Radiation Safety
- Personal Protective Equipment
- Engineering controls
  - Biological safety cabinets, fume hoods, compressed gas restraints
- Eyewashes
Environmental Safety Laboratory Inspections

- Performed annually.
- Covers general safety, chemical safety, and hazardous waste.
- Laboratories are expected to make corrections to compliance issues noted during the inspection.
Environmental Safety Laboratory Inspection Form

GENERAL/FIRE SAFETY and HOUSEKEEPING
- 1. Aisles and walkways not free of tripping hazards
- 2. High shelves and/or cabinet tops have items which may fall and injure someone
- 3. Empty containers, boxes, and broken equipment not promptly discarded
- 4. Emergency exit or egress route blocked or poorly accessible
- 5. Power cord found in poor condition or not tied wrapped
- 6. Energized electrical panel uncovered and/or blocked
- 7. Portable electric heater used in the laboratory
- 8. Failure to remediate non-hazardous chemical release within a timely manner
- 9. Laboratory doors propped open
- 10. Items stored within 18 inches of the ceiling
- 11. Workers do not use a safe platform for climbing

SIGNS and POSTINGS
- 12. Lab specific emergency contact list not updated or posted
- 13. Emergency Procedures not posted by the laboratory phone
- 14. Laboratory refrigerators/freezers/microwaves not labeled “Not for Food Use” / “Not for Flammable Liquid Storage”
- 15. Cabinets and/or storage areas not labeled properly

CHEMICAL HYGIENE PLAN and TRAINING RECORDS
- 16. Chemical Hygiene Plan unavailable
- 17. MSDS’s unavailable for lab employees
- 18. Laboratory Safety and Compliance training
  - a. Annual Training not up-to-date
  - b. New employees have not attended safety training
- 19. Lab Specific Training Outline unavailable and/or attendance not documented
- 20. Chemical Inventory unavailable
- 21. Previous lab inspection not posted

LABORATORY PRACTICES
- 22. Gloves are worn outside the lab
- 23. Evidence of personnel eating or drinking in the laboratory
- 24. Food items stored with hazardous chemicals
- 25. Hazardous chemicals not carried in secondary/spill-proof containers when transported through corridors/elevators

CHEMICAL USE and STORAGE
- 26. Chemicals not properly segregated by hazard class
- 27. High-pressure gas cylinders unsecured, untagged, or transported unsafely
- 28. Hazardous chemicals stored above eye level
- 29. Fume hood used as storage area for hazardous chemicals
- 30. Excessive quantities of hazardous chemicals/reagents stored on lab bench top
- 31. Hazardous chemicals/reagents stored on the floor
- 32. Chemicals susceptible to peroxide formation are not dated/expired (e.g., ethyl, 1,4-dilane, tetradifuran, picrates)
- 33. Chemicals not labeled with the following information:
  - a. Full chemical name
  - b. Chemical concentration (if applicable)
  - c. Hazard class
- 34. Storing an uncapped chemical container or allowing a chemical liquid to evaporate inside or outside the fume hood
- 35. Flammable liquids not stored in flammable storage cabinet
- 36. Flammable storage cabinets not located in a safe area
- 37. Excessive quantities of flammable liquids present
- 38. Flammable liquids stored in non-explosion-proof/non-flammable-proof refrigerator
- 39. Unattended chemicals not secured against unauthorized access

SAFETY EQUIPMENT and ENGINEERING CONTROLS
- 40. Eye Wash Station
  - a. Unavailable or not accessible/blocked
  - b. Weekly inspection not documented
- 41. Safety shower unavailable or not accessible
- 42. First aid kit location not known and/or not available
- 43. Fire extinguisher not readily accessible and/or inspected
- 44. Fume Hood
  - a. Unavailable or not used when handling hazardous chemicals
  - b. Not inspected annually
  - c. Chemical containers not cuffed or in poor condition
  - d. Performance impeded by overcrowding
- 45. Vacuum System
  - a. In-house vacuum system not adequately protected
  - b. Vacuum system flash not labeled and protected

HAZARDOUS WASTE COMPLIANCE
- 46. Hazardous Chemical Waste Labeling
  - a. Not labeled “Waste” or “Hazardous Waste”
  - b. All chemical components not listed
  - c. No accumulation start date
- 47. Hazardous Chemical Waste Storage
  - a. Not segregated by hazard class
  - b. Greater than one container per chemical waste stream
  - c. Excessive amounts of hazardous wastes accumulated (chemical, biological, radioactive)
  - d. Accumulation start date greater than one year
- 48. Sharps, Broken Glass, Empty Containers:
  - a. Sharps containers not used or disposed of improperly
  - b. Broken Glass not placed in proper receptacles
  - c. Failed to triple rinse and remove/mark out labels of empty chemical containers
- 49. Mercury/Chemical Spills:
  - a. Broken mercury thermometer not contained or labeled
  - b. Failure to promptly report a mercury/chemical release

PERSONAL PROTECTION
- 50. Respirators used without proper clearance/fit testing/training
- 51. Personal protective equipment (e.g., gloves, safety glasses, lab coat) unavailable or of limited quantity
- 52. Gloves, safety glasses, or other protective equipment not worn while working with hazardous chemicals/reagents
- 53. Evidence of open toed shoes (sandals, etc.) worn in the laboratory

COMMENTS
- NO comments necessary
- See attached comments

(Laboratory Representative present during inspection)

(Reviewed by: Chemical Hygiene Officer/Director Environmental Safety)
Most Common Areas of Noncompliance

1. Chemicals not labeled with the full chemical name, concentration and/or hazard class.
2. Laboratory refrigerators/freezers/microwaves not labeled “Not for Food Use” & “Not for Flammable Liquid Storage”.
4. Chemicals not properly segregated by hazard class.
5. Vacuum systems not adequately protected with in-line filters.
Environmental Safety Highlights

Broken glass boxes are designed for disposal of clean broken glass, glass bottles that have been tripled rinsed and other sharp glass that is not contaminated. Please triple rinse glassware and mark out or remove labels before disposal in the broken glass box.

All peroxide-forming chemicals (diethyl ether, picric acid, tetrahydrofuran, etc.) must be dated when received and dated when opened. Please do not open if expired or crystals have formed inside the bottle. Request a chemical waste pickup.

Food and drinks are not allowed inside the laboratory. Each lab should have a designated area to ensure food and drink are not used or stored in the lab.

Minors (<18 yrs old) are not allowed to access or work in the laboratory without official approval. Consult the EHS Minors in Labs Policy.
Biosafety Inspections

- Performed annually and anytime lab locations or work practices change.
- Required for Institutional Biosafety Committee Protocol approval.
- Typically not announced but are usually performed the same month every year.
**Biosafety Inspection Form**

### Classification of Laboratory Space

1. Biological research (e.g., rDNA) is approved by IBC and is current.
2. Infectious Material:
3. Human Derived Material:
4. Classification of Research □ Risk Group 1 □ Risk Group 2

#### Biosafety Level 1 Practices

5. Lab supervisor controls access to the laboratory
6. Pest Control Policy is available and no pest management problems observed
7. Laboratory has a sink for hand washing
8. Persons wash their hands after working with samples and before leaving the lab
9. No Evidence of Eating, drinking, and storing food for consumption
10. Mechanical pipetting devices are always used. No Mouth Pipetting
11. Needles are never bent, broken, recapped or reused before disposal
12. Used needles, syringes, and other sharps placed in a puncture-resistant container
13. Vacuum lines are protected with HEPA filters, or their equivalent
14. All procedures are performed to minimize the creation of splashes and/or aerosols
15. Work surfaces are decontaminated after completion of work or after any spill
16. Biological waste (e.g., cultures, stocks) are properly decontaminated before disposal
17. Lab designed so that it can be easily cleaned (i.e., no carpet, cloth furniture, etc.)
18. Protective eyewear worn when potential to create splashes of microorganisms
19. Bench tops are impervious to water and resistant to heat and other chemicals
20. Lab windows that open to the exterior are fitted with screens
21. Housekeeping is appropriate and lab is maintained in a clean/sanitary condition
22. Biohazard signage is posted at the lab entrance when infectious agents are present
23. Gloves are worn to protect hands from exposure to hazardous materials

### Safety Equipment - Primary Barriers & PPE

24. Protective clothing (i.e., lab coat) worn to prevent contamination of personal clothing
25. Eyewash station is readily available
26. All procedures that may generate aerosols are conducted in containment (e.g., BSC)

#### Biosafety Level 2 Practices

□ BBP Training □ Shippers Training □ EHS Training records
28. All persons entering lab are advised of potential hazards & entry/exit requirements
29. Lab equipment is routinely decontaminated, including after spills or splashes
30. No evidence of non research related Animals or Plants in the lab
31. BSCs located away from doors, heavily traveled areas, and other airflow disruptions
32. BSCs have been certified within the last year (annual certification)
33. Samples are placed in durable, leak proof container during storage and transport
34. Plasticware is substituted for glass whenever possible
35. All personnel have been offered Hepatitis B vaccination or signed declination form
36. Personnel are familiar with post-exposure evaluation and follow-up
37. Engineering and work practice controls are used to reduce the risk of exposure
Common Areas of Noncompliance

- Biological Safety Cabinet not certified within 12 months.
- Eyewash not flushed weekly and recorded.
- Vacuum flasks missing HEPA filters between flask and vacuum source.
- Not wearing appropriate PPE according to biosafety level and eIBC protocol.
- Incorrect disposal of biological waste.
- Sharps not handled/stored/disposed of properly.
- Plants in labs.
Biosafety Inspection Highlights

- Lab-specific biosafety training records for all personnel should be maintained in the research space.
- Training records should be documented on the *Laboratory Training Record* spreadsheet to be attached to the eIBC protocol.
Autoclave Inspections

- Autoclave function must be validated weekly (spore tests) when the autoclave is used to decontaminate waste.
- Autoclave records are checked annually.
Radiation Safety Inspections

Training: All personnel working with radioactive materials must have completed the Radiation Safety Orientation and passed the associated test.

Radionuclide Shipment Log (Green Sheet): must be completed as required including surveys and inventory log.

PPE: Appropriate PPE must be worn for the radioactive materials being used. Typically, this includes lab coat, gloves, protective eyewear, and dosimeters if required.

Surveys: Survey meter readings (unless H-3 use only, which is not detectable with meter) and wipe tests must be documented weekly. Surveys of personnel and nearby area required following all procedures involving radioactive materials (no documentation required).

Inventory: A quarterly physical inventory of all radionuclides must be completed. This includes all radioactive materials on hand, whether in stock vials, experiments, or waste. The online Radiation Safety database must be updated by the Permit Holder/lab following the inventory.

Security: Radionuclides must be secured against unauthorized access or removal at all times.

Food and Drink: No food and drink is allowed in any laboratory where radioactive materials are used or stored.
**POSTING & RECORDS ACCESSIBILITY**

- 1. NRC-3 form not posted.
- 3. Radiation area sign not posted.
- 4. High radiation area sign not posted.
- 5. Airborne radioactivity area sign not posted.
- 6. Low Level Exposure Zone (>0.2 mR/hr) not posted.
- 8. Permit not posted.
- 9. Permit application (copy) not accessible.
- 10. Previous RSO inspection not logged or posted.

**TRAINING REQUIREMENTS** (see comments for specification of individuals)

- 12. Personnel working with RAM have not attended Radiation Safety Orientation Course and passed exam.
- 13. Personnel have not attended the annual refresher course.
- 14. Permit Holder has not provided/certified laboratory specific instruction to workers.

**RADIONUCLIDE RECEIPT, INVENTORY & TRANSFER**

- 15. Radionuclide Shipment Receipt Log incomplete
  - A. ≤ 10% of shipments received
  - B. ≤ 25% of shipments received
  - C. > 25% of shipments received
  - D. other; see comments.
- 16. Inventory Log - Radionuclide Stock Vial Inventory Ledger incomplete
  - A. ≤ 10% of shipments received
  - B. ≤ 25% of shipments received
  - C. > 25% of shipments received
  - D. other; see comments.
- 17. Online radionuclide inventory database not updated.
- 18. Radionuclide shipment received directly; RSO not notified.
- 19. Radioactive material provided to unauthorized staff.

**SAFETY PRACTICES, SURVEYS & SUPPLIES**

- 21. Staff do not adequately survey during & after each use of radionuclides
- 22. Area survey documentation lacking (specify dates of missing surveys in comments section):
  - A. 1 weekly survey
  - B. 2 weekly surveys
  - C. 3 or more weekly/1 or more monthly surveys
  - D. survey meter readings not documented
  - E. Other; specify in comments section.
- 23. Appropriate survey instrument not used or unavailable.
- 24. Survey instrument not operational, has depleted batteries, or lacks check source.
- 25. Survey instrument calibration not current within 1 year; comments:
- 26. Evidence of personnel eating or drinking in areas designated for radioactive materials use or storage.
- 27. Staff not wearing gloves, lab coat, or other protective clothing while working with radionuclides.
- 28. Staff wearing open toed shoes (sandals, etc.) or shorts while working with radionuclides.
- 29. Laboratory surfaces (bench tops, etc.) inadequately covered.
- 30. Fume hood, glove box, or charcoal filtered mini-hood not used as required.
- 31. Essential spill response supplies not maintained within laboratory (see itemized list below):
  - absorbent pads
  - decontaminant solution
  - mild hand soap (e.g., Joy)
  - scouring pads
  - scrub brush
  - shoe covers (disposable)
  - heavy duty plastic bags
  - gloves (disposable)
  - tape ("Cautions RAM")
  - spare clothing/shoes

**RADIONUCLIDE USE & STORAGE**

- 32. Use or storage of radionuclides in an unauthorized area.
- 33. Radionuclides improperly stored or inadequately shielded.
- 34. Unmarked and unattended labware containing radionuclides.
- 35. Radionuclides not secured against unauthorized access or removal
  - A. unattended laboratory not locked
  - B. unlocked refrigerator/freezer in unrestricted area
  - C. unattended radioactive waste in unrestricted area
  - D. other; see comments.
- 36. Food/drink stored in area designated for RAM.

**RADIONUCLIDE WASTE DISPOSAL**

- 37. Waste disposal records inadequate.
- 38. Improper packaging/labeling of radioactive waste.
- 40. Improper disposal of radioactive waste.

**INTERNAL & EXTERNAL DOSIMETRY**

- 41. Personnel bioassay not submitted as required.
- 42. Personnel dosimeter (badge) not timely returned; specify individual(s).
- 43. Location of personnel exposure records unknown.
- 44. Staff not wearing required dosimeter while handling radionuclides.
- 45. Staff wearing dosimeter assigned to another person.
- 46. Dosimeter (badge) stored in radiation work/storage area.

**OTHER ITEMS OF NONCOMPLIANCE**

- 47. 
- 48. 

**COMMENTS**

[ ] See attached comments [ ] No comments necessary

(Signature of Laboratory Inspector)

(Signature of Laboratory Staff Member)
Contact ehs@slu.edu for any questions regarding inspections.

Please complete the Safety Awareness Quiz on Laboratory Inspections by September 30th, 2023.