Laboratory Safety
Newsletter
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Yale *Environmental Health & Safety*


Photo courtesy of New Haven Promise

This issue

The Next Generation

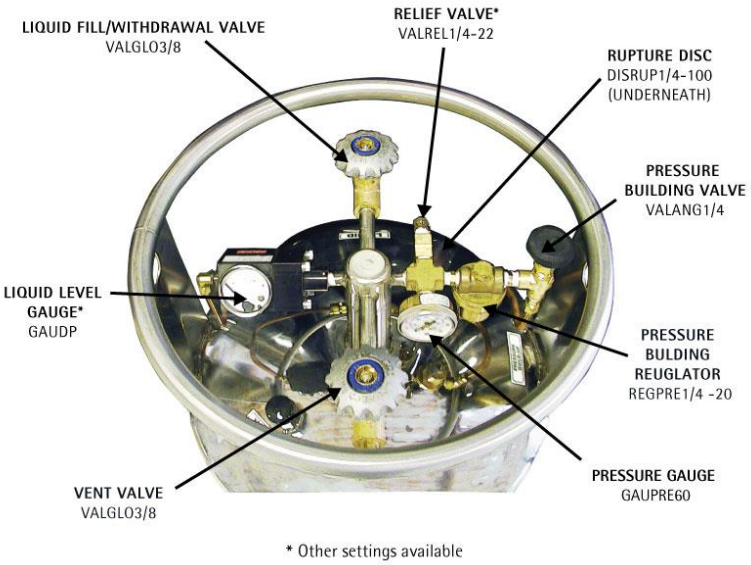
In the summer of 2024, Yale EHS launched a comprehensive internship program aimed at addressing the critical shortage of qualified candidates in the Environmental Health and Safety field. This initiative provided invaluable hands-on experience to students from diverse backgrounds, including those from Historically Black Colleges and Universities (HBCUs) and the New Haven Promise program.
Iain Kinsella, Environmental Affairs manager, (pictured above) and Dave Krochko, air pollution compliance engineer, recently attended New Haven Promise's 12th Annual Internship and Career Fair to speak with potential future interns.
Learn more about the *EHS internship program.*

Keep BSC Airflow Grilles Clear

This fall, representatives from the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International, visited Yale as part of their re-accreditation process for the university's animal care and use programs. One of the notable observations was that biosafety cabinet users on campus were frequently blocking the front grilles, which greatly impacts the safety features and sterility the cabinet provides. Laptop computers, notebooks, animal cages, pens, markers, pipette wrappers, and paper towels were all witnessed on an area of the cabinet that must remain unobstructed. Notably, inspectors observed researchers placing pads and performing procedures on animals directly over the front grille.

The airflow grilles must never be blocked by anything. EHS has embarked on an educational campaign to provide additional information to researchers on proper techniques for effective use of the biosafety cabinet. Please review this information to learn more about how the biosafety cabinet works and what interferes with proper operation. Effective use of the biosafety cabinet is not only a regulatory compliance requirement, but it protects you and others from exposure to biohazards and animal allergens and protects your research from adventitious contaminants. EHS will also be posting "Do Not Block the Front Air Grilles of the Biosafety Cabinet" stickers (pictured below) on all biosafety cabinets in animal facilities during the campaign period.

Handling and Preventing Frozen Liquid Nitrogen Valves



Liquid nitrogen is essential for many research applications, but its extreme cold can occasionally cause equipment malfunctions, such as a valve freezing open. This can lead to safety risks, including oxygen displacement. Here's how to prevent, address, and resolve this issue safely.

Prevention Tips

- **Regular Maintenance:** Inspect liquid nitrogen valves regularly to ensure they are clean, functional, and free of moisture.
- **Moisture Control:** Use proper storage techniques and keep equipment dry to minimize frost accumulation.
- **Thaw Proactively:** If you notice frost beginning to form, thaw the valve immediately using warm water before it freezes completely.

What to Do When a Valve Freezes Open

1. **Verify Oxygen Levels:** If the oxygen detection system signals or indicates low oxygen levels, evacuate the area immediately, inform others, and contact the EHS emergency line at 203-785-3555.
2. **Ensure Proper Ventilation:** If oxygen levels are within the acceptable range (19.5-23.5% O_2) and the area is safe to enter, increase ventilation where possible by opening windows or, if available, put the lab on purge exhaust. If a fume hood is present, roll the tank adjacent to the fume hood and open the sash fully. If safe to do so, bring the dewar to a loading dock (do not enter an elevator or other enclosed space).
3. **Use Warm Water to Thaw:**
   - Wear appropriate PPE: cryogenic gloves, a face shield, and a lab coat.
   - Pour warm (not hot) water gently over the frozen valve to thaw it. Avoid hot water, as it can damage the valve.
   - Once the valve is thawed, gently close it. Do not force it if resistance persists. Contact your vendor/supplier and report the valve failure.

Responding to an Oxygen Alarm

- **Evacuate Immediately:** If the alarm sounds, everyone should leave the area promptly. Oxygen displacement can occur rapidly and may not always be noticeable.
- **Wait for Clearance:** Do not re-enter until the area is declared safe by EHS or emergency responders.

Follow-Up Actions

- **Inspect Equipment:** After resolving the issue, inspect the valve and surrounding equipment for damage.
- **Document the Incident:** Record details of the event to help identify causes and improve safety procedures.
- **Request Support:** Contact your safety advisor for training on cryogenic safety and guidance on equipment maintenance.

By staying prepared and following these steps, you can ensure the safety of your team while minimizing disruptions to your research. For more information, click on the links below or contact your safety advisor.

- Cryogen Use and Storage Safety Guidelines
- Liquid Nitrogen Safety Guidelines and FAQs
- Airgas Troubleshooting Dewar Issues

Drain Disposal of Laboratory Chemicals

The Yale EHS Management of Hazardous Waste Procedure details the requirements for drain disposal of chemicals and rinsate from laboratory operations. Please review the procedure to determine if your material can be safely drain disposed.

Material discharged to a laboratory drain on campus enter the local Water Pollution Control Authority's sanitary sewer system where it is mixed with sewage and wastewater from area households and businesses and flows to the wastewater treatment facility.

At the waste treatment plant, the waste is subjected to bacterial degradation.

Non-degradable chemicals, such as metals, are adsorbed in the sludge or potentially discharged to surface waters. The drain disposal guidelines outlined below must be followed to minimize hazards within the plumbing system, prevent toxic concentrations of metals or organic compounds from reaching surface waters, accumulating in the sludge, or overwhelming or disrupting the sewage treatment process.

To help determine if your material is eligible for drain disposal, contact your safety advisor or the EHS Environmental Affairs Section at 203-432-6545.

The university is required to test its laboratory discharge, including for excessive chemical and biological oxygen demand (COD/BOD). Excessive organic material such as glycols and alcohols can cause exceedances in COD/BOD levels; please adhere to the 100 grams per day solute per laboratory quantity limitations in the procedure.

Some chemicals that are neither Connecticut regulated nor hazardous wastes, and that are either simple inorganic salts or organic materials readily digestible by the microorganisms in a water treatment plant, can generally be disposed of down the drain in limited quantities. The Federal EPA, Connecticut DEEP, and the local Water Pollution Control Authority regulate what can be disposed of through the sanitary sewer system.

The following materials should NEVER be disposed of through the sanitary sewer system:

- Any waste chemical that meets the EPA's criteria for being hazardous, either as a listed or characteristic waste
- Oil, grease, or other water insoluble chemicals
- Materials that are not biodegradable or would pass through the sewage treatment plant into the New Haven harbor and be toxic to aquatic organisms or accumulate in harbor sediments
- Flammable and combustible solvents (flashpoints less than 140oF) (unless sufficiently diluted in water as part of the laboratory process such that the solution has a flashpoint greater than 140oF)
- Discharges with a pH below 5.5 or higher than 9.5
- Materials that could interfere with the biological processes of sewage treatment or would contaminate the sludge-making disposal through the normal methods difficult or impossible
- All compounds that could result in the presence of toxic gases or vapors within the POTW in a quantity that may cause acute worker health and safety problems
- Malodorous compounds or volatile organic chemicals that can escape from the plumbing system (such as dry traps) causing exposures or obnoxious odors (such as mercaptans or thiols)
- Metallic ions and salts of the heavy metals in solutions or suspension
- Organic compounds other than as specified in Section 3.6.2
- Pesticides or solutions containing pesticides.
- Chemicals, including rinsate, prohibited from drain disposal by CTDEEP. (From Section 22a-430-4 of the Regulations of Connecticut State Agencies, Appendix B, Tables II, III, V and Appendix D). See lists by Category and Alphabetical in Appendix F of the Management of Hazardous Waste Procedure. These chemicals and their rinsate shall be collected as hazardous waste

EHS INTEGRATOR SUPPORT

EHS Integrator is used by faculty and staff to track their biological, chemical, and radiation registrations and protocols, hazardous material inventory, safety critical equipment, facility inspections, and training compliance.

If you have any questions about EHS Integrator access, registrations, surveys, inventory, waste pickups, and more, please submit your support request through ehs.yale.edu/ehs-integrator-assistance.

REMINDER:

Use aerosol-tight buckets and lids for experiments involving viral vectors.

BSL-2 enhanced work practices are required for research involving defective lentiviruses. To comply with these requirements, aerosol-tight buckets and lids for centrifugation must be used for any defective lentivirus protocols including spinfections and spinoculations (centrifuging well plates/tubes with defective viral vectors to increase the efficiency of viral transduction/ infection/transfection). Aerosol containment buckets and covers must accommodate the well plates to prevent spills and contain aerosols. Please note that only certain centrifuges, rotors and aerosol-tight buckets can accommodate well plates, therefore researchers are required to confirm that centrifuges meet the requirements to contain aerosols before any experiments begin.

Incident Overview: TRIzol Exposure in the Lab

A recent incident involving TRIzol exposure has highlighted the importance of using appropriate personal protective equipment (PPE) and adhering to safety protocols, even when working in a controlled environment like a fume hood. Here's what happened and the lessons learned to help prevent future occurrences.

The Incident

A researcher was using TRIzol in the fume hood while wearing gloves and a lab coat. During the procedure, a splash occurred, and TRIzol made contact with the skin near the eye. Although polyethylene glycol (PEG) was immediately applied to the affected skin, the researcher wisely decided to seek medical evaluation at Yale Health Acute Care to ensure no further harm.

Key Factors

TRIzol, a reagent commonly used in RNA extraction, contains phenol and is known for its potential to cause skin and eye irritation. Although the work was performed inside a fume hood to minimize inhalation risk, safety goggles were not worn, as the team considered the fume hood sufficient for protection against splashes. However, this incident demonstrated that the angle and force of a splash could still result in accidental exposure.

Actions Taken

Following the incident, the lab immediately reviewed and updated its safety protocols. The use of safety goggles, in addition to gloves and lab coats, is now enforced when handling TRIzol or any other hazardous chemical that could pose a splash risk.

Additional Requirements

Researchers using TRIzol are reminded that they must fill out a Phenol Survey in EHS Integrator to register its use. Labs that complete this registration will receive an initial PEG kit free of charge. This registration helps ensure that all necessary safety measures are in place and that researchers are aware of the hazards associated with TRIzol.

Lessons Learned

1. **PPE Beyond the Basics:** Even in a controlled environment like a fume hood, PPE should be selected based on the specific risks associated with the chemicals being handled. Safety goggles or face shields are essential when there is any potential for splashes, particularly with chemicals like TRIzol that can cause severe eye irritation.
2. **Immediate Response is Crucial:** The researcher's prompt action in applying PEG and seeking medical attention was vital. Always report incidents immediately, even if the exposure seems minor, to ensure proper treatment and documentation.
3. **Register Phenol Containing Chemicals:** Registering the use of TRIzol, through the Phenol Survey in EHS Integrator ensures that safety protocols are followed and that all lab personnel are properly informed of the potential risks. Additionally, registered labs will benefit from receiving a free initial PEG kit.
4. **Review and Update Safety Protocols Regularly:** Safety procedures should be continually assessed and updated as new risks are identified. This proactive approach helps maintain a safe working environment and prevents similar incidents.

Conclusion

This incident serves as a reminder to all lab personnel to carefully assess the risks of their work and wear the appropriate PPE. Remember to register the use of TRIzol by completing the Phenol Survey in EHS Integrator to receive a free initial PEG kit. Safety is everyone's responsibility, and by taking the necessary precautions, we can maintain a safer laboratory environment for all.

Keeping Eyewashes Functional: Weekly Inspection Tips

Eyewashes are vital emergency safety devices designed to provide immediate decontamination for the eyes in case of exposure to hazardous substances. While EHS conducts annual testing and certification of eyewashes and safety showers, lab users must test eyewashes weekly to ensure they function correctly and deliver clear water in times of need. Recently, a researcher noticed that the emergency eyewash sprayer had been improperly positioned and draped over the counter and in the sink. After repositioning the device, the researcher accidentally brushed the eyewash sprayer with their forearm, causing it to spray high-pressure water into their eye. On investigation, it was found that part of the sprayer nozzle had been removed, increasing the water pressure far beyond the appropriate range for an eyewash.

This incident is a powerful reminder of the importance of regular safety equipment inspections. Here are some best practices for inspecting eyewashes:

1. **Correct Positioning:** Ensure the eyewash sprayer is securely mounted and easily accessible. Any deviation from the proper positioning can hinder quick access in an emergency.
2. **Component Verification:** Check that all parts of the eyewash are intact. Missing, damaged, or worn components can render the eyewash ineffective or, worse, hazardous. If a hazardous condition is identified, place a service request immediately and tag out the eyewash.
3. **Water Testing:** Activate the eyewash for 1-3 minutes to flush out stagnant water and verify the appropriate water pressure and temperature. The pressure should be gentle enough to avoid injury while effectively flushing the eyes, and the temperature should be tepid.

By prioritizing weekly inspections and upkeep of eyewashes and other safety equipment, we can prevent accidents and ensure a safer working environment for all. For more information, please get in touch with your safety advisor.

STOP THE PROP

A recent inspection brought forward a reminder that laboratory doors may not be propped open. Doors may only be opened for lab entry and exit. Biosafety regulations imposed by the State of Connecticut Department of Public Health require that doors be kept closed while research is in progress. The fire safety requirements (National Fire Protection Association Standard 101) state that all lab doors be shut at all times except for entry and exit. EHS will be posting stickers (see below) on all research lab doors to remind researchers of this requirement. Please help us by sharing with your colleagues that propping doors open is not allowed in research laboratories.