Policy Title: Working Alone in Laboratories

Policy Category: University Policy

Policy Owner: Venessa Macro

Review Period: Every Two (2) Years

Effective Date: January 1, 2016

Related University Policies:

Purpose

This policy provides safety requirements for working alone in Drake University laboratories. Working alone, especially after hours, can be unsafe and should be avoided whenever possible. When working alone cannot be avoided, other available means should be used to protect workers in an emergency situation.

Policy

High School Students: Never permitted to work alone in a laboratory, even with non-hazardous materials. They must always have a Faculty, Staff or Student supervisor present. Supervisors must have completed all required laboratory safety training pertaining to the work that the students will be performing. The Supervisor must understand the hazards and risks of the student's project and must have reviewed the written SOP/safety protocol.

Undergraduate Students: Never permitted to work alone with hazardous materials or equipment. Someone else must be in the lab or adjacent to the lab and be able to check on their safety.

Graduate Students, Postdoctoral Fellows, Research Scientists, Technicians and Principal Investigators: These are considered full time laboratory workers and laboratory training is an integral component of their professional training. They are permitted to work alone in a research laboratory after approval by the PI and must follow all lab safety protocols for working alone.

Unaffiliated Workers: An unaffiliated worker is a Faculty, Scientist, Staff member or, Student from another institution or business that is collaborating or assisting in research being conducted at this institution. The Principal Investigator for the project must assess their knowledge, skill and proficiency to make the determination on whether they are allowed to work alone. It is strongly recommended that they be placed in the corresponding group that would be in if they were affiliated with Drake University, unless they need to be in more restricted category.

Scope

This policy applies to all work with hazardous materials (chemical, biological or radiological material) or hazardous equipment in laboratories at Drake University.

Responsibility

Principal Investigator (PI): approve laboratory staff that may conduct work with hazardous materials and equipment alone in the research laboratory.

Laboratory Workers: Obtain PI approval before working alone in the laboratory.

Definitions

Laboratory: A laboratory is defined as, but is not limited to, any location where research or teaching is conducted using hazardous chemicals, biohazardous or biological materials, radioactive materials and/or radiation producing devices, or controlled experiments on animals. A storage room containing the above materials is considered a laboratory if the materials are stored in support of teaching or research.

Buddy System: A "buddy system" establishes regular, routine checks on personnel working alone, such as every 5 – 10 minutes, to ensure no accidents have occurred. Checks should be accomplished by physically walking to the room where the lab worker is located. A system of visual checks ensures there are no problems and/or determines if help is needed.

Working Alone: A worker is considered as "working alone" if the individual is working by his/herself and assistance is not readily available should some injury, illness or emergency arise. Alone is interpreted as being out of visual contact with another person for more than a few minutes. It includes working in physical isolation (e.g. as the sole occupant of a laboratory or during a site sampling activity) where no other person is in the vicinity (i.e. within a short direct range or earshot). It is possible for a worker to be on the same floor of a building or even in the same general area as others, yet be working alone. It can occur during normal working hours as well as in the evening, at night, or during weekends.

Hazardous Materials and Equipment: Hazardous materials includes but is not limited to: chemicals that are pyrophoric, water reactive, potentially explosive, acutely toxic, peroxide forming, strong corrosives, strong oxidizing agents, strong reducing agents, regulated carcinogens, biological material that is listed as a "select agent", and radiological material. Hazardous equipment includes, but is not limited to, equipment found in machine shops (lathes, drill presses), Midspeed to ultra-centrifuges (excluding micro-centrifuges), and autoclaves. A list of example Hazardous equipment can be found in Attachment 1.

Serious Injury: Substantial risk of death, unconsciousness, protracted and obvious disfigurement, or loss or impairment of the function of a bodily member, organ, or mental faculty.

Procedures

Working Alone

1.1. Working alone, especially after hours, should be avoided whenever possible.
1.2. Conduct a Hazard Assessment of the work being performed and the risks and emergency response requirements for working alone or after hours.
1.3. Prepare a written safety protocol identifying the hazards and risks along with the methods for controlling the risks.
1.4. Working alone and working after normal building hours requires supervisor/PI approval.
1.5. PI approval for working alone or after normal building hours must consider:
- Tasks and hazards involved in the work.
- Consequences resulting from a worst-case scenario.
- The possibility of an accident or incident that would prevent the laboratory personnel from calling for help.
- The laboratory personnel's training and experience.
- Time the work is to be conducted (during normal business hours versus at night or on weekends/holidays). See Appendix for *Laboratory Specific Working Alone Protocol Approval* form.

1.6. Have a cell phone on person with University Public Safety Department phone number programmed in (515-271-2222). If a cell phone is not available or there is no cell service, know

where the campus phone is located and have the emergency number posted nearby.

1.7. Each lab must develop a safety protocol for working alone (or use the recommended form in this policy). This protocol must clearly state what hazardous materials (chemical, biological and/or radiological), equipment, and/or procedures must not be performed when working alone. Example requirements are:

The policy in this laboratory is:

The following chemicals will not be used while working alone:

- Pyrophoric Chemicals
- Water Reactive Chemicals
- Potentially Explosive Chemicals or Compounds
- Explosive Salts
- Acutely Toxic Chemicals or Gases
- Peroxide Forming Chemicals
- Strong Corrosives
- Strong Oxidizing Agents
- Strong Reducing Agents
- Regulated Carcinogens
- Other chemicals or substances deemed hazardous by PI, Lab Manager or EH&S

The following biological material will not be used while working alone:

- Select Agents (ex. Botulinum neurotoxins, Tetrodotoxin, Yersinia pestis)

  (http://www.selectagents.gov/SelectAgentsandToxinsList.html)

The following procedures will not be conducted with only one person present:

- Use of machine shop equipment or lathes
- Procedures involving high-pressure equipment [identify specific equipment]
- Transferring large quantities [e.g., 10 liters or more] of hazardous materials
- Handling animals that could cause serious injury
- Other safety considerations for working alone in the laboratory: (list specific lab requirements)

Emergency requirements including, but not limited to:

- A reasonable expectation that the person would have the ability to self-rescue
- "Check in" with someone (identify person and confirm they are available before beginning work)
- Door has a viewing window or other means of indicating someone is inside
- Use Drake Guardian
  - Turns your cell phone into a "personal blue light phone" in your pocket and can function in "Panic Call Mode" or "Precautionary Timer Mode". This application only works where you have cell phone service or a wireless internet connection.
  - The profile for those individuals working alone in laboratories should include the following:
    - Name
    - Building name/number, floor number, room/lab number
    - Any highly hazardous processes/chemicals being used

  Instructions for accessing Drake Guardian:
  www.drake.edu/publicsafety/drakeguardianmobileapp

Situations where working alone may occur include:

- Periodic attendance to check laboratory equipment/experiments
- Cleaning and maintenance activities in laboratories

- Working with analytical equipment
- Working in storage areas and temperature-controlled rooms
- Working in offices, libraries and at computer workstations

1.8. A Laboratory Emergency Plan must be posted near the lab phone. The names and phone numbers for the lab and building contacts must be up to date.

2. Recordkeeping and Auditing
   2.1. Copies of the protocol approval will be kept by the department or college, and an electronic copy will be sent to EHS. Students and Unaffiliated Workers this will be completed once per Semester, and for Faculty and Staff once per academic year.
   2.2. EHS will audit compliance during lab inspections, no less than once per semester.

3. **Related attachments, forms or documents**:

   3.1 Policy Summary
   3.2 *Laboratory Specific Working Alone Protocol Approval*
   3.3 *Appendix 3, List of Example Hazardous Lab and Shop equipment*

Appendix: Policy Summary

See Policy for definitions and descriptions

Summary for Personnel

<table>
<tr><th></th><th>HS</th><th>UG</th><th>Grad</th><th>PI and Non-Student Worker</th></tr>
<tr><td>No Hazardous Materials</td><td rowspan="2">Always supervised when in lab</td><td colspan="3">No restrictions</td></tr>
<tr><td>Hazardous Materials, Process &/or Equipment</td><td>Someone else in the lab</td><td>Working alone ok after PI approval</td><td>Working alone ok after PI approval</td></tr>
</table>

Summary for Supervision

Supervision	Qualified Supervision at all times	Someone present in lab	Working AlonePermitted with PI Approval
Personnel	High School Students	Undergraduate Students	Graduate Students, Postdoctoral Fellows, PhD Students, Research Scientists, Technicians

Environmental Health and Safety
2804 Forest Ave
Harvey Ingham 30
Des Moines, Iowa 50311
Phone: (515) 271-3804
ehs@drake.edu
www.drake.edu/ehs

Laboratory Specific Working Alone Protocol Approval*

Lab Worker:_____

Lab Location:_____Date: _____
(include date range for this specific protocol)

Chemical Hazards: *Working with any materials in these hazard classes requires a "buddy system"*

❍ **Pyrophoric Chemicals** (ex.: Lithium Reagents: RLi (R = alkyls, aryls, vinyls); Metal carbonyls: Lithium carbonyl, Nickel tetracarbonyl; Metal hydrides: Potassium Hydride, Sodium hydride, Lithium Aluminum Hydride; Nonmetal hydrides: Arsine, Boranes, Diethylarsine, diethylphosphine, Germane, Phosphine, phenylphosphine, Silane; Elements: Phosphorus, Cesium, Lithium, Potassium, Sodium, Sodium Potassium Alloy (NaK)), or listed as OSHA Hazard Class Pyrophoric
❍ **Water Reactive Chemicals** (ex.: Aluminum Carbide, Calcium, Calcium carbide, Lithium aluminum hydride, Potassium, Sodium), or listed as OSHA Hazard Class "substances which, in contact with water, emit flammable gases"
❍ **Potentially Explosive Chemicals** (ex.: Azide Metal (M-N3), Nitrate (-ONO2), Nitro (-NO2), Nitrite (-ONO), Peroxide (-O-O-), Ammonium nitrate, Ammonium perchlorate, Benzoyl peroxide, Dinitrophenol, Nitrocellulose, Picric acid (trinitrophenol), Urea nitrate), or listed as OSHA Hazard Class Explosive or Self-reactive
❍ **Explosive Salts** (ex.: Perchlorate salts (ClO4-)), or listed as OSHA Hazard Class Explosive or Self-reactive
❍ **Acutely Toxic Chemicals** (ex.: Carbon Monoxide, Cyanide salts, Digoxin, 2,4-Dinitrophenol, Methyl mercaptan, Nitric oxide,Phosgene, Potassium cyanide, Sodium Azide, Sodium cyanide, any chemical with LD50 (oral)< 50 mg/kg) or listed as OSHA Hazard Class Acutely Toxic Category 1 or 2
❍ **Peroxide Forming Chemicals** (ex.: Isopropyl Ether, Methyl Isobutyl Ketone, Tetrahydrofuran, Acrylonitrile, Methyl Methacrylate, Styrene), or listed as OSHA Hazard Class Peroxide
❍ **Strong Corrosives** (ex., Hydrochloric acid, Hydrofluoric acid, Nitric acid, Perchloric acid, Phenol, Sulfuric acid, Potassium hydroxide, Sodium hydroxide), or listed as OSHA Hazard Class Corrosive
❍ **Strong Oxidizing Agent** (ex.: Ammonium perchlorate, Ammonium permanganate, Bromine, Calcium chlorate, Calcium hypochlorite, Chromic acid, Hydrogen peroxide, Oxygen), or listed as OSHA Hazard Class Oxidizer
❍ **Strong Reducing Agents** (ex.: Lithium, Lithium aluminum hydride, Magnesium, Potassium, Sodium, Sodium borohydride)
❍ **Regulated Carcinogens** (ex.: Acrylonitrile, Benzene, Formaldehyde, Gallium Arsenide, Inorganic Arsenic, Paraformaldehyde), or listed as OSHA Hazard Class Carcinogen
❍ **Other:**

Biological Hazards: *Working with any materials in this hazard class requires a "buddy system"*

❍ **Select Agents** (ex. Botulinum neurotoxin, Tetrodotoxin, Yersinia pestis) http://www.selectagents.gov/SelectAgentsandToxinsList.html
❍ **Other:**

Health and Safety Requirements:

Can the person have a reasonable expectation to rescue themselves in case of an emergency?	Yes	No
Identify that a "Buddy" is required and confirm they are available before beginning work each time.		
Drake Guardian activated? During a timer session, Guardians and Public Safety can view your profile—which should include Name, Building name/number, floor number, room/lab number, and any highly hazardous processes/chemicals being used —and monitor your location. If the Safety Timer is not deactivated manually before it expires, Public Safety is automatically provided with your Drake Guardian profile to proactively identify and check in on you. http://www.drake.edu/publicsafety/drakeguardianmobileapp		
The Laboratory Emergency Plan is posted near the lab phone. The names and phone numbers for the lab and building contacts are up to date.		

❒ This procedure *does not* involve any highly hazardous materials or processes. "Working Alone" is allowed.

❒ This procedure involves work with highly hazardous materials or processes.

Laboratory Worker Signature: _____ Date_____

Principal Investigator Approval:

I have reviewed the Hazard Assessment for this procedure, the tasks and hazards involved in the work, the consequences resulting from a worst-case scenario, the possibility of an accident or incident that would prevent the laboratory personnel from calling for help, the laboratory personnel's training and experience and the time the work is to be conducted (during normal business hours versus at night or on weekends/holidays). This lab worker has permission to work alone on this procedure.

PI Date:

Appendix 3: List of Example Hazardous Equipment and Tasks

Powerful portable and small benchtop tools (>1/2 hp; 10-15 amps @ 120 VAC; 24-36V portable, pneumatics, hydraulics)

- Circular saw
- Belt sander
- Framing nailer
- Drill (both portable and benchtop)
- Reciprocating saw
- >20V cordless tool
- Chop/miter saw
- Router
- Mini-lathe
- Angle grinder
- Printing press

Light industrial tools (typically benchtop; <1/2 hp, pneumatics, hydraulics)

- Small bandsaw
- Small drill press
- Small/benchtop milling machine
- Small/benchtop lathe
- Belt/disc sander
- Horizontal saw
- Scroll saw
- Planer/jointer
- Bench grinder

Large industrial tools (manual and NC-controlled)

- Full sized milling machine
- Full sized metal lathe
- Table saw (non-SawStop)
- Radial arm saw
- Large drill press
- Large band saw
- Surface grinder
- Large jointer/planer
- Shaper/moulder
- Power shear

Hazardous Lab Equipment

Centrifuges-Mid-speed to ultra, excluding micro-centrifuges
Autoclaves
High voltage equipment (above 120 VAC)
Radioactive materials
Lasers- Class III and above
Cryogenics-Dispensing
Compressed Gas Cylinders-Installing, Uninstalling, or exchanging
Ultrasonic Sonicators

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