IOWA STATE UNIVERSITY
Environmental Health and Safety

Greenhouse Safety Manual

2408 Wanda Daley Drive | Ames, IA 50011-3602 | (515) 294-5359 | www.ehs.iastate.edu

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Protecting the Safety, Health, and Environment of the Iowa State Community

Iowa State University strives to be a model for safety, health, and environmental excellence in teaching, research, extension, and the management of its facilities. In pursuit of this goal, appropriate policies and procedures have been developed and must be followed to ensure the Iowa State community operates in an environment free from recognized hazards. Faculty, staff, and students are responsible for following established policies and are encouraged to adopt practices that ensure safety, protect health, and minimize the institutions' impact on the environment.

As an institution of higher learning, Iowa State University

- fosters an understanding of and a responsibility for the environment,
- encourages individuals to be knowledgeable about safety, health and environmental issues that affect their discipline, and
- shares examples of superior safety, health and environmental performance with peer institutions, the State of Iowa and the local community.

As a responsible steward of facilities and the environment, Iowa State University

- strives to provide and maintain safe working environments that minimize the risk of injury or illness to faculty, staff, students, and the public,
- continuously improves the operations, with the goal of meeting or exceeding safety, health and environmental regulations, rules, policies, or consensus standards, and
- employs innovative strategies of waste minimization and pollution prevention to reduce the use of toxic substances, promote reuse, and encourage the purchase of renewable, recyclable and recycled materials.

The intent of this statement is to promote environmental stewardship, protect health, and encourage safe work practices within the Iowa State University community. The cooperative efforts of the campus community will ensure that Iowa State University continues to be a great place to live, work, and learn.

Wendy Wintersteen
President

Service and Emergency Providers

Environmental Health and Safety
2408 Wanda Daley Drive | (515) 294-5359

Iowa State University Occupational Medicine Department
G11 Technical and Administrative Services Facility (TASF), 2408 Pammel Drive | (515) 294-2056

McFarland Clinic PC, Occupational Medicine
1018 Duff Avenue | (515) 239-4496

Thielen Student Health Center
2647 Union Drive | (515) 294-5801

Emergency

Emergency - Ambulance, Fire, Police
911

Department of Public Safety/ Iowa State University Police
Armory, 2519 Osborn Drive | (515) 294-4428

Mary Greeley Medical Center
1111 Duff Avenue | (515) 239-2011

Non-discrimination Statement

"Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3350 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. (515) 294-7612, email eooffice@iastate.edu"

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A. Introduction

The Iowa State University Greenhouse Safety program provides a framework of requirements and guidelines for hazard identification, controls, and training that will minimize potential hazards to greenhouse users. Tailoring this program to each greenhouse space is necessary to address unique hazards that may be present in each greenhouse setting. Customized procedures must be added to each greenhouse program to provide a comprehensive outline for greenhouse safety. Greenhouse personnel must have access to, be familiar with, and adhere to the Greenhouse Safety Manual as a primary basis for working safely in Iowa State University (ISU) greenhouse spaces. All approved greenhouse users must review and follow the Greenhouse Safety Manual and their research program's standard operating procedures.

Definition of Greenhouses

At Iowa State University, a greenhouse is defined as a structure with a glass or plastic roof and side walls, used to produce research crops/plants/materials and may be used seasonally or year-round. Iowa State University has greenhouses in many departments and buildings/facilities, including, but not limited to Agronomy Hall, Advanced Teaching and Research Building (ATRB), Bessey Hall, Biocentury Research Farm (BCRF), Horticulture Farm, Horticulture Hall, ISU Muscatine Island Research Farm (MIRF), Molecular Biology, and Carver Co-Laboratory.

B. Responsibilities

ISU encourages employees at all levels to promote a positive attitude regarding safety, to incorporate safety into their work practices, and to cooperate fully in the implementation of safety-related programs. Iowa State University shall provide greenhouse safety training for faculty, staff, student-employees, and students who are using the ISU greenhouses.

Department:

- Develop, adapt, and implement greenhouse policies, requirements, and procedures.
- Ensure adequate supervision and access control are provided per ISU and department policy.
- Provide support and necessary items/supplies to greenhouse managers to implement safety measures in the greenhouse.

Environmental Health and Safety:

- Provide support in implementing the Greenhouse Safety Manual.
- Assist with regulatory compliance.
- Conduct periodic greenhouse safety surveys per EH&S policy.
- Ensure relevant training is available for greenhouse users.

Principal Investigator (PI):
(May also serve as greenhouse supervisor)

- Develop specific greenhouse safety policies, requirements, and procedures required by the Greenhouse Safety Manual and ensure they are being followed.
- Implement emergency response procedures and ensure they are communicated to users.
- Encourage a safe work culture by modeling safe work practices.
- Submit the first report of injury/incident forms as necessary.
- Submit annual greenhouse chemical and/or biological inventories to EH&S.
- Provide personal protective equipment (PPE).
- Remove or replace damaged or broken equipment and signs.
- Maintain site-specific training records.

Greenhouse Manager:
(Oversees the greenhouse spaces and its users)

- Implement greenhouse safety policies and procedures outlined in the Greenhouse Safety Manual and their customized greenhouse program.
- Encourage a safe work culture by modeling safe work practices.
- Routine greenhouse maintenance, coordinating repairs with ISU Facilities Planning and Management (FPM) or outside contractors, supply ordering, repairs, and coordination of greenhouse space with potential researchers.

Greenhouse Users and Personnel:

- Follow specific policies and procedures outlined in the Greenhouse Safety Manual and their customized greenhouse program.
- Complete required greenhouse related training.
- Inspect each piece of equipment before and after use.
- Report hazardous or unsafe conditions and damaged or missing equipment to a supervisor.
- Use, maintain, and store required PPE properly.
- Perform general housekeeping tasks.
- Report all injuries to a supervisor, including injuries to greenhouse.

Greenhouse visitors:

- Understand and comply with the greenhouse rules.
- Abide by the posted health and safety signage.

C. General Greenhouse Safety Guidelines

All greenhouse users and managers must follow safe work practices, complete and document safety training (both site-specific and through EH&S) and abide by posted health and safety signs.

Greenhouse Access

Greenhouses at ISU are considered workplaces of departments/facilities; therefore, only authorized users (as defined by the department and its representatives) should have access to greenhouse spaces. The greenhouses are to be used only for university-approved programs, not for personal use.

General Greenhouse Safety

The following general safety practices apply to all greenhouses at ISU. Greenhouse managers/PIs may also apply additional requirements, as appropriate.

- Greenhouse doors are locked when unoccupied.
- Ensure fire doors are kept closed.
- Aisles must be clear to allow for safe and unobstructed passage.
- Good housekeeping is practiced, including proper disposal of trash, plants, and soil.
- Ensure that water hoses are free from walkways; nozzles are kept off the floor; hose integrity is maintained; hoses are hung properly, and water is turned off while not in use.
- Food, beverages, tobacco, vapes, and cosmetics are absent from the research areas of the greenhouse.
- Refrigerators in the greenhouses should be properly labeled (no food or drink, no volatile chemicals, etc.).
- Post signage indicating water supplies are for plant usage only.
- Avoid horseplay or other disruptive behavior.
- Avoid working alone in the greenhouse. If it is unavoidable, make arrangements with the greenhouse supervisor or a colleague to check on your status periodically.
- Obtain approval from the greenhouse manager (if applicable) before using any machines, equipment, or tools.
- Document acknowledgement of the hazard assessment and the implemented controls to mitigate each hazard.
- Ensure ventilation is operational and appropriate for the task.

- Ensure a sink, liquid hand soap, and paper towels are available in the greenhouse.
- Wash your hands before leaving the greenhouse.
- Easily removed shading formulations should be used. Shading material should not be removed chemically and should be removed by snowfall or with water and scrubbing.
- Wet floor signage should be posted to alert greenhouse users and visitors to potential hazards.
- Wear appropriate attire and fully enclosed, non-slip shoes.
- Ensure ladders are maintained and inspected regularly.
- Ensure sharps disposal containers are leak proof, puncture resistant, and have a lid.
- Ensure machines in the greenhouse are securely anchored.

Hazardous Chemicals

A greenhouse using any chemical with an SDS (solvents, pesticides, etc.) must comply with the Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450; Laboratory Standard), the OSHA Hazard Communication Standard (29 CFR 1910.1200), and the Personal Protective Equipment Standard (29 CFR 1910.132). The greenhouses using pesticide products must also comply with the Environmental Protection Agency's Agricultural Worker Protection Standard (WPS, 40 CFR 170). Safety data sheets (SDS) for all chemicals or products in the greenhouse must be available to all users, and an annual chemical inventory must be submitted to EH&S.

Proper Labeling

All containers used to store chemical or biological material in the greenhouses must be labeled to ensure hazard information is readily available to greenhouse users, visitors, and emergency response personnel.

The label must include the following components:

- Proper chemical or common name of contents in English. Chemical formulas, symbols, or acronyms alone are not acceptable. Mixtures or solutions must include a list of constituents and their concentrations.
- Signal word, available from a safety data sheet (SDS) (danger, caution, or warning).
- Associated hazard statement(s), (fatal if swallowed, flammable liquid, vapor, etc.).
- Include additional information, such as dates received,

prepared or opened, storage location, and owner or user of the material.

Chemical Storage

- All hazardous liquids in storage should have compatible secondary containment.
- Store chemicals in a cool, dry area, away from direct sunlight, heat, and water sources.
- Chemicals must be segregated according to compatibility. Refer to the SDS.
- Flammable liquids must be stored appropriately. Quantities more than 10 gallons must be stored in an approved flammable cabinet.

Hazardous Waste

- Waste or unwanted chemicals must be accumulated in designated Satellite Accumulation Areas (SAA) in the same room or suite of rooms where they are generated.
- The SAA should be appropriately marked (see Postings and Signage).
- Waste containers must be closed when waste is not actively being added and they must be labeled with orange waste tags. The orange tags must be completely filled out when hazardous waste accumulation begins.
- Hazardous waste cannot be moved across hallways or between SAAs.
- Waste removal can be initiated by submitting an online request. Consult ISU's Waste and Recycling Guidelines for more information.
- Greenhouse mangers are responsible for proper disposal of the other greenhouse waste such as used soil, foliage, and organic waste.

Postings and Signage

Postings and signage are used to identify hazards, communicate procedures, and provide guidance during emergencies.

Hazard communication door signage provides critical information to greenhouse users, visitors, and emergency responders and alerts them to specific hazards. Greenhouse managers and PIs are responsible for keeping their hazard communication signage up to date. Post the hazard communication door signage on the exterior, main entrance to the greenhouse and on individual interior rooms within the greenhouse.

The Door Signage Program requires a current chemical inventory.

If applicable, the interior of the greenhouse must be posted with the following:

- The Hazardous Waste Satellite Accumulation Area sign. Place this orange sign where you intend to accumulate waste or unwanted chemicals for collection. Contact EH&S to request an SAA sign.
- Signs identifying the Emergency Action Plan and safety equipment locations (fire extinguisher, safety shower, eyewash fountain, etc.) are required.

If you have questions about required signage, please contact EH&S at (515) 294-5359 or ehsinfo@iastate.edu.

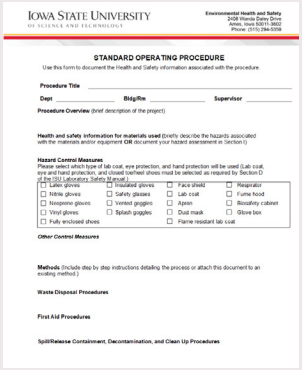
Greenhouse Safety Surveys

EH&S has a Greenhouse Safety Survey program in place to assist in identifying unsafe conditions and areas of improvement to protect workers and the environment. EH&S will coordinate with greenhouse users and managers to schedule surveys. Greenhouse managers and PIs will be responsible for implementing corrective actions to deficiencies noted during surveys. In addition to EH&S surveys, greenhouse managers and PIs are required to conduct and document their own greenhouse safety surveys annually.

Standard Operating Procedures (SOPs) and Hazard Assessment

All operations involving hazardous materials (biological, chemical, or radiological) or physical hazards must have a written SOP and documented hazard assessment. An SOP provides a reference during instruction, training, and competence verification on individual equipment or processes. For assistance, see the SOP Development page.

A hazard assessment documents the hazards greenhouse personnel may encounter and specifies the controls in place to mitigate the risks of those activities. The PI must approve all SOPs and hazard assessments and all greenhouse personnel must have documented training on the SOP and hazard assessment before beginning work. See the ISU Resources for Greenhouses web page for more information.


IOWA STATE UNIVERSITY
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STANDARD OPERATING PROCEDURE

Use this form to document the Health and Safety information associated with the procedure.

Procedure Title

Dept Bldg/Rm Supervisor

Procedure Overview (brief description of the project)

Health and safety information for materials used (briefly describe the hazards associated with the materials and/or equipment OR document your hazard assessment in Section I)

Hazard Control Measures

Please select which type of lab coat, eye protection, and hand protection will be used (Lab coat, eye and hand protection, and closed toe/heel shoes must be selected as required by Section D of ISU Laboratory Safety Manual)

☐ Latex gloves	☐ Insulated gloves	☐ Face shield	☐ Respirator
☐ Nitrile gloves	☐ Safety glasses	☐ Lab coat	☐ Fume hood
☐ Neoprene gloves	☐ Vented goggles	☐ Apron	☐ Biosafety cabinet
☐ Vinyl gloves	☐ Splash goggles	☐ Dust mask	☐ Glove box
☐ Fully enclosed shoes		☐ Flame resistant lab coat	

Other Control Measures

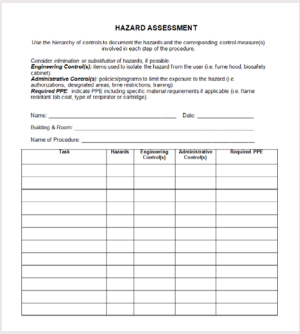
Methods (include step by step instructions detailing the process or attach this document to an existing method.)

Waste Disposal Procedures

First Aid Procedures

Spill/Release Containment, Decontamination, and Clean Up Procedures

SOP Template


HAZARD ASSESSMENT

Use the hierarchy of controls to document the hazards and the corresponding control measure(s) involved in each step of the procedure.

Consider elimination or substitution of hazards, if possible.
Engineering Control(s): Items used to isolate the hazard from the user (i.e. fume hood, biosafety cabinet)
Administrative Control(s): policies/programs to limit the exposure to the hazard (i.e. authorizations, designated areas, time restrictions, training)
Required PPE: indicate PPE including specific material requirements if applicable (i.e. flame resistant lab coat, type of respirator or cartridge)

Name: Date:

Building & Room:

Name of Procedure:

Task	Hazards	Engineering Control(s)	Administrative Control(s)	Required PPE

Hazard Assessment Template

D. Safety Practices for Specific Hazards

The following safety practices apply to Iowa State University (ISU) greenhouses where specific hazardous materials or processes are encountered.

Pesticides and Fertilizers

All greenhouses using pesticides must comply with Federal Worker Protection Standard (WPS) regulations issued by the U.S. Environmental Protection Agency (EPA). Pesticides must be applied by a certified pesticide applicator and must be stored in designated, secure, and labeled storage areas. The pesticide application equipment should be stored in the chemical storage area or in a similar location only accessible by trained personnel. Pesticides must be stored by hazard class (flammable, corrosive, toxicity/poison, reactive, etc.) and pesticidal function, with incompatible materials physically separated from one another. Fertilizers should be stored in a separate designated storage area away from pesticides. Pesticides should be stored in their original containers. If a container becomes damaged, pesticides must be transferred to a compatible container with a complete label, including the full name, signal word, and hazard statements. When handling pesticides and fertilizers, personnel must wear appropriate PPE, as recommended by the SDS. An inventory of pesticides, fertilizers and other chemicals stored in ISU greenhouses must be submitted to EH&S by completing an annual chemical inventory.

Transgenic Material and Regulated Plant Pests

Greenhouse users must be aware of the special procedures required for permitted transgenic materials and plant pests. The PI is responsible for ensuring personnel working with transgenic material and permitted plant pests have the proper training. Users may only remove transgenic and/or permitted material from the greenhouse spaces with PI approval, and only approved users have access to spaces with transgenic and/or permitted material. Users must practice appropriate methods to render transgenic materials and plant pests biologically inactive before disposal. Refer to the ISU Biosafety Manual: Section E, for additional information about proper disposal and disinfection of biohazardous materials.

Permit requirement for transgenic material and plant pests:
Special federal permits may be required for importing, exporting and/or transporting plant pathogens or plant pests, and plants or plant products. The USDA, through its Animal and Plant Health Inspection Service (APHIS), regulates transport of materials that could potentially harm U.S. agricultural products, such as livestock or crops. For this reason, APHIS permits may be required for import and/or transport of animal or plant pathogens, soil samples, insects, plants or plant products, or transport or introduction of genetically modified organisms

into the environment. Permit requirements should be verified well in advance of needing the material in question, because some permits can take 60-180 days to receive. The biosafety staff can assist with any questions about shipping and/or required permits for biological materials. For assistance in determining the need for a permit, see Permits on the EH&S website or call (515) 294-5359.

Any transgenic or plant pest materials transported between greenhouses or buildings on campus must be double-contained to protect against release of the materials into the environment. Refer to the Guidelines for Transport of Infectious Materials by Non-Commercial Routes for detailed procedures. Transport containers must be labeled with the biohazard symbol and the identity of the material inside.

Autoclave Safety

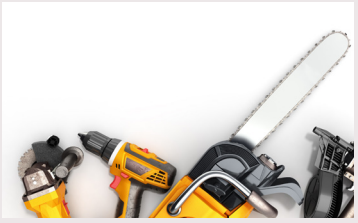
Autoclaves use saturated steam under high pressure to achieve sterilizing temperatures. Proper use is important to ensure operator safety. Prevent injuries when using the autoclave by observing the following rules:

- Wear heat-resistant gloves, eye protection, fully enclosed shoes, and a lab coat.
- Prevent steam burns and shattered glassware by making sure that the pressure in the autoclave chamber is zero before opening the door at the end of a cycle. Slowly open the autoclave door and allow any residual steam to escape gradually.
- Allow items to cool for at least 10 minutes before removing them from the autoclave. Be careful with glass containers that contain liquids. Superheating is a condition that occurs often in autoclaves. Superheating occurs when liquids are at a temperature above their normal boiling point but do not appear to be boiling. In situations where personnel hurry to remove flasks or bottles from the autoclave, these superheated containers can explode or boil over.
- Never put sealed containers in an autoclave. They can explode. Large bottles with narrow necks may boil over violently if filled too full of liquid.
- Never put solvents, volatile or corrosive chemicals (such as phenol, chloroform, bleach, formalin, fixed tissues, etc.), or radioactive materials in an autoclave. Call EH&S at (515) 294-5359 if you have questions about proper disposal of these materials.

Electrical Safety

Current as low as 12-volts can cause electrical shock. When working with or around electrically powered equipment follow these general precautions:

- Equipment must be powered by an appropriate electrical source in accordance with manufacturer recommendations.
- Electrical equipment must be UL listed and have either a grounded plug (three prong) or be double insulated.
- Protect electrical power cords from damage. Immediately replace cords that are worn, frayed, or otherwise damaged.
- Extension cords are only for temporary use (less than 72 hours).
- Do not use extension cords for high wattage (oven, refrigerator, etc.) equipment.
- Power strip use should be limited to sensitive and office equipment.
- Connect equipment to separate power sources to avoid overloading a circuit.
- Electrical equipment used within six feet of water or in wet/damp environments should be protected with a Ground Fault Circuit Interrupter (GFCI) power source.
- Unplug electrical equipment before attempting any repair or maintenance.
- Grasp the plug to remove it from the socket, do not pull on the cord.



Hand, Portable, and Stationary Power Tools

Hand tools are non-powered tools such as saws, screwdrivers, hammers, chisels, and wrenches. Hand tools should be properly maintained after each use. Portable power tools are primarily powered by an electrical power source (cord or battery), pneumatic (compressed air), or gasoline. Examples of electrical tools include a drill, circular saw, grinder, router, jigsaw, and sander. Examples of pneumatic tools /equipment include drills, impact wrench, grinder, ratchet, sander, and a cut-off tool. Stationary power tools are large, non-portable and powered by electricity, gravity, pneumatic, or hydraulics. Maintain an inventory of power tools and equipment using the Equipment Inventory Form.

Follow these guidelines for general tool safety:

- Use a tool for its intended purpose and only if you have been trained.

- Inspect tools before use. If damage is found, place the tool out of service until repair or replacement is complete and report it to the greenhouse supervisor.
- Keep bits and blades sharp.
- Direct sharp cutting tools away from yourself and others.
- Keep all guards in place.
- Avoid distractions when operating power tools.
- Do not rely on strength for proper operation. The correct tool, blade, and method should not require excessive force.
- Maintain a safe distance from the point of operation while equipment is running.
- Disconnect from the power source before clearing jams or blockages.
- Never disable or tamper with safety releases or switches.
- Use a push stick or pad to move material through a machine whenever possible.

For more information on power tool safety, users can take the EH&S online Power Tools Safety course.

Respiratory Hazards

Processes in a greenhouse may produce airborne dust and particulates. If exposure monitoring indicates levels beyond OSHA's permissible exposure limit (PEL), engineering controls such as ventilation hoods or snorkels should be used. If these controls are not sufficient, respirator use may provide an alternate form of protection. The issuance of respirators to employees must be completed as specified in the ISU Respiratory Protection Program. Greenhouse users may choose to wear an N95 respirator voluntarily provided they follow ISU's Voluntary Use Policy. Pesticide applicators should follow label instructions and the SDS regarding respirator requirements.

Heat Hazards

Heat stress can happen when working in hot environments and the body is unable to get rid of excess heat. It is important to recognize the signs of heat related illness, prevention methods, contributing factors, and what to do if greenhouse users experience heat stress. All greenhouse users are required to complete the Heat related Illness training before they begin work in the greenhouse (see the Heat Stress in the Workplace web page for more information).

E. Safety Equipment

Eyewash Station

An eyewash station must be readily accessible in all areas where corrosives, hot liquids, or other eye-injurious materials are used or stored. During the development of an Emergency Action Plan, personnel must identify eyewash stations, verify proper function, and determine if additional eyewash stations are required in the greenhouse. Ensure that eyewash stations are properly marked. Eyewash stations should be flushed monthly and recorded on the attached "Safety Equipment Test Record" tags by greenhouse personnel.

Fire Extinguishers

Each greenhouse must have unobstructed access to at least one fire extinguisher at or near an exit. During the development of an Emergency Action Plan, personnel must identify fire extinguisher locations and determine if available extinguishers are appropriate for planned greenhouse activities. Ensure that fire extinguisher locations are properly marked. Monthly fire extinguisher inspections are required. Annual extinguisher testing is performed by EH&S. Fire Safety and Extinguisher Training is required for all greenhouse personnel and it is recommended that personnel take the hands-on training the first time. Additional information is contained in the ISU's Fire Safety Guidelines.

First Aid Kits

A properly stocked first aid kit shall be available to greenhouse personnel. Complete kits are available at Central Stores (515) 294-0408 or through CyBuy. A list of recommended contents can be found in ISU's First Aid Guidelines. Signs to mark the location of the first aid kit are available from EH&S.

Personal Protective Equipment (PPE)

- Minimum personal protective equipment (PPE) requirements — long pants and fully enclosed shoes — for entering a greenhouse will be posted at the doors.
- PPE required above or below the minimum must be determined by completing a hazard assessment or developing an SOP.
- PPE requirements must be included in the SOP for all hazardous processes.
- Greenhouse users are expected to use assigned PPE designated by the PPE assessment, hazard assessment, SOP, container label, or SDS.
- Users must maintain the PPE in a clean, sanitary, and usable

condition. Soiled PPE should not be taken home for laundering. Greenhouse users must not reuse disposable PPE and PPE must be removed before leaving the greenhouse.

Specific information on PPE requirements is available in ISU's Personal Protective Equipment Policy.

PPE can be purchased at Central Stores, 195 General Services Building (515) 294-0408, or Chemistry Stores, 1351 Gilman Hall (515) 294-0203.

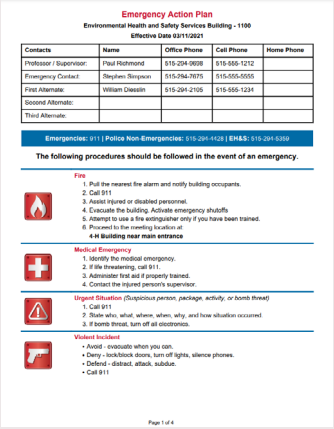
Safety Shower

An easily accessible, drench-type safety shower shall be available within 10 seconds travel time in each area where corrosive or toxic liquids are used or stored. During the development of an Emergency Action Plan, personnel must identify safety shower locations and verify proper function by checking the testing record tag or contacting the building area mechanic. Ensure that safety shower locations are properly marked. Semiannual safety shower testing is performed by Facilities Planning and Management (FP&M).

Spill Kits

Properly stocked spill kits are required in all greenhouses containing chemicals. Spill kits appropriate for pesticide spills must be available at the pesticide storage areas. Spill kits are available at Central Stores, through safety equipment suppliers, or can be assembled by users. A list of items to be included in the spill kit can be found on the EH&S website. In the event of a spill, follow the spill cleanup guidelines. Greenhouse users should report spills to their supervisor(s) and ensure spills are cleaned up quickly and appropriately.

F. Emergency Planning



Emergency Action Plan

Environmental Health and Safety Services Building - 1100

Effective Date 03/11/2021

Contacts	Name	Office Phone	Cell Phone	Home Phone
Professor / Supervisor:	Paul Richmond	515-294-9608	515-555-1212	
Emergency Contact:	Stephen Simpson	515-294-7675	515-555-5555	
First Alternate:	William Diesslin	515-294-2105	515-555-1234	
Second Alternate:				
Third Alternate:				

Emergencies: 911 | Police Non-Emergencies: 515-294-4428 | EH&S: 515-294-8369

The following procedures should be followed in the event of an emergency.

Fire

1. Pull the nearest fire alarm and notify building occupants.
2. Call 911
3. Assist injured or disabled personnel.
4. Evacuate the building. Activate emergency shutoffs
5. Attempt to use a fire extinguisher only if you have been trained.
6. Proceed to the meeting location at:

4-H Building near main entrance

Medical Emergency

1. Identify the medical emergency.
2. If life threatening, call 911.
3. Administer first aid if properly trained.
4. Contact the injured person's supervisor.

Urgent Situation (Suspicious person, package, activity, or bomb threat)

1. Call 911
2. State who, what, where, when, why, and how situation occurred.
3. If bomb threat, turn off all electronics.

Violent Incident

- Avoid - evacuate when you can.
- Deny - lock/block doors, turn off lights, silence phones.
- Defend - distract, attack, subdue.
- Call 911

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Emergency Action Plan Template

Planning for emergencies enables greenhouse personnel and users to respond appropriately. Hazard communication door signage ensures first responders and visitors are aware of hazards contained within each of ISU's greenhouses.

Emergency Action Plan (EAP)

Each greenhouse shall develop an Emergency Action Plan including the names and emergency contact information describing actions greenhouse users should take in the event of the following events:

- Fire
- Medical Emergency
- Intruder
- Vandalism
- Severe weather
- Utility outage
- Spill/Release

Post the completed EAP near the greenhouse exit for easy retrieval during an incident. All greenhouse users should be trained on the plan, and it should be reviewed and updated annually. A fillable template is available here: http://www.ehs.iastate.edu/prep/eap.

Evacuation Procedures

Aisles, exits, and access to emergency equipment must be maintained clear to ensure proper response to emergencies. Identify evacuation routes and meeting locations for emergencies such as fire, severe weather, and chemical spills. Building Evacuation Maps are available for download on the EH&S website.

Identify building alarm pull station locations (i.e., fire alarm, chemical spill, severe weather). Greenhouse users must know how and when to activate alarms.

Greenhouse users should always be aware of the severe weather conditions such as hail or high winds. In such situations greenhouse users must avoid the glass or plastic roofed areas and find shelter indoors in a structurally-sound building.

Fire Emergencies

Fire and evacuation alarms alert building occupants to life-threatening situations. Follow instructions given by audible alarms and evacuate the building quickly and safely.

- **Activate the alarm** – If a fire has started, no matter how small, activate the alarm system with a fire alarm pull station to alert building occupants.
- **Call 911** – Notify responders. The building alarm should initiate a response, but calling 911 will ensure that responders are provided critical information, such as fire location within the building, materials involved, etc. Rapid response minimizes loss of life and property.
- **Respond** – Only attempt to extinguish the fire if you are trained and feel comfortable doing so.
  - Extinguish a fire if you have been trained, the fire is small, and you have a safe exit route. However, you are not required to do this – it is always OK to evacuate.
  - Shut down hazardous operations if possible.
- **Exit the building** – Leave immediately by the shortest and safest exit route. Do not use elevators.
  - Assist injured or impaired persons if you are able.
  - Close doors behind you.
  - Stay low if you encounter smoke.
  - Refer to your Emergency Map for the nearest exit.
  - Proceed to your designated Meeting Place.
  - Do not re-enter the building until the fire department has cleared the building for re-entry, even if the alarms have been silenced.
- **Designated Meeting Place** – Gather and stay at your designated safe location. Notify supervisors and responders of the following:
  - Injured or disabled persons.
  - Missing or unaccounted personnel. Provide their last known location or places they might be working.
  - Hazardous operations or areas in the building.

Additional information on responding, preventing, and preparing for a fire is available in ISU's Fire Safety Guidelines.

G. Training

Training plays a critical role in preventing injuries and promoting safe work practices by bringing attention to hazards in the greenhouse environment. Training should be reviewed with new greenhouse users and be refreshed at regular intervals. Satisfactory completion of training must be documented and retained for at least one year after termination or graduation.

EH&S Training

EH&S will ensure safety training is accessible to all ISU employees and students. All greenhouse users, managers, PIs, and supervisors shall complete, at minimum:

- Greenhouse Safety Fundamentals
- Fire Safety and Fire Extinguisher Training
- Emergency Response Guide Video
- Federal Worker Protection Standard (WPS) training for workers and handlers (handler part of the training is only required for early entry workers)
- Heat Related Illnesses

Safety training records must be readily available from the greenhouse manager or supervisor.

Greenhouse managers can review training records in Workday Learning. Managers can request access to the rest of the greenhouse staff's training records by contacting EH&S at ehstrain@iastate.edu.

Site-Specific Training

In addition to EH&S training, site-specific safety training should be developed by the PI or greenhouse manager for processes and equipment in the greenhouse space. Site-specific training should be based on hazard assessment of the greenhouse space, processes, and equipment; developed by the PI or greenhouse manager. At a minimum, site-specific training should cover the Emergency Action Plan, the group's Standard Operating Procedures, workplace hazard assessment(s), and waste management procedures. Training should be conducted by experienced personnel and routinely reviewed with all greenhouse users. Site-specific training must be documented and include attendees, date, location, presenter, and training topics. An example is shown on the EH&S website: Site-Specific Training form.

H. Medical Care and Exposure Monitoring

Chemical exposure assessment and medical care must be considered when developing SOPs. Chemical, biological, radiological, and physical hazards may require specific health monitoring or treatment if exposure occurs. The PI, greenhouse supervisor, and department ensure employees receive appropriate monitoring and medical care based on greenhouse hazards.

Medical Emergencies

If an injury, illness, or exposure is life-threatening, dial 911. Be prepared to provide relevant safety information, such as a 911 address or SDS. When an employee requires emergency treatment, the incident must be reported to EH&S (515) 294-5359 as soon as possible without delaying treatment. Assist injured or exposed personnel by following the First Aid Procedures.

Occupational Medicine Program

The ISU Occupational Medicine Program is designed to minimize personnel health risks from workplace hazards. Hazards may include chemicals such as formaldehyde or benzene; physical hazards such as excessive noise or lasers; human pathogens, tissues, and cell lines; animal handling, pathogens, tissues, and cell lines; and radioactive materials or devices. The program includes workplace exposure assessments, exposure monitoring, and medical surveillance. All Iowa State University personnel, including part-time and student employees, are encouraged to participate in the Occupational Medicine Program, which is provided at no charge. Refer to the Occupational Medicine Guidelines for more information.

Workplace Exposure Assessment

Participation in the Occupational Medicine Program requires completing a Hazard Inventory form. The online form must be completed by new employees exposed to hazards as part of their assigned job duties and/or current employees who have changes to their hazards or personnel information. EH&S will use this information to determine the need for enrollment in the ISU Occupational Medicine Program. Individuals and supervisors will receive an email after EH&S has completed the evaluation of the hazards and can log in to see the results. If it is determined that the individual's workplace hazards require medical monitoring or training, the individual will receive a notice from the ISU Occupational Medicine Program with further instructions.

Exposure Monitoring

As part of the workplace exposure assessment, exposure monitoring may be performed by EH&S to quantify the level of exposure experienced by employees at Iowa State University.

Some of the evaluations EH&S can perform include:

- Ergonomics
- Indoor air quality
- Noise
- Dust
- Mold
- Hazardous chemicals
- Physical hazards

Monitoring results are used to determine if medical surveillance is required and whether control measures should be implemented to ensure a safe work environment. Each department and supervisors are responsible for ensuring that any recommended control measures are implemented. EH&S may perform additional monitoring to determine the effectiveness of control measures. EH&S is available to monitor occupational exposure whenever a possible exposure or potential health hazard is suspected in the work environment.

Medical Surveillance

Employees enrolled in the Occupational Medicine Program will be required to complete a baseline medical review at the Occupational Medicine office, G11 Technical and Administrative Services Facility (TASF), 2408 Pammel Drive, (515) 294-2056. The Occupational Medicine physicians will determine what tests and immunizations will be required to prevent occupational disease relating to an employee's exposure. Ongoing medical surveillance will be offered to personnel exposed to hazards covered under OSHA or other applicable regulations. When leaving ISU, a separation medical review will be offered to Occupational Medicine Program participants.

Work-Related Injuries, Illnesses, and Exposures

Iowa State University employees exposed or injured while at work or in the course of employment must seek medical attention at the McFarland Clinic PC, Occupational Medicine Department, 1215 Duff Ave, Ames, IA; (515) 239-4496. Supervisors should call the McFarland Clinic Occupational Medicine Department during regular work hours to schedule an appointment for the employee. Any relevant safety information, such as an SDS, should accompany the employee to the appointment.

All work-related injuries, illnesses, or exposures must be reported to the employee's supervisor, even when medical attention is not required or is refused by the employee. An Incident Report must be completed by the injured employee and/or the supervisor through the ISU Incident Portal within 24 hours of the incident. Upon submission of

the report, the supervisor will receive an email requesting information relating to the Accident Investigation as part of the incident reporting process. The supervisor is asked to reply directly to the email with answers to the questions within 24 hours of receiving the email. Questions regarding the form may be forwarded to University Human Resources at (515) 294-3753. Contact Environmental Health and Safety at (515) 294-5359 for guidance and assistance, especially when a serious injury or major loss occurs.

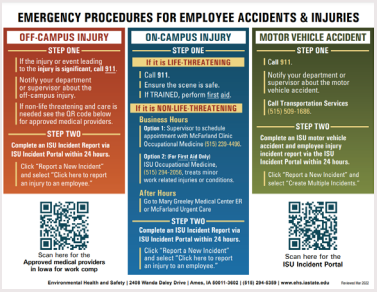
For additional information, visit EH&S Accidents and Injuries.

Student Accidents and Injuries

Students not employed by ISU who are exposed or injured in the greenhouse should seek medical attention at the Thielen Student Health Center, 2647 Union Drive, (515) 294- 5801. All accidents and injuries sustained by ISU students while in academic classes or events sponsored by the university must be reported to Risk Management by the student or an ISU representative using the ISU Incident Portal.

Where to Seek Medical Care

The Emergency Procedures For Employee Accidents & Injuries is a resource that can provide employees with information on proper steps for seeking medical attention where to go for care in the event of an injury.



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