



# Greenhouse Safety Program

## **Purpose**

This safety program outlines Clemson University Pee Dee Research and Education Center's guidelines for working safely in greenhouses. The following program is given to provide hazard identification, safe operating procedures, and required training to diminish safety issues in the greenhouse. Faculty, staff, and students are required to follow the guidelines outlined in this document.

## **Scope**

This procedure is applicable to any faculty, staff, or student who enters the greenhouses.

The greenhouse complex at Pee Dee REC is located beside the Pitner Building and includes 12 individual bays along with the headhouse.

## **Responsibilities**

### **Environmental Health Manager (Pee Dee REC Safety Coordinator):**

- Develop, implement, and adapt the Greenhouse Safety Program.
- Assist with regulatory compliance.
- Provide required Occupational and Environmental Safety training to current and new workers in the greenhouse.
- Create and conduct inspections of the greenhouses at least annually.

### **Greenhouse Manager:**

- Assists the EHM with enforcing safety standards in the greenhouse.
- Completes work in the greenhouses in a safe manner to model safe work practices.
- Manages routine greenhouse maintenance and monitors proper upkeep of greenhouse space by users.



### **Principal Investigator:**

- Develops and trains employees/students on area-specific greenhouse safety policies and requirements and ensures they are followed.
- Maintains records of area-specific training given.
- Completes work in the greenhouses in a safe manner to model safe work practices.
- Provides and enforces the use of personal protective equipment (PPE).
- Consults with EHM when there are compliance and safety issues.
- Responsible for escorting visitors and collaborators in the greenhouse outside of PDREC employees. Must ensure visitors abide by all policies and procedures when entering the greenhouse.
- Maintains pesticide application records in the greenhouse for a minimum of 3 years and ensures records are always correct and up to date.
- Ensures periodic inspections are conducted to identify and control hazards.
- Manages required permits for transgenic materials and trains employees/students on specific protocols and safety precautions related to transgenic materials.

### **Greenhouse Workers:**

- Following all safety policies and procedures when working in the greenhouse.
- Use and maintain all PPE.
- Complete all greenhouse related training.
- Inspects all equipment before and after use and reports issues to their supervisor and the Greenhouse Manager.
- Maintains the greenhouse space and equipment properly and completes housekeeping tasks regularly.
- Reports any hazardous or unsafe conditions to the supervisor, Greenhouse Manager and Environmental Health Manager.
- Reports any injuries to supervisor, Administrative Coordinator, and EHM for required documentation.
- Documents pesticide application records at the Greenhouse Central Location in the Pitner building.



### **Inspections**

All greenhouses should be inspected periodically and at least annually. Greenhouse inspections can be conducted using the “Pee Dee REC Greenhouse Inspection” form located in SciShield database.

The link to the inspection is: [https://clemsun.scishield.com/raft/inspections/add\\_inspection](https://clemsun.scishield.com/raft/inspections/add_inspection)

Steps: sign in to SciShield using your Clemson username and password – on the left side go to INSPECTIONS – Down to ADD NEW INSPECTION – Choose PEE DEE REC GREENHOUSE INSPECTION – Lookup the greenhouse space by searching by PI LAST NAME and choosing the appropriate space – Click INSPECT NOW – Fill out all necessary fields – SUBMIT.

### **Training**

Pee Dee Research and Education faculty, staff, and students will be assigned required training in SciShield based on the job duties indicated by their supervisor.

All faculty, staff, and students who do have a valid South Carolina Pesticide License are required to be given the Environmental Protection Agency’s Worker Protection Standard Training which must be given by a qualified trainer with the EPA’s required training material. The standard policy is for the Environmental Health Manager to give this training on the employee or student’s first day and annually thereafter.

Faculty members and supervisors are required to create and administer area-specific safety training for their employees and students for work in the greenhouses.

Refresher training will be required if a greenhouse worker is repeatedly not following the policies outlined in this program.

### **Applicable Regulations**

- OSHA Chemical Safety - Laboratory Standard: 29 CFR part 1910.1450 and Global Harmonization Standard: 29 CFR 1910.1200.
- USDA APHIS Transgenic Regulations: The Plant Protection Act, and Biotechnology Regulations 7 CFR part 340.
- OSHA Electrical Safety Regulations: 29 CFR parts 1910.302-1910.308.
- EPA Worker Protection Standard (WPS): 40 CFR part 170.

- OSHA Administration Personal Protective Equipment Regulations: 29 CFR part 1910.132.
- Heat Safety - OSHA Standard: General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health Act of 1970 and NIOSH *Criteria for a Recommended Standard: Occupational Exposure to Hot Environments*.
- OSHA Medical and First Aid: 29 CFR part 1910.151.

### **General Greenhouse Safety**

Bays in the greenhouse complex at PDREC are assigned to PIs and should be used for research only. The following safety guidelines are required to be followed by any person entering or working in a greenhouse space:

- Greenhouse doors must remain closed when not in use.
- Avoid working in the greenhouse alone. If it is necessary, make appropriate arrangements for a supervisor or coworker to check in periodically.
- Maintain proper housekeeping in the greenhouse by disposing of materials in the proper receptacles, cleaning up spilled materials, and keeping the drain trenches free from weeds to allow proper drainage. Do not pour soil down the sinks.
- Maintain proper housekeeping in the Washdown Room inside the Pitner building. Clean up all the trash in the room and refrain from pouring soil down the sinks.
- Greenhouse floors must be free from slip hazards. Examples of slip hazards include algae from standing water.
- Greenhouse floors must be free from trip hazards. Examples of trip hazards include water hoses and electrical cords.
- Water hoses should be properly hung when not in use, water spigots should be turned off immediately when not in use, and hose integrity should be maintained.
- There must be 7 feet of clearance between the floor and any hanging objects in the walkways, such as lights, fans, and sprinklers.

### **Pesticide Safety**

Pesticide use in the greenhouse must comply with the regulations from the Environmental Protection Agency in the Worker Protection Standard. All employees must be trained on this standard before work in the greenhouse is permitted.



- Pesticide application records must be documented on the clipboard at the Greenhouse Central Location in the Pitner building and remain posted for at least 90 days after application.
- Pesticide safety signs should be hung on the hook outside of the door when a pesticide application is occurring and during the restricted entry interval depicted on the label.
- Pesticide containers and spray equipment should not be stored in the greenhouses.
- The chemical spill kit in the greenhouse headhouse must be used if there is a chemical spill. Collect all spill cleanup materials, place them in a trash bag, and contact the Environmental Health Manager for disposal. DO NOT use water to rinse the spilled chemicals down the drain.
- Notify the Environmental Health Manager if materials in the chemical spill kit are used, so they can be replaced.

### **Transgenic Material and Regulated Pests**

All transgenic material grown in the greenhouse must be handled with appropriate precautions found in specific permits (such as IBC protocols) and those in this program.

- All transgenic material must be autoclaved before disposal in the compost bin or trash.
- Security measures must be taken to ensure only approved employees and students enter the area, such as signs.
- When transporting transgenic material out of the greenhouse, double containment should be used to protect areas outside of the greenhouse from potential contamination.
- Avoid growing transgenic plants alongside sexually compatible plants to prevent transgene spread.

### **Electrical Safety**

- All electrical cords must be free from frays and damage. If frays or damage are found, cords and equipment must be put out of service and replaced.
- Electrical cords and power strips must be weather-proof and located away from water sources, chemicals, and heat sources. Outlets must be ground fault circuit interrupters (GFCIs) and have a plastic bubble cover to protect from water.



- Deenergize all electrical equipment before attempting repairs by unplugging the equipment or removing a battery. Note: no employee is permitted to perform repairs on electrical systems. This refers to repairing equipment such as tools.

### **Personal Protection Equipment (PPE)**

Proper personal protective equipment must be always used.

- Proper gloves must be used with pesticides and plants/seeds that have had pesticides applied to them.
- Safety goggles must be worn when applying pesticides if the label requires it.
- Respirators must be worn when applying pesticides if the label requires it.
  - Any employee wearing a respirator must be enrolled in the Medical Surveillance Program through Clemson's Occupational and Environmental Safety department. If an employee is not up to date on their medical clearance or respirator fit testing, they are not permitted to wear a respirator or perform work that requires a respirator.

### **Heat Safety**

A greenhouse can exacerbate the outdoor heat, making temperatures much higher inside. This can make workers more susceptible to heat-related illnesses when working in a greenhouse.

Proper precautions must be taken to mitigate the effects of the heat.

- Implement proper work/rest ratios using the heat index and NIOSH work/rest schedule. Breaks should be taken in the shade or indoors.
- Drink plenty of water and reduce caffeine intake.
- Complete work in the greenhouses earlier in the day to keep from working at the hottest parts of the day.
- Know how to recognize heat illness and how to react.

### **Medical Emergencies**

A small first aid kit is present in the greenhouse headhouse to be used for minor cuts, scrapes, burns and insect bites. A larger first aid kit is close by in the mailroom of the Pitner building if



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the supplies in the greenhouse kit do not suffice. Contact the Environmental Health Manager if the first aid kit needs to be stocked.

Emergency contact information is posted in the headhouse at the end of each corridor.

For injuries requiring medical attention, contact the Administrative Coordinator, Mandy Stephan, for assistance in contacting Corvel for medical coverage.

All injuries must be reported to the Environmental Health Manager, so an incident report can be submitted.