Working with Transgenic Plants Training

Amy Robison– Biosafety Officer (ext. 6733)

Topics Covered:

- **Regulations**
- **Individual Responsibilities**
- **Risk Assessment**
- **Controlled Access**
- **Shared Space with Non-Transgenic Plants**
- **Records**
- **Signs**
- **Decontamination and Inactivation**
- **Transporting**
- **Housekeeping**
- **Biological Containment Techniques**

Regulations and Permitting Agencies

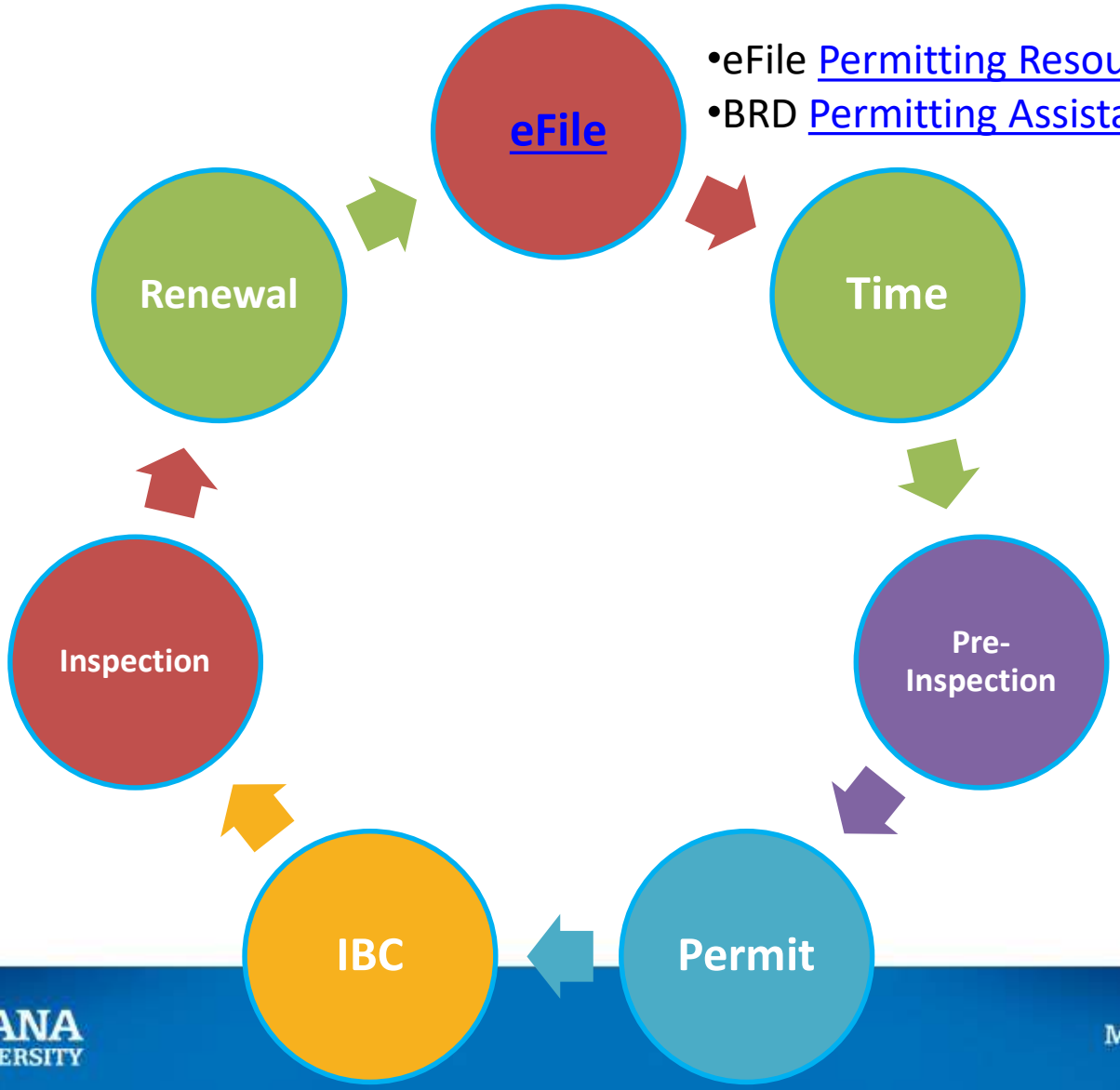
Regulations

- NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (OSP-NIH)
  - Appendix L – Physical and Biological Containment for Recombinant DNA Research Involving Plants

Permitting Agencies

- United States Department of Agriculture (USDA)/Animal and Plant Health Inspection Services (APHIS)
  - Plant Protection and Quarantine (PPQ) – Non-transgenic materials
  - Biotechnology Regulatory Services (BRS) – Transgenic materials

Permitting Process

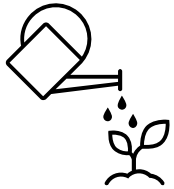


- eFile Permitting Resources and Training
- BRD Permitting Assistant

Examples

- Endemic Pathogens & r/sNA
  - IBC

- Regulated Imported Pathogen
  - IBC
  - APHIS



- Greenhouse Transgenic Plant Work
  - IBC
  - Locked Greenhouse

- Field Transgenic Plants
  - IBC
  - APHIS

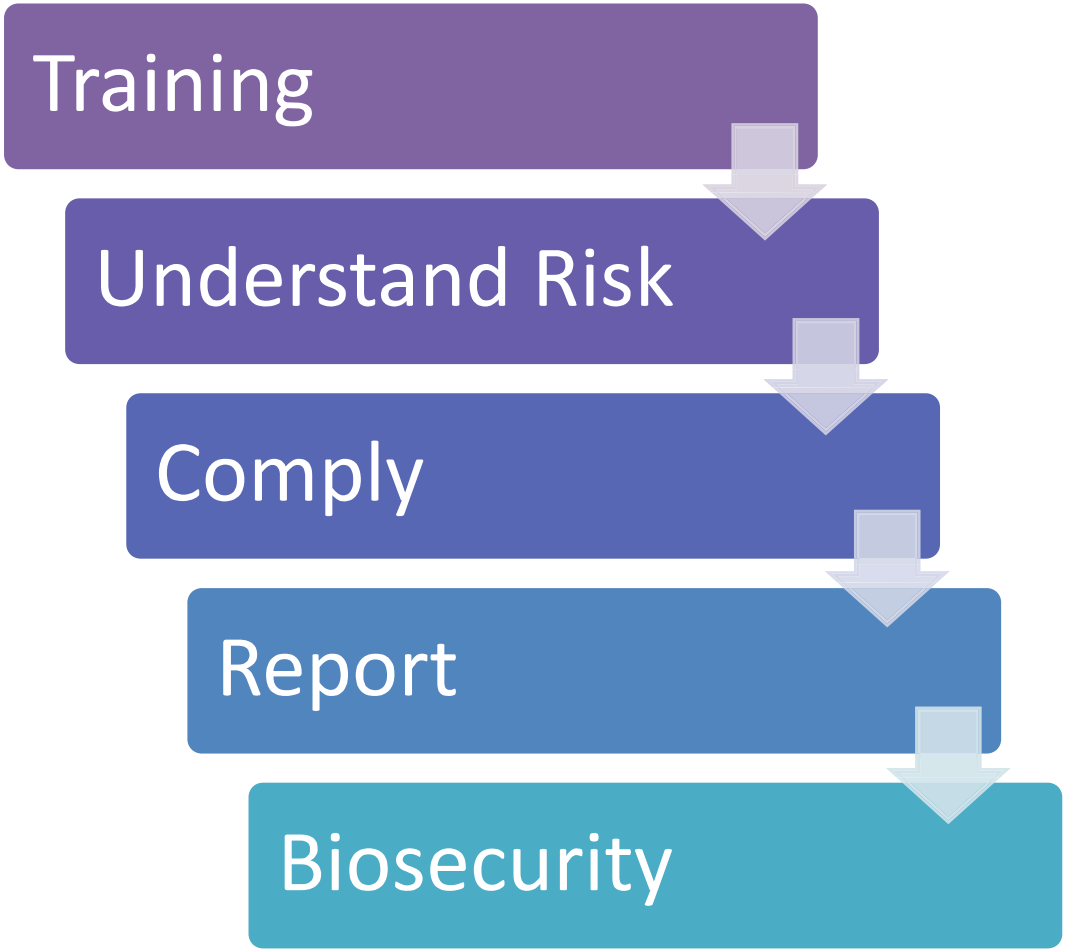
Standard Conditions of Most Permits

- Authorized Activities
- Duration and Authorized Locations
- The Responsible Person and Designated Agents
- Responsibilities After Permit Expiration
- Proposed Changes to an Issued Valid Permit

Standard Conditions of Most Permits

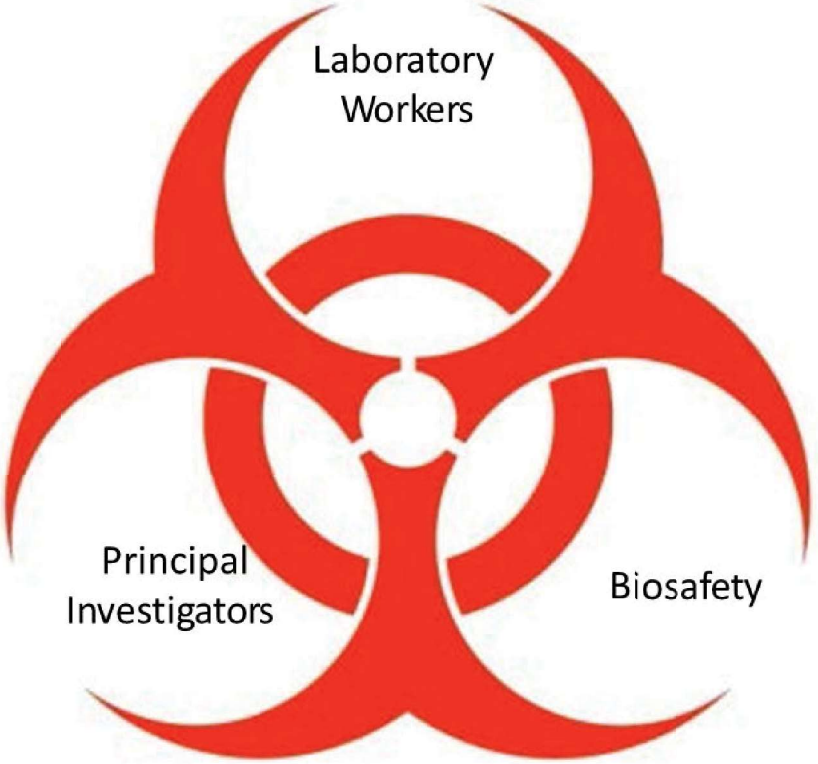
- Record Maintenance
- Containment in Transit
- Containment and Storage at Destinations
- Devitalization and Disposition
- Reporting a Possible or Actual Unauthorized Release

Individual Responsibilities



Laboratory Worker

- **First line of defense for:**
  - Protecting themselves
  - Others in the laboratory
  - Public from hazardous agents
- **Provide a Safe Environment by:**
  - Good laboratory practices
  - Correctly operating safety equipment
- **Laboratory worker should have:**
  - Knowledge of agent
  - Procedure hazards
  - Training
  - Experience
  - Concern for the health of others



Risk Assessment of Transgenic Plants

- Risk Assessment
  - What is the source and nature of the introduced genetic material?
    - Is it from an exotic infectious agent or pathogenic organism?
    - Is it a fragment of DNA or a complete genome?
  - Are bioactive proteins expressed?
    - What is the nature of the expressed proteins?
  - What is the profile of the local environment?
    - Are local crops potentially affected?
    - Are sexually compatible wild or weed species capable of spreading the genetic modification?
  - What experimental procedures may impact containment?
    - Will it be necessary to transport materials to/from the PGC?
    - Will arthropods or other potential vectors be used during the course of the project?

Controlled Access (Physical)

- Labs, bays and growth chambers containing transgenic plants must be **locked at all times**.
- Access authorization must only be given to individuals that are approved.

Transgenic and Non-Transgenic Plants Cultivated in the Same space

- Non-transgenic plants housed on the same bench space with transgenic plants must be treated in the same manner as transgenic plants.
- Non-transgenic plants housed in the same bay as transgenic plants but not on the same bench may be treated separately.
  - Will be decided on a case be case basis by the Plant Growth Center Manager and the Institutional Biosafety Committee.

Records

- Records must be kept of all transgenic plants and materials that are brought into or removed from the Plant Growth Center.
- Records must be kept of all ongoing experiments involving transgenic plants.

Signs

1) Bay door and/or growth chamber sign
   - ✓ Responsible Individual
   - ✓ Plant(s) in use
   - ✓ Special Requirements
   - ✓ IBC Protocol Number
2) APHIS permitted material sign
   - ✓ Containment Director
   - ✓ Phone number

Researcher Contact Information

- Principal Investigator: Insert PI Name
  - PI Office Phone Number: x Insert PI Office Extension
- Secondary Contact: Insert Secondary Contact Name
  - Secondary Contact Phone: Insert secondary contact's phone number

Plant Materials Present

List plant names

Institutional Biosafety Committee Protocols

List IBC protocols, or N/A

EMERGENCY CONTACTS

PGC Manager: David Baumbauer; Office: x2231
Biosafety Officer: Amy Robison; Office: x6733; Cell: 406-451-3511
Chemical Safety Officer: Ryan Brickman; Office: x7760; Cell: 440-313-4201

This Facility Contains Organisms

Regulated by USDA APHIS

Plant Protection and Quarantine

Entry by Authorized Personnel Only

for information or access please contact

Containment Director

(name)

at

(phone number)

Decontamination and Inactivation

Transgenic plants, seeds and any other plant materials must be rendered inactive by sterilization via autoclave before disposal.

Decontamination of transgenic plant soil, will be decided on a case-by-case basis by the PGC Manager and the Institutional Biosafety Committee.

Decontamination of water is not necessary, but an appropriately sized filter must be installed to ensure transgenic plant material does not exit the PGC.

Transporting Transgenic Plants and Materials

- Transgenic plants, seeds, soil or other plant materials be transported in a leak-proof shatterproof container on a cart.
- The outside of the container must be sanitized prior to transport to ensure that transgenic pollen and seed are removed.
  - Examples requiring to follow this policy:
    - Between bays
    - To and from laboratories
    - To the autoclave.

Housekeeping

- Keep bay(s) clean and uncluttered
- Do not eat or drink in bay(s)
- Observe all special containment measures such as footbaths, sticky mats, etc. when present.
- Wash hands before leaving the greenhouse facility;
- Wear disposable fluid-resistant gloves when handling transgenic plant material
- Wear facility-dedicated or disposable lab coats/smocks when handling transgenic plant material.
- Thoroughly inspect street clothes/shoes for transgenic material (especially seed and/or pollen) prior to leaving the greenhouse bay.

Biological Containment Techniques

- Removing flower heads or bagging plants prior to flowering.
- Harvesting material before the reproductive stage.
- Using male sterile lines.
- Localizing engineered genes in the non-reproductive parts of the plant by expressing the transgene transiently rather than in stably transformed plants.
- Conducting the experiment when pollination will not occur outside (e.g. winter months).

Resources

- Amy Robison (Biosafety Officer)
  - Email: amanda.robison@montana.edu
  - Work Phone: x6733
  - Cell Phone: (406) 451-3511
- Biosafety Webpage
- Transgenic Plant Containment Manual
- One page cheat sheet