

UNITED STATES DEPARTMENT OF AGRICULTURE  
ANIMAL AND PLANT HEALTH INSPECTION SERVICE  
PLANT PROTECTION AND QUARANTINE

**CONTAINMENT FACILITY GUIDELINES  
FOR NOXIOUS WEEDS AND PARASITIC  
SEED PLANTS**

[(Revised February 2010) – Noxious Weeds]

# Containment Guidelines for Noxious Weeds and Parasitic Plants

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## I. PURPOSE OF THIS DOCUMENT:

These guidelines are a reference to help you (a state, federal researcher, or commercial entity) design, build, maintain, and operate a containment facility for parasitic seed plants or federal noxious weeds.

During inspections or reinspections of your facility, USDA, APHIS, PPQ personnel will review these guidelines and any risk mitigation instructions that accompany your permit. When your facility meets containment standards and risk mitigation instructions, USDA, APHIS, PPQ it will be considered "adequate" for containment purposes; pest permits may then be issued to you.

The inspection and permitting procedures of the USDA, APHIS, PPQ are intended to prevent the release of nonindigenous plant pests to the environment of the United States. Failure to comply with conditions of a noxious weed permit is a violation of the **Plant Protection Act** and may result in penalties, loss of permits and loss of plant material.

Components of this Document:

To facilitate your permit(s), your containment site must meet the **“Standards”** listed in the boxes. The **“Suggestions”** listed under each Standard are methods or equipment that may help accomplish each standard. This document offers information on facility design and operational topics that PPQ commonly considers prior to issuing a permit for nonindigenous organisms. However, you may have alternative methods to contain these organisms. USDA, APHIS, PPQ welcomes alternatives that are proven to meet or exceed the standards. In addition, the construction and operation of your containment site may vary depending on the organisms you wish to contain and your location. After you review this document and research alternatives, and before you contract or start construction, please discuss exact specifications for containment with the PPQ permit group. You can initiate this discussion by contacting the Containment Facilities staff at (301) 734-5592 or fax (301) 734-5392 [Other useful containment references (non-USDA-APHIS) are: 1) "Containment Facilities and Safeguards for Exotic Plant Pathogens and Pests ". 1999. R. P. Kahn and S.B Mathur. (eds.). APS Press, St. Paul, MN; 2) "A Practical Guide to Containment (Plant Biosafety in Research Greenhouses)". Adair, D. and R. Irwin. 2008 (revised edit.). Information Systems for Biotechnology, Virginia Tech, Blacksburg (<http://www.isb.vt.edu>); 3) "Containment Standards for Facilities Handling Plant Pests ". 2009. (1 st edition) Canadian Food Inspection Agency, Office of Biohazard Containment and Safety, (<http://www.inspection.gc.ca/english/sci/bio/plaveg/placone.shtml>)].

## II. FACILITY DESIGN STANDARDS

A facility to contain weeds is often a facility with a greenhouse attached. Greenhouses are defined as freestanding or attached structures whose exterior surface is primarily composed of a light transmitting material attached to a frame so that natural light may penetrate the interior of the structure to enable plant growth.

**Design Standard A. Location and Demarcation.** Locate the noxious weed containment facility in an area with minimal human, agricultural, and environmental risk. Identify the facility as dedicated and secure.

### Suggestions:

- Ensure the facility meets local building codes.
- Locate the facility in an area relatively free of agricultural zones, environmentally sensitive areas (e.g., areas with endangered species that may be negatively impacted by accidental release), high risk microclimates (e.g. known flood zones) or other high-risk areas.
- Design the containment facility as a separate, dedicated building. If this is not possible, design and build to prevent propagule escape.
- Surround the facility by a buffer zone that is clear of all vegetation and is at least fifteen feet wide.
- Surround the facility by a fence at least six feet in height and at least fifteen feet from the structure's foundation.
- Post a copy of the containment director/ containment officer name and contact numbers at the main entry to the containment area.
- Post a sign stating - "Access Is By Authorized Personnel Only," at the main entry.
- Post emergency telephone numbers at the main entry.

**Design Standard B.** Design the floor plan of the weed containment facility to prevent escape of the organisms while allowing secure entry and exit of personnel.

### Suggestions:

- Install one primary entry/exit.
- Install a restroom at the primary entrance.
- Install self-closing doors throughout the containment structure(s).
- Install exterior doors that lock.

- Install vestibules in each entry with doors that interlock so that only one door can be opened at a time.
- Ensure negative air pressure throughout the facility.
- Ensure air moves from the least to most hazardous rooms.
- Designate one or more secure rooms or areas within the facility for opening incoming packages and seed storage. These areas should be in close proximity to sterilization equipment.

**Design Standard C.** Construct walls, ceilings, and floors that are impenetrable to the enclosed organisms, and withstand repeated cleaning and decontamination.

**Suggestions:**

- Construct the walls and ceilings from moisture resistant gypsum board (minimum ½ inch thick).
- Install floor drains to collect liquid wastes for sterilization.
- Seal all penetrations into internal walls, ceilings, and floors (e.g. plumbing, electrical wiring, air ducts, vacuum lines) with suitable caulking.
- Seal the junctions of walls with ceilings and floors with plaster, caulking, or similar materials.
- Use concrete or trowled epoxy for floors.

**Suggestions for greenhouses:**

- Build the greenhouse at ground level, not on top of a building.
- Construct the foundation of concrete block, poured concrete, brick or similar material.
- Extend the foundation below the soil line to ensure a permanent and stable structure.
- Build the foundation at least three feet above the soil line.
- Construct greenhouse floors of impervious material, with one or more drains that collect liquid for sterilization.
- Install a frame strong enough to support the translucent walls and ceilings.
- Install translucent wall and ceiling materials strong enough to guarantee the security of the facility. Plexiglas, Lucite, lexon, safety glass, and wire-reinforced glass are acceptable. Polyethylene and vinyl are NOT acceptable.
- Seal the translucent panels to the frame with caulking or appropriate materials on the inside and outside surfaces.
- Install an alarm system to detect breakage due to sound, motion, or pressure.

- Install windbreaks (trees, hedges, fences, etc.) around the glasshouse.
- Install screens over the roof to protect it from hail, if needed.
- Seal joints between the greenhouse and the containment facility with caulking or other suitable material.
- Install doors between the greenhouse and the rest of the facility that close completely, and seal to their frames.
- If the glasshouse is a detached structure, install a vestibule at each exit door.
- Ensure the HVAC system can be turned off to allow greenhouse fumigation.
- Cover ventilation ducts with metallic screen 6.3 mm or 0.250 inch (as measured across the midpoints of any opening). However screen mesh may vary depending on the size of the propagule and dissemination methods (air, water, etc.) associated with the organism(s) to be contained.

**Design Standard D.** Install windows impenetrable to the enclosed organisms

**Suggestions:**

- Install glazing (glass, Plexiglas, etc.) in windows that resists breakage.
- Seal all joints between the windowsills, frames, and walls with appropriate materials
- For emergency use, store extra glass or other panels, and appropriate sealants on the premises.

**Design Standard E.** Install doors that contribute to the security of the facility.

**Suggestions:**

- Install self-closing doors throughout the containment structure(s).
- Install exterior doors that lock.
- Install thresholds and gaskets that seal the exterior and interior doors with their frames. The space between seal and doorframe should not exceed 6.3mm (0.250 inch).
- In greenhouses attached to a main facility, install doors equipped with gaskets (rubber, neoprene, magnetic, etc.) between the two facilities to form a complete seal at the frame and floor.
- Lock emergency exit doors from the outside.

- Post signs on the exterior and interior stating: USDA APHIS Containment Facility - Emergency Exit Only.
- Install audible alarms that activate when emergency exit doors are opened.

**Design Standard F.** Design and install an **HVAC system** (Heating, Ventilation, and Air Conditioning) that prevents escape of contained organisms.

**Suggestions for containing weeds with minute seeds that may become AIRBORNE (*Striga* spp., *Orobancha* spp.):**

- If possible, install an HVAC system dedicated to the containment area. If not, then describe how the HVAC is connected to other areas or buildings and actions taken to prevent organism escape.
- Ensure air moves from outside to the inside of the facility when exterior doors are opened.
- Ensure the exhaust air from the facility passes through screens or filters before being discharged to the outside.
- Ensure air moves from the least to the most hazardous rooms. Install equipment to measure the airflow direction.
- Seal connections in air ducts, plenums, etc. with caulking or an equivalent material.
- Seal vents to interior surfaces with caulking or an equivalent material.
- Install filters and screens of the HVAC system so they are easy to clean, decontaminate, and replace.
- Install tandem filters so one side of the ventilation ductwork and its filter can be decontaminated while the other side supplies air.

**Design Standard G.** Install **benches, tables, and furniture** that are easy to inspect and clean.

**Suggestions:**

- Install bench tops and other work surfaces with seamless surfaces (or sealed surfaces) impervious to water and resistant to acids, alkalis, organic solvents, and moderate heat.
- Ensure spaces, if any, between and behind benches, cabinets, and equipment are accessible for cleaning and inspection.

**Design Standard H.** Use equipment to sterilize or decontaminate solid waste (contained organisms, soil, plant material, solid waste, and contaminated or infested articles) before removing it from the facility.

**Suggestions:**

- Install an autoclave, preferably a double-door pass-through model. Conduct tests to evaluate effectiveness of the autoclave on a regular basis.
- Install a gas sterilizer for articles that would be damaged by steam. A double-door pass-through model is recommended.
- Incinerate combustible materials. An incinerator within or adjacent to the quarantine facility is recommended.

**Design Standard I.** Design and install an electrical system that maintains containment features under normal and emergency situations and is impenetrable to the contained organism.

**Suggestions:**

- Install an alarm to indicate power failure.
- Install an alternative power source (generator, battery bank, etc.) for use when normal power is lost or interrupted.
- Install weatherproof electrical boxes, receptacles, lighting fixtures, and switches.
- Seal electrical boxes, lighting, switches, wiring, conduit, etc., with appropriate materials such as caulking, foam, etc. that are impenetrable to the contained organisms.

**Design Standard J.** If a vacuum system is to be used, install a system that will prevent the escape of contained organisms.

**Suggestions:**

- Use the vacuum cleaning appliance only within the facility.
- Sterilize vacuum waste and filter before disposal.



**Design Standard K.** Install a communication system that allows communication between the inside and the outside the facility.

**Suggestions:**

- Install a telephone or intercom system between the interior and exterior of the containment facility.
- Install a computer (LAN, modem, etc.) or Fax machine to allow communication and data transfer to and from the facility.
- Electronic devices (i.e. cell phones, etc.) must be decontaminated before being removed from the facility.

**Design Standard L.** Design and install a plumbing system to contain the organisms and remove liquid wastes.

**Suggestions:**

- Seal sewer or drains (sink, floor, shower, etc.) with metallic 80-mesh screens [NOTE: mesh may vary depending on the size of the propagules]
- Treat effluents from sinks, floor drains, etc. with heat or chemicals before releasing them into the sewer system.

### III. OPERATIONAL PERFORMANCE STANDARDS

**Operational Standard A.** A containment officer or director is responsible for the daily operation of the facility, and its physical and operational integrity.

**Suggestions:**

Containment officer or director maintains a copy of the Standard Operating Procedures (SOP) Manual for the facility. SOPs contain directions for normal use, maintenance, and disinfection of the facility and its equipment. SOPs also describe actions to take:

- if organism(s) escape containment.

- if a typical emergency event happens (power outage, fire, glass breaks in containment area, flood, etc.).
- to replace translucent panels in glasshouse.
- to monitor visitors.

The containment officer or director:

- Trains employees and/or authorized personnel in the SOPs.
- Updates copies of construction records for the facility.
- Maintains daily, weekly, and monthly maintenance records of the facility.

Containment officer or director updates these lists annually :

- The names and phone numbers of those to call during emergencies.
- The regulated plant species in facility.
- Authorized personnel.
- Incoming and outgoing shipments of permitted organisms.

SOPs also describe procedures related to all operating standards listed below:

**Operational Standard B.** Only authorized personnel have routine access to the facility.

**Suggestions:**

- Keep all exterior doors locked at all times.
- Train authorized personnel in the SOPs.
- List the personnel authorized to enter the facility.
- Require that visitors sign a logbook.
- Keep all emergency exit doors locked from the outside to prevent unauthorized entry.

**Operational Standard C.** Wear, sterilize, and handle personal apparel to minimize the risk of organism escape.

**Suggestions:**

- Ensure visitors and employees remove all unnecessary street clothing such as coats, gloves, hats, purses, overshoes, etc. and leave them in a special area outside of the facility or in one of the vestibules.
- Ensure visitors and employees wear a laboratory coat or disposable jumpsuit or overalls, and shoe-coverings. Autoclave or incinerate these disposable covers after use.

**Operational Standard D.** Use personal cleanliness to minimize the risk of accidentally carrying organisms to the outside of the facility

**Suggestion:**

- Ensure that people leaving the facility wash their hands and check hair, clothing, and shoes for propagules.

**Operational Standard E.** Clean and disinfect the interior of the facility and its equipment regularly.

**Suggestions:**

- List materials and methods used to clean and disinfect the facility and its equipment.
- Consider a program to eliminate undesired pests (e.g. cockroaches and rodents) from the facility.
- Autoclave or sterilize solid wastes (plant materials, soil, trash, etc.) prior to disposal.

**Operational Standard F. Open and handle packages** of permitted organisms to prevent organism release.

**Suggestions:**

- Establish one area to open packages received from foreign sources.
- Autoclave or incinerate packing materials immediately after the removal of specimens.
- Store propagules in appropriate containers to prevent their escape within the facility.

**Operational Standard G. Follow all PPQ regulatory requirements** for organisms received in the containment facility.

**Suggestions:**

- Meet all PPQ requirements as listed in permits for organisms kept in the facility.
- Maintain a file of all organisms described in PPQ permits that enter and leave the containment facility.
- Obtain permission from PPQ to ship organisms outside of the facility.
- Maintain voucher specimens.
- Notify PPQ if facility closes temporarily or permanently