

# Cleaning and Disinfection:

## Premises



Cleaning and disinfection (C&D) procedures are a crucial part of any animal health emergency response. The cleaning and disinfection of infected premises during an animal health response will be necessary to eliminate the targeted disease from the location and must be done before animals can be reintroduced to the facility.

### Preparation

- **Turn all fans off to prevent dissemination of infectious agent**
- **Disconnect the electrical supply to the building to prevent electrical accidents during cleaning**
  - An alternative electrical supply should be acquired to power any cleaning equipment
  - Good lighting is essential to ensure that surfaces are visibly clean after the washing step
- **Reduce transfer of pathogens by vectors**
  - Rodents, birds, insects and other wildlife must be detected and dealt with appropriately
  - Seal rodent entrances
  - Remove and prohibit wild bird nesting areas
  - Eliminate insect breeding areas
- **Set up disinfectant footbaths at all entrances and exits of the building**
  - **NOTE:** Footbaths should not be used as a sole process of disinfection, as this can give a false sense of security to responders
  - Always use freshly prepared, appropriate disinfectant solutions
  - Footwear should remain in contact with the solution for the necessary contact time
- **Disinfectant Solutions**
  - Use according to product label
  - Use only EPA-registered or approved products
  - Prepare fresh solutions – old solutions may have reduce efficacy
  - Use test kits to check for disinfectant active ingredient concentration or degradation
- **Maintain biosecurity work zones to prevent the spread of pathogens (see diagram on next page)**

### Material Composition

The material composition of items and areas on animal production facilities can be quite diverse and impact the ability to adequately conduct C&D processes.

- Raw concrete surfaces are porous and therefore difficult to clean
  - Use a disinfectant product registered for concrete surfaces
  - High pressure washing can be helpful, but may cause damage to some concrete surfaces
  - Flame guns may be an alternative
- Metal surfaces are generally easy to clean and disinfect, especially when surfaces are smooth
  - Some disinfectants are incompatible or corrosive to metal surfaces
  - A flame gun may be a useful alternative
- Wood is extremely porous and therefore difficult to disinfect
  - Any decaying wood should be appraised, removed, and disposed of appropriately (e.g., burn or burial)
  - Wetting wood surfaces prior to disinfectant application can cause unintended dilution
  - Use a disinfectant product registered for wood surfaces
- No environmentally safe procedures exist for “disinfecting” soil surfaces (e.g., dirt, sand, clay)

### Basic C&D Protocol

Premises C&D should follow the basic protocol. Use a systematic approach to ensure thorough coverage of each area.

#### Systematic Approach

- Start at the back of the facility and proceed to the front
- Begin all procedures at the ceiling, moving down the walls to the floor, then across the drainage area
- Work in small sections at a time to ensure thorough coverage of each area
- Use marking tape to clearly indicate where disinfection has and has not taken place

## A. Cleaning

### ➤ Dry Clean

- Use shovels, manure forks, brooms, brushes to sweep, scrape, and remove contamination and organic material (e.g., soil, manure, bedding, feed) from premises surfaces and areas
- Heavy equipment may be needed for large quantities of bedding or manure
- Air blowers should not be used due to the risk of spreading pathogens
- Move any washable and removable equipment (e.g., hand feeders, mangers) to the outside for cleaning and disinfection
- Remove rotten wood fixtures, posts, and flooring for burial or burning
- Dispose of organic material and debris in a manner that minimizes further spread of microorganisms and that is compliant with federal, state and local requirements

### ➤ Wash and Rinse

- Wash areas and items with detergent and warm (110°F) water
- Mechanical scrubbing and scraping may be needed to remove oils, grease or exudates from rough or irregular surfaces and deep cracks
- Areas with organic materials adhered to the surface should be pre-soaked for several hours
- High pressure sprayers can be very effective for removing heavy accumulations of urine and feces, and for cleaning porous surfaces, but should be avoided in cases of highly infectious or zoonotic pathogens to avoid further spread
- Hot water and steam can be effective for cleaning cracks, crevices and the inside of pipework
- Rinse items with clean, warm water
- When possible, allow surfaces to dry completely (if possible overnight) before applying disinfectant

## B. Disinfection

### ➤ Disinfectant Application

- Apply an EPA-registered disinfectant with a low pressure sprayer, or by wiping

### ➤ Contact Time

- Ensure all areas are covered thoroughly with the solution and remain "wet" throughout the necessary contact time; reapply if necessary

### ➤ Rinse and Dry

- Rinse thoroughly with clean warm water
- Some disinfectants can cause deterioration of rubber or metal parts if not completely removed
- Allow items to air dry

### ➤ Don't forget areas such as:

- Rafters, light fixtures, fan blades, louvers, curtains
- Watering systems: water lines, dispensers, nipple drinkers, troughs
- Feeding equipment: feed lines, augers, hoppers

## C. Downtime

- Once cleaned and disinfected, premises should have a period of downtime
- This involves the area being free of any animals or activity for a period of time to allow it to completely dry to further reduce any remaining microorganisms through desiccation
- Downtime should be at least three times the longest expected incubation time of the targeted pathogen
- Areas should be cordoned off with marking tape to designate these areas

## Building Exterior

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- The exterior of the building must also be cleaned and disinfected
- The width around the perimeter will vary depending on pathogen
- In some situations (e.g., concrete, brick, metal), a flame gun may be useful – but only if no combustible materials are present
- C&D of fan inlets on the exterior of the building can be done using a low pressure sprayer

## Slurry Pits

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- Decontamination of slurry pits may use chemicals that alter the pH for set periods of time
- Vigorous stirring will be needed to ensure adequate distribution of the disinfectant
- This agitation can release toxic gases such as carbon monoxide, carbon dioxide, hydrogen sulfide, ammonia, and methane
- Safety precautions must be implemented!
  - Have a minimum of two personnel engaged in mixing or preparing the tanks
  - Ensure the area is well ventilated
  - Responders should wear respirators, safety harnesses and a lifeline

## Additional Safety Concerns

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- Skin, eye, respiratory tract irritation from chemicals
- Physical injury from slips, trips on slick surfaces and high pressure sprayers

## Environmental Hazards

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- Runoff of infectious material or chemical solutions must be avoided to prohibit environmental impacts
  - Many chemical disinfectants are toxic to aquatic organisms
  - Prevent the further spread of pathogens into the environment

## Evaluation

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- Inspection of a premise following C&D procedures should ensure all tasks have been performed effectively
- Factors to be checked should include:
  - All grossly contaminated, infected or suspected areas have been identified and properly cleaned and disinfected
  - All personnel are aware of and are implementing C&D measures for themselves and their equipment
  - One or more appropriate disinfectants have been selected and used at the appropriate concentration and the correct contact time was achieved
- Effluent from the C&D procedures has been handled in a manner to minimize or avoid environmental impact
- Final inspection of the premises should be conducted by experienced personnel
  - If there is any doubt or sign of inadequate procedures, the disinfection measures must be repeated
  - Once final inspection of the premises has occurred, any and all personnel present should proceed through the personnel C&D disinfection station before leaving the premises

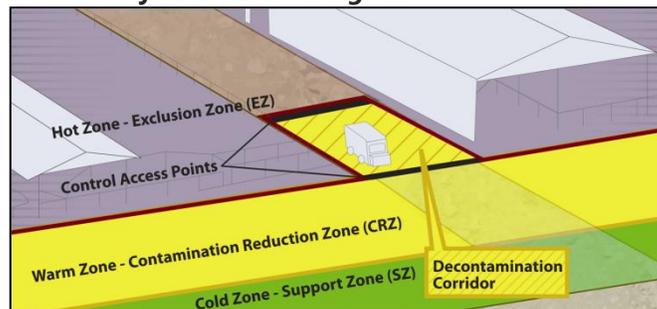
## Biosecurity Work Zones

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Biosecurity work zones must be maintained to prevent the spread of microorganisms.

- Premises are located in the Hot Zone – Exclusion Zone. This high-risk area is where infected animals were housed and is potentially contaminated and considered unsafe. PPE must be worn in this area.
- Entry onto the premises for C&D procedures occurs through the Decontamination Corridor, after appropriate PPE is donned in the Cold Zone. The Decontamination Corridor is an area between the Hot Zone-Exclusion Zone and the Warm Zone-Contamination Reduction Zone.

### ➤ Biosecurity Work Zone Diagram



## Additional Resources

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USDA APHIS. Foreign Animal Disease Preparedness and Response Plan (FAD PRP). Cleaning and Disinfection Guidelines.

[http://www.aphis.usda.gov/animal\\_health/emergency\\_management/downloads/nahems\\_guidelines/cleaning\\_disinfection.pdf](http://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/cleaning_disinfection.pdf)

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