Carcass Disposal:

Overview

During an animal health emergency, the timely and safe disposal of animal carcasses and related materials will be necessary to prevent the spread of disease.

Carcass Disposal Methods

- Burial
- Landfills/Subsurface Disposal
- Incineration
- Composting
- Rendering
- **Method Selected Depends On**
  - Animal species
  - Number of animals
  - Space and equipment needed
  - Pathogen and its ability to persist or spread
  - Environmental issues
  - Public health issues, including responder safety
  - Regulations

Carcass Disposal Considerations

- Site location
  - Soil topography and area
  - Subsequent use of site
- Environmental impacts
  - Water source contamination
  - Air quality
  - Scavengers
- Biosecurity
  - Personal protective equipment
  - Movement control
  - Cleaning and disinfection
- Site security
  - Unauthorized persons
  - Warning or restriction signs
- Transport of infected materials
  - Closed, leak-proof
  - Liquid collection/absorption system
  - Applicable laws/regulations/permits
- Safety Issues
  - Physical and psychological
- Regulations
- Public perception

Burial

- Carcasses placed in an excavated trench or pit; covered with soil or backfill. Buried materials are degraded and broken down into minerals and organic material. Decomposition generates heat that destroys microorganisms.
- Decomposition time varies; dependent on the species, size, number of carcasses, as well as soil composition, temperature and moisture. The process can take weeks to years.
- **Considerations**
  - Decomposition gases
    - Bloating can displace burial mound
    - Lance/vent carcasses prior to burial
    - Use caution if zoonotic disease
  - Burial location
    - Soil characteristics (slope, permeability)
    - Area of land required
    - Accessibility
    - Subsequent intended use of site
    - Record Global Position System (GPS)
  - Environmental impacts
    - Ground and surface water sources
    - Air quality (odor)
    - Difficult in cold weather conditions
  - Biosecurity
    - Movement control
    - All vehicles/equipment used must be cleaned and disinfected
  - Site security
  - Limit unauthorized access (vandals, scavengers, curious public)
  - Regulations
    - Not allowed in some states
  - Public perception

Landfills/Subsurface Disposal

- Similar to burial, carcasses are layered between compacted soil and solid waste materials.
- Established sites have minimal potential risks to groundwater, surface water and other environmentally sensitive areas.
- Landfill design incorporates liners, leachate containment systems and gas collections systems to minimize environmental impacts.

- Landfill used must meet design and operating standards outlined in Subtitle D of the Resource Conservation and Recovery Act.
- **Considerations**
  - Immediately available
  - Minimal environmental risk
  - May have limited capacity
  - Owner acceptance and terms of use
  - Transportation issues/Biosecurity
  - Public opposition

Incineration

- Use of high-temperature combustion to convert carcasses to inert gases and sterile ash as well as deactivate pathogens.
- Three methods
  - Open-air burning (or pyres)
  - Fixed-facility incineration
  - Air-curtain incineration
- Various fuel sources (e.g., diesel fuel, propane, and furnace or waste oils) may be used.
  - **Gasoline or other highly explosive accelerants should NEVER be used.**
  - Firefighting officials should be notified and involved in planning and procedure.
  - Fire retardant equipment and protective gear should be available to personnel
- **Considerations**
  - Complete combustion of carcasses
  - Limited capacity
  - Air pollution
  - Regulations
    - State approval
    - Licensing of facilities
  - Trained personnel required
  - Transportation biosecurity issues
  - Public opposition

Composting

- Use of naturally occurring microbes to promote decomposition at elevated temperatures.
- Requires sources of nitrogen, carbon, oxygen and moisture for optimal tissue breakdown.
  - Nitrogen = carcasses
  - Carbon = co-compost plant material
    - Silage, ground cornstalks, straw, wood chips, mulch, nut hulls
  - Carbon : Nitrogen ratio
    - 25:1 to 40:1 optimal
  - Moisture = 50%
- May require 3-5 cubic yards of cover materials per 1000# carcass.
- The recommended height for a pile is 5-7 feet.
- **Considerations**
  - Monitor frequently - Desired initial core temperature should be between 135-140°F
  - On-site process reduces biosecurity risks associated with transport
  - Affected by weather and ambient temperature
  - Protect from wind, rain, drying conditions and scavengers

Rendering

- Offsite process that uses heat to convert carcasses to meat and bone meal, fat or tallow, and water; Some pre-processing may be required
- Some facilities can efficiently transport and process one million or more pounds of raw animal per day.
- Rendering will most likely not be used if barbiturates are used for chemical euthanasia.
- **Considerations**
  - Facilities typically have established procedures for handling biosecurity, wastewater and byproducts
  - Rendering facilities are closely regulated to maintain environmental safety
  - Biosecure transport of carcasses needed.
    - Leak-proof transport trucks
    - Delivery coordination to avoid overwhelming the facility
    - Temporary storage may be needed if carcasses cannot be rendered right away

Additional Resources

USDA Foreign Animal Disease Preparedness (FAD PReP) Guidelines: Disposal
http://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/disposal_nahems.pdf

Carcass Disposal: A Comprehensive Review. National Agricultural Biosecurity Center Consortium. http://fss.k-state.edu/FeaturedContent/CarcassDisposal/CarcassDisposal.htm

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