



NCDEQ FOREIGN ANIMAL DISEASE RESPONSE RECOMMENDATIONS

ABSTRACT

Many animal diseases are highly contagious and can be spread by people through contact with contaminated clothing, vehicles, and equipment. The mass mortalities caused by disease outbreaks can negatively impact both surface and groundwater resources. This guidance is offered to protect animal health, to prevent the spread of disease, and ultimately, to protect North Carolina's environment and natural resources.

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NCDEQ Foreign Animal Disease Response Recommendations

Abstract: Many animal diseases are highly contagious and can be spread by people through contact with contaminated clothing, vehicles, and equipment. The mass mortalities caused by disease outbreaks can negatively impact both surface and groundwater resources. This guidance is offered to protect animal health through the prevention of spread of disease, and ultimately, to protect North Carolina's environment and natural resources.

DEQ FOREIGN ANIMAL DISEASE OVERVIEW

The North Carolina Department of Environmental Quality (DEQ) has a long-standing history of response to emergency management-related events that impact the environment. Response efforts from the department following hurricanes, tornadoes, and other natural disasters have provided experience and an internal framework that has prepared the agency to assist in a potential outbreak of a foreign animal disease (FAD), e.g., Highly Pathogenic Avian Influenza (HPAI), African Swine Fever (ASF) and Foot and Mouth Disease (FMD). The potential economic impact to the State of North Carolina, the United States, and the swine and poultry industries from a FAD is significant and unprecedented. North Carolina ranks in the top 5 in the nation in swine and poultry production, with their receipts accounting for nearly 60% on the total agricultural economy in NC.

DEQ staff are being identified across the agency to form an internal task force to assist the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) and other state agencies in addressing a FAD outbreak. Unlike previous DEQ involvement with the potential for highly pathogenic avian influenza (HPAI) in poultry operations, swine farms are permitted by the Division of Water Resources. All mortality and other wastes must be managed in accordance with the facility's permit unless otherwise approved by DEQ. Specific guidance is being developed in collaboration with NCDA&CS on biosecurity, decontamination, on-farm burial/disposal, composting, incineration, and transport for disposal and/or rendering. The most common methods of mass carcass disposal are addressed in this document, as other methods may become available, they will be reviewed. DEQ does not expect to be involved in depopulation, but the department's role is to ensure environmentally safe pathogen inactivation, transport, and disposal of all infected mortality, feed, animal waste, and other materials.

Improper disposal of animal carcasses, unused feed, and animal wastes raises several environmental concerns including scavenging by birds, insects, and other animals (e.g., dogs, coyotes, etc.), excess nutrient concentrations, potential air quality impacts, and possible continued spread of disease.

In addition to assembling the guidance that is included within this document, DEQ staff have established points of contact within the private disposal industry sector, at the Federal level, and with other states to ensure that the vast disposal and resource needs can be met during an FAD event. DEQ staff have worked from the foundation and framework that were developed by DEQ's Avian Influenza Task Force to provide substantive input on the management of a potential FAD outbreak in North Carolina. Preparation by department staff will continue after the attached guidance is submitted to NCDA&CS, with the focus on a proactive mode regarding FAD response in North Carolina.

The FAD task force and supporting department staff stand ready to actively participate in a potential state of emergency, which will require additional resources depending on the type of role assigned to staff. At minimum, there will be a need for additional communication equipment (e.g., cell phones, laptops, tablets), safety equipment, decontamination equipment, and the continued involvement of department and/or division public information officers. If a FAD event occurs, ASF task force members and/or additional department staff could be called to respond, which would require the redistribution of routine work assignments within DEQ.

In conclusion, the goal of this document and ongoing efforts by DEQ is to ensure that, in collaboration with NCDA&CS, North Carolina is prepared to address an outbreak of a FAD in a manner that preserves our current state of environmental quality and public health while also rapidly controlling disease spread to preserve our state's robust swine industry. Although this guidance is for a FAD involving swine, the information and guidance contained within can be used and applied to address the mass mortality of livestock resulting from weather events like hurricanes, potential disruptions to the food supply chain, etc.

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****Disclaimer: All documents included in the above appendices were used as reference only in developing this guidance to ensure consistency with NC laws and rules, as well as industry practice within and outside of NC. Those documents do not supersede any laws and rules that apply to the activities outlined in this guidance and as such, should not be relied upon to ensure compliance with the law.***

This document may be periodically updated to accurately reflect current rules and regulations. Decisions on how and when to apply this document should always be made in consult with the State Veterinarian’s office and NCDEQ where applicable.

BIOSECURITY GUIDANCE FOR A FOREIGN ANIMAL DISEASE RESPONSE

Many FADs are highly contagious between animals and can be spread through contact with contaminated clothing, vehicles, and equipment. Mass mortalities caused by disease outbreaks have the potential to, if left unmanaged, negatively impact both surface and groundwater resources. This guidance is offered to help protect animal health and prevent the spread of disease and ultimately protect North Carolina's environment and natural resources.

In the event of an outbreak, staff should only enter affected areas with authorization from the established Incident Management Team (IMT). The following are general guidelines to be used when visiting affected farms, compost sites, and disposal sites. These measures may be updated if the FAD threat to North Carolina becomes more imminent and the responsibility of DEQ staff becomes more defined.

VEHICLES

- Vehicles must be washed on a regular basis, preferably prior to visiting farms and after site visits, especially after being on an affected farm. Tires, fenders, and vehicle undercarriages must be sprayed prior to farm site entry and after leaving the site.
- The vehicle interior must be vacuumed, and floor mats must be disinfected using a spray disinfectant.
- Vehicles need to be cleaned and disinfected using only products that have been approved by the EPA and USDA-APHIS that are effective against the FAD agent.
- Vehicles entering or exiting sites requiring active decontamination shall adhere to the established protocols.
- Park vehicles outside of the "dirty zone." Unless otherwise directed, park vehicles at least 50 feet from any confinement house, mortality composter, or burial site. Do not park downwind from building ventilation fans.
- Whenever possible, avoid areas where feed trucks, live haul trucks, and rendering trucks may travel or congregate.
- Decrease the number of vehicles traveling onto an affected site by carpooling response personnel.

PERSONNEL AND EQUIPMENT

- Follow all requirements for personal protective equipment (PPE).
- Rubber boots or disposable boot covers shall be worn during the entire site visit. Rubber boots shall be disinfected prior to leaving the facility.
- Disposable boot covers, gloves, or other PPE, such as Tyvek coveralls or disposable respirators, shall be disposed of on the farm when possible. If on-site disposal is not available, staff shall be equipped with heavy-duty trash bags of a size sufficient to hold the contaminated items.
- Hands shall be cleaned and sanitized before leaving the site.
- Any sampling devices or tools used while working on the farm or at off-site disposal sites shall be cleaned and disinfected prior to leaving the site.

- Observe any minimum down time as prescribed by USDA, NCDA&CS, and/or DEQ between visits. This time may vary among agencies and depending on the severity of a particular situation.
Response staff who own animals susceptible to the disease of concern should not be deployed to affected premises.

OTHER BIOSECURITY CONSIDERATIONS

There may be affected areas of the state that warrant the establishment of “clean” and “dirty” travel corridors. Response staff shall become fully aware of this designated status if and when it is put in place and must seek permissions from the Incident Management Team.

As with other emergency response situations that have occurred in North Carolina, such as hurricane response, it is recommended that response staff carry the following items in the event of required duty away from home for more than one day at a time: change of clothing, cell phone and charger, cash or credit cards, and other personal items, including medications.

GUIDANCE FOR DECONTAMINATION ACTIVITIES AT FACILITIES IMPACTED BY FOREIGN ANIMAL DISEASE

All vehicles and equipment leaving an infected premise will require decontamination as described by N.C. Department of Agriculture and Consumer Services procedures. Decontamination (Decon) activities include cleaning with a detergent-water mix and subsequent application of an approved disinfecting [agent](#). Decon flows may contain detergents, surfactants, and various disinfecting agents, and, if not properly controlled, could result in negative environmental effects not limited to macroinvertebrate and fish kills, foaming, turbidity, and sediment runoff. Public observation of negative environmental effects may create undue concern over the safety and effectiveness of the overall decontamination process. This guidance is designed to minimize potential negative environmental impacts by managing the wastewater flows from Decon activities.

REGULATIONS

The North Carolina rules for both Discharges to Surface Waters (15A NCAC 02H .0106) and Waste Not Discharged to Surface Waters (15A NCAC 02T .0113) do not require permits for discharges to surface waters and to the ground surface associated with biological or chemical decontamination activities under the following provisions:

- Activities are performed as a result of an emergency declared by the Governor or the Director of the Division of Emergency Management.
- Activities are conducted by or under the direct supervision of the federal or state on-scene coordinator.
- The Division of Water Resources (DWR) is informed prior to commencement of the discharge from Decon.
- No ground or surface water standards are contravened. If it is determined that standards are violated, an individual permit may be necessary.

SITING

It is desirable to place the Decon site a significant distance from barns and to account for other siting considerations to reduce the potential for environmental impacts. These considerations include distances from streams, water supply wells, and conduits to surface waters and site slopes. It is recommended that DEQ DWR Regional Office staff be contacted to assist in siting Decon stations. Recommended setbacks for Decon stations should be vegetative buffers (where possible) at the following distances:

- 100 feet from intermittent and perennial streams
- 25 feet from ephemeral streams, waterways, and ditches
- 100 feet from any well (with exception of monitoring wells)

Alternative setbacks may be determined based on site-specific criteria.

REDUCTION OF SURFACE RUNOFF FROM DECONTAMINATION ACTIVITIES

Infiltration of Decon water to the soil is preferred over discharge to surface waters. Recommended steps to maximize infiltration to the soil are listed below:

- Minimize soil compaction in infiltration areas by establishing driving routes to and from vehicle Decon areas that do not cross the infiltration areas. Elevate area(s) where vehicles are parked for washing by using gravel or aggregate rock layers, grates, or other mechanical designs. This keeps soils from becoming saturated, which prevents the formation of tire ruts, increases overall site stability, and minimizes the release of solids.
- Consider the above setback requirements and site Decon stations as far as practicable from surface water and wells.
- Recommended activities to facilitate infiltration of Decon flows include:
 - Placement of hay bales, sorbent sleeves, soil swales, or any other physical barrier in preferred pathways (e.g., drainage swales, channels, or roadside ditches that flow to surface water) to reduce the flow of water and allow for maximum infiltration.
 - If a suitable site capable of keeping the Decon water out of surface waters is not available, construction of a temporary catchment may be necessary. The catchment should be large enough to hold, at a minimum, the expected discharge on the most active day. An Authorization to Construct permit is not necessary; however, DWR regional staff should be consulted prior to all Decon activities and construction of temporary catchments. Commonly accepted engineering practices should be implemented.
- If Decon activities must occur during rain events, efforts should be taken to reduce runoff of pollutants and wastewater flows.

GUIDANCE FOR BURIAL OF MASS MORTALITY FROM A FOREIGN ANIMAL DISEASE

The goal of these recommendations is to properly dispose of all animal carcasses that result from the response to a FAD outbreak in a timely, biosecure, aesthetically acceptable, and environmentally responsible manner approved by the State Veterinarian. Burial sites must meet the criteria outlined below.

In the recommendations listed below, the term *burial site* refers to the disposal footprint, not the farm. The term also covers both traditional and above ground burial options.

RECOMMENDED SITE ASSESSMENT CRITERIA

- Perform adequate assessment of on-site burial areas prior to establishment of burial sites/pits to prevent contamination of groundwater or surface water with disease agents and conventional pollutants such as dissolved solids, nitrate, or ammonia from decaying carcasses.
- Adequate assessments for on-site burial require an initial review of County Soil Surveys for determining suitable areas by soil map unit, which is then confirmed by on-site verification by qualified individuals such as a [Licensed Soil Scientist](#).
- In cases where the burial site is in a waste disposal spray field, the burial site is not available for subsequent waste spraying until a new, viable crop is established on the site. In the case of above ground burial, the spray field may need to be removed, either in part or wholly, from use permanently.
- The burial site should be located and maintained to minimize intrusion of stormwater into the disposal area and stormwater runoff.
- Burial is not permitted in the tiled area of an underdrained field. If no other option exists, drain tiles should be removed or otherwise rendered inoperable in the immediate area of disposal.
- Burial sites should not be located within the 100-yr floodplain, if possible. At no time should a burial site be located within a floodway.

RECOMMENDED DEPTH TO SEASONAL HIGH WATER TABLE AND COVER CRITERIA

- (Option 1) The site where dead animals are to be buried should have a separation to the seasonal high water table based on the following soil textural classes:
 - **Soil Group 1:** sandy texture soils- > 36 inches and soil textures coarser than loamy sand may require a greater separation distance to the seasonal high water table;
 - **Soil Group 2:** coarse, loamy, and fine loamy texture soils->24 inches; or
 - **Soil Group 3:** clayey texture soils->18 inches.
- (Option 2) Burial sites for dead animals should be at least 36 inches above the seasonal high water table. Soil textures coarser than loamy sand may require a greater separation distance to the seasonal high water table.

RECOMMENDED BUFFERS AND SETBACKS

The burial site shall meet the minimum buffer requirements:

- 300 feet from any existing stream or public body of water and at no time within the regulated floodway of any waters of the state.
- 300 feet from any existing public or private water supply well.
- 100 feet from any other type of existing well (e.g., monitoring, irrigation, etc.).
- At least 500 feet from a residential dwelling.
- At least 50 feet from the property boundary unless the owner of the adjacent property is the same person or entity. If the property boundary is a public road or highway, the buffer shall be 200 feet from the edge of the right-of-way.
- The burial site cannot include any portion of a waste lagoon or lagoon wall.

Alternative setbacks may be determined based on site-specific criteria by NCDACS or DEQ staff.

TRADITIONAL BURIAL

- Burial trenches or pits should never be constructed at a depth greater than 4 feet to remain in a biologically active part of the soil and reduce safety concerns.
- Vehicular traffic should be limited to greater than 4 feet from a burial site.
- A clay liner at least 18 inches in thickness should be considered for burial sites, especially those in soil group 1, to allow for additional environmental protection.
- Burial locations should be lined with a minimum of twelve (12) inches of carbonaceous material (e.g., sawdust, woodchips, silage, etc.) to absorb leachate and promote biological activity.
- Carcasses should be covered with soil within 48 hours of placement. Cover should be sufficient to prevent odors, vectors, etc.
- There should be at least 36 inches of soil covering any buried animal unless otherwise approved by the State Veterinarian under the declared State of Emergency. This can be interpreted to mean soil mounded over the animals above the adjacent ground level.
- Cover of the burial trench should be slightly mounded above the ground surface to allow for settling and to shed stormwater. Topsoil shall be retained to re-grade the disposal site after the ground has settled as the decomposition process is completed. Stockpiled soil shall be no closer than 20 feet from the edge of the burial pit. Soil shall be of a textural class sufficient to limit the infiltration of stormwater into the burial pit.
- Hydrated lime may assist in pathogen inactivation. As such, it may be incorporated into the burial pits at levels approved by the State Veterinarian. It should be noted though that excess lime may have negative impacts by slowing the overall decomposition process. At no time should lime be placed below the seasonal high water table as it could negatively impact pH levels.

ABOVE GROUND / SHALLOW BURIAL

DEQ acknowledges that there is on-going research on the above ground burial of animal mortality as an alternative disposal option where traditional burial may not be an option due to site specific restrictions. Except for some recent use in the current outbreaks in SE Asia, most of the research has been relatively small scale testing. In demonstration experiments it has shown potential to reduce groundwater contamination caused by the burial of animals, feed, and other allowable materials. In addition, because above ground burial pile construction is similar to compost windrows, it may allow for faster decomposition. It is unclear however, similar to traditional burial, of the efficacy of above ground burial for pathogen inactivation.

Without more information on its use for successfully addressing mass mortality, if above ground burial is a method approved by the State Veterinarian, DEQ makes the following recommendations:

- The burial site must meet the same criteria outlined above for buffers, separation from the seasonal high water table, etc.
- Burial locations should be lined with a minimum of twelve (12) inches of carbonaceous material (e.g., sawdust, woodchips, silage, etc.) to absorb leachate and promote biological activity.
- Carcasses should be sufficiently covered within 48 hours of placement to prevent odors, vectors, etc.
- Burial of carcasses should not extend below the surface of the ground more than eighteen (18) inches on sites limited to Soil Group 1 as described above, unless more than thirty-six (36) inches of separation to the seasonal high water table from the bottom of the trench has been confirmed.
- Upon final placement of carcasses, soil cover must be applied at a minimum depth of thirty-six (36) inches (unless otherwise approved by the State Veterinarian under the declared State of Emergency) and graded to a slope no steeper than 3:1. The top six (6) inches of the soil must be suitable to support vegetative growth.
- Groundcover should consist of regionally appropriate vegetation to promote establishment and long-term stabilization of the area.
- Temporary erosion control measures (e.g., silt fence, straw bales, etc.) shall be placed around the area and maintained until such time groundcover is established.
- Periodic inspection and maintenance of the burial area should be required to address settling as decomposition occurs.

RECORD KEEPING / POST-BURIAL CRITERIA

- A record of the location of the approved site (GPS latitude and longitude coordinates if available) and the burial history of each burial site, to include the reason of death, the burial date, species, head count and age, should be kept by the property owner and reported to the local health director, the State Veterinarian, and the Secretary of the Department of Environmental Quality.

- Deed notices for burial site locations should be required. The purpose of recording the disposal location is to provide actual and constructive notice to subsequent purchasers of the property and to reduce any risk to public health, safety, or the environment from either the improper disturbance of the waste or from development in proximity to the waste.
- A post-disposal environmental assessment may be required by DEQ based on the number of carcasses buried and site specific risks associated with the burial site (to include a minimum of three monitoring wells, with one well located upgradient of groundwater flow). Surface water sampling may also be required.

COLLECTIVE BURIAL SITES CRITERIA

A collective burial site may be designated to serve multiple farms in the event of a large-scale emergency when individual farm sites are not available. In order to establish a collective burial site, in addition to the siting criteria noted above, it should be required to be constructed with, at a minimum, a 1.25×10^{-6} cm/sec clay liner at least 18 inches in thickness. Post-disposal assessment as noted above would be required for any collective burial site. Due to the potential generation of gases from the decomposition of carcasses, DEQ recommends air monitoring of enclosed buildings, spaces, etc. within 500 feet of the disposal area.

GUIDANCE FOR COMPOSTING OF MASS MORTALITY FROM FOREIGN ANIMAL DISEASE

Composting has been used successfully to manage mortality from avian influenza outbreaks in the US poultry sector in a manner that inactivates the virus. Based on information known about ASF, the thermophilic temperatures associated with composting should be effective in the management of this virus as well. Time and temperature criteria for virus inactivation through composting will be established by USDA-APHIS and conveyed by the IMT.

A result of utilizing the compost process to manage mortality from an ASF outbreak is the production of a safe, stable material that can have agronomic value and contributes to soil tilth. However, there are known challenges associated with composting infected animals such as the variable size of the carcasses, the amount of liquid generated, the availability of carbon materials and needed equipment, as well as the potential for increased time to reach thermophilic temperatures.

If those challenges can be addressed, DEQ believes composting should be the recommended disposal option as it will have the least short and long-term impacts on public health and the environment. Should the State Veterinarian approve composting, DEQ offers the following:

RECOMMENDED SITE ASSESSMENT CRITERIA

- Perform adequate assessment of composting areas prior to an ASF outbreak to prevent contamination of groundwater or surface water by either the pathogen or conventional pollutants such as dissolved solids, nitrates, or ammonia from decaying carcasses.
- Adequate assessments for composting areas should initially consider County Soil Surveys for determining suitable areas by soil map unit, confirmed by on-site assessments from qualified individuals.
- The compost site should be located to minimize the effect of stormwater runoff.
- Composting should not be conducted in the tiled area of an underdrained field.

RECOMMENDED MINIMUM BUFFERS AND SETBACKS

- Compost areas should be at least one foot above the seasonal high water table. Soil textures coarser than loamy sand may require a greater separation distance to the seasonal high water table.
- 200 feet from residences if owned/occupied by same entity, 500 feet otherwise
- 100 feet from the property boundary, unless the owner of the adjacent property is the same person or entity.
- 50 feet from intermittent, perennial streams or public body of water.
- 25 feet from ephemeral streams, waterways, or ditches.
- 100 feet from an existing well.

Alternative setbacks may be determined based on site-specific criteria.

RECOMMENDED PROCESS MANAGEMENT CRITERIA

- Adequate carbon material should be available to ensure that a balanced carbon-to-nitrogen ratio can be created. Sources of carbon include woodchips, sawdust, bedding material, hay, etc. Carbon sources with particle sizes greater than .5-1 inch should not be considered.
- Construct indoor or outdoor windrows with a 12-15 inch base of carbon material 8-12 feet wide (alternative sizes may be considered).
- Use available equipment to combine carcasses and carbon/litter material together prior to placing it on the 12-15 inch base.
- Windrow construction should prevent carcass exposure.
- Construct windrows to a 4-8 foot height and cap with 12 inches of carbon material.
- Moisture may be added to keep piles within a 40-60 percent moisture range. Leachate from the base of the windrow is indicative of excessive moisture within the windrow and additional carbonaceous material may need to be added. Leachate should not discharge to any surface water body, waterway, or ditch.
- Compost should be turned no sooner than what is allowed by USDA requirements for ASF mortality management.

RECOMMENDED MONITORING CRITERIA

- Unless otherwise established by USDA-APHIS, temperatures at 18 and 36 inch depths should be taken every 25 feet of the windrow to ensure adequate temperatures (130 degrees Fahrenheit or above) are being achieved at both depths. Temperatures should be monitored the first week to ensure that thermophilic temperatures (>130 degrees Fahrenheit) are reached and again at day 14, for documentation purposes. It is important to note that composting temperatures for ASF at 140 degrees Fahrenheit have been observed.
- If elevated temperatures are not reached, the moisture level of the windrows should be measured and possibly corrected.
- If pile temperatures decrease early in the composting process, there may be inadequate oxygen (<5%), requiring the pile to be mixed or aerated.
- Excessive temperatures over 160 degrees Fahrenheit should be closely monitored to prevent spontaneous combustion.
- Calibration of temperature probes should be required to ensure their accuracy.

RECOMMENDED STORAGE AND LAND APPLICATION OF COMPOST CRITERIA

Composted material that satisfies the above criteria and has been certified by Incident Management Team may be transported offsite for disposal or land application as a Class B compost product. Class B compost is restricted to distribution for land and mine reclamation, silviculture, and agriculture (on crops not for human consumption). Other beneficial uses may be approved by DEQ. The following are recommended minimum setbacks and practices for the storage and land application of compost.

Compost storage setbacks

- 100 feet from residences
- 100 feet from any well
- 50 feet from intermittent, perennial streams or public body of water
- 25 feet from ephemeral streams, waterways, or ditches
- 50 feet from the property boundary unless the owner of the adjacent property is the same person or entity

Land application setbacks:

- 100 feet from residences
- 100 feet from any well
- 50 feet from intermittent, perennial streams or public body of water
- 25 feet from ephemeral streams, waterways, or ditches
- 50 feet from the property boundary unless the owner of the adjacent property is the same person or entity.
- Compost should be applied at no greater than agronomic rates.
Records should be maintained of dates the compost was removed from the farm, estimated amount of compost removed, and the location of sites where compost was land-applied.

RECOMMENDED ADDITIONAL COMPOSTING CONSIDERATIONS

- Further composting of the mortality may be conducted in addition to the USDA-APHIS requirements in order to reach a Federal Class A standard. Class A standards for windrow composting include five turning events over a 15-day period while compost pile temperatures remain at or above 131 degrees Fahrenheit. Additional sampling of the finished product for heavy metals, pathogens, and inert material is required for Class A material. Class A composted materials have much greater distribution options.
- Compost should not be distributed and marketed to the public unless it meets federal Class A standards, and the facility is issued a permit by DEQ's Division of Water Resources.
- Siting of compost windrows should be considered to ensure they can be accessed by heavy machinery and firefighting equipment.
- Siting locations for storage of carbon materials should also be considered. Carbon storage locations that allow storing of carbon outside of the potentially quarantined area should be identified to prevent unnecessary Decon of vehicles.
- Analytical testing of finished compost is recommended to ensure agronomic loading rates are not exceeded in land application systems.

CENTRALIZED COMPOSTING

- If a centralized composting site is established for managing animal mortality from multiple farms, additional criteria may apply. DEQ will continue to collaborate with the State Veterinarian to ensure compliance with the applicable sections of 15A NCAC 02L, 15A NCAC 02B, 15A NCAC 02T, 15A NCAC 02D, and 15A NCAC 04C.

- If a centralized compost site is to be established for the long term or permanent management of animal mortality, the site shall be subject to permitting requirements by DEQ. For a site established under an emergency declaration and only for use during that emergency, DEQ permitting requirements may not be applicable based on coordination and agreement with the respective DEQ Divisions, in the establishment of best management practices (BMPs) to be implemented.
 - In addition to any requirements noted in above composting sections, DEQ would further recommend the following BMPs to address erosion and sedimentation control (E&SC) as well as stormwater concerns related to activities at the central compost site:
 - Avoid site locations that drain to 303(d) listed impaired waters or High Quality Waters.
 - Avoid site locations in wooded/shaded areas that would reduce pathogen exposure to sunlight.
 - A stabilized construction entrance/exit should be installed (ex. at least of 6 inches depth of #5 stone).
 - Access roads should be graded to prevent run-off into the State Roads.
 - Dust from traffic on access roads should be controlled using clean water (Ex. from a local fire hydrant meter).
 - Loading/unloading areas should be stabilized for heavy equipment and truck turning. (Recommend 6 inches depth of #5 stone).
 - Visual screening (trees, fencing or earthen berms) should be installed around the perimeter of the site.
 - Silt fence should be installed along the site perimeter as a BMP (expected useful life of maintained silt-fence is 6 months to 1 year.)
 - To the maximum extent practical, divert applicable run-on around the active work site via site grading and/or berms/diversions.
 - Stormwater conveyances from active/exposed work areas should be designed and constructed to promote diffuse sheet flow and to the extent practical through vegetated buffers. Stormwater should be conveyed through vegetated broad-based swales as applicable to address run-off. Compost windrows shall be oriented in a manner that does not impede stormwater flow from the active compost or curing area.
 - Maintain or install vegetated filter strips and/or riparian buffers (with slope of <1%, buffer width at least 35'; slope of 2%+, buffer width at least 50') around streams.
 - Consider the use of ponds or basins for stormwater retention and sediment control that can function as fire suppression if needed.
 - Any bulk liquid (e.g., fuels, fluids, lubricants) storage areas should have secondary containment structures to prevent discharge of product should a leak or spill occur.

- Heavy equipment fueling/maintenance should be conducted away from streams, ditches, and stormwater conveyances to prevent discharge of contaminants.
- Refer to the NC Stormwater Control Design Manual and NC Erosion & Sedimentation Control Design Manual for design standards and available tools.

GUIDANCE FOR INCINERATION OF MASS MORTALITY FROM A FOREIGN ANIMAL DISEASE

The purpose of this section is to provide guidance on the burning of infected and potentially infected carcasses for the purpose of disposal. While it is recognized that the use of other disposal methods is recommended, there may be technical or logistical limitations associated with these methods such that burning may be discussed as an alternative and may be the only viable option of disposal. Under these circumstances, the State Veterinarian will make this determination.

Burning of infected or potentially infected carcasses involves a substantial combustion challenge. The two most significant aspects are the moisture content of the carcass and the limitations of getting air and fuel to the carcass in order to produce effective combustion. By providing the following recommended practices and procedures for burning as an alternative means of disposal, it is anticipated that the air quality impacts can be reduced and minimized.

TRANSPORTABLE INCINERATORS

Incineration, using equipment specifically designed for destruction of animal carcasses and the associated infectious disease agent, provides the most effective control for both pathogen destruction and air emissions.

The benefits of using an incinerator include:

- Two-stage combustion and control of both fuel and air to the incinerator.
- Minimization of air emissions (relative to any form of open burning).
- Reduction of fuel requirements.
- May allow for the use of air pollution control technologies to control emissions.
- Destruction of the disease agent.

There are a number of disadvantages to using incinerators, including:

- Availability and acquisition of the equipment.
- Requirements for setup and site preparation time.
- Access to fuel (e.g., natural gas, propane, diesel).
- The rate of throughput on most units can be relatively low.

PERMIT EXEMPTIONS

For the purposes of a FAD outbreak, where time is of the utmost importance, and where it has been determined that the application of an incinerator is necessary for the control of the disease, the incinerator is exempt from air permitting requirements and the requirements of 15A NCAC 02D .1200. The exemption is allowed under 02D .1201(b)(4) provided it meets the requirements of subparagraphs (A) through (D) of that paragraph. These requirements are:

- The incinerator is located on a farm and is operated by the farm or farm operator.
- The incinerator is used solely for the disposal of animals originating on the farm where the incinerator is located.
- The incinerator is not charged at a rate that exceeds its design capacity.
- The incinerator complies with 15A NCAC 02D .0521 (visible emissions).

OPEN BURNING

Open burning should be considered as a last resort for disposal of infected and potentially infected carcasses. If it is the required alternative option, as a practice approved by the State Veterinarian, it should be considered agricultural burning as defined under 15A NCAC 02D .1903(b)(5) and permissible without an air quality permit. However, the Division of Air Quality recommends the following practices be observed to improve combustion and minimize other environmental impacts. These practices include:

- Burn only materials required to start and maintain or support combustion.
- Placement or piling of animals in direct contact with the ground should be avoided.
- Commence burning in daylight to take advantage of better daytime dispersal of air pollutants.
- Burn with setbacks or situational BMPs whenever possible.
- Follow DEQ rules and guidance with regard to ash residue.

GUIDANCE FOR TRANSPORTATION, LANDFILL DISPOSAL, AND RENDERING OF MASS MORTALITY FROM A FOREIGN ANIMAL DISEASE

TRANSPORTATION

The transport or movement of live or deceased animals in a foreign animal disease outbreak is subject to the authorities granted to the State Veterinarian, and possibly under the authority of USDA-APHIS.

DEQ's concerns associated with the transport of carcasses off-site are the potential for loss of solids and liquids from containers or trailers during transport. These issues are addressed in the North Carolina Administrative Code, specifically 15A NCAC 13B .0105. This rule makes the hauler responsible for satisfactorily transporting waste in covered and leak-resistant containers. Until new guidance is released, we recommend using the USDA-APHIS transport requirements for HPAI for the containment of pathogens during transport.

It is presumed that carcasses will be hauled in roll-off containers and/or trailers. The USDA APHIS procedure for the preparation and loading of the transport container is as follows:

- Seal all holes and cracks in the sides, bottom, and doors of the container.
- Line the bottom and sides of the container with at least one layer of polyethylene*, leaving enough to cover the load.
- Place a one-foot depth of wood shavings/absorbent material before adding carcasses.
- Spray carcasses with an approved disinfectant (not to the point of saturation) prior to loading.
- Load to not more than one foot from the top, or maximum load weight.
- Fold the liner onto itself and seal with tape.
- Cover the loaded container with a tarp, securing it with tape or tie-downs, followed by a polyethylene sheet, also secured, and a second tarp secured around the top of the container.

All loaded containers need to be inspected prior to disinfection for leaks or holes/punctures prior to departure.

*Polyethylene bags can also be used to hold carcasses, etc. in lined containers.

Transport equipment must be cleaned and disinfected prior to exit from the premises.

LANDFILL DISPOSAL

DEQ staff have worked with county governments, both public and private solid waste landfill owners and operators, and NCDA&CS for 10-plus years on mass animal mortality management whether it be caused by a disease outbreak or a natural disaster such as Hurricanes Matthew and Florence in recent years. Of NC's forty-two lined municipal solid waste landfills, only around twenty-five percent (25%) of them have been willing to accept mass mortality to date, and less than a handful have done so after the recent hurricanes. Landfills provide for a rapid, convenient,

and safe method to dispose of animal mortality, however, there are many factors that create operational and planning concerns for landfill owners and operators. Landfills provide a vital public service to ensure the solid waste generated by NC's 10 million plus residents is safely managed on a day to day basis. The idea of losing highly valuable landfill space, especially when expanding existing and/or siting of new landfills is not guaranteed in the respective county, often drives landfills away from accepting mortality. Any disruption of landfill services caused by managing mortality could cause ripple effects across the state in both collection and disposal of waste, leading to larger public health and environmental concerns. Waste acceptance at landfills is conditioned by state law and permits, but also often by conditions of the local Board of Commissioners. Therefore, if landfill disposal is to be a viable option for mass mortality, pre-event outreach, planning, and communication directly with these facilities is critical.

Landfills have been adamant that they will not accept diseased animals. All incoming loads will need to be manifested and signed off by the State Veterinarian or his representatives as disease free in order to be accepted for disposal. Landfills themselves will have additional site-specific operation controls and protocols that must be met to maintain compliance with their permits that may place limits on operational hours, acceptable volumes of waste, etc.

RENDERING

Potential environmental issues associated with the utilization of rendering facilities are primarily related to the transport of carcasses and the potential discharge of wastewater generated from cleaning and disinfection associated with transport. Decontamination will be required for all vehicles exiting rendering facilities that accept mortalities from ASF-impacted farms.

A rendering facility needs to have, and follow, all required NPDES or non-discharge permits for the wastewater generated in the cleaning and disinfection process, especially if cleaning occurs unconfined. Permits may also be required for truck and equipment storage areas.

GUIDANCE FOR MANAGING DISEASE IMPACTED WASTE IN ON-FARM LAGOONS

There is limited information available on the survival of the ASF virus in manure. Additional research is underway to determine the viability of the ASF virus outside of the animal body. The research covers a broad range of environmental conditions and hosts/mediums including water, feces, etc. Lagoon management and environmental conditions impact virus survival in the manure and wastewater. Determination of a 'virus-free' state is an important step in returning a facility to normal operations.

While no official guidance is currently available from USDA-APHIS, some areas of initial discussion include how to determine the presence of and quantity of impacted areas of a lagoon, effective treatment methods, and biosecure disposal of lagoon effluent and sludges.

Determining Presence and Extent of Impact – evaluation must consider waste transfer methods (flush tanks/deep pits), the number and distribution of sampling points in the lagoon, sampling within recycle system, testing of both effluent and sludge, as well as frequency of testing to determine treatment.

It is DEQ's understanding that USDA-APHIS will provide final guidance on the acceptable Treatment Methods for animal waste lagoons and storage structures. With that, possible methods of lagoon management and treatment may include:

- Advance guidance for lagoon management to keep waste levels at or near the minimum operating level. This would be **STRONGLY** recommended to reduce volumes that may require treatment and to maximum the length of time until disposal would be required.
- PH adjustment such as hydrated lime or a strong acid. Information will be needed on when/how to apply.
- Ban on land application on an impacted farm for 'X' period of time (e.g., 30 days) to allow for virus inactivation based on time and environmental/biological conditions.

	Treatment	Applicability	Efficacy/Effectiveness	Limitations	References
Manure /slurry	Heat - slurry	efficacious after 24 hours @ 50C (122F) or 15 minutes @ 60C (140F)	Depends on solids concentration	- may pose logistical challenges - needs field validation	- Turner et al. Laboratory-scale inactivation of African swine fever virus and swine vesicular disease virus in pig slurry. Pirbright Institute. 1999.
	Heat - manure, urine, saliva	efficacious after 15.3 days at 4C (40F)			- Davies et al. Survival of African Swine Fever Virus in Excretions from Pigs Experimentally Infected with the Georgia 2007/1 Isolate. Pirbright Institute. 2015.
	1% Sodium or calcium hydroxide wt./volume - slurry	efficacious after less than 5 minutes @ 4C (40F)	Depends on solids concentration	- worker health/safety risk from potential chemical burns and inhalation hazards	- Turner et al. Laboratory-scale inactivation of African swine fever virus and swine vesicular disease virus in pig slurry. Pirbright Institute. 1999.