This National Pollutant Discharge Elimination (NPDES) permit is issued pursuant to North Carolina General Statutes 143-215 et seq. and Section 402 of the Clean Water Act, may apply to any swine facility in the State of North Carolina and shall be effective from the date of issuance until July 1, 2007.

The animal waste management systems covered by this General Permit normally include some type of collection system (flush, pit recharge, scraped lots, etc); pipes or ditches for transmission of the waste; lagoons or ponds to collect, treat and store the waste; irrigation equipment; and sufficient acreage for application of the animal waste at agronomic rates.

All activities authorized herein shall be consistent with the terms and conditions of this permit.

Holders of Certificates of Coverage (COC) under this permit shall comply with the following specified conditions and limitations.

I. PERFORMANCE STANDARDS

1. Any discharge of waste which reaches surface waters or wetlands is prohibited except as otherwise provided in this permit and associated statutory and regulatory provisions. Waste shall not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches not otherwise classified as state waters.

The waste collection, treatment, storage and application system operated under this permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands. Application of waste to terraces and grassed waterways is acceptable as long as it is applied in accordance with Natural Resources Conservation Service (NRCS) Standards and does not result in a discharge of waste to the surface waters or wetlands.

Facilities must be designed, constructed and operated to contain all waste plus the runoff from a 25-year, 24-hour rainfall event for the location of the facility. A facility that has a discharge of waste that results because of a storm event more severe than the 25-year, 24-hour storm will not be considered to be in violation of this permit if the facility is in compliance with its Certified Animal Waste Management Plan (CAWMP), the Clean Water Act (Act) and its implementing regulations, and this permit.

Any discharge or application of waste to a ditch that drains to surface waters or wetlands is prohibited except as follows: (a) discharges from the ditches are controlled by best management practices (BMPs) designed in accordance with NRCS standards; (b) the BMPs have been submitted to and approved by the Division; (c) the BMPs were implemented as designed to prevent a discharge to surface waters or wetlands; (d) the waste was removed immediately from the ditch upon discovery; and (e) the event was documented and reported in accordance with Part III.11. of this permit. Nothing in this exception shall excuse a discharge to surface waters or wetlands except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.

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2. No discharge of waste shall result in a violation of the water quality standards established for the receiving waters as per Title 15A, Subchapter 2B, Section .0200 of the North Carolina Administrative Code.

3. The facility’s COC and its CAWMP are hereby incorporated by reference into this permit. The CAWMP must be consistent with all applicable laws, rules, ordinances, and standards (federal, state and local) in effect at the time of siting, design and certification of the facility. The Permittee must assess, on an ongoing basis, the effectiveness of the implementation of the CAWMP. The Permittee must amend the CAWMP in order to address any changes needed to maintain compliance with the facility’s COC and this permit. Any amendment to the CAWMP must be documented, dated, and included as part of the CAWMP. All amendments, along with an explanation identifying all amendments, shall be submitted to the appropriate Division regional office within ten (10) working days of the amendment. If field, riser or pull numbers are changed as a result of the amendment, an explanation shall also be submitted and include a description of how the new numbers relate to the old numbers.

Any violation of the COC or the CAWMP shall be considered a violation of this permit and subject to enforcement actions. A violation of this Permit may result in the Permittee having to take immediate or long-term corrective action(s) as required by the Division or the Environmental Protection Agency (EPA). These actions may include but are not limited to: modifying the CAWMP; ceasing land application of waste; removing animals from the facility; or the COC being reopened and modified, revoked and reissued, and/or terminated.

4. Any proposed increase in the certified design capacity or the Steady State Live Weight of animals above that authorized by the COC will require a modification to the CAWMP and the COC prior to the actual increase in either waste production or Steady State Live Weight of animals.

5. A copy of this General Permit, the facility’s COC, certification forms, lessee and landowner agreements, the CAWMP and copies of all records required by this permit and the facility’s CAWMP shall be readily available at the facility (stored at places such as the farm residence, office, outbuildings, etc.) where animal waste management activities are being conducted for the life of this permit, unless otherwise specified in this permit. These documents shall be kept in good condition and records shall be maintained in an orderly fashion.

6. If prior to the expiration date of this permit either the state or federal government establishes Phosphorus loss standards that are applicable to land application activities at a facility operating under this permit, the Permittee must conduct an evaluation of the facility and its CAWMP under the requirements of the Phosphorus loss standards to determine the facility’s ability to comply with the standards. This evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within six (6) month of receiving notification from the Division.

Once Phosphorus loss standards are established by the state or federal government that are applicable to facilities applying to operate under this permit, no COC will be issued to any new or expanding facility to operate under this permit until the applicant demonstrates that the new or expanding facility can comply with these standards.

7. If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add treatment units for the purpose of removing pollutants before the waste is discharged into the lagoons/storage ponds. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the new treatment unit will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

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If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add various innovative treatment processes to the systems on a pilot basis in order to determine if the innovative treatment process will improve how the waste is treated and/or managed. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the innovative treatment process will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

For all new and expanding operations, no collection, treatment or storage facilities may be constructed in a 100-year flood plain.

Existing swine dry lots may remain in wetlands as long as the wetlands uses are not removed or degraded as a result of the swine. The swine however may not be confined within 100 feet of an adjacent surface water or a seasonally-flooded area. The swine also must not cause a loss of more than 10% of the existing tree canopy. Where trees do not exist, the area must be managed to include crop rotation.

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The collection, treatment, and storage facilities, and the land application equipment and fields shall be properly operated and maintained at all times.

2. A vegetative cover shall be maintained as specified in the facility’s CAWMP on all land application fields and buffers in accordance with the CAWMP. No waste shall be applied upon areas not included in the CAWMP.

3. Soil pH on all land application fields must be maintained in the optimum range for crop production.

4. Land application rates shall be in accordance with the CAWMP. In no case shall land application rates exceed the Plant Available Nitrogen rate for the receiving crop. In no case shall land application rates result in excessive ponding or any runoff during any given application event.

5. Direct application of animal waste onto land which is used to grow crops for direct human consumption that do not undergo further processing (e.g., strawberries, melons, lettuce, cabbage, apples, etc.) shall not occur following the planting of the crop or at any time during the growing season, or in the case of fruit bearing trees, following breaking dormancy. Application of animal wastes shall not occur within thirty (30) days of the harvesting of fiber and food crops for direct human consumption that undergoes further processing.

6. If manure or sludges are applied on conventionally tilled bare soil, the waste shall be incorporated into the soil within two (2) days after application on the land. This requirement does not apply to no-till fields, pastures, or fields where crops are actively growing.

7. Pesticides, toxic chemicals and petroleum products shall not be disposed of in the animal waste collection, treatment, storage or application systems.

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8. Domestic and/or industrial wastewater from showers, toilets, sinks, etc. shall not be discharged into the animal waste collection, treatment, storage and application system. Washdown of stock trailers owned by and used to transport animals to and from the facility only, will be permissible as long as the system has been evaluated and approved to accommodate the additional volume. Only those cleaning agents and soaps that are EPA approved, will not harm the cover crop, and will not contravene the groundwater standards listed in 15A NCAC 2L may be utilized in facilities covered by this permit. Instruction labels are to be followed when using cleaning agents and soaps.

9. Disposal of dead animals resulting from normal mortality rates associated with the facility shall be done in accordance with the facility’s CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division’s Statutes and regulations.

Disposal of dead animals whose numbers exceed normal mortality rates associated with the facility shall also be done in accordance with the facility’s CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division’s Statutes and regulations provided that: 1) burial of such animals shall be done in consultation with the State Veterinarian of the Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division’s Statutes and in compliance with NCDA&CS regulations; 2) the Division of Water Quality shall be notified prior to burial; and 3) all such burial sites must be mapped, and the dates and numbers of the animals buried by type must be recorded.

In the event of a Governor declared state of emergency, disposal of dead animals shall be done in accordance with requirements and guidelines dictated by the State Veterinarian according G.S. §106-339.4. The Division may require groundwater monitoring when there is massive burial of animals. All burial sites of such animals must be mapped, and the dates and numbers of the animals buried by type must be recorded.

10. Unless accounted for in temporary storage volume, all uncontaminated runoff from the surrounding property and buildings shall be diverted away from the waste lagoons/storage ponds to prevent any unnecessary addition to the liquid volume in the structures.

11. A protective vegetative cover shall be established and maintained on all earthen lagoon/storage pond embankments (outside toe of embankment to maximum pumping elevation), berms, pipe runs, and diversions to surface waters or wetlands. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the lagoon/storage pond embankments. All trees shall be removed in accordance with good engineering practices. Lagoon/storage pond areas shall be accessible, and vegetation shall be kept mowed.

12. At the time of sludge removal from a lagoon/storage pond, the sludge must be managed in accordance with the CAWMP. When removal of sludge from the lagoon is necessary, provisions must be taken to prevent damage to the lagoon dikes and liner.

13. Lagoons/storage ponds shall be kept free of foreign debris including, but not limited to, tires, bottles, light bulbs, gloves, syringes or any other solid waste.

14. The facility must have at least one of the following items at all times: (a) adequate animal waste application and handling equipment, (b) a lease, or other written agreement, for the use of the necessary equipment, or (c) a contract with a third party applicator capable of providing adequate waste application.

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15. In accordance with 15A NCAC 8F .0203(b)(2), the Operator in Charge (OIC) or a designated back-up OIC of a Type A Animal Waste Management System shall inspect, or a person under the supervision of an OIC or designated back-up OIC shall inspect, the land application site as often as necessary to insure that the animal waste is land applied in accordance with the CAWMP. In no case shall the time between inspections be more than 120 minutes during the application of waste. A record of each inspection shall be recorded on forms supplied by, or approved by, the Division and shall include the date, time, sprayfield number and name of the operator for each inspection.

The Permittee may assert as an affirmative defense in any enforcement action alleging noncompliance with the requirements imposed in this condition that such noncompliance was due to circumstances beyond the Permittee’s control. A notation shall be made on the form indicating the inspection affected by such circumstance and an explanation setting forth the circumstances claimed to have been beyond the Permittee’s control shall be submitted with the form.

16. Within one hundred and twenty (120) days of the effective date of a COC issued under this permit, the Permittee shall install, operate and maintain devices on all irrigation pumps/equipment designed to automatically stop irrigation activities during precipitation. This condition does not apply to manure spreaders or other equipment pulled by manned vehicles.

The Permittee will not be required to install, operate and maintain the devices if the Permittee commits to provide for the presence of the OIC or the designated backup OIC at all times during the land application of waste. This commitment must be submitted in writing to the Division prior to the 120th day following the effective date of the COC on a form supplied by, or approved by, the Division.

17. The Director may require any permittee to install and operate flow meters with flow totalizers based on the facility’s violations and/or incomplete or incorrect record keeping during irrigation events.

18. No waste shall be applied in wind conditions that might reasonably be expected to cause the mist to reach surface waters or wetlands.

19. The Permittee shall maintain buffer strips or other equivalent practices as specified in the facility’s CAWMP near feedlots, manure storage areas and land application areas.

20. Waste shall not be applied on land that is flooded, saturated with water, frozen or snow covered at the time of land application.

21. The Permittee shall consider pending weather conditions in making the decision to land apply waste and shall document the weather conditions at the time of land application on forms supplied by or approved by the Division. Land application of waste is prohibited during precipitation events.

22. Land application activities shall cease on any application site that exceeds a Mehlich 3 Soil Test Index for Copper of greater than 3,000 (108 pounds per acre) or Zinc of greater than 3,000 (213 pounds per acre).

23. All waste application equipment must be tested and calibrated at least once per year. The results must be documented on forms provided by, or approved by, the Division.

24. The Permittee must maintain monthly stocking records for the facility and make the records available to Department and EPA staff upon request.

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25. Crops for which animal waste is land applied must be removed from the land application site and properly managed and utilized. Harvested crops shall not be allowed to become unusable due to prolonged exposure to the weather.

III. MONITORING AND REPORTING REQUIREMENTS

1. An inspection of the waste collection, treatment, and storage structures, and runoff control measures shall be conducted and documented at a frequency to insure proper operation but at least monthly and after all storm events of greater than one (1) inch in 24 hours. For example, lagoons/storage ponds, and other structures should be inspected for evidence of erosion, leakage, damage by animals or discharge. Any major structural repairs to lagoons/storage ponds must have written documentation from a technical specialist certifying proper design and installation. However, if a piece of equipment is being replaced with a piece of equipment of the identical specifications, no technical specialist approval is necessary [i.e. piping, reels, valves, pumps (if the gallons per minute (gpm) capacity is not being increased or decreased), etc.] unless the replacement involves disturbing the lagoon/storage pond embankment.

2. Monitoring and Recording Freeboard Levels
   a. Highly visible waste-level gauges shall be maintained to mark the level of waste in each lagoon/storage pond that does not gravity feed through a free flowing transfer pipe into a subsequent structure. The gauge shall have readily visible permanent markings.

   The waste level in each lagoon with a waste level gauge shall be monitored and recorded weekly on forms supplied by or approved by the Division.

   The Director may require more frequent monitoring and recording on lagoon levels based on the facility’s compliance history for freeboard violations.

   b. The freeboard levels of lagoons serving any facility which experiences freeboard violations in any two consecutive years following the issuance of this General permit, or as determined necessary by the Director, shall be monitored and recorded as follows:

   In addition to the facility’s existing lagoon waste-level gauges, automated lagoon/storage pond waste-level monitors and recorders (monitored and recorded at least hourly) must be installed on all treatment and storage lagoons covered by a COC issued under this permit to measure and record lagoon freeboard. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer’s operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following notification from the Director. The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate to the satisfaction of the Director that the violations were due to conditions beyond its control.

   If an automated level monitor(s) becomes inoperable, the Permittee shall:

   i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than 24 hours following first knowledge of the problem; and,

   ii. make any needed repairs to the equipment as quickly as possible, and take and record daily lagoon levels at the same time every day until such time as the automated equipment is placed back into operation.

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c. The Director may require new or modified waste-level gauges at any facility if he determines that the existing gauges are not adequate to accurately indicate actual lagoon levels, or the various lagoon levels required to be maintained by this permit or the facility’s CAWMP.

3. Monitoring and Recording Precipitation Events

a. Precipitation events at facilities issued a COC to operate under this permit shall be monitored and recorded as follows:

A rain gauge must be installed to measure all precipitation events. The precipitation type and amount must be recorded daily following all precipitation events.

b. As deemed necessary by the Director, precipitation events at facilities shall be monitored and recorded as follows:

An automated rain gauge and recorder must be kept on site to measure and record all precipitation events. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer’s operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following receipt of notice from the Director.

If an automated rain gauge(s) becomes inoperable, the Permittee shall:

i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty four (24) hours following first knowledge of the problem; and,

ii. make any needed repairs to the equipment as quickly as possible, and take and record all rainfall events until such time as the automated equipment is placed back into operation.

4. A representative Standard Soil Fertility Analysis, including pH, phosphorus, copper, and zinc, shall be conducted on each application field receiving animal waste in accordance with NCGS 143-215.10C(e)(6). As of the effective the date of this permit, the Statute requires that the analysis be conducted at least annually. The results of these tests shall be maintained on file by the Permittee for a minimum of five (5) years and shall be made available to the Division or EPA upon request.

5. An analysis of the animal waste shall be conducted in accordance with recommended laboratory sampling procedures as close to the time of application as practical and at least within sixty (60) days (before or after) of the date of application. Every reasonable effort shall be made to have the waste analyzed prior to the date of application and as close to the time of waste application as possible. This analysis shall include the following parameters:

   Nitrogen  Zinc
   Phosphorus  Copper

6. The Permittee shall record all irrigation and land application event(s) including hydraulic loading rates, nutrient loading rates and cropping information. The Permittee shall also record removal of solids and document nutrient loading rates if disposed on-site or record the off-site location(s). These records must be on forms supplied by, or approved by, the Division.

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7. A record shall be created and maintained of all transfers of waste between lagoons/storage ponds not typically operated in series. Such record shall include at least the identity of the lagoon from which the waste was transferred, the identity of the lagoon receiving the waste, the date and time of transfer and the total volume of waste transferred.

8. If, for any reason, there is a discharge from the waste collection, treatment, storage and application systems (including the land application sites), to surface waters or wetlands, the Permittee is required to make notification in accordance with Condition III. 11. The discharge notification shall include the following information:
   a. Description of the discharge: A description of the discharge including a description of the flow path to the receiving surface waters or wetland and a site sketch showing the path of the waste. Also, an estimation of the volume discharged.
   b. Time of the discharge: The period of discharge, including exact dates and times, and if not corrected, the anticipated time the discharge is expected to continue. Also, steps being taken to reduce, eliminate and prevent recurrence of the discharge.
   c. Cause of the discharge: A detailed statement of the cause of the discharge. If caused by a precipitation event, detailed information from the on-site rain gauge concerning the size and duration of the precipitation event.
   d. Analysis of the waste: A copy of the last waste analysis conducted as required by Condition III. 5. above.

9. In the event of any overflow or other discharge from the waste collection, treatment, storage and application system(s) (including the land application sites) that reach surface waters or wetlands, the following actions must be taken:
   a. Analysis of the waste: Samples of the waste in the lagoon or storage pond from which the overflows or other discharges originated must be sampled and analyzed within 72 hours of the time that the producer or his representative becomes aware of the discharge. Samples must, at a minimum, be analyzed for the following parameters: fecal coliform bacteria; five-day biochemical oxygen demand (BOD$_5$); total suspended solids (TSS); total phosphorus as phosphorus; ammonia-nitrogen as nitrogen; TKN as nitrogen; and nitrate.
   b. Sampling procedures: The sample shall be collected and analyzed in accordance with EPA approved methods for water analysis listed in 40 CFR 136. Samples collected for the purpose of monitoring shall be representative of the discharged waste. Monitoring results must be submitted to Division within thirty (30) days of the discharge event.

10. All records required by this permit and the facility’s CAWMP, including but not limited to soil and waste analysis, rain gauge readings, freeboard levels, irrigation and land application event(s), past inspection reports and operational reviews, animal stocking records, records of additional nutrient sources applied (including but not limited to sludges, unused feedstuff leachate, milk waste, septage and commercial fertilizer), cropping information, waste application equipment testing and calibration, and records of removal of solids to off-site location(s), shall be maintained by the Permittee in chronological and legible form for a minimum of five (5) years. These records shall be maintained on forms provided or approved by the Division and shall be readily available for inspection. The Permittee shall also furnish to the Division or EPA upon request complete copies of any records required by this permit to be kept.

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11. Regional Notification:

The Permittee shall report by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty-four (24) hours following first knowledge of the occurrence of any of the following events:

a. Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.

b. Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.

c. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands or an event that poses a serious threat to surface waters or wetlands.

d. Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

e. Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of this Permit.

f. Overapplying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.

g. Any discharge to surface waters or wetlands and/or that poses a serious threat to the environment.

For any emergency, which requires immediate reporting after normal business hours, contact must be made with the Division of Emergency Management at 1-800-858-0368.

The Permittee shall also file a written report to the appropriate Division Regional Office within five (5) calendar days following first knowledge of the occurrence. This report shall outline the actions taken or proposed to be taken to correct the problem and to ensure that the problem does not recur. The requirement to file a written report may not be waived by the Division Regional Office.

12. An annual certification report shall be filed with the Division’s Central Office and appropriate Regional Office by March 1 of each year for the previous calendar year’s activities on forms provided by the Division. If the facility was not in compliance, the annual certification must be used to summarize all noncompliance during the previous year, actions taken or actions proposed to be taken to resolve noncompliance and explain the current compliance status of the facility.

13. The Director may require facilities to submit additional reports and/or certifications based on the facility’s compliance history.

14. In the event of a discharge of 1,000 gallons or more of waste to surface waters or wetlands, the Permittee must issue a press release to all print and electronic news media that provide general coverage in the county in which the discharge occurred setting out the details of the discharge. The press release must be issued within forty-eight (48) hours after it is determined that the discharge has reached the surface waters or wetlands. A copy of the press release and a list of the news media to which it was distributed must be kept for at least one (1) year after the discharge and must be distributed to any person upon request.

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15. In the event of a discharge of 15,000 gallons or more of animal waste to surface waters or wetlands, a public notice is required in addition to the press release described in Condition III 14. The public notice must be placed in a newspaper having general circulation in the county in which the discharge occurred and the county immediately downstream within ten (10) days of the discharge. If a discharge of 1,000,000 gallons of wastewater or more reaches surface waters or wetlands, the DWQ regional office must be contacted to determine in what additional counties, if any, a public notice must be published. A copy of all public notices and proof of publication must be sent to the Division within thirty (30) days of the discharge. The minimum content of the notice is the location of the discharge, estimated volume, identification of the surface water or wetland affected, steps taken to prevent future discharges and a phone number and contact name.

16. All facilities, which are issued a COC to operate under this permit, shall conduct a survey of the sludge accumulation in all lagoons within one (1) year of receiving the COC and every year thereafter. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. This survey shall be submitted as part of the facility’s annual report in the year it was conducted. This survey frequency may be reduced if it can be demonstrated to the satisfaction of the Division that the rate of sludge accumulation does not warrant an annual survey.

If the sludge accumulation is such that it is greater than the volume for which the lagoon was designed or reduces the lagoon’s minimum treatment volume to less than the volume for which the lagoon was designed, a plan must be submitted to the Division’s Central Office within ninety (90) days of this determination which documents removal and waste utilization procedures to be used.

17. The Division may require any additional monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste, sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of such waste upon the surface waters, groundwaters or wetlands. Such monitoring, including its scope, frequency, duration and any sampling, testing, and reporting systems, shall meet all applicable Environmental Management Commission and EPA requirements.

18. All monitoring, record keeping and reporting required by this permit, the Permittee’s COC and any additional monitoring and reporting required by the Director shall be on forms supplied by or approved by the Director. Submittal of these reports shall be in paper and/or electronic format as required by the Director.

19. Within five (5) working days of receiving the request from the Division, the Permittee shall provide to the Division one (1) copy of all requested information and reports related to the operation of the animal waste management system. Once received by the Division, all such information and reports become public information, unless they constitute confidential information under G.S. 132-1.2, and shall be made available to the public by the Division as specified in Chapter 132 of the General Statutes.

IV. INSPECTIONS AND ENTRY

1. The Permittee shall allow any authorized representative of the Department of Environment and Natural Resources (Department) or EPA, upon the presentation of credentials and other documents as may be required by law and in accordance with reasonable and appropriate biosecurity measures, to:

   a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

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b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

d. Sample or monitor, at reasonable times, for the purpose of assuring permits compliance or as otherwise authorized by the Act, any substances or parameters at any location.

V. GENERAL CONDITIONS

1. The issuance of a COC to operate under this permit shall not relieve the Permittee of the responsibility for compliance with all applicable surface water, wetlands, groundwater and air quality standards or for damages to surface waters, wetlands or groundwaters resulting from the animal operation.

2. The Permittee shall designate a certified animal waste management system operator with a valid certification to be in charge of the animal waste management system. The waste management system shall be operated by the OIC or a person under the OIC’s supervision.

3. The maximum waste level in lagoons/storage ponds shall not exceed that specified in the facility’s CAWMP. At a minimum, maximum waste level for lagoons/storage ponds must not exceed the level that provides adequate storage to contain the 25-year, 24-hour storm event plus an additional one (1) foot of structural freeboard except that there shall be no violation of this condition if: (a) there is a storm event more severe than a 25-year, 24-hour event, (b) the Permittee is in compliance with its CAWMP, and (c) there is at least one (1) foot of structural freeboard. In addition to the above requirements, for new and expanding farms with lagoon and storage pond designs completed after September 1, 1996, storage must also be provided for the heavy rainfall factor for the lagoons/storage pond. In case of lagoons/storage ponds in series that are gravity fed, the 25-year, 24-hour storm event and/or the heavy rainfall factor storage requirement for the system may be designed into the lowest lagoon/storage pond in the system. However, adequate freeboard must be designed into the upper lagoons/storage ponds to allow sufficient storage to prevent the waste level from rising into the structural freeboard while the storm water is draining into the lowest lagoon in the system.

4. Any containment basin, such as a lagoon or a storage pond, used for waste management shall continue to be subject to the conditions and requirements of this permit until properly closed. When the containment basin is properly closed in accordance with the “Natural Resource Conservation Service (NRCS) North Carolina Standard for Closure of Waste Impoundments,” March 2002 or any subsequent amendment, the containment basin shall not be subject to the requirements of this permit or the Act. The Permittee must submit a letter to the Division to request inactivation of the NPDES permit COC by providing documentation describing the procedures taken to close any containment basin.

Closure shall also include pre-notification of the Division and submittal of the Animal Waste Storage Pond and Lagoon Closure Report Form to the Water Quality Section, Non-Discharge Compliance and Enforcement Unit within fifteen (15) days of completion of closure.

5. The Permittee must maintain records of the amount of manure leaving the facility, provide the recipient(s) with information on the nutrient content of the manure, and record the name and address of recipient(s). The Permittee must inform the recipient(s) of his/her responsibilities to properly manage the land application of manure. Record keeping for the distribution of manure up to four (4) cubic yards per visit to individuals for personal use is not required.

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6. The annual permit fee shall be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly constitutes grounds for revocation of its COC to operate under this Permit.

7. Failure of the Permittee to maintain, in full force and effect, lessee and landowner agreements, which are required in the CAWMP, shall constitute grounds for revocation of its COC to operate under this Permit.

8. A COC to operate under this General Permit is not transferable. In the event there is a desire for the facility to change ownership, or there is a name change of the Permittee, a formal permit request must be submitted to the Division, including documentation from the parties involved and other supporting materials as may be appropriate. This request will be considered on its merits and may or may not be approved.

9. A COC to operate under this General Permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. The Permittee shall notify the Division immediately of any applicable information not provided in the permit application.

10. If the Permittee wishes to continue an activity regulated by this General Permit after the expiration date of this permit, the Permittee must apply for and obtain a new COC. Renewal applications must be filed at least 180 days prior to the expiration of the permit.

11. The issuance of a COC to operate under this General Permit does not prohibit the Division from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit as allowed by the laws, rules, and regulations contained in Title 40, Code of Federal Regulations, Parts 122 and 123; Title 15A of the North Carolina Administrative Code, Subchapter 2H .0100; and North Carolina General Statute 143-215.1 and 215.10C.

12. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual NPDES permit by notifying that person that an application is required. Coverage by this general permit shall automatically terminate upon issuance of the individual permit.

VI. PENALTIES

1. Failure to abide by the conditions and limitations contained in this permit; the facility’s COC; the facility’s CAWMP; applicable state law; and/or the Act and their implementing regulations may subject the Permittee to an enforcement action by the Division and/or EPA including but not limited to the modification of the animal waste management system, civil penalties, criminal penalties and injunctive relief.

The Act and 40 CFR Part 122.41, as well as state law, provide that any person who violates a permit condition is subject to civil penalties and administrative penalties. In addition criminal penalties including imprisonment are provided for falsifying data, knowingly violating a permit condition, or for negligence.

2. The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of state law and the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

3. It shall not be a defense for a Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

March 14, 2003
VII. STANDARD PERMIT CONDITIONS

A. General Conditions

1. Introduction: In accordance with the provisions of 40 CFR Part 122.41, et. seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Act, as amended, as well as ALL applicable regulations.

2. Duty to Comply: The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation, and reissuance; and/or for denial of a permit renewal application.

3. Toxic pollutants: The Permittee shall comply with effluent standards and prohibitions established under section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. Permit actions: This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Property rights: The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State/Tribal or local laws or regulations.

6. Duty to provide information: The Permittee shall furnish to the Division staff, within a reasonable time, any information which the Division staff may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Division staff, upon request, copies of records required by this permit to be kept.

7. Criminal and Civil Liability: Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, state law, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

8. State/Tribal Laws: Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by Section 510 of the Act.

9. Severability: The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

March 14, 2003
B. Proper Operation and Maintenance

1. Need to halt or reduce activity not a defense: It shall not be a defense for a Permittee in an enforcement action to plead that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Duty to mitigate: The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3. Proper operation and maintenance: The Permittee shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

C. Monitoring and Records

1. Representative sampling: Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

2. Retention of records: The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

3. Record content: Records of monitoring information shall include:
   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) and time(s) analyses were performed;
   d. The individual(s) or Division certified analytical laboratory(ies) who performed the analyses;
   e. The analytical techniques or methods used;
   f. The results of such analysis.

4. Monitoring procedures:
   a. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Director.
   b. The Permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.
   c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the Permittee or designated commercial laboratory.

March 14, 2003
D. Reporting Requirements

1. Anticipated Noncompliance: The Permittee shall give advance notice to the Division of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

2. Other information: Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Division, it shall promptly submit such facts or information to Division.

E. Signatory requirements

All applications, reports, or information submitted to the Division shall be signed and certified as follows:

1. All permit applications shall be signed as follows:
   a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
      i. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or,
      ii. The manager of one or more manufacturing, production, or operating facilities provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
   b. For a partnership or sole proprietorship: By a general partner for a partnership or the proprietor, respectfully.
   c. By the co-permittee.

2. All reports required by the permit and other information requested by the Division or EPA shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   a. The authorization is made in writing by a person described above;
b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or any individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

c. The written authorization is submitted to the Division.

3 Changes to authorization: If an authorization, as described above, is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements above must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

F. Certification

Any person signing a document under this section shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.”

G. Bypass

Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass.

VIII. DEFINITIONS

25-year, 24-hour rainfall or storm event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, “Rainfall Frequency Atlas of the United States,” May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

Act means the Federal Water Pollution Control Act as amended, also known as the Clean Water Act as amended, found at 33 USC 1251 et seq.

Agronomic rates means the amount of animal waste and/or other nutrient sources to be land applied to lands as contained in the nutrient management standard of the USDA Soil Conservation Service Technical Guide Section IV or as recommended by the North Carolina Department of Agriculture and Consumer Services and the North Carolina Cooperative Extension Service at the time of certification of the Animal Waste Management Plan by the appropriate technical specialist.
Animal feeding operation means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single animal feeding operation if they adjoin each other, or if they use a common area or system for the disposal of wastes.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

Director means the Director of the North Carolina Division of Water Quality.

Ditch means any man made channel for the purpose of moving water off a site to the surface waters.

Division means the North Carolina Division of Water Quality.

Excessive Ponding means any area of the application field where visible liquid waste is ponded on the surface of the land application site more than four (4) hours following the application of waste. Excessive ponding also means any areas where the ponding of waste has resulted in crop failure.

Groundwaters means any subsurface waters, as defined in 15A NCAC 2L .0102.

Land application means the application of wastewater and/or waste solids onto or incorporation into the soil.

Process wastewater means any process-generated wastewater and any precipitation (rain or snow) which comes into contact with any manure, litter or bedding, or any other raw material or intermediate or final material or product used in or resulting from the production of animal or poultry or direct products (e.g. milk, eggs).

Process-generated wastewater means any water directly or indirectly used in the operation of a feedlot for any of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning or flushing pens, barns, manure pits, or other feedlot facilities; direct contact swimming, washing or spray cooling of animals; and dust control.

State Waters means all surface waters, wetlands, groundwaters and waters of the United States located in the State.

Surface Waters means any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other surface body or surface accumulation of water, whether public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of the State of North Carolina, including any portion of the Atlantic Ocean over which the State has jurisdiction as well as any additional Waters of the United States which are located in the State.

Toxic pollutants means any pollutant listed as toxic under Section 307(a)(1) of the Act.

Waste means manure, animal waste, process wastewater and/or sludge generated at an animal feeding operation.
**Waters of the United States** means: (1) all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, and streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or, which are or could be used for industrial purposes by industries in interstate commerce; (4) all impoundments of waters otherwise defined as waters of the U.S.; (5) tributaries of waters identified in (1) through (4) of this definition; (6) the territorial sea; and (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in items (1) through (6) of this definition.

**Wetlands** means areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined in 15A NCAC 2B .0202.

This Permit issued the 14th day of March, 2003.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

____________________________________________________, Director

Alan W. Klimek, P.E.
North Carolina Division of Water Quality
By Authority of the Environmental Management Commission

NPDES Permit Number NCA200000

March 14, 2003
NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

SWINE WASTE MANAGEMENT SYSTEM GENERAL PERMIT

This General Permit is issued pursuant to North Carolina General Statutes 143-215 et seq., may apply to any swine facility in the State of North Carolina, and shall be effective from October 1, 2004 until September 30, 2009.

All activities authorized herein shall be consistent with the terms and conditions of this General Permit.

Holders of Certificates of Coverage (COC) under this General Permit shall comply with the following specified conditions and limitations.

I. PERFORMANCE STANDARDS

1. Any discharge of waste that reaches surface waters or wetlands is prohibited except as otherwise provided in this General Permit and associated statutory and regulatory provisions. Waste shall not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches not otherwise classified as state waters.

The waste collection, treatment, storage and application system operated under this General Permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands. Application of waste to terraces and grassed waterways is acceptable as long as it is applied in accordance with Natural Resources Conservation Service (NRCS) Standards and does not result in a discharge of waste to surface waters or wetlands.

Facilities must be designed, constructed and operated to contain all waste plus the runoff from a 25-year, 24-hour rainfall event for the location of the facility. A facility that has a discharge of waste that results because of a storm event more severe than the 25-year, 24-hour storm will not be considered to be in violation of this General Permit if the facility is in compliance with its Certified Animal Waste Management Plan (CAWMP) and this General Permit.

Any discharge or application of waste to a ditch that drains to surface waters or wetlands is prohibited except as follows: (a) discharges from the ditches are controlled by best management practices (BMPs) designed in accordance with NRCS standards; (b) the BMPs have been submitted to and approved by the Division of Water Quality (Division); (c) the BMPs were implemented as designed to prevent a discharge to surface waters or wetlands; (d) the waste was removed immediately from the ditch upon discovery; and (e) the event was documented and reported in accordance with Part III.13. of this General Permit. Nothing in this exception shall excuse a discharge to surface waters or wetlands except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.

2. No discharge of waste shall result in a violation of the water quality standards established for the receiving waters as per Title 15A, Subchapter 2B, Section .0200 of the North Carolina Administrative Code and Title 15A, Subchapter 2L of the North Carolina Administrative Code.

June 4, 2004
3. The facility's COC and its CAWMP are hereby incorporated by reference into this General Permit. The CAWMP must be consistent with all applicable laws, rules, ordinances, and standards (federal, state and local) in effect at the time of siting, design and certification of the facility.

The Permittee must assess, on an ongoing basis, the effectiveness of the implementation of the CAWMP. The Permittee must make “major changes,” “revisions,” or “amendments” to the CAWMP, as defined in Section VII, “Definitions,” of this Permit, in order to address any changes needed to maintain compliance with the facility’s COC and this General Permit. “Major changes,” “revisions,” and “amendments” to the CAWMP must be documented, dated, and included as part of the CAWMP. “Major changes” and “revisions” to the CAWMP shall be submitted to the appropriate Division Regional Office within thirty (30) calendar days of the “major change” or “revision.” “Amendments” are not required to be submitted to the Division Regional Office unless specifically requested by the Division. If field, riser or pull numbers are changed, an explanation shall also be submitted and include a description of how the new numbers relate to the old numbers. Any violation of the COC or the CAWMP shall be considered a violation of this General Permit and subject to enforcement actions. A violation of this General Permit may result in the Permittee having to take immediate or long-term corrective action(s) as required by the Division. These actions may include but are not limited to: modifying the CAWMP; ceasing land application of waste; removing animals from the facility; or the COC being reopened and modified, revoked and reissued, and/or terminated.

4. Any proposed increase or modification to the annual average design capacity from that authorized by the COC will require a modification to the CAWMP and the COC prior to modification of the facility.

5. During the period of this General Permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility’s ability to comply with the NRCS nutrient management standard as it relates to phosphorous. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation. This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within twelve (12) months of receiving notification from the Division.

No COC will be issued to any new or expanding facility to operate under this General Permit until the applicant has completed and submitted a phosphorous loss assessment to determine if the new or expanding facility can comply with the NRCS phosphorous standards. This assessment shall not be a basis for denial of a COC to operate under this permit unless that demonstration of compliance is a Statutory requirement for COC issuance.

6. If prior approval is received from the Director of the Division of Water Quality (Director), facilities which have been issued a COC to operate under this General Permit may add treatment units for the purpose of removing pollutants before the waste is discharged into the lagoons/storage ponds. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the new treatment unit will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

June 4, 2004
7. If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add innovative treatment processes to the systems on a pilot basis in order to determine if the innovative treatment process will improve how the waste is treated and/or managed. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the innovative treatment process will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

8. For all new and expanding operations, no collection, treatment or storage facilities may be constructed in a 100-year flood plain.

9. Animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells. The allowable distance to monitoring wells shall be established on a case by case basis by the Division.

10. Existing swine dry lots may remain in wetlands as long as the wetlands uses are not removed or degraded as a result of the swine. The swine however may not be confined within 100 feet of an adjacent surface water or a seasonally-flooded area. The swine also must not cause a loss of more than 10% of the existing tree canopy. Where trees do not exist, the area must be managed to include crop rotation.

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The collection, treatment, and storage facilities, and the land application equipment and fields shall be properly operated and maintained at all times.

2. A vegetative cover shall be maintained as specified in the facility’s CAWMP on all land application fields and buffers in accordance with the CAWMP. No waste shall be applied upon areas not included in the CAWMP.

3. Soil pH on all land application fields must be maintained in the optimum range for crop production.

4. Land application rates shall be in accordance with the CAWMP. In no case shall land application rates exceed the agronomic rate of the nutrient of concern for the receiving crop. In no case shall land application rates result in excessive ponding or any runoff during any given application event.

5. Animal waste shall not be directly applied onto crops for direct human consumption that do not undergo further processing (e.g., strawberries, melons, lettuce, cabbage, apples, etc.) at any time during the growing season, or in the case of fruit bearing trees, following breaking dormancy. Application of animal wastes shall not occur within thirty (30) days of the harvesting of fiber and food crops for direct human consumption that undergoes further processing.

6. If manure or sludges are applied on conventionally tilled bare soil, the waste shall be incorporated into the soil within two (2) days after application on the land. This requirement does not apply to no-till fields, pastures, or fields where crops are actively growing.

7. Pesticides, toxic chemicals and petroleum products shall not be disposed of in the animal waste collection, treatment, storage or application systems.
8. Domestic and/or industrial wastewater from showers, toilets, sinks, etc. shall not be discharged into the animal waste collection, treatment, storage and application system. Washdown of stock trailers owned by and used to transport animals to and from the facility only, will be permissible as long as the system has been evaluated and approved to accommodate the additional volume. Only those cleaning agents and soaps that are EPA approved according to their label, will not harm the cover crop, and will not contravene the groundwater standards listed in 15A NCAC 2L may be utilized in facilities covered by this General Permit. Instruction labels are to be followed when using cleaning agents and soaps.

9. Disposal of dead animals resulting from normal mortality rates associated with the facility shall be done in accordance with the facility’s CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division's Statutes and regulations.

Disposal of dead animals whose numbers exceed normal mortality rates associated with the facility shall also be done in accordance with the facility’s CAWMP and NCDA&CS Veterinary Division’s Statutes and regulations provided that: 1) burial of such animals shall be done in consultation with the State Veterinarian of the NCDA&CS Veterinary Division’s Statutes and in compliance with NCDA&CS regulations; 2) all such burial sites must be mapped, and the dates and numbers of the animals buried by type must be recorded; and 3) the map is submitted to the appropriate Regional Office Groundwater Section within 15 calendar days of burial.

In the event of a state of emergency declared by the Governor, disposal of dead animals shall be done in accordance with requirements and guidelines dictated by the State Veterinarian according G.S. §106-339.4. The Division may require groundwater monitoring when there is massive burial of animals. All burial sites of such animals must be mapped, and the dates and numbers of the animals buried by type must be recorded.

10. Unless accounted for in temporary storage volume, all uncontaminated runoff from the surrounding property and buildings shall be diverted away from the waste lagoons/storage ponds to prevent any unnecessary addition to the liquid volume in the structures.

11. A protective vegetative cover shall be established and maintained on all earthen lagoon/storage pond embankments (outside toe of embankment to maximum pumping elevation), berms, pipe runs, and diversions to surface waters or wetlands. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the lagoon/storage pond embankments. All trees shall be removed in accordance with good engineering practices. Lagoon/storage pond areas shall be accessible, and vegetation shall be kept mowed.

12. At the time of sludge removal from a lagoon/storage pond, the sludge must be managed in accordance with the CAWMP. When removal of sludge from the lagoon is necessary, provisions must be taken to prevent damage to the lagoon dikes and liner.

13. Lagoons/storage ponds shall be kept free of foreign debris including, but not limited to, tires, bottles, light bulbs, gloves, syringes or any other solid waste.

14. The facility must have at least one of the following items at all times: (a) adequate animal waste application and handling equipment, (b) a lease, or other written agreement, for the use of the necessary equipment, or (c) a contract with a third party applicator capable of providing adequate waste application.

15. The Permittee shall designate a certified animal waste management system operator with a valid certification to be in charge of the animal waste management system. The waste management system shall be operated by the OIC or a person under the OIC’s supervision.
16. In accordance with 15A NCAC 8F .0203(b)(2), the Operator in Charge (OIC) or a designated back-up OIC of a Type A Animal Waste Management System shall inspect, or a person under the supervision of an OIC or designated back-up OIC shall inspect, the land application site as often as necessary to ensure that the animal waste is land applied in accordance with the CAWMP. In no case shall the time between inspections be more than 120 minutes during the application of waste. A record of each inspection shall be recorded on forms supplied by, or approved by, the Division and shall include the date, time, sprayfield number and name of the operator for each inspection.

The Permittee may assert as an affirmative defense in any enforcement action alleging noncompliance with the requirements imposed in this condition that such noncompliance was due to circumstances beyond the Permittee's control. A notation shall be made on the form indicating the inspection affected by such circumstance and an explanation setting forth the circumstances claimed to have been beyond the Permittee's control shall be submitted with the form.

17. The Director may require any permittee to install, operate and maintain devices on all irrigation pumps/equipment designed to automatically stop irrigation activities during precipitation. This decision will be based on the facility's compliance history for irrigation events.

18. The Director may require any permittee to install and operate flow meters with flow totalizers based on the facility's violations and/or incomplete or incorrect record keeping events.

19. No waste shall be applied in wind conditions that might reasonably be expected to cause the mist to reach surface waters or wetlands.

20. The Permittee shall maintain buffer strips or other equivalent practices as specified in the facility's CAWMP near feedlots, manure storage areas and land application areas.

21. Waste shall not be applied on land that is flooded, saturated with water, frozen or snow covered at the time of land application.

22. Land application of waste is prohibited during precipitation events. The Permittee shall consider pending weather conditions in making the decision to land apply waste and shall document the weather conditions at the time of land application on forms supplied by or approved by the Division.

23. Land application activities shall cease on any application site that exceeds a Mehlich 3 Soil Test Index for Copper of greater than 3,000 (108 pounds per acre) or Zinc of greater than 3,000 (213 pounds per acre).

24. All waste application equipment must be tested and calibrated once in the first two years after issuance of the COC and then at least once every two years thereafter. The results must be documented on forms provided by, or approved by, the Division.

25. Any major structural repairs to lagoons/storage ponds must have written documentation from a technical specialist certifying proper design and installation. However, if a piece of equipment is being replaced with a piece of equipment of the identical specifications, no technical specialist approval is necessary [i.e. piping, reels, valves, pumps (if the gallons per minute (gpm) capacity is not being increased or decreased), etc.] unless the replacement involves disturbing the lagoon/storage pond embankment.

26. Crops for which animal waste is land applied must be removed from the land application site and properly managed and utilized unless other management practices are approved in the CAWMP.
III. MONITORING AND REPORTING REQUIREMENTS

1. An inspection of the waste collection, treatment, and storage structures, and runoff control measures shall be conducted and documented at a frequency to insure proper operation but at least monthly and after all storm events of greater than one (1) inch in 24 hours. For example, lagoons/storage ponds, and other structures should be inspected for evidence of erosion, leakage, damage by animals or discharge.

2. Monitoring and Recording Freeboard Levels
   a. Highly visible waste-level gauges shall be maintained to mark the level of waste in each lagoon/storage pond that does not gravity feed through a free flowing transfer pipe into a subsequent structure. The gauge shall have readily visible permanent markings.
   
   The waste level in each lagoon with a waste level gauge shall be monitored and recorded weekly on forms supplied by or approved by the Division.
   
   The Director may require more frequent monitoring and recording on lagoon levels based on the facility’s compliance history for freeboard violations.
   
   b. The freeboard levels of lagoons serving any facility which experiences freeboard violations in any two consecutive years following the issuance of this General Permit, or as determined necessary by the Director, shall be monitored and recorded as follows:

   In addition to the facility’s existing lagoon waste-level gauges, automated lagoon/storage pond waste-level monitors and recorders (monitored and recorded at least hourly) must be installed on all treatment and storage lagoons covered by a COC issued under this General Permit to measure and record lagoon freeboard. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer’s operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following notification from the Director. The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate that preventative measures were taken to avoid the violations and that the violations resulted from conditions beyond the Permittee’s control.

   If an automated level monitor(s) becomes inoperable, the Permittee shall:
   
   i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than 24 hours following first knowledge of the problem; and,
   
   ii. make any needed repairs to the equipment as quickly as possible, and take and record daily lagoon levels at the same time every day until such time as the automated equipment is placed back into operation.
   
   c. The Director may require new or modified waste-level gauges at any facility if he determines that the existing gauges are not adequate to accurately indicate actual lagoon levels, or the various lagoon levels required to be maintained by this General Permit or the facility’s CAWMP.

3. Monitoring and Recording Precipitation Events
   a. Precipitation events at facilities issued a COC to operate under this General Permit shall be monitored and recorded as follows:
A rain gauge must be installed at a site that is representative of the weather conditions at the farm’s land application site(s) to measure all precipitation events. The precipitation type and amount must be recorded daily for all precipitation events and maintained on site for Department review. Daily records do not need to be maintained for those days without precipitation events.

b. The Director may require that an automated rain gauge and recorder must be installed on site to measure and record all precipitation events. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer’s operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following receipt of notice from the Director.

If an automated rain gauge(s) becomes inoperable, the Permittee shall:

i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty four (24) hours following first knowledge of the problem; and,

ii. make any needed repairs to the equipment as quickly as possible, and take and record all rainfall events until such time as the automated equipment is placed back into operation.

4. A representative Standard Soil Fertility Analysis, including pH, phosphorus, copper, and zinc, shall be conducted on each application field receiving animal waste in accordance with NCGS 143-215.10C(e)(6). As of the effective date of this General Permit, the Statute requires that the analysis be conducted at least annually.

5. An analysis of the animal waste shall be conducted in accordance with recommended laboratory sampling procedures as close to the time of application as practical and at least within sixty (60) days (before or after) of the date of application. Every reasonable effort shall be made to have the waste analyzed prior to the date of application and as close to the time of waste application as possible. This analysis shall include the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>Zinc</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Copper</td>
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</tbody>
</table>

6. The Permittee shall record all irrigation and land application event(s) including hydraulic loading rates, nutrient loading rates and cropping information. The Permittee shall also record removal of solids and document nutrient loading rates if disposed on-site or record the off-site location(s). These records must be in forms supplied by, or approved by, the Division.

7. A record shall be created and maintained of all transfers of waste between lagoons/storage ponds on the same site not typically operated in series. Such record shall include at least the identity of the lagoon from which the waste was transferred, the identity of the lagoon receiving the waste, the date and time of transfer and the total volume of waste transferred.

8. The Permittee must maintain monthly stocking records for the facility and make the records available to Department of Environment and Natural Resources (Department).

9. If, for any reason, there is a discharge from the waste collection, treatment, storage and application systems (including the land application sites), to surface waters or wetlands, the Permittee is required to make notification in accordance with Condition III. 13. The discharge notification shall include the following information:
a. Description of the discharge: A description of the discharge including an estimate of the volume discharged, a description of the flow path to the receiving surface waters or wetlands and a site sketch showing the path of the waste. Also, an estimation of the volume discharged.

b. Time of the discharge: The length of time of the discharge, including the exact dates and times that it started and stopped, and if not stopped, the anticipated time the discharge is expected to continue.

c. Cause of the discharge: A detailed statement of the cause of the discharge. If caused by a precipitation event, detailed information from the on-site rain gauge concerning the inches and duration of the precipitation event.

d. All steps being taken to reduce, stop and cleanup the discharge. All steps to be taken to prevent future discharges from the same cause.

e. Analysis of the waste: A copy of the last waste analysis conducted as required by Condition III. 5. above.

10. A copy of this General Permit, the facility's COC, certification forms, lessee and landowner agreements, the CAWMP and copies of all records required by this General Permit and the facility's CAWMP shall be maintained by the Permittee in chronological and legible form for a minimum of three (3) years. Records include but are not limited to: soil and waste analyses, rain gauge readings, freeboard levels, irrigation and land application event(s), past inspection reports and operational reviews, animal stocking records, records of additional nutrient sources applied (including but not limited to sludges, unused feedstuff leachate, milk waste, septage and commercial fertilizer), cropping information, waste application equipment testing and calibration, and records of removal of solids to off-site location(s). These records shall be maintained on forms provided or approved by the Division and shall be readily available at the facility (stored at places such as the farm residence, office, outbuildings, etc.) where animal waste management activities are being conducted for the life of this General Permit, unless otherwise specified in this General Permit.

11. Within fifteen (15) working days of receiving the request from the Division, the Permittee shall provide to the Division one (1) copy of all requested information and reports related to the operation of the animal waste management system. Once received by the Division, all such information and reports become public information, unless they constitute confidential information under NC G.S. 132-1.2, and shall be made available to the public by the Division as specified in Chapter 132 of the General Statutes.

12. The Division may require any additional monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste, sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of such waste upon the surface waters, groundwaters or wetlands. Such monitoring, including its scope, frequency, duration and any sampling, testing, and reporting systems, shall meet all applicable Division requirements.

13. Regional Notification:

The Permittee shall report by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty-four (24) hours following first knowledge of the occurrence of any of the following events:

a. Any discharge to ditches, surface waters or wetlands.

June 4, 2004
b. Any discharge that poses a serious threat to the environment or human safety or health.

c. Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of this General Permit.

d. Over applying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.

e. Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.

f. Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.

g. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands.

h. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge that poses a serious threat to surface waters or wetlands.

i. Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

For any emergency, which requires immediate reporting after normal business hours, contact must be made with the Division of Emergency Management at 1-800-858-0368.

The Permittee shall also file a written report to the appropriate Division Regional Office within five (5) calendar days following first knowledge of the occurrence. This report shall outline the actions taken or proposed to be taken to correct the problem and to ensure that the problem does not recur. The requirement to file a written report may not be waived by the Division Regional Office.

14. The Director may require any permittee to file an annual certification report based on the compliance history of the facility. If required, the report must be filed on forms provided by the Division.

15. The Director may require facilities to submit additional reports and/or certifications based on the facility’s compliance history.

16. In the event of a discharge of 1,000 gallons or more of waste to surface waters or wetlands, the Permittee must issue a press release to all print and electronic news media that provide general coverage in the county in which the discharge occurred setting out the details of the discharge. The press release must be issued within forty-eight (48) hours after it is determined that the discharge has reached the surface waters or wetlands. A copy of the press release and a list of the news media to which it was distributed must be kept for at least one (1) year after the discharge and must be distributed to any person upon request.
17. In the event of a discharge of 15,000 gallons or more of animal waste to surface waters or wetlands, a public notice is required in addition to the press release described in Condition III 13. The public notice must be placed in a newspaper having general circulation in the county in which the discharge occurred and the county immediately downstream within ten (10) days of the discharge. The minimum content of the notice is the name of the facility, location of the discharge, estimated volume of waste entering state waters, time and date discharge occurred, duration of the discharge, identification water body that was discharged into including creek and river basin if applicable, actions taken to prevent further discharge, and a facility contact person and phone number.

18. If a discharge of 1,000,000 gallons of wastewater or more reaches surface waters or wetlands, the appropriate Division Regional Office must be contacted to determine in what additional counties, if any, a public notice must be published. A copy of all public notices and proof of publication must be sent to the Division within thirty (30) days of the discharge.

19. All facilities, which are issued a COC to operate under this General Permit, shall conduct a survey of the sludge accumulation in all lagoons within two (2) years of receiving the COC and every year thereafter. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. This survey frequency may be reduced if it can be demonstrated to the satisfaction of the Division that the rate of sludge accumulation does not warrant an annual survey.

If the sludge accumulation is such that it is greater than the volume for which the lagoon was designed or the accumulation reduces the lagoon's minimum treatment volume to less than the volume for that which the lagoon was designed, a sludge removal or management plan must be submitted to the appropriate Division Regional Office within ninety (90) days of the determination. The plan shall describe removal and waste utilization procedures to be used.

IV. INSPECTIONS AND ENTRY

1. The Permittee shall allow any authorized representative of Department, upon the presentation of credentials and other documents as may be required by law and in accordance with reasonable and appropriate biosecurity measures, to:

   a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this General Permit;

   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this General Permit;

   c. Inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this General Permit; and,

   d. Sample or monitor, at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

V. GENERAL CONDITIONS

1. The issuance of a COC to operate under this General Permit shall not relieve the Permittee of the responsibility for compliance with all applicable surface water, wetlands, groundwater and air quality standards or for damages to surface waters, wetlands or groundwaters resulting from the animal operation.
2. The maximum waste level in lagoons/storage ponds shall not exceed that specified in the facility’s CAWMP. At a minimum, maximum waste level for lagoons/storage ponds must not exceed the level that provides adequate storage to contain the 25-year, 24-hour storm event plus an additional one (1) foot of structural freeboard except that there shall be no violation of this condition if: (a) there is a storm event more severe than a 25-year, 24-hour event, (b) the Permittee is in compliance with its CAWMP, and (c) there is at least one (1) foot of structural freeboard.

In addition to the above requirements, for new and expanding farms with lagoon and storage pond designs completed after September 1, 1996, storage must also be provided for the heavy rainfall factor for the lagoons/storage pond. In case of lagoons/storage ponds in series that are gravity fed, the 25-year, 24-hour storm event and/or the heavy rainfall factor storage requirement for the system may be designed into the lowest lagoon/storage pond in the system. However, adequate freeboard must be designed into the upper lagoons/storage ponds to allow sufficient storage to prevent the waste level from rising into the structural freeboard while the storm water is draining into the lowest lagoon in the system.

3. Any containment basin, such as a lagoon or a storage pond, used for waste management shall continue to be subject to the conditions and requirements of this General Permit until properly closed. When the containment basin is properly closed in accordance with the “Natural Resource Conservation Service (NRCS) North Carolina Standard for Closure of Waste Impoundments,” March 2002 or any subsequent amendment, the containment basin shall not be subject to the requirements of this General Permit. The Permittee must submit a letter to the Division to request rescission of the COC by providing documentation of closure of all containment basins.

Closure shall also include a minimum of 24 hours pre-notification of the Division and submittal of the Animal Waste Storage Pond and Lagoon Closure Report Form to the address identified on the form within fifteen (15) days of completion of closure.

4. This General Permit allows for the distribution of up to four cubic yards of manure per visit to individuals for personal use. The Permittee provide the recipient(s) with information on the nutrient content of the manure. Distribution of greater quantities must be to individuals or businesses permitted to distribute the waste, or to be land applied to sites identified in the Permittee’s CAWMP.

5. The Permittee must inform the recipient(s) of his/her responsibilities to properly manage the land application of manure. Record keeping for the distribution of manure up to four (4) cubic yards per visit to individuals for personal use is not required.

6. The annual permit fee shall be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly constitutes grounds for revocation of its COC to operate under this General Permit.

7. Failure of the Permittee to maintain, in full force and effect, lessee and landowner agreements, which are required in the CAWMP, shall constitute grounds for revocation of its COC to operate under this General Permit.

8. A COC to operate under this General Permit is not transferable. In the event there is a desire for the facility to change ownership, or there is a name change of the Permittee, a Notification of Change of Ownership form must be submitted to the Division, including documentation from the parties involved and other supporting materials as may be appropriate. This request will be considered on its merits and may or may not be approved.
9. A COC to operate under this General Permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. The Permittee shall notify the Division immediately of any applicable information not provided in the permit application.

10. If the Permittee wishes to continue an activity regulated by this General Permit after the expiration date of this General Permit, the Permittee must apply for and obtain a new COC. Renewal applications must be filed at least 180 days prior to the expiration of the General Permit.

11. The issuance of a COC to operate under this General Permit does not prohibit the Division from reopening and modifying the General Permit or COC, revoking and reissuing the General Permit or COC, or terminating the General Permit or COC as allowed by the appropriate laws, rules, and regulations.

12. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual permit by notifying that person that an application is required.

13. The Groundwater Compliance Boundary is established by 15A NCAC 2L and 15A NCAC 2H .0225. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to the requirements of 15A NCAC 2L and the Division in addition to the penalty provisions applicable under the North Carolina General Statutes.

VI. PENALTIES

1. Failure to abide by the conditions and limitations contained in this General Permit; the facility's COC; the facility's CAWMP; and/or applicable state law; may subject the Permittee to an enforcement action by the Division including but not limited to the modification of the animal waste management system, civil penalties, criminal penalties and injunctive relief.

2. The Permittee must comply with all conditions of this General Permit. Any permit noncompliance constitutes a violation of state law and is grounds for enforcement action; for permit coverage termination, revocation and reissuance, or modification; or denial of a permit coverage renewal application.

3. It shall not be a defense for a Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

VII. DEFINITIONS

25-year, 24-hour rainfall or storm event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

Agronomic rates means the amount of animal waste and/or other nutrient sources to be land applied to lands as contained in the nutrient management standard of the USDA Soil Conservation Service Technical Guide Section IV or as recommended by the North Carolina Department of Agriculture and Consumer Services and the North Carolina Cooperative Extension Service at the time of certification of the Animal Waste Management Plan by the appropriate technical specialist.
Amendment to the CAWMP means a change and/or addition to a part(s) of the plan, and requires that the change and/or addition adhere to current applicable standards. The following are examples of amendments to the CAWMP:

- In an existing CAWMP, a change in crops and/or cropping pattern that utilizes 25% or less of the N generated is considered a plan amendment. Additional acreage needed to facilitate the change in crops and/or cropping pattern is permissible and considered part of the amendment.

- The addition of winter crops and/or interseeded perennial crops are considered amendments to an existing CAWMP when the operation does not require additional acreage and/or crops for N utilization, and does not exceed the 25% criteria stated above.

- When a CAWMP cannot meet N utilization requirements due to land lost to irrigation inefficiency (usable versus total acres), then the CAWMP may be amended to increase available acreage and/or change the crop for N utilization. This is the only exception to the 25% N criteria for plan revision.

- Inclusions of emergency action plans, and insect, odor and mortality checklists are considered CAWMP amendments.

- Including additional acreage for land application beyond what is required in the existing CAWMP is considered a plan amendment.

Animal feeding operation means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single animal feeding operation if they adjoin each other, or if they use a common area or system for the disposal of wastes.

Ditch means any man made channel for the purpose of moving water off a site to the surface waters.

Excessive Ponding means any area of the application field where visible liquid waste is ponded on the surface of the land application site more than four (4) hours following the application of waste. Excessive ponding also means any areas where the ponding of waste has resulted in crop failure.

Groundwaters means any subsurface waters, as defined in 15A NCAC 2L .0102.

Land application means the application of wastewater and/or waste solids onto or incorporation into the soil.

Major changes to the CAWMP means changes in the number of animals, type of operation (feeder to finish to wean to feeder), retrofit of a lagoon, installation of a new irrigation system, and similar type changes. Recertification is only required for major changes to the CAWMP. Major changes to a facility must first be approved by DWQ. The new CAWMP and the certification shall be submitted with a request that the COC be amended to reflect the changes. The facility may not make the changes until a new or amended COC has been issued.
Revision to the CAWMP means a change to an entire CAWMP to meet current applicable standards. A CAWMP must be revised if the operation cannot utilize all N nitrogen generated by the animal production in accordance with the existing CAWMP, except for the specific conditions noted in the CAWMP amendment criteria as previously defined. For an existing CAWMP, a change in crops and/or cropping pattern that utilizes more than 25% of the N generated by the operation is considered a plan revision. Any change to an existing CAWMP, whether an amendment or revision, must be signed and dated by both the producer and a technical specialist for the new CAWMP to be valid. A revision of the CAWMP does not require recertification.

State Waters means all surface waters, wetlands, groundwaters and waters of the United States located in the State.

Surface Waters means any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other surface body or surface accumulation of water, whether public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of the State of North Carolina, including any portion of the Atlantic Ocean over which the State has jurisdiction as well as any additional Waters of the United States which are located in the State.

Waste means manure, animal waste, process wastewater and/or sludge generated at an animal feeding operation.

Wetlands means areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined in 15A NCAC 2B .0202.

This General Permit issued the 11th day of June, 2004.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

[Signature]
Alan W. Klimek, P.E.
North Carolina Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number AWG100000
SUBCHAPTER 8F - CERTIFICATION OF OPERATORS OF ANIMAL WASTEMANAGEMENT SYSTEMS

SECTION .0100 - GENERAL PURPOSE/DEFINITIONS

15A NCAC 08F .0101 PURPOSE
(a) The purpose of these Rules is to reduce nonpoint source pollution in order to protect the public health and to conserve and protect the quality of the State's water resources, to encourage the development and improvement of the State's agricultural land for the production of food and other agricultural products, and to require the examination of animal waste management system operators and certification of their competency to operate or supervise the operation of those systems.
(b) These Rules apply to all operators of animal waste management systems that are required to designate an operator in charge as specified by G.S. 90A-47.2(a). These animal waste management systems include those systems that are designed to serve an animal operation as defined by G.S. 143B-215.10B(1).
(c) The Certification Commission shall classify animal waste management systems based on the types of structures and nonstructural practices serving a feedlot that provide for the collection, treatment, storage, or land application of animal waste.
(d) The Certification Commission shall establish certifications for each type of animal waste management system so that persons holding these certificates shall be affirmed competent to operate a specific type of animal waste management system.


15A NCAC 08F .0102 DEFINITIONS
(a) "Animal waste management system operator" means a person that has been certified by the Certification Commission as a Type A Animal Waste Management System Operator or as a Type B Animal Waste Management System Operator.
(b) "Appropriate examination" means an examination that has been approved by the Certification Commission.
(c) "Approved training program" means a training program that has been approved by the Certification Commission in cooperation with the Cooperative Extension Service.
(d) "Certified operator" means a person who holds a currently valid certification as an animal waste management system operator.
(e) "Certification Commission" means the Water Pollution Control System Operators Certification Commission (WPCSOCC) created by G.S. 143B-300. The Certification Commission's mailing address is PO Box 29535, Raleigh, NC 27626-0535.
(f) "Contract animal waste management system operator" means any certified animal waste operator who contracts with the owner or person in control of an animal operation pursuant to G.S. 90A-47.2(b).
(g) "Currently valid certification" means that all training and certification requirements pursuant to G.S. 90A-47.3(b) and G.S. 90A-47.4 have been completed.
(h) "Emergency circumstances" means any extraordinary meteorological event, natural catastrophe, or equipment failure that threatens the integrity of the animal waste management system.
(i) "Person under the supervision of an Operator in Charge" means a person who takes directions from the Operator in Charge and who may only land apply animal waste when the Operator in Charge is available for consultation and advice at any time during the application of animal waste.


SECTION .0200 - DUTIES AND REQUIREMENTS

15A NCAC 08F .0201 DUTIES AND REQUIREMENTS OF OWNERS
(a) The owner of each animal operation having an animal waste management system shall submit a letter to the Certification Commission which designates an Operator in Charge. This letter shall be signed by the owner and the certified operator and be submitted to the Certification Commission. The Operator in Charge shall be designated:
   (1) before a new animal operation having an animal waste management system is placed in operation; or
   (2) within 30 days after a new Operator in Charge is designated.
(b) An owner may voluntarily designate a back-up Operator in Charge to operate the animal waste management system during the absence of the primary Operator in Charge.
15A NCAC 08F .0202  DUTIES AND REQUIREMENTS OF CERTIFIED OPERATORS

Certified Operators shall:

(1) notify the Certification Commission in writing, within 30 days of any change in address; and
(2) pay an annual renewal fee as specified at G.S. 90A-47.4(b) and complete all additional training requirements as specified at G.S. 90A-47.3(b).

15A NCAC 08F .0203  DUTIES AND REQUIREMENTS OF AN OPERATOR IN CHARGE

(a) An Operator in Charge of any animal waste management system shall:

(1) possess a currently valid certification as an Animal Waste Management System Operator of the appropriate type;
(2) visit, and inspect each animal waste management system at a frequency sufficient to ensure proper operation of the system; and
(3) be responsible for the proper application of the animal waste; properly manage, supervise and document daily operation and maintenance of the system; and certify monitoring and reporting information as prescribed in the permit.

(b) The Operator in Charge or a designated back-up Operator in Charge of a Type A Animal Waste Management System shall:

(1) ensure that animal waste is applied in accordance with the animal waste management plan and the permit issued for the animal operation;
(2) inspect, or a person under the supervision of an Operator in Charge or designated back-up Operator in Charge shall inspect, the land application site at least every four hours during the application of animal waste; and
(3) inspect the land application site within 24 hours of the application of animal waste if the Operator in Charge was not present during the application of animal waste.

(c) The Operator in Charge or a designated back-up Operator in Charge of a Type B Animal Waste Management System shall:

(1) ensure that animal waste is applied in accordance with the animal waste management plan and the permit issued for the animal operation;
(2) inspect, or a person under the supervision of an Operator in Charge or designated back-up Operator in Charge shall inspect, the land application site during the application of animal waste; and
(3) inspect the land application site within 48 hours of the application of animal waste if the Operator in Charge was not present during the application of animal waste.

(d) Any certified operator that contracts with an owner to serve as Operator in Charge shall submit an annual report to the Certification Commission in accordance with G.S. 90A-45(c). This report shall be submitted on or before January 15 of each year and shall include the following information:

(1) the name of the certified operator, mailing address, phone number, and certificate number(s); and
(2) the name, mailing address, county, and facility identification number, and type of each animal waste management system for which the certified operator has been designated as Operator in Charge.
SECTION .0300 - CLASSIFICATION

15A NCAC 08F .0301 CLASSIFICATION OF ANIMAL WASTE MANAGEMENT SYSTEMS
(a) The Certification Commission shall classify animal waste management systems based on the types of structures and nonstructural practices serving a feedlot that provide for the collection, treatment, storage, or land application of animal waste.

(1) Type A: These animal waste management systems generally include the following structures and nonstructural components that provide for the collection, treatment, storage and land application of animal waste and primarily rely on an anaerobic lagoon and soil/plant systems for the treatment of animal waste: anaerobic lagoon; pumps, pipes and associated appurtenances that convey the waste from point of generation to final treatment/disposal site; flushing systems; solids separation equipment; irrigation equipment; and land application site and crops. Type A animal waste management systems are generally used to treat waste generated by monogastric animals which produce a low-fiber waste.

(2) Type B: These animal waste management systems generally include the following structures and nonstructural components that provide for the collection, treatment, storage and land application of animal waste and primarily rely on soil/plant systems for the treatment of animal waste: dry stacks; solids and slurry collection equipment; storage ponds for the collection of solids and runoff; pumps, pipes and associated appurtenances that convey the waste from point of generation to final Type B animal waste management systems are generally used to treat waste generated by ruminants and other animals which produce a high-fiber waste.

(b) Animal waste management systems which include components that are significantly different than the system described in Subparagraph (a)(1) of this Rule shall be evaluated by the Commission, or its designee, to determine if the system is subject to classification in accordance with 15A NCAC 08C .0102(b).


SECTION .0400 - CERTIFICATION OF OPERATORS

15A NCAC 08F .0401 QUALIFICATIONS FOR EXAMINATION
(a) Type A Animal Waste Management System Operator.

(1) An applicant for certification as a Type A Animal Waste Management System Operator shall be expected to have a general knowledge of animal operations and Type A animal waste management systems. The applicant shall have knowledge of the laws and regulations related to the operation of Type A animal waste management systems, the equipment usually employed in Type A animal waste management systems, be able to describe the general maintenance requirements for such equipment, have the ability to perform calibrations and calculations relating to the land application of the waste, have an understanding of animal waste management plans, and be able to read and complete the forms necessary to document the proper land application of animal waste in accordance with the animal waste management plan. The applicant must submit an application to the Certification Commission showing that the following requirements have been met in order to take an examination for certification as a Type A Animal Waste Management System Operator:

(A) be at least 18 years of age;
(B) completion of a 10 hour training program on the operation of Type A animal waste management systems that provides instruction regarding the collection, storage, treatment, and land application of animal waste,

(2) An applicant who has failed to pass the appropriate examination after three attempts must attend and complete the approved training program before being eligible to retake the examination.

(b) Type B Animal Waste Management System Operator.

(1) An applicant for certification as a Type B Animal Waste Management System Operator shall be expected to have a general knowledge of animal operations and Type B animal waste management systems. The applicant shall have knowledge of the laws and regulations related to the operation of Type B animal waste management systems, knowledge of the equipment usually employed in Type B animal waste management systems, and have completed a 10 hour training program on the operation of Type B animal waste management systems.
systems, be able to describe the general maintenance requirements for such equipment, have the ability to perform calibrations and calculations relating to the land application of the waste, have an understanding of animal waste management plans, and be able to read and complete the forms necessary to document the proper land application of animal waste in accordance with the animal waste management plan. The applicant must submit an application to the Certification Commission showing that the following requirements have been met in order to take an examination for certification as a Type B Animal Waste Management System Operator:

(A) be at least 18 years of age;
(B) completion of a 10 hour training program on the operation of Type B Animal Waste Management Systems that provides instruction regarding the collection, storage, treatment, and application of animal waste.

(2) An applicant who has failed to pass the appropriate examination after three attempts must attend and complete the approved training program before being eligible to retake the examination.


15A NCAC 08F .0402 APPLICATION FORM

(a) An application form which is designed for requesting certification as an Animal Waste Management System Operator by way of examination must be properly and accurately completed and submitted with the appropriate fee as stipulated by G.S. 90A-47.4 to the Certification Commission.
(b) Incomplete applications and applications not accompanied by the appropriate fee and attachments cannot be processed and will be returned to the applicant.


15A NCAC 08F .0403 APPLICATION PROCEDURES

(a) An application being filed for examination shall be postmarked by the United States Postal Service at least 30 days prior to the date upon which the examination is scheduled to be administered and the appropriate fee must accompany the application.
(b) Upon receipt of the application by the Certification Commission, the application will be reviewed by the designee(s) of the Certification Commission for eligibility to take the examination. The applicant will be notified by letter, which will serve as the receipt for the examination fee, of his/her eligibility and will be advised of the date, time and place of the examination. In cases where the applicant is ineligible for examination, the applicant will also be notified by letter and advised of the reason for ineligibility. The examination fee will be refunded in the event that the applicant is determined to be ineligible for the examination. Upon notification of ineligibility, the applicant may request a hearing to be heard by the Certification Commission at the next regularly scheduled meeting, relative to the ineligibility. Such requests must be in writing and shall be submitted postmarked at least 30 days prior to the next regularly scheduled meeting. Any applicant who intentionally supplies false information on the application for certification for the purpose of gaining eligibility, will be ineligible for the examination and will forfeit the examination fee. Applicants who have intentionally supplied false information and who have been determined to be ineligible who wish to reapply for certification shall follow the procedure set forth in Rule .0407(d) of this Section.

15A NCAC 08F .0404 EXAMINATION PROCEDURES

The Certification Commission or its designee shall conduct examinations for certification in accordance with the following:

(1) The dates, times, and places of examination shall be determined by the Certification Commission. Announcements of the dates, times, and places of examination shall be distributed to the Cooperative Extension Service office in each county.

(2) Each applicant applying for examination shall be notified of the date, time, and place of the examination in accordance with Rule .0403(b) of this Section.

(3) Examinations approved by the Certification Commission shall be given only to those who, after filing proper application, have been determined to be eligible.

(4) When each applicant receives his/her examination paper, he/she shall identify themselves by way of a valid driver's license or other form of photo identification satisfactory to the proctor of the examination.

(5) Representatives of the Certification Commission or its designee(s), who are supervising the examinations may take appropriate action against applicants, including dismissal from the examination, if the examination policies and procedures are not followed.

(6) An examination score of 70 percent or higher shall constitute a passing score.

(7) The applicant shall be notified, in writing only, of the score achieved on the examination by the Certification Commission or its designee. The results of the examination shall be mailed to the address submitted with the application for examination. If a passing score is made, such notification constitutes certification by the Certification Commission that the applicant is qualified operator of the appropriate type of animal waste management systems and shall be issued a certificate by the Certification Commission. After each examination, a list of those certified shall be prepared and made part of the permanent records of the Certification Commission.


15A NCAC 08F .0405 RENEWAL OF CERTIFICATION

(a) A currently valid certification as an animal waste management system operator shall be maintained by:

(1) the payment of an annual renewal fee by the date established by the Certification Commission;

(2) completion of a minimum of six hours of additional training approved by the Certification Commission during each three year period following initial certification.

(b) A certified animal waste management system operator that fails to pay the annual renewal fee within 30 days of the due date, or fails to complete the approved additional training within 30 days of the end of three year period, shall take and pass an examination approved by the Certification Commission in order to renew the certificate.

History Note: Authority G.S. 90A-47; and 143B-300; Temporary Adoption Eff. January 7, 1997; Eff. August 1, 1998.

15A NCAC 08F .0406 REVOCATION, RELINQUISHMENT OR INVALIDATION OF CERTIFICATION

(a) The Certification Commission, in accordance with the provisions of G.S. 150B and G.S. 90A-41, may suspend or revoke the certificate of a certified operator, or issue a written reprimand to an operator if it finds that the operator:

(1) engages in fraud or deceit in obtaining certification; or

(2) fails to exercise reasonable care, judgment, or use of the operator's knowledge and ability in the performance of the duties of an operator in charge; or

(3) is incompetent or otherwise unable to properly perform the duties of an operator in charge.

(b) Prior to the Certification Commission taking action on a proposed revocation, suspension, or civil penalty assessment, the operator shall be given an opportunity to submit a written statement and present oral argument before the Certification Commission at a regularly scheduled meeting. The operator shall be notified by the Certification Commission in writing at
least 15 days prior to the meeting. This notification shall be delivered by first class mail to the operator's address that the Certification Commission has on file.

(c) The Certification Commission may issue a written reprimand to an operator in accordance with G.S. 90A-41. The reprimand shall be delivered personally or by certified mail. A copy of the letter will be kept in the operator's file and a copy will be sent to the operator's employer. The operator will be given the opportunity to put a letter of rebuttal into the file when a reprimand has been issued.

History Note: Authority G.S. 90A-41; 90A-47; 143B-300; 150B-3; 150B-23; 150B-38; 150B-52;
Temporary Adoption Eff. January 7, 1997;

15A NCAC 08F .0407 RECERTIFICATION FOLLOWING REVOCATION OR RELINQUISHMENT

(a) After revocation or relinquishment has been effective for a period of not less than 270 days, a person may apply in writing for recertification by the Certification Commission. The petition must include any relevant facts concerning changes to conditions under which revocation or relinquishment occurred. Such facts must show clearly that the applicant will comply with the laws and regulations concerning the operation of animal waste management systems.

(b) Within 120 days following receipt of an application for recertification, the Certification Commission will notify the applicant by letter of its decision to deny or grant examination eligibility in accordance with procedures set out in Rule .0403 of this Section. Additional eligibility requirements including a show cause conference may be imposed by the Certification Commission. Eligibility will only be granted if there is substantial evidence that the conditions leading to the revocation or relinquishment have been corrected.

(c) Recertification of a person as an operator of animal waste management systems shall only occur by means of application and examination. The examination will not be waived. The applicant shall meet the eligibility requirements as outlined in Rule .0401 of this Section.

(d) Upon notification of the Certification Commission's decision to deny eligibility, the applicant may appeal the decision pursuant to the procedures contained in G.S. 150B, Article 3A.

(e) Prior to recertification the applicant must pay in full all civil penalties assessed against them by the Certification Commission.

History Note: Authority G.S. 90A-39; 90A-47; 143B-300; 150B-3; 150B-38;
Temporary Adoption Eff. January 7, 1997;

SECTION .0500 - CIVIL PENALTIES

15A NCAC 08F .0501 WHO MAY ASSESS
Civil penalties may be assessed by the Secretary of the Department of Environment and Natural Resources or his designee, for willful violation of the requirements of G.S. 90A-47 and this Subchapter.

History Note: Authority G.S. 90A-47; 90A-47.5; 143B-300;
Temporary Adoption Eff. January 7, 1997;

15A NCAC 08F .0502 WHEN ASSESSABLE
Civil penalties may be assessed whenever the Secretary, or his designee, has determined that an owner of an animal operation with an animal waste management system, or an Operator in Charge of an animal waste management system, willfully violates the requirements of G.S. 90A-47 and this Subchapter. Violations that may result in the assessment of civil penalties
include, in addition to matters specially referenced in G.S. 90A-47.5(a), failure to designate a properly certified Operator In Charge of the animal waste management system as required by G.S. 90A-47.2(a).

History Note:  Authority G.S. 90A-47; 90A-47.5; 143B-300; Temporary Adoption Eff. January 7, 1997; Eff. August 1, 1998.

15A NCAC 08F .0503 STANDARDS
In determining the amount of the assessment the Secretary, or his designee, shall consider the following standards:

1. duration of the violation;
2. other violations of this Subchapter or G.S. 143-215.6(a);
3. effectiveness of preventive or responsive measures taken by violator;
4. cost of rectifying any damage caused by the violation; and
5. the violator's previous record in complying or not complying with the requirements of G.S. 143, Article 21.

History Note:  Authority G.S. 90A-47; 90A-47.5; 143B-300; Temporary Adoption Eff. January 7, 1997; Eff. August 1, 1998.

15A NCAC 08F .0504 ASSESSMENT
(a) For all violations for which a penalty is assessed a notice of such action shall be sent to the respondent by certified mail. The notice will describe the violation, advise that the penalty is due, and advise the respondent of the rights of appeals as specified in Rule .0505 of this Section.
(b) The Secretary, or his designee, may modify a penalty to a lower amount upon finding that additional or different facts should be or should have been considered in determining the amount of assessment.

History Note:  Authority G.S. 90A-47; 90A-47.5; 143B-300; Temporary Adoption Eff. January 7, 1997; Eff. August 1, 1998.

15A NCAC 08F .0505 PAYMENT AND HEARING
(a) Within 30 days after receipt of notification of an assessment, the assessed person must tender payment, or submit in writing a request for remission or reduction of the penalty, or file a petition with the Office of Administrative Hearings in accordance with the procedures found in G.S. 150B, Article 3A.
(b) The Secretary, or his designee, will accept and acknowledge all tenders of payment on behalf of the Certification Commission. Requests for remission or reduction of the penalty will be presented to the Certification Commission and the respondent will be allowed the opportunity to present its request only when the respondent and Chairman stipulate that no facts are in dispute, or where the respondent waives his right to an administrative hearing.

History Note:  Authority G.S. 90A-47; 90A-47.5; 143B-300; Temporary Adoption Eff. January 7, 1997; Eff. August 1, 1998.

15A NCAC 08F .0506 REFERRALS
If any civil penalty as finally assessed is not paid, the Secretary, or his designee, on behalf of the Certification Commission shall request the Attorney General to commence action to recover the amount of assessment.
ANIMAL WASTE MANAGEMENT SYSTEM
OPERATOR IN CHARGE
DESIGNATION FORM

ANIMAL WASTE MANAGEMENT SYSTEM:

Facility ID Number: __________________________ County: __________________________

OPERATOR IN CHARGE
Home Mailing Address
City____________________ State_________ Zip________________
Certificate #___________ Social Security #____________________
Work Phone______________ Home Phone____________________
Signature_________________ Date____________________

BACKUP OPERATOR (Optional):
Home Mailing Address
City____________________ State_________ Zip________________
Certificate #___________ Social Security #____________________
Work Phone______________ Home Phone____________________
Signature_________________ Date____________________

OWNER
Mailing Address_____________________ City_____________________
State______________ Zip__________ Telephone#
Signature_________________ Date____________________

Please Mail to: WPCSOCC
Division of Water Quality
1618 Mail Service Center
Raleigh, N.C. 27699-1618
CONTRACT OPERATORS ANNUAL REPORT FORM

Company Name: ________________________________________________________________

Name of Owner(s): _____________________________________________________________

Contact Person(s): _____________________________________________________________

Mailing Address: ______________________________________________________________

Phone Number(s): ( ) _______________________ ( ) ________________________________

Fax Number: ( ) _______________________  Email: (optional) _____________________________

Website Address: (optional) _____________________________________________________

Do you wish to have your company’s name and information appear on a list of contract operators that will be available to the public?  _____Yes  _____No

Please list the names and permit numbers of the water pollution control system(s) for which you/your company is responsible (please use additional sheets as necessary).

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Facility Permit Number</th>
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Please list the counties in which the company operates.

1. ______________________  2. ______________________  3. ______________________  4. ______________________
5. ______________________  6. ______________________  7. ______________________  8. ______________________
9. ______________________  10. ______________________ 11. ______________________ 12. ______________________

Revised 10/25/2005
Please list the certified laboratories used by the company:

1. 

2. 

3. 

Please list the names of the certified operators employed by the company, their certification types and numbers, the permit number of the facilities they operate, and indicate if they are the designated ORC or backup (use additional sheets if necessary).

<table>
<thead>
<tr>
<th>Employee</th>
<th>Cert Type/ Numbers</th>
<th>Permit Number</th>
<th>ORC/BU</th>
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<td>6.</td>
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15A NCAC 02D .1801  DEFINITIONS

For the purpose of this Section, the following definitions apply:
(1)  "Animal operation" means animal operation as defined in G.S. 143-215.10B.
(2)  "Child care center" means child care centers as defined in G.S. 110-86 licensed under G.S. 110, Article 7.
(3)  "Construction" means any physical change (including fabrication, erection, installation, replacement, demolition, excavation, or other modification) at any contiguous area under common control.
(4)  "Control technology" means economically feasible control devices installed to effectively reduce objectionable odors from animal operations.
(5)  "Existing animal operation" means an animal operation that is in operation or commences construction on or before February 28, 1999.
(6)  "Historic properties" means historic properties acquired by the State pursuant to G.S. 121-9 or listed in the North Carolina Register of Historic Places pursuant to G.S. 121-4.1.
(7)  "Modified animal operation" means an animal operation that commences construction after February 28, 1999, to increase the steady state live weight that can be housed at that animal operation. Modified animal operation does not include renovating existing barns, relocating barns, or replacing existing lagoons or barns if the new barn or lagoon is no closer to the nearest property and if the new barn or lagoon does not increase the steady state live weight that can be housed at that animal operation.
(8)  "New animal operation" means an animal operation that commences construction after February 28, 1999.
(9)  "Objectionable odor" means any odor present in the ambient air that by itself, or in combination with other odors, is or may be harmful or injurious to human health or welfare, or may unreasonably interfere with the comfortable use and enjoyment of life or property. Odors are harmful or injurious to human health if they tend to lessen human food and water intake, interfere with sleep, upset appetite, produce irritation of the upper respiratory tract, or cause symptoms of nausea, or if their chemical or physical nature is, or may be, detrimental or dangerous to human health.
(10) "Occupied residence" means occupied residence as defined in G.S. 106-802.
(11) "State Parks" means State Parks as defined in G.S. 113-44.9.
(12) "Technologically feasible" means that an odor control device or a proposed solution to an odor problem has previously been demonstrated to accomplish its intended objective, and is generally accepted within the technical community. It is possible for technologically feasible solutions to have demonstrated their suitability on similar, but not identical, sources for which they are proposed to control.

History Note: Authority G.S. 143-213; 143-215.3(a)(1); 143-215.107(a)(11); Temporary Adoption Eff. April 27, 1999; March 1, 1999; Eff. July 1, 2000.
15A NCAC 02D .1802  CONTROL OF ODORS FROM ANIMAL OPERATIONS USING LIQUID ANIMAL WASTE MANAGEMENT SYSTEMS

(a) Purpose. The purpose of this Rule is to control objectionable odors from animal operations beyond the boundaries of animal operations.
(b) Applicability. This Rule shall apply to all animal operations.
(c) Required management practices. All animal operations shall be required to implement applicable management practices for the control of odors as follows:

(1) The carcasses of dead animals shall be disposed of within 24 hours after becoming aware of the death of the animal according to the methods approved by the State Veterinarian for disposal of dead domesticated animals under G.S. 106-403;
(2) Waste from animal wastewater application spray systems shall be applied in such a manner and under such conditions to prevent drift from the irrigation field of the wastewater spray beyond the boundary of the animal operation, except waste from application spray systems may be applied in an emergency to maintain safe lagoon freeboard if the owner or operator notifies the Department and resolves the emergency with the Department as written in Section III.6 of the Swine Waste Operation General Permit;
(3) Animal wastewater application spray system intakes shall be located near the liquid surface of the animal wastewater lagoon;
(4) Ventilation fans shall be maintained according to the manufacturer's specifications; and
(5) Animal feed storage containers located outside of animal containment buildings shall be covered except when necessary to remove or add feed; this Subparagraph does not apply to the storage of silage or hay or to commodity boxes with roofs; and

All animal operations shall be in compliance with this Paragraph by June 1, 1999.

(d) Odor management plan for existing animal operations for swine. Animal operations for swine that meet the criteria in the table in this Paragraph shall submit an odor management plan to the Director according to the schedule in the table in this Paragraph. The odor management plan shall describe how odors are currently being controlled and how these odors will be controlled in the future. The odor management plan shall contain the elements described in Rule .1803(a) of this Section. The animal operation shall be required to submit its odor management plan only once.

<table>
<thead>
<tr>
<th>100 pounds steady state live weight of swine</th>
<th>Distance in feet to the boundary of the nearest neighboring occupied property with an inhabitable structure, business, school, hospital, church, outdoor recreational facility, national park, State Park, historic property, or child care center</th>
<th>Date by when the odor management plan is to be submitted</th>
</tr>
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<tbody>
<tr>
<td>at least 10,000</td>
<td>less than or equal to 3,000</td>
<td>January 15, 2002</td>
</tr>
<tr>
<td>20,000 but less than 40,000</td>
<td>less than or equal to 4,000</td>
<td>July 15, 2001</td>
</tr>
<tr>
<td>40,000</td>
<td>less than or equal to 5,000</td>
<td>January 15, 2001</td>
</tr>
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</table>
For the purposes of this Rule, the distance shall be measured from the edge of the barn or lagoon, whichever is closer, to the boundary of the neighboring occupied property with an inhabitable structure, business, school, hospital, church, outdoor recreational facility, national park, State Park, historic property, or child care center. All animal operations for swine that are of the size in the table in this Paragraph shall submit by the date specified in this table either an odor management plan or documentation that no neighboring occupied property with an inhabitable structure, business, school, hospital, church, outdoor recreational facility, national park, State Park, historic property, or child care center is within the distances specified in the table as of the date that the submittal is due. After July 15, 2002, the Director may require existing animal operations for swine with a steady state live weight of swine between 1,000 to 10,000 hundredweights to submit an odor management plan if the Director determines that these animal operations may cause or contribute to an objectionable odor. The Director may require an existing animal operation to submit a best management plan under Paragraph (h) of this Rule if the existing animal operation fails to submit an odor management plan by the schedule in this Paragraph of this Rule.

(e) Location of objectionable odor determinations.
(1) For an existing animal operation that does not meet the following siting requirements:
   (A) at least 1500 feet from any occupied residence not owned by the owner of the animal operation;
   (B) at least 2500 feet from any school, hospital, church, outdoor recreation facility, national park; State Park, historic property, or child care center; and
   (C) at least 500 feet from any property boundary;
   objectionable odors shall be determined at neighboring occupied property not owned by the owner of the animal operation, businesses, schools, hospitals, churches, outdoor recreation facilities, national parks, State Parks, historic properties, or child care centers that are affected.
(2) For a new animal operation or existing animal operation that meets the siting requirements in Subparagraph (1) of this Paragraph, objectionable odors shall be determined beyond the boundary of the animal operation.

(f) Complaints. The Director shall respond to complaints about objectionable odors from animal operations as follows:
(1) Complaints shall be investigated to the extent practicable.
(2) Complaints may be used to assist in determination of a best management plan failure or a control technology failure.
(3) The Director shall respond to complaints within 30 days.
(4) Complaint response shall at least include a written response of the Director's evaluation of the complaint.
(5) The investigation of a complaint shall be completed as expeditiously as possible considering the meteorology, activities at the animal operation, and other conditions occurring at the time of the complain.

(g) Determination of the existence of an objectionable odor. In deciding if an animal operation is causing or contributing to an objectionable odor, the Director may consider one or more of the following:
(1) the nature, intensity, frequency, pervasiveness, and duration of the odors from the animal operation;
(2) complaints received about objectionable odors from the animal operation;
(3) emissions from the animal operation of known odor causing compounds, such as ammonia, total volatile organics, hydrogen sulfide or other sulfur compounds at levels that could cause or contribute to an objectionable odor;
(4) any epidemiological studies associating health problems with odors from the animal operation or documented health problems associated with odors from the animal operation provided by the State Health Director; or
(5) any other evidence, including records maintained by neighbors, that show that the animal operation is causing or contributing to an objectionable odor.

(h) Requirement for a best management plan for controlling odors from existing animal operations. If the Director finds that an existing animal operation is causing or contributing to an objectionable odor, the owner or operator of the animal operation shall:
(1) submit to the Director as soon as practical, but not to exceed 90 days after receipt of written notification from the Director that the animal operation is causing or contributing to an objectionable odor, a best management plan for odor control as described in Rule .1803 of this Section; and
(2) be in compliance with the terms of the plan within 30 days after the Director approves the best management plan (compliance with an approved compliance schedule in the best management plan is deemed to be in compliance with the plan).

(i) Requirement for amendment to best management plan. No later than 60 days from completion of a compliance schedule in an approved best management plan or if the best management plan contains no compliance schedule, no later than 60 days from the implementation date of the best management plan, the Director shall determine whether the plan has been properly implemented. If the Director determines that a plan submitted under Paragraph (h) of this Rule does not control objectionable odors from the animal operation, the Director shall require the owner or operator of the animal operation to amend the plan to incorporate additional or alternative measures to control objectionable odors from the animal operation. The owner or operator shall:
(1) submit a revised best management plan to the Director as soon as practical but not later than 60 days after receipt of written notification from the Director that the plan is inadequate; and
(2) be in compliance with the revised plan within 30 days after the Director approves the revisions to the best management plan (compliance with an approved compliance schedule in the best management plan is deemed to be in compliance with the plan).

(j) Plan failure. Any of the following conditions shall constitute failure of a best management plan:
(1) failing to submit the initial best management plan required under Paragraph (h) of this Rule within 90 days of receipt of written notification from the Director that the animal operation is causing or contributing to an objectionable odor;
(2) failing to submit a revised best management plan required under Paragraph (i) of this Rule within 60 days of receipt of written notification from the Director that the animal operation is causing or contributing to an objectionable odor;
(3) failing to correct all deficiencies in a submitted best management plan under Rule .1803(c) of this Section within 30 days of receipt of written notification from the Director to correct these deficiencies;

(4) failing to implement the best management plan after it has been approved; or

(5) finding by the Director, using the criteria under Paragraph (g) of this Rule, that, after the best management plan has been implemented and revised no more than one time (voluntary revisions and revisions made pursuant to 15A NCAC 2D .1803(c) shall not be counted as revisions under this Subparagraph); the best management plan does not adequately control objectionable odors from the animal operation and will not adequately control objectionable odors even with further amendments.

(k) Requirements for control technology. If a plan failure occurs, the Director shall require the owner or operator of the animal operation to install control technology to control odor from the animal operation. The owner or operator shall submit within 90 days from receipt of written notification from the Director of a plan failure, a permit application for control technology and an installation schedule. If the owner or operator demonstrates to the Director that a permit application cannot be submitted within 90 days, the Director may extend the time for submittal up to an additional 90 days. Control technology shall be determined according to Subparagraph (1) of this Paragraph. The installation schedule shall contain the increments of progress described in Subparagraph (2) of this Paragraph. The owner or operator may at any time request adjustments in the installation schedule and shall in his request explain why the schedule cannot be met. If the Director finds that the reason for not meeting the schedule is valid, the Director shall revise the installation schedule as requested; however, the Director shall not extend the final compliance date beyond 24 months from the date that the permit was first issued for the control technology. The owner or operator shall certify to the Director within five days after the deadline for each increment of progress described in Subparagraph (2) of this Paragraph whether the required increment of progress has been met.

(1) Control technology. The owner or operator of an animal operation shall identify control technologies that are technologically feasible for his animal operation and shall select the control technology or control technologies that results in the greatest reduction of odors considering human health, energy, environmental, and economic impacts and other costs. The owner or operator shall explain the reasons for selecting the control technology or control technologies. If the Director finds that the selected control technology or control technologies will effectively control odors following the procedures in 15A NCAC 2Q .0300 or .0500, he shall approve the installation of the control technology or control technologies for this animal operation. The owner or operator of the animal operation shall comply with all terms and conditions in the permit.

(2) Installation schedule. The installation schedule for control technology shall contain the following increments of progress:

(A) a date by which contracts for odor control technology shall be awarded or orders shall be issued for purchase of component parts;

(B) a date by which on-site construction or installation of the odor control technology shall begin;

(C) a date by which on-site construction or installation of the odor control technology shall be completed; and

(D) a date by which final compliance shall be achieved.
Control technology shall be in place and operating as soon as practical but not to exceed 12 months from the date that the permit is issued for control technology.

(1) New or modified animal operations. This Paragraph does not apply to activities exempted from the moratorium on construction or expansion of swine farms in S.L. 1997, c. 458, s. 1.1 provided that the owner or operator demonstrates to the Director that the activity will not result in an objectionable odor.

(1) Before beginning construction, the owner or operator of a new or modified animal operation raising or producing swine shall submit and have an approved best management plan and shall meet the following: A house or lagoon that is a component of an animal operation shall be constructed:
   (A) at least 1500 feet from any occupied residence not owned by the owner of the animal operation;
   (B) at least 2500 feet from any school, hospital, church, outdoor recreation facility, national park, State Park, historic property, or child care center; and
   (C) at least 500 feet from any property boundary;

(2) Before beginning construction, the owner or operator of a new or modified animal operation other than swine shall submit and have an approved best management plan.

(3) For new or modified animal operations raising or producing swine, the outer perimeter of the land area onto which waste is applied that is a component of an animal operation shall be:
   (A) at least 75 feet from any boundary of property on which an occupied residence not owned by the owner of the animal operation is located, and
   (B) at least 200 feet from any occupied residence not owned by the owner of the animal operation.

(4) The Director shall either approve or disapprove the best management plan submitted under this Paragraph within 90 days after receipt of the plan. If the Director disapproves the plan, he shall identify the plan=s deficiency.

History Note: Authority G.S. 143-215.3(a)(1); 143-215.107(a)(11); 143-215.108(a); Temporary Adoption Eff. April 27, 1999; March 1, 1999; Eff. July 1, 2000.

15A NCAC 02D .1803 BEST MANAGEMENT PLANS FOR ANIMAL OPERATIONS

(a) Contents of a best management plan. The best management plan for animal operations shall:

   (1) identify the name, location, and owner of the animal operation;
   (2) identify the name, title, address, and telephone number of the person filing the plan;
   (3) identify the sources of odor within the animal operation;
   (4) describe how odor will be controlled from:
         (A) the animal houses;
(B) the animal wastewater lagoon, if used;
(C) the animal wastewater application lands, if used;
(D) waste conveyances and temporary accumulation points; and
(E) other possible sources of odor within the animal operation;
(5) contain a diagram showing all structures and lagoons at the animal operation, forced air directions, and approximate distances to structures or groups of structures within 3000 feet of the property line of the animal operation; a recent or updated aerial photograph may be submitted in place of a diagram provided the items required under this Subparagraph of this Rule are shown;
(6) for existing animal operations, contain a schedule not to exceed six months by which the plan will be implemented (a new animal operation is to have and be in compliance with its best management plan when it begins operation); for an amended best management plan, the implementation schedule shall not exceed six months;
(7) describe how the plan will be implemented, including training of personnel;
(8) describe inspection and maintenance procedures; and
(9) describe methods of monitoring and recordkeeping to verify compliance with the plan.

(b) The Division shall review all best management plan submittals within 30 days of receipt of the submittal to determine if the submittal is complete or incomplete for processing purposes. To be complete, the submittal shall contain all the elements listed in Paragraph (a) of this Rule. The Division shall notify the person submitting the plan by letter stating that:
(1) the submittal is complete,
(2) the submittal is incomplete and identifying the missing elements and a date by which the missing elements need to be submitted to the Division, or
(3) the best management plan is incomplete and requesting that the person rewrite and resubmit the plan.

(c) Approval of the best management plan. The Director shall approve the plan if he finds that:
(1) the plan contains all the required elements in Paragraph (a) of this Rule;
(2) the proposed schedule contained in the plan will reduce objectionable odors in a timely manner;
(3) the methods used to control objectionable odors are likely to prevent objectionable odors beyond the property lines of the animal operation (the Director shall not consider impacts of objectionable odors on neighboring property if the owner of the neighboring property agrees in writing that he does not object to objectionable odors on his property and this written statement is included with the proposed best management plan; this agreement becomes void if the neighboring property changes ownership. If the neighboring property changes ownership, the plan shall be revised, if necessary, to prevent objectionable odors on this property unless the new owner agrees in writing that he does not object to objectionable odors on his property); and
(4) the described compliance verification methods are sufficient to verify compliance with the plan.

Within 90 days after receipt of a plan, the Director shall determine whether the proposed plan meets the requirements of this Paragraph of this Rule. If the Director finds that the proposed plan does not meet the requirements of this Paragraph, he shall notify the owner
or operator of the animal operation in writing of the deficiencies in the proposed plan. The owner or operator shall have 30 days after receiving written notification from the Director to correct the deficiencies. If the Director finds that the proposed plan is acceptable, he shall notify the owner or operator in writing that the proposed plan has been approved.


15A NCAC 02D .1804 REPORTING REQUIREMENTS FOR ANIMAL OPERATIONS

If the Department receives an odor complaint about an animal operation, the Department may require the owner or operator of the animal operation to submit the following information:
(1) the name and location of the animal operation;
(2) the name, title, address, and telephone number of the person filing the report;
(3) the type and number of animals at the animal operation;
(4) potential sources of odors, such as animal housing structures, lagoons, collection and handling devices, and storage containers, with a physical description of these sources;
(5) waste water land application procedures; and
(6) measures taken to reduce odors.
This information shall be submitted to the Division within 15 days after receipt of the request.


15A NCAC 02D .1805 IMPLEMENTATION PLAN

15A NCAC 02D .1806 CONTROL AND PROHIBITION OF ODOROUS EMISSIONS

(a) Purpose. The purpose of this Rule is to provide for the control and prohibition of objectionable odorous emissions.

(b) Definitions. For the purpose of this Rule the following definitions shall apply:

(1) "Commercial purposes" means activities that require a state or local business license to operate.

(2) "Temporary activities or operations" means activities or operations that are less than 30 days in duration during the course of a calendar year and do not require an air quality permit.

(c) Applicability. With the exceptions in Paragraph (d) of this Rule, this Rule shall apply to all operations that may produce odorous emissions that can cause or contribute to objectionable odors beyond the facility's boundaries.

(d) Exemptions. The requirements of this Rule do not apply to:

(1) processes at kraft pulp mills identified in Rule .0528 of this Section, and covered under Rule .0524 or .0528 of this Section;

(2) processes at facilities that produce feed-grade animal proteins or feed-grade animal fats and oils identified in and covered under Rule .0539;

(3) motor vehicles and transportation facilities;

(4) all on-farm animal and agricultural operations, including dry litter operations and operations covered under Rule .1804 of this Section;

(5) municipal wastewater treatment plants and municipal wastewater handling systems;

(6) restaurants and food preparation facilities that prepare and serve food on site;

(7) single family dwellings not used for commercial purposes;

(8) materials odorized for safety purposes;

(9) painting operations that do not require a business license; or

(10) all temporary activities or operations.

(e) Control Requirements. The owner or operator of a facility subject to this Rule shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.

(f) Maximum feasible controls. If the Director determines that a source or facility subject to this Rule is emitting an objectionable odor by the procedures described in Paragraph (g) of this Rule, the Director shall require the owner or operator to implement maximum feasible controls for the control of odorous emissions. (Maximum feasible controls shall be determined according to the procedures in Rule .1807 of this Section.) The owner or operator shall:

(1) within 180 days of receipt of written notification from the Director of the requirement to implement maximum feasible controls, complete the determination process outlined in 15A NCAC 2D .1807 and submit the completed maximum feasible control determination process along with a permit application for maximum feasible controls and a compliance schedule to the Division of Air Quality; the compliance schedule shall contain the following increments of progress:
(A) a date by which contracts for the odorous emission control systems and equipment shall be awarded or orders shall be issued for purchase of component parts;
(B) a date by which on-site construction or installation of the odorous emission control systems and equipment shall begin;
(C) a date by which on-site construction or installation of the odorous emission control systems and equipment shall be completed; and
(D) a date by which final compliance shall be achieved.

(2) within 18 months after receiving written notification from the Director of the requirement to implement maximum feasible controls, have installed and begun operating maximum feasible controls.

The owner or operator shall certify to the Director within five days after the deadline for each increment of progress in this Paragraph whether the required increment of progress has been met.

(g) Determination of the existence of an objectionable odor. A source or facility is causing or contributing to an objectionable odor when:

(1) A member of the Division staff determines by field investigation that an objectionable odor is present by taking into account nature, intensity, pervasiveness, duration, and source of the odor and other pertinent factors;
(2) The source or facility emits known odor causing compounds such as ammonia, total volatile organics, hydrogen sulfide, or other sulfur compounds at levels that cause objectionable odors beyond the property line of that source or facility; or
(3) The Division receives epidemiological studies associating health problems with odors from the source or facility or evidence of documented health problems associated with odors from the source or facility provided by the State Health Director.

History Note: Authority G.S. 143-215.3(a)(1); 143-215.107(a)(5);

15A NCAC 02D .1807 DETERMINATION OF MAXIMUM FEASIBLE CONTROLS FOR ODOROUS EMISSIONS

(a) Scope. This Rule sets out procedures for determining maximum feasible controls for odorous emissions. The owner or operator of the facility shall be responsible for providing the maximum feasible control determination.

(b) Process for maximum feasible control determinations. The following sequential process shall be used on a case-by-case basis to determine maximum feasible controls:

(1) Identify all available control technologies. In the first step, all available options for the control of odorous emissions shall be listed. Available options include all possible control technologies or techniques with a practical potential to control, reduce, or minimize odorous emissions. For the purposes of this document, in some specific cases a comprehensive, effective odor control plan can be listed among the possible odor control technologies as a viable and satisfactory maximum feasible control technology option. All available control technologies shall be included on this list regardless of their
technical feasibility or potential energy, human health, economic, or environmental impacts.

(2) Eliminate technically infeasible options. In the second step, the technical feasibility of all the control options identified under Subparagraph (b)(1) of this Rule shall be evaluated with respect to source specific factors. A demonstration of technical infeasibility shall be clearly documented and shall show, based on physical, chemical, or engineering principles, that technical difficulties preclude the successful use of the control option under review. Technically infeasible control options shall then be eliminated from further consideration as maximum feasible controls.

(3) Rank remaining control technologies by control effectiveness. All the remaining control technologies, which have not been eliminated under Subparagraph (b)(2) of this Rule, shall be ranked and then listed in order of their ability to control odorous emissions, with the most effective control option at the top of the list. The list shall present all the control technologies that have not been previously eliminated and shall include the following information:

(A) control effectiveness;
(B) economic impacts (cost effectiveness);
(C) environmental impacts: this shall include any significant or unusual other media impacts (for example, water or solid waste), and, at a minimum, the impact of each control alternative on emissions of toxic or hazardous air pollutants;
(D) human health impacts; and
(E) energy impacts.

However, an owner or operator proposing to implement the most stringent alternative, in terms of control effectiveness, need not provide detailed information concerning the other control options. In such cases, the owner or operator shall only document, to the satisfaction of the Director, that the proposed control option is indeed the most efficient, in terms of control effectiveness, and provide a review of collateral environmental impacts.

(4) Evaluate most effective controls and document results. Following the delineation of all available and technically feasible control technology options under Subparagraph (b)(3) of this Rule, the energy, human health, environmental, and economic impacts shall be considered in order to arrive at the maximum feasible controls. An analysis of the associated impacts for each option shall be conducted. The owner or operator shall present an objective evaluation of the impacts of each alternative. Beneficial and adverse impacts shall be analyzed and, if possible, quantified. If the owner or operator has proposed to select the most stringent alternative, in terms of control effectiveness, as maximum feasible controls, he shall evaluate whether impacts of unregulated air pollutants or environmental impacts in other media would justify selection of an alternative control technology. If there are no concerns regarding collateral environmental impacts, the analysis is ended and this proposed option is selected as maximum feasible controls. In the event the most stringent alternative is inappropriate, due to energy, human health, environmental, or economic impacts, the justification for this conclusion shall be fully documented; and the next most stringent option, in terms of control effectiveness, becomes the primary alternative and is similarly evaluated. This process shall continue until the control technology evaluated can not be
eliminated due to source-specific environmental, human health, energy, or economic impacts.

(5) Select maximum feasible controls. The most stringent option, in terms of control effectiveness, not eliminated under Subparagraph (b)(4) of this Rule shall be selected as maximum feasible controls.

History Note: Authority G.S. 143-215.3(a)(1); 143-215.107(a)(5);
### Dairy Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmstead</td>
<td>• Dairy production</td>
<td>☐ Vegetative or wooded buffers</td>
<td>☐ Recommended best management practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Good judgment and common sense</td>
<td>☐ Promote drying with proper ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Scrape or flush daily</td>
<td>☐ Routine checks and maintenance on waterers, hydrants, pipes, stock tanks</td>
</tr>
<tr>
<td>Paved lots or barn   alley surfaces</td>
<td>• Wet manure-covered surfaces</td>
<td>☐ Promote drying with proper ventilation</td>
<td>☐ Replace wet or manure-covered bedding</td>
</tr>
<tr>
<td>Bedded areas</td>
<td>• Urine</td>
<td>☐ Promote drying with proper ventilation</td>
<td>☐ Replace wet or manure-covered bedding</td>
</tr>
<tr>
<td></td>
<td>• Partial microbial decomposition</td>
<td>☐ Provide liquid drainage for stored manure</td>
<td>☐ Partial microbial decomposition</td>
</tr>
<tr>
<td>Manure dry stacks</td>
<td>• Partial microbial decomposition</td>
<td>☐ Provide liquid drainage for stored manure</td>
<td>☐ Partial microbial decomposition</td>
</tr>
<tr>
<td>Storage tank or basin surface</td>
<td>• Partial microbial decomposition</td>
<td>☐ Bottom or mid-level loading</td>
<td>☐ Tank covers</td>
</tr>
<tr>
<td></td>
<td>• Mixing while filling</td>
<td>☐ Tank covers</td>
<td>☐ Basin surface mats of solids</td>
</tr>
<tr>
<td></td>
<td>• Agitation when emptying</td>
<td>☐ Basin surface mats of solids</td>
<td>☐ Minimize lot runoff and liquid additions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Agitate only prior to manure removal</td>
<td>☐ Proven biological additives or oxidants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Proven biological additives or oxidants</td>
<td></td>
</tr>
<tr>
<td>Settling basin surfaces</td>
<td>• Partial microbial decomposition</td>
<td>☐ Liquid drainage from settled solids</td>
<td>☐ Remove solids regularly</td>
</tr>
<tr>
<td></td>
<td>• Mixing while filling</td>
<td>☐ Liquid drainage from settled solids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Agitation when emptying</td>
<td>☐ Remove solids regularly</td>
<td></td>
</tr>
<tr>
<td>Manure, slurry, or sludge spreader outlets</td>
<td>• Agitation when spreading</td>
<td>☐ Soil injection of slurry/sludges</td>
<td>☐ Proven biological additives or oxidants</td>
</tr>
<tr>
<td></td>
<td>• Volatile gas emissions</td>
<td>☐ Soil injection of slurry/sludges</td>
<td>☐ Proven biological additives or oxidants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Wash residual manure from spreader after use</td>
<td></td>
</tr>
</tbody>
</table>
Dairy Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncovered manure, slurry, or sludge on field surfaces</td>
<td>Volatile gas emissions while drying</td>
<td>Soil injection of slurry/sludges, Soil incorporation within 48 hours, Spread in thin uniform layers for rapid drying, Proven biological additives or oxidants</td>
<td></td>
</tr>
<tr>
<td>Flush tanks</td>
<td>Agitation of recycled lagoon liquid while tanks are filling</td>
<td>Flush tank covers, Extend fill lines to near bottom of tanks with anti-siphon vents</td>
<td></td>
</tr>
<tr>
<td>Outside drain collection or junction boxes</td>
<td>Agitation during wastewater conveyance</td>
<td>Box covers</td>
<td></td>
</tr>
<tr>
<td>Lift stations</td>
<td>Agitation during sump tank filling and drawdown</td>
<td>Sump tank covers</td>
<td></td>
</tr>
<tr>
<td>End of drainpipes at lagoon</td>
<td>Agitation during wastewater conveyance</td>
<td>Extend discharge point of pipes underneath lagoon liquid level</td>
<td></td>
</tr>
<tr>
<td>Lagoon surfaces</td>
<td>Volatile gas emission, Biological mixing, Agitation</td>
<td>Proper lagoon liquid capacity, Correct lagoon startup procedures, Minimum surface area-to-volume ratio, Minimum agitation when pumping, Mechanical aeration, Proven biological additives</td>
<td></td>
</tr>
<tr>
<td>Irrigation sprinkler nozzles</td>
<td>High pressure agitation, Wind drift</td>
<td>Irrigate on dry days with little or no wind, Minimum recommended operating procedure, Pump intake near lagoon liquid surface, Pump from second-stage lagoon, Flush residual manure from pipes at end of slurry/sludge pumpings</td>
<td></td>
</tr>
</tbody>
</table>
## Dairy Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead animals</td>
<td>Carcass decomposition</td>
<td>☐</td>
<td>Proper disposition of carcasses</td>
</tr>
<tr>
<td>Standing water around facilities</td>
<td>Improper drainage</td>
<td>☐</td>
<td>Grade and landscape such that water drains away from facilities</td>
</tr>
<tr>
<td></td>
<td>Microbial decomposition of organic matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mud tracked onto public roads from farm access</td>
<td>Poorly maintained access roads</td>
<td>☐</td>
<td>Farm access road maintenance</td>
</tr>
</tbody>
</table>

### Additional Information:

<table>
<thead>
<tr>
<th>Available From:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle Manure Management; .0200 Rule/BMP Packet</td>
<td>NCSU, County Extension Center</td>
</tr>
<tr>
<td>Dairy Educational Unit Manure Management System—Lake Wheeler Road Field Laboratory; EBAE 209-95</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Management of Dairy Wastewater; EBAE 106-83</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings</td>
<td>Florida Cooperative Extension</td>
</tr>
</tbody>
</table>

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## Swine Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmstead</td>
<td>Swine production</td>
<td>☐ Vegetative or wooded buffers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Recommended best management practices</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Good judgment and common sense</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dirty manure-covered animals</td>
<td>☐ Dry floors</td>
<td></td>
</tr>
<tr>
<td>Animal body surfaces</td>
<td>Wet manure-covered floors</td>
<td>☐ Slotted floors</td>
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<tr>
<td></td>
<td></td>
<td>☐ Waterers located over slotted floors</td>
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<td></td>
<td></td>
<td>☐ Feeders at high end of solid floors</td>
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<td></td>
<td></td>
<td>☐ Scrape manure buildup from floors</td>
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<td></td>
<td></td>
<td>☐ Underfloor ventilation for drying</td>
<td></td>
</tr>
<tr>
<td>Manure collection pits</td>
<td>Urine</td>
<td>☐ Frequent manure removal by flush, pit recharge, or scrape</td>
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</tr>
<tr>
<td></td>
<td>Partial microbial decomposition</td>
<td>☐ Underfloor ventilation</td>
<td></td>
</tr>
<tr>
<td>Ventilation exhaust fans</td>
<td>Volatile gases</td>
<td>☐ Fan maintenance</td>
<td></td>
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<tr>
<td></td>
<td>Dust</td>
<td>☐ Efficient air movement</td>
<td></td>
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<tr>
<td>Indoor surfaces</td>
<td>Dust</td>
<td>☐ Washdown between groups of animals</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Feed additives</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Feeder covers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Feed delivery downspout extenders to feeder covers</td>
<td></td>
</tr>
<tr>
<td>Flush tanks</td>
<td>Agitation of recycled lagoon liquid while tanks are filling</td>
<td>☐ Flush tank covers</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>☐ Extend fill lines to near bottom of tanks with anti-siphon vents</td>
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<tr>
<td>Flush alleys</td>
<td>Agitation during wastewater conveyance</td>
<td>☐ Underfloor flush with underfloor ventilation</td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td>Cause</td>
<td>BMPs to Minimize Odor</td>
<td>Site Specific Practices</td>
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<tr>
<td>Pit recharge points</td>
<td>• Agitation of recycled lagoon liquid while pits are filling</td>
<td>☐ Extend recharge lines to near bottom of pits with anti-siphon vents</td>
<td></td>
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<tr>
<td>Lift stations</td>
<td>• Agitation during sump tank filling and drawdown</td>
<td>☐ Sump tank covers</td>
<td></td>
</tr>
<tr>
<td>Outside drain collection or junction boxes</td>
<td>• Agitation during wastewater conveyance</td>
<td>☐ Box covers</td>
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<td>End of drainpipes at lagoon</td>
<td>• Agitation during wastewater conveyance</td>
<td>☐ Extend discharge point of pipes underneath lagoon liquid level</td>
<td></td>
</tr>
<tr>
<td>Lagoon surfaces</td>
<td>• Volatile gas emissions</td>
<td>☐ Proper lagoon liquid capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Biological mixing</td>
<td>☐ Correct lagoon startup procedures</td>
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<td></td>
<td>• Agitation</td>
<td>☐ Minimum surface area-to-volume ratio</td>
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<td>☐ Minimum agitation when pumping</td>
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<td></td>
<td>☐ Mechanical aeration</td>
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<td></td>
<td></td>
<td>☐ Proven biological additives</td>
<td></td>
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<tr>
<td>Irrigation sprinkler nozzles</td>
<td>• High pressure agitation</td>
<td>☐ Irrigate on dry days with little or no wind</td>
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<tr>
<td></td>
<td>• Wind drift</td>
<td>☐ Minimum recommended operating pressure</td>
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<td></td>
<td>☐ Pump intake near lagoon liquid surface</td>
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<td>☐ Pump from second-stage lagoon</td>
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<tr>
<td>Storage tank or basin surface</td>
<td>• Partial microbial decomposition</td>
<td>☐ Bottom or midlevel loading</td>
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<tr>
<td></td>
<td>• Mixing while filling</td>
<td>☐ Tank covers</td>
<td></td>
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<tr>
<td></td>
<td>• Agitation when emptying</td>
<td>☐ Basin surface mats of solids</td>
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<td></td>
<td></td>
<td>☐ Proven biological additives or oxidants</td>
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</tr>
<tr>
<td>Source</td>
<td>Cause</td>
<td>BMPs to Minimize Odor</td>
<td>Site Specific Practices</td>
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<td>--------------------------------------</td>
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<td>--------------------------------</td>
</tr>
<tr>
<td>Settling basin surface</td>
<td>• Partial microbial decomposition</td>
<td>☐ Extend drainpipe outlets underneath liquid level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mixing while filling</td>
<td>☐ Remove settled solids regularly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Agitation when emptying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manure, slurry, or sludge spreader</td>
<td>• Agitation when spreading</td>
<td>☐ Soil injection of slurry/sludges</td>
<td></td>
</tr>
<tr>
<td>outlets</td>
<td>• Volatile gas emissions</td>
<td>☐ Wash residual manure from spreader after use</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Proven biological additives or oxidants</td>
<td></td>
</tr>
<tr>
<td>Uncovered manure, slurry, or sludge</td>
<td>• Volatile gas emissions while drying</td>
<td>☐ Soil injection of slurry/sludges</td>
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<tr>
<td>on field surfaces</td>
<td></td>
<td>☐ Soil incorporation within 48 hours</td>
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<td></td>
<td></td>
<td>☐ Spread in thin uniform layers for rapid drying</td>
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</tr>
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<td></td>
<td></td>
<td>☐ Proven biological additives or oxidants</td>
<td></td>
</tr>
<tr>
<td>Dead animals</td>
<td>• Carcass decomposition</td>
<td>☐ Proper disposition of carcasses</td>
<td></td>
</tr>
<tr>
<td>Dead animal disposal pits</td>
<td>• Carcass decomposition</td>
<td>☐ Complete covering of carcasses in burial pits</td>
<td></td>
</tr>
<tr>
<td>Incinerators</td>
<td>• Incomplete combustion</td>
<td>☐ Proper location/construction of disposal pits</td>
<td></td>
</tr>
<tr>
<td>Standing water around facilities</td>
<td>• Improper drainage</td>
<td>☐ Secondary stack burners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Microbial decomposition of organic matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manure tracked onto public roads</td>
<td>• Poorly maintained access roads</td>
<td>☐ Grade and landscape such that water drains away from facilities</td>
<td></td>
</tr>
<tr>
<td>from farm access</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Additional Information:**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Available From</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine Manure Management; .0200 Rule/BMP Packet</td>
<td>NCSU, County Extension Center</td>
</tr>
<tr>
<td>Swine Production Farm Potential Odor Sources and Remedies; EBAE Fact Sheet</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Swine Production Facility Manure Management: Pit Recharge—Lagoon Treatment; EBAE 128-88</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Swine Production Facility Manure Management: Underfloor Flush—Lagoon Treatment; EBAE 129-88</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet</td>
<td>NCSU—BAE</td>
</tr>
<tr>
<td>Controlling Odors from Swine Buildings; PIH-33</td>
<td>NCSU—Swine Extension</td>
</tr>
<tr>
<td>Environmental Assurance Program; NPPC Manual</td>
<td>N.C. Pork Producers Assoc.</td>
</tr>
<tr>
<td>Options for Managing Odor; a report from the Swine Odor Task Force</td>
<td>NCSU Agricultural Communications</td>
</tr>
<tr>
<td>Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings</td>
<td>Florida Cooperative Extension</td>
</tr>
</tbody>
</table>
# Poultry Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmstead</td>
<td>Poultry production</td>
<td>☑ Vegetative or wooded buffers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Recommended best management practices</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Good judgment and common sense</td>
<td></td>
</tr>
<tr>
<td>Floor surfaces (walk aisles)</td>
<td>Wet dirty surfaces</td>
<td>☑ Scrape manure, dust, feathers into collection alleys</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Splash boards along upper ends of collection alleys</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Proper ventilation</td>
<td></td>
</tr>
<tr>
<td>Cage manure dropping boards</td>
<td>Manure-covered surfaces</td>
<td>☑ Scrape manure into collection alleys</td>
<td></td>
</tr>
<tr>
<td>Manure collection alleys</td>
<td>Partial microbial decomposition</td>
<td>☑ Frequent manure removal by flush or scrape</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Frequent checks and maintenance on waterers and water pipes</td>
<td></td>
</tr>
<tr>
<td>Ventilation exhaust fans</td>
<td>Volatile gases</td>
<td>☑ Fan maintenance</td>
<td></td>
</tr>
<tr>
<td>Indoor surfaces</td>
<td>Dust</td>
<td>☑ Efficient air movement</td>
<td></td>
</tr>
<tr>
<td>Manure conveyors</td>
<td>Partial microbial decomposition</td>
<td>☑ Keep mechanical equipment in good repair</td>
<td></td>
</tr>
<tr>
<td>Storage tank or basin surface</td>
<td>Partial microbial decomposition</td>
<td>☑ Remove manure accumulations promptly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mixing while filling</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agitation when emptying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manure slurry or sludge spreader outlets</td>
<td>Agitation when spreading</td>
<td>☑ Soil injection of slurry/sludges</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volatile gas emissions</td>
<td>☑ Wash residual manure from spreader after use</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☑ Proven biological additives or oxidants</td>
<td></td>
</tr>
</tbody>
</table>
### Poultry Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncovered manure slurry or sludge on field surfaces</td>
<td>• Volatile gas emissions while drying</td>
<td>☐ Soil injection of slurry/sludges ☐ Soil incorporation within 48 hours</td>
<td></td>
</tr>
<tr>
<td>Outside drain collection or junction boxes</td>
<td>• Agitation during wastewater conveyance</td>
<td>☐ Box covers</td>
<td></td>
</tr>
<tr>
<td>Lift stations</td>
<td>• Agitation during sump tank filling and drawdown</td>
<td>☐ Sump tank covers</td>
<td></td>
</tr>
<tr>
<td>End of drainpipes at lagoon</td>
<td>• Agitation during wastewater conveyance</td>
<td>☐ Extend discharge point of pipes underneath lagoon liquid level</td>
<td></td>
</tr>
<tr>
<td>Lagoon surfaces</td>
<td>• Volatile gas emissions</td>
<td>☐ Proper lagoon liquid capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Biological mixing</td>
<td>☐ Correct lagoon startup procedures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Agitation</td>
<td>☐ Minimum surface area-to-volume ratio</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Minimum agitation while pumping</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Mechanical aeration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Proven biological additives</td>
<td></td>
</tr>
<tr>
<td>Irrigation sprinkler nozzles</td>
<td>• High pressure agitation</td>
<td>☐ Irrigate on dry days with little or no wind</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wind drift</td>
<td>☐ Minimum recommended operating procedure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Pump intake near lagoon liquid surface</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Pump from second-stage lagoon</td>
<td></td>
</tr>
</tbody>
</table>
# Poultry Farm Waste Management Odor Control Checklist

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Minimize Odor</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead birds</td>
<td>Carcass decomposition</td>
<td>☐ Proper disposition of carcasses</td>
<td></td>
</tr>
<tr>
<td>Dead bird disposal pits</td>
<td>Carcass decomposition</td>
<td>☐ Complete covering of carcasses in burial pits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Proper location/construction of disposal pits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>☐ Disposal pit covers tight fitting</td>
<td></td>
</tr>
<tr>
<td>Standing water around facilities</td>
<td>Improper drainage</td>
<td>☐ Grade and landscape such that water drains away from facilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microbial decomposition of organic matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mud tracked onto public roads from farm access</td>
<td>Poorly maintained access roads</td>
<td>☐ Farm access road maintenance</td>
<td></td>
</tr>
</tbody>
</table>

**Additional Information:**

- Poultry Manure Management; .0200 Rule/BMP Packet
- Poultry Layer Production Facility Manure Management: High Rise, Deep Pit; EBAE 131-88
- Poultry Layer Production Facility Manure Management: Undercage Flush—Lagoon Treatment; EBAE 130-88
- Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83
- Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet
- Proper Disposal of Dead Poultry; PS&T Guide No. 19
- Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings

**Available From:**

- NCSU, County Extension Center
- NCSU—BAE
- NCSU—Poultry Science
- Florida Cooperative Extension
## Insect Control Checklist for Animal Operations

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Control Insects</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid Systems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flush gutters</td>
<td>Accumulation of solids</td>
<td>☐ Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed</td>
<td>☐ Remove bridging of accumulated solids at discharge</td>
</tr>
<tr>
<td>Lagoons and pits</td>
<td>Crusted solids</td>
<td>☐ Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6 to 8 inches over more than 30 percent of surface</td>
<td></td>
</tr>
<tr>
<td>Excessive vegetative growth</td>
<td>Decaying vegetation</td>
<td>☐ Maintain vegetative control along banks of lagoons and other impoundments to prevent accumulation of decaying vegetative matter along water’s edge on impoundment’s perimeter.</td>
<td></td>
</tr>
<tr>
<td><strong>Dry Systems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeders</td>
<td>Feed spillage</td>
<td>☐ Design, operate, and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage</td>
<td>☐ Clean up spillage on a routine basis (e.g., 7- to 10-day interval during summer; 15- to 30-day interval during winter)</td>
</tr>
</tbody>
</table>
# Insect Control Checklist for Animal Operations

<table>
<thead>
<tr>
<th>Source</th>
<th>Cause</th>
<th>BMPs to Control Insects</th>
<th>Site Specific Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed storage</td>
<td>• Accumulations of feed residues</td>
<td>☐ Reduce moisture accumulation within and around immediate perimeter of feed storage areas by ensuring drainage is away from site and/or providing adequate containment (e.g., covered bin for brewer’s grain and similar high moisture grain products)</td>
<td>☐ Inspect for and remove or break up accumulated solids in filter strips around feed storage as needed</td>
</tr>
<tr>
<td>Animal holding areas</td>
<td>• Accumulations of animal wastes and feed wastage</td>
<td>☐ Eliminate low areas that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal</td>
<td>☐ Maintain fence rows and filter strips around animal holding areas to minimize accumulations of wastes (i.e., inspect for and remove or break up accumulated solids as needed)</td>
</tr>
<tr>
<td>Dry manure handling</td>
<td>• Accumulations of animal wastes</td>
<td>☐ Remove spillage on a routine basis (e.g., 7- to 10-day interval during summer; 15- to 30-day interval during winter) where manure is loaded for land application or disposal</td>
<td>☐ Provide for adequate drainage around manure stockpiles</td>
</tr>
</tbody>
</table>

For more information contact:
Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613.
Waste Utilization Agreement
(Needed only if additional land has to be leased, etc.)

I, ________________________________ hereby give ____________________ permission to apply waste from his Waste Utilization System on ________ acres of my land for the duration of the time shown below. The field(s) on which waste can be applied are shown on the attached map.

I understand that this waste contains nitrogen, phosphorus, potassium and trace elements, and when properly applied should not harm my land or crops. I also understand that the use of animal manure will reduce my need for commercial fertilizer.

Landowner: _____________________________ Date: ________________

Term of Agreement: ____________________________ to ____________________________

(Minimum Ten Years on Cost-Shared Items)
# WASTE SAMPLE INFORMATION

**NCDA&CS Agronomic Division Plant/Waste/Solution Section**
Mailing Address: 1040 Mail Service Center, Raleigh NC 27699-1040
Physical Address (UPS/FedEx): 4300 Reedy Creek Road, Raleigh NC 27607
Phone: (919) 733-2655  Web Address: www.ncagr.com/agronomi

---

**SAMPLE TYPE** (circle one / see instructions)
- Predictive
- Diagnostic
- Research
- Out of State

---

**PAYMENT**: refer to back of sheet for fee information

Make check or money order payable to NCDA&CS

<table>
<thead>
<tr>
<th>No. Samples</th>
<th>Check</th>
<th>Money Order</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Escrow

<table>
<thead>
<tr>
<th>Cash</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Account Name _________________________________

---

**SAMPLE ID** — Provide sample identification (no more than six digits or letters). Put the same ID on the sample container.

---

**WASTE CODE** — Identify the type of waste in the sample by using codes (see back of information sheet).

---

**SAMPLE DESCRIPTION / COMMENTS** — Briefly describe problem or reason for sampling (necessary for diagnostic samples).

---

**APPLICATION METHODS** — Select one or two application methods from the list at the right for estimation of nutrient availability.

- **BR** = Waste broadcast on soil surface and left uncovered for one week or longer
- **SI** = Waste broadcast on soil surface and plowed or disked into soil within two days
- **IN** = Waste injected directly into the soil and covered immediately
- **IR** = Waste applied through irrigation system and left uncovered for one week or longer

---

**Sample results are available online. Please check this box if you do not need a printed report mailed to you.**

---

**LAB NUMBER** (leave blank)

**APPLICATION METHODS**

---

**FORM AD9 (revised December 2005)**
<table>
<thead>
<tr>
<th>INDUSTRIAL / MUNICIPAL WASTE CODES</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per sample = Base fee ($5 for N.C. residents; $25 out-of-state samples; $1.25 research samples) + $10 for each optional special test requested (calcium carbonate equivalence, CCE); heavy metals, nitrogen breakdown, BOD and COD</td>
<td></td>
</tr>
</tbody>
</table>

Cost per sample = Base fee ($5 for N.C. residents; $25 out-of-state samples; $1.25 research samples) + $10 for each optional special test requested (calcium carbonate equivalence, CCE); heavy metals, nitrogen breakdown, BOD and COD.

**Industrial - Pack Dust/Ash**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTD</td>
<td>Other</td>
</tr>
<tr>
<td>IDE</td>
<td>Industrial</td>
</tr>
<tr>
<td>MOC</td>
<td>Municipal</td>
</tr>
</tbody>
</table>

**Industrial - Textile**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTD</td>
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</tr>
<tr>
<td>IDE</td>
<td>Industrial</td>
</tr>
<tr>
<td>MOC</td>
<td>Municipal</td>
</tr>
</tbody>
</table>

---

### TIPS ON SAMPLING FARM MANURES

**Lugur Manure Slurry**

- **Wet Slurry**
  - Use a length of 1/2-inch conduit or similar device to collect the sample.
  - Construct a 10- to 15-foot pole with a 1/2-inch conduit attached to one end. Use this tool to collect liquid from at least five distinct locations in the pit. Always take samples from approximately 18 inches deep from several locations in the pit. Place the samples in a plastic bag and mail promptly.

- **Dry Slurry**
  - Collect representative core samples at least 18 inches deep from several locations on the pile. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

**In-House**

- Inspect house and estimate percentage of floor space used by different activities (feeding, watering, etc.). Take core sections of litter in these areas to represent the proportionate makeup of the house. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

---

### INDUSTRIAL / FARM WASTE CODES

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
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<tbody>
<tr>
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### IN-HOUSE:

- Inspect house and estimate percentage of floor space used by different activities (feeding, watering, etc.). Take core sections of litter in these areas to represent the proportionate makeup of the house. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

---

### SURFACE SCRAPED MANURES

**Lagoon Liquid — Anaerobic**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Poultry House Litter**

- Collect representative core samples at least 18 inches deep from several locations in the pit. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

---

### STOCKPILED (Dry Stack):

**Manure — Surface Scraped**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Liquid Manure Slurry**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

---

### SURFACE SCRAPED MANURES

**Lagoon Liquid — Anaerobic**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Poultry House Litter**

- Collect representative core samples at least 18 inches deep from several locations in the pit. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

---

### STOCKPILED (Dry Stack):

**Manure — Surface Scraped**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Liquid Manure Slurry**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

---

### SURFACE SCRAPED MANURES

**Lagoon Liquid — Anaerobic**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Poultry House Litter**

- Collect representative core samples at least 18 inches deep from several locations in the pit. Mix samples thoroughly in a plastic bucket. Place approximately one quart of material in a clean plastic bag and mail in a suitable container to the laboratory.

---

### STOCKPILED (Dry Stack):

**Manure — Surface Scraped**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.

**Liquid Manure Slurry**

- Collect liquid from at least five representative locations in the lagoon. Always take the sample approximately 10 feet from the edge of the lagoon and one foot under surface. Do not include floating scum or debris. Mix thoroughly. Put approximately one pint of material in a clean plastic container, leaving at least one inch of air space to allow for gas production.
**Soil Facts**

**The North Carolina Phosphorus Loss Assessment Tool (PLAT)**

Nutrient management is the correct placement of the correct amount of nutrients in the soil at the right time and in the right form. Nutrient management should always be used when applying fertilizer or animal waste.

For many applications in North Carolina, nutrient management must meet the standards set by the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS). Specific instances in which NRCS nutrient management guidelines must be followed are:

- If your nutrient management plan is being written by an USDA-NRCS employee or by county Soil and Water District Conservation personnel.
- If you are receiving state or federal agricultural cost share funds.
- If your animal waste is regulated under state .0200 laws.
- If your animal waste is regulated under NPDES permits.
- If you farm in the Neuse or Tar-Pamlico River Basins.

Phosphorus (P) management is one important aspect of the USDA-NRCS nutrient management standard (590). Anyone applying animal waste or fertilizer in a nutrient-impaired subwatershed must determine potential P loss from each field. Under the national 590 standard, each state chose from three methods for determining potential off-site P loss: agronomic soil test level, environmental soil test threshold, or a P index methodology. Soil tests are valuable as site-specific estimators of P accumulation, but they do not predict potential P loss because loss is a function of soil-test P and the amount of soil loss and runoff.

A state interagency group composed of faculty from NC State University and personnel from the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Soil and Water Conservation (DSWC), the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), and the USDA-NRCS chose to develop a site-specific index because both the agronomic soil test and environmental threshold approaches were too strict and not scientifically defensible. In addition, North Carolina has very diverse agricultural conditions and systems. The P index, which is referred to as the North Carolina Phosphorus Loss Assessment Tool, or PLAT for short, was adopted in November 2003 and is described below.

**Loss Pathways**

Phosphorus loss from fields to waters occurs along four major pathways:

- Soil-attached P erosion.
- Soluble-P runoff.
- Soluble-P leaching.
- Source-P loss (fertilizer and/or animal waste).

The dominant loss pathway in any field depends on many factors. One or more pathways may contribute to significant P loss for a site.

---

1 Members included David Crouse, Wendell Gilliam, John Havlin, Eugene Kamprath, Rory Maguire, and Deanna Osmond (Soil Science Department, NC State University); Robert Evans, John Parsons, Wayne Skaggs, and Phil Westerman (Biological and Agricultural Engineering Department, NC State University); David Hardy and Richard Reich (NCDENR-DSWC); Steve Coffey and Carroll Pierce (NCDENR-DSC); and Roger Hansard and Lane Price (USDA-NRCS).
Each of the four loss pathways is calculated in PLAT and added together to estimate the total P loss for a field.

\[
\text{Total P Loss} = \text{Soil-Attached P Erosion Loss} + \text{Soluble-P Runoff Loss} + \text{Soluble-P Leaching Loss} + \text{Source-P Loss}
\]

1. **Soil-attached P erosion loss**

Phosphorus added from fertilizers and animal waste usually attaches to soil particles. If these soil particles erode, the attached P will move with the soil when it erodes. Soils with higher soil-test P levels will have higher P in eroded particles.

Soil lost through erosion (and the P attached to these soil particles) may be reduced by redeposition in areas near the edge of the fields that are flatter (these are referred to as receiving slopes) or by certain best management practices (BMPs). The BMPs that can reduce P are diverse and consist of terraces, minimum tillage, and changes in cropping systems. Off-field BMPs include buffers, controlled drainage, ponds, and sediment basins.

2. **Surface water runoff loss**

When water runs off fields, it carries dissolved P. The amount of dissolved P in the runoff increases proportionally as the soil-test P level increases. The amount of P the soil releases to runoff at a given soil-test level also varies with soil texture, organic matter content, and types of soil minerals. If field practices reduce runoff (e.g., conservation tillage, soil cover, contour farming), then P losses will be reduced.

Runoff depends on rainfall, soil texture, field slope, field practices, and drainage. For calculation of runoff in PLAT, soils are divided into two broad drainage categories: artificially drained soils (mostly in the eastern part of the state) or naturally drained soils (upper coastal plain and piedmont).

The BMPs that effectively reduce soluble P transport are the same ones that reduce erosion.

3. **Leaching loss**

Phosphorus may be discharged into surface water as a result of subsurface flow processes on sites with tile drains and ditches. Soils with very high soil-test P and sandy textures can cause P to leach deeply into the soil and possibly into the shallow groundwater. This most often occurs when large applications of animal waste have been applied over long periods.

4. **Applied P loss**

There is a strong relationship between the P application rate from either solid waste or slurry and the concentration of P in runoff following applications. In manured or fertilized fields, the concentration of P in surface runoff increases with the type and form of the waste, the application rate, the application method, and the solubility of the applied P.

**PLAT Rating**

Index values are computed for each of the four P loss pathways. These indices are added to produce the final PLAT rating for the field (see Table 1). When commercial fertilizer is applied, soil-test P recommendations as specified in the nutrient management plan should always be followed. If animal waste is applied, a PLAT rating of “High” will limit the amount of waste that can be applied to the quantity that will be removed by the crop; a rating of “Very High” will prohibit any P application at all, except as a starter fertilizer.

**PLAT Results**

The necessary data to run PLAT were collected from 1,379 fields throughout North Carolina. These data were used to predict P losses from the different pathways. It was apparent that loss of P from certain P loss pathways was more significant than others. For example, Soil-Attached P Erosion Losses were generally low, due either to cropping systems that kept the soil in place (such as pastures) or to low soil-test P. Loss of P through Soluble-P Runoff was relatively more important to overall P loss, especially from sandy coastal plain sites that received animal waste. Soils from these sites tended to have much higher soil-test P levels. Sites with sandy soils were more susceptible to Soluble-P Leaching losses than other soil types.

Predicted P losses were higher from fields on which animal waste was applied, although there were differences in loss depending on which animal waste was used. More P was lost, in general, from fields receiving poultry waste because of the higher P content of the waste. Dairy waste has an equally high total P content, but application rates tend to be lower relative to poultry waste. Fields receiving swine waste tend to predict more P loss as soluble P, in both surface runoff and subsurface drainage, rather than applied source P, because most of the P in this waste is in a soluble form.

**PLAT Website**

North Carolina’s PLAT tool is one of the most comprehensive of its kind. Its development over a three-year period was based on the integration of all the available research and science. Information about PLAT can be found on the NC State University Interagency Nutrient Management Website at http://www.soil.ncsu.edu/nmp/ncnmwg/. The North Carolina Agricultural Nutrient Assessment Tool, which includes the PLAT software, can be downloaded from this site. There are additional materials, such as how to take deep soil samples and other information, available on this site.

**Table 1. PLAT Rating When Applying Animal Waste.**

<table>
<thead>
<tr>
<th>Rating Value</th>
<th>Consequence of Rating</th>
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<tr>
<td>Low</td>
<td>0-25</td>
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<tr>
<td>Medium</td>
<td>26-50</td>
</tr>
<tr>
<td>High</td>
<td>51-100</td>
</tr>
<tr>
<td>Very High</td>
<td>&gt;101</td>
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NORTH CAROLINA COOPERATIVE EXTENSION

AGW-439-56
Deep Soil Sampling for Nutrient Management

The soil samples that determine lime and fertilizer needs of crops routinely come from the top 4 to 8 inches of soil. The results of soil tests help to optimize the purchase of fertilizer, maximize yield, and minimize environmental impact. However, there are times when deep soil sampling is appropriate or necessary.

Deep sampling (28 to 32 inches into the ground) represents a way to monitor the movement of nutrients below the topmost 8 inches of soil. The nutrient phosphorus (P) is of particular interest because it builds up in the soil if overapplied, and it may leach into groundwater, seep into streams, or bind itself to soil particles and be carried to water bodies when soil is washed from fields. Thus, monitoring, via deep soil sampling, may be required as part of the new Phosphorus Loss Assessment Tool (PLAT), which seeks to preserve water quality.

Growers and consultants normally do not take deep samples, so the collection of samples requires that they exercise extreme care. Soil near the surface usually has higher nutrient levels than soil in the deeper strata; because of this, the sampler must avoid contamination of the deep sample by soil from near the surface.

Sampling Tools

Tool selection depends on price, availability, quality of sample desired, and expected frequency of use (Table 1).

- **Hydraulic soil probes** usually are mounted on a tractor or truck. The soil-collecting tubes usually have no open face and come in various diameters. If contamination is a major concern, plastic liners can be inserted into the tubes to provide intact cores that can be cross-sectioned for easy acquisition of subsamples for specific depths. Although hydraulic soil probes are easy to operate and very effective in removing cores with little contamination from above soil, they also are very expensive and not readily available to the public. Another potential drawback is the difficulty of accessing sampling sites with vehicles when field conditions are wet.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Cost &amp; Accessibility</th>
<th>Ease of Sampling</th>
<th>Quality of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic probe</td>
<td>✓</td>
<td>★★★★☆</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Soil probe with extensions</td>
<td>★★★★☆</td>
<td>★★★☆</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>Soil auger</td>
<td>★★★★☆</td>
<td>★☆</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>Post-hole digger</td>
<td>★★★★☆</td>
<td>★☆</td>
<td>★★★★☆</td>
</tr>
</tbody>
</table>

* The higher the number of checkmarks (✓), the higher the rating of the tool.
Soil sample probes are hand-held, single units 18 to 36 inches in length. The lower portion of the probe (12 inches) is an open-faced soil tube with an approximate diameter of ½ inch. Some probes have screw-on extensions for more versatile sampling by depth. Agronomists and growers commonly use the shorter, single-unit probes to obtain the routine shallow soil samples used for fertility and nematode analyses. Probes are usually pushed into the ground by hand, using necessary body weight. Quality samples can be easily obtained when soils are moist. When soils are dry and there is significant resistance, the probe may be hammered into the ground. It may be difficult to take samples in dry, single-grain sands due to their unstable, shifting nature. Soil sample probes are available through mail order from outdoor or forestry suppliers at a modest cost, usually $50 to $100.

Soil augers with various handle lengths and extensions for deep sampling are also available through mail-order suppliers, but they are more expensive than soil probes. They are generally easy to use except where rocks are abundant. The auger itself is about 12 inches long and comes in various diameters. Its sides may be open or completely closed (bucket augers). Planing augers provide clean excavation of soil from a hole’s bottom. Soil extracted with augers comes up in cores due to the twisting and cutting action of the auger, so care is essential in verifying the exact depth of sampling. Since several borings are necessary for sampling deeper depths, contamination may occur from soil sloughing into the hole upon inserting the auger or from side-wall contamination when removing an auger with open sides. Sampling dry, sandy, single-grained soils may be difficult with an auger.

Post-hole diggers consist of two metal blades bridged together with wooden handles about 4 feet long. They are inexpensive and commonly available. Sampling is usually easy except in dry soil conditions or when soil is compacted. There is some potential for contamination due to soil sloughing. Samples, however, will not be in cores, so depths are best determined by inserting a measuring tape into the hole.

Suggested Deep Sampling Technique for PLAT

A site with high P leaching potential, as determined by PLAT, requires a soil sample from a depth of 28 to 32 inches. The composite sample submitted for analysis should be taken from a mixture of at least five cores to ensure that it is representative of the site. To minimize contamination and acquire a quality sample, follow these steps:

1. Using a post-hole digger or auger at least 2 inches in diameter, excavate to 26 inches. Clean as much soil as possible from the bottom of the hole. Use a measuring tape to measure the depth at the center of the hole.

2. Use a standard soil probe at least 36 inches in length to collect a 6-inch soil core from the center of the hole. Measure the top 2 inches and discard. Place the remaining 4-inch core in a clean plastic bucket.

3. Collect at least four additional cores using the same technique.

4. Thoroughly mix the cores into a composite sample. Mixing is extremely important for best characterization of the site.

5. Take a surface sample to further confirm elevated P levels as found in the initial site characterization. Cores should be taken from areas coinciding with deep sampling.

6. Submit samples to a laboratory that is certified by the N.C. Department of Environment and Natural Resources, Division of Water Quality, Laboratory Section. Request Mehlich-3 methodology and results as a phosphorus index (P-I) as routinely performed by the N.C. Department of Agriculture and Consumer Services (NCDA&CS) Agronomic Division, Soil Testing Laboratory.

For more information concerning deep sampling, contact the NCDA&CS Agronomic Division (919-733-2655) or the county offices of any of these agencies: Division of Soil and Water Conservation, N.C. Cooperative Extension, or U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). Direct PLAT inquiries to NRCS at 919-873-2100.


Prepared by

David H. Hardy, Soil Testing Section Chief, Agronomic Division, North Carolina Department of Agriculture and Consumer Services

Deanna L. Osmond, Department Extension Leader, Department of Soil Science, North Carolina State University

Richard Reich, Director, Agronomic Division, North Carolina Department of Agriculture and Consumer Services

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NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
HOW TO FILL OUT THE INFORMATION SHEET

SAMPLE TYPE
- Predictive analysis checks nutrient content and provides interpretation and general recommendations.
- Diagnostic analysis identifies nutritional problems and provides interpretation and specific recommendations.
- Research is for samples submitted in connection with an approved research contract agreement.
- Out of state is for samples submitted by non-North Carolina residents.

GROWER INFORMATION — Provide as much contact information as possible (phone with area code, address, e-mail) and area where sample was collected.

PAYMENT — Cost per sample = Base fee [$5 for N.C. residents; $25 for out-of-state samples; $12 for research samples] + $2 for each additional mandatory test [petiole nitrates is required for cotton, strawberry and viniferia grape; a molybdenum test is required for alfalfa, broccoli, all kinds of cabbage, cauliflower, collards, kale, poinsettia, spinach and turnip greens] + $2 for each optional test requested [petiole nitrates, molybdenum and/or chloride].

SAMPLE ID — Provide sample identification (no more than six digits or letters). Put the same ID on the sample envelope.

CROP NAME — Enter the name of the crop sampled. You can use the common and/or botanical name.

GROWTH STAGE — Identify plant growth stage by one of these letter codes: S = Seedling, E = Early growth, B = Bloom, F = Fruiting, M = Mature.

WEEK — Indicate the estimated number of weeks that the crop has been in the current growth stage.

PLANT PART — Identify the part of the plant that was sampled by one of these letter codes: W = Whole plant, T = Top three inches, E = Ear leaf, M = Most recent mature leaf (including petioles for appropriate crops), H = Harvested leaf. For most plants, the most recent mature leaf (M) is the proper plant part to sample.

PLANT POSITION — Identify the position on the plant where the sample was taken by one of these letter codes: U = Upper, M = Middle, L = Lower. For most plants, the upper (U) position is the proper place to sample.

CORRESPONDING SAMPLE ID — List the IDs of any matching soil, solution or waste samples submitted.

PLANT APPEARANCE — Describe the symptoms of the plant at sampling. If this space is left blank, we assume growth is normal.

EXTRA TESTS — Indicate nonstandard tests desired: molybdenum, chloride, nitrate nitrogen or other (heavy metals, aluminum, lithium).

GROWING CONDITIONS — Answer the questions as completely as possible.

PROBLEM SAMPLE COMMENTS — Provide additional information needed to help diagnose specific problems.

FERTILIZER HISTORY — Answer the questions as completely as possible.

SAMPLES WILL NOT BE ANALYZED UNLESS ALL INFORMATION REQUESTED IN THE SHADED AREAS ON THE FRONT OF THIS FORM IS PROVIDED.

Please do not place samples in plastic bags.

Leave ample air space in paper containers to promote drying and avoid sample deterioration.
Lagoon Data Form for Temporary Adjustment in the Stop Pump Level
(a completed form must be submitted for each lagoon pumped below stop pump)

A. Farm Name _____________________________________________________________________________

B. Facility Number __________  - ___________

C. Lagoon Identification _____________________________________________________________________

(Name) _________________________________ of the Water Quality Section's staff of the Division of Water
Quality's ___________ Regional Office was contacted on ______________________ (date) for notification of
the pending lagoon pump down below the stop pump mark for this facility. At that time, I notified DWQ that the
depth of liquid between the stop pump level and the top of the sludge layer was ________________ inches (must be
at least 48 inches). This notification was at least 24 hours prior to the time that the lagoon level was pumped below
the stop pump level for this lagoon.

If a producer elects to exercise the option of pumping into the top 8 inches of the “Stop Pump” Zone during the period
June 15 through October 31, the following information must be provided concerning the pump down condition:

1. Date the lagoon was first pumped below the Stop Pump Level ______________________

2. Depth of liquid between the stop pump level and the sludge layer prior to pumping below the stop pump mark
____________ (measured in inches). The depth must be measured from the stop pump level near the pump intake
location but off the inside slope of the embankment.

3. Date pump down was completed:_____________________________

4. Depth of pump down below the stop pump level ________________ (measured in inches).

This form shall be submitted to the following address as soon as practicable, but no later than March 1 of the
following year.

NC Division of Water Quality
Aquifer Protection Section
Animal Feeding Operations Unit
1636 Mail Service Center
Raleigh, NC 27699-1636

Completed by: ___________________________ _______________________________  Date: __________

Print Name    Signature

LDF September 12, 2003
North Carolina Cooperative Extension

Friday, July 28th, 2006

Agriculture & Food
- Animal Agriculture
- Commercial
- Horticulture, Nursery, & Turf
- Farm Health & Safety
- Field Crops
- Food Safety & Processing
- Pest Control
- Specialty Crops

Community
- Environment
- Forest Resources
- Health & Nutrition
- Home & Family
- Lawn & Garden
- Youth & 4-H

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- Alleghany
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- Ashe
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- Caldwell
- Camden
- Carteret
- Caswell
- Catawba
- Chatham
- Cherokee
- Cherokee Reservation
- Chowan
- Clay
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- Columbus
- Craven
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- Currituck*
- Dare*
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- Davie
- Duplin
- Durham
- Edgecombe
- Forsyth*
- Franklin
- Gaston*
- Gates
- Graham
- Granville
- Greene
- Guilford
- Halifax
- Harnett
- Haywood*
- Henderson
- Hertford
- Hoke
- Hyde
- Iredell
- Jackson
- Johnston
- Jones
- Lee
- Lenoir*
- Lincoln
- Macon
- Madison
- Martin*
- McDowell
- Mecklenburg*
- Mitchell
- Montgomery
- Moore
- Nash
- New Hanover
- Northampton
- Onslow
- Orange
- Pamlico*
- Pasquotank
- Pender
- Perquimans
- Person
- Pitt
- Polk
- Randolph
- Richmond
- Robeson
- Rockingham
- Rowan
- Rutherford
- Sampson
- Scotland
- Stanly
- Stokes
- Surry
- Swain
- Transylvania*
- Tyrrell
- Union
- Vance
- Wake*
- Warren
- Washington
- Watauga
- Wayne
- Wilkes
- Wilson
- Yadkin
- Yancey

Districts
- Northeast District
- Northwest District
- North Central District
- South Central District
- Southeast District
- Southwest District
- West District

District Map (PDF)

Mountain Horticultural Crops Research & Extension Center

Vernon G. James Research & Extension Center

NC 4-H Centers

NC Industrial Extension Service

Cooperative Extension in other states

*Gateway County Center

NC Cooperative Extension is based at North Carolina's two land-grant institutions, NC State University and NC A&T State University, in all 100 counties and on the Cherokee Reservation.
<table>
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<th>County</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
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<tr>
<td>Alamance</td>
<td>Alamance Co. Agricultural &amp; Environmental Center&lt;br&gt;209-B Graham-Hopedale Rd.&lt;br&gt;Burlington, NC 27217</td>
<td>336-228-1753x3</td>
<td>336-227-2488</td>
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<tr>
<td>Alexander</td>
<td>Alexander County Governmental Office Building&lt;br&gt;Room 101&lt;br&gt;255 Liledoun Rd., Box 10&lt;br&gt;Taylorsville, NC 28681</td>
<td>828-632-2708</td>
<td>828-632-0059</td>
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<td>Alleghany</td>
<td>P.O. Box 127&lt;br&gt;County Office Building, Room 100&lt;br&gt;90 South Main Street&lt;br&gt;Sparta, NC 28675</td>
<td>336-372-4645</td>
<td>336-372-7402</td>
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<td>Ashe</td>
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<td>336-246-6171</td>
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<td>Avery</td>
<td>P.O. Box 190&lt;br&gt;146 West B Street, Unit 3&lt;br&gt;Newland, NC 28657</td>
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<td>828-737-0217</td>
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<td>Beaufort</td>
<td>Agriculture Service Center&lt;br&gt;155 Airport Rd.&lt;br&gt;Washington, NC 27889</td>
<td>252-946-4989</td>
<td>252-946-2501</td>
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<td>P.O. Box 566&lt;br&gt;Bertie County Office Building&lt;br&gt;106 Dundee St., Room 211&lt;br&gt;Windsor, NC 27983-0566</td>
<td>252-794-5305</td>
<td>252-794-5333</td>
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<td>Bladen</td>
<td>Agricultural Service Center, Room 122&lt;br&gt;450 Smith Circle&lt;br&gt;Elizabethtown, NC 28337-9409</td>
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<td>Bolivia, NC 28422-0026</td>
<td>910-253-2830</td>
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<td>Buncombe</td>
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<td>Asheville, NC 28801</td>
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<td>Burke</td>
<td>130 Ammons Dr., Suite 3</td>
<td>Morganton, NC 28655</td>
<td>828-439-9727x3</td>
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<tr>
<td>Cabarrus</td>
<td>715 Cabarrus Ave., West, Room 301</td>
<td>Concord, NC 28027</td>
<td>704-788-2107</td>
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<tr>
<td>Caldwell</td>
<td>120 Hospital Ave., NE, Suite 2</td>
<td>Lenoir, NC 28645</td>
<td>828-758-1111</td>
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<tr>
<td>Camden</td>
<td>Beechtree Plaza, 1023-5 US 17 South</td>
<td>Elizabeth City, NC 27909</td>
<td>252-338-6353</td>
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<td>Carteret</td>
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<td>Beaufort, NC 28516-0125</td>
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<td>P.O. Box 96 126 Court Square</td>
<td>Yanceyville, NC 27379</td>
<td>336-694-4581</td>
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<td>Catawba</td>
<td>1175 S. Brady Ave., Box A</td>
<td>Newton, NC 28658</td>
<td>828-464-1382x3</td>
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<tr>
<td>Chatham</td>
<td>P.O. Box 309 County Agriculture Building 45 South Street</td>
<td>Pittsboro, NC 27312</td>
<td>919-542-2244</td>
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<tr>
<td>Cherokee</td>
<td>225 Valley River Ave., Suite J</td>
<td>Murphy, NC 28789</td>
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<tr>
<td>Cherokee Tribal Office</td>
<td>P.O. Box 455</td>
<td>US 19N, Tribal Utilities Building</td>
<td>Cherokee, NC 28719</td>
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<tr>
<td>Chowan</td>
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<td>Craven</td>
<td>302 Industrial Dr.</td>
<td>New Bern, NC 28562</td>
<td>252-637-2547</td>
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<td>301 East Mountain Drive</td>
<td>Fayetteville, NC 28306-0069</td>
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<td>Dare</td>
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<td>301 East Center Street</td>
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<td>Mocksville, NC 27028</td>
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<td>P.O. Box 219</td>
<td>Duplin County Soil Conservation Building</td>
<td>105 East Hill Street</td>
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| Person | Person County Office Building, Room 126  
304 South Morgan Street  
Roxboro, NC 27573 | 336-597-2973 | 336-599-6516 |
| Perquimans | County Office Building  
601 A Edenton Road Street  
Hertford, NC 27944 | 252-426-5545 | 252-426-1646 |
| Pitt | Pitt County Office Building  
403 Government Circle, Suite 4  
Greenville, NC 27834-8166 | 252-752-2720x3 | 252-752-5595 |
| Polk | P.O. Box 236  
Courthouse Annex  
Corner of Ward and Gibson Street  
Columbus, NC 28722 | 828-894-8823 | 828-894-2231 |
| Randolph | Federal Building, Room 105  
241 Sunset Avenue  
Asheboro, NC 27203 | 336-629-4449 | 336-629-0105 |
| Richmond | 123 Caroline St., Suite 300  
Rockingham, NC 28379 | 910-997-8244 | 910-739-8306 |
| Robeson | County Office Building  
440A Caton Road  
Lumberton, NC 28358 | 910-739-5478 | 910-739-8306 |
| Rockingham | Rockingham Agricultural Center  
525 NC 65, Suite 100  
Reidsville, NC 27320-8861 | 336-342-0460x3 | 336-361-0062 |
| Rowan | Rowan County Agriculture Center  
2727-C Old Concord Road  
Salisbury, NC 28146 | 704-637-1604 | 704-647-9714 |
| Rutherford | 121 Laurel Drive  
Rutherfordton, NC 28139 | 828-287-4220x3 | 828-287-8081 |
| Sampson | New Agricultural Building  
84 County Complex Road  
Clinton, NC 28328 | 910-592-7963x3 | 910-590-3092 |
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<td>704-982-6811</td>
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<td>Stokes</td>
<td>P.O. Box 98 Old Courthouse Building Highway 89 Danbury, NC 27016</td>
<td>336-593-2846</td>
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<td>Surry</td>
<td>P.O. Box 218 220 Cooper St. Dobson, NC 27017</td>
<td>336-386-8751</td>
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<td>Swain</td>
<td>P.O. Box 731 Federal Building, Room 231 Main Street Bryson City, NC 28713</td>
<td>828-488-3785</td>
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<td>Transylvania</td>
<td>Community Services Building 203 East Morgan Street Brevard, NC 28712</td>
<td>828-884-3230</td>
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<td>Tyrrell</td>
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<td>Union</td>
<td>604 Lancaster Avenue Monroe, NC 28112</td>
<td>704-289-3212</td>
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<td>Vance</td>
<td>County Office Building, Room 1 305 Young Street Henderson, NC 27536</td>
<td>919-438-5727</td>
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<td>Wake</td>
<td>Agricultural Services Building, Suite D 4001 D Carya Drive Raleigh, NC 27610</td>
<td>919-250-1070</td>
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| Warren     | Route 1, Box 486-D  
150 Business & 401 N  
Warrenton, NC 27589 | 252-257-3836 | 252-257-4499 |
| Washington | 128 East Water Street, Suite 202  
Plymouth, NC 27610 | 252-793-4561x3 | 252-793-5303 |
| Wayne      | Wayne Center, Room 104  
208 West Chestnut Street  
Goldsboro, NC 27530 | 919-734-5281 | 919-736-7089 |
| Watauga    | 971 West King Street  
Boone, NC 28607 | 828-264-3943 | 828-264-3857 |
| Wilkes     | P.O. Box 194  
Federal Building, Room 244  
207 West Main Street  
Wilkesboro, NC 28697 | 336-667-5700 | 336-838-1619 |
| Wilson     | County Agriculture Center  
1806 Goldsboro Street, SW  
Wilson, NC 27893 | 252-237-5147 | 252-243-7713 |
| Yadkin     | P.O. Box 8  
County Office Building  
209 East Elm Street  
Yadkinville, NC 27055 | 336-679-8052 | 336-679-3088 |
| Yancey     | 22 East By-Pass, Suite 1  
Burnsville, NC 28714 | 828-682-2466 | 828-682-5682 |
<table>
<thead>
<tr>
<th>Division Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Archdale Building Headquarters</strong></td>
</tr>
<tr>
<td><strong>Mailing Address:</strong> Soil and Water Conservation, 1614 Mail Service Center, Raleigh, NC 27699-1614</td>
</tr>
<tr>
<td><strong>Location:</strong> 512 North Salisbury Street, Raleigh, NC 27604-1148</td>
</tr>
<tr>
<td><strong>Main Number:</strong> (919) 733-2302 • <strong>Fax:</strong> (919) 715-3559 and/or (919)715-1738</td>
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<thead>
<tr>
<th><strong>Director’s Office</strong></th>
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<tr>
<td><strong>Manly S. Wilder</strong></td>
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<tr>
<td><strong>Lenette Sherwood</strong></td>
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<tr>
<td><strong>Andrew Sleeth</strong></td>
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<td><strong>Theresa Harper</strong></td>
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<td><strong>Greg Taylor</strong></td>
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<tr>
<th><strong>District Programs Section</strong></th>
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<tbody>
<tr>
<td><strong>Lynn Sprague</strong></td>
</tr>
<tr>
<td><strong>Donna Stearns</strong></td>
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<tr>
<th><strong>Area Coordinators</strong></th>
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<tbody>
<tr>
<td><strong>Davis Ferguson</strong></td>
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<tr>
<td><strong>Vacant</strong></td>
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<tr>
<td><strong>Gerald Dorsett</strong></td>
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<td><strong>Steve Bennett</strong></td>
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<td><strong>David Cash</strong></td>
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<tr>
<td><strong>Sandra Weitzel</strong></td>
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<td><strong>Michelle Lovejoy</strong></td>
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<td><strong>Ralston James</strong></td>
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<tr>
<td>Nonpoint Source Programs Section</td>
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<tr>
<td><strong>David B. Williams</strong></td>
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<tr>
<td><strong>Steve Coffey</strong></td>
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<tr>
<td><strong>Natalie Jones</strong></td>
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<td><strong>Julie Henshaw</strong></td>
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<tr>
<td><strong>Teresa Furr</strong></td>
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<tr>
<td><strong>Lisa Fine</strong></td>
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<td><strong>Ken Parks</strong></td>
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<td><strong>Tonyia Neal</strong></td>
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<tr>
<td><strong>Tom Potter</strong></td>
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<tr>
<td><strong>Felicia McClain</strong></td>
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<tr>
<td><strong>Charles Bowden</strong></td>
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<td><strong>Vacant</strong></td>
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<td><strong>Kent Vaughan</strong></td>
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<td><strong>Lee Corum</strong></td>
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<td><strong>Beki Holloway</strong></td>
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<tr>
<td>Jonathan Lanier</td>
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<tr>
<td>Vacant</td>
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<tr>
<td>Janine Owens</td>
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<tr>
<td>Nolan Simon</td>
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<td>Jason Dressen</td>
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**Technical Services Section**

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<thead>
<tr>
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<tbody>
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**Survey Crew**

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<tbody>
<tr>
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**Operation Review Team**

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<tbody>
<tr>
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<tr>
<td><strong>Soil Scientists</strong></td>
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<tr>
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<tr>
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<tr>
<td><strong>Guilford County</strong></td>
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<tr>
<td>Mailing Address:</td>
<td>Soil Survey Office, 3309</td>
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<tr>
<td></td>
<td>Channa Witanachchi</td>
<td>Soil Specialist</td>
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<tr>
<td><strong>Wake County</strong></td>
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<tr>
<td>Mailing Address:</td>
<td>Wake County Office Park, 4001-D Carya Drive, Raleigh, NC 27610-2921</td>
<td>Telephone:</td>
<td>(919) 231-6126 ext. 5 • FAX: (919) 250-1058</td>
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<tr>
<td></td>
<td>Miranda Stamper</td>
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</tr>
<tr>
<td><strong>Asheville DENR Regional Office</strong></td>
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<tr>
<td>2090 US Hwy 70 • Swannanoa, NC 28778</td>
<td>Telephone:</td>
<td>(828) 296-4500 FAX: (828) 299-7043</td>
<td>Courier: 12-59-01</td>
</tr>
<tr>
<td>Davis Ferguson</td>
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</tr>
<tr>
<td>Jeff Young</td>
<td>Environmental Engineer</td>
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<td><a href="mailto:Jeff.Young@ncmail.net">Jeff.Young@ncmail.net</a></td>
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<td></td>
<td><a href="mailto:William.Miller@ncmail.net">William.Miller@ncmail.net</a></td>
</tr>
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</table>
### Fayetteville DENR Regional Office

**Mailing Address:** 225 Green Street, Fayetteville, NC 28301 • Telephone: (910) 486-1541 FAX: (910) 486-0707 • Courier: 14-56-25

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Email</th>
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<tbody>
<tr>
<td>Michelle Lovejoy</td>
<td>Area Coordinator</td>
<td><a href="mailto:Michelle.Lovejoy@ncmail.net">Michelle.Lovejoy@ncmail.net</a></td>
</tr>
<tr>
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### Mooresville DENR Regional Office

**Mailing Address:** P. O. Box 950, Mooresville, NC 28115 • Telephone: (704) 663-1699 FAX: (704) 663-6040 • Courier: 09-08-06

<table>
<thead>
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<tbody>
<tr>
<td>Vacant</td>
<td>Area Coordinator</td>
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<tr>
<td>Ralston James</td>
<td>Area Coordinator</td>
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<tr>
<td>Rocky Durham</td>
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### Raleigh DENR Regional Office

**Mailing Address:** 1628 Mail Service Center, Raleigh, NC 27699-1628 • Telephone: (919) 791-4200 FAX: (919) 571-4718 • Courier: 52-01-00

<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Steve Bennett</td>
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<tr>
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</tr>
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### Washington DENR Regional Office

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<table>
<thead>
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<tbody>
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**Wilmington DENR Regional Office**

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**Winston-Salem DENR Regional Office**

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</table>
NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
CLOSURE OF WASTE IMPOUNDMENTS

(Number)

Code 360

DEFINITION
The closure of waste impoundments (treatment lagoons and waste storage ponds), that are no longer used for their intended purpose, in an environmentally safe manner.

PURPOSE
This practice may be applied as part of a conservation management system to support one or more of the following purposes.

• To protect the quality of surface water and groundwater resources;
• To eliminate a safety hazard for humans and livestock;
• To safeguard the public health.

CONDITIONS WHERE PRACTICE APPLIES
This practice applies to animal Waste Treatment Lagoons and Waste Storage Ponds (Impoundments) that are no longer used for their original intended purpose.

CRITERIA
Objective
The objective is to remove waste materials to the maximum extent practicable from a lagoon/structure prior to closure.

Water Quality Testing
No special water quality testing will be required, unless the waste impoundment is a candidate for the Alternate Method of Closure.

All sludge will be removed as determined by visual inspection.

Removal of Inflow Devices
All devices used to convey animal waste into the lagoon or storage pond shall be removed.

Spillways
All abandoned impoundments that are not breached or filled that have an embankment of 3 feet or more, shall have a principal spillway and an emergency spillway installed that meets the requirements of the Pond Conservation Practice Standard (Code 378).

Excavated Pits
For excavated pits that were previously used for waste treatment lagoons or waste storage ponds that are to be closed, all reasonable efforts must be made to agitate and remove all waste materials. If the bottom of the lagoon/structure is above the water table at the time of closure and will support earth-moving equipment, it must be scraped. A qualified technical specialist must determine the soil stability for earth moving equipment. For lagoons/structures that are not to be scraped and those with bottoms documented to be below the water table at the time of closure, the depth of "agitated" waste material remaining in the lagoon/structure at the time of closure may not exceed a maximum depth of one (1) foot.

The wastewater will be analyzed and land applied in accordance with the requirements of the Waste Utilization Conservation Practice Standard (Code 633).

Once all sludge is removed, the owner has the option of using the structure as a fresh water pond, or the pit may be filled.

Embarkment Structures
If a lagoon/structure is to be breached, the liquid must be pumped out and the remaining waste material scraped. Reasonable efforts must be made to remove all waste materials prior to closure.

For impoundments not to be breached, reasonable efforts must be made to agitate and

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.
remove all waste materials. If the bottom of the lagoon/structure is above the water table at the time of closure and will support earth-moving equipment, it must be scraped. A qualified technical specialist must determine the soil stability for earth moving equipment. For impoundments that are not to be scraped and those with bottoms documented to be below the water table at the time of closure, the depth of “agitated” waste remaining in the impoundment may not exceed a maximum depth of one (1) foot.

The waste water will be analyzed and applied to crops at agronomic rates based on Realistic Yield Expectation (RYE) in accordance with the Nutrient Management Conservation Practice Standard (Code 590).

If intended for use as a fresh water pond, the requirements under the “Spillways” section of this standard shall be met.

The embankment may be:
1) breached so that it will no longer impound liquid, or
2) be left intact and allowed to fill with fresh water for use as a fresh water pond.

If the embankment is breached, the slopes and bottom of the breach shall be stable for the soil material involved, but the side slopes shall be no steeper than 3:1.

**Alternate Method of Closure:**

There are existing impoundments that may be closed by the following alternate method. This alternative closure process consists of vacuum dredging the sludge and leaving the liquid.

Impoundments which have a liquid waste analysis of more than 40 parts per million of total N before sludge removal can not be closed by this alternate method.

Locations on the lagoon bottom where sludge is 0.2 foot or greater must be dredged. Where the sludge is less than 0.2 foot in depth, dredging is not required.

Sludge must be removed to the fullest extent practical on the slopes, but in no case shall there be more than 0.2 ft. of sludge in the bottom when finished.

The impoundment must be converted to a fresh water pond. Spillways, if required under this standard, must meet the requirements of the Pond Conservation Practice Standard (Code 378).

**Required documentation for the above criteria include:**

1. A liquid waste analysis performed by the NCDA&CS or other accredited lab. The sample shall be taken by Division of Soil and Water Conservation (DSWC) staff, Division of Water Quality (DWQ) staff, or NRCS staff with a WUP designation as a technical specialist.

2. A survey of the lagoon showing the bottom elevation and depth of sludge before and after dredging using a “sludge judge” or other measuring device made for this purpose, on a 25 foot grid, or closer, if needed to show true size and volume of sludge. The survey and volume computations shall be signed by a technical specialist with the SD or SI designation.

3. A representative from DWQ, DSWC, or an NRCS Engineer or Civil Engineering Technician must verify that the sludge has been satisfactorily removed.

Lagoons which have a liquid waste analysis of more than 40 parts per million of total N before sludge removal can not be closed by this alternate method.

**Vegetation**

All disturbed areas shall be vegetated and maintained in accordance with the Critical Area Treatment Technical Guide Standard (Code 342).

**CONSIDERATIONS**

The proper removal of organics and nutrients and prevention of pollutant discharges to surface waters is the responsibility of the owner.

NRCS, NC
March 2002
PLANS AND SPECIFICATIONS

Plans and specifications for closure of abandoned waste treatment lagoons and waste storage ponds shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

If the waste facility being converted to a fresh water pond is required to meet the Pond Conservation Practice Standard (Code 378), the plans and specifications will also be in keeping with the requirements of that standard.

OPERATION AND MAINTENANCE

A properly decommissioned waste impoundment should require little or no operation and maintenance; however, if it has been converted to another use, such as a fresh water pond, operation and maintenance will be in accordance with the needs as set forth in the Pond Conservation Practice Standard (Code 378).
General Information:
Name of Farm: ____________________________ Facility No:______ - _________
Owner(s) Name: ____________________________
Mailing Address: ____________________________ Phone No: ____________________________
County: ____________________________

Operation Description (remaining animals only):
□ Please check this box if there will be no animals on this farm after lagoon closure. If there will still be animals on the site after lagoon closure, please provide the following information on the animals that will remain.

Operation Description:

<table>
<thead>
<tr>
<th>Type of Swine</th>
<th>No. of Animals</th>
<th>Type of Poultry</th>
<th>No. of Animals</th>
<th>Type of Dairy</th>
<th>No. of Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wean to Feeder</td>
<td></td>
<td>Layer</td>
<td></td>
<td>Milking</td>
<td></td>
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<tr>
<td>Feeder to Finish</td>
<td></td>
<td>Non-Layer</td>
<td></td>
<td>Dry</td>
<td></td>
</tr>
<tr>
<td>Farrow to Wean</td>
<td></td>
<td>Type of Beef</td>
<td>No. of Animals</td>
<td>Heifers</td>
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<tr>
<td>Farrow to Feeder</td>
<td></td>
<td>Brood</td>
<td></td>
<td>Calves</td>
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<tr>
<td>Farrow to Finish</td>
<td></td>
<td>Feeder</td>
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</tr>
<tr>
<td>Gilts</td>
<td></td>
<td>Stockers</td>
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</tr>
</tbody>
</table>
| Boars          |                | Other Type of Livestock: ______________ Number of Animals: ______________

Will the farm maintain a number of animals greater than the 2H .0217 threshold?  Yes □  No □
Will other lagoons be in operation at this farm after this one closes?  Yes □  No □
How many lagoons are left in use on this farm?: ______________

(Name) ____________________________ of the Water Quality Section's staff in the Division of Water Quality's ______________ Regional Office (see map on back) was contacted on ______________ (date) for notification of the pending closure of this pond or lagoon. This notification was at least 24 hours prior to the start of closure, which began on ______________ (date).

I verify that the above information is correct and complete. I have followed a closure plan, which meets all NRCS specifications and criteria. I realize that I will be subject to enforcement action per Article 21 of the North Carolina General Statutes if I fail to properly close out the lagoon.

Name of Land Owner (Please Print):
Signature: ____________________________ Date: ____________________________

The facility has followed a closure plan which meets all requirements set forth in the NRCS Technical Guide Standard 360. The following items were completed by the owner and verified by me: all waste liquids and sludges have been removed and land applied at agronomic rate, all input pipes have been removed, all slopes have been stabilized as necessary, and vegetation established on all disturbed areas.

Name of Technical Specialist (Please Print): ____________________________
Affiliation: ____________________________
Address (Agency): ____________________________ Phone No.: ____________________________
Signature: ____________________________ Date: ____________________________

Return within 15 days following completion of animal water storage pond or lagoon closure to:
N. C. Division Of Water Quality
Animal Feeding Operations Unit
1636 Mail Service Center
Raleigh, NC 27699-1636

PLC - 1 March 18, 2002
PLAN OF ACTION (POA) FOR LAGOON SLUDGE REDUCTION

Facility Number: ____________________________  County: ____________________________

Facility Name: ________________________________________________________________

Certified Operator Name: ____________________________  Operator #: ____________________________

Note: A certified Sludge Management Plan may be submitted in lieu of this POA.

<table>
<thead>
<tr>
<th></th>
<th>Lagoon 1</th>
<th>Lagoon 2</th>
<th>Lagoon 3</th>
<th>Lagoon 4</th>
<th>Lagoon 5</th>
<th>Lagoon 6</th>
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</thead>
<tbody>
<tr>
<td>a. Lagoon Name/ Identifier</td>
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<td>b. Total Sludge Depth (ft)</td>
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<td>c. Sludge Depth to be</td>
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<td>Removed for Compliance</td>
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<td>d. Sludge Volume to be</td>
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<td>Removed (gallons)</td>
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<td>e. Sludge PAN</td>
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<td>f. Liquid PAN</td>
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<td>(lbs/1000 gal)</td>
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<tr>
<td>g. PAN of Sludge (lbs)</td>
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<tr>
<td>(d x e)/1000</td>
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</tbody>
</table>

Compliance Timeframes:

If the sludge level is equal to or higher than the stop pump level of the lagoon or if the sludge level results in an elevated waste analysis, a sludge management plan that meets the requirements of SB Interagency Group Guidance Document 1.26 must be prepared by a technical specialist and submitted to DWQ within 180 days. Work to reduce the sludge level must begin within another 180 days. Compliance with NRCS Standard 359 must be achieved by the expiration date of the current permit, July 1, 2007.

If the sludge level is non-compliant, but below the stop pump level of the lagoon, compliance with NRCS Standard 359 must be achieved by the expiration date of the current permit, July 1, 2007. If future sludge surveys do not show improvement in sludge levels, DWQ may require the owner to develop a sludge management plan that meets the requirements of SB Interagency Group Guidance Document 1.26.

SPOA 5-18-04
NARRATIVE: Use this section to describe the method(s) that will be used to lower the sludge depth. If microbe use is planned, specify the product to be used.

I hereby certify that I have reviewed the information listed above and included within the attached Plan of Action, and to the best of my knowledge and ability, the information is accurate and correct.

_________________________________          Phone: ________________________________

Facility Owner/Manager (print)

_________________________________

Facility Owner/Manager (signature)

Date: ________________________________

Return this form to:

Keith Larick
Animal Feeding Operations Unit
NC Division of Water Quality
1636 Mail Service Center
Raleigh, NC 27699-1636
Sludge Survey Methods for Anaerobic Lagoons

Sludge accumulates in anaerobic lagoons and consists of organic and non-organic material. Lagoon design includes consideration of sludge accumulation, and lagoon management should include periodic measurement of sludge accumulation and removal of sludge when accumulation is excessive. The Natural Resource Conservation Service (NRCS) has a practice standard for lagoon management (Code 359) that requires an annual sludge survey after five years of lagoon operation, and the N. C. Division of Water Quality (DWQ) issues many permits that require annual sludge surveys. This document discusses sludge depth measurement, volume determination, and sampling. This document supplements publication AG 604 Sludge Management & Closure Procedures for Anaerobic Lagoons.

Requirements for Sludge Surveys

NRCS Conservation Practice Standard for Waste Treatment Lagoons (Code 359) requires proper operation and maintenance of lagoons. Specifically the Standard states: After five years the waste treatment lagoon shall be checked for sludge accumulation and annually thereafter. If sludge has encroached into the treatment volume, the sludge will be removed and applied at agronomic rates based on analysis of the sludge. Treatment volume must have a minimum of 4 feet of depth free of sludge at all times.

Many permits for animal facilities issued by DWQ require an annual survey of sludge accumulation in lagoons within one year of receiving the individual permit or Certificate of Coverage (COC), and every year thereafter. The survey frequency may be reduced if it can be demonstrated to the satisfaction of DWQ that the rate of sludge accumulation does not warrant an annual survey. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. If the sludge accumulation is such that it is greater than the sludge volume for which the lagoon was designed or reduces the lagoon’s minimum treatment volume to less than the volume for which the lagoon was designed, a plan must be submitted to the DWQ Central Office within ninety (90) days of this determination that documents removal and waste utilization procedures to be used.

For proper management of anaerobic lagoons, a sludge survey should be conducted periodically regardless of whether or not the farm is required to do so by a permit issued by DWQ.

Sludge Characteristics

Two distinctly different zones are found within an anaerobic lagoon. First is the sludge accumulation zone at the bottom of the lagoon (Figure 1, “Sludge Accumulation”). The sludge is composed of settled manure solids, non-organic constituents of manure, active and dead microbial cells, and other materials (debris, sand, etc.) that got into the manure collection system and have settled to the bottom. Sludge is black, moderately viscous,
typically about 10 % solids (90 % liquid), and high in nutrients, bacteria, and organic matter. Biological anaerobic degradation activity occurs in the sludge as can be evidenced by biogas periodically floating sludge to the liquid surface. Sludge can be handled by pumps designed for higher solids applications, i.e. 10 – 15 % solids. Refer to AG 604 publication for sludge removal options.

The second distinct zone in the lagoon is the liquid layer above the sludge (Figure 1). This liquid, typically called lagoon supernatant or effluent, is low in solids (generally 0.3 to 0.6 % solids), moderately rich in nutrients, and easily pumped with irrigation pumps. If the liquid and sludge are mixed, the solids content will probably be between 2 % and 8 % solids, depending on the proportion of sludge.

### Conducting a Sludge Survey

A sludge survey requires that the location of the top of the sludge layer and the thickness of the sludge layer be determined at a number of locations in a lagoon. Recommended steps for conducting a survey are listed in Appendix 1, and recommended methods for measuring sludge layer thickness are listed in Appendix 2. From the measurements, the thickness of the sludge layer and the thickness of the Permanent Liquid Treatment Zone (distance from the Minimum Liquid Level (Figure 1) to the top of the sludge layer) can be determined (Appendix 3), and the volume of sludge can be estimated (Appendix 5). Appendix 4 has a Sludge Survey Data Sheet for recording measurements at each point of the survey grid. Appendix 6 is conversion table from feet and inches to feet in tenths.
For planning purposes, samples of the sludge or “cores” of the liquid column and sludge may be taken at the same time as the survey and sent for nutrient analyses.

Unless “remote” methods are developed, the sludge survey and sampling must be conducted from a boat on the lagoon. Special care should be taken when going onto a lagoon in a boat. For safety reasons, at least three people should be present: two in the boat and one on the lagoon bank. The extra person on the boat assists with getting in and out of the boat and anchoring the boat at the measurement locations, and the extra person(s) on shore may be needed as a rescuer(s), should anything go awry. Also, it is more efficient if one person in the boat is using the measuring instruments and the other is recording the data. Flat-bottom or “Jon boats” are preferred over canoes or V-bottom boats. All persons working within the inner slopes of the lagoon, and especially those in the boat, should wear appropriate flotation devices.

The sludge layer is generally a “mobile” fluid but may form peaks and valleys within the lagoon. Small (usually older) lagoons seem to have more variation in sludge layer thickness. For this reason, at least 8 depth measurements should be taken for a lagoon less than 1.33 acre in area, and at least 6 measurements per acre for lagoons with area equal to or greater than 1.33 acre, up to a maximum of 24 points. The locations for measurements should be determined by a uniform grid if possible. Avoid taking measurements on the slope of the lagoon embankments. For example, if a lagoon is 12 ft. deep and the side slope is 3:1 (horizontal to vertical), then the slope extends for 36 ft. into the lagoon. In this case, the measurements should be more than 36 ft. from inside top of the lagoon embankment. All the measurements from the various locations on the grid are averaged to get an average sludge layer thickness and to calculate the volume of sludge.

Taking a Sludge Sample

Samples of the sludge, or “cores” of the lagoon liquid and sludge may be taken at the time of the lagoon survey, or when it is determined that sludge should be removed. Samples should be taken directly from the lagoon for planning purposes. When sampling in the lagoon, several locations should be sampled, and then composited into one sample for laboratory analysis.

How the sample is collected depends on how the sludge will be removed. If the sludge will be “dredged” with minimal inclusion of lagoon liquid, then a “grab sampler” such as the Ekman Bottom Grab Sampler (available from various sources such as Wildlife Supply Co. (http://www.wildco.com/bottom.htm)) may be used. If the lagoon will be agitated to mix lagoon liquid and sludge, a “core” of the liquid and sludge should be taken. A Sludge Judge® (available from various sources such as www.pollardwater.com or www.wildco.com) with a clear plastic tube and “float valve” at bottom does not work well for obtaining complete cores in animal waste lagoons because the sludge does not freely flow through the valve, and the valve may not seal well due to high solids content. However, a Sludge Judge® can obtain the liquid column and a portion of the sludge that can be analyzed for nutrients. A larger PVC pipe of 1.5 inch diameter with a ball valve at the bottom with a handle operated by a rope can be used to take a core, but it typically
does not reflect accurate sludge zone thickness because of compression. The larger
diameter pipe is difficult to manage because the pipe must be longer than the lagoon
depth (liquid surface to lagoon soil bottom) and thus will typically be more than 10 ft.
long and heavy. Constructing a pipe with 4 ft. to 5 ft. sections will make it easier to
transport between lagoons and to store. To obtain a sample, open the valve and vertically
insert the pipe into the lagoon slowly until it reaches the bottom, and then pull the rope to
close the valve. Pull the pipe upward out of the lagoon. This will capture a core or
profile of lagoon effluent and sludge, but maybe not the entire core. Empty the contents
of the pipe into a clean 5-gallon bucket by opening the ball valve. If the entire lagoon is
going to be agitated during sludge removal, the entire core of collected sludge and
effluent should be sent to the laboratory. If the lagoon effluent is going to be drawn
down and primarily only sludge pumped out, then just the collected sludge should be sent
to the lab. If you are unsure on how the sludge will be removed, take samples using both
methods, label them separately, and have them analyzed.

Place several samples in the bucket and mix thoroughly before removing a sub-sample
for analysis. Consider using a plastic, wide-mouth bottle when shipping samples to the
laboratory. For more information on preparing samples, consult:

- *Sludge Management & Closure Procedures for Anaerobic Lagoons* (AG 604)
- Chapter 4, “Tools for the Plan,” of the *Certification Training Manual for
  Operators of Animal Waste Management Systems*
Appendix 1. Steps for Conducting Sludge Survey

1. Gather necessary equipment (boat, life jackets, paddles, anchor, map or sketch of lagoon, clipboard and pencils, sludge detection device (such as infrared detector or disk on rope with interval markings (See Appendix 2)) to determine the top of the sludge layer, and solid rod or pole with interval markings to determine depth to lagoon bottom. A 12 ft. “Jon boat” with trolling motor and two people in the boat are recommended.

2. Determine the number of sample points to be measured. Recommendation is to determine sludge at a minimum of 6 points per acre on a uniform grid up to 24 points maximum, or minimum of 8 points if lagoon is less than 1.33 acre. If unsure of lagoon area, measure length times width at inside top of bank, and divide by 43,560 to get acres (1 acre = 43,560 ft²). Multiply number of acres by 6, and round to nearest number that gives a uniform grid, with minimum of 8 points for lagoons of less than 1.33 acre area. Once the number of sample points has been determined, set up a uniform grid on the lagoon sketch to show the location of those points. For a one-acre lagoon twice as long as wide, 8 locations would be on a grid of about 60 ft. by 50 ft. (See Figure 2). This sketch must be attached to the Sludge Survey Data Sheet.

3. Mark on the lagoon bank with survey flags or possibly other landmarks (inlet pipe, power pole, confinement house, etc.) the lines corresponding to the grid developed in item #2.

4. Prepare data sheets and forms to record information (see “Lagoon Sludge Survey Form” (Appendix 3) and “Sludge Survey Data Sheet” (Appendix 4) for recording information).
5. Launch boat and move to first sample point. Measure the depth to the top of the sludge from the liquid surface. Record this depth. Insert pole vertically at the same location until lagoon bottom (soil contact) is felt. Record this depth. The sludge thickness is the difference between the 2 readings. If measurements are taken in feet/inches, convert to feet/tenths using conversions in Appendix 6.

6. Proceed to all other sample points and record measurements as in item #5 above.

7. To determine average sludge layer thickness in the lagoon, add all sludge layer thickness determinations and divide by the number of readings taken. This average sludge layer thickness can be used in the Sludge Volume Worksheet (Appendix 5) to determine how much sludge volume is in the lagoon if it is rectangular shaped with uniform side slopes. If the lagoon is an irregular shape, the sludge volume can be estimated by using the total surface area in square feet and taking the square root to obtain the dimensions for a square lagoon, and then use the same procedure as in Appendix 5.

8. For each survey, the present liquid level should also be referenced to a permanent elevation or benchmark and the Maximum Liquid Level on the lagoon gage. Then, by knowing or measuring the difference in elevation between the Maximum Liquid Level and the Minimum Liquid Level on the lagoon gages, the difference between the Minimum Liquid Level and the top of the sludge layer can be calculated. This is considered the Permanent Liquid Treatment Zone. This should be a minimum of 4 ft. in thickness based on NRCS standards. For example, if the total depth from liquid surface to bottom is 8 ft., the liquid level is 1 ft. above the Minimum Liquid Level on the lagoon plan or lagoon gage, and the sludge layer surface is 5.5 ft. below the liquid surface (or 2.5 ft. sludge layer thickness), then the amount of depth in the Permanent Treatment Zone is 5.5 ft. – 1 ft. = 4.5 ft. (or 8 ft. - 1 ft. - 2.5 ft. = 4.5 ft.). (This is calculated and recorded on Lagoon Sludge Survey Form, Appendix 3.)
Appendix 2. Recommendations for Measuring Sludge Layer Thickness

**Basic Approach** -- Measure the depth from the liquid surface to the top of the sludge layer, and then measure the depth from the liquid surface to the lagoon bottom (soil contact), and calculate the difference to obtain the thickness of the sludge layer.

**Depth to Top of Sludge** -- Various methods can be used to measure depth from liquid surface to the top of the sludge layer. Although some publications have recommended a capped pipe, a pipe with disk attached to bottom, or a tee at bottom to detect the sludge layer by “feel” of resistance from the sludge, these “feel” methods are likely to yield variable and inaccurate results. Although the sludge is more viscous than the lagoon liquid, it is still difficult to “feel” when sludge is first encountered. Therefore, “feel” methods are not recommended. Alternative methods that have proven to be better than “feel” methods include commercially available infrared sensors, disk-on-rope, and clear plastic pipe (such as the Sludge Judge®) for obtaining liquid column, and a method that may be adequate is an electronic sonar depth finder.

**Infrared Sensors** -- Depth from the liquid surface to top of the sludge layer can be measured reliably in most lagoons with infrared detectors (Markland Engineering Sludge Gun¹ or Raven Sludge Detector²). The infrared detectors indicate when the sludge layer is reached by emitting an audible sound (Sludge Gun) or by “peaking” the meter dial (Raven Sludge Detector). Because of the audible sound from the Sludge Gun, it is easier to use than the Raven Sludge Detector. The “sensitivity” of the detectors can be adjusted, but in a few lagoons with high solids content in the liquid, the detectors might “alarm” as soon as the sensor is put into the liquid. If this occurs, then an alternative method may be needed to detect the top of the sludge layer. The infrared detectors cost between $400 and $900.

**Disk-on-Rope** -- A much cheaper but somewhat more time consuming method to determine the top of the sludge layer is with a disk or plate that sinks through the liquid and settles on the sludge layer. When done carefully, this method generally agrees within 1” of the Infrared Detectors. A PVC disk (specific gravity = 1.4) ¼ in. thick and about 8 to 12 inches diameter or of square shape has shown results consistent with the infrared detectors. The size (area) of the disk should make little difference, because the pressure exerted on the sludge is constant per unit area. Disks of Lexan (s.g. = 1.2) gave similar results. Materials that are heavier than PVC would exert more pressure and perhaps penetrate into the sludge. The wire, rope or string by which the infrared detectors or disks are lowered into the lagoon should be marked in inches or tenths of feet for easy reading, and should not be elastic such that stretching causes variation in lengths between markings. The disk should be lowered slowly to keep it from “swaying” off vertical line. Holes drilled in the disk to allow liquid through may reduce “swaying” somewhat. The rope or string can be attached to the disk at the center or at 2 to 4 locations symmetrically on the disk to keep it more stable. The depth to the sludge layer should be measured first with the disk before using a pole for measuring depth to lagoon bottom, because the pole may disturb the sludge layer.
Sludge Judge® or Clear Plastic Pipe -- Another method that is considered slightly less accurate for determining the top of the sludge layer is to use a Sludge Judge® or similar clear plastic pipe with valve at bottom. This method can agree within 1” to 3” of the infrared and disk methods if done carefully. Typically, the sludge does not flow freely into the pipe and indicates slightly less depth to the sludge than actual. Observe the liquid level inside the pipe as the Sludge Judge® is slowly lowered into the lagoon. When the sludge layer is reached, the liquid level inside the pipe will drop slightly below the liquid level outside the pipe. Then, the Sludge Judge® can be removed and the depth of the liquid column down to the sludge can be observed (there will typically be at least 1 in. to 2 in. of sludge at bottom end of pipe to ensure that the sludge layer has been reached). The Sludge Judge® can be ordered with ¾ in. or 1¼ in. outside diameter. For a self made apparatus, a ball valve with handle (operated by a rope) can be put at the bottom section of a clear plastic pipe. The pipe can be constructed from sections that can be disassembled for transport. The pipe can be larger, such as 2 in. diameter, but will be heavy to handle when collecting liquid and sludge. Either the Sludge Judge® or a self-made pipe can be used to get a sludge sample for analysis, but experience shows that penetrating the sludge layer with an open pipe does not yield accurate thickness estimates of the sludge layer, probably because of sludge compression or clogging of the pipe.

Electronic Sonar Depth Finder -- Another method that may be adequate to determine sludge layer depth is the depth finder that is available for boaters and fishermen. A future scenario is to have a sensor that could be floated on the lagoon without having to get on the lagoon in a boat, and even possible GPS connection to record locations. Some investigation with one depth finder unit and two different cone angle transducers attached to a float alongside a boat has been conducted with promising results, but more investigation and verification is needed before making specific recommendations as to unit specifications.

Fish finders and depth finders, which utilize sonar (Sound, Navigation and Ranging) technology transmit a high frequency signal from an antenna (called a transducer) and measure the time that it takes the signal to be reflected back to the transducer. The receiver then calculates the distance based on the time delay between the transmitted and reflected signals and the speed at which the signal travels in water (approximately 4800 feet per second).

An experienced operator can obtain good results with a properly selected sonar unit. A suitable unit will cost between $120 and $200 but if additional features are desired the cost may be considerably more. Some of the important considerations for selecting a sonar unit are:

Transmitter Power – higher power increases the likelihood that a signal will be reflected back to the transducer in lagoons with high solids content

Transducer – narrow cone angles concentrate the signal into a smaller area and are preferable
Receiver – manually adjustable controls such as sensitivity are important to reduce false readings, especially in lagoons with high solids content.

Display – a graphic (picture) display with high resolution and good contrast is less likely than a digital display to produce false readings.

Measurement considerations:
1. The relative location of the transducer to the surface of lagoon liquid should be recorded and the liquid level in the lagoon referenced to a fixed elevation (such as the start/stop pumping marker).

2. For the initial survey, a permanent grid should be determined and the lagoon bottom elevation should be measured with a pole or other method and recorded for each point on the grid.

3. The sonar transducer is best mounted on a float independent of the boat so that it remains at a constant relative location to the liquid surface (i.e. it doesn't move up and down with a rocking boat). The distance from the transducer to the liquid surface should be recorded and added to the depth measurement if necessary.

4. Adjust the sensitivity to the lowest possible setting and turn off the fish identification feature, if the unit is so equipped, to reduce the interference from suspended solids.

5. Record the depth to the top of the sludge at each reference point.

**Depth to Bottom of Lagoon** -- After the depth to the sludge layer is measured, measure depth from liquid surface to lagoon bottom at the same location. Use a ½ in. to 1 in. diameter pole of wood, PVC with end cap, or aluminum marked off in inches or tenths of feet. Push the pole through the sludge until the bottom (soil) is reached. The pole should be held vertically and not be pushed into the soil, but just make contact. The marked readings should be zero at the end inserted into the lagoon, so that the distance from the lagoon bottom to the liquid surface can be read directly. Poles may be constructed with sections that can be joined together, such as 4 ft. lengths of PVC with joints, but the sections should always be assembled the same so that the depth indicators are accurate.

---

1 Sludge Gun Model 10 from Markland Specialty Engineering LTD of Toronto, Canada has price including shipment of $875 with 10 meter cable marked in feet. Phone (416) 244-4980; Email: markland@sludgecontrols.com  WEB: www.sludgecontrols.com  Makes audible sound when sludge layer is detected.

2 Raven Sludge Detector by Raven Environmental Products can be ordered from USA BlueBook (item # 41424). Phone 1-800-548-1234. Price about $450. Meter dial pointer “peaks” when sludge layer is detected.
3 Sludge Judge® information can be found at [www.pollardwater.com](http://www.pollardwater.com) (3 types with prices of about $60 to $90 for 15 ft. length in 3 5-ft. sections) (phone 1-800-437-1146) or [www.wildco.com](http://www.wildco.com) (1 type with price about $70 for 15 ft. length) (phone 1-800-799-8301).

4 The sonar method should only be used by individuals who have experience with equipment set-up and operation. In addition, the operation of any equipment should be verified under lagoon conditions prior to use in this application.

Disclaimer: The use of trade or brand names in this publication does not imply endorsement of products mentioned or criticism of similar products not mentioned.
Appendix 3. **Lagoon Sludge Survey Form**

A. Farm Permit or DWQ Identification Number

B. Lagoon Identification

C. Person(s) taking Measurements

D. Date of Measurements

E. Methods/Devices Used for Measurement of:
   a. Distance from the lagoon liquid surface to the top of the sludge layer:
   
   b. Distance from the lagoon liquid surface to the bottom (soil) of lagoon:
   
   c. Thickness of the sludge layer if making a direct measurement with “core sampler”:
   
F. Lagoon Surface Area (using dimensions at inside top of bank): __________ (acres)
   (Draw sketch of lagoon on a separate sheet and list dimensions, and calculate surface area.)

G. Estimate number of sampling points:
   a. Less than 1.33 acre: Use 8 points
   b. If more than 1.33 acre, ____ acres x 6 = ______, with maximum of 24.
   (Using sketch and dimensions, develop a uniform “grid” that has number of intersection points that match most closely with the estimated number of sampling points needed. Number the grid intersection points on the lagoon grid to correspond with the data to be recorded for points of measurement.)

H. Conduct sludge survey and record data on “Sludge Survey Data Sheet”.

I. At time of sludge survey, also measure the distance from the Maximum Liquid Level to the Present Liquid Level (measure at the lagoon gage pole):

J. Determine distance from Maximum Liquid Level to Minimum Liquid Level:
   (Determine from Plan or other lagoon records)

K. Calculate distance from present liquid surface level to Minimum Liquid level: **Item J – Item I**, assuming present liquid level is below Max. Liq. Level:

L. Record from sludge survey data sheet the distance from the present liquid surface level to the lagoon bottom (average for all the measurement points):

M. Record from sludge survey data sheet the distance from the present liquid surface level to the top of the sludge layer (average for all the measurement points):

N. Record from sludge survey data sheet the average thickness of the sludge layer:

O. Calculate the thickness of the existing Liquid Treatment Zone (**Item M – Item K**):
   (Note: If Item O is less than 4 ft., a sludge removal and utilization plan may be required by N. C. DWQ. See your specific permit or contact DWQ for more information.)

P. Proceed to Sludge Volume Worksheet if desire to calculate sludge volume for rectangular shaped lagoon with uniform side slope.

Completed by:) _______________________  ____________________________ Date: _____________

  Print Name   Signature
Appendix 4.  **Sludge Survey Data Sheet**

**Sludge Survey Data Sheet**

<table>
<thead>
<tr>
<th>Grid Point No.</th>
<th>Distance from liquid surface to top of sludge (Ft. &amp; inches, Feet (tenths))</th>
<th>Distance from liquid surface to lagoon bottom (soil) (Ft. &amp; inches, Feet (tenths))</th>
<th>Thickness of sludge layer (Ft. &amp; inches, Feet (tenths))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
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<td></td>
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<td>4</td>
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<tr>
<td>5</td>
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<td>6</td>
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<td>7</td>
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<td></td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12</td>
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<td></td>
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<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All Grid Points and corresponding sludge layer thickness must be shown on a sketch attached to this Sludge Survey Data Sheet.*

See Appendix 6 for conversion from inches to tenths of feet.
Appendix 5. **Sludge Volume Worksheet.**

The average thickness of the sludge layer is determined from the Lagoon Sludge Survey Form. In this example, the average sludge layer thickness is 2.5 ft. The dimensions of the lagoon and the side slope are needed for calculations. If the lagoon is a standard geometric shape, the volume of sludge in the lagoon can then be estimated by using standard equations. For rectangular lagoons and constant side slope, calculate length and width at midpoint of sludge layer, and multiply by sludge layer thickness to calculate sludge layer volume as shown in the example. If the lagoon is an irregular shape, the sludge volume can be estimated by using the total surface area in square feet and taking the square root to obtain the dimensions for a square lagoon, and then use the same procedure as listed below.

<table>
<thead>
<tr>
<th></th>
<th>Example</th>
<th>Your lagoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Average Sludge Layer Thickness (T)</td>
<td>2.5 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>B. Depth of lagoon from top of bank to bottom soil surface (D)</td>
<td>11 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>C. Slope = horizontal/vertical side slope (S)</td>
<td>3</td>
<td>____________</td>
</tr>
<tr>
<td>D. Length at top inside bank (L)</td>
<td>457 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>E. Width at top inside bank (W)</td>
<td>229 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>F. Length at midpoint of sludge layer (L_m = L - 2S(D - (T/2)))</td>
<td>398.5 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>G. Width at midpoint of sludge layer (W_m = W - 2S(D - (T/2)))</td>
<td>170.5 ft.</td>
<td>____________</td>
</tr>
<tr>
<td>H. Volume of sludge (V): (V = L_m W_m T)</td>
<td>169,860 ft³</td>
<td>____________</td>
</tr>
<tr>
<td>I. Volume in gallons: (V_g = V * 7.5) gal./ft³.</td>
<td>1,273,950 gal.</td>
<td>____________</td>
</tr>
</tbody>
</table>
Appendix 6. **Conversion Table From Inches to Tenths of Feet.**

<table>
<thead>
<tr>
<th>Inches</th>
<th>Tenths of feet</th>
<th>Inches</th>
<th>Tenths of feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1</td>
<td>7</td>
<td>0.6</td>
</tr>
<tr>
<td>2</td>
<td>0.2</td>
<td>8</td>
<td>0.7</td>
</tr>
<tr>
<td>3</td>
<td>0.2</td>
<td>9</td>
<td>0.7</td>
</tr>
<tr>
<td>4</td>
<td>0.3</td>
<td>10</td>
<td>0.8</td>
</tr>
<tr>
<td>5</td>
<td>0.4</td>
<td>11</td>
<td>0.9</td>
</tr>
<tr>
<td>6</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Prepared by

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Karl A. Shaffer, Extension Associate, Department of Soil Science, North Carolina State University, Raleigh, NC

J. Mark Rice, Extension Specialist, Biological and Agricultural Engineering, North Carolina State University, Raleigh, NC

This publication is intended to supplement Sludge Management & Closure Procedures for Anaerobic Lagoons (AG-604), prepared by Ronald E. Sheffield, James C. Barker, and Karl A. Shaffer (May 2000). The focus of this publication is on sludge survey methods and reporting. Some of the material in this publication is adapted from AG 604.

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Sludge is a natural byproduct of anaerobic biological digestion. This dead microbial material, which accumulates over many years in the bottom of anaerobic lagoons and is rich in nutrients and organic matter, periodically must be removed from the lagoon. Typically, it is land-applied to crops. Improperly managing the sludge volume in a lagoon will result in higher concentrations of nitrogen in lagoon effluent, a faster rate of sludge buildup, and a greater potential for odors from the lagoon surface. This document discusses several options for removing sludge from anaerobic lagoons. It also outlines the procedures that should be followed to properly “close” a lagoon or take it out of service.

Sludge (also known as biosolids or residuals) is a thick, black, viscous substance that is rich in organic material and nutrients. It is comprised of the dead and degraded microbial cells that anaerobically digested the manure influent and of any other materials (excess feed, debris, rocks, etc.) that were placed in the manure collection system and have settled to the bottom of the lagoon.

Over 10 to 15 years in the life of a lagoon, the volume of sludge will accumulate until it reaches a level at which it should be removed. At this point, it is typically taken from the lagoon and land-applied. Table 1 lists the volume units of sludge that can be expected to accumulate in anaerobic lagoons on various types of farms. If the amount of sludge becomes too large, the Permanent Liquid Treatment volume (Figure 1) will effectively be reduced. The loss of treatment volume will, in turn, adversely affect the overall treatment ability of the lagoon, causing the nitrogen content of the effluent to increase, more sludge to be produced, and more odors to be released from the lagoon’s surface.

Since 1996, the state has required earthen lagoons to be designed with a Sludge Accumulation zone (Figure 1). Lagoons built before 1996 may or may not have a zone for sludge accumulation. Thus, older lagoons may not have adequate treatment volume, are prone to emit more odors, and contain high nutrient values in irrigated lagoon effluent.

![Figure 1. An anaerobic waste treatment lagoon (drawing is not to scale).](image-url)
It is important to review current knowledge of sludge in earthen structures and lagoon dynamics prior to sludge removal. This knowledge will help producers and technical specialists prepare plans to safely remove sludge from a lagoon. The following summary lists some critical factors to consider when planning.

Two distinctly different zones are to be found within an anaerobic lagoon. First is the sludge accumulation zone at the bottom of the lagoon, comprised of inert materials and the biologically active sludge itself (Figure 1, “Sludge Accumulation”). Inert materials—rocks, sand, excess feed, debris (pens, plastic bottles, etc.)—accumulate near the inflow pipe(s) from the animal housing and drift to the very bottom of lagoons. This sediment is high in phosphorus, dense in nature, and easily identifiable from the sludge above it (applesauce consistency). Sludge, which is the likely source of much of the anaerobic degradation occurring in a lagoon, is black, moderately viscous, and high in nutrients, bacteria, and organic matter. It can be handled by pumps designed for higher solids applications (e.g., dairy manure slurry).

The second distinct zone in the lagoon is the liquid layer above the sludge (Figure 1, “Permanent Liquid Treatment”). This liquid, typically called lagoon supernatant or effluent, is low in solids, moderately rich in nutrients, and easily pumpable with irrigation pumps.

Sludge is rich in nutrients. Like all animal waste, it must be applied at a rate that does not exceed the nitrogen requirement for a given crop. Sludge has much more phosphorus and heavy metals (copper and zinc) than lagoon liquid. Because of this, it should be applied to land with low phosphorus and metal levels, as indicated by a soil test, and incorporated to reduce the chance of runoff and odor. Note that if sludge is applied to fields with very high soil- test phosphorus, it should be applied only at rates equal to the crop removal of phosphorus. An estimate of the available nutrients in sludge from an active anaerobic lagoon is given in Table 2. Some sludge should be removed every 10 to 15 years so that phosphorus does not accumulate beyond what can be agronomically applied to cropland. However, during regular sludge removals, some sludge should be left behind because of its contribution to the biological treatment processes of the lagoon.

Protecting the lagoon liner integrity is essential during sludge and solids removal. Earthen manure storage structures with well-designed, well-constructed, and well-maintained liners seep less. Manure also reduces seepage rates in most situations due to the physical, chemical, and biological processes that contribute to the clogging of soil pores. Preventing mechanical damage or liner erosion during sludge removal is critical.

### Table 1. Average Animal Waste Generation Values for Different Production Units

<table>
<thead>
<tr>
<th>Production Unit</th>
<th>Animal Unit</th>
<th>Live Weight</th>
<th>Lagoon Sludge 📊</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Swine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weanling-to-feeder ²</td>
<td>Per head capacity</td>
<td>30</td>
<td>6.7</td>
</tr>
<tr>
<td>Feeder-to-finish ²</td>
<td>Per head capacity</td>
<td>135</td>
<td>33.0</td>
</tr>
<tr>
<td>Farrow-to-weanling ²</td>
<td>Per active sow</td>
<td>433</td>
<td>78.0</td>
</tr>
<tr>
<td>Farrow-to-feeder ²</td>
<td>Per active sow</td>
<td>522</td>
<td>94.0</td>
</tr>
<tr>
<td>Farrow-to-finish ²</td>
<td>Per active sow</td>
<td>1,417</td>
<td>382.0</td>
</tr>
<tr>
<td><strong>Poultry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pullet (nonlaying)</td>
<td>Per bird</td>
<td>1.5</td>
<td>No data</td>
</tr>
<tr>
<td>Pullet (laying)</td>
<td>Per bird</td>
<td>6.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Layer</td>
<td>Per bird</td>
<td>4.0</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calf</td>
<td>Per head</td>
<td>350</td>
<td>395.0</td>
</tr>
<tr>
<td>Heifer</td>
<td>Per head</td>
<td>1,000</td>
<td>1,237.0</td>
</tr>
<tr>
<td>Milk cow</td>
<td>Per head</td>
<td>1,400</td>
<td>1,335.0</td>
</tr>
</tbody>
</table>

1: No solids removal before lagoon input. ²: Assumes 400-pound sow and boar on limited feed, 3-week-old weanling, 50-pound feeder pig, 220-pound market hog, and 20 pigs/sow/year.

### Table 2. Average Nutrient Composition of Sludge from Active Anaerobic Lagoons

<table>
<thead>
<tr>
<th>Sludge Type</th>
<th>Nitrogen (N)</th>
<th>Phosphorus (P₂O₅)</th>
<th>Potassium (K₂O)</th>
<th>Copper (Cu)</th>
<th>Zinc (Zn)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pounds/1,000 gallons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swine Anaerobic Lagoon</td>
<td>22</td>
<td>49</td>
<td>7</td>
<td>0.78</td>
<td>0.30</td>
</tr>
<tr>
<td>Poultry Layer Anaerobic Lagoon</td>
<td>26</td>
<td>92</td>
<td>13</td>
<td>0.14</td>
<td>1.14</td>
</tr>
<tr>
<td>Dairy Anaerobic Lagoon</td>
<td>15</td>
<td>22</td>
<td>8</td>
<td>0.36</td>
<td>0.74</td>
</tr>
</tbody>
</table>

*Refers to lagoons that are currently in operation and receiving manure from production house. Site-specific sludge samples should be taken to estimate nutrient content from “inactive” lagoons.

### Principles of sludge management

Regular sludge and solids removal should be part of the management of any anaerobic lagoon. The following suggestions will help producers and technical specialists to manage sludge from these facilities:

1. **Identify and use practices that minimize sludge accumulation.** Settling basins and mechanical separators can substantially reduce sludge buildup in a lagoon. Efforts to minimize sludge accumulation should be noted in the farm’s Certified Waste Management Plan. Additional information on liquid/solid separation is available from the N.C. Cooperative Extension Service or other sources, such as the Livestock Waste Facilities Handbook, produced by the Midwest Plan Service (MWPS #18).

2. **Identify the trigger point at which accumulated sludge should be pumped out.** The lagoon design should include
an indicator by depth or volume showing what the maximum accumulation of sludge may be. The Permanent Liquid Treatment volume (Figure 1) in most lagoons should provide at least 1 cubic foot of liquid for every pound of steady state live weight (SSLW) of animals on the farm. Farms with more than 1 cubic foot per pound SSLW may accumulate more sludge than farms with only 1 cubic foot per pound SSLW before the volume will begin to harm lagoon performance. Once calculated, this indicator depth or volume should serve as the trigger point for sludge removal. If not defined in this manner, the trigger point should be set at a depth that is less than the lagoon’s Permanent Liquid Treatment pool depth. Worksheet 1 shows how to calculate sludge storage volume for anaerobic lagoons.

3. Monitor the sludge accumulation relative to the trigger point. This can be done in two ways. First, sludge accumulation can be predicted using the volumes presented in Table 1. When the predicted accumulation nears the trigger point, make a direct measurement. For an anaerobic lagoon, use a 12- to 14-foot rigid, light-weight pole to check the depth of sludge accumulation. Detailed directions on how to measure sludge depth are provided in the “Estimating sludge volume” section below. The depth of sludge in the lagoon should then be compared to the trigger point to determine if sludge should be removed.

An alternative method for monitoring sludge accumulation is to visually check when the lagoon is pumped to its lowest seasonal level (Figure 1, “Minimum Liquid Level”). A visual check of the lagoon surface after drawdown or after the last lagoon liquid is pumped would confirm whether accumulated sludge is occupying a large portion of the lagoon’s permanent pool. The appearance of sludge at this time should trigger sludge removal.

4. Do not remove the last foot of accumulated sludge. Sludge represents the biologically active portion of the lagoon with significant bacteria population for anaerobic processes. Removal of significantly more sludge will adversely affect the odor control benefits of the lagoon.

5. Protect the integrity of the earthen liner. Liner integrity can be compromised by both aggressive agitation and use of front-end loaders or backhoes for removal of solids. Agitator/loaders or agitator/pumps are very efficient for suspending, mixing, and removing sludge. However, special care should be taken to prevent scouring of the lagoon walls when using the recirculation nozzle.

6. Land-apply the sludge and solids to cropland at agronomic rates. Sludge and solids have significant quantities of nutrients, especially phosphorus and metals such as copper and zinc. Procedures should be defined for nutrient analysis, estimating desired application rate, and field measurement of actual application rate.

As discussed earlier, sludge removed from lagoons has a much higher phosphorus and heavy metal content than lagoon liquid. You will need to work with a certified technical specialist to develop a Manure Utilization Plan (MUP) to properly remove and apply lagoon sludge. If possible, sludge should be applied to land with low phosphorus and metal levels, as indicated by a soil test, and incorporated to reduce the chance of runoff. If the sludge is applied to fields with very high soil-test phosphorus, it should be applied only at rates equal to the crop removal of phosphorus.

7. Limit odor production during land application of sludge. Depending on the age and condition of the lagoon, sludge may or may not release significant odor during land application. Immediate incorporation of sludge into the soil is the preferred land-application method to minimize odor. If surface application or irrigation is to be used, carefully consider wind direction, time of day, and potential effects on neighbors when scheduling sludge removal. Odors dissipate most quickly at midday on warm, sunny days. Avoid applications in the evening or at night or on days of little or no wind.

**Sludge sampling**

There are two components of sludge sampling: estimating sludge volume and taking sludge samples for analysis. Unlike effluent, sludge cannot be sampled from the edge of the lagoon. Thus, when either estimating or analyzing, sludge must be sampled from a boat on the lagoon. Special care should be taken when going onto a lagoon in a boat. For safety reasons, at least three people should be present: two in the boat and one on the lagoon bank. The extra person on the boat assists with entering and getting out of the craft, and the extra person(s) on shore may be needed as a rescuer(s), should anything go awry. Flat-bottom or johnboats are preferred over canoes or V-bottom boats. As with any watercraft, appropriate flotation devices should be used by everyone in the boat.

**Estimating sludge volume**

Once on the lagoon, an estimation of sludge volume can easily be made. First, bring a lightweight, rigid, wooden or capped aluminum pole (0.5–1 inch thick by 14 feet long). The pole should be lowered slowly into the lagoon until the liquid seems to become denser and thicker (Figure 2). At this point mark (or record) the water level on the pole. Continue to push the pole down until you feel you have reached the bottom of the lagoon. Mark (or record) the water level on the rod, and pull it out of the lagoon. The difference between these two readings is the depth of the
sludge. Due to the density of anaerobic lagoon sludge, commercially available “sludge judges” should not be used to estimate sludge volume, but they can be useful when collecting sludge samples.

The sludge layer in a lagoon is a “mobile” fluid that forms peaks and valleys within the lagoon. For this reason, at least 10 depth measurements should be taken randomly. Avoid areas that may be affected by the slope of the lagoon embankments and the inlets of irrigation and recycle pumps. Taking more readings will provide a more accurate estimate of volume as well as highlight “hot spots” of accumulated sludge, which may need more attention during sludge removal. Next, average all of the sludge depths. Use steps E through L in Worksheet 1 to estimate the sludge volume in the lagoon.

For a more detailed assessment of sludge volume, a formal grid should be established around the lagoon. Then plot depth measurements at grid points to develop a contour map. Last, calculate an accurate sludge volume from this map. Consult your local Natural Resources Conservation Service office or surveyor for assistance.

**Taking a sludge sample**

The best time to take a sludge sample is while measuring for volume of sludge in a lagoon. This allows samples to be collected from several points around the interior of the lagoon. How the sample is collected depends on how the sludge will be removed. Depending on the density and nutrient concentration of the lagoon effluent, the samples may differ by up to 100 percent from point to point. To draw a sample, insert a ½-inch or ¾-inch PVC pipe into the lagoon sludge until the pipe almost reaches the bottom (Figure 3). Wearing plastic or latex gloves, place your thumb over the end of the pipe to create a vacuum and slowly pull the pipe from the lagoon. This will capture a core or profile of lagoon effluent and sludge. Once the pipe is over a clean 5-gallon bucket, **slowly** break the vacuum by removing your finger from the end of the pipe. If the entire lagoon is going to be agitated during sludge removal, the entire core of collected sludge and effluent should be sent to the laboratory. If the lagoon effluent is going to be drawn down and primarily only sludge pumped out, then just the collected sludge should be sent to the lab. If you are unsure on how the sludge will be removed, take samples using both methods, label them separately, and have them analyzed.

Place several samples in the bucket and mix thoroughly before removing a sub-sample for analysis. Consider using a plastic, wide-mouth bottle when shipping samples to the laboratory. For more information on preparing samples, consult Chapter 4, “Tools for the Plan,” of the Certification Training Manual for Operators of Animal Waste Management Systems (AG-538) or Soil Facts: Waste Analysis (AG-439-33).

**Sludge removal**

Removing sludge from anaerobic lagoons can be accomplished by several methods:

- Hire a custom applicator.
- Agitate the lagoon and irrigate/land-apply.
- Dewater lagoon, agitate sludge, and land-apply.
- Dewater lagoon, dredge lagoon, and land-apply sludge.

**Hiring a custom applicator**

This is the most common method for managing sludge in North Carolina for two main reasons. First, many lagoons can properly accumulate sludge for up to 10 years or more before their treatment ability declines. Second, the cost of removal equipment is prohibitive for most producers, especially due to the infrequeny of sludge removal. The cost of hiring a contractor is largely based on the amount of sludge to be removed. A recent survey of custom applicators in eastern North Carolina showed that prices ranged from 1.5 cents to 5 cents per gallon of sludge. The difference in cost depends on the size of lagoon to be pumped; lagoon accessibility; distance to available application fields; and a decision on whether the sludge is to be irrigated, broadcast, or injected.
Custom applicators should be selected using these criteria:

- Ability to assist you in developing a Manure Utilization Plan to properly manage the removed sludge.
- Ability to provide appropriate agitation and pumping equipment for high-solid sludge.
- Ability to immediately incorporate sludge into the soil to minimize odor.
- Ability to transport sludge the required distance.
- Cost. Lower costs mean good lagoon access, irrigated applications, and nearby application fields. Higher costs mean poor lagoon access or that sludge must be hauled several miles before being applied. Direct injection or immediate soil incorporation of sludge also costs more.

**Agitate the lagoon, and irrigate/land-apply**

In this method, lagoon liquid and sludge are mixed with an agitator or a chopper-agitator impeller pump (Figure 4). High-volume pumps (3,000 to 5,000 gallons per minute) specifically designed for agitation and loading provide the best suspension of solids. However, agitation equipment is generally effective in suspending solids only within a limited area (within about 50 feet of the agitator). Because agitation equipment also can erode earthen liners, it should be used cautiously. The mixed liquid then can be pumped through a large-bore sprinkler irrigation system onto nearby cropland. The liquid should be soil-incorporated to minimize odor, nitrogen volatilization, and runoff potential.

**Dewater lagoon, agitate sludge, and land-apply**

The upper part of the lagoon can be dewatered by irrigation onto nearby cropland or forageland. The remaining sludge is agitated and pumped into a liquid sludge applicator. The liquid sludge can be spread onto cropland or forageland and soil-incorporated or injected (Figures 5 and 6).

**Dewater lagoon, dredge sludge, and land-apply**

The upper part of the lagoon is dewatered by irrigation onto nearby cropland or forageland. Sludge is then dredged from the lagoon with a dragline or sludge barge. A berm area should be created beside the lagoon to receive the sludge so that liquids can drain back into the lagoon. Removed sludge is then placed in the berm and allowed to dewater. Finally, the drier material is hauled and spread with a manure spreader onto cropland or forageland and soil-incorporated. Consult your waste management plan, farm conservation plan, or local Soil and Water Conservation district office to see if the specific fields used for sludge application can be disturbed with soil-incorporation equipment.

When removing sludge, the pumper or drag-line operator should pay close attention to ensure that the lagoon liner remains intact. If the soil material or the synthetic liner material is being disturbed, stop the activity.
immediately and do not resume operations until the sludge can be removed without liner injury. If the liner is damaged, it must be repaired as soon as possible.

**Sludge reduction alternatives**

Several companies in North Carolina offer various lagoon additives intended to reduce the volume of sludge in anaerobic lagoons. These products provide a mix of various microorganisms, enzymes, proteins, or catalysts to stimulate the microbial degradation of accumulated sludge. The Animal and Poultry Waste Management Center at North Carolina State University has evaluated several of these products since 1997. To date, these studies have been unable to demonstrate significant reductions in sludge volume similar to those estimated by product representatives and producers who have been using the products for several years. This may be due to differences in the dosage of product, method of application, type of disinfectant used, or the type of operation where the products were tested. However, because the cost of conventional sludge removal is high, research continues at NC State University into the use of lagoon additives to reduce sludge volume.

Numerous commercial products are available for suspending sludge and solids in the lagoon’s liquid. Producers in the Midwest say some of these products are effective. Baker’s yeast also can be an effective means of suspending solids. Spread 1 pound of fresh baker’s yeast mixed with 1 gallon of lukewarm water (90°–100°F) at a rate of 1 gallon per 75 square feet of liquid surface. After two weeks, agitate and pump the lagoon.

**Lagoon closure**

Sludge removal is a major consideration when an anaerobic lagoon is to be closed or taken out of service. In addition to the removal of collected solids, the future use of the lagoon must be carefully considered before it can be closed. North Carolina producers should contact their local technical specialist, local conservation district, or the Natural Resources Conservation Service (NRCS) for assistance in developing a plan to close a lagoon and in completing an Animal Waste Storage Pond and Lagoon Closure Report Form. As part of this process, the local office of the North Carolina Division of Water Quality (DWQ) must be notified of the scheduled closure two days before sludge is removed. The date and name of the DWQ representative who is notified are required on the Lagoon Closure Report Form. After liquids and sludge are removed, the closure form must be completed and signed by the landowner and a technical specialist, then mailed to DWQ within 15 days of closure. Once the form is received and processed, the lagoon will be removed from DWQ’s lagoon registration database, and inspections will no longer be required by representatives from DWQ or the N.C. Division of Soil and Water Conservation.

Lagoon closures must meet the requirements established in the NRCS Technical Guide Standard 709, which states that all reasonable efforts must be made to agitate and remove all waste materials from the lagoon before it can be closed. If the bottom of the lagoon/structure is above the water table at the time of closure, it must be scraped to remove the final amount of sludge. If the lagoon’s integrity during scraping comes into question, a qualified technical specialist must determine if the soil stability is suitable to support earth-moving equipment. In the case of lagoons that are not to be scraped and those with bottoms documented to be below the water table at the time of closure, a maximum depth of “agitated” waste material may be left in the lagoon at the time of closure. Contact your local NRCS office or technical specialist for a copy of the standard.

There are three options for managing the earthen lagoon:
- Complete closure and fill.
- Breaching the lagoon berm.
- Conversion to a farm pond.

**Complete closure or elimination of earthen storage structure**

1. **Contact DWQ within 48 hours of beginning closure.**
2. **Remove lagoon effluent and accumulated sludge.** Effluent and sludge should be pumped from the lagoon and applied to crops according to an approved Waste Utilization Plan.
3. **Remove or plug the outlets of any pipes adding runoff or manure to the lagoon.**
4. **Divert all surface water runoff from the lagoon.** All runoff should be directed away from the lagoon, including water from building roofs, abandoned feedlots, and cropland.
5. **Fill the lagoon with soil.** After pumping away as much liquid and sludge as possible, allow the remaining sludge and solids to dry. If more than about 12 inches of solids remain after pumping, remove them while making every effort to maintain liner integrity. This can be done by agitating and removing liquids at a time when the solids can dry sufficiently to allow earth-moving equipment access to the storage, or by refilling with water, agitating, and emptying again and again, until most of the solids are removed. The lagoon can then be filled with soil by pushing in existing dams or berms and bringing in additional fill as needed. The fill should be mounded in the storage cavity and graded to a 4 percent slope or greater (after allowing for settling) to ensure surface runoff from the lagoon site.
6. Establish a growing crop or sod. The final surface should be tilled and planted with vegetation to minimize soil erosion. A crop with a deep root zone, such as alfalfa, is preferred because it can harvest some remaining nutrients.
7. Complete Lagoon Closure Report Form. The producer, technical specialist, and a representative of the NRCS or local Conservation District must sign this form. Once all parties sign the form and it is sent to DWQ, within 15 days the lagoon will no longer be recognized as a “permitted” facility.

Breaching the lagoon berm.
1. Contact DWQ within 48 hours of beginning closure.
2. Remove lagoon effluent and accumulated sludge. Lagoon effluent and sludge should be pumped from the lagoon and applied to crops according to an approved Waste Utilization Plan.
3. Remove or plug the outlets of any pipes adding runoff or manure to the lagoon.
4. Divert all surface water runoff from the lagoon. All runoff should be directed away from the lagoon, including water from building roofs, abandoned feedlots, and cropland.
5. Breach the lagoon berm. After pumping away as much liquid and sludge as possible, allow the remaining sludge and solids to dry. If more than about 12 inches of solids remain after pumping, remove them while making every effort to maintain liner integrity. This can be done by agitating and removing liquids at a time when the solids can dry sufficiently to allow earth-moving equipment access to the storage, or by refilling with water, agitating, and emptying again and again, until most of the solids are removed. A section of the existing lagoon berm or dam can then be removed. The lagoon breach should be low enough on the slope of the dam to allow rainwater to flow from the impoundment and not pond.
6. Establish a growing crop or sod. The final surface should be tilled and planted with vegetation to minimize soil erosion.
7. Complete Lagoon Closure Report Form. The producer, technical specialist, and a representative of the NRCS or local Conservation District must sign this form. Once all parties sign the form and it is sent to DWQ, within 15 days the lagoon will no longer be recognized as a “permitted” facility.

Conversion to a farm pond
1. Contact DWQ within 48 hours of beginning closure.
2. Remove lagoon effluent and accumulated sludge. Lagoon effluent and sludge should be pumped from the lagoon and applied to crops according to an approved Waste Utilization Plan.
3. Remove or plug the outlets of any pipes adding runoff or manure to the lagoon.
4. Divert all surface water runoff from the lagoon. All runoff should be directed away from the lagoon, including water from building roofs, abandoned feedlots, and cropland.
5. Add an emergency spillway. A spillway (if one does not currently exist) is required if the pond has an embankment of 3 feet or more. If required, a principal and emergency spillway must be installed according to NRCS Conservation Practice Standard 378 (Ponds).
6. Complete Lagoon Closure Report Form. The producer, technical specialist, and a representative of the NRCS or local Conservation District must sign this form. Once all parties sign the form and it is sent to DWQ, within 15 days the lagoon will no longer be recognized as a “permitted” facility.
7. Rinse the lagoon with water. Refill the lagoon with water after pumping out all sludge and liquid, and allow it to sit for several months. During the next growing season, agitate and completely empty the lagoon, applying the water based on crop water needs. Nutrient concentration should be minimal by this time and will not be a factor in determining the application rate.
8. Refill lagoon with water. Although not required, check the dissolved oxygen (DO) level after the second refill. If levels are less than 3 milligrams per liter of DO, continue the rinsing cycles. If DO levels are higher than 3 milligrams per liter, the earthen structure can be managed as a farm pond. Alternatively, available nitrogen levels can be checked and rinsing continued until available nitrogen levels as measured by a laboratory or a nitrogen meter are less than 30 milligrams per liter of nitrate-nitrogen. Runoff should be allowed to enter the lagoon or fresh water added to maintain the pond nearly full. A high water level is necessary to minimize liner degradation due to burrowing animals or vegetative growth. Water from the new pond should not be used for watering livestock without testing it for pathogens and consulting a veterinarian.

Prepared by
Ronald E. Sheffield, Animal Waste Extension Specialist, Department of Biological and Agricultural Engineering, North Carolina State University
James C. Barker, Professor and Extension Specialist, Department of Biological and Agricultural Engineering, North Carolina State University
Karl A. Shaffer, Extension Associate, Department of Soil Science, North Carolina State University
Worksheet 1. Calculating sludge storage volume for existing lagoons.

Example: A 3,720-head hog finishing farm has a lagoon that is 600 feet long, 205 feet wide, and 12 feet deep. The average weight of each hog is 135 pounds. The Waste Utilization Plan states that 753,300 cubic feet are allocated as the permanent treatment volume. The lagoon has an inside slope of 3:1. The producer takes 10 sludge depth measurements from various points around the lagoon. The average sludge depth is 3.8 feet. Is it time to remove sludge from the lagoon?

<table>
<thead>
<tr>
<th>Example</th>
<th>Your Lagoon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Permitted Steady State Live Weight (SSLW)</strong>&lt;br&gt;(Multiply number of animals by average weight.)</td>
<td>502,200 (lbs.)</td>
</tr>
<tr>
<td><strong>B. Permanent Treatment Volume</strong>&lt;br&gt;(cubic feet)&lt;br&gt;(Divide gallons by 7.481 to get cubic feet, if needed.)</td>
<td>753,300 (cu.ft.)</td>
</tr>
<tr>
<td><strong>C. Divide A into B.</strong>&lt;br&gt;If C is more than 1.5, then go to D.&lt;br&gt;If C is less than 1.0, the Permanent Treatment Volume is less than recommended levels. Contact your technical specialist or NRCS representative to discuss options.</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>D. Subtract A from B.</strong>&lt;br&gt;This is the volume of Available Sludge Storage for minimal manure treatment.</td>
<td>251,100 (cu.ft.)</td>
</tr>
<tr>
<td><strong>E. Average Sludge Depth.</strong>&lt;br&gt;Average of a minimum of 10 random depth measurements from around the lagoon.</td>
<td>3.8 (ft.)</td>
</tr>
<tr>
<td><strong>F. Inside Slope of the lagoon.</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>G. Lagoon Depth.</strong>&lt;br&gt;Measured from the top of the embankment to the bottom of the lagoon.</td>
<td>12 (ft.)</td>
</tr>
<tr>
<td><strong>H. Lagoon Length.</strong></td>
<td>600 (ft.)</td>
</tr>
<tr>
<td><strong>I. Lagoon Width.</strong></td>
<td>205 (ft.)</td>
</tr>
<tr>
<td><strong>J. Bottom Length.</strong> Calculate: ((H - 2 \times F \times G))</td>
<td>528 (ft.)</td>
</tr>
<tr>
<td><strong>K. Bottom Width.</strong> Calculate: ((I - 2 \times F \times G))</td>
<td>133 (ft.)</td>
</tr>
<tr>
<td><strong>L. Average Sludge Volume.</strong> Calculate using the equation below.</td>
<td></td>
</tr>
</tbody>
</table>

\[-\frac{1}{3} \cdot F \times E^3 + (F \times E^2) + (F \times E) + I \cdot (J \times K)\]

\[V_{sludge} = \frac{1}{3} F \cdot E^3 + (F \cdot E^2) + (F \cdot E) + I \cdot (J \cdot K)\]

**Hint:**
1. Multiply: \([4 \times F \times E \times E \times E] \) then divide by 3. \[658.46 \, 1\]
2. Multiply: \([F \times J \times E \times E] \) \[22,872.96 \, 2\]
3. Multiply: \([F \times K \times E \times E] \) \[5,761.56 \, 3\]
4. Multiply: \([J \times K \times E] \) \[266,851.20 \, 4\]
5. Add: \(1 + 2 + 3 + 4\) \[296,144,18 \, 5\]

**M. Compute D minus L.** \[-45,044 \, (cu.ft.)\]

**Negative values** in step M indicate that sludge accumulation may be compromising lagoon treatment efficiency and sludge should be removed. **Positive values** in step M indicate that sludge volume has not exceeded available storage. Monitor sludge depth and recalculate step L annually.

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5/00—5M—JL/GM

E00 38814

AG-604
Notification of Change of Ownership
Animal Waste Management Facility
(Please type or print all information that does not require a signature)

In accordance with the requirements of 15A NCAC 2H .0217(a)(1)(H)(xii) this form is official notification to the Division of Water Quality (DWQ) of the transfer of ownership of an Animal Waste Management Facility. This form must be submitted to DWQ no later than 60 days following the transfer of ownership.

**General Information:**
Name of Farm:_________________________ Facility No: _______-_______
Previous Owner(s) Name:_________________________ Phone No:_________________________
New Owner(s) Name:_________________________ Phone No:_________________________
Mailing Address:____________________________________________
Farm Location: Latitude and Longitude: ___ ___ ___ / ___ ___ ___ County:_________________________
Please attach a copy of a county road map with location identified and describe below (Be specific: road names, directions, milepost, etc.):____________________________________________

**Operation Description:**

<table>
<thead>
<tr>
<th>Type of Swine</th>
<th>No. of Animals</th>
<th>Type of Poultry</th>
<th>No. of Animals</th>
<th>Type of Cattle</th>
<th>No. of Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Wean to Feeder</td>
<td></td>
<td>□ Layer</td>
<td></td>
<td>□ Dairy</td>
<td></td>
</tr>
<tr>
<td>□ Feeder to Finish</td>
<td></td>
<td>□ Pullets</td>
<td></td>
<td>□ Beef</td>
<td></td>
</tr>
<tr>
<td>□ Farrow to Wean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Farrow to Feeder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Farrow to Finish</td>
<td></td>
<td>Other Type of Livestock:</td>
<td>Number of Animals:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Gilts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Boars</td>
<td></td>
<td></td>
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</tbody>
</table>

Acreage Available for Application:__________ Required Acreage:________________________

Number of Lagoons / Storage Ponds: ___________ Total Capacity:___________ Cubic Feet (ft³)

************************************************************************************

**Owner / Manager Agreement**
I (we) verify that all the above information is correct and will be updated upon changing. I (we) understand the operation and maintenance procedures established in the Certified Animal Waste Management Plan (CAWMP) for the farm named above and will implement these procedures. I (we) know that any modification or expansion to the existing design capacity of the waste treatment and storage system or construction of new facilities will require a permit modification before the new animals are stocked. I (we) understand that there must be no discharge of animal waste from the storage or application system to surface waters of the state either directly through a man-made conveyance or from a storm event less severe than the 25-year, 24-hour storm and there must not be run-off from the application of animal waste. I (we) understand that this facility may be covered by a State Non-Discharge Permit or a NPDES Permit and completion of this form authorizes the Division of Water Quality to issue the required permit to the new land owner.

Name of Previous Land Owner:_________________________
Signature:_________________________ Date:_________________________

Name of New Land Owner:_________________________
Signature:_________________________ Date:_________________________

Name of Manager(if different from owner):_________________________
Signature:_________________________ Date:_________________________

Please sign and return this form to: N. C. Division of Water Quality
Aquifer Protection Section
Animal Feeding Operations Unit
1636 Mail Service Center
Raleigh, NC 27699-1636

November 1, 2004
Change Of Swine Integrator Registration Form

Farm Name:______________________________ Facility Number:____-____

Physical Location of the Swine Farm:__________________________________

Owner(s) Name:__________________________________________
Mailing Address:__________________________________________
City, State, Zip Code:______________________________________
Grower(s) Name if different than owner:_______________________
Mailing Address:__________________________________________
City, State, Zip Code:______________________________________

Current Integrator:________________________________________
Integrator Contact:________________________________________
Mailing Address:__________________________________________
City, State, Zip Code:______________________________________

Owner’s Signature                          Date

We appreciate your cooperation. This information is required in accordance with G.S. 143-215.10H. If you have any questions contact the AFO Unit at (919) 733-3221, otherwise please return this form to:

NC Division of Water Quality
Aquifer Protection Section
Animal Feeding Operations Unit
1636 Mail Service Center
Raleigh, NC  27699-1636

5CISIR 12-15-05
### Facility Number

- Division of Water Quality
- Division of Soil and Water Conservation
- Other Agency

#### Type of Visit
- Compliance Inspection
- Operation Review
- Structure Evaluation
- Technical Assistance

#### Reason for Visit
- Routine
- Complaint
- Follow up
- Referral
- Emergency
- Other
- Denied Access

#### Date of Visit:

#### Arrival Time:

#### Departure Time:

#### County:

#### Region:

#### Farm Name:

#### Owner Email:

#### Owner Name:

#### Phone:

#### Mailing Address:

#### Physical Address:

#### Facility Contact:

#### Title:

#### Phone No:

#### Onsite Representative:

#### Integrator:

#### Certified Operator:

#### Operator Certification Number:

#### Back-up Operator:

#### Back-up Certification Number:

#### Location of Farm:

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
</table>

### Swine

<table>
<thead>
<tr>
<th>Design Capacity</th>
<th>Current Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wean to Finish</td>
<td></td>
</tr>
<tr>
<td>Wean to Feeder</td>
<td></td>
</tr>
<tr>
<td>Feeder to Finish</td>
<td></td>
</tr>
<tr>
<td>Farrow to Wean</td>
<td></td>
</tr>
<tr>
<td>Farrow to Feeder</td>
<td></td>
</tr>
<tr>
<td>Farrow to Finish</td>
<td></td>
</tr>
<tr>
<td>Gilts</td>
<td></td>
</tr>
<tr>
<td>Boars</td>
<td></td>
</tr>
</tbody>
</table>

#### Wet Poultry

<table>
<thead>
<tr>
<th>Design Capacity</th>
<th>Current Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer</td>
<td></td>
</tr>
<tr>
<td>Non-Layer</td>
<td></td>
</tr>
</tbody>
</table>

#### Dry Poultry

<table>
<thead>
<tr>
<th>Design Capacity</th>
<th>Current Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layers</td>
<td></td>
</tr>
<tr>
<td>Non-Layers</td>
<td></td>
</tr>
<tr>
<td>Pullets</td>
<td></td>
</tr>
<tr>
<td>Turkeys</td>
<td></td>
</tr>
<tr>
<td>Turkey Poults</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

### Cattle

<table>
<thead>
<tr>
<th>Design Capacity</th>
<th>Current Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Cow</td>
<td></td>
</tr>
<tr>
<td>Dairy Calf</td>
<td></td>
</tr>
<tr>
<td>Dairy Heifer</td>
<td></td>
</tr>
<tr>
<td>Dry Cow</td>
<td></td>
</tr>
<tr>
<td>Non-Dairy</td>
<td></td>
</tr>
<tr>
<td>Beef Stocker</td>
<td></td>
</tr>
<tr>
<td>Beef Feeder</td>
<td></td>
</tr>
<tr>
<td>Beef Brood Cow</td>
<td></td>
</tr>
</tbody>
</table>

### Number of Structures:

#### Discharges & Stream Impacts

1. Is any discharge observed from any part of the operation?
   - Discharge originated at:
     - Structure
     - Application Field
     - Other
     - Yes
     - No
     - NA
     - NE
   - a. Was the conveyance man-made?
     - Yes
     - No
     - NA
     - NE
   - b. Did the discharge reach waters of the State? (If yes, notify DWQ)
     - Yes
     - No
     - NA
     - NE
   - c. What is the estimated volume that reached waters of the State (gallons)?
   - d. Does discharge bypass the waste management system? (If yes, notify DWQ)
     - Yes
     - No
     - NA
     - NE

2. Is there evidence of a past discharge from any part of the operation?

3. Were there any adverse impacts or potential adverse impacts to the Waters of the State other than from a discharge?
Waste Collection & Treatment

4. Is storage capacity (structural plus storm storage plus heavy rainfall) less than adequate?
   a. If yes, is waste level into the structural freeboard?

<table>
<thead>
<tr>
<th>Identifier:</th>
<th>Structure 1</th>
<th>Structure 2</th>
<th>Structure 3</th>
<th>Structure 4</th>
<th>Structure 5</th>
<th>Structure 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spillway?:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Designed Freeboard (in): ________________________
Observed Freeboard (in): ________________________

5. Are there any immediate threats to the integrity of any of the structures observed? (ie/ large trees, severe erosion, seepage, etc.)

6. Are there structures on-site which are not properly addressed and/or managed through a waste management or closure plan?

If any of questions 4-6 were answered yes, and the situation poses an immediate public health or environmental threat, notify DWQ

7. Do any of the structures need maintenance or improvement?

8. Do any of the structures lack adequate markers as required by the permit? (Not applicable to roofed pits, dry stacks and/or wet stacks)

9. Does any part of the waste management system other than the waste structures require maintenance or improvement?

Waste Application

10. Are there any required buffers, setbacks, or compliance alternatives that need maintenance/improvement?

11. Is there evidence of incorrect application? If yes, check the appropriate box below.

   - Excessive Ponding
   - Hydraulic Overload
   - Frozen Ground
   - Heavy Metals (Cu, Zn, etc.)
   - PAN
   - PAN > 10% or 10 lbs
   - Total Phosphorus
   - Failure to Incorporate Manure/Sludge into Bare Soil
   - Outside of Acceptable Crop Window
   - Evidence of Wind Drift
   - Application Outside of Area

12. Crop type(s) ________________________________

13. Soil type(s) ________________________________

14. Do the receiving crops differ from those designated in the CAWMP?

15. Does the receiving crop and/or land application site need improvement?

16. Did the facility fail to secure and/or operate per the irrigation design or wettable acre determination?

17. Does the facility lack adequate acreage for land application?

18. Is there a lack of properly operating waste application equipment?

Comments (refer to question #): Explain any YES answers and/or any recommendations or any other comments. Use drawings of facility to better explain situations. (use additional pages as necessary):

Reviewer/Inspector Name ___________________________ Phone: ___________________________
Reviewer/Inspector Signature: ______________________ Date: __________________________

12/28/04 Continued
Facility Number: — Date of Inspection —

**Required Records & Documents**

19. Did the facility fail to have Certificate of Coverage & Permit readily available?  
   □ Yes  □ No  □ NA  □ NE

20. Does the facility fail to have all components of the CAWMP readily available? If yes, check the appropriate box.  
   □ WUP  □ Checklists  □ Design  □ Maps  □ Other
   □ Yes  □ No  □ NA  □ NE

21. Does record keeping need improvement? If yes, check the appropriate box below.  
   □ Waste Application  □ Weekly Freeboard  □ Waste Analysis  □ Soil Analysis  □ Waste Transfers  □ Annual Certification  
   □ Rainfall  □ Stocking  □ Crop Yield  □ 120 Minute Inspections  □ Monthly and 1” Rain Inspections  □ Weather Code
   □ Yes  □ No  □ NA  □ NE

22. Did the facility fail to install and maintain a rain gauge?  
   □ Yes  □ No  □ NA  □ NE

23. If selected, did the facility fail to install and maintain rainbreakers on irrigation equipment?  
   □ Yes  □ No  □ NA  □ NE

24. Did the facility fail to calibrate waste application equipment as required by the permit?  
   □ Yes  □ No  □ NA  □ NE

25. Did the facility fail to conduct a sludge survey as required by the permit?  
   □ Yes  □ No  □ NA  □ NE

26. Did the facility fail to have an actively certified operator in charge?  
   □ Yes  □ No  □ NA  □ NE

27. Did the facility fail to secure a phosphorus loss assessment (PLAT) certification?  
   □ Yes  □ No  □ NA  □ NE

**Other Issues**

28. Were any additional problems noted which cause non-compliance of the permit or CAWMP?  
   □ Yes  □ No  □ NA  □ NE

29. Did the facility fail to properly dispose of dead animals within 24 hours and/or document and report the mortality rates that were higher than normal?  
   □ Yes  □ No  □ NA  □ NE

30. At the time of the inspection did the facility pose an odor or air quality concern? 
   If yes, contact a regional Air Quality representative immediately 
   □ Yes  □ No  □ NA  □ NE

31. Did the facility fail to notify the regional office of emergency situations as required by General Permit? (ie/ discharge, freeboard problems, over application)  
   □ Yes  □ No  □ NA  □ NE

32. Did Reviewer/Inspector fail to discuss review/inspection with an on-site representative?  
   □ Yes  □ No  □ NA  □ NE

33. Does facility require a follow-up visit by same agency?  
   □ Yes  □ No  □ NA  □ NE

**Additional Comments and/or Drawings:**

—

12/28/04
PLAN OF ACTION (PoA) FOR HIGH FREEBOARD AT ANIMAL FACILITIES

Facility Number: _________ - _________  County: ____________________________
Facility Name:____________________________________________________________________________
Certified Operator Name: ________________________________ Operator #___________________

1. Current liquid level(s) in inches as measured from the current liquid level in the lagoon to the lowest point on the top of the dam for lagoons without spillways; and from the current liquid level in the lagoon to the bottom of the spillway for lagoons with spillways.

<table>
<thead>
<tr>
<th>Structure 1</th>
<th>Structure 2</th>
<th>Structure 3</th>
<th>Structure 4</th>
<th>Structure 5</th>
<th>Structure 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagoon Name/Identifier (ID): _________</td>
<td>_________</td>
<td>_________</td>
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<tr>
<td>Spillway (Yes or No): _________</td>
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<tr>
<td>Level (inches): _________</td>
<td>_________</td>
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</tbody>
</table>

2. Check all applicable items

_____ Liquid level is within the designed structural freeboard elevations of one or more structures. Five and 30 day Plans of Action are attached. Hydraulic and agronomic balances are within acceptable ranges.

_____ Liquid level is within the 25 year 24 hour storm elevations for one or more structures. A 30 day Plan of Action is attached. Agronomic balance is within acceptable range.

_____ Waste is to be pumped and hauled to off site locations. Volume and PAN content of waste to pumped and hauled is reflected in section III tables. Included within this plan is a list of the proposed sites with related facility number(s), number acres and receiving crop information. Contact and secure approval from the Division of Water Quality prior to transfer of waste to a site not covered in the facility’s certified animal waste management plan.

_____ Operation will be partially or fully depopulated.
- attach a complete schedule with corresponding animal units and dates for depopulation
- if animals are to be moved to another permitted facility, provide facility number, lagoon freeboard levels and herd population for the receiving facility

3. Earliest possible date to begin land application of waste: _____________________

I hereby certify that I have reviewed the information listed above and included within the attached Plan of Action, and to the best of my knowledge and ability, the information is accurate and correct.

______________________________________________________ Phone: ________________________
Facility Owner/Manager (print) Facility Owner/Manager (signature)

______________________________________________________ Date: __________________________
Facility Owner/Manager (print)

PoA Cover Page  2/21/00
PLAN OF ACTION (PoA) FOR HIGH FREEBOARD AT ANIMAL FACILITIES
FIVE (5) DAY DRAW DOWN PERIOD

I. TOTAL VOLUME TO BE LAND APPLIED PER WASTE STRUCTURE

1. Structure Name/Identifier (ID): _________________________________

2. Current liquid volume in structural freeboard
   a. current liquid level according to marker ___________ inches
   b. designed structural freeboard zone ___________ inches
      (Normally 12 inches or greater)
   c. line b - line a (inches within structural freeboard) = ___________ inches
   d. top of dike surface area according to design ___________ ft²
      (area at below structural freeboard elevation)
   e. \( \frac{\text{line c} \times \text{line d} \times 7.48 \text{ gallons}}{12 \text{ ft}^2} \) = ___________ gallons

3. Projected volume of waste liquid produced during draw down period
   f. temporary storage period according to structural design ___________ days
   g. volume of waste produced according to structural design ___________ ft³
   h. actual waste produced = \( \frac{\text{current herd #} \times \text{line g}}{\text{certified herd #}} \) = ___________ ft³
   i. volume of wash water according to structural design ___________ ft³
   j. excess rainfall over evaporation according to design ___________ ft³
   k. \( (\text{lines h + i + j}) \times 7.48 \times \frac{5 \text{ days}}{\text{line f}} \) = ___________ gallons

4. Total volume of waste to be land applied during 5 day draw down
   l. total volume to be land applied line e + line k = ___________ gallons

REPEAT SECTION I FOR EACH WASTE STRUCTURE ON SITE WITH A LIQUID LEVEL WITHIN THE STRUCTURAL FREEBOARD ELEVATIONS

II. TOTAL VOLUME OF WASTE STORED WITHIN STRUCTURAL FREEBOARD ELEVATIONS FOR ALL WASTE STRUCTURES FOR FACILITY

PoA (5 Day) 2/21/00
1. structure ID:________________  
   line l = ____________ gallons
2. structure ID:________________  
   line l = ____________ gallons
3. structure ID:________________  
   line l = ____________ gallons
4. structure ID:________________  
   line l = ____________ gallons
5. structure ID:________________  
   line l = ____________ gallons
6. structure ID:________________  
   line l = ____________ gallons

n. lines 1 + 2 + 3 + 4 + 5 + 6 = ______________ gallons

o. line n =
   
   27,154
   
   ______________ acre-inches

III. TOTAL ACRES AVAILABLE TO RECEIVE WASTE DURING 5 DAY DRAW DOWN PERIOD\(^1,2\)
\(^1\) While this section deals with hydraulic loading capacities, applications cannot exceed agronomic rate for receiving crop according to its certified waste plan
\(^2\) Fields with no remaining PAN balance, no receiving crop, and/or completely saturated are not considered available to receive waste

<table>
<thead>
<tr>
<th>p. tract #</th>
<th>q. field #</th>
<th>r. soil type</th>
<th>s. crop</th>
<th>t. acres</th>
<th>u. remaining IRR-2 PAN balance (lb/acre)</th>
<th>v. maximum application rate (in/hr)</th>
<th>w. maximum application amount (inches)</th>
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</table>

x. total acres available during 5 day draw down (sum of column t) = ______________ acres

IV. FACILITY’S PoA OVERALL HYDRAULIC LOAD TO BE LAND APPLIED PER ACRE

y. line o =
   
   ______________ inches per acre to be applied within 5 days

\[ \frac{\text{line o}}{\text{line x}} \]

PoA (5 Day) 2/21/00
If unable to land apply hydraulic load listed in line y, list course of action here including pump and haul, depopulation, herd reduction, etc. For pump & haul and herd reduction options, recalculate new hydraulic load based on new information.

Plan to land apply hydraulic load:

1. Describe moisture conditions of fields? (e.g./ Is there water standing in field; does irrigation equipment mar down in field; “trafficability” across soils; will soils absorb application without runoff, etc.)

2. Date and amount of last rainfall event?

3. Dates of last waste application event per field

4. Given optimum soil and weather conditions, is irrigation equipment capable of applying the volume in line “n” at appropriate seasonal (i.e. winter) application rates within five days?

5. Irrigation schedule for next 5 days - include daily schedule; proposed application rates and amounts per irrigation event; changes made in gun sizes, nozzles, “o” rings, operating time, travel speed, etc. to meet proposed changes in application rates and amounts; and any other information for consideration

PoA (5 Day) 2/21/00
PLAN OF ACTION (PoA) FOR HIGH FREEBOARD AT ANIMAL FACILITIES
THIRTY (30) DAY DRAW DOWN PERIOD

I. TOTAL PAN TO BE LAND APPLIED PER WASTE STRUCTURE

1. Structure Name/Identifier (ID): ________________________________

2. Current liquid volume in 25 yr./24 hr. storm storage & structural freeboard
   a. current liquid level according to marker ___________ inches
   b. designed 25 yr./24 hr. storm & structural freeboard ___________ inches
   c. line b - line a (inches in red zone) = ___________ inches
   d. top of dike surface area according to design ___________ ft²
      (area at below structural freeboard elevation)
   e. \( \frac{\text{line c} \times \text{line d} \times 7.48 \text{ gallons}}{12 \text{ ft}^3} = \) ___________ gallons

3. Projected volume of waste liquid produced during draw down period
   f. temporary storage period according to structural design ___________ days
   g. volume of waste produced according to structural design ___________ ft³
   h. actual waste produced = current herd # x line g = ___________ ft³
      certified herd #
   i. volume of wash water according to structural design ___________ ft³
   j. excess rainfall over evaporation according to design ___________ ft³
   k. (lines h + i +i) x 7.48 x \( \frac{30 \text{ days}}{\text{line f}} \) = ___________ gallons

4. Total PAN to be land applied during draw down period
   l. current waste analysis dated ___________
      _________ lb/1000 gal.
   m. \( \frac{\text{lines e} + k}{1000} \) = _________ lb PAN

REPEAT SECTION I FOR EACH WASTE STRUCTURE ON SITE

II. TOTAL POUNDS OF PAN STORED WITHIN STRUCTURAL FREEBOARD AND/OR 25 YR./24 HR. STORM STORAGE ELEVATIONS IN ALL WASTE STRUCTURES FOR FACILITY

PoA (30 Day) 2/21/00
1. structure ID:________________  
   line m = ____________ lb PAN

2. structure ID:________________  
   line m = ____________ lb PAN

3. structure ID:________________  
   line m = ____________ lb PAN

4. structure ID:________________  
   line m = ____________ lb PAN

5. structure ID:________________  
   line m = ____________ lb PAN

6. structure ID:________________  
   line m = ____________ lb PAN

n. lines 1 + 2 + 3 + 4 + 5 + 6 = _______________ lb PAN

III. TOTAL PAN BALANCE REMAINING FOR AVAILABLE CROPS DURING 30 DAY DRAW DOWN PERIOD. DO NOT LIST FIELDS TO WHICH PAN CAN NOT BE APPLIES DURING THIS 30 DAY PERIOD.

<table>
<thead>
<tr>
<th>o. tract #</th>
<th>p. field #</th>
<th>q. crop</th>
<th>r. acres</th>
<th>s. remaining IRR-2 PAN balance (lb/acre)</th>
<th>t. TOTAL PAN BALANCE FOR FIELD (lbs.) column r x s</th>
<th>u. application window</th>
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</table>

1State current crop ending application date or next crop application beginning date for available receiving crops during 30 day drawn down period

v. Total PAN available for all fields (sum of column t) = _______________ lb. PAN

IV. FACILITY’S PoA OVERALL PAN BALANCE

PoA (30 Day) 2/21/00
w. Total PAN to be land applied (line n from section II) = _______________ lb. PAN
x. Crop's remaining PAN balance (line v from section III) = _______________ lb. PAN
y. Overall PAN balance (w - x) = _______________ lb. PAN

Line y must show as a deficit. If line y does not show as a deficit, list course of action here including pump and haul, depopulation, herd reduction, etc. For pump & haul and herd reduction options, recalculate new PAN based on new information. If new fields are to be included as an option for lowering lagoon level, add these fields to the PAN balance table and recalculate the overall PAN balance. If animal waste is to be hauled to another permitted facility provide information regarding the herd population and lagoon freeboard levels at the receiving facility.

NARRATIVE:
This plan will be implemented in the event that wastes from your operation are leaking, overflowing, or running off site. You should not wait until wastes reach surface waters or leave your property to consider that you have a problem. You should make every effort to ensure that this does not happen. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. Stop the release of wastes. Depending on the situation, this may or may not be possible. Suggested responses to some possible problems are listed below.

   A. Lagoon overflow-possible solutions are:
      a. Add soil to berm to increase elevation of dam.
      b. Pump wastes to fields at an acceptable rate.
      c. Stop all flows to the lagoon immediately.
      d. Call a pumping contractor.
      e. Make sure no surface water is entering lagoon.

   B: Runoff from waste application field-actions include:
      a. Immediately stop waste application.
      b. Create a temporary diversion to contain waste.
      c. Incorporate waste to reduce runoff.
      d. Evaluate and eliminate the reason(s) that caused the runoff.
      e. Evaluate the application rates for the fields where runoff occurred.

   C: Leakage from the waste pipes and sprinklers-action include:
      a. Stop recycle pump.
      b. Stop irrigation pump.
      c. Close valves to eliminate further discharge.
      d. Repair all leaks prior to restarting pumps.

December 18, 1996
D: Leakage from flush systems, houses, solid separators-action include:

a. Stop recycle pump.
b. Stop irrigation pump.
c. Make sure no siphon occurs.
d. Stop all flows in the house, flush systems, or solid separators.
e. Repair all leaks prior to restarting pumps.

E: Leakage from base or sidewall of lagoon. Often this is seepage as opposed to flowing leaks- possible action:

a. Dig a small sump or ditch away from the embankment to catch all seepage, put in a submersible pump, and pump back to lagoon.
b. If holes are caused by burrowing animals, trap or remove animals and fill holes and compact with a clay type soil.
c. Have a professional evaluate the condition of the side walls and lagoon bottom as soon as possible.

2. Assess the extent of the spill and note any obvious damages.

a. Did the waste reach any surface waters?
b. Approximately how much was released and for what duration?
c. Any damage noted, such as employee injury, fish kills, or property damage?
d. Did the spill leave the property?
e. Does the spill have the potential to reach surface waters?
f. Could a future rain event cause the spill to reach surface waters?
g. Are potable water wells in danger (either on or off of the property)?
h. How much reached surface waters?

3: Contact appropriate agencies.

a. During normal business hours, call your DWQ (Division of Water Quality) regional office; Phone - - - . After hours, emergency number: 919-733-3942. Your phone call should include: your name, facility, telephone number, the details of the incident from item 2 above, the exact location of the facility, the location or direction of movement of the spill, weather and wind conditions. The corrective measures that have been under taken, and the seriousness of the situation.
b. If spill leaves property or enters surface waters, call local EMS Phone number - - - .
c. Instruct EMS to contact local Health Department.
d. Contact CES, phone number - - - , local SWCD office phone number - - - , and local NRCS office for advice/technical assistance phone number - - - .

December 18, 1996
4: If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask that person to contact the proper agencies for you.

5: Contact the contractor of your choice to begin repair of problem to minimize off-site damage.
   a. Contractors Name: ____________________________
   b. Contractors Address: __________________________
   c. Contractors Phone: ____________________________

6: Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc.)
   a. Name: _________________________________________
   b. Phone: _________________________________________

7: Implement procedures as advised by DWQ and technical assistance agencies to rectify the damage, repair the system, and reassess the waste management plan to keep problems with release of wastes from happening again.

December 18, 1996


Example of Notice of Discharge

Notification of Wastewater Spill in Sampson County

House Bill 1160, which the General Assembly enacted in July 1999, requires that municipalities, animal operations, industries and others who operate waste handling systems issue news releases when a waste spill of 1,000 gallons or more reaches surface waters.

In accordance with that regulation, the following news release has been prepared and issued to media in the affected county (ies):

The John Doe Animal Farm of Springfield had a wastewater spill October 1, 1999 of an estimated 1,000 gallons from a spray field near the intersection of State Road 1445 and Big Curve Road. The untreated wastewater spilled into an unnamed tributary that flows to Big Creek in the Cape Fear River Basin.

The Division of Water Quality was notified of the event on October 1, 1999 and is reviewing the matter. For information contact the John Doe Animal Farm at (457) 968-2254.

############################
<table>
<thead>
<tr>
<th>Entity</th>
<th>website</th>
<th>Information found there</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Carolina Pork Council</td>
<td><a href="http://www.ncpork.org">http://www.ncpork.org</a></td>
<td>Commodity information, regulations, environmental bulletins, upcoming events</td>
</tr>
<tr>
<td>North Carolina Division of Water Quality – Technical Assistance and Certification Unit</td>
<td><a href="http://www.ncwaterquality.org/tacu">http://www.ncwaterquality.org/tacu</a></td>
<td>Information and rules on operator certification, upcoming training, status of certification and continuing education hours, examination applications and information, OIC designation forms</td>
</tr>
<tr>
<td>Organization</td>
<td>URL</td>
<td>Description</td>
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<td>--------------------------------------------------------</td>
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<tr>
<td>NCSU-College of Agriculture and Life Sciences</td>
<td><a href="http://www.cals.ncsu.edu/waste_mgt/apwmc.htm">http://www.cals.ncsu.edu/waste_mgt/apwmc.htm</a></td>
<td>Information on research concerning waste management systems</td>
</tr>
<tr>
<td>U.S. Environmental Protection Agency</td>
<td><a href="http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm">http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm</a></td>
<td>Concentrated Animal Feeding Operation Rules and Programs</td>
</tr>
<tr>
<td>USDA-LPES</td>
<td><a href="http://www.lpes.org/">http://www.lpes.org/</a></td>
<td>Information and training materials for confined animal feeding operations</td>
</tr>
<tr>
<td>NCDA&amp;CS Agronomic Division</td>
<td><a href="http://www.ncagr.com/agronomi/index.htm">http://www.ncagr.com/agronomi/index.htm</a></td>
<td>Information and forms for waste, soil, and plant samples, on-line sample results, regional agronomists</td>
</tr>
<tr>
<td>NCDA&amp;CS Veterinary Division</td>
<td><a href="http://www.ncagr.com/vet/index.htm">http://www.ncagr.com/vet/index.htm</a></td>
<td>Animal disease alerts, information on animal disease control, animal health programs</td>
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<tr>
<td>North Carolina State Animal Response Team</td>
<td><a href="http://nc.sartusa.org/">http://nc.sartusa.org/</a></td>
<td>Information on preparing and planning for, responding to, and recovering from animal emergencies.</td>
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<tr>
<td>North Carolina Division of Soil and Water</td>
<td><a href="http://www.enr.state.nc.us/DSWC/index.html">http://www.enr.state.nc.us/DSWC/index.html</a></td>
<td>Information on technical specialists, the Agriculture Cost Share Program</td>
</tr>
</tbody>
</table>