

**State of North Carolina  
Department of Environment and Natural Resources  
Division of Water Quality**

**Animal Waste Management Systems  
Request for Certificate of Coverage  
Facility Currently Covered by an Expiring NPDES General Permit**

On July 1, 2012, the North Carolina NPDES General Permits for Animal Waste Management Systems will expire. Facilities that have been issued Certificates of Coverage to operate under these NPDES General Permits must apply for renewal within 30 days of receipt of this application.

*Please do not leave any question unanswered. Please make any necessary corrections to the data below.*

1. Facility Number: 40-136 and Certificate of Coverage Number: NCA240136
2. Facility Name: Lindell 1+2
3. Landowner's name (same as on the Waste Management Plan): Murphy Brown, LLC
4. Landowner's mailing address: P.O. Box 856  
City/State: Warsaw NC Zip: 28395  
Telephone Number (include area code): 910-293-3434 E-mail: toniking@murphybrownllc.com
5. Facility's physical address: SR 1253, 2443 Pope Farm Rd.  
City/State: Stantonsburg NC Zip: 27883
6. County where facility is located: Greene
7. Farm Manager's name (If different than the Landowner): David Nordin
8. Farm Manager's telephone number (include area code): 910-293-3434
9. Integrator's name (if there is not an integrator write "None"): Murphy Brown, LLC
10. Lessee's name (if there is not a lessee write "None"): None
11. Indicate animal operation type and number:

**Swine**

Wean to Finish \_\_\_\_\_  
Wean to Feeder \_\_\_\_\_  
Farrow to Finish \_\_\_\_\_  
Feeder to Finish 8206  
Farrow to Wean \_\_\_\_\_  
Farrow to Feeder \_\_\_\_\_  
Boar/Stud \_\_\_\_\_  
Gilts \_\_\_\_\_  
Other \_\_\_\_\_

**Cattle**

Dairy Calf \_\_\_\_\_  
Dairy Heifer \_\_\_\_\_  
Milk Cow \_\_\_\_\_  
Dry Cow \_\_\_\_\_  
Beef Stocker Calf \_\_\_\_\_  
Beef Feeder \_\_\_\_\_  
Beef Brood Cow \_\_\_\_\_  
Other \_\_\_\_\_

**Dry Poultry**

Non Laying Chickens \_\_\_\_\_  
Laying Chickens \_\_\_\_\_  
Turkeys \_\_\_\_\_  
Other \_\_\_\_\_  
Pullets \_\_\_\_\_  
Turkey Poults \_\_\_\_\_

**Wet Poultry**

Non Laying Pullets \_\_\_\_\_  
Layers \_\_\_\_\_

**RECEIVED/DENR/DWQ  
MAR 12 2012  
Aquifer Protection Section**

Submit two (2) copies of the most recent **Certified Animal Waste Management Plan (CAWMP)**. The CAWMP must include the following components. Some of these components may not have been required at the time the facility was certified but should be added to the CAWMP for permitting purposes:

- ✓ The Waste Utilization Plan (WUP) must include the amount of Plant Available Nitrogen (PAN) produced and utilized by the facility
- ✓ The method by which waste is applied to the disposal fields (e.g. irrigation, injection, etc.)
- ✓ A map of every field used for land application
- ✓ The soil series present on every land application field
- ✓ The crops grown on every land application field
- ✓ The Realistic Yield Expectation (RYE) for every crop shown in the WUP
- ✓ The PAN to be applied to every land application field
- Phosphorous to be applied on every land application field with a "HIGH" PLAT rating.
- ✓ The waste application windows for every crop utilized in the WUP
- The required NRCS Standard specifications
- A site schematic
- ✓ Emergency Action Plan
- Insect Control Checklist with chosen best management practices noted
- Odor Control Checklist with chosen best management practices noted
- Mortality Control Checklist with the selected method noted. A mass mortality plan must also be included.
- Site-Specific Conservation Practices necessary to prevent runoff of pollutants to waters of the State.
- PLAT results including datasheets for each field.
- ✓ Lagoon/storage pond capacity documentation (design, calculations, etc.); please be sure to include any site evaluations, wetland determinations, or hazard classifications that may be applicable to your facility
- Operation and Maintenance Plan

I attest that this application has been reviewed by me and is accurate and complete to the best of my knowledge. I understand that, if all required parts of this application are not completed and that if all required supporting information and attachments are not included, this application package will be returned to me as incomplete. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application may be subject to civil penalties up to \$25,000 per violation. (18 U.S.C. Section 1001 provides a punishment by a fine of not more than \$10,000 or imprisonment of not more than 5 years, or both for a similar offense.)

Printed Name of Signing Official (Landowner, or if multiple Landowners all landowners should sign. If Landowner is a corporation, signature should be by a principal executive officer of the corporation):

Name: Murphy Brown, LLC Title: Asst Vice Pres. Environ. Health & Compliance  
Murphy Brown, LLC  
 Signature: [Signature] Date: 5-6-2012  
 Name: \_\_\_\_\_ Title: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

THE COMPLETED APPLICATION SHOULD BE SENT TO THE FOLLOWING ADDRESS:

NCDENR – DWQ Animal Feeding Operations Unit  
 1636 Mail Service Center  
 Raleigh, North Carolina 27699-1636  
 Telephone Number: (919) 807-6300  
 Fax Number: (919) 807-6354



North Carolina Department of Environment and Natural Resources

Division of Water Quality

Beverly Eaves Perdue  
Governor

Coleen H. Sullins  
Director

Dee Freeman  
Secretary

August 16, 2010

Murphy-Brown, LLC  
Lindell Farms 1 & 2  
P. O. Box 856  
Warsaw, NC 28398

Subject: Certificate of Coverage No. NCA240136  
Lindell Farms 1 & 2  
Animal Waste Management System  
Greene County

*COC*  
*Existing*

Dear Murphy-Brown, LLC:

In accordance with your May 12, 2010 application, we are hereby forwarding to you this Certificate of Coverage (COC) issued to Murphy-Brown, LLC, authorizing the operation of the subject animal waste management system in accordance with NPDES General Permit NCA200000.

This approval shall consist of the operation of this system including, but not limited to, the management and land application of animal waste as specified in the facility's Certified Animal Waste Management Plan (CAWMP) for the Lindell Farms 1 & 2, located in Greene County, with an animal capacity of no greater than the following swine annual averages:

Wean to Finish: 0	Feeder to Finish: 8200	Boar/Stud: 0
Wean to Feeder: 0	Farrow to Wean: 0	Gilts: 0
Farrow to Finish: 0	Farrow to Feeder: 0	

If this is a Farrow to Wean or Farrow to Feeder operation, there may also be one boar for each 15 sows. Where boars are unnecessary, they may be replaced by an equivalent number of sows. Any of the sows may be replaced by gilts at a rate of 4 gilts for every 3 sows

The COC shall be effective from the date of issuance until June 30, 2012 and replaces the COC No. AWS400136 dated October 1, 2009. Pursuant to this COC, you are authorized and required to operate the system in conformity with the conditions and limitations as specified in the General Permit, the facility's CAWMP, and this COC. An adequate system for collecting and maintaining the required monitoring data and operational information must be established for this facility. Any increase in waste production greater than the certified design capacity or increase in number of animals authorized by this COC (as provided above) will require a modification to the CAWMP and this COC and must be completed prior to actual increase in either wastewater flow or number of animals.

**Please carefully read this COC and the enclosed General Permit. This General Permit contains many new requirements than the previous NPDES General Permit. Enclosed for your convenience is a package containing the new and revised forms used for record keeping and reporting. Please pay careful attention to the record keeping and monitoring conditions in this permit. The Animal Facility Annual Certification Form must be completed and returned to the Division of Water Quality by no later than March 1st of each year.**

If your Waste Utilization Plan has been developed based on site-specific information, careful evaluation of future samples is necessary. Should your records show that the current Waste Utilization Plan is inaccurate you will need to have a new Waste Utilization Plan developed.

1636 Mail Service Center, Raleigh, North Carolina 27699-1636  
Location: 2728 Capital Blvd., Raleigh, North Carolina 27604  
Phone: 919-733-3221 \ FAX: 919-715-0588 \ Customer Service: 1-877-623-6748  
Internet: [www.ncwaterquality.org](http://www.ncwaterquality.org)

One  
North Carolina  
*Naturally*

The issuance of this COC does not excuse the Permittee from the obligation to comply with all applicable laws, rules, standards, and ordinances (local, state, and federal), nor does issuance of a COC to operate under this permit convey any property rights in either real or personal property.

Upon abandonment or depopulation for a period of four years or more, the Permittee must submit documentation to the Division demonstrating that all current NRCS standards are met prior to restocking of the facility.

Per 15A NCAC 02T .0111(c), a compliance boundary is provided for the facility and no new water supply wells shall be constructed within the compliance boundary. Per NRCS standards a 100-foot separation shall be maintained between water supply wells and any lagoon or any wetted area of a spray field.

Per 15A NCAC 02T .1306, any containment basin, such as a lagoon or waste storage structure, shall continue to be subject to the conditions and requirements of the facility's permit until closed to NRCS standards and the permit is rescinded by the Division.

Please be advised that any violation of the terms and conditions specified in this COC, the General Permit or the CAWMP may result in the revocation of this COC, or penalties in accordance with NCGS 143-215.6A through 143-215.6C, the Clean Water Act and 40 CFR 122.41 including civil penalties, criminal penalties, and injunctive relief.

If you wish to continue the activity permitted under the General Permit after the expiration date of the General Permit, an application for renewal must be filed at least 180 days prior to expiration.

This COC is not automatically transferable. A name/ownership change application must be submitted to the Division prior to a name change or change in ownership.

If any parts, requirements, or limitations contained in this COC are unacceptable, you have the right to apply for an individual NPDES Permit by contacting the staff member listed below for information on this process. Unless such a request is made within 30 days, this COC shall be final and binding.

This facility is located in a county covered by our Washington Regional Office. The Regional Office Aquifer Protection Staff may be reached at (252) 946-6481. If you need additional information concerning this COC or the General Permit, please contact the Animal Feeding Operations Unit staff at (919) 733-3221.

Sincerely,



for Coleen H. Sullins

Enclosures (General Permit NCA200000, Record Keeping and Reporting Package)

cc: (Certificate of Coverage only for all cc's)  
Washington Regional Office, Aquifer Protection Section  
Greene County Health Department  
Greene County Soil and Water Conservation District  
APS Central Files (Permit No. NCA207008)  
AFO Notebooks

# Animal Waste Management Plan Certification

(Please type or print all information that does not require a signature)

Existing or New or Expanded (please circle one)

**General Information:**

Name of Farm: Lindell Farms 1+2 Facility No: 40 -- 138 136

Owner(s) Name: Murphy Family Farms Phone No: (910) 238-2388

Mailing Address: Rt. 1 Box 45A, Waltonsburg, NC 27884

Farm Location: County Farm is located in: Greene

Latitude and Longitude: 35 30 43 / 77 48 07 Integrator: MFF

Please attach a copy of a county road map with location identified and describe below (Be specific: road names, directions, milepost, etc.): Take NC 58 N towards Wilson for 10.3 miles

+ turn left on SR 1225; Go 0.4 mile to Lindell crossroads; Turn left on SR 1253; Go 2.6 miles to Lindell crossroads + turn left on SR 1253; Go 6.0 miles to farm entrance on left

**Operation Description:**

Type of Swine	No. of Animals	Type of Poultry	No. of Animals	Type of Cattle	No. of Animals
<input type="checkbox"/> Wean to Feeder		<input type="checkbox"/> Layer		<input type="checkbox"/> Dairy	
<input checked="" type="checkbox"/> Feeder to Finish	<u>8200</u>	<input type="checkbox"/> Pullets		<input type="checkbox"/> Beef	
<input type="checkbox"/> Farrow to Wean		Other Type of Livestock: _____		Number of Animals: _____	
<input type="checkbox"/> Farrow to Feeder					
<input type="checkbox"/> Farrow to Finish					
<input type="checkbox"/> Gilts					
<input type="checkbox"/> Boars					

Expanding Operation Only  
 Previous Design Capacity: \_\_\_\_\_ Additional Design Capacity: \_\_\_\_\_ Total Design Capacity: \_\_\_\_\_

Acres Available for Application: 61.9 Required Acres: 61.9

Number of Lagoons / Storage Ponds: 1 Total Capacity: 1,920,126 Cubic Feet (ft<sup>3</sup>)

Are subsurface drains present on the farm: YES or NO (please circle one)

If YES: are subsurface drains present in the area of the LAGOON or SPRAY FIELD (please circle one)

**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 approved animal waste management plan for the farm named above and will implement these procedures. I (we) know that any expansion to the existing design capacity of the waste treatment and storage system or construction of new facilities will require a new certification to be submitted to the Division of Environmental Management 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 run-off of pollutants from lounging and heavy use areas must be minimized using technical standards developed by the Natural Resources Conservation Service. The approved plan will be filed at the farm and at the office of the local Soil and Water Conservation District. I (we) know that any modification must be approved by a technical specialist and submitted to the Soil and Water Conservation District prior to implementation. A change in land ownership requires written notification to DEM or a new certification (if the approved plan is changed) within 60 days of a title transfer.

Name of Land Owner: Murphy Family Farms

Signature: \_\_\_\_\_ Date: 12/24/97

Name of Manager (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# Technical Specialist Certification

I. As a technical specialist designated by the North Carolina Soil and Water Conservation Commission pursuant to 15A NCAC 6F .0005, I certify that the animal waste management system for the farm named above has an animal waste management plan that meets or exceeds standards and specifications of the Division of Environmental Management (DEM) as specified in 15A NCAC 2H.0217 and the USDA-Natural Resources Conservation Service (NRCS) and/or the North Carolina Soil and Water Conservation Commission pursuant to 15A NCAC 2H.0217 and 15A NCAC 6F .0001-.0005. The following elements are included in the plan as applicable. While each category designates a technical specialist who may sign each certification (SD, SI, WUP, RC, I), the technical specialist should only certify parts for which they are technically competent.

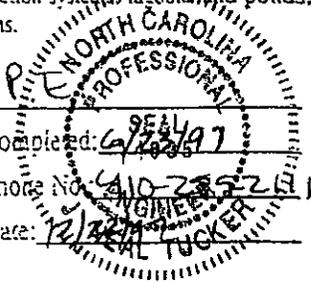
## II. Certification of Design

### A) Collection, Storage, Treatment System

Check the appropriate box

- Existing facility without retrofit (SD or WUP)  
Storage volume is adequate for operation capacity; storage capability consistent with waste utilization requirements.
- New, expanded or retrofitted facility (SD)  
Animal waste storage and treatment structures, such as but not limited to collection systems, troughs and ponds, have been designed to meet or exceed the minimum standards and specifications.

Name of Technical Specialist (Please Print): J. Neal Tucker  
Affiliation: Murphy Family Farms Date Work Completed: 6/28/97  
Address (Agency): P.O. Box 754 Rose Hill, NC 27054 Phone No: 410-289-2111  
Signature: J. Neal Tucker Date: 12/15/97



### B) Land Application Site (WUP)

The plan provides for minimum separations (buffers); adequate amount of land for waste utilization; chosen crop is suitable for waste management; hydraulic and nutrient loading rates.

Name of Technical Specialist (Please Print): Kraig Westerbeek  
Affiliation: Murphy Family Farms Date Work Completed: 12/15/97  
Address (Agency): P.O. Box 754 Rose Hill, NC 27054 Phone No: 289-2111  
Signature: [Signature] Date: 12/15/97

### C) Runoff Controls from Exterior Lots

Check the appropriate box

- Facility without exterior lots (SD or WUP or RC)  
This facility does not contain any exterior lots.
- Facility with exterior lots (RC)  
Methods to minimize the run off of pollutants from lounging and heavy use areas have been designed in accordance with technical standards developed by NRCS.

Name of Technical Specialist (Please Print): Kraig Westerbeek  
Affiliation: MFF Date Work Completed: 12/15/97  
Address (Agency): [Signature] Phone No: 289-2111  
Signature: [Signature] Date: 12/15/97

D). Application and Handling Equipment

Check the appropriate box

- Existing or expanding facility with existing waste application equipment (WUP or I)  
Animal waste application equipment specified in the plan has been either field calibrated or evaluated in accordance with existing design charts and tables and is able to apply waste as necessary to accommodate the waste management plan; (existing application equipment can cover the area required by the plan at rates not to exceed either the specified hydraulic or nutrient loading rates; a schedule for timing of applications has been established; required buffers can be maintained and calibration and adjustment guidance are contained as part of the plan).
- New, expanded, or existing facility without existing waste application equipment for spray irrigation. (I)  
Animal waste application equipment specified in the plan has been designed to apply waste as necessary to accommodate the waste management plan; (proposed application equipment can cover the area required by the plan at rates not to exceed either the specified hydraulic or nutrient loading rates; a schedule for timing of applications has been established; required buffers can be maintained; calibration and adjustment guidance are contained as part of the plan).
- New, expanded, or existing facility without existing waste application equipment for land spreading not using spray irrigation. (WUP or I)  
Animal waste application equipment specified in the plan has been selected to apply waste as necessary to accommodate the waste management plan; (proposed application equipment can cover the area required by the plan at rates not to exceed either the specified hydraulic or nutrient loading rates; a schedule for timing of applications has been established; required buffers can be maintained; calibration and adjustment guidance are contained as part of the plan).

Name of Technical Specialist (Please Print): Kraig Westerbeek  
 Affiliation: MFF Date Work Completed: 12/15/97  
 Address (Agency): \_\_\_\_\_ Phone No.: 281-2111  
 Signature: \_\_\_\_\_ Date: 12/15/97

E) Odor Control, Insect Control, Mortality Management and Emergency Action Plan (SD)

SI, WUP, RC or I  
 The waste management plan for this facility includes a Waste Management Odor Control Checklist, an Insect Control Checklist, a Mortality Management Checklist and an Emergency Action Plan. Sources of both odors and insects have been evaluated with respect to this site and Best Management Practices to Minimize Odors and Best Management Practices to Control Insects have been selected and included in the waste management plan. Both the Mortality Management Plan and the Emergency Action Plan are complete and can be implemented by this facility.

Name of Technical Specialist (Please Print): Kraig Westerbeek  
 Affiliation: MFF Date Work Completed: 12/15/97  
 Address (Agency): \_\_\_\_\_ Phone No.: 281-2111  
 Signature: \_\_\_\_\_ Date: 12/15/97

F) Written Notice of New or Expanding Swine Farm

The following signature block is only to be used for new or expanding swine farms that begin construction after June 21, 1996. If the facility was built before June 21, 1996, when was it constructed or last expanded 1990.

I (we) certify that I (we) have attempted to contact by certified mail all adjoining property owners and all property owners who own property located across a public road, street, or highway from this new or expanding swine farm. The notice was in compliance with the requirements of NCGS 106-805. A copy of the notice and a list of the property owners notified is attached.

Name of Land Owner: \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Name of Manager (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_  
 Signature: \_\_\_\_\_

### III. Certification of Installation

#### A) Collection, Storage, Treatment Installation

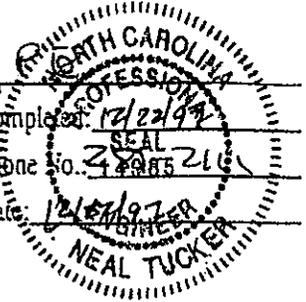
New, expanded or retrofitted facility (SI)

Animal waste storage and treatment structures, such as but not limited to lagoons and ponds, have been installed in accordance with the approved plan to meet or exceed the minimum standards and specifications.

*For existing facilities without retrofits, no certification is necessary.*

\*CERTIFICATION IS FOR NEW LIABILITY. EXISTING LIABILITIES ARE TO BE CLOSED

Name of Technical Specialist (Please Print): J. Neal Tucker  
Affiliation: MFP Date Work Completed: 12/22/97  
Address (Agency): P.O. Box 759 Rose Hill, NC 28458 Phone No.: 704-865-2111  
Signature: J. Neal Tucker Date: 12/15/97



#### B) Land Application Site (WUP)

Check the appropriate box

- The cropping system is in place on all land as specified in the animal waste management plan.
- Conditional Approval: all required land as specified in the plan is cleared for planting; the cropping system as specified in the waste utilization plan has not been established and the owner has committed to establish the vegetation as specified in the plan by \_\_\_\_\_ (month/day/year); the proposed cover crop is appropriate for compliance with the waste utilization plan.
- Also check this box if appropriate if the cropping system as specified in the plan can not be established on newly cleared land within 30 days of this certification, the owner has committed to establish an interim crop for erosion control;

Name of Technical Specialist (Please Print): Kraig Westerbeek  
Affiliation: MFP Date Work Completed: 12/15/97  
Address (Agency): \_\_\_\_\_ Phone No.: 281-2111  
Signature: \_\_\_\_\_ Date: 12/15/97

This following signature block is only to be used when the box for conditional approval in III. B above has been checked.

I (we) certify that I (we) have committed to establish the cropping system as specified in my (our) waste utilization plan, and if appropriate to establish the interim crop for erosion control, and will submit to DEM a verification of completion from a Technical Specialist within 15 calendar days following the date specified in the conditional certification. I (we) realize that failure to submit this verification is a violation of the waste management plan and will subject me (us) to an enforcement action from DEM.

Name of Land Owner: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Name of Manager (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_

C) Runoff Controls from Exterior Lots (RC)

Facility with exterior lots

Methods to minimize the run off of pollutants from lounging and heavy use areas have been installed as specified in the plan.

*For facilities without exterior lots, no certification is necessary.*

Name of Technical Specialist (Please Print): \_\_\_\_\_  
Affiliation \_\_\_\_\_ Date Work Completed: \_\_\_\_\_  
Address (Agency): \_\_\_\_\_ Phone No.: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

D) Application and Handling Equipment Installation (WUP or I)

Check the appropriate block

- Animal waste application and handling equipment specified in the plan is on site and ready for use; calibration and adjustment materials have been provided to the owners and are contained as part of the plan.
- Animal waste application and handling equipment specified in the plan has not been installed but the owner has proposed leasing or third party application and has provided a signed contract; equipment specified in the contract agrees with the requirements of the plan; required buffers can be maintained; calibration and adjustment guidance have been provided to the owners and are contained as part of the plan.
- Conditional approval: Animal waste application and handling equipment specified in the plan has been purchased and will be on site and installed by \_\_\_\_\_ (month/day/year); there is adequate storage to hold the waste until the equipment is installed and until the waste can be land applied in accordance with the cropping system contained in the plan; and calibration and adjustment guidance have been provided to the owners and are contained as part of the plan.

Name of Technical Specialist (Please Print): Kraig Westerbeek  
Affiliation MFF Date Work Completed: 12/15/97  
Address (Agency): \_\_\_\_\_ Phone No.: 289-2111  
Signature: \_\_\_\_\_ Date: 12/15/97

The following signature block is only to be used when the box for conditional approval in III D above has been checked.

I (we) certify that I (we) have committed to purchase the animal waste application and handling equipment as specified in my (our) waste management plan and will submit to DEM a verification of delivery and installation from a Technical Specialist within 15 calendar days following the date specified in the conditional certification. I (we) realize that failure to submit this verification is a violation of the waste management plan and will subject me (us) to an enforcement action from DEM.

Name of Land Owner: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Name of Manager (if different from owner): \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_

E) Odor Control, Insect Control and Mortality Management (SD, SI, WUP, RC or I)

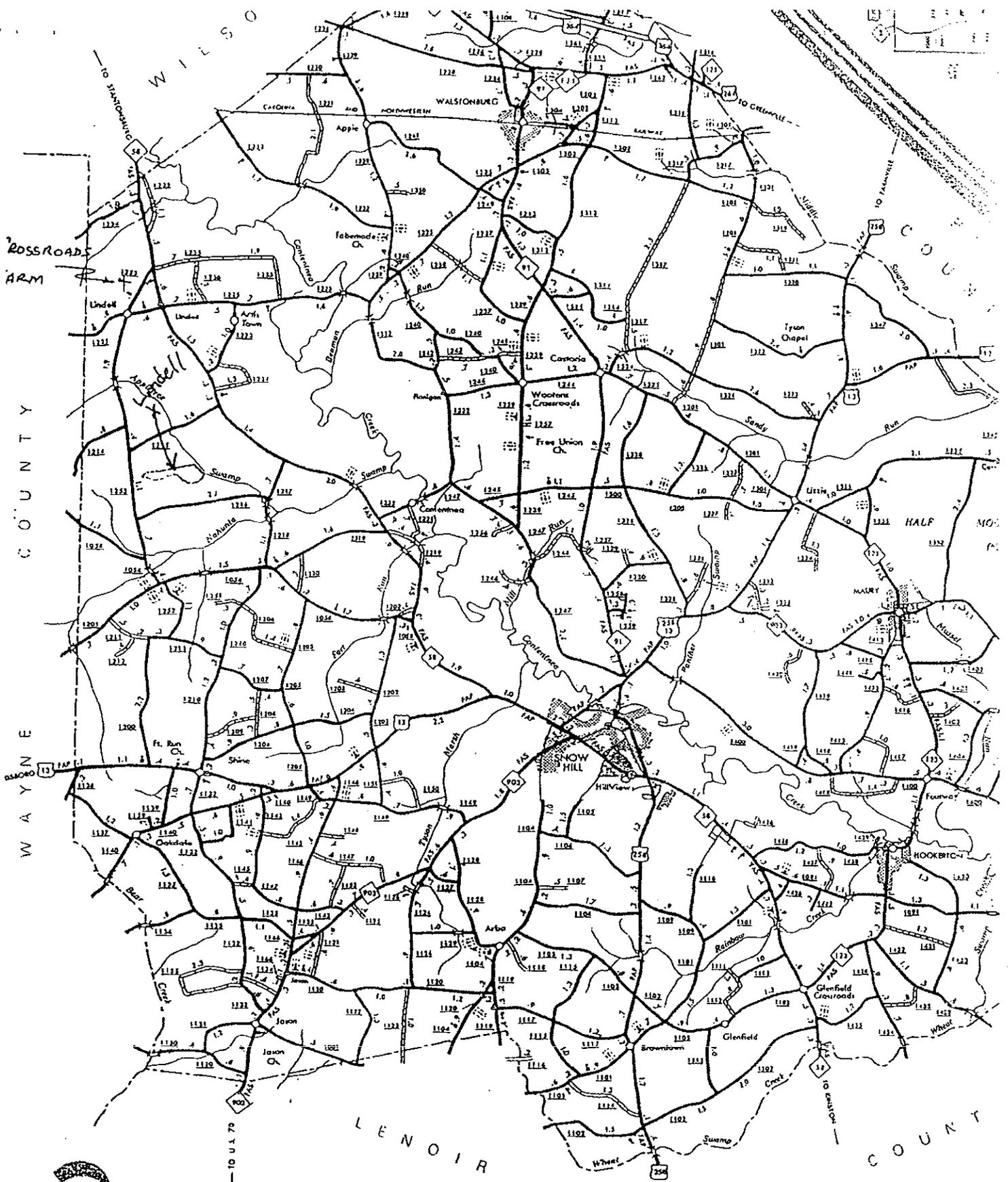
Methods to control odors and insects as specified in the Plan have been installed and are operational. The mortality management system as specified in the Plan has also been installed and is operational.

Name of Technical Specialist (Please Print): Kraig Westerbeek  
Affiliation MFF Date Work Completed: \_\_\_\_\_  
Address (Agency): \_\_\_\_\_ Phone No.: 289-2111  
Signature: \_\_\_\_\_ Date: 12/15/97

Please return the completed form to the Division of Water Quality at the following address:

Department of Environment, Health, and Natural Resources  
Division Of Water Quality  
Water Quality Section, Compliance Group  
P.O. Box 29535  
Raleigh, NC 27626-0535

Please also remember to submit a copy of this form along with the complete Animal Waste Management Plan to the local Soil and Water Conservation District Office and to keep a copy in your files with your Animal Waste Management Plan.



M00202170127

## NUTRIENT UTILIZATION PLAN

Grower(s):	Murphy-Brown, LLC
Farm Name:	Lindell Farm; 40-136
County:	Greene

<b>Farm Capacity:</b>	
Farrow to Wean	
Farrow to Feeder	
Farrow to Finish	
Wean to Feeder	
Feeder to Finish	8200

Storage Structure:	Anaerobic Lagoon
Storage Period:	>180 days
Application Method:	Irrigation

The waste from your animal facility must be land applied at a specified rate to prevent pollution of surface water and/or groundwater. The plant nutrients in the animal waste should be used to reduce the amount of commercial fertilizer required for the crops in the fields where the waste is to be applied.

This waste utilization plan uses nitrogen as the limiting nutrient. Waste should be analyzed before each application cycle. Annual soil tests are strongly encouraged so that all plant nutrients can be balanced for realistic yields of the crop to be grown.

Several factors are important in implementing your waste utilization plan in order to maximize the fertilizer value of the waste and to ensure that it is applied in an environmentally safe manner:

1. Always apply waste based on the needs of the crop to be grown and the nutrient content of the waste. Do not apply more nitrogen than the crop can utilize.
2. Soil types are important as they have different infiltration rates, leaching potentials, cation exchange capacities, and available water holding capacities.
3. Normally waste shall be applied to land eroding at less than 5 tons per acre per year. Waste may be applied to land eroding at 5 or more tons per acre annually, but less than 10 tons per acre per year providing that adequate filter strips are established.
4. Do not apply waste on saturated soils, when it is raining, or when the surface is frozen. Either of these conditions may result in runoff to surface waters which is not allowed under DWQ regulations.
5. Wind conditions should also be considered to avoid drift and downwind odor problems.
6. To maximize the value of the nutrients for crop production and to reduce the potential for pollution, the waste should be applied to a growing crop or applied not more than 30 days prior to planting a crop or forages breaking dormancy. Injecting the waste or disking will conserve nutrients and reduce odor problems.

This plan is based on the waste application method shown above. If you choose to change methods in the future, you need to revise this plan. Nutrient levels for different application methods are not the same.

The estimated acres needed to apply the animal waste is based on typical nutrient content for this type of facility. In some cases you may want to have plant analysis made, which could allow additional waste to be applied. Provisions shall be made for the area receiving waste to be flexible so as to accommodate changing waste analysis content and crop type. Lime must be applied to maintain pH in the optimum range for specific crop production.

This waste utilization plan, if carried out, meets the requirements for compliance with 15A NCAC 2H .0217 adopted by the Environmental Management Commission.

**AMOUNT OF WASTE PRODUCED PER YEAR ( gallons, ft<sup>3</sup>, tons, etc.):**

Capacity	Type	Waste Produced per Animal	Total
8200	Farrow to Wean	3212 gal/yr	gal/yr
	Farrow to Feeder	4015 gal/yr	gal/yr
	Farrow to Finish	10585 gal/yr	gal/yr
	Wean to Feeder	223 gal/yr	gal/yr
	Feeder to Finish	986 gal/yr	8,085,200 gal/yr
<b>Total</b>			<b>8,085,200 gal/yr</b>

**AMOUNT OF PLANT AVAILABLE NITROGEN PRODUCED PER YEAR (lbs):**

Capacity	Type	Nitrogen Produced per Animal	Total
8200	Farrow to Wean	5.4 lbs/yr	lbs/yr
	Farrow to Feeder	6.5 lbs/yr	lbs/yr
	Farrow to Finish	26 lbs/yr	lbs/yr
	Wean to Feeder	0.48 lbs/yr	lbs/yr
	Feeder to Finish	1.7748 lbs/yr	14,553 lbs/yr
<b>Total</b>			<b>14,553 lbs/yr</b>

Applying the above amount of waste is a big job. You should plan time and have appropriate equipment to apply the waste in a timely manner.

**LAND UTILIZATION SUMMARY**

The following table describes the nutrient balance and land utilization rate for this facility. Note that the Nitrogen Balance for Crops indicates the ratio of the amount of nitrogen produced on this facility to the amount of nitrogen that the crops under irrigation may uptake and utilize in the normal growing season.

**Total Irrigated Acreage: 52.174**  
**Total N Required 1st Year: 14934.8075**  
**Total N Required 2nd Year: 0**

**Average Annual Nitrogen Requirement of Crops: 14,934.81**  
**Total Nitrogen Produced by Farm: 14,553.36**  
**Nitrogen Balance for Crops: (381.45)**

The following table describes the specifications of the hydrants and fields that contain the crops designated for utilization of the nitrogen produced on this facility. This chart describes the size, soil characteristics, and uptake rate for each crop in the specified crop rotation schedule for this facility.

Reception Area Specifications

Nitrogen

Tract	Field Hyd	Irrigated Acreage	Soil Type	1st Crop Code	Time to Apply	1st Crop Yield	1st Crop lbs N/Unit	Lbs N /Ac	Lbs N /Ac Residual	Total lbs N Utilized	2nd Crop Code	Time to Apply	2nd Crop Yield	2nd Crop lbs N/Unit	Lbs N /Ac	Total lbs N Utilized	Total lbs N Utilized	
T141	1	4.45	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1051.313	K	Sept-Apr	1	50	50	222.5	1273.813	
T141	2	2.55	WAB	B/C	Mar-Sept	5.4	43.75	236.25		602.4375	K	Sept-Apr	1	50	50	127.5	729.9375	
T3	3	5.93	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1400.963	K	Sept-Apr	1	50	50	236.5	1637.463	
T2121	5	5.1	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1204.875	K	Sept-Apr	1	50	50	255	1459.875	
T2121	7	1.64	WAB	B/C	Mar-Sept	5.4	43.75	236.25		387.45	K	Sept-Apr	1	50	50	82	469.45	
T3	8	5.31	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1254.488	K	Sept-Apr	1	50	50	265.5	1519.988	
T3	9	5.75	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1358.438	K	Sept-Apr	1	50	50	267.5	1625.938	
T2121	10	4.38	WAB	B/C	Mar-Sept	5.4	43.75	236.25		1034.775	K	Sept-Apr	1	50	50	219	1253.775	
T2121	11	0.88	WAB	B/C	Mar-Sept	5.4	43.75	236.25		207.9	K	Sept-Apr	1	50	50	44	251.9	
T2121	12	3.76	WAB	B/C	Mar-Sept	5.4	43.75	236.25		888.3	K	Sept-Apr	1	50	50	188	1076.3	
T2121	13	1.37	WAB	B/C	Mar-Sept	5.4	43.75	236.25		323.8625	K	Sept-Apr	1	50	50	68.5	392.3625	
T3	14	1.64	WAB	B/C	Mar-Sept	5.4	43.75	236.25		387.45	K	Sept-Apr	1	50	50	82	469.45	
T3	15	2.39	WAB	B/C	Mar-Sept	5.4	43.75	236.25		564.8375	K	Sept-Apr	1	50	50	119.5	684.3375	
T3	16	3.43	WAB	B/C	Mar-Sept	5.4	43.75	236.25		810.8375	K	Sept-Apr	1	50	50	171.5	982.3375	
T141	sub1	0.3	WAB	B/C	Mar-Sept	5.4	43.75	236.25		70.875	K	Sept-Apr	1	50	50	15	85.875	
T3&T2121	Sub2&3	1.104	WAB	B/C	Mar-Sept	5.4	43.75	236.25		260.82	K	Sept-Apr	1	50	50	55.2	316.02	
T3	sub4	0.24	WAB	B/C	Mar-Sept	5.4	43.75	236.25		56.7	K	Sept-Apr	1	50	50	12	68.7	
T2121	sub5	0.51	WAB	B/C	Mar-Sept	5.4	43.75	236.25		120.4875	K	Sept-Apr	1	50	50	25.5	145.9875	
T3	sub6	1.44	WAB	B/C	Mar-Sept	5.4	43.75	236.25		340.2	K	Sept-Apr	1	50	50	72	412.2	
<b>Total:</b>																		
															52.174	12326.11	2608.7	14934.81



This plan does not include commercial fertilizer. The farm should produce adequate plant available nitrogen to satisfy the requirements of the crops listed above.

The applicator is cautioned that P and K may be over applied while meeting the N requirements. In the future, regulations may require farmers in some parts of North Carolina to have a nutrient management plan that addresses all nutrients. This plan only addresses nitrogen.

In interplanted fields ( i.e. small grain, etc, interseeded in bermuda), forage must be removed through grazing, hay, and/or silage. Where grazing, plants should be grazed when they reach a height of six to nine inches. Cattle should be removed when plants are grazed to a height of four inches. In fields where small grain, etc, is to be removed for hay or silage, care should be exercised not to let small grain reach maturity, especially late in the season (i.e. April or May). Shading may result if small grain gets too high and this will definitely interfere with stand of bermudagrass. This loss of stand will result in reduced yields and less nitrogen being utilized. Rather than cutting small grain for hay or silage just before heading as is the normal situation, you are encouraged to cut the small grain earlier. You may want to consider harvesting hay or silage two to three times during the season, depending on the time small grain is planted in the fall.

The ideal time to interplant small grain, etc, is late September or early October. Drilling is recommended over broadcasting. Bermudagrass should be grazed or cut to a height of about two inches before drilling for best results.

#### CROP CODE LEGEND

Crop Code	Crop	Lbs N utilized / unit yield
A	Barley	1.6 lbs N / bushel
B	Hybrid Bermudagrass - Grazed	50 lbs N / ton
C	Hybrid Bermudagrass - Hay	50 lbs N / ton
D	Corn - Grain	1.25 lbs N / bushel
E	Corn - Silage	12 lbs N / ton
F	Cotton	0.12 lbs N / lbs lint
G	Fescue - Grazed	50 lbs N / ton
H	Fescue - Hay	50 lbs N / ton
I	Oats	1.3 lbs N / bushel
J	Rye	2.4 lbs N / bushel
K	Small Grain - Grazed	50 lbs N / acre
L	Small Grain - Hay	50 lbs N / acre
M	Grain Sorghum	2.5 lbs N / cwt
N	Wheat	2.4 lbs N / bushel
O	Soybean	4.0 lbs N / bushel
P	Pine Trees	40 lbs N / acre / yr

Acres shown in the preceding table are considered to be the usable acres excluding required buffers, filter strips along ditches, odd areas unable to be irrigated, and perimeter areas not receiving full application rates due to equipment limitations. Actual total acres in the fields listed may, and most likely will be, more than the acres shown in the tables.

See attached map showing the fields to be used for the utilization of animal waste.

**SLUDGE APPLICATION:**

The following table describes the annual nitrogen accumulation rate per animal in the lagoon sludge

Farm Specifications	PAN/yr/animal	Farm Total/yr
Farrow to Wean	0.84	
Farrow to Feeder	1	
Farrow to Finish	4.1	
Wean to Feeder	0.072	
8200 Feeder to Finish	0.36	2952

The waste utilization plan must contain provisions for periodic land application of sludge at agronomic rates. The sludge will be nutrient rich and will require precautionary measures to prevent over application of nutrients or other elements. Your production facility will produce approximately 2952 pounds of plant available nitrogen per year will accumulate in the lagoon sludge based on the rates of accumulation listed above.

If you remove the sludge every 5 years, you will have approximately 14760 pounds of plant available nitrogen to utilize. Assuming you apply this PAN to hybrid bermuda grass hayland at the rate of 300 pounds of nitrogen per acre, you will need 49 acres of land. If you apply the sludge to corn at a rate of 125 pounds per acre, you will need 118.08 acres of land. Please note that these are only estimates of the PAN produced and the land required to utilize that PAN. Actual values may only be determined by sampling the sludge for plant available nitrogen content prior to application. Actual utilization rates will vary with soil type, crop, and realistic yield expectations for the specific application fields designated for sludge application at time of removal.

**APPLICATION OF WASTE BY IRRIGATION:**

The irrigation application rate should not exceed the intake rate of the soil at the time of irrigation such that runoff or ponding occurs. This rate is limited by initial soil moisture content, soil structure, soil texture, water droplet size, and organic solids. The application amount should not exceed the available water holding capacity of the soil at the time of irrigation nor should the plant available nitrogen applied exceed the nitrogen needs of the crop.

If surface irrigation is the method of land application for this plan, it is the responsibility of the producer and irrigation designer to ensure that an irrigation system is installed to properly irrigate the acres shown in the preceding table. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

\*This is the maximum application amount allowed for the soil assuming the amount of nitrogen allowed for the crop is not over applied. In many situations, the application amount shown cannot be applied because of the nitrogen limitation. The maximum application amount shown can be applied under optimum soil conditions.

Your facility is designed for >180 days of temporary storage and the temporary storage must be removed on the average of once every 6 months. In no instance should the volume of the waste stored in your structure be within the 25 year 24 hour storm storage or one foot of freeboard except in the event of the 25 year 24 hour storm.

It is the responsibility of the producer and waste applicator to ensure that the spreader equipment is operated properly to apply the correct rates to the acres shown in the tables. Failure to apply the recommended rates and amounts of nitrogen shown in the tables may make this plan invalid.

Call your technical specialist after you receive the waste analysis report for assistance in determining the amount of waste per acre and the proper application prior to applying the waste.

## Application Rate Guide

The following is provided as a guide for establishing application rates and amounts.

<b>Tract</b>	<b>Hydrant</b>	<b>Soil Type</b>	<b>Crop</b>	<b>Application Rate in/hr</b>	<b>Application Amount * inches</b>
T141	1	WaB	B/C	0.6	1
T141	2	WaB	B/C	0.6	1
T3	3	WaB	B/C	0.6	1
T2121	5	WaB	B/C	0.6	1
T2121	7	WaB	B/C	0.6	1
T3	8	WaB	B/C	0.6	1
T3	9	WaB	B/C	0.6	1
T2121	10	WaB	B/C	0.6	1
T2121	11	WaB	B/C	0.6	1
T2121	12	WaB	B/C	0.6	1
T2121	13	WaB	B/C	0.6	1
T3	14	WaB	B/C	0.6	1
T3	15	WaB	B/C	0.6	1
T3	16	WaB	B/C	0.6	1
T141	sub1	WaB	B/C	0.6	1
T3	sub4	WaB	B/C	0.6	1
T2121	sub5	WaB	B/C	0.6	1
T3	sub6	WaB	B/C	0.6	1



## NUTRIENT UTILIZATION PLAN CERTIFICATION

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**Name of Farm:** Lindell Farm; 40-136  
**Owner:** Murphy-Brown, LLC  
**Manager:**

**Owner/Manager Agreement:**

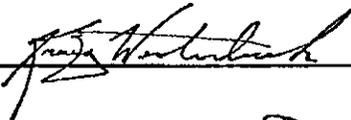
I/we understand and will follow and implement the specifications and the operation and maintenance procedures established in the approved animal waste nutrient management plan for the farm named above. I/we know that any expansion to the existing design capacity of the waste treatment and/or storage system, or construction of new facilities, will require a new nutrient management plan and a new certification to be submitted to DWQ before the new animals are stocked.

I/we understand that I must own or have access to equipment, primarily irrigation equipment, to land apply the animal waste described in this nutrient management plan. This equipment must be available at the appropriate pumping time such that no discharge occurs from the lagoon in the event of a 25 year 24 hour storm. I also certify that the waste will be applied on the land according to this plan at the appropriate times and at rates which produce no runoff.

This plan will be filed on site at the farm office and at the office of the local Soil and Water Conservation District and will be available for review by NCDWQ upon request.

**Name of Facility Owner:** Murphy-Brown, LLC

**Signature:**



4-3-2012  
Date

**Name of Manager (if different from owner):**

David Nordin

**Signature:**

David Nordin

4-3-2012  
Date

**Name of Technical Specialist:** Toni W. King  
**Affiliation:** Murphy-Brown, LLC.  
**Address:** 2822 Hwy 24 West, PO Drawer 856  
Warsaw, NC 28398  
**Telephone:** (910) 293-3434

**Signature:**

Toni W. King

4-3-2012  
Date

# NUTRIENT UTILIZATION PLAN

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## REQUIRED SPECIFICATIONS

- 1 Animal waste shall not reach surface waters of the state by runoff, drift, manmade conveyances, direct application, or direct discharge during operation or land application. Any discharge of waste which reaches surface water is prohibited.
  
- 2 There must be documentation in the design folder that the producer either owns or has an agreement for use of adequate land on which to properly apply the waste. If the producer does not own adequate land to properly dispose of the waste, he/she shall provide evidence of an agreement with a landowner, who is within a reasonable proximity, allowing him/her the use of the land for waste application. It is the responsibility of the owner of the waste production facility to secure an update of the Nutrient Utilization Plan when there is a change in the operation, increase in the number of animals, method of application, receiving crop type, or available land.
  
- 3 Animal waste shall be applied to meet, but not exceed, the nitrogen needs for realistic crop yields based upon soil type, available moisture, historical data, climatic conditions, and level of management, unless there are regulations that restrict the rate of applications for other nutrients.
  
- 4 Animal waste shall be applied to land eroding less than 5 tons per acre per year. Waste may be applied to land eroding at more than 5 tons per acre per year but less than 10 tons per acre per year provided grass filter strips are installed where runoff leaves the field (See USDA, NRCS Field Office Technical Guide Standard 393 - Filter Strips).

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- 5 Odors can be reduced by injecting the waste or disking after waste application. Waste should not be applied when there is danger of drift from the land application field.
  
- 6 When animal waste is to be applied on acres subject to flooding, waste will be soil incorporated on conventionally tilled cropland. When waste is applied to conservation tilled crops or grassland, the waste may be broadcast provided the application does not occur during a season prone to flooding (See "Weather and Climate in North Carolina" for guidance).
  
- 7 Liquid waste shall be applied at rates not to exceed the soil infiltration rate such that runoff does not occur offsite or to surface waters and in a method which does not cause drift from the site during application. No ponding should occur in order to control odor and flies.
  
- 8 Animal waste shall not be applied to saturated soils, during rainfall events, or when the surface is frozen.

# NUTRIENT UTILIZATION PLAN

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## REQUIRED SPECIFICATIONS

(continued)

9 Animal waste shall be applied on actively growing crops in such a manner that the crop is not covered with waste to a depth that would inhibit growth. The potential for salt damage from animal waste should also be considered.

10 Nutrients from waste shall not be applied in fall or winter for spring planted crops on soils with a high potential for leaching. Waste/nutrient loading rates on these soils should be held to a minimum and a suitable winter cover crop planted to take up released nutrients. Waste shall not be applied more than 30 days prior to planting of the crop or forages breaking dormancy.

11 Any new swine facility sited on or after October 1, 1995 shall comply with the following: The outer perimeter of the land area onto which waste is applied from a lagoon that is a component of a swine farm shall be at least 50 feet from any residential property boundary and canal. Animal waste, other than swine waste from facilities sited on or after October 1, 1995, shall not be applied closer than 25 feet to perennial waters.

12 Animal waste shall not be applied closer than 100 feet to wells.

13 Animal waste shall not be applied closer than 200 feet of dwellings other than those owned by the landowner.

14  
Waste shall be applied in a manner not to reach other property and public right-of-ways.

15 Animal waste shall not be discharged into surface waters, drainageways, or wetlands by discharge or by over-spraying. Animal waste may be applied to prior converted cropland provided the fields have been approved as a land application site by a "technical specialist". Animal waste shall not be applied on grassed waterways that discharge directly into water courses, and on other grassed waterways, waste shall be applied at agronomic rates in a manner that causes no runoff or drift from the site.

16 Domestic and industrial waste from washdown facilities, showers, toilets, sinks, etc., shall not be discharged into the animal waste management system.

# NUTRIENT UTILIZATION PLAN

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## REQUIRED SPECIFICATIONS

(continued)

- 17 A protective cover of appropriate vegetation will be established on all disturbed areas (lagoon embankments, berms, pipe runs, etc.). Areas shall be fenced, as necessary, to protect the vegetation. Vegetation such as trees, shrubs, and other woody species, etc., are limited to areas where considered appropriate. Lagoon areas should be kept mowed and accessible. Berms and structures should be inspected regularly for evidence of erosion, leakage, or discharge.
- 18 If animal production at the facility is to be suspended or terminated, the owner is responsible for obtaining and implementing a "closure plan" which will eliminate the possibility of an illegal discharge, pollution and erosion.
- 19 Waste handling structures, piping, pumps, reels, etc., should be inspected on a regular basis to prevent breakdowns, leaks and spills. A regular maintenance checklist should be kept on site.
- 20 Animal waste can be used in a rotation that includes vegetables and other crops for direct human consumption. However, if animal waste is used on crops for direct human consumption, it should only be applied pre-plant with no further applications of animal waste during the crop season.
- 21 Highly visible markers shall be installed to mark the top and bottom elevations of the temporary storage (pumping volume) of all waste treatment lagoons. Pumping shall be managed to maintain the liquid level between the markers. A marker will be required to mark the maximum storage volume for waste storage ponds.
- 22 Waste shall be tested within 60 days of utilization and soil shall be tested at least annually at crop sites where waste products are applied. Nitrogen shall be the rate-determining nutrient, unless other restrictions require waste to be applied based on other nutrients, resulting in a lower application rate than a nitrogen based rate. Zinc and copper levels in the soil shall be monitored and alternative crop sites shall be used when these metals approach excessive levels. pH shall be adjusted and maintained for optimum crop production. Soil and waste analysis records shall be kept for a minimum of five years. Poultry dry waste application records shall be maintained for a minimum of three years. Waste application records for all other waste shall be maintained for a minimum of five years.
- 23 Dead animals will be disposed of in a manner that meets North Carolina regulations.





## Phosphorus Loss Assessment Tool Completion

Name of Facility: Lindell Farm Facility Number: 40-136  
Owner(s) Name: Murphy Brown, LLC Phone No: 910-293-3434  
Mailing Address: P.O. Box 856 Warsaw, NC 28398

Check the appropriate box below, and sign at the bottom:

- No fields received a high or very high rating.  
 Yes, the fields listed below received a high or very high rating:

Field Number	Size (Acres)	Rating (High or Very High)
<u>Pulls 4, 6, sub 2+3</u>	<u>10.9</u>	<u>28 (High)</u>

Please use as many additional attachment forms (PLAT-A-12-15-05) as needed for additional fields.

By completing the above section and any additional attachments and by signing this form, the facility owner and Technical Specialist acknowledge all application fields were evaluated using the Phosphorus Loss Assessment Tool. All necessary calculations were completed to conduct the Assessment. A copy will be kept on site with the Certified Animal Waste Management Plan. Any future modifications must be approved by a technical specialist and filed with the Soil and Water Conservation District prior to implementation. Waste plans with fields having a high or very high rating will have to be modified to address phosphorus loss by the next permit cycle beginning July, 2007.

Owner Name: Murphy Brown, LLC  
Owner Signature: [Signature] Date: 4-3-2012

Technical Specialist Name: Toni W. King  
Technical Specialist Signature: Toni W. King Date: 4-3-2012  
Affiliation: Murphy Brown, LLC Phone No: 910-293-5334

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

INPUTS

Calendar Year: 2012  
County: Greene  
Producer Identifier: 40-136  
Tract Number: T141  
Field Number: Pulls 1,2,sub1  
Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
Crop: Hybrid Bermudagrass (Pasture)\*\* :  
Fertilizers: Swine-Lagoon liquid  
Yearly Applied Amount: 4.55 ac in  
Lb P205: 53.4 lb  
Application Method: All other surface applications

Soil Loss: 0.040 t/ac/yr  
Receiving Slope Distance 0-9 ft  
Soil Test 0" - 4" 295  
WV\_Factor (DATABASE) 1.4  
Soil Test 28" - 32" 25  
WV\_Factor (USER) 1.32  
Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
SOLUBLE P = 2  
LEACHATE P = 8  
SOURCE P = 1  
TOTAL P RATING = 11 (LOW)

INPUTS

Calendar Year: 2012  
County: Greene  
Producer Identifier: 40-136  
Tract Number: T3, T2121  
Field Number: Pulls 4,6, sub2&3  
Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
Crop: Hybrid Bermudagrass (Pasture)\*\* :  
Fertilizers: Swine-Lagoon liquid  
Yearly Applied Amount: 4.55 ac in  
Lb P2O5: 53.4 lb  
Application Method: All other surface applications  
Soil Loss: 0.04 t/ac/yr  
Receiving Slope Distance 0-9 ft  
Soil Test 0" - 4" 367  
WV\_Factor (DATABASE) 1.4  
Soil Test 28" - 32" 62  
WV\_Factor (USER) 1.13  
Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
SOLUBLE P = 3  
LEACHATE P = 24  
SOURCE P = 1  
TOTAL P RATING = 28 (HIGH)

INPUTS

Calendar Year: 2012  
County: Greene  
Producer Identifier: 40-136  
Tract Number: T2121  
Field Number: Pulls 3,5,7, sub2&3  
Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
Crop: Hybrid Bermudagrass (Pasture)\*\* :  
Fertilizers: Swine-Lagoon liquid  
Yearly Applied Amount: 4.55 ac in  
Lb P205: 53.4 lb  
Application Method: All other surface applications  
Soil Loss: 0.04 t/ac/yr  
Receiving Slope Distance 0-9 ft  
Soil Test 0" - 4" 279  
WV\_Factor (DATABASE) 1.4  
Soil Test 28" - 32" 19  
WV\_Factor (USER) 1.17  
Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
SOLUBLE P = 2  
LEACHATE P = 7  
SOURCE P = 1  
TOTAL P RATING = 10 (LOW)

INPUTS

Calendar Year: 2012  
County: Greene  
Producer Identifier: 40-136  
Tract Number: T3,T2121  
Field Number: Pulls 8,9,10,12,sub4&5  
Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
Crop: Hybrid Bermudagrass (Pasture)\*\* :  
Fertilizers: Swine-Lagoon liquid  
Yearly Applied Amount: 4.55 ac in  
Lb P205: 53.4 lb  
Application Method: All other surface applications  
Soil Loss: 0.04 t/ac/yr  
Receiving Slope Distance 0-9 ft  
Soil Test 0" - 4" 489  
WV\_Factor (DATABASE) 1.4  
Soil Test 28" - 32" 33  
WV\_Factor (USER) 1.21  
Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
SOLUBLE P = 4  
LEACHATE P = 12  
SOURCE P = 1  
TOTAL P RATING = 17 (LOW)

PLAT Results For: Greene 3/30/2012 4:12:26 PM

INPUTS

Calendar Year: 2012  
 County: Greene  
 Producer Identifier: 40-136  
 Tract Number: T3,T2121  
 Field Number: Pulls 8,9,10,12,sub4&5  
 Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
 Crop: Hybrid Bermudagrass (Pasture)\*\* :  
 Fertilizers: Swine-Lagoon liquid  
                     Yearly Applied Amount: 4.55 ac in  
                     Lb P2O5: 53.4 lb  
                     Application Method: All other surface applications  
 Soil Loss: 0.04 t/ac/yr  
 Receiving Slope Distance 0-9 ft  
 Soil Test 0" - 4" 489  
     WV\_Factor (DATABASE) 1.4  
 Soil Test 28" - 32" 33  
     WV\_Factor (USER) 1.21  
 Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
 SOLUBLE P = 4  
 LEACHATE P = 12  
 SOURCE P = 1  
 TOTAL P RATING = 17 (LOW)

INPUTS

Calendar Year: 2012  
County: Greene  
Producer Identifier: 40-136  
Tract Number: T3,T2121  
Field Number: Pulls 11,13-16,sub5&6  
Soil Series: WaB: WAGRAM LOAMY SAND, 0 TO 6 PERCENT SLOPES  
Crop: Hybrid Bermudagrass (Pasture)\*\* :  
Fertilizers: Swine-Lagoon liquid  
Yearly Applied Amount: 4.55 ac in  
Lb P205: 53.4 lb  
Application Method: All other surface applications  
Soil Loss: 0.04 t/ac/yr  
Receiving Slope Distance 0-9 ft  
Soil Test 0" - 4" 719  
WV\_Factor (DATABASE) 1.4  
Soil Test 28" - 32" 17  
WV\_Factor (USER) 1.22  
Hydrologic Condition: GOOD

OUTPUTS

PARTICULATE P = 0  
SOLUBLE P = 5  
LEACHATE P = 6  
SOURCE P = 1  
TOTAL P RATING = 12 (LOW)





TABLE 4 - Irrigation System Specifications

	Traveling Irrigation Gun	Solid Set Irrigation
Flow Rate of Sprinkler (gpm)	205	
Operating Pressure at Pump (psi)	110.1	
Design Precipitation Rate (in/hr)	0.34	
Hose Length (feet)	1000	XXXXXXXXXX
Type of Speed Compensation	Mechanical	XXXXXXXXXX
Pump Type (PTO, Engine, Electric)	Engine	
Pump Power Requirement (hp)	26.3	

TABLE 5 - Thrust Block Specifications	
	THRUST BLOCK AREA (sq. ft.)
90 degree bend	4.94
Dead End	3.5
Tee	2.45
Gate Valve	3.5
45 degree bend	2.66

IRRIGATION SYSTEM DESIGNER

Name: Craig Westerbeek  
Company: Murphy Farms  
Address: PO Box 759 Rose Hill, NC  
Phone: (910) 289 6439 ext. 4556

Required Documentation

The following details of design and materials must accompany all irrigation designs:

1. A scale drawing of the proposed irrigation system which includes hydrant locations, pipelines, thrust block locations and buffer areas where applicable
2. Assumptions and computations for determining total dynamic head and horsepower requirements
3. Computations used to determine all mainline and lateral pipe sizes.
4. Sources and/or calculations used for determining application rates.
5. Computations used to determine the size of thrust blocks and illustrations of all thrust block configurations required in the system
6. Manufacturer's specifications for the irrigation pump, traveler and sprinkler(s).
7. Manufacturer's specifications for the irrigation pipe and/or USDA-NRCS standard for IRRIGATION WATER CONVEYANCE.
8. The information required by this form are the minimum requirements. It is the responsibility of the designer to consider all relevant factors at a particular site and address them as appropriate.
9. Irrigation pipes should not be installed in lagoon or storage pond embankments without the approval of the designer.

NOTE: A buffer strip of 25' or wider must be maintained between the limits of the irrigation system and all perennial streams and surface waters per NC Statutes.

Narrative of Irrigation System Operation

Acres shown are wetted acres. This system was installed in the early '90's, and aluminum pipe has been used to achieve the pulls shown. This design will allow the installation of hydrants as shown if desired. One or two 3" reels may be used. As an alternative to the 1.18" ring nozzle, a 1.08" nozzle may be used. If this is desired, the gun pressure should be increased to 60psi, and a flowrate of 182 GPM should be used on the records.

CALCULATIONS

Sprinkler Specifications

Sprinkler Type: Nelson 150 gun  
 Nozzle Size: 1.18 inches  
 Sprinkler Pressure: 50 psi  
 Flowrate(GPM): 205 gpm  
 Wetted Diameter: 300 feet

Lane Spacings

Desired Spacing (%): 70 %  
 Design Spacing(feet): 210 \*PVC irrigation pipe normally comes in 20' pieces, so round to the nearest multiple of 20.  
 Actual Spacing (feet): 220 feet  
 Actual Spacing (%): 73 %

Application Rate

Application Rate =  $(96.3 \times \text{Flowrate}) / (3.1415 \times (\text{radius})^2)$

Design App. Rate = 0.34 in/hr  
 300 degree arc = 0.41 in/hr  
 220 degree arc = 0.56 in/hr  
 180 degree arc = 0.69 in/hr

Traveller Speed

Travel speed =  $1.605 \times \text{Flowrate} / \text{Desired application amount} \times \text{Lane Spacing}$

Desired app. (in.) = 1 inches  
 300 degree arc = 1.50 ft/min  
 220 degree arc = 1.79 ft/min  
 180 degree arc = 2.99 ft/min

Mainline Velocity

Velocity =  $.408 \times \text{Flowrate} / \text{pipe diameter squared}$  feet/sec.\*\*

\*\*For buried pipelines, velocity should be below 5 feet per second

Pipe size: 6 inches  
 Velocity= 2.32 ft/sec.

Maximum Mainline Friction Loss

Most distant hydrant:  
 Total distance: 2000 feet

Friction Loss is figured using Hazen/William's Equation

Friction Loss= 0.30 feet/100 feet

Max. Mainline Loss = 6.1 feet or 2.6 psi

Total Dynamic Head

Sprinkler Pressure:	50 psi	
Loss through traveller:	50 psi	
Elevation head:	0 psi	
Mainline loss:	2.6 psi	
Suction head and lift:	2.2 psi	
5% fitting loss:	5.2 psi	
TOTAL(TDH) =	110.1 psi or	254.2 feet

Horsepower Required

Horsepower = Flowrate x TDH(feet) / 3960 / Pump efficiency

Pump Description: Berkeley B3J  
 Pump Efficiency: 50 %

Horsepower Required: 26.3 Hp

Thrust Blocking

Thrust Block Area = Thrust / Soil Bearing Strength:

Thrust:	4200 feet
Soil Bearing Strength:	1200 feet

End Cap:	3.5 ft2
90 degree elbow:	4.9 ft2
Tee:	2.5 ft2
45 degree elbow:	2.7 ft2

Pipe Pressure Rating Check

Pressure Rating of Pipe to be Used:	160 psi
Max. Pressure on system when running:	110.1 psi
70% of Pressure Rating:	112 psi

If Max. Pressure on system is less than 70% of Pressure Rating, OK

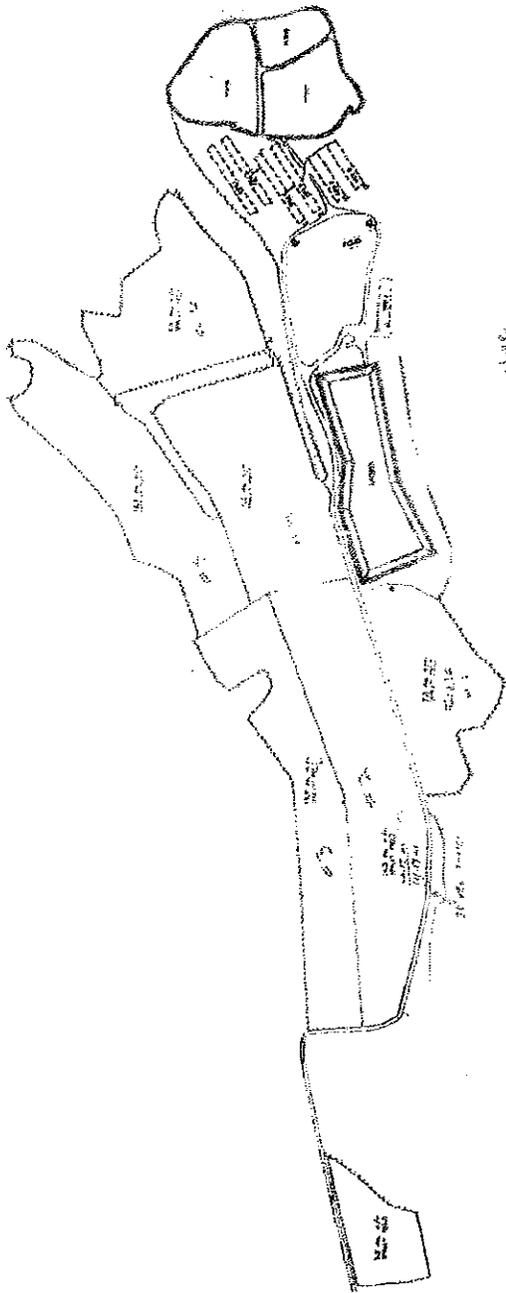
Net Positive Suction Head Check

NPSHA: 14

NPSHR: 7 \*from pump curve

if NPSHA > NPSHR OK

LEGEND  
 ○ FERRY  
 ● PILL



**MURPHY FARMS**  
 2510 S. 10th St. - ST. LOUIS, MO. 63104

**SPRAY FIELD LOCATION  
 LINDELL FARM**

ENGINE: CROSBY  
 DRAWING NO.: 100  
 PROJECT NO.: 100  
 SHEET 1 OF 1  
 SCALE: 1" = 200'



Grower: Lindell  
 Address: PO BOX 759  
 ROSE HILL, NC 28458  
 County: GREENE

Designed By: KBW  
 Checked By: DSE  
 Date: 12/18/08  
 Sheet 1 of 7

## ANAEROBIC WASTE LAGOON DESIGN

### FARM INFORMATION

Farm Population:

Nursery:	-----	0
Wean to Finish:	-----	0
Finishing:	-----	8200 Hd.
Farrow to weanling:	-----	0
Farrow to feeder:	-----	0
Farrow to finish:	-----	0
Boars:	-----	0
Storage Period:	-----	180 Days
25 Yr. / 24 Hr Storm Event	-----	7.5 In.
"Heavy Rain" Factor		
Rainfall in Excess of Evaporation	-----	7.0 In.
Additional Water Usage:	-----	0
Additional Drainage Area:	-----	0

### LAGOON INFORMATION

Is Lagoon Designed as an Irregular Shape?	(Y/N) -----	Y
Does Operator Want Emergency Spillway?	(Y/N) -----	N
Was This Design Built Prior to Sept. 1996?	(Y/N) -----	Y
Is Drain Tile Req'd to Lower SHWT?	(Y/N) -----	N
Seasonal High Water Table Elev:	-----	0.00 <i>101.00</i>
Freeboard:	-----	1.0 Ft.
Emergency Spillway Flow Depth:		
Side Slopes:	-----	3 :1 (H:V)
		0.0
		0.0
Top of Dike Elevation:	-----	105.00 Ft.
Finished Bottom Elevation:	-----	93.80 Ft.
Start Pump Elevation:	-----	103.34 Ft.
Stop Pump Elevation:	-----	100.00 Ft.

<u>LAGOON VOLUME</u>	<u>REQUIRED VOL.</u>	<u>DESIGN VOLUMES</u>	<u>% REQ'D.</u>
Storm Stor =	148115 (Cu.Ft.)	149,255 (Cu.Ft.)	100.77%
Temporary =	586171 (Cu.Ft.)	712,751 (Cu.Ft.)	121.59%
Permanent =	1107000 (Cu.Ft.)	1,119,020 (Cu.Ft.)	101.09%
<b>Total Volume =</b>	<b>1,841,286 (Cu.Ft.)</b>	<b>1,981,026 (Cu.Ft.)</b>	<b>107.59%</b>

1/2 Treatment Volume =	553,500 (Cu.Ft.)	
1/2 Treatment Volume Elevation =	97.11 Ft.	94.69 In.
90 Temporary Storage Volume Elevation =	101.69 Ft.	39.69 In.

Min. Required Liner Thickness -----  
 Lagoon Surface Area: (Inside TOD) -----

RECEIVED / DENR / DWQ 1.6 Ft.  
 AQUIFER PROTECTION SECTION 238,984 S.F.

**MAY 12 2010**

Grower: Lindell  
 Address: PO BOX 759  
 ROSE HILL, NC 28458  
 County: GREENE

Designed By: KBW  
 Checked By: DSE  
 Date: 12/18/08  
 Sheet 2 of 7

**ACTUAL DESIGN VOLUME CALCULATIONS**

**BASE VOLUME:**  Cu. Ft.

**LAGOON STAGE-AREA VOLUMES**

<u>Elevation (FT.)</u>	<u>Contour Area (SF)</u>	<u>Incr. Vol. (Cu. FT)</u>	<u>Cumul. Vol. (Cu. FT)</u>
93.80	159,986		0
94.00	161,279	32,127	32,127
95.00	167,788	164,534	196,660
96.00	174,372	171,080	367,740
97.00	181,030	177,701	545,441
98.00	187,764	184,397	729,838
99.00	194,572	191,168	921,006
100.00	201,455	198,014	1,119,020
101.00	208,413	204,934	1,323,954
102.00	215,445	211,929	1,535,883
103.00	222,553	218,999	1,754,882
104.00	229,735	226,144	1,981,026
105.00	236,984	233,360	2,214,385

These volumes were calculated using the vertical average end area method.

TOTAL REQD VOL	1,841,286	CF	CUMULATIVE VOL.	ZONE VOL.	107.59%
END PUMP = = = =	100.00	FT	1,119,020 CF TR'MT	1,119,020	101.09%
START PUMP = = :	103.34	FT	1,831,770 CF TEMP	712,751	121.59%
MAX STORAGE =	104.00	FT	1,981,026 CF STORM	149,255	100.77%

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 Sheet 3 of 7

**MINIMUM REQUIRED VOLUME CALCULATIONS**

**Permanent Storage:**

Required Treatment Volume:

Animal Type	Capacity *	ALW *	(cu.ft./lb)	= Total
Nursery	0	30	1.00	0
Wean to Finish	0	115	1.00	0
Finishing	8,200	135	1.00	1,107,000
Farrow to weanling	0	433	1.00	0
Farrow to feeder	0	522	1.00	0
Farrow to finish	0	1,417	1.00	0
Boars	0	400	1.00	0

Total Required Treatment Volume (cu. ft.)= 1,107,000

Sludge Storage Volume:

Animal Type	Capacity *	ALW *	(cu.ft./lb)	= Total
Nursery	0	30	0.00	0
Wean to Finish	0	115	0.00	0
Finishing	8,200	135	0.00	0
Farrow to weanling	0	433	0.00	0
Farrow to feeder	0	522	0.00	0
Farrow to finish	0	1,417	0.00	0
Boars	0	400	0.000	0

Total Required Sludge Storage Volume (cu. ft.)= 0

**Temporary Storage Volume:**

Manure Production:

Animal Type	Capacity *	Sto. Period d./day)	= Total
Nursery	0	180	0.30
Wean to Finish	0	180	1.17
Finishing	8,200	180	1.37
Farrow to weanling	0	180	4.39
Farrow to feeder	0	180	5.30
Farrow to finish	0	180	14.38
Boars	0	180	4.06

Total Manure Production (gals.)= 2,022,120

Total Manure Production (cu.ft.)= 270,337

Excess Fresh Water:

Animal Type	Capacity *	Sto. Period d./day)	= Total
Nursery	0	180	0.00
Wean to Finish	0	180	0.00
Finishing	8,200	180	0.90
Farrow to weanling	0	180	0.00
Farrow to feeder	0	180	0.00
Farrow to finish	0	180	0.00
Boars	0	180	0.00

Total Fresh Water Excess (gals.)= 1,328,400

Total Fresh Water Excess (cu.ft.)= 177,594

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 Date: 12/18/08  
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**Temporary Storage Volume: (Cont.)**

**Rainfall in Excess of Evaporation:**

Vol.=(Lagoon Surface Area + Additional Drainage Area) \* Rainfall / 12in./ft.  
 Vol.= (236984 sq.ft. + 0 sq.ft.) \* 7 in. /12 in./ft.  
**Total Required Volume for Rainfall in Excess of Evap. (cu.ft.)= 138,241**

**Storm Storage:**

Vol.=(Lagoon Surf. Area + Add'l Drainage Area) \* 25Yr./24Hr. Storm(in) / 12in./ft.  
 Vol.= (236984 sq.ft + 0 sq.ft.) \* 7.5 in. /12 in./ft.  
**Total Required Volume for 25Yr./24Hr. Storm Event (cu.ft.)= 148,115**

**"Heavy Rain" Storage:**

Vol.=(Lagoon Surf. Area + Add'l Drainage Area) \* "Heavy Rain" Factor (in) / 12in./ft.  
 Vol.= (236984 sq.ft + 0 sq.ft.) \* 0.0 in. /12 in./ft.  
**Total Required Volume for "Heavy Rain" (cu.ft.)= 0**  
 (for Extended Periods of Chronic Rainfall)

**Additional Water Storage:**

No Additional Water Storage is Required  
**0 0**

**Total Required Storm Storage**  
 (25Yr. / 24Hr. Storm + 'Heavy Rain')= **148,115 (CU.FT)**

**Total Required Temporary Storage**  
 (Manure Prod. + Excess Fr. Water + Rainfall Excess + Additional Water Storage) = **586,171 (CU.FT)**

**Total Required Permanent Storage**  
 (Treatment + Sludge) = **1,107,000 (CU.FT)**

**TOTAL REQUIRED VOLUME = 1841286 (CU.FT.)**

Grower: Lindell  
Address: PO BOX 759  
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Designed By: KBW  
Checked By: DSE  
Date: 12/18/08  
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LAGOON DESIGN SUMMARY

Top of Dike Elevation	-----	105.00 FT.
Emergency Spillway Crest Elevation	-----	Not Applicable
Top of 25Yr. / 24Hr. Storm Storage	-----	104.00 FT.
Top of "Heavy Rain" Storage	-----	Not Applicable
Start Pump Elevation	-----	103.34 FT.
End Pump Elevation	-----	100.00 FT.
Top of Sludge Storage	-----	Not Applicable
Seasonal High Watertable Elev.	-----	0.00
Finished Bottom Elevation	-----	93.80 FT.
Inside Top Length	-----	Not Applicable
Inside Top Width	-----	Not Applicable
Side Slopes	-----	3:1 H:V
Lagoon Surface Area	-----	236,984 SF
Min. Liner Thickness (if required)	-----	1.6 FT.
Freeboard Depth	-----	1.00 FT.
Temporary Storage Period	-----	180 Days

TOTAL DESIGN VOLUME = 1981026 (CU.FT.)

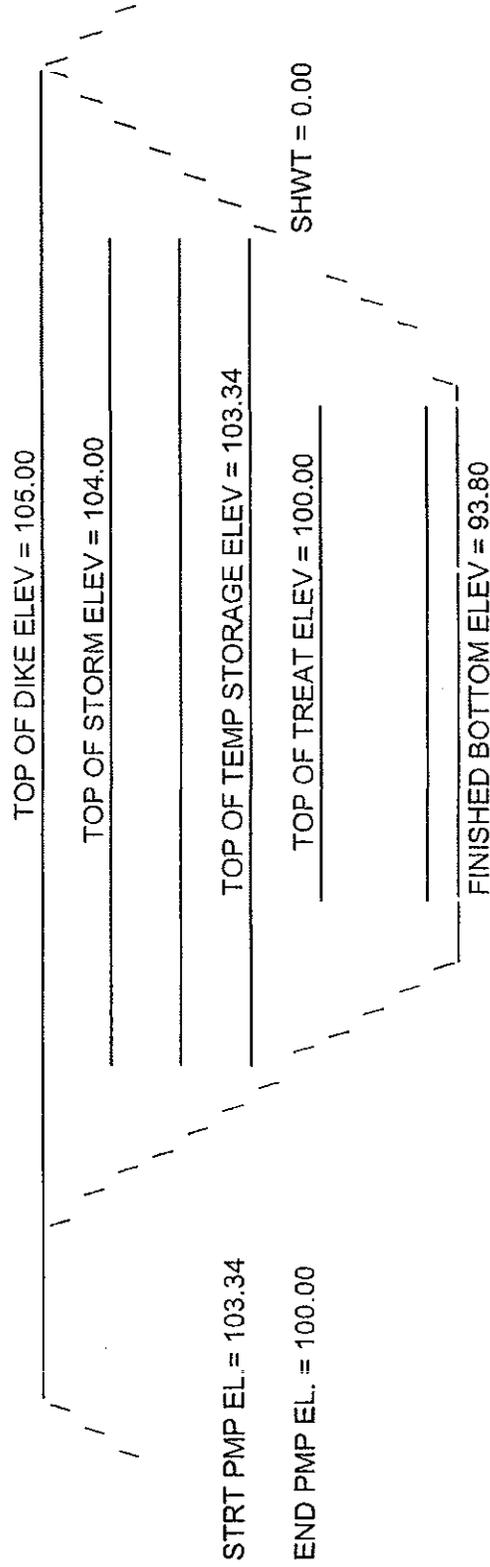
Zone Depths:

Treatment / Sludge Storage Zone Depth	-----	6.2 FT.
Temporary Storage Zone Depth	-----	3.3 FT.
Freeboard / Storm Storage Zone Depth	-----	1.7 FT.
Total Lagoon Depth	-----	11.2 FT.

Grower: Lindell  
Address: PO BOX 759  
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Design: KBW  
Checker: DSE  
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ZONE ELEVATIONS



Grower: Lindell  
Address: PO BOX 759  
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Designed By: KBW  
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Date: 12/18/08  
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This livestock waste treatment lagoon is designed in accordance with the United States Natural Resources Conservation Service PRACTICE STANDARD 359- WASTE TREATMENT LAGOON, revised prior to June, 1996.

Emergency Spillway:

An Emergency Spillway is not required.

NOTE: See attached Waste Utilization Plan

DESIGNED:

David S. Elkin

DATE:

12/18/08



COMMENTS:

The lagoon has been designed as an irregular shape.

This design is update of start and stop pump elevations and to show the 1/2

treatment volume level for sludge storage. This design does not supercede the

original certification of the farm.

## System Calibration

Information presented in manufacturer's charts are based on average operation conditions with relatively new equipment. Discharge rates and application rates change over time as equipment gets older and components wear. In particular, pump wear tends to reduce operating pressure and flow. With continued use, nozzle wear results in an increase in the nozzle opening which will increase the discharge rate while decreasing the wetted diameter.

You should be aware that operating the system differently than assumed in the design will alter the application rate, diameter of coverage, and subsequently the application uniformity. For example, operating the system with excessive pressure results in smaller droplets, greater potential for drift, and accelerates wear of the sprinkler nozzle. Clogging of nozzles can result in pressure increase. Plugged intakes or crystallization of mainlines will reduce operating pressure. Operating below design pressure greatly reduces the coverage diameter and application uniformity.

For the above reason, you should calibrate your equipment on a regular basis to ensure proper application rates and uniformity. Calibration at least once every three years is recommended. Calibration involves collecting and measuring flow at several locations in the application area. Any number of containers can be used to collect flow and determine the application rate. Rain gauges work best because they already have a graduated scale from which to read the application amount without having to perform additional calculations. However, pans, plastic buckets, jars, or anything with a uniform opening and cross-section can be used provided the liquid collected can be easily transferred to a scaled container for measuring.

For stationary sprinklers, collection containers should be located randomly throughout the application area at several distances from sprinklers. For traveling guns, sprinklers should be located along a transect perpendicular to the direction of pull. Set out collection containers 25 feet apart along the transect on both sides of the gun cart. You should compute the average application rate for all nonuniformity of the application. On a windless day, variation between containers of more than 30 percent is cause for concern. You should contact your irrigation dealer or technical specialist for assistance.

*\*Reprinted for Certification Training for Operations of Animal Waste Management Systems Manual*

RECEIVED / DENR / DWQ  
AQUIFER PROTECTION SECTION

MAY 12 2010

## OPERATION & MAINTENANCE PLAN

Proper lagoon management should be a year-round priority. It is especially important to manage levels so that you do not have problems during extended rainy and wet periods.

Maximum storage capacity should be available in the lagoon for periods when the receiving crop is dormant (such as wintertime for bermudagrass) or when there are extended rainy spells such as a thunderstorm season in the summertime. This means that at the first sign of plant growth in the later winter / early spring, irrigation according to a farm waste management plan should be done whenever the land is dry enough to receive lagoon liquid. This will make storage space available in the lagoon for future wet periods. In the late summer / early fall the lagoon should be pumped down to the low marker (see Figure 2-1) to allow for winter storage. Every effort should be made to *maintain* the lagoon close to the minimum liquid level as long as the weather and waste utilization plan will allow it.

Waiting until the lagoon has reached its maximum storage capacity before starting to irrigate does not leave room for storing excess water during extended wet periods. Overflow from the lagoon for any reason except a 25-year, 24-hour storm is a violation of state law and subject to penalty action.

The routine maintenance of a lagoon involves the following:

- Maintenance of a vegetative cover for the dam. Fescue or common bermudagrass are the most common vegetative covers. The vegetation should be fertilized each year, if needed, to maintain a vigorous stand. The amount of fertilizer applied should be based on a soils test, but in the event that it is not practical to obtain a soils test each year, the lagoon embankment and surrounding areas should be fertilized with 800 pounds per acre of 10-10-10, or equivalent.
- Brush and trees on the embankment must be controlled. This may be done by mowing, spraying, grazing, chopping, or a combination of these practices. This should be done at least once a year and possibly twice in years that weather conditions are favorable for heavy vegetative growth.

NOTE: If vegetation is controlled by spraying, the herbicide must not be allowed to enter the lagoon water. Such chemicals could harm the bacteria in the lagoon that are treating the waste.

Maintenance inspections of the entire lagoon should be made during the initial filling of the lagoon and at least monthly and after major rainfall and storm events. Items to be checked should include, as a minimum, the following:

### **Waste Inlet Pipes, Recycling Pipes, and Overflow Pipes -- look for:**

1. separation of joints
2. cracks or breaks
3. accumulation of salts or minerals
4. overall condition of pipes

**Lagoon surface -- look for:**

1. undesirable vegetative growth
2. floating or lodged debris

**Embankment -- look for:**

1. settlement, cracking, or "jug" holes
2. side slope stability -- slumps or bulges
3. wet or damp areas on the back slope
4. erosion due to lack of vegetation or as a result of wave action
5. rodent damage

Larger lagoons may be subject to liner damage due to wave action caused by strong winds. These waves can erode the lagoon sidewalls, thereby weakening the lagoon dam. A good stand of vegetation will reduce the potential damage caused by wave action. If wave action causes serious damage to a lagoon sidewall, baffles in the lagoon may be used to reduce the wave impacts.

Any of these features could lead to erosion and weakening of the dam. If your lagoon has any of these features, you should call an appropriate expert familiar with design and construction of waste lagoons. You may need to provide a temporary fix if there is a threat of a waste discharge. However, a permanent solution should be reviewed by the technical expert. Any digging into a lagoon dam with heavy equipment is a serious undertaking with potentially serious consequences and should not be conducted unless recommended by an appropriate technical expert.

**Transfer Pumps -- check for proper operation of:**

1. recycling pumps
2. irrigation pumps

Check for leaks, loose fittings, and overall pump operation. An unusually loud or grinding noise, or a large amount of vibration, may indicate that the pump is in need of repair or replacement.

NOTE: Pumping systems should be inspected and operated frequently enough so that you are not completely "surprised" by equipment failure. You should perform your pumping system maintenance at a time when your lagoon is at its low level. This will allow some safety time should major repairs be required. Having a nearly full lagoon is not the time to think about switching, repairing, or borrowing pumps. Probably, if your lagoon is full, your neighbor's lagoon is full also. You should consider maintaining an inventory of spare parts or pumps.

- Surface water diversion features are designed to carry *all* surface drainage waters (such as rainfall runoff, roof drainage, gutter outlets, and parking lot runoff) away from your lagoon and other waste treatment or storage structures. The only water that should be coming from your lagoon is that which comes from your flushing (washing) system pipes and the rainfall that hits the lagoon directly. You should inspect your diversion system for the following:
  1. adequate vegetation
  2. diversion capacity
  3. ridge berm height

Identified problems should be corrected promptly. It is advisable to inspect your system during or immediately following a heavy rain. If technical assistance is needed to determine proper solutions, consult with appropriate experts.

You should record the level of the lagoon just prior to when rain is predicted, and then record the level again 4 to 6 hours after the rain (assumes there is no pumping). This will give you an idea of how much your lagoon level will rise with a certain rainfall amount (you must also be recording your rainfall for this to work). Knowing this should help in planning irrigation applications and storage. If your lagoon rises excessively, you may have an overflow problem from a surface water diversion or there may be seepage into the lagoon from the surrounding land.

## **Lagoon Operation**

### **Startup:**

1. Immediately after construction establish a complete sod cover on bare soil surfaces to avoid erosion.
2. Fill new lagoon design treatment volume at least half full of water before waste loading begins, taking care not to erode lining or bank slopes.
3. Drainpipes into the lagoon should have a flexible pipe extender on the end of the pipe to discharge near the bottom of the lagoon during initial filling or another means of slowing the incoming water to avoid erosion of the lining.
4. When possible, begin loading new lagoons in the spring to maximize bacterial establishment (due to warmer weather).
5. It is recommended that a new lagoon be seeded with sludge from a healthy working swine lagoon in the amount of 0.25 percent of the full lagoon liquid volume. This seeding should occur at least two weeks prior to the addition of wastewater.
6. Maintain a periodic check on the lagoon liquid pH. If the pH falls below 7.0, add agricultural lime at the rate of 1 pound per 1000 cubic feet of lagoon liquid volume until the pH rises above 7.0. Optimum lagoon liquid pH is between 7.5 and 8.0.
7. A dark color, lack of bubbling, and excessive odor signals inadequate biological activity. Consultation with a technical specialist is recommended if these conditions occur for prolonged periods, especially during the warm season.

### **Loading:**

The more frequently and regularly that wastewater is added to a lagoon, the better the lagoon will function. Flush systems that wash waste into the lagoon several times daily are optimum for treatment. Pit recharge systems, in which one or more buildings are drained and recharged each day, also work well.

- Practice water conservation --- minimize building water usage and spillage from leaking waterers, broken pipes and washdown through proper maintenance and water conservation.
- Minimize feed wastage and spillage by keeping feeders adjusted. This will reduce the amount of solids entering the lagoon.

### **Management:**

- Maintain lagoon liquid level between the permanent storage level and the full temporary storage level.
- Place visible markers or stakes on the lagoon bank to show the minimum liquid level and the maximum liquid level. (Figure 2-1).
- Start irrigating at the earliest possible date in the spring based on nutrient requirements and soil moisture so that temporary storage will be maximized for the summer thunderstorm season. Similarly, irrigate in the late summer / early fall to provide maximum lagoon storage for the winter.
- The lagoon liquid level *should never* be closer than 1 foot to the lowest point of the dam or embankment.
- Do not pump the lagoon liquid level lower than the permanent storage level unless you are removing sludge.
- Locate float pump intakes approximately 18 inches underneath the liquid surface and as far away from the drainpipe inlets as possible.
- Prevent additions of bedding materials, long-stemmed forage or vegetation, molded feed, plastic syringes, or other foreign materials into the lagoon.
- Frequently remove solids from catch basins at end of confinement houses or wherever they are installed.
- Maintain strict vegetation, rodent, and varmint control near lagoon edges.
- Do not allow trees or large bushes to grow on lagoon dam or embankment.
- Remove sludge from the lagoon either when the sludge storage capacity is full or before it fills 50 percent of the permanent storage volume.
- If animal production is to be terminated, the owner is responsible for obtaining and implementing a closure plan to eliminate the possibility of a pollutant discharge.

### **Sludge Removal:**

Rate of lagoon sludge buildup can be reduced by:

- proper lagoon sizing,
- mechanical solids separation of flushed waste,
- gravity settling of flushed waste solids in an appropriately designed basin, or
- minimizing feed wastage and spillage.

Lagoon sludge that is removed annually rather than stored long term will:

- have more nutrients,
- have more odor, and
- require more land to properly use the nutrients.

Removal techniques:

- Hire a custom applicator.
- Mix the sludge and lagoon liquid with a chopper - agitator impeller pump through large - bore sprinkler irrigation system onto nearby cropland; and soil incorporate.
- Dewater the upper part of lagoon by irrigation onto nearby cropland or forageland; mix remaining sludge; pump into liquid sludge applicator; haul and spread onto cropland or forageland; and soil incorporate.
- Dewater the upper part of lagoon by irrigation onto nearby cropland or forageland; dredge sludge from lagoon with dragline or sludge barge; berm an area beside lagoon to receive the sludge so that liquids can drain back into lagoon; allow sludge to dewater; haul and spread with manure spreader onto cropland or forageland; and soil incorporate.

Regardless of the method, you must have the sludge material analyzed for waste constituents just as you would your lagoon water. The sludge will contain different nutrient and metal values from the liquid. The application of the sludge to fields will be limited by these nutrients as well as any previous waste applications to that field and crop requirement. Waste application rates will be discussed in detail in Chapter 3.

When removing sludge, you must also pay attention to the liner to prevent damage. Close attention by the pumper or drag-line operator will ensure that the lagoon liner remains intact. If you see soil material or the synthetic liner material being disturbed, you should stop the activity immediately and not resume until you are sure that the sludge can be removed without liner injury. If the liner is damaged it must be repaired as soon as possible.

Sludge removed from the lagoon has a much higher phosphorus and heavy metal content than liquid. Because of this it should probably be applied to land with low phosphorus and metal levels, as indicated by a soil test, and incorporated to reduce the chance of erosion. Note that if the sludge is applied to fields with very high soil-test phosphors, it should be applied only at rates equal to the crop removal of phosphorus. As with other wastes, always have your lagoon sludge analyzed for its nutrient value.

The application of sludge will increase the amount of odor at the waste application site. Extra precaution should be used to observe the wind direction and other conditions which could increase the concern of neighbors.

### **Possible Causes of Lagoon Failure**

Lagoon failures result in the unplanned discharge of wastewater from the structure. Types of failures include leakage through the bottom or sides, overtopping, and breach of the dam. Assuming proper design and construction, the owner has the responsibility for ensuring structure safety. Items which may lead to lagoon failures include:

- Modification of the lagoon structure -- an example is the placement of a pipe in the dam without proper design and construction. (Consult an expert in lagoon design before placing any pipes in dams.)
- Lagoon liquid levels -- high levels are a safety risk.
- Failure to inspect and maintain the dam.
- Excess surface water flowing into the lagoon.
- Liner integrity -- protect from inlet pipe scouring, damage during sludge removal, or rupture from lowering lagoon liquid level below groundwater table.

NOTE: If lagoon water is allowed to overtop the dam, the moving water will soon cause gullies to form in the dam. Once this damage starts, it can quickly cause a large discharge of wastewater and possible dam failure.

# EMERGENCY ACTION PLAN

## PHONE NUMBERS

DIVISION OF WATER QUALITY (DWQ)  
EMERGENCY MANAGEMENT SERVICES (EMS)  
SOIL AND WATER CONSERVATION DISTRICT (SWCD)  
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)  
COOPERATIVE EXTENSION SERVICE (CES)

(252) 946-6481  
(252) 747-2544  
(252) 747-3705  
(252) 747-3705  
(252) 747-5831

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 flow 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 cause 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.
  - D. Leakage from flush systems, houses, solid separators - action include:
    - a) Stop recycle pump.
    - b) Stop irrigation pump.
    - c) Make sure siphon occurs.
    - d) Stop all flow in the house, flush systems, or solid separators.
  - 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 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 the lagoon bottom as soon as possible.

2. Assess the extent of the spill and note any obvious damages.
  - a. Did the waste reach surface waters?
  - b. Approximately how much was released and for what duration?
  - c. Any damage notes, 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 the property)?
  - h. How much reached surface waters?
  
3. Contact appropriate agencies.
  - a. During normal business hours call your DWQ regional office; Phone #, After hours, emergency number: (919) 733-3942. Your phone call should include: your name, facility number, telephone number, the details of the incident from item 2 above, the exact location of the facility, the location or direction of the movement of the spill, weather and wind conditions. The corrective measures that have been under taken, and the seriousness of the situation.
  - b. If the spill leaves property or enters surface waters, call local EMS phone number.
  - c. Instruct EMS to contact local Health Department.
  - d. Contact CE's phone number, local SWCD office phone number and the local NRCS office for advice / technical assistance phone number.
  
4. If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask the person to contact the proper agencies for you.
  
5. Contact the contractor of your choice to begin repair or problem to minimize offsite damage.
  - a. Contractors Name: Murphy Brown, LLC
  - b. Contractors Address: P.O. Box 856, Warsaw, NC 28398
  - c. Contractors Phone: (910)293-3434
  
6. Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc.)
  - a. Name: Kraig Westerbeek
  - b. Phone: (910) 293 - 5330
  
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.

## INSECT CONTROL CHECKLIST FOR ANIMAL OPERATIONS

Source	Cause	BMP's to Minimize Odor	Site Specific Practices
(Liquid Systems)			
Flush Gutters	Accumulation of solids	<ul style="list-style-type: none"> <li>(✓) Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed.</li> <li>( ) Remove bridging of accumulated solids at discharge</li> </ul>	
Lagoons and Pits	Crusted Solids	(✓) Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6-8 inches over more than 30% of surface.	
Excessive Vegetative Growth	Decaying vegetation	(✓) Maintain vegetative control along banks of lagoons and other impoundment's to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter.	
(Dry Systems)			
Feeders	Feed Spillage	<ul style="list-style-type: none"> <li>( ) Design, operate and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage.</li> <li>( ) Clean up spillage on a routine basis (e.g. 7-10 day interval during summer; 15-30 day interval during winter).</li> </ul>	
Feed Storage	Accumulation of feed residues	<ul style="list-style-type: none"> <li>( ) Reduce moisture accumulation within and around immediate perimeter of feed storage areas by insuring drainage away from site and/or providing adequate containment (e.g., covered bin for brewer's grain and similar high moisture grain products).</li> <li>( ) Inspect for and remove or break up accumulated solids in filler strips around feed storage as needed.</li> </ul>	
Animal Holding Areas	Accumulation of animal wastes and feed wastage	<ul style="list-style-type: none"> <li>( ) Eliminate low area that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal.</li> <li>( ) 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).</li> </ul>	

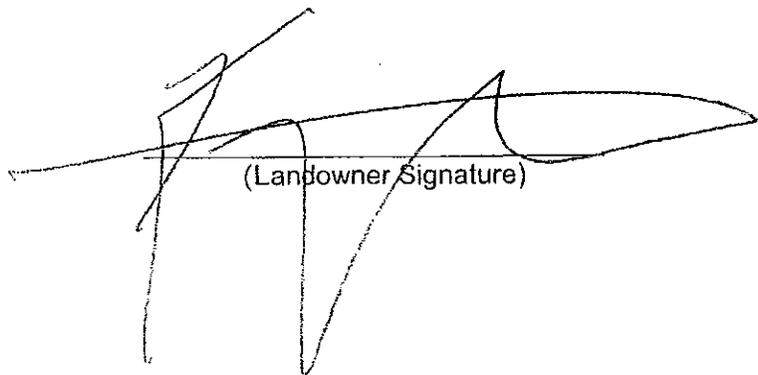
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Dry Manure Handling Systems	Accumulations of animal wastes	<input type="checkbox"/> Remove spillage on a routine basis (e.g. 7-10 day interval during summer; 15-30 days interval during winter) where manure is loaded for land application or disposal. <input type="checkbox"/> Provide for adequate drainage around manure stockpiles <input type="checkbox"/> Inspect for and remove or break up accumulated wastes in filter strips around stockpiles and manure handling areas as needed.
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The issues checked ( ) pertain to this operation. The landowner / integrator agrees to use sound judgment in applying insect control measures as practical.

I certify the aforementioned insect control Best Management Practices have been reviewed with me.



(Landowner Signature)

For more information contact the Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613.

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## SWINE FARM WASTE MANAGEMENT ODOR CONTROL CHECKLIST

Source	Cause	BMP's to Minimize Odor	Site Specific Practices
Farmstead	Swine production	(✓)Vegetative or wooded buffers; (✓)Recommended best management practices; (✓)Good judgment and common sense	
Animal body surfaces	Dirty manure covered animals	( )Dry floors	
Floor surfaces	Wet manure-covered floors	(✓)Slotted floors; (✓)Waterers located over slotted floors; (✓)Feeders at high end of solid floors; (✓)Scrape manure buildup from floors; ( )Underfloor ventilation for drying	
Manure collection pits	Urine  Partial microbial decomposition	(✓)Frequent manure removal by flush, pit recharge or scrape ( )Underfloor ventilation	
Ventilation exhaust fans	Volatile gases Dust	(✓)Fan maintenance; (✓)Efficient air movement	
Indoor surfaces	Dust	(✓)Washdown between groups of animals ( )Feed additives; ( )Feeder covers; ( )Feed delivery downspout extenders to feeder covers	
Flush Tanks	Agitation of recycled lagoon liquid while tanks are filling	( )Flush tank covers ( )Extend fill lines to near bottom of tanks with anti-siphon vents	
Flush alleys	Agitation during waste water conveyance	( )Underfloor flush with underfloor ventilation	
Pit recharge points	Agitation of recycled lagoon liquid while pits are filling	( )Extend recharge lines to near bottom of pits with anti-siphon vents	
Lift stations	Agitation during sump tank filling and drawdown	( )Sump tank covers	
Outside drain collection or junction boxes	Agitation during waste water conveyance	( )Box Covers	
End of drain pipes at lagoon	Agitation during waste water	( )Extend discharge point of pipes underneath lagoon liquid level	
Lagoon surfaces	Volatile gas emissions Biological mixing Agitation	(✓)Proper lagoon liquid capacity (✓)Correct lagoon startup procedures ( )Minimum surface area-to-volume ratio (✓)Minimum agitation when pumping ( )Mechanical aeration ( )Proven biological additives	
Irrigation sprinkler nozzles	High pressure agitation Wind draft	(✓)Irrigate on dry days with little or no wind (✓)Minimum recommended operation pressure (✓)Pump intake near lagoon liquid surface ( )Pump from second-stage lagoon	

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Storage tank or basin surface	Partial microbial decomposition Mixing while filling Agitation when emptying	( ) Bottom or midlevel loading ( ) Tank covers ( ) Basin surface mats of solids ( ) Proven biological additives or oxidants
Settling basin surface	Partial microbial decomposition Mixing while filling Agitation when emptying	( ) Extend drainpipe outlets underneath liquid level ( ) Remove settled solids regularly
Manure, slurry or sludge spreader outlets	Agitation when spreading Volatile gas emissions	( ) Soil injection of slurry/sludges ( ) Wash residual manure from spreader after use ( ) Proven biological additives or oxidants
Dead animals	Carcass decomposition	( ) Proper disposition of carcasses
Dead animal disposal pits	Carcass decomposition	( ) Complete covering of carcasses in burial pits ( ) Proper location / construction of disposal pits
Incinerators	Incomplete combustion	( ) Secondary stack burners
Standing water around facilities	Improper drainage Microbial decomposition of organic matter	(✓) Farm access road maintenance away from facilities
Manure tracked onto public roads from farm access	Poorly maintained access roads	(✓) Farm access road maintenance

Additional Information:

Available From:

Swine Manure Management 0200 Rule / BMP Packet	NCSU-County Extension Center
Swine Production Farm Potential Odor Sources and Remedies, EBAE Fact Sheet	NCSU-BAE
Swine Production Facility Manure Management: Pit Recharge--Lagoon Treatment: EBAE 128-88	NCSU-BAE
Swine Production Facility Manure Management: Underfloor Fluse-Lagoon Treatment 129-88	NCSU-BAE
Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83	NCSU-BAE
Calibration of Manure and Wastewater Application Equipment EBAE Fact Sheet	NCSU-BAE
Controlling Odors from Swine Buildings; PIH-33	NCSU-Swine Extension
Environmental Assurance Program: NPPC Manual	NC Pork Producers Assoc
Options for Managing Odor; a report from the Swine Odor Task Force	NCSU Agri Communication
Nuisance Concerns in Animal Manure Management: Odors and Flies; PR0101, 1995 Conference Proceedings	Florida Cooperative Extension

The issues checked ( ) pertain to this operation. The landowner / integrator agrees to use sound judgment in applying odor control measures as practical.

I certify the aforementioned odor control Best Management Practices have been reviewed with me.

  
(Landowner Signature)

**MORTALITY MANAGEMENT METHODS**  
(Check which method(s) are being implemented)

- ( ) Burial three feet beneath the surface of the ground within 24 hours after knowledge of the death. The burial will be at least 300 feet from any flowing stream or public body of water.
- ( ✓ ) Rendering at a rendering plant licensed under G. S. 106 - 168.7
- ( ) Complete incineration
- ( ) In the case of dead poultry only, placing in a disposal pit of a size and design approved by the Department of Agriculture.
- ( ) Any method which in the professional opinion of the State Veterinarian would make possible the salvage of part of a dead animal's value without endangering human or animal health. (Written approval of the State Veterinarian must be attached)