

# WASTE UTILIZATION PLAN

Monday, March 12, 2012

Updated 3/12/2012

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**Producer :** Tim Craig  
**Farm Name :** Slippery Rock Farm  
864 Cumnock Road  
Sanford, NC 27330  
**Telephone # :** (919) 777-3380  
**Type of Operation :** Feeder to Finish Swine  
**Number of Animals :** 2400 hogs design capacity  
**Application Method:** Irrigation

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The waste from your animal facility must be land applied at a specified rate to prevent pollution of surface 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 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. Always apply waste based on the needs of the crop to be grown and the nutrient contents of the waste. Do not apply more nitrogen than the crop can utilize. Soil types are important as they have different infiltration rates, leaching potentials, cation exchange capacities, and available water holding capacities. Normally waste shall not be applied to land eroding at greater than 5 tons per acre per year. With special pre-cautions, waste may be applied to land eroding at up to 10 tons per acre per year. 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 DEM regulations. Wind conditions should also be considered to avoid drift and downwind odor problems. 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 to bare ground not more than 30 days prior to planting. Injecting the waste or disking will conserve nutrients and reduce odor problems. This plan is based on waste application through irrigation for this is the manner in which you have chosen to apply your waste. If you choose to inject the waste in the future, you need to revise this plan. Nutrient levels for injecting waste and irrigating waste are not the same.

The estimated acres needed to apply the animal waste is based on typical nutrient content for this type of facility. Acreage requirements should be based on the waste analysis report from your waste management facility. Attached you will find information on proper sampling techniques, preparation, and transfer of waste samples to the lab for analysis. 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, ft3, tons, etc.)

2400 hogs X 1.9 tons waste/hogs/year = 4560 tons

AMOUNT OF PLANT AVAILABLE NITROGEN (PAN) PRODUCED PER YEAR

2400 hogs X 2.3 lbs PAN/hogs/year = 5520 PAN/year  
 $\times 1.7 = 4080$   
 $- 1656$  30% REDUCTION FOR SOLIDS REMOVED  
3864

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.

The following acreage will be needed for waste application based on the crop to be grown, soil type and surface application.

TABLE 1 : ACRES OWNED BY PRODUCER

TRACT	FIELD	SOIL TYPE & CLASS- DETERMINING PHASE	CROP CODE	YIELD	LBS AW N/ACRE	COMM N/ACRE	ACRES	LBS AW USED	APPLIC. TIME
1991	1	FUQUAY 0-6%	BH	5.5	275	0	3.79	1042	MAR-SEP
1991	~ 1	FUQUAY 0-6%	SG	2	100	0	3.79	379	SEP-MAR
1991	2	FUQUAY 0-6%	BH	5.5	275	0	0.75	206	MAR-SEP
1991	~ 2	FUQUAY 0-6%	SG	2	100	0	0.75	75	SEP-MAR
1991	3	FUQUAY 0-6%	BH	5.5	275	0	3.96	1089	MAR-SEP
1991	~ 3	FUQUAY 0-6%	SG	2	100	0	3.96	396	SEP-MAR
1991	4	FUQUAY 0-6%	BH	5.5	275	0	4.24	1166	MAR-SEP
1991	~ 4	FUQUAY 0-6%	SG	2	100	0	4.24	424	SEP-MAR
1991	5	FUQUAY 0-6%	BH	5.5	275	0	0.43	118	MAR-SEP
1991	~ 5	FUQUAY 0-6%	SG	2	100	0	0.43	43	SEP-MAR
TOTALS:							4938.75		

~ Indicates that this field is being overseeded (i.e. interplanted) or winter annuals follow summer annuals.

\* Indicates a Crop Rotation

NOTE: The applicator is cautioned that P and K may be over applied while meeting the N requirements. Beginning in 1996 the Coastal Zone Management Act will require farmers in some eastern counties of NC to have a nutrient management plan that addresses all nutrients. This plan only addresses Nitrogen.

## TABLE 2 : ACRES WITH AGREEMENT OR LONG TERM LEASE

(Agreement with adjacent landowners must be attached.)

(Required only if operator does not own adequate land. See required specifications 2.)

### There are no Acres Leased

~ Indicates that this field is being overseeded (i.e. interplanted) or winter annuals follow summer annuals.

\* Indicates a Crop Rotation

\* Acreage figures may exceed total acreage in field due to overseeding.

\*\*Lbs AW N (animal waste nitrogen) equals total required nitrogen less any commercial nitrogen (COMM N) supplied.

The following legend explains the crop codes used in TABLES 1 and 2 above:

CROP CODE	CROP	UNITS	LBS N/UNIT
BH	HYBRID BERMUDAGRASS-HAY	TONS	50
SG	SMALL GRAIN OVERSEED	AC	50

## TOTALS FROM TABLES 1 AND 2

	ACRES	LBS AW N USED
TABLE 1	13.17	4,939
TOTALS:	13.17	4,939

AMOUNT OF N PRODUCED:

5,520

\*\*\* BALANCE

581 - 1075

\* THERE WAS SIGNIFICANT DISCUSSION WITH NCSU WHETHER TO USE  
30% REDUCTION OR 1.7 LBS PAN/H06/HR WITH THE SOLIDS REMOVED  
FROM THE WASTE STREAM. I SHOWED BOTH AND BOTH HAVE A PAN  
DEFICIT, SO WE ARE GOOD EITHER WAY.

2.17 LBS PAN  
[4080]  
[1075]

\*\*\* This number must be less than or equal to 0 in order to fully utilize the animal waste N produced.

Acres show in each of the preceeding tables 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.

NOTE: The Waste Utilization Plan must contain provisions for periodic land application of sludge at agronomic rates. The sludge will be nurturient rich and will require precautionary measures to prevent over application of nutrients or other elements. Your production facility will produce approximately 888 pounds of plant available nitrogen (PAN) per year in the sludge that will need to be removed on a periodic basis. This figure is PAN when broadcasting the sludge. Please be aware that additional acres of land, as well special equipment, may be needed when you remove this sludge.

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

### 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.

Your facility is designed for 180 days of temporary storage and the temporary storage must be removed on the average of once every 5.92 months. In no instance should the volume of waste being stored in your structure be within 1 feet of the top of the dike.

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 Tables 1 and 2. Failure to apply the recommended rates and amounts of Nitrogen shown in the tables may make this plan invalid.

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

TRACT	FIELD	SOIL TYPE	CROP	APPLICATION RATE (in/hr)	APPLICATION AMT (inches)
1991	-1, -2, -3, -4, -5	FUQUAY 0-6%	SG	0.60	*1
1991	1, 2, 3, 4, 5	FUQUAY 0-6%	BH	0.60	*1

\* 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 the nitrogen limitation. The maximum application amount shown can be applied under optimum soil conditions.



## PLANS & 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. Illegal discharges are subject to assessment of civil penalties of \$10,000 per day by the Division of Water Quality for every day the discharge continues.
2. The Field Office must have documentation in the design folder that the producer either owns or has long term access to adequate land to properly dispose of waste. If the producer does not own adequate land to properly dispose of waste, he shall provide NRCS with a copy of a written agreement with a landowner who is within a reasonable proximity, allowing him/her the use of the land for waste application for the life expectancy of the production facility. It is the responsibility of the owner of the facility to secure an update of the Waste Utilization Plan when there is a change in the operation, increase in the number of animals, method of utilization, or available land.
3. Animal waste shall be applied to meet, but not exceed, the Nitrogen needs for realistic crop yields based on soil type, available moisture, historical data, climate conditions, and level of management, unless there are regulations that restrict the rate of application for other nutrients.
4. Animal waste may be applied to land that has a Resource Management System (RMS) or an Alternative Conservation System (ACS). If an ACS is used the soil loss shall be no greater than 10 tons per acre per year and appropriate filter strips will be used where runoff leaves the field. These filter strips will be in addition to "Buffers" required by DEM. (See FOTG Standard 393 - Filter Strips and Standard 390 Interim Riparian Forest Buffers).
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 irrigation field.
6. When animal waste is to be applied on acres subject to flooding, it will be soil incorporated on conventionally tilled cropland. When 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" in the NRCS Technical Reference - Environment file 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 conditions conducive to odor or flies and to provide uniformity of application.
8. Animal waste shall not be applied to saturated soils, during rainfall events, or when the surface is frozen.
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.
10. Waste nutrients 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 a crop on bare soil.
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 from any perennial stream or river (other than an irrigation ditch or 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. (See Standard 393 - Filter Strips)

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 croplands provided they have been approved as a land application site by a "technical specialist". Animal waste should not be applied on grassed waterways that discharge directly into water courses, except when applied at agronomic rates and the application 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.

\*17. A protective cover of appropriate vegetation will be established on all disturbed areas (lagoon embankments, berms, pipe runs, etc.). If needed, special vegetation shall be provided for these areas and 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. Lagoon 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 as a preemergence with no other 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 element. Zinc and copper levels in the soils shall be monitored and alternative crop sites shall be used when these metals approach excessive levels. pH shall be adjusted for optimum crop production and maintained. Soil and waste analysis records shall be kept for five (5) years. Poultry dry waste application records shall be maintained for three (3) years. Waste application records for all other waste shall be maintained for five (5) years.

23. Dead animals will be disposed of in a manner that meets North Carolina Department of

Agriculture regulations.

\* **Liquid Systems**



NAME OF FARM: Slippery Rock Farm

**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 utilization 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 utilization plan and a new certification to be submitted to DEM 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 waste utilization plan. This equipment must be available at the appropriate pumping time such that no discharge occurs from the lagoon in a 25-year 1-day storm event. I also certify that the waste will be applied on the land according to this plan at the appropriate times and at rates that no runoff occurs.

NAME OF FACILITY OWNER: Tim Craig

SIGNATURE: Tim Craig DATE: March 27, 2012

NAME OF MANAGER (if different from owner): \_\_\_\_\_  
*please print*

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

NAME OF TECHNICAL SPECIALIST: George H. Pettus

AFFILIATION: MOUNTAIN 2 SEA ENVIRONMENTAL, LLC

ADDRESS (AGENCY): 12 HAMPTON LANE  
WEAVERVILLE, NC 28787  
765-625-0297

SIGNATURE: George H. Pettus DATE: 27 MARCH 12

# EMERGENCY ACTION PLAN

## PHONE NUMBERS

DWQ  
EMERGENCY MANAGEMENT SYSTEM  
SWCD  
NRCS

910-486-1541

910-893-0630

910-893-5101

910-893-5101

This plan will be implemented in the event that wastes from your operation are leaking, overflowing, or running off site. You should not wait until wastes reach surface waters or leave your property to consider that you have a problem. You should make every effort to ensure that this does not happen. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. Stop the release of wastes. Depending on the situation, this may or may not be possible. Suggested responses to some possible problems are listed below.

A. Lagoon overflow-possible solutions are:

- a. Add soil to berm to increase elevation of dam.
- b. Pump wastes to fields at an acceptable rate.
- c. Stop all flows to the lagoon immediately.
- d. Call a pumping contractor.
- e. Make sure no surface water is entering lagoon.

B: Runoff from waste application field-actions include:

- a. Immediately stop waste application.
- b. Create a temporary diversion to contain waste.
- c. Incorporate waste to reduce runoff.
- d. Evaluate and eliminate the reason(s) that caused the runoff.
- e. Evaluate the application rates for the fields where runoff occurred.

C: Leakage from the waste pipes and sprinklers-action include:

- a. Stop recycle pump.
- b. Stop irrigation pump.
- c. Close valves to eliminate further discharge.
- d. Repair all leaks prior to restarting pumps.

- 4: If none of the above works call 911 or the Sheriff's Department and explain your problem to them and ask that person to contact the proper agencies for you.
- 5: Contact the contractor of your choice to begin repair of problem to minimize off-site damage.
- a. Contractors Name: TIM CRAIG
  - b. Contractors Address: \_\_\_\_\_
  - c. Contractors Phone: 919-777-3380
- 6: Contact the technical specialist who certified the lagoon (NRCS, Consulting Engineer, etc.)
- a. Name: BILLY H. JONES
  - b. Phone: RETIRED
- 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	BMPs to Control Insects	Site Specific Practices
Liquid Systems			
Flush gutters	<ul style="list-style-type: none"><li>Accumulation of solids</li></ul>	<div><input type="checkbox"/> Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed</div> <div><input type="checkbox"/> Remove bridging of accumulated solids at discharge</div>	N/A
Lagoons and pits	<ul style="list-style-type: none"><li>Crusted solids</li></ul>	<div><input checked="" type="checkbox"/> Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6 to 8 inches over more than 30 percent of surface</div>	
Excessive vegetative growth	<ul style="list-style-type: none"><li>Decaying vegetation</li></ul>	<div><input checked="" type="checkbox"/> Maintain vegetative control along banks of lagoons and other impoundments to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter.</div>	
Dry Systems			
Feeders	<ul style="list-style-type: none"><li>Feed spillage</li></ul>	<div><input type="checkbox"/> Design, operate, and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage</div> <div><input checked="" type="checkbox"/> Clean up spillage on a routine basis (e.g., 7- to 10-day interval during summer; 15- to 30-day interval during winter)</div>	

## Swine Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Farmstead	<ul style="list-style-type: none"> <li>Swine production</li> </ul>	<input checked="" type="checkbox"/> Vegetative or wooded buffers <input checked="" type="checkbox"/> Recommended best management practices <input checked="" type="checkbox"/> Good judgment and common sense	
Animal body surfaces	<ul style="list-style-type: none"> <li>Dirty manure-covered animals</li> </ul>	<input checked="" type="checkbox"/> Dry floors	
Floor surfaces	<ul style="list-style-type: none"> <li>Wet manure-covered floors</li> </ul>	<input checked="" type="checkbox"/> Slotted floors <input checked="" type="checkbox"/> Waterers located over slotted floors <input type="checkbox"/> Feeders at high end of solid floors <input type="checkbox"/> Scrape manure buildup from floors <input checked="" type="checkbox"/> Underfloor ventilation for drying	
Manure collection pits	<ul style="list-style-type: none"> <li>Urine</li> <li>Partial microbial decomposition</li> </ul>	<input type="checkbox"/> Frequent manure removal by flush, pit recharge, or scrape <input checked="" type="checkbox"/> Underfloor ventilation	BELT SYSTEM SEPARATION OF LIQUID & SOLIDS
Ventilation exhaust fans	<ul style="list-style-type: none"> <li>Volatile gases</li> <li>Dust</li> </ul>	<input checked="" type="checkbox"/> Fan maintenance <input checked="" type="checkbox"/> Efficient air movement	
Indoor surfaces	<ul style="list-style-type: none"> <li>Dust</li> </ul>	<input checked="" type="checkbox"/> Washdown between groups of animals <input type="checkbox"/> Feed additives <input type="checkbox"/> Feeder covers <input checked="" type="checkbox"/> Feed delivery downspout extenders to feeder covers	
Flush tanks	<ul style="list-style-type: none"> <li>Agitation of recycled lagoon liquid while tanks are filling</li> </ul>	<input type="checkbox"/> Flush tank covers <input type="checkbox"/> Extend fill lines to near bottom of tanks with anti-siphon vents	N/A
Flush alleys	<ul style="list-style-type: none"> <li>Agitation during wastewater conveyance</li> </ul>	<input type="checkbox"/> Underfloor flush with underfloor ventilation	

## Swine Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Settling basin surface	• Partial microbial decomposition	<input type="checkbox"/> Extend drainpipe outlets underneath liquid level	N/A
	• Mixing while filling	<input type="checkbox"/> Remove settled solids regularly	
	• Agitation when emptying		
Manure, slurry, or sludge spreader outlets	• Agitation when spreading	<input type="checkbox"/> Soil injection of slurry/sludges	
	• Volatile gas emissions	<input checked="" type="checkbox"/> Wash residual manure from spreader after use	
		<input type="checkbox"/> Proven biological additives or oxidants	
Uncovered manure, slurry, or sludge on field surfaces	• Volatile gas emissions while drying	<input type="checkbox"/> Soil injection of slurry/sludges	
		<input checked="" type="checkbox"/> Soil incorporation within 48 hours	
		<input checked="" type="checkbox"/> Spread in thin uniform layers for rapid drying	
		<input type="checkbox"/> Proven biological additives or oxidants	
Dead animals	• Carcass decomposition	<input checked="" type="checkbox"/> Proper disposition of carcasses	
Dead animal disposal pits	• Carcass decomposition	<input type="checkbox"/> Complete covering of carcasses in burial pits	
		<input type="checkbox"/> Proper location/construction of disposal pits	
Incinerators	• Incomplete combustion	<input type="checkbox"/> Secondary stack burners	
Standing water around facilities	• Improper drainage	<input checked="" type="checkbox"/> Grade and landscape such that water drains away from facilities	
	• Microbial decomposition of organic matter		
Manure tracked onto public roads from farm access	• Poorly maintained access roads	<input checked="" type="checkbox"/> Farm access road maintenance	

**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 must 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)

December 18, 1996

# SWINE LAGOON DESIGN

Operator: DAVE PEGRAM County: HARNETT Date: 6-5-91

Distance to nearest residence (other than owner): 1300 feet

## 1. STEADY STATE LIVE WEIGHT

_____ sows (farrow to finish)	x	1417 lbs.	= _____ lbs
<u>624</u> sows (farrow to feeder)	x	522 lbs.	= <u>325728</u> lbs
_____ head (finishing only)	x	135 lbs.	= _____ lbs
_____ sows (farrow to wean)	x	433 lbs.	= _____ lbs
_____ head (wean to feeder)	x	30 lbs.	= _____ lbs

TOTAL STEADY STATE LIVE WEIGHT (SSLW) = \_\_\_\_\_ lbs

## 2. MINIMUM REQUIRED TREATMENT VOLUME OF LAGOON

Volume = 325728 lbs. SSLW x Treatment Volume(CF)/lb. SSLW

Treatment Volume(CF)/lb. SSLW = 1.0 CF/lb. SSLW

Volume = 325728 cubic feet

## 3. STORAGE VOLUME FOR SLUDGE ACCUMULATION

*NO SLUDGE STORAGE DESIGNED AT OWNER'S REQUEST. SLUDGE  
WILL BE REMOVED AS NEEDED.*

Volume = 0 cubic feet



Inside top length <sup>I 190</sup> 165 feet ; Inside top width <sup>160</sup> 140 feet  
 Top of dike at elevation 37.0 feet  
 Freeboard 1.0 feet ; Side slopes 2.5 : 1 (Inside lagoon)  
 Total design lagoon liquid level at elevation 36.0 feet  
 Bottom of lagoon elevation 23.0 feet  
 Seasonal high water table elevation < 30.0 feet

Total design volume using prismoidal formula

SS/END1	SS/END2	SS/SIDE1	SS/SIDE2	LENGTH	WIDTH	DEPTH
_____	_____	_____	_____	_____	_____	_____

*SEE ATTACHED SHEET FOR VOLUME ESTIMATE*

AREA OF TOP

LENGTH \* WIDTH =  
 \_\_\_\_\_ = \_\_\_\_\_ (AREA OF TOP)

AREA OF BOTTOM

LENGTH \* WIDTH =  
 \_\_\_\_\_ = \_\_\_\_\_ (AREA OF BOTTOM)

AREA OF MIDSECTION

LENGTH \* WIDTH \* 4  
 \_\_\_\_\_ = \_\_\_\_\_ (AREA OF MIDSECTION \* 4)

CU. FT. = [AREA TOP + (4\*AREA MIDSECTION) + AREA BOTTOM] \* DEPTH/6  
 \_\_\_\_\_

VOLUME OF LAGOON AT TOTAL DESIGN LIQUID LEVEL = 467,594 CU. FT.

## 5. TEMPORARY STORAGE REQUIRED

### DRAINAGE AREA:

Lagoon (top of dike)

Length \* Width =

$$\begin{array}{rcl} \text{SECT I} & 160' & 190' = 30400 \text{ square feet} \\ \text{SECT II} & 140' & 165' = 23100 \\ & & \hline & & 53,500 \text{ FT}^2 \end{array}$$

Buildings (roof and lot water)

Length \* Width =

\_\_\_\_\_ = \_\_\_\_\_ square feet

TOTAL DA = 53,500 square feet

Design temporary storage period to be 180 days.

### 5A. Volume of waste produced

Approximate daily production of manure in CF/LB SSLW 0.00136

Volume = 325728 Lbs. SSLW \* CF of Waste/Lb./Day \* 180 days

Volume = 79738 cubic feet

This is the amount of fresh water used for washing floors or volume of fresh water used for a flush system. Flush systems that recirculate the lagoon water are accounted for in 5A.

$$\text{Volume} = \underline{\hspace{2cm}} \text{ gallons/day} * \underline{\hspace{2cm}} \text{ days storage} / 7.48 \text{ gallons per CF}$$

$$\text{Volume} = \underline{\hspace{2cm}} \text{ cubic feet}$$

5C. Volume of rainfall in excess of evaporation

Use period of time when rainfall exceeds evaporation by largest amount

$$\underline{180} \text{ days excess rainfall} = \underline{7.0} \text{ inches}$$

$$\text{Volume} = \overset{53,500}{\underline{7}} \text{ in} * \text{DA} / 12 \text{ inches per foot}$$

$$\text{Volume} = \underline{31208} \text{ cubic feet}$$

5D. Volume of 25 year - 24 hour storm

$$\text{Volume} = \overset{53,500}{\underline{6.7}} \text{ inches} / 12 \text{ inches per foot} * \text{DA}$$

$$\text{Volume} = \underline{29871} \text{ cubic feet}$$

TOTAL REQUIRED TEMPORARY STORAGE

$$5A. \underline{79738} \text{ cubic feet}$$

$$5B. \underline{\hspace{2cm}} \text{ cubic feet}$$

$$5C. \underline{31208} \text{ cubic feet}$$

$$5D. \underline{29871} \text{ cubic feet}$$

$$\text{TOTAL } \underline{140817} \text{ cubic feet}$$

325,728

## 6. SUMMARY

Total required volume 466,545 cubic feet

Total design volume avail. 467,574 cubic feet

Min. req. treatment volume plus sludge accumulation 325,728 cubic

At elev. 32.0 feet ; Volume is \_\_\_\_\_ cubic feet (end pumping)

Total design volume less 25yr-24hr storm is 436,674 cubic feet

At elev. 35.3 feet ; Volume is 440,757 cubic feet (start pump)

Seasonal high water table elevation < 30.0 feet

7. DESIGNED BY: Billy H. Jones APPROVED BY: Billy H. Jones

DATE: 6-10-91

DATE: 6-10-91

DAVE PROGRAM - SWINE LAGOON  
HARRIET COUNTY

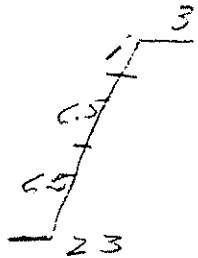
624 SOW FARROW TO FRESH + 572 = 325725 LBS = 325  
TOTAL NEEDED 474532 FT<sup>3</sup>

VOLUME ESTIMATE  
SECT. I

$$\begin{array}{r} 190 + 130 \\ \hline 320 \end{array} \times 14' = 4480$$

$$\begin{array}{r} 190 \times 14 \\ - 37.5 \\ \hline 2625 \end{array} \quad \begin{array}{r} 130 \times 14 \\ - 18.75 \\ \hline 1812.5 \end{array} \quad 7.5 \times 5 = 37.5$$

$$172.5 \times 171.25 \times 13 = 272716 \text{ FT}^3$$



SECT II

$$\begin{array}{r} 140 \times 165 \times 14 \\ - 37.5 \quad - 18.75 \\ \hline \end{array}$$

$$102.5 \times 146.25 \times 13 = 194878 \text{ FT}^3$$

$$V_{\text{STORAGE}} = 272716 + 194878 = 467594 \text{ FT}^3$$

**LAGOON**

Distance from nearest residence \_\_\_\_\_

Soils Cecil

Number of Animal Units or Total lbs. \_\_\_\_\_

Type Lagoon Anaerobic

Kind of animals \_\_\_\_\_

Volume \_\_\_\_\_

Units X

ft.<sup>3</sup>

= \_\_\_\_\_ cu. yds.

27

**HOLDING VOLUME** (waste + rain + 25-year storm)

Period \_\_\_\_\_ Watershed \_\_\_\_\_ acres

Waste \_\_\_\_\_ cu. yds., normal rain less evaporation \_\_\_\_\_ cu. yds.

25-yr. storm \_\_\_\_\_

Total \_\_\_\_\_ cu. yds.

**FERTILIZATION & SEEDING**

\_\_\_\_\_ acres

Lime \_\_\_\_\_

Fertilizer \_\_\_\_\_

Seed \_\_\_\_\_

Mulch \_\_\_\_\_

**MAINTENANCE**

The vegetative cover on the fill shall be maintained by fertilizing when needed. Woody growth should be prevented from developing by proper mowing. Repair any minor erosion that occurs.

As BuiltLength 190' Width 160' Top Width 10'Top of fill - - - - - elev. 37.0Top of holding volume - - - - - elev. ~~36.0~~ 35.3Top of lagoon volume - - - - - elev. 32.0Bottom of lagoon - - - - - elev. 23.0Emergency spillway - - - - - elev. NoneInterior side slopes - - - - - 2.5 to 1 Exterior side slopes 2.5 to 1Just seeded - Built according to design

TBM \_\_\_\_\_

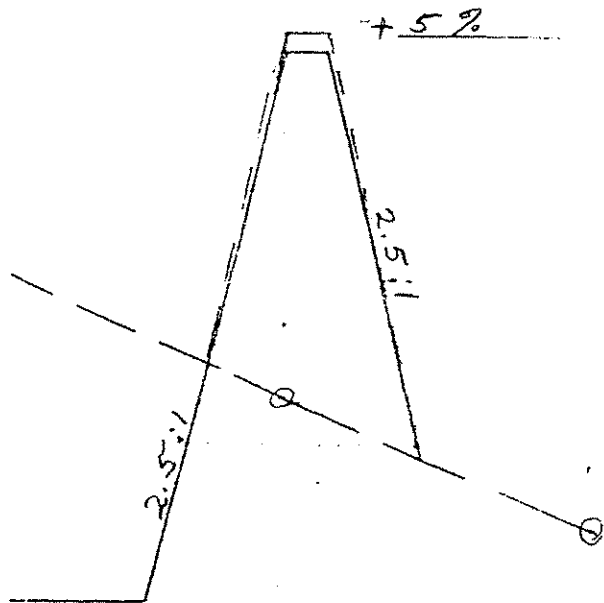
Parley V. Bleck, D.C.  
8-25-91 **U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE**

Designed _____	Date _____	Approved by _____
Drawn _____		Title _____
Typed _____		Title _____
Checked _____		Sheet _____ Drawing No. _____
		of _____

FEET)

1750

2700



SIDE  
TOP

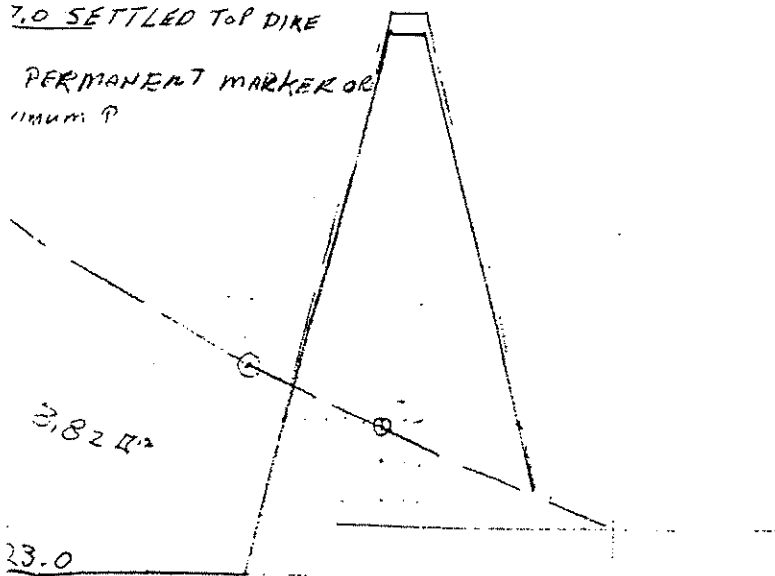
1700

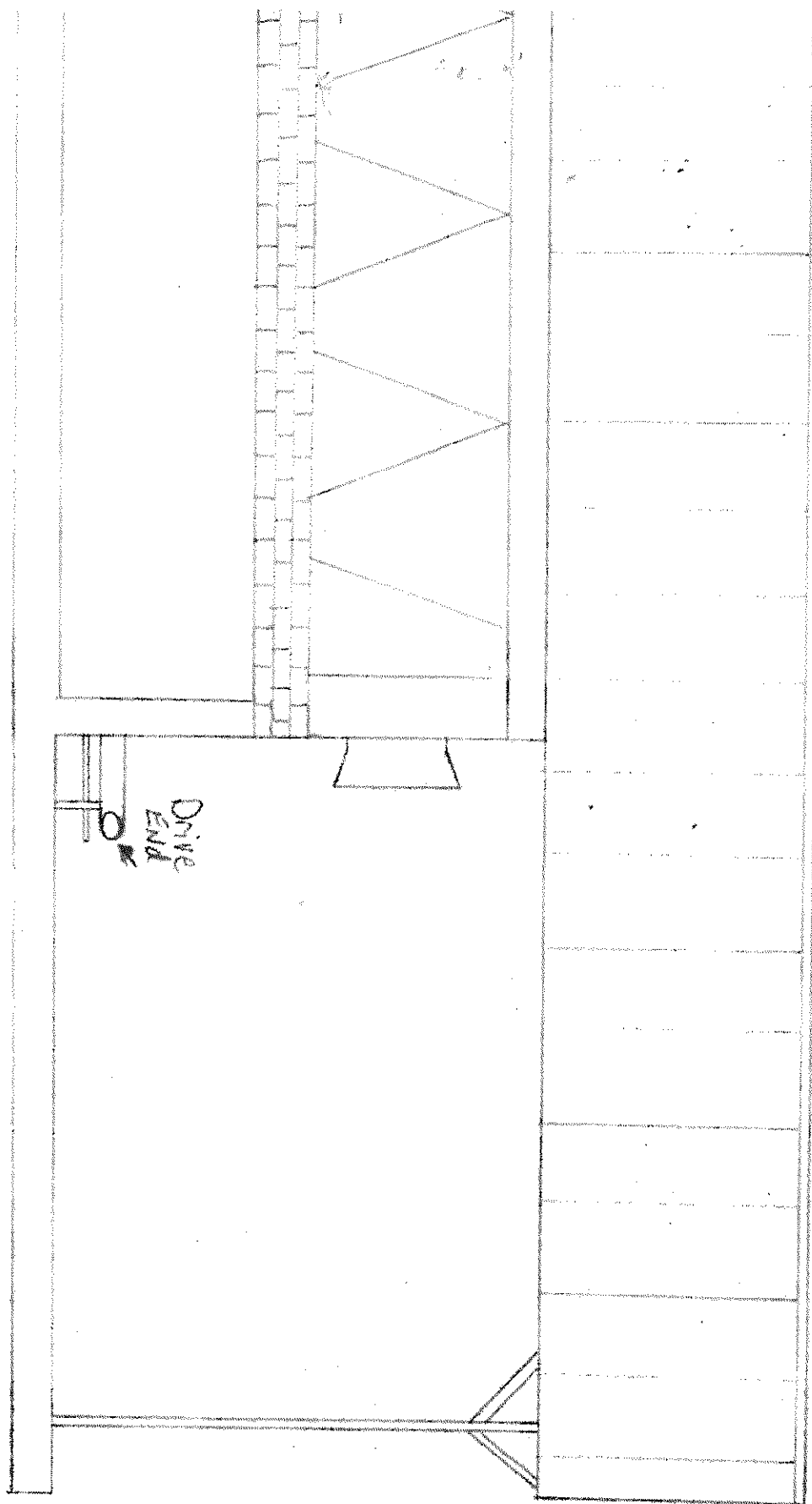
1750

2700

7.0 SETTLED TOP DIKE

PERMANENT MARKER OR  
MINIMUM P







Burn Area

SLATS

$\frac{1}{4}$ " PE SHEETING

$\frac{24}{16}$ " Belt

8" PVC PIPE SPLIT

← Poured or Block  
6" or 8"

← Poured Concrete,  
Footings

