APPLICATION FOR A PERMIT TO OPERATE A SEPTAGE LAND APPLICATION SITE

North Carolina Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
1646 Mail Service Center, Raleigh, NC 27699-1646

RECEIVED
MAR 17 2015
SOLID WASTE SECTION

I. Site and Operator Information

1. Applicant PAUL G HOFFMAN HOFFMAN SEPTIC TANK Service
   Address 110 ENTERPRISE DR
   ELIZABETH City NC 27909
   Phone 252 339-4910

2. Contact person for site operation (if different from applicant): _____
   Title or position OWNER Phone 252 339 4910
   Address _____

3. Landowner J. Bryan Smith JBS Group LLC
   Address 1913 Hunting Ridge Rd
   RALEIGH NC 27615

4. Site Location: County Currituck State Road Number 1146
   Directions to site: TAKE I-7N TO 155, WHEN YOU GET TO 168 TAKE RIGHT ON SWAINS LN

5. Indicate whether request is: new _____ renewal X modification _____

   For a permit renewal or modification, provide the following information:
   Existing site permit number SLAS-27-11 permit expiration date: JUNE 28, 2015

6. Number of acres meeting the requirements of the N.C. Septage Management Rules: 13.5 acres.

7. Substances other than septage or grease trap pumpings previously disposed of on the site:
   (a) None X, or (b) Attach a list indicating other substances, the amounts discharged, and the dates of discharge.

8. Attach written, notarized landowner authorization to operate a septage disposal site signed by the landowner (if the permit applicant does not own the property). ***If a corporation owns the land use a corporate landowner authorization form. If limited liability company owns the land, use a limited liability company landowner authorization form.***

9. Attach site evaluation report, including aerial photograph and soil analysis with metals results, unless the Division prepared the report.

10. Attach a vicinity map (county road map showing site location).

(over)

II. Site Management Information:

The following information shall be included with the application form:

1. Nutrient Management Plan
2. Soil Erosion and Runoff Control Plan

3. Alternative plan for disposal (detention facility permit number or wastewater treatment plant authorization): TOWN OF HENFORD WWTP / SDTF-2711 / SDTF-70-02

4. Types of septage proposed to be discharged at the site (check all that apply):
   (a) Domestic septage pumped from septic tanks ✓
   (b) Grease trap pumpings ✓
   (c) Portable toilet waste ✓
   (d) Commercial / Industrial septage ✓

5. Proposed treatment method of each type of septage to be land applied (use additional paper to explain if necessary): I will USE Hydrated Lime TO STABILIZE SEPTAGE.

6. Proposed method of applying septage to land, including septage distribution plan if required * (use additional paper to explain if necessary): I will USE A device ON PUMPER TO discharge under pressure SEPTAGE SO NO standing SEPTAGE OR puddling will BE visible.

7. Demonstration from the appropriate state or federal government agency that the land application site complies with the Endangered Species Law ** or if any part of the site specified is not agricultural land (use additional paper to explain if necessary): FARM LAND

III. Certification

I hereby certify that:

1. The information provided on this application is true, complete, and correct to the best of my knowledge.
2. I have read and understand the N.C. Septage Management Rules, and
3. I am aware of the potential consequences, including penalties and permit revocation, for failing to follow all applicable rules and the conditions of a Septage Land Application Site permit.

Paul G Hoffman
Signature***

3-6-15
Date

PAUL G HOFFMAN
Print name

OWNER
Title

Note: This application will not be reviewed until all parts of the application are complete.
*** Refer to Section .0837(e) of the N.C. Septage Management Rules.**
**** Refer to Section .0837(g) of the N.C. Septage Management Rules.**
*****Signature of company official required.**

The pathogen reduction requirement on the receiver site in the EPA 503 regulation can be achieved through alkaline stabilization of the septage. The lime or alkaline stabilization process requires septage hauler to add sufficient lime ($Ca(OH)_2$) to the septage to achieve a pH of 12 for at least 30 minutes or 2 hours for grease without the addition of more alkaline material. The process will be done by vacuum the lime into the vacuum truck tank and be mixed by driving to the septage site. The domestic septage will be land applied by spreader bar attached to discharge outlet as the truck travels across site. The domestic septage will be checked by micro essential m1313 ph paper,mikro,ph 0-13 before land applying.

Paul Hoffman

Digitally signed by Paul Hoffman
DN: cn=Paul Hoffman, o=Hoffman Septic, ou, email=hstp@roadrunner.com, c=US
Date: 2016.02.18 21:10:23 -05'00'

Paul G Hoffman

SLAS 27-11
NCS-0210

Limited Liability Company Landowner's Authorization to Operate a Septage Land Application Site

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North Carolina Department of Environment and Natural Resources
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I hereby certify that the undersigned limited liability company, JBS Group, owns 13.5 acres of land located Swains Lane, Barco NC and identified by Book 1144 PAGE 820 (book and page of recorded deed or tax map parcel) and that the limited liability company agrees to allow PAUL G HOFFMAN (operator name) to use said land for application of septage for a period of 5 YEARS (length of time), beginning MAY 28, 2015 (give date), and that on behalf of the limited liability company, I have read the North Carolina Septage Management Rules*, and JBS GROUP (name of limited liability company) understands and agrees to maintain the restrictions on land use after septage application ends**. JBS Group (name of limited liability company) further understands that no septage may be land applied until the Division of Waste Management has issued a permit for a septage land application site. The above described property is owned solely by the undersigned limited liability company, or jointly with NONE (name all co-owners, or state none).

Date: 3-2-15

JBS GROUP, LLC
Limited Liability Company (Print Name)

J. Bryan Smith
Signature (Authorized Member or Manager)

J. BRYAN SMITH, MANAGER
Print Name and Title

North Carolina
Currituck County

I, TRACEY A. BRANNAN, a Notary Public for said County and State do hereby certify that J. Bryan Smith (name of authorized member or manager of limited liability company) personally appeared before me this day and, being first duly sworn, acknowledged that he (she) is a (the) manager (member or manager) of JBS Group, a limited liability company, and that by authority duly given and as the act of the limited liability company, the foregoing instrument was signed in its name by its authorized manager (member or manager), and that the statements contained therein are true. Witness my hand and official seal, this the 3rd day of March, 2015.

Tracey A. Brannan
Notary Public

My Commission expires: 10-3-17

(OFFICIAL SEAL)
TRACEY A BRANNAN
NOTARY PUBLIC
Currituck County
North Carolina
My Commission Expires October 3, 2017

***15A N.C. Admin. Code 13B Section .0800**
**** As required by Rule .0843**

SEPTAGE LAND APPLICATION LOG

COVER SHEET

Site Operator: PAUL G HOFFMAN

SLAS Permit #: SLAS-27-11

Site Location: 36.3719°N Latitude & -75.9989°W Longitude
(street address for the site **or** latitude and longitude)

Number of acres permitted: 7.4 ACRE

Permitted application rate: 100,000
(gallons septage per acre per year)

Crop(s): WHEAT / BERMUDA GMS 3

Crop nitrogen requirement(s): 225
(pounds nitrogen per acre)

CERTIFICATION:

"I certify, under penalty of law, that the pathogen requirements in (insert either 503.32 (c)(1) or 503.32 (c)(2)) and the vector attraction reduction requirements in (insert 503.33 (b)(9), 503.33 (b)(10) or 503.33 (b)(12)) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

Paul G Hoffman
(signature)

3-6-15
(date)

March 12, 2015

Hoffman Septic Tank Pumping

Nutrient Management Plan for
Septage Application to
Bermudagrass and Annual Ryegrass

A. General Information

1. The septage disposal site (permit number to be determined) is located off of State Road #1146 in Currituck.

2. Periodic sampling of the septage is not being conducted at this time.

3. Total permitted site size is 13 acres and the application site is 7.4 acres. The site named field A.

4. The soil series at this site includes Wando loamy fine sand, Conetoe loamy sand, and Munden loamy sand, but the dominant series is Wando.

5. *Septage will not be applied where the site is untrafficable (untrafficable is* defined as a soil that will allow a truck to leave a depression sod greater than 3 inches in depth).

6. All nitrogen recommendations for forages will be 75% of the realistic yield expectation rate should the forage be only grazed.

7. Septage storage shall be provided to account for the average volume of septage pumped per week, or an alternative plan, such as disposal at a waste treatment plant, should be in place.

8. Sites utilized for application of septage are managed according to certain laws and regulations (see appendix for current regulations).

B. Crops Being Grown and Approximate Planting Times

1. Field A was established by seeding Wrangler bermudagrass for a summer crop, at the rate of 13 pounds per acre. This will be accomplished during the time period of April 15 to May 15.

   As a winter crop, this field of Bermuda grass will be over seeded annually with wheat. It will be seeded at a rate of 125 to 150 pounds per acre by drilling during the months of September and October.

2. If there is not an agronomically acceptable stand of bermudagrass

(i.e.ground covered with bermudagrass stolons) on at least 85% of the surface area of the site, then bermudagrass will be sown in those areas in the following spring unless the determination of poor stands is made prior to or at the time of planting for bermudagrass of the current year. The bare areas should be lightly tilled and reseeded at the rate of 5-7 pounds of bermudagrass seed (i.e. 0.2 lbs of seed per 1000 square feet).

C. Nitrogen (N) Needs for Crops Grown:

Table 1. Nitrogen Needs for Crops Grown

Crop (harvested for Hay)	R.Y.E.[1]	Nitrogen Application Rate[2]	Lbs N/Acre/Year
Bermudagrass	3.9 tons/ac	45.6 lbs/dry ton	175 lbs/ac/yr
Wheat	1 tons/ac	45.6lbs/dry ton	50 lbs/ac/yr

1. R.Y.E. = Realistic Yield Expectation

2. Nitrogen Application Rate = Suggested nitrogen rate based on R.Y.E.

D. Annual Application Rate

MONTH	FIELD A
January	Low
February	Low
March	Medium
April	High
May	Medium
June	High
July	High
August	Medium
September	Medium
October	Medium
November	Low
December	Low

None = 0 gallons; Low = 5,000 gallons; Medium = 10,000 gallons; High = 15,000 gallons
Note: Cumulative application rate is not to exceed the permitted rate.

E. Application Method

The preceding information is based on septage being evenly applied over the entire site with a splash shield or side discharge extension.

F. Crop Management and Additional Fertility Requirements

For the bermudagrass, do not apply lime because of the lime supplied by the stabilized septage (see note below). Apply 100 pounds of 0-20-20 per acre prior to planting to help the crop to establish itself unless the report from the soil sample indicates that nutrient levels are sufficient. The remainder of the nutrients will be supplied by the septage, which will be surface applied to the crop during the growing season. If higher levels of production by the crop are desired, then supplemental nutrients may be needed. Incorporation of the fertilizer prior to planting the bermudagrass with a disk and/or chisel-plow will suffice for preparing the seed bed. Seeds will be planted with a drill.

In September/October, clip the bermudagrass to a height of 1 inch or less. Prior to seeding the wheat apply 200 pounds of 10-10-10 per acre unless otherwise indicated by the soil test report. This fertilizer is needed as a starter and only 20 pounds of nitrogen per acre is negligible when considering the cumulative net requirement of the two crops. Overseeding may be accomplished by using a sod-seeder or a grain drill. A light disking may be required prior to seeding (especially since septage application equipment may compact the soil) with a grain drill or a broadcast seeder.

Note: Soil samples should be taken annually to monitor the pH of the soils as well as other nutrients in the soil. Since most waste materials do not contain optimum nutrient balance required for each crop and field, it is important to check the soil recommendations and, if necessary, supplement with commercial fertilizer. The pH of the soil at the site will be higher than that required for most crops because of the addition of lime stabilized septage. There should be no need for additional lime to meet the needs of the crop.

G. Harvest of the Crop and Their Use

1. The bermudagrass will be cut as hay and removed whenever it reaches approximately 12 inches in height or roughly every 4 weeks beginning in June.

2. The wheat will be cut as hay and baled in April, and/or May from field A

3. All harvested material will be removed from the site and properly disposed of. The harvested material will not be used for animal feed or come into contact with humans.

H. Soil Erosion and Runoff Control Plan

Given that the slopes on this site do not exceed five percent, a 50 foot buffer should suffice to prevent septage waste from migrating off of the fields. The buffers will be a row crop that will not be used for human consumption. The stubble left from the row crop should suffice for soil erosion. (More severe site conditions could require that soil erosion structures be installed before septage can be applied.)

Submitted by: Paul G Hoffman ***Date:*** 3-11-15

Appendix

Management Requirements

By:
A.R. Rubin, Penny Mascaro, Ted Lyon and Joe Zublena

Septage Defined

The EPA 503 regulation (40 CFRPT 503) was printed in the Federal Register on February 19, 1993. The regulation addresses the management of septage and sludge produced from municipal and domestic sources. Septage is specifically defined as material from domestic sources only. If any commercial or industrial wastes are combined with domestic septage, then the 503 regulation does not apply. In the 503 regulation, septage is defined as liquid, solid, or semi-solid material removed from a septic tank, portable toilet, cesspool, type III marine sanitation or similar facility that receives only non-commercial septage. Some material such as grease trap residues are often referred to as septage but are not included in this definition. The Part 503 regulation offers a simple and manageable regulatory scheme for the land application of septage. This management scheme is applicable only if the septage is applied to "non-public contact sites." These non-public contact sites are defined as those where the potential for public exposure is minimal. An agricultural field, forest land, or a disturbed site in need of reclamation is considered a non-public contact site.

Land Application to Non-Public Sites

The Part 503 regulation mandates that domestic septage appliers are required to:

1. Meet and certify pathogen reduction and vector attraction reduction requirements prior to land application.

2. Follow a prescribed Best Management Practice for septage management

3. Utilize septage application rates based upon the nitrogen requirement of the crop.

4. Ensure that septage is from domestic sources only.

5. Develop and maintain a record-keeping system germane to their land application activities.

1 Much of this document was adopted from the Residuals Management Workshop 503 regulations handout provided by the EPA, the Water Environmental Federation and the NC Dep. Environ. Mgmt. May 6-7, 1993, Charlotte, NC.

Each of the requirements of the 503 regulations are discussed in this document. Septic tank pumpers who land apply septage are not required to obtain a Federal permit for these activities. However, North Carolina law requires that septic tank pumpers who land apply obtain two permits; one to transport and haul septage, and second to land apply it. The land application permit is specific to a defined land receiver site.

Pathogen Reduction

The pathogen reduction requirement on the receiver site in the EPA 503 regulation can be achieved through either defined management practices, requirements for soil incorporation or through alkaline stabilization of the septage. The management practices are primarily restrictions on harvesting and requirements for restricting public access to the site. The lime or alkaline stabilization process requires septage haulers to add sufficient lime ($Ca(OH)_2$) to the septage to achieve a pH of 12 for at least 30 minutes without the addition of more alkaline material.

On those sites, which rely on management practices only, certain crop restrictions must apply. The crop restrictions are:

1. Food crops with harvested parts that touch the soil surface, but are totally above ground, cannot be harvested for 14 months after application.

   Examples include: Melons and cucumbers

2. Root crops cannot be harvested for 20 months after application if the septage is not disked in and remains on the soil surface for less than 4 months.

   Examples include: Carrots and turnips

3. Root crops cannot be harvested for 38 months after application if the septage remains on the soil surface for less than 4 months.

4. No crop can be harvested for at least 30 days following application of septage.

5. Animals cannot be grazed on a septage receiver site for 30 days following land application.

6. Turf cannot be harvested for one year following application of septage if the turf is to be placed on any sites with high potential for public exposure.

In addition, public access must be restricted for at least 30 days. These restrictions include fencing and posting of signs. Any remotely situated site is considered to have a restricted access by virtue of the location.

When septage is lime stabilized prior to application, the first four restrictions (no food crop harvesting for 14 months, no root crop harvesting for either 20 or 38 months, and no harvesting for 30 days for all crop revisions) still apply. There are however, no restrictions on animal grazing or use as turf for sites on which stabilized septage are applied and there are no public restrictions to this site.

Vector Attractions and Reduction

There are three vector attraction and reduction alternatives listed in the Part 503 regulation. One of the following of the vector attraction reduction requirements must be employed whenever septage is applied to land.

1. Septage can be injected into the soil surface at the time of application and no significant amount of septage can remain present on the soil surface one hour after application. The regulation does not define a significant amount of septage.

2. Septage must be incorporated into the surface soil within six hours of application.

3. The pH of septage must be elevated to and maintained at a pH of at least 12 for a minimum of 30 minutes without the addition of more alkaline material.

Application Rate Based on Nitrogen Requirements

The maximum volume of domestic septage, which can be applied to any receiver site, will depend upon the amount of nitrogen required by the crop grown on that site and the anticipated crop yield. The equation below is used in the regulation to calculate the annual application rate for septage: The annual application rate yielded will be expressed as gallons per acre year.

$$\text{annual application rate (gal/ac/yr)} = \frac{\text{crop nitrogen requirement (lb/ac/yr)}}{.0026}$$

In addition to the requirement of the EPA 503 rules, the NC Div. of Solid Waste Management is proposing that no more than 50,000 gallons/acre/year be land applied. When designing application systems for NC, Agronomic N rates would be based on either the EPA formula or the NC 50,000 gal/ac/yr limited whichever is lowest.

Record-Keeping

There are no formal reporting requirements listed in the EPA 503 regulation. The regulation does specify that records must be maintained by individuals who land apply septage. The following information must be recorded and retained by the septage applier for five years following any application event:

1. Site location

2. Number of acres involved in the land application program.

3. Date and time of each application event.

4. The nitrogen requirement of the crop grown on the land receiver site.

5. The gallons of septage applied in each application event, certification that the material is domestic septage only, and that pathogen reduction and vector attraction reduction requirements have been met.

6. A description of the pathogen reduction methods.

North Carolina Requirements

Any individual or firm, which collects, transports, or handles septage in any manner, must obtain at least one, and perhaps two, permits. The septage management firm must obtain a permit to transport septage over state roads. In order to obtain a permit to operate, the owner must submit the following information to the State Solid Waste Management Branch:

1. The owner's name and the business name, address, and phone number.

2. The number and capacity of pump trucks.

3. The type of pumping equipment used on trucks.

4. License and serial numbers of vehicles.

5. A hazardous waste permit number, if appropriate.

6. The county or counties in which the firm operates.

7. The method for ultimate disposal of septage.

8. The location of all disposal of septage.

9. The method for managing washings and cleaning generated from the interior of the septage hauling containers and the location of the disposal site for those washings.

In addition, if the septage is applied to agricultural lands, the permittee must also submit information concerning the operation of that site. The information, which must be submitted to the State Solid Waste Management Branch Include:

1. Site location.

2. Name, address, and telephone number of the owner of the site.

3. The number of acres included in the receiver area on the site.

4. The estimated application rate onto this site.

5. The crop to be grown on that site.

6. Method for managing septage during adverse weather.

7. Method for incorporation and pretreatment methods used for septage management.

8. The equipment to be utilized at that site.

The operator of that site must present to the State Solid Waste Management Branch an estimate of the nutrient and metal assimilative capacity of the site, evidence that the hydraulic components contained in septage will be assimilated on that site, and must document the nutrient requirements of the crop growing or to be grown on that site.

In all cases, the state and federal regulatory agencies must consider the impact of the septage management program on rare and endangered species.

The state also limits septage application onto sites based on both a hydraulic and a nutrient load. The federal regulations list setback requirements from surface waters which are less stringent than those utilized by the state. In all cases where state rules are more stringent than federal rules, then owners and operators of septage disposal sites must comply with state regulations. The state septage management rules are listed in Section .0800 of the State Solid Waste Management rules (15ANCAC13B). Copies of these rules can be obtained from the Department of Environment, Health, Natural Resources, Solid Waste Management Section or from local health departments.

Compliance

Any individual who land applies septage must maintain records of their activities after July 19, 1993. If septage hauling is required to construct any major facility to comply with the 503 provisions, then a one year compliance period is allowed. Full compliance with the provisions of the 503 regulation will be required by February 19, 1995. These EPA rules are self implementing. That is, anyone who handles, transports or land applies septage is expected to comply with all provisions of the EPA 503 rule.

Horizontal Buffer Requirements for Septage Receiver Sites

Feature	Buffer (ft)
Residence (off site)	500
Residence (on site)	250
Office (for septage mgmt firm)	100
Wells (up slope)	100
Wells (down slope)	250
Wells (community water supply)	500
Springs (up slope)	300
Springs (down slope)	500
Surface Waters (WS II, WS III, WS IV)	300
Surface Waters (class B, nutrient sensitive, or ORW)	300
Surface Waters (class C Swamps)	100 - 200
Waterways (with grass buffers)	25
Waterways (no cover)	100
Intermittent Streams (with vegetative buffers)	50
Intermittent Streams (no cover)	100
Ditches	25
Property Boundaries	50
Road	100
Food Crops	50
Vertical buffer requirements for septage receiver sites	
Feature	**Buffer (in)**
Seasonal wetness - Group I Soil (sands)	24
Seasonal Wetness - Group II Soil (loams)	18
Seasonal wetness - Group III Soil (clays)	12
Rock - Group I Soil	24

Rock - Group II Soil	18
Rock - Group III Soil	12

Addendum to Nutrient Management Plan
for
Septage Land Application Site 27-11
Carryover Nitrogen Calculation
March 2015

The following calculations are based on the assumption that there is approximately 2.6 lbs nitrogen (N) per 1,000 gal. of septage. It is also assumed that only 40% of the N from the applied septage will be available for crop uptake that year. In the years after the application, the amount of N released from the previous year septage applications is assume to follow the percentages listed in the following table.

Nitrogen Mineralization Rates

Year After Application	Percentage Mineralized
First	20
Second	10
Third	5
Fourth	3

Year 1:

For year 1, no residual nitrogen (N) is taken into account. Thus, the amount of N available for crop uptake is 40% of the total N applied through the septage.

Available N = 0.4 * 2.6 lbs/1000 gal = 1.04 *lbs/1000 gal.*

Year 2:

For year 2, the amount of N available for crop uptake equals 40% of the total N applied through the septage this year and 20% of the remaining N from last year's applications.

Available N = 0.4 * 2.6 lbs/1000 gal + (year 1 remaining N * 0.20)

Available N = 1.04 lbs/1000 gal + (2.6 – 1.04 lbs/1000 gal * 0.20)
= 1.04 lbs/1000 gal + (1.56 lbs/1000 gal * 0.20)
= 1.04 + 0.312
= 1.35 lbs/1000 gal

Year 3:

For year 3, the amount of N available for crop uptake equals 40% of the total N applied through the septage this year plus 20% of the remaining N from last year's applications plus 10% of the remaining N from year 1 septage applications.

Available N = 0.4 * 2.6 lbs/1000 gal + (year 2 remaining N * 0.20) + (year 1 remaining N * 0.10)

Available N = 1.04 lbs/1000 gal + (2.6 – 1.04 lbs/1000 gal * 0.20) + [(1.56 – 0.312 lbs/100 gal) * 0.10]
= 1.04 + 0.312 + (1.248 * 0.10)
= 1.04 + 0.312 + 0.1248
= 1.477 lbs/1000 gal

Year 4:

For year 4, the amount of N available for crop uptake equals 40% of the total N applied through the septage this year plus 20% of the remaining N from last year's applications plus 10% of the remaining N from year 2 septage applications plus 5.0% of the remaining N from year 1 septage applications.

Available N = 0.4 * 2.6 lbs/1000 gal + (year 3 remaining N * 0.20) + (year 2 remaining N * 0.10) + (year 1 remaining N *0.05)

Available N = 1.04 lbs/1000 gal + (2.6 – 1.04 lbs/1000 gal * 0.20) + [(1.56 – 0.312 lbs/100 gal) * 0.10] + [(1.56 – (0.312 + 0.1248) lbs/1000 gal * 0.05]
= 1.04 + 0.312 + 0.1248 + (1.1232 * 0.05)
= 1.04 + 0.312 + 0.1248 + 0.0562
= 1.533 lbs/1000 gal

Year 5:

For year 5, the amount of N available for crop uptake equals 40% of the total N applied through the septage this year plus 20% of the remaining N from last year's applications plus 10% of the remaining N from year 3 septage applications plus 5.0% of the remaining N from year 2 septage applications plus 3.0% of the remaining N from year 1 septage applications.

Available N = 0.4 * 2.6 lbs/1000 gal + (year 4 remaining N * 0.20) + (year 3 remaining N * 0.10) + (year 2 remaining N *0.05) + (year 1 remaining N * 0.03)

Available N = 1.04 lbs/1000 gal + (2.6 – 1.04 lbs/1000 gal * 0.20) + [(1.56 – 0.312 lbs/100 gal) * 0.10] + [(1.56 – (0.312 + 0.1248) lbs/1000 gal * 0.05] + [(1.56 – (0.312 + 0.1248 + 0.0562) lbs/1000 gal * 0.03]
= 1.04 + 0.312 + 0.1248 + 0.0562 + (1.067 * 0.03)
= 1.04 + 0.312 + 0.1248 + 0.0562 + 0.0320
= 1.565 lbs/1000 gal

Nitrogen Calculations for SLAS-27-11

CROP TABLE

Crop	RYE[1]	N rate (*lbs/ac*)
Hybrid bermudagrass (hay)[2]	4.5 *tons/ac*	225
Rye[2]	-	-

[1] Realistic Yield Expectations for Wando loamy fine sand

[2] N rate for hybrid bermudagrass and rye overseed not to exceed the N rate for hybrid bermudagrass overseeded with rescuegrass (hay) of 225 *lbs/ac*.

Rye or wheat at an application rate of 35,000 *gal/ac/yr*.

Year	N Rate (*lbs/1000 gal*)	Total Available N (*lbs/ac*)
1	1.04	36.4
2	1.35	47.2
3	1.48	51.8
4	1.53	53.6
5	1.56	54.6

Hybrid bermudagrass at an application rate of 65,000 *gal/ac/yr*.

Year	N Rate (*lbs/1000 gal*)	Total Available N (*lbs/ac*)
1	1.04	67.6
2	1.35	87.7
3	1.48	96.2
4	1.53	99.4
5	1.56	101.4

* Any supplemental N additions not to exceed N requirement for that crop for that year.

* Monthly application rates (gallons) are:
None = 0; Low = 10,000; Medium = 20,000; High = 30,000

Submitted by: Paul G Hoffman Date: 3-13-15

Report PO 210 8 (6) Wheat 900/910 lbs
(3) Bermuda 900/910 6/12/2012

CEC

6/9/14	Mixed Grass 18 Bales	3 Bales @ 2223 lb	741
8/18/14	Bermuda Grass 44 Bales	2 Bales / 630 lbs	815
11/10/14	36 Bales Bermuda	3 Bales @ 2110 lbs	703
			753
			0.3765 Tons
6/28/13	Bermuda 20 Bales	2 Bales @ 2048 lbs	1024 lbs
7/24/13	Bermuda 28 Bales	3 Bales @ 2490	830 lbs
9/16/13	Bermuda 38 Bale	3 Bales @ 2355	785 lbs
			880
			0.44 Tons

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 09/16/2013
LIMS #: AA40320
Transcript #: 2013-0563
Page Number: Page 1 of 1

[X] Final Report [ ] Interim Report [ ] Amended Report

Sample Description: 38/3/2355
Forage Form: Hay
Species: Beef
Forage Type: Bermudagrass

Ext. Assistance: N

Production Status: N/A
Maturity: Grasses, Heads Emer
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	93.07	
	Crude Protein	%	11.03	11.85
	Unavailable Protein	%	1.07	1.15
	Adjusted Crude Protein	%	11.03	11.85
	Nitrate Ion	%	0.09	0.10
	Acid Detergent Fiber	%	29.59	31.79
(Beef/Dairy)	Total Digestive Nutrients	%	56.09	60.27
	Calcium	%	0.49	0.52
	Phosphorus	%	0.23	0.25
	Sulfur	%	0.39	0.42
	Magnesium	%	0.17	0.18
	Sodium	%	0.39	0.42
	Potassium	%	0.97	1.04
	Copper	ppm	9.00	10.00
	Iron	ppm	205.00	220.00
	Manganese	ppm	12.00	13.00
	Zinc	ppm	48.00	52.00
	Ash	%	6.22	6.68
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.57	0.62

Approved by: *Deborah Beach* **Date:** 09/23/2013

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End of Report

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 07/24/2013
LIMS #: AA39196
Transcript #: 2013-0131
Page Number: Page 1 of 1

[X] Final Report [ ] Interim Report [ ] Amended Report

Sample Description: 28/2490/3
Forage Form: Hay
Species: Beef
Forage Type: Bermudagrass

Ext. Assistance: N

Production Status: N/A
Maturity: Grasses, Vegetative,
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	88.47	
	Crude Protein	%	14.22	16.07
	Unavailable Protein	%	1.00	1.13
	Adjusted Crude Protein	%	14.22	16.07
	Nitrate Ion	%	0.27	0.30
	Acid Detergent Fiber	%	24.33	27.50
(Beef/Dairy)	Total Digestive Nutrients	%	57.31	64.78
	Calcium	%	0.43	0.49
	Phosphorus	%	0.21	0.24
	Sulfur	%	0.34	0.39
	Magnesium	%	0.14	0.16
	Sodium	%	0.37	0.42
	Potassium	%	1.17	1.32
	Copper	ppm	14.00	16.00
	Iron	ppm	335.00	379.00
	Manganese	ppm	11.00	12.00
	Zinc	ppm	81.00	92.00
	Ash	%	6.06	6.85
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.59	0.67

Approved by: *Deborah Beach* **Date:** 08/01/2013

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End of Report

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 06/28/2013
LIMS #: AA38721
Transcript #: 2012-2162
Page Number: Page 1 of 1

[X] Final Report [ ] *Interim Report [ ] Amended Report

Sample Description: 20/2048/2
Forage Form: Hay
Species: Beef
Forage Type: Bermudagrass

Ext. Assistance: N

Production Status: Maintenance
Maturity: Grasses, Vegetative,
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	93.01	
	Crude Protein	%	13.66	14.69
	Unavailable Protein	%	1.62	1.75
	Adjusted Crude Protein	%	13.66	14.69
	Nitrate Ion	%	0.24	0.26
	Acid Detergent Fiber	%	31.56	33.93
(Beef/Dairy)	Total Digestive Nutrients	%	56.10	60.31
	Calcium	%	0.50	0.54
	Phosphorus	%	0.21	0.23
	Sulfur	%	0.37	0.40
	Magnesium	%	0.18	0.19
	Sodium	%	0.45	0.49
	Potassium	%	1.19	1.28
	Copper	ppm	10.00	11.00
	Iron	ppm	233.00	250.00
	Manganese	ppm	7.00	8.00
	Zinc	ppm	47.00	51.00
	Ash	%	7.54	8.11
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.57	0.62

Approved by: *Deborah Beach* **Date:** 07/09/2013

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End of Report

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 06/09/2014
LIMS #: AA48989
Transcript #: 2013-2026
Page Number: Page 1 of 1

[X] Final Report [ ] Interim Report [ ] Amended Report

Sample Description: 2223/3/18
Forage Form: Hay
Species: Beef
Forage Type: Mixed Mostly Grass
Ext. Assistance: N
Production Status: N/A
Maturity: Grasses, Vegetative,
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	94.41	
	Crude Protein	%	16.84	17.84
	Unavailable Protein	%	0.79	0.84
	Adjusted Crude Protein	%	16.84	17.84
	Nitrate Ion	%	0.09	0.10
	Acid Detergent Fiber	%	22.36	23.68
(Beef/Dairy)	Total Digestive Nutrients	%	67.37	71.36
	Calcium	%	0.50	0.53
	Phosphorus	%	0.25	0.26
	Sulfur	%	0.30	0.31
	Magnesium	%	0.17	0.19
	Sodium	%	0.28	0.30
	Potassium	%	0.95	1.01
	Copper	ppm	8.00	8.00
	Iron	ppm	97.00	103.00
	Manganese	ppm	10.00	11.00
	Zinc	ppm	40.00	42.00
	Ash	%	5.08	5.39
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.69	0.73

Approved by: *Kevin Page* **Date:** 06/16/2014

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End of Report

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 08/18/2014
LIMS #: AA50799
Transcript #: 2014-0310
Page Number: Page 1 of 1

[X] Final Report [ ] Interim Report [ ] Amended Report

Sample Description: 2/1630/44
Forage Form: Fresh Forage
Species: Beef
Forage Type: Bermudagrass
Ext. Assistance: N
Production Status: Maintenance
Maturity: Grasses, Heads Emer
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	94.99	
	Crude Protein	%	9.12	9.60
	Unavailable Protein	%	0.89	0.93
	Adjusted Crude Protein	%	9.12	9.60
	Nitrate Ion	%	0.00	0.00
	Acid Detergent Fiber	%	33.95	35.74
(Beef/Dairy)	Total Digestive Nutrients	%	54.03	56.88
	Calcium	%	0.49	0.51
	Phosphorus	%	0.24	0.26
	Sulfur	%	0.33	0.35
	Magnesium	%	0.18	0.19
	Sodium	%	0.31	0.32
	Potassium	%	0.93	0.98
	Copper	ppm	9.00	10.00
	Iron	ppm	174.00	183.00
	Manganese	ppm	21.00	22.00
	Zinc	ppm	50.00	53.00
	Ash	%	6.28	6.61
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.55	0.58

Approved by: *Kevin Page* **Date:** 08/26/2014

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End of Report

North Carolina Department of Agriculture and Consumer Services
Food and Drug Protection Division Laboratory
4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler
Commissioner

Daniel Ragan
Director

TEST REPORT

Paul Hoffman
110 Enterprise Dr
Elizabeth City, NC 27909

County: PASQUOTANK **Telephone:** 252-339-4900

Sample Submitted To Laboratory By:
NCDA& CS Feed/Forage Office
1070 Mail Service Center
Raleigh, NC 27699 - 1070

Sample Submitted Date: 11/10/2014
LIMS #: AA53891
Transcript #: 2014-1064
Page Number: Page 1 of 1

[X] Test Results [ ] Duplicate Report [ ] Corrected Report

Sample Description: 3/36/2110 pulled out of bale
Forage Form: Hay
Species: Beef
Forage Type: Bermudagrass
Ext. Assistance: N
Production Status: N/A
Maturity: Grasses, Heads Emer
Special Treatment:

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	96.45	
	Crude Protein	%	12.93	13.41
	Unavailable Protein	%	1.31	1.35
	Adjusted Crude Protein	%	12.93	13.41
	Nitrate Ion	%	0.17	0.18
	Acid Detergent Fiber	%	32.32	33.52
(Beef/Dairy)	Total Digestive Nutrients	%	57.84	59.97
	Calcium	%	0.41	0.42
	Phosphorus	%	0.29	0.30
	Sulfur	%	0.38	0.40
	Magnesium	%	0.20	0.21
	Sodium	%	0.43	0.45
	Potassium	%	0.88	0.91
	Copper	ppm	14.00	14.00
	Iron	ppm	249.00	258.00
	Manganese	ppm	12.00	12.00
	Zinc	ppm	80.00	83.00
	Ash	%	6.49	6.73
(Beef/Dairy)	Net Energy of Lactation	Mcal/lb	0.59	0.61

Approved by: *Kevin Page* **Date:** 11/19/2014

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End of Report

NCDA&CS Agronomic Division Phone: (919)733-2655 Web site: www.ncagr.gov/agronomi/ **Report: P02108**

Plant Analysis Report

Grower: **Hoffman, Paul**
617 Pitts Chapel Rd
Elizabeth City, NC 27909

Copies to: Cobb, Chester

6 W 800 810

Farm: 27-01

Currituck County

3 B 880 910

Received: 06/07/2012 **Completed:** 06/12/2012 Links to Helpful Information

Sample Information	Laboratory Results																
Sample ID:	*N%*	*P%*	*K%*	*Ca%*	*Mg%*	*S%*	*Fe-ppm*	*Mn-ppm*	*Zn-ppm*	*Cu-ppm*	*B-ppm*	*Mo-ppm*	*Cl%*	*Na%*	*Ni-ppm*	*Cd-ppm*	*Pb-ppm*
01	3.65	0.61	3.45	0.43	0.18	0.35	102	16.2	59.5	26.4	7.4			0.03			
Crop:	**Interpretation Indexes**												**Ratios**			**Petiole(ppm)**	
Wheat	*N*	*P*	*K*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*N:S*	*N:K*	*Fe:Mn*	*Nitrate N*	
Plant Appearance:	45-L	80	59	57	51	60	60	31-L	69	89	54		10.4	1.06	6.30		
OK	**DRIS Interpretation:** *Most limiting--* *--Least limiting*																

Recommendations:
Note where nutrient concentrations fall outside of the recommended ranges. Please contact your crop consultant for further assistance.

Brenda R. Cleveland, Agronomist
Completed: June 11, 2012

Sample Information	Laboratory Results																
Sample ID:	*N%*	*P%*	*K%*	*Ca%*	*Mg%*	*S%*	*Fe-ppm*	*Mn-ppm*	*Zn-ppm*	*Cu-ppm*	*B-ppm*	*Mo-ppm*	*Cl%*	*Na%*	*Ni-ppm*	*Cd-ppm*	*Pb-ppm*
02	2.95	0.28	1.75	0.39	0.17	0.41	69.7	14.7	31.2	13.9	5.5			0.40			
Crop:	**Interpretation Indexes**												**Ratios**			**Petiole(ppm)**	
Bermudagrass	*N*	*P*	*K*	*Ca*	*Mg*	*S*	*Fe*	*Mn*	*Zn*	*Cu*	*B*	*Mo*	*N:S*	*N:K*	*Fe:Mn*	*Nitrate N*	
Plant Appearance:	48-L	60	48-L	63	53	62	52	23-D	55	64	51		7.20	1.69	4.74		
OK	**DRIS Interpretation:** *Most limiting--* *--Least limiting*																

North Carolina
Tobacco Trust Fund Commission

Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

Thank you for using agronomic services to manage nutrients and safeguard environmental quality.
- Steve Troxler, Commissioner of Agriculture