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Cary, North Carolina 27511

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January 12, 1998

Mr. Ted Lyon  
North Carolina Department of Environment  
and Natural Resources  
Waste Management Division  
PO Box 27687  
Raleigh, NC 27611-7687

17 19 1998  
Received  
Solid Waste  
Centr

Dear Ted:

E&A Environmental Consultants, Inc. (E&A) has prepared the attached permit application for the Brooks Farm Solid Waste Composting Facility in accordance with the NC DENR Solid Waste Compost Rules.

If any questions arise during review of the permit application, please call.

Sincerely,

E&A Environmental Consultants, Inc.

*R. Allen Boyette*

R. Allen Boyette, P.E.  
Project Engineer

RAB:jwl

Enclosures

CC: Dean Brooks, Brooks Farm

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# DEAN BROOKS FARM SOLID WASTE COMPOSTING FACILITY

## PERMIT APPLICATION

January 1998

(Revised June 1999)

**APPROVED**  
DIVISION OF SOLID WASTE MANAGEMENT  
DATE 7/22/99 BY TL

Prepared for:  
**Brooks Farm Composting Facility**  
1195 Beal Road  
Goldston, North Carolina 27252  
Phone: (919) 837-5914

Prepared by:  
**E&A Environmental Consultants, Inc.**  
1130 Kildaire Farm Road, Suite 200  
Cary, North Carolina 27511  
Phone: (919) 460-6266

**E & A Environmental Consultants, Inc.**

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SOLID WASTE  
COMPOSTING FACILITY**

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Cary, North Carolina 27511  
Phone: (919) 460-6266

*(This application is printed on recycled paper).*

## PROFESSIONAL ENGINEER CERTIFICATION

The information, drawings, and figures contained in this permit application were prepared under the supervision and direction of the undersigned, whose seal as a registered professional engineer is affixed below.

E&A Environmental Consultants, Inc.

*R. Allen Boyette*

R. Allen Boyette, P.E.  
Senior Engineer/Branch Manager



6-11-99

Date

# TABLE OF CONTENTS

	Page
<b>Section 1</b>	
1.0 - GENERAL .....	1
<b>Section 2</b>	
2.0 - APPLICATION REQUIREMENTS .....	2
2.1 - AERIAL PHOTOGRAPH OR SCALED DRAWING .....	2
2.2 - ZONING .....	2
2.3 - SITING AND DESIGN STANDARDS .....	2
2.3.1 - Floodplain .....	2
2.3.2 - Property Line Buffer .....	2
2.3.3 - Residences Buffer .....	3
2.3.4 - Well Buffer .....	3
2.3.5 - Perennial Streams/Rivers Buffer .....	3
2.3.6 - Surface Water Quality Standards .....	3
2.3.7 - Closed-Out Disposal Area .....	3
2.3.8 - Adequate Access .....	3
2.3.9 - Surface Water Requirements .....	4
2.3.10 - Groundwater Requirements .....	5
2.3.11 - Public Access .....	5
2.3.12 - Sedimentation Pollution Control Law .....	5
2.3.13 - Air Pollution Control Requirements .....	5
2.4 - WASTE TYPES .....	5
Table 1 - Brooks Farm Compost Feedstock and Final Products Summary .....	6
2.5 - SITE PLAN .....	7
2.6 - OPERATION DESCRIPTION .....	7
2.7 - PROCESS FLOW .....	9
Figure 1 - Brooks Farm Process Flow Diagram .....	9
2.7.1 - Materials Receiving/Processing .....	10
2.7.2 - Mixing .....	10
2.7.3 - Composting .....	10
2.7.4 - Curing and Storage .....	11
2.7.5 - Screening .....	11
2.7.6 - Air Emissions and Control Technologies .....	11
2.7.7 - Leachate Treatment .....	11
2.8 - PRODUCT LABEL .....	12
2.9 - ENGINEERING PLANS AND SPECIFICATIONS .....	12

## TABLE OF CONTENTS (CONT'D)

### Section 3

3.0 - REQUIRED INFORMATION FOR OPERATING PERMIT .....	13
3.1 - CONTINGENCY PLANS .....	13
3.1.1 - Equipment Breakdown .....	13
3.1.2 - Air Pollution/Odors .....	13
3.1.3 - Non-Conforming Wastes .....	13
3.1.4 - Spills .....	13
3.1.5 - Fires .....	13
3.1.6 - Particulates .....	14
3.1.7 - Noise .....	14
3.1.8 - Vectors .....	14
3.1.9 - Unusual Traffic Conditions .....	14
3.2 - OPERATIONS AND MAINTENANCE MANUAL .....	14
3.3 - QUALITY ASSURANCE PLAN .....	15
Table 2 - Semi-Annual Monitoring for Grade A Compost Requirements .....	15
3.4 - PROCESS FLOW .....	15
3.5 - AS-BUILT DRAWINGS .....	15
3.6 - PERMITS AND APPROVALS .....	16
3.7 - PRODUCT MARKETING AND DISTRIBUTION PLANS .....	16

### APPENDICES

- Appendix A - Zoning Letter
- Appendix B - Soil Investigation
- Appendix C - Product Test Data
- Appendix D - Manufacturer's Information Sheets
- Appendix E - Topographical Map
- Appendix F - Aerial Photograph
- Appendix G - Compost Information Sheet
- Appendix H - Storm Water Permit

## 1.0 - GENERAL

Dean Brooks Farm (Brooks Farm) is currently operating a solid waste composting facility under a pilot permit from the North Carolina Department of Environment and Natural Resources (NC DENR) Division of Waste Management - Solid Waste Section. The primary feedstocks to the composting facility are yard waste and eggshell waste. The composting facility is located off Beal Road in Chatham County near Goldston, North Carolina.

In order to comply with the North Carolina Solid Waste Compost Rules as outlined in Section 1400, Brooks Farm has compiled the information included in the attached permit application. The site plan drawings and specific permit documents were prepared for Brooks Farm by E&A Environmental Consultants, Inc. (E&A).

## **2.0 - APPLICATION REQUIREMENTS**

The following sections correspond with the permit application for a large Type 3 solid waste compost facility as outlined in the North Carolina Solid Waste Compost Rules. The site plan drawing was prepared by a professional engineer duly registered in the State of North Carolina. A soils investigation of the site was performed by the Chatham County Soil Conservation Service.

### **2.1 - AERIAL PHOTOGRAPH OR SCALED DRAWING**

An aerial photograph (1" = 600'), the Chatham County tax map (1" = 300'), and a topographical map (1" = 2000') are included with this permit application. These maps and photographs depict the entire property owned or leased by Brooks Farm as well as general information such as homes, wells, buildings, roads, watercourses, and general topography around the site.

### **2.2 - ZONING**

A letter from the Chatham County Planning Department, the agency having zoning jurisdiction, is included in Appendix A. The composting facility is allowed within the existing zoning.

### **2.3 - SITING AND DESIGN STANDARDS**

The following sections explain how the composting facility complies with siting and design standards in Rule 1404 of the North Carolina Solid Waste Compost Rules.

#### **2.3.1 - Floodplain**

The compost facility is not located within a floodplain.

#### **2.3.2 - Property Line Buffer**

A minimum 100 foot buffer between compost areas and property lines is maintained.

### **2.3.3 - Residences Buffer**

A minimum 500 foot buffer between compost areas and residences not owned by Brooks Farm is maintained.

### **2.3.4 - Well Buffer**

There are two wells located on Brooks Farm. One well is a drilled-type deep well used to supply water for the Brooks family home. It is located approximately 500 feet from the compost area. The other well is a shallow hand dug well located behind the abandoned house east of the compost area. It is located approximately 100 feet from the main access road and greater than 100 feet from the compost area.

### **2.3.5 - Perennial Streams/Rivers Buffer**

The compost areas are located greater than 50 feet from perennial streams/rivers as shown on the 1:24,000 Goldston, North Carolina topographic map dated 1970 and photo inspected in 1980.

### **2.3.6 - Surface Water Quality Standards**

The facility is located in an area classified as a Watershed-IV because it is within ten miles of the Deep River (as per Chatham County Planning Department). Runoff from the facility is treated as described in Section 2.3.9.

### **2.3.7 - Closed-Out Disposal Area**

The composting facility is not located over a closed-out disposal area.

### **2.3.8 - Adequate Access**

A 25 foot minimum distance will be maintained around the periphery compost area to allow adequate access by fire fighting equipment.

### **2.3.9 - Surface Water Requirements**

The compost windrows are constructed with the existing slope to allow water to drain between windrows. This allows greater access during wet weather. Currently, runoff drains from the southeast side of the facility. The runoff is not collected or treated on site. Runoff from the southwest side of the facility is collected in a grass lined channel and allowed to sheet flow into an existing stand of pine trees. Additional grass is maintained on the compost pad side of the grass channel to aid in slowing and treating water prior to entering the grass lined channel. Runoff from the southeast corner of the compost facility sheet flows into an open field. A grassed area is maintained as shown on the site plan to aid in slowing and treating runoff prior to reaching the creek. Additionally, runoff from the north side of the facility will be collected and diverted around the materials processing areas in a grass lined channel to the southwest side of the facility. This grass lined channel will be constructed and operational not later than December 31, 1999. The Chatham County Soil Conservation Service prepared a runoff collection plan for the facility in January 1996. This plan was partially implemented by Brooks Farm. During heavy rainfall events, runoff from the site travels through the stand of pine trees (approximately 600 feet) and then over an open field with natural vegetation (approximately 800 feet) before reaching Little Indian Creek. Therefore, the total overland flow path to the Little Indian Creek is approximately 1,400 feet. Additionally, runoff from an adjacent cattle pasture flows directly into the Little Indian Creek. Although not measured directly, the actual runoff from the facility to the Little Indian Creek is small and only occurs during heavy rainfall events. In addition, significant treatment from the overland flow is expected to remove the majority of contaminants prior to entering the Little Indian Creek. To ensure no adverse effects as a result of runoff from the site, Brooks Farm will collect semi-annual samples of any runoff prior to water entering Little Indian Creek. The sample locations are shown on the site plan. The water samples will be analyzed in accordance with the facility's storm water permit which is included in Appendix H. The water analysis will also be submitted with the annual report for review by the NC DENR - Division of Waste Management.

### **2.3.10 - Groundwater Requirements**

The facility utilizes natural soils for pads. The depth to the seasonal high water table is maintained at greater than 24 inches. The soils at the site are mostly clay, and surface water is not expected to leach into the groundwater.

### **2.3.11 - Public Access**

The site will not allow uncontrolled public access. The entrance road to the site passes the owner's house. Wooded areas surround almost all sides of the facility.

### **2.3.12 - Sedimentation Pollution Control Law**

No land disturbance activities are planned for site modifications, hence a detailed and approved erosion and sedimentation control plan is not required by the Land Quality Section of the DENR. Measures such as seeding and grass lined channels are utilized at the facility to prevent site erosion.

### **2.3.13 - Air Pollution Control Requirements**

The facility is operated to meet the Air Pollution Control Requirements (15A NCAC 2D) to minimize fugitive odorous emissions and minimize odors at the property boundary. The compost facility is in an agricultural area with active composting areas surrounded by wooded areas adjacent to the site. Operational procedures, such as maintaining aerobic conditions within the compost piles, are adhered to in order to reduce odor generation.

## **2.4 - WASTE TYPES**

The composting facility's main feedstock is eggshell waste. Based on Brooks Farm facility records, approximately 1,200 tons of eggshells per month are composted at the facility.

Various other materials are received at the site and mixed with the eggshells to enhance the composting process. Some of the additional materials processed at the facility over the past year include ground yard waste from local cities, saw mill waste wood, cotton gin waste, paper waste, cow manure, and horse manure. The facility has investigated other waste materials to be included in the composting process. These materials include chicken manure, tobacco dust, food

waste, Doxey Industries waste wood, wallboard paper and drywall, and water plant residuals. New materials will be tested as required by the Division of Waste Management prior to acceptance at the compost facility. Food waste will be processed the same as eggshell waste. Table 1 summarizes the typical annual quantities of materials processed based on operational records.

**TABLE 1**  
**BROOKS FARM COMPOST FEEDSTOCK AND**  
**FINAL PRODUCTS SUMMARY**

	Estimated Bulk Density (Lbs/CY)	Estimated Annual Quantities <sup>1</sup>	
		Weight (tons) <sup>2</sup>	Volume (CY)
Eggshell Waste	1,000	14,500	29,000
Ground Yard Waste <sup>3</sup>	800	8,900	22,300
Saw Mill/Wood Waste	350	7,000	39,900
Cotton Gin Waste	500	3,250	13,000
Cotton Mill Waste	1,500	375	500
Mixed Paper	400	250	1,250
Cow and Horse Manure	1,450	2,900	4,000
Wallboard Paper/Drywall		Future	
Tobacco Dust		Future	
Manufactured Wood Waste <sup>4</sup>		Future	
Chicken Manure		Future	
Water Plant Residuals		Future	
Food Waste		Future	
Final Compost Produced	1,000	16,300	32,500

1 - Annual quantities based on 1996 and 1997 operational records.

2 - Future values based on potential compost feedstocks available in the area.

3 - Includes Hurricane Fran waste

4 - Doxey Industries or similar

The eggshell waste is generated year round. Yard waste is generated mostly in the spring and fall. Cotton gin waste is generated seasonally from October to February.

The facility utilizes natural soils as a pad. A soil investigation by the Soil Conservation Service in an area just south of the compost pad was conducted in November 1995. A copy of the investigation is included in Appendix B. The soil investigation indicates that the soils are predominately clay and that the seasonal high water table is greater than two feet from the surface. In addition, fine granular aggregate has been placed in high traffic areas to allow better accessibility during wet weather.

## **2.5 - SITE PLAN**

The facility site plan is shown in the attached drawing. The site plan indicates the general drainage pattern of the area. The site slopes approximately 2% to 4%, and compost piles are built to facilitate natural drainage. The 1:24,000 USGS map is included in Appendix E and shows the general topography of the site.

## **2.6 - OPERATION DESCRIPTION**

The following information describes the facility operation:

Facility Operator: Dean Brooks  
1195 Beal Road  
Goldston, North Carolina 27252  
Phone: (919) 837-5914

Eggshell waste is delivered four days per week (Tuesday, Wednesday, Friday, and Saturday) by dump truck. Bulking agents such as wood waste and yard waste are stored on an open pad adjacent to the composting area. Eggshell waste is unloaded in the composting area. The eggshell waste is immediately (the same day) blended with the bulking agent utilizing a front end loader. The front end loader is then used to form the mix into windrows. Other waste materials such as manure, cotton gin waste, etc. are also blended into the mix at this time. The compost pad slopes with the natural lay of the land to facilitate drainage and allow access around the site in adverse weather conditions. During extremely adverse conditions such as wind, heavy rain, snow, or freezing the eggshell waste is placed on the upper portion of the compost pad and

covered with bulking agent until access improves. The upper portion of the pad has a fine granular aggregate surface which provides all weather access. Windrows are constructed approximately 14 feet wide, six feet high, and several hundred feet long. The windrows are turned periodically by a self propelled straddle-type windrow turner to maintain anaerobic conditions within the pile, enhance the composting process, and prevent the formation of objectionable odors. Material remains in the turned windrows for approximately three months followed by final curing in a static pile for a minimum of two months to as much as 12 months. The material achieves the process to further reduce pathogens (PFRP) requirements by maintaining pile temperatures at or above 131°F for at least 15 days with five turnings during the high temperature period prior to use. Alternatively, PFRP is achieved after windrowing using an aerated static pile and achieving a minimum of 131°F for three consecutive days.

After composting, the material is screened to approximately 3/8 inch to prepare for marketing. The finished product is marketed in bulk for landscaping projects. Additionally, the material may be blended with soil to make custom products. Brooks Farm maintains records of purchasers of compost and submits this information annually to the North Carolina Department of Agriculture. In the event material cannot be marketed, it is applied to pasture or farmland on the owner's farm. The owner has the necessary equipment to apply the material to pasture or farmland.

Brooks Farm is a family owned and operated facility. There is not a precise routine, and each employee is trained to do various tasks. Depending on the specific operations on any given day, several people may work together to accomplish the work. Regardless of the priorities, the eggshell waste is blended with a bulking agent and placed in windrows the same day it arrives at the site.

Listed below are some general operations typically performed by personnel at the facility.

- Facility Operator - Manage all operations and direct work efforts
- Truck Drivers - Haul feedstocks and finished materials
- Front End Loader Operator - Construct windrows/loads product
- Compost Turner Operator - Turns windrows/monitors compost piles

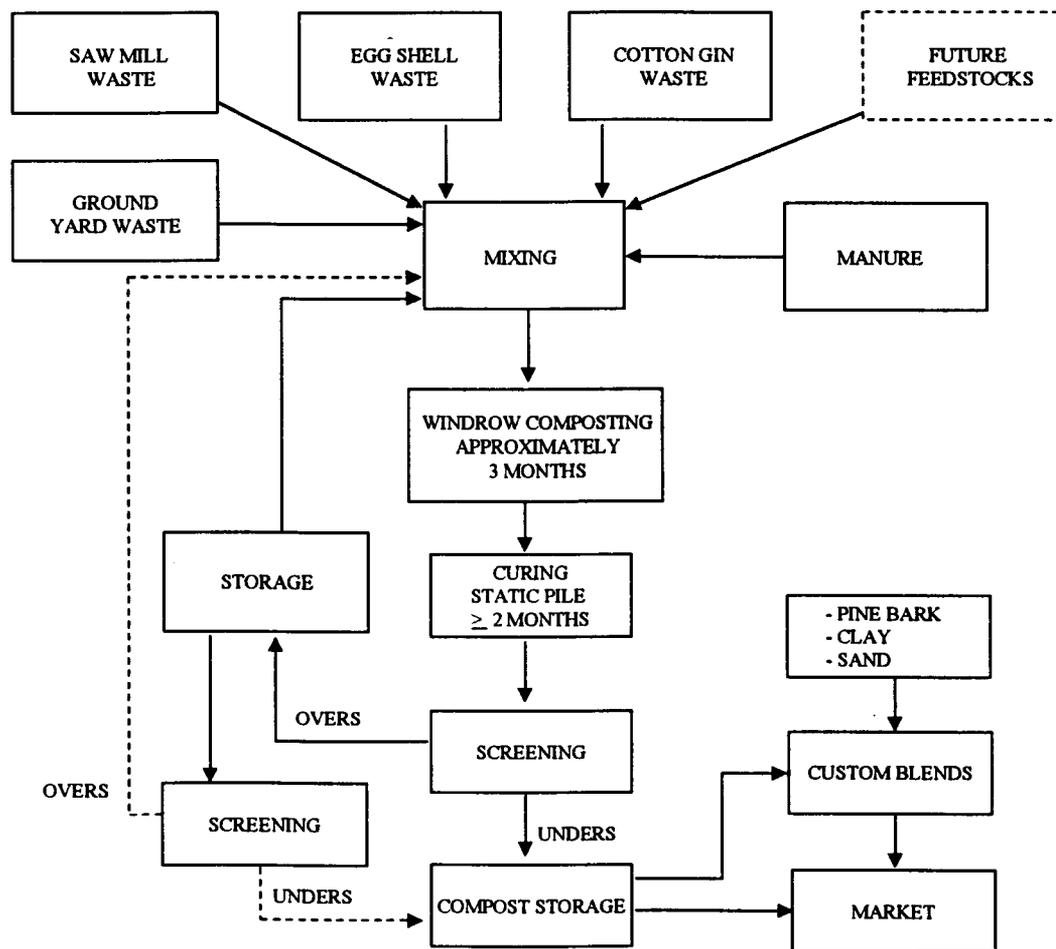
The operating schedule varies similar to other farm operations and the priorities of the day. The operations may be performed seven days per week depending on the work to be

accomplished. Materials are not received nor piles turned before sunrise or after sunset to minimize noise and other impacts on surrounding neighbors. Airborne particulates are generally associated with dry, dusty compost piles. The initial mix solids content is varied during mixing to prevent over drying of the piles during composting. In addition, water is added to the compost piles, if required, through the use of a trailer mounted water tank or through the use of a sump pump and soaker hose system.

## 2.7 - PROCESS FLOW

Figure 1 shows the process flow diagram for the composting facility. A description of the composting process is outlined in the following sections.

**FIGURE 1**  
**BROOKS FARM SOLID WASTE COMPOSTING FACILITY**  
**PROCESS FLOW DIAGRAM**



### **2.7.1 - Materials Receiving/Processing**

Based on operational records, the facility received and processed approximately 37,200 tons per year. Several thousand cubic yards of yard waste from Hurricane Fran in 1996 were collected and stored in the bulking agent storage area for future use. To maintain a minimum three months period in windrows, a maximum of approximately 40,000 tons can be processed in the existing compost area. Eggshell waste is delivered by truck to the site and placed in the compost area. There is no designated unloading area for the eggshells. Rather, the eggshells are unloaded near the next windrow to be constructed. Food waste, if accepted at the site, will be treated the same as the eggshells. Ground yard waste is delivered by truck to the site and stored in the bulking agent storage area. Other bulking agents or feedstocks such as cotton gin waste are delivered and stored in a pile. Chipping or grinding of wood waste is not currently conducted on site. Any contaminants such as metal or trash that are inadvertently mixed with the feedstocks are disposed of at a landfill.

The facility also receives materials such as clay, sand, pine bark, and sta-lite to mix with the final compost product to produce custom blends.

### **2.7.2 - Mixing**

Mixing is conducted on the compost pad prior to constructing the windrows. A front end loader blends the materials by repeatedly turning and moving the pile. Alternatively, materials are placed in a windrow and mixed using the windrow turner. The front end loader, with a known bucket size is utilized to blend the materials at the proper mix ratio. The proper mix ratio varies depending on the bulking agent to be used.

### **2.7.3 - Composting**

The mix is placed into windrows by a front end loader. Prior to constructing the windrows, a layer of unscreened compost or wood material is placed on the pad, and the mix is placed on top of the wood material. This bottom layer minimizes runoff from the windrows. The windrows are periodically turned with a straddle-type turner. This turning of the windrows is conducted to aerate the composting mass. Windrows are constructed approximately 14 feet wide at the base and six feet high. The temperatures in each windrow are measured daily with a four

foot long probe until PFRP is achieved. PFRP will be achieved by maintaining temperatures above or equal to 131°F for at least 15 days while turning the pile five times during the same period. Vector attraction reduction is met by maintaining pile temperatures above 104°F for 14 days or longer, and the average temperature for that time is greater than 113°F. Material remains in windrows for a minimum of three months during the active composting period. Alternatively, the aerated static pile method can be utilized to obtain PFRP by achieving a minimum of 131°F for three consecutive days.

#### **2.7.4 - Curing and Storage**

After active composting, material is stored in a static pile for at least two months prior to screening. Final curing and storage is typically performed together. The facility has the capacity for approximately 18 months of compost curing and storage. The curing and storage is accomplished on an open pad in areas adjacent to the compost area.

#### **2.7.5 - Screening**

The material is stockpiled on site and periodically screened. The typical screen size is 3/8 inch and used to produce a more marketable compost product. The overs (> 3/8 inch) are stored and then recycled and mixed with the fresh feedstocks.

#### **2.7.6 - Air Emissions and Control Technologies**

Air emissions from the facility are typical of farm type livestock operations and consist of low concentrations of odorous compounds. The low concentrations from these type of operations are generally accepted to be below any health risk but may cause nuisance problems. Operational procedures such as maintaining aerobic conditions within the pile will be followed to reduce the generation of odorous compounds. Eggshell waste spills will be immediately cleaned up and placed in active windrows or covered with ground yard waste until the next windrow is constructed.

#### **2.7.7 - Leachate Treatment**

All runoff from the facility will be treated as outlined in Section 2.3.9.

## **2.8 - PRODUCT LABEL**

The finished product is marketed in bulk for landscaping projects. Brooks Farm maintains records of purchasers and submits this information annually to the NCDA. An information sheet containing data on the final product and well as guidelines for use is included in Appendix G. This information sheet is given to each person who purchases the final product. In addition, the final product is registered with the NCDA. Sample test data on the product is included in Appendix C.

## **2.9 - ENGINEERING PLANS AND SPECIFICATIONS**

No additional work is planned to the site in order to meet the requirements as indicated in the North Carolina Solid Waste Composting Rules. A site plan is included with the permit application.

Manufacturer's performance data for equipment utilized at the facility is included in Appendix D.

### **3.0 - REQUIRED INFORMATION FOR OPERATING PERMIT**

The following section outlines the information required for reviewing an application for a permit to operate the composting facility.

#### **3.1 - CONTINGENCY PLANS**

Contingency plans for usual and adverse conditions are as follows:

##### **3.1.1 - Equipment Breakdown**

Brooks Farm conducts regular equipment maintenance. If the windrow turner is not operational, a front end loader will be used to turn piles. Two front end loaders are used on site. Therefore, if one breaks down, there is a backup. If equipment breakdowns prevent composting according to the Solid Waste Compost Rules, then eggshell waste will not be accepted on site.

##### **3.1.2 - Air Pollution/Odors**

Operational procedures will be adjusted or modified to rectify offsite odor nuisances.

##### **3.1.3 - Non-Conforming Wastes**

Incoming feedstocks are inspected upon arrival. Any non-conforming wastes are removed and disposed of in an off site permitted sanitary landfill.

##### **3.1.4 - Spills**

Eggshell waste spills are cleaned up by a front end loader and added to active compost piles. This procedure is only done on piles before they meet pathogen destruction requirements. Alternatively, the eggshell waste spills are immediately covered with ground yard waste until the next windrow is constructed.

##### **3.1.5 - Fires**

If piles of material catch on fire, a bulldozer will be used to separate the unburned material from the burning material and prevent the fire from spreading. In addition, a portable water tank is available to soak material if necessary.

### **3.1.6 - Particulates**

Particulates are generally associated with overly dry compost piles. Water from a trailer mounted tank will be used to increase moisture content and reduce particulates from the compost piles if necessary.

### **3.1.7 - Noise**

Equipment normally associated with farm operations is used on the site and unusual noise is not expected. If noise becomes problematic, the operating schedule may be modified to reduce the impact to neighbors.

### **3.1.8 - Vectors**

The current process meets US EPA and NC DENR vector attraction reduction requirements. Process modifications will be made, if required, to ensure vector attraction reduction requirements continue to be met.

### **3.1.9 - Unusual Traffic Conditions**

Delivery schedules may be modified, if required, to prevent traffic impacts.

## **3.2 - OPERATIONS AND MAINTENANCE MANUAL**

A separate operations and maintenance (O&M) manual for the facility has been prepared. It is included with this permit application. The following information will be available for NC DENR inspection:

- Type and quantity of waste received at the facility
- Origin of the waste
- Total quantity of compost produced
- Total quantity of compost used or disposed from the facility
- Monthly temperature monitoring sheets
- Product test results showing compliance with Table 2

In addition to the above data, daily operational records including temperature data and quantity of material processed are maintained and available for inspection.

### 3.3 - QUALITY ASSURANCE PLAN

Detailed records including quantity and type of incoming materials, outgoing products, pile temperatures, turning frequency, and product testing are maintained at the facility. Composite product samples are taken at least semi-annually or every 20,000 tons, whichever comes first, and compared to the standards shown in Table 2.

**Table 2**  
**Brooks Farm Compost Facility**  
**Semi-Annual Monitoring for Grade A Compost Requirements**

Parameter	Unit	Limit
Foreign Matter	%	< 6%
Cadmium	mg/kg dry wt.	39
Copper	mg/kg dry wt.	1500
Lead	mg/kg dry wt.	300
Nickel	mg/kg dry wt.	420
Zinc	mg/kg dry wt.	2800
Fecal Coliform	MPN/g dry wt.	1000
Total N	%	None
Phosphorous	%	None
Potassium	%	None

### 3.4 - PROCESS FLOW

The process flow is described in Section 2.7.

### 3.5 - AS-BUILT DRAWINGS

No additional construction is planned for the site. As such, as-built drawings will not be produced.

### **3.6 - PERMITS AND APPROVALS**

A copy of the local zoning authority approval to operate the composting facility is included in Appendix A.

### **3.7 - PRODUCT MARKETING AND DISTRIBUTION PLANS**

Brooks Farm markets the final compost in bulk form to local landscapers. Additionally, the compost is blended with other materials to produce custom topsoil blends and marketed in bulk form. These blending materials include items such as clay, pine bark, sta-lite, sand, and coarse sand/rock.

# **APPENDIX A**

Zoning Letter

## COUNTY OF CHATHAM

PLANNING DEPARTMENT  
POST OFFICE BOX 54  
PITTSBORO, N. C. 27312-0054

PHONE: 919-542-8204  
FAX: 919-542-0527



ORGANIZED 1770

707 SQUARE MILES

October 2, 1997

Mr. William Dean Brooks  
Dean Brooks Farms  
1195 Beal Road  
Goldston, North Carolina 27252

RE: Composting facility  
Gulf Township

Dear Mr. Brooks:

This letter is to provide information to you and other interested parties regarding the Chatham County Zoning Ordinance and the use of your property for a composting facility.

Your property identified by parcel identification number 8695-03-6050 in Gulf Township is located in an unzoned portion of Chatham County. The Chatham County Zoning Ordinance is not applicable in the unzoned portions of Chatham County. Therefore, there would be no regulations regarding the use of the property for a composting facility.

According to the Chatham County Watershed Protection Ordinance adopted January 1, 1994 this property is within a WS-IV Protected Area which requires development of properties not to exceed thirty-six per cent (36%) of built-upon area.

If you have other questions, please feel free to call our office at 542-8204.

Sincerely yours,

A handwritten signature in cursive script that reads "Lynn W. Richardson".

Lynn W. Richardson  
Land Use Administrator



# **APPENDIX B**

Soil Investigation

United States  
Department of  
Agriculture

Natural Resources  
Conservation  
Service

Pittsboro T.S.O.  
P.O. Box 308  
Pittsboro, N.C. 27312

January 31, 1996

William Dean Brooks  
1194 Beal Road  
Goldston, N.C.

Dear Mr. Brooks:

On November 14, 1995, the NRCS conducted a soils investigation in a natural draw below to your composting facility. This small draw is the anticipated site of a Waste Storage Pond (WSP) to capture and store contaminated rain water runoff from your compost piles. The investigation revealed soils with a shallow depth to fractured rock of varying hardness. The presence of this rock makes the construction of a traditional, deep rectangular WSP impractical.

As an alternative, a clay-lined embankment-type pond is suggested. However, the size of the draw is limited and the exact depth that you will be able to excavate into the underlying rock is unknown. Thus, it is uncertain that this structure will accommodate all of the contaminated runoff. In that case, a second WSP may be constructed in an adjacent draw where a portion of the contaminated runoff naturally flows if not diverted into the first WSP.

In the interest of time and practicality, the NRCS will consider designing the waste water system in two stages as follows:

STAGE ONE: Complete a design for the original site (site one), you construct WSP1, as deep as practical, and NRCS measure its capacity.

STAGE TWO: Clear and survey site two, design WSP2 to handle the remaining storage requirement, and you construct it.

Diversions would be constructed to guide runoff from the correct acreages into the appropriate pond. A waste management plan would be included.

Please let us know if this proposal is acceptable to you and to the N.C. Division of Environmental Management.

*Peter J. Crawford*  
Peter J. Crawford  
Civil Engineer

cc: Angela G. Jessup  
Carey F. Evans  
Michael W. Sturdivant

Mr. Brooks informed the NRCS Field Office on March 20, 1996 that he received approval from State Agencies to proceed with this two-stage plan.

P.J.C.







U-1 b

4-12-83

Soils (D. ...)  
Nashville  
Determ...  
130-B  
6% slopes  
Scientist on site

Joins D-7

Joins C-8

Moore County, NC

Chatham County, Progressive  
Scale 24,000  
Completed by RCF, I.

NONTECHNICAL SOILS DESCRIPTION REPORT  
Georgeville

Map Symbol	Soil name and description
2308	Nason silt loam, 2 to 6 percent slopes  These gently sloping, deep, well drained soils are on uplands. They formed in residuum from Carolina slates and other fine grained rocks. They have a loamy surface layer and a clayey subsoil. Permeability is moderate and shrink-swell potential is moderate. Soft bedrock is within a depth of 40 to 60 inches. Seasonal high water table is below 6.0 feet.
205C2	georgeville silty clay loam, 6 to 10 percent slopes, eroded  These gently sloping, very deep, well drained, eroded soils are on uplands. They formed in residuum from Carolina slates and other fine grained rocks. They have a loamy surface layer and a clayey subsoil. Permeability is moderate. Shrink-swell potential is low. Seasonal high water table is below 6.0 feet.
205C	Georgeville silt loam, 6 to 10 percent slopes  These strongly sloping, very deep, well drained soils are on uplands. They formed in residuum from Carolina slates and other fine grained rocks. They have a loamy surface layer and a clayey subsoil. Permeability is moderate. Shrink-swell potential is low. Seasonal high water table is below 6.0 feet.
205B	Georgeville silt loam, 2 to 6 percent slopes  These gently sloping, very deep, well drained soils are on uplands. They formed in residuum from Carolina slates and other fine grained rocks. They have a loamy surface layer and a clayey subsoil. Permeability is moderate. Shrink-swell potential is low. Seasonal high water table is below 6.0 feet.
205B2	georgeville silty clay loam, 2 to 6 percent slopes, eroded

Dean Brooks

PHYSICAL PROPERTIES OF SOILS

Georgeville  
(See Definitions on following Pages)

Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodability index" apply only to the surface layer)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
2030B:												
Georgeville-----	0-11	10-27	1.25-1.55	0.60-2.00	0.14-0.20	Low	1.0-3.0	0.43	0.43	4	5	---
	11-34	35-50	1.30-1.60	0.60-2.00	0.12-0.19	Moderate	---	0.28	0.28			
	34-51	10-25	1.25-1.55	0.60-2.00	0.15-0.20	Low	---	0.28	0.32			
	51-53	---	---	0.00-0.06	---		---	---	---			
205C2:												
Georgeville-----	0-7	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.49	0.49	4	6	---
	7-52	35-65	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.28	0.28			
	52-62	15-40	1.20-1.40	0.60-2.00	0.05-0.10	Low	0.0-0.5	0.32	0.32			
205C:												
Georgeville-----	0-6	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.49	0.49	4	6	---
	6-10	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.32	0.32			
	10-53	35-65	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.28	0.28			
	53-63	15-40	1.20-1.40	0.60-2.00	0.05-0.10	Low	0.0-0.5	0.32	0.32			
205B:												
Georgeville-----	0-6	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.49	0.49	4	6	---
	6-10	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.32	0.32			
	10-53	35-65	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.28	0.28			
	53-63	15-40	1.20-1.40	0.60-2.00	0.05-0.10	Low	0.0-0.5	0.32	0.32			
205B2:												
Georgeville-----	0-7	27-35	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.49	0.49	4	6	---
	7-52	35-65	1.20-1.40	0.60-2.00	0.13-0.18	Low	0.0-0.5	0.28	0.28			
	52-62	15-40	1.20-1.40	0.60-2.00	0.05-0.10	Low	0.0-0.5	0.32	0.32			



# APPENDIX C

Product Test Data



# Waste Analysis Report

8/12/97

Sample Info.	Laboratory Results (parts per million unless otherwise noted)													
	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	C
35	13941 M	2939 M	1614 M	162758 M	1907 M	1807 M	3078 M	101 L	51.7 M	47.3 M	2.19 L			174709
Waste Code:	-NH4													
FCW	-NO3													
Description:	OR-N													
Composted Waste - Other	U'rea	Na	Ni	Cd	Pb	Al	Se	Li	pH	SS	C:N	DM%	CCE%	ALE(tons)
	990 M	0.13	0.01	2.81		6.5	292	12.53	69.56	73.00	1.80			

**Recommendations:**

Application Method	Nutrients Available for First Crop													
	N	P2O5	K2O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Other Elements
Broadcast	7.8	5.6	2.2	135.9	1.6	1.5	2.6	0.08	0.04	0.04	T			Na Ni Cd Pb Al Se Li
Soil Incorp	9.7	7.0	2.4	169.8	2.0	1.9	3.2	0.10	0.05	0.05	T			1.4 T T T T

Nitrogen is very high in relation to carbon (Low C:N Ratio). If the waste product is to be used as a raw material in composting, blend it with another material with a high C:N ratio. The C:N ratio should be 20-30 for ideal composting conditions.

Soluble salt level is very high. The compost cannot be used as a landscape soil or potting media without blending other materials to lower soluble salts to an acceptable level. Very high soluble salts likely indicate very high nutrient availability. Take a matching soil sample to further evaluate pH and nutrient availability.

Sample Info.	Laboratory Results (parts per million unless otherwise noted)													
	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	C
36	15613 M	3836 M	1143 L	156402 M	2167 M	1559 M	2832 M	120 L	69.8 M	70.2 M	2.28 L			154716
Waste Code:	-NH4													
FCW	-NO3													
Description:	OR-N													
Composted Waste - Other	U'rea	Na	Ni	Cd	Pb	Al	Se	Li	pH	SS	C:N	DM%	CCE%	ALE(tons)
	776 M	0.13	0.02	1.30		6.74	210	9.91	73.53	87.25	1.40			

**Recommendations:**

Application Method	Nutrients Available for First Crop													
	N	P2O5	K2O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Other Elements
Broadcast	9.2	7.8	1.6	138.0	1.9	1.4	2.5	0.11	0.06	0.06	T			Na Ni Cd Pb Al Se Li
Soil Incorp	11.5	9.7	1.8	172.5	2.4	1.7	3.1	0.13	0.08	0.08	T			1.1 T T T T

Nitrogen is very high in relation to carbon (Low C:N Ratio). If the waste product is to be used as a raw material in composting, blend it with another material with a high C:N ratio. The C:N ratio should be 20-30 for ideal composting conditions.

Soluble salt level is high. The roots of plants growing directly in the compost may be damaged particularly under dry soil conditions. The compost should be blended at least 50:50 with another material of lower salt level. High soluble salts likely indicate high nutrient availability. Take a matching soil sample to further evaluate pH and nutrient availability.

Compost pH is higher than ideal for plant production. If the compost will be used as a landscape or potting soil, blend other materials or add elemental sulfur to decrease pH to the desired range. As a general rule, add

25 lb. of elemental sulfur per cu. yd. of soil to lower pH 0.5-1.0 unit. One month after treatment, take a soil sample to determine if pH is within the desired range.

**Laboratory Results (parts per million unless otherwise noted)**

Sample Info.	N	P	K	Ca	Mg	Fe	Mn	Zn	Cu	B	Mo	Cl	C
Sample ID: 57	12562 M	2466 M	523 VL	172671 VII	1854 M	1526 M	57.8 L	37.5 L	39.6 M	0.88 L			154091
Waste Code: FCW	-NH4												
Description: OR-N													
Composted Waste - Other													
		602 M	0.05 Ni	0.01 Cd	0.86 Pb			6.98 pH			183 SS		
										12.27 C:N	73.76 DM%	88.50 CCE%	1.40 ALE(tons)

**Recommendations:**

Application Method	N	P2O5	K2O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Other Elements	lbs/ton (wet basis)
Broadcast	7.4	5.0	0.74	152.8	1.6	0.97	1.4	0.05	0.03	0.04	T			Na 0.89, Ni T, Cd T, Pb T, Se T	
Soil Incorp	9.3	6.3	0.83	191.0	2.1	1.2	1.7	0.06	0.04	0.04	T			Na 0.89, Ni T, Cd T, Pb T, Se T	

Nitrogen is very high in relation to carbon (Low C:N Ratio). If the waste product is to be used as a raw material in composting, blend it with another material with a high C:N ratio. The C:N ratio should be 20-30 for ideal composting conditions.

Soluble salt level is high. The roots of plants growing directly in the compost may be damaged particularly under dry soil conditions. The compost should be blended at least 50:50 with another material of lower salt level. High soluble salts likely indicate high nutrient availability. Take a matching soil sample to further evaluate pH and nutrient availability.

Compost pH is higher than ideal for plant production. If the compost will be used as a landscape or potting soil, blend other materials or add elemental sulfur to decrease pH to the desired range. As a general rule, add 25 lb. of elemental sulfur per cu. yd. of soil to lower pH 0.5-1.0 unit. One month after treatment, take a soil sample to determine if pH is within the desired range.



# **APPENDIX D**

**Manufacturer's Information Sheets**

North Carolina State University is a land-grant university and a constituent institution of The University of North Carolina

Department of Biological and Agricultural Engineering

**NC STATE UNIVERSITY**

Box 7625  
Raleigh, NC 27695-7625

919.515.2675  
919.515.6772 (fax)

Dean Brooks  
1195 Beal Rd.  
Goldston, NC.  
27252

Dear Mr. Brooks;

**Subject: Composting program for Doxey Industries waste wood**

Thank you for your continued interest in composting and beneficial use as a means of managing biodegradable waste materials. Many of the materials discarded by industries throughout the country have a great deal of potential for beneficial reuse. Your continued efforts to seek these materials and transform them into useable materials is indeed commendable.

The material from Doxey Industries is primarily a woody waste generated during the manufacture of wood products. The Material Safety Data Sheets indicate that the glues and resins used in the manufacturing process contain no compounds listed as toxic or hazardous. The glues and resins, however, may contain very low concentrations of chemicals that must be monitored. For example, formaldehyde is often used in resins and glues. Formaldehyde does compost nicely, but high concentrations of this chemical may interfere with composting processes. Consequently, The compost product generated with the woody waste from Doxey should be tested to determine whether there is formaldehyde present. The test should be accomplished at the beginning and end of a complete compost cycle. The testing can be accomplished at NCSU and I would be happy to accomplish it for you.

The compost process itself is the best indicator of the successful degradation of organic compounds. The temperature monitoring accomplished in support of composting operations indicates the extent of the biological activity within a compost pile. The presence of toxic compounds in a compost pile will result in depression of the biological activity in the compost windrow. This depression of biological activity depresses the pile temperature. Monitoring the pile temperature is the single best indicator of the success of a compost operation.

The addition of the woody waste from Doxey should result in the production of a high quality compost product. The pile temperature monitoring accomplished with any compost operation should be accomplished on a more frequent basis than with the other operations at your facility. I suggest that the temperature monitoring be accomplished at several locations in the Doxie material compost pile at least daily. This intensive temperature monitoring will assure that the process is not degraded by the addition of the woody waste from Doxey. Once the

temperature monitoring indicates that there is no adverse impact associated with this material, then normal monitoring can resume.

In addition to the test for formaldehyde discussed above, the finished compost should also be tested to determine the levels of the essential plant nutrients and regulated metals contained in finished product. These tests can be accomplished as a standard waste analysis by the Agronomic Services Laboratory at NCDA for a fee of \$4.00 per sample. Duplicate samples should be tested to determine the consistency of the material.

I hope that this is helpful to you. I will be happy to work with you during this compost activity to test product and observe the compost operation. Please advise if I can be of assistance.

This woody waste from Doxey does not appear to contain any material that will interfere with your ongoing compost activity and I urge you to examine this material as a component of your operation.

Sincerely,



A. R. Rubin, Professor and Extension Specialist  
Biological and Agricultural Engineering

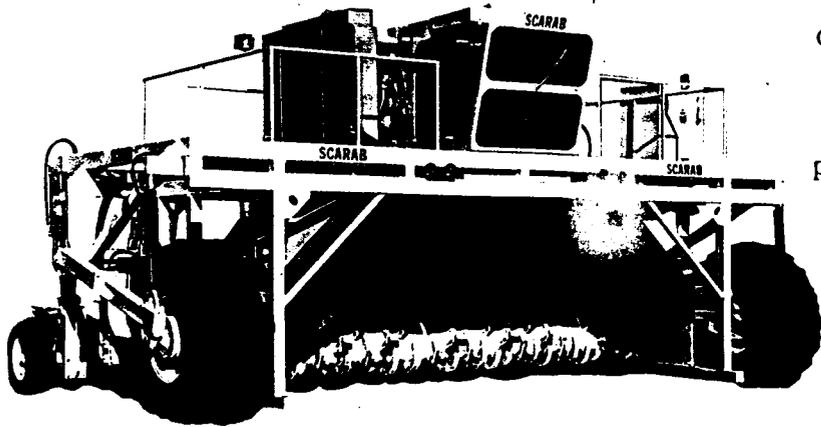
# "There's more than one way to straddle a windrow"

SCARAB, the trusted pioneer in high volume composting, recognizes that every program and site have unique characteristics.

Other manufacturers ask you to design around their machine's limitations.

Not so with us.

The SCARAB is designed to exceed the rigorous daily demands of large scale commercial and municipal composting operations.



## The SCARAB®



### Windrow Composting Machine

Our reputation stands proudly on two decades of innovative product development. With over 130 machines in use around the world, there aren't many site problems we haven't seen – and solved!

Is the efficiency of your operation constrained by

**Climatic extremes? Problematic surface conditions? Tight quarters?**

You won't lose performance on soft ground with our extra-wide, high-flotation tire machine.

Snow and mud won't result in downtime with the heavy-duty SCARAB halftrack or fulltrack drive systems.

We've even designed a special transversely configured machine, resulting in an ultra-narrow turning radius to save precious floor space in indoor operations.

Whatever your application, we most probably have the SCARAB to meet your special requirements. If not, we'd love to design one.

And remember, don't believe it the next time someone tries to tell you

**"There's only one way to straddle a windrow"**

For more information please contact:

#### MAJOR CITIES

Ann Arbor	Lexington
Austin	Los Angeles
Chicago	Minneapolis
Dallas	New York
Denver	Oakland
Detroit	Orlando
Eric	San Diego
Las Vegas	Tampa
	Toledo

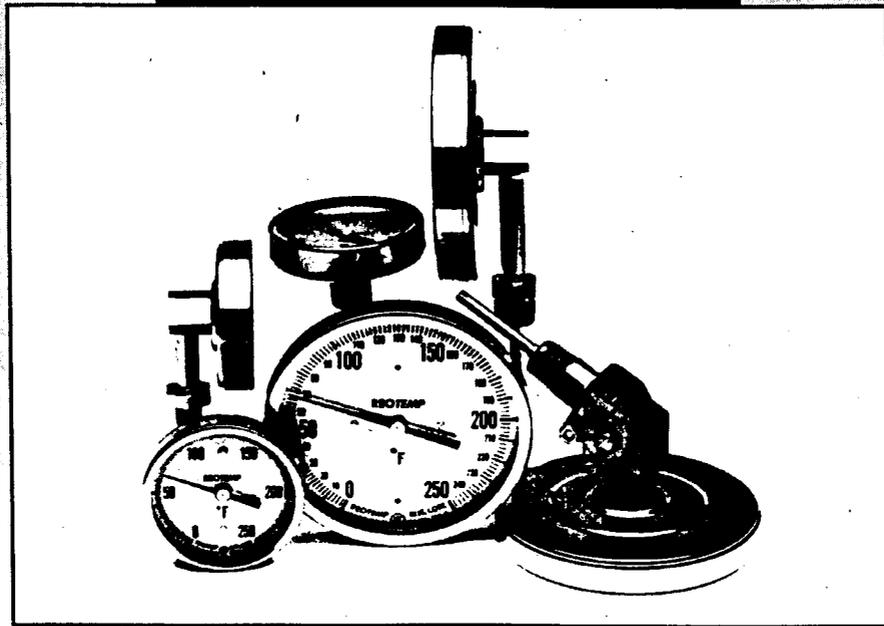
#### STATES

Arizona	Minnesota
Arkansas	Missouri
California	Nebraska
Colorado	Nevada
Connecticut	New Jersey
Florida	New Mexico
Illinois	New York
Kansas	N. Carolina
Kentucky	Ohio
Louisiana	Oklahoma
Maine	Pennsylvania
Maryland	S. Dakota
Michigan	Texas
Massachusetts	Washington

#### INTERNATIONAL

Australia  
Canada  
Hong Kong  
Italy  
Mexico  
Saudi Arabia  
Singapore  
Sweden

# Quality Instruments



Bimetal Thermometers  
Manufactured  
by the  
Service Leader

## REOTEMP.



DISTRIBUTED BY:

# INDUSTRIAL 3" AND 5" DIAL BIMETALS

Back Connected (Angle Form) Models • All Stainless • Hermetically Sealed

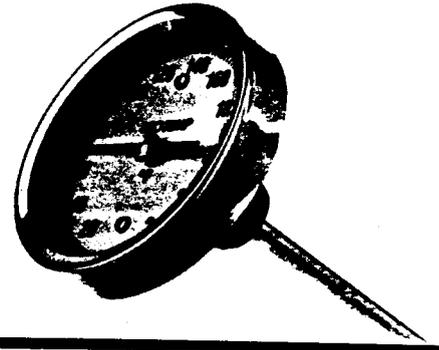
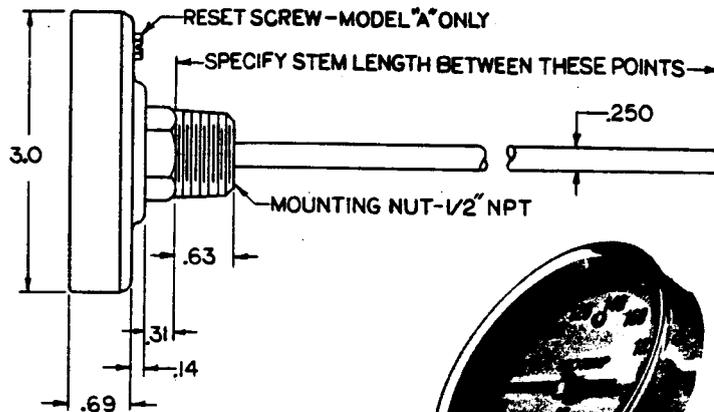
## 3" BACK CONNECTED (ANGLE FORM MODELS)

**MODEL A** (WITH RESET)

**MODEL R** (WITHOUT RESET)

Order by specifying:

1. Model; 2. Range; 3. Stem Length;
4. Mounting Connection



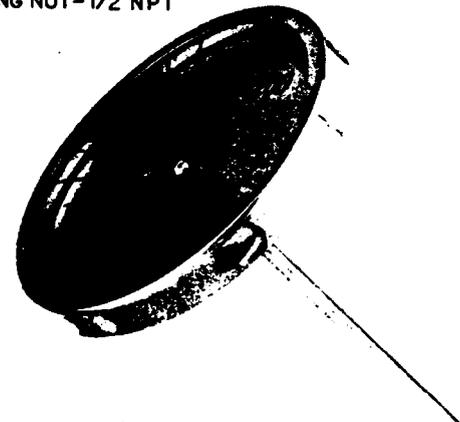
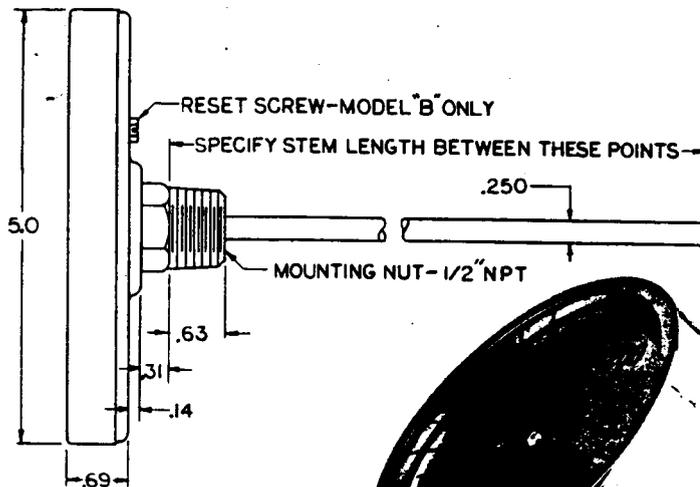
## 5" BACK CONNECTED (ANGLE FORM MODELS)

**MODEL B** (WITH RESET)

**MODEL S** (WITHOUT RESET)

Order by specifying:

1. Model; 2. Range; 3. Stem Length;
4. Mounting Connection



### FOR ALL MODELS SHOWN ABOVE:

RANGES AND DIVISIONS				DUAL	
FAHRENHEIT					
-100-100°F	2°	-50-300°F	2°	-50-210°F	5°/
-40-160°F	2°	50-300°F	2°	-100-100°F	2°/
-20-120°F	2°	50-400°F	5°	*25-125°F	1°/
* 0-100°F	1°	50-500°F	5°	-40-180°F	2°/
* 25-125°F	1°	50-550°F	5°	0-250°F	2°/
0-200°F	2°	100-800°F	10°	50-300°F	2°/
0-250°F	2°	150-750°F	10°	50-500°F	5°/
20-240°F	2°	200-1000°F	10°	150-750°F	10°/
				200-1000°F	10°/
CELSIUS					
-50-100°C	2°	0-100°C	1°	-50-100°C	2°
-50-50°C	1°	0-150°C	1°	-70-40°C	1°
-40-70°C	1°	0-200°C	2°	-5-50°C	1°
-20-120°C	2°	0-300°C	5°	-40-70°C	1°
-10-110°C	1°	0-400°C	5°	-20-120°C	2°
* 0-50°C	1°	100-500°C	5°	10-150°C	2°
				10-280°C	5°
				70-400°C	5°
				100-500°C	5°

\*Min. 4" stem for these ranges

### STEM LENGTHS

Standard: 2-1/2", 4", 6", 9", 12", 15", 18", 24", 30", 36"  
Optional: Intermediate Lengths up to 80"

### MOUNTING CONNECTIONS

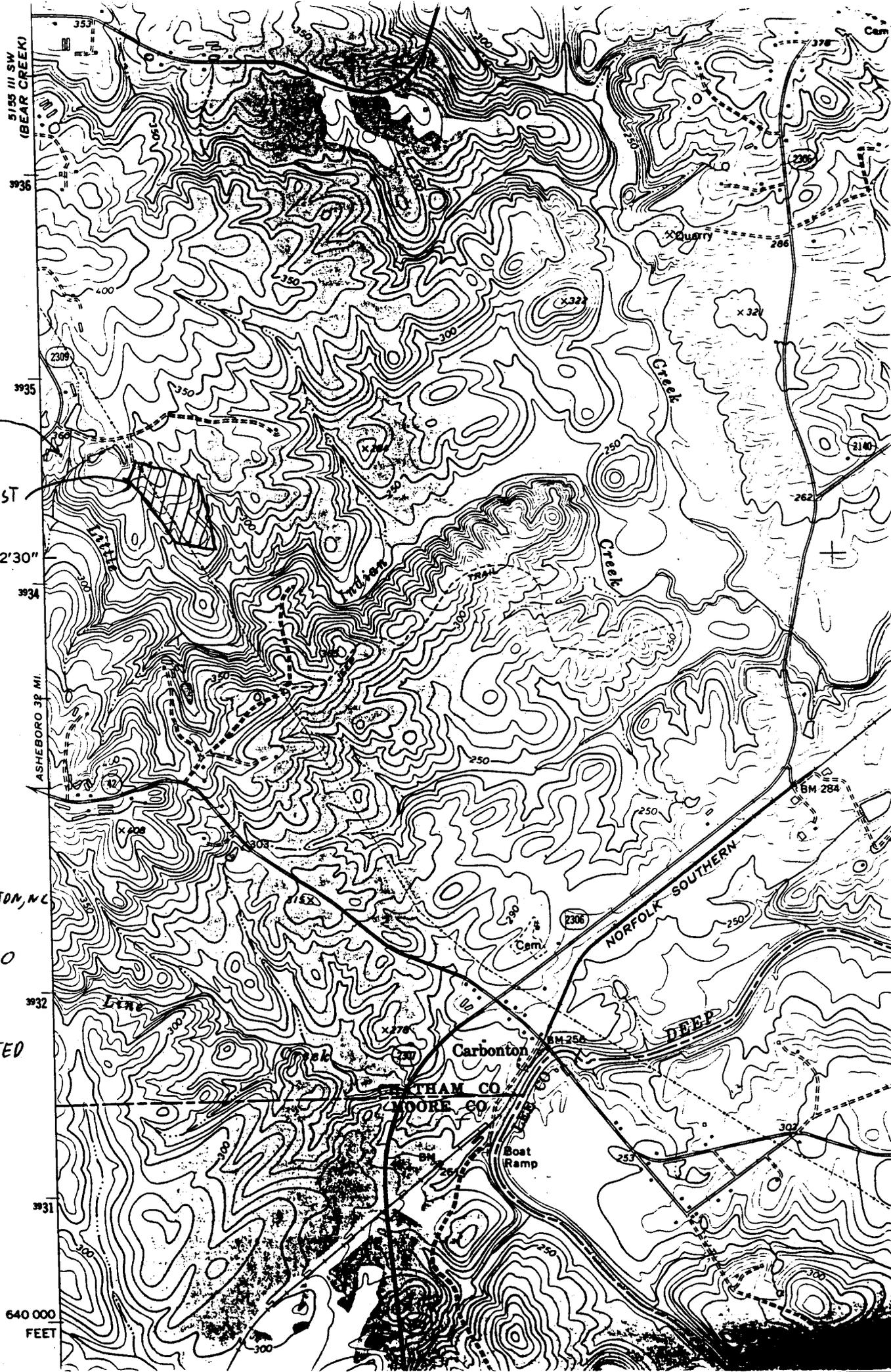
1/2" NPT, (Standard)  
1/4" NPT  
Hex Bushing (no threads)

### OPTIONS

Unbreakable Plastic Crystal  
Pointed Stem  
Silicone Filling (With Ranges up to 300°F)  
Minimum and/or Maximum Pointers (3" dial only)  
Teflon Coated Stems  
5/16" Diameter Stem  
(See p. 15 For All Options)

# APPENDIX E

Topographical Map



5155 III SW  
(BEAR CREEK)

3936

3935

3934

ASHEBORO 3P MI.

3932

3931

640 000  
FEET

OWNERS HOME

COMPOST SITE

32'30"

GOLOSTON, NC  
USGS  
1:24,000

1970

INSPECTED  
1980

Creek

Creek

NORFOLK SOUTHERN

DEEP

Carbonton

MOORE CO  
WYTHAM CO

Boat Ramp

X Quarry

Cem.

Cem.

2140

BM 284

BM 250

BM

302

300

255

250

250

250

250

262

286

286

370

X 322

X 324

2306

X 278

152

308

350

350

350

350

350

350

353

400

3936

3936

353

# APPENDIX F

Aerial Photograph

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

James B. Hunt, Jr., Governor  
Wayne McDevitt, Secretary  
Kerr T. Stevens, Director



June 15, 1999

Dean Brooks Farm Composting Facility  
Attn: Dean Brooks  
1195 Beal Road  
Goldston, North Carolina 27252

Subject: Permit No. NCS000371  
Dean Brooks Farm Composting Facility  
Chatham County

Dear Mr. Brooks:

In accordance with your application for a stormwater discharge permit received on September 29, 1998, we are forwarding herewith the subject state - NPDES permit. This permit is issued pursuant to the requirements of North Carolina General Statute 143-215 .1 and the Memorandum of Agreement between North Carolina and the US Environmental Protection agency dated December 6, 1983.

The Division of Water Quality has received and reviewed comments on the draft permit and as a result of the comments made the following changes to the draft permit:

- Increased the specific monitoring frequency from the Annual to Semi-annual
- Included analysis for the components of Total Nitrogen which are Total Kjeldahl Nitrogen and Nitrate/Nitrite Nitrogen
- Included the analysis for an additional nutrient, Total Phosphorus
- Included analysis for Ammonia for toxicity

If any parts, measurement frequencies or sampling requirements contained in this permit are unacceptable to you, you have the right to an adjudicative hearing upon written request within thirty (30) days following receipt of this letter. This request must be in form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, Post Office Drawer 27447, Raleigh, North Carolina 27611-7447. Unless such demand is made, this decision shall be final and binding.

Please take notice this permit is not transferable. Part II, B.2. addresses the requirements to be followed in case of change in ownership of control of this discharge.

This permit does not affect the legal requirements to obtain other permits which may be required by the Division of Water Quality or permits required by the Division of Land Resources, Coastal Area Management Act or any other Federal or Local governmental permit that may be required.



# **APPENDIX G**

## **Compost Information Sheet**

## EGGSHELL COMPOST

Our compost uses organic material from local hatchery plants in the state of North Carolina. This material is blended with a bulking agent (sawdust, bark, woodchips, leaves).

This compost has received an unrestricted grade from the State of NC department of Environment, Health & Resources, which means that this compost shall have unlimited, unrestricted distribution (bagged or bulk) as a mulch or soil amendment.

Beneficial bacteria produce temperatures in excess of 131 degrees F. Oxygen levels are adjusted by means of timely aeration. Temperature and moisture levels are monitored on a regular basis. These optimum conditions for composting produce a finished product which is free of harmful pathogens and heavy metal concentrations. The finished product is a humus-like material which can be used as a beneficial soil conditioner, as a planting aid for trees, and shrubs, and as a source of plant nutrients. The compost is weed-free and odorless.

This compost has a high rate of calcium which is beneficial as a liming agent. It is recommended that soils where compost is applied maintain a soil pH of 6.5, for best results have your soil tested by the NC Department of Agriculture before applying compost.

This compost is approximately 1% nitrogen. This is entirely organic nitrogen and will not harm plants when applied as recommended. The moisture content usually tests approximately 30% moisture, but may vary due to the fact that this product is stored outside. One cubic yard of compost weighs approximately 1300 pounds. Do not apply more than 1 ton of compost per 1000 square feet of fescue lawns.

### GENERAL USES:

Compost can be surface applied or soil incorporated. When added to soil compost will improve the physical properties of that soil, greatly improving growing conditions for plants. This compost is environmentally safe if used properly, however a few precautions should be noted:

1. Do not leave in piles that could become a play area for children.
2. Do not apply to frozen, flooded or snow covered ground.
3. Do not apply to ground within 10 feet of any public or private water supply source (well, stream, lake, river, etc.).
4. Do not apply where run off is likely.
5. Do not apply at rates higher than recommended.

Application of this compost is prohibited except in accordance with the instructions on the information sheet. For further information on uses and availability call the compost operation at (919)837-5914 or write to:

Dean Brooks  
1195 Beal Road  
Goldston, NC 27252



# APPENDIX H

Storm Water Permit

NCS000371

STATE OF NORTH CAROLINA  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF WATER QUALITY

**PERMIT**

TO DISCHARGE STORMWATER UNDER THE

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provision of North Carolina General Statute 143-215.1, other lawful standards and regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Federal Water Pollution Control Act, as amended,

**Dean Brooks Farm Composting Facility**

is hereby authorized to discharge stormwater from a facility located at

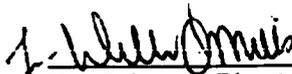
Dean Brooks Farm Composting Facility  
Goldston, NC  
Chatham County

to receiving waters designated as Little Indian Creek, a class WS IV stream, in the Cape Fear River Basin in accordance with the discharge limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, IV, V and VI hereof.

This permit shall become effective July 1, 1999.

This permit and authorization to discharge shall expire at midnight on May 31, 2004.

Signed this day June 15, 1999.



Kerr T. Stevens, Director  
Division of Water Quality

By Authority of the Environmental Management Commission