Craven
AG SERVICES, INC.
2115 Hwy 55 West New Bern, NC 28562

BILLY DUNHAM, PRESIDENT
(252) 633-5334
(252) 670-8530

June 10, 2011

Mike Scott
Composting and Land Application Branch
N.C. Division of Waste Management
1646 Mail Service Center
Raleigh, N. C. 27699-1646

Dear Mr. Scott:

Craven Ag Services' compost demonstration permit will expire this month. We are in the process of expanding the existing site and moving part of the operation further back into the Pine Plantation. This will put us well over 1000 feet from the highway and will enable us to expand our operation. This move however will require some major work in land preparation composting pad development, etc. We have been working on this process now for about six months and are making good head way in getting things in order. However, we will need an extension on our present composting facility so we can keep composting while we reach all the requirements for a Full Large Type III Compost Site.

This letter is to request a twelve (12) month extension on our present compost demonstration site. I feel we will have everything in order for a Large Type III Facility by then.

I am sending you copies of the work that we have gotten done thus far on the Type III Facility. They are as follows:

1.A copy of our Application For Large Type III Facility. This has everything except for the attachments. We are working on them
2. A copy of our Compost Facility Operations Guide. This has everything except all of the Appendices. We are working on them.
3. A copy of the Preliminary Plat from our surveyor showing the composting sites and the floodplain.

Now that the flood plain area has been identified I can go ahead and cut the trees in the composting site and begin working on the mixing pads and windrow pads.

Please let me know your thoughts and where I need to go from here.

Sincerely,

Billy Dunham

Billy Dunham, Craven Ag Services,

15 May, 2011

Mr. J. W. Dunhan
President
Craven Ag Service , LLC
Box 1184
New Bern, NC,

Dear Mr. Dunham:

Please find herein the permit application package for the operation of a commercial compost facility on River Road in Craven County, NC. The facility is intended as a large type III facility as described in North Carolina Solid Waste Rule. The compost facility operation proposes to handle and utilize a variety of regulated waste materials and processes in excess of 1000 cubic yards of compost per quarter; consequently the operation will be classified as a large Type III facility under North Carolina General Statute. A permit application must be submitted by an engineer licensed in North Carolina. This application was developed in cooperation with Gary MacConnell, P.E.; Robert Rubin; and representatives from Craven Ag Service.

The materials contained herein should be reviewed and submitted along with the Operation and Maintenance manual to Michael Scott, NCDENR – DWM.

Sincerely;

A. R. Rubin, Professor Emeritus, NCSU-BAE

CRAVEN AG SERVICE COMPOST SITE APPLICATION FOR LARGE TYPE III FACILITY

15 May, 2011

PREPARED FOR:

CRAVEN AG SERVICE
RIVER ROAD
NEW BERN, NC

DEVELOPED BY:

GARY MACCONNELL, P.E.
President, MacConnell and Associates

ROBERT RUBIN
President, A. R. Rubin and Associates

Background and Introduction: Materials Contained herein are derived from North Carolina Administrative Code (NCAC) and the compost requirements contained in 15 A NCAC 13B 1400 et seq. and are intended to support the application to permit and operate a Compost Production facility in Craven County, NC.

This application is intended to support requirements in the .1400 rule to permit a septage/FOG/MSW compost facility.

A. Site Location (.1405 (b)(1))

The Craven Ag Service, Compost Facility is currently operating through a demonstration permit. The site is located on River Road in Craven County, NC. The site is located between River Road and the Neuse River. The location of the compost facility is shown on a site map and aerial photographic maps included in Attachment 1. The Craven Ag Service, Compost Site is located so as to meet or exceed all the applicable buffers for a Large Type 3 composting facility posed in NC Rule. The applicable buffers are shown on the site map provided in Attachment 1.

The application for the compost site permit does include feedstocks from the septage and grease trap operation. These activities have been ongoing as a part of a pre-existing, permitted septage operation.

B. Letter from Craven County Planning (1405(a)(2))

The Craven County Zoning letter, 12 May, 2011 is attached as appendix A.

C. Compliance: (.1405(b)(3) and .1404 (a)

(1) The Craven Ag site is located on a terrace landscape position adjacent to the Neuse River in Craven County, NC. Portions of the property are in designated 100 year flood elevation areas and designated as AE in the FEMA flood maps (FIRM Map, Map Number 37205544001, 2 July, 2004). The areas designated as Zone AE or the AE floodway are not intended to host compost operations.
In the Mayo survey the floodway is labeled as zone AE. The none floodway is labeled as zone X.
(2) The site map attached identifies property boundaries and demonstrates compliance with mandated buffer requirements.
(3) The site map attached indicates adequate buffer between site operations and adjacent residences or dwellings.
(4) The site map attached indicates adequate buffer between site operations and wells.
(5) The site map attached indicates adequate buffer between compost operations and

waterways.

(6) There is no direct discharge of pollutants from the site. An assessment by Ken Pickel indicates no direct runoff. Water quality standards apply to discharge systems; non-point sources of discharge have been addressed through the operations plan.
(7) No portion of the operation is located over a closed solid waste operation.
(8) No portion of the operation is located within 25 feet of a berm or swale.
(9) No discharge of pollutants will impact section 404 waters or areas or violate water quality standards.
(10) Site assessments confirm no groundwater within 24 inches of soil surface.

Compliance: 1404(b)

1. Not applicable

Compliance: .1404(c)

1. Access to the site is controlled at locked gate along River Road
2. Effective sediment control practices are in place and practiced
3. Air emissions are controlled by turning appropriately and maintaining required buffers
4. Odor emissions are controlled by managing compost turning operations and feedstock management

D. Operational Details:

1. Waste types: The compost is manufactured from a mixture of hardwood and softwood sawdust, animal bedding, ground corn cobs, ground and un-ground yard waste, Septage and FOG wastes (dewatered grease trap residuals and septage) and floating, fatty solids from animal processing or transportation operations such as Dissolved Air Flotation (DAF) skimmings, construction debris (clean, unfinished wallboard, wood pallets where nails can be removed, clean wood scrap from construction operations), pre and post consumer, source controlled food wastes, vegetative agricultural products tobacco waste agribusiness wastes such as wet, indigestible hay or forage, corn stover, cotton gin trash, or peanut hulls, land clearing debris material, lime mud from water treatment operations and non-toxic/non-hazardous coal combustion dust.

2. Site assessment: evaluations indicate seasonal groundwater elevations at a depth of well over 24 inches. Soil evaluation indicated the predominant soil texture in the expansion area as a loamy sand. The soil materials in site 1 & 3 will be modified by addition of coal dust and/ or clay to introduce fine particles and modify soil texture in the control zone. The current permitted area (site 3) has been modified over the last two (2) years through continued use as a compost production facility and the natural and planned addition of

compost fines and coal combustion dust to the site. The soil texture in the existing compost manufacturing area is fine sandy loam to sandy loam as determined by hand-texture method and to be confirmed by laboratory analysis. This meets requirements contained in DWM Rule NCAC.1404 10 b.

E. Site Plan: Site plan is attached, see attachment 1

F. Compost Facility Permittee

(1) Mr. J. W. (Billy) Dunham is the Permittee for this facility. The Craven Ag service operation is a family business. Personnel involved in the compost operation are:

a. J. W. (Billy) Dunham, Facility
b. Operator
c. Mack Dunham, Assistant Facility Operator
d. Maintenance crew
e. Equipment crew
f. Transportation crew (over-the-road crew)

(2) Operations Schedule: The Craven Ag compost operation may be open between 7:00 am through 7:00 P.M. Monday through Saturday depending on the need to process and move compost. These operating hours will accommodate inflow, outflow of finish product and required compost production operations. Hours of operation may be less than reported here. Upon completion of a typical work day, the compost windrows will be checked to assure proper cover is in-place and the gate will be closed and locked as staff exit the site.

(3) HHW - Household hazardous Wastes are not composted at the site. If these materials are ever received on the site, they will be removed and handled through approved HHW operations.

(4) Special precautions: during inclement weather (excessive rain, severe winds, snow, ice, or weather warning associated with tornado or hurricane), the facility will not actively mix or blend incoming feedstock materials. Compost windrow turning may proceed if site and soil conditions permit access to the site and the operation can be conducted safely without generating runoff or endangering staff.

(5) Vector and nuisance conditions will be addressed by maintaining proper cover over windrows to prevent vector attraction. Noise associated with equipment operations will be controlled by operating only during posted hours of operation, no Sunday morning operation, and by controlling vehicle speed along River Road. Dust control if needed will be achieved by wetting roadways and other surfaces generating dust.

(6) Finished compost will be utilized as a component of bioretention mix in stormwater systems, as a medium for plant growth, as a landscape material and for agricultural, horticultural, and silvicultural operations and as substrate for plant growth. All compost materials will be certified as PFRP and representative samples of the material will be tested as accomplished by NCDA for organic matter, nutrient, regulated metal, and salt levels as required in rule.

An operations and maintenance manual is provided. The Operations manual lists activities of individuals involved, operational requirements during normal operations and adverse weather, turning frequencies, temperature monitoring requirements, product quality testing and disposition for the compost.

G. Compost Facility Design

(1) The Craven Ag Service, Compost Facility consists of a series of compacted marl gravel and compacted soil/clay/ash pads each of varying size. The site contains several distinct sites. These are:

Site 1 – material receiving and mix pit
Site 2 – material processing area to assure PFRP and VAR compliance, these are active compost production areas
Site 3 – screening and material curing

In addition to these defined areas, the site may also contain temporary tank trucks for storage and treatment of the raw materials to be processed and composted. These consist of above ground portable tanks ranging from 1500 to 6500 gallons capacity.

The compost is manufactured from a mixture of hardwood and softwood chips and sawdust, animal bedding, ground corn cobs, ground yard waste, FOG wastes (dewatered grease trap residuals and DAF skimmings), construction debris (clean, unfinished wallboard, construction debris such as saw wood or pallets), pre and post consumer, source controlled food wastes, vegetative agricultural/agribusiness wastes such as tobacco dust, indigestible hay or forage, corn stover, cotton gin trash, or peanut hulls, and land clearing debris material. New feedstock sources will be tested to determine levels of nutrients, regulated metals, organic carbon and salt prior to receipt. No new feedstock will be allowed if regulated metal levels exceed the Table 1 values listed in 40 CFR Part 503.

All of the putrescible material is mixed and blended at Site1 with a suitable substrate in the concrete bin on the day of arrival to prevent nuisance problems. The mixing facility is a concrete pad that slops to the back. The pit is water tight and all liquids that are not absorbed by dry substrate (sawdust, wood waste) will drain to the back of the pit and will flow to an underground holding tank. (1000 gallon capacity) On day of arrival, the non-

putrescible materials are stored in the raw material storage areas on Site 1 for subsequent use as needed for staging purposes. As raw feedstock materials are initially mixed and blended they are transferred from the mixing pit to a kuhn mixer where it is further mixed and carried to Site 3 for windrowing. The windrow composting continues in these open windrows for approximately 60 days from placement to product. At the end of the composting process, the PFRP/VAR compliant compost is moved by loader onto the compacted finished compost storage pad (Site 3) for curing. The finished compost is to be stored for a period of not less than120 days and not to exceed 270 days for curing. A maturity test will be used to assess the stage of maturity of the compost. The finished compost may be sold in bulk as a soil amendment, blended with topsoil or sand marketed as finish compost, topsoil or bio-retention blend.

The facility is intended to accommodate up to 50,000 tons per year of compostable materials. These materials will be received on a varying schedule and daily receipts may exceed 100 tons, while annual processing will not exceed 50,000 tons. This schedule supports 300 days of active operation per year. Compost mixes or blends will be developed each day based on incoming feedstocks and ultimate market opportunity. Coarse materials will be used to produce silvicultural product while the finer textured materials will be mixed and blended for the horticulture and bioretention blend markets.

2. Compost Recipes

The exact blends and mixtures are developed based on proprietary mixes and blends developed by Craven Ag Service, for specific end uses or general compost production. The compost is made from a mixture of hardwood sawdust and animal bedding from livestock operations, untreated wallboard and other untreated construction debris, land clearing debris, yard and leaf waste, dewatered grease trap wastes, Tobacco dust and vegetative wastes from food operations. The ground yard waste, ground corn cobs and land clearing debris material may be incorporated into the compost recipes to increase levels of solids and decrease moisture levels. Table 1 shows the characteristics of a portion of the raw materials used for compost mixture calculations.

Table 1. Raw Material Characteristics

Raw Material[1]	% N	C:N Ratio	% Moisture Content
Septage	1.0	40:1	95
Dewatered Grease Trap	1.0	60:1	70
Hardwood Sawdust	0.09	560	10
Sawdust Bedding	0.24	442	20
Ground Corn Cobs	.6	98	15
Animal Bedding	.5	120	40
Yard Waste	.9	54	40
Land Clearing Debris	.09	560	5
Food waste	1	30	95

[1]Nitrogen and Carbon Information based on data from "On-Farm Composting Handbook"

The composting operation serves primarily to receive septage and dewatered grease trap wastes in order to allow an increase in the hydraulic loads onto the land treatment operation permitted for Craven Ag Service and to provide an outlet for solids produced in dewatering operations operated by CAS. The mixtures of substrate and waste should result in an initial C:N ratio of ~30:1 and a moisture content of ~75%.

3. Availability of Raw Materials Protocol For Compost

The waste production assumptions for the compost operation are as follows:

a. 50,000 gallons grease trap waste processed 5 days per week (10 to 20 dry tons/day after dewatering)
b. 50,000 gallons of septage processed 5 days per week (10 to 20 dry tons per day after dewatering)
c. 5,000 gallons of portable toilet waste processed 5 days/week (0.5 DT/D)
d. 20,000 pounds (10 tons) of vegetative waste per day received
e. 100,000 pounds (50 tons) per day feedstock from municipal, commercial, agricultural/agribusiness, and industrial sources.

These volumes will vary seasonally, but total production from all sources will not exceed 50,000 tons annually.

The solids portion of the processed liquid waste is to be composted. The liquid will be accommodated through land application, transport to a separate and properly permitted land treatment facility or to a permitted POTW (such as Kinston POTW). In addition to

the nitrogen sources available from the septage and dewatered grease trap waste, several sources of carbonaceous bulking materials are readily available for utilization in the composting process. These materials include hardwood and softwood sawdust from a local manufacturing plants, mixed wood chips and sawdust from ground pallets (nail free), animal transport bedding materials from livestock operations, straw bedding material from the on-site free-stall dairy, horse, or cattle barns, poultry litter from local poultry growers, untreated wallboard from home/mobile home construction/manufacture, pre and post consumer food waste and hay/straw harvested form the land application fields, and Tobacco dust.

4. Flow Diagram

The composting process at the Craven Ag Service Compost Facility is depicted on the site plan showing the processing area and the concrete mixing pad (Site 1), the compost production windrows (Site 2), the curing area and the screening/mixing area (Site 3) may be described as follows: dry raw materials such as sawdust, wood chips, bedding material and ground pallet materials (wooden pallets) are received and stored prior to use in the "dry material" storage areas. These materials are combined with a daily delivery of wet raw materials and the dewatered materials generated off-site at the Craven Ag dewatering facility. The dry materials are placed directly into the concrete bin and the dewatered or processed septage/grease trap materials are placed over the top of the material, these materials are mixed and blended using a loader in an approximate 50/50 ratio. These raw feedstock materials are loaded via loader into the bulk mixer. The proper ratio of material introduced onto the mixing pad is determined by the number of "buckets" of material placed by the loader. This is done on Site 1. The bulk mixing operation thoroughly combines the raw material and "mixed" raw materials are transferred to the compost production area (Site 2). After initial treatment in the compost windrows for PFRP and VAR compliance, the compost is removed to the initial storage or curing area (Site 3), where it is allowed to complete the compost curing process. A **Solvita** test will be used to assess the maturity of the compost.

A process flow diagram, showing the equipment and flow of materials through the composting system is included in Attachment 2. The critical flow duration in the active windrow is 15 days at required temperature with 5 consecutive turnings as required in rule. Typical time in an active windrow will be 4 to 6 weeks to allow for temperature rise from ambient to thermophilic and required mixing. Mixing and blending will be accomplished in a single day. Composting will require an estimated 21 days. Curing may require between 2 and 3 months depending on end use and Solvita test results. Storage can be accomplished following a Solvita test indication that the material is stable. Storage will be dependent on end use and may require up to 9 months depending on users.

5. Leachate Collection and Recycle System

The concrete compost mixing area will have a 1000 gallon underground holding tank to

collect any excess leachate that may leave the mixing area. The leachate collected in the holding tank will be removed as needed and will be incorporated back into the mixing process of the compost material and will serve as a nitrogen and water source. If any addition of leachate back into the windrow is carried out in the primary loading of the windrow it results in an additional full processing and heat cycle which results in the Process to Further Reduce Pathogens to be repeated. In very wet conditions or in an emergency, such as a sustained power outage or equipment breakdown, the collected leachate will be transferred to the nearby waste water treatment facility in Kinston, NC. Site 2 will consist of windrows that are going through the PFRP process. The site is gently sloping and well buffered with trees, grasses, and shrubs, thus preventing any runoff of water from the site to the states waters. Site 3 will consist of curing windrows and or screened material. It is gently sloping and is well buffered with grassed areas to prevent runoff of water from the site.

6. Preliminary Compost Analysis/Quality

Detailed compost characterizations have been performed previously by NCDA on several samples of the finished compost. All units in the analysis are measured on a dry weight basis (mg/kg). Table 3 shows a summary of the results from NCDA sampling. The finished compost does not exhibit high concentration of regulated or heavy metals. The raw material sources are primarily agricultural in nature and do not have significant heavy metal concentrations.

7. Pathogen Reduction Verification

Pathogens are to be reduced as required in the NC Solid Waste Compost Rules, Section .1406. Craven Ag Services shall maintain the compost process at a temperature above 55 degrees C (131 degrees F) for 15 days or longer and the average temperature for an additional 14 days shall be higher than 45 degrees C (113 degrees F) for the PFRP and VAR compliance.

The completed compost from the Craven Ag Services will have a fecal coliform density of less than 1000 colonies Most Probable Number (MPN) per gram of dry solids. The materials will demonstrate pathogen reduction requirements by process monitoring (time and temperature).

8. Protocol For Compost Which does not Meet Pathogen Reduction Level

All finished compost which does not meet the time temperature requirements listed in rule(131 degrees F for 15 days) or tested fecal coliform level of 1,000 colonies per gram of dry material are to be returned to the windrow and subjected to an additional, high heat cycle (up to 131 degrees Fahrenheit for 15 or more days). Temperature probes will be calibrated annually to assure reliable measures. In the event that this process does not reduce the fecal coliform count or the manager/operator decides that the additional composting is of no value, then the material will be land applied to an appropriate, permitted off-site disposal area (permitted for class B material through NCDWQ or NCDWM) or transported to a permitted landfill.

9. Contingency Plans for the Operation

An operating manual detailing the composting facility operations and procedures, including recipes, equipment, monitoring, maintenance, and record keeping is included as Attachment 4.

Contingency plans for operation in the event of equipment breakdown or temporary power failure or inclement weather essential operations will be accomplished with alternative equipment; for example, if turning is required and the turner is inoperable, turning will be accomplished with front end loader.

Problems with operation of the composting facility during extreme weather conditions such as heavy rain or high winds will be minimized because of limited ingress to the site. Essential operations will be accomplished as required with equipment available.

In freezing conditions, it may be necessary to modify the compost cycle to assure

temperatures are maintained adequately. This may require turning during late morning and early afternoon hours to take advantage of warmer day-time temperatures. This practice should allow the temperature to reach and maintain the desired level in excess of 131 degrees Fahrenheit for at least 15 days with the required turnings to meet the PFRP requirements. Special caution will need to be taken with the operation of skid loader equipment in any areas where the small amount of leachate could freeze and present a slippage hazard. Operators will be trained in proper operation of all equipment to assure a safe and sound operation.

10. Compost Equipment

a. 1135 Massy Ferguson
b. Khun/Night 1881 pro slinger mixer
c. Two rubber tired loaders, (3 yard Dresser and 2 yard Komatsu)
d. 1997 two ton dump truck
e. One 24 foot dump trailer and 1988 Freightliner truck
f. One Ultra Screen 4'x10'x5/8 inch screen

11. Vector Reduction

On day of arrival, putrescible materials will be mixed, blended and prepared for composting, then placed into the compost windrow on that same day to reduce nuisance vectors. These materials will be covered with 3 to 6 inches of finished compost, 3 to 6 inches of a carbon rich material such as sawdust or a layer of plastic as described in the operation and maintenance manual to present escape of odor. Other component materials such as sawdust, bulking agents such as ground corn cobs or yard waste may be stored for longer periods. The VAR requirements established in rule shall be met through compost temperatures of 105 degrees for 15 days and 115 degrees for 5 of those days as established in 40 CFR Part 503 Rules.

12. Traffic Flow

Based on the maximum throughput production of the compost operation a maximum of two tractor trailer loads of compost per day would leave the facility on average. The over the road tractor trailers are anticipated to move on the gravel access road leading from the facility to River Road, thence to NC Highways and roads for ultimate distribution in the area. Given the existing truck traffic from the facility, the additional effect on local traffic of a maximum of two trucks of finish compost per day, 4 to 5 loads of dry feedstock materials, and 2 to 3 loads of dewatered material on average will be negligible.

H. Marketing Plan and Materials

A portion of the finished compost has normally been sold by bulk to local buyers. At present, CAS Compost Facility has established a strong working relationship and goodwill with growers and producers in the area to continue with expansion of markets for soil amendment, compost and bioretention area soil mixes.

Copies of the previous communication from the NC Division of Solid Waste regarding the Compost Facility are included as Attachment 9.

I. SUBMITTAL

Gary MacConnell with MacConnell and Associates and I, appreciates the opportunity to compile this permit application for the CAS Compost Facility. Initial development and final review of these materials was provided by Billy Dunham, Gary MacConnell, and A. R. Rubin. If either you or the NC DENR have any questions regarding this report, please contact us directly.

Sincerely,

Gary MacConnell, P.E.

A. R. Rubin

attachments

List of Attachments

Attachment 1. Site and Topographic Maps of the Compost Facility

Attachment 2. Design Schematics

Attachment 3. Compost Analysis Report

Attachment 4. Composting Operations Manual

Attachment 5. Equipment Specifications

Attachment 6. Buffer Maps

Attachment 7. Craven County Zoning Letter

Attachment 8. Marketing Information Sheets

Attachment 9. Division of Solid Waste Communications

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Attachment 6. Buffer Maps

Attachment 7. Craven County Zoning Letter

Attachment 8. Marketing Information Sheet

Edited Copy

Craven Ag Service, ~~LLC~~ INC Compost Facility Operations Guide For Large Type III Facility

May 15, 2011

Prepared for: Craven Ag Service, LLC
River Road
New Bern, NC

Developed by: J. W. (Billy) Dunham, Craven Ag Service
Dr. A. R. Rubin,
Gary MacConnell, P.E.

Craven Ag Service Large Type III Compost Facility Information

Owner: J. W. (Billy) Dunham

Location: Site Location: River Road
Office Location:
2115 W. Highway 55
New Bern NC

Permit: Pending

Primary Contact: J. W. (Billy) Dunham

Office:
Cell:

Regulatory Agency Emergency Contact:

NCDWM, Eastern Region: Joe Gallo

Hours of Operation:

Monday to Friday: 7:00 AM – 7:00 PM
Saturday: 7:00 am – 3:00PM
Sunday: Closed

Prohibited Feedstock:

Hazardous waste
Infectious waste

Craven Ag Service Compost Facility - Operations Guide

1.0 Introduction

The Craven Ag Service Compost Facility is located in the northern part of Craven County, North Carolina, near the intersection of River Road and Highway 4, approximately 5 miles southwest of Vanceboro, NC. This facility currently operates in accordance with a demonstration permit, and will be permitted by NCDENR-DWM as a Large Type 3 composting operation. The purpose of this operations guide is to comply with Section 1406 of the DWM regulations. Key personnel involved in the production of compost at this facility will acknowledge reading of this manual (below) to assure a basic understanding of the policies and procedures contained herein.

NAME:	DATE:
NAME:	DATE
NAME:	DATE:

The raw feedstock materials for the composting operation will come from permitted sources. These include:

Permitted Materials:

- Dewatered Septage
- Dewatered Grease trap wastes
- Material from permitted waste sources such as scrapped manure or litter from local animal operations
- DAF Skimmings
- Sawdust from local wood products manufacture
- Ground yard waste
- Agribusiness residues or vegetative agricultural wastes and by-products (such as waste cotton fiber or gin trash, corn stover, tobacco dust, straw or wet hay)
- Land clearing debris
- Shavings and animal waste from any local livestock trailer wash
- Pre and post consumer food wastes from source controlled operations
- Untreated, unpainted new construction wallboard or gypsum-board, wood pallets
- Seafood processing waste
- Ash from wood burning operations or coal facilities

Prohibited Materials:

- Municipal sludge
- Hazardous waste
- Infectious waste

Materials composted must be permitted in the DWM permit. New feedstocks will be tested and approved by consultants to Craven Ag Service or DWM prior to receipt.

The composting operation will be conducted in open windrows specifically designed for compost production. Feedstock storage will be on compacted clay or ash pads at site one (1). Primary mixing of feedstock will be carried out in a water tight bin (attached to a 1000 gallon underground holding tank to collect any excess leachate), moved to the kuhn mixer for further mixing, and then windrowed on site two (2) to begin the composting process. As the composting process progresses and PFRP and VAR compliances are met, the compost will be moved to site three (3) for screening, further curing, processing, and distribution. Excess liquid generated during the compost feedstock mixing will drain to a 1000 gallon underground holding tank. The leachate will be recycled back into the mixing process, applied on unfinished windrows, or carried to the Kinston Waste Water Treatment Facility. If it is necessary to add leachate to existing windrows the PFRP process will start all over again. The windrow composting pads are well buffered and will not have a leachate run off leaving the site and interring any waters of the state.

1.1 Composting Requirements and General Operations

Compost is defined by the U.S. Composting Council as "the product resulting from the controlled biological decomposition of organic matter that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth." Composting is accomplished by mixing an energy source (carbonaceous material) with a nutrient source (nitrogen and phosphorus containing materials) in a prescribed manner to meet microbial requirements necessary to support metabolic processes. Moisture levels, solids levels, and nutrient levels in the compost feedstocks are controlled to assure the process reaches the required temperatures for the time prescribed by rule (15 days above 131 degrees F with 5 turnings in that 15 day time). The process is carried out under specific moisture and temperature conditions for a specified period of time. Certain steps and procedures are necessary to ensure that the composting process proceeds properly with a minimum of odors, adverse environmental impacts, and other process related problems.

The facility will be divided into four (3) distinct areas. These are receiving area 1, where raw materials are received, this does include the mix bin at the entrance to the process; here incoming materials are mixed and blended in preparation for subsequent placement in the windrows; area 2, where the mixed/blended materials from area 1 are placed into the long windrows for compost operations and where PFRP and VAR compliance will take place; area 3 where composted materials and inert bulking material are stored or cured, screened and prepared for distribution.

Materials permitted for receipt at the facility will be received at area 1. Solid and Semi Dry materials from off-site sources (litter, shavings, other energy sources etc) will be stored on the compacted pad awaiting blending with the permitted nutrient sources, dewatered septage and FOG. These nutrient sources will be placed onto the mixing pad for proper mixing with dry energy sources of bulking materials. A volume of energy sources (sawdust) equal to the volume of nutrient sources (dewatered material) will be placed on the pad. The nutrient material and the

dry bulking energy material will be mixed together for approximately 10 to 20 minutes to assure complete mixing. This process is not intended to generate excess liquid. Should liquid be generated during this initial mixing, it will be collected and discharged to the 1000 gallon underground tank that is attached to the mixing area. Prior to blending or transport into the compost windrows in area 2, all materials will be examined to assure proper moisture level (upon firm squeezing, material will release a thin film of water to hand or a few drops of water). If material is too wet, additional bulking material will be added to dry the mixture; if too dry, liquid from the holding tank or other water sources will be added to the mixture to provide moisture. Dry materials will be mixed or blended at the proprietary mix or blend ratios developed at Craven Ag Service for various compost end uses and markets.

Materials will be formed into the windrows using the kuhn mixer, rubber tired loaders, or by dump truck. Feedstock materials will be transported to the windrows and placed carefully in windrows by lifting and dropping materials to provide final mixing and blending, preliminary aeration, and minimal compaction prior to windrow activities. Typical windrows shall measure no more than 8 feet in height and no more than 32 feet at the base. Material placed in this manner should heat adequately to assure PFRP compliance. Temperatures will be monitored and recorded daily to demonstrate compliance with PFRP and VAR requirements. Windrow areas are designated on the facility permit and all windrows will be marked with date of formation and dates of turning.

The windrow compost process achieves the VAR and PFRP compliance. Demonstrated compliance with VAR requires temperatures exceeding 104 degrees F for 14 days or longer, and averaging 114 degrees F or higher for the 14 day period. Compliance with PFRP requires maintaining temperatures at or above 131 degrees F for 15 days with at least 5 turnings of the windrows. These PFRP temperatures have consistently been exceeded in the VAR area of windrow operations and a PFRP windrow is a "de facto" VAR. Material will be moved through the active compost production area (area 2) using a front-end-loader bucket to lift and drop or windrow turner (as available) until material has achieved required VAR and PFRP compliance and has been rotated in the windrow for 60 to 120 days. Temperatures will be monitored at specified locations along an active windrow. These are 20%, 40%, 60% and 80% of the windrow length and at depths of 24" and 36" into the windrow at each of these locations. Temperature monitoring will be accomplished Monday through Saturday. Once compliance with all PFRP and VAR requirements has been established through the time/temperature monitoring, the compost shall be moved to area 3 for curing and screening.

The curing/screening area (area 3) is intended as an area where the compost matures and is prepared for distribution. This process is important in developing stable compost suitable for a wide variety of end-use applications. The stability and maturity of the compost will be assessed through the Solvita test.

Once stable and ready for distribution, the compost will be transported by loader to a screening operation collocated in area 3. The screen separates fine material from coarse material. The fines are placed into the final stage of the operation in the final storage area of site 3 before being hauled to sales locations, while the course materials are recycled back through the compost

operation by transport back to area 1, feedstock storage. Here these course materials are mixed and blended with incoming material and returned to compost windrows as "seed".

A quality assurance/quality control program will be instituted at Craven Ag Service. This process will help to assure:

A. Compliance with appropriate rules and regulations
B. Product quality consistent with specified or designated end use
C. Trained personnel remain available to manufacture quality compost

The QA/QC effort will involve the compliance testing and monitoring including: routine temperature monitoring and recording, nutrient and regulated metals testing, foreign material content and bacteriologic sampling. The compliance testing for regulated metals and bacteria will be conducted by a private certified laboratory. Sampling will be conducted every 20,000 tons of material produced or twice (6 month intervals) per year. Annual calibration will be required on temperature probes. An annual report submitted to DWM is required as a part of the QA/QC program.

In the event that an additional raw material stream becomes available to be added to the composting operation, the material will be submitted for review and approval by the DWM-Solid Waste Section or to this consultant prior to use as a feedstock. The following procedure will be utilized to submit raw materials for approval to the Solid Waste Section:

1. A sample of the raw material will be taken according to the protocol detailed in Section 5.2 of this manual.
2. The sample will be analyzed for the parameters listed in Table 2, Section 5.3 of this manual.
3. A report of the analysis results and a written request for inclusion of the raw material, including proposed handling instructions for the raw material, will be submitted to the Solid Waste Section.
4. Upon notification of approval of the raw material by the Solid Waste Section, the raw material may be incorporated into the process used for compost production.

Incoming or raw material will be inspected visually to assure unwanted trash is not present, that no material received is prohibited by permit, and that the material received is authorized under the permit.

1.2 Moisture

Appropriate moisture is necessary to compliment the biological processes of the microorganisms responsible for the degradation of organic matter and stabilization of compost. Composting is a naturally occurring aerobic process. Consequently, the moisture content is influenced by the necessity of supplying oxygen and venting off-gasses. As moisture increases, the particles in the compost become more dense and air spaces shrink, limiting the supply of oxygen and the ability to off-gas. If oxygen supply drops to below 8%, the process becomes anaerobic and slows

dramatically. The results are foul odors, and the need to restore the aerobic conditions, which will delay the processing time and reduce production rates.

Experience has shown that oxygen consumption in compost operations increase at moisture levels above 40% and reaches a maximum at 60%. Based on the proposed ratio of materials, the initial moisture content will be reduced from approximately 70% to the optimum initial moisture level of 60 % by mixing the wetter feedstocks with dry materials such as wood-chip, poultry litter, sawdust shavings or gin trash, and cotton waste. The initial moisture levels encountered of near 70% will possibly slow the degradation process of the compost materials until moisture reduces to approximately 60%. As a consequence, the wetter feedstocks will be mixed with dry materials on a 50/50 volume ratio to increase solids levels and reduce moisture levels to a more optimum level prior to feeding the materials into the bin. The optimum moisture content for compost materials transported to the windrow is 60% to 65%. This is the target for this operation and it will be met by the 50/50 mix (by volume) using the front-end-loader to lift and drop, mix and blend feedstocks. All mixing and blending of feedstocks will occur on the compacted pad located at the end of the initial receiving bay.

The composting process may also be inhibited when moisture levels fall below 40%. Moisture levels will be maintained such that compost materials are thoroughly wetted without being waterlogged or dripping excess water. As a rule of thumb, the compost materials are too wet if water can be squeezed out of a handful and too dry if the handful does not feel moist to the touch or if firm squeezing does not result in a film of water on the hand or gloved hand. A moisture meter, similar to that described in the Equipment Specifications (Appendix 2), would provide a more accurate determination of the initial moisture content of the compost material, but is not considered necessary for operation of the facility.

If the compost needs additional moisture, local water sources that are not contaminated will be used to add moisture during the composting process. The basic compost materials, with the exception of the sawdust, litter, cotton wastes or gin trash and corncobs, are wet and therefore it is unlikely that very much additional moisture will be needed. In all likelihood, the material will normally compost "as-is" or may require moisture removal as achieved through blending with dry feedstock materials.

Given that multiple windrows are presently used, excess moisture can be managed by simply allowing the initial heating cycle to rise, or by turning the windrows frequently to drive water vapor off by venting excess moisture to the atmosphere. The higher the heat generated in the process will also have the additional beneficial effect of killing off potentially pathogenic organisms such as coliform or salmonella, helminthes eggs or cysts, or inactivating viruses and other organisms regulated in waste treatment processes.

Particle size and structure are also important when determining the optimum moisture content. Generally, the smaller the particles the more available the surface area for microorganism habitat and the greater the microbial activity. This is only the case if sufficient oxygen is available. Insufficient oxygen presents the same problem described earlier with too much moisture. A combination of excessive moisture and small particles is doubly detrimental. A typical target for particles 15 mm (1/2 inch) in diameter or larger is to keep the compost mixture content at 55-

65% moisture. If the particles are 5-15 mm (less than ½ inch), a 45-55% moisture content is recommended. If particles are too small and/or wet, bulking materials such as sawdust, ground corn stover or ground wall-board can be added. This is also subject to variation depending on the specific materials available for the compost

1.3 Temperature

Temperature should be monitored closely at 20%, 40%, 60% and 80% of windrow length in all active windrows and recorded daily. Metabolic or biological activity increases with increasing temperature. The optimum temperature range for composting is between 130° F (54.4° C) and 160° F (71.1° C) once the process has begun. As stated in the North Carolina Solid Waste Compost Rules section .1406, the facility shall maintain the compost process at a temperature above 131° F (55° C) for 15 consecutive days or longer, with 5 turnings, and the average temperature during that time shall be higher than 131° F (55° C) to ensure the highest level of pathogen reduction. If pile temperature falls significantly during the composting period, odors may develop. If the pile material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing. Compost managed at the required temperatures will favor destruction of pathogens.

Monitor temperature of the compost windrows **daily – except Sunday.** Appendix 1 provides a Temperature Record form. The system operator should monitor temperatures at specified monitoring locations along the windrow. Temperature monitoring locations are 20%, 40%, 60% and 80% of the total length of the windrow. The temperature monitoring probes consist of 36 inch to 48 inch long dial stem thermometers. Temperature monitoring shall be accomplished at the 24 to 30 inch depth at each monitoring location. At least annually, the temperature probes must be calibrated to assure they are reading temperatures accurately.

1.4 Mixing and Process Time

Mixing the compost with the loader bucket turner is necessary to ensure that all particles are exposed to the high temperatures required to inactive potentially pathogenic microorganisms. The mixing redistributes air pockets to insure proper oxygen levels for the composting process. The mixing is accomplished by the rotation of the composting mass. Mixing in the windrow with the turner assures that all particles in the compost mass are exposed to the required temperatures for the required time. Pathogen reduction (PFRP) is achieved in the active compost windrow.

Mixing of raw materials with the loader should be done to evenly distribute additives and bulk materials throughout the composting material. Feedstock mixing and blending shall be done on the concrete pad. Feedstock mixing and blending prior to composting shall be done by mixing approximately 50% active materials such as the dewatered septage and grease trap wastes with approximately 50% wood chip/sawdust, 50% yard and leaf waste, etc. The pre-compost mixing shall be accomplished by successive scooping, lifting and falling of materials with a 3 cubic yard front-end-loader bucket. At least three scoop/lift/fall cycles will be required to mix materials adequately. Liquids will be placed in the mass of material by creating a "v" shaped trough in the dry materials prior to adding the liquid materials.

The PFRP compliance temperature is achieved in Site 2, and a curing stage follows the active compost phase. The curing phase may require as much as 30 days of storage in Site 3. Materials may be bagged or moved to bulk outside storage at off-site locations following finishing in Site 3. Disposition of compost following compliance depends on market outlets. The finished product is normally dark brown to black in color with a 60%-65% solids composition based on analysis. The odor is slightly earthy or musty and texture is loose. The volume is roughly half of the original volume.

Composting time required is primarily a function of the amount of air supplied. The efficiency can be increased and composting time decreased with added aeration by forced air or increasing turning cycles. This also produces a cooling effect which must be monitored. Once the composting process is complete (as measured by PFRP Compliance), the compost can be stockpiled without further temperature monitoring until used.

1.5 Carbon : Nitrogen Ratio (C:N)

The carbon to nitrogen ratio is the most important chemical consideration in compost. The C:N ration desired is between 25:1 and 40:1. Other nutrients are generally contained in sufficient ratios for composting in most organic wastes. Carbon and nitrogen are consumed in the decomposition process at a rate which is proportional to one another.

The main goal is to produce a compost which will not deprive soil of its natural nitrogen due to a nitrogen deficiency in the compost. A low carbon to nitrogen ratio during decomposition will result in ammonia volatilization. A high carbon to nitrogen ratio reduces the efficiency of the process, because more microbial activity is required to reduce the C:N ratio. The optimum C:N ratio for finished compost is between 25:1 and 40:1 (carbon to nitrogen).

1.6 Compost Recipes

Ongoing analysis has produced several compost recipes with potential for use at the composting facility. These recipes assume a "Plug Flow" batch of compost. The process time for the compost batch is normally 45 – 60 days in the Windrow and another 90 days in the Curing Pile prior to being screened and ready for market. Once cured, the process can be considered a finish product and is suitable for distribution and beneficial use. The finish product may be moved off site and stocked for ultimate use.

Typical chemical and moisture characteristics of common raw materials used in composting operations are shown in the following table.

Table 1. Raw Material Characteristics

Raw Material[1]	% N	C:N Ratio	% Moisture Content
Vegetable Waste	4.2	10:1	82
Dewatered Septage	3	25:1	70
Dewatered FOG	1.5	50-60:1	70
Hardwood Sawdust	0.09	560:1	25
Sawdust Bedding	0.24	442:1	40
Ground Corn Cobs	.6	98:1	15
Ash	<0.5	400:1	5
Gin trash/cotton waste	.5	120:1	10
Tobacco Dust	0.75 to 1.5	40:1	15
Ground Yard Waste	.9	80:1	40
Land Clearing Debris	.09	560:1	--

[1]Nitrogen and Carbon Information based on data from "On-Farm Composting Handbook" or testing on-site materials

2.0 Operations

The Craven Ag Service Compost Facility will be operated daily, from 7:00 am until 7:00 pm Monday through Saturday. Additional hours of operation may occur during periods of high demand for the finished compost material; however, no Sunday operations are planned. Operations will proceed according to the requirements and procedures detailed in this operations manual.

2.1 Personnel Duties and Requirements

1. Compost Facility Operator - This individual is responsible for overall operation of the Compost facility. He is responsible for loading the proper amount of the selected raw material into the mixer to insure a good quality finished compost. In addition, the facility operator is responsible for maintaining all the temperature monitoring logs and collecting samples of the finished compost for analysis.

2. Assistant Facility Operator(s) - This individual will assist the facility operator, as necessary, and additionally will be responsible for upkeep and clean up around the compost facility. This individual will perform routine preventative maintenance on the composting equipment. This position will be filled as required, and may require more than one person.

3. Maintenance crew - These personnel will be provided from the on-site pre-treatment plant or staff available to Craven Ag Environmental from other operations as maintenance staff required to perform major maintenance or repairs on the composting equipment.

4. Equipment crew - These personnel will be responsible for screening and custom blending the finished compost material, and for loading trucks for delivery.

5. Transport - These personnel will operate over-the-road transfer trucks. The compost will either be trucked to the final destination by over-the-road trucks, or may be removed by vendor trucks as well, depending on size of the order. It is anticipated that direct sale of bulk material to local contractors would be accommodated by direct loading of the buyer vehicles (private trucks or trailers).

2.2 Compost Testing Needs

In addition to the routine testing of the compost material every 20,000 tons or every 3 months for the parameters specified in Section 5 of this manual, and the 6 day/wk monitoring of the composting process for temperature, it may be advantageous to test compost material for carbon, nitrogen, moisture, and pH should compost fail to reach desired temperature or if odor problems develop. The finished compost material will be monitored every 6 months or 20,000 tons of compost processed (the smaller of the two) for nutrients and regulated metals tested by the North Carolina Department of Agriculture. More frequent testing will be accomplished as additional feedstock is added or as process optimization begins, to ensure that the composting process has been successful and that the NC Solid Waste Section annual reporting requirements have been met. Testing may be accomplished on a more frequent basis than required by rule as varying feedstocks are added to the compost and as end users require test product quality information.

2.3 Storage

Storage of finished compost should be limited to 4 months after completion of the process. Compost should be utilized within this time period if at all possible. Storage will be provided in either open areas of Bay 4, or open exterior storage in the area designated, immediately south of the processing area, on land out of the flood-plain or at off site locations awaiting disposition and use.

2.4 Maintenance Practices and Cleanliness

In order to optimize the composting process, proper maintenance of the facility and equipment is recommended. Listed below are some maintenance practices that can be implemented to ensure the productivity of the facility.

1. Do not allow any equipment that exceeds design load limits on or within twenty feet of the concrete pad.

2. Maintain all electrical and mechanical equipment in good operating condition by following electrical codes and manufacturers' recommendations. Inspect and repair grounding rods, switches, wiring, and all vehicles and equipment involved in the process.

3. Fences, railing, roofing, and/or warning signs must be maintained to provide warning and prevent unauthorized entry.

4. Repair any vehicular, vandalism or animal damage. Inspect and maintain runoff control structures.

5. Keep the area around the composting facility mowed and free of tall weeds and brush.

6. Clean, shovel, or dry sweep compost production and bagging areas as required to maintain pleasant work environment. Clean and dry any oil spills, wet material spills immediately to sustain reasonably safe work environment.

7. All buffer zones will be well maintained with vegetative growth to control any leachate run off. Buffer zones will be a combination of grasses, trees, and shrubs.

The following is a list of practices that will reduce the potential of odors being emitted from the Compost Site. Where practical, some or all of these practices may be utilized. The odor management practices include:

1. Avoid overly wet feedstocks and compost. The use of relatively coarse co-composting materials that allow oxygen diffusion into the pile can help avoid odor problems.

2. Activities such as mixing and movement of odorous raw materials should be scheduled to minimize the impact of odors. Accomplish these activities only early in the work day to take advantage of rising air currents. Avoid doing these activities on hot, still days or holidays and weekends. Windy conditions or early morning hours are better times to conduct such activities. Monitor the wind direction and postpone activities that may release significant odors when the wind is blowing toward the most sensitive neighbors.

3. Prevent puddles and standing water on the compost pad.

4. Minimize dust, which can transport odor.

5. Ensure that proper aeration, pH, and temperature control is maintained during the composting process.

6. Covering the upper third of the windrow with either 3 to 6 inches of finished compost, 3 to 6 inches of a stable, carbon rich material such as wood chip, or covering the area with a heavy (20 ml) plastic sheet or tarp.

2.5 Seasonal and Weather Management

Composting can continue year round, even during cold weather. Seasonal and weather variations may require operational adjustments that compensate for the change in weather conditions. The insulation layer covering the windrows should sufficiently buffer the mass of materials in the windrow against temperature variation, and changes in the operation should not be required.

Cold weather can slow the composting process by increasing the heat transfer rate from the composting operation into the atmosphere, but the insulation layer should mitigate this transfer. The lower air temperatures reduce the microbial activity, especially near the surface. This, in turn, decreases the amount of heat generated.

Warm weather enhances water loss due to evaporation from the windrows. Water should be added if materials become too dry (moisture content drops below 40%). Again, the loss should not be excessive from the windrow, and controls can be implemented by scheduling turning operations or adding moisture as required.

In event excess liquid accumulates on the site because of wet weather or other adverse condition. That excess liquid will be collected in a tank truck and transported to an approved liquid handling facility such as City of Kinston POTW or CRSWMA.

2.6 Contingency Plans

1. Equipment Breakdown

In the event of a breakdown of the compost equipment (mixer, loader, screens, etc.), delivery of raw materials from the on-site treatment facilities should be suspended until the equipment is repaired or replaced and material passes all VAR and PFRP requirements.

2. Fire

In the case of a fire, immediately notify the local fire department. If employee safety is not compromised, the company pump truck may be utilized to extinguish the fire.

3. Freezing Conditions

Operation in freezing conditions requires more frequent inspection of the leachate collection system to insure the drains do not freeze and allow leachate liquid to pool on the pads or windrow areas. Additional caution in operation of the loader is necessary during conditions where ice may have formed on the site. Frozen raw materials should not be added to the bulk mixer (Knight) due to the possibility of damaging the mixer blades and auger.

4. Extended Power Failure

Operations during an extended power failure may be accomplished by the use of a portable generator. Temperature monitoring of the composting windrows during a power failure must be continued, and any compost which does not meet the temperature criteria must be re-processed.

5. Windy Conditions

Windy conditions should have little effect on the composting operation since windrows are in open areas. However, during windy conditions, special attention must be given to the temperature of the windrows, and care must be taken during the loading of raw materials (especially light materials such as sawdust) which could tend to "blow off" the composting area. It is anticipated that the local vegetation (tree line) will tend to block a great deal of the wind from the facility. However, if windy conditions are demonstrated to have a detrimental effect on the continued processing of the compost, consideration will be given to planting additional windbreaks.

6. Disposal or Re-Processing of Poor Quality Products

It is anticipated that the compost produced at this facility will easily meet the standards for Class A compost. In the event that a batch of compost does not meet the requirements for Class A compost, several options exist. An initial option would be to re-process the batch in an attempt to meet the Class A compost requirements. This option would be selected if the controlling factor indicating poor quality was pathogen reduction.

Compost materials which do not meet Class A compost requirements but meet the Class B compost may be land applied under specific circumstances in accordance with a separate permit. Specifically, these materials could be applied to agricultural land, provided the land is used for silvicultural or non-food chain related production, or the material could be used for land reclamation projects. Compost which does not meet either Class A or Class B criteria, and is deemed undesirable for any attempt at re-processing, will be disposed of in an appropriate approved, sub-part D landfill site such as CRSWMA.

3.0 Equipment Specifications

The equipment required to operate the Craven Ag Service Composting Site can be characterized as either processing or monitoring equipment.

3.1 Processing Equipment

The primary processing equipment currently utilized at the site for composting is a Loader to serve as a Compost Windrow Turner, a mixer to assure feedstocks are properly mixed prior to placement in the windrow and a screen to assure high quality end product is generated. The windrow turning is achieved by lifting and cascading compost to allow reaeration. Equipment

may change with time, but basic functions associated with each will remain as critical to the process. Equipment may be replaced with like equipment and new equipment will be reported to NCDWM as it is obtained.

Two rubber tired loaders and a dump truck will be used to transport the raw compost mix to the windrows. Finished compost shall be transported by loader or dump truck to the curing area and ultimately to the finish product storage area and segregated into batches in the storage area. Final screening will be accomplished as material is transported off site or as finished/cured material is placed into storage.

3.2 Monitoring Equipment

A probe-type dial stem thermometer (as manufactured by REOTEMP) with a 36" stainless steel stem will be needed to monitor the temperature of the compost in the finishing piles in Site 2 & 3. The thermometer should have a temperature range of 0-200 degrees Fahrenheit.

An additional, optional device that can prove very useful in the production of compost is a moisture meter. This device is more accurate than the "hand squeeze" method of moisture determination. REOTEMP Instrument Corporation has developed a moisture meter which determines moisture levels via a sensor that measures electrical conductivity of the raw materials. The device is available in lengths of 36", 48", and 60".

Equipment specifications for the equipment discussed above can be found in Appendix 2.

4.0 Nutrient Management Plan

The majority of the compost produced by the Composting Facility will ideally be sold as a soil amendment. Additional or excess compost will be sold in bulk to local greenhouses and landscape contractors for use as a soil amendment or to the NCDOT for use in highway landscape projects.

In the event of a long term market decline, it may be desirable to land apply some compost off-site. In this case, the material must be a Class A product, or an approval from the NCDWM must be obtained. Land application to agricultural cropland may be used as long as appropriate records are maintained. Compost application rates will vary depending on the agronomic needs of the crop and whether the compost is being used as a primary nutrient source. If the finished compost is used as a primary nutrient source, it should be spread following agronomic practices used for spreading manure. However, compost is generally spread onto land at a thickness of 0.5 to 1 inch. If it is applied at a rate greater than this, it becomes too difficult to incorporate into the soil. Conventional manure spreaders are ideal for handling and spreading compost.

5.0 Compost Record Keeping, Analysis and Reporting Requirements

The compost produced at the Craven Ag Service Compost Facility will be routinely analyzed to insure quality control is maintained. Analysis shall be conducted by the North Carolina Department of Agriculture (NCDA), Soil Test Laboratory on Blue Ridge Road in Raleigh, or by

a certified analytical laboratory (A and L, Prism Laboratories, Southern Testing, etc.). The compost will be monitored for temperature daily to insure vector and pathogen reduction compliance (see record keeping forms in Appendix 1). An annual report will be submitted to the NC Solid Waste Section by August 1st of each year, in compliance with NCAC 13B Section .1408 (c).

5.1 Daily Record Keeping

The compost facility will maintain daily (except Sunday) temperature, compost processing length and daily volume of compost processed records for the composting operation. In addition, the volumes of the various feedstocks will be recorded to ascertain the optimum mix and blend ratios for the continued operation at this facility.

5.2 Routine Compost Sampling Procedure

The compost must be sampled once per every 20,000 tons of compost produced or every six (6) months, whichever comes first. The samples will be obtained in a sterile manner according to the following procedure. The sample will be obtained from the finished compost piles, immediately prior to the screening and bagging equipment. The sample will consist of a multiple position composite grab sample. A minimum of 5 discrete locations within the finished compost pile in Site 3, after the screening process but before bagging and bulk loading. Processing of the pile, will be sampled as a composite sample. These sample locations should be taken from within the finished pile, and should represent a "cross section" of the pile, not just the "surface". The sampling will be conducted wearing latex or nitrile gloves, and the composite samples should be well mixed to insure a representative sample is tested. Samples should be immediately refrigerated or placed in sealed containers in a cooler for transport to the laboratory. Collected composite samples should be placed in sterile bags provided by the laboratory if pathogen samples are to be run on the material. Samples should be delivered to the laboratory within 24 hours if pathogen testing is to be performed. It is essential to coordinate with the laboratory ahead of sampling to insure that the proper "hold times" for the various parameters to be tested are not exceeded. It may be desirable to run intermediate nutrient and heavy metal content samples at a more frequent interval than the once every 20,000 tons as specified by regulation.

5.3 Routine Compost Analysis

The analysis must include the parameters listed in Table 2 with measurements less than the regulatory limits based on dry weight (mg/kg) or percentage. Testing shall be conducted by private certified laboratories for regulated metals and bacteria. NCDA testing is adequate for nutrients, and foreign matter can be tested by trained personnel.

Foreign matter testing will be determined as follows. The compost material will be dried (EPA Method 160.3), weighed and passed through a one quarter inch (1/4") screen. All materials remaining on the screen will be visually inspected and all foreign material (glass, plastic, metal, etc.) will be removed and weighed. The weight of the removed foreign material, divided by the weight of the total dried sample, multiplied by 100% will be recorded and reported as the percentage foreign material observed in the sample.

Table 2. Routine Compost Analysis Requirements

Parameter	Reporting Unit	Test Method
Foreign Matter	%	As described in Subparagraph (2)(5) of 13B Section .1408
Cadmium	mg/kg dry weight basis	EPA Standard Methods 3050/3051
Copper	mg/kg dry weight basis	"
Lead	mg/kg dry weight basis	"
Nickel	mg/kg dry weight basis	"
Zinc	mg/kg dry weight basis	"
Pathogens (Fecal Coliform)	MPN/1000 grams of Sample	Standard Methods for the Examination of Water and Wastewater, Part 9221 E or Part 9222 D
Total Kjeldahl Nitrogen*	%	"
Phosphorus*	%	"
Potassium*	%	"
Salts*		NCDA Standard Analysis

* Not required by statute, but these analyses provide useful information on product quality

5.4 Annual Report

Craven Ag Service will submit an annual report to the NC Solid Waste Section by August 1st of each year, in compliance with NCAC 13B Section .1408 (c). The annual report will contain the facility name, address, permit number, a summary of the total quantities of raw material received at the facility, the total quantity of compost produced by the facility, and the total quantity of compost removed from the facility (marketed or disposed of off-site). The annual report will also include temperature monitoring records and the results of the required analysis for metals, pathogen reduction analysis (fecal coliform), and for the percentage of foreign matter in the finished compost.

6.0 Safety & Health

Proper attention to health and safety at composting facilities can prevent most occupational risks. The safety concerns in composting relate primarily to the use of equipment. If front-end loaders or other standard farm equipment is used, eye and ear protection should be used. Normal safety precautions, such as those provided with the equipment, should be followed. The Farm Safety

Association has developed a fact sheet (No. F-017 - Agricultural Machinery Hazards - See Appendix 3) which should be reviewed by all personnel operating or working near machinery.

Fires are rarely a problem in outdoor composting, as properly moist composting material does not readily burn. However, if material does dry out and if storage piles are too large, spontaneous combustion becomes a possibility. This phenomenon occurs at moisture contents approximately between 25% and 45%. In piles over 12 feet high, it is possible for the internal heat of the compost to initiate chemical reactions, which then lead to spontaneous combustion. Proper attention to moisture, temperature, and pile size is the best protection against this problem. An accessible water supply is a valuable safety precaution.

Human health concerns relating to compost depend both on the individual and on the material being composted. While few pathogenic organisms found in farm animal manures or vegetative wastes affect humans, normal sanitary measures are important (such as washing hands before touching food, eyes, etc.). Some individuals may be hyper-sensitive to some of the organisms in compost. The high population of many of the species of mold and fungi in an active compost process can cause allergic reactions in sensitive individuals. Simple precautions, such as wearing dust masks or even half-mask respirators with disposable cartridges, can help limit human exposure to organisms that may cause allergic reactions. Conditions which may predispose individuals to an infection or allergic response include allergies, asthma, such medication conditions such as antibiotics, punctured eardrum, weakened immune system, adrenal cortical hormones, etc. Workers with any of these conditions should not be assigned to a composting operation. If a worker does develop an allergic reaction to compost, it is important to recognize the problem promptly so that it does not develop into a chronic condition. To prevent health concerns during particularly dry and dusty conditions, a dust mask or half mask respirators should be worn.

Blood borne pathogen testing should be accomplished on employees of the compost operation as a part of the annual physical.

With proper knowledge, equipment, caution, and precautions, these sources of harm can be removed or limited, and injuries, illnesses, and deaths can be prevented.

List of Appendices

Appendix 1. Record Keeping Forms

Appendix 2. Equipment Specifications

Appendix 3. Safety Information

OFF-SITE COMPOST REMOVAL RECORD

Recipient's Name & Address	Date	Quantity Received	Signature

Craven Ag Service - Composting Site

Composting Activity Record

Batch Number	Date	Temperature Recorded (Yes/No)	Samples Taken and Submitted?	Moisture Added (gal)	Mixture Used - Volume of Feedstock, Sawdust, Manure and Bulking Material Used

Craven Ag Service - Composting Facility
Temperature Monitoring Record

Batch Identification Number: _____

Date Batch Started: _____

Data Collected By: _____

Sample Location Windrow	**Month/Year**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Sample Location (Drum or Windrow)	Month/Year	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31