OPERATIONS AND MAINTENANCE MANUAL FOR COMPOSTING

Novozymes North America, Inc.

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1. DESCRIPTION of FACILITIES -

A. LAND USE –

The Novozymes-Nature's GREEN-RELEAF composting operation is located at 445 Old Smith Farm Road, on 35 acres off of State Highway 56 in Franklinton, North Carolina. Approximately 2 acres are used as roads and staging facilities. Berms, buffer zones, drainage ditches, and retention ponds take up an additional 3 acres. This leaves the remaining 30 acres for composting operations. The mixing area will utilize approximately 1/2 acre of space. The compost pad area is made up of 3.0 acres. Feedstock storage is estimated to utilized 1.6 acres. An additional 2.0 acres is available for curing, screening, and storage of product inventory. There is an additional 4 acres in the back 30 acres of this parcel designated as an Emergency Storm Debris site.

B. DESIGN CAPACITY -

The site is designed to handle 100,000 cubic yards/yr (50,000 tons/yr) with future expansion to 150,000 cubic yards/yr (75,000 tons/yr) of feedstock materials. The approximate starting volume in production windrows is 15,000 cubic yards (7,000 tons) this could expand to 22,500 cubic yards (11,250 tons) of material. There are 16,000 cubic yards (8,000 tons) of compost product storage as curing or finished product.

Novozymes Composting Facility Design Capacity	
EQUIPMENT	
(2) CAT 924G Front-end Loader	3.25-6.0 cubic yard bucket
(1) CAT 964 Front-end Loader	4.5-9.5 cubic yard bucket
Rotochopper MC-266 Grinder	100 -150 cubic yards/hour
Water Tank Trailer	6000 gallon tank
Knight Reel Augie 3095 Electric Mixer	35 cubic yards
Backhus 16.43 Windrow Turner with Conveyors	3,000 cubic yards/hour
(2) Hoist Lift Trucks	20-40 cubic yard roll offs (13 tons)
Roll-off Containers	20 - 40 cubic yards
McCloskey 561R Trommel Screen	80 -125 cubic yards/hour
GMT Compost Manager Monitoring Program	N/A
SITE CAPACITIES	
Compost Aeration Capacity	5 -15% oxygen/windrow
Active Composting Period	60 days
Curing Composting Period	30 days minimum
Current Annual Volume	100,000 cubic yards (50,000 tons)
Future Annual Volume	150,000 cubic yards (75,000 tons)
Current Storage Capacity Active Windrows	15,000 cubic yards (7,500 tons)
Future Storage Capacity Active Windrows	22,500 cubic yards (11,250 tons)
Storage Capacity for Curing & Finished Compost	16,000 cubic yards (8,000 tons)
Overflow Finished Product Storage Capacity	8,000 cubic yards (4,000 tons)

C. STORMWATER & LEACHATE MANAGEMENT SYSTEMS-

STORMWATER MANAGEMENT SYSTEM

The production and storage areas are graded to maintain surface water drainage toward the surface drains that lead to the retention ponds. A 12 inch diameter Compost sock has been installed along the lower perimeter of the site to filter out fine particles and silts from entering drainage ditches. Rock check dams and compost inlet socks are installed and maintained within key points of the stormwater drainage ditches on the site to minimize the flow of silts into the stormwater retention pond. These structures are the first stages of treatment in the stormwater management system and are checked after each rain event to observe effectiveness of sediment removal. These structures are periodically cleaned out to maintain a positive flow of surface drainage to the stormwater retention pond. Sediment materials collected is incorporated into new windrows. As a Best Management Practice (BMP) windrows are oriented to minimize surface erosion and to avoid water collecting between rows.

The second stage of treatment consists of a dry retention pond whose primary purpose is to restrict the peak discharge of the 1-yr 24 hr storm to levels predicted for pre-development conditions. In addition the retention system removes TSS loading and nitrogen loading from the stormwater as well as providing a system to remove any floating material from the compost which might find its way into the stormwater system. The retention pond satisfies the requirements of State Stormwater regulations for water supply water sheds, peak discharge from 1 year – 24 hour from pre-development to post construction. The stormwater retention pond

is checked daily to maintain safe levels of operation. This pond is periodically dredged to remove sediment and to maintain capacity. The third stage of treatment within the system is a Level Spreader designed to provide diffuse flow of all storms up to and including the 10yr-24-hr storm. The conveyance channel on the upstream side of the level spreader provides for a portion of the peak discharge reduction. The level Spreader is made of concrete and is 300 feet in length and discharges into a 50' wide grassed buffer with a maximum slope of 8%, then into a forested area and finally into an existing ephemeral stream. The level spreader system satisfies the requirements of diffuse flow of Stormwater through buffers. Stormwater BMP's reduce TSS load by 85%, peak discharge from 1 year – 24 hour storm events, and net export of Nitrogen is limited to 10 lbs/acre/year with a buy-down of an additional 4 lbs/acre/year.

The level spreader is inspected after each rain event to assure that it is working properly. The structure and its components are inspected monthly for maintenance. The riparian buffer strip is mowed to maintain a stable vegetative stand of grass. Weep holes in the structure are cleaned out to maintain seepage to the stone apron. Weed control is applied to the stone apron of the level spreader to maintain sheet flow to the riparian buffer.

Specifics of stormwater management and drainage collection and storage systems:

Stormwater Retention Pond:

Retention Pond Volume	9,537 Cu ft
Total Volume of Retention components (Retention pond and conveyances)	12,087 Cu ft
Max outflow to Level Spreader	19.9 cfs
Bottom Elevation	298 ft
Liner	none

Level Spreader:

Storage Volume of Conveyance system	2550 Cu ft
Length	300 ft
Material	Concrete
Elevation	297
Down-slope cover	Grass
Discharge slope	8% (max)

LEACHATE MANAGEMENT SYSTEM

Due to concerns over long term effects of infiltration of leachate water into groundwater a liner system is installed designed to intercept any rainfall infiltrating the surface layer. The leachate ponds are specially built ponds designed to hold and reuse water that leaches through the compost pad area of the compost site. They are lined with 60 mil HDPE liner and are located in the southeast corner of the Compost Facility surrounded by chain linked fence. A water reuse tank is located next to the ponds. The main purpose of this tank is to pump the reuse water back into the Compost Facility for operational use and moisture addition. This tank is also fitted to receive fresh spring water.

The leachate ponds have a limited amount of storage and thus have to be monitored and operated in a way to ensure safety of the pond walls as well as the local environment outside of the Compost Facility. Since the ponds do have a limited amount of storage they need to be check frequently for depth levels. This process is done by visual inspection of the depth chain which is located in the first pond. The visual inspection is taken in the morning and the afternoon. The depth chain is measured in feet and inches. Below one foot is considered empty. Seven feet is where the ponds are consider full and run the risk of breaching the pond walls. At the 5 foot level on the depth chain action needs to

be taken in order to bring the ponds' levels back down to a safe zone of operation which is at or below four feet.

A valve is located between the two ponds to help control individual levels of the ponds. The levels of the ponds rise and fall due to reuse of the water back into the Compost Facility and by rain fall onto the Compost Facility.

Novozymes stores all leachate water and monitors it for excessive nutrients. In the event that water quality analysis indicates that the water quality is insufficient for reuse as moisture addition, the volume of water in the retention pond is then pumped or hauled to Novozymes existing wastewater treatment system or to a Municipal Waste Water Treatment Plant.

Specifics of leachate management and drainage collection and storage systems:

Leachate Retention Ponds:

Volume of Retention Pond #1	15,664 Cu ft
Volume of Retention Pond #2	46,992 Cu ft
Liner	60 mil HDPE

Detailed information regarding the composting pad and liner system was submitted with the permit to construct application. Some of this information is provided in the appendices.

D. SIGNS for INSTRUCTION -

Signs are posted to show traffic flow and hours of operation. Included on the main sign is our permit number and non-acceptance of the following wastes:

1. Hazardous wastes.
2. Asbestos containing wastes.
3. Medical wastes.
4. Painted or treated wood wastes.

E. WASTE COMPOSTED -

Composting is limited to the following waste by-products:

1. Wood waste.
2. Agricultural plant waste.
3. Pre and post consumer food waste.
4. Sludge from industrial enzyme production.
5. Residuals from drinking water treatment.
6. New gypsum dry wall scrap wastes (ground on site).
7. Source separated specialty wastes as approved by NCDENR Waste Management Division.

2. DESCRIPTION of PRODUCTION –

A. EQUIPMENT and PERSONNEL -

1. Equipment – The following equipment is stored and maintained on site.

a. Fixed Capital Equipment

(1) - Mixing Area - 4,200 square foot area for SBM and mixing other organic feedstock.

(1) – 35 cubic yard Electric Mixer

b. Mobile Equipment

(3) Rubber tire loaders

(3-6) 30 & 40 cubic yard roll-off containers

(2) Hoist Lift truck for roll-off containers

(1) Screening plant

(1) Compost turner & hose reel

(1) Grinder

c. Monitoring Equipment

Analog Temperature probes

Digital Temperature/Oxygen probe

PC and Compost Manager Software

Oven

Scales

pH meter

Weather station

All equipment is maintained by Novozymes or contract vendors. Preventive maintenance schedule have been developed to track all work performed on each piece of equipment as recommended by the manufacture. Additional equipment may be added as volumes and efficiency dictates the need. Some of the equipment listed above may

become obsolete or outdated over time and they will then be replaced with suitable alternatives. Laboratory equipment such as scales, pH meter, oven and probes are calibrated annually by Novozymes personnel or sent off to the equipment manufacturer for calibration.

2. Personnel - We have a minimum of three full time trained employees on site during hours of operation. These three employees are capable to run this operation at all times. In the event that all employees leave the site during normal operating hours, the site will be then be closed by securing and locking the entrance gate.

(1) Manager

(3) Equipment Operators

(1) Staff Assistant

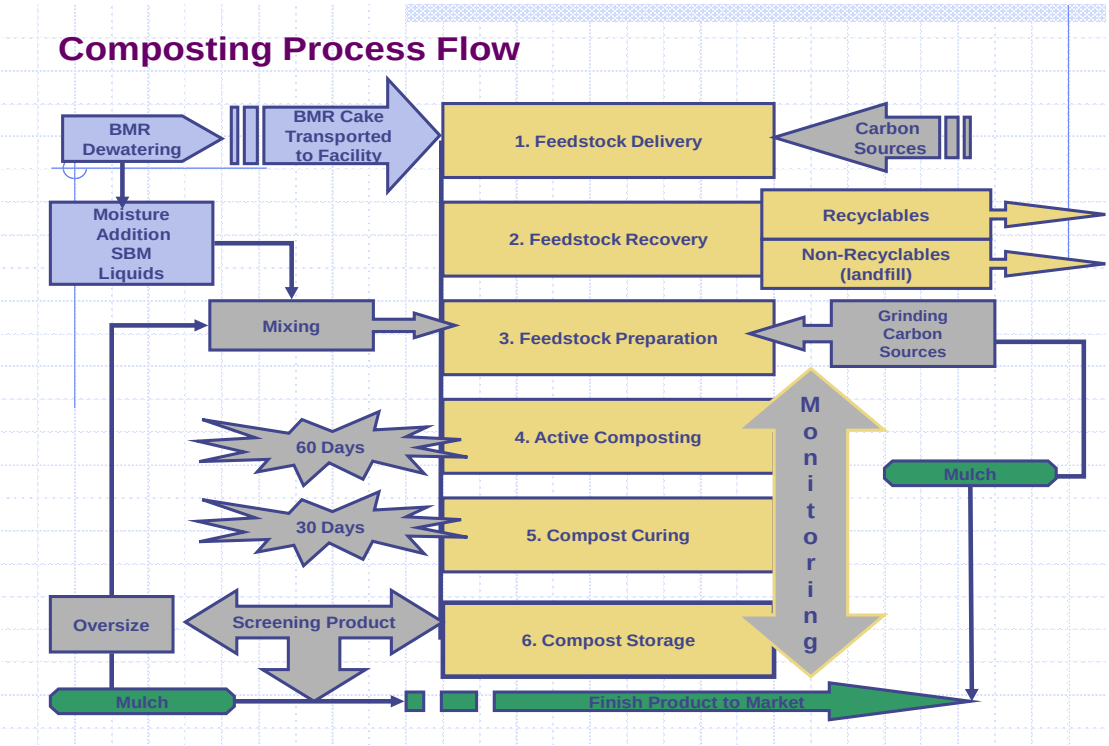
Additional personnel may be added as volume dictates the need.

3. Training of Personnel – The Compost Department Manager has been formally trained at Composting Schools conducted by the University of Maryland (1994) and The University of Georgia (1996). All equipment operators are trained by the Compost Department Manager. They may also attend “operator training” courses as they become available from the North Carolina Composting Council or the US Composting Council. We currently have 4 operators trained from the NC Composting Council’s Yard Waste Training Program.

B. METHOD USED -

We use the “Turned Windrow Composting Method” to compost the waste materials identified in section one. Windrows are constructed at approximately 6 feet in height and 12 feet in width. The length of windrows may vary based on the location within the compost pad area. The average length of a windrow is 500 feet. Windrow height will shrink to 4 feet during the active composting period. At this time windrows may be combined to utilize compost pad space in the most efficient manner.

C. PROCESS FLOW of COMPOSTED MATERIALS



PROCESS FLOW

The following is a Process Flow description of the six steps of compost production:

1. Feedstock Delivery - Feedstocks enter off of highway 56 and turn down Old Smith Farm Road. Signs direct traffic flow to the office and truck scale. All incoming feedstocks are inspected and weighed prior to unloading. Feedstock materials are then placed at the Feedstock Storage Area for temporary storage. These are stored in bins by feedstock type. Carbon based materials are stored outdoors and separated by type. Certain large wood waste materials are ground to size for mulch or is used as a bulking agent in the composting process. Oversized wood waste feedstocks are unloaded at the *Grinding Area*. All trucks are operated by onsite personnel or unloaded under the direct supervision of site personnel. This assures the homogeneity of materials being delivered. Nitrogen based feedstocks are mixed with carbon based feedstocks and then incorporated into windrows by the end of the workday or are stored under cover. Precautions are taken to minimize problems with runoff, odors and vectors at the *Mixing Area.*

2. Feedstock Recovery - At the *Feedstock Storage Area*, feedstocks that contain non-biodegradable but recoverable materials are sorted and recycled. All non-recoverable materials are collected and disposed in a permitted landfill. All recyclables are stored in small containers and picked up for recycling on an as needed basis. Any known household hazardous wastes are separated out from recyclables and other trash and then are disposed at a NC permitted facility that is approved in receiving household hazardous wastes.

3. Feedstock Preparation - At the *Grinding Area* carbon based feedstocks are reduced to appropriate size for composting. A select amount of the higher-grade wood waste material may be ground and sold as a mulch and or boiler fuel product. All of this activity occurs at and around the *Grinding Area.* The *Mixing Area* provides an all weather surface to mix the various components of the compost recipe. Front-end loaders use a 3.25 or 6 cubic yard bucket volume to mix the feedstock components by batching them into an electric powered mixer. Water or liquid Novozymes BMR may be added at this time to increase moisture content if necessary. The mixer will un-loaded the batch mix via conveyor into a roll-off container for transport to the *Compost Production Pad*. Feedstocks are mixed base on recipe design to maintain the following mix parameters.

- A Carbon to Nitrogen Ratio of 20:1
- A moisture rating at 50 - 65%
- An oxygen rating at 5 - 15%
- A pH rating at 5.5-8.0
- A porosity rating of 1.5 – 2.0

A typical recipe is as follows:

Feedstock Type	Volume (cubic yards) Per mix batch	Weight (lbs.) Per mix batch
Enzyme Residuals	3	6,000
Sawdust	6.0	600
Yard Waste	6.0	3,000
Oversize screenings	6.0	2,000
Totals	22	11,600

During seasonal variations of yard waste feedstock this recipe is adjusted accordingly. The C:N is lower during the spring and summer months and higher during the fall and winter months. The recipe is adjusted by lowering or raising the amount of enzyme residuals (nitrogenous material) in the recipe mix. Changes in the mixing recipe can only be made by the Compost Dept. Manager.

Each feedstock material is tested prior to acceptance in the facility and to determine base levels of the above parameters. Initial testing of feedstocks includes the following:

Parameter (mg/kg/dry wt.)	Code 1
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	36
Zinc	2800

Windrows are constructed at six feet in height and twelve feet in width. Length may vary depending on location within the site. An average length would be approximately 500 feet. Windrows are monitored and tracked by batch number. Newly formed windrows are placed at the far southwest end of the *Compost Production Pad*. Windrows are turned, inverted, mixed and conveyed by using a compost windrow turner with a side conveyor system. The purpose of turning is to homogenize the feedstock mix, provide airspace, hydrate or dehydrate windrows. The side conveyor system is used to index windrows from the starting location to the post process screening and curing areas. This system can pick up one entire windrow in on pass and index one slot over on the *Compost Production Pad*. In the event that the compost windrow turner becomes non-functional, the front-end loader will then be used to turn windrows. A two-foot access row is left between each windrow for track space for the compost windrow turner. The turner maintains a straight line when turning through each windrow. As the turner approaches the end of each windrow it drives off the area that has membrane and under-drain and drives on to a gravel or concrete turning pad to make a 180 degree turn to circle back and turn the next windrow in line. Turning on these surfaces protects the membrane and under-drain from potential damage by the turners tracks. A twenty-five foot access way is maintained surrounding the *Compost Production Pad* for vehicular traffic and fire control.

4. Active Composting - Mixed feedstocks are actively composted using the “Turned Windrow Method of Composting”. Windrows are turned 5 times during the 15-day high temperature period (131°F)

by using the compost turner or front-end loader. This maintains homogeneity and porosity during aerobic decomposition and control any pathogens present in the feedstock materials. Turning frequency thereafter is based on moisture and oxygen levels. The monitoring biological activity is accomplished by tracking both pile temperatures and oxygen levels. Pile temperatures are monitored two times per week, by using a four-foot digital probe thermometer. Temperatures are taken at different points every sixty feet along the windrow by inserting the temperature probe half way up the slope of the windrow, and into the windrow the length of the shaft. All readings are recorded as well as the mean temperature. Readings are recorded to achieve the Process to Further Reduce Pathogens (PFRP) specification of for 131°F over 15-day period with a minimum of 5 turnings. Data is collected on the “Compost Manager” Software program. This program tracks the time and temperature as it relates to meeting the PFRP requirement for windrow composting. The program will highlight in green which windrows have met the 131°F – 15 day requirement. This program also tracks turning frequency, watering amounts and oxygen readings. In the event that this program becomes non-functional hard copy of the data is recorded manually.

Percent oxygen present within a windrow is monitored weekly using a digital oxygen probe to maintain aerobic decomposition of organic matter. If oxygen levels decline, more bulking materials such as wood chips are added to increase the porosity of the pile. This increases the oxygen levels by increasing convection currents of oxygen being pulled into the pile. Increasing the frequency windrow turning also achieves this same result by increasing the porosity of the windrow. Both temperature and oxygen data are recorded by batch number using a computerized “Compost

Manager" software program. In the event that this program becomes non-functional hard copy of the data is recorded manually.

Moisture is checked weekly by grabbing a handful of composting material and balling it up with both hands. If the ball is compacted with no moisture running out, but can be easily broken apart, it will be at approximately 50% moisture. This is verified at the end of each month in the lab by using an oven to determine the dry weight and wet weight of the composting materials. Windrows are watered to maintain the minimum 50% moisture and the maximum of 65%, by using the following method. The irrigation system pumps water through a main PVC line running perpendicular to the windrows. Hydrants come off the mainline. An irrigation reel is attached to the hydrant to access water at one end and the compost turner at the other end. As the turner moves down the windrow it provides moisture addition directly to the compost with minimal run off. The source of water comes from the following source: An onsite spring, leachate retention ponds, stormwater detention pond, or the Novozymes spray irrigation water. Leachate pond water is only used during the first 30 days of active composting or prior to reaching PFRP requirement. Once windrows meet the PFRP requirement only spring water or Novozymes spray irrigation water can be used for moisture addition. These waters do not contain pathogens. By maintaining this practice we minimize the potential of reintroducing pathogens to windrows that have reached PFRP.

The pH of the active compost is tested monthly by NCDA Labs. Sampling will occur every sixty feet along each windrow. We use the US Compost Council Test Methods for Examination of

Compost as our parameters for sampling and preservation. The detail of this program is enclosed in the appendix of this document. This is accomplished by sampling at a depth of four feet. A composite sample is tested using an electronic pH meter. Composting materials are monitored to maintain a pH rating of 5.5-8.0. If levels change beyond this range corrective measures are taken by increasing the amount of acid or alkaline materials.

5. Compost Curing - After a minimum period of 60 days of active composting the compost product is moved off of the *Compost Production Pad* area to the Screening Area. There are two curing piles located near the loading ramp area. Adjacent to the cure piles are finished product piles. Cure piles and finished product piles are rotated to insure that the oldest mature product is sold first. These piles are each sized at 100 feet wide, 75 feet long and 15 feet high. The compost cures in static piles for a minimum of 30 days or until testing indicates a mature product. Normally this is indicated by lower temperatures, a neutral pH of 7.0, and a lowered carbon to nitrogen ratio. The Solvita Maturity Test is used as an indicator to determine final product maturity. This test uses a color key to measure ammonia and carbon dioxide levels in the cured compost. Our standard for product sales is a final Solvita Index of 6–8 for product distribution. A copy of the Solvita test and the sampling protocol is provided in the appendix. The USCC-STA program verifies this quick test by testing both maturity and stability parameters.

6. Compost Storage - The *Compost Storage Area* is maintained as a large static pile of cured, finished, and screened compost. The site has the capacity to maintain a stockpile of 16,000 cubic yards (8,000 tons) for inventory. An overflow storage area is

located behind the loading dock area that can store an additional 8,000 cubic yards (4,000 tons) of compost.

a. *Screening*

Screening of finished product occurs in the *Compost Storage Area.* A front-end loader feeds compost product into a screening machine. The screen separates out large oversized material to meet particle size requirements. Fines are conveyed by a stacker and stockpiled for final curing and sale in the *Compost Storage Area*. Oversize product is stockpiled for re-incorporation into windrows as a bulking agent or sold as a mulch product. The site has an overflow finished product storage area that can be used to store an additional 3,000 cubic yards of finished compost product.

The following products are labeled and stored on site in the *Compost Storage Area*:

1. Medium Compost (finished)
2. Coarse Compost (finished)
3. Fine Compost (finished)
4. Special Blends
5. Amendments

b. *Blending*

Cured and screened finished compost product are mixed by volume, using a front-end loader, with pine bark or other horticultural amendments that do not contain pathogen or heavy metals, such as Sand, Topsoil, Perlite, Perma-till, Rock, and Vermiculite. Once mixed, these products are stored as finished products ready for shipping.

3. QUALITY ASSURANCE PLAN

A. FEEDSTOCKS -

New Incoming feedstock materials are monitored and if needed tested by a North Carolina Certified lab for hazardous waste, pesticides, asbestos, heavy metals and organic matter content. Existing feedstock sources are tested quarterly.

B. DAILY PROCEDURES -

The information below is recorded on a Monitoring Checklist. Data will then be transferred to a database.

1. Date of record and day of the week.
2. Person recording.
3. Tests or activity to be performed
4. Visual check of stormwater and leachate management systems
5. Visual check of evidence of vectors.
6. Odor check
7. Visual check of trash and recycling areas.
8. Inventory Control **-** The amount of both incoming and outgoing materials will be weighed and or measure by volume and tracked by a computerized database scale system.

C. WEEKLY PROCEDURES –

1. Temperatures for PFRP

Temperatures are monitored two times per week with a three-four foot temperature probe. Temperatures are taken every sixty feet along the windrow. All readings are recorded as well as the mean temperature.

2. Oxygen Content

Percent Oxygen present within a windrow is monitored weekly using a digital oxygen probe to maintain levels at or above the aerobic range. All readings are recorded.

3. Percent Moisture

Percent moisture readings are taken at the end of each week by using the hand check method. We use a 50% minimum and a 65% maximum moisture percentage as our optimum ranges for decomposition. This also gives us an indication for monitoring watering activities. All readings are recorded. The weather station is also be used to gauge rainfall over the same period.

4. Turning of Windrows

Windrows are turned based on PFRP specifications and thereafter on moisture and oxygen levels. Turning frequency is recorded.

5. Watering Amounts

Moisture readings taken weekly determine the frequency of watering. The water source and amount applied in gallons is recorded.

D. MONTHLY/BI-MONTHLY PROCEDURES -

1. Stormwater System Maintenance

The Stormwater System is inspected after each rain event and maintained monthly or more frequently if not operating properly. Monthly activities include the following:

a. Maintaining positive flow to retention pond.

b. Removal of trash and sediment in drainage ditches.

c. Cleaning and clearing weep holes along level spreader.

d. Maintaining a no vegetation zone on stone apron of level spreader.

e. Maintaining grass riparian buffer on down slope of level spreader.

2. Testing Parameters

Novozymes participates in the United States Composting Council's Seal of Testing Assurance Program, NCDA labs and in house testing parameters to monitor for both compost product quality and NCDENR compliance. The USCC guidelines and test methods for sample collection and preservation are included in the appendix of this document. The USCC STA Program goes beyond the North Carolina State requirements for testing therefore; participation in this program assures distribution of a quality "Grade A" compost product. The following chart compares these of testing parameters:

Testing Parameters By Sample Type	NCDENR Requirement Compost Permit Frequency by Facility Capacity 2 X/ year or every 20, 000 tons	US Composting Council STA Program Frequency by Volume of Finished Product Annually 6,251 – 17,500 tons - 1 per 2 months	Novozymes NA QA & QC Requirement Frequency as Stated Below 6,251 – 17,500 tons - 1 per 2 months
Feedstocks			
Hazardous Waste	Non applicable	Non applicable	New Feedstocks if warranted
pH	Not required	Non applicable	Quarterly
Soluble Salts	Not required	Non applicable	Quarterly
Nutrients	Not required	Non applicable	Quarterly
Moisture Content	Not required	Non applicable	Quarterly
Organic Matter Content	Not required	Non applicable	Quarterly
Regulated metals	Not required	Non applicable	Quarterly
Carbon: Nitrogen Ratio	Not required	Non applicable	Quarterly
Pathogens	Not required	Non applicable	Quarterly if warranted
Active Compost			
Temperature	2 times/Week	Non applicable	2 times/Week
Turning of Windrows	Based on temperature	Non applicable	Based on temperature
Oxygen	Weekly	Non applicable	Weekly
Moisture Content	Weekly	Not required	Weekly
Final Product			
pH	Required	Bi-Monthly	Quarterly
Soluble Salts	Required	Bi-Monthly	Quarterly
Nutrients	Required	Bi-Monthly	Quarterly
Moisture Content	Not required	Bi-Monthly	Quarterly
Organic Matter Content	Not required	Bi-Monthly	Quarterly
Regulated metals	Required	Bi-Monthly	Quarterly
Maturity	Not required	Bi-Monthly	Quarterly
Stability	Required	Bi-Monthly	Quarterly
Particle size	Required	Bi-Monthly	Quarterly
Pathogens	Required	Bi-Monthly	Quarterly
Solvita Maturity Index	Not required	As needed	As needed
Man-made Inerts	Required	Bi-Monthly	Quarterly
Carbon Nitrogen Ratio	Monthly	Bi-Monthly	Monthly

3. Inventory Control

Daily shipments of finished product and incoming feedstocks are tracked using the scale computer system. An inventory control report is generated monthly.

4. Physical Characteristics Parameters

Grading of the physical characteristics of the finished product is determined as per table one of section .1407 by measuring particle size and percent of dry weight inerts. Particle size will not exceed 1 inch and percent dry weight inerts will not exceed 6%.

5. Chemical Characteristics Parameters

Composite samples of finished and mixed product are tested for the following materials:

Parameter (mg/kg/dry wt.)	Code 1
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	36
Zinc	2800

6. Mature Degree of Stabilization

Tests of composite samples of finished product are tested to determine PFRP and Reduction of organic matter as per table 3 of section .1407. The Solvita Maturity Test is used as needed to determine final product stability. Details on sampling and testing procedures are provided in the appendix. USCC STA testing confirms both finished product stability and maturity.

7. Soluble Salts

Composite samples of finished compost are tested to determine total soluble salts. USCC STA testing confirms soluble salt levels.

All testing is performed by using methods outlined in table 5 section .1408 of the NCDENR Solid Waste Management Rules.

E. ANNUAL PROCEDURES -

1. Annual Reporting

This is a synopsis of procedures and activities that have taken place over the course of the year. This report is submitted by August 1 of each year to the following address:

State of North Carolina Dept. of Environment,
& Natural Resources
Division of Waste Management
401 Oberlin Road
Suite 150
Raleigh, NC 27605

As per section .1408 (c) of the NCDENR Solid Waste Management Rules an annual report will be submitted to

NCDENR Solid Waste Section on August 1 of each year covering July 1st to June 30th with the following information:

a. The facility name, address, and permit number,

b. The total quantity in tons, with sludge values expressed in dry weight, and type of waste received at the facility during the year covered by the report, including tons of waste received from local governments of origin.

c. The total quantity in tons, with sludge values expressed in dry weight and type of waste processed into compost during the year covered by the report.

d. The total quantity in tons and type of compost produced at the facility by product classification during the year covered by the report.

e. The total quantity in tons and type of compost removed for use or disposal from the facility, by product classification, along with a general description of the market if for use during the year covered by the report.

f. Condensed monthly temperature monitoring to support Rule .1406 (12) (A).

g. Results of tests required in Table 3 of Rule .1408 (a) (1). (d) Condensed yearly totals of solid waste received and composted shall be reported back to the local government of origin for annual recycling reporting.

G. PEROIDIC MAINTENANCE PROCEDURES -

1. Stormwater and Leachate System Maintenance

There is a periodic need for maintenance for both the Stormwater and Leachate System. Sediment in ponds can build up and there is a need to dredge these structures periodically. As this need arises the dredged material is re-incorporated into newly formed compost windrows and or landfilled.

2. Compost Pad Maintenance

There is a need to patch or replace any areas on the compost pad that are low, rutted, or worn due to vehicle traffic. ABC Stone is spread out on these areas and then compacted by a vibratory roller.

3. Equipment Maintenance

All equipment used on site has been assigned Preventative Maintenance Program based on the manufactures suggested maintenance and hours of operation. A Preventative Maintenance Form is filled out by the operator before the equipment is used in the daily production. Novozymes Maintenance staff tracks all hours and maintenance activities associated with each piece of equipment. Novozymes also maintains service contracts with select vendors to service and repair equipment that has been deemed critical to the operation. Some of these include rental equipment contracts for equipment that may take more than 24 hours to repair.

4. HEALTH AND SAFETY -

A. HEALTH AND SAFETY STATEMENT -

Safety and Health Services at Novozymes is organized around the full-time Safety and Health Manager and Occupational Health Nurse. In addition, safety and health is very much a part of line management fundamentals with goals aimed at improving hazard recognition/control and eliminating injuries. To accomplish this, we provide frequent training, departmental self-audits, and utilize our expanding Behavior Based Safety program. New employees are given safety orientation, which includes hazard communication, personal protective equipment, emergency procedures, lock-out and tag-out, confined space, and forklift operator training requirements. Written safety programs include all OSHA required subjects such as:

- Proper Use of Fire Extinguishers
- Hazard Communication
- Emergency Action Plan
- Eye Protection
- Hearing Conservation
- Lockout/Tag-out
- Confined Space
- Forklift Safety
- Hot Work
- Electrical Safety
- Respiratory Protection
- Blood borne Pathogens

B. CONTINGENCY PLANS & EMERGENCY RESPONSE -

1. In-climate Weather

In the event of adverse weather conditions we are prepared to shut down operations of the site. The processing of incoming and outgoing materials will cease. All nitrogenous materials will be mixed into windrows or covered with ground carbon materials or finished compost. If we experience a heavy rainfall period, the site is designed to handle any overflow from the primary retention pond to the secondary overflow structures. In the event that it becomes necessary we have the capabilities of pumping water from the retention pond to the Novozymes waste water treatment plant.

2. Fire

In the event of a fire we are prepared to extinguish and contain any start of fires with fire extinguishers. Emergency phone numbers are posted at all phones to call the local fire department to respond.

3. Spill Response

The following are general guidelines to be followed for a non-hazardous chemical spill.

Non-Hazardous spills or leaks

a. Alert area occupants and supervisor.

b. Check MSDS for hazard determination and spill cleanup method.

c. If the determination is hazardous, contact NZNA Environmental Operations.

d. If the determination is non-hazardous, follow MSDS clean up method and properly dispose of the clean up material

The following are general guidelines to be followed for a diesel fuel spill.

Small spill: < than 100 Gallons

a. Alert area occupants and supervisor.

b. Eliminate all ignition sources.

c. Isolate spill or leak area immediately for at least 25 to 50 meters.

d. Remove contaminated people from spill area and flush with water for 20 minutes.

e. Call 911 if First Aid is needed.

f. All equipment used when handling the product must be grounded.

g. Do not touch or walk through spilled material.

h. Stop leak if you can do it without risk.

i. Absorb or cover with dry earth, sand or other non-combustible material.

j. Transfer clean up material with product to containers for proper disposal.

Large spill: > 100Gallons

Immediately alert area occupants and supervisor

a. Call 911 and NZNA Environmental Operations.

b. Eliminate all ignition sources.

c. Initial downwind evacuation for at least 300 meters.

d. Remove contaminated people from spill area and flush with water for 20 minutes.

e. Keep unauthorized people away and stay upwind.

f. Dike far ahead of spill for later disposal.

g. Water spray may reduce vapor.

h. Transfer clean up material with product to containers for proper disposal.

4. Dust, Odor, Noise, Vectors or Traffic

To date we have not experience any complaints due to odor, noise or vector problems. Potential odor and noise problems should not be a factor based on the sites design and operation. There is a natural buffering of noise and wind from the screening of existing trees and vegetation. We monitor odor on a daily basis and use a trouble shooting guide establish by the US Composting Council to eliminate the cause of odor generation. This is accomplished by managing carbon to nitrogen ratios in mix design, tracking oxygen and moisture levels in windrows, and managing a windrow turning schedule. In the event that we should have a complaint of an odor problem we will first look at the source of the problem and correct it immediately by investigating the root cause of the problem. During the interim we will take action to minimize the odor by adding a ground high carbon material or a finished compost to act as a Biofilter for the odor. The following is a decision chart that we will use to correct odor problems.

Cause of Odor	Action
Lack of oxygen	Turn windrow and/or add bulking material
Excess nitrogen	Add carbon and turn windrow
Excess moisture	Turn windrow and/or add bulking materials
Compressed windrow	Turn windrow and/or add bulking materials

We monitor any conditions that would cause dust problems from particulates. A water wagon and our irrigation system can be used to minimize any potential dust problems. We have limited the operating hours of the facility to minimize any potential noise problems. The presence of vectors is inspected daily as part of the daily monitoring procedures. If we were to experience problems with vectors, we will contact a professional exterminator for control. Our site location and design should minimize any traffic problems. The site is located of a highway 56 with a marked entrance area sufficient to handle our daily estimated traffic volume. The road entering the facility is a private road and does not receive any local traffic.

5. Non-Conforming Waste

As stated earlier incoming feedstocks are inspected and weighed prior to unloading. It is our intent to screen all materials as they are unloaded. In the event that contamination from a non-conforming waste has occurred the source will be identified and material will then be transported back to its place of origin or sent to an approved landfill. Any known household hazardous wastes are separated out from recyclables and other trash and then are disposed at a NC permitted facility that is approved in receiving household hazardous wastes.

6. Non-Conforming Product

All non-conforming or off spec product will be reprocessed or disposed in an approved landfill.

Novozymes NA has in place contacts for equipment rental, lease, or contracted labor in the event that our existing equipment breaks down. This is a precaution allows us to continue operations.

5. PRODUCT MARKETING AND DISTRIBUTION PLAN

PRODUCTS-

Our Certified Compost comes in three forms Coarse, Medium and Fine. This is screened at 1/2inch, 3/8 inch and ¼ inch. Special Blends are derived from mixing, amendments with Certified Compost. Landscape Mulch and Boiler Fuel are derived from grinding and screening clean wood by-products.

Products

Certified Compost

Special Blends

Landscape Mulch & Boiler Fuel

Certified Compost

This product is produced by first selecting clean source-separated biodegradable feedstocks. Strict feedstock selection is an assurance that the finished product will be of desirable characteristics. The other basis for quality product is the participation in the US Compost Council Seal of Testing Program and assurance of quality control of the production process. The compost is carefully monitored to achieve optimum results for the various particle sizes that we will sell to specific end markets. Certified Compost has advantages over both natural occurring soils and municipal yard waste compost. It provide organic matter, it is neutral in pH, low in soluble salts, and has no significant pathogens, weed seeds or diseases. It is mature in age, which provides a stable product to manage in different horticultural applications. These are important characteristics when considering product quality.

Special Blends

The blending of compost plus other select amendments is designed for a specific market niche. An example of this would be a 50/50 mix of compost and screened topsoil that can be used in landscape installation as backfill for planting trees and shrubs. Another example would be a mixture of compost, and aged pine bark that would be used by growers in the container nursery business.

Landscape Mulch & Boiler Fuel

Wood waste is generated in all types of sizes and quality. Some wood wastes are more suitable for composting while others are better suited as a mulch product. Landscape mulch comes in different sizes, and grades. This material is made up of double ground wood wastes such as pallets. Natural landscape mulch is made up of ground bark by-product from the milling of lumber. This product is sold to the ornamental horticulture market. Less desirable and lower quality mulch product is sold as boiler fuel.

MARKETS-

The product sales are marketed by direct sales personnel. We accomplished this by the management of face- to -face sales calls on the following market segments:

- Soil & Mulch Brokers
- Landscape Contractors
- Nurseries
- Agriculture
- Golf Courses
- Grading Contractors
- Bag Product Companies

DISTRIBUTION OF PRODUCT –

Our customers and prospects are easy to reach in person because they are located within a 150 miles radius. In addition, our customers are dependent upon having direct, personal contact with us. In light of these considerations, our design distribution plan relies heavily on the use of sales calls. Novozymes Composting uses contract transportation for outgoing product. All products are shipped F.O.B. our compost plant or are picked up by the customer.

ADVERTISING AND PROMOTION –

Our advertising and promotion is based on the following positioning statement:

"We will provide premium quality horticultural products that perform in and on the landscape".

The overall marketing plan for Novozymes Composting is based on the following fundamentals:

- Quality products priced at competitive rates
- Quality control and quality assurance in each product made
- Continued research and development of new products and markets
- Developing partners in growth with customers and the community

The advertising and promotional campaigns are designed to increase customer awareness of our products and educate the end users. This is achieved by developing marketing materials that includes our research data, environmental stewardship, quality control, quality assurance, and proven testimonials. We advertise in Trade Journals,

Association Newsletters and on the web. Our point of sale advertising displays are designed to educate the consumer on our product applications. Novozymes NA continues to support the Trade Associations by actively participating in seminars and trade shows. Novozymes maintains a professional trade show booth for such exhibits. We run seasonal promotions and pre-season booking programs to increase sales during slow periods. We schedule press release copy to local newspapers, radio, and the web. Our composting facility is used for tours of area groups such as garden clubs, schools, and civic groups.

6. NOVOZYMES- ISO 14000 INTERNAL DOCUMENTS

ISO 14001 is an environmental management standard. It specifies a set of environmental management requirements for environmental management systems. The purpose of this standard is to help organizations protect the environment, to prevent pollution, and to improve their environmental performance. Novozymes North America has an ISO 14001 certified Environmental Management System which covers all aspects of the operations, including Composting. ISO 14001 is a worldwide environmental management system standard that requires systems to assure regulatory compliance as well as objectives to continually improve environmental performance.
http://www.fs.fed.us/ems/includes/sum_ems_elements.pdf

The site has been certified since 2000 and was most recently audited by an outside registrar in April, 2009. The audit indicated full conformance with the standard and only a couple of minor recommendations for further improvement.

The following are Novozymes internal forms and documents used to comply with our ISO 14001 certification program.

List of abbreviations are as follows:

TSS = Total Suspended Solids
BMR = Bio Mass Residuals
USCC-STA = US Composting Council Seal of Testing Assurance
MSDS = Material Safety Data Sheet
NZNA = Novozymes North America
NA = North America
ISO = International Standards Organization
WEF= Water Environment Federation
IMAP = The internal system to tract NZNA documents
LGU, PReh, Jeer, LGU, SSMD, FRFR, SAST, DDD, LPJ, FIF, AKM, CLAN, = Are all personal email initials for personnel in Novozymes.

OPERATION OF WATER REUSE TANK

Purpose

The purpose of this document is to ensure proper operation of the water reuse on the compost site.

Description

The water reuse tank is a 3,000 gallon tank located at the southeast corner of the compost facility. The tank is located on the edge of the two leachate ponds and is white in color. The purpose of the tank is to supply water to certain operations within the compost facility. The water stored in the tank comes from the leachate ponds or from a well that provides fresh water to the compost site.

Operations

Step	Operation of the water reuse tank
1	Operation of the water reuse tank can be done either manually or by a remote control. If done manually, you have to go to the control panel located at the tank and turn the switches into the manual positions and then turn on the start button. The water valve that is being used has to be open in order to supply water to the operation. It is advised that the water valve is open so that you do not have pressure build up behind the water valve that will be used. The water reuse tank can also be operated automatically using the remote control. Leave the switches in the auto position at the tank control panel and use the on and off buttons on the remote.

Trouble-shooting

Step	Tank does not pump

1	• Check to make sure there is power at the tank by looking at the control panel. • The panel should be displaying the tank level in red LCD number. • If there is no power to the panel issue a work order notification for the maintenance department to investigate the problem. • If there is power then check the panel at the tank to see if the pump switch is in the auto or manual position. • If in the manual position push the reset button and then the start button. • If pump starts but you still have no water, check the manual water value under the tank to make sure it is open. • If switch is in the auto position, push the reset button and then the start button. • If pump starts and no water check the manual value under the water tank to make sure it is open. • If pump is running and the manual water value is open but still no water, issue a work order notification for the maintenance department to investigate.
Step	**Water running out of the top of the Tank.**
2	• Check to make sure pump switch is in the automatic position or manual position. If in the manual position turn the switch to off or the auto position. Pump should stop pumping. • If pump switch is in the auto position, high level indicator switch inside the tank has failed. Operators will manually turn off the switch to the stop position on the panel to stop the tank from filling. Then a work order notification is issue for the maintenance department to investigate.

Revisions

IMAP format and loaded into DDD.

MONITORING OF THE LEACHATE PONDS

Purpose

The purpose of this document is to ensure that the leachate ponds are monitored on a routine basis and includes troubleshooting.

Description

The leachate ponds are specially built ponds designed to hold and reuse water that leachates throughout the compost site. They are located in the southeast corner of the Compost Facility. A water reuse tank is located next to the ponds. The purpose of this tank is to pump the reuse water back into the Compost Facility for operational use.

The leachate ponds have a limited amount of storage and thus have to be monitored and operated in a way to ensure safety of the pond walls as well as the local environment outside of the Compost Facility. Since the ponds do have a limited amount of storage they need to be check frequently for depth levels. This process is done by visual inspection of the depth chain which is located in the first pond. The visual inspection is taken in the morning and the afternoon. The depth chain is measured in feet and inches. Below one foot is consider empty, Seven foot is where the ponds are consider full and run the risk of breaching the pond walls. At the 5 foot level on the depth chain action needs to be taken in order to bring the pond's levels back down to a safe zone of operation witch is at or below four foot.

A valve is located between the two ponds to help control individual levels of the ponds. As of present this valve is left open for operational purposes.

The levels of the ponds rise and fall due to reuse of the water back into the Compost Facility and by rain fall onto the Compost Facility.

Monitor and operations

Step	Monitoring and recording Leachate Pond AM
1	A visual inspection of the leachate ponds is done in the morning. Water level is recorded in feet and inches from the depth chain in the first pond on the Compost Dept. Operator worksheet (Form CO-001). If the ponds are at the 5 foot level Environmental Supervisor or Compost manager is notified.
Step	**Monitoring and recording Leachate Pond PM**
2	A visual inspection of the leachate ponds is done in the afternoon. Water level is recorded in feet and inches from the depth chain in the first pond on the Compost Dept. Operator worksheet (Form CO-001). If the ponds are at the 5 foot level Environmental Supervisor or compost manager is notified. Turned in the sheet at the end of the work day to the Environmental Operations supervisor.

Step	Record Keeping.
3	Data associated with the Leachate ponds is recorded on the Composting Dept. Operator Worksheet (Form CO-001). Composting Dept. Operator Worksheet (Form CO-001) is turned into the Environmental Supervisor for review and signature. The Environmental supervisor turns over the form to the Compost Staff assistance for filing into the binder for Composting Dept. Operator Worksheet.

Action

If the leachate pond is at 5 foot pumping should begin and should be done until ponds are at the safe level.To do this use trash pump to pump through the compost site's irrigation line and send the leachate water to Lagoon 3.

Trouble Shooting

Contact the Environmental Operations Supervisor or Compost Manager.

Revisions

IMAP format and loaded into DDD.

OPERATION OF THE SCREEN

Purpose

Describe normal operations and troubleshooting of the screen.

Description

The Screen is a machine designed to remove unwanted particles to ensure a consistent uniform product at the end of the screening process. The Compost Facility presently uses a McCloskey Brothers 516E screen for the purpose of screening the compost from the Windrows.

Operations

Step	Action
1	Complete PM Check Sheet before start-up Reference: NZNA-CO-007.
2	Start-up and Operate Screen according to Manufacturer's manual.
3	Take one bucket at-a-time of mature compost from Windrow using a loader. Reference: NZNA-CO-104.
4	Final product is moved to load out area on Compost pad.
5	Oversized material is moved to bulking bin to be reused in future Windrows.
6	Shut down Screen according to Manufacturer's manual.
7	Complete end of day info on NZNA-Co-001.
8	Turn completed form into Compost Staff Assistant.
9	Completed form is filed in binder by (CSA).

Trouble Shooting

Trouble shooting of the machine is included in the Maintenance section of the manufacturer's manual.

Revisions

IMAP format and loaded into DDD.

OPERATION OF THE TURNER and INDEXER

Purpose

Describe normal operations and troubleshooting of the Turner and Indexer.

Description

The Turner is a machine designed to turn composting Windrows in order to provide adequate mixture of oxygen, moisture and help in keeping a control temperature in the compost rows so that the bacterial organisms located in the Windrows can perform the duties of breaking down the carbon sources in the Windrows. Generally the Windrows are turned 1x/wk. The Compost Facility presently uses a Backhus 16.43 Turner with an Indexer. The Indexer is used to move the oldest windrows closer to the screen during the turning process.

Operations

Step	Action
1	Complete PM check sheet before start-up Reference: NZNA-CO-006.
2	Start-up and operate Turner and Indexer according to Manufacturer's manual.
3	Shut down Turner and Indexer according to Manufacturer's manual.
4	Complete end-of-day information on NZNA-CO-001.
5	Turn completed form into Compost Staff Assistant.
6	Completed form is filed in binder by (CSA).

Trouble shooting

Trouble shooting of the machine is included in the Maintenance section of the manufacturer's manual.

Revisions

The Indexer is used to move the oldest windrows closer to the screen during the turning process.

WINDROW MANAGEMENT & MONITORING OF WINDROWS

Purpose

Describe how to monitor the maturing process of the windrows by checking the temperature, oxygen and moisture.

Description

Windrows have a maturity date of 90 days. The production activity is monitored throughout the 90 day cycle by checking the temperature and oxygen 3x/wk, the moisture 1x/wk and the pH 1x/month. Presently Environmental Operators use a windrow manager probe and the Operators have to be familiar with operation of this probe and the manufacturer's manual.

Temp. & Oxygen Monitoring & Measurement

Step	Action
1	Take Temperature and Oxygen at different points every 60' along the Windrow, using the connecting probe and IPAQ unit.
2	After all Windrow data is collected, connect IPAQ unit to Compost computer.
3	Download data into the Windrow Manager software page.

Moisture Monitoring and Measuring

Step	Action
1	Collect samples from each Windrow.
2	Take samples to compost lab to determine the dry and wet weight of the Windrows by using compost oven.

pH Monitoring and Measurement

Step	Action
1	Compost sample is taken from the Windrows and shipped to the US Composting Council test methods for examination of compost as our parameters for sampling and conservation. Optimal pH is between 6 & 7.

Troubleshooting Guidelines

Step	Action
1	Windrow temperatures should be over 131 F for a 15 day period. Below 131 F consult Compost Manager for guidance.
2	An oxygen rating between 5-15% is optimum. Above 15% consult compost manager. Below 5% need to turn the windrow more frequently to add porosity, consult compost manager for guidance

3	A moisture reading between 50-65% is optimum. Above 65% turn the windrow more frequently. Below 50% need to add water to the windrow.
4	pH beyond optimal ranges contact Compost Manager.

Revisions IMAP format and loaded into DDD.

PURPOSE OF WINDROWS

Purpose

To give guidelines on how to build windrows for the production of compost.

Description

Windrow building is done in a designated area so that material consisting largely of organic material can be broken down into a reuse material called compost. The Compost Facility is presently designed for 15 windrows with the average length between 500-600 feet long, 5-6 feet in height and 12 foot in width.

Operations

Step	Action
1	Operators will start windrows sequence numbering, beginning with row number 1 and ending with windrow number 15. Variation from this is a verbal approval from the compost manager.
2	Mix material is carried over from the Mixer by either a box truck or a Front-end loader to the South End of the Windrow area and placed in the designated windrow under construction.
3	There are pole markers located at the South and North ends of the windrow area to give the Operators guidance.
4	Building of the windrows will take several days and depends on the recipe mix.

Data Collection

Step	Action
1	Record data of mixture placed on each Windrow Reference: NZNA-CO-001.
2	Enter data into Windrow Manager software program.
3	Turn complete Form into Environmental Supervisor.
4	Review completed form.
5	File Form.

Revisions

IMAP format and loaded into DDD.

OPERATION OF THE MIXER

Purpose

Describe the normal operations and troubleshooting of the Mixer.

Description

The Mixer is multi-use machine designed to mix different material together for the purpose of blending. The compost facility uses a Kuhn Knight mixer for the blending of Raw materials into an unfinished compost mixture.

Operations

Step	Action
1	Complete PM Check Sheet before start-up Reference: NZNA-CO-005.
2	Receive recipe from Compost Manager.
3	Start up and operate Mixer according to manufacturer's manual.
4	Load mixer.
5	Open discharge door.
6	Close discharge door once truck is full.
7	Take truck with batch load to windrow area.
8	Record amounts of raw material in buckets on Form NZNA-CO-004.
9	Shut down Mixer according to manufacturer's manual.
10	Turn complete form into Compost Staff Assistant.
11	Complete form is filed in binder by (CSA).

Trouble-shooting

Troubleshooting of the machine is included in the Maintenance section of the manufacturer's manual.

Revisions

IMAP format and Loaded into DDD.

OPERATIONS OF THE GRINDER

Purpose

To establish a document that covers normal operations and troubleshooting of the Grinder.

Description

A Grinder is a machine that is used to ground bulky raw material into more manageable material that can be use for different functions across the Compost Facility. The present grinding machine onsite is a Rotochopper model MC266 and is located at the rear of the Compost Facility. This particular model comes with the color option for the dying of mulch.

Operations

Step	Action
1	Complete PM Check Sheet before Start-Up Reference: NZNA-CO-003
2	Start up and operate Grinder according to manufacturer's manual.
3	Shut down Grinder according to manufacturer's manual.
4	Complete end of day info on PM Check Sheet from Step 1.
5	Turn complete form into Compost Staff Assistant.
6	Complete form is filed in binder by (CSA).

Troubleshooting

Troubleshooting of the machine is included in the Maintenance section of the manufacturer's manual.

Revisions

IMAP format and loaded into DDD.

OPERATION OF THE LOADERS

Purpose

Describe the process of normal Operations and troubleshooting of the Loaders

Description

A Loader is a machine designed to load, move and carry material around the compost site. Presently the Compost Operations has two Caterpillar 924G models and one 962H model.

Operations

Step	Action
1	Complete PM Check Sheet before Start-Up Reference: NZNA-CO-002.
2	Start up and operator loader according to manufacture's manual.
3	Shutdown loader according to manufacture's manual.
4	Complete end of day info on PM Check Sheet from step 1
5	Turn completed form into Compost Staff Assistant (CSA).
6	Completed form is filed in binder by (CSA).

Trouble shooting

Troubleshooting of the machine is included in the Maintenance section of the manufacturer's manual.

Revisions

Added Loader.

OPERATIONS OF WEIGHT SCALE

Purpose

This document is to describe the proper weighing of Incoming raw material and outgoing finish product for billing purposes. The document also covers trouble-shooting. The scope is for the Licensees in the Compost Department.

Description

The present scale is a Cardinal WinVRS model. The location of the scale controls is inside the compost trailer. The operational unit of the scale is located in front of the compost trailer.

In order to operate the weight scale you must have:

- Certified Operator

The Operations of the Weight scale is done by Licensees approve by the North Carolina Department of Agriculture and Consumer Services. The certificate's of the Licensees is located next to the computer scale area in the Compost Trailer.

- Software setup

The setup of the software to operate the scale is the responsibility of the Compost Manager and Compost Staff Assistance. They assign a system with the software so as to recognize the customer's within a data base.

Step	Action
1	The scale is operated in accordance with manufacturing recommendations. The Manufacture's manual is located in the Compost Trailer. Customer's vehicles are weighed as they enter the compost facility.
Step	**Action**
2	Vehicles drive up onto the scale which is located in front of the compost trailer. The beginning weight is recorded into the file of the customer on the scale computer.
Step	**Action**
3	Once the data has been recorded the certified operator turns on the green light on the stop light so that the customer can exit the scale and drive to the appropriated area within the compost facility.

Step	Action
4	Once the customer is loaded or unloaded they return too the scale for weighting out.
Step	**Action**
5	• The certified operator records the end weight into the customer's file on the scale computer. The difference between the beginning and ending weight is your actual weight.
Step	**Action**
6	A carbon copy weight ticket is then issued for the customer.
Step	**Action**
7	The customer takes one copy and two copies of the weight ticket are turned over to the Compost Staff Assistant.

Data Collection

All data collected from the above operation is turned over to the compost staff assistant for further processing.

Troubleshooting

Troubleshooting guidelines are located in the manufacturer's manual.

Revisions

IMAP format and loaded into DDD.

Compost Operations Training Program

Purpose

The purpose of this document is to describe training background for the Compost Department.

Description

The Compost Operations Department Training Plan should ensure that all Staff and Operators have a basic understanding of processes, relevant quality systems, equipment and procedures in order to conduct their assignments in a safe and effective manner. Since Environmental Operations supplies the Operators for Compost Operations their training is related to Operations within Environmental Operations.

Department Structure

Compost Operations personal are divided into three categories:

- Staff (Compost Operations Manager, Environmental Supervisor, and Staff Assistant).
- Environmental Operations Senior Operator
- Environmental Operations Operators

Training Program

Training programs will be provided for each employee to insure that the needed training to full fill job duties is identified.

Once per year, during the annual review process, the Employee's Supervisor or Manager will review the previous year's training program and amend as necessary. Status of training from the previous year should be documented. This training program will be kept in the employee's training file. When Environmental Operators rotate back into the compost operations they will be re-evaluate on their knowledge of the operation and updated on any parts of the operation that has change. A compost training form is provided for the Environmental Operators so that progress and training can be tracked. (Form CO-010)

Training Records

Environmental Operators:

The Environmental Operations Supervisor is responsible for making sure that each of the operators has an up-to-date training record in their training file. Training files will contain an over-all cover sheet indicating the types of training an operator has had. The file may also contain any state certifications or training, completion of training signatures, training goals and any other certifications that may be beneficial to an operator or the department. Environmental Operations staff assistance keeps the training records in the staff assistance

office. Training records for Environmental Operators working within the Compost Operations is kept with the Environmental Operation Supervisor.

Responsibility

The Environmental Operations Supervisor is responsible for defining and implementing the training program on an individual basis.

Revisions

IMAP format and loaded into DDD.

Compost Quality Records

Purpose

This document is to describe Quality Records for the NZNA Composting Department to insure compliance with QMS 1.05, NZNA 1.06.02 and QMS 1.06.

External Documents

Composting Department uses the Manufacturers manuals of the equipment as operating SOP for equipment. Environmental Operations Supervisor/Environmental Operations Senior Operators are responsible for registering each piece of equipment with manufacturer to insure that any updates to equipment manuals are received. Once received manufacturer's manuals are maintained in Compost Trailer.

Quality Records

Information collected on approved forms, entered into databases, spreadsheets and/or prepared reports are considered as Quality Records if they are used to:

- Document the operation of the Compost Department equipment and processes.
- Meet requirements of stated issued environmental permits and operation permits for which the Compost Department has primary responsibility for assuring compliance.

Control of Records

- Hard copies of all completed forms are stored in binders in Compost trailer for the current year.
- PM documents are kept for 1 year. Forms are located under the relative equipment.
- Electronic data bases and spreadsheets are maintained on the R drive.
- Exception is the windrow monitoring folder which is maintain on the compost computer under C\programfiles\windrowmanaget. Hard copies of reports for the current calendar year are located in the Compost Trailer.

Revision

Document control removed due to document kept in DDD.

Moisture Monitoring - Input Sheet

Windrow Number	Date	Temperature Degrees C	Time In	Date	Time Out	Start Weight	End Weight	Tray Weight
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

1. Turn on oven and set dial to 4.5 = 75 degrees C.
2. Turn on scales and zero out.
3. Mark pans with windrow number.
4. Tare each pan record weight in Tray Weight column.
5. Add approximately 2 grams of compost from each windrow sampled and record weight in Start Weight column.
5. Place all pans inside oven for a minimum 4 hours.
6. Turn off oven before leaving for the day.
7. Return the next day to record weights.
8. Return Input sheet to FrFr

PM Check Sheet For : Backhus 16.43 Turner

All safety information,warnings, and Instructions must be read and understood before you perform any operation or any maintenance.

Start of Day - Check:	Ok	Need Attention	/Action Taken
Leaks - any kind			
Engine oil level			
Hydraulic oil level			
Differential and final drive oil level			
Engine air filter			
Engine coolant			
Horn			
Lights			
Track Tension			
Check around final drives			
Track cleaners for free operation			
Rotor drive seal			
Rotor teeth			
Cab air filters			
Reset water meter			
Seat belt			
Windows -clean			
Fire extinguiser			
Backup-alarm			

Monthly	Done	
Check final drive to drive sprocket bolts		
Start engine - let run for 3 minutes to warm up		

End of Day:	Done	
Shut Down - let engine run for 3 minutes to cool down		
Clear cab of any trash		
Park turner & apply parking brakes & lower rotor		
Lock all doors and remove all keys		
Hand in this sheet before leaving		

Engine Hours	Hours		
Start of day engine hours			
End of day engine hours			

Operator name :

Date:

********** **No Smoking in Cab of Turner** *********

PM Check Sheet for Screen

Operator_____

Date_____

Check and/or Perform once daily

Hydraulic oil level. Refill as necessary	☐
Flow control settings	☐
All items running clear & free from obstruction	☐
Conveyor belt aligment. Track belt if necessary	☐
Remove all debris from the machine that may cause build up	☐
Lubricate all 4 tormemmel drum support roller bearings using EP2 Lithium bearing grease	☐
Lubricate all conveyor bearings using EP2 Lithium bearing grease	☐
Ensure trommel cleaning brush bristles project about 1/4" through the screen mesh	☐
Safety inspection of the machine	☐
Hours	☐

Comments:

PM Check Sheet For : Backhus 16.43 Turner

All safety information,warnings, and Instructions must be read and understood before you perform any operation or any maintenance.

Start of Day - Check:	Ok	Need Attention	/Action Taken
Leaks - any kind			
Engine oil level			
Hydraulic oil level			
Differential and final drive oil level			
Engine air filter			
Engine coolant			
Horn			
Lights			
Track Tension			
Check around final drives			
Track cleaners for free operation			
Rotor drive seal			
Rotor teeth			
Cab air filters			
Reset water meter			
Seat belt			
Windows -clean			
Fire extinguiser			
Backup-alarm			

Monthly	Done	
Check final drive to drive sprocket bolts		
Start engine - let run for 3 minutes to warm up		

End of Day:	Done	
Shut Down - let engine run for 3 minutes to cool down		
Clear cab of any trash		
Park turner & apply parking brakes & lower rotor		
Lock all doors and remove all keys		
Hand in this sheet before leaving		

Engine Hours	Hours		
Start of day engine hours			
End of day engine hours			

Operator name :

Date:

********** **No Smoking in Cab of Turner** *********

COMPOST DEPARTMENT MIX SHEET

DATE: _____ **WINDROW #** _____

INITIALS: _____ **BATCH #** _____

BUCKET TYPE:

SMALL ☐ **3.25 CY** **RECIPE #** _____

LARGE ☐ **6.5 CY**

MIXER BATCH #1				
FEEDSTOCK	QTY		RUNNING TOTAL	
BULKING MATERIAL		BUCKETS		LBS
WAS		BUCKETS		LBS
NEW SAWDUST		BUCKETS		LBS
OLD SAWDUST		BUCKETS		LBS
TOTAL		BUCKETS		LBS

MIXER BATCH #2				
FEEDSTOCK	QTY		RUNNING TOTAL	
BULKING MATERIAL		BUCKETS		LBS
WAS		BUCKETS		LBS
NEW SAWDUST		BUCKETS		LBS
OLD SAWDUST		BUCKETS		LBS
TOTAL		BUCKETS		LBS

MIXER BATCH #3				
FEEDSTOCK	QTY		RUNNING TOTAL	
BULKING MATERIAL		BUCKETS		LBS
WAS		BUCKETS		LBS
NEW SAWDUST		BUCKETS		LBS
OLD SAWDUST		BUCKETS		LBS
TOTAL		BUCKETS		LBS

MIXER BATCH #4				
FEEDSTOCK	QTY		RUNNING TOTAL	
BULKING MATERIAL		BUCKETS		LBS
WAS		BUCKETS		LBS
NEW SAWDUST		BUCKETS		LBS
OLD SAWDUST		BUCKETS		LBS
TOTAL		BUCKETS		LBS

COMPOST DEPARTMENT DAILY MIX SHEET

DATE: _____ WINDROW # _____

INITIALS: _____ BATCH # _____

BUCKET TYPE:

RECIPE # R6-8-06

LARGE ☐ 6.5 CY

TEST BATCH							
FEEDSTOCK	Empty Wt	Full Wt	Tare	QTY		RUNNING TOTAL	
BULKING MATERIAL					BUCKETS		LBS
BULKING MATERIAL					BUCKETS		LBS
BULKING MATERIAL					BUCKETS		LBS
BULKING MATERIAL					BUCKETS		LBS
WAS					BUCKETS		LBS
NEW SAWDUST					BUCKETS		LBS
TOTAL					BUCKETS		LBS

PM Check Sheet For : Cat Loader Model # Loader

All safety information,warnings, and Instructions must be read and understood before you perform any operation or any maintenance.

Start of Day - Check:	Ok	Need Attention	/Action Taken
Leaks - any kind			
Engine oil			
Hydraulic oil			
Transmission oil			
Differential and final drive oil level			
Engine air precleaner			
Engine coolant			
Horn			
Lights			
Brakes			
Tire Inflation			
Seat belt			
Window washer fluid			
Windows -clean			
Backup-alarm			

Action Items - Before Start	Done	
Lubricate - 2 pumps on all ports & front end		
Fuel system water separator - drain		
Start engine - let run for 3 minutes to warm up		

End of Day:	Done	
Shut Down - let engine run for 3 minutes to cool down		
Engine air precleaner-clean out bowl		
Clear cab of any trash		
Park loader & apply parking brakes & Lower Bucket		
Check under loader in Park Brake area for material build up		
Lock all doors and remove all keys		
Hand in this sheet before leaving		

Engine Hours	Hours			
Start of day engine hours				
End of day engine hours				
Operator name :				
Date:				
********** No Smoking in Cab of Loader *********				

Compost Inventory Counting

Purpose

This procedure describes the inventory counts of production consumables, compost feed stocks and finished goods

Scope

Compost and NZNA Finance Departments

Requirements

Following table lists the tasks, who is responsible and the frequency of Compost inventory counting:

Task	Responsible	Frequency
Worksheet completion	Operators	Daily
Review of worksheets	Supervisor	Daily
Data entry	Compost Staff Assistant	Daily
Inventory Counts	Supervisor, Sr. Operator	Monthly
Data conversion, entry	Compost Staff Assistant	Monthly
Review on-hand vs. SAP	Supervisor, Sr. Operator	Monthly
Inventory reconciliation	Compost Manager	Monthly
Inventory adjustments	NZNA Finance Dept.	Monthly

Revisions

New document

Daily Operator Checklist Form

Date: **Operators:**_____ **Mgr.** _____

- ☐ **PM Check for Loader #1 – HRS: START _____ END _____**
- ☐ **PM Check for Loader #2 - HRS: START _____ END _____**
- ☐ **PM Check for Loader #3 - HRS: START _____ END _____**
- ☐ **PM Check for Mixer**
- ☐ **PM Check for Screen - HRS: START _____ END _____**
- ☐ **PM Check for Turner - HRS: START _____ END _____**
- ☐ **PM & Safety for Rotochopper: HRS: START _____END _____**

TURNING	Hours	CY's	Batch #		
Compost					
Irrigate					
BLEND	Hours	CY's	Mix Material		
Scaper's Mix			Top Soil		COMPOST
MIXING	Hours	CY's	Batch #		
Compost					
GRINDING	Hours	CY's			
SCREENING	Hours	CY's	Batch #	Overs	
COMPILANCE					
Trash Present	no		yes		action:
Vectors Present	no		yes		action:
Rainfall Amount			inches		
Leachate Pond Level - AM			feet		inches
Leachate Pond Level - PM			feet		inches

Control of Equipment

Purpose

The purpose of this document is to provide requirements to control, maintenance and calibration of equipment to ensure:

- Suitable identification and recording of equipment.
- Suitable maintenance for sustainable process capability.
- Sufficient precision and accuracy of measuring equipment.

Scope

This document is applicable to all Production, SCO, Pilot Plant and Laboratory equipment.

Definitions

Types of equipment are defined:

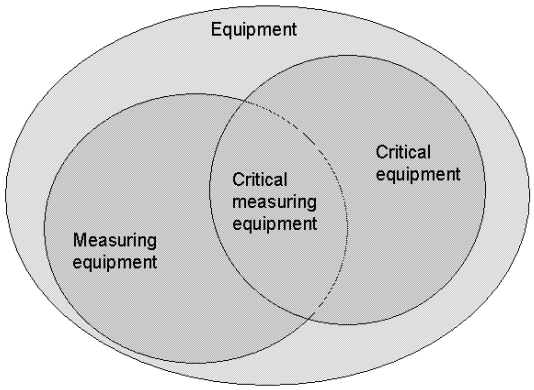
Type	Definition
Equipment	Process equipment and utilities
Measuring Equipment	Measuring instrument, software, measurement standard, reference material or auxiliary apparatus used for measuring and monitoring of process or product data.
Critical Equipment	Process equipment where regular maintenance are necessary to ensure process capability and ❖ Product quality ❖ Environmental impact ❖ Compliance with regulatory requirements.
Critical Measuring Equipment	Measuring and monitoring devices used to demonstrate conformance to specified requirements for ❖ Product quality ❖ Environmental impact ❖ Compliance with regulatory requirements.

This can be illustrated as follows:

Continued on next page

Control of Equipment, *Continued*

Definitions ***(continued)***



Equipment

Local procedures must be available to ensure that:

- Equipment is suitable for intended use.

NOTE: Production and Pilot plant equipment must be evaluated for environmental impact.

- Equipment is categorised, including identification of critical equipment.
- A systematic maintenance schedule is established for critical equipment.

Test of critical equipment

For new critical equipment in production and SCO, the manager must specify the responsibility for (and will assume it himself if not described):

- Considering if a test of new equipment is necessary; and if a test is necessary define extend of test, including compliance with GMP, OH&S and other relevant requirements.
- Conducting the test, if test is necessary.
- Approving the test and equipment being taken into use.
- Documenting the test if test has been made.
- Establishing the necessary schemes for calibration and running/periodic testing.

Continued on next page

Control of Equipment, *Continued*

Critical Measuring Equipment

Local procedures for critical measuring equipment must be available to ensure:

- Registration of critical measuring equipment, including:
  - Identification.
  - Measuring range.
  - Accuracy and precision.
- Safe handling and storage of critical measuring equipment and protection of the calibration.
- Establishment of a calibration schedule, including:
  - Frequency of calibration.
  - Traceability to International or National standards (where possible or relevant) or establishing the basis for the calibration.
  - Acceptance criteria for the calibration.
  - Disposition of out of calibration measuring equipment including assessment of the validity of previous results.
  - Documentation of calibration.
  - Calibration status readily available to the user (e.g. by labelling).

Software in Critical Measuring Equipment

If critical measuring equipment includes computer software this must be tested prior to initial use or upon changes to confirm that the software can be used for the intended purpose with satisfactory results.

Revision

Scope: SCO added. Paragraph on testing of critical equipment in production and SCO added. Author changed from LBJO to LPJ

7. APPENDICES

APPLICABLE PERMITS, APPROVALS & SUPPORT DOCUMENTS

Franklin County Planning & Inspections
215 E. Nash St.
Louisburg, NC 27549

Phone: 919.496.2909
Fax: 919.496.2637

www.franklincountync.us

August 25, 2009

Mr. Frank Franciosi
Composting Dept. Manager
Novozymes North America, Inc.
P. O. Box 576
Franklinton, NC 27525-0576

RE: Request for Zoning Consistency Determination
Novozymes North America, Inc.
Franklin County Tax Parcel 1874-88-9840
Franklin County, North Carolina

Dear Mr. Franciosi:

The compost & mulch facility located at 445 Old Smith Farm Road is in compliance with the Franklin County Unified Development Ordinance. The property is located in the Light Industrial District.

If you have any questions, please do not hesitate to contact our office at (919) 496-2909.

Sincerely,

Donna Wood

Donna Wood
Senior Planner

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

Michael F. Easley, Governor
William G. Ross Jr., Secretary
Alan W. Klimek, P.E., Director

NCDENR
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

September 19, 2003

Mr. Frank Franciosi
Novozymes North America, Inc.
77 Perry Chapel Church Road
P.O. Box 576
Franklinton, NC 2752

Subject: Composting Facility's Stormwater Permitting
Franklin County

Dear Mr. Franciosi:

This letter is in response to your letter requesting direction for your proposed composting facility's stormwater permitting. A review of the provided materials shows that the drainage from the compost facilities and detention pond will be diffused through a level spreader. Since this type of discharge is designed to produce sheet flow rather than a point source discharge it is not subject to stormwater permitting at this time.

If after the system is installed the level spreader does not work properly and does indeed produce a channelized, point source, flow it will become subject to stormwater permitting regulations.

Not requiring a stormwater permit does not preclude the site from requiring any other water permits. Leachate that will be draining from the windrows is considered a wastewater which may require permitting under the nondischarge permit since there will be no point source discharge. For more information about obtaining a nondischarge permit contact Mr. Kim Colson at (919) 733-5083, ext. 540.

If you have any questions concerning this matter please contact me at (919) 733-5083, ext. 578.

Sincerely,

Aisha H. Lau

Aisha H. Lau
Environmental Engineer

cc: Raleigh Regional Office
Stormwater and General Permits Unit
Central Files

SEP 29 2003

NCDENR

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

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
Alan W. Klimek, P.E., Director

Aquifer Protection Section
July 22, 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Steve Stadelman, Ph.D.
Manager of Environmental Operations
Novozymes North America, Inc.
PO Box 576
Franklinton, NC 27525

Subject: Request from the Solid Waste Section Concerning Modification of Permit
Novozymes North America, Inc.
Wastewater Spray Irrigation
Permit No. WQ0002806
Franklin County
Incident Number:86545, Site Rank: 65B

Dear Mr. Stadelman:

Novozymes North America, Inc. (Novo) has requested a modification to the above referenced permit in order to install a compost facility. The compost site overlies confirmed soil and groundwater nitrate contamination which is currently being investigated by Novo as part of a facility-wide Comprehensive Site Investigation that is ongoing (pollution incident investigation number referenced above).

As part of the compost facility approval process, the Solid Waste Section, Division of Waste Management has requested a letter of approval from our office concerning the compost site (Division Water Quality, Aquifer Protection Section, Raleigh Regional Office-DWQ). This office does not have the engineering expertise to approve of the construction plans for the facility,

however, the DWQ believes that the construction of the compost facility will not hinder the present and future assessment and remediation of soil and groundwater under and adjacent to the facility.

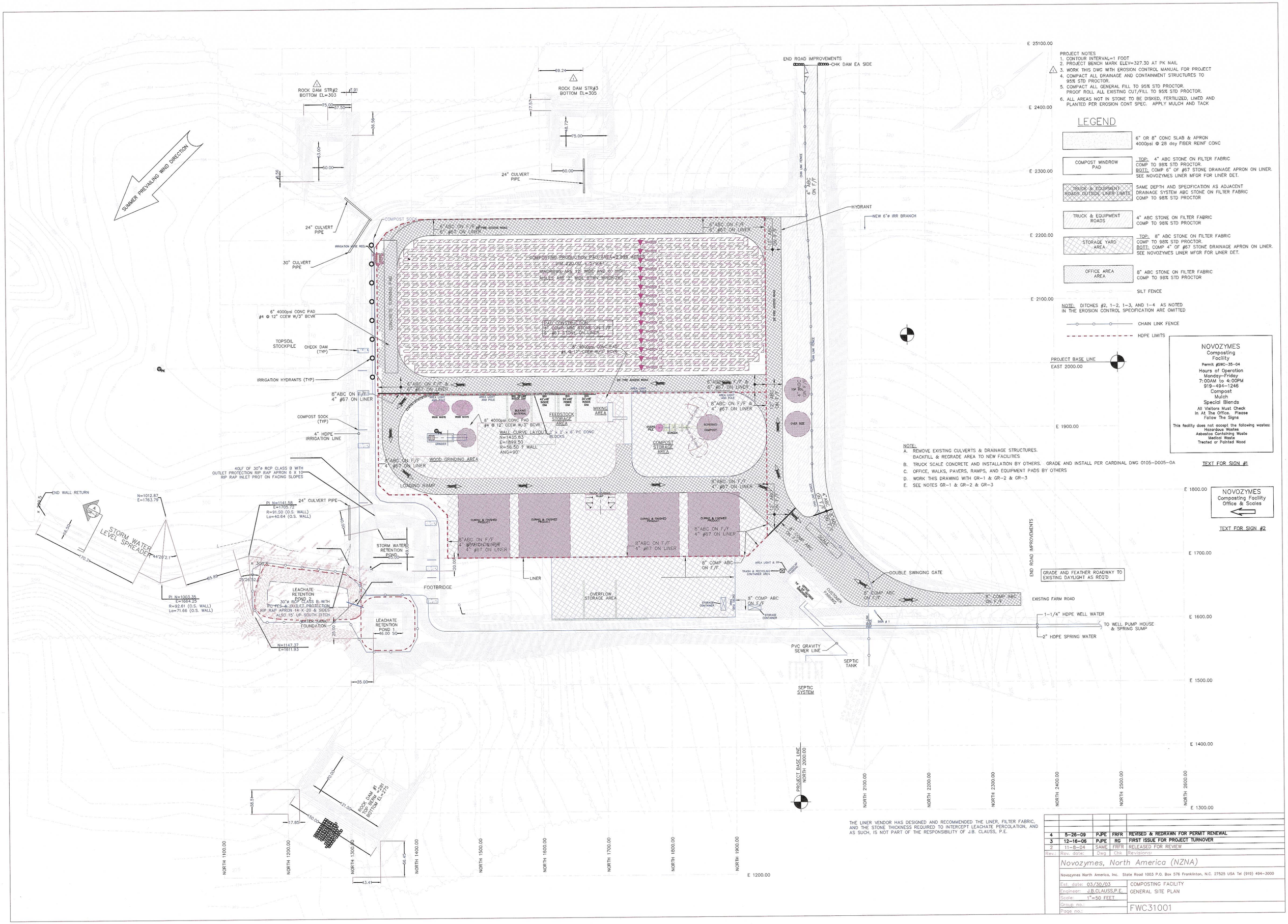
The DWQ does request the installation of a pair of nested monitoring wells to investigate shallow and deeper groundwater characteristics at the site. The wells should be located using the North American 1983 Coordinate System at 848746N and 2178504E (approximately 530 feet north and 140 feet west of monitoring well MW-37).

If you have questions, please do not hesitate to call Jim Roush or me at (919) 571-4700.

Sincerely,

S. Jay Zimmerman, L.G.
Environmental Regional Supervisor
Raleigh Regional Office

cc: Franklin County Health Department
Ted Lyon, Solid Waste Section, Division of Waste Management
File/JMR



PROJECT NOTES
1. CONTOUR INTERVAL=1 FOOT
2. PROJECT BENCH MARK ELEV=327.30 AT PK NAIL
3. WORK THIS DWG WITH EROSION CONTROL MANUAL FOR PROJECT
4. COMPACT ALL DRAINAGE AND CONTAINMENT STRUCTURES TO 95% STD PROCTOR.
5. COMPACT ALL GENERAL FILL TO 95% STD PROCTOR. PROOF ROLL ALL EXISTING CUT/FILL TO 95% STD PROCTOR.
6. ALL AREAS NOT IN STONE TO BE DISKED, FERTILIZED, LIMED AND PLANTED PER EROSION CONT SPEC. APPLY MULCH AND TACK

LEGEND

	6" OR 8" CONC SLAB & APRON 4000psi @ 28 day FIBER REINF CONC
COMPOST WINDROW PAD	TOP: 4" ABC STONE ON FILTER FABRIC COMP TO 98% STD PROCTOR. BOTT: COMP 6" OF #67 STONE DRAINAGE APRON ON LINER. SEE NOVOZYMES LINER MFGR FOR LINER DET.
TRUCK & EQUIPMENT ROADS OUTSIDE LINER LIMITS	SAME DEPTH AND SPECIFICATION AS ADJACENT DRAINAGE SYSTEM ABC STONE ON FILTER FABRIC COMP TO 98% STD PROCTOR
TRUCK & EQUIPMENT ROADS	4" ABC STONE ON FILTER FABRIC COMP TO 98% STD PROCTOR
STORAGE YARD AREA	TOP: 8" ABC STONE ON FILTER FABRIC COMP TO 98% STD PROCTOR. BOTT: COMP 4" OF #67 STONE DRAINAGE APRON ON LINER. SEE NOVOZYMES LINER MFGR FOR LINER DET.
OFFICE AREA AREA	8" ABC STONE ON FILTER FABRIC COMP TO 98% STD PROCTOR
	SILT FENCE

NOTE: DITCHES #2, 1-2, 1-3, AND 1-4 AS NOTED IN THE EROSION CONTROL SPECIFICATION ARE OMITTED

CHAIN LINK FENCE

HDPE LIMITS

NOTE:
A. REMOVE EXISTING CULVERTS & DRAINAGE STRUCTURES. BACKFILL & REGRADE AREA TO NEW FACILITIES
B. TRUCK SCALE CONCRETE AND INSTALLATION BY OTHERS. GRADE AND INSTALL PER CARDINAL DWG 0105-D005-0A
C. OFFICE, WALKS, PAVERS, RAMPS, AND EQUIPMENT PADS BY OTHERS
D. WORK THIS DRAWING WITH GR-1 & GR-2 & GR-3
E. SEE NOTES GR-1 & GR-2 & GR-3

NOVOZYMES
Composting Facility
Permit #SWC-35-04
Hours of Operation
Monday-Friday
7:00AM to 4:00PM
919-494-1246
Compost
Mulch
Special Blends
All Visitors Must Check In At The Office. Please Follow The Signs
This facility does not accept the following wastes:
Hazardous Wastes
Asbestos Containing Waste
Medical Waste
Treated or Painted Wood

TEXT FOR SIGN #1

NOVOZYMES
Composting Facility
Office & Scales

TEXT FOR SIGN #2

THE LINER VENDOR HAS DESIGNED AND RECOMMENDED THE LINER, FILTER FABRIC, AND THE STONE THICKNESS REQUIRED TO INTERCEPT LEACHATE PERCOLATION, AND AS SUCH, IS NOT PART OF THE RESPONSIBILITY OF J.B. CLAUSS, P.E.

Rev.:	Rev. date:	Dwg	Chk	Revisions:
4	5-26-09	PJPE	FRFR	REVISED & REDRAWN FOR PERMIT RENEWAL
3	12-16-06	PJPE	RG	FIRST ISSUE FOR PROJECT TURNOVER
2	11-8-04	SAME	FRFR	RELEASED FOR REVIEW

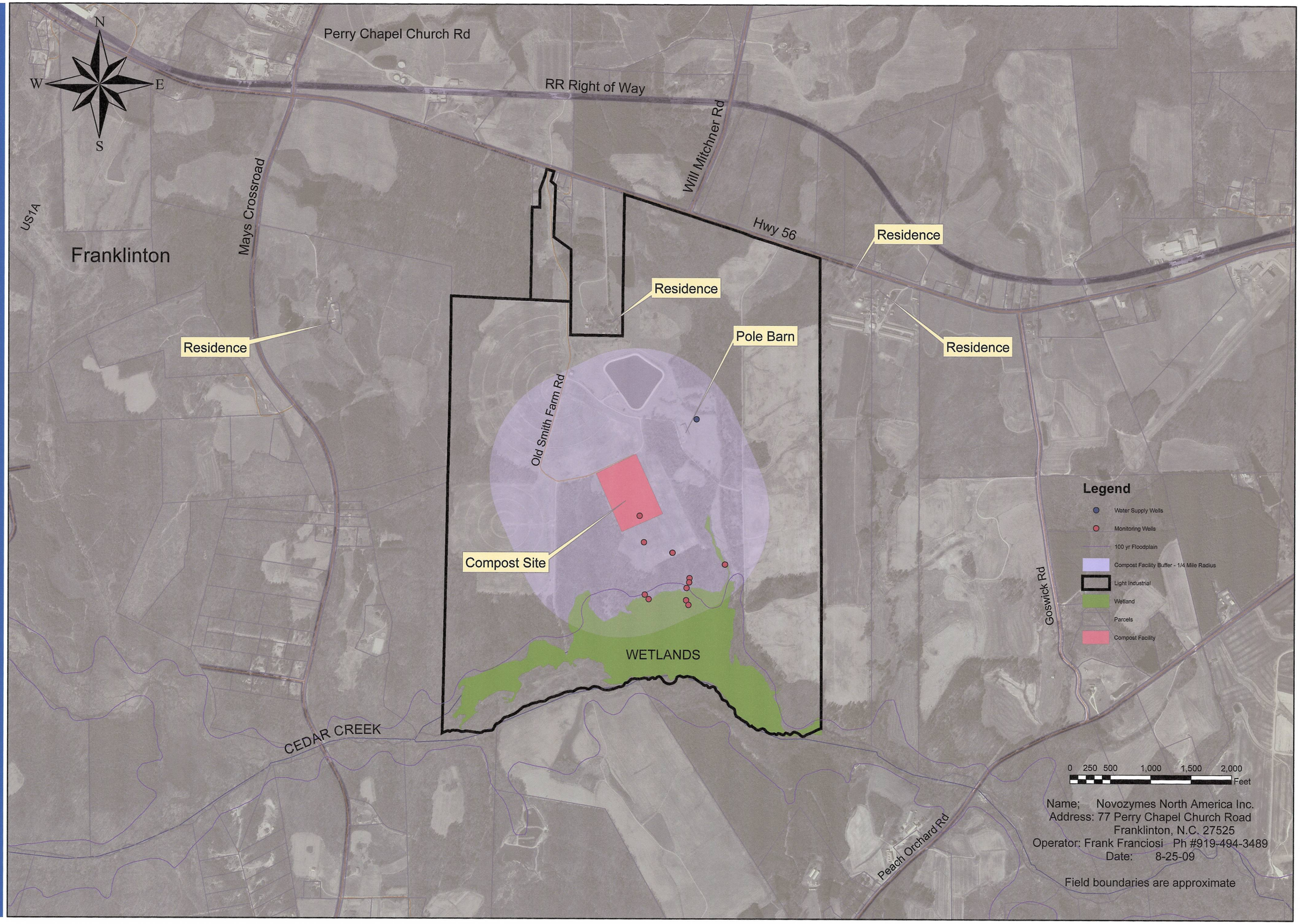
Novozymes, North America (NZNA)

Novozymes North America, Inc. State Road 1003 P.O. Box 576 Franklinton, N.C. 27525 USA Tel (919) 494-3000

Est. date: 03/30/03	COMPOSTING FACILITY
Engineer: J.B.CLAUSS,P.E.	GENERAL SITE PLAN
Scale: 1"=50 FEET	
Group no.:	FWC31001
Page no.:	

Q:\FWC31\DWG\FWC31001.dwg

Novozymes North America Inc. (NZNA)
Compost Site Permit
Permit No. SWC-35-04
Novozymes Location on Aerial Photo



Vers. 4 - UPDATE 2004

SOLVITA™ by WOODS END® RESEARCH

Recognized WORLDWIDE

OFFICIAL SOLVITA® GUIDELINE COMPOST MATURITY INDEX

The Solvita® procedure is a widely recognized and easy-to-perform compost test that results in a *Maturity Index*. The kit detects carbon-dioxide and ammonia levels which aid interpreting maturity which by common definition means *resistance to further decomposition* and *absence of phytotoxic compounds*.[1]

> THIS MANUAL UPDATES THE FOLLOWING PROTOCOLS:

- MOISTURE: We have downgraded concern about testing overly wet compost as Solvita results appear to be accurate to high levels of moisture.
- COLOR: We now recommend removing paddles from jar to read color.
- DENSITY: We have added a table to estimate packing density in the jar.
- AMMONIA: We have provided tables to estimate ammonia gas hazards.

The Solvita test can be used effectively for the following purposes:

1) To comply with state, governmental or trade standards that specify stability/maturity.[2]

2) For evaluating compost conditions in order to make improvements to the process.

3) To determine suitable end-use prior to distribution and sale of compost products.

Obtaining Satisfactory Test Results

Composts are by nature heterogeneous in terms of ingredients, texture and bulk-density. Therefore, great care should be exercised when obtaining, handling and preparing any sample for testing. If proper and reasonable precautions are taken, there is no reason why the test will not produce highly reliable results. A troubleshooting key is included as Appendix to help understand when results appear to be unusual.

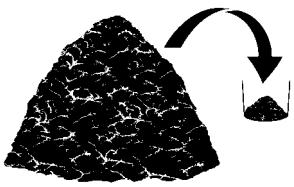
---

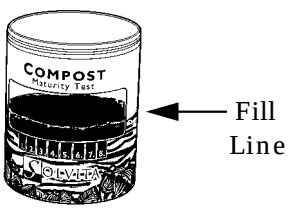
1. SEE Wang, P, C.M. Changa, M.E. Watson, W.A. Dick, Y. Chen, H.A.J. Hoitink (2004) Maturity indices for composted dairy and pig manures. Soil Biology & Biochemistry. Elsevier. 36: 767-776 (see www.woodsend.org)
2. Solvita is TMECC Test #05-08E (US Composting Council, Compost Test Methods Manual, 2002). Solvita may be used to fulfill 2 of 3 requirements for the California Maturity Index (a C:N test is also required).
** Solvita is approved or required in the following states and regions: CA, CT, ID, IL, KS, OH, MA, ME, MN, NJ, NM, TX, WA. In Europe Solvita is recognized in: DK, S, N, UK, IT. Also listed for EU Eco-Label.

Solvita® is a trademark of Woods End Research Laboratory, Inc.
Protected by one or more of the following patents: 5,320,807 - 6,391,262 - 6,780,646 and DE4416387AI

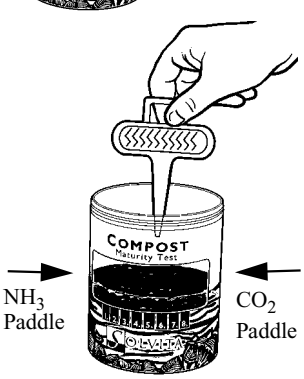
Copyright © 1999-2004 Woods End Research Laboratory, Inc.- PO Box 297 — Mt Vernon ME 04352
Technical support line 207-293-2457 Fax 293-2488 / Sales 800-451-0337 www.solvita.com

Detailed sampling instructions are available at: www.woodsend.org





lbs/ yd^3	kg/m^3	g / jar
600	300	30
800	400	40
1,000	500	50
1,200	600	60



SAMPLE PREPARATION

1. OBTAIN SAMPLE: Make a composite sample by mixing several sub-samples representing the compost to be tested.

2. SCREENING: Remove or screen-out wood chips and large fragments before testing. A $^3/_8$" (10mm) sieve is customary.

3. CHECK MOISTURE: Compost should only be tested when at ideal moisture for proper composting. Compost that is too dry may have suppressed respiration and therefore may give a false positive for maturity. Try the squeeze test[1].

4. LOAD COMPOST: Fill the Solvita jar to the indicated fill line. Samples are meant to be tested at field volume density. When compost is disturbed the porosity may increase. To get the proper density it is useful to sharply tap the jar while observing the fill line. Optionally, the proper weight in grams per jar of suitably moistened compost corresponding to actual field density is found in the table at the left.

5. EQUILIBRATION STEP: Let the sample "air-out" in the jar for one-hour prior to starting the test. If the sample was taken directly from a very hot or frozen pile, or if it needed remoistening after being too dry, then let it sit in the test jar overnight with the lid open before starting the test. This improves the reliability of the respiration reading.

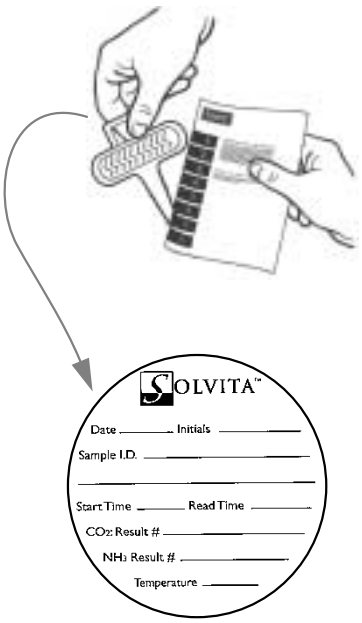
6. START TEST: The Solvita test is two tests in one, carried out in the same 4-hour period. Open the individual pouches marked "Compost CO_2" or "Ammonia" and carefully remove each paddle. The gel in the paddles is color-coded: the carbon-dioxide paddle is purple and the ammonia paddle is yellow. *Do not touch the special gel surface, and don't allow compost to touch it.* Once the gelpack is opened, the test should be started within 30-minutes as it will start absorbing gases from the atmosphere.

7. INSERT PADDLES: Both paddles are pushed into the sample in the jar according to the cue marks on the jar, and may be observed through the clear back panel. The edges of the paddles can be touching in the middle at about right angles. Push the paddle tips all the way into the compost to the bottom of the jar. Do not jostle or tip the jar which may coat the gel paddles!

---

1. **Squeeze test**: make a fistful of compost. Squeeze very hard. Moisture should appear between fingers but not drip out if compost is at the proper moisture content.

RUNNING THE SOLVITA TEST



For proper documentation, record the results on the removable Solvita jar labels and affix to the log sheet.

8. SCREW THE LID TIGHT, and keep the jar at room temperature (68—77°F or 20—25°C) *out of direct sunlight* for 4 hours.

9. READ THE GEL COLOR. At the correct time (4 hours) after the jar has been sealed, remove the paddles one at a time from the jar and hold next to the correct color chart. Compare the gel color to the numbered color scales, finding the closest match (half shades of color may also be read). Read within 5-minutes after removing from the jar. Color matching is best under fluorescent room light. Mark the results on the lid label on the jar.

10. FILL IN THE VALIDATION FORM: Provided in the kit is a removable lid label to aid in the documentation of the results from Solvita testing. A pre-punched monitoring sheet is provided along with the test kit. The Solvita lid label may be peeled off the jar after the test and affixed to the monitoring sheet and stored in a binder to document the test.

11. FIND THE MATURITY INDEX: Using both paddle numbers from the color chart, read the table below to find the intersection of the CO_2 and Ammonia values. See also Tables 2-3-4 to separately estimate ammonia content and ammonia hazards.

Table 1. Compost Maturity Index Table[a]

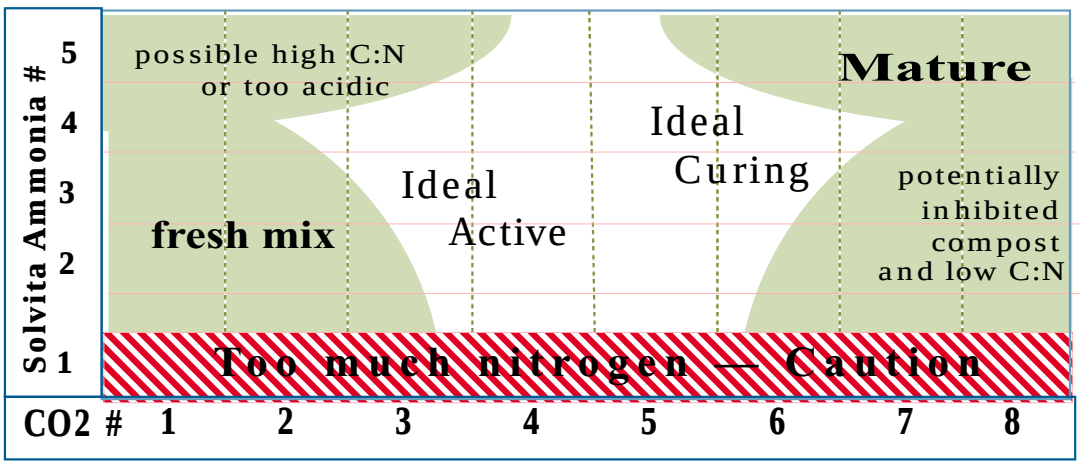
use the Ammonium and CO2 paddle color numbers and read across and down to where the columns meet

Solvita Ammonia Test Result is:		SOLVITA Carbon Dioxide Test Result is: 1	2	3	4	5	6	7	8
5	Very Low NH_3	1	2	3	4	5	6	7	8
4	Low NH_3	1	2	3	4	5	6	7	8
3	Medium NH_3	1	1	2	3	4	5	6	7
2	High NH_3	1	1	1	2	3	4	5	6
1	Very High NH_3	1	1	1	1	1	2	3	4

a. **Example:** If the NH_3 result is 2, and the CO_2 result is 6, then the Maturity Index is: 4

THE STATE OF COMPOST

The Solvita test uses ammonia to partly compensate for the CO_2 result which alone may not provide enough information about maturity. The graph below shows how to use both Solvita results together to deduce what the likely state of the compost is. Specific conditions may vary.



IF THE INDEX IS:	COMPOSTING PROCESS IS:	
8.	Inactive, highly matured compost, very well aged, possibly over-aged, like soil; no limitations for usage	"FINISHED" COMPOST
7.	Well matured, aged compost, cured; few limitations for usage	
6.	Curing; aeration requirement reduced; compost ready for piling; reduced management requirements. Solvita *6 and above is commonly recognized as suitable maturity for official uses*.	Curing
5.	Compost is moving past the active phase of decomposition and ready for curing; reduced need for intensive handling	"ACTIVE" COMPOST
4.	Compost in medium or moderately active stage of decomposition; needs on-going management	
3.	Active compost; fresh ingredients, still needs intensive oversight and management	Very Active
2.	Very active, putrescible fresh compost; high-respiration rate; needs very intensive aeration and/or turning	"RAW" COMPOST
1.	Fresh, raw compost; typical of new mixes; extremely high rate of decomposition; putrescible or very odorous material	

BEST USE OF COMPOST BASED ON MATURITY INDEX

There is an indirect relationship between compost maturity or stability and plant performance[1]. Generally speaking, plants perform better the more mature a compost is, unless other nutrient, salt or pH factors dominate. Solvita® Maturity Index can help identify the general best-use category, by consulting the following Table. The table also shows typical associations with other known soil amendments.

SOLVITA MATURITY INDEX	Raw Feedstock- Mushroom Compost	Landspreading on fallow soil; Mulch	Farm Row Crops, Field Cultivation	Hothouse Beds, Greenhouses	Orchards, Pastures, Hay Crops, Turf	Topsoil Substitute Blends	General Gardening	Bedding Plants, Container Media	Potting Mixes, Seedling Starters	Material in this class will be similar to:
8.					✔	✔	✔	✔	✔	soil & peat-based mixes
7.				✔	✔	✔	✔	✔	✔	soil mixes
6.				✔	✔	✔	✔			compost-soil blends
5.			✔	✔	✔					organic fertilizers
4.		✔	✔	✔						un-treated organic fertilizers
3.	✔	✔	✔							dehydrated manures
2.	✔	✔								raw-waste and most manures
1.	✔									raw-waste & some manures

Increase wait time prior to planting

Control Limit, CA, MA,

Control Limit: ID, WA, TX

Note: Factors that also determine how well a compost will perform include nutrients, nitrogen-availability, pH, and salinity. See the web site www.solvita.com for up-to-date information on other aspects of compost testing. The Solvita Ammonia Test may indicate potential to damage crops based only on ammonia levels and oxygen deprivation of growing media. Table 3 below helps estimate this potential. The actual damage depends on the rate of compost usage, the density and moisture at the time of application.

1. See footnote #1, Page 1 See also: Changa et al (2003) Assessment of the Reliability of a Commercial Maturity Test Kit for Composted Manures. Compost Science & Utilization 11:125-143

UNDERSTANDING AMMONIA CONTENT OF COMPOST

The Solvita® test kit separately determines volatile ammonia (NH_3) which is a sign of instability and potential phytotoxicity in compost. It is one cause of the characteristic odor in young composts and especially in manures. It is also a source of significant N-loss during composting. Ammonia results from protein and urea hydrolysis in presence of air and an elevated pH. If ammonia is not taken into account, a CO_2- respiration test alone over-estimates maturity. Ammonia may indicate several traits: the compost may be high in nitrogen or low in C:N ratio; it is immature, it is phytotoxic (i.e. capable to burn plants); and that a compost facility is noxious or hazardous. Table 2 below suggests the potential toxicity based on the Solvita color.

Table 2. Potential Phytotoxicity And Noxiousness Associated with Ammonia Gas

Ammonia Color No:	1	2	3	4	5
Potential Phytotoxicity is:	Very High	High	Medium	Slight	None
Noxious Hazard	Extreme	Severe	Moderate	Slight	None

There are two states of ammoniacal nitrogen in compost- the gas ammonia (NH_3) and the ion ammonium (NH_4). The ratio of the two depends on the pH of the compost. As a gas, ammonia can be fairly noxious and potentially plant toxic. In contrast, the ammonium form is an odorless, water soluble plant nutrient. Due to this dual nature of NH_3 - NH_4, where ammonia is usually just a fraction of total-ammonium, an estimate of total ammonium can be made if the pH and Solvita values are known. With a compost pH less than 8.0, there is usually little or no ammonia gas present. With a pH over 8.0, however, ammonia increases exponentially with each small rise in pH. The following table may be used to estimate the total ammonium-N (NH_3 + NH_4) content based on Solvita and pH. For quantitative results, lab tests are required.

Table 3. Estimating Total Ammonium-N (NH_4 + NH_3) in Compost, in ppm

Ammonia Color #:	1	2	3	4	5
Compost pH < 8.0	**n/a** (unlikely value)		up to 7,000	up to 5,000	less than 1,000
> 8.0	up to 30,000	up to 10,000	up to 5,000	up to 3,000	less than 1,000

Table 4. Compost Status Based on Ammonium-N and Solvita NH_3 Values

Ammonium level is:	> 10,000	3,000-10,000	1,000-3,000	< 1,000
Solvita NH3 Level	1 - 2	3	4	5
Compost Condition	Very Active	Med. Active	Curing	Mature

Composts that persist in Solvita ammonia values of 1-2-3 for lengthy periods) should be investigated for pH issues and low C:N ratio (too much nitrogen!). However, if the nitrogen is very low (i.e. high C:N ratio), then Solvita ammonia may be low even if the compost is not mature. ❑

Table Appendix. Compost Maturity Troubleshooting Guideline

Indicated Problem or Result	Possible Explanation	Possible Remedy
Compost is young but test results indicate "mature"	Compost may be very low in organic matter and have low overall respiration	Check organic content; add more organic-rich ingredients; check self-heating
	Compost may be inhibited by low or high pH; very dry or very hot prior conditions; check Solvita ammonia test	Check pH and VOA level; correct moisture; test again 1-2 days later
Compost is old but Solvita results indicate "active" and/or high ammonia levels	Compost may have composted improperly and not advanced significantly, e.g. it is too wet or too dry, too compacted, poor mix of ingredients, not enough air	Turn pile, loosen material, add moisture or "green" materials if needed; if high in ammonia select for field rather than seedling use
Compost has given the same Solvita colors on several tests at 1-2 weeks apart	Compost is not progressing properly— it may be too dry or too compacted, not well mixed; C:N or pH is too high or too low	If pile looks woody add green matter; add moisture if too dry; loosen if too dense
Different parts of the pile give different Solvita colors	Pockets of poorly mixed or poorly aerated material exist	Re-mix entire pile and re-sample and test again
Core is always #1 or #2 on Maturity Scale	Core is anaerobic and/or is not composting properly	Provide coarse structural materials, mix pile or add air; pile may be too large
Solvita colors indicate very "mature" but plants were hurt by compost	Compost contains high levels of salts, VOA or pH is too low	Check pH and conductivity before use; allow to compost more; allow to mature in soil before planting
Color doesn't match the color chart	Package may have leaked air prior to the test or is defective	Discard paddle and request replacement product
Unexpected CO_2 vs. ammonia paddle results	unusual or extreme conditions persist; check paddle quality	See table 2

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Technical support line 207-293-2457 Fax 293-2488 / Sales 800-451-0337 www.solvita.com

CLUES TO UNDERSTANDING COMPOST MATURITY

Compost maturity is commonly characterized as a state of compost that is conducive to good plant performance. Stability on the other hand is often defined as a rate of change with regard to a measured trait (e.g. heat, respiration-rate). Both terms- maturity and stability- are clearly interrelated and Solvita measures both conditions.

The relationship of compost maturity to plant growth, however, is not direct. There is no single property of finished compost that alone predicts plant growth. A compost may be mature but not viable for plant growth, and under some circumstances it may be immature yet produce good plants. The reasons for these varying qualities are factors such as pH, salt content or availability of nutrients, which may "confound" the direct relation of maturity to plant growth. Therefore, maturity in the Solvita sense is interpreted as being indirectly useful for plant growth by association with common traits we associate with finished compost: low respiration and absence of free ammonia. These aspects are commonly recognized by practising horticulturists and growers.

A significant trait of immature compost that does directly and negatively affect plant growth is depletion of oxygen in and around the roots[1]. Oxygen content relates directly to respiration rate measured by the Solvita CO_2- test. When compost is used heavily in containers, garden beds and potting trays, the respiration may produce symptoms typical of air starvation. Another trait of immature compost that acts directly as a toxicant is ammonia gas, which may burn plants and damage roots when present in appreciable amounts. This trait, however, is often remedied by blending compost with a lower pH soil or peat, whereby the gas (NH_3) is rendered to water soluble (NH_4) form, and is significantly less harmful. Therefore, the Solvita NH3 test provides a potential indication of harm, while also suggesting that noxious conditions exist directly in the compost.

Finally, properties of compost that are measured by Solvita may be interpreted to improve understanding of the process of composting, regardless of the use for plants. CO_2 respiration rate should decline significantly during composting as indicated by Solvita, and if it does not it may be a sign of poor and improper composting conditions. Also, ammonia is often high in early stages of composting and should normally decline, particularly in the late cure phase of composting when NH_3 should be converted by microbes to the plant nutrient nitrate form. High ammonia vapors are certainly noxious and are a health hazard. Therefore, the Solvita tests should also be thought of as expressing qualities and traits of compost that have intrinsic meaning for the process and for workers involved in it. ❑

QUALITY CONTROL & STORAGE OF SOLVITA KITS

Solvita kits are packaged to insure highest quality prior to shipping. The gel-paddles should be the "Control Color" when the foil pack is opened (see color chart). If the foil packs have been damaged or the jar is cracked then the test may not work properly. The kits may be used for up to one year from date of purchase. Shelf-life is extended by refrigeration. Do not allow to freeze.

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1. Brinton, W and E. Evans (2002) Plant Performance in Relation to Oxygen Depletion in Container Media of Varying Maturity. in **Microbiology of Composting**, Ed. Insam, Riddech, Klammer. Springer Press. New York, Paris, Berlin. (Chapter reprint available on the Woods End website: www.woodsend.org).

STA CHAIN OF CUSTODY INFORMATION

1. Reporting Instructions

1.1 Chain of custody forms and procedures are to be used with all USCC Seal of Testing Assurance (STA), environmental and regulatory samples. A chain of custody form is used to track sample handling from time of collection through laboratory analysis, and data reporting.

1.2 STA information for the chain-of-custody record includes, at a minimum:

1.2.1 Place and address of collection;

1.2.2 Name or customer ID of the sample;

1.2.3 Name of person(s) collecting the sample(s);

1.2.4 Signature of collector;

1.2.5 Sample type, (e.g., as described in TMECC 02.01 paragraph 9.3: point; composite; stratified; or interval);

1.2.6 Client sample identifier and special instructions such as requested preprocessing (e.g., sub-sampling, compositing, sieving);

1.2.7 Rank Feedstock Contents in Descending Order (optional). In the space provided beside each feedstock type, indicate the relative amount of feedstock which makes up the material represented by the submitted sample;

1.2.8 Date and time of collection;

1.2.9 Sample matrix, (e.g., compost, feedstock, mulch, etc.);

1.2.10 Composting operation type, (e.g., windrow, static pile, in-vessel, etc. Refer to TMECC Fig 02.01-A3 for additional examples of composting technologies);

1.2.11 Shipping temperature, (e.g., ambient, chilled with wet ice, or frozen with dry ice);

1.2.12 Requested analyses. Refer to the laboratory sample submittal form provided by your STA Laboratory for optional tests in addition to the minimum requirements for STA and/or State DOT samples. USE SPACES “A”, “B” and “C” TO SPECIFY THE REQUIRED LABORATORY PROTOCALS FOR REGULATED COMPOST MATERIAL. IT IS THE RESPONSIBILITY OF THE PARTY SUBMITTING THE SAMPLE TO INFORM THE STA LABORATORY OF SPECIFIC REGULATORY TESTING REQUIREMENTS;

1.2.13 Specific Feedstock and Operational Detail (optional). Use this space to more accurately describe feedstock types used and specific composting operation detail, (e.g., if manure is used as feedstock, indicate the specific type of manure: horse, feeder cattle, poultry litter, liquid swine, etc);

1.2.14 Signatures of the persons involved in the chain of possession.

OFFICIAL Seal of Testing Assurance Compost Sample Chain of Custody Form

US COMPOSTING COUNCIL

STA Laboratory:	Soil Control Lab	*Tel:*	831-724-5422
Address:	42 Hangar Way	*FAX:*	831-724-3188
		Email:	Frank@compostlab.com
City, State Zip code:	Watsonville, CA 95076		

Client/Reporting Company:	Novozymes Nature's GREEN-RELEAF	*Tel:*	919-494-3489
Contact Name:	Frank Franciosi	*FAX:*	919-494-1472
Billing Address:	PO Box	*Email:*	frfr@novozymes.com
City, State Zip code:	Franklinton, NC 27525-0576		
Send Results to:	Same as above		
City, State Zip code:			
Name or Source of Sample(s):	Nature's GREEN-RELEAF Compost		
Name of Person(s), Sample Collector(s):	Frank Franciosi		

LABORATORY USE ONLY *Storage Locations*

Freezer _____ Cold Room _____ Storage Shelf _____

_____ _____ _____ _____ _____ _____ _____ _____ _____

Sample Condition: _____

Temperature: _____ *Malodor:* _____ *Moisture:* _____

Sample Type: O POINT ✓ COMPOSITE O STRATIFIED O INTERVAL

P.O. Number: 3700031351

USCC Member: ✓YES O NO

SELECTION OF ANALYSIS. Refer to http://www.tmecc.org/cap/methods.html for details.
STA Suite; State DOT Tests (indicate State); A, B, C – Specify other tests in fields A through C, (e.g., tests required for regulated samples, etc.). NOTE ! *STA **analytical** results via the STA Compost Technical Data Sheet and this Chain of Custody form are submitted to STA program management.*

A STA Test	B	C

Client Sample ID and Special Instructions	*1. List Feedstocks 2. Check all that apply 3. List % by volume.* ***(Optional)***		*Collection Date/Time*	*Sample Matrix*	*Composting Operation Type*	*Shipping Temperature*	*Indicate Compost Analysis Requirements (*identify state)*					LAB USE ONLY *Job Number & Sample Status*
	✓ Green waste	Carcass	*Date:12-11-06*	Compost ✓	Windrow ✓	Ambient O	STA Suite	State DOT Identify State	A	B	C	
	Manure	Fish Waste		Feedstock O	Static pile O	Wet Ice O						
	✓ Food	Grease, Fats	*Time:10:45 am*	Mulch O	In-Vessel O	Dry Ice ✓						
	Biosolids	✓ Enzyme Res.		_____ O	_____ O							
	MSW	✓ Sawdust	*Initials:FF*	_____ O	_____ O							
	Wood											

INFORM THE STA LABORATORY AND SPECIFY THE REQUIRED LABORATORY TESTS WHEN SUBMITTING REGULATED COMPOST SAMPLES (please use spaces A, B and C provided above).

PLEASE PROVIDE SPECIFIC FEEDSTOCK AND OPERATIONAL DETAIL IN THE SPACE PROVIDED.
YOUR VOLUNTEERED INFORMATION PROVIDES USCC STANDARDS AND PRACTICES COMMITTEE WITH CRUTIAL DATA NEEDED TO BETTER UNDERSTAND THE COMPOSTING PROCESS AND COMPOST END USES.

Releasing Signature 1	Date	Time	Receiving Signature 1	Date	Time
Releasing Signature 2	Date	Time	Receiving Signature 2	Date	Time
Releasing Signature 3	Date	Time	Receiving Signature 3	Date	Time
Releasing Signature 4	Date	Time	Receiving Signature 4	Date	Time

US COMPOSTING COUNCIL

Seal of Testing Assurance

If it isn't STA compost.....

What is it??

Dear friend of composting and the environment:

The question posed above may, at first glance, appear to be a bit silly. However, if you really think about making compost, specifying compost or purchasing compost, don't you want to have more information than just the generic word "compost"? No one walks into a supermarket and buys a box of "cereal", or purchases a bag of "fertilizer" from the garden center. They seek out those products that provide them with a product description, a specific list of ingredients or contents AND instructions on how to use the product, where appropriate. Isn't this how every consumer product in this country is packaged and sold? Isn't this the way all commercial products are purchased too? Shouldn't these same common sense standards apply to compost products?

*The information contained in this packet explains the details of the United States Composting Council's ("USCC") **Seal of Testing Assurance ("STA") program.** The USCC's goal is to have all composters participate in this program AND to have **compost specifiers, regulators and users accept ONLY STA compost for their specific projects.** It is our belief that this program is of immense benefit to both composters and compost users. These reasons will hopefully become clear after reading this letter and the enclosed information.*

What is STA compost?

Every product that is purchased by consumers today both commercially and in their home, **EVERY PRODUCT,** from breakfast cereal to garden fertilizer comes furnished with basic product information that includes what is in the product and how to use it. We have come to accept and **EXPECT** this as the norm when making a purchase of any kind. STA certified compost comes furnished with this type of information.

What isn't STA compost?

STA compost is **NOT** a compost specification, per say. **It is a testing and information disclosure program.** There are many different types of compost, produced from a variety of different organic feed-stocks. These products look different and may perform differently in various applications and conditions. Keep in mind, that they all may be perfectly acceptable compost products **if used correctly**. Correct compost usage, however, is a function of having the appropriate product information. The consumer has a **RIGHT** and the composter has an **OBLIGATION** to make this information available prior to purchase.

US COMPOSTING COUNCIL

Seal of Testing Assurance

Why should composters participate in the STA program and why should consumers demand it?

- ***Improves the image and value of compost*** *– as a manufactured product, produced under controlled conditions BOTH uniform AND consistent*
- ***Improves field results*** *– provides compost users with the product quality and application information they need to use compost properly, and with optimum results*
- ***Promotes customer-oriented composters*** *– assists composters who are rigorously testing their compost products and providing end-use information to their customers to differentiate themselves from composters who are not*
- ***Improves customer satisfaction*** *– assists compost customers and specifiers make more informed purchasing decisions*
- ***Reduces the chance of additional regulation*** *– reduces the trend of state/national organizations towards the creation of additional compost regulation. This keeps operational and distribution costs down!*
- ***Provides a competitive advantage over non-STA compost products*** *– STA compost will become the norm as more and more composters participate in the program. What product would you specify or purchase given the choice?*
- ***Becomes an internal quality control program for composters*** *– allowing the composter to market their product and end users to purchase and that product with confidence*
- ***Standardizes laboratory test methods used to evaluate compost products*** *– allows composters, regulators, researchers and compost buyers/specifiers to better compare products being produced throughout the country*

Compost customers and specifiers, compost facility operators and regulators, and your plants and soil will all benefit from this program – a great advantage over non-STA certified facilities.

How does the STA program work?

The additional information enclosed with this cover letter includes all of the specific technical requirements of the STA program. Please read through this carefully and feel free to contact ***Al Rattie at 215-258-5259 (Turflife@aol.com)*** *or* ***Ron Alexander at 919-367-8350 (alexassoc@earthlink.net)*** *if you have any questions or require additional information.*

The STA program makes sense for the composting industry, the compost customer and the environment. We hope that you'll embrace it, promote it and participate in it!