

# Novozymes North America, Inc. Operation & Maintenance Manual February 2015

APPROVED DOCUMENT  
Division of Waste Management  
Solid Waste Section  
Approved June 21, 2016  
By D. Wilson  
Facility ID 3504-COMPOST  
Doc ID 26183 (permit)  
Doc ID 26185 (applic)



Prepared by:  
Frank Franciosi  
Composting Department Manager  
Novozymes North America, Inc.



NC DENR Division of Waste Management  
Tony Gallagher  
Solid Waste Permitting  
1646 Mail Service Center  
Raleigh, NC 27699-1646

February 13, 2015

Mr. Gallagher,  
The attached information is submitted on behalf of Novozymes North America, Inc. As per your instructions outlined in the document titled "Compost Facility Permit Application Guidance"; Novozymes is filing for a permit renewal.

**Novozymes North America, Inc. - Large Type 3- Composting Permit Amendment-Renewal**

Section 1-General Information

Novozymes North America, Inc. is formally requesting the renewal of its NCDENR-Division of Waste Management Large Type 3 Composting Operating Permit (SWC-35-04). The facility is located on company owned land at 445 Old Smith Farm Road in Franklinton, NC. The contact person for all correspondence is as follows:

Contact: Frank Franciosi-Composting Department Manager  
Owner: Novozymes North America, Inc.  
PO Box 576- 445 Old Smith Farm Road  
Franklinton, NC 27525-0576  
919-494-3489 [frfr@novozymes.com](mailto:frfr@novozymes.com)  
All correspondence and invoices should be sent to this contact

North Carolina – Professional Engineer Seal 042160  
Angela Walsh  
Novozymes North America, Inc.  
PO Box 576  
Franklinton, NC 27525-0576  
919-494-7056 [ANWA@novozymes.com](mailto:ANWA@novozymes.com)

Section 2-Siting Requirements

This information was provided with the original permit application and updated again in 2010.

Section 3-Design Plan

This information is provided in the updated Operations & Maintenance Plan.

Section 4-Operational Plan

This information is provided in the updated Operations & Maintenance Plan.

Section 5-Sediment & Erosion Control Plan

Not applicable for renewal.

*Novozymes North America, Inc.  
Composting Department  
77 Perry Chapel Church Road  
P.O. Box 576  
Franklinton, North Carolina 27525*

Section 6-Signature Pages

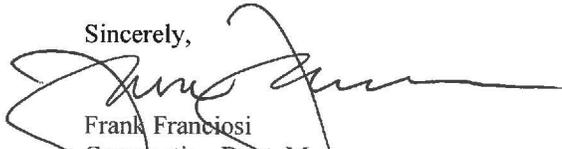
See attached.

Section 7-Drawings

Information was provided with the original permit application and not applicable for renewal.

Please contact me if you have any questions or concerns.

Sincerely,



Frank Franciosi  
Composting Dept. Manager  
Novozymes North America, Inc.

Enclosures:

2015 OPERATIONS AND MAINTENANCE MANUAL FOR COMPOSTING

Signature page of Applicant

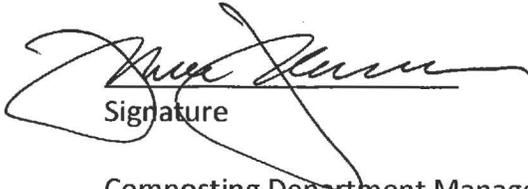
*Novozymes North America, Inc.  
Composting Department  
77 Perry Chapel Church Road  
P.O. Box 576  
Franklinton, North Carolina 27525*

Signature page of applicant –

Name of facility Novozymes North America, Inc. Composting Facility

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision and that the information provided in this application is true, accurate, and complete to the best of my knowledge.

I understand that North Carolina General Statute 130A-22 provides for administrative penalties of up to fifteen thousand dollars (\$15,000.00) per day per each violation of the Solid Waste Management Rules. I further understand that the Solid Waste Management Rules may be revised or amended in the future and that the facility siting and operations of this solid waste management facility will be required to comply with all such revisions or amendments.



Signature

Frank Franciosi  
Print Name

2-13-15  
Date

Composting Department Manager  
Title

Novozymes North America, Inc.  
Business or organization name



## COMPOST FACILITY PERMIT APPLICATION GUIDANCE

The completion of an application is required for the permitting or approval of all compost facilities, with a few exceptions. Permits are not required for backyard composting, certain farming operations, and certain small school projects (see Rule .1402 (g) and Rule .1409(d), <http://portal.ncdenr.org/web/wm/sw/compost>).

For Small Type 1 facilities producing mulch or compost, a permit is not required but a notification form must be submitted annually, instead of an application (<http://portal.ncdenr.org/web/wm/sw/yardwaste> ).

Other special cases of compost permitting are Residential and Summer Camps, Urban Farms, and Community gardens. Specific guidance for these sites can be found on our website: <http://portal.ncdenr.org/web/wm/sw/compost> .

If the majority (more than 50%) of the material to be composted, not including bulking material, is animal manure or sewage sludge, the permitting process is regulated through the Division of Water Resources (DWR), instead of DWM. John Risgaard, Unit Supervisor of the Land Application Unit of DWR, can be contacted at 919-807-6458.

For proposed new compost projects with new owners/operators, the Section recommends beginning the process as a compost demonstration, if the operation will initially be less than 2 acres. Application guidance for a compost demonstration is a separate document and can be found on our website, <http://portal.ncdenr.org/web/wm/sw/compost>.

The N.C. Compost Rules are located in 15A NCAC 13B .1400 et seq., and can be viewed online: <http://portal.ncdenr.org/web/wm/sw/compost>

Other Solid Waste Section Rules and related General Statutes are also linked on the website.

For compost facilities that require a permit, there are three types of permit actions:

A “new permit” means an application for a permit for a facility that has not been previously permitted by the Department.

A “permit amendment” means (1) an application for the five-year renewal of a permit for a permitted facility, or (2) an application that proposes a change in ownership or corporate structure of a permitted facility.

A “permit modification” means an application for a change to the plans approved in a permit for a compost facility, including an increase in facility capacity, or the addition of new feedstock materials.

A significant expansion or change in the boundaries of a permitted facility will be considered a new permit for permit fee purposes.

A complete application for a compost facility permit shall consist of drawings and other required information submitted in report format in a binder. Tabbed pages should separate the Sections in the report.

One paper copy and one electronic (pdf) copy of the application report should be submitted. The electronic copy can be sent by email, FTP, or on a CD. The drawings must be included in the electronic copy.

Permit fees are required for Large compost facilities, not for Small facilities (see Rule .1402 (f)(6) and (7) for definition). The permit fees for are as follows:

New Permit	\$1,750
Permit Amendment	\$1,250
Permit Modification	\$500
Annual Fee	\$500

An invoice will be mailed to the applicant when an application is received. A modification that involves only the addition of a new feedstock is considered a modification, but does not require a permit fee, unless that feedstock is unusual in nature and requires additional research as to its acceptability.

For a new permit application, or permit renewal application, a Compliance Review will be required of the owner and operator of the facility, in accordance with State statutes. After the application is submitted, the owner and operator will be sent a letter requesting compliance history information and parent, subsidiary, or other affiliate information, which is required in order to complete the application.

The Solid Waste Section reserves the right to ask for additional information as determined necessary.

Questions regarding an application should be directed to the Solid Waste Section, Phone 919-707-8200.

Applications should be sent or brought to the following address:

By Mail or Delivery Service:

NC DENR, Division of Waste Management  
Solid Waste Section Permitting  
1646 Mail Service Center  
Raleigh, NC 27699-1646

In Person:

NC DENR, Division of Waste Management  
Solid Waste Section Permitting  
217 West Jones St.  
Raleigh, NC 27603

An application for a new permit must address all Sections as listed below.

An application for a permit amendment (permit renewal) must address Sections 1, 3 (updated as necessary), 4, 6, and other Sections as applicable, in which any information contained in the original permit application is incomplete or has changed.

An application for a permit modification must address Sections 1, 3, 4, 6, and other Sections as applicable, in which any information contained in the original permit application has or will change due to the proposed modification.

Applications for a Large Type 3, Small Type 4, Large Type 4 facility, or a facility proposed to be located over a closed out disposal area, must be prepared and signed/sealed by a N.C. registered professional engineer.

For facilities not enclosed in a building, surface water run-off from the site will most likely require a stormwater and/or wastewater permit. It is important to contact Ken Pickle, Division of Energy, Mineral, and Land Resources (DEMLR), early in the permitting process to determine if a permit is required, and to begin the stormwater/wastewater permitting process. He can be reached at 919-807-6376 or [ken.pickle@ncdenr.org](mailto:ken.pickle@ncdenr.org). The main number for the DEMLR Permitting Unit is 919-807-6300.

## **Compost Facility Application Report Format and Contents**

Letter of transmittal, which states desired Department action (including whether the request is for a new permit, permit amendment, or permit modification)

Title page

Table of Contents

**Section 1 – General Information** - Provide a narrative discussion, including the following:

1. The name of the facility or proposed facility. Street address of the facility. Include the facility type: large or small, and Type 1, 2, 3, or 4.
2. Name, address, telephone number, and email address of the applicant/owner and contact person.
3. Name, address, telephone number, and email address of the landowner, if not the applicant. A landowner authorization form must be signed and notarized if the facility owner/operator is not the landowner (see attached form).
4. Name, address, telephone number, and email address of the engineer and/or composting consultant (if applicable).
5. Name, address, telephone number, and email address of person to receive permit fee invoices and annual fee invoices.

**Page 1 letter**

**Section 2 – Siting Requirements** – Provide a narrative discussion that includes the following items:

6. Location of the facility. If the property was previously used for solid waste management activities, provide a description of the operation including permit information and a map with boundaries. Describe the history of any solid waste permits and approvals issued.
7. Total acreage of the property and the size of the actual area to be used for the compost operation, to include active areas and storage areas.

8. In an appendix, provide a legal description of the property and a complete copy of the current land deed. Also provide a copy of any available current plats or survey drawings of the property. Reference these items in the text of this section.
9. Provide a copy of the USGS topographic quadrangle map of the area. The property boundaries of the site and the approximate composting and storage areas should be drawn onto the map. The map may be a high quality color photocopy and should show at least 0.5 mile surrounding the property boundary.
10. In an appendix, provide a letter from the appropriate City or County official confirming that the siting of the facility will be in conformance with all zoning and local laws, regulations, and ordinances, or that no such zoning, laws, regulations, or ordinances are applicable. Reference the letter in the text of this section.
11. Provide a copy of the FEMA Flood Insurance floodplains map for the area, with the site property marked on the map (appendix or within the section). Discuss compliance with Rule .1404 (a)(1).
12. For sites that potentially contain wetlands, provide a letter from the Army Corps of Engineers that addresses the wetlands determination for the property, and compliance with requirements, if applicable. Include letter in an appendix and reference the letter in the text of the section.
13. Discuss compliance with the buffer requirements of the Compost Rules, Section .1404 (a)(2) – (5) and (8). Buffer requirements apply to unloading areas, composting and curing areas, mixing/processing areas, and feedstock storage areas. Final product may be stored within the buffer.
14. Address compliance with Rule .1404 (a)(7), concerning sites located over a closed out disposal area.
15. Address compliance with the soil texture requirements or pad requirements of Rule .1404 (a)(10)(B)-(E).
16. For outdoor facilities, provide a soil evaluation of the site conducted by a soil scientist down to a depth of four feet, or to bedrock or evidence of a seasonal high water table, to evaluate all chemical and physical soil properties and depth of the seasonal high water table. Include the report in an appendix, and reference the report in the text of the Section.

Section 3 - Design Plan – Provide a narrative discussion, broken into appropriate sections, that includes the following items: **This information is provided in the updated O&M Manual**

17. List the types of feedstocks, residuals, bulking materials, and amendments to be accepted (for example, yard waste, land clearing debris, pre-consumer food waste, post-consumer food waste, grease trap waste, agricultural waste, etc.). Specify whether feedstocks and residuals will be accepted from the general public. Provide specific descriptions for all materials other than yard waste and land clearing debris. Provide the sources of all materials. If some materials are generated onsite, provide a description. Analytical data may be required for materials that could contain metals or other contaminants, such as commercial or industrial by-products. **O&M Manual Page 8 & Appendix**

18. Provide an estimate of the total amount of materials to be received at the facility per day, week, or month, in tons or cubic yards. Provide a general amount for the types of feedstock, carbon or nitrogen, to be received, per day, week, or month. Describe any seasonal variation for any of the materials. [O&M Manual Page 8](#)
19. Design capacity of the facility. The site capacity is the incoming volume, or throughput, per year, and is based on the compost method, duration of the process, and the size of the facility. Show calculations for Large facilities. [O&M Manual Page 3 & Appendix](#)
20. For Type 1 and Type 2 operations, describe plan for balancing the carbon and nitrogen ratio (“browns” and “greens”). For Type 3 and Type 4 operations, provide carbon to nitrogen ratio (C:N) testing and calculations. Describe and provide compost recipes. [Page 13](#)
21. A process flow diagram of the entire facility, including the type, size, and location of all major equipment, and feedstock flow streams. The flow streams should indicate the quantity of materials on a wet weight and volumetric basis. [Page 13](#)
22. Design and testing of a constructed pad, if needed to meet alternative soil texture requirements or distance to groundwater, in accordance with Rule .1404 (a)(10)(B)-(E). [On the original permit to construct original application.](#)
23. Grading and sloping of site surface to prevent ponding of water. [Pages 4-5](#)
24. The means for measuring, shredding, mixing, and proportioning input materials. [Pages 3,9 & 11-18](#)
25. Anticipated process duration, including receiving, preparation, composting, curing, and distribution. [Pages 11-18](#)
26. Location of all temperature, air and any other type of monitoring points, probe depth, and the frequency of monitoring. [Pages 19-20](#)
27. How the temperature control and monitoring equipment will demonstrate that the facility meets the requirements in Rule .1406 (10), (11), or (12), as appropriate for the feedstock. Include frequency and locations of monitoring points. [Pages 19-20](#)
28. The method of aeration provided and the capacity of aeration equipment. [Pages 19-20](#)
29. For outdoor facilities, surface water control features, including run-on and run-off. Describe plan for operation of the facility in wet weather. Surface water must be diverted from the operational, compost curing, and storage areas. For sites that will have run-off from the facility operation, a stormwater/wastewater permit will most likely be required (see page 2 for contact information). [Pages 4-7](#)
30. Process water or contact water (water and liquid that has come in contact with compost or feedstocks) may either be collected and disposed of separately, or for some facilities, it is possible that it may be combined with clean surface water run-off for discharge from the site with a stormwater/wastewater permit. Describe the collection, storage, and disposal of process water. Disposal could involve connection with a sanitary sewer line, or collection in a holding tank, with the liquid periodically pumped and removed from the site for proper disposal. [Pages 4-7](#)

31. Plans and specifications for the facility, including manufacturer's performance data for all equipment selected. **Summited in the Appendices with last permit revision.**
32. Describe any amendments to be added to the finished compost, if applicable, including the amount. For ash, provide analytical data. Describe storage of the amendments, maximum pile size, and methods to prevent surface water run-on and run-off, if applicable. It should be stated that samples for required compost metals analysis will be taken from the compost with the amendments added. **Page 20**
33. For Large Type 2, Large Type 3, and Type 4 facilities:
  - a. description and sizing of the storage facilities for amendment, bulking agent, solid waste, recyclables, household hazardous waste and finished compost. **Pages 17-18**
  - b. A description of the air emission and control technologies. Examples include an air mist or the application of 3 to 6 inches of cover over piles. For indoor facilities, describe how particulates are minimized. **Page 30**
  - c. A description of any recycling or other material handling processes used at the facility. **Pages 12 & 18**

**Section 4 - Operation Plan** – Provide a narrative discussion, broken into appropriate sections, that includes the following items:

34. A list and description of the equipment, scales, structures, tipping floor, water source for cleaning, hopper, and any other feedstock or compost management devices. Also describe equipment maintenance. **Page 26**
35. Site security and access control. Large sites must be secured by gates, chains, berms, fences, or other measures to prevent unauthorized entry. **Page 2**
36. Confirm that an operator will be on duty at the site at all times while the facility is open for public use to ensure compliance with operational requirements. **Page 10**
37. Confirm that access roads will be of all-weather construction and maintained in good condition. **Page 2**
38. Days and hours of operation, preparations before opening, and procedures to be followed after closing for the day. **Page 7**
39. Signs to be posted at the entrance. Signs must provide a description of the types of feedstocks and residuals received, the types of waste prohibited, operating hours, permit number, and emergency contact phone numbers. The sign should state that no hazardous waste, asbestos containing waste, or medical waste can be received at the site. State whether the site will receive feedstocks or residuals from the general public. **Page 7**
40. List of personnel required and the responsibilities of each position. For Large Type 2, Large Type 3, and Type 4 facilities, describe personnel training (site specific safety, remedial, and corrective action procedures) and recordkeeping of training records. **Appendices and Pages 10 & 29**
41. A narrative description of all operational activities, including but not limited to:

- d. Arrival of materials onsite, unloading, processing, mixing, storage, composting to meet PFRP and VAR, curing, testing, and final product storage. Describe the location that each of the activities take place, and the estimated time for composting and curing. [Pages 15-18](#)
  - e. Method for screening loads for unacceptable waste. Describe plan for handling incoming loads that contain unacceptable waste. Describe storage of the unacceptable waste, the frequency of removal of the waste (at least weekly), and final disposition. [Page 11 & 14](#)
  - f. Any special feedstock or residual handling (e.g., odorous residuals, liquid residuals, etc.). [N/A](#)
  - g. Any amendment to be added to the compost, how it will be stored, when it will be added, testing of the amendment, and testing of the compost after amendment. [Page 19](#)
  - h. Non-composting activities, such as grinding to make mulch, or to prepare materials for composting. [Page 19](#)
  - i. Pile sizes for feedstock, composting, curing, and final product storage (width and height). Length is unlimited within the permitted boundary of each area. Describe distance between rows, to provide access in the event of a fire. [On the site plan and on Pages 17 & 18](#)
  - j. Frequency of turning, for both composting and curing. [Page 14-15](#)
  - k. Moisture control monitoring, carbon to nitrogen ratio testing, porosity. [Pages 13-14 & 19](#)
  - l. The ultimate use for the finished compost, method for removal from the site, and a contingency plan for disposal or alternative usage of residues or finished compost that cannot be used in the expected manner due to poor quality or change in market conditions. [Pages 32-34](#)
  - m. For Type 4 facilities receiving mixed waste, a plan for removal and disposal of household hazardous waste from the waste stream. [Page 31](#)
  - n. A quality assurance plan for the process and final product which lists the procedures used in inspecting incoming material, monitoring, sampling and analyzing the compost process and final product, testing schedule, and recordkeeping requirements. [Pages 19-26](#)
42. Plan for maintaining facility property in a sanitary condition and actions to be taken to minimize noise, vectors, and air borne particulates. At the end of each operating day, the unloading area should be clean and all feedstocks should be processed/mixed or properly stored. [Pages 28-31](#)
43. Contingency plans for wind, heavy rain, snow, freezing weather and other extreme weather events, air pollution, equipment breakdown, spills, unusual traffic patterns, long-term power outages, cracks in concrete pads, etc. [Pages 28-31](#)

44. Describe odor control measures and steps to be taken in the event of unexpected offsite odors. [Page 30](#)
45. Describe operational activities for surface water and process water control features. For onsite tanks, frequency of pumping and removal. [Pages 4-7](#)
46. Plan for litter and dust control. Procedures to prevent blowing litter and dust from leaving the onsite management areas and from leaving the property. [Pages 30-31](#)
47. Plan for fire prevention and actions to be taken in the event of an accidental fire. Describe equipment provided to control accidental fires and arrangements made with the local fire protection agency to provide services when needed. [Page 28](#)
48. Describe compost testing, in accordance with Rule .1408(a). [Pages 23-24](#)
49. Describe compliance with the classification requirements in Rule .1407. [Pages 23-24](#)
50. Describe recordkeeping in accordance with Rule .1408 (b), (c), and (d). Recordkeeping should also include personnel training, inspection reports, and odor complaints and actions taken. The facility should also keep a copy of the permit, operations plan, and site drawings on site at all times. [Page 22 & Appendices](#)
51. An outline of reports to be submitted in compliance with the Rules. [Pages 26-28](#)
52. A description of the label or other information source that meets the requirements of Rule .1407(g). [Appendices](#)
53. Safety instructions. [Page 27](#)

#### Section 5 – Sedimentation and Erosion Control Plan

54. For new facilities or existing facilities with proposed construction modifications, provide a copy of the sedimentation and erosion control plan as required by local governments and/or the NC Division of Land Resources. If the plan is voluminous, provide an electronic copy only.

#### Section 6 – Signature Pages

55. Applicant signature page (see attached). [Attached](#)
56. If the landowner of the property is not the applicant, the attached certification form by the land owner is required.

#### Section 7 –Drawings

For a new facility or an existing facility with proposed modifications that would change the previously submitted drawing, provide drawings showing the compost facility. For Large Type 3, Small Type 4, and Large Type 4 facilities, engineering drawings should be prepared and sealed by a NC professional engineer. Drawings should be drawn to scale and include:

1. An aerial photograph, where one inch is less than or equal to 400 feet, accurately showing the area within one-fourth mile of the proposed site's boundaries with the following specifically identified. It may be included in the Siting Requirements Section, if it can be appropriately sized 11x17. The following should be drawn onto the map:
  - a. Boundaries of entire property owned or leased by the person proposing the facility;

- b. Location of all homes, wells, industrial buildings, public or private utilities, roads, streams, water bodies, intermittent streams/ditches, and other applicable information regarding the general topography within 500 feet of the proposed facility.
2. Site plan drawing where one inch is less than or equal to 100 feet that delineates the following:
  - a. Buffers to property lines, residences, wells, and perennial streams/rivers .
  - b. gates/fences or other access control features.
  - c. Existing and proposed contours, at intervals appropriate to the topography.
  - d. Location and elevations of dikes, trenches, basins, and other water control devices and structures for the diversion and controlled removal of surface water and process water.
  - e. Labeled areas for unloading, mixing, processing, composting, curing, storage, and final product storage. Illustrate the location of all piles onsite, including feedstocks, active compost, finished compost, and amendments.
  - f. Proposed utilities and structures/buildings, existing and proposed.
  - g. Areas for unloading, processing, active composting, curing, and storing of material.
  - h. Other physical characteristics of the site, as applicable.
3. For Large Type 2, Large Type 3, and Type 4 facilities, the site plan drawing should also show:
  - a. Access roads existing and proposed, details on traffic patterns.
  - b. Areas for unloading, processing, and storing recyclables, household hazardous waste, and other materials, where applicable.
  - c. Proposed surface and groundwater monitoring locations, if applicable.
  - d. Flood plains and wetlands located on the property.
  - e. Benchmarks.
  - f. Label ground cover, including any concrete pads.

All sides of storage areas for flammable feedstocks and residuals should be clear and drivable, to provide vehicular access in the event of a fire.

**OPERATIONS AND**  
**MAINTENANCE MANUAL**  
**FOR COMPOSTING FACILITY**

**Novozymes North America, Inc.**  
**77 Perry Chapel Church Road**  
**Franklinton NC 27525 United States**

**Prepared By:**

**Frank Franciosi**  
**Compost Department Manager**  
**FRFR@novozymes.com**  
**Phone: 919-3494-3489**

**February 2015**

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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 utilizes approximately 0.5 acre of space. The compost pad area is made up of 3.0 acres. Feedstock storage is estimated to utilize 1.6 acres. An additional 2.0 acres is available for curing, screening, and storage of product inventory. There is an additional 4.0 acres on this parcel designated as an Emergency Storm Debris site.

The site is secured by a private access road with two intermediate gates for entry and one large gate at the surrounding fence line. These gates are locked at the end of each work day. All access roads are maintained as all-weather surfaces.

### **B. DESIGN CAPACITY**

The site is designed to handle 60,000 cubic yards/yr (30,000 tons/yr) with future expansion to 100,000 cubic yards/yr (50,000 tons/yr) of feedstock materials. The approximate starting volume in production windrows is 15,000 cubic yards (7,500 tons) this could expand to 25,000 cubic yards (12,500 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

<b>Equipment Capacities</b>	
(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
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
Bakers Star Screen	100-150 cubic yards/hour
GMT Compost Manager Monitoring Program	N/A
<b>Site Capacities</b>	
Compost Aeration Capacity	5-15% oxygen/windrow
Active Composting Period	60 days
Curing Composting Period	30 days minimum
Current Annual Volume	60,000 cubic yards (30,000 tons)
Future Annual Volume*	100,000 cubic yards (50,000 tons)
Current Storage Capacity Active Windrows	15,000 cubic yards (7,500 tons)
Future Storage Capacity Active Windrows	25,000 cubic yards (12,500 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)

\*Future capacity volume is based on increasing the cubic volume of the windrows by purchasing a larger compost turner.

## **C. STORMWATER & LEACHATE MANAGEMENT SYSTEMS**

### **STORMWATER MANAGEMENT SYSTEM**

The site is designed to prevent any water from running on to the facility from external parcels by diverting water into ditches that surround the perimeter of the site. The production and storage areas are graded to maintain drainage toward the surface drains that discharge to the retention ponds. Ditches on the east and south side drain to the stormwater pond based on the sites designed slope. A 12-inch diameter compost filter sock has been installed along the lower perimeter of the site to prevent fine particles and silts from entering the 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 ponds. 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 positive flow to the stormwater retention pond. Rock check dams and compost socks are replaced on an as needed basis. Sediment materials collected are incorporated into new windrows. As a Best Management Practice (BMP), windrows are oriented to minimize surface erosion and to avoid water ponding between rows.

The second stage of treatment consists of a dry retention pond that is used to restrict the peak discharge of the 10-yr 24 hour storm event to levels predicted for pre-development conditions. This retention system reduces TSS and nitrogen loading due to the stormwater and provides a mechanism to remove any floating debris which might find its way into the stormwater system. The retention pond satisfies the requirements of the NC State stormwater regulations for water supply water sheds during peak discharge from 10-yr 24 hour storm events. 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 stormwater up to and including the 10-yr 24 hour storm. The conveyance channel on the upstream side of the Level Spreader aids in peak discharge reduction. The Level Spreader is a concrete structure, 300 feet in length, that discharges into a 50 foot 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 implemented at this facility reduce TSS load by 85%, during peak discharge from 1 year – 24 hour storm events.

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 grassed buffer strip is mowed to maintain a stable vegetative stand of grass. Weep holes in the structure are cleaned out to maintain seepage through the stone apron. Herbicides are applied to the concrete apron of the level spreader to control weed growth on the apron and maintain diffuse flow to the grassed buffer. A Standard Operating Procedure is in place for the operation and maintenance of this system.

### **Stormwater Management System Characteristics**

<b>Stormwater Retention Pond</b>	
Retention Pond Volume	9,537 cu. ft.
Total Volume (incl. pond and conveyances)	12,087 cu. ft.
Max Outflow to Level Spreader	19.9 cfs
Bottom Elevation	298 ft.
Liner	none
<b>Level Spreader</b>	
Storage Volume of Conveyance system	2,550 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 installed to prevent any rainfall from infiltrating the surface layer of the compost pad area. The leachate ponds are designed to hold and reuse water that leaches through the compost pad area of the compost site. The ponds are lined with a 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 moisture addition during the first phase of composting. This tank is also fitted to receive fresh spring water during long periods of dry weather.

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 checked frequently for depth levels. This process is done by visual inspection of the depth chain which is located in the first pond. The pond levels are

measured in the morning and the afternoon. The depth chain is marked in feet and inches. Below one foot depth is considered empty. When the level of the pond reaches 5 feet, action must be taken in order to bring the ponds' levels back down to a safe zone of operation which is at or below four feet. The ponds are considered full and run the risk of breaching the pond walls when the water level reaches 7 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 collects and 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.

**Leachate Retention Pond Characteristics:**

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 to NCDENR previously with the original permit to construct application. Some of this information is provided in the appendices.

**D. SIGNS FOR INSTRUCTION -**

Signs are posted at the entrance to the facility to direct traffic flow and provide safety instructions, limits on site access, 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

Hours of operation are 7:00am-4:00pm Monday-Friday

**E. WASTE COMPOSTED -**

Composting is limited to the following feedstocks:

1. Wood waste including both yard and land clearing debris
2. Sawdust
3. Agricultural plant crop residuals
4. Pre and postconsumer food residuals
5. Residual from industrial enzyme production
6. Residuals from drinking water treatment
7. New gypsum dry wall scrap wastes (ground on site)
8. Source-separated organic specialty wastes, as approved by  
NCDENR Waste Management Division

Note: We do not accept feedstocks from the general public.

<b>Feedstock Type</b>	<b>Average Monthly Tons</b>
Yard Waste & Land Clearing Debris	1,000
Enzyme Residuals	500
Sawdust	100
Food Residuals	500
Total	2,100

There are some slight variations in the seasonal flow of yard waste make up. During the spring and summer months there are increases in the volume of green materials (nitrogen) and during the late fall through the winter increases in brown (carbon) materials. We adjust our recipes based on this seasonal change by adding more carbon or more nitrogen to the mixes.

## **2. DESCRIPTION OF PRODUCTION**

### **A. EQUIPMENT AND PERSONNEL**

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

#### **a. Fixed Capital Equipment**

(1) – 35 cubic yard electric mixer

(1)-Platform truck scale

#### **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. 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. In total, the following personnel staff the Composting Facility:

- (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). He is also certified by the Solid Waste Association of North America (SWANA) as a Compost Systems Manager. All equipment operators are trained by the Compost Department Manager. Operators also attended “US Composting Council’s Compost Operator Training Course” as presented by the North Carolina Composting Council. Novozymes currently has 4 operators trained.

## **B. COMPOSTING METHOD**

We use the “Turned Windrow Composting Method” to compost the waste materials identified in section one. Windrows are constructed 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 approximately 2 feet during the active composting period. At this time,



feedstock materials placed in the Feedstock Storage Area for temporary storage 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 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 to receive 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 boiler fuel product. 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. Reuse water or liquid Novozymes Biomass Residuals (BMR) may be added at this time to increase moisture content if necessary. The mixer un-loads the mixed feedstocks 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. We use the Green Mountain Technologies Compost Calc software to develop and change composting recipes. This calculates volumes of each feedstock in the mix based on the following parameters.

- A Carbon to Nitrogen Ratio (C:N) (20-25:1)
- A moisture rating (50-65%)
- An oxygen rating (5-15%)
- A pH rating (5.5-8.0)
- A porosity rating (1.5-2.0)

A typical compost feedstock mix batch contains the following feedstocks:

Feedstock Type	Volume per mix batch (cubic yards)	Weight Per mix batch (lbs.)
Enzyme Residuals	3.0	6,000
Sawdust	6.0	600
Mixed Yard Waste	12.0	3,000
Leaves	6.0	2,000
Oversize screenings	6.0	2,000
Totals	30.0	13,600

This recipe is adjusted with seasonal variations of yard waste feedstock availability. The C:N is typically 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 or by adding addition carbon in the form of leaves and or yard waste. Moisture can be increased by the addition of reuse water at the time of mixing. Changes in the recipe can only be made by the Compost Dept. Manager. Recipe calculation and test data is provided in the appendix.

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

<b>Parameter</b>	<b>Acceptable Concentration (mg/kg, dry wt.)</b>
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	36
Zinc	2800

Windrows are constructed to be six feet high and twelve feet wide. 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, and 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 one pass and shift one row 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. The windrows are spaced at minimum two feet apart to provide adequate track space for the compost turner. The turner maintains a straight path when turning each windrow. When the turner reaches 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 an adjacent gravel surface protects the membrane and under-drain from potential damage by the turners tracks. A 25 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”. Vector Attraction Reduction (VAR) is demonstrated by showing a 38 percent reduction in volatile solids when mixing nitrogenous wastes with carbon feedstocks. Windrows are turned 5 times during the 15-day high temperature period (i.e. the compost has reached a temperature of 131°F) by using the compost turner or front-end loader. This maintains homogeneity and porosity during aerobic decomposition and prevents the growth of pathogens present in the feedstock materials. Turning frequency thereafter is based on moisture and oxygen levels. The biological activity is monitored by tracking both pile temperatures and oxygen levels. Pile temperatures are monitored two times per week, 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 and the average temperature is calculated. Readings are recorded to achieve the Process to Further Reduce Pathogens (PFRP) specification of 131°F over a 15-day period with a minimum of 5 turnings. Data is collected in the “Compost Manager” Software program. This program tracks the time and temperature as it relates to meeting both the VAR and PFRP requirements 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, analog thermometers are used and a hard copy of the data is recorded manually.

Oxygen levels within each windrow are 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 visually checked once per week 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 moisture content between 50-65%. The irrigation system pumps water through a main PVC line running perpendicular to the windrows to hydrants positioned at the end of the windrows. An irrigation reel mounted on the compost turner is connected to the nearest hydrant to access water. As the turner moves down the windrow it provides moisture addition directly to the compost with minimal run off. Windrows can be irrigated with the following source waters: an onsite spring, leachate retention ponds, stormwater detention pond, or the Novozymes spray irrigation water. Leachate pond water is only used during the first 15 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, as 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. Samples are collected every sixty feet along each windrow and preserved in accordance with US Compost Council Test Methods for Examination of Compost. The detail of this program is enclosed in the appendix of this document. Samples are taken at a depth of four feet. A composite sample is tested using an electronic pH meter. The pH of the compost is maintained between 5.5-8.0 standard units. This is an acceptable pH.

**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 lower C:N. 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 US Composting Council's Seal of Testing Program (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 boiler fuel product. The site has an overflow finished product storage area that can be used to store an additional 8,000 cubic yards (4,000 tons) of finished compost product. (See site plan showing area and dimensions of storage piles) Light weight plastic contamination is removed from the finished product during the screening process. This material cannot be recycled and is landfilled.

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 –(finished compost mixes)
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. Blended products are tested for EPA heavy metals.

### **3. QUALITY ASSURANCE PLAN**

#### **A. FEEDSTOCKS**

New incoming feedstock materials are visually inspected 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. The data is archived for a period of two years.

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 and are policed as necessary.
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 4 ft temperature probe. Temperatures are taken every sixty feet along the windrow. All readings are recorded and the mean windrow temperature is calculated.

### **2. Oxygen Content**

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

### **3. Percent Moisture**

Percent moisture readings are taken at the end of each week using the hand check method. The optimum moisture range for decomposition at this facility is 50-65%. The percent moisture indicates if additional irrigation of the windrows is needed. All readings are recorded. The on-site weather station is used to gauge rainfall.

### **4. Turning of Windrows**

Windrows are turned based on PFRP specifications and thereafter on moisture and oxygen levels. Turning frequency of each windrow is recorded in the Compost Manager Program.

### **5. Watering Amounts**

Weekly moisture readings determine the frequency of watering. The water source and amount applied in gallons is recorded in the Windrow Manager Program. Watering occurs only during the first 15 days of the active composting period.

## **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. Cleaning and clearing weep holes along level spreader.
- c. Controlling vegetative growth on stone apron of level spreader.
- d. Maintaining grass buffer on down slope of level spreader.

## **2. Testing Parameters**

Novozymes participates in the United States Composting Council's Seal of Testing Assurance Program, utilizing 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 , assuring 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
<u>Feedstocks</u> Hazardous Waste pH Soluble Salts Nutrients Moisture Content Organic Matter Content Regulated metals Carbon: Nitrogen Ratio Pathogens	Non applicable  Not required Not required Not required Not required  Not required  Not required Not required	Non applicable  Non applicable Non applicable Non applicable Non applicable  Non applicable  Non applicable Non applicable	New Feedstocks if warranted  Quarterly Quarterly Quarterly Quarterly  Quarterly  Quarterly Quarterly if warranted
<u>Active Compost</u> Temperature Turning of Windrows Oxygen Moisture Content	2 times/Week Based on temperature  Weekly Weekly	Non applicable Non applicable  Non applicable Not required	2 times/Week Based on temperature  Weekly Weekly
<u>Final Product</u> pH Soluble Salts Nutrients Moisture Content Organic Matter Content Regulated metals Maturity Stability Particle size Pathogens Solvita Maturity Index Man-made Inerts Carbon Nitrogen Ratio	Required Required Required Not required  Not required  Required  Not required Required Required Required Required Not required  Required Monthly	Bi-Monthly Bi-Monthly Bi-Monthly Bi-Monthly  Bi-Monthly  Bi-Monthly  Bi-Monthly Bi-Monthly Bi-Monthly Bi-Monthly As needed  Bi-Monthly Bi-Monthly	Quarterly Quarterly Quarterly Quarterly  Quarterly  Quarterly  Quarterly Quarterly Quarterly Quarterly As needed  Quarterly Monthly

A controlled copy of the permit, operations plan, and site drawings on site at all times. Testing and monitoring records are also accessible upon request.

### 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

Finished composted is graded using the criteria presented in Table 1 of section .1407 of the NC DENR Solid Waste Rules 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:

<b>Parameter</b>	<b>Maximum Allowable Concentration (mg/kg, dry)</b>
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 conducted to determine PFRP and reduction of organic matter as per Table 3 of section .1407 of the NC DENR Solid Waste Rules. 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 using methods outlined in Table 5, section .1408 of the NC DENR Solid Waste Management Rules.

## **8. Man-Made Inerts**

Finished product is tested at a minimum of once per quarter to meet the criteria of less than 1-inch in size.

## **E. ANNUAL PROCEDURES**

### **1. Annual Reporting**

An annual report summarizing procedures and activities that have taken place over the course of the year is prepared and submitted to NCDENR. This report is submitted by August 1 of each year to the following address:

**NC DENR-Division of Waste Management  
1646 Mail Service Center  
Raleigh NC 27699-1646**

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 1<sup>st</sup> to June 30<sup>th</sup> with the following information:

1. The facility name, address, and permit number,
2. The total quantity in tons, with sludge values expressed in dry weight, and type of waste received at the facility,
3. The total quantity in tons, with sludge values expressed in dry weight, and type of waste processed into compost,
4. The total quantity in tons and type of compost produced at the facility by product classification,
5. 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 removed for use,
6. Condensed monthly temperature monitoring to support compliance with Rule .1406 (12) (A), and
7. Results of tests required per Table 3 of Rule .1408 (a) (1). (d) of the NC DENR Solid Waste Rules. Condensed yearly totals of solid waste received and composted shall be reported back to the local government of origin for annual recycling reporting.

## **G. PERIODIC 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 occasionally dredge these structures. As this need arises the dredged material is re-incorporated into newly formed compost windrows and/or landfilled.

## **2. Compost Pad Maintenance**

Any areas on the compost pad that are low, rutted, or worn due to vehicle traffic will be patched or replaced. 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 a Preventative Maintenance Program based on the manufacturer's 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. Cleaning and power washing of equipment is done off site.

## **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 requirements, emergency procedures, lock-out and tag-out procedures, confined space protocols, 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. Inclement 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 material 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 small fires with fire extinguishers. Fire extinguishers are located on the outside of every loader, the turner, the grinder, the mixer area and on the inside of our office and site vehicles. 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: < 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: > 100 Gallons**

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. Odor, Dust, Noise, Vectors, Litter and Traffic

To date we have not experienced any complaints due to odor, noise or vector problems. Potential odor and noise problems should not be a factor based on the site's design and operation. There is a natural buffering of noise and wind via existing trees and vegetation. We monitor odor on a daily basis and use a troubleshooting guide established 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 ground yard trimming material with high carbon content or finished compost to act as a biofilter to control odor. The following is a decision chart used to correct odor problems.

<b>Cause of Odor</b>	<b>Action</b>
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.

The facility is only operated during normal business hours (7:00 a.m. to 4:00 p.m., Mon-Fri) to minimize nuisance noise problems.

The site is inspected daily for the presence of vectors. If vectors are discovered, a professional exterminator will be brought on site. Litter is controlled within the fenced-in areas of the site's boundaries and policed daily.

Our site location and design should minimize any traffic problems. The site is located off 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**

Incoming feedstock is 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 to receive household hazardous wastes.

#### **6. Non-Conforming Product**

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

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

## **5. PRODUCT MARKETING AND DISTRIBUTION PLAN**

### **PRODUCTS**

The facility generates three products available for sale or use on site: certified compost, special blends, and boiler fuel.

Our Certified Compost comes in three forms: Coarse, Medium and Fine, which are screened at 1/2inch, 3/8 inch and 1/4 inch, respectively. Special Blends are derived by mixing amendments with Certified Compost. Boiler Fuel is derived from grinding and screening clean wood.

#### **Certified Compost**

This product is produced by first selecting clean, source-separated biodegradable feedstock. Strict feedstock selection criteria ensure the finished product will be of desirable characteristics. 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 provides organic matter, is neutral in pH, is 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 a sample blend produced at this facility is an 80/20 mix of compost and sand/silt/clay mixture that can be used in landscape installation as backfill for planting trees and shrubs. These amendments are stored separately near the finish product storage piles in quantities needed to fill orders, as needed.

#### **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 Boiler Fuel.

## **MARKETS**

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

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

To maintain regular contact with customers, Novozymes maintains sales of compost to within a 150-mile radius of the facility. This allows for a stronger relationship with each customer by our sales team and provides faster response time to customers' needs and concerns.

## **DISTRIBUTION OF PRODUCT**

Novozymes Composting uses contract transportation for outgoing product. All products are shipped F.O.B. from our compost plant or are picked up by the customer.

## **ADVERTISING AND PROMOTION**

Our advertising and promotion are 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

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 include our research data, environmental stewardship, quality control, quality assurance, and proven testimonials. We advertise in Trade Journals, Association Newsletters and on the web.

Novozymes continues to support the Trade Associations by actively participating in seminars, trade shows, and conferences. Novozymes maintains a professional trade show booth for such exhibits. 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 (International Standards Organization) 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 and set objectives to continually improve environmental performance.

The site has been certified since 2000 and was most recently audited by an outside registrar in 2013. The audit indicated full conformance with the standard with only a couple of minor recommendations for further improvement.

Novozymes internal forms and documents used to comply with our ISO 14001 certification program are enclosed in the Appendices.

## **7. APPENDICES**

- Compost Recipe & Feedstock Data
- Novozymes ISO 14001 Documents
- Job Descriptions
- Product Labels



1/31/15

Compost Calc Recipe: Novozymes Nature's GREEN-RELEAF

Enzyme Residuals-WAS	3 cubic yards
Mixed Yard Waste	12 cubic yards
Sander Dust	3 cubic yards
Leaves	6 cubic yards
TOTAL:	30 cubic yards
Overall Density:	0.32 kg/liter
Overall Moisture:	55%*
Available Carbon: (8.33%)	1,366.09 pounds
Total Nitrogen: (0.41%)	67.39 pounds
Total C:N Ratio:	20:1

\*Moisture is adjusted up by adding water to the mix or down by adding dry carbon materials.



# Diagnostic Waste Report

*Client:* Novozymes Composting  
Dept.  
Attn: Frank Franciosi  
PO Box 576  
Franklinton, NC 27525  
Franklin County

*Advisor:* ,

*Sampled:*

*Received:* 01/05/2015

*Completed:* 01/09/2015

*Farm:*

[Links to Helpful Information](#)

Sample Information	Nutrient and Other Measurements																			
<b>Sample ID:</b> WAS-01 <b>Waste Code:</b> NCW <b>Description:</b> Non-Composted - Other <b>Comments:</b>	<i>Nitrogen (N) (ppm)</i>	<i>P (ppm)</i>	<i>K (ppm)</i>	<i>Ca (ppm)</i>	<i>Mg (ppm)</i>	<i>S (ppm)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Na (ppm)</i>	<i>C (ppm)</i>							
	Total N	72700	26200	11000	14100	2170	4760	23200	79.6	140	52.3	41.1	2020	353000						
	Total Kjeldahl N																			
	<i>Inorganic N</i>	<i>pH</i>	<i>DM (%)</i>	<i>SS (10<sup>-5</sup>S/cm)</i>	<i>EC (mS/cm)</i>	<i>CCE (%)</i>	<i>ALE(tons)</i>	<i>C:N</i>												
	<i>NH<sub>4</sub>-N</i>	6.07	14.4	505	5.05			4.86 : 1												
	<i>NO<sub>3</sub>-N</i>																			
	<i>Organic N</i>	<i>Ni (ppm)</i>	<i>Cd (ppm)</i>	<i>Pb (ppm)</i>	<i>Al (ppm)</i>	<i>Se (ppm)</i>	<i>Li (ppm)</i>	<i>As (ppm)</i>	<i>Cr (ppm)</i>	<i>Co (ppm)</i>	<i>Cl (ppm)</i>	<i>Mo (ppm)</i>								
	<i>Urea</i>	64.7	0.01	3.38																
<b>Application Method</b>	<b>Estimate of Nutrients Available for First Crop (lb / ton)</b>										<b>Other Elements (lb / ton)</b>									
	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>	<i>Ca</i>	<i>Mg</i>	<i>S</i>	<i>Fe</i>	<i>Mn</i>	<i>Zn</i>	<i>Cu</i>	<i>B</i>	<i>Mo</i>	<i>Cl</i>	<i>Na</i>	<i>Ni</i>	<i>Cd</i>	<i>Pb</i>	<i>Al</i>	<i>Se</i>	<i>Li</i>
	Broadcast	4.18	6.89	3.04	1.61	0.25	0.55	2.67	0.01	0.02	0.01	T		0.58	0.02	T	T			
Soil Incorporated	8.36	10.3	3.42	2.42	0.37	0.82	4.01	0.01	0.02	0.01	0.01		0.58	0.02	T	T				

**Agronomist's Comments:**  
Aaron Pettit 1/9/2015 1:47 PM

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



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



# Diagnostic Waste Report

Client: Novozymes Composting  
Dept.  
Attn: Frank Franciosi  
PO Box 576  
Franklinton, NC 27525  
Franklin County

Advisor: ,

Sampled:

Received: 12/01/2014

Completed: 12/08/2014

Farm:

[Links to Helpful Information](#)

Sample Information	Nutrient and Other Measurements																			
<b>Sample ID:</b> YWS-Q4 <b>Waste Code:</b> NCW <b>Description:</b> Non-Composted - Other <b>Comments:</b>	<i>Nitrogen (N) (ppm)</i>	<i>P (ppm)</i>	<i>K (ppm)</i>	<i>Ca (ppm)</i>	<i>Mg (ppm)</i>	<i>S (ppm)</i>	<i>Fe (ppm)</i>	<i>Mn (ppm)</i>	<i>Zn (ppm)</i>	<i>Cu (ppm)</i>	<i>B (ppm)</i>	<i>Na (ppm)</i>	<i>C (ppm)</i>							
	Total N	7950	1350	4910	19200	3800	1130	3320	698	81.6	12.5	23.9	83.3	340000						
	Total Kjeldahl N																			
	<i>Inorganic N</i>	<i>pH</i>	<i>DM (%)</i>	<i>SS (10<sup>-5</sup>S/cm)</i>	<i>EC (mS/cm)</i>	<i>CCE (%)</i>	<i>ALE(tons)</i>	<i>C:N</i>												
	<i>NH<sub>4</sub>-N</i>	4.61	48.4	176	1.76			42.8 : 1												
	<i>NO<sub>3</sub>-N</i>																			
	<i>Organic N</i>	<i>Ni (ppm)</i>	<i>Cd (ppm)</i>	<i>Pb (ppm)</i>	<i>Al (ppm)</i>	<i>Se (ppm)</i>	<i>Li (ppm)</i>	<i>As (ppm)</i>	<i>Cr (ppm)</i>	<i>Co (ppm)</i>	<i>Cl (ppm)</i>	<i>Mo (ppm)</i>								
	<i>Urea</i>	8.38	0	9.67																
<b>Application Method</b>	<b>Estimate of Nutrients Available for First Crop (lb / ton)</b>										<b>Other Elements (lb / ton)</b>									
	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>	<i>Ca</i>	<i>Mg</i>	<i>S</i>	<i>Fe</i>	<i>Mn</i>	<i>Zn</i>	<i>Cu</i>	<i>B</i>	<i>Mo</i>	<i>Cl</i>	<i>Na</i>	<i>Ni</i>	<i>Cd</i>	<i>Pb</i>	<i>Al</i>	<i>Se</i>	<i>Li</i>
	Broadcast	1.54	1.20	4.56	7.42	1.47	0.44	1.29	0.27	0.03	T	0.01		0.08	0.01	T	0.01			
Soil Incorporated	3.08	1.79	5.14	11.1	2.21	0.66	1.93	0.41	0.05	0.01	0.01		0.08	0.01	T	0.01				
<b>Agronomist's Comments:</b>																				
Aaron Pettit 12/8/2014 11:25 AM																				



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

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

Sample Information	Nutrient and Other Measurements														
<b>Sample ID:</b> SAW-Q4 <b>Waste Code:</b> NCW <b>Description:</b> Non-Composted - Other <b>Comments:</b>	Nitrogen (N) (ppm)		P (ppm)	K (ppm)	Ca (ppm)	Mg (ppm)	S (ppm)	Fe (ppm)	Mn (ppm)	Zn (ppm)	Cu (ppm)	B (ppm)	Na (ppm)	C (ppm)	
	Total N	57200	273	472	783	234	168	58.0	69.5	11.0	1.26	7.59	731	465000	
	Total Kjeldahl N														
	Inorganic N		pH	DM (%)	SS (10 <sup>-5</sup> S/cm)			EC (mS/cm)		CCE (%)		ALE(tons)		C:N	
	NH <sub>4</sub> -N		5.19	88.5	50			0.50						8.13 : 1	
Organic N		Ni (ppm)	Cd (ppm)	Pb (ppm)	Al (ppm)	Se (ppm)	Li (ppm)	As (ppm)	Cr (ppm)	Co (ppm)	Cl (ppm)	Mo (ppm)			
Urea		0.29	0.16	0.51											

Application Method	Estimate of Nutrients Available for First Crop (lb / ton)										Other Elements (lb / ton)									
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Ca	Mg	S	Fe	Mn	Zn	Cu	B	Mo	Cl	Na	Ni	Cd	Pb	Al	Se	Li
Broadcast	20.3	0.44	0.80	0.55	0.17	0.12	0.04	0.05	0.01	T	0.01			1.29	T	T	T			
Soil Incorporated	40.5	0.66	0.90	0.83	0.25	0.18	0.06	0.07	0.01	T	0.01			1.29	T	T	T			

**Understanding the Waste Report \*** - additional information: [www.ncagr.gov/agronomi/pdf/ufwaste.pdf](http://www.ncagr.gov/agronomi/pdf/ufwaste.pdf) & [www.ncagr.gov/agronomi/pdf/wasteguide.pdf](http://www.ncagr.gov/agronomi/pdf/wasteguide.pdf)

Nutrient concentrations and other data on this report are provided so that waste materials can be applied at agronomic rates, thereby supplementing or reducing fertilizer application and preventing environmental contamination. In reading the **Laboratory Results** section, remember that materials with < 15% dry matter (generally liquids) are analyzed as received; all other wastes are dried first. Values in the **Estimate of Nutrients Available for First Crop** section are based on the type of waste and method of application you specify and reflect the fact that only 40-60% of the nitrogen and 70-100% of other nutrients become available within one year of application. The remainder *may or may not* ever become available.

\* **ppm** = parts per million; **S** = siemens; **mS** = millisiemens; **T** = trace (<0.005 lb/unit); **EC** = electrical conductivity; **CCE** = calcium carbonate equivalence; **ALE** = agricultural lime equivalence; **pH** = acidity or basicity; **DM%** = % dry matter [for semi-solid and solid waste samples, this value facilitates conversion of dry-basis concentrations (ppm) back to wet-basis of original sample]; **C:N ratio** = carbon:nitrogen ratio.

# Summary of Requirements for ISO 14001:2004 February 24, 2005

This document provides a summary of the requirement of ISO 14001:2004, which is an international standard describing the specification and requirements for an environmental management system (EMS).

## **ELEMENT-BY-ELEMENT GUIDANCE**

### **ISO 14001 Requirement: 4.1 General requirements**

An organization must establish, document, implement, and continually improve their environmental management system and show how they meet all the requirements of this standard. The organization defines the scope of the EMS, i.e. the boundaries of the organization to which the EMS applies.

### **ISO 14001 Requirement: 4.2 Environmental Policy**

The organization must have a policy, or commitment statement, developed by top management relative to the scope of the EMS that conforms to the standard. This is generally a short statement that drives the remainder of the EMS. There are specific items that must be committed to in the policy, such as compliance with legal and other requirements, prevention of pollution, and continual improvement. In addition, the policy must be communicated to all employees, and others working on behalf of the organization, and be available to the public. The policy provides a framework for reviewing objectives and targets and be appropriate to the nature and scale of the entity included in the scope. This policy must be documented, implemented, and maintained. This means that it is kept current through the EMS review and continual improvement process, and is implemented through the remainder of the EMS elements.

### **ISO 14001 Requirement: Planning- 4.3.1 Environmental Aspects**

This element requires a procedure to identify environmental aspects and related impacts that the organization can control or have influence over, and determine those which are significant to the organization. ISO 14001 does not prescribe what aspects should be significant, or even how to determine significance. However, it is expected that a consistent and verifiable process is used to determine significance.

Aspects are defined as how an organization's activities products and/or services interact with the environment. An impact is how an aspect changes the environment. The intent of this element is to help the organization identify how it affects the environment, prioritize aspects, and use the EMS to manage, control, and improve upon the aspects. So the organization must ensure that the significant aspects are taken into account in the EMS.

In order to ensure that the system is continually improving and current, this information must be kept up to date.

**ISO 14001 Requirement: 4.3.2 Legal and Other Requirements**

This is a requirement for a procedure that explains how the organization obtains information regarding its legal and other requirements, and makes that information known to key functions within the organization.

The intent of this element is to identify the environmental legal and other requirements that pertain to its operations and activities so that the organization can ensure that they are taken into account in the EMS. In doing so, the organization must also determine how these requirements apply to the significant aspects.

**ISO 14001 Requirement: 4.3.3 Objectives, Targets, and Programs**

There is no requirement for a procedure in this element. However, there must be some process that ensures that the objectives and targets are consistent with the policy, which includes the commitments to compliance with legal and other requirements, continual improvement, and prevention of pollution. Also, the organization must take into consideration significant aspects, legal and other requirements, views of interested parties, and technological, financial, and business issues when deciding what it wishes to accomplish as an objective. The objectives and targets need to exist at whatever functions and levels of the organization, and be measurable, where practicable.

Management programs (MPs) are the detailed plans and programs explaining how the objectives and targets will be accomplished. These MPs usually note responsible personnel, milestones and dates, and measurements of success. Noting monitoring and measurement parameters directly in the MP facilitates conforming to 4.5.1 on Monitoring and Measurement discussed below. MP's are required for the objectives and targets in an EMS.

**ISO 14001 Requirement: 4.4.1 Structure and Responsibility**

ISO 14001 requires that the relevant management and accountability structure be defined in this element. Top management is expected to ensure that resources are available so that the EMS can be implemented, maintained, and improved. These resources include human resources, organizational structure, financial and technological resources, and others as needed.

Roles, responsibilities, and authorities must be defined, documented and communicated as appropriate.

The organization must denote the Management Representative who is responsible to oversee the EMS and report to management on its operation. This person(s) ensures that the EMS is established, implemented and maintained consistent with ISO 14001, and also reports to top management on the performance of the system including recommendations for improvement.

**ISO 14001 Requirement: 4.4.2 Competence, Training, and Awareness**

The key point in this element is to ensure that persons performing tasks that have or can have significant impact on the environment and/or relate to the legal and other requirements are competent to do those tasks. Competence is ensured through appropriate education, training, and/or experience.

The organization needs to identify training needs as they relate to the EMS, the significant aspects, and the legal and other requirements and make sure this training is provided (records of such are to be maintained). A procedure is needed that makes sure such persons are: aware of the need to conform with all EMS procedures and requirements and what they specifically need to do to do so; the significant aspects and the legal and other requirements associated with their respective responsibilities and why improved performance is beneficial; and the consequences of not following these procedures and requirements. In addition to job-specific knowledge, it is expected that all personnel within the EMS (including contractors) have general awareness on items such as the policy and emergency response.

**ISO 14001 Requirement: 4.4.3 Communications**

Procedures are required for both internal and external communications. Note that ISO 14001 only requires procedures, and allows the organization to decide for itself the degree of openness and disclosure of information. Whatever the decision is in terms of disclosure, the decision process must be recorded. There is a specific requirement that the organization consider external communications about its significant environmental aspects and record its decision.

For internal communications, the procedure needs to describe how it is done among the levels of the organization. For external communications, it has to describe how external communications are received, documented, and a response provided.

**ISO 14001 Requirement: 4.4.4 EMS Documentation**

This requirement ensures that the organization has documented the system in either electronic or paper form such that it addresses the elements of the standard, describes how the organization conforms to each element, and provides direction to related documentation. Not all ISO 14001-required procedures need to be documented, as long as the system requirements can be verified. However, documentation must be provided such that enough is available to ensure the effective planning, operation, and control of processes related to the significant aspects, and to demonstrate conformance to ISO 14001. Such documentation at a minimum includes policy, objectives and targets, a definition of the scope of the EMS, and other main elements.

**ISO 14001 Requirement: 4.4.5 Control of Documents**

The organization is required to control documents, such as system procedures and work instructions, to ensure that current versions are distributed and obsolete versions are

removed from the system. There is a requirement for a document control procedure that ensures documents are approved prior to use, are reviewed and updated as necessary, changes to versions are identified, that the current versions are available at points of use, that they are legible, identifiable, and that obsolete ones are so noted to avoid unintended use. It is acceptable to use documents of internal origin in the EMS, but those must be identified as being essential to the EMS and their distribution controlled.

**ISO 14001 Requirement: 4.4.6 Operational Control**

For this element, critical functions related to the policy, significant aspects, the legal and other requirements, and objectives and targets are identified and procedures and work instructions are required to ensure proper execution of activities. Requirements for communicating applicable system requirements to contractors also need to be addressed in these procedures.

The required procedures need to provide instruction such that the organization conforms to the policy, objectives and targets, the legal and other requirements, and addresses any impacts from significant aspects. Which procedures are needed can be determined by review of the significant aspects, objects and targets, the legal and other requirements, and policy and then deciding what must be proceduralized and documented to ensure that deviations from planned arrangements do not occur.

In regard to the contractors, the organization will need to establish procedures related to the significant aspects the legal and other requirements, of the goods and services it uses, and communicating the relevant elements of those procedures to the suppliers and contractors.

**ISO 14001 Requirement: 4.4.7 Emergency Preparedness and Response**

Although typically addressed through conventional emergency response plans, this element also requires that a process exist for actually identifying the potential emergencies, in addition to planning and mitigating them. Emergency incidents include those that may not be regulated, but may still cause significant impact as defined by the organization.

As part of continual improvement, it is required that the organization not only responds to emergency situations, but also reviews the emergency procedures and make improvements as necessary. This may involve periodic testing of emergency procedures, if practicable.

**ISO 14001 Requirement: 4.5.1 Monitoring and Measurement**

In order to properly manage the system, measurements must be taken of its performance to provide data for action. Procedures are required describing how the organization will monitor and measure key parameters of operations. These parameters relate to the operations that can have significant impacts, to monitor performance towards the objectives and targets, and to monitor conformance to the legal and other requirements and other EMS requirements.

Equipment related to environmental measurements, such as temperature and pH meters and pressure gauges, must be calibrated according to procedures, and records maintained.

**ISO 14001 Requirement: 4.5.2 Evaluation of Compliance**

The first part of this element (4.5.2.1) requires the organization to have a procedure(s) to periodically evaluate its compliance with applicable legal requirements as defined in 4.3.2. The organization will need to keep records of these periodic evaluations.

ISO 14001 in 4.5.2.2 also requires a similar evaluation for compliance with other requirements. Again these are defined in 4.3.2 and the procedure can be the same as, and even part of, 4.5.2.1.

**ISO 14001 Requirement: 4.5.3 Non-conformances, Corrective and Preventive Action**

This element requires procedures for acting on non-conformances identified in the system, including corrective and preventive action. A non-conformance is a situation where the actual condition is not in accordance with planned conditions. Someone not following a procedure, a regulatory non-compliance, or an incident, is all examples of possible systemic non-conformances. Non-conformances may be identified through audits, monitoring and measurement, and communications. The intent is to correct the system flaws by addressing root causes, rather than just fixing the immediate incident only. The standard also requires that trends in corrective actions be evaluated to see if deeper-rooted preventive actions can also be implemented.

The procedure needs to make sure the non-conformances are not only first addressed to mitigate environmental impact; but that further investigation occurs to determine their cause, and action taken to avoid it happening again. Preventive actions would then be those actions resulting from an evaluation as to why nonconformities are occurring and taking action to prevent their recurrence. The standard states that the corrective action is appropriate to the magnitude of the problem and the impacts encountered; to avoid either over-compensating or under-compensating for a problem.

The organization must record the results of corrective actions taken, and must also review the effectiveness of actions taken

**ISO 14001 Requirement: 4.5.4 Control of Records**

Records are expected to exist to serve as verification of the system operating and the organization's conformance to the standard and its own EMS requirements. Procedures in this element are required for the maintenance of records, and specifically require that records are identifiable, retrievable, safely stored, and legible, retained as appropriate, and traceable.

**ISO 14001 Requirement: 4.5.5 Internal Audit**

ISO 14001 requires that the system provide for internal audits. This procedure could include methodologies, schedules, checklists and forms, and processes used to conduct the audits. The purpose of this audit is to determine whether the system conforms to the requirements of ISO 14001 and the organization's own EMS detailed requirements, and if the EMS has been properly implemented and maintained. The procedure for internal audits has to address responsibilities and requirements for planning and executing the audits, reporting results, and what records will be generated (and maintained in accordance with 4.5.4). The procedures also address determination of audit scope, how often they will be conducted, and specifically how they will be done.

Auditors need to be selected such that it ensures objectivity and impartiality of the audit process.

**ISO 14001 Requirement: 4.6 Management Review**

This element requires that periodically, top management will review the EMS to ensure it is operating as planned, and is suitable, adequate, and effective. The organization needs to ensure that in the review: results of internal audits (EMS and compliance); external communications; environmental performance; status on objectives and targets; status of corrective and preventive actions; follow up on actions from prior management reviews; and changing conditions or situations; and recommendations for improvement are all discussed.

Results and records of management review include: agendas, attendance records, minutes, and documented agreed upon action items.

## COMPOST DEPARTMENT MIX SHEET

DATE:

INITIALS:

BATCH #

MIXER BATCH #1			
FEEDSTOCK	QTY	BUCKETS	RUNNING TOTAL
Woodwaste		BUCKETS	LBS
Foodwaste		BUCKETS	LBS
WAS		BUCKETS	LBS
SAWDUST		BUCKETS	LBS
TOTAL		BUCKETS	LBS
Overs		BUCKETS	LBS

MIXER BATCH #2			
FEEDSTOCK	QTY	BUCKETS	RUNNING TOTAL
Woodwaste		BUCKETS	LBS
Foodwaste		BUCKETS	LBS
WAS		BUCKETS	LBS
SAWDUST		BUCKETS	LBS
TOTAL		BUCKETS	LBS
Overs		BUCKETS	LBS

MIXER BATCH #3			
FEEDSTOCK	QTY	BUCKETS	RUNNING TOTAL
Woodwaste		BUCKETS	LBS
Foodwaste		BUCKETS	LBS
WAS		BUCKETS	LBS
SAWDUST		BUCKETS	LBS
TOTAL		BUCKETS	LBS
Overs		BUCKETS	LBS

MIXER BATCH #4			
FEEDSTOCK	QTY	BUCKETS	RUNNING TOTAL
Woodwaste		BUCKETS	LBS
Foodwaste		BUCKETS	LBS
WAS		BUCKETS	LBS
SAWDUST		BUCKETS	LBS
TOTAL		BUCKETS	LBS
Overs		BUCKETS	LBS

MIXER BATCH #5			
FEEDSTOCK	QTY	BUCKETS	RUNNING TOTAL
Woodwaste		BUCKETS	LBS
Foodwaste		BUCKETS	LBS
WAS		BUCKETS	LBS
SAWDUST		BUCKETS	LBS
TOTAL		BUCKETS	LBS
Overs		BUCKETS	LBS

MIXER BATCH #6			
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## 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 Screen        HRS: START \_\_\_\_\_ END \_\_\_\_\_
- PM Check for Turner        HRS: START \_\_\_\_\_ END \_\_\_\_\_
- PM-Safety for Grinder      HRS: START \_\_\_\_\_ END \_\_\_\_\_
- PM Check for Mixer

TURNING	Hours	CY's	Batch #		
Compost					
Irrigate					
BLEND	Hours	CY's	Mix Materials		
			COMPOST		
			SAND MIX		
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
Storm Pond		check		action	
Storm Pond		check		action	
Level Spreader		check		action	
Level Spreader		check		action	

---

## Compost Quality Records

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<b>Purpose</b>	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.
<b>External Documents</b>	Composting Department uses the Manufacturers manuals of the equipment as operating SOP for equipment. The Environmental and Composting Operations Manager or the 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.
<b>Quality Records</b>	<p>Information collected on approved forms, entered into databases, spreadsheets and/or prepared reports are considered as Quality Records if they are used to:</p> <ul style="list-style-type: none"><li>• Document the operation of the Compost Department equipment and processes.</li><li>• Meet requirements of stated issued environmental permits and operation permits for which the Compost Department has primary responsibility for assuring compliance.</li></ul>
<b>Control of Records</b>	<ul style="list-style-type: none"><li>• Hard copies of all completed forms are stored in binders in Compost trailer for the current year.</li><li>• PM documents are kept for 1 year. Forms are located under the relative equipment.</li><li>• Electronic data bases and spreadsheets are maintained on the R drive.</li><li>• Exception is the windrow monitoring folder which is maintained on the compost computer under C:\programfiles\windrowmanager. Hard copies of reports for the current calendar year are located in the Compost Trailer.</li></ul>
<b>Revision</b>	Corrected above link.

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## Compost Operations Training Program

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<b>Purpose</b>	The purpose of this document is to describe training background for the Compost Department.
<b>Description</b>	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.
<b>Department Structure</b>	Compost Operations personnel are divided into three categories: <ul style="list-style-type: none"><li>• Staff (Compost Manager, Environmental and Composting Operations Manager, Environmental and Composting Supervisor and Staff Assistant).</li><li>• Environmental Operations Lead Operators</li><li>• Environmental Operations Operators</li></ul>
<b>Training Program</b>	<p>Training programs will be provided for each employee to insure that the needed training to fulfil job duties is identified.</p> <p>Once per year, during the annual review process, the Employee's 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-evaluated 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)</p>
<b>Training Records</b>	<p>Environmental Operators:</p> <p>The Environmental and Composting Operations Manager 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. Training records for Environmental and Composting Operators are kept in the Administrative Assistants office.</p>

---

**Responsibility** The Environmental and Composting Operations Manager is responsible for defining and implementing the training program on an individual basis.

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**Revisions** Title changes made.

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## 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 troubleshooting. 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 Licenses approved by the North Carolina Department of Agriculture and Consumer Services. The certificate's of the Licenses are 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 Staff Assistant. They assign a system with the software so as to recognize the customer's within a data base.

Step	Action
1	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Step	Action
2	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Step	Action
3	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Step	Action
4	Once the customer is loaded or unloaded they return to the scale for weighting out.

Step	Action
5	<ul style="list-style-type: none"><li>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.</li></ul>
Step	Action
6	<ul style="list-style-type: none"><li>A carbon copy weight ticket is then issued for the customer.</li></ul>
Step	Action
7	<ul style="list-style-type: none"><li>The customer takes two copies, and two copies of the weight ticket are turned over to the Staff Assistant.</li></ul>

---

**Data Collection** All data collected from the above operation is turned over to the Staff Assistant for further processing.

---

**Troubleshooting** Troubleshooting guidelines are located in the manufacturer's manual.

---

**Revisions** Changed Administrative Assistant to Staff Assistant in 3 locations.

---

## Material Flow & Inventory Management

**Purpose** Describe the process of managing the flow of raw material and Inventory Management.

**Description** Proper placement of raw material and finished product is essential to a consistency of production flow. Raw material (also called feedstocks) consists of wood pallets, yard waste, sawdust, and waste activated sludge. Finished product consists of compost and Special Blends. The compost area is arranged into a sequence, to give production areas an easy access flow for raw material placement, production output and finished product placement.

**Operations:  
Raw Material  
and Inventory**

Step	Receiving of Raw Materials
1	<ul style="list-style-type: none"> <li>Customers carrying raw material enter the Compost Facility and drive up onto the weight scale.</li> <li>A beginning weight is taken by a scale operator. <b>Reference NZNA-CO-102, Operation of the weight scale.</b></li> </ul>
Step	Inspections
2	<ul style="list-style-type: none"> <li>Raw material is inspected by operators for Trash and Hazardous Waste before placement.</li> <li>Operators follow guideline from Recognizing Hazardous Waste or Suspect Waste in event they find anything out of the ordinary.</li> </ul>
Step	Placing of the Raw Materials
3	<ul style="list-style-type: none"> <li>Once the beginning weight has been recorded by the scale operator, the customer is directed to the holding area of the compost production site for Raw material placement.</li> <li>New customers are given a tour of the area by operators and shown where they will be placing the material when they arrive. Older and establish customers know where these areas are located and can go direct to this area with out help from the Operators.</li> <li>Any change to the Raw material placement area is a verbal approval by the Compost Manager or the Environmental and Composting Operations Manager with a verbal communication to customers.</li> </ul>

Step	Completion of the Placement of Raw Materials
4	<ul style="list-style-type: none"> <li>Once the Raw Materials have been placed in the proper location, the customer returns to the scale for an exit weight.</li> <li>Once the scale operator has recorded the exit weight a ticket is generated and issued to the customer for the total weight of the Raw Material.</li> <li>The final data for the total weight is then given to the Administrative Assistant for recording.</li> </ul>
Step	Month-end Inventory
5	Inventory of Raw Materials and finished product is taken at the end of the month by a member of the compost business unit and the responsible operator on site. Data collected from this is recorded <a href="#">W:\Compost Accounting\Inventory Template Sheet.xls</a>

**Raw Material Handling**

Step	Action	Responsible				
1	Drive truck carrying raw material onto weight scale	Customer				
2	Take beginning weight Reference: NZNA-CO-102 Operations of weight scale	Scale operator				
3	Direct customer to holding area	Scale operator				
	<table border="1"> <thead> <tr> <th>If...customer is</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>New</td> <td>Tour of area is given.</td> </tr> </tbody> </table>		If...customer is	Then...	New	Tour of area is given.
If...customer is	Then...					
New	Tour of area is given.					
	<table border="1"> <thead> <tr> <th>If...customer is</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>Established</td> <td>Customer can go directly to holding area.</td> </tr> </tbody> </table>		If...customer is	Then...	Established	Customer can go directly to holding area.
If...customer is	Then...					
Established	Customer can go directly to holding area.					
4	Inspect raw material for trash & hazardous waste.	Operator				
5	Deposit/Unload raw material in assigned location	Customer				
6	Drive empty truck to weight scale	Customer				
7	Take exit weight	Scale operator				
8	Issue weight ticket to customer of total weight of load received	Scale operator				

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9	Give copy to Staff Assistant	Scale operator
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**Revisions**

Changed Administrative Assistant to Staff Assistant.

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## OPERATION OF THE LOADERS

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**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	Start up and operator loader according to manufacturer's manual.
2	Shutdown loader according to manufacturer's manual.
3	Complete end of day information on NZNA-COM-009
4	Turn completed form into Staff Assistant.
5	Any repairs or major maintenance is done by the vendor and should be recorded in SAP.
6	Completed form is filed in binder by Administrative Assistant.

---

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

---

**Revisions** Step 3 changed from Administrative to Staff and Step 5 added wording and location to record repairs.

---

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## 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 used 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.

---

### Operations

Step	Action
1	Start up and operate Grinder according to manufacturer's manual.
2	Shut down Grinder according to manufacturer's manual.
3	Complete end of day information on NZNA-COM-009
4	Before any repairs are done NZNASafe-5.02 Lock Out Tag Out Procedure must be followed.
5	Any repairs or major maintenance should be recorded in SAP
6	Turn complete form into Staff Assistant.
7	Complete form is filed in binder by Staff Assistant.

---

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

---

**Revisions** Deleted last sentence under description. Added Step 4 concerning Lock Out Tag Out. On Step 5 changed place to record repairs. Changed Administrative to Staff Assistant.

---

## 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	Receive recipe from Compost Manager.
2	Start up and operate Mixer and Conveyor according to manufacturer's manual.
3	Load mixer.
4	Open discharge door.
5	Close discharge door once truck is full.
6	Take truck with batch load to windrow area.
7	Record amounts of raw material in buckets on Form NZNA-CO-004.
8	Shut down Mixer according to manufacturer's manual.
9	Before any repairs or maintenance is done following NZNASafe 5.02 Lock Out Tag Out Procedure.
10	Any repairs or major maintenance should be recorded in SAP
11	Turn complete form into Administrative Assistant.
12	Complete form is filed in binder by Administrative Assistant.

---

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

---

**Revisions** Added Step 9 concerning Lock Out Tag Out, On Step 10 changed where repairs and maintenance should be recorded, changed administrative to Staff Assistant.

---

## PURPOSE OF WINDROWS

---

**Purpose** This document gives guidelines on how to build windrows for the production of compost.

---

**Description** Mixed feedstocks from the Compost Mixer are transported via truck or loader to the northwest corner of the Compost Production Pad. The Compost Facility is presently designed for 15 windrows with the average length between 500-575 feet long, 5-6 feet in height and 12 foot in width.

---

**Operations**

Step	Action
1	Operators will start windrows with a batch sequence number.
2	Mix material is carried over from the Mixer by either a box truck or a Front-end loader to the Northwest part of the Compost Production Pad.
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-COM-009.
2	Enter data into Windrow Manager software program.
3	Turn completed form into Staff Assistant.
4	Review completed form.
5	File Form.

---

**Revisions** Changed Administrative to Staff Assistant.

---

## WINDROW MANAGEMENT & MONITORING OF WINDROWS

**Purpose** This document describes 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 2 times/week, the moisture 1time/week and the pH 1time/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 Windrow Manager 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 composite samples from each Windrow.
2	Take samples to compost lab to determine the dry and wet weight of the Windrows by using compost oven. As per page 21 of the Composting Facility Operations & Maintenance Manual.

**pH Monitoring and Measurement**

Step	Action
1	Compost sample is taken from the Windrows and shipped to the North Carolina Department of Agriculture Soil Labs. As per 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 need to reach 131 F for a 15 day period. Below 131 F consult page 31 of Compost Facility Operations & Maintenance Manual for guidance.

---

2	An oxygen rating between 5-15% is optimum. Below 5% need to turn the windrow more frequently or add more bulking material to increase porosity.
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**

Steps Changed.

---

## 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 1 time a week. Turning frequency can be increased or decreased based on windrow moisture and achieving PFRP (Process to Reduce Pathogens) as per the permit. The Compost Facility presently uses a Backhus 16.43 Turner with an Indexer. The Indexer is used to pick up and displace windrows across the compost pad into the post process area to be screened and stored for curing.

---

### Operations

---

Step	Action
1	Start-up and operate Turner and Indexer according to Manufacturer's manual.
2	Shut down Turner and Indexer according to Manufacturer's manual.
3	Complete end-of-day information on NZNA-COM-009.
4	Any repairs or major maintenance should be recorded in SAP.
5	Turn completed form into Staff Assistant.
6	Completed form is filled in binder by Staff Assistant.

---

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

---

**Revisions** Changed where repairs and maintenance are recorded, and changed Administrative to Staff Assistant.

---

---

## 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 1 time a week. Turning frequency can be increased or decreased based on windrow moisture and achieving PFRP (Process to Reduce Pathogens) as per the permit. The Compost Facility presently uses a Backhus 16.43 Turner with an Indexer. The Indexer is used to pick up and displace windrows across the compost pad into the post process area to be screened and stored for curing.

---

**Operations**

---

Step	Action
1	Start-up and operate Turner and Indexer according to Manufacturer's manual.
2	Shut down Turner and Indexer according to Manufacturer's manual.
3	Complete end-of-day information on NZNA-COM-009.
4	Any repairs or major maintenance should be recorded in SAP.
5	Turn completed form into Staff Assistant.
6	Completed form is filled in binder by Staff Assistant.

---

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

---

**Revisions** Changed where repairs and maintenance are recorded, and changed Administrative to Staff Assistant.

---

## 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 Backers Star Screen for the purpose of screening the compost from the Windrows.

**Operations**

Step	Action
1	Start-up and Operate Screen according to Manufacturer's manual.
2	Take one bucket at-a-time of mature compost from Windrow using a loader. Reference: NZNA-CO-104.
3	Final product is moved to curing and finished product area on Compost pad.
4	Final product to be accounted for in inventory at that time.
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-COM-009
8	Before any repairs or maintenance is done NZNASafe 5.02 Lock Out Tag Out Procedure should be followed.
9	Any repairs or major maintenance should be recorded in SAP.
10	Turn completed form into Staff Assistant.
11	Completed form is filed in binder by Staff Assistant.

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

**Revisions** Added Step 8 adding Lock Out Tag Out Procedure, changed where to record maintenance and repair, and changed Administrative to Staff Assistant.

## 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 checked 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 foot is where the ponds are considered full and run the risk of breaching the pond walls. At the 3 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 which 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 rainfall 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 (NZNA-COM-009). If the ponds are at the 3 foot level, the Manager of Environmental and Composting Operations or the 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 (NZNA-COM-009). If the ponds are at the 3 foot level the Manager of Environmental and Composting Operations or the Compost Manager is notified. Turn in the sheet at the end of the work day to the Administrative Assistant.

---

Step	Record Keeping.
3	Data associated with the Leachate ponds is recorded on the Composting Dept. Operator Worksheet (NZNA-COM-009). Composting Dept. Operator Worksheet (NZNA-COM-009) is turned into the Administrative Assistant 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 Manager of Environmental and Composting Operations or the Compost Manager.

---

**Revisions** Steps changed.

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## 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

<b>1</b>	<ul style="list-style-type: none"><li>• Check to make sure there is power at the tank by looking at the control panel.</li><li>• The panel should be displaying the tank level in red LCD number.</li><li>• If there is no power to the panel, issue a work order notification for the maintenance department to investigate the problem.</li><li>• If there is power then check the panel at the tank to see if the pump switch is in the auto or manual position.</li><li>• If in the manual position push the reset button and then the start button.</li><li>• If pump starts but you still have no water, check the manual water value under the tank to make sure it is open.</li><li>• If switch is in the auto position, push the reset button and then the start button.</li><li>• If pump starts and no water, check the manual value under the water tank to make sure it is open.</li><li>• 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.</li></ul>
<b>Step</b>	<b>Water running out of the top of the Tank.</b>
<b>2</b>	<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li></ul>

**Revisions**

No revisions needed.

## Leachate Water Pumping, *Continued*

**Pumping operations**

Step	Action
1	Place pump at gate of leachate pond with suction hose connected to suction side of pump and connect discharge hose to discharge side of pump. Open door on bottom of white tank and close the two ball valves with the green valve wrench.

2	Lay discharge out around storm water pond dam and connect hose to the first irrigation hydrant located next to the concrete pad in the compost field to the west side of the compost facility.
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3	Go to the last hydrant and connect hose to hydrant so that it will not impede compost production. Lay hose along drainage ditch and head north toward the hydrant in the north west corner of facility and connect to hydrant.
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4	Open and close the proper valves and open hydrants that are connected. Open valve # FUC98AV516 in G1 and close valve # FUC98AV517 that goes to G2. Also at the base of lagoon 3 open valve # FUC98AV514 the valve on left and close valve # FUC98AV515 to the right. Go to the back of lagoon pump house and open discharge valve on metal pipe that comes out of the building and allows leachate water to get to lagoon.
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*Continued on next page*

## Leachate Water Pumping, *Continued*

**Pumping operations  
(continued)**

<b>5</b>	Return to leachate pond and check oil and fuel level in pump. Make sure drain plug is in place on bottom of pump.
<b>6</b>	Prime pump by removing cap from pumping chamber and pour water in and install cap back.
<b>7</b>	There is a butterfly valve on discharge side of pump that needs to be closed during the priming of pump. Crank pump. Once the water gets to the pump butterfly valve needs to be opened about 4 notches to allow water to move into discharge hose. As the discharge hose fills gradually open butterfly valve until completely opened.
<b>8</b>	Walk around compost facility following discharge line looking for leaks or problem areas. It will take several minutes for water to reach lagoon 3.
<b>9</b>	Return to pump every 1-2 hours to refill and to monitor process.
<b>10</b>	At end of day let compost operators know what the leachate pond level is so that level can be recorded on NZNA-COM-009 and close all valves and hydrants that were opened.

**Upset conditions**

If pump is not primed properly the pump will not begin to move the water and if not corrected this could cause damage to pump. Also if hydrants and valves are not set prior to start up, dead heading and damage to underground distribution lines could occur. If rainy weather persists, other pumping options may have to be implemented by the Environmental and Composting Operations Manager.

**Responsibility**

This procedure is the responsibility of the Environmental and Composting Operations Manager. Implementation of this procedure is the responsibility of operators assigned to compost and irrigation. The Environmental and Composting Operations Manager is responsible for the approval of this procedure.

*Continued on next page*

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## Leachate Water Pumping, *Continued*

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**Revisions**      None.

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## COMPOST CONTAINER TRUCK

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**PURPOSE** To establish a procedure for the operation of the container truck (KEN-WORTH) or (PETERBILT).

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**SCOPE** This procedure covers operations and responsibility of the truck

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**DESCRIPTION** The compost department has a Kenworth and Peterbilt hoist lift truck that will pick up metal containers. These containers are brought back to the compost facility and then dumped in the appropriate spots. The container holds wood-waste and waste activated sludge (WAS) and filter pads. These trucks are normally operated by Novozymes Environmental Operation Operators that have their Class B CDL license.

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**OPERATIONS** Operation of these trucks should be done by following manufacture's owner's manuals and by following all state and federal licensing guidelines. Daily inspections of the operating equipment in accordance with state and federal law shall be followed. Operations of the hoist and truck should follow the procedures that are at the compost trailer.

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**DRIVER'S RESPONSIBILITY** The truck(s) and boxes that are picked up are the responsibility of the operator assigned to the truck and Novozymes Composting Dept.

It is up to the operator to advise the Environmental and Composting Operations Manager if there is a problem with a box, the weight of a box or anything else involving the truck i.e. tires, brakes and damage done to anything on the truck or to a customer's site.

If a box looks too heavy or looks out of compliance the driver should let the customer (i.e. WAS box) know so that any messes or spills can be handled properly.

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**Documents** Kenworth and Peterbilt owner's manuals, Galbreath hoist manuals, North Carolina DMV inspections

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*Continued on next page*

## COMPOST CONTAINER TRUCK

*Continued*

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**Responsibility** This procedure is the responsibility of the Environmental and Composting Operations Manager. Implementation of this procedure is the responsibility of the Operator assigned to the trucks.

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**Revisions** Changes made to feedstocks, titles and approvals.

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## NZNA Composting Facility Level Spreader

### Purpose and Application

A level spreader is a Stormwater Best Management Practice (BMP) constructed at a virtually zero (0 %) grade across the slope consisting of a permanent linear structure used to disperse or "spread" concentrated flow thinly over a vegetated or forested riparian buffer or filter strip. Its purpose is to spread concentrated water over a wide enough area so that erosion of the vegetated buffer or filter strip does not result (e.g., mitigate downslope erosion and ponding). It can reduce erosion and the movement of sediment. An additional benefit of a level spreader is to remove nutrients and other pollutants from runoff by filtration, infiltration, absorption, adsorption, decomposition, and volatilization.

This practice applies:

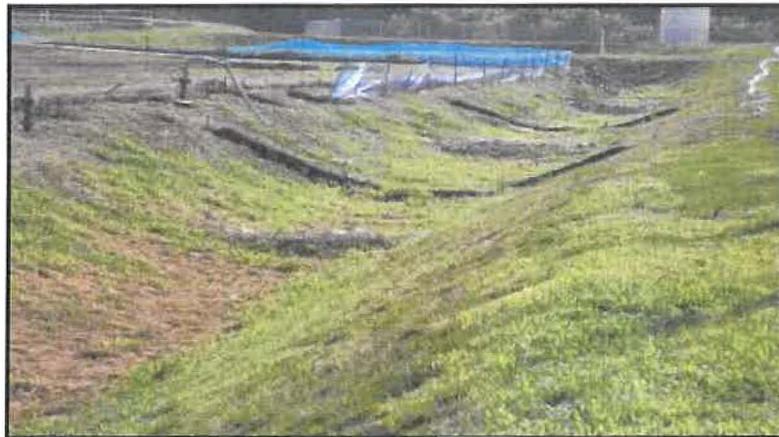
- Where uniform, diffuse flow can be achieved downslope of the level spreader.
- Where Riparian Area Protection Rules require diffuse flow through the buffers, the concentrated water is dispersed within wooded buffers or on fields adjacent to streams, ponds, and lakes; and/or
- In areas requiring a vegetative filter strip to treat runoff; and/or as a part of a series of stormwater BMP's, where topography constrains the ability to achieve diffuse flow.

The application of level spreaders must take into consideration specific conditions such as topography, vegetative cover, soil and other geologic conditions. If diffused flow is not attainable based on sites conditions, they should not be used (i.e., the slope of the natural ground away from or parallel to the level spreader should be relatively smooth in the direction toward the natural site drainage pattern so that the flow will not re-concentrate).

## System Components

Level spreader system consists of the following parts:

1. **Site Interior Drainage Ditches**- the structures that receive all diverted surface run-off from the compost pad that drain to the **Stormwater Pond**. The drainage ditches are grass lined and contain both rock check dams and compost filter socks in 15 ft intervals. The purpose of these structures is to dissipate energy and trap sediment.



1. **Stormwater Pond** – the excavated structure that receives all diverted surface run-off from the **Site Interior Drainage Ditches**. This pond is a clay lined structure that flows to the **Outlet Structure** at two different levels with an over flow by-pass at the top of the structure for extreme rain events. The pond acts as temporary retention for stormwater. Sediment settles out in this structure.



2. **Outlet Structure**- the structure that controls the outlet flow of water from the **Stormwater Pond**. The picture below shows the inlet pipe from the **Interior Drainage** Ditches, the **Outlet Structures** overflow by-pass and the **Faircloth Skimmer**. Stormwater from this structure flows to the **Forebay**.



1. **Forebay** - an excavated bowl-shaped feature that acts to slow the influent water and allow sediment and debris to settle out. A forebay can contain some rip rap to reduce the amount of erosive losses within the **Forebay** itself. Stormwater from this structure flows to the **Grass Swale** and **Concrete Level Spreader**.



2. **Grass Swale** – the grass lined swale structure that diverts and controls flow from the forebay to the **Concrete Level Spreader**. The picture below shows both of these structures. Stormwater enters the **Grass Swale** from the **Forebay**. This area functions a retention, settlement, and evaporation.



1. **Concrete Level Spreader** -water passes through the forebay to the **Grass Swale** main body of the level spreader. The lower side (downslope portion) is constructed so that it is level along its entire length. Water seeps slowly from the weep holes located along the inner wall of the concrete level spreader. Water rises and falls evenly over the lip of the level spreader, which functions essentially as a long weir.



2. **Stone Filter Strip Apron**— the area directly downslope from the **Concrete Level Spreader** and is made up of filter fabric and #57 stone. This area is 25 feet in width and as long as the **Concrete Level Spreader**. This functions as a settlement and infiltration area.



- 3. Vegetative Buffer Strip** – after the stormwater passes over the level spreader lip, it enters the **Stone Filter Strip Apron**. Some of the water infiltrates, while the rest is treated for sediment and nutrients. The **Vegetative Buffer Strip** receiving area has the capacity to pass the flow without erosion. The entire system safely passes a 10-year storm event without failing or causing erosion, gullies or rills.



## Inspection

### After Rain Events Exceeding 2 inches

All components of the level spreader structure need to be carefully inspected for any signs of channelization and be immediately repaired. The structure will fail if water exits from it as channelized flow. The **Outlet Structure** and **Forebay** should be inspected for any blockage or debris. The spreaders concrete curb weep holes need to be check for clogging and cleaned out by using the metal rod cleaning tool. Sediment and debris should be removed from the **Forebay**, from behind the level lip, and from inside the diversion structure after all storms. The level spreader and **Vegetative Buffer** should be checked for signs of erosion after all events storm. All vegetation that grows in the section of **Stone Filter Strip Apron** should be removed. Any formation of gullies (e.g., evidence of #57 stone washing downslope) or erosion that is discovered in the **Vegetative Buffer Strip** should be addressed through the application of ero-

sion control mat or regrading and re-seeded if necessary. Observations and Action Plans are noted on the ***Daily Operator Checklist Form (NZNACOM-009)***.

## Level Spreader Maintenance Schedule

### Monthly:

Inspection – Walk through visual inspection of the stormwater pond, outlet structure, forebay, grass swale, level spreader, stone apron, and vegetated buffer strip. Down slope beyond the vegetated buffer should be inspected for erosion riling and gullies. Observations and Action Plans are noted on the ***Daily Operator Checklist Form (NZNACOM-009)***.

**Mowing** – ***Vegetated Buffer*** strip needs to be mowed monthly. If accessible the grass swale in front of the level spreader should also be mowed.



**Vegetation Control** – The **Stone Filter Strip Apron** downslope of the level spreader should be maintained vegetation free. Apply round-up herbicide to the stone apron area.



**Weep Holes** – The weep holes along the **Concrete Level Spreader** must be cleaned out monthly using the metal rod cleaning tool.



### **Annually:**

Over time, the level spreader **Forebay** and **Grass Swale** will fill with sediment and will need to be cleaned out to maintain its capacity. The **Vegetative Buffer Strip** must be maintained with vegetative grasses. Annual re-seeding of Bermuda grass is may be required based on Monthly Inspections or rain events exceeding 2 inches. Observations and Action Plans are noted on the **Daily Operator Checklist Form (NZNACOM-009)**.

## Repairing Kuhn Knight Mixer Door

**Purpose** Describe the repair procedure of the Kuhn Knight Mixer.

**Description** Detailed Guide on proper removal and installation of mixer door.

Step	Action
1	Lockout and Tag out Mixer's Power Supplies.
2	Fill out NZNA Lock/Tag out Checklist Sheet NZNASafe-5.02a
3	Disconnect conveyor power plug after locking out power supply to conveyor.
4	Place approved conveyor platform into conveyor platform holders on each side of conveyor belt safety shield.
5	Attach safety harness lanyard to one of the mixer harness attachment points.
6	Attach chain and/or lifting strap to mixer door lifting points located on each side at the top of the door.
7	Connect chain and/or lifting strap to the lifting boom on the Cat Loader.
8	Tighten chain and/or lifting strap to ensure no slack is present.
9	Unbolt and remove door cylinder and mount.
10	Slowly lift the door out of the door tracks using loader lifting boom.
11	Once removed out of door tracks place in location that is out of current mixer work area.
12	Locate new mixer door and attach chain and/or lifting strap to each side of the door lifting points.
13	Position new mixer door into door tracks and slowly lower into place.
14	Attach door cylinder and mount back.
15	Remove chains and/or lifting strap from door.
16	Ensure door is operating correctly.
17	Remove conveyor platform and reconnect conveyor power plug.
18	Remove all lockout/tagout equipment.
19	Apply power to Mixer and conveyor.
20	Finish filling out NZNA Lockout/Tagout Checklist NZNASafe-5.02a.

## Compost Manager

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**Level** Exempt

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**Basic Function** Manage the feedstock procurement, product development, and all sales and marketing functions of the composting operation within budgeted guidelines. Assure quality production at budgeted cost and volumes. Develop, implement and manage quality control and quality assurance guidelines and testing protocols for the composting operation. Develop and maintain a public relations program to disseminate information about NZNA Composting to local landowners, community, and other stakeholders in the agronomic reuse of NZNA compost products.

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**Reports To** Senior Environmental Manager

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**Supervises** None

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**Duties and Responsibilities** Manage the feedstock procurement, marketing plan, advertising, public relations, sales promotions, merchandising, and all sales and marketing functions of the composting operation. Develop, implement and manage quality control and quality assurance guidelines and testing protocol for the composting department. Provide professional assessment and planning for short and long term operation of the Composting Facility. Develop relationships to procure raw material feedstock customers. Develop and implement marketing plans for compost product sales. Ensure conformance to applicable governmental permits/regulations and to applicable Novozymes policies and programs.

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*Continued on next page*

## Compost Manager, *Continued*

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**Duties and Responsibilities (continued)**

- Ensure a constructive dialogue with local and central authorities regarding waste management at NZNA.
- Promote active cooperation with other departments to meet current and future needs and to develop more environmentally sound processes.
- Coordinate research and development activities with Universities and independent labs.
- Provide input to periodically update a formal long term plan for NZNA biodegradable wastes.
- Responsible for all applicable NCDENR reporting requirements, as they pertain to compost facility operation.
- Prepare an annual budget. Review and explain monthly variances.
- Make formal internal and external presentations on the beneficial use of NZNA compost.
- Interact with appropriate local universities and consultants to improve the efficiency and sustainability of NZNA compost.
- Interact with other Novozymes Waste Management departments to share information and experiences and to develop and implement best practices.
- Manages sales office activities, including customer service and product support.
- Other duties as assigned by the Senior Environmental Manager.

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**Minimum Qualifications**

- A minimum BS required in Agronomy, Soil Science or related natural sciences.
- A minimum of five years general management experience in compost facility operations.
- Experienced with NCDENR environmental regulations desirable.
- Knowledge of waste treatment and beneficial reuse of waste is also desirable.
- A minimum of ten years of experience in sales and marketing.
- Must be computer literate and able to utilize relevant software programs.

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*Continued on next page*

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## **Compost Manager, *Continued***

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<b>Minimum Qualifications (continued)</b>	Physically mobility and visual acuity to inspect equipment and composting operations.
<b>Contacts</b>	Internal: All Departments External: Waste generators, compost product customers, contractors, vendors, appropriate local and state governmental agencies.
<b>Budget</b>	Responsible for compost budget.
<b>Revisions</b>	Changed reports to, deleted oversee operations, deleted supervise work of operators, deleted provide guidance and direction to composting operation employees of goals, deleted departmental goals, deleted maintaining job descriptions.

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# Environmental Operations Team Supervisor

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**Level** Exempt

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- Basic Function**
- Plan, organize, and supervise daily operations of the Environmental Department to ensure NZNA enzyme manufacturing by-products are treated and disposed of in accordance with state regulations, and in a manner which minimizes negative impacts on production, the environment, and the local community. Ensure operational conformance to applicable government permits and regulations, and to Novozymes policies and programs.
  - Develop and sustain constructive communications with regulatory authorities, local landowners, and other relevant stakeholders necessary to ensure continued reuse and disposal of NZNA by-products.
  - Plan and supervise the activity of the Environmental Operators to effectively meet the NZNA Process Waste Water Treatment, SBM Land Application, PWW Spray Irrigation and Composting schedules and goals. Observe performance of equipment, take part in unit operations whenever needed and maintain accurate, timely employee and operational records.
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**Reports To** Sr. Environmental Manager

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- Supervises**
- Lead Operators
  - Sr. Operators
  - Operators I & II
- 

**Duties &  
Responsibilities**

General

- Hire, train, motivate and retain competent operators and contractors to ensure safe and economical disposal of operational by-products in an environmentally sound manner, and in accordance with regulatory requirements
  - Demonstrate a positive team-work attitude on a consistent basis
  - Promote a working climate that provides Dare to Lead, Trust and Earn Trust, Connect to Create and Unlock Passion
  - Conduct routine safety meetings to maintain a high degree of safety awareness. Provide counselling and coaching to improve safety attitudes and lower accident potential
- 

*Continued on next page*

## Environmental Operations Team Supervisor, *Continued*

### **Duties & Responsibilities (continued)**

- Support the NZNA Environmental Policy and EQS, and assure that the environmental impact of changes to processes and equipment is assessed prior to implementation
- Ensure adherence to all NZNA employee relations policies
- Provide leadership and guidance to the individual team members and assures that they get information, general and/or specific, necessary to accomplish their tasks
- Adhere to and enforce corporate and local safety, Zeal and GMP policy
- Assure that house keeping and methods of operations are in compliance with safety regulations, Good Manufacturing Practices (GMP), and other regulatory requirements
- Coach and develop personnel according to their individual needs, and the scope of their job related functions
- Coordinate and assign work effectively among team members
- Daily follow up of team performance
- Make recommendations for investments in all department areas
- Implement and instill continuous improvements for culture and optimum performance
- Prepare individual development plans for all assigned personnel
- Ensure that all processes are conducted according to the better practices, standard operating procedures, and/or product manufacturing directions
- Initiate and capture new ideas and/or opportunities related to continuous improvement
- Utilize strong communication skills to achieve key goals at the local level
- Integrate with other production, environmental, and waste treatment functions
- Other duties as assigned by manager

### Environmental and Compost Operations

- Operator in Responsible Charge for SBM land application and PWW spray irrigation in accordance with the state permit requirements
- Ensure accuracy and sign off on monthly submission of all regulatory state permit report requirements in a timely manner

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*Continued on next page*

## Environmental Operations Team Supervisor, *Continued*

### Duties & Responsibilities (*continued*)

- Facilitate strong cooperation with waste treatment group to ensure optimum operation of treatment systems to assure compliance with permits and regulations
- Ensure high level of flexibility of operations teams by rotation of operators through PWW irrigation, Wastewater treatment, SBM spreading, and compost operations schedules that provide the most effective level of operational capacity and flexibility
- Observe equipment performance, investigate and troubleshoot abnormal performance; prepare work orders for maintenance and follow up as necessary using computer maintenance management system; Coordinate these activities with the production coordinator and maintenance personnel
- Maintain working knowledge of all plant operations, taking part in operations for training purposes and when new equipment or equipment modifications are added to the process
- Supervise the completion and ensure the accuracy of all paperwork in accordance with standard operating procedures and regulatory requirements
- Supervise daily operations to ensure systems are operating properly with minimal nuisance conditions and meet state permit conditions
- Make recommendations for improving capacity and decreasing costs
- Ensure accurate record keeping. Keep accurate records of waste stream storage and disposal capacities and actual applications. Inform all other operations at NZNA and relevant state regulatory agencies if storage levels and/or disposal capacities are short or interrupted ahead of time, if possible
- Interact with state representatives as needed to ensure compliance with state issued PWW Treatment, Land application, Spray irrigation, and Compost permits
- Supervise the daily completion and ensure the accuracy of all data collected for the purposes of state required reporting of waste applications
- Manage relationships with approximately 200 land owners to ensure efficient hauling to application sites
- Monitor and control environmental operations systems through SATT and/or BMS as necessary
- Other duties as assigned by manager

### Minimum Qualifications

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#### General

- Demonstrated leadership abilities are required. Effective written and oral communication skills are necessary.

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## Environmental Operations Team Supervisor, *Continued*

- Must perform quality work and demonstrate personal characteristics which assist in motivating others to perform quality work, with high productivity and positive morale.
- Must be able to effectively train and evaluate the performance of team members.
- Basic personal computer skills.
- High school diploma or equivalent, with demonstrated good math/arithmetic skills preferred.
- Must be physically able to perform all aspects of the job, including the ability to climb ladders and stairs and possess the necessary visual acuity.
- Must be able to lift up to 50 pounds, unaided.

### **Minimum Qualifications** *(continued)*

#### Environmental Operations

- Must hold NCDENR Land Application of Residuals System Operator Certification.
  - Must hold NCDENR Surface Irrigation of Wastewater System Operator Certification.
  - Must hold NCDENR Level II Waste Water Treatment Operator Certification.
  - Relevant environmental and compost operations experience.
  - Ability to operate relevant equipment and possess working knowledge of all departmental procedures.
- 

### **Contacts**

- Internal: All NZNA departments and functions
  - External: Contractors and vendors
- 

### **Budget**

- This position is responsible for assuring expenditures are within operational budget
  - Assists manager in preparing assigned budgets.
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### **Revision**

- None
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## Compost Department Staff Assistant

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**Level** Non-Exempt

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**Basic Function** Responsible for all business and operation related support activities for the Compost Department / Nature's GREEN-RELEAF.

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**Reports To** Compost Manager

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**Supervises** None

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**Duties and Responsibilities** The Compost Department Staff Assistant provides administrative support to the Compost Manager as well as the Operations Supervisor and Compost operators

### Customer Service

Responsible for all Customer Service related activities for all Nature's GREEN-RELEAF product and feedstock customers

Acts as initial contact between internal and external customers and Compost department personnel

Handle all customer requests in a timely and efficient manner

Provides product literature and point of sale support upon request

Responsible for operation of the scale system

Handles all customer phone interactions for feedstock, product sales, transportation and monitoring of the compost business phone during normal business hours

Sets up all new customer accounts and processes credit information

Facilitates the scheduling of pickup and deliveries by maintaining a dispatch process to ensure all customer orders are picked up or deliveries made according to the schedule

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## Compost Department Staff Assistant, *Continued*

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**Duties and  
Responsibilities  
(continued)**

**Accounting & Administrative**

Handles all invoicing for Nature's GREEN-RELEAF products as well as feedstock suppliers in SAP

Responsible for creating process orders for semi-finished and finished products in SAP

Responsible for timely and accurate month-end closing

Responsible for all Nature's GREEN-RELEAF feedstock , product invoices and tickets

Maintains daily input of compost batch mixing files and all daily worksheets completed by operators

Prepares SAP transactions for feedstock, compost, monthly rentals and transportation

Must maintain control of detail and accuracy of reporting

Tracks contract trucking costs and assigns them to appropriate accounts

Responsible for purchases including the writing of purchase requisitions, assignment of account numbers, signing purchase requisition, receiving items

Maintains the necessary paperwork for Finance and Accounting

Responsible for creating PM notifications for maintenance work as needed or requested

Coordinate all office services including copy machines, fax machines, computers, furniture and break room supplies as needed

Processes E-VIP work daily

Maintains department org charts, job descriptions and QMS policies and procedures

Distributes correspondence and keep announcements up to date on the bulletin board

Performs job duties in a manner that supports NZNA Quality, Safety and Environmental Policies and regulations and contribute to improving results in these areas

Compiles data for annual NCDENR Composting Facility Report

Maintains ISO compliance data and reports

Makes arrangements for visitors, tours and other departmental activities as requested

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*Continued on next page*

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## Compost Department Staff Assistant, Continued, *Continued*

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**Duties and  
Responsibilities  
(continued)**

**Sales Support**

Maintains an updated customer prospect data base  
Performs email marketing campaigns  
Tracks customer sales data and reports  
Handles sales inquiries in a professional manner

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**Minimum  
Qualifications**

HS diploma or equivalency with a minimum of two years experience.  
Competent in English composition, grammar and spelling. Proven computer experience in MS Office functions.  
Must have good interpersonal skills to interface with a wide diversity of people.  
Must be well organized and systematic in work habits.  
Must be able to prioritize tasks and be service oriented.  
Must have good interpersonal skills to interface with a wide diversity of people.

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**Contacts**

Internal: Compost Operations, Accounting, Finance  
External: Suppliers / Contractors, Compost Customers and Regulatory Agencies

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**Budget**

None

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## Operator II

No.: NZNAJD-4.12.06 Version: 1.0 Valid From: 26 July 2004 Document owner: [AKM](#)



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<b>Level</b>	Wage
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<b>Basic Function</b>	Responsible for operation of PWW irrigation, SBM application, and <u>compost systems</u> .
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<b>Reports To</b>	Environmental Operations Supervisor
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<b>Supervises</b>	None
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<b>Duties and Responsibilities</b>	<p><u>Operations of Spent Biomass (SBM) application to include those of Operator I and the following:</u></p> <ul style="list-style-type: none"><li>• recording necessary information for application team for departmental databases.</li><li>• maintaining up to date, accurate farmer map book for application team.</li><li>• interfacing with landowners as needed to insure good landowner relations.</li><li>• coordinating SBM drivers to meet daily site requirements.</li><li>• assure compliance with all pertinent permit conditions including volumes applied and application rates</li><li>• draining of FLF SBM lines in cold weather to prevent freezing of pipes.</li></ul> <p><u>Operation of PWW irrigation to include those of Operator I and the following:</u></p> <ul style="list-style-type: none"><li>• adjustment of portable irrigation equipment during operation</li><li>• operation and programming of center pivot equipment</li><li>• daily calculation of PWW application volumes</li><li>• interfacing with landowners as needed to insure good landowner relations</li><li>• interfacing with contractors as needed</li><li>• operation of pertinent BMS functions</li><li>• monitoring of pump performance</li></ul> <p><u>Operation of Composting equipment to include Operator I duties and the following:</u></p>
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- entering work orders
- unloading of raw materials
- ordering parts and chemicals
- collection and recording of compost monitoring data
- collection and reporting of assigned raw material and product inventories
- operation of weigh station and associated software
- independent operation of grinder, mixer, windrow turner, and screen
- load-out of finished product
- interfacing with production departments as needed to insure proper waste treatment operations
- sampling of waste streams
- perform basic laboratory analyses
- Perform job duties in a manner that supports NZNA Quality, Safety and Environmental Policies and regulations, and contribute to improving results in these areas.
- Other duties as assigned by Department Manager and Supervisor.

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**Minimum  
Qualifications**

- High School Diploma or GED required.
- Must have good basic reading, writing, and math skills related to performance of all position requirements.
- Operation of Heavy Farm Equipment or similar Heavy Non-Farming Equipment. CDL.
- Must have attended training and certification courses in two of the following three (3) areas: 1). Biosolids/residuals application, 2). spray irrigation, or 3) composting.
- Computer data entry, record keeping, and reporting experience.
- Must have a minimum of two years of acceptable experience in environmental operations at Novozymes or five years of relevant industrial or municipal waste management experience.
- Must be physically able to perform all tasks related to the position, to include the ability to walk, bend, climb stairs and ladders and to lift 50 pounds without assistance. Good visual acuity is necessary, as well as, the manual dexterity to enter computer data and retrieve records, and to perform manual repair work on equipment.
- Must be able to work evenings and weekends as assigned.
- If the position held requires possession of a CDL, employee must comply with NZNA DOT Drug and Alcohol Policy.

**Contacts**

**Internal:** Other departments, including but not limited to QC, Maintenance, Recovery, and Supply Chain Operations.

**External:** Surrounding farmers, Contracted truck drivers, vendors, customers, Visitors, Contractors

**Budget**

Not applicable - has no budgetary responsibility

[\[Top\]](#)

Field Code Changed



## Compost/Soil Conditioner

Congratulations you have just purchased one of the finest compost products on the market today. We take great pride in producing this product to meet the requirements of the United States Composting Council "Standard Testing of Assurance Program". Our on going "Quality Assurance Testing" guarantees a consistent "Grade A", certified compost product each and every load every time!



**US Composting Council**  
Seal of Testing Assurance

### US Composting Council STACompost Testing Parameters

Parameter	Range
pH	7.0-8.7
Soluble Salts	2.0-5.0 mmhos/cm
Bulk Density	900-1000 lbs/cy
Moisture Content (wet wt. basis)	45-55%
Organic Matter Content (dry wt. basis)	70-80%
Particle Size	Passes through 1/2 screen
Growth Screening	Passes growth assay test
Stability	Stable to Very Stable

### "The Benefits of Compost"

Improves the soil structure and increases permeability and infiltration!

Provides needed organic matter and restores biological activity!

Stabilizes the soil pH by increasing the soil's buffering capacity!

Improves moisture holding capacity, reducing erosion and run-off!

Supplies beneficial microorganisms to soils and growing media!

Enables soils to retain nutrients longer!

Supplies organic matter!

## Recommended Use & Application Rates

Type of Application	Use	Recommended Rates
Landscaping	Backfill for tree plantings	30-50% by volume blend in with native soil
Landscaping	Mulching	1 inch evenly applied
Landscaping	Ornamental beds	1-2 inches tilled into raised bed
Turf	New turf establishment	1-2 inches tilled in to a depth of 5 inches
Turf	Top-dressing	¼-1 inch evenly applied and raked in
Nurseries	Container mixes	5-40% by volume
Nurseries	Band application	2 inches applied in 2ft. bands
Flowers & Vegetable	New establishment	3-4 inches tilled in to a depth of 5 inches
Flowers & Vegetable	Maintenance	1-2 inches tilled in to a depth of 5 inches

### Cubic Yards of Compost Required to Cover 1,000 square feet

¼ inch layer	Approximately 0.75 cubic yards
½ inch layer	Approximately 1.5 cubic yards
1 inch layer	Approximately 3.0 cubic yards
1 ½ inch layer	Approximately 4.5 cubic yards
2 inch layer	Approximately 6.0 cubic yards

### Approximate Number of Pots Filled by One Cubic Yard of Compost Amended Media

Pot Size	Number Filled
4 inch	1,210
1 gal. (6 inch)	225
2 gal. (8 inch)	120
3 gal. (10 inch)	80
7 gal. (14 inch)	38
15 gal. (17 inch)	14

If you need additional technical assistance regarding the use of this product please give us a call:

Manufactured by  
Novozymes North America, Inc.  
P.O. Box 576  
445 Old Smith Farm Road  
Franklinton, NC 27525  
919-494-3489

Disclaimer: Novozymes has tested this product at the recommended rates above and takes no liability of the misuse or improper application of this product.



## Erosion Control Compost

Is made up of organic humus that has the unique ability to improve the chemical, physical, and biological characteristics of soils and provide growing media for vegetation to prevent erosion and sedimentation run-off. Our Erosion Control Compost is screened to 1/2 inch and tested in the US Compost Council's Seal of Testing Assurance Program. Meets North Carolina Department of Transportation specifications for compost blankets.



**US Composting Council**  
Seal of Testing Assurance

### US Composting Council STA Compost Testing Parameters

Parameter	Range
pH	7.0-8.7
Soluble Salts	2.0-5.0 mmhos/cm
Bulk Density	900-1000 lbs/cy
Moisture Content (wet wt. basis)	45-55%
Organic Matter Content (dry wt. basis)	70-80%
Particle Size	Passes through 1/2 screen
Growth Screening	Passes growth assay test
Stability	Stable to Very Stable

### "The Benefits of Compost"

Improves the soil structure and increases permeability and infiltration!

Provides needed organic matter and restores biological activity!

Stabilizes the soil pH by increasing the soil's buffering capacity!

Improves moisture holding capacity, reducing erosion and run-off!

Supplies beneficial microorganisms to soils and growing media!

Enables soils to retain nutrients longer!

Supplies organic matter!

## Recommended Use & Application Rates

Type of Application	Use	Recommended Rates
Vegetation Establishment	Compost Blanket	1 inch evenly applied

Cubic Yards of Compost Required to Cover 1,000 square feet

¼ inch layer	Approximately 0.75 cubic yards
½ inch layer	Approximately 1.5 cubic yards
1 inch layer	Approximately 3.0 cubic yards
1 ½ inch layer	Approximately 4.5 cubic yards
2 inch layer	Approximately 6.0 cubic yards

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919-494-3489  
[www.naturesgreenreleaf.com](http://www.naturesgreenreleaf.com)

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Active Ingredients: 100% Compost



## Compost Topdress

Congratulations you have just purchased one of the finest compost products on the market today. We take great pride in producing this product to meet the requirements of the United States Composting Council "Standard Testing of Assurance Program". Our on going "Quality Assurance Testing" guarantees a consistent "Grade A", certified compost product each and every load every time!



**US Composting Council**  
*Seal of Testing Assurance*

### US Composting Council STA Compost Testing Parameters

Parameter	Range
pH	7.0-8.7
Soluble Salts	2.0-5.0 mmhos/cm
Bulk Density	900-1000 lbs/cy
Moisture Content (wet wt. basis)	45-55%
Organic Matter Content (dry wt. basis)	70-80%
Particle Size	Passes through 1/4 screen
Growth Screening	Passes growth assay test
Stability	Stable to Very Stable

### "The Benefits of Compost"

Improves the soil structure and increases permeability and infiltration!

Provides needed organic matter and restores biological activity!

Stabilizes the soil pH by increasing the soil's buffering capacity!

Improves moisture holding capacity, reducing erosion and run-off!

Supplies beneficial microorganisms to soils and growing media!

Enables soils to retain nutrients longer!

Supplies organic matter!

## Recommended Use & Application Rates

Type of Application	Use	Recommended Rates
Turf	Top-dressing	¼-1 inch evenly applied and raked in
Rain Gardens	Mix with expanded shale	20% by volume
Green Roof Media	Mix with expanded shale & sand	15% by volume

### Cubic Yards of Compost Required to Cover 1,000 square feet

¼ inch layer	Approximately 0.75 cubic yards
½ inch layer	Approximately 1.5 cubic yards
1 inch layer	Approximately 3.0 cubic yards
1 ½ inch layer	Approximately 4.5 cubic yards
2 inch layer	Approximately 6.0 cubic yards

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**Active Ingredients: 100% Compost**



## Engineered Topsoil

Engineered Topsoil is a blend of 75% USCC-STC Compost and 25% Sand, Silt and Clay  
 Resembles same soil characteristics as a native sandy loam topsoil



**US Composting Council**  
*Seal of Testing Assurance*

Parameter	Range
pH	6.0-8.0
Bulk Density	1300-1500 lbs/cy
Moisture Content (wet wt. basis)	45-55%
Organic Matter Content (dry wt. basis)	6-8%
Particle Size	Passes through 1/2 screen
Percent Sand	55-65%
Percent Clay	8-12%
Percent Silt	25-35%

## Recommended Use & Application Rates

Type of Application	Use	Recommended Rates
Landscaping	Backfill for tree plantings	Blend with native soil 50:50
Landscaping	Ornamental beds	Use as is
Turf	New turf establishment	2-3 inches in depth

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Active Ingredients: Compost, sand, silt and clay