
Kewaunee County

LAND & WATER CONSERVATION DEPARTMENT

Composting Guide for Non-Permitted Facilities

Objective: Develop and maintain a composting facility which meets current rules and regulations listed in WI. State Statute NR 502. To handle organic material or agricultural by-products such as crop by-products or animal wastes. To properly manage compost to reduce the contamination potential of agricultural wastes to surface and ground waters. To sequester or breakdown nutrients through natural processes and reduce pathogens, viruses and bacteria.

General

- Sites must be approved by Kewaunee County Land and Water Conservation Department
- Sites(s) must comply with all Operation and Maintenance objectives listed under Site Preparation, Monitoring and General Considerations
- Routine inspections of Temperature, pH, Moisture and Carbon to Nitrogen ratios must be completed weekly or based on approved schedule, to prove compost is properly managed
- Composting must comply with all current County, State and Federal rules and regulations
- Compost must be land applied according to NRCS 590 Standard and an approved Nutrient Management Plan
- Composting site shall be operated in a nuisance-free and environmentally sound manner

Plan

- Intent of operation (size and scope)
- Layout of operation (collection points and site plan)
- Animal numbers and animal type, estimate of annual and seasonal volume of compostable manure
- Material to be composted (bedding type, other sources of carbon and nitrogen)
- Winter storage plan for manure or other wastes under regulation

Compost materials are limited to the following:

- Animal waste
- Bedding
- Waste feed
- Yard waste (from farmstead)
- All other wastes must receive written approval by Kewaunee County Land and Water Conservation Department

Location Requirements (to be approved by LWCD)

- Compost Facilities **may not** be located in any of the following areas: (Please refer to NR 502.12(8) and NR 151.015(18-24) for full list of requirements)
 1. Within a floodplain
 2. On less than 5 feet to Bedrock or Subsurface Saturation
 3. Within 250 feet of any private water supply well, or within 1,200 feet of any public water supply well
 4. Within a WQMA: 1,000 feet of any navigable lake, pond, or flowage; Within 300 feet of any navigable river or stream; and a site that is susceptible to groundwater contamination, or has the potential to be a direct conduit to groundwater
 5. An area within 300 feet upslope or 100 feet downslope of a direct conduit to groundwater
 6. Within 250 feet of land owned by a person other than the owner of the operator of the facility
 7. Within 1,000 feet of the nearest edge of the right-of-way of any state trunk highway, interstate or federal aid primary highway or the boundary of any public park or state natural area. Unless screened by natural objects, plantings, fences or other appropriate means to reduce visibility
 8. Within 10,000 feet of any turbo jet airport runway or 5,000 feet used only by piston type aircraft

Site Preparation

- Site should be no greater than 6% slopes - Recommend between 2% and 4%
- Site should be vegetated- Mixture of grasses and legumes are preferred
- Site may only be used 1 year out of 2, unless pad is engineered
- Site shall be kept free of ruts, stones and other obstructions
- Diversions should be installed to keep all clean water clean and keep excess water from flowing over work surface

Hazard Concerns

- List all possible hazards (Site Specific) See examples below
 1. Surface Water and Ground Water contamination- proposed site must be managed to prevent substantial runoff or wastewater from leaving site
 2. Karst Features- thorough site investigation should be completed to ensure site is free of all Karst Features
 3. Sharps and other non- organic material – Compost must be free of sharp particles which could cause injury to persons handling the compost
 4. Toxins or pathogens that may cause impacts to public health or the environment

General Considerations (per NR 502)

- Agricultural material composted, must be from operations of common ownership, management or located adjacent to each other, and the composting occurs on the property of one of these agricultural operations
- Unfinished compost piles should be left in windrows. Manure storages or stacking in windrows must be utilized until composting can resume
- Compost sites should be rotated, with a growing crop installed between rotations
- Compost should be free of sharp particles which have the potential to cause injury or harm
- System must be operated in such a way to minimize odors and air drift
- Size of pile not to exceed 10ft in height and should be within equipment specifications
- Divert surface water runoff from the compost facility (keep clean water clean)
- Work surface should be graded to suitable work surface, free of stones and loose debris
- Refrain from turning piles if work surface is saturated to prevent ruts. Ruts create pooling and create conditions suitable for pathogens

Key Components of Composting

- Moisture
 1. Must range between 40-65 percent. Anaerobic conditions occur above 65 percent and microbial activity will slow below 40 percent
 2. Windrows should be placed to avoid ponding on work surface
- Temperature
 1. Optimal internal temperatures range between 95°F - 165°F
 2. Compost used for off farm use, temperature must be maintained above 130°F for fifteen days with a minimum of five turnings. (NR 502.12(10)(h)(3)
 - a. Pathogen reduction occurs $\geq 130^{\circ}\text{F}$ for ≥ 3 days between each of five turning events (s. NR 204 40 CFR, Part 257, Appendix II, Section B)
 - b. Bacteria, virus and fly larvae reduction occur between 140°F and 165°F
 3. Turning shall be completed when temperatures reach 150°F to prevent odor and to ensure proper aerobic conditions remain sustained for composting
 4. Temperature must not exceed 185°F (may cause combustion or kill needed bacteria). If temperature reaches 185°F, turn pile to aerate AND add water to increase moisture
- Carbon and Nitrogen Ratio
 1. Must be monitored to ensure proper composting is occurring
 2. Optimal range between 20:1 and 40:1
- Compost pH should range between 6.5 and 7.5
- Time
 1. Composting times range depending on material and conditions

Monitoring

- Records of operation and maintenance must be kept for (4) years to ensure compost objectives are being met per NR 502.12 (15). Pathogen analysis must be completed by certified lab prior to land application of material
- Records should consist of the following:
 1. Time / Date
 2. Site Conditions
 3. Temperature of pile (weekly)
 4. Odor
 5. Moisture
 6. Number of Turnings (to ensure aerobic conditions)
 7. Total Amount processed (tons)

Testing

1. Samples of the finished compost shall be collected every 2,000 tons or 4,000 cubic yards with a minimum of one sample per year, or, alternatively, in accordance with the testing frequency specified by the United States Composting Council’s Seal of Testing Assurance program, unless a different frequency approved in writing by the department, and tested for the parameters listed in Tables 1 and 2 (NR 502.12(16)(d))
2. Test results and records shall be made available upon request and kept for (4) years

**Table 1.
Test parameters for nonexempt compost facilities and class A compost**

Parameter	Limit for class A compost (mg/kg dry weight)
Arsenic	12
Cadmium	6.1
Chromium	120
Copper	400
Lead	95
Mercury	1.2
Molybdenum	15
Nickel	49
Selenium	4.9
Zinc	820
Physical contaminants	less than 1 percent
Fecal coliform	Either 1,000 MPN/g of total solids (dry wt) fecal coliform or 3 MPN/4g of total solids (dry wt) salmonella
Salmonella	

**Table 2.
Maturity and stability testing for nonexempt facilities and class A compost**

Characteristic	Test procedure	Limit for class A compost
Maturity (both methods)	Carbon:Nitrogen ratio Seedling emergence and vigor bioassay	10 – 20:1 Indices above 80%
Stability (one of the following methods)	Respirometry (carbon dioxide evolution) Dewar self-heating test Solvita test	Up to 5 mg CO ₂ -C/g volatile solids/day 0 – 20°C temperature rise Index value 6 or greater

*****Please contact Kewaunee County Land & Water Department Conservation Specialist, Travis Engels at (920) 845-9742 with any questions.**

References

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