

**COAL TOWNSHIP COMPOST
& RECYCLING CENTER**

Northumberland County
Pennsylvania

OCTOBER 2000



Gannett Fleming

INTRODUCTION

Presently, Coal Township collects several hundred tons of leaves per year and dumps them onto private property. The Township plans to improve their handling of yard waste with the establishment of a composting site on property leased by the Township from the Northumberland County Vocational-Technical School. The property is located south of the Northumberland County Vocational-Technical School ballfield along Venn Access Road. The planned Compost & Recycling Center will service Coal Township, the City of Shamokin, Zerbe Township, Kulpmont Borough and the Borough of Mount Carmel. The combined service area has an approximate population of 31,000 residents. Coal Township will continue with the curbside pick-up of yard waste. The facility is planned as a drop-off system for residents of areas that are not served by the curbside pick-up.

SITE SELECTION

Three sites were investigated as possibilities for the composting facility. The first site is the “Gun Club Site” where the Township is currently stockpiling yard waste. This is a private site which presently allows the Township to stockpile yard wastes on the site. The Gun Club is private and the use of the planned public drop-off area for yard wastes and the pick-up of finished compost product could not occur on the site. The site is not available for Coal Township ownership. Therefore, this site was eliminated from evaluation. The second and third sites investigated are owned by the Northumberland County Vocational-Technical School. The sites are located on either side of the Venn Access Road south of the school. The site on the east side of the road was determined to be more desirable because of the size and topography.

SITE CHARACTERISTICS

The site is located along a curve of the Venn Access Road with no residential dwellings, streams, wetlands, or floodplains in close proximity. The site is currently covered with brush and small trees, numerous depressions, and has an approximate average slope of 5% in the flatter sections. The site will require clearing/grubbing and grading to less than 5% sloping to the south. The north side of the site is at the toe of the bank of a ballfield near the school and will require a swale to divert stormwater runoff from the ballfield area around the proposed yard waste composting site. The optimum entrance to the site based on sight distance and access road grade considerations was determined from a site visit conducted on February 28, 2000 and is documented in a Memorandum attached as Appendix A¹. The site will require a paved 75 feet by 150 feet storage pad and a paved 30 feet by 100 feet access road. The recommendations for paving of the area is included in Appendix A. A sketch of the proposed site layout is attached as Exhibit 1².

ACCESS CONTROL

Due to the topography of the area, fencing will not be required around the entire site. A fence will be constructed along the Venn Access Road. A gate will be installed at the facility entrance from

¹ Appendix A is not presented in the on-line version of this report

² Exhibit 1 is not presented in the on-line version of this report

Venn Access Road to limit unauthorized access to the site.

OPERATIONAL REQUIREMENTS

SITE SIZE

The facility will accept waste from Coal Township, the City of Shamokin, Zerbe Township, Kulpmont Borough and the Borough of Mount Carmel. The compost facility service area is rural with a total population of 31,000 people in 49 square miles. Due to the large geographical area involved, it is conservatively estimated that 50% of the population will contribute their yard waste to the facility. Based on a yard waste generation of 200 lbs. per capita per year, it is estimated that the compost facility could receive approximately 3,100,000 pounds of yard waste annually. The composition of the waste received at the facility will be mixed yard waste with a typical density of 500 pounds per cubic yard. Therefore, it is conservatively estimated that the facility should be sized to receive and process approximately 6,200 cubic yards of material.

The amount of yard waste that is allowed per acre is regulated by the PA DEP Guidelines for Yard Waste Composting Facilities. The guidelines state “ no more than 3,000 cubic yards of yard waste may be placed, stored, or processed on any acre of a facility where composting activity occurs or is planned to occur.” Based on the guideline, the Coal Township facility site should be a minimum of 2.06 acres. The site that was chosen is approximately 3 acres and satisfies this requirement.

Due to the expected limited growth, rural character, and large service area it is unlikely that the amount of yard waste estimated will be collected at the facility at the present time or in the near future. In light of the possibility of adding a recycling center to the site in the future, Gannett Fleming, Inc. recommends that the conservative figure of 3 acres be used in the design of the site to allow for the possibility of future yard waste composting growth as well as possible future recycling operations.

SIGNAGE

A durable and weather-resistant facility identification sign will be posted at the entrance to the facility. The sign should be sized to be clearly visible and easily read from the Venn Access Road. The main entrance sign will read as follows:

COAL TOWNSHIP

COMPOST AND RECYCLING CENTER

OPERATED BY: COAL TOWNSHIP COMMISSIONERS
805 WEST LYNN STREET
COAL TOWNSHIP, PA. 17866
PHONE—570-644-0395

OPERATED FOR: COAL TOWNSHIP RESIDENTS AND ALL AREA
COMMUNITIES



HOURS OF OPERATION:

TUESDAY thru THURSDAY — 10 AM to 2 PM
SATURDAY — 9 AM to 1 PM

THIS SITE ACCEPTS:

LEAVES GRASS YARD WASTE
TREES (UP TO 8" diameter) AND TREE TRIMMINGS

RECEIVING AREA

All incoming loads should be directed to the paved receiving area to be de-bagged and inspected for unacceptable materials. The residents should be informed that the material must be de-bagged, and a trash receptacle should be placed in the receiving area for the discarded bags.

WINDROW CONFIGURATION

The number and size of windrows is based on the estimated 6,200 cubic yards of material that the facility will receive. It is estimated that facility will require five windrows that are 8 feet high, 16 feet wide and 200 feet long. The piles should be placed a distance of 7 feet apart to allow for proper use of equipment. An additional 50 feet should be left around the perimeter of the site to allow for equipment movement and to provide a buffer zone.

WINDROW CONSTRUCTION AND MAINTENANCE

Gannett Fleming Inc. is recommending that the Coal Township Compost and Recycling Facility utilize a Turned Windrow System Technology. The key aspects of windrow construction and turning are described below.

1. Construction. Windrow construction should occur within one week, but preferably within 1-2 days of delivery of the yard wastes. If several different types of waste are to be composted together, they should be thoroughly mixed. Grass clippings are sometimes placed on top of an existing windrow pile and incorporated into the pile. PADEP guidelines require grass clippings to be incorporated in partially decomposed windrow piles within 24 hours of grass delivery, at a ratio of no less than 3 parts leaves to 1 part grass. Mixing of yard wastes can be performed using a front-end loader, but when mixing with grass clippings, which tend to mat together, use of a windrow turner is recommended.

Pile construction involves an important watering period. Water should be added to reach the desired moisture content (between 40 and 60 percent for leaf composting).

The form and shape of the windrow affects several key conditions of the composting process. For instance, if the piles are too large, oxygen cannot reach the center, and if the piles are too small they will not reach optimum temperatures. The ideal windrow size varies with the substrate and with seasons of the year. Windrows of autumn leaves can be constructed 6 to 8 feet tall and 12 to 16 feet wide at the base; these piles may be built to 8 to 10 feet tall in mid-winter months. Larger or smaller piles can create problems for leaf composting operations. Windrows of grass clippings with leaves may need to be smaller, often only 5 feet high and 10 feet wide (however, with a 3:1 minimum ratio of leaves to grass, reduction of the windrow pile size is probably not necessary).

When constructing the windrow, care should be taken not to drive on or compact the material. The material should be allowed to cascade down from the bucket of a front-end loader to form a loose pile. Wetting of the piles to an optimum 50 percent moisture content can occur during pile construction if a water source is available. Space permitting, windrows should be constructed in pairs for later combining of piles (7-foot clearance between piles is necessary for equipment passage).

2. Turning. The main goals of turning the compost pile are to promote decomposition by moving material from the outside to the inside of the pile, and to “fluff” the material so it will be more porous, allowing air to move freely through the pile. Turning the piles increases the rate of decomposition by mixing of materials and exposing new surface areas.

Turning frequency should be based on temperature, since temperature reflects decomposition taking place in the pile. Whenever temperatures drop below 90°F or exceed 140°F, turning should be performed. If the compost is staying within the 90°F to 140°F range by itself, turning can still help accelerate decomposition. Windrows may be turned within 1 to 2 weeks after initial windrow construction. Windrows composed entirely of leaves may only need turned a few times a year, and should be left alone during winter months (between December/January and March/April), as severe cold weather may decrease the decomposition rate. Windrows which include grass clippings in the substrate will require more frequent turning to prevent odors caused by anaerobic conditions. However, if a 3:1 grass:leaves ratio is maintained, this should not be a major issue.

Should anaerobic conditions become apparent, turning the pile will temporarily add oxygen but will also create offensive odors. Before turning, try to identify the cause of the problem so remedial action can be taken as the pile is being turned. Turning of piles during breezy days with preferred prevailing wind directions can help dissipate offensive odors safely.

Although several types of equipment are available for turning windrows, front-end loaders may be the only equipment necessary for smaller composting facilities. When turning the piles with a front-end loader, let the compost cascade out of the bucket so that the materials drop through the air to keep it as loose as possible. As in initial construction, when turning/reconstructing the piles care should be taken not to compact the material. For the Coal Township operation, a windrow turner is proposed.

Windrows may only need to be turned 3-4 times between initial fall delivery (pile

construction) and the middle of the next summer.

3. Curing. After a period of 8-10 months, decomposition in the windrows has slowed substantially. At this time, the material can be moved from the windrow composting area and stacked 10-12 feet high in curing piles (height limited by the capabilities of the site's front-end loader equipment). The material will slowly continue to stabilize. Further turning of the pile should not be necessary at this time, as long as the material stacked is stable due to proper windrow decomposition. The composted material should remain in the curing piles for a minimum of 45 days to allow for final stabilization.
4. Screening. Often, finished yard waste compost is used as a mulch, soil amendment or conditioner, without further processing. To improve product quality, a mechanical screen or shredder may be used to size-reduce and/or size-separate various grades of material. This can improve demand and potential end-uses of the material. A screen is proposed for the Coal Township operation.
5. Limitations. There are two potential limitations associated with the turned windrow system. These are odors and pathogens. Odors can periodically be a part of the composting process, even with appropriate operating procedures. Proper site and operations management will minimize odor occurrences. Pathogens are generally applicable to operations that involve the processing of wastewater sludges or residues from other animals, and should not be an issue in the proposed yard waste operations.

EQUIPMENT

The equipment needs of Coal Township are based upon the use of turned windrow system technology and an assessment of the equipment Coal Township presently possesses. It is recommended that the Township purchase the following equipment (or any other of equal specifications):

1. Leaf Box (1) - approx. \$2,500
ODM Model - LCB 500, 72 inches wide, 72 inches high, and 10 feet long, 12 gauge steel.
2. Leaf Vacuum (2) - approx. \$31,000
ODM Model LCT 650, with John Deere 80 HP 4 cycle diesel engine, rear straight exhaust, hydraulic hose boom.
3. F-550 Ford Truck (1) - approx. \$56,000
Model F-550 4 x 4 chassis, 165 inch wheelbase, 7.3 Turbo diesel engine, electric 4 speed automatic transmission, with 11 ft. x 7 ft. box with 3 chutes.
4. Compost Turner (1) - approx. \$20,000
Dura Tech Model ST-10, 31½ inch rotor diameter, concrete ballast supplied, 68 hammers.
5. 16 Inch Drum Chipper (1) - approx. \$24,000

Wood/Chuck Model WC 16, Cummins turbo charged 4 cylinder 239 cu. in. diesel engine, rotor knives, pintle hitch.

6. John Deere Tractor 4 x 4 (1) - approx. \$44,000
Model 6410, 90 HP 4 cylinder turbo-charged diesel engine, comfort guard cab, forward and reverse creeper gears.
7. Trommel Screen (1) - approx. \$47,000
Dura Tech Model 6012, 17 feet long, 9½ feet high, Isuzu 25 HP 3 cylinder diesel engine, pintle hitch.
8. Tub Grinder (1) - approx. \$59,000
Dura Tech Model HD-8, 8 foot tub width, 40 inch tub depth, Cummins 130 HP diesel engine, pintle hitch.
9. Skid Steer Loader with Grapple Bucket (1) - approx. \$25,000
Bobcat Model 873-G, 73 HP turbo charged Deutz diesel engine, with enclosed cab and heater, high flow, 72 inch industrial bucket with grapple.

Total Proposed Equipment Purchases: \$ 308,500 .

SITE IMPROVEMENTS

It is recommended that the Township perform the following activities for site improvements.

1. Engineering
 - a. Survey including boundary and grade - approx. \$5,000
 - b. Pavement Design - approx. \$2,000
 - c. Stormwater/ Erosion and Sedimentation Control - approx. \$8,000
2. Bid Specification Assistance - approx. \$10,000
3. Clearing/Grubing/Grading - approx. \$14,000
4. Fence - approx. \$14,100
Installation of approximately 540 feet of fence along Venn Access Road
5. Bank Cutback - approx. \$2,700
The edge of the bank should be cut approx. 5 feet to provide sufficient sight distance.
6. Pavement Construction - approx. \$7,400
Construction of a 30 feet wide by 100 feet long entrance and a 75 feet by 150 feet storage pad
7. Stormwater Construction - approx. \$7,900
Construction of a drainage swale on the north side of the property and a culvert under the

proposed entrance.

8. Storage Bins - approx. \$3,200
Installation of 10 cement barriers (12 feet long)
9. Signage - approx. \$400
10. Office Trailer - approx. \$7,000
Trailer to be used as an educational training facility.

Total Site Improvements Cost: \$81,700 .

FINISHED PRODUCT DISTRIBUTION

The intent of Coal Township is to provide the finished product to area citizens free of charge. At the present time, the Township does not plan to sell the material. An educational program is planned to inform the area residents of the uses of the compost and mulch. It is recommended that the information given to the residents include language to assure that the Township is not responsible for any damage caused to plants by use of the compost and mulch. Also, the Township should determine if a limit will be placed on the amount of material a resident can obtain at a single visit or throughout the year. If the Township establishes a limit, the amount of necessary monitoring and enforcement will need to be evaluated.

PUBLIC AWARENESS OF FACILITY

It is recommended that the Township inform residents and area municipalities of the impending opening of the facility approximately two months prior to opening. The Township should consider having the facility educational coordinator (or other informed Township personnel) make presentations at various public meetings in the Township and surrounding areas on the proposed operations.

It is recommended that one month prior to opening, the Township place a press release in an area-wide newspaper announcing the opening of the site, hours of operations, location of the site, and rules for using the site.

It is recommended that the Township consider if they want to have an opening ceremony.

FACILITY BUDGET AND FINANCE

The budget for the facility should be kept separate in the Township budget. The PA DEP Municipal Yard Waste Composting Manual contains a budget worksheet that could be used by the Township to estimate the required facility budget.

The Township proposes to use Section 902 recycling program grant funds for site development and equipment purchase. The Township should consider the source of funding for future operating

expenses and equipment replacement. The Township may have to institute a tipping fee for materials deposited at the site to offset the costs.

CONCLUSIONS AND RECOMMENDATIONS

The facility will accept waste from Coal Township and surrounding communities. The designated site is of an acceptable size to handle the projected yard wastes from the service area.

The site will require the grading of a swale on the north property line to keep stormwater from entering the site, site grading and preparation, paving of the composting storage pad and access drive, and site fencing/gate.

The site will be managed as a turned windrow system technology.

The Township will need to purchase additional equipment to operate the facility.

An education coordinator will inform and educate area residents about the benefits of composting and about the composting facility.

The Township should prepare a separate budget for the costs of the facility.

The Township should submit the completed Yard Waste Facility Application Form and a Section 902 grant application to PA DEP by October 6, 2000, for the site development work and the purchase of equipment.

When the Township receives approval of the Section 902 grant, the site should be developed as described in this report and facility plan and should purchase the necessary equipment as stated in this report.

By following the recommendations presented in this report, the Township facility will be constructed and operated in compliance with PA DEP's guidelines and should operate efficiently and effectively.