

# Development of a Multi-Municipal Yard Waste Composting Facility

Dorrance, Fairview, Rice, and Wright Townships and Nuangola Borough

Luzerne County



Gannett Fleming Sketch Plan  
Regional Yardwaste Composting Site for MTA COG, 2001

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## **Background**

The Pennsylvania Department of Environmental Protection (PaDEP), the Governor's Center for Local Government Services, the Pennsylvania State Association of Township Supervisors (PSATS) and the Solid Waste Association of North America (SWANA) formed a training partnership for Pennsylvania local governments interested in achieving higher recycling rates. Through this partnership, Fairview Township in Luzerne County was awarded \$5,000 in technical assistance services from Gannett Fleming, Inc.

## **Introduction**

Dorrance, Fairview, Rice, and Wright Townships and Nuangola Borough in Luzerne County formed the Mountain Top Area Council of Governments (MTA COG) to provide yard waste composting to its residents. A 1990 Census estimated the total population of these municipalities at approximately 12,000. In May 2001, the Pennsylvania Department of Environmental Protection (PaDEP) announced that Wright Township, as the sponsor for the Mountain Top Area, was awarded a grant for \$1,082,227 to develop an intermunicipal composting operation.

With the assistance of Gannett Fleming, MTA COG located an acceptable site for the composting operation through the Greater Wilkes-Barre Chamber of Business and Industry (Chamber). In August 2001, the Chamber agreed to donate approximately 15 acres of a 39-acre parcel in the Crestwood Industrial Park of Wright Township for the purpose of composting. Plans are currently underway to subdivide the property.

At the time that technical assistance was requested, MTA COG was in the preliminary stages of developing an intermunicipal composting operation. Fairview Township, acting on the behalf of the Mountain Top Area requested technical assistance from Gannett Fleming through the Solid Waste Association of North America (SWANA) for locating an acceptable composting site as well as for addressing the technical issues related to a municipal yard waste composting operation.

## Scope of Work

Harry Zearfoss, the Chairman of the Fairview Township Supervisors, requested technical assistance from Gannett Fleming through SWANA in 2000. Upon project approval, Tom Herlihy of Gannett Fleming and Mr. Zearfoss developed the following list of tasks:

- Task 1**      Meet with the intermunicipal compost committee to discuss composting fundamentals, materials to accept, collection, inspection and refuse disposal methods, site security, and potential nuisances.
  
- Task 2**      Assist in locating a site for the composting facility. Meet with landowners and evaluate potential sites on the basis of its physical aspects, such as topography, traffic flow, and nuisance potential for suitability. For each potential site, develop conceptual drawings of an appropriately sized composting facility.
  
- Task 3**      Recommend equipment, material quantities and types, and site development requirements to assist in finalizing capital costs.

## Task Completion

### ***Task 1:    The Fundamentals of Composting***

After notification of the grant award from the PaDEP, one of the first orders of business for representatives from Dorrance, Fairview, Rice, and Wright Townships and Nuangola Borough was to form a Council of Governments (COG) for composting, which became known as the Mountain Top Area COG or MTA COG. Council hired Patricia Lakhia of Rosenn, Jenkins, & Greenwood, L.L.P. in Wilkes-Barre, Pennsylvania to assist with the drafting of an intermunicipal agreement for composting.

Gannett Fleming's assisted with educating the MTA COG on the fundamentals of composting and its operation. The PaDEP "Guide to Municipal Yard Waste Composting," which is located on the PaDEP Recycling Homepage at [www.dep.state.pa.us](http://www.dep.state.pa.us) is an excellent source of background information on composting. Excerpts from this guidance document are presented in this section. A flow diagram of the composting process from material drop-off to cured material is presented in the Figures section as **Figure 1**.

***Composting Fundamentals:*** The PaDEP "Guide to Municipal Yard Waste Composting" describes composting as a method of solid waste management where organic components such as leaves, grass, and brush are biologically decomposed under controlled conditions to produce a useful end-product. The guide also lists the basics of successful composting as the following:

- **Organic Materials:** Leaves can be composted alone or mixed with grass clippings in a ratio of three parts leaves to one part grass.
- **Oxygen:** Aerobic organisms – those requiring oxygen – compost most efficiently. By controlling oxygen levels in a compost system, you can help speed up the composting process and reduce the potential for foul odors.
- **Moisture:** The moisture level in composting materials should be about 50%. During composting, materials should feel moist and emit a few drops of water when squeezed with one hand.
- **Temperature:** Temperatures in the center of composting piles should range from 90 to 140 degrees as organic materials break down.
- **pH balance:** pH is a measure of acidity. Finished compost should have a nearly neutral pH value, in the six to eight pH range. If materials become too acidic during composting, lime or other alkaline materials can be added.

The most common approach to processing yard waste, as stated in the PaDEP guidance document, is the windrow-and-turn method. Leaves and grass clippings are formed into long narrow piles, called windrows. The piles should be 6 to 8 feet high and 12 to 16 feet wide. The length of the windrows will depend on the size of the composting facility.

Windrows should be formed within one day of receiving the yard waste at the facility and should be formed perpendicular to the slope of the site to prevent water from ponding around the base.

If leaves and grass will be composted together, the materials should be mixed prior to windrow formation. The yard waste should be fluffed to break up clumps. Water should be added to dry leaves to achieve the optimum 50% moisture content.

Windrows should be turned after the first one or two weeks of composting, then periodically (at least twice a year) after that. Leaf windrows should not be turned during frigid weather because heat losses can slow the composting process. If grass and leaves are composted together, a more frequent turning schedule may be needed to prevent odor problems.

The duration of the composting cycle lasts approximately 300 days. After this time period, compost material can be screened. The screening process separates non-spec material, such as large debris and contaminants, from the compost. Non-spec material is disposed of in a dumpster. The portion that passes through the screen is then allowed to cure for 30 to 60 days in large pile prior to distribution as a finished compost material.

***Materials to Accept:*** Leaves, grass clippings, garden residue, tree trimmings, chipped shrubbery, and other vegetative material are collectively called yard waste. These materials are commonly accepted at a municipal composting facility.

***Material Collection, Inspection, and Refuse Disposal:*** Participating municipalities are normally responsible for transporting leaves from the curbside to the composting facility. Grass clippings and other yard waste are often handled differently than leaves. Municipalities designate drop-off locations for residents to dispose of grass clippings, tree trimmings, and garden residue, and set-up a collection schedule for the growing season.

Personnel at the composting facility are responsible for inspecting the incoming material for refuse contamination. A dumpster can be located on-site for refuse disposal.

***Site Security:*** A secure site is important to deter vandalism, arson, and illegal dumping. Fencing and surveillance cameras are often adequate deterrents.

**Potential Nuisances:** Foul odors are the most notable potential nuisance, and result from anaerobic conditions (lack of oxygen) within the compost pile. These conditions can result from making the compost piles too large or not turning the piles often enough. Storing the leaves in piles for an extended time period prior to windrow formation also results in foul odors from anaerobic conditions.

## **Task 2: Assistance with Locating a Site for the Composting Facility**

As MTA COG is aware the first site assessed became undesirable when a local business threatened a lawsuit if odors emitted from the proposed location should result in downtime for the business. American Legion Home Association, Mountain Post 781, had agreed to provide a long-term lease on 10 acres of land in Rice Township to host the proposed composting facility.

Subsequently, an inquiry to the Greater Wilkes-Barre Chamber of Business and Industry resulted in locating an available site at the Crestwood Industrial Park in Wright Township. The Chamber agreed to donate 15 acres of a 39-acre parcel to MTA COG for the purpose of composting. This parcel as shown in the Figures sections as **Figure 2** is located off Oak Hill Drive next to the recently constructed Luzerne Country garage.

The Crestwood Industrial Park site is considered ideal due to its central locality to the participating municipalities as well as its remoteness from residential neighborhoods. The size of the donated property also allows for adequate isolation of the facility from neighboring industrial establishments. Gannett Fleming developed a sketch plan for the planned facility, which is also located in the Figures section as **Figure 3**. The sketch plan shows a five-acre composting facility that consists of two-windrow composting areas. A turn around area for loading and unloading material is located near the entrance along with the equipment storage building, office, and storage bins. A storm water detention basin is suggested for a down-gradient location.

### **Task 3: Project Requirements and Associated Costs**

In the October 2000 Application for Recycling Program Grant (902-grant), Wright Township, acting on behalf of the Mountain Top Area, requested a PaDEP share of \$1,340,379. A grant of \$1,082,228 to Wright Township was announced in May 2001. Since the amount awarded was less than the amount requested, a reassessment of costs for each task was necessary. Gannett Fleming with assistance from Chris Fritz, the PaDEP Recycling Coordinator for the Northwest Region, developed a budget allotment for each task on the basis of the actual grant award. The reassessment of costs for each task is presented in **Table 1**. As Mr. Fritz commented, MTA COG has two years from the date of encumbrance to use the grant money. Therefore, a 2003 date of project completion is planned.

**Table 1: Reassessment of Costs on the Basis of the Actual 902-Grant Award**

<b>Task</b>	<b>Will Commence</b>	<b>Will Be Completed</b>	<b>Task Cost</b>	<b>PaDEP Share</b>	<b>Applicant Match</b>
Site Improvements	2002	2003	\$556,400	\$500,760	\$55,640
Equipment	2002	2003	\$370,775	\$333,698	\$37,078
Buildings	2002	2003	\$138,000	\$124,200	\$13,800
Site Security	2002	2003	\$47,000	\$42,300	\$4,700
A/E Services <sup>1</sup>	2002	2003	\$86,800	\$78,120	\$8,680
Public Education	2002	2003	\$3,500	\$3,150	\$350
<b>Total Costs</b>			<b>\$1,202,475</b>	<b>\$1,082,228</b>	<b>\$112,038</b>

Note:

1. A/E Services is Architectural and Engineering Services

**Site Improvements:** Costs are associated with the preparation of the site for composting, which include clearing and grubbing, cutting and filling, storm water management, and soil erosion and sedimentation control. Site improvements also include paving the access road to the facility and the parking lot area inside of the composting area. Utility services and subdivision planning are included in the cost estimate, as well.

**Equipment:** The recommended equipment for operation of the Mountain Top Area composting facility is presented in **Table 2**. Gannett Fleming sized the equipment on the basis of the anticipated operating capacity of the composting facility. Manufacturer representatives provided the list costs for each piece of equipment.



**Table 2: Recommended Equipment for a Municipal Windrow Composting Operation**

<b>Equipment</b>	<b>Recommendation</b>	<b>Capacity</b>	<b>Cost</b>
Chipper/Shredder	Bandit 150 XP	80 hp	\$19,675
Tub Grinder	DuraTech HD-8 Series V (7 ft diameter)	130 hp	\$52,850
Skid Loader	Bobcat 963 (with hi-flow hydraulics)	105 hp	\$42,150
Truck	GMC 4500 with aluminum dump	1 ton	\$59,000
Screener	Star Screen – Screen USA 6012	75 yd <sup>3</sup>	\$54,000
Turner	Wildcat TS514-185	185 hp	\$77,000
Tractor with Bucket	John Deer	80 hp	\$61,000
Support Equipment	Thermometers, pH & stability kits, and moisture probes		\$5,100
<b>Total Equipment Costs</b>			<b>\$370,775</b>

**Buildings:** An equipment and material storage building is necessary, which can include an office for the facility manager. Gannett Fleming based the cost estimate for equipment storage on a 3,200-square foot building with three overhead doors. The anticipated cost for the material storage portion is based on a 3,000-square foot pole barn.

**Site Security:** A security camera system is recommended for the both the interior and exterior of the maintenance building. The cost estimate is based on the purchase of four security cameras. The cost for site security also includes fencing around the perimeter and an access control gate.

**Architectural and Engineering Services:** Support services might be necessary for the subdivision planning, site design, storm water management, soil erosion and sedimentation control (E&S) plan, facility permits, construction oversight, and operation start-up. The cost estimate assumes that all of these services will require support.

Additional details on the cost reassessment are presented in the **Appendix**. These details represent an opinion of probable construction and equipment costs for budgetary purposes. The costs are not intended to represent actual bids for such items as site improvements, building construction, or architectural and engineering services. Equipment costs can also vary with the timing of the purchase.

## **Conclusions and Recommendations**

The Crestwood Industrial Park site in Wright Township is considered ideal due to its central locality to the participating municipalities as well as its remoteness from residential neighborhoods. The size of the donated property also allows for adequate isolation of the facility from neighboring industrial establishments. The Greater Wilkes-Barre Chamber of Business and Industry deserves a great deal of gratitude for its willingness to donate 15 acres of a 39-acre parcel for a municipal service.

As of January 2002, the Mountain Top Area COG has made considerable progress toward the 2003 project completion date. Patricia Lakhia of Rosenn, Jenkins, & Greenwood, L.L.P. in Wilkes-Barre, Pennsylvania has been instrumental in the creation of the Mountain Top Area COG, and detailing the responsibilities of each municipality involved in the COG. The Mountain Top Area COG with assistance from Gannett Fleming has started the subdivision plan for this parcel of land. When the composting facility is completed in 2003, we expect that it will not only provide an outlet for yard waste disposal for the 12,000 residents of Dorrance, Fairview, Rice, and Wright Townships and Nuangola Borough, but also return to them a valuable landscaping product.