



**COMMONWEALTH OF PENNSYLVANIA
Department of Environmental Protection
Bureau of Land Recycling and Waste Management**

Final

**Best Management Practices (BMP) for the Management of Waste
From Land Clearing, Grubbing, and Excavation (LCGE)**

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THE DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Land Recycling and Waste Management
Division of Municipal and Residual Waste

Document No: 254-5400-001

Title: BEST MANAGEMENT PRACTICES FOR THE MANAGEMENT OF WASTE FROM LAND CLEARING, GRUBBING AND EXCAVATION (LCGE).

Authority: The Solid Waste Management Act (35 P.S. 6018.101 et seq.), and the Department of Environmental Protection Municipal Waste Regulations (25 Pa. Code Chapters 271, 273, 279, 281, 283, and 285).

Effective Date: Upon publication in the Pennsylvania Bulletin

Policy: It is the Department's policy to provide persons, municipalities and counties with the information necessary for on-site management of land clearing, grubbing and excavation (LCGE) plant material, and how to operate a LCGE plant material processing facility in an environmentally responsible manner.

Purpose: The purpose of this manual is to specify the best management practices for on-site management, and off-site processing and temporary storage of land clearing material without a permit.

Applicability: This guidance applies to persons, municipalities, and counties who own or manage an on-site LCGE operation, or operate an off-site LCGE material processing or temporary storage facility.

Disclaimer: The policies and procedures outlined in this manual are intended to supplement existing requirements. Nothing in these policies or procedures shall affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in these policies that weight or deference. This manual establishes the framework within which DEP will exercise its administrative discretion. DEP reserves the right to alter the requirements presented in this manual if circumstances warrant.

Page length: 52

Location: Volume 6, Tab 3

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Forward

Land clearing, grubbing and excavation (LCGE) operations may be conducted in an environmentally responsible manner if proper management methods are practiced. While many methods are common to a wide array of facilities, others may be uniquely tailored to a specific site. In either case, the Department recognizes that a distinction should be made between these operations and others under the umbrella of the Municipal Waste Regulations. Accordingly, DEP has provided a mechanism for many types of LCGE facilities to operate through implementation of applicable best management practices, rather than a conventional permit. This manual details those practices. It will also help reduce both the unnecessary and illegal disposal of those materials that may be processed into a desirable end product.

This manual will not address every aspect of LCGE operations, nor will it relieve some facilities from requiring either a general or site-specific permit. However, it will afford many operators an opportunity to fulfill their obligation to operate their site/facility in a responsible manner, while providing an alternative to the conventional permitting process.

This manual is organized into the following chapters:

- Chapter 1 addresses the applicability of the BMP Manual and provides a brief regulatory overview.
- Chapter 2 identifies potential hazards associated with the storage and disposal of LCGE plant material.
- Chapter 3 addresses the best management practices that apply to LCGE plant material management activities at the site where the LCGE plant materials are generated.
- Chapter 4 provides the best management practices applicable to the temporary storage and processing of LCGE plant material at an off-site location.
- The appendix contains web addresses and contact information for DEP Central and Regional Offices.
- The list of references and sources consulted in preparing this manual.

Chapter 1 - Applicability

1.0 Introduction

The Pennsylvania Municipal Waste Regulations, 25 Pa. Code Section 271.101(b)(5), state that “The Department will prepare a manual for the management of waste from land clearing, grubbing, and excavation, including trees, brush, stumps and vegetative material which identifies best management practices and may approve additional best management practices on a case-by-case basis”. This manual addresses the best management practices (BMP) for on-site management and off-site temporary storage and processing of LCGE plant materials.

LCGE plant material includes trees, brush, stumps and vegetative material that are appropriately managed or processed. Processing may include chipping or shredding for mulch, or recycling for manufacturing of other products, etc. Tree trunks used to produce logs, lumber or firewood, if they are not abandoned or disposed and if managed in a timely fashion, are not considered LCGE materials for the purposes of this manual.

Certain on-site storage and processing operations, and off-site storage and processing operations, as defined within the provisions of this manual, may be exempt from requiring a general or an individual waste management permit if the applicable BMP included in this manual are implemented. Beneficial use of LCGE and LCGE-derived materials such as wood chips is not considered disposal if the materials are managed as the equivalent raw material or product. If a person or municipality fails to implement the BMP for LCGE material, DEP may require the person or municipality to obtain a general or an individual permit. The Department may also require compliance with the applicable municipal waste disposal, composting, recycling, transportation, storage and processing regulations of 25 Pa. Code Chapters 271 (Municipal Waste Management General Provisions), 273 (Municipal Waste Landfills), 279 (Transfer Facilities), 281 (Composting Facilities), 283 (Resource Recovery and Other Processing Facilities), and 285 (Storage Collection and Transportation of Municipal Waste). The municipal waste regulations are electronically available at the following web address:

<http://www.pacode.com/secure/data/025/025toc.html>

Both the regulations and the BMP specified in this manual are intended to address past problems and prevent future problems associated with mismanagement of LCGE plant materials. Typical problems include illegal disposal, uncontrolled fires, methane gas generation, pest infestations and other nuisances, and surface water contamination.

DEP has many ongoing initiatives to reduce waste disposal in Pennsylvania through waste minimization, recycling, and reuse, as required by the Municipal Waste Planning, Recycling and Waste Reduction Act (Act 101). The stated purposes of Act 101 include requirements for the development of waste reduction and recycling programs and encouraging municipalities to implement these programs. For these and other reasons, this manual will emphasize reuse rather than disposal of leaves, garden residues, shrubbery and tree trimmings, and other similar plant

materials in municipal landfills. Accordingly, DEP encourages reuse and recycling of LCGE plant material wherever possible.

It is the responsibility and obligation of the owner and operator of a land clearing site facility to ensure that LCGE plant material storage, processing, etc., activities and/or materials cause no adverse impacts on the public health, welfare, safety and the environment, and that potential nuisances are controlled. In the event of pollution, nuisances or other hazards, the owner and operator must take immediate corrective action to resolve any existing or potential impacts on the public health, welfare, safety and environment, and that nuisances are corrected. Nuisances may include vectors, dust, odors, noise, traffic hazards, etc.

This manual may not present all measures that may be needed to prevent or reduce the adverse environmental and safety consequences of managing plant materials from LCGE operations. Rather, it presents what DEP believes are appropriate minimum standards applicable to most small LCGE operations. DEP may impose certain additional requirements or modify existing standards on a case-by-case basis, if such actions are deemed necessary to provide safe and appropriate management of LCGE plant material. Modification of standards may be afforded to promote the legitimate reuse of these materials. An example of a scenario that would modify existing standards is the use of brush piles for wildlife habitat that are similarly constructed as those used by the Pennsylvania Game Commission.

The Department assumes no liability in the event that these BMP prove inadequate for any given situation. These are minimal standards. Nothing in this manual shall affect existing regulatory requirements established by the Commonwealth of Pennsylvania.

Nothing herein shall be construed to supersede, amend or authorize violation of the provisions of any valid and applicable local law, ordinance, or regulation, provided that said local law, ordinance or regulation is not preempted by environmental protection acts, laws and regulations, including but not limited to the Solid Waste Management Act, 35 P.S. Section 6018.101, et seq., the Municipal Waste Planning, Recycling and Waste Reduction Act, 53 P.S. Section 4000.101, et seq., Pennsylvania Clean Streams Law, 35 P.S. Section 691.601, et Seq., Pennsylvania Storage Tank and Spill Prevention Act, 35 P.S. Section 6021.101, et seq., Air Pollution Control Act, 35 P.S. Section 4001, et seq., Oil and Gas Act, 58 P.S. Section 601.101, et seq., and Federal Water Pollution Control Act, 33 U.S.C. Section 1251, et seq.

1.1 This Manual Addresses the Following Practices:

This manual presents BMP for on-site management, and off-site storage and processing of plant materials from LCGE operations. There are different ways for actually managing and processing the plant materials from LCGE operations. This manual, however, refers only to the environmental aspects and ramifications of these land-clearing activities.

Plant materials from LCGE operations that are covered by this manual include trees, brush, stumps, and vegetative materials. This manual does not apply when these materials fail to meet the provisions of 25 Pa. Code 271.101(b)(5). This manual does not apply to the mixing or

processing of LCGE material with other wastes and also does not apply to composting of yard wastes, food wastes, and residual wastes such as spent mushroom substrate or any other organic materials (Sections 271.103 and 287.101).

The provisions of this manual are applicable for mobile processors of LCGE material. Mobile processors may operate at either an on-site location (e.g. along roadways clearing overhead tree branches away from power lines; a ten acre parcel of land being cleared for a housing development, etc.) or an off-site location (areas which store/process material received from the types of on-site areas described above). Due to the nature of mobile processing operations that work along roadways, not all the provisions under Chapter 3 (On-Site Management of LCGE Plant Materials) will apply; however, the owner/operator must adhere to the relevant provisions when conducting these operations.

The BMP presented here address certain measures typically covered by DEP's municipal waste program. Also, as noted in 25 Pa. Code 271.101(c), persons or municipalities who manage LCGE material operations may also be subject to other environmental protection acts, laws, and regulations including but not limited to the Solid Waste Management Act, the Municipal Waste Planning, Recycling and Waste Reduction Act, the Clean Streams Law, the Storage Tank and Spill Prevention Act, the Oil & Gas Act, and the Air Pollution Control Act.

Considering that LCGE plant material disposal facilities may be harmful to the human health, safety and the environment, DEP will not permit any future off-site disposal of LCGE materials in Pennsylvania (refer to Section 1.2 - This Manual Does Not address the following practices). Accordingly, all *existing* off-site LCGE material disposal facilities operating after the effective date of the manual must implement one of the following: (1) cease operations and manage the materials according to this manual within a year from the date of the final publication of this BMP manual; (2) obtain a general or an individual permit; or (3) comply with the requirements, with certain exceptions, as indicated in Chapter 4, Section 4.4 (relating to siting restrictions and isolation distances for existing facilities) of this manual. The Department may authorize, through a general permit, various non-disposal beneficial uses of LCGE material. Off-site disposal areas would require an individual permit for continued operation.

Note that the Solid Waste Management Act prohibits burning of waste without a permit from the Department. Permits must be obtained from the Solid Waste Programs in order to burn LCGE Municipal Waste, unless the burning is performed according to Chapter 2, Section 2.1D of this manual (Air Pollution and Burning).

1.2 This Manual Does Not Address the Following Practices:

The BMP presented in this manual do not apply to mining facilities, both coal and noncoal, operating under a DEP permit. These facilities may process and dispose of LCGE plant materials from off-site sources in order to promote wildlife enhancement, habitat protection and other environmental enhancements. The appropriate DEP Mining District Office approves these activities as a condition of coal or noncoal mining operation permit.

The BMP also do not apply to oil and gas well operations covered under the Oil & Gas Act (including support activity areas such as access roads, rights-of-way, etc.). The manual does apply, however, if the site is part of a processing or disposal facility for LCGE material from other types of operations. Contact the Department's Bureau of Oil & Gas for further guidance and information on oil and gas well operations.

Organizations, municipalities, counties or other parties interested in utilizing brush piles at their sites for wildlife habitat enhancement are required to contact the Pennsylvania Game Commission for information on the applicable requirements. The Pennsylvania Game Commission is electronically available at the following web address:

<http://www.pgc.state.pa.us/>

LCGE plant materials, rock, stone, etc., left on site as part of an officially approved wildlife habitat enhancement practice or plan (as denoted by DEP or the Pennsylvania Game Commission), are not considered LCGE materials for the purposes of this manual.

This manual also does not apply to facilities that are issued either a DEP general or an individual permit for accumulation, processing or disposal of LCGE materials; or to permitted facilities that accept the previously chipped or shredded LCGE materials for mixing and further processing and/or resale. Similarly, this manual does not apply to facilities that process or dispose of wood from demolition or other dimensional lumber sources, since these activities require either a general or an individual permit from the Department. The permit may, however, incorporate the requirements of these BMP. The BMP do not apply to facilities covered under the provisions of Subchapter 271.103 of the Municipal Waste Regulations, including but not limited to permit-by-rule, yard waste composting and captive facilities.

Waste materials such as rock, stone, gravel, brick, block, concrete, plastics, etc., which are not defined in 25 Pa. Code 271.101(b)(5), are not considered LCGE materials. Accordingly, these wastes are not covered under this manual. When transported to a LCGE plant material processing facility, these wastes must be separated from the LCGE materials and removed from the facility within one (1) week for proper management under the rule and regulations of the Department. Vegetative plant materials containing contaminated soils, construction and demolition waste, yard waste, plastic or other wastes must be managed in accordance with the applicable municipal, residual and hazardous waste regulations. Such materials may qualify for beneficial use under the relevant regulations. Contact the appropriate Department's Regional Office if you wish to pursue such beneficial use.

This BMP Manual does not authorize the storage of LCGE or LCGE-derived material for more than one (1) year prior to beneficial use unless the Department authorizes additional storage time in writing prior to the end of one (1) year storage. Storage for more than one (1) year without clear and convincing evidence to the contrary is defined as disposal per the definition of "storage" in Chapter 271.1.

1.3 Development of This Manual

Information on methods for management of plant materials from LCGE operations was collected through contacts with a wide range of individuals within the industry, DEP, other government agencies, colleges and universities. In addition, published literature was reviewed, as well as regulations and guidance documents from DEP and other government agencies. This information included practices and requirements for related materials, such as sawmill residues. DEP also solicited input from the Solid Waste Advisory Committee (SWAC). Based on the above information, a draft document was developed for review by DEP, industry representatives, SWAC, and the regulated and non-regulated communities. The draft document was published in the Pennsylvania Bulletin for a 60-day public comment period. The comment period ended November 30, 2001. After considering the comments from that review, DEP prepared and proposed a second draft BMP manual to the earlier commentators for additional comments. Following receipt of these comments, DEP has prepared this final BMP manual. Implementation of these BMP may show over time that changes would be appropriate. In this event, DEP will revise and update the manual as needed.

Chapter 2 - Environmental, Safety, and Nuisance Hazards

2.0 Introduction

The plant materials generated from LCGE operations have the potential to cause a variety of adverse effects, through different media, to human health, safety, and the environment. Since the disposal of LCGE material greatly increases the potential for problems to human health, safety and the environment and requires very careful management and operating practices, this manual does not allow the disposal of these materials at off-site locations in Pennsylvania, except when a permit has been issued. Additionally, the Department imposes certain limitations to those sites that implement either on-site storage and disposal, or off-site storage (prior to processing) operations. The operational limitations imposed on these later facilities are the subject of Chapters 3 and 4 of this manual.

The plant materials generated from LCGE operations can be managed in several ways, including chipping, shredding, composting, temporary storage or on-site accumulation prior to processing. Each of these management techniques can be done in a way to minimize potential nuisances and prevent negative impacts on health, safety and the environment. This chapter briefly describes the potential hazards associated with these LCGE material management methods.

2.1 Environmental Hazards

2.1-A. Surface Water Contamination

Contamination of surface water may result via run-off from storage and disposal of LCGE plant material. Storage and disposal sites are usually maintained outdoors, where they are exposed to rain and snow. Over time, with the addition of water, LCGE plant material begins to decompose, releasing a dark brown organic liquid. This liquid, or leachate, may contain high levels of tannins, organic acids, and other contaminants.

Due to its potentially acidic nature, leachate from wood material can degrade the quality of nearby water sources by reducing the pH, mobilizing metals within the soil and other surface formations, and lowering the level of dissolved oxygen in surface water. This in turn can kill fish and other aquatic organisms, and impair wildlife habitats (Pa Hardwoods Development Council, 1992).

Site run-off may also contain organic fines that can be washed into the waters of the Commonwealth or that may accumulate in low spots with resultant nuisances generated during decomposition. Storm water runoff should be diverted away from the processing, staging, curing and storage areas. Proper drainage (i.e., diversions, drains, dikes, etc.) should be constructed and maintained to prevent ponding and excessive wetting. On-site storm water runoff may be directed to either a properly sized vegetated filter area for treatment, or a properly sized temporary storage impoundment or tank for reuse, recycling, or disposal.

2.1-B. Soil Contamination

Soil may also become contaminated by leachate from LCGE component storage and disposal when the amount of run-off is greater than what the soil can naturally absorb and break down. Acidic leachate may cause beneficial nutrients to leach from the soil, creating infertile, acidic soil and stressing vegetation.

2.1-C. Groundwater Contamination

When the ability of the soil to absorb and filter leachate is exhausted, leachate can migrate through soils to contaminate groundwater. In general, the more the soil is permeable, the greater the chance of groundwater contamination. The distance to the groundwater table also affects the rate of contamination; the deeper the groundwater table, the longer the leachate remains in the soil to be absorbed and treated by natural processes before reaching the groundwater (Pa Hardwoods Development Council, 1992).

2.1-D. Air Pollution and Burning

Storage and disposal of LCGE materials may result in an odor nuisance. They may also serve as a source of particulates, which may contribute to exceedances of National Ambient Air Quality Standards (NAAQS). Dust may result from truck traffic on the site or from wind lifting soil or other fine-grained materials from stockpiles or disposal areas.

In addition, burning of LCGE plant materials may result in air emissions and potential NAAQS violations, especially if fires are uncontrolled. These emissions include nitrogen oxides (NO_x) and volatile organic compounds (VOC), which may be harmful to human health, safety and the environment. Figure 2.1 shows an example of significant fires that have occurred in Pennsylvania in large piles of LCGE material. Smoke from these fires often leaves the property on which the burning is taking place and affects the neighboring community. Uncontrolled fires may result from spontaneous combustion or other natural or accidental causes, as discussed in Section 2.2.



Figure 2.1. Spontaneous combustion and burning LCGE plant material in eastern PA. Fires in large piles such as this may burn for months before being extinguished.

The U.S. Environmental Protection Agency conducted an evaluation of emissions from burning LCGE material, with an emphasis on the quantification of hazardous air pollutants listed in Title III of the Clean Air Act Amendments (CAAA) of 1990. The study indicated that burning of LCGE plant material emitted a substantial amount of several air pollutants, including carbon monoxide, particulate matter (PM₁₀, PM_{2.5}), benzene, acetone, toluene, ethyl benzene, naphthalene, phenol, and 14 polycyclic aromatic hydrocarbons. These contaminants may be harmful to human health, safety, and the environment (Lutes, 1997). To access a summary of the results of this study, click on <http://www.epa.gov/ttn/atw/burn/brushburn1.pdf>.

The Department has two separate programs that specifically regulate the burning of land clearing and grubbing wastes: Air Quality and Municipal Waste. A person who is planning to burn land clearing and grubbing wastes must comply with the regulatory requirements of both programs. The Air Quality regulations differentiate between clearing and grubbing materials that are burned inside or outside of an air basin. The Municipal Waste regulations apply to the management of all clearing and grubbing materials, whether the materials are burned inside or outside of an air basin.

The Air Quality regulations for open burning operations are found at 25 Pa. Code Section 129.14. Unless otherwise exempt under Section 129.14(c), the Air Quality regulations allow clearing and grubbing wastes to be burned inside or outside of an air basin subject to certain limitations set forth in the regulations.

Section 129.14(d)(2) allows clearing and grubbing wastes to be burned *inside of an air basin*, subject to the following requirements:

- a. Air curtain destructors shall be used when burning clearing and grubbing wastes.
- b. Each proposed use of air curtain destructors must be reviewed and approved by the Department in writing with respect to equipment arrangement, design and existing environmental conditions prior to commencement of burning. Proposals approved under this subparagraph need not obtain plan approval or operating permits under 25 Pa. Code, Chapter 127 (relating to construction, modification, reactivation and operation of sources).
- c. Approval for use of an air curtain destructor at one site may be granted for a specified period not to exceed three (3) months, but may be extended for additional limited periods upon further approval by the Department.
- d. The Department reserves the right to rescind approval granted if a determination by the Department indicates that an air pollution problem exists.

Section 129.14(d)(3) allows clearing and grubbing wastes to be burned *outside of an air basin*, subject to the following limitations:

- a. Upon receipt of a complaint or determination by the Department that an air pollution

problem exists, the Department may order that the open burning cease or comply with 25 Pa. Code Section 129.14(b).

- b. Authorization for open burning under this paragraph does not apply to clearing and grubbing wastes transported from an air basin for disposal outside of an air basin.

Section 129.14(b) provides that no person may permit the open burning of material in an area outside of air basins in a manner that:

- a. The emissions are visible, at any time, at the point such emissions pass outside the property of the person on whose land the open burning is being conducted.
- b. Malodorous air contaminants from the open burning are detectable outside the property of the person on whose land the open burning is being conducted.
- c. The emissions interfere with the reasonable enjoyment of life or property.
- d. The emissions cause damage to vegetation or property.
- e. The emissions are or may be deleterious to human or animal health.

The applicable Municipal Waste regulations are found at 25 Pa. Code Section 271.101(b)(5). Section 271.101(b)(5) requires that a person managing waste from land clearing, grubbing and excavation shall implement best management practices as outlined in a manual prepared by the Department. For purposes of this manual, the Department considers the burning of LCGE materials to be a best management practice under the Municipal Waste regulations only if the materials are burned on-site in accordance with the requirements of the Air Quality regulations at Section 129.14(d)(2) and 129.14(b), whether *inside or outside* of an air basin. Because the Department does not consider off-site burning of LCGE materials to be a best management practice, the materials should not be transported anywhere, inside or outside of an air basin, from the area upon which they were generated.

If a person fails to implement the BMP for LCGE materials in this manual, the Department may require the person or municipality to obtain an individual or general solid waste permit.

2.2 Safety Hazards

2.2-A. Fire Hazards

As noted above, fire is a well-recognized risk at LCGE plant material management facilities. In managing LCGE material piles, fire prevention is highly desirable because of the potential size, environmental impact, duration, and associated cost of fires at these sites. Fires can occur both on the outside of the accumulated material, called a *surface fire*, and within the material mass (*spontaneous combustion*). Surface fires are typically caused by human activities, such as smoking or operation of machinery near the storage or disposal site, but are less common due to

the higher moisture content of piles towards the surface. Spontaneously ignited fires, which occur on the inside of a storage pile, are more common.

Soon after being placed in a stockpile, the decomposition of plant material creates elevated temperatures and local hot spots. The internal temperature of LCGE components increase rapidly and the hot spots may cause a spontaneous fire. However, if air circulation is adequate to help dissipate the heat, the temperature levels off after a few weeks (below the temperature required for spontaneous combustion), and then decreases slightly, but remains well above the outside air temperature for several months (Pa Hardwoods Development Council, 1992). Certain conditions, including excessive pile size and increased pile compaction, often the result of the use of tractors and other heavy machinery on a pile, can restrict aeration and the dissipation of heat out of the pile. If heat in the pile continues to rise unabated, combustion may occur. The internal combustion, if not addressed in a timely manner, increases the potential for sinkhole formation within the mass, and causes safety concerns.

High proportions of green vegetation (grass, leaves etc.), which are high in nitrogen and support heat-generating bacterial activity, increase the potential for spontaneous combustion to occur. Other non-LCGE materials, such as bark, decayed wood, and sawdust, can also promote pile fires (Ontario Office of Fire Marshall, 1998). Piles should be turned and aerated more often if these materials are present in the pile to prevent any spontaneous combustion. Internal fires are not always obvious but may become a problem if they go undetected for very long.

Several other factors affect the potential for internal spontaneous combustion of the LCGE plant material. Examples include, but are not limited to: the type and size of material in the pile or windrow; biological activity; age of the clearing and grubbing material; pile or windrow size; pile compaction; moisture content of the materials; outside temperature and humidity; wind direction and air flow; climate (rain, freeze), etc. Management practices employed at LCGE material sites with regard to these factors will determine the potential for fire at a particular site (Riggle, 1996).

2.2-B. Explosive Gases

Microbiological decomposition under anaerobic conditions generates heat, carbon dioxide and methane, with potential odor and nuisance problems. If the methane gas accumulates, it can enhance the risk of fire in the plant material pile. In addition, it can pose an explosion hazard if it migrates through the subsurface and accumulates in neighboring buildings. These and other factors highly support occasionally rotating, turning and aerating both processed and unprocessed LCGE material piles and windrows. This also minimizes the potential liability associated with these risks.

2.2-C. Subsidence and Sinkholes

LCGE material disposal sites can present both safety hazards and nuisances when subsidence occurs or sinkholes develop following burial of the plant material. As the plant material decomposes, approximately 20 percent of the material mass is converted to gas. In addition, soil

around the material shifts to fill voids that were created when the material was buried. The resulting subsidence in the disposal area can range from a few inches to several feet, depending on when and how the plant material was buried. This may in turn cause structural problems for nearby buildings or dangerous conditions for persons coming in contact with the site. Any construction over, and in the vicinity of, the emplaced materials may require proper engineering for the foundations. Also, additional earthen materials may be needed to ensure that the area remains relatively stable and level.

Sinkholes occur when large void spaces within the buried plant material become exposed, and are formed more readily if storm water is not properly channeled around the disposal area (Delaware Debris Pit Program, 2001).

2.2-D. Emergency Access Limitations

Certain hazards may be compounded if access to the LCGE material is restricted or inadequate for emergency vehicles. This is particularly true in the event of a fire. Inadequate access can result from failure to coordinate access/entry when the site is locked and unattended, as well as failure to provide adequate roads to and through the plant material area (Ontario Office of Fire Marshall, 1998).

2.3 Site Safety and Security

2.3-A. Physical Hazards

LCGE plant material piles located in storage and disposal sites can pose safety hazards, due to instability to both site personnel and visitors. Sites without proper fencing, restricted access gates, and/or a site attendant may provide access to unauthorized individuals who are not familiar with the safety measures necessary at a LCGE material facility. This may increase the risk of injury or fire.

2.3-B. Illegal Dumping

Inadequate security and access control at storage and processing or disposal sites can also result in illegal dumping of waste. This waste may include vegetative and non-vegetative material, or garbage, trash, refuse and other unwanted debris. This practice may introduce contaminants and increase the risk of fire.

2.4 Nuisances

2.4-A. Insects

Nuisance conditions may be caused by insect infestation at LCGE plant material storage and processing or disposal sites. These facilities provide harborage for insects since they are a good source of food, water, and shelter, especially in the winter months. Insects can use the protection of a LCGE material pile in every stage of life, from the egg-laying phase to adulthood.

The presence of insects in a LCGE plant material pile or at a disposal site may not necessarily be a nuisance, especially in rural areas, unless the population size increases excessively, due to favorable conditions, and exhausts its resources. This may cause it to spread from the pile to neighboring areas in search of food. Insects can also infest storage and disposal sites if they are brought in with the LCGE material. This was the case in summer 1999 at Monroe County, Pennsylvania, where cockroaches were hauled in with the wood. Certain factors, including prime habitat and unseasonably warm weather, allowed the population to expand rapidly to neighboring properties (Tomayko, 2001).

On-site puddles, impoundments, ponds, erosion and sedimentation controls, etc., are also potential areas for harboring mosquitoes and other harmful insects. These areas should be controlled, designed and/or maintained in a way that prevents nuisance conditions (Arnett, 93).

2.4-B. Mammals and Birds

Mammals and birds may use LCGE material storage and processing or disposal sites as a habitat, where they can find food, water, shelter and warmth. The presence of LCGE plant material management sites near residential areas increases the chance that deer or other wildlife species will create a nuisance by spreading into nearby housing areas.

2.4-C. Odors

Odors can create a nuisance at LCGE material storage and processing or disposal sites, especially if the piles develop anaerobic conditions. This is especially true in wet and hot climates, and in the warmer seasons of more temperate climates common in Pennsylvania. Although this may not pose a problem in rural areas, it can become a nuisance in more densely populated urban and suburban areas (Witzel, 2001).

Odor problems can also occur wherever leachate and/or fine particulate matter from organic materials migrates to surface water and accumulates in puddles, depressions, erosion and sedimentation controls, etc. This may represent a nuisance not only for nearby residents but for those passing by the site as well.

Chapter 3 – On-Site Management of LCGE Plant Materials

3.0 Introduction

The term “on-site”, as used in this manual, refers to activities that occur on the same site where the LCGE plant material was generated. This chapter contains information that will help with on-site management of LCGE plant materials in a manner that minimizes health and safety hazards and environmental impacts.

The BMP described in this chapter apply to accumulation, processing, disposal, or utilization of LCGE materials at the site where they are generated. There are many useful alternatives to disposing LCGE plant materials. DEP strongly encourages the use of these alternatives to reuse and recycle LCGE materials wherever possible, discourages the management of LCGE plant materials by on-site disposal (restrictions apply, refer to Section 3.3), and prohibits any sort of burning, except as specified in Section 2.1D – Air Pollution and Burning.

Examples of such alternatives include use in plant nursery, landscaping and related applications, such as mulch, plant bedding, and “tot lots”; manufacturing of particle board; use in products, such as briquetted wood, paper, and fiberboard; and recycling the LCGE materials through an off-site processor. The benefits of reusing LCGE plant materials include reduced potential liability and increased flexibility for land use. Also, the mulch from processing of the LCGE materials may be used for erosion and sedimentation control under Chapter 105, Dam Safety and Waterway Management. There are innovative technologies for utilization of LCGE materials for erosion and sedimentation control measures. Compost or mulch produced from LCGE provides many positive benefits in reducing or eliminating erosion or sedimentation when implemented and applied properly.

This BMP Manual also applies to owners and/or operators of mobile processors. These owners and/or operators must contact the Air Quality Program in the appropriate DEP Regional Office and request a determination if the equipment used in their operation would require a plan approval.

The BMP Manual allows homeowners to manage LCGE that is generated on their own property, on the property parcel(s) containing their places of residence for such beneficial uses as leveling a small area or bringing a small-scale depression area to grade as long as the area is not within the waters of the Commonwealth. This BMP Manual does not prohibit the homeowner from composting their own generated LCGE plant material, yard wastes, etc. on the property containing their residence. The homeowner may find useful information and recommendations pertaining to the proper management of LCGE within this Manual. Any additional questions regarding the use of LCGE or LCGE-derived materials should be directed to the Department Regional Office.

3.1 Access Control Measures

For on-site management of LCGE plant materials, access controls required by applicable local ordinances for land-clearing activities generally are sufficient. The owner/operator should contact their local municipalities to determine the local requirements.

3.2 On-Site Accumulation and Processing of LCGE Plant Materials

On-site temporary storage may include accumulating unprocessed LCGE materials at the on-site location prior to removal from the site to an off-site facility for processing and reuse. If processing occurs at the on-site location, such as grinding, shredding, chipping, etc., these LCGE materials may also be stored on site prior to either the on-site utilization/disposal described in this Chapter, or before removal to an off-site facility for additional processing and reuse. The potential nuisances and the impacts to public health, welfare and the environment, as identified in Chapter 2, will limit on-site storage of LCGE material. In the event of an actual nuisance or impact on public health, safety, welfare and the environment, it is the responsibility of the landowner and site operator to take prompt, effective action. Failure to prevent or resolve these conditions may result in compliance monitoring and/or enforcement action by the Department.

Accumulation and storage of LCGE plant materials in excess of one year constitutes disposal under the Department's municipal waste regulations and a permit would be required. The Department may approve a longer period in writing, prior to the end of one year of storage (refer to Municipal Waste Regulation Subchapter 285.113 – Duration of storage). Please note that DEP encourages the recycling and utilization of LCGE materials, due to the potential impacts as described in Chapter 2. DEP strongly recommends that the on-site LCGD materials, whether processed or unprocessed, be sent to a processing, recycling, or composting facility.

This BMP manual does not prescribe limits on stockpile height for on-site operations; however, their dimensions should be based on several considerations. Storage of LCGE materials for extended periods may foster spontaneous combustion and fire in a larger pile, especially if the pile is not turned or aerated periodically. The potential for spontaneous combustion will increase as the stockpile expands. Although long-term storage is not routine due to the nature of on-site operations, operators anticipating accumulation and/or storage of materials in larger stockpiles for longer than sixty days should consider implementing these practices to reduce hot spots. Additionally, the risk of surface fires (fire from cigarettes, child play, etc.) will grow both with increasing stockpile size and the longer the pile resides at a particular site. Also, stockpile dimensions should not hinder, and spacing between stockpiles should not restrict, the ability of emergency response vehicles and equipment to respond to a fire or other event at the on-site area. The size of the stockpile also should not pose a safety hazard for individuals at the site or adjacent properties.

Tree trunks, roots, brush, stumps, vegetative materials, rocks, and other grubbing and excavation materials may be left on the site as part of an officially approved wildlife habitat enhancement practice or plan. These materials, when approved by the Pennsylvania Game Commission, may be used as a structure for wildlife habitat enhancement, and will not be considered LCGE

materials for the purposes of this manual. These structures promote increased wildlife diversity and are a valuable asset to the Commission's Land Management Plans in Game-Lands complexes and through the Commonwealth. Persons, municipalities, or counties interested in utilizing brush piles on-site for wildlife habitat enhancement are required to contact the Pennsylvania Game Commission for additional information and complete requirements. The landowner, or the landowner's authorized agents such as contractors or developers, may conduct limited on-site processing of the LCGE materials, such as sizing, shaping, sorting, grinding, chipping, shredding, and screening, without a permit or permit-by-rule. If non-LCGE materials such as rocks, concrete, etc., are also processed, or if other methods of processing of LCGE materials such as composting (other than homeowner composting) are proposed, DEP must be contacted in regard to permit options.

Improper accumulation and processing of on-site LCGE plant materials may create a fire and safety hazard and cause other nuisances, including pest infestations and objectionable odors. These unwanted consequences could affect not only the on-site area but also surrounding properties. Mismanaged LCGE material may pose an additional threat to the surface water and groundwater in these areas as well. To help prevent these potential nuisances and harms, the Department recommends that LCGE materials not be stored in excessive volumes. Ideally, the materials should be either processed or utilized within a few weeks to minimize potential nuisances, unsightliness, and potential harms from the decomposition of the plant materials. In addition, the LCGE materials must not be situated in a way that causes adverse impacts and nuisances on adjacent receptors and surrounding environmental media.

3.3 On-Site Utilization of Processed Material

The Department strongly encourages the use of certain alternatives, including re-use and recycling of LCGE materials wherever possible. Accordingly, the Department limits the management of LCGE plant materials by disposal and prohibits the burning of LCGE materials, except as specified in Chapter 2, Section 2.1 D - Air Pollution and Burning. The LCGE plant materials must be processed (shredded, ground, chipped, etc.) prior to distribution and disposal at the site, except as provided for homeowners in Section 3.0 - Introduction. The BMP prohibits the utilization of brush, trunks, stumps, etc., on the site unless they have been processed and disposed as described below, or qualify for alternate uses as described in Chapter 1.

Processed materials produced from shredding or chipping of LCGE materials may be placed in the holes formed by stump removal. These materials may also be used to fill in existing small-scale depressions on the site to bring an area to grade, or used for landscaping. Utilization of processed LCGE materials in the above manner is considered the only acceptable on-site "disposal" option. However, the processed or unprocessed LCGE materials may not be used to fill in larger-scale, low-lying areas and depressions on the site, or areas where future building or construction activities would occur. This would include ravines, valleys, excavated areas, landfills, etc. These limitations may also be subject to the siting restrictions related to wetlands and surface waters. Pits or holes may not be excavated in order to bury LCGE materials, and mounds or permanent piles of materials, which raise the prevailing grade of the land, may not be

constructed. This restriction does not apply for processed LCGE material used as a berm, as part of a site run-on or run-off control measure.

LCGE materials cannot be accepted from outside the property. Within the property boundary, the volume of shredded or chipped material used to bring an area to grade or spread in an area must not exceed the original volume of LCGE material generated from the property. If processed stumps and other LCGE materials are disposed on site, it must be disposed in the same general area of the site where the land-clearing activity occurred and must not be concentrated in a corner of the site. The processed material may not be situated in a way that causes adverse impacts and nuisances on adjacent receptors and surrounding environmental media.

3.4 Siting Restrictions and Isolation Distances

On-site operations must be managed in an environmentally responsible manner. Although specific isolation distances for stockpiles, disposal areas, etc., are not prescribed, owing to the duration and operational dynamics of these operations, they may not be situated in a way that cause adverse impacts and nuisances on adjacent receptors and surrounding environmental media. These factors must be considered when stockpiles, disposal areas and other features are positioned relative to property boundaries, floodplains, surface waters, water sources, occupied dwellings, etc.

3.5 Burning of LCGE Plant Materials

As stated earlier, the Solid Waste Management Act prohibits burning of waste without a permit. Accordingly, for the purpose of BMP, this manual does not authorize any burning of LCGE plant materials, except as specified in Chapter 2, Section 2.1 D – Air Pollution and Burning. DEP strongly encourages recycling and reuse of the LCGE plant material wherever possible. LCGE material may not be sent off-site for burning, except for energy recovery.

3.6 Run-on and Run-off Controls

An on-site LCGE material operation must not cause or allow a point or non-point source pollution discharge to any surface waters of the Commonwealth. Fine organic material and leachate from LCGE operations may result in odors and pollution of the waters of the Commonwealth. Therefore, run-off from these sites must be minimized to control such nuisances and pollution. In addition, on-site owners and operators must comply with the erosion and sedimentation control requirements in 25 Pa. Code, Chapter 102. Also, collection and storage of run-off that has been in contact with LCGE material in a pile or windrow needs to be managed in accordance with the Municipal Waste Regulations in 25 Pa Code, Chapter 285. These requirements are accessible through the following DEP web address.

<http://www.pacode.com/secure/data/025/025toc.html>

The regulations contained in Chapters 102 and 285 include various requirements and best management practices to minimize the potential for erosion and sedimentation and to protect the

waters of the Commonwealth from contaminated drainage. Additional control measures for piles, temporary storage areas, requirements for access roads, etc., are described below.

3.6-A. Controlling Run-on

Storm water run-on at the facility should be diverted away from the processing, staging, curing and storage areas. Proper drainage (i.e., diversion ditches, drains, dikes, etc.) must be constructed and maintained to prevent ponding and excessive wetting. Site run-on must be controlled in order to prevent contact with the material from land clearing activities. This may be accomplished by diverting storm water flow around the on-site LCGE material area. One way to reduce run-on is to install a trench system, which relies on drainage ditches, or culverts, to divert storm water away from LCGE materials. Another technique is to create earthen berms, or protective hills formed with earth around the base of the piles. The on-site temporary accumulation or storage of the LCGE plant material may be in the form of windrows. If the site area is not level, these windrows should be placed perpendicular to the land contours to minimize contact between LCGE materials and any run-on at the facility.

3.6-B. Controlling Run-off

On-site storm water runoff must be directed to either a properly sized vegetated filter area for treatment, or a properly sized temporary storage impoundment or tank for later reuse, recycling, or disposal. A storm water discharge permit may be required before the runoff is discharged into surface waters of the Commonwealth. For more information on managing run-off, contact the appropriate County Conservation District through the following web address, and DEP Regional Offices for further assistance.

<http://www.pacd.org/>

In addition, an adequate Erosion and Sedimentation (E&S) Control Plan must be prepared and implemented, if the land-clearing site involves an earth disturbance area of 5,000 square feet or greater. The E&S plan should be retained at the site and must be available to the Department for review and inspection. All best management practice components of the plan should be maintained. Also, it must be determined whether the site requires a permit under the National Pollutant Discharge Elimination System (NPDES) program for the discharge of storm water from a construction site. An earth disturbance permit may be required for construction activity at the site. For these and other regulatory requirements contact the County Conservation District, the Water Quality Management Program in the appropriate DEP Regional Office, or the Department's web site for further information.

Local governments or municipalities may also have ordinances regarding surface water management for flood control purposes, elimination of potential mosquito breeding grounds, etc. This manual does not override these local requirements. Accordingly, local government or municipalities must also be contacted for their ordinances and other applicable requirements.

3.6-C. Access Roads

Consistent with the Municipal Waste Regulations, 25 Pa. Code Section 281.212(a) and the requirements noted above, access roads must be constructed in a manner that prevents erosion and sedimentation run-off to streams. Access roads crossing any streams and wetlands must use bridges, culverts, or similar structures. The access road should have a drainage system compatible with the natural drainage system of the area. Also, access roads must be surfaced with a component suitable for dust and erosion control and maintained accordingly. Contact your DEP regional office for information about permit requirements for these crossings and additional information.

Chapter 4 - Off-Site Temporary Storage and Processing of LCGE Plant Materials

4.0 Introduction

The term “off-site”, as used in this manual, refers to activities that occur at a site where LCGE plant materials are accepted for processing, or temporary storage prior to and following processing. The incoming LCGE materials were generated at another site (an “on-site” location, as defined in Chapter 3), and may be accepted into the off-site facility as unprocessed or semi-processed (ground, shredded, chipped, etc.) plant material. The BMP presented in this chapter applies to storage prior to and following processing, and the actual processing, of the LCGE materials.

As defined in the Municipal Waste Regulations (Section 271.1 - Definitions), the term *facility* includes “land, structures and other appurtenances or improvements where municipal waste disposal, processing or beneficial use is permitted or takes place”. While an off-site LCGE *facility* is not restricted to an acreage limit, actual *storage and processing operation areas within the facility* are limited to twenty-five (25) acres or less to qualify for using this BMP manual. If a LCGE material storage and processing area(s) exceeds twenty-five (25) acres, the owner/operator must obtain either a general or an individual permit from DEP before initiating any operation. Note that office buildings, equipment storage areas, etc. as well as any storage areas of packaged product (e.g. fifty (50) pound bags of shredded mulch, etc., ready for sale/use) are not to be included as part of the twenty-five (25) acre area.

The storage and processing acreage restriction described above limits the potential for adverse environmental impacts and allows operations to be effectively managed through implementation of best management practices, as opposed to regulations imposed through a permit. This concept also requires a restriction on other nearby LCGE facilities that have the potential to contribute an additive effect to the same local environmental receptors. Accordingly, nearby or adjacent properties that share common owners/operators may not qualify for operation under the provisions of this manual, if these properties cumulatively exceed 25 acres and affect the same environmental receptors. This practice is intended to discourage the division of large facilities, with storage and processing areas exceeding twenty-five acres, into smaller, adjacent facilities. The additive effect of these smaller facilities, similar to one large facility, may preclude the use of best management practices as described in this manual. The appropriate DEP Regional Office may be contacted for additional information on the limitations regarding multiple facility locations and the potential for any subsequent, additive impact on local environmental media.

Some off-site facilities currently accept clean pallets, and lesser quantities of wood packing crates for grinding in addition to LCGE materials. This material is used as a feedstock component with LCGE materials in the production of a finished product, e.g. 60-70% LCGE material blended with 30-40% ground pallet material, or, due to its physical characteristics, as a separate finished product. This practice falls within the provisions of this BMP manual only if the following apply:

- Only clean, untreated wood from pallets or wood packing crates is accepted, free of glues, resins, adhesives, paints and other additives. Refer to Figure 4.1 below.



Figure 4.1: Stockpile of clean pallets prior to processing.

- Processing of this wood is limited to the same processing as occurs with LCGE material, with the exception to separation/removal of nails and other metal fastening agents. See Figure 4.2 below.

Figure 4.2: Clean pallets being loaded into a tub grinder for processing.



- Pallets must be actively used in the production of a finished product, and may neither be disposed nor accumulated speculatively, as defined in the Department's Residual Waste Regulations, Section 287.1 – Definitions. See Figure 4.3 below.



Figure 4.3: Processed pallet material for use as a feedstock component in mulching applications.

- A coproduct determination has been made for these materials, as defined under Section 287.7 of the Department’s Residual Waste Regulations.

Any processing of the LCGE materials other than sizing, shaping, sorting, grinding, chipping, shredding and screening may require a permit. A general or an individual permit must be obtained from the Department if mixing and/or processing LCGE material with any other waste, except as provided for wood from sources as defined above. Contact the Department’s appropriate Regional Office for further information.

4.1 Notification and Recordkeeping Requirements

For a LCGE material storage and processing facility becoming operational after the effective date of this manual, to operate under the provisions of this manual, the appropriate DEP Regional Office must be notified in writing, at least thirty (30) days prior to initiation of activities at the site. The written notice must include the following forms and information, specified in items #1 through #11.

1. A completed General Information Form (GIF). The GIF blank form may be obtained from the Department or from the following DEP web site:
<http://www.dep.state.pa.us/dep/efacts/departmentspermits.htm>
2. Unless the operator owns the property, a completed Form E – Contractual Consent of Landowner should be submitted. This form may be obtained from the Department or from the above DEP web site.
3. A drawing showing the relationship of the storage and/or processing areas to the facility and adjacent property boundaries, surface water management controls, access roads/controls and any of the applicable manual setback distances. The drawing must also define the areas contributing run-on to the tipping, staging,

processing, curing and storage areas of the site, areas that receive run-off from the facility, and where the site run-off enters the waters of the Commonwealth. It must also include design details showing that the surface water management controls are sized for a 25-year, 24-hour storm event.

4. Hours and days of facility operation.
5. Type of processing, proposed end use and proposed turnaround time for the raw and processed materials.
6. Identification of the host municipality and county, and phone numbers for the local police and fire department.
7. Nuisance and fire control measures including available sources of water.
8. A plan that addresses the potential for both dissolved and particulate-contaminated run-off. This may include some form of filtering system and/or plans for potential aeration of impoundments.
9. A Preparedness and Prevention Control Plan (PPC). The PPC should be based on the latest plan guidelines (refer to Section 4.8.A – Fire and Emergency Plan for further information).
10. Approximate amount of raw and processed material to be managed annually at the site.
11. Total area and location of the processing and storage facility, including directions to the facility from a nearby highway intersection or town.

For an *existing* LCGE material storage and processing facility to qualify for operation under the provisions of this manual, the Department must be notified, in writing, within 90 days of final publication of this manual. The notification must include the forms and information, specified in items #1 through #11 above.

Sites with unresolved compliance problems do not qualify to operate under the provisions of this manual, unless written DEP approval for the proposed facility areas and activities has been obtained. Accordingly, they must notify the DEP and include the applicable Forms and information, specified in items #1 through #11.

Records must be maintained to identify the volume of LCGE received and the volume of finished product shipped from the site, on a daily basis or as these activities occur. Daily records should also include the dates of raw and/or processed material delivery, material processing, and when raw and/or processed materials are rotated, turned and/or aerated (see Section 4.5), etc. This information is not required to be reported to DEP, but must be maintained for at least three (3) years after the final date processed material is shipped from the site. The records should be

available to DEP inspectors at the site upon request. In addition, records must also be provided to DEP Regional Office for review if requested.

4.2 Access Control Measures

All facilities must indicate, and legibly display, both the days and hours the facility is in operation, and the hours that LCGE plant material will be accepted at the site. Facilities that require a gate for restricting access should post these hours on the gate or an adjacent fence. Facilities that do not require a gate should post these hours on a sign adjacent to, and in clear view from, the main access road into the facility.

Appropriate measures to restrict site access are required to discourage unauthorized site entry, prevent illegal dumping of other materials, and decrease the risk of fire, nuisances or personal injury. Specific measures will depend on site location, land use(s) in the vicinity, storage and processing duration, and any local requirements prescribed through municipal ordinances or other means.

LCGE material storage and processing facilities located in populated areas, including residential and commercial units on nearby or adjacent properties should use perimeter fencing and gates across road entrances to control access. If an operator or security guard is present at the site at all times, the fencing and gates may not be required. Where required, the fencing and gate(s) must be at least six (6) feet in height. Durable, weather-resistant signs must be posted at the gate and around the perimeter fencing to indicate “Danger - Do Not Enter”, “No Trespassing” or similar language, to make it clear that the fencing is intended to protect individuals from potential hazards at the site. If the site is located in a more remote area, then gates with posted signs may be sufficient, unless local requirements specify fencing or other additional measures. In any case, the site owner and/or operator is responsible for site security and maintenance, to prevent illegal dumping, injury, fire or other unwanted occurrences.

If the site will be unattended, gates controlling access to the site must be locked; however, access must be provided to emergency personnel and vehicles at all times. This entails planning and coordination with area emergency response authorities to ensure site access is not restricted for these individuals and their equipment. This will be discussed in greater detail in Section 4.8.

4.3 Waste Types

The BMP apply only to LCGE plant materials. If a facility will be accepting materials other than the LCGE, the owner and/or operator must submit an application for either an individual or a general permit prior to conducting any site operations. An exception is provided for clean wood from pallets and packing crates used as a component in a finished product. Use of this material is subject to the provisions and restrictions incorporated under Section 4.0, above. The use and processing of such woody material increases the potential for problems to human health, safety and the environment and requires very careful management and operating practices. If DEP determines that the use and processing of these materials by an owner/operator of a facility is potentially harmful to the human health, safety, and the environment, DEP may require the

owner/operator to obtain a general or an individual permit, or cease that activity.

Plant material delivered to a facility must be inspected before acceptance to prevent receipt of unauthorized components. Unauthorized materials include, but are not limited to, yard waste (leaves, grass clippings, garden residue, tree trimmings, chipped shrubbery and other related vegetative materials); wood from construction/demolition projects or industry; all type of plastics (bags, containers, etc.); particleboard (processed or unprocessed); and concrete, rocks, bricks, etc. Figure 4.4, for example, shows wood from a construction/demolition operation, which is not covered under this manual. Material loads of any type, which exhibit evidence of contamination or contain unusual odors, must be rejected by the facility. In these later cases, the facility owner or operator must notify the Department. This will ensure only appropriate materials enter the site for storage and processing operations.



Figure 4.4: A load of construction/demolition wood indicates an example of unauthorized waste under this manual.

Material must also be inspected and pre-screened prior to processing. Any unauthorized material mixed with the LCGE plant material not uncovered during the LCGE load acceptance must be separated and removed from the site within one (1) week.

4.4 Siting Restrictions and Isolation Distances

To maintain environmentally responsible off-site operations, the following restrictions and isolation distances listed below apply to new off-site LCGE facilities. For existing facilities, the DEP Regional Office will evaluate the applicability of these restrictions and isolation distances on a case-by-case basis. Note that the distances specified below are the shortest distances between the actual storage and processing areas within the facility (e.g. stockpiles, windrows, chipping/grinding areas, etc) and the relevant feature.

Wetlands

Off-site processing and storage areas must be located at least 100 feet from a wetland other than an exceptional value wetland and at least 300 feet from an exceptional value wetland (as defined in §105.17 and §281.202).

Floodplains

Off-site processing and storage areas must not be located in the 100-year floodplain of the waters of this Commonwealth, unless it is demonstrated that the facility will be protected during flooding.

Property Boundaries

Off-site processing and storage areas must be located at least 50 feet from all property boundaries, unless the owner of the adjacent property provides a written waiver consenting to a lesser distance.

Perennial Streams

Off-site processing and storage areas must be located at least 100 feet from a perennial stream. No adverse impacts to the perennial stream or other surface waters may occur.

Occupied Dwellings

Off-site processing and storage areas must be located at least 300 feet from an occupied dwelling unless the owner provides a written waiver consenting to a lesser distance.

School, Park or Playground

Off-site processing and storage areas must be at least 300 yards from a school, park or playground, unless the owner provides a written waiver consenting to a lesser distance.

Water Table

Off-site processing and storage areas may not be in contact with the seasonal high water table or a perched water table.

Water Source

Off-site processing and storage areas may not be within ¼ mile upgradient and within 300 feet downgradient of a public or private water source.

4.5 Storage and Processing of LCGE Materials

Raw, partially processed and finished-product LCGE material all must be managed prudently to minimize the risk of adverse environmental impacts and nuisances, and to establish and maintain efficient site operations. Failure to implement these measures may result in DEP-initiated enforcement and legal action.

Processing and storage of LCGE material must be performed on a prepared surface area to prevent leachate infiltration. Leachate is considered a “wastewater” and is required to be recycled or collected, treated and properly managed. An NPDES permit is required if the treated leachate is discharged into waters of the Commonwealth. The surface area should be prepared to facilitate site operations and the working area must be accessible in all weather conditions.

LCGE material may be managed and stored in the form of a stockpile, extended stockpile or windrow. Size limitations are important factors in the prevention of, and in the response to, fires that may occur in the stockpile or windrow. This is especially true with raw material. Heterogeneous conditions in a raw material stockpile or windrow contribute to an increased risk of spontaneous combustion, compared to those containing processed product. Due to the fire potential, it is critical that raw LCGE material be processed within 60 days of the acceptance date, or be rotated, turned and/or aerated within 60 days, and every 60 days thereafter, until the material is processed.

Single-shredded material in a pile, in turn, has a significantly higher potential for spontaneous combustion (SC) than final product (double-shredded and higher). This is due to the particle size of the single-shredded material (normally over four (4) inches long) and the air distribution level within the pile. The air distribution level within a pile of single-shredded LCGE material generally does not allow sufficient air circulation to dissipate the heat, yet is not deficient enough to prevent SC. Single-shredded plant material should be turned, mixed, aerated and sprayed with water, preferably once a week, to prevent SC if the material will not be processed into its final product size within this timeframe. Single-shredded material is often processed into a final product size while adding/spraying water to ensure proper and uniform moisture distribution throughout the pile and prevent spontaneous combustion.

LCGE materials that have undergone final processing often are stockpiled at the time of processing, where they continue to undergo additional composting into the final product. If processing is properly implemented, the material will exhibit a uniform moisture content and consist of a relatively homogeneous particle size. Adding/spraying water on the LCGE material as it undergoes processing, as mentioned above, is one preferred method to ensure proper moisture content and its uniform distribution throughout the LCGE stockpile. This method is more efficient than adding water to the top of a stockpile after the material has been processed, since this later method may selectively channel water and not achieve uniform moisture distribution. Some operators also process LCGE material during rainy conditions, which also helps to evenly distribute moisture (Zeager, 2002; Zwicky & Martin, 2002). The inconsistencies inherent to rainfall, however, suggest spraying water should serve as the primary method of adding moisture to the material. Although this final processed material may still generate

temperatures of 150 °F to 160 °F, the uniform moisture distribution and consistency of the material will hinder the development of the higher temperatures common to raw and partially processed stockpiles, and subsequently should pose a lower risk of fires resulting from internal spontaneous combustion.

Stockpiles and windrows of processed, finished product should still be monitored for signs of hot spots and nuisance conditions. Turning/mixing/aeration of this material, and adding water when necessary, is also a recommended practice. This helps ensure uniform moisture content and eliminates the precursors of spontaneous combustion. This practice is especially recommended if water was not previously added at the time of final processing. This mixing should be performed every sixty (60) days until the material leaves the site for its intended application (Riggle, 1996; Rynk, 2000). Temperatures in the pile should also be monitored using a heat detection device with a long probe such as pyrometer at several locations around the stockpile (refer to Chapter 4, Section 4.7 C. Material Stockpile Management and Fire Prevention).

After final processing, the LCGE material may be stored at the off-site facility for up to one year, as long as the material does not impact public health and safety, cause nuisances or result in environmental degradation. Storage for periods greater than one year constitutes disposal, as defined by the Department's Municipal Waste Regulations, and is prohibited unless the Department has specifically approved a longer period in writing (see Chapter 285.113- Duration of Storage). An individual or a general permit may also be required if the one-year period will be exceeded.

A "first-in/first-out" approach for managing LGCE materials is required. This procedure will minimize the residence time for material kept on the site and reduce potential problems as described in Chapter 2. By addressing these conditions in a timely manner, the owner/operator can prevent an adverse impact on public health, safety and the environment, and avoid potential enforcement action by the Department.

Taller piles are more likely to develop the higher internal temperatures that may result in spontaneous combustion and subsequent fire risk. Size limits also facilitate fire control by ensuring that adequate space exists for emergency equipment to reach the fire. DEP has observed several facilities, with large piles, that have caught on fire. Some fires had burned for a considerable length of time, as long as several months. These fires create safety risks, unacceptable air pollution, and other adverse environmental conditions. By following the BMP, the risk of fire, and associated liability, may be minimized at the facility. Accordingly, the following table lists the applicable maximum dimensions of the stockpiles or windrows of raw, partially processed and final product to limit the risk of fire and other unwanted impacts from these structures (Ontario Office of the Fire Marshall Guideline, 1998; Rynk, 2000; Buggeln & Rynk, 2002).

Table 4.1 – Stockpile and Windrow Size Limitations

	<i>Raw LCGE Material (ft)</i>	<i>Partially Processed (Single Shredded) (ft)</i>	<i>*Double/Final Shredded (ft)</i>
<i>Windrow Height</i>	12	12	20
<i>Windrow Width</i>	30	40	50
<i>Stockpile Height</i>	20	20	25
<i>Stockpile Width</i>	50	50	60

* For final product stockpiles and windrows, the Department may consider certain exceptions to these dimensions on a case-by-case basis. Operators maintaining stockpiles and/or windrows exceeding these dimensions, or anticipating such structures, must demonstrate, through the Notification requirements specified under Section 3.1, that adequate fire control measures, water sources, equipment and monitoring provisions exist to address any adverse conditions. This requirement does not relieve an operator of similarly addressing fire and nuisance control measures for stockpiles and windrows within the above dimensions; rather, it requires additional safeguards inherent to the operation and storage of larger piles and windrows. Consideration will also be given to past and current operating practices at existing facilities. Facilities having past and current problems with stockpiles and windrows, regardless of size, may not only not qualify for an exception to the dimensions listed above, but may be more limited in size. Alternatively, existing facilities with a sound operating history, that have clearly demonstrated the capability to prevent hazards and nuisances, and address them should they occur, will more likely be afforded an exception to these dimensions.

Smaller stockpiles, as shown in Figure 4.5, may be required if the facility does not have the equipment necessary to adequately address a fire in a larger pile.



Figure 4.5: A pile of raw LCGE materials, approximately 15 feet high. Fires in small piles are unlikely and relatively easy to control, even with limited equipment, if they occur.

At least ten (10) feet of clear space must be maintained between individual stockpiles or windrows of raw or processed material to facilitate equipment access, unless DEP approves, in writing, an alternate distance. Note in Figure 4.6 an example of LCGE plant material accumulated in large piles with no access roads between the piles. Fire-fighting equipment has no access to the fire area of the pile.



Figure 4.6: LCGE material stockpiled in western Pennsylvania with no access roads between the piles. Equipment cannot efficiently access the fire area in this case.

Figure 4.7 below portrays windrows of LCGE materials. Note the lack of access between the windrows for any emergency equipment maneuvering. This BMP manual requires at least a 10-foot clear space between the windrows.

Figure 4.7: Photo showing windrows with insufficient access space for fire-fighting equipment.



4.6 Run-on and Run-off Controls

Operations at a LCGE facility must not cause or allow a point or non-point source pollution discharge to any surface waters of the Commonwealth. Fine organic material and leachate from

LCGE operations may result in odors, nuisances and pollution of the waters of the Commonwealth. Therefore, runoff from these sites must be minimized to control such nuisances and pollution. In addition, facilities must comply with the erosion and sediment control requirements in 25 Pa. Code, Chapter 102. Also, collection and storage of run-off that has been in contact with LCGE material in a pile or windrow need to be managed in accordance with the Municipal Waste Regulations in 25 Pa Code, Chapter 285.

The regulations in 25 Pa Code, Chapters 102 and 285 and the *Erosion and Sediment Pollution Control Program Manual, DEP Document No. 363-2134-008*, include various requirements and best management practices to minimize the potential for erosion and sedimentation and to protect the waters of the Commonwealth from contaminated drainage. Additional control measures for piles, temporary storage areas, requirements for access roads, etc., are described below.

4.6-A. Controlling Run-on

Storm water run-on at the facility should be diverted away from the processing, staging, curing and storage areas. Proper drainage (i.e., diversions, drains, dikes, etc.) must be constructed and maintained to prevent ponding and excessive wetting. Site run-on must be controlled in order to prevent contact with the material from land clearing activities. This may be accomplished by diverting storm water flow around the off-site LCGE plant material processing and storage facility. One way to reduce run-on is to install a trench system, which relies on drainage ditches, or culverts, to divert storm water away from LCGE materials. Another technique is to create earthen berms, or protective hills formed with earth around the base of the piles. The off-site temporary accumulation or storage of the LCGE material may be in the form of windrows. If the site area is not level, these windrows should be placed perpendicular to the land contours to minimize contact between LCGE materials and any run-on at the facility.

4.6-B. Controlling Run-off

On-site storm water runoff must be directed to either a properly sized vegetated filter area for treatment, or a properly sized temporary storage impoundment or tank for later reuse, recycle, or disposal. The run-off control measures may require some form of filtering system, potential aeration of impoundments, etc. A storm water discharge permit may be required before the runoff is discharged into surface waters of the Commonwealth. For more information on managing run-off, contact the appropriate County Conservation District and DEP Regional Offices for further assistance.

In addition, an adequate Erosion and Sedimentation (E&S) Control Plan must be prepared and implemented, if the off-site storage and processing facility involves an earth disturbance area of 5,000 square feet or greater. The E&S plan should be retained at the site and must be available to the Department for review and inspection. All best management practice components of the plan should be maintained. Also, it must be determined whether the site requires a permit under the National Pollutant Discharge Elimination System (NPDES) program for the discharge of storm water from a construction site. An earth disturbance permit may be required for construction activity at the site. For these and other regulatory requirements contact the County

Conservation District, the Water Quality Program Management in the appropriate DEP Regional Office, or the Department's web site for further information.

Local governments or municipalities may also have ordinances regarding surface water management for flood control purposes, elimination of potential mosquito breeding grounds, etc. This Manual does not override these local requirements. Accordingly, local government or municipalities must also be contacted for their ordinances and other applicable requirements.

4.6-C. Access Roads

Access roads must be constructed in a manner that prevents erosion and sedimentation run-off to streams. Access roads crossing any streams and wetlands must use bridges, culverts, or similar structures. The access roads should have a drainage system compatible with the natural drainage system of the area. Also, access roads must be surfaced with a material suitable for dust and erosion control and maintained accordingly. Contact the appropriate DEP Regional Office for information about permit requirements for these crossings and additional information.

4.7 Fire Prevention Requirements

4.7-A. Fires in Composting Operations

The initial feedstocks used in a mulching operation consist of an energy rich substrate that releases considerable heat during the composting process. These elevated temperatures, a consequence of the biological decomposition phase of LCGE plant material, promote drying of the material. The maximum temperature developed at this phase is in the order of 165 °F to 180 °F (75 °C to 80 °C). For spontaneous combustion (SC) in organic material to occur, however, an ignition temperature of 295 °F to 390 °F (145°C to 200°C) is required. These SC temperatures may be achieved under a subsequent chemical oxidation phase, which occurs in mulch under certain circumstances. These circumstances include but not limited to: (1) hot and dry conditions in the organic material; (2) relatively small particle size; (3) a small supply of air to support the chemical oxidation; (4) insulating conditions, so that the heat generated is contained and not released; and (5) time for the heat to develop, etc., (Rynk, 2000).

In general, the feedstock particle sizes common to mulching operations are all sufficiently small in that chemical oxidation can occur. The amount of air required to support chemical oxidation, however, is more variable and difficult to quantify. Only a small amount of air is required to support this process, but if there is no air at all, chemical oxidation in composting LCGE materials will stop. Higher airflow through the material, on the other hand, means heat will usually be removed faster than it is generated and the material will cool down. Consequently, there is a very narrow, critical range for the air supply necessary to initiate and support the chemical oxidation process and allow self-heating to occur.

Fire control objectives should be to keep the processed materials homogenous (to prevent dry or wet pockets) and fairly moist, avoid insulating conditions, and promote air movement through

the pile to remove heat faster than it is generated (Haug, 1997). These are discussed in greater detail below.

4.7-B. Conditions Contributing to Spontaneous Combustion

The following conditions may contribute to spontaneous combustion in LCGE materials:

- The key conditions that contribute to spontaneous combustion in LCGE stockpiles include biological activity, relatively dry materials or dry pockets of material, large insulated piles, limited airflow, short circuiting of airflow (creating a pocket), non-uniform materials, poor moisture distribution, difficulty in knowing temperatures throughout a pile, and a lapse or oversight in monitoring. These conditions should carefully be monitored in curing and storage areas.
- In small or well-ventilated piles, cooling occurs even at low moisture levels. In a large pile with moist materials, evaporation helps keep the temperature at reasonable levels, at least as long as moisture is available to evaporate. However, the combination of low moisture, large piles and little air exchange readily contributes to SC.
- The critical moisture range that supports SC is roughly 20 to 45 percent. Above 45 percent, there is enough moisture available for evaporation to hold the temperature down. Below 20 percent, there is not enough moisture to sustain the biological activity that initiates the temperature rise.
- In an active composting system, the possibility of SC increases over time because the compost dries. Adding water reduces this possibility. However, dry pockets may exist because it is difficult to evenly distribute added water. It is difficult to achieve uniform moisture in large piles without agitating or turning the material.
- Pile size is an important factor in SC. Large piles slow both heat loss and air movement. Heat generation is determined by volume, while heat loss is mostly determined by surface area. As a pile grows in size, there is less surface area per unit volume, so more of the generated heat is retained and the temperature subsequently increases.
- Large piles are difficult to monitor for signs of hot spots. Large, undisturbed piles of partially dry, decomposing materials pose the greatest risks. With diligent monitoring, however, the beginnings of a fire can be detected and reversed. Operators should check for hot spots by looking for evidence of aeration vents in piles and then regularly measure the temperature near those vents. Fissures of steam and wet spots on the pile surface indicate likely vent locations (Rynk, 2000).

4.7-C. Stockpile Material Management and Fire Prevention

The first step in preventing fire in a LCGE mulch producing facility is the way the facility is managed. A wood recycler indicates “...*the best way to not catch a land clearing debris chip pile on fire is to first learn how to compost*”. Perhaps, awareness of what causes fires and constant attention to the relevant conditions at the facility are the keys to preventing fires (Riggle, 1996; Rynk, 2002).

Many factors including stockpile or windrow size, moisture content of the constituents, air distribution within the material, material homogeneity, etc., may contribute to SC in raw and/or processed LCGE materials. Several of these factors should be monitored closely to prevent a fire. Awareness of the contributing factors in stockpile fires, coupled with careful and routine monitoring, are critical keys in preventing fires at LCGE facilities. Many of the best management practices described in this section will reduce the risk of fire at an off-site land-clearing facility and help to control a fire if one starts. These fire control measures are listed below:

- The precursor of fire is the biological heating in a pocket of the stockpile. Accordingly, the most important consideration in preventing fire during mulch production is to suppress the amount of this biological activity in the pile. This primarily means limiting the amount of green vegetation in a pile or ensuring that the green vegetation in a pile has dried out before adding more raw materials to it. This also indicates the importance of maintaining a consistent blend of material in the stockpile to reduce pockets in the interior of the pile, which serve as a source area for biological heating and potential spontaneous combustion (Riggle, 1996).
- A method for preventing fires is a layering technique, which builds the height of a pile slowly rather than all at once. If the materials in a pile are allowed to dry, the potential for SC is reduced. In this method, a layer of LCGE material is evenly spread and allowed to dry and stabilize before the next layer is added. The biological activity in the pile is suppressed with this method, and the subsequent heat output does not achieve the threshold levels required to initiate spontaneous combustion of the material (Riggle, 1996, Rynk, 2000).
- In a heterogeneous stockpile, there is an intermixture of dry and damp materials, a condition favorable to differential heating of the material. The damper pockets (especially those within the critical moisture range) generate heat due to the biological/thermophilic activity. Nearby dryer areas may then begin to smolder. Therefore, the potential for spontaneous combustion will be reduced as the homogeneity of the stockpile material increases.
- When receiving raw LCGE materials at the facility, they should be separated into brush, stumps, roots, etc., before storage prior to processing and/or aging. This will help to homogenize the individual piles and reduce the risk of fires.

- Moisture content of the LCGE material is also a critical factor in a spontaneous fire. If the material is very wet, any rise in temperature is offset by evaporation. If the material is too dry, the biological action is inhibited and heat generation is minimized. It is a self-regulating process. In either case, a spontaneous fire would be unlikely. However, if the moisture content is between 20 to 45 percent, the risk of SC will increase.
- Mixing the raw materials by shredding, before storing for aging will help homogenize the materials. This in turn helps reduce hot spots, increases aeration to dissipate heat, and decreases the chance of spontaneous combustion.

Raw LCGE materials should be processed within 60 days from the date of acceptance at the site, or be rotated, turned, and/or aerated to prevent hot spots every 60 days until processing occurs. Stockpiles of processed or semi-processed materials must also be rotated, turned, and aerated as often as necessary, depending on the type and size of the material, to prevent hot spots.

- Water should be sprayed on the material during the shredding process to keep them cool and insure uniform moisture distribution. The shredded material should also occasionally be rotated, turned, aerated and sprayed with water to dissipate excessive internal heat. Water spraying also assists with the aging of the mulch to produce a desirable end product. Rotating, turning and aerating may be performed during a rainfall to supplement this process.
- Fine plant materials, such as grass and sawdust, should not be added to stockpiles of bulk LCGE plant material. These materials may limit air circulation and increase heat generation as the fine materials fill in the available air spaces.
- Under the assumption that dense piles fail to heat, some operators drive compaction equipment on large storage piles of mulch in an attempt to prevent the initial heating. However, this strategy may have the opposite effect. Physical compaction from heavy equipment driven on piles can lead to greater heat retention within the mass. Although compaction of fines materials might reduce oxygen penetration, it may lead to heat generation via rapid pyrolysis (substance decomposition by heat under oxygen-starved conditions). In addition, fines becoming stratified and compacted in piles tend to block vertical airflows and reduce convective heat transfer and loss, thereby increasing pile temperature. Accordingly, heavy machinery should not be operated on top of the stockpile. This will avoid compaction and decrease the risk of heat build-up (Riggle, 1996, Buggeln & Rynk, 2002).
- Stockpiles should be routinely inspected for signs of smell, smoke and unusual appearance such as fissures of steam and wet spots on the pile surface. Pile or windrow temperature should be monitored daily by using a heat detection device such as a pyrometer with long probe [five (5) feet or longer] at several locations

around the stockpile. An infrared thermometer may also be used to monitor the temperature. However, infrared radiations from these devices do not penetrate to monitor the internal pile temperature. These devices may be useful when digging into, relocating, or aerating a pile.

- In the unlikely scenario that a layer of snow or ice would accumulate on the pile or windrow, remove as much as practical to allow air and heat to dissipate. This will prevent the encapsulation of the pile and allow detection of signs of spontaneous combustion during inspection (Buggeln & Rynk, 2002; Riggle, 1996).
- Smoking and fire must not be permitted around the plant material storage and processing area. Use of heavy equipment around stockpiles, or maintenance/repair of equipment using methods that may accidentally contribute to ignition of materials (such as welding), should be restricted to the earlier part of a work shift (e.g. before lunch), to allow any smoldering material to be discovered and properly handled during the same work shift and before the site is left unattended for an extended period (Zwicky, 2002).
- All materials delivered to the storage and processing area must be inspected. Loads that contain unauthorized materials, which could contaminate the stockpiles, increase the chance of fire, and decrease the quality and value of end product produced from the LCGE material, must be rejected.
- The height of piles and windrows must be controlled. Refer to Section 4.5 – Storage and Processing of LCGE Materials and Table 4-1, for stockpile and extended pile or windrow dimensions. A minimum of ten (10) feet of clear access space must be maintained between the piles and the windrows, unless DEP approves an alternate distance in writing. These seemingly limited dimensions do not guarantee that a spontaneous combustion fire will not happen. It does, however, provide more efficient access for fire control equipment to respond in a timely and efficient manner (Riggle, 1996; Rynk, 2000; Buggeln & Rynk, 2002).
- Since raw LCGE materials are heterogeneous in nature, they may foster the development of hot pockets, and potentially a large fire, in a pile through the same mechanism as described above. This raw material may be “pre-processed” (prior to actual processing) into a coarse size to allow air to pass through the pile to keep it cool. This also results in more homogeneous materials, which helps prevent the hot spots (Rynk, 2000).
- Limiting particle size in processed materials to less than four (4) inches significantly reduces void spaces for air, which in turn may diminish the risk of spontaneous combustion.

- A mulch processing facility should not be located in an area prone to high wind. A facility in a wind prone area should be cautioned to place the stockpile in a direction to prevent spread of fire by the wind into the pile or to other areas of the site, if one starts. It is advised that the top of the pile be dome-shaped to reduce the chance of fire by wind (Riggle, 1996).

4.7-D. Monitoring

As briefly mentioned in the BMP listed above, LCGE storage piles must be monitored to detect excessive heat build-up and to prevent spontaneous combustion. In general, spontaneous combustion is unlikely, unless the temperature exceeds the threshold levels as described in Section 4.7 A, above. It is difficult to detect “hot spots” reliably by directly measuring the temperature of the plant material pile, however, due to the heterogeneous nature of bulk material and the localized nature of “hot spots” within a pile. As a result, monitoring pile temperature through visual observation and by noting the pile’s odor is often the most effective and practical method. Monitoring pile temperatures and checking for signs of smoke, charring, steaming fissures, or wet spots is key to detecting a fire or budding fire. Using a heat detection device such as pyrometer at several locations around the stockpile may assist in monitoring the temperature within a pile or windrow. One problem with larger piles is that the highest temperatures normally occur toward the middle of the pile, which makes it difficult to monitor.

Personnel who work in the plant material storage and processing area of the site must be alert at all times for signs of hot spot development and must know what actions to take if a hot spot is detected. Thus, the site personnel must be trained to know what signs to look for, and what actions they must take in the event of a fire in the LCGE plant material. These actions will be based on the emergency plan for the facility, as discussed below. In particular, personnel must be aware that an odor of smoke is often the first sign of a developing hot spot. If this occurs, they must take action immediately, and should not wait until smoke or flame is visible. If a hotspot is detected, water may be applied, by e.g. spraying or flooding using a perforated pipe, to the entire area while digging out and looking for the hot spot. Periodic rotating, turning, and aerating, described earlier would certainly reduce the potential for hotspots and spontaneous combustion.

4.8 Fires and Related Emergency Response

4.8-A. Fire and Emergency Plan

The Department’s Municipal Waste Regulations require all applicable industrial and commercial facilities having the potential to cause pollution of air, land or water, or endanger public health and safety, to maintain a Preparedness, Prevention and Contingency Plan (PPC). This requirement extends to off-site LCGE facilities covered under the provisions of this manual. Preparation and implementation of the PPC Plan will help ensure a proper response to a fire or related emergency at the facility. The latest guidelines should be employed in the preparation of the PPC Plan. These guidelines may be found in the DEP Technical Guidance Document #400-2200-001 titled *Guidelines for the Development and Implementation of Environmental*

Emergency Response Plans. This manual details all State and Federal laws and regulations pertaining to emergency planning and response, as well as pollution prevention and contingency planning requirements. These guidelines are electronically available at the following web address:

http://www.dep.state.pa.us/dep/subject/All_Final_Technical_guidance/field/400-2200-001.pdf

A copy of the PPC plan and any subsequent revisions must be maintained at the site and all emergency coordinators must review the plan and be thoroughly familiar with its provisions.

At a minimum, the plan must describe:

- A description of the facility activities, material inventory, implementation schedule, and incident history;
- The communication system at the site that will be used to alert site personnel as well as emergency response officials, during a potential or realized emergency situation;
- A detailed contingency plan to address potential odor, vector, litter, contaminated run-off and leachate produced following the application of water for fire fighting;
- The availability of fire-fighting and other emergency equipment at the site, including a description of the available water supply;
- The responsibilities and duties of site personnel during an emergency; and
- The phone numbers and contact information for all personnel and emergency officials to be contacted during an emergency situation.

4.8-B. Fire Fighting

Facility personnel must be knowledgeable on the characteristics of LCGE materials and know how to treat the processed or unprocessed materials in case they catch fire. Implementing best management practices does not necessarily ensure that fires will not occur at an off-site land-clearing site. Fires may start not only in the stockpile interior, through spontaneous combustion, but inadvertently on the outskirts of the pile as well. For this reason, proper equipment and access to a reliable water source must be available at the facility, and application of water to a stockpile fire must be managed carefully.

Front loaders, excavators, dozers and high lifts are some examples of fire-fighting equipment that may be used at a LCGE facility. Reliable water sources include fire hydrants, tanker trucks, water wells, impoundments, lakes or other surface waters, etc. Smaller-scale operators may find a 5,000-gallon tanker truck with backup from a reliable water supply source and a re-circulating pond/impoundment is sufficient. In any case, all operations must have access to an adequate water supply and application systems for their facility for any fire emergency that may occur.

The adequacies of water supply sources and application systems depend on the maximum volume of processed and unprocessed LCGE materials residing at the site. These adequacies must be planned and determined by engineering estimates (Linder, 1997). The adequate water supply source and the application systems, determined by engineering estimates must be available at the facility or be available under contractual agreements.

The water source required at the site also depends on the type of the facility operation, and the management and method of mulch production. Some facilities apply water to the piles of stored mulch to promote aging and enhance its color as well as keeping the organic materials cool. Others do not apply water to the piles and simply use different management methods for aging the LCGE material for mulch production. This later group may utilize a smaller pile size and the layering method explained earlier for storing the plant materials. However, in either case, an adequate source of water, coupled with application systems determined by engineering estimates, must be present at all facilities for fire emergency response (Diller, 2002, Siberini, 2002).

It is also a good practice to keep a large amount of soil on hand and available for fire fighting. The required amount of soil depends on the size of the stockpile(s), the type of operation, and management methods used at the facility.

Figure 4.8 portrays large piles of burning LCGE material. The facility does not have a fire-fighting water supply on site. The fire company had to lay approximately 1,800 feet of five-inch line from the nearest hydrant. Three excavators and a high-lift were tearing the large burning piles apart while the fire companies applied water to extinguish the fire and cool the material. However, the fire was still burning and smoldering for about six weeks (DEP, 2001).



Figure 4.8: Large piles of LCGE material burning at a facility in western Pennsylvania having no fire-fighting water supplies. Local fire fighters had to lay 1,800 feet of water line from the nearest hydrant.

4.8-C. Fire Fighting Readiness

An effective and timely response to a fire or other emergency at a LCGE processing operation site will rely on proper coordination with local emergency response personnel/authorities. This will ensure these responders have access to the facility during an emergency situation if the gates are locked and/or the site is unattended. The Department requires that facility owners and operators arrange an on-site meeting with these authorities, to provide them with information needed during an actual emergency response.

One means of ensuring site access would be providing the local fire department and other local emergency response personnel with a copy of the facility-specific PPC Plan and a key or combination to any gate lock(s). Alternatively, the site owner or operator may provide emergency personnel with the name, and telephone number of an employee who is on-call and can reach the site within a time frame acceptable to these authorities. Note that if the former approach is used, the owner/operator must still provide the response authorities with contact information in the event of an emergency when the site is unattended.

Adequate access must be provided to and within the facility to ensure emergency and fire-fighting equipment can reach and respond to a fire or other event at the site. All stockpiles and windrows must be accessible to fire-fighting equipment. As previously indicated, at least ten (10) feet of access space must be maintained between stockpiles and windrows, respectively, to facilitate an emergency response, unless the Department has approved an alternate distance, in writing. Access roads, paths, etc. at the site must be capable of supporting the fire-fighting vehicles to within 150 feet of the storage and processing areas. Also, fire-fighting equipment must have unobstructed vehicle clearances of at least fourteen (14) feet (Pa HB 1026 of 1999; Scrap Tire Management Council and International Association of Fire Chiefs, 1999).

The following are additional BMP for fire fighting:

- Conventional fire fighting practices are normally effective for fires referred to as surface fires. These fires are more accessible, and the traditional approach of applying water or chemicals usually is effective. Handling an internal fire from SC is more complicated, but successful approaches have emerged from experience. However, in all cases preparation for a potential fire makes the task of fighting a fire much easier and can help avert a dangerous situation.
- For mulching facilities, a potential fire is an accepted fact, inherent to the type of operation. The best strategy remains prevention, based on an understanding of how fires start and behave among large volumes of bulk organic materials. Diligent monitoring of materials and conditions at the site are key ingredients in the recipe for fire prevention. Attentive management and good housekeeping procedures such as keeping the equipment clean, go a long way in preventing fires.

- The facility must be prepared to manage the large volume of water that drains from the site due to fire fighting activities. The runoff carries particulate matter, including compost and ash, and dissolved nutrients. The facility must be prepared to prevent any environmental pollution during these times. Preparation includes an adequate supply of water, fire hoses and related hardware, equipment for moving materials quickly, and written guidelines.
- Hints of smoke or a charred smell near the pile are clear indications that the materials are too hot. When these conditions are observed, even if there is no indication of a fire, breaking the pile by rotating, turning, and aeration must be performed. Water and hose should be available in case materials removed from the pile begin to burn when they are exposed to air.
- A fire within the stockpile manifests itself by smoke and smell. Given enough time, it will gradually burn to the surface and become a visible fire, or flames may emerge when the pile is disturbed. Therefore, if smoke is observed, the fire department should be contacted.
- Using water alone is often ineffective for extinguishing fires that originate in the interior of the stockpile. The large volume of material, the amount of heat generated, underestimating needed water supplies, the propensity of mulching materials to repel water, and the selective channeling of water around potential hot spots and interior fires are all contributing factors. The only consistently effective approach in fighting an internal fire is removing material from the pile until the burning sections are isolated and quenched. As material is removed, it is spread out on the ground or stacked in small piles to cool. Hot material is drenched with water, as needed, as it is removed from the pile.
- The space required to tear apart a burning pile will require careful planning of the composting site. Piles must also be accessible to unloading operations and fire fighting equipment. Adequate buffer space must be provided to spread out the material removed from the burning pile.
- Smothering a burning pile with soil and waiting for it to cool is not always a practical strategy for an internal fire, unless the pile can be allowed to sit in place for an extended time. Although the flames and smoke quickly disappear, the covered-up pile may continue to smolder indefinitely (Rynk, 2000).
- The direction of the wind in fire fighting is critical and should not be forgotten. It is advised to keep the wind on your back when fighting a fire. “Don’t ever push into the wind”, as one operator observed, otherwise the fire fighting machinery will be set on fire (Riggle, 1996)

4.9 Closure

When storage and processing operations at the LCGE facility have ceased, the owner and/or operator must close the site properly, and at a minimum, implement the following:

- Except for a limited amount of mulch utilized for the landscaping purposes at the site, all LCGE materials must be removed from the site. Properly closing access roads, grading the storage and processing areas to prevent ponding and erosion, and establishing a vegetative cover must be implemented.
- Disposal of any remaining processed or unprocessed material at the site is prohibited. There are many useful alternatives to disposing LCGE materials. Therefore, DEP strongly encourages the use of alternatives to reuse and recycle LCGE materials, including use in plant nurseries, landscaping and related applications, such as mulch, plant bedding, “tot lots”; manufacturing of particle board; and use in products, such as briquetted wood, paper, and fiberboard. For further instructions, please contact the DEP Regional Office.
- The Department must be notified when closure is completed. The Department will then inspect the site to verify that the facility has been properly closed, without any outstanding nuisance or odor problems.

Appendix: Web addresses, Other Information and DEP Regional Offices

PA DEP Website www.dep.state.pa.us

PA Regulations Website www.pacode.com

PA DEP Regional Offices Website

<http://www.dep.state.pa.us/dep/deputate/fieldops/default.htm>

Erosion and Sediment Control, 25 Pa. Code Chapter 102, Website

<http://www.pacode.com/secure/data/025/chapter102/chap102toc.html>

Erosion & Sediment Pollution Control Program Manual, DEP Document No. 363-2134-008, Website

http://www.dep.state.pa.us/dep/subject/All_Final_Technical_guidance/bwqm/363-2134-008.pdf

County Conservation Districts Website <http://www.pacd.org>

Pennsylvania Agriculture Department Website <http://www.pda.state.pa.us>

For more information about management of LCGE material, contact the Pennsylvania Department of Environmental Protection.

Central Office

Pennsylvania Department of Environmental Protection
Bureau of Land Recycling and Waste Management
Division of Municipal and Residual Waste
Rachel Carson State Office Building
P.O. Box 8471
Harrisburg, PA 17105-8471
Telephone: (717) 787-2814

Department of Environmental Protection
Regional Offices

Southeast Regional Office (Region I)

Suite 6010, Lee Park
555 North Lane
Conshohocken, PA 19428

Telephone: 610-832-6000
Fax: 610-832-6259

Counties: Bucks, Chester, Delaware, Montgomery and Philadelphia

Northeast Regional Office (Region II)

2 Public Square
Wilkes Barre, PA 18711-0790

Telephone: 570-826-2511
Fax: 570-830-3054

Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill,
Susquehanna, Wayne and Wyoming

Southcentral Regional Office (Region III)

909 Elmerton Avenue
Harrisburg, PA 17110-8200

Telephone: 717-705-4700
Fax: 717-705-4710

Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon,
Juniata, Lancaster, Lebanon, Mifflin, Perry and York

Northcentral Regional Office (Region IV)

208 West Third Street
Williamsport, PA 17701

Telephone: 570-327-3636
Fax: 570-327-3565

Counties: Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour,
Northumberland, Potter, Snyder, Sullivan, Tioga and Union

Southwest Regional Office (Region V)

400 Waterfront Drive
Pittsburgh, PA 15222-4745

Telephone: 412-442-4000
Fax: 412-442-4194

Counties: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset,
Washington and Westmoreland

Northwest Regional Office (Region VI)

230 Chestnut Street
Meadville, PA 16335-3481

Telephone: 814-332-6945
Fax: 814-332-6125

Counties: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean,
Mercer, Venango and Warren

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