

# ORGANIC WASTE PROCESSING FACILITIES RECOMMENDED MANAGEMENT GUIDELINES

## Introduction

The main goal of this document is to help in the planning, building, operating and maintenance of an organic waste processing facility. This document will serve as a reference guide to assist facility owners to plan, set up and operate a facility, and on-site workers to maintain proper operations. The intention of this document is to educate and guide the user through various control measures and procedures. These guidelines, when in place, will help to reduce environmental vulnerabilities, threats to human life and well-being, loss of product, avoid regulatory disputes. The list of recommended practices for operating an organic waste processing facility covered in this document are:

- Fire prevention
- Pile management
- Dust mitigation
- Storm-water management
- Lock-out / tag-out procedures
- Vector control
- Zoning
- Regulatory Challenges

The standards, schemes and other specifications identified in this document are subject to change. Any references to products or companies in this document are only intended as examples and are not endorsements by the authors. For specific regulatory requirements, consult with local governing agencies and safety and fire codes.

## 1. Fire Prevention (Phoenix Fire Code, 2016)

- **Fire Protection Plan:** The owner or operator should prepare a Fire Protection Plan for any commercial facilities processing and/or storing piles in excess of 6 feet (1,828 mm) in height or 12 feet (3,657 mm) in depth of combustible material.

The Fire Protection Plan should address procedures for controlling, and extinguishing fires. The Fire Protection Plan should be submitted to the *Fire Code Official* and could include the following:

- A scaled and dimensioned site plan indicating property lines, buildings, access roads, fire hydrants, location of tipping areas, pile height indicators, piles and push out areas.
- Pile contents (hogged material, compost, tipping, manure, etc.) and maximum pile dimensions of each pile.
- Monitoring procedures, and schedules for checking for pile temperature and moisture content.
- Fire suppression methods and emergency plans.
- Other procedures and methods to reduce fire risk within piles.
- Employee training.
- Equipment and resources available on-site, and through contract, for fire prevention and suppression.

- Thresholds for calling 9-1-1.
- Reports and other justifications if requesting to exceed this standard.
- **Fire Department Access:** The owner or operator should ensure that the local fire department has access to the facility as follows:
  - The Fire Department must have full 24/7 access to the facility through the use of a fire department keyed lock or through having the facility continually staffed 24 hours a day, 7 days a week.
    - Note: If the facility does not have a gate, it must be staffed 24 hours a day, 7 days a week.
  - Facility name and address should be posted at main fire department entrance and clearly visible from the street.
  - 24-hour emergency contact telephone numbers should be posted at the main entrance and clearly visible from the street.
  - Access roads at the facility must provide access to within 150ft of all areas of the property so that a fire truck can drive close enough to deploy lines to fight a fire.
  - Access roads must be 20ft wide and maintained so that in inclement weather fire trucks can drive on them.
  - Access roads should be marked with some form of signage, reflective and contrasting colors for example. This ensures not only that the Fire Department can see the lanes, but also discourages their use for storage or other activities that will restrict access.
- **Fire Extinguishers:** Portable fire extinguishers with a minimum rating of 4-A: 60-B: C should be provided on all vehicles and equipment operating on piles and at all processing equipment.
- **Fire Hydrants:** The Fire Marshall may increase the distance required to a fire hydrant to comply with the city regulations. The omitting of an onsite hydrant or increased overall distance to the nearest hydrants will be evaluated with the application for a fire permit.
- **Conveyor Systems:** Automatic sprinkler protection could be provided in conveyor tunnels and combustible enclosures that pass under a pile. Conveyor systems carrying combustible materials and enclosed conveyor systems should be equipped with an approved automatic sprinkler system.

## 2. Pile Management (Phoenix Fire Code, 2016)

- **Storage site:** Storage sites should be level and on solid ground, elevated soil lifts or other all-weather surface. Sites should be thoroughly cleaned before transferring wood products to the site.
- **Size of piles:** Piles should not exceed 25 feet (7,620 mm) in height, 150 feet (45,720 mm) in width and 250 feet (76 200 mm) in length. Exception: The *Fire Code Official* is authorized to allow the pile size to be increased through fire department appeal. To aid in the management of piles it is recommended to install indicator posts.
  - Indicator posts are poles that provide a point of reference to scale the height of a pile. They should be taller than the highest point of each pile and should be located at readily recognizable locations. The posts should be marked at 5 foot (1,524 mm) increments, and should be provided to give visual height references at, or near, the highest point(s) of each pile. The post(s) should not be positioned so as to interfere with access to the piles.

Due to the operational challenges of placing a post in an area where piles are constantly changing and new material is added and removed, optimal location of the posts is to be determined by the owner of the facility. It is recommended to place the posts on the outskirts of the operational areas. For example, in an external buffer area near the property line or in non-operational areas that will not interfere with pile maintenance, such as near access roads or dedicated fire lanes.

- **Pile separation:** Piles should be separated from adjacent piles by approved fire apparatus access roads.
- **Static pile protection:** Static piles should be monitored by an *approved* means to measure temperatures within the static piles. Internal pile temperatures could be monitored and recorded weekly. Such records should be maintained and available for review by the *Fire Code Official* upon request.
  - If any location of the pile is found to have an internal temperature of 160 degrees Fahrenheit (71 degrees Celsius), immediate action must be taken to reduce the temperature. If at any time the temperature, at any location, is found to have an internal temperature of 180 degrees Fahrenheit (82 degrees Celsius) or greater, the following procedures must immediately be taken:
    - a) The area with the high temperature should be dug out of the main pile. This overheated material should be pushed out into designated push-out / clear area.
    - b) Water should be stationed closely to the affected area, prior to digging out the hotspot to immediately douse any flare ups that may occur when air is added to overheated area.
    - c) Continual temperature probing and removal of material greater than 180 degrees Fahrenheit (82 degrees Celsius) should be conducted until all overheated material is separated into the push out area.
- **Delivery & Tipping Area:** Feedstock and raw materials should be placed into designated tipping areas or piles upon delivery and should comply with all storage requirements for organic material. A maximum of two designated tipping areas may be provided at a single facility and should be shown on the approved facility site plan. Tipping areas should comply with the following:
  - Size: Tipping areas should not exceed a maximum area of 50 feet (15,240 mm) by 50 feet (15,240 mm).
  - Height: Material within a tipping area should not exceed 5 feet (1,524 mm) in height at any time.
  - Separation: Tipping areas should be separated from all piles and other tipping areas by a fire access lane, at minimum 20 feet (6,096 mm) wide.
  - Water System: A water system should be available to douse and/or cool the raw product in case of fire within the tipping area.
  - Duration: Raw product could be kept in tipping area long enough to ensure no load was delivered that is already over heated. Raw product should be less than 160 degrees Fahrenheit (71 degrees Celsius), before mixing with main pile.
- **Push-out/clear area:** Approved push-out or clear areas could be provided for temporary pile storage. Any pile in place exceeding 30 days and when piles are over 100 cubic yards (76.5 m<sup>3</sup>) in size should have a push-out area. The intent is to provide areas to spread piles and move

unburned material away from a pile in the event of fire or hotspot within the pile. Push-out/clear areas should be located not more than 250 feet (76,200 mm) from the pile and should not be located within 20 feet (6,096 mm) of any building. The push-out/clear area should be sized to hold no less than a quarter of the size of the single largest pile it serves at a maximum depth of 3 feet (914 mm). Water should be immediately available to aid in cooling.

### 3. Dust Mitigation (Guide to Agricultural PM10 BMP, 2008)

- **Equipment Modification:** Shields or deflectors that redirect fan or vehicle exhaust sideways or upward. This can prevent PM10 from becoming airborne because exhaust is not blowing downward on the soil surface. Installing dust shrouds or spray bars that emit a mist help to knock down PM10.
- **Reduce Vehicle Speed:** Reduced speeds on unpaved farm roads can decrease the amount of PM10 generated by vehicles or equipment. This can be achieved by:
  - Posting speed limit signs
  - Informing all employees, contractors and sub-contractors of speed limits
  - Placing signs in all vehicles stating the speed limits on facility roads
  - Installing speed bumps
- **Synthetic Particulate Suppressant:** Synthetic particulate suppressants provide a surface barrier or bind soil particles together to retard PM10 on unprotected areas, such as unpaved roads, rights-of-way and abandoned areas. Consult a Natural Resource Conservation District (NRCD) office or a dust control contractor for specific recommendations. All products should be applied strictly in accordance with manufacturers' specifications. Examples of synthetic particulate suppressant include, but are not limited to:
  - Calcium chloride (CaCl)
  - Soybean feedstock (SBF) processing by products
  - Calcium lignosulfonate (lignin)
  - Polyvinyl acrylic polymer emulsion (PVA)
  - Polyacrymide (PAM)
  - Emulsified petroleum resin
- **Track-out Control System:** Using a track-out control system helps remove mud and soil from the tires of processing equipment and vehicles before they enter a paved public road, where the mud or soil can be crushed into fine particles and easily suspended in the air by passing vehicles. Some examples of track-out control systems are:
  1. Grizzly - a device similar to a cattle guard, which is used to dislodge mud, dirt or debris from the tires and undercarriage of equipment and vehicles prior to leaving a farm.
  2. Gravel pad - a pad of crushed stone, coarse gravel or recycled road base located at the point of intersection of a paved public roadway and a farm entrance.
    - It is recommended that:
      - The stone or gravel is one inch or larger in diameter.
      - The gravel pad is applied a minimum of four inches deep.
      - The gravel pad is the full width of the facility entrance.
      - The gravel pad is a minimum of 50 feet (15240 mm) long.
  3. Pavement – an area of asphalt, concrete or similar material applied to an access road at the intersection of a paved public roadway and an access entrance/exit.

It is recommended that:

- The pavement is the width of the access road.
- The pavement is a minimum of 100 feet long from the point of intersection with a paved public roadway.
- **Watering:** Applying water from a truck, tractor or other portable spray system to bare soil surfaces, such as unpaved roadways and equipment yards where high traffic areas exist, can help reduce PM10. Watering the soil surface tends to compact the soil so that it is not dispersed into the air. Apply water so that the surface is visibly moist.

#### 4. Storm-water Management

- **Stockpile Protection** (Stormwater Best Management Practices, 2016): Guidelines for sediment control for stockpiles.
  - Locate stockpiles a minimum of 50 feet (15240 mm) away from concentrated flows of storm-water, drainage courses, and inlets.
  - Do not place stockpiles on a paved surface or street.
  - Protect stockpiles from storm-water run-on using temporary perimeter sediment barriers such as berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale barriers.
  - Provide silt fences or other effective sediment control Best Management Practices around soil stockpiles except when stockpiles are being actively worked (i.e., controls must be in place evenings, weekends, and other down times).
  - Implement dust control practices as appropriate on all stockpiled material.
  - Stockpiles not disturbed for over 14 days must be covered or protected with soil stabilization measures.
- **Raw Materials Receiving Area (General)** (Johnston, 2014)
  - Divert storm water around receiving areas with vegetated swales, and/or berms. A properly designed vegetated swale can also provide infiltration benefits.
  - Locate receiving areas on stable, well-drained soils with slopes of 2 to 5 percent to prevent ponding and to convey storm water and leachate to treatment. Sloping should be limited to prevent erosion. Slopes should be stabilized.
  - Practice good housekeeping measures such as frequent removal of debris, bark, and wood waste. Cleanup methods may include mobile sweepers, scrapers, brow logs (log placed parallel to roadway), or scoops.
  - Use sedimentation measures to control sediment from leaving storage area.
  - Cover piles to prevent contact with storm water (use roofs, canopies, soils, sheds, etc.).
- **Yard Waste and Clean Wood** (Johnston, 2014)
  - Consolidate piles to minimize surface areas exposed to precipitation.
- **Food Scraps** (Johnston, 2014)
  - Situate loading/unloading areas indoors or in a covered area.
  - Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters.
  - Use a dead-end sump where materials could be directed.
  - Avoid loading/unloading materials in the rain or provide cover or other protection for loading docks.

- Provide diversion berms, dikes, or grassed swales around the perimeter of the area to limit run-on.
- Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials.
- Where liquid or powdered materials are transferred in bulk to/from truck or rail cars, ensure hose connection points at storage containers are inside containment areas, or drip pans are used in areas where spillage may occur which are not in a containment area.
- **Bulking Agents (shredded paper, cardboard, wood chips, sawdust, and stover)** (Johnston, 2014)
  - Consolidate piles to minimize surface areas exposed to precipitation.
  - Cover piles to prevent contact with storm water (use roofs, canopies, soils, sheds, etc.).
- **Food De-packaging** (Johnston, 2014)
  - Situate loading/unloading areas indoors or in a covered area.
  - Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters.
  - Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials.
- **Active Composting and Curing Areas** (Johnston, 2014)
  - Provide diversion berms, dikes, or grassed swales around the perimeter of the area to limit run-on.
  - In-vessel or contained methodologies are preferable.
  - For windrows and piles, perform operations under roof, or cover to prevent precipitation from infiltrating into the piles.
- **Compost Product Handling, Storage (bulk), Storage (bagged)** (Johnston, 2014)
  - Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on.

## 5. Vector Control (Composting Operating Standards, 2007)

- “Vector” includes any insect or other arthropod, rodent, or other animal capable of transmitting the causative agents of human disease, or disrupting the normal enjoyment of life by adversely affecting the public health and well-being.” Commonly encountered vectors at a compost site are, flies, mosquitoes, rodents, birds, coyotes, feral cats & dogs. Surveillance and treatments for vectors should be done on a weekly basis to ensure populations don’t exceed the established thresholds for the area.
- **Vector Indicators**
  - Footprints or tracks
  - Droppings/scat
  - Urine odor
  - Fresh gnaw marks
  - Habitat signs- nests/ burrows
  - Visual sightings
  - Damage to windrows, site structures, equipment
- **Fly Control**

- Cover and avoid exposure of the wet organic decomposing waste that are potential feeding and breeding sites for flies.
- Prompt processing of food waste into the windrows.
- Spraying insecticides over potential breeding sites.
- Insecticide free, pheromone, and plain sticky traps.
- Augmentative biological control of flies by the release of parasitoid wasps as they are effective at decreasing fly populations because they kill any fly pupa they come across (Hatch, 2016).
- **Mosquito Control**
  - Eliminate all sources of standing water as all mosquitoes need water to complete their lifecycle.
  - Mosquito surveillance (CO<sub>2</sub> trapping) should be done on a weekly basis to determine mosquito species and abundance.
  - Ensure good drainage throughout site.
  - Apply larvicides to mosquito breeding sites.
  - Apply adulticides to adult mosquito populations present.
  - Use of biological controls such as mosquito fish, invertebrate predators, parasites and diseases to destroy mosquito larvae.
- **Rodent Control**
  - Remove access to food sources, water, and items that provide shelter for rodents.
  - Promptly processing food waste into the windrows
  - Eliminate water sources.
  - Fencing to prevent encroachment into buildings.
  - Remove the habitat of the rodent first before the application of other control measures.
  - Rodenticides
  - Rodent traps
- **Bird Deterrents**
  - Prompt processing of food waste into the windrows.
  - Noisemakers and bird distress sounds.
  - A grid of monofilament line as traps.
  - Reflective tape to scare birds away.
  - Decoys, typically designed to look like an owl or other bird of prey
  - Deploy model airplanes to scare away birds.
  - Breed predatory birds like falcons.
- **Controlling Coyotes, Feral Cats and Dogs**
  - Site fencing (exclusion)
  - Noisemaking devices
  - Animal repellants
  - Trapping and relocation

## 6. Equipment Lockout/ Tag-out Procedures (DuraTech 3010 Tub Grinder Manual 1, 2007)

- **Before working on or near any feedstock size reducing equipment for any reason such as servicing, inspecting, or unclogging the machine:**

- Disengage the equipment.
- Allow the conveyor belts and all feed mechanisms to run until empty.
- Lower engine RPM to idle, and disengage the wet clutch.
- After the rotor has stopped, disengage the conveyor drive.
- Follow the engine manufacturer’s recommendations for cooling the engine; generally, this consists of running the engine at 1/2 speed or idle for 5 minutes.
- Shut off the engine and remove the key.
- Turn the battery disconnect switch to “OFF”.
- Note the service hour meter reading, and perform periodic maintenance as required.
- Repair any leaks, perform minor adjustments, tighten loose bolts, etc.
- If the unit is still attached to a towing vehicle, place the towing vehicle’s transmission in park and set the parking/emergency brake.
- Relieve all pressure in the hydraulic system before disconnecting hydraulic lines or performing work on the system. Make sure all connections are tight and the hoses and lines are in good condition before applying pressure to the system.
- If more than one maintenance worker is working on the machine, they should have separate locks and keys. No worker should activate the machine until the person who placed the lock has properly removed the lock. Locks should be used for ignition or power ionizing units.

**7. Zoning** (Maricopa County Zoning Ordinance, 2015)

- Typically, an organic waste processing facility can be placed under the general commercial zoning district category. The main purpose of a general commercial zoning district is to provide for commercial uses to run wholesale or distribution activities in locations where there is adequate access to major streets or highways while encouraging sustainable building practices.
- **Height regulations:** The height of buildings should not exceed 40 feet, except that the height of any building or structure closer than 40 feet to any rural or residential zone boundary should not exceed the distance from said building or structure to the zone boundaries. Streets or alleys may be included in calculating distance.
- **Intensity of use regulations:**
  - Lot Area: Each lot should have a minimum area of 6,000 square feet.
  - Lot Width: Each lot should have a minimum width of 60 feet.
  - Lot Coverage: The maximum lot coverage should be 60% of the lot area.
- **Loading and unloading regulations:** The required loading and unloading spaces should in all cases be on the same lot as the use they are intended to serve. In no case should the required loading and unloading spaces be part of the area used to satisfy the parking requirement.
- **Additional regulations:**
  - All activity (except required on-site parking, including loading and unloading areas), incidental or accessory storage and display areas should be within a completely enclosed building unless otherwise specifically noted herein.
  - A building other than the residence of the family of the operator or caretaker employed on the premises of a commercial use should not be used for dwellings, unless approved as a Special Use by the Board of Supervisors.
  - In any multi-phase commercial project, all areas of a parcel which have been graded or the surface disturbed in any way, and which are not currently under development should

be revegetated or surfaced to minimize wind-blown dust by a plan approved by the Department of Planning and Development.

## 8. Regulatory Challenges (Composting Council Research and Education Foundation, 2016)

- The fundamental basis for Organic Processing Facility Regulations is to protect public health, safety and the environment. Regulations can vary considerably based on state and local jurisdiction. It is the responsibility of the processing facility to know what rules and regulations apply to the site.
- **Common Challenges:**
  - Odor Issues
  - Stormwater violations
  - Truck traffic
  - Fire
  - Dust
  - Record keeping
  - Land use compatibility
- **Working with Regulators:** Agencies often need to make unannounced visits to see the operations of the facility in normal operating mode. This is not meant to burden or entrap the operations at the facility. Inspections can be useful for exchanging information on how to stay within the rules.
  - Be honest. Listen. Ask questions.
  - If an inspector identifies a violation:
    - Work with the inspector(s) to get simple items corrected immediately.
    - Discuss potential timeframes for correcting larger issues.
    - As Manager/Owner/Expert at the facility, educate inspector(s) to gain a common understanding on how the facility operates and discuss different ways to achieve desired outcome.
  - Write down everything.
  - Don't let small problems escalate.
- **Record Keeping:**
  - Keep good records.
  - Understand site and equipment capacity.
- **More on Regulations:**
  - State Compost Regulations
    - <http://compostingcouncil.org/state-compost-regulations-map/>

## References

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