
# BIOMASS STORAGE ENVIRONMENTAL PRACTICES GUIDE

**DECEMBER 2008**

Ontario Forest Industries Association, 20 Toronto Street, Suite 950, Toronto, ON M5C 2B8 Phone: 416-368-6188 Fax: 416-368-5445

# TABLE OF CONTENTS

# APPENDIX

# SECTION ONE: INTRODUCTION

The Ontario Forest Industries Association (OFIA) and its member companies are committed to operating their facilities in a safe and environmentally responsible manner. This "Biomass Storage Environmental Practices Guide" (Guide) was developed by the OFIA in consultation with various regulatory agencies.

The Guide is intended to assist operators of biomass storage sites in operating and maintaining their facilities in a manner that minimizes potential environmental impact. It attempts to outline a 'best available practices' approach to environmental management, but does not claim to be all inclusive or to cover all options. Users are advised to seek professional advice to deal with site specific conditions as necessary.

**The Guide may be used as a reference for dealing with specific concerns or complaints and to ensure ongoing environmental responsibility. Information in this Guide is intended to assist operators of biomass storage sites by outlining "best practices" within the industry. It is the individual operator's responsibility to operate their site/facility within compliance of all municipal, provincial and federal regulations or requirements.**

For the purposes of the Guide, biomass storage is confined to material and activities that meet the definition of woodwaste, and the provisions applicable to woodwaste storage and woodwaste combustor sites as per Regulation 347 – General Waste Management under the Environmental Protection Act (EPA).

# SECTION TWO: APPLICATION

The Guide is intended to provide assistance to operators of facilities that store, process and manage biomass that consists of woodwaste as defined by the Ontario Ministry of the Environment in Regulation 347.

Facilities affected but not limited to include pulp and paper mills, sawmills, wood product manufacturing, wood recycling/processing facilities, cogeneration plants and intermediate transfer/processing sites.

The improper management of biomass storage has the potential to cause a number of offsite impacts that may affect the environment or the general public. These potential impacts could include, odours, contaminated storm water run-off, groundwater contamination, fugitive emissions (dust), fire, noise and excessive truck traffic.

Every facility/site that stores biomass will have site specific design and legal requirements**. It is the responsibility of the site operator to ensure that facilities comply with all municipal, provincial and federal regulations and to ensure site specific design requirements are considered and implemented to minimize the impact on the environment and the general public.**

# SECTION THREE: ENVIRONMENTAL CONSIDERATIONS

## Air Emissions

### Odour

Fresh biomass depending on the wood species may produce a non-offensive odour. Generally this odour may be present when the material is being aerated during loading or unloading.

Biomass may produce an offensive odour if material begins to decompose. This odour will also be present when the material is disturbed during material movement or removal.

Odour of any type generated from storage of biomass is considered a potential nuisance that may affect neighbours.

### Particulates

Depending on the particle size of the biomass, fugitive particulate emissions may occur. Generally these emissions consist of coarse wood dust that may be generated during the placement/movement of the material or as a result of pile erosion from wind.

Potential points of particulate generation are from the unloading/loading of trucks, the movement of material with loaders/dozers, conveyor belts, processing/screening equipment or stockpiles.

The site may also generate road dust from the movement of vehicles and heavy equipment.

### Noise

Sources of noise from a storage site may originate from mobile heavy equipment, trucks, conveyor belts, blowers and processing/screening equipment. The impact of noise on the surrounding area is highly dependent on the time of day/night, ambient noise levels and surrounding land use.

## Water Impacts

### Storm Water Run-off

Due to the absorptive nature of biomass, storage piles have a certain amount of moisture storage capacity. When contacted with storm water or snow melt, biomass storage piles have the potential over time to leach organic/inorganic compounds which may contaminate site run-off. These compounds may include biochemical oxygen demand (BOD), chemical oxygen demand (COD), phenols, tannins/lignins and metals.

During heavy run-off biomass storage piles may also produce total suspended solids (TSS).

The generation of contaminated site run-off may cause off-site impacts on adjacent receiving waters.

### Leachate Generation

When biomass is stored for an extended period of time, water from rain and snow melt will generate leachate from the pile that may contain organic/inorganic compounds that may contaminate the ground and potentially groundwater.

### Fire Suppression Run-off

In the event that there is a need to extinguish a fire at a biomass storage site there may be large volumes of potentially contaminated water generated. Consideration must be made to ensure this run-off does not discharge into adjacent receiving waters.

## Waste

### Non-Hazardous Waste Generation

Biomass storage sites will produce small quantities of non-hazardous waste material. This material would most likely be in the form of biomass that is unusable due to storage yard contamination of rock/sand/dirt or does not meet quality specifications due to moisture content or low heating value.

### Subject Waste Generation

Waste material generated at a biomass storage site that meets subject (hazardous) waste characteristics would primarily be from the operation and maintenance of mobile/heavy equipment at the site (eg. oils, greases, solvents, fuels). There should be no subject waste generated from the storage of biomass.

## Fire

A fire in the storage pile may be caused by careless operation of the site and equipment (smoking, equipment maintenance) or due to improper storage and compaction of the material.

Biomass will also generate heat from decomposition when it is placed in a stockpile. This heat combined with the proper conditions may cause fires to spontaneously breakout within the pile.

Fires in a storage piles are difficult to identify and extinguish and could cause significant health and safety concerns at the site. Storage pile fires may generate large quantities of smoke which may cause off site impacts.

# SECTION FOUR: ENVIRONMENTAL BEST PRACTICES

The best practices presented in this section of the Guide outline the suggested operation and maintenance procedures to mitigate environmental impacts from the facility. **The adherence of these practices is recommended and do not relieve the facility from identifying and operating within site specific requirements or regulatory requirements.**

In certain circumstances the recommended practices identified in this section may not be sufficient to prevent adverse impacts and additional steps may have to be taken. Site operators should proactively assess the need for additional steps and implement if necessary.

## Site Development and Management

The following should be accounted for when developing and managing a Biomass Storage Site:

- increased vehicle traffic
- neighbouring properties (proximity, similar land use)
- proximity to water courses and water wells
- accessibility for emergency vehicles
- site access, security and inspection
- material tracking/weighing/quality control

### Site Preparation

- Storage sites should be developed in areas that are level and well drained. Low lying, poorly drained areas should be avoided or filled in to ensure there is no standing water.
- Where feasible consideration should be made to placing storage piles on low permeable bases.

- Surface run-off from the surrounding area should be directed away from the storage pile.

- The site should have a base that is free of material that could cause potential quality concerns/contamination such as rubble, large rock or other substrates that could be picked up during material loading.

- Consideration should be taken into prevailing winds and proximity of neighbouring properties.

- The site should have material storage limits clearly delineated and identified.

- The site should be clearly signed and access restricted to authorized personnel only.

- Emergency access to the storage pile should be taken into consideration.

- Consideration must be made to ensure there is a safe flow of traffic in and out of the site.

- Storage sites should be sited away from bodies of water or wells. It is recommended that sites be set back a minimum of 30 metres from these features. If this recommended setback distance is not feasible additional steps should be taken to ensure impacts from the storage pile are mitigated. It is also recommended that there be a vegetated buffer of at least 15 metres between the storage pile and water body.

- It is recommended that storage sites be at least 30 metres from residential areas to help mitigate off-site odour, noise and dust concerns. If this recommended setback distance is not feasible additional steps should be taken to ensure impacts from the storage pile are mitigated.

- Where appropriate consideration must be made to ensure storm-water management practices at the site minimize off-site discharges.

**Material Placement and Handling**

- The quantity of material entering and leaving the site should be tracked and recorded. At a minimum the number of loads and corresponding load volumes being delivered to and from the site should be documented.

- In order to maintain quality control and reduce fire risk, it is recommended that material should be delivered and placed in the pile to ensure a first in first out delivery system to minimize time material is stored on site

- Fine material (sawdust etc) should be quickly mixed with coarse material to prevent fugitive dust emissions.

- Site should have established traffic patterns to ensure a safe and efficient flow of traffic and heavy equipment around the pile.

- Depending on the nature of the material, compaction, slope angles and pile height should be taken into consideration to ensure pile stability, facilitate fire prevention and control/minimize fugitive emissions.

- It is recommended that piles have a maximum 1H:1V side slopes, however specific site considerations and material characteristics may require lower side slopes.

**Waste Management**

- Biomass that is unusable due to storage yard contamination of rock/sand/dirt or the material does not meet quality specifications due to moisture content or low heating value should be disposed of at a licensed landfill

- Any material removed from the site as waste must be removed by an MOE licensed waste hauler and taken to a MOE approved waste disposal site.

- Any "municipal" waste from offices and/or lunchrooms must be disposed of in an approved manner. To avoid contamination, municipal waste must be managed away from the biomass storage pile.

- All subject (hazardous) waste generated at the site should be segregated from the storage pile and must be managed and disposed of as per regulatory requirements.

- Any site surface run-off that is contaminated by leaching wood must be collected and either treated on site or removed from the site for treatment. Ensure all regulatory requirements for sewage works or liquid waste generation are complied with.

## Site Security/Emergency Response

- Access to site should be restricted to ensure only authorized deliveries/pick-ups are made.
- Site should have adequate signage indicating name of operator, contact number for public inquiry, emergency contacts and any site specific restrictions.
- It is recommended that on-site fire suppression equipment should be available. If site specific response is not available instructions for fire response should be clearly identified and communicated
- It is recommended that a minimum 6 m access road should be maintained around the pile(s) for emergency response purposes.
- For sites with fuel handling, emergency spill kits should be made available
- When the site is operating, a daily inspection should be conducted and documented to ensure there are no un-authorized activities, security, safety or environmental concerns.
- Any spill to the natural environment that may cause an adverse effect must be immediately reported to the MOE.

## Site Operation

- An inventory control system should be developed to ensure material that is delivered or taken from the site is tracked and records maintained.
- To ensure no off-quality or unauthorized material is delivered, quality specifications should be clearly identified and communicated to all suppliers of the storage site.
- A routine inspection schedule of the material delivered to the site should be developed to ensure there is no off quality material. Records should be maintained of this inspection.
- If the site has a Certificate of Approval a copy of the Approval should be kept on the site.

- Records of public complaints, inquiries or any environmental incidents and responses should be maintained.

**Emergency Response**

- Each site should have an emergency response plan developed which contains at minimum:
    - Spill Response Manual
        - location of on-site spill response equipment (if applicable)
        - location of nearest receptors (surface water, neighbours etc)
        - response procedures and notification protocols (internal and external)
        - listing of applicable response agencies
    - Fire Response Manual
        - location of on-site fire response/suppression equipment (if applicable)
        - response procedures and notification protocols (internal and external)
        - listing of applicable response agencies
    - Complaint Response Procedure
        - ensure the following is documented
            - date and time of incident
            - nature of complaint
            - weather and wind conditions
            - source of suspected problem
            - measures taken to mitigate problem
            - effectiveness of mitigation
            - record any follow-up activity

# APPENDIX

## REGULATORY REQUIREMENTS

The following are excerpts from applicable Acts and Regulations. These are only portions of the legislation and are provided for convenience only – for current and complete copies of the legislation please go to http://www.e-laws.gov.on.ca/index.html for electronic versions or contact your local Ministry of the Environment office, and/or other municipal and regulatory agencies as needed.

# ENVIRONMENTAL PROTECTION ACT

## *Definitions*

"adverse effect" means one or more of,

(a) impairment of the quality of the natural environment for any use that can be made of it,

(b) injury or damage to property or to plant or animal life,

(c) harm or material discomfort to any person,

(d) an adverse effect on the health of any person,

(e) impairment of the safety of any person,

(f) rendering any property or plant or animal life unfit for human use,

(g) loss of enjoyment of normal use of property, and

(h) interference with the normal conduct of business;

"contaminant" means any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from human activities that causes or may cause an adverse effect;

"natural environment" means the air, land and water, or any combination or part thereof, of the Province of Ontario;

## *Section 9 Approval of Director*

9. (1) No person shall, except under and in accordance with a certificate of approval issued by the Director,

(a) construct, alter, extend or replace any plant, structure, equipment, apparatus, mechanism or thing that may discharge or from which may be discharged a contaminant into any part of the natural environment other than water; or

(b) alter a process or rate of production with the result that a contaminant may be discharged into any part of the natural environment other than water or the rate or manner of discharge of a contaminant into any part of the natural environment other than water may be altered. R.S.O. 1990, c. E.19, s. 9 (1).

### *Section 14 Prohibition, discharge of contaminant*

14. (1) Subject to subsection (2) but despite any other provision of this Act or the regulations, a person shall not discharge a contaminant or cause or permit the discharge of a contaminant into the natural environment, if the discharge causes or may cause an adverse effect.

### *Section 15 When Ministry to be notified, adverse effect*

15. (1) Every person who discharges a contaminant or causes or permits the discharge of a contaminant into the natural environment shall forthwith notify the Ministry if the discharge is out of the normal course of events, the discharge causes or is likely to cause an adverse effect and the person is not otherwise required to notify the Ministry under section 92.

# REGULATION 347 – GENERAL WASTE MANAGEMENT

### *Definitions:*

"waste biomass" means organic matter that is derived from a plant or animal, that is available on a renewable basis and that is,

(a) waste from harvesting or processing agricultural products or forestry products,

(b) waste resulting from the rendering of animals or animal by-products,

(c) solid or liquid material that results from the treatment of wastewater generated by a manufacturer of pulp, paper, recycled paper or paper products, including corrugated cardboard,

(d) waste from food processing and preparation operations, or

(e) woodwaste;

"woodwaste" means waste,

(a) that is wood or a wood product, including tree trunks, tree branches, leaves and brush,

(b) that is not contaminated with chromated copper arsenate, ammoniacal copper arsenate, pentachlorophenol or creosote, and

(c) from which easily removable hardware, fittings and attachments, unless they are predominantly wood or cellulose, have been removed,

but does not include,

(d) an upholstered article, or

(e) an article to which a rigid surface treatment is affixed or adhered, unless the rigid surface treatment is predominantly wood or cellulose;

"woodwaste combustor site" means a waste disposal site where woodwaste is subject to thermal treatment or wholly utilized as a fuel or fuel supplement in a combustion unit.

### *Woodwaste Storage Sites*

8 (6) Sections 27, 40 and 41 of the Act do not apply in respect of a waste disposal site if,

(a) the only management of waste done at the waste disposal site is the collection, handling, storage, transfer or processing of woodwaste;

(b) none of the woodwaste is stored at the waste disposal site for more than 18 months;

(c) the woodwaste is transferred by a generator and is destined for one or more woodwaste combustor sites;

(d) the owner or operator of the waste disposal site has in his or her possession, while collecting, handling, storing, transferring or processing woodwaste, a document from the owner or operator of each woodwaste combustor site to which the woodwaste is destined that indicates that,

(i) the owner or operator of the woodwaste combustor site agrees to accept the woodwaste, and

(ii) the woodwaste will be used at the woodwaste combustor site principally for functions other than waste disposal; and

(e) no more woodwaste is stored at the waste disposal site than is reasonably capable of being subject to thermal treatment or wholly utilized as a fuel or fuel supplement during a period of six months at the woodwaste combustor sites to which the woodwaste is destined.

8 (7) Sections 27, 40 and 41 of the Act do not apply in respect of a waste management system if,

(a) the only management of waste done by the waste management system is the collection, handling, transportation, storage, transfer or processing of woodwaste;

(b) none of the woodwaste is stored at waste disposal sites that are part of the waste management system for more than 18 months;

(c) the woodwaste is transferred by a generator and is destined for one or more woodwaste combustor sites;

(d) the owner or operator of every waste disposal site that is part of the waste management system has in his or her possession, while collecting, handling, storing, transferring or processing woodwaste, a document from the owner or operator of each woodwaste combustor site to which the woodwaste is destined that indicates that,

(i) the owner or operator of the woodwaste combustor site agrees to accept the woodwaste, and

(ii) the woodwaste will be used at the woodwaste combustor site principally for functions other than waste disposal; and

(e) no more woodwaste is stored at waste disposal sites that are part of the waste management system than is reasonably capable of being subject to thermal treatment or wholly utilized as a fuel or fuel supplement during a period of six months at the woodwaste combustor sites to which the woodwaste is destined.

8 (8) If, pursuant to subsection (6) or (7), sections 27, 40 and 41 of the Act do not apply in respect of a waste disposal site or waste management system, the owner and the operator of the waste disposal site or waste management system shall ensure that all woodwaste that is transported from the waste disposal site or by the waste management system is transported to,

(a) a woodwaste combustor site that uses the woodwaste principally for functions other than waste disposal; or

(b) a waste disposal site or waste management system that, pursuant to subsection (6) or (7), is also exempt from sections 27, 40 and 41 of the Act.

8 (9) Sections 27, 40 and 41 of the Act do not apply in respect of a waste disposal site if,

(a) the only management of waste done at the waste disposal site is the collection, handling, storage, transfer or processing of woodwaste; and

(b) the site is operated by the holder of a land use permit issued under the *Public Lands Act* that authorizes the collection, handling, storage transfer or processing of woodwaste at the site.

# ONTARIO WATER RESOURCES ACT

## *Definitions*

"sewage" includes drainage, storm water, commercial wastes and industrial wastes and such other matter or substance as is specified by the regulations;

"sewage works" means any works for the collection, transmission, treatment and disposal of sewage or any part of such works, but does not include plumbing to which the *Building Code Act, 1992* applies;

## *Section 30 Discharge of polluting material prohibited*

30. (1) Every person that discharges or causes or permits the discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters is guilty of an offence.

(2) Every person that discharges or causes or permits the discharge of any material of any kind, and such discharge is not in the normal course of events, or from whose control material of any kind escapes into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters, shall forthwith notify the Ministry of the discharge or escape, as the case may be.

53. (1) No person shall establish, alter, extend or replace new or existing sewage works except under and in accordance with an approval granted by a Director.

# ONTARIO REGULATION 213/07 - FIRE CODE

Subsection 3.2.3.Outdoor Storage of Wood Chips

### *Deviations from requirements*

3.2.3.1. This Subsection does not apply where the existing situation is approved and does not endanger life safety, or approved alternative measures to the requirements set out in this Subsection are taken to provide life safety.

### *Surface of ground*

3.2.3.2. The storage site shall be well drained and be level, solid ground or paved with asphalt, concrete or other hard surface material.

3.2.3.3. The ground surface between piles shall be kept free of combustible materials.

### *Vegetation removal*

3.2.3.4. (1) Weeds, grass and similar vegetation shall be removed from the yard.

### *Burning of weeds*

(2) Portable open-flame weed burners shall not be used in chip storage yards.

### *Pile dimensions*

3.2.3.5. Piles shall not exceed 18 m in height, 90 m in width and 150 m in length unless temporary water pipes with hose connections are laid on the top surface of the pile.

### *Fire department access*

3.2.3.6. (1) Space shall be maintained between chip piles and exposing structures, yard equipment or stock equal to

(a) twice the pile height for combustible stock or buildings**,** or

(b) the pile height for noncombustible buildings and equipment.

(2) Despite Sentence (1), space between chip piles and exposing structures, yard equipment or stock shall not be less than 9 m.

3.2.3.7. Where storage areas are fenced or otherwise enclosed, gates at least 3.5 m in width shall be provided to permit entry of fire department vehicles.

3.2.3.8. (1) Permanently installed access walkways at least 1.8 m wide and constructed of noncombustible material shall be provided so that hose streams may be directed on any part of the piles.

(2) Despite Sentence (1), other approved means may be used to ensure adequate fire department access to the piles.

3.2.3.9. Piles exceeding 150 m in length shall be surrounded by fire department access routes at least 9 m wide.

### *Smoking prohibited*

3.2.3.10. Smoking shall be prohibited in chip pile areas.

### *Fire extinguishing provisions*

3.2.3.11. Portable extinguishers for Class A fires shall be provided on vehicles operating on chip piles in addition to the units for Class B fires normally required for the vehicles.

3.2.3.12. (1) Hose houses or cabinets shall be provided around the perimeter of chip piles at intervals not exceeding 120 m.

(2) One 75 m length of 65 mm hose and 2 portable extinguishers having a 2A or higher rating and conforming to Section 6.2 shall be installed in each hose house or cabinet.

(3) Each hose required in Sentence (2) shall be connected to a water supply capable of supplying 1140 L/min of water to it at a pressure that will allow the hose stream to reach the top of the chip pile.

3.2.3.13. Portable extinguishers in conformance with Section 6.2 shall be provided in transfer houses.