

Soil Enhancement Using Wastes

Code of Practice Intentions Paper – October 2005

1. Introduction

The Ministry of Environment intends to establish a “code of practice” (minister’s regulation) to authorize the land application of wastes used as soil amendments under provisions of the *Environmental Management Act* (EMA) and the *Waste Discharge Regulation* (WDR). The intent of this intentions paper is to seek responses and comments from stakeholders and the public on the proposed code of practice.

The EMA and WDR were brought into force in July 2004. Under the legislation, introductions of waste from identified “prescribed” industries, trades, businesses, operations and activities require authorization (e.g., permit or approval) from the ministry. The WDR also contains provisions for establishing codes of practice issued by the minister as a form of authorization for specified industries, trades, businesses, operations and activities. A code of practice is a legally binding and enforceable set of rules that must be followed – the environmental protection measures and other actions that are expected of the industry by the ministry. A code of practice can also be supported by guidelines and/or “best management practices” (BMPs) that could provide detailed discussion and direction related to practices and procedures. These practices and procedures do not have the force of law, and as such would not be established as regulations under the *Environmental Management Act* or *Waste Discharge Regulation*. Guidelines may be viewed as assistance to persons governed by a code of practice in meeting their legal obligations.

This intentions paper provides a summary of the ministry’s mandate and objectives, background information and potential concerns arising from the use of industrial wastes as soil amendments, the proposed contents of the code of practice, and the avenues for providing comment as the code is developed and implemented by the ministry.

The intentions paper and response form for providing comments to the ministry, as well as further information and links to related legislation, are posted on the ministry’s website. The information can be accessed by clicking on the address below, or from

the Ministry of Environment homepage, by following the *Environmental Protection Division & Environmental Management Branch* links. See: <http://www.env.gov.bc.ca/epd/>

2. Ministry Objectives

The Ministry of Environment provides leadership and support to British Columbians to help them limit the adverse effects of their individual and collective activities on the environment, while fostering economic development and providing recreational opportunities. The ministry’s objectives for this code of practice are to:

- ◆ Protect the environment and human health and safety by ensuring clean and safe water, land and air;
- ◆ Support waste reduction, reuse and recycling; and
- ◆ Streamline standards and improve monitoring, reporting and compliance with environmental regulations.

The ministry intends the code of practice to provide clear, consistent and appropriate environmental protection standards for the beneficial use of certain industrial wastes as soil amendments.

3. Background Information

Soil amendments are used to improve the biological, physical or chemical characteristics of a soil (i.e., soil conditioners) and may also provide nutrients for crop growth (i.e., fertilizers). Industrial wastes or byproducts – such as lime, ash and biosolids – have been recognized and used as soil amendments in agricultural or forestry practices in many jurisdictions. Such wastes can provide organic content (improving soil water-holding capacity, structure and bulk density), neutralize acidic soils (i.e., “liming”), and supply nutrients and trace elements. The use of industrial residues for soil amendment also has the potential of diverting significant quantities of waste from landfills or incineration.

Potential concerns from the use of industrial waste for soil amendments include soil contamination with heavy metals, groundwater contamination

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(e.g., by nitrate leaching), deleterious changes to soil chemistry, and soil or water pollution.

Several Canadian provinces (e.g., Alberta, Quebec, Ontario), as well as US jurisdictions, have regulations or processes in place governing the use of industrial wastes for soil amendment on land. In British Columbia, some limited land application programs have been allowed under permits and short term approvals.

4. Contents of the Proposed Code

The ministry intends to establish a code of practice for the beneficial use of specified industrial wastes on land – to provide consistent requirements across the province and to protect the quality of soil and surface and groundwater on sites where the wastes would be applied.

4.1 Interpretation and Application

The proposed code will apply to only the following materials (defined as “soil amendments”) applied to land:

- ◆ **Fly ash*** (produced by industrial power boilers primarily using wood, oil or coal as a fuel);
- ◆ **Primary or secondary pulp or paper mill wastewater treatment residuals*** (wood or paper fibre and waste lime removed from a pulp or paper mill wastewater treatment plant or a spill retention pond after primary treatment);
- ◆ **Lime mud** (solids or slurry);
- ◆ **Water treatment plant residuals**; and
- ◆ **Wood** (hogged or chipped wood, mill ends, bark, sawdust and log handling yard waste – but not demolition or construction waste).

***Dioxins and Furans**

Certain pulp or paper mill treatment plant residuals or fly ash may contain dioxins and furans. The ministry intends to prevent wastes that may contain these contaminants from being considered under this code. A dioxin/furan (TEQ) limit of 0.00001 mg/kg dry weight would be included as part of the definition for these wastes. If such wastes exceed this threshold, they would not be considered for management under this code of practice.

The code would not apply to composting facilities or to other specified organic matter (e.g., Class A or Class B biosolids, manure, food waste, yard waste) managed under terms of the *Organic Matter Recycling Regulation* (OMRR).

The proposed code would set limits on the concentration of listed substances in the materials – in accordance with limits established under OMRR. Material that exceeds the identified concentrations for soil amendments would not be governed under this code of practice and would require a permit or approval for disposal or use.

Provisions of the code would also address “soil amendment derived material” – which is defined as a marketable material, not primarily intended for application to land (e.g., flowerpots), which has been derived from specified industrial wastes (e.g., wood).

4.2 Prohibitions

The proposed code would parallel and reinforce provisions of OMRR, prohibiting:

- ◆ Application of any soil amendment to land in a location, quantity or manner that would result in the material or leachate entering a well or stream;
- ◆ Introduction of unacceptable levels of contaminants into the terrestrial food web;
- ◆ Application of a soil amendment in a manner that exceeds the agronomic application rate;¹ or
- ◆ Application of a soil amendment in a quantity or manner that would cause any of the identified substances in soil to exceed the Generic Numerical Soil Standards or the Matrix Numerical Soil Standards set out under the *Contaminated Sites Regulation* of the EMA.

4.3 Contaminant Limits in Soil Amendments

The proposed code would use or point to the limiting values for concentrations (mg/kg dry weight) of listed substances for soil amendments set out in

¹ The rate of application as determined by a qualified professional that provides nutrient and organic matter required to establish or sustain the desired vegetation or crop.

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OMRR. The concentration of any of the listed substances in a sample must be less than the limiting value² for the material to be deemed a soil amendment. See the table below for an example of the limits for “Class B biosolids” in OMRR. (Most industrial waste would likely fall within this class.)

Table 1: Limiting values in the Organic Matter Recycling Regulation (OMRR) of listed substances for “Class B Biosolids” (mg/kg dry weight)

Substance	Limiting Value
Arsenic (total)	<75
Cadmium (total)	<20
Chromium (total)	<1 060
Cobalt (total)	<150
Copper (total)	<2 200
Lead (total)	<500
Mercury (total)	<15
Molybdenum (total)	<20
Nickel (total)	<180
Selenium (total)	<14
Zinc (total)	<1 850

Most of these numbers are consistent with the standards for metals in fertilizers and supplements established by the Canadian Food Inspection Agency and adopted by the Canadian Council of Ministers of the Environment (CCME) Guidelines for Compost Quality.

4.4 General Technical and Administrative Requirements

A. Initial Sampling and Monitoring

Before the first application of a soil amendment to land, or the transfer of a soil amendment to another person, the producer of the material would be required to establish the classification of the material

² Using analysis in accordance with procedures set out in the “British Columbia Environmental Laboratory Manual for the Analysis of Waters, Wastewaters, Sediments and Biological materials” published by the ministry, or by suitable alternative procedures as approved by the director.

as a soil amendment – by collecting representative samples and analyzing them for all the sub-stances listed in the table above. Samples would have to be taken before the first application or transfer in any calendar year, and at time intervals corresponding to the application or transfer of every 1,000 tonnes of dry weight of waste. The producer of the material would be required to keep analytical records available for inspection for at least 3 years. A director would be empowered under the proposed code to require additional samples of the soil amendment material, the soil, groundwater and surface water – for one or more of the listed substances, or for other substances or parameters that he or she believes could negatively affect the soil amendment quality or its effect on soil.

B. Land Application Plans

Before a soil amendment is applied to land, or transferred to another person for application, the person responsible for the material would, if requested by a director, be required to submit a land application plan prepared by a qualified professional.³ A land application plan would have to address each site where, and each occurrence that, the soil amendment would be applied to land – and be signed by the qualified professional who prepared it prior to implementation of the plan. The plan would be required to include the following information:

- ◆ The legal name and address of the facilities where the soil amendment material is produced, the name and contact information of the local contact (discharger), the name and contact information of the qualified professional who prepared the land application plan, and the location and boundaries of the land application site (with a map or plan);
- ◆ Information regarding the constituents of the soil amendment (including “foreign matter”⁴),

³ A “qualified professional” as defined by the proposed code would be a person: a) registered in BC with an appropriate professional association, acting under that association’s code of ethics and subject to disciplinary action by that association; and b) who through education, experience, accreditation and knowledge may be reasonably relied on to provide advice within an area of expertise related to the code.

⁴ Foreign matter means a contaminant that is not readily decomposed during the composting process (other than

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the name of the registered owner(s) of the land upon which the application will take place and their written authorization of the application, the intended application date(s), and a description of the amendment storage and leachate management works at the application site;

- ◆ Detailed technical information concerning the intended soil amendment material, including: fecal coliform densities; vector attraction reduction process or management method; moisture content; Total Kjeldahl Nitrogen (TKN), ammonia plus ammonium and nitrate nitrogen, and plant available phosphorus and potassium on a dry weight basis; soil conditioner and/or crop nutrient requirements; soil concentrations of listed substances and concentrations of the listed substances in the intended soil amendment material (see Table 1 above); pH and electrical conductivity in the soil where the material is to be applied and in the intended soil amendment material;
- ◆ Management and monitoring information, including: projected soil concentrations and methods to measure the concentrations of listed substances for each year following the application of the amendment; management methods for specific site conditions or as specified by the director; application rate (in dry tonnes per hectare) for each year of the plan to achieve desired fertilizer nutrient and soil conditioner levels while minimizing the potential for adverse environmental impacts; and a post-application monitoring plan appropriate to the application rates and potential for adverse environmental impacts; and
- ◆ Special procedures if the plan is to apply a soil amendment material with fecal coliform levels greater than or equal to 1 000 MPN⁵ per gram of total solids, or if the material does not meet the vector attraction process requirements set out in the code of practice.

C. Soil Amendment-Derived Material

A person wishing to have a soil amendment qualify as a “soil amendment-derived material” (defined as a marketable material derived from a soil amendment and not primarily intended for land application – for example, flower pots manufactured from untreated wood) would have to submit a written request to the director. The request would have to satisfy the director that the soil amendment is a recyclable material and include a plan describing how and where the soil amendment and subsequent derived material is intended to be managed or used.

If the person receives written confirmation from the director regarding the soil amendment-derived material, he or she would then have to manage the material in accordance with the submitted plan and with any other conditions specified by the director. The director would be able, at any time, to cancel or amend such a confirmation – and to post on the Internet a list of persons who have received confirmations and information associated with the submission for confirmation.

D. Storage Facilities and Sites

The proposed code would require a person who stores a soil amendment (or soil amendment-derived material) to meet specific requirements for storage equivalent to those set out for “managed organic matter” in the *Organic Material Recycling Regulation* (OMRR). Requirements are set out for “storage facilities” (structures for containing managed organic matter) and “storage sites” (locations for storing a temporary stock of managed organic matter immediately prior to use).

Soil amendment material must be managed in a way that prevents its escape while in storage. Any soil amendment storage facility would have to be located more than 15 metres from any well or stream and more than 30 metres from any source of water used for domestic purposes (such as drinking water).

mineral materials such as silt, sand or stones that are naturally found in soil).

⁵ MPN – “Most Probable Number”

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If the material is to be stored at a site for more than 2 weeks,⁶ the site would have to meet the same location criteria as required for a storage facility. In areas that receive more than 600 mm of precipitation between October 1 and March 31 (such as the Fraser Valley and Vancouver Island), the soil amendment material would have to be covered to prevent escape of material over the October-December and January-March period of each year, if it is not stored in a storage facility.

4.5 Management of Soil Amendments

Application of a soil amendment to land would have to be in accordance with terms of the proposed code, the *Organic Matter Recycling Regulation* (OMRR) and other legislated requirements for protection of human health and the environment.

Following application of designated soil amendments to a site, the producer of the material would be required to obtain written certification from a qualified professional that the application was undertaken and completed in accordance with the land application plan submitted to the director.

A. Notification Requirements

At least 30 calendar days prior to the proposed land application of a specified soil amendment in a volume greater than 5 m³, the producer would be required to inform:

- ◆ The director;
- ◆ The applicable medical health officer(s), if the proposed application is to agricultural land or within a watershed used as a permitted water supply under the *Drinking Water Protection Regulation*; and
- ◆ The Provincial Agricultural Land Commission, if the proposed application is within an agricultural land reserve.

The director could request additional information from the producer within 30 days of receipt of notification of the proposed application, and require the producer to meet additional management standards to protect

⁶ It would not be permissible to store a soil amendment material at a "storage site" for more than 9 months.

human health and the environment. The medical health officer having jurisdiction in the area of the proposed application could (within 30 days of receipt of notification) provide written direction to the producer (with a copy to the director) that the proposed application must not proceed, or may only proceed subject to specified conditions.

Under the proposed code, the director could also direct the producer to post specified information relevant to the proposed application on the Internet.

B. Application Requirements

A person intending to apply a soil amendment material would have to follow direction set out in the associated land application plan (prepared by a qualified professional prior to the intended application of material), including:

- ◆ Ensuring that the amendment is not applied to residential land or urban park land;
- ◆ Obtaining written permission from the owner of the land to which the soil amendment is to be applied; and
- ◆ Complying with any additional site specific conditions set out in the land application plan.

Soil amendment material would have to be applied with the following minimum distances:

- ◆ 30 metres to potable water sources and irrigation wells, lakes, rivers, streams, farm dwellings and off-property occupied dwellings or boundaries of property zoned for residences or recreation;
- ◆ 20 metres to major arterial roads or highways;
- ◆ 10 metres to minor public roads (excluding logging roads); and
- ◆ Not applied to land where the groundwater table at the time of application is within 1 metre of the surface.

C. Record-keeping

Under the proposed code, the results of any analysis and the land application plan would have to be made available, on request, to an authorized inspector, officer or director. The land application plan signed by a qualified professional would have

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to be kept at the (production or storage) facility, or by the registered owner of the land application site, for at least 36 months after the material has been applied to the land. A director would also be able to request a sampling report from the facility operators, or the registered owner of the land, up to 36 months after application of the soil amendment material to the land.

5. Development and Implementation of the Code of Practice

The code of practice will be implemented as a minister's regulation under the *Environmental Management Act*, and will complement existing legislation, including the:

- ♦ *Environmental Management Act* and associated regulations, including *Waste Discharge Regulation*, *Organic Matter Recycling Regulation*, *Hazardous Waste Regulation*, *Contaminated Sites Regulation*, and *Spill Reporting Regulation*; and
- ♦ *Water Act*; *Groundwater Protection Regulation* and *Drinking Water Protection Act*.

5.1 Providing Comment on the Proposed Code of Practice

The ministry is intending to finalize and implement the code of practice for soil enhancement using waste in the spring of 2006. Comments regarding the proposed intentions of the ministry are being solicited and will be carefully considered in development of the code. The ministry welcomes all suggestions with respect to any or all sections of the proposed code of practice.

Comments to the ministry should be made on or before November 30, 2005.

Submissions will be compiled and summarized, without specific attribution, by an independent contractor and the summary posted on the ministry website. Following review of comments and submissions, the ministry will complete legal drafting of the code of practice for legislative review and implementation.

This intentions paper, and a response form with questions based on the proposed contents of the code, have been posted on the ministry's web site, see: <http://www.env.gov.bc.ca/epd/>.

Those interested are invited to submit comments on the proposal – using the instructions and questions provided on the response form. Individuals or organizations may also make written submissions to the ministry without following the format set out in the response form – as desired.

All submissions will be reviewed for inclusion in a consultation summary report. Comments received will be treated with confidentiality by Ministry staff and contractors when preparing consultation reports. Please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a Freedom of Information request is made under the *Freedom of Information and Protection of Privacy Act*.

If you have any questions or comments regarding the consultation process, review the information posted on the ministry website, or contact Cindy Bertram of C. Rankin & Associates, who has been contracted to manage consultation comments, at:

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Thank you for your time and comments!