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West Carleton Environmental Centre Ottawa, Ontario

Final Report

Best Management Practice Plan (Odour & LFG) Version 1

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SUBMITTED TO

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TABLE OF CONTENTS

1. PURPOSE	1
2. RESPONSIBILITIES	1
3. GENERAL INFORMATION	2
3.1 Odourous Compounds	2
4. EMISSION SOURCES	2
4.1 Landfill Exposed Areas, Landfills and LFG Collection System	2
4.2 Leachate Collection and Treatment System	2
5. TRAINING	3
6. INSPECTION AND MAINTENANCE PROCEDURES	3
7. CONTROL METHODS FOR IDENTIFIED SOURCES	4
7.1 Landfill Exposed Areas, Landfills and LFG Collection System	4
7.2 Leachate Collection and Treatment System	4
8. SCHEDULE OF IMPLEMENTATION	5
9. RECORD KEEPING	5
10. EA COMMITMENTS AND EA CONDITIONS	6

Attachments

- Attachment A: Example of WM Odour Training Form
- Attachment B: Example of WM Odour Inspection and Dispatch Form
- Attachment C: Example of WM Odour Complain Form



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1. PURPOSE

A Best Management Practice Plan (BMPP) for odour and landfill gas (LFG) is a detailed document that outlines the odour and LFG sources at a given site and describes the measures that shall be used to control emissions from these sources. The BMPP is used to manage odour and LFG emissions from the landfills, landfill exposed areas, leachate collection and treatment system. This BMPP for odour and LFG includes the following:

- Details regarding odour and LFG compounds emitted at the landfill;
- A description of the emission sources from the facility;
- A summary of control measures that are or will be put in place as part of the BMPP;
- An implementation schedule for the control measures;
- An implementation plan for the control measures;
- Details regarding the inspection and maintenance schedule; and
- A description of the planned monitoring and record keeping activities.

In an effort to minimize the potential for off-site odour and LFG events for the existing and future operations of the West Carleton Environmental Centre (WCEC) landfill site, Waste Management of Canada Corporation (WM) has developed this BMPP.

This BMPP is to be amended if there is an alternative solution or modification to the practices and controls provided herein. The following sections outline the procedure that WM will implement to control the potential for odour and landfill gas emissions from the site.

2. RESPONSIBILITIES

WM is responsible for ensuring the requirements of this BMPP. To accomplish this, employees will be trained in this BMPP and employee responsibilities will be designated. Training and responsibilities include the deployment, maintenance, monitoring and inspections of equipment and operations.

The Site Manager is responsible for:

- Providing formal training to appropriate staff to ensure that this BMPP is followed;
- Providing guidance on odour/landfill gas control measures by having a working knowledge and understanding of the practices and control measures as outlined in this BMPP;
- Maintaining this BMPP; and
- Maintaining Odour Controls and Complaints logs.



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3. GENERAL INFORMATION

3.1 Odourous Compounds

Landfill gas is a mixture of compounds created as a by-product of anaerobic digestion of the waste. Compounds include volatile organic compounds (VOCs) and reduced sulphur species.

The odours from the landfill are based on a mixture of compounds contained within the landfill gas and surface emissions (e.g., working face odour). The odours from the non-landfill sources are based on a mixture of compounds contained in the leachate, potentially escaping through the leachate collection system or leachate treatment system exhausts.

4. EMISSION SOURCES

Potential odour and LFG sources are grouped into two general categories, and reflect various operations of the WCEC landfill.

4.1 Landfill Exposed Areas, Landfills and LFG Collection System

There are several potential odour and LFG sources associated with the landfills and landfilling activities. Dominant odour and LFG sources at the facility are expected to be the landfill exposed areas such as the active working face, the daily cover area and the interim cover area. Odours and LFG may also be emitted from the Mini-Transfer Area, the installation of LFG wells, trenching activities and cracks/fissures in the landfill final cover areas.

Emissions from the daily cover area, interim cover area and final cover areas are influenced by:

- Waste acceptance rates;
- Composition of waste;
- Surface area of daily cover, type of ADC, interim cover and final cover;
- Material processing;
- Portion of landfill with LFG collection system in place;
- LFG collection system efficiency; and
- Soil/waste moisture.

4.2 Leachate Collection and Treatment System

Leachate can produce a strong, odour that is distinct from the LFG odours. Leachate is collected from the landfill by the leachate collection system and is then sent to treatment and disposal. The landfill collection system has leachate collector cleanouts, used for removing debris that may accumulate in the system. These manholes are potential odour sources.

The leachate treatment facility treats and discharges leachate for further treatment.



5. TRAINING

The site manager is responsible for identifying a list of personnel who will be trained in odour and LFG suppression and control. These individuals will have the responsibility to evaluate odour conditions and implement odour control measures on an on-going basis.

The list of individuals identified will be listed in the Odour log as well as the date when they were trained. The list will be updated every five (5) years or upon employee turnover. Attachment A includes an example of the WM Odour Training Log.

In addition, WM personnel will be screened for odour sensitivity using screening kits. WM will be trained on how to administer the tests as well as the frequency of on-going screening. The representatives that best meet the normal range of sensitivity for odours will be utilized to complete the “walkabout” surveys and to investigate odour complaints.

6. INSPECTION AND MAINTENANCE PROCEDURES

The site manager or trained individuals will be responsible for inspecting the activities on the landfills, landfill gas collection system (including the flares and the landfill-gas-to-energy system), the leachate collection system and the leachate treatment system to ensure the equipment is running properly. All anomalies will be noted in the site odour log. The record will include the time the anomaly was noted, the corrective measures taken and the time the corrective measure was implemented. Examples of anomalies to record are (but not limited to) low vacuum, low flare or generator temperature, gas volumes lower or higher than anticipated.

Other items that will occur during inspections include the following:

- Evaluate the size of the active working face of the landfill. If for any reason the size of the working face exceeds 900 square metres, an explanation will be included in the odour log. The size of the working face must be reduced as quickly as possible should this situation occur.
- Confirm the proper installation and maintenance of the horizontal pipes and vertical wells to ensure the collection of landfill gas continues with high efficiency.

Evaluate leachate collection and treatment system to ensure that it is operating as designed. This will include a visual survey of any manholes or access points (for cracks and/or fissures) and of soils around access points. Leaking areas can be readily identified by a blackened discolouration and a rotten egg odour. To monitor site odour conditions, the following items will occur as part of the on-going monitoring activities:

- Complete “walkabout” surveys in areas of the landfill where final cap (on closed existing landfill and landfill to be constructed) is installed and near leachate collection manholes to identify any cracks, fissures or other hot-spots for escaping landfill gas. The “walkabout” survey should occur on a semi-annual basis (spring and fall) and consists of a grid survey of the entire landfill using a handheld flame ionization detector (FID) total hydrocarbon (THC).



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- Conduct ambient air quality monitoring programs for volatile organic compounds and hydrogen sulphide during the worst-case conditions (i.e. summer) at the property line, upwind and downwind of the landfill to be constructed. This on-going monitoring program will enable WM to track annual emissions, identify increases in emissions over time and provide supporting evidence that the potential site odour issues and landfill gas emissions are being properly controlled.
- Conduct source testing of the leachate treatment facility for source validation purposes.

Please refer to Ambient Air Quality Monitoring Program for full detail.

Attachment B includes an example of the WM Odour Inspection and Dispatch Form.

7. CONTROL METHODS FOR IDENTIFIED SOURCES

The following measures will be taken to help reduce off-site impacts.

7.1 Landfill Exposed Areas, Landfills and LFG Collection System

- Limit the size of the active working face to 900 square metres. If for any reason the size of the working face exceeds 900 square metres, an explanation will be included in the odour log. The size of the working face must be reduced as quickly as possible should this situation occur.
- Cover the landfill working face daily with appropriate cover materials to reduce odour emissions and LFG emissions. Apply odour suppressant chemicals, if necessary;
- Apply interim cover and final cover to completed waste cells in a timely manner to reduce odour and LFG emissions;
- Repair interim cover and final cover on landfills when fissures, cracks or erosion of the soil cover are identified. The areas requiring repair should be covered with a layer of compacted clayey silt of topsoil.
- Before undertaking activities that may generate odours (i.e. excavation of previously filled areas), forecasts of wind speed and wind direction shall be consulted, and current conditions monitored on a continuous basis to minimize potential impacts.
- Progressively install and activate the landfill gas collection to minimize the amount of odorous landfill gas emissions escaping through the landfill. The system should be constructed in a manner to ensure that high collection efficiency is achieved on a regular basis.

7.2 Leachate Collection and Treatment System

- Place the leachate collection system under negative pressure and send the leachate gases to the landfill gas collection system. On a quarterly basis the gas from the leachate collection system will be analysed for oxygen content. Any significant increase in oxygen could indicate leaks in the system and an inspection of the system is warranted.



8. SCHEDULE OF IMPLEMENTATION

The following table provides the proposed schedule for implementation of the plan:

Table 7.1: Schedule for Control Methods

Tasks	Implementation Time Lines
Implementation of Training as defined in Section 4.0	During construction of the first cell excavation and on-going until site completion
Implementation of Inspection and Maintenance Procedures as defined in Section 5.0	During construction of the first cell excavation and on-going until site completion
Implementation of Control Methods as defined in Section 6.0	During construction of the first cell excavation and on-going until site completion
Ambient Monitoring Program	During receipt of first wastes and on-going until site completion

Attachment B includes an example of the Odour Inspection and Dispatch Log.

9. RECORD KEEPING

Throughout this BMPP there is reference to an Odour and LFG log that will be maintained on site. This log will include notation of the items listed previously as well as any other notes relevant to odour and LFG at the site. The log will be in a three-ringed binder that will contain portioned sections for training, inspection, remediation activities, general notes and complaint log. The odour and LFG log will contain all odour training, inspection, dispatch and complaint records going back no less than 1 year or until included in annual monitoring report. Routine inspections will not be noted in the LFG Log. Any irregular or abnormal activities will be noted.

From time to time there may be complaints regarding odour. There will be individual logs with standard forms for odour complaints (Attachment C). Complaint logs will include the following at a minimum:

- Name of complainant;
- Time of complaint;
- Time that the incident occurred;
- Nature of complaint;
- Operational details at the time of the complaint;
- Wind conditions at the time of the complaint; and,
- Details of any investigation.

All complaints will be included in the odour log. On an annual basis, the logs will be reviewed and any unfavourable trends will be examined further to identify corrective actions and included in annual monitoring report.



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10. EA COMMITMENTS AND EA CONDITIONS

The following table provides a summary of EA commitments and EA Conditions that have been addressed through this Best Management Plan for Odour and Landfill Gas:

Table 9.1: Overview of EA Commitments and EA Conditions

EA Commitments	EA Conditions	Covered in BMPP
<ul style="list-style-type: none"> • Development of an Odour and Landfill Gas BMP Plan that includes the following mitigation measures: <ol style="list-style-type: none"> a) Conduct regular maintenance of the landfill cap and interim cover areas to reduce the cracks and fissures due to erosion and settling; b) Conduct regular maintenance of landfill has collection and control system to prevent leaks in the system and ensure proper function of the system; c) Progressively install the LFG collection system to improve collection efficiency; d) Flare or otherwise combust all collected LFG; e) Record meteorological conditions (i.e., wind) on a continuous basis and consider the conditions before undertaking highly odorous activities to minimize off-site odour impacts (i.e., excavation of previously filled areas); f) Minimize area of the landfill working face to reduce LFG and odour releases to the atmosphere; g) Cover landfill working face daily with appropriate cover materials (soil) to filter odour and apply odour suppressant chemicals, if necessary; h) Apply final or interim cover to completed waste cells in a timely manner to reduce LFG and odour releases to the atmosphere; i) Document, address and investigate all off-site odour complaints to determine odour source and to prevent or minimize future off-site odour impacts; and j) Place the leachate collection system under negative pressure and send the leachate gases to the landfill gas collection system. • Development of an Odour and Landfill Gas BMP Plan that includes the following monitoring measures: <ol style="list-style-type: none"> a) Total hydrocarbons or hydrogen sulphide surface surveys of both the existing and proposed landfill , as well as the leachate collection manholes, to identify cracks, fissures, or other hot-spots for escaping landfill gas; b) Continuous monitoring for temperature and flow on the landfill gas flares and the landfill gas-to-energy-generator sets to ensure proper operation; c) Volatile Organic Compound and hydrogen sulphide ambient air quality monitoring programs to continue to track annual emissions and identify increases in emissions over time; and d) Source testing of the SBR for source validation. 	<ul style="list-style-type: none"> • <u>Condition 2.2:</u> The proponent shall fulfill all commitments made during the environmental assessment process. • <u>Section 4.0:</u> Compliance Monitoring <ul style="list-style-type: none"> • <u>Section 4.1:</u> The proponent shall prepare and submit to the Director for the public record, an environmental assessment compliance monitoring plan. • <u>Section 4.3:</u> The program shall include monitoring of the proponent's implementation of the undertaking in accordance with the environmental assessment and the conditions in this Notice with respect to mitigation measures, public consultation and additional studies and work to be carried out. The program shall also include monitoring of compliance with all commitments made in the environmental assessment and the subsequent review assessment with respect to mitigation measures, public consultation and additional studies of work to be carried out. 	<p>Section 6 Section 7.1 Section 7.2 Section 9</p> <p>Section 6</p> <p>Please refer to Ambient Air Quality Monitoring Plan for more details.</p>

ATTACHMENT A

**West Carleton Environmental Centre Best Management Practice Plan
Odour Control Training Log**



Trained Employee Name	Date of Training	Supervisor Signature

ATTACHMENT B



West Carleton Environmental Centre Best Management Practice Plan Odour Inspection and Dispatch Log

Inspected By: _____ **Inspection Date:** _____

Areas to inspect include: Active Face & Working Area, Interim & Final Cap, Gas Collection System & Flares, Waste Diversion Area (including compost area) and poplar forest irrigation system

Area Inspected and Time	Quality / Characteristic of Odour	Source Identified and Distance Downwind Odours are Detectable	Corrective Action to be Complete?	Notes
<p>Example <i>Leachate Collection System @ 10:30am</i></p>	<p><i>Strong odour, smells like rotten eggs</i></p>	<p><i>SW corner of Cell 1 Detectable 20 metres from source No detectable off-site</i></p>	<p><i>Replace leaking piping in collection system Action completed within 20 minutes of notable odour</i></p>	<p><i>Once repair complete, odour survey to ensure corrected</i></p>

ATTACHMENT C



West Carleton Environmental Centre Best Management Practice Plan Odour Complaint Form

WM Personnel:	
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Date of Call		Time of Call	
Complainant Name		Complainant Contact Number	
Complainant Address			

Date of Odour Incident		Time of Odour Incident	
Description of Event			

Operations at Time of Incident	
Winds at Time of Incident	
Investigation Results and Corrective Action	