Newfoundland Labrador

Department of Environment and Conservation
Pollution Prevention Division

Guidance Document

Title: **Guidelines for the Closure of Non-Containment Municipal Solid Waste Landfill Sites**

Prepared By: Marie J. Ryan
Environmental Scientist – M. Ryan

Issue Date: **December, 2009**

Approved By: D. Maddocks
Derrick Maddocks, Director

Closure of Non-containment Municipal Solid Waste Landfills/ Waste Disposal Sites
GD-PPD-062

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Waste management strategy implementation

The goals of the Provincial Waste Management Strategy are to eliminate open burning of waste and close all teepee incinerators; to promote waste diversion to and to reduce the total number of landfills in the Province in favor of Regional Waste Management Sites.

Closure of small non-containment landfills involves the cooperation of municipalities in consolidating waste management services at the sub-regional level, and eventually joining the Regional Waste Management System. The regional systems may include a series of local waste management facilities or transfer stations where the various waste streams are consolidated for regular delivery to the regional site. The regional site would be equipped for separate recovery of recyclables; composting of organic material, and final disposal of residual garbage to an engineered lined landfill with leachate collection and treatment to prevent adverse environmental impacts.

These guidelines provide a standard set of procedures for the closure of small non-containment landfills (Class B and Class C sites) in an environmentally acceptable manner. Decommissioning of larger non-containment landfills (Class A sites) will require the services of a Qualified Professional to prevent or mitigate any future environmental impacts. Further information regarding is provided in Appendices B and C.

Where a consultant is engaged, appropriate application of the closure guidelines will require confirmation of the original site classification (Rutter, March 2005), taking into account the actual environmental impacts and risk posed by the condition of the site, and reasonable mitigation measures required to secure the site and mitigate impacts. In a number of cases this may mean downgrading a Class A site to Class B respecting closure criteria, where environmental contamination is restricted to the immediate area of the landfill and can be contained. Occasionally, Class B or Class C sites may be upgraded to Class A where the need for further environmental monitoring is indicated from soil, or surface water quality.

The guidelines are intended for internal use by departmental agents at the Government Service Centre (GSC) and may also be used as environmental guidelines by municipalities and landfill owners/operators.

1.2 Supercedence

This guidance document supercedes the following documents:

- Guidance Document prepared by Jocelyn Tucker: Guidelines for Decommissioning of Class B and C Waste Disposal Sites within the Province of Newfoundland and Labrador, March 2006

- Guidance Document prepared by Brenda Rowe: Environmental Standards for Closure of Non-Containment Municipal Solid Waste Landfill Sites, March 5, 2008.

2.0 LEGISLATION and APPROVALS

The construction, operation, modification, closure and decommissioning of a Waste Management System are activities subject to the provisions of the *Environmental Protection Act,* Parts IV, V, X and XI; and the *Municipalities Act,* Part XIII.1. Other pieces of legislation that may apply include the following:

Provincial

- *Environmental Protection Act and Regulations*
- *Occupational Health and Safety Act and Regulations*
- *Municipalities Act and Regulations*
- *Water Resources Act and Regulations*

Federal

- *Canadian Environmental Protection Act and Regulations*
- *Transportation of Dangerous Goods Act and Regulations*
- *Fisheries Act*
- National Fire Code

Municipal

- Municipal permits may be required for closure / decommissioning activities at a landfill.

3.0 ADVANCE NOTICE AND FUNDING

The owner and/or operator of a waste disposal site is required to provide advance notice to the Regional GSC of the intention to close and/or decommission a site. Sufficient time must be allowed to advise the users of the site of the pending closure date, and alternate site arrangements.

Funding may be available from the Department of Municipal Affairs once the Closure or Decommissioning plan has been approved.

4.0 DEFINITIONS

Class A Sites	Waste disposal sites which are considered high risk. Characteristics include one or more of the following: population served is greater than 5,000 and includes industrial, commercial, and institutional wastes, visible leachate, close to the community (less than 1.0 km), poorly maintained, and the potential for contamination (current or future) is high (main text provides further details).
Class B Sites	Waste disposal sites which are considered moderate risk. Characteristics would generally be intermediate between Class A and C (main text provides further details).
Class C Sites	Waste disposal sites which are considered low risk. Characteristics include: waste from residential sources only, no visible leachate, at least 1.0 km from the community it serves, well-maintained, and the potential for future contamination is low (main text provides further details).
Closure	The closure of a waste disposal site such that it is no longer used, waste material is no longer visible and the necessary measures have been taken to minimize environmental impact.
Decommissioning	Collectively, the steps beyond closure of a waste disposal site which have been taken to minimize and/or monitor for potential adverse environmental impacts. These steps may include: leachate collection and treatment, landfill gas migration, surface and groundwater quality, odour and rodent control, and general aesthetics.
Department	Newfoundland and Labrador Department of Environment and Conservation and its successors.
Environment:	Includes air, land, water, buildings, structures, plant and animal life, including human life, community or communities.
GSC	Newfoundland and Labrador Government Service Centre, Department of Government Services. – Environmental Protection Officers with the GSC are authorized to act on behalf of the Department of Environment and Conservation.
Landfill:	Means real property upon or which, waste material is deposited. In the context of this document it is used interchangeably with the term 'waste disposal site' as defined by the Environmental Protection Act.
Leachate	Any liquid and suspended and dissolved materials which it contains, which has percolated through or drained from a municipal solid waste disposal facility.
Minister	Unless otherwise indicated, means the Minister of the Department of Environment and Conservation.
MMSB	an acronym for Multi-Materials Stewardship Board, the Crown corporation which presently provides funding for landfill closure.
MSW	means municipal solid waste which is garbage, refuse, rubbish, litter, and other discarded materials resulting from residential, commercial, institutional, and industrial activities which are commonly accepted at a municipal solid waste management facility.

Non-Containment Landfill: Landfills which do not incorporate an engineered bottom liner to capture leachate, and similar top liners or caps to create a "dry entombment" situation.

Owner/Operator A person that owns or is responsible for or has the charge, management, or control of the operation of a waste disposal site. A person includes a council, firm, committee, or franchise holder.

Qualified Professional An individual with the appropriate education, training, and experience to perform the designated task. Depending on the task, this education, training, and experience is typically recognized through registration in a professional association by the individual or by the company to which the individual is responsible. Determination of qualifications or any other requirements (e.g. insurance) rests ultimately with the person or organization who contracts the services of a Qualified Professional.

Run-off Any surface water that drains the waste disposal area of a MSW landfill site.

Run-on Any surface water that enters a MSW landfill site.

Treatment Any physical, thermal, chemical or biological process, including sorting, that changes the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance its recovery.

Waste or Waste material means

(i) refuse, garbage, rubbish, litter, refuse scrap and discarded material, including tailings, slime, offal, effluent, sludge, sewage, machinery, products, vehicles and other articles which are dumped, discarded, abandoned or otherwise disposed of; or other substance or waste products that would or could cause an adverse effect

(ii) a material or thing that may be a danger to the health of human beings, animals, wildlife or fish, or is of unsightly appearance; and

(iii) a substance designated at waste material under the *Environmental Protection Act.*

Waste Disposal Site The physical site / geographic location designated for storage, handling and disposal of waste materials for which a certificate of approval has been issued under the provisions of the *Environmental Protection Act* . Also refers to the real property and a building or structure upon or in which, waste material is deposited (as under Part XIII.1 of the *Environmental Protection Act*, section 403.1 of the *Municipalities Act*)..

Waste Management Strategy Technical Committee – A group of managers, engineers and scientific/ technical advisors from the Departments of Municipal Affairs, Environment & Conservation and Government Services, and the Multi-Material Stewardship Board who are assigned to the implementation of the Provincial Waste Management Strategy.

5.0 APPLICATION/ WASTE DISPOSAL SITE CLOSURE PROCESS

1. The landfill owner/operator submits a proposal (application) to the GSC for closure of the waste disposal site.

2. A landfill closure/decommissioning plan is submitted for approval by the Waste Management Strategy Technical Committee.

3. When closure/decommissioning of the site has been completed, the landfill owner/operator notifies the GSC and provides a brief summary report of the work completed, including as built drawings pre- and post-closure, a list of approved variances to the plan, and outstanding concerns/issues.

4. A final joint inspection will be conducted by GSC, the landfill owner/operator and Qualified Professional where applicable; and the Regional Waste Management Authority or Regional Service Board where applicable, to determine compliance with the approved closure /decommissioning plan.

6.0 CLOSURE REQUIREMENTS –CLASS B and CLASS C SITES

1) Site clean up and preparation

- Remove all infrastructure no longer required, from the site (required).
- Remove accessible scrap metal to recycling (required).
- Collect and bury windblown litter and debris from the site, the access roads, and from adjacent property where necessary and to the extent possible (required).
- Note and remove obvious hazards where practical (required).
- Implement rodent and nuisance control measures where a problem is identified (required).

2) Site grading and waste compaction

- Consolidate waste (required) and compact where appropriate (optional). This may require the addition of fill material to provide a stable surface for heavy equipment to manoever.
- Shape and grade to the extent possible to achieve the required finished grades prior to backfilling (required). The level of difficulty in achieving a stable grade will vary according to the condition and natural slope of the site.

3) Final Cover

- Install final cover system to minimize the infiltration of liquids and soil erosion (required). Where available, the fill material used for the final cover should have a low permeability and be compacted according to acceptable engineering practices to ensure the overall structural integrity of the final cover (optional).
- Cover all refuse evenly with 60 cm of backfill material (required). Backfill may include an erosion control layer of 15 cm of soil capable of sustaining native plant growth (optional). Note that areas of a site that are already covered and/or have vegetation do not require additional cover unless there is evidence of exposed waste.
- Grade the final cover to accommodate settling of the waste, prevent surface ponding and seepage, and direct surface drainage away from the waste disposal area (required).
- Seed to initiate vegetation cover, reduce erosion potential and improve the appearance of the site (optional).
- Use of an alternative cover design is acceptable where it provides equivalent protection against infiltration and erosion (optional).

4) Perimeter ditching

- Install drainage ditches, if not already in place, on the up-gradient sides of the site to divert precipitation/drainage waters away from the disposal area and to prevent impact from future overland flow (optional).

5) **Location records**

- Delineate waste disposal site boundaries and features using available existing and historic information, and geographic positioning system coordinates (required).
- Site features would include the primary waste disposal area(s), access routes, and potential environmental receptors such as adjacent waterways or property.
- Submit information to the GSC and kept on file permanently (required).
- Install and maintain permanent markers and/or fencing to indicate site boundaries (optional).

6) **Access to the closed waste disposal site** is to be permanently removed or restricted (required).

7) **Signage for site closure**

- Install site signage to notify the public of the pending closure date; and providing directions to, hours of operation and contact numbers for the alternate waste disposal site(s) (required).
- Install "No Trespassing" and "No Dumping" signage at the former site entrance stating the applicable fines for offense (required).
- Install signage indicating that a landfill has existed on the site (required).
- All signage must be weather-proof (required).

8) **Contingency plans** are to be developed to deal with the following:
   - Illegal dumping around the former waste disposal site following closure (required)
   - Fire safety, in the event of a deliberate or spontaneous occurrence (required)

9) **Provide a summary report** describing the work done to close/decommission the site, including as built drawings pre- and post-closure, the existing condition, and the anticipated future condition relating to environmental concerns (required).

10) **Future use** of a closed or decommissioned waste disposal site or any amendment to land development plans for the area are subject to review and approval by the GSC. Any development proposals within the 1.6 km buffer zone of a closed landfill remain subject to review and approval by the GSC. Select long term uses such that the security of the wastes deposited in the site is not breached.

Items marked optional will not normally be required but where unique requirements exist may be approved.

APPENDIX A

REGIONAL CONTACT INFORMATION

For further information on waste disposal site decommissioning, contact any of the Regional Offices of the Government Service Centre, Department of Government Services or the Department of Environment and Conservation, Pollution Prevention Division.

St. John's 5 Mews Place P. O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2550 Fax: (709) 729-7400	**Corner Brook** 133 Riverside Drive P. O. Box 2006 Corner Brook, NL A2H 6J8 Tel: (709) 637-2204 Fax; (709) 637-2681
Clarenville 2 Masonic Terrace Clarenville, NL A5A 1N2 Tel: (709) 466-4060 Fax (709) 466-4070	**Happy Valley – Goose Bay** 13 Churchill St. P. O. Box 3014, Stn. B Happy Valley-Goose Bay, NL A0P 1E0 Tel: (709) 896 – 5473 Fax: (709) 896-4340
Gander Fraser Mall P. O. Box 2222 Gander, NL A1V 2N9 Tel: (709) 256-1420 Fax: (709) 256-1438	**Grand Falls – Windsor** Office address: 9 Queensway Grand Falls – Windsor Mailing address: Provincial Building 3 Cromer Avenue Grand Falls – Windsor A2A 1W9 Tel: (709) 292-4206 Fax: (709) 292-4528
Department of Environment and Conservation Pollution Prevention Division P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2556 Fax: (709) 729-6969	

Appendix B LANDFILL CLASSIFICATION

Referring to the Rutter Engineering report, *Environmental Risk Classification on Non-Containment Landfills in Newfoundland and Labrador, March 2005*, landfills have been classified as: Class A (high), Class B (moderate) and Class C (low) for the potential risk of contamination to the environment. Classification is generally based on the population serviced, the size of the site, the types and amounts of wastes disposed of and the environmental impacts of these wastes.

In general Class A sites will require a higher level of environmental site assessment and decommissioning as part of the closure process. For Class B and Class C waste disposal sites, the closure process should be relatively straightforward as the post-closure environmental impacts associated with these sites should be minimal.

The classes of landfills are described as follows:

Class A

Class A landfills may pose a higher risk to the environment and would have one or more of the following characteristics:

- services a population greater than 5,000;
- industrial, commercial and institutional waste is accepted;
- leachate contamination is visible on or around the site;
- the site is close to the community it serves (less than 1km);
- residential properties are located within 500 metres down gradient of the site;
- site maintenance has been poor during the operating life;
- off-site contamination has already occurred or is likely to occur in the future.

Class B

Class B landfills would likely pose a moderate risk to the environment and would have one or more of the following characteristics:

- the primarily source of waste is residential or incinerator ash from burning of residential waste;
- there is visible evidence of leachate contamination on the site, but not off site;
- the site is close to the community it serves (less than 1km);
- residential properties are located within 500 metres down gradient of the site;
- attention to site maintenance has been moderate during the operating life;
- off-site contamination is likely to occur in the future.

Class C

Class C landfills would likely pose a low environmental risk. These are typically smaller in size and accept waste from residential sources only. The sites would have one or more of the following characteristics:

- waste from residential sources only or incinerator ash from burning of residential waste only;
- no visible evidence of leachate contamination on or around the site;
- the site is remote (1 km or more) from the community it serves and there are no residential properties in the immediate area;
- the site has been generally well maintained during the operating life;
- the potential for future contamination is low.

Prior to closure, Class A sites are to be assessed by a qualified professional to determine if they may be reclassified to a lower risk classification and closed or decommissioned accordingly.

A Qualified Professional would be able to conduct a site assessment, identify any potential environmental impacts and confirm the classification of the site based on the above description. The re-classification of the site as posing a lower or higher level of risk may be required if, for example, there has been a change in the operation and or types of wastes disposed of at the site or if adverse environmental impacts have occurred since the initial site classification.

This information is to be provided to the Department in the closure or decommissioning plan submitted for review and approval by the Waste Management Strategy Technical Committee.

Appendix C POST-CLOSURE CARE FOR CLASS A SITES

Post-closure care consists of monitoring and maintaining the waste containment systems and monitoring groundwater to ensure that waste is not escaping and polluting the surrounding environment. The average period is 30 years from site closure, but this may be varied depending upon the site condition and issues. Specific post-closure care requirements consist of maintaining the integrity and effectiveness of the:

- Final cover system
- Leachate collection system
- Surface and groundwater monitoring programs/systems
- Methane gas monitoring system
- Environmental emergency health and safety contingency plans may be required.

The owner/operator of a closed Class A landfill site is required to submit a written post-closure care plan to the GSC that provides:

- A description of all required monitoring and maintenance activities, including the frequency with which each activity will be performed.
- The name, address, and telephone number of the person to contact during the post-closure care period.
- A description of planned uses of the land during the post-closure care period.

Any use of the land during this period must not disturb the integrity or operation of any of the waste containment systems or the monitoring systems. At the end of the post-closure care period, the completion of post-closure care in accordance with the plan must be certified by a qualified professional, the owner/operator and the Department. Permanent records are to be kept on file with the GSC.

Groundwater, Leachate and Surface Water Monitoring Parameters – Class A sites

*Parameter limits may be specified by the Department based on sampling results and the recommended site-specific Environmental Monitoring Program)

	Groundwater		Surface Water	
Parameter Group	**Column 1 – Comprehensive List for Groundwater and Leachate**	**Column 2 – Indicator List for Groundwater**	**Column 3 – Comprehensive List for Surface Water**	**Column 4 – Indicator List for Surface Water**
Inorganics				
	Alkalinity	Alkalinity	Alkalinity	Alkalinity
	Aluminum	Aluminum	Aluminum	Aluminum
	Ammonia	Ammonia	Ammonia	Ammonia
	Antimony		Antimony	
	Arsenic		Arsenic	
	Barium		Barium	
	Boron		Boron	
	Cadmium	Cadmium	Cadmium	Cadmium
	Calcium	Calcium	Calcium	Calcium
	Chloride	Chloride	Chloride	Chloride
	Chromium	Chromium	Chromium	Chromium
	Cobalt		Cobalt	
	Copper	Copper	Copper	Copper
	Total Cyanide		Total Cyanide	
	Fluoride	Fluoride	Fluoride	Fluoride
	Iron	Iron	Iron	Iron
	Lead	Lead	Lead	Lead
	Magnesium	Magnesium	Magnesium	Magnesium
	Manganese	Manganese	Manganese	Manganese
	Mercury	Mercury	Mercury	Mercury
	Molybdenum		Molybdenum	
	Nickel	Nickel	Nickel	Nickel
	Nitrate	Nitrate	Nitrate	Nitrate
	Nitrite	Nitrite	Nitrite	Nitrite
	Total Kjeldahl Nitrogen		Total Kjeldahl Nitrogen	Total Kjeldahl Nitrogen
	Orthophosphate		Orthophosphate	
	Total Phosphorous	Total Phosphorous	Total Phosphorous	Total Phosphorous
	Potassium	Potassium	Potassium	Potassium
	Selenium		Selenium	
	Sodium	Sodium	Sodium	Sodium
	Total and Reactive Silica		Total and Reactive Silica	
	Silver		Silver	
	Sulphate	Sulphate	Sulphate	Sulphate
	Tin		Tin	
	Titanium		Titanium	
	Vanadium		Vanadium	
	Zinc	Zinc	Zinc	Zinc