

**SOLID WASTE MANAGEMENT
Annual Operations and Monitoring Report
Sicamous Refuse Disposal Site MR-00514
2016**



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1.0 EXECUTIVE SUMMARY

This report has been prepared in accordance with Section 4.4 of Operational Certificate MR-00514. The main objective of the report is to provide the Ministry of Environment with an overview of the operations at the Sicamous landfill for 2016 and to address the specific requirements outlined in Section 4.4.

In 2016 approximately 2,814 tonnes of waste was directed to the active face and landfilled, which represents a 4% increase over 2015 and, based on census data for the area, a per capita disposal rate of 0.92 tonnes per person.

2.0 INTRODUCTION

The Sicamous refuse disposal site (hereinafter referred to as “the site”) is located approximately 2.5 km south of Sicamous and 900 metres east of Mara Lake along Highway 97A. The legal description of the property is Block A of Section 30, Township 21, Range 7, West of the Sixth Meridian, Kamloops Division of the Yale District. The 10.2 acre site provides solid waste disposal and residual processing services to residents, businesses, and institutions located within the municipality of Sicamous and portions of Electoral Area E. The site is operated under an Operating Certificate issued by the Ministry of Environment (MR-00514) and is governed in operating and closure standards by Provincial criteria.

The landfill is operated in accordance with an approved Design and Operations Plan (D&O Plan). An ongoing groundwater monitoring program is conducted at the site from downstream monitoring wells and from a surface water sample on nearby Sicamous Creek. Data collected from the monitoring program has been compared to historical record to determine whether the respective landfills have affected groundwater quality and, if so, to what extent.

In accordance with the user-pay principles of the Solid Waste Management Plan, fees are charged for the disposal of all waste materials. The disposal fee for co-mingled municipal solid waste across scaled sites is set at \$70 per tonne, as per changes in 2009 in accordance with the new Solid Waste Management Plan. Furthermore, in 2010 a differential tipping fee was introduced to encourage recycling by creating disincentive fees for loads which are not separated.

3.0 BACKGROUND

The site has been in operation since 1971 when the Ministry of Environment, Lands and Parks issued Permit PR-00514 to the Sicamous Waterworks District. In 1977, the permit was transferred to the Columbia Shuswap Regional District (CSRD). The property is leased to the CSRD by the Crown and was operated under contract by Gary Reading in 2016.

With the exception of Christmas, New Years and Remembrance Day, the site was open on the following schedule:

Year Round Friday through Tuesday 10:00 am to 4:00 pm

The site is fully enclosed with an electrified fence, contains a lockable gate, a truck scale with electronic weighing and reporting software, a scale house and marshaling areas for mattresses, wood waste, gypsum, asphalt shingles, refrigerators and air conditioners, white goods and other metal wastes, concrete and asphalt, propane bottles, and auto batteries. A swap shed for reusable items is also provided.

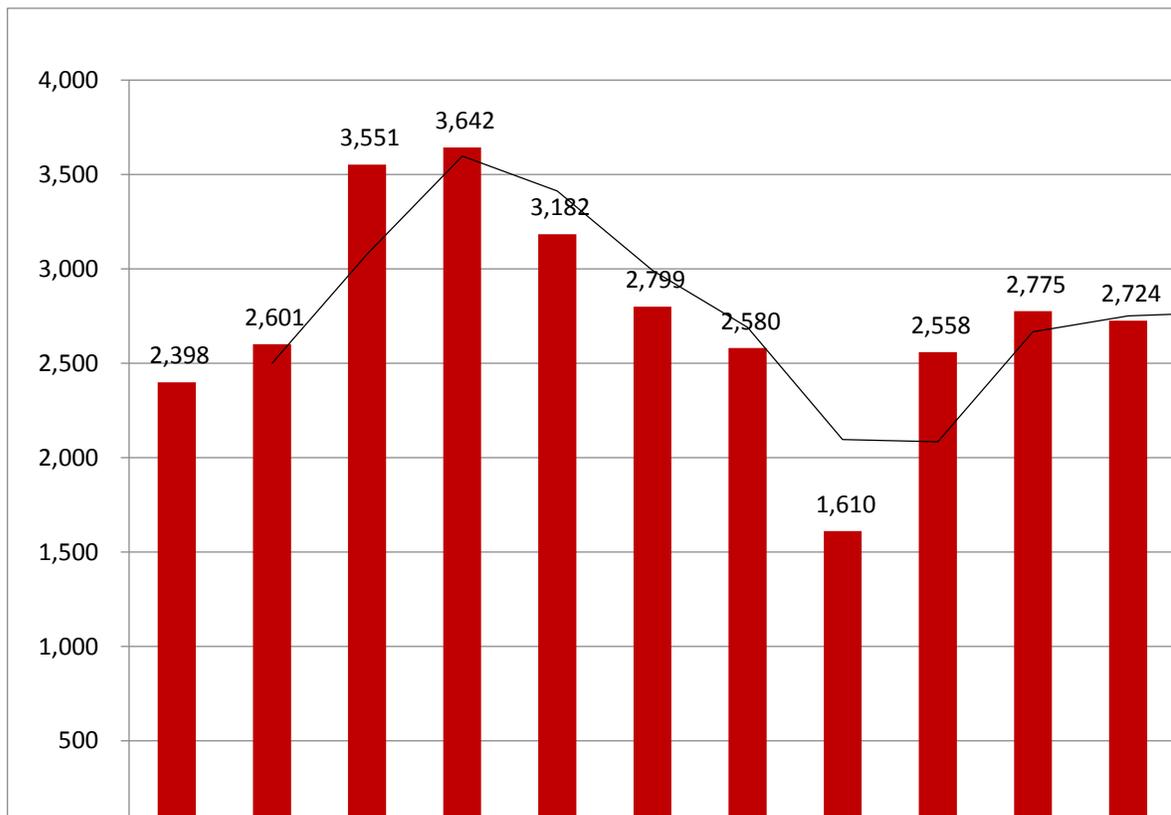
4.0 OBJECTIVES

The objective of this report is to provide information required to meet the annual reporting requirements in Section 4.4 of Operational Certificate MR-00514 issued by the BC Ministry of Environment on December 21, 2007 (most recent).

4.1 Total Tonnage of Waste Discharged (Figure 1)

In 2016 approximately 4,004 tonnes of refuse and recoverable wastes were managed at the Sicamous landfill. In 2016 approximately 2,814 tonnes of waste was directed to the active face and landfilled, which represents a 3% increase over 2015.

Figure 1



*2012 – Landfill closed for summer months because access to site was restricted due to road closure. Refuse diverted to Salmon Arm landfill via temporary transfer station.

Approximately one third of all incoming materials, 1,190 tonnes, were diverted to marshaling areas for recovery. Existing diversion programs include; mattress, drywall, asphalt shingles, concrete, contaminated soil, wood waste, metal and reusable items.

4.2 Design Volume/Life Expectancy

The Sicamous D&O Plan was prepared by Gartner Lee Ltd. in August, 2006. According to the plan, the site will be constructed and progressively closed in four phases which would consume an overall 353,000 m³ of air space.

Phase 1 reached capacity by 2007, and approximately 50,000 cubic meters of excavated material from phase 2 was temporarily placed on the crest of phase 1. This soil material was excavated to provide airspace for the placement of waste in phase 2 and cover requirements for phase 2 and phase 3. Therefore, according to the D&O Plan phase 1 closure would occur with the closure of phase 3 when the soil stockpile was exhausted.

It was determined by survey that 7,899 m³ of air space was consumed at the site in 2016. This represents a 28% increase in air space use over 2015.

4.3 Accomplishments and Inspections in 2016

The Sicamous landfill was inspected by CSRD staff on three separate occasions in 2016. The contractor was found to be in compliance with the contract and the D&O Plan during all inspections. No major projects were completed at the Sicamous landfill in 2016.

4.4 Wildlife Occurrences

According to the scale attendant and the site contractor, there were no reported occurrences of wildlife at the site in 2016. In order to ensure that the electric fence is being maintained at adequate voltage the CSRD has a fencing testing/maintenance kit from our fencing contractor. The kit is used to test the fence voltage and make minor repairs during site inspections.

4.5 Closure Fund

A detailed overview of landfill closure and post-closure liability has been provided in Appendix 'A', prepared by the CSRD Finance Department for 2016 auditing purposes.

4.6 Plans for 2017

Projects for 2017 include improvements to the marshaling areas. In 2016 the CSRD acquired new GPS survey equipment to check current landfill design to ensure it is compliant with the D&O Plan.

New alternative daily cover plates will be purchased to replace damaged ones. This will help reduce vectors from accessing refuse.

5.0 WASTE HIERARCY

The CSRD emphasizes and encourages the 6R Hierarchy of Rethink, Reuse, Reduce, Recycle, Recovery and Residual management and continually strives towards a higher 'R' in waste management practice. At the Sicamous landfill there are a number of programs established to facilitate the separation and salvaging of various recyclable materials.

The CSRD also manages a network of Multi Material BC (MMBC) recycling depots throughout the regional district, including one in downtown Sicamous and one at the Sicamous landfill. MMBC is the provincial stewardship group responsible for collecting packaging and printed paper, including but limited to; paper, cardboard, newsprint, containers, plastics, glass and styrofoam. Currently the District of Sicamous does not offer a curbside recycling program.

5.1 Resource Recovery - Landfill Salvage Materials

In 2016 over 1,000 tonnes of material was marshaled and recycled or reused on site. Wood waste and yard and garden waste were separated on site and chipped by the CSRD wood grinding contractor. Wood chips are used on site for access roads, unloading pads, and blended with cover material for use on interior landfill cells. Metal, gypsum/drywall, asphalt shingles, mattresses, auto batteries, and propane tanks are separated from waste on site and are salvaged by CSRD contractors for recycling off site.

Concrete, asphalt, brick, and porcelain are separated on site and stockpiled to be crushed into an aggregate product for use on site. No concrete crushing was done in 2016. Appliances containing refrigerants and ozone depleting substances are separated on site and these substances are removed by a CSRD contractor before items are added to the metal area for salvage. Clean soil, contaminated soil, and chipped wood are separated for internal use at the site.

The following table provides an annual summary of 1) materials received and separated for processing and 2) categories and related tonnages processed for recycling or reused on the site for internal purposes:

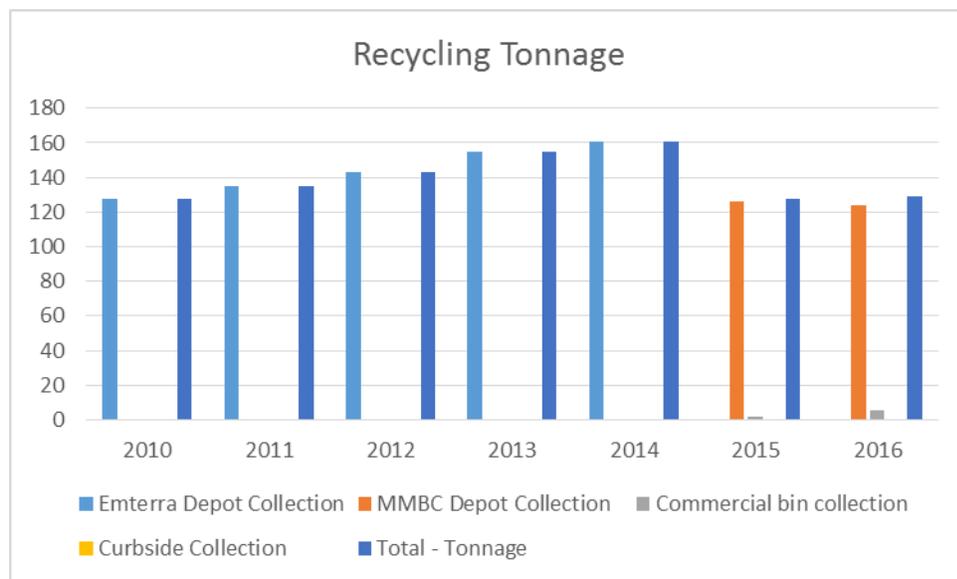
Sicamous Landfill - Resource Recovery							
Recoverable Resource	2010	2011	2012	2013	2014	2015	2016
Wood Waste - Received (MT)	206	431	173	336	330	340	347
Wood Waste - Processed (m ³)	2,050	1,937	1,565	2,486	5,324	5,608	2,000
Yard & Garden Waste - Received (MT)	283	364	309	342	447	489	503
Yard & Garden Waste - Processed (m ³)	incl. WW	incl. WW	incl. WW	incl. WW		incl. WW	1,876
Metal Waste - Received (MT)	35	55	91	82	86	79	88
Metal waste - Salvaged (MT)	181	120	95	113	109	94	75
Gypsum Drywall - Received (MT)	10	47	55	89	93	47	52
Gypsum Drywall - Salvaged (MT)	-	-	25	128	105	75	51
Asphalt Shingles - Received (MT)	27	76	33	42	59	62	62
Asphalt Shingles - Salvaged (MT)	-	-	25	32	32	97	94
Concrete/Brick/Porcelain - Received (MT)	2	18	79	42	60	45	95
ODS Units - Received	-	120	112	139	183	222	187
ODS Units - Processed	147	143	176	125	136	219	208
Propane Tanks - Salvaged	139	58	75	72	307	159	245
Auto Batteries - Salvaged	110	99	130	42	6	28	17
Mattresses - Received	-	-	-	-	297	389	465
Mattresses - Salvaged	-	-	-	-	297	233	404
Contaminated Soil Received (MT)	-	3	2	-	-	-	-
Clean Soil Received (MT)	-	109	3	30	65	38	31
Wood Waste Chipped Received (MT)	-	-	-	-	-	1	13
MT - Metric Tonne							
m ³ - cubic metre							

5.2 Recycling - Commercial and Residential Programs

In January of 2015, the residential recycling collection changed to the MMBC Packaging and Printed Paper collection Extended Producer Responsibility (EPR) program. Prior to the MMBC program the depot recycling program was not monitored which contributed to illegal dumping and inflated tonnage results.

The CSRD maintains a recycling program for commercial users, which is tracked separately. In addition, the CSRD has been working to add other stewardship materials, such as power tools and electronics, where there is a lack of program accessibility and partnerships with stewardship groups can be achieved.

The following table is an overview of tonnage collected since 2010:



6.0 ENVIRONMENTAL MONITORING

6.1 Ground Water

Western Water Associates Ltd. conduct all monitoring and reporting for the Sicamous landfill, as per the requirements of the Operational Certificate. Western Water has provided conclusions and recommendations based on the 2016 data collected, which will be posted on the CSRD website for public review after April 1, 2017.

Appendix 'A' - Solid Waste Landfill Closure and Post-Closure Liability

COLUMBIA SHUSWAP REGIONAL DISTRICT

Notes to Consolidated Financial Statements

December 31, 2016

5. Solid Waste Landfill Closure and Post-Closure Liability

The Environmental Management Act of B.C. and the Ministry of Environment of B.C. set out the landfill criteria to properly close and maintain all active and inactive landfill sites. Under the guidelines, there is a requirement for closure and post-closure care of solid waste landfill sites. Provisions are therefore made over the estimated remaining life of the Regional District landfill sites based on scalehouse records and through tipping fees.

The main components of the landfill closure plans are: final capping using an engineered cap design and the implementation of a drainage and gas management plan. The post-closure care requirements may involve: cap maintenance; groundwater monitoring; gas management system operation and maintenance; inspections; leachate treatment and monitoring; and annual reports. Post-closure care activities begin once the entire landfill site no longer accepts waste and continues on for a period of twenty-five years. As the date of the site closure is unknown, management estimates the liability to begin after the closure of the current active phase, assuming another phase will not be opened. In the event another phase is opened, the start date for the liability will be adjusted to begin upon closure of the newly opened phase.

The table below sets out the liability based on the estimated capacities used in cubic metres, multiplied by the estimated total expenditures, expressed as discounted present values, assuming 1.80% (2015 - 1.10%) inflation and 2.10% (2015 - 2.75%) long-term borrowing rate (fall issue MFA 25 year rate). The amount remaining to be recognized in future years is \$1,869,700 (2015 - \$1,619,300). The annual provision is reported as an Operating Fund expense and the accumulated provision is reported as a liability on the Consolidated Statement of Financial Position. Reserve funds totalling \$1,347,230 (2015 - \$1,004,009) have been established to provide for this liability in the Landfill Closure Special Reserve Fund.

The table also indicates the remaining landfill life in years and remaining capacity (100 minus % used) on the open phases and the anticipated post-closure costs recognized on total site capacity used.

	Estimated Remaining Life (Years)	Estimated Total Expenditure for Closure	Cumulative Capacity Used (m³)	Total Estimated Capacity (m³)	Used (%)	Liability for Closure December 31, 2016
Salmon Arm (phase 2 of 5)	10	\$ 2,202,700	165,799	383,778	43	\$ 951,600
Golden (pre-phase)	12	356,400	613,416	613,416	100	356,400
Golden (phase 1 of 4)	12	407,400	75,147	157,000	48	195,000
Revelstoke (pre-phase)	4	324,800	70,000	70,000	100	324,800
Revelstoke (phase 1 of 4)	4	728,800	57,476	98,535	58	425,100
Revelstoke (phase 2 of 4)	10	749,500	65,000	156,212	42	311,900
Revelstoke (phase 3 of 4)	21	911,000	10,000	160,688	6	56,700
Sicamous (phase 2 of 4)	9	293,300	87,315	166,000	53	154,300
Sicamous (phase 4 of 4)	27	463,600	110,000	125,000	88	408,000
Closure liability subtotal		\$ 6,437,500	1,254,153	1,930,629	65	3,183,800
Post closure liability subtotal						1,384,000
2016 total liability						4,567,800
Less: expenses previously recognized						(3,430,700)
2016 increase in the liability for landfill closure						\$ 1,137,100