

**BEAVER REGIONAL WASTE  
MANAGEMENT SERVICES COMMISSION**

**2014 ANNUAL REPORT  
RYLEY CLASS II LANDFILL**

Compiled March 2015





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- Figure 2. Basic Landfill Plan 2013.
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- Appendix A: Approval 20754-01-00
- Appendix B: Stormwater Pond Release Information
- Appendix C: Construction Report - Project BMS-2014-C: North Slope Final Capping  
(Prepared by Beaver Municipal Solutions)
- Appendix D: C.E. Moell & Associates Environmental Monitoring Reports  
Spring and Fall 2014
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## 1.0 INTRODUCTION

### 1.1 OWNERSHIP

The Beaver Regional Landfill is solely owned by the Beaver Regional Waste Management Services Commission (the “Commission”) – a Regional Services Commission incorporated under the provisions of Part 15.1 of the Municipal Government Act. The landfill site is comprised of all of the NE, SE, and NW quarters of 10-50-17-W4 excepting the 21.3-acre parcel in quarter NW-10 owned by Mr. Doyle Booth. No other parties have any stake or share in the ownership of this facility. Please refer to Figure 1. Landfill Boundary Plan 2012.

### 1.2 APPROVAL AND REPORTING REQUIREMENTS

This annual report for 2014 has been compiled and submitted to Alberta Environment and Sustainable Resource Development (AESRD) to satisfy the Approval conditions and requirements as outlined in the August 29, 2007 Approval, No. 20754-01-00, a copy of which is provided in [Appendix A](#).

The Approval contains the following reporting requirements:

- **Section 4.10.9** - The approval holder shall submit an Annual Landfill Operation Report which shall include, at a minimum, all of the following:
  - A summary of the information monitored as required in TABLE 4.10-A, TABLE 4.10-B, and TABLE 4.10-C;
  - A summary of the dates when the landfill closed or restricted access to the working face due to wind conditions;
  - A summary of the waste types stored, including their origin;
  - A summary of the landfill gas monitoring data interpretation as per Section 4.10.6;
  - All landfill scheduled inspection records;
  - A summary of the performance of the landfill run-on and run-off control systems, and;
  - A summary of any changes to the Operations Plan since the last Annual Landfill Operations Report.
  
- **Section 4.11.7** - The approval holder shall compile an Annual Groundwater Monitoring Program Summary Report which shall include, at a minimum, all of the following information in the Standards for Landfills in Alberta, June 2007, as amended.

## 2.0 FORMAT

This annual report is intended to satisfy the regulatory requirements as expressed in the Approval, and to provide a summary of the principal activities conducted during 2014. This information is provided in the following format:

- A brief description of the Landfill;
- A summary of the regulatory setting of the Landfill;
- Summaries of the principal development, operating, environmental monitoring and closure activities undertaken at the Landfill by the Commission in 2014;
- A summary of the major interactions between the Commission and the public and regulatory communities during 2014;
- Reporting data required by the Approval, and;
- Appendices providing the details of information summarized and referenced in the foregoing sections of the report.

## 3.0 LANDFILL DESCRIPTION

Section 1.1.2(h) of the Approval defines the Landfill as being “... *all buildings, structures, storage facilities, material handling facilities, process and pollution abatement equipment, vessels, cells, roadways, berms, monitor wells, pipelines and other installations, and includes the land, located on the NE, SE, and NW of Section 10, Township 50, Range 17, West of the 4<sup>th</sup> Meridian, that is being or has been used or held for or in connection with the Beaver Regional Class II landfill...*”.

The Landfill is located approximately 3km north of Highway 14, and approximately 2km northeast of the Village of Ryley. The permitted site is surrounded by the following land uses:

- To the north by municipal Township Road 502, to the north of which is agricultural land;
- To the west by Secondary Highway 854, to the west of which lies a Class I waste management facility which is owned and operated by Clean Harbors Environmental Services Inc.;
- To the southwest by agricultural land and the sewage lagoon operated by the Village of Ryley;
- To the south by agricultural land; and
- To the east by municipal Range Road 172, to the east of which is agricultural land.

Figure 2. Basic Landfill Plan 2013 illustrates the location of the Landfill relative to surrounding geographic features.

## 4.0 REGULATORY SETTING

### 4.1 REGULATORY HISTORY

The regulatory history of the Landfill is summarized as follows:

- **12<sup>th</sup> September 1989** – a small portion of the site (now known as Stage 1) was permitted for waste disposal through Permit to Operate a Waste Management Facility W1075, as issued by the Vegreville Health Unit under the Alberta Public Health Act;
- **03<sup>rd</sup> May 1994** – an Approval to Develop/Permit to Operate was issued by Vegreville Health Unit for the development of Stage 2, including related site infrastructure;
- **12<sup>th</sup> July 1994** – a Development Permit was issued for Stage 2 by Beaver County;
- **March 1996** – application was filed with the East Central Health Authority to “...construct and operate such additional stages as are necessary to develop out the balance of the Lands...”. This application was subsequently re-filed with Alberta Environmental Protection in 1997 due to the transfer of legislative jurisdiction for landfills from Alberta Health to Alberta Environmental Protection in 1996;
- **13<sup>th</sup> August 1996** – a development Permit was issued to the Commission by Beaver County for landfill development on the “balance of the Lands” within NE ¼ - 10 – 50 –17 –W4M;
- **November 1996** – additional development conditions were added to the August 1996 Development Permit by the Development Appeal Board;
- **29<sup>th</sup> May 1998** – the Amending Approval to Permit W1075 was issued to the Commission by Alberta Environmental Protection;
- **13<sup>th</sup> July 1999** – the Alberta Environmental Appeal Board recommended to the Minister of Environment that the Amending Approval to Permit W1075 be modified, and that additional requirements be placed on the Commission;
- **25<sup>th</sup> August 1999** – the Alberta Minister of Environment responded to the recommendations of the Environmental Appeal Board with a Ministerial Order which varied the Amending Approval to Permit W1075;
- **24<sup>th</sup> July 2000** – Alberta Environment confirmed that the Commission response to the Ministerial Order complied with the requirements in that order;
- **17<sup>th</sup> September 2001** – a new Development Permit was issued for the development of the remainder of the landfill, superseding all previous development permits;

- **16<sup>th</sup> November 2005** – an application for the Approval Renewal was filed with Alberta Environment as required under the provisions of the Alberta Activities Designation Regulation;
- **16<sup>th</sup> November 2005** – Amendment 20754-00-04 was issued by Alberta Environment to remove the chloride concentration limits for the recirculation of leachate in the Stage 1 cell;
- **28<sup>th</sup> June 2006** – Ministerial Order 13/006 was issued by the Minister of Environment accepting the Alberta Environment Appeals Board recommendation to uphold the Director's decision on Amendment 20754-00-04, subject to conditions for the submission of supplementary clarification reports;
- **22<sup>nd</sup> August 2006** - the term of Amending Approval 20754 was extended to September 1, 2007 by letter from Alberta Environment;
- **31<sup>st</sup> August 2006** – Five reports were filed with Alberta Environment to satisfy the Ministerial Order 13/006 conditions;
- **18<sup>th</sup> September 2006** – Alberta Environment acknowledged receipt of the five reports as required to satisfy the conditions of Ministerial Order 13/006, and;
- **29<sup>th</sup> August, 2007** – The new and current Operating Approval No. 20754-01-00 was issued.
- **17<sup>th</sup> and 18<sup>th</sup> December, 2008** – Alberta Environment Appeals Board heard an appeal from a local resident.
- **21<sup>st</sup> January, 2009** – Ministerial Order 03/2009 was issued in response to recommendations from the Environment Appeals Board setting out additional conditions for Approval 20754-00-00
- **19<sup>th</sup> June 2009** – Response to Ministerial Order 03/2009, three reports and a revised Operating Plan were submitted to the Director
- **23<sup>rd</sup> December 2009** – Alberta Environment acknowledged receipt of the three reports as required to satisfy the conditions of Ministerial Order 03/2009, and suggested further changes to the Operating Plan.
- **2<sup>nd</sup> June, 2010** – A revised Operating Plan was submitted to the Director incorporating changes to the stormwater management reporting protocols as suggested by the Office of the Director.

Operation of the Landfill is currently bound by the requirements of the regulatory authorizations described in Section 1 of this report. The principal requirements of the regulatory authorizations governing the Landfill are summarized in the following subsections of the report.



#### **4.2 ALBERTA ENVIRONMENT APPROVAL**

Operation of the Landfill is authorized by Alberta Environment in the form of Approval 0020754-01-00 under the *Alberta Environmental Protection and Enhancement Act*. The Approval contains conditions relating to a number of operational, monitoring and closure aspects of the Landfill.

#### **4.3 DEVELOPMENT PERMIT**

Operation and development of the Landfill is in accordance with the development permit No. 2001-09-17-01 issued by Beaver County on September 17, 2001, and in accordance with the County's land use bylaw 98-801. The land use bylaw was amended in December 2001 with respect to lines and grades, and again in June 2004 to remove operating hour restrictions to accommodate tentative staging and operational requirements.

### **5.0 DEVELOPMENT AND IMPROVEMENTS**

#### **5.1 CELL DEVELOPMENT**

The Commission did not undertake new cell construction during 2014.

#### **5.2 SITE IMPROVEMENTS**

To improve customer service and provide a contingency / back-up in the event of mechanical problems, the Commission installed a second, permanent weigh scale during 2014. The new scale was installed south of the existing scale to allow for separate inbound and outbound traffic. Construction documentation will be maintained in the operating records. Calibration records for both scales are included in Appendix E.

## 6.0 REPORTING REQUIREMENTS

### 6.1 STORM WATER CONTROL SYSTEMS

The storm water control system is designed to prevent surface run-off from leaving the landfill property. Surface run-off is directed by ditches to the northeast and west storm water ponds. Storm water is pumped from the northeast pond to the west pond as needed to prevent overflow and to allow for release. Figure 3. Landfill Surface Water Drainage Plan, illustrates the storm water collection network employed at the landfill during 2014.

Storm water from the west storm water detention pond was released to the designated release point in the tributary to Bible Creek as per the Stored Water Release Notification Protocol (June 17, 2009). Advance notification was provided to AESRD and affected neighbour(s) by letter dated November 21, 2014. The storm water release from the West Detention Pond began November 27, 2014 and was halted November 28, 2014 due to mechanical failure of the pump. After repairs were completed, the planned release continued from December 11 through December 31, 2014. In total, the duration of the planned release was approximately 500 hours over 23 days. The total stormwater released is calculated to be approximately 28,350m<sup>3</sup>. A copy of the release letter including the storm water analytical report is provided in Appendix B.

### 6.2 APPROVAL TABLE 4.10-A (OPERATIONS – MONITORING AND REPORTING REQUIREMENTS)

#### 6.2.1 Weight and Type of Solid Waste Received and Removed

The types and quantities of waste received during 2014 are summarized in Table 1.

Table 1. Summary of Waste Quantities Received During 2014.

WASTE TYPE	*QUANTITY (tonnes)
MSW	342,633.80
C & D	1,463.40
Contaminated Soil	659,282.67
Special Waste	52,272.26
Liquid Waste ( <i>Containerized – see description in 6.2.2 below</i> )	1,044.19
<b>Total</b>	<b>1,056,696.32</b>

\*Note: Totals reflect the amount of waste placed in the landfill. Other materials accepted at the landfill for recycling or re-use (e.g. scrap metal, wood waste, clean concrete, used oil) are detailed in Section 6.3.9.

### 6.2.2 Volume and Type of Liquid Waste Received

A total of 1,044.19 tonnes of liquid waste was received at the Landfill during 2014. This waste was comprised of outdated liquor received in containers of less than 5 litres each.

### 6.2.3 Hazardous Wastes Detection

A minimum target frequency of 10% of all inbound loads of MSW and C&D waste are randomly inspected for hazardous and prohibited wastes. Identification is by visual inspection and/or by interviews with waste haulers. Daily load inspections are performed and documented. Details of these inspections are documented and retained in the Operating Record.

In addition, the landfill attendants and equipment operators are constantly monitoring the tipping face and all offloading vehicles for any indications of the presence of unacceptable materials. Any offending materials are immediately recovered and removed from the site in accordance with the provisions of the Operations Plan.

Materials rejected during 2014 are summarized in Table 2. Details of all material rejected are recorded and retained in the official Operating Record.

Table 2. Summary of Rejected Waste During 2014.

Month	Waste Material	Reason for Rejection	Source
June	Hot Ash	Potential fire source	Beaver County Resident
July	Fire Extinguishers (2)	Pressurized container	Beaver County Resident
	Hot Ash	Potential fire source	Beaver County Resident
October	Construction debris	Contained Asbestos	Contractor

Residents attempting to dispose of hot ash are encouraged to find alternative uses or to properly extinguish ash for disposal. The resident with fire extinguishers was advised to contact local fire safety businesses for proper disposal options. The Contractor that delivered the construction debris containing asbestos was asked to re-load the bags and dispose elsewhere.

#### **6.2.4 Location of Waste Deposited**

Waste received during 2014 was placed primarily in the newest landfill Cell 5. The Commission did identify an area along the west slope of Cells 1 and 2 that was underbuilt. This area was filled to proper cell limits during 2014 in preparation for final capping in 2015. Figure 2. Basic Landfill Plan 2014 illustrates the location of all landfill Cells that were used during 2014 operations. The 2014 year end survey and contour maps provide a 3-dimensional illustration of the fill plan used at the landfill and are included in [Appendix G](#).

Detailed coordinates for the placement of all manifested wastes (i.e. contaminated soils and wastes requiring special handling) are documented and retained in the Operating Record. A monthly summary of reports is prepared and retained in the Operating Record to document the landfilling progress and the locations in which waste was deposited during the month. A daily record is maintained using GPS coordinates to document the location of waste deposited during the day.

#### **6.2.5 Working face width**

As in previous years, a working face width of 20 m was used as an operating target for routine operations during 2014. The face was surveyed and staked during the year to assist in achieving this target. No significant deviations from this target are identified in the site operating records.

#### **6.2.6 Daily Cover Thickness**

In accordance with the provisions of Section 4.3.13 of the Approved Operating Plan, daily cover was applied when required to ensure that no waste was left exposed for more than 24 hours. When daily cover was required, it was applied at a minimum thickness of 150 mm. Due to the cohesive nature of the clay cover materials available at the site, actual cover thicknesses are expected to have generally exceeded this minimum.

No clay from onsite stockpiles was needed for daily cover in 2014. Rather, contaminated soils with low levels of hydrocarbon or chloride contamination were used for daily cover. This was done in such a manner as to ensure that there would not be any leaching from the contaminated soils to the storm water detention ponds.

### 6.2.7 Intermediate Soil Cover

During 2014, inside intermediate soil cover was placed to an average thickness of about 0.3 metres over lifts of waste to provide a solid base for truck and equipment traffic and subsequent lifts of waste. This intermediate cover is breached prior to placement of subsequent lifts of waste to accommodate downward migration of leachate and upward migration of landfill gas. On landfill stages that are not actively accepting waste, intermediate soil cover is used to maintain access roads for truck and equipment traffic.

Intermediate side cover was also placed upon outside slopes to an average thickness of 0.3 metres over lifts of waste to completely cover waste from view and wind. Maintenance of this cover is completed as needed on all landfill slopes.

Other intermediate soil cover uses included construction of access roads and ramps within the active landfill cells. Table 3 below summarizes where approximately 51,675m<sup>3</sup> of intermediate cover soil were used during 2014.

Table 3. Intermediate Soil Cover Used During 2014

Location of Use	Type of Intermediate Cover (m <sup>3</sup> )			Totals (m <sup>3</sup> )
	Inside	Side	Other	
Stage 1	-	2,595	-	2,595
Stage 2	-	4,440	-	4,440
Stage 3	-	-	-	-
Stage 4	915	-	-	915
Stage 5	37,785	-	5,940	43,725
<b>Totals</b>	<b>38,700</b>	<b>7,035</b>	<b>5,940</b>	<b>51,675</b>

Information regarding the inventory of topsoil and subsoil stockpiled at the Landfill for future closure and reclamation is included in section 6.3.14.

### 6.2.8 Reclamation Test Plots

As per Section 3.2.5 of the 2005 Approval Application, information describing the work completed on the reclamation test plots was provided as part of the 2012 Annual Report. The majority of this information was contained in a report prepared by Paragon Soil and Environmental Consulting. The purpose of the test plots was to demonstrate and evaluate the effectiveness of alternative

capping and reclamation configurations to support vegetation on a sustainable basis.

During 2013, the Commission (through AECOM) provided technical information to AESRD to support the cap configuration approved within the 2005 Approval Application as follows:

- Barrier – compacted clay: 600mm
- Subsoil: 290mm
- Topsoil: 130mm

Based on information provided by the Commission (through AECOM), AESRD approved this cap configuration. The Commission incorporated the configuration into its closure activities during 2014. Details of the final capping work are included under Section 5.2 and Appendix C.

#### **6.2.9 Leachate Level Management**

The Approval requires that leachate be removed from the sumps when levels exceed 0.3 m above the lowest point on the liner excluding the sumps. The Approval also requires monthly monitoring of leachate levels within the Landfill. However, monitoring and removal of leachate were done at least weekly during 2014, or more frequently during periods of high leachate accumulation. Of note for 2014 are the addition of measurements for Stage 5. The maximum leachate levels observed for each month are shown in Table 4 on the following page.

Table 4. Summary of Leachate Level and Depth Measurements 2014.

Month	Maximum leachate depth (m) or elevation (mASL)					
	Stage 1 (trigger for removal = 675.5mASL)	Stage 2 (trigger for removal = 1.965m)	Stage 3 (trigger for removal = 676.9mASL)	Stage 4, Phase 1 (trigger for removal = <28.405m)	Stage 4, Phase 2 (trigger for removal = <28.776m)	Stage 5 (trigger for removal = <31.93m)
January	675.369	1.880	676.897	29.720	35.75	33.68
February	675.321	1.880	676.897	29.790	35.94	34.60
March	675.309	1.870	676.897	29.960	36.360	35.18
April	675.314	2.020**	-***	29.760	36.240	34.74
May	675.281	2.170**	-	29.380	35.560	33.58
June	675.009	2.020**	-	29.560	35.920	33.10
July	674.864	2.020	-	29.280	35.720	30.16 <sup>+</sup>
August	675.281	2.150	-	29.210	35.940	29.74 <sup>+</sup>
September	675.375	2.220	-	29.200	35.450	30.42 <sup>+</sup>
October	675.375	2.200**	-	28.860	35.200	31.06 <sup>+</sup>
November	675.680*	1.960	-	29.020	35.110	34.72
December	675.697*	2.090**	-	28.950	35.480	34.69

Notes:

\*Stage 1 measurements during November and December 2014 indicate leachate had exceeded the allowable limit. Leachate height after pumping returned the level below applicable limits. Below are the measurements to illustrate that pumping rectified the exceedance. As noted above, leachate limit for Stage 1 is 675.5 mASL.

Month	Day	Leachate Depth Prior to Pumping (mASL)	Leachate Depth After Pumping (mASL)
November	3	675.367	674.911
	10	675.372	675.147
	17	675.630	674.800
	24	675.680	675.189
	25	675.267	675.147
December	1	675.572	675.267
	9	675.697	674.775
	22	675.319	675.139
	29	675.572	675.197

\*\* The Stage 2 leachate sump was pumped empty on the occasion of each measurement to maintain leachate below allowable limits. Staff did report difficulty obtaining a reading from the sonar device. A project to clean the Stage 2 sump is currently underway with assistance from AMEC Foster Wheeler to ensure that accurate measurements are being recorded. A complete report will be provided to AESRD with the 2015 Annual Report.

\*\*\* Staff were unable to pump leachate from Stage 3. A down-hole camera was used to inspect the leachate extraction pipes on June 2014, but the camera could not reach the sump / base of pipe. A second inspection on found the pipes were filled with silt and it is expected the sump is also filled with silt preventing the pump from extracting leachate. Cleaning of this sump is being attempted during the cleaning of the Stage 2 sump mentioned above.

+ Stage 5 leachate exceedance was reported to AESRD on July 28, 2014. A 7-Day Letter was provided to AESRD under Reference Number 288318 on August 8, 2014. A copy of this letter is included in Appendix E. Leachate data from Stage 5 for the remainder of 2014 is also included to demonstrate when the leachate levels were rectified and maintained for the balance of the year.

As illustrated by the data and information included above, the Commission did experience operational stress due to the current leachate practice of recirculation. As the active areas of the landfill are developed, leachate extracted from all stages (1 – 5) is being recirculated into one landfill cell; Stage 5. As written in the response submitted to AESRD under Reference Number 288318, the Commission “will evaluate its leachate management plan and revise as needed to ensure all practical measures are being taken to prevent future contraventions.” During 2015, the strategy is to continue with the current practice of leachate recirculation, but during high-leachate events, excess leachate will be hauled to an appropriate disposal / treatment facility.

#### **6.2.10 Leachate Quality**

As per Section 4.10 of Approval 20754-01-00, Table 4.10-B: Leachate Monitoring and Reporting Requirements, leachate samples from each of the active sumps are to be analyzed annually. For the 2014 reporting year, the Commission prepared data tables and trend charts incorporating leachate data from 2007 to present to better illustrate leachate quality on an ongoing basis. Review of the data by Beaver Municipal Solutions noted the following:

- Cell 1: Leachate quality appears relatively consistent.



- Cell 2: Leachate quality appears relatively consistent. Slight upward trend for BTEX with Toluene at 0.378 mg/L and Xylene at 0.143 mg/L that will be monitored.
- Cell 3: Generally shows a consistent (flat) or downward trend in all parameters.
- Cell 4A: Leachate quality appears relatively consistent. Slight upward trend for F2 at 0.8 mg/L that will be monitored.
- Cell 4B: Leachate quality appears relatively consistent. Slight upward trend for F2 at 0.4 mg/L that will be monitored.
- Cell 5: 2014 is the first year of testing for this new cell.

Data tables and charts are included in Appendix H. The approximate locations of the leachate collection sumps are illustrated on Figure 2. Basic Landfill Plan 2013.

#### **6.2.11 Landfill Gas Monitoring**

The landfill gas-monitoring network is comprised of four sub-surface monitoring probes at the locations illustrated in Figure 1 of the C.E. Moell & Associates spring and fall monitoring reports located in Appendix D. Landfill gas monitoring was conducted in accordance with the Landfill Gas Monitoring Plan set out in the Operations Plan. Monitoring was conducted by C.E. Moell and Associates on behalf of the Commission from June 18 to July 16 and September 29 to October 1, 2014.

C.E. Moell and Associates reported the 2014 field measurements from the landfill gas monitoring system indicate the absence of either detectable methane or abnormal pneumatic pressures within the shallow subsurface bounding landfill areas. As such, no recommendations arose from the 2014 landfill gas monitoring events. The summary of the gas monitoring procedures and details of monitoring results are provided in section 4.0 of the C.E. Moell & Associates spring and fall monitoring reports included in [Appendix D](#).

### **6.3 MISCELLANEOUS DATA**

#### **6.3.1 Wastes Requiring Special Handling**

Wastes requiring special handling were accepted at the landfill during 2014 including contaminated soils, abattoir wastes (cattle under 30 months – non SRM), animal carcasses (cattle under 30 months – non SRM), asbestos, and other restricted non-hazardous wastes. Wastes requiring special handling require approval from the VO-OPS or CAO/GM prior to acceptance and must be accompanied by a special waste manifest. Handling and disposal is done in

accordance with the approved Operations Plan and the Commission's Health and Safety Policy. Detailed coordinates for the placement of all manifested wastes (i.e. contaminated soils and wastes requiring special handling) are documented and retained in the Operating Record. A monthly summary of reports is prepared and retained in the Operating Record to document the landfilling progress and the locations in which waste was deposited during the month. A daily record is maintained using GPS coordinates to document the location of waste deposited during the day. The Beaver Regional Landfill is not accepting any SRM wastes. In addition, acceptance of asbestos-containing waste was suspended during 2014; acceptance has not yet resumed.

### **6.3.2 Revisions to the Operations Plan**

There were no changes or revisions to the operating plan in the year 2014. A full review of the Operations Plan is ongoing and the Commission will provide a copy of the revised Operations Plan to AESRD for review and approval upon completion.

### **6.3.3 Emergency Response**

No emergency response activities occurred at the landfill during 2014.

### **6.3.4 Complaints**

No formal complaints regarding the landfill operations were received during 2014. Two informal complaints related to dust were received by Commission staff. Both were related to construction activities at the landfill and were rectified immediately.

### **6.3.5 Environmental and Compliance Audits**

Internal landfill inspections are performed weekly by landfill staff and are reviewed by the Supervisor, Landfill Services (SLS) and the Vice President – Operations (VP-OPS). Monthly internal audits are completed by landfill staff, the SLS, VP-OPS or the Health, Safety and Environmental Coordinator. The results are tabulated with assignment to the responsible staff member to rectify any fault or omission. An example of the monthly inspection reports is provided in [Appendix E](#).

The following external audits were performed in 2014:

- The Beaver County Regional Fire Chief conducted a fire inspection on March 20, 2014. No major contraventions were noted and all minor deficiencies have been corrected. The Fire Inspection report is included in [Appendix E](#).

- Imperial Oil Audit Group conducted an environmental risk assessment of the landfill to assess the risk associated with their use of the Beaver Regional Landfill. Although the detailed report for the assessment are not made available from Imperial Oil, the Commission did receive a letter verifying the Beaver Regional landfill had passed the waste facility assessment. A copy of the letter is included in Appendix E.

### **6.3.6 Other Operational Issues**

As part of normal operations, landfill scales are calibrated twice annually to ensure accurate weight reporting for customers and AESRD. During 2014, the Commission rented a temporary scale to process the significant traffic increases. As mentioned in Section 5.3 of this report, to improve customer service and provide a contingency / back-up in the event of mechanical problems, the Commission installed a second, permanent weigh scale during 2014. The temporary scale was used during construction. All scale inspections passed and the scales were successfully re-certified. Calibration records for permanent and temporary scales used during 2014 are included in Appendix E.

An annual fly over was conducted on November 16, 2014. From this, a new contour map and photo mosaic were prepared.

### **6.3.7 Supervising Operator and Certified Operators**

The operations management of the Beaver Regional Landfill is under the direction and control of the Vice President, Operations, Mr. Aaron Hills, Certificate No. 0412. The VP-OPS manages the following certified operators who are responsible for overseeing and performing daily routine landfilling operations activities:

- Supervisor, Landfill Services: Mr. Kevin Bugge, Certificate No. CR0033
- Landfill Operator, Lead Hand: Mr. Richard Dueck, Certificate No. 0123
- Landfill Operator, Lead Hand: Mr. Ryan Komarnisky, Certificate No.0414
- Supervisor, Collection and Transportation: Mr. Russell Kowalchuk, Certificate No. 0250
- Landfill Operator: Mr. Arno Purin, Certificate No. 0246 and SWANA No. 93918 –Certified Landfill Technical Associate certificate
- Landfill Operator: Mr. Malcolm Swinamer, Certificate No. 0471
- Landfill Operator: Mr. Graham Munro, Certificate No. 0468

The VP-OPS reports to the Chief Administrative Officer and General Manager of the Beaver Regional Waste Management Services Commission, Pierre

Breau, P. Eng. The CAO / GM is responsible for all Commission operations and administrative services. An organizational chart is included in [Appendix F](#).

### 6.3.8 Communities Serviced and Estimated Populations

The Beaver Regional Landfill provides direct waste disposal services for the communities that comprise the Commission (i.e. Beaver County, the Town of Tofield, the Town of Viking, the Village of Holden and the Village of Ryley). The Landfill also provides disposal services for several regional communities. The populations of these communities as published by Statistics Canada for the most recent census (2011) are presented in Table 5. In addition, the Landfill receives waste from a variety of private commercial haulers which are not specifically associated with individual communities.

Table 5. Summary of Community / Regional Populations.

Community	Population
Beaver County	5,689
Town of Tofield	2,182
Town of Viking	1,041
Village of Holden	381
Village of Ryley	497
Town of Vermilion	3,930
Vermilion River County	7,905
Cold Lake	13,839
Bonnyville	6,216
Municipal District of Bonnyville (no.87)	11,191
Parkland County*	30,568
Town of Stony Plain*	15,051
City of Edmonton**	1,159,869

\* The Commission services one of four transfer stations in Parkland County, which also serves the Town of Stony Plain.

\*\* The City of Edmonton has two primary options for disposal; the waste received at the Commission landfill only represents a portion of their total disposal requirements.

### 6.3.9 Waste Storage and Recycling

There was no waste stored at the landfill site during 2014. The Commission operates various recycling activities at the Landfill, including:

- Pesticide container recycling is operated by Beaver County and Alberta Agriculture as a service to the local farm community. Pesticide containers (triple-rinsed) are received and stored in a dedicated pesticide container

storage building and containers are shredded and removed from the site on an annual basis.

- Tire recycling facility operated in cooperation with the Alberta Recycling Management Authority. Old tires are received, sorted and stored in bunkers for recycling and removed as volumes dictate.
- As part of the Alberta Used Oil Management Association (AUOMA), used oil is received and stored in a dedicated used oil tank while used oil filters and empty plastic oil jugs are received and stored in dedicated 205 litre barrels for recycling. The oil tank and filter barrels are serviced as required by Safety-Kleen Canada Inc. or GFL Environmental. Used oil from landfill equipment and vehicles is re-used in a used oil burner to create heat for the main landfill shop. Excess used oil is added to the used oil tank for recycling.
- Electronics recycling bin operated in cooperation with the Alberta Recycling Management Authority. Electronic components are received and stored in an enclosed roll-off container for removal and recycling as required.
- Wet cell batteries recycling operated in cooperation with DBS Environmental. Used batteries are received and stored in a special container for removal and recycling as required.
- White goods and miscellaneous metals are received and stored in an open stockpile for recycling. Any appliances containing refrigerant gases are separated, and the refrigerant removed by a certified technician prior to recycling. All metals are baled and shipped to a steel foundry for recycling on an annual basis or as volumes require.
- Clean concrete is received and stockpiled for future recycling. Periodically, depending on the accumulated volume, a portable crusher is brought in to crush the concrete for re-use as a road base construction material. During 2014, 582.69 tonnes of clean concrete were accepted.
- Paint recycling is operated in cooperation with the Alberta Recycling Management Authority. Waste paint and waste paint material is received and stored in a special container for removal and recycling as required by DBS Environmental.

#### **6.3.10 Fugitive Waste Retrieval Reporting.**

Fugitive litter recovery is done on an ongoing daily basis by the landfill maintenance employees. Additional temporary staff are brought in to assist when required. The Commission aggressively controls fugitive litter at the tipping face through a combination of measures as outlined in the Operations Plan.

A fugitive waste retrieval log is maintained on a daily basis and reported in the Monthly Activities Summary Report. This report shows the location waste was retrieved and volume of waste retrieved. These reports have been placed in the Operating Record.

### **6.3.11 Groundwater Monitoring**

Groundwater monitoring was conducted in the spring and fall of 2014 by C.E. Moell and Associates on behalf of the Commission in accordance with the approved Groundwater Monitoring Plan. The current groundwater-monitoring network includes:

- 28 on-site groundwater monitoring wells around the Landfill;
- A groundwater interceptor trench, and;
- Two privately owned off-site dug-out systems.

General findings from the 2014 spring and fall reports include:

- *“From the hydrogeologic interpretations contained herein, there is no indication that the Beaver Regional Landfill has affected or influenced groundwater chemistry within the various underlying hydrostratigraphic zones. Although the total organic carbon concentrations reported for many of the well waters sampled during 2014 are anomalously high, the validity of these results is questionable for reasons stated in Section 2.3.4.1. The irregularities with respect to total organic carbon will be revisited during the next scheduled monitoring event.”* Section 2.3.4.1 is included below.
- *“There is no hydrochemical indication that the presence or operation of the Beaver Regional Landfill has in any way affected the quality of water in either dug-out.”*
- *“As is apparent from the analysis conducted herein, the total organic carbon concentrations reported by CARO Analytical Services for most of the well waters during the current monitoring event are not valid. Although all of the TOC analyses generated by CARO should be retained in the tabular historical database (Appendix E), none should be included as data points in the historical trend charts (Appendix F).”*

As written above, the explanation for elevated TOC levels is included in Section 2.3.4.1 of the C.E. Moell and Associates Fall Monitoring Report. For ease of review, the section is included below:

*“At the time of the Spring event, total organic carbon was initially reported in most groundwaters at concentrations substantially higher than established background ranges. Although the laboratory (CARO) subsequently determined that the high TOC values resulted from analytical errors (Appendix H – email correspondence), the downward-adjusted values were still higher than established background for many of the well waters.*

*The same problem occurred during the current (Fall) event, whereby the TOC values reported for 18 well waters were again substantially higher than assumed background levels. This time, however, CARO indicated that the analyses were correct as reported (Appendix H), and that no data adjustments were necessary. The validity of these results might reasonably be questioned, however, because of an over-riding improbability that organic compounds could physically migrate instantaneously and simultaneously to depths ranging from six to 20 metres below surface, particularly given the hydrogeologic characteristic of the Ryley site (Sections 1.1, 1.2 and 2.1). An example of the simultaneous and essentially instantaneous appearance of elevated TOC concentrations at all three monitored depth levels, as suggested by the analytical results from CARO, is illustrated in Figure 4.*

*By contrast, the TOC values currently reported for three well waters are normal, or in accordance with expected background conditions (96-2A, 96-3A and 96-3B – Figure 5). These were the final three well waters collected during the Fall event, and CARO, on their own initiative (Appendix H), referred these samples to AGAT Laboratories for analysis of TOC. As will be presented in Section 2.6, CARO also sublet the TOC analyses for the field and trip blanks to AGAT Laboratories; by this action, the quality control measures designed to test the ability of CARO to return error- and contaminant-free analyses for TOC were circumvented, and therefore invalidated.*

*In light of the problematic TOC values returned by CARO for water samples collected during the Fall Monitoring Event, eight of the site wells, representing 28% of the total, were re-sampled on December 26 and 27. These samples were referred to AGAT Laboratories to determine the TOC concentrations, for comparison against the values returned by CARO for the same well waters. It*

*was concluded from the AGAT results that most of the TOC analyses performed by CARO do not faithfully reflect the organic carbon content of site waters, and, although the CARO results should be retained in the tabular historical database (Appendix E), they should not be included as data points in the historical concentration trend charts (Appendix F). The re-sampling methods, procedures and analytical results leading to these conclusions are documented in Appendix I.”*

The Commission will work with C.E. Moell and Associates to resolve the issue of TOC during 2015 monitoring events. The detailed reports describe and interpret the results of the 2014 monitoring events and are provided in Appendix D.

#### **6.3.12 Closure and Post-Closure care**

The Commission completed final closure of the north slope of waste cells 1 and 4 during 2014. The earthworks and the liner placement for Project BMS-2014-C began on August 15th, 2014 and was completed on November 22nd, 2014. This construction covered an area of 43,750 m<sup>2</sup>. A copy of the Construction Report was provided to AESRD by email on March 11, 2015 and is included in Appendix C.

#### **6.3.13 Estimate of Landfill Space Remaining**

The ultimate capacity of the Landfill (N.E ¼ and SE ¼ - 10 as approved) is estimated to be 36,177,000 m<sup>3</sup>. (*Reference Table 3 – Section 3.1.1.3 of the 2005 Approval Renewal Application document.*) As calculated from monthly volume surveys conducted by AMEC Earth and Infrastructure, the net volume of air space consumed in 2014 was as follows:

- Cell 1: 46,670 m<sup>3</sup>
- Cell 2: 58,559 m<sup>3</sup>
- Cell 3: 863 m<sup>3</sup>
- Cell 4, Phase 1: 110,073 m<sup>3</sup>
- Cell 4, Phase 2: 6,192 m<sup>3</sup>
- Cell 5: 547,238 m<sup>3</sup>

Total airspace consumed in 2014 was 769,595 m<sup>3</sup>. The cumulative air space consumed from commencement of operations in 1995 through to December 31, 2014 is calculated to be 5,337,936 m<sup>3</sup>. The total air space remaining (developed and developable) in the Landfill (NE ¼ and SE ¼- 10 combined as approved) is calculated to be 30,839,064 m<sup>3</sup>. The 2014 year end survey and contour maps are included in Appendix G.



#### **6.3.14 Topsoil and Subsoil Management**

The Commission employs both physical survey and annual fly-over survey to verify and track the inventory of topsoil, clay and subsoil contained in stockpiles at the Landfill for future closure and reclamation activities. As mentioned in Section 6.3.6 of this report, the most recent soil inventory data was collected during the annual fly-over survey conducted by AMEC on November 16, 2014. The soil inventory is updated at least annually and is maintained in the Operating Record.

#### **6.4 OTHER REPORTING**

A visitor's log is kept at the Scale for anyone entering the landfill site. Copies of the log are incorporated into the monthly reports which are placed and retained in the Operating Record.

#### **7.0 CLOSURE**

This report has been prepared by the Beaver Regional Waste Management Services Commission, owner and operator of the landfill facility, incorporating information provided by the Commission's respective consultants of record. The information provided in this report is, to the best of my knowledge, an accurate representation of the 2014 activities at the Beaver Regional Landfill.

Respectfully submitted,  
Beaver Regional Waste Management Services Commission

Pierre Breau, P. Eng.  
CAO / General Manager  
March 31, 2015

Aaron Hills  
VP, Operations