

**BEAVER REGIONAL WASTE  
MANAGEMENT SERVICES COMMISSION**

**2016 ANNUAL REPORT  
RYLEY CLASS II LANDFILL**

Compiled March 2017



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- Appendix A: Approval 20754-01-00
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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 Location within Beaver County, and Figure 2. 2016 Aerial Photography Showing Site Location and Approved Landfill Boundary.

### 1.2 APPROVAL AND REPORTING REQUIREMENTS

This annual report for 2016 has been compiled and submitted to Alberta Environment and Parks (AEP) 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 2016. 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 2016;
- A summary of the major interactions between the Commission and the public and regulatory communities during 2016;
- 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.

## 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 sub-sections 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 undertake new cell construction during 2016. The construction report for Cell 8A will be provided to AEP by separate submission.

#### **5.2 SITE IMPROVEMENTS**

The Commission did undertake additional closure activities during 2016. These are described in section 6.3.12.

### **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. Basic Landfill Plan 2016 identifies the storm water collection ponds employed at the landfill during 2016.

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 AEP and affected neighbour(s) by letter dated February 8, 2016. The storm water release from the West Detention Pond began February 15, 2016 and was halted



March 1, 2016. In total, the duration of the planned release was approximately 400 hours over 17 days. The total stormwater released is calculated to be approximately 22,250m<sup>3</sup>. A copy of the release letter including the storm water analytical report is provided in Appendix C.

## 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 2016 are summarized in Table 1.

Table 1. Summary of Waste Quantities Received During 2016.

WASTE TYPE	*QUANTITY (tonnes)
MSW	389,396.26
C & D	841.12
Contaminated Soil	327,700.76
Special Waste	19,395.38
Liquid Waste ( <i>Containerized – see description in 6.2.2 below</i> )	944.11
<b>Total</b>	<b>738,277.63</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 944.11 tonnes of liquid waste was received at the Landfill during 2016. 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.

Table 2 below summarizes the loads and waste permit applications that were rejected during 2016. Details of all material rejected are recorded and retained in the official Operating Record.

Table 2. Summary of Rejected Loads and Waste Permit Applications During 2016.

Month	Waste Material	Reason for Rejection	Source
March	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application
June	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application
June	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application
July	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application
July	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application
August	Special Waste	Exceeds Class 2 limits	Waste Permit Application
October	Contaminated Soil	Exceeds Class 2 limits	Waste Permit Application

It should be noted the Commission does not operate a Household Hazardous Waste (HHW) program at this time but cooperates with Beaver County to provide an annual community round-up. Additionally, in the event that HHW is left at the landfill inadvertently by site users it is removed for recycling or disposal by approved processors at an approved facility. Manifests and reports related to this material are maintained in the Operating Record.

#### 6.2.4 Location of Waste Deposited

Waste received during 2016 was placed in landfill cells 1, 2, 4, 5 and 8. Figure 3. Basic Landfill Plan 2016 illustrates the location of all landfill cells that were used during 2016 operations. Survey data from 2016 is presented in tabular form in Append E. Figure 6. December 2016 Contours offers a visual contour map that provides a 3-dimensional illustration of the fill plan used at the landfill during 2016.

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 2016. 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 2016. 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 2016, 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 on the following page summarizes where approximately 96,690m<sup>3</sup> of intermediate cover soil were used during 2016.

Table 3. Intermediate Soil Cover Used During 2016

Location of Use	Type of Intermediate Cover (m <sup>3</sup> )			Totals (m <sup>3</sup> )
	Inside	Side	Other	
Stage 1	255	570	930	1,755
Stage 2	6,210	1,050	915	8,175
Stage 3	0	0	0	0
Stage 4	3,450	810	900	5,160
Stage 5	24,765	14,385	1,410	41,010
Stage 8A	40,305	0	285	40,590
<b>Totals</b>	<b>74,985</b>	<b>17,265</b>	<b>4,440</b>	<b>96,690</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 has incorporated the configuration into its closure activities since 2014.

### 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 2016, or more frequently during periods of high leachate accumulation to reduce the time that leachate accumulates on the liner system.

Use of both on-site recirculation and disposal continued through 2016 whereby 2,917.16 m<sup>3</sup> were recirculated within the landfill and 9,601.71m<sup>3</sup> were hauled off-site for disposal at a licensed deep-well facility. The quantity of leachate removed from each landfill cell is shown in Table 5 on the following page. Leachate level measurements and disposal records from licensed deep well disposal facilities are retained in the Operating Record.

As a result of the final capping of the north and west slopes of the landfill and the extension of the leachate manhole during 2015 and 2016, leachate extraction pipes in Cells 1, 2, 4-1 and 4-2 were extended. During 2016, the Commission verified the leachate level measurements that indicate the leachate has reached the 0.3m limit above the lowest point of the liner system excluding the sump. These cells and their revised leachate level limits are shown in Table 4 below and the supporting engineered drawings are included as Figure 7. Leachate Extraction Pipe Extensions.

Table 4. Leachate Level Limit Measurements.

Cell	Leachate Level Limit (m)
1	45.60
2	30.035
4-1	30.505
4-2	35.657

Table 5. Summary of Leachate Quantity Removed from Landfill Cells During 2016.

Month	Cell 1	Cell 2	Cell 3	Cell 4	Cell 4-2	Cell 5	Cell 8A	Total
January	52.02	47.71	1.59	40.44	13.18	151.30	--	<b>306.23</b>
February	21.40	24.53	0.91	34.08	12.72	348.02	--	<b>441.66</b>
March	34.30	28.85	0.91	44.07	10.45	412.76	--	<b>531.34</b>
April	28.85	27.26	1.36	37.71	8.41	114.00	--	<b>217.59</b>
May	24.76	20.45	0.00	40.89	17.27	84.00	--	<b>187.36</b>
June	34.17	27.94	0.00	40.44	27.26	395.27	2,926.09	<b>3,451.16</b>
July	32.03	35.67	2.27	32.71	15.45	--	4,183.60	<b>4,301.73</b>
August	28.17	34.98	0.00	34.76	14.77	--	1,065.00	<b>1,177.68</b>
September	35.67	39.76	2.27	33.62	15.49	--	161.31	<b>288.12</b>
October	29.53	32.94	0.00	34.98	14.99	--	991.59	<b>1,104.04</b>
November	23.63	39.76	0.00	31.35	13.18	--	277.53	<b>385.44</b>
December	30.21	21.13	1.82	30.67	14.31	--	28.40	<b>126.53</b>
<b>Total</b>	<b>374.74</b>	<b>380.97</b>	<b>11.13</b>	<b>435.71</b>	<b>177.47</b>	<b>1,505.35</b>	<b>9,633.52</b>	<b>12,518.87</b>

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Notes: All volumes in m<sup>3</sup>

Spike in leachate quantity extracted from Cell 8 between June and August 2016 was a result of Cell 8A construction and is not expected to represent normal annual volumes.

As of July 2016, extraction of leachate from the Cell 5 sump was stopped. With Cell 5 being located in the centre of the landfill, the Cell 5 leachate system was connected to Cell 8A allowing leachate to flow into Cell 8A for extraction.

Cell 8A leachate extraction during 2016 was through three temporary extraction points at the eastern edge of the cell. These temporary extraction points will be used until completion of the construction of Cell 8-B during 2017. Leachate from Cell 8A will flow into Cell 8B where the sump and extraction pipes will be installed.

### **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 2016 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.
- Cell 3: As written in the 2015 Annual Report, sampling of the Cell 3 leachate had not been completed since 2011 due to a blocked extraction pipe. This leachate extraction pipe was repaired during 2015 and the upward trend was to be monitored during 2016. Based on the laboratory results from 2016, the leachate appears to be returning to historical quality levels.
- Cell 4A: Leachate quality appears relatively consistent to historical levels.
- Cell 4B: Leachate quality appears relatively consistent.
- Cell 5: Extraction from Cell 5 was halted when the leachate system was connected to Cell 8. No further data will be presented for Cell 5.
- Cell 8: 2016 represents the first year of testing.

Data tables and charts are included in Appendix F. The approximate locations of the leachate collection sumps are illustrated on Figure 5. Leachate Extraction, Landfill Gas and Groundwater Monitoring Well Locations.

### **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 5. 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 on April 22 and September 28, 2016.

C.E. Moell and Associates reported the 2016 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 2016 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 B.

## **6.3 MISCELLANEOUS DATA**

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

Wastes requiring special handling were accepted at the landfill during 2016 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 VP-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 2016 and had not resumed at year's end.

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

There were no changes or revisions to the operating plan in the year 2016. A full review of the Operations Plan is ongoing and the Commission will provide a copy of the revised Operations Plan to AEP for review and approval upon completion.

### **6.3.3 Emergency Response**

One emergency response activity did occur at the landfill during 2016. On June 4, 2016, fire crews from Beaver Emergency Services Commission were dispatched to extinguish a fire in the landfill. The fire was extinguished without incident and the source of the fire could not be determined by Emergency Responders.

### **6.3.4 Complaints**

There were no formal complaints regarding the landfill operation received during 2016 through AEP. A summary table of contraventions reportable to AEP is maintained in the Operating Record.

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

Internal landfill inspections are performed weekly by landfill staff and are reviewed by the Landfill Manager and the Vice President – Operations (VP-OPS). Monthly internal audits are completed by landfill staff, the Landfill Manager, 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 C.

The following external audits were performed in 2016:

- Personnel from the Beaver Emergency Services Commission conducted a fire inspection on April 15, 2016, and identified five concerns. All concerns were addressed by the Commission and the actions taken were deemed compliant by follow-up inspection on June 20, 2016. The Fire Inspection report is included in Appendix C.
- On November 9, 2016, a representative from Clean Harbors conducted a Compliance Audit of the landfill facility as part of their corporate due diligence program. The audit did not identify any compliance issues according to the auditor, but no formal report was provided to Commission.

#### **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 AEP. Calibration was completed on April 15 and September 8 and all scale inspections passed and the scales were successfully re-certified. Calibration records for permanent scales used during 2016 are included in Appendix C.

The most recent annual fly over was conducted on December 31, 2016. Information from this survey has been used within this annual report.

#### **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:

- Landfill Manager: Mr. Mark Lowe, Certificate No. 362
- Landfill Foreman: Mr. Richard Dueck, Certificate No. 0123
- 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
- Landfill Operator: Mr. Weston Magneson, Certificate No. 0523
- Landfill Operator: Ms. Shauna Candlish, Certificate No. 0517
- Landfill Operator: Mr. Jason Loosemore, Certificate No. 0522

The VP-OPS reports to the General Manager of the Beaver Regional Waste Management Services Commission, Pierre Breau, P. Eng. The GM is responsible for all Commission operations and administrative services. An organizational chart is included in Appendix D.

**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 6. In addition, the Landfill receives waste from a variety of private commercial haulers which are not specifically associated with individual communities.

Table 6. 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**

During 2016, all wastes received at the landfill were disposed into the active landfill Cell, or were diverted into one of the various recycling activities operated by the Commission 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 2016, 104.95 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 2016 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.

The detailed reports prepared by C.E. Moell and Associates describe and interpret the results of the 2016 monitoring events and are provided in Appendix B.

For convenience, the recommendations from the 2016 spring and fall reports are included below.

#### Spring 2016 Recommendations:

*“On the basis of the hydrophysical and hydrochemical assessments contained herein, no changes to the monitoring program or system are deemed advantageous or necessary.”*

#### Fall 2016 Recommendations:

*“On the basis of the hydrophysical and hydrochemical assessments contained herein, no changes to the monitoring program or system are deemed advantageous or necessary.”*

*It is suggested that the ownership status of the Dennis Wood property be clarified, and, if the landowner is agreeable, that biannual monitoring (sampling and analysis) of this dugout water be reinstated.”*

The Commission has accepted the recommended changes to the groundwater monitoring program and will implement them during 2017 unless directed otherwise by AEP upon review of this annual report.

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

As reported in the 2015 Annual Report, the Commission retained an earthworks contractor to install final capping on an approximate area of 36,000m<sup>2</sup> along the west landfill slope and build associated roads and ditches. The clay barrier layer, roads and ditches were completed, but due to weather delays, completion of the subsoil and topsoil layers and seeding were deferred until spring 2016.

This work was completed on schedule in 2016 and the construction report for the landfill closure will be submitted as a separate document.

#### **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 Commission staff and verified by AMEC Foster Wheeler Environment and Infrastructure, the net volume of air space consumed in 2016 was 697,480 m<sup>3</sup>. The cumulative air space consumed from commencement of operations in 1995 through to December 31, 2016 is calculated to be 6,608,694 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 29,568,306 m<sup>3</sup>. The 2016 year end survey tables are included in Appendix E while Figure 6. December 2016 Contours illustrates the 3-dimensional fill plan for the landfill.

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

The Commission employs both physical survey and 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 December 31, 2016. From this, the soil inventory has been updated and quantities 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 2016 activities at the Beaver Regional Landfill.

Respectfully submitted,  
Beaver Regional Waste Management Services Commission

Aaron Hills, C.E.T.  
Vice President, Operations  
March 29, 2016