

**BEAVER REGIONAL WASTE  
MANAGEMENT SERVICES COMMISSION**

**2015 ANNUAL REPORT  
RYLEY CLASS II LANDFILL**

Compiled March 2016



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- Appendix B: C.E. Moell & Associates Environmental Monitoring Reports, Spring and Fall 2015
- Appendix C: Miscellaneous Data (Facility Inspections, Scale Calibration, Complaints, etc.)
- Appendix D: Organizational Chart
- Appendix E: 2015 Year-End Survey: Waste Fill
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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 2015 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 2015. 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 2015;
- A summary of the major interactions between the Commission and the public and regulatory communities during 2015;
- 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 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 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 not undertake new cell construction during 2015.

#### **5.2 SITE IMPROVEMENTS**

The Commission did undertake additional closure activities during 2015. These are described in section 6.3.12.

To match the rate of fill in landfill Cell 2, the Commission also fortified and extended the Cell 2 leachate manhole during 2015. This extension allows for the continued removal of leachate. The construction report for the manhole extension will be submitted to AEP upon completion. Further extension will be completed as determined by the rate of fill in the future. The impact on the leachate level measurements is described in Section 6.2.9.

## 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 2015.

Storm water from the west storm water detention pond can be released by the Commission to the designated release point in the tributary to Bible Creek as per the Stored Water Release Notification Protocol (June 17, 2009). During 2015, no surface water was released.

### 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 2015 are summarized in Table 1.

Table 1. Summary of Waste Quantities Received During 2015.

WASTE TYPE	*QUANTITY (tonnes)
MSW	360,331.90
C & D	2,088.73
Contaminated Soil	301,867.94
Special Waste	18,983.23
Liquid Waste <i>(Containerized – see description in 6.2.2 below)</i>	1,168.99
<b>Total</b>	<b>684,440.79</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 1,168.99 tonnes of liquid waste was received at the Landfill during 2015. 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.

As summarized in Table 2 below, no materials were rejected during 2015. Details of all material rejected are recorded and retained in the official Operating Record.

Table 2. Summary of Rejected Waste During 2015.

Month	Waste Material	Reason for Rejection	Source
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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 2015 was placed in landfill cells 1, 2, 4 and 5. Figure 2. Basic Landfill Plan 2015 illustrates the location of all landfill cells that were used during 2015 operations. The 2015 year end survey and contour maps provide a 3-dimensional illustration of the fill plan used at the landfill and are included in Appendix E.

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 2015. 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 2015. 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 2015, 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 66,255m<sup>3</sup> of intermediate cover soil were used during 2015.

Table 3. Intermediate Soil Cover Used During 2015

Location of Use	Type of Intermediate Cover (m <sup>3</sup> )			Totals (m <sup>3</sup> )
	Inside	Side	Other	
Stage 1	3,795	7,485	-	11,280
Stage 2	-	-	3,210	3,210
Stage 3	-	-	-	-
Stage 4	3,540	1,575	-	5,115
Stage 5	18,120	27,120	1,410	46,650
<b>Totals</b>	<b>25,455</b>	<b>36,180</b>	<b>4,620</b>	<b>66,255</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 and 2015.

### 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 2015, or more frequently during periods of high leachate accumulation. Of note for 2015 are:

- the successful repair to Stage 3 leachate pipes;
- the extension of the Stage 2 manhole; and
- the extension of Stage 1 leachate pipes as part of final closure.

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 2015.

Month	Maximum leachate depth (m) or elevation (mASL)					
	Stage 1 (trigger for removal = <41.19m)	Stage 2 (trigger for removal = 1.965m)	Stage 3 (trigger for removal = <21.02m)	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	40.29*	2.08*	-	28.860	35.360	33.86
February	40.75*	1.86	-	29.840	37.250	34.14
March	41.14*	2.04*	-	29.930	37.040	30.63 <sup>+</sup>
April	41.76	2.38*	-	30.140	37.460	29.70 <sup>+</sup>
May	42.46	2.45*	-	29.960	37.420	30.05 <sup>+</sup>
June	41.48	1.94	-	30.690	37.730	32.95
July	41.27	2.45*	-	30.780	37.670	31.73 <sup>+</sup>
August	41.03*	2.05*	20.57 <sup>***</sup>	30.750	37.250	32.28
September	37.55*	21.04 <sup>**</sup>	21.61	30.660	37.550	31.67 <sup>+</sup>
October	37.36*	22.27 <sup>**</sup>	21.67	30.720	37.610	33.13
November	38.33*	28.32 <sup>**</sup>	21.95	30.960	37.580	33.16
December	40.63*	28.62 <sup>**</sup>	21.79	29.810	37.610	33.44

Notes:

\*Stage 1 measurements during January and single instances in February, March and August 2015 indicated leachate had exceeded the allowable limit, but the 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 41.19m.

Month	Day	Leachate Depth Prior to Pumping (mASL)	Leachate Depth After Pumping (mASL)
January	5	40.75	42.58
	12	40.87	42.49
	19	40.72	42.77
	29	40.29	43.80
February	17	40.75	43.49
March	11	41.14	45.14
August	10	41.03	43.22

During the months of September through December, Cell 1 was open to precipitation due to the construction / final capping of the west slope of the Stage. This resulted in an increased quantity of leachate within Stage 1. In addition, it is believed construction activities caused dirt to enter the leachate extraction pipe for Stage 1 causing inconsistent measurements. In all cases, Commission staff were able to return the leachate to acceptable levels with regular extraction and recirculation. The completion of the final capping construction is scheduled for spring 2016. Upon completion of this work, the Stage 1 leachate pipes will be formally inspected and repairs scheduled accordingly.

\*\* The Stage 2 leachate sump was pumped empty on the occasion of each high measurement to maintain leachate below allowable limits from January through August 2015.

\*\* As indicated in section 5.2, to match the rate of fill in Stage 2, the Commission fortified and extended the Stage 2 leachate manhole during 2015. This extension allows for the continued removal of leachate. The construction report for the manhole extension will be submitted upon completion. Further extension will be completed as determined by the rate of fill in the future. The impact on the leachate level measurements is described in the table below. Leachate levels were maintained below acceptable limits by extraction and recirculation.

Date of Change	New Trigger for Removal (metres)
August 13, 2015	< 22.29
September 21, 2015	< 24.88
October 26, 2015	< 28.48
November 9, 2015	<30.91

\*\*\* As disclosed within the 2014 Annual Report, staff were unable to pump leachate from Stage 3. A down-hole camera inspection found the extraction pipe filled with silt preventing the pump from extracting leachate. Cleaning of this sump was scheduled to be completed at the same time as the work to the Stage 2 sump was completed (as described above). Cleaning of the Stage 3 leachate extraction pipe was successfully completed on August 5, 2015. Staff required 7 days to assess the leachate sump patterns and permanently returned the leachate levels below the limit on August 12, 2015. The leachate level in the sump remained in compliance through December 2015.

+ The Commission reported a temporary Stage 5 leachate exceedance event in 2014. 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 was 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.

Staff were able to control leachate levels through January – March during which time any exceedances were rectified using recirculation. However, in April it became apparent that recirculation alone would not maintain the leachate at suitable levels and the contravention reported to AESRD under Reference 297919 on May 5, 2015. As written in the response submitted to AESRD, “*Immediate mitigation measures performed include:*

- *Increased daily pumping and recirculation of leachate to maximize evaporation and decrease of leachate levels in Stage 5.*
- *Arranged for disposal at Absolute Environmental Waste Management Inc., 1250 Hayter Road, Edmonton.*
- *Removed 173.19 cubic metres of leachate from Stage 5 for disposal at Absolute Environmental as of May 7, 2015. Copies of disposal tickets are attached to this letter.*
- *Leachate level in Stage 5 was decreased to normal, below the allowable 0.30m limit as a result of disposal action.”*

Use of both recirculation and disposal continued through 2015. This enabled staff to immediately rectify the two single exceedances in July and September. A summary of leachate disposal activities is included in Appendix F while disposal records from Absolute Environmental are retained in the operating records.

### 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 2015 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. Spike in iron, manganese and petroleum hydrocarbon fraction F2 above historical levels is noted and will be monitored during 2016.
- Cell 3: Generally shows a slight upward trend for most parameters. Sampling of the Cell 3 leachate has not been completed since 2011 due to a blocked extraction pipe. As previously noted in this report, this leachate extraction pipe was repaired during 2015. The upward trend will be monitored during 2016.
- Cell 4A: Leachate quality appears relatively consistent to historical levels.
- Cell 4B: Leachate quality appears relatively consistent. Slight upward trend for petroleum hydrocarbon fraction F2 at 0.8 mg/L continues from 2014 observations.
- Cell 5: 2015 is the second year of testing for this new cell.

Data tables and charts are included in Appendix F. The approximate locations of the leachate collection sumps remain the same as previous years and 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 B. 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 May 11 and September 23 and 25, 2015.

C.E. Moell and Associates reported the 2015 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 2015

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 2015 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 2015 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 2015. 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 2015. On May 6, 2015, fire crews from Beaver Emergency Services Commission were dispatched to extinguish a fire in a trailer loaded with municipal solid waste. The hot load was handled without incident.

### **6.3.4 Complaints**

One formal complaint regarding the landfill operation was received during 2015 under AEP Reference Number 302902. The complaint of dust and litter was logged by AEP on August 31, 2015 but was only reported by email to

Commission staff on December 9, 2015. The email communication between AEP and the Commission is included in Appendix C.

### **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 2015:

- Personnel from the Beaver Emergency Services Commission conducted a fire inspection on March 2, 2015. No major contraventions or deficiencies were noted during the inspection. The Fire Inspection report is included in Appendix C.
- During May 2015, Wotherspoon Environmental Inc. completed an external audit under the Waste Receiver Assessment Program (WRAP). The Waste Receiver Assessment Program (WRAP) was initiated by a consortium of upstream oil and gas producers. The purpose of a WRAP assessment is to determine the environmental exposure and risk associated with the producers utilizing third party waste receivers for the treatment and disposal of oilfield wastes. The waste receivers provide a wide range of services including, but not limited to, treatment facilities, transfer stations, landfill disposal, sub-surface injection, and incineration facilities. Each year, based on a three year rotational program, a group of waste receivers are selected for the current year program and approved by the consortium. Wotherspoon Environmental Inc. acts as the administrator and assessor of the program and provided a final rating of 5 indicating the Beaver Regional Class 2 Landfill facility is designed and managed to control risks to the environment. Safety, emergency response and fire management programs are well designed and implemented at all levels of the organization. The company has complete insurance coverage, closure security and sufficient net asset base to absorb any environmental clean-up costs. A copy of the report is included in Appendix C.

### **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 May 24 and October 13 and all scale inspections passed and the scales were successfully re-certified. The October 13 calibration did include a recommendation for service to the Commission's oldest scale to prevent future issues. This service is scheduled to be completed in 2016. Calibration records for permanent scales used during 2015 are included in Appendix C.

The most recent annual fly over was conducted on November 16, 2014. A fly over of the Landfill is scheduled for 2016 upon completion of the west slope final closure and the construction of Cell 8 (Phase A). From this, a new contour map and photo mosaic will be prepared.

During November 2015, a search of the landfill by Calgary Police Service and the RCMP was conducted in support of a criminal investigation. The Commission cooperated with the police officers and assisted as requested with search activities. At the conclusion of the investigation, any waste that had been excavated was properly re-compacted and covered.

### **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 Foreman: 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
- Landfill Operator: Mr. Weston Magneson, Certificate No. 0523
- Landfill Operator: Ms. Shauna Candlish, Certificate No. 0517
- Landfill Operator: Mr. Jason Loosemore, Certificate No. 0522
- Landfill Operator: Mr. Nick Baker

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 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**

During 2015, 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 2015, 612.51 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 2015 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 2015 monitoring events and are provided in [Appendix B](#).

For convenience, the recommendations from the 2015 spring and fall reports are included below.

#### Spring 2015 Recommendations:

*“As reported in Section 2.3.2.2 (concerning ammonia), the chemical corruptive effects associated with purging wells completed in very low permeability geologic deposits are evident in the historical database; groundwater samples recovered from Well 96-3B have remained in an oxidized (nitrate-dominant) state since 2001, and those from Well 96-1A have remained in a mixed oxidized-reduced state since 2005. In light of the completion depths, both wells are reasonably assumed to be isolated from atmospheric gases, and groundwaters from both should therefore be in an anoxic (reduced) state, with ammonia rather than nitrate as the dominant nitrogen form.*

*From the forgoing analysis, it is recommended that wells 96-3B and 96-1A be sampled without prior evacuation, a method generally referred to as “passive*

*sampling”. Samples should be collected from the bottom of the wells (screen-depths) to avoid the presumably atmospheric-contaminated water in the upper part of the wells. It is anticipated that this change in methodology will provide chemical analyses that are more reflective of the natural formation water, particularly with respect to nitrate, ammonia, iron and manganese.”*

Fall 2015 Recommendations:

*“Upon review of the parameter list and historical results, it is suggested that fluoride and bromide be dropped from the monitoring program. As neither parameter is a regulatory requirement (Alberta Environment, 2010), and as background levels have been firmly established for both, there is no technical or hydrogeologic justification for retention of fluoride and bromide in the monitoring parameter list.”*

The Commission has accepted the recommended changes to the groundwater monitoring program and will implement them during 2016 unless directed otherwise by AEP upon review of this annual report.

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

During 2015, 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. The construction report for the landfill closure will be submitted upon completion.

#### **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 2015 was as follows:

- Cell 1: 71,370 m<sup>3</sup>
- Cell 2: 113,622 m<sup>3</sup>
- Cell 3: 149 m<sup>3</sup>
- Cell 4, Phase 1: 107,049 m<sup>3</sup>
- Cell 4, Phase 2: 1,865 m<sup>3</sup>
- Cell 5: 279,223 m<sup>3</sup>

Total airspace consumed in 2015 was 573,278 m<sup>3</sup>. The cumulative air space consumed from commencement of operations in 1995 through to December 31, 2015 is calculated to be 5,911,214 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 30,265,786 m<sup>3</sup>. The 2015 year end survey and contour maps are included in Appendix E.

#### **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 November 16, 2014. A fly over of the Landfill is scheduled for 2016 upon completion of the west slope final closure and the construction of Cell 8 (Phase A). From this, the soil inventory will be updated and quantities maintained in the Operating Record.

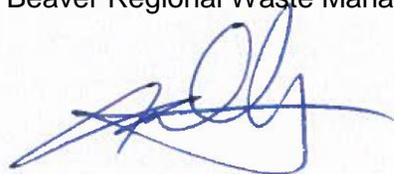
#### **6.4 OTHER REPORTING**

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 2015 activities at the Beaver Regional Landfill.

Respectfully submitted,  
Beaver Regional Waste Management Services Commission

A handwritten signature in blue ink, appearing to read "A. Hills", is written over a light blue rectangular background.

Aaron Hills, C.E.T.  
Vice President, Operations  
March 31, 2016