COMHAIRLE CHONDAE AN CABHÁIN

Cavan County Council

Annual Environmental Report 2010

Belturbet Landfill WL 92-1

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Introduction & Site History

Belturbet Landfill has been operated as waste disposal facility by Cavan County Council since the late 1979. The site was operated as a traditional landfill and is located on the Belturbet - Ballyconnell road (R200) approximately 4.5km west of Belturbet on the north side. The site was originally operated as a limestone quarry and comprises of some 1.65 acres. The rock is composed of the Darty Limestone Formation from the Lower Carboniferous period.

A Waste Licence for the facility was issued by the EPA on 13th February 2002, Ref WL 92-1. Condition 11.4 of Waste Licence requires the submission of an Annual Environmental Report for Belturbet Landfill facility. This document is produced in order to comply with requirements of Condition 11.4. The site at Belturbet was closed in February 2002. Prior to closing the site a temporary cap was placed on site.

The requirements for reporting of Annual Environmental Information arise under individual EPA licences issued under the EPA Acts 1992 – 2008, the Waste Management Acts 1996 – 2008 and other legislation.

This AER will provide information as outlined in Schedule F of the Licence "Content of the Annual Environmental Report".

1. Reporting Period

The reporting period for the purposes of this AER is 1st January 2010 to 31st December 2010.

2. Waste Activities carried out at the facility

There were no waste activities carried out at the facility.

3. Quantity & Composition of waste received, disposed of and recovered during the reporting period and each previous year

There is no longer any waste being accepted at the site. The quantity of waste accepted is zero tonnes.

4. Summary Report on Emissions

The PRTR Regulations are the European Communities (European Pollutant Release and Transfer Register) Regulation 2007, S.I. No. 123 of 2007), which signed into Irish Law on 22 March 2007 the E-PRTR Regulation, (EC) No 166/2006, concerning the establishment of a European Pollutant Release and Transfer Register. The summary of emissions is detailed in the (PRTR) Report which appears in Appendix A of this report. The PRTR has been uploaded onto the EPA website in accordance with our responsibility as Licensee.

A register of Environmental Monitoring is now established and shall be maintained. Cavan County Council now carries out sampling as required by the Licence.

Due to access issues with an adjoining landowner monitoring was not carried out from 1999 to April 2008 when these issues were somewhat resolved. Monitoring

has now resumed and was carried out by BHP Laboratories in 2010 on behalf of Cavan County Council and reported each quarter to the EPA.

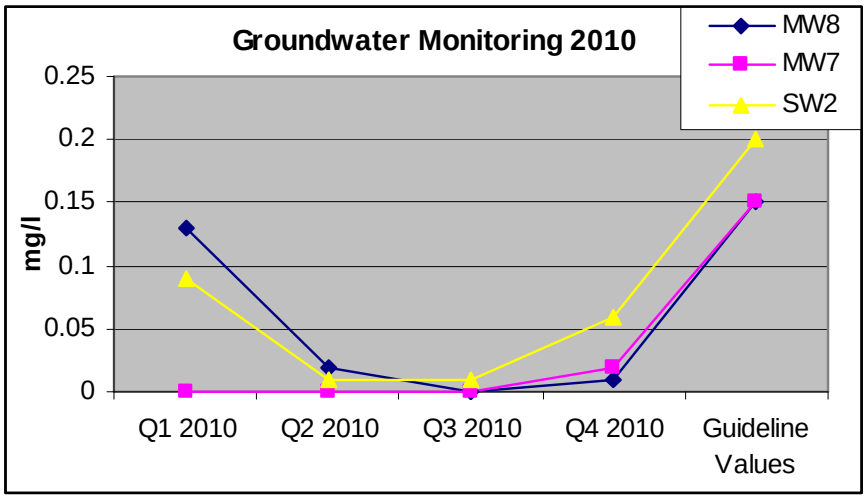
Surface Water

Killynaher Lake is part of the Lough Oughter System and is a Special Area of Conservation. The lake quality is A2 status.

A copy of the annual results are included in Appendix C. As there is only a short history of monitoring we are now building a picture of the overall quality of groundwater, surface water and gas emissions from the site. Unfortunately we are still limited to a small number of sample locations.

The graph below shows Ammonical Nitrogen Results for ground waters and surface waters taken around this landfill site. As can be seen there are no exceedences or high levels reported.

Graph 4.1 Ammonical Nitrogen

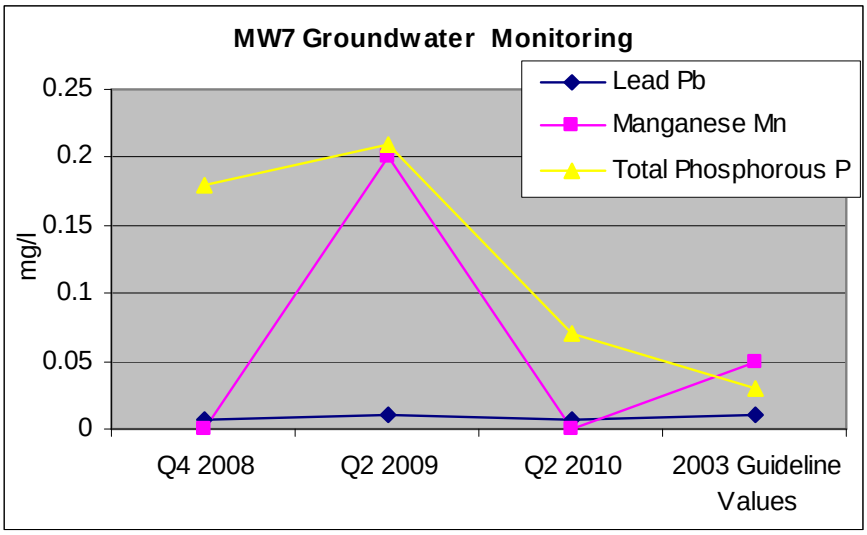


Groundwater

As the final cap has not been constructed and placed on this landfill site there is infiltration with rain events. However in 2011 we are expecting to place a cap on the site and a surface water pipeline to divert rain water.

Graph 4.2 shows exceedences for 2010 in Manganese Total P and Lead in Groundwater well MW7.

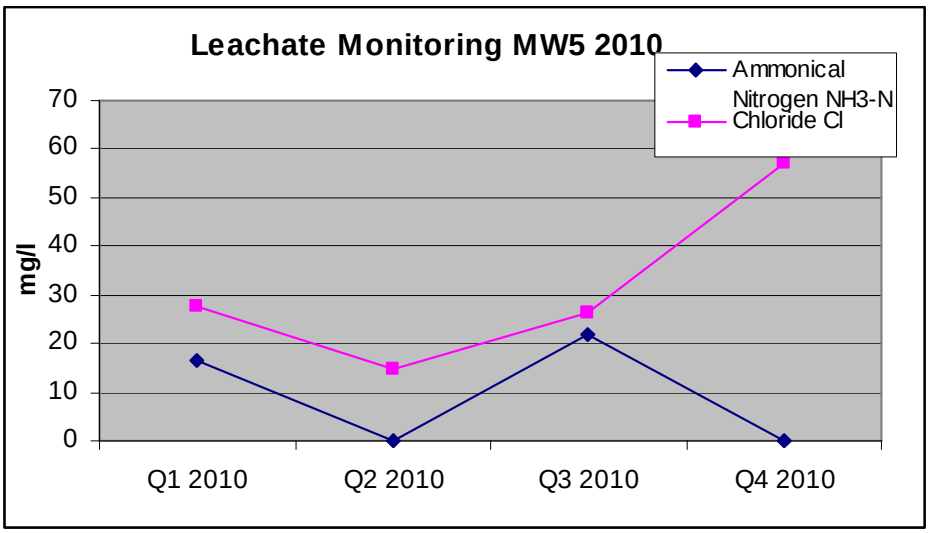
Graph 4.2 Groundwater Monitoring MW7



Leachate Monitoring

Monitoring Well MW5 is sampled for Leachate. The graph 4.3 below shows typical weak leachate results.

Graph 4.3 Leachate Monitoring MW5



The BOD:COD ratio figures are shown in table 4.1 from monitoring well MW5 below. These show that this landfill is producing a weak leachate typical of mature landfills.

Table 4.1 MW5 Leachate BOD:COD Ratio

Leachate I.D	BOD	COD	Ratio
Q2-2009	5	34	0.15
Q3-2009	6	28	0.21
Q4-2009	7	44	0.16
Q1-2010	11	66	0.17
Q2-2010	6	40	0.15
Q3-2010	9	190	0.05
Q4-2010	4	33	0.12

Gas Emissions

Table 4.2 Landfill Gas Concentration Limits:

Methane	Carbon Dioxide
20% LEL (1%v/v)	1.5% v/v

In Quarter 4, 2010 an exceedence for carbon dioxide was noted at MW6 but otherwise gas concentrations are low and in the expected ranges.

5. Summary of results and interpretation of environmental monitoring

As presented in the information above and in Appendix 3, apart from slight elevations in certain parameters, there appears to be no environmental pollution associated with this landfill. We will continue to monitor this facility and monitoring will be increased following restoration works with the insertion of new boreholes etc.

6. Resource and energy consumption summary

There is no energy consumption or resource use on the site. There is no landfill gas of any value produced as can be seen from the PRTR Report

7. Volume of leachate produced

The volume of Leachate produced is unknown.

8. Report on development works undertaken during the reporting period and a timescale for those proposed during the coming year

There were no developments works carried out on the site during the reporting period. All efforts have been concentrated on communicating with adjoining landowners regarding access for works and conditions thereof. Negotiations are ongoing.

Final capping is also proposed for completion in 2011.

9. Report on restoration of completed cells/ phases

No restoration works completed on site in 2010 however every effort has been made to proceed the remediation process.

10. Site survey showing existing levels of the facility at the end of the reporting period

Site Survey is included in Appendix B

11. Estimated annual and cumulative quantities of landfill gas emitted from the facility.

This information is reported in the PRTR Report attached in Appendix A. The estimated quantity of Methane released is 21700kgs/yr. The Annual Gas Survey first page is in Appendix A also.

12. Full title and a written summary of any procedures developed by the licensee in the year which relates to the facility operation

There are no written procedures required for this site.

13. Tank and bund testing and inspection report

There are no tanks or bunds on site.

14. Reported incidents and Complaints summaries

There were no complaints reported or recorded for this site during the reporting period.

15. Reports on financial provision made under this licence, management and staffing structure of the facility, and a programme for public information

Financial Provision

Provision will be made in Cavan County Council Official Estimates for Charges as required under Condition 12 of Waste Licence Ref. 92-1.

Management Structure 2010-2011 – as presented in Table 15.1 below

Table 15.1

Position	Name	Duties
Director of Services Environment	Eoin Doyle	Oversee and assign responsibilities to staff regarding landfill
Senior Executive Officer	John Brannigan	Oversee general supervision, monitoring and reporting of the site.
Landfill Operations Manager	Sinead Fox	Responsible for general supervision, monitoring and reporting of the site.

Contact Person for Sanitary Authority for 2010/ 2011:

John Brannigan

Senior Executive Officer
Waste Management Section
Cavan County Council
Farnham Street,
Cavan

Programme for Public Information:
Cavan County Council informs local residents of any works that are taking place at the landfill facility.

16. Report on training of staff

Landfill Operations Manager Sinead Fox for Cavan County Council deals with in full with any issues identified by the Agency Inspectors or any other party. Sinead has been fully trained by the FAS Waste Management Training Course, Control of Landfill Gas and carries a Safe Pass.

17. Any other items specified by the Agency

No other items have been specified.

Appendix A

PRTR Emissions Report

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.11

REFERENCE YEAR	2010

1. FACILITY IDENTIFICATION

Parent Company Name	Cavan County Council
Facility Name	Belturbet Landfill
PRTR Identification Number	W0092
Licence Number	W0092-01

Waste or IPPC Classes of Activity

No.	class_name
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.

Address 1	Rahaghan
Address 2	Belturbet
Address 3	Co Cavan
Address 4	
Country	Ireland
Coordinates of Location	-7.51132 54.0873
River Basin District	GBNIIENW
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Sinead Fox
AER Returns Contact Email Address	sfox@cavancoco.ie
AER Returns Contact Position	Landfill Operations Manager
AER Returns Contact Telephone Number	049-4437 8418
AER Returns Contact Mobile Phone Number	087 980 8507
AER Returns Contact Fax Number	
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(a)	Installations for the recovery or disposal of hazardous waste
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4.1 RELEASES TO AIR

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
03	Carbon dioxide (CO2)	C	MAB	GASSIM	0.0	60800.0	0.0	60800.0
01	**Methane (CH4)**	C	MAB	GASSIM	0.0	21700.0	0.0	21700.0

ADD NEW ROW | DELETE ROW *

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

ADD NEW ROW | DELETE ROW *

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

ADD NEW ROW | DELETE ROW *

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Belturbet Landfill

Please enter summary data on the quantities of methane flared and / or utilised

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	21700.0	C	GASSIM	GASSIM	N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	21700.0	C	GASSIM	GASSIM	N/A	

Environmental Protection Agency

A survey of landfill sites to determine the quantity of methane flared and or recovered in utilisation plants for 2010

Please choose from the drop down menu the license number for your site	W0092
Please choose from the drop down menu the name of the landfill site	Belturbet Landfill
Please enter the number of flares operational at your site in 2010	Select
Please enter the number of engines operational at your site in 2010	Select
Total methane flared	0 kg/year
Total methane utilised in engines	0 kg/year

Please note that the closing date for reciept of completed surveys is 31/03/2011

Introduction

The Office of Climate Licensing and Resource Use (OCLR) of the Environmental Protection Agency acts as the inventory agency in Ireland with responsibility for compiling and reporting national greenhouse gas inventories to the European Commission and the United Nations Framework Convention on Climate Change. In addition to meeting international commitments Ireland's national greenhouse gas inventory informs national agencies and Government departments as they face the challenge to curb emissions and meet Ireland's targets under the Kyoto Protocol. The national inventory also informs data suppliers, making them aware of the importance of their contributions to the inventory process and a means of identifying areas where input data may be improved.

It is on this basis that the Environmental Protection Agency is asking landfill operators to partake in this survey so that the most uptodate information on methane flaring and recovery in utilisation plants at landfills sites is used in calculating the contribution of the waste sector to national greenhouse gas emissions

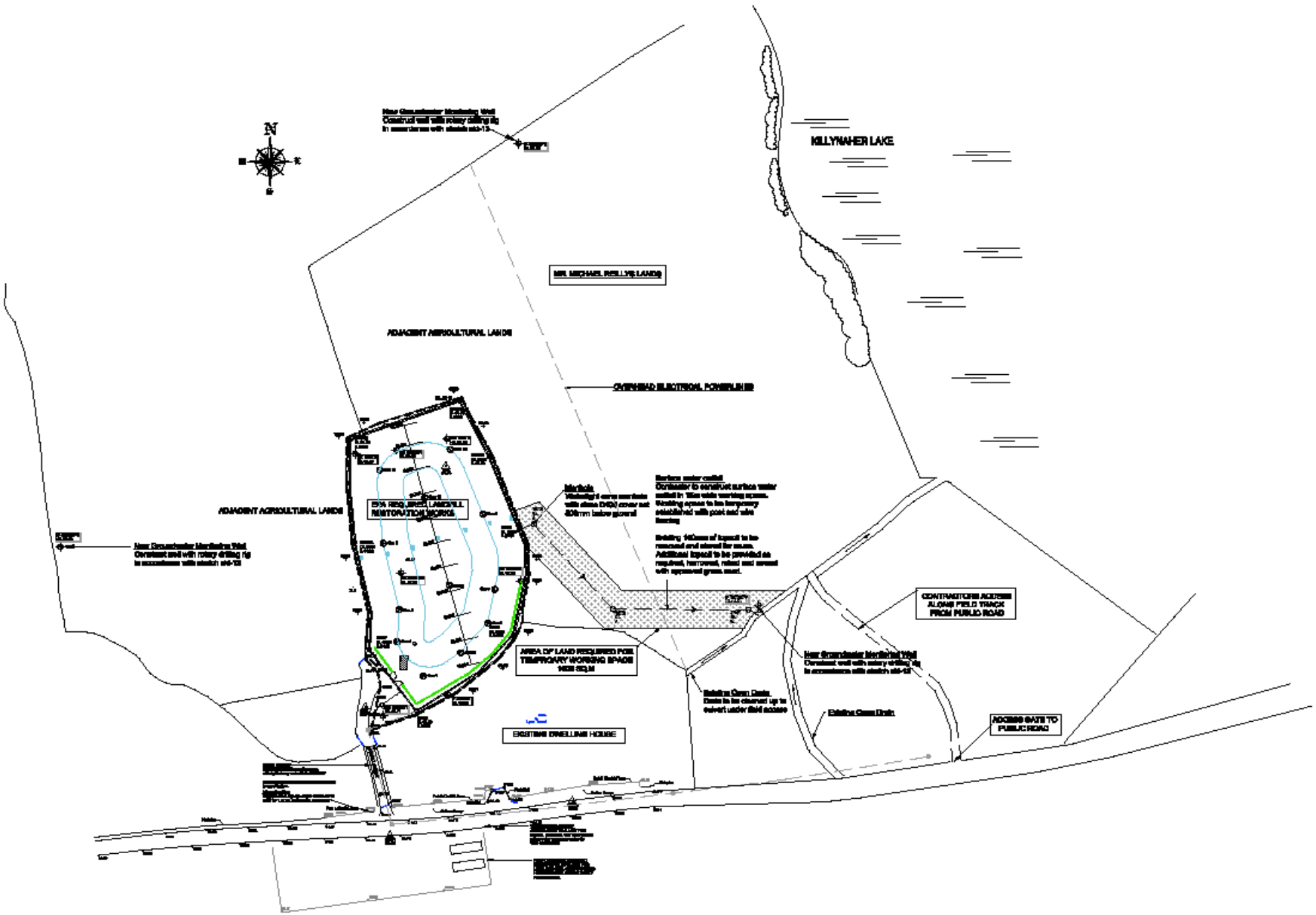
The Environmental Protection Agency wishes to thank you for partaking in this survey. If you have any questions about the survey and how to complete it please view the "Help sheet" worksheet. If however, your query is not answered by viewing the "Help sheet" worksheet please contact:
LFGProject@epa.ie

If an operator wishes to enter more precise information than the data options in the drop down menus, please contact LFGProject@epa.ie for a version of the survey that will allow you to do so

Once completed please send the completed file as an attachment clearly stating the name and or license number of the landfill site (e.g. W000 Xanadu landfill_2010) to:

Appendix B

Site Map


KILLYNAHER LAKE
MR. MICHAEL REILLYS LANDS
ADJACENT AGRICULTURAL LANDS
OVERHEAD ELECTRICAL POWERLINES
ADJACENT AGRICULTURAL LANDS
EXISTING DWELLING HOUSE
CONTRACTORS ACCESS ALONG FIELD TRACK FROM PUBLIC ROAD
ACCESS GATE TO PUBLIC ROAD
Existing Open Drain
Existing Open Drain

Appendix C

Site Annual Monitoring Report

BHP/CEM/23

Analysing
Testing
Consulting
Calibrating

Client: Cavan Co. Co

TEST REPORT

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail
bhpcem2@bhp.ie

BHP Ref No.: 92019

Order No.:

Date Received: 26th May 2010

Date Completed: 30th June 2010

Test Specification: Nil

Item: Belturbet Landfill Site

Annual Report covering groundwater, leachate and surfacewater at Belturbet Landfill for 2010.

Cavan County Council
Courthouse
Cavan Town
Co. Cavan

FTAO: Sinead Fox

Report on Belturbet Landfill for annual parameters, 2010

For and on behalf of BHP Ltd.

Pat O'Sullivan
Date Issued: 20th August 2010

Table of Contents

1.0 Introduction :

BHP were contracted by Cavan County Council to carry out environmental monitoring at Belturbet Landfill site which is located outside Belturbet, Co.Cavan. This landfill is no longer operational and is operated under waste license no. 92-1, which was issued to Cavan Co. Co. by the EPA.
This report covers surfacewater, leachate and groundwater at Belturbet for the annual monitoring event of 2010 for the available monitoring locations.

2.0 Sampling :

This monitoring is a continuation of an established monitoring program at Belturbet Landfill. BHP sampled at 2 boreholes. The individual reference is shown in table 1.

Borehole reference	Static water level (m)
MW 7	6.08
MW 8	7.83

Table 1 : Borehole reference points and levels.

BHP Laboratories have received subsequent to this sampling event an updated map of Belturbet landfill with new groundwater monitoring locations. These will be identified and sampled in Q3, 2010. This new map is shown in the Appendices.

In order to ensure correct groundwater monitoring, the following steps were taken.

1. Chemical analysis according to standard testing methods (As shown in table 2).

2. Appropriate on-site sampling techniques were utilised.
    - ISO 5667 ; 'Guidance on sampling of groundwaters' was followed which is appropriate for the objective of monitoring groundwater quality.
    - A Waterra inertial lift pump was utilised which is designed for borehole monitoring in that at no time does the pump come in contact with the water sample. By utilising dedicated hosing at each borehole and new sample containers then any possibility of cross-contamination is eliminated.
    - In order to achieve representative sampling, the method used needs to be capable of withdrawing samples whose composition reflects that of the sub-strata (and not that of stagnant water in the standpipe). In order to achieve this, each borehole is purged of several times its volume before any sample is taken. This is estimated on-site using an electronic dip-meter to measure depth of water and then calculating volume of water present (after measuring radius of borehole).

3. Having taken a representative sample, several analysis parameters are time sensitive and therefore need to be measured on-site i.e. pH, temperature, conductivity and dissolved oxygen. All meters are calibrated before each site-visit.
    - pH and temperature are measured using a Hanna HI 9023 C portable pH meter and thermocouple. The pH meter automatically compensates for temperature variations
    - Dissolved oxygen is measured using a Hanna HI 9142 portable oxygen meter.
    - Conductivity is measured using a Hanna HI 9033 multi-range conductivity meter.

4. BHP operates a chain of custody system. The sample site-sheet / chain of custody form can be found in Appendix A.

5. All samples received by the Laboratory were stored between 0 and 4^{o}C. Subsequent analysis of all samples was carried out in accordance with Standard Methods for the

examination of water and wastewater, 20th Edition, 1998, published by the American public health association.

The methods and limits of detection are listed in the results section.

Parameters for Laboratory Analysis

PARAMETER	Standard Method Reference *** APHA-AWWA-WEF 20th
pH	4500-H^+B
Temperature	2550B
Conductivity	2510B
COD	5220D
Colour	2120B
Turbidity	2130B
Total Suspended Solids	2540D
Alkalinity	2320B
Ammonia	4500-NH_3-D
TOC	5310A
Total Hardness	2340B
Calcium	3120B
Chloride	4110B
Fluoride	4110B
Nitrate	4110B
Magnesium	3120B
Potassium	3120B
Sodium	3120B
Sulphate	4110B
Phosphate	4110B
Iron	3120B
Aluminium	3120B
SiO_2	3120B
Boron	3120B
Barium	3120B
Cadmium	3120B
Chromium	3120B
Copper	3120B
Lead	3120B
Manganese	3120B
Mercury	3112B
Nickel	3120B
Arsenic	3120B
Zinc	3120B
Tin	3120B
Antimony	3120B
Selenium	3120B
Cobalt	3120B
Beryllium	3120B

Silver	3120B

Table 2 : Table of chemical testing methods adopted by BHP Laboratories

*** APHA = American Public Health Association
AWWA = American Water Works Association
WEF = Water Environment Federation

3.0 Quality Assurance :

The Chemical and Environmental Monitoring laboratory (CEM) operates a rigorous approach to quality assurance. The central elements of the quality control system are outlined.

a) Chain of Custody and Client Instruction

Every sample received at BHP laboratories is inspected by the laboratory manager Pat O'Sullivan or by laboratory administrator, Mary Hehir.

A client instruction is required to start analysis.

All samples are then given a unique BHP reference number before storage between 0 and 4^{o}C.

b) Training and Competence

All analysts conducting work at BHP are fully trained. Training involves demonstration of accuracy and precision of analysis. All analysts are subject to periodic reviews in their training. All training is fully documented and retrievable.

c) Validation

BHP procedures are subjected to a rigorous validation which includes the following;

- Evaluation of instrument detection limits and limits of detection.
- Evaluation of operator characteristics including bias, precision and uncertainty of measurement.
- Demonstration of Linearity.
- Evaluation of the standard error on the mean and evaluation of any systematic biases.
- Evaluation of total uncertainty and uncertainty budgets.
- Evaluation of the uncertainty in measurement at a regulatory limit.
- Demonstration of repeatability.
- Evaluation of Matrix effects.

d) Quality Control (Skewhart) Charts

Analysis in the CEM laboratory is monitored using control charts. Each analysis will have at least 3 charts monitoring;

- Certified Reference Material recovery
- Precision of analysis
- Accuracy of analysis

Batchs of analyses are rejected if any of the control charts indicate a loss in control.

e) Interlaboratory Testing

The CEM laboratory are members of the W.R.C Aquacheck Scheme. The Laboratory also participates in the Environmental Protection Agency's Intercalibration Programme and is listed on the Agency's Register of Quality Approved Testing Laboratories.

The Laboratory participates on a bi-annual basis in the British Gas Interlaboratory Proficiency Schemes for the analysis of contaminated soils and waters.

4.0 Results :

The results are presented in the tables following the next section.

5.0 Discussion**/**Interpretation

5.1 Groundwaters

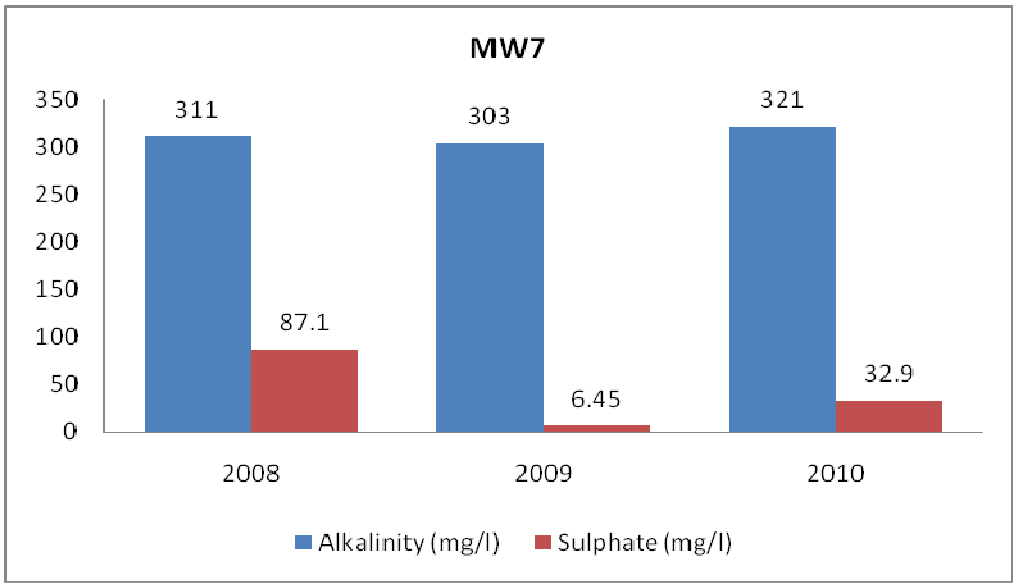
The location of the groundwater monitoring location is shown in Appendix B. The results of the chemical and microbiological analysis conducted on the groundwater are presented in Section 5.

All results are assessed against the interim guideline values for specific substances in ground water taken from the publication, 'Towards setting guideline values for the protection of groundwater in Ireland, Interim Report' as published by the EPA, 2003. The limits for the relevant parameters are outlined here. All results have been further compared to S.I No.278 of 2007 (European Communities (Drinking Water) (No.2) Regulations, 2007) in each set of individual reports.

Parameter	**Unit**	**Limit**
Boron	mg/l	1.0
Cadmium	mg/l	0.005

Calcium	mg/l	200
Total Chromium	mg/l	0.03
Copper	mg/l	0.03
Iron	mg/l	0.2
Lead	mg/l	0.01
Magnesium	mg/l	50
Manganese	mg/l	0.05
Nickel	mg/l	0.02
Potassium	mg/l	5
Sodium	mg/l	150
Zinc	mg/l	0.1
Total Cyanide	mg/l	0.01
Fluoride	mg/l	1.0
Organic Substances	ug/l	0.04
Mercury	mg/l	0.001
Sulphate	mg/l	200
Total Alkalinity	mg/l	No abnormal change
OrthoPhosphate	mg/l	0.03
Nitrate	mg/l	25
Nitrite	mg/l	0.1
Residue on Evaporation	mg/l	-

MW7 has an elevated level of phosphate at 0.07 mg/l when compared to the drinking water standard. All other parameters met the standard and overall the water quality is good.
The following graph illustrates the levels of sulphate and alkalinity seen during the annual monitoring between 2008 and 2010.



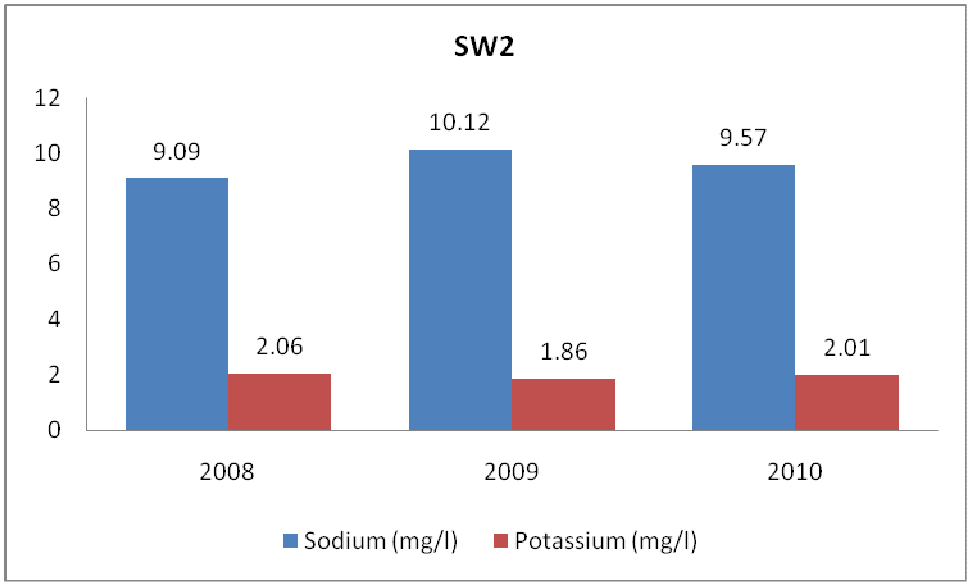
MW8 has an elevated level of phosphate at 0.08 mg/l when compared to the drinking water standard. All other parameters met the standard and overall the water quality is good.

5.2 Surface Waters

1 surfacewater was sampled in the vicinity of the landfill. This has been assessed against the surface water limits as outlined in the European Communities (Quality of Surface water intended for the abstraction of drinking water) Regulations, 1989. The limit values for the relevant parameters are outlined here.

Parameter	Unit	A1 water	A2 water	A3 water
Boron	mg/l	2	2	2
Cadmium	mg/l	0.005	0.005	0.005
Calcium	mg/l	-	-	-
Total Chromium	mg/l	0.05	0.05	0.05
Copper	mg/l	0.05	0.1	0.1
Iron	mg/l	0.2	2	2
Lead	mg/l	0.05	0.05	0.05
Magnesium	mg/l	-	-	-
Manganese	mg/l	0.05	0.3	1
Nickel	mg/l	-	-	-
Potassium	mg/l	-	-	-
Sodium	mg/l	-	-	-
Zinc	mg/l	3	5	5
Mercury	mg/l	0.001	0.001	0.001
Sulphate	mg/l	200	200	200
Total Alkalinity	mg/l	-	-	=
OrthoPhosphate	mg/l	0.22	0.32	0.32
Nitrate	mg/l	50	50	50
Nitrite	mg/l	-	-	-

SW02 is classed as category A1 water. The following graph illustrates the levels of sodium and potassium seen during the annual monitoring between 2008 and 2010.



5.2 Leachate

1 leachate sample was available this quarter.

Leachate consists of water that has become contaminated by wastes as it passes through a waste disposal site. It contains waste constituents that are soluble, not retained by soil, and not degraded chemically or biochemically. Some potentially harmful leachate constituents are products of chemical or biochemical transformations of wastes. If this leachate is allowed to migrate from the site, it may pose a threat to surrounding surface and ground waters.

Leachate composition within any landfill is unique. The characteristics of the leachate will depend on the waste types being deposited. The principal factors which can influence the generation of leachate include.

a) Waste composition
b) Phase of waste decomposition
c) Waste density
d) Meteorological conditions
e) Depth of landfill
f) Moisture content
g) Rate of water movement

The chemical composition of leachate will vary depending on the age of the landfill.

Analytical Interpretation:

The biological qualities of leachate will vary with time and can be monitored from assessing the BOD : COD ratio. The results for the MW5 leachate are presented in the table for 2009 and 2010.

Leachate I.D	BOD	COD	Ratio
MW5 (Q1-2009)	11	54	0.2
MW5 (Q2-2009)	5	34	0.15
MW5 (Q3-2009)	6	28	0.21
MW5 (Q4-2009)	7	44	0.16
M5 (Q1-2010)	11	66	0.17
M5 (Q2-2010)	6	40	0.15

Ratios in the range of 0.4 to 0.6 are indicative that the organic matter in the leachate is readily degradable (young/medium aged landfill). When a BOD:COD ratio is typically in the range 0.05 to 0.2, this suggests a mature landfill.

All other results are typical of a weak leachate.

Chemical Analysis Report for Belturbet Landfill Site

Client: Cavan Co. Co., Courthouse, Cavan, Co. Cavan.

Site Address: Belturbet, Co.Cavan

(Sheet 1 of 1) **Monitoring Point / Grid Reference:_____MW 8 _____** Groundwater Monitoring

Parameter	**Results (mg/l)**				**Interim Report Guideline values for the protection of groundwater EPA 2003**	**Normal Analytical Range or Limit of detection (LOD)**	**Analysis method / technique**
BHP Reference			10/05/1322				
	Date	**Date**	**Date**	**Date**			
			2nd Qtr 10				
Boron B			0.086		1	0.01 mg/l	ICP
Calcium Ca			42.1		200	0.01 mg/l	ICP
Cadmium Cd			<0.0035		0.005	0.0035 mg/l	ICP
Total Chromium Cr			<0.01		0.03	0.01 mg/l	ICP
Copper Cu			<0.015		0.03	0.015 mg/l	ICP
List I Organics *			<0.001		0.001	0.001 mg/l	GC - MS
List II Organics *			<0.001		0.001	0.001 mg/l	GC - MS
Residue on Evaporation			83.6			1 mg/l	Evaporation
Lead Pb			0.004		0.01	0.001 mg/l	ICP
Magnesium Mg			10.12		50	0.01 mg/l	ICP
Manganese Mn			<0.014		0.05	0.014 mg/l	ICP
Mercury Hg			<0.0005		0.001	0.0005 mg/l	AAS
Sulphate SO_4			14.4		200	0.20 mg/l	IC
Total Phosphorous P			0.08		0.03	0.01 mg/l	Photometric
Zinc Zn			<0.011		0.1	0.011 mg/l	ICP
Total Alkalinity (as $CaCO_3$)			374		No abnormal change	1 mg/l	Titration
Total Cyanide Cn			0.004		0.01	0.001 mg/l	Colourimetrically
Fluoride F			0.46		1	0.08 mg/l	IC

Chemical Analysis Report for Belturbet Landfill Site

Client: Cavan Co. Co., Courthouse, Cavan, Co. Cavan.

Site Address: Belturbet, Co.Cavan

(Sheet 1 of 1) **Monitoring Point / Grid Reference:**_____**MW 6** _____ Landfill Gas Monitoring

Parameter	**Results**				**Landfill Gas Concentration Limits (Scheule C.2)**	**Normal Analytical Range or Limit of detection (LOD)**	**Analysis method / technique**
BHP Reference	90422.5	92017.5	94394	95579.1			
	Date	**Date**	**Date**	**Date**			
	1st Qrt '10	2nd Qrt '10	3rd Qrt '10	4th Qrt '10			
Methane (% v/v)	0	0	0.8	0.0	20		Infra Red
Carbon Dioxide (% v/v)	1.3	0.5	11.5	4.8	1.5		Infra Red
Oxygen (% v/v)	20.2	20.3	1.9	11			Electrochemical cell
Pressure (mBar)	990	1001	998	980			Standard
Well Temperature (^{o}C)	11.4	11.9	12.5	9.9			Standard

Chemical Analysis Report for Belturbet Landfill Site

Client: Cavan Co. Co., Courthouse, Cavan, Co. Cavan.

Site Address: Belturbet, Co.Cavan

(Sheet 1 of 1) **Monitoring Point / Grid Reference:_____MW 5 _____** Leachate Monitoring

Parameter	**Results (mg/l)**				**Sampling method (grab, drift etc.)**	**Normal Analytical Range or Limit of detection (LOD)**	**Analysis method / technique**
BHP Reference	08/10/952	09/04/771	10/05/1323				
	Date	**Date**	**Date**	**Date**			
	4th Qtr 08	2nd Qtr 09	2nd Qtr 10				
Boron B	0.26	0.31	0.45		Grab	0.05 mg/l	ICP
Calcium Ca	185.8	134.35	127.5		Grab	0.01 mg/l	ICP
Cadmium Cd	<0.0035	<0.0035	<0.0035		Grab	0.0035 mg/l	ICP
Total Chromium Cr	<0.01	<0.01	<0.01		Grab	0.01 mg/l	ICP
Copper Cu	<0.015	<0.015	0.086		Grab	0.015 mg/l	ICP
Total Cyanide Cn	0.049	0.006	0.005		Grab	0.001 mg/l	Colourimetrically
Fluoride F	<0.08	0.98	0.14		Grab	0.08 mg/l	IC
Iron Fe	<0.03	0.142	1.812		Grab	0.03 mg/l	ICP
Lead Pb	0.007	0.008	0.011		Grab	0.001 mg/l	ICP
Magnesium Mg	14.96	27.35	35.4		Grab	0.01 mg/l	ICP
Manganese Mn	<0.014	0.161	0.186		Grab	0.014 mg/l	ICP
Mercury Hg	<0.0005	<0.0005	<0.0005		Grab	0.0005 mg/l	AAS
Sulphate SO_4	6.22	15.02	167		Grab	0.20 mg/l	IC
Potassium K	15.8	16.2	13.7		Grab	0.10 mg/l	ICP
Sodium Na	18.2	20.1	21.4		Grab	0.03 mg/l	ICP
Total Phosphorous P	0.25	0.08	0.11		Grab	0.01 mg/l	Photometric
Zinc Zn	<0.011	<0.011	<0.011		Grab	0.011 mg/l	ICP
List I Organics *	<0.01	<0.01	<0.001		Grab	0.001 mg/l	GC - MS
List II Organics *	<0.01	<0.01	<0.001		Grab	0.001 mg/l	GC - MS
Total Coliforms	2540	1520	236		Grab	1 to 2419 cfu/100ml	Quanti Cult
Faecal Coliforms	None Found	None Found	None Found		Grab	1 to 2419 cfu/100ml	Quanti Cult

Chemical Analysis Report for Belturbet Landfill Site

Client: Cavan Co. Co., Courthouse, Cavan, Co. Cavan.

Site Address: Belturbet, Co.Cavan

(Sheet 1 of 1) **Monitoring Point / Grid Reference:_____MW 7 _____** Groundwater Monitoring

Parameter	**Results (mg/l)**				**Interim Report Guideline values for the protection of groundwater EPA 2003**	**Normal Analytical Range or Limit of detection (LOD)**	**Analysis method / technique**
BHP Reference	08/10/950	09/04/769	10/05/1321				
	Date	**Date**	**Date**	**Date**			
	4th Qtr 08	2nd Qtr 09	2nd Qtr 10				
Boron B	0.195	<0.01	0.123		1	0.01 mg/l	ICP
Calcium Ca	29.22	178.5	35.7		200	0.01 mg/l	ICP
Cadmium Cd	<0.0035	<0.0035	<0.0035		0.005	0.0035 mg/l	ICP
Total Chromium Cr	<0.01	<0.01	<0.01		0.03	0.01 mg/l	ICP
Copper Cu	<0.015	<0.015	<0.015		0.03	0.015 mg/l	ICP
List I Organics *	<0.01	<0.01	<0.001		0.001	0.001 mg/l	GC - MS
List II Organics *	<0.01	<0.01	<0.001		0.001	0.001 mg/l	GC - MS
Residue on Evaporation	310	421	64.3			1 mg/l	Evaporation
Lead Pb	0.007	0.01	0.007		0.01	0.001 mg/l	ICP
Magnesium Mg	35.29	10.73	9.94		50	0.01 mg/l	ICP
Manganese Mn	<0.014	0.2	<0.014		0.05	0.014 mg/l	ICP
Mercury Hg	<0.0005	<0.0005	<0.0005		0.001	0.0005 mg/l	AAS
Sulphate SO_4	87.1	6.45	32.9		200	0.20 mg/l	IC
Total Phosphorous P	0.18	0.21	0.07		0.03	0.01 mg/l	Photometric
Zinc Zn	<0.011	<0.011	<0.011		0.1	0.011 mg/l	ICP
Total Alkalinity (as $CaCO_3$)	311	303	321		No abnormal change	1 mg/l	Titration
Total Cyanide Cn	<0.001	0.001	0.004		0.01	0.001 mg/l	Colourimetrically
Fluoride F	1.45	<0.08	0.82		1	0.08 mg/l	IC

Chemical Analysis Report for Belturbet Landfill Site

Client: Cavan Co. Co., Courthouse, Cavan, Co. Cavan.

Site Address: Belturbet, Co.Cavan

(Sheet 1 of 1) **Monitoring Point / Grid Reference:** _____SW 2 _____ Surfacewater Monitoring

Parameter	**Results (mg/l)**				**S.I No.294/1989 Quality of surfacewater intended for the adstraction of drinking water (A1)**	**Normal Analytical Range or Limit of detection (LOD)**	**Analysis method / technique**
BHP Reference	08/10/951	09/04/770	10/05/1323				
	Date	**Date**	**Date**	**Date**			
	4th Qtr 08	2nd Qtr 09	2nd Qtr 10				
Calcium Ca	44.89	66.67	47.81			0.01 mg/l	ICP
Cadmium Cd	<0.0035	<0.0035	<0.0035		0.005	0.0035 mg/l	ICP
Total Chromium Cr	<0.01	<0.01	<0.01		0.05	0.01 mg/l	ICP
Copper Cu	<0.015	<0.015	<0.015		0.05	0.015 mg/l	ICP
List I Organics *	<0.01	<0.01	<0.001			0.001 mg/l	GC - MS
List II Organics *	<0.01	<0.01	<0.001			0.001 mg/l	GC - MS
Iron Fe	<0.03	<0.03	0.042		0.2	0.03 mg/l	ICP
Lead Pb	0.006	0.009	0.005		0.05	0.001 mg/l	ICP
Magnesium Mg	3.04	4.53	3.89			0.01 mg/l	ICP
Manganese Mn	<0.014	0.084	0.018		0.05	0.014 mg/l	ICP
Mercury Hg	<0.0005	<0.0005	<0.0005		0.001	0.0005 mg/l	AAS
Sulphate SO_4	<0.2	0.34	28.6		200	0.20 mg/l	IC
Potassium K	2.06	1.86	2.01			0.10 mg/l	ICP
Sodium Na	9.09	10.12	9.57			0.03 mg/l	ICP
Total Phosphorous P	0.1	0.02	0.04		0.5	0.01 mg/l	Photometric
Zinc Zn	<0.011	<0.011	<0.011		3	0.011 mg/l	ICP
Total Alkalinity (as $CaCO_3$)	155	150	179			1 mg/l	Titration
Total Oxidised Nitrogen TON	0.2	2.26	2.52			0.10 mg/l	Calculated from IC
Nitrite NO_2	<0.1	<0.1	<0.1			0.10 mg/l	IC
Nitrate NO_3	0.9	10.04	11.2		50	0.10 mg/l	IC

Appendix D

Declaration of True Topy

Cavan County Council

Comhairle Chontae an Chabháin

Teach Na Cúirte
An Cabháin

Courthouse
Cavan

Declaration

Cavan County Council hereby certifies that the content of the full pdf AER W0092-012010AER.pdf uploaded to the EPA website is a true copy of the original AER.

Signed Sinead Fox Dated 11/4/11

Sinead Fox
Landfill Operations Manager
Cavan County Council

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