

COMHAIRLE CHONDAE AN CABHÁIN

Cavan County Council



Annual Environmental Report 2009

Belturbet Landfill WL 92-1

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Belturbet Landfill

Annual Environmental Report 2009

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.

This Annual Environmental Report (AER) has been prepared in accordance with the conditions of the Waste Licence and the EPA “Draft Guidance on Environmental Management Systems and Reporting to the Agency, 1999”. 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 2009 to 31st December 2009.

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 summary of emissions is detailed in the Pollutant Release and Transfer Register (PRTR) Report which accompanies this report (Appendix A). The PRTR has been uploaded onto the EPA website in accordance with our responsibility as Licensee. Please refer to the attached map in Appendix B for location points etc.

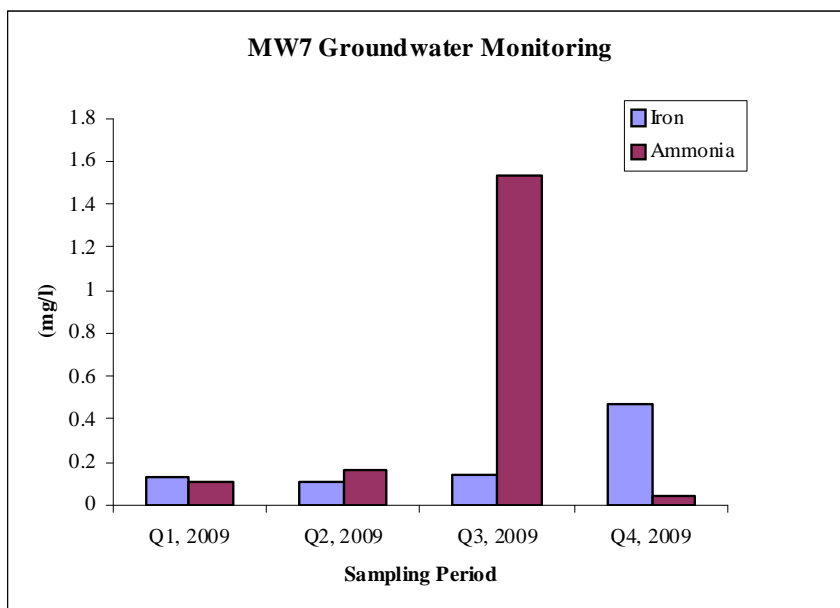
Due to access issues with an adjoining landowner monitoring was not carried out from 1999 to April 2008 when these issues were somewhat resolved. Monitoring has now resumed and is carried out by BHP Laboratories on behalf of Cavan County Council and reported each quarter to the EPA.

4.1 Emissions to Water

Groundwater

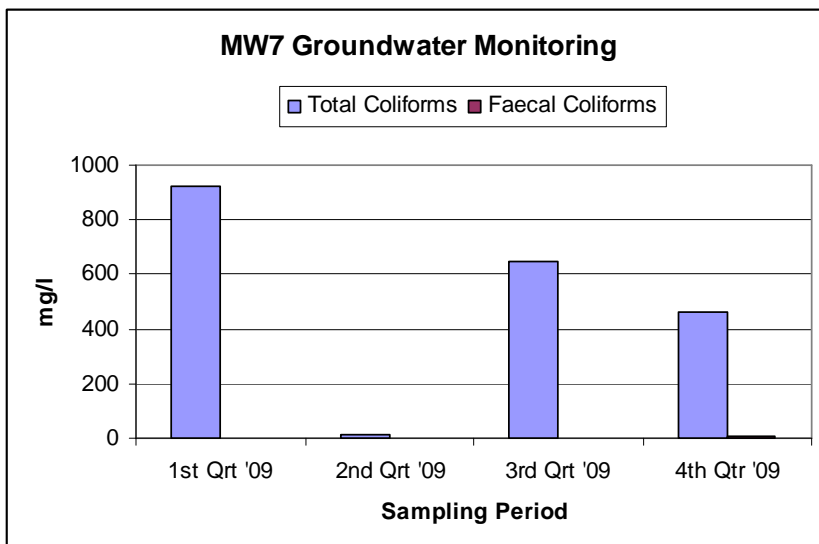
Overall the quality of the groundwater during 2009 showed signs of improvement to that seen in previous monitoring periods with the exception of elevated Ammonia levels in quarter 3 as shown on the graph below.

Graph 4.1 Iron & Ammonia



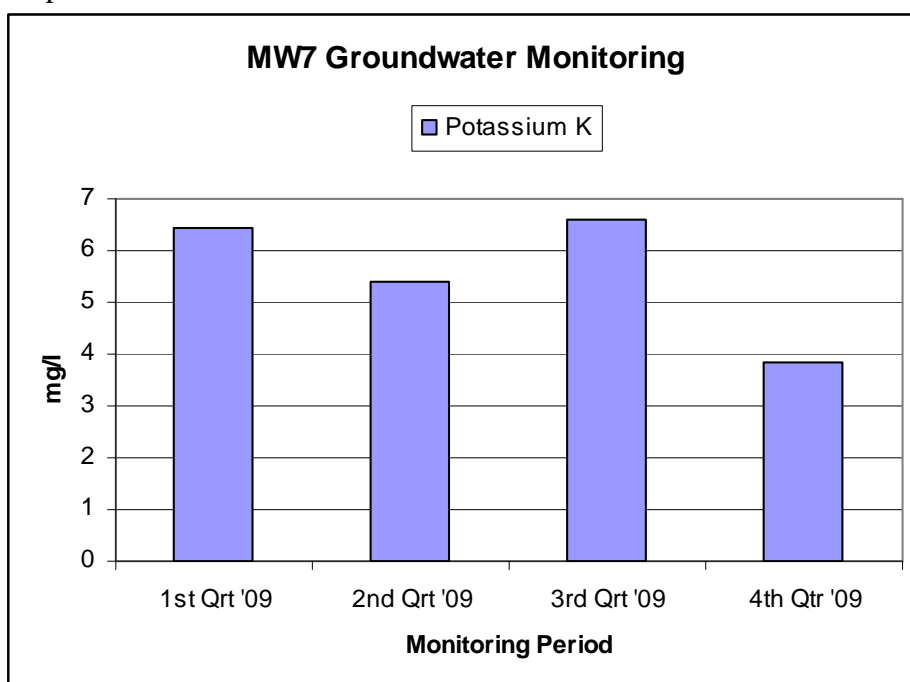
MW7 for Quarter 4 exceeded the interim guideline values for the protection of groundwater in Ireland for iron and total and faecal coliforms at 0.469 mg/l and 461 and 4 cfu/100mls respectively.

Graph 4.2 Coliform Bacteria



Potassium is elevated in many of the results. These are in exceedence of the Interim Report Guideline Values for the Protection of Groundwater EPA 2003 which outlines the limit at 5mg/lK.

Graph 4.3



As the final cap has not been constructed and placed on this landfill site there is filtration with rain events. However in 2010-2011 we are expecting to place a cap on the site and a surface water pipeline to divert rain water.

Leachate Monitoring

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

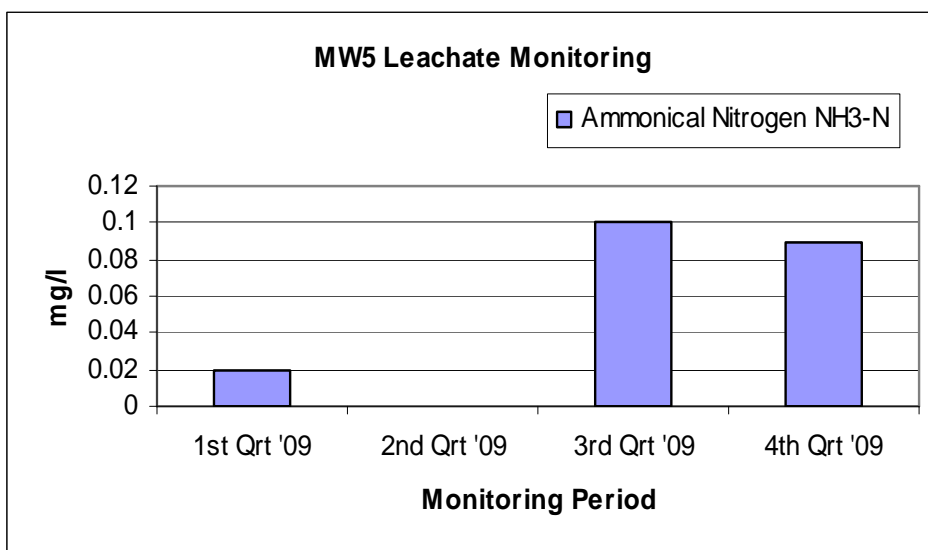
Table 4.1

Leachate I.D	BOD	COD	Ratio
MW5	5	34	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 which is the case.

The graph shows the low ammonia levels in the MW5 leachate sample.

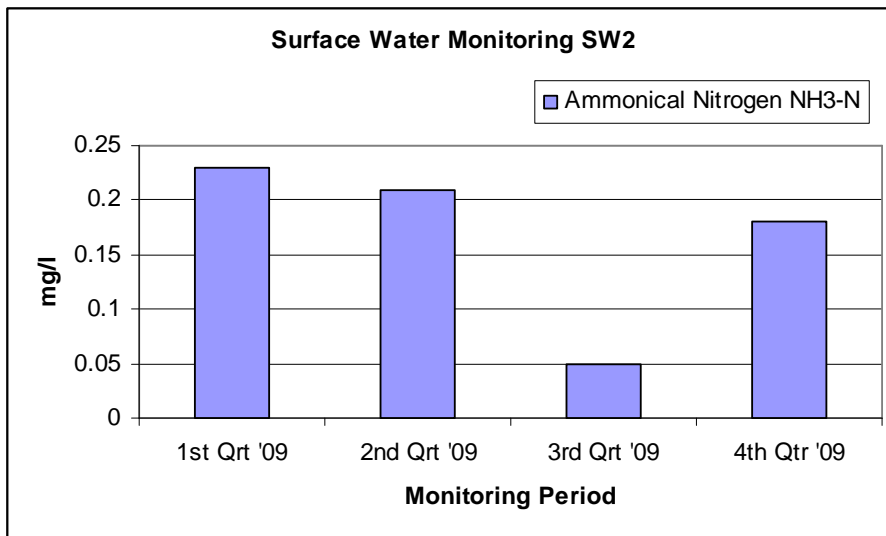
Graph 4.4



Surface Water

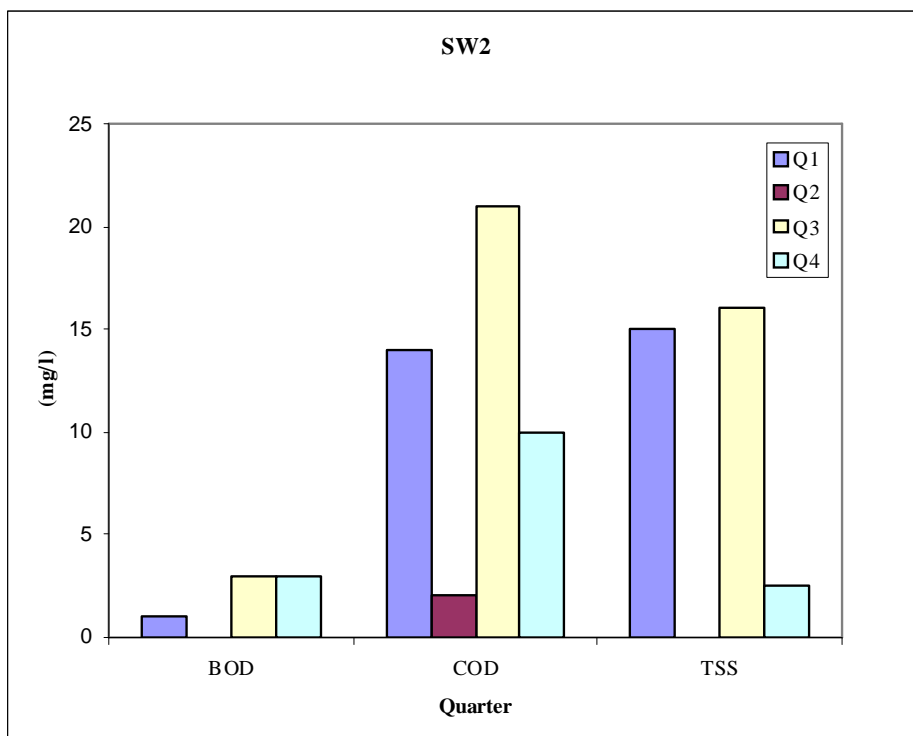
SW02 is classed as a category A1-A2 water due to the level of manganese at 0.084 mg/l. As shown in the graph below Ammonia levels are within the compliance range for the second half of the year but slightly elevated for the first two quarters.

Graph 4.5



A summary of the SW2 results for Biological Oxygen Demand, Chemical Oxygen Demand and Total Suspended Solids is show in the graph overleaf.

Graph 4.6



5. Summary of results and interpretation of environmental monitoring

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. We hope that in the year ahead we can expand our sampling.

6. Resource and energy consumption summary

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

7. Volume of leachate produced

Cavan County Council monitors the quality of leachate in MW5. The MW5 Static Water Level i.e. the distance from the top of the monitoring well to the liquid level is 6.6m.

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.

For 2010-2011 we are planning as a minimum to have completed the surface water pipeline to Killynaher lake as communicated with the EPA. Final capping is also proposed for this period.

9. Report on restoration of completed cells/ phases

10.

There has been no restoration works completed on site 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 Appendix A PRTR Report attached. The estimated quantity of Methane released is 66900kgs/yr.

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

As the site is non-operational there are no written procedures required.

13. Tank and bund testing and inspection report

There are no tanks or bunds to be tested 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 2009-2010 – as presented in Table 15.1 below

Table 15.1

Title	Name	Duties
Director of Services, Environment	Eoin Doyle	To oversee and assign responsibilities to staff regarding landfill
A/Senior Executive Officer	Padraig McGivney	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:

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

Programme for Public Information

The program will comprise of a media campaign which will contain Regular updates of proposed development works. The County Council Website page will also offer information regarding the remediation works of the site as they unfold.

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 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

AER Returns Worksheet

Version 1.1.10

REFERENCE YEAR	2009
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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

4.1 RELEASES TO AIR

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR									
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY			
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	0.0	0.0	0.0	0.0
01	Methane (CH4)	C	MAB	GASSIM	0.0	66900.0	0.0	0.0	66900.0

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									
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY			
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	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									
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY			
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	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		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	66900.0	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)	66900.0	C	GASSIM	GASSIM	N/A

Appendix B
Site Map



New Groundwater Monitoring Well
Constructed with heavy casing to
in accordance with sketch 104-12

MRS MICHAEL McILLVAINE

KILLYNAHER LAKE

ADJACENT AGRICULTURAL LANDS

EXISTING ELECTRIC POWERLINE

ADJACENT AGRICULTURAL LANDS

20% REDUCED CIRCUMFERENCE
RESTRICTION WORKS

Methods
Working 4 rows outside
with stone DPM cover not
300mm below ground

Surface water control
Outlets to surface surface water
will be 1.5m wide working screen.
Working screen in line temporary
enclosed with post and rail
fencing

Grading 400mm of gravel to be
removed and stored for reuse.
Additional gravel to be provided as
required, hatched, rolled and covered
with approved grass seed.

New Groundwater Monitoring Well
Constructed with heavy casing to
in accordance with sketch 104-12

CONTRACTORS ACCESS
ALONG FIELD TRACK
FROM PUBLIC ROAD

AREA OF LAND REQUIRED FOR
TEMPORARY WORKING SPACE
1000 SQ.M

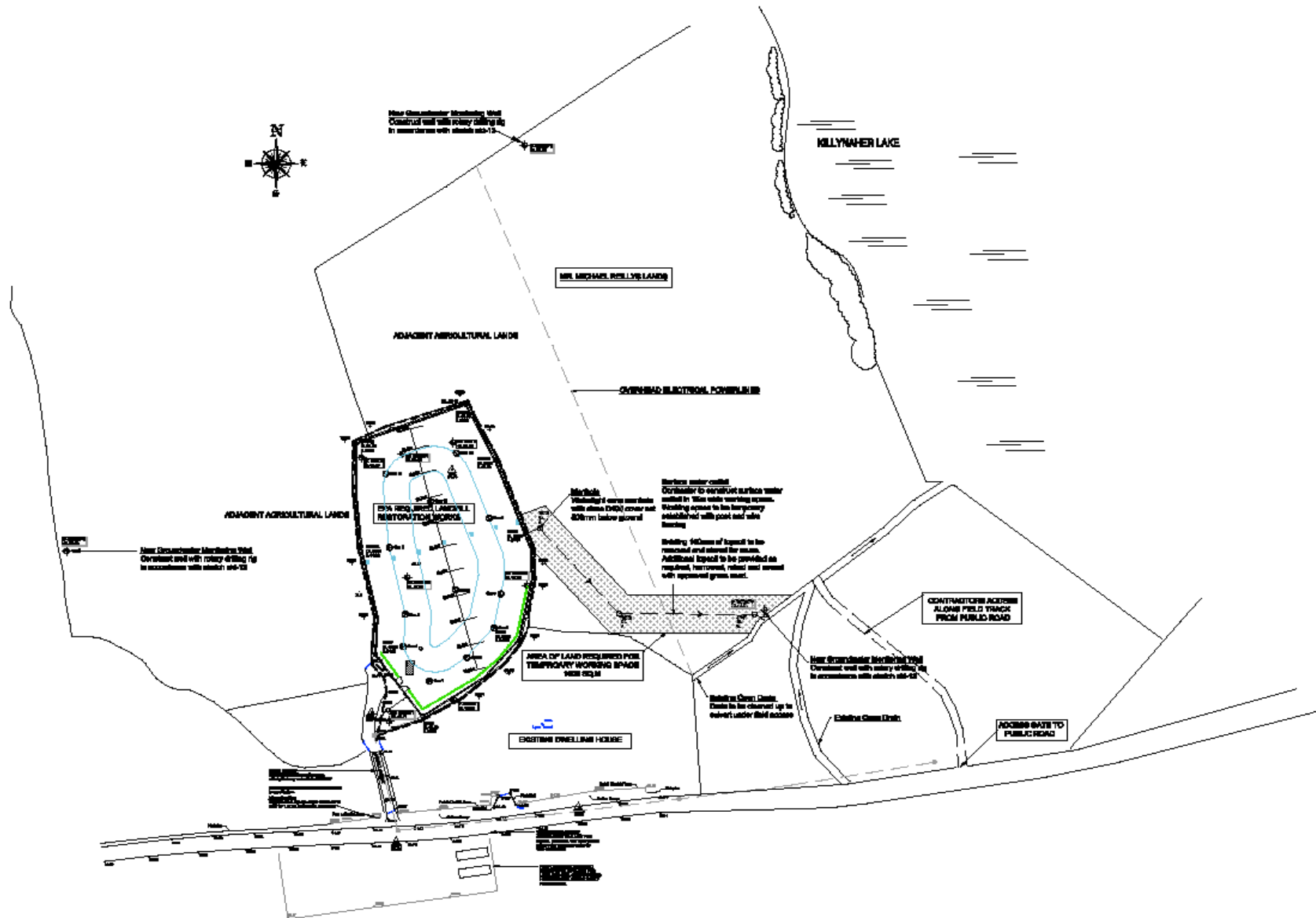
New Groundwater Monitoring Well
Constructed with heavy casing to
in accordance with sketch 104-12

EXISTING DWELLING HOUSE

Retaining Clay Drain
Ditch to be cleaned up as
shown on the site access

Existing Clay Drain

ACCESS GATE TO
PUBLIC ROAD



Appendix C
Site Annual Monitoring Report

For and on behalf of BHP Ltd.

Pat O'Sullivan

Date Issued: 20th July 2009

BHP/CEM/23

Test results relate only to this item. This test report shall not be duplicated except in full and with the permission of the test laboratory

Analysing
Testing
Consulting
Calibrating

Client: Cavan Co. Co

TEST REPORT

BHP Ref No.: 86101

Order No.:

Date Received: 23rd April 2009

Date Completed: 22nd May 2009

Test Specification: Nil



BHP

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Limerick
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Item: Belturbet Landfill Site

Annual Report covering groundwater, leachate and surfacewater at Belturbet Landfill for 2009.

**Cavan County Council
Courthouse
Cavan Town
Co. Cavan**

FTAO: Sinead Fox

Report on Belturbet Landfill for annual parameters, 2009

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- 1.0 Introduction
- 2.0 Sampling / Analysis
- 3.0 Quality Assurance
- 4.0 Results
- 5.0 Discussion

Appendix A: Site Sampling Sheet/Chain of Custody

Appendix B: List I/II Organic Parameters

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 2009 for the available monitoring locations.

2.0 Sampling :

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

Borehole reference	Static water level (m)
MW 7	6.06

Table 1 : Borehole reference point and level.

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°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 20 th
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°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

Batches 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 following tables.



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)				Sampling method (grab, drift etc.)	Normal Analytical Range or Limit of detection (LOD)	Analysis method / technique
	08/10/950 Date	09/04/769 Date	Date	Date			
BHP Reference	4th Qtr 08	2nd Qtr 09					
Boron B	0.195	<0.01			Grab	0.01 mg/l	ICP
Calcium Ca	29.22	178.5			Grab	0.01 mg/l	ICP
Cadmium Cd	<0.0035	<0.0035			Grab	0.0035 mg/l	ICP
Total Chromium Cr	<0.01	<0.01			Grab	0.01 mg/l	ICP
Copper Cu	<0.015	<0.015			Grab	0.015 mg/l	ICP
List I Organics *	<0.01	<0.01			Grab	0.01 mg/l	GC - MS
List II Organics *	<0.01	<0.01			Grab	0.01 mg/l	GC - MS
Residue on Evaporation	310	421			Grab	1 mg/l	Evaporation
Lead Pb	0.007	0.01			Grab	0.001 mg/l	ICP
Magnesium Mg	35.29	10.73			Grab	0.01 mg/l	ICP
Manganese Mn	<0.014	0.2			Grab	0.014 mg/l	ICP
Mercury Hg	<0.0005	<0.0005			Grab	0.0005 mg/l	AAS
Sulphate SO ₄	87.1	6.45			Grab	0.20 mg/l	IC
Total Phosphorous P	0.18	0.21			Grab	0.01 mg/l	Photometric
Zinc Zn	<0.011	<0.011			Grab	0.011 mg/l	ICP
Total Alkalinity (as CaCO ₃)	311	303			Grab	1 mg/l	Titration
Total Cyanide Cn	<0.001	0.001			Grab	0.001 mg/l	Colourimetrically
Fluoride F	1.45	<0.08			Grab	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)				Sampling method (grab, drift etc.)	Normal Analytical Range or Limit of detection (LOD)	Analysis method / technique
	Date	Date	Date	Date			
BHP Reference	08/10/951	09/04/770					
	4th Qtr 08	2nd Qtr 09					
Calcium Ca	44.89	66.67			Grab	0.01 mg/l	ICP
Cadmium Cd	<0.0035	<0.0035			Grab	0.0035 mg/l	ICP
Total Chromium Cr	<0.01	<0.01			Grab	0.01 mg/l	ICP
Copper Cu	<0.015	<0.015			Grab	0.015 mg/l	ICP
List I Organics *	<0.01	<0.01			Grab	0.01 mg/l	GC - MS
List II Organics *	<0.01	<0.01			Grab	0.01 mg/l	GC - MS
Iron Fe	<0.03	<0.03			Grab	0.03 mg/l	ICP
Lead Pb	0.006	0.009			Grab	0.001 mg/l	ICP
Magnesium Mg	3.04	4.53			Grab	0.01 mg/l	ICP
Manganese Mn	<0.014	0.084			Grab	0.014 mg/l	ICP
Mercury Hg	<0.0005	<0.0005			Grab	0.0005 mg/l	AAS
Sulphate SO ₄	<0.2	0.34			Grab	0.20 mg/l	IC
Potassium K	2.06	1.86			Grab	0.10 mg/l	ICP
Sodium Na	9.09	10.12			Grab	0.03 mg/l	ICP
Total Phosphorous P	0.1	0.02			Grab	0.01 mg/l	Photometric
Zinc Zn	<0.011	<0.011			Grab	0.011 mg/l	ICP
Total Alkalinity (as CaCO ₃)	155	150			Grab	1 mg/l	Titration
Total Oxidised Nitrogen TON	0.2	2.26			Grab	0.10 mg/l	Calculated from IC
Nitrite NO ₂	<0.1	<0.1			Grab	0.10 mg/l	IC
Nitrate NO ₃	0.9	10.04			Grab	0.10 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 5** _____

Leachate Monitoring

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

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 0.21 mg/l and manganese at 0.2 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 a category A1-A2 water due to the level of manganese at 0.084 mg/l.

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 leachate are presented in the table.

Leachate I.D	BOD	COD	Ratio
MW5	5	34	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.

The results for this monitoring period indicate that the leachate is typical of a mature landfill. All other results are typical of a weak leachate.

Appendix D
Declaration of True Topy



Cavan County Council

Comhairle Chontae an Chabháin



Courthouse

Teach Na Cúirte

Cavan

An Cabhán

Telephone Numbers

Central Council

049 437 8300

Motor Tax

049 437 8430

Planning

049 437 8500

Corporate Services

049 437 8601

Johnston Central Library

049 437 8500

Finance Department

049 437 8300

Roads

049 437 8300

Housing

049 437 8300

Community & Enterprise

049 437 8602

Water Services

049 437 8300

Email: info@cavancoco.ie

Declaration

Cavan County Council hereby certifies that the content of the full pdf AER W0092-012009AER.pdf uploaded to the EPA website is a true copy of the original AER.

Signed 

Dated 8/April/2010

Sinead Fox
Landfill Operations Manager
Cavan County Council