

Analysing
Testing
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TEST REPORT

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Item: Corranure Landfill Site

Annual Report covering surface water sediment monitoring

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Report on Corranure Landfill for annual surfacewater sediment monitoring for 2008

For and on behalf of BHP Ltd.

Pat O'Sullivan
Date Issued: 01st April 2008

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

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1.0 Introduction :

BHP were contracted by Cavan County Council to carry out environmental monitoring at Corranure Landfill site which is located outside Cavan town, Co.Cavan. This landfill is operational and is operated under waste license no. 77-1, which was issued to Cavan Co. Co. by the EPA.

This report covers surfacewater sediment monitoring for all available samples at Corranure for the annual monitoring event of 2008.

2.0 Sampling :

This monitoring is a continuation of an established monitoring program at Corranure Landfill. As such, the locations are as on previously drafted site maps. A site map is attached in the appendix showing the surfacewater sediment locations. BHP sampled at 6 locations. Their individual references are as shown in table 1.

Reference	Location (stream)
B1	Lismagratty
B2	Lismagratty
B5	Lismagratty
A1	Corranure
A2	Corranure
A3	Corranure

Table 1 : Surfacewater reference points and stream locations.

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.

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 Corranure Landfill Site

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

Site Address: Corranure Landfill, Cavan, Co. Cavan

(Sheet 1 of 1)

Monitoring Point / Grid Reference: _____ (Corranure Stream) _____

Surfacewater Sediment Monitoring

Parameter Location	Results (mg/l)				Sampling method (grab, drift etc.)	Normal Analytical Range or Limit of detection (LOD)	Analysis method / technique
	A1	A2	A5				
	Date	Date	Date	Date			
	27/02/2008	27/02/2008	27/02/2008				
Total Hydrocarbons	<0.001	<0.001	<0.001		Grab	0.001 mg/kg	GC-MS
Polychlorinated Biphenyls	<0.001	<0.001	<0.001		Grab	0.001 mg/kg	GC-MS
Heavy Metals					Grab		ICP/AA
Cadmium	1.65	1.26	1.76		Grab	0.05 mg/kg	AA
Chromium	38.37	22.62	22.07		Grab	0.05 mg/kg	AA
Arsenic As	0.448	0.68	13.33		Grab	0.01 mg/kg	ICP
Mercury	0.012	0.005	0.03		Grab	0.005 mg/kg	ICP
Zinc	58.05	54.18	91.35		Grab	0.01 mg/kg	AA
Lead	8.43	11.18	76.48		Grab	0.08 mg/kg	AA
Selenium	0.09	1.46	1.69		Grab	0.01 mg/kg	ICP
Copper	19.35	18.32	27.66		Grab	0.01 mg/kg	AA
Tin	2.18	0.56	11.75		Grab	0.01 mg/kg	AA
Nickel	71.91	39.83	40.73		Grab	0.01 mg/kg	AA
Total Phenols	0.1	0.09	0.04		Grab	0.01 mg/kg	Photometric

All results expressed as mg/kg dry weight

Signed for and on behalf of BHP Laboratories Ltd.

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Chemical Analysis Report for Corranure Landfill Site

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

Site Address: Corranure Landfill, Cavan, Co. Cavan

(Sheet 1 of 1)

Monitoring Point / Grid Reference: _____ (Lismagraty Stream) _____

Surfacewater Sediment Monitoring

Parameter Location	Results (mg/l)				Sampling method (grab, drift etc.)	Normal Analytical Range or Limit of detection (LOD)	Analysis method / technique
	B1	B2	B5				
	Date	Date	Date	Date			
	27/02/2008	27/02/2008	27/02/2008				
Total Hydrocarbons	<0.001	<0.001	<0.001		Grab	0.001 mg/kg	GC-MS
Polychlorinated Biphenyls	<0.001	<0.001	<0.001		Grab	0.001 mg/kg	GC-MS
Heavy Metals					Grab		ICP/AA
Cadmium	0.26	0.77	1.13		Grab	0.05 mg/kg	AA
Chromium	41.09	24.57	48.4		Grab	0.05 mg/kg	AA
Arsenic As	5.09	3.46	12.56		Grab	0.01 mg/kg	ICP
Mercury	0.043	0.02	0.025		Grab	0.005 mg/kg	ICP
Zinc	58.99	27.74	52.87		Grab	0.01 mg/kg	AA
Lead	8.42	7.99	5.64		Grab	0.08 mg/kg	AA
Selenium	1.25	1.3	1.93		Grab	0.01 mg/kg	ICP
Copper	20.73	13.56	17.61		Grab	0.01 mg/kg	AA
Tin	1.27	2.35	2.85		Grab	0.01 mg/kg	AA
Nickel	58.99	44.48	77.27		Grab	0.01 mg/kg	AA
Total Phenols	0.05	0.06	0.02		Grab	0.01 mg/kg	Photometric

All results expressed as mg/kg dry weight

Signed for and on behalf of BHP Laboratories Ltd.

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5.0 Discussion/Interpretation

The locations of the various surfacewater sediment monitoring locations are shown in the Appendix. The results of the chemical analysis conducted on the sediments are presented in Section 4.

The results have been assessed to the levels outlined for soil sediments contained in the new dutchlist for the assessment of contaminated soil sediments and groundwaters.

The relevant sections are presented in the table for comparison.

Contaminant	Soil Sediment (mg/kg dry weight)	
	Optimum	Action
Total Hydrocarbons	0.001 min	0.1-130
PolychloroBiphenyls	0.02	1
Phenols	0.05	40
Cadmium	0.8	12
Chromium	100	380
Arsenic	29	55
Mercury	0.3	10
Lead	85	530
Nickel	35	210
Zinc	140	720
Copper	36	190

In summary, all locations that were sampled and analysed have contaminant concentrations lower than the action level where remediation would be required.

Some parameters do fall between the optimum and action levels and the results are generally higher the further downstream one goes.