

Appendix 6

Groundwater composition

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Environmental Protection Agency
An tAidmheacht um an tAonúil Comhaltas

Environmental Protection Agency
Regional Water Laboratory
Butts Green,
Kilkenny

Report of: Analysis of landfill site sample(s)
Report to: North Tipperary County Council
Report date: 09/06/04

Facility: **Ballaghveny Landfill**
Ballymackey, Co. Tipperary,
Reference No: 78

Date collected: 15/04/2004 Date received: 15/04/2004

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			Type of sample:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
			Location code:	00078/1 - GW5	00078/1 - GW6	00078/1 - GW9	00078/1 - GW10	00078/1 - GW12	00078/1 - BH3
			Sampling point:	Clear sample	Clear sample	Clear sample	Clear sample	Clear sample	
			Sampled by:	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS
			Time Sampled:	13:05	13:14	15:22	15:04	14:30	15:44
			Start/End - Dates of Analysis:						
			Status of results:	Final Report	Final Report	Final Report	Final Report	Final Report	Final Report
Parameter	Units	Limits							
F Depth of Borehole	m		13.8	nm	13.2	12.9	nm	12	
F Water Level	m		11.8	nm	8.3	9.4	nm	6.8	
F Temperature	°C		11.1	9.9	11.5	10.3	9.5	10.5	
F Dissolved Oxygen	% Saturation		13.3	67.6	20.3	59.9	84.2	23.8	
	pH		7.2	7.3	7.1	7.2	7.4	7.0	
	Conductivity	µS/cm	658	812	1739	827	706	1095	
	Ammonia	mg/l N	0.54	0.006	21	0.02	0.003	0.24	
	Chloride	mg/l Cl	14	32	200	31	29	53	
	Total Oxidised Nitrogen	mg/l N	<0.06	11	0.54	13	6.6	11	
	Nitrite	mg/l N	<0.001	<0.001	0.008	<0.001	<0.001	0.007	
	Ortho-Phosphate	mg/l P	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
	Sodium	mg/l	2.1	3.4	nm	6.2	3.4	9.0	
	Potassium	mg/l	1.6	6.8	40.5	3.0	3.9	22.4	
	Total Organic Carbon	mg/l C	nm	nm	nm	nm	nm	nm	
	Iron	µg/l	3430	123	693	340	106	380	
	E Coli	per 100ml	-	-	-	-	-	0	
	Total coliforms	No/100 ml	-	-	-	-	-	0	

Comments:

- 1) Results highlighted and in bold are outside specified limits.
- 2) All Metals Analysed in the EPA, Dublin Laboratory.
Cyanide Analysed in the EPA Cork Laboratory.
Phenols Analysed in the EPA Castlebar Laboratory.
- 3) nm "Not measured"
- 4) nd "None detected"
- 5) nt "No time" - Time not recorded
- 6) tntc "Too numerous to count"
- 7) F "Field measured parameters"

Signed:



Michael Neill, Regional
Chemist

Date:

9/6/04

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Appendix 7

Groundwater levels

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Monthly Landfill Groundwater Levels Monitoring Form

April 2004

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary CoCo	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid Reference : 197040.85E, 182012.11N
Site Status : Active	Date : 30/4/04	Time : 14.30 – 16.00	
Instrument used : Geotechnical Instruments EA 450/010 Borehole Dipper			
Monitoring Personnel : Olga Broderick	Weather : Dry Overcast Day		

Results

Sample Station Number	Groundwater Borehole Depth (m)	Depth at which groundwater reached (m)
GW5	13.8	2.03
GW10	12.6	3.86
GW9	12.9(New borehole)	4.79
BH3	12.1(New borehole)	5.59
GW12	Unknown	4.70
GW6	Unknown	Unable to measure as well is functioning at present
GW3 This borehole is used in lieu of GW6	17.8	3.69
GW11	Unknown	Unable to measure as caravan is parked over monitoring point

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Monthly Landfill Groundwater Levels Monitoring Form

May 2004

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary CoCo	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid Reference : 197040.85E, 182012.11N
Site Status : Active	Date : 29/5/04	Time : 14.30 – 16.00	
Instrument used : Geotechnical Instruments EA 450/010 Borehole Dipper			
Monitoring Personnel : Olga Broderick		Weather : Dry Sunny Day	

Results

Sample Station Number	Groundwater Borehole Depth (m)	Depth at which groundwater reached (m)
GW5	13.8	2.09
GW10	12.6	3.93
GW9	12.9(New borehole)	4.78
BH3	12.1(New borehole)	5.77
GW12	Unknown	3.52
GW6	Unknown	Unable to measure as well is functioning at present
GW3 This borehole is used in lieu of GW6	17.8	3.72
GW11	Unknown	Unable to measure as caravan is parked over monitoring point

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Monthly Landfill Groundwater Levels Monitoring Form

June 2004

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary CoCo	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid Reference : 197040.85E, 182012.11N
Site Status : Active		Date : 30/6/04	Time : 14.30 – 16.00
Instrument used : Geotechnical Instruments EA 450/010 Borehole Dipper			
Monitoring Personnel : Olga Broderick		Weather : Dry Sunny Day	

Results

Sample Station Number	Groundwater Borehole Depth (m)	Depth at which groundwater reached (m)
GW5	13.8	2.18
GW10	12.6	4.12
GW9	12.9(New borehole)	4.9
BH3	12.1(New borehole)	5.99
GW12	Unknown	5.24
GW6	Unknown	Unable to measure as well is functioning at present
GW3 This borehole is used in lieu of GW6	17.8	4.03
GW11	Unknown	Unable to measure as caravan is parked over monitoring point

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Appendix 8

Quarterly groundwater visual inspection

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Environmental Protection Agency
Regional Water Laboratory
Butts Green,
Kilkenny

Report of: Analysis of landfill site sample(s)
Report to: North Tipperary County Council
Report date: 09/06/04

Facility: **Ballaghveny Landfill**
Ballymackey, Co. Tipperary,
Reference No: 78

Date collected: 15/04/2004 Date received: 15/04/2004

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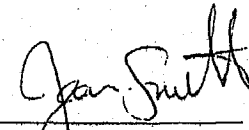
Type of sample:	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Location code:	00078/1 - GW5	00078/1 - GW6	00078/1 - GW9	00078/1 - GW10	00078/1 - GW12	00078/1 - BH3
Sampling point:	Clear sample	Clear sample	Clear sample	Clear sample	Clear sample	
Sampled by:	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS	JMcGarry/JS
Time Sampled:	13:05	13:14	15:22	15:04	14:30	15:44
Start/End - Dates of Analysis:						
Status of results:	Final Report	Final Report	Final Report	Final Report	Final Report	Final Report

Parameter	Units	Limits							
F Depth of Borehole	m		13.8	nm	13.2	12.9	nm	12	
F Water Level	m		11.8	nm	8.3	9.4	nm	6.8	
F Temperature	°C		11.1	9.9	11.5	10.3	9.5	10.5	
F Dissolved Oxygen	% Saturation		13.3	67.6	20.3	59.9	84.2	23.8	
pH	pH		7.2	7.3	7.1	7.2	7.4	7.0	
Conductivity	µS/cm		658	812	1739	827	706	1095	
Ammonia	mg/l N		0.54	0.006	21	0.02	0.003	0.24	
Chloride	mg/l Cl		14	32	200	31	29	53	
Total Oxidised Nitrogen	mg/l N		<0.06	11	0.54	13	6.6	11	
Nitrite	mg/l N		<0.001	<0.001	0.008	<0.001	<0.001	0.007	
Ortho-Phosphate	mg/l P		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Sodium	mg/l		2.1	3.4	nm	6.2	3.4	9.0	
Potassium	mg/l		1.6	6.3	40.5	3.0	3.9	22.4	
Total Organic Carbon	mg/l C		nm	nm	nm	nm	nm	nm	
Iron	µg/l		3430	123	693	340	106	380	
E Coli	per 100ml		-	-	-	-	-	0	
Total coliforms	No/100 ml		-	-	-	-	-	0	

Comments:

- 1) Results highlighted and in bold are outside specified limits.
- 2) All Metals Analysed in the EPA, Dublin Laboratory.
Cyanide Analysed in the EPA Cork Laboratory.
Phenols Analysed in the EPA Castlebar Laboratory.
- 3) nm "Not measured"
- 4) nd "None detected"
- 5) nt "No time" - Time not recorded
- 6) intc "Too numerous to count"
- 7) F "Field measured parameters"

Signed:



Michael Neill, Regional
Chemist

PP

Date:

9/6/04

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Appendix 9

Gas monitoring results

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Monthly Landfill Gas Monitoring Form

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary County Council	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid 197040.85E, 182012.11N
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Site Status : Active	Date : 23/04/04	Time : 9.30 – 12.00
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Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser	Date Next Calibration May 2004
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Monitoring Personnel : Olga Broderick	Weather : Dry Day	Barometric pressure : 978-992 mBar
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Results

Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP02	Gas Borehole	1m	0.0	0.0	20.8	9.0	No gas migration
MP03	Gas Borehole	1m	0.0	0.0	21.0	8.0	No gas migration
MP04	Gas Borehole	1m	0.0	0.0	21.0	6.5	No gas migration
MP05	Gas Borehole	1m	0.0	0.0	20.5	8.5	No gas migration
MP06	Gas Borehole	1m	0.0	0.0	20.8	6.5	No gas migration
MP07	Gas Borehole	1m	0.0	0.0	21.0	7.5	No gas migration
MP08	Gas Borehole	1m	0.0	0.0	21.0	8.0	No gas migration
MP15	Gas Borehole	1m	0.0	0.0	20.5	7.1	No gas migration
MP16	Gas Borehole	1m	0.0	0.0	21.0	6.5	No gas migration
MP17	Gas Borehole	1m	0.0	0.0	21.0	8.0	This borehole was replaced in October
MP18	Gas Borehole	1m	0.0	0.0	21.0	7.0	No gas migration
MP19	Gas Borehole	1m	0.0	0.0	21.0	6.0	No gas migration
MP20	Gas Borehole	1m	0.0	0.5	20.0	7.3	No gas migration

Monthly Landfill Gas Monitoring Form

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary County Council	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid 197040.85E, 182012.11N
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Site Status : Active	Date : 23/04/04	Time : 2.00 – 4.00
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Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser	Date Next Calibration : May 2004
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Monitoring Personnel : Olga Broderick	Weather : Dry day	Barometric pressure : 995 - 1000 mBar
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Results

Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP09	Gas Vent	1m	-	-	-	-	Blocked
MP10	Gas Vent	1m	9.5	4.6	16.0	14.0	Gas venting to atmosphere
MP11	Gas Vent	1m	-	-	-	-	Blocked
MP12	Gas Vent	1m	9.0	4.0	14.0	12.0	Gas venting to atmosphere
MP13	Gas Vent	1m	4.5	4.0	15.0	9.0	Gas venting to atmosphere

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Monthly Landfill Gas Monitoring Form

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary County Council	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid 197040.85E, 182012.11N
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Site Status : Active	Date : 29/05/04	Time : 9.30 – 12.00
Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser		Date Next Calibration May 2004
Monitoring Personnel : Olga Broderick	Weather : Dry Sunny Day	Barometric pressure : 1005 - 1007 mBar

Results

Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP02	Gas Borehole	1m	0.0	0.0	20.8	9.5	No gas migration
MP03	Gas Borehole	1m	0.0	0.0	21.0	8.0	No gas migration
MP04	Gas Borehole	1m	0.0	0.0	21.0	7.5	No gas migration
MP05	Gas Borehole	1m	0.0	0.0	20.5	8.5	No gas migration
MP06	Gas Borehole	1m	0.0	0.0	20.8	6.5	No gas migration
MP07	Gas Borehole	1m	0.0	0.0	21.0	7.5	No gas migration
MP08	Gas Borehole	1m	0.0	0.0	21.0	10.0	No gas migration
MP15	Gas Borehole	1m	0.0	0.0	20.5	8.0	No gas migration
MP16	Gas Borehole	1m	0.0	0.0	21.0	6.5	No gas migration
MP17	Gas Borehole	1m	0.0	0.0	21.0	9.0	This borehole was replaced in October
MP18	Gas Borehole	1m	0.0	0.0	21.0	7.0	No gas migration
MP19	Gas Borehole	1m	0.0	0.0	21.0	7.0	No gas migration
MP20	Gas Borehole	1m	0.0	0.5	20.0	8.5	No gas migration

Monthly Landfill Gas Monitoring Form

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary County Council	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid 197040.85E, 182012.11N				
Site Status : Active		Date : 29/05/04		Time : 2.00 – 4.00			
Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser					Date Next Calibration : May 2004		
Monitoring Personnel : Olga Broderick		Weather : Dry Sunny day		Barometric pressure : 1005 - 1007mBar			
Results							
Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP09	Gas Vent	1m	-	-	-	-	Blocked
MP10	Gas Vent	1m	10.0	5.5	14.0	15.0	Gas venting to atmosphere
MP11	Gas Vent	1m	-	-	-	-	Blocked
MP12	Gas Vent	1m	9.0	4.5	14.0	11.5	Gas venting to atmosphere
MP13	Gas Vent	1m	4.0	4.3	16.0	10.0	Gas venting to atmosphere

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Site Name : Ballaghveny Landfill Site		Operator : North Tipperary County Council		Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.		National Grid 197040.85E, 182012.11N	
Site Status : Active			Date : 26/06/04		Time : 9.30 – 12.00		
Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser					Date Next Calibration Dec 2004		
Monitoring Personnel : Olga Broderick			Weather : Dry Sunny Day		Barometric pressure : 1000 mBar		
Results							
Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP02	Gas Borehole	1m	0.0	0.0	20.8	9.5	No gas migration
MP03	Gas Borehole	1m	0.0	0.0	21.0	8.0	No gas migration
MP04	Gas Borehole	1m	0.0	0.0	21.0	7.5	No gas migration
MP05	Gas Borehole	1m	0.0	0.0	20.5	8.5	No gas migration
MP06	Gas Borehole	1m	0.0	0.0	20.8	6.5	No gas migration
MP07	Gas Borehole	1m	0.0	0.0	21.0	7.5	No gas migration
MP08	Gas Borehole	1m	0.0	0.0	21.0	10.0	No gas migration
MP15	Gas Borehole	1m	0.0	0.0	20.5	8.0	No gas migration
MP16	Gas Borehole	1m	0.0	0.0	21.0	6.5	No gas migration
MP17	Gas Borehole	1m	0.0	0.0	21.0	9.0	This borehole was replaced in October
MP18	Gas Borehole	1m	0.0	0.0	21.0	7.0	No gas migration
MP19	Gas Borehole	1m	0.0	0.0	21.0	7.0	No gas migration
MP20	Gas Borehole	1m	0.0	0.5	20.0	8.5	No gas migration

Monthly Landfill Gas Monitoring Form

Site Name : Ballaghveny Landfill Site	Operator : North Tipperary County Council	Site Address : Ballaghveny, Ballymackey, Nenagh, Co. Tipperary.	National Grid 197040.85E, 182012.11N
Site Status : Active		Date : 26/06/04	Time : 2.00 – 4.00
Instrument used : Geotechnical Instruments GA94 Infra Red Gas Analyser			Date Next Calibration : Dec 2004
Monitoring Personnel : Olga Broderick		Weather : Dry Sunny day	Barometric pressure : 1000 mBar

Results

Sample Station Number	Borehole/ Spike/ Other	Survey Depth	CH ₄ % v/v	CO ₂ % v/v	O ₂ % v/v	Temp °C	Comments
MP09	Gas Vent	1m	-	-	-	-	Blocked
MP10	Gas Vent	1m	8.0	4.2	15.0	18.5	Gas venting to atmosphere
MP11	Gas Vent	1m	-	-	-	-	Blocked
MP12	Gas Vent	1m	3.9	2.0	18.6	22.0	Gas venting to atmosphere
MP13	Gas Vent	1m	0.5	0.5	20.0	20.9	Gas venting to atmosphere

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