

**QUARTER 4 2004**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

Comhairle Contae Thiobraid Árann Thuaidh  
North Tipperary County Council



Mr. Frank O'Halloran,  
Senior Engineer,  
Environment Section,  
North Tipperary Co. Council  
Machinery Yard,  
Limerick Road,  
Nenagh,  
Co. Tipperary.  
07/01/05  
Our ref: WM/122/LF/R7

Mr. Caoimhin Nolan,  
Waste Licence Inspector,  
EPA Regional Inspectorate,  
John Moore Rd.  
Castlebar,  
Co. Mayo.

REF: Waste Licence 78 – 1, Ballaghveny Landfill – Environmental Monitoring Data and Interpretation.

Dear Mr. Nolan,

I am corresponding with you in regard to Schedule C – Table C. 1 specifically:

- Groundwater composition, groundwater levels and groundwater visual inspections (Schedule E.5 – Table E.5.2 & Table E.5.5)
- Leachate levels, leachate composition and leachate visual inspections (Schedule E.5 – Table E.5.3 & Table E.5.5),
- Surface water inspections and surface water composition (Schedule E.5 – Table E.5.1 & Table E.5.5) and
- Landfill gas composition and landfill gas migration monitoring (Schedule E.1) taken around and within Ballaghveny landfill site as per the conditions of waste licence 78 – 1 (Ballaghveny Landfill Site).

Please find attached detailed reports on the leachate composition, groundwater composition and surface water composition results. The samples were taken and tested by the EPA Regional Laboratory, Butts Green, Kilkenny.

Please also find attached detailed reports on groundwater levels and groundwater visual inspections, leachate levels and leachate visual inspections, surface water inspections, landfill gas composition and landfill gas migration monitoring. Please find attached an interpretation of the above environmental data.

Yours sincerely

Frank O'Halloran

<b>RPS MGOS</b>				
Proj. Director				
Proj. Manager				
Recipient		W. Madras		
Register No.		9		
Project No.				
File Reference				
Scanned				
Date Recd		20 JUN 2005		
In	A	I	C	Sign
				Date
Return To				

Civic Offices, Limerick Road, Nenagh, Co. Tipperary

Telephone: 067-44500 Facsimile: 067-33134 Web Address: www.tipperarynorth.ie

'ag obair leis an bpobal'

'working with the community'



## Introduction

This is the quarterly report for October, November and December 2004. The quarterly monitoring is done by the EPA, Butts Green, Kilkenny except for monthly gas monitoring, weekly surface water inspection, weekly leachate levels and the monthly groundwater levels which are carried out by the Landfill Manager.

The results of analysis carried out are compared to strict water standards, as there are no set limits for leachate, surface and groundwater's for Landfill Sites.

Any exceedances to these strict water standards are highlighted in bold in the tables below.

### 1. Leachate

#### **(A) Leachate composition (See appendix 1)**

There are nine purpose installed leachate extraction wells in cells 1-5.

Samples were taken from LM01, LM03, LM05, LM07 and LM08 on the 13/10/04. Additionally two routine leachate samples were taken from the landfill. The Old Lagoon (LL1 serves cells 3, 4 & 5 and the new lagoon (LL2) serves Cell 6, 7 & 8 (Currently filling Cell 8).

The sample results were compared to drinking water standards (EU Directive 80/778/EEC and Irish Standard S.I. No. 81 of 1988 – see appendix 10), as there is no set standard for leachate samples.

Table 1.0 shows a comparison between the leachate samples and the drinking water standards, Irish Standard S.I. No. 81 of 1988 – see appendix 10

All figures marked in bold are exceedances of the Irish drinking water standards.

**Table 1.0 Shows a comparison of leachate composition to Drinking water standards (Irish Standards SI No. 81 of 1988**

	<b>M.A.C. Values of Irish Standard SI No. 81 of 1988</b>	<b>LM01</b>	<b>LM03</b>	<b>LM05</b>	<b>LM07</b>	<b>LM08</b>	<b>L1</b>	<b>LL1</b>	<b>LL2</b>
<i>Parameters</i>									
Temperature °C	25	-	14	19	32	35	-	12	14
PH	6 – 9	-	7.1	7.3	7.8	7.8	-	7.5	7.7
∞S/cm	1500	-	6740	12970	25000	24500	-	6600	10760
BOD	-	-	66	57.5	140	255	-	26	>1480
COD	-	-	662	1228	3995	5305	-	547	5075
Ammonia	0.23 (Total Ammonia mg/l N)	-	580	890	2100	2900	-	570	830
Chloride	250	-	707	1683	2883	2269	-	662	1744
TON	-	-	<0.06	0.4	0.3	0.2	-	0.2	0.6
Nitrite	-	-	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01

As can be expected the

- Conductivity
- Ammonia
- BOD and COD
- And chlorides are high, as are the other test parameters.

The test results for the leachate boreholes and lagoons are higher than the drinking water standards. This is the case for all landfill sites. The test results for Temperature and pH show no significant change from the last quarter. Conductivity is lower for this quarter. Ammonia and Chloride levels are higher for this quarter then the last quarter.

**(B) Leachate Levels (See appendix 2)**

Leachate levels in cells 1 – 5 inclusive are remaining static or reducing.

LM01 has gone from >4.3m above the liner in the third quarter of 2003 to 3.3m or below for the fourth quarter of 2004. The pumping system is put on this station over one third of the time because of the levels at this point.

LM02 isn't showing a reduction in its levels and is still averaging at 2m above the liner.

LM03 is just over the licence requirements and is having difficulty getting and keeping the level at 1m above the liner.

LM04 is within the license requirements.

LM05 is within the license requirements except on the 19/11/04, 3/12/04 and the 10/12/04

The levels in LM07 and LM08 are improving and LM08 is meeting the licence requirements on occasion.

LM09 is within the license limits except for one occasion on the 17/12/04

This is due to the fact that the gravity flow system draining cells 3,4 and 5 was jet - vac'd in January 2003. The flow into the old lagoon is more constant now than previous.

Ballaghveny Landfill purchased a new mobile leachate management system. This system has further reduced the leachate levels especially in cells 1 and 2 where there is no gravity flow system. This system was commissioned in July 2003

The leachate levels in L1 are within the license limits for this quarter except on the 3/12/04. This chamber is emptied on a weekly basis for a 4 to 5 hour period depending on levels. The old lagoon (LL1) and the new lagoon (LL2) maintained a freeboard of 1m as per license conditions.

The Capping and Restoration Contract will have to be commissioned and further leachate extraction systems purchased if the landfill is to achieve the licence requirements of 1m above the liner at all monitoring locations. However there have been improvements since

the last quarter. Every effort will be made to further improve the situation before the end of the next quarter.

**(C) Leachate Visual Inspections (See appendix 3)**

The quarterly leachate visual inspections showed that the leachate is generally a brown, black, yellow, amber or clear colour.

**(D) Conclusion**

The leachate samples appear to be normal for a Landfill Site. The leachate levels are reducing and will continue to reduce to the specified license conditions over the next quarter with the aid of the leachate management system and the Capping and Restoration of cells 1 - 5. Ballaghveny landfill is awaiting the outcome of the license review before it can proceed with Contract 3 'The Capping and Restoration Contract'

**2. Surface Water**

**(A) Surface water composition (See appendix 4)**

The sample results were compared to the standards set in the surface water abstraction S.I. No. 294 of 1989 – see appendix 10. The sample results were also compared to freshwater fish, Irish Salmonid Standards SI No 293 of 1988 – see appendix 10. The results were further compared to a guide issued by the EPA – see appendix 10.

Table 2 below shows the limits expressed in tabular form and how the sample results for Ballaghveny compared. Any exceedances are highlighted in bold.

	Irish Standards SI no. 294 of 1989	Irish Salmonid Standards SI No 293 of 1988	SW1	SW2	SW3	SW4	SW6	SWD1
<b>Parameters</b>								
Temperature °C	25	21.5	14.0	12.7	12.9	14.0	11.5	11.8
Dissolved Oxygen % Saturation	>60%	50% >9	76.3	88.4	107.8	<b>49.2</b>	105.4	<b>48.5</b>
PH	5.5 – 8.5	6-9	7.8	8.0	8.4	7.3	8.3	7.2
Conductivity $\mu$ S/cm	1,000	None listed	755	828	391	774	418	150
BOD mg/l O <sub>2</sub>	5.0	-	2.1	1.2	0.8	1.1	1.6	1.9
COD mg/l O <sub>2</sub>	None listed	None listed	48	43	31	69	39	116
Ammonia mg/l N	0.1556	0.778	<b>0.54</b>	0.13	0.007	<b>1.1</b>	0.02	0.012
Chloride mg/l Cl	250	None listed	19	27	17	16	27	19
TON mg/l N	None listed	None listed	0.8	4.3	2.9	<0.06	2.9	<0.06
Nitrite mg/l N	None listed	None listed	0.017	0.019	0.011	<0.001	0.019	<0.001
O.P mg /l P	None listed	None listed	<0.006	<0.006	0.006	<0.006	0.008	<0.006
Suspended Solids mg/l	50	25	<6	20.8	<6.0	<6	22.2	11.0

*Note: There is currently only a trickle of water discharging from the site*

For inspection purposes only. Consent of copyright owner required for any other use.

### **% Saturation**

SW4 and SWD1 are both showing exceedances to this limit.

Turf cutting operations are being carried out upstream and adjacent to SW4. This is having a negative impact on sampling points SW4 and SW1 which is the next sampling point downstream of SW4. There is abundant algal growth at SW4 due to silage effluent which is further adding to the negative quality of the sampling station.

There is only a small volume of water being discharged from SWD1. There is also very low flow at this monitoring point. These are contributory factors to the low Dissolved Oxygen at this monitoring point.

SW1 has seen a very significant improvement since the last quarter with the value well within the set limits.

### **Conductivity & pH**

All conductivity and pH results were within the limits set in table 2 above.

### **BOD**

All sampling stations are within the limits set in table 2 above.

### **Ammonia**

SW4 and SW1 are showing an exceedance to this limit with a reading of 1.1mg/lN at SW4 and a reading of 0.54mg/lN at SW1. SW4 is a monitoring point upstream of Ballaghveny Landfill. This monitoring point is being contaminated by Agriculture and

For inspection purposes only.  
Consent of copyright owner required for any other use.



turf cutting operations. SW1 is the first monitoring point on the Ballaghveny Stream d/s of SW4. SW4 is contributing to the high readings at SW1.

### **Suspended Solids**

All monitoring points are within the limits. This is a significant improvement on the last quarter.

### **Chlorides**

There was no significant change in the chloride levels between the two quarters. All results were within the limits specified in table 2 above.

### **(C) Surface water Visual Inspection (See appendix 5)**

The weekly surface water visual inspections show that the Ballaghveny Stream appears not to be contaminated by landfill leachate.

### **(C) Conclusion**

The surface water results show that the Ballaghveny Stream and the Ollatrim River are unpolluted by leachate. Biological monitoring showed that there has been an improvement in the water quality in the area since last year except for SW4, which is u/s of Ballaghveny landfill.

SW4 is currently being polluted by turf cutting and silage effluent. SW4 is a point u/s of Ballaghveny landfill and is used as a control i.e. where the landfill can not be impacting on the water quality. As mentioned earlier SW4 is a point u/s on the Ballaghveny stream

but it is feeding SW1 which is the first monitoring point d/s on the Ballaghveny Stream.  
This monitoring station is being negatively impacted on by commercial activities feeding  
SW4 which in turn feed SW1.

For inspection purposes only.  
Consent of copyright owner required for any other use.

### 3.0 Groundwater

#### (A) Groundwater composition (see appendix 6)

The groundwater sample results were compared with drinking water standards (EU Directive 80/778/EEC and S.I No. 81 of 1988 – see appendix 10)

A new borehole has been installed at BH3.

**Table 3.0 Shows a comparison of groundwater composition to Drinking water standards (Irish Standards SI No. 81 of 1988) on the 13/10/04. All values marked in bold are exceedances to the set directive limits**

	M.A.C. Values of Irish Standard SI No. 81 of 1988	GW5	GW6	GW10	GW12	BH3
<i>Parameters</i>						
Temperature °C	25	11.4	12.0	11.4	11.8	11.1
PH	6 – 9	7.1	7.2	7.2	7.4	7.0
αS/cm	1500	750	800	849	697	1172
BOD	-					
COD	-					
Ammonia Mg/l – N	0.2333	<b>0.76</b>	<0.003	0.014	0.032	<b>0.42</b>
Chloride mg/l Cl	250	14	26	48	31	104
TON	-	<0.06	8.2	6.9	5.6	9.2
Nitrite mg/l N	0.0304	<0.001	<0.001	<0.001	0.026	<0.01

### **Summary of table**

Results from the 13/10/04 show that GW5 and BH3 have slightly elevated ammonia readings. These elevated readings are consistent with previous monitoring results for these stations. Groundwater flow within the landfill is in a southerly direction towards the Ollatrim River. GW5 is to the west of the landfill so it is unlikely that the landfill is impacting on the groundwater quality of this monitoring point. GW5 is surrounded by boggy land that is naturally high in ammonia.

BH3 is however situated to the south east in agricultural land that frequently receives both chemical and organic fertilizer. Cattle congregate around this monitoring point and further contribute to the organic fertilizer load at this monitoring station.

### **(B) Groundwater Levels (see appendix 7)**

The groundwater levels appear to be normal.

### **(C) Quarterly groundwater visual inspection (see appendix 8)**

The quarterly groundwater visual inspection showed all samples had no visible or nasal evidence of leachate contamination.

#### **4. Landfill Gas Monitoring (see appendix 9)**

Routine gas monitoring carried out on gas vents drilled into the waste bodies showed that the gas vents are working quite well with a variance in the rates of methane production. Monitoring of landfill gas migration boreholes did not show any exceedances of methane or carbon dioxide gas and so I can conclude that there is no landfill gas migration.

The gas flare is due to be commissioned after cells 1 – 5 have been capped. This will burn off gases produced within the waste cells.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*