

Environmental
Protection Agency
-1 JUL 2005

APPENDIX B

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QUARTER 2 2004

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Mr. Frank O'Halloran,
Senior Engineer,
Environment Section,
North Tipperary Co. Council
Machinery Yard,
Limerick Road,
Nenagh,
Co. Tipperary.
27/08/04
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,

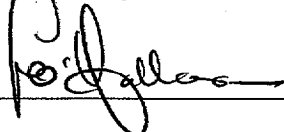
I am corresponding with you in regard to Schedule C – Table C. 1 specifically:

- 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

Introduction

This is the quarterly report for April, May and June 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 15/04/04. 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

	M.A.C. Values of Irish Standard SI No. 81 of 1988	LM01	LM03	LM05	LM07	LM08	L1	LL1	LL2
<i>Parameters</i>									
Temperature °C	25	10	12	21	34	37	-	14	15
PH	6-9	7.1	7.0	7.4	7.5	7.9	-	7.6	7.7
µS/cm	1500	3900	3910	11850	25000	25800	-	4320	3170
BOD	-	12.6	38.1	88	188	345	-	40	103.5
COD	-	169	356	980	3505	5005	-	358	824
Ammonia	0.23 (Total Ammonia mg/l N)	175.9	221.5	757.9	2056.1	2237.5	-	219.6	137.6
Chloride	250	299	296	1131	2648	2661	-	404	284
TON	-	0.3	<0.3	<0.3	<0.3	<0.3	-	4.0	<0.3
Nitrite	-	<0.005	<0.005	<0.005	<0.005	<0.005	-	0.138	<0.001

As can be expected the

- Conductivity
- Ammonia
- 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 last quarter. Conductivity, ammonia and chloride levels for LM05 and LM08 are higher for this quarter than last quarter. LM05 and LM08 are in more reactive, newer cells than LM01 and LM03. There has also been less rainfall this quarter than last quarter, which would also make these leachate samples more concentrated.

(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 3.1m for the last quarter of 2003 to 2.5m for the second 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 reaching the licence requirements on occasion but is having difficulty continually keeping the level at 1m above the liner.

LM05 is also now within the licence requirements.

LM07 and LM08 are not yet within the limits of the licence but the levels are reducing on a monthly basis.

LM09 is within the licence limits.

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. Modifications to this system are currently underway to further improve the efficiency of the system.

The leachate levels in L1 are being exceeded on very few occasions for this quarter. This chamber is emptied on a weekly basis for a 4 to 5 hour period depending on levels. However the leachate from cell 5 flows via gravity to this point and refills it quickly. The old lagoon (LL1) and the new lagoon (LL2) maintained a freeboard of 1m as per licence conditions.

The mobile leachate system will help maintain the level of leachate in the cells at or below 1m. However it will take the system some time before it can get the levels to 1m or below in cells 1 – 5. The capping and restoration contract will aid the reduction in leachate production.

(C) Leachate Visual Inspections (See appendix 3)

The quarterly leachate visual inspections showed that the leachate is generally a brown, black, amber or clear colour with the exception of LM01 which was a clear sample with red solids.

(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 licence conditions over the next quarter with the aid of the leachate management system and the capping and restoration of cells 1 - 5.

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
Parameters								
Temperature °C	25	21.5	14.1	11.2	12.3	10.6	11.2	14.0
Dissolved Oxygen % Saturation	>60%	50% >9	90.7	90.1	101.7	82.0	106.6	77.4
PH	5.5 – 8.5	6-9	7.9	7.9	8.3	7.7	8.2	7.9
Conductivity µS/cm	1,000	None listed	706	824	346	637	394	988
BOD mg/l O2	5.0	-	4.0	0.9	2.4	1.4	2.3	5.3
COD mg/l O2	None listed	None listed	40	24	34	35	39	40
Ammonia mg/l N	0.1556	0.778	0.062	0.005	0.013	0.034	0.04	1.511
Chloride mg/l Cl	250	None listed	29	30	19	20	18	46
TON mg/l N	None listed	None listed	2.1	5.9	2.7	1.5	3.0	2.7
Nitrite mg/l N	None listed	None listed	0.04	0.012	0.015	<0.001	0.015	0.058
O.P mg /l P	None listed	None listed	<0.006	<0.006	<0.006	<0.006	<0.006	<.006
Suspended Solids mg/l	50	25	<10	<10	<10	<10	16	<11

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% Saturation

All samples are within the limits set in table 2 above.

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 except for sampling station SWD1. The results for this date give a reading of 5.3 mg/l O₂. However this is a significant improvement on results for the first quarter of 2004 which gave a reading of >54mg/l O₂.

Contract 4 is commencing shortly and as part of this contract the spring which is being pumped from the landfill will be blocked off so there will be no surface water discharge leaving Ballaghveny Landfill.

Ammonia

SWD1 shows an exceedance to ammonia.

SWD1 is the surface water discharge point from Ballaghveny Landfill. It has been agreed with the Agency that the discharge from Ballaghveny Landfill is not to have a negative impact on SW1. The readings for SW1 for this quarter are inside the Irish standard and EC standard for surface waters. Therefore Ballaghveny Landfill is not having a negative effect on the Ballaghveny Stream or the Ollatrim River. The results for this quarter for this monitoring point have significantly improved from the last quarter. The last quarter giving readings of 4.6mg/l N and this quarter giving readings of 1.511mg/lN

Suspended Solids

SW1, SW2, SW3, SW4, SW6 and SWD1 are within the limits set out in Table 2.

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. There also appears to be an improvement in the water quality of both the Ballaghveny Stream and the Ollatrim River since the last quarter.

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.

The results for this quarter indicate that Ballaghveny Landfill is not having a negative impact on the water quality in the area. SW1 is the first monitoring point on the Ballaghveny stream after SWD1 enters the stream. The results for SW1 show that it is not contaminated by leachate.

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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 15/04/04. 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	11.1	9.9	10.3	9.5	10.5
PH	6 – 9	7.2	7.3	7.2	7.4	7.0
µS/cm	1500	658	812	827	706	1095
BOD	-					
COD	-					
Ammonia Mg/l – N	0.2333	0.54	0.006	0.02	0.003	0.24
Chloride mg/l Cl	250	14	32	31	29	53
TON	-	<0.06	11	13	6.6	11
Nitrite mg/l N	0.0304	<0.001	<0.001	<0.001	<0.001	0.007

Summary of table

Results from the 15/4/04 show that GW5 and BH3 have a slightly elevated ammonia reading. This elevated reading is 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 situated to the Northeast of the landfill so natural groundwater flow is not to this point. It is unlikely that the landfill has anything to do with its elevated ammonia reading. However this borehole is located in agricultural land that is grazed and used as slurry and chemical fertiliser spreadlands from time to time. This may have had an impact on the ammonia reading.

(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 presence of methane 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.

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