Ballyguyroe Landfill Site

Annual Environmental Report

December 2008 – December 2009

Cork County Council

Waste Licence Reg.	No. W 0002-2

Prepared by:

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BALLYGUYROE LANDFILL SITE

ANNUAL ENVIRONMENTAL REPORT

DECEMBER 2008 - DECEMBER 2009

Client:
Cork County Council

Keywords:
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Reporting Period:
This report presents the landfill monitoring results for Ballyguyroe Landfill, Co. Cork to the Environmental Protection Agency. The report covers the annual reporting period of 2009.

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1. INTRODUCTION

1.1 Scope and Purpose of the Report

Cork County Council held a waste licence (Register No. 2-1) to operate Ballyguyroe Landfill Site until 15th March 2004 when it obtained a new Waste Licence (Register No. 2-2/ W 0002-2). The aim of this Annual Environmental Report (AER) is to provide a review of activities at Ballyguyroe Landfill Site within the past 12 months. The full scope of the type of report is outlined in Schedule F of the waste licence.

1.2 Background to the Report

The landfill facility at Ballyguyroe North has been in operation since 1990, accepting waste at an annual rate of approximately 20,000 tonnes. The site reached full capacity and closed for the acceptance of waste on Thursday 27th September 2001.

The Environmental Protection Agency (the Agency) issued the site with a waste management licence on December 22nd 1999 (Waste Licence No. 2-2).

In accordance with the requirements of Condition 11.3 of the waste licence, an AER for the facility is submitted to the Agency annually by 31st March.

This is the tenth AER to be submitted and covers the reporting period December 22nd 2008 to December 31st 2009.

1.3 Site Location

The facility is located at:
Ballyguyroe North
Kildorrery
Mallow
Co. Cork

Tel: (063) 91614
Fax: (063) 91614

The location of the site is shown on Figure 1.1.

The National Grid Reference for the site is: -166250E, 114550N

1.4 Environmental Policy

Cork County Council is committed to conducting all activities such that they have a minimal effect on the environment.

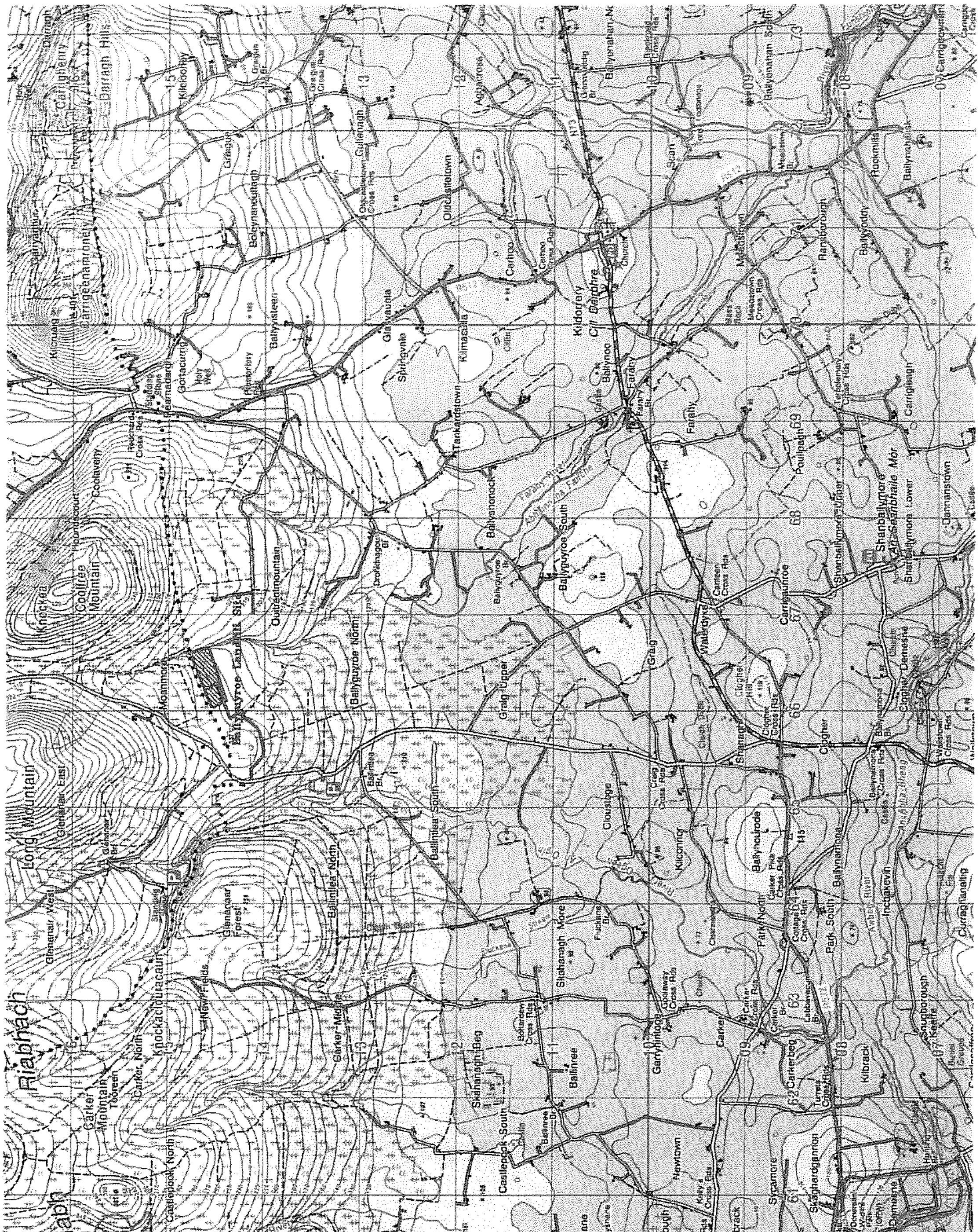
The main objectives of the Council are:

- A commitment to comply with the waste licence and all relevant environmental legislation and approved code of practice;
- To reduce negative environmental impacts by continually developing and modifying all procedures;

- To provide adequate training and awareness to all employees with regard to minimizing environmental risks; and

- To ensure that management and all personnel working on the site are familiar with the conditions of the waste licence, the content of the Environmental Management Plan and the Emergency Response Procedures.

Figure 1.1: Location of Ballyguyroe Landfill



2. SITE DESCRIPTION AND ACTIVITIES

2.1 Description of the Site

The Ballyguyroe Landfill Site occupies an area of approximately 15 hectares and is located in the townland of Ballyguyroe North on the southern lower slopes of the Ballyhoura Mountains. It is situated 6 km north-west of the village of Kildorrery.

The site lies in the Blackwater catchment with the Farahy River flowing southwards within a valley outside the eastern boundary. Surface water on the site drains towards this river.

There are no major water abstractions within the immediate catchment of the landfill. Several local residents do depend on water wells for domestic and farm supplies, however, historical monitoring results have confirmed that the landfill is not a threat to these supplies. The groundwater quality is indicative of the overburden geology, being high in manganese, and has not changed in quality over the years.

The meteorological station on site indicates prevailing winds from the southwest. The annual rainfall at the site during 2009 is outlined in Table 2.1.

Table 2.1: Site Rainfall 2009

Month	*Rainfall (mm)*
January	139.4
February	43
March	65.5
April	67.5
May	155.7
June	66.8
July	87.4
August	136.8
September	38.1
October	126.1
November	285.9
December	87.1
Total	**1299.3**

The site consists of a total of seven waste cells. Cells 1 to 7 have been completed and the site has reached full capacity. The site closed for the acceptance of waste on September 27th 2001.

2.2 Waste Activities carried out at the Facility

Waste Disposal activities at Ballyguyroe Landfill Facility are restricted to those outlined in the waste licence as specified below. The only main activity at the site when open was the land-filling of non-hazardous domestic and commercial waste only.

Class 4. Surface impoundment, including placement of liquid or sludge discards into pits, ponds, or lagoons

Class 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.

The Waste Recovery Activities permitted are outlined below:

Class 4. Recycling or reclamation of other inorganic materials

Class 10. The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system

2.3 Waste Quantity and Composition

The site ceased accepting waste on the 27th September 2001. No waste was accepted at the facility during the reporting period.

The weighbridge was installed at the site in 1997. Therefore, accurate tonnages are only available from 1998 onwards. It is estimated that approximately 20,000 tonnes per annum were land-filled during the period 1990 to 1997.

Table 2.2: Quantities of waste received and disposed of during the lifetime of the site

Year	Quantity of Waste (tonnes)
1990-1997	160,000
1998	18,577
1999	20,207
2000	22,892
2001	16,523
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
Total	**238,199**

2.4 Remaining Capacity

The site reached full capacity on September 27th 2001. The landfill facility ceased to accept waste on this date.

2.5 Methods of waste deposition

No waste was accepted at the site during the reporting period.

2.6 Tank Pipeline and Bund Testing

Integrity testing of the new Leachate lagoon was carried out between December 2002 and June 2003. Results were submitted to the Environmental Protection Agency on September 19th 2003.

A successful structural integrity test was carried out on the new Leachate lagoon by consultants Fehily Timoney and Company in June 2008. Copies of this report have been forwarded to the EPA. (Ref EPA-080901). The lagoon shall be retested in June 2011.

A permanent Automatic Pneumatic Leachate Extraction System was commissioned during 2003. The leachate is removed under contract by Cork County Council. The contractor has a site specific risk assessment and operating procedure to ensure any spillages during removal are effectively controlled.

3. SUMMARY OF MONITORING AND EMISSIONS

3.1 Landfill Gas

Condition 8 and Schedule D.2 of the Licence Resister 2-2 requires that the licensee conducts monthly monitoring in the gas borehole/vents/wells in order to detect offsite gas migration and weekly monitoring in the site office, shed and canteen in order to detect accumulation of landfill gas.

The gas is monitored using "GA94" automatic infra-red analyser, which detects levels of carbon dioxide, methane, and oxygen. This analyser is calibrated in accordance with manufacturer's specifications.

All monitoring locations are illustrated in Drawing NC-10-025-001, attached Appendix 1.

3.1.1 Gas Monitoring Results

3.1.1.1 Site Buildings

In September 2008 new gas detectors and alarms were fitted in the office, canteen and the storage container. There is no evidence of landfill gas in site buildings.

3.1.1.2 Gas Wells outside Filled Cells

Elevated levels of gas were detected in gas wells GS1, GS4, GS5 , GS8 and GS10. The levels and dates of these exceedences are illustrated in Table 3.1, below.

3.1.2 Long Term Proposals

The installation of a permanent gas collection system at the site was carried out during 2003. The gas flaring system has been operating since January 2004. The unit is maintained quarterly under contract.

Table 3.1: Gas Monitoring Exceedences for 2009

Date	Location	Methane (CH_4)	Carbon Dioxide (CO_2)
		% v/v	% v/v
31/12/2008	GS1	**60.2**	**10.5**
	GS10	**1.6**	**2.1**
07/01/2009	GS1	**66.5**	**10.1**
	GS4	0	**1.8**
	GS10	**2.1**	**2.5**
14/01/2009	GS1	**58.4**	**9.1**
	GS5	0	**2.0**
	GS10	**2.3**	**2.6**
19/01/2009	GS1	**55.1**	**8.6**
	GS4	0	**2.4**
	GS5	0	**3.2**
	GS10	**10.2**	**2.1**
28/01/2009	GS1	**50.3**	**6.2**

	GS4	0	3.4
	GS5	0	4.9
	GS10	4.5	5.6
05/02/2009	GS1	45.7	10.2
	GS4	0	3.8
	GS5	0	4.6
	GS10	4.8	6.0
11/02/2009	GS1	22.9	7.6
	GS4	0	3.2
	GS5	0	2.4
	GS10	3	4.4
18/02/2009	GS1	26.4	7.1
	GS4	0	2.8
	GS5	0	2.2
	GS10	2.5	4.0
27/02/2009	GS1	28.5	6.2
	GS4	0	2.7
	GS5	0	2.2
	GS8	0	2.4
04/03/2009	GS1	36.1	7.8
	GS4	0	2.3
	GS5	0	2.0
	GS10	5.6	3.4
26/03/2009	GS1	47.5	8.2
	GS10	5.2	3.0
01/04/2009	GS1	28.7	6.4
	GS10	4.8	2.7
08/04/2009	GS1	48	8.6
	GS5	0	2.7
	GS10	4.4	2.4
15/04/2009	GS1	51.5	8.7
	GS5	0	2.4
	GS10	4.0	2.1
22/04/2009	GS1	53.9	9.4
	GS10	3.5	1.8
06/05/2009	GS1	62.5	9.2
	GS10	3.2	1.5
13/05/2009	GS1	63.4	9.0
	GS10	3.4	1.8
19/05/2009	GS1	66.1	8.8
	GS10	3.0	1.4
27/05/2009	GS1	66.3	7.2
	GS10	2.8	1.2
03/06/2009	GS1	59.8	9.1
	GS10	3.1	1.5
10/06/2009	GS1	57.2	9.0
	GS10	3.6	2.1
24/06/2009	GS1	54.2	15.0
	GS5	3.0	1.4
01/07/2009	GS1	66.1	18.8
	GS5	0	2.3
	GS10	2.7	1.2
08/07/2009	GS1	57.2	16.1
	GS5	0	1.9

	GS10	**2.5**	1.1
15/07/2009	GS1	**41.9**	**15.7**
	GS5	0	**5**
	GS10	**2.8**	1.5
22/07/2009	GS1	**65.4**	**17.8**
	GS5	0	**2.8**
	GS10	**2.3**	1.2
05/08/2009	GS1	**58.5**	**18.5**
	GS5	0	**2.2**
	GS10	**2.5**	1.4
12/08/2009	GS1	**67.1**	**18.5**
	GS10	**2.1**	1.1
19/08/2009	GS1	**71.3**	**17.8**
	GS5	0	**1.9**
	GS10	**1.8**	1.0
26/08/2009	GS1	**56.4**	**18.8**
	GS5	**0**	**1.6**
	GS10	**1.5**	0.8
03/09/2009	GS1	**53.5**	**16.2**
	GS10	**1.8**	1.0
09/09/2009	GS1	**22**	**7.0**
	GS5	0	**1.5**
	GS10	**1.6**	0.8
16/09/2009	GS1	**23.8**	**11.9**
	GS10	**1.8**	0.9
24/09/2009	GS1	**58.1**	**13.1**
	GS10	**1.6**	0.8
30/09/2009	GS1	**65.2**	**13.8**
	GS10	**1.3**	0.6
07/10/2009	GS1	**47.6**	**16.1**
	GS5	0.2	**7.0**
	GS10	**1.6**	1.0
14/10/2009	GS1	**48.1**	**14.3**
	GS5	0	**5.6**
	GS10	**1.4**	0.8
21/10/2009	GS1	**46.5**	**13.2**
	GS5	0	**5.2**
	GS10	**1.1**	0.6
28/10/2009	GS1	**40.6**	**14.2**
	GS5	0	**4.6**
	GS10	**1.3**	0.7
04/11/2009	GS1	**53.1**	**13.4**
	GS5	0	**2.2**
	GS10	**1.1**	0.6
11/11/2009	GS1	**46.9**	**11.7**
	GS5	0	**2.0**
	GS10	**1.5**	1.0
18/11/2009	GS1	**29.5**	**24.8**
	GS10	**1.3**	0.7
25/11/2009	GS1	**42.1**	**12.6**
	GS5	0	**3.5**
	GS10	**1.6**	1.1
02/12/2009	GS1	**44.5**	**12.7**
	GS5	0	**3.9**

	GS10	**1.9**	1.3
16/12/2009	GS1	**40.8**	**10.9**
	GS5	0	**3.5**
	GS10	**2.2**	**1.6**
23/12/2009	GS1	**36.3**	**8.6**
	GS5	0	**4.1**
	GS10	**2.0**	1.4

3.2 Surface Water

Condition 8 and Schedule D.4 of the waste licence require the licensee to conduct surface water monitoring at various locations throughout the site and at points upstream and downstream on the River Farahy. The frequency of monitoring varies from weekly to quarterly depending on the location.

Surface water results for the report period have been submitted to the Agency in four quarterly reports and have been compared to limits outlined in the Surface Water Regulations S.I. No. 294 of 1989 (implementing the Surface Water Directive (75/440 EEC).

The iron levels (Figure 3.1) indicate high levels of iron that are naturally occurring due to the iron rich geology of the site.

The suspended solids are monitored monthly at locations SS2 and SS5, from figure 3.2 it is apparent that there was no exceedances of the 35 mg/l limit outlined by the EPA.

Figure 3.1: Surface water Iron Levels

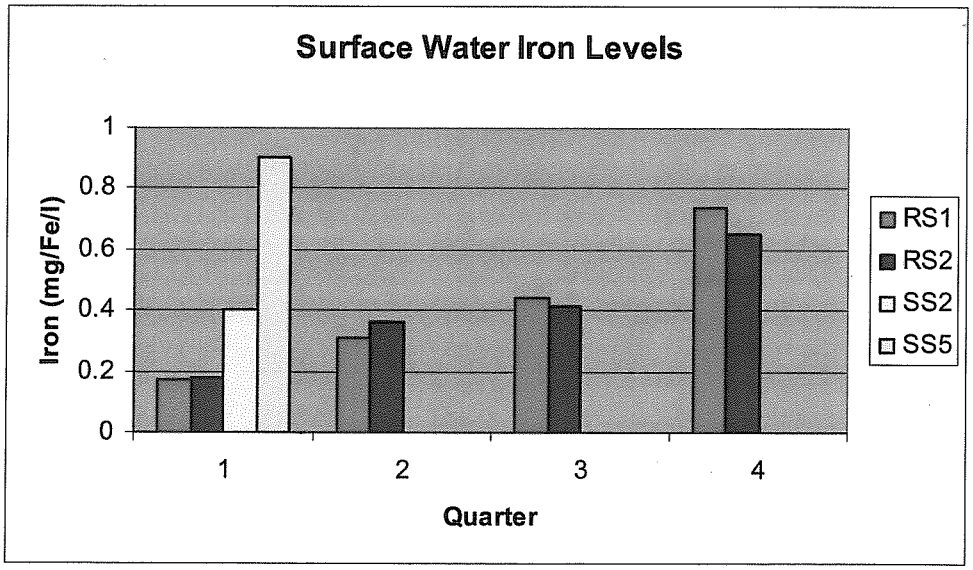
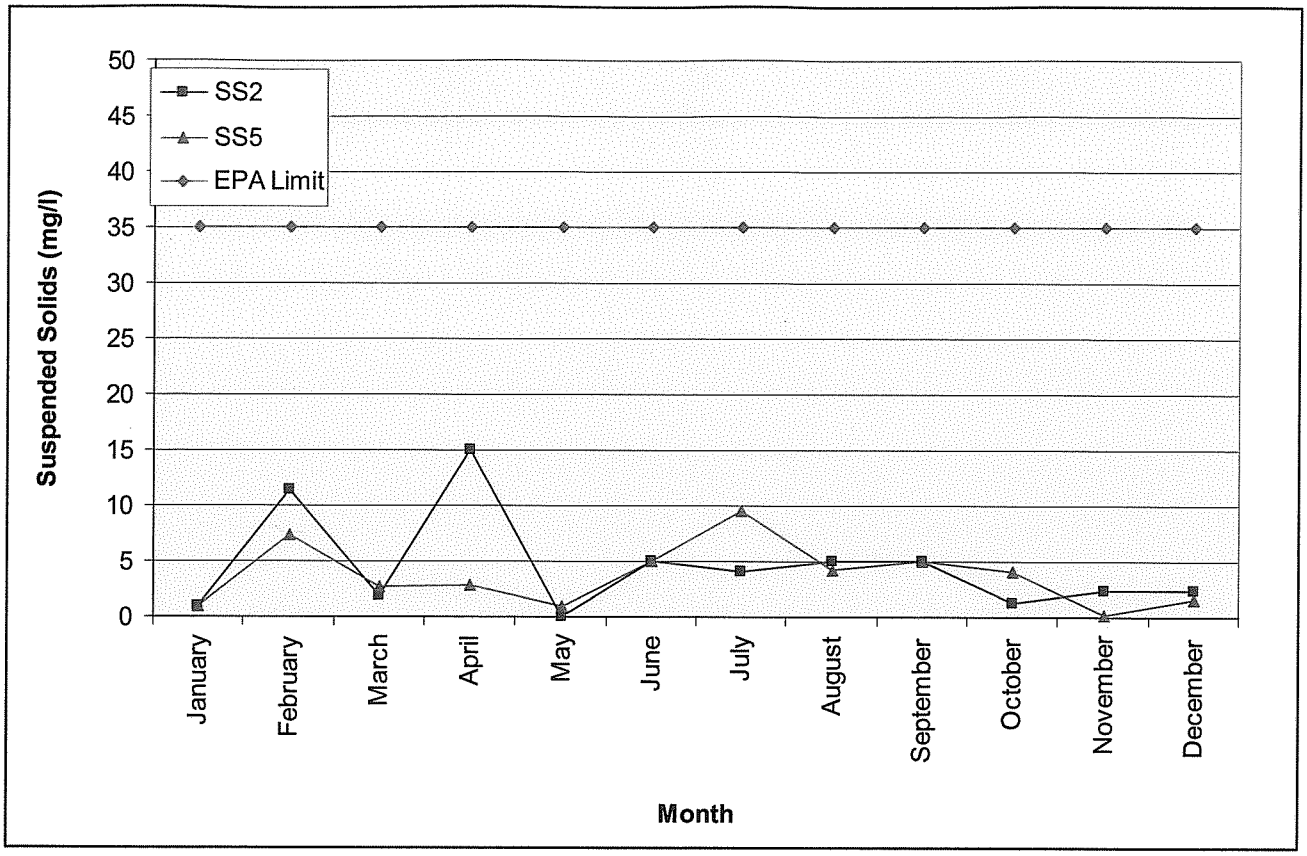


Figure 3.2: Suspended Solids SS2 and SS5



3.2.1. Long Term Trends

Levels of ammonical nitrogen, chloride, pH, BOD, and COD in the upstream sampling location RS1 and the downstream sampling location RS2 have been compared in order to detect any impact the landfill site may be having upon the surface water. These comparisons are illustrated graphically in Figures 3.3 to 3.7 inclusive.

Levels of ammonical nitrogen (Figure 3.3) are similar upstream and downstream of the landfill site and are consistently below the limit of 0.2 mg/l as set out in the Surface Water Regulations.

Chloride levels upstream and downstream are similar (Figure 3.4) and are significantly below the Surface Water Regulation limits of 250 mg/l in each quarter.

BOD levels upstream and downstream of the site (Figure 3.5) did not exceed the limit of 5 mg/l for A1 waters as outlined in the Surface Water Regulations in the reporting period.

Levels of pH (Figure 3.6) do not differ significantly between the upstream site and downstream site and generally remain between 7 and 8.

COD levels (Figure 3.7) are similar during each sampling date during the reporting period.

In conclusion, surface water monitoring results from the upstream sampling location RS1 and the downstream sampling location RS2 do not indicate that there is any contamination of the Farahy River as a result of activities at the landfill site.

Figure 3.3: Surface Water Ammonia Levels

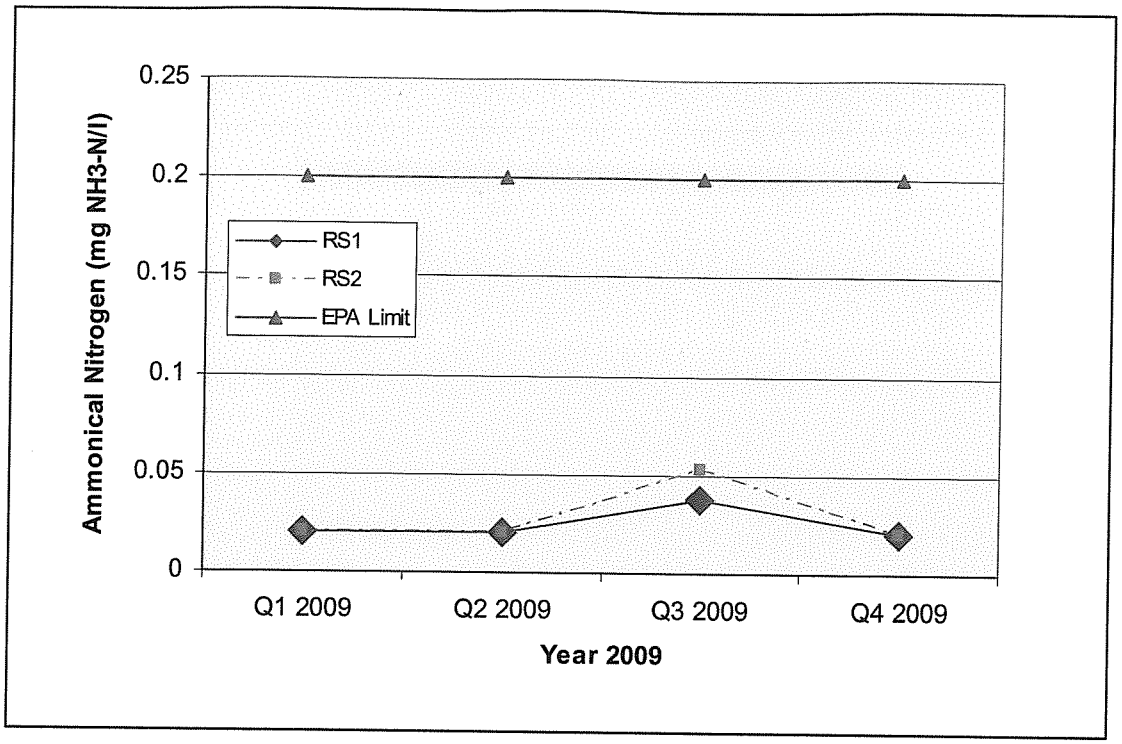


Figure 3.4: Surface Water Chloride Levels

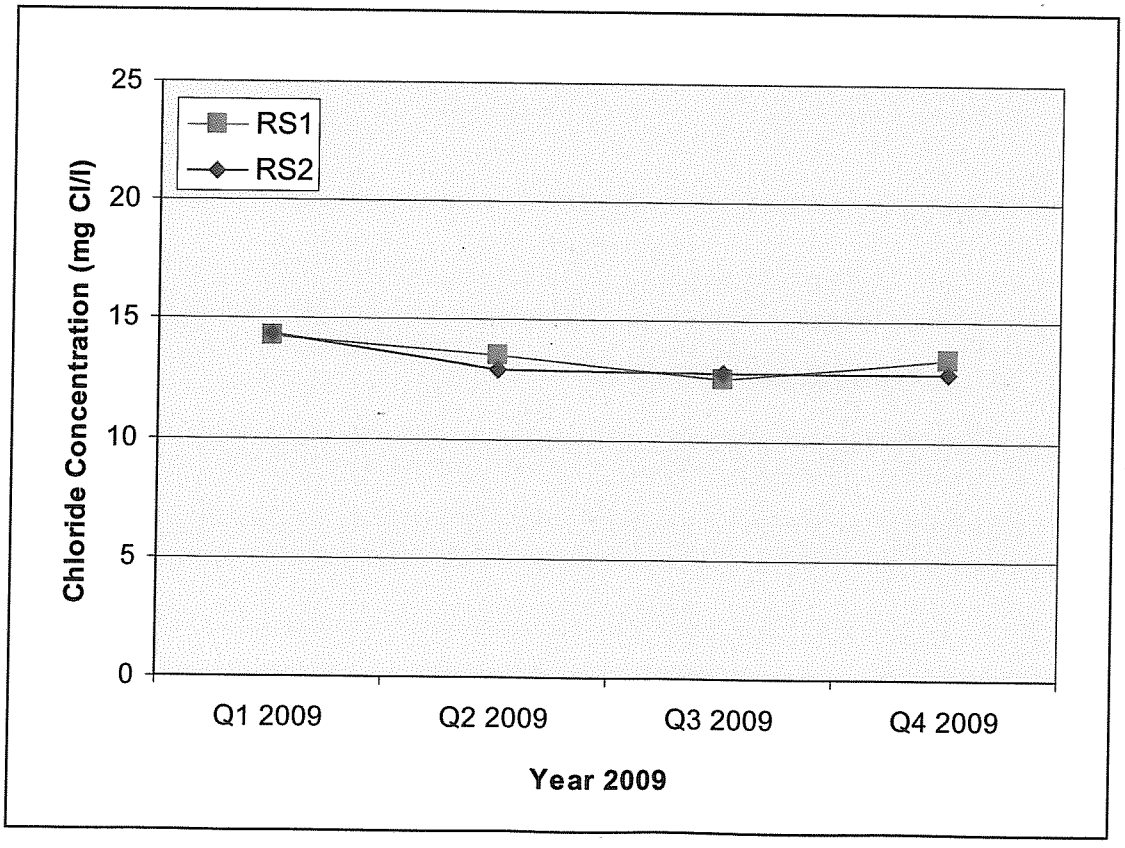


Figure 3.5: Surface Water BOD

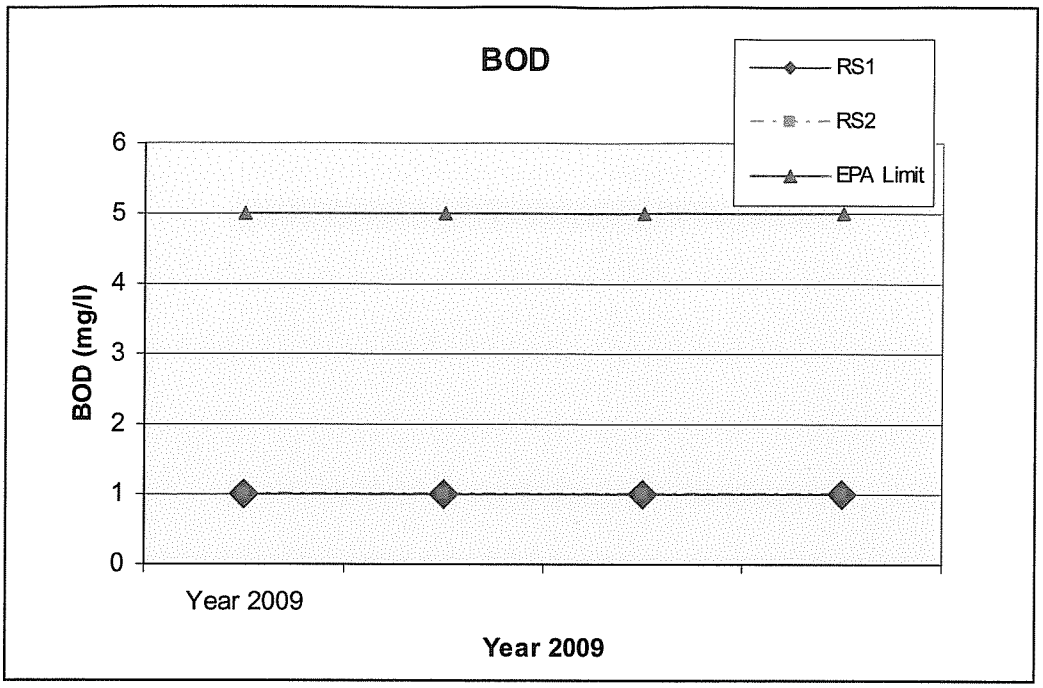


Figure 3.6: Surface Water pH levels

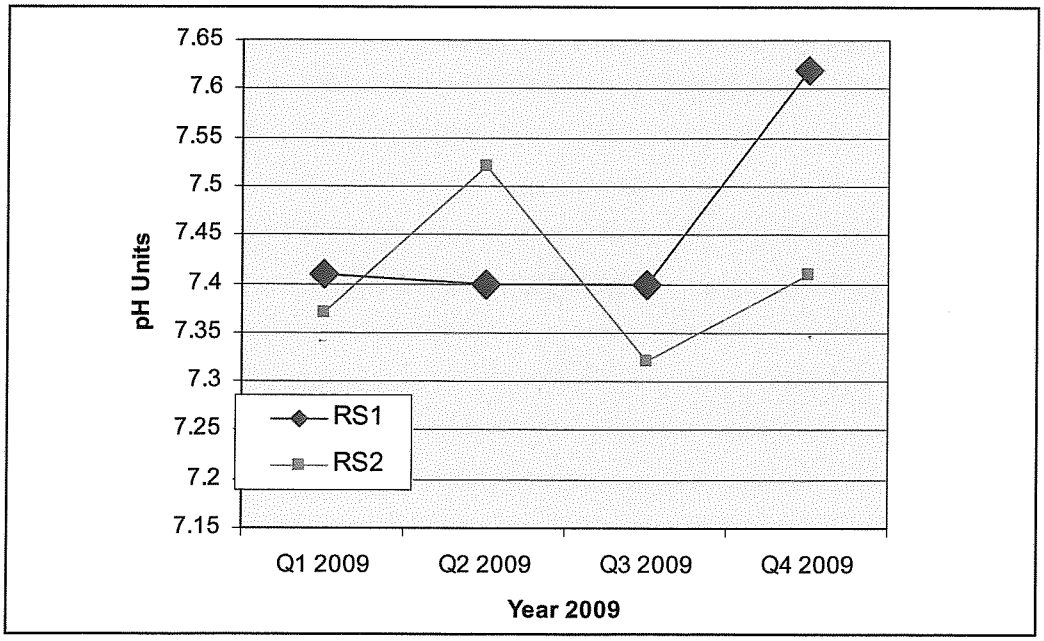
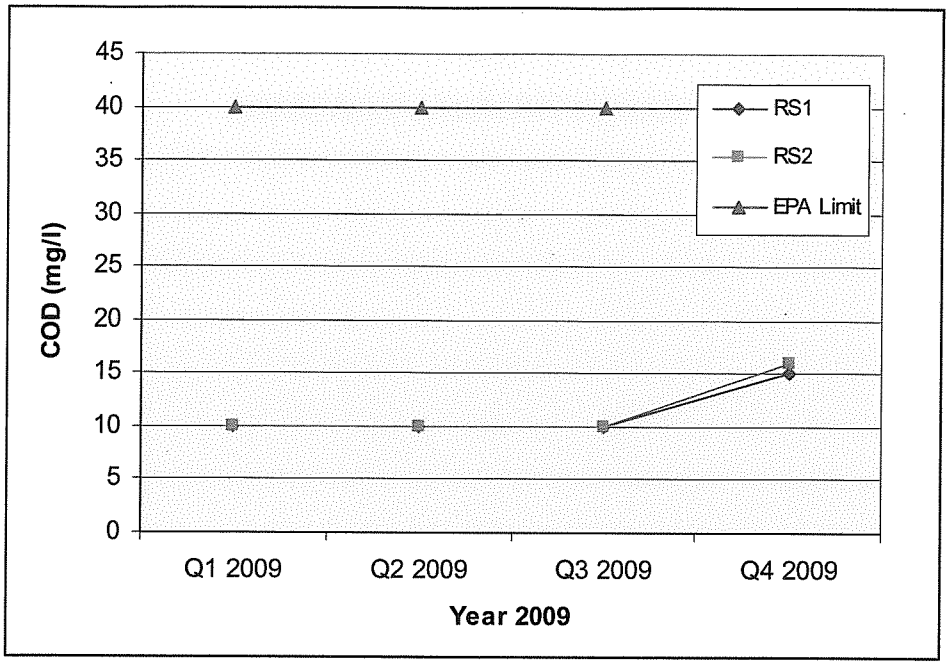


Figure 3.7: Surface Water Chemical Oxygen Demand (COD) Levels



3.3. Groundwater

Condition 8 and Schedule D.4 of the waste licence require the licensee to conduct groundwater monitoring on an annual basis at various locations within the site and outside the site boundary including two domestic wells. The samples were taken in quarter one in 2009, inline with direction from the EPA to rotate the quarter that the samples are taken each year.

There was no access to Carroll's private well during sampling in 2009 by the EPA.

Figure 3.8 shows the levels of iron detected in the various wells over the reporting period, only elevated levels were recorded in Connerys Well.

Total Coliforms levels were detected in one wells sampled during 2009. This is shown in Figure 3.9. The highest level recorded was 100 MPN/l in 96-3D.

Levels of manganese recorded were high. This can also be attributed to the geology of the site. Refer to Figure 3.10. These evaluated manganese results are an established trend as can be seen from previous AER's.

Figure 3.8: Groundwater Iron Levels

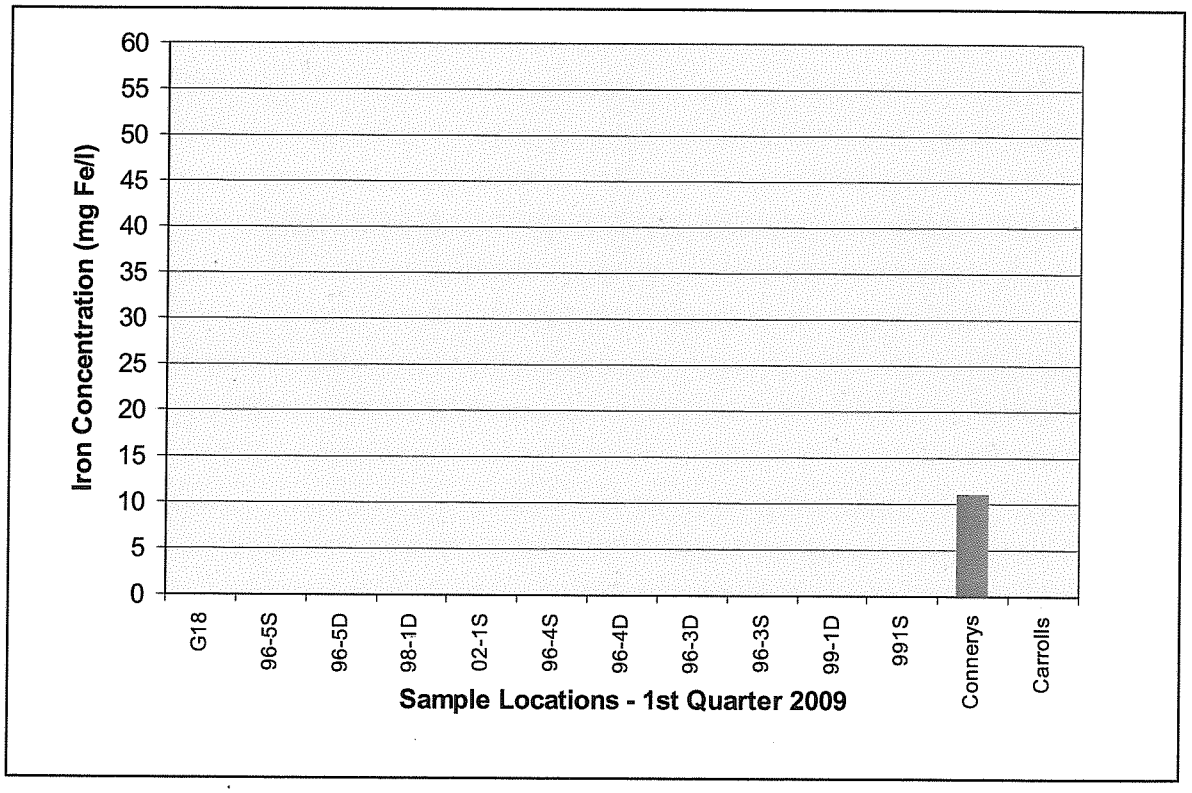


Figure 3.9: Groundwater Coliforms Levels

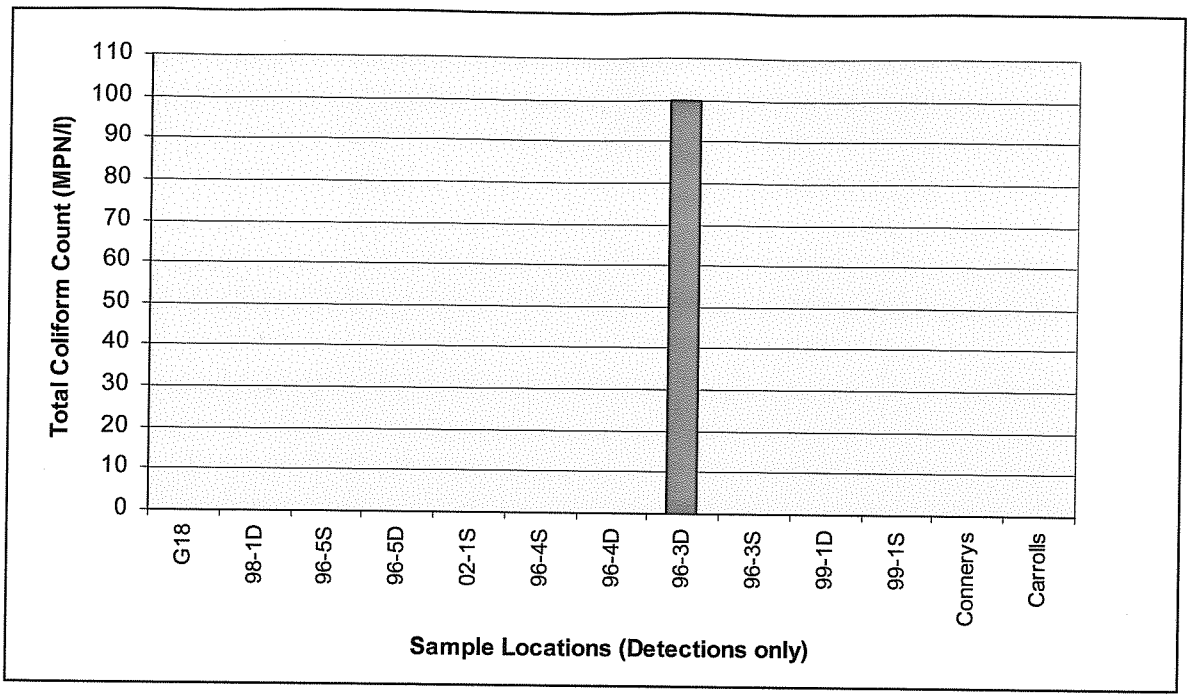
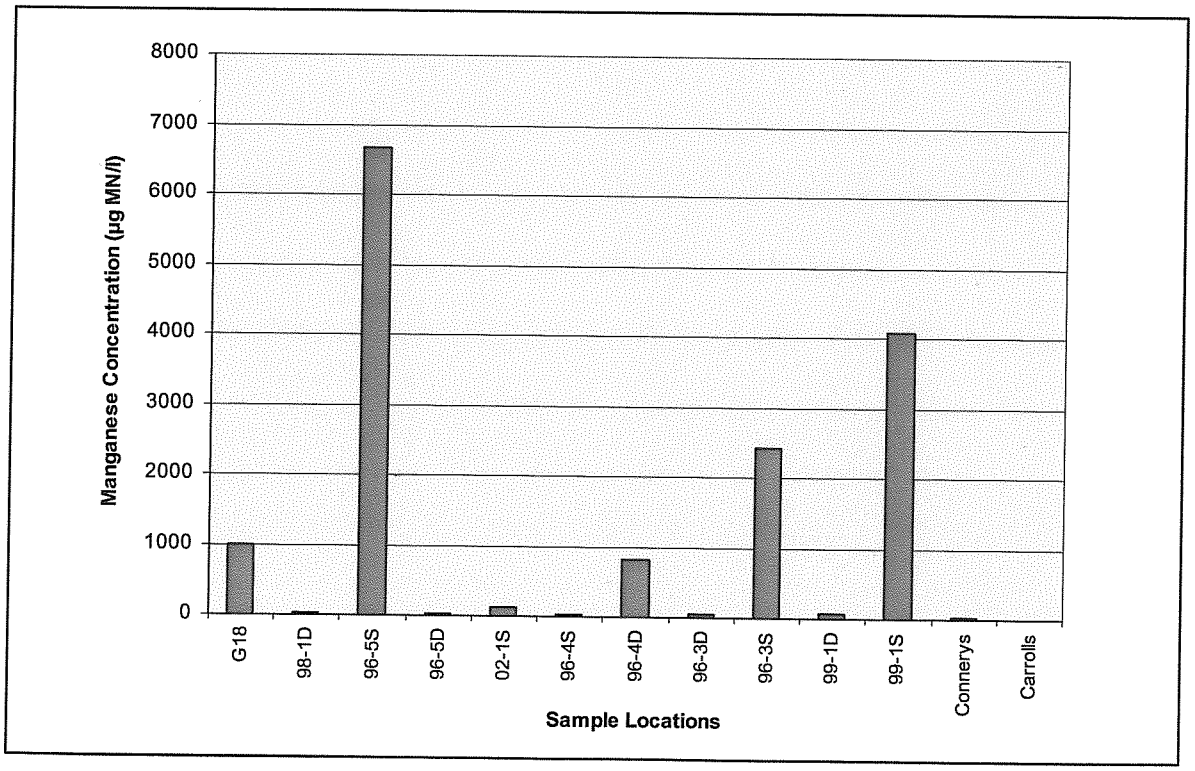


Figure 3.10: Groundwater Manganese Concentrations



3.3.1 *Long Term Trends*

As discussed above, levels of manganese are naturally elevated in the groundwater as a result of the geology of the site.

The normal indicative parameters of leachate contamination in groundwater include ammonia, chloride, total organic carbon (TOC), conductivity, pH, iron and heavy metals such as cadmium, nickel, zinc, copper and lead.

Chloride levels measured in wells, both upgradient and downgradient of the site, throughout the monitoring period were below the Drinking Water Regulations 2000 limit of 250 mg/l.

Cadmium and lead levels upgradient and downgradient of the site are consistently less than 2 ug/l, which are below the limits as set out in the Drinking Water Directive.

Ammonia levels (NH_3-N) did not exceed the Drinking Water Regulations 2000 limit of 0.2 mg/l on any occasion.

3.4 Leachate

3.4.1 Leachate Levels

There have been a number of exceedances in leachate levels in the cells. These are outlined in Table 3.2 below.

Table 3.2: Leachate Cell Exceedences for 2009

Date	Cell	Dipped Level	Height
07-Jan-09	2B	4.28	2.944
	2C	4.32	1.632
14-Jan-09	2B	4.2	3.024
	2C	4.26	1.692
21-Jan-09	2B	4.18	3.044
	2C	4.22	1.732
28-Jan-09	2B	4.23	2.994
	2C	4.2	1.752
05-Feb-09	2B	4.08	3.144
	2C	4.02	1.932
12-Feb-09	2B	4.12	3.104
	2C	4.06	1.892
19-Feb-09	2B	4.08	3.144
	2C	4.03	1.922
25-Feb-09	2B	4.2	3.024
	2C	4.42	1.532
5-Mar-09	2B	4.18	3.044
	2C	4.15	1.802
26-Mar-09	2B	4.2	3.024
	2C	4.18	1.772
1-Apr-09	2B	4.22	3.004
	2C	4.21	1.742
8-Apr-09	2B	4.29	2.934
	2C	4.25	1.702
15-Apr-09	2B	4.3	2.924
	2C	4.27	1.682
22-Apr-09	2B	4.24	2.984
	2C	4.2	1.752
6-May-09	2B	4.15	3.074
	2C	4.1	1.852
13-May-09	2B	4.23	2.994
	2C	4.16	1.792
21-May-09	2B	4.25	2.974
	2C	4.2	1.752
27-May-09	2B	4.2	3.024
	2C	4.16	1.792
3-Jun-09	2B	4.28	2.944
	2C	4.22	1.732
10-Jun-09	2B	4.26	2.964
	2C	4.2	1.752

Note:
Exceedances in cells 2B and 2C have been highlighted to EPA, ref. Incident 1 2008 and Incident 2 2008.
These elevated readings have been reduced by fitting a new electric pump to cell 2B.

3.4.2 *Chemical Analysis*

Indicators of decomposition of leachate include BOD, COD, conductivity, pH, chloride, sodium, iron, manganese, cadmium and VOCs. Generally, leachate constituents tend to rise during landfill operation, peaking approximately at the time of closure followed by a gradual post closure decrease (Krug and Ham, 1997: Proceedings of the Sixth International Landfill Symposium). Figures 3.15 to 3.22 inclusive illustrate the levels of the some of the above-mentioned parameters over time.

Leachate sampling for this reporting period consisted of one central measurement for each parameter taken from the Leachate Lagoon, rather than separate results taken from each cell. Hence the measurement shown as Cell 7 in the legend, relates to the measurement taken from the leachate lagoon from 2005 onwards.

The samples from the Leachate Lagoon were taken on 21st July 2009. There was low levels of rainfall for the week prior to the sample been taken.

Figure 3.11 illustrates that in the leachate BOD levels have decreased in all of the cells since end 2003, however there is a rise in BOD from 2007 to 2009 from 4 to 39 mg per litre.

Figure 3.12 shows COD levels in cells 1 to 7. The COD levels, while consistently higher than BOD, reflect a similar trend to that illustrated in Figure 3.11 with levels falling in all cells since 2003.

Figure 3.13 illustrates the electrical conductivity of the leachate in the lagoon. The 2005 result showed a marked increase on levels noted in the previous reports, but the 2006 and 2007 results show a decrease in conductivity levels, as per figures 3.11 and 3.12 there was a slight increase in the conductivity from 2007 to 2009 from 1827 to 3030.

Figure 3.14 illustrates pH levels in the cells and shows that the pH in all of the cells has fluctuated little in previous years between 6.5 and 7.5.

Figure 3.15, show that leachate chloride levels increased in cells 2, 3, 6 and 7 after capping. Chloride levels for 2009 are129 mg cl per litre.

Sodium levels increased slightly over this reporting period as seen in Figure 3.16. Iron and Manganese have decreased slightly (Figure 3.17 & Figure 3.18)

Leachate results for all the cells have been compared to leachate quality criteria as outlined in "A Review of the Composition of Leachates from Domestic Wastes in Landfill Sites" (DoE Research Report No. CWM 072/94).

These criteria are based upon a typical methanogenic leachate. When compared to these criteria, the leachate results taken at Ballyguyroe landfill site indicate typical characteristics of such a leachate.

Figure 3.11: Leachate Biological Oxygen Demand

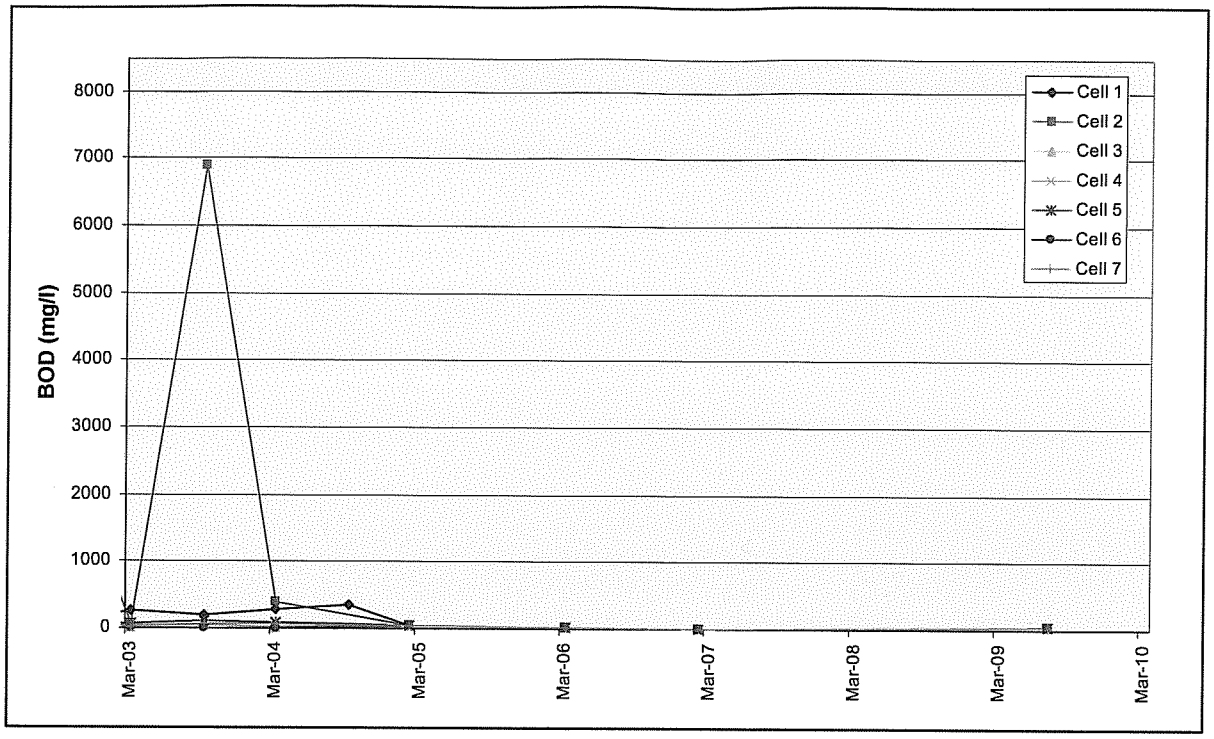


Figure 3.12: Leachate Chemical Oxygen Demand

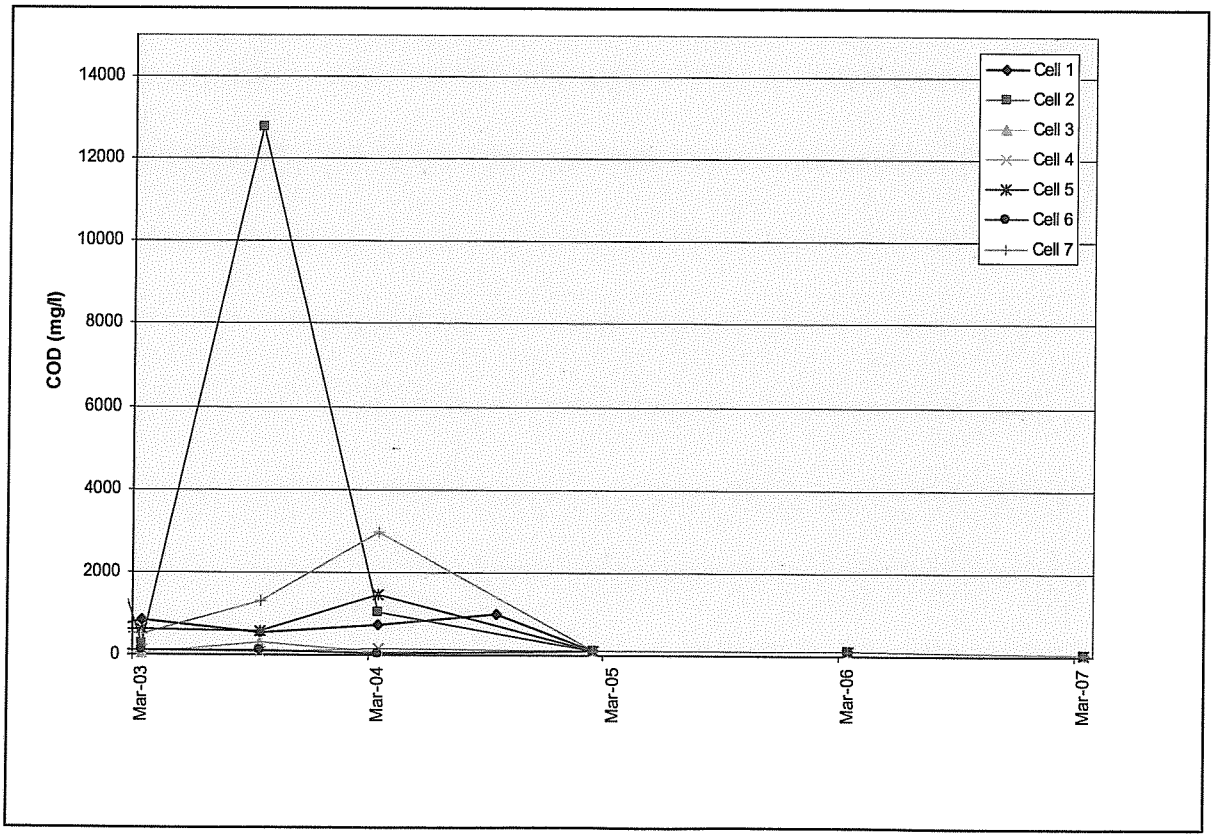


Figure 3.13: Leachate Conductivity

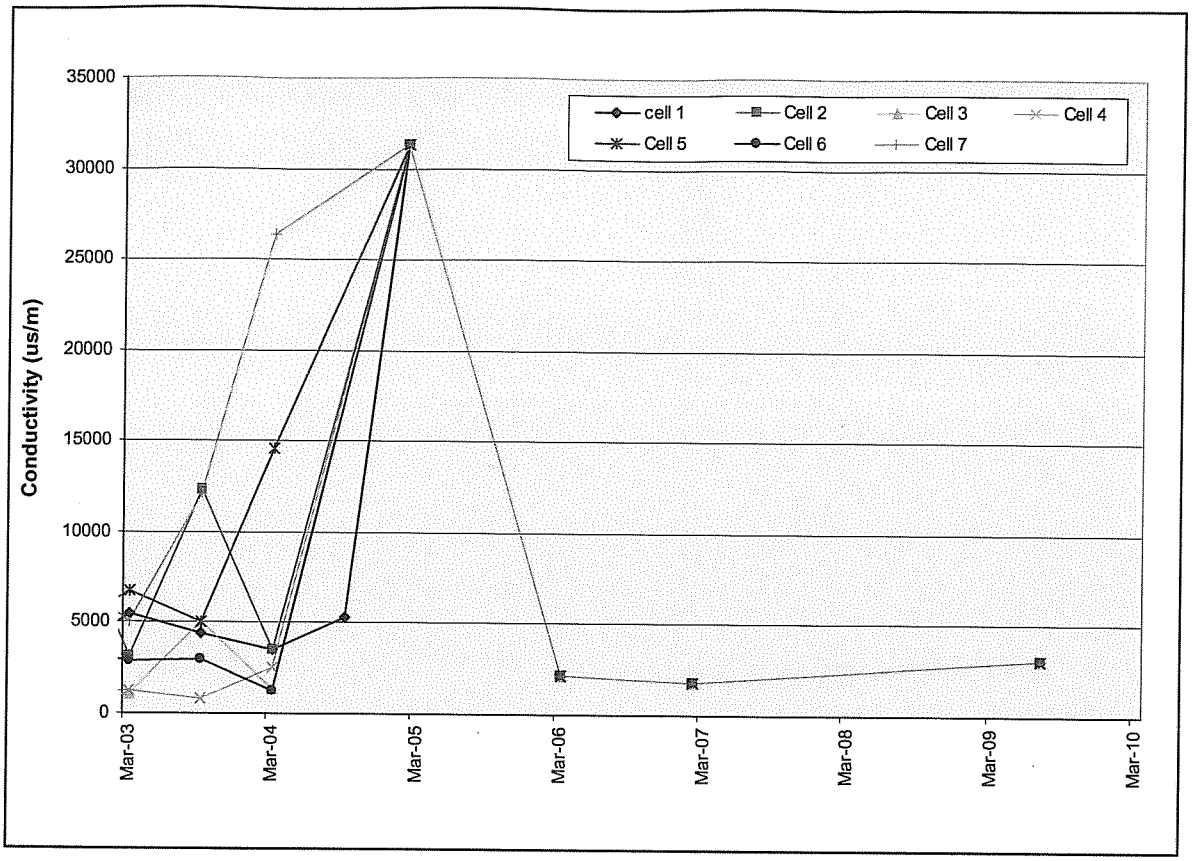


Figure 3.14: Leachate pH Levels

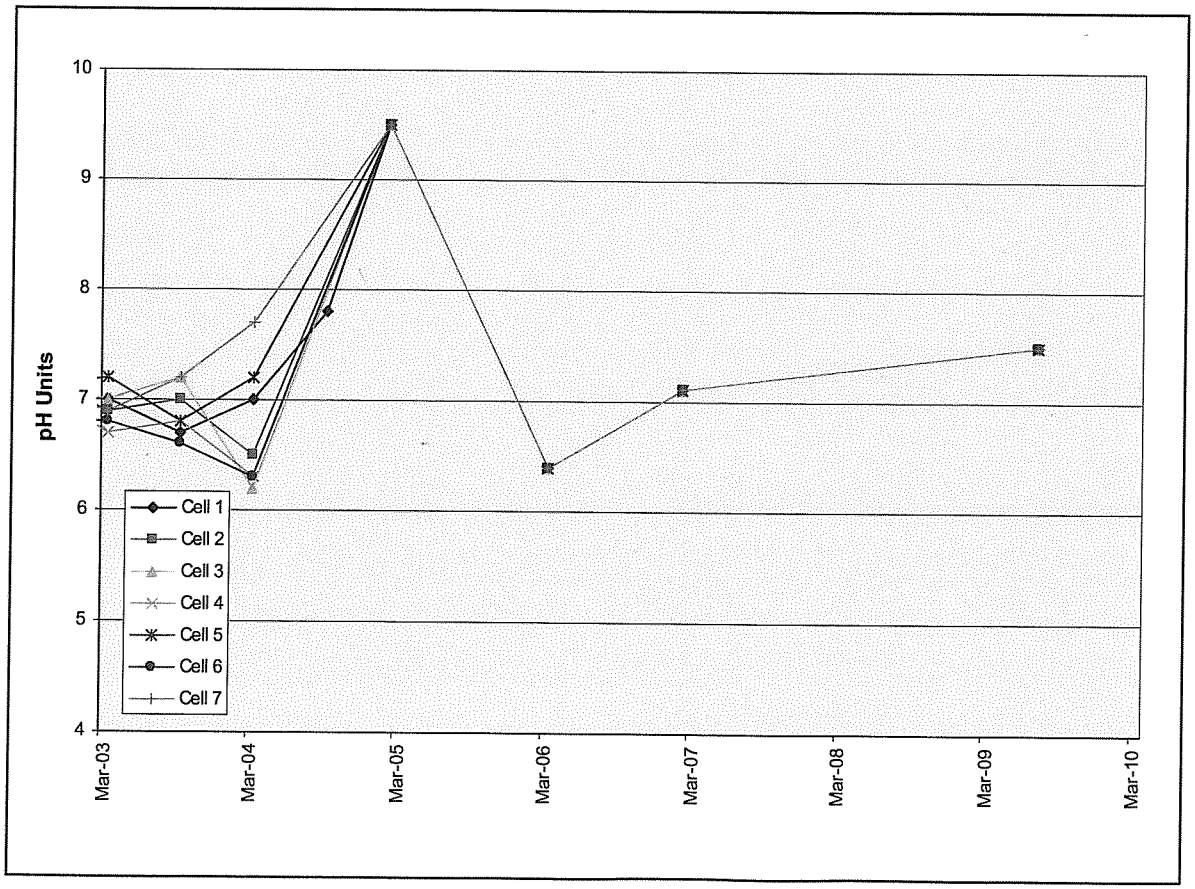


Figure 3.15: Leachate Chloride Levels

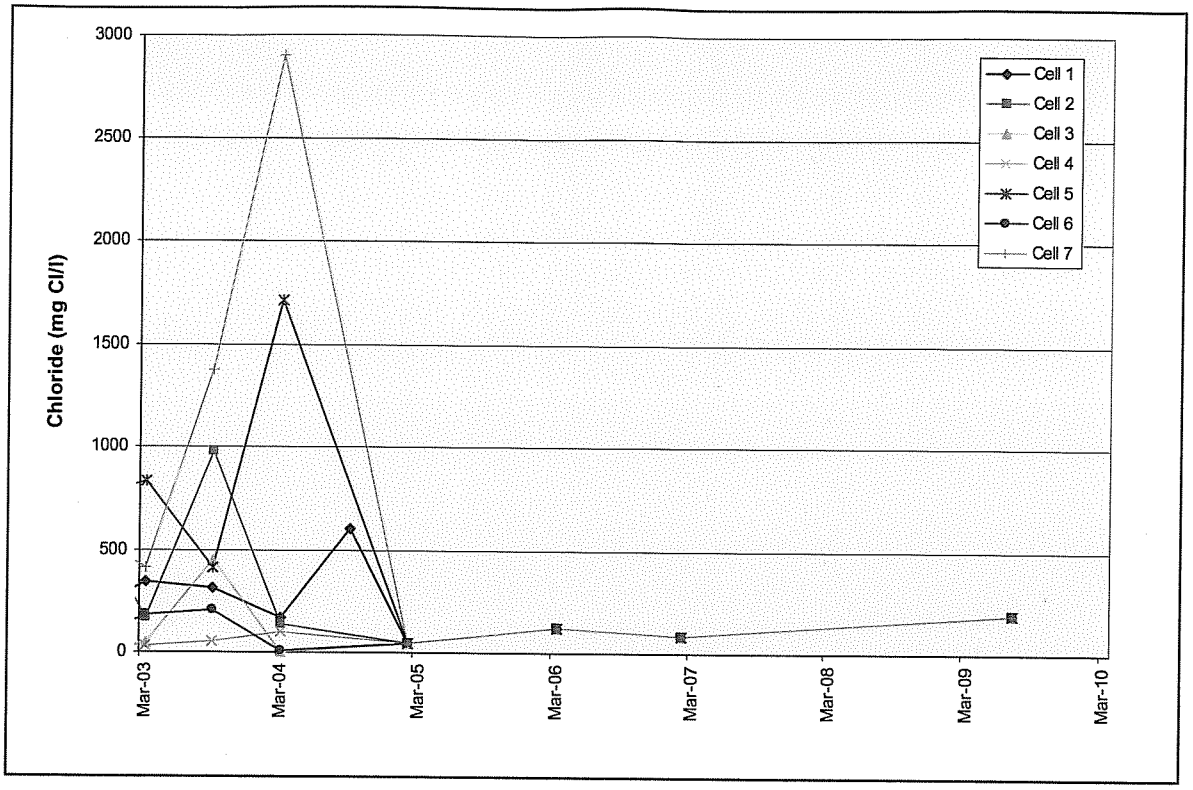


Figure 3.16: Leachate Sodium Levels

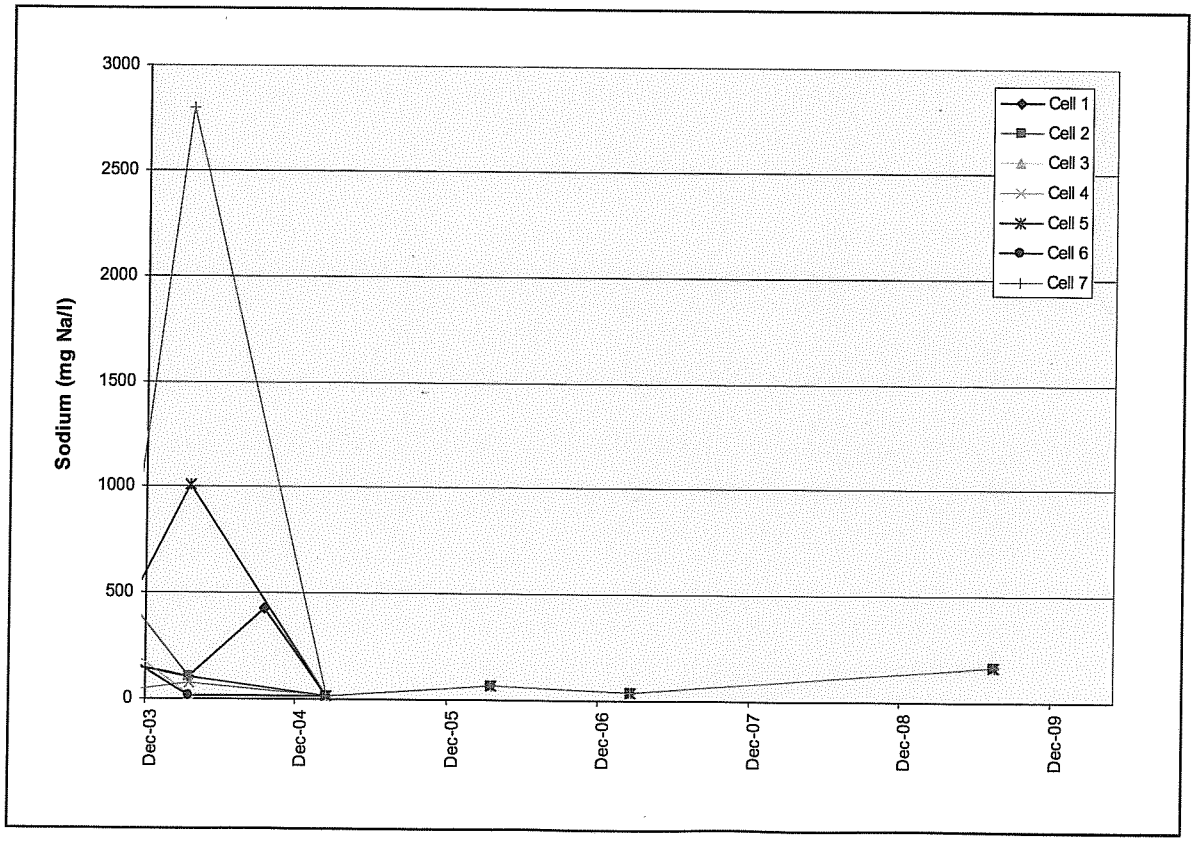


Figure 3.17: Leachate Iron Levels

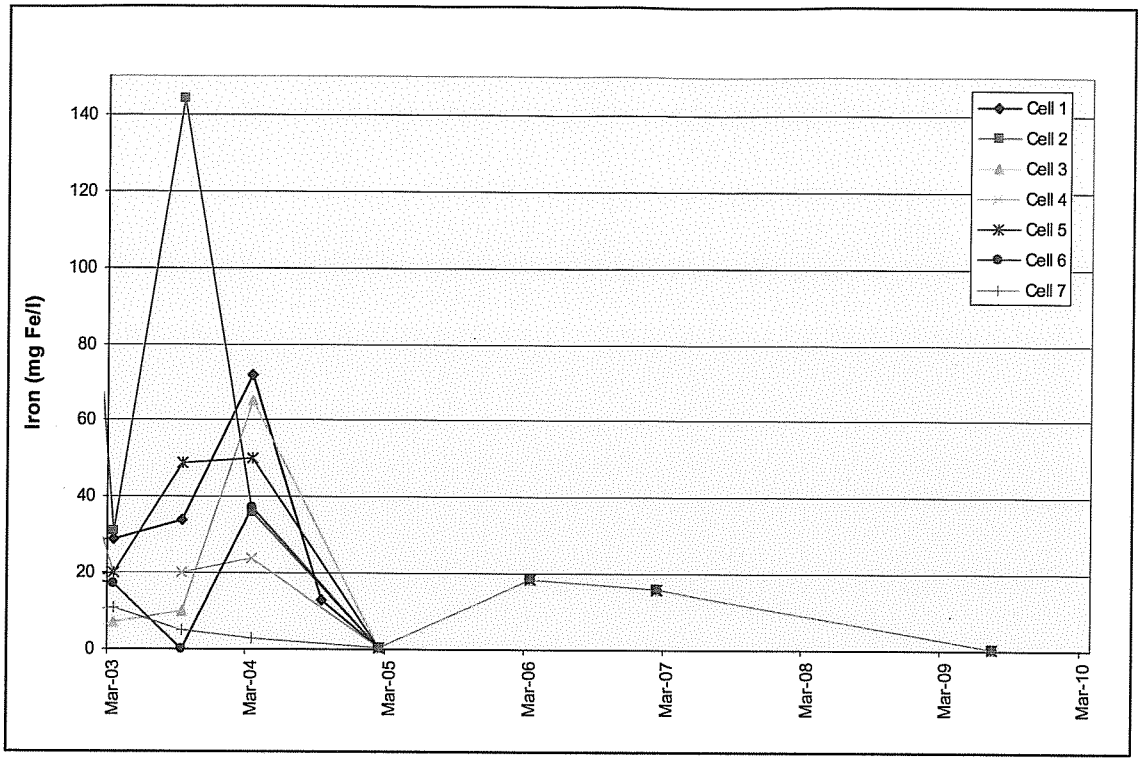
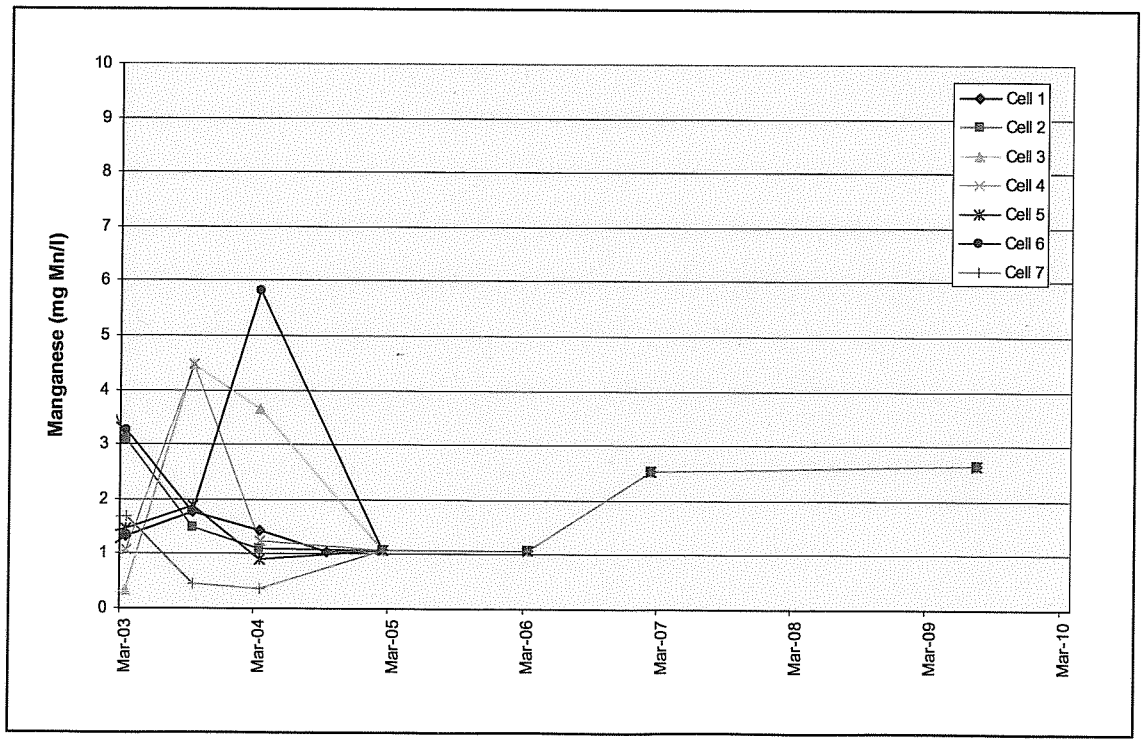


Figure 3.18: Leachate Manganese Levels



3.5 Biological Monitoring

The closest EPA monitoring point (Station No 200 – Bridge near Ballyguyroe North) has a Q value of 4 (unpolluted) according to the EPA's National Monitoring Program.

As per testing carried out through out the year the landfill has had no discernable impact on the river Farahy.

4. SITE DEVELOPMENT WORKS

The landfill site has been in operation since 1990, prior to the application for a waste licence, and therefore much of the infrastructure of the site was already complete by the time the licence came into being.

Site development works that were carried out in accordance with the conditions of the licence, during 2003 are outlined below:

- Installation of leachate management system.
- Replacement of gas boreholes and installation of a gas flare system.

4.1 Progress towards Site Restoration

The Cells 1 to 6 inclusive have been grassed at this stage and a landscaping proposal has been approved by the Agency. The final cap has been applied to Cell 7 during works carried out in 2002. A surface water settling pond was created in 2004.

4.2 Site Survey

In accordance with Condition 8.3 of the licence, a topographical survey of the site including the void space was conducted in March 2010 and is submitted within this report (Appendix 1 – Drawing No NC-10-025-001).

Cell 7 settled and as a result a depression formed in the landfill cap. This depression had the effect of gathering rainfall as leachate. Remedial works to cell 7 were commenced in 2006 and completed and re-seeded in 2007.

4.3 Landfill Gas Quantities

The gas flare has been installed and is currently operational. Steady state conditions have not yet been arrived at. Landfill gas emissions will not exceed the capacity of the flare which is 250 m^3/hr.

4.4 Indirect Emissions to Groundwater

There are no direct or indirect emissions to groundwater from the site for the following reasons:

- all of the cells are underlain by a very low permeability clay layer (cells 1-6) or are lined with a HDPE liner (cell 7).
- all leachate levels in the cells are kept within limits set by the Agency with the exceptions outlined in section 4.3.1.
- surface water and groundwater monitoring data indicates that there is no direct or indirect emission to the groundwater from the landfill site.

4.5 Monthly Water Balance Calculations

The monthly water balance calculations have been calculated as outlined in Appendix 2. The results are summarized in Table 4.1. The predicted amount of leachate can be compared with the actual amount tankered off site for each month.

The differences in actual and predicted quantities month to month can be explained by the absorptive capacity of the waste mass, which has a balancing effect. That is, high rainfall in one

month, which would lead to a high-predicted leachate quantity, may only be realized in actual leachate quantity the following month after the water has percolated down through the waste mass.

Table 4.1 Water Balance Calculations 2009

Month	Predicted Leachate	Actual Leachate
	m^3	m^3
January	944	1,621
February	291	1,317
March	444	1,012
April	457	1,388
May	1,055	1,059
June	453	872
July	592	1,263
August	927	1,030
September	258	1,113
October	854	1,572
November	1,937	4,178
December	590	1,297
Total	8,801	17,722
		8,920

Predicted leachate (8,801) — Actual leachate (17,722) = -8,920 m^3.

It is a condition of the waste licence that the level of leachate in Cells 1 to 7 has to remain within 1m above the base of the cell. As a pumping system is in place on site all efforts are made to maintain the leachate level below 1m above the base of the cell. In order to keep the leachate at this level excess volumes have to be removed.

In conclusion, the volume of leachate tankered off the site in 2009 was 101.35% more than the predicted volume.

5. WASTE RECEIVED BY THE FACILITY

Ballyguyroe Landfill Facility provided a final disposal point for municipal solid waste up to September 27th 2001, at which stage it ceased to accept waste. No waste was accepted by the facility during the reporting period.

6. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

6.1 Incident Summary

Condition 9 of the waste licence requires that the licensee shall make written records of environmental incidents.

Corrective actions taken in response to incidents and complaints are in accordance with the requirements of the licence and with the site Corrective Action Procedure.

Table 6.1: Recordable Incidents during the Reporting Period

Date	Incident	Cause	Corrective Action
28/01/2009	High levels of Faecal Coliforms in Groundwater Well 69-4 Deep – 6,500 MPN/100ml	The cause of the incident was apportioned to heavy rainfall preceding the date of sampling.	Continue to monitor and test well in February and March 2009. Our Reference - Incident 1 2009.

6.2 Complaints Received During the Reporting Period

No complaints were received during this reporting period.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME

In compliance with Condition 2.3 of the waste licence, an Environmental Management Programme (EMP) has been established for the facility.

The EMP includes the Environmental Management Plan, the Schedule of Drawings, the timescale for achieving the Objectives and Targets and the designation of responsibility for achieving the Objectives and Targets.

7.1 Summary of procedures associated with the facility

Documented procedures governing the operation of the facility are outlined in Table 7.1 below.

Table 7.1: Operational Procedures

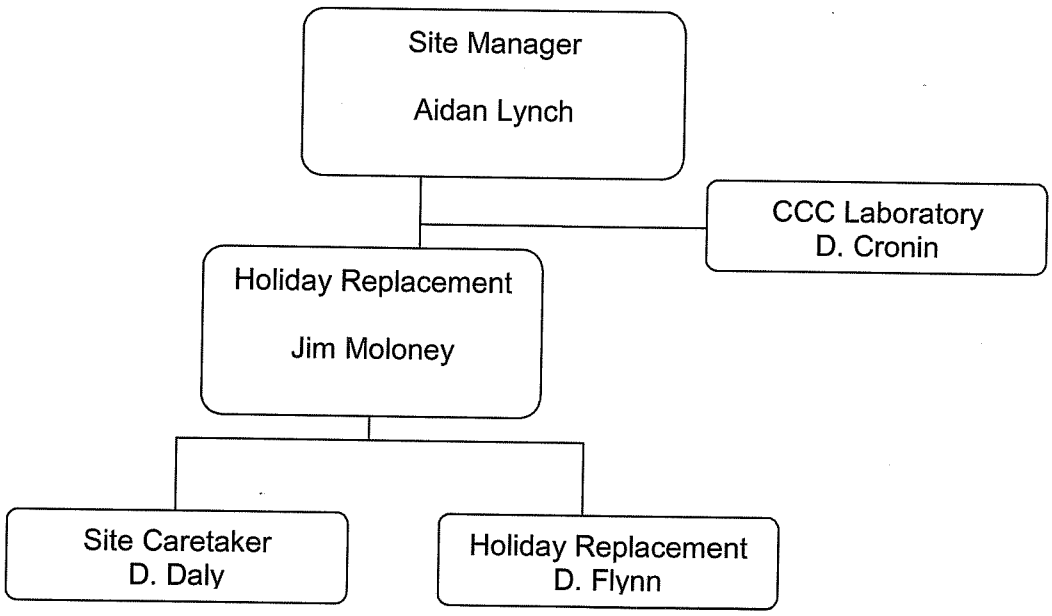
Procedure No.	Procedure Title
2	Smoking rules on site.
3	Rules for the refuse drivers entering the site.

4	Pumping of leachate on site.
5	Leachate levels on site.
7	Gas monitoring on site.
8	Use of absorbent material on site.
9	Site security and site fencing.
10	Loading of leachate.
11	Collection of litter.
12	Water ponding on cells.
14	Filling of the diesel tank
15	Loading of leachate from Cells 1 to 4
16	Discharging of leachate at Charleville Sewage Works
17	Spraying of flies

7.2 Management and Staff Structure

Cork County Council operates the landfill facility under the management structure illustrated in Figure 7.1 below.

Figure 7.1: Management Structure



- **Site Manager: Aidan Lynch**

Responsibilities: Entire management of the facility
Qualifications: B.E.

- **Holiday Replacement Site Manager: Jim Moloney**

Responsibilities: Entire management of the facility
Qualifications: B.E

- **Laboratory: Diarmuid Cronin**

Responsibilities: Sampling, analysis and interpretation of all in-house sampling on the landfill site.
Qualifications: Technician Grade I

- **Site Caretaker: D. Daly**

Responsibilities: Control of access to site, all weighbridge duties, canteen/storage container, machinery hire, leachate levels, measurement of stream discharges, gas measurement, well level measurement, daily environmental records.
Experience: Seven years as Site Caretaker on Ballyguyroe Landfill Site

- **Holiday Replacement: Denis O'Flynn**

Responsibilities: As above when substituting for D. Daly

The contingency arrangements for the absences of the main persons from the facility are outlined below:

Person Absent	Replacement
A. Lynch	J. Moloney
D. Daly	D. O'Flynn
D. O'Flynn	Operative is supplied by a County Council area office.

7.3 Budget

The budget for 2009 was €301,000 including contact capital works and operational costs.

7.4 Staff Training

No training was carried out in this reporting period.

7.5 Nuisance Controls

The nuisance control methods that were in place during the monitoring period have been reviewed and have been deemed as adequate. These include litter fencing, a silt discharge pond and gas detection metres.

7.6 Any Other Items Specified by the Agency

The Agency has not specified any additional items to be included in this report.

8. RESOURCE CONSUMPTION

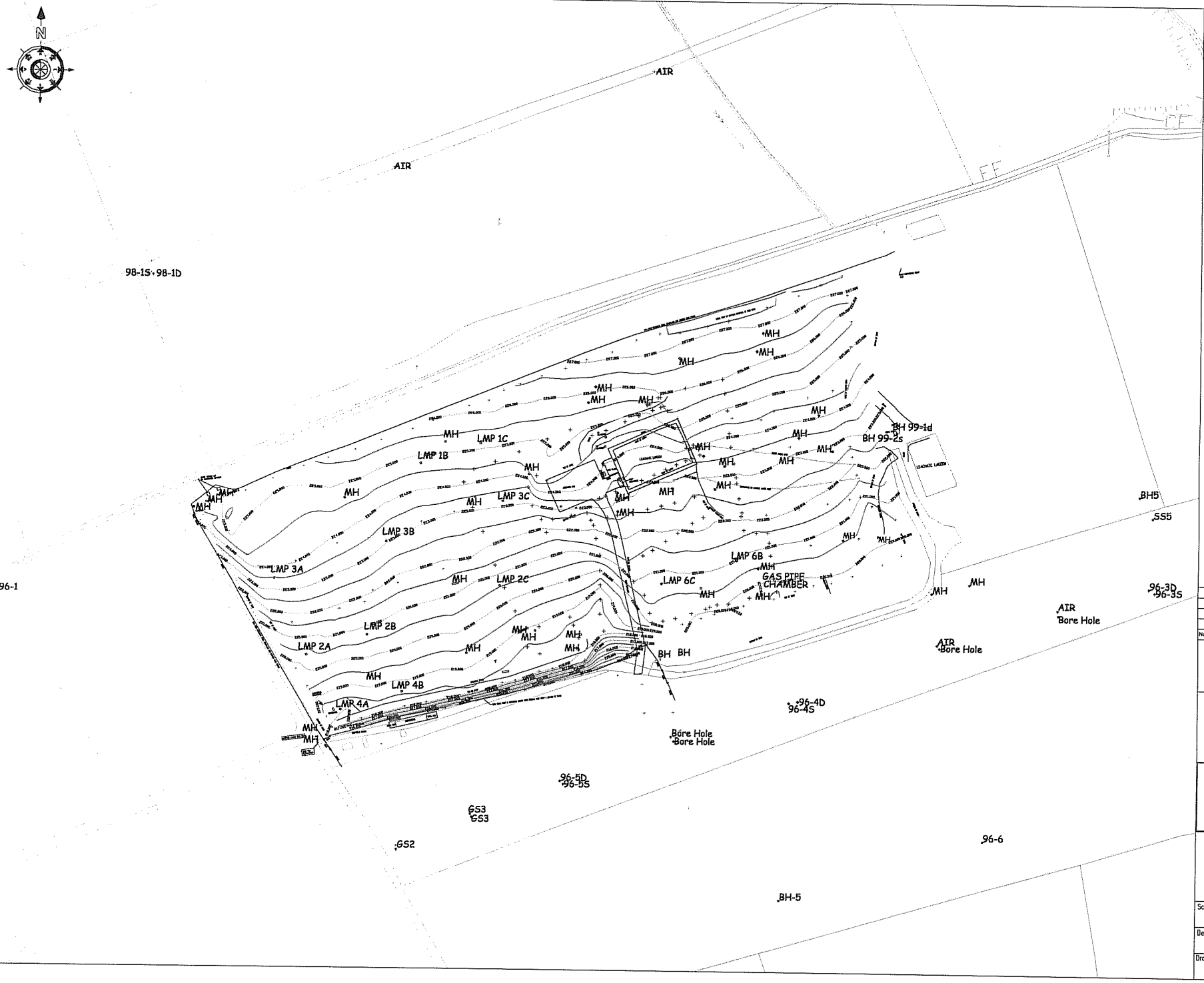
During the reporting period the following resources were utilised at the site:

- Electricity 37,050 kilowatt hours

Water use on site was for domestic use only.

APPENDIX 1

Topographical Survey Contour Drawing



NOTES

1. Dimensions are not to be scaled from drawing. For any discrepancies found consult with the design office.
2. This drawing is to be read in conjunction with the Specification.
3. This drawing is to be read in conjunction with all other contract drawings.

No.	Date	Drwn	Surv	Chkd	Revision Description

Cork County Council,
Northern Division.

N. O'KEEFFE, B.E.,
COUNTY ENGINEER,
COUNTY HALL,
CORK.

Job Title:

BALLYGUYROE LANDFILL SITE,

Drawing Title:

Location of Monitoring points

Scales:	Surveyed by:	Drawn by:
1:1000	D.L.	D.L.
Designed by:	Checked by:	Date:
A.L.	A.L.	March 2010
Drawing number:		Rev:
NC-10-025-001		-

APPENDIX 2

Water Balance Calculations

Ballyguyroe Landfill

Monthly Leachate Prediction for Year 2009

Month	Active Cell No.	Active Area (m2)	Waste Input (t)	Rainfall (mm)	Evapotranspiration (mm)	Active Infiltration (m3)	Restoration Cell No.	Restored Area No. 1 (m2) 1 to 4	Restored Area No. 2 (m2) 5 & 6	Restored Area No. 3 (m2) 7	Restored Infiltration Area No. 1 (m3)	Restored Infiltration Area No. 2 (m3)	Restored Infiltration Area No. 3 (m3)	Liquid Waste (m3)	Total Leachate (m3)	Cummulative Leachate (m3)	Absorptive Capacity (m3)	Cummulative Absorptive Capacity (m3)	Monthly Leachate Generation (m3)	Monthly Leachate Generation (gallons)
1	7	0	0.00	139.4	0.0	0	1 to 7	29,820	15,810	14,400	624	220	100	0	944	944	0	5,850	944	249,294
2	7	0	0.00	43	0.0	0	1 to 7	29,820	15,810	14,400	192	68	31	0	291	1236	0	5,850	291	76,898
3	7	0	0.00	65.5	0.0	0	1 to 7	29,820	15,810	14,400	293	104	47	0	444	1679	0	5,850	444	117,136
4	7	0	0.00	67.5	0.0	0	1 to 7	29,820	15,810	14,400	302	107	49	0	457	2137	0	5,850	457	120,713
5	7	0	0.00	155.7	0.0	0	1 to 7	29,820	15,810	14,400	696	246	112	0	1055	3191	0	5,850	1,055	278,444
6	7	0	0.00	66.8	0.0	0	1 to 7	29,820	15,810	14,400	299	106	48	0	453	3644	0	5,850	453	119,461
7	7	0	0.00	87.4	0.0	0	1 to 7	29,820	15,810	14,400	391	138	63	0	592	4236	0	5,850	592	156,301
8	7	0	0.00	136.8	0.0	0	1 to 7	29,820	15,810	14,400	612	216	98	0	927	5162	0	5,850	927	244,644
9	7	0	0.00	38.1	0.0	0	1 to 7	29,820	15,810	14,400	170	60	27	0	258	5421	0	5,850	258	68,136
10	7	0	0.00	126.1	0.0	0	1 to 7	29,820	15,810	14,400	564	199	91	0	854	6275	0	5,850	854	225,509
11	7	0	0.00	285.9	0.0	0	1 to 7	29,820	15,810	14,400	1279	452	206	0	1937	8211	0	5,850	1,937	511,285
12	7	0	0.00	87.1	0.0	0	1 to 7	29,820	15,810	14,400	390	138	63	0	590	8801	0	5,850	590	155,764
																			8,801	2,323,585

Density of in-situ waste = 0.75 t/m3

Absorptive Capacity = 0.075 m3/t

Final Infiltration = 15% of Effective rainfall p.a. in cells 1 to 4

Final Infiltration = 10% of Effective rainfall p.a. in cells 5 & 6

Final Infiltration = 5% of Effective rainfall p.a. in cell 7

Active Infiltration = Total rainfall

Liquid waste input = 0 t/year

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.10

REFERENCE YEAR	2009

1. FACILITY IDENTIFICATION

Parent Company Name	Cork County Council
Facility Name	Ballyguyroe Landfill Site
PRTR Identification Number	W0002
Licence Number	W0002-02

Waste or IPPC Classes of Activity

No.	class_name
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
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.
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
4.4	Recycling or reclamation of other inorganic materials.

Address 1	Ballyguyroe North
Address 2	Mallow
Address 3	Co. Cork
Address 4	
Country	Ireland
Coordinates of Location	-8.49413 52.2825
River Basin District	IESW
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Aidan Lynch
AER Returns Contact Email Address	aidan.lynch@corkcoco.ie
AER Returns Contact Position	Assistant Engineer
AER Returns Contact Telephone Number	022 - 30483
AER Returns Contact Mobile Phone Number	086 8146519
AER Returns Contact Fax Number	022 21983
Production Volume	0.0
Production Volume Units	0
Number of Installations	1
Number of Operating Hours in Year	1095
Number of Employees	1
User Feedback/Comments	
Web Address	www.corkcoco.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(c)	Installations for the disposal of non-hazardous waste
5(c) 50.1	Installations for the disposal of non-hazardous waste General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4.1 RELEASES TO AIR

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR								
POLLUTANT		METHOD				QUANTITY		
		Method Used			Flare			
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
08	Nitrogen oxides (NOx/NO2)	M	alt	Testo 350 Flue gas analyser	6.935985	6.935985	0.0	0.0

* 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							QUANTITY		
		Method Used			Flare						
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
02	Carbon monoxide (CO)	M	alt	Testo 350 Flue gas analyser	43.5811058	0.0	0.0	0.0	43.5811058	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	alt	Testo 350 Flue gas analyser	0.6935985	0.0	0.0	0.0	0.6935985	0.0	0.0
80	Chlorine and inorganic compounds (as HCl)	M	alt	Anaylsis of gas colelcted in impinger solution	0.30633934	0.0	0.0	0.0	0.30633934	0.0	0.0
84	Fluorine and inorganic compounds (as HF)	M	alt	Anaylsis of gas colelcted in impinger solution	0.01849596	0.0	0.0	0.0	0.01849596	0.0	0.0

* 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				QUANTITY		
		Method Used						
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

* 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: Ballyguyroe Landfill Site

Please enter summary data on the quantities of methane flared and / or utilised

	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)						
Methane flared	0.0	M	oth		N/A	
Methane utilised in engine/s	37974.52	M	oth	hitech instruments infrared a	0.0	(Total Flaring Capacity)
Net methane emission (as reported in Section A above)	0.0				0.0	(Total Utilising Capacity)
	6.935985	M	oth	Testo 350 Flue Gas Analyser	N/A	

4.2 RELEASES TO WATERS

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of s

RELEASES TO WATERS			
POLLUTANT			
No. Annex II	Name	M/C/E	Method Code
18	Cadmium and compounds (as Cd)	M	alt
19	Chromium and compounds (as Cr)	M	alt
20	Copper and compounds (as Cu)	M	alt
21	Mercury and compounds (as Hg)	M	alt
22	Nickel and compounds (as Ni)	M	alt
23	Lead and compounds (as Pb)	M	alt
24	Zinc and compounds (as Zn)	M	alt
13	Total phosphorus	M	alt
12	Total nitrogen	M	alt
79	Chlorides (as Cl)	M	alt

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS			
POLLUTANT			
No. Annex II	Name	M/C/E	Method Code

* 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 WATERS			
POLLUTANT			
Pollutant No.	Name	M/C/E	Method Code
238	Ammonia (as N)	M	alt
321	Manganese (as Mn)	M	alt
327	Nitrate (as N)	M	alt
343	Sulphate	M	alt
303	BOD	M	alt
320	Magnesium	M	alt
338	Potassium	M	alt
357	Iron	M	alt
240	Suspended Solids	M	alt
341	Sodium	M	alt
305	Calcium	M	alt

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

			QUANTITY		
Method Used	North Stream SS2	South Stream SS5			
Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
us epa methos 200.8	0.000004638	0.000012535	0.000017172	0.0	0.0
us epa methos 200.8	0.000004638	0.000050139	0.000054777	0.0	0.0
us epa methos 200.8	0.000004638	0.000050139	0.000054777	0.0	0.0
us epa methos 200.8	0.000002319	0.00002507	0.000027388	0.0	0.0
us epa methos 200.8	0.000004638	0.000050139	0.000054777	0.0	0.0
us epa methos 200.8	0.000004638	0.000050139	0.000054777	0.0	0.0
us epa methos 200.8	0.000092752	0.001153201	0.001245953	0.0	0.0
Apha 21st edition 4500-pd (2005)	0.000023188	0.001504175	0.001527363	0.0	0.0
Alpha 21st edition 4500-NO2b	0.046376	0.50139	0.547766	0.0	0.0
Apha 21st edition 4110B (2005)	0.0301444	0.3027151	0.3328595	0.0	0.0

		QUANTITY		
Method Used				
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

			QUANTITY		
Method Used	North Stream SS2	South Stream SS5			
Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
Apha 21st edition 4500	0.000046376	0.000501392	0.000547768	0.0	0.0
US epa method 200.8	0.000013913	0.000250696	0.000264609	0.0	0.0
Apha 21st edition (2005) 4500	0.001576784	0.005515308	0.007092092	0.0	0.0
Apha 21st edition 4110b (2005)	0.01263746	0.077715699	0.090353159	0.0	0.0
US epa method 200.8	0.0046376	0.05013916	0.05477676	0.0	0.0
US epa method 200.8	0.00394196	0.052646118	0.056588078	0.0	0.0
US epa method 200.8	0.00371008	0.032590454	0.036300534	0.0	0.0
US epa method 200.8	0.00092752	0.002256262	0.003183782	0.0	0.0
Apha 21st edition 2540 d(2005)	0.011594	0.125347901	0.136941901	0.0	0.0
US epa method 200.8	0.01924604	0.22813318	0.24737922	0.0	0.0
US epa method 200.8	0.01646348	0.626739505	0.643202985	0.0	0.0

4.3 RELEASES TO WASTEWATER OR SEWER

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
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

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
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

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND							
POLLUTANT		METHOD			QUANTITY		
No. Annex II	Name	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND							
POLLUTANT		METHOD			QUANTITY		
Pollutant No.	Name	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE

| PRTR# : W0002 | Facility Name : Ballyguyroe Landfill Site | Filename : AER W0002_2009.xls | Return Year : 2009 |

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	19 07 03	No	17721.37	Landfill Leachate	D9	M	Weighed	Onsite in Ireland	Charleville Waste Water Treatment Plant,.	,,,,,,,,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button