Comhairle Contae Chiarraí

Kerry County Council

Waste Licence Ref No. W0001-04

Annual Environmental Report for North Kerry Landfill

Reporting Period:

January 2013 – December 2013

1.0 Contents

2.0 Introduction and Reporting Period

Kerry County Council (KCC) operates a municipal solid waste landfill facility at Muingnaminnane, Kielduff, Tralee, Co. Kerry.

It is located approximately 8km northeast of Tralee, in the Stacks Mountains.

The landfill site accepts solid waste for disposal. The landfill is operated under licence W0001-04.

This Annual Environment Report is prepared in accordance with Condition 12.6 and Schedule F of Waste Licence W0001-04.

The reporting period for this Annual Environmental Report is from January 1st 2013 to December 31st 2013.

3.0 Waste Activities carried out at the Facility

Waste disposal activities carried out at North Kerry Landfill are in accordance with Part 1 of Waste Licence W0001-04 which outlines the waste disposal activities licenced in accordance with the Third Schedule of the Waste Management Act 1996-2010.

Licenced activities include;

Class 2	Land treatment, including biodegradation of liquid or sludge discards in soils.
Class 4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
Class 5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
Class 6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.
Class 7	Physico-chemical treatments not referred to elsewhere in this Schedule (including evaporation, drying and calcinations) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.
Class 11	Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
Class 12	Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
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.

Waste recovery activities carried out at North Kerry Landfill are in accordance with Part 1 of Waste Licence W0001-04 which outlines the waste recovery activities licenced in accordance with the Fourth Schedule of the Waste Management Acts 1996-2008.

Licenced activities include:

Class 2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
Class 3	Recycling or reclamation of metals and metal compounds.

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.

Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.

Class 13 Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

4.0 Quantity and composition of waste received, disposed and recovered

Waste tonnage disposed of at NKL during the reporting year 2013 decreased on the previous year to 55,276.68 tonnes.

This is due mainly to a reduction of private waste contractors disposing of their collected waste at North Kerry Landfill for the reporting period.

Quantity of Waste disposed at facility

Since opening in May 1994 the total quantity of waste disposed of at the facility is 883,879 tonnes.

Appendix B shows a yearly break down of tonnage from 1994 – 2013.

BMW Percentage Composition of Waste disposed at facility

Total Qty MSW of which the BMW Condition Applies	Total Qty BMW	% BMW
55,276.68	30,668.49	55.64%

Appendix A shows the yearly breakdown of tonnage and %BMW entering the landfill site between 1st January – 31st December 2013 as submitted to the Agency.

5.0 Remaining Capacity and Projected Closure Date

Waste disposal/placement is currently being carried out in cell 17. It is estimated at current waste disposal trends that waste disposal/placement in cell 17 will cease in July 2014 after which all developed cells will be full and the landfill will stop accepting waste.

The remaining developed void capacity is circa 2,700 m^3. This equates making allowance for cover requirements and compaction densities to approximately 2,646 tonnes.

Remaining undeveloped licensed capacity volume is 509,012 m^3 which equates to approximately 450,000 tonnes which could be utilised in the future.

6.0 Method of Deposition of Waste at North Kerry Landfill

Large vehicle access/private customers with large trailers.

The current arrangement for disposing of waste in cell 17 is carried out on a pre-built pre-planned tip head.

The tip head height is normally kept at a height allowing for adequate working room for plant in the area.

At the latter stage of a cells life, it is not feasible to maintain the purpose built tip head so an access road is constructed on top of the placed/compacted waste. A temporary level tip is constructed. Waste is deposited on the flat and a bull dozer is used to push the waste ahead of the compactor for placement and further compaction.

Customers accessing the site with small quantities of waste.

The majority of customers do not access the tip head in order to dispose of their waste. These were directed to the public skip area to place their waste into a series of trailers. These trailers are removed from the public skip area on a regular basis and tipped at the tip head for placement/compaction. The weighbridge supervisor takes note of the weight of each trailer before it emptied and this information is added to the daily tonnage records and the end of every day.

Appendix C outlines the types of waste which are accepted in NKL for removal off site for recycling/recovery/disposal.

The civic amenity area contains a number of receptacles into which members of the public can deposit specific waste types free of charge for recovery/recycling/disposal. In addition to the concrete slab area there is a shed for the housing of WEEE and Hazardous waste collection.

Additionally the civic amenity area includes an area for the deposition of green waste. With the introduction of BMW target in July 2010, all green waste collected on site is being removed to the Bord na Mona licenced site at Kilberry Co Kildare for further processing and reuse.

7.0 Summary Report on Emissions for the Reporting Period.

Emissions to Water.

A full report prepared by the Environmental Laboratory of KCC is included in the Appendix D which covers the emission to water and ecological assessments undertaken.

Emissions to Air.

Gas management practices at North Kerry Landfill is an interlinked system of mutually reinforcing actions no one of which can fully control or manage the generation of LFG from the deposited waste mass. In combination however, they comply fully with the requirements of the licence.

The Systems and operations include:

- Active management of the gas control infrastructure
- Introduction of new gas collection systems
- Odour patrol and consequent reactive measures
- Monitoring and testing of infrastructure

The infrastructure in place at North Kerry Landfill includes the construction of a basal liner and capping system.

Outside the footprint of the landfill is a network of LFG monitoring boreholes. There are constructed in a grid around the footprint of the area that waste has been deposited within. These wells are monitored on a prescribed cycle for the presence of a suite of indicator gases that would signal the possible migration of LFG.

Perimeter Gas Wells No. 6 through to 6d continue to show methane and CO2 concentrations above the allowable limits. This is a historically problematic well. In 2004 wells 6a-d were constructed to monitor the gas migration in the vicinity of the gas well. These perimeter gas wells also showed gas concentration levels in excess of the allowable at times during the year.

It is noted however that there is no odour of nuisance issue at the location or evidence of vegetation die back.

In November 2011 the gas to energy project was successfully commissioned. A Genset of nominal rating 300 kW is in operation at the facility however it has not been in operation from 9th September 2013 as per ESB recommendations.

The demand of the generation plant has been balanced against the generation output of the field. Field balancing and network management are vital components of a successful operation of the gas to energy project. These are actively managed to ensure maximum production.

8.0 Resource and Energy Consumption.

The following is the energy consumption for North Kerry Landfill for the reporting period.

Diesel

The diesel usage for the reporting period was 82,039 litres.

Electricity

The total usage for 2013 was 118,650 kWh; this is an increase energy consumption of 12,300 kWh. This is due to an increase in the use of pumps in the active cells during 2013.

9.0 Energy Efficiency and Audit Report Summary

Electricity

The kW hour usage on site for 2013 is set out in the attached table.

Table 8.2, kWh usage 2013

From	To	Day kWh	Night kWh
31/12/2012	28/02/2012	14,625	8,250
28/02/2013	30/04/2012	17,325	13,200
30/04/2013	30/06/2012	10,525	6,875
30/06/2013	31/08/2012	8,850	5,625
31/08/2013	31/10/2012	8,425	4,850
31/10/2013	31/12/2012	12,500	7,600
		72,250	**46,400**

10.0 Proposed Development of the Facility and timescale of the Development

The following projects are proposed for construction at North Kerry Landfill over 2014.

Gas to Energy Utilisation Project (ongoing)

This project was commissioned and started exporting electricity in November 2011.

The gas utilisation compound occupies the footprint of the previous public waste acceptance skips.

It comprises of:

- A Jenbacher JGC208GS Generation Set Engine and associated ancillary works (i.e. concrete pad)
- Two substation buildings for the ESB and 20kV equipment
- Cable and trenches ducts
- Installation of containerised office/welfare unit/storage unit.

A number of improvements have been completed on the collection network including which has improved the quantity of gas of a specific makeup that is required of the generation plant.

The remaining works refer to continual incremental improvements to the collection infrastructure with the focus on gas quality and collection network.

Permanent Capping of cells 18 and 19

Cells 18 and 19 are currently being capped followed by Cell 17 after it reaches profile height in 2014.

11.0 Volume of leachate produced and volume transported off site.

Over the reporting period 67,830 m^3 of leachate was produced on site.
The total quantity of leachate produced on site since the landfill site opened in May 1994 to the end of the reporting period is 697,909 m^3.
No leachate has been treated on site; all leachate is tankered off site for treatment.

Table 10.1, Leachate volumes tankered off –site, 2013.

Month	2009	2010	2011	2012	2013
January	8,186.27	4,230.94	5,255.90	11,271.74	9,991.34
February	7,985.36	5,666.38	5,395.38	6,780.04	10,926.18
March	4,881.29	3,324.86	3,768.72	2,502.62	2,412.84
April	5,379.62	4,080.68	3,845.78	3,623.48	5,506.44
May	5,579.68	1,711.48	2,805.70	3,724.42	5,322.99
June	1,844.61	1,236.44	3,735.13	4,351.31	3,488.05
July	4,084.22	4,304.64	3,698.12	7,551.38	2,313.66
August	5,208.40	2,208.06	2,751.70	6,072.90	4,572.32
September	8,017.22	4,902.34	3,655.51	4,576.09	2,028.98
October	3,508.76	2,393.60	3,956.40	5775.56	5,791.80
November	11,213.14	6,719.70	4,905.12	6997.38	9,154.71
December	7,839.28	1,663.61	6,335.12	5836.08	6,320.70
Total	***73,727.85***	***42,442.73***	**50,108.58**	**69,063.00**	**67,830.01**

12.0 Report on Development Works Undertaken during the Reporting Period

Completion work on the permanent capping of Cells 15B and 16 took place in 2013.
Also the commissioning of the ICW project took place in August 2013.

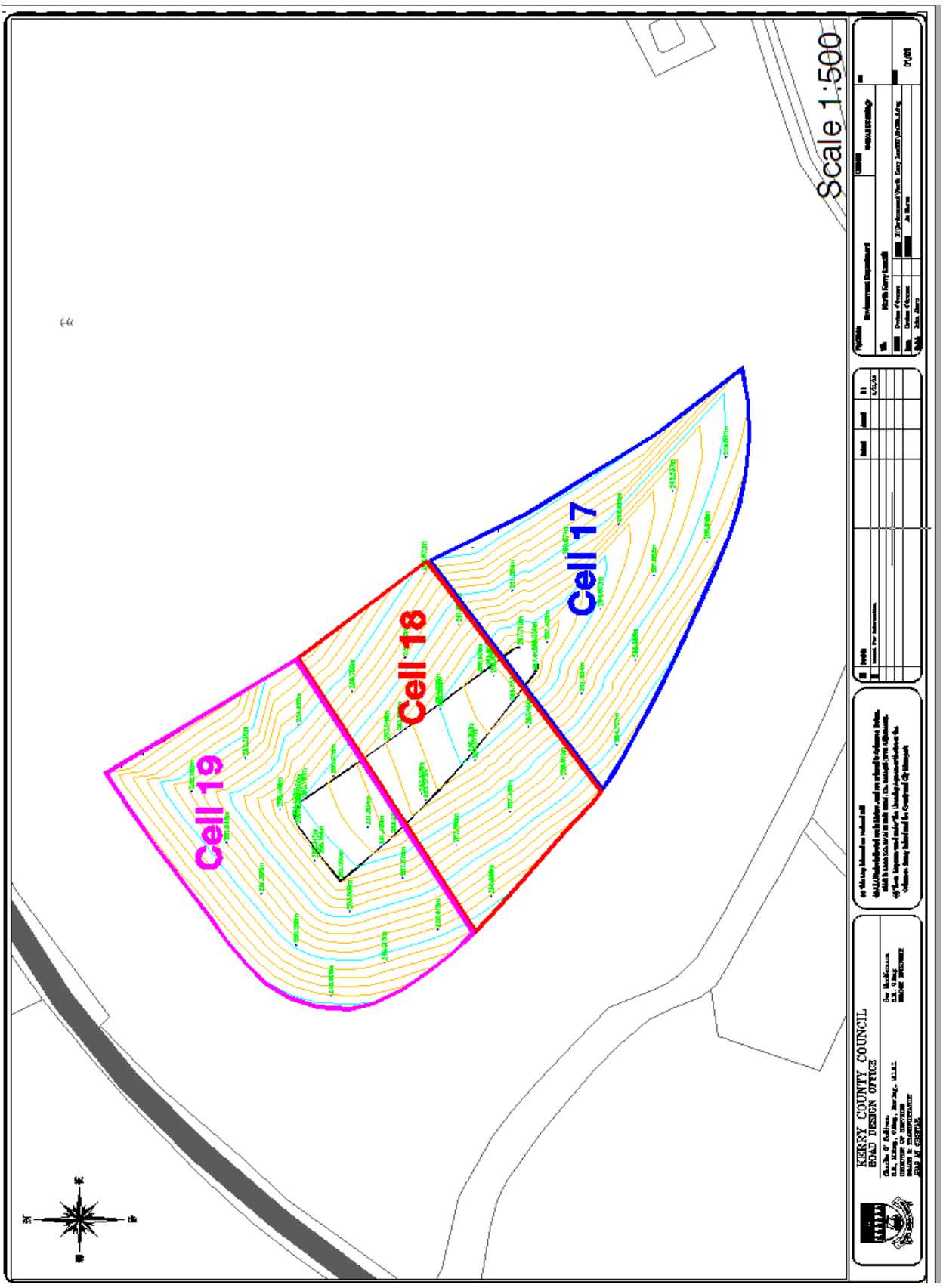
13.0 Report on Restoration of Completed Cells and Phases

Cells 15B and 16 are now fully capped and works ongoing on Cells 18 and 19.

Site Survey Showing Existing Levels of the Facility and the End of the Reporting Period.

The following page includes the design profile for Cell 17, 18 & 19.

14.0 Site Survey Showing existing Levels



15.0 Estimated Annual and Cumulative quantities of landfill gas emitted from the facility – LandGem NKL

The following table show the landfill input and expected/modelled gas outputs for the landfill site over the design period. These figures were used in the estimation of landfill gas generation over the reporting period and submitted as part of the Landfill Gas Survey 2013 (Appendix G) and the PRTR 2013 (Appendix F).

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1994	16,902	18,592	0	0
1995	23,505	25,856	16,902	18,592
1996	23,722	26,094	40,407	44,448
1997	25,582	28,140	64,129	70,542
1998	33,530	36,883	89,711	98,682
1999	57,873	63,660	123,241	135,565
2000	60,474	66,521	181,113	199,225
2001	63,946	70,341	241,587	265,746
2002	62,822	69,104	305,533	336,086
2003	50,235	55,259	368,354	405,190
2004	48,054	52,860	418,590	460,449
2005	34,431	37,874	466,644	513,309
2006	60,025	66,028	501,075	551,182
2007	56,794	62,474	561,100	617,210
2008	62,413	68,654	617,894	679,684
2009	39,755	43,731	680,307	748,338
2010	20,987	23,086	720,063	792,069
2011	16,546	18,200	741,050	815,155
2012	71,007	78,107	757,595	833,355
2013	55,277	60,804	828,602	911,462
2014	0	0	883,879	972,267
2015	0	0	883,879	972,267
2016	0	0	883,879	972,267
2017	0	0	883,879	972,267
2018	0	0	883,879	972,267
2019	0	0	883,879	972,267
2020	0	0	883,879	972,267
2021	0	0	883,879	972,267
2022	0	0	883,879	972,267
2023	0	0	883,879	972,267
2024	0	0	883,879	972,267
2025	0	0	883,879	972,267
2026	0	0	883,879	972,267
2027	0	0	883,879	972,267
2028	0	0	883,879	972,267
2029	0	0	883,879	972,267
2030	0	0	883,879	972,267
2031	0	0	883,879	972,267
2032	0	0	883,879	972,267
2033	0	0	883,879	972,267

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1994	0	0	0	0	0	0
1995	3.233E+03	2.916E+06	1.960E+02	5.642E+02	8.458E+05	5.683E+01
1996	6.102E+03	5.504E+06	3.698E+02	1.065E+03	1.596E+06	1.072E+02
1997	7.569E+03	6.826E+06	4.587E+02	1.321E+03	1.980E+06	1.330E+02
1998	8.652E+03	7.804E+06	5.243E+02	1.510E+03	2.263E+06	1.521E+02
1999	1.071E+04	9.661E+06	6.491E+02	1.869E+03	2.802E+06	1.882E+02
2000	1.639E+04	1.478E+07	9.933E+02	2.860E+03	4.287E+06	2.881E+02
2001	1.971E+04	1.778E+07	1.194E+03	3.439E+03	5.155E+06	3.464E+02
2002	2.202E+04	1.986E+07	1.334E+03	3.843E+03	5.760E+06	3.870E+02
2003	2.295E+04	2.070E+07	1.391E+03	4.005E+03	6.004E+06	4.034E+02
2004	2.101E+04	1.895E+07	1.273E+03	3.666E+03	5.495E+06	3.692E+02
2005	1.963E+04	1.770E+07	1.189E+03	3.425E+03	5.133E+06	3.449E+02
2006	1.633E+04	1.473E+07	9.898E+02	2.850E+03	4.272E+06	2.870E+02
2007	1.959E+04	1.767E+07	1.187E+03	3.419E+03	5.125E+06	3.444E+02
2008	2.060E+04	1.858E+07	1.248E+03	3.594E+03	5.387E+06	3.619E+02
2009	2.217E+04	1.999E+07	1.343E+03	3.868E+03	5.798E+06	3.896E+02
2010	1.861E+04	1.679E+07	1.128E+03	3.248E+03	4.869E+06	3.271E+02
2011	1.326E+04	1.196E+07	8.035E+02	2.314E+03	3.468E+06	2.330E+02
2012	9.749E+03	8.793E+06	5.908E+02	1.701E+03	2.550E+06	1.713E+02
2013	1.843E+04	1.662E+07	1.117E+03	3.215E+03	4.819E+06	3.238E+02
2014	1.972E+04	1.779E+07	1.195E+03	3.442E+03	5.159E+06	3.466E+02
2015	9.795E+03	8.834E+06	5.936E+02	1.709E+03	2.562E+06	1.721E+02
2016	4.864E+03	4.387E+06	2.948E+02	8.488E+02	1.272E+06	8.548E+01
2017	2.415E+03	2.179E+06	1.464E+02	4.215E+02	6.318E+05	4.245E+01
2018	1.199E+03	1.082E+06	7.269E+01	2.093E+02	3.137E+05	2.108E+01
2019	5.956E+02	5.372E+05	3.610E+01	1.039E+02	1.558E+05	1.047E+01
2020	2.958E+02	2.668E+05	1.792E+01	5.161E+01	7.737E+04	5.198E+00
2021	1.469E+02	1.325E+05	8.901E+00	2.563E+01	3.842E+04	2.581E+00
2022	7.294E+01	6.579E+04	4.420E+00	1.273E+01	1.908E+04	1.282E+00
2023	3.622E+01	3.267E+04	2.195E+00	6.321E+00	9.474E+03	6.366E-01
2024	1.799E+01	1.622E+04	1.090E+00	3.139E+00	4.705E+03	3.161E-01
2025	8.932E+00	8.056E+03	5.413E-01	1.559E+00	2.336E+03	1.570E-01
2026	4.435E+00	4.000E+03	2.688E-01	7.740E-01	1.160E+03	7.795E-02
2027	2.203E+00	1.987E+03	1.335E-01	3.844E-01	5.761E+02	3.871E-02
2028	1.094E+00	9.865E+02	6.628E-02	1.909E-01	2.861E+02	1.922E-02
2029	5.431E-01	4.899E+02	3.292E-02	9.478E-02	1.421E+02	9.545E-03
2030	2.697E-01	2.433E+02	1.635E-02	4.707E-02	7.055E+01	4.740E-03
2031	1.339E-01	1.208E+02	8.117E-03	2.337E-02	3.503E+01	2.354E-03
2032	6.651E-02	5.999E+01	4.031E-03	1.161E-02	1.740E+01	1.169E-03
2033	3.303E-02	2.979E+01	2.002E-03	5.764E-03	8.639E+00	5.805E-04
2034	1.640E-02	1.479E+01	9.940E-04	2.862E-03	4.290E+00	2.882E-04
2035	8.145E-03	7.346E+00	4.936E-04	1.421E-03	2.130E+00	1.431E-04
2036	4.045E-03	3.648E+00	2.451E-04	7.058E-04	1.058E+00	7.108E-05
2037	2.008E-03	1.812E+00	1.217E-04	3.505E-04	5.253E-01	3.530E-05
2038	9.974E-04	8.996E-01	6.044E-05	1.740E-04	2.609E-01	1.753E-05
2039	4.953E-04	4.467E-01	3.001E-05	8.643E-05	1.295E-01	8.704E-06
2040	2.460E-04	2.218E-01	1.490E-05	4.292E-05	6.433E-02	4.322E-06
2041	1.221E-04	1.102E-01	7.402E-06	2.131E-05	3.195E-02	2.146E-06
2042	6.065E-05	5.470E-02	3.676E-06	1.058E-05	1.586E-02	1.066E-06
2043	3.012E-05	2.716E-02	1.825E-06	5.256E-06	7.878E-03	5.293E-07

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2044	1.496E-05	1.349E-02	9.064E-07	2.610E-06	3.912E-03	2.628E-07
2045	7.427E-06	6.699E-03	4.501E-07	1.296E-06	1.943E-03	1.305E-07
2046	3.688E-06	3.327E-03	2.235E-07	6.436E-07	9.647E-04	6.482E-08
2047	1.832E-06	1.652E-03	1.110E-07	3.196E-07	4.791E-04	3.219E-08
2048	9.095E-07	8.203E-04	5.512E-08	1.587E-07	2.379E-04	1.598E-08
2049	4.516E-07	4.074E-04	2.737E-08	7.881E-08	1.181E-04	7.937E-09
2050	2.243E-07	2.023E-04	1.359E-08	3.914E-08	5.866E-05	3.942E-09
2051	1.114E-07	1.005E-04	6.749E-09	1.943E-08	2.913E-05	1.957E-09
2052	5.531E-08	4.988E-05	3.352E-09	9.651E-09	1.447E-05	9.720E-10
2053	2.746E-08	2.477E-05	1.664E-09	4.793E-09	7.184E-06	4.827E-10
2054	1.364E-08	1.230E-05	8.265E-10	2.380E-09	3.567E-06	2.397E-10
2055	6.773E-09	6.109E-06	4.104E-10	1.182E-09	1.771E-06	1.190E-10
2056	3.363E-09	3.033E-06	2.038E-10	5.869E-10	8.797E-07	5.911E-11
2057	1.670E-09	1.506E-06	1.012E-10	2.914E-10	4.368E-07	2.935E-11
2058	8.294E-10	7.480E-07	5.026E-11	1.447E-10	2.169E-07	1.458E-11
2059	4.118E-10	3.715E-07	2.496E-11	7.187E-11	1.077E-07	7.238E-12
2060	2.045E-10	1.845E-07	1.239E-11	3.569E-11	5.349E-08	3.594E-12
2061	1.016E-10	9.160E-08	6.155E-12	1.772E-11	2.656E-08	1.785E-12
2062	5.043E-11	4.549E-08	3.056E-12	8.801E-12	1.319E-08	8.863E-13
2063	2.504E-11	2.259E-08	1.518E-12	4.370E-12	6.551E-09	4.401E-13
2064	1.244E-11	1.122E-08	7.537E-13	2.170E-12	3.253E-09	2.186E-13
2065	6.176E-12	5.570E-09	3.743E-13	1.078E-12	1.615E-09	1.085E-13
2066	3.067E-12	2.766E-09	1.859E-13	5.352E-13	8.022E-10	5.390E-14
2067	1.523E-12	1.374E-09	9.229E-14	2.658E-13	3.983E-10	2.676E-14
2068	7.563E-13	6.821E-10	4.583E-14	1.320E-13	1.978E-10	1.329E-14
2069	3.756E-13	3.387E-10	2.276E-14	6.553E-14	9.823E-11	6.600E-15
2070	1.865E-13	1.682E-10	1.130E-14	3.254E-14	4.878E-11	3.278E-15
2071	9.261E-14	8.353E-11	5.612E-15	1.616E-14	2.422E-11	1.628E-15
2072	4.599E-14	4.148E-11	2.787E-15	8.025E-15	1.203E-11	8.082E-16
2073	2.284E-14	2.060E-11	1.384E-15	3.985E-15	5.973E-12	4.014E-16
2074	1.134E-14	1.023E-11	6.873E-16	1.979E-15	2.966E-12	1.993E-16
2075	5.632E-15	5.079E-12	3.413E-16	9.827E-16	1.473E-12	9.897E-17
2076	2.797E-15	2.522E-12	1.695E-16	4.880E-16	7.315E-13	4.915E-17
2077	1.389E-15	1.253E-12	8.416E-17	2.423E-16	3.632E-13	2.441E-17
2078	6.896E-16	6.220E-13	4.179E-17	1.203E-16	1.804E-13	1.212E-17
2079	3.425E-16	3.089E-13	2.075E-17	5.976E-17	8.957E-14	6.019E-18
2080	1.701E-16	1.534E-13	1.031E-17	2.968E-17	4.448E-14	2.989E-18
2081	8.445E-17	7.617E-14	5.118E-18	1.474E-17	2.209E-14	1.484E-18
2082	4.194E-17	3.782E-14	2.541E-18	7.318E-18	1.097E-14	7.370E-19
2083	2.083E-17	1.878E-14	1.262E-18	3.634E-18	5.447E-15	3.660E-19
2084	1.034E-17	9.327E-15	6.267E-19	1.805E-18	2.705E-15	1.817E-19
2085	5.135E-18	4.632E-15	3.112E-19	8.961E-19	1.343E-15	9.025E-20
2086	2.550E-18	2.300E-15	1.545E-19	4.450E-19	6.670E-16	4.482E-20
2087	1.266E-18	1.142E-15	7.674E-20	2.210E-19	3.312E-16	2.226E-20
2088	6.289E-19	5.672E-16	3.811E-20	1.097E-19	1.645E-16	1.105E-20
2089	3.123E-19	2.817E-16	1.892E-20	5.449E-20	8.168E-17	5.488E-21
2090	1.551E-19	1.399E-16	9.398E-21	2.706E-20	4.056E-17	2.725E-21
2091	7.701E-20	6.946E-17	4.667E-21	1.344E-20	2.014E-17	1.353E-21
2092	3.824E-20	3.449E-17	2.317E-21	6.673E-21	1.000E-17	6.721E-22
2093	1.899E-20	1.713E-17	1.151E-21	3.314E-21	4.967E-18	3.337E-22
2094	9.430E-21	8.505E-18	5.715E-22	1.646E-21	2.467E-18	1.657E-22

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2095	4.683E-21	4.224E-18	2.838E-22	8.172E-22	1.225E-18	8.230E-23
2096	2.325E-21	2.097E-18	1.409E-22	4.058E-22	6.082E-19	4.087E-23
2097	1.155E-21	1.042E-18	6.998E-23	2.015E-22	3.020E-19	2.029E-23
2098	5.734E-22	5.172E-19	3.475E-23	1.001E-22	1.500E-19	1.008E-23
2099	2.848E-22	2.568E-19	1.726E-23	4.969E-23	7.448E-20	5.005E-24
2100	1.414E-22	1.275E-19	8.570E-24	2.468E-23	3.699E-20	2.485E-24
2101	7.022E-23	6.334E-20	4.256E-24	1.225E-23	1.837E-20	1.234E-24
2102	3.487E-23	3.145E-20	2.113E-24	6.085E-24	9.121E-21	6.128E-25
2103	1.732E-23	1.562E-20	1.049E-24	3.022E-24	4.529E-21	3.043E-25
2104	8.599E-24	7.756E-21	5.211E-25	1.501E-24	2.249E-21	1.511E-25
2105	4.270E-24	3.851E-21	2.588E-25	7.452E-25	1.117E-21	7.505E-26
2106	2.121E-24	1.913E-21	1.285E-25	3.700E-25	5.547E-22	3.727E-26
2107	1.053E-24	9.498E-22	6.381E-26	1.838E-25	2.754E-22	1.851E-26
2108	5.229E-25	4.716E-22	3.169E-26	9.125E-26	1.368E-22	9.190E-27
2109	2.597E-25	2.342E-22	1.574E-26	4.531E-26	6.792E-23	4.564E-27
2110	1.289E-25	1.163E-22	7.815E-27	2.250E-26	3.373E-23	2.266E-27
2111	6.403E-26	5.776E-23	3.881E-27	1.117E-26	1.675E-23	1.125E-27
2112	3.180E-26	2.868E-23	1.927E-27	5.549E-27	8.317E-24	5.588E-28
2113	1.579E-26	1.424E-23	9.569E-28	2.755E-27	4.130E-24	2.775E-28
2114	7.841E-27	7.073E-24	4.752E-28	1.368E-27	2.051E-24	1.378E-28
2115	3.894E-27	3.512E-24	2.360E-28	6.795E-28	1.019E-24	6.843E-29
2116	1.934E-27	1.744E-24	1.172E-28	3.374E-28	5.058E-25	3.398E-29
2117	9.602E-28	8.661E-25	5.819E-29	1.676E-28	2.512E-25	1.688E-29
2118	4.768E-28	4.301E-25	2.890E-29	8.321E-29	1.247E-25	8.380E-30
2119	2.368E-28	2.136E-25	1.435E-29	4.132E-29	6.194E-26	4.161E-30
2120	1.176E-28	1.061E-25	7.126E-30	2.052E-29	3.076E-26	2.067E-30
2121	5.839E-29	5.267E-26	3.539E-30	1.019E-29	1.527E-26	1.026E-30
2122	2.900E-29	2.615E-26	1.757E-30	5.060E-30	7.584E-27	5.096E-31
2123	1.440E-29	1.299E-26	8.726E-31	2.513E-30	3.766E-27	2.531E-31
2124	7.150E-30	6.449E-27	4.333E-31	1.248E-30	1.870E-27	1.257E-31
2125	3.551E-30	3.203E-27	2.152E-31	6.196E-31	9.288E-28	6.240E-32
2126	1.763E-30	1.590E-27	1.069E-31	3.077E-31	4.612E-28	3.099E-32
2127	8.756E-31	7.898E-28	5.306E-32	1.528E-31	2.290E-28	1.539E-32
2128	4.348E-31	3.922E-28	2.635E-32	7.588E-32	1.137E-28	7.642E-33
2129	2.159E-31	1.948E-28	1.309E-32	3.768E-32	5.648E-29	3.795E-33
2130	1.072E-31	9.671E-29	6.498E-33	1.871E-32	2.805E-29	1.884E-33
2131	5.325E-32	4.803E-29	3.227E-33	9.292E-33	1.393E-29	9.358E-34
2132	2.644E-32	2.385E-29	1.602E-33	4.614E-33	6.916E-30	4.647E-34
2133	1.313E-32	1.184E-29	7.957E-34	2.291E-33	3.434E-30	2.308E-34
2134	6.520E-33	5.881E-30	3.951E-34	1.138E-33	1.705E-30	1.146E-34

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1994	0	0	0	0	0	0
1995	3.790E+03	2.071E+06	1.391E+02	6.272E+00	1.750E+03	1.176E-01
1996	7.153E+03	3.908E+06	2.626E+02	1.184E+01	3.302E+03	2.219E-01
1997	8.872E+03	4.847E+06	3.257E+02	1.468E+01	4.096E+03	2.752E-01
1998	1.014E+04	5.541E+06	3.723E+02	1.678E+01	4.682E+03	3.146E-01
1999	1.256E+04	6.859E+06	4.609E+02	2.078E+01	5.797E+03	3.895E-01
2000	1.921E+04	1.050E+07	7.052E+02	3.179E+01	8.870E+03	5.960E-01
2001	2.310E+04	1.262E+07	8.480E+02	3.823E+01	1.067E+04	7.166E-01
2002	2.581E+04	1.410E+07	9.475E+02	4.271E+01	1.192E+04	8.007E-01
2003	2.691E+04	1.470E+07	9.876E+02	4.452E+01	1.242E+04	8.346E-01
2004	2.463E+04	1.345E+07	9.039E+02	4.075E+01	1.137E+04	7.639E-01
2005	2.301E+04	1.257E+07	8.444E+02	3.807E+01	1.062E+04	7.136E-01
2006	1.915E+04	1.046E+07	7.027E+02	3.168E+01	8.839E+03	5.939E-01
2007	2.297E+04	1.255E+07	8.431E+02	3.801E+01	1.060E+04	7.124E-01
2008	2.414E+04	1.319E+07	8.861E+02	3.995E+01	1.115E+04	7.489E-01
2009	2.598E+04	1.420E+07	9.538E+02	4.300E+01	1.200E+04	8.060E-01
2010	2.182E+04	1.192E+07	8.009E+02	3.611E+01	1.007E+04	6.768E-01
2011	1.554E+04	8.490E+06	5.705E+02	2.572E+01	7.175E+03	4.821E-01
2012	1.143E+04	6.243E+06	4.195E+02	1.891E+01	5.276E+03	3.545E-01
2013	2.160E+04	1.180E+07	7.928E+02	3.574E+01	9.971E+03	6.700E-01
2014	2.312E+04	1.263E+07	8.487E+02	3.826E+01	1.067E+04	7.172E-01
2015	1.148E+04	6.272E+06	4.214E+02	1.900E+01	5.301E+03	3.562E-01
2016	5.702E+03	3.115E+06	2.093E+02	9.435E+00	2.632E+03	1.769E-01
2017	2.831E+03	1.547E+06	1.039E+02	4.685E+00	1.307E+03	8.783E-02
2018	1.406E+03	7.681E+05	5.161E+01	2.327E+00	6.491E+02	4.361E-02
2019	6.982E+02	3.814E+05	2.563E+01	1.155E+00	3.223E+02	2.166E-02
2020	3.467E+02	1.894E+05	1.273E+01	5.738E-01	1.601E+02	1.075E-02
2021	1.722E+02	9.406E+04	6.320E+00	2.849E-01	7.949E+01	5.341E-03
2022	8.550E+01	4.671E+04	3.138E+00	1.415E-01	3.947E+01	2.652E-03
2023	4.246E+01	2.319E+04	1.558E+00	7.026E-02	1.960E+01	1.317E-03
2024	2.108E+01	1.152E+04	7.739E-01	3.489E-02	9.734E+00	6.540E-04
2025	1.047E+01	5.720E+03	3.843E-01	1.733E-02	4.834E+00	3.248E-04
2026	5.199E+00	2.840E+03	1.908E-01	8.604E-03	2.400E+00	1.613E-04
2027	2.582E+00	1.410E+03	9.477E-02	4.273E-03	1.192E+00	8.009E-05
2028	1.282E+00	7.004E+02	4.706E-02	2.122E-03	5.919E-01	3.977E-05
2029	6.367E-01	3.478E+02	2.337E-02	1.054E-03	2.939E-01	1.975E-05
2030	3.162E-01	1.727E+02	1.161E-02	5.232E-04	1.460E-01	9.807E-06
2031	1.570E-01	8.577E+01	5.763E-03	2.598E-04	7.248E-02	4.870E-06
2032	7.797E-02	4.259E+01	2.862E-03	1.290E-04	3.599E-02	2.418E-06
2033	3.872E-02	2.115E+01	1.421E-03	6.407E-05	1.787E-02	1.201E-06
2034	1.923E-02	1.050E+01	7.057E-04	3.182E-05	8.876E-03	5.964E-07
2035	9.547E-03	5.216E+00	3.504E-04	1.580E-05	4.408E-03	2.962E-07
2036	4.741E-03	2.590E+00	1.740E-04	7.846E-06	2.189E-03	1.471E-07
2037	2.354E-03	1.286E+00	8.642E-05	3.896E-06	1.087E-03	7.303E-08
2038	1.169E-03	6.387E-01	4.291E-05	1.935E-06	5.397E-04	3.627E-08
2039	5.806E-04	3.172E-01	2.131E-05	9.607E-07	2.680E-04	1.801E-08
2040	2.883E-04	1.575E-01	1.058E-05	4.771E-07	1.331E-04	8.943E-09
2041	1.432E-04	7.821E-02	5.255E-06	2.369E-07	6.610E-05	4.441E-09
2042	7.110E-05	3.884E-02	2.610E-06	1.176E-07	3.282E-05	2.205E-09
2043	3.531E-05	1.929E-02	1.296E-06	5.842E-08	1.630E-05	1.095E-09

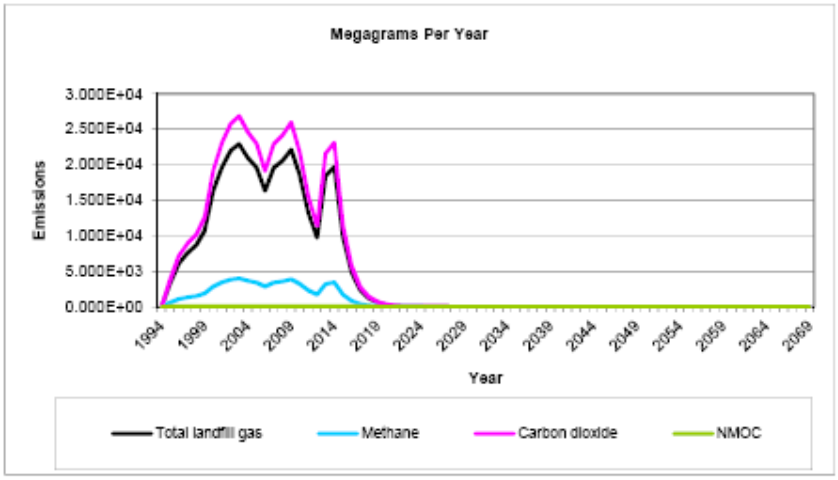
Results (Continued)

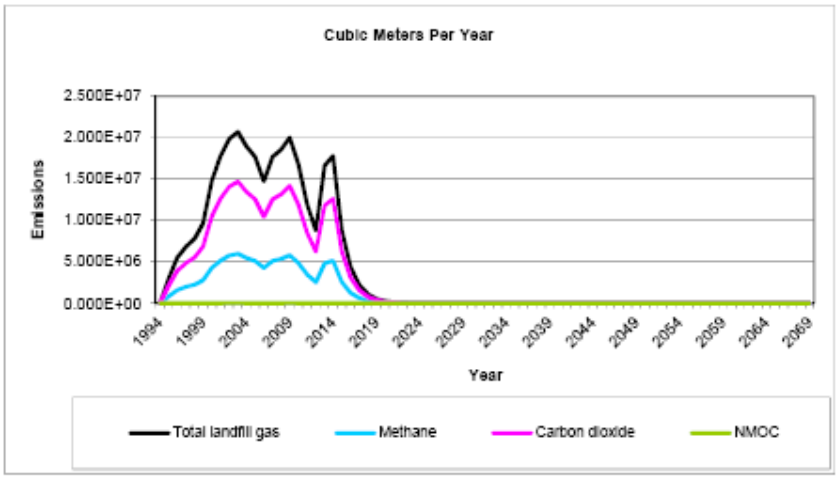
Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2044	1.753E-05	9.578E-03	6.435E-07	2.901E-08	8.094E-06	5.438E-10
2045	8.706E-06	4.756E-03	3.196E-07	1.441E-08	4.019E-06	2.701E-10
2046	4.323E-06	2.362E-03	1.587E-07	7.154E-09	1.996E-06	1.341E-10
2047	2.147E-06	1.173E-03	7.880E-08	3.553E-09	9.911E-07	6.659E-11
2048	1.066E-06	5.824E-04	3.913E-08	1.764E-09	4.922E-07	3.307E-11
2049	5.294E-07	2.892E-04	1.943E-08	8.761E-10	2.444E-07	1.642E-11
2050	2.629E-07	1.436E-04	9.650E-09	4.351E-10	1.214E-07	8.155E-12
2051	1.306E-07	7.132E-05	4.792E-09	2.160E-10	6.027E-08	4.050E-12
2052	6.483E-08	3.542E-05	2.380E-09	1.073E-10	2.993E-08	2.011E-12
2053	3.219E-08	1.759E-05	1.182E-09	5.328E-11	1.486E-08	9.986E-13
2054	1.599E-08	8.734E-06	5.868E-10	2.646E-11	7.381E-09	4.959E-13
2055	7.939E-09	4.337E-06	2.914E-10	1.314E-11	3.665E-09	2.463E-13
2056	3.942E-09	2.154E-06	1.447E-10	6.524E-12	1.820E-09	1.223E-13
2057	1.958E-09	1.070E-06	7.186E-11	3.240E-12	9.038E-10	6.073E-14
2058	9.722E-10	5.311E-07	3.568E-11	1.609E-12	4.488E-10	3.016E-14
2059	4.828E-10	2.637E-07	1.772E-11	7.989E-13	2.229E-10	1.497E-14
2060	2.397E-10	1.310E-07	8.800E-12	3.967E-13	1.107E-10	7.436E-15
2061	1.190E-10	6.504E-08	4.370E-12	1.970E-13	5.496E-11	3.693E-15
2062	5.912E-11	3.230E-08	2.170E-12	9.783E-14	2.729E-11	1.834E-15
2063	2.936E-11	1.604E-08	1.078E-12	4.858E-14	1.355E-11	9.106E-16
2064	1.458E-11	7.964E-09	5.351E-13	2.412E-14	6.730E-12	4.522E-16
2065	7.239E-12	3.955E-09	2.657E-13	1.198E-14	3.342E-12	2.246E-16
2066	3.595E-12	1.964E-09	1.320E-13	5.949E-15	1.660E-12	1.115E-16
2067	1.785E-12	9.753E-10	6.553E-14	2.954E-15	8.242E-13	5.538E-17
2068	8.865E-13	4.843E-10	3.254E-14	1.467E-15	4.093E-13	2.750E-17
2069	4.402E-13	2.405E-10	1.616E-14	7.285E-16	2.032E-13	1.366E-17
2070	2.186E-13	1.194E-10	8.024E-15	3.618E-16	1.009E-13	6.781E-18
2071	1.086E-13	5.931E-11	3.985E-15	1.796E-16	5.012E-14	3.367E-18
2072	5.391E-14	2.945E-11	1.979E-15	8.921E-17	2.489E-14	1.672E-18
2073	2.677E-14	1.462E-11	9.826E-16	4.430E-17	1.236E-14	8.304E-19
2074	1.329E-14	7.262E-12	4.880E-16	2.200E-17	6.137E-15	4.124E-19
2075	6.601E-15	3.606E-12	2.423E-16	1.092E-17	3.048E-15	2.048E-19
2076	3.278E-15	1.791E-12	1.203E-16	5.425E-18	1.513E-15	1.017E-19
2077	1.628E-15	8.893E-13	5.975E-17	2.694E-18	7.515E-16	5.050E-20
2078	8.084E-16	4.416E-13	2.967E-17	1.338E-18	3.732E-16	2.508E-20
2079	4.014E-16	2.193E-13	1.474E-17	6.643E-19	1.853E-16	1.245E-20
2080	1.993E-16	1.089E-13	7.317E-18	3.299E-19	9.203E-17	6.184E-21
2081	9.899E-17	5.408E-14	3.634E-18	1.638E-19	4.570E-17	3.071E-21
2082	4.916E-17	2.686E-14	1.804E-18	8.135E-20	2.269E-17	1.525E-21
2083	2.441E-17	1.334E-14	8.960E-19	4.040E-20	1.127E-17	7.572E-22
2084	1.212E-17	6.622E-15	4.450E-19	2.006E-20	5.596E-18	3.760E-22
2085	6.020E-18	3.289E-15	2.210E-19	9.962E-21	2.779E-18	1.867E-22
2086	2.989E-18	1.633E-15	1.097E-19	4.947E-21	1.380E-18	9.273E-23
2087	1.484E-18	8.110E-16	5.449E-20	2.456E-21	6.853E-19	4.605E-23
2088	7.372E-19	4.027E-16	2.706E-20	1.220E-21	3.403E-19	2.287E-23
2089	3.661E-19	2.000E-16	1.344E-20	6.058E-22	1.690E-19	1.135E-23
2090	1.818E-19	9.931E-17	6.672E-21	3.008E-22	8.392E-20	5.639E-24
2091	9.027E-20	4.931E-17	3.313E-21	1.494E-22	4.167E-20	2.800E-24
2092	4.483E-20	2.449E-17	1.645E-21	7.418E-23	2.069E-20	1.390E-24
2093	2.226E-20	1.216E-17	8.171E-22	3.684E-23	1.028E-20	6.905E-25
2094	1.105E-20	6.039E-18	4.057E-22	1.829E-23	5.103E-21	3.429E-25

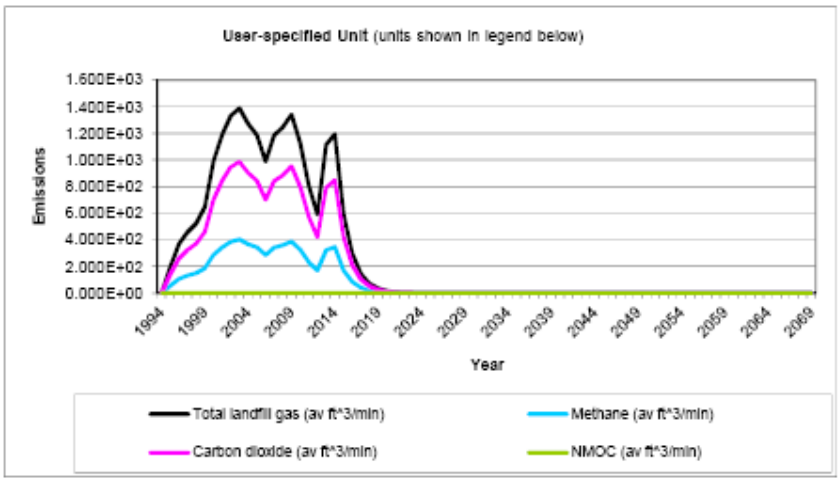
Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2095	5.489E-21	2.999E-18	2.015E-22	9.084E-24	2.534E-21	1.703E-25
2096	2.726E-21	1.489E-18	1.001E-22	4.511E-24	1.258E-21	8.455E-26
2097	1.354E-21	7.395E-19	4.969E-23	2.240E-24	6.249E-22	4.199E-26
2098	6.722E-22	3.672E-19	2.467E-23	1.112E-24	3.103E-22	2.085E-26
2099	3.338E-22	1.824E-19	1.225E-23	5.524E-25	1.541E-22	1.035E-26
2100	1.658E-22	9.056E-20	6.084E-24	2.743E-25	7.653E-23	5.142E-27
2101	8.232E-23	4.497E-20	3.021E-24	1.362E-25	3.800E-23	2.553E-27
2102	4.088E-23	2.233E-20	1.500E-24	6.764E-26	1.887E-23	1.268E-27
2103	2.030E-23	1.109E-20	7.451E-25	3.359E-26	9.371E-24	6.296E-28
2104	1.008E-23	5.507E-21	3.700E-25	1.668E-26	4.654E-24	3.127E-28
2105	5.006E-24	2.735E-21	1.837E-25	8.283E-27	2.311E-24	1.553E-28
2106	2.486E-24	1.358E-21	9.124E-26	4.113E-27	1.148E-24	7.710E-29
2107	1.234E-24	6.743E-22	4.531E-26	2.043E-27	5.699E-25	3.829E-29
2108	6.130E-25	3.349E-22	2.250E-26	1.014E-27	2.830E-25	1.901E-29
2109	3.044E-25	1.663E-22	1.117E-26	5.037E-28	1.405E-25	9.442E-30
2110	1.512E-25	8.258E-23	5.548E-27	2.501E-28	6.978E-26	4.689E-30
2111	7.506E-26	4.101E-23	2.755E-27	1.242E-28	3.465E-26	2.328E-30
2112	3.727E-26	2.036E-23	1.368E-27	6.168E-29	1.721E-26	1.156E-30
2113	1.851E-26	1.011E-23	6.794E-28	3.063E-29	8.545E-27	5.742E-31
2114	9.192E-27	5.021E-24	3.374E-28	1.521E-29	4.244E-27	2.851E-31
2115	4.565E-27	2.494E-24	1.675E-28	7.553E-30	2.107E-27	1.416E-31
2116	2.267E-27	1.238E-24	8.320E-29	3.751E-30	1.046E-27	7.031E-32
2117	1.126E-27	6.149E-25	4.132E-29	1.863E-30	5.196E-28	3.491E-32
2118	5.590E-28	3.054E-25	2.052E-29	9.250E-31	2.580E-28	1.734E-32
2119	2.776E-28	1.516E-25	1.019E-29	4.593E-31	1.281E-28	8.610E-33
2120	1.378E-28	7.530E-26	5.059E-30	2.281E-31	6.363E-29	4.276E-33
2121	6.845E-29	3.739E-26	2.512E-30	1.133E-31	3.160E-29	2.123E-33
2122	3.399E-29	1.857E-26	1.248E-30	5.625E-32	1.569E-29	1.054E-33
2123	1.688E-29	9.221E-27	6.196E-31	2.793E-32	7.792E-30	5.236E-34
2124	8.382E-30	4.579E-27	3.077E-31	1.387E-32	3.870E-30	2.600E-34
2125	4.162E-30	2.274E-27	1.528E-31	6.888E-33	1.922E-30	1.291E-34
2126	2.067E-30	1.129E-27	7.587E-32	3.420E-33	9.542E-31	6.411E-35
2127	1.026E-30	5.607E-28	3.768E-32	1.699E-33	4.739E-31	3.184E-35
2128	5.097E-31	2.784E-28	1.871E-32	8.435E-34	2.353E-31	1.581E-35
2129	2.531E-31	1.383E-28	9.291E-33	4.188E-34	1.169E-31	7.851E-36
2130	1.257E-31	6.866E-29	4.614E-33	2.080E-34	5.803E-32	3.899E-36
2131	6.242E-32	3.410E-29	2.291E-33	1.033E-34	2.882E-32	1.936E-36
2132	3.099E-32	1.693E-29	1.138E-33	5.129E-35	1.431E-32	9.614E-37
2133	1.539E-32	8.408E-30	5.650E-34	2.547E-35	7.106E-33	4.774E-37
2134	7.643E-33	4.176E-30	2.806E-34	1.265E-35	3.529E-33	2.371E-37

Graphs


Megagrams Per Year
Emissions
3.000E+04
2.500E+04
2.000E+04
1.500E+04
1.000E+04
5.000E+03
0.000E+00
1994
1999
2004
2009
2014
2019
2024
2029
2034
2039
2044
2049
2054
2059
2064
2069
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
2.500E+07
2.000E+07
1.500E+07
1.000E+07
5.000E+06
0.000E+00
1994
1999
2004
2009
2014
2019
2024
2029
2034
2039
2044
2049
2054
2059
2064
2069
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
1.600E+03
1.400E+03
1.200E+03
1.000E+03
8.000E+02
6.000E+02
4.000E+02
2.000E+02
0.000E+00
1994
1999
2004
2009
2014
2019
2024
2029
2034
2039
2044
2049
2054
2059
2064
2069
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

16.0 Estimated Annual and Cumulative quantities of Indirect Emissions to Groundwater

None to report.

17.0 Annual Water Balance Calculation and Interpretation

The predicted Water Mass Balance calculation shows predicted leachate production for 2013.

Lo= [ER(A) + LW + IRCA + ER(l)] - [aW]

			1		2		3					
year	Active Phase	Active Area	Active Area infiltration	Restored Phase No.	Liquid Waste	Restored Area	Restored Area Infiltration	Total Water	Absorptive Capacity	Predicted Leachate Produced	Actual Leachate	Difference
		A (m2)	R(A) m3		LW (m3)	RCA (m2)	IRCA (m3)	1 +2+3 (m3)	aW (m3)	Lo (m3)	m3	
2002	5	11,800.00	19918.4	1,2,3	0	22,050.00	2840.04	22,758.44	1770.8075	23,885.63	34,218.23	10,332.60
2003	6	16,100.00	20946.1	1,2,3,4	0	25,450.00	2547.545	23,493.65	879.11758	24,866.78	30,721.59	5,854.81
2004	6	19,500.00	32416.8	1,2,3,4	0	27,550.00	3306	35,722.80	840.95323	37,947.25	45,130.40	7,183.15
2005	6,7	16,200.00	27596.7	1,2,3,4,5	0	29,600.00	4004.88	31,601.58	602.53935	34,155.79	54,784.59	20,628.80
2006	7	28,800.00	27596.7	1,2,3,4,5	0	29,600.00	4025.6	31,622.30	1050.4414	33,361.86	60,922.61	27,560.75
2007	7	14,400.00	24036.48	1,2,3,4,5,6	0	53,340.00	6769.913	30,806.39	1391.4589	33,307.30	55,436.15	22,128.85
2008	8	24,300.00	50,517.27	1,2,3,4,5,6	0	53,340.00	6,931.00	57,448.27	1,528.82	59,811.81	78,558.23	18,746.42
2009	8	32,400.00	62,763.98	1,2,3,4,5,6	0	53,340.00	2997.015	65,761.00	439.04833	66,586.16	73,727.85	7,141.69
2010	8	32,400.00	44,248.68	1,2,3,4,5,6,7	0	63,340.00	3558.885	47,807.56	439.04833	48,632.72	42,442.00	-6,190.72
2011	8	32,400.00	45,392.40	1,2,3,4,5,6,7	0	63,340.00	3558.885	48,951.28	439.04833	49,776.44	50,108.00	331.55
2012	9	33,616.67	61,619.36	1,2,3,4,5,6,7,8	0	95,740.00	5379.34	66998.70	439.04833	67,823.86	69,063.01	1239.15
2013	10	18,666.8	30,658.35	1,2,3,4,5,6,7,8	0	95,740.00	5379.34	36037.69	439.04833	35,598.64	67,830.01	32,231.37

18.0 Report on the Progress towards Achievement of Environmental Objectives contained in previous AER

Target Area	*Objective*	*Works Carried Out*	*Results*
Odour Management *Reduction in Fugitive Gas Emissions*	Reduction in number of off site odours experienced	Regular patrol of gas collection infrastructure to ensure that there is no blockages on the lines. Adequate intermediate capping on cells prior to final cap Gas extraction of intermediately capped cells.	Odour Complaints reduced from 16 in 2012 to 5 in 2013.
Surface Water Emissions	Keep Surface Water Emissions within agreed limits	Proper management of leachate on site. Regular inspection of surface water drains Meters on site. Regular inspection of bunded area for integrity on site	Three ammonia levels exceeded in surface water lagoons.
Ground Water Emissions	Keep Ground Water Emissions to within agreed limits	Proper management of leachate levels on site. Regular inspection of bunded area for integrity on site.	One licence limit exceeded.
Leachate Management	Reduction in the quantity of leachate produced on site	Capping cells 15B and 16 within 1 year of final placement of waste.	Decrease in leachate produced on site during reporting period. Phase 7 is now permanently capped.
Dust	Keep dust deposit limits within allowable level.	Regular spray of site roads with water at time of dry and windy weather.	No licenced limits exceeded
Vermin	Keep vermin population on site to a minimum	Regular baiting of bait boxes through out the site	No visible activity of vermin on site
		Particular attention to be paid to area of	

		know or sighted vermin activity	
Bird Control	Keep number of crow and sea gulls on site to a minimum	Bird control on site from Dawn to Dusk to aid in the reduction in the number of bird on site during day light.	No bird nuisance during reporting period
Flies	Keep the fly population on site down in the active cell	Regular spray of the waste in the active cell at times of heat and particular emphasis on spraying during summer months	No fly nuisance during reporting period.
Litter – windblown on site	No windblown litter visible outside the active cell area	Proper and complete netting around the active cell Regular litter picking patrols on site to pick up any windblown litter. Stopping the access to the site of rota-press vehicles at times of high winds	No visible wind blown litter on site during reporting period
Litter – On main road to landfill site	Reduction in the number of bags of waste lost from trailer on the way to the landfill	Enforcement of the three strikes and you're out rule in operation on site in relation to uncovered loads entering the landfill site. Quick response to clean up any reported waste on the main road to the landfill	Continued enforcement of covered loads to landfill site and regular litter patrols on main access routes to landfill site
Energy Resources	Reduce the quantity of diesel and electricity used on site		Increase in electricity consumption on site due to additional leachate pump no.17.
Reduction of BMW entering the landfill site	Reduce the percentage of biological municipal waste entering the landfill site to 40%.	Provide organic bin for cold callers to the site and have such material removed for further processing.	Removal of green waste from site for further processing during reporting period.

19.0 Schedule of Environmental Objectives and Targets for the Forthcoming Year.

The following tables sets out the environmental objectives for the facility under a range of headings.

Target Area	Objective	Actions to be progressed and methods	By	2014	2015	2016	2017
Odour Management Reduction in Fugitive Gas Emissions	Reduction in number of off site odour experienced	o Regular patrol of gas collection infrastructure to ensure satisfactory operation o Permanent capping of Cells 18 and 19. o Permanent gas extraction from Cells 18 and 19	FM SEE SEE	Ongoing Q1/2 Q1/2	Ongoing	Ongoing	Ongoing
Surface Water Emissions	Keep surface water emissions within limits	o Proper management of leachate on site o Regular inspection of surface water drains o Regular inspection of bunded area for integrity on site	FM FM FM	Ongoing Ongoing	Ongoing Ongoing Ongoing	Ongoing Ongoing Ongoing	Ongoing Ongoing Ongoing
Ground Water Emissions	No emissions	o Proper management of leachate on site o Regular inspection of bunded area for integrity on site	FM FM	Ongoing Ongoing	Ongoing Ongoing	Ongoing Ongoing	Ongoing Ongoing
Leachate Management	Reduction in the quantity of leachate produced on site	o Capping of intermediately capped cells o Reduction in the fill area of cell into which surface water flows. o ICW trial	FM FM	Q1/2 Ongoing			
Dust	Keep dust deposit limits within allowable level	o Regular spray of site roads with water at time of dry and windy weather.	FM	Ongoing	Ongoing	Ongoing	Ongoing
Vermin	Keep vermin population on site to a minimum	o Regular baiting of bait boxes through out the site o Particular attention to be paid to area of known or sighted vermin activity	FM	Ongoing	Ongoing	Ongoing	Ongoing
Bird Control	Minimise bird nuisance	o Bird control on site from to aid in the reduction in the number of birds on site.	FM	Ongoing	Ongoing	Ongoing	Ongoing
Flies	Minimise fly nuisance	o Regular spray of the waste in the active cell at times of heat and particular emphasis on spraying during summer months	FM	Ongoing	Ongoing	Ongoing	Ongoing
Litter – windblown on site	No windblown litter visible outside the active cell area	o Proper and complete netting around the active cell o Regular litter picking patrols on site to pick up any windblown litter.	FM	Ongoing	Ongoing	Ongoing	Ongoing

Target Area	Objective	Actions to be progressed and methods	By	2014	2015	2016	2017
		o					
Energy Resources	Reduce the quantity of diesel and electricity used on site	o Progress gas to energy project	FM				
Reduction of BMW entering the landfill site	Reduce the percentage of biological municipal waste entering the landfill site to 30%	o Continue to take green waste on site but charge the true cost of treatment for the green waste and have it removed by contractor for further processing.	FM				
Leachate Management	Develop Integrate Constructive Wetland in order to reduce Environmental Emissions and the strength and Volume of Leachate leaving the Facility Site	• Operate & Monitor ICW • Present Results to EPA of Project	FM	Ongoing Ongoing			

FM – Facility Manager
SEE – SEE Waste Management

20.0 Summary of Procedures Developed by the Licensee

The following are the procedures and documents developed by the licensee:

Procedures

- Gas Monitoring Procedure (perimeter wells)
- Waste Acceptance Procedure – Uncovered loads entering landfill site
- Complaints Management Procedure.

Plans

- Closure Remediation Aftercare Management Plan

21.0 Tank, Pipeline and Bund Testing and Inspection Report

Integrity testing completed on leachate lagoons 1 and 2 in 2013.

22.0 Environmental Incidents and Complaints

Environmental Incidents

The incidents reported to the agency refer to exceedances experienced in perimeter gas wells 6 to 6d.
It is noted that there is no odour nuisance or vegetative die back and it is thought that the readings refer to a sump effect in a rock fill embankment that is at a finished construction height above the original ground level.
There were three incidents of trigger level exceedances in the surface water lagoons during the reporting period.

Complaints

There were 10 complaints received for the reporting period (37 in 2012). The complaints can be broken down into the following categories:

Table 18.1: Breakdown of complaints received.

Issue	2010	2011	2012	2013
Odour	6	1	16	5
Illegal Dumping	7	6	3	1
Rubbish on Main Road	1	2	1	1
Uncovered/unsecure loads being admitted into landfill site	0	0	9	0
Flies	1	5	5	0
Site Infrastructure	3	6	3	3
Speeding Leachate Trucks	0	0	0	0
Noise from Leachate Lorries at Treatment Plant	1	1	0	0
Windblown litter	0	0	0	0
Total Number of Complaints	19	21	37	10

23.0 Review of Nuisance Controls

Odour.

Significant works have been undertaken on the gas collection network and the entire network is actively managed as part of the gas to energy project.

Permanent vertical gas wells in cells 15B and 16 were completed in May 2013.

Intermediate cover of the active cell is completed on a weekly basis.

Illegal Dumping.

Quicker response time to complaints received, closer co-operation with litter warden for the area. The warden is immediately notified of the location of the dumping in order to retrieve evidence.

Signage is being erected in (black spot) locations advising of covert camera operations – this is being followed with deployment of the cameras. This is being co-ordinated by the waste enforcement unit.

Regular road side clean ups being carried on main road leading to the landfill site Larger items which have fallen from vehicles carrying waste to the landfill site are removed once a complaint is received in relation to them.

Hedgecutting completed on local road to landfill to aid greater visibility and deter illegal dumping on roadside.

Site Infrastructure.

These complaints referred to the layout of the CAS – the comments were noted and acted upon as appropriate. Signage has been improved.

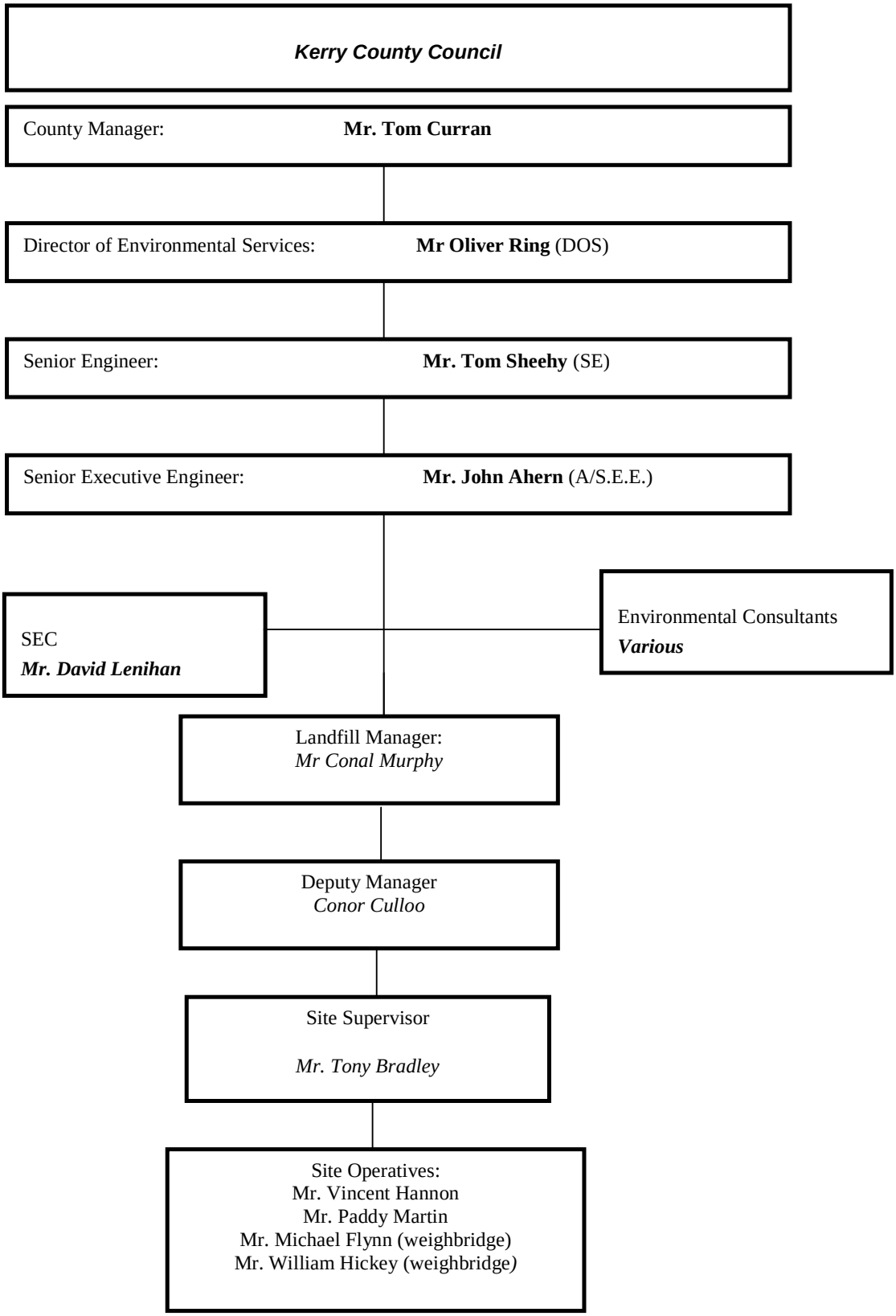
24.0 Report on Financial Provision

Kerry County Council has a Landfill Aftercare and Development Fund.

The CRAMP report as submitted estimates that is required to maintain the landfill site both during its active phase and closed phase. Kerry County Council is well positioned to meet its financial liabilities.

A submission under Section 53A of the Waste Management Act was submitted to the Agency in April 2013 which details the financial standing of the facility.

25.0 Management and Staffing Structure at the Facility 2013



26.0 Programme of Public Information

The following files are available for inspection on site by members of the public:

- AER of previous reporting years
- All correspondence with the Agency
- Surface Water Monitoring Results
- Ground Water Monitoring Results
- Perimeter Gas Detection Well Monitoring Results
- Nuisance Control Documentation
- Leachate Chemical Analysis results
- Leachate quantities produced
- Tonnage of waste accepted on site
- Characterisation of waste accepted for landfilling on site
- Operational Procedure Manual
- Waste Acceptance Procedure
- Environmental Management System.

In main office a notice board is on site which contains information in relation to the management structure of the site, waste tonnages accepted over the relevant years, emergency procedure in relation to fire or accident on site and other environmental information as required.

27.0 Training of Staff

	SafePass	CSCS Card	Waste Management Certificate	Landfill Compactor Training	Domestic Waste at Civic Amenity Site	Waste Facility Operations	Hazardous Spillage and Chemical Control	Managing Safety in Construction
Facility Manager	X		X					
Supervisor	X	X		X				
Weighbridge Supervisor	X					X		X
Operatives	X	X		X		X	X	

	Safe Use of Pesticides and Herbicides	Banksman	Tractor Driving					
Facility Manager								
Supervisor	X	X	X					
Weighbridge Supervisor	X	X	X					
Operatives		X	X					

28.0 Cost of Landfill/Community Fund.

The Community Fund is operated under the Local Government Act, 2001 Section 109.-(1) In this section "community initiative" means any project or programme which in the opinion of the local authority will benefit the local community and includes the provision or improvement of amenity, recreational, cultural or heritage facilities, the protection or enhancement of the environment and programmes to promote social inclusion and community development.

Kerry County Council allocated €60,199.16 (Consumer Index Link) to the Community Fund, which was used on various projects in the area.

The following table gives a break down of the financial outlay under the recycling and landfilling headings.

Table 22.2, Financial outlay 2013

Category	*Recycling*	*Landfill*
Wages/salaries	95,634	260,031
Contracts	23,053	291,474
Plant, equipment, maintenance	3,142	125,244
Office	147	2,121
Other Charges	8,656	247,352
Energy	8,924	78,256
Total	€ 139,556	€ 1,004,478

29.0 Metrological, Noise and Dust Monitoring Results

Table 23.1, Rainfall data 2012/2013

	2012			2013		
	Rainfall (mm)	True Evaporation (mm)	Effective Rainfall (mm)	Rainfall (mm)	True Evaporation (mm)	Effective Rainfall (mm)
Jan	193.7	-29.20	222.9	210.7	-0.08	210.78
Feb	67.9	6.18	61.72	92.9	18.26	74.64
Mar	42.8	31.02	11.78	46.4	-31.52	77.92
Apr	169.5	44.66	124.84	135.2	38.92	97.00
May	46.7	44.48	2.54	119.7	55.6	64.10
Jun	215.4	38.88	176.52	120.7	81.94	38.76
Jul	170.3	33.60	136.7	89.5	118.48	-28.98
Aug	159.3	43.38	115.92	110.4	51.84	58.56
Sep	118.0	13.58	104.42	107.4	31.8	75.60
Oct	152.8	-10.94	163.74	209.6	13.68	195.92
Nov	242.5	-4.88	247.38	149.2	4.86	144.34
Dec	181.4	-7.08	188.48	250.7	-5.92	256.62
Total	*1760.3*	*203.68*	*1556.94*	*1642.4*	*377.86*	*1265.26*

Noise Monitoring 2013

Southern Scientific were commissioned by Kerry County Council to undertake a noise survey at North Kerry Landfill on the 6/12/13, 9/12/13 and 13/12/13. No limits were exceeded.

Table 23.2, Noise monitoring data

6/12/13

Location	Laeq 30min dB	Laf10 30min	Laf90 30min
N1	44.5	45.6	36.8
N2	42.9	43.4	36.7
N3	44.1	45.5	38.4
E1	47.6	49.0	45.8
E2	58.1	47.7	41.9
E3	58.0	50.3	31.8

9/12/13

Location	Laeq 30min dB	Laf10 30min	Laf90 30min
N1	47.5	50.2	42.5
N2	43.6	45.3	40.7
N3	49.3	51.2	46.9
E1	42.2	43.1	39.8
E2	58.0	46.9	38.2
E3	60.2	57.7	45.4

13/12/13

Location	Laeq 30min dB	Laf10 30min	Laf90 30min
N1	54.4	52.9	45.2
N2	50.7	50.3	46.2
N3	46.9	50.3	37.3
E1	51.1	51.8	50.5
E2	60.9	53.2	48.1
E3	56.4	55.1	35.3

Dust Monitoring 2013

Southern Scientific was commissioned by Kerry County Council to carry out dust deposition monitoring at four locations at North Kerry Landfill in 2013.

Table 23.3, Dust Monitoring Results

02/07/13 to 01/08/13	Total particulates, mg/m^2/d	86	108	214	35
	Inorganic particulates, mg/m^2/d	64	68	149	17
02/09/13 to 01/10/13	Total particulates, mg/m2/d	109	116	155	96
	Inorganic particulates, mg/m2/d	63	59	45	56
01/11/13 to 02/12/13	Total particulates, mg/m2/d	71	106	158	69
	Inorganic particulates, mg/m2/d	42	49	55	40

30.0 Statement on the Achievement of the Waste Acceptance and Treatment Obligations

BMW Percentage Composition of Waste disposed at facility

Total Qty MSW of which the BMW Condition Applies	Total Qty BMW	% BMW
55,276.68	30,668.49	55.64%

Appendix A shows the yearly breakdown of tonnage and %BMW entering the landfill site between 1st January – 31st December 2013 as submitted to the Agency.

Comment:

Kerry County Council has been carrying out a review of options available for waste collection and disposal during the reporting period. In the interim it is our intention to provide segregation facilities at each of our transfer station and landfill site to facilitate the segregation of organic waste being brought directly to these facilities.

We are currently in a very uncertain policy environment and Kerry County Council are constantly evaluating the options available. In this context every effort is being made to minimise the BMW content of waste entering North Kerry Landfill Site.

Waste Category Report

North Kerry Landfill — Residual Waste - Tonnage Period 01/01/13 to 31/12/2013

Residual Waste to which Levy Applies

Month	Castleisland KTC Refuse	Castleisland Weighed Waste Less KTC	Castleisland Token Waste	Milltown KTC Refuse	Milltown Weighed Waste Less KTC	Milltown Token Waste Levied	Caherciveen Weighed Waste	Caherciveen Token Waste	Kenmare Weighed Waste	Kenmare Token Waste	Dingle Weighed Waste	Dingle Token Waste	Tonne of Transferred Levied Waste: Total T/S Levied Waste	KTC Refuse Collection: KTC Refuse
January 2013	84.04	62.93	55	0	56.18	33.84	23.84	9.88	32.8	29.23	7.74	21.43	435.07	0
January 2012	96.36	60.52	76.9	0.00	87.48	59.66	38.62	18.84	42.84	35.6	4.30	8.54	505.66	0
February 2013	73.64	56.78	19	0	56.78	50.04	18.5	13.12	33.06	32.6	7.08	13.94	394.34	0
February 2012	81.94	50.88	45.88	3.62	55.74	45.06	20.26	14.34	37.06	34.72	4.6	14.74	408.88	0
March 2013	92.1	60.46	40.74	0	54.72	38.8	32.48	6.36	35.67	41.96	8.44	18.08	487.18	0
March 2012	96.50	74.24	36.82	0.00	82.44	44.12	27.06	8.02	28.90	34.54	4.78	18.00	435.20	0.00
April 2013	88.66	57.36	46.72	0.00	56.52	41.96	21.56	23.48	38.54	18.28	5.26	14.46	403.68	0.00
April 2012	84.00	65.82	46.14	0	57.36	50.7	29.76	12.64	36.42	41.22	4.28	13.86	442.06	0
May 2013	73.44	65.34	46.46	0.00	63.02	57.66	23.84	11.68	42.22	30.60	5.04	26.16	468.10	0.00
May 2012	79.42	69.52	31.44	0	68.22	52.74	28.62	20.38	41.22	37.42	2.38	16.16	445.72	1.38
June 2013	66.44	56.22	32.02	0	66.3	34.64	38.62	13.62	34.2	37.02	0.80	8.96	393.62	0
June 2012	75.64	64.22	37.88	0	69.86	46.04	38.06	21.38	41.06	37.16	5.56	11.16	438.16	0
July 2013	80.12	60.7	49.46	0	64.62	52.90	36.88	5.02	43.06	37.86	8.54	27.84	497.12	0
July 2012	77.50	61.96	54.20	0.00	80.52	45.14	34.42	11.36	41.92	45.76	4.88	11.94	469.40	0.02
August 2013	68.08	61.34	65.6	0	67.68	51.18	31.58	30.88	44.68	46.16	15.08	34.14	396.58	0
August 2012	82.9	61.08	33.4	0	75.80	46.72	38.76	19.5	48.02	33.62	6.32	22.94	477.06	0
September 2013	67.38	54.84	43.18	0.00	49.34	53.96	23.88	0.88	37.18	23.42	8.48	11.68	378.88	0.00
September 2012	66.78	54.04	35.72	0	65.4	46.94	26.42	8.92	40.46	35.24	3.82	16.00	403.76	0
October 2013	77.90	62.44	45.78	0	51.98	50.76	32.48	27.88	39.87	32.06	9.04	21.07	432.58	0
October 2012	88.06	56.04	33.84	0	54.18	52.72	21.1	14	28.66	30.56	3.24	16.46	387.46	0
November 2013	70.18	46.48	32.6	0	85.52	36.66	21.1	19.36	30.48	37.55	0.20	11.68	358.50	0
November 2012	67.32	67.98	44.32	0	62.22	41.06	16.24	13.64	28.6	34.16	7.86	18.36	385.06	0
December 2013	68.34	55.38	47.8	0	55.384	56.836	19.84	-1.1	32.22	37.16	7.36	19.8	[illegible]	0
December 2012	79.4	59.22	32.78	0	58.64	57.36	23.44	19.46	15.7	46.5	0.84	3.74	368.10	0
Total Tonnage 2013	957.18	697.86	534.38	0.00	696.30	551.08	392.20	184.08	373.86	422.50	97.80	232.06	[illegible]	0.00
Total Tonnage 2012	967.94	732.90	500.90	3.62	785.86	580.32	329.04	182.46	431.06	454.70	56.08	167.96	5188.76	1.38
Total Levied Waste 2013	2100.54			1347.38			459.28		795.52		319.86			
Total Non Levied Waste 2013	232.06			129.53			47.9		21.28		27.62			
Total Residual Waste 2013	2420.6			1376.90			504.18		816.8		346.92			
Grand Total	5488.88													

Month	Public Levied Waste: Public Household Commercial C&D & Farmyard Waste	Public Skip (Tickets): Public Skip	Account Holders: A/C Holders Less Large Customers & NC Holders	Waste Recovery Services	Higgins	Dillon	Greenstar	Mr Binman	Country Clean Recycling	KWS	SWS	Wards	Total of Levied Waste Account Holders
January 2013	26.68	24.18	1.84	21.78	3.68	1007.94	2279.002	0	1581.6	1933.53	172.1	37.33	7016.682
January 2012	40.58	33.96	3.66	0	3.34	120.42	1546.74	4027.24	0	288.32	208.66	0	6211.92
February 2013	25.8	21.08	2.62	0.00	1.42	1256.66	1056.34	0	884.76	1273.38	6.34	56.44	4318.96
February 2012	32.12	18.5	2.3	0	1.34	599.22	2126.94	1963.08	0	211.74	581.74	0	5488.36
March 2013	20.30	21.48	4.24	23.26	1.16	1578.36	1791.86	0	1167.6	1465.66	0.00	65.72	6149.18
March 2012	102.48	21.60	3.68	0.00	2.48	864.60	4314.08	1090.48	0.00	275.34	432.30	0.02	8782.96
April 2013	28.04	18.78	4.64	0	2.78	1417.52	1780.96	0.00	1019.24	2181.86	0.00	59.84	7355.84
April 2012	40.28	18.96	2	0	1.56	535.72	2507.78	0	0	233.66	586.36	73.5	3740.76
May 2013	50.38	24.86	5.42	24.60	2.76	544.02	2770.72	0.00	442.88	2488.16	0.00	83.18	6831.82
May 2012	38.58	19.24	4.34	0	3.94	262.64	0	0	0	229.42	718.84	40	1277.28
June 2013	29.12	22.74	3.62	26.62	4.34	498.7	1001.94	0	327.28	2456.62	0	83.36	4382.36
June 2012	39.38	38.06	3.28	0	4.22	1158.5	0	0	0	721.96	889.92	42.2	2830.06
July 2013	39.87	37.38	1.46	0	6.38	224.62	0	0	0	1828.68	0	80.36	2139.86
July 2012	38.04	22.8	42.5	0	2.72	692.68	0	0	0	1602.66	651.36	26.1	3018.04
August 2013	39.5	29.64	2.54	87.88	3.24	388.44	235.36	0	0	1886.73	0	95.02	[illegible]
August 2012	28.9	24.12	4.18	0	3.44	151.28	601.62	0	0	328.34	544.8	62.2	1695.84
September 2013	27.2	28.18	2.78	17.13	2.74	183.72	1390.38	0	0	1058.4	0	40.38	[illegible]
September 2012	29.38	21.88	2.62	0	2.82	623.24	1446.84	0	0	651.02	396.44	41.8	3194.88
October 2013	30.18	24.08	2.06	0	1.58	111.20	0	0	0.00	462.16		100.88	877.88
October 2012	30.96	20.64	2.96	0	1.34	1784.3	2186.36	0	1281.3	1587.3	358.76	80.38	7242.72
November 2013	33.74	29.34	2.1	0	3.6	0.00	0	0	0.00	469.66	0	0	475.56
November 2012	22.88	25.42	3.66	46.12	1.88	1578.68	3766.88	0	3381.6	2579.06	0	80.54	11440.72
December 2013	26.4	36.82	1.6	0	16.88	4.18	0	0	0.00	367.34	0	0	418.86
December 2012	29.1	22.52	3.06	47.14	1.48	1472.02	3601.2	0	3058.4	2182.2	0	37.64	10421.12
Total Tonnage 2013	394.56	308.44	34.76	201.32	40.82	7185.56	12290.42	0.00	6584.03	17897.66	178.44	701.92	45509.66
Total Tonnage 2012	470.60	264.01	78.76	85.26	30.58	9643.30	21924.52	7100.80	7588.26	10832.24	5145.54	404.44	63116.66

Month	KCC Internal Depts Levied Waste	TTC Levied Waste	LTC Levied Waste	Total Direct to NKL	Total Levied Waste	KCC Road Sweeping/Road Clean	TTC Road Sweeping/Street Cleaning	LTC Rd Sweeping	Grave Yard Waste	TC Clean Ups/Fly Tipping	KCC Clean Ups/Fly Tipping	Greenstar Residue collected by Limerick City Council	Wood Maintenance/Forestry/Fly Tipping	Stabilised Landfill Cover	Total Non Levied at NKL	Non Levied Waste from TS: Transfer Station Road sweeping/Graveyard Waste/Fly tipping/Clean ups	Grand Totals
January 2013	7.62	0	0.72	7060.012	7495.082	3.88	57.63	0	0	0	1.52	0	0.58	0.00	68.38	31.07	7594.887
January 2012	1.34	0	0	6277.728	6783.58	13.78	51.46	0	3.5	0	0.5	0.00	2.42	0.00	71.66	41.52	6896.88
February 2013	0	0	0	4366.788	4661.03	28.48	85.48	0	0	0	0.83	0.00	0.43	0.00	115.22	28.86	5073.02
February 2012	2.3	0	0	5541.288	5950.148	1.84	69.7	0	0	0	0.96	0.00	0.58	0.00	72.88	32.32	6055.34
March 2013	0.1	0	0.02	6198.868	6667.728	0.83	88.8	0	0	1.16	2.04	20.12	0.24	0.00	153.38	32.34	6783.44
March 2012	2.48	0.00	0.52	8909.88	7345.18	9.12	85.86	0.00	0.00	0.00	21.82	0.00	2.88	1110.24	1209.54	25.64	8580.58
April 2013	0.70	0.00	0.76	7466.12	7906.80	0.62	77.9	0	0	4.12	3.04	79.70	1.2	0.00	166.28	37.7	8088.88
April 2012	7.18	0	0	3813.14	4255.22	18.7	81.76	0	0.6	0	9.34	0.00	2.38	0.00	112.78	34.22	4402.22
May 2013	30.22	0.00	0.00	6955.78	7184.88	0.00	67.38	0.00	0.00	39.90	66.50	103.90	1.84	0.00	279.8	38.62	7485.82
May 2012	0.02	0	2.16	1330.84	1702.38	0	66.14	0	0	0	4.52	0.00	0.48	0.00	73.14	27.2	1802.7
June 2013	13.2	0	0.94	4448.38	4833.00	0	53.64	0	1.13	0	54.10	81.20	0.28	0.00	193.58	42.74	5083.33
June 2012	7.66	0	0	3090.38	3121.51	0	72.78	0	3.14	0	2.64	0.00	0.38	0.00	78.94	33.66	3234.11
July 2013	3.46	0	0	2320.24	2868.48	13.78	54.06	0	1.03	0	25.26	47.52	0.8	13.64	156.54	47.84	2875.82
July 2012	12.06	0	0	3091.04	3500.44	0.3	78.22	0	0	0	0.86	0.00	0.14	0.00	79.42	45.92	3585.78
August 2013	1.34	0	0.32	2762.58	3298.08	3.62	70.63	0	0	0	0.73	0.00	1	22.28	95.58	63.53	3458.88
August 2012	0.42	0	0	1749.28	2226.34	0.3	88.54	0	0	0	0.6	0.00	0.6	0.00	90.04	58.62	2373.2
September 2013	0.18	0	0	2708.8	3136.68	0.84	53.3	0	0	0	1.04	0.00	0.16	382.22	456.88	34.63	3698.88
September 2012	13.44	0	0	3259.58	3663.34	0.64	66.76	4.48	0	0	123	0.00	0.08		197.98	35.6	3897.82
October 2013	2.72	0	0	735.58	1168.54	14.82	78.7	0	0	0	0.42	0.00	0.4	764.53	858.73	52.76	2099.82
October 2012	2.06	0	1.34	7297.93	7685.38	21.04	100.52	0	0.06	0.54	21.52	0.00	0.3		143.98	25.12	7854.48
November 2013	0	0	1.65	540.3	900.23	0.28	88.14	1.4	0	0	2	0.00	1.78	730.04	831.6	31.33	1763.16
November 2012	48.02	0	1.48	11536.5	11921.50	0	107.34	0	0	0	1.38	0.00	0.78	0	109.38	34.94	12065.82
December 2013	0	0	0	423.2	894.88	0.1	59.4	0	0	0	1.7	0.00	0.1	567.00	637.38	36.13	1508.83
December 2012	0.58	0	0	10453.32	10801.42	7.6	48.66	0	0	0	0.86	256.52	0.94	0	314.8	30.6	11196.82
Total Tonnage 2013	61.68	0.00	4.40	49857.74	50025.38	56.80	808.64	1.40	2.06	45.18	157.44	382.10	8.54	2492.52	3993.48	457.84	55279.883
Total Tonnage 2012	95.83	0.00	5.48	63969.73	69146.51	73.03	900.70	4.48	7.30	0.54	408.00	256.52	11.76	1110.24	2554.58	415.76	72116.836

46917.74

3905.83

48811.23

55279.882

Appendix A: % BMW Report 2013

Biodegradable Municipal Waste Reporting
Landfill Submission Report

Waste licence number: W0001-04 North Kerry Landfill Site

Report created on: 13/01/2014 11:58

Submission details

Year: 2013 Quarter: 4

Reporting period: October - December

Reference number: R-W0001-2013-4

Site details

License number: W0001-04

Parent company name: Kerry County Council

Facility name: North Kerry Landfill Site

Facility address: Muingnaminnane, Tralee, Co. Kerry,

Contact details of person who made the return

Contact name: Conal Murphy Contact position: Landfill Manager

Email address: cmurphy@kerrycoco.ie Telephone number: 0667183735

Mobile number: 0874187103 Fax number: 0667129195

BMW details

Summary for Q4 2013

Type of MSW	Total Qty MSW	Factor Type	Factor Value	Total Qty BMW	Comment	% BMW
2-bin residual commercial waste	32.3	EPA Approved factor	0.75	24.22		74.98
Other	80.04	Site Specific factor	0.63	52.32	Dingle CA	63.01
Other	322.56	Site Specific factor	0.64	205.44	Milltown TS	64.00
Other	589.44	Site Specific factor	0.65	383.14	Cooleashtagh TS	65.00
Other	183.9	Site Specific factor	0.66	121.37	Kenmare TS	66.00
Other	117.88	Site Specific factor	0.64	75.30	Caherciveen TS	64.00
Other	1329.16	Site Specific factor	0.55	731.04	KWD	55.00
Other	2089.68	Site Specific factor	0	0.00	Greenstar Ltd.	0
Other	100.88	Site Specific factor	0.5	50.44	Wards	50
Other	115.38	Site Specific factor	0.55	64.61	Dillons	56.00
Residual MSW from civic amenity facility	181.34	EPA Approved factor	0.63	114.24		63.00
Untreated cleansing waste (fly-tipping, street bins, road sweepings etc.)	259	EPA Approved factor	0.65	168.35		65
	5384.34			1991.47		36.99

Cumulative report for year

Appendix B: Historic Data

Waste Landfill Leachate off Site			
	Waste Tonnes	**Leachate m3**	**tonnes/m3**
1994	16,902	1,494.00	11.31325
1995	23,505	6,475.00	3.630116
1996	23,722	8,496.37	2.792016
1997	25,581.88	12,175.49	2.101097
1998	33,529.67	20,318.09	1.650237
1999	57,872.71	22,822.95	2.535724
2000	60,473.65	36,780.71	1.644168
2001	63,945.91	18,953.85	3.373769
2002	62,821.52	34,218.23	1.835908
2003	50,235.29	30,721.59	1.635179
2004	48,054.47	45,130.40	1.064792
2005	34,430.82	54,784.59	0.628476
2006	60,025.22	60,922.61	0.98527
2007	56,794.24	55,436.15	1.024498
2008	62,412.96	78,558.53	0.794477
2009	39,755.40	73,727.85	0.539218
2010	20,986.80	42,442.73	0.494473
2011	16,545.71	50,108.58	0.330197
2012	71,006.59	69,063.01	1.028142
2013	55,276.68	67,830.01	0.814929
Total	**883878.68**	**790461.01**	**1.12**

Appendix C: Waste Recycling and Recovery

Recycling Waste collected at NKL in 2013

Material type	Suggested EWC codes	Notes	Name of destination facility(ies), or collector(s) if directly exported (please provide licence/permit number)	January	February	March	April	May	June	July	August	September	October	November	December	Total Household waste (tonnes)
Organic waste (food and garden)																
garden	20 02 01		W0001-03				10.76		32.10						43.16	86.02
Mixed dry recyclables (Eco Sense Bags)	20 03 01		Kerry County Council Refuse and Recycling Service collect and transport to Dillons Waste WP	1.78	1.54	1.24	1.44	1.28	1.34	2.1	1.52	1.94	1.64	2.18	1.28	19.28
Cardboard, newspaper and other paper																0.00
cardboard packaging	15 01 01		Dillon Waste The Kerries, Tralee WCP - LK-007/07d				18.28						17.24			35.52
newspaper and magazines	20 01 01		Dillon Waste, The Kerries, Tralee WCP-LK-007/07d	5.34	3.4	2.96	4.96	3.6	3.34	6.24	4.66	5.04	5.06	5.02	5.36	64.98
Glass																0.00
glass packaging	15 01 07		Dillon Waste, The Kerries, Tralee WCP -LK-007/07d	2.625			7.572			2.561	3.084	2.485	3.372	0		21.70
Metals																0.00
aluminium cans (packaging)	15 01 04		Dillon Waste, The Kerries, Tralee WCP -LK-007/07d	0.1			0.285			0.126	0.133	0.152	0.128	0		0.92
steel cans (packaging)	15 01 04		Dillon Waste, The Kerries, Tralee WCP -LK-007/07d	0.273			1.212			0.416	0.4	0.452	0.538	0		3.29
other metals (non-packaging)	20 01 40		united metals limerick	3.74	4.38	2.26	1.88	6.28	4.56	3.08	13.7	2.6	0	4.8	3.9	51.18
Plastic (Bottles)																0.00
plastic packaging (bottles)	15 01 02		Dillon Waste, The Kerries, Tralee Wp	2.88	1.88	1.28	1.98	1.76	1.54	2.72	2.6	3.2	2.22	2.46	2	26.52
Textiles																0.00
textiles, non-packaging	20 01 11		textile recyclers ltd	0	1.14	0.48	0.44	0.88	0	0.88	0.58	0.00		1.68		6.08
Waste Electrical and Electronic Equipment																0.00
CRT	20 01 36			13.238	7.965	2.275	2.49	3.129	5.398	4.048	3.128	6.145	2.646	4.072	6.396	60.93
SDA - Small Domestic Appliances	20 01 36			4.31	3.899	2.114	2.554	1.528	4.08	3.464	2.18	3.84	2.758	2.405	3.508	36.64
LDA - Large Domestic Appliances	20 01 36		Ratcliffe/ENM WCP-DC-08-1130-01 WFP-DS-09-0012-01	0	0	0	6.904	2.424	0	2.441	0	0	4.523	4.183	0	20.48
Cold	20 01 36		KMK Metals Recycling	0	0	0	3.217	1.071	0	2.357	0	0	7.647	2.137	0	16.43
				17.548	11.864	4.388	16.17	8.16	9.478	12.31	5.308	8.885	17.674	12.787	9.904	134.472
				20	13.18	4.76	16.96	7.64	9.2	12.88	6.14	9.94	14.18	12.38		127.28

nw - indicates not weighed

Appendix D: Summary of results and Interpretation of Environmental Monitoring

ANNUAL ENVIRONMENT REPORT

Physio-chemical and Biological Monitoring of North Kerry Landfill

2013

Prepared by:
David Lenihan
Senior Executive Chemist **12th May 2014**

INTRODUCTION

As Part of requirements under EPA Licence for North Kerry landfill this laboratory produces a report on a six monthly basis as well as an annual detailed report. This report can thus be interpreted as *Laboratory contribution to* ***Annual Environment report.***

Enclosed are:

- Annual results in spreadsheet format for Leachate, Surface Water and Groundwater as required per monitoring provisions as of licence requirements for 2013.
- Interpretation of results pertaining to three matrices of concern i.e. Groundwater, Surface water and Leachate
- results from ELS contract laboratory pertaining to individual List 1 and List 2 organics which were analysed for in Nov 2013 at three groundwater locations ***App3***
- ***Appendix 1*** detailing sample locations and associated grid references used in report
- ***Table 1*** outlines trigger values for strategic parameters analysed in groundwater
- ***Appendix 2*** details list of List 1,2 Organics monitored and their associated Limits of detection (LODs)
- ***Appendix 3*** trend graphs for Total organic Carbon results and associated conductivity measurements for each of boreholes
- Invertebrate assessment of surface water impact sites conducted by KCC Scientific staff

All except for analysis of ***Total cyanide, list 1*** and ***List 2 organic substances***, was conducted at KCC laboratory.
Analysis on these Parameters (italics *and asterix*) was farmed out to ***ELS laboratories*** Mahon Industrial Estate, Cork.

A summary of Environmental requirements has been prepared by Tobin Consulting engineers. This is the document we are using. Results are also included for monthly analysis of groundwater as required by provisions of old licence
In 2013 a total of ***311*** samples were sampled by KCC Laboratory personnel
Altogether ***2156*** tests were analysed to satisfy requirements of licence monitoring.

Of these ***2121*** tests were analysed in KCC laboratory
35 tests were analysed by *ELS laboratories*. The latter included Cyanide and List1 / 2 organics as required on an annual basis for three groundwater locations It must however be stressed that each test for SVOCs or VOCs comprises analysis for 153 specific compounds

The monitoring locations monitored are as per requirements of new licence.
APP1 outlines locations and associated northing's and easting's

Trigger limits

Trigger limits are required to be set for certain parameters in groundwater and submitted to EPA. Perhaps the best such limits to use are groundwater threshold values as set out in groundwater regulations 2009. Other standards used, correspond to drinking water regulatory standards. However where drinking water limits cannot be adhered to because of natural conditions (non anthropogenic effects) i.e. Ph the trigger value would have to be more flexible. The trigger values for Boreholes ***GWML-E1*** to ***4*** are as highlighted in Table 1. Borehole ***5*** appears to be monitoring an aquifer which contains a lot of decaying organic matter more than likely from natural sources. Therefore trigger value for ammonia may be too strict.

Table I Parametric Trigger values for Groundwater

Parameter	units	Trigger value (max)	Trigger value(min)
Ammonium	mg/L	0.225	
Nitrite	mg/L	0.38	
Total Oxidised Nitrogen	mg/L (NO_3)	37.5	
Conductivity	Us/cm	800	
Ph	Ph units	10	4.5
Dissolved Oxygen	mg/L O2		1.0
Chloride	mg/L	200	
Flouride	ug/L	1000	
Sodium	mg/L	150	
Potassium	mg/L	10	
Boron	mg/L	0.75	
Copper	mg/L	1.5	
Cadmium	ug/L	3.75	
Chromium	ug/L	37.5	
Arsenic	ug/L	7.5	
Lead	ug/L	10	
Nickel	ug/L	15	
Mercury	ug/L	0.75	
Total Cyanide	ug/L	37.5	
VOCs			
Benzene	ug/L	0.75	

Parameter	units	Trigger value (max)	Trigger value(min)
1,2 dichloroethane	ug/L	2.25	
Tetra chloroethene and Trichloroethene	ug/L	7.5	
Toluene	ug/L	5	
Phenols	mg/L	0.05	
SVOCs			
Atrazine	ug/L	0.075	
Simazine	ug/L	0.075	
Poly aromatic Hydrocarbons[1]	ug/L	0.075	
Pesticides[2,3]	ug/L	0.375	

[1] ***PAHs neasured should include at least benzo(b)Fluoranthene, benzo(k Fluoranthene, benzo(ghi)perylene,indeno(123-cd)pyrene Fluoranthene***
[2] ***the trigger value applies to each individual pesticide measured.***
[3]***Pesticides include organic insecticides, Organic herbicides, Organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides, related products (inter alia, growth regulators***

List 1 and List 2 Organics

Under the provisions of monitoring requirements we are required to monitor List 1 and List 2 organic compounds in three groundwater locations on an annual basis. These locations have to be agreed with EPA. In this report we report on three groundwater locations which were monitored for these compounds i.e. ***Borehole 2***, ***3*** and ***GWML-E1***
The compounds analysed comprised of two types Volatile Organic compounds ***(VOCs)*** and Semi Volatile organic compounds ***(SVOCs)*** . VOCs comprise of organic compounds with boiling points close to or less than that of Water i.e. ***Petroleum products*** and common solvents –up to 83 compounds were screened for using Purge and Trap GC MS.
Semi Volatile compounds comprise of higher boiling point organics and comprise of classes of compounds such as ***pesticides, herbicides, PCBs (****polychlorinated Biphenyls****)*** and ***PAHs(****Poly aromatic Hydrocarbons)* .Up to 63 different compounds in this category were screened for. A list of these compounds, together with limits of detection is given in ***Appendix 2***
No VOCs or SVOCs greater than their respective detection limits were detected

Heavy Metals

As we possess and use *ICP-MS instrument we monitored many more locations for heavy metals than were strictly required i.e. 11 surface water,6 Leachate, and 8 groundwater locations

**Inductively coupled Plasma Mass spectrometer*

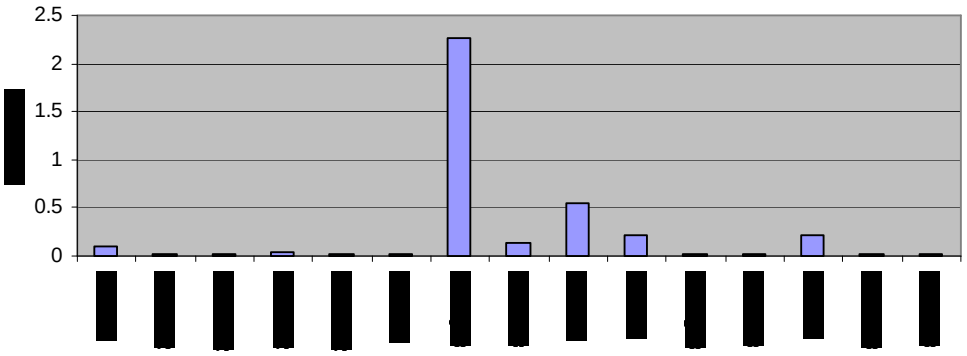
INTERPRETATION OF RESULTS

Groundwater*: . See also trend graphs for Total Organic Carbon (with associated conductivity) for each Borehole (encl)*

All boreholes are showing evidence of surface water contamination to a greater or lesser extent –borehole 2 been least affected. . This is evident from turbidity and Total Organic carbon levels.
GWML-E1 (formerly Borehole 1) still has high levels of some heavy metals including lead . In the latter case, this may be due to fact that well is recently bored and thus some leaching of casing is still occurring
GWML –E1 experienced high Ammonia levels in May 2013 –a corresponding odour of leachate indicated contamination. Since then however there has been no recurrence.
Borehole ***5*** continues pattern of other years i.e. high Ammonias coupled with highest levels of colour and molybdate reactive Phosphorous. The primary source of this would appear to be natural decomposition material in peaty soil

. ***See Fig 1.***

Fig 1: Ammonia levels : GWML_E1



GWML-E1, 2 and ***3*** were tested for list 1 , 2 organics. No organic compounds in excess of their respective detection limits were found here.

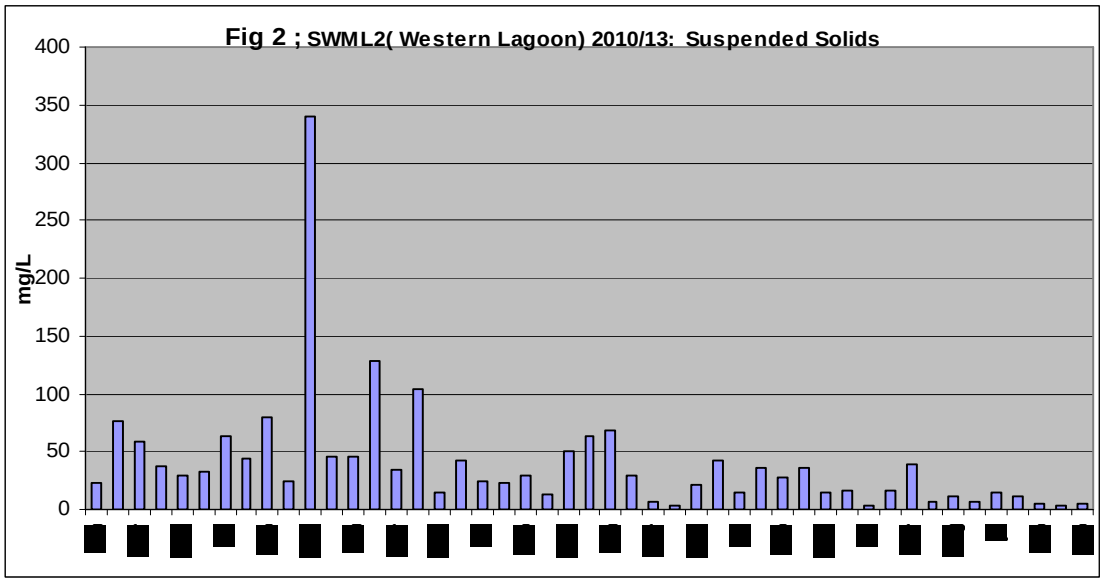
Surface water:

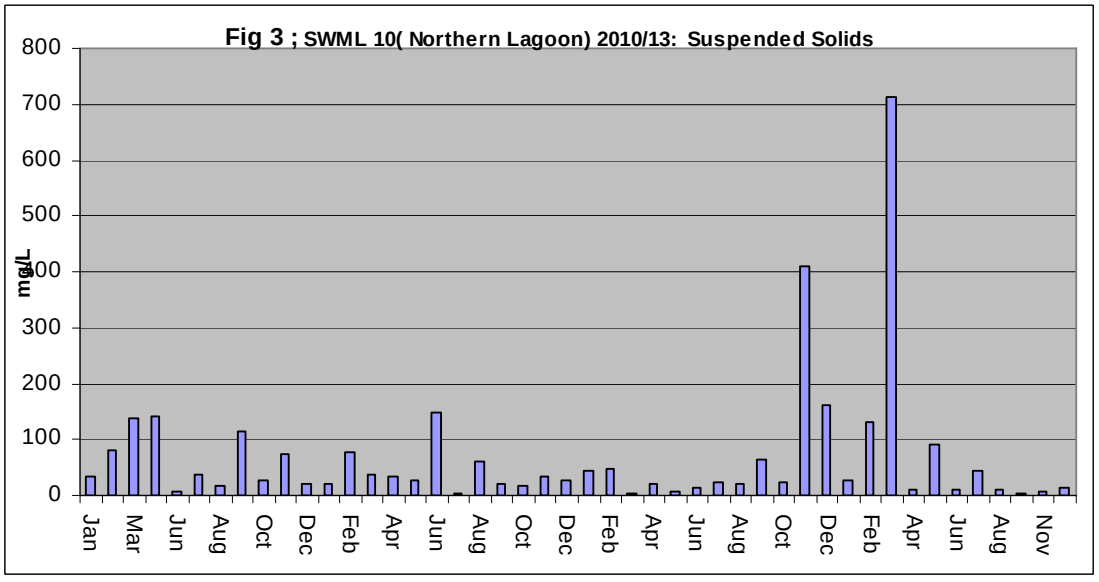
Impact of Suspended solids :

Results from monitoring over last 10 years indicates that most significant threat or impact from Landfill activities in surrounding waters is suspended solids
Samples were obtained "in site monitoring" from Stations ***SWML ,2.3,4,5,10,11 and new lagoon SWMLE1***.

Occasional excesses of suspended solids are noted at on site impact stations i.e. at new surface water lagoon (***SWMLE1***) and ***SWML 10*** in Nov. Figs 3 and 6

While overall there was a noticeable decrease in suspended solids in receiving waters at W1 during 2013 relative to earlier years- there was a spike observed in October probably exacerbated by heavy rainfall prior to sampling. . *See Fig 4 Suspended solids @ W1 2010/2013.*





There was also much less significant impact from Suspended Solids on off site SW1 *See Fig 5Suspended solids @ sW1 2008/2011*

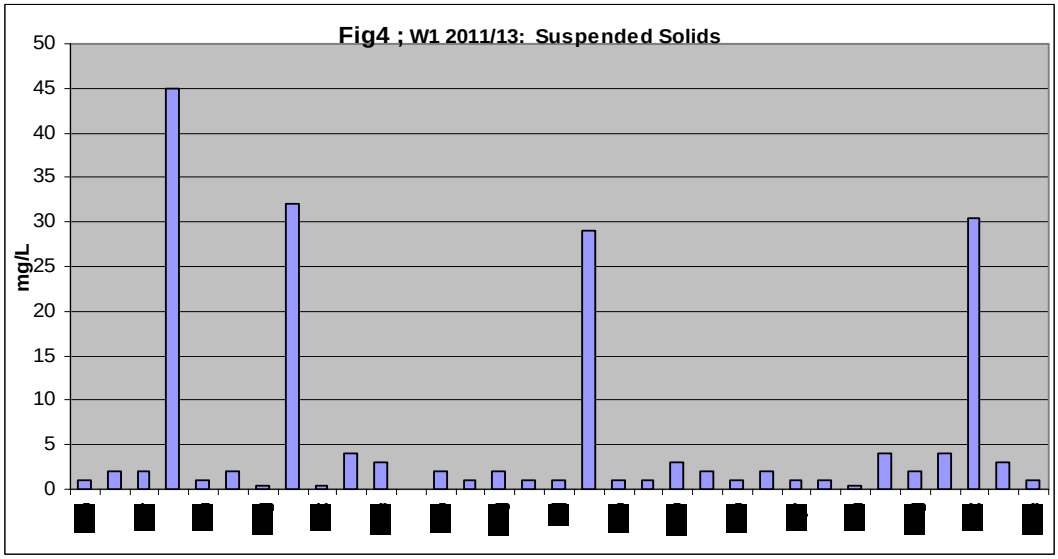


Fig4 ; W1 2011/13: Suspended Solids
mg/L
50
45
40
35
30
25
20
15
10
5
0

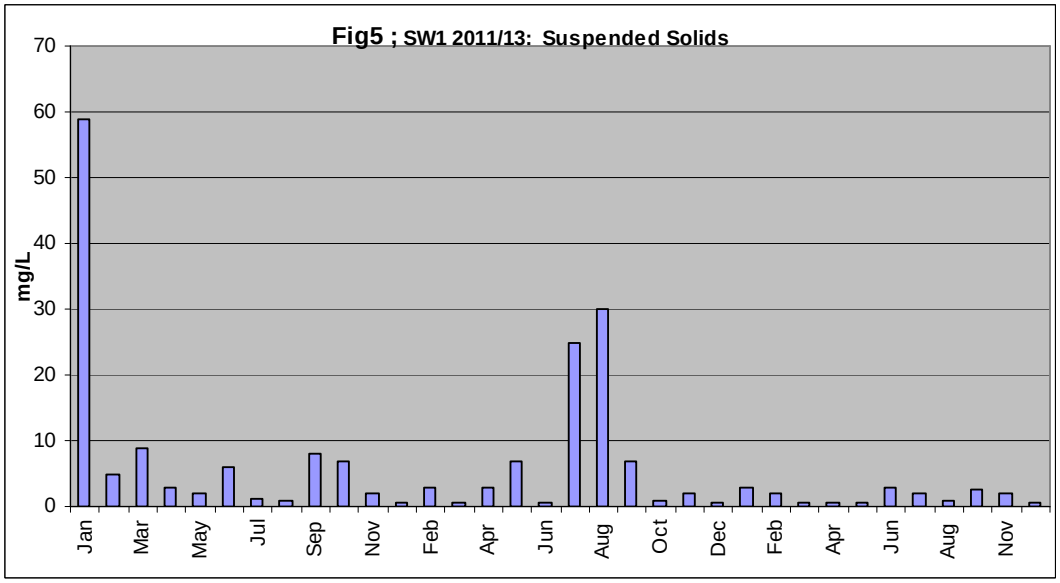


Fig5 ; SW1 2011/13: Suspended Solids
mg/L
70
60
50
40
30
20
10
0
Jan
Mar
May
Jul
Sep
Nov
Feb
Apr
Jun
Aug
Oct
Dec
Feb
Apr
Jun
Aug
Nov

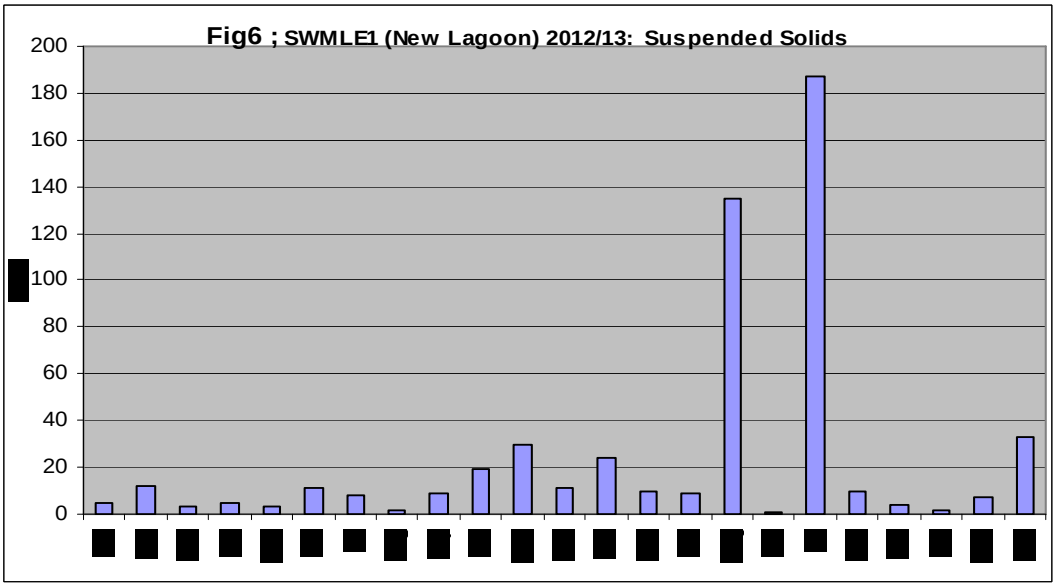


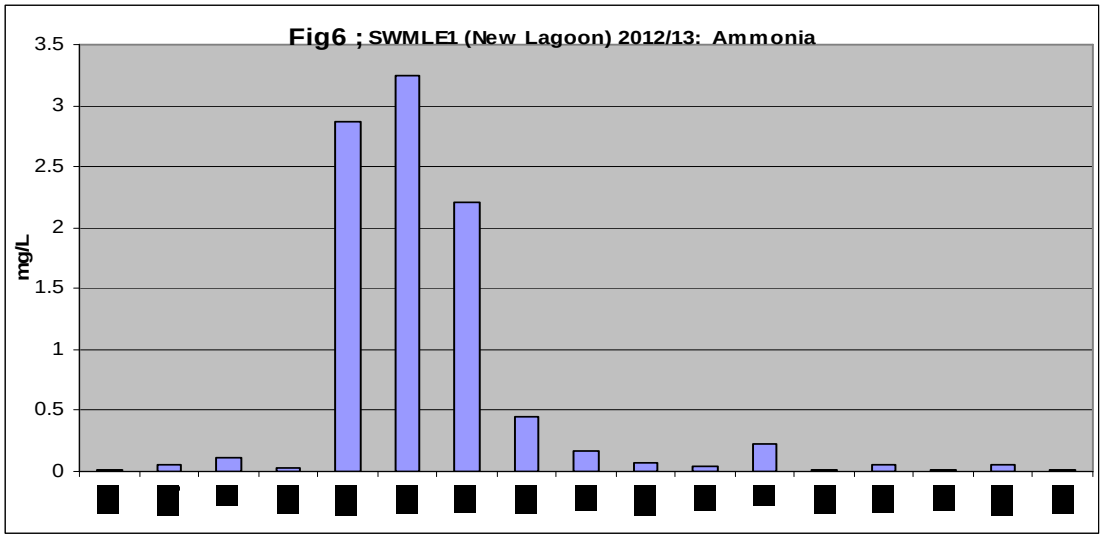
Fig6 ; SWMLE1 (New Lagoon) 2012/13: Suspended Solids
200
180
160
140
120
100
80
60
40
20
0

High suspended solids in river waters may impair fish spawning grounds particularly in winter and spring. Occasional pulses of suspended matter entering these sites are more than likely the main contributory factor for unsatisfactory biological quality at this site in the past (see 2011 AER)
Ecological assessment of ***W1*** In 2013 denotes a ***Q3*** (moderate pollution), which still reflects some impact See ***Invertebrate monitoring report 2013***. This is deterioration from 2012 where a ***Q 3-4*** was detected. The difference may be accounted for very wet 9 month period from may to Dec of 2012. Biological assessment at station on Lee about 3 km downstream (O'Brennans bridge) indicates a stream of good quality i.e. ***Q =4-5***

Because of importance and significance of Suspended solids monitoring of both W1 and SW1 are at a much higher frequency for this parameter than license obligations

Impact of Ammonia levels on receiving waters
At present as part of operational monitoring instruments for automated monitoring of Ammonia in lagoons is been sourced. In the interim grab samples for this parameter are been taken from lagoons and analyzed in laboratory *(appropriate preservative has been added prior to sampling to sample bottles*). This analysis is reported separately which accompanies this report.

In 2010 some impact was noted from landfill on receiving waters gauged by Ammonia levels at Location W1 (see 2010 AER). However since that year no such impact has been repeated . However significant impact judging by Ammonia levels was noted from Nov to march 2013 at new lagoon ***(SWMLE1***). However after appropriate remedial action , this has since been stabilized ***See Fig 7 and sheet of results on investigative monitoring***



Leachate results

Leachate was detected in all detection manholes monitored i.e. ***LD1***, ***LD2*** and ***LD3.***
A comprehensive analysis of leachate outside of scope of licensing conditions is also reported in spreadsheet.

Conclusion

- ***Surface water contamination noted in all boreholes –lower than previous years***
- ***Biological assessment in 2012 denoted deteriorationt in main surface water impact site i.e. W1 from Q 3-5 to Q 3***
- ***Ammonia detected at significant levels in New surface water lagoon SWML E1***
- ***Evidence of leachate was detected in all three leachate detection manholes***

References:

1. Summary of Environmental Monitoring requirements For- Kerry Co Council Landfill, Muingnaminnane, Tralee, Co Kerry -Waste Licence Ref No: 1-3: Tobin Consulting Engineers
2. Biological Invertebrate Monitoring of Surface Waters 2012; Laboratory KCC

APPENDIX 2 ; LIST 1, 2 Organics

Appendix1: Details Sampling points referred to in report

Location	comments	old or alternative name	Location Easting	Location Northing
Groundwater				
specified groundwater monitoring pts				
Groundwater – GWML-E1	Formerly Borehole 1		94697	117360
Groundwater - BH-2			94814	117306
Groundwater - BH-3			94808	117005
Groundwater - BH-4			95430	117040
Groundwater - BH-5			94917.5	117152.7
Groundwater – GWML-E3	Formerly Borehole 6		94843	117658
Private boreholes adjacent to landfill				
borehole: Dennis O Mahony	not specified in new licence		97390.7	118348.7
borehole: Gerry Sugrue	not specified in new licence		93037.8	116489.5
Leachate				
Detection manholes				
LD-1		leachate detection manhole 1	94909	117268
LD-2		leachate detection manhole 2	94894	117298
LD-3		leachate detection manhole from lagoon	94905	117264
Lagoon sampling pts				
LL-1		Leachate in lagoon 1	94904	117237
LL-2		leachate in Lagoon 2	94927	117166
LL-3		lagoon containing run off from compost	94979	117414
Ancillary pts				
Puraflo Treatment Inlet	not specified in new licence			
Puraflo Treatment Outlet	not specified in new licence		94867.2	117332
Wheelwash	Not specified in new licence			
Surface water				
Off site sampling pts				
Surface Water sampling point: W1	not specified in new licence	biological station	94493.3	117107.5
Surface water sampling point: E2	Not specified in new licence	O'Learys farm	95870.6	116575.6
Surface water sampling point: W2	Not specified in new licence		94493.3	117159.9
SW-1		previously E1	95471	117077
SW-2			95143.6	117969.4
SW-3			94853	118263
On site sampling pts				
SWML-1		previously 1	94948.3	117376.4
SWML-2	Western Lagoon	previously 2	94837.9	117263.7
SWML-3			94866	117221
SWML-4		previously 4	94883.9	117092.6
SWML-5			94911	117027
SWML-10	Eastern lagoon		95092	117470
SWML-11		previously 11	95067	117520
SWML-E1	New surface water lagoon		94592	117510

SVOCs: (Semi Volatile base Neutrals)
Std Method 6410 B Liquid-Liquid Extraction GC/MS.

Parameter	***limit of detection***	***units***
1.3 - Dichlorobenzene	1	ug/l
1.4 - Dichlorobenzene	1	ug/l
Hexachloroethane	1	ug/l
bis(2-Chloroethyl) ether	1	ug/l
1,2-Dichlorobenzene	1	ug/l
bis(2-Chloroisopropyl) ether	1	ug/l
N-Nitrosodi-n-propylamine	1	ug/l
Nitrobenzene	1	ug/l
Hexachlorobutadiene	1	ug/l
1,2,4-Trichlorobenzene	1	ug/l
Isophorone	1	ug/l
Naphthalene	1	ug/l
bis(2-Chlororthoxy) methane	1	ug/l
Hexachlorocyclopentadiene	1	ug/l
2-Chloronaphthalene	1	ug/l
Acenaphthylene	1	ug/l
Acenaphthene	1	ug/l
Dimethyl phthalate	1	ug/l
2,6-Dinitrotoluene	1	ug/l
Fluorene	1	ug/l
4-Chlorophenyl phenyl ether	1	ug/l
2,4-Dinitrotoluene	1	ug/l
Diethyl phthalate	1	ug/l
N-Nitrosodiphenylamine	1	ug/l
Hexachlorobenzene	1	ug/l
a-BHC	1	ug/l
4-Bromophenyl phenyl ether	1	ug/l
y-BHC	1	ug/l
Phenanthrene	1	ug/l
Anthracene	1	ug/l
B-BHC	1	ug/l
Heptachlor	1	ug/l
d-BHC	1	ug/l
Aldrin	1	ug/l
Dibutyl phthalate	1	ug/l
Heptachlor epoxide	1	ug/l
Endosulfan I	1	ug/l
Fluoranthene	1	ug/l
Dieldrin	1	ug/l
4,4'-DDE	1	ug/l
Pyrene	1	ug/l
Endrin	1	ug/l
Endosulfan II	1	ug/l
4,4'-DDD	1	ug/l
Benzidine	1	ug/l
4,4'-DDT	1	ug/l
Endosulfan sulfate	1	ug/l

VOCs : Std Method 6210 D-Purge and Trap Capillary Column GCMS.Screening per USEPA 524.2 list.

Parameter	***limit of detection***	***units***
Dichlorodifluoromethane	10	ug/l
Chloromethane	0.5	ug/l
Ethyl Chloride/Chloroethane	0.5	ug/l
Vinyl Chloride/Chloroethene *(0.5ppb)	0.5	ug/l
Vinyl Chloride/Chloroethene * (25ppb)	0.5	ug/l
Bromomethane	0.5	ug/l
Trichloromonofluoromethane	0.5	ug/l
Ethyl Ether/Diethyl Ether	0.5	ug/l
11 Dichloroethene	0.5	ug/l
Acetone	2	ug/l
Iodomethane/Methyl Iodide	0.5	ug/l
Carbon Disulphide	0.5	ug/l
Allyl Chloride	0.5	ug/l
Methylene Chloride/DCM	5	ug/l
2-Propenenitrile/Acrylonitrile	2	ug/l
Chloroacetonitrile	0.5	ug/l
Nitrobenzene	0.5	ug/l
Propanenitrile	10	ug/l
Hexachlorobutadiene	0.5	ug/l
Trans-1,2 Dichloroethene	0.5	ug/l
MtBE	0.5	ug/l
11 Dichloroethane	0.5	ug/l
22 Dichloropropane	0.5	ug/l
cis-12 Dichloroethene	0.5	ug/l
2-Butanone	5	ug/l
Methyl Acrylate	5	ug/l
Bromochloromethane	0.5	ug/l
Methacrylonitrile	5	ug/l
Tetrahydrofuran	5	ug/l
Chloroform*	1	ug/l
111 Trichloroethane	0.5	ug/l
1-Chlorobutane	0.5	ug/l
Carbon Tetrachloride	0.5	ug/l
11 Dichloropropene	0.5	ug/l
Benzene	0.1	ug/l
12 Dichloroethane)	0.1	ug/l
Trichloroethylene/ Trichloroethene	0.1	ug/l
12 Dichloropropane	0.5	ug/l
Dibromomethane	0.5	ug/l
Methyl Methacrylate	0.5	ug/l
Bromodichloromethane*	2	ug/l
13 Dichloropropene,cis	2	ug/l
MIBK/4 Methyl 2 Pentanone	2	ug/l
Toluene	0.5	ug/l
13 Dichloropropene,trans	2	ug/l
Ethyl Methacrylate	2	ug/l
112 Trichloroethane	0.5	ug/l

APPENDIX 2 ; LIST 1, 2 Organics

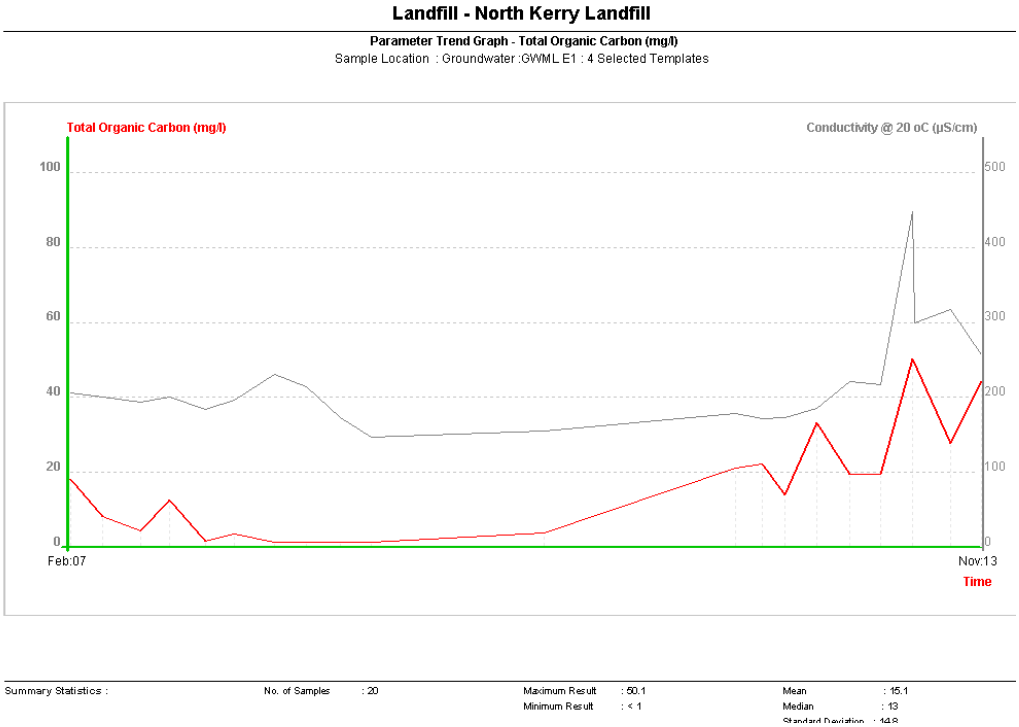
SVOCs: (Semi Volatile base Neutrals)
Std Method 6410 B Liquid-Liquid Extraction
GC/MS.

Parameter	***limit of detection***	***units***
Endrin aldehyde	1	ug/l
Butyl benzyl phthalate	1	ug/l
bis(2-Ethylhexyl) phthalate	1	ug/l
Chrysene	1	ug/l
Benzo(a)anthracene	1	ug/l
3,3'-Dichlorobenzidine	1	ug/l
Di-n-octyl phthalate	1	ug/l
Benzo(b)fluoranthene	1	ug/l
Benzo(k)fluoranthene	1	ug/l
Benzo(a)pyrene	1	ug/l
Indeno(1,2,3-cd)pyrene	1	ug/l
Dibenzo(a,h)anthracene	1	ug/l
Benzo(ghi)perylene	1	ug/l
N-Nitrosodimethylamine	1	ug/l
Chlordane	1	ug/l
Toxapene	1	ug/l
PCB 1016	1	ug/l
PCB 1221	1	ug/l
PCB 1232	1	ug/l
PCB 1242	1	ug/l
PCB 1248	1	ug/l
PCB 1254	1	ug/l
PCB 1260	1	ug/l

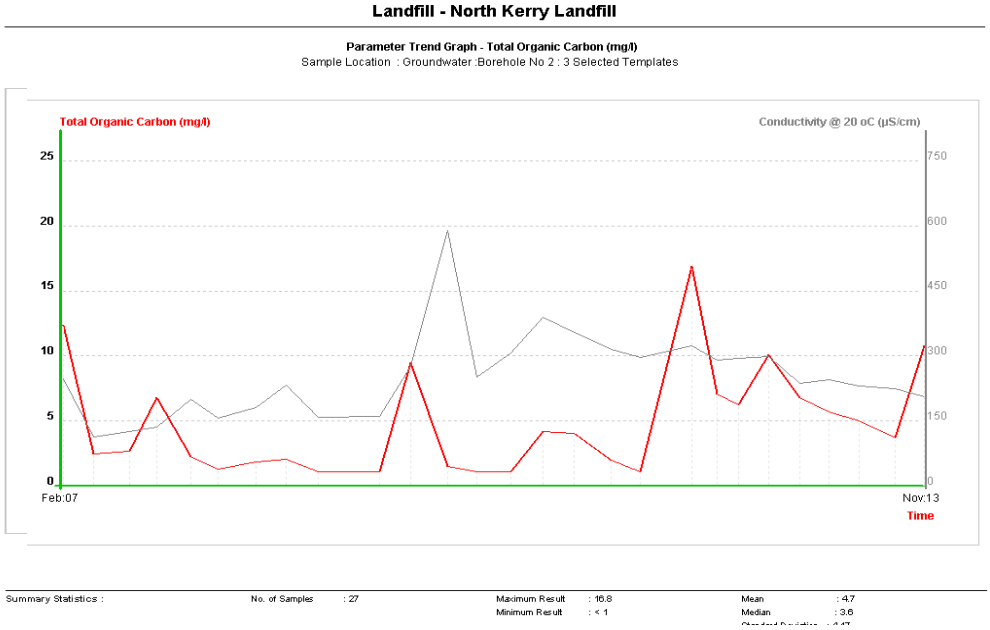
VOCs : Std Method 6210 D-Purge and Trap Capillary Column GCMS.Screening per USEPA 524.2 list.

Parameter	***limit of detection***	***units***
Tetrachloroethylene/ Tetrachloroethene*	0.1	ug/l
Tetrachloroethylene/ Tetrachloroethene*	0.1	ug/l
13 Dichloropropane	0.5	ug/l
2-Hexanone	1	ug/l
Dibromochloromethane *	1	ug/l
12 Dibromoethane	0.5	ug/l
Chlorobenzene	0.5	ug/l
1112 Tetrachloroethane	2	ug/l
Ethyl Benzene	0.5	ug/l
m & p Xylene	0.5	ug/l
o Xylene	0.5	ug/l
Styrene	2	ug/l
Bromoform *	1	ug/l
Isopropyl Benzene	0.5	ug/l
Bromobenzene	0.5	ug/l
1122 Tetrachloroethane	0.5	ug/l
123 Trichloropropane	2	ug/l
Trans 14 Dichloro 2 Butene, tran	2	ug/l
Propyl Benzene	0.5	ug/l
2-Chlorotoluene	0.5	ug/l
4 Chlorotoluene	0.5	ug/l
135 Trimethylbenzene	0.5	ug/l
Tert Butyl Benzene	0.5	ug/l
124 Trimethylbenzene	0.5	ug/l
Sec Butyl Benzene	0.5	ug/l
13 Dichlorobenzene	0.5	ug/l
P Isopropyltoluene	0.5	ug/l
14 Dichlorobenzene	0.5	ug/l
12 Dichlorobenzene	0.5	ug/l
N Butyl Benzene	0.5	ug/l
Hexachloroethane	5	ug/l
12 Dibromo 3 Chloropropane	2	ug/l
124 Trichlorobenzene	0.5	ug/l
Napththalene	2	ug/l
123 Trichlorobenzene	0.5	ug/l
Toluene	0.5	ug/l
13 Dichloropropene,trans	2	ug/l
Ethyl Methacrylate	2	ug/l
112 Trichloroethane	0.5	ug/l
Tetrachloroethylene/ Tetrachloroethene*	0.1	ug/l

GWML-E1 : TOC vs Conductivity 2007 to 2013



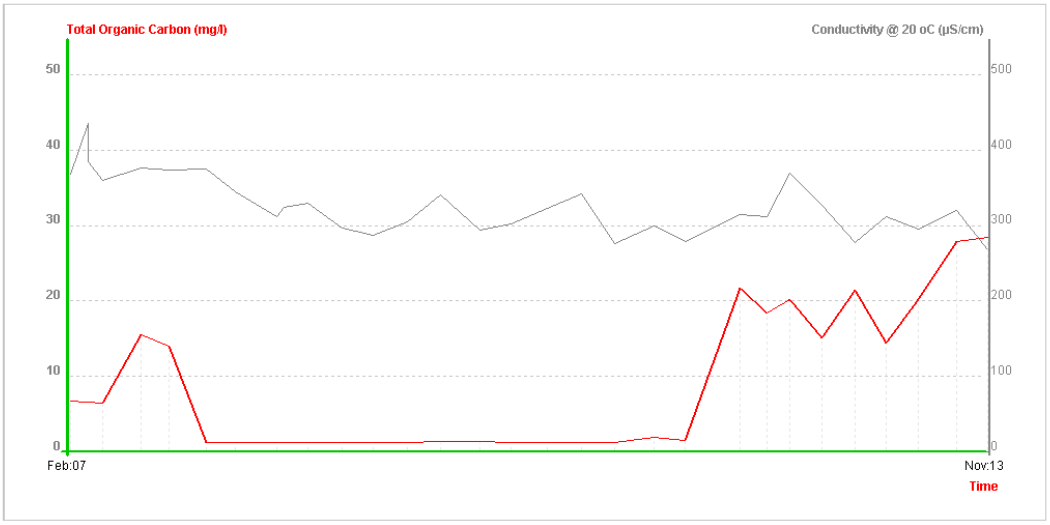
Borehole 2 ; TOC vs Conductivity 2007 to 2013



Borehole 3: TOC vs Conductivity 2007 to 2013

Landfill - North Kerry Landfill

Parameter Trend Graph - Total Organic Carbon (mg/l)
Sample Location : Groundwater :Borehole No 3 : 3 Selected Templates

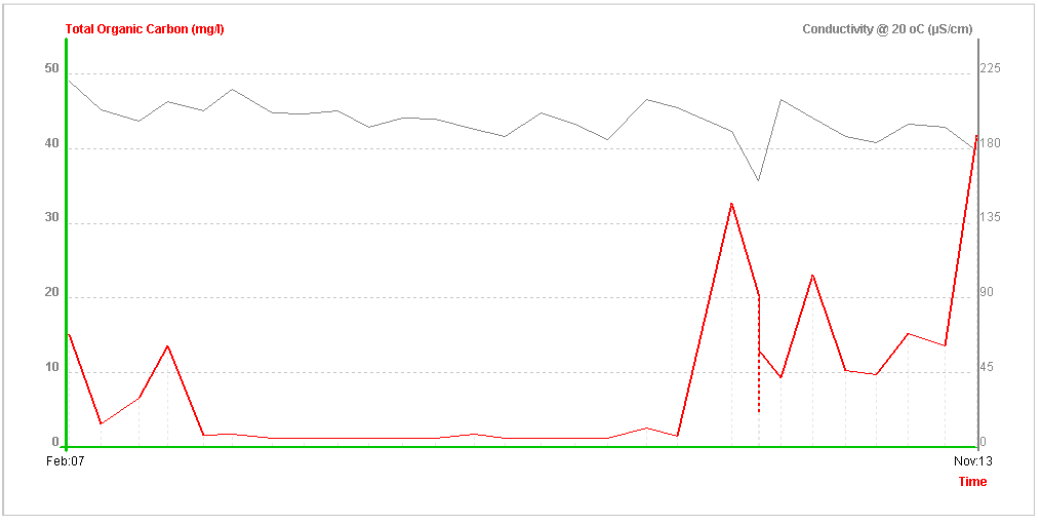


Summary Statistics :	No. of Samples : 28	Maximum Result : 28.3	Mean : 8.56
		Minimum Result : < 1	Median : 1.55
			Standard Deviation : 9.67

Borehole 4: TOC vs Conductivity 2007 to 2013

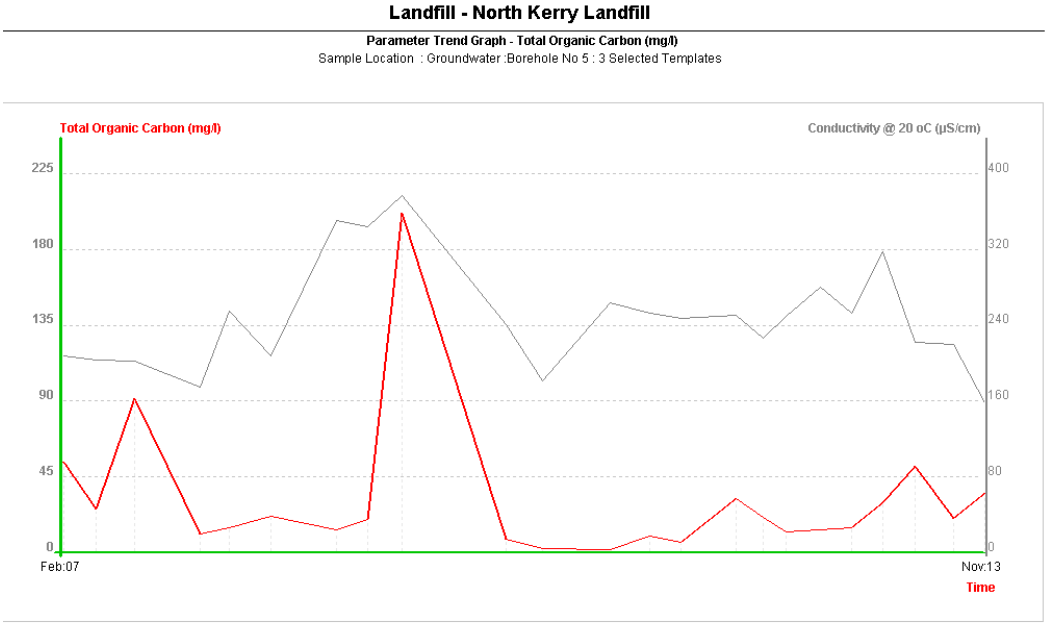
Landfill - North Kerry Landfill

Parameter Trend Graph - Total Organic Carbon (mg/l)
Sample Location : Groundwater :Borehole No 4 : 3 Selected Templates



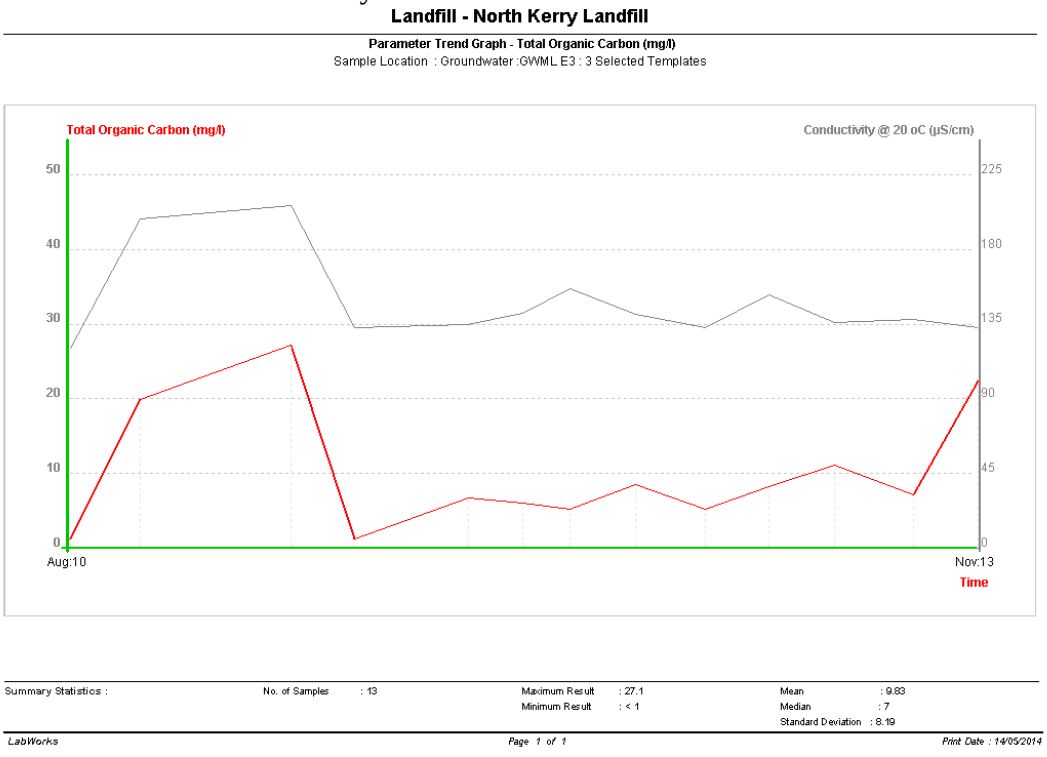
Summary Statistics :	No. of Samples : 35	Maximum Result : 41.7	Mean : 8.28
		Minimum Result : < 1	Median : 6.4
			Standard Deviation : 9.66

Borehole 5: TOC vs Conductivity 2006 to 2013



GGW

ML- E3: TOC vs Conductivity 2007 to 2013



Conductivity 2006 to Feb 2013

Appendix E: Filling Sequence

Appendix1: Details Sampling points referred to in report

Comhairle Chontae Chiarraí
Kerry County Council

Waste Licence W0001-03

Filling Sequence and Gas Collection Plan
Phase 9

Cells 17/18/19

North Kerry Landfill

September 2009

Prepared By:

Environment Section
Kerry County Council

Roinn Comhshaoil
Comhairle Chontae Chiarraí

Introduction

This plan details the following:

- The proposed filling sequence for cells 17, 18 and 19;
- The liner/capping placement sequence for the filled cells (daily, weekly, intermediate and permanent);
- The progressive construction of a gas collection network from Phase 9 development.

This plan outlines the methods that will be adopted and the gas control techniques adopted on site. These techniques are developed with the site specific circumstance taken into consideration.

This plan takes into account the Conditions of Waste Licence W0001/03 and best practice as detailed in the Landfill Gas Management Practice manuals and Best Available Technology available.

Filling Sequence

Cell 19 will initially be filled followed by cell 18 and cell 17.

The filing of Cell 19 will commence from the west via a constructed access ramp and work in a north to south direction until intercell berm 19/18 is met.

The first lift height will be in the regions of 3m. Once this initial area is filled the remaining area to the east will be sub-divided into sections to the intercell berm between Cell 19 / 20.

These will be progressively filled until a complete first lift has been placed within Cell 19.

The pattern will then be repeated and the height of the haul road adjusted to accommodate the filling area at any given time.

Within each section a particular area will be designated the active area. The active area will be kept to a minimum size as is practical taking account for the safe turning distance required for landfill plant.

Side slopes will be raised slightly above the level of the waste as filling progresses. This facilitates the pushing of waste against the inner face and the construction of a robust side slope.

Liner Placement

It is proposed that the sequence of permanent capping actions will be as follows:

- Incremental landfill to finished final profile
- Place intermediate capping material to all finished areas
- Place vertical wells
- Place woven polypropylene cover over sub soil intermediate cover as gas layer
- Connect vertical wells via temporary pipework
- Horizontal gas collection from the cell will still be active
- Once settlement has ceased place final LDPE capping
- Connect permanent vertical wells with permanent piping to manifold on trunk main.

The exact proposal with regard to the lining will be advised to the Agency for agreement in advance through a SEW.

Permanent capping will be LDPE liner with welded seams and welded to the HDPE liner within the anchor trench as appropriate.

Intermediate cover will be placed on all areas that have reached profile height. The intermediate cover will consist of site won low permeability soils spread in layers over the footprint and finished to final profile level.

Temporary Gas Extraction System

KCC have operated a successful horizontal gas extraction system in cells 15 and 16 while active. This has contributed significantly to the capture of gas from the active cell which was conveyed to and destroyed at the flare.

The gas network consist of layers of pipes work approximately 4m lifts within the waste.

For cells 19/18/17 a ring main will be used in the lowest lift. To mitigate gas escaping through the leachate drainage blanket and under any side slopes, an outer ring main will be placed as close as practical above the drainage blanket approximately 2m from the edge. Each edge of the manifold will be connected to the manifold to ensure maximum suction throughout the pipeline.

The inner pipes runs will be at a height of 2m above the leachate stone.

The pipes will be HDPE perforated pipework welded on site on the horizontal level and solid pipework from the connection to the manifold.

Condensate containment and removal is difficult when using a temporary manifold that is not located within the waste body.

The manifold will have a backfall and a solid pipe will be placed at the lowest end of the pipeline and will return down the side slope to return the condensate to the waste body.

The network will be constructed in progressive lifts following the depth of waste placed.

Each pipe will be controlled by a valve at the manifold. A sampling port on each pipe will facilitate balancing of the field with regard to gas capture. A check on O_2 ingress will be done to ensure that the draw in of air is kept to a minimum.

The horizontal system is intended to the be a sacrificial system which will be decommissioned once the permanent cap has been constructed and vertical wells are commissioned.

The treatment of the pipes work leading to the manifold before decommissioning will require cutback as far as practical and termination within the annulas of a vertical well to provide a pathway for any gas that will vent through the redundant pipework.

Permanent Gas Extraction

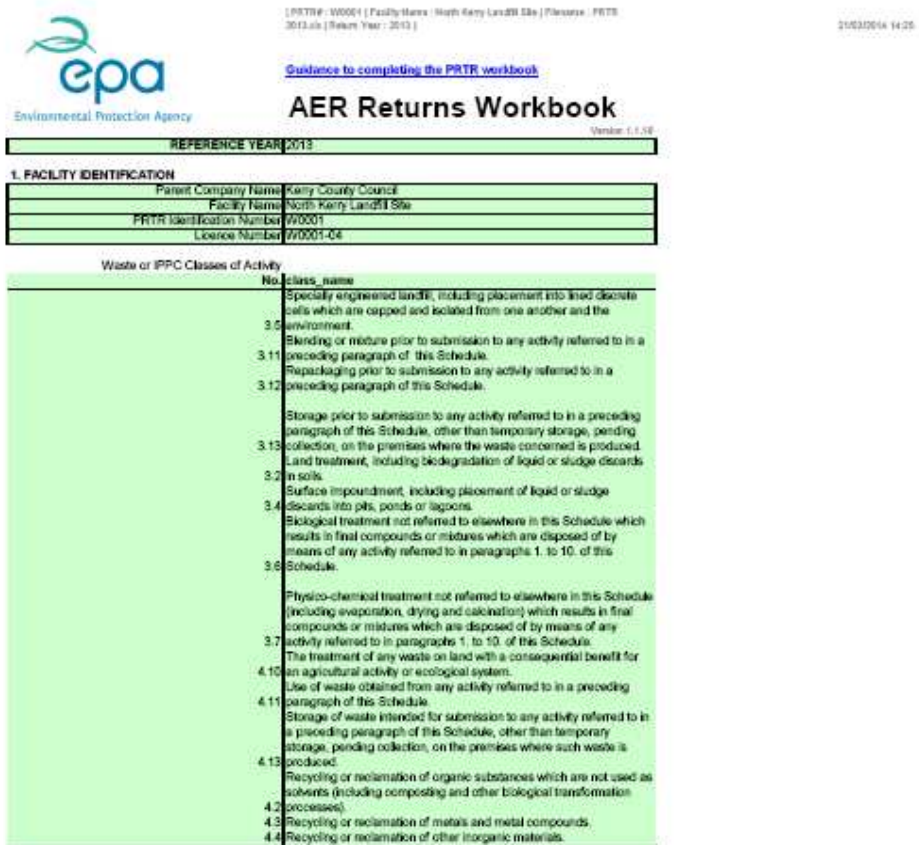
The permanent vertical wells will be constructed after the placement of the intermediate cover over the area that has been filled to profile height. Once constructed a polypropylene liner. The wells will be attached to a temporary manifold, once permanent capping is undertaken the wells will be connected to the permanent manifold.

A SEW will be lodged with the Agency setting out the engineering details for the proposal. The SEW will included all aspects of the permanent capping.

Gas Destruction

Currently all gas is conveyed to the permanent enclosed flare. The flare has a capacity of 500 m^3/hr.

Appendix F: PRTR 2013



[PRTR# : W0001] [Facility Name : North Kerry Landfill Site] [Filename : PRTR 2013.xls] [Return Year : 2013]

21/03/2014 14:25

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.10

REFERENCE YEAR	2013

1. FACILITY IDENTIFICATION

Parent Company Name	Kerry County Council
Facility Name	North Kerry Landfill Site
PRTR Identification Number	W0001
Licence Number	W0001-04

Waste or IPPC Classes of Activity

No.	class_name
3.5	Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.
3.11	Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
3.12	Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
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.
3.2	Land treatment, including biodegradation of liquid or sludge discards in soils.
3.4	Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.
3.6	Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
3.7	Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule.
4.10	The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.
4.11	Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.

Address 1	Mulngraminnane
Address 2	Tralee
Address 3	Co. Kerry
Address 4	
	Kerry
Country	Ireland
Coordinates of Location	-9.85099 54.1738
River Basin District	IESENSH
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Conal Murphy
AER Returns Contact Email Address	cmurphy@kerryco.co.ie
AER Returns Contact Position	Landfill Manager
AER Returns Contact Telephone Number	0667129195
AER Returns Contact Mobile Phone Number	0874187108
AER Returns Contact Fax Number	0667129195
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	0
Number of Employees	5
User Feedback/Comments	Net emmisions of methane to air increased to 2,540,235 kg/yr for 2013.The landfill gas generator was not in operation since 6th September 2013 as per ESB recommendations.
Web Address	cmurphy@kerryco.co.ie

2. PRTR CLASS ACTIVITIES

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

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

Is it applicable?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs				
POLLUTANT		METHOD					QUANTITY		
			Method Used						
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	Emission Point 2	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
01	Methane (CH4)	C	OTH	Total est. minus total utilised	2540235.0	0.0	2540235.0	0.0	0.0
08	Carbon dioxide (CO2)	C	OTH	LandGem model 3.02	21600.0	0.0	21600.0	0.0	0.0

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

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
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 II) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
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
210	Dust	E	ESTIMATE		214.0	214.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column II) 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(otal) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: North Kerry 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)	3215000.0	C	Other	LandGem Model 3.02	N/A	
Methane flared	237357.0	M	Other	Landfill Gas Survey 2013	180.0	(Total Flaring Capacity)
Methane utilised in engine/s	437408.0	C	Other	Landfill Gas Survey 2013	143.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	2540235.0	C	Other	Diff LandGem 3.02 /Gas Su	N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of stormisurface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					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 PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					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 C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					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

Please enter all quantities on this sheet in Tonnes

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					
To Other Countries	13 02 05	Yes	3.26	Mineral Based non chlorinated engine,gear and lubricating oils	R9	C	Volume Calculation	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
To Other Countries	13 08 99	Yes	0.0	wastes not otherwise specified	R9	C	Volume Calculation	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
To Other Countries	14 06 01	Yes	0.0	chlorofluorocarbons, HCFC, HFC	R7	C	Volume Calculation	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
To Other Countries	14 06 03	Yes	0.0	other solvents and solvent mixtures	R7	C	Volume Calculation	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
Within the Country	15 01 01	No	91.0	paper and cardboard packaging	R3	M	Weighed	Offsite in Ireland	Dillon Waste and Greenstar Sarsfield Court,WCP-LK-08-0077-04	Dillon Waste and Recycling The Kerries Tralee (91.94 tonnes),Greenstar Sarsfield Court Cork (12.68 tonnes),,,,Ireland		
Within the Country	15 01 07	No	22.0	glass packaging	R3	M	Weighed	Offsite in Ireland	Dillon Waste ,WCP-LK-08-0077-04	Dillon Waste and Recycling The Kerries Tralee (91.94 tonnes),Greenstar Sarsfield Court Cork (12.68 tonnes),,,,Ireland		
To Other Countries	15 01 10	Yes	0.0	packaging containing residues of or contaminated by dangerous substances	R7	C	Volume Calculation	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
To Other Countries	16 06 01	Yes	0.59	lead batteries	R4	M	Weighed	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP_LK_052/08d ,ENVA,Campine,MLVA/05-173/gvda,Belgium,Belgium	ENVA,Campine,MLVA/05-173/gvda,Belgium,Belgium
To Other Countries	16 06 02	Yes	1.04	Ni-Cd batteries	R4	M	Weighed	Abroad	ENVA Ireland,WCP-LK-052-08d	Clonminam Ind,Portlaoise ,Co Laois,,,Ireland	ENVA,WCP-LK_052/08d,Lindenscmidt,Accurec,Germany,,,Germany	Lindenscmidt,Accurec,Germany,,,Germany
Within the Country	19 07 03	No	67830.01	Landfill leachate other than those mentioned in 19 07 02	D8	M	Weighed	Offsite in Ireland	Finucane Burke Haulage,WCP-CK-09-0691-01	Tralee Wastewater Treatment Plant,The Kerries,Tralee ,Co Kerry,Ireland		
To Other Countries	20 01 11	No	6.08	textiles	R3	M	Weighed	Abroad	Cookstown Textile Recyclers,roc 1929 wmez 01/11	36 Maheralane Rd,Randalstown,Co Antrim,,,United Kingdom		
Within the Country	20 01 25	No	3.2	edible oil and fat	R9	M	Weighed	Offsite in Ireland	Buckley ECO Fuels,WCP-LK-95-07c	Killarney,Co Kerry,,,,Ireland		
Within the Country	20 01 39	No	26.52	plastics	R3	M	Weighed	Offsite in Ireland	Dillon Waste and Recycling,WCP-LK-08-0077-04	Dillon Waste and Recycling,The Kerries,Tralee,Co Kerry,Ireland		
Within the Country	**20 01 40**	**No**	4.21	metals	R4	M	Weighed	Offsite in Ireland	Dillon Waste,WCP-LK-08-0077-04	Dillon Waste and Recycling The Kerries Tralee (91.94 tonnes),Greenstar Sarsfield Court Cork (12.68 tonnes),,,,Ireland		
Within the Country	20 01 40	No	51.0	metals	R4	M	Weighed	Offsite in Ireland	United Meatis,WFP-LKO-10-00001-02	Ballysimon Road,Limerick,,,,Ireland		
Within the Country	20 02 01	No	86.0	biodegradable waste	R3	M	Weighed	Offsite in Ireland	Bord Na Mona,WO198-01	Kilberry ,Co Kildare,,,,Ireland		
Within the Country	20 03 01	No	19.0	mixed dry recyclables	R3	M	Weighed	Offsite in Ireland	Kerry County Council Refuse Collection Service,N/a	Dillons Waste and Recycling,The Kerries,Tralee,Co Kerry,Ireland		
Within the Country	20 03 01	No	0.0	mixed municipal waste	D5	M	Weighed	Onsite of generati	North Kerry Landfill,W0001	Kerry,,,,,Ireland		

Appendix G: Landfill Gas Survey 2013

Environmental Protection Agency

A survey of landfill sites to determine the quantity of methane flared and or recovered in utilisation plants for 2013

Please choose from the drop down menu the license number for your site	W0004
Please choose from the drop down menu the name of the landfill site	North Kerry
Please enter the number of flares operational at your site in 2013	1
Please enter the number of engines operational at your site in 2013	1
Total methane flared	237,357 kg/year
Total methane utilised in engines	437,408 kg/year

Please note that the closing date for reciept of completed surveys is 31/03/2014

Introduction

The Office of Climate Licensing and Resource Use (OCLR) of the Environmental Protection Agency acts as the inventory agency in Ireland with responsibility for compiling and reporting national greenhouse gas inventories to the European Commission and the United Nations Framework Convention on Climate Change. In addition to meeting international commitments Ireland's national greenhouse gas inventory informs national agencies and Government departments as they face the challenge to curb emissions and meet Ireland's targets under the Kyoto Protocol. The national inventory also informs data suppliers, making them aware of the importance of their contributions to the inventory process and a means of identifying areas where input data may be improved.

It is on this basis that the Environmental Protection Agency is asking landfill operators to partake in this survey so that the most uptodate information on methane flaring and recovery in utilisation plants at landfills sites is used in calculating the contribution of the waste sector to national greenhouse gas emissions

The Environmental Protection Agency wishes to thank you for partaking in this survey. If you have any questions about the survey and how to complete it please view the "Help sheet" worksheet. If however, your query is not answered by viewing the "Help sheet" worksheet please contact:
LFGProject@epa.ie

Once completed please send the completed file as an attachment clearly stating the name and or license number of the landfill site (e.g. W000 Xanadu landfill_2013) to:
LFGProject@epa.ie

	to be filled in by licensee		calculated by spreadsheet	

Flare No. 1

Flare type ?	Other	**Biogas 500m3/hr Modular Ground Flare**	
Is the flare an open or enclosed flare ?	Enclosed	**Rated flare capacity ?** 500	**m3/hr**
Month /year comissioned ?	June 2000		
Month decomissioned if decomissioned in 2013 ?	Select		
What is the function of the flare	Back-up to engines	**If "other" enter flare function here**	

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Flow Rate (m^3/hr)	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
January	C	3	24.0	0.0	72	-30	250	51.00	34.00	2.10	98.0	8,996	6,028
February	C	2	24.0	0.0	48	-28	280	54.00	35.00	1.60	98.0	7,112	4,775
March	C	2	10.0	0.0	20	-33	265	52.00	33.50	1.90	98.0	2,701	1,804
April	C	3	3.5	0.0	11	-29	260	54.50	34.80	1.20	98.0	1,458	978
May	C	4	4.0	0.0	16	-30	270	53.00	34.20	1.40	98.0	2,244	1,503
June	C	3	4.0	0.0	12	-32	255	56.00	35.00	1.10	98.0	1,679	1,123
July	C	4	3.5	0.0	14	-25	290	52.00	33.70	1.40	98.0	2,069	1,393
August	C	6	3.0	0.0	18	-28	270	49.00	33.00	1.90	98.0	2,334	1,567
September	C	22	22.5	0.0	495	-39	310	42.00	29.00	2.70	98.0	63,160	41,930
October	C	31	24.0	0.0	744	-41	290	41.00	28.00	2.90	98.0	86,692	57,435
November	C	30	24.0	0.0	720	-38	320	40.50	28.80	2.70	98.0	91,446	60,771
December	C	31	24.0	0.0	744	-36	280	42.70	29.00	2.20	98.0	87,174	58,050
Total					2,914							357,065	237,357

Please note: Only fill the "Yearly" table if data is not availabe or cannot be calculated nor estimated on a monthly basis

Yearly	Method M/C/E	Runtime days/year	Runtime hrs/day	Downtime hrs	Total runtime hrs/year	Average Inlet Pressure (mbg)	Average Flow Rate m^3/hr	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
2013					0						98.0	0	0

	to be filled in by licensee		calculated by spreadsheet	

Engine No. 1

Engine type ? Other — **Jenbacher J208 GS**

Month /year comissioned ? November 2011

Month decomissioned if decomissioned in 2013 ? Select

Monthly	Method M/C/E	Runtime days/month	Runtime hrs/day	Downtime hrs	Total runtime hrs/month	Average Inlet Pressure (mbg)	Average Flow Rate (m^3/hr)	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
January	M	31	24	48	696	-15	220	53.00	35.00	1.40	98.0	79,531	54,099
February	M	28	24	24	648	-18	215	51.00	33.00	1.20	98.0	69,632	47,223
March	M	31	24	20	709	-15	200	54.00	35.00	1.10	98.0	75,041	51,045
April	M	30	24	10	710	-18	190	55.60	35.40	1.00	98.0	73,504	49,849
May	M	31	24	15	729	-14	210	52.60	35.00	1.50	98.0	78,915	53,734
June	M	30	24	10	710	-18	220	55.00	36.00	1.00	98.0	84,192	57,098
July	M	31	24	9	735	-15	215	54.70	35.70	1.00	98.0	84,711	57,623
August	M	31	24	13	731	-17	210	51.00	34.60	1.00	98.0	76,724	52,085
September	M	30	24	542	178	-35	300	42.00	29.00	2.70	98.0	21,979	14,651
October	M	31	24	744	0	-40	290	41.00	28.00	2.90	98.0	0	0
November	M	30	24	720	0	-38	320	40.50	28.80	2.70	98.0	0	0
December	C	31	24	744	0	-36	280	42.70	29.00	2.20	98.0	0	0
Total					5,846							644,229	437,408

Please note: Only fill the "Yearly" table if data is not availabe or cannot be calculated nor estimated on a monthly basis

Yearly	Method M/C/E	Runtime days/year	Runtime hrs/day	Downtime hrs	Total runtime hrs/year	Average Inlet Pressure (mbg)	Average Flow Rate m^3/hr	Average CH_4 %v/v	Average CO_2 %v/v	Average O_2 %v/v	Combustion efficiency (%)	Total CH_4 m^3	Total CH_4 kgs
2013					0						98.0	0	0