# ANNUAL ENVIRONMENTAL REPORT

## January - December 2009

## For

## Dundalk Landfill Site

## Co. Louth

## Waste Licence Reference W0034-02

## By

## Dundalk Town Council

## To

## Environmental Protection Agency

# Dundalk Landfill & Civic Waste Facility Site (W0034-02)

# Annual Environmental Report January – December 2009

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# APPENDICES

# 1.0 INTRODUCTION

This Annual Environmental Report (AER) has been prepared to meet the requirements of Waste Licence W0034-02 for Dundalk Landfill.

The site is owned by Dundalk Town Council and is located at Newry Road, Dundalk. It is situated on the northern bank of the Castletown River in an area of intertidal mudflats. The northern boundary of the site adjoins low lying and poorly drained agricultural lands. Residential and industrial properties adjoin the western boundary of the site.

Dundalk Landfill Site has been in operation since 1980. In 2000 Dundalk Town Council submitted an application to the Environmental Protection Agency (EPA) for the continued operation of the landfill site, as required by the Waste Management (Licensing) Regulations 1997. The landfill site ceased to accept waste in October 2002.

In March 2005, the EPA granted the Council a revised Waste Licence (registration number W0034-02) for the facility, in accordance with the Third and Fourth Schedule of the Waste Management Act, 1996-2003.

The site has been restored. Restoration works include the installation of capping layer, provision of storm water drainage, leachate collection trench, provision of gas collection system, provision of gas flare, grading of site to provide for future football pitches and provision of an access road.

## 1.1 REPORT PERIOD

The reporting period of this report refers to January to December 2009. The landfill site ceased to accept waste in October 2002. A Civic Waste Facility is currently in operation at the facility.

## 2.0 WASTE ACTIVITIES CARRIED OUT AT THE FACILITY

Waste is no longer accepted at the landfill facility except for restoration purposes. The maximum tonnage of waste to be accepted at the Civic Waste Facility is 20,000 tonnes per annum in accordance with Table A1 of the Waste Licence.

The licensed disposal activities, in accordance with the Third Schedule of the Waste Management Act, 1996, are restricted to those listed as follows:

**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.**

Licensed waste recovery activities, in accordance with the Fourth Schedule of the Waste Management Act, 1996, are restricted to those listed as follows:

**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.**

## 3.0 QUANTITY AND COMPOSITION OF WASTE RECEIVED AND DISPOSED OF DURING THE REPORTING PERIOD AND EACH PREVIOUS YEAR.

Waste data figures are derived from weighbridge readings. These figures are shown in Table 1.

**Table 1 Waste Quantities Accepted (Tonnes) at Landfill**

| Waste types | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|
| Total | 37,060 | 37,560 | 38,000 | 36,000 | 32,000 | 32,420 | 27,417 | 3,018 |

*1997-2001 figures based on estimates

** The landfill site ceased to accept waste in October 2002 and waste is only brought on site for restoration purposes.

In accordance with Condition 5 of the waste licence only those waste types and quantities listed in Schedule A shall be disposed of at the facility unless prior agreement from the Agency has been obtained. The maximum annual tonnage of individual waste categories for acceptance to the site is listed in Schedule A of the Waste Licence. The quantity of waste received during the reporting period at the Civic Amenity Facility (CWF) is 9,695 tonnes and breakdown is presented in Appendix A. The figures are taken from EPA Landfill and IWMF Survey, Part 3 2009.

# 4.0 SUMMARY REPORT ON EMISSIONS

## 4.1 MONITORING LOCATIONS

Monitoring is carried out at locations and frequencies as specified in Schedules D of the waste licence. Monitoring points are labelled and permanent access to all monitoring points is maintained.

The following parameters form the major part of Dundalk Urban District Council's monitoring programme;

- Groundwater Quality
- Groundwater Levels
- Surface Water Quality
- Leachate Quality
- Leachate Levels
- Landfill Gas Data

All ditches and drains around the perimeter of the facility are kept clear to allow for surface water monitoring points to be maintained.

All monitoring points are detailed in Drawing Monitoring Locations as shown in Appendix B.

The results contained in this report were assessed as follows;

- **Groundwater:** the European Communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) and Interim Guideline Value (IGV) Towards Setting Guideline Values for the Protection of Ground Water in Ireland. The following substances defined by the European communities (Drinking Water) (No. 2) Regulations 2007 were monitored in April and are referred to in the report.

  **Total pesticides** means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure. The DWR is 0.50µg/l. (Only those pesticides which are likely to be present in a given supply require to be monitored - organic insecticides, organic herbicides, organic fungicides, organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides , related products (*inter alia*, growth regulators and their relevant metabolites, degradation and reaction products).

**Polycyclic aromatic hydrocarbons** are the sum of concentrations of specified compounds. The DWR is 0.10ug/l. The specified compounds are benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.

**Total trihalomethanes** are the sum of concentrations of specified compounds. The DWR is 100ug/l. The specified compounds are: chloroform, bromoform, dibrom-ochloromethane and bromodichloromethane

- **Surface Water:** Assessed against the Surface Water Quality Standards (SWQS) laid out in the European Communities Quality of Surface Water Intended for the Abstraction of Drinking Water Regulations 1989 and Dangerous Substances Regulations, 2001.

# 5.0 SUMMARY OF RESULTS AND INTERPRETATIONS OF ENVIRONMENTAL MONITORING, INCLUDING LOCATION PLAN OF ALL MONITORING LOCATIONS

## 5.1 LEACHATE QUALITY

Leachate quality can vary during the lifetime of landfill sites depending on the phase of decomposition of the waste. Leachate results for the reporting period are presented in Appendix C and some of the characteristic parameters of the leachate are listed in Table 2.

Raw leachate results have been compared to "Typical Leachate Composition of 30 Samples from UK/Irish Landfills accepting mainly Domestic Waste" (Landfill Operational Practices). As can be seen from the Table 2 all of the parameters are below the maximum concentration.

**Table 2 Raw Leachate Concentrations**

| | Dundalk Landfill Site | | From 30 samples from UK/Irish landfills accepting domestic waste Results in mg/l | | |
|---|---|---|---|---|---|
| PARAMETER | Min.Conc | Max.Conc | Min.Conc | Max.Conc | Mean |
| Ammonia (mg/N) | 0.05 | 112.55 | <0.2 | 1700 | 491 |
| BOD | 7.4 | 41 | 4.5 | >4800 | >834 |
| COD | 80 | 842 | <10 | 33,700 | 3078 |
| Chloride (mg/l) | 90 | 655 | 27 | 3410 | 1256 |
| Iron (μg/l)* | 5416.5 | 33120.5 | 0.4 | 664 | 54.4 |
| Potassium (mg/l) | 40.31 | 370.32 | 2.7 | 1480 | 491 |
| Sodium (mg/l) | 97.54 | 535.8 | 12 | 3000 | 904 |
| TON (mg/l N) | 0.11 | 0.12 | / | / | / |
| Conductivity (μS/cm) | 2580 | 9910 | 503 | 19,200 | 7789 |
| pH (pH units) | 6.7 | 7.2 | 6.4 | 8.0 | 7.2 |

## 5.2 GROUNDWATER

As required under the Waste Licence, groundwater monitoring has been undertaken at the borehole locations as set out in Table D1.1 of the waste licence. Schedule D of the waste licence requires the monitoring of certain parameters on either a monthly, quarterly or annual basis; the frequencies of the monitoring of groundwater parameters are shown in Table 3 below.

**Table 3 Groundwater Parameters Monitoring Frequencies**

| Monthly | Quarterly | Annually | | |
|---|---|---|---|---|
| Groundwater Level | Visual Inspection/Odour | Aluminium | Manganese | Total Alkalinity |
| Ammoniacal Nitrogen | Dissolved Oxygen | Boron | Nickel | Orthophosphate |
| Chloride | pH | Cadmium | Potassium | TON |
| Electrical Conductivity | Temperature | Calcium | Sodium | Residue on Evaporation |
| | TOC | Chromium | Zinc | List I/II Organic |
| | | Copper | Cyanide | |
| | | Iron | Fluoride | |
| | | Lead | Mercury | |
| | | Magnesium | Sulphate | |

The main groundwater flow path is generally towards the estuary, which is located to the south of the site. Groundwater monitoring has been undertaken at boreholes WM1, WM4, WM5, WM6, WM8, WM9 and WM10. Groundwater monitoring results are provided in full within Appendix D. These results are also presented graphically.

Groundwater was assessed against:

**Groundwater:** the European Communities (Drinking Water) (No. 2) Regulations 2007 parametric value (DWR) and Interim Guideline Value (IGV) Towards Setting Guideline Values for the Protection of Ground Water in Ireland.

The following substances defined by the European communities (Drinking Water) (No. 2) Regulations 2007 were monitored in April and are referred to in the report.

**Total pesticides** means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure. The DWR is 0.50µg/l. (Only those pesticides which are likely to be present in a given supply require to be monitored - organic insecticides, organic herbicides, organic fungicides, organic nematocides, organic acaricides, organic algicides, organic rodenticides, organic slimicides , related products (*inter alia*, growth regulators and their relevant metabolites, degradation and reaction products).

**Polycyclic aromatic hydrocarbons** are the sum of concentrations of specified compounds. The DWR is 0.10ug/l. The specified compounds are benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.

**Total trihalomethanes** are the sum of concentrations of specified compounds. The DWR is 100ug/l. The specified compounds are: chloroform, bromoform, dibrom-ochloromethane and bromodichloromethane

Parameters that are indicative of possible leachate contamination include Ammoniacal-N, Conductivity, Iron, Chloride and heavy metals.

## 5.3 BASELINE DATA

Monitoring was carried out up-gradient of the site in order to obtain an overview of the baseline monitoring water quality of the surrounding groundwater. This allows for a baseline to be established from which the actual impact caused by the site on the down-gradient groundwater can be assessed. WM1 is the up-gradient monitoring point. Monitoring is undertaken on a monthly, quarterly and annual basis.

### *5.3.1 Monthly Parameters*

Electrical Conductivity in WM1 was above the IGV of 1500µScm throughout the monitoring period. All Ammonia concentrations recordings were below the IGV 0.15mg/l and the DWR of 0.30mg/l except in August (0.22 mg/l). The concentrations in WM1 were <0.03mg/l at times during the monitoring period. Chloride concentrations were above the IGV (30mg/l) and the DWR (250mg/l) throughout the monitoring period. The highest chloride reading recorded was 655mg/l in August.

### *5.3.2 Quarterly Parameters*

Dissolved Oxygen (DO) levels ranges from 33% and 57% respectively. WM1 exhibits TOC values ranging from 3.6 mg/l to 11.5 mg/l.

### *5.3.3 Annually*

Cyanide is below the IGV (0.01mg/l) and DWR (50µg/l) with a reading of <0.01mg/l. Fluoride has a reading of 0.2mg/l which is below the DWR (0.8mg/l0 and the IGV (1mg/l). Mercury (<0.1µg/l) is below the IGV (0.001mg/l) and the DWR (1µg/l). Sulphate is below the IGV (200mg/l) and the DWR (250mg/l) with a reading of 180.2mg/l. Ortho-phosphate is above the IGV of 0.03mg/l with a recording of 0.04mg/l. Total Alkalinity shows no abnormal change with a reading of 375mg/l. TON shows no abnormal change with a value of 1.29mg/l for WM1. Residue on Evaporation recorded 1,784mg/l in WM1 in April.

Metals consist of Aluminium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, lead, Magnesium, Manganese, Nickel, Potassium, Sodium and Zinc. These parameters were measured in April and were all below the relevant IGV and/or DWR except for Magnesium, Potassium and Sodium.

Magnesium exceeds the IGV of 50mg/l in WM1 with a reading of 69.09mg/l. Potassium exceeds the IGV of 5mg/l with a result of 24.41mg/l and Sodium is above the IGV (150mg/l) and DWR (200mg/l) with a value of 386mg/l.

Analysis for Polycyclic Aromatic Hydrocarbons (Total 16 EPA PAHs) was carried out in WM1 in April and recorded <0.1µg/l and is below the DWR of 0.1µg/l for PAH.

Phenols levels were <2.0µg/l which is the lower limit of detection for the methodology used for Phenols. Therefore this level could be above or below the appropriate IGV of 0.5µg/l.

Pesticides analysis was carried out in WM1 in April. The readings were <2.0µg/l which is the lower limit of detection for the methodology used. The total pesticides could be above or below the IGV 0.5µg/l.

Total-Trihalomethanes (THM) is the sum of Dichloromethane, Chloroform, Bromodichloromethane and Bromoform. Dichloromethane, Bromodichloromethane and Bromoform were below the lower detection limit for the analytical methodology used (<0.1 µg /l), however Chloroform (0.1 µg/l) was detected. However it does not exceed the DWR of 12µg/l. THM is below the DWR of 100 µg/l total trihalomethanes.

Volatiles and semi volatiles parameters were either below the IGV or less than the detection limit for those comparable. Ethylbenzene at a concentration of 0.1µg/l and m,p-Xylene at a concentration of 0.2 µg/l were detected, however it does not exceed the IGV of 10µg/l.

The detection limit of 0.1µg/l is higher than the IGV for a number of parameters.

The remaining parameters were below the detection limit (0.1ug/l) for the analytical methodology used.

## 5.4 DOWN-GRADIENT DATA

The impact on the groundwater from leachate generated within the landfill can be identified from Boreholes WM4, WM5, WM6, WM8, WM9 and WM10.

### *5.4.1 Monthly Parameters*

Results from downstream indicate elevated levels of Ammonia in the majority of boreholes. The highest Ammonia level recorded was 147.92 mg/l in WM8 in September. Elevated levels of Ammonia are indicative of leachate contamination. Electrical Conductivity exceeds the DWR of 2,500µScm in all boreholes. The highest level was recorded in WM8 (19,440 µS/cm).

Chloride levels also exceeded the DWR throughout the monitoring period. The highest Chloride concentration recorded was 5,667mg/l in WM8. It should be noted that saline water intrusion may contribute to the high levels of Chloride and Electrical Conductivity recorded down-stream of the site as seawater can contain Chloride levels up to 20,000mg/l.

### *5.4.2 Quarterly Parameters*

TOC values provide a measure of organic contamination of the water, the higher the content the more oxygen is consumed. Organic contamination results in an increase in the growth of micro-organisms. TOC results are highest at WM6 (51.4 mg/l). DO ranges from 12% to 57%.

### *5.4.3 Annually*

Cyanide is below the IGV (0.01mg/l) and DWR (50µg/l) with a reading of <0.01mg/l. Fluoride readings are below the DWR (0.8mg/l) and the IGV (1mg/l). Mercury (<0.1µg/l) is below the IGV (0.001mg/l) and the DWR (1µg/l). Sulphate readings are below the IGV (200mg/l) and the DWR (250mg/l) except at WM5 with a reading of 265 mg/l. Ortho-phosphate is above the IGV of 0.03mg/l with a recording of 0.04mg/l to 0.12mg/l. Total Alkalinity shows no abnormal change with a reading of 790mg/l to 1560 mg/l. TON shows no abnormal change with a value of <0.08 to 3.56 mg/l. Residue on Evaporation recorded reading of 1902 mg/l to 6919 mg/l in downstream boreholes in April.

Metals /Non metals consist of Aluminium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Sodium and Zinc. These parameters were measured in April and were all below the relevant IGV and/or DWR except for Aluminium, Boron, Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Sodium and Zinc. These results are included in Appendix B.

Annual analysis for List I and II substances were undertaken at WM6 and WM8 downstream of the site and are included in Appendix C.

Polycyclic Aromatic Hydrocarbons (total 16 EPA PAHs) in the two boreholes recorded of 0.1µg/l and are below the DWR of 0.1µg/l for PAH.

Phenols levels were <2.0µg/l and lower than the limit of detection for the methodology used for Phenols however this is higher than the appropriate IGV of 0.5µg/l.

Pesticides analysis was carried out in WM6 and WM8 in April. The readings were <2.0µg/l which is the lower limit of detection for the methodology used. The total pesticides could be above or below the IGV 0.5µg/l.

Total-Trihalomethanes (THM) is the sum of Dichloromethane, Chloroform, Bromodichloromethane and Bromoform. All levels were below the lower detection limit for the analytical methodology used (<0.1µg/l) and are below the DWR of 100µg/l total trihalomethanes.

Volatiles and semi volatiles parameters were either below the IGV or less than the detection limit for those comparable. 1,2,4-Trimethylbenzene, Benzene, Toluene, Chlorobenzene, c-1,2-Dichloroethene, Ethylbenzene, m,p-Xylene, o-Xylene, Isopropylbenzene, Naphthalene, n-Propylbenzene, sec-Butylbenzene, and tert-Butylbenzene were all detected above the detection limit of 0.1µg/l. Those which exceed IGV for those comparable are Benzene (1.6 µg/l), Chlorobenzene (4.4 µg/l), and Naphthalene (1.3 µg/l) which exceed the IGV of 1 µg/l. The parameters detected above the detection limit of 0.1µg/l and those which exceed the IGV are all located in WM8.

The detection limit of 0.1µg/l is higher than the IGV for a number of parameters.

## 5.5 SURFACE WATER

The results contained in this report are assessed against the Surface Water Quality Standards (SWQS) laid out in the European Communities Quality of Surface Water Intended for the Abstraction of Drinking Water Regulations 1989, (EC Abstraction of Drinking Water Regulations) for surface water assessment and Dangerous Substances Regulations, 2001.

The frequencies of the monitoring of surface water parameters are shown in Table 5.

**Table 5 Surface Water Parameters Monitoring Frequencies**

| Monthly | Quarterly | Annually | |
|---|---|---|---|
| Ammoniacal Nitrogen | BOD | Aluminium | Manganese |
| Chloride | COD | Boron | Nickel |
| Electrical Conductivity | Dissolved Oxygen | Cadmium | Potassium |
| | pH | Calcium | Sodium |
| | Total Suspended Solids | Chromium | Zinc |
| | Temperature | Copper | Mercury |
| | TON | Iron | Sulphate |
| | | Lead | Alkalinity |
| | | Magnesium | Orthophosphate |

Samples SW1 to SW4 are taken along the course of the drainage ditch, which adjoins the northern boundaries of the landfill. Monitoring points SW5 to SW9, located adjacent to the estuary.

### *5.5.1 Monthly Parameters*

Monthly chemical analyses of surface water are summarised in Appendix E. The results indicate elevated levels of Ammoniacal-N, the highest concentration recorded in the stream was 39.94 mg/l in SW2 and in the estuary was 0.97 mg/l in SW5. Elevated levels of Electrical Conductivity, and Chloride recorded at SW5 to SW9 maybe due to the presence of estuarine water.

### *5.5.2 Quarterly Parameters*

The pH values range from 7.2 to 8.9 in all surface water locations which are between the SWQS of 5.5 to 9.

The results indicate elevated levels of BOD and COD, the highest concentration recorded in the stream was 19.8 mg/l in SW2 and in the estuary was 27.0 mg/l in SW8 for BOD and for COD the stream was 470 mg/l in SW2 and in the estuary was 2,100 mg/l in SW6.

Total Suspended Solids exceed the SWQS in all surface water monitoring locations, the highest concentration recorded in the stream was 6830 mg/l in SW2 and in the estuary was 55.0 mg/l in SW6.

The Total Organic Nitrogen (TON) showed no abnormal change throughout 2009, the highest concentration recorded in the stream was 6.5 mg/l in SW4 and in the estuary was 4.03 mg/l in SW8.

The majority of parameters assessed show that levels of contamination increase between sampling points SW1 and SW4, which are located along the drainage ditch running along the north of the site. It can be seen that elevated levels of Ammonia, COD and BOD have been recorded at the various monitoring locations along the drainage ditch.

### *5.5.3 Annually*

Mercury (<0.1µg/l) is below the IGV (0.001mg/l) and the DWR (1µg/l). Sulphate readings are below the IGV (200mg/l) and the DWR (250mg/l). Ortho-phosphate is above the IGV of 0.03mg/l with a recording of <0.02 mg/l to 0.05 mg/l. Total Alkalinity shows no abnormal change with a reading of 89mg/l to 460 mg/l.

Metals /Non metals consist of Aluminium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Sodium and Zinc. These parameters

were measured in April and were all below the relevant IGV and/or DWR except for Aluminium, Iron, Manganese and Potassium. These results are included in Appendix D.

## 5.6 PERIMETER GAS MONITORING AND LANDFILL GAS EXTRACTION

Schedule D of the licence requires the licensee to conduct monthly monitoring of gas levels on the perimeter and in the waste of the landfill site. The gas is monitored using a GA2000 infra-red monitoring device. The monitoring locations are shown on Table 7.

**Table 7 Landfill Gas Monitoring Locations**

| | |
|---|---|
| **Landfill Gas within Waste and Boundary Locations** | GW1 to GW47 inclusive<br>(as shown on Drawing No. 004 of the Restoration Plan for 34-1 (Nov 2002) agreed by the Agency) |
| **Boundary Locations** | G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, G16, G17,<br>GM1, GM2, GM3, GM4, GM5, GM6, GM7, GM8, GM24 |

Landfill gas around the periphery of the site is indicated by piezometers as shown in Table 7 above.

A landfill gas trench has been installed to the west of the active landfill site to intercept the potential pathway of the gas migrating from the current active landfill site. Piezometers GM5 to GM7, G4 to G10 are to the west of the landfill gas trench.

A permanent gas extraction system has been installed at the facility during 2005. This includes a gas collection layer and 47 landfill gas extraction wells laid out on a grid system over the main body of the site. The wells are connected via 63mm diameter pipework to a 250mm diameter main gas collection pipe. A 500m$^3$ enclosed Flare Unit and SCADA system has been installed. The boreholes in the area of historical fill have also been attached to the active gas collection system. This enclosed flare has now been commissioned and field balancing is being undertaken. Records of field balancing are maintained. Monitoring of emissions from the flare will be undertaken and sent as a separate report.

Monthly monitoring of periphery piezometers around Dundalk Landfill site have indicated exceedances of licence requirements of Methane greater than or equal to 1.0% v/v in G6, G8, G9, G10 and G20 over a period of time. The highest reading was 6.1 % v/v in G6 in January.

Monthly monitoring of periphery piezometers around Dundalk Landfill site have indicated exceedances of licence requirements of Carbon Dioxide greater than or equal to 1.5% v/v in G4, G6, G8, G9, G10, G17, G20, G21 and GM2. The highest reading was 4.6% v/v in G10 in May.

Subsequent monitoring of adjacent premises and houses using Flame Ionization Detector has not shown any raised methane levels. Landfill gas results for 2009 are included in Appendix F.

## 5.7 ESTUARINE SOIL SAMPLES

Sediment sampling was undertaken at five locations in the estuary in October 2009. These results are presented in Table 8. These results have been compared to the Dutch Target values and intervention values for soil remediation soil/sediment. The results are below the Target Value for all parameters except Zinc, Cadmium and Copper at locations SW5 to SW8. The results are below the intervention value. No Targets Values are given for Iron, Manganese or Cyanide. Cyanide levels are below the lower detection limit for the analytical method used.

**Table 8 Sediment Results**

| Date Sampled | 28/10/09 | 28/10/09 | 28/10/09 | 28/10/09 | 28/10/09 | | |
|---|---|---|---|---|---|---|---|
| Parameter (mg/kg dry wt) | SW5 | SW6 | SW7 | SW8 | SW9 | Target Value (Dutch) | Inter - vention Value (Dutch) |
| % Dry Weight | 31.1 | 33.0 | 28.2 | 23.6 | 39.6 | | |
| Cadmium | 0.819 | 0.705 | 0.975 | 1.32 | 0.343 | 0.8 | 12 |
| Copper | 39.9 | 40.5 | 52.6 | 48.6 | 22.4 | 36 | 190 |
| Chromium | 41.8 | 42.3 | 43.2 | 45.4 | 51.2 | 100 | 380 |
| Iron | 32600 | 32800 | 33300 | 36200 | 20100 | | |
| Lead | 39.7 | 40.7 | 48.3 | 41.0 | 31.4 | 85 | 530 |
| Manganese | 612 | 583 | 629 | 1070 | 380 | | |
| Mercury | 0.222 | 0.156 | <0.14 | <0.14 | 0.254 | 0.3 | 10 |
| Zinc | 213 | 276 | 307 | 279 | 119 | 140 | 720 |
| Total cyanide mg/kg | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | | |

## 5.8 DUST MONITORING

Dust monitoring was carried out three times in the year. Table 9 details the results of the three dust monitors installed on site. The waste licence requires dust deposition limits to be no more than **350** mg/m$^2$/day.

**Table 9 Dust Monitoring Results**

| Sampling Period | Dust monitor 1 | Dust monitor 2 | Dust monitor 3 |
|---|---|---|---|
| 07/07/2009 - 04/08/2009 | 7.7 | 32.7 | 54.7 |
| 04/08/2009 - 31/08/2009 | 151.6 | 126.9 | 202.1 |
| 03/11/2009 - 03/12/2009 | 90.2 | 372.5 | 127.2 |

From Table 9 it can be seen that all dust deposition levels in all periods are below the limits except in DG2, which exceeds the licence requirements.

## 5.9 COMPOSTING MONITORING

V & W recycling compost hedge grass & hedge cuttings from Civic Amenity users. 2,334 tonnes was composted. Compost testing was undertaken by Bord na Mona Ltd and is provided in Appendix G.

## 5.10 METEOROLOGICAL MONITORING

Temperature and rainfall readings are taken from Dublin Airport.

**Table 10 Summary of Meteorological Monitoring for the Reporting Period**

| Total rainfall in millimetres for Dublin Airport | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** | **Annual** |
| 2009 | 62.1 | 56.1 | 26.2 | 71.1 | 75.5 | 64.3 | 165.4 | 69.5 | 24.2 | 63 | 171.3 | 69.1 | 917.8 |
| mean | 69.5 | 50.4 | 53.5 | 51.1 | 54.8 | 55.8 | 50.0 | 71.1 | 66.4 | 70.1 | 64.3 | 75.8 | 732.7 |

| Mean temperature in degrees C. for Dublin Airport | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** | **Annual** |
| 2009 | 4.3 | 5.1 | 6.7 | 8.3 | 10.9 | 13.2 | 14.9 | 15.3 | 12.5 | 11.1 | 7.4 | 3.6 | 9.5 |
| mean | 5.0 | 5.0 | 6.3 | 7.9 | 10.5 | 13.4 | 15.1 | 14.9 | 13.1 | 10.6 | 7.0 | 5.9 | 9.6 |

## 6.0 RESOURCE AND ENERGY CONSUMPTION SUMMARY

Consumption of resources for the reporting period were;

- Electricity consumption: 2,980 kW units.
- Diesel Usage: 6,150 litres

## 7.0 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS FOR THE FORTHCOMING YEAR

The following developments works (Environmental Objectives and Targets) will be carried out in 2010.

- Dundalk Town Council are proposing, on a trial basis, to allow an archery club access to the capped landfill area.
- Following the last years EPA inspection additional gas monitoring points at well heads were requested, this in conjunction with the monitoring at the manifolds will give a better indication of the landfill gas production and help determine if there is any problems/blockages with the gas pipes leading from the wells to the manifolds; thus identifying any repairs that may need to be carried out. The monitoring points have been installed and monitoring is taking place with a view to identifying and carry out any repairs to the gas lines later this year.

# 8.0 REPORT ON THE PROGRESS TOWARDS ACHIEVEMENT OF THE ENVIRONMENTAL OBJECTIVES AND TARGETS CONTAINED IN THE PREVIOUS YEARS REPORT

Report on progress of previous environmental objectives and targets.

## 8.1 DUST MONITORING

The dust monitoring points were relocated to reflect changes due to the compost/recycling operations.

## 9.0 FULL TITLE AND A WRITTEN SUMMARY OF ANY PROCEDURES DEVELOPED BY THE LICENSEE IN THE YEAR, WHICH RELATES TO THE FACILITY OPERATION

The Environmental Management System and Environmental Management Plan were reviewed and updated in 2006 to include the procedures for the Civic Waste Facility and the closure of the Landfill site. No new procedures were developed in 2010.

## 10.0 REPORT ON INCIDENTS AND COMPLAINTS SUMMARIES

No complaints were received from the public and no incidents were reported. A site inspection was carried out at the facility in December 2009.

**Table 11 Summary of Non Compliances and Audit Observations noted during Audits/Landfill Site Inspections undertaken during the Reporting Period by EPA**

| Date and Reference | Summary of Inspection Report/Audit |
|---|---|
| **Inspection date:**<br>**09/12/09**<br>**Issue date:**<br>**17/12/09**<br>**Inspection**<br>**Reference No:**<br>**(W0034-02)**<br>**09SIO8EM** | **Inspection findings**<br>**Non Compliances**<br>The licensee was found to have no non-compliances with the requirements of the Licence on the day of the Inspection<br><br>**Inspection Observations**<br>1. WEEE Weatherproof Covering.<br>2. Register of Monitoring Station<br>3. Environmental Monitoring Data<br>4. Landfill Gas Collection System.<br>5. Use of landfill area by a local archery club.<br>6. Facility Notice Board<br>7. Change of Inspector |

# 11.0 REVIEW OF NUISANCE CONTROLS

## 11.1 DUST CONTROL

There was a breach of the dust deposition limit in 2009; however the exceedance was only slightly above permitted levels. In addition to relocation of monitoring equipment, operational activities to 'wet down' materials are in place.

## 11.2 LITTER

The landfill site was closed in October 2002 and therefore there is no wind blown litter arising from the landfill site.

V & W carry out regular clean up of the site; inspections by staff indicate this is being addressed adequately.

## 11.3 ODOURS

The landfill site was closed in October 2002 and therefore the potential for odours has been reduced. The permanent capping and installation of an active extraction system reduces the occurrence of odour from landfill gas. The doors to the waste processing building are kept closed where possible, the biofilters minimize the odours from the composting process in the CWF and municipal waste is placed in a closed container and removed within 96 hours for appropriate disposal.

## 11.4 PEST CONTROL (VERMIN)

A pest control company are employed as part of an ongoing programme, regular inspections have shown that vermin is being controlled.

## 11.5 NOISE

Noise monitoring has been undertaken in June 2010. A copy of the noise monitoring report can be found in Appendix H. The noise measurements taken around the site are dominated by traffic movements on the local roads and the bypass. There is audible noise from the landfill at location 1 (vehicles entering/leaving the site, with some general activity) and some activity audible at location 3, although this is difficult to distinguish from the commercial units adjacent to the site. It is further noted that at both of these locations; although some activity was audible; the predominant noise source was traffic movements on the local roads, which

have impacted the higher noise levels in the report. The night-time measurements are heavily influenced from traffic with no audible noise from the site.

## 12.0 VOLUME OF LEACHATE PRODUCED AND VOLUME OF LEACHATE TRANSPORTED DISCHARGED OFF SITE

A leachate collection trench has been constructed on the southern slope of the landfill. The trench is lined on the estuary side of the trench and also to a level of 3.65mOD on the landfill side of the trench. The trench is connected to the foul sewer running along the western boundary of the site. A flow monitoring has been installed in this trench. Zero flow has been measured to date.

## 13.0 PRTR REPORTING

PRTR Reporting was undertaken for 2010. A copy of the PRTR EPA returns worksheet is provided in Appendix I.

# APPENDIX A

# EPA LANDFILL AND IWMF SURVEY, PART 3 2009

# APPENDIX B

# MONITORING POINTS DRAWING

# APPENDIX C

# LEACHATE RESULTS

# APPENDIX D

# RESULTS FOR ALL GROUNDWATER MONITORING LOCATIONS

# APPENDIX E

## SUMMARY OF MONTHLY CHEMICAL ANALYSES OF SURFACE WATER

# APPENDIX F

# LANDFILL GAS MONITORING

# APPENDIX G

# COMPOSTING MONITORING REPORT

# APPENDIX H

# NOISE REPORTING

# APPENDIX I

# PRTR REPORTING