

*Monaghan County Council*  
*Scotch Corner Landfill*



**Scotch Corner Landfill**

**1<sup>st</sup> January 2008 – 31<sup>st</sup> December 2008**

**Annual Environmental Report**

**March 2009**

**Waste Licence W0020-01**

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## 1. INTRODUCTION

On 7<sup>th</sup> December 2001 the EPA granted a waste licence subject to conditions to Monaghan County Council for its facility at Scotch Corner Landfill. This licence is for the operation and development of an existing non-hazardous landfill at Scotch Corner, Letterbane, Annyalla, Castleblaney, Co. Monaghan and also covers the operation of a Material Recovery Facility at the site. The Material Recovery Facility allows for the storage and processing of pre-segregated recyclable wastes.

Condition 11.7 of Waste Licence W0020-01 states the following:

### 11.7 *Annual Environmental Report*

11.7.1 *The licensee shall submit to the Agency for its agreement, within thirteen months of the date of grant of this licence, and within one month of the end of each calendar year thereafter, an Annual Environmental Report (AER).*

11.7.2 *The AER shall include as a minimum the information specified in Schedule G: Content of the Annual Environment Report of this licence and shall be prepared in accordance with any relevant written guidance issued by the Agency.*

This Annual Environmental Report will include the following:

- Reporting Period.
- Waste activities carried out at the facility.
- Quantity and Composition of waste received, disposed of and recovered during the reporting period and each previous year.
- Calculated remaining capacity of the facility and year in which final capacity is expected to be reached.
- Methods of deposition and recovery of waste.
- Summary report on emissions.
- Summary of results and interpretation of environmental monitoring.
- Resource and energy consumption summary.
- Proposed development of the facility and timescale of such development (including plant operating capacity at the MRF, provision of adequate standby and provision of contingency, backup and spares in the case of breakdown)
- Capacity and provision of contingency, backup and spares in the case of breakdown).
- Volume of leachate produced and volume of leachate transported / discharged off-site.
- Report on development works undertaken during the reporting period, and a timescale for those proposed during the coming year.
- Report on restoration of completed cells/ phases.
- Site survey showing existing levels of the facility at the end of the reporting period.
- Estimated annual and cumulative quantities of landfill gas emitted from the facility.
- Estimated annual and cumulative quantity of indirect emissions to groundwater.
- Annual water balance calculation and interpretation.
- Report on the progress towards achievement of the Environmental Objectives and Targets contained in previous year's report.
- Schedule of Environmental Objectives and Targets for the forthcoming year.
- Full title and a written summary of any procedures developed by the licensee in the year which relates to the facility operation.
- Tank, pipeline and bund testing and inspection report.
- Reported incidents and Complaints summaries.
- Review of Nuisance Controls.

- Reports on financial provision made under this licence, management and staffing structure of the facility, and a programme for public information.
- Report on training of staff.
- Any other items specified by the Agency.

## **2. REFERENCES**

Waste Licence W0020-01

Waste Licence Application Form – Monaghan County Council 25<sup>th</sup> February 1998

EPA Landfill Manuals – Landfill Operational Practises

E.I.S. for Scotch Corner Landfill Site Monaghan – MCOS

Scotch Corner Landfill October to December 2008 Groundwater, Surface Water and Leachate Monitoring Report.

Scotch Corner Landfill 2008 Noise Monitoring Report.

Scotch Corner Landfill October to December 2008 Landfill Gas Monitoring Report.

Scotch Corner Landfill 2008 Dust Monitoring Report.

Pestcheck & ISS Service Reports.

Bird Control of Ireland and Falcon Bird Control Service Reports.

Environmental Management System at Scotch Corner Landfill Rev.00

Monaghan County Council Scotch Corner Landfill One Year Phasing Report – Phase 3 Rev 1 October 2007 by RPS.

Scotch Corner Landfill 1<sup>st</sup> January 2007 – 31<sup>st</sup> December 2007 Annual Environmental Report

## **3. CONTENT OF ANNUAL ENVIRONMENTAL REPORT**

### **3.1 Reporting Period**

This report covers the period 1<sup>st</sup> January 2008 to 31<sup>st</sup> December 2008.

### **3.2 Waste activities carried out at the facility**

Scotch Corner Landfill is licenced to accept household waste, commercial waste, non-hazardous industrial waste and construction and demolition waste.

Wastes that will not be accepted at the landfill facility include the following:

- Liquid Wastes
- Hazardous Wastes as defined by the European Waste Catalogue & Hazardous Waste List
- Sewage Sludge and Industrial Sludge

Scotch Corner Landfill is closed to the public and accepts the above waste types from licenced hauliers only. All other persons must present their waste for disposal at the Material Recovery Facility (MRF). The MRF accepts the following clean, dry, segregated recycables from householders and industrial and commercial sectors: paper, newspaper, cardboard, glass, timber, rubble, aluminium and steel cans, plastic, textiles/clothes, footwear, white goods, scrap metal, electrical goods (except printers), waste oil, used cooking oil, fluorescent tubes,

batteries, gas cylinders, tyres, polystyrene, plasterboard, paint cans and green waste. The MRF also accepts mixed skips of recyclables from householders and kerbside collection of recyclables from waste hauliers.

Scotch Corner Landfill is licensed to accept and deposit the following waste types in lined cells as per Schedule A of the Waste Licence:

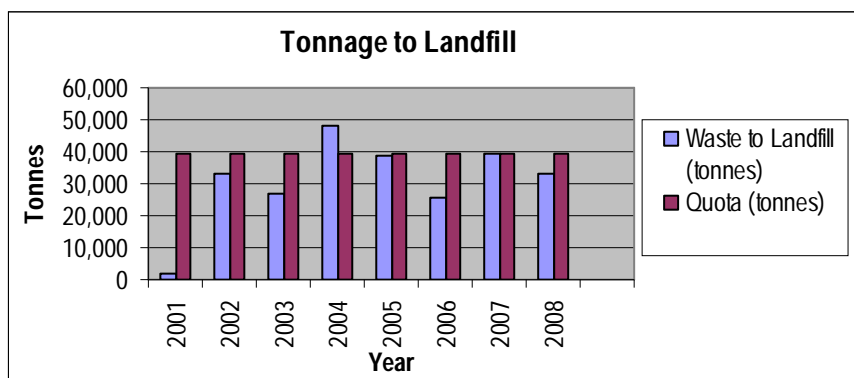
Waste Type	Maximum Tonnes Per Annum
Household	12,600
Commercial	5,700
Sewage Sludge	5,000
Treated Industrial Non-Hazardous Sludge	600
Construction and Demolition	2,800
Industrial Non-Hazardous	12,800
TOTAL	39,500

### 3.3 Quantity and Composition of waste received, disposed of and recovered during the reporting period and each previous year

#### (A) Waste Disposal

**Table 1: Types and Quantities of waste disposed to landfill from 07/12/01 – 31/12/08.**

Year	Household EWC 20 03 01	Commercial EWC 20 03 01	Industrial Non-hazardous EWC 20 03 01	Mixed Municipal Waste EWC 20 03 01	Sewage Sludge EWC 19 08 05	Industrial Sludge EWC 02 05 02	Construction & Demolition EWC 17 09 04	Street Cleanings EWC 20 03 03	TOTAL (tonnes)
2001	908.52	121.89	562.75		238.72	15.90	0	13.11	1860.89
2002	15,103.3	3,736.66	8,390.4		4,703.44	622.77	277.32	397.39	33,231.28
2003	11,895.14	2,047.01	6,833.30		4,921.88	662.85	239.29	414.65	27,014.12
2004	19,096.03	3,757.94	16,210.71		5,473.12	560.91	345.56	2,487.23	47,931.50
2005	20,111.51	2,981.29	8,085.37		5,681.26	1020.06	214..28	729.77	38,823.54
2006	13,770.61	1,305.71	7,280.73		1,232.70	169.60	291.48	1,693.69	25,744.52
2007	12,559.82	2,689.06	10,888.38	12,528.14	0	0	49.44	792.75	39,507.59
2008	12,976.48	1,972.74	7,121.10	10,137.14	0.00	0	40.9	706.38	32,954.74
Quota	12,600	5,700	12,800		5,000	600	2,800		39,500



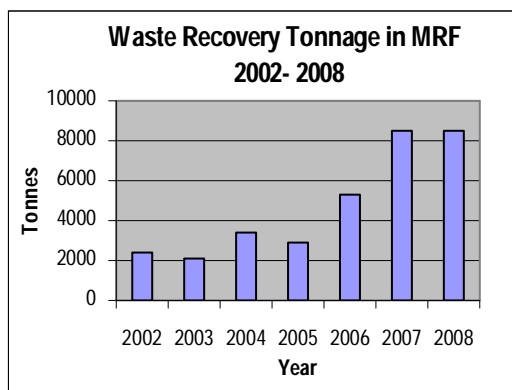
**(B) Waste Recovery**

**Table 2: Waste Recovery Table for Scotch Corner Recycling Centre 01/01/07 – 31/12/07**

Load Type	EWC Code	Tonnes
Batteries	20 01 33	8.64
C & D waste	17 01 07	954.1
Cardboard	20 01 01	2892.02
Clothes	20 01 10	41.74
Glass	20 01 02	79.06
Green waste	20 01 08	166.5
Fluorescent lights & bulbs	20 01 21	0.32
Newspapers	20 01 01	382.04
Plastic Bottles	20 01 39	28.32
Clear Plastic Film	20 01 39	145.82
Coloured Plastic Film	20 01 39	36.74
Scrap metal	20 01 40	283.64
Timber	20 01 38	706.97
Cooking Oil	20 01 25	0.6
Waste Oil	20 01 26	3.34
Alum cans	20 01 40	1.96
Steel cans	20 01 40	15.52
Paper mixed	20 01 01	186.24
WEEE	20 01 36	200.08
Mixed recyclables	20 03 01	2271.67
Plasterboard	17 08 02	52.2
Tyres	16 01 03	1.62
Polystyrene	15 01 02	0.98
	<b>total</b>	<b>8460.12</b>

**Table 3: Waste Recovery Table for Scotch Corner Recycling Centre 2001 - 2008**

Year	Tonnes
Dec 2001 & 2002	2,435.88
2003	2,067.32
2004	3,382.10
2005	1749.69
2006	5280.5
2007	8531.999
2008	8460.12



### **3.4 Calculated Remaining Capacity of the Facility and year in which Final Capacity is expected to be reached**

Ref. Monaghan County Council Scotch Corner Landfill One Year Phasing Report – Phase 3 Rev 1 October 2007 by RPS. By June 2009 when waste deposition will commence in Cell 4b there will remain ~ 287,000 tonnes capacity in Phase 3 (317,000 – 30,000) with a life expectancy of approx. 7 years maximum (287,000 / 39,500)

### **3.5 Methods of Deposition and Recovery of Waste**

From 1/1/08 to 23/6/08 all waste deposited to landfill was received into Cell 5a of Phase 3. On 23/6/08 waste deposition commenced in Cell 4a and Cell 5a also continued to receive waste until 26/6/08 when by this date sufficient household type waste was placed in Cell 4a to protect the lining systems from potentially damaging industrial type waste. Waste in all cells was compacted using a dozer and/or hymax and a compactor.

From 25<sup>th</sup> April 2005 to date the MRF is operated by McElvaney Waste & Recycling Ltd. During this period 1/1/08 to 31/12/08, source segregated recyclable materials and mixed recyclables from their skip collection service at the MRF are sent to recycling outlets approved by the Agency. Unsorted household recyclable materials collected by kerbside is not sorted at the MRF but are sent directly to approved recycling outlets.

Waste deposited in the compactor at the MRF was landfilled in Cell 5a and Cell 4a.

Ref. "SOP 05 Waste Acceptance and Characterisation Procedure at Scotch Corner Landfill"

### **3.6 Summary Report on Emissions**

#### **3.6.1 Dust**

Results for dust monitoring location D1 are below the Waste Licence dust deposition limit of 350mg/m<sup>2</sup>/day for the first schedule of sampling only. Results for this dust monitoring location exceeded the dust deposition limit for the second schedule because of bird poo in the jar and the slight exceedance of the dust deposition limit of 350mg/m<sup>2</sup>/day in the third schedule was due to algae growth in the sample.

Results for dust monitoring location D2 are below the Waste Licence dust deposition limit of 350mg/m<sup>2</sup>/day for the second schedule of sampling only. The slight exceedances of the dust deposition limit of 350mg/m<sup>2</sup>/day in the first and third schedules were due to algae growth in the samples.

Results for dust monitoring location D3 are below the Waste Licence dust deposition limit of 350mg/m<sup>2</sup>/day.

Results for dust monitoring location D4 are below the Waste Licence dust deposition limit of 350mg/m<sup>2</sup>/day for the first and second schedules. Results for this dust monitoring location exceeded the dust deposition limit for the third schedule because of a small twig in the sample.

Data since 2002 shows significant improvements since monitoring commenced in 2002.

Ref. 'Scotch Corner Landfill 2008 Dust Monitoring Report'.



### **3.6.2 Noise**

As per 2002, 2003, 2004, 2005, 2006 and 2007 the noise survey carried out at Scotch Corner Landfill in 2008 indicated that there are no significant noise emissions at the facility.

Results for noise monitoring locations NSL1, D1 and D4 are below the Waste Licence noise emission limits of 45 Night dB(A)  $L_{AEO}(30 \text{ minutes})$  and 55 Day dB(A)  $L_{AEO}(30 \text{ minutes})$ .

Results for noise monitoring locations NSL 2 are below the Waste Licence noise emission limits of 55 Day dB(A)  $L_{AEO}(30 \text{ minutes})$  but exceed the Waste Licence noise emission limits of 45 Night dB(A)  $L_{AEO}(30 \text{ minutes})$ . This is due to road traffic as the landfill site was not open during the sampling period.

Ref. 'Scotch Corner Landfill 2007 Noise Monitoring Report'.

### **3.6.3 Landfill Gas**

Permanent landfill gas extraction and flaring has operated from Area 1 and Area 2 (capped cells) since 8<sup>th</sup> December 2005 including this period 1/1/08 to 31/12/08. Landfill gas extraction and flaring has operated from Phase 2 (uncapped cells) since 10<sup>th</sup> December 2007. Landfill gas extraction and flaring has operated from Cell 5a (uncapped cell) since 29<sup>th</sup> January 2008.

Landfill gas produced by the decomposition of waste from Phase 2 (cells 2 & 3) discharged to the atmosphere until 10/12/07 when flaring from this area commenced.

Landfill gas produced by the decomposition of waste from Cell 5a discharged to the atmosphere until 29/1/08 when flaring from this area commenced.

Landfill gas produced by the decomposition of waste from the active cell (cells 4a) discharged to the atmosphere until 19/1/09 when flaring from this area commenced.

See also 3.7 Summary of results and interpretation of environmental monitoring and 3.14 Estimated annual and cumulative quantities of landfill gas emitted from the facility.

### **3.6.4 Leachate**

An analysis of surface water and groundwater at the Scotch Corner facility indicates that there is contamination of surface water and groundwater by leachate from the old landfill.

See also 3.7 Summary of results and interpretation of environmental monitoring and 3.10 Volume of leachate produced and volume of leachate transported / discharged off-site and 3.15 Estimated annual and cumulative quantities of indirect emissions to groundwater.

### **3.7 Summary of results and interpretation of environmental monitoring**

#### **3.7.1 Landfill Gas**

During 2008, analysis of the inlet the landfill gas flarestack indicates active decomposition of waste since monitoring commenced on 1/3/06.

Analysis of the outlet the landfill gas flarestack was carried out by Euro Environmental Services in March and September 2008. Emissions sampled and analysed from the flarestack at 11.17 to 11.47 on 6/3/08 exceeded the CO trigger level of 50 mg/Nm<sup>3</sup> by 188.5. All other parameters remained below the flarestack emission trigger levels for this date. Emissions sampled and analysed from the flarestack at 12.00 to 12.30 on 4/9/08 exceeded the particulates trigger level of 130 mg/Nm<sup>3</sup> by 188.1. All other parameters remained below the flarestack emission trigger levels for this date.

During 2008, analysis of gas in boreholes at the perimeter of the facility indicates that there is no migration of gas from the current facility i.e. Area 1 (comprising of Cell 1 and the unlined cell to the north of Cell 1), Area 2 (comprising of the unlined cell behind the MRF), Phase 2 (Cells 2 and 3) and Phase 3 (Cells 5a and 4a)

However the presence of landfill gas intermittently in borehole B2a during January and February 2008 and July and August 2008 indicated some migration of landfill gas from Phase 2 to this borehole. Since connection of Phase 2 gas extraction boreholes to the flare on 10/12/07 and interim gas pipe work from cell 5a on 17/12/07, from the leachate sump in the south-western corner of Cell 2 on 14/1/09 and from the active cell, Cell 4a on 19/1/09 there has a drop in methane levels in borehole B2a and since September 2008 the level of methane in this borehole has remained below the trigger level of 1.0%.

Boreholes B5a exceeded the trigger level of 1.0% Methane and 1.5% v/v Carbon Dioxide level on only one of the twelve sampling periods in 2008. This is most likely due to periodic migration of landfill gas from the old landfill, outside of the current facility. This borehole has exceeded the methane and carbon dioxide trigger levels only twice in each year 2005, 2006 and 2007.

Landfill Gas readings for boreholes L7, L8 and L9, located within the body of waste, are typical for waste that is actively decomposing.

Continuous monitoring of landfill gas in the weighbridge office, MRF office and in the MRF canteen indicate that the results are below the Waste Licence trigger levels for landfill gas emission levels of less than or equal to 1.0%v/v methane and less than or equal to 1.5% Carbon Dioxide.

Ref. 'Scotch Corner Landfill October to December 2008 Landfill Gas Monitoring Report' Emissions to Atmosphere Report No: 3740/M05 Waste Licence No. W0020-01' by Euro Environmental Services.  
Emissions to Atmosphere Report No: 3740/M06 Waste Licence No. W0020-01' by Euro Environmental Services.

#### **3.7.2 Noise Monitoring**

See 3.6.2 Noise above.

### 3.7.3 Groundwater Monitoring

Analytical results of groundwater samples taken from private wells within 250m of the facility indicate no contamination from the landfill.

Analysis of groundwater at new G1 continues to indicate contamination by leachate from the old landfill. Old G1 was connected to the leachate collection system on 28/5/07. Works to install groundwater interceptor drains around the perimeter of old landfill took place in early 2007 and the discharge from this system was sampled and analysed as new G1 since April 2007. Results from new G1 still show some contamination from the old landfill with ammonia levels ranging from 6.97mg/l to 98.55mg/l which is significantly less contaminated than old G1. Further investigations at the old landfill have identified the source of contamination and further remedial works were completed in summer of 2008 to prevent this source of contamination entering this groundwater collection system. A slight improvement in new G1 water quality has been noted since November 2008.

Groundwater from G2 (discharge of groundwater from under Phase 3 since July 2007) indicates no contamination from the landfill and its quality remains typical of background levels for a boggy area.

The leachate interceptor drain has been fully operational around unlined Cell 1 since 04/06/03 and this has eliminated leachate contamination from this unlined cell to Boreholes S3 and RC1.

Analysis of groundwater sampled from S3, RC1, B1, B1a, B2, B2a, B3, B3a, B4, B4a, B6 and B6a show no contamination from the landfill while analysis of groundwater from boreholes B5 and B5a continues to indicate leachate contamination from the old landfill.

Groundwater levels and temperature continued to be monitored in groundwater boreholes RC1, S3, B1, B1a, B2, B2a, B3, B3a, B4, B4a, B5, B5a, B6 and B6a on a quarterly basis during 2008.

Ref. Scotch Corner Landfill October to December 2008 Groundwater, Surface Water and Leachate Monitoring Report.

### 3.7.4 Leachate Monitoring

Results of analysis of leachate in all boreholes on site are typical of leachate from waste that is actively decomposing, with elevated readings of BOD, COD, Ammonia, Chloride and Minerals during this reporting period.

Leachate levels continue to be monitored on a quarterly basis in leachate boreholes L5, L7, L8 and L9 during 2008. Leachate levels in cell 5a and Phase 2 were measured on a weekly basis during 2008.

Leachate levels in the lined cells, Cell 1, Cell 5a and Phase 2 did not exceed the 1m threshold in 2008 with the exception of L5 on 31/3/08 when the leachate level reached 1.25m.

Ref. Scotch Corner Landfill October to December 2008 Groundwater, Surface Water and Leachate Monitoring Report.

### **3.7.5 Surface Water Monitoring**

Surface water samples S5, S6 and S7 continue to show contamination from the landfill. This contamination is attenuated with distance from the landfill as seen by analysis data for S7, EPA 155 and EPA 180. S8 is the surface water sampling point upstream of the landfill and is typical of background surface water quality. Oil Interceptor S9 shows elevated ammonia levels but mineral oil analysis remains below the trigger level.

Ref. Scotch Corner Landfill October to December 2008 Groundwater, Surface Water and Leachate Monitoring Report.

### **3.7.6 Meteorological Monitoring**

Met Eireann on behalf of Monaghan County Council recorded the meteorological parameters as per Schedule D.6 of the Waste Licence W0020-01 for its facility at Scotch Corner.

Ref. Meteorological Monitoring Report for 2008 at Scotch Corner Landfill.

### **3.7.7 Topographical Survey**

This survey completed by Alpha Engineering in February 2008.

### **3.7.8 Biological Assessment**

This survey completed by Conservation in March 2008 and indicated that there was an improvement in water quality at sites S7 (from Q2 to Q2-3) and EPA180 (from Q3 to Q3-4). However the site in between these locations, EPA155 remained at Q3.

### **3.7.9 Archaeological Assessment**

No archaeological assessment was carried out at the facility in 2008.

### **3.7.10 Nuisance Monitoring**

Nuisance monitoring was carried out at least twice weekly basis by the landfill manager or by the deputy landfill manager or by the acting landfill manager. These site inspections recorded the presence or absence of nuisances caused by litter, vermin, birds, flies, mud, dust and odours at the facility and at its immediate surrounds and the corrective actions to be carried out. Completed 'Site Inspection Forms at Scotch Corner Landfill' are maintained at the Landfill Office.

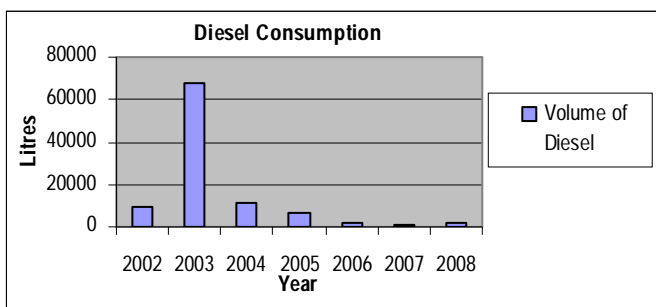
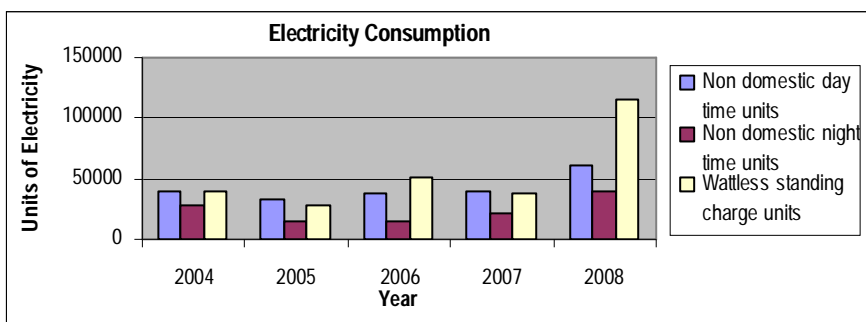
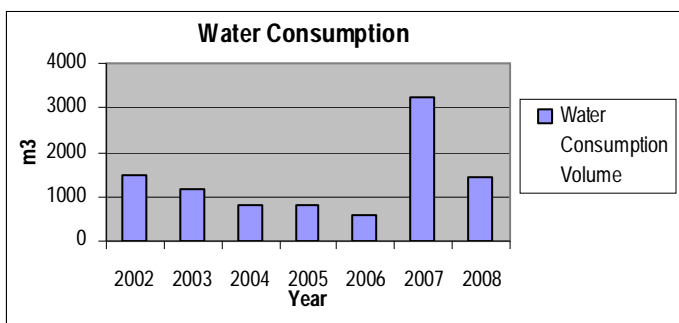
Ref. "SOP 11 Site Inspection Procedure in Environmental Management System at Scotch Corner Landfill

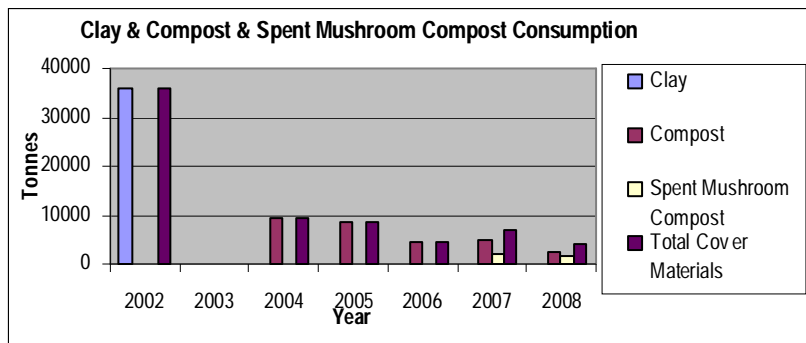
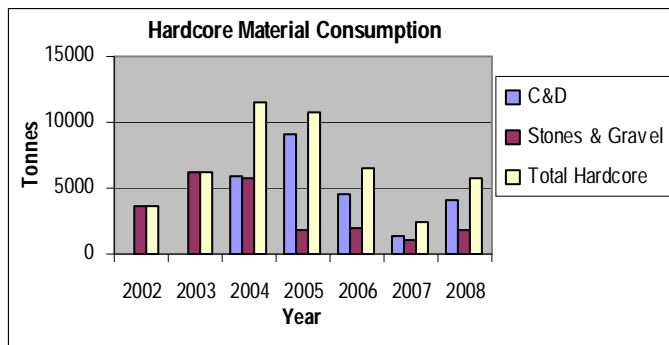
### 3.8 Resource and energy consumption summary

The following table summarizes the consumption on site of water, electricity, diesel, and gravel. Water consumption consisted of usage by the wheelwash facility and domestic purposes. Electricity consumption consisted of usage by the landfill office, leachate pumps, groundwater pumps and the landfill gas flare. Diesel consumption includes the diesel supplied for the jeep and other hired in plant and equipment (e.g. dumper, generator etc). Gravel was required for maintenance of site roads and other works on site as they arose (e.g. placement of ducting).

**Table 8: Resource and Energy Consumption Table**

Resource/Energy Source	Units consumed
Water	1450m3
Electricity	Non-domestic day time units 61,308 Non-domestic night time units 40,008 Wattless standing charge units 115,560
Diesel	1,435L
Stones/Gravel	1,806.01 tonnes
C&D	4024.24 tonnes
Compost	2,632.18 tonnes
Spent Mushroom Compost	1,521.04 tonnes





### 3.9 Proposed development of the facility and timescale of such development (including plant operating capacity at the MRF, provision of adequate standby and provision of contingency, backup and spares in the case of breakdown)

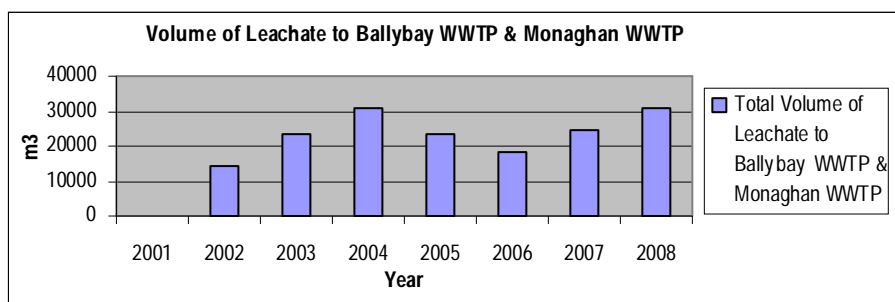
The following are the proposed development works for the year 2008/2009 subject to approval from the Agency, planning permission and/or funding from the Department of the Environment as appropriate:

- Interim gas infrastructure in Cells 4a and Cell 4b.
- Gas collection infrastructure from the leachate sump in Cell 2.
- Capping of Phase 2.
- Intermediate capping of Cell 5a and Cell 4a.
- Completion of review of Waste Licence W0020-01.
- Investigation of wetlands for leachate treatment on old landfill and current facility.
- Capacitor on electricity supply at substation.
- Completion of Scada package for leachate and gas management system.
- Further insulation of attic in weighbridge office building.
- Developing level concrete hardstanding to facilitate composting.
- Infrastructure from alternative processing at MRF e.g. MBT, removal of high calorific waste.

**3.10 Volume of leachate produced and volume of leachate transported / discharged off-site**

**Table 9: Disposal of Leachate from 07/12/01 – 31/12/07**

Year	Total Volume to Ballybay WWTP/Monaghan WWTP
07/12/01 – 31/12/01	81.97 m <sup>3</sup>
2002	14,484.68 m <sup>3</sup>
2003	23,411.11 m <sup>3</sup>
2004	30,841.64 m <sup>3</sup>
2005	23,490.46 m <sup>3</sup>
2006	18,344.17 m <sup>3</sup>
2007	24,313.93 m <sup>3</sup>
2008	30,631.02 m <sup>3</sup>



**3.11 Report on development works undertaken during the reporting period, and a timescale for those proposed during the coming year**

The following development works were undertaken during the reporting period 01/01/08 to 31/12/08:

- Second installation of interim gas infrastructure in Cell 5a.
- Installation of gas infrastructure from Cell 4a & leachate sump in Cell 2.
- Completion of Phase 3 at current facility.
- Installation of new silt trap upstream of oil interceptor.
- Re-drilling of leachate borehole L5 in Cell 1.
- Installation of electrical system for removal of rain water from Cells 5b, 4b and 4c.
- Installation of inverter on landfill gas flare.
- Installation of new Scada package for leachate and gas management system.

See also 3.9 Proposed development of the facility and timescale of such development (including plant operating capacity at the MRF, provision of adequate standby and provision of contingency, backup and spares in the case of breakdown) above.

**3.12 Report on restoration of completed cells/ phases**

No restoration works were carried out in 2008.

**3.13 Site survey showing existing levels of the facility at the end of the reporting period**

A topographical survey was carried out by Alpha Engineering in February 2008.

### 3.14 Estimated annual and cumulative quantities of landfill gas emitted from the facility

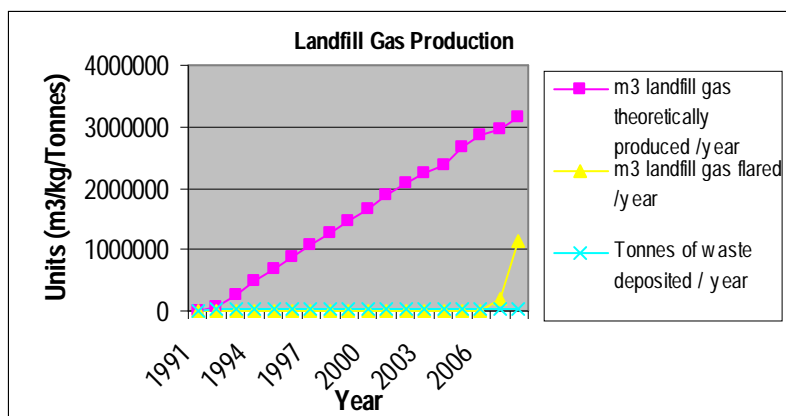
The volume of landfill gas has been estimated as 200m<sup>3</sup> of gas per tonne of waste over its life in the Waste Licence Application. This figure assumes that the waste comprises of a 50/50 mix of slowly decomposable and rapidly decomposable material. The rapidly decomposable material is assumed to generate gas for 5 years after placement with peak gas generation for each tonne of waste being 1 year after placement. Gas generation for the slowly decomposable material is assumed to be on going for 15 years after placement with a peak at 5 years after placement.

Using the Landgem program 3.15 x 10<sup>6</sup> m<sup>3</sup> of landfill gas was theoretically produced in 2008 by waste deposited at Scotch Corner.

Landfill gas extracted and flared from Area 1, Area 2 and Phase 2 in 2008 was approximately 1.15 x 10<sup>6</sup> m<sup>3</sup> of landfill gas with an average composition of 32% CH<sub>4</sub>, 28% CO<sub>2</sub>, and 4% O<sub>2</sub>.

The follows summaries landfill gas production since the site opened in 1991 using the Landgem Program:

Year	Tonnes of waste deposited / year	Theoretical m <sup>3</sup> landfill gas produced /year	Actual m <sup>3</sup> landfill gas flared /year
1991	6750 (estimated)	0	0
1992	28000 (estimated)	53,040	0
1993	28000 (estimated)	271,000	0
1994	28000 (estimated)	480,400	0
1995	28000 (estimated)	681,600	0
1996	28000 (estimated)	874,800	0
1997	32237 (estimated)	1,061,000	0
1998	30120.87	1,272,000	0
1999	33882.46	1,459,000	0
2000	36762.53	1,668,000	0
2001	33256.37	1,892,000	0
2002	33231.28	2,079,000	0
2003	27014.12	2,258,000	0
2004	47931.5	2,382,000	0
2005	38823.53	2,665,000	0
2006	25744.52	2,866,000	0
2007	39507.59	2,956,000	~200,000
2008	32954.74	3,150,000	1,140,680





### 3.15 Estimated annual and cumulative quantities of indirect emissions to groundwater

Waste for disposal at Scotch Corner landfill is placed in lined cells to prevent potential discharge to groundwater. Leachate is pumped from the lined cell to the leachate lagoon and tankered off-site for treatment at Monaghan WWTP.

However, prior to the construction of lined cells on site, the landfill operated on a dilute and disperse principle with leachate collection by gravity in the old leachate lagoon. Consequently leachate from the unlined cells also migrated to groundwater. Leachate interceptor drains have been put in place around unlined cells at the facility to mitigate the risk of leachate contamination of groundwater and capping of unlined cells was completed on 28/7/05.

Despite remediation works that were undertaken at the old landfill, leachate contamination from the old landfill continues to discharge to surface water at new G1.

See also 3.7.3 Groundwater Monitoring.

### 3.16 Annual water balance calculation and interpretation

The calculation for annual water balance is as follows:

$$Lo = [ER(A) + LW + IRCA + ER(1)] - [aW]$$

Where

- Lo = leachate produced (m<sup>3</sup>)
- ER = effective rainfall (use actual rainfall (R) for active cells)(m)
- A = area of cell (m<sup>2</sup>)
- LW = liquid waste (also includes excess water from sludges) (m<sup>3</sup>)
- IRCA = infiltration through restored and capped areas (m)
- 1 = surface area of lagoons (m<sup>2</sup>)
- a = absorptive capacity of waste (m<sup>3</sup>/t)
- W = weight of waste deposited (t/a)

ER = 1.0063m (Total rainfall for 2008 from Met Eireann Data)  
(Rainfall from 23/06/08 to 31/12/08 = 0.5998m)

A = 17,700m<sup>2</sup> (~Area of unlined cell 1 & Area of unlined cell behind MRF)  
+ 7,800m<sup>2</sup> (~Area of Cell 1)  
+ 20,000m<sup>2</sup> (~Area of Cell 2 & 3)  
+ 8,100m<sup>2</sup> (~Area of Cell 5a)  
+ 4,500m<sup>2</sup> (~Area of Cell 4a – operational since 23/6/08)

LW = 0m<sup>3</sup>

IRCA = 30% of ER x Area of capped cells  
= (30% of 1.0063) x (7800m<sup>2</sup> + 17700m<sup>2</sup>)  
= 0.3019m x 25500 m<sup>2</sup>  
= 7698.5m<sup>3</sup>

1 = 350m<sup>2</sup> (~ area of new leachate lagoon)

a = 0.025m<sup>3</sup>/t

W = 32954.74t (total weight deposited in landfill in 2008)

$$\begin{aligned}
 L_o &= [ER(A) + LW + IRCA + ER(1)] - [aW] \\
 &= (1.0063m \times 28100m^2) + (0.5998m \times 4500m^2) + 0m^3 + 7698.5m^3 + (1.0063 \times 350m^2) - [0.025m^3/t \times 32954.74t] \\
 &= [28277m^3 + 2699.1m^3 + 0m^3 + 7698.5m^3 + 352.2m^3] - 823.87m^3 \\
 &= 38202.93m^3
 \end{aligned}$$

Theoretical volume of leachate produced in 2008 = 38,202.93m<sup>3</sup>.

Actual volume of leachate tankered off site to Monaghan and Ballybay WWTP = 30,631.02m<sup>3</sup>.

In 2008 the theoretical volume of leachate generated at the Scotch Corner facility was calculated at 38,203m<sup>3</sup>. However, the actual volume of leachate tankered off site to the Wastewater Treatment Plants at Monaghan was lower approximately 20% at 30,631m<sup>3</sup>.

The discrepancy between the theoretical and actual leachate volume can be attributed to the capping materials on completed cells (Cell 1, Unlined Cell 1 and Unlined cell behind MRF) allowing significantly less than 30% of rainfall into the waste. The intermediate capping material (compost and spent mushroom compost) on Phase 2, Cell 5a and Cell 4a is also proving to be an effective rainfall barrier. This 20% difference was also seen in 2007 calculations.

The figure of 30,631m<sup>3</sup> of leachate tankered to Monaghan WWTP also includes approximately 7,167m<sup>3</sup> of contaminated water from the old landfill and condensate from the gas collection system.

Another reason for the discrepancy in the theoretical and actual volume of leachate generated on site can be attributed to the fact that the water balance formula determines the approximate theoretical volume of leachate produced and therefore may be subject to a large margin of error. It is normally only used to assist the likely rate of leachate generation when sizing plant/pipe work.

### **3.17 Report on the progress towards achievement of the Environmental Objectives and Targets contained in previous year's report**

The following progress toward achieving the Environment Objectives and targets listed in the 2007 AER was achieved in 2008:

- Implementation of EMS.
- Submission of AER to EPA.
- Provision of Staff training as per training plans in 2008.
- Construction of Phase 3.
- Further remedial works at the old landfill.
- Construction of new silt trap upstream of the old landfill.
- Extraction and flaring of landfill gas from gas extraction boreholes on Phase 2 (Cells 2 & 3).
- Installation of interim landfill gas extraction pipework from Cell 5a.
- On-going review of Waste Licence W0020-01.
- On-going implementations of "Scotch Corner Landfill Resource Use and Energy Efficiency Report" dated December 2006 and subsequent Energy Audits

### 3.18 Schedule of Environmental Objectives and Targets for the forthcoming year

**Table 12: Schedule of Environmental Objectives and Targets for 2009**

Objective	Target	Completion Date
Maintain EMS	Update and implement changes to EMS and continuous implementation of EMS to meet requirements of ISO14001, Audit by Odour Monitoring Ireland and "Energy Map" by SEI.	December 2009
Prepare AER	Submit Annual Environmental Report to the Agency	By 31 <sup>st</sup> March 2009
Provision of Training	Provide training as per training plans for 2009.	December 2009
Provision of MRF Infrastructure / Reduce waste to landfill	Provision of baled waste storage facility at rear of existing MRF.	December 2010
	Provision of concrete hardstanding area to facilitate composting.	December 2010
	Provision of new infrastructure at MRF for MBT.	December 2010
Provision of Landfill Infrastructure	Capping of Cells 2 & 3.	December 2009
	Intermediate capping of Cell 5a & 4a using geo-textile material.	December 2009
	Installation of temporary infrastructure for the active collection & flaring of landfill gas from Cell 4b if required	December 2009
	Further remediation of Old Landfill if required by Agency.	December 2010
Provision of Restoration & Aftercare	Further Investigation on leachate treatment options.	December 2010
	On-going implementation of Restoration and Aftercare Plan.	December 2009
Improve Energy Efficiency & Reduce Resource Use	On-going implementation of "Scotch Corner Landfill Resource Use and Energy Efficiency Report" dated December 2006 and subsequent Energy Audits and "Energy Map" recommendations by SEI.	December 2009

### 3.19 Full Title and a written summary of any procedures developed by the licensee in the year which relates to the facility operation

No procedures were created in 2008

The following SOPs are in operation on site:

**Title:** SOP 01 Document Control and Records

**Revision No:** Rev.00

**Issue Date:** 22/10/02

**Summary:** This procedure outlines how documentation and data relating to the operation of the landfill at Scotch Corner is controlled and how records are maintained to demonstrate compliance with the Waste Licence 20-1. This procedure covers the control of the following documents and the records associated with them: Waste Licence 20-1; Environmental Management Plan; SOPs; Master Forms.

**Title:** SOP 02 Procedure for Leachate Management at Scotch Corner Landfill  
**Revision No:** Rev.02  
**Issue Date:** 07/03/02, Revised 29/04/02, Revised 12/04/07  
**Summary:** This procedure details the leachate collection and removal system in operation at Scotch Corner landfill.

**Title:** SOP 03 Procedure for Operation of Weighbridge at Scotch Corner Landfill  
**Revision No:** Rev.00  
**Issue Date:** 12/04/07  
**Summary:** This procedure details the protocol for the weighbridge using Riteweight software at Scotch Corner landfill.

**Title:** SOP 04 Emergency Response Procedure  
**Revision No:** Rev.01  
**Issue Date:** 28/08/02, Revised 05/12/02  
**Summary:** This procedure details the Emergency Response Procedure that will be implemented at the facility at Scotch Corner to comply with Condition 9.2 of Waste Licence 20-1. This procedure and SOP 07 Corrective Action Procedure will be followed in the event of an emergency situation arising on site. The Emergency Response Procedure applies, but is not limited to the following incidents: Major Fire / Explosion; Migration of Landfill Gas; Spillage; Serious injury/accident to persons; Equipment Breakdown greater than 24 hours; Any other incident that may pose a significant threat to persons or to the environment.

**Title:** SOP 05 Waste Acceptance and Characterisation Procedure at Scotch Corner Landfill  
**Revision No:** Rev.01  
**Issue Date:** 29/05/02, Revised 18/10/04  
**Summary:** This procedure details the waste acceptance and characterisation operations in place at Scotch Corner landfill to comply with Condition 5.2 of Waste Licence 20-1. The procedure is summarised under the following headings: Waste Acceptance; Waste Rejection; Waste Handling; Waste Characterisation; Sludge Testing.

**Title:** SOP 06 Communications Programme  
**Revision No:** Rev.00  
**Issue Date:** 20/08/02  
**Summary:** This procedure details the Communications Programme that will be implemented at the facility at Scotch Corner to comply with Condition 2.4.1 of Waste Licence 20-1. The Communications Programme includes newspaper advertisements, web site advertisements, and letters to the elected members and information requests to the Landfill Manager.

**Title:** SOP 07 Corrective Action Procedure  
**Revision No:** Rev.00  
**Issue Date:** 28/08/02

- Summary:** This procedure details the Corrective Action Procedure that will be implemented at the facility at Scotch Corner to comply with Condition 2.3.2.3 of Waste Licence 20-1. This procedure will be followed in the event of any non-compliance of the Waste Licence that occurs in relation to the operation of the site. This includes incidents, complaints from the public, non-conforming waste loads, etc.
- Title:** SOP 08 Procedure for Operation of Scotch Corner Landfill in Adverse Wind Conditions
- Revision No:** Rev.00  
**Issue Date:** 04/10/02  
**Summary:** This procedure details the programme that operates at Scotch Corner landfill in adverse wind condition resulting in either complete closure, limited closure or complete closure.
- Title:** SOP 09 Procedure for Acceptance and Handling of Sludge at Scotch Corner Landfill
- Revision No:** Rev.01  
**Issue Date:** 09/10/02, Revised 18/10/04  
**Summary:** This procedure details the operations for accepting and handling sludges (sewage sludge and industrial non-hazardous sludges) at Scotch Corner landfill including restricted acceptance hours and deep burial of sludge on site to minimise nuisance by odours from sludges on site.
- Title:** SOP 10 Awareness and Training Programme
- Revision No:** Rev.00  
**Issue Date:** 22/10/02  
**Summary:** This procedure details the Awareness and Training Programme that has implemented at the facility at Scotch Corner to comply with Condition 2.3.2.4 of Waste Licence 20-1. The purpose of this programme is to outline how training needs are identified, carried out and documented for all staff whose work is related to the operation of Scotch Corner Landfill by means of training plans and training records.
- Title:** SOP 11 Site Inspection Procedure
- Revision No:** Rev.00  
**Issue Date:** 03/12/02  
**Summary:** This procedure details the protocol for performing a site inspection at Scotch Corner to comply with Condition 8.14 of Waste Licence W0020-01 and completion of Site Inspection Forms at Scotch Corner Landfill.
- Title:** SOP 12 Sampling Procedure
- Revision No:** Rev.00  
**Issue Date:** 04/12/02  
**Summary:** This procedure details the frequency and protocol for sampling and analysis of groundwater, well water, surface water, leachate, and dust and landfill gas at Scotch Corner to comply with Condition 8.1 of Waste Licence W0020-01.

**Title:** SOP 16 Wheel Wash Facility Procedure  
**Revision No:** Rev.00  
**Issue Date:** 05/12/02  
**Summary:** This procedure details the protocol for operation and maintenance of the wheel wash facility in operation at Scotch Corner since 21/10/2002.

**Title:** SOP 17 Procedure for Landfill Gas Management at Scotch Corner Landfill  
**Revision No:** Rev.00  
**Issue Date:** 13/06/07  
**Summary:** This procedure details the landfill gas analysis and balancing protocol for efficient landfill gas flare operation at Scotch Corner landfill.

### **3.20 Tank, pipeline and bund testing and inspection report**

None were carried out in 2008.

### **3.21 Reported Incidents and Complaints Summaries**

#### **3.21.1 Incidents**

Incident No. 01/08, 02/08, 06/08, 12/08, 14/08, 20/08 and 21/08 records an incident in which a delivery of diesel washing and/or waste paint was taken to the waste quarantine area.

Incident No. 03/08, 05/08 and 11/08 records an exceedance in the waste license W0020-01 trigger levels for landfill gas in borehole B2a and B5a.

Incident No. 04/08 and 15/08 records exceedance of various Maximum Admissible Concentrations (Ref: European Communities (Quality of Water Intended for Human Consumption) Regulations, 1988 – Department of the Environment) in Groundwater Samples G1 and G2, records exceedance in surface water samples S5, S6, S7, S8, S9, EPA155, and EPA180 of various Maximum Admissible Concentrations Ref: European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989.

Incident 17/08 records an exceedance in the waste license W0020-01 trigger levels for noise at monitoring point D4 at Scotch Corner Landfill.

Incident 09/08 records an exceedance in the waste license W0020-01 trigger levels for leachate at leachate borehole L5 at Scotch Corner Landfill.

Incident No. 10/08 records an incident of green polluting matter in S6 drain.

Incident 13/08 and 18/08 records an exceedance of the trigger level in the waste license W0020-01 flare stack emissions.

Incident No. 07/08, 08/08, 19/08 and 22/08 records shutdowns of the landfill gas flare.

Incident No. 16/08 records an exceedance in the waste license W0020-01 trigger levels for dust at monitoring location D1, D2 and D4.

### **3.21.2 Complaints**

Complaint 01/07: Relates to a complaint from a local resident about odour and litter in fields outside of the landfill site.

Complaint 02/08, 03/08, 04/08, 05/08, 06/08, 07/08, 08/08, 09/08, 10/08, 11/08, 12/08, 13/08, 14/08, 15/08, 16/08, 17/08 and 18/08: Relates to complaints from local residents about flies in their houses.

## **3.22 Review of Nuisance Controls**

### **3.22.1 Litter**

The erection and maintenance of 5m high anti-litter netting has been very successfully in controlling wind blown litter within the active face. Holes in netting are repaired and landfill operatives collect any litter that escapes from the tipping area. Compaction, daily cover with geo-hess or compost/spent mushroom compost (smc) and intermediate covering of the waste with compost/smc will continue as to prevent nuisance by litter at the facility.

### **3.22.2 Vermin**

Since March 2004, the contract was being carried out by Pestcheck (now trading as ISS). From inspection of the bait boxes on site, Pestcheck has noted sporadic low levels of infestation from mice and to a lesser extent rat infestation at varying times of the year. Satisfactory rodent control was provided by Pestcheck/ISS during the reporting period.

### **3.22.3 Birds**

Bird control at Scotch Corner landfill is an integrated approach of keeping the tipping face as small as possible, compacting the waste, daily covering with geo-hess or compost/smc, intermediate cover with compost/smc and deployment of visual deterrents and use of acoustic deterrents. Since January 2004, Monaghan County Council engaged the services of Bird Control of Ireland on a weekly or fortnightly basis, in an attempt to improve bird management at the facility as previous providers of bird control services had proved inconsistent and unsatisfactory. In addition to the deterrents employed by Monaghan County Council operatives, Bird Control of Ireland also used various visual and acoustic deterrents as well as the use of a firearm and 2 hawks as necessary. To improve bird management by landfill operatives, Monaghan County Council purchased a pistol as an additional acoustic scarring technique on site. Satisfactory bird control was provided by Bird Control of Ireland from January to April 2008 and by Falcon Bird Control from May 2008 to December 2008 (on a twice weekly basis).

### **3.22.4 Flies**

Fly control at Scotch Corner landfill is also an integrated approach of keeping the tipping face as small as possible, compaction of the waste, and covering the tip head daily with geo-hess or compost and intermediate cover with compost. The above measures proved to be very

successful in preventing nuisance by flies in 2008. The spraying of insecticide was carried out as required and in response to complaints received.

### **3.22.5 Mud**

The installation of the wheel wash facility at Scotch Corner Landfill has been successful as it has virtually eliminated mud as a nuisance at the facility. Additional measures in place to prevent nuisance by mud are the regular maintenance of site roads and regular cleaning of the site entrance and the weighbridge.

### **3.22.6 Dust**

Nuisance by dust was not a problem at the facility during the reporting period due to compaction of the waste and spraying of site roads with water when necessary.

### **3.22.7 Odour**

Nuisance by odour was addressed during the reporting period by an integrated approach that involved keeping the tipping face as small as possible, compacting the waste, daily covering with geo-hess, intermediate covering with compost/smc, capping of completed cells and operation of permanent flare since 8/12/05. As a response to odour in the vicinity of Cells 2 and 3 gas extraction and flaring from this phase has commenced since 10/12/07 and from Cell 5a since 29/1/08.

## **3.23 Reports on financial provision made under this licence, management and staffing structure of the facility, and a programme for public information**

### **3.23.1 Report on financial provision made under this licence**

From the period January to December 2008, Monaghan County Council paid €41,146.71 (371 equivalents @ €111.66 per equivalent) in monitoring charges to the EPA, Monaghan for this reporting period and €26,768 to the Agency in Wexford for Waste Licence monitoring.

The operating cost of the landfill was €2,660,648.63 for 2008.

Income from the deposition of waste at Scotch Corner was €2,902,352.40 for 2008.

### **3.23.2 Report on management and staffing structure**

The management and staffing structure at Scotch Corner Landfill consisted of Senior Engineer, Landfill Manager, Deputy Landfill Manager, Weighbridge Operative, 2 Landfill Operatives and subcontracted Machine Operatives for this reporting period.



The management and staffing structure at Scotch Corner Recycling Centre at the end of 2008 was employed by McElvaney Waste and Recycling and consisted of a Facility Manager, Deputy Facility Manager, Civic Amenity Site Caretaker, 4 Office staff and 6 MRF Operatives.

**3.23.3 Report on programme for public information**

Environmental information relating to the landfill and to the Recycling Centre is on display at the landfill offices and available in the Environment Section of Monaghan County Council. A notice to this effect is on the Monaghan County Council Web site.

**3.24 Report on training of staff**

Training plans and records were compiled for all staff at the facility including the subcontracted machine operators. Training was been completed as per training plans during the reporting period.

Training completed for this period included the following:

- 01/08 Landfill Gas balancing & Site Inspections by Landfill Manager.
- 02/08 Spillage Awareness Training by SSI Environmental.
- 03/08 Refresher First Aid Course by Civil Defense.
- 04/08 Welding & Installation of Gas carrier pipes by TAL Ltd.

**3.25 Any Other Items Specified by the Agency.**

**3.25.1 AER / PRTR Electronic Reporting Workbook**

A copy of the 2008 AER / PRTR Electronic Reporting Workbook is contained in Appendix 1.

<p><b>Report Prepared By:</b></p> <hr/> <p style="text-align: center;"><b>Irene Williamson</b> <i>Landfill Manager</i></p>	<p><b>Report Approved By:</b></p> <hr/> <p style="text-align: center;"><b>Martin Murray</b> <i>Senior Engineer</i></p>	<p><b>Date:</b></p> <hr/>
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# **APPENDIX 1**

## **AER / PRTR Electronic Reporting Workbook for 2008**