Irish Distillers Ltd.

Midleton Distilleries

Midleton

Co. Cork

Reg.No. P0442-01

Annual Environmental Report

Date of Issue: March 2009

1.0 Introduction

Licence Register Number

Name and Location of Site

Brief Description of Activities at the Site

Company Environmental Policy

Company Organisation Chart for Environmental Management

Licence Register Number: **Reg. No. P0442-01**

Name and Location of Site: Irish Distillers Ltd.
Midleton Distilleries
Midleton
Co. Cork

Company Background:

The Old Midleton Distillery was founded in 1825. It operated as a private Company until 1966 when it merged with the Powers and Jameson companies in Ireland to form Irish Distillers Ltd. The present Distillery at Midleton was built in 1975. Since 1988 Irish Distillers has formed part of Group Pernod Ricard the French multi-national drinks company

Brief Description of Activities at the Site:

The Midleton Distilleries complex occupies a 45-hectare site and comprises a number of modern industrial buildings with associated large - scale warehousing. The distillery is involved in the following production activities:

Pot Whiskey Distilling
Grain Whiskey Distilling
Feeds Recovery
Spirit Store / Maturation

The main buildings located on-site consist of the brew house, still house, feeds recovery house, vat house, bonded spirit store, offices, canteen and 34 warehouses. The main utilities on-site are the process water treatment, cooling tower, ESB sub-stations, gas supply station and there is also a waste water treatment plant (WWTP).

The plant operates seven days per week. The annual production capacity, based on a 7-day operation, is as follows:

Pot Whiskey Line	11,000,000 litres of alcohol
Grain Whiskey / Grain Neutral Spirit (GNS)	22,000,000 litres of alcohol
Feeds Recovery / Distillers Dark Grain / Syrup	29,500 t DDG equivalent

The site lies outside the Midleton Urban fringe to the east of the town mainly in a semi-rural area. To the east and south of the site the landscape is dominated by extensive farmlands. To the west of the site are primary and secondary schools and their playing fields. Beyond these is Midleton town. The Old Midleton Distillery, now a Heritage Centre, is located immediately to the southwest. The nearest houses to the site are located on the northwestern boundary behind the weighbridge control room.

MIDLETON DISTILLERIES
QSE POLICY

The Board of Directors of Irish Distillers Limited regards the promotion of health and safety, food safety, quality and the environment (QSE) as a priority at all levels within the organisation, and undertakes to produce distilled spirits and associated by-products of the highest quality in a safe manner which protects the environment.

Midleton Distilleries is therefore committed to:

- complying with all applicable regulatory, legislative and corporate requirements and relevant standards (ISO9001, ISO14001, OHSAS18001, ISO22000 and FEMAS);

- identifying hazards and evaluating risks associated with the distilleries' activities on a regular basis, and documenting a programme to reduce or eliminate, as far as reasonably practicable, any risks identified;

- continually monitoring and improving site management and developing best practices to provide a safe and healthy work environment, to prevent pollution and to minimise the use of natural resources in line with the principles of sustainable development;

- controlling all food safety related process hazards using the Hazard Analysis and Critical Control Point (HACCP) principles;

- providing products which, according to their intended use, are safe for customers and meet agreed specifications;

- continual improvement and performance measurement by setting and reviewing, on a regular basis, QSE objectives, targets and management programmes at all levels within the organisation;

- ensuring, through appropriate training, planning, resource availability and communication, that all personnel on-site at Midleton are aware of their QSE responsibilities;

- consulting with, and encouraging employees to participate in, the QSE management system;

- maintaining the QSE management system through regular auditing, reviewing and updating;

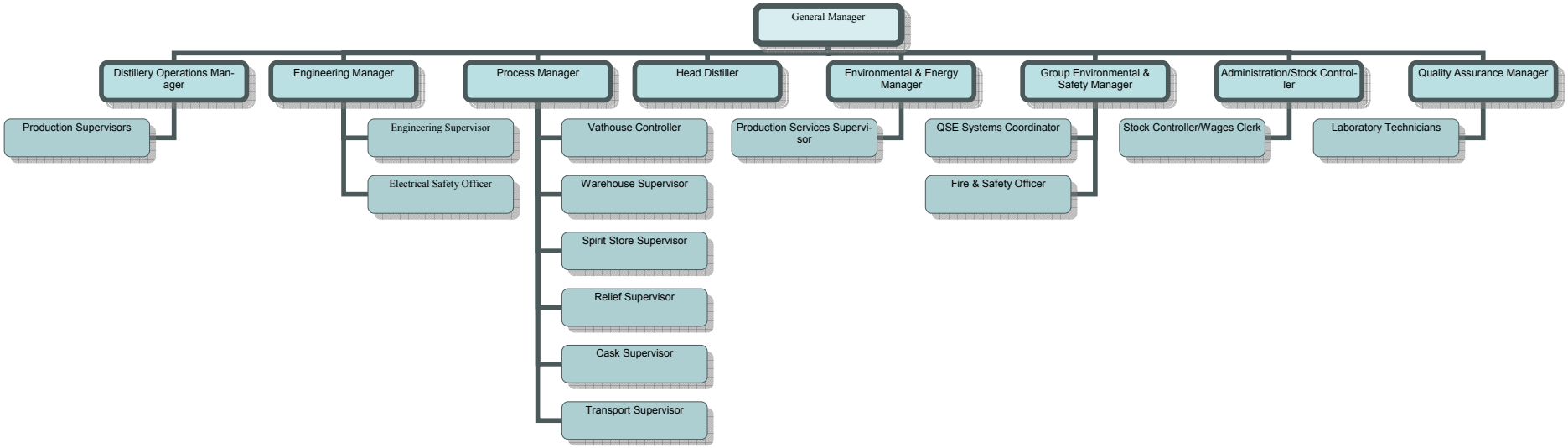
- continually improving emergency preparedness and response procedures.

The success of this policy requires commitment from all employees, visitors, suppliers and contractors. It is the responsibility of each employee to observe all rules and procedures and co-operate with the company in complying with its statutory obligations. Employees must be aware at all times of the responsibility that they have for both their own safety and the safety of others.

Responsibility for implementation of this policy lies with the Group Production Director, who ensures through the Head of Distilling Operations and line management that the objectives of the policy are achieved.

This policy is communicated, implemented and maintained at all levels throughout Midleton Distilleries. It is available to external interested parties upon request.

Organisation Chart



2.0 Summary Information

Self Monitoring Data

Emission to Waters/Sewer

Emissions to Air

Energy and Water Consumption

Environmental Incidents and Complaints

Waste Arisings

Emissions to Waters/Sewer

The Integrated Pollution Control Licence was issued in October 1999. The information contained in the "Present Year" column relates to the calendar year 2008 with the "Previous year" column relating to the calendar year 2007. During the course of the year the IPPC License was reviewed and amended. Heretofore only the treated wastewater emission point (SE1) was subject to a monitoring regime whereas the amended license further imposes the Urban Waste Water Regulation limits on the combined discharge (SE Final) from the site. Therefore it is not possible to compare the year's performance with the previous year's performance. Suffice it to say that the emissions to waters/sewer were in compliance with the conditions of the license.

Licensed Emission Point SE1 (January to December)

Parameter	Mass Emissions (kg) (Previous year)	Mass Emissions (kg) (Present year)	Licensed Mass Emissions (kg)
Volume	191262 m^3	250572 m^3	426500 m^3
COD	N/A	7768	53313
TOC	2801	3508	51180
Suspended Solids	644	1002	14928
OFG	N/A	<2505	8530

Table 1: Summary Emissions to Waters/Sewer

Licensed Emission Point SE Final (March to December)

Parameter	Mass Emissions (kg) (Previous year)	Mass Emissions (kg) (Present year)	Licensed Mass Emissions (kg)
Volume	N/A	306718	1520000 m^3
pH	N/A	8.2	6.5 – 9.0
COD	N/A	9723	190000
BOD	N/A	2024	38000
Suspended Solids	N/A	1595	53200
Total Nitrogen	N/A	828	22800
Sulphates	N/A	1963	912000
Cadmium	N/A	0.00	304
Chromium	N/A	0.306	760
Copper	N/A	14.72	760
Lead	N/A	1.07	760
Nickel	N/A	0.00	760
Zinc	N/A	10.43	760
OFG	N/A	<3067	30400
Faecal Coliforms	N/A	<250 per 100ml	<250 per 100ml

Table 1a: Summary Emissions to Waters/Sewer

Date	08/04/08
Parameter	pH
Emission Point Ref. No.	SE Final
No. of exceedences vs. No. of samples	1 vs. 120
Maximum Exceedence vs. Emission Limit Value	6.29 vs. 6.5
Cause	Acidic chemicals being used to clean Reverse Osmosis unit caused pH to drop to 6.29. A license limit of 6.5 had only recently been introduced. New automatic pH controls were being installed at the time but had not been completed. The volume involved was 11.5 m^3. The total volume discharged that day was 1372 m^3. The average pH for the day was 8.04, the normal range would be 8.0 to 8.4
Corrective Action	Automatic pH controls now in operation.

Table 2: Summary of non-compliances

Surface Water Emissions (SE5 & SWE2 to SWE8)

Emission Point	pH Range	COD Range	Visual
SE5 & SWE2 to SWE8	7.1 to 8.2	14 to 122 ppm	Occasionally Turbid

Table 3: Summary of Surface Water Emissions

Emission points SWE2 to SWE8 drain the surface water from the warehousing area to the dry bed of the disused millstream. As part of the whiskey maturation process ethanol evaporates from the casks and escapes to atmosphere. The rate of evaporation is temperature dependent with the losses being higher in the summer than in the winter. When it rains this ethanol is washed out of the atmosphere and results in the TOC levels reported above. These emission points serve 30 maturation warehouses with approximately 200,000 m^2 of impermeable surface area. Ethanol is highly biodegradable and is not persistent. Until March 2000 the millstream was in use and had a thriving fish population, which was not affected by the surface water discharges. The occasional turbidity is caused by the construction activities in the area. Since the revision of the license in March 2008 the monitoring requirement has changed from TOC to COD and emission point SE5 has been removed since it forms one of the constituent streams monitored in SE Final.

Process emissions to Water (SWE1)

Emission Point	pH Range	Average TOC Range	Visual
SWE1	7.1 to 8.5	<15 ppm	Clear

Table 4: Summary of Process Emissions to Water

Process emissions to water were within the agreed limits.

Emissions to Air

The Integrated Pollution Control Licence was issued in October 1999. The information contained in the "Present Year" column relates to the calendar year 2008 with the "Previous year" column relating to the calendar year 2007.

Licensed Emission Points A1-1, A1-2 and A1-3

Parameter	Mass Emissions (kg) (Previous year)	Mass Emissions (kg) (Present year)	Licensed Mass Emissions (kg)
CO	<200	7762	N/A
NO_2	24994	38584	245952

Table 5: Summary Emissions to Atmosphere (Boilers)

Licensed Emission Point A2-1

Parameter	Mass Emissions (kg) (Previous year)	Mass Emissions (kg) (Present year)	Licensed Mass Emissions (kg)
Volume	71146529 m^3	109477080 m^3	321494400 m^3
Particulates	9427	2061	16074

Table 6: Summary Emissions to Atmosphere (Feeds Recovery Stack)

The average measured emission from the stack was 18.83 mg/Nm^3 measured by two separate service providers each of whom carried out three half-hour sampling campaigns. The results ranged from 12 mg/Nm^3 to 24 mg/Nm^3 with the volumetric flows ranging from 17125 Nm^3/h to 29908 Nm^3/h giving an average mass emission rate of 0.389 kg/h particulate matter. The driers were operated for approximately 5328 hours during the year. Copies of both reports are contained in Appendix II.

Agency Monitoring and Enforcement

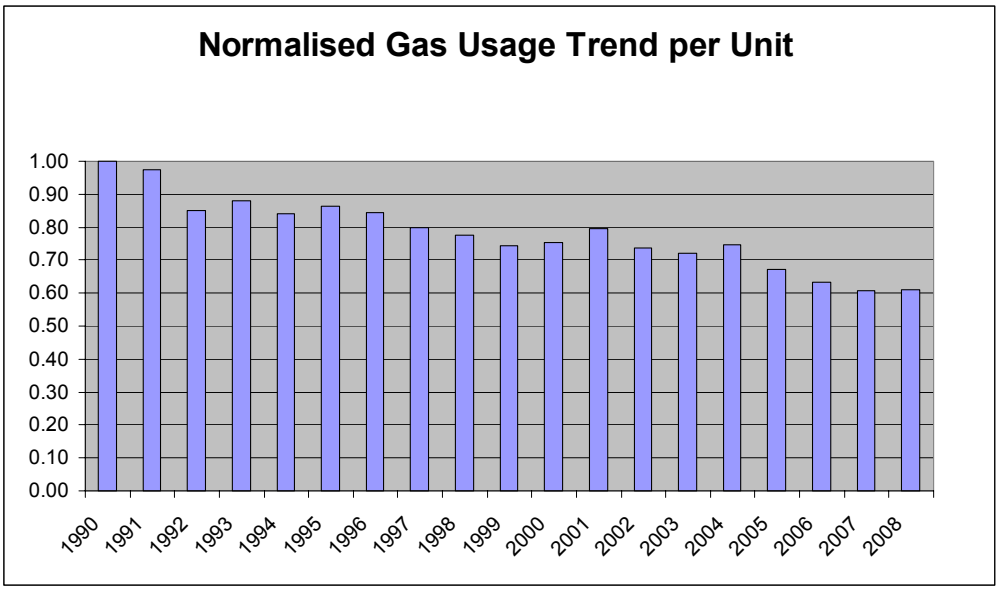
No issues to report.

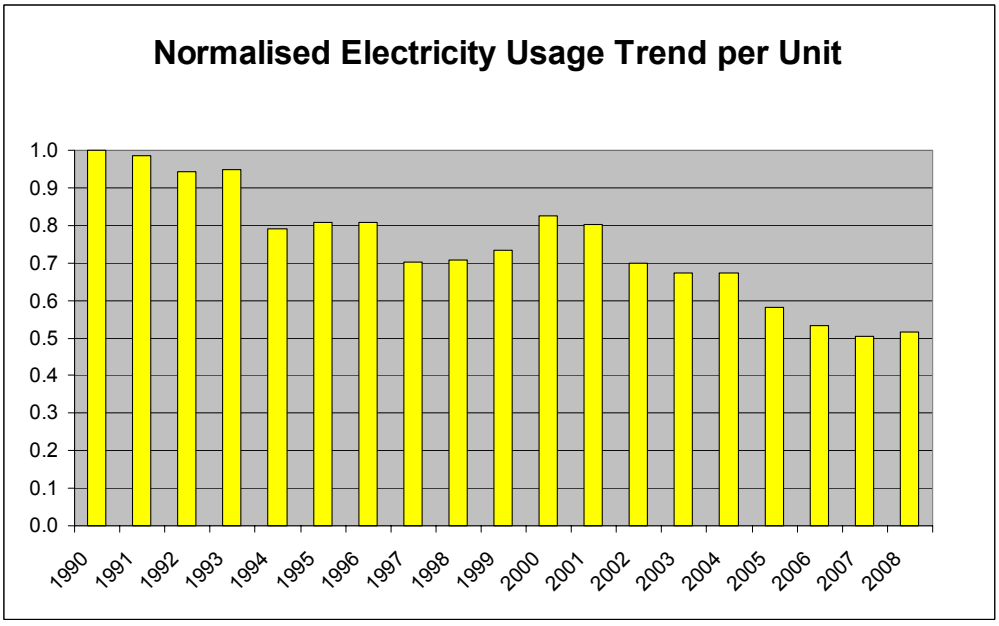
Energy and Water Consumption

Energy Consumption

Light Fuel Oil	0 m^3
Natural Gas	19736844 Nm^3
Electricity	16445.6 MWh

Table 7: Energy Consumption Summary





Water Consumption

On-site ground water (m^3)	837112
On-site surface water (m^3)	574002
Municipal supply (m^3)	53220

Table 8: Water Consumption Summary

Environmental Incidents and Complaints

Incidents

There were no environmental incidents during the year.

Complaints

There were no complaints during the year.

Waste Arisings

Environmental Protection Agency

AER Returns Worksheet

Version 1.1.01

REFERENCE YEAR	2008

1. FACILITY IDENTIFICATION

Parent Company Name	Irish Distillers Limited
Facility Name	Irish Distillers Limited
PRTR Identification Number	P0442
Licence Number	P0442-01

Waste or IPPC Classes of Activity

No.	class_name

Address 1	Midleton Distilleries
Address 2	Midleton
Address 3	Co. Cork
Address 4	
Country	Ireland
Coordinates of Location	18850735
River Basin District	
NACE Code	1101
Main Economic Activity	Distilling, rectifying and blending of spirits
AER Returns Contact Name	Aidan Curran
AER Returns Contact Email Address	Aidan.Curran@idl.ie
AER Returns Contact Position	Environmental, Health & Safety Manager
AER Returns Contact Telephone Number	021-4631821
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	021-4631602
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name

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

Is it applicable?	No
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 ?	

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR								
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Yea	A (Accidental) KG/Yea	F (Fugitive) KG/Yea
					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 AIR								
POLLUTANT		METHOD				QUANTITY		
			Method Used		A1-1, A1-2, A1-3			
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Yea	A (Accidental) KG/Yea	F (Fugitive) KG/Yea
02	Carbon monoxide (CO)	M	OTH	BS3405:1983	7686.0	7686.0	0.0	0.0
03	Carbon dioxide (CO2)	C	ETS		41406590.0	41406590.0	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	M	OTH	BS3405:1983	38584.0	38584.0	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 AIR								
POLLUTANT		METHOD				QUANTITY		
			Method Used		A2-1			
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Yea	A (Accidental) KG/Yea	F (Fugitive) KG/Yea
210	Dust	M	OTH	BS3405:1983	2061.0	2061.0	0.0	0.0

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

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Irish Distillers Limitec

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 si model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section above)	0.0				N/A	

4.2 RELEASES TO WATERS

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

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

RELEASES TO WATERS

POLLUTANT			Method Used		QUANTITY			
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

POLLUTANT			Method Used		SE Final	QUANTITY		
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
18	Cadmium and compounds (as Cd)	M	OTH	ICP MS	0.0	0.0	0.0	0.0
19	Chromium and compounds (as Cr)	M	OTH	ICP MS	0.306	0.306	0.0	0.0
20	Copper and compounds (as Cu)	M	OTH	ICP MS	14.72	14.72	0.0	0.0
23	Lead and compounds (as Pb)	M	OTH	ICP MS	1.07	1.07	0.0	0.0
22	Nickel and compounds (as Ni)	M	OTH	ICP MS	0.0	0.0	0.0	0.0
12	Total nitrogen	M	EN ISO 11905-1:1998		828.0	828.0	0.0	0.0
24	Zinc and compounds (as Zn)	M	OTH	ICP MS	10.43	10.43	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

POLLUTANT			Method Used		SE Final	QUANTITY		
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
303	BOD	M	OTH	APHA98.5210.B	2024.0	2024.0	0.0	0.0
306	COD	M	OTH	HACH Method 8000	9723.0	9723.0	0.0	0.0
314	Fats, Oils and Greases	M	OTH	APHA98.5520.D	3067.0	3067.0	0.0	0.0
343	Sulphate	M	OTH	Ion Chromatography	1963.0	1963.0	0.0	0.0
240	**Suspended Solids**	M	OTH	AWWA 2540	1595.0	1595.0	0.0	0.0

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

4.3 RELEASES TO WASTEWATER OR SEWER

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

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

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER								
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

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

4.4 RELEASES TO LAND

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND							
POLLUTANT		METHOD				QUANTITY	
			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
					0.0	0.0	0.0

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

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

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

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

Transfer Destination	European Waste Code	Hazardous	Quantity T/Year	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Name and Licence / Permit No. of Recoverer / Disposer / Broker	Address of Recoverer / Disposer / Broker	Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)	Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	17 06 01	Yes	0.150	Asbestos Insulation	D1	M	Weighed	Abroad	BIS Willich Industrial Services Ltd. (CK WMC 32/01)	15, Crag Terrace, Clondalkin Ind. Est., Dublin 22.	Buhck GmbH & Co. KG, Rappenberg, DE21502 Weirshop, Germany	A53F00502
Within the Country	17 05 03	Yes	19.320	Contaminated Soil	R5	M	Weighed	Offsite in Ireland	M. McGuire Haulage Ltd. (CK WMC 241/04)	Ahenure, Callan, Co. Kilkenny	Enva Ireland Ltd., Clonminam Ind. Est., Portlaoise, Co. Laois, Ireland	W0184-1
Within the Country	20 01 21	Yes	0.180	Fuorescent Tubes	R4	M	Weighed	Abroad	Contec Ltd. (CK WMC 31-01; WP 98092)	Davitt Rd., Inchicore, Dublin 12, Ireland	Mercury Recycling Ltd., Mercury House, 17 Commerce way, Trafford Park, Manachester M17 1HW, UK	YP373533
Within the Country	11 01 13	Yes	0.360	Kerosene (from spent degreaser)	R1	M	Weighed	Offsite in Ireland	Safety Kleen (CK WMC 56/01; W0099-01)	Unit 5, Airton Rd., Tallaght, Dublin 24, Ireland	Enva Ireland Ltd., Clonminam Ind. Est., Portlaoise, Co. Laois, Ireland	W0184-1
Within the Country	11 01 13	Yes	0.070	Kerosene (from spent degreaser)	R2	M	Weighed	Abroad	Safety Kleen (CK WMC 56/01; W0099-01)	Unit 5, Airton Rd., Tallaght, Dublin 24, Ireland	Solvent Resource Management Ltd. (SRM Ltd.), Weeland Road, Knottingly,West Yorkshire, WF11 8DZ, UK	TP33345F
Within the Country	06 01 06	Yes	5.921	Hazardous Waste Chemicals [Aqueous	D9	M	Weighed	Abroad	South Coast Transport (CK	Corrin, Fermoy, Co. Cork,	Bredox BV, Industrieterrein	02/14323
Within the Country	16 03 03	Yes	3.430	Hazardous Waste Chemicals [Aqueous	D9	M	Weighed	Offsite in Ireland	Lehane Environmental &	Unit 5, Wallingstown Ind.	Rilta Environmental Ltd.,	W0192-02
Within the Country	13 05 03	Yes	4.350	Interceptor Sludge	D9	M	Weighed	Offsite in Ireland	Lehane Environmental &	Unit 5, Wallingstown Ind.	Rilta Environmental Ltd.,	W0192-02
Within the Country	13 07 03	Yes	1.400	Oily Water	R1	M	Weighed	Offsite in Ireland	Enva Ireland Ltd. (CK WMC	Clonminam Ind. Est.,	Enva Ireland Ltd.,	W0184-1
Within the Country	13 02 08	Yes	2.580	Waste Oil	R1	M	Weighed	Offsite in Ireland	Enva Ireland Ltd. (CK WMC	Clonminam Ind. Est.,	Enva Ireland Ltd.,	W0184-1
Within the Country	20 01 35	Yes	0.591	WEEE (discarded IT equipment)	R13	M	Weighed	Offsite in Ireland	Rehab Recycle (CK WMC	Monahan Road, Cork,	Rehab Recycle, Parkmore	WR/121
Within the Country	16 06 04	No	0.014	Alkaline Batteries	R4	M	Weighed	Abroad	Returnbatt Ltd. (CK WMC	Old Mill Industrial Estate,		
Within the Country	20 01 40	No	0.463	Aluminium Tags	R4	M	Weighed	Offsite in Ireland	Rehab Recycle (CK WMC	Monahan Road, Cork,		
Within the Country	17 09 04	No	37.680	General C&D Waste	R5	M	Weighed	Offsite in Ireland	O'Brien Skip Hire (CK WMC	Ballyrussell, Midleton Co.		
Within the Country	17 02 01	No	9.170	General C&D Timber Waste	R13	M	Weighed	Offsite in Ireland	O'Brien Skip Hire (CK WMC	Ballyrussell, Midleton Co.		
Within the Country	20 01 01	No	1.540	Confidential Paper/Paper ISM	R3	M	Weighed	Offsite in Ireland	Rehab Recycle (CK WMC	Monahan Road, Cork,		
Within the Country	20 01 25	No	0.175	Edible Oil	R9	M	Weighed	Offsite in Ireland	Frylite Ltd. (CK WMC	Frylite Ltd., Orchard Road,		
Within the Country	15 01 02	No	0.079	Empty Plastic Drums (triple-rinsed)	R5	M	Weighed	Offsite in Ireland	Greenstar Recycling	Sarsfield Court, Glanmire,		
Within the Country	16 01 03	No	1.953	Tyres	R3	M	Weighed	Offsite in Ireland	Hanover Tyres Ltd. (Permit	Carrigtwohill, Co. Cork,		
Within the Country	16 01 03	No	0.042	Tyres	R3	M	Weighed	Offsite in Ireland	Cork Truck Services Ltd.	Mallow Rd., Cork, Ireland		
Within the Country	20 01 40	No	97.180	Waste Metal	R4	M	Weighed	Offsite in Ireland	Cork Metal (CK WMC 26/01;	Dublin Hill, Cork, Ireland		
Within the Country	02 07 02	No	241.988	Fusel Oil	R1	M	Weighed	Onsite in Ireland	Midleton Distilleries (IPPC	Midleton, Co. Cork, Ireland		
Within the Country	02 07 99	No	13.730	General Waste	R5	M	Weighed	Offsite in Ireland	Midleton Skip Hire (CK WMC	Knockgriffin, Midleton, Co.		
Within the Country	20 03 01	No	42.100	General Waste	D5	M	Weighed	Offsite in Ireland	Veolia (CK WMC 10/01)	Forge Hill, Kinsale Rd., Cork,		
Within the Country	15 01 07	No	3.210	Glass	R5	M	Weighed	Offsite in Ireland	REHAB Recycle (CK WMC	Monahan Rd., Cork, Ireland;		
Within the Country	02 07 04	No	390.120	Grain Intake Screenings	R3	M	Weighed	Offsite in Ireland	Midleton Skip Hire (CK WMC	Knockgriffin, Midleton, Co.		
Within the Country	**15 01 10**	**Yes**	0.318	Empty IBC residues of or contaminated by	D9	E	Weighed	Offsite in Ireland	Johnston Logistics Ltd. (CK	Blackchurch Business Park,	Rilta Environmental Ltd.,	W0192-02
Within the Country	15 01 06	No	9.222	Mixed Packaging Waste	R5	E	Weighed	Offsite in Ireland	Johnston Logistics Ltd. (CK	Blackchurch Business Park,		
Within the Country	20 01 01	No	1.650	Newspaper/Newsprinl	R3	M	Weighed	Offsite in Ireland	Greenstar Recycling	Sarsfield Court, Glanmire,		
Within the Country	20 01 01	No	15.020	Paper & Cardboard	R13	M	Weighed	Offsite in Ireland	Veolia (CK WMC 10/01)	Forge Hill, Kinsale Rd., Cork,		
Within the Country	20 01 39	No	1.740	Plastic	R5	M	Weighed	Offsite in Ireland	Midleton Skip Hire (CK WMC	Knockgriffin, Midleton, Co.		
Within the Country	02 07 04	No	42.160	Spoilt Grains	R3	M	Weighed	Offsite in Ireland	Veolia (CK WMC 10/01);	Forge Hill, Kinsale Rd., Cork,		
Within the Country	02 07 04	No	66.760	Spoilt Grains	R3	M	Weighed	Offsite in Ireland	Midleton Skip Hire (CK WMC	Knockgriffin, Midleton, Co.		
Within the Country	20 01 38	No	22.120	Wood Pallets/Shavings	R13	M	Weighed	Offsite in Ireland	Veolia (CK WMC 10/01)	Forge Hill, Kinsale Rd., Cork,		
Within the Country	19 08 12	No	990.390	WWTP Sludge	R3	M	Weighed	Offsite in Ireland	Veolia (CK WMC 10/01);	Forge Hill, Kinsale Rd., Cork,		

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

3.0 Management of the Activity

Environmental Management Programme Report

Environmental Management Programme Proposal

Pollution Emission Register

Environmental Management Programme – Report

Environmental Objectives & Targets Progress Report for 2008

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	Objective		Objective Rationale				
1	To develop and improve site-wide environmental management in accordance with ISO 14001 and related IPC Licence.		The environmental management system provides a structured framework for co-ordinating site-wide environmental affairs and sustaining IDLs policy of continual improvement				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
1.1	IDL has established a baseline for river water quality and will continue to ensure that it has no adverse effect on same.	1.1.1	To repeat the biological survey of river water quality for Dungourney and Millstream	Environmental & Energy Manager	07 Feb 2006	31 Dec 2009	Deferred pending future expansion plans for the site
1.2	IDL intends to establish a baseline for flora and fauna levels at the sites so as to preserve the ecological habitats that exist.	1.1.2	To perform a baseline flora and fauna survey.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2009	Deferred pending future expansion plans for the site
	Objective		**Objective Rationale**				
2	To reduce emissions to sewer from IDL.		The IPPC licence (No. P0442-01) contains a number of specific conditions regarding the monitoring, control and reduction of emissions to sewer and waters. The emissions have been calculated as significant				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
2.1	To replace the existing pumps within the main on-site pumping station.	2.1.1	Upgrade existing pumps within the main on-site pumping station (this project will be implemented as part of the overall plant upgrade works).	Environmental & Energy Manager	01 Jan 2006	31 Dec 2008	Not required in the immediate future. Deferred pending future expansion plans for the site

	Objective		Objective Rationale				
3	To reduce emissions to atmosphere from the IDL Site.		The evaluation of environmental impacts has identified emissions to atmosphere as significant.				
	Target			**Responsible**	**Creation Date**	**Target Date**	**Status Update**
3.2	To continue to investigate possible methods of CO_2 recovery.	**3.2.1**	IDL intend to continue to investigate methods of recovering process CO_2 emissions.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2008	No outlets identified as yet.
3.3	To address the issue of particulate emissions from the Feeds Recovery stack.	**3.3.1**	Service agents to visit site and develop a solution to the problem.	Distillery Operations Manager	27 Feb 2008	31 Dec 2008	High turbulence in stack may have contributed adversely to the non-compliant results. The sampling port was less thasn 5D downstream of the horizontal bend. The port was relocated and the emissions analysed by two separate service providers. All results were compliant.

	Objective		Objective Rationale				
4	To reduce emissions to ground and water, including groundwater, from IDL		The Register of Aspects & Impacts has identified the impacts associated with emissions to ground as significant. In addition, the IPPC licence contains a number of specific conditions regarding monitoring, control and other measures to protectground and groundwater.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
4.3	Review containment measures for spillage of waste water at the effluent outfall.	4.2.1	IDL intend to check the adequacy of containment measures for spillage of waste water at the effluent outfall.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2008	Deferred pending future expansion plans for the site
4.4	To ensure that the oil/water interceptors are structurally sound.	4.3.1	To perform an integrity check on the oil/water interceptors.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2008	One checked and deemed to be structurally sound. The second due to be decommissioned wit the installation of the MVR evaporator.
4.6	To ensure the integrity of unbunded vessels..	4.6.1	Conduct integrity tests on specific bulk tanks every two years using external contractor.	Environmental & Energy Manager	27 Feb 2008	31 Dec 2009	Due in 2009.
		4.6.2	To replace the Thick Stillage Tank and provide bunding for same	Environmental & Energy Manager	27 Feb 2008	31 Dec 2008	Complete.
		4.6.3	To replace the Thin Stillage Tank and provide bunding for same	Environmental & Energy Manager	27 Feb 2008	31 Dec 2008	Not possible to relocate the tank.
	Objective		**Objective Rationale**				
6	To control and minimise waste generated at IDL Midleton so as to prevent pollution.		The control of waste (storage, segregation, disposal, etc) and reduction of waste at source is an integral part of IDLs business and is part of IDLs IPC Licence (No. 442)				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
6.1	Conduct waste contractor audits.	6.1.1	Continue waste contractor audit programme (Composting contractor, wood shaving contractor, grain rubble agents).	Environmental & Energy Manager	07 Feb 2006	31 Dec 2008	Deferred due to lack of resources.
	Objective		**Objective Rationale**				
	To prevent incidents with the potential for environmental consequences.		Projects designed to prevent incidents with the potential for environmental consequences will help to minimise emergency emissions to air, water and land.				
	Target			**Responsible**	**Creation Date**	**Target Date**	**Status Update**
7.7	Ensure that old fermenters are decommissioned in a proper manner.	7.7.1	Decommissioning plan to be documented for old fermenters as per IPPC licence requirements.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	Deferred pending future expansion plans for the site

	Objective		Objective Rationale				
8	To improve the efficiency of resource and energy use.		IDL is committed to energy conservation and recognise that the environmental impacts associated with on-site energy and resource usage are significant.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
8.3	Reuse cavern water as process water in the plant, thus saving on total volume of water usage.	**8.3.1**	IDL intend to divert the cavern water that has been used for process cooling to the Bowen Water Treatment Plant, thus making it available as process water.	Distillery Operations Manager	07 Feb 2006	31 Dec 2009	Deferred. Additional controls would be required before this would be acceptable under ISO 22000
	Objective		**Objective Rationale**				
9	To improve the level of environmental awareness and training at IDL.		Employee and contractor training to address (i) the prevention of incidents with the potential for environmental consequences (ii) a site-wide awareness and commitment to achieving IDLs environmental				
	Target		**Plan**		**Creation Date**	**Target Date**	**Status Update**
9.1	Provide training to all employees on general environmental awareness.	**9.1.1**	Re-induct all employees and cover site rules and best practice.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2009	Ongoing.

Environmental Management Programme - Proposal

Environmental Objectives & Targets Proposal 2009

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	Objective		Objective Rationale				
1	To develop and improve site-wide environmental management in accordance with ISO 14001 and related IPC Licence.		The environmental management system provides a structured framework for co-ordinating site-wide environmental affairs and sustaining IDLs policy of continual improvement.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
1.1	IDL has established a baseline for river water quality and will continue to ensure that it has no adverse effect on same.	1.1.1	To repeat the biological survey of river water quality for Dungourney and Millstream	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	
1.2	IDL intends to establish a baseline for flora and fauna levels at the sites so as to preserve the ecological habitats that exist.	1.1.2	To perform a baseline flora and fauna survey.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	
	Objective		**Objective Rationale**				
2	To reduce emissions to sewer from IDL.		The IPPC licence (No. P0442-01) contains a number of specific conditions regarding the monitoring, control and reduction of emissions to sewer and waters. The emissions have been calculated as significant.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
2.1	To replace the existing pumps within the main on-site pumping station.	2.1.1	Upgrade existing pumps within the main on-site pumping station (this project will be implemented as part of the overall plant upgrade works).	Environmental & Energy Manager	01 Jan 2006	31 Dec 2012	
	Objective		**Objective Rationale**				
3	To reduce emissions to atmosphere from the IDL Site.		The evaluation of environmental impacts has identified emissions to atmosphere as significant.				
	Target			**Responsible**	**Creation Date**	**Target Date**	**Status Update**
3.2	To continue to investigate possible methods of CO_2 recovery.	3.2.1	IDL intend to continue to investigate methods of recovering process CO_2 emissions.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	

	Objective		Objective Rationale				
4	To reduce emissions to ground and water, including groundwater, from IDL		The Register of Aspects & Impacts has identified the impacts associated with emissions to ground as significant. In addition, the IPPC licence contains a number of specific conditions regarding monitoring, control and other measures to protectground and groundwater.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
4.3	Review containment measures for spillage of waste water at the effluent outfall.	**4.2.1**	IDL intend to check the adequacy of containment measures for spillage of waste water at the effluent outfall.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	
4.6	To ensure the integrity of unbunded vessels.	**4.6.1**	Conduct integrity tests on specific bulk tanks every two years using external contractor.	Environmental & Energy Manager	27 Feb 2008	31 Dec 2009	
4.7	To ensure the integrity of the foul sewer.	**4.7.1**	Carry out the 3-year test and inspection.	Environmental & Energy Manager	19 Feb 2009	31 Dec 2009	
4.8	To ensure the integrity of the organic drainage system.	**4.8.1**	Carry out the 3-year test and inspection.	Environmental & Energy Manager	19 Feb 2009	31 Dec 2009	
4.9	To ensure the integrity of the bund system.	**4.9.1**	Carry out the 3-year test and inspection.	Environmental & Energy Manager	19 Feb 2009	31 Dec 2009	
	Objective		**Objective Rationale**				
6	To control and minimise waste generated at IDL Midleton so as to prevent pollution.		The control of waste (storage, segregation, disposal, etc) and reduction of waste at source is an integral part of IDLs business and is part of IDLs IPC Licence (No. 442).				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
6.1	Conduct waste contractor audits.	**6.1.1**	Continue waste contractor audit programme (Composting contractor, wood shaving contractor, grain rubble agents).	Environmental & Energy Manager	07 Feb 2006	31 Dec 2009	
	Objective		**Objective Rationale**				
	To prevent incidents with the potential for environmental consequences.		Projects designed to prevent incidents with the potential for environmental consequences will help to minimise emergency emissions to air, water and land.				
	Target			**Responsible**	**Creation Date**	**Target Date**	**Status Update**
7.7	Ensure that old fermenters are decommissioned in a proper manner.	**7.7.1**	Decommissioning plan to be documented for old fermenters as per IPPC licence requirements.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2012	

	Objective		Objective Rationale				
8	To improve the efficiency of resource and energy use.		IDL is committed to energy conservation and recognise that the environmental impacts associated with on-site energy and resource usage are significant.				
	Target		**Plan**	**Responsible**	**Creation Date**	**Target Date**	**Status Update**
8.3	Reuse cavern water as process water in the plant, thus saving on total volume of water usage.	**8.3.1**	IDL intend to divert the cavern water that has been used for process cooling to the Bowen Water Treatment Plant, thus making it available as process water.	Distillery Operations Manager	07 Feb 2006	31 Dec 2012	
8.4	To reduce energy consumption and GHG emissions.	**8.4.1**	To replace the quadruple effect evaporator with a mechanical vapour recompression unit.	General Manager	01 Jul 2007	31 Mar 2009	
		8.4.2	To investigate to potential for low temperature brewing.	General Manager	01 Oct 2008	31 Dec 2009	
	Objective		**Objective Rationale**				
9	To improve the level of environmental awareness and training at IDL.		Employee and contractor training to address (i) the prevention of incidents with the potential for environmental consequences (ii) a site-wide awareness and commitment to achieving IDLs environmental				
	Target		**Plan**		**Creation Date**	**Target Date**	**Status Update**
9.1	Provide training to all employees on general environmental awareness.	**9.1.1**	Re-induct all employees and cover site rules and best practice.	Environmental & Energy Manager	07 Feb 2006	31 Dec 2009	

4.0 RELATIONSHIP WITH IPPC LICENCE CONDITIONS AND REGISTER OF ENVIRONMENTAL ASPECTS AND IMPACTS

Schedule 6(i) of IDL's IPPC Licence (No. P0442-01) includes a list of specific items to be addressed in the Schedule of Objectives and Targets. Table 4.1 summarises the targets listed in the IPPC licence (No. P0442-01) and the plans IDL has to ensure that they are achieved.

TABLE 4.1

Reuse of timber pallets	6.6										
List I and List II substance reductions	1.2										
Reduction in noise emissions from the site	5.2										
Reduction in the volume and pollutant concentration of emissions to sewer	2.2										
Integrity testing of tanks	4.17										
Recovery of CO2 from fermenters	3.3										

Table 4.2 below summarises the targets and plans, which relate to the significant environmental impacts identified in the Register of Environmental Aspects and Impacts.

TABLE 4.2

Emissions to sewer	2.1 to 2.20 inclusive							
Emissions to water (including groundwater)	4.1 to 4.19 inclusive							
Water Usage	8.1	8.2	8.3	8.4	8.7			
Air Emissions	3.1	3.2						
Hazardous waste	6.1	6.2	6.3					
Emergencies	7.1 to 7.10 inclusive							

Pollution Emission Register – Proposal

PROPOSAL

FOR A

POLLUTION EMISSIONS REGISTER

AT

IRISH DISTILLERS LTD.

MIDLETON

Contents

1.0 INTRODUCTION

2.0 IDENTIFICATION OF SUBSTANCES

3.0 PROPOSED METHODOLOGY

4.0 CONCLUSIONS

Appendix 1 EPA Pollution Emissions Register List

1.0 INTRODUCTION

Irish Distillers Ltd's Integrated Pollution Control Licence (Register No. P-0442-01) requires the licensee to prepare a Pollution Emissions Register (PER) for the activity.

The list of substances to be considered for inclusion in the PER is specified in the EPA Annual Environmental Report (AER) Guidance Note (included as Appendix 1 of this report).

Irish Distillers Ltd. have compared the materials used at the site with the list of substances in Appendix 1 of this report and have proposed a list of materials for inclusion for a PER in Section 4.0 of this report for review by the EPA. The proposed methodology for quantification of material flows of the PER materials at Irish Distillers Ltd. is also described.

2.0 IDENTIFICATION OF SUBSTANCES

2.1 Master List of Materials

A master list of relevant process and ancillary materials to which the EPA PER List applies, has been compiled as follows:

Material	PER Classification
Carbon Dioxide (Fermentation)	Environmental Themes
Total Nitrogen	Environmental Themes
Total Phosphorous	Environmental Themes

Carbon Dioxide is produced at the fermentation stage of the production process during the conversion of fermentable sugars to ethanol and carbon dioxide as illustrated by the following reaction:

$$C_6H_{12}O_6 \rightarrow 2CO_2 + 2C_2H_5OH$$

The carbon dioxide is vented to atmosphere since, unlike breweries, there is no internal use for the material and to-date we have been unable to source a customer for the product. On a mass basis the ratio of carbon dioxide to ethanol production is 44:46. In terms of greenhouse gas emissions the process is carbon neutral since the carbon content of the fermentable sugars is derived from the absorption of atmospheric CO_2 during the growth of the cereals. The total CO_2 absorbed during the growth of the cereals is more than three times the combined fermentation and combustion CO_2 emissions.

Total Nitrogen results from the processing of cereals in the brewing process. All cereals contain nitrogen in the form of proteins. Once the ethanol is separated by distillation the spent 'wash' and 'stillage' are further processed in a quadruple effect evaporator to produce syrup which is combined with the spent grains to produce Distillers Dark Grains. The condensate from the evaporator constitutes approximately 70%, by volume, of the effluent treated in the on-site Waste Water Treatment Plant. The balance of the effluent arises from a variety of sources including CIP residues. All biological WWTPs require nutrients to sustain the biological activity. Traditionally, nitrogenous nutrients are added in the form of urea-type fertilizers. The sludge from the WWTP is separated, de-watered and landspread thereby replacing artificial fertilizer as part of an approved Nutrient Management Plan.

Total Phosphorous results from the processing of cereals in the brewing process. All cereals contain phosphorous. Once the ethanol is separated by distillation the spent 'wash' and 'stillage' are further processed in a quadruple effect evaporator to produce syrup which is combined with the spent grains to produce Distillers Dark Grains. The condensate from the evaporator constitutes approximately 70%, by volume, of the effluent treated in the on-site Waste Water Treatment Plant. The balance of the effluent arises from a variety of sources including CIP residues. All biological

WWTPs require nutrients to sustain the biological activity. Traditionally, phosphate nutrients are added in the form of tri-sodium phosphate or phosphoric acid. The sludge from the WWTP is separated, de-watered and landspread thereby replacing artificial fertilizer as part of an approved Nutrient Management Plan..

2.2 Materials requiring Full PER

It is not proposed to carry out a full PER on any of the substances listed in 2.1 due to the limited use and/or lack of persistence of these substances in the environment.

2.3 Materials subject to Discharge Reporting

Irish Distillers Ltd proposes that the following material be subjected to a PER Discharge Report:

Reference	Material
PER1	Carbon Dioxide (Fermentation)
PER2	Total Nitrogen
PER3	Total Phosphorous

3.0 PROPOSED METHODOLOGY

In each case, the PER will be based on a material balance equation. If the site is considered as a "box", then all material entering, leaving and accumulating must be accounted for. Manipulation of this data will result in a percentage of material that cannot be accounted for. It does not automatically follow that this is to be considered as an emission.

The proposed timeframe for individual mass balances is twelve months.

3.1 Carbon Dioxide (Fermentation)

The CO_2 generated during the fermentation process is determined by reference to the total ethanol production. CO_2 and ethanol are produced in equimolar quantities and the quantity of CO_2 relative to ethanol is the same as the ratio of their molecular weights i.e. 44 and 46, respectively. All CO_2 is vented to atmosphere.

3.2 Total Nitrogen

The bulk of the nitrogen content of the cereals used in the process is recovered in the Distillers Dark Grains. The nitrogen content of the cereals ranges from 1.28% (m/m) in the case of maize to 1.78% (m/m) in the case

of barley. The nitrogen in the waste water results from the processing of various cereals and is essentially absorbed by the biomass in the WWTP as a nutrient and subsequently shed as sludge or is discharged in the treated waste water. The sludge was then used for landspreading according to an approved Nutrient Management Plan. This is classed as offsite waste recovery. Since the beginning of 2005 all sludge produced in the WWTP has been disposed of by composting. Some residual sludge produced in 2004 and stored in the on-farm slurry pit was landspread in 2005.

Reference	Measurement
C	Total Nitrogen content of cereals
N	Total Nitrogen added as nutrient
G	Total Nitrogen content of Dark Grains
D	Total Nitrogen content of Waste Water Discharge
S	Total Nitrogen recovered in WWTP Sludge

The PER determination may be expressed by the formula:

C + N = G + D + S

3.4 Total Phosphorous

The bulk of the phosphorous content of the cereals used in the process is recovered in the Distillers Dark Grains. The phosphorous content of the cereals ranges from 0.27% (m/m)in the case of maize to 1.0% (m/m) in the case of malt. The phosphorous in the waste water results from the processing of various cereals and is essentially absorbed by the biomass in the WWTP as a nutrient and subsequently shed as sludge or is discharged in the treated waste water. The sludge is then used for landspreading according to an approved Nutrient Management Plan. This is classed as offsite waste recovery. Since the beginning of 2005 all sludge produced in the WWTP has been disposed of by composting. Some residual sludge produced in 2004 and stored in the on-farm slurry pit was landspread in 2005.

Reference	Measurement
C	Total Phosphorous content of cereals
N	Total Phosphorous added as nutrient
G	Total Phosphorous content of Dark Grains
D	Total Phosphorous content of Waste Water Discharge
S	Total Phosphorous recovered in WWTP Sludge

The PER determination may be expressed by the formula:

C + N = G + D + S

4.0 CONCLUSIONS

This report has reviewed the criteria set by the EPA for a PER and submits the following list of materials at Irish Distillers Ltd. for inclusion in a PER.

Reference	Material
PER1	Carbon Dioxide (Fermentation)
PER2	Total Nitrogen
PER3	Total Phosphorous

APPENDIX 1

EPA POLLUTION EMISSIONS REGISTER LIST (PERL)

PERL

1. Environmental Themes

CH_4
CO
CO_2
HFCs
N_2O
NH_3
Non-Methane VOCs
NO_X
PFCs
SF_6
SO_X
Total Nitrogen
Total Phosphorus

2. Heavy Metals

As and compounds
PM_{10}
Cd and compounds
Cr and compounds
Cu and compounds
Hg and compounds
Ni and compounds
Pb and compounds
Zn and compounds

3. Chlorinated Organic Substances

Dichloroethane-1,2 (DCE)
Dichloromethane (DCM)Chloroalkanes (C10-13)
Hexachlorobenzene (HCB)
Hexachlorobutadiene (HCBD)
Hexachlorocyclohexane (HCH)
Halogenated organic compounds
PCDD+PCDF (dioxins+furans)
Pentachlorophenol (PCP)
Tetrachloroethylene (PER)
Tetrachloromethane (TCM)
Trichlorobenzenes (TCB)
Trichloroethane-1,1,1 (TCE)
Trichloroethylene (TRI)
Trichloromethane

4. Other Organic Compounds

Benzene
Benzene, toluene, ethylbenzene, xylene
Brominated diphenylether
Organotin - compounds
Polycyclic Aromatic Hydrocarbons
Phenols
Total Organic Carbon

5. Other Compounds

Chlorides
Chlorine and inorganic compounds
Cyanides
Fluorides
Fluorine and inorganic compounds
HCN

4.0 Licence-Specific Reports

Tank and pipeline testing and inspection report

Noise Monitoring

Groundwater Monitoring (GW1 to GW5)

List I & II substance reductions

Bund Inspection Report

Pollution Emission Register – Report

Review of Environmental Liabilities Insurance Cover

All other required reports are contained in the previous sections.

Appendix I: Boundary Noise Report

Appendix II: Atmospheric Monitoring Report

Appendix III: Groundwater Monitoring Results

Tank and pipeline testing and inspection report

A weekly inspection of valves and flanges in sensitive areas is carried and a record of the inspection is maintained. There were no issues to report.

A list of critical vessels is maintained and these are subjected to an inspection every two years by an independent agency. The report was last conducted in 2007. The next inspection is scheduled for 2009.

The foul and organic drains were subjected to inspection/ testing programme during 2006. The remedial work indicated in the report was undertaken in 2007. The next scheduled inspection is due to take place in 2009.

Noise Monitoring

A boundary noise survey was conducted on 8th June 2008 by AWN Consulting. The results (Appendix I) show that the noise levels are in compliance with the License conditions with the exception of the nighttime levels at Noise Sensitive Location 1 (NSL1). A repeat survey will be conducted before the end of March 2008, weather permitting.

Groundwater Monitoring (GW1 to GW5)

Four boreholes, GW1 to GW4, are monitored annually for groundwater and the fifth, GW5, is monitored biannually for groundwater and landfill gas. The analytical results for GW1 to GW4 (Appendix III) show normal groundwater values. GW5 is located in the disused landfill and was sunk to bedrock level and for the past number of years the borehole has been dry indicating little or no infiltration. The landfill gas analysis occasionally shows trace levels of methane and carbon dioxide.

List I & II substance reductions

There are no List I or List II substances on site.

Bund Inspection Report

All bunds were inspected by an independent third party in 2006 as required by the Licence. The next scheduled inspection will take place in 2009.

Pollution emission register – report

Carbon Dioxide emitted from the fermentation process was 23481897 kg.

Total Nitrogen content of the cereals used was 1143750 kg. Nutrient addition to the WWTP was 0 kg. The total quantity of WWTP sludge generated during the year was 990390 kg. The average adjusted nitrogen content of the sludge was 0.735% ppm indicating that the nitrogen recovered in the sludge was 7280 kg. The total nitrogen discharged in the waste water was 880 kg. The balance of the nitrogen i.e. 1135590 kg was recovered in Distillers Dark Grains.

Total Phosphorous content of the cereals used was 319620 kg. Nutrient addition to the WWTP was 0 kg. The total quantity of WWTP sludge generated during the year was 990390 kg. The average adjusted phosphorous content of the sludge was 999.5 ppm indicating that the phosphorous recovered in the sludge was 990 kg. The total phosphorous discharged in the waste water was 750 kg. The balance of the phosphorous i.e. 317880 kg was recovered in Distillers Dark Grains.

Pollution Emissions Register				If PER does not apply to your license, please tick here										
				Outputs										
Pollutant Name	CAS No.	Input	Gross Usage	Emissions to air	MOM	Emissions to waters	MOM	Waste	MOM	Product	MOM	Recovery	Treated	Unaccounted
Carbon Dioxide		23,481,897	23,481,897	23,481,897	C									
Total Nitrogen		1,143,750	1,143,750	0		880	M	0		1,135,590	C	7,280	0	0
Total Phosphorous		319,620	319,620	0		750	M	0		317,880	C	990	0	0

Review of Environmental Liabilities Insurance Cover

Irish Distillers Ltd. and its parent company Irish Distillers Group Ltd are subsidiaries of the French multinational drinks company Group Pernod Ricard. Irish Distillers Group and Subsidiary Companies carry a Public Liability Policy which is placed with a panel of insurers, AXA Insurance Company being the leading office.

They also have a policy enforce for pollution through AIG with a limit of indemnity of €35,000,000 including the following sub limits:

Accidental Contamination - €30,000,000 – AIG and Nassau.
Criminal Contamination - €35,000,000.

Pollution cover applies if it is caused by a sudden, identifiable, unattended and unexpected incident which takes place in its entirety at a specific time and place during the period of insurance.

Pollution or contamination is defined in the policy to mean:

1. All pollution or contamination of buildings or other structures or of water or land or the atmosphere and;
2. All loss or damage or injury directly or indirectly caused by such pollution or contamination.

This level of cover is in excess of the potential liabilities outlined in the Environmental Liabilities Risk Assessment report submitted to and approved by the Environmental Protection Agency.

Appendix I: Boundary Noise Report

awnconsulting

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Co. Cork, Ireland

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IRISH DISTILLERS
IPPC NOISE EMISSION SURVEY
MIDLETON
CO CORK

Technical Report Prepared For

Irish Distillers
Midleton Distilleries
Midleton
Co. Cork

Technical Report Prepared By

Brian S. Johnson BSci (Eng), MIOA

Our Reference

BJ/08/4329NR01a

Date Of Issue

30 June 2008

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T Donnelly, E Porter
Associate Director: D Kelly

EXECUTIVE SUMMARY

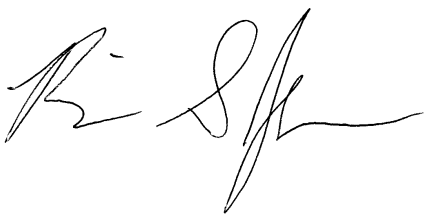
The Environmental Protection Agency (EPA) have recommended that noise monitoring be carried out at a number of locations in the vicinity of the Irish Distillers facility in Midleton, Co. Cork to demonstrate compliance with the appropriate guidance.

Environmental noise surveys have been carried out at selected locations in and around the Midleton site during both daytime and night time periods. The surveys were conducted in accordance with the *Environmental Survey Guidance Document 2003* as issued by the EPA.

The nearest noise sensitive locations in relation to the site are located immediately adjacent to the northern boundary of the property and 150m to the east.

The results of the survey indicate that noise emissions associated with the facility in question are within the EPA licensing noise criteria at all off site noise sensitive locations during daytime periods. Night time noise emissions were in excess of the criteria at the north boundary noise sensitive locations but were compliant at all other locations.

Report Prepared By:



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1.0 INTRODUCTION

AWN Consulting Limited have been commissioned by Irish Distillers to conduct a noise monitoring survey at their facility in Midleton, Co. Cork.

This noise monitoring is being conducted in order to comply with the recommendations of the Environmental Protection Agency (EPA). The operational hours for the facility are continuous and 24 hours in nature.

Appropriate guidance may be taken from the current EPA license as follows.

> *Activities on site shall not give rise to noise levels off site at noise sensitive locations which exceed the following sound pressure limits (Leq, 15min):*
>
> *Daytime: 55dB(A)*
> *Night-time: 45dB(A)*
>
> *There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.*

The following criteria would therefore apply at the façades of those residential properties closest to the development:

Daytime (08:00 hrs to 22:00 hrs)	55dB $L_{Aeq,30min}$
Night-time (22:00 hrs to 08:00 hrs)	45dB $L_{Aeq,30min}$

2.0 SURVEY DETAILS

An environmental noise survey was conducted in order to quantify the existing noise environment. The survey was conducted generally in accordance with the *Environmental Survey Guidance Document 2003*. Specific details are set out below.

2.1 Choice of Measurement Locations

Measurements were conducted at four locations along the Irish Distillers facility property boundary.

Location NSL1 This measurement position is located along the northern boundary adjacent to the nearest residence.

Location N1 This measurement position is located along the western boundary approximately 150m away from Midleton college.

Location N2 This measurement position is located along the southern boundary and is adjacent to a green fields site.

Location N3 This measurement position is also located along the southern boundary and is also adjacent to a green fields site.

The nearest noise sensitive locations to the facility are a number of detached houses along the northern boundary adjacent to NSL1.

Midleton College locates approximately 150m to the east of N1; we will refer to the nearest college building as Noise Sensitive Location 2 (NSL2). Noise measurements conducted at N1 were used to project levels at NSL2 .

All survey measurement and nearest noise sensitive locations are detailed in Figure 1 to the rear of this document.

2.2 Survey Period

Measurements were conducted over the course of both day and night time survey periods as follows:

- Daytime: 2:05hrs to 16:05hrs on 15 May 2008;
- Night time : 22:15hrs to 00:40hrs on 28/29 May 2008.

The weather throughout the daytime survey period was warm and clear with a mild breeze of approximately 1 – 2 m/s.

The weather throughout the night time survey period was also warm and clear with no significant wind present.

2.3 Personnel & Instrumentation

Brian S. Johnson (AWN) conducted the noise level measurements during both survey periods.

The measurements were performed using a Brüel & Kjær Type 2260 Type 1 Sound Level Meter which satisfies BS EN 60651:1994. Before and after the survey, the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

2.4 Procedure

Measurements were conducted at Locations 1 to 4 on a cyclical basis during both survey periods. Sample periods for the noise measurements were nominally 15 minutes. The results were noted onto a Survey Record Sheet immediately following each sample, and were also saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up.

2.5 Measurement Parameters

The survey results are presented in terms of the following five parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

2.6 Results

2.6.1 Location NSL1

The results of measurements conducted at Location NSL1 are summarised in Table 1.

Time	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)					Dominant Noise Sources
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
12:10 – 12:25	Day	55	69	48	58	50	Plant noise. Frequent dog barking from NSL1.
13:30 – 13:45		53	61	48	57	50	Plant noise.
14:50 – 15:05		53	66	48	55	50	Plant noise.
22:15 – 22:30	Night	50	61	49	51	49	Plant noise.
23:30 – 23:45		58	62	47	60	49	Plant noise.

Table 1 Summary of results for Location NSL1

Daytime noise measurements at this location were dominated by plant noise. There were also contributions from birdsong, roosters crowing at a nearby residence and occasional car park event contributions. A dog at NSL1 barked frequently during the first survey period. Noise levels were in the range of 53 to 55dB L_{Aeq} and of the order of 50dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

Night time noise measurements were controlled almost exclusively by plant noise with occasional contributions from the dog at NSL1. During the second survey period, a CIP process (cleaning in place) of the fermenter vessels occurred which significantly increased the measured noise levels (we understand this process to be an occasional noise source only). Noise levels were in the range of 50 to 58dB L_{Aeq} and of the order of 49dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

2.6.2 Location N1

The results of measurements conducted at Location N1 are summarised in Table 2.

Time	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)					Dominant Noise Sources
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
12:30 – 12:45	Day	56	63	54	56	55	Plant noise.
13:50 – 14:05		56	78	52	55	53	Plant noise.
15:10 – 15:25		54	63	52	55	53	Plant noise.
22:35 – 22:50	Night	53	55	51	53	52	Plant noise.
23:45 – 00:00		53	64	52	54	53	Plant noise.

Table 2 Summary of results for Location N1

Daytime noise measurements at this location were dominated by plant noise. There were also contributions from birdsong and occasional activity noise from the adjacent school playground. A forklift drive by event occurred during the second survey period. Noise levels were in the range of 54 to 56dB L_{Aeq} and 53 to 55dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

Night time noise measurements were exclusively dominated by plant noise. One car drive by event occurred during the second survey period. Noise levels were in the range of 53 to 54dB L_{Aeq} and 52 to 53dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

2.6.3 Location N2

The results of measurements conducted at Location N2 are summarised in Table 3.

Time	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)					Dominant Noise Sources
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
12:50 – 13:05	Day	53	62	51	54	52	Plant noise. Birdsong.
14:10 – 14:25		51	61	48	52	49	Plant noise. Birdsong.
15:30 – 15:45		51	63	48	52	49	Plant noise. Birdsong.
22:50 – 23:05	Night	50	55	49	50	49	Plant noise.
00:05 – 00:20		50	61	45	49	48	Plant noise.

Table 3 Summary of results for Location N2

Daytime noise measurements at this location were dominated by plant noise with some contributions from birdsong in the nearby trees. Noise levels were in the range of 51 to 53dB L_{Aeq} and 49 to 52dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

Night time noise measurements were exclusively dominated both by noise from the main plant facility and the nearby pumping station. Noise levels were of the order of 50dB L_{Aeq} and in the range of 48 to 49dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

2.6.4 Location N3

The results of measurements conducted at Location N4 are summarised in Table 4.

Time	Period	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)					Dominant Noise Sources
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
13:10 – 13:25	Day	50	58	46	51	48	Plant noise. Birdsong.
14:30 – 14:45		49	62	46	50	48	Plant noise. Birdsong.
15:50 – 16:05		50	64	45	51	47	Plant noise. Birdsong.
23:10 – 23:25	Night	48	53	46	49	47	Plant noise.
00:25 – 00:40		48	55	46	48	47	Plant noise.

Table 4 Summary of results for Location N3

Daytime noise measurements at this location were exclusively dominated by plant noise with some contributions from birdsong in the nearby trees. Distant traffic noise was also faintly audible. Noise levels were of in the range of 49 to 50dB L_{Aeq} and 47 to 48dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

Night time noise measurements were exclusively dominated both by main facility plant noise. Noise levels were of the order of 48dB L_{Aeq} and 47dB L_{A90}. No audible tonal or impulsive characteristics were noted in plant noise emissions at this location.

3.0 DISCUSSION & CONCLUSIONS

Table 5 below outlines L_{Aeq} and L_{A90} level ranges monitored at all locations.

Reference	Period	L_{Aeq} (dB)	L_{A90} (dB)
NSL1	Day	53 - 55	50
N1		54 - 56	53 - 55
N2		51 - 53	49 - 52
N3		49 - 50	47 - 48
NSL1	Night	50 - 58	49
N1		53 - 54	52 - 53
N2		50	48 - 49
N3		48	47

Table 5 Review of Measured L_{Aeq} and L_{A90} Levels

These noise levels are discussed in relation to the EPA daytime and night time noise criteria at the nearest noise sensitive locations in the following sections.

3.1 Daytime Noise Levels

Measured noise levels during the daytime period were all consistent with the daytime EPA noise sensitive location criterion of 55dB L_{Aeq} at the property boundary. Given that measurements conducted at location NSL1 were measured at the property line, predicted noise levels at the façade of NSL1 would therefore be of the same order (i.e. 53 – 55dB L_{Aeq}).

Measurements conducted at location N1 were measured at a distance of approximately 20m from the western side of the main plant facility. Assuming that the measured noise levels were entirely due to plant operation noise and taking into account the likely attenuation due to distance, the estimated plant emission noise

level at NSL2 (150m to the west) would be of the order of 36 – 38dB L_{Aeq}. These levels would be within the daytime EPA criterion of 55dB $L_{Aeq.}$

No audible tonal or impulsive characteristics were noted in plant noise emissions at any of the measurement locations.

In summary, all measured daytime noise levels were in accordance with the daytime EPA criterion. Plant daytime noise emission would therefore be compliant with EPA licensing requirements.

3.2 Night Time Noise Levels

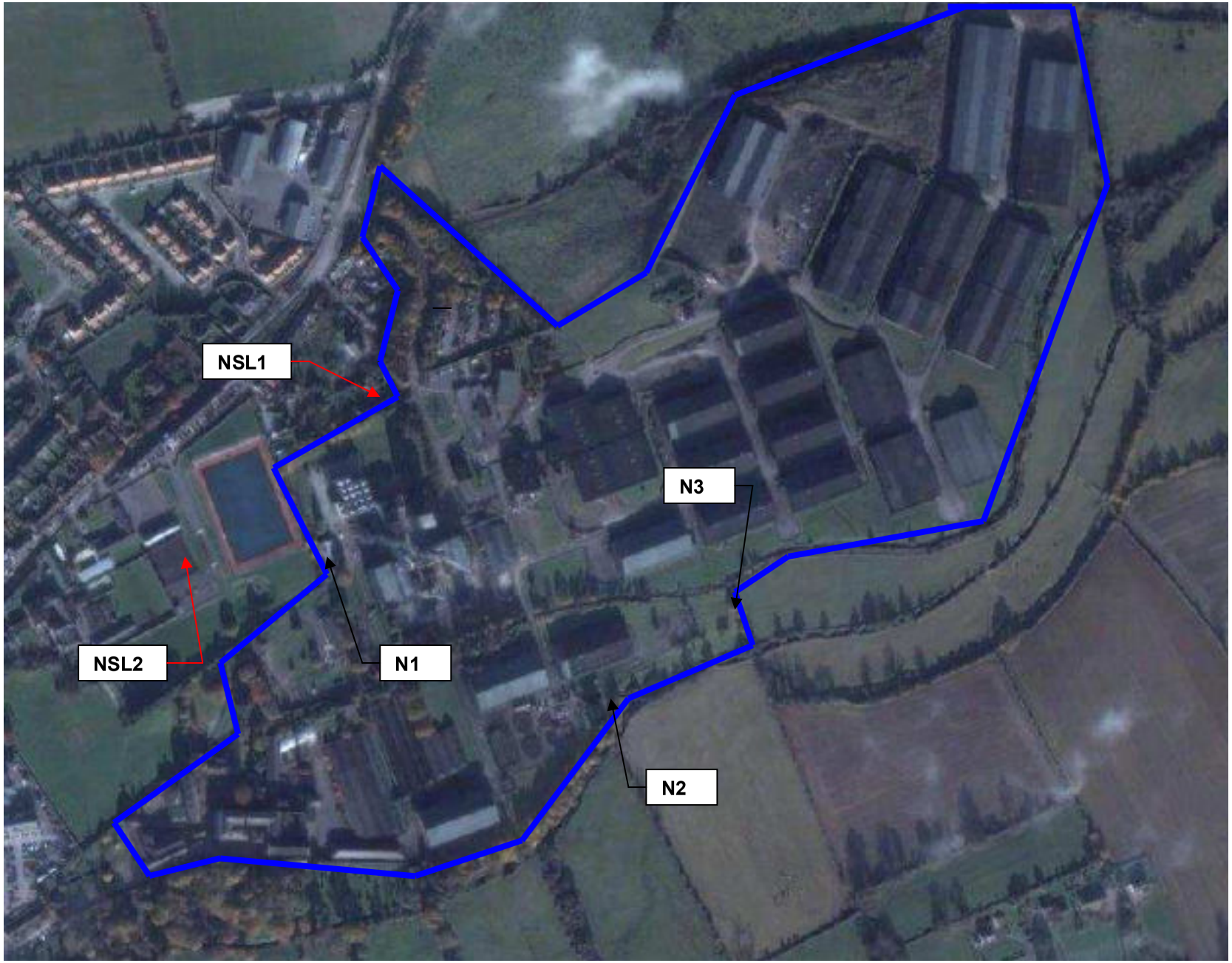
Measured night time noise levels at the property boundary with NSL1 were of the order of 50 – 58dB L_{Aeq} and would therefore be of the same order at the NSL1 dwelling façade. These levels would be some 5dB in excess of the night time EPA noise criterion of 45dB L_{Aeq} during normal plant operation and 13dB in excess of the criterion during CIP fermenter vessel events.

Measurements conducted at location N1 were projected to NSL2 in similar fashion to the daytime calculations. The results of this calculation indicated that the plant emission noise level at NSL2 would be of the order of 35 – 36dB L_{Aeq}. These levels would be within the night time EPA criterion of 45dB $L_{Aeq.}$

No audible tonal or impulsive characteristics were noted in plant noise emissions at any of the measurement locations.

In summary, night time noise levels were generally in accordance with the night time EPA criterion except at NSL1.

Figure 1: Measurement Location & Noise Sensitive Location Map



APPENDIX A

1/3 Octave Band Centre Frequency Data

Location	Period	1/3 Octave Band Frequency Data																								dB(A)
		50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	
NSL1	Day 1	60	57	54	53	49	48	49	43	42	43	44	47	48	46	46	44	43	42	40	38	34	31	27	23	19	55
	Day 2	59	55	52	52	49	49	48	43	44	43	43	43	43	42	42	42	42	41	40	38	34	30	26	23	19	53
	Day 3	59	56	52	51	49	48	49	43	41	41	41	44	45	43	44	44	41	41	39	36	34	30	27	24	21	53
	Night 1	58	55	51	51	49	47	45	42	41	40	40	42	42	41	40	39	38	38	36	34	30	26	22	17	12	50
	Night 2	59	55	50	51	48	46	48	45	47	47	46	47	47	47	47	48	49	48	46	43	40	36	31	25	18	58
N1	Day 1	61	59	55	56	53	54	58	49	48	47	45	45	45	45	45	44	44	42	43	39	36	30	26	21	17	56
	Day 2	63	59	55	56	53	53	57	49	49	49	47	46	44	45	44	44	44	43	43	39	36	32	28	23	20	56
	Day 3	62	59	54	55	52	53	56	48	49	46	44	44	44	44	43	43	41	41	40	36	33	28	25	20	17	54
	Night 1	60	59	53	54	52	52	56	45	46	44	42	44	43	43	41	41	39	39	37	34	31	25	20	14	11	53
	Night 2	61	60	54	54	53	51	55	45	46	45	44	44	44	44	43	42	41	40	39	35	32	27	22	17	14	53
N2	Day 1	56	62	52	52	51	49	60	48	48	44	41	40	41	41	39	40	37	36	35	33	31	28	25	22	19	53
	Day 2	57	62	51	51	54	52	56	45	44	43	41	41	40	40	38	37	36	33	33	31	28	25	22	19	16	51
	Day 3	56	63	54	52	53	49	54	45	44	44	42	42	40	39	38	37	35	34	32	31	29	27	24	20	17	51
	Night 1	57	61	49	49	54	51	53	44	42	42	38	38	39	39	38	39	35	34	33	30	27	23	21	16	12	50
	Night 2	57	61	51	50	55	50	50	46	44	45	41	39	38	38	37	36	34	33	31	28	26	22	19	14	11	50
N3	Day 1	58	57	52	51	48	44	47	39	40	42	41	42	41	40	39	37	34	33	34	35	35	33	30	17	15	50
	Day 2	58	57	53	51	49	45	45	39	40	42	42	42	41	41	39	36	35	33	33	33	31	29	30	18	14	49
	Day 3	56	56	52	51	48	43	44	38	39	41	41	41	40	40	38	36	36	36	36	38	38	34	31	17	14	50
	Night 1	56	55	51	49	47	42	41	39	39	42	41	41	41	39	37	36	34	31	28	23	20	14	10	9	12	48
	Night 2	57	55	50	49	46	41	40	39	41	44	41	41	40	39	37	34	31	28	25	21	18	15	14	13	12	48

Table A1 Summary of 1/3 Octave Frequency Data.

Note A Data detailed in the table above has been reviewed in order to identify any tonal components from site noise emissions in line with EPA requirement.

Appendix II: Atmospheric Monitoring Report

Atmospheric Emissions Monitoring
at
Irish Distillers Ltd., Midleton, Co. Cork

Final Report Dated: 7th January 2009

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DETAILED EMISSION MONITORING RESULTS

APPENDIX II

SAMPLING AND ANALYTICAL METHODS

APPENDIX III

INSTRUMENTATION AND CALIBRATION DETAILS

1. Introduction

Moloney & Associates were commissioned by Irish Distillers Limited (IDL) to undertake an atmospheric emission monitoring programme at the company's Midleton distillery.

Atmospheric emissions from the plant's boilers and the Feeds Recovery Building were measured in accordance with the terms and conditions of the company's IPPC licence (Reg. No. 442-01).

Sampling at the emission points was conducted on the 17th of November 2008 when the facility was operating normally. A preliminary report was issued on the 2nd of December 2008 and this final report describes the methodology of the emission monitoring programme and presents the full set of results.

2. Atmospheric Emission Monitoring

The emissions to atmosphere from four emission points (A1- 1, A1- 2, A1- 3, and A2-1) were determined in accordance with the licence requirements.

Table 1: Irish Distillers Limited Licensed Atmospheric Emission Points.

Emission Point	*Source of Emission*
A1- 1	Natural gas boiler
A1- 2	Natural gas boiler
A1- 3	Natural gas boiler
A2 - 1	Feeds Recovery

A summary of the sampling and analytical methodology is presented in Appendix II.

Boiler emissions were tested for: carbon monoxide, nitrogen oxides and oxygen using a Eurotron GL 8000, flue gas analyser.

The concentrations are reported in mg/Nm^3 and calculated on a dry gas basis and corrected to 3% oxygen as specified in the IPPC Licence.

Total particulates were sampled isokinetically at the Feeds Recovery Stack (A2-1) using a TCR Tecora Izostack sampler. The methodology used was based on B.S. 3405 and the concentration of particulates was determined gravimetrically by conditioning and weighing a series of collecting filters before and after sampling. The filters and entrained particulates were oven-dried at 160^oC and after conditioning the collected particulate was determined to exceed 20% of the filter weight following sampling.

The particulate concentrations are reported in mg/Nm^3 and calculated with no correction for water vapour or oxygen as specified in the IPPC Licence. The particulate mass emissions are reported in kg/h.

3. Atmospheric Emission Monitoring Results

All analytical results have been converted to standard reference conditions as specified under Condition 3 of the IPC licence. The detailed analytical results are presented in Appendix I of this report.

A summary of the emission monitoring results is presented in a series of tables below:

Table 2: Summary of Feeds Recovery (A2-1) Emission Results.

	Date/Time	**Concentration**	**Licence Limit**	**Gas Flow Rate**	**Licence Limit**
Sample Number	**17.11.2008**	**mg/Nm^3**	**mg/Nm^3**	**Nm^3/h**	**Nm^3/h**
1	11.18 - 11.48	22	50	17125	36600
2	11.52 - 12.22	12	50	21329	36600
3	12.25 – 12-55	21	50	20495	36600

Table 3: Summary of Boiler Emission Results (arithmetic mean results).

Source	Date/Time	Oxygen	Carbon Monoxide	NO_x as NO_2
	17.11.2008	**%**	**Concentration mg/Nm^3 Corrected to 3% Oxygen**	
A1-1	12.02 – 12.32	4.6	< 1	144
A1-2	13.17 – 13.27	6.8	< 1	194
A1-3	12.36 – 13.15	2.9	101	169

A full set of analytical results is presented in Appendix I of this report.

A1-1 and A1-3 were on full fire A1-2 was cycling in and out on demand during the monitoring programme.

4. Conclusion

The particulate monitoring results for the Feeds Recovery emission point (A2-1) are within the licence limit (50 mg/Nm^3).

The nitrogen oxide emission concentrations for the boiler-house emission points are typical of the results of previous monitoring tests which demonstrated that the mass emissions were well within the licence limit (28 kg/h, for the total of the three boiler emission points).

APPENDIX I

Tables A - F:
Detailed Emission Monitoring Results.

Table A: Stack Sampling Results - Particulates			
Company:	Irish Distillers		
Address:	Midleton, Co. Cork		
Plant:	Feeds Recovery	Stack:	A2-1
Date:	17.11.2008	Time:	11.18 - 11.48
Test No.:	1	Activity	Normal
1. Test Conditions			
1.1 Stack Diameter		m	0.8
1.2 Stack Cross Sectional Area		m^2	0.503
1.3 Gas Velocity (average)		m/s	12.0
1.4 Gas Volume		Nm^3/hr	17125
1.5 Gas Temperature		^oC	74
1.6 Duration of Test		mins.	30
2. Results			
2.1 Emission Rate		kg/hr	0.38
2.2 Concentration (Wet)		mg/Nm^3	22.4

Table B: Stack Sampling Results - Particulates			
Company:	Irish Distillers		
Address:	Midleton, Co. Cork		
Plant:	Feeds Recovery	Stack:	A2-1
Date:	17.11.2008	Time:	11.52 - 12.22
Test No.:	2	Activity	Normal
1. Test Conditions			
1.1 Stack Diameter		m	0.8
1.2 Stack Cross Sectional Area		m^2	0.503
1.3 Gas Velocity (average)		m/s	15.0
1.4 Gas Volume		Nm^3/hr	21329
1.5 Gas Temperature		^oC	74
1.6 Duration of Test		mins.	30
2. Results			
2.1 Emission Rate		kg/hr	0.26
2.2 Concentration (Wet)		mg/Nm^3	12.3

Table C: Stack Sampling Results - Particulates			
Company:	Irish Distillers		
Address:	Midleton, Co. Cork		
Plant:	Feeds Recovery	Stack:	A2-1
Date:	17.11.2008	Time:	13.31 – 14.00
Test No.:	3	Activity	Normal
1. Test Conditions			
1.1 Stack Diameter		m	0.8
1.2 Stack Cross Sectional Area		m^2	0.503
1.3 Gas Velocity (average)		m/s	14.4
1.4 Gas Volume		Nm^3/hr	20495
1.5 Gas Temperature		^oC	75
1.6 Duration of Test		mins.	29
2. Results			
2.1 Emission Rate		kg/hr	0.43
2.2 Concentration (Wet)		mg/Nm^3	21

Table D: Boiler emission results – Emission point A1-1.

Time	% O_2	CO mg/Nm^3	NO_x as NO_2 mg/Nm^3
12:02	4.9	0	127
12:03	4.7	0	125
12:04	4.5	0	131
12:05	4.6	0	135
12:06	4.6	0	133
12:07	4.7	0	135
12:08	4.5	0	127
12:09	4.7	0	129
12:10	4.6	0	129
12:11	4.5	0	127
12:12	4.6	0	127
12:13	4.6	0	127
12:14	4.5	0	129
12:15	4.5	0	131
12:16	4.4	0	129
12:17	4.4	0	131
12:18	4.5	0	133
12:19	4.8	0	129
12:20	4.5	0	131
12:21	4.5	0	131
12:22	4.5	0	131
12:23	4.6	0	131
12:24	4.5	0	131
12:25	4.5	0	133
12:26	4.6	0	133
12:27	4.6	0	133
12:28	4.6	0	133
12:29	4.6	0	133
12:30	4.5	0	133
12:31	4.7	0	133
12:32	4.5	0	135
Average	**4.6**	**0**	**131**

Table E: Boiler emission results – Emission point A1-3.

Time	% O_2	CO mg/Nm^3	NO_x as NO_2 mg/Nm^3
12:36	2.8	195	166
12:37	2.9	114	168
12:38	2.9	96	168
12:39	2.9	112	170
12:40	3.0	87	168
12:41	2.9	97	170
12:42	2.9	109	170
12:43	2.9	102	174
12:44	2.8	181	170
12:45	2.8	127	170
12:46	2.8	141	172
12:47	2.8	166	170
12:48	2.8	126	172
12:49	3.0	214	170
12:50	3.0	126	170
12:51	2.9	122	170
12:52	2.8	129	170
12:53	2.9	105	168
12:54	2.9	116	168
12:55	2.8	161	168
12:56	2.8	117	168
12:57	3.1	76	179
12:58	2.8	124	170
12:59	3.0	30	179
13:00	2.8	141	168
13:01	2.8	81	168
13:02	2.7	144	170
13:03	2.8	174	168
13:04	3.3	100	168
13:05	2.7	169	168
13:06	2.8	114	168
13:07	2.8	157	168
13:08	2.8	129	168
13:09	2.9	72	168
13:10	2.9	149	168
13:11	2.8	137	168
13:12	2.9	117	168
13:13	2.8	132	168
13:14	2.8	150	168
13:15	3.1	109	168
Average	**2.9**	**126**	**170**

Table F: Boiler emission results – Emission point A1-2.

Time	% O_2	CO mg/Nm^3	NO_x as NO_2 mg/Nm^3
13:17	6.8	0	144
13:18	6.5	0	144
13:19	6.5	0	144
13:20	6.6	0	144
13:21	6.5	0	144
13:22	6.4	0	144
13:23	6.4	0	144
13:24	6.5	0	144
13:25	6.5	0	144
13:26	6.6	0	144
13:27	9.2	0	125
Average	**6.8**	**0**	**142**

APPENDIX II

Summary of Sampling and Analytical Methods

Summary of Sampling and Analytical Methods

Nitrogen oxides, carbon monoxide, oxygen and temperature were measured in the flue gas from the boilers using a flue gas analyser. The concentrations are reported in mg/Nm^3.

Particulate monitoring at the Feeds Recovery stack was undertaken using an isokinetic sampling method based on methodologies B.S. 3405.

The concentrations of particulate emissions from the Feeds Recovery stack have been calculated to standard reference conditions as follows.

Temperature : 273 K.
Pressure : 101.3 KPa.
Wet Gas
no correction for oxygen

The concentrations of the gaseous emissions from the boilers have been calculated to standard reference conditions as follows.

Temperature: 273 K.
Pressure: 101.3 KPa.
Dry Gas
corrected to 3% oxygen

APPENDIX III

Instrumentation and Calibration Details

INSTRUMENTATION AND CALIBRATION DETAILS

Unit	Serial Number	Date of Calibration	Calibration Certificate Number
Eurotron GL-8000 Flue gas analyser	96810/96811	19-11-2007	9716
AGB Digital Thermometer	0295/139	25-07-2007	TO7255
TCR Tecora Izostack sampler SKC DryCal Electronic Calibrator	108283	14-11-2007	80810

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STACK EMISSION TESTING AT IRISH DISTILLERS LTD. MIDLETON, CO. CORK.

PERFORMED BY ODOUR MONITORING IRELAND ON BEHALF OF IRISH DISTILLERS LTD.

Prepared by:	Dr. Brian Sheridan
Attention:	Mr. John Colbert
Date:	12th Sept 2008
Report Number:	2008.A231 (2)
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Licence No.	PO442-01
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Document Amendment Record

Client: Irish Distillers Ltd.

TITLE: Stack Emission Testing at Irish Distillers Ltd, Midleton, Co. Cork.

Project Number: 2008.A231(1)			**Document reference:** Stack Emission Testing at Irish Distillers Ltd. Midleton, Co. Cork.		
2008.A231(1)	Document for review	B.A.S	JWC	B.A.S	28/08/2008
Revision	**Purpose/Description**	**Originated**	**Checked**	**Authorised**	**Date**

1. Introduction

Odour Monitoring Ireland was commissioned by Irish Distillers Ltd to perform stack emission testing from the exhaust stack (A2-1) from the cyclones treating emissions from the driers.

The parameters monitored are identified in *Table 1.1*.

Table 1.1. Monitored parameters and techniques for Irish Distillers Ltd. Midleton, Co. Cork.

Sample location	**Parameter**	**Analytical method**
Stack locations A2-1	Volumetric Flow Rate	Pilot tube method
Stack locations A2-1	Temperature ^{0}C	PT100 type thermocouple
Stack locations A2-1	Total Particulate Matter	Isokinetic sampling train

This report presents details of this monitoring programme. The environmental monitoring was carried out by Dr. John Casey and Dr. Brian Sheridan, Odour Monitoring Ireland at Irish Distillers Ltd. Midleton, Co. Cork on the 19th Aug 2008. Methodology, Results, Discussion and Conclusions are presented herein.

2. Materials and Methods

This section provides brief details of the methodologies employed to perform emission testing of each stack source.

The following standards were used for reference and adhered to where possible:

- ISO10780:1994- Stationary source emissions-Measurement of velocity and volume flowrate of gas streams in ducts.
- BS EN13284-1:2002- Stationary source emissions, Determination of low range mass concentration of dust.

2.1 Volumetric flow rate measurement

An initial assessment of the airflow rate sampling ports was performed to ensure that approximately 5 duct diameters were achieved between the nearest obstructions in the system.

An initial airflow rate measurement survey was performed in accordance with ISO10780:1994-Stationary source emissions-Measurement of velocity and volume flowrate of gas streams in ducts. The following equipment was used through the airflow rate assessment. These included:

- Testo 400 and 350/454 MXL handheld and differential pressure sensors,
- S type pitot probe,
- PT100 temperature probe,

The following control procedure was used through the measurement sequence:

1. Measurement was performed at two diameters at right angles to each other,
2. The internal diameter of the ductwork was measured and verified to be 800 mm inner diameter,
3. Approximately 5 duct diameters were available between the measurement point and the outlet of the stack,
4. The temperature profile across the stack was verified and did not differ by more than 5% from the average absolute temperature of the duct cross section,
5. Samples points excluding the duct centre point were used to determine the average flow at specified locations across the duct diameter during the initial duct survey. No sample point was located within 20 mm of the duct wall.
6. The difference in the average airflow velocity across each diameter did not exceed 5% of the mean for all the diameters (2 in total).
7. The number of sample points across the 2 diameters was determined in accordance with Table 7.1.4 of ISO10780:1994. The sample locations were marked upon the S type pitot using a water resistant marker.
8. The S type pitot was checked for any burrs and obstructions in the pitot orifices,
9. The absence of swirling flow was determined in accordance with Section 7.2 and Annex C-ISO10780:1994.
10. The measurement sequence was performed in accordance with the procedure described in Section 7.2-ISO10780:1994.

The airflow rate measurement was used to ascertain the volumetric airflow rate from the Feeds Recovery Plant and as a preliminary survey for sample nozzle diameter sizing. In addition, the automatic total particulates sampling probe was automated and included continuous airflow rate measurement and adjustment. The overall % deviation from the standard was also presented through he onboard computer following completion of the measurement sequence.

2.2 Particulate sampling and analysis

Samples of the gas stream were extracted through a probe and filter holder arrangement containing a pre-conditioned and pre-weighed quartz fibre filter using a TCR automated iso-kinetic sampling train. Sampling was performed in accordance with BS EN13284-1:2002, where possible. Emissions were measured over a minimum of 30 to 40 -minute period.

Upon completion of sampling, the filters were placed in their original container and sealed. All sampled were labelled and logged onto a laboratory submission sheet. All filters were sent to a UKAS accredited laboratory for gravimetric analysis. Filter head wash was also packaged into a sealed container for gravimetric analysis. Results are presented in mg Nm^{-3} at standard temperature of 273.15K and standard pressure of 101.3 kPa without correction for moisture content.

2.2.1 Total Particulate matter sampling methodology

2.2.1.1 Job preparation

A pre-site survey must first be taken to obtain the following information. Client details (name and address), description of stack to include name and location), sample platform/access, Hazards, Power supply and location, additional PPE required.

The Iso stack TCR Tecora automatic isokinetic particulates measurement equipment is fully inspected prior to use and its calibration stats observed. This includes:

Pitot tube-All pitot tubes are checked for damage/burrs, paying particular attention to the inlet holes. All dirt and blockages are removed.

Micro manometer-Digital differential pressure metres that are used are capable of measuring in the range of 0 Pa to 2250 Pa with a sensitivity of $\pm$1 Pa. The instrument is checked for physical damage, battery life test and calibration status observed.

Nozzles-All nozzles used have been constructed in accordance with EN13284-1 and ISO 9096:2003. Each nozzle is physical checked for damage and removed if necessary. The nozzle calibration status is observed.

Flow metre-The flow metre is checked for blockages and obvious physical damage. Its calibration status is also observed.

Rope kit-All lifting tackle are physical checked for cuts and contamination.

Laboratory-The gravimetric testing house selected is UKAS accredited for the particular test method.

2.2.1.2 Filter selection and preparation

Stack conditions can vary for temperature, moisture, acidity, low and heavy particulate loading. Following the pre-site survey, the stack condition should be known and the appropriate filter can be selected and prepared as described below.

Filter mediums-glass wool, quartz wool, Low ash PVC membranes and a range of thimbles can be used depending on stack characteristics. Quartz filters were used in this instance as glass fibre filters can react to SO_3 and lead to inaccurate measurement.

Filters are prepared by drying in an oven at 180^{0}C for a period of 1 hour and placed in a dessicator to cool. The filters are weighed accurately on a 4-figure balance and then placed in clean filter holder before transport to site. Spare filters are also prepared.

2.2.2 Sampling location

2.2.2.1 Suitability of sampling location

Before sampling can commence, a preliminary velocity and temperature survey must be undertaken along the two sampling lines at nine equally concentric spaced areas in the stack. This is performed in accordance with ISO10780:1994 where possible. The procedures as set out in *Section 2.1* were followed. The stack diameter is measured using a steel rod. The angle of gas flow must be less than 15^0 with regard to duct axis. There should be no local negative flow. The minimum velocity should be larger than 5 Pa for Pitot tube measurement. Sampling is undertaken from either four or eight sampling points on each plane. Sampling points shall be located either more than 3% of the sampling line length or more than 5 cm whichever is the greater value from the inner wall. If the ratio of the highest to the lowest dynamic pressure exceeds 9:1 of the ratio of the highest to lowest gas velocity exceeds 3:1, another sampling plane should be used. Sampling is undertaken from four sampling points on each plane. Temperature is also measured at nine equally spaced points along the sampling line and average temperature calculated during the initial survey. Should the temperature at any of the sampling points differ by more that $\pm$10% from that of the average, then that point must not be used.

The required number of sampling points can now be calculated using the following:

- 8 point sampling, circular stacks 0.067 X D, 0.25 X D, 0.75 X D, 0.933 X D.

2.2.2.2 Leak checks

A leak check is undertaken before and after the isokinetic sampling is carried out. This is to make sure that all intake volume is through the sampling nozzle only.

2.2.2.3 Sampling

Once the isokinetic sampling flow rates have been calculated, the probe is inserted into the stack at 90^0 to the stack gas flow, as not to impinge any particulate matter on to the filter media prior to sampling. The filter head is allowed to attain stack temperature. The pump is started and the nozzle is turned into the flow and the timing device is started (automatic on TCR Tecora kit).

2.2.2.4 Duration of sampling

Duration of sampling time depends on:

- Ensuring adequate quantities of particulate matter on the filter for weighing (> 0.3% of the filter weight),
- Whether cumulative or incremental sampling is undertaken,
- The number of sampling points,
- The continuity of the plant operation.

2.2.2.5 Cumulative sampling

After the first sample is taken from the first sampling location, the probe is moved to the next position and the values recorded. This should be performed until all sampling points have been used. Sampling is continued till all locations are sampled.

2.2.2.6 Repeat Velocity and temperature readings.

Since the TCR Tecora is an automatic system, continuous velocity and temperature readings are carried out using the instrument. All data is stored upon the on board computer and recorded following the sampling event. The % DI (deviation) is also computed and recorded continuously.

2.2.2.7 Weighing of the sample

When finished, the sample filter is placed in its container and all particulate from the filter head is added to the particulate matter on the filter (i.e. filter wash).

The used filter is placed in an over at 160^0C for at least 1 hour and dried thoroughly, cooled and equilibrated in a dessicator and weighed as quickly as possible so as to avoid any errors to moisture. The gross weight of the filter should be measured to within $\pm$0.01 to 0.10 mg. The filter weight and any of the residual particulate matter from the filter head can then be used in the final report to calculate the particulate concentration.

3. Results-Emission testing.

The results of testing emission sources A2-1 are presented in *Table 3.1 and 3.2.*

3.1 Volumetric flow rate

Sampling for airflow rate was performed in accordance with ISO 10780:1994. *Table 3.1* summarises the flow measurements from the stack and includes the stack velocity, expressed in metres per second (m s^{-1}) and volumetric airflow rates expressed in m^3 hr^{-1} at both actual and standard reference conditions of 273.15 K, 101.3 kPa (i.e. normalised temperature and pressure).

Stack pressure was determined using a pitot tube turned at right angles to the airflow rate. This is expressed in Kilo Pascal (kPa). The atmospheric pressure was also recorded during the sampling event in kPa.

Table 3.1. Measurement of Volumetric airflow rate and normalisation of data.

Stack Reference- A2-1	Value
Stack diameter (m)	0.80
Average temperature (K)	346
Airflow rate (m s^{-1})	13.90 to 20.20
Area (m^2)	0.50272
Atmospheric pressure (kPa)	101.60
Static pressure (kPa)	0.045
Standard barometric pressure (kPa)	101.30
Actual volumetric airflow rate (Am^3/s)	6.98 to 10.15
Normalised volumetric airflow (Nm^3/s)[1]	5.53 to 8.03
Normalised volumetric airflow rate (Nm^3/hr)	19,908 to 29,908

Notes: [1] denotes normalised to 273.15 Kelvin and 101.3 kPa, with no correction for moisture content.

All calculations are presented in *Appendix I* of this document.

3.2 Total particulates emissions

Total Particulates concentrations were monitored using a TCR Tecora automated Particulate sampler. The results of Total Particulates are presented in *Table 3.2*. The results of mg m^{-3} have been converted to mg Nm^{-3} at 273.15 K, 101.3 kPa, on a wet gas basis without correction for oxygen content.

Table 3.2. Emission value results from emission point A2-1 located in Irish Distillers Ltd. Midleton, Co. Cork.

Emission Point A2-1	Start / Finish time	Values (mg/Nm^3)	Sample id[3]	Normalised Volumetric flow rate (Nm^3/hr)	Mass emission rate (kg/hr)	Emission limit values
Total particulates Run 1[1, 2,]	11.25AM to 11.55AM	18	04375	19,908	0.358	50 mg/Nm^3 or a mass flow of 0.50 kg/hr
Total particulates Run 2[1, 2]	12.20 PM to 12.50PM	24	04378	19,908	0.477	50 mg/Nm^3 or a mass flow of 0.50 kg/hr
Total particulates Run 3[1, 2]	1.20PM to 2.20 PM	16	04385	29,908	0.478	50 mg/Nm^3 or a mass flow of 0.50 kg/hr
Average Conc		**19.33**	**-**	**23,241**	**0.449**	**50 mg/Nm^3 or a mass flow of 0.50 kg/hr**

Notes: [1] denotes the sample volume acquired was greater than 1 Nm^3 per sample run and therefore in accordance with the requirements of the EN13284-1 standard.
[2] denotes the particulate matter collection upon the filter was within the recommended 20% of the filter paper weight following sampling.
[3] denotes QMA quartz filters were used throughout the study.

4. Discussion of results

Tables 3.1 to *3.2* present the results of the emission-monitoring program carried out on the 19th August 2008 in Irish Distillers Ltd. Midleton, Co. Cork.

As can be observed in *Tables 3.1 and 3.2*, volumetric airflow rate and emissions of Total particulates are in compliance with the values stated in IPPC licence PO442-01.

There are many difficulties in performing monitoring of this exhaust point to include:
Previous monitoring was performed only on one plane and in location which would not facilitate the formation of laminar flow. Upon initial screening, swirling flow was identified within the stack which was resulting in both –ive and +ive pressure readings on the pitot tube. Therefore it was concluded that the required Isokinetic conditions could not be attained and erroneous results would be recorded if monitoring were performed at this location. IDL were requested to move the sample port to an appropriate location to ensure laminar flow. In addition, the levels of moisture coupled with temperature below 105 deg C will not facilitate the repeatable measurements of total particulates on this emission point at any time due to the dew point of the airstream. This needs to be taken into account when anybody is reporting results. It is very unlikely that Absolute reporting values will ever be possible on this emission source and therefore it is important to ensure the implementation of an efficient operation and maintenance plan for both the drier and cyclone operation. This should be strictly adhered to and outline the steps that should or should not occur in relation to the mitigation and minimisation of Particulate carryover to the exhaust flue.

5. Conclusion

The following conclusions were drawn from the study:

1. The volumetric airflow rate and Total Particulates emission values on emission point A2-1 were in compliance with IPPC licence PO442-01.

6. Recommendations

The following recommendations were generated from the study:

- The cyclones should be checked once per week in order to ascertain the headloss across the cyclone and also in addition to verify that the cyclone is clear of material build up. The differential headloss across the cyclone will dictate the cut point efficiency of the technology. If this differential headloss drops to unacceptable levels (i.e. less than 100 mmWG), then the removal efficiency of particulate will reduce and may result in breach of the emission limit values contained in IPPC licence PO442-01. On the day of the survey, the following differential headloss measurement were recorded:
    a. Cyclone 1 inlet = -ive 48.437, Outlet = -ive 175.799. Differential headloss = 127.362 mmWG
    b. Cyclone 2 inlet = -ive 25.493, Outlet = -ive 137.152. Differential headloss = 111.659 mmWG
    c. Cyclone 3 inlet = -ive 41.095, Outlet = -ive 124.405. Differential headloss = 83.31 mmWG.

    d. In this instance, cyclone 3 did not have the required 100 mmWG headloss and therefore should be checked for blockage on the cone side of the cyclone.

- The drier drum should be emptied of material following each changeover or shutdown. Failure to empty the drier drum could result in significant emissions of dust from the drier due to over drying of the material. In addition, the over drying of material within the drum can result in dust emissions to the cyclone and therefore may result in unnecessary carryover in the system. This should be eliminated through operational practices and / or sensor / engineering solution.
- Sampling should be performed during continuous process operation in order to obtain representative samples of the airstream.

7. *Appendix I*-Sampling and analysis details

B.1.1 Location of Sampling
Irish Distillers Ltd. Midleton, Co. Cork

B.1.2 Date & Time of Sampling
19th Aug 2008

B.1.3 Personnel Present During Sampling
Dr. John Casey, Odour Monitoring Ireland, Unit 32 DeGranville Court, Dublin Road, Trim, Co. Meath.
Dr. Brian Sheridan, Odour Monitoring Ireland, Unit 32 DeGranville Court, Dublin Road, Trim, Co. Meath.

B.1.4 Instrumentation
Testo 350 MXL/454 in stack analyser.
L type pitot and PT100 thermocouple.
Testo 400 handheld and appropriate probes.
TCR Tecora Isokinetic Particulate sampler.

B.1.5 Standards
ISO 10780:1994
EN13284-1:2002
ISO 9096:2003

8. *Appendix II*-Volumetric airflow rate calculations

V	=	Stack gas velocity (m/s)	= 13.90 to 20.20
D	=	Stack diameter(m)	= 0.800
A	=	Stack area (m^2)	= 0.50272
Pi	=	Pi	= 3.142
T	=	Stack temperature (K)	= 346
P_A	=	Atmospheric pressure (kPa)	= 101.60
P_{ST}	=	Static pressure (kPa)	=0.045
P_B	=	Standard barometric Pressure (kPa)	= 101.3

Q_{actual} = V × A = 13.90 m/s ×0.50272 m^2 = **6.987m^3/s**

$$Q_{STP} = \frac{273.15}{T} \times \frac{(P_A + P_{ST}) \times V \times A}{P_B}$$

$$\mathbf{Q_{STP}} = \frac{273.15}{346} \times \frac{(101.6 + 0.045) \times 13.90 \times 0.50272}{101.3} = \mathbf{5.53\ Nm^3/s}$$

9. *Appendix III*-Total particulates calculations

9.1 Sample run 1:

Duration of sampling: 30 minutes (1800 seconds)
Nozzle internal diameter: 10 mm
Nozzle area (m^2)=7.86 X E-05
Deviation in velocity over sampling period = -ive 2.93% (limit permitted is 5%)

Start filter weight=	0.13240 g
Finish filter weight=	0.15868 g
Probe rinse=	0.00000 g
Total dust mass =	0.02628 g

Sample as a percentage of filter weight 20%

Total volume sampled (V_{gn}) (Nm^3) = 1.46 Nm^3

Total dust concentration (m) = 26.28mg/1.46 Nm^3

Total dust concentration (m) = **18 mg/Nm^3**

Total dust emission rate (g/s) = (Q_{STP} × m) /1000

Total dust mass emission rate (g/s) = (5.53 Nm^3/s × 18 mg/Nm^3)/1000 = **0.09954 g/s or 0.358 kg/hr**

The calculations for Sample Run 2 and Sample run 3 were performed using the same format. The DI % value for Sample run 2 and 3 was –ive 1.86 and –ive 1.55, respectively.

Rapporto di taratura dopo manutenzione

Calibration report after maintenance R-7093500

Strumento - *Instrument:* **Isokinetic Sampler** Costruttore - Constructor : **TCR Tecora**
Modello - *Type* : **Isostack Plus - ISO EF/** S.N.: **7093500**
Destinatario - *Customer* :

Il presente verbale di taratura non è utilizzabile per misure fiscali. Rappresenta la registrazione delle prove eseguite durante il collaudo dello strumento, in accordo ai requisiti qualitativi previsti dal nostro sistema di qualità.

Condizioni ambientali della prova - *Ambient condition*

Temp. - *Temperature* (°C) : **21,5** Pressione - *Pressure* (KPa) : **99,8**

Riferimenti utilizzati - *Reference used*

Temperatura - *Temperature* :	Eurotron mod. Microcal 1	S.N. 3901-RTD G0237	TCR std 21S
Pressione - *Pressure* :	Tradinco mod. 2095P	S.N. 6.04.007/2286	TCR std 06P

Misura della temperatura - *Temperature Measure*

Campo di misura - *Range* : -20 +80°C
Dmax = Deviazione massima della misura - *Max reading deviation* (°C)
E max = Max errore di indicazione percentuale sul campo di misura - *Max full range percent indication error (%)*

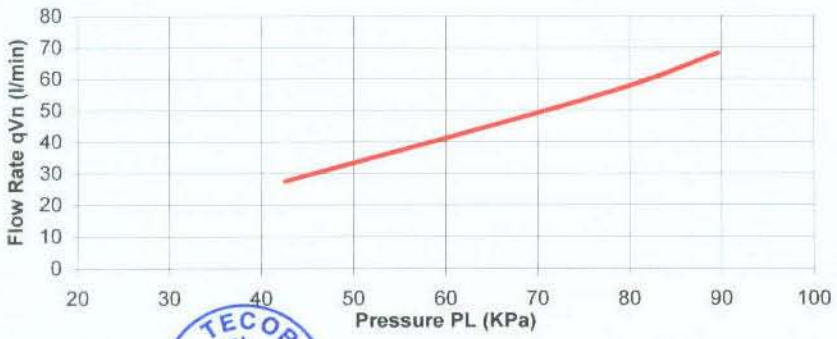
	Riferimento *Reference*			
Nome - *Name*	21,5	Dmax (°C)	Accett. *Accept.*	Emax (%)
ΘIN	21,51	0,01	± 0.5 °C	0,01
Θg	21,56	0,06	± 0.5 °C	0,06

Misura della pressione assoluta - *Absolute pressure Measure*

Campo di misura - *Range : 0 - 103.5 KPa*

	Riferimento *Reference*				
Nome - *Name*	99,8	60,7	Dmax (Kpa)	Accett. *Accept.*	Emax (%)
Pa	99,56	60,721	-0,24	± 0.5 KPa	-0,23

Curva caratteristica - *Performance curve*



Pl (KPa)	qVn (l/min)
89,6	68,3
77,87	55,9
42,63	27,55

Data - *Date:* 12/03/2008 Eseguito da - *Tested by:*

TCR TECORA DEL COLLAUDATO

TCR TECORA

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
ISO 9000

Rapporto di verifica taratura N°

Calibration report N° R-27763081

Cont. Volumetrico - *Gas Meter* S.N. : **27763081**
Modello - *Type* : **Gallus 2000**

Costruttore - Constructor : **ACTARIS**

Il presente verbale di taratura non è utilizzabile per misure fiscali. Rappresenta la registrazione delle prove eseguite durante il collaudo dello strumento, in accordo ai requisiti qualitativi previsti dal nostro sistema di qualità.

Condizioni ambientali della prova - *Ambient condition*

Temp. - *Temperature* (°C) : **21,2**

Pressione - *Pressure* (KPa) : **99,7**

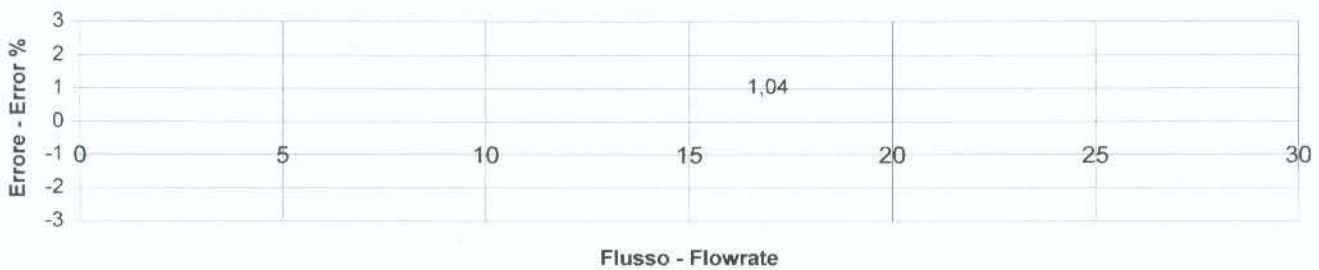
Riferimenti utilizzati - *Reference used*

Volume - *Volume* :	ACTARIS mod. Gallus2000 G1,6	S.N. 005789049	TCR std 51S
Volume - *Volume* :	ACTARIS mod. Gallus2000 G4	S.N. 0307A1217266	TCR std 52S

Verifica misura del Volume - *Volume Measure Verifying*

Flusso *Flowrate* (l/min) ± 0.2	V ref (l)		V Str (l)		Differenza-*Difference*		Emax (%)	Coefficiente CG *CG factor*
	Iniz. *Initial*	Finale *Final*	Iniz. *Initial*	Finale *Final*	V ref (l)	V Str (l)		
2								
16	8449	8559,6	530,4	641,7	110,2	111,3	1,04	0,99
20								
30								

Vref = Volume riferimento - *Reference volume*
V Str = Volume indicato da strumento in calibrazione - *Instrument volume reading*
E max = Max errore di indicazione percentuale - *Max percent indication error (%)*
CG = Fattore di correzione per c.v. - Correction factor for g.m.



Data - *Date* : 19/03/2008

TCR TECORA DEL COLLAUDATO

Eseguito da - *Tested by:* Zonca M.

TCR TECORA

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
ISO 9000

Rapporto di taratura N°
Calibration report N° R-709344

Strumento - *Instrument:* **Isokinetic Sampler** Costruttore - Constructor : **TCR Tecora**
Modello - *Type* : **Isostack Plus - Control Unit** S.N.: **709344A**
Destinatario - *Customer* :

Il presente verbale di taratura non è utilizzabile per misure fiscali. Rappresenta la registrazione delle prove eseguite durante il collaudo dello strumento, in accordo ai requisiti qualitativi previsti dal nostro sistema di qualità.

Condizioni ambientali della prova - *Ambient condition*

Temp. - *Temperature* (°C) : **21,5** Pressione - *Pressure* (KPa) : **99,8**

Riferimenti utilizzati - *Reference used*

Temperatura - *Temperature* :	Eurotron mod. Microcal 1	S.N. 237	TCR std 21S
Pressione - *Pressure* :	Tradinco mod. 2095P	S.N. 6.04.007/2286	TCR std 06P

Misura della temperatura - *Temperature Measure*

Campo di misura - *Range* : -20 +1200°C

Dmax = Deviazione massima della misura - *Max reading deviation* (°C)
E max = Max errore di indicazione percentuale sul campo di misura - *Max full range percent indication error (%)*

	Riferimento - *Reference*				
Nome - *Name*	200	600	Dmax (°C)	Accett. *Accept.*	Emax (%)
Θa	201,08	601,06	1,08	± 2 °C	0,09
Θo				± 2 °C	
Θ1				± 2 °C	
Θ2				± 2 °C	
Θ3				± 2 °C	
Θ4				± 2 °C	
Θ5				± 2 °C	
Θ6				± 2 °C	

Misura della pressione assoluta - *Absolute pressure Measure*

Campo di misura - *Range : 0 - 103.5 KPa*

	Riferimento *Reference*				
Nome - *Name*	**99,6**	**57,2**	**Dmax (Kpa)**	**Accett. *Accept.***	**Emax (%)**
Pa	99,56	57,28	0,08	± 0.15 KPa	0,08
Nome - *Name*			**Dmax (Kpa)**	**Accett. *Accept.***	**Emax (%)**
Po			0	± 0.15 KPa	0,00

Misura della pressione Differenziale - *Differential pressure Measure*

Campo di misura - *Range : 0 - 3556 Pa*

	Riferimento *Reference*			
Nome - *Name*	**934**	**Dmax (Pa)**	**Accett. *Accept.***	**Emax (%)**
dPpt	935	1	± 10 Pa	0,03
Nome - *Name*		**Dmax (Pa)**	**Accett. *Accept.***	**Emax (%)**
dPo		0	± 10 Pa	0,00

Data - *Date* : 19/03/2008

TCR TECORA DEL COLLAUDATORE

Eseguito da - *Tested by:*

Appendix III: Ground Water Monitoring Report

EURO
environmental
services

Environmental Monitoring,
Consultancy & Testing

Irish Distillers

Middleton, Co. Cork

Gas Monitoring and Groundwater Monitoring Report

Report Date
23rd May 2008

EURO environmental services
Unit 35, Boyne Business Park, Drogheda, Co. Louth

Report No. 2070/M08

1.0 Introduction

EURO environmental services were commissioned to conduct Bi-Annual Gas and Groundwater monitoring on GW05 and Annual Groundwater monitoring at GW01-GW04 at Irish Distillers, Middleton, Co. Cork. The monitoring was conducted by Paul Cassidy of EURO environmental services on 28th April 2008. GW05 well was installed to monitor methane and carbon dioxide concentrations from a small on-site disused landfill. This area has had aftercare treatment and has been monitored on an annual basis by Irish Distillers.

2.0 Gas Analysis Methods

Methane, carbon dioxide, oxygen and atmospheric pressure were carried out using a GA 2000 gas analyzer. CH_4 and CO_2 were measured by infra red light and O_2 by electrochemical cell measurement.

3.0 Calibration

The GA 2000, serial no. GA05213 was calibrated in January 2008, and has a valid calibration certificate until December 2008.

2.0 Groundwater Methods

Groundwater depths were measured using a water level dip meter. From assessments made on the volumes of water in the well it was determined that all wells had adequate water for sampling.

The quality of water has been assessed against criteria outlined in a recent report issued by the EPA entitled "Towards Setting Guideline Values for the Protection of Groundwater in Ireland" EPA Interim report 2003.

3.0 Main Constituents

3.1 Chloride:

Chloride, in the form of chloride ion (Cl-), is one of the major inorganic ions in water. This parameter has a salty taste in high concentrations. It can also be a problem to fish life and can be prejudicial to other water users. An interim guideline value of 30 mg/L has been a proposed limit for groundwater.

3.2 Conductivity:

Conductivity is a measure of the ability of an aqueous solution to carry an electric current. This ability depends on the presence of ions; on their total concentration, mobility and valence; and on the temperature of measurement. The conductivity of potable waters ranges generally from 50 – 1000 uS/cm. An interim guideline value has been set at 1000 us/cm.

3.3 Metals:

Ground waters were analysed for a range of metals including cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, potassium, sodium and zinc. Trace metals are generally found at low levels owing to their low solubility's at normal groundwater pH values. However, iron and manganese can occur at elevated levels in certain natural hydro geological conditions, or where organic pollution has resulted in de-oxygenation of water.

3.4 pH

Measurement of pH is one of the most important and frequently used tests in water chemistry. At a given temperature the intensity of the acidic character of a solution is indicated by pH. The interim guideline range for ground waters is $\geq$6.5 and $\leq$9.5 pH units.

4.0 Gas Well- Interpretation of Results

The landfill gas analyzer carries out a self calibration test prior as part of its initialization programme. Ambient readings were recorded at security to determine the concentrations of target parameters in the surrounding atmosphere. There was 0.0% methane, 0.0% v/v CO_2 and 21.4% v/v oxygen determined at an atmospheric pressure of 998 mb.

Methane, carbon dioxide or hydrogen sulphide was not detected in the gas well.

5.0 Groundwater- Interpretation of Results

5.1 Borehole GW01

The water level in the well was 4.0m from the surface of the internal pipe. Ammonia and Arsenic values were above the EPA Guideline Interim Values at this location, reaching values of 0.43 mg/l as N and 35 mg/l respectively, much higher than the advised EPA Guideline Interim value of 0.12 mg/l as N and 10 mg/l. All parameters were determined to be within limits.

5.2 Borehole GW02

The water level in the well was 4.0m from the surface of the internal pipe. All parameters apart from chloride (35 mg/l) were determined to be within the EPA Guideline Interim Values at this location. This level of chloride slightly exceeds the advised EPA Guideline Interim value of 30mg/l.

5.3 Borehole GW03

The water level in the well was 11.0m from the surface of the internal pipe. Chloride (with a value of 54.42 mg/l), Lead (with a reading of 23 ug/l) and Mercury (which reached 3.9 ug/l) were determined to exceed the Guideline Interim Values at this location (30 mg/l, 10 ug/l and 1 ug/l, respectively). All parameters were determined to be within limits.

5.4 Borehole GW04

A water level of 12.8 was recorded for GW04. All parameters (apart from Ammonia, with a value of 0.14 mg/l as N, 0.02 mg/l above the limit) were determined to be within the EPA Guideline Interim Values at this location.

5.5 Borehole GW05

GW05 was dry during the monitoring period and thus no sample could be retrieved for analysis.

6.0 Conclusion

Trigger levels for methane and carbon dioxide have been set at 1.0 and 1.5% v/v respectively for gas concentrations in perimeter monitoring points for landfill. The gas well, GW05 showed levels of carbon dioxide and methane which were determined within the trigger levels.

Ammonia levels were above the EPA Guideline Interim Values at wells GW01 and GW04.

Arsenic concentrations in well GW01 were above the EPA Guideline Interim Value.

Chloride levels were elevated at wells GW02 and GW03.

Well GW03 also showed elevated concentrations of Lead and Mercury above the EPA Guideline Interim Values.

GW05 was dry during the monitoring period.

Aadil Khan
Environmental Technical Manager

VICTOR OLMOS
Victor Olmos
Environmental Technician

23rd May 2008

EURO
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Web: www.euroenv.ie
email info@euroenv.ie

Customer	Aidan Curran Irish Distillers Middleton Co Cork Ireland	*Lab Report Ref. No.*	4150/006/01S
		Date of Receipt	30/04/2008
		Date Testing Commenced	30/04/2008
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO		*Date of Report*	15/10/2008
Customer Ref	GW1	*Sample Type*	Groundwater

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.43	mg/L as N	UKAS
Arsenic	177	ICPMS	35	ug/L	UKAS
Chloride	100	Colorimetry	18.45	mg/L	UKAS
COD	107	Colorimetry	17	mg/L	UKAS
Conductivity	112	Electrometry	950	uscm -1@25C	UKAS
Fluoride	115	Colorimetry	0.19	mg/L	
Lead	177	ICPMS	5	ug/L	UKAS
Mercury	178	ICPMS	0.3	ug/L	
Nitrate	103	Colorimetry	<0.09	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	1.12	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	<0.03	mg/L as N	
Nitrogen (Total)	0	Calculation	1.12	mg/L as N	
pH	110	Electrometry	7.0	pH Units	UKAS
Phosphate (Total)	166	Digestion/ Colorimetry	0.156	mg/L as P	UKAS
Potassium	184	ICPMS	2.54	mg/L	UKAS
Sulphate	119	Colorimetry	36.58	mg/L as SO4	UKAS
Zinc	177	ICPMS	20.8	ug/L	UKAS

Signed : Donna Heslin ***Date :*** 15/10/08

Donna Heslin - Laboratory Manager

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C

Results contained in this report relate only to the samples tested

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Customer	Aidan Curran Irish Distillers Middleton Co Cork Ireland	*Lab Report Ref. No.*	4150/006/02S
		Date of Receipt	30/04/2008
		Date Testing Commenced	30/04/2008
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO		*Date of Report*	15/10/2008
Customer Ref	GW2	*Sample Type*	Groundwater

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.12	mg/L as N	UKAS
Arsenic	177	ICPMS	3	ug/L	UKAS
Chloride	100	Colorimetry	67.03	mg/L	UKAS
COD	107	Colorimetry	5	mg/L	UKAS
Conductivity	112	Electrometry	686	uScm -1@25C	UKAS
Fluoride	115	Colorimetry	0.10	mg/L	
Lead	177	ICPMS	6	ug/L	UKAS
Mercury	178	ICPMS	0.2	ug/L	
Nitrate	103	Colorimetry	1.48	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	1.68	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	1.49	mg/L as N	UKAS
Nitrogen (Total)	0	Calculation	3.17	mg/L as N	
pH	110	Electrometry	7.3	pH Units	UKAS
Phosphate (Total)	166	Digestion/ Colorimetry	0.055	mg/L as P	UKAS
Potassium	184	ICPMS	2.57	mg/L	UKAS
Sulphate	119	Colorimetry	18.24	mg/L as SO4	UKAS
Zinc	177	ICPMS	18.1	ug/L	UKAS

Signed : Donna Heslin

Donna Heslin - Laboratory Manager

Date : 15/10/08

Acc. : Accredited Parameters by ISO 17025:2005

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Customer	Aidan Curran Irish Distillers Middleton Co Cork Ireland	*Lab Report Ref. No.*	4150/006/03S
		Date of Receipt	30/04/2008
		Date Testing Commenced	30/04/2008
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO		*Date of Report*	15/10/2008
Customer Ref	GW3	*Sample Type*	Groundwater

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.09	mg/L as N	
Arsenic	177	ICPMS	3	ug/L	UKAS
Chloride	100	Colorimetry	54.42	mg/L	UKAS
COD	107	Colorimetry	19	mg/L	UKAS
Conductivity	112	Electrometry	685	uscm -1@25C	UKAS
Fluoride	115	Colorimetry	0.09	mg/L	
Lead	177	ICPMS	23	ug/L	UKAS
Mercury	178	ICPMS	3.9	ug/L	
Nitrate	103	Colorimetry	6.80	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	<1.00	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	6.81	mg/L as N	UKAS
Nitrogen (Total)	0	Calculation	7.37	mg/L as N	
pH	110	Electrometry	7.3	pH Units	UKAS
Phosphate (Total)	166	Digestion/ Colorimetry	0.217	mg/L as P	UKAS
Potassium	184	ICPMS	3.14	mg/L	UKAS
Sulphate	119	Colorimetry	14.27	mg/L as SO4	UKAS
Zinc	177	ICPMS	48.8	ug/L	UKAS

Signed : Donna Heslin ***Date :*** 15/10/08

Donna Heslin - Laboratory Manager

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C

Results contained in this report relate only to the samples tested

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Customer	Aidan Curran Irish Distillers Middleton Co Cork Ireland	*Lab Report Ref. No.*	4150/006/04S
		Date of Receipt	30/04/2008
		Date Testing Commenced	30/04/2008
		Received or Collected	Collected by Euro
		Condition on Receipt	Acceptable
Customer PO		*Date of Report*	15/10/2008
Customer Ref	GW4	*Sample Type*	Groundwater

CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.14	mg/L as N	UKAS
Arsenic	177	ICPMS	1	ug/L	UKAS
Chloride	100	Colorimetry	13.58	mg/L	UKAS
COD	107	Colorimetry	7	mg/L	UKAS
Conductivity	112	Electrometry	510	uscm -1@25C	UKAS
Fluoride	115	Colorimetry	0.10	mg/L	
Lead	177	ICPMS	5	ug/L	UKAS
Mercury	178	ICPMS	0.2	ug/L	
Nitrate	103	Colorimetry	2.16	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	1.12	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	2.17	mg/L as N	UKAS
Nitrogen (Total)	0	Calculation	3.29	mg/L as N	
pH	110	Electrometry	7.2	pH Units	UKAS
Phosphate (Total)	166	Digestion/ Colorimetry	0.098	mg/L as P	UKAS
Potassium	184	ICPMS	0.91	mg/L	UKAS
Sulphate	119	Colorimetry	6.89	mg/L as SO4	UKAS
Zinc	177	ICPMS	30.5	ug/L	UKAS

Signed : Donna Heslin

Donna Heslin - Laboratory Manager

Date : 15/10/08

Acc. : Accredited Parameters by ISO 17025:2005

All organic results are analysed as received and all results are corrected for dry weight at 104 C

Results contained in this report relate only to the samples tested

EURO
environmental
services

Environmental Monitoring,
Consultancy & Testing

Irish Distillers

Middleton, Co. Cork

Gas Monitoring Report

Report Date
3rd November 2008

EURO environmental services
Unit 35, Boyne Business Park, Drogheda, Co. Louth

Report No. 2070/M09rev.1

1.0 Introduction

EURO environmental services were commissioned to conduct Bi-Annual Gas monitoring on GW05 at Irish Distillers, Middleton, County Cork. The monitoring was conducted by Ameer Awadalla of EURO environmental services on 15th October 2008. GW05 well was installed to monitor methane and carbon dioxide concentrations from a small on-site disused landfill. This area has had aftercare treatment and has been monitored on an annual basis by Irish Distillers.

2.0 Gas Analysis Methods

Methane, carbon dioxide, oxygen and atmospheric pressure were carried out using a GA 2000 gas analyzer. CH_4 and CO_2 were measured by infra red light and O_2 by electrochemical cell measurement.

3.0 Calibration

The GA 2000, serial no. GA05213 was calibrated in January 2008, and has a valid calibration certificate until December 2008.

4.0 Gas Well – Interpretation of Results

The landfill gas analyzer carries out a self calibration test prior to monitoring as part of its initialization programme. Ambient readings were recorded at security to determine the concentrations of target parameters in the surrounding atmosphere. At the security office, there was 0.0% volume to volume (v/v) methane (CH_4), 0.0% v/v carbon dioxide (CO_2) and 20.1% v/v oxygen (O_2) detected at an atmospheric pressure of 1011 millibar (mb). Readings at the gas well indicated 0.1% v/v methane (CH_4), 0.0% v/v carbon dioxide (CO_2) and 20.0% v/v oxygen (O_2) detected at an atmospheric pressure of 1011 millibar (mb)

Carbon dioxide and hydrogen sulphide were not detected in the gas well.

5.0 Groundwater

Results for groundwater monitoring are not available for this period as all biannual groundwater points were dry on the day of sampling.

Aadil Khan
Environmental Technical Manager

Michael Cohen
Environmental Technician

3rd November 2008