



**WHITEGATE POWER STATION**  
**ANNUAL ENVIRONMENTAL REPORT**  
**2011**

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## 1 INTRODUCTION

### 1.1 Name and Location of the Site

Whitegate Power Station  
Fort Davis Road  
Whitegate  
Co. Cork  
GPS Co-ordinates 51° 49' 07" N, 8° 15' 17" W

### 1.2 IPPC Licence Registration Number

Integrated Pollution Prevention Control (IPPC) License Register Number P0830-01 was issued on 24<sup>th</sup> April 2009 to Bord Gais Eireann to carry on the following activity:

“The operation of combustion installations with a rated thermal input greater than 50MW at Whitegate (Corkbeg and Glanagow Townlands), County Cork”

### 1.3 Brief Description of Activities at the Site


Bord Gais Eireann (Owner) is the IPPC Licence holder and has contracted General Electric Operations and Maintenance (GE O&M) to operate and maintain the power station and its environmental policy, aspects and impacts on their behalf.

GE O&M is part of the General Electric Contractual Services (GECS) business that has the responsibility to define all required EHS Procedures and to drive their implementation. GECS EHS procedures are based on GE Corporate procedures and guidelines.

Whitegate Power Station is a Combined Cycle Power Plant (CCGT), which utilises natural gas and distillate oil as fuel to generate up to 450 MW of electricity for supply to the National Grid. The site is located to the southwest of Whitegate village, County Cork on the Fort Davis Road. The Glanagow stream crosses the site, flowing in a south-westerly direction. The area is approximately ten hectares. Neighbouring lands are used for a variety of activities, including: an adjacent oil refinery, a gas bottling plant depot, agricultural activities, and the Fort Davis fortifications to the west.

The Combined Cycle Gas Turbine (CCGT) plant consists of a Gas Turbine (GT) exhausting into a Heat Recovery Steam Generator (HRSG) supplying steam to a Steam Turbine (ST). Supplementary firing in the upstream duct of the HRSG is also provided. The fuel used in the supplementary firing is natural gas, Refinery Off Gas (ROG) or a combination of both.

## 1.4 Environmental Health and Safety Policy Statement

 GE Energy Whitegate IPP O&M	<b>EHS POLICY</b>			Page:	1 of 1
	QMS REF:	Version	02	Approved:	10 June 2011
	WIPP-QAP 14- EHS 01- D01	Owner:	Plant Manager	Review:	Annually

### Whitegate Independent Power Plant - EHS Policy

Whitegate Independent Power Plant (WIPP) operated and maintained by General Electric International Inc., is a Combined Cycle power plant that utilizes natural gas or distillate oil as fuel to generate up to 450 MW of electricity for supply to the National Grid.

At GE O&M WIPP we strive to provide a safe and healthy working environment and to avoid adverse impact to the environment and the community in which we do business. This will be achieved through planning, controlling and monitoring of operations involved in the safe generation of steam and electricity in accordance with applicable requirements.

We are committed to continual improvement of our environmental, health and safety performance and to prevent pollution associated with our operations. We will:

- Meet all relevant legislative, regulatory and corporate requirements.
- Promote awareness amongst all staff and seek their active participation in all environmental, health & safety activities.
- Continuously evaluate and update the environmental, health and safety programs to ensure continued improvement and lasting effectiveness.
- Pursue objectives and targets based on criteria defined in our management system to improve our performance
- Communicate the EHS Policy to all employees and contractors and make the policy available to interested 3rd Parties
- Establish procedures to recognize, evaluate and control environmental, health & safety hazards at the site.
- Provide appropriate levels of environmental, health & safety training for all employees.
- Define responsibilities, accountability and disciplinary actions.
- Ensure proper and adequate response to events or inquiries related to our activities

At WIPP site, we realize that our most valued assets are our employees and their safety is of utmost importance to the business. Both management and employees will consider themselves a team working together to accomplish the common goal of a safe, healthy and environmentally compliant workplace.

This policy complements our corporate environmental policies, the implementation of which is a part of our parent companies primary requirements. It is the responsibility of all staff at all levels to implement the requirements of this policy as part of their everyday activities.

Policy Endorsement:

Maurice Mulqueen

Plant Manager



Signature

10/06/2011

Date

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Fig. 1.4:1: Whitegate Power Station Environmental Health and Safety Policy.

### 1.5 Whitegate Power Station - Environmental Management Responsibility

Environmental Management is fully integrated into all aspects of operations and management of the power station. The management structure is shown in Figure 1.4.1. The EHS Specialist is responsible for the co-ordination of environmental compliance activities and preparation for ISO14001 certification. This is achieved by delegation of actions from the plant manager to the different teams.

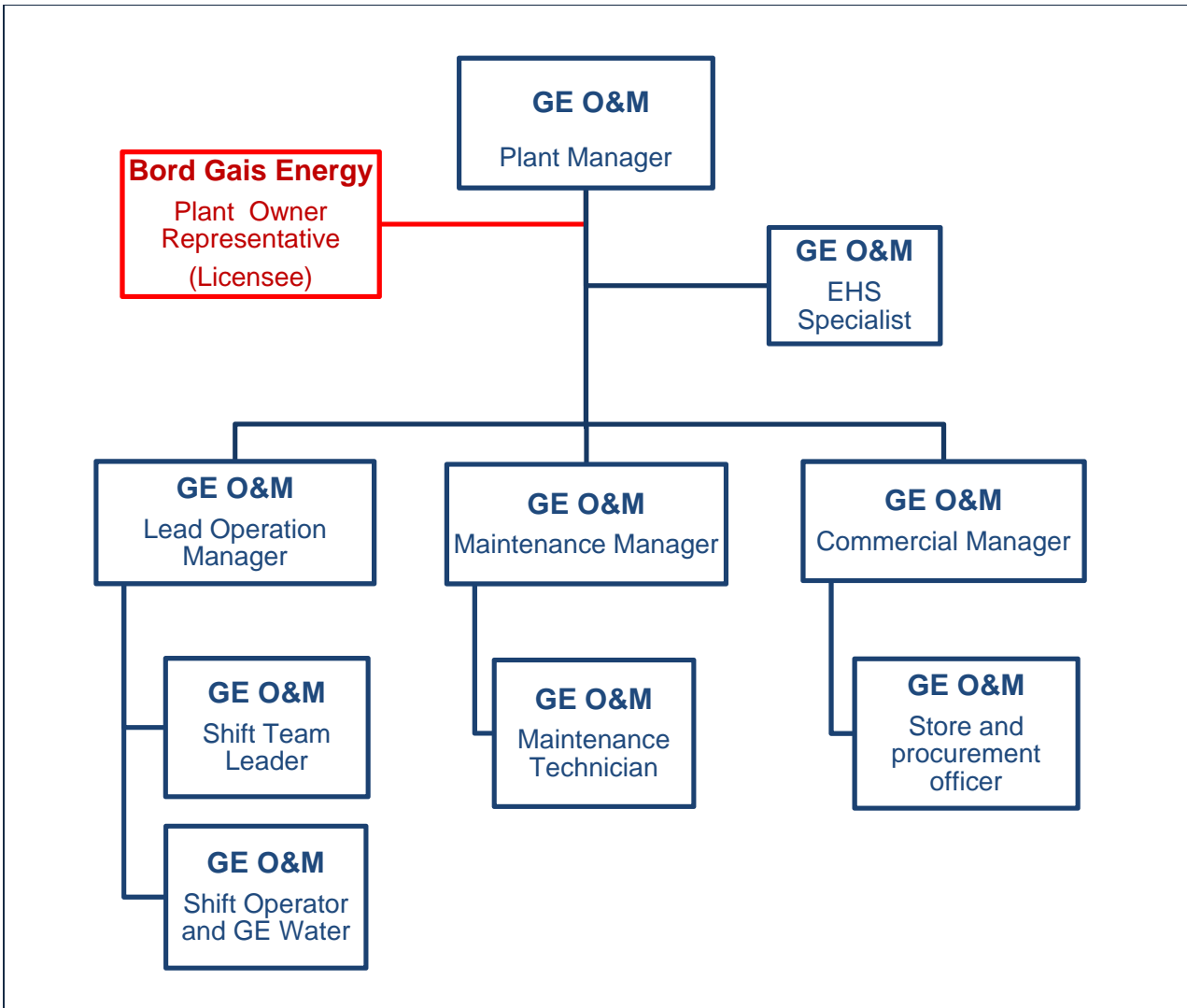


Fig. 1.5:1: Whitegate Power Station Environmental Management Responsibility structure.

## 2 SUMMARY INFORMATION

### 2.1 Emissions to Water Summary

Parameter	Unit	Max Licensed emission per year	2010
Volume	[m <sup>3</sup> /yr]	219000	25,117
BOD	[Kg/yr]	4380	186
Suspended Solids	[Kg/yr]	6570	601
Total Dissolved Solids	[Kg/yr]	-	56
Ammonia (as N)	[Kg/yr]	1095	66
Total Phosphorus (as P)	[Kg/yr]	1095	48

Table 2.1.1: Process Emissions to Water at SW1 for 2010

Parameter	Unit	Max Licensed emission per year	2011
Volume	[m <sup>3</sup> /yr]	219000	45,571
BOD	[Kg/yr]	4380	344
Suspended Solids	[Kg/yr]	6570	426
Total Dissolved Solids	[Kg/yr]	-	48,411
Ammonia (as N)	[Kg/yr]	1095	13
Total Phosphorus (as P)	[Kg/yr]	1095	30

Table 2.1.2: Process Emissions to Water at SW1 for 2011

Year	pH (average)	TOC (average)
2010	--	2.0 mg/l

Table 2.1.3: Table of Surface Water Emissions to Open Pit (SW2) for 2010

Year	pH (average)	TOC (average)
2011	--	6.21 mg/l

Table 2.1.4: Table of Surface Water Emissions to Open Pit (SW2) for 2011

One water emission non-compliance was registered in 2011.

Year	Non-Compliances	Cause	Corrective Action
2011	Nov 29 <sup>th</sup> 2011: BOD reading of 40 mg/l, IPPC licence limit of 20 mg/l	Faulty heat exchanger in which glycol leaked into the process water	Heat exchanger isolated. TOC meter installation on the raw water return line

Table 2.1.5: Emissions to Water. Summary of Non-Compliances for 2011

Toxicity Testing for emission reference point SW1 was carried out during 2011 (parameters as agreed with the agency), results for same are contained below.



**TOXICOLOGICAL ANALYSIS REPORT** Form No.: ToxF035-1 Ver 2.3

**TEST RESULTS**

**Customer:** GE Energy (Ireland) Ltd

**Customer sample description:** Final effluent, grab sample, 05.12.11

**Tox. Ref. No.:** 11T148

**Test Date:** 05.12.11 - *Psetta maxima*  
06.12.11 - *Tisbe battagliai*

Test Parameter	Test Results			
	Concentration % vol./vol.	Toxic Units	95% Confidence Limits % vol./vol.	Method of Calculation
96 h LC <sub>50</sub> to <i>Psetta maxima</i>	>32	<3.1	n/a	n/a
48 h LC <sub>50</sub> to <i>Tisbe battagliai</i>	>32	<3.1	n/a	n/a

**Comments:**

**96 h LC<sub>50</sub> to *Psetta maxima***  
No mortality occurred at 32% vol./vol.

**48 h LC<sub>50</sub> to *Tisbe battagliai***  
No mortality occurred at 32% vol./vol.

**Test Method(s): (see Appendix on back of page 4)**

Method 7: Marine fish, *Psetta maxima* (turbot)  
Method 3: Marine copepod, *Tisbe battagliai*

Fig 2.1.1: Toxicity Test Results 2011

**TOXICOLOGICAL ANALYSIS REPORT** Form No.: ToxF035-1 Ver 2.3

**TEST RESULTS**

**Customer:** GE Energy (Ireland) Ltd

**Customer sample description:** Final effluent, grab sample, 05.12.11

**Tox. Ref. No.:** 11T148

**Test Date:** 06.12.11 – *Skeletonema costatum*  
07.12.11 – *Vibrio fischeri*

Test Parameter	Test Results		95% Confidence Limits % vol./vol.	Method of Calculation
	Concentration % vol./vol.	Toxic Units		
72 h IC <sub>50</sub> to <i>Skeletonema costatum</i>	16.2	6.2	6.7-37.4	Log-linear Interpolation
30 min EC <sub>50</sub> to <i>Vibrio fischeri</i>	>45	<2.2	n/a	n/a

**Comments:**

**72 h IC<sub>50</sub> to *Skeletonema costatum***  
82% growth inhibition occurred at 32% vol./vol.  
55% growth inhibition occurred at 18% vol./vol.  
27% growth inhibition occurred at 10% vol./vol.  
3% growth inhibition occurred at 5.6% vol./vol.  
- compared to the control.

**30 min EC<sub>50</sub> to *Vibrio fischeri***  
No light inhibition occurred at 45% vol./vol.  
- compared to the control.

**Test Method(s): (see Appendix on back of page 4)**  
Method 4: Marine alga, *Skeletonema costatum*  
Method 2: Marine copepod, *Vibrio fischeri*

Fig 2.1.2: Toxicity Test Results 2011



## 2.2 Ground Water Analysis Summary

Due to a contractual misunderstanding ground water well monitoring was carried out for one well only during 2011 (results contained below). The ground water wells onsite were put in place during the final stages of site construction in November 2010 and the location of a small number wells had to be altered slightly due to site layout. In late 2011 a revised GPS survey was carried out to ascertain exact location of all wells. A project is currently ongoing to erect permanent signage at all groundwater wells, with samples being taken and analysed as agreed with the agency.

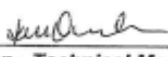


Unit 35,  
Boynes Business Park,  
Drogheda,  
Co. Louth  
Ireland  
Tel: +353 41 9846440  
Fax: +353 41 9846171  
Web: www.fitzsci.ie  
email: info@fitzsci.ie

Customer	Benedetta Gafforio GE Energy GE Energy Services Office Fort Davis rd, Whitegate Cork	Lab Report Ref. No.	0141/001/03
Customer PO		Date of Receipt	01/07/2011
Customer Ref	GW (#11)	Sampled On	01/07/2011
		Date Testing Commenced	01/07/2011
		Received or Collected	By Fitz/Victor
		Condition on Receipt	Acceptable
		Date of Report	11/07/2011
		Sample Type	Groundwater

### **CERTIFICATE OF ANALYSIS**

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Arsenic (Ground Water)	177	ICPMS	0.993	ug/L	UKAS
Cadmium (Ground Water)	177	ICPMS	<0.09	ug/L	UKAS
Chromium (Ground Water)	177	ICPMS	<2.14	ug/L	UKAS
Cobalt (Ground Water)	177	ICPMS	0.291	ug/L	UKAS
Conductivity (Ground Water)	112	Electrometry	537	uscm -1@25C	UKAS
Copper (Ground Water)	177	ICPMS	1.182	ug/L	UKAS
Lead (Ground Water)	177	ICPMS	0.099	ug/L	UKAS
Manganese (Ground Water)	177	ICPMS	10.32	ug/L	UKAS
Mercury (Ground water)	178	ICPMS	<0.04	ug/L	UKAS
Nickel (Ground Water)	177	ICPMS	0.424	ug/L	UKAS
pH (Ground Water)	110	Electrometry	7.9	pH Units	UKAS
Tin	177	ICPMS	<2.8	ug/L	
Titanium	227	ICPMS	<5	ug/L	
TPH (>C10-40)	188	GC-FID	<1	ug/L	

Signed:   
**Katherine McQuillan - Technical Manager**

Date: 11/7/11

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 shall not be reproduced, except in full, without the approval of Fitz Scientific  
Results contained in this report relate only to the samples tested

\*\*The analytical result for this parameter may not be reflective of the concentration present at the time of sampling. The maximum recommended preservation time for this parameter has been exceeded.

Page 1 of 1

Fig 2.2.1: Ground Water Test Results 2011

## 2.3 Emissions to Atmosphere Summary

Parameter	Mass Emission [kg/yr] 2010
Oxides of Sulphur	120,372
Nitrogen Oxides (as NO <sub>2</sub> )	586,994
Dust	19,541

Table 2.3.1: Emissions to Atmosphere Summary 2010

Parameter	Mass Emission [kg/yr] 2011
Oxides of Sulphur	34,601
Nitrogen Oxides (as NO <sub>2</sub> )	477,223
Dust	11,095

Table 2.3.2: Emissions to Atmosphere Summary 2011

No emissions to atmosphere non-compliances were recorded in 2011

Year	Non-Compliances	Cause	Corrective Action
2011	None	Not Applicable	Not Applicable

Table 2.3.3: Emissions to Atmosphere. Summary of Non-Compliances

## 2.4 Waste Management Report Summary

Waste	2010 [tonnes]
<b>Total quantity of waste produced in a calendar year</b>	6,668
Total quantity of waste disposed of on site	0
Total quantity of waste disposed of off site	6,668
Total quantity of waste recovered on site	0
Total quantity of waste recovered off site	0
	<b>2010 [tonnes]</b>
<b>Total quantity of non-hazardous waste produced in a calendar year</b>	6,599
Total quantity of non-hazardous waste disposed of on site	0
Total quantity of non-hazardous waste disposed of off site	6,599
Total quantity of non-hazardous waste recovered on site	0
Total quantity of non-hazardous waste recovered off site	0
	<b>2010 [tonnes]</b>
<b>Total quantity of hazardous waste produced in a calendar year</b>	69
Total quantity of hazardous waste disposed of on site	0
Total quantity of hazardous waste disposed of off site	69
Total quantity of hazardous waste recovered on site	0
Total quantity of hazardous waste recovered off site	0

Table 2.4.1: Waste disposal report summary 2010

<b>Waste</b>	<b>2011 [tonnes]</b>
<b>Total quantity of waste produced in a calendar year</b>	1,484
Total quantity of waste disposed of on site	0
Total quantity of waste disposed of off site	1,484
Total quantity of waste recovered on site	0
Total quantity of waste recovered off site	0
	<b>2011 [tonnes]</b>
<b>Total quantity of non-hazardous waste produced in a calendar year</b>	1,055
Total quantity of non-hazardous waste disposed of on site	0
Total quantity of non-hazardous waste disposed of off site	1,055
Total quantity of non-hazardous waste recovered on site	0
Total quantity of non-hazardous waste recovered off site	0
	<b>2011 [tonnes]</b>
<b>Total quantity of hazardous waste produced in a calendar year</b>	430
Total quantity of hazardous waste disposed of on site	0
Total quantity of hazardous waste disposed of off site	430
Total quantity of hazardous waste recovered on site	0
Total quantity of hazardous waste recovered off site	0

Table 2.4.2: Waste disposal report summary 2011

## 2.5 Agency Monitoring and Enforcement

### **Emissions to Water Agency Inspections:**

During the course of 2011 the agency took wastewater emission samples from SW1 and SW2 on two occasions during which all parameters were checked as per IPPC licence limits.

### **Emissions to Air Agency Inspections:**

During the course of 2011 the agency carried out monitoring of the sites main stack (emission point reference A2-1) and all parameters were checked against IPPC licence limits.

### 3 ENERGY AND WATER CONSUMPTION

Energy Consumption		Unit	2010
Heavy fuel Oil	[M <sup>3</sup> /yr]		0
Light Fuel Oil	[M <sup>3</sup> /yr]		8,254
Natural Gas	[M <sup>3</sup> /yr]		136,334,658
Electricity	[MWhr]		30,047
Coal	[Kg/yr]		0

Table 3.1: Energy Consumption for 2010

Energy Consumption		Unit	2011
Heavy fuel Oil	[M <sup>3</sup> /yr]		0
Light Fuel Oil	[M <sup>3</sup> /yr]		187,204
Natural Gas	[M <sup>3</sup> /yr]		432,839,938
Electricity	[MWhr]		49,133
Coal	[Kg/yr]		0

Table 3.2: Energy Consumption for 2011

Water Consumption	Unit	2010
On-site groundwater	[M <sup>3</sup> /yr]	--
On-site surface water	[M <sup>3</sup> /yr]	--
Municipal supply	[M <sup>3</sup> /yr]	129,149

Table 3.3: Water Usage for 2010

Water Consumption	Unit	2011
On-site groundwater	[M <sup>3</sup> /yr]	--
On-site surface water	[M <sup>3</sup> /yr]	--
Municipal supply	[M <sup>3</sup> /yr]	77,566

Table 3.4: Water Usage for 2011

## 4 ENVIRONMENTAL INCIDENTS AND COMPLAINTS

### 4.1 Reported Incidents Summary

There was one (1) reportable environmental incident recorded in 2011.

Date	From	Reported to	EPA Incident Category	Brief description of the incident	Brief description of corrective action taken
Nov 29 <sup>th</sup> 2011	SW1	EPA Inspector	Cat 1	BOD reading of 40 mg/l, IPPC licence limit of 20 mg/l -- Faulty heat exchanger in which glycol leaked into the process blow-down water	Heat exchanger isolated. TOC meter installation planned for blow-down water return line.

*Table 4.1.1: Summary of incidents reported to the Agency during 2011.*

### 4.2 Summary of Complaints and Conclusions Drawn

The site had zero (0) environmental complaints during 2011.

## 5 MANAGEMENT OF THE ACTIVITY

### 5.1 Environmental Management Programme (EMP) Report

#### 5.1.1 *Objectives and Targets*

Whitegate Power Station is engaged and committed to a process of continuous improvement across all aspects of environmental management. While the primary focus will always be on maintaining compliance with the IPPC licence, keeping abreast with best industry practise and benchmarking performance against best in class are additional and parallel goals for the power station. To this end, and in line with IPPC licence conditions, environmental objectives and targets are set for the site, targeting specific areas where performance can be improved and/or risk of non-compliance can be reduced or eliminated.

In terms of environmental management, the power station operates under the umbrella of a site wide Quality System, from which all aspects of Operations and Maintenance (O&M), Environmental, Health and Safety (EHS), Procurement, etc, are established. This Quality System effectively guides how the power station is managed and provides the linkages to all of the various aspects of power station operations. Within this Quality System is found the Environmental Management System, under which objectives and targets are set for the power station. These objectives and targets are reviewed annually in line with AER reporting, but are also reviewed quarterly to monitor progress on current year objectives and targets. The review process is undertaken by station senior management and involves representatives from across all departments.

#### 5.1.2 *Review of 2011*

With the power station going into commercial operations during November 2010, the latter part of that year and all of 2011 was focused on maintaining compliance with the IPPC licence, rolling out the environmental management system for the power station and collecting operational data. Target areas of specific interest for 2011 are outlined below in Table 5.1.1, and generally centred on energy, waste, water and noise management.

For the most part, the objectives and targets set for 2011 were well achieved, given that it was the first full year's operation of the power station. The main focus was on data collection and building up operational profiles across the power station. The intent is that these profiles will allow for detailed analysis of relevant power station environmental related operations to be undertaken, highlighting areas where best industry practice is effective and areas where improvements can be achieved.

The power station now has a full year's data on energy usage and has built up an operational profile of overall energy efficiency that is monitored daily. The main focus on energy efficiency will always be on the conversion of natural gas (or distillate) into electricity, which is monitored on a daily basis. Examples of other areas of the power station operations where energy efficiency will be considered in future years will include the use of auxiliary power, lighting and heating systems for offices.

Water usage has also been monitored closely, with a model of water flows and demands developed. From this model a project has emerged whereby process improvements are being assessed with respect to the recirculation of water on site and recycling of good quality process water.

A waste management program was rolled out across the site during 2010 and 2011 and improvements have been identified in the process with respect to waste handling and segregation.

During 2011, on and off-site noise monitoring identified one particular area of the plant that had the potential to increase overall noise emissions. Operational and procedural changes were introduced to the area of plant in question to reduce the risk of any noise impact from the source.

### *5.1.3 Proposed for 2012*

The objectives and targets set for 2012 are outlined in Table 5.1.2 below. There will be continued focus across the power station on energy, waste, water and noise management, with several of the objectives and targets from 2011 extending into 2012 as on-going improvement projects.

New objectives and targets for 2012 include (1) auditing of the Continuous Emissions Monitoring System (CEMS) to 'Qual 3' standards, (2) gaining accreditation to ISO 14001 and (3) complete and implement the Bund Testing program.

#### 5.1.4 EMP 2011 Report

Task Area	Environmental Objectives	Action Plan	Responsible Function	Timeframe	Status
<b>Waste Management</b>	1.Reduce waste generated on site. 2.Improve on handling system.	<ul style="list-style-type: none"> <li>• Develop baseline for waste reduction program.</li> <li>• Improve segregation system.</li> </ul>	EHS Lead	Q4 2011	<p><b><u>Complete</u></b></p> <p>A recycling initiative was introduced to site in late 2011 and composting of food waste was also introduced.</p>
<b>Energy Management</b>	1. Improve energy efficiency across the site.	<ul style="list-style-type: none"> <li>• Complete data collection and analysis.</li> <li>• Develop baseline for energy efficiency improvement project definition.</li> </ul>	Operations Manager	Q4 2011	<p><b><u>Complete- 1<sup>st</sup> Phase</u></b></p> <p>Phase 2: Data analysis to identify and target future energy reduction projects, followed with feasibility studies.</p> <p>The primary focus will revolve around maximising plant efficiency in relation to primary energy inputs (natural gas) and primary energy outputs (electricity)</p>
<b>Water Usage</b>	1. Reduce water consumption across the site.	<ul style="list-style-type: none"> <li>• Develop baseline water usage model for normal and emergency operations.</li> <li>• Identify critical water streams and characterization.</li> <li>• Identify improvement areas.</li> </ul>	EHS Lead	Q4 2011	<p><b><u>Complete.</u></b></p> <p>Baseline water usage established for 2011 and plant is currently involved in a project to minimise water usage onsite</p>
<b>Water Discharges</b>	1.Reduce usage of chemicals	<ul style="list-style-type: none"> <li>• Reduce usage of chemicals</li> <li>• Optimize chemicals dosing systems.</li> </ul>	Operations Manager	Q2 2012	Not due until 2012
<b>Air Emissions</b>	1. Enhanced Management System.	<ul style="list-style-type: none"> <li>• Identify certification body and implement actions as per QAL3 standard.</li> <li>• Obtain CEMS QAL3 certification or equivalent</li> </ul>	Maintenance Manager	Q4 2012	Not due until 2012
<b>Environmental Management</b>	1. Enhanced Management System	<ul style="list-style-type: none"> <li>• Complete certification road map and apply for certification audit.</li> <li>• Obtain ISO 14001 certification.</li> </ul>	EHS Lead	Q4 2012	Not due until 2012
<b>Noise</b>	1. Reduce number of complaints received by surrounding community.	<ul style="list-style-type: none"> <li>• Identify high impact noise sources</li> <li>• Assess suitability of each source for abatement</li> </ul>	Maintenance Manager	Q2 2011	<p><b><u>Complete.</u></b></p> <ul style="list-style-type: none"> <li>• Identified the hogger as a potential source of high impact noise.</li> <li>• Changed operating methodology of hogger to avoid any excess noise.</li> <li>• Zero noise complaints for 2011</li> </ul>



<b>Fugitive Emissions</b>	1.Reduce fugitive emissions	<ul style="list-style-type: none"> <li>• Carry out survey of all flanges and valves</li> <li>• Evaluate provision of catchment system for flanges and valves.</li> </ul>	Operations Manager	Q3 2011	<p><b><u>Complete.</u></b></p> <ul style="list-style-type: none"> <li>• A number of areas were identified and these will addressed as part of capital projects in 2012.</li> </ul>
<b>Bunding</b>	1.Maintain Integrity.	<ul style="list-style-type: none"> <li>• Development of program for testing the bund integrity over 3 years.</li> </ul>	Maintenance Manager	Q3 2012	Not due until 2012
<b>Underground pipes, tanks</b>	1.Maintain Integrity.	<ul style="list-style-type: none"> <li>• Development of program for testing the bund integrity over 3 years.</li> </ul>	Maintenance Manager	Q3 2013	Not due until 2013

Table 5.1.4.1: Summary of EMP for 2011

5.1.5 EMP 2012 Proposal

Task Area	Environmental Objectives	Action Plan	Responsible Function	Timeframe	Status
<b>Waste Management</b>	<ol style="list-style-type: none"> <li>1. Reduce waste generated on site.</li> <li>2. Improve waste handling on system.</li> </ol>	<ul style="list-style-type: none"> <li>• Using data generated during 2011, undertake a waste management audit.</li> <li>• Use audit to identify a suitable waste reduction program.</li> </ul>	EHS Lead	Q2 2012	Phase 2 of waste management program on-going.
<b>Energy Management</b>	<ol style="list-style-type: none"> <li>1. Improve energy efficiency across the site.</li> </ol>	<ul style="list-style-type: none"> <li>• Using data generated during 2011, identify a suitable energy efficiency program.</li> </ul>	Operations Manager	Q1 2013	Phase 2 of Energy Management program on-going.
<b>Water Usage</b>	<ol style="list-style-type: none"> <li>1. Reduce water usage on site.</li> </ol>	<ul style="list-style-type: none"> <li>• Collect baseline data.</li> <li>• Using data from 2011 develop a water management program.</li> </ul>	Operations Manager	Q4 2012	On-going. Due 2012.
<b>Waste Discharge</b>	<ol style="list-style-type: none"> <li>1. Reduce usage of chemicals</li> </ol>	<ul style="list-style-type: none"> <li>• Identify operational profile of chemical dosing system and usage drivers.</li> <li>• Establish new operations plan to optimize chemicals dosing systems.</li> </ul>	Operations Manager	Q2 2013	On-going. Due 2013.
<b>Air Emissions</b>	<ol style="list-style-type: none"> <li>1. Enhanced Management System</li> </ol>	<ul style="list-style-type: none"> <li>• Identify certification body and implement actions as per QAL3 standard.</li> <li>• Obtain CEMS QAL3 certification or equivalent.</li> </ul>	Maintenance Manager	Q4 2012	On-going. Due 2012.
<b>Environmental Management</b>	<ol style="list-style-type: none"> <li>1. Enhanced Management System</li> </ol>	<ul style="list-style-type: none"> <li>• Complete certification road map and apply for certification audit.</li> <li>• Obtain ISO 14001 certification.</li> </ul>	EHS Lead	Q4 2012	On-going. Due 2012.
<b>Noise</b>	<ol style="list-style-type: none"> <li>1. Maintain noise under IPPC licence limits.</li> <li>2. Reduce noise where possible.</li> </ol>	<ul style="list-style-type: none"> <li>• Identify areas of the plant where noise abatement could be utilised effectively.</li> <li>• Establish a noise management program to compliment IPPC Licence requirements.</li> </ul>	Maintenance Manager	Q2 2013	On-going. Due 2013.

<b>Reduction of fugitive emissions</b>	1. Reduce fugitive emissions	<ul style="list-style-type: none"> <li>• Install catchment systems in areas identified during the 2011 survey.</li> </ul>	Operations Manager	Q2 2013	On-going. Due 2013.
<b>Bunding</b>	1. Maintain Integrity	<ul style="list-style-type: none"> <li>• Development of program for testing the bund integrity over 3 years.</li> </ul>	Maintenance Manager	Q3 2012	On-going. Due 2012.
<b>Underground pipes, tanks</b>	1. Maintain Integrity	<ul style="list-style-type: none"> <li>• Development of program for testing the underground pipes over 3 years.</li> </ul>	Maintenance Manager	Q3 2013	On-going. Due 2013.

Table 5.1.5.1: Summary of EMP for 2012

## 5.2 Pollution Emission Register

### 5.2.1 *PRTR 2011 Report*

The PRTR for 2011 has been submitted electronically to the Agency on the 30<sup>th</sup> March 2012.

### 5.2.2 *PRTR 2012 Proposal*

The proposed PRTR for 2012 is reported in Table 5.2.2.1 below

<b>AIR</b>
Nitrogen oxides (NOx/NO2)
Carbon dioxide (CO2)
Carbon monoxide (CO)
Particulate matter (PM10)
Sulphur oxides (SOx/SO2)
<b>WATER</b>
Total nitrogen
Total phosphorus
BOD
Suspended Solids
Total Dissolved Solids
<b>WASTE</b>
Lab smalls/ acid
Mercury compounds
Paint related material
Used resin
Waste oil
Oilv water
Wood pallets & wood packaging
Mixed Recyclables
Oilv rags and absorbents
Steel oil drums (contaminated)
WEEE (discarded electrical equipment)
Ammonia waste
Aerosols
Oxidizers
Sodium and Potassium Hydroxide waste
Hydrochloric acid waste
Discarded inorganic chemicals consisting of or containing
Blade wash rinse water
Metal waste
Concrete waste
Discharge lamps
Waste printer toners
Waste Batteries
Aqueous washing liquids and other liquors
Aerosols
Domestic and canteen wastes

Table 5.2.2.1: PRTR Proposal for 2012

## 6 LICENCE SPECIFIC REPORTS

The power station achieved commercial operations on the 8<sup>th</sup> November 2010 and at year end 2011 has just over 13 months of full operations logged. A significant portion of 2011 was given over to the collation of all relevant operational data to ensure that plant efficiency was maximised and as per design specifications. The power station is working towards completing all reports and assessments outlined in Schedule D of the IPPC Licence.

The power station continually monitors the overall energy efficiency of the plant, with a particular focus on maintaining overall plant design efficiency, given the ambient conditions experienced during the year. Daily monitoring and reporting is carried out on input energy (natural gas or distillate) and output energy (electricity), to track the overall efficiency of the power station. Further monitoring and reporting includes weekly and monthly reporting to senior management on operational efficiencies.

During 2011, Bord Gais and the gas turbine manufacturer General Electric, identified software and hardware upgrades that could improve operational performance, including heat rate. These modifications have been factory designed and tested by GE, with the Whitegate site being used as a validation site. Actual results from the upgrades are not yet known and will be reported post installation, testing and validation.

The following items outlined in Schedule D of the IPPC licence are planned for completion during 2012:

- Energy efficiency audit report and summary.
- Report on the assessment of efficiency of use of raw materials in processes and the reduction in waste generated.
- Report on progress made and proposals being developed to minimise water demand and the volume of trade effluent discharge.

### 6.1 Appendix 1 – Tank and Pipeline Inspection Report

The construction of the project was completed during November 2010. Tank and pipeline inspections were completed during the construction phase, details of which are available in the Turn Over Packages (TOP's) supplied by the contractor. These TOPs have not been included in the AER but are available for inspection on site.

## 6.2 Appendix 2 - Bund Integrity Test Report

<b>Bund</b>	<b>Date tested</b>	<b>Result [Pass/Fail]</b>	<b>Action</b>
Lube Oil Tank	23/01/2009	Pass	No action
Hydraulic Power Unit	03/02/2009	Pass	No action
GT Fuel Drain	31/03/2009	Pass	No action
Fin Fan Cooler	03/04/2009	Pass	No action
Vacuum Flash Tank	06/04/2009	Pass	No action
Isolation Transformer	22/04/2009	Pass	No action
Main Transformer	24/04/2009	Pass	No action
Water Treatment Building Dosing Tank	24/04/2009	Pass	No action
Fire Fighting room fuel tank	24/04/2009	Pass	No action
Auxiliary Transformer	05/05/2009	Pass	No action
Excitation Transformer	22/05/2009	Pass	No action
Attenuation Tank	24/06/2009	Pass	No action
Fuel Gas Performance Manhole	21/07/2009	Pass	No action
Aux D.O. Tank	27/07/2009	Pass	No action
WTP Chemical Dosing	14/08/2009	Pass	No action
ETP Chemical Dosing	14/08/2009	Pass	No action
Fuel Oil Bund	09/10/2009	Pass	No action

Table 6.2.1: Bund Integrity Test Results Summary

Certification was provided for each bund as part of the AER 2010.

## 6.3 Appendix 3 - Environmental Liabilities Risk Assessment

The version of the above mentioned document submitted under the AER for 2010 remains unchanged and has not been included with this AER for 2011.

## 6.4 Appendix 4 - Decommissioning Management Plan

The version of the above mentioned document submitted under the AER for 2010 remains unchanged and has not been included with this AER for 2011.

## 6.5 Appendix 5 - Individual Waste Stream Quantities



(PRTR: P0830) Facility Name: Bord Gais Eireann; Filename: P0830-01 PRTR 2011 (submitted).xml; Return Year: 2011

30/03/2012 09:21

[Guidance to completing the PRTR workbook](#)

### AER Returns Workbook

Version 1.1.02

REFERENCE YEAR	2011
----------------	------

#### 1. FACILITY IDENTIFICATION

Parent Company Name	Bord Gais Eireann
Facility Name	Bord Gais Eireann
PRTR Identification Number	P0830
Licence Number	P0830-01

Waste or IPPC Classes of Activity	
No.	class_name
2.1	The operation of combustion installations with a rated thermal input equal to or greater than 50MW

Address 1	Gas Works Road
Address 2	Cork
Address 3	
Address 4	
Country	Cork
Country	Ireland
Coordinates of Location	-8.25029 51.8149
River Basin District	ESW
NACE Code	3521
Main Economic Activity	Manufacture of gas
AER Returns Contact Name	Mr Declan Lynch
AER Returns Contact Email Address	deylnc@bordgais.ie
AER Returns Contact Position	Senior Engineer
AER Returns Contact Telephone Number	021 4907250
AER Returns Contact Mobile Phone Number	087 6739559
AER Returns Contact Fax Number	021 490 7201
Production Volume	0.0
Production Volume Units	
Number of Installations	0.0
Number of Operating Hours In Year	
Number of Employees	
User Feedback/Comments	
Web Address	

#### 2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
1(c)	Thermal power stations and other combustion installations

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

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

4.1 RELEASES TO AIR

[Click to review your activities data](#)

(PRTR - 2020) (Facility Name: Red Sea Brown) (Release - 2020) (PRTR 2017) (quantity:kg) (Release Year: 2017)

20200701 00:21

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT		METHOD			QUANTITY			
No. Annex II	Name	MCOE	Method Used		Emission Point 1	T (Total) kg/Year	A (Accidental) kg/Year	F (Fugitive) kg/Year
			Method Code	Designation or Description				
06	Nitrogen oxides (NOx/NO2)	M	ALT	EN15267-3: 2007	47723.0	47723.0	0.0	0.0
02	Carbon dioxide (CO2)	C	ETS		868183.0	868183.0	0.0	0.0
02	Carbon monoxide (CO)	M	ALT	EN15267-3: 2007	23981.0	23981.0	0.0	0.0
06	Particulate matter (PM10)	C	OTH	USEPA Method 5D	11095.0	11095.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	ALT	EN15267-3: 2007	34801.0	34801.0	0.0	0.0

\* Select a row by double clicking on the Pollutant Name (Column 6) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

POLLUTANT		METHOD			QUANTITY			
No. Annex II	Name	MCOE	Method Used		Emission Point 1	T (Total) kg/Year	A (Accidental) kg/Year	F (Fugitive) kg/Year
			Method Code	Designation or Description				
						0.0	0.0	0.0

\* Select a row by double clicking on the Pollutant Name (Column 6) then click the delete button

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

POLLUTANT		METHOD			QUANTITY			
Pollutant No.	Name	MCOE	Method Used		Emission Point 1	T (Total) kg/Year	A (Accidental) kg/Year	F (Fugitive) kg/Year
			Method Code	Designation or Description				
						0.0	0.0	0.0

\* Select a row by double clicking on the Pollutant Name (Column 6) 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 utilized on their facilities to accompany the figures for total methane generated. Operators should only report their total methane (CH4) emission to the environment under (table 4.33a) for Section A, sector specific PRTR pollutants above. Please complete the table below.

Landfill:

Red Sea Brown

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

	T (Total) kg/Year	MCOE	Method Used		Facility Total Capacity m3 per hour
			Method Code	Designation or Description	
Total estimated methane generation (as per site model)	0.0				N/A
Methane flared	0.0				0.0 (Total Flaring Capacity)
Methane utilized in engines	0.0				0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A



4.2 RELEASES TO WATERS

[Link to previous years emissions data](#)

[ PRTR : P030 | Facility Name : Irod Gala Glass | Pname : P030-01 PRTR 2011.xlsx | Return Year : 2011 ]

30/03/2012 09:30

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of stormwater or groundwater, conducted as part of your license requirements, should NOT be submitted under ABR / PRTR Reporting as this only concerns Releases from your facility

POLLUTANT		RELEASERS TO WATERS			Please enter all quantities in this section in KGs				
No. Annex II	Name	WC/E	Method Used		QUANTITY				
			Method Code	Designation or Description	SW1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
12	Total nitrogen	M	ALT	ISO 17025:2005	Emission Point 1	12.54	12.54	0.0	0.0
13	Total phosphorus	M	ALT	ISO 17025:2005	Emission Point 1	29.78	29.78	0.0	0.0

\* Select a row by double-clicking on the Pollutant name (Column 1) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

POLLUTANT		RELEASERS TO WATERS			Please enter all quantities in this section in KGs				
No. Annex II	Name	WC/E	Method Used		QUANTITY				
			Method Code	Designation or Description	SW1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
					Emission Point 1	0.0	0.0	0.0	0.0

\* Select a row by double-clicking on the Pollutant name (Column 1) then click the delete button

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

POLLUTANT		RELEASERS TO WATERS			Please enter all quantities in this section in KGs				
Pollutant No.	Name	WC/E	Method Used		QUANTITY				
			Method Code	Designation or Description	SW1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
303	BOD	M	ALT	ISO 17025:2005	Emission Point 1	344.03	344.03	0.0	0.0
340	Suspended Solids	M	ALT	ISO 17025:2005	Emission Point 1	426.26	426.26	0.0	0.0
363	Total Dissolved Solids	M	ALT	ISO 17025:2005	Emission Point 1	48411.0	48411.0	0.0	0.0

\* Select a row by double-clicking on the Pollutant name (Column 1) then click the delete button

**2. SOLIDS TREATMENT & OFFSITE TRANSFERS OF SOLIDS**

12/17/2024 1:00 PM Production - San Ben County (Review) - 02/04/2025 09:38 (modified) (show Year: 2024)

02/04/2025 10

Table with 4 columns: Transfer Location, Quantity (Tons per Year), Description of Waste, Waste Treatment Operation

Transfer Location	Regulatory Waste Code	Description	Quantity (Tons per Year)	Description of Waste	Waste Treatment Operation	Material Used		Location of Treatment	Description, Name and Location of the Facility Receiving or Storing the Material	Description, Name and Location of the Receiving Facility (including Address of Receiving Facility)	Regulatory Waste Code (including other codes, if applicable)	Transfer and/or Storage Manifest and/or Reporting Form (including Waste ID #)	Other Location of Transfer or Storage (including Address of Facility)
						WTCB	Material Used						
Within the County	01 01 26	No	144.03	residue from cooling water treatment	08	01	Integrated	Offsite in Island	Shore Island L&M 156 01	Industrial Inorganic waste (Slurries, Slimes, etc.) (see 01)		Shore Island L&M 156 01	Shore Island
Within the County	01 08 13	Yes	44.27	sludge containing dangerous substances from off-site treatment of industrial waste water	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Controlled Solid Waste, Hazardous Waste	Controlled Solid Waste, Hazardous Waste
To Other Countries	01 01 06	Yes	0.006	Residual organic chemicals consisting of a waste containing dangerous substances	01 10	01	Integrated	Aboard	BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste		BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste
To Other Countries	01 01 07	Yes	0.012	Residual inorganic chemicals consisting of a waste containing dangerous substances	01 10	01	Integrated	Aboard	BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste		BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste
Within the County	01 01 14	No	0.001	residue coming from other than bleed treatment in 20 02 07	01 10	01	Integrated	Offsite in Island	Reuter Imaging Supplies LLC 0509 15009 0169 1 01	Controlled Solid Waste, Hazardous Waste		Reuter Imaging Supplies LLC 0509 15009 0169 1 01	Offsite in Island
To Other Countries	01 02 11	Yes	0.003	bleed wastes (including volumes of materials from mechanical treatment of waste containing dangerous substances)	01	01	Integrated	Aboard	Reuter Imaging Supplies LLC 0509 15009 0169 1 01	Dangerous Waste		Reuter Imaging Supplies LLC 0509 15009 0169 1 01	Dangerous Waste
Within the County	07 02 01	Yes	0.004	sludge containing sulfur and sulfur dioxide	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 15	Yes	0.123	sludge containing residues of a substance listed by dangerous substances	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
To Other Countries	01 01 02	Yes	0.127	sludges, the materials (including all sludge) (sludge specified), cooling sludge produced during combustion by dangerous substances	01 10	01	Integrated	Aboard	BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste		BOYA, Boya & Co. KOLAS 1300006, Tokoroide 1, 20041, Bunkyo-ku, Tokyo	Dangerous Waste
Within the County	01 02 08	Yes	1.002	bleed engine gas and scrubbing oil	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 06 02	Yes	0.007	bleed emulsions	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 07 01	Yes	4.006	fuel oil and bleed	01	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	07 01 04	Yes	0.013	bleed engine exhausts including sulfur and sulfur dioxide	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 07	Yes	0.017	Residual inorganic chemicals consisting of a waste containing dangerous substances	01 10	01	Integrated	Offsite in Island	Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste		Van Dyke Environmental Services LLC 028000 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 28	No	480.0	residue from cooling water treatment	08	01	Volume Calculation	Offsite in Island	Shore Island L&M 156 01	Industrial Inorganic waste (Slurries, Slimes, etc.) (see 01)		Shore Island L&M 156 01	Shore Island
Within the County	01 01 29	No	480.0	residue from cooling water treatment	08	01	Volume Calculation	Offsite in Island	Shore Island L&M 156 01	Industrial Inorganic waste (Slurries, Slimes, etc.) (see 01)		Shore Island L&M 156 01	Shore Island
Within the County	01 01 09	Yes	27.0	hydrochloric acid	08	01	Volume Calculation	Offsite in Island	Shore Island L&M 156 01	Industrial Inorganic waste (Slurries, Slimes, etc.) (see 01)		Shore Island L&M 156 01	Shore Island
Within the County	01 01 04	Yes	80.0	sulfuric acid and potassium hydroxide	08	01	Volume Calculation	Offsite in Island	Shore Island L&M 156 01	Industrial Inorganic waste (Slurries, Slimes, etc.) (see 01)		Shore Island L&M 156 01	Shore Island
Within the County	21 01 01	No	0.004	metal recycling waste	01	01	Integrated	Offsite in Island	Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste		Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 08	No	1.759	metal packaging	01	01	Integrated	Offsite in Island	Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste		Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 05	No	0.04	metal other than that described in 20 01 07	01	01	Integrated	Offsite in Island	Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste		Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste
Within the County	01 01 40	No	0.0	waste	04	01	Integrated	Offsite in Island	Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste		Shore Island L&M 156 01	Controlled Solid Waste, Hazardous Waste

1) Reporting by Volume Based on Sampling of Waste from Storage Areas on-site

## 6.6 Appendix 6 - Noise Monitoring Report

Attached below is the noise monitoring report for monitoring that was carried out during December 2011.



Monitoring and Testing Services

## GE Energy Whitegate

Bord Gais Site  
Whitegate IPP  
East Cork  
Co. Cork

### Day and Night Time Noise Survey

Report Date:  
20<sup>th</sup> December 2011

***Fitz Scientific***

*35A Boyne Business Park, Drogheda, Co. Louth*

Report No. 7140/M02

## 1.0 Introduction

Timmy Carey of GE Energy commissioned Fitz Scientific to carry out a day time and night time noise survey on five noise monitoring locations around the GE Energy premises, Bord Gais Site, Whitegate IPP, East Cork, Co. Cork. GE Energy is required to carry out an annual noise survey in accordance with Condition 6 of their IPPC licence number P0830-01. Activities on the site continued as normal in all of the five monitoring locations.

The GE Energy facility in Whitegate operates on a day time and night time basis.

## 2.0 Duration and Measurements of Surveying

The noise survey was carried out between 15:34 and 18:25 on Monday, 12<sup>th</sup> December 2011 and between 22:29 and 01:18 on the 13<sup>th</sup> of December 2011. The following measurements were carried out at each site:

- Day time and Night time Broadband measurements  $L(A)_{eq}$ ,  $L(A)_{10}$ ,  $L(A)_{90}$ ,  $L(A)_{50}$ ,  $L(A)_1$  and  $L(A)_{99}$  over a 30-minute period.
- Day time and Night time 1:3 Octave measurements over a 30-minute period.

## 2.1 Description of Measurement Parameters

- 2.1.1  **$L_{eq}$  Values:**  $L_{eq}(t)$  values represent the continuous equivalent sound level over a specified time (t). This value expresses the average levels over time and is a linear integral.
- 2.1.2  **$L_{90}$  and  $L_{10}$  Values:** The  $L_{90}$  and  $L_{10}$  are statistical values which represent the sound levels exceeded for a percentage of the measurement time.  $L_{10}$  indicates the sound levels exceeded for the 10% of the monitoring period while  $L_{90}$  indicates the sound levels exceeded for 90% of the monitoring period. The  $L_{90}$  value is a good indication of background noise levels.
- 2.1.3 **Tonal and Impulsive Characteristics:** Tonal noise is characterised in accordance with ISO 1996-2, which indicates that a noise source being tonal at a particular frequency is either clearly audible or exceeds the level of the adjacent bands by 5dB or more. An impulsive noise is of short duration (typically less than 1 second), it is brief and abrupt, and its startling effect causes greater annoyance than would be expected from a simple measurement of sound pressure level. For example an instantaneous bang/thud that may be associated with pile driving, hammering etc.

## 3.0 Weather Conditions

Weather conditions were cool, wet and overcast for the duration of the day time survey, with a moderate wind of <5m/sec blowing.

Weather conditions at night were cold, wet with a moderate wind of <5m/sec blowing.

#### **4.0 Location of Monitoring Points**

Southwest Site Boundary was located inside the southwest boundary of the power plant side to provide a baseline reference noise level.

Houses at Fort Davis, was located at Fort Davis Road in the side garden of the Murray residence approximately 7 meters away from the house.

Roches Point Road (Location 1) was located near the beach car park opposite the entrance of a house. The monitoring location was at an elevated position approximately 15 meters from the front of the house and over 700 metres from the southern boundary of the refinery.

Roches Point Road (Location 2) was located opposite the residences on Roches point road near Trabolgan crossroads approximately 15 metres from the front of two houses and approximately 1 kilometre from the refinery.

Houses at the refinery Entrance was located outside the closest residence to the main entrance facing the plant approximately 7 metres from the front of the house and 50 metres from the main entrance to the refinery.

#### **5.0 Methodology**

The noise survey was carried out in accordance with ISO 1996/1/2/3 – Acoustics – Description and Measurement of Environmental Noise.

Reference was also made to the guidance note issued by the Environmental Protection Agency for the assessment of noise from licensed facilities.

Broadband measurements were 30-minute intervals, in the set range 30 – 90dB.

The meter was calibrated before and after the survey.

#### **6.0 Equipment**

The equipment used was a Bruel & Kjaer 2250 serial No. 2463166 integrating sound pressure meter, with selective 1:1 or 1:3 octave band measurements.

The meter was fixed to a tripod 1.3 meters above ground level and the microphone was protected using a windshield. The microphone cartridge type was BK4189, serial number 2643699 with open circuit sensitivity level of 44.0 mV per Pa during the day time monitoring and 43.9 mV per Pa during the night time monitoring.

#### **7.0 Calibration**

Calibration was carried out on site using an acoustic calibrator at 94dBA. The meter was calibrated before and after the monitoring events.

## 8.0 Day Time Environmental Noise Results – Broadband Measurements

Monitoring Point	Date / Time	Sampling Interval (Minutes)	L(A)eq	L(A)10	L(A)90	Comments
Refinery Entrance	12/12/11 15:34	30	64	64	53	The main noise sources at this location were from HGV's entering and exiting the refinery. Audible noises from fans and processes noises from the refinery were noted. Wind rustling through bushes and trees close by, cars driving past the monitoring location contributed to the elevated noise levels at this location. 13 Cars and 8 HGV's passed the monitoring location during the survey.
Roches Point Road (Location 2)	12/12/11 16:14	30	56	58	52	The main noise source at this location was the traffic passing close by, within 10m of the houses on Roche's Point Road. Wind rustling through bushes and trees also contributed to the noise at this location. No noise from the GE Energy site related activities were audible at this monitoring location. 10 Cars and 6-7 HGV's were noted at this location during the survey.
Roches Point Road (Location 1)	12/12/11 16:55	30	65	69	52	Noise at this location was generated by a number of cars travelling along the road. 7 HGV's passed close by to the residences from entering and exiting the refinery entrance. No noise from the GE Energy site related activities were audible at this monitoring location.
House at Fort Davis	12/12/11 17:37	30	53	57	46	No audible noises were heard from any of the sites within the vicinity of the monitoring location. Light traffic noise, wind rustling through bushes and trees contributed to the noise at this location.
Southwest Site Boundary	12/12/11 18:25	30	57	61	49	Wind blowing through the acoustically screened fences and rain drops on large plastic bunds were the main cause of audible noise. Very faint noise of the plant processes were heard.

## 8.1 Night Time Environmental Noise Results – Broadband Measurements

Monitoring Point	Date / Time	Sampling Interval (Minutes)	L(A)eq	L(A)10	L(A)90	Comments
Refinery Entrance	13/12/11 00:02	30	58	53	50	The main noise sources at this location were low level noise from the refinery. No audible noises were heard from the GE Energy site. Wind rustling through bushes and trees, cars and HGV's driving past the monitoring location contributed to the elevated noise levels at this location. 2 Cars and 3 HGV's passed the monitoring location during the survey.
Roches Point Road (Location 2)	13/12/11 01:18	30	49	50	46	The main noise source at this location was the traffic passing close by, within 10m of the houses on Roche's Point Road. A resident entering and driving his car past the monitoring location, wind rustling through bushes and trees contributed to the noise at this location. No noise from the GE Energy site related activities were audible at this monitoring location.
Roches Point Road (Location 1)	13/12/11 00:40	30	50	51	44	Noise at this location was generated by a number of cars and HGV's travelling along the road. No noise from the GE Energy site related activities were audible at this monitoring location. A flag pole blowing in the wind and sea birds were the main interference at this monitoring location.
House at Fort Davis	12/12/11 22:29	30	43	46	38	Main audible noises were caused by the wind. No audible noises were heard from the GE Energy site.
Southwest Site Boundary	12/12/11 23:15	30	52	54	45	Light audible process noise was heard during this monitoring period caused by fans. A large tanker drove past the monitoring point. Interferences were caused by light winds and light rain.



## 9.0 1/3 Octave Measurements

No tonal components were detected at the monitoring locations during the survey.

## 10.0 Interference

Traffic movements close by to the residences at Roches Point road and the residence at the refinery entrance, significantly contributed to elevated noise levels at these monitoring locations.

## 11.0 Conclusions

Noise levels should not exceed 55 dB(A) during day time hours and 45 dB(A) during night time hours as agreed with the Environmental Protection Agency in Schedule B.4 of the IPPC licence P0830-01.

Background noise sources, particularly traffic movement, wind blowing through the trees and rain falling caused elevations in noise levels recorded in all locations during both day time and night time hours.

### Daytime Survey

All five of the locations, exceeded the noise limit during the daytime survey.

The noise recorded at Refinery Entrance can be attributed to the passing traffic entering and exiting the site and process noise from the refinery. There was no noise audible from the GE Energy premises.

The noise recorded at Roches Point road (Location 2) can be attributed to the frequent traffic on the main road. There was no noise audible from the GE Energy premises.

The noise recorded at Roches Point road (Location 1) can be attributed to the frequent traffic on the main road. There was no noise audible from the GE Energy premises.

The noise recorded at the Houses at Ford Davis can be attributed to light traffic noise. Elevated noise levels may have been caused by external/ interference noise sources such as wind blowing through trees and bushes.

The noise recorded at the Southwest site Boundary can be attributed to faint plant process noises and the wind blowing through the barrier fences. Elevated noise levels may have been caused by external/ interference noise sources such as wind blowing through trees and bushes and rain falling on the ground.

### Night-time Survey

Four of the five monitoring locations exceeded the noise limit during the night time survey. There was no noise audible from the GE Energy premises at four of the monitoring locations, with elevated noise levels caused by external/ interference noise sources.


The noise recorded at Refinery Entrance can be attributed to the passing cars and HGV's entering and exiting the site and process noise from the refinery. There was no noise audible from the GE Energy premises. Elevated noise levels may have been caused by external/ interference noise sources such as wind blowing through trees and bushes and rain.

The noise recorded at Roches Point road (Location 2) can be attributed to the frequent traffic on the main road. A resident entering and driving his car past the monitoring point and interference noise sources such as wind blowing through trees and bushes and rain may have contributed to the elevated noise levels. There was no noise audible from the GE Energy premises.


The noise recorded at Roches Point road (Location 1) can be attributed to the frequent traffic on the main road. There was no noise audible from the GE Energy premises. Elevated noise levels may have been caused by a flag pole vibrating from the wind and by external/ interference noise sources such as wind blowing through trees and bushes and rain falling on the ground.

The noise recorded at the Houses at Ford Davis can be attributed to the wind and rain. There was no noise audible from the GE Energy premises.

The noise recorded at the Southwest site Boundary can be attributed to faint plant process noises, a large tanker driving past the monitoring point and the wind blowing through the barrier fences. Elevated noise levels may have been caused by external/ interference noise sources such as the rain.



Ameer Awadalla  
Environmental Technician

  
Victor Olmos  
Field Services Manager

20<sup>th</sup> December 2011

## **Appendix 1: Broadband Data and 1/3 Octave Spectra**

## Refinery Entrance

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 15:33:07
End Time:		12/12/2011 16:03:30
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.05

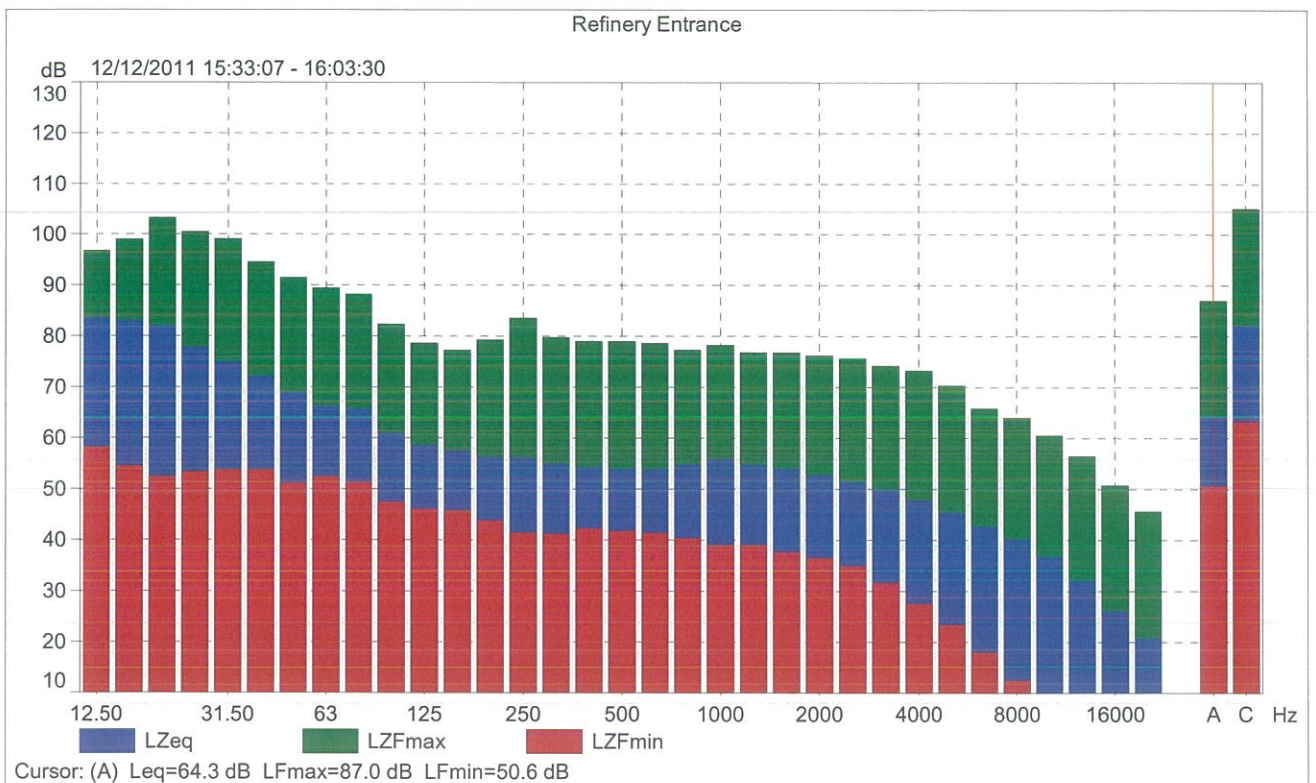
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 15:26:00
Calibration Type:		External reference
Sensitivity:		44.0534576773643 mV/Pa

## Refinery Entrance

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				64.3	64.3	53.4	87.0
Time	15:33:07	16:03:30	0:30:00				
Date	12/12/2011	12/12/2011					



### Roches Point Road (Location 2)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 16:14:07
End Time:		12/12/2011 16:44:07
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.05

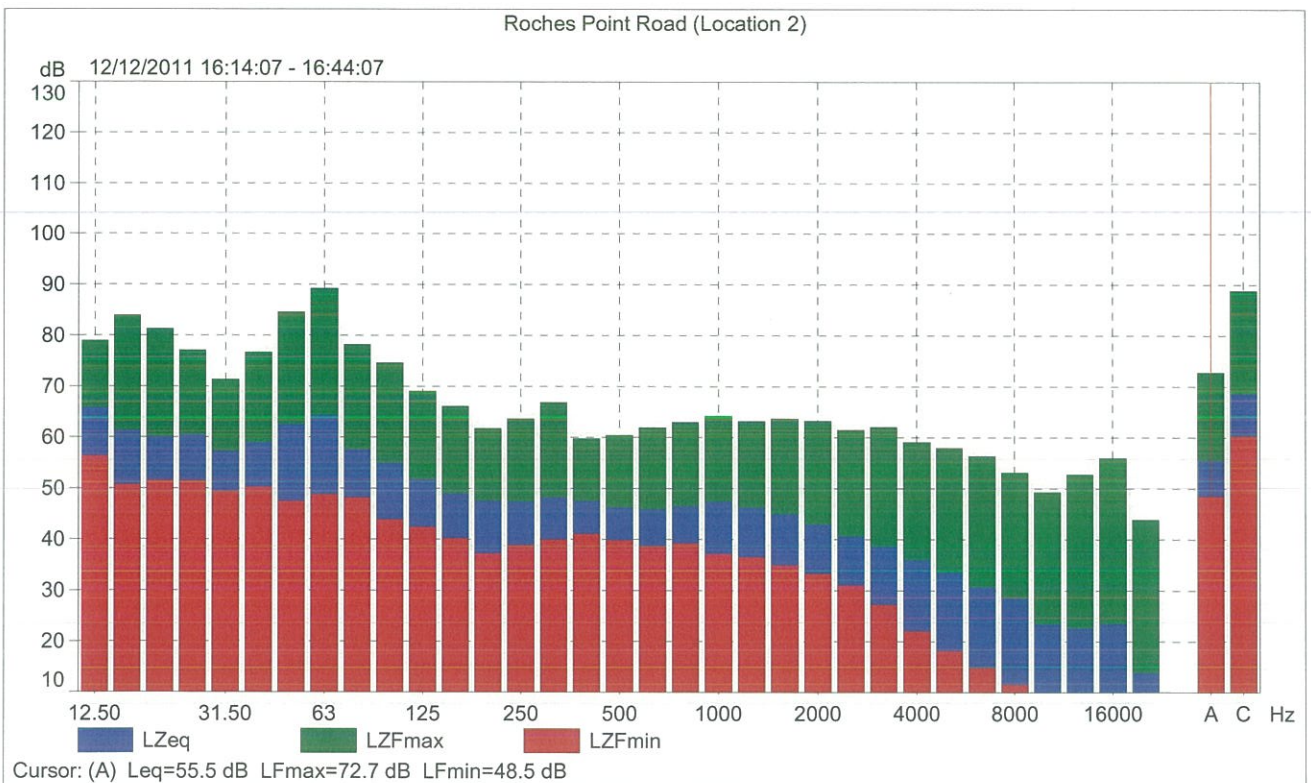
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 15:26:00
Calibration Type:		External reference
Sensitivity:		44.0534576773643 mV/Pa

### Roches Point Road (Location 2)

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				55.5	57.9	51.6	72.7
Time	16:14:07	16:44:07	0:30:00				
Date	12/12/2011	12/12/2011					



### Roches Point Road (Location 1)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 16:54:16
End Time:		12/12/2011 17:24:16
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.05

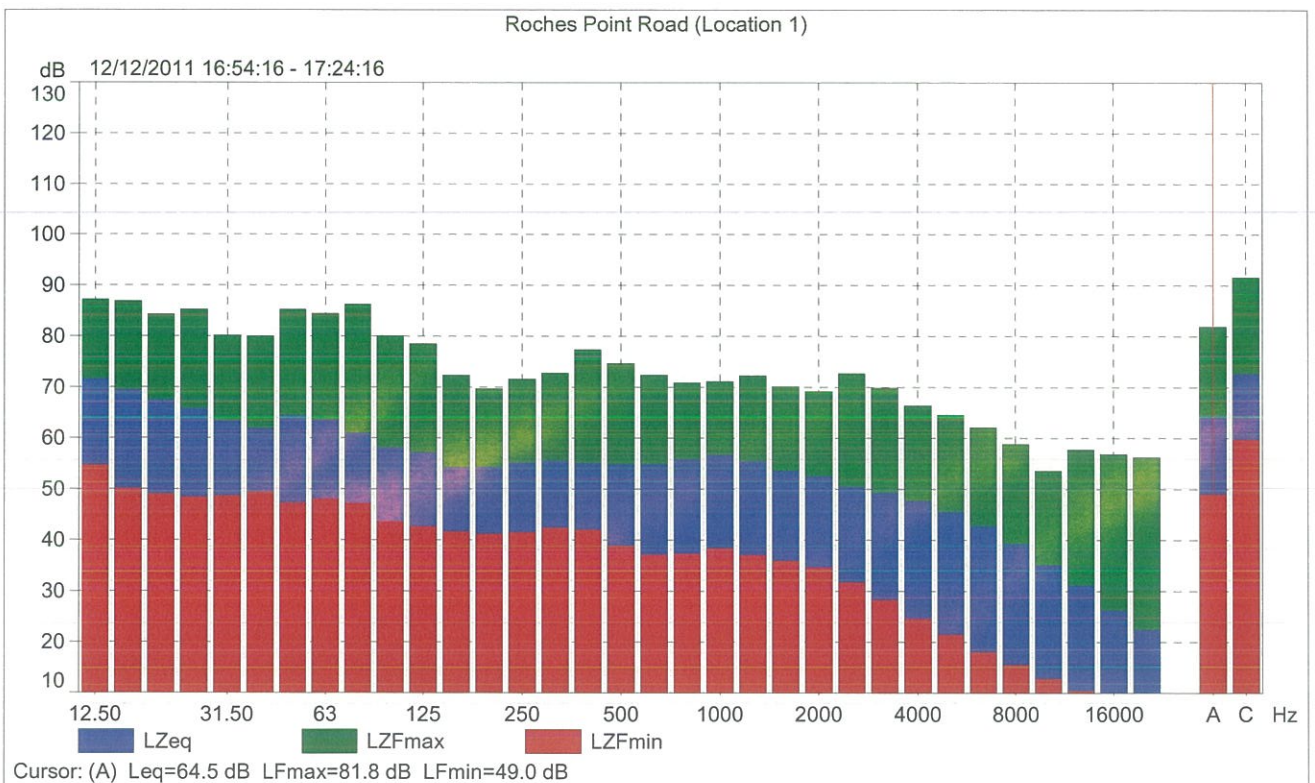
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 15:26:00
Calibration Type:		External reference
Sensitivity:		44.0534576773643 mV/Pa

### Roches Point Road (Location 1)

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				64.5	69.1	51.6	81.8
Time	16:54:16	17:24:16	0:30:00				
Date	12/12/2011	12/12/2011					



### House at Fort Davis

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 17:34:41
End Time:		12/12/2011 18:06:22
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.05

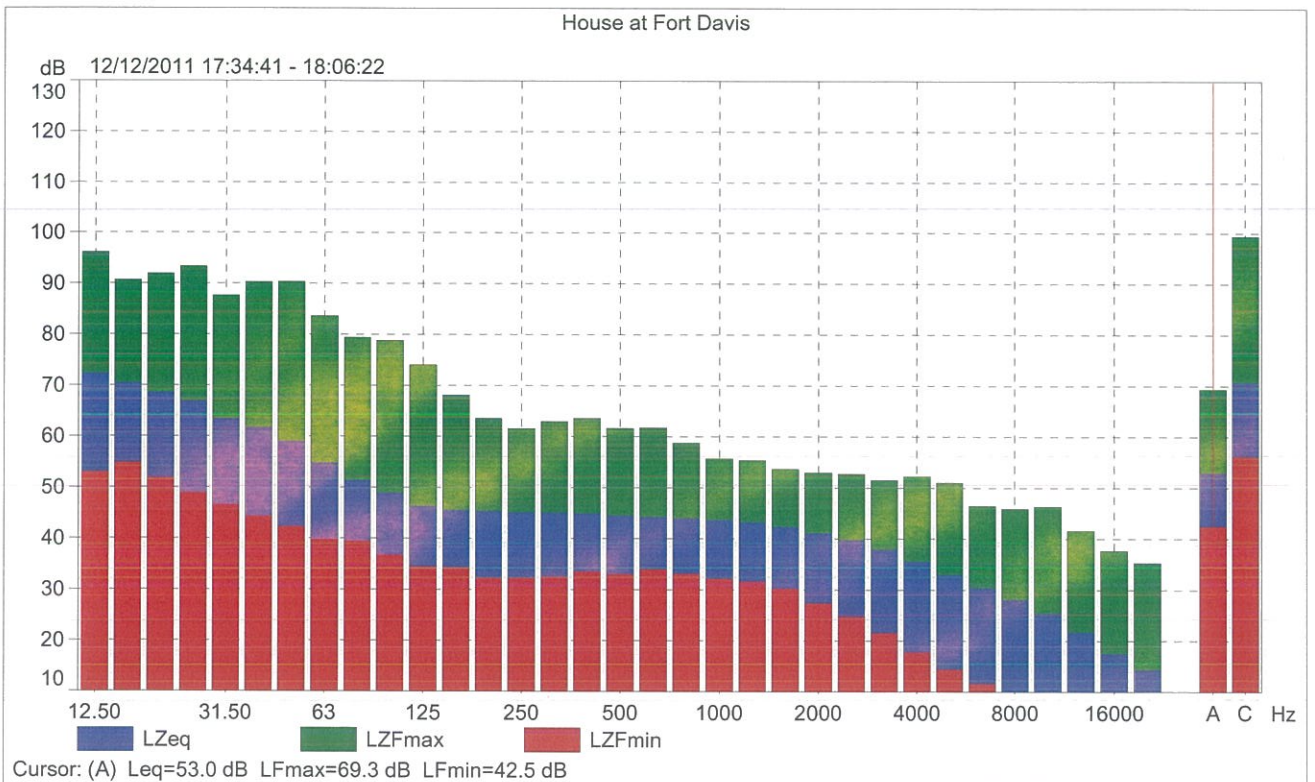
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 15:26:00
Calibration Type:		External reference
Sensitivity:		44.0534576773643 mV/Pa

### House at Fort Davis

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				53.0	56.5	45.8	69.3
Time	17:34:41	18:06:22	0:30:00				
Date	12/12/2011	12/12/2011					



### Southwest Site Boundary

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 18:23:24
End Time:		12/12/2011 18:53:24
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.05

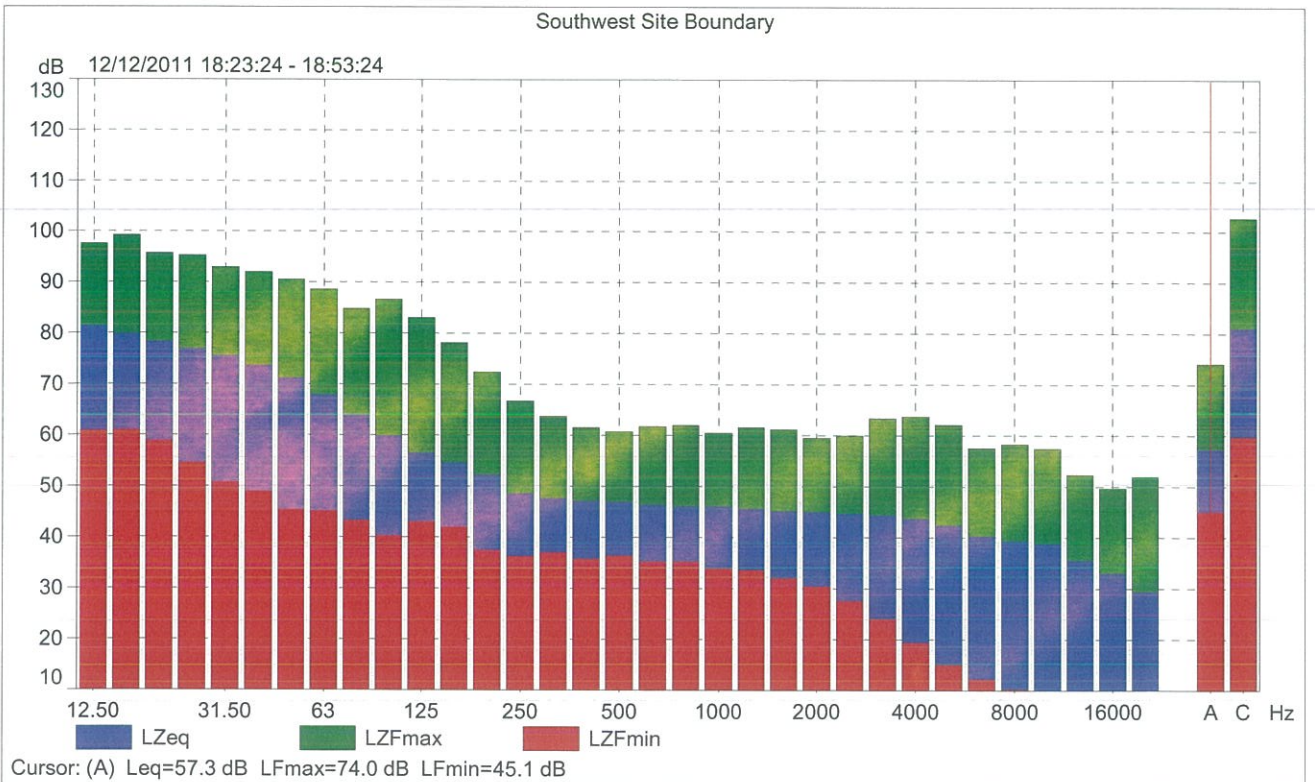
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 15:26:00
Calibration Type:		External reference
Sensitivity:		44.0534576773643 mV/Pa

### Southwest Site Boundary

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				57.3	60.6	49.4	74.0
Time	18:23:24	18:53:24	0:30:00				
Date	12/12/2011	12/12/2011					





### House at Fort Davis (Night)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 22:27:39
End Time:		12/12/2011 22:58:04
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.07

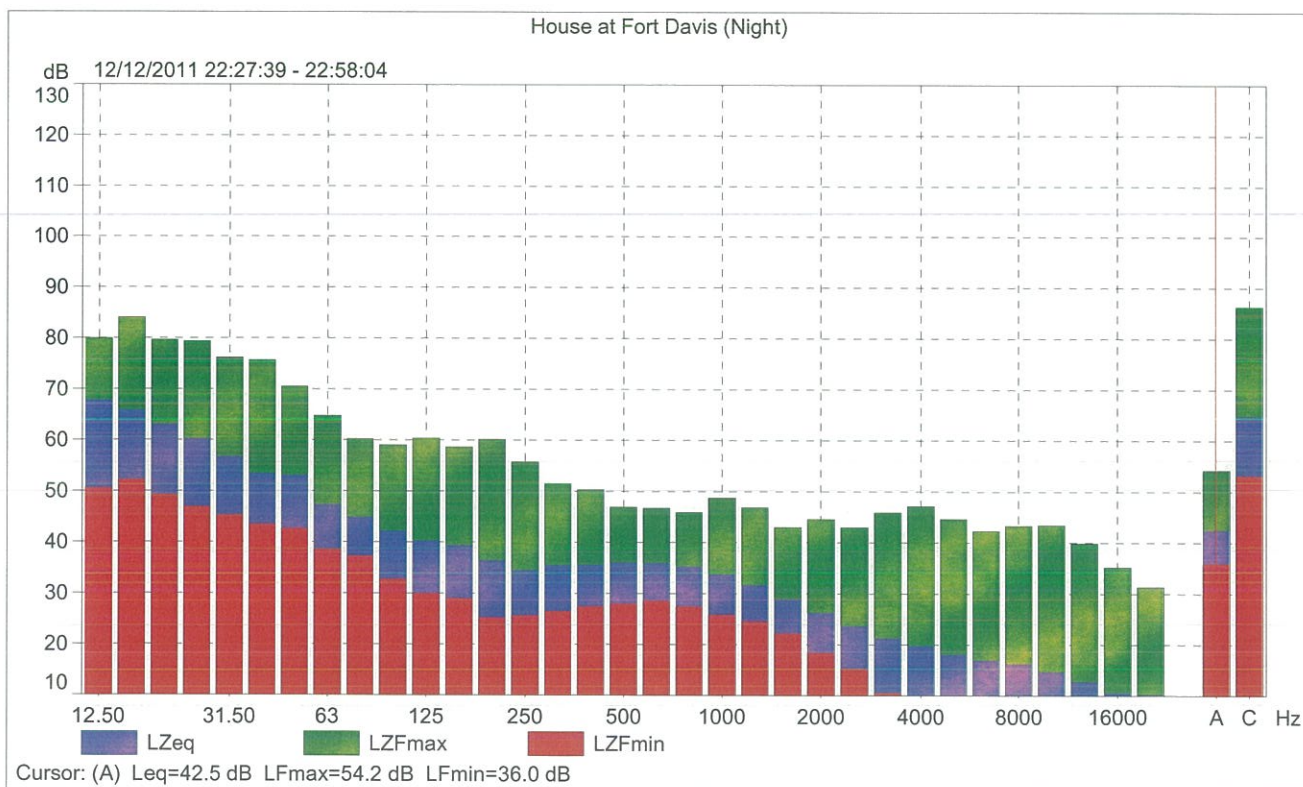
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 22:23:20
Calibration Type:		External reference
Sensitivity:		43.913695961237 mV/Pa

### House at Fort Davis (Night)

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				42.5	45.5	38.2	54.2
Time	22:27:39	22:58:04	0:30:00				
Date	12/12/2011	12/12/2011					



### Southwest Site Boundary (Night)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/12/2011 23:12:56
End Time:		12/12/2011 23:42:56
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.07

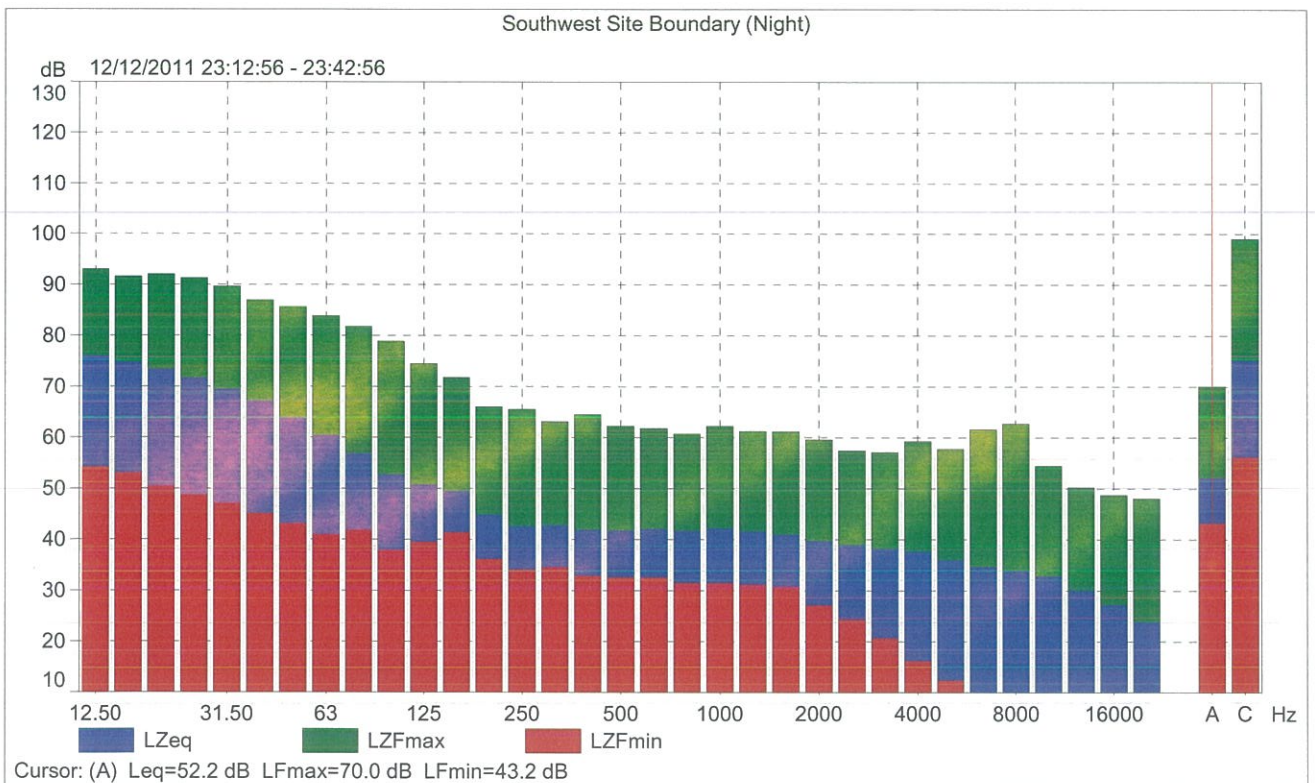
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 22:23:20
Calibration Type:		External reference
Sensitivity:		43.913695961237 mV/Pa

### Southwest Site Boundary (Night)

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				52.2	54.4	45.0	70.0
Time	23:12:56	23:42:56	0:30:00				
Date	12/12/2011	12/12/2011					



### Refinery Entrance (Night)

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/13/2011 00:00:27
End Time:		12/13/2011 00:30:27
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.07

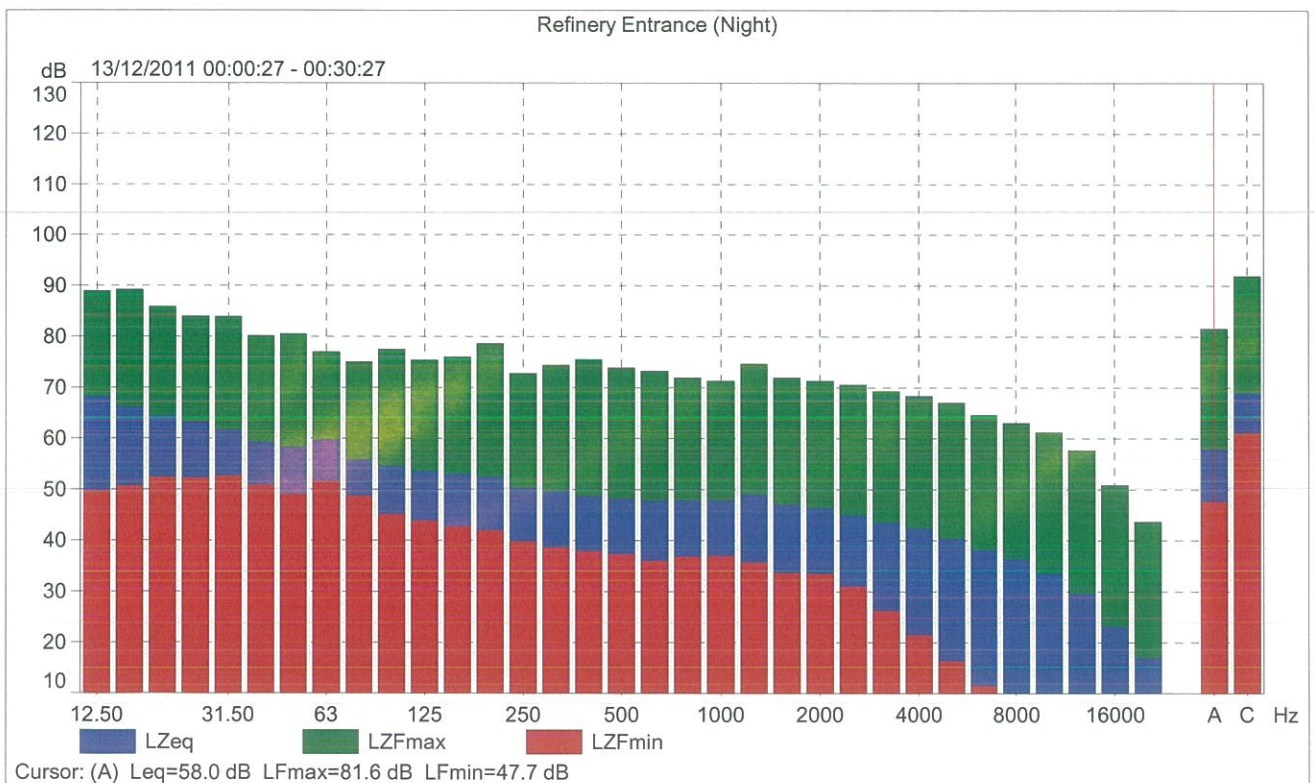
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 22:23:20
Calibration Type:		External reference
Sensitivity:		43.913695961237 mV/Pa

### Refinery Entrance (Night)

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				58.0	53.4	49.8	81.6
Time	00:00:27	00:30:27	0:30:00				
Date	13/12/2011	13/12/2011					



### Roches Point Road (Location 1) Night

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/13/2011 00:38:37
End Time:		12/13/2011 01:08:37
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.07

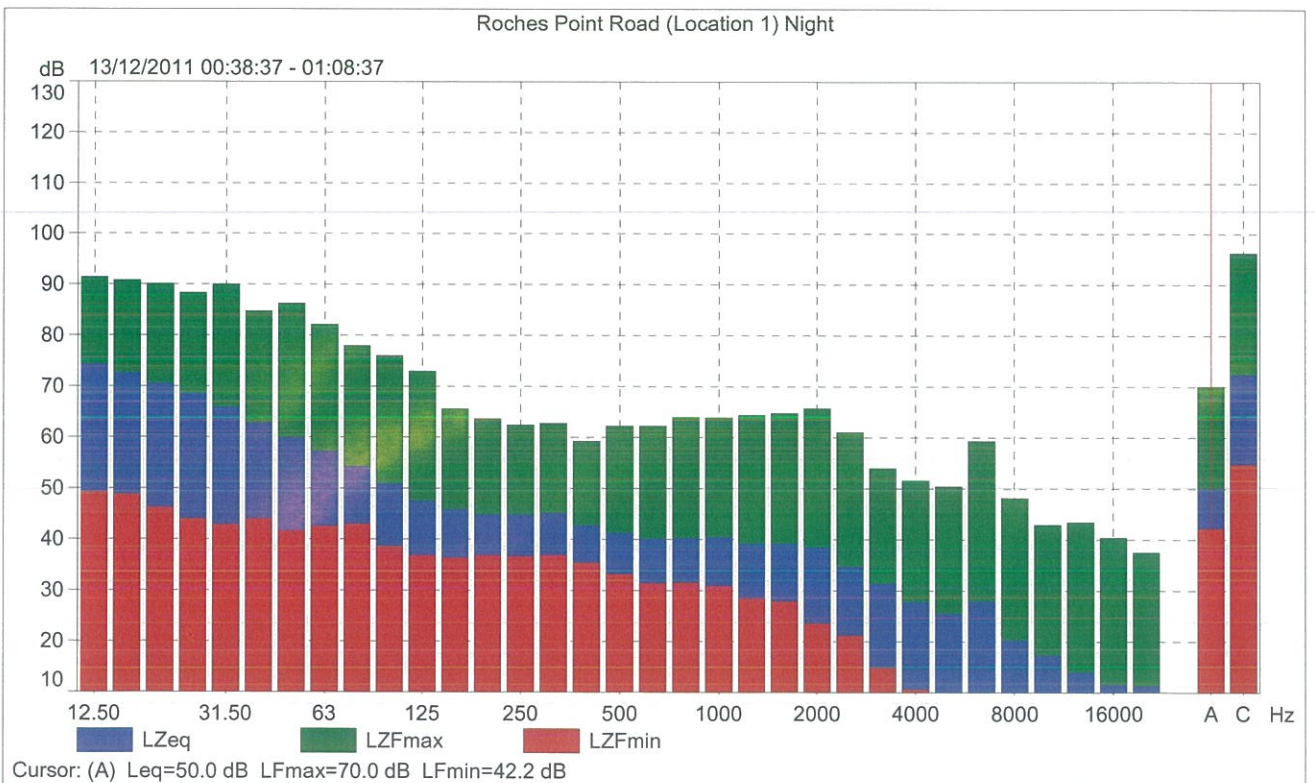
	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 22:23:20
Calibration Type:		External reference
Sensitivity:		43.913695961237 mV/Pa

### Roches Point Road (Location 1) Night

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				50.0	50.9	44.3	70.0
Time	00:38:37	01:08:37	0:30:00				
Date	13/12/2011	13/12/2011					



### Roches Point Road (Location 2) Night

Instrument:		2250
Application:		BZ7223 Version 3.4.1
Start Time:		12/13/2011 01:16:26
End Time:		12/13/2011 01:46:26
Elapsed Time:		00:30:00
Bandwidth:		1/3-octave
Max Input Level:		142.07

	Time	Frequency
Broadband (excl. Peak):	FSI	AC
Broadband Peak:		A
Spectrum:	FS	Z

Instrument Serial Number:		2463166
Microphone Serial Number:		2643699
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

Calibration Time:		12/12/2011 22:23:20
Calibration Type:		External reference
Sensitivity:		43.913695961237 mV/Pa

### Roches Point Road (Location 2) Night

	Start time	End time	Elapsed time	LAeq [dB]	LAF10 [dB]	LAF90 [dB]	LAFmax [dB]
Value				48.7	49.5	45.6	67.7
Time	01:16:26	01:46:26	0:30:00				
Date	13/12/2011	13/12/2011					

