

# JOBURG LANDFILL GAS TO ENERGY PROJECT



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|                          |                                                                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>     | Joburg Landfill Gas to Energy Project                                                                                                                                        |
| <b>Version</b>           | 04                                                                                                                                                                           |
| <b>Report ID</b>         | VCS-MR-01                                                                                                                                                                    |
| <b>Date of Issue</b>     | 21 -January-2014                                                                                                                                                             |
| <b>Project ID</b>        |                                                                                                                                                                              |
| <b>Monitoring Period</b> | 27-May-2011 to 11-November-2012                                                                                                                                              |
| <b>Prepared By</b>       | ENER-G Systems Joburg (PTY) LTD                                                                                                                                              |
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## 1 PROJECT DETAILS

### 1.1 Summary Description of Project

The Joburg Landfill Gas to Energy Project developed by ENER-G Systems Joburg (Pty) Ltd is a landfill gas (LFG) collection and utilisation project located at the Johannesburg landfill sites in South Africa. The landfill site addresses and coordinates are detailed in section 1.7 below.

The objective of the project is to collect and destruct/utilise the landfill gas (LFG) generated at five of the Johannesburg landfill sites. The project activity will consist of two distinct stages. In the first stage, LFG will be captured and destroyed by using a LFG flare, while in the second stage the captured LFG will be fed to the LFG flare and a modular electricity generation plant. The purpose of LFG flaring is to dispose of the flammable constituents, particularly methane, safely and to control odour nuisance, health risks and adverse environmental impacts. The generator once installed will combust the methane in the LFG to produce electricity for export to a local power purchaser. Excess LFG, and all gas collected during periods when electricity is not produced, will be flared.

The project consists of five landfill sites in and around the Johannesburg municipality. The project brings benefits of consolidating five landfill sites into one project but it is not a grouped project activity.

### 1.2 Sectoral Scope and Project Type

Scope 13 – Waste Handling and Disposal. Not a grouped project.

### 1.3 Project Proponent

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Address: Unit 2, The Firs, 5 Humber Street, Woodmead, Johannesburg, South Africa

The Project Proponent is the project owner.

### 1.4 Other Entities Involved in the Project

None.

### 1.5 Project Start Date

27 May 2011.

## **1.6 Project Crediting Period**

27 May 2011 through to the 11 November 2012 with a total of one year, five months and fifteen days a total of 533 days.

## **1.7 Project Location**

All five landfill sites are located in the Gauteng Province of South Africa, and have the following co-ordinates:

Linbro Park Landfill - Marlboro Drive, Sandton: 26° 05' 41.85" S & 28° 07' 13.43" E;  
Marie Louise Landfill - Dobsonville Drive, Roodepoort: 26° 11' 23.89" S & 27° 53' 00.13" E;  
Robinson Deep Landfill – Turffontein Road, Turffontein: 26° 13' 59.03" S & 28° 02' 14.77" E;  
Goudkoppies – Houthammer Road, Devland, Lenasia: 26° 16' 52.31" S & 27° 55' 24.93" E; and  
Ennerdale Landfill – Old Lawley Road, Lawley: 26° 22' 07.78" S & 27° 50' 02.80" E.

## **1.8 Title and Reference of Methodology**

The large scale methodology ACM0001 Version 11, adopted at EB47, "Consolidated baseline and monitoring methodology for landfill gas project activities" has been employed in the project activity.

# **2 IMPLEMENTATION STATUS**

## **2.1 Implementation Status of the Project Activity**

To date ENER-G Systems Joburg has installed and commissioned gas collection and flaring systems at two of the five sites. These initial flare projects have been constructed on the Robinson Deep landfill site and the Marie Louise landfill sites and were commissioned in 27 May 2011 and 4 May 2012 respectively. The sites consist of a gas extraction wells and a reticulation system that conveys the landfill gas to an equipment compound that houses the flaring equipment that combusts the landfill gas in an enclosed high temperature flare. To date no electricity generation has been installed as a buyer for the resultant power is still being sought. The balance of the sites will be constructed once a buyer for the power has been secured.

As stated in the PDD no Leakage effects need to be taken into account in this methodology.

The sites have operated well over the period of review and the only restrictions on the actual reductions in green house gas emissions has been the impacts of the landfilling activities that has restricted our ability to collect more gas or has caused damage to our plant. The activities included the extraction of landfill gas through a series of gas collection wells that are buried in the waste mass that collects the gas through the application of a gentle vacuum to the wells. The gas is then conveyed to the flares where it is combusted in a high temperature flare.

## 2.2 Project Description Deviations

No deviations have been applied to the project Descriptions.

## 2.3 Grouped Project

Although the five sites have been registered as basket of projects we are not able to include new projects under its registration and it is therefore not a grouped project.

## 3 DATA AND PARAMETERS

### 3.1 Data and Parameters Available at Validation

|                        |                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | Regulatory requirements relating to landfill gas projects                                                                                                                                        |
| Data unit:             | -                                                                                                                                                                                                |
| Description:           | Regulatory requirements relating to landfill gas projects                                                                                                                                        |
| Source of data:        | Draft 'Minimum Requirements for Waste Disposal by Landfill', Department of Water Affairs & Forestry, 2005, and Landfill Permits for all Landfill Sites.                                          |
| Value applied:         | 0 for the first crediting period                                                                                                                                                                 |
| Purpose of the data:   | This is used to establish if there is a legislative requirement to flare landfill gas and if so this forms the portion of the project activity that will be excluded from the baseline emissions |
| Any comment:           | No change for this period                                                                                                                                                                        |

|                        |                                                                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | GWP <sub>CH4</sub>                                                                                                                                                         |
| Data unit:             | tCO <sub>2</sub> e/tCH <sub>4</sub>                                                                                                                                        |
| Description:           | Global Warming Potential of methane                                                                                                                                        |
| Source of data:        | IPCC                                                                                                                                                                       |
| Value applied:         | 21                                                                                                                                                                         |
| Purpose of the data:   | This data is used as a factor to calculate the number CO <sub>2</sub> e for each ton of CH <sub>4</sub> that is destroyed and is used to calculate the baseline emissions. |
| Any comment:           | This parameter is also referred to in the "Tool to determine methane emissions avoided from disposal of waste at a solid                                                   |

|  |                      |
|--|----------------------|
|  | waste disposal site" |
|--|----------------------|

|                        |                                                                                                                                                                                      |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | $D_{CH_4}$                                                                                                                                                                           |
| Data unit:             | $tCH_4/m^3CH_4$                                                                                                                                                                      |
| Description:           | Methane Density                                                                                                                                                                      |
| Source of data:        | ACM 0001, Version 11                                                                                                                                                                 |
| Value applied:         | 0.0007168                                                                                                                                                                            |
| Purpose of the data:   | This value is used to establish the total weight of Methane combusted based on the volume of gas combusted and is used to calculate the baseline emissions generated by the project. |
| Any comment:           | None                                                                                                                                                                                 |

|                        |                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | $CEF_{elec,BL,y}$                                                                                                                                                                                                                                    |
| Data unit:             | $tCO_2/MWh$                                                                                                                                                                                                                                          |
| Description:           | Carbon dioxide emission factor of grid electricity                                                                                                                                                                                                   |
| Source of data:        | <i>"Tool to calculate emission factor for an electricity system"</i>                                                                                                                                                                                 |
| Value applied:         | 0.977                                                                                                                                                                                                                                                |
| Purpose of the data:   | This data represents the emissions produced or displaced by the use or generation of electricity and is used to calculate project emissions for electricity consumed or to calculate baseline emissions based on electricity produced.               |
| Any comment:           | Note that $CEF_{elec,BL,y} = EF_{EL,j,y}$ from <i>"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"</i> and $EF_{grid,CM,y}$ from <i>"Tool to calculate the emission factor for an electricity system"</i> |

|                        |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | $BECH_4,SWDS,y$                                                                                                                    |
| Data unit:             | $tCO_2e$                                                                                                                           |
| Description:           | Methane generation from the landfill in the absence of the project activity at year y                                              |
| Source of data:        | Calculated as per the <i>"Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site"</i> . |
| Value applied:         | ex-ante estimate: 479,133 $tCO_2e$ (annual average over 1st                                                                        |

|                      |                                                                         |
|----------------------|-------------------------------------------------------------------------|
|                      | crediting period)                                                       |
| Purpose of the data: | Used for <i>ex-ante</i> estimation of the amount of baseline emissions. |
| Any comment:         | None                                                                    |

|                        |                                                                                                              |
|------------------------|--------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter: | $TDL_{j,y}$                                                                                                  |
| Data unit:             | Mass or volume unit                                                                                          |
| Description:           | Average technical transmission and distribution losses for providing electricity to source $j$ in year $y$ . |
| Source of data:        | Eskom Annual Report                                                                                          |
| Value applied:         | 2011 -2012 8.7%<br>2012-2013 9.1%                                                                            |
| Purpose of the data:   | Used to establish technical and distribution losses on power consumption.                                    |
| Any comment:           | None                                                                                                         |

### 3.2 Data and Parameters Monitored

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | $\eta_{\text{flare},h}$                                                                                                                                                                                                                                                                                                                                                   |
| Data unit:                                                       | %                                                                                                                                                                                                                                                                                                                                                                         |
| Description:                                                     | Flare efficiency in the hour $h$                                                                                                                                                                                                                                                                                                                                          |
| Source of data:                                                  | Flare                                                                                                                                                                                                                                                                                                                                                                     |
| Description of measurement methods and procedures to be applied: | Operational parameters are monitored and measured continuously and recorded every 30 minutes. This data is then used to establish if the flares operations comply with the guidelines outlined in the tool and the OEM specifications.                                                                                                                                    |
| Frequency of monitoring/recording:                               | Monitored and measured continuously and recorded every thirty minutes.                                                                                                                                                                                                                                                                                                    |
| Value monitored:                                                 | 90%                                                                                                                                                                                                                                                                                                                                                                       |
| Monitoring equipment:                                            | Flare $T_{\text{flare}}$ thermocouple mounted in the flare stack, $LFG_{\text{flare}}$ , $W_{\text{ch4}}$ and operational time recorded in the workbook reflecting with the data collected.                                                                                                                                                                               |
| QA/QC procedures to be applied:                                  | Calculated and check during verification. Check in May 2013                                                                                                                                                                                                                                                                                                               |
| Calculation method:                                              | ACM 0001 The flare continuously monitors the temperature, flow rate and methane concentrations to ensure that the flare operates within the manufacturers specifications and above the limits set in the tool. Should this not be achieved the flare will trip/shutdown. The measured data is recorded every 30 minutes and this data is used to check that the flare has |

|              |                                                                                                                                                                         |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | indeed operated for a full hour above the limits established in the tool. If all these parameters are complied with, then workbook allocates a flare efficiency of 90%. |
| Any comment: | None                                                                                                                                                                    |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|-------|-------------------|-------|-------------------|--------|---------------------|--------|-----------------------|--------|----------------------|--------|----------------------|--------|-----------------------|--------|----------------------|--------|-----------------------|--------|--------------------|--------|--------------------|-------|------------------|--------|-------------------|--------|-------------------|--------|
| Data Unit / Parameter:                                           | LFG <sub>total,y</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Data unit:                                                       | Nm <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Description:                                                     | Total amount of landfill gas captured at Normal Temperature and Pressure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Source of data:                                                  | Flow meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Description of measurement methods and procedures to be applied: | The flow meter will express gas flow in normalized cubic meters, and is recorded every 30 minutes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Frequency of monitoring/recording:                               | Continuous and is recorded every 30 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| Value monitored:                                                 | Robinson Deep: <table><tr><td>May 2011 Average</td><td>569.7</td></tr><tr><td>June 2011 Average</td><td>807.1</td></tr><tr><td>July 2011 Average</td><td>1218.3</td></tr><tr><td>August 2011 Average</td><td>1234.1</td></tr><tr><td>September 2011Average</td><td>1350.6</td></tr><tr><td>October 2011 Average</td><td>1228.7</td></tr><tr><td>November 2011Average</td><td>1520.8</td></tr><tr><td>December 2011 Average</td><td>1465.9</td></tr><tr><td>January 2012 Average</td><td>1288.8</td></tr><tr><td>February 2012 Average</td><td>1380.0</td></tr><tr><td>March 2012 Average</td><td>1235.2</td></tr><tr><td>April 2012 Average</td><td>890.4</td></tr><tr><td>May 2012 Average</td><td>1070.9</td></tr><tr><td>June 2012 Average</td><td>1109.3</td></tr><tr><td>July 2012 Average</td><td>1156.4</td></tr></table> |  | May 2011 Average | 569.7 | June 2011 Average | 807.1 | July 2011 Average | 1218.3 | August 2011 Average | 1234.1 | September 2011Average | 1350.6 | October 2011 Average | 1228.7 | November 2011Average | 1520.8 | December 2011 Average | 1465.9 | January 2012 Average | 1288.8 | February 2012 Average | 1380.0 | March 2012 Average | 1235.2 | April 2012 Average | 890.4 | May 2012 Average | 1070.9 | June 2012 Average | 1109.3 | July 2012 Average | 1156.4 |
| May 2011 Average                                                 | 569.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| June 2011 Average                                                | 807.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| July 2011 Average                                                | 1218.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| August 2011 Average                                              | 1234.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| September 2011Average                                            | 1350.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| October 2011 Average                                             | 1228.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| November 2011Average                                             | 1520.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| December 2011 Average                                            | 1465.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| January 2012 Average                                             | 1288.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| February 2012 Average                                            | 1380.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| March 2012 Average                                               | 1235.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| April 2012 Average                                               | 890.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| May 2012 Average                                                 | 1070.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| June 2012 Average                                                | 1109.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |
| July 2012 Average                                                | 1156.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                  |       |                   |       |                   |        |                     |        |                       |        |                      |        |                      |        |                       |        |                      |        |                       |        |                    |        |                    |       |                  |        |                   |        |                   |        |

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|                       | August 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1251.8 |
|                       | September 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0      |
|                       | October 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0      |
|                       | November 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0      |
|                       | Marie Louise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |
|                       | June 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 383.0  |
|                       | July 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 389.8  |
|                       | August 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 392.8  |
|                       | September 2012Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 380.6  |
|                       | October 2012 Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 360.7  |
|                       | November 2012Average                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 318.8  |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
| Monitoring equipment: | <p>For Robinson Deep</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No: E2110C02000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> <p>1<sup>st</sup> calibration date02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> <p>For Marie Louise</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No: E704AF02000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> |        |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p>1<sup>st</sup> calibration date 13/11/2011</p> <p>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| QA/QC procedures to be applied: | <p>Meters are subject to routine maintenance and calibration as per the manufacturers' specifications which is every three years and data is archived electronically. No meters have been changed or require calibration for this period.</p> <p>Robinson Deep<br/>1<sup>st</sup> calibration date 02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> <p>Marie Louise<br/>1<sup>st</sup> calibration date 13/11/2011</p> <p>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications . Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> |
| Calculation method:             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Any comment:                    | <p>The flow meter will express gas flow in normalized cubic meters, therefore no separate monitoring of pressure (P) and temperature (T) of LFG is necessary.</p> <p><math>LFG_{elec,y} = 0</math> therefore <math>LFG_{total,y} = LFG_{flare,y}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                                                  |                                                                                                    |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | $LFG_{flare,y}$                                                                                    |
| Data unit:                                                       | $Nm^3$                                                                                             |
| Description:                                                     | Amount of LFG flared at Normal Temperature and Pressure                                            |
| Source of data:                                                  | Flow meters                                                                                        |
| Description of measurement methods and procedures to be applied: | The flow meter will express gas flow in normalized cubic meters, and is recorded every 30 minutes. |

|                                    |                                             |        |
|------------------------------------|---------------------------------------------|--------|
| Frequency of monitoring/recording: | Continuous and is recorded every 30 minutes |        |
| Value monitored:                   | Robinson Deep                               |        |
|                                    | May 2011 Average                            | 569.7  |
|                                    | June 2011 Average                           | 807.1  |
|                                    | July 2011 Average                           | 1218.3 |
|                                    | August 2011 Average                         | 1234.1 |
|                                    | September 2011Average                       | 1350.6 |
|                                    | October 2011 Average                        | 1228.7 |
|                                    | November 2011Average                        | 1520.8 |
|                                    | December 2011 Average                       | 1465.9 |
|                                    | January 2012 Average                        | 1288.8 |
|                                    | February 2012 Average                       | 1380.0 |
|                                    | March 2012 Average                          | 1235.2 |
|                                    | April 2012 Average                          | 890.4  |
|                                    | May 2012 Average                            | 1070.9 |
|                                    | June 2012 Average                           | 1109.3 |
|                                    | July 2012 Average                           | 1156.4 |
|                                    | August 2012 Average                         | 1251.8 |
|                                    | September 2012Average                       | 0      |
|                                    | October 2012 Average                        | 0      |
|                                    | November 2012Average                        | 0      |
|                                    | Marie Louise                                |        |
|                                    | June 2012 Average                           | 383.0  |
|                                    | July 2012 Average                           | 389.8  |
|                                    | August 2012 Average                         | 392.8  |
|                                    | September 2012Average                       | 380.6  |
|                                    | October 2012 Average                        | 360.7  |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | November 2012Average 318.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Monitoring equipment:           | <p>For Robinson Deep</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No:E2110D02000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> <p>1<sup>st</sup> calibration date 02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> <p>For Marie Louise</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No: E704B102000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> <p>1<sup>st</sup> calibration date 13/11/2011</p> <p>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> |
| QA/QC procedures to be applied: | <p>Meters are subject to routine maintenance and calibration as per the manufacturers' specifications which is every three years and data is archived electronically. No meters have been changed or require calibration for this period.</p> <p>Robinson Deep<br/>1<sup>st</sup> calibration date 02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <p>of operation from the date of use and not the date of calibration.</p> <p>Marie Louise<br/>1<sup>st</sup> calibration date 13/11/2011</p> <p>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications . Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> |
| Calculation method: | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Any comment:        | The flow meter will express gas flow in normalized cubic meters, therefore no separate monitoring of pressure (P) and temperature (T) of LFG is necessary.                                                                                                                                                                                                                                                                                                                       |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | <b>LFG<sub>Electricity,y</sub></b>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Data unit:                                                       | Nm <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description:                                                     | <p>Amount of LFG combusted in power plants at Normal Temperature and</p> <p>Pressure</p>                                                                                                                                                                                                                                                                                                                                                                                      |
| Source of data:                                                  | Flow meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description of measurement methods and procedures to be applied: | The flow meter will express gas flow in normalized cubic meters, and is recorded every 30 minutes.                                                                                                                                                                                                                                                                                                                                                                            |
| Frequency of monitoring/recording:                               | Continuous and is recorded every 30 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Value monitored:                                                 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Monitoring equipment:                                            | <p>For Robinson Deep</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No:E2110B02000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> <p>1<sup>st</sup> calibration date 02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the</p> |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p>validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> <p>For Marie Louise</p> <p>Thermal Mass flow meters<br/>Type : E&amp;H Proline T mass 65F<br/>Serial No: E704B002000<br/>Accuracy:&lt;3%<br/>Calibration frequency: every three years as per manufacturer's specifications.</p> <p>1<sup>st</sup> calibration date 12/11/2011<br/>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p>                                                                                                                                                                                                                                                                                          |
| QA/QC procedures to be applied: | <p>Meters are subject to routine maintenance and calibration as per the manufacturers' specifications which is every three years and data is archived electronically. No meters have been changed or require calibration for this period.</p> <p>Robinson Deep<br/>1<sup>st</sup> calibration date 02/03/2011</p> <p>Valid from 27/05/2011 to 26/05/2014 as per manufacturer's specifications. Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> <p>Marie Louise<br/>1<sup>st</sup> calibration date 12/11/2011<br/>Valid from 04/05/2012 to 03/05/2015 as per manufacturer's specifications . Please note that manufacturer stipulates that although the instrument was calibrated on a certain date the validity of the calibration remains valid for the first three years of operation from the date of use and not the date of calibration.</p> |
| Calculation method:             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Any comment:                    | No power generation is installed at the sites at this stage and therefore a value of zero has been taken.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
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| Data Unit / Parameter:                                           | $PE_{\text{flare},y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Data unit:                                                       | tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Description:                                                     | Project emissions from flaring of the residual gas stream in year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Source of data:                                                  | Calculated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Description of measurement methods and procedures to be applied: | This is calculated using the Tool for project emissions generated from flaring gas by adjusting the efficiency of the flare based on the temperature at which the gas is combusted and checking the operational availability of the plant. The project has opted for a default 90% flare efficiency and the balance of the measured parameters are checked by the calculation to ensure that they have met the requirements for the default 90% flare efficiency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Frequency of monitoring/recording:                               | Continuously and recorded every 30 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| Value monitored:                                                 | <table> <tr><td>May 2011</td><td>5.29 tCO<sub>2e</sub></td></tr> <tr><td>June 2011</td><td>37.99 tCO<sub>2e</sub></td></tr> <tr><td>July 2011</td><td>64.25 tCO<sub>2e</sub></td></tr> <tr><td>August 2011</td><td>53.54 tCO<sub>2e</sub></td></tr> <tr><td>September 2011</td><td>71.33 tCO<sub>2e</sub></td></tr> <tr><td>October 2011</td><td>71.79 tCO<sub>2e</sub></td></tr> <tr><td>November 2011</td><td>84.27 tCO<sub>2e</sub></td></tr> <tr><td>December 2011</td><td>80.71 tCO<sub>2e</sub></td></tr> <tr><td>January 2012</td><td>74.4 tCO<sub>2e</sub></td></tr> <tr><td>February 2012</td><td>56.56 tCO<sub>2e</sub></td></tr> <tr><td>March 2012</td><td>69.01 tCO<sub>2e</sub></td></tr> <tr><td>April 2012</td><td>48.1 tCO<sub>2e</sub></td></tr> <tr><td>May 2012</td><td>50.61 tCO<sub>2e</sub></td></tr> <tr><td>June 2012</td><td>58.92 tCO<sub>2e</sub></td></tr> <tr><td>July 2012</td><td>41.85 tCO<sub>2e</sub></td></tr> <tr><td>August 2012</td><td>62.07 tCO<sub>2e</sub></td></tr> <tr><td>September 2012</td><td>0 tCO<sub>2e</sub></td></tr> </table> | May 2011 | 5.29 tCO <sub>2e</sub> | June 2011 | 37.99 tCO <sub>2e</sub> | July 2011 | 64.25 tCO <sub>2e</sub> | August 2011 | 53.54 tCO <sub>2e</sub> | September 2011 | 71.33 tCO <sub>2e</sub> | October 2011 | 71.79 tCO <sub>2e</sub> | November 2011 | 84.27 tCO <sub>2e</sub> | December 2011 | 80.71 tCO <sub>2e</sub> | January 2012 | 74.4 tCO <sub>2e</sub> | February 2012 | 56.56 tCO <sub>2e</sub> | March 2012 | 69.01 tCO <sub>2e</sub> | April 2012 | 48.1 tCO <sub>2e</sub> | May 2012 | 50.61 tCO <sub>2e</sub> | June 2012 | 58.92 tCO <sub>2e</sub> | July 2012 | 41.85 tCO <sub>2e</sub> | August 2012 | 62.07 tCO <sub>2e</sub> | September 2012 | 0 tCO <sub>2e</sub> |
| May 2011                                                         | 5.29 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| June 2011                                                        | 37.99 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| July 2011                                                        | 64.25 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| August 2011                                                      | 53.54 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| September 2011                                                   | 71.33 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| October 2011                                                     | 71.79 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| November 2011                                                    | 84.27 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| December 2011                                                    | 80.71 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| January 2012                                                     | 74.4 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| February 2012                                                    | 56.56 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| March 2012                                                       | 69.01 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| April 2012                                                       | 48.1 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| May 2012                                                         | 50.61 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| June 2012                                                        | 58.92 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| July 2012                                                        | 41.85 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| August 2012                                                      | 62.07 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |
| September 2012                                                   | 0 tCO <sub>2e</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                        |           |                         |           |                         |             |                         |                |                         |              |                         |               |                         |               |                         |              |                        |               |                         |            |                         |            |                        |          |                         |           |                         |           |                         |             |                         |                |                     |

|                                 |                                                                                                   |                         |
|---------------------------------|---------------------------------------------------------------------------------------------------|-------------------------|
|                                 | October 2012                                                                                      | 0 tCO <sub>2e</sub>     |
|                                 | November 2012                                                                                     | 0 tCO <sub>2e</sub>     |
|                                 | Marie Louise                                                                                      |                         |
|                                 | June 2012                                                                                         | 6.13 tCO <sub>2e</sub>  |
|                                 | July 2012                                                                                         | 16.9 tCO <sub>2e</sub>  |
|                                 | August 2012                                                                                       | 18.7 tCO <sub>2e</sub>  |
|                                 | September 2012                                                                                    | 18.78 tCO <sub>2e</sub> |
|                                 | October 2012                                                                                      | 17.87 tCO <sub>2e</sub> |
|                                 | November 2012                                                                                     | 4.91 tCO <sub>2e</sub>  |
| Monitoring equipment:           | The monitoring equipment used is T <sub>flare</sub> , WCH <sub>4</sub> and LFG <sub>flare</sub> . |                         |
| QA/QC procedures to be applied: | This calculation is checked at verification. Check May 2013                                       |                         |
| Calculation method:             | Calculated as per the 'Tool to determine project emissions from flaring gases containing Methane' |                         |
| Any comment:                    |                                                                                                   |                         |

|                                                                  |                                                                               |  |
|------------------------------------------------------------------|-------------------------------------------------------------------------------|--|
| Data Unit / Parameter:                                           | W <sub>CH<sub>4</sub></sub>                                                   |  |
| Data unit:                                                       | Nm <sup>3</sup> CH <sub>4</sub> / Nm <sup>3</sup> LFG                         |  |
| Description:                                                     | Methane fraction in the landfill gas                                          |  |
| Source of data:                                                  | Gas analyzer installed on each flare at each site.                            |  |
| Description of measurement methods and procedures to be applied: | Measured continuously and recorded every 30 minutes via telemetry.            |  |
| Frequency of monitoring/recording:                               | 30 minutes                                                                    |  |
| Value monitored:                                                 | Robinson Deep<br>May 2011 Average      48.2%<br>June 2011 Average      49.9 % |  |

|                       |                               |        |
|-----------------------|-------------------------------|--------|
|                       | July 2011 Average             | 50.8%  |
|                       | August 2011 Average           | 54.4%  |
|                       | September 2011Average         | 51.7%  |
|                       | October 2011 Average          | 51.1%  |
|                       | November 2011Average          | 52.3%  |
|                       | December 2011 Average         | 53.8%  |
|                       | January 2012 Average          | 51.1%  |
|                       | February 2012 Average         | 50.0%  |
|                       | March 2012 Average            | 48.7%  |
|                       | April 2012 Average            | 49.0%  |
|                       | May 2012 Average              | 49.8%  |
|                       | June 2012 Average             | 48.1 % |
|                       | July 2012 Average             | 49.3%  |
|                       | August 2012 Average           | 49.3%  |
|                       | September 2012Average         | 0 %    |
|                       | October 2012 Average          | 0 %    |
|                       | November 2012Average          | 0 %    |
|                       | Marie Louise                  |        |
|                       | June 2012 Average             | 49.1%  |
|                       | July 2012 Average             | 50.7%  |
|                       | August 2012 Average           | 46.2%  |
|                       | September 2012Average         | 47.9%  |
|                       | October 2012 Average          | 46.6%  |
|                       | November 2012Average          | 42.3%  |
|                       |                               |        |
|                       |                               |        |
|                       |                               |        |
|                       |                               |        |
|                       |                               |        |
|                       |                               |        |
| Monitoring equipment: | Robinson Deep                 |        |
|                       | Trolex                        |        |
|                       | Serial No: BG 10931-inlet -GA |        |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p>Maximum Drift: <math>\pm 0.05\%</math>/month<br/> Repeatability/Accuracy <math>\pm 0.1\%</math><br/> Calibration frequency: Recommended to undertake calibration Monthly</p> <p>1<sup>st</sup> calibration cert as per the original manufacturer which is valid from 27 May 2011. The unit is then calibrated at least monthly with a certified span gas to ensure accuracy until the unit is no longer able to be calibrated on site. If the unit is not able to be calibrated using the certified span gas then the analyzing unit is replaced.</p> <p>Hi Tech GIR 5000 gas analyzer<br/> Serial no: I - 05007<br/> Stability: <math>&lt; 2\%</math> per month<br/> Resolution/Accuracy: <math>\pm 0.5\%</math><br/> Calibration frequency:</p> <p>1<sup>st</sup> calibration on installation valid from 17 January 2013 The unit is then calibrated at least monthly with a certified span gas to ensure accuracy until the unit is no longer able to be calibrated on site. If the unit is not able to be calibrated using the certified span gas then the analyzing unit is replaced.</p> <p>Marie Louise</p> <p>Trolex<br/> Serial No: 017976<br/> Maximum Drift: <math>\pm 0.05\%</math>/month<br/> Repeatability/Accuracy <math>\pm 0.1\%</math><br/> Calibration frequency: Recommended to undertake calibration Monthly</p> <p>1<sup>st</sup> calibration cert as per the original manufacturer which is valid from 4 May 2012 The unit is then calibrated at least monthly with a certified span gas to ensure accuracy until the unit is no longer able to be calibrated on site. If the unit is not able to be calibrated using the certified span gas then the analyzing unit is replaced.</p> |
| QA/QC procedures to be applied: | <p>Instruments are subject to routine maintenance and calibrated on site utilizing a know certified Span gas. These instruments have been calibrated in the factory and are valid from the dated detailed below. The following dates note the date on which the instruments have been calibrated on site which done on a weekly basis.</p> <p>Robinson Deep</p> <p>1<sup>st</sup> calibration cert as per the original manufacturer which is valid from 27 May 2011 until the unit was no longer able to be calibrated on site.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|  | Calibration<br>needs to<br>be done<br>weekly | CH4  | CO2  | O2  | CH4  | CO2  | O2  | ERROR<br>CH4 % |
|--|----------------------------------------------|------|------|-----|------|------|-----|----------------|
|  | 27/05/11                                     | 58.2 | 38.6 | 0.8 | 60.0 | 40.0 | 0.9 | 1.8            |
|  | 03/06/11                                     | 60.1 | 40.2 | 1.2 | 60.0 | 40.0 | 1.0 | 0.1            |
|  | 10/06/11                                     | 60.5 | 40.4 | 0.9 | 60.0 | 40.0 | 0.9 | 0.5            |
|  | 20/06/11                                     | 60.1 | 40.2 | 1.4 | 60.0 | 40.0 | 1.3 | 0.1            |
|  | 24/06/11                                     | 60.6 | 40.3 | 0.8 | 60.0 | 40.0 | 0.8 | 0.6            |
|  | 01/07/11                                     | 60.8 | 41.2 | 0.9 | 60.0 | 40.0 | 0.8 | 0.8            |
|  | 11/07/11                                     | 59.6 | 40.1 | 0.8 | 60.0 | 40.0 | 0.8 | 0.4            |
|  | 22/07/11                                     | 60.2 | 41.1 | 1.0 | 60.0 | 40.0 | 0.9 | 0.2            |
|  | 29/07/11                                     | 59.8 | 40.3 | 0.7 | 60.0 | 40.0 | 0.7 | 0.2            |
|  | 10/08/11                                     | 60.3 | 41.1 | 0.9 | 60.0 | 40.0 | 0.9 | 0.3            |
|  | 19/08/11                                     | 60.4 | 40.2 | 0.8 | 60.0 | 40.0 | 0.9 | 0.4            |
|  | 26/08/11                                     | 59.7 | 39.7 | 0.7 | 60.0 | 40.0 | 0.7 | 0.3            |
|  | 02/09/11                                     | 59.8 | 41.2 | 0.7 | 60.0 | 40.0 | 0.7 | 0.2            |
|  | 09/09/11                                     | 60.6 | 40.3 | 0.8 | 60.0 | 40.0 | 0.8 | 0.6            |
|  | 23/09/11                                     | 60.6 | 40.5 | 0.8 | 60.0 | 40.0 | 0.8 | 0.6            |
|  | 30/09/11                                     | 60.3 | 40.0 | 0.9 | 60.0 | 40.0 | 0.9 | 0.3            |
|  | 07/10/11                                     | 60.1 | 40.2 | 1.2 | 60.0 | 40.0 | 1.1 | 0.1            |
|  | 14/10/11                                     | 60.3 | 40.8 | 0.8 | 60.0 | 40.0 | 0.8 | 0.3            |
|  | 21/10/11                                     | 60.5 | 39.6 | 0.8 | 60.0 | 40.0 | 0.8 | 0.5            |
|  | 28/10/11                                     | 60.2 | 40.3 | 0.7 | 60.0 | 40.0 | 0.7 | 0.2            |
|  | 04/11/11                                     | 60.7 | 40.3 | 0.9 | 60.0 | 40.0 | 0.9 | 0.7            |

|  |                                              |      |      |     |      |      |     |                |
|--|----------------------------------------------|------|------|-----|------|------|-----|----------------|
|  | 11/11/11                                     | 60.1 | 39.5 | 1.2 | 60.0 | 40.0 | 1.1 | 0.1            |
|  | 18/11/11                                     | 60.5 | 40.6 | 1.0 | 60.0 | 40.0 | 1.0 | 0.5            |
|  | 25/11/11                                     | 60.0 | 40.3 | 0.8 | 60.0 | 40.0 | 0.8 | 0.0            |
|  | 02/12/11                                     | 60.3 | 40.9 | 0.7 | 60.0 | 40.0 | 0.8 | 0.3            |
|  | 08/12/11                                     | 60.8 | 40.2 | 0.8 | 60.0 | 40.0 | 0.8 | 0.8            |
|  | 15/12/11                                     | 60.3 | 40.1 | 0.8 | 60.0 | 40.0 | 0.9 | 0.3            |
|  | 22/12/11                                     | 60.8 | 40.4 | 0.9 | 60.0 | 40.0 | 0.9 | 0.8            |
|  | 30/12/11                                     | 61.0 | 40.8 | 1.1 | 60.0 | 40.0 | 1.1 | 1.0            |
|  |                                              |      |      |     |      |      |     |                |
|  | Calibration<br>needs to<br>be done<br>weekly | CH4  | CO2  | O2  | CH4  | CO2  | O2  | ERROR<br>CH4 % |
|  | 11/01/12                                     | 58.6 | 40.7 | 0.8 | 60.0 | 40.0 | 0.7 | 1.4            |
|  | 20/01/12                                     | 59.4 | 41.0 | 0.8 | 60.0 | 40.0 | 0.8 | 0.6            |
|  | 27/01/12                                     | 60.8 | 40.2 | 1.0 | 60.0 | 40.0 | 0.9 | 0.8            |
|  | 07/02/12                                     | 61.3 | 40.8 | 1.7 | 60.0 | 40.0 | 1.7 | 1.3            |
|  | 24/02/12                                     | 60.4 | 39.2 | 1.2 | 60.0 | 40.0 | 1.2 | 0.4            |
|  | 02/03/12                                     | 61.4 | 38.9 | 1.1 | 60.0 | 40.0 | 1.0 | 1.4            |
|  | 09/03/12                                     | 58.9 | 39.6 | 0.9 | 60.0 | 40.0 | 0.9 | 1.1            |
|  | 22/03/12                                     | 60.5 | 40.3 | 0.8 | 60.0 | 40.0 | 0.7 | 0.5            |
|  | 30/03/12                                     | 60.1 | 39.7 | 1.2 | 60.0 | 40.0 | 1.2 | 0.1            |
|  | 05/04/12                                     | 60.7 | 40.5 | 0.8 | 60.0 | 40.0 | 0.8 | 0.7            |
|  | 13/04/12                                     | 60.6 | 39.2 | 1.0 | 60.0 | 40.0 | 1.1 | 0.6            |
|  | 27/04/12                                     | 59.0 | 39.2 | 0.9 | 60.0 | 40.0 | 0.9 | 1.0            |
|  | 03/05/12                                     | 59.6 | 40.9 | 1.4 | 60.0 | 40.0 | 1.3 | 0.4            |

|  |                                                                                                                                                                               |      |      |     |      |      |     |                                |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-----|------|------|-----|--------------------------------|
|  | 14/05/12                                                                                                                                                                      | 60.7 | 41.2 | 1.1 | 60.0 | 40.0 | 1.0 | 0.7                            |
|  | 25/05/12                                                                                                                                                                      | 60.2 | 40.0 | 0.9 | 60.0 | 40.0 | 0.9 | 0.2                            |
|  | 01/06/12                                                                                                                                                                      | 59.1 | 40.5 | 0.8 | 60.0 | 40.0 | 0.8 | 0.9                            |
|  | 12/06/12                                                                                                                                                                      | 61.2 | 40.5 | 0.7 | 60.0 | 40.0 | 0.7 | 1.2                            |
|  | 22/06/12                                                                                                                                                                      | 60.4 | 39.6 | 1.3 | 60.0 | 40.0 | 1.2 | 0.4                            |
|  | 29/06/12                                                                                                                                                                      | 61.0 | 40.4 | 0.9 | 60.0 | 40.0 | 0.8 | 1.0                            |
|  | 06/07/12                                                                                                                                                                      | 60.5 | 39.8 | 0.7 | 60.0 | 40.0 | 0.7 | 0.5                            |
|  | 13/07/12                                                                                                                                                                      | 58.2 | 40.7 | 0.8 | 60.0 | 40.0 | 0.8 | 1.8                            |
|  | 20/07/12                                                                                                                                                                      | 58.6 | 39.0 | 1.0 | 60.0 | 40.0 | 1.0 | 1.4                            |
|  | 02/08/12                                                                                                                                                                      | 58.8 | 40.9 | 0.8 | 60.0 | 40.0 | 0.8 | 1.2                            |
|  | 10/08/12                                                                                                                                                                      | 59.0 | 39.1 | 0.7 | 60.0 | 40.0 | 0.7 | 1.0                            |
|  | 17/08/12                                                                                                                                                                      | 10.0 | 39.5 | 0.8 | 60.0 | 40.0 | 0.8 | 50.0<br>BEFORE<br>0.0<br>AFTER |
|  | 24/08/12                                                                                                                                                                      | 60.3 | 40.8 | 0.8 | 60.0 | 40.0 | 0.7 | 0.3                            |
|  | 31/08/12                                                                                                                                                                      | 59.5 | 39.2 | 0.8 | 60.0 | 40.0 | 0.8 | 0.5                            |
|  | 07/09/12                                                                                                                                                                      | 40.8 | 40.6 | 0.9 | 60.0 | 40.0 | 0.9 | 19.2<br>BEFORE<br>0.0<br>AFTER |
|  | 12/09/12                                                                                                                                                                      | 60.1 | 40.6 | 0.8 | 60.0 | 40.0 | 0.9 | 0.1                            |
|  | 14/09/12                                                                                                                                                                      | 105  | 41.2 | 0.7 | N/A  | 40.0 | 0.7 | 45.0                           |
|  | 21/09/12                                                                                                                                                                      | 105  | 40.6 | 0.6 | N/A  | 40.0 | 0.6 | N/A                            |
|  | <p>This Hitech GIR 5000 instrument was installed on 17 January 2013 as the previous instrument (Troxex) was no longer able to be calibrated on site as of the 14/09/2012.</p> |      |      |     |      |      |     |                                |

Marie Louise

1<sup>st</sup> calibration cert valid from 4 May 2012 and was calibrated on site on a weekly basis using a known span gas.

| Calibration needs to be done weekly | CH4  | CO2  | O2  | CH4  | CO2  | O2  | ERROR CH4 % |
|-------------------------------------|------|------|-----|------|------|-----|-------------|
| 04/05/12                            | 60.2 | 40.0 | 0.4 | 60.0 | 40.0 | 0.4 | 0.2         |
| 17/05/12                            | 60.1 | 39.9 | 0.4 | 60.0 | 40.0 | 0.5 | 0.1         |
| 25/05/12                            | 60.2 | 40.2 | 0.8 | 60.0 | 40.0 | 0.8 | 0.2         |
| 01/06/12                            | 60.1 | 40.3 | 0.8 | 60.0 | 40.0 | 0.8 | 0.1         |
| 08/06/12                            | 59.8 | 39.7 | 1.2 | 60.0 | 40.0 | 1.1 | 0.2         |
| 15/06/12                            | 61.0 | 39.8 | 0.9 | 60.0 | 40.0 | 0.9 | 1.0         |
| 29/06/12                            | 60.5 | 40.1 | 0.6 | 60.0 | 40.0 | 0.6 | 0.5         |
| 11/07/12                            | 60.2 | 40.3 | 0.4 | 60.0 | 40.0 | 0.4 | 0.2         |
| 20/07/12                            | 61.2 | 40.0 | 0.4 | 60.0 | 40.0 | 0.4 | 1.2         |
| 27/07/12                            | 60.5 | 39.4 | 0.3 | 60.0 | 40.0 | 0.3 | 0.5         |
| 03/08/12                            | 60.2 | 40.6 | 0.4 | 60.0 | 40.0 | 0.3 | 0.2         |
| 10/08/12                            | 61.0 | 40.2 | 0.5 | 60.0 | 40.0 | 0.5 | 1.0         |
| 24/08/12                            | 59.8 | 39.4 | 0.3 | 60.0 | 40.0 | 0.4 | 0.2         |
| 07/09/12                            | 60.4 | 40.3 | 0.4 | 60.0 | 40.0 | 0.3 | 0.4         |
| 20/09/12                            | 60.0 | 41.2 | 0.5 | 60.0 | 40.0 | 0.4 | 0.0         |
| 28/09/12                            | 60.8 | 40.5 | 0.3 | 60.0 | 40.0 | 0.3 | 0.8         |
| 05/10/12                            | 59.7 | 40.2 | 0.2 | 60.0 | 40.0 | 0.3 | 0.3         |
| 12/10/12                            | 61.2 | 39.0 | 0.6 | 60.0 | 40.0 | 0.6 | 1.2         |
| 19/10/12                            | 60.3 | 39.4 | 0.3 | 60.0 | 40.0 | 0.2 | 0.3         |
| 30/10/12                            | 58.9 | 40.7 | 0.4 | 60.0 | 40.0 | 0.5 | 1.1         |

|                     |          |      |      |     |      |      |     |     |
|---------------------|----------|------|------|-----|------|------|-----|-----|
|                     | 09/11/12 | 59.6 | 39.8 | 0.3 | 60.0 | 40.0 | 0.3 | 0.4 |
|                     | 16/11/12 | 60.2 | 38.3 | 0.4 | 60.0 | 40.0 | 0.3 | 0.2 |
|                     | 29/11/12 | 60.6 | 41.2 | 0.4 | 60.0 | 40.0 | 0.4 | 0.6 |
|                     | 07/12/12 | 59.7 | 40.4 | 0.3 | 60.0 | 40.0 | 0.3 | 0.3 |
|                     | 14/12/12 | 60.2 | 39.6 | 0.7 | 60.0 | 40.0 | 0.7 | 0.2 |
|                     | 24/12/12 | 60.4 | 40.0 | 0.4 | 60.0 | 40.0 | 0.4 | 0.4 |
|                     | 28/12/12 | 61.1 | 40.8 | 0.3 | 60.0 | 40.0 | 0.3 | 1.1 |
| Calculation method: | N/A      |      |      |     |      |      |     |     |
| Any comment:        |          |      |      |     |      |      |     |     |

|                                                                  |                                                                                                                           |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | EL <sub>LFG</sub>                                                                                                         |
| Data unit:                                                       | MWh                                                                                                                       |
| Description:                                                     | Net amount of electricity generated using LFG                                                                             |
| Source of data:                                                  | Site electricity meter                                                                                                    |
| Description of measurement methods and procedures to be applied: | Measured continuously using an electricity meter that will make the data available electronically available for download. |
| Frequency of monitoring/recording:                               | Continuously and archived                                                                                                 |
| Value monitored:                                                 | 0                                                                                                                         |
| Monitoring equipment:                                            | To be installed when generators are installed                                                                             |
| QA/QC procedures to be applied:                                  | Instruments are subject to routine maintenance and calibration as per the manufacturers' specification to ensure accuracy |
| Calculation method:                                              | N/A                                                                                                                       |
| Any comment:                                                     | There is no data for this parameter as the power generation component of this project is still to be installed.           |

|                                                                  |                                                                                                                            |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | Operation of the energy plant                                                                                              |
| Data unit:                                                       | Hours                                                                                                                      |
| Description:                                                     | Operation of the energy plant in a year y                                                                                  |
| Source of data:                                                  | Generator                                                                                                                  |
| Description of measurement methods and procedures to be applied: | Measured electronically and automatically by the generator.                                                                |
| Frequency of monitoring/recording:                               | Continuously and archived.                                                                                                 |
| Value monitored:                                                 | 0                                                                                                                          |
| Monitoring equipment:                                            | N/A Still to be installed with Generators.                                                                                 |
| QA/QC procedures to be applied:                                  | Instruments are subject to routine maintenance and calibration as per the manufacturers' specification to ensure accuracy. |
| Calculation method:                                              | N/A                                                                                                                        |
| Any comment:                                                     |                                                                                                                            |

|                                                                  |                                                                                                                                                       |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | $PE_{EC,y}$                                                                                                                                           |
| Data unit:                                                       | tCO <sub>2</sub>                                                                                                                                      |
| Description:                                                     | Project emissions from electricity consumption by the project activity during the year y                                                              |
| Source of data:                                                  | Electricity supply meter on site and Eskom website for the most current TDL <sub>y</sub> .                                                            |
| Description of measurement methods and procedures to be applied: | As per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".                                               |
| Frequency of monitoring/recording:                               | Continuously monitored, recorded monthly.                                                                                                             |
| Value monitored:                                                 | Robinson Deep<br>27 May 2011 to 11 November 2012 121 tCO <sub>2</sub><br>Marie Louise<br>1 May 2012 to 11 November 2012 19 tCO <sub>2</sub>           |
| Monitoring equipment:                                            | Electricity meter:<br>Type: Transformer<br>Part No: CBI- EC330CM<br>Accuracy: class 1<br>Calibration: Calibration not required Solid state instrument |

|                                 |                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | Robinson Deep<br><br>Type: Transformer<br>Part No: DEM024SJ<br>Accuracy: class B<br>Calibration: Calibration not required Solid state instrument<br>Marie Louise |
| QA/QC procedures to be applied: | Instruments are subject to routine maintenance as per the manufacturers' specification. These are solid state units are not able to be calibrated,               |
| Calculation method:             | As per the " <i>Tool to calculate baseline, project and/or leakage emissions from electricity consumption</i> ".                                                 |
| Any comment:                    |                                                                                                                                                                  |

|                                                                  |                                                                                                    |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | $PE_{FC,i,y}$                                                                                      |
| Data unit:                                                       | tCO <sub>2e</sub>                                                                                  |
| Description:                                                     | Project emissions from fossil fuel combustion in fossil fuel based generators during the year y    |
| Source of data:                                                  | N/A                                                                                                |
| Description of measurement methods and procedures to be applied: | N/A                                                                                                |
| Frequency of monitoring/recording:                               | N/A                                                                                                |
| Value monitored:                                                 | 0                                                                                                  |
| Monitoring equipment:                                            | N/A                                                                                                |
| QA/QC procedures to be applied:                                  | N/A                                                                                                |
| Calculation method:                                              | N/A                                                                                                |
| Any comment:                                                     | No standby generators have been used and therefore this parameter is not used in this application. |

|                        |             |
|------------------------|-------------|
| Data Unit / Parameter: | $T_{flare}$ |
|------------------------|-------------|

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|-------------------|-----------|-------------------|-----------|---------------------|----------|------------------------|----------|----------------------|----------|-----------------------|----------|-----------------------|----------|----------------------|----------|-----------------------|----------|--------------------|----------|--------------------|----------|------------------|----------|-------------------|----------|-------------------|----------|---------------------|----------|------------------------|------|----------------------|------|-----------------------|------|
| Data unit:                                                       | °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| Description:                                                     | Temperature in the exhaust gas of the flare                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| Source of data:                                                  | Type N Thermocouples installed in the flare stack to measure the combustion temperature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| Description of measurement methods and procedures to be applied: | Measured continuously and recorded every 30 minutes via telemetry. Used to cross check that the flare is operating at a suitable temperature to fully combust and oxidise the methane gas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| Frequency of monitoring/recording:                               | 30 minutes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| Value monitored:                                                 | <p>Robinson Deep</p> <table> <tr><td>May 2011 Average</td><td>1007.4 °C</td></tr> <tr><td>June 2011 Average</td><td>1003.7 °C</td></tr> <tr><td>July 2011 Average</td><td>1002.1 °C</td></tr> <tr><td>August 2011 Average</td><td>936.5 °C</td></tr> <tr><td>September 2011 Average</td><td>967.8 °C</td></tr> <tr><td>October 2011 Average</td><td>877.8 °C</td></tr> <tr><td>November 2011 Average</td><td>859.1 °C</td></tr> <tr><td>December 2011 Average</td><td>866.4 °C</td></tr> <tr><td>January 2012 Average</td><td>867.8 °C</td></tr> <tr><td>February 2012 Average</td><td>902.7 °C</td></tr> <tr><td>March 2012 Average</td><td>891.9 °C</td></tr> <tr><td>April 2012 Average</td><td>911.9 °C</td></tr> <tr><td>May 2012 Average</td><td>898.1 °C</td></tr> <tr><td>June 2012 Average</td><td>840.2 °C</td></tr> <tr><td>July 2012 Average</td><td>872.2 °C</td></tr> <tr><td>August 2012 Average</td><td>960.3 °C</td></tr> <tr><td>September 2012 Average</td><td>0 °C</td></tr> <tr><td>October 2012 Average</td><td>0 °C</td></tr> <tr><td>November 2012 Average</td><td>0 °C</td></tr> </table> | May 2011 Average | 1007.4 °C | June 2011 Average | 1003.7 °C | July 2011 Average | 1002.1 °C | August 2011 Average | 936.5 °C | September 2011 Average | 967.8 °C | October 2011 Average | 877.8 °C | November 2011 Average | 859.1 °C | December 2011 Average | 866.4 °C | January 2012 Average | 867.8 °C | February 2012 Average | 902.7 °C | March 2012 Average | 891.9 °C | April 2012 Average | 911.9 °C | May 2012 Average | 898.1 °C | June 2012 Average | 840.2 °C | July 2012 Average | 872.2 °C | August 2012 Average | 960.3 °C | September 2012 Average | 0 °C | October 2012 Average | 0 °C | November 2012 Average | 0 °C |
| May 2011 Average                                                 | 1007.4 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| June 2011 Average                                                | 1003.7 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| July 2011 Average                                                | 1002.1 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| August 2011 Average                                              | 936.5 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| September 2011 Average                                           | 967.8 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| October 2011 Average                                             | 877.8 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| November 2011 Average                                            | 859.1 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| December 2011 Average                                            | 866.4 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| January 2012 Average                                             | 867.8 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| February 2012 Average                                            | 902.7 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| March 2012 Average                                               | 891.9 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| April 2012 Average                                               | 911.9 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| May 2012 Average                                                 | 898.1 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| June 2012 Average                                                | 840.2 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| July 2012 Average                                                | 872.2 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| August 2012 Average                                              | 960.3 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| September 2012 Average                                           | 0 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| October 2012 Average                                             | 0 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |
| November 2012 Average                                            | 0 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |           |                   |           |                   |           |                     |          |                        |          |                      |          |                       |          |                       |          |                      |          |                       |          |                    |          |                    |          |                  |          |                   |          |                   |          |                     |          |                        |      |                      |      |                       |      |

|                                 |                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | <p>Marie Louise</p> <p>June 2012 Average      840.2   °C</p> <p>July 2012 Average      860.8   °C</p> <p>August 2012 Average    896.3   °C</p> <p>September 2012Average 892.8   °C</p> <p>October 2012 Average    879.9   °C</p> <p>November 2012Average   882.0   °C</p>                                                                                        |
| Monitoring equipment:           | <p>Robinson Deep</p> <p>Type N thermocouple<br/>Serial No: Part number T1TECNSX60<br/>Accuracy: +0.75% (333°C-1200°C)<br/>Calibration: Functionality test every three months</p> <p>Marie Lousie</p> <p>Type N thermocouple<br/>Serial No: Part number T1TECNSX60 Accuracy: +0.75%<br/>(333°C-1200°C)<br/>Calibration: Functionality test every three months</p> |
| QA/QC procedures to be applied: | <p>The thermocouples are calibrated and or replaced annually.<br/>The test dates are as follows.</p> <p>Robinson Deep</p> <p>11-10-2011   Passed</p> <p>17-02-2012   Passed</p> <p>17-05-2012   Passed</p> <p>27-08-2012   Passed</p> <p>11-12-2012   Passed</p> <p>Marie Louise</p> <p>15-08-2012   Passed</p> <p>23-11-2012   Passed</p>                       |
| Any comment:                    |                                                                                                                                                                                                                                                                                                                                                                  |

|                        |                                           |
|------------------------|-------------------------------------------|
| Data Unit / Parameter: | <b>Other Flare operational Parameters</b> |
| Data unit:             | -                                         |

|                                                                  |                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:                                                     | Operating conditions as per manufacturer specifications.                                                                                                                                                                                          |
| Source of data:                                                  | Raw data from site                                                                                                                                                                                                                                |
| Description of measurement methods and procedures to be applied: | Cross checked referencing the source data and recorded every 30 minutes in workbook.                                                                                                                                                              |
| Frequency of monitoring/recording:                               | 30 minutes                                                                                                                                                                                                                                        |
| Value monitored:                                                 | WCH4 and Tflare<br>700°C < Tflare < 1,200°C<br>Tflare < 1,200°C<br>wCH4 > 25% v/v                                                                                                                                                                 |
| Monitoring equipment:                                            | N/A                                                                                                                                                                                                                                               |
| QA/QC procedures to be applied:                                  | The thermocouple will be subject to exchange or calibration on an annual basis to ensure accuracy.<br>The gas analysing unit(s) will be maintained and calibrated regularly in line with manufacturer's requirements in order to ensure accuracy. |
| Calculation method:                                              | "Tool to determine project emissions from flaring gases containing methane".                                                                                                                                                                      |
| Any comment:                                                     |                                                                                                                                                                                                                                                   |

|                                                                  |                                                                                                                                                                                                                                                                                    |  |                  |                          |                  |               |                 |       |                          |             |  |  |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|--------------------------|------------------|---------------|-----------------|-------|--------------------------|-------------|--|--|
| Data Unit / Parameter:                                           | EC <sub>PJ,i,y</sub>                                                                                                                                                                                                                                                               |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Data unit:                                                       | MWh                                                                                                                                                                                                                                                                                |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Description:                                                     | Onsite consumption of electricity attributable to the project activity during the year y                                                                                                                                                                                           |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Source of data:                                                  | Electricity supply meter on site                                                                                                                                                                                                                                                   |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Description of measurement methods and procedures to be applied: | Electricity will be measured using electricity meters and data will be collected monthly and will be aggregated at least annually.                                                                                                                                                 |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Frequency of monitoring/recording:                               | Monitored continuously, recorded monthly                                                                                                                                                                                                                                           |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| Value monitored:                                                 | <table><tr><td><u>Parameter</u></td><td><u>EC<sub>Pj,y</sub></u></td></tr><tr><td><u>SITE NAME</u></td><td>ROBINSON DEEP</td></tr><tr><td><u>FLARE ID</u></td><td>10931</td></tr><tr><td><u>ELECTRICITY METER</u></td><td>CBI-EC330CM</td></tr><tr><td></td><td></td></tr></table> |  | <u>Parameter</u> | <u>EC<sub>Pj,y</sub></u> | <u>SITE NAME</u> | ROBINSON DEEP | <u>FLARE ID</u> | 10931 | <u>ELECTRICITY METER</u> | CBI-EC330CM |  |  |
| <u>Parameter</u>                                                 | <u>EC<sub>Pj,y</sub></u>                                                                                                                                                                                                                                                           |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| <u>SITE NAME</u>                                                 | ROBINSON DEEP                                                                                                                                                                                                                                                                      |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| <u>FLARE ID</u>                                                  | 10931                                                                                                                                                                                                                                                                              |  |                  |                          |                  |               |                 |       |                          |             |  |  |
| <u>ELECTRICITY METER</u>                                         | CBI-EC330CM                                                                                                                                                                                                                                                                        |  |                  |                          |                  |               |                 |       |                          |             |  |  |
|                                                                  |                                                                                                                                                                                                                                                                                    |  |                  |                          |                  |               |                 |       |                          |             |  |  |

|  |                      |                          |
|--|----------------------|--------------------------|
|  | Year 2011            | Monthly net MWh Reading  |
|  | 31/05/2011           | 5.671                    |
|  | 30/06/2011           | 5.671                    |
|  | 29/07/2011           | 5.671                    |
|  | 31/08/2011           | 5.671                    |
|  |                      | Accumulative MWh Reading |
|  | 30/09/2011           | 4.363                    |
|  | 31/10/2011           | 10.227                   |
|  | 30/11/2011           | 18.815                   |
|  | 30/12/2011           | 26.041                   |
|  | Average/month        | 6.09MWh/month            |
|  | Parameter            | ECpj,y                   |
|  | SITE NAME            | ROBINSON DEEP            |
|  | FLARE ID             | 10931                    |
|  | ELECTRICITY<br>METER | CBI- EC330CM             |
|  |                      |                          |
|  | Year 2012            | Accumulative MWh Reading |
|  | 30/01/2012           | 31.862                   |
|  | 29/02/2012           | 37.657                   |
|  | 30/03/2012           | 44.342                   |
|  | 26/04/2012           | 48.685                   |
|  | 31/05/2012           | 53.501                   |
|  | 29/06/2012           | 57.752                   |
|  | 27/07/2012           | 61.038                   |
|  | 31/08/2012           | 64.910                   |
|  | 28/09/2012           | 69.651                   |
|  | 31/10/2012           | 76.974                   |
|  | 30/11/2012           | 84.510                   |
|  | 31/12/2012           | 90.742                   |
|  | Average/month        | 7.56MWh/month            |
|  | Parameter            | ECpj,y                   |
|  | SITE NAME            | MARIE LOUISE             |
|  | FLARE ID             | 11104                    |
|  | ELECTRICITY<br>METER | ACORP DEMO 24SJ          |
|  |                      |                          |
|  | Year 2012            | Accumulative MWh Reading |
|  |                      |                          |

|                                 |                                                                                                                                                                                                                                                                                                                           |               |  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--|
|                                 | 31/05/2012                                                                                                                                                                                                                                                                                                                | 2.192         |  |
|                                 | 29/06/2012                                                                                                                                                                                                                                                                                                                | 4.204         |  |
|                                 | 27/07/2012                                                                                                                                                                                                                                                                                                                | 6.694         |  |
|                                 | 31/08/2012                                                                                                                                                                                                                                                                                                                | 9.297         |  |
|                                 | 28/09/2012                                                                                                                                                                                                                                                                                                                | 11.487        |  |
|                                 | 31/10/2012                                                                                                                                                                                                                                                                                                                | 13.881        |  |
|                                 | 30/11/2012                                                                                                                                                                                                                                                                                                                | 16.266        |  |
|                                 | 31/12/2012                                                                                                                                                                                                                                                                                                                | 18.575        |  |
|                                 | Average/month                                                                                                                                                                                                                                                                                                             | 2.32MWh/month |  |
| Monitoring equipment:           | Electricity meter:<br>Type: Transformer<br>Part No: CBI- EC330CM<br>Accuracy: class 1<br>Calibration: Calibration not required Solid state instrument<br>Robinson Deep<br><br>Type: Transformer<br>Part No: DEM024SJ<br>Accuracy: class B<br>Calibration: Calibration not required Solid state instrument<br>Marie Louise |               |  |
| QA/QC procedures to be applied: | Instruments are subject to routine maintenance as per the manufacturers' specification. These are solid state units are not able to be calibrated,                                                                                                                                                                        |               |  |
| Calculation method:             | N/A                                                                                                                                                                                                                                                                                                                       |               |  |
| Any comment:                    |                                                                                                                                                                                                                                                                                                                           |               |  |

|                                                                  |                                                                                                                                 |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | <b><i>FC<sub>i,m,y</sub></i></b>                                                                                                |
| Data unit:                                                       | Mass or volume unit                                                                                                             |
| Description:                                                     | Amount of fossil fuel type <i>i</i> consumed by the group of power units <i>m</i> in year <i>y</i><br><br>(mass or volume unit) |
| Source of data:                                                  | N/A                                                                                                                             |
| Description of measurement methods and procedures to be applied: | N/A                                                                                                                             |
| Frequency of monitoring/recording:                               | N/A                                                                                                                             |
| Value monitored:                                                 | 0 lt                                                                                                                            |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Monitoring equipment:           | Diesel will be supplied from tanks and ruler gauges will be used to determine volume of diesel consumed. The ruler gauges will be part of the tank and calibrated at least once a year. The measurements will be recorded in a book (on a daily basis or per shift). The volume is obtained by multiplying the tank level by the tank cross-sectional area. The mass is calculated by multiplying the resulting volume by the density value of 0.84 Kg/l from Oak Ridge National Laboratory, ( <a href="http://bioenergy.ornl.gov/papers/misc/energy_conv.html">http://bioenergy.ornl.gov/papers/misc/energy_conv.html</a> ). |
| QA/QC procedures to be applied: | The metered fuel consumption quantities may be cross checked against purchase invoices (if available).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Calculation method:             | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Any comment:                    | No standby generators have been used and therefore this parameter is not used in this application.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### 3.3 Description of the Monitoring Plan

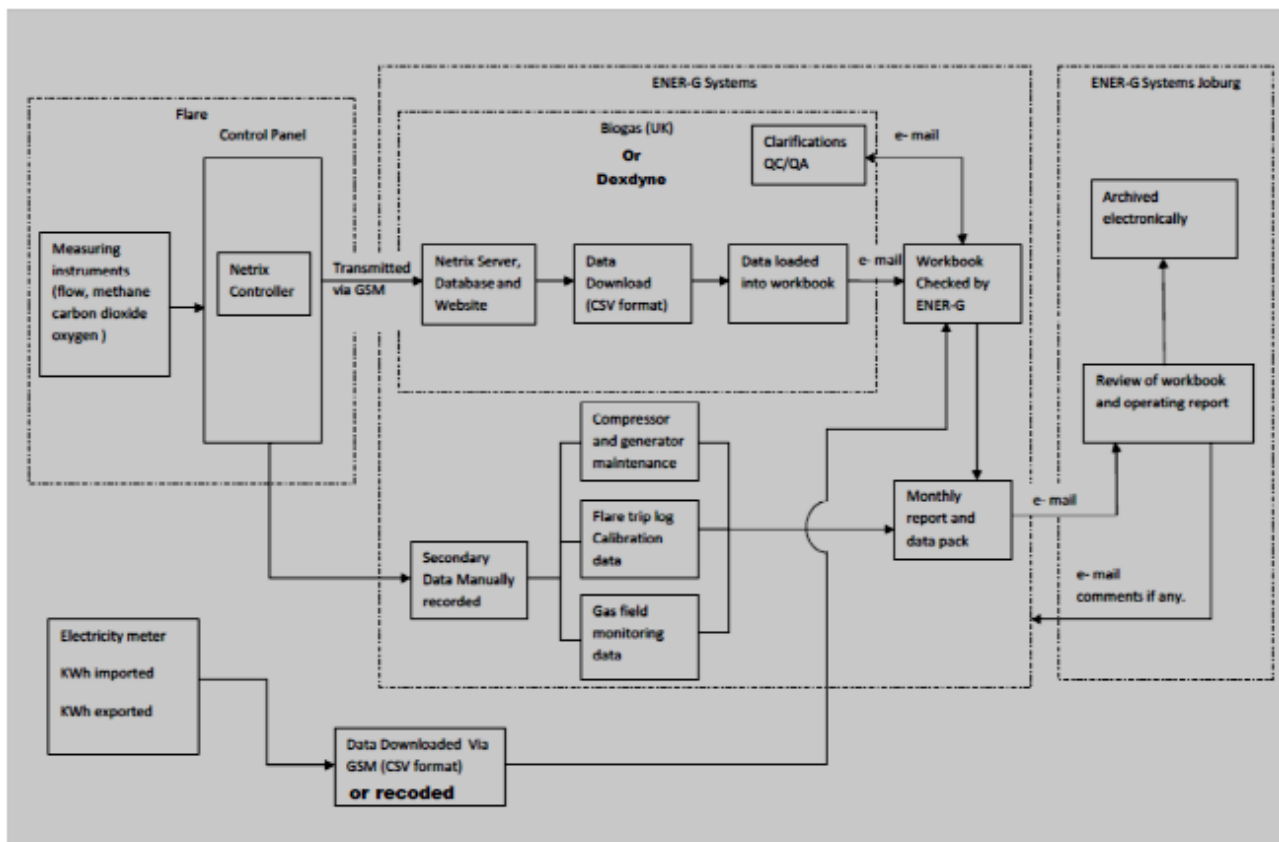
The monitoring system consists of total flow, flare flow and electricity flow meters that record the flow of landfill gas extracted from the site and conveyed to the flare and generators in Nm<sup>3</sup>/h. The landfill gas is then analysed by a fixed gas analyser that measures the concentration of methane in the landfill gas. The gas is then combusted in a high temperature enclosed flare and the combustion temperature is monitored to ensure that the methane gas is combusted at a suitable temperature. All of the above measurements are recorded and transmitted via telemetry every 30 minutes to a central database where the raw data is stored in CSV (comma separated Values) format available for down load.

The data is downloaded monthly and compiled into a workbook where the raw data is used to calculate the number of emission reductions achieved by the flare by applying the approved calculations as detailed in the PDD.

The monthly reports are then reviewed and stored electronically by the operations manager and the general manager.

The workbooks only provide the electronic data for the methane destroyed by the projects activities. Other parameters are also recorded but are documented manually such as the projects emissions from fuel consumed or electricity consumed. This data is then included in the monitoring periods consolidated workbook that takes into account both emission reductions from the project activity and the project emissions and established the net reduction in tCO<sub>2</sub>e.

Below is a diagrammatic flow chart showing the flow of data from each site for the project.



## Quality Assurance

The data is compiled into a monthly workbook which collects the data and calculates the volume of CERs produced from the project activity. This data is reviewed for consistency and details of the plants' operations over the month. This data and the trip sheets are used to compile a brief monthly report that documents the sites performance and plant availability but also highlights any challenges being faced by the project in terms of operations or quality of data and systems. Internal auditing takes place every six months and an audit report is compiled and circulated for corrective action and filing. Corrective action is then implemented by the site technicians under the supervision and instruction of the production manager who is responsible for the day to day operation of the plant.

## Staff Training

ENER-G Systems embarks on continuous site based training that included induction training and CDM training when a new staff member joins the team and hands on technical training on a regular basis to enhance site based skills and knowledge. Training is very targeted and focussed on the individual areas of involvement and is recorded in a sheet titled on the Job Training and this signed off by the trainer and trainee.

## Roles and Responsibilities

| Position              | Responsibilities               | Authorities                        |
|-----------------------|--------------------------------|------------------------------------|
| ENER-G Systems Joburg | Overall responsibility for the | Manages resources for operation of |

| Position                                                                                                           | Responsibilities                                                                                                                                                                                                                                                                | Authorities                                               |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Process Operations Manager (Tony Cummings)                                                                         | landfill gas system.<br>Overall responsibility for the Quality Management System for the landfill gas system.<br>Reviews performance data on landfill gas system<br>Stores and archives data received on the ENER-G Systems Joburg Robinson Deep and Marei lousie CDM projects. | the landfill gas system                                   |
| Ener-G Systems General Manager (David Cornish)                                                                     | Overall responsibility for managing the landfill gas projects, allocation of resources and review of performance..                                                                                                                                                              | Manages resources for the landfill gas system and flare.. |
| Ener-G Site Technician<br>Nhlanhla Sepetake –RD<br>Ellek Mkhari – RD<br>Musa Mobombi –ML<br>Tshimangadzo Manngo-ML | Day-to-day operation of the landfill gas system and flare maintenance and calibration of instruments.                                                                                                                                                                           | Controls the landfill gas system and flare                |
| Data Controller                                                                                                    | Reviews and compares primary and secondary data from flare system.<br>Prepares monthly workbook and submits to Ener-G General Manager for review and comments.                                                                                                                  | Compiles Data into the monthly workbook.                  |
| Dexdyne                                                                                                            | Responsible for data collection. Allows ENER-G Systems and Biogas access to down load the raw data collected from the sites.                                                                                                                                                    | Management and archiving of the raw data.                 |

## 4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 4.1 Baseline Emissions

The baseline emissions for the monitoring period are 94667 tCO<sub>2e</sub>

$$BE_y = (MD_{project,y} - MDBL_y) * GWP_{CH4} + (ELLFG_y * CE_{elec,BL,y})$$

Criteria Values applied

MD<sub>project,y</sub> = 2011 43497 tCO<sub>2e</sub>

2012 51170 tCO<sub>2e</sub>

MDBL<sub>y</sub> = 0

$$\text{GWPOCH4} = 21$$

$$\text{ELLFG}_{,y} = 0$$

$$\text{CEFelec, BL}_{,y} = 0.977$$

## 4.2 Project Emissions

The project emissions for the monitoring period are:

$$\text{PE}_y = \text{PE}_{\text{EC},y} + \text{PE}_{\text{FC},j,y}$$

$$\text{PE}_{\text{FC},j,y} = 0$$

Therefore

$$\text{PEEC}_{,y} = \text{ECPJ}_{,y} * 0.977 * (1 + (8.7/100)) = \text{PE}_y$$

Where:

### Robinson Deep Values applied in 2011

|                        |        |                            |
|------------------------|--------|----------------------------|
| TDLJ <sub>,y</sub>     | 8.7%   | 1 April 2011-31 March 2012 |
| EFEL <sub>,j,y</sub>   | 0.977  | Fixed ex ante              |
| Σ ECPJ <sub>,j,y</sub> | 70.383 | MWh                        |

$$\text{PEEC}_{,y} = \text{ECPJ}_{,y} * 0.977 * (1 + (8.7/100)) = \text{PE}_y$$

$$\text{PEEC}_y = 75 \text{ tCO}_{2e}$$

### Robinson Deep Values applied in 2012

|                        |       |                               |
|------------------------|-------|-------------------------------|
| TDLJ <sub>,y</sub>     | 9.1%  | 1 April 2012-11 November 2012 |
| EFEL <sub>,j,y</sub>   | 0.977 | Fixed ex ante                 |
| Σ ECPJ <sub>,j,y</sub> | 42    |                               |

$$\text{PEEC}_{,y} = \text{ECPJ}_{,y} * 0.977 * (1 + (9.1/100)) = \text{PE}_y$$

$$\text{PEEC}_y = 46 \text{ tCO}_{2e}$$

### Marie Louise Values applied in 2012

|                        |       |                               |
|------------------------|-------|-------------------------------|
| TDLJ <sub>,y</sub>     | 9.1%  | 1 April 2012-11 November 2012 |
| EFEL <sub>,j,y</sub>   | 0.977 | Fixed ex ante                 |
| Σ ECPJ <sub>,j,y</sub> | 17    |                               |

$$\text{PEEC}_{,y} = \text{ECPJ}_{,y} * 0.977 * (1 + (9.1/100)) = \text{PE}_y$$

PEECy= 19 tCO<sub>2e</sub>

#### 4.3 Leakage

Zero

#### 4.4 Summary of GHG Emission Reductions and Removals

$$ER_y = BE_y - PE_y$$

| <u>Criteria</u>                  | <u>Values applied</u>         |
|----------------------------------|-------------------------------|
| PEFC,jy                          | 0                             |
| Bey 2011                         | 43497                         |
| PEEC,y 2011                      | 75                            |
| <b>Total 2011</b>                | <b>43422 tCO<sub>2e</sub></b> |
| Bey 2012                         | 51170                         |
| PEEC,y 2012                      | 65                            |
| <b>Total 2012 (rounded down)</b> | <b>51105 tCO<sub>2e</sub></b> |
| <u>Total ERy =</u>               | 94527 <u>tCO<sub>2e</sub></u> |

These are to be issued according vintage in years as detailed above.

## 5 ADDITIONAL INFORMATION

All the calculations and data has been recorded and used in the calculation of the emission reductions according to the methodology that the project have been registered for with the UNFCCC and are used to calculate pre registration VERs. All the data and calculations has been attached along will all the supporting data referred to in the index attached to this report.