



## Validation opinion

### Revision of the monitoring plan

Title of project activity:			
BRASCARBON Methane Recovery Project BCA-BRA-05			
CDM reference number:		DNV project No.:	
3455		PRJC- 297127 -2011-CCS-BRA	
Type of revision:	<input type="checkbox"/> Proposed revision only includes the request by the CDM EB <input type="checkbox"/> Proposed revision includes not only the request by the CDM EB but also additional revisions proposed by the PP/DOE <input checked="" type="checkbox"/> Proposed Revision includes revisions proposed by the PP/DOE		
Date	Work carried out by:	Work verified by:	Approved by:
13 December 2011	 Luis Filipe Tavares	 Andrea Leiroz	 Michael Lehmann

## 1 Description of the changes to the monitoring plan

This is a request for review of the monitoring plan of the registered PDD regarding the monitoring of the flare efficiency.

The revised monitoring plan provides for measuring the flare temperature by a thermocouple and flow rate by a flow meter and both data are stored every one minute during 24 hours per day.

To ensure adequate flaring, the flare shall operate with temperatures above or equal to 500 °C according to the flare manufacturer specification and minimum flow rate as designed for each specific farm.

Each flare is sized according to the specific farm where pipes and burners are calculated according to the estimated biogas flow rate using parameters of the IPCC 2006.

Therefore, the project participant considers

- an efficiency of 90% for the hour with all temperature measurements above or equal to 500 °Celsius and the biogas flow rate above the minimum flow rate as established by the manufacturer specification,

- 50% efficiency for the respective hour when all temperature measurements are above 500°C but when the biogas flow rate at any time in that hour was lower than the minimum flow rate as established by the manufacturer specification and
- 0% efficiency for the hour with any temperature below 500° Celsius.

### ***Reason for revision in Monitoring Plan (MP)***

The monitoring plan of the registered PDD contain in section B.7.1 the parameters:

“Combustion temperature of the flare” (Tf) with the monitoring frequency as each 3 minutes.

In addition, the parameter “Flare Efficiency” (FE) mention the “*Value of data*” as “*If hourly temperature < 500 °C than 50% efficiency*” and the measurement procedure mentions *Enclosed flare. Continuous temperature registration in the programmable logic controller (PLC)*”, which was based on the “*Tool to determine project emissions from flaring gases containing methane*” version 1 item II (a).

The revision in the monitoring plan is being submitted to bring in more clarity on the monitoring of the “Combustion temperature of the flare” (Tf) and “Flare Efficiency” (FE) including the monitoring frequency as being every one minute and considering, as described above, the flare efficiency as 90%, 50% or 0%, respectively, depending on whether the temperature is above 500° Celsius and whether the biogas flow rate is above the minimum flow rate as established by the manufacturer specification.

This changes is proposed in order to clarify that the flare efficiency is monitored according paragraph 26 (a) of AMS-III.D version 13.

### ***Proposed revision in monitoring plan (MP)***

a) Change the “Combustion temperature of the flare” (Tf) from “*Every 3 minutes measurement*” to “*Every 1 minute measurement*”;

b) Change the “Flare Efficiency” (FE)

Under “Value data”;

i) from “*If hourly temperature < 500 °C then 50% efficiency*” to

“*If hourly temperature < 500 °C then 0% efficiency*”.

ii) Included “

*If flare operation conditions is out of any spec then 50% efficiency;*

Under “Measurement procedures”

iii) from “*Enclosed flare. The temperature measurement and it’s registration in the programmable logic controller system (PLC) is every minute. Brascarbon considers efficiency 90% for the hour with all temperature measurements above or equal to 500° Celsius and 0% efficiency for the hour with any temperature measurements is below 500° Celsius*” to

“*Enclosed flare is used in the entire project.*

*Brascarbon considers 90% efficiency for the hour with all temperature measurements above or equal to 500° Celsius, 50% for the hour with any parameter of flare operation is out of the*

*range of manufacturer specifications and 0% efficiency for the hour with any temperature measurement is below 500° C. and*

iv) included in “Any comment”:

*“According to the manufacture specifications of the enclosed flares the dimension of the burner, the biogas flow rate, and the continuous sparking system of the enclosed flares were established according to the maximum theoretical flow of biogas for each swine farm.*

c) As the enclosed flares are sized by the manufacturer, Ecogas, for each farm, with the pipes and burners calculated according to the maximum estimated biogas flow rate, the biogas flow rate and the burning temperature is necessary to be monitored. According to the manufacture specifications of the enclosed flares the dimension of the burner, the refractory and the continuous sparking system of the enclosed flares were established according to the maximum theoretical flow of biogas for each swine farm. Hence, the burning temperature of the enclosed flare, the biogas flow rate will be monitored to ensure adequate combustion of biogas in the flare with temperatures above 500°C.

In addition, the requirement of AMS-III.D version 14 that states “*If in any specific hour any of the parameters is out of the range of specifications, 50% of default value should be used for this specific hour*” will be complied and 50% default value will be applied by the project participant if all temperature measurements are above 500°C but when the biogas flow rate at any time in that hour was lower than the minimum flow rate as established by the manufacturer specification.

## **2 Assessment of the revision of the monitoring plan**

***The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions***

- a) “Combustion temperature of the flare” ( $T_f$ ): The change in the monitoring frequency from 3 minutes to 1 minute will not affect the level of accuracy or completeness in the monitoring and verification process, as all measurements will be integrated by PLC in order to consider the entire hour;
- b) “Flare Efficiency” (FE): The change excludes the incorrect approach of 50% efficiency of enclosed flare at temperature below 500° C. The PLC will integrate all combustion temperature measurement and biogas flow rate measurement for the enclosed flare and consider:
  - an efficiency of 90% for the hour with all temperature measurements above or equal to 500 °Celsius and the biogas flow rate above the minimum flow rate as established by the manufacturer specification,
  - 50% efficiency for the respective hour when all temperature measurements are above 500°C but when the biogas flow rate at any time in that hour was lower than the minimum flow rate as established by the manufacturer specification, and
  - 0% efficiency for the hour with any temperature below 500° Celsius.

This integration will not have any impact on level of accuracy or completeness of the monitoring and verification process due this practice being used since the project start but not mentioned in the monitoring plan. However, this change is to reflect the actual monitoring practice control at site. This will also bring more clarity in the monitoring plan.

- c) As the enclosed flares are designed by the manufacturer, Ecogas, for each farm, with the dimension of the pipes and burners calculated according to the maximum estimated biogas flow rate, the biogas flow rate is necessary to be monitored. According to the manufacture specifications of the enclosed flares the dimension, the combustor, the mixer, the refractory and the continuous sparking system of the enclosed flares were established according to the maximum theoretical flow of biogas for each swine farm. Hence, the temperature of the enclosed flare and the biogas flow rate must be monitored to ensure adequate combustion of the biogas with temperatures above 500°C.

In addition, the requirement of AMS-III.D version 14 that states “If in any specific hour any of the parameters is out of the range of specifications, 50% of default value should be used for this specific hour” will be complied.

***The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation***

Since the project had implemented the control system which exclude automatically the hour with any temperature below 500 °C the revision monitoring plan was changed in order to clarify this procedure and included an efficiency of 50% efficiency for hours when all temperature measurements are above 500°C but when the biogas flow rate at any time in that hour was lower than the minimum flow rate as established by the manufacturer specification.

This proposed revision will be applied to the first and subsequent verification reports.

The above corrections are in line with the requirements of the applied methodology (AMS-III.D version 14).

***The findings of previous verification reports, if any, have been taken into account***

As this is the first verification activity, the findings will be taken into account in the revised monitoring report and verification report.

### **3 Validation opinion**

4 Hence, it is DNV’s opinion that:

- a. The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions: As the limit of 500 °C was considered for each 1 minute measurements reflecting on entire hour, the proposed revision has the same accuracy and completeness of monitoring.
- b. The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity to assure the correct monitoring plan and emission reductions: The changes on monitoring plan are according (AMS-III.D version 14).

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