
VERIFICATION AND CERTIFICATION REPORT

Sherritt International Corporation

**Energas Varadero Conversion from
Open Cycle to Combined Cycle
Project**

UNPA 0918

**Monitoring Period 3:01/07/2008 – 31/12/2010
(Both days inclusive)**

SGS Climate Change Programme

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03/10/2012		CDM.VER0404 MP3	
Project Title:			
Energas Varadero Conversion from Open Cycle to Combined Cycle Project			
Organisation:		Client:	
SGS United Kingdom Limited		Sherritt International Corporation	
Publication of Monitoring Report:			
Monitoring Period:		01/07/2008 to 31/12/2010	
First Monitoring Version and Date:		Version 01, 04/07/2011	
Final Monitoring Version and Date:		Version 10, 03/10/2012	
Summary:			
<p>SGS United Kingdom Ltd has performed the third periodic verification of the CDM project 'Energas Varadero Conversion from Open Cycle to Combined Cycle Project,' and UNFCCC Ref. Number: 0918. The verification includes confirming the implementation of the monitoring plan of the registered PDD UNFCCC Ref. Number: 0918 and the application of the monitoring methodology as per ACM0007 version 1. A site visit was conducted to verify the data submitted in the monitoring report. SGS confirms the following has been reviewed;</p> <ul style="list-style-type: none"> (a) The registered PDD, including the monitoring plan and the corresponding validation report; (b) Monitoring Report, ERs calculation spreadsheet and previous verification reports; (c) The applied monitoring methodology, approved revised monitoring plan and approved deviation; (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board; (e) All information and references relevant to the project activity's resulting in emission reductions <p>The Project consists of retrofitting each of the three gas turbines (GTs) at the Energas Varadero electrical generating plant with a heat recovery steam generator (HRSG). The HRSG uses the heat in the exhaust from the gas turbines to produce high pressure steam that is used to power a steam turbine. The electric generator driven by the steam turbine produces about 75 MW of electric power.</p> <p>SGS confirms that the project is implemented in accordance with the validated and registered Project Design Document and with the revised monitoring plan approved on 13/05/2011. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 634,208 tCO2e emission reductions during period 01/07/2008 up to 31/12/2010.</p>			
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CDM Verification			
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CUPET	Cuba's state oil company; acronym from the Spanish "Cubapetroleo"
DNA	Designated National Authority
DOE	Designated Operational Entities
EB	Executive Board
FAR	Forward Action Request
GHG	Greenhouse gas (es)
GT	Gas Turbine
GWP	Global Warming Potential
HRSg	Heat Recovery Steam Generation
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
NCV	Net Calorific Value
PDD	Project Design Document
PDT	Differential Pressure Transmitter
PP	Project Participant
PT	Pressure Transmitter
RMP	Revised Monitoring Plan
SGS	SGS United Kingdom Ltd
TT	Temperature Transmitter
UNE	Cuba's national electricity authority; acronym from the Spanish "Unión Nacional de Electricidad"
VGP	Varadero Gas Plant

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1. Introduction

1.1 Objective

SGS United Kingdom Ltd has been contracted by Sherritt International Corporation to perform an independent verification of its CDM project Energas Varadero Conversion from Open Cycle to Combined Cycle Project. CDM projects must undergo periodic audits and verification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The emissions report conforms with the requirements of the monitoring plan in the registered PDD and the approved methodology; and
- The data reported are complete and transparent.

1.2 Scope

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated and registered project design document and the monitoring report. The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

SGS has, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Project Activity and Period Covered

This engagement covers emissions and emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the following project and period.

Title of Project Activity:	Energas Varadero Conversion from Open Cycle to Combined Cycle Project
UNFCCC Registration Number:	0918
Monitoring Period Covered in this Report:	01/07/2008 to 31/12/2010
Project Participants:	Energas, S. A (Cuba – host) Sherritt International Corporation (Canada & United Kingdom of Great Britain and Northern Ireland)
Location of the Project Activity:	Varadero, Matanzas, Cuba

The Project consists of retrofitting each of the three gas turbines (GTs) at the Energas Varadero electrical generating plant with a heat recovery steam generator (HRSG). The HRSG uses the heat in the exhaust from the gas turbines to produce high pressure steam that is used to power a steam turbine. The electric generator driven by the steam turbine produces about 75 MW of electric power.

2. Methodology

2.1 General Approach

SGS' approach to the verification is a two-stage process.

In the first stage, SGS completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

At the end of this stage, SGS produced a Periodic Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

Using the Periodic Verification Checklist, SGS verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the monitoring report. This verification report describes the findings of this assessment.

2.2 Verification Team for this Assessment

Verification Team	
Name	Role
Alicia Fernandez	Lead Assessor & Local Assessor
Francisco Solis	Sectoral Scope Expert (TA 1.1)

Technical Review Team	
Name	Role
Simon Zhao	Technical Reviewer
Jumson Fu	Sectoral Scope Expert (TA 1.1)

2.3 Means of Verification

2.3.1 Review of Documentation

The validated PDD, the monitoring report submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached in section 8 of this report.

2.3.2 Site Visits

As part of the verification, the following on-site inspections have been performed by members of the assessment team:

Location: Varadero Gas Plant: Varadero, Cuba Puerto Escondido Plant: Puerto Escondido, Cuba	
Date: 29/08/2011 – 30/08/2011	
Coverage:	Source of Information / Persons Interviewed
Management and operational system: documentation, allocation of responsibilities, qualification and training, data archiving, internal audit and management review; Onsite inspection of the physical components of the project; Project boundaries and additional GHG sources Interviews with project personnel; Verification of calibration records of monitoring equipment; Review and sampling of internal system records.	Mihai Lincan – Operations Supervisor (Sherritt) David Quintillo – Operations Supervisor (Energas) Leonardo Morales Martell – Plant Manager (Energas) Miguel Angel Izquierdo – Shift Operator (Energas) Ernesto del Castillo García – Plant Sub-manager (Energas) Angel Taponés – Shift Operator (Energas) Julio César Toledo – Plant Operation Manager (Energas) Ricardo Hernandez – Instrument Technician (Energas) Antonio Sotolón – Chemical specialist (Energas)

2.4 Reporting of Findings

As an outcome of the verification process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the team shall raise a Clarification Request (CL) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- I. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- II. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- III. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

The verification process may be halted until this information has been made available to comply with the requirements of the CDM Executive Board. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A clarification request (CL) will be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.

Corrective Action Requests and Clarification requests are raised in the Periodic Verification Checklist. The Project Developer is given the opportunity to “close” outstanding CARs and respond to CLs and Observations.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period. Observations may be raised which are for the benefit of future projects and future verification actors. These have no impact upon the completion of the verification activity.

All CARs, CLs and FARs for this verification period are included in this report.

In all cases that a document has different version, the last one contains all the changes and modifications requested along the verification. In order to maintain the transparency, in this verification report the version of the document mentioned is the one where the CAR/CL was closed (not necessarily the last version). Therefore it has been verified that all the changes done along the process are included in the last versions as well.

2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

3. Verification Findings

3.1 Project Implementation - General

The conversion from open cycle to combined cycle in the Varadero power plant was completed in early 2003. The starting date of the CDM project activity was recorded as 22/06/2007. The entire activity of the project consists in only one site, located in Varadero Plant, and the project has been implemented in one phase. There are no observed or proposed changes to the CDM project activity as confirmed during the site visit.

With regard to special events, the project plant experienced downtimes of equipment with no impact on the applicability of the methodology. The generator rotor of the GT 3 failed two times in September 2008 and September 2009. The same failure was reported for the GT1 in April 2009. This is reflected in the ER spreadsheet records of sales gas consumption and net power generation (ref.71h). Routine maintenance was conducted to the gas turbines (GT- 1, 2, 3) and steam turbine (ST-1) as verified in the monthly and weekly production reports (ref.13, ref.50), as well as major inspections on GT1 and GT3. There were no events identified which may have an impact on the applicability of the methodology.

The project activity converted an open cycle thermal generation facility into a combined cycle facility that adds approximately 75 MW of generating capacity to Cuba's electric power grid with minimal incremental additions to greenhouse gas (GHG) emissions. The equipment used is designed to provide a high level of availability; the project activity is therefore available to supply the grid as a base load facility. For the foreseeable future, the project activity will allow an equivalent capacity of existing (relatively high GHG emitting) generating units supplying the grid to be taken out of service for such things as scheduled maintenance and/or to conserve (increasingly costly) imported fuel. Over the long term, the facility will continue to displace energy produced by other (relatively high GHG emitting) facilities supplying the grid and may also delay the need to construct additional generating capacity, depending on the country's growth in electricity demand.

The first crediting period for this project activity is from 22/06/2007 – 21/06/2014 (renewable). This is the third periodic verification of the project, and the monitoring period for this verification as established in the Monitoring Report (Ref.09j) is from 01/07/2008 to 31/12/2010. The start date of the monitoring period 01/07/2008 is also consistent with the previous monitoring period which extended until 30/06/2008. Information is available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>.

The monitoring methodology applied is ACM0007: "Baseline methodology for conversion from single cycle to combined cycle power generation" (Version 01; Sectoral Scope 01; 28 November 2005). The methodology ACM0002 was also used to calculate the CM Emission Factor established ex-ante (0.906 tCO₂/MWh). The Monitoring Report (Ref.09j) is consistent with the versions of methodologies ACM0007 (Version 1) and ACM0002 (version 6) that the project was registered against.

Initially the information of the PPs in Section A.2 of the MR v5 was not fully consistent with the information of the project page on UNFCCC website: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>. The PP was requested to review the information in the MR. **CAR #16 was thus raised.** The revised MR incorporates the PP "United Kingdom of Great Britain and Northern Ireland" and is now consistent with the information of the Project Participants available on the UNFCCC project page. **CAR #16 was closed out.**

All the physical features of the CDM project activity are implemented in accordance with the registered PDD; however during the verification of the second monitoring period it was noted that not all features of the project operation were in accordance with the monitoring plan in the registered PDD. As it was validated during the assessment of the Revised Monitoring Plan (ref.06), the RMP follows conservative criteria, this improves the accuracy of information provided and ensures consistency with the registered PDD and the monitoring plan. The project activity and its operation are in accordance with the RMP approved on 13/05/2011 by the UNFCCC available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view> and with the deviation incorporated in the request for revision of the monitoring plan, following Para 58 of EB 43 meeting report. According to the registered PDD (ref.01), the gas consumption for GT's and HRSG's

(FGT and FST) would be recorded daily; this was not consistent with ACM0007 ver.01, which requires an hourly recording frequency. The approved deviation applies from 01/01/2008 until 31/03/2011.

The project boundary was found to be in compliance with the registered PDD and the approved methodology. According to the ACM0007 version 1, the project boundary encompasses the power plant at the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to. According to the PDD, the project boundary includes both open and combined cycle power generation systems, as well as the power plants connected to the grid. During the site visit it was observed that the facilities involved with the project are in compliance with the project boundary in the PDD. There are no changes compared to the previous verification; no other source of GHG emissions were identified during the site visit.

The final emission reductions verified in the monitoring period (634,208 tCO₂) are lower than the emission reduction estimated in the registered PDD (856,994 tCO₂ for the equivalent period). As described in section E.6 of the MR (ref.09j), the difference is explained by lower levels of fuel gas availability than expected. The differences can also be accounted to the proper monitoring of the electricity generation capacity (PC), the electricity generated in open cycle (OGy) and electricity generated in combined cycle (CGy) as outlined in the Revised Monitoring Plan (ref.06). The monitoring of the project variables as described in the RMP has been done according to the monitoring methodology (refer to section 3.3 of this report).

As clarified in the MR (ref.09j), an error was identified in the calculation of PLF in the previous monitoring period (01/01/2008 – 30/06/2008), which did not apply the most conservative value between Option 1 and Option 2. The ER spreadsheet for the previous monitoring period was revised (ref.74) to apply the correct value of PLF (the higher value), thus decreasing the baseline emissions and showing that 5,180 CERs were over-issued for the period 01/01/2008 – 30/06/2008. Thus, the PP has voluntarily discounted this amount from the ERs obtained during this monitoring period. It is important to note that neither the VVM nor any other UN guidance state any provisions for discounting the emission reductions in the current monitoring period due to the issues in the previous monitoring periods. This discounting of the CERs in MP3 due to issues in MP2 is a voluntary action by the PP & SGS. Please refer to section 4 of this report for more details.

3.2 Remaining Issues, CAR's, FAR's from Previous Validation or Verification

There are no remaining issues such as FARs raised in the previous verification assessment (ref.08). The monitoring plan has been revised during the previous verification as recommended in the verification report of the 1st periodic verification (ref.04).

3.3 Compliance of the monitoring plan with the monitoring methodology.

During the previous verification (ref.08), the following main inconsistencies between the methodology and monitoring plan were identified:

1. Parameter "PC – Electricity Generation Capacity" is required by the methodology to be monitored; however it was not available in the Monitoring Plan.
2. Parameters OGy (electricity generated by the open cycle in year y) and CGy (Electricity generated from use of waste heat in year y) were being monitored directly by the PP even though according to the methodology the parameters shall be calculated as per formula (7) and (12) of the methodology.

The monitoring plan was revised to address these issues (ref.06) and is now in accordance with the monitoring methodology. Information is available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>.

In addition, a deviation was approved for this project within the request for revision of the monitoring plan, following EB 43 meeting report Para 58. According to the registered PDD (ref.01), the gas consumption for GT's and HRSG's (FGT and FST) would be recorded daily; this was not consistent with ACM0007 ver.01, which requires an hourly recording frequency. The deviation is described in the Validation Report of the Revised Monitoring Plan which was approved on 13/05/2011, and it applies from 01/01/2008 until 31/03/2011.

3.4 Completeness of Monitoring

Monitoring of reductions in GHG emissions resulting from the registered project have been implemented in accordance with the approved Revised Monitoring Plan and the request for deviation included in the request for revision of the monitoring plan, approved on 13/05/2011, and available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>. The monitoring mechanism is effective and reliable.

Initially the Monitoring Report was not consistent with the latest F-CDM-MR template available on the UN at: http://cdm.unfccc.int/Reference/PDDs_Forms/Issuance/index.html. **CAR #15** was raised. The PP amended the MR (ref.09f). The revised version now correctly applies the latest UN template. **CAR #15** was closed out.

According to the approved Revised Monitoring Plan, the following parameters shall be monitored:

Project emission parameters:

$FGT_{NG,y}$ – Consumption of natural gas to operate the gas turbine for the year (y)

$FST_{NG,y}$ – Consumption of natural gas used for supplementary heat in the HRSG for the year (y)

$NCV_{NG,y}$ - Net Calorific Value of natural gas.

$EF_{CO_2,NG,y}$ - CO2 Emission Factor for natural gas

$OXID_{NG,y}$ - Oxidation factor for natural gas

Baseline emission parameters:

PG_y – Actual electricity generated by project in the year

OG_y – Actual electricity generated by open cycle in the year

CG_y – Actual electricity generated from waste heat use in steam turbine

PC – Net generation capacity of the project power plant

Leakage emissions:

According to the methodology leakage is assumed negligible and therefore no data is required.

All of the abovementioned parameters are reported in the MR Version 1 (ref.09a). The monitoring procedures were verified and are implemented according to the RMP (ref.06).

Project Emission Parameters:

1. $FGT_{NG,y}$ – Consumption of natural gas to operate the gas turbine for the year (y)

This parameter is measured by 3 differential pressure transmitters (PDT), along with a temperature transmitter (TT) and a pressure transmitter (PT) for each turbine. During the site visit, the meters were checked and were found to be correctly installed and the same as the previous verification. For the gas turbines the instruments are:

GT1:

- PDT: Manufacturer SMAR; Model LD301D21IVD10012A1I3P; Serial No. 177898-03 (Pic.2a-b);
- PT: Manufacturer Rosemount; Model 3051PG5 / Serial No. unreadable (Pic.3);
- TT: Manufacturer Rosemount; Model 00G5A11D080N0385E1X1X7; Serial No. 1605982 (Pic.4a-c)

GT2:

- PDT: Manufacturer SMAR; Model LD301D21IVD10012A1I3P; Serial No. 154040 (Pic.6a-d);
- PT: Manufacturer Rosemount; Model 3051PG5 / Serial No. unreadable (Pic.7a-b);
- TT: Manufacturer Rosemount; Model 00G5A11D080N0385E1X1X7; Serial No. 1605980 (Pic.8a-d)

GT3:

- PDT: Manufacturer SMAR; Model LD301D21IVD10012A1I3P; Serial No. 200263 (Pic.10a-c);
- PT: Manufacturer Rosemount; Model 3051PG5; Serial No. unreadable (Pic.11a-b);
- TT: Manufacturer Rosemount; Model 00G5A11D080N0385E1X1X7; Serial No. 1605981 (Pic.12a-c)

According to the RMP (ref.06) the fuel gas meters shall be calibrated on an annual basis (section B.7.1). Equipment specifications (Ref.20, 24-25) do not establish a specific calibration frequency required for the SMAR and Rosemount transmitters. This was also confirmed in the previous verification with the equipment suppliers (Telematic) (Ref.21). Therefore, in the absence of a frequency requirement by the manufacturer, an internally established calibration frequency of 1 year as stated in the RMP is deemed appropriate to ensure the accuracy of data.

CL #03 was raised to request the calibration records of the Rosemount PT and TT transmitters for GT1:3 in 2010 as well as certificates of calibration of the pattern devices that were employed in the calibrations of the monitoring equipment in 2009 and 2010 (Fluke 744 7740009, Crystal IS33 and Fluke 744 G4258) (ref.18 & 19). The calibration records of the Rosemount PT and TT transmitters for GT1-GT3 in 2010 were provided during the site visit (ref.53-54). The certificates indicate that these were calibrated on 02/11/2010. During the site visit, the PP provided the calibration certificates of the Fluke and Crystal devices for 2008 and 2010 (ref.45-46). The PP confirmed that the calibration certificates of the Fluke and Crystal devices for 2009 are not available.

Finally, the PP provided documentation in order to confirm the dates in the calibration certificates of the SMAR and Foxboro transmitters on 2009 and 2010 (ref.18 & 19). Since the SMAR and Rosemount certificates for 2009 (ref.18) state "09/12/2009" it was not clear if it referred to September or December 2009. According to the Varadero maintenance plan of 2009 (ref.73) provided by the PP, the correct date is December 2009.

With regard to the calibrations conducted in 2010 (ref.19), the certificates state "10/02/2010"; the PP was requested to confirm if it referred to February or October 2010. The PP provided a Work Order (ref.72) which was issued on "February 09 2010" in order to calibrate all three GT gas inlet differential flow meters. Hence, the correct calibration date is verified as 10/02/2010. The calibration dates of the PDT were corrected in the MR (ref.09d) to indicate Feb 10, 2010 in consistency with the calibration records (ref.19). **CL #03** was closed out on 25/10/2011.

On 12/06/2012, this finding was re-opened as **CAR #03** since the lack of calibration in 2009 of the Fluke and Crystal devices (which are used as pattern for calibrating the monitoring equipment) have an impact on the accuracy of the flow transmitters. The PP was requested to provide the certificates of calibration of Fluke and Crystal equipments from 2009 and then on, or otherwise apply EB52 Annex 60 Para 4 to the values of $FGT_{NG,y}$ and $FST_{NG,y}$ according to the maximum error between the metering equipments error (SMAR, Rosemount and Foxboro) and the error found in the valid delayed calibration. According with the verified information (ref 46&45), the patterns used in calibration done in 2009 and 2010 were not duly calibrated. Thus the PP was requested to provide the results of the following calibration of the meters performed. As per the PP records and as it was verified, the following calibration of the equipments (linked to FGT) was done on 04/11/2011 (ref 82); it was verified as well that all the pattern devices used (Crustal IS33 and Fluke 724) were duly calibrated (ref 83&84). Thus the results of the calibration done on 04/11/2011 (ref 82) were used by the PP to apply EB 52 annex 60 for the GT1:GT3 ($FGT_{NG,y}$) to the period 09/12/2009 to 31/12/2010. Finally it has to mention that after calibration that was done on 04/11/2011 (ref 82) still Smar PDT remains operating with an error higher than the maximum allowable, in order to cover this issue **FAR #17** was raised. Please refer to section 3.5.

It is important to note that according to EB 52 Annex 60, the DOE shall verify that the calibration of *measuring equipments* is conducted at a frequency specified in the applied monitoring methodology and the monitoring plan. EB 52 Annex 60 does not refer to the patterns or standards used, which is the case for the Fluke and Crystal devices. Similarly, ACM0007 does not refer to the standards used in the calibrations. However, considering that the calibration certificates of the Fluke and Crystal indicate their calibration frequency, it is possible to affirm that these devices did not work under certification in 2009 and 2010.

In response, the PP provided a revised MR (ref.09j) and ER spreadsheet (ref.71h) with corrections in the FGT and FST values following EB 52 Annex 60 Para 4 (also refer to parameter FST below).

Regarding FGT, the PP elaborated an analysis of the calculation of gas flow consumption (ref.81) which applies correctly the equations for the volume flow of natural gas shown in the document “Orifice Metering of Natural Gas and other Related Hydrocarbon Fluids” from AGA Report 3 (ref.80). Since this FGT is measured by 3 components (PDT, PT and TT), the analysis from the PP demonstrates that applying the addition of the error (%PDT + %PT) over the gas consumption leads to a more conservative value than applying the error of PDT and PT separately in the equation used by the equipment (ref 80) to obtain the gas. Thus it was verified that for instance the PDT SMAR maximum allowable error (+0.075%) plus the Rosemount PT maximum error (+0.15%) leads to more conservative correction factor (+0.225%), instead of combining the PDT, PT and TT maximum allowable errors, which leads to a variation of +0.0165% (when individual error are applied directly in the formula to obtain the gas flow).

The PP applied the highest value between the maximum allowable error and the error found in the delayed calibration. It was done in the monthly tabs of the ER calculation file (ref 71h).

Later it was reviewed that in those cases where error found in the delayed calibration of PDT and PT is lower than the maximum permissible error, the value representing the sum of the two errors of PDT and PT (+0.225%) is applied to FGT values for the period from 09/12/2009 to 31/12/2010. On the other hand, where the error found in the delayed calibration of PDT or PT is higher than the maximum permissible error, the addition of the highest value is applied to correct FGT values.

As it was verified against the delayed calibration records (ref 82), PDT error was higher than the maximum allowable (0.075%) for GT1, GT2 and GT3. Similarly PT error was higher than the allowable error (0.15%) for GT1. Thus the following values were considered:

- Error applied to FGT - GT1 is 2.89 % (PDT = 0.85% - found, PT = 0.9% - found, TT% = 1.14% - found)
- Error applied to FGT - GT2 is 2.16% (PDT = 1.51% - found, PT = 0.15% - maximum, TT% = 0.5% - found)
- Error applied to FGT - GT3 is 1.81% (PDT = 0.43% - found, PT = 0.15% - maximum, TT% = 0.8% - found)

The correction applied to the month of December 2009 is made to each daily value starting on December 9th (see ref 71h, “December 2009” sheet, cells N6:8 up to AJ6:8). From January 2010 onwards the correction is applied to the monthly totals (see ref 71h, sheets “January 2009” up to “December 2009”, cells E6:8). The values are multiplied by 1.0289, 1.0216 and 1.0181 respectively to the gas linked to GT1, GT2 and GT3, which is mathematically correct.

The above correction resulted in a higher project emissions and therefore has a conservative impact on ERs. The MR was updated based on these changes and incorporates an explanation regarding the error applied to FST and FGT in sections D.2 and in E.4 under “Clarifications.” Thus, **CAR #03** was closed out.

Calibration records of the GT flow transmitters were verified as follows:

Unit	Equipment type	Manufacturer & Model	Serial number	Calibration frequency	Calibration dates	Reference	Calibration equipment
GT1	PDT	SMAR LD301D21IVD1001 2A1I3P	177898-03	1 year (Ref.20-21)	26/12/2007	Ref.40 p. 1	Fluke 743B 7110617
					18/12/2008	Ref.17 p. 1	Fluke 743B 7110617
					09/12/2009	ref.18 p. 1	Fluke 744 7740009
					10/02/2010	ref.19 p. 1	CRYSTAL IS33
					04/11/2011	ref.82 p. 1	CRYSTAL IS33 2262-434826
	PT	Rosemount 3051PG5	Unreadable	1 year	26/12/2007	Ref.40 p. 2	Fluke 743B 7110617
					18/12/2008	Ref.17 p. 2	Fluke 743B 7110617
					09/12/2009	ref.18 p. 2	Fluke 744 7740009
					02/11/2010	ref.53 p. 1	Fluke 744 7740009
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605982	1 year	26/12/2007	Ref.40 p. 3	Fluke 743B 7110617
					18/12/2008	Ref.17 p. 3	Fluke 743B 7110617
					09/12/2009	ref.18 p. 3	Fluke 744 7740009
					02/11/2010	ref.54 p. 1	Fluke 744 7740009
					04/11/2011	ref.82 p. 3	Fluke 724 8815091

GT2	PDT	SMAR LD301D21IVD1001 2A1I3P	154040	1 year (Ref.20- 21)	08/01/2008 17/12/2008 09/12/2009 10/02/2010 04/11/2011	ref.41 p. 1 ref.17 p. 4 ref.18 p. 4 ref.19 p. 2 ref.82 p. 4	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 CRYSTAL IS33 CRYSTAL IS33 2262-434826
	PT	Rosemount 3051PG5	102Q815	1 year	08/01/2008 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.41 p. 2 ref.17 p. 5 ref.18 p. 5 ref.53 p. 2 ref.82 p. 5	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744 7740009 CRYSTAL IS33 2262-434826
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605980	1 year	08/01/2008 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.41 p. 3 ref.17 p. 6 ref.18 p. 6 ref.54 p. 2 ref.82 p. 6	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744 7740009 Fluke 724 8815091
GT3	PDT	SMAR LD301D21IVD1001 2A1I3P	200263	1 year (Ref.20- 21)	28/12/2007 17/12/2008 09/12/2009 10/02/2010 04/11/2011	ref.42 p. 1 ref.17 p. 7 ref.18 p. 7 ref.19 p. 3 ref.82 p. 7	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 CRYSTAL IS33 CRYSTAL IS33 2262-434826
	PT	Rosemount 3051PG5	Unreadable	1 year	28/12/2007 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.42 p. 2 ref.17 p. 8 ref.18 p. 8 ref.53 p. 3 ref.82 p. 8	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744 7740009 CRYSTAL IS33 2262-434826
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605981	1 year	28/12/2007 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.42 p. 3 ref.17 p. 9 ref.18 p. 9 ref.54 p. 3 ref.82 p. 9	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744 7740009 Fluke 724 8815091

The readings in the calibration certificates are within their established accuracy (PDT: $\pm 0.075\%$, PT: $\pm 0.15\%$, TT: $\pm 0.18^\circ\text{F}$) as provided by the manufacturer (Ref.20, 24-25) for calibration done in 2007 and 2008. As reported previously, the calibrations done in 2009 & 2010 were not valid, thus their results are useless. Finally as mentioned before, calibration 2011 was valid and the errors found were used to apply EB52 annex 60.

The PP has provided the monthly production reports (ref.13) which contain the daily records of fuel consumption for all the months of the monitoring period. Data is automatically collected and is then transferred to an excel file. In accordance with the approved RMP (Ref.06), a normalization procedure is applied to the gas flow data which is generated in Sm^3/day . The value is divided by a temperature correction factor (1.0549), which is obtained by dividing 288.15 K (15°C) representing the temperature associated with normal conditions, into 273.15 K (0°C), which is the temperature related to standard conditions. Thus, the gas flow measured under standard conditions (Sm^3/day) will give the gas flow data in normalized flow per day (Nm^3/day). The normalization procedure is methodologically correct and follows the Revised Monitoring Plan (ref.06).

A deviation has been requested for the monitoring period with regard to the recording frequencies of $\text{FGT}_{\text{NG},y}$ and $\text{FST}_{\text{NG},y}$, since they are recorded on a daily basis by the project following the monitoring plan in the registered PDD, whereas the methodology requires hourly recording frequency. The deviation request was included in the request for revision of the monitoring plan following Para 58 of EB 43 Meeting Report (<http://cdm.unfccc.int/EB/043/eb43rep.pdf>). The request for revision of the monitoring plan incorporates the reasons for deviation as per EB 43 Meeting Report Para 58, and was approved on 13/05/2011

(<http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>). The deviation applies from 01/01/2008 until 31/03/2011; therefore it covers the monitoring period of this verification (01/07/2008 to 31/12/2010).

Initially the reported values in the MR for FGT and FST were not consistent in terms of decimals. For example, FGT was reported in section E.2 of the MR in the formula for July-Dec 2008 as "142,764.3268"; for Jan-Dec 2009 it was reported as "255,475"; and for Jan-Dec 2010 it was shown as "239,001.370". Additionally the sum of the values was not exact as per the ER spreadsheet (e.g. the MR section D.2 reported FGT=637,240,000 Nm³ and FST = 68,918,000 Nm³ which were not exact as per ER spreadsheet). Finally, the PP was requested to provide the ER calculations in a single Excel file with the calculations for the whole monitoring period. Thus **CAR #02** was raised. The decimals for the parameters in the formulas presented in section E.2 of the MR are now consistent among each other. Additionally, the values reported for FGT and FST are now consistent with the ER spreadsheet (ref.71a). The PP provided a consolidated ER spreadsheet (ref.71a) for the period 01/07/2008 - 31/12/2010 which reports separately the yearly values and calculations following the monitoring methodology. **CAR #02** was closed out.

During the verification assessment, several inconsistencies were identified between the FGT and FST values reported in the ER spreadsheet (ref.71a) and the monthly report data (Ref.13). The PP was requested to review the values of Sales Gas to GT1-3 and HRSG duct burners and apply the values according to the monthly production reports, sheet "Varadero" (Ref.13). The monthly report of May 2009 was requested as it was missing. **CAR #10** was raised. The values of FGT were revised in the ER spreadsheet (ref.71c) according to the Production Reports (ref.13). Additionally, the PP provided the monthly report of May 2009 (ref.13, "2009-05"). The value of May 2009 has been corrected in the ER spreadsheet (ref.71c) according to the monthly report (ref.13). **CAR #10** was closed out.

Documentation on training carried out was checked (Ref.52) and showed that operators are trained to conduct their activities on site.

According to the RMP, the results of gas consumption are to be compared with energy balance over the year. The PP has provided annual energy balance reports for 2008, 2009 and 2010 (ref.76-78) which are compared with the gross power produced each year against the recalculated gross power based on the plant gross heat rate (BTU/kWh), gas consumption (Sm³) and Net Calorific Value (GJ/Sm³). The gross heat rate of the plant is determined annually based on the total annual fuel consumption and the gross power generation (ref.75). There were no significant deviations in the gross power production (1.9% for 2008, 3.0% for 2009 and -0.6% for 2010); thus, quality of data is assured.

2. $FST_{NG,y}$ – Consumption of natural gas used for supplementary heat in the HRSG for the year (y)

This parameter is monitored continuously by 3 Vortex flow meters. There were no changes in equipment. For the steam turbines the flow meters are:

HRSG1 – Manufacturer Foxboro; Model 83W-A03S1SSSTNE-N / Serial No. 98382301 (Pic.14a-c)

HRSG2 – Manufacturer Foxboro; Model 83W-A03S1SSSTNE-N / Serial No. 98382299 (Pic.15a-d)

HRSG3 – Manufacturer Foxboro; Model 83W-A03S1SSSTNE-N / Serial No. 98382300 (Pic.16a-d)

According to the RMP (ref.06) the fuel gas meters shall be calibrated on an annual basis (section B.7.1). Equipment specifications (Ref.22) do not establish a specific calibration frequency required for the Foxboro transmitters. An official statement from the equipment provider (Simark Controls) (Ref.23) was provided during the previous verification assessment: "For the Foxboro vortex meters (HRSG), calibration is required at a minimum of once every year, i.e. *full calibration is not usually required unless something physical has changed with the device (ie: the shedder bar has worn) which is something that would only occur after time and would depend on the process flow itself (abrasives such as sand in the process). Preventative maintenance checks can be made on the meter at the customer's desired schedule (3 or 6 months...), but according to directive 17, at minimum once per year to ensure the meter is operating properly.*" Hence, an internally established calibration frequency of 1 year as stated in the RMP (ref.06) is deemed appropriate to ensure the accuracy of data. Calibration records were verified as follows:

Unit	Manufacturer & Model	Serial number	Calibration frequency	Calibration dates	Reference	Calibration equipment
HRSG 1	Foxboro 83W-A03S1SSTNE-N	98382301	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.1 ref.17 p.10 ref.18 p.10 ref.19 p.4 ref. 82 p.10	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744-G4258 Fluke 743B sv 00008923
HRSG 2	Foxboro 83W-A03S1SSTNE-N	98382299	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.2 ref.17 p.11 ref.18 p.11 ref.19 p.5 ref. 82 p.11	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744-G4258 Fluke 743B sv 00008923
HRSG 3	Foxboro 83W-A03S1SSTNE-N	98382300	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.3 ref.17 p.12 ref.18 p.12 ref.19 p.6 ref. 82 p.12	Fluke 743B 7110617 Fluke 743B 7110617 Fluke 744 7740009 Fluke 744-G4258 Fluke 743B sv 00008923

The readings in the calibration certificates 2007 & 2008 are within their established accuracy ($\pm 1\%$) as provided by the manufacturer (Ref.22) as the most strict condition. The PP was requested through **CL #03** to provide the evidence for calibration of the flow patterns Fluke 744 7740009, Crystal IS33 and Fluke 744 G4258 used in the calibrations conducted in 2009 and 2010 (ref.18 & 19). **CL #03** was previously raised and closed. As described for parameter $FGT_{NG,y}$ above, this finding was re-opened as **CAR #03** because of the lack of calibration in 2009 and 2010 of the Fluke and Crystal pattern devices which has an impact on the accuracy of the flow transmitters. For this reason the calibration 2009 & 2010 were not considered for the application of EB 52 annex 60. The PP provided a revised MR (ref.09h) and ER spreadsheet (ref.71h) with corrections in the FGT and FST values following EB 52 Annex 60 Para 4 and considering the valid calibration performed in 2011 (ref 82).

As per the information reviewed, it was verified that on 04/11/2011 (ref 82) the PP calibrated the meters linked to FST, and that the patter device (Fluke 743B) used was duly calibrated as well (ref 85).

As it was verified against the delayed calibration certificate (ref 82), the error found always was lower that the maximum permissible error. Thus following a conservative criterion the error of $\pm 2\%$ (as stated in RMP and Foxboro specifications (ref.22) for RD 5000 – 20000) was considered to apply EB52 annex 60. Therefore FST values were corrected using 2% for the period from 14/12/2009 to 31/12/2010. In the ER spreadsheet the correction for December 2009 is made to each daily value starting on December 14th (see “December 2009” sheet, cells S9:AJ9) and from January 2010 onwards the correction is applied to the monthly totals (refer to sheets “January 2009” up to “December 2009”, cells E9). The values are multiplied by 1.02 which is correct.

The above correction resulted in higher project emissions and therefore has a conservative impact on ERs. **CAR #03** was closed out.

The data corresponding to the parameter monitoring is automatically collected and transferred to an excel file; the PP has provided the monthly production reports (ref.13) which contain the daily records of fuel consumption for all the months of the monitoring period. All the links and the equations were checked and found to be correct.

A deviation was requested for the monitoring period with regard to the recording frequencies of $FGT_{NG,y}$ and $FST_{NG,y}$, following paragraph 58 of EB 43 Report, as explained for parameter $FGT_{NG,y}$ above. The deviation applies from 01/01/2008 until 31/03/2011; therefore it covers the monitoring period of this verification (01/07/2008 to 31/12/2010).

In accordance with the approved RMP (Ref.06), a normalization procedure is applied to the gas flow data which is generated in Sm^3/day . The value is divided by a temperature correction factor (1.0549), which is obtained by dividing 288.15 K (15°C) representing the temperature associated with normal conditions, into

273.15 K (0°C), which is the temperature related to standard conditions. The gas flow measured under standard conditions (Sm^3/day) will give the gas flow data in normalized flow per day (Nm^3/day). The normalization procedure is methodologically correct and follows the revised monitoring plan (ref.06).

Several inconsistencies were identified between the values reported in the ER spreadsheet (ref.71a) and the monthly report data (Ref.13). These were addressed through **CAR #10** as previously discussed (see above parameter $\text{FGT}_{\text{NG},y}$). The values of FST were revised in the ER spreadsheet (ref.71c) according to the Production reports (ref.13).

QA&QC is based on an energy balance done over the year (ref.76-78). As stated above for parameter $\text{FGT}_{\text{NG},y}$, no significant deviations have been identified in relation to the recalculated (theoretical value based on historical yield) gross power production.

3. $\text{NCV}_{\text{NG},y}$ – Net Calorific Value of natural gas

This parameter is calculated by Energas based on monthly measurements on-site. All gas testing in the monitoring period has been done with a Hewlett Packard gas chromatograph model HP 5890 Serial N° 3303A50915 (Pic.22a-c). During the site visit the equipment was checked at the Energas plant at Puerto Escondido and found correctly installed and the same as the previous verification.

In addition, the project plant performs a cross-check using the same gas sample with a Gow-Mac gas chromatograph series model 600 Serial N° 200407 (Pic.23a-c) located at the Varadero gas plant; measurement results are consistently uniform regardless of which chromatograph is used (ref.60).

According to the revised monitoring plan (ref.06) the manufacturer has no recalibration requirement specified; it was verified in the equipment specifications (ref.26-27) that no calibration frequency is required by the manufacturer. In the absence of a frequency requirement from the manufacturer, an internally established calibration frequency of 1 year as stated in the RMP (Ref.06) is deemed appropriate. The calibrations are done on-site by Energas staff. Calibration records were verified as follows:

Manufacturer & Model	Serial number	Calibration frequency	Calibration dates	Reference	Calibration equipment
Hewlett Packard 5890	3303A50915	1 year (internal) Not required (Ref.26)	23/01/2008	ref.55 p.3	Lot 1014780
			26/09/2008	ref.55 p.5	Lot 1014780
			21/11/2008	ref.55 p.7	Lot 1064683
			12/01/2010	ref.55 p.9	Lot 1064683

The calibrations of 23/01/2008 and 26/09/2008 were done using a standard gas sample from an outside supplier: Linde reference gas lot #1014780. The PP provided the sample gas certificate for the gas cylinder used for the calibrations of the gas chromatographer (ref.57). The PP was requested to provide the most recent calibration records (certificates) of the chromatographer used for the gas analysis; that is, for years 2009 and 2010. Additionally, it was requested the sample gas certificates for the gas cylinder used in the respective calibrations. **CL #05** was raised. During the site visit the calibration records of the gas chromatograph (ref.55-56) were provided to the assessment team. The sample gas certificate for the gas cylinder employed in the two last calibrations was provided and verified (ref.58). **CL #05** was closed out.

The calibration results of the gas chromatograph (ref.55) are within the maximum error % of the gas chromatograph specified by the respective manufacturer (1%) (ref.27). According to the RMP (ref.06), the chromatograph shall be calibrated annually. A calibration delay was identified from the period 21/11/2009 – 12/01/2010, corresponding to 52 days. According to the *Guidelines for Assessing Compliance with the Calibration Frequency Requirements* (EB 52 Annex 60 available at: http://cdm.unfccc.int/EB/052/eb52_repan60.pdf), Para 4 (a), if the calibration has been delayed and the results of the delayed calibration do not show any errors in the measuring equipment, then the maximum permissible error (as specified by the respective manufacturer) of the instrument shall be applied to the measured values. The error shall be applied in a conservative manner such that the adjusted measured values shall result in lower baseline emissions and higher project emissions / leakage. The PP was requested to apply the error to all the measured values taken during the period between the scheduled date of calibration (21/11/2009) and the actual date of calibration (12/01/2010). According to the VGP Gas

Analysis records (ref.60), the values of gas composition measured during this period correspond to 03/12/2009, 18/12/2009 and 29/12/2009. **CAR #11** was raised. As explained by the PP, the maximum error of the gas chromatograph cannot be applied to the measured values to overcome the calibration delay since the measured values are given in % of gas composition (ref.60); therefore the PP has correctly applied the maximum error to the final values of NCV and EFco2 in sheet "Annex 1" cells H32 and I32. The adjustment is conservative and generates higher project emissions and therefore a lower ERs value. The MR has been updated accordingly (ref.09d). **CAR #11** was closed out. The MR version 10 (ref.09j) includes in sections D.2 and E.4 a clarification for the corrections of values for parameters $NCV_{NG,y}$ and $EF_{CO2,NG,y}$ for the purpose of clarity in the information. However it must be noted that this correction had already been applied by the PP as shown above.

According to the RMP (ref.06) and the Monitoring Report (ref.09a), the NCV_{NG} is calculated by Energas based on monthly testings on-site. The PP has provided the monthly NCV_{NG} calculation spreadsheets for the monitoring period (01/07/2008 – 31/12/2010) (ref.14). The PP was requested to provide the calculation file for November 2010 as it was missing. Thus **CL #04** was raised. The PP provided the missing Gas Balance Report (ref.14, "Varadero Gas Balance - 2010.11"). The values of gas composition applied in the calculation of NCV_{NG} and $EF_{CO2,NG}$ in the Gas Balance Reports (ref.14) were cross-checked against the VGP laboratory analysis (Ref.60). Several variations in data used to calculate NCV were detected; the PP was requested to review these inconsistencies. The reported values for NCV were corrected in the ER spreadsheet and MR and were verified to be in line with the corresponding Gas Balance Reports (ref.14) and raw data (ref.60). Therefore **CL #04** was closed out.

A methodology of calculation prepared by Sherritt Power, a division of Sherritt International Corporation, (Ref.28) was provided in the previous verification, showing step by step the formulas used to calculate NCV_{NG} and $EF_{CO2,NG,y}$. The calculation method employed to determine the NCV as described in the project methodology (ref.28) and applied in the Gas Balance reports (ref.14) is correct and according to international standards. The NCV is correctly normalized in the ER spreadsheet (Ref.71f) using the gas temperature correction factor of 1.0549, in accordance with the RMP (ref.06). Formulae are correctly applied in the ER spreadsheet (ref.71f).

The technical staff in charge of performing the gas analyses and calibrating the gas chromatograph was interviewed and found knowledgeable of the subject matter and prepared to perform the measurements and quality checks of the equipment; on the other hand qualification documents and training certificates were checked in the previous verification assessment (ref.08), showing that the personnel is properly trained to conduct their activities onsite.

4. $EF_{CO2,NG,y}$ – CO₂ Emission Factor for natural gas

Similar to parameter above, the emission factor of natural gas is calculated by Energas based on monthly testing on-site. All the gas testing in the monitoring period has been done with a Hewlett Packard gas chromatograph model HP 5890 Serial N° 3303A50915 (Pic.22a-c). During the site visit the equipment was checked and found correctly installed at the Energas Puerto Escondido plant and the same as the previous verification.

In addition, the project plant performs a cross-check using the same gas sample with a Gow-Mac gas chromatograph series model 600 Serial N° 200407 (Pic.23a-c); measurement results are consistently uniform regardless of which chromatograph is used (ref.60).

According to the Monitoring Report (ref.09a), the $EF_{CO2,NG}$ is calculated by Energas based on monthly testings on-site. The PP has provided the VGP gas analysis records for the monitoring period (ref.60) where the gas measurements can be verified. The values of gas composition applied in the calculation of NCV_{NG} and $EF_{CO2,NG}$ in the Gas Balance Reports (ref.14) were cross-checked against the VGP Gas Analysis records (Ref.60). Several inconsistencies were initially identified and addressed through **CL #04**, as previously described (see above parameter NCV_{NG}).

A methodology of calculation prepared by Sherritt Power was provided (Ref.28) in the previous verification, showing step by step the formulas used to calculate NCV_{NG} and $EF_{CO2,NG,y}$. The calculation method employed to determine the EFco2 as described in the project methodology (ref.28) and applied in the Gas Balance Reports (ref.14) is correct and according to international standards.

For calibration records of the gas chromatograph please refer to the parameter above (NCV_{NG}). Following EB 52 Annex 60, the PP has applied the maximum error to the final values of NCV and EF_{CO2} in sheet "Annex 1" cells H32 and I32. The adjustment is conservative and generates higher project emissions and therefore a lower ERs value. The MR has been updated accordingly (ref.09d) (refer to **CAR #11** previously raised and closed).

5. $OXID_{NG,y}$ – Oxidation factor for natural gas

The oxidation factor of natural gas is obtained from IPCC and is verified annually to ensure that the data used reflects the most recent IPCC estimates. The parameter has been correctly applied as 100.0% in the ER calculations, based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2, page 2.11 (Ref.15).

The MR (ref.09a) initially reported in section D.2 the parameter as "1"; however this is not consistent with the unit which is %; the correct value would be 100%. The PP was requested to revise the MR for consistency with the unit. **CAR #06** was raised. The value reported for $OXID_{NG,y}$ in section D.2 is now consistent with the unit. **CAR #06** was closed out. The value for oxidation factor was verified to be correctly applied in the calculations of emission reductions (Ref.71h).

6. PG_y – Actual electricity generated by project in the year

During the previous verification it was noted that the electric meters used to measure the net electricity exported to the grid were changed on more than one occasion. The PP was requested to provide in the MR information for all the monitoring equipment that was installed during the monitoring period. Additionally the PP was requested to provide a log book showing the meters replacement history during the monitoring period. **CL #01** was raised. The revised MR incorporates the information of the new power meters installed, with their specifications, installation dates and calibration dates. Calibration records of the power meters were provided by the PP (ref.35-38, 65-69). During the site visit the log books showing the power meters replacement history was provided and verified (ref.61-64). The QA&QC information shown in Annex 2 of the MR v5 (ref.09e) was verified as correct. **CL #01** was closed out.

The history of meters installed was verified in the log book of power meters history (ref.61-64) verified in the previous verification. The following meters were installed during the monitoring period (01/07/2008 – 31/12/2010):

Bay 1:

- 06/2005 – 16/09/2008: Powerlogic, Model ION 7330, Serial No. PB-0308A151-11;
- 16/09/2008 – to-date: Powerlogic, Model ION 7330, Serial No. PB-0804A559-11 (pic.29a-b)

Bay 2:

- 06/2006 – 03/08/2009: Powerlogic, Model ION 7330, Serial No. PB-0308A149-11;
- 03/08/2009 – to-date: Powerlogic, Model ION 7330, Serial No. PB-0902A148-11 (pic.30a-b)

Bay 3:

- 12/2007 – 10/2008: Powerlogic; Model ION 7330, Serial No. PB-0604A348-11;
- 10/2008 – 06/08/2009: Powerlogic, Model ION 7330, Serial No. PB-0605A116-11;
- 06/08/2009 – to-date: Powerlogic, model ION 7330, Serial No. PB-0604A347-11 (pic.31a-b)

Bay 4:

- 11/2005 – 20/05/2010: Powerlogic; Model ION 7330, Serial No. PB-0308A150-11;
- 20/05/2010 – to-date: Powerlogic, model ION 7330, Serial No. PB-0911A606-11 (pic.32a-b)

According to the records of Bay 1-4 meter replacements (ref.61-64), the PP has estimated the amount of MWh generated during the replacement jobs. However, according to the monitoring methodology (ref.02), the net quantity of electricity generated by the project power plant shall be measured ("M"). **CAR #13** was raised to request the PP to discount the estimations of electricity made during the meter replacements as follows:

Bay 1 – As per the records of Bay 1 meters installation (ref.61), during the replacement of meter PB-0308A151-11 on 16/09/2008 there was an estimated net MWh "during 1.5h replacement jobs" but it does not specify the estimated amount of energy during the replacement time for this date. For conservative purposes the PP was requested to consider discounting the electricity generated by Bay 1 meter for the entire day

16/09/2008. A revised ER spreadsheet (ref.71b) was provided by the PP. The value for Bay 1 on day 16-sep-08 was adjusted by the PP to 0 MWh as a conservative measure due to the replacement of the Bay 1 meter on that date (sheet "September 2008", U25).

Bay 2 – According to the records of Bay 2 (ref.62), the estimation of net MWh during the replacement of meter PB-0308A149-11 was done as follows:

Estimated energy between 11:40 and 16:40 (calculated as $P_{ave} = 25.6 \text{ MW} \times 5 \text{ hours}$): 128 MWh

Following ACM0007, the PP was requested to discount the 128 MWh corresponding to the estimated net electricity generation during the meter replacement period. The estimated generation of electricity during replacement of Bay 2 meter on 03-aug-09 has been discounted from the daily value reported for that date (sheet "August 2009", H26).

Bay 3 – According to the records of Bay 3 (ref.63), the estimation of net MWh during the replacement of meter PB-0605A116-11 was done as follows:

Estimated energy between 13:25 and 17:05 (05/Aug/2009): 100.8 MWh (Calculated as $P_{ave} = 27.5 \text{ MW} \times 3.66 \text{ hours} = 100.8 \text{ MWh}$)

This time the power meter was stopped the previous day (05/Aug/2009).

Total day Energy for 06/Aug/2009:

Estimated energy between 09:00 and 09:30 am (Calculated as $P_{ave} = 28 \text{ MW} \times 0.5 \text{ hours} = 14 \text{ MWh}$)

Following ACM0007, the PP was requested to discount the estimated amounts of 100.8 MWh + 14 MWh during 05/08/2009 and 06/08/2009. The estimations done for the Bay 3 meter replacement have been correctly discounted in the revised ER spreadsheet (sheet "August 2009", J27:K27).

Additionally, the PP was requested to provide the replacement log for meter PB-0604A348-11, which according to the previous verification (ref.08) was replaced in October 2008, and apply the same procedure to the estimated value during the replacement of the meter. With regard to the replacement log of meter PB-0604A348-11, which according to the power meters replacement history (ref.74), was installed from December 2007 until October 2008, the PP clarified that the replacement record could not be found and is thus not available for verification. In the absence of evidence to support the exact date of the replacement of meter PB-0604A348-11 as well as the amount of estimated electricity generation during the meter replacement, the PP was required to discount the electricity reported for the entire day with the highest reported MWh of Bay 3 in October 2008 in order to ensure the conservativeness of data. The PP has discounted the value of 744 MWh in the revised ER spreadsheet (ref.71c) "October 2008" cell AG27, corresponding to the highest daily electricity generation reported for the month (29-oct-2008). The adjustment is correct and conservative as it generates a lower value of PGy for Bay 3 in order to account for any data estimation done during the replacement of meter PB-0604A348-11.

Bay 4 – According to the records of Bay 4 (ref.64), the estimation of net MWh during the replacement of meter PB-0308A150-11 was done as follows:

Estimated energy between 16:06 and 16:19 = 15.39 MWh

The PP was requested to discount the estimated amount of 15.39 MWh from 20/05/2010 PGy values. The estimation done for the Bay 4 meter replacement is correctly discounted in the ER spreadsheet (sheet "May 2010", cell Y28). **CAR #13** was closed out.

Quality check / calibration records:

The certificates of calibration from the manufacturer were requested to the PP for all the power meters installed during the monitoring period. **CL #07** was raised. The PP provided the calibration certificates for the new meters installed during the monitoring period (ref.65-69). The power meters are calibrated by the manufacturer and are working within their calibration periodicity. **CL #07** was closed out.

<i>Unit</i>	<i>Manufacturer & Model</i>	<i>Calibration frequency</i>	<i>Serial number</i>	<i>Calibration date</i>
Bay 1	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A151-11	13/08/2003 (Ref.35)
	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0804A559-11	24/04/2008 (ref.65)
Bay 2	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A149-11	13/08/2003 (Ref.36)
	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0902A148-11	10/02/2009 (ref.66)
Bay 3	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0604A348-11	24/04/2006 (Ref.37)
	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0605A116-11	24/05/2006 (ref.67)
	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0604A347-11	23/04/2006 (ref.68)
Bay 4	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A150-11	13/08/2003 (Ref.38)
	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0911A606-11	20/11/2009 (ref.69)

According to the methodology ACM0007 v1, “the consistency of metered net electricity generation should be cross-checked with receipts from sales (if available)”. Also the RMP (ref.06) states that the “the results are cross-checked with UNE power sale invoices.” The value of the energy reported in the invoices is available in the ER calculation file (ref.71h), monthly tabs, cells C25:C28. The cited values were verified against the invoices (ref.16). The value of the energy sold comes from the time when the power meters are read, by Energas field operation personnel on one side and UNE employees on the other side.

The metered values are available in weekly reports (ref.50), which are used to construct the monthly production reports (ref.13). The ER spreadsheet (ref.71h) reports the measured values in cells E25:E28 of the monthly sheets. In order to validate the measured values presented in the calculation spreadsheet, the data was cross-checked against the weekly and monthly reports.

Therefore, the ER calculation file (ref.71h) tab “Annex 1” column M includes parameter PG_y as the sum of Bay 1 through Bay 4, with the lower value applied between the measured value and the reported in the invoices (see for example sheet “Annex 1”, cells C65:C68); this provides conservative data for ER calculation as it underestimates baseline emissions and complies with the monitoring methodology. The slight differences between the energy sold recorded in the invoices and the measured values (available in the weekly and monthly reports) are because the time when the meters were read was different to the time when the system records the energy generation in the system.

Several inconsistencies were identified between the values of measured electricity presented in the first ER spreadsheet (ref.71a) and the internal records (weekly and monthly reports, ref.13, ref.50). **CAR #12** was raised. The revised ER spreadsheet (ref.71b) has been corrected for the monthly Bay1-4 values; the data is now consistent with the monthly reports. As discussed in CAR #13, the PP has correctly adjusted some values of electricity generation to discount the estimations done during meter replacements. Also, the

formula of PGy for November and December 2008 has been corrected in the ER spreadsheet "Annex 1" cells M10:M11 which now include also the values of electricity generation in Bay 4. **CAR #12** was closed out.

The ER spreadsheet reports (ref 71a) the values from the electricity invoices in cells C25:28 of the monthly sheets. In order to validate the invoiced values presented in the calculation spreadsheet the electricity invoices from UNE (ref.16) were verified for all the months of the MP. The PP was requested to review the reported invoiced data for consistency with the sales receipts (Ref.16). **CAR #14** was raised. The revised ER spreadsheet (ref.71b) provided by the PP now reports the correct invoiced electricity values in consistency with the sales receipts (ref.16). **CAR #14** was closed out.

Finally it was verified that to ensure conservativeness the ER calculation file (ref.71h) applies the lowest value between the internally measured values and the invoice records; the formulae were verified to be correctly applied and to comply with the monitoring methodology.

7. OG_y – Actual electricity generated by open cycle in the year

The RMP (ref.06) states that this parameter shall be calculated according to the formula provided by the methodology and that the data will be verified against the metered values for conservativeness. The meters that measure the net electricity generated in open cycle are Bay1-Bay3. Please refer to parameter PGy above for meter details.

The value of OG1 for Sep-08 in "Annex 1" sheet, cell R9 was initially taking the value of Operation hours from July 2008. Additionally, the operation hours of feb-09, (cell J48 of "Annex 1") was not correct. According to the amount of days of February 2009, it would be 24 h * 28 days = 672 h. Finally, the formulas for OG2 were not taking the values for Bay 1 to Bay 3. The PP was requested to revise the spreadsheet accordingly. **CAR #08** was raised. The formula of OG1 for Sep-08 in the revised ER spreadsheet "Annex 1" (cell R8) now applies correctly the operation hours for the corresponding month. The value of operation hours for the month of February 2009 has been corrected to 672h in "Annex 1" (cell J68) according to the number of days in the month. Finally, the revised ER spreadsheet (ref.71c) now indicates correctly the formula of OG2 as the sum of Bay 1-Bay 3 for each month.

However, it was further noted that in the ER spreadsheet, smaller values of OG_y between the calculated results using the methodology and the directly measured results are selected. However, this leads to higher baseline emissions than if higher values of OG_y are selected. The PP was requested to review the monthly formulae of OG_y to reach the most conservative (highest) figures. Additionally, the selection of the PLF value between Option 1 and 2 was not being carried out conservatively. According to the RMP, the most conservative value of PLF is applied in OG calculation formula. The ER spreadsheet was taking the minimum value of PLF (column R), which overestimates baseline emissions. The revised ER spreadsheet (ref.71d) now takes the maximum value of OG_y between the calculated and the measured value ("Annex 1" sheet, column L), which underestimates baseline emissions and is thus the most conservative approach as per the RMP. On the other hand, the ER spreadsheet (ref.71d) now takes into account the most conservative (highest) value of PLF ("Annex 1" sheet, column R) in accordance with the methodology and the RMP. **CAR #08 was closed out.**

Plant records of electricity generation in open cycle (Bay 1-3) were verified. Please refer to **CAR #12** previously raised and closed. The metered values are compared with the invoices (Ref.16) as these are issued by a third party (UNE). Bay 1-3 data was verified against invoices; **CAR #14** was previously raised and closed out.

Additionally in the calculation formula for OG_y the most conservative (higher) value of Option 1 and Option 2 formulas for PLF calculation is applied. The calculation and formulae are correctly done following the RMP.

8. CG_y – Actual electricity generated from waste heat use in steam turbine

According to the methodology (ref.02) and the RMP (ref.06), this parameter is calculated as per the following formula: $CG_y = PG_y - OG_y$. It was verified in the ER spreadsheet calculations of 01/07/2008 to 31/12/2008 (ref.10) “Annex 1” sheet, that the PP takes the minimum value between the metered values and the calculated ones. As clarified in the validation report of the RMP (ref.07) page 11, even though the project also measures the electricity generated from the use of waste heat (CG_y), the conservative criterion of comparing with metered values cannot be used for CG_y in the same manner as for OG_y . According to equation (12) of the methodology CG_y and OG_y are not independent from each other: $[BE_y = (EF_{OC} \cdot OG_y) + (EF_{grid,y} \cdot CG_y)]$. Therefore CG_y must always be the difference between PG_y and OG_y [$CG_y = PG_y - OG_y$]. This ensures that the sum of CG_y and OG_y will be equivalent to PG_y , which represents the invoiced electricity to UNE, and therefore safeguards the validity of PG_y .

The PP was requested to revise the calculations following the methodology and RMP. **CAR #08** was raised. The PP provided a revised ER spreadsheet (Ref.71a) which presents the consolidated calculations for the monitoring period. Parameter CG_y is now calculated in accordance with the formula: $CG_y = PG_y - OG_y$ following the methodology and RMP. **CAR #08** was closed out. All the links and the equations were checked and found to be correct (ref.71h).

9. PC – Net generation capacity of the project power plant

According to the methodology, the net generation capacity shall be monitored annually. According to the RMP, this parameter is derived from annual records from UNE. The PP reports one value for the monitoring period (160 MW). The PP was requested to provide evidence from UNE for the annual net generation capacity of the power plant (for each year of the monitoring period – 2008, 2009, 2010). **CL #09** was raised.

During the site visit an official letter was obtained from UNE (ref.33) dated 29/08/2011 and signed by the UNE National Dispatch Manager. The letter states that the installed capacity of the Energas Varadero power plant is 160 MW and that the same has not varied from 2008 to-date. Therefore it is correct to assign PC the value of 160 MW for July-Dec 2008, 2009 and 2010. **CL #09** was closed out.

The net generation capacity of the project plant has been correctly applied in the Option 2 formula for calculation of OG. All the links and the equations were checked and found to be correct.

3.5 Accuracy of Equipment

The accuracy of the equipment used for monitoring is controlled and calibrated in accordance with the approved revised monitoring plan (Ref.06). The accuracy of the monitoring equipment was verified against the equipment manuals, technical specifications or provider confirmation. The following table summarizes the equipment accuracy:

Parameter	Equipment	Accuracy	Reference
$FGT_{NG,y}$ (Units: GT1-GT3)	SMAR PDT	$\pm 0.075\%$	Ref.20 Ref.21
	Rosemount PT	$\pm 0.15\%$ in standard performance; $\pm 0.04\%$ in high performance	Ref.24
	Rosemount TT	$\pm 0.10^\circ\text{C}$ ($\pm 0.18^\circ\text{F}$)	Ref.25
$FST_{NG,y}$ (Units: HRSG 1-3)	Foxboro Vortex flow meter	$\pm 1\% - 2\%$	Ref.22
$NCV_{NG,y}$, $EF_{CO2,NG,y}$	HP Gas chromatograph	$\pm 1\%$	Ref.27
PG_y (Units: Bay 1-4)	PowerLogic power meter	$\pm 0.50\%$	Ref.30

EB 52 Annex 60 has been correctly applied in order to compensate for a calibration delay in the gas chromatograph for the period of 21/11/2009 to 12/01/2010 (refer to section 3.4, parameter $NCV_{NG,y}$ for further details). Similarly EB52 annex 60 was correctly applied to compensate a calibration delay in the equipments linked to flow meter for the periods 09/12/2009 to 31/12/2010 for FGT and 14/12/2009 to 31/12/2010 for FST.

The following table summarizes the information related to the quality checks of each monitoring instrument:

<i>Unit</i>	<i>Equipment type</i>	<i>Manufacturer & Model</i>	<i>Serial number</i>	<i>Calibration frequency</i>	<i>Calibration dates</i>	<i>Reference</i>
GT1	PDT	SMAR LD301D21IVD100 12A1I3P	177898-03	1 year (Ref.20-21)	26/12/2007 18/12/2008 09/12/2009 10/02/2010 04/11/2011	Ref.40 p.1 Ref.17 p.1 ref.18 p.1 ref.19 p.1 ref. 82 p.1
	PT	Rosemount 3051PG5	Unreadable	1 year	26/12/2007 18/12/2008 09/12/2009 02/11/2010 04/11/2011	Ref.40 p .2 Ref.17 p.2 ref.18 p.2 ref.53 p. 1 ref. 82 p.2
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605982	1 year	26/12/2007 18/12/2008 09/12/2009 02/11/2010 04/11/2011	Ref.40 p.3 Ref.17 p.3 ref.18 p. 3 ref.54 p. 1 ref. 82 p.3
GT2	PDT	SMAR LD301D21IVD100 12A1I3P	154040	1 year (Ref.20-21)	08/01/2008 17/12/2008 09/12/2009 10/02/2010 04/11/2011	ref.41 p. 1 ref.17 p. 4 ref.18 p. 4 ref.19 p. 2 ref. 82 p.4
	PT	Rosemount 3051PG5	102Q815	1 year	08/01/2008 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.41 p.2 ref.17 p.5 ref.18 p.5 ref.53 p. 2 ref. 82 p.5
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605980	1 year	08/01/2008 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.41 p. 3 ref.17 p. 6 ref.18 p. 6 ref.54 p. 2 ref. 82 p.6
GT3	PDT	SMAR LD301D21IVD100 12A1I3P	200263	1 year (Ref.20-21)	28/12/2007 17/12/2008 09/12/2009 10/02/2010 04/11/2011	ref.42 p.1 ref.17 p.7 ref.18 p.7 ref.19 p.3 ref. 82 p.7
	PT	Rosemount 3051PG5	Unreadable	1 year	28/12/2007 17/12/2008 09/12/2009 02/11/2010 04/11/2011	ref.42 p.2 ref.17 p.8 ref.18 p.8 ref.53 p.3 ref. 82 p.8
	TT	Rosemount 00G5A11D080N03 85E1X1X7	1605981	1 year	28/12/2007 17/12/2008 09/12/2009 02/11/2010	ref.42 p.3 ref.17 p.9 ref.18 p.9 ref.54 p.3

					04/11/2011	ref. 82 p.9
HRSG 1	Flow transmitter	Foxboro 83W-A03S1SSTNE-N	98382301	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.1 ref.17 p.10 ref.18 p.10 ref.19 p.4 ref. 82 p.10
HRSG 2	Flow transmitter	Foxboro 83W-A03S1SSTNE-N	98382299	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.2 ref.17 p.11 ref.18 p.11 ref.19 p.5 ref. 82 p.11
HRSG 3	Flow transmitter	Foxboro 83W-A03S1SSTNE-N	98382300	1 year (Ref.22-23)	18/12/2007 16/12/2008 14/12/2009 08/12/2010 04/11/2011	ref.48 p.3 ref.17 p.12 ref.18 p.12 ref.19 p.6 ref. 82 p.12
N/A	Gas chromatograph	Hewlett Packard 5890	3303A50915	1 year (internal) Not required (Ref.26)	23/01/2008 26/09/2008 21/11/2008 12/01/2010	ref.55 p.3 ref.55 p.5 ref.55 p.7 ref.55 p.9
Bay 1	Power meter	PowerLogic ION 7330	PB-0308A151-11	10 years (Ref.30, Ref.32)	13/08/2003	ref.35
	Power meter	PowerLogic ION 7330	PB-0804A559-11	10 years (Ref.30, Ref.32)	24/04/2008	ref.65
Bay 2	Power meter	PowerLogic ION 7330	PB-0308A149-11	10 years (Ref.30, Ref.32)	13/08/2003	ref.36
	Power meter	PowerLogic ION 7330	PB-0902A148-11	10 years (Ref.30, Ref.32)	10/02/2009	ref.66
Bay 3	Power meter	PowerLogic ION 7330	PB-0604A348-11	10 years (Ref.30, Ref.32)	24/04/2006	ref.37
	Power meter	PowerLogic ION 7330	PB-0605A116-11	10 years (Ref.30, Ref.32)	24/05/2006	ref.67
	Power meter	PowerLogic ION 7330	PB-0604A347-11	10 years (Ref.30, Ref.32)	23/04/2006	ref.68
Bay 4	Power meter	PowerLogic ION 7330	PB-0308A150-11	10 years (Ref.30, Ref.32)	13/08/2003	ref.38
	Power meter	PowerLogic ION 7330	PB-0911A606-11	10 years (Ref.30, Ref.32)	20/11/2009	ref.69

As it was discussed in section 3.4. (CAR# 3) and summarized in the previous table, the equipments linked to FGT and FST were delayed calibrated on 04/11/2011. As per the calibration certificates (ref 82) they were calibrated using patterns that were duly calibrated (ref 83 to 85), however the Smar PDTs remained with an

error higher than the maximum permissible (Smar PDT of GT1, error 0.85%, Smar PDT of GT2, error 0.26% and Smar PDT of GT3 error 0.43%), since it will have impact in the following Monitoring Period the PP is requested to:

1. Calibrated again the equipments to have them operating within the maximum error or replaces them if necessary, and
2. Consider the lower accuracy of the equipments (error found: Smar PDT of GT1, error 0.85%, Smar PDT of GT2, error 0.26% and Smar PDT of GT3 error 0.43%) and follow a conservative approach in the next Monitoring period until the date that the equipments are calibrated again or replaced. Therefore, given that the equipment will operate with lower accuracy than the committed in the RMP (ref 6), the involved parameter (FGT) will have to be corrected by a factor given by the error found minus the accuracy level defined in the RMP.

FAR #17 was raised.

3.6 Accuracy of Emission Reduction Calculations

The calculation of emission reductions is found to be correct. The response to CARs and CLs was satisfactory and these were closed. The details of the reported and the verified values for all parameters are listed in section 4, 'Calculation of Emission Reductions'.

3.7 Quality of Evidence to Determine Emission Reductions

Critical parameters used for the determination of the Emission Reductions are discussed in section 3.4 above. All the data recorded is in compliance with the monitoring report.

3.8 Management System and Quality Assurance

The companies involved in the project have ISO 9001:2000 quality assurance system implemented, therefore the assessment team can confirm that the management system for the CDM project is in place; with the responsibilities properly identified and in place.

In order to verify data quality, the companies involves in the project works in accordance with a quality assurance procedure (*Procedure for Monitoring Plan Implementation*), which establishes the operational and management structure implemented.

3.9 Data from External Sources

The grid emission factor (EF_{grid}) is fixed *ex-ante* in the registered PDD as 0.906 tCO₂/MWh for this crediting period.

The CO₂ emission factor for the open cycle plant ($EF_{OC,y}$) is fixed *ex-ante* in the registered PDD as 0.766 tCO₂/MWh for this crediting period.

The values for the above parameters are fixed *ex-ante* in the registered PDD, and are correctly used for the direct calculation of baseline emissions in the ER spreadsheet (Ref.71h) for each monitoring period.

4. Calculation of Emission Reductions

Parameter	Reported Value in MR version 1*	Verified Value*
FGT_{NG,y} – Consumption of natural gas to operate the gas turbine the year (y)	637,240,000 Nm ³	Total sum: 656,496 Nm ³ 2008 (Jul-Dec) – 141,179 Nm ³ 2009 – 255,083 Nm ³ 2010 – 260,235 Nm ³
FST_{NG,y} – Consumption of natural gas used for supplementary heat in the HRSG for the year (y)	68,918,000 Nm ³	Total sum: 68,953 Nm ³ 2008 (Jul-Dec) – 21,774 Nm ³ 2009 – 29,309 Nm ³ 2010 – 17,869 Nm ³
NCV_{NG,y} – Net calorific value of natural gas	0.0365 GJ/Nm ³	Total average: 0.0365 GJ/Nm ³ 2008 (Jul-Dec) – 0.0363 GJ/Nm ³ 2009 – 0.0365 GJ/Nm ³ 2010 – 0.0367 GJ/Nm ³
EF_{CO2,NG,y} – CO ₂ emission factor for natural gas	0.0588 tCO ₂ /GJ	Total average: 0.0589 tCO ₂ /GJ 2008 (Jul-Dec) – 0.0591 tCO ₂ /GJ 2009 – 0.0591 tCO ₂ /GJ 2010 – 0.0585 tCO ₂ /GJ
OXID_{NG,y} – Oxidation factor for natural gas	1%	100%
PG_y – Actual electricity generated by project in the year	2,594,407 MWh	Total sum: 2,716,257 MWh 2008 (Jul-Dec) – 632,812 MWh 2009 – 1,029,253 MWh 2010 – 1,054,192 MWh
OG_y – Actual electricity generated by open cycle in the year	1,647,033 MWh	Total sum: 1,863,637 MWh 2008 (Jul-Dec) – 399,017 MWh 2009 – 739,035 MWh 2010 – 725,585 MWh
CG_y – Actual electricity generated from waste heat use in steam turbine	947,374 MWh	Total sum: 852,620 MWh 2008 (Jul-Dec) – 233,795 MWh 2009 – 290,218 MWh 2010 – 328,607 MWh
PC – Net generation capacity of the project power plant	160 MW	160 MW

*Differences found are based on the monitoring report version 1 published on the UNFCCC website prior to verification assessment. These differences are detailed in the findings raised during the verification assessment. After revision of the Monitoring Report which addresses values verified above, no differences were found.

Emission reductions initially reported in the MR v1 (ref.09a) were 600,102 tCO₂e, while the verified value for the monitoring period is 634,208 tCO₂e. Differences are given mainly due to an increase in the value of total baseline emissions from 2,119,948 to 2,200,019 tCO₂, which in turn is a result of the increase in the total value of electricity generation delivered to the grid (PG_y) from 2,594,407 to 2,716,257 MWh. The difference in the value of PG_y is due to the inconsistencies identified during the verification assessment in the reported data for Bay 1-4 against the weekly and monthly reports (ref.13, ref.50) as well as differences detected in cross-checking against the electricity invoices (ref.16) (refer to CAR #12 and CAR #14 for details).

On the other hand project emission varied from 1,521,301 to 1,560,631 tCO₂, due to the corrections done in the gas consumption by the errors found in the delayed calibration (refer to CAR #3 for details). The final

values of PGy, FGT and FST are thus correct based on the verified records and final Emission Reductions are therefore accurate and real.

Calculation of Emission Reductions:

The following values are determined ex-ante in the registered PDD (Ref.01) and used for the calculation of baseline emissions:

- $EF_{OC,y}$ – Average emission factor for the power plant operating in open cycle mode for the three years previous to the project activity = 0.766 tCO₂/MWh;
- $EF_{grid,y}$ – Baseline emission factor for the electricity displaced due to the project activity = 0.906 tCO₂/MWh.

The following formulas were verified to be correctly applied in the calculations (Ref.71h):

$$BE_y = (EF_{OC,y} * OG_y) + (EF_{grid,y} * CG_y)$$

01/07/2008 – 31/12/2008:

$$BE_y = (0.766 \text{ tCO}_2/\text{MWh} * 399,017 \text{ MWh}) + (0.906 \text{ tCO}_2/\text{MWh} * 233,795 \text{ MWh})$$

$$BE_y = 517,465 \text{ tCO}_2\text{e (rounded down for conservativeness)}$$

01/01/2009 – 31/12/2009:

$$BE_y = (0.766 \text{ tCO}_2/\text{MWh} * 739,035 \text{ MWh}) + (0.906 \text{ tCO}_2/\text{MWh} * 290,218 \text{ MWh})$$

$$BE_y = 829,038 \text{ tCO}_2\text{e (rounded down for conservativeness)}$$

01/01/2010 – 31/12/2010:

$$BE_y = (0.766 \text{ tCO}_2/\text{MWh} * 725,585 \text{ MWh}) + (0.906 \text{ tCO}_2/\text{MWh} * 328,607 \text{ MWh})$$

$$BE_y = 853,516 \text{ tCO}_2\text{e (rounded down for conservativeness)}$$

$$PE_y = (FGT_{NG,y} + FST_{NG,y}) * COEF_{NG,y}$$

$$COEF_{NG,y} = NCV_{NG} * EF_{CO_2,NG} * OXID_{NG}$$

01/07/2008 – 31/12/2008:

$$COEF_{NG,y} = 0.0362721 \text{ GJ/Nm}^3 * 0.0590767 \text{ tCO}_2/\text{GJ} * 1.00 = 0.002142832 \text{ tCO}_2/\text{Nm}^3$$

$$PE_y = (141,179 \text{ Nm}^3 + 21,774 \text{ Nm}^3) * 0.002142832 \text{ tCO}_2/\text{Nm}^3 * 1,000$$

$$PE_y = 349,181 \text{ tCO}_2\text{e (rounded up for conservativeness)}$$

01/01/2009 – 31/12/2009:

$$COEF_{NG,y} = 0.0365234 \text{ GJ/Nm}^3 * 0.0590863 \text{ tCO}_2/\text{GJ} * 1.00 = 0.002158035 \text{ tCO}_2/\text{Nm}^3$$

$$PE_y = (255,083 \text{ Nm}^3 + 29,309 \text{ Nm}^3) * 0.002158035 \text{ tCO}_2/\text{Nm}^3 * 1,000$$

$$PE_y = 613,729 \text{ tCO}_2\text{e (rounded up for conservativeness)}$$

01/01/2010 – 31/12/2010:

$$COEF_{NG,y} = 0.0367385 \text{ GJ/Nm}^3 * 0.0585019 \text{ tCO}_2/\text{GJ} * 1.00 = 0.002149272 \text{ tCO}_2/\text{Nm}^3$$

$$PE_y = (260,235 \text{ Nm}^3 + 17,869 \text{ Nm}^3) * 0.002149272 \text{ tCO}_2/\text{Nm}^3 * 1,000$$

$$PE_y = 597,721 \text{ tCO}_2\text{e (rounded up for conservativeness)}$$

$L_y = 0$ (As per approved methodology no data is required for leakage as it is assumed negligible).

$$ER_y = BE_y - PE_y - L_y$$

01/07/2008 – 31/12/2008:

$$ER_y = 517,465 \text{ tCO}_2 - 349,181 \text{ tCO}_2 - 0 \text{ tCO}_2 = 168,284 \text{ tCO}_2$$

01/01/2009 – 31/12/2009:

$$ER_y = 829,038 \text{ tCO}_2 - 613,729 \text{ tCO}_2 - 0 \text{ tCO}_2 = 215,309 \text{ tCO}_2$$

01/01/2010 – 31/12/2010:

$$ER_y = 853,516 \text{ tCO}_2 - 597,721 \text{ tCO}_2 - 0 \text{ tCO}_2 = 255,795 \text{ tCO}_2$$

01/07/2008 – 31/12/2010:

$$\text{Total ERs} = 168,284 \text{ tCO}_2 + 215,309 \text{ tCO}_2 + 255,795 \text{ tCO}_2 = 639,388 \text{ tCO}_2$$

As stated in the MR v10 (ref.09j), an error was identified in the calculation of PLF in the previous monitoring period (01/01/2008 – 30/06/2008), which did not apply the most conservative value between Option 1 and Option 2 (cells K20:25). The ER spreadsheet for the previous monitoring period was revised (ref.74) to apply the correct value of PLF (the higher value), thus decreasing baseline emissions and resulting in 171,201 tCO₂ which translates into 5,180 tCO₂ less than the amount of issued CERs (176,381 tCO₂). The excess CERs represented only 2.94% of the total CERs issued. Nevertheless, the PP has voluntarily discounted the over-issued CERs of 5,180 tCO₂ from the ERs obtained during this monitoring period (Ref.71h, 'Annex 1' sheet, cell H62), as follows:

$$\text{Final ERs} = 639,388 \text{ tCO}_2 - 5,180 \text{ tCO}_2 = 634,208 \text{ tCO}_2$$

It is important to note that neither the VVM nor any other UN guidance state any provisions for discounting the emission reductions in current monitoring periods due to the issues in the previous monitoring period. This discounting of the CERs is a voluntary action by the PP & SGS.

5. Recommendations for Changes in the Monitoring Plan

After the revision of the monitoring plan approved by CDM EB on 13/05/2011, there are no further recommendations to the project participant related to changes in the monitoring plan. However as it was stated in section 3.5, a FAR was raised to address the issue related with the error found in the gas meters related with FGT.

6. Overview of Results

Assessment Against the Provisions of Decision 17/CP.7:

Is the project documentation in accordance with the requirements of the registered PDD and relevant provision of decision 17/CP.7, EB decisions and guidance and the COP/MOP?

Yes. The results of the compliance assessment are recorded in the verification checklist which is used as an internal report only.

Have on-site inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?

Yes. Members of the assessment team visited the site and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.

The results of the site visit are recorded in the verification checklist which is used as an internal report only.

The evidence has been checked and collected. The revised Monitoring Report is attached with this Verification Report.

Has data from additional sources been used? If yes, please detail the source and significance.

The emission factor for the grid is registered in the PDD and fixed for the crediting period (ex-ante).

The CO₂ emission factor for the open cycle plant is registered in the PDD and fixed for the crediting period (ex-ante).

Please review the monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.

Yes. The monitoring methodology has been correctly applied and the Monitoring Report and supporting references are complete and transparent.

Have any recommendations for changes to the monitoring methodology for any future crediting period been issued to the project participant?

No.

Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, based on the data and information using calculation procedures consistent with those contained in the registered project design document and the monitoring plan.

The data used in anthropogenic emission reduction calculation is consistent with those contained in the registered PDD and monitoring plan. The emission reduction was 856,994 tCO₂ for the period from 01/07/2008 to 31/12/2010 as per the estimation made in the registered PDD. The actual emission reduction has been verified as 634,208 tCO₂ for the same period (after the voluntary discount of over-issued CERs from the previous monitoring period). Differences on the estimated (expected) data in PDD and the obtained in the monitoring period are clearly justified in Section E.6 of the Monitoring Report and in Section 3.1 of this report.

Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the registered project design document. Project participants shall address the concerns and supply relevant additional information.

All non-conformities of the actual project activity and its operation with the monitoring plan in the registered project design document have been informed to the project participants and were addressed in the verification report of the second monitoring period (ref.08). A revised monitoring plan was provided by the project participant and was approved by the UNFCCC on 13/05/2011 (available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>) to address the nonconformities of the actual project operation with the original monitoring plan and the monitoring methodology.

Post monitoring report on UNFCCC website

*Yes, the Monitoring Report is available at ref. ref. 0918 on UNFCCC website:
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>*

7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Sherritt International Corporation to perform the verification of the emission reductions reported for the CDM project Energas Varadero Conversion from Open Cycle to Combined Cycle Project - UNFCCC Reference Number 0918 in the period from 01/07/2008 to 31/12/2010.

The verification is based on the validated and registered project design document and the Monitoring Report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in Monitoring Report Version 10 dated 03/10/2012.

The management of Sherritt International Corporation is responsible for the preparation, calculation and determination of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring Report Version 10 dated 03/10/2012. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period from 01/07/2008 to 31/12/2010 based on the reported emission reductions in the Monitoring Report Version 10 dated 03/10/2012 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, SGS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

SGS confirms that the project is implemented as described in the validated and registered project design documents. Based on the information we have seen and evaluated, we confirm the following:

Project Title:	Energas Varadero Conversion from Open Cycle to Combined Cycle Project
UNFCCC Reference Number:	UNFCCC registration No.0918
Registered PDD Used for Verification:	Registered PDD version 6 dated 18/12/2006
Approved Revised Monitoring Plan	Approved on 13/05/2011, available at http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view
Methodology Used for Verification:	ACM0007 version 1; dated 28/11/2005
Applicable Period:	01/07/2008 to 31/12/2010
Total GHG Emission Reductions Verified:	634,208 tCO ₂ e

Signed on behalf of the Verification Body by Authorized Signatory

Signature: 

Name: Siddharth Yadav

Date: 30/10/2012

8. Document References

- /1/ Registered PDD of Energas Varadero Conversion from Open Cycle to Combined Cycle Project (UNFCCC number 0918) version 6 dated 18/12/2006. Available on UNFCCC website at: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>
- /2/ Approved methodology applied by the project activity. ACM0007 Version 1, dated 28/11/2005. Available in UNFCCC website: <http://cdm.unfccc.int/methodologies/DB/1QZ9K3OFVZ90Q35ZE5EYQFKC9I026T/view.html>
- /3/ Project Validation Report No. 2006-1788, Revision 01, and dated 23/11/2006. Available at: <http://cdm.unfccc.int/UserManagement/FileStorage/S2AM980520G8NO7YLOI8F6TIBYQKP4>
- /4/ Verification and Certification Report of 1st monitoring period, available at: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/iProcess/SGS-UKL1201009960.99/view>
- /5/ EB 55 Annex 01 – Validation and Verification Manual Version 01.2. Available at: <http://cdm.unfccc.int/Reference/Manuals/index.html>
- /6/ Revised Monitoring Plan version 8 dated 19/04/2011; Approved by the UNFCCC on 13/05/2011, available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>
- /7/ Validation opinion of RMP; approved 13/05/2011. Available at: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view>
- /8/ Verification and Certification Report of 2nd monitoring period, available at: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/iProcess/SGS-UKL1225807092.34/view>
- /9a/ Energas Varadero Monitoring Report Varadero Version 1 dated 04/07/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9b/ Energas Varadero Monitoring Report Varadero Version 2 dated 12/09/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9c/ Energas Varadero Monitoring Report Varadero Version 3 dated 26/09/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9d/ Energas Varadero Monitoring Report Varadero Version 4 dated 17/10/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9e/ Energas Varadero Monitoring Report Varadero Version 5 dated 27/10/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9f/ Energas Varadero Monitoring Report Varadero Version 6 dated 24/11/2011 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9g/ Energas Varadero Monitoring Report Varadero Version 7 dated 02/02/2012 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9h/ Energas Varadero Monitoring Report Varadero Version 8 dated 19/06/2012 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9i/ Energas Varadero Monitoring Report Varadero Version 9 dated 12/09/2012 (Monitoring Period 01/07/2008 – 31/12/2010)
- /9j/ Energas Varadero Monitoring Report Varadero Version 10 dated 03/10/2012 (Monitoring Period 01/07/2008 – 31/12/2010)

MR Version	Date of Revision	Main changes and reason for revision
1	04/07/2011	<ul style="list-style-type: none"> Original monitoring report version
2	12/09/2011	<ul style="list-style-type: none"> Reporting of consolidated data for the whole period 01/07/2008 to 31/12/2010 Incorporation of additional energy meters QA/QC details in Annex 2 Editorial changes Sections modified: B.1., D.2., E.1 – 5, Annex 1, Annex 2
3	26/09/2011	<ul style="list-style-type: none"> Reporting of data separately for each year of the monitoring period to follow the methodology

		<ul style="list-style-type: none"> Inclusion of additional QA/QC information for monitoring equipment in Annex 2 Sections modified: D.2., E.1 – 5, Annex 2
4	17/10/2011	<ul style="list-style-type: none"> Application of the latest UN MR template Correction of QA/QC information in Annex 2 Correction of maximum permissible error applied to NCV and EFco2 values following EB 52 Annex 60 to compensate for a calibration delay of the gas chromatograph Sections modified: Annex 2
5	27/10/2011	<ul style="list-style-type: none"> Revision of ERs Editorial changes Sections modified: D.2., E.1 – 5, Annex 2
6	24/11/2011	<ul style="list-style-type: none"> Missing calibration date 26/09/2008 was incorporated for the gas chromatograph Project participant “United Kingdom of Great Britain and Northern Ireland” was included in section A.2 as per UNFCCC project page Value of OGy and PLF were revised to follow the most conservative approach as per methodology and RMP Over-issued 5,180 CERs were voluntarily discounted from the ERs of this monitoring period due to non-conservative selection of PLF value in the previous monitoring period Editorial changes Sections modified: A.2, D.2., E.1 – 5, Annex 2
7	02/02/2012	Changes during SGS completeness check: <ul style="list-style-type: none"> Contact information of responsible person was included in section A.8 Missing information incorporated in section D.2 tables as result of SGS completeness check Editorial changes Sections modified: A.8, D.2.
8	19/06/2012	<ul style="list-style-type: none"> Correction applied to FGT and FST measured values following EB 52 Annex 60 due to the lack of calibration in 2009 of the Fluke and Crystal devices, thereby increasing project emissions and decreasing ERs A clarification was included in sections D.2 and E.4 with regard to the correction that was already applied to NCV and EFco2 values following EB 52 Annex 60 Rounding of values was corrected for more conservative ERs (was applied directly to PE and BE instead of ERs). Sections modified: D.2., E.1 – 5, Annex 2
9	12/09/2012	<ul style="list-style-type: none"> Correction applied to FGT and FST measured values following EB 52 Annex 60 due to the lack of calibration in 2009 of the Fluke and Crystal devices, thereby increasing project emissions and decreasing ERs Sections modified: D.2., E.1 – 5,
10	03/10/2012	<ul style="list-style-type: none"> Correction of error applied to FGT in GT2. Sections modified: D.2., E.1 – 5,

/10/ Varadero Emission Reductions spreadsheet for the period 01/07/2008 – 31/12/2008 v.1

/11/ Varadero Emission Reductions spreadsheet for the period 01/01/2009 – 31/12/2009 v.1

/12/ Varadero Emission Reductions spreadsheet for the period 01/01/2010 – 31/12/2010 v.1

/13/ Summary of monthly records of gas consumption (01/07/2008 – 31/12/2010)

/14/ NCV and EFco2 monthly calculation spreadsheets

/15/ IPCC 2006 Guidelines - V2 Ch2_Stationary_Combustion. Available at the following IPCC link:

<http://www.ipcc->

nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

- /16/ Monthly electricity invoices from 01/07/2008 to 31/12/2010
- /17/ SMAR and Foxboro calibration certificates for December 2008
- /18/ SMAR and Foxboro calibration certificates for December 2009
- /19/ SMAR and Foxboro calibration certificates for February and December 2010
- /20/ SMAR LD300CE flow meter technical specifications
- /21/ SMAR transmitters calibration frequency statement from Telematic (supplier)
- /22/ Foxboro technical specifications
- /23/ Foxboro calibration frequency statement from Simark (supplier)
- /24/ Rosemount 3051 technical specifications
- /25/ Rosemount 644 technical specifications
- /26/ HP5890 Chromatograph manual
- /27/ HP5890 Chromatograph specifications (accuracy details)
- /28/ Methodology of calculation NCVng & EFco2
- /29/ Bay 1-4 power meters installation record
- /30/ ION7330 power meters specifications (accuracy details)
- /31/ Schneider-electric ION7330 series specifications
- /32/ Statement from Schneider-Electric dated 24/03/2010 - ION meters lifespan
- /33/ UNE statement of project net installed capacity dated 29/08/2011
- /34/ Organization chart of Energas Varadero power plant
- /35/ Power meter PB-0308A151-11 calibration certificate dated 13/08/2003 issued by Schneider Electric
- /36/ Power meter PB-0308A149-11 calibration certificate dated 13/08/2003 issued by Schneider Electric
- /37/ Power meter PB-0604A348-11 calibration certificate dated 24/04/2006 issued by Schneider Electric
- /38/ Power meter PB-0308A150-11 calibration certificate dated 13/08/2003 issued by Schneider Electric
- /39/ SMAR meters calibration certificates issued by the manufacturer
- /40/ SMAR meters internal calibration records dated 26/12/2007
- /41/ SMAR meters internal calibration records dated 08/01/2008
- /42/ SMAR meters internal calibration records dated 28/12/2007
- /43/ Fluke 743B certificate of calibration dated 05/04/2007
- /44/ Fluke 743B certificate of calibration dated 06/05/2008
- /45/ Fluke 744 certificate of calibration dated 06/05/2008
- /46/ Crystal IS33 certificate of calibration dated 26/04/2010
- /47/ Foxboro meter calibration certificate issued on 16/10/1998
- /48/ Foxboro meters internal calibration records dated 18/12/2007
- /49/ Photographs taken during the site visit conducted on 29/08/2011 and 30/08/2011
- /50/ Summary of weekly records of electric production
- /51/ Varadero Gas Plant maintenance conducted from 2008 to 2010
- /52/ Varadero Gas Plant training records
- /53/ Pressure transmitters calibration records dated 02/11/2010
- /54/ Temperature transmitters calibration records dated 02/11/2010
- /55/ Gas chromatograph calibration records
- /56/ Excel sheet - HP 5890 gas chromatograph calibration details
- /57/ Cylinder #1014780 certificate dated 26/02/2007
- /58/ Cylinder #1064683 certificate dated 26/02/2007
- /59/ Cylinder #1155745 certificate dated 12/10/2010
- /60/ VGP historical gas measurements
- /61/ GT1 power meter replacement registries
- /62/ GT2 power meter replacement registries
- /63/ GT3 power meter replacement registries

- /64/ STG power meter replacement registries
- /65/ Manufacturer calibration certificate of Bay 1 power meter S/N PB-0804A559-11 issued on 24/04/2008
- /66/ Manufacturer calibration certificate of Bay 2 power meter S/N PB-0902A148-11 issued on 10/02/2009
- /67/ Manufacturer calibration certificate of Bay 3 power meter S/N PB-0605A116-11 issued on 24/05/2006
- /68/ Manufacturer calibration certificate of Bay 3 power meter S/N PB-0604A347-11 issued on 23/04/2006
- /69/ Manufacturer calibration certificate of Bay 4 power meter S/N PB-0911A606-11 issued on 20/11/2009
- /70/ Production report of monthly electricity generation from 2008 to 2010
- /71a/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 1
- /71b/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 2
- /71c/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 3
- /71d/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 4
- /71e/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 5
- /71f/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 6
- /71g/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 7
- /71h/ Consolidated Emission Reduction spreadsheet for the period 01/07/2008 – 31/12/2010 version 8
- /72/ Varadero Gas Plant Work Order issued on 09/02/2010 for conducting calibration checks to the three gas turbine PDTs
- /73/ Varadero Gas Plant maintenance program 2009
- /74/ Varadero Emission Reductions spreadsheet for the period 01/01/2008 – 30/06/2008 v.9 – Revised to discount over-issued CERs
- /75/ Calculation of the Varadero plant gross heat rate for 2008, 2009 and 2010
- /76/ Varadero plant energy balance sheet 2008
- /77/ Varadero plant energy balance sheet 2009
- /78/ Varadero plant energy balance sheet 2010
- /79/ Approved baseline methodology applied by the project activity. ACM0002 Version 6, dated 19/05/2006. Available on UNFCCC website:
<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT/view.html>
- /80/ Sales Gas Flow Calculation – Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids, Part 3, Natural Gas Applications. Third edition, August 1992
- /81/ Mathematical Analysis of Gas Flow consumption
- /82/ FGt & FST meters, calibration November 2011
- /83/ Pattern Crystal IS33 calibration March 2011.
- /84/ Pattern Fluke 724 calibration March 2011.
- /85/ Pattern Fluke 743b calibration January 2011.
- /86/ Maximum permissible error – Smar meters
- /87/ Summary of error founds at calibration 04/11/2011
- /88/ Errors found assessment done by the team.

9. Findings Overview

Findings Overview Summary

	CARs	CLs	FARs
Total Number raised	11	5	1

Date:	26/08/2011	Raised by:	Assessment team		
Type:	CL	Number:	01	Reference:	AU4 Section 2, 3.5
Lead Assessor Comment:			Date: 26/08/2011		
<p>QA/QC / equipment information:</p> <p>According to the RMP (ref.06), the flow transmitters (FGT & FST) and the gas chromatograph (NCV & EFco2) shall be calibrated annually. The monitoring report (ref.09a) includes in Annex 2 a table with the QA & QC procedures for the relevant CDM monitoring equipments, including manufacturer name, model, serial number, parameter, dates of installation, calibration frequency requirement, dates of calibration, next calibration due dates, equipment accuracy. However the information on installed meters and calibrations performed shall be updated and it should show the maintenance performed on 2009 and 2010 to the equipment that require annual calibrations.</p> <p>Also, it shall provide information for all the monitoring equipment that was installed during the monitoring period (e.g. energy meter replacements should be transparently shown). Additionally the PP is requested to provide a log book showing the meters replacement history.</p> <p>CL #01 was raised.</p>					
Project Participant Response:			Date: 11/09/2011		
<p><i>Annex 2 included in MR has been updated showing the replacement of power meters. Also, during the site visit the log book reflecting the power meters replacement history has been provided.</i></p>					
Documentation Provided as Evidence by Project Participant:					
Monitoring Report 03 Jul 2008-Dec 2010 ver 01 (2)					
Information Verified by Lead Assessor:					
<p>The revised MR (ref.09b) incorporates the information of the new power meters installed, with their specifications, installation dates and calibration dates. Also, during the site visit the log books showing the power meters replacement history was provided (ref.61-64).</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
<p>a) However, the installation date of meter PB-0605A116-11 is indicated as "Oct 2008", the PP is requested to confirm the exact date of installation of this meter.</p> <p>b) Also, the installation date of PB-0604A347 mentioned in the MR "Jun 8 2009" is not correct as per the replacement history document of the GT3 meter (ref.63). Please check and revise.</p> <p>c) The revised MR (ref.09b) does not include the calibrations performed in <u>2009 and 2010</u> to all the flow transmitters (FGT and FST, SMAR, Rosemount, Foxboro) and for the gas chromatograph (HP); these need to be included as well in Annex 2.</p> <p>d) The serial number of the GT2 Rosemount TT mentioned in the MR as "Ex96D1434X" is not correct as per site visit photo. Please revise.</p>					
CL #01 remains open.					
Project Participant Response:			Date: 26/09/2011		
<p>a) <i>The exact date of the installation could not be provided by field electrician</i></p> <p>b) <i>The installation date has been corrected according with replacement history</i></p> <p>c) <i>Calibration performed in 2009 and 2010 have been included</i></p> <p>d) <i>The serial number has been corrected indicating now 1605980</i></p>					
Documentation Provided as Evidence by Project Participant:					
Ref.09b - Monitoring Report v03 14.09.2011_REV (ref.09c)					

Information Verified by Lead Assessor:	
a) The PP clarified that the exact date of installation of the meter could not be confirmed. This has no impact on the verification because the meter was calibrated in 2006 and was within its calibration period. Item closed.	
b) The PP revised the installation date of PB-0604A347 from "Jun 8 2009" to "Oct 2008" in the MR (ref.09c). However, this date is also not consistent with the replacement history document of the GT3 meter (ref.63). The PP is required to review the date accordingly. Item remains open.	
c) The PP has included the calibration dates of 2009 and 2010 for some of the equipment but omitted the same for GT2, GT3 and HRSG transmitters. Please include all the dates of calibration from 2008 to 2010 for ALL equipment that have a yearly calibration frequency. Also, for clarity purposes please include all the calibration dates of each equipment in one single column of calibration dates, and avoid stating their calibration due date. Item remains open.	
d) The serial number of the GT2 Rosemount TT has been corrected by the PP in accordance with the information verified onsite. Item closed.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #01 remains open.	
Project Participant Response:	Date: 06/10/2011
b) <i>The instalment date has been changed as per ref 63, indicating now Aug 06, 2009.</i>	
c) <i>The calibration dates have been included for all the equipment, for 2008, 2009 and 2010 in one single column (Calibration date) under Annex 2 in MR.</i>	
Documentation Provided as Evidence by Project Participant:	
MR ver.04. doc	
Information Verified by Lead Assessor:	
a) The installation date of meter PB-0604A347 is now correct in the MR v4 (ref.09d) as per GT3 meter records (ref.63). Item closed.	
b) The revised MR (ref.09d) now states consistently the equipment calibration dates during the monitoring period. Yet the date of Oct. 2006 stated for the GT2 PDT and PT in Annex 2 of MR could not be confirmed. Please consider that reporting this date is not essential for the current monitoring period. Additionally, for the gas chromatograph the calibration record (ref.55) states that the equipment was calibrated on 23/01/2008, but this is not shown in the MR (also, the date Feb 17 2007 is not essential for the current monitoring timeframe). Item remains open.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #01 item b) remains open.	
Project Participant Response:	Date: 27/10/2011
b) <i>Oct 2006 has been removed from MR annex 2</i>	
Feb 17, 2007 has been replaced by 23/01/2008	
Documentation Provided as Evidence by Project Participant:	
MR 03 ver 05.doc	
Information Verified by Lead Assessor:	
b) The date of October 2006 has been removed from the MR (ref.09e) as it is not relevant for the monitoring period. The calibration date 23/01/2008 of the gas chromatograph was included in the MR in accordance with the calibration records (ref.55).	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #01 was closed out on 28/10/2011.	
According to the chromatograph calibration records (ref.55), the equipment was calibrated on 26/09/2008, but this date is not reported in the MR. Please consider including in the MR for completeness of data.	
CL #01 was re-opened on 15/11/2011.	
Project Participant Response:	Date: 16/11/2011
26/09/2008 has been included as calibration date in MR.	
Documentation Provided as Evidence by Project Participant:	
MR ver.06.	
Information Verified by Lead Assessor:	
The calibration date 26/09/2008 was incorporated in the MR v06 (ref.09f) according to the calibration records (ref.55 p. 5).	

Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #01 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 30/11/2011

Date:	26/08/2011	Raised by:	Assessment team		
Type:	CAR	Number:	02	Reference:	AU4 Section 2, 4.3
Lead Assessor Comment:			Date: 26/08/2011		
<p>FGT & FST</p> <p>The reported values in the MR for FGT and FST should be consistent in terms of decimals (see section E.2 and E.4). For example, FGT is reported in section E.2 of the MR in the formula for July-Dec 2008 as "142,764.3268" with 4 decimals; for Jan-Dec 2009 it is reported as "255,475" with no decimals; and for Jan-Dec 2010 it is shown as "239,001.370" with 3 decimals. The same is shown in section E.4. Please review this for FST as well.</p> <p>Additionally the sum of the values should be exact as per ER spreadsheet (e.g. the MR section D.2 reports FGT=637,240,000 Nm³ and FST = 68,918,000 Nm³ which are not exact as per ER spreadsheet).</p> <p>ER calculations</p> <p>In addition, the PP is kindly requested to provide the ER calculations in a single Excel file with the calculations for the whole monitoring period.</p> <p>CAR #02 was raised.</p>					
Project Participant Response:			Date: 12/09/2011		
<p><i>Monitoring Report 03 Jul 2008-Dec 2010 ver 01 (2)</i> <i>Annex MR. 03 Jul 2008-Dec 2010.ver 01</i></p>					
Documentation Provided as Evidence by Project Participant:					
<p><i>The decimals have been eliminated and the calculation is showing as per ER spreadsheet.</i> <i>The whole monitoring period is in a single ER spreadsheet now.</i></p>					
Information Verified by Lead Assessor:					
<p>The decimals for the parameters in the formulas presented in section E.2 of the MR (ref.09b) are now consistent among each other. Additionally the values reported for FGT and FST are now consistent with the ER spreadsheet (ref.71a).</p> <p>The PP has provided a consolidated ER spreadsheet (ref.71a) with the calculations for the whole monitoring period.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
<p>However the revised MR (ref.09b) and ER spreadsheet (ref.71a) now report the parameters for the entire monitoring period. According to the methodology, the monitored parameters shall be recorded <u>annually</u>. Therefore, the PP is requested to report ALL parameters for each monitored year. That is:</p>					
Monitoring Report:					
<ul style="list-style-type: none"> a) Section D.2 of the MR shall report each parameter as three (3) values, one for each period 2008 (July-Dec), 2009 and 2010. b) Annex 2 of the MR shall report separately the values for 2008, 2009 and 2010 (3 total values or averages for each parameter) c) Sections E.1, E.2 and E.4 shall report baseline emissions, project emissions and emission reductions for each year separately. d) For clarity purposes please specify the value of Leakage in section E.3 (L = 0 tCO₂e). 					
ER spreadsheet:					
<ul style="list-style-type: none"> e) The ER spreadsheet shall report each parameter for each period 2008 (July-Dec), 2009 and 2010. f) Baseline emissions, project emissions and ERs shall be calculated for each year 2008, 2009 and 2010. A final consolidated value of ERs shall be reported in the ER spreadsheet (the sum of ERs for the 2008-2010 periods). 					
CAR #02 remains open.					
Project Participant Response:			Date: 26/09/2011		

Monitoring Report

- a) Section D2 of the MR is reporting now each parameter as three values, one for each period
- b) Annex 2 of the MR has been corrected and report separately the values for 2008, 2009, and 2010
- c) Sections E1, E2, and E 4 reports the values as per DOE request.
- d) The value of Leakage has been introduced in appropriate formulas for clarity purposes.

ER spreadsheet

- a) The parameters are reported for each period of time
- b) BE, PE and ER are reported for the three years and a final value of ER is reported in ER spreadsheet as a sum of the previous three values

Documentation Provided as Evidence by Project Participant:

Ref.09b - Monitoring Report v03 14.09.2011_REV

Information Verified by Lead Assessor:

Monitoring Report:

- a) The revised MR v03 (ref.09c) now reports in section D.2 each measured parameter as 3 separate values, one for each year according to the monitoring methodology. However the value of CGy reported in section D.2 of the MR for year 2009 is not as per ER spreadsheet. Please correct. **Item remains open.**
- b) Annex 1 of the MR has been corrected to report the parameters separately for each year. However the PP is requested to adjust the tables to fit into the page (pg. 23). Moreover, several inconsistencies in the NCV and EFco2 values were identified; the PP is required to review all the values of NCV and EFco2 for consistency with the ER spreadsheet. Finally, please correct the separation comma in the NCV average of 2010 since it is a decimal number. **Item remains open.**
- c) Sections E.1, E.2 and E.4 now report separately the yearly values and formulas as per methodology. However, the last digits of COEF values for 2008, 2009 and 2010 in section E.2 are not correctly rounded up according to the ER spreadsheet. Please revise. Also, the OXID value is reported as "1,000" even though it is a decimal number. Please correct. Finally in section E.4, please correct the value of Project Emissions in the formula for Jan-Dec 2009 as per ER spreadsheet. **Item remains open.**
- d) The value of leakage was introduced in the E.3 section title; Since the title is part of the UN template, the PP is requested to incorporate the leakage value inside the section, below the title. **Item remains open.**

ER spreadsheet:

- e) The revised ER spreadsheet (ref.71b) now reports the summary of parameters for each year in the monitoring period. **Item closed.**
- f) The calculation of BE, PE and ERs in the revised ER spreadsheet is now done for each year of the monitoring period, with a consolidated value of ERs. **Item closed.**

Reasoning for not Acceptance or Acceptance and Close Out:

Based on the above, **CAR #02 remains open.**

Project Participant Response:

Date: 11/10/2011

- a) CGy value has been corrected in section D 2 of MR according with ER spreadsheet.
- b) The reporting parameters tables in page 23 have been adjusted to fit the format. The inconsistencies in the NCV and EFCO2 values have been eliminated and now they are showing as per spreadsheet. NCV 2010 value-coma has been replaced by dot.
- c) COEF value has been rounded as per ER spreadsheet. OXID value is reported 1.000, and PE value for 2009 has been corrected as per spreadsheet.
- d) The leakage value is now inside the section below the title.

Documentation Provided as Evidence by Project Participant:

Monitoring Report VER.04 doc

Information Verified by Lead Assessor:	
a) The value of CGy in the MR (ref.09d) was corrected according to the ER spreadsheet. Item closed. b) The tables are now adjusted in Annex 1 of MR to fit the page. The parameter values in Annex 1 were verified and are according to the ER spreadsheet, except for the value of FST _{NG} in October 2009; please check for consistency. Item remains open. c) The COEF value has been corrected in the MR as per ER spreadsheet, as well as OXID decimal number and PE value for 2009. However, the NCV value "0.0364928" in the formula of COEF for Jan-Dec 2009 (page 20 of MR) is not according to the ER spreadsheet. Please review. Item remains open. d) Since the title of E.3 is part of the MR template and should not be modified, the PP is requested to include the leakage value outside the "Leakage calculation" title, (namely, after the text "...Leakage is assumed negligible. [ACM0007 ver.01 page 15]"). Item remains open.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #02 remains open.	
Project Participant Response:	Date: 27/10/2011
<i>b) Parameter has been corrected consistent with ER spreadsheet</i> <i>c) Parameter consistent now with ER spreadsheet</i> <i>d) The MR is now as per template.</i>	
Documentation Provided as Evidence by Project Participant:	
MR 03 ver 05.doc	
Information Verified by Lead Assessor:	
b) The value of FST for October 2009 was corrected in the MR according to the ER spreadsheet. Item closed. c) The COEF of 2009 has been corrected in the MR as per ER spreadsheet. Item closed. d) The title of the MR section E.3 is now as per MR template. Item closed.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #02 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 27/10/2011

Date:	26/08/2011		Raised by:	Assessment team	
Type:	CAR (previously CL)	Number:	03	Reference:	AU4 Section 3, 1.1, 2.1
Lead Assessor Comment:				Date: 26/08/2011	
<p>FGT & FST</p> <p>Calibration records of the flow transmitters that measure the gas consumption of the gas turbines were verified (ref.17-19). However the following additional evidence is required:</p> <ol style="list-style-type: none"> 1. Calibration records of the Rosemount PT and TT transmitters for GT1-GT3 in 2010. 2. Certificates of calibration of the flow patterns Fluke 744 7740009, Crystal IS33 and Fluke 744 G4258 used in the calibrations conducted in 2009 and 2010 (ref.18 & 19). <p>CL #03 was raised.</p>					
Project Participant Response:				Date: 12/09/2011	
<ol style="list-style-type: none"> 1. Calibration records of Rosemount PT and TT has been provided during the site visit between Aug 29-30,2011. 2. After a carefully investigation on instrumentation archive, the calibration transmitters for Fluke and Crystal equipment for 2009, is missing. 3. The confirmation for calibration dates (ref. 18 & 19) is received from instrumentation manager and it states as follows: <p><i>Ref 18 – This documentation would have been completed when the calibration PM was done as per our attached 2009 PM schedule. See the Gas Plan (t) tab, and scroll down to December Week 1. I would conclude that the date is December 9, 2009.</i></p> <p><i>Ref 19 – This documentation would have been complete when the calibration was checked as per the attached work order. When I was reviewing the calibrations from December 2009, it appeared as if there was a significant drift in the differential pressure calibrations and this work order was written to double check those calibrations and ensure that the transmitters were not drifting off again. I would conclude that the date is February 10, 2010.</i></p> <p><i>In addition Varadero Master list and WO 38237 are attached for DOE reference.</i></p>					
Documentation Provided as Evidence by Project Participant:					
WO VGP-38237 for GT1 Varadero, Combined Cycle, Boca Master List, 2009					
Information Verified by Lead Assessor:					
<ol style="list-style-type: none"> 1. The calibration records of the Rosemount PT and TT transmitters for GT1-GT3 in 2010 were provided during the site visit (ref.53-54). The certificates indicate that these were calibrated on 02/11/2010. Item closed. 2. During the site visit, the PP provided the calibration certificates of the Fluke and Crystal devices for 2008 and 2010 (ref.45-46). The PP confirmed that the calibration certificates of the Fluke and Crystal devices for 2009 are not available. This has no impact on the accuracy of the flow transmitters because the calibrations records of 2009 and 2010 (ref.18-19, 53-54) indicate that the transmitters were working within their accuracy level ($\pm 0.075\%$ for SMAR meters, $\pm 0.15\%$ for Rosemount PT, $\pm 0.18^\circ\text{F}$ for Rosemount TT and $\pm 1\%$ for the Foxboro transmitters). No calibration delay was detected for the flow transmitters (FGT & FST) during the monitoring period. Item closed. 3. Finally, the PP provided documentation in order to confirm the dates in the calibration certificates of the SMAR and Foxboro transmitters on 2009 and 2010 (ref.18 & 19). Since the SMAR and Rosemount certificates for 2009 (ref.18) state “09/12/2009” it was not clear if it referred to September or December 2009. According to the Varadero maintenance plan of 2009 (ref.73), the correct date is December 2009. Item closed. <p>Also, with regard to the calibrations conducted in 2010 (ref.19), the certificates state “10/02/2010”; the PP was requested to confirm if it referred to February or October 2010. The PP provided a Work Order (ref.72) which was issued on “February 09 2010” in order to calibrate all three GT gas inlet differential flow meters. Hence, the correct calibration date is 10/02/2010. Item closed.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					

Based on the above, CL #03 was closed out on 14/09/2011.	
CL #03 was re-opened on 03/10/2011 since despite the PP clarification above that the calibration date of the 3 PDT was February 10, 2010, the revised MR v3 (ref.09c) is stating "Oct 02 2010" as calibration date for the PDT. Please review or clarify accordingly.	
Project Participant Response:	Date: 06/10/2011
<i>The calibration date for the three PDT corresponding with GT1-GT3 has been corrected in MR, and it indicates now Feb 10 ,2010. It was a mistake due to date/month/year format.</i>	
Documentation Provided as Evidence by Project Participant:	
<i>MR ver.04 doc</i>	
Information Verified by Lead Assessor:	
The calibration dates of the PDT have been corrected in the MR (ref.09d) to indicate Feb 10, 2010 in consistency with the calibration records (ref.19).	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #03 was closed out on 25/10/2011.	
<p>On 12/06/2012, this finding was re-opened as CAR #03 after a Request for Review on 07/06/2012. With reference to item 2 above, the DOE mistakenly concluded that the lack of calibration in 2009 of the Fluke and Crystal devices had no impact on the accuracy of the flow transmitters. The PP is requested to provide the certificates of calibration of Fluke and Crystal equipments from 2009. If not available, the PP is required to apply EB52 Annex 60 Para 4 (available at http://cdm.unfccc.int/EB/052/eb52_repan60.pdf), which states:</p> <p><i>If during verification of a certain monitoring period, the DOE identifies that the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), the DOE may conclude its verification, provided the following conservative approach is adopted in the calculation of emission reductions:</i></p> <p><i>(a) Applying the maximum permissible error of the instrument to the measured values, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or</i></p> <p><i>(b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment.</i></p> <p><i>The error shall be applied in a conservative manner such that the adjusted measured values shall result in lower baseline emissions and higher project emissions / leakage.</i></p> <p>If the calibration certificates of 2009 are not available, the PP shall revise the values of FGT_{NG,y} and FST_{NG,y} by apply the maximum error between the metering equipments error (SMAR, Rosemount and Foxboro) and the error found the calibrations. For the GT1:GT3 (it means FGT), the period that would apply covers 09/12/2009 to 31/12/2010. For the HRS G1:HRS G3 the applicable period would be from 14/12/2009 to 31/12/2010. See table below for reference.</p> <p>If this procedure is applied, please provide the excel files where the corrections over the parameters are applied.</p>	

Unit	Equipment type	Manufacturer & Model	Serial number	Calibration frequency	Calibration 2009	Calibration device	Device calibrated on	Calibration 2010	Calibration device	Device calibrated on
GT 1	PDT	SMAR LD301D21IVD10 012A1I3P	177898-03	1 year (Ref.20-21)	09/12/2009 (ref.18 p.1)	Fluke 744 7740009	06/05/2008 (ref.45)	10/02/2010 (ref.19 p.1)	CRYSTAL IS33	26/04/2010 (ref.46)
	PT	Rosemount 3051PG5	82700918	1 year	09/12/2009 (ref.18 p.2)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.53 p.1)	Fluke 744 7740009	06/05/2008 (ref.45)
	TT	Rosemount 00G5A11D080N 0385E1X1X7	1605982	1 year	09/12/2009 (ref.18 p.3)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.54 p.1)	Fluke 744 7740009	06/05/2008 (ref.45)
GT 2	PDT	SMAR LD301D21IVD10 012A1I3P	154040	1 year (Ref.20-21)	09/12/2009 (ref.18 p.4)	Fluke 744 7740009	06/05/2008 (ref.45)	10/02/2010 (ref.19 p.2)	CRYSTAL IS33	26/04/2010 (ref.46)
	PT	Rosemount 3051PG5	102Q815	1 year	09/12/2009 (ref.18 p.5)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.53 p.2)	Fluke 744 7740009	06/05/2008 (ref.45)

	TT	Rosemount 00G5A11D080N 0385E1X1X7	1605980	1 year	09/12/2009 (ref.18 p.6)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.54 p.2)	Fluke 744 7740009	06/05/2008 (ref.45)
			Ex96D1434X (assembly)							
GT 3	PDT	SMAR LD301D21IVD10 012A1I3P	200263	1 year (Ref.20-21)	09/12/2009 (ref.18 p.7)	Fluke 744 7740009	06/05/2008 (ref.45)	10/02/2010 (ref.19 p.3)	CRYSTAL IS33	26/04/2010 (ref.46)
	PT	Rosemount 3051PG5	Unreadable	1 year	09/12/2009 (ref.18 p.8)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.53 p.3)	Fluke 744 7740009	06/05/2008 (ref.45)
	TT	Rosemount 00G5A11D080N 0385E1X1X7	1605981	1 year	09/12/2009 (ref.18 p.9)	Fluke 744 7740009	06/05/2008 (ref.45)	02/11/2010 (ref.54 p.3)	Fluke 744 7740009	06/05/2008 (ref.45)
HRSG 1		Foxboro 83W- A03S1SSTNE-N	98382301	1 year (Ref.22-23)	14/12/2009 (ref.18 p.10)	Fluke 744	06/05/2008 (ref.45)	08/12/2010 (ref.19 p.4)	Fluke 744- G4258	06/05/2008 (ref.45)
HRSG 2		Foxboro 83W- A03S1SSTNE-N	98382299	1 year (Ref.22-23)	14/12/2009 (ref.18 p.11)	Fluke 744	06/05/2008 (ref.45)	08/12/2010 (ref.19 p.5)	Fluke 744- G4258	06/05/2008 (ref.45)
HRSG 3		Foxboro 83W- A03S1SSTNE-N	98382300	1 year (Ref.22-23)	14/12/2009 (ref.18 p.12)	Fluke 744	06/05/2008 (ref.45)	08/12/2010 (ref.19 p.6)	Fluke 744- G4258	06/05/2008 (ref.45)

Project Participant Response:
Date: 19/06/2012

As per Corrective Action requested, the maximum allowable error of +2% has been applied to FST from December 14, 2009 and entire year of 2010. That resulted in increased values for PE and subsequently in conservative values for ER's.

In regards of the maximum allowable error applied to FGT, the maximum allowable error of +0.225 % (0.15% Rosemount Transmitter+0.075% SMAR Transmitter errors) has been applied to the gas flow values from December 09, 2009 until December 31, 2010. It has been proved that applying the PDT SMAR maximum allowable error will conduct at more conservative ER, instead to individually apply the maximum allowable error to TT and PT Rosemount transmitters.

Please note that the date and version of MR has been updated, and the explanation regarding the error applied to FST and FGT has been inserted in section E4 under "Clarifications"

Documentation Provided as Evidence by Project Participant:

MR ver.08

ER spreadsheet ver.06

GTs Sales Gas Flow Calculation by using AGA

Mathematical Analysis of Gas Flow consumption

Information Verified by Lead Assessor:

The PP provided a revised monitoring report (ref.09h) and ER spreadsheet (ref.71f) with corrections in the FGT and FST values following EB 52 Annex 60 Para 4.

Regarding FGT, the PP elaborated an analysis of the calculation of gas flow consumption (ref.81) which applies correctly the equations for volume flow of natural gas shown in the document "Orifice Metering of Natural Gas and other Related Hydrocarbon Fluids" from AGA Report 3 (ref.80). Since this parameter is measured by 3 components (PDT, PT and TT), the analysis from the PP demonstrates that applying the PDT SMAR maximum allowable error (+0.075%) plus the Rosemount PT maximum error (+0.15%) leads to more conservative correction factor (+0.225%), instead of combining the PDT, PT and TT maximum allowable errors, which leads to a variation of +0.0165%.

Therefore the value representing the sum of the two errors of PDT and PT (+0.225%) is applied to FGT values for the period from 09/12/2009 to 31/12/2010. The correction applied to the month of December 2009 is made to each daily value starting on December 9th (see "December 2009" sheet, cells N6:8 up to AJ6:8). From January 2010 onwards the correction is applied to the monthly totals (sheets "January 2009" up to "December 2009", cells E6:8). The values are multiplied by 1.00225 which is mathematically correct.

Regarding FST, the maximum permissible error of +2% according to the Foxboro specifications (ref.22) was correctly applied to FST values for the period from 14/12/2009 to 31/12/2010. In the ER spreadsheet the correction for December 2009 is made to each daily value starting on December 14th (see "December 2009" sheet, cells S9:AJ9) and from January 2010 onwards the correction is applied to the monthly totals (refer to sheets "January 2009" up to "December 2009", cells E9). The values are multiplied by 1.02 which is correct.

<p>The above corrections resulted in higher project emissions and therefore have a conservative impact on ERs.</p> <p>The MR was updated based on these changes and incorporates an explanation regarding the error applied to FST and FGT in sections D.2 and in E.4 under "Clarifications."</p> <p>Additionally, in the same manner, clarifications were included in sections D.2 and E.4 for the corrections of values for parameters $NCV_{NG,y}$ and $EF_{CO2,NG,y}$ for the purpose of keeping consistency in the information. However it must be noted that this correction had already been applied by the PP in a prior version of the MR and ER spreadsheet.</p>	
<p>Reasoning for not Acceptance or Acceptance and Close Out:</p> <p>However, EB 52 Annex 60 Para 6 requires that: <i>In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, the DOE, prior to finalizing verification, shall request the project participant to conduct the required calibration and shall ensure that the project participant has calculated the emission reductions conservatively using the approach mentioned in paragraph 4 above.</i></p> <p>Since the calibrations of flow meters (FGT & FST) performed in 2009 and 2010 were done using "pattern devices" (Fluke & Crystal) that were out of their calibration period, calibrations 2009 and 2010 are not valid. Therefore, following Para 6 above it is necessary to compare the error of the flow transmitters found in the next valid calibration with the maximum error of the device (defined in the RMP). In this regard, the certificates of calibration conducted in 2011 have been received from the PP (ref.82). However the PP is requested to provide the calibration certificates of the pattern devices that were used in these calibrations (Crystal IS33, S/N 2262-434826, Fluke 724, S/N 8815091, Fluke 743B S/N SV00008923).</p> <p>CAR #03 remains open.</p>	
<p>Project Participant Response:</p> <p>The errors found in valid calibration (November 2011) were compared with the maximum allowable errors provided by manufacturer and the biggest values have been applied in order to conservatively calculate the ER. The calibration certificates for pattern devices were provided as well.</p>	<p>Date: 12/09/2012 & 03/10/2012</p>
<p>Documentation Provided as Evidence by Project Participant:</p> <p>ER spreadsheet dated 09/12, the corrected MR in both formats, word and pd and the file containing the comparison between maximum permissible errors and calculated ones.</p>	
<p>Information Verified by Lead Assessor:</p> <p>Ref.09j - Monitoring Report v10 03.10.2012.pdf – MR version 10 Ref.71h - ER spreadsheet Sep 12 (2).xls – ER calculation file Ref.82 - GTs and HRSG calibrations 04.11.2011.pdf Ref.83 - Crystal IS33 -- SN 2262-434826 Calibration certification -- March 2011-March 2012.pdf Ref.84 - Fluke 724 -- SN 8815091 Calibration certification -- March 2011-March 2012.pdf Ref.85 - Fluke 744 -- SN SV0008923 -- 7100600 Calibration certification -- February 2011-February 2012.pdf</p>	
<p>Reasoning for not Acceptance or Acceptance and Close Out:</p> <p>As per the records provided by the PP (ref 82) it was verified that on 04/11/2011 the equipments related to FGT and FST monitoring were calibrated. It was verified as well that the pattern devices employed in the calibration process were duly calibrated as well (ref 83 to 85). Thus the results of the calibration performed on 04/11/2011 were considered for the application of EB52 annex 60.</p> <p>It was verified that the PP applied the error (highest between the error found in the delayed calibration and the maximum permissible error) to the gas consumption from 09/12/2009 for FGT and 14/12/2009 for FST. In order to evaluate the value of the error, the assessment team performed independently the error calculation (ref 88), it was concluded that the error were correctly obtained by the PP based on the information available in the calibration certificates.</p> <p>Item closed.</p> <p>Finally it was found that there were three cases where after calibration still the equipment were out the maximum allowable error (Smar PDT of GT1, error 0.85%, Smar PDT of GT2, error 0.26% and Smar PDT of GT3). Since this issue will have impact in ER calculation of the following Monitoring Period one FAR is being raised, please see the FAR at the end of findings overview section.</p> <p>CAR #03 was closed</p>	
<p>Acceptance and Close out by Lead Assessor:</p>	<p>Date: 03/10/2012</p>

Date:	26/08/2011	Raised by:	Assessment team		
Type:	CL	Number:	04	Reference:	AU4 Section 3, 3.1
Lead Assessor Comment:			Date: 26/08/2011		
NCV_{NG} & EF_{CO2,NG} According to the Monitoring Report (ref.09a), NCV _{NG} and EF _{CO2,NG} are calculated by Energas based on monthly testings on-site. The PP has provided the monthly NCV _{NG} calculation spreadsheets for the monitoring period (01/07/2008 – 31/12/2010) (ref.14). However, it was noted that the gas balance spreadsheet for November 2010 is missing. The PP is requested to provide the calculation file for this month. CL #04 was raised.					
Project Participant Response:			Date: 12/09/2011		
<i>The spreadsheet for Gas Balance calculation for November 2010 is included in the attachments to this FO document.</i>					
Documentation Provided as Evidence by Project Participant:					
<i>Varadero Gas Balance - November 2010</i>					
Information Verified by Lead Assessor:					
The PP has provided the missing Gas Balance report for November 2010 (ref.14, "Varadero Gas Balance - 2010.11").					
Reasoning for not Acceptance or Acceptance and Close Out:					
The values of gas composition applied in the calculation of NCV _{NG} and EF _{CO2,NG} in the Gas Balance Reports (ref.14) were cross-checked against the VGP Gas Analysis records (Ref.60). a) The composition results shown in the Dec 2008 Gas Balance report (ref.14, <u>December 2008</u> , sheet "Sales Gas", columns F&G) are not consistent with the measured values of Dec 2008 shown in the VGP Gas Analysis file (ref.60) "Sales Gas", column BS. b) The same was noted for the month of <u>November 2009</u> as the values shown in the Gas Balance Report (ref.14, November 2009, sheet "Sales Gas", columns F&G) are not consistent with the VGP Gas Analysis (ref.60), "Sales Gas", column "DE". Also, the values of gas composition shown in the ER calculation file (ref.71), column "E" in the monthly spreadsheets, were cross-checked with the values in the Gas Balance reports (ref.14) "Sales Gas" sheet. The following inconsistencies were found: c) The gas composition values reported in the ER spreadsheet for August 2008 are not consistent with the Gas Balance report of August 2008 "Sales Gas" sheet. The same was noted for October 2009, June 2010 and August 2010. d) Also, the NCV of natural gas for June 2010 reported in the ER spreadsheet does not coincide with the calculated NCV in the Gas Balance report of June 2010, "CDM Report Data" sheet. Finally, the monthly EF _{CO2,NG} values reported in the ER spreadsheet, "Annex 1" column "I" were cross-checked with the EFco2 reported in the Gas Balance reports, sheet "CDM Report Data". e) The values from January 2009 until August 2009 as well as October 2009 are not consistent with the values of EFco2 calculated in their respective Gas Balance Reports. The PP is requested to review the above inconsistencies or clarify accordingly. CL #04 remains open.					
Project Participant Response:			Date: 26/09/2011		
a) <i>The composition gas for Nov 2008, has been revised and corrected as per VGP Gas Analysis Records</i> b) <i>The composition gas for December 2009, has been revised and corrected as per VGP Gas Analysis Records (A new calculation for Nov 2008 and Dec 2009 is provided in attachment)</i> e) <i>The composition gas has been corrected for August 2009, June 2010 and August 2010. For the month of October 2009 the values reported were found to be correct.</i> f) <i>NCV reported for the month of June 2010 in ER spreadsheet has been corrected as per CDM report data in Varadero Gas Balance sheet.</i> g) <i>The values of EFCO2 have been corrected for Jan-Aug 2009 and October 2009 as well.</i>					
Documentation Provided as Evidence by Project Participant:					

<p> <i>Varadero Gas Balance - December, 2008 – Original</i> <i>Varadero Gas Balance - December, 2008 – Revised</i> <i>Varadero Gas Balance - November 2009 – Original</i> <i>Varadero Gas Balance - November 2009 – Revised</i> <i>Ref.09b - Monitoring Report v03 14.09.2011_REV</i> <i>Annex MR. 03 Jul 2008-Dec 2010.ver 02</i> </p>	
Information Verified by Lead Assessor:	
<p> a) The PP provided a revised Gas Balance report for Dec 2008 (ref.14, “Varadero Gas Balance – December, 2008 – Revised”) which now reports consistently the measured values as per original file “VGP Gas Analysis file” (ref.60). The initial reported values were $NCV_{NG} = 0.03429 \text{ GJ/Sm}^3$ and $EF_{CO2,NG} = 0.05917 \text{ tCO}_2/\text{GJ}$; the revised values are $NCV_{NG} = 0.03410 \text{ GJ/Sm}^3$ and $EF_{CO2,NG} = 0.05949 \text{ tCO}_2/\text{GJ}$. However, the EF_{CO2} value has not been updated in the ER spreadsheet, “Annex 1”, cell I11. Item remains open. b) A revised Gas Balance report for Nov 2009 (ref.14, “Varadero Gas Balance - November 2009 - Revised”) was provided; which now reports consistently the measured values as per original file “VGP Gas Analysis file” (ref.60). The initial reported values were $NCV_{NG} = 0.03471 \text{ GJ/Sm}^3$ and $EF_{CO2,NG} = 0.05914 \text{ tCO}_2/\text{GJ}$; the revised values are $NCV_{NG} = 0.03488 \text{ GJ/Sm}^3$ and $EF_{CO2,NG} = 0.05850 \text{ tCO}_2/\text{GJ}$. However, the EF_{CO2} value has not been updated in the ER spreadsheet, “Annex 1”, cell I31. Item remains open. c) The gas composition values reported in the ER spreadsheet are now consistent with the Gas Balance report of August 2008, June 2010 and August 2010 (ref.14). For the month of October 2009 the data was not adjusted since it was correct as checked in the Gas balance report. Item closed. d) According to the PP, the NCV reported for the month of June 2010 was corrected in the ER spreadsheet (ref.71b). However the NCV has not changed, it is still reporting 0.03442 GJ/Sm^3 for June 2010; while the calculated value in the CDM Report data is 0.03491 GJ/Sm^3. Item remains open. e) The values of EF_{CO2} were corrected by the PP according to the Gas Balance Reports. However for the month of September 2009 the EF_{CO2} figure ($0.0588 \text{ tCO}_2/\text{GJ}$) is not consistent with the Gas Balance report ($0.0591 \text{ tCO}_2/\text{GJ}$). Please review. Item remains open. f) Also, please review the NCV value reported in the ER spreadsheet, November 2010 sheet; it is different from the value reported in the Gas Balance report. Item opened. <ul style="list-style-type: none"> ➤ Please make sure that the MR reflects the revised values in the ER spreadsheet in ALL sections of the MR in a consistent manner. </p>	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #04 remains open.	
Project Participant Response:	Date: 15/10/2011
<p> a) The new value reported for EF_{CO2} has been updated in ER spreadsheet in cell I 11. b) The new value reported has been updated in ER spreadsheet in cell I 31 d) Now the value is showing 0.03491 in ER spreadsheet for June 2010 e) The value has been revised is consistent with Gas Balance Report. f) NCV value for November 2010 has been corrected as per Gas Balance Report. </p>	
Documentation Provided as Evidence by Project Participant:	
Annex MR. ER spreadsheet ver.03	

Information Verified by Lead Assessor:	
a) The value reported for EFco2 in Dec 2008 has been corrected in the ER spreadsheet "Annex 1" (ref.71c), in accordance with the revised Varadero Gas Balance sheet (ref.14). Item closed.	
b) The value reported for EFco2 in Nov 2009 has been corrected in "Annex 1" sheet of ER spreadsheet, in accordance with the revised Gas Balance sheet (ref.14). Item closed.	
d) The NCV value for June 2010 has been updated in the ER spreadsheet, "June 2010" sheet, in line with the corresponding Gas Balance sheet (ref.14). Item closed.	
e) The NCV value for November 2010 was reviewed in the ER spreadsheet, sheet "November 2010", in accordance with the Gas Balance report. Item closed.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CL #04 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 25/10/2011

Date:	26/08/2011		Raised by:	Assessment team	
Type:	CL	Number:	05	Reference:	AU4 Section 3, 3.1
Lead Assessor Comment:				Date: 26/08/2011	
<p>NCV_{NG} & EF_{CO2,NG}</p> <p>The PP is requested to provide the most recent calibration records (certificates) of the chromatographer used for the gas analysis; that is, for years 2009 and 2010.</p> <p>Additionally, please provide the sample gas certificates for the gas cylinder used in the respective calibrations.</p> <p>CL #05 was raised.</p>					
Project Participant Response:				Date: 12/09/2011	
<p><i>During the site visit in Puerto Escondido plant, all the documents available were provided to the lead assessor. The sample gas certificates for August and November 2010 could not be found.</i></p>					
Documentation Provided as Evidence by Project Participant:					
-					
Information Verified by Lead Assessor:					
<p>During the site visit the calibration records of the gas chromatograph (ref.55-56) were provided to the auditors. Also, the sample gas certificates for the gas cylinders employed in the calibrations were provided and verified (ref.57-59). Please refer to CAR #11 for details on the calibration of the gas chromatograph.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
Based on the above, CL #05 was closed out.					
Acceptance and Close out by Lead Assessor:				Date: 14/09/2011	

Date:	26/08/2011	Raised by:	Assessment team		
Type:	CAR	Number:	06	Reference:	AU4 Section 3, 5.1
Lead Assessor Comment:			Date: 26/08/2011		
<p>OXID_{NG,y} The MR (ref.09a) reports in section D.2 the parameter as "1"; however this is not consistent with the unit which is %. The correct value would be 100%. The PP is requested to revise the MR for consistency with the unit.</p> <p>CAR #06 was raised.</p>					
Project Participant Response:			Date: 12/09/2011		
<p><i>The value reported for oxidation factor has been corrected and now is showing 100%.</i></p>					
Documentation Provided as Evidence by Project Participant:					
<i>Annex MR. 03 Jul 2008-Dec 2010.ver 01</i>					
Information Verified by Lead Assessor:					
The value reported for OXID _{NG,y} in section D.2 is now consistent with the unit.					
Reasoning for not Acceptance or Acceptance and Close Out:					
Based on the above, CAR #06 was closed out.					
Acceptance and Close out by Lead Assessor:			Date: 14/09/2011		

Date:	26/08/2011	Raised by:	Assessment team					
Type:	CL	Number:	07	Reference:	AU4 Section 3, 6.1			
Lead Assessor Comment:			Date: 26/08/2011					
PGy The PP is requested to provide the certificates of calibration from the manufacturer of all the energy meters installed during the monitoring period (please refer to CL #01). CL #07 was raised.								
Project Participant Response:			Date: 12/09/2011					
<i>The manufacturer calibration certificates for power meters, were provided during the site visit verification</i>								
Documentation Provided as Evidence by Project Participant:								
-								
Information Verified by Lead Assessor:								
The PP provided the certificates of calibration for the new meters installed during the monitoring (ref.65-69). The calibrations of the power meters were verified as follows:								
Unit	Manufacturer & Model	Calibration frequency	Serial number	Calibration date	Serial number	Calibration date	Serial number	Calibration date
Bay 1	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A151-11	13/08/2003 (Ref.35)	PB-0804A559-11	24/04/2008 (ref.65)	n/a	n/a
Bay 2	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A149-11	13/08/2003 (Ref.36)	PB-0902A148-11	10/02/2009 (ref.66)	n/a	n/a
Bay 3	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0604A348-11	24/04/2006 (Ref.37)	PB-0605A116-11	24/05/2006 (ref.67)	PB-0604A347-11	23/04/2006 (ref.68)
Bay 4	PowerLogic ION 7330	10 years (Ref.30, Ref.32)	PB-0308A150-11	13/08/2003 (Ref.38)	PB-0911A606-11	20/11/2009 (ref.69)	n/a	n/a
The power meters are calibrated by the manufacturer and are working within their calibration periodicity.								
Reasoning for not Acceptance or Acceptance and Close Out:								
Based on the information verified above, CL #07 was closed out.								
Acceptance and Close out by Lead Assessor:					Date: 14/09/2011			

Date:	26/08/2011	Raised by:	Assessment team		
Type:	CAR	Number:	08	Reference:	AU4 Section 3, 6.3
Lead Assessor Comment:		Date: 26/08/2011			
CGy & OGy According to the methodology (ref.02) and the RMP (ref.06), parameter CGy is calculated as per the following formula: $CG_y = PG_y - OG_y$. It was verified in the ER spreadsheet calculations of 01/07/2008 to 31/12/2008 (ref.10) "Annex 1" sheet, that the PP takes the minimum value between the metered values and the calculated ones. The PP is requested to revise the calculations following the RMP (ref.06). Also please provide a single ER spreadsheet file with the calculations for the whole monitoring period (requested in CAR #02). CAR #08 was raised.					
Project Participant Response:		Date: 12/09/2011			
<i>The ER spreadsheet has been revised and is in accordance with the methodology now. A single spreadsheet has been built as well.</i>					
Documentation Provided as Evidence by Project Participant:					
Annex MR. 03 Jul 2008-Dec 2010.ver 01					
Information Verified by Lead Assessor:					
The PP provided a revised ER spreadsheet (Ref.71a) which presents the consolidated calculations for the monitoring period. It was verified that parameter CGy is now calculated in accordance with the formula: $CG_y = PG_y - OG_y$ following the methodology and RMP.					
Reasoning for not Acceptance or Acceptance and Close Out:					
a) The value of OG1 for Sep-08 in "Annex 1" sheet, cell R9 is taking the value of Operation hours from July 2008. Please check. b) The operation hours of feb-09, (cell J48 of "Annex 1") is not correct. According to the amount of days of February 2009, it would be $24 \text{ h} * 28 \text{ days} = 672 \text{ h}$. Please review.					
CAR #08 remains open.					
Project Participant Response:		Date: 15/09/2011			
a) <i>The value of operation hours have been corrected in formula, taking the value for the month of September.</i> b) <i>The operation hours for February 2009 have been revised, indicating now 672 hours.</i>					
Documentation Provided as Evidence by Project Participant:					
Ref.09b - Monitoring Report v03 14.09.2011_REV					
Annex MR. 03 Jul 2008-Dec 2010.ver 02					
Information Verified by Lead Assessor:					
a) The formula of OG1 for Sep-08 in the revised ER spreadsheet (ref.71b), "Annex 1" (cell R8) now applies correctly the Operation hours for the corresponding month. Item closed. b) The value of operation hours for the month of February 2009 has been corrected to 672h in "Annex 1" (cell J68) according to the number of days in the month. Item closed.					
Reasoning for not Acceptance or Acceptance and Close Out:					
ER spreadsheet: "Annex 1" Column S, the formulas for OG2 are not taking the values for Bay 1 to Bay 3 (rows 64-66). Please revise the spreadsheet accordingly. ➤ <i>Please keep in mind that any changes in the ER spreadsheet shall be reflected in the MR consistently.</i>					
CAR #08 remains open.					
Project Participant Response:		Date: 12/10/2011			
<i>Column S of the spreadsheet has been corrected now indicates the sum of Bay 1 to Bay 3.</i>					
Documentation Provided as Evidence by Project Participant:					
Annex MR. ER spreadsheet ver.03					
Information Verified by Lead Assessor:					
The revised ER spreadsheet (ref.71c) now indicates correctly the formula of OG2 as the sum of Bay 1-Bay 3 for each month.					
Reasoning for not Acceptance or Acceptance and Close Out:					

Based on the above, CAR #08 was closed out on 25/10/2011.	
CAR #08 was re-opened on 15/11/2011 to address the following issue:	
a) The RMP requires that parameter OGy shall be calculated according to the formula provided by the methodology and that the data will be verified against the metered values for conservativeness. In the ER spreadsheet, smaller values of OGy between the calculated results using the methodology and the directly measured results are selected. However, this leads to higher baseline emissions than if higher values of OGy are selected. Please review the monthly formulae of OGy to reach the most conservative (highest) figures.	
b) Additionally, the selection of the PLF value between Option 1 and 2 has not been carried out conservatively. According to the RMP, the most conservative value of PLF is applied in OG calculation formula. The ER spreadsheet is taking the minimum value of PLF (column R), which overestimates baseline emissions. Please revise the formulae accordingly.	
Please keep in mind that any changes in the ER spreadsheet should be reflected in the MR accordingly.	
Project Participant Response:	Date: 24/11/2011
a) <i>The maximum value of OGy has been chosen as requested</i>	
b) <i>The maximum value for PLF has been chosen in order to keep conservativeness.</i>	
Documentation Provided as Evidence by Project Participant:	
<i>Annex MR 03 ER spreadsheet ver. 05</i>	
Information Verified by Lead Assessor:	
a) The revised ER spreadsheet (ref.71d) now takes the maximum value of OGy between the calculated and the measured value ("Annex 1" sheet, column L), which underestimates baseline emissions and is thus the most conservative approach as per the RMP. Item closed.	
b) The ER spreadsheet (ref.71d) now takes into account the most conservative (highest) value of PLF ("Annex 1" sheet, column R) in accordance with the methodology and the RMP. Item closed.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #08 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 30/11/2011

Date:	26/08/2011		Raised by:	Assessment team	
Type:	CL	Number:	9	Reference:	AU4 Section 3, 6.4
Lead Assessor Comment:				Date: 26/08/2011	
<p>PC</p> <p>According to the methodology the net generation capacity shall be monitored annually. According to the RMP, this parameter is derived from annual records from UNE.</p> <p>The PP reports one value for the monitoring period (160 MW). The PP is requested to provide evidence from UNE for the annual net generation capacity of the power plant (for each year of the monitoring period – 2008, 2009, 2010).</p> <p>CL #09 was raised.</p>					
Project Participant Response:				Date: 12/09/2011	
A letter from UNE showing the net generation capacity has been provided during the site visit.					
Documentation Provided as Evidence by Project Participant:					
-					
Information Verified by Lead Assessor:					
During the site visit an official letter was obtained from UNE (ref.33) dated 29/08/2011 and signed by the UNE National Dispatch Manager. The letter states that the installed capacity of the Energas Varadero power plant is 160 MW and that the same has not varied from 2008 to-date. Therefore it is correct to assign PC the value of 160 MW for July-Dec 2008, 2009 and 2010.					
Reasoning for not Acceptance or Acceptance and Close Out:					
Based on the above, CL #09 was closed out.					
Acceptance and Close out by Lead Assessor:				Date: 14/09/2011	

Date:	14/09/2011	Raised by:	Assessment team		
Type:	CAR	Number:	10	Reference:	AU4 Section 3, 1.1, 2.1
Lead Assessor Comment:			Date: 14/09/2011		
FGT & FST					
<p>a) Several inconsistencies were identified between the FGT & FST values reported in the ER spreadsheet (ref.71a) and the monthly report data (Ref.13):</p> <p>2008 – July to Dec; 2009 – Jan, Feb, April, June-Aug, Oct-Dec; 2010 – Jan to Dec.</p> <p>The PP is requested to review the values of Sales Gas to GT1-3 and HRSG duct burners and apply the values according to the monthly production reports, sheet “Varadero” (Ref.13).</p> <p>b) Also, please provide the monthly report of May 2009 (missing) and ensure that the correct values are applied in the ER spreadsheet, “May 2009” sheet.</p>					
CAR #10 was raised.					
Project Participant Response:			Date: 15/10/2011		
<p>a) FTG and FST values have been revised and now they are as per monthly reports.</p> <p>b) Monthly report of May 2009 is provided in attachment.</p>					
Documentation Provided as Evidence by Project Participant:					
<p>Ref.09b - Monitoring Report v03 14.09.2011_REV</p> <p>Annex MR. 03 Jul 2008-Dec 2010.ver 02</p>					
Information Verified by Lead Assessor:					
<p>a) The FGT & FST values reported in the revised ER spreadsheet (ref.71b) were verified. Several inconsistencies still remain; please check carefully the following discrepancies:</p> <ul style="list-style-type: none"> - With the exception of Mar-09, Sep-09 and Nov-09, ALL months (2008-2010) are inconsistent in the values reported for “Sales Gas to HRSG Duct Burners.” The values do not match those in the Monthly Reports (ref.13) sheet “Varadero”, row 104 “Sales Gas to HRSG Duct Burners.” - Also, for Nov-08 an additional day is being incorrectly counted. <p>Item remains open.</p> <p>b) The PP provided the monthly report of May 2009 (ref.13, “2009-05”). The same inconsistency in the values of FST (HRSG) as stated above was identified for this month.</p> <p>Item remains open.</p> <p>➤ Please keep in mind that any changes in the ER spreadsheet shall be reflected in the MR consistently.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
Based on the above, CAR #10 remains open.					
Project Participant Response:			Date: 17/10/2011		
<p>a) All months have been revised and now the reported values for Sales gas to HRSG Duct Burners (FST) are consistent with Production reports (row 104, sheet Varadero).</p> <p>Additional day for November 2008 has been removed</p> <p>b) The inconsistency for May 2009 has been corrected.</p>					
Documentation Provided as Evidence by Project Participant:					
ER spreadsheet ver.03					

Information Verified by Lead Assessor:	
a) The value of FST has been revised in the ER spreadsheet (ref.71c) according to the Production reports (ref.13). Also, the inconsistency in additional day for November 2008 was corrected. However the "Sales Gas to HRSG Duct Burners" value for March 2009 remains different from the figure in the monthly report. Please review. Item remains open.	
b) The value of May 2009 has been corrected in the ER spreadsheet (ref.71c) according to the monthly report of May 2009 (ref.13). Item closed.	
c) The formula of FGT _{NG} in cell D11 of Annex 1 sheet is taking only the values of GT1 and GT2; the formula should include the values of GT3 as well. Please bear in mind that the resulting changes (values of FGT, PE and ERs) shall be applied consistently in the MR. Item opened.	
Reasoning for not Acceptance or Acceptance and Close Out:	
CAR #10 item a) and c) remain open.	
Project Participant Response:	Date: 27/10/2011
a) <i>Value for March 2009 has been corrected</i>	
c) <i>Formula for cell D 11 has been corrected</i>	
Documentation Provided as Evidence by Project Participant:	
<i>ER spreadsheet ver.04.</i>	
Information Verified by Lead Assessor:	
a) The value of Sales gas to HRSG for March 2009 has been corrected in the ER spreadsheet (ref.71d). Item closed.	
c) The formula of FGT has been corrected in the ER spreadsheet to consider the value of GT3 as well. The values of FGT, PE and ERs have been updated accordingly. Item closed.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #10 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 27/10/2011

Date:	14/09/2011	Raised by:	Assessment team			
Type:	CAR	Number:	11	Reference:	AU4 Section 3, 3.1, 4.1	
Lead Assessor Comment:			Date: 14/09/2011			
The calibrations of the gas chromatograph were verified as follows:						
Manufacturer & Model	Serial number	Calibration frequency	Calibration date	Calibration date	Calibration date	Calibration date
Hewlett Packard 5890	3303A50915	1 year (internal) Not specified by manufacturer (Ref.26)	23/01/2008 (Ref.55 p.3)	26/09/2008 (ref.55 p.5)	21/11/2008 (ref.55 p.7)	12/01/2010 (ref.55 p.9)
<p>The calibration results were verified (ref.55) and the results are within the maximum error % of the gas chromatograph specified by the respective manufacturer (1%) (ref.27). According to the RMP (ref.06), the chromatograph shall be calibrated annually. A calibration delay was identified from the period 21/11/2009 – 12/01/2010, corresponding to 52 days. According to the <i>Guidelines for Assessing Compliance with the Calibration Frequency Requirements</i> (EB 52 Annex 60 available at: http://cdm.unfccc.int/EB/052/eb52_repan60.pdf), Para 4 (a), if the calibration has been delayed and the results of the delayed calibration do not show any errors in the measuring equipment, then the maximum permissible error (as specified by the respective manufacturer) of the instrument shall be applied to the measured values. The error shall be applied in a conservative manner such that the adjusted measured values shall result in lower baseline emissions and higher project emissions / leakage. The PP is requested to apply the error to all the measured values taken during the period between the scheduled date of calibration (21/11/2009) and the actual date of calibration (12/01/2010). According to the VGP Gas Analysis records (ref.60), the values of gas composition measured during this period correspond to 03-dic-09, 18-dic-09 and 29-dic-09.</p> <p>CAR #11 was raised.</p>						
Project Participant Response:			Date: 12/09/2011			
Documentation Provided as Evidence by Project Participant:						
<i>The maximum permissible errors have been applied to the gas measurements values for the month of December 2009. There is no significant change in values reported.</i>						
Information Verified by Lead Assessor:						
According to the PP the maximum permissible error has been applied to the gas measurement values from December 2009. However this adjustment is not reflected in the revised ER spreadsheet (ref.71b) and thus could not be verified.						
Reasoning for not Acceptance or Acceptance and Close Out:						
<p>The PP is required to provide a revised file of the VGP Gas Analysis (ref.60) showing transparently the conservative adjustment of measured values in 03-dic-09, 18-dic-09 and 29-dic-09 according to the maximum error % specified by the manufacturer.</p> <p>Please apply the resulting changes to the ER spreadsheet for the respective month and review the values in the MR accordingly.</p> <p>CAR #11 remains open.</p>						
Project Participant Response:			Date: 12/10/2011			
<i>The maximum error of 1%, could not be applied to values measured, since the calculation program does not recognize the sum of gas components being greater than 100%. Therefore the maximum error has been applied to the final values of NCV and EFCO2 for the month of December 2009.</i>						
Documentation Provided as Evidence by Project Participant:						
Annex MR. ER spreadsheet ver.03 MR Ver.04.doc						

Information Verified by Lead Assessor:	
As stated by the PP the maximum error of the gas chromatograph cannot be applied to the measured values to overcome the calibration delay since the measured values are given in % of gas composition (ref.60); therefore the PP has applied the maximum error to the final values of NCV and EFco2 in sheet "Annex 1" cells H32 and I32 (ref.71c). The adjustment is conservative and generates higher project emissions and therefore a lower ERs value. The MR has been updated accordingly (ref.09d).	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #11 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 25/10/2011

Date:	14/09/2011		Raised by:	Assessment team	
Type:	CAR	Number:	12		Reference: AU4 Section 3, 6.1
Lead Assessor Comment:				Date: 14/09/2011	

PGy

Several inconsistencies were identified between the values of measured electricity delivered to the grid (Bay 1-4), presented in the ER spreadsheet and the internal records (weekly and monthly reports, ref.13, ref.50), as shown in the tables below. The PP is requested to review the data according to the monthly reports.

	August 2008		September 2008	
	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)
Bay 1	19,840	19,840	17,732	18,380
Bay 2	19,136	20,827	17,418	18,123
Bay 3	20,827	20,827	12,676	13,390
Bay 4	50,229	50,229	38,403	40,109

	April 2009		June 2009		September 2009		October 2009	
	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)
Bay 1	-2,840	204	16,720	12,422	19,679	1,613	22,274	22,274
Bay 2	20,254	18,732	5,217	15,793	19,309	17,976	20,885	20,885
Bay 3	21,163	16,962	20,726	20,781	8,543	19,623	-241	0
Bay 4	31,376	36,474	31,546	31,944	38,176	29,181	5,181	5,181

	February 2010		August 2010		September 2010	
	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)	Internal records (ref.13, ref.50)	ER spreadsheet (ref.71a)
Bay 1	17,648	18,315	20,075	18,135	666	1,613
Bay 2	17,850	17,724	18,635	16,712	17,976	17,976
Bay 3	18,304	19,051	21,433	19,361	19,623	19,623
Bay 4	31,674	32,765	38,941	35,361	29,181	29,181

CAR #12 was raised.

Project Participant Response:	Date: 15/09/2011
<i>All inconsistencies have been eliminated and nor ER spreadsheet is showing the values as per internal records. Please note that negative readings have been kept, for the shutdowns periods of GT's.</i>	
Documentation Provided as Evidence by Project Participant:	
<i>Ref.09b - Monitoring Report v03 14.09.2011_REV Annex MR. 03 Jul 2008-Dec 2010.ver 02</i>	
Information Verified by Lead Assessor:	
The revised ER spreadsheet (ref.71b) has been corrected for the monthly Bay1-4 values; the data is now consistent with the monthly reports. As discussed in CAR #13, the PP has correctly adjusted some values of electricity generation to discount the estimations done during meter replacements.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Please check the formula of PGy in November 2008 and December 2008 (cells M10:M11 in "Annex 1" spreadsheet; they are not taking the values for Bay 4. CAR #12 remains open.	
Project Participant Response:	Date: 12/10/2011
<i>November 2008 and December 2008 have been corrected in regards of PGy calculation (sum Bay1-Bay4).</i>	
Documentation Provided as Evidence by Project Participant:	
<i>Annex MR. ER spreadsheet ver.03</i>	
Information Verified by Lead Assessor:	
The formula of PGy for November and December 2008 has been corrected in the ER spreadsheet "Annex 1" cells M10:M11 which now include also the values of electricity generation in Bay 4.	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above CAR #12 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 25/10/2011

Date:	14/09/2011	Raised by:	Assessment team																																
Type:	CAR	Number:	13	Reference:	AU4 Section 3, 6.1																														
Lead Assessor Comment:			Date: 14/09/2011																																
<p>PGy</p> <p>a) During the site visit the replacement records of the power meters (ref.61-64) were verified as follows:</p> <table border="1"> <thead> <tr> <th></th><th>Previous meter (verified for MP2)</th><th>Replacement date</th><th>Meter installed</th><th>Replacement date</th><th>Meter installed</th></tr> </thead> <tbody> <tr> <td>Bay 1</td><td>PB-0308A151-11</td><td>16/09/2008</td><td>PB-0804A559-11</td><td>n/a</td><td>n/a</td></tr> <tr> <td>Bay 2</td><td>PB-0308A149-11</td><td>03/08/2009</td><td>PB-0902A148-11</td><td>n/a</td><td>n/a</td></tr> <tr> <td>Bay 3</td><td>PB-0604A348-11</td><td>10/2008</td><td>PB-0605A116-11</td><td>06/08/2009</td><td>PB-0604A347-11</td></tr> <tr> <td>Bay 4</td><td>PB-0308A150-11</td><td>20/05/2010</td><td>PB-0911A606-11</td><td>n/a</td><td>n/a</td></tr> </tbody> </table> <p>According to the records of Bay 1-4 meter replacements (ref.61-64), the PP has estimated the amount of MWh generated during the replacement jobs. According to the monitoring methodology (ref.02), the net quantity of electricity generated by the project power plant shall be measured ("M").</p> <p>Bay 1 – According to the records of Bay 1 (ref.61), during the replacement of meter PB-0308A151-11 on 16/09/2008 there was an estimated net MWh "during 1.5h replacement jobs" but it does not specify the estimated amount of energy during the replacement time for this date. For conservative purposes the PP is requested to consider discounting the electricity generated by Bay 1 meter for the entire day 16/09/2008.</p> <p>Bay 2 – According to the records of Bay 2 (ref.62), the estimation of net MWh during the replacement of meter PB-0308A149-11 was done as follows: Estimated energy between 11:40 and 16:40 (calculated as P ave = 25.6 MW X 5 hours): 128 MWh Following ACM0007, the PP is requested to discount the 128 MWh corresponding to the estimated net electricity generation during the meter replacement period.</p> <p>Bay 3 – According to the records of Bay 3 (ref.63), the estimation of net MWh during the replacement of meter PB-0605A116-11 was done as follows: Estimated energy between 13:25 and 17:05 (05/Aug/2009): 100.8 MWh (Calculated as P ave = 27.5 MW X 3.66 hours = 100.8 MWh) This time the power meter was stopped the previous day (05/Aug/2009).</p> <p><u>Total day Energy for 06/Aug/2009:</u> Estimated energy between 09:00 and 09:30 am (Calculated as P ave = 28 MW X 0.5 hours = 14 MWh)</p> <p>Following ACM0007, the PP is requested to discount the estimated amounts of 100.8 MWh + 14 MWh during 05/08/2009 and 06/08/2009.</p> <p>Bay 4 – According to the records of Bay 4 (ref.64), the estimation of net MWh during the replacement of meter PB-0308A150-11 was done as follows: Estimated energy between 16:06 and 16:19 = 15.39 MWh The PP is requested to discount the estimated amount of 15.39 MWh from 20/05/2010 PGy values.</p> <p>b) Additionally, the PP is requested to provide the replacement log for meter PB-0604A348-11 (Bay 3), which according to the previous verification (ref.08) was replaced in October 2008. The PP shall apply the same procedure to the estimated value during the replacement of the meter.</p> <p>CAR #13 was raised.</p>							Previous meter (verified for MP2)	Replacement date	Meter installed	Replacement date	Meter installed	Bay 1	PB-0308A151-11	16/09/2008	PB-0804A559-11	n/a	n/a	Bay 2	PB-0308A149-11	03/08/2009	PB-0902A148-11	n/a	n/a	Bay 3	PB-0604A348-11	10/2008	PB-0605A116-11	06/08/2009	PB-0604A347-11	Bay 4	PB-0308A150-11	20/05/2010	PB-0911A606-11	n/a	n/a
	Previous meter (verified for MP2)	Replacement date	Meter installed	Replacement date	Meter installed																														
Bay 1	PB-0308A151-11	16/09/2008	PB-0804A559-11	n/a	n/a																														
Bay 2	PB-0308A149-11	03/08/2009	PB-0902A148-11	n/a	n/a																														
Bay 3	PB-0604A348-11	10/2008	PB-0605A116-11	06/08/2009	PB-0604A347-11																														
Bay 4	PB-0308A150-11	20/05/2010	PB-0911A606-11	n/a	n/a																														
Project Participant Response:			Date: 14/09/2011																																
<p>a) The values of energy produced have been discounted in ER spreadsheet for specified dates, as per DOE requests.</p> <p>b) The log replacement for PB-0604A348-11 could not be found.</p>																																			
Documentation Provided as Evidence by Project Participant:																																			

Monitoring Report v03 14.09.2011_REV Annex MR. 03 Jul 2008-Dec 2010.ver 02	
Information Verified by Lead Assessor:	
<p>a) A revised ER spreadsheet (ref.71b) has been provided by the PP, applying the following changes:</p> <p>Bay 1 (PB-0308A151-11) – The value for Bay 1 on day 16-sep-08 was adjusted by the PP to 0 MWh as a conservative measure due to the replacement of the Bay 1 meter on that date (sheet “September 2008”, U25).</p> <p>Bay 2 (PB-0308A149-11) – The estimated generation of electricity during replacement of Bay 2 meter on 03-aug-09 has been discounted from the daily value reported for that date (sheet “August 2009”, H26).</p> <p>Bay 3 (PB-0605A116-11) – The estimations done for the Bay 3 meter replacement have been correctly discounted in the revised ER spreadsheet (sheet “August 2009”, J27:K27).</p> <p>Bay 4 (PB-0308A150-11) – The estimation done for the Bay 4 meter replacement is correctly discounted in the ER spreadsheet (sheet “May 2010”, Y28).</p> <p>b) Bay 3 (PB-0604A348-11) – With regard to the replacement log of meter PB-0604A348-11, which according to the power meters replacement history (ref.74), was installed from December 2007 until October 2008, the PP clarified that the replacement record could not be found and is thus not available for verification.</p>	
Reasoning for not Acceptance or Acceptance and Close Out:	
<p>b) In the absence of evidence to support the exact date of replacement of meter PB-0604A348-11 as well as the amount of estimated electricity generation during the meter replacement, the PP is required to discount the electricity reported for the entire day with the highest reported MWh of Bay 3 in October 2008 in order to ensure the conservativeness of data (29-oct-08 = 744 MWh).</p> <p>CAR #13 remains open.</p>	
Project Participant Response:	Date: 12/10/2011
<i>The value of 744 MW has been discounted for 28/10/2008 for Bay 3.</i>	
Documentation Provided as Evidence by Project Participant:	
<i>ER spreadsheet ver.03</i>	
Information Verified by Lead Assessor:	
<p>The PP has discounted the value of 744 MWh in the revised ER spreadsheet (ref.71c) “October 2008” cell AG27, corresponding to the highest daily electricity generation reported for the month (29-oct-2008). The adjustment is correct and conservative as it generates a lower value of PGy for Bay 3 in order to account for any data estimation done during the replacement of meter PB-0604A348-11.</p>	
Reasoning for not Acceptance or Acceptance and Close Out:	
Based on the above, CAR #13 was closed out.	
Acceptance and Close out by Lead Assessor:	Date: 25/10/2011

Date:	14/09/2011	Raised by:	Assessment team																																																														
Type:	CAR	Number:	14	Reference:	AU4 Section 3, 6.1																																																												
Lead Assessor Comment:			Date: 14/09/2011																																																														
<p>PGy</p> <p>According to the methodology ACM0007 (ref.02), "the consistency of metered net electricity generation should be cross-checked with receipts from sales (if available)." The electricity invoices from UNE (ref.16) were verified for all the months of the MP. The following inconsistencies were identified between the values reported in the ER spreadsheet (ref.71a) and the invoices (ref.16):</p> <table border="1"> <thead> <tr> <th colspan="2">June 2009</th><th colspan="2">August 2009</th><th colspan="2">September 2009</th></tr> <tr> <th>Invoices (ref.16)</th><th>ER spreadsheet (ref.71a)</th><th>Invoices (ref.16)</th><th>ER spreadsheet (ref.71a)</th><th>Invoices (ref.16)</th><th>ER spreadsheet (ref.71a)</th></tr> </thead> <tbody> <tr> <td>16,730.000</td><td>12,409</td><td>18,966.000</td><td>18,966</td><td>19,685.000</td><td>19,685</td></tr> <tr> <td>5,076.000</td><td>16,029</td><td>19,477.856</td><td>11,857</td><td>18,945.000</td><td>14,887</td></tr> <tr> <td>20,744.000</td><td>20,744</td><td>19,967.936</td><td>12,879</td><td>8,893.000</td><td>8,893</td></tr> <tr> <td>31,330.000</td><td>31,950</td><td>47,623.000</td><td>47,623</td><td>38,460.000</td><td>38,460</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">May-10</th><th colspan="2">July 2010</th></tr> <tr> <th>Invoices (ref.16)</th><th>ER spreadsheet (ref.71a)</th><th>Invoices (ref.16)</th><th>ER spreadsheet (ref.71a)</th></tr> </thead> <tbody> <tr> <td>20,093.000</td><td>20,093.000</td><td>20,073.000</td><td>19,924.000</td></tr> <tr> <td>19,794.000</td><td>19,794.000</td><td>15,353.000</td><td>19,146.000</td></tr> <tr> <td>17,096.000</td><td>17,096.000</td><td>21,513.000</td><td>21,506.000</td></tr> <tr> <td>37,041.000</td><td>24,710.000</td><td>37,421.000</td><td>46,700.000</td></tr> </tbody> </table> <p>The PP is requested to review the reported data for consistency with the sales receipts (Ref.16). CAR #14 was raised.</p> <p>Project Participant Response: Date: 14/09/2011</p> <p><i>The reported data for electricity sold were revised and they are in accordance with power invoices</i></p> <p>Documentation Provided as Evidence by Project Participant:</p> <p><i>Ref.09b - Monitoring Report v03 14.09.2011_REV</i> <i>Annex MR. 03 Jul 2008-Dec 2010.ver 02</i></p> <p>Information Verified by Lead Assessor:</p> <p>The revised ER spreadsheet (ref.71b) provided by the PP now reports the correct invoiced electricity values in consistency with the sales receipts (ref.16).</p> <p>Reasoning for not Acceptance or Acceptance and Close Out:</p> <p>Based on the above, CAR #14 was closed out.</p> <p>Acceptance and Close out by Lead Assessor: Date: 04/10/2011</p>						June 2009		August 2009		September 2009		Invoices (ref.16)	ER spreadsheet (ref.71a)	Invoices (ref.16)	ER spreadsheet (ref.71a)	Invoices (ref.16)	ER spreadsheet (ref.71a)	16,730.000	12,409	18,966.000	18,966	19,685.000	19,685	5,076.000	16,029	19,477.856	11,857	18,945.000	14,887	20,744.000	20,744	19,967.936	12,879	8,893.000	8,893	31,330.000	31,950	47,623.000	47,623	38,460.000	38,460	May-10		July 2010		Invoices (ref.16)	ER spreadsheet (ref.71a)	Invoices (ref.16)	ER spreadsheet (ref.71a)	20,093.000	20,093.000	20,073.000	19,924.000	19,794.000	19,794.000	15,353.000	19,146.000	17,096.000	17,096.000	21,513.000	21,506.000	37,041.000	24,710.000	37,421.000	46,700.000
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Date:	04/10/2011		Raised by:	Assessment team	
Type:	CAR	Number:	15	Reference:	AU4 Section 2, 4.3
Lead Assessor Comment:				Date: 04/10/2011	
<p>The Monitoring Report (ref.09c) is not consistent with the latest F-CDM-MR template available on the UN at: http://cdm.unfccc.int/Reference/PDDs_Forms/index.html#iss</p> <p>a) Please note that the footnote in asterisk * in the 1st page needs to be included as per UN template.</p> <p>b) Also, the version number in the 1st page of the MR shall remain as per UN template "Version 01 – in effect as of: 28/09/2010" (this is the version of the UN template, not the version of the specific MR document which is already detailed in page 2).</p> <p>c) Also, please use Times New Roman in Annex 1 of MR according to the UN template.</p>					
CAR #15 was raised.					
Project Participant Response:				Date: 12/10/2011	
<p>a) <i>The asterisk and footnote has been inserted as per UN template.</i></p> <p>b) <i>Version 01 is showing in the first page</i></p> <p>c) <i>Times New Roman in Annex 1 is used now.</i></p>					
Documentation Provided as Evidence by Project Participant:					
MR Ver.04.doc					
Information Verified by Lead Assessor:					
<p>a) The footnote has been included in the revised MR (ref.09d) as per UN template.</p> <p>b) The version number in page 1 of the MR has been revised to reflect the UN template.</p> <p>c) The MR now applies Times New Roman font type throughout the document.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
Based on the above CAR #15 was closed out.					
Acceptance and Close out by Lead Assessor:				Date: 25/10/2011	

Date:	15/11/2011		Raised by:	Assessment team	
Type:	CAR	Number:	16	Reference:	AU4 – Section 4.1
Lead Assessor Comment:				Date: 15/11/2011	
<p>The information of the PPs in Section A.2 of the MR version 5 is not fully consistent with the information of the project page on UNFCCC website: http://cdm.unfccc.int/Projects/DB/DNV-CUK1170423186.13/view. There is a PP from the UK, Sherritt International Corporation. Please review the PPs information in the MR.</p> <p>CAR #16 was raised.</p>					
Project Participant Response:				Date: 24/11/2011	
<p><i>The third PP has been included as per information provided in UNFCCC website</i></p>					
Documentation Provided as Evidence by Project Participant:					
<p><i>MR ver. 06 doc.</i></p>					
Information Verified by Lead Assessor:					
<p>The revised MR (ref.09f) incorporates the PP “United Kingdom of Great Britain and Northern Ireland” and is now consistent with the information of project participants available on the UNFCCC project page.</p>					
Reasoning for not Acceptance or Acceptance and Close Out:					
<p>Based on the above, CAR #16 was closed out.</p>					
Acceptance and Close out by Lead Assessor:				Date: 30/11/2011	

Date:	03/10/2012		Raised by:	Assessment team		
Type:	FAR	Number:	17		Reference:	CAR 3
Lead Assessor Comment:				Date: 26/08/2011		
Given that after calibration the error of Smar PDT still was over the maximum allowable error (Smar PDT of GT1, error 0.85%, Smar PDT of GT2, error 0.26% and Smar PDT of GT3 error 0.43%), the PP is requested to:						
<div><div>1.</div><div>Calibrated again the equipments to have them operating within the maximum error or replaces them if necessary.</div></div> <div><div>2.</div><div>Consider the remaining error over FGT (Smar PDT of GT1, error 0.85%, Smar PDT of GT2, error 0.26% and Smar PDT of GT3 error 0.43%) following a conservative approach in the next Monitoring period until the date that the equipments are calibrated again or replaced. This criterion obeys to the fact that the equipments will be operating with a lower accuracy than the stipulated in the RMP.</div></div>						
FAR was raised.						

10. Statement of Competence

Statement of Competence

Name: Alicia
Fernandez

Status

- Lead Assessor	x	- Expert	
- Assessor	x	- Financial Expert	
- Local Assessor	Cuba	- Technical Reviewer	x

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)

Technical Area(s):

2. Energy Distribution

Technical Area(s):

3. Energy Demand

Technical Area(s):

4. Manufacturing

Technical Area(s):

5. Chemical Industry

Technical Area(s):

6. Construction

Technical Area(s):

7. Transport

Technical Area(s):

8. Mining/Mineral Production

Technical Area(s):

9. Metal Production

Technical Area(s):

10. Fugitive Emissions from Fuels (solid, oil and gas)

Technical Area(s):

11. Fugitive Emissions from Production and

Consumption of Halocarbons and Sulphur Hexafluoride

Technical Area(s):

12. Solvent Use

Technical Area(s):

13. Waste Handling and Disposal

Technical Area(s):

14. Afforestation and Reforestation

Technical Area(s):

15. Agriculture

Technical Area(s):

Approved Member of Staff by: Siddharth
Yadav Date: 25/01/2012

Statement of Competence

Name: Francisco Solis

Status

- Lead Assessor	<input type="checkbox"/>	- Expert	<input checked="" type="checkbox"/>
- Assessor	<input type="checkbox"/>	- Financial Expert	<input type="checkbox"/>
- Local Assessor	<input type="checkbox"/>	- Technical Reviewer	<input type="checkbox"/>

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	<input checked="" type="checkbox"/>
Technical Area(s): <i>TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar</i>	
2. Energy Distribution	<input type="checkbox"/>
Technical Area(s):	
3. Energy Demand	<input type="checkbox"/>
Technical Area(s):	
4. Manufacturing	<input type="checkbox"/>
Technical Area(s):	
5. Chemical Industry	<input type="checkbox"/>
Technical Area(s):	
6. Construction	<input type="checkbox"/>
Technical Area(s):	
7. Transport	<input type="checkbox"/>
Technical Area(s):	
8. Mining/Mineral Production	<input type="checkbox"/>
Technical Area(s):	
9. Metal Production	<input type="checkbox"/>
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	<input type="checkbox"/>
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	<input type="checkbox"/>
Technical Area(s):	
12. Solvent Use	<input type="checkbox"/>
Technical Area(s):	
13. Waste Handling and Disposal	<input type="checkbox"/>
Technical Area(s):	
14. Afforestation and Reforestation	<input type="checkbox"/>
Technical Area(s):	
15. Agriculture	<input type="checkbox"/>
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 25/01/2012

Statement of Competence

Name: Simon
Zhao

Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	x

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	x
Technical Area(s): TA 1.2 Energy generation from renewable energy sources	
2. Energy Distribution	
Technical Area(s):	
3. Energy Demand	
Technical Area(s):	
4. Manufacturing	
Technical Area(s):	
5. Chemical Industry	
Technical Area(s):	
6. Construction	
Technical Area(s):	
7. Transport	
Technical Area(s):	
8. Mining/Mineral Production	
Technical Area(s):	
9. Metal Production	
Technical Area(s):	
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Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
12. Solvent Use	
Technical Area(s):	
13. Waste Handling and Disposal	
Technical Area(s):	
14. Afforestation and Reforestation	
Technical Area(s):	
15. Agriculture	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 04/07/2012

Statement of Competence

Name: **Jumson Fu**

Status

- Lead Assessor	<input type="checkbox"/>	- Expert	<input checked="" type="checkbox"/>
- Assessor	<input type="checkbox"/>	- Financial Expert	<input type="checkbox"/>
- Local Assessor	<input type="checkbox"/>	- Technical Reviewer	<input type="checkbox"/>

Scopes of Expertise

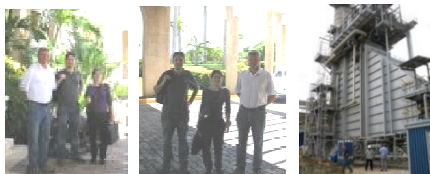
1. Energy Industries (renewable / non-renewable)	<input checked="" type="checkbox"/>
Technical Area(s): TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
2. Energy Distribution	<input type="checkbox"/>
Technical Area(s):	
3. Energy Demand	<input type="checkbox"/>
Technical Area(s):	
4. Manufacturing	<input type="checkbox"/>
Technical Area(s):	
5. Chemical Industry	<input type="checkbox"/>
Technical Area(s):	
6. Construction	<input type="checkbox"/>
Technical Area(s):	
7. Transport	<input type="checkbox"/>
Technical Area(s):	
8. Mining/Mineral Production	<input type="checkbox"/>
Technical Area(s):	
9. Metal Production	<input type="checkbox"/>
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	<input type="checkbox"/>
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	<input type="checkbox"/>
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12. Solvent Use	<input type="checkbox"/>
Technical Area(s):	
13. Waste Handling and Disposal	<input type="checkbox"/>
Technical Area(s):	
14. Afforestation and Reforestation	<input type="checkbox"/>
Technical Area(s):	
15. Agriculture	<input type="checkbox"/>
Technical Area(s):	

Approved Member of Staff by: **Siddharth Yadav** Date: **15/02/2012**

11. Photographic Evidence

Unique reference number: Ref.49, pic.1a-c

Name: Assessment team and client onsite



Parameter: N/A

Date: 29/08/2011 - 30/08/2011

Unique reference number: Ref.49, pic.2a-b

Name of equipment: GT1 SMAR PDT



Parameter: FGT_{NG,y}

Date: 29/08/2011

Unique reference number: Ref.49, pic.3

Name of equipment: GT1 Rosemount PT

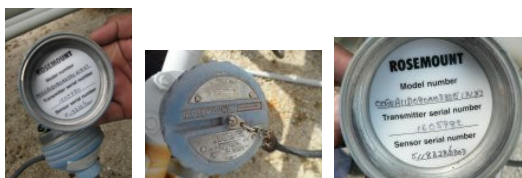


Parameter: FGT_{NG,y}

Date: 29/08/2011

Unique reference number: Ref.49, pic.4a-c

Name of equipment: GT1 Rosemount TT



Parameter: FGT_{NG,y}

Date: 29/08/2011

Unique reference number: Ref.49, pic.5

Name of equipment: GT1 Orifice Plate specifications



Parameter: FGT_{NG,y}

Date: 29/08/2011

Unique reference number: Ref.49, pic.6a-c

Name of equipment: GT2 SMAR PDT



Parameter: FGT_{NG,y}

Date: 29/08/2011

Unique reference number: Ref.49, pic.7a-b

Name of equipment: GT2 Rosemount PT

Parameter: $FGT_{NG,y}$

Date: 29/08/2011



Unique reference number: Ref.49, pic.8a-d

Name of equipment: GT2 Rosemount TT

Parameter: $FGT_{NG,y}$

Date: 29/08/2011



Unique reference number: Ref.49, pic.9a-b

Name of equipment: GT2 Orifice plate specifications

Parameter: $FGT_{NG,y}$

Date: 29/08/2011



Unique reference number: Ref.49, pic.10a-c

Name of equipment: GT3 SMAR PDT

Parameter: $FGT_{NG,y}$

Date: 29/08/2011



Unique reference number: Ref.49, pic.11a-b

Name of equipment: GT3 Rosemount PT

Parameter: $FGT_{NG,y}$

Date: 29/08/2011



Unique reference number: Ref.49, pic.12a-c

Name of equipment: GT3 Rosemount TT

Parameter: $FGT_{NG,y}$

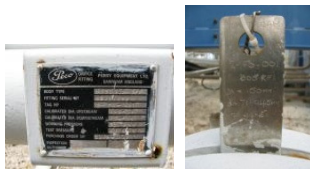
Date: 29/08/2011



Unique reference number: Ref.49, pic.13a-c

Parameter: $FGT_{NG,y}$

Name of equipment: GT3 Orifice plate specifications Date: 29/08/2011



Unique reference number: Ref.49, pic.14a-c

Parameter: $FST_{NG,y}$

Name of equipment: HRSG1 Foxboro 98382301 Date: 29/08/2011



Unique reference number: Ref.49, pic.15a-d

Parameter: $FST_{NG,y}$

Name of equipment: HRSG2 Foxboro 98382299 Date: 29/08/2011



Unique reference number: Ref.49, pic.16a-d

Parameter: $FST_{NG,y}$

Name of equipment: HRSG3 Foxboro 98382300 Date: 29/08/2011



Unique reference number: Ref.49, pic.17a-b

Parameter: FGT_{NG} & FST_{NG}

Name of equipment: Crystal IS33 calibrator Date: 29/08/2011



Unique reference number: Ref.49, pic.18a-d

Parameter: FGT_{NG} & FST_{NG}

Name of equipment: Fluke 743B calibrator Date: 29/08/2011



Unique reference number: Ref.49, pic.19a-c

Name: Continuous monitoring screen at control room

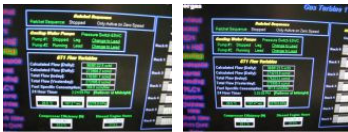


Parameter: FGT_{NG} & FST_{NG}

Date: 29/08/2011

Unique reference number: Ref.49, pic.20a-b

Name: Historical gas flow on screen



Parameter: FGT_{NG} & FST_{NG}

Date: 29/08/2011

Unique reference number: Ref.49, pic.21a-c

Name: Raw data used for daily reports



Parameter: FGT_{NG} & FST_{NG}

Date: 29/08/2011

Unique reference number: Ref.49, pic.22a-b

Name of equipment: HP 5890 chromatograph



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.23a-c

Name of equipment: Gow-Mac chromatograph



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.24a-b

Name: Internal system NCV records



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.25

Name of equipment: Sales gas sample bottle



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.26

Name: Simulation of gas measurement

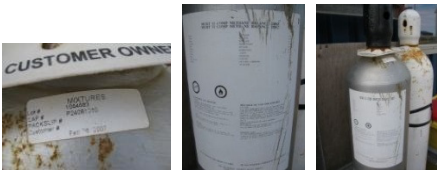


Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.27a-c

Name of equipment: Cylinder #1064683



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.28a-e

Name of equipment: Cylinder #1155745



Parameter: NCV_{NG} & $EF_{CO2,NG}$

Date: 29/08/2011

Unique reference number: Ref.49, pic.29a-b

Name of equipment: Bay 1 ION 7330



Parameter: PG_y & OG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.30a-b

Name of equipment: Bay 2 ION 7330



Parameter: PG_y & OG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.31a-b

Name of equipment: Bay 3 ION 7330



Parameter: PG_y & OG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.32a-b

Name of equipment: Bay 4 ION 7330



Parameter: PG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.33a-b

Name of equipment: ION7330 Bay 1-4 panels



Parameter: PG_y & OG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.34a-b

Name: Bay 1-4 continuous monitoring screen



Parameter: PG_y & OG_y

Date: 29/08/2011

Unique reference number: Ref.49, pic.35a-b

Name: Daily net energy generation data



Parameter: PG_y & OG_y

Date: 29/08/2011

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