THE CAPTURE AND UTILISATION OF METHANE AT THE GFI MINING SOUTH AFRICA OWNED BEATRIX MINE IN SOUTH AFRICA

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Project Title	The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa
Version	01
Monitoring Period	01/03/2011 to 30/06/2011.
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Summary:

Carbon Check (Pty) Ltd, has performed the verification of the emissions reductions reported for the CDM project activity "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" (UNFCCC ref. no. 4728) for the pre-registration period from 01-03-2011 to 30-06-2011. Verification has been done using the latest available VCS standard version 03.

The VCS project involves capture, destruction and use of methane released from Beatrix gold mine, located in Free State province of Republic of South Africa.

Beatrix mine is a gold mine that is owned by GFI Mining South Africa. Beatrix is located in the Free State

Province of South Africa. The proposed project activity involves the destruction and utilisation of methane at the mine. The project activity is divided into two distinct activities:

- The first being the destruction and utilisation of mine methane; which originates in the main Beatrix mine from intersecting geological faults whilst mining. The mining activity releases underground methane.
- The second being the destruction of non-mine methane; which is methane emitting from boreholes drilled for exploration purposes by the Beatrix mine. Methane is released from numerous exploration boreholes.

The verification assessed the project's compliance with VCS Version 3 criteria. The scope of the verification includes the review of the project design document, monitoring report and other relevant documents and consists of background investigations, site visit, interviews including the review of the applicable approved methodology and tools.

The verification criteria followed the guidance documents provided by VCS and included the following: VCS Program Guide (v3.3, 1 May 2012) /04/, VCS Standard (v3.2, 1 February 2012) /05/, Program Definitions (v3.3, 1 May 2012) /06/, Registration & Issuance Process (v3.3, 1 May 2012) /07/.

Based on the assessment of monitoring report version 01 dated 06/06/2012, responses were requested from the project proponents on the Clarification Requests (CLs), Corrective Action Requests (CARs) and Forward Action Requests (FARs).

During the course of verification 03 Corrective Action Requests (CARs), 03 Clarification Requests (CLs) and 01 Forward Action Requests (FARs) were raised. CARs & CLs are successfully closed while FAR will be reviewed in successive verification.

The total number of VCUs claimed by the project activity during the monitoring period 01-03-2011 to 30-06-2011 is 9643 tonnes of CO_2 equivalent.

Baseline Emissions: 12169 tCO_2e

Project Emissions: 2526 tCO_2e

Leakage: 0 tCO_2e

Net GHG emission reductions: 9643 tCO_2e

Carbon Check confirms a positive verification opinion confirming the project complies with the applicable VCS requirements, thus recommending the project for issuance.

Abbreviations

BE	Baseline Emissions
CAR	Corrective Action Request
CC	Cross Check
CCL	Carbon Check (Pty) Ltd
CDM	Clean Development Mechanism
CER(s)	Certified Emission Reduction(s)
CH_4	Methane
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DR	Document Review
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
I	Interview or any follow up action
IPCC	Intergovernmental Panel on Climate Change
LE	Leakage Emission
LoA	Letter of Approval
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PLF	Plant Load Factor
PP(s)	Project Participant(s)
Ref.	Document Reference
SD	Sustainable Development
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Unit
VER(s)	Verified Emission Reductions
VVB	Validation/Verification Body
VVM	Validation and Verification Manual

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1 INTRODUCTION

GFI Mining South Africa (Pty) Ltd has commissioned Carbon Check (Pty) Ltd, herein after referred to as "Carbon Check", to carry out the verification of the project activity "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" in Republic of South Africa, (here after called 'the project').

This report summarizes the findings of the verification of the project activity, with regards to the relevant requirements of the Verified Carbon Standard VCS version 03. Carbon Check reviewed the implementation of monitoring plan for the monitoring period 01/03/2011 to 30/06/2011.

1.1 Objective

Verification is the periodic independent review and ex-post determination by the Validation/Verification Body (VVB) of the monitored reductions in anthropogenic emissions by sources of greenhouse gases (GHGs) that have occurred as a result of a project activity during the verification period.

The objective of the verification is to establish whether sufficient evidence exists to confirm, to reasonable assurance:

- Whether the project activity has been implemented and is being operated as per the project description and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project activity are in place.
- Whether the approved revised monitoring plan is in compliance with the methodology that has been applied;
- Whether the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the monitoring plan and applicable VCS requirements.
- Whether the emission reductions as set out in the Monitoring Report have been measured, calculated and reported in accordance with the requirements set out in the subsequent approved monitoring plan revision.
- Whether the reported data meet the key principles of data quality and are complete, reliable, consistent, accurate, valid, transparent and conservative.

Carbon Check also assessed whether the monitoring report and other supporting documents provided are complete in accordance with the VCS requirements.

1.2 Scope and Criteria

The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the VVB.

Based on the key project information set out in the earlier part of the report, the verification addresses the implementation and operation of the project activity as set out in the registered project document, and the information and reported emissions reductions set out in the monitoring report prepared by the project

participant (PP) for this monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period by the PPs and is based on:

1. Validated project document
2. Monitoring report
3. Emission reduction calculation spread sheet
4. Other supporting documents

The verification considers both quantitative and qualitative information on emission reductions. The monitoring report is assessed; using a rule based approach, against the principles of accuracy, relevance, credibility, reliability, completeness, consistency, and transparency. Conservativeness is applied throughout the process to ensure that emission reductions are not overstated.

The verification criteria followed the guidance documents provided by VCS and included the following:

- VCS Program Guide (v3.3, 1 May 2012)
- VCS Standard (v3.2, 1 February 2012)
- Program Definitions (v3.3, 1 May 2012)
- Registration & Issuance Process (v3.3, 1 May 2012)

Carbon Check conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

1.3 Level of assurance

In line with VCS version 3 requirements, a **reasonable level of assurance** is defined for the verification of the project.

This implies that, based on the process and procedures conducted, Carbon Check confirms that the GHG assertion in the monitoring report

- is materially correct and is a fair representation of the GHG data and information, and
- is prepared in accordance with VCS version 3 requirements, the registered CDM PDD and the approved methodology for information pertaining to GHG quantification, monitoring and reporting.

1.4 Summary Description of the Project

The VCS project involves capture, destruction and use of methane released from Beatrix gold mine, located in Free State province of Republic of South Africa.

Beatrix mine is a gold mine that is owned by GFI Mining South Africa. Beatrix is located in the Free State Province of South Africa. The proposed project activity involves the destruction and utilisation of methane. The project activity is divided into two distinct activities:

- The first being the destruction and utilisation of mine methane; which originates in the main Beatrix mine from intersecting geological faults whilst mining. The mining activity releases underground methane.
- The second being the destruction of non-mine methane; which is methane emitting from boreholes drilled for exploration purposes by the Beatrix mine. Methane is released from numerous exploration boreholes.

Project Title	The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa
Project Owner(s)	GFI Mining South Africa (Pty) Ltd, Promethium Carbon (Pty) Ltd Mercuria Energy Trading SA
Location	The project is located on Leeuwbult 52, which is a farm in the district of Theunissen near Virginia. Virginia is in the Free State Province of South Africa.
Methodology Used	AM0064: Methodology for methane capture and utilization or destruction in underground, hard rock, precious and base metal mines (Version 02)
Sectoral Scope	10
Monitoring period under VCS	01/03/2011 to 30/06/2011
Emission reductions (in tCO_2e)	9643

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

The project is already registered as CDM project No.4728 on 10/06/2011 (http://cdm.unfccc.int/Projects/DB/RWTUV1303323974.38/view). The first crediting period for the CDM project cycle starts on 01/07/2011. The VCUs are being claimed for the monitored period of 01/03/2011 to 30/06/2011 that is before the start date of the first crediting period under CDM; therefore double accounting is not applicable.

- Method and Criteria

Validation was conducted using Carbon Check procedures in line with the requirements specified in the CDM Modalities and Procedures, the latest version of the CDM Validation and Verification Manual and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following phases:

- Document review, involving:

a. a review of data and information;

b. cross checks between information provided in the PDD and information from sources other than those used,

- Follow-up actions, including:

a. Interviews with relevant stakeholder in the host country, personnel with knowledge of the project design and implementation;

b. Cross checks between information provided by interviewed personnel to ensure that no relevant information has been omitted.

- Reference to available information relating to projects or technologies similar to the proposed project activity under validation;
- Review, based on the approved methodology being applied, of the appropriateness of formulae and accuracy of calculations.
- The resolution of outstanding issues and the issuance of the final validation report

▪ Document Review

Project Design Document and other supporting documents were reviewed by Carbon Check and follow up interviews were conducted.

▪ Interviews

On 11/06/2012, Carbon Check conducted an onsite visit at the location of the project activity to check implementation of the project & perform interviews with relevant stakeholders. Representatives of the project participant and the consultants were interviewed.

▪ Site Inspections

The key personnel interviewed and the main topics of the interviews are summarized in the table below:

	Date	Name and Role	Organization	Topic
/a/	11/06/2012	Robbie Louw, CDM consultant	Promethium Carbon (Pty) Ltd	• Project Design • Monitoring and reporting documentation • Quality Assurance – Management and operating system • Qualification and Training • Plant Operations • Roles and responsibility
/b/	11/06/2012	AB van der Merwe, CDM consultant	Promethium Carbon (Pty) Ltd	• Monitoring and reporting documentation • Quality Assurance – Management and operating system

				• Qualification and Training • Plant Operations • Roles and responsibility
/c/	11/06/2012	Prof Jan Du Plessis, Vice President and Group Head of Energy, Carbon and Water Management	GFI Mining South Africa (Pty) Ltd	• Monitoring and measuring system • Observations of established practices • Data and information flow • Data Verification of monitoring parameters • Roles and responsibility
/d/	11/06/2012	DC van Greuning, Environment Engineering Manager	GFI Mining South Africa (Pty) Ltd	• Monitoring and measuring system • Observations of established practices • Data and information flow • Data Verification of monitoring parameters • Roles and responsibility
/e/	11/06/2012	Marthinus van der Bank, Environment Engineering Superintendent	GFI Mining South Africa (Pty) Ltd	• Monitoring and measuring system • Collection of measurements • Observations of established practices • Testing of the accuracy of monitoring equipment • On-site flare operation • Operational parameters • Gas analyser, thermocouple functionality • Data and information flow • Data Verification of monitoring parameters

- Resolution of Any Material Discrepancy

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for Carbon Check's conclusion on the project design. No outstanding issues were found with respect to the validation of project activity.

2.2 Validation Findings

2.2.1 Gap Validation

The project is already registered as a CDM project (Reference No. 4728) on 10/06/2011 (http://cdm.unfccc.int/Projects/DB/RWTUV1303323974.38/view).

Beatrix mine is a gold mine that is owned by GFI Mining South Africa. Beatrix is located in the Free State Province of South Africa. The proposed project activity involves the destruction and utilisation of methane at the mine. The project activity is divided into two distinct activities:

- The first being the destruction and utilisation of mine methane; which originates in the main Beatrix mine from intersecting geological faults whilst mining. The mining activity releases underground methane.

- The second being the destruction of non-mine methane; which is methane emitting from boreholes drilled for exploration purposes by the Beatrix mine. Methane is released from numerous exploration boreholes.

During the site visit it was observed that the project proponent "GFI Mining South Africa (Pty) Ltd" successfully started the phase I of the project activity, i.e. flaring. One mine methane and five non-mine methane flares were installed. One of the non-mine methane flares, 2264 was not operational at the time of site visit./d//e/

It was confirmed during the site visit that the project activity has been implemented as described above in accordance with the design mentioned in the registered PDD /03/.

2.2.2 Methodology Deviations

NA

2.2.3 New Project Activity Instances

NA

2.3 Validation Conclusion

The project complies with all relevant validation criteria for projects, as set out in VCS Version 3 as well as all relevant host country criteria. The review of the project design document and the subsequent follow-up interviews have provided Carbon Check with sufficient evidence to determine the fulfilment of the stated criteria.

The project correctly applies the approved baseline and monitoring methodology AM0064, "Methodology for methane capture and utilization or destruction in underground, hard rock, precious and base metal mines", version 02 of 26/09/2008 /08/.

3 VERIFICATION PROCESS

3.1 Method and Criteria

Verification was carried out using Carbon Check procedures in line with the requirements specified by VCS version 03. The verification consists of the following phases:

- Appointment of Verification team and technical reviewer;
- Document review;
- On-site assessment;
- Follow-up actions;

- Draft verification reporting;
- The resolution of outstanding issues;
- Technical review;
- Issuance of the final verification report.

3.1.1 Verification team and technical reviewer

The verification team and the technical reviewers consist of the following personnel:

Verification Team	**Role**						
Full Name	Team Leader	Trainee Auditor	Local Expert	Site Visit	Technical Expert	Technical Reviewer	Technical Review Expert
Ravi Shankar	x			x			
Sean Heathcote			x	x	x		
Anubhav Dimri		x		x			
Barun Kumar		x		x			
Sunil Kathuria						x	
Karun Sheel							x

3.2 Document Review

The validated PDD /03/, VCS monitoring report /01/, emission reduction calculation spread sheet /02/ and other supporting background documents related to the project implementation, project design, monitoring and baseline were reviewed as per VCS version 03 standard requirements. The desk review included:

- A review of the data and information presented to verify completeness and consistency in accordance with VCS version 03 requirements;
- A review of the approved revised monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, quality of metering equipment (including calibration requirements) and the quality assurance and quality control (QA/QC) procedures;
- An evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reductions.

The following table lists the documentation that was assessed during the validation:

/01/	Monitoring report for "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" version 01 dated 06/06/2012. Monitoring report for ""The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" version 02 dated 04/10/2012.
/02/	Emission reduction (VCU) calculation sheet "2012-04-16 Ex-post ERs" dated 16/04/2012. Emission reduction (VCU) calculation sheet "2012-10-01 ERs for VERs" dated 01/10/2012
/03/	Registered CDM-PDD of the project activity "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" version 16 of 18/04/2012
/04/	VCS program guide "VCS Program Guide, v3.3" version 03 of 01/05/2012.
/05/	VCS standard "VCS Standard, v3.2_0" version 03 of 01/02/2012
/06/	"Program Definitions v3.3" version 03.3 of 01/05/2012
/07/	"Registration & Issuance Process v3.3" of 01/05/2012
/08/	Baseline and monitoring methodology "AM0064", "Methodology for methane capture and utilization or destruction in underground, hard rock, precious and base metal mines" version 02 of 26/09/2008
/09/	Monitoring report template, "VCS Monitoring Report Template, v3.1", http://v-c-s.org/sites/v-c-s.org/files/VCS%20Monitoring%20Report%20Template%2C%20v3.1.doc
/10/	Hofstetter: Flare layout diagram Main flare – 15/09/2010 Borehole flare 1400 – 08/10/2010 Borehole flares 2264 & DBE1 – 08/10/2010 Borehole flare ST23 – 03/09/2010 Borehole flare EX1 – 03/09/2010
/11/	Beatrix Training Academy: Training Record – 07/11/2011 Dewald du Toit

	Gerrit Janse van Rensburg William Lavarack Jan Wessels Marthinus van der Bank
/12/	DATech Deutshe Akkreditierungsstelle Technik in der TGA GmbH: E&H accreditation – 01/10/2008
/13/	GFI Gold Mining: Gas analyser calibration sheets
/14/	GFI Gold Mining: Flare primary data sheet
/15/	Endress+Hauser: E&H error curve statement , 26/10/2008
/16/	NUK Automatisierung Analysentechnik: Gas analyser manual, Edition 06.09/Ne
/17/	Endress+Hauser: Operating Instructions, Pitot tubes for differential pressure flow measurement
/18/	Jumo GmbH & Co. KG: Thermocouple details
/19/	United Kingdom Accreditation Service: Schedule of Accreditation: 14/01/2011
/20/	Beatrix Gold Mine: Management Structure
/21/	GFI Gold Mining: Flare Trip Logs Main flare – 15/09/2010 Borehole flare 1400 – 08/10/2010 Borehole flares 2264 & DBE1 – 08/10/2010 Borehole flare ST23 – 03/09/2010 Borehole flare EX1 – 03/09/2010
/22/	Hoftstetter: Flare service and Maintenance Manual , version 01
/23/	Beatrix Gold Mine: Thermocouple replacement log 15/12/2011
/24/	GFI Mining: Start Up and commissioning procedure
/25/	Trip Log variance
/26/	GFI Mining: Safety, Health and Sustainable Development Quarterly report

/27/	CDM website http://cdm.unfccc.int
/28/	VCS website http://v-c-s.org/
/29/	VCS project database http://www.vcsprojectdatabase.org/
/30/	IPCC website http://www.ipcc-nggip.iges.or.jp/
/31/	Pelindaba Analytics Labs: Flare samples for August 2011 - 06/09/2011
/32/	Pelindaba Analytics Labs: Flare samples for November 2011 - 03/02/2012
/33/	Validation report for "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" version 01 date 20/04/2011
/34/	Beatrix Gold Mine: Addendum to Environmental management programme for the gold fields Beatrix Gold Mine - 02/2009

3.3 Interviews

A site visit to the project activity was undertaken on 11/06/2012 to assess implementation and operation of the project activity and to review evidence, and interview key personnel to confirm evidence associated with the data generation, aggregation, and calculation and reporting of the monitoring parameters. The site visit addressed:

- An assessment of the project implementation and operation as per the PDD /03/ (including site walk to confirm physical existence and operation of project components);
- Review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved revised monitoring plan in the monitoring report /01/.

The key personnel interviewed and the main topics of the interviews are summarized in the table below:

	Date	Name and Role	Organization	Topic
/a/	11/06/2012	Robbie Louw, CDM consultant	Promethium Carbon (Pty) Ltd	• Project Design • Monitoring and reporting documentation • Quality Assurance – Management and operating system

				• Qualification and Training • Plant Operations • Roles and responsibility
/b/	11/06/2012	AB van der Merwe, CDM consultant	Promethium Carbon (Pty) Ltd	• Monitoring and reporting documentation • Quality Assurance – Management and operating system • Qualification and Training • Plant Operations • Roles and responsibility
/c/	11/06/2012	Prof Jan Du Plessis, Vice President and Group Head of Energy, Carbon and Water Management	GFI Mining South Africa (Pty) Ltd	• Monitoring and measuring system • Observations of established practices • Data and information flow • Data Verification of monitoring parameters • Roles and responsibility
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/e/	11/06/2012	Marthinus van der Bank, Environment Engineering Superintendent	GFI Mining South Africa (Pty) Ltd	• Monitoring and measuring system • Collection of measurements • Observations of

				established practices • Testing of the accuracy of monitoring equipment • On-site flare operation • Operational parameters • Gas analyser, thermocouple functionality • Data and information flow • Data Verification of monitoring parameters

3.4 Site Inspections

Site inspection was carried out to verify that the project is implemented in accordance with the applicable criteria. On-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks carried out during site inspection are:

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration/testing of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.

3.5 Resolution of Any Material Discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs. **Corrective action requests (CAR)** are issued, where:

i) mistakes have been made with a direct influence on project results requiring adjustments of the VERs/VCUs monitoring report;

ii) applicable methodological specific requirements have not been met.

A **Clarification request (CL)** may be used where additional information is needed to fully clarify an issue.

A **forward action request (FAR)** should be issued, where:

i) the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive verification period, or

ii) an adjustment of the MP is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality emissions reductions in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions.

4 VERIFICATION FINDINGS

This section summarises the findings from the verification of the voluntary emission reductions reported for the project, "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" with a monitoring period from 01/03/2011 to 30/06/2011. In this section the assessments and findings from the document review, site visit, and interviews are provided.

4.1 Project Implementation Status

4.1.1 Implementation status of the project activity(s)

The project proponent "GFI Mining South Africa (Pty) Ltd" successfully started the phase I of the project activity, i.e. flaring. One mine methane and five non-mine methane flares were installed. One of the non-mine methane flares, 2264 was not operational at the time of site visit. /d//e/

Though the start date of current monitoring period is 01/03/2011 the VCUs are claimed from the start date of operation of the respective flares, which are tabulated below:

Flare		Start of Operation
Mine methane	Number 1 shaft	21/05/2011
Non-mine methane	DBE1	08/03/2011
	2264	04/03/2011
	1400	06/03/2011
	EX1	23/03/2011
	ST23	02/03/2011

Phase two was projected to start in November 2011 as per the project design document. Phase II of the project activity (i.e. generation of electricity from internal combustion engines) has not been implemented yet. As observed during the site visit the flow of methane to the flares has been found to be variable and hence the internal combustion engines would be used when the flow of methane gets stabilised for use of internal combustion engines for electricity generation. All the flares were operational from the date of start of operation to the end of monitoring period. However, there were times when the temperature of flares was below 500 degree Celsius. No emission reductions can be claimed for the flare during this period as efficiency of flare is assumed to be 0% according to the tool used. No emission reductions have been claimed for such periods in the monitoring report. This has been verified from emission reduction calculation sheet "2012-10-01 ERs for VERs" /02/.

Finding	4.1.1-1		
Classification	☒ CAR-1	☐ CL	☐ FAR
Description of finding *(Validators)*	As per "VCS Monitoring Report Template, v3.1", details of the individual or an entity that prepared the document is not provided under the Monitoring Report Title.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	The details of the entity that prepared the document have been provided under the Monitoring Report Title.		
DOE Assessment #1 *(validators) The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Monitoring report /01/ of the project activity "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" has been updated with the details of the individual or an entity that prepared the document.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	4.1.1-2		
Classification	☐ CAR	☒ CL-1	☐ FAR
Description of finding *(Validators)*	Section 2.1 of the monitoring report states that no Certified Emission Reductions (CERs) are claimed for the periods when temperature of flares was below 500 degree Celsius. It is not clear whether VCUs are claimed for the same periods or not.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	The same conditions apply for the VCUs and the monitoring report was updated accordingly in section 2.1.		
DOE Assessment #1 *(validators) The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Section 2.1 of the monitoring report /01/, has been revised to state that "No Certified Emission Reductions (CERs) or VCUs are claimed for these periods", periods when temperature of flares was below 500 degree Celsius. It confirms that no CERs or VCUs are claimed for the periods when temperature of flares was below 500. This has also been verified from VCU calculation sheet "2012-10-01 ERs for VERs".		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

4.1.2 Implementation status of the monitoring plan and the completeness of monitoring

The monitoring plan of the project activity is in line with the description of monitoring plan provided in section B.7 of PDD /03/. The complete monitoring procedure was verified at the site.

Following instruments and records were verified at the project site:

- Gas analysers for the gas sent to the flares.
- Pressure meters for the gas sent to the flares.
- Thermocouple used for measuring temperature at the inlet and exhaust gas from the flares.
- Gas analysers for measuring methane and oxygen concentration of the exhaust from the flares.
- Log books for checking calibration records of gas analysers.
- Power meters for measuring electricity consumed.

Finding	**4.1.2-1**		
Classification	☐ CAR	☒ CL-2	☐ FAR
Description of finding *(Validators)*	According to section B.7 of the registered PDD, NMHC concentration is being measured in the extract gas. However, it could not be established clearly from PDD and the site visit if NMHC concentration is being measured for each of the flares every 3 months according to the monitoring plan.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	The NMHC concentration is being measured for each of the flares every 3 months according to the monitoring plan. Supporting documentation for this has been sent together with this verification protocol. These documents show the NMHC concentration tests that have been done by NECSA. Please see the document '*Flare sample August 2011*'. This report shows that in August 2011, the NMHC concentration of a sample from the main flare was 0.1715%. Please see supporting document '*Flare sample November 2011*'. This report shows that in November 2011, the NMHC concentrations of the two samples taken from the main flare were 0.231% and 0.3554% respectively. According to AM0064 version 02, if NMHC accounts for less than 1% by volume of the extracted mine methane, then the combustion emissions from these gases can be neglected. Therefore, in accordance with the above statement, since the NMHC concentration has never exceeded 1% in any of the NECSA tests, the emissions from the combustion of the gases can be neglected.		
DOE Assessment #1 *(validators)* *The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Supporting documents confirming that the NMHC concentration is being measured every 3 months has been verified by the verification team /31/. It has also been ensured that NMHC concentration is below 1% volume as required by the applied methodology AM0064 version 02. If NMHC concentration is below 1 % it is not required to be accounted in project emissions as per the methodology.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	4.1.2-2		
Classification	☐ CAR	☐ CL	☒ FAR-1
Description of finding *(Validators)*	The span gas used for calibration of gas analyser was found to have expired some time before site visit. Although, this would not have any impact on the monitoring period under consideration, but there is a potential risk in management of emission reductions in future monitoring periods.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	This will be addressed in the CDM monitoring report.		
DOE Assessment #1 *(validators) The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Project activity under verification for VCS is also under the CDM verification process for the next monitoring period. The monitoring period for the CDM activity starts only after the date of project registration for CDM, that is, 10 June 2011. Also the crediting period for the CDM project activity starts only on 01 July 2011, which is later than the monitoring period for VCS (March 2011-June 2011). So, the FAR would be taken under consideration for the next monitoring period.		
Conclusion *Tick the appropriate checkbox*	☒ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☐ The finding is closed		

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Emission reductions have been calculated in accordance with the applied methodology AM0064 "Methodology for methane capture and utilization or destruction in underground, hard rock, precious and base metal mines" version 2 /08/. A linked spreadsheet has been provided for calculations of VCUs. No significant reporting risks have been identified for the data reported.

Non-mine methane flare ST23 is operating for all the four months, from 03/2012-06/2012. Flares DBE1 and 2264 could not produce any emission reduction during the monitoring period, because they were either non-operational or the flare temperatures were below 500 degree Celsius.

Calibration of records and certificates were checked for the equipment, and calibration was done as per the monitoring plan. /13/

Trip logs /21/ were analysed to check for the power outages observed and during which no emission reduction claims should be made.

There was a change of Thermocouple and a replacement report /23/ was made to log the same The details of monitoring parameters are provided in Annex 1.

Finding	4.2-1

Finding	4.2-1		
Classification	☐ CAR	☒ CL-3	☐ FAR
Description of finding *(Validators)*	Data for non-mine methane flares DBE1 and 1400 are available in VCU calculation sheet "2012-04-16 Ex-post ERs" from 03/03/2011. However, start of operation date for DBE1 flare is 08/03/2012 and for 1400 flare is 06/03/2012. It is not clear, how data is available for the flares even before start of operation.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	The emission reduction calculation spread sheet has been updated to exclude the data prior to the start of operation of borehole flares DBE1 and 1400. Please refer to the updated emission reduction calculation spread sheet that has been sent together with this verification protocol.		
DOE Assessment #1 *(validators)* *The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The emission reduction (VCU) calculation sheet has been updated to exclude the data prior to the operation of flares. The data reflected in revised emission reduction (VCU) calculation sheet "2012-10-01 ERs for VERs" dated 01/10/2012 has been checked by the verification team to confirm the same.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	4.2-2		
Classification	☒ CAR-2	☐ CL	☐ FAR
Description of finding *(Validators)*	Not all the references for the values used in the VCU calculation sheet "2012-04-16 Ex-post ERs", have been provided. Like, $\eta_{flare,h}$ – appropriateness of value 0.9 used for the parameter has not been justified.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	A sheet titled 'Inputs' has been included in the updated emission reduction calculation spreadsheet. This sheet lists every value that is used as an input (and its source) for the emission reduction calculations. The updated emission reduction calculation spreadsheet has been sent together with this verification protocol.		
DOE Assessment #1 *(validators)* *The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The work sheet 'Inputs' provided in revised Emission reduction (VCU) calculation sheet "2012-10-01 ERs for VERs" dated 01/10/2012 lists all the assumptions with the references. This has been verified by the verification team.		

Finding	**4.2-2**
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	**4.2-3**		
Classification	☒ CAR-3	☐ CL	☐ FAR
Description of finding *(Validators)*	It has been stated in section 3.3 of monitoring report that a 4 MB USB stick is installed in the data logger. However, it was observed on the site that a 4 MB USB stick is not sufficient to store the amount of data being handled and stored from the gas analyser.		
Corrective Action #1 *(PP shall write a detailed and clear corrective action as per finding)*	This was a typographical error and was corrected in section 3.3 of the report.		
DOE Assessment #1 *(validators)* *The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Section 3.3 of the monitoring report has been revised to exclude that a 4 MB USB stick is being used with the data logger. It was confirmed during the site visit that a 4 GB USB stick is being used to store the information in the data logger. The same data was being saved in backup systems. This is to ensure that the data is not lost for any interval in the monitoring period.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

The quality of supporting documents that are provided by the PP as evidence is adequate.

Primary data sheets for all the flares is provided, which tallies with the data provided in the emission reduction calculation sheet/02/.

Competent employees are recruited for the management and operation of the project. A management structure has been provided supporting the same /20/. Trainings have been provided to the concerned persons operating the project. Training certificates have been provided as evidence. /11/

All the calibration sheets provided are valid for the monitoring period.

4.4 Management and Operational System

The data is collected at the site by Operations Manager (Environmental Engineering Superintendent) under the supervision of Project manager (Environmental Engineering Manager), who is responsible for ensuring that the data is monitored and recorded and that the instruments are all in working order. The operations manager also extracts the monitored data from the data logger at each flare at the end of each cost month.

Promethium Carbon (Pty) Ltd is responsible for calculating the emission reductions and writing the monitoring report.

- It was confirmed during the site visit that the operational structure is in place as stated in monitoring plan in monitoring report /01/ and PDD /03/.
- Competent staff under the supervision of operations manager is employed for data monitoring and collection. Personnel are trained by manufacturer and are provided with manuals to operate tools and equipment.
- Data collection, measurement, calibration, recording and archiving was found to be carried out as per the monitoring plan.
- Periodic review of the system is conducted and internal review reports are prepared and provided for management review. Additional monitoring was not required from the Addendum to EMPR. Addendum makes it clear that good environmental practice needs to be followed at all times/34/.

5 VERIFICATION CONCLUSION

Carbon Check has performed the verification of the project activity "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" in South Africa, with regards to the relevant requirements for CDM activities.

The review of the project design document and the subsequent follow-up interviews have provided Carbon Check with sufficient evidence to determine the fulfilment of the stated criteria. Project has been implemented in accordance with the project description and subsequently validated variations.

The project activity results in reduction of methane emissions that are real, measurable and give long-term benefits to the mitigation of climate change. The total emission reductions from the "The Capture and Utilisation of Methane at the GFI Mining South Africa owned Beatrix Mine in South Africa" for the monitoring period 01/03/2011 to 30/06/2011 are 9643 tCO2e.

It is Carbon Check's opinion that the GHG emission reduction stated in the monitoring report for the monitoring period 01/03/2011 to 30/06/2011 are fairly stated. The GHG emission reductions are calculated correctly on the basis of the approved monitoring methodology AM0064 "Methodology for methane capture and utilization or destruction in underground, hard rock, precious and base metal mines" (Version 02) /08/.

Hence, Carbon Check certifies that the emission reductions from the period during the monitoring period 01/03/2011 to 30/06/2011 are 9643 tCO2e.

Reporting period: From [01-March-2011] to [30-June-2011]

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	tCO_2e
Baseline Emissions	12169
Project Emissions	2526
Leakage	0
Net GHG emission reductions or removals	**9643**

Johannesburg, 08/11/2012

Ravi Shankar

Ravi Shankar

Verification Team Leader

Carbon Check (Pty) Ltd

Johannesburg, 08/11/2012

Adam Simcock

Final Approval

Carbon Check (Pty) Ltd

Annex 1: Monitoring Parameters

Validation team confirms that the following parameters are monitored as per the registered PDD and verified as described:

Data / Parameter	$MM_{PR,engine,y}$ or $MMES_{ELEC,y}$
Data Unit	tCH_4/yr
Description	Mine methane captured, sent to and destroyed by internal combustion engines in the project activity in year y.
Value used	--
Measured / calculated / Default	NA (Not operational during the monitoring period)

Data / Parameter	$MM_{PR,flare,y}$ or $MMES_{FL,y}$
Data Unit	tCH_4/yr or $tCH_4/month$
Description	Mine methane captured, sent to and destroyed by flare in the project activity in year y. In the project activity the methane concentration and the flow rate of the raw gas are aggregated monthly and not yearly as the monitoring period includes only 4 months.
Value used	Month: Value 05/2011: 13.7 06/2011: 65.4
Measured / calculated / Default	Measured Equipment Specifications Main Flare Gas analyser: Endress and Hauser A 71.51: Planned frequency and actual frequency is weekly and has been done in accordance with manufacturer's specifications. Weekly using span gas cylinder no. 8053548. Flow meter: Endress and Hauser FIR 71.51 D900070111C: In accordance with manufacturer's specifications. Planned frequency is yearly. Not applicable for monitoring period as the monitoring period is less than one year.

Data / Parameter	GEN_y
Data Unit	MWh
Description	Electricity generated by the project activity in year y
Value used	--