



VALIDATION OPINION GVK GAUTAMI POWER LIMITED, HYDERABAD

VALIDATION OF POST REGISTRATION CHANGES OF THE NATURAL GAS BASED GRID CONNECTED POWER PROJECT AT PEDDAPURAM, A.P. BY GAUTAMI POWER LIMITED

REPORT No. INDIA-PRC/497.49/2012

REVISION No.02

BUREAU VERITAS CERTIFICATION

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BUREAU
VERITAS

VALIDATION OPINION

Date of first issue: 11/03/2013		Organizational unit: Bureau Veritas Certification Holding SAS	
Client: GVK Gautami Power Limited, Hyderabad		Client ref.: Mr. A. Issac George	
Project reference No.: 4828	Date of registration: 09/09/2011	Registered PDD version and date Version 3.1, 22/08/2011	Revised PDD version and date Version 06, 07/09/2013
Monitoring period to which the request applies.: Date of registration: From 09/09/2011 onwards		PRC tracks <input checked="" type="checkbox"/> Prior approval track <input type="checkbox"/> Issuance track	
The DOE conducted validation of the changes: <input type="checkbox"/> Prior to commencement of a verification for the project activity or PoA. <input checked="" type="checkbox"/> When performing a verification for the project activity or PoA.			
Types of Changes <input type="checkbox"/> A. Temporary deviations from the monitoring plan as described in the registered PDD, PoA-DD or generic CPA-DD, or the monitoring methodology <input type="checkbox"/> B. Corrections that do not affect project/ programme design <input type="checkbox"/> C. Change to the start date of the crediting period <input checked="" type="checkbox"/> D. Permanent changes from the monitoring plan as described in the registered PDD or the monitoring methodology <input type="checkbox"/> E. Changes to the project or programme design of a registered project activity or PoA <input type="checkbox"/> F. Changes specific to afforestation or reforestation project activities			

Report No.: INDIA-PRC/497.49/2012	Subject Group: CDM
Project title: Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited	
Work carried out by: Mr. Sanjay Patankar - Team Leader Mr. Prabhavtar Singh - Team Member Mr. Sadashiva Bhat - Technical Specialist	
Internal Technical Review carried out by: Mr. Bhavesh Prajapati	
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Work approved by:

Matthieu Martini

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CL	Clarification Request
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
FAR	Forward Action Request
GHG	Green House Gas(es)
MoV	Means of Verification
MP	Monitoring Plan
PDD	Project Design Document
PLF	Plant Load Factor
PP	Project Participant
PPA	Power Purchase Agreement
PRC	Post-Registration Changes
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard



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1. INTRODUCTION

GVK Gautami Power Limited, Hyderabad has commissioned Bureau Veritas Certification to validate the post-registration changes of CDM project "Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited" (hereafter called "the Project") at Industrial Development Area, Samalkot, East Godavari District, Andhra Pradesh.

This report summarizes the findings of the validation of the post-registration changes, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1. Objective

The objective of a validation is to provide a thorough and independent third party assessment of the post-registration changes. In particular, the changes' compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the changes meet the applicable CDM requirements and the identified criteria.

1.2. Scope

The validation scope is defined as an independent and objective review of the revised project design document and other relevant documents. The information in these documents is reviewed against the requirements of paragraph 37 of the CDM M&Ps, the applicability conditions of the selected methodology and guidance issued by the Board.

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

1.3. Validation Team

The assessment team and internal technical reviewer team consist of the following personnel:

FUNCTION	NAME	TA 1.1	TA X.X	TASK PERFORMED*
Team Leader	Mr. Sanjay Patankar	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI <input type="checkbox"/> TR
Team Member	Mr. Prabhavtar Singh	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI <input type="checkbox"/> TR
Technical Specialist	D. Sadashiva Bhat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI <input type="checkbox"/> TR
Internal Technical Reviewer (ITR)	Mr. Bhavesh Prajapati	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI <input checked="" type="checkbox"/> TR
Specialist supporting ITR	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI <input type="checkbox"/> TR

*DR = Document Review; SV = Site Visit; RI = Report issuance; TR = Internal Technical Review



2. METHODOLOGY

The overall validation, from Contract Review to Validation Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a validation protocol was customized for the project, according to the version 03.0 of the Clean Development Mechanism Validation and Verification Standard, issued by CDM Executive Board at its 70th meeting on 23/11/2012 (Ref-/9/). The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements the post-registration changes are expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Appendix A to this report.

2.1. Review of Documents

The Revised Project Design Document (PDD) submitted by General Carbon Advisory Services Pvt. Ltd and additional background documents related to the project design and monitoring plan were reviewed.

Furthermore, cross checks were made between information provided in the revised PDD and information from sources other than those used.

To address Bureau Veritas Certification corrective action and clarification requests, General Carbon Advisory Services Pvt. Ltd revised the PDD and resubmitted it on 07/09/2013.

The validation conclusions presented in this report relate to the project as described in the revised PDD version 06.

2.2. Follow-up Interviews

On 13/07/2012, Bureau Veritas Certification performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of GVK Gautami Power Limited, Hyderabad and General Carbon Advisory Services Pvt. Ltd were interviewed (see References).

2.3. Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the validation is to resolve issues that require further elaboration, research or expansion prior to Bureau Veritas Certification's positive conclusion on the post-registration changes.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

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- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable, verifiable and additional emission reductions;
- (b) The applicable CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A Forward Action Request (FAR) may also be raised during validation, to identify issues related to project implementation that require review during the first verification of the project activity.

To guarantee the transparency of the validation process, the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the PDD or supporting annexes are documented in the Validation Protocol in Appendix A.

2.4. Internal Technical Review

The validation opinion underwent an Internal Technical Review (ITR) before requesting approval of the post-registration changes.

The ITR is an independent process performed to examine thoroughly that the process of validation has been carried out in conformance with the requirements of the validation scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the validation opinion to the reviewer, including any necessary validation documentation. The reviewer reviews the submitted documentation for conformance with the validation scheme. This will be a comprehensive review of all documentation generated during the validation process.

When performing an Internal Technical Review, the reviewer ensures that:

- The validation activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, closure of CARs and CLs during the validation exercise, review of sample documents.

The reviewer may raise Clarification Requests to the validation team and will discuss these matters with the Team Leader.

After the agreement of the responses to the Clarification Requests from the validation team as well as the PP(s), the finalized validation opinion is accepted for further processing such as uploading via the UNFCCC interface.



3. VALIDATION CONCLUSIONS

In the following sections, the conclusions of the validation are stated.

The findings from the desk review of the revised project design documents and the findings from interviews are described in the Validation Protocol in Appendix A.

The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project revised monitoring plan resulted in 08 CAR(s), 03 CL(s) and no FAR(s).

The CARs and CLs were closed out based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section corresponds to the VVS paragraph.

3.1. Temporary deviations from the registered monitoring plan and/or monitoring methodology (255-256)

The verification team confirms that there are no temporary deviations for the registered monitoring plan. Hence, this section is not applicable.

3.2. Corrections (259)

The verification team confirms that there are no corrections required in the registered PDD. Hence, this section is not applicable.

Not Applicable

3.3. Changes to the start date of the crediting period (261)

The verification team confirms that there are no changes required to the start date of the crediting period. Hence, this section is not applicable.

3.4. Permanent changes from the registered monitoring plan or monitoring methodology (267-268)

During the initial site visit conducted on 13/07/2012, for the verification of monitoring period 09/09/2011 to 10/03/2012, the verification team made some observations, which were reported as corrective / clarification action requests. Considering the nature of the discrepancies, the verification team recommended a revision to the registered monitoring plan.

The project participant accordingly modified the monitoring plan and submitted the revised PDD to the verification team for validation before submission to the UNFCCC for approval.

The following are some of the observations made during the site visit viz;



Information in registered PDD/methodology	Observations during physical site visit and review of documents
The measurement unit for monitoring parameter $EG_{PJ,y}$ in the registered PDD is mentioned as GWh.	However, it was observed that the actual measurement was done in MWh. The monitoring report states the units of measurement in kWh.
It is stated that the data for parameter $EG_{PJ,y}$ measured by the Cumulative Energy Meter. The meter is a 3 phase 4 wire meter and of an accuracy of 0.2 class. This represents the summation of the readings measured by the energy meter line-1 and energy meter line-2. This energy meter is present in the Switch Yard, Tariff metering room.	In actual, there is no cumulative meter at the project site. The reference to "cumulative meter" (for $EG_{PJ,y}$) appears to be misleading, as if there is one single meter. There are actually 2 main & 2 check meters (1 main meter each on Line 1 & Line 2 and 1 check meter each on line 1 & line 2).
The frequency of calibration of the energy meter for measurement of $EG_{PJ,y}$ is six months.	The actual frequency adopted for calibration of energy meters by project participants is on yearly basis; this does not match with the frequency mentioned in registered PDD.
Quantity of natural gas measurement: Q_{NG} in the registered PDD it is stated that only one meter is used ("gas flow meter"). The notation of the Quantity of natural gas supplied to project activity is given as Q_{NG}	In actual practice the gas flow measurement takes place on two lines in the gas skid (Loop A and Loop B). The notation of the Quantity of natural gas supplied to project activity does not match with the monitoring methodology.
The PDD states that NCV of natural gas would be cross-checked with an internal gas calorimeter calculator.	During the physical site visit the team noticed that there is no gas calorimeter installed by the project participant on project activity side to crosscheck the NCV of NG consumed.
The unit of measurement of NCV_{NG} is presented as kcal/SCM in the registered PDD.	The monitoring methodology requires NCV_{NG} to be measured and presented in units GJ/m^3 .



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Information in registered PDD/methodology	Observations during physical site visit and review of documents
The baseline emission factor for electricity supplied by the project activity to grid which is identified as build margin emission factor $EF_{BM,y}$ is not included in the monitoring plan of the registered PDD as a monitored parameter.	As per the monitoring methodology, if $EF_{BM,y}$ is identified as baseline emission factor, it has to be monitored ex post.
Project emissions PE_y is not included in the monitoring plan of the registered PDD. The monitoring methodology AM0029 requires this parameter to be monitored. and the monitoring report as monitored parameter.	The Project emissions PE_y is not included as monitoring parameter in the registered PDD.
The emission factor of the fuel consumed in project activity, $EF_{CO_2,y}$, is a parameter to be monitored ex-post as per the AM 0029 methodology.	EF_{CO_2} is not included as monitoring parameter in the registered PDD.
The monitoring plan in the registered PDD section B.7.1 states that the quantity of gas flow measured by GAIL at their terminal is tallied with the quantity measured by the gas flow meter that is installed by the Project Participant for internal purposes. The applicable monitoring methodology AM0029 requires this parameter to be cross checked at project end.	During the site visit, it was observed that there is no provision to measure the quantity of gas flow at the project end.
It has been understood that there is a provision of supply of RLNG to the project activity as well. However, any provision to monitor or compute the leakage emissions due to upstream fugitive methane emissions as a result of the use of R-LNG in the fuel supply and transportation chain is not provided in the registered PDD.	The emission reduction calculations do not include provision of accounting for additional leakage emissions caused due to upstream fugitive methane emissions as a result of the use of R-LNG in the fuel supply and transportation chain.

Summary of the changes made to the registered PDD:

The revised PDD version 05 incorporated following changes:-



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Section A.4.3

- 1) The information of the gas supply arrangement and data sources for quantity & calorific value of natural gas supplied to project activity for power generation is included in section A.4.3.

Section B.6.2

- 2) $EF_{CO_2, \text{ upstream, LNG}}$ (Emission factor for upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system has been included in section B.6.2

Section B.6.4

- 3) The representation of the years in the table in section B.6.4 is changed to match with the year of registration of project activity

Section B.7.1

- 4) For the monitoring parameter $EG_{PJ,y}$, the details of the measuring points and meter location is explained clearly. The revised PDD now clearly shows that there are two transmission lines evacuating power from project activity, 1 main meter and 1 check meter is installed at each transmission line. The net electricity exported from the project activity will be the summation of the net electricity supplied by Line 1 & line 2 and measured by the main meters installed, by APEPDCL – Andhra Pradesh Eastern Power Distribution Company Limited, on each line the same was confirmed by the validation team from the monthly joint meter reading report (Ref-/8/). The arrangement of energy meters presented in the revised PDD is correct and same is in line with actual practice at site. The measurement unit of electricity $EG_{PJ,y}$ in the revised PDD has been changed to MWh which is in line with monitoring methodology. The calibration frequency of the energy meters has been changed from six monthly to annual.
- 5) For monitoring parameter FC_{NG} , the description on location of monitoring equipment is improved. It has now been included in the revised PDD that there are two gas metering lines (Loop A & Loop B) at the gas supply terminal of GAIL (Gas transporter). Each line is equipped with an ultrasonic gas flow meter of Daniel make owned by the gas supplier GAIL. The quantity of the gas supplied to the project activity will be the sum of the reading of Loop A & Loop B. The present arrangement was verified by the verification team during the physical site visit. The revised PDD also states that, quantity of the natural gas supplied to the project activity will be cross checked with the readings of the mass flow meters inbuilt into each Gas turbine. The DCS system measures the mass flow, LHV & density of gas and gives the computed quantity of gas in m^3 . The quantity of gas supplied to project activity is measured at supplier ends as well as project end and the higher value among the two will be used for calculating project emissions, for a conservative value.
- 6) For monitoring parameter NCV_{NG} , the description of the QA/QC procedures have been revised. The crosschecking mechanism for the NCV of the gas supplied to project

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activity, not being a requirement of the methodology, is removed from the revised PDD. The same is acceptable since the applicable monitoring methodology AM0029 version 03 does not mandate the crosschecking of this parameter. The source of the data will be the fortnightly or daily joint ticket signed jointly by the Project participant and the gas supplier GAIL. The unit of NCV has been revised to GJ/m³ which is in line with the requirement of monitoring methodology.

- 7) Parameters $EF_{BL,CO_2,y}$ (Baseline CO₂ emission factor), $EF_{BL,upstream,CH_4}$ (Emission factor for upstream fugitive methane emissions), $EF_{CO_2,NG,y}$ (Emission factor of natural gas) also have been included as monitoring parameters in the revised PDD. The monitoring methodology requires these parameters to be monitored.
- 8) In the revised PDD the parameters Quantity of LNG (FC_{LNG}), net calorific value of LNG consumed in the project activity (NCV_{LNG}) also have been included as monitoring parameters in section B.7.1.
- 9) The oxidation factor of natural gas $OXID_{NG}$ also is added to the list of monitoring parameters in section B.7.1. This is in line with the methodology table of monitored parameters which includes this parameter.

Assessment on the changes:

- (a) The proposed revisions ensure that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision.

Accuracy

The accuracy of the monitoring and verification process is not reduced rather it is enhanced as a result of the revision to the monitoring plan because of the following reasons;

- The description of the parameter $EG_{PJ,y}$ is revised to represent the clear & transparent process of measurement and the metering arrangement. The calibration frequency has been corrected to “yearly” and a provision for applying correction factor is included in monitoring plan in case during calibration the error goes beyond the limit. Validation team checked the power purchase agreement and noted that the PPA prescribes the calibration of the electricity measurement system to be every six months. To meet this requirement PP is replacing the energy meters every six months with a pre calibrated set of meters. The meters thus removed are sent for calibration and again after six months the online meters will be replaced with these pre calibrated meters. Thus the calibration frequency of measurement system is every six months and the calibration frequency of these energy meters in cycle is once in a year. Validation team checked the calibration frequency of the meters and meter replacement frequency of meters and found the arrangement in line with PPA requirements. Hence, the accuracy of the measurement system in any way is not reduced. Also, since the accuracy class of the monitoring equipment remains the same as a result of the revision, the overall accuracy of the measurement is not reduced. This change has been done in response to CAR 1, CAR 2 & CL 1 raised in table 2 below.

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- The description of the metering arrangement & cross checking of the parameter FC_{NG} , quantity of natural gas supplied to project activity is revised to represent the actual practice followed at the site. A conservative approach has been adopted for computation, because the higher of the two values of fuel consumption between the supplier end reading and the project end reading is considered to compute the project emissions. As there is no change in the monitoring equipment, accuracy of measurement is not reduced in any manner. This change has been done in response to CL 2 raised in table 2 below.
- The unit of measurement of the parameter NCV_{NG} has been revised to GJ/m^3 to make it consistent with the monitoring methodology. This does not result in any change in the accuracy level. The statement regarding the crosschecking the NCV_{NG} has been removed as the methodology per se does not mandate the crosschecking of the parameter. The data for this parameter is sourced from the fortnightly/daily joint tickets (Ref-/7/) issued by the gas supplier and the same is also used for invoicing. This change has been done in response to CAR 7 raised in table 2 below.
- In section A.4.3, it has now been clearly described that fuel consumption and CV measurement and consequently, the fuel consumption billing' would be per formed based on fuel suppliers/ transporter metering system (at present GAIL); the, total fuel consumption will be monitored both at supplier and project end for cross-verification. This is in line with monitoring methodology AM 0029 requirement. It has also been clarified in the revised PDD that in the event of changes in the fuel supplier / transporter, measurement of the fuel consumption, GCV and fuel consumption billing would be based on metering system located closest to the project plant. The present arrangement was verified by the verification team at site by reviewing the fortnightly invoices of the fuel transporter (GAIL), the joint meter reading records (taken in the presence of the representatives of PP and GAIL ,daily) and the tickets issued by GAIL for the fuel consumed every day.

Completeness

In the opinion of verification team, the completeness of the monitoring and verification process of the project activity is not reduced but effectively improved or made more transparent due to the following inclusions in the revised monitoring plan:

The revised monitoring plan includes following parameters which were not included in registered PDD and were required by the monitoring methodology

- $EF_{BL,CO_2,y}$ baseline CO_2 emission factor – build margin of southern grid
- FC_{LNG} Quantity of LNG consumed in the project activity
- NCV_{LNG} Net Calorific Value of LNG
- $EF_{BL, Upstream,CH_4}$ Emission factor for upstream fugitive methane emissions occurring in the absence of the project activity in terms of ton of methane per MWh
- $EF_{CO_2,NG,y}$ Emission Factor of Natural Gas



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- **OXID_{NG}** Oxidation factor of Natural gas
- **PE_y** Project emission due to combustion of fuel
- The parameters related to R-LNG, viz., FC_{LNG} (Quantity of LNG consumed in the project activity), NCV_{LNG} (Net Calorific Value of LNG) are also **included**. It was observed by the verification team during the site visit that use of R-LNG as a fuel for the project activity could be probable and hence, the monitoring of these parameters is a necessity. This has improved the completeness of the monitoring plan. **[CL 3]**

The description of leakage emission has been revised in PDD to include leakage emission due to emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system. Emission factor for upstream CO₂ emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system (EF_{CO₂, upstream,LNG}) has been included in section B.6.2, The value is provided by the applied monitoring methodology and has been mentioned correctly in the revised monitoring plan.

The validation team used objective evidence, assessed the accuracy and completeness of each proposed revision to the monitoring plan, including the frequency of measurements, the quality of monitoring equipment (e.g. calibration requirements, and the quality assurance and quality control procedures);

(b) The proposed revisions are in accordance with the monitoring methodology.

The proposed revision of the monitoring plan mainly relates to the inclusion of all the actual metering systems involved in the monitoring activity of the Project, compared to the original description in the registered PDD and the inclusion of missing monitoring parameters which are required by the applicable monitoring methodology. Bureau Veritas Certification was able to conclude that the proposed revision is in accordance with the methodology applied by the Project.

(c) The findings of previous verification reports, if any, have been taken into account.

This is not applicable as there is no open issue identified in the validation report and this is the first verification period of the Project activity.

The permanent changes from the registered monitoring plan of approved methodology, as evident from the description in the above paragraphs, do not fit the examples provided in paragraphs (4) & (5) of Appendix 1 of the EB 70 Annex 2 Project Standard version 0.2.1. Hence, in accordance with the requirements of paragraph 249 (b) of EB 70 Annex 3 Validation & Verification Standard version 03.0, as well as the requirements under paragraph 130 (b) (iii) & 133 (a) of the EB 70 Annex 4 Project Cycle Procedure version 03.0, the verification team of BVCH seeks the Executive Board's prior approval for the post-registration changes from the registered monitoring plan.



3.5. Changes to the project design of a registered project activity (277-282)

The verification team has confirmed by means of the on-site assessment that there is no change to the project design of the said project activity. Hence, this section is not applicable.



4. VALIDATION OPINION

Bureau Veritas Certification has performed a validation of post-registration changes of the Natural Gas based grid connected power project at Peddapuram, A.P. by Gautami Power Limited, which is located in Industrial Development Area, Samalkot, East Godavari District, Andhra Pradesh. The validation was performed on the basis of UNFCCC criteria for the CDM, and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) desk review of the project design document and additional background documents; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion.

The review of the revised project design document, relevant additional information and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the post-registration changes meet all relevant UNFCCC requirements for the CDM and the relevant host country criteria. Bureau Veritas Certification thus requests the approval of post-registration changes of the project activity.

Mr. Bhavesh Prajapati

Internal Technical Reviewer

10/09/2013

Mr. Sanjay Patankar

Team Leader

10/09/2013



5. REFERENCES

Category 1 Documents:

Documents provided by project participants that relate directly to the GHG components of the project.

- /1/ CDM-PDD Version 3.1 dated 22/08/2011 for the registered project activity
- /2/ The revised CDM-PDD Version 06 dated 07/09/2013 for the project activity
- /3/ Validation Report No. SQAS-CDM-ES12880011 Revision No. 04 dated 09/09/2011 for the registered project activity
- /4/ Generic Commissioning Test Procedure For gas flow meter
- /5/ Operation Concept for the Alstom Gas turbine GT 13E2
- /6/ Sample GT11 & GT 12 gas flow report
- /7/ Fortnight joint gas ticket from 09/09/2011 to 10/03/2012
- /8/ Joint electricity meter reading by GVK Gautami Power Limited & Andhra Pradesh Eastern Power Distribution Company Limited for the period 10/09/2011 to 10/03/2012

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents used for cross-check.

- /9/ CDM Validation and Verification Standard Version 03.0 (EB70 Annex 3)
- /10/ CDM Validation Project Standard Version 02.1 (EB70 Annex 2)
- /11/ CDM Project Cycle Procedure Version 03.1 (EB70 Annex 4)
- /12/ Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas AM0029 version 03

Persons interviewed:

Persons interviewed during the validation or persons that contributed with other information that are not included in the documents listed above.

GVK Gautami Power Limited, Hyderabad

- /1/ Mr. Raja Roy AGM (Electrical Maintenance) GVK
- /2/ Mr. Alok Kumar Shift Incharge GVK
- /3/ Mr. Sai Babu Head- Instrumentation Section GVK
- /4/ Mr. Subba Reddy Control Room Engineer GVK

Gas Authority of India Limited

- /5/ Mr. K. Srinivas Senior Technician GAIL

General Carbon Advisory Services Pvt. Ltd. (Consultant)

- /6/ Pravin Jadhav, Assistant Vice President , General Carbon



6. CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS

Mr. Sanjay Patankar	Bureau Veritas Certification, India	<p>Team Leader, Climate Change Lead Verifier,</p> <p>Educational qualifications: B.E. (Mech.) M.E. (Mech.)</p> <p>He has over 20 years of experience in engineering manufacturing industry covering various functions like enterprise management, product design, engineering, tool & die design, improvements in the production shop, quality assurance & control and systems planning and implementation, including ISO 9001 based quality management systems. He is working for the last 4 years in Bureau Veritas Certification (India) Pvt. Ltd. as Lead Verifier for CDM and also Lead Auditor for ISO 9001, 14001 and OHSAS 18001 standards/specifications. Has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of CDM project activities.</p>
Mr. Prabhavtar Singh	Bureau Veritas Certification, India	<p>Team Member, Climate Change Verifier.</p> <p>He has a Bachelors of Technology degree in Mechanical Engineering and Masters of Business Administration degree in Energy and Finance. Has 2 years of experience in manufacturing industry in functions like Quality, Process validation and QMS. Has over 1 year of experience as consultant in CDM/VCS. Has worked on various Wind, Hydro and Biomass based cogeneration projects. He has undergone training related to Clean Development Mechanism. He is working in Bureau Veritas Certification (India) Pvt. Ltd. as Verifier – Climate Change and currently involved in validation and verification of CDM projects</p>



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Mr. D. Sadashiv Bhat	Bureau Veritas Certification, India	Technical Specialist,. Holds B.E. degree in Mechanical Engineering. He has over 32 years of work experience in the maintenance operations, quality control, machinery installation, erection, commissioning including the experience in the field of Thermal and Hydro Power Projects.
Mr. Bhavesh Prajapati	Bureau Veritas Certification, India	Internal Technical Reviewer, Climate Change Lead Verifier. He is graduate in the field of Chemical Engineering and post-graduate in Finance (MBA- Finance). He has more than 8 years of Industrial work experience in the field of environment audits, consultancy of HVAC (pharmaceutical industry as well as commercial air conditioning) and utility services and project management of various green field as well as gray field projects. He has undergone lead verifier's training on Clean Development Mechanism. He is involved in the Validation/ Verification projects of CDM and VCS.

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APPENDIX A: VALIDATION PROTOCOL FOR POST REGISTRATION CHANGES

Table 1 Validation requirements based on VVS section IX (EB70 Annex3) and PS section XII (EB70Annex2)

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
1. Temporary deviations from the registered monitoring plan or applied methodology					
a. Are there deviations from the registered monitoring plan or methodology?	VVS	251	Not Applicable	OK	OK
b. Do the provisions of appendix 1 of the Project standard apply to the identified deviations?	VVS	252	Not Applicable	OK	OK
c. If the provisions of appendix 1 of the Project standard do not apply, is prior approval from the Board with respect to the acceptability of the deviations sought?	VVS	252	Not Applicable	OK	OK
d. If the deviation will lead to a reduction in the accuracy of the calculation of ERs, are conservative assumptions or discount factors applied to the calculations to the extent required to ensure that ERs will not be over-estimated as a result	VVS	253	Not Applicable	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
of the deviation?					
e. For cases where a deviation from the monitoring plan may be applicable to the monitoring period under verification, and part of the subsequent monitoring period, is the exact period to which the deviation applies verified?	VVS	254	Not Applicable	OK	OK
2. Corrections					
a. Are the corrections to project information or parameters fixed at validation, as described in the registered PDD, made by PPs in a revised PDD comply with the requirements of the Project standard?	VVS	257	Not Applicable	OK	OK
b. Is the corrected information an accurate reflection of actual project information?	VVS	258 (a)	Not Applicable	OK	OK
c. Are the corrected parameters in accordance with the applied methodology and/or selected monitoring plan?	VVS	258 (b)	Not Applicable	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
3. Changes to the start date of the crediting period					
a. Is it ensured that the start date of the crediting period in the registered PDD was not prior to the date of registration?	PS	211	Not Applicable	OK	OK
b. Is it ensured that PPs do not request any changes to the start date of the crediting period of more than two years - not more than four years for project activities hosted by a Least Developed Country?	PS	212	Not Applicable	OK	OK
c. If the change of the start date of the crediting period constitutes a difference of more than one year but less than two years - more than two years but less than four years for project activities hosted by a Least Developed Country, do PPs demonstrate that no changes have occurred to the project activity that would result in a less conservative baseline, and that substantive progress has been made by the PPs to start the project activity?	PS	214	Not Applicable	OK	OK

VALIDATION OPINION

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
4. Permanent changes from the registered monitoring plan or monitoring methodology					
a. Is it ensured that the changes to the monitoring plan contained in the registered PDD are in compliance with the applied methodology and do not reduce the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan?	VVS	263	<p>Yes, It is ensured that the changes to monitoring plan are in compliance with applied methodology and do not reduce the level of accuracy of monitoring.</p> <p>The build margin emission factor $EF_{BM,y}$ is an ex-post monitored parameter, as per the monitoring plan of the methodology. However, this parameter is not included in the monitoring plan of the registered PDD.</p> <p>Project emissions PE_y is required as a monitorable parameter under the monitoring requirements of the methodology. But this parameter is not included in the monitoring plan of the registered PDD and the monitoring report</p> <p>Monitoring methodology requires NCV_{NG} to be measured and presented in units GJ/m³. But the actual units used are different from the units prescribed by the methodology</p> <p>$EF_{CO2,NG,y}$ is required by AM 0029 methodology to be a part of the monitoring. But this parameter is not included in the monitoring report</p> <p>(It is also not included in the monitoring plan of the</p>	CAR 4, CAR 6, CAR 7, CAR 8, CL 3	OK

VALIDATION OPINION

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>registered PDD)</p> <p>The emission reduction calculations do not include provision of accounting for additional leakage emissions caused due to upstream fugitive methane emissions as a result of the use of R-LNG in the fuel supply and transportation chain. Please clarify if there was any use of R-LNG and how the leakage emissions were addressed.</p>		
b. If the proposed changes refer to a later version of the applied methodology in the registered PDD, does the application of any later version of the applied methodology and tools impact the conservativeness of the monitoring and verification process, including the related emission reduction calculation?	VVS	264	Not Applicable. Proposed changes does not refers to later version the applied methodology. There is also no change in the version of the methodology since the registration and end of the monitoring period.	OK	OK
c. If the PPs are unable to implement the registered monitoring plan and it will not be possible to monitor the registered CDM project activity in accordance with a monitoring plan	VVS	265	NCV _{NG} : The PDD states that this would be cross-checked with an internal gas calorimeter calculator. However, the monitoring report merely states that the cross-check would be w.r.t. the invoices obtained from GAIL.	CAR 4, CL 2	OK

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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
that would comply with the applied methodology and any applicable tools or the relevant provisions of appendix 1 of the Project standard, is any guidance (prior approval) requested from the Board concerning the acceptability of the permanent changes?			<p>During site visit, the team noticed that there is no provision to measure the NCV of NG consumed.</p> <p>The monitoring plan in the PDD section B.7.1 states that the quantity of gas flow measured by GAIL at their terminal is tallied with the quantity measured by the gas flow meter that is installed by the Project Participant for internal purposes. The AM 0029 monitoring methodology requires that the total fuel consumption be monitored both at supplier end and project end for cross-verification. However, at the time of the site visit, it was observed that there is no metering provision to measure the quantity of gas flow at the project end.</p>		
d. If the permanent changes will lead to a reduction in the accuracy of the calculation of ERs, are conservative assumptions or discount factors to the calculations applied to the extent required to ensure that ERs will not be over-estimated as a result of the permanent change?	VVS	266	The permanent changes will not lead to a reduction in the accuracy of the calculation of ERs, as per the verification team's assessment of the changes observed.	Ok	OK
5. Changes to the project design of a registered project activity					
a. If the project design in the implementation or operation of the	VVS	270	Not Applicable		

VALIDATION OPINION

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
project activity does not conform with the description contained in the registered PDD or the relevant provisions of appendix 1 of the Project standard, is any guidance (prior approval) requested from the Board concerning the acceptability of the proposed or actual changes?					
b. Was an on-site visit conducted in case of actual changes?	VVS	271	Not Applicable		
c. Does the revised PDD describe the nature and extent of the proposed or actual changes, including	PS	218			
i. Changes in the effective output capacity due to increased installed capacity or increased number of units, or installation of units with lower capacity or units with a technology which is less advanced than that described in the PDD?	PS	218 (a)	Not Applicable		
ii. Addition of component or extension of technology?	PS	218 (b)	Not Applicable		
iii. Removal or addition of one site (or more) of a project activity registered	PS	218 (c)	Not Applicable		

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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
with multiple-sites?					
iv. Actual operational parameters which are within the control of PPs differing from the expected parameters?	PS	218 (d)	Not Applicable		
v. Any consequential changes to the baseline methodology, including changing or adding another baseline methodology or applying a baseline scenario that is more appropriate as a result of the proposed or actual modifications to the project activity?	PS	218 (e)	Not Applicable		
d. Are the impacts of the proposed or actual changes to the registered CDM project activity reported in the revised PDD, including	PS	219			
i. The applicability and application of the applied methodology under which the project activity has been registered?	PS	219 (a)	No Not Applicable	OK	OK
ii. Compliance of the monitoring plan with the applied methodology?	PS	219 (b)	Not Applicable	OK	OK
iii. The level of accuracy and	PS	219 (c)	Not Applicable	OK	OK

VALIDATION OPINION

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
completeness in the monitoring of the project activity?					
iv.The additionality of the project activity?	PS	219 (d)	Not Applicable	OK	OK
v. The scale of the project activity?	PS	219 (e)	Not Applicable	OK	OK
e. Are the proposed or actual changes would adversely affect the conclusions of the validation report of the registered PDD with regard to:	VVS	273			
i. Additionality of the project activity?	VVS	273 (a)	Not Applicable		
ii. Scale of the project activity?	VVS	273 (b)	Not Applicable		
iii.Applicability and application of approved baseline methodology under which the project activity has been registered?	VVS	273 (c)	Not Applicable		
iv.The compliance of the monitoring plan with the applied monitoring methodology?	VVS	273 (d)	Not Applicable		
f. If the proposed or actual changes affect the additionality of the project activity:	VVS	274			

VALIDATION OPINION

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
i. In the case of investment analysis, have PPs only modified the key parameters in the original spreadsheet calculations affected by the proposed or actual changes to the project activity?	VVS	274 (a)	Not Applicable		
ii. In the case where only barriers have been claimed to demonstrate additionality, have PPs demonstrated that the barriers are still valid under the new circumstances?	VVS	274 (b)	Not Applicable		
g. If the PP applies a later version of the methodology or another methodology that is applicable to the project activity, is it confirmed that the applied methodology and tools do not impact the conservativeness of the monitoring and verification process and the related emission reduction calculations?	VVS	275	Not Applicable		
h. Does the revised PDD comply with the applied monitoring methodology and tools or any later version of the methodology or the requirements of another methodology that is	VVS	276	Not Applicable		



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
applicable to the project activity?					

VALIDATION OPINION

Table 2 Resolution of Corrective Action /Clarification /Forward Action Requests

Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
<p>CAR 1</p> <p>EG_{PJ,y} measurement units in the registered PDD are in GWh. However, it was understood that the actual measurement was done in MWh. The monitoring report says kWh. The units of measurement need to be uniform.</p> <p>Also, in tables E.1, E.2 & E.3 : the units for parameters listed need to match with their corresponding units in the methodology and PDD section B.6.2</p>		<p>The PP proposes to revise the monitoring plan of the project activity and a modified version of registered PDD in track change version is being submitted.</p> <p>The PDD Section B.7.1 is now updated to mention unit of EG_{PJ,y} as MWh in line with the monitoring methodology and actual measurement.</p>	<p>The unit of measurement of EG_{PJ,y} has been changed to MWh in the revised PDD and is therefore in line with requirement of applicable monitoring methodology. Hence CAR 1 was closed.</p>
<p>CAR 2</p> <p>The reference to “cumulative meter” (for EG_{PJ,y}) appears to be misleading, as if there is one single meter, whereas there are actually 2 main & 2 check meters. [1 meter each on Line 1 & Line 2 and 1 meter each on line 1 & line 2 , acting as check meter.</p> <p>(There is no “cumulative meter” anywhere. It is only a summation of Line 1 & Line 2 main meters).</p>		<p>In the modified PDD for the RMP, the metering is explained in detail to state that there are two transmission lines and each has two meters (one main and one check).</p> <p>The term ‘cumulative meter’ is removed. To get total reading, addition of values (either export or import) is done.</p>	<p>Clear description has been provided in the revised PDD. The description matches with the observation by verification team during site visit. Hence CAR 2 is closed.</p>

VALIDATION OPINION

Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
<p>CAR 3</p> <p>Quantity of natural gas measurement : Q_{NG} – in the registered PDD it is stated that only one meter is used (“gas flow meter”). Whereas the actual gas flow measurement takes place on both the lines (Line A as well as Line B)</p>		<p>In the modified PDD for the RMP, the gas metering is explained in detail to state that there are two gas supply lines (Line A and Line B).</p>	<p>Clear description of the gas supply monitoring has been provided in the revised PDD. The description matches with the observation by verification team during site visit. Hence CAR 3 is closed.</p>
<p>CAR 4</p> <p>NCV_{NG} : The PDD states that this would be cross-checked with an internal gas calorimeter calculator. However, the monitoring report merely states that the cross-check would be w.r.t. the invoices obtained from GAIL.</p> <p>During site visit, the team noticed that there is no provision to measure the NCV of NG consumed.</p>		<p>The monitoring methodology AM0029 does not require cross checking NCV. Thus, this requirement is removed in the proposed RMP in the updated PDD.</p>	<p>The information on crosschecking mechanism for NCV of natural gas is removed from the revised PDD and the source of information is changed to fortnightly joint ticket which comes from the gas supplier. The methodology AM0029 does not mandate per se cross checking of the parameter, hence the verification team considers this to be acceptable. The team has also verified the joint ticket issued by the gas supplier every fortnight and accepts it as a source for data. Based on the above, CAR 4 is closed.</p>

VALIDATION OPINION

Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
<p>CL 1</p> <p>According to the PDD, frequency of calibration of the energy meter for measurement of $EG_{PJ,y}$ is six months. However, the actual frequency as per the monitoring report is stated as “yearly”. Please clarify.</p>		<p>In the modified PDD for the RMP, the calibration frequency of energy meters is changed as ‘annual’. This will not violate any national/ CDM calibration related guidance (which allow calibration once in 5 years and once in 3 years respectively).</p>	<p>In response to CL 1, PP has corrected the frequency of calibration of energy meter from “six monthly” to “annual”. Validation team found this to be acceptable because reducing the frequency will not impact the accuracy of the energy meters, as calibrating the meters, which are electronic tri-vector type meters, at an annual frequency is an acceptable practice in several power plant installations and facilities. Hence CL1 is closed.</p>
<p>CAR 5</p> <p>The build margin emission factor $EF_{BM,y}$ ($EF_{BL,CO_2,y}$) is an ex-post monitored parameter, as per the monitoring plan of the methodology. However, this parameter is not included in the monitoring plan of the registered PDD.</p>		<p>In the modified PDD for the RMP, the parameter $EF_{BM,y}$ is added to the Section B.7.2 and will be monitored ex-post.</p>	<p>The applicable monitoring methodology AM0029 Version 03 requires this to be estimated <i>ex post</i> and PP has included the same as a monitoring parameter. Hence CAR 5 is closed.</p>
<p>CAR 6</p> <p>Project emissions PE_y is required as a monitorable parameter under the monitoring</p>		<p>In the modified PDD for the RMP, the parameter is included in the Section B.7.1 and will be monitored ex-post.</p>	<p>The applicable monitoring methodology AM0029 Version 03 requires project emissions PE_y to</p>

VALIDATION OPINION

Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
<p>requirements of the methodology. But this parameter is not included in the monitoring plan of the registered PDD and the monitoring report</p> <p>(In section E.2, it is stated that the said parameter is included as "parameter 8" in section D.2; but no such parameter is found in D.2)</p>		The MR will also be modified to show this as a monitored parameter.	be included as monitoring parameter and PP has included the same as monitoring parameter in the revised PDD. Hence, CAR is closed.
<p>CAR 7</p> <p>Monitoring methodology requires NCV_{NG} to be measured and presented in units GJ/m^3. But the actual units used are different from the units prescribed by the methodology</p>		In the modified PDD for the RMP, the NCV_{NG} is monitored in unit - GJ/m^3 .	The unit of measurement of the parameter NCV_{NG} , has been revised to GJ/m^3 in the revised PDD. The same is in line with monitoring methodology AM0029 version 03. Hence accepted by validation team and CAR 7 is closed.
<p>CAR 8</p> <p>$EF_{CO2,NG,y}$ is required by AM 0029 methodology to be a part of the monitoring. But this parameter is not included in the monitoring report</p> <p>(It is also not included in the monitoring plan of the registered PDD)</p>		In the modified PDD for the RMP, the parameter $EF_{CO2,NG,y}$ is included in B.7.1 and will be monitored ex-post.	In response to CAR , project participant has included the parameter $EF_{CO2,NG,y}$ as a monitoring parameter in the monitoring plan of revised PDD. This is in line with the requirements of the applicable monitoring methodology. Hence,



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Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
			the CAR-8 is closed.
<p>CL 2</p> <p>The monitoring plan in the PDD section B.7.1 states that the quantity of gas flow measured by GAIL at their terminal is tallied with the quantity measured by the gas flow meter that is installed by the Project Participant for internal purposes. The AM 0029 monitoring methodology requires that the total fuel consumption be monitored both at supplier end and project end for cross-verification. However, at the time of the site visit, it was observed that there is no metering provision to measure the quantity of gas flow at the project end.</p>		<p>The gas flow is metered by gas supplier within the project boundary using a highly accurate ($\pm 0.1\%$) Daniel Senior Sonic 4-Path Gas Flow Meter.</p> <p>PP uses an inbuilt gas flow monitoring mechanism in the GTs. The relevant literature of this meter and measurement principle is shared with the DOE now.</p>	<p>Validation team has verified the turbine manual and confirmed the presence of the mass flow meter inbuilt in the gas turbine which will act as cross-check meter. The sample reports of the DCS clearly show the measurement & calculation of the quantity of the gas consumed by the project activity. The description in the PDD has been revised. It is also stated that the higher between the two values (Supplier data & crosscheck meter data) will be considered for project emission computation. Validation team found this conservative and hence CL 2 is closed.</p>
<p>CL 3</p> <p>The emission reduction calculations do not include provision of accounting for additional leakage emissions caused due to upstream fugitive methane emissions as a result of the use of R-LNG in the fuel supply and</p>		<p>In the modified PDD for the RMP, a provision is made for monitoring quantity of LNG, its NCV and $EF_{CO_2, \text{ Upstream, LNG}}$. The leakage emissions will be calculated using these parameters whenever LNG will be used in the project activity.</p>	<p>PP has updated the registered PDD and included the provision of computing leakage emissions caused due to upstream fugitive methane emissions as a result of the use of R-LNG in the fuel</p>



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Draft report clarifications and corrective action requests by verification team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
transportation chain. Please clarify if there was any use of R-LNG and how the leakage emissions were addressed.			supply and transportation chain. The revised monitoring plan now monitors quantity of LNG supplied to project activity , NCV of the LNG supplied and has fixed the EF _{CO2,Upstream,LNG} as fixed ex ante. Validation team reviewed the revised PDD and found this complete as per the applied monitoring methodology. Hence CL 2 is closed