TÜV NORD

VCS VOLUNTARY CARBON STANDARD

VOLUNTARY CARBON STANDARD 2007.1

VERIFICATION REPORT

NATURAL GAS BASED GRID CONNECTED POWER GENERATION PROJECT AT VALANTHARAVAI

Monitoring Period: 2006-04-01 to 2009-12-31
(incl. both days)

Report No: 53801210 - 10/329

Date: 2011-09-07

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Name of Verification company:	Date of the issue:
TÜV NORD CERT GmbH	2011-09-07
Report Title:	**Approved by:**
Natural Gas Based Grid Connected Power Generation Project at Valantharavai	Mr. Ingo Klein
Client:	**Project Title:**
M/s. Coromandel Electric Company Limited (CECL)	Natural Gas Based Grid Connected Power Generation Project at Valantharavai

Summary:

M/s. Coromandel Electric Company Limited (CECL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project - "Natural Gas Based Grid Connected Power Generation Project at Valantharavai " with regard to the relevant requirements of VCS 2007.1 Standard.

The project activity is generation of electricity by utilizing Natural Gas electricity which displaces electricity generated in the Southern grid of India, thus achieves GHG emission reduction.

Reporting period: From 2006-04-01 to 2009-12-31((incl. both days)

A risk based approach has been followed to perform this verification. In the course of the verification Six (06) Corrective Action Requests (CAR) and three (03) Clarification Request (CL) were raised and closed successfully

The verification is based on the validated VCS PD/VCS-PD/, Monitoring Report/MR/ and the monitoring plan as set out in the validated PD, the validation report/FValR/, Emission reduction calculation spreadsheet/ER/ and supporting documents/CAL//GEN/ made available to the TÜV NORD JI/CDM CP by the project participant

As the result of the 1st periodic verification, the verifier confirms that the GHG emission reductions are calculated without material mis-statements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions : 205551 tCO2 equivalents

Work carried out by:	Number of pages:
Mr. B.J.M Amarnath(TL) Mr. S. Stalin(TM) Ms. A. Kirthika(TM) Srivastava Abhishek Kumar(TE)	36

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CP	Certification Program
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
QC/QA	Quality control/Quality assurance
TNEB	Tamil Nadu Electricity Board.
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCS - PD	VCS - Project Description
VCU	Voluntary Carbon Unit
VVM	Validation and Verification Manual

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1 INTRODUCTION

The M/s. Coromandel Electric Company Limited (CECL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project:

" Natural Gas Based Grid Connected Power Generation Project at Valantharavai"

with regard to the relevant requirements of the Voluntary Carbon Standard 2007.1[VCS]. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered CDM project for the monitoring period 2006-04-01 to 2009-12-31, (both days inclusive).

The applied monitoring methodology is in accordance with ACM0029 "Methodology for Grid Connected Electricity Generation Plants using Natural Gas", Version 3.

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the project design document;
- to assess the implementation of the monitoring plan (MP) content in the CDM PDD;
- to assess the project's compliance with other relevant rules, including the host country (India) legislation;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs / VCUs) without any double counting; and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification of this project is based on the validated project design document /PDD/, the monitoring report/MR/, emission reduction calculation spread sheet/XLS/, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3 VCS Project Description

1.3.1 Project Characteristics

Essential data of the project is presented in the following Table 1-1.

Table 1-1: Project Characteristics

Item	Data			
Project title	Natural Gas Based Grid Connected Power Generation Project at Valantharavai			
Project owner	M/S. COROMANDEL ELECTRIC COMPANY LIMITED (CECL)			
Any specific project categories	☐ Mega project (> 10^6 t CO_{2eq} / a) ☒ Project (> 5000 t CO_{2eq} / a and >10^6 t CO_{2eq} / a) ☐ AFOLU project ☐ Grouped project ☐ No specific project category			
VCS PD dated	Draft:	-	Final:	2009-11-17
Applied Methodology	AM 0029 "Methodology for Grid Connected Electricity Generation Plants using Natural Gas" -Version 3			
Project starting date	2004-11-26			
Crediting period	Crediting Period (10y)			
Start of crediting period	2006-03-30			

1.3.2 Project Location

The details of the project location are given in table 1-2:

Table 1-2: Project Location

No.	Project Location
Host Country	India
Region:	Tamilnadu.
Project location address:	Valantharavai village, Ramanathapuram district,
Latitude:	09°22′05″ N As per the Validated registered PDD
Longitude:	78°57′18″ E As per the Validated registered PDD

1.3.3 Technical Project Description

Coromandel Electric Company Limited (CECL) is an associate company of The India Cements Limited (ICL), the leading producer of cement in South India . CECL was established by ICL with the objective of setting up a grid connected power generation plant from which electricity would be “wheeled” through the TNEB grid to ICL’s three cement units and thereby substitute import of TNEB grid electricity.

Coromandel Electric Company Limited (CECL) power generation plant employs natural gas fired gas engines with an installed capacity of 26.19 MW (Phase I: 17.46 MW + Phase II: 8.73 MW). The system comprises of three numbers of reciprocating internal combustion gas engines coupled with alternator sets, each rated 8.73 MW designed and developed by Wartsila.The gas engine employed is a four stroke spark ignited gas engine that works according to the Otto process and the lean-burn principle.

The engine runs at 720 rpm and produces 8.73 MW in an 18-cylinder configuration. The engine gives a high thermal efficiency and is a reliable and low-pollution power source for small to medium sized power plants. The project activity requires around 1,19,000 standard cubic meters (SCM) of natural gas per day (Phase I – 80,000 and Phase II – 39,000) which is sourced from Gas Authority of India Limited (GAIL)’s ONGC field at Perungulam/Ramnad located near to the project site and transported through pipelines. The power generated by the system is stepped up to 110 kV and exported to the TNEB grid at the substation located in project site. The project is in operational since 26/11/2004[/SD/].

The NG based grid connected power generation project intends to reduce GHG emissions to the extent of the difference of (a) baseline emission (multiplication of net electricity generated by the project plant with the baseline emission factor calculated based on CEA data) and (b) the sum of project emissions (multiplication of fuel quantity and CO2 emission coefficient of NG) and (c) leakage.

The emission factor is in accordance with ACM0002[/ACM0002/] version 7 which refers “Tool to calculate emission grid emission version 2”. The value has been sourced from the carbon dioxide database (CEA Version 5). The net electricity generated from the project activity is calculated based on the difference between the Gross electricity generation and Auxiliary consumption of the plant.

The key parameters of the Gas engine are given in tables 1-3 a.

Table 1-3 a: Key parameters of the Internal Combustion Gas Engine

Parameter	Project Scope
Make	Wartsila, Finland OY
Maximum rated electrical output	(3 x *8.73* MW)
Frequency	*47.5 – 51.5 HZ*
Heat Rate	*2038 kCal/kWh*
Output voltage	11kV
Export voltage	110 kV
Specific gas consumption	0.23 Nm^3/kWh

Table 1-3b: Parameters confirmed during verification

The capacity and other parameters mentioned in Table 1.3 a was confirmed during onsite verification .The following details also verified by the verification team during onsite verification.

Parameter	Name	Unit	Value
$FC_{NG,y}$	Quantity of natural gas consumed by the plant	Mn SCM	158.978
$EG_{PJ,y,}$	Net electricity generated in the project activity	MWh	6,67,139.32

S.No	ID	Equipment Name	Location	Serial No.	Model No.	Accuracy class
1	EM1	GEG#1 : I/C Energy Meter	Control room	58956/3-4104	EM 3360	±0.2%
2	EM2	GEG#2 I/C Energy Meter	Control room	58956/2-4104	EM 3360	±0.2%
3	EM3	GEG#3 : I/C Energy Meter	Control room	77307/22-3105	EM 3360	±0.2%
4	EM4	SAT # 01 Aux Energy Meter	Control room	58956/4-4104	EM 3360	±0.2%
5	EM5	SAT # 01 Aux Energy Meter	Control room	79560/23-3705	EM 3360	±0.2%
10	NGFM1	NG Online Flow meter	Gail yard	16329468	FB 503	DP-Transducer: +/-0.075% PR-Transducer: +/-0.075%

						Dir.RTD +/- 1.0%

1.3.4 Appointment of team members and technical reviewer

On the basis of a competence analysis a verification team was appointed. Furthermore also the personnel for the technical review and the final approval was determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 1-4 below.

Table 1-4: Involved Personnel

	Name	Company	Function [1]	Qualification Status [2]	Scheme competence	Technical competence [4]	Host country Competence	Team Leading competence
☒ Mr. ☐ Ms.	B.J.M Amarnath	TUV India Pvt. Ltd	TL	LA	☒	G	☒	☒
☒ Mr. ☐ Ms	S.Stalin	TUV India Pvt. Ltd	TM	A	☒	G	☒	☐
☐ Mr. ☒ Ms.	A.Kirthika	TUV India Pvt. Ltd	TM	A	☒		☒	☐
☒ Mr. ☐ Ms	Srivastava Abhishek Kumar	TUV India Pvt. Ltd	TM	LA	☒	G & J	☒	☒
☒ Mr. ☐ Ms	Samir Beqqal	TN CERT	TR[3]	A	☒	-	☐	☐
☒ Mr. ☐ Ms	Ingo Klein	TN CERT	FA[3]/TR[3]	SA	☒	G & J	☐	☒

[1] TL: Team Leader; TM: Team Member, TR: Technical review; FA: Final approval

[2] GHG Auditor Status: A: Assessor; E: Expert; SA: Senior Assessor; T: Trainee; TE: Technical Expert

[3] No team member

[4] As per S01-MU03 or S01-VA070 A2 (such as A, B, C.....)

1.4 Level of Assurance

The verification has been planned and organized to achieve a

☒ reasonable level of assurance

☐ limited level of assurance.

The verification report is based on VCS PD[/VCS-PD/] and Monitoring report[/MR1//MR2/]supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment.

2 METHODOLOGY

The verification of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Desk review of the Monitoring Report/MR/ submitted by the client and additional supporting documents.
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

The sequence of the verification is given in the table 2.1 below:

Table 2.1: Verification sequence

Topic	Time
Assignment of verification	05-03-2010
On-site visit	23-12-2010
Draft reporting finalised	27-01-2011
Technical review on draft reporting finalised	-
Final reporting finalised	26-05-2011
Technical review on final reporting finalised	07-09-2011
Final corrections	07-09-2011

The main verification steps are described below.

2.1 Review of Project Documentation

The CDM PDD[/PDD/], VCS PD [/VCS-PD/] and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this verification are summarized in section 5.

2.2 On-Site Assessment

2.2.1 Review of Performance Records

As most essential part of the verification exercise it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- 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 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.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

The on-site audit was carried out on 2010-12-23. The verification team attended the site visit.

2.2.2 Follow-up Interviews

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

During verification, the verification team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 2-2.

Table 2-2: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives/IM01/ Project consultant/IM02/	- General aspects of the project - Technical equipment and operation - Changes since validation - Monitoring and measurement equipment - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification - Maintenance - Environmental aspects - Editorial issues of the Monitoring Report

A comprehensive list of all interviewed persons is part of section 5: **Table 5-4:** List of interviewed persons.

2.2.3 Collection of Measurements

The main parameters to monitor are Annual quantity of natural gas consumed in the project activity, Net Calorific value of natural gas, Gross energy generation of the project plant, Auxiliary consumption. The Gross energy generation and Auxiliary consumption were monitored continuously by the energy meters installed at the project site. The quantity of natural gas consumed were measured continuously by the flow meters installed at the plant site.The Net Calorific value of the natural gas was taken from the Customer Fortnight Statement" provided by Fuel supplier (GAIL) .The evacuation facility of the project activity to deliver the power to grid is maintained by the TNEB. The measuring devices are well known and state of the art. All the monitoring parameters involved in the project activity are monitored in accordance with the validated VCS project description/VCSPD/.

2.2.4 Observation of established practices and testing of the accuracy of monitoring equipment

All required instruments including stand by and operating procedures for the same have been implemented in an appropriate manner. Calibration procedures and test reports/CAL/ of the all online energy meters and flow meter covering the reported monitoring period were verified for their frequency and traceability to industry standards. The calibration of the monitoring equipments including flow meter, energy meters was carried out at the required frequency by the competent personals as per

the validated monitoring plan/VCS-PD/.The calibration details are incorporated in the monitoring report/MR2/ and the calibration certificates/CAL/ are submitted to the verification team. The certificates are reviewed by the verification team and found to be appropriate. The monitoring system is in compliance with the applied monitoring methodology (AM 0029). However, it is to be noted that since there is some delay observed in the periodic calibration of the flow meter, and energy meters, the PP had to go by the CDM Executive Board Guidelines, "Guidelines for assessing compliance with the calibration frequency requirement", EB-52 annex- 60, this is acceptable to the verification team. As per the guidelines, since the errors identified during the delayed calibration are within the maximum permissible error of the equipments, the project proponent has considered the maximum permissible error in the readings. The calculation approach has been verified by the verification team and found to be correct. The details of calibration and delay period has been provided in Appendix-I of this report.

2.3 Determination of the reductions in GHG emissions

A detail spread sheet/XLS3/ for the emission reduction calculation has been submitted by the project proponent to the verification team. The calculation has been carried out as per the procedure defined in the validated VCS project description/VCSPD/ using the appropriate equations. The procedure for determining emission reductions from baseline emissions, project emissions and leakage emissions is found as per the algorithm and formulae presented as per AM 0029 version 3 in the validated PD/PD/. The calculation of emission reductions is based on subtracting project emissions and leakage from the baseline emissions. All the input values of the monitoring parameters are used from the relevant sources/LOG/NCV/GR/for the calculation. The values are checked from the sources by the verification team and found to be correct

2.4 Review of additional data from other sources if appropriate

The grid emission factor, net electricity generation, natural gas quality supplied to project activity and NCV of natural gas are the only data used to determine the emission reductions. These values are sourced from the appropriate data sources i.e. monthly energy statements/Log sheets and customer fortnight statement provided GAIL. Hence the review of additional data from other sources is not applicable for this project activity.

2.5 Review of monitoring results and verification of the correct application of monitoring methodologies

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

2.6 Resolution of any material discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 3 of this report.

3 VERIFICATION FINDINGS

In this section the assessments and findings from the desk review of the VCS PD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 3-1 includes an overview of all raised CARs, CLs and FARs.

Table 3-1: Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
3.1	Remaining issues, including any material discrepancy	-	-	-
3.2	Project implementation	-	-	-
3.3	Completeness of monitoring	2	2	-
3.4	Accuracy of emission reduction calculations	3	1	-
3.5	Quality of evidence to determine emission reductions	1	-	-
3.6	Management and operational system	-	-	-
-	**SUM**	**6**	**3**	**-**

3.1 Remaining issues, including any material discrepancy, from previous validation

Description

All raised CARs and CLs were successfully closed during the validation of the project design. There are no remaining issues. The verification has been carried out based on the Monitoring Report, Final VCS PD and VCS-Validation Report.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment:

Thus, it can be concluded that there is no remaining issues from the previous validation which needs to be addressed during this verification

3.2 Project implementation

Description

The project activity involves generation of electricity from 3 nos. of Natural gas based engines which is wheeled to the industrial units of the project participants through Tamilnadu Electricity Board (TNEB) grid which is a part of the southern grid. The natural gas based engines are of *3 x 8.73* MW capacity designed and developed by Wartsila, Finland. It was verified in the course of this verification that the actual project activity was implemented in accordance with the validated VCS-PD.Though the commissioning date of the natural gas based engine is 26th November 2004 as per the VCS requirements the crediting period should start from 30th March 2006 as per validated PD, as a conservative approach the monitoring period starts from 1st April 2006 to 31st December 2009 as described in monitoring report/MR/ is acceptable.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

During the verification a site visit was carried out. On the basis of this site visit and the reviewed project documentation/COM/, it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the validated PD/VCS-PD/.There are no major changes in the key equipment since the validation of the project. The project uses Natural gas for electricity generation. Also no change is envisaged. These facts have been verified during site visit.

3.3 Completeness of monitoring

Description

The monitoring period of the project activity covers the period from 01/04/2006 to 31/12/2009. The key monitoring parameters with influence on the calculation of the emission reductions is the Gross power generation, auxiliary consumption, Natural gas consumption and NCV of Natural Gas. Data regarding the electricity generated, auxiliary consumption and natural gas consumption are recorded as per the monitoring plan. The power and natural gas consumption are measured with a duly

calibrated energy meters and online flow meter. The calibration of the monitoring equipments was carried out by the competent personals as per the validated monitoring plan/VCS-PD/. A draft monitoring report/MR//XLS/ was submitted to the verification team by the project participants. During the verification, mistakes and needs for clarification were identified. The PP has carried out the requested corrections so that it can be confirmed that the Monitoring report is complete and transparent and in accordance with the Validated PD and other relevant requirements.

Nevertheless, CARs CLs were raised and closed successfully.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**CAR 3.3-1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The monitoring period mentioned in the monitoring report is condradicts with crediting start date given in the validated PD-Clarify.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	For calculation purposes, the project promoter has decided to take the monitoring period start date as 1/04/2006 indicated in the Monitoring Report instead of 30/03/2006, as indicated in the registered PD. Irrespective of this change, the end date of the crediting period will not change from the validated PD and will remain as 29/03/2016 (fixed crediting period of 10 years). The approach adopted is conservative in nature as the emission reductions for those two days (30/03/2006 and 31/03/2006) is not accounted for.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The approach followed by the project participant is conservative and acceptable. Hence CAR 3.3.1 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Finding:	**CL 3.3-1**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	In section A.1 of the MR, the relevant dates of the project activity (e.g. construction, commissioning, continued operation periods, etc.) is missing. Correction requested.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The Implementation Schedule has been included along with details on operation details of the project activity in section A.1 of the revised monitoring report.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The monitoring report has been revised and found OK. Hence CL 3.3-1 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Finding:	**CL 3.3-2**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Section B.1 of the MR is not filled as per the guidelines for completing the monitoring report form. Correction requested		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	As per the guidelines for completing the monitoring report, section B.1 of the monitoring report now includes the implementation status of the project activity, the actual operation of the project plant during this monitoring period consisting of the shutdown details and any events / situations that occurred during the monitoring period.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The details of the major shutdowns or outages is mentioned in section B.1 of the monitoring report/MR2/ and the outages/shutdown periods are also verified from the breakdown report/BR/ and further, verification team has done in-depth analysis of the reported outages from generation report/GR/.Hence CAR 3.3-1is closed		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Finding:	**CAR 3.3-2**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	Section C of the monitoring report is not in line with information provided in the validated PD in terms of data collection procedures, roles and responsibilities of personnel, and emergency procedures for the monitoring system. Correction requested.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The detailed description of data collection, frequency, roles and responsibilities has been included in the revised monitoring report		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The Section C of the monitoring report has been revised and same has been verified during onsite visit by interviewing the monitoring personnel. Hence CAR 3.3-2 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Final Assessment

The reporting /MR/ /XLS/ is in line with the requirements of the validated monitoring plan as well as with the applied methodology AM0029 version 3.0 /AM0029/. All the measuring equipments required for the measurement of the parameters are installed at site as per the validated VCS PD/VCS-PD/. The technical specifications/TS/ including serial numbers, make and accuracy class of the measuring equipments were verified during onsite verification conducted by the verification team. The details provided in the monitoring report/MR/ are found to be consistent. All relevant evidences/GR//COM//CAL/ were fully checked by the verification team during the on-site visit. All evidences are clearly identifiable and assessed to be correct. It could be evidenced/BR/ that the monitoring system ensures for continuous (except some routine breakdowns or outage) operation. For the considered verification period, all indicators stated in the applicable monitoring methodology AM0029 (Version 3.0) were correctly monitored and reported. Calibration of Meter is carried by the competent personnel's covering the reported monitoring period was verified for their frequency and traceability to industry standards/CAL/.

3.4 Accuracy of emission reduction calculations

Description

The value of the emission reductions depends on the net electricity exported by the project activity and the Natural gas consumption. The calculation is in line with the applied methodology and is presented in a complete and transparent manner.

The **baseline emissions** are calculated by multiplying the net electricity generated in the project plant with a baseline emission factor. For the Baseline emission factor three options as per the methodology were calculated. The lowest emission factor out of these three options – Build margin - was applied for the baseline emissions calculation. The total net electricity generated by the project activity during the monitoring period is 667139.32 MWh.The baseline emission factor (Build Margin) has to be expost and the values during the validation is based on CEA version 4 and hence the Build margin is updated based on the version 5 of CEA data/CEA/.Based on the net electricity supplied from gas engine multiplied by the emission factor the baseline emissions are 5,45,666 tCO_{2e}.

The **project emissions** result from the on-site natural gas consumption. They are defined as the volume of natural gas combusted for electricity generation multiplied by an emission factor for natural gas. The project emission is estimated by multiplying volume of natural gas combusted (158.97 Mn SCM) by the project activity during the monitoring period and CO_2 emission co efficient (0.00267). Based on the natural gas combusted and the CO_2 emission co efficient the project emissions are 328603 tCO_{2e}.

The **leakage** calculations haven been carried out in supporting excel sheets and presented MR. The leakage calculations were carried out in line with AM0029 requirements. The relevant parameters for fugitive methane emissions calculations deemed to be duly elaborated. In particular, emission factor for upstream fugitive methane emissions (EFBL, upstream, CH4) is calculated in a conservative manner in accordance with the methodology and the Leakage emission for the monitoring period is 11512 $tCO_{2e.}$ CO2 emissions from LNG were not considered because LNG is not used in the project activity.

Emission reductions have been calculated as difference between the Baseline emissions, minus the project emissions and leakage. The emission reductions for the entire monitoring period is 205551tCO_{2e}.

Related Findings:

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**CAR 3.4-1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The baseline emission factor calculations need to be mentioned more transparently as specified by the steps provided in Tool to calculate emission factor for an electricity system in section E.1 of the monitoring report.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The baseline emission factor calculations have been included as per the "Tool to calculate emission factor for an electricity system".		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The baseline emission factor calculation has been transparently explained in section E.1 of the revised monitoring report and also in line with "Tool to calculate emission factor for an electricity system". Hence CAR 3.4-1 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Finding:	**CAR 3.4-2**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The emission reductions values mention in the MR is not in line with emission reduction calculations spreadsheet. Correction requested.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The correct emission reduction calculation sheet has been submitted to the DOE.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The values mentioned in the revised MR and revised emission reduction calculation spread sheets are consistent now. Hence CAR 3.4-2 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Finding:	**CAR 3.4-3**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The reason for higher generation during the monitoring period has not been adequately described in the Monitoring Report. Correction requested.		

Corrective Action #1

This section shall be filled by the PP. It shall address the corrective action taken in details.

It was observed that the emission reductions achieved during the monitoring period were higher than the value determined ex-ante. The reason for this increase is detailed below and the same is now detailed in the revised monitoring report.

The estimated PLF considered during validation was 87.82% (as per CERC norms). However, the actual PLF achieved during the monitoring period (on an average) works out to be 73.38%. The PLF achieved by the project activity each year is detailed below:

Period	**Gross electricity generation (GWh)**	**PLF**
Apr 06 - Dec 06	157207.442	90.95%
Jan 07 - Dec 07	187861.184	81.88%
Jan 08 - Dec 08	170030.9062	74.11%
Jan 09 - Dec 09	158308.854	69.00%
Entire Monitoring Period: Apr 06 - Dec 09	673408.3862	**73.38%**

As per page 5 of the applied methodology, AM0029, version 3, the emission factor used to calculate the emission reductions should be determined ex-post if build margin (BM) of combined margin (CM) are selected. The ex-ante value of the emission factor is 0.71 tCO_2/MWh while the emission factor calculated ex-post for this monitoring period is 0.8179 tCO_2/MWh, a higher value, This increase in the value of the emission factor is one of the reasons why there is an increase in the emission reductions than that determined ex-ante in the registered PD.

To achieve a PLF of 87.82%, the quantity of natural gas consumed in the project activity was calculated ex-ante as 46.96 Million SCM. Considering the actual PLF achieved by the project activity during the monitoring period, the quantity of natural gas consumed by the project activity was:

Period	**Natural gas consumption (Million SCM)**
Apr 06 - Dec 06	36.5777
Jan 07 - Dec 07	44.2053
Jan 08 - Dec 08	40.3728
Jan 09 - Dec 09	37.8217

This reduction in the quantity of natural gas consumption caused a reduction in the quantity of project emissions and leakage emissions.

As a result of an increase in the baseline emissions, reduction in

	the project and leakage emissions, there was an increase observed in the quantum of emission reductions.
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The reason for the higher generation provided by the project participant is acceptable. Hence CAR 3.4-3 is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements

Finding:	**CL 3.4-1**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	The emission reduction value cannot be in decimal form. Monitoring report and spreadsheet needs correction.		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	The emission reductions are calculated annually and the annual emission reductions have been round down. The total emission reductions calculated for the entire monitoring period is calculating by simply adding the emission reductions calculated annually.		
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The final emission reduction values has rounded down in the revised monitoring report and spread sheet are found to be correct. Hence CL 3.4-1 is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements		

Final Assessment

The emission reductions were calculated correctly on the basis of the approved CDM baseline and monitoring methodology AM 0029 Version 3, formulae given in the monitoring report and validated PD. There are no possible transposition errors between data sets since the monitoring of the net electricity generated and natural gas consumption are through calibrated electronic meters with high accuracy. Also all the recorded data are verified by the team of project proponent as described

monitoring plan of validated PD. The closure of all the CARs and CLs issued above resulted in change of 205551 tCO2e. Also the project proponent gave justification for the difference in estimated emission reduction and actual emission reduction. The actual emission reduction is higher than the estimated emission reduction over the monitoring period is acceptable. This due the facts that the ex-ante value of the emission factor is 0.71 tCO_2/MWh while the emission factor calculated ex-post for this monitoring period is 0.8179 tCO_2/MWh, a higher value, This increase in the value of the emission factor is one of the reasons why there is an increase in the emission reductions than that determined ex-ante in the validated PD.

3.5 Quality of evidence to determine emission reductions

Description

The net electricity generation is calculated based on the difference between gross energy generation and auxiliary energy consumption which is monitored by energy meters located in control room of the project site. The natural gas consumption of the project activity is monitored by the online flow meters located in the plant site. The amount of electricity generated from the project activity is continuously metered by energy meters. The meters for generation and auxiliary consumption are with an accuracy class of 0.2. The energy meter readings are noted every day by the operators and consolidated to monthly reports. The data has been crosschecked with the TNEB statements. The meters are calibrated by third party ensuring error free measurements. Also the the log books are maintained by the operating personnel has been verified by the manager and the same is forwarded to the top management.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	**CAR 3.5-1**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *Describe the finding in unambiguous style; address the context (e.g. section)*	During verification of the calibration records it was found that the calibration has not been done in specified calibration interval mentioned in the validated PD for energy meters and flow meter. Clarification is requested in this context..		
Corrective Action #1 *This section shall be filled by the PP. It shall address the corrective action taken in details.*	As per the monitoring plan, the energy meters have to be calibrated annually and the GAIL natural gas flow meter has to be calibrated every quarter. During the monitoring period, all the energy meters and the flow meter were found to be working within the required accuracy class however there was a delay in calibration observed for the energy meters and the GAIL natural gas flow meter. To account for the delay in calibration as detailed		

	in the tables above, as a conservative measure, emission reductions have been adjusted. The same approach as that specified by UNFCCC for CDM project activities under EB 52 Annex 60: "Guidelines for Assessing Compliance with the Calibration Frequency Requirements" has been adopted. In accordance with paragraph 4a of the guideline, the emission reductions have been adjusted considering the maximum permissible error of the energy meters. The delayed calibration test reports for all the energy meters do not show any error that is more than the maximum possible error of 0.2% and similarly, the delayed calibration test reports for the GAIL natural gas flow meter does not show any error that is more than the maximum possible error of 1%. This can be substantiated with the calibration reports for the meters that have been provided to the DOE. This being the case, the maximum permissible error of the instrument has been applied to the measured values for the months where no calibration was done. The data adjustment has been applied in a conservative manner such that the adjusted measured values shall result in lower baseline emissions and higher project emissions / leakage thus reducing the emission reductions.
DOE Assessment #1 *The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	The approach applied by the PP is in line with the CDM Executive Board Guidelines, "Guidelines for assessing compliance with the calibration with the calibration frequency requirement", EB-52 annex- 60 and hence acceptable to the verification team. CAR 3.5-1 is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The project activity has got dedicated metering system for generation, auxiliary consumption for gas engine and natural gas consumption and thus the value reflected in the ER sheet is purely for the project activity. Calibration procedures and test reports of the all online energy meters and flow meter covering the reported monitoring period were verified for their frequency and traceability to industry standards and found inline. The calibration certificates/CAL/ for entire vintage were verified along with the daily meter readings and customer fortnight statement provided by GAIL. Since there is some delay observed in the periodic calibration of the energy meters, natural gas flow meter, the PP had to go by the CDM Executive Board Guidelines, "Guidelines for assessing compliance with the calibration with the calibration frequency requirement", EB-52 annex- 60. As per the guidelines, since the errors identified during the delayed calibration are within the maximum permissible error of the equipments, the project proponent has considered the maximum

permissible error in the readings. The calculation approach has been verified by the verification team and found to be correct. The details of calibration and delay period has been provided in Appendix-I of this report Proper data management including of data acquisition, aggregation and data management system is being followed in project activity. All records needed for monitoring are archived in line with the requirements of the validated monitoring plan/VCS-PD/. No significant, lack of evidence and missing data were detected during on-site verification. It is evident from the monitoring data that the monitoring system ensures for continuous operation, no major break down has been found during the monitoring period. The data pertaining to the monitoring are maintained in identified records for the entire monitoring period. All the data is in compliance with the figures stated in the monitoring report. Hence the quality of evidence provided is found to be credible and in line with monitoring plan of the validated PD/VCS-PD/

3.6 Management and operational system

Description ruined

The General Manger (Operations) of CECL is responsible for conducting the monitoring task strictly as per monitoring plan in the Validated PD/VCS-PD/ and also calculates the emission reductions regularly and writes the monitoring report. The organizational structure includes Shift Engineers and the Operators who is responsible for O & M, monitoring and reporting for smooth functioning of plant. The General Manager of CECL is responsible for overall project management. Day to day operation is supervised by Shift Engineer of respective sections of the Power plant. He has the responsibility to supervise the operators for around the clock operation and maintenance of the plant. The training needs of the monitoring personnel are identified and necessary training programs are conducted by qualified personnel. All monitored data are archived in Physical and Electronic form. The data will be kept for the whole crediting period and additional 2 years as given in the PD/VCS-PD/.

Related Findings

☒ No CARs, CLs or FARs have been identified in this context

☐ The following finding(s) have been addressed:

Final Assessment

The allocation of responsibilities is documented and is followed as described in the Validated PD/PD/. Routines for the archiving of data are defined and documented. The monitoring personnel are well trained and follow reproducible routines. Thus, they have the necessary competence to carry out the relevant tasks with sufficient accuracy. The training schedules/TRG/ for the monitoring personnel were checked by the verification team during the on-site verification. During onsite visit the verification team confirmed the above mentioned monitoring and reporting procedures and also in line with established procedures as mentioned in the monitoring plan of the validated PDD.

4 VERIFICATION STATEMENT

M/s. Coromandel Electric Company Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project - "Natural Gas Based Grid Connected Power Generation Project at Valantharavai." with regard to the relevant requirements of VCS 2007.1 Standard.

The project activity is generation of electricity by utilizing Natural Gas electricity which displaces electricity generated in the Southern grid of India, thus achieves GHG emission reduction.

Reporting period: From 2006-04-01 to 2009-12-31((incl. both days)

A risk based approach has been followed to perform this verification. In the course of the verification six (06) Corrective Action Requests (CAR) and three (03) Clarification Request (CR) were raised and closed successfully.

The verification is based on the validated VCS PD/VCS-PD/, Monitoring Report/MR/ and the monitoring plan as set out in the validated PD, the validation report/FValR/, Emission reduction calculation spreadsheet/ER/ and supporting documents/CAL//GEN/ made available to the TÜV NORD JI/CDM CP by the project participant

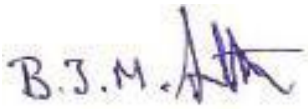
In detail the conclusions can be summarised as follows:

- all operations of the project are implemented and installed as planned and described in the validated project description.
- the monitoring plan is in accordance with the applied approved methodology, i.e., AM 00029 Version 3.
- the installed equipment essential for measuring parameters required for calculating emission reductions is calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1st periodic verification, the verifier confirms that the GHG emission reductions are calculated without material mis-statements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Period	Emission Reductions (tCO_2)
April 2006-December 2006	**49,481**
January 2007 to December 2007	**57,561**
January 2008 to December 2008	**50,957**
January 2009 to December 2009	**47,552**
Total	**2,05,551**

Chennai 2011-09-07



TÜV NORD JI/CDM Certification Program Verification

Team Leader

Essen, 2011-09-07

TÜV NORD JI/CDM Certification Program

Final Approval

5 REFERENCES

Table 5-1: Documents provided by the project participant

Reference	Documents
/GR/	Monthly reports for electricity generation, Auxiliary consumption covering the monitoring period.
/NCV/	Customer Fortnight Statement provided by GAIL covering the monitoring period.
/MR/	• Monitoring Report version 01dated 20/10/2010 • Monitoring Report Version 02 dated 22/03/2011
/SC/	Consent of operation issued by the Tamilnadu Pollution control Board dated on 04/05/2009
/TRG/	Training Records of Monitoring Personnel.
/TS/	Technical specification of the Gas Engines.
/COM/	Commissioning certificate from suppliers dated on 26/11/2004.
/BR/	Breakdown details of the plant.
/CON/	Contract between GAIL and CECL dated on 21/09/2004
/CAL/	• Calibration certificates for the Energy meters (3) for generation connected to individual gas engines during the monitoring period. • Calibration certificates for the Energy meters (2) for auxiliary connected to auxiliaries of gas engines during the monitoring period. • Calibration certificates for the online flow meter (1) for gas consumption during the monitoring period.(Details provided in Appendix-I)
/VCS-PD/	Validated Project Document as per VCS 2007.1 standards version 1.4 dated 17/11/2009
/FValR/	Final Validation Report dated 18/11/2009
/ER/	Emission reduction calculation sheet corresponding to Draft and Final

	monitoring report.

Table 5-2: Background investigation and assessment documents

Reference	Document
/AM 0029/	"Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas" Version 3
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/IPPC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/ISO 14064/	Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals Greenhouse gases -- Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
/ISO14065/	Greenhouse gases -- Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
VCS	Voluntary Carbon Standard 2007.1
/VDS-PD-T/	VCS PD Template
/VVM/	Validation and Verification Manual (Version as per EB51)

Table 5-3: Websites used

Reference	Link	Organisation
/cd4cdm/	www.cd4cdm.org	UNEP Riso Centre
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/vcs/	www.v-c-s.org	VCSA

Reference	Link	Organisation
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 5-4: List of interviewed persons

[1)] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

Reference		Name	Organisation / Function
/IM01/	☒ **Mr.** ☐ **Ms.**	M.Pannerselvam	Plant Head,CECL
/IM01/	☒ **Mr.** ☐ **Ms.**	S.Manikandan	Shift Incharge,Wartsila O&M
/IM01/	☒ **Mr.** ☐ **Ms.**	K.Thangaraj	Operator
/IM01/	☒ **Mr.** ☐ **Ms.**	B.Madhavan	Engineer CECL.
/IM02/	☐ **Mr.** ☒ **Ms.**	Priya B	Consultant ,E&Y
/IM02/	☐ **Mr.** ☒ **Ms.**	Divya BP	Associate Consultant ,E&Y

Appendix –I

Calibration Details of Monitoring Equipments:

Energy Meters

Energy Meters	GEG 1	GEG 2	GEG 3	SAT 1	SAT 2
Location	Control Room	Control Room	Control Room	Control Room	Control Room
Model	EM 3360	EM 3360	EM 3360	EM 3360	EM 3360
Accuracy Class	0.2	0.2	0.2	0.2	0.2
Sl.No.	58956/3-4104	58956/2-4104	77307/22-3105	58956/4-4104	79560/23-3705
PT I/P	110 V AC	110 V AC	110 V AC	110 V AC	110 V AC
CT I/P	5A	5A	5A	5A	5A
Make	ENERCON	ENERCON	CONZERV	ENERCON	CONZERV
Calibration dates (during the monitoring period)	30.09.06	30.09.06	30.09.06	30.09.06	30.09.06
	02.10.07	08.10.07	23.08.07	16.08.07	23.08.07
	23.08.08	16.10.08	15.09.08	30.11.08	27.08.08
	03.10.09	13.08.09	23.07.09	13.10.09	12.07.09

Natural Gas Monitoring Equipment :

ID	NGFM1
Monitored parameter	Fuel consumed by the project plant
Equipment Name	GAIL Natural Gas flow meter
Location	Gail yard
Serial No.	16329468
Make	Floboss/Fisher
Model No.	FB503
Accuracy class	± 1.0%
Unit	SCM
Previous calibration date	25.02.2006
Calibration dates (during the monitoring period)	24.05.2006, 27.11.2006, 21.02.2007, 21.05.2007, 24.08.2007, 12.10.2007, 19.02.2008, 05.05.2008, 20.08.2008, 15.11.2008, 24.02.2009, 28.05.2009, 18.08.2009, 28.11.2009.

Calibration delay in energy meters & Natural Gas Flow Meter

Energy meter	Previous calibration date	Due date for next calibration	Actual date of calibration	Remarks
GEG 1 : I/C Sl. No.: 58956/3-4104	23.11.05	23.11.06	30.09.06	No delay
	30.09.06	30.09.07	02.10.07	Calibration delay (30.09.07 - 02.10.07)
	02.10.07	02.10.08	23.08.08	No delay
	23.08.08	23.08.09	03.10.09	Calibration delay (23.08.09 - 03.10.09)
GEG 2 : I/C Sl. No.: 58956/2-4104	23.12.05	23.12.06	30.09.06	No delay
	30.09.06	30.09.07	08.10.07	Calibration delay (30.09.07 - 08.10.07)
	08.10.07	08.10.08	16.10.08	Calibration delay (08.10.08 - 16.10.08)
	16.10.08	16.10.09	13.08.09	No delay
GEG 3 : I/C Sl. No.: 77307/22-3105	10.08.05	10.08.06	30.09.06	Calibration delay (10.08.06 - 30.09.06)
	30.09.06	30.09.07	23.08.07	No delay
	23.08.07	23.08.08	15.09.08	Calibration delay (23.08.08 - 15.09.08)
	15.09.08	15.09.09	23.07.09	No delay
SAT 1 Sl. No.: 58956/4-4104	23.12.05	23.12.06	30.09.06	No delay
	30.09.06	30.09.07	16.08.07	No delay
	16.08.07	16.08.08	30.11.08	Calibration delay (16.08.08 - 30.11.08)
	30.11.08	30.11.09	13.10.09	No delay
SAT 2 Sl. No.: 79560/23-3705	13.09.05	13.09.06	30.09.06	Calibration delay (13.09.06 - 30.09.06)
	30.09.06	30.09.07	23.08.07	No delay
	23.08.07	23.08.08	27.08.08	Calibration delay (23.08.08 - 27.08.08)
	27.08.08	27.08.09	12.07.09	No delay

Previous calibration date	Due date for next calibration	Actual date of calibration	Remarks
25.2.2006	25.5.2006	24.5.2006	No delay
24.5.2006	24.8.2006	27.11.2006	Calibration delay (24.8.06 - 27.11.06)
27.11.2006	27.2.2007	21.2.2007	No delay
21.2.2007	21.5.2007	21.5.2007	No delay
21.5.2007	21.8.2007	24.8.2007	Calibration delay (21.8.07 - 24.8.07)
24.8.2007	24.11.2007	12.10.2007	No delay

12.10.2007	12.2.2008	19.2.2008	No delay
19.2.2008	19.5.2008	5.05.2008	No delay
5.05.2008	5.8.2008	20.8.2008	Calibration delay (5.8.08 - 20.8.08)
20.8.2008	20.11.2008	15.11.2008	No delay
15.11.2008	15.2.2009	24.2.2009	Calibration delay (15.2.09 - 24.2.09)
24.2.2009	24.5.2009	28.5.2009	Calibration delay (24.5.09 - 28.5.09)
28.5.2009	28.8.2009	18.8.2009	No delay
18.8.2009	18.11.2009	28.11.2009	Calibration delay (18.11.09 - 28.11.09)