# VERIFICATION AND CERTIFICATION REPORT

## Vandana Vidhyut Limited

## Rice Husk Based Power Project

## UN PA 0186

## Monitoring Period 7: 01/04/2011 – 31/03/2012 (Both days inclusive)

**SGS Climate Change Programme**
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| **Date of Issue:** | **Project Number:** |
|---|---|
| 21/08/2012 | CDM.VER0053 MP7 |
| **Project Title:** | |
| Rice Husk Based Power Project | |
| **Organisation:** | **Client:** |
| SGS United Kingdom Limited | Vandana Vidhyut Limited |
| **Publication of Monitoring Report:** | |
| **Monitoring Period:** | 01/04/2011 – 31/03/2012 |
| First Monitoring Report Version and Date: | Version 01 dated 26/04/2012 |
| Final Monitoring Report Version and Date: | Version 04 dated 01/08/2012 |

**Summary:**

SGS United Kingdom Ltd has performed the periodic verification of the CDM project "Rice Husk Based Power Project" (UNFCCC Ref Number 0186). The verification includes confirming the implementation of the monitoring plan of the registered PDD (UNFCCC Ref Number 0186) and the application of the monitoring methodology as per AMS I.D version 7 dated 28 November 2005. A site visit was conducted to verify the data submitted in the monitoring report. SGS confirms the following has been reviewed;

(a) The registered PDD/1/, including the monitoring plan and the corresponding validation report/2/;

(b) Monitoring report, previous verification reports/3/

(c) The applied monitoring methodology/7/;

(d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;

(e) All information and references relevant to the project activity's resulting in emission reductions

The project activity is a rice husk based power generation project with provisions to co-fire coal with rice husk to maintain consistency in power generation. The total capacity of the power plant is 7.7MW. Entire power generated from the project activity is exported to the Chhattisgarh State Electricity Board (CSEB) Grid after meeting the auxiliary consumption of the power plant equipment, thus the equivalent amount of electricity is replaced from the grid generation mix, which would have generated from carbon intensive fossil fuel.

SGS confirms that the project is implemented in accordance with the validated and registered Project Design Document/1/. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 26,248 tCO2e emission reductions during period 01/04/2011 up to 31/03/2012.

**Subject:**

CDM Verification

**Verification Team:**

Sudeep Kodialbail – Lead Assessor and Local Assessor
Shivaji Chakraborty – Assessor
Tarit Roy – Sectoral Scope Expert (TA 1.1)

**Technical Review:**

Date: 21/08/2012
Name: Ravi Kant Soni

**Authorised Signatory:**

Name: Siddharth Yadav
Date: 17/09/2012

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## Abbreviations

| | |
|---|---|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CEA | Central Electricity Authority |
| CERs | Certified Emission Reductions |
| CL | Clarification Request |
| CO2 | Carbon Dioxide |
| COP/MOP | Conference of parties serving as the meeting of parties to Kyoto Protocol |
| CSEB | Chhattisgarh State Electricity Board |
| CSPDCL | Chhattisgarh State Power Development Corporation Limited |
| CSPTCL | Chhattisgarh State Power Transmission Corporation Limited |
| DGM | Deputy General Manager |
| DCS | Distributed Control System |
| DNA | Designated National Authority |
| DOE | Designated Operational Entity |
| DR | Document Review |
| E&I | Electrical & Instrumentation |
| EB | Executive Board |
| ER | Emission Reduction |
| FAR | Forward Action Request |
| FBC | Fluidized Bed Combustion |
| GHG | Green House Gas(es) |
| GCV | Gross calorific value |
| GWh | Giga Watt Hour |
| HT | High Tension |
| IPCC | Intergovernmental Panel on Climate Change |
| kV | Kilo Volt |
| kVA | Kilo Volt Ampere |
| kWh | Kilo Watt Hour |
| MR | Monitoring Report |
| MT | Metric Tonne |
| MW | Mega Watt |
| NABL | National Accreditation Board for Testing and Calibration Laboratories |
| NCV | Net Calorific Value |
| PDD | Project Design Document |
| PEs | Project Emissions |
| PP | Project Participants |
| QA/QC | Quality Assurance/Quality Control |
| TPH | Tonne per hour |
| TPA | Tonne per Annum |
| T&D | Transmission and Distribution |
| UNFCCC | United Nations Framework Convention for Climate Change |
| VVL | Vandana Vidhyut Limited |

## Table of Content

# 1. Introduction

## *1.1 Objective*

SGS United Kingdom Ltd has been contracted by Vandana Vidhyut Limited to perform an independent verification of its CDM project "Rice Husk Based Power Project". CDM projects must undergo periodic audits and verification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

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

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

## *1.2 Scope*

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

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

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

## *1.3 Project Activity and Period Covered*

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

| | |
|---|---|
| Title of Project Activity: | Rice Husk Based Power Project |
| UNFCCC Registration Number: | 0186 |
| Monitoring Period Covered in this Report: | 01/04/2011 to 31/03/2012 (both days inclusive) |
| Project Participants | Vandana Vidhyut Limited<br>Bunge Emissions Fund Limited |
| Location of the Project Activity: | District: Bilaspur<br>State: Chhattisgarh<br>Country: India |

Vandana Vidhyut Limited has implemented a rice husk based 7.7 MW power project and the surplus power is being exported to CSEB grid after meeting in-house auxiliary demand. Coal is co-fired with rice husk to maintain consistency in power generation. The project activity involves operation of a 35 tonnes per hour (TPH) fluidized bed combustion type boiler with the outlet steam parameters of 66 kg/cm2 and 500$^{o}$C and a bleed-cum-condensing type 7.7 MW capacity turbo-generator for generation of power.

# 2. Methodology

## 2.1 General Approach

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

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

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

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

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

## 2.2 Verification Team for this Assessment

Assessment Team

| Name | Role |
|---|---|
| Sudeep Kodialbail | Team Lead; Lead Assessor & Local Assessor |
| Shivaji Chakraborty | Assessor |
| Tarit Roy | Sectoral Scope Expert (TA 1.1) |

Technical Review Team

| Name | Role |
|---|---|
| Ravikant Soni | Technical Reviewer (TR) |
| Nayan Jyoti Deka | Sectoral Scope Expert (TA 1.1) to TR |

## 2.3 Means of Verification

### 2.3.1 Review of Documentation

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

### *2.3.2 Site Visits*

As part of the verification, the following on-site inspections have been carried out by the assessment team

| **Location:** District: Bilaspur; State: Chhattisgarh; Country: India | |
|---|---|
| **Date:** 28/05/2012 and 29/05/2012 | |
| **Coverage:** | **Source of Information / Persons Interviewed** |
| Overall project planning, roles & responsibility for the designated project management team and Verification of monitoring and data handling procedure | Mr. Pankaj Baldua (AGM - Finance)<br>Mr. S R Vajpaee (Vice President - VVL) |
| Confirmation of data collection and handling procedures. Cross checking daily records, monthly records, audited annual report, emission reduction calculation, project emissions and leakage. | Mr. Sanjay Singh (Asst Manager - Operations)<br>Mr. B K Gananayak (DGM E&I, VVL)<br>Mr. Vivek Singh (Executive, VVL)<br>Mr. Sandeep Sharma (Officer, VVL) |
| Assessment of project boundary, inspection of infrastructure and equipments, calibration, maintenance, personnel training. Detailed audit of project procedures, verification of implementation of monitoring procedures. | Mr. B K Gananayak (DGM E&I, VVL)<br>Mr. Ajoy Kaushik (Sr. Chemist LAB, VVL)<br>Mr. Ambrish Sukhla (Store Keeper, VVL) |

## *2.4 Reporting of Findings*

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

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

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

I. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;

II. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;

III. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

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

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

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

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

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

## *2.5 Internal Quality Control*

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

# 3. Verification Findings

## *3.1 Project Implementation - General*

Vandana Vidhyut Limited has implemented a rice husk based 7.7 MW power project and the surplus power is being exported to CSEB grid after meeting in-house auxiliary demand. Coal is co-fired with rice husk to maintain consistency in power generation. The project activity involves operation of a 35 tonnes per hour (TPH) fluidized bed combustion type boiler with the outlet steam parameters of 66 kg/cm2 and 500°C and a bleed-cum-condensing type 7.7 MW capacity turbo-generator for generation of power. The project was implemented and equipment installed as described in the registered PDD/1/. The project documentation was found in compliance with the registered PDD/1/. The project was registered with CDM EB on 09/02/2006 and the project meets the criteria for claiming credits for the monitoring period which starts from 01/04/2011 to 31/03/2012. This was checked from the UNFCCC website: http://cdm.unfccc.int/Projects/DB/SGS-UKL1135954820.19/view

The data and variables provided in the monitoring report are the same as stated in the registered PDD/1/. An increase in 24.54% in the CERs as compared to the annual estimated CERs as per the registered PDD/1/ was noted in the MR/4a/. The PP has justified this increase in the ex-post emission reduction over the ex-ante calculations in section E.6 of the MR/4a/.

The PP has mentioned that in the registered PDD/1/, the emission reductions for the entire crediting period were projected based on the following:

a) Baseline emissions corresponding to a net exportable electricity of 45.41 GWh to Chattisgarh State Electricity Board (CSEB) grid for the year 2002-2003 and

b) Project emissions resulting from co-firing of 9784.9 tonnes of coal with rice husk in 2002-2003 and a total carbon content of 45% in coal.

In line with the registered monitoring plan, the emission reductions for the period 2010-2011 (i.e. 01/04/2011 to 31/03/2012) are calculated based on the following:

a) Baseline emissions corresponding to a net exported electricity of 49.61 GWh to CSEB grid for the year 2011-2012. The main reason for it, was the increase in gross generation due to an increased quantity of rice husk and coal fired in comparison to the quantity fired in the year 2002-03 during the initial phase of the project. Further, the generation of 49.61 GWh is within the capacity of generation of 7.7 MW, i.e. with nearly 315 days of operation during the year 2011-2012, the plant has generated within the rated capacity and there has been a change in the gross generation as compared to the projected generation reported in 2002-03.

b) Project emissions resulting from co-firing of 13,909.892 tonnes of coal with rice husk in 2011-2012 and a total carbon content of coal (measured monthly) ranging between 20.21% to 34.10%

The above explanation signifies:

a) An increase in baseline emissions of 3,459.84 tonnes CO2 in 2011-2012 with respect to that in 2002-2003 (as provided in the registered PDD/1/) which is attributed to an increase in net exported electricity to CSEB grid,

b) An increase in project emissions by 1,712 tonnes CO2 in 2011-2012 with respect to that in 2002-2003 (as provided in the registered PDD/1/) which is attributed to a corresponding reduction in total carbon content of coal used.

The above remarks, provided by the PP in section E.6 of the MR/4a/, for the excess CER as compared to the ex-ante scenario has been checked against the data monitored during the monitoring period. The value of net electricity exported to the grid has been checked with the meter reading data and is found to be consistent. Further, the total carbon content of coal has been cross checked with the test certificates and found to be consistent and hence accepted. The amount of project emissions from the co-firing of coal with rice husk in 2011-2012 has been checked and found to be correct.

The PP has remarked that due to the changes in the values of carbon content in coal and actual electricity supplied to the grid there is a difference in the ex-ante emission reduction and the actual emission reduction during the year 2011-2012. This was verified against the actual scenario seen during the site visit and the data provided for the period 2012-2011 and was found to be consistent, hence accepted.

Section B.1 of the MR Version 1/4a/ mentions that "The plant was on a complete shutdown mode for maintenance related purposes from 1st November 2011 to 9th December 2011. Apart from this date, the shutdown of the plant has been rare and was stopped only in case of any emergency." Hence **CAR #1 was raised** requesting the PP to clarify the above statement by providing documentary evidence for the same. In response the PP has deleted the above statement from section B.1 of the MR/4c/ and has mentioned the shutdown period per month for the entire monitoring period. This has been checked against the power interruption reports/19/ for the entire monitoring period and is found to be consistent. Hence **CAR #1 was closed out**.

Section A.2 of the MR mentions "Vandana Vidhyut Limited" only as the project participant. There are two project participants as per the UNFCCC webpage of this project activity. PP was requested to clarify the inconsistency between section A.2 and the UNFCCC webpage. Hence CAR #5 was raised. In response gthe PP has revised section A.2 of the MR/4d/ to mention 'Vandana Vidhyut Limited' and 'Bunge Emissions Fund Limited' as the project participants. This is consistent with the UNFCCC webpage. Hence CAR #5 was closed out.

Corresponding to paragraph 200 to 203 of VVM 1.2/6/, the assessment team is able to confirm that the monitoring has been carried out in accordance with the approved methodology AMS I.D version 7/7/ which was applied to the project activity and monitoring plan contained in registered PDD/1/. All the parameters used in the calculation of net electricity supplied to the regional grid by the project activity have been verified against the monitoring plan and in the monitoring report and found to be complete, consistent and correct.

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

There are no issues from the previous verification/3/.

### *3.3 Compliance of the monitoring plan with the monitoring methodology.*

The project has been registered under the small scale approved baseline and monitoring methodology AMS I.D, "Grid connected renewable electricity generation," version 7/7/ dated 28 November 2005. The monitoring of the project has been carried out in accordance with the methodology and the registered PDD/1/. Neither a revision nor a deviation to the monitoring plan has been requested to the CDM Executive Board. This is inline with paragraph 191-195 of VVM version 1.2/6/. For photographic evidences of all meters and monitoring and measuring devices clearly showing the serial numbers please refer to Section 11 of this verification report.

### *3.4 Completeness of Monitoring*

Monitoring of the reductions in GHG emissions resulting from the registered project have been implemented in accordance with the monitoring plan contained in the registered PDD/1/. The monitoring mechanism is effective and reliable.

The monitored parameters under project monitoring plan are in compliance with the registered PDD/1/, the monitoring results of the parameters are as following:

**Total Electricity Generated (kWh)**

The total electricity generated is measured by in-house generation energy meter supplied by ABB. The energy meter with serial number 02131300 is calibrated/11/ by a third party (M/s Yenkay Instruments and Controls Pvt. Ltd.) on a periodic basis.

The monitoring procedure of the total electricity generation along with calibration procedure of the monitoring equipment was found in line with the registered PDD/1/. The meter is calibrated in a cycle of 1 year in accordance with the Registered Monitoring Plan by a third party NABL accredited laboratory and the accuracy class of the meter being high hence it can be inferred that the data reliability of the meter is high. Further the Data Management System was found appropriate and in place which was confirmed during the verification site visit and hence was concluded to be accurate.

The shift-in-charge records and logs in the data and reports to the DGM (Operations). The data is also checked by the Manager, Electrical and Instrumentation who is responsible for maintaining the records of calibration of the instruments. The reports are finally reviewed by the General Manager (Power Plant). The total electricity generation figures have been checked with the plant energy reports and further verified with the DCS records during on site evaluation and found correct. All data for current monitoring period was checked during the site visit and were found to be consistently reported and hence accepted.

**Auxiliary Consumption (kWh)**

The auxiliary consumption is measured by auxiliary energy meter in the plant premises to the best accuracy and is recorded and monitored on a continuous basis through DCS. The energy meter installed is of make SEMS with serial number MPU 02814; accuracy class 0.5s and an annual calibration[/12/] frequency. The date of last calibration is 14/11/2011 with validity up to 13/11/2012. The previous calibration was carried out on 16/11/2010 with validity up to 15/11/2011. Both calibration[/12/] have been done by CSPDCL on 14/11/2011 and 16/11/2010 respectively. The calibration of the meter was checked and found to be covering the entire monitoring period and hence accepted.

The monitoring procedure of the auxiliary electricity consumption along with calibration procedure of the monitoring equipment was found in line with the registered PDD[/1/]. The meter is calibrated in a cycle of 1 year in accordance with the Registered Monitoring Plan by a third party NABL accredited laboratory and the accuracy class of the meter being high hence it can be inferred that the data reliability of the meter is high. Further the Data Management System was found appropriate and in place which was confirmed during the verification site visit and hence was concluded to be accurate.

The shift-in-charge records and logs the data and reports to the DGM - Operations. The data is also cross checked by the Manager Electrical and Instrumentation who is responsible for maintaining the records of calibration of the instruments. The reports are finally reviewed by the Vice President- Power Plant.

**Power Export (kWh)**

The power export is measured by the CSEB main meter no. CSE 40281 (Make: SEMS; Accuracy class 0.5s) from 01/04/2011 to 08/10/2011 and main meter no. APM 08758 (Make: SEMS; Accuracy class 0.2s) from 09/10/2011 to 31/03/2012. There is a provision of cross checking the same against the check meters installed by the CSEB i.e. Check meter no. CSE 40281 (Make: SEMS; Accuracy class 0.5s) from 09/10/2011 to 31/03/2012 and check meter no. APM 08758 (Make: SEMS; Accuracy class 0.2s) from 01/04/2011 to 08/10/2011. An additional check meter no. CSE 29187 (Make: SEMS; Accuracy class 0.2s) was installed at the sub-station on 14/10/2011.

The main meter and check meter were exchanged by the CSPDCL from 09/10/2011 onwards. This was confirmed from the monthly meter reading statement issued by the CSPDCL. The statements issued prior to 09/10/2011 mention meter no. CSE 40281 as the main meter. The statements issued from 09/10/2011 onwards mention meter no. APM 08758 as the main meter. The PP has submitted an inter-office memo dated 14/10/2011 which indicates the installation of the additional check meter (CSE 29187) at the substation, based on the information received from CSEB. The new meter configuration of one main meter and 2 check meters were verified during the site visit. The details of the meters mentioned in the MR[/4c/] are consistent with the meter details observed at the sub-station during the site visit.

All the above mentioned meters are under the control of the grid authorities and are checked and sealed by CSPDCL. The maintenance and periodic calibration of the meters are entirely under jurisdiction of CSPDCL and the project proponent does not have any control on the same. The meters are calibrated by CSEB which was cross checked against the information provided in the monthly statements[/15/] of CSPDCL from April 2011 to March 2012 and is found to be consistent.

The date on which the statements were received from CSPDCL (earlier CSEB) have been mentioned in the table of the parameter Power Export in section D.2 of the MR[/4c/]. These dates have been verified against the statement[/15/] submitted by the PP and are found to be correct.

The net electricity export is also metered through an in-house energy export meter bearing serial number TNB 00708 (SEMS make). The in-house export meter reading by the power project is monitored and recorded on a continuous basis through DCS. The main meter being under the control of CSEB and the PP has no control over the same. Hence for any discrepancy noted it is imperative that the CSEB (the paying

authority) against the net power exported to the state grid would take up appropriate action thereby ensuring the recalibration or replacement of the faulty meter. This is done to ensure the reliability of the parameter against which payment is done.

The emission reduction calculations are calculated based on the net electricity exported as metered by the Chhattisgarh State Electricity Board (CSEB) Main Meter, which is in line with the registered PDD/1/ and are therefore not affected by the in-house export meter readings. The power export values were cross checked with the monthly HT meter reading statements issued by Chhattisgarh State Electricity Board and found to be consistent.

**Type of fuel used - Coal**

The quantity of coal consumed is monitored by scaling of bunker (i.e. by measuring the difference in levels of coal in the bunker before feeding coal and after discharging the same into the feeding hoppers of the FBC boiler). A standardized scaling chart for the bunker is used to monitor the fuel fed from the bunker to the FBC boiler. The monitoring procedure of the total quantity of coal consumption was found in line with the registered PDD/1/, page 39. The scaling of bunker was carried out by VVL which was certified by Power Tech Engineers Consulting Engineers. The bunker capacity certificate/13/ has been checked, which certifies the capacity for coal bunkers as 174.180 $m^3$ and 174.670 $m^3$ respectively for the two bunkers.

The data for the quantity of coal consumption is monitored hourly as well as on a daily basis through on-site measurements and recorded under coal stock register/24/. The annual coal consumption value is also subjected to financial audit carried out by the independent statutory auditors and annual coal consumption value is also provided under company's annual audited report/17/.

The coal consumption values have been cross checked with the coal stock register/24/ and audited annual report of the company/17/ and found correct.

**Type of fuel used - Biomass**

The quantity of rice husk consumed is monitored by scaling of bunker (i.e. by measuring the difference in levels of rice husk in the bunker before feeding the husk and after discharging the same into the feeding hoppers of the FBC boiler). A standardized scaling chart for the bunker is used to monitor the fuel fed from the bunker to the FBC boiler. The monitoring procedure of the total quantity of rice husk consumption was found in line with the registered PDD/1/, page 38. The scaling of the bunker was carried out by VVL which was certified by Power Tech Engineers Consulting Engineers. The bunker capacity certificate/13/ has been checked, which certifies the capacity for rice husks 173.180 $m^3$ and 173.280 $m^3$ respectively for the two bunkers.

The data for the quantity of rice husk consumption is monitored on hourly as well on daily basis through on-site measurements and captured under Rice Husk Stock Register/25/. The annual rice husk consumption value is also subjected to financial audit carried out by the independent statutory auditors and annual audited rice husk consumption value is also provided in company's annual audited report/17/.

The rice husk consumption values have been cross checked with the rice husk stock register and audited annual report of the company and found correct.

Annual biomass assessment report/10/ for the current monitoring period as per requirement of EB 28 Annex 35/8/, was made available initially which has been conducted by Power Tech Consulting Engineers, Bilaspur. The same has been checked and was found to be consistent and the amount of biomass in the region is in excess of the required amount. The rice husk requirement of VVL is projected at only 11.79% of the total biomass availability in the region which is in line with the guideline of EB 47 Annex 28/9/ which requires the availability of biomass; 25% in excess of the total biomass requirement as specified during ex-ante estimation of amount of biomass required to ensure year round availability of the biomass. Hence the report was considered to be acceptable in line with the EB requirement. The PP has demonstrated in the report stated above, that the quantity of biomass (rice husk) available in the region far exceeds the total requirement to run the power plant year round. As per the biomass assessment report/10/ conducted by Power Tech Consulting Engineers, Bilaspur, the total availability of biomass in the region is 593,807 TPA. The total requirement of VVL is 70,000 TPA and total demand of the region including for VVL is 398,000 TPA. Thus an additional of 195,807 TPA of biomass is available.

Thus the amount of biomass in excess after consumption by the project and after meeting the other demands in the region is 195,807 TPA. Thus the total availability is 49.19% in excess of the total demand of the region and far exceeds the 25% excess requirement as per the guideline of EB 47 Annex 28[/9/]. The same has been checked and found to be consistent and hence accepted.

**Calorific Value of fuel used - Biomass (kCal/kg)**

The calorific value of the rice husk is determined by in the in-house laboratory of VVL as per the standard national practice by taking random samples of the rice husk. The bomb calorimeter (Advance Research Instruments Corporation, Model: BCM/ Serial No. 21018) used for the purpose is calibrated internally once a year following standard calibration procedure as provided by Advance Research Instruments Manual for bomb calorimeter which is checked against the calibration certificate dated 20/05/2010 and 05/05/2011 respectively and found to be satisfactory. The calibration is carried out in accordance with the manufacturer specification which is the standard national practice for in-house calibration[/21/] of the Bomb Calorimeter.

The calorific value of the rice husk is monitored for the purpose of calculation of plant heat rate and efficiency of power generation as per the monitoring plan of the registered PDD[/1/] and the same is not required for the calculation of the emission reduction. The monthly rice husk calorific values[/5a/] have been cross checked with the in-house laboratory reports[/26/] and found to be correct.

**Plant Heat Rate (kCal/kWh)**

The plant heat rate is the operational parameter of the power plant which is monitored as per the monitoring plan of the registered PDD[/1/]. The plant heat rate is calculated based on the duly monitored total power generation value, rice husk consumption, coal consumption values and respective calorific values of rice husk and coal. The plant heat rate is actually not required for calculation of the emission reductions. It is required to determine the efficiency of power generation. The calculation of plant heat rate in the emission reduction calculation sheet has been checked and found justified.

**Efficiency of power generation (%)**

The efficiency of power generation is the operational parameter of the power plant which is monitored as per the monitoring plan of the registered PDD[/1/]. It is calculated based on the values of plant heat rate. The efficiency of power generation is also not required for calculation of emission reductions. The calculation of efficiency of power generation in the emission reduction calculation sheet has been checked and found to be justified.

All the above parameters have been verified on the basis of paragraphs 196-198 of VVM version 1.2[/6/].

**CAR #2 was raised** regarding issues observed in section D.2 of MR Version 1[/4a/]. The following issues were raised, discussed and closed out.

(a) The PP was requested to clarify the inconsistency in the QA/QC procedure between the MR[/4a/] for MP7 and final MR (version 4) for MP6 for the parameters Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal. In response, the PP has rectified the observed inconsistency in the QA/QC procedure. The PP has revised the QA/QC procedure to make it consistent with that of the previous monitoring period. This has been checked on the site and is accepted.

(b) The PP was requested to clarify how the mentioned dates of calibration indicate that the calibration covers the entire monitoring period for the following parameters: Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal. In response, the PP mentioned the date of validity of the previous calibrations in section D.2 of the MR[/4c/]. These dates are consistent with that mentioned in the final MR (version 4) for MP6. With this, it is now transparently mentioned in the MR[/4c/] that the calibration covers the entire monitoring period.

(c) The PP was requested to clarify the date for the change in meters for the parameter “Power Export”. In response, the PP has mentioned the complete dates for the change in meters for the parameter “Power Export” in section D.2 of the MR[/4c/] (i.e. 8$^{th}$ October 2011 and 9$^{th}$ October 2011). This has been checked and is accepted.

(d) The PP was requested to clarify the date of receipt of the readings from CSEB for the month of October 2011; specifically 09/11/2011 in the parameter ‘Power Export’. In response, the PP has clarified that the

dates mentioned in the table of the parameter 'power export' in section D.2 of the MR[/4a/] are the dates on which the meter readings were received from CSEB. For the month of October 2011, the PP has received 5 separate communications from CSEB on 08/10/2011, 19/10/2011, 28/10/2011, 02/11/2011 and 09/11/2011. The dates have been verified against the communication received and are found to be correct.

(e) In the parameter auxiliary consumption, the PP was requested to clarify the inconsistency between the accuracy class of the meter MPU 02814 between the MR version 1[/4a/] for MP7 (0.5%) and final MR (version 4) for MP6 (0.55%). In response, the PP has clarified that the accuracy of the auxiliary consumption meter (MOU02814) is 0.5s and it was mistakenly mentioned as +/- 0.55% in the Monitoring Report of the previous Monitoring Period (MP 6). The accuracy class of 0.5s was verified against the meter test certificate issued by CSPDCL and also checked during the site visit. This error has no effect on the ER calculations. Hence this correction is accepted and closed out.

(f) The PP was requested to clarify if annual rice husk and coal consumption checked from the audited Balance sheet of VVL, mentioned under the QA/QC procedures of the parameters Type of fuel used- Biomass; and Type of fuel used- Coal respectively, is the source of the value or a cross-check. In response, the PP has clarified that the balance sheet of Vandana Vidhyut Limited is a cross-check and not check. The same has been revised under the QA/QC procedures in tables of the parameters Type of fuel used- Biomass and Type of fuel used- Coal in section D.2 of the MR[/4c/]. This has been checked and found to be correct.

(g) For the parameters Carbon content of Coal; Calorific value of fuel used- coal; Calorific value of fuel used- biomass; Efficiency of power generation; Plant Heat rate the value for the period 01/11/11 to 30/11/11 has been mentioned as zero since the plant was in shutdown. The PP was requested to clarify if coal or biomass was purchased during this period. In response, the PP has clarified that coal and biomass both were purchased during the Month of November 2011, when the Power Plant was under shut down. The same has been verified against the coal stock register and the rice husk stock register and is found to be correct. The corresponding calorific values of the coal and husk purchased during this period have now been mentioned in the Monitoring Report Version 02[/4b/], and the Excel computation sheet[/5b/] for calculation of emission reductions. Hence closed out.

Thus **CAR #2 was closed out**. For detailed discussion please refer CAR #2 under Section 9 of this report.

**CAR #3 was raised** regarding meter related issues observed in MR Version 1[/4a/]. The following issues were raised, discussed and closed out.

1. In the single line diagram in section C of the MR[/4a/], the main meter and check meter were not clearly indicated, so the PP was requested to clarify this point. In response, the PP has revised the line diagram in section C of the MR[/4c/] to clearly indicate the main meter and the check meter. This has been checked against the observations during the site visit and is found to be correct. Hence closed out.

2. During the site visit, an additional energy check meter (No. CSE29187) for the parameter "Power Export" was observed at the sub-station. The verification team was informed by the PP that the new meter was installed in October 2011. The details of the new meter were not mentioned in the relevant sections (C & D.2) of the MR[/4a/]. The PP was requested to clarify the exchange in the main meter and check meter after 9th October 2011, as mentioned in section D.2 of the MR[/4a/] under parameter "Power export" and clarify the difference in the source of the meter readings. In response, the PP has included the details of the new meter (No. CSE 29187) in the line diagram in section C and the table of parameter "Power Export" in section D.2 of the MR[/4c/]. The meter details have been checked and found consistent with the actual meter details observed during the site visit. The PP has submitted an inter-office memo dated 14/10/2011 which indicates the installation of the additional check meter (CSE 29187) at the substation. The new meter configuration of one main meter and 2 check meters were verified during the site visit. The details of the meters mentioned in the MR[/4c/] are consistent with the meter details observed at the sub-station during the site visit. Further it was also physically verified at the sub-station that the meters are sealed and in control (maintenance; replacement and calibration) of the CSEB. The PP has no control. The PP has also clarified that the main meter and check meter were exchanged by the state utility from 9th October 2011 onwards. This was confirmed from the monthly meter reading statements issued by the state utility. The statements issued prior to 9th October 2011 mention meter no. CSE 40281

as the main meter. The statements issued from 9th October 2011 onwards mention meter no. APM 08758 as the main meter. It was noted that the new main meter was of higher accuracy class (0.2s) than the previous on (0.5s).

3. The make of meter no. 02131300 in section C (line diagram) and in section D.2 under the parameter "Total electricity generated" was inconsistent. The PP was requested to clarify the same. In response, the PP has now consistently mentioned the make of the meter no. 02131300 in section C (line diagram) and in section D.2 under the parameter "Total electricity generated" as ABB P+. This has been checked and hence closed out.

Thus **CAR #3 was closed out**. For detailed discussion please refer CAR #3 under Section 9 of this report.

**CL #4 was raised** regarding issues observed in the ER spreadsheet[/5a/]. The following issues were raised, discussed and closed out.

1. In sheet "April-11 to March-12" the Export to CSEB Grid (As per CSEB Statement) is higher than Export to CSEB (As per the in-house Export Meter of SEMS) for the months of April to June 2011; February 2012 & March 2012. The PP was requested to clarify the same. In response, the PP has clarified that the time of taking the readings at the in-house meter and at the sub-station are not the same. Hence for some months (April to June 2011; February 2012 & March 2012) the Export to CSEB Grid (As per CSEB Statement) is higher than Export to CSEB (As per the in-house Export Meter of SEMS). The cumulative difference between the values measured at the sub-station meter and the in-house meter is 11.31 MWh. Considering that the capacity of the plant is 7.7MW, this difference is small and hence justified. It has also been checked and confirmed during the site visit that the sub-station meters are sealed and in control of the state utility. It is not in control of the PP. Hence closed out.

2. In sheet "April-11 to March-12", for the months of May 2011 and March 2012 the Gross Generation values are comparable, however the heat input is varying by 13%. The PP was requested to clarify the same. The PP has clarified that the power plant performance depends on a host of other parameters such as such as boiler efficiency and turbine heat rate. They are subsequently dependent on carbon % in coal, husk, the GCV of coal and rice husk, the moisture content in rice husk and depending on these parameters; the power plant performance can significantly go up and down. Therefore, it is difficult to ascertain the power plant performance just based on the input heat value. It is also noted that the gross generation values are not used in the emission reduction calculations. The emission reductions claimed for the project activity is based on the net electricity exported to the grid which is measured at the meters located in the sub-station. The meters are in the control of the state utility and the PP has no control on the same. This has been verified during the site visit. The PP has submitted the statements from CSEB stating the quantity of electricity supplied to the grid. These have been checked to confirm that the net electricity exported to the grid as mentioned in the statements is the value used for the emission reduction calculations. Hence closed out.

Thus **CL #4 was closed out**. For detailed discussion please refer CL #4 under Section 9 of this report.

For the parameter "Total electricity generated" in Section D.2 of the MR[/4c/], against the row "source" it is mentioned "Plant Log Sheets further cross checked with DCS logs". PP was requested to clarify the appropriateness of the same and hence CAR #5 was raised. In response, the PP has deleted the cross-check with DCS logs from the row source and has inserted the same in the row QA/QC procedure of the MR[/4d/]. This is appropriate and hence accepted. Thus CAR #5 was closed out.

### *3.5 Accuracy of Equipment*

The metering equipment (i.e. CSEB-HT Meter) for monitoring the parameter 'Power export' is located at the sub-station where the meter reading is taken. This meter is in the custody of the CSPDCL (formerly CSEB). Based on this meter reading CSPDCL statement for power export to the grid is generated which in turn forms the basis of emission reduction calculation.The metering equipment is duly approved, tested, and sealed by CSPDCL. The PP has no control. This was verified at the sub-station during the site visit.

As per registered PDD[/1/] frequency of meter calibration is annual and calibration certificates provided for current monitoring period revealed that meters are calibrated in accordance with the monitoring plan by CSPDCL. This has been cross checked with the CSPDCL from April 2011 to March 2012 and is found to be consistent.

All measuring and monitoring devices have been calibrated by external agencies (NABL certified labs) and by CSPDCL and found to be capable to meet the monitoring purposes. The accuracy of all such equipment has been maintained within specified limits. Calibration details of monitoring instruments have been provided in subsequent section of this report.

The assessment team is able to confirm that the management system of the project is in place, with the assigned responsibilities properly identified based on monitoring plan in registered PDD/1/ the key parameters being measured and reviewed periodically as per the procedures. This was checked during the site visit and found to be consistent.

### 3.6 Accuracy of Emission Reduction Calculations

The total emission reductions in the monitoring report for the period 01/04/2011 to 31/03/2012 is higher than the values projected in the registered PDD/1/. The justification for this has been mentioned in detail in section 3.1 of this report.

The reported values adopted for the calculation of emission reductions (Power export, Coal consumption and Carbon content of the coal) have been checked against the CSPDCL-HT meter reading reports/15/; coal stock register; audited company Annual report; reports issued by the Central Institute of Mining and Fuel Research, Bilaspur Unit and found correct. The monitoring procedures for power export, coal consumption and carbon content of the coal are completely consistent with the registered PDD/1/.

The difference in values of ex post monitored parameter (total carbon content of coal as monitored during the current monitoring period) from the values considered for estimation of the ex-ante emission reduction as presented in the registered PDD/1/ has resulted in the difference in the total CER reported. The conservative ex ante estimate of emission reductions for the entire crediting period was based on 45% total carbon content. The 'F' Grade Indian coal (used for the project activity) has a maximum of 45% total carbon. This has been cross checked against the invoice/14/ raised by South Eastern Coalfields Limited and is found to be consistent. Furthermore, reports/16/ of ultimate analysis conducted by Central Institute of Mining and Fuel Research, Bilaspur Unit over the period 01/04/2011 to 31/03/2012 with coal samples used in the project activity substantiate that the coal that is co-fired in the project activity has total carbon content in the range 20.21% to 34.10%. The coal receipts from the South Eastern Coalfields Limited were verified which state that the coal used is 'F' grade and considered accepted. Thus the ex-post monitored emission reduction value for the monitoring period 01/04/2011 to 31/03/2012 was found to be acceptable by the assessment team.

The emission factor used in the ER calculations has been fixed ex-ante for the entire crediting period. This value has been verified against the sources provided in the registered PDD/1/ and the MR/4d/. This value is justified.

The data involved in emission reduction calculation has been thoroughly verified with plant records/20/ and found satisfactory. The details of the reported and the verified values for all parameters are listed in section 4. The calculation of emission reductions is found to be correct.

### 3.7 Quality of Evidence to Determine Emission Reductions

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

### 3.8 Management System and Quality Assurance

The company has a dedicated team comprising of members having long standing experience in the said field of operations. The shift-in-charge records and logs the data and reports to the DGM (Operations). The data is also cross checked by the Manager (E&I) who is responsible for maintaining the records of calibration of the instruments. The reports are finally reviewed by the General Manager (Power Plant). The internal audits/18/ are being conducted at regular intervals to ensure control to keep the plant operational without any disturbance.

There is a defined procedure/22/ on "GHG Performance Monitoring, Measurement and Reporting of Data" which ensures that proper corrective actions are undertaken immediately if any discrepancies are identified in the generation, consumption and export figures (like inconsistencies in reported parameters) and/or

discrepancies in the operation of the power plant. Therefore the assessment team confirms that the management system for the CDM project is in place, with the responsibilities properly identified.

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

### *3.9 Data from External Sources*

**Grid Emission Factor** used for emission reduction calculation has been determined ex ante on the basis of power sector values provided by CEA, Ministry of Power, Government of India and the value is fixed for the entire crediting period. The value of the Grid emission factor 0.820 kg$CO_2$/kWh has been checked and found to be consistent with the value mentioned on page number 32 of the registered PDD/1/

**Carbon content in Coal** is analysed by the Central Institute of Mining and Fuel Research, Bilaspur Unit over the time period from April 2011 to March 2012 with monthly frequency as per the monitoring plan of the registered PDD/1/. The coal carbon content values are within the range 20.21% to 34.10% as checked from the monthly reports/16/ issued by the institute and the same has been consistently reported in the MR/4c/. These have been cross checked against the respective monthly ultimate coal analysis laboratory reports/23/ and found satisfactory.

**Calorific Value of Coal** is analysed by the Central Institute of Mining and Fuel Research, Bilaspur Unit over the time period from April 2011 to March 2012 with monthly frequency as per the monitoring plan of the registered PDD/1/. The coal calorific values are within the range between 1895 to 3310 kCal/kg as checked from the monthly reports/16/ issued by the institute and the same has been consistently reported in the MR/4c/. These have been cross checked with the respective monthly ultimate coal analysis laboratory reports/23/ and found to be satisfactory.

## 4. Calculation of Emission Reductions

| *Parameter* | *Reported Value* (MR Version 01) | | *Verified Value* (Final MR Version 04) | |
|---|---|---|---|---|
| Grid Emission factor ($kgCO_2/kWh$)<br><br>Grid emission factor used for emission reduction calculation is determined ex-ante, as mentioned in the registered PDD | 0.820 | | 0.820 | |
| Total Electricity Generated (kWh) | Apr-11 | 4,923,000.00 | Apr-11 | 4,923,000.00 |
| | May-11 | 5,616,800.00 | May-11 | 5,616,800.00 |
| | Jun-11 | 5,422,900.00 | Jun-11 | 5,422,900.00 |
| | Jul-11 | 5,640,200.00 | Jul-11 | 5,640,200.00 |
| | Aug-11 | 5,352,600.00 | Aug-11 | 5,352,600.00 |
| | Sep-11 | 5,314,800.00 | Sep-11 | 5,314,800.00 |
| | Oct-11 | 5,067,600.00 | Oct-11 | 5,067,600.00 |
| | Nov-11 | 0.00 | Nov-11 | 0.00 |
| | Dec-11 | 1,618,800.00 | Dec-11 | 1,618,800.00 |
| | Jan-12 | 5,591,600.00 | Jan-12 | 5,591,600.00 |
| | Feb-12 | 5,358,100.00 | Feb-12 | 5,358,100.00 |
| | Mar-12 | 5,601,400.00 | Mar-12 | 5,601,400.00 |
| | **Total** | **55,507,800.00** | Total | **55,507,800.00** |
| Power Export (kWh) | Apr-11 | 4,401,360.00 | Apr-11 | 4,401,360.00 |
| | May-11 | 5,018,880.00 | May-11 | 5,018,880.00 |
| | Jun-11 | 4,995,840.00 | Jun-11 | 4,995,840.00 |
| | Jul-11 | 4,944,480.00 | Jul-11 | 4,944,480.00 |
| | Aug-11 | 4,776,000.00 | Aug-11 | 4,776,000.00 |
| | Sep-11 | 4,734,240.00 | Sep-11 | 4,734,240.00 |
| | Oct-11 | 4,494,266.25 | Oct-11 | 4,494,266.25 |
| | Nov-11 | 0.00 | Nov-11 | 0.00 |
| | Dec-11 | 1,421,520.00 | Dec-11 | 1,421,520.00 |
| | Jan-12 | 4,986,240.00 | Jan-12 | 4,986,240.00 |
| | Feb-12 | 4,813,200.00 | Feb-12 | 4,813,200.00 |
| | Mar-12 | 5,025,360.00 | Mar-12 | 5,025,360.00 |
| | **Total** | **49,611,386.25** | **Total** | **49,611,386.25** |
| Auxiliary Consumption (KWh) | Apr-11 | 541,360.00 | Apr-11 | 541,360.00 |
| | May-11 | 602,220.00 | May-11 | 602,220.00 |
| | Jun-11 | 574,630.00 | Jun-11 | 574,630.00 |
| | Jul-11 | 596,420.00 | Jul-11 | 596,420.00 |
| | Aug-11 | 580,200.00 | Aug-11 | 580,200.00 |
| | Sep-11 | 576,610.00 | Sep-11 | 576,610.00 |
| | Oct-11 | 568,300.00 | Oct-11 | 568,300.00 |
| | Nov-11 | 0.00 | Nov-11 | 0.00 |
| | Dec-11 | 275,200.00 | Dec-11 | 275,200.00 |
| | Jan-12 | 564,640.00 | Jan-12 | 564,640.00 |
| | Feb-12 | 540,660.00 | Feb-12 | 540,660.00 |
| | Mar-12 | 575,850.00 | Mar-12 | 575,850.00 |
| | **Total** | **5,996,090.00** | **Total** | **5,996,090.00** |

| ***Parameter*** | ***Reported Value*** (MR Version 01) | | ***Verified Value*** (Final MR Version 04) | |
|---|---|---|---|---|
| Rice Husk Consumption (Tonnes) | Apr-11 | 5,533.105 | Apr-11 | 5,533.105 |
| | May-11 | 5,946.085 | May-11 | 5,946.085 |
| | Jun-11 | 5,912.594 | Jun-11 | 5,912.594 |
| | Jul-11 | 5,967.365 | Jul-11 | 5,967.365 |
| | Aug-11 | 5,660.015 | Aug-11 | 5,660.015 |
| | Sep-11 | 5,311.089 | Sep-11 | 5,311.089 |
| | Oct-11 | 4,891.257 | Oct-11 | 4,891.257 |
| | Nov-11 | 0.000 | Nov-11 | 0.000 |
| | Dec-11 | 1,696.750 | Dec-11 | 1,696.750 |
| | Jan-12 | 5,018.536 | Jan-12 | 5,018.536 |
| | Feb-12 | 4,393.420 | Feb-12 | 4,393.420 |
| | Mar-12 | 4,662.300 | Mar-12 | 4,662.300 |
| | **Total** | **54,992.516** | **Total** | **54,992.516** |
| Coal Consumption (Tonnes) | Apr-11 | 1,248.655 | Apr-11 | 1,248.655 |
| | May-11 | 1,523.105 | May-11 | 1,523.105 |
| | Jun-11 | 1,349.281 | Jun-11 | 1,349.281 |
| | Jul-11 | 1,360.845 | Jul-11 | 1,360.845 |
| | Aug-11 | 1,306.211 | Aug-11 | 1,306.211 |
| | Sep-11 | 1,235.894 | Sep-11 | 1,235.894 |
| | Oct-11 | 1,128.353 | Oct-11 | 1,128.353 |
| | Nov-11 | 0.000 | Nov-11 | 0.000 |
| | Dec-11 | 408.460 | Dec-11 | 408.460 |
| | Jan-12 | 1,467.158 | Jan-12 | 1,467.158 |
| | Feb-12 | 1,377.470 | Feb-12 | 1,377.470 |
| | Mar-12 | 1,504.460 | Mar-12 | 1,504.460 |
| | **Total** | **13,909.892** | **Total** | **13,909.892** |
| Carbon content of coal (%) | Apr-11 | 28.45 | Apr-11 | 28.45 |
| | May-11 | 20.21 | May-11 | 20.21 |
| | Jun-11 | 26.20 | Jun-11 | 26.20 |
| | Jul-11 | 34.10 | Jul-11 | 34.10 |
| | Aug-11 | 28.70 | Aug-11 | 28.70 |
| | Sep-11 | 29.21 | Sep-11 | 29.21 |
| | Oct-11 | 26.00 | Oct-11 | 26.00 |
| | Nov-11 | 0.00 | Nov-11 | 32.00 |
| | Dec-11 | 31.00 | Dec-11 | 31.00 |
| | Jan-12 | 33.20 | Jan-12 | 33.20 |
| | Feb-12 | 28.20 | Feb-12 | 28.20 |
| | Mar-12 | 28.20 | Mar-12 | 28.20 |
| Calorific Value of Coal (kCal/kg) | Apr-11 | 2725 | Apr-11 | 2725 |
| | May-11 | 1895 | May-11 | 1895 |
| | Jun-11 | 2370 | Jun-11 | 2370 |
| | Jul-11 | 3310 | Jul-11 | 3310 |
| | Aug-11 | 2495 | Aug-11 | 2495 |
| | Sep-11 | 2565 | Sep-11 | 2565 |
| | Oct-11 | 2277 | Oct-11 | 2277 |
| | Nov-11 | 0 | Nov-11 | 2955 |
| | Dec-11 | 2835 | Dec-11 | 2835 |
| | Jan-12 | 3170 | Jan-12 | 3170 |
| | Feb-12 | 2610 | Feb-12 | 2610 |
| | Mar-12 | 2594 | Mar-12 | 2594 |

| ***Parameter*** | ***Reported Value*** (MR Version 01) | | ***Verified Value*** (Final MR Version 04) | |
|---|---|---|---|---|
| Calorific Value of Rice Husk (kCal/kg) | Apr-11 | 3276 | Apr-11 | 3276 |
| | May-11 | 3254 | May-11 | 3254 |
| | Jun-11 | 3305 | Jun-11 | 3305 |
| | Jul-11 | 3297 | Jul-11 | 3297 |
| | Aug-11 | 3225 | Aug-11 | 3225 |
| | Sep-11 | 3105 | Sep-11 | 3105 |
| | Oct-11 | 3280 | Oct-11 | 3280 |
| | Nov-11 | 0 | Nov-11 | 3266 |
| | Dec-11 | 3272 | Dec-11 | 3272 |
| | Jan-12 | 3286 | Jan-12 | 3286 |
| | Feb-12 | 3292 | Feb-12 | 3292 |
| | Mar-12 | 3312 | Mar-12 | 3312 |
| Efficiency of power generation (%) | Apr-11 | 19.67 | Apr-11 | 19.67 |
| | May-11 | 21.72 | May-11 | 21.72 |
| | Jun-11 | 20.51 | Jun-11 | 20.51 |
| | Jul-11 | 20.06 | Jul-11 | 20.06 |
| | Aug-11 | 21.40 | Aug-11 | 21.40 |
| | Sep-11 | 23.25 | Sep-11 | 23.25 |
| | Oct-11 | 23.41 | Oct-11 | 23.41 |
| | Nov-11 | 0.00 | Nov-11 | 0.00 |
| | Dec-11 | 20.75 | Dec-11 | 20.75 |
| | Jan-12 | 22.75 | Jan-12 | 22.75 |
| | Feb-12 | 25.52 | Feb-12 | 25.52 |
| | Mar-12 | 24.90 | Mar-12 | 24.90 |
| Plant Heat Rate (kCal/kWh) | Apr-11 | 4373.15 | Apr-11 | 4373.15 |
| | May-11 | 3958.63 | May-11 | 3958.63 |
| | Jun-11 | 4193.13 | Jun-11 | 4193.13 |
| | Jul-11 | 4286.87 | Jul-11 | 4286.87 |
| | Aug-11 | 4019.08 | Aug-11 | 4019.08 |
| | Sep-11 | 3699.29 | Sep-11 | 3699.29 |
| | Oct-11 | 3672.86 | Oct-11 | 3672.86 |
| | Nov-11 | 0.00 | Nov-11 | 0.00 |
| | Dec-11 | 4144.89 | Dec-11 | 4144.89 |
| | Jan-12 | 3780.99 | Jan-12 | 3780.99 |
| | Feb-12 | 3370.29 | Feb-12 | 3370.29 |
| | Mar-12 | 3453.44 | Mar-12 | 3453.44 |

The calculated values of baseline emission and project emissions below have been rounded down.

1. Baseline Emissions = Power Export to CSEB Grid * Grid emission Factor
   = 49,611,386.25 kWh * 0.820 kg$CO_2$/kWh
   = 40,681 t$CO_2$
2. Project Emissions = (44/12) * Quantity of Coal consumed * Carbon content of coal
   = 14,433 t$CO_2$
3. Emission Reductions = Total Baseline Emissions – Project Emissions
   = (40,681 – 14,433) t$CO_2$
   = 26,248 t$CO_2$

## 5. Recommendations for Changes in the Monitoring Plan

No recommendation was provided to the client to improve their monitoring plan.

## 6. Overview of Results

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

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

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

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

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

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

*The evidences have been checked and collected. The revised monitoring report is attached with this verification report.*

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

*The baseline emission factor for grid electricity is fixed ex-ante and the value (0.820 kg$CO_2$ /kWh) has been checked against that mentioned in page 32 of the registered PDD.*

*Carbon content in Coal is analysed by the Central Institute of Mining and Fuel Research, Bilaspur Unit over the time period from April 2011 to March 2012 with monthly frequency as per the monitoring plan of the registered PDD. The coal carbon content values are within the range 20.21% to 34.10% as checked from the monthly reports issued by the institute and the same has been consistently reported in the MR. These have been cross checked against the respective monthly ultimate coal analysis laboratory reports.*

*The Calorific Value of Coal is analysed by the Central Institute of Mining and Fuel Research, Bilaspur Unit over the time period from April 2011 to March 2012 with monthly frequency as per the monitoring plan of the registered PDD. Tshe coal calorific values are within the range between 1895 to 3310 kCal/kg as checked from the monthly reports issued by the institute and the same has been consistently reported in the MR. These have been cross checked with the respective monthly ultimate coal analysis laboratory reports.*

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

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

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

*No recommendation was provided to the Client to change the Monitoring methodology.*

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

*The data used in anthropogenic emission reduction calculation is consistent with those contained in the registered PDD and monitoring plan. The emission reduction was 21,076.2 tCO2 for the period 01/04/2011 to 31/03/2012 as per the estimation made in the registered PDD. The actual emission reduction has been verified as 26,248 tCO2 for the same period. Clarification for such difference has been provided in section 3.6.*

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

*No such non conformity of the actual project activity and its operation with the registered project design document has been observed.*

Post monitoring report on UNFCCC website

*Yes, the monitoring report is available at ref. 0186 on the UNFCCC website*

*http://cdm.unfccc.int/Projects/DB/SGS-UKL1135954820.19/view*

## 7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Vandana Vidhyut Limited to perform the verification of the emission reductions reported for the CDM project "Rice Husk Based Power Project" UNFCCC Ref Number 0186 in the period 01/04/2011 – 31/03/2012.

The verification is based on the validated and registered project design document and the monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in Monitoring Report Version 04 dated 01/08/2012.

The management of Vandana Vidhyut Limited is responsible for the preparation, calculation and determination of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Monitoring Report Version 04 dated 01/08/2012. The development and maintenance of records and reporting procedures are in accordance with the monitoring report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 01/04/2011 – 31/03/2012 based on the reported emission reductions in the Monitoring Report Version 04 dated 01/08/2012 for the same period.

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

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

| | |
|---|---|
| Project Title: | Rice Husk Based Power Project |
| UNFCCC Reference Number: | 0186 |
| Registered PDD used for Verification: | Registered PDD – "Rice Husk based Power Project"<br>Version and Date of the registered PDD is not available |
| Methodology Used for Verification: | AMS I.D version 07, dated 28 November 2005 |
| Applicable Period: | 01/04/2011 to 31/03/2012 |
| Total GHG Emission Reductions Verified: | 26,248 $tCO_{2e}$ |

**Signed on behalf of the Verification Body by Authorized Signatory**

Signature:

Name: Siddharth Yadav

Date: 17/09/2012

## 8. Document References

| | |
|---|---|
| /1/ | Registered PDD – "Rice Husk based Power Project", UN Ref. 0186<br>http://cdm.unfccc.int/Projects/DB/SGS-UKL1135954820.19/view |
| /2/ | Validation Report of UN PA 0186<br>http://cdm.unfccc.int/Projects/DB/SGS-UKL1135954820.19/view |
| /3/ | Verification Report of previous monitoring period |
| /4/ | /4a/ Monitoring Report version 01, dated 26/04/2012<br>/4b/ Monitoring Report version 02, dated 10/06/2012<br>/4c/ Monitoring Report version 03, dated 07/07/2012<br>/4d/ Monitoring Report version 04, dated 01/08/2012 |
| /5/ | /5a/ Emission reduction calculation spreadsheet, version 01<br>/5b/ Emission reduction calculation spreadsheet, version 02 |
| /6/ | Validation and Verification Manual 1.2 (EB 55 Annex 1) |
| /7/ | Methodology AMS I.D version 07 dated 28 November 2005 |
| /8/ | EB 28 Annex 35 - General guidance on leakage in biomass project activities (Version 02) |
| /9/ | EB 47 Annex 28 - General guidance on leakage in biomass project activities (Version 03) |
| /10/ | Biomass Assessment Report (2011-2012), prepared by M/s. Power Tech Consulting Engineers |
| /11/ | Calibration certificates issued by M/s Yenkay Instruments and Controls Pvt. Ltd. for meter number 02131300 (in-house generation energy meter)<br>i. Ref. YB/VVL/2010-2011/EM-04 dated 27/01/2011 valid up to 26/01/2012<br>ii. Ref. YB/VVL/11-12/EM-01 dated 21/11/2011 valid up to 20/11/2012 |
| /12/ | Calibration of meter number MPU02814 (Auxiliary Consumption) carried out by CSPDCL<br>i. Calibration certificate dated 14/11/2011 with validity up to 13/11/2012<br>ii. Calibration certificate dated 16/11/2010 with validity up to 15/11/2011 |
| /13/ | Bunker capacity certificates issued by Power Tech Engineers<br>i. Ref: VVL-SK-16-10 dated 09/02/2011 done on 06/02/2011<br>ii. Ref: PT/12/467 dated 19/01/2012 done on 18/01/2012 |
| /14/ | Coal invoice from the South Eastern Coalfields Limited<br>SECL/RGH/CQM/ACCT/11-12/4903/1678 dated 04/01/2012 |
| /15/ | CSEB-HT monthly meter reading statements for the entire monitoring period from April 2011 to March 2012:<br>i. CSPDCL Statement for April 2011 dated 09/04/2011 and 30/04/2011<br>ii. CSPDCL Statement for May 2011 dated 31/05/2011<br>iii. CSPDCL Statement for June 2011 dated 01/07/2011<br>iv. CSPDCL Statement for July 2011 dated 01/08/2011<br>v. CSPDCL Statement for August 2011 dated 01/09/2011<br>vi. CSPDCL Statement for September 2011 dated 01/10/2011 |

| | |
|---|---|
| | vii. CSPDCL Statement for October 2011 dated 08/10/2011; 19/10/2011; 28/10/2011; 02/11/2011 and 09/11/2011<br>viii. CSPDCL Statement for December 2011 dated 11/01/2012<br>ix. CSPDCL Statement for January 2012 dated 01/02/2012<br>x. CSPDCL Statement for February 2012 dated 12/03/2012<br>xi. CSPDCL Statement for March 2012 dated 04/04/2012 |
| /16/ | Monthly Reports issued by the Central Institute of Mining and Fuel Research, Bilaspur Unit for the analysis of coal for the period April 2011 to March 2012:<br>i. Report No.11/P/26[A]<br>ii. Report No.11/P/26[B]<br>iii. Report No 11/P/29<br>iv. Report No. 11/P/43<br>v. Report No. 11/P/65<br>vi. Report No. 11/P/68<br>vii. Report No. 11/P/83<br>viii. Report No. 11/P/110<br>ix. Report No. 11/P/111[A]<br>x. Report No.11/P/111[B]<br>xi. Report No. 11/P/135<br>xii. Report No 11/P/144 |
| /17/ | Audited Annual Report for the financial year 2011 – 2012 |
| /18/ | Quarterly Internal Audit Reports<br>i. Ref No. CDM/VVL/VF07/001 dated 07/07/2011 for the period 01/04/2011 to 30/06/2011<br>ii. Ref No. CDM/VVL/VF07/002 dated 06/10/2011 for the period 01/07/2011 to 30/09/2011<br>iii. Ref No. CDM/VVL/VF07/003 dated 09/01/2012 for the period 01/10/2011 to 31/12/2011<br>iv. Ref No. CDM/VVL/VF07/004 dated 04/04/2012 for the period 01/01/2012 to 31/03/2012 |
| /19/ | Power Interruption details for the entire monitoring period from April 2011 to March 2012 |
| /20/ | Plant Records for the entire monitoring period from April 2011 to March 2012 |
| /21/ | In-house procedure for Calibration of Bomb Calorimeter as per the manual |
| /22/ | Defined procedure on “GHG Performance Monitoring, Measurement and Reporting of Data” |
| /23/ | In-house monthly ultimate coal analysis reports for the entire monitoring period from 01/04/2011 to 31/03/2012 |
| /24/ | Monthly Coal Stock Register for the entire monitoring period from April 2011 to March 2012 |
| /25/ | Monthly Rice Husk Stock Register for the entire monitoring period from April 2011 to March 2012 |
| /26/ | In-house laboratory records for analysis of rice-husk for the entire monitoring period from April 2011 to March 2012 |

## 9. Findings Overview

### Findings Overview Summary

| | CARs | CLs | FARs |
|---|---|---|---|
| **Total Number raised** | 04 | 01 | 00 |

| Date: | 29/05/2012 | | Raised by: | Assessment Team | | |
|---|---|---|---|---|---|---|
| Type: | CAR | Number: | #1 | | Reference: | AU4 - Section 2 sub section 4.2 |
| **Lead Assessor Comment:** | | | | **Date:** 29/05/2012 | | |
| Section B.1 of the MR mentions that "The plant was on a complete shutdown mode for maintenance related purposes from 1st November 2011 to 9th December 2011. Apart from this date, the shutdown of the plant has been rare and was stopped only in case of any emergency." PP is requested clarify the above statement and provide documentary evidence for the same. | | | | | | |
| **Project Participant Response:** | | | | **Date:** 04/06/2012 | | |
| The PP has incorporated the relevant dates in section B.1 of the Monitoring Report Version 02 dated 10/06/2012. | | | | | | |
| **Documentation Provided as Evidence by Project Participant:** | | | | | | |
| Power Interruption Report for the entire Monitoring Period. | | | | | | |
| **Information Verified by Lead Assessor:** | | | | | | |
| The shut down period mentioned in section B.1 of the MR has been verified against the power interruption reports for the entire monitoring period submitted by the PP | | | | | | |
| **Reasoning for not Acceptance or Acceptance and Close Out:** | | | | | | |
| PP has deleted the statement "The plant was on a complete shutdown mode for maintenance related purposes from 1st November 2011 to 9th December 2011. Apart from this date, the shutdown of the plant has been rare and was stopped only in case of any emergency." from section B.1 of the MR Version 02 dated 10/06/2012. PP has now mentioned the shutdown periods month wise for the entire monitoring period. This has been checked against the power interruption reports for the entire monitoring period and is found to be consistent. Hence accepted.<br>CAR #1 closed out | | | | | | |
| **Acceptance and Close out by Lead Assessor:** | | | | **Date:** 02/07/2012 | | |

| Date: | 29/05/2012 | | Raised by: | Assessment Team | |
|---|---|---|---|---|---|
| Type: | CAR | Number: | #2 | Reference: | AU4 - Section 3 |
| **Lead Assessor Comment:** | | | | **Date:** 29/05/2012 | |

**Section D.2**

1. PP is requested to clarify the inconsistency in the QA/QC procedure between the MR (Version 01) for MP7 and final MR (version 4) for MP6 for the parameters Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal.
2. PP is requested to clarify the validity of the previous calibrations along with the date of calibration for the following parameters: Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal.
3. PP is requested to clarify the date for the change in meters for the parameter “Power Export”.
4. PP is requested to clarify the date of receipt of the readings from CSEB for the month of October 2011; specifically 09/11/2011.
5. In the parameter auxiliary consumption, PP is requested to clarify the inconsistency between the accuracy class of the meter MOU 02814 between the MR (Version 01) for MP7 (0.5%) and final MR (version 4) for MP6 (0.55%).
6. PP is requested to clarify if annual rice husk and coal consumption checked from the audited Balance sheet of VVL, mentioned under the QA/QC procedures of the parameters Type of fuel used- Biomass; and Type of fuel used- Coal respectively, is the source of the value or a cross-check.
7. For the parameters Carbon content of Coal; Calorific value of fuel used- coal; Calorific value of fuel used- biomass; Efficiency of power generation; Plant Heat rate the value for the period 01/11/11 to 30/11/11 has been mentioned as zero since the plant was in shutdown. PP is requested to clarify if coal or biomass was purchased during this period. Please revise the MR and excel sheet accordingly.

| **Project Participant Response:** | **Date:** 04/06/2012 |
|---|---|

1. There was a typo error in the Monitoring Report Version 01 for MP 7 and the PP has corrected the same in the Monitoring Report Version 02.
2. The validity of the previous calibration has been incorporated in the Monitoring Report Version 02.
3. The PP would like to state the main and the check meters were as follows till 8th October 2011.

The details of the main meter and the check meter up to 8th October is as follows:

**Main Meter details:**
Type: Energy meter
Make: SEMS
Sl No.: CSE 40281
Accuracy class: 0.5 S

**Check meter details:**
Type: Energy Meter
Make: SEMS (ABT)
Sl No.: APM 08758
Accuracy class: 0.2 S

From 9th October onwards details of the main meter and the check meter are as follows:

| Details of Main Meter | Details of Check Meter |
|---|---|
| Type: Energy Meter<br>Make: SEMS (ABT)<br>Sl No.: APM 08758<br>Accuracy class: 0.2 S | 1) Type: Energy meter<br>Make: SEMS<br>Sl No.: CSE 40281<br>Accuracy class: 0.5 S |

Further to the Main and the check meters as have been mentioned above, there was an addition of a new additional check meter located at the sub-station itself on date 14/10/2011. The details of the additional check meter which was installed is as follows:
Type: Energy meter
Make: SEMS (ABT)
Sl No.: CSE 29187
Accuracy class: 0.2 S

The PP would like to further state that all of the three energy meters mentioned above are installed in Silpahari Sub-station of the Chhattisgarh State Electricity Board (CSEB). The installation, maintenance and the calibration of these above energy meters are under the jurisdiction of CSEB and is beyond the control of the PP. CSEB had communicated the details of the installation process to the head power plant. The Head Power Plant had in turn informed the entire power plant personnel via an Inter office Memo dated 14/10/2011. The Inter office Memo has been submitted to the DOE.

4. The PP would like to state that it received the data from CSEB for all the Months of the Monitoring Period, including October 2011. In the Month of October 2011, the PP received 4 separate communications from CSEB and the dates with the relevant details for the same are as follows:
    a. For dates 01/10/2011 – 08/10/2011 : On date 08/10/2011
    b. For date 09/10/2011 : On date 19/10/2011
    c. For dates 10/10/2011 – 16/10/2011: On date 28/10/2011
    d. For dates 17/10/2011 – 23/10/2011 : On date 02/11/2011
    e. For dates 24/10/2011 – 30/11/2011: On date 09/11/2011
5. The PP would like to clarify that the accuracy of the Auxiliary consumption meter is +/- 0.5%. It was by mistakenly mentioned as +/- 0.55% in the Monitoring Report of the last Monitoring Period (MP 6).
6. The PP would like to state that the figure from the balance sheet of Vandana Vidhyut Limited is a source of cross-check and not check. The rice husk consumption and the coal consumption in the power plant is sourced from the Rice Husk stock register and coal stock register.
7. The PP would like to state that coal and biomass both were purchased during the Month of November also, when the Power Plant was under shut down. The coal and husk purchased were subsequently tested for its calorific value. The same has been incorporated in the Monitoring Report Version 02, and the Excel computation sheet for calculation of emission reductions.

**Documentation Provided as Evidence by Project Participant:**

1. Monitoring Report version 02 dated 10/06/2012
2. Inter office Memo dated 14/10/2011.

**Information Verified by Lead Assessor:**

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|---|
| Section D.2 of the MR Version 02 dated 10/06/2012 was verified for the above mentioned revisions made by the PP |
| **Reasoning for not Acceptance or Acceptance and Close Out:** |
| 1. PP has clarified that the inconsistency in the QA/QC procedure between the MR for MP7 and final MR (version 4) for MP6, in section D.2 of the MR Version 02 dated 10/06/2012, for the parameters Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal is a typo error. PP has revised the QA/QC procedure to make it consistent with that of the previous monitoring period. This has been checked on the site and is accepted. Hence closed out.<br>2. PP has now mentioned the date of validity of the previous calibrations along with the date of calibration for the following parameters: Total electricity generated; Auxiliary Consumption; Type of fuel used- Biomass; and Type of fuel used- Coal in section D.2 of the MR Version 02 dated 10/06/2012. These dates are consistent with that mentioned in the final MR (version 4) for MP6. With this, it is now transparently mentioned in the MR Version 02 dated 10/06/2012 that the calibration covers the entire monitoring period. Hence closed out.<br>3. PP has mentioned the complete dates (8th October 2011 and 9th October 2011) for the change in meters for the parameter "Power Export" in section D.2 of the MR Version 02 dated 10/06/2012. This has been checked and is accepted. Hence closed out.<br>4. PP has clarified that the dates mentioned in the table of the parameter 'power export' in section D.2 of the MR Version 02 dated 10/06/2012 are the dates on which the meter readings were received from CSEB. For the month of October 2011, the PP has received 5 separate communications from CSEB on 08/10/2011, 19/10/2011, 28/10/2011, 02/11/2011 and 09/11/2011. The dates have been verified against the communication received and are found to be correct. Hence closed out.<br>5. The PP has clarified that the accuracy of the Auxiliary consumption meter (MOU02814) is 0.5s and it was mistakenly mentioned as +/- 0.55% in the Monitoring Report of the previous Monitoring Period (MP 6). The accuracy class of 0.5s was verified against the meter test certificate issued by CSPDCL. This has no effect on the ER calculations. Hence closed.<br>6. PP has clarified that the balance sheet of Vandana Vidhyut Limited is a cross-check and not check. The same has been revised under the QA/QC procedures in tables of the parameters Type of fuel used- Biomass and Type of fuel used- Coal in section D.2 of the MR Version 02 dated 10/06/2012. This has been checked and found to be correct. Hence closed out.<br>7. PP has clarified that coal and biomass both were purchased during the Month of November 2011, when the Power Plant was under shut down. The same has been verified against the coal stock register and the rice husk stock register and is found to be correct. The corresponding calorific values of the coal and husk purchased during this period have now been mentioned in the Monitoring Report Version 02, and the Excel computation sheet for calculation of emission reductions. Hence closed out.<br>CAR #2 closed out |
| **Acceptance and Close out by Lead Assessor:** **Date:** 02/07/2012 |

| | | | | | |
|---|---|---|---|---|---|
| Date: | 29/05/2012 | | Raised by: | Assessment Team | |
| Type: | CAR | Number: | #3 | Reference: | AU4 - Section 3 |
| **Lead Assessor Comment:** | | | **Date:** 29/05/2012 | | |
| 1. In the single line diagram in section C of the MR Version 01 dated 26/04/2012, the main meter and check meter is not clearly indicated. PP is requested to clarify the same.<br>2. During the site visit, an additional energy check meter (No. CSE29187) for the parameter "Power Export" was observed at the sub-station. The verification team was informed by the PP that the new meter was installed in October 2011. PP is requested to address the following points regarding the meter:<br>a. Please clarify the details of the new meter in the relevant sections (C & D.2) of the MR<br>b. Please submit evidence for installation of the meter<br>c. Please clarify the exchange in the main meter and check meter after 9th October 2011, as mentioned in section D.2 of the MR Version 01 dated 26/04/2012 under parameter "Power export"<br>d. Please clarify the difference in the source of the meter readings<br>3. PP is requested to clarify the inconsistency in the Make of the meter no. 02131300 in section C (line diagram) and in section D.2 under the parameter "Total electricity generated". | | | | | |
| **Project Participant Response:** | | | **Date:** 04/06/2012 | | |

1. The PP has clearly indicated the main meter and the check meter in the Monitoring Report Version 02. The diagram has been inserted in the Single Line Diagram in the section C of the MR Version 02.
2.
    a. The details of the new meter has been included in section C and section D.2 of the Monitoring Report version 02.
    b. The PP would like to state that it had received a verbal intimation from the CSEB regarding the addition of an additional check meter at the sub-station. The head of the power plant had informed the concerned persons of the plant via a Inter office Memo dated 14/10/2011. Any control over the energy meters located at the sub station is beyond the control of the PP. The meters have been physically verified by the DOE.
    c. The PP would like to state that there was an addition of a new meter on 14/10/2011. It was an energy meter and the details of the same are as follows:

Type: Energy meter
Make: SEMS
Sl No.: CSE 29187
Accuracy class: 0.2 S

Further, the PP had received a verbal intimation from the CSEB regarding the addition of an additional check meter at the sub-station. Any control over the energy meters located at the sub station is beyond the control of the PP. The head of the power plant had informed the concerned persons of the plant via a Inter office Memo dated 14/10/2011. The same has been submitted to the DOE.The details of the main meter and the check meter up to 8th October is as follows:

**Main Meter details:**
Type: Energy meter
Make: SEMS
Sl No.: CSE 40281
Accuracy class: 0.5 S
**Check meter details:**
Type: Energy Meter
Make: SEMS (ABT)
Sl No.: APM 08758
Accuracy class: 0.2 S

From 9th October onwards details of the main meter and the check meter are as follows:

**Main Meter details:**
Type: Energy Meter
Make: SEMS (ABT)
Sl No.: APM 08758
Accuracy class: 0.2 S
**Check meter details:**
Type: Energy meter
Make: SEMS
Sl No.: CSE 40281
Accuracy class: 0.5 S

The PP would like to further state that CSEB officials interchanged the main meter and check meter on 9th October 2011 to take the Net Export readings from ABT Meter and of better accuracy class i.e 0.2 S.

In addition to above check meter there was an addition of a new check meter on 14/10/2011, details of the same are as follows:
Type: Energy meter
Make: SEMS
Sl No.: CSE 29187
Accuracy class: 0.2 S

**D.** The PP would like to further state that on and before 8th October 2011, the readings were based on the energy meter whose details are as below:

Main Meter details:
Type: Energy meter
Make: SEMS
Sl No.: CSE 40281
Accuracy class: 0.5 S

Further, after 9th October 2011, the readings were based on the energy meter whose details are as below:
Main Meter details:
Type: Energy Meter
Make: SEMS (ABT)
Sl No.: APM 08758
Accuracy class: 0.2 S

The PP would like to further state that the main meter has undergone an accuracy change and the same has been improved from Accuracy class: 0.5 S to Accuracy class: 0.2 S.

3. The PP would like to state that it has made the relevant changes in the Monitoring report version 02. The Sl no. of the gross generation meter is consistent. The details of the meter is as follows:

Type: ABB P+
Accuracy class : +/- 0.5%
Sl No. : 02131300

**Documentation Provided as Evidence by Project Participant:**

1. Inter-office Memo dated 14/10/2011.
2. Monitoring Report Version 02 dated 10/06/2012.

**Information Verified by Lead Assessor:**

The revised line diagram in section C and the meter details in section D.2 of the MR Version 02 dated 10/06/2012 have been verified as per the PP response above.

**Reasoning for not Acceptance or Acceptance and Close Out:**

1. PP has revised the line diagram in section C of the MR Version 02 dated 10/06/2012 to clearly indicate the main meter and the check meter. This has been checked against the observations during the site visit and is found to be correct. Hence closed out.
2. The following issues regarding the new meter were addressed by the PP:
    a. PP has included the details of the new meter (No. CSE 29187) in the line diagram in section C and the table of parameter "Power Export" in section D.2 of the MR Version 02 dated 10/06/2012. The meter details have been checked and found consistent with the actual meter details observed during the site visit. Hence accepted and closed out.
    b. PP has submitted an inter-office memo dated 14/10/2011 which indicates the installation of the additional check meter (CSE 29187) at the substation. The new meter configuration of one main meter and 2 check meters were verified during the site visit. The details of the meters mentioned in the MR Version 02 dated 10/06/2012 are consistent with the meter details observed at the sub-station during the site visit. Further it was also physically verified at the sub-station that the meters are sealed and in control (maintenance; replacement and calibration) of the CSEB. The PP has no control. Hence accepted and closed out.
    c. PP has mentioned that the main meter and check meter were exchanged by the state utility from 9th October 2011 onwards. This was confirmed from the monthly meter reading statement issued by the state utility. The statements issued prior to 9th October 2011 mentioned meter no. CSE 40281 as the main meter. The statements issued from 9th October 2011 onwards mention meter no. APM 08758 as the main meter. It was physically verified at the sub-station that the meters are sealed and in control (maintenance; replacement and calibration) of the CSEB and the PP has no role in this. It was also noted that the new main meter was of higher accuracy class (0.2s) than the previous on (0.5s). Hence accepted and closed out.
    d. PP has confirmed that prior to 9th October 2011 meter no. CSE 40281 was the main meter and from 9th October 2011 onwards meter no. APM 08758 is the main meter. This was verified from the monthly meter reading statement issued by the state utility. It was physically verified at the sub-station that the meters are sealed and in control (maintenance; replacement and calibration) of the CSEB and the PP has no role in this. It was also noted that the new main meter was of higher accuracy class (0.2s) than the previous on (0.5s). Hence accepted and closed out. Hence closed out.
3. PP has now consistently mentioned the Make of the meter no. 02131300 in section C (line diagram) and in section D.2 under the parameter "Total electricity generated" as ABB P+. This has been checked and hence closed out.

CAR #3 closed out.

| **Acceptance and Close out by Lead Assessor:** | **Date:** 02/07/2012 |
|---|---|

| Date: | 29/05/2012 | | Raised by: | Assessment Team | |
|---|---|---|---|---|---|
| Type: | CL | Number: | #4 | Reference: | AU4 Section 3 / ER Excel sheet |

| **Lead Assessor Comment:** | **Date:** 29/05/2012 |
|---|---|

1. In sheet "April-11 to March-12" the Export to CSEB Grid (As per CSEB Statement) is higher than Export to CSEB (As per the in-house Export Meter of SEMS) for the months of April to June 2011; February 2012 & March 2012. PP is requested to clarify the same.
2. In sheet "April-11 to March-12", for the months of May 2011 and March 2012 the Gross Generation values are comparable, however the heat input is varying by 13%. Please clarify the same.

| **Project Participant Response:** | **Date:** 04/06/2012 |
|---|---|

1. The PP would like to state that the CSEB readings are based on readings for the entire month. But the time of noting the readings is not fixed. The final reading at the end of the month is sometimes taken on the last day of the month, the first day of the next month. Further, the timings of taking the reading is not fixed. Hence, it is difficult to compare the readings on a month wise basis. Hence, it is difficult to compare the readings of the in-house Export Meter of SEMS and the Readings as per CSEB statement.
2. The PP would like to state that there is a difference in the power plant performance for all the months. The power plant performance does vary on a host of parameters such as boiler efficiency and turbine heat rate. They are subsequently dependent on carbon % in coal, husk, the GCV of coal and rice husk, the moisture content in rice husk and depending on these parameters; the power plant performance can significantly go up and down. Therefore, it is difficult to ascertain the power plant performance just based on the input heat value. Additionally, the PP has also referred to the excel calculation sheets submitted to the DOE, wherein the efficiency of the power plants achieved have been calculated and presented. It can be seen that the efficiency of the power plant for the month of May was 21.72%, while that for the Month of March was 24.90%.

**Documentation Provided as Evidence by Project Participant:**

-

**Information Verified by Lead Assessor:**

PP response above has been checked

**Reasoning for not Acceptance or Acceptance and Close Out:**

1. PP response is justified. The time of taking the readings at the in-house meter and at the sub-station are not the same. Hence for some months (April to June 2011; February 2012 & March 2012) the Export to CSEB Grid (As per CSEB Statement) is higher than Export to CSEB (As per the in-house Export Meter of SEMS). The cumulative difference between the values measured at the sub-station meter and the in-house meter is 11.31 MWh. Considering that the capacity of the plant is 7.7MW, this difference is small and hence justified. It has also been checked and confirmed during the site visit that the sub-station meters are sealed and in control of the state utility. It is not in control of the PP. Hence closed out.
2. PP response is not clear. It is not justified how, when the Gross Generation values are comparable, the heat input is varying by 13%. Hence open.

CL #4 open

| | |
|---|---|
| **Acceptance and Close out by Lead Assessor: Open** | **Date:** 02/07/2012 |
| **Project Participant Response:** | **Date:** 07/07/2012 |

2. The PP would like to further state the following facts. The Power Plant performance depends on a host of other parameters such as such as boiler efficiency and turbine heat rate. They are subsequently dependent on carbon % in coal, husk, the GCV of coal and rice husk, the moisture content in rice husk and depending on these parameters; the power plant performance can significantly go up and down. Therefore, it is difficult to ascertain the power plant performance just based on the input heat value. The PP would like to further state that all the parameters as have been mentioned above do not fall under the purview of the monitoring parameters. As a thumb rule for any case, the efficiency of a power plant depends is a function of boiler efficiency and the turbine heat rate. These two specific quantities are themselves functions of a host of other variables. Therefore, the PP would like to state that the gross electricity generation cannot be a mere function of the Input heat value in Kcal.

The PP claims emission reduction based on the units of net electricity that is exported to the grid. This is monitored via a dedicated meters located at the CSEB Grid end and the same was also verified by the DOE during the site visit. All the communications from the CSEB to Vandana Vidhyut Limited specifying the unit of electricity being supplied to the grid have been submitted to the DOE. It is imperative to note that the gross generation figures do not contribute in the calculation of emission reductions. Even then, the PP does it monitoring to ensure a safe and transparent system of monitoring.

**Documentation Provided as Evidence by Project Participant:**

-

**Information Verified by Lead Assessor:**

The above PP response has been verified

**Reasoning for not Acceptance or Acceptance and Close Out:**

| |
|---|
| The justification provided by the PP for the gross generation not being a function of the Input heat value alone, is accepted.<br>It is also noted that the gross generation values are not used in the emission reduction calculations. The emission reductions claimed for the project activity is based on the net electricity exported to the grid which is measured at the meters located in the sub-station. The meters are in the control of the state utility and the PP has no control on the same. This has been verified during the site visit. PP has submitted the statements from CSEB stating the quantity of electricity supplied to the grid. These have been checked to confirm that the net electricity exported to the grid as mentioned in the statements is the value used for the emission reduction calculations.<br>Hence closed. |
| **Acceptance and Close out by Lead Assessor:** **Date:** 12/07/2012 |

| | | | | | |
|---|---|---|---|---|---|
| Date: | 31/07/2012 | | Raised by: | Assessment Team | |
| Type: | CAR | Number: | #5 | Reference: | AU4 - Section 2 sub section 4.2 |

| |
|---|
| **Lead Assessor Comment:** **Date:** 31/07/2012 |
| 1. Section A.2 of the MR mentions “Vandana Vidhyut Limited” only as the project participant. There are two project participants as per the UNFCCC webpage of this project activity. PP is requested to clarify the inconsistency between section A.2 and the UNFCCC webpage.<br>2. For the parameter “Total electricity generated” in Section D.2 of the MR, against the row “source” it is mentioned “Plant Log Sheets further cross checked with DCS logs”. PP is requested to clarify the appropriateness of the same. |
| **Project Participant Response:** **Date:** 01/08/2012 |
| 1. The PP has included the name of the second PP for the project activity in section A.2 of the Revised Monitoring Report version 04. Bunge Emissions Fund Limited has been added as a Project Proponent in the relevant section.<br>2. The PP uses the Plant Log Books as the primary source of data for the computation of emission reductions. Thereafter, the same is further cross-checked against the DCS data for cross checking. It was incorporated as a typographical error in the MR and has been suitably corrected. |
| **Documentation Provided as Evidence by Project Participant:** |
| Revised MR |
| **Information Verified by Lead Assessor:** |
| Section A.2 of the MR version 04 dated 01/08/2012 was checked for the PP names.<br>The source of the parameter “Total electricity generated” in Section D.2 of the MR version 04 dated 01/08/2012, was checked for the revisions made by the PP |
| **Reasoning for not Acceptance or Acceptance and Close Out:** |
| 1. Section A.2 of the MR version 04 dated 01/08/2012 now mentions ‘Vandana Vidhyut Limited’ and ‘Bunge Emissions Fund Limited’ as the project participants. This is consistent with the UNFCCC webpage. Hence accepted.<br>2. PP has deleted the cross-check with DCS logs from the row source of the parameter “Total electricity generated” in Section D.2 of the MR version 04 dated 01/08/2012 and has inserted the same in the row QA/QC procedure. This is appropriate and hence accepted.<br>CAR #5 closed out |
| **Acceptance and Close out by Lead Assessor:** **Date:** 13/08/2012 |

## 10. Statement of Competence

Name: Sudeep Kodialbail

**Status**

| | | | | | |
|---|---|---|---|---|---|
| - | Lead Assessor | x | - | Expert | x |
| - | Assessor | x | - | Financial Expert | |
| - | Local Assessor | India | - | Technical Reviewer | |

**Scopes of Expertise**

| | |
|---|---|
| **1. Energy Industries (renewable / non-renewable)** | **x** |
| Technical Area(s): *TA 1.2 Energy generation from renewable energy sources* | |
| **2. Energy Distribution** | |
| Technical Area(s): | |
| **3. Energy Demand** | |
| Technical Area(s): | |
| **4. Manufacturing** | |
| Technical Area(s): | |
| **5. Chemical Industry** | |
| Technical Area(s): | |
| **6. Construction** | |
| Technical Area(s): | |
| **7. Transport** | |
| Technical Area(s): | |
| **8. Mining/Mineral Production** | |
| Technical Area(s): | |
| **9. Metal Production** | |
| Technical Area(s): | |
| **10. Fugitive Emissions from Fuels (solid, oil and gas)** | |
| Technical Area(s): | |
| **11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride** | |
| Technical Area(s): | |
| **12. Solvent Use** | |
| Technical Area(s): | |
| **13. Waste Handling and Disposal** | |
| Technical Area(s): | |
| **14. Afforestation and Reforestation** | |
| Technical Area(s): | |
| **15. Agriculture** | |
| Technical Area(s): | |

Approved Member of Staff by: Siddharth Yadav Date: 06/02/2012

Name: Shivaji Chakraborty

**Status**

| | | | | | |
|---|---|---|---|---|---|
| - | Lead Assessor | x | - | Expert | x |
| - | Assessor | x | - | Financial Expert | |
| - | Local Assessor | India | - | Technical Reviewer | |

**Scopes of Expertise**

1. **Energy Industries (renewable / non-renewable)** **x**

Technical Area(s*): TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar*
*TA 1.2 Energy generation from renewable energy sources*

2. **Energy Distribution** **x**

Technical Area(s*): TA 2.1 Electricity distribution*
*TA 2.2 Heat distribution*

3. **Energy Demand** **x**

Technical Area(s*): TA 3.1 Energy Demand*

4. **Manufacturing**

Technical Area(s*):*

5. **Chemical Industry**

Technical Area(s*):*

6. **Construction**

Technical Area(s*):*

7. **Transport**

Technical Area(s*):*

8. **Mining/Mineral Production**

Technical Area(s*):*

9. **Metal Production**

Technical Area(s*):*

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

Technical Area(s*):*

11. **Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride**

Technical Area(s*):*

12. **Solvent Use**

Technical Area(s*):*

13. **Waste Handling and Disposal**

Technical Area(s*):*

14. **Afforestation and Reforestation**

Technical Area(s*):*

15. **Agriculture**

Technical Area(s*):*

Approved Member of Staff by: Siddharth Yadav Date: 01/08/2012

Name: Tarit Roy

**Status**

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

**Scopes of Expertise**

| | |
|---|---|
| **1. Energy Industries (renewable / non-renewable)** | **x** |
| Technical Area(s*): TA 1.1 Thermal energy generation from fossil fuels and biomass including thermal electricity from solar* | |
| **2. Energy Distribution** | |
| Technical Area(s*):* | |
| **3. Energy Demand** | |
| Technical Area(s*):* | |
| **4. Manufacturing** | **x** |
| Technical Area(s*): TA4.3 Iron and steel* | |
| **5. Chemical Industry** | |
| Technical Area(s*):* | |
| **6. Construction** | |
| Technical Area(s*):* | |
| **7. Transport** | |
| Technical Area(s*):* | |
| **8. Mining/Mineral Production** | |
| Technical Area(s*):* | |
| **9. Metal Production** | |
| Technical Area(s*):* | |
| **10. Fugitive Emissions from Fuels (solid, oil and gas)** | |
| Technical Area(s*):* | |
| **11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride** | |
| Technical Area(s*):* | |
| **12. Solvent Use** | |
| Technical Area(s*):* | |
| **13. Waste Handling and Disposal** | |
| Technical Area(s*):* | |
| **14. Afforestation and Reforestation** | |
| Technical Area(s*):* | |
| **15. Agriculture** | |
| Technical Area(s*):* | |

Approved Member of Staff by: Siddharth Yadav Date: 13/02/2012

Name: Ravi Kant Soni

**Status**

| | | | | | |
|---|---|---|---|---|---|
| - | Lead Assessor | x | - | Expert | x |
| - | Assessor | x | - | Financial Expert | |
| - | Local Assessor | India | - | Technical Reviewer | x |

**Scopes of Expertise**

| | |
|---|---|
| **1. Energy Industries (renewable / non-renewable)** | **x** |
| Technical Area(s*):* TA 1.2 Energy generation from renewable energy sources ( Wind) | |
| **2. Energy Distribution** | |
| Technical Area(s*):* | |
| **3. Energy Demand** | |
| Technical Area(s*):* | |
| **4. Manufacturing** | |
| Technical Area(s*):* | |
| **5. Chemical Industry** | |
| Technical Area(s*):* | |
| **6. Construction** | |
| Technical Area(s*):* | |
| **7. Transport** | |
| Technical Area(s*):* | |
| **8. Mining/Mineral Production** | |
| Technical Area(s*):* | |
| **9. Metal Production** | |
| Technical Area(s*):* | |
| **10. Fugitive Emissions from Fuels (solid, oil and gas)** | |
| Technical Area(s*):* | |
| **11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride** | |
| Technical Area(s*):* | |
| **12. Solvent Use** | |
| Technical Area(s*):* | |
| **13. Waste Handling and Disposal** | |
| Technical Area(s*):* | |
| **14. Afforestation and Reforestation** | |
| Technical Area(s*):* | |
| **15. Agriculture** | |
| Technical Area(s*):* | |

Approved Member of Staff by: Siddharth Yadav Date: 05/04/2012

Name: NAYAN JYOTI DEKA

**Status**

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

**Scopes of Expertise**

**1. Energy Industries (renewable / non-renewable)** **x**

Technical Area(s*):*
*TA 1.1 Thermal energy generation from fossil fuels and biomass*
*TA 1.2 Energy generation from renewable energy sources*

**2. Energy Distribution**

Technical Area(s*):*

**3. Energy Demand**

Technical Area(s*):*

**4. Manufacturing**

Technical Area(s*):*

**5. Chemical Industry**

Technical Area(s*):*

**6. Construction**

Technical Area(s*):*

**7. Transport**

Technical Area(s*):*

**8. Mining/Mineral Production**

Technical Area(s*):*

**9. Metal Production**

Technical Area(s*):*

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

Technical Area(s*):*

**11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride**

Technical Area(s*):*

**12. Solvent Use**

Technical Area(s*):*

**13. Waste Handling and Disposal**

Technical Area(s*):*

**14. Afforestation and Reforestation**

Technical Area(s*):*

**15. Agriculture**

Technical Area(s*):*

Approved Member of Staff by: Siddharth Yadav Date: 20/07/2012

## 11. Photographic Evidence

Unique reference number: 02131300
Parameter: Total Electricity Generated (kWh)
Name of equipment: ABB Energy Meter
Date: 28/05/2012


Unique reference number: MPU02814
Parameter: Auxiliary Consumption (kWh)
Name of equipment: Alstom Energy Meter/SEMS
Date: 28/05/2012

Unique reference number: CSE 40281; APM 08758 and CSE 29187 | Parameter: Power Export (kWh)

Name of equipment: SEMS Export Meter (CSEB) | Date: 28/05/2012


Unique reference number: APM 08758 | Parameter: Power Export (kWh)

Name of equipment: SEMS Export Meter (CSEB) | Date: 28/05/2012

Unique reference number: CSE 29187 Parameter: Power Export (kWh)

Name of equipment: SEMS Export Meter (CSEB) Date: 28/05/2012


Unique reference number: BCM/21018 Parameter: Calorific Value of Rice Husk (kCal/kg)

Name of equipment: Advance Research Instrument Corporation – Bomb Calorimeter Date: 28/05/2012


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