



VERIFICATION / CERTIFICATION REPORT

4.5 MW BIOMASS (LOW DENSITY
CROP RESIDUES) BASED POWER
GENERATION UNIT OF MALAVALLI
POWER PLANT PVT LTD. IN INDIA

(UNFCCC Registration Ref. No. 298)

Monitoring Period:
1 May 2009 to 30 June 2010

REPORT NO. 2011-9200

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DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

Date of first issue: 29 March 2011	Project No.: PRJC-288890-2011-CCS-IND	
Recommended for approval Chandrashekara Kumaraswamy	Approved by Michael Lehmann	Organisational unit: DNV Climate Change and Environmental Services
Client: Malavalli Power Plant Pvt. Ltd.		Client ref.: Mr. K.Krishnan

DNV CLIMATE CHANGE
SERVICES AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 994 774 352 MVA

Summary:

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” in India (UNFCCC Registration Ref. No. 298) for the period 1 May 2009 to 30 June 2010.

In our opinion, the GHG emission reductions reported for the project in the revised monitoring report (version 02) of 22 March 2011 are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-I.D (version 13), the revised monitoring plan approved on 5 January 2011 and the registered Project Design Document of 24 April 2008.

Hence, DNV is able to certify that the emission reductions from the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” in India during the period 1 May 2009 to 30 June 2010 amount to 15 036 tonnes of CO₂ equivalent.

Report No.: 2011-9200		Subject Group: Environment	
Report title: 4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd. in India			
Work carried out by: Gaurav Srivastava, Thamizharasi Kaliaperumal, Kakaraparthi Venkata Raman			
Work verified by: Krishnan Namboodiri,			
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**Abbreviations**

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
KPTCL	Karnataka Power Transmission Corporation Limited
KSPCB	Karnataka State Pollution Control Board
MESCL	Mangalore Electricity Supply Company Limited
MP	Monitoring Plan
MPPPL	Malavalli Power Plant Pvt. Ltd.
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
RMP	Revised Monitoring Plan
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Malavalli Power Plant Pvt. Ltd. has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of emission reductions reported for the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” (the project) in the period 1 May 2009 to 30 June 2010. This report contains the findings from the verification and a certification statement for the certified emission reductions.

1.1 Objective

Verification is the periodic independent review and *ex post* determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” for the period 1 May 2009 to 30 June 2010.

1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

1.3 Description of the project activity

Project Parties:	India and Switzerland
Title of project activity:	4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.
UNFCCC registration No:	298
Baseline and monitoring methodology	AMS-I.D (version 13)



Project Participants:	Malavalli Power Plant Pvt Ltd from India, myclimate – The Climate Protection Partnership and South Pole Carbon Asset Management Ltd. from Switzerland.
Location of the project activity:	Kirugaval village, Malavalli Taluka, Mandya District, Karnataka state, India
Project's crediting period:	1 August 2008 to 31 July 2015 (second renewable crediting period)

Period verified in this verification: 1 May 2009 to 30 June 2010

The project activity is a 4.5 MW (gross) capacity grid connected biomass residues based renewable energy power plant with high pressure stem turbine configuration that comprises a condensing steam turbo generator unit with a matching boiler of travelling grate type capable of firing multi fuel of low density crop residues and produces steam at 22 tonnes per hour. Biomass for the activity is sourced from the surrounding regions of Kirugaval village, Malavalli Taluka in Karnataka state. The generated electricity is exported to the state owned power utility company Karnataka Power Transmission Corporation Ltd. (KPTCL). Auxiliary plant facilities such as biomass storage and handling systems, ash handling system, air pollution control devices and cooling water systems have all been established.

The project activity results in the reduction of GHG emissions through displacement of fossil fuel based state grid power by the 4.5 MW biomass residues based renewable power plant.

1.4 Methodology for determining emission reductions

Baseline emissions: The project's baseline emissions are determined as the product of the net electricity supplied to the southern regional grid of India by the project activity and the combined margin CO₂ emission coefficient for the southern regional grid of India (at 0.780 tCO₂/MWh) /3/. The combined margin CO₂ emission coefficient for the southern regional grid of India has been sourced from data by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India /14/. CEA has published a database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This value is fixed *ex-ante* for the entire renewable crediting period /3/.

As per the monitoring methodology AMS-I.D (version 13) /9/, the electricity generated (metered) shall be compared with the amount of electricity generated calculated using the *ex-ante* fixed specific fuel consumption (of each kind of biomass residues) and the quantity of each type of biomass residues consumed during the verification period, and the lower of the two values should be used to calculate the baseline emissions.

Project Emission: The project activity is equipped with D.G. set, hence emissions due to diesel consumed during emergencies consumption is accounted as project emission.

Leakage: Following sources have been covered under emissions due to leakage:

- Leakage due to competing use of biomass residues
- Leakage due to transportation of biomass residues

Emission Reduction (ER) = Baseline emission – Project Emission – Leakage.



2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

- i) Gross electricity generated by the project activity- monitored continuously and recorded on daily basis /15/.
- ii) Net electricity exported to the grid (as difference of gross export and import to/from grid) – monitored continuously and recorded on daily basis /15/.
- iii) Biomass quantity utilised by the project activity (each kind of biomass residues) - measured and recorded on daily basis /25/.
- iv) Leakage emissions due to transportation of biomass residues on daily basis /25/.
- v) Net Calorific Value of each kind of biomass residues through sample testing in lab on monthly basis /24/.
- vi) Annual surplus biomass residues availability /26/.

Verification team

Role	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 1.1 competence
Team leader (Verifier)	Kakaraparthi	Venkata Raman	India	✓	✓	✓	✓		✓
Verifier	Srivastava	Gaurav	India	✓	✓	✓			
Assessor under training	Kaliaperumal	Thamizharasi	India	✓	✓	✓			
Technical reviewer	Namboodiri	Krishnan	India					✓	✓

Duration of verification

Webhosting of MR: 28 January 2011
 Preparations: From 9 March 2011 to 11 March 2011
 On-site verification: 18 March 2011
 Reporting, calculation checks and QA/QC: From 29 March 2011 to 2 June 2011

2.1 Review of documentation

The monitoring reports (webhosted version 1 dated 16 December 2010 and revised version 2 dated 22 March 2011) /1/ and the emission reduction calculations (version 1 dated 16 December 2010 and revised version 2 dated 22 March 2011) /2/, provided in the form of



spreadsheets submitted by Malavalli Power Plant Pvt. Ltd., were assessed as a part of the verification. In addition, the project's registered Project Design Document /3/, the revised monitoring plan approved by UNFCCC on 5 January 2011 /5/, the project's validation report /4/ and verification/certification report /7/ for previous monitored period were also assessed. Moreover, other documents referenced as (/8/-/30/) were also assessed as evidence.

2.2 Site visit

Detailed verification of all data contained in the monitoring report was performed during the site visit by DNV at project plant on 18 March 2011. During the site visit, DNV has verified the actual implementation and operation of the project as described in the registered PDD /3/. The instruments and records used for monitoring electricity, quantity of biomass residues consumed, net calorific value of each kind of biomass residues, project emissions due to diesel consumption in diesel generator and leakage emissions due to transportation of biomass residues were checked, including the calibration records for these instruments. These were found to be in order.

Interviewed organisation	Interview topics
Malavalli Power Plant Pvt. Ltd.	➤ Whether the project has been implemented as planned ➤ Calculation of emission reductions ➤ Adherence to monitoring plan established in approved revised monitoring plan and registered project design document. ➤ Management procedures like internal audits and reviews to minimise uncertainties in data monitoring and data management. ➤ Calibration records ➤ Project performance ➤ Lab analysis records for NCV of each kind of biomass residues ➤ Resources, training needs and procedures for operation and maintenance. ➤ Surplus availability of fuel in region. ➤ Leakage emissions due to transportation

2.3 Reporting of findings

A corrective action request (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.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.



A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

During this verification, five CARs have been raised by DNV (refer to Appendix A of the report).



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” for the period 1 May 2009 to 30 June 2010.

3.1 Remaining issues, CARs, FARs from previous validation / verification

While closing CARs of the previous verification of the project activity /7/, DNV requested project proponent to seek revision of monitoring plan to include monitoring of NCV of each kind of biomass residue on monthly basis prior to subsequent verification as monthly monitoring of NCV of each kind of biomass residue represents better monitoring practice in comparison to biomass batch defined by project proponent. Subsequently the revision of monitoring plan has been approved by UNFCCC /5/. Details of CAR from the previous verification have been provided in Appendix A.

3.2 Project implementation

As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in registered PDD of 24 April 2008 /3/.

The project has been implemented as planned. The project boundaries and key equipments for the project activity are in line with the registered PDD /3/. The project boundary covers the fuel storage, boiler, steam turbine generator, other accessory equipments and KPTCL grid interconnection. The following equipment has been installed as mentioned in the registered PPD:

- 4.5 MW gross capacity steam turbine
- Travelling grate technology type boiler (capacity 22 tonnes per hour steam at 42 atmospheric pressure and 440°C temperature)
- Ash handling system for effective disposal of fly ash
- Demineralised water plant for boiler feed water supply
- Electro static precipitator
- Energy meters for monitoring electricity

After trial operations, commercial power generation from CPP started on 1 August 2001 after obtaining all statutory clearances. After implementation and commissioning of the project technology, no changes have been carried out or are envisaged. These facts have been verified by DNV during the site visit.

Valid air and water consents have also been obtained from the Karnataka State Pollution Control Board /23/. In addition the verification of air and effluent reports confirm that relevant pollution parameters as specified in the consents are within the specified limits /23/.

Biomass residues used as fuel in the plant are agriculture wastes, comprising of crop residues like cane trash, coconut fronds, toppings of plantation wood (casuarinas & eucalyptus), corn cobs, rice husk, mill residues like saw mill waste, etc. This has been confirmed through the verification of invoices / receipts from suppliers of biomass /25/, the records maintained at the weighbridge centre /25/ and stock balance prepared on daily basis /28/.



The total plant outages of 2 525 hours and 21 minutes have been recorded (during the monitoring period of 1 May 2009 to 30 June 2010) and has verified from daily plant performance sheet /15/ and monthly operation and maintenance log book /29/.

The project activity has already been issued CER's for the period 1 August 2008 to 30 April 2009 (for second renewable crediting period).

3.3 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the revised monitoring plan approved on 5 January 2011 /5/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.D (version 13) /9/.

3.4 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the revised monitoring plan approved on 5 January 2011 /5/ and monitoring methodology AMS-I.D. (version 13) /9/, which requires following to be monitored:

Baseline emission: Baseline emissions for the project activity have been determined as the product of the electricity supplied to the southern grid by the project activity and combined margin emission factor for the grid. The *ex-ante* figure of 0.780 tCO₂e/MWh /14/ in the validated and registered PDD /3/ has been used. During the current verification period (1 May 2009 to 30 June 2010), it has been verified and confirmed that the project activity has generated 23 392.200 MWh (gross) /15/ and has displaced 19 805.570 MWh (net) /15/ electricity in the southern electricity grid.

- **Electricity production generated in a year “y”:** The gross electricity generated by the project activity has been monitored continuously via tri-vector energy meter (Tag no: E38/3721-0201) and recorded on shift basis by shift in charges. The shift readings of the plant are then aggregated into daily readings and maintained in daily plant performance sheet /15/. The gross energy meter used to monitor the gross electricity generation from the project activity is of 1S accuracy class and is tested and calibrated annually by external third party /20/. During the current verification period (1 May 2009 to 30 June 2010), it has been verified that the project activity has generated 23 392.200 MWh (gross) of electricity /15/ and same has been cross checked against the monthly electricity generation records submitted to electrical Inspectorate /30/.
- **Electricity production exported to the grid in the year “y”:** The net electricity exported to the grid (difference between the gross export and import to/from grid) has been monitored continuously by tri-vector bi-directional main meter (with serial number: 01955018) and check meter (with serial number: 01955020) and recorded on shift basis in daily plant performance sheet /15/. Summation of value provided in daily plant performance sheet for the month has been cross checked against the readings provided in monthly joint meter readings records (reading recoded in presence of both parties, the project developer's representative and KPTCL officials) /13/ and invoices issued to Mangalore Electricity Supply Company Limited (a distribution wing of Karnataka Power Transmission Corporation Limited) /17/. The main energy meter and check meter used to monitor the electricity exported/imported to/from grid are of class 0.5 S accuracy class. These meters are under control of KPTCL and are tested and calibrated annually /19/ as per procedures defined in the



power purchase agreement signed with state electricity board /16/. During the current verification period (1 May 2009 to 30 June 2010), it has been verified and confirmed that the project activity has displaced 19 805.570 MWh (net) /15/ electricity in the southern electricity grid.

- **Biomass quantity utilized by the project activity:** The fuel quantity (biomass residues) procured by the project activity during the current verification period is monitored by Weigh Bridge calibrated by "Controller of Weights and Measures" department of Karnataka /22/. The receipts of each kind of biomass residues at plant premises is measured on each vehicle basis and reported in the form of Fuel Receipt Notes /25/ and aggregated to daily records. Whereas the fuel quantity (biomass residues) consumed in the boiler by the project activity is recorded on daily basis based on bunker level assessment and steam fuel ratio on daily basis in plant performance sheet /15/ and has been cross checked from the stock balance prepared on daily basis /28/. During the current verification period project activity has consumed 45 374.184 tonnes of biomass residue (2 926.5 tonnes of cane trash, 25 205.56 tonnes of coconut fronds, 2 866.49 tonnes of corn cob, 9 315.67 tonnes of toppings and 5 059.96 tonnes of husk) /25/.
- **Net Calorific Value of each kind of biomass residues:** The net calorific values of each kind of biomass residue have been measured on monthly basis by external third party from independent third party /24/.

The project activity applies baseline & monitoring methodology AMS-I.D version 13 /9/, however the validation report /4/ erroneously refer to AMS-I.D version 11. Nevertheless as required by the monitoring methodology AMS-I.D (version 13) the electricity generated using biomass residues (metered) shall be compared with the amount of electricity generated calculated using *ex-ante* fixed specific fuel consumption (of each kind of biomass residues) and amount of each type of biomass residues used during the verification period and the lower of the two values should be used to calculate emission reductions.

DNV has verified the total possible electricity generation based on the specific fuel consumption of each kind of biomass residues (fixed ex antae in revised monitoring plan approved on 5 January 2011) consumed during the verification period to be 41 642.788 MWh /2/, which is 78% higher than the electricity generation based on the metered value of 23 392.200 MWh /15/. Hence, application of the metered net electricity exported value for emission reduction calculation is conservative and same has been used for emission reduction calculation /2/.

It has been verified by DNV from the daily plant performance sheet that project activity has not consumed coal during the current verification period /15/.

Project Emissions: the project activity is equipped with 250 kVA diesel generator, hence emissions due to diesel consumption have been considered as project emissions.

- **Project emissions due to diesel consumption in diesel generator:** It has been verified by DNV from diesel generator operation log book /27/ that project activity has not used diesel generator during current verification period for operation of the plant, hence project emissions due to diesel consumption has been considered as zero for the current verification period.



Leakage: following sources have been covered under emissions due to leakage:

- **Leakage due to competitive use of biomass residues:** The project proponent has carried out a biomass assessment survey /26/ (within 200 kms radius) to establish that leakage calculation due to competing use of biomass is not required for the project activity for verification period. This survey was conducted by Span Educational & Charitable Trust (independent third party) /26/. A detailed analysis is provided in table below:

Sl. No.	Type of Fuel	Total Residue Generation in MT	Biomass consumption by Others (excluding project activity) in MT	Available Biomass before consumption from MPPL in MT	Usage of Biomass by MPPL in MT	Net residue Availability (after including project activity consumption also) in MT	% surplus of total consumption (including project activity)
1	Cane Trash	486150	0	486150	2926.50	483224	16512%
2	Coconut Fronds	150 517	26428	124089	25205.56	98883.44	191.51%
3	Corn Cobs	40786	33319	7467	2866.49	4600.51	12.71%
4	Toppings	26732	12587	14145	9315.67	4829.33	22.05%
5	Rice Husk + Ground Nut Husk	74583	49198	25385	5059.96	20325.04	37.46 %
	Total	778768	121532	657236	45374.18	611861.82	367 %

In line with the clarification provided by small scale working group (SSC- 366) /12/ that if project proponent demonstrated that the total/aggregated quantity of available biomass residues in the region is greater than 25% the quantity of biomass residues utilized in the region, (including by the project activity), the leakage emissions due to competitive use of biomass can be neglected. Thus estimation of leakage due to competitive use of biomass is not required for this project activity.

- **Leakage due to transportation of biomass residues:** Leakage emissions due to transport has been calculated based on the total biomass residues purchased, average distance between source of procurement of biomass residues and the power plant, number of trips and vehicle type details maintained in Fuel Receipt Note /25/ and the ex-ante validated emission factor of diesel at 3.185 tCO₂/ ton of diesel /3/, density of diesel at 0.830 kg/l (provided in registered project design document) /3/ and mileage of each type of vehicle (validated during the first renewable crediting period based on the historic consumption records).



- MPPL procured biomass residues through fixed vendors only and information of each vendor like name and registered address is maintained in the computer database available at weigh bridge record room. At weigh bridge room project proponent maintains a Fuel Receipt Note /25/ which contains following:
- Date (used for procurement date details) /25/
 - Vehicle No (used to calculate trips) /25/
 - Supplier Name (used to calculate distance based on the address information available in computer database) /25/
 - Vehicle Type e.g. Lorry, 4 Wheel Trolley, 2 Wheel Trolley, Bullock Cart (used for specific fuel consumption of each type of vehicle) /25/
 - Fuel type (e.g. cane trash, coconut fronds, groundnut husk, rice husk, toppings of various types of plantation wood etc.) /25/
 - Gross Weight /25/
 - Tare Weight (used to calculate biomass procurement) /25/
 - Net Weight (used to calculate biomass procurement) /25/
 - Moisture % (used to calculate biomass procurement) /25/
 - Since Malavalli Power Pvt. Ltd. uses its own vehicles for transportation of biomass residues, hence project proponent also maintains diesel purchase receipts and records for allocation of diesel to each vehicle and information regarding same can also be verified from the fuel receipt notes /25/.

Based on the information provided in the Fuel Receipt Notes /25/, project proponent estimates emissions from transport that contributes to leakage from biomass supply to the Plant. Leakage due to transportation of biomass for the current verification period (1 May 2009 to 30 June 2010) has been verified to be 411.395 tCO₂ equivalent /2/.

The parameters reported, including source, frequency and review criteria as indicated in the monitoring plan were verified to be correct and in line with the revised monitoring plan approved on 5 January 2011 /5/. Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the revised monitoring plan approved on 5 January 2011 /5/. Knowledge of personnel associated with the project activity was also found to be satisfactory.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Electricity production exported to the grid in the year “y” (We,y) Meter: Tag no: E38/3721-0201
Measuring frequency:	Continuously (Online)
Reporting frequency:	Shift basis aggregated to daily summation in daily plant performance sheet /15/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Tri-vector energy meter



Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy of meters used. 1S class meter is used to monitor the electricity and it is a good practice.									
Calibration frequency /interval:	Annually									
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes									
Company performing the calibration:	Trans Power /20/									
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes									
Is (are) calibration(s) valid for the whole reporting period.	No, There is 15 day delay in calibration of gross energy meter. The calibration for gross energy meter was due on 4 August 2009 /20/, but calibration was conducted on 19 August 2009 only /20/. The errors observed during the calibration conducted on 19 August 2009 /20/ were found to be lower than the maximum permissible error of the meters (1%). The electricity units measured through this meter is not directly linked to emission reduction as emission reduction claim is based on the net electricity exported to the grid meter reading. Even after adjusting the gross electricity generation (for the complete month of August 2009) by applying the maximum inaccuracy level of the meter (1%) on the measured value of the gross electricity generation, in line with the requirement of “Guidelines for assessing compliance with the calibration frequency requirement” version 1 /10/, the total possible electricity generation based on the specific fuel consumption of each kind of biomass residues (fixed ex ante in revised monitoring plan approved on 5 January 2011) consumed during the verification period to be was higher than the electricity generation based on the metered value. <table><tr><td>Gross Energy Meter</td><td>Calibrated on</td><td>Valid till</td></tr><tr><td>E38/372</td><td>5 August 2008</td><td>4 August 2009</td></tr><tr><td>1-0201</td><td>19 August 2009</td><td>18 August 2010</td></tr></table>	Gross Energy Meter	Calibrated on	Valid till	E38/372	5 August 2008	4 August 2009	1-0201	19 August 2009	18 August 2010
Gross Energy Meter	Calibrated on	Valid till								
E38/372	5 August 2008	4 August 2009								
1-0201	19 August 2009	18 August 2010								



If applicable, has the reported data been cross-checked with other available data?	Yes, with monthly electricity generation report submitted to electrical inspectorate /30/.
How were the values in the monitoring report verified?	Daily plant performance sheet /15/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The electrician records the data on shift basis in the log books based on the continuous measurement from the respective energy meter. The data is then compiled and finalized by the shift in charge, which is responsible for data recording as per the monitoring plan of the approved revised monitoring plan. The daily generation log book records are then forwarded to the Manager Power Plant who verifies the authenticity of the data. Any discrepancies observed are dealt with immediately. The verified report is sent for archive.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Net Electricity Supplied to the southern Grid (Wel,y) Main Meter: Tag no: 01955018 Check Meter: Tag no: 01955020
Measuring frequency:	Export and import are continuously (Online) monitored. The net electricity is the difference of the export and import.
Reporting frequency:	Daily basis in daily plant performance sheet /15/.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Trivector bi-directional energy meter /19/.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy of meters used. 0.5S class meter is used to monitor the electricity; this is inline with the requirement of power purchase agreement signed and represents a good practice.
Calibration frequency /interval:	Annually



Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes																				
Company performing the calibration:	Karnataka Power Transmission Corporation Limited /19/.																				
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes																				
Is (are) calibration(s) valid for the whole reporting period?	Yes, the calibration is valid for complete monitoring period. <table><tr><th>Main Meter</th><th>Calibrated on</th><th>Valid till</th></tr><tr><td rowspan="3">01955018</td><td>14 February 2009</td><td>13 February 2010</td></tr><tr><td>4 August 2009</td><td>3 August 2010</td></tr><tr><td>18 February 2010</td><td>17 February 2011</td></tr></table> <table><tr><th>Meter number</th><th>Calibrated on</th><th>Valid till</th></tr><tr><td rowspan="3">01955020.</td><td>14 February 2009</td><td>13 February 2010</td></tr><tr><td>4 August 2009</td><td>3 August 2010</td></tr><tr><td>18 February 2010</td><td>17 February 2011</td></tr></table>	Main Meter	Calibrated on	Valid till	01955018	14 February 2009	13 February 2010	4 August 2009	3 August 2010	18 February 2010	17 February 2011	Meter number	Calibrated on	Valid till	01955020.	14 February 2009	13 February 2010	4 August 2009	3 August 2010	18 February 2010	17 February 2011
Main Meter	Calibrated on	Valid till																			
01955018	14 February 2009	13 February 2010																			
	4 August 2009	3 August 2010																			
	18 February 2010	17 February 2011																			
Meter number	Calibrated on	Valid till																			
01955020.	14 February 2009	13 February 2010																			
	4 August 2009	3 August 2010																			
	18 February 2010	17 February 2011																			
If applicable, has the reported data been cross-checked with other available data?	Yes, daily summation of net electricity exported figures mentioned in the daily plant performance sheet /15/ where cross check against the joint meter reading records /13/ and sales invoices /17/ raised to Mangalore Electricity Supply Company Limited on a monthly basis.																				
How were the values in the monitoring report verified?	Daily plant performance sheet /15/.																				
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The electrician records the data on a continuous basis from the respective energy meters in the log books. The data is then compiled and finalized by the shift in charge, who is responsible for data recording as per the monitoring plan of the approved revised monitoring plan. The daily generation log book records are then forwarded to the Manager Power Plant who verifies the authenticity of the																				



	data. Any discrepancies observed are dealt with immediately. The verified report is sent for archive.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

	Assessment/ Observation							
Data / Parameter: (as in monitoring plan of RMP):	Biomass Quantity utilized by project activity BQ _{project}							
Measuring frequency:	Daily							
Reporting frequency:	Daily							
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.							
Type of monitoring equipment:	Weigh bridge (Serial No. 08C-232)							
Is accuracy of the monitoring equipment as stated in the RMP? If the RMP does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The RMP does not specify the accuracy of the monitoring equipment. Accuracy Class III weigh bridge is used to monitor the biomass procured. The weigh bridge is calibrated annually to represent the good monitoring practice.							
Calibration frequency /interval:	Annual							
Is the calibration interval in line with the monitoring plan of the RMP? If the RMP does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes							
Company performing the calibration:	“Controller of Weights and Measures” Department of Karnataka /22/.							
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes							
Is (are) calibration(s) valid for the whole reporting period?	Yes, the calibration is valid for complete monitoring period /22/. <table><tr><td rowspan="3">Weigh Bridge</td><td>Calibrated on</td><td>Valid till</td></tr><tr><td>28 April 2009</td><td>27 April 2010</td></tr><tr><td>27 April 2010</td><td>26 April 2011</td></tr></table>	Weigh Bridge	Calibrated on	Valid till	28 April 2009	27 April 2010	27 April 2010	26 April 2011
Weigh Bridge	Calibrated on		Valid till					
	28 April 2009		27 April 2010					
	27 April 2010	26 April 2011						
If applicable, has the reported data been cross-checked with other available data?	The fuel data procured and consumed during current verification period has been checked from fuel purchase receipts /25/ and stock balance prepared on daily basis /28/.							



How were the values in the monitoring report verified?	Fuel receipt Notes /25/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The amount of biomass residues entering the plant is measured using duly calibrated electronic weigh bridge and records of the same are maintained. The data is recorded for further verification from the amount of each kind of biomass residues purchased based on invoices / receipts from fuel contractors /25/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Net Calorific Value of each kind of biomass residue
Measuring frequency:	Monthly
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	NCV has been estimated annually by an external laboratory /24/.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	This is monitored externally and hence not applicable.
Calibration frequency /interval:	NA
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The PDD does not mention the calibration frequency. This parameter has been estimated by Ganesh Consultancy & Analytical Services (external laboratory) /24/.
Company performing the calibration:	Ganesh Consultancy & Analytical Services /24/.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	NA
Is (are) calibration(s) valid for the whole reporting period?	The NCV has been estimated externally and hence this is not applicable.
If applicable, has the reported data been cross-checked with other available data?	NA



How were the values in the monitoring report verified?	Lab Analysis Report /24/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Monthly Lab Analysis Report /24/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

3.5 Assessment of data and calculation of emission reductions

No significant reporting risks have been identified for the data reported. All the data required for emission reduction calculations are manually recorded in log sheets once in each shift i.e., after every 8 hours. The gross electricity generated by the project activity has been monitored continuously via trivector energy meter (Tag no: E38/3721-0201) and recorded on shift basis by shift in charges. The shift readings of the plant are then aggregated into daily readings and maintained in daily plant performance sheet /15/. The gross energy meter (Tag no: E38/3721-0201) was calibrated by Trans Power (external third party) on annual basis /20/. There is 15 day delay in calibration of gross energy meter. The calibration for gross energy meter was due on 4 August 2009 /20/, but calibration was conducted on 19 August 2009 only /20/. The errors observed during the calibration conducted on 19 August 2009 /20/ were found to be lower than the maximum permissible error of the meters (1%). The electricity units measured through this meter is not directly linked to emission reduction as emission reduction claim is based on the net electricity exported to the grid meter reading. Even after adjusting the gross electricity generation (for the complete month of August 2009) by applying the maximum inaccuracy level of the meter (1%) on the measured value of the gross electricity generation, in line with the requirement of "Guidelines for assessing compliance with the calibration frequency requirement" version 1 /10/, the total possible electricity generation based on the specific fuel consumption of each kind of biomass residues (fixed ex ante in revised monitoring plan approved on 5 January 2011) consumed during the verification period was higher than the electricity generation based on the metered value.

Net electricity exported to the grid by the project activity is also measured on daily basis from the two way KPTCL meters (main meter: Tag no: 01955018 and check meter: Tag no: 01955020) by project proponent and same has been recorded by project proponent in daily plant performance sheet /15/. These meters reading were also recorded on monthly basis jointly by the officials of KPTCL and MPPL /13/. The net electricity exported to the grid is also addressed in the invoices raised to Mangalore Electricity Supply Company limited /17/. These records have been verified and found to be correct. These are, then, transferred to spread sheets for emission reduction calculations /2/. The baseline emissions are calculated as a product of net electricity exported to the southern regional grid of India to which the project



activity is connected and the ex-ante fixed combined margin emission factor of southern regional grid of India (fixed ex-ante at 0.780 tCO₂e/MWh).

Quantity of biomass received is weighed on calibrated weigh bridges and subjected to quality check and rejection criteria of MPPL. Daily power generation data (including total power and net electricity exported) is monitored and recorded from duly calibrated energy meters and same has been verified by DNV. All the power generation, net electricity exported, fuel receipt and consumption data is maintained in daily performance report in electronic as well as hard print form and have been verified by DNV.

Leakage emissions due to transport has been calculated based on the total biomass residues purchased, average distance between source of procurement of biomass residues and the power plant, number of trips and vehicle type details, maintained in Fuel Receipt Note /25/ and the ex-ante validated emission factor of diesel at 3.185 tCO₂/ ton of diesel /3/, density of diesel at 0.830 kg/l (provided in registered project design document) /3/ and mileage of each type of vehicle (validated during the first renewable crediting period based on the historic consumption records)

The responsibility of ensuring that there is no data misstatement is with general manager of the plant, subsequently the verified reports are sent to head office for management reference. Periodical internal audits are carried out by the CDM team from head office to ensure the transparency and accuracy of the data being monitored and recorded.

3.6 Quality of evidence to determine emission reductions

The calculations have been verified and are deemed correct. The emission reductions from the project for the period from 1 May 2009 to 30 June 2010 as reported in the revised monitoring report of 22 March 2011 /1/ and actually verified at site equals to 15 036 tCO₂e /2/. The emission reductions reported in the revised monitoring report /1/ are lower (- 35.56 %) than the estimated emission reduction of 23 333 tCO₂e (estimated for the same period as per the registered PDD of 24 April 2008 /3/). This variation in comparison to the registered PDD /3/ is due to less number of actual operating hours in comparison to operating hours considered in the registered PDD /3/.

Year	Registered PDD, CERs	Initial Monitoring Report CERs	Revised Monitoring Report CERs
1 May 2009 to 30 June 2010	23 333 tCO ₂ e	15 036 tCO ₂ e	15 036 tCO ₂ e
% Deviation from PDD	0	(-) 35.56%	(-) 35.56%

Sufficient evidence was presented for the reported net emission reductions.

3.7 Management system and quality assurance

Malavalli Power Plant Pvt Ltd. has established management procedures and implemented effectively to ensure that the process is consistent. The procedures cover management responsibilities, data monitoring procedures, training procedures, periodical internal audits /18/, management reviews and corrective actions in case of any deviations effectively.



4 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions that have been reported for the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” (UNFCCC Registration Ref. No. 298) for the period 1 May 2009 to 30 June 2010.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

DNV conducted the verification on the basis of the monitoring methodology AMS-I.D (version 13), the revised monitoring plan approved on 5 January 2011 and the revised monitoring report (version 02) dated 22 March 2011. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV’s verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions of the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” (UNFCCC Registration Ref. No. 298) for the period 1 May 2009 to 30 June 2010 are fairly stated in the revised monitoring report (version 02) dated 22 March 2011.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.D (version 13), and the revised monitoring plan approved on 5 January 2011.

Hence, DNV Climate Change Services AS is able to certify that the emission reductions from the “4.5 MW Biomass (low density Crop residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” during the period 1 May 2009 to 30 June 2010 amount to 15 036 tonnes of CO₂ equivalent.

Bangalore and Oslo, 2 June 2011

Kakaraparthi Venkata Raman
CDM Verifier
DNV Bangalore, India

Michael Lehmann
Director of Services and Technologies
DNV Climate Change Services AS



5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

- /1/ MPPL: Monitoring report for “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” for period 1 May 2009 to 30 June 2010, version 1 dated 16 December 2010 and final version 2 dated 22 March 2011.
- /2/ MPPL: Malavalli emission reduction spreadsheet_1 May 2009 to 30 June 2010.xls version 1 dated 16 December 2010 and final version 2 dated 22 March 2011.
- /3/ MPPL: CDM-PDD for “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” version 2 dated 24 April 2008.
- /4/ DNV: Validation report for the “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” DNV Report No. 2008-10565, revision 2 dated 26 January 2009.
- /5/ MPPL: Revised monitoring plan for “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” approved by UNFCCC on 5 January 2011.
- /6/ DNV: Validation opinion on revised monitoring plan for “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” dated 9 August 2010.
- /7/ DNV: First Verification Report (renewal crediting period) for “4.5 MW Biomass (low density Crop Residues) based Power Generation unit of Malavalli Power Plant Pvt Ltd.” DNV Report No. 2009-0210, revision 3 dated 13 May 2010.

Background documents related to the design and/or methodologies employed in the design or other reference documents.

- /8/ CDM Executive Board: Validation and Verification Manual. Version 01.2.
- /9/ CDM Executive Board: Simplified baseline and monitoring methodology AMS-I.D - Grid connected renewable electricity generation, Version 13.
- /10/ CDM Executive Board: Guidelines for assessing compliance with the calibration frequency requirement version 1.



- /11/ CDM Executive Board: General guidance on leakage in biomass project activities version 03 EB 47 Annex 28.
- /12/ CDM Small Scale Working Group: Clarification_366, During the biomass surplus assessment, all sub-types of biomass involved can be considered together and assessed as a whole to demonstrate that the total/aggregated quantity of available biomass residues in the region is greater than 25% the quantity of biomass residues utilized in the region, (including by the project activity), the leakage emissions due to competitive use of biomass can be neglected.
<http://cdm.unfccc.int/UserManagement/FileStorage/NSX53GD0ROCVY7Z24WPAEBJHUQLKM6>
- /13/ MPPL: Monthly joint meter reading records (reading recoded in presence of parties, the project developer's representative and KPTCL officials) of net energy exported to the grid for the current verification period (1 May 2009 to 30 June 2010).
- /14/ CEA CO₂ Baseline Database for the Indian Power Sector. Version 3, dated 15 December 2007.
http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
- /15/ MPPL: Daily and monthly plant performance sheet for the current verification period (1 May 2009 to 30 June 2010).
- /16/ MPPL: Power purchase agreements signed between KPTCL and MPPL dated 25 September 2000.
- /17/ MPPL: Net electricity exported sales invoices raised to Mangalore Electricity Supply Company limited for the current verification period (1 May 2009 to 30 June 2010).
- /18/ MPPL: Internal Audit records for the current verification period (1 May 2009 to 30 June 2010).
- /19/ KPTCL: Calibration Certificates of main meter and check meter conducted by KPTCL dated 14 February 2009, 4 August 2009 and 18 February 2010.
- /20/ Trans Power: Calibration certificates of gross energy meter conducted by Trans Power dated 4 August 2008 and 19 August 2009.
- /21/ Certificate from Boiler inspectorate valid from 12 November 2009 to 10 November 2010 and previous one valid from 18 November 2008 to 17 November 2009.
- /22/ Weighing bridge calibration record "Controller of Weights and Measures" department of Karnataka, dated 28 April 2009 and 27 April 2010.
- /23/ Consent for operation from Karnataka Pollution control board KSPCB/SEO (Non-EIA)/LR/2010-11/90 (both air and water) valid from 1 July 2009 to 30 June 2010 and previous one KSPCB/SEO-4/EO/DEO/AEO/0809-256 (both air and water) valid from 1 July 2008 to 30 June 2009.
- /24/ Ganesh Consultancy & Analytical Services: Monthly net calorific value certificate for each kind of biomass residue for the current verification period (1 May 2009 to 30 June 2010).
- /25/ MPPL: Fuel purchase receipts, biomass residues consumption data sheet and transportation vehicle details for the current verification period (1 May 2009 to 30 June 2010).
- /26/ Biomass residues surplus availability survey conducted by Span Educational & Charitable Trust (independent third party) for year 2009-10.



- /27/ MPPL: D.G. Set operation log book details for the current verification period (1 May 2009 to 30 June 2010).
- /28/ MPPL: Biomass residue stock balance prepared on daily basis for the current verification period (1 May 2009 to 30 June 2010).
- /29/ MPPL: Monthly plant operation and maintenance log book for the current verification period (1 May 2009 to 30 June 2010).
- /30/ MPPL: Monthly electricity generation reports submitted to district electrical inspectorate for the current verification period (1 May 2009 to 30 June 2010).

Persons interviewed during the initial verification, or persons who contributed with other information that are not included in the documents listed above.

- /31/ Mr. Nara Singh – Project Co-ordinator, MPPL
- /32/ Mr. M.A. Sharif – Plant manager, MPPL
- /33/ Mr. Purushotham Nayak – Admin Manager, MPPL
- /34/ Mr. B.R Krishna – Superintendent, MPPL
- /35/ Mr. A. R. Kulkarni – Superintendent Electrical, MPPL

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APPENDIX A

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	PP to revise the Emission Reduction spreadsheet in order to meet the requirement of "Guidelines on Completeness check of Requests for Issuance" (EB 48 Annex 68). Emission Reduction calculation spreadsheet to contain. 1. Value of the monitored parameters Formula to be shown on the cell wherever applicable	Emission Reduction Sheet has been corrected now. Corrected Emission Reduction Sheet has been Submitted to DOE for Verification.	Revised emission reduction version 2 has been verified by DNV. DNV confirms that revised emission reduction spreadsheet meets the requirement of "Guidelines on Completeness check of Requests for Issuance" (EB 48 Annex 68). OK accepted. CAR 1 is closed.
CAR 2	PP to revise monitoring report for the project activity inline with the requirement of "Guidelines for completing the monitoring report" (EB 54 Annex 34).	Revised Monitoring inline with the requirement of Guidelines for completing the monitoring report has been submitted to DOE for verification.	Revised monitoring report version 2 has been verified by DNV. DNV confirms that revised monitoring report version 2 meets the requirement of "Guidelines for completing the monitoring report" (EB 54 Annex 34). OK accepted. CAR 2 is closed.
CAR 3	NCV of the biomass used for the period from February 2010 to June 2010 needs to be included in the monitoring report.	NCV Values has been included in monitoring report for the entire current monitoring period. Revised MR has been submitted to DOE for verification	Revised Monitoring Report has been checked out for the NCV of biomass used for the period 1 May 2009 to 30 June 2010 and found that the same was included in the report. Revised monitoring report has been reviewed by DNV OK accepted. CAR 3 is closed.

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 4	Project proponent is requested to revise the values used to demonstrate surplus availability of biomass, inline with the recent survey conducted in 2009-10	Revised Monitoring Report inline with latest Biomass Survey Report has been submitted to DOE for verification.	Values from the recent survey report have been included in the revised Monitoring report. Revised monitoring report has been reviewed by DNV. OK accepted. CAR 4 is closed.
CAR 5	Project proponent is requested to correct the specific fuel consumption values provided in section D.1 of MR, inline with the approved monitoring plan for the project activity.	Revised Monitoring Report is in line with the approved Monitoring Plan and same has been submitted to DOE	SFC values are corrected in line with the approved revised monitoring plan in the revised monitoring report. Revised monitoring report has been reviewed by DNV. OK accepted. CAR 5 is closed.

Clarification requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	Not Applicable		

Corrective action request pending from previous verification

CAR ID	Corrective action request	Summary of how CAR has been addressed in this reporting period	Assessment of how CAR has been addressed
CAR 4	During previous verification DNV request project proponent to seek revision of monitoring plan to include monitoring of NCV of each kind of biomass residue on monthly basis prior to subsequent verification as monthly monitoring of NCV of each kind of biomass residue represents better monitoring practice in comparison to Biomass batch defined by project proponent.	A revision of monitoring plan has been sought to UNFCCC based on the request raised by DoE during the last verification the revision of monitoring plan has been approved by UNFCCC on 5 January 2011.	The project proponent had sought a revision of monitoring plan before applying for current verification. The revision of monitoring plan was approved by UNFCCC on 5 January 2011 http://cdm.unfccc.int/Projects/DB/DNV-CUK1141812568.71/view?cp=1 OK accepted. CAR 4 closed.

Forward action requests from previous verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
FAR 1	Not Applicable		

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
FAR 1	Not Applicable		

APPENDIX B

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Kakaraparathi Venkata Raman

Mr. Kakaraparathi Venkata Raman holds a bachelor degree (B.Tech) in Chemical Engineering and a Diploma in Management. He has an overall experience of 18 years in the Chemical Process Industry - Fertilisers and Chemicals industry (FACT). His main areas of work include a) Technical Services (for Ammonia, Urea, Co-generation thermal power plants (captive), and complex fertilizers plants)- 10 years b) Erection, commissioning and hands-on operation of state of art HTAS Ammonia plant - 4 years c) Management and operation of Sulphuric acid plant as Plant Manager- 2 years and d) two years in management Information System operation and assisting of top management in planning of operations.

While in FACT he has completed the ISO14001 EMS LA course and also involved in implementation of Environmental Management Systems and in conducting internal audits.

Experience prior to joining Fertiliser industry includes six months experimental work on charcoal manufacture in Karnataka Regional Engineering College.

He has experience of around 5 years in validation and verification of numerous CDM projects. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass as well as thermal electricity from solar (b) 1.2 Energy Generation from renewable energy sources (c) 5.1/4.13/11.1/12.1 Chemical Processes Industries and (d) 13.1 Waste handling and disposal.

Gaurav Srivastava

Mr. Gaurav Srivastava, CDM Validator/Verifier, DNV Bangalore, India holds a Master's Degree in Energy Systems. His educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing. He has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA.

He has experience of around 3 and half years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, training and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Thamizharasi Kaliaperumal

Ms. Thamizharasi Kaliaperumal holds a Bachelor Degree in Chemical Engineering. She has an overall experience of around five years in Chemical /Petrochemical processing industries and CDM Consultancy altogether. Her main areas of work include Production support, Process trouble shooting (Technical Services), Energy Management (EnCon Measures, Energy Audits, CDM projects), Project feasibility studies, Management Information System.

She has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA and DNV Training Programme on Corporate GHG Inventory.

She has been involved in various CDM Validation and Verification project activities.

Krishnan Namboodiri

Holds graduate degree in chemical engineering and has done a short term diploma course in Management. Prior to joining DNV in 2008, has had 24 years of direct work experience in the fertilizer and chemicals industry. Work experience covers 5 years in process design & engineering for chemical industry; 7 years in technical services, including environment management activities, 7 years in project management and 5 years in training & corporate planning in fertilizer & petrochemical manufacturing units. Has been actively involved in Management System Audits as per ISO 14001 for more than 8 years.

The above work experience includes-(a) experience in steam system optimization & trouble shooting , development of improvement schemes in large fertilizer & caprolactam complex (b) Design and engineering, efficiency studies and development of efficiency improvement schemes for fossil fuel fired steam & power generation plants (c) Implementation of energy saving measures in Ammonia plants , sulphuric acid plant etc (d)Monitoring, trouble shooting and development & implementation of improvement schemes for of pollution control facilities (chemical, aerobic & anaerobic treatment systems) in Fertilizer and petrochemical complex. Development & implementation of landfill facilities for solid and hazardous wastes from fertilizer & caprolactam manufacturing complex.

He has received extensive training in the CDM validation and verification process. He is an appointed GHG auditor for the CDM validation and verification program of DNV and has performed validation & verification of several CDM projects.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in (i) Thermal energy generation from fossil fuels as well as thermal electricity from solar, (ii) Waste handling and disposal (iii) Energy demand and (iv) Chemical process industries.