

MONITORING REPORT

(Version- 01)

DATE: 30th April 2010

“9.8 MW Biomass Based Power Plant at Lahari Power & Steels Limited in Champa-Janjgir District, Chattisgarh”

Reference No. UNFCCC 1199

Crediting Period: 03 Sep 2007 - 02 Sep 2017

Methodology: AMS I.D

Version 10

Monitoring Period

03/09/2007 – 31/12/2009

(Both days included)

Project Site

Champa-Janjgir District, Chattisgarh, India

M/s Lahari Power & Steels Limited

**Plot No: 1115, Road No: 54, Jubilee Hills,
Hyderabad- 500 033, Andhra Pradesh, India**

Tel: +91- 40- 2355 0597, 2355 0598

Fax: +91- 40- 2354 1339

E-mail: lahari_power@yahoo.co.in

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1. General Information

1.1 Project Activity

The project activity is a biomass (rice husk) based power generation project with provisions to co-fire coal with biomass. The total capacity of the power plant is 9.8 MW. The project activity generates electricity which is exported to the Chhattisgarh State Electricity Board (CSEB) after meeting the auxiliary consumption of the power plant equipment.

The Project got registered with UNFCCC as CDM project on 3rd September 2007. As per the Registered Project Design Document, the start date of the crediting period for the project activity under consideration is 3rd September 2007. However the plant started commercially operating from 01st May 2008 and the data/parameters were monitored from 01st May 2008 onwards. Therefore although the monitoring period for first verification is chosen from 03/09/2007 to 31/12/2009 (both days included), actual monitoring has been done and emission reductions have been claimed for the period 01/05/2008 to 31/12/2009 (both days included). During this period the project activity has exported 64655400 kWh of electricity and used 78233.984 MT of biomass.

1.2 Project Commissioning

Start date of commercial operation: 01st May 2008, ever since the project has been in operation

1.3 Monitoring Period

The monitoring period is chosen from 03/09/2007 to 31/12/2009 (both days included).

1.4 Monitoring Protocol

According to the approved monitoring plan in the registered PDD, the following parameters are required to be monitored for the computation of emission reductions:

- a. Parameters monitored for computation of Baseline Emissions
 - Net power export
 - Grid emission factor
- b. Parameters monitored for computation of Project Emissions
 - Quantity of fossil fuel (coal) combusted to supplement the biomass residues in the project activity

- Net calorific value of the fossil fuel (coal)
- CO₂ emission factor of the fuel (coal)-taken from the Registered PDD (India's Initial National Communication to UNFCCC)
- Oxidation factor of the fuel (coal)

Parameters monitored for computation of Leakage Emissions

- Surplus biomass availability (for estimation of leakage)

As per the monitoring plan in the Registered PDD, biomass assessment survey has been carried out for the monitoring period. From the study, it is evident that there is no leakage associated due to biomass usage in the project activity.

- Diesel used

Apart from the above parameters, the project proponent also monitors the following supplementary parameters to check the operational performance of the power plant:

- Gross generation
- Auxiliary consumption
- Quantity of biomass used
- NCV of biomass used

Please refer to the following table for a detail description on the Monitoring Protocol:

Serial No.	Parameters	Monitoring Equipment	Monitoring Record(s)	Uncertainty Analysis
1.4.1.	Gross Generation	The gross electricity generation will be recorded at the project site by an Energy meter	Plant log sheets/DCS	<p>1. The Gross Generation Energy meter is calibrated and regularly inspected by CSEB.</p> <p>2. The Auxiliary consumption Energy meter is calibrated and regularly inspected by CSEB.</p>
1.4.2	Auxiliary consumption	The auxiliary consumption will be recorded at the project site by an Energy meter		
1.4.3	Power Import	The power import will be recorded at the project site by an Energy meter at the project site	Plant log sheets/ CSEB meter reading statement/ invoice	The power import Energy meter is calibrated and regularly inspected by CSEB. The parameter may be cross checked with the power import values as recorded in CSEB statements.
1.4.4	Power Export	The power export will be recorded at the grid substation, which is under the control of CSEB	Plant log sheets/ CSEB meter reading statement / invoice	The power export will be recorded at the grid substation, which is under the control of CSEB. The values may be cross checked from CSEB bills receipts. The CSEB readings are taken within the +/- 2 days of the last day of the month.

Serial No.	Parameters	Monitoring Equipment	Monitoring Record(s)	Uncertainty Analysis
1.4.5	Total quantity of biomass used	The quantity of biomass consumed is measured by a weigh bridge meter	Plant log sheets / biomass purchase invoices	The weigh bridge meter will be calibrated by the project proponent as per the industrial standards of India. Fuel purchase records can be used for verification of each category of biomass purchased.
1.4.6	Total quantity of fossil fuels (coal) used	The quantity of fossil fuels (coal) consumed is measured by a weigh bridge meter	Plant log sheets /coal purchase invoice	The weigh bridge meter will be calibrated by the project proponent as per the industrial standards of India. Fuel purchase records can be used for verification of fossil fuel (coal) purchased.
1.4.7	NCV of Biomass used	The calorific value of the biomass sample will be found from tests conducted at reputed laboratories	Records of external laboratory	Testing the NCV of biomass sample at reputed laboratories will ensure accuracy of the NCV value.
1.4.8	NCV of coal used in the plant	The NCV of coal will be obtained from suppliers if available. Otherwise the calorific value of the biomass sample will be found from tests conducted at reputed laboratories.	Suppliers' records or Records of external laboratory	The NCV value provided by the supplier or by testing the biomass sample at reputed laboratories will ensure accuracy of the same.
1.4.9	Grid Emission Factor	The grid emission factor (for NEWNE grid) is taken from the latest database published by CEA, Govt of India.	Available publicly at http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm	Since the values used to calculate Grid Emission Factor is taken from the CEA database, the authenticity of the data is guaranteed.

Meter & Meter Calibration details of the monitoring equipments

Parameter 1.4.1 Gross generation	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	Plant log sheets
Monitoring Equipment	An in-house energy meter
Specification of Monitoring Equipment	<u>Make:</u> L&T <u>Sl. No.:</u> 06489660 <u>Type:</u> 3 Ph, 4 wire meter <u>Date of last calibration:</u> 04.09.2009 <u>Calibrating house:</u> CSEB <u>Calibration schedule:</u> Once a year
Calibration of Monitoring Equipment	The meter is calibrated and maintained by CSEB (third party)
Accuracy of Monitoring Equipment	+/-0.2%
Uncertainty of Data	Low
Justification	The uncertainty of data is low. This is ensured through calibration of the metering system by the CSEB. Discrepancies, if identified, are addressed immediately and proper preventive measures are undertaken.

Parameter 1.4.2: Auxiliary consumption	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	Plant log sheets
Monitoring Equipment	An in-house meter for measuring both auxiliary consumption and export
Specification of Monitoring Equipment	<u>Make:</u> L&T <u>Sl. No.:</u> 06606803 <u>Type:</u> 3 phase 4wire meter <u>Date of last calibration:</u> 04.09.2009 <u>Calibrating house:</u> CSEB <u>Calibration schedule:</u> Once a year
Calibration of Monitoring Equipment	The main meter is calibrated and maintained by CSEB (third party)
Accuracy of Monitoring Equipment	+/-0.2%

Uncertainty of Data	Low
Justification	The uncertainty of data is low. This is ensured through calibration of the metering system by the CSEB. Discrepancies, if identified, are addressed immediately and proper preventive measures are undertaken.

Parameter 1.4.3: Power Import	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	Plant log sheets
Monitoring Equipment	An in-house meter
Specification of Monitoring Equipment	<u>Make:</u> L&T <u>Sl. No.:</u> 06606805 <u>Type:</u> 3 Ph, 4 wire <u>Date of last calibration:</u> 04.09.2009 <u>Calibrating house:</u> CSEB <u>Calibration schedule:</u> Once a year
Calibration of Monitoring Equipment	The main meter is calibrated and maintained by CSEB (third party)
Accuracy of Monitoring Equipment	+/-0.2%
Uncertainty of Data	Low
Justification	The uncertainty of data is low. This is ensured through calibration of the metering system by the CSEB. Discrepancies, if identified, are addressed immediately and proper preventive measures are undertaken.

Parameter 1.4.4: Power export	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	CSEB meter reading statements
Monitoring Equipment	A meter present at the substation under the control of the CSEB
Specification of Monitoring Equipment	<u>Make:</u> L&T <u>Sl. No.:</u> 06606805 <u>Type:</u> E3V055,3 Ph, 3 wire as per IS: 14697 <u>Date of last calibration:</u> 04.09.2009 <u>Calibrating house:</u> CSEB <u>Calibration schedule:</u> Once a year
Calibration of Monitoring Equipment	The main meter is calibrated and maintained by CSEB (third party)
Accuracy of Monitoring Equipment	+/-0.2%
Uncertainty of Data	Low
Justification	The uncertainty of data is low. This is ensured through calibration of the metering system by the CSEB. Discrepancies, if identified, are addressed immediately and proper preventive measures are undertaken.

Parameters 1.4.5 and 1.4.6: Total quantity of biomass and total quantity of fossil fuels (coal) used	
Parameter	Description
Measured, Calculated, Estimated	Measured
Source of Data	Plant log sheets
Monitoring Equipment	Two weigh bridge meters present at the plant site
Specification of Monitoring Equipment	<p><u>Weigh bridge 1:-</u></p> <p><u>Sl. No.:</u> BB0839012421 <u>Type:</u> An electronic weigh bridge meter of capacity 60 tons <u>Model No. :</u> BR500CI-IN <u>Calibrating house:</u> Digi-Weigh <u>Date of last calibration:</u> 24.09.2008 <u>Calibration schedule:</u> Once a year <u>Accuracy Class:</u> +/-200 kg</p> <p><u>Weigh bridge 2:-</u></p> <p><u>Sl. No. :</u> 176 <u>Capacity:</u> 30 tons <u>Make:</u> IPA <u>Model No. :</u> AWWB <u>Calibrating house:</u> Weights & Measurements division, Govt of India <u>Calibration schedule:</u> Every year <u>Date of last calibration:</u> 29.10.2007 <u>Accuracy Class:</u> +/-100 kg</p>
Calibration of Monitoring Equipment	The calibration of the two weigh bridges is done on a periodic basis by a third party.
Uncertainty of Data	Low
Justification	The uncertainty of data is low. This is ensured through periodic calibration of the corresponding weigh bridges. Also, these values are crosschecked with the data given in the invoices to ensure consistency and proper monitoring of the data

2. Monitored Results

According to the Monitoring Plan of the Registered PDD, the Emission Reduction is calculated based on the net electricity exported to the grid as per the CSEB Statement. Actual values of parameters monitored for calculating the emissions reduction during the monitoring period are provided in the table below.

Parameters Month	Monitored parameters for the period									
	Electrical Energy						Biomass		Coal	
	Gross Generation	Auxiliary Consumption	Power Import (As per the in-house Energy Meter)	Power Import (As per CSEB statement)	Power Export to CSEB Grid (As per in-house meter)	Power Export to CSEB Grid (As per CSEB Statement)	Quantity used	NCV	Quantity used	NCV
	kWh	kWh	kWh	kWh	kWh	kWh	MT	kCal/kg	MT	kCal/kg
May-08	2084000	294350	85000	95000	1789650	1742600	1980.612	2900	226.220	2950
Jun-08	697000	111604	86500	86200	585396	565800	733.147	2900	68.987	2950
Jul-08	1605000	253769	90800	89000	1351231	1255800	1551.190	2850	160.372	2900
Aug-08	1426000	180865	76800	78400	1245135	1227400	1416.520	2850	161.370	2850
Sep-08	1761000	230749	59300	61800	1530251	1493600	1748.420	2800	186.930	2850
Oct-08	1786000	230380	34200	35000	1555620	1499200	1732.820	2850	169.590	2850
Nov-08	3594000	422110	41300	41400	3171890	3053600	3512.100	2800	376.500	2800
Dec-08	4800000	479845	18700	21000	4320155	4132400	4666.940	2876	499.524	2850
Jan-09	5943000	581475	19600	20000	5361525	5126400	5758.300	2876	660.860	2900
Feb-09	5659000	520861	19700	19600	5138139	4885200	5550.170	2992	600.710	2950
Mar-09	4234000	384859	27300	28800	3849141	3636800	4126.630	2867	454.450	2950
Apr-09	6253000	582849	19800	21800	5670151	5367400	6299.477	2932	716.254	2900
May-09	5490000	535934	21500	22400	4954066	4694200	5553.302	3001	646.051	2950
Jun-09	5601000	536667	31500	32000	5064333	4797000	6146.910	3018	729.097	2900
Jul-09	5016000	506529	52900	53000	4509471	4291000	5548.686	2956	736.437	2950
Aug-09	5554000	572930	29300	29800	4981070	4741800	6542.456	3185	785.330	2875
Sep-09	3434000	420932	40300	40400	3013068	2885400	4003.933	3145	552.831	2850
Oct-09	3122000	350860	31800	34000	2771140	2650000	3284.502	3065	398.790	2800
Nov-09	3420000	327240	28100	26600	3092760	2948200	3651.869	2930	454.140	2800
Dec-09	4245000	397507	27200	27800	3847493	3661600	4426.000	3010	541.000	2750
Total	75724000	7922315	841600	864000	67801685	64655400	78233.984		9125.443	

No diesel has been procured during the monitoring period for usage for the project activity.

3. Computation of Emission Reductions

The emission reduction figures have been calculated based on the following equations:

1. Baseline Emissions = (Grid Emission Factor* Net Power Export), tCO₂
2. Project Emissions = (Quantity of coal combusted * net calorific value of coal * CO₂ emission factor of coal * oxidation factor of coal), tCO₂
3. Emission Reductions = (Baseline Emissions – Project Emissions), tCO₂

Parameters Months	Emission Reductions for the period								
	Baseline Emissions			Project Emissions					Emission Reductions
	Net Power Export	Grid Emission Factor	Baseline Emissions	Coal used	NCV of Coal	Emission Factor of coal	Oxidation Factor of coal	Project Emissions	
	kWh	tCO ₂ /MWh	tCO ₂	MT	kCal/kg	tCO ₂ /TJ		tCO ₂	tCO ₂
May-08	1647600	0.84	1384	226.220	2950	95.81	1.0	268	1116
Jun-08	479600	0.84	403	68.987	2950	95.81	1.0	82	321
Jul-08	1166800	0.84	980	160.372	2900	95.81	1.0	187	794
Aug-08	1149000	0.84	965	161.370	2850	95.81	1.0	184	781
Sep-08	1431800	0.84	1203	186.930	2850	95.81	1.0	214	989
Oct-08	1464200	0.84	1230	169.590	2850	95.81	1.0	194	1036
Nov-08	3012200	0.84	2530	376.500	2800	95.81	1.0	423	2107
Dec-08	4111400	0.84	3454	499.524	2850	95.81	1.0	571	2883
Jan-09	5106400	0.84	4289	660.860	2900	95.81	1.0	769	3521
Feb-09	4865600	0.84	4087	600.710	2950	95.81	1.0	711	3376
Mar-09	3608000	0.84	3031	454.450	2950	95.81	1.0	538	2493
Apr-09	5345600	0.84	4490	716.254	2900	95.81	1.0	833	3657
May-09	4671800	0.84	3924	646.051	2950	95.81	1.0	764	3160
Jun-09	4765000	0.84	4003	729.097	2900	95.81	1.0	848	3155
Jul-09	4238000	0.84	3560	736.437	2950	95.81	1.0	871	2689
Aug-09	4712000	0.84	3958	785.330	2875	95.81	1.0	906	3053
Sep-09	2845000	0.84	2390	552.831	2850	95.81	1.0	632	1758
Oct-09	2616000	0.84	2197	398.790	2800	95.81	1.0	448	1750
Nov-09	2921600	0.84	2454	454.140	2800	95.81	1.0	510	1944
Dec-09	3633800	0.84	3052	541.000	2750	95.81	1.0	597	2456
Total	63791400		53585	9125.443				10547	43038

4. Summary of the Emission Reductions

As per the PDD, 37,947 tCO₂ per annum is expected to reduce from the project activity. So for a period of 28 months (3rd September 2007-31st December 2009), the expected emission reduction as per the Registered PDD would be 88,543 tCO₂. Actual emission reduction during the monitoring period has been less (by about 51%) than that mentioned in the Registered PDD.

Monitoring period	Emission Reductions (tCO₂)
3rd September 2007-31 st December 2009	43038
Total Emission Reductions	43038