KSPCL Waste Heat to Power project, India

(CDM Project Activity Ref No. 1151)

MONITORING REPORT

Monitoring Period: 31/12/2007 to 31/03/2008 (Inclusive of both days)

Version: 1.2

Date: 14/10/2008

Emission Reductions: 3506 tCO_2e

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1.0 Project Activity

Kamachi Sponge & Power Corporation Limited ("KSPCL" hereafter) has set up 04 nos. DRI kilns of capacity 100 TPD each at its sponge iron production unit. Each of the kilns generates ~25000 Nm^3/hr of high temperature flue gases. This waste heat of flue gases is being utilised in generation of steam in Waste Heat Recovery Boilers (WHRB), which is further expanded in a single bleed-condensing turbine of 10MW to generate power.
It is successful in displacing equivalent amount of power from the Tamil Nadu Electricity Board (TNEB) grid, which is a part of Southern Region (SR) grid in India that is primarily fossil fuel based.

2.0 CDM Registration Details

- **Date:** 03/10/07
- **Reference No.:** 1151
- **PDD version and date:** 1.6, 02/08/2007
- **Methodology:** ACM0004 "**Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation"**
- **Reference:** Approved consolidated baseline methodology ACM0004 / Version 02, Sectoral Scope: 01, 03 March 2006

2.1 Start date of the crediting period

31 Dec 07 - 30 Dec 17 (Fixed)

3.0 Monitoring Details

The monitoring period is chosen from 31/12/2007 to 31/03/2008 (inclusive of both days)**.** The following table details out the data and parameters to be monitored from the emission reductions estimation from the project activity.

3.1 Data and Parameters to be monitored to determine Emission Reductions:

Data/Parameter	Data unit	Description
$\mathbf{EG_Y}$	MWh	Net power supplied to manufacturing facility due to waste heat recovery
$\mathbf{EG_{GEN}}$	MWh	Gross power generation from project activity
$\mathbf{EG_{AUX}}$	MWh	Auxiliary power consumption in project activity
$\mathbf{EF_{electricity,y}}$	tCO2/ MWh	CO_2 baseline emission factor for the electricity displaced due to the project activity in year y
$\mathbf{EF_{OM,y}}$	tCO2/ MWh	CO_2 Operating Margin emission factor for the grid
$\mathbf{EF_{BM,y}}$	tCO2/ MWh	CO_2 Build Margin emission factor for the grid

3.2 Description of Monitoring Plan

KSPCL has procedure for monitoring and recording of data on operation & maintenance of the plant/ equipments. The equipments/ instruments used for CDM project are also part of the procedures and records on maintenance and rectification done on all the equipments are maintained.

Various departments at KSPCL are headed by respective HOD (Head of Department) supported by shift-in-charges & support staff. Departments are mainly divided into projects, mechanical, electrical & instrumentation, production, QC and administration. Mechanical & electrical department are responsible for the overall upkeep of plant, plant machinery and instruments.

Mr. Sunil Patodia-Managing Director is responsible for the overall functioning of the sponge iron plant. KSPCL proposes adoption of following procedures to assure the completeness and correctness of the data needed to be monitored for CDM project activity.

Formation of CDM Team:

A CDM project team is constituted with participation from relevant sections. This team is responsible for data collection and archiving. This team periodically reviews CDM project activity, checks data collected, emissions reduced etc.

- *Unit Head:* Overall responsibility of compliance with the CDM monitoring plan.
- *Power plant In-charge:* Responsibility for completeness of data, reliability of data (calibration of meters), and monthly report generation
- *Shift In-charge:* Responsibility of data monitoring & recording

Day to day data collection and record keeping:

Plant data is collected on operation under the supervision of the respective Shift-in-charge and record is kept in daily logs. Diesel consumption for emergency electricity generation is monitored by dip stick measurement and diesel storage level indicator. Tank top up data is also monitored and is used for cross checking diesel consumption. Diesel consumption data is recorded in the 'Diesel stock register'. The data is reported on monthly basis. Net Calorific value of the diesel consumed is tested by external agency every three month and the test reports are kept for verification purpose.

Reliability of data collected-
The reliability of the meters is checked by testing the meters on yearly basis. Documents pertaining to testing of meters are maintained.

Frequency-
The frequency for data monitoring is as per the monitoring details in Section B.7.1 of the document.

Archiving of data-
Data shall be kept for two years after the crediting period (total 12 years)

Checking data for its correctness and completeness:
The CDM team is overall responsible for checking data for its completeness and correctness. The data collected from daily logs is recorded after verification from respective departments.

Calibration of instruments:
KSPCL has procedures defined for the calibration of instruments. Electrical & Instrumentation department in the company is responsible for the upkeep of instruments in the plant.

Maintenance of instruments and equipments used in data monitoring:
The process department is responsible for the proper functioning of the equipments/ instruments and informs the concerned department for corrective action if found not operating as required. Corrective action is taken by the concerned department and a report on corrective action taken is maintained as done time to time along with the details of problems rectified.

Emergency preparedness
The project activity does not lead to any unintentional emissions. So, there is no need for any emergency preparedness in project activity.

4.0 Emission Reduction Calculations

4.1 Baseline Emissions

$$BE_{electricity,y} = EG_y \cdot EF_{electricity,y}$$

Where,

EG_y = Net quantity of electricity supplied to the manufacturing facility by the project during the year y; (MWh)

EF_y = CO_2 baseline emission factor for the electricity displaced due to the project activity during the year y; (tCO2/MWh)

CO2 baseline emission factor in the baseline scenario is determined to be grid power supply, the Emissions Factor for displaced electricity is calculated as described ACM0002.

4.2 Project Emissions

$$PE_y = \sum_i Q_i \times NCV_i \times EF_i \times \frac{44}{12} \times OXID_i$$

Where,

PE_y = Project emissions in year y (tCO_2)

Q_i = Mass or volume unit of fuel *i* consumed (t or m3 or KL)

NCV_i = Net calorific value per mass or volume unit of fuel *i* (TJ/t or m3 or KL)

EF_i = Carbon emissions factor per unit of energy of the fuel *i* (tC/TJ)

$OXID_i$ = Oxidation factor of the fuel *i* (%)

4.3 Emission Reductions:

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission reduction of the project activity during the year y in tons of CO2

BE_y = Baseline emission due to displacement of electricity during the year y in tons of CO2

PE_y = Project emissions during the year y in tons of CO2

5.0 Monitored Results

In the project activity, PP had proposed power generation from steam generated in 4 Nos. of waste heat recovery boilers. The boilers were commissioned and put in line in a phased manner.

The commissioning date of all the 4 Nos. Waste Heat Recovery Boilers are given below:

Boiler 1 : 03/11/07
Boiler 2 : 03/11/07
Boiler 3 : 15/01/08
Boiler 4 : 20/09/08

The current monitoring period under verification is from 31/12/2007 – 31/03/2008. During this period only 3 Nos. boilers were operational as indicated by the commissioning dates.

Month	EG GEN (MWh)	EG AUX	EG Y	Qi (L)	EF electricity	EF OM	EF BM
Dec-07	0	5	-5	0	0.85	1	0.71
Jan-08	1739	279	1460	200			
Feb-08	1957	287	1670	2160			
Mar-08	1253	238	1015	2324			
Total	**4948**	**809**	**4139**	**4684**			

Baseline Emissions and Project Emissions:

Month	Project emissions	Baseline Emissions
Dec-07	0.0	-4
Jan-08	0	1241
Feb-08	5.4	1419
Mar-08	5.8	863
Total	**12**	**3518**

Emission Reductions:

Month	Emission Reductions
Dec-07	-4
Jan-08	1240
Feb-08	1414
Mar-08	857
Total	**3506**