G.R. SPONGE AND POWER LIMITED

06-August-2007

Kind Attention
Chairman, Executive Board
UNFCCC

Subject: Clarification on request for review for "4MW Waste Heat Recovery based power project by GRSPL, India" by G. R. Sponge & Power Limited; (Reference No 1114)

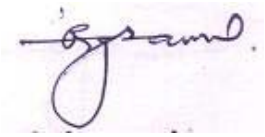
Dear Sir,

This is with reference to the request for review raised by Executive Board members for the project "4MW Waste Heat Recovery based power project by GRSPL, India" by G. R. Sponge & Power Limited; (Reference No 1114). We are enclosing herewith our clarifications on the comments raised for your consideration.

The undersigned is the nodal point for all communication for this process.

Thanking you,

Yours sincerely,



Ramesh Agrawal
Director

G.R. Sponge & Power Limited
Plot-102, Phase II, Siltara Industrial Area
Raipur (C.G.)
Phone: 0771 - 2253704/ 2254802
Mobile: 98261 26001
Fax: 0771 – 2254873
Email: rameshsteel@yahoo.co.in

Reasons for Request 1:

1. Many of the technological barriers listed appear to be operational problems related to the use of the kilns rather than the implementation of the project activity. The prevailing practice barriers appear to relate to the further investment and corporate restructuring taken by the project participant to avoid wheeling charges. Further justification of the identified barriers and how the CDM will overcome them is required.

Reply from PP:

The project activity is one of power generation utilizing waste heat from DRI kilns in the sponge iron plant of PP. The waste heat generation in the kiln is directly & completely dependent on kiln operation and need untroubled and continuous operation of the kilns. In the absence of which, waste heat generation from the kilns would be erratic and of lower energy value **leading to problems in power generation in the project activity**. Also in such a scenario there would not be any backup option of power generation from WHRB. Hence the project activity faces a major risk of uncertainty regarding kiln operation which in turn impacts viability of the project activity. As has been highlighted in the PDD that capacity utilization of the existing kilns in the past two years has been very low and inconsistent (annex 1).

The power generation potential from utilization of sponge iron kilns can be estimated based on waste heat availability, which in turn is dependent on kiln operation. The details are as discussed below:

Power Generation Potential for a 100 TPD DRI kiln

Waste gas generation = ~25000 Nm3/ hour Temperature of waste gas as available at the waste heat recovery boiler (WHRB) = 950 deg C Temperature of gas post heat recovery in WHRB system = 170 deg C Specific heat of waste gas = 0.27 kcal/ Nm3 So, the heat energy available for utilization in WHRB and subsequent power generation = 25000 x 0.27 x (950-170) = 5265000 kcal/ hour if the conversion efficiency of the system from waste heat to power is taken as ~33% Then, Power generation potential from the waste heat would be = 5265000 x 33% kcal/ hour Or, 7274.70 MJ/ hour which is equivalent to ~2 MW of power generation	Standard kiln operation data The temperature ranges between 950-1000 deg C. The power generation would be dependent on waste gas availability which in turn depends

	on kiln operation. Hence kiln operation is critical to successful operation of project activity.

Based on the above information it can be assessed how the power generation would vary with capacity utilization of the kilns in the project activity.

Power Gen Potential vs. Kiln Utilization

Capacity Utilization Factor – Kiln (100 TPD)	Available heat energy in Waste Gas	Power Gen Potential
%	GJ/ h	MW
20%	4.41	0.40
30%	6.61	0.61
40%	8.82	0.81
50%	11.02	1.01
60%	13.23	1.21
65%	14.33	1.31
70%	15.43	1.41
75%	16.53	1.52
80%	17.64	1.62
85%	18.74	1.72
90%	19.84	1.82
100%	22.04	2.02

There are technological issues related to power generation using waste heat which makes the project risky (detailed out in section B.5 of PDD). The problems in the kilns directly affect project activity performance and that makes the project activity even more risky. As also been provided to DOE, the campaign life (this is an indicator of continuous kiln running between two subsequent stoppages, which is required primarily for removal of accretion build up inside the kilns. The records of plant operation show that campaign life has also been erratic and of very short duration at times due to the problems faced by PP in kiln operation (annex 2). Low campaign life is reflected in lower capacity utilization of the kilns as shown in annex 1. The problems highlighted in the PDD have been faced by PP in the past years and they have decided to go ahead with the project activity despite these problems considering the CDM benefits available to such projects.

The difficulties of restructuring and further investments occurred due to the implementation of project activity and in the absence of it none of the efforts were required from PP. These were hurdles which also needed to be overcome as any additional burden (including that of additional wheeling charges) on project activity would again have impacted the project activity.

2. The project activity involves steam generated from a waste heat recovery boiler to produce 4MW of power through a 8MW turbine at the same time a coal based boiler is

installed to generate the remaining 4MW of power. The two boilers are connected via a common header. Therefore, 4MW of grid power is displaced by the project activity and at the same time 4MW of grid power is displaced by coal based power. Because an 8MW turbine is installed, they are interdependent. Therefore, the emissions from the coal based power should be included in the project emissions. If they are not considered to be interdependent, then the baseline scenario should have included the installation of 4MW of coal based power. Therefore, it is unclear if the methodology is applicable and/or whether the methodology is correctly applied. Further, it is stated in the PDD that "…unit power generation is the lowest for the coal/char based power plants." However, electricity from the grid has been chosen as the baseline scenario.

Reply from PP:

In section B.4 of the PDD, PP has clearly identified various available options for meeting the power demand of the plant in the absence of project activity. It also included possibility of generation of power in a coal based thermal power plant. It has been stated in the PDD that a coal based power generation would have been the most economical for PP among all plausible options. It has also been stated that it could have been the choice of power generation considering the fact that char (residue from DRI kilns) would also be available that would make the power generation even more economical. The unit power cost for a coal based thermal power plant is also suggested by the Expert Committee from Central Electricity Authority in India to be lower than the other plausible power source i.e. DG sets as available to PP. But, as the emission factor for power generation in a coal based thermal power plant is more than grid emission factor (Western Region Grid in India), grid emission factor has been used for calculation of ER estimation in the project activity (annex 4) for conservative estimation of emission reductions. It may also be noted that PP had been drawing power from the grid prior to implementation of project activity.

As for estimation of emission reductions, steam energy from WHRBs only has been considered (steam from AFBC is not being considered for this estimation). Hence it is not required to consider project emissions on account of steam generation from coal fired boiler.

3. It is unclear whether the monitoring methodology is applicable and/or has been correctly applied. In the project activity, the net electricity supplied to the facility is calculated using a pro-rata for the fraction of total steam supplied by the waste heat recovery boiler to the turbine. This is not in accordance with the methodology which requires the net electricity supplied to the facility to be calculated by subtracting the measured auxiliary electricity from the measured total electricity generated.

Reply from PP:

Approved methodology ACM0004, version 02 has been used for estimation of emission reductions from the project activity. The methodology has been used by a number of registered projects in the past with similar monitoring plan as these projects have also installed WHRBs along with AFBC boilers.

1. http://cdm.unfccc.int/Projects/DB/SGS-UKL1146048256.38/view.html ;
2. http://cdm.unfccc.int/Projects/DB/SGS-UKL1139564002.3/view.html
3. http://cdm.unfccc.int/Projects/DB/SGS-UKL1145002776.48/view.html
4. http://cdm.unfccc.int/Projects/DB/SGS-UKL1147435158.71/view.html

In the PDD, PP has estimated the power generation from the project activity (attributable to WHRB) calculated as steam fraction supplied to the turbine from the WHRB. This is done as the steam from WHRB and AFBC have same properties (pressure and temperature). However, to consider any difference in properties of the two steam (WHRB & AFBC), PP has included monitoring of steam properties (pressure and temperature), which would be the basis of steam energy (read from steam tables directly) calculation. This has been included in the revised PDD (revised PDD version 1.3 dated 01/08/2007)

Steam energy now has been used as the basis for pro-rata power generation from the turbine attributable to steam from WHRB in the project activity (revised PDD version 1.3 dated 01/08/2007). The estimations in the PDD are ex-ante based on prorated steam generated from WHRB and for estimation of actual emission reductions in the project activity, the electricity generated and auxiliary consumption will be monitored directly and the net electricity will be proportioned on the basis of the steam energy.

It should also be noted here that any loss of steam between individual boilers (WHRB & AFBC) outlet and common steam header and from common steam header to the turbine inlet has been deducted from WHRB steam. This is conservative and transparent.

In its recent ruling (EB 31; AM_REV_0033[1]), EB has accepted this method for estimation of power attributable to WHRB steam in cases where turbine is fed by steam from WHRB and AFBC both.

Reasons for Request 2:

Many of the technological barriers listed appear to be operational problems related to the use of the kilns rather than the implementation of the project activity. The prevailing practice barriers appear to relate to the further investment and corporate restructuring taken by the project participant to avoid wheeling charges. Further justification of the identified barriers and how the CDM will overcome them is required.

The project activity involves steam generated from a waste heat recovery boiler to produce 4MW of power through a 8MW turbine at the same time a coal based boiler is installed to generate the remaining 4MW of power. The two boilers are connected via a common header. Therefore, 4MW of grid power is displaced by the project activity and at the same time 4MW of grid power is displaced by coal based power. Because an 8MW turbine is installed, they are interdependent. Therefore, the emissions from the coal based power should be included in the project emissions. If they are not considered to be interdependent, then the baseline scenario should have included the installation of 4MW of coal based power. Therefore, it is unclear if the methodology is applicable and/or whether the methodology is correctly applied. Further, it is stated in the PDD that "…unit power generation is the lowest for the coal/char based power plants." However, electricity from the grid has been chosen as the baseline scenario.

It is unclear whether the monitoring methodology is applicable and/or has been correctly applied. In the project activity, the net electricity supplied to the facility is calculated using a pro-rata for the fraction of total steam supplied by the waste heat recovery boiler to the turbine. This is not in accordance with the methodology which requires the net electricity supplied to the facility to be

1 http://cdm.unfccc.int/UserManagement/FileStorage/AM_REC_MVA0P355FK7ZLTJ39U9ENNIYPEFA6V

calculated by subtracting the measured auxiliary electricity from the measured total electricity generated.

Reply from PP:

Same answered against Request 1 above.

Reasons for Request 3:

1. Many of the technological barriers listed appear to be operational problems related to the use of the kilns rather than the implementation of the project activity. The prevailing practice barriers appear to relate to the further investment and corporate restructuring taken by the project participant to avoid wheeling charges. Further justification of the identified barriers and how the CDM will overcome them is required.

2. The project activity involves steam generated from a waste heat recovery boiler to produce 4MW of power through a 8MW turbine at the same time a coal based boiler is installed to generate the remaining 4MW of power. The two boilers are connected via a common header. Therefore, 4MW of grid power is displaced by the project activity and at the same time 4MW of grid power is displaced by coal based power. Because an 8MW turbine is installed, they are interdependent. Therefore, the emissions from the coal based power should be included in the project emissions. If they are not considered to be interdependent, then the baseline scenario should have included the installation of 4MW of coal based power. Therefore, it is unclear if the methodology is applicable and/or whether the methodology is correctly applied. Further, it is stated in the PDD that "…unit power generation is the lowest for the coal/char based power plants." However, electricity from the grid has been chosen as the baseline scenario.

3. It is unclear whether the monitoring methodology is applicable and/or has been correctly applied. In the project activity, the net electricity supplied to the facility is calculated using a pro-rata for the fraction of total steam supplied by the waste heat recovery boiler to the turbine. This is not in accordance with the methodology which requires the net electricity supplied to the facility to be calculated by subtracting the measured auxiliary electricity from the measured total electricity generated.

4. The proposed start date of the crediting period should be changed to the date of registration.

Reply from PP:

Crediting period has been revised as suggested to the date of registration in revised PDD (revised PDD version 1.3 dated 01/08/2007)

Annex 1

Production from the Sponge Iron Kilns and Capacity Utilization of the Kilns

Month (20040-05)*	Quantity of Sponge Iron production (MT)	Capacity Utilization Factor
Apr-04	2316.1	77%
May-04	2080.3	**69%**
Jun-04	2219.5	74%
Jul-04	1919.9	**64%**
Aug-04	2257.9	75%
Sep-04	2094.1	70%
Oct-04	2203.1	73%
Nov-04	1485.0	**49%**
Dec-04	2287.0	76%
Jan-05	2561.5	85%
Feb-05	2209.2	74%
Mar-05	1831.9	**61%**

*Only one kiln of 100 TPD was available in the year 2004-05.

Month (2005-06)#	Quantity of Sponge Iron production (MT)	Capacity Utilization Factor
Apr-05	1719.4	**57%**
May-05	3676.1	61%
Jun-05	1937.8	**32%**
Jul-05	1968.4	**33%**
Aug-05	1823.1	**30%**
Sep-05	3726.5	62%
Oct-05	3726.3	62%
Nov-05	1629.4	**27%**
Dec-05	810.3	**14%**
Jan-06	3541.5	**59%**
Feb-06	2489.8	**41%**
Mar-06	3306.0	**55%**

Second kiln of 100 TPD started in month of May 2005

G.R. SPONGE AND POWER LIMITED

Annex 2

Low and erratic campaign life would directly impact the availability of waste heat for the project activity directly affecting the overall power generation potential

G.R.SPONGE & POWER LTD, SILTARA, RAIPUR

CAMPAIGN DETAILS FROM 01. 04. 2006 TO 31. 12. 2006

CAMPAIGN	KILN - A		DAYS	KILN - B		DAYS
	FROM	TO		FROM	TO	
2006						
IST	03.04.2006	15.04.2006	13	01.04.2006	18.04.2006	18
2ND	30.04.2006	01.07.2006	63	4.05.2006	27.06.2006	44
3RD	13.07.2006	29.08.2006	47	6.07.2006	28.08.2006	53
4TH	08.09.2006	13.10.2006	36	0.10.2006	28.10.2006	18
5TH	25.10.2006	18.11.2006	24	05.11.2006	06.12.2006	31
6TH	08.12.2006	till now				

Authorised Signatory

Annex 3

Monitoring Plan for Estimation of Power Generation attributable to steam generated in Waste Heat Recovery Boiler in the project activity

Power generation from WHRB:

In the project activity, steam from WHRB and coal based AFBC is fed to the turbine through a common header. Steam flow meters are installed at respective boiler outlets and also at turbine inlet.

Gross power generation from turbine is measured directly. Net generation is calculated by deducting auxiliary power consumption from gross power generation. The quality of steam from WHRB and AFBC i.e. temperature and pressure are same and so power linked with WHRB steam will be calculated pro-rata for the fraction of total steam energy supplied to the turbine.

Data to be monitored:

1. Steam quantity from WHRB in project activity to common steam header
2. Steam quantity from AFBC to common header
3. Steam quantity at turbine inlet
4. Gross power generation from turbine in power plant
5. Auxiliary power consumption in power plant
6. Pressure and temperature from WHRB and AFBC boilers

Calculation for net power generation attributable to steam from WHRB in project activity:

Step1: Net power generation from turbine in project activity

Net power generation from turbine = Gross power generation – aux power consumption

Step 2: Fraction of steam energy supplied due to WHRB

Option 1:
Fraction of steam energy from WHRB = Steam energy supplied from WHRB to common header / total steam energy input at turbine inlet from common header

Option 2:
Fraction of steam energy from WHRB = (total steam energy input at turbine inlet from common header - Steam energy supplied from AFBC to common header)/ total steam energy input at turbine inlet from common header

Choose from option 1 & option 2; whichever is less. . **This gives conservative estimations as any loss of steam on the way to turbine has been accounted towards WHRB steam.**

Step 3: Net power generation from WHRB steam

Net power generation due to WHRB = Fraction of steam energy from WHRB X net power generation from the turbine

Estimation of steam energy

Steam energy = Quantity of steam X Steam enthalpy

Annex 4

Estimation of Emission Factor for a coal based Thermal Power Plant

Parameter	Unit	Value	Remarks
Station Heat Rate - Coal based TPP	kcal/ kWh	2605	Calculated considering overall power generation efficiency of 33%.
Boiler efficiency	%	100%	Conservative estimates
Fuel input energy	kJ/ kWh	10909	Calculated based on data above
EF-coal	tC/TJ	25.8	For sub bituminous coal IPCC default value
EFy*	**tCO2/MWh**	**1.03**	

* This is less than the grid emission factor of 0.89 tCO2/ MWh for Western Region grid in India where the project is located.