Mr. Hans Jürgen Stehr Chair, CDM Executive Board
UNFCCC Secretariat
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April 18th 2007

Re Request for review of the request for registration for the CDM project activity "GHG emission reduction by energy efficiency improvement of clinker cooler in cement manufacturing at Rajashree cement at District Gulbarga, Karnataka India" (Ref. no. 0954)

Dear Mr. Stehr,

SGS has been informed that the request for registration for the CDM project activity "GHG emission reduction by energy efficiency improvement of clinker cooler in cement manufacturing at Rajashree cement at District Gulbarga, Karnataka India" (Ref. no. 0954) is under consideration for review because three requests for review have been received from members of the Board.

The requests for review are based on the reasons outlined below. SGS would like to provide an initial response to the issues raised by the request for review:

Request for Review:

1. *This project activity uses AMS II D which is a generic methodology for energy efficiency. The same technology was submitted as large scale methodologies NM0101 and NM0154 for energy efficiency in clinker cooler, both of which were given a C by the Meth Panel. It should be assessed whether AMS IID is correctly applied to this project.*

2. *We have now seen several project activities that present this issue. The Board may wish to ask the SSWG to review whether the concerns expressed by the Meth Panel with respect to the above not approved large scale methodologies need to be addressed by AMS II D.*

3. *It should be clarified if the project meets the small scale criteria (the sum of the size of the technology applied being above the 45 MWthermal limit suggest it is not).*

SGS Response to comments 1 and 2:
NM0101 and NM0154 were submitted in 2005 when AMS.II.D had not included the thermal energy limit 45 GWh_{th} (until version 5 of the methodology). The same was included in version 6 after a clarification sought in September 2005. This change in version 6 made the project eligible under AMS.II.D methodology.

The proposed new methodologies (NM0101 and NM0154) were submitted for the similar kind of project activity by Vikram Cement and both received a 'C'. As per the comment on NM0154, there were two main issues with the calculation method:

Methodology complexity - The methodology (NM 0154) proposes to estimate energy efficiency of a heat transfer and heat conversion equipment/s based on heat balance. This is based on the fact that such an approach is considered as a technically correct way to accurately determine efficiency of such equipment/s by following well established basic engineering principals {example technical data books accepted world wide viz Perry's Chemical Engineer's Handbook, McGraw-Hill, NY (1997) and many others}.

It is for sure that the project activity is increasing the efficiency of the equipments and reducing the fuel consumption. The only issue is how to estimate the reduction in the complex cement manufacturing process. As per the information obtained from some of the leading international manufacturers, it has been observed that:

a) All of them use heat balance approach to demonstrate the efficiency of the device/equipment they supply and then translate the same to savings in monitory terms.
b) Many a times the heat balance conducted is based on short span of time (2-3 days) using only representative data. Which then for the conservativeness of methodology can not be used, as instantaneous data used by equipment supplier to demonstrate guarantee may not reflect the annual variation.
c) Again to establish that pre-defined energy savings are real and measurable during the crediting period (i.e. few years down the line that is equipment is performing as guaranteed by technology supplier), the only available option is to conduct proper heat balance across the equipment.

Based on the number of parameters the calculation may look complex but it is simple based on institutional as well as industrial standards.

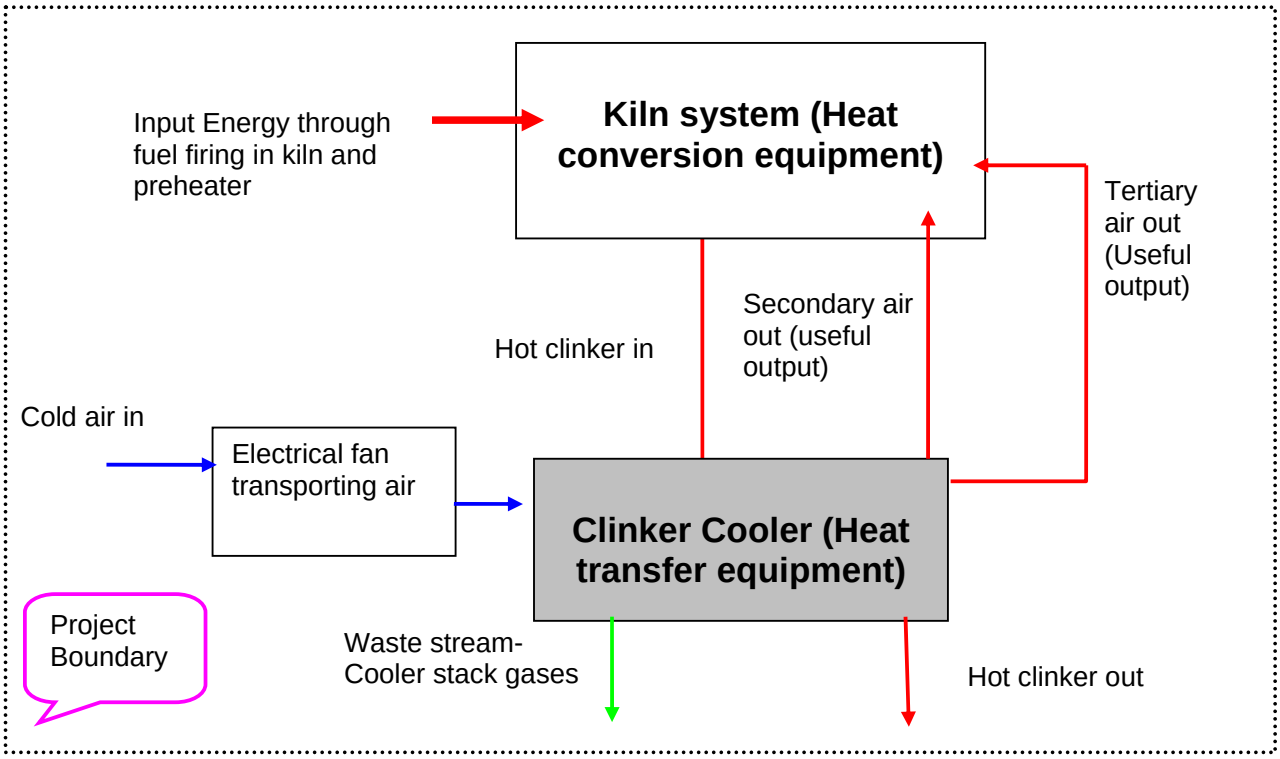
Heat Balance Approach - In the project activity all the parameters used are continuously monitored parameters and the quality of products depends on those parameters. The project proponent is reputed cement manufacturer and has its brand value and produces consistent quality of product. For the consistent quality, the parameters will be more or less within the acceptable range of variations. The approach adopted is same for baseline and project scenario and the small variations are averaged out in determination of baseline efficiency. In this manner the calculation performed in the project activity will be as per the established practice in cement sector and will be within the acceptable variation.

The project activity has applied AMS.II.D *Energy efficiency and fuel switching measures for industrial facilities.* The same has been checked for the applicability criteria. The methodology covers the emission reduction due to energy saving by increasing the efficiency in industrial facilities. The same has been verified as follows:

The present project activity is a sub-bundled project activity which consists of the modification i.e. redesigning of the grate system in clinker cooler and up-gradation of pre-heater section from 5^{th} stage to 6^{th} stage. The project activity will result in increase in the cooler recuperation efficiency as well as better utilization of heat due to providing additional surface area by increasing it to stage 6; thus project activity is utilizing maximum available heat in the cement manufacturing process. A new clinker inlet distribution system was also installed to distribute the clinker uniformly on the grate. The increase in cooler efficiency decreases the losses from the cooler which results in decreasing the fuel quantity being consumed in the kiln to generate the same amount of heat. This amount of heat is multiplied with the average emission factor to calculate the emission reduction from the project activity. The energy saving is well below than

the maximum saving limit of 45GWhth per year in fuel input. Hence project activity satisfies para 1 under heading technology/ measure of AMS-II-D version 07.

The clinker cooler in discussion is attached to the kiln for exchanging the available heat between clinker and the air entering to the kiln. The project boundary selected is the clinker cooler and kiln system, including preheater section. This was also shown in the project boundary diagram (Fig. B.4) under section B.4 in the PDD submitted with UNFCCC. All these components of the project boundary are located within Rajashree Cement's campus at Malkhed. Thus project activity satisfies para 2 under heading boundary of AMS-II-D.



The baseline selected for the project activity includes energy baseline for the cooler system prior to the modification i.e. continuation of the previous scenario. The attached excel spreadsheet shows data monitored for calculating the baseline. Also the emission factor for fossil fuel has been calculated as per the equation given in *section E.1.2.1 under sub-heading Average emission factor.* The emission factor will be ex-post monitor as per the monitoring plan. Thus project activity satisfies para 3 and 4 under heading baseline of AMS-II-D.

The project activity is an energy efficient technology and no equipment is being transferred from another activity; hence no leakage is considered while calculating the emission reductions as mentioned in section E.1.2.2 and same was found in excel spreadsheet showing emission reduction calculations. Thus project activity satisfies para 5 under heading leakage of AMS-II-D.

As per para 6 in AMS-II-D version 7, In the case of replacement, modification and retrofit measures the monitoring shall consist of:

a) *Documenting the specifications of the equipment replaced* - The specifications of pre and post scenario are available with project proponent and the performance guarantee test is carried out based on these specifications.
b) *Metering the energy use of the industrial facility, processes or the equipment affected by the project activity*
c) *Calculating the energy savings using the metered energy obtained from subparagraph (b).*

The project activity is metering the energy use as mentioned in the monitoring plan of the project activity in section D.3 of the PDD. Based on this metered data the energy savings are calculated. The cooler efficiency is calculated as per technology supplier method. The method is based on the basic engineering principals; which are well accepted in cement industry. The emission reduction excel spreadsheet was already submitted to UNFCCC. Thus project activity satisfies para 6 under heading monitoring of AMS-II-D.

The project is metering the energy use of the equipment affected by the project activity. By increasing the efficiency of the clinker-cooler, the kiln fuel input is affected hence the monitoring of the clinker-cooler and the kiln fuel input is necessary as per the methodology (Please refer to the diagram below). However, the emission reduction is calculated based on the fuel emission factor (tCO2/TJ) and energy saved due to increase in the clinker-cooler efficiency. This approach avoids the claim of any emission reduction due to kiln modifications itself and considers the benefits from clinker-cooler efficiency only.

The following parameters are being monitored to calculate the fuel emission factor, cooler efficiency and energy saving to calculate the emission reduction:

A) Fuel Emission Factor:

1. Quantity of fuel consumed in the kiln (tonnes/month)
2. Calorific value of the fuel consumed (kcal/kg)
3. Average emission factor (tCO2/TJ)

Default factor: Emission factor of the fuel (tC/TJ) – IPCC default (fixed)

B) Clinker Cooler Efficiency:

1. Clinker production
2. Clinker inlet/outlet temperature to cooler
3. Specific heat of clinker in/out
4. Clinker dust temperature in/out cooler
5. Clinker dust quantity in/out cooler
6. Specific heat of clinker dust in/out
7. Air inlet/outlet temp/pr to cooler for air density
8. Specific heat at air inlet/outlet
9. Mass flow rate of cooler air in/out
10. Power consumed by cooler fans
11. Radiation losses from cooler

C) Energy Saving:

1. Total heat input
2. Cooler efficiency increase from the baseline

D) Emission Reduction:

1. Energy saving
2. Fuel emission factor

The monitoring of the parameters is in terms of mass of the stream and temperature. The formula used is (mass * specific heat * temperature difference) for the energy content. The project activity is metering all the parameters required for the stream energy input/output of the cooler for calculating the cooler efficiency increase and energy saved. The fuel emission factor is being monitored separately.

In lieu of the monitoring methodology and monitoring plan the project proponent is metering all the parameters and calculating the savings. This is a transparent and metered approach for emission reduction calculation. The same approach was followed in registered CDM project 0858.

SGS Response to the Comment 3:

It was mentioned in the PDD as well as in the validation report that present CDM project activity is a bundling of two sub-bundled project activities. The criterion for sub-bundling was checked with reference to EB 21 Annex 21 on General Principles for Bundling.

Project activities within a bundle can be arranged in one or more sub-bundles, with each project activities retaining it distinctive characteristics. Such characteristics include its: technology/measure; location; application of simplified baseline methodology. Project activities within a sub-bundle belong to the same type. The sum of the output capacity of project activities within a sub-bundle shall not exceed the maximum output capacity limit for its type."

Since each of the two sub-bundled activities is a separate sub-bundled activity as per the definition given in Annex 21 of EB 21; the small scale limit of 45 GWh_{th} applies to each of the activities and not to the sum of the energy savings from the project. The savings from each of the sub-bundled activities is well below the application criteria of AMS-II-D .i.e. 45 $GWh_{th.}$

We hope that the above explanation clarifies the project activity, applicability of AMS.II.D and emission reduction calculations.

Sanjeev Kumar (+91 9871794628) will be the contact person for the review process and is available to address questions from the Board during the consideration of the review in case the Executive Board wishes.

Yours sincerely

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Annex 1: Supplier method of calculating cooler efficiency (Confidential)