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Your reference/letter of	Our reference/name	Tel. extension/E-mail	Fax extension	Date/Document	Page
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Response to Request for Review

Dear Sirs,

Please find below the response to the request for review formulated for the CDM project with the registration number 1921. In case you have any further inquiries please let us know as we kindly assist you.

Yours sincerely,

Thomas Kleiser
Head of Certification Body "Climate and Energy"

Attached documents:

- ERS Bisasar Road 010708_2.xls

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Response to the CDM Executive Board

Issue 1:

The PP/DOE are requested to provide the spreadsheets used for the calculations of the cost of electricity generation and the long run marginal cost.

Response by the Project Participants:

Annex 3 to the Bisasar Road PDD (Baseline Information, pages 53 to 58), is replicated in Annex 3 to the Mariannahill and LaMercy PDD (sites in Durban which were initially considered collectively with Bisasar Road as one CDM project but are now separated into Components 1 (Mariannahill and La Mercy) and 2 (Bisasar Road)). The Mariannahill and La Mercy PDD was approved and registered by the UNFCCC in December 2006. The baseline information is the same for all three sites and does not distinguish between the sites.

The figures in Annex 3 are based upon a cost model which was prepared and modified during 2004-5. It is stated in Annex 3 that the cost model was adjusted based on budget quotes which were obtained at that time. The calculations of generating cost and LRMC were based on these budget figures, but in response to the specific question raised, there are no spreadsheets which provide additional information over that already presented in Annex 3.

Response by TÜV SÜD:

The calculation of the power generation cost as presented in the PDD has been based on the baseline information for the 3 site projects. The long run marginal cost of South African Grid has been considered according to the information by Eskom in terms of Fuel Cost, O&M costs and Debt service. The baseline information has been reported under Annex 3 of the PDD.

Issue 2:

The PP/DOE are requested to clarify how the volume of gas and gross electricity generation calculated in the annual analysis of CERs, comply with the applicable methodology.

Response by the Project Participants:

In this case the applicable methodology is Approved Baseline Methodology AM0010 "Landfill gas capture and electricity generation projects where landfill gas capture is not mandated by law".

This methodology, which was based on the Durban Landfill Gas to Electricity Project, defines emission reductions as:

"the difference between the amount of methane actually destroyed/combusted during the year and the amount of methane that would have been destroyed/combusted during the year in the absence of the project activity, times the approved Global Warming Potential value for methane plus the quantity of electricity sold to the grid during the year multiplied by the CO₂ emissions intensity of the electricity displaced"



The ex-ante emission reductions estimates, as summarized in tabular form on page 5 of the PDD, are based on the use of a First Order Decay Model as required by the methodology, which also states that such estimates are for reference purposes only.

Row 9 of Microsoft Excel spreadsheet "ERS Bisasar Road 010708_2" (attached) uses data taken from the First Order Decay Model as the basis for the estimation of emission reductions, i.e. the predicted amount of methane used for electricity generation during the year, taking into account engine availability (using industry standard factors), a default methane content of 50% by volume and known parameters concerning the density and global warming potential of methane.

The predicted electricity generation (Row 25 of the spreadsheet) is based on the proposed generating capacity in place for each operating year, assuming engine operation at 100% load for 8,000 hours (approximately 91.3%) of each year. 8,000 hours is the industry standard for landfill gas engines. This calculation reflects the theoretical quantity of electricity which could be sold to the grid during each year, represented by (ES_y) in AM0010. ES_y is multiplied by the CO_2 emissions intensity of the electricity displaced ($El_{grid,y}$) which, in this case, is the Eskom factor of 0.000958t CO_2 /kWh for the year in question.

Initial predictions concluded that an operating capacity of 3MW would be feasible by the year 2007. However, the installation of engines did not take place until 2008. By this time additional engineering measures including side slope risers had been installed to enhance the gas collection system, and sufficient gas was being extracted to justify the installation of four 1MW engines. Future engine capacity will be added to reflect increasing volumes of collected gas as the site continues to expand, with a maximum of 8MW predicted by 2012.

Ex-post emission reductions will be determined by metering of the actual quantity of methane captured and combusted for producing electricity and the amount of electricity sold to the grid, in accordance with AM0010.

Response by TÜV SÜD:

The estimate of the volume of gas produced by the landfill has been made using a first order decay model "GasSim", developed by the UK Environment Agency. This model determines the generation of methane, carbon dioxide and hydrogen produced from the waste mass, waste composition and moisture content using a multi-phase first decay order equation. The model includes a single phase first order equation to emulate the "LandGEM" model functionality, which was produced for the US Environmental Protection Agency.

The DOE has considered the GasSim as equivalent to the LandGEM model for the purpose of ex-ante emission reductions calculation as both are based on a first order decay rate. Further confirmation of the high level of comparability between the UK and the US models has been found in a 2003 study (Gregory, R.G., Attenborough, G.M., Hall, D.C., Deed, C. - *"The validation and development of an integrated landfill gas risk assessment model GasSim, Sardinia Proceedings, UK"*). According to this research the cumulative gas generated per tonne during 150 years simulation (for a UK landfill scenario) differs only for about 4% between the two models with GasSim providing the lower value.

The DOE accordingly confirms that the model used by project participants for the ex-ante estimation of the emission reductions is appropriate and its application provides results with the same level of uncertainty as the US EPA model.



The gross electricity generation was estimated by the PPs multiplying the generating capacity in place (kW) times the predicted average operational time (8000 hours).

The generating capacity ranges within the simulation period, from 3000 kW to 8000 kW in order to fit with the estimated gas production throughout the years.

The operational time of 8000 hours (representing about 91.3% of the year) has been set considering the engines stops due to maintenance or repair.

The DOE considers this approach as in compliance with the methodology AM0010 that does not provide a specific guidance on the estimation of the gross electricity generation.

Issue 3:

The PP/DOE are requested to clarify if the gas combusted in flare is going to be used while calculating the emission reductions.

Response by the Project Participants:

It is confirmed that the gas combusted in the flare will not be used in the calculation of emission reductions. Formulae and calculations in the PDD will be corrected accordingly.

Response by TÜV SÜD:

The DOE confirms that the PPs will not claim any emission reductions due to flare operation.

Formulae and calculations in the PDD will have to be corrected accordingly.

It's furthermore confirmed that the monitoring provisions as in the PDD requesting registration allow to clearly and separately monitor the quantity of methane voted to electricity production and the quantity of methane which will be occasionally flared.

Issue 4:

The DOE is requested to clarify how it has validated the monitoring plan, in particular, the difference between the measurement frequency for combustion efficiency and heat rate of the generator (pages 24/25 and 62/63 of the PDD).

Response by the Project Participants:

It is confirmed that both parameters will be monitored on a semi-annual (i.e. 6-monthly) basis.

Response by TÜV SÜD:

Has been clarified that both the combustion efficiency and the heat rate will be monitored on a semi-annual basis within the crediting period.