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Att: CDM Executive Board

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Your ref.:	Our ref.:	Date:
CDM Ref 1893	MLEH/KCHA	20 October 2008

Response to request for review
Energy efficiency improvement of the existing Frame V Gas Turbine by steam injection and change of drive (from steam to electricity) of Ammonia cooling water pumps at NFCL (1893)

Dear Members of the CDM Executive Board,

We refer to the requests for review raised by three Board members concerning DNV's request for registration of project activity 1893 "Energy efficiency improvement of the existing Frame V Gas Turbine by steam injection and change of drive (from steam to electricity) of Ammonia cooling water pumps at NFCL" and would like to provide the following initial response to the issues raised by the requests for review.

Comment 1:

The PP/DOE is requested to further clarify that continuing and real actions were taken to secure CDM status for the project activity in parallel with its implementation (EB41Annex 46, Para. 5(b) guidance).

DNV Response:

The sequence of events has been provided below by the project participant (PP) which describes the real and continuing actions taken to secure CDM status for the project activity.

a. The PP had been interacting with a CDM consultant (namely M/s Ernst & Young) since September 2004. The CDM consultant had made presentations on Climate Change & CDM opportunities to the management of the PP based on which the PP had requested the consultant to make evaluations of a number of projects (including the project activity under consideration). Please refer to Annex I – Communications between PP and CDM Consultant dated 2004.
b. Implementation of the project activity was approved as a CDM project activity dated 21 November 2005 – please refer to the approval note attached as annex to the PDD submitted for request for registration.
c. The project activity was discussed internally with the consultants again in December 2005 and steps were taken to firm up the scope of work of the consultant. (Annex-II)

d. The PP placed the order for development of the CDM-PDD for the project in September 2006 after due evaluation of the project and consequent fee negotiation with the CDM Consultant – Please refer to Annex III, the engagement letter with CDM Consultant dated 4th September 2006.
e. From September 2006, the PP along with the CDM Consultant was involved in developing the Project Idea Note (PIN), PDD and the Project Concept Note (PCN).
f. Proposal for validation of the project activity received from the DOE on 25 May 2007 (Annex IV)
g. Submission of PDD and PCN to Indian DNA applying for Host Country Approval – 4 June 2007 (Please refer to application letter from PP to Indian DNA attached as Annex V to this reply)
h. Work order placed on DOE for validation of the project activity – 30 July 2007 (Please refer to copy of work order to DOE attached as Annex VI to this reply)
i. Invitation from Indian DNA for presentation of project to CDM cell of Indian DNA – 14 August 2007 (Please refer to copy of the invitation letter from Indian DNA attached as annex VII to this document)
j. Commencement of validation corresponding to web-hosting of PDD in DOE website for global stakeholder consultation – 18 September 2007 to 17 October 2007

The above sequence of events establishes that real and continuing actions were taken to ensure CDM benefits. The project approval note submitted along with the PDD also established that CDM benefits were seriously considered prior to going ahead with the project activity.

Comment 2:

The DOE is requested to further clarify why project emission and/or leakage from the project activity has been considered as zero.

DNV Response:

Project emissions are accountable if the project activity leads to any further emissions than what was already occurring in the baseline. However, in this case there is no additional emission in the project scenario. In the project activity, the steam which was previously used in the ammonia cooling water pumps will now be diverted to the gas turbine by converting the steam driven pumps to electrical drives. 13.8 TPH MP steam will be diverted from the cooling water pumps to the GT for injection. The amount of steam injected in the turbine is 15.6 TPH. Apparently this seems to increase the steam requirement by 1.8 TPH as well as the electricity requirement to cater to the ammonia cooling water pumps in the project scenario. However, due to steam injection in the GT, the gas turbine will operate more efficiently with a lower station heat rate and lower quantity of fossil fuel will be combusted to generate the same power as that in the baseline. Also, due to steam injection, since the amount of flue gas going to the HRSG will increase there will be an increase in the steam generation as well as the power generation from the HRSG. The details provided by BGGTS, the technology provider suggests that there will be 16% increase in the power generation (3.04 MW over the baseline) without any additional firing of natural gas over the baseline. The steam balance provided as annex-VIII to this response also establishes that there will be additional steam generation of 3.4 TPH due steam injection only. Thus there are no additional emissions due to either the excess steam or the additional electricity. Hence calculation of project emissions is not necessary. Further, to discount any effect of the additional electricity generation, DNV has restricted the baseline emission calculations to the baseline electricity

generation level determined on three years average prior to project implementation and no additional electricity generation will contribute to the emission reductions.

As per the methodology, leakage emissions are accountable if the project involves any transfer of existing equipment from another activity or transfer of equipment to another activity. There is no such equipment transfer to the project activity from other activities. Also additional electricity or steam requirement, as explained above will be obtained from the augmented power generated by the gas turbine (GT-C) on injection of steam on implementation of the project. However since the emission reductions have been restricted to the baseline generation level, leakage calculation due to the project activity is not necessary.

Comment 3:

The PP/DOE is requested to clarify the overlapping of the project boundary with the other two proposed CDM projects by the same PP. The DOE is requested to further confirm how they have validated that there is no double counting of the energy savings between all the CDM projects in the unit.

DNV Response:

The other two CDM projects by the same PP involve reduction in steam demand in the chemical processing units (Ammonia plants) of the fertilizer unit. This will affect the fuel consumption in the auxiliary boilers in the plant and do not affect in any way the fuel combustion by the GT-C to generate power. The monitoring and emission reduction calculations are based on the difference between the station heat rate (fossil fuel consumption to generate unit power) of the GT-C. The baseline emissions are calculated as the reduction in the station heat rate (i.e. fuel to generate unit power) by the GT-C multiplied by the emission factor of natural gas. Hence this formula gives the actual emission reductions due to lower specific fuel consumption by the GT-C. This is multiplied by the power that would have been generated in the baseline to arrive at the total emission reductions. Thus the formulae proposed do not include fuel savings due to the two other CDM projects and the fuel savings in the GT-C is only accounted for. Due to implementation of the other two CDM projects, steam consumption in the chemical process units will reduce thus reducing steam demand from the header which will translate to lower fuel firing in auxiliary boilers A & B and not the fuel consumption of either GT A/B or GT C. This is because GT A/B and GT-C is not used to control the header pressure but only to generate power. Thus there is no overlapping of the project boundaries of the other projects and no possibility of double counting of the emission reductions from this project activity.

Comment 4:

The DOE is requested to clarify how the correctness of the baseline methodology is followed in the PDD, in particular the consideration of energy form of steam in the emission baseline.

DNV Response:

The methodology requires *"Each energy form in the emission baseline is multiplied by an emission coefficient (in kg CO2e/kWh)"*. The project proponent has not claimed any emission reductions on the energy form of steam in the emission baseline. Only the energy form of power has been considered for calculation of the emission reductions. The proposed calculation method takes into account only the reduction in heat rate of the turbine in the project scenario and the

power generation in the baseline scenario. As explained above, in response to comment 2, energy form of steam is not required to be considered in the emission baseline.

Comment 5:

The PP/DOE is requested to clarify how the energy flow of the project activity is monitored, in particular, the steam to be diverted from the water cooling pumps to the gas turbine.

DNV Response:

DNV would like to re-iterate that steam injection in the turbine will result in the reduction of the turbine heat rate and the emission reductions are accurately calculated from the reduction in heat rate of the turbine due to the project activity. This involves direct measurement of the turbine heat rate in the project scenario and comparing it with the turbine heat rate in the baseline. This gives an accurate representation of the energy saved by the project activity due to efficiency increase of the turbine. Thus monitoring of diverted steam is not necessary under the project activity.

We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully
for DET NORSKE VERITAS CERTIFICATION LTD

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