TÜV SÜD Industrie Service GmbH · Westendstrasse 199 · 80686 Munich · Germany

CDM Team

Your reference/letter of	Our reference/name	Tel. extension/E-mail	Fax extension	Date/Document	Page
	IS-CMS-MUC/Mu	+49 89 5791-2170	+49 89 5791-2756	2007-11-01	1 of 15
	Werner Betzenbichler	werner.betzenbichler@tuev-sued.de			

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 1272. In case you have any further inquiries please let us know as we kindly assist you.

Yours sincerely,

Werner Betzenbichler
Certification Body Climate and Energy

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Comment No.1:

Further substantiation of additionality and CDM consideration by senior management to undertake the project activity is required.

Response by project proponent:

Query (a) Further substantiation of CDM consideration by senior management to undertake the project activity is required.

IGF's senior management took the decision of carrying out the project activity, considering the incentive from the CDM at various stages of the project planning and implementation. The project proponent was well aware of the possible benefits of CDM and risk involved with the implementation of the project activity.

Following documents substantiate the fact that senior management of Indo Gulf Fertilisers (IGF) has considered CDM seriously to undertake the project activity:

Document No. 1 – Internal memo addressed to the senior management, apprising about CDM and associated benefits by implementing the project activity

During the inception and planning stage of the project activity, the Senior Management of Indo Gulf Fertilizers (IGF) was well aware of the possible CDM benefits by implementing the project activity. In the internal memo (Annexure-1) about the project activity, Manager- Process Engineering (Mr.Gupta) has apprised to the Senior Management of IGF - Vice President (Mgf. Oprns), Vice President (Finance), Deputy General Manager (Production, Ammonia), Deputy General Manager (Electrical & Power Plant), Deputy General Manager (Production, Urea & Bagging), GM (Commercial) about CDM, Kyoto Protocol and possibility of Vacuum Pre-Concentrator project qualifying as CDM project and associated CDM benefits.

This clearly substantiates that the CDM has been seriously considered by IGF to undertake the project activity. Please find attached the Internal Memo as Annexure 1, this document has been already submitted to UNFCCC.

Document No. 2 – Minutes of Meeting (MoM) of Monthly Progress Review (MPR) meeting held on 06/03/2000

In IGF, the new or proposed projects like energy saving projects, safety projects, product quality improvement projects etc. are discussed in Monthly Progress Review (MPR) meeting .The MPR meeting is convened by Head Unit Technical Cell, chaired by Unit Head and is attended by functional heads, GMs, departmental heads (Senior Management) and area in-charges. The MPR meeting is usually conducted once in a month. Following the meeting, a monthly progress report is released to all attendees, which details the various decisions taken in the meeting and the path forward.

In the MPR meeting, Mr. Gupta explained the concept of vacuum pre-concentrator project to all participants including possible energy saving potential and related environmental benefits of the project. It was advised to Mr. Anand Bihari to carry out a techno-feasibility study report for the same.

Mr. Gupta also apprised the participants about the Clean Development Mechanism (CDM) and Kyoto protocol and informed that VPC project can qualify as CDM project since it leads to GHG emission reduction and is environmentally benign. The technical problems associated with project were discussed and it was concluded that carbon revenues would assist in overcoming these risks.

The monthly progress report held on 06/03/2000 (Annexure 2) is being submitted as evidence of the same.

Document No. 3 – Minutes of Meeting (MoM) of Monthly Progress Review (MPR) held on 05/05/2000

Further to demonstrate that CDM was considered by IGF to undertake the project, MoM of MPR meeting of May 2000 is also being attached here (Please refer Annexure-3). This document has been already submitted to UNFCCC.

Since VPC project involves huge investment and also carries certain technical risks, this project was discussed and agreed during the Planning & Budgeting Meeting held on 23rd April 2000 at Mumbai.

Moreover in MPR held on 05/05/2000, it was apprised that a study by PDIL indicated that project is viable and thus it was decided to go ahead considering CDM benefits. Please find attached the MPR of May 2000 as Annexure-3 which clearly substantiates that CDM was considered to undertake the project.

The above documents clearly substantiate that the CDM was seriously considered by senior management of IGF in the decision to undertake the project activity.

The above information has also been included in the revised PDD under section B.5 (step-0).

Query (b) Further substantiation of additionality

Document No. 1 – Minutes of Meeting (MoM) of Monthly Progress Review (MPR) held on 06/03/2000

As stated above, in IGF the new or proposed projects like energy saving projects, are discussed in Monthly Progress Review (MPR) meeting .In the MPR meeting in the presence of senior ranking officials across different departments of IGF, the various technical problems (Technological risks) like failure of Urea solution pump, Polymer Deposition, Lute choking etc., which were envisaged by implementing the VPC project were discussed. During these discussions, it was envisaged that the Carbon revenues generated from this project would help in covering up these risks. (Please find enclosed the MoM of the MPR meeting as Annexure-2).

Document No. 2 – Correspondence between technical consultant- PDIL and IGF

As a part of the project activity, Urea solution pump is installed and this pump forms a vital component in urea production process. Any technical problem like cavitation, discharge valve malfunction etc., may result in tripping of the pump and subsequently may impact the plant operations. Under these circumstances, the Urea production may get affected leading to revenue loss for IGF.

With this apprehension in mind during the implementation stage itself, IGF consulted PDIL (Engineering consultant to IGF) on this issue. PDIL is a reputed and leading government agency

which offers design engineering and consultancy to fertilizer industry in India (Minutes of Meeting of this discussion are being attached as Annexure-4 for reference).

Bearing this risk of technological failure and associated repercussions, IGF had a long deliberation with PDIL about providing a by-pass arrangement to VPC (project activity). IGF provided this suggestion in case of any problem in VPC like operational failure of the urea solution pump etc. may lead to production losses. However, PDIL did not favour this suggestion and by-pass arrangement was not implemented thus exposing the VPC project to a huge technical risk.

The above documents substantiate that IGF had envisaged the problems and risks associated with the project activity before implementation of the project, which thereby substantiates additionality of the project.

Response by TÜV SÜD:

Besides an internal memo to the senior management (Annexure 1), the project proponent submitted minutes of meeting of two monthly progress review meetings on 06/03/2000 and 05/05/2000 (Annexure 2 and 3). These documents substantiate that possible CDM benefits for the vacuum pre-concentrator project have been discussed on management level.

It has been discussed in length during validation that the project start is very close to the earliest possible day (01 Jan 2000). The wording of Annexure 1 left the possibility that decision for the project was already available on Jan 15, 2000 and therefore might have been made in late 1999, it was finally demonstrated convincingly through the given evidences that the ultimate decision was made at the high management level in May 2000.

Two additional documents substantiate additionality with respect to technical barriers faced by the project activity:

The minutes of meeting of the monthly progress review meeting on 06/03/2000 (Annexure 2) evidences that possible technological risks of the project like failure of urea solution pump, polymer deposition and lute choking, leading to a disturbance of the whole urea production process and thus production losses, were discussed in the project planning stage. In addition the minutes of meeting between representatives of Indo Gulf Corporation Ltd. and the consultant PDIL (Annexure 4) demonstrates that this risk of production losses due to the change of an established process was taken very seriously and bypassing arrangements were discussed.

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Comment No.2:

Clarification is required on the risks of technological failure, e.g., by benchmarking specific energy consumption and performance for similar processes, and on the essential distinction between the project activity and other VPC projects (Steps 3a and 4, respectively, of Additionality Tool, v3).

Response by project proponent:

The project activity is a retrofit measure for reduction of LP steam consumption in urea section by installing a unique technology of vacuum pre-concentrator (VPC) in between the Low Pressure (LP) concentrator and Vacuum concentrator in the urea section. The VPC uses the enthalpy of off gases (which was earlier unutilized) from the Medium Pressure (MP) decomposer to pre-concentrate urea solution from 71% (outlet of LP concentrator) to 85% in vacuum pre-concentrator before feeding the solution to vacuum concentrator. Thus, the project activity serves the two fold objective of reduction of low pressure (LP) steam consumption in Urea plant and thereby the fossil fuel consumption in the boiler.

As defined in Sub Step 1(a) of the PDD, there are two alternatives to the project activity, namely Alternative 1: Continuation of existing scenario and Alternative 2: Implementation of the project without CDM consideration.

The project activity “Effective utilization of waste heat by installing vacuum pre-concentrator in urea section” is “first of its kind” in Indian fertiliser industry. There are no similar measures that have been implemented in the Indian Fertilizer industry. Being a novel concept with no precedence, the proponent had to take a huge technological risk by implementing the project activity. Hence, during the planning stages itself, IGF had to face many barriers due to unfamiliarity of technology, unavailability of relevant technical expertise and the uncertainty of the impact of project activity (retrofit measure) on existing process (alternative/ base case).

Additionally, in the absence of the private / government/ national or international capital availability to cover the risks associated with carrying out this innovative energy efficiency activity in the fertilizer manufacturing units, IGF had to take a huge risk to install the proposed project activity. Considering this scenario, the proponent could not have implemented this project without CDM benefits. Thus, the barrier described above prevents the implementation of the project activity thereby making the Alternative 2 i.e. implementing the project without CDM consideration practically infeasible.

According to the Tool for the demonstration and assessment of additionality (version 03), the barrier analysis (Step 3) and common practice analysis (Step 4) has been carried out.

Step-3 i.e. “Barrier Analysis” of “Tool for the demonstration and assessment of additionality (version 03) EB 29” is used to demonstrate that the proposed project activity faces barriers that prevent the baseline scenario from occurring and therefore the project activity is additional. In this step it has been shown that the project activity faces barriers that:

(c) Prevent the implementation of this type of proposed project activity; and

(d) Do not prevent the implementation of at least one of the alternatives.

The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a CDM project activity. If the CDM does not alleviate the identified barriers that prevent the proposed project activity from occurring, then the project activity is not additional.

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Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

Establish that there are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a CDM activity. Such realistic and credible barriers may include, among others:

Technological barriers, inter alia:

- *Skilled and/or properly trained labour to operate and maintain the technology is not available, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance;*
- *Risk of technological failure: the process/technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the proposed CDM project activity, as demonstrated by relevant scientific literature or technology manufacturer information.*
- *The particular technology used in the proposed project activity is not available in the relevant region.*

Barriers due to prevailing practice, inter alia:

- *The project activity is the "first of its kind".*

Other barriers, preferably specified in the underlying methodology as examples.

Technological barriers

The following section describes the technological risk IGF had to undertake, while going ahead with the decision of implementing the project. These risks pose as a serious barrier to implementation of the project activity.

Retrofitting of vacuum pre-concentrator before vacuum concentrator is not a common practice in the Indian fertilizer industry and IGF has done a pioneering effort in taking the initiative in implementing this technology for their project.

During project inception and design stage itself, several technological issues were anticipated by IGF, involving:

- **Designing of Vacuum pressure***:* The vacuum pressure of the vacuum pre-concentrator plays a vital role in salubrious operation of pre-concentrator and downstream sections as well as urea plant itself. IGF and the technology supplier M/s Snam Progetti spent considerable time for designing the appropriate vacuum pressure for IGF process condition.
- **Transfer of urea solution***:* In VPC technology / process, the urea solution is to be transferred from the Vacuum pre-concentrator to the vacuum Concentrator section employing a urea solution pump due to following reasons:
    - In the baseline scenario, urea solution (71% concentration) would get transferred from LP decomposer to Vacuum concentrator due to pressure gradient (P=4.62 ata). In project activity case, urea solution (85% concentration) there is no or negligible pressure gradient between Vacuum pre-concentrator and Vacuum concentrator, hence it requires installation of an urea solution pump

Problems from urea solution pump

The transfer of the urea solution from the vacuum pre-concentrator to the vacuum section is one of the biggest technical challenges inveighed by the team.

Considerable time was spent in selecting an appropriate pump for urea solution transportation. Since in the project scenario, the urea solution is concentrated up to 85% in the Vacuum pre-concentrator, for this specific requirement, pumps were not readily available in the market. IGF has contacted few of the pump suppliers for their specific requirement and after various discussion and technical analysis pump was selected for the urea solution transfer. Still, IGF was wary about the performance of the pump in transferring urea solution of such concentration. Thus, proper operations of the urea solution pump became a vital component in the plant operations.

Moreover, installation of the urea solution pump poses a huge technological risk for the VPC technology on account of its failure due to tripping / malfunctioning.

The urea solution which is transferred by using urea solution pump is 85% concentrated and highly viscous in nature. The temperature of solution is around 104^{o}C to 107^{o}C. The seal of the pump is exposed to the high temperature urea solution on one side and air on the other side. Hence, there is a chance of heat loss of the urea solution through the seal. For this purpose, the seal is kept at a temperature equivalent to urea solution temperature by steam heating. At 85% concentration, the urea solution gets solidified at a temperature of 92^{o}C. If urea solution gets solidified, then the pump trips thus affecting the operations of VPC and vacuum concentrator and subsequently affecting urea production process.

Hence, the technology for steam heating of the seal poses a huge technical risk. The urea solution pump gets tripped on account of failure of this technology, thus affecting the urea production process.

With this apprehension in mind, IGF consulted PDIL (Engineering consultant to IGF) on this issue. PDIL is a reputed and leading government agency which offers design engineering and consultancy to fertilizer industry in India. (Minutes of Meeting of this discussion are being attached as Annexure-4 for reference). This problem and associated risks was also discussed during the Monthly Progress Review (MPR) meeting held on 06/03/2000 (attached herewith as Annexure 2). During these discussions, it was envisaged that the Carbon revenues generated from this project would help in covering up these risks.

Bearing this risk of technological failure of urea solution pump and associated repercussions, IGF had a long deliberation with PDIL about providing a by-pass arrangement to VPC (project activity). IGF provided this suggestion in case of operational failure of the urea solution pump. However, PDIL did not favour this suggestion and by-pass arrangement was not implemented thus exposing the VPC project to a huge technical risk.

Apart from urea solidification problem, the other technological failure risks associated with the pump is malfunctioning of discharge valve. The discharge valve of the pump (which is electronically controlled by DCS) is used to control the flow of urea solution to the vacuum concentrator. This technology (control of discharge valve) poses a huge risk on account of failure of function of discharge valve. If the function of the discharge valve fails, the flow of the urea solution gets affected both in upstream (vacuum pre-concentrator) and downstream (vacuum concentrator), leading to the problem of cavitation. This scenario may again pose risk to the technology leading to disruption in proc-

ess parameters and operation, which may lead to shut down of the plant and also to cavitation of the pump, which in turn would trip the pump.

The alternative to the project activity i.e. the baseline scenario does not have this equipment (urea solution pump) and thus these barriers do not prevent the implementation of Alternative 1 i.e. continuation of current practice.

As anticipated before implementation of the project activity, IGF has already faced many times the problem of urea solution pump tripping during operation of the plant and subsequent reduction in urea production or stoppage in urea production. This is substantiated by the following documents:

- Copy of plant log sheets (an ISO document which is being audited on regular basis) mentioning several incidents of tripping of urea solution pump (P-54) and discharge valve (LV 540) malfunctioning is being attached as Annexure 5 for reference. Page 2, 3 and 5 of Annexure 5 describes incidents for urea solution pump (P-54) tripping and cavitation problem, while Page 4 describes incidents of discharge valve (LV 540) malfunctioning.
- Minutes of Monthly Progress Review (MPR) meeting held in June 2006 is being attached as Annexure 6 for reference, indicating urea production losses on account of urea solution pump (P-54) tripping.

- **Polymer deposition and Lute Choking:** In VPC technology, urea solution is concentrated to 85% and fed to Vacuum concentrator. In the baseline scenario (Alternative 1), the urea solution concentration fed to Vacuum concentrator was 71%. In vacuum concentrator, the urea solution is further concentrated by means of flashing in flash vessels (MV6 and MV7). The rate of formation of polymer during flashing is dependent on the temperature and concentration of the urea solution. Higher the temperature and concentration of the solution, higher is the rate of formation of polymer. Hence, the technology of concentrating urea solution to 85% and subsequently using in vacuum concentrator poses a huge technical risk, that may lead to disruption of plant operations and thereby production losses.

  As discussed above, the rate of polymer formation increases manifold with the increase in concentration. The polymer formation inside the walls of the vacuum pre-concentrator leads to the following problems:

  - The polymer deposition on the inner surface of the vessel would affect the vacuum maintained in the vacuum concentrator. Any decrease in vacuum may affect the urea production process and may lead to production losses consequently.
  - Further, over a period of time, the polymers formed would coagulate to form lumps, which may choke the outlet of the vacuum concentrator and the transmission line (lute) from vacuum section to prilling tower. This may lead to shutdown of the vacuum concentrator, thereby impacting the urea production.

  This problem and associated risks was discussed during the Monthly Progress Review (MPR) meeting held on 06/03/2000 (attached herewith as Annexure 2). During these discussions, it was envisaged that the Carbon revenues generated from this project would help in covering up these risks.

As anticipated before implementation of the project activity, IGF has already faced the problem of polymer deposition and lute choking during operation of the plant and subsequent reduction in urea production or stoppage in urea production. The following documents substantiate the occurrence of these problems and the discussions of IGF with consultants / technology supplier (M/s Snam Progetti):

- Engineering Work Requisition (EWR) for provision of steel grating to avoid choking due to polymer deposition is being attached as Annexure 7
- Work Order for cleaning /removal of polymer from MV6 is being attached as Annexure 8
- Correspondence with the technology supplier (M/s Snam Progetti) on polymer deposition is being attached as Annexure 9
- Discussion with senior faculty members of Indian Institute of Technology (IIT) Kanpur (Top engineering and R&D institution in India) on polymer deposition is being attached as Annexure 10
- Report on lute choking during plant start-up is being attached as Annexure 11
- Copy of plant log sheet (an ISO document which is being audited on regular basis) mentioning lute choking is being attached as Annexure 12; Page 2 of Annexure 12 describes incident of lute choking

In addition, the cleaning of the transfer line may also create many difficulties and in case of complete solidification of urea solution inside the transfer line, the pipeline may have to be cut for solid deposition removal, leading to additional requirement of maintenance cost.

The retrofitting of vacuum pre-concentrator technology before vacuum concentrator is not a common practice in the Indian fertilizer industry and IGF is the first plant to retrofit such technology in India.

As mentioned above, the project activity has many operating risks, which may severely impact the urea production process and subsequently production. Under these circumstances, IGF may also incur heavy financial losses and hence CDM revenues would help in covering up the operating risks of the project activity due to technological failure.

Barrier due to prevailing practice:
The retrofit measures taken by IGF in their project activity “Effective utilization of waste heat by installing vacuum pre-concentrator in urea section” is “first of its kind” in Indian fertilizer industry. IGF lacked experience in such a technology and thus have taken a huge risk by implementing the project.

Other Barriers

The gestation period of the project activity was about 1 year; hence the project was to be implemented along with the plant operation. The urea section contains highly flammable and hazardous material. IGF faced many difficulties during project construction and fabrication; due care and extra safety precautions were needed during foundation laying, welding, piping and other stages of project implementation. IGF needed highly skilled and trained manpower for project commissioning.

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Sub-step 3b. Show that the identified barriers would not prevent a wide spread implementation of at least one of the alternatives (accepted the proposed project activity already considered in step 3a):

As defined in Sub Step 1(a), there are two alternatives to the project activity, namely continuation of existing scenario and implementation of the project without CDM consideration.

Alternative 1 for the proposed project activity "Effective utilization of waste heat by installing vacuum pre-concentrator in urea section" is the continuation of current practice. In the existing system, urea solution (71 % concentrated) is transferred to vacuum section using the pressure gradient between the low pressure and vacuum section and hot off gases from the medium pressure section is cooled by cooling water from cooling tower before recycling to high pressure urea section. The barriers identified in sub-step 3 (a) like problems associated with urea solution pump, polymer deposition, lute choking etc. are relevant only if the project activity is implemented. Hence in case of Alternative 1 i.e. continuation of current practice, these barriers do not exist and thus would not prevent its implementation.

Step 4 : Common Practice Analysis
Sub-step 4a. Analyze other activities similar to the proposed project activity:
Provide an analysis of any other activities implemented previously or currently underway that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities are not to be included in this analysis. Provide documented evidence and, where relevant, quantitative information. On the basis of that analysis, describe whether and to which extent similar activities have already diffused in the relevant region.

IGF being an energy conscious and responsible organization realizes that energy conservation and environmental benign activities are key parameters for better future of the businesses and continuously explores the possibility implementing certain schemes to achieve better energy efficiency.

Urea Fertiliser plants are based on complex and integrated processes and retrofitting energy efficient technology like VPC technology in existing operating system has high risk as this may affect the existing process parameters and equipments and may lead to malfunctioning of equipments and disruption in operation.

Out of 33 urea plants in India, IGF is the first plant to retrofit the VPC technology in their existing urea production process. (Please find attached a letter from Projects and Development India Limited (PDIL) to substantiate the same as Annexure 13). PDIL is a reputed and leading government agency which offers design engineering and consultancy to fertilizer industries in India. PDIL has vast experience in providing consulting for many energy saving projects in the fertilizer industry.

This substantiates that implementing VPC project in existing plant is not a common practice in India, due to unforeseen risks associated with VPC project which may lead to malfunctioning of equipment, stoppage of plant, resulting in heavy financial losses.

Sub-step 4b. Discuss any similar options that are occurring:

If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive (as contended in Step 2) or faces barriers (as contended in Step 3). Therefore, if similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject.

Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects were carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

Since the project activity is “first of kind” in India, therefore this step is not applicable.

The above information has also been included in the revised PDD under section B.5 (step-03 and 04)

Response by TÜV SÜD:

Project proponent has further specified the technological risks and the prevailing practice barrier faced by the project activity in line with Step 3 and 4 of Additionality tool, v3.

The project activity involves changes in an established production process, which leads to uncertainties with regards to operation and performance of the whole process.

IGF was aware that due to the characteristics of the urea solution, the installation of the Vacuum pre-concentrator and required urea solution pump could cause operational problems affecting the whole urea production process. This considerations has been proven to come true by actual problems, which have been substantiated within Annexure 5-12.

CDM incentives are expected to mitigate the risks of changing the established process, by providing additional income.

The project activity is first of its kind. This is substantiated by a letter of Projects and Development India Limited (PDIL), a government agency which offers design engineering and consultancy to fertilizer industry in India (Annexure 13).

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Comment No.3:

Clarification is required if the monitoring method for urea production rate is not a deviation from the prescribed method and on its implication for the accuracy of emission reduction calculation.

Response by project proponent:

As per the methodology AM0018 version 01.1, the output rate (urea production rate) should be measured by automatic or manual weighing balance or by volume in the plant premises to the best accuracy.

We would like to bring to your kind notice that at IGF, Urea Production Rate is being monitored continuously in the plant premises by measuring the mass flow rate of liquid ammonia supplied/consumed in urea plant and applying Ammonia-urea conversion factor[1].

The quantity of ammonia supplied to the urea plant is measured by using an online mass flow meter with integrator of accuracy ± 0.1 %. This kind of measurement using a mass flow meter is reliable and more accurate than bulk (solid) flow measurement or orifice flow measurement.

The mass flow meter installed in Ammonia Plant is calibrated once in a year from a Government accredited external calibration agency - Fluid Control Research Institute (A Govt. of India Project with UNDP Assistance) Palghat, kerala India. The calibration is carried out in presence of IGF officials and Fluid Control research Institute company officials (Please find attached the Calibration copy as annexure 14).

The conversion factor is regularly checked audited and reconciled using the figures of bagged urea, urea dispatched and urea in stock.

The conversion factor used by IGF is independently audited once in every six months by three independent parties

1. Independent accredited government auditors – FICC(Fertiliser Industry Coordination Committee) and Department Of Fertilisers, Government of India
2. Reputed third parties auditors (financial auditors of IGF)
3. Internal auditors (officials of Aditya Birla Group from Corporate office)

(Please find attached audited copy as annexure 15)

All these audits are carried out independently. Since the inception of the plant, there has been no instance where a deviation / error in the declared and actually achieved urea production have been reported during the audit checks thus confirming the consistency in conversion factor.

The other two methods for measuring Urea production is given below:

1. The urea melt (liquid urea) produced from urea plant

   The urea melt (liquid urea) produced from urea plant can not be precisely or directly measured due to following reasons:

   - Till date no technology supplier has supplied flow meter to measure flow of urea melt and no technology supplier intend to supply urea melt flow meter in near future

[1] Ammonia- Urea conversion factor: In India Ammonia-urea conversion factor is used to calculate the Urea production. This conversion factor and calculated urea production is submitted to FICC and other Govt. organizations for all regulatory and other requirements.

Industrie Service

- The urea melt is highly viscous and contains micro crystals of urea. Thus, the accurate and precise measurement of liquid urea is not possible with any mass flow meter.

2. IGF has also installed a Solid Bulk Flow Measurement device along with belt conveyor (belt conveyor transports solid urea from Prilling tower to urea bagging plant). The accuracy of bulk flow meter is ± 2%. As well as, the bulk flow meter is installed in very dusty environment also the hygroscopic and corrosive nature of urea makes the bulk flow meter highly unreliable and precise measurement of the urea output rate is not possible with this instrument.

Hence the liquid ammonia flow measurement and use of the conversion factor to calculate the urea production is more reliable and standard practice in Indian fertilizer industry then the direct urea production measurement. Please find attached the Government agency (FICC) document stating the procedure to monitor urea production (through ammonia mass flow meter and conversion factor) in fertilizer industry as Annexure-16.

In India, all the fertilizer companies (including IGF) uses the aforesaid method and the quantity of urea produced is monitored through ammonia mass flow meter and conversion factor. The quantity of urea produced is reported and submitted on daily basis to various government authorities like FAI (Fertiliser Association of India), FICC (Fertiliser Industry Co-ordination Committee) and DOF (Department Of Fertiliser), Excise Dept etc., .

The above mentioned method of monitoring urea production by ammonia consumption is being used for reporting the urea production to the aforesaid government agencies and subsidy is being granted by the government on the same.

Therefore the urea production rate monitored through aforesaid method is highly accurate and reliable and has no implication on emission reduction calculation and is the more appropriate and accurate than any other measurement technique.

Response by TÜV SÜD:

The approach for monitoring the output rate of urea is based on continuously monitoring of the ammonia input rate and a conversion factor. The conversion factor is determined and regularly checked by calculating the urea production rate through a mass balance approach based on the quantity of urea dispatched and the difference in the quantity held in stock over a day. In view that the liquid urea as direct output of the process affected cannot be measured accurately due to its consistency and no respective metering system is available, the approach taken by the project proponent is deemed to be the most appropriate in order to get reliable and high quality data.

The applied monitoring method for this parameter is common practice in the fertilizer industry in India and is controlled by the Indian government (see Annexure 15 – summary of audit report) as the urea output is a basic parameter for granting governmental subsidies. Thus high reliability of reported data free of potential conflicts of interests should be ensured.

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Comment No.4:

Clarification is required if fuel testing to determine fuel-related parameters is being observed.

Response by project proponent:

Fuel testing to determine fuel related parameters is being observed in the project activity. The following parameters are being monitored with respect of the project activity:

1. **The net calorific value of natural gas used in the boiler**

   Gas Authority of India (GAIL)- A reputed Government Company supplies Natural Gas to Indo Gulf Fertilizers (IGF). The Net Calorific Value (NCV) of Natural Gas is monitored on daily basis using an online gas chromatograph and the same is forwarded to IGF based on which payments are made to GAIL by IGF. As per the report forwarded by GAIL to IGF, the NCV of Natural gas is logged in the PRC (Production Consumption Report) report by IGF official which is a controlled ISO document. Based on the logged data a monthly report is compiled by the Process (MIS) Engineer and is forwarded to the CDM coordinator on a monthly basis.

   The same had already been mentioned in section B.7.1 of the PDD.

2. **The net calorific value of naphtha used in the boiler**

   For every supply of naphtha to Indo Gulf Fertilizers (IGF) the fuel supplier forwards the ultimate analysis report of the fuel to IGF. The report contains the Net Calorific Value (NCV) of naphtha and other parameters of naphtha based on which the payments are made to the fuel supplier by IGF. As per the report, NCV of naphtha is logged in the PRC report by IGF official which is a controlled ISO document. Based on the logged data a monthly report is compiled by the Process (MIS) Engineer and is forwarded to the CDM coordinator on a monthly basis. The same had already been mentioned in section B.7.1 of the PDD.

3. **The quantity of fuel (s) used in the boiler**

   The quantity of the fuel(s) used in the boiler being monitored in the plant premises using flow meters. The monitored data is recorded in the PRC report which is a controlled ISO document. A monthly compilation is thereafter forwarded to the CDM coordinator by the Process (MIS) engineer. The same had already been mentioned in section B.7.1 of the PDD.

4. **The Emission Factor of Natural Gas used as fuel**

   Gas Authority of India (GAIL)- A reputed Government Company supplies Natural Gas to Indo Gulf Fertilizers (IGF). The ultimate analysis of Natural Gas is monitored on daily basis using an online gas chromatograph by the fuel supplier and the same is forwarded to IGF based on which payments are made to GAIL by IGF. From the results of ultimate analysis of Natural Gas, the Carbon number of Natural Gas is calculated on daily basis.

   However for conservative purpose, Emission factor of natural gas is calculated from 2006 IPCC Guidelines for Green House Gas Inventories. In CER calculations the same value has been used for the Natural gas used as fuel for service boiler and power generation in the project activity.

Industrie Service

The natural gas is the main fuel used in the service boiler (the project activity leads to reduction in steam consumption and steam is sourced from the service boiler) and in case of non- availability of Natural gas, Naphtha fuel is used occasionally.

To be conservative, the fuel (used in the boiler) having lowest emission factor (Natural gas has lower emission factor compared with Naphtha) is considered for all emission reduction calculation.

Hence, Emission factor of Natural Gas (IPCC) is used for Emission reduction calculation.

However, the emission factor of Natural Gas (IPCC value) used for power generation in the project activity has been explicitly mentioned in the PDD in section B.6.2.

Also, the same IPCC value as provided by 2006 IPCC Guidelines for Green House Gas Inventories has been used for the Natural Gas used as fuel in the boiler. This however has not been mentioned explicitly in the PDD. The same is now being mentioned in section B.6.2 in the revised PDD.

Moreover, please find attached an excel sheet (as Annexure-17) which compares the Emission reductions of the project activity calculated by considering IPCC value and actual carbon number of Natural gas fuel. The excel sheet states that emission reduction calculated by using IPCC value of Natural Gas is conservative compared with emission reduction calculated by using actual carbon number of Natural gas fuel.

Response by TÜV SÜD:

Fuel related parameters with ID number 2.20 and 2.21 of AM 0018 version 01.1 (fuel related parameters) have been described in the PDD within the parameters of net calorific values for natural gas and naphtha. PDD states that NCV of the natural gas (naphtha) is estimated by ultimate analysis of natural gas (naptha) and that all data are provided by the fuel supplier. Therefore it should be ensured that fuel testing to determine fuel-related parameters is performed.

However for the calculation of emission reductions due to the fuel savings it is it is assumed that only natural gas consumption is reduced by the project activity as this is the major fuel. As natural gas has a lower emission factor than naphtha this is a conservative approach. IPCC emission factor for natural gas will be applied. It has been demonstrated (Annexure 17) that this approach is more conservative than basing the calculations on the actual carbon number and resulting carbon emission factor.

In addition to the responses by project proponent provided above, the project proponent submitted a revised PDD, version 09, dated 01/11/2007 including:

- references to the substantiating documents MoM 06/03/2000 und 05/05/2000 (Annexure 2 and 3) in section B 5 as per response given to comment No. 1.
- revised barrier discussion specifying technological barriers (step 3) and common practice analysis (step 4) in section B 5 as per response given to comment No. 2.
- specified parameter for natural gas emission factor applied (fuel used in service boiler) in section B.6.1 as per response given to comment No. 4.

Therefore a revised validation report is submitted referring to the revised PDD version.