



Industrie Service

Validation Report

Carbon Projektentwicklung GmbH

**VALIDATION OF THE CDM-PROJECT:
CATALYTIC N₂O DESTRUCTION PROJECT IN THE
TAIL GAS OF THREE NITRIC ACID PLANTS AT
HU-CHEMS FINE CHEMICAL CORP.**

REPORT NO. 775390

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TÜV SÜD Industrie Service GmbH
Carbon Management Service
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Report Title:		Validation of the CDM Project: Catalytic N ₂ O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.		
Number of pages		18 (excluding cover page and annexes)		
Summary: <p>The Certification Body "Climate and Energy" of TÜV SÜD Industrie Service GmbH has been ordered by CARBON Projektentwicklung to perform a validation of the above mentioned project.</p> <p>Using a risk based approach; the validation of this project has been performed by document reviews and on-site inspection, audits at the locations of the project and interviews at the offices of the project developer and the project owner.</p> <p>In summary, it is TÜV SÜD's opinion that the project "Catalytic N₂O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.", as described in the revised project design document dated July 22, 2006, meets all relevant UNFCCC requirements for the CDM, set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board and that the project furthermore meets all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0028.</p> <p>Hence, TÜV SÜD will recommend this project for registration as CDM project activity by the CDM Executive Board.</p> <p>Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNAs of involved parties, including confirmation by the DNA of the Republic of Korea that the project assists in achieving sustainable development.</p> <p>Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 8,878,169 tonnes CO_{2e} over a crediting period of seven years, resulting in a calculated annual average of 1,268,310 tonnes CO_{2e}, represents a conservative estimation using the assumptions given by the project documents.</p>				
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Abbreviations

AOR	Ammonia Oxidation Reactor
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CR	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
EU-ETS	European Union Emissions Trading Scheme
GHG	Greenhouse gas(es)
HU-Chems	Hu-Chems Fine Chemical Corp.
KP	Kyoto Protocol
MP	Monitoring Plan
NGO	Non Governmental Organisation
PDD	Project Design Document
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual



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1 INTRODUCTION

1.1 Objective

Carbon Projektentwicklung GmbH has commissioned TÜV SÜD Industrie Service GmbH (TÜV SÜD) to validate the prospective CDM Project: Catalytic N₂O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp. The validation serves as design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

For this specific project TÜV SÜD has been provided with a first PDD in March 2006. Based on this documentation a document review and a fact finding mission in form of an on-site audit has taken place. This PDD version was made publicly available by the DOE as required by the Marrakech Accords. In July 2006 a revised final PDD has been submitted in which all open issues and clarification requests as documented by this report have been resolved. It serves as the basis for the final evaluation presented herewith.

Studying the existing documentation belonging to this project, it was obvious that the competence and capability of the validation team has to cover at least the following aspects:

- Ø Knowledge of Kyoto Protocol and the Marrakech Accords
- Ø Environmental and Social Impact Assessment
- Ø Skills in environmental auditing (ISO 14000, EMAS)
- Ø Quality assurance
- Ø Production process for nitric acid
- Ø Business environment in the fertilizer industry
- Ø Monitoring concepts
- Ø Political, economical and technical conditions in host country

According to these requirements TÜV SÜD has composed a project team in accordance with the appointment rules of the TÜV certification body “climate and energy”:

The validation team was consisting of the following three experts:

Werner Betzenbichler	(project manager, GhG auditor)	TÜV SÜD
Nikolaus Kröger	(GHG auditor trainee)	TÜV SÜD
Bo-Mi Lee	(local expert)	TÜV SÜD (Seoul Office)
Stefan Reis	(local expert)	TÜV SÜD (Seoul Office)

Werner Betzenbichler is head of the department Carbon Management Service of TÜV SÜD and head of the “Certification Body for Climate and Energy” and expert for conventional energy generation, renewable energy, energy expansion planning and familiar with the recent version of CDM and JI criteria as necessary for the implementation of Art. 6 and Art. 12 of the KP. Since 2000 he has been working in the international climate change and emission trading business as a verifier.

Nikolaus Kröger is mechanical engineer and expert for emissions monitoring and quality assurance at the department “Environmental Service” of TÜV SÜD. He is located in the Hamburg office and is also engaged as personally accredited verifier in the EU-ETS serving the Northern German market. Being a trainee for qualifying as ghg-auditor he has already been involved in several CDM activities with a special focus on industrial non-CO₂ projects.

Bo-Mi Lee is technical assistant at the Seoul Office of TÜV SÜD Korea. She attended the audits for assisting with translations of information provided in Korean language.

Stefan Reis is mechanical engineer heading the industry service unit of the Seoul Office of TÜV SÜD Korea. quality management auditor and is engaged by TÜV SÜD's Cairo office. He contributed to this assessment by providing his specific expertise on the local market and common practise at the local chemical industry.

The audit team covers the above mentioned requirements as follows:

- § Knowledge of Kyoto Protocol and the Marrakech Accords (Betzenbichler)
- § Environmental and Social Impact Assessment (Betzenbichler, Kröger)
- § Skills in environmental auditing (Betzenbichler, Kröger)
- § Quality assurance (Betzenbichler, Kröger, Reis)
- § Technical aspects (Betzenbichler, Kröger, Reis)
- § Monitoring concepts (Betzenbichler, Kröger)
- § Political, economical and technical conditions in host country (Lee, Reis)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body “climate and energy”:

- § Michael Rumberg (deputy head of certification body “climate and energy”)
- § Javier Castro (ghg auditor, veto person for covering scope 5)

1.3 GHG Project Description

The project consists of the installation of a tertiary N₂O reduction technology in the tail gas stream of three nitric acid production plants of Hu-Chems Fine Chemical Corp. in Yeosu, South Korea. Nitrous oxide which is formed as by-product of the nitric acid production will be removed by three EnviNOx[®]-System which apply a special catalyst developed for this specific purpose. The only incentive for implementing the project is the CDM as no other revenues are generated and no legal obligations exist requiring such a technology.

The project is expected to start operation in December 2006.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol is enclosed in Annex 1 to this report.



Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Figure 1 Validation Protocol Tables



2.1 Review of Documents

The project design document submitted by the Client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as annex 2 to this report.

2.2 Follow-up Interviews

In the period of March 24 to 25, 2006 TÜV SÜD performed interviews on-site with project stakeholders to confirm selected information and to resolve issues identified in the first document review. Furthermore an inspection of a similar plant took place on April 12, 2006 in Linz, Austria, where the technology supplier UHDE has installed the EnviNOx[®]-System in a pilot project two years ago. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
HU-Chems	<ul style="list-style-type: none"> § Nitric acid production § Project implementation § Baseline determination § Additionality § Monitoring plan § Environmental licensing § Stakeholder process § Maintenance § Production data (historic and projections)
Carbon Projektentwicklung GmbH & Carbon CDM Korea Ltd.	<ul style="list-style-type: none"> § Project design document § Baseline determination § Additionality § Crediting period § Monitoring plan § Environmental impacts § Stakeholder process § Metering system, calibration, power supply § Stakeholder process
AMI	<ul style="list-style-type: none"> § Experiences with technology § Reduction efficiency § Maintenance § Nitric acid production / market
UHDE	<ul style="list-style-type: none"> § Nitric acid production

	<p>§ Emission reduction technology</p> <p>§ Instrumentation for monitoring</p> <p>§ Design parameter of all three plants</p>
Emerson / Rose-mount	<p>§ N₂O analyzers</p> <p>§ Flow monitoring</p> <p>§ Quality assurance procedures</p> <p>§ Data acquisition system</p>

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by TÜV SÜD were resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are summarised in chapter 3 below and documented in more detail in the validation protocol in annex 1.

3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the final project design document and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in annex 1.
- 2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in annex 1. The validation of the project resulted in seven Corrective Action Requests and eight Clarification Requests.
- 3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Clarification or Corrective Action Requests are summarised.
- 4) The final conclusions for validation subject are presented.

The validation findings relate to the project design as documented and described in the final project design documentation dated 2006-07-22.

3.1 Project Design

3.1.1 Discussion

The submitted project design document applies the most recent version of the PDD template as provided by the EB. The technical design is based on advanced emissions reduction technology installed in a very limited amount of nitric acid plant so far. The PDD delivers in principle a complete and transparent overview of the project activity. All information on technical details has been verified and is in compliance with the actual situation.

Regarding the employed technology, there is no technical requirement avoiding the continuation of the recent operation conditions. Furthermore, there are no significant indications that the technology used to implement the project could be substituted during the envisaged operational lifetime of the project activity (21 years) and in particular during the first crediting period.

The project is in line with relevant legislation of the Republic of Korea. The funding for the project does not lead to a diversion of official development assistance as according to the information obtained by the audit team ODA does not contribute to the financing of the project.

The applied methodology AM0028 is deemed being the most fitting one as it has been developed in the context of this specific project.

The first crediting period covers the period Dec. 15, 2006 – Dec. 14, 2013 (set by the final PDD), with the intention for renewal. The operational lifetime of the project is 21 years.

The starting date as well as the operational lifetime are clearly defined and also handled in a reasonable manner. The first crediting period is with 7 years clearly defined. But the management of the

plant operator could not yet confirm the installation dates which will have to coincide with the regular shut down schedule.

3.1.2 Findings

Outstanding issue:

A Letter of Approval by the Republic of Korea has to be available at time of requesting for registration.

Response:

-

Clarification Request #1:

The way of presenting information on the use of reducing agents is more generic than project specific. The PDD should focus in a project-specific manner on the extent of including the use of reducing agents.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Clarification Request #2:

The envisioned starting date of the crediting period should be defined in alignment with the plant operator's schedule. In case of any changes the projections for the first and the last year of the crediting period will have to be adjusted.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

3.1.3 Conclusion

The requests indicated above are considered as being resolved. Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNAs of involved parties, including confirmation by the DNA of the Republic of Korea that the project assists in achieving sustainable development. The project is in compliance with the requirements.

3.2 Baseline and Additionality

3.2.1 Discussion

All applicability criteria are in compliance with the situation as verified during the on-site visits:

- the three plants are in operation since July 1990, 1999 and 2003
- there is no existing N₂O destruction or abatement technology installed
- the nitric acid production level will not be affected by the project

- there will be no increase of NO_x emissions
- the existing DeNO_x unit is a Selective Catalytic Reduction (SCR) DeNO_x unit
- the N₂O concentration at inlet and outlet will be measurable

The baseline is established in a project specific manner. A stepwise approach as given by the methodology is applied for identifying the baseline scenario. It is demonstrated and evidenced by underlying information that the continuation of the current situation represents the baseline. By using the tools for demonstrating the additionality it is shown that there is no further incentive other than CDM for implementing the project. In particular there is no regional or national obligation in South Korea, which sets threshold on emissions of nitrous oxide.

The PDD correctly defines the project boundaries and identifies the emissions which have to be included or excluded in the baseline and/or project scenario but does not apply a project-specific presentation in chapter B.4. Emissions caused by the use of ammonia are correctly excluded from the baseline scenario as they appear also in project scenario.

The table as provided in annex 2 (baseline data) is not sufficient for fixing all baseline parameter. Even more the methodology requires the provision of historical data which is not given at any part of the PDD (1st version). All information required is available on-site and has been shown to the validator.

3.2.2 Findings

Corrective Action Request #1:

It is necessary to provide a project-specific discussion of the project boundaries within chapter B.4 clearly expressing kind of emissions is covered by the project boundaries.

Response:

A revised PDD dated July 22, 2006 has been submitted. It contains the required discussion justifying the exclusion of emissions by ammonia use and the inclusion of emissions by the use of propane at HUCHems II and III.

Corrective Action Request #2:

It is necessary to amend annex 3 of the PDD and to provide information on

- historic supplier of catalyst
- historic composition of the ammonia catalyst
- maximum historical ammonia flow
- design capacity
- historical operating temperature range
- historical pressure range
- information on time base to get all data

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

3.2.3 Conclusion

The revised annex 3 provides all data as required to compare the operation conditions with historic conditions during future verifications. The use of option b for ammonia flow, pressure and temperature in the production process - design parameter – is deemed to be suitable as existing historic data did not undergo any calibration and continuous quality assurance routines. During regular operation there is no necessity to have requirements on the accuracy of such parameter. Hence the reluctance on the existing system would imply additional risks on the verifiability once a meter would have to be replaced. Therefore it is reasonable to bind the operation conditions to design figures.

The projects baseline and additionality is in line with the requirements.

3.3 Monitoring Plan

3.3.1 Discussion

The specific approach of AM0028 foresees the continuous monitoring of nitrous oxide flow (concentration and flow) in the individual tail gas stream of each plant in front of and behind the reduction technology (catalyst), i.e. a simultaneous metering of baseline and project emissions concerning nitrous oxide. Additionally other relevant project emissions like those from the use of propane require continuous monitoring, too. In order to avoid any gaming by changing production conditions several production parameters (e.g. temperature, pressure at the AOR) have to be compared with historic data. Only in case they will remain in an acceptable band width data from the on-line monitoring system will be used for the calculation of emission reductions. In any other case default values will be applied.

All parameter required to determine the project's emissions reductions are correctly included in chapter D of the PDD, also reflecting the situation that monitoring has to be conducted at each plant separately. But details are missing on type of equipment, data recording and data reduction processes (averaging). The choice of parameter is following the approved methodology. Monitoring technology for these parameters is available on the market.

With regard to version 1 of the PDD the intended procedures on quality assurances and quality control are not considered to be complete and sufficient. As requested by the EB guidance more details on quality assurance and data uncertainty have to be specified. It has not been possible to assess the inherent overall uncertainty belonging to the foreseen approach because of a lack of information in the first PDD version. In spite of this missing transparency all information required has been available at different sites audited (plant, equipment manufacturer, project developer).

3.3.2 Findings

Clarification Request #3:

It is necessary to provide more details on

- type of metering equipment
- data recording and processing procedures

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Corrective Action Request #3:

Updated procedures for quality assurance and control should be submitted. These procedures should include:

- details on monitoring equipment implementation
- details on calibration and function tests
- details on troubleshooting routines
- requirements on data availability
- details on the inclusion of Third Party services
- internal control procedures

at least for all parameter requiring the installation of physical meters (N₂O, temperature, flow, pressure).

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Clarification Request #4:

The expected accuracy can not be assessed as long as CAR3 is not resolved.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Clarification Request #5:

The observation indicated as CR3 (project emissions) is also relevant for baseline emissions.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Corrective Action Request #4:

The observation indicated as CAR3 (project emissions) is also relevant for baseline emissions.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Clarification Request #6:

The expected accuracy can not be assessed as long as CAR4 is not resolved.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Clarification Request #7:

It is not yet clarified which standards will be used for normalization of temperature and pressure.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Corrective Action Request #5:

The Monitoring Plan as provided by annex 4 should be updated due to the guidance given by EB and the project-specific requirements as already discussed by this validation protocol.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

3.3.3 Conclusion

The revised PDD provides all data requested. It delivers a comprehensive insight to the envisioned monitoring system. By resolving the underlying CARs and CRs also information on the accuracy of all key parameter has been provided in a complete manner. The revised monitoring plan also provides all procedures requested. The envisioned quality assurance system for all parameter is deemed to be sufficient. The given discussion on data uncertainty includes all relevant aspects. Nonetheless it will be necessary to determine the specific uncertainty of each monitoring period exposed due to the given algorithms.

The monitoring plan complies with existing guidance as given by the EB.

The project is in line with the requirements.

3.4 Calculation of GHG Emissions

3.4.1 Discussion

Chapter E of the first PDD version provides information on the estimated emission reductions while it does not exactly follow the guidance on completing a PDD. The form for presenting the annual emission reductions is correctly applied. But in particular baseline emissions and project emissions were not specified in the corresponding subchapters.

There is no inconsistency within data as provided several times in different chapters of the PDD. The existing SCR DeNOx-unit and its replacement (HU-Chems II and III) are correctly covered by the PDD.

The emission reduction calculations have been made by Excel spreadsheets which have been assessed during the validation process. The project uses conservative values for reduction technology efficiency (94%) which is below the experiences obtained from the pilot plant at AMI, Austria. Additionally the used figures for operation hours and baseline nitrous oxide concentration are considered to be conservative and will lead rather to an underestimation than an overestimation of the expected emission reductions.

3.4.2 Findings

Corrective Action Request #6:

The PDD should indicate the estimated project emissions explicitly in section E.1.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

Corrective Action Request #7:

The PDD should indicate the estimated project emissions explicitly in section E.4.

Response:

A revised PDD dated July 22, 2006 has been submitted, addressing this issue.

3.4.3 Conclusion

The project will result in a reduction of GHG emissions. The calculated estimation of prospective emission reductions, stated with 8,878,169 metric tons CO_{2e} totally within the first crediting period of seven years, i.e. 1,268,310 metric tons CO_{2e} annually, is deemed to be a conservative estimation.

The project complies with the requirements.

3.5 Environmental Impacts

3.5.1 Discussion

The first PDD Due contained a statement that the local legislation does not require the submission of an EIA. But a clear proof by reference to the existing legislation could not be given as the plant itself would require an EIA for major changes.

The PDD (first and revised version) is claiming that the project will have no negative environmental impacts. This point of view can be followed as the project does not change emissions behavior of the nitric acid plant besides emissions reductions for N₂O and NO_x. No additional waste will occur as the catalyst will be taken back by the manufactures for future re-activation.

3.5.2 Findings

Clarification Request #8:

Confirmation should be provided by an environmental authority that no EIA is required for the implementation of the project activity.

Response:

A revised PDD dated July 22, 2006 has been submitted. It contains the required confirmation as annex 5.



3.5.3 Conclusion

The project is in line with national and regional laws. The project fulfils the requirements of the UNFCCC.

3.6 Comments by Local Stakeholders

3.6.1 Discussion

A local stakeholder process has performed. By the uses of various media stakeholders have been invited to attend a meeting which was held on February 17, 2006. The PDD presents the comments and the way how they have been taken into account in an appropriate and transparent manner.

3.6.2 Findings

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3.6.3 Conclusion

The project is in compliance with the CDM requirements.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on UNFCCC website and on its own website at

http://www.netinform.net/KE/Wegweiser/Guide2.aspx?ID=1613&Ebene1_ID=26&Ebene2_ID=447&mode=0

from March 31, 2006 for 30 days and invited comments by Parties, stakeholders and non-governmental organisations.

No comments were received.

5 VALIDATION OPINION

TÜV SÜD has performed a validation of the project: Catalytic N₂O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp., on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and subsequent decisions by the CDM Executive Board.

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Hence TÜV SÜD will recommend the project for registration by the CDM Executive Board.

The project will reduce nitrous oxide emission in a nitric acid plant by applying a tertiary reduction technology in the waste gas stream of three production lines. An analysis as provided by the applied methodology demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNAs of involved parties, including confirmation by the DNA of the Republic of Korea that the project assists in achieving sustainable development.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 8,878,169 tonnes CO_{2e} over a crediting period of seven years, resulting in a calculated annual average of 1,268,310 tonnes CO_{2e}, represents a conservative estimation using the assumptions given by the project documents.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2006-08-04



Michael Rumberg
Certification Body "Climate and Energy"
TÜV SÜD Industrie Service GmbH

Munich, 2006-08-03



Werner Betzenbichler
Project Manager

Validation of the CDM Project:
Catalytic N₂O destruction project in the tail gas of three Nitric Acid
Plants at Hu-Chems Fine Chemical Corp.



Industrie Service

Appendix A: Validation Protocol



Table 1 Project's Environment

REQUIREMENT	REFERENCE	Comment	CONCLUSION
1. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	The Republic of Korea (known as South Korea) is Party of the Kyoto Protocol	p
2. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	South Korea has a DNA in place. Austria has a DNA in place (remark: this Party has been deleted from the list of participants with the submission of the final PDD version).	p
3. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, Marrakech Accords, CDM Modalities §40a	A LoA of the Republic of Korea is not yet available. Austria has been deleted from the list of participants with the submission of the final PDD version. A letter of approval issued by the South Korean DNA has to be submitted before requesting for registration.	Open issue
4. The project shall have the written approval of voluntary participation from the designated national au-	Kyoto Protocol Art. 12.5a,	A LoA of the Republic of Korea is not yet available.	Open issue



REQUIREMENT	REFERENCE	Comment	CONCLUSION
thorities of each party involved.	Marrakech Accords, CDM Modalities §40a	Austria has been deleted from the list of participants with the submission of the final PDD version. A letter of approval issued by the South Korean DNA has to be submitted before requesting for registration.	
5. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3. A letter of approval for participants originating from Annex-I-Countries should be available.	Kyoto Protocol Art.12.2	Austria has been deleted from the list of participants with the submission of the final PDD version.	p
6. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Marrakech Accords, CDM Modalities, §40	Global stakeholders have been invited by installing a link to http://www.netinform.net/KE/Wegweiser/Guide2.aspx?ID=1613&Ebene1_ID=26&Ebene2_ID=447&mode=0 publicly available on the CDM web-page of UNFCCC. No comments have been received	p
7. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB De-	The document is in line with the recent version of the CDM-PDD format.	p



Industrie Service

REQUIREMENT	REFERENCE	Comment	CONCLUSION
	cisions		
8. The project participants shall submit a letter on the modalities of communication (MoC) before submitting a request for registration	EB-09 F_CDM_REG form	Not yet available (at time of first re-view). A letter on the modalities of communication signed by the project participants has been submitted together with the revised PDD	To be submitted before registration p

Table 2 PDD

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of Project Activity					
A.1. Project Title					
A.1.1. Does the used project title clearly enable to identify the unique CDM activity?	5, 6	DR	The project's title enables a clear identification of the CDM activity	p	p
A.1.2. Are there an indication of a revision number and the date of the revision?	5, 6	DR	OK	p	p
A.1.3. Is this in consistency with the time line of the project's history?	5, 6 1	DR I	There are no inconsistencies. Project schedules have been presented and assessed.	p	p
A.2. Description of the project activity					
A.2.1. Is the description delivering a transparent overview of the project activities?	5, 6	DR	In principle the project description is delivering a complete overview, but the way of presenting information on the use of reducing agents is more generic than project specific. Therefore this might create irritation on the completeness of the further considera-	CR1	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			tion of project emissions and leakage. <u>Clarification Request #1:</u> The PDD should focus in a project-specific manner on the extent of including the use of reducing agents.		
A.2.2. Is all information provided in compliance with actual situation or planning?	5, 6 1 - 2	DR I	All information provided by chapter A.2 is in compliance with the actual situation.	p	p
A.2.3. Are proofs available evidencing all information with relevance for the validity, for the determination of baseline and project emissions and for emission projections?	1 – 2 12 – 16	DR	OK, as there is no specific data within project description besides indicating the name of the relevant plant and their construction dates.	p	p
A.2.4. Is all information provided in consistency with details provided by further chapters of the PDD?	5, 6	DR	See above	p	p
A.3. Project Participants					
A.3.1. Is the form required for the indication of project participants correctly applied?	5, 6	DR	OK, it is correctly applied. Remark: Austria has been deleted from the list of participants with the submission of the final PDD version.	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.3.2. Is the voluntary participation of all listed entities or Parties confirmed by each of them?	1 – 2	I	The voluntary participation can be confirmed.	p	p
A.3.3. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	5, 6	DR	Annex 1 details the information of the listed project participants.	p	p
A.4. Technical description of the project activity					
A.4.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	5, 6 1	DR I	The information provided enables a unique identification of the site.	p	p
A.4.2. Do the project participants possess ownership or licenses which will allow the implementation of the project at that site / those sites?	1	I	Respective contracts and licenses have been submitted during the on-site audits.	p	p
A.4.3. Is the category(ies) of the project activity correctly identified?	5, 6	DR I	OK, the project refers correctly to scope 5, chemical industry.	p	p
A.4.4. Does the project design engineering reflect current good practices?	1 – 2	I	The project engineering reflects current good practice. Detailed schedules for all steps of equipment installations, training measures and later operation have been presented.	p	p
A.4.5. Does the description of the technology to be applied provide sufficient and transparent input	5, 6	DR	The use of propane as reducing agent in not sufficiently described as already recognized	See	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
to evaluate its impact on the greenhouse gas balance?			by CR1.	CR1	
A.4.6. Is the brief explanation how the project will reduce greenhouse gas emission transparent and suitable?	5, 6	DR	An appropriate explanation is provided by the PDD.	p	p
A.4.7. Is all information provided in compliance with actual situation or planning as available by the project participants?	5, 6 1 – 2	DR I	<p>The project-specific information presented by chapter A.4.4 (incl. A.4.4.1) has been verified on-site along with other information provided later on in more details by the PDD. There is no inconsistency within data provided several times in different chapters of the PDD. The existing SCR DeNOx-unit and its replacement at HUCheMs IV are correctly covered by the PDD.</p> <p>The management of the plant operator could not yet confirm the installation dates which will have to coincide with the regular shut down schedule.</p> <p><u>Clarification Request #2:</u></p> <p>The envisioned starting date of the crediting period should be defined in alignment with the plant operator's schedule. In case of any changes the emission reduction projections for the first and the last year of the crediting period will have to be adjusted.</p>	CR2	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.8. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	5, 6 2	DR I	There are several options available on the market providing secondary or tertiary reduction technologies. This project applies a technology which can refer to a successful pilot installation in the plant of AMI in Linz, Austria. This plant has been visited by the audit team and records of more than two years of continuous operations have been presented and assessed.	p	p
A.4.9. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	5, 6 2	DR I	No, a replacement during the project period is not reasonably.	p	p
A.4.10. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	5, 6 2	DR I	The project requires specific training and maintenance efforts in the context of changing the catalyst material and for monitoring duties, which are addressed by the project implementation schedule.	p	p
A.4.11. Does the project make provisions for meeting training and maintenance needs?	2, 3	I	Yes	p	p
A.4.12. Is a schedule available on the implementation of the project and are there any risks for delays?	2, 3 11	I	A schedule is available for all steps of project implementation. The objection related to the starting date is already expressed by CR2.	See CR2	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.13. Is the form required for the indication of projected emission reductions correctly applied?	5, 6	DR	Yes, it is in compliance with the required format.	p	p
A.5. Public Funding					
A.5.1. Is all information on public funding provided in compliance with actual situation or planning as available by the project participants?	5, 6 1	DR I	Evidenced by a business plan it can be confirmed that no public funding is included in the project investment.	p	p
A.5.2. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 2)?	5, 6 1	DR I	See above	p	p
B. Baseline Methodology					
B.1. Choice and Applicability					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	5, 6, 4	DR	The project applies AM0028, Vers. 1	p	p
B.1.2. Is the choice of the methodology correctly justified by the PDD?	5, 6, 4	DR	The application of this methodology is justified.	p	p
B.1.3. Is the baseline methodology the one deemed most applicable for this project?	5, 6, 4	DR	Yes, as above	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.1.4. Is the project in conformance with all applicability criteria of the applied methodology?	5, 6, 4 1	DR I	<p>All applicability criteria are in compliance with the situation as verified during the on-site visits:</p> <ul style="list-style-type: none"> - the three plants are in operation since July 1990, 1999 and 2003 - there is no existing N₂O destruction or abatement technology installed - the nitric acid production level will not be affected by the project - there will be no increase of NO_x emissions - the existing DeNO_x units are of Selective Catalytic Reduction (SCR) DeNO_x unit type - the N₂O concentration at inlets and outlets will be measurable 	p	p
B.2. Application of the Baseline Methodology / Identification of the Baseline Scenario					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	5, 6, 4	DR	<p>The discussion is done in a transparent manner.</p> <p>The statement that there is not yet any legal threshold on N₂O emission in place has been verified.</p>	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2.2. Does the application consider all potential base-line scenarios in the discussion?	5, 6, 4	DR	Yes potential baseline scenarios have been identified in compliance with the approach as presented by the approved methodology.	p	p
B.2.3. Is conservativeness addressed in the way of identifying the baseline?	5, 6, 4	DR	Yes	p	p
B.2.4. Has the baseline been established on a project-specific basis?	5, 6, 4, 1	DR I	The baseline is established in a project specific manner. It can be confirmed that there are no reasons which would contradict the continuation of the current situation. The assumed remaining life time of the nitric acid plants is exceeding the indicated life time of the project by far.	p	p
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	5, 6, 4, 1	DR I	Yes, policies and trends have been taken into account.	p	p
B.2.6. Is the baseline determination compatible with the available data?	5, 6, 4, 1	DR I	Compatibility can be confirmed	p	p
B.2.7. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	5, 6	DR	The continuation of the current situation is the most likely course of action.	p	p
B.2.8. Does the PDD follow the approach for identifying the baseline scenario as given by the	5, 6,	DR	All five steps are followed in a transparent	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
approved methodology?	4		manner.		
B.2.9. Is all literature and sources clearly referenced?	5, 6	DR	The required literature is clearly referenced	p	p
B.3.Additionality					
B.3.1. Is the discussion of how emission reductions are archived by the project scenario in comparison to the identified project scenario provided in a transparent manner?	5, 6, 4 1	DR I	Emission reductions are archived by the destruction of N ₂ O by a catalyst which would not be installed without the CDM activity. This is clearly discussed.	p	p
B.3.2. In case of using calculation models in order to demonstrate emission reductions: Are all formulae and input data based on provable records?		DR	Not relevant	p	p
B.3.3. Does the PDD clearly demonstrate the additionality using the approach as given by the methodology?	5, 6	DR	The PDD uses the additionality tool.	p	p
B.3.4. In case of using the additionality tool: Are all steps followed in a transparent and provable manner?	5, 6 1	DR I	All steps are followed in a transparent manner. A simple cost analysis is applied as the project generates no further revenues besides the CDM.	p	p
B.3.5. Does the discussion sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	5, 6 1	DR	The discussion is complete in that context.	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.3.6. Does the CDM registration have any impact on the implementation of the project?	5, 6 1	DR I	There would be no implementation without CDM as this is generating the only revenues form the project.	p	p
B.3.7. Is the approach for demonstrating additionality provided by the most recent (or still applicable) methodology correctly applied?	5, 6	DR	The additionality tool is applied in a correct and complete manner.	p	p
B.3.8. Are other proofs than anecdotal evidence for all assumptions and statements used by the additionality discussion?	5, 6 8	DR I	Evidence on statements on investment and the decision making process has been provided by a business plan.	p	p
B.4. Project Boundary					
B.4.1. Are all emission related to the baseline scenario clearly identified and described in a complete manner?	5, 6 1	DR I	<p>Emissions caused by the use of ammonia are correctly excluded from the baseline scenario as they appear in both scenarios, baseline and project.</p> <p>The emissions from the use of hydrocarbons as reducing agent should be described in more project-specific details as already required by CR1.</p> <p>The table as presented by chapter B.4. of the PDD is simply a copy of the methodology's text without project-specific informa-</p>	See CR1 CAR1	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			tion. <u>Corrective Action Request #1:</u> It is necessary to provide a project-specific discussion which kind of emissions is covered by the project boundaries.		
B.4.2. In case of grid connected electricity projects: Is the relevant grid correctly identified due to the EB guidance and the underlying methodology?			Not applicable	p	p
B.4.3. Are all emission related to the project scenario clearly identified and described in a complete manner?	5, 6 1	DR I	Yes, besides the objection identified as CAR 1 the discussion is complete and follows the guidance given by the approved methodology AM0028.	See CAR1	p
B.4.4. Are all emission related to leakage clearly identified and described in a complete manner?	5, 6 1	DR	As above	p	p
B.5.Detailed Baseline Information					
B.5.1. Is there any indication of a date when the baseline has been determined?	5, 6	DR	Correctly indicated in chapter B.5.	p	p
B.5.2. Is this in consistency with the time line of the PDD history?	5, 6 1, 2	DR I	The date is in consistency with the known time line.	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.5.3. Is all data required provided in a complete manner by annex 3 of the PDD?	5, 6 1	DR I	<p>The table as provided in annex 2 is not sufficient for fixing all baseline parameter. Even more the methodology requires the provision of historical data which is not given at any part of the PDD. All information is available and has been shown to the validator. But it is necessary to have such documentation publicly available by a revised PDD as it will be required during the verification process.</p> <p><u>Corrective Action Request #2:</u></p> <p>It is necessary to amend annex 3 of the PDD and to provide information on</p> <ul style="list-style-type: none"> - historic supplier of catalyst - historic composition of the ammonia catalyst - maximum historical ammonia flow - design capacity - historical operating temperature range - historical pressure range - information on time base to get all data 	CAR2	p
B.5.4. Is all data given in compliance with the methodology?	4 1	DR I	Data not provided is available and has been verified on site. But CAR2 has to be considered as relevant data is not included in the baseline section /annex.	See CAR2	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.5.5. Is all data evidenced by official data sources or replicable records?	1	I	All data including such not documented in the first PDD has been verified on-site	p	p
B.5.6. Is the vintage of the baseline data correct?	5, 6 1	DR I	The vintage of baseline data is not indicated by the PDD.	See CAR 2	p
C. Duration of the Project / Crediting Period					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	5, 6	DR	All dates are clearly defined and reasonable.	p	p
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?	5, 6	DR	As above	p	p
D. Monitoring Plan					
D.1. Monitoring Methodology					
D.1.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	3, 4	DR	The project applies AM0028, Vers. 1	p	p
D.1.2. Is the choice of the methodology correctly justified by the PDD?	4	DR	The choice is correctly justified.	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.1.3. Is the project in conformance with all applicability criteria of the applied methodology?	4 1	DR I	Yes, as above already stated for the baseline methodology (there are no further criteria)	p	p
D.1.4. Does the monitoring methodology provide a consistent approach in the context of all parameter to be monitored and further information provided by the PDD?	4 2	DR	All parameter as covered by the methodology and being relevant for the project-specific environment are completed included in the PDD.	p	p
D.1.5. Does the monitoring methodology apply consistently the choice of the option selected for monitoring both of project and baseline emissions?	4, 5, 6	DR	Yes it is consistently applied.	p	p
D.2. Monitoring of Project Emissions (if applied)					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	5, 6 1,2	DR	Yes, but to determine project emissions more details are required on type of equipment, data recording and data reduction processes (e.g. creation of averages) <u>Clarification Request #3:</u> It is necessary to provide more details on - type of metering equipment - data recording and processing procedures	CR3	p
D.2.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology ap-	5, 6 1, 2	DR	The choice of parameter is following the approved methodology. The need for monitor each variable at each plant separately is	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
plied?			correctly reflected.		
D.2.3. Will it be possible to determine the specified project GHG indicators?	5, 6 1, 2	DR I	It should be no problem as all required technology is available on the market.	p	p
D.2.4. Will the indicators enable comparison of project data and performance over time?	5, 6 1, 2	DR I	In case of a proper implementation and operation of the monitoring plan such a comparison will be possible.	p	p
D.2.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	5, 6 1, 2	DR	Not as long as CR3 and CAR 2 are not solved.	See CR3 See CAR2	p
D.2.6. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	5, 6 1, 2	DR I	<p>Not yet, as the intended procedures on quality assurances and quality control are not considered to be complete and sufficient.</p> <p><u>Corrective Action Request #3:</u></p> <p>Updated procedures for quality assurance and control should be submitted. These procedures should include:</p> <ul style="list-style-type: none"> - details on monitoring equipment implementation - details on calibration and function tests - details on troubleshooting routines - requirements on data availability 	CAR3	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<ul style="list-style-type: none"> - details on the inclusion of Third Party services - internal control procedures <p>at least for all parameter requiring the installation of physical meters (N2O, temperature, flow, pressure).</p>		
D.2.7. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	5, 6 1, 2	DR I	<u>Clarification Request #4:</u> The expected accuracy can not be assessed as long as CAR3 is not solved.	CR4	p
D.2.8. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	5, 6	DR	All formulae are clearly indicated and in compliance with AM0028	p	p
D.3. Monitoring of Baseline Emissions (if applied)					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions of the baseline emissions during the crediting period?	5, 6 1, 2	DR I	<u>Clarification Request #5:</u> The observation indicated as CR3 (project emissions) is also relevant for baseline emissions.	CR5	p
D.3.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology ap-	5, 6	DR	The choice of parameter is following the approved methodology	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
plied?					
D.3.3. Will it be possible to determine the specified project GHG indicators?	5, 6	DR	It should be no problem as all required technology is available on the market.	p	p
D.3.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	5, 6 1, 2	DR I	Not as long as CR3 and CAR 2 are not solved.	See CR3 See CAR2	p
D.3.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	5, 6 1, 2	DR I	<u>Corrective Action Request #4:</u> The observation indicated as CAR3 (project emissions) is also relevant for baseline emissions.	CAR4	p
D.3.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	5, 6 1, 2	DR I	<u>Clarification Request #6:</u> The expected accuracy can not be assessed as long as CAR4 is not solved.	CR6	p
D.3.7. Are all formulae used to determine baseline emission clearly indicated and in compliance with the monitoring methodology.	5, 6	DR	All formulae are clearly indicated and in compliance with AM0028	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.4. Direct Monitoring of Emission Reductions (if applied) à not applicable					
D.5. Monitoring of Leakage (if applicable)					
D.5.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring of leakage emissions during the crediting period?		DR	Not relevant as all emissions are included in the boundary.	p	p
D.5.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?		DR	Not relevant as all emissions are included in the boundary.	p	p
D.5.3. Will it be possible to determine the specified project GHG indicators?		DR	Not relevant as all emissions are included in the boundary.	p	p
D.5.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?		DR	Not relevant as all emissions are included in the boundary.	p	p
D.5.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?		DR	Not relevant as all emissions are included in the boundary.	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.5.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?		DR	Not relevant as all emissions are included in the boundary.	p	p
D.5.7. Are all formulae used to determine leakage emissions clearly indicated and in compliance with the monitoring methodology.		DR	Not relevant as all emissions are included in the boundary.	p	p
D.6. Determination of Emission Reductions					
D.6.1. Are all formulae used to determine leakage emissions clearly indicated and in compliance with the monitoring methodology.	5, 6	DR	All formulae are clearly indicated and in compliance with AM0028	p	p
D.6.2. Is the information given for each calculated variable sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	5, 6 1, 2	DR I	The project participants will use a computerized system which will disable any changes of raw data.	p	p
D.7. Quality Control (QC) and Quality Assurance (QA) Procedures					
D.7.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	5, 6	DR	The selection of data to undergo such procedures is complete.	p	p
D.7.2. Is the belonging determination of uncertainty levels done correctly for each ID in a correct and reliable manner?	5, 6 1, 2	DR I	See CR6 and CR4	See CR4	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
				See CR6	
D.7.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	5, 6 1, 2	DR I	See CAR3 and CAR4	See CAR3 See CAR4	p
D.7.4. Is it ensured that data will be bound to national or internal reference standards?	5, 6 1, 2	DR I	<u>Clarification Request #7:</u> It is not yet clarified which standards will be used for normalization of temperature and pressure.	CR7	p
D.7.5. Is it ensured that data provisions will be free of potential conflicts of interests resulting in a tendency of overestimating emission reductions?	5, 6 1, 2	DR I	The project participants will use a computerized system which will disable any changes of raw data. Hence there should be at least a possibility during verification to trace all data to unchanged raw data.	p	p
D.8. Operational and management structure					
D.8.1. Is the authority and responsibility of project management clearly described?	5, 6	DR	These aspects are clearly described.	p	p
D.8.2. Is the authority and responsibility for registration, monitoring, measurement and reporting	5, 6 1	DR I	As above	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
clearly described?					
D.8.3. Are procedures identified for training of monitoring personnel?	5, 6 1, 2	DR I	The project requires specific training and maintenance efforts for monitoring duties for Carbon Korea as well as for HUChems. Procedures for this aspect are identified.	p	p
D.8.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	5, 6 1, 2	DR I	As long as baseline emissions are monitored directly no such procedures are required.	p	p
D.9. Monitoring Plan (Annex 4)					
D.9.1. Is the monitoring plan developed in a project specific manner clearly addressing the unique features of the CDM activity?	5, 6 1, 2	DR I	As indicated by CAR3 and CAR4 as well as CR3 to CR6 details are missing on several monitoring issues. The existing monitoring plan is considered to be incomplete. <u>Corrective Action Request #5:</u> The Monitoring Plan as provided by annex 4 should be updated due to the guidance given by EB and the project-specific requirements as already discussed by this validation protocol.	CAR5	p
D.9.2. Does the monitoring plan completely describes all measures to be implemented for monitoring all parameter required?	5, 6 1, 2	DR I	See CAR5	See CAR5	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.9.3. Does the monitoring plan completely describes all measures to be implemented for ensuring data quality of all parameter to be monitored?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.4. Does the monitoring plan provide information on monitoring equipment and respective position- ing in order to safeguard a proper installation?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.5. Are procedures identified for calibration of monitoring equipment?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.6. Are procedures identified for maintenance of monitoring equipment and installations?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.7. Are procedures identified for monitoring, measurements and reporting?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	5, 6 1, 2	DR I	See CAR5	See CAR5	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.9.10. Does the monitoring plan provide procedures identified for troubleshooting allowing redundant reconstruction of data in case of monitoring problems?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.11. Are procedures identified for review of reported results/data?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.12. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.13. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
D.9.14. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	5, 6 1, 2	DR I	See CAR5	See CAR5	p
E. Calculation of GHG Emissions by Source					
E.1. Predicted Project GHG Emissions					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	5, 6	DR	OK, but no figures are in behind to derive an estimation of project emissions as provided in chapter E.1	CAR6	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<u>Corrective Action Request #6:</u> The PDD should indicate the estimated project emissions explicitly in section E.1.		
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	5, 6 1	DR I	The calculations have been provided by Excel-files in a transparent manner.	p	p
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	5, 6 1	DR I	Conservative assumptions have been used.	p	p
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	5, 6 1	DR I	See CR6 and CR4	See CR4 See CR6	
E.1.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	5, 6 1	DR I	The estimation is based on the same algorithms as used for later monitoring.	p	p
E.1.6. Is the projection based on provable input parameter?	5, 6 1	DR I	Yes, the project is based on provable data which has been verified during the assessment process.	p	p
E.2. Leakage					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?		DR	Not applicable	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.2.2. Have these leakage effects been properly accounted for in calculations?		DR	Not applicable	p	p
E.2.3. Have conservative assumptions been used to calculate leakage emissions?		DR	Not applicable	p	p
E.2.4. Are uncertainties in the leakage estimates properly addressed in the documentation?		DR	Not applicable	p	p
E.2.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?		DR	Not applicable	p	p
E.2.6. Is the projection based on provable input parameter?		DR	Not applicable	p	p
E.3. Baseline Emissions					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	5, 6 1	DR I	OK, but no figures are in behind to derive an estimation of project emissions as provided in chapter E.4 <u>Corrective Action Request #7:</u> The PDD should indicate the estimated project emissions explicitly in section E.4.	CAR7	p
E.3.2. Are the GHG calculations documented in a complete and transparent manner?	5, 6 1	DR I	The calculations have been provided by Excel-files in a transparent manner.	p	p

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.3.3. Have conservative assumptions been used when calculating baseline emissions?	5, 6 1	DR I	Conservative assumptions have been used.	p	p
E.3.4. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	5, 6 1	DR I	See CR6 and CR4	See CR4 and CR6	p
E.3.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	5, 6 1	DR I	The estimation is based on the same algorithms as used for later monitoring.	p	p
E.3.6. Is the projection based on provable input parameter?	5, 6 1	DR I	Yes, the project is based on provable data which has been verified during the assessment process.	p	p
E.4. Emission Reductions					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	5, 6	DR	The project will result in emission reductions.	p	p
E.4.2. Is the form/table required for the indication of projected emission reductions correctly applied?	5, 6	DR	The required form is correctly applied.	p	p
E.4.3. Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	5, 6 1	DR I	See CR2 There are no further risks to be considered as the plant is presumed to operate on sta-	See CR2	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			ble conditions as it did during the past.		
F. Environmental Impacts					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	5, 6 1	DR I	The relevant environmental impacts are sufficiently described	p	p
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	5, 6 1	DR I	<p>Due to the statement by the legislation does not require the submission of an EIA. But a clear proof by reference to the existing legislation could not be given as the plant itself would require an EIA for major changes.</p> <p><u>Clarification Request #8:</u> Confirmation should be provided by an environmental authority that no EIA is required for the implementation of the project activity.</p>	CR8	p
F.1.3. Will the project create any adverse environmental effects?	5, 6 1	DR I	No negative effects are expected	p	p
F.1.4. Are transboundary environmental impacts considered in the analysis?	5, 6	DR	No	p	p
F.1.5. Have identified environmental impacts been addressed in the project design?	5, 6	DR	There are no such impacts	p	p



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
F.1.6. Does the project comply with environmental legislation in the host country?	5, 6 1	DR I	See CR8	See CR8	p
G. Stakeholder Comments					
G.1.1. Have relevant stakeholders been consulted?	5, 6 1	DR I	Relevant stakeholders have been consulted.	p	p
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	5, 6 1	DR I	Evidence has been provided concerning the procedures as described by the PDD.	p	p
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	1	I	No such process is required by local laws.	p	p
G.1.4. Is the undertaken stakeholder process described in a complete and transparent manner?	5, 6 1	DR I	Yes, it is described in a complete manner.	p	p
G.1.5. Is a summary of the stakeholder comments received provided?	5, 6	DR	A summary is provided as required.	p	p
G.1.6. Has due account been taken of any stakeholder comments received?	5, 6 1	DR I	There has been no requirement to take further action besides some voluntary measures which are reported by the PDD	p	p



Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
Open issue: A Letter of Approval by the Republic of Korea has to be available at time of requesting for registration.	Table 1 3, 4, 8	-	Open Issue
<p>In principle the project description is delivering a complete overview, but the way of presenting information on the use of reducing agents is more generic than project specific. Therefore this might create irritation on the completeness of the further consideration of project emissions and leakage.</p> <p><u>Clarification Request #1:</u></p> <p>The PDD should focus in a project-specific manner on the extent of including the use of reducing agents.</p>	A.2.1	A revised PDD dated July 22, 2006 has been submitted.	<p>The revised PDD includes a project specific description in chapter A.2, which complies with the situation verified on-site.</p> <p>þ</p>
<p>The management of the plant operator could not yet confirm he installation dates which will have to coincide with the regular shut down schedule.</p> <p><u>Clarification Request #2:</u></p> <p>The envisioned starting date of the crediting period should be defined in alignment with the plant operator's schedule. In case of any changes the projections for the first and the last year of the crediting period will have to be adjusted.</p>	A.4.7	A revised PDD dated July 22, 2006 has been submitted.	<p>The revised PDD has changed the starting date of the crediting period by 15 days. The revision is reflected by all projections.</p> <p>þ</p>



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
<p>The table as presented by chapter B.4. of the PDD is simply a copy of the methodology's text without project-specific information.</p> <p><u>Corrective Action Request #1:</u></p> <p>It is necessary to provide a project-specific discussion of the project boundaries within chapter B.4 clearly expressing kind of emissions is covered by the project boundaries.</p>	B.4.1	A revised PDD dated July 22, 2006 has been submitted. It contains the required discussion justifying the exclusion of emissions by ammonia use and the inclusion of emissions by the use of propane at HUCheMs II and III.	p
<p>The table as provided in annex 3 is not sufficient for fixing all baseline parameter. Even more the methodology requires the provision of historical data which is not given at any part of the PDD. All information is available and has been shown to the validator. But it is necessary to have such documentation publicly available by a revised PDD as it will be required during the verification process.</p> <p><u>Corrective Action Request #2:</u></p> <p>It is necessary to amend annex 3 of the PDD and to provide information on</p> <ul style="list-style-type: none"> - historic supplier of catalyst - historic composition of the ammonia catalyst - maximum historical ammonia flow - design capacity - historical operating temperature range 	B.5.3	A revised PDD dated July 22, 2006 has been submitted.	The revised annex 3 provides all data as required to compare the operation conditions with historic conditions during future verifications. The use of options b for ammonia flow, pressure and temperature in the production process - design parameter – is deemed to be suitable as existing historic data did not undergo any calibration and continuous



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> - historical pressure range - information on time base to get all data 			<p>quality assurance routines. During regular operation there is no necessity to have requirements on the accuracy of such parameter. Hence the reluctance on the existing system would imply additional risks on the verifiability once a meter would have to be replaced.</p> <p>þ</p>
<p>To determine project emissions more details are required on type of equipment, data recording and data reduction processes (e.g. creation of averages)</p> <p><u>Clarification Request #3:</u></p> <p>It is provide more details on</p> <ul style="list-style-type: none"> - type of metering equipment - data recording and processing procedures 	D.2.1	A revised PDD dated July 22, 2006 has been submitted.	<p>The revised PDD provides all data requested. It delivers a comprehensive insight to the envisioned monitoring system.</p> <p>þ</p>



Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
<p>Not yet, as detailed procedures for documenting the intended procedures on quality assurances and quality control are not considered to be complete and sufficient.</p> <p><u>Corrective Action Request #3:</u></p> <p>Updated procedures for quality assurance and control should be submitted. These procedures should include:</p> <ul style="list-style-type: none"> - details on monitoring equipment implementation - details on calibration and function tests - details on troubleshooting routines - requirements on data availability - details on the inclusion of Third Party services - internal control procedures <p>at least for all parameter requiring the installation of physical meters (N2O, temperature, flow, pressure).</p>	D.2.6	A revised PDD dated July 22, 2006 has been submitted. Furthermore the procedures have been presented and explained in a conclusive meeting.	<p>The revised monitoring plan provides all procedures requested. It delivers a comprehensive insight to the envisioned quality assurance system.</p> <p style="text-align: center;">p</p>
<p><u>Clarification Request #4:</u></p> <p>The expected accuracy can not be assessed as long as CAR3 is not resolved.</p>	D.2.7	A revised PDD dated July 22, 2006 has been submitted.	<p>By resolving CAR 3 also information on the accuracy of all key parameter has been provided in a complete manner. Hence the issue is considered being resolved.</p> <p style="text-align: center;">p</p>



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
<p><u>Clarification Request #5:</u></p> <p>The observation indicated as CR3 (project emissions) is also relevant for baseline emissions.</p>	D.3.1	A revised PDD dated July 22, 2006 has been submitted.	<p>The revised PDD provides all data requested. It delivers a comprehensive insight to the envisioned monitoring system.</p> <p>þ</p>
<p><u>Corrective Action Request #4:</u></p> <p>The observation indicated as CAR3 (project emissions) is also relevant for baseline emissions.</p>	D.3.5	A revised PDD dated July 22, 2006 has been submitted. Furthermore the procedures have been presented and explained in a conclusive meeting.	<p>The revised monitoring plan provides all procedures requested. It delivers a comprehensive insight to the envisioned quality assurance system also for all baseline parameter.</p> <p>þ</p>
<p><u>Clarification Request #6:</u></p> <p>The expected accuracy can not be assessed as long as CAR4</p>	D.3.6	A revised PDD dated July 22, 2006 has been submitted.	By resolving CAR 4 also information on the accuracy of all key parameter has been



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
is not resolved.			provided in a complete manner. Hence the issue is considered being resolved. p
<p><u>Clarification Request #7:</u></p> <p>It is not yet clarified which standards will be used for normalization of temperature and pressure.</p>	D.7.4	<p>A revised PDD dated July 22, 2006 has been submitted.</p> <p>It provides the following information: Standard Conditions: Temperature: 273.15 K Pressure: 1013.25 hPa</p>	p
<p>As indicated by CAR3 and CAR4 as well as CR3 to CR6 details are missing on several monitoring issues. The existing monitoring plan is considered to be incomplete.</p> <p><u>Corrective Action Request #5:</u></p> <p>The Monitoring Plan as provided by annex 4 should be updated due to the guidance given by EB and the project-specific requirements as already discussed by this validation protocol.</p>	D.9.1	A revised PDD dated July 22, 2006 has been submitted.	The revised PDD provides information on all aspects requested under item D of table 2 of this validation protocol. It delivers a comprehensive insight to the envisioned monitoring system



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
			<p>and all quality control and quality assurance procedures in a project-specific manner. It fully complies with existing guidance as given by the EB.</p> <p>þ</p>
<p>No figures are provided in chapter E.1 allowing to derive an estimation of project emissions.</p> <p><u>Corrective Action Request #6:</u></p> <p>The PDD should indicate the estimated project emissions explicitly in section E.1.</p>	E.1.1	A revised PDD dated July 22, 2006 has been submitted.	<p>The estimated project emissions are correctly presented in chapter E.1.</p> <p>þ</p>
<p>OK, but no figures are in behind to derive an estimation of baseline emissions are provided in chapter E.4</p> <p><u>Corrective Action Request #7:</u></p> <p>The PDD should indicate the estimated project emissions explicitly in section E.4.</p>	E.3.1	A revised PDD dated July 22, 2006 has been submitted.	<p>The estimated baseline emissions are correctly presented in chapter E.4.</p> <p>þ</p>



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Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
<p>Due to the statement by the legislation does not require the submission of an EIA. But a clear proof by reference to the existing legislation could not be given as the plant itself would require an EIA for major changes.</p> <p><u>Clarification Request #8:</u></p> <p>Confirmation should be provided by an environmental authority that no EIA is required for the implementation of the project activity.</p>	F.1.2	A revised PDD dated July 22, 2006 has been submitted. It contains the required confirmation as annex 5.	p

Validation of the CDM Project:
Catalytic N₂O destruction project in the tail gas of three Nitric Acid
Plants at Hu-Chems Fine Chemical Corp.




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Appendix B: Information Reference List

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Reference No.	Document or Type of Information
1.	<p>On-site interviews at the premises of HU-Chems Fine Chemical Corp. by auditing team of TÜV SÜD performed on March 24 and 25, 2006 in Yeosu, South Korea</p> <p>Participants:</p> <p>Werner Betzenbichler, TÜV SÜD, Munich office Nikolaus Kröger, TÜV SÜD, Hamburg office Bo-Mi Lee, TÜV SÜD, Seoul office Stefan Reis, TÜV SÜD, Seoul office</p> <p>Gerald Dunkel, Carbon Projektentwicklung GmbH Dong-Kyeon Kim, Carbon CDM Korea Ltd. H.B. Wang, HU-Chems, deputy managing director K.S. Hwang, HU-Chems, project manager J.H. Ra, HU-Chems, project engineer Y.K. Kim, HU-Chems, deputy manager nitric acid team</p>
2.	<p>On-site interviews at AMI Nitric Acid Production Plant by auditing team of TÜV SÜD performed on April 12, 2006 in Linz; Austria (this audit has to be seen in conjunction with the validation of the similar project at Abu Qir nitric acid plant in Egypt)</p> <p>Participants:</p> <p>Werner Betzenbichler, TÜV SÜD, Munich office Nikolaus Kröger, TÜV SÜD, Hamburg office</p>

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Reference No.	Document or Type of Information
	<p>Ferdinand Heilig, Carbon Projektentwicklung GmbH Gerald Dunkel, Carbon Projektentwicklung GmbH Dr. Christian Hanisch, UHDE Dr. Helmut Haag, UHDE Bernd Schnepfer, Emerson Process Management Arthur Pfeffer, Emerson Process Management Dr. Karl Hohenwarter, AMI Agrolinz Melamine International GmbH</p>
3.	www.unfccc.int - web-page of UNFCCC
4.	Approved Methodology AM0028: "Catalytic N ₂ O destruction in the tail gas of Nitric Acid Plants", vers. 01, 03 March 2006
5.	Project Design Document: "Catalytic N ₂ O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp." version 1, 15 March 2006
6.	Project Design Document "Catalytic N ₂ O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp." version 2, 22 July 2006
7.	Declaration (Ref.-No. EMT-1830) concerning the non-requirement of an EIA issued by Yeongsan River Basin Environmental Office on June 20, 2006
8.	"Business Plan of the HU-Chems CDM project" prepared by Carbon Korea, submitted by fax on April 20, 2006
9.	"Clean Air Conservation Act" of the Republic of Korea, 2004

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Reference No.	Document or Type of Information
10.	"Statements on Design Parameter" of the three production lines of HU-Chems prepared by the plant manufacturer UHDE, dated July 20, 2006
11.	Project Schedule, prepared by Carbon CDM Korea, dated February 17, 2006
12.	Technical Planning Data sheets, prepared by UHDE
13.	Daily records of historic N ₂ O concentrations obtained by gas chromatography, HU-Chems laboratory dept.
14.	Quality assurance documentation of applied gas chromatography, HU-Chems laboratory dept.
15.	Daily records for nitric acid production and operation parameter for the year 2003 to 2005 (insight to data recording system)
16.	Declaration on Specification for Catalyst Gauzes, HU-Chems, 2006
17.	www.huchems.com
18.	Manuals of analyzers and metering devices, Emerson, 2006
19.	Statement on the Modalities of Communication, Carbon CDM Korea, 14 June 2006