

# VALIDATION REPORT

## RENEWAL OF THE CREDITING PERIOD

### CARBON CDM KOREA LTD.

CATALYTIC N<sub>2</sub>O DESTRUCTION PROJECT IN  
THE TAIL GAS OF THREE NITRIC ACID PLANTS  
AT HU-CHEMS FINE CHEMICAL CORP.

UNFCCC REF. No. : 0765

CP #2 from 2014-01-22 to 2021-01-21  
(incl. both days)

**Report No: 8000420315 – 13/095**

**Date: 2013-11-07**

TÜV NORD CERT GmbH  
JI/CDM Certification Program  
Langemarckstraße, 20  
45141 Essen, Germany  
Phone: +49-201-825-3335  
Fax: +49-201-825-3290  
[www.tuev-nord.de](http://www.tuev-nord.de)  
[www.global-warming.de](http://www.global-warming.de)

<b>Validation Report:</b>	<b>Report No.</b>	<b>Rev. No.</b>	<b>Date of 1<sup>st</sup> issue:</b>	<b>Date of this rev.</b>				
	8000420315 – 13/095	0	2013-11-07	2013-11-07				
<b>Project:</b>	<b>Title:</b>		<b>Registr. Date:</b>	<b>UNFCCC-No.:</b>				
	Catalytic N <sub>2</sub> O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.		2007-01-22	<a href="#">0765</a>				
	<b>Project Scale:</b>							
	<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale							
<b>Crediting Periods:</b>	<b>Crediting period renewal:</b>							
	<input checked="" type="checkbox"/> 1 <sup>st</sup> renewal <input type="checkbox"/> 2 <sup>nd</sup> renewal							
	<b>Crediting periods (actual / planned):</b>		<b>From:</b>	<b>To:</b>				
	First Crediting Period		2007-01-22	2014-01-21				
	Second Crediting Period		2014-01-22	2021-01-21				
	Third Crediting Period		N/A	N/A				
<b>Project Participant(s):</b>	<b>Client:</b>							
	CARBON CDM KOREA Ltd.							
	<b>Non Annex 1 country:</b>		<b>Annex 1 country:</b>					
	Republic of Korea		Germany					
	<b>PP from non Annex 1 country:</b>		<b>PP from Annex 1 country:</b>					
	CARBON CDM KOREA Ltd.		RWE Power AG					
<b>Applied methodology/ies:</b>	<b>Title (PDD - registered):</b>		<b>Version No.:</b>	<b>Scope(s) / TA(s)</b>				
	AM0028 - Catalytic N <sub>2</sub> O destruction in the tail gas of Nitric Acid Plants		1.0	5 / 5.1				
	<b>Title (PDD – renewCP)</b>		<b>Version No.:</b>	<b>Scope(s) / TA(s)</b>				
	ACM0019 - N <sub>2</sub> O abatement from nitric acid production		2.0	5 / 5.1				
<b>Validation team / Technical Review and Final Approval:</b>	<b>Validation Team:</b>		<b>Technical review:</b>	<b>Final approval:</b>				
	Rainer Winter (TL) Martin Saalman (TM)		Dirk Speyer Stefan Winter	Stefan Winter				
<b>PDD Versions (for the new CP)</b>	<b>Reg. PDD</b>		<b>revised MP (rMP)</b>		<b>Draft RCP PDD</b>		<b>Final RCP PDD</b>	
	<b>Date</b>	<b>Version</b>	<b>Date of approval</b>	<b>Version</b>	<b>Date</b>	<b>Version</b>	<b>Date</b>	<b>Version</b>
	2006-07-22	2	2010-03-18	N/A	2013-09-20	4.0	2013-10-14	4.1
<b>Onsite visit</b>	From		2013-04-30		To		2013-04-30	
<b>Expected Emission reductions: [t CO<sub>2</sub>e]</b>	<b>Expected emission reductions over the last crediting period:</b>				<b>Expected emission reductions over the new crediting period:</b>			
	8,878,169 tCO <sub>2</sub> e				8,642,580 tCO <sub>2</sub> e			
<b>Summary of Validation opinion</b>	<input checked="" type="checkbox"/> Positive validation opinion <input type="checkbox"/> Negative validation opinion							
	As a result of the validation the validation team confirms that: <ul style="list-style-type: none"> <li>The PDD has been updated in accordance to section 12.9 of the Project Standard;</li> <li>The baseline for the new crediting period is in compliance with the national and/or sectoral policies and circumstances (taking into account relevant guidance from the Board) applicable at the time of requesting the renewal;</li> <li>The applicable, approved baseline methodology ACM0019 (Version 2) has been correctly applied for the determination/validity of the baseline;</li> </ul>							



	<ul style="list-style-type: none"><li>• The calculation of the emission reductions is carried out correctly and in a transparent and conservative manner, so that the estimated emission reductions of 8,642,580 tCO2e are most likely to be achieved in the 2nd CP;</li><li>• The project participant transparently explained that the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity exceeds the crediting period for which renewal is requested;</li><li>• The project participant has correctly updated the ex-ante data and parameters in accordance with the "Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period";</li><li>• The applicable, approved monitoring methodology ACM0019 (Version 2) has been correctly applied</li></ul>		
Document information:	Filename:	Confidential content:	No. of pages:
	2013-12-23 Hu Chems RCP FVR_rev01.docx	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	67

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## Abbreviations

<b>BAU</b>	Business as usual
<b>CA</b>	Corrective Action / Clarification Action
<b>CAR</b>	Corrective Action Request
<b>CDM</b>	Clean Development Mechanism
<b>CER</b>	Certified Emission Reduction
<b>CL</b>	Clarification Request
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2</sub>e</b>	Carbon dioxide equivalent
<b>CP</b>	Crediting Period
<b>DNA</b>	Designated National Authority
<b>EB</b>	CDM Executive Board
<b>ER</b>	Emission Reductions
<b>ETS</b>	Emission Trading Scheme
<b>FAR</b>	Forward Action Request
<b>GHG</b>	Greenhouse gas(es)
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>PCP</b>	Project Cycle Procedure
<b>PDD</b>	Project Design Document
<b>PS</b>	Project Standard
<b>QC/QA</b>	Quality control/Quality assurance
<b>RCP</b>	Renewal of Crediting Period
<b>rMP</b>	Revised and approved Monitoring Plan
<b>SCR</b>	Selective Catalytic Reduction
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VVS</b>	CDM Validation and Verification Standard

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## 1 OBJECTIVE / SCOPE

Carbon CDM Korea Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out validation of the request for renewal of the crediting period (RCP) for the project

*“Catalytic N<sub>2</sub>O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.”*

with regard to the relevant UNFCCC requirements. The project has been registered on 2007-01-22 under the UNFCCC registration No. 0765. The PPs have chosen a 7 year crediting period which is now due for renewal. The PPs have thus notified the UNFCCC about their intention to request the renewal of the crediting period.

The objective of this RCP validation is the review by an independent entity whether the project is still compliant with the applicable sections of:

- the CDM project standard,
- the CDM cycle procedure
- the updated applied UNFCCC Methodology ACM0019 and
- the methodological tools “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” and “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”.

As per the requirements of the CDM Validation and Verification Standard<sup>/VVS/</sup> (section 11) the validation is based on

- the registered and/or latest updated version of the PDD (including revisions of the monitoring plan)<sup>/PDD/</sup>,
- the updated emission reduction calculation spread sheet <sup>/XLS/</sup>,
- further supporting documents made available to the validator as well as
- information collected through performing interviews and during the on-site assessment.

Furthermore publicly available information, such as the host country legislation, was considered as far as available and required.

## 2 GHG PROJECT DESCRIPTION

### 2.1 Project Characteristics

Essential data of the project is presented in the following table 2-1.

**Table 2-1:** Project Characteristics

Item		Data
Project title		Catalytic N <sub>2</sub> O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.
Project size		<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input type="checkbox"/> 1	Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/> 2	Energy distribution
	<input type="checkbox"/> 3	Energy demand
	<input type="checkbox"/> 4	Manufacturing industries
	<input checked="" type="checkbox"/> 5	Chemical industry
	<input type="checkbox"/> 6	Construction
	<input type="checkbox"/> 7	Transport
	<input type="checkbox"/> 8	Mining/Mineral production
	<input type="checkbox"/> 9	Metal production
	<input type="checkbox"/> 10	Fugitive emissions from fuels (solid, oil and gas)
	<input type="checkbox"/> 11	Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/> 12	Solvents use
	<input type="checkbox"/> 13	Waste handling and disposal
	<input type="checkbox"/> 14	Afforestation and Reforestation
	<input type="checkbox"/> 15	Agriculture
	<input type="checkbox"/> 16	Carbon Capture and Storage
Applied Methodology	At registration	AM0028 - Catalytic N <sub>2</sub> O destruction in the tail gas of Nitric Acid Plants (Version 1.0)
	At RCP	ACM0019 - N <sub>2</sub> O abatement from nitric acid production (Version 2.0)
Technical Area(s)		5.1
Renewal of crediting period		<input checked="" type="checkbox"/> first renewal <input type="checkbox"/> second renewal
CDM registration No.		0765
Date of registration		2007-01-22

### 2.2 Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity (Table 2-2).

**Table 2-2:** Project Parties and project participants

Party	Project Participant
Republic of Korea	CARBON CDM KOREA Ltd.
Germany	RWE Power AG

## 2.3 Project Location

The details of the project location are given in table 2-3:

**Table 2-3:** Project Location

Characteristic	Project Location
Host Country:	Republic of Korea
Region:	Jeonnam
Project location address:	7-6, Wollae-dong, Yeosu-si
Latitude:	34.848686 N
Longitude:	127.743198 E

## 2.4 Technical Project Description

### Hu-Chems II and III

The design capacity of Nitric Acid production for both plants is 116,800 t/a each. A catalytic reduction process is installed in Hu-Chems II and III Nitric Acid Plants. The EnviNOx® reactor is located between the existing SCR DeNOx reactor and the tail gas turbine. The current tail gas temperature at this stage of the process is around 360°C for high rates of N<sub>2</sub>O removal. LPG (effectively propane) and ammonia are utilized as reducing agents for N<sub>2</sub>O and NOx respectively.

### Hu-Chems IV

The design capacity of the Nitric Acid production is 467,200 t/a. A catalytic N<sub>2</sub>O decomposition process is installed at Hu-Chems IV Nitric Acid Plant. The EnviNOx® reactor is located upstream of the tail gas turbine. The current tail gas temperature here is around 435°C. The prior existing SCR DeNOx unit (SCR = Selective Catalytic Reduction) installed for Nox reduction has been removed during the implementation of the project activity, with the new EnviNOx® reactor taking on the function of the SCR DeNOx unit.

The technical key data are provided in table 2-4 below.

**Table 2-4:** Technical data of the project activity



	Information		
Plant Name	Hu-Chems II	Hu-Chems III	Hu-Chems IV
EnviNOx <sup>®</sup> Reactor	322-R-202	323-R-302	324-R-402
Static mixer	322-MX-203	323-MX-303	-
Design capacity	116,800 t/a	116,800 t/a	467,200 t/a

## 2.5 Project History

Essential events since the registration of the project are presented in the following Table 2-5.

**Table 2-5:** Status of previous Monitoring Periods

#	Item	Time	Status
1	Project Registration	2007-01-22	Registered
2	1 <sup>st</sup> Monitoring period	2007-01-22 to 2007-03-31	Issued
3	2 <sup>nd</sup> Monitoring period	2007-04-01 to 2007-06-30	Issued
4	3 <sup>rd</sup> Monitoring period	2007-07-01 to 2007-09-30	Issued
5	4 <sup>th</sup> Monitoring period	2007-10-01 to 2007-12-31	Issued
6	5 <sup>th</sup> Monitoring period	2008-01-01 to 2008-03-31	Issued
7	6 <sup>th</sup> Monitoring period	2008-04-01 to 2008-06-30	Issued
8	7 <sup>th</sup> Monitoring period	2008-07-01 to 2008-09-30	Issued
9	8 <sup>th</sup> Monitoring period	2008-10-01 to 2009-02-28	Issued
10	9 <sup>th</sup> Monitoring period	2009-03-01 to 2009-06-30	Issued
11	10 <sup>th</sup> Monitoring period	2009-07-01 to 2009-09-30	Issued
12	11 <sup>th</sup> Monitoring period	2009-10-01 to 2009-12-31	Issued
13	12 <sup>th</sup> Monitoring period	2010-01-01 to 2010-03-31	Issued
14	13 <sup>th</sup> Monitoring period	2010-04-01 to 2010-06-30	Issued
15	14 <sup>th</sup> Monitoring period	2010-07-01 to 2010-09-30	Issued
16	15 <sup>th</sup> Monitoring period	2010-10-01 to 2010-12-31	Issued
17	16 <sup>th</sup> Monitoring period	2011-01-01 to 2011-03-31	Issued

#	Item	Time	Status
18	17 <sup>th</sup> Monitoring period	2011-04-01 to 2011-06-30	Issued
19	18 <sup>th</sup> Monitoring period	2011-07-01 to 2011-09-30	Issued
20	19 <sup>th</sup> Monitoring period	2011-10-01 to 2011-12-31	Issued
21	20 <sup>th</sup> Monitoring period	2012-01-01 to 2012-03-31	Issued
22	21 <sup>st</sup> Monitoring period	2012-04-01 to 2012-06-30	Issued
23	22 <sup>nd</sup> Monitoring period	2012-07-01 to 2012-09-20	Issued
24	23 <sup>rd</sup> Monitoring period	2012-09-21 to 2012-10-14	Issued
25	24 <sup>th</sup> Monitoring period	2012-10-15 to 2012-11-06	Issued
26	25 <sup>th</sup> Monitoring period	2012-11-07 to 2013-08-31	Awaiting issuance request

An overview of all Post Registration Changes is given in the following table.

**Table 2-6:** Overview Post Registration Changes

#	Applicable from – to / as of	Type of post registration change <sup>1)</sup>	Description	Status <sup>2)</sup> / Date
1	2010-03-18	PCfrMP	Cross-check of N <sub>2</sub> O concentration by periodic sampling with gas chromatography	Approval (by EB) / 2010-03-18

- <sup>1)</sup> TDfrMP : Temporary deviation from registered monitoring plan  
TDfMM : Temporary deviation from the monitoring methodology  
CrPDD : Corrections to the registered PDD  
PCfrMP : Permanent changes from registered Monitoring Plan  
PCfMM : Permanent changes from Monitoring Methodology  
CoPD : Changes to the project design of a registered project activity

- <sup>2)</sup> Approval (by EB) or Acceptance (by DOE)

### **3 METHODOLOGY AND VALIDATION SEQUENCE**

#### **3.1 Validation Steps**

The validation of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Desk review of the PDD and supporting documents
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation reporting
- Resolution of corrective actions (if any)
- Final validation reporting
- Technical review
- Final approval of the validation

#### **3.2 Contract review**

To assure that

- the project falls within the scopes for which accreditation is held,
- the necessary competences to carry out the validation can be provided,
- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

#### **3.3 Appointment of team members and technical reviewers**

On the basis of a competence analysis and individual availabilities a validation team, consistent of one team leader and 2 additional team member, were appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3-2 below.

**Table 3-2: Involved Personnel**

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme Competence <sup>3)</sup>	Technical Competence <sup>4)</sup>	Verification Competence <sup>5)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Rainer Winter	TÜV NORD CERT	TL	SA	<input checked="" type="checkbox"/>	5.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Martin Saalman	TÜV NORD CERT	TM	SA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Paul Kim	TÜV NORD Korea	TE	-	<input type="checkbox"/>	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dirk Speyer	TÜV NORD CERT	TR	LA	<input checked="" type="checkbox"/>	5.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Stefan Winter	TÜV NORD CERT	TR/F A	SA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<sup>1)</sup> TL: Team Leader; TM: Team Member<sup>A)</sup>, TR: Technical review<sup>B)</sup>, OT: Observer-Team<sup>B)</sup>, OR: Observer-TR<sup>B)</sup>, FA: Final approval<sup>B)</sup>

<sup>A)</sup> Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

<sup>B)</sup> No team member: OT, TR, OR, FA

<sup>2)</sup> GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

<sup>3)</sup> GHG auditor status (at least Assessor)

<sup>4)</sup> Technical Area / TR Subcategory as per S01-VA000-F02 or S01-VA070-F01 (such as 1.1, 1.2, ...)

<sup>5)</sup> In case of verification projects

Certificates of appointment for the above mentioned team members are enclosed in annex 3 of this report.

### 3.4 Validation Protocol

In order to ensure consideration of all relevant assessment criteria, a validation protocol is used. The protocol shows, in a transparent manner, criteria and requirements, means of validation and the results from pre-validating the identified criteria. The validation protocol reflects the CDM requirements for RCP. The validation protocol serves the following purposes:

- It organizes, details and clarifies the applicable requirements;
- It ensures a transparent validation process where the validating entity will document how a particular requirement has been validated and the result of the determination.

The validation protocol is described in Figure 1.

<b>Validation Protocol Table A-1: Requirement checklist</b>				
<b>Checklist Item</b>	<b>Reference</b>	<b>Validation Team Comments</b>	<b>Draft Conclusion</b>	<b>Final Conclusion</b>
<i>The checklist items in table A-1 are linked to the various requirements the project should meet. The checklist is organized in various sections. Each section is then further subdivided as per the requirements of the topic and the individual project activity.</i>	<i>Gives reference to the information source on which the assessment is based.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the validation team and how the assessment was carried out. The reporting requirements of the VVS shall be covered in this section.</i>	<i>Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft validation stage.</i>	<i>In case a corrective action or a clarification the final assessment at the final validation stage is given.</i>

**Figure 1:** Validation protocol table

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

### 3.5 Review of Documents

The revised PDD version and supporting background documents related to the RCP were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

### 3.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for RCP.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 3-3.

**Table 3-3:** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives / Project consultant	<ul style="list-style-type: none"> <li>- Project history</li> <li>- Monitoring and measurement equipment and system.</li> <li>- Remaining lifetime of equipment</li> <li>- Crediting period</li> <li>- Baseline study assumptions</li> <li>- Roles &amp; responsibilities of the project participants</li> <li>- National legislation</li> <li>- ER calculation</li> <li>- Ex-ante parameters</li> <li>- Changes of parameters</li> <li>- Editorial issues of the revised PDD</li> </ul>

A comprehensive list of all interviewed persons is part of section 7 ‘References’.

## 3.7 Resolution of Clarification and Corrective Action Requests

### 3.7.1 Definition

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence on the project results,
- the requirements relevant for validation of the renewal of crediting period have not been met or
- omissions or incomplete information might lead to a risk that the renewal of crediting period could not be approved by the UNFCCC or
- Required information has not been provided.

A **Clarification Request (CL)** is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the subsequent verification.

### 3.7.2 Draft Validation

After reviewing all relevant documents and taken all other relevant information into account, the validation team issues all findings in the course of a draft validation

report and hands this report over to the project participant(s) in order to request responses on the issues raised and to revise the project documentation accordingly.

### **3.7.3 Final Validation**

The final validation starts after issuance of the proposed corrective action (CA) of the CARs, CLs and FARs by the project proponent. The validation team has to reply on those and the requests are “closed out” by the validation team in case the response is assessed as sufficient. If applicable, the project proponent has to respond on raised FARs, identifying the necessary actions to ensure that the topics raised in this finding are likely to be resolved at the latest during the subsequent verification. The validation team has to assess whether the proposed action is adequate or not.

In case the findings from CARs and CLs cannot be resolved by the project proponent no positive validation opinion can be issued by the validation team.

The CAR(s), CL(s) and FAR(s) are documented in chapter 4.

## **3.8 Technical review**

Before submission of the final validation report a technical review of the whole RCP validation procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the validation team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the validation opinion and the topic specific assessments as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

## **3.9 Final approval**

After successful technical review of the final report an overall (esp. procedural) assessment of the complete validation will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the document submission to the UNFCCC can be started (in case of a positive validation opinion).

## 4 VALIDATION FINDINGS

In the following table the findings from the desk review of the published PDD, visits, interviews and supporting documents are summarized:

**Table 4-1:** Summary of CARs, CLs and FARs issued

Validation topic <sup>1)</sup>	No. of CAR	No. of CL	No. of FAR
General description of project activity (A) - Project specification - Technical project description - Participation	-	-	-
Project Baseline, Estimated Emission Reductions and Monitoring Plan (B) - Application of the Methodology - Baseline validity and update - Calculation of GHG emission reductions Project emissions Baseline emissions Leakage - Applicability of data and parameters defined ex-ante - Monitoring Methodology - Monitoring Plan	7	4	1
Duration of the Project / Crediting Period (C)	-	-	-
PDD editorial aspects (D)	1	-	-
<b>SUM</b>	<b>8</b>	<b>4</b>	<b>1</b>

<sup>1)</sup> The letters in brackets refer to the validation protocol

The following tables include all raised CARs, CLs and FARs. For an in depth evaluation of all validation items it should be referred to the validation protocols (see Annex 1).

Finding	B1		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR



Finding	B1								
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR						
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.2., Applicability criterion #2: The justification why this criterion is met is not conclusive. PP is requested to clarify the start date of commercial operation of the 3 lines and how it is substantiated that abatement technology was not installed.								
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>A similar applicability criterion had to be met in for crediting period #1, based on the originally applied methodology (i.e. AM0028, Version 1). Already at that stage, it was clearly demonstrated that there hasn't been any existing N<sub>2</sub>O destruction or abatement facility at the Hu-Chems nitric acid plants. The NO<sub>x</sub> abatement systems in place were Selective Catalytic Recuction (SCR) DeNO<sub>x</sub> units.</p> <p>The nitric acid plants itself were commissioned in following years. Documents including these dates have been provided to the DOE during the validation process already:</p> <ul style="list-style-type: none"> <li>• Hu-Chems II: 1990</li> <li>• Hu-Chems III: 1997</li> <li>• Hu-Chems IV: 2003</li> </ul> <p>As obvious, there wasn't any reason to install N<sub>2</sub>O destruction or abatement facilities due to the lack of regulatory requirements or economic incentives.</p> <p>Furthermore, during the on-site visit for revalidation in the course of the renewal of the crediting period, the DOE has checked the original design documents of the nitric acid plants, which are substantiating the non-existence of N<sub>2</sub>O destruction or abatement facilities prior to the CDM Project.</p> <p>For the sake of clarity, a more detailed statement will be added in the PDD.</p> <table border="1"> <tr> <td><input checked="" type="checkbox"/> Changes in PDD</td><td>Section(s): B.2.</td><td>New version No.: 4.1</td></tr> <tr> <td><input type="checkbox"/> Changes in XLS</td><td>Worksheet(s): N/A</td><td>New version No.: N/A</td></tr> </table>			<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.2.	New version No.: 4.1	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.2.	New version No.: 4.1							
<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A							
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Explanation provided by the PP is reasonable. The validation team checked the validation report of the first crediting period.<sup>/VAL/</sup> The information provided is confirmed. Further original PIDs have been checked to confirm the commissioning.<sup>/PID/</sup> Finally, the project owner has confirmed the same during interview.</p> <p>Hence, the validation team concluded that applicability criterion #2 is met.</p>								
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed								

Finding	B2		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR

Finding	B2		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.3.: Information about the spatial extent of the project boundary as per the methodology is not provided.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The requested information will be stated at the respective section of the PDD.		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.3.	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The PP revised the PDD accordingly. Information as required by the methodology is included in section B.3.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B3		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.3., Table, "Operation of a tertiary N <sub>2</sub> O Abatement facility": The table shown is incomplete since CH <sub>4</sub> includes an incomplete justification and information is not provided whether N <sub>2</sub> O is included.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The table will be updated accordingly in order to comply with methodological provisions.		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.3.	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The PDD has been updated and is now in line with the stipulation as described in the applied methodology ACM0019.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B4
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<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.6.1, Project Emissions: The parameters defined under Equation (5) are wrong (BE vs PE).		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The parameter identifiers will be corrected accordingly.		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.6.1.	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Correction has been conducted. Respective PDD section has been checked and confirmed to be in line with the methodology.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B5		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.6.1, Project Emissions, Footnote 6: The result could not be transparently tracked. Information shall be provided which values have been considered to derive 1.96 kg/m <sup>3</sup> .		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>As clearly stated further above at the page of footnote 6, the density of greenhouse gas i in the gaseous stream (i.e. parameter <math>\rho_{i,t}</math>) is calculated as per the formula given in the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" and based on constant values for the parameters used in this formula. Beyond the already given constants for <math>MM_i</math> (Molecular mass of greenhouse gas i) and <math>R_u</math> (Universal ideal gases constant), the values for <math>T_n</math> (Temperature at normal conditions) as well as <math>P_n</math> (Total pressure at normal conditions) are stated there.</p> <p>Moreover, all used parameters (<math>P_n</math>, <math>T_n</math>, <math>MM_i</math>, <math>R_u</math>), their applied values as well as background information are available in the parameter tables under section B.6.2.</p> <p>When applying all these values in the given formula, the result of 1.96 kg/m<sup>3</sup> can be tracked.</p> <p>For the sake of clarity, the values will be added to the footnote.</p>		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.6.1	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A

Finding	B5		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The footnote has been updated and the values utilized to calculate $p_{i,t}$ are provided and are correct.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B6		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section B.6.2, Parameter $EF_{new,y}$ : The period considered for "Value(s) applied" is not correct, since 2 <sup>nd</sup> crediting period starts in 2014.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The parameter table has been updated accordingly in order to reflect the 2 <sup>nd</sup> crediting period correctly.		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): B.6.2.	New version No.: 4.1
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The PP revised the PDD which is now reflecting the correct period. It should be noted that this had no impact on the ER calculation since the EF in XLS files were correctly applied.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B7		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	XLS calculation for Hu Chems II, III, IV:  The source of $EF_{historical,II}$ (same applies to III, IV) is not clear. The PDD refers to "Historical information from issuance reports of CDM-PDD documents". Clarification is required and related evidence to justify the historical EFs shall be provided.		

Finding	B7		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>The calculations described below were performed separately for each plant and for each calendar year in the observation period (i.e. 2007 to 2012). The input values used for the calculations were available due to related measurements during the first crediting period, whereas these values were verified during previous verifications by DOEs and were successfully used for claiming CERs in the past as well.</p> <p>Similarly as in previous verifications and as per the methodology used in the first crediting period, the total quantity of N<sub>2</sub>O at the inlet of the destruction facility has been determined by multiplying the measured volume flow and the measured concentration of N<sub>2</sub>O. Annual (calendar year based) total values have then been determined.</p> <p>Subsequently, annual values of EF<sub>historical</sub> were obtained by dividing the total (calendar year based) quantity of N<sub>2</sub>O at the inlet of the destruction facility by the (calendar year based) total HNO<sub>3</sub> Production.</p> <p>The finally applicable value for EF<sub>historical</sub> for a plant is the minimum out of a plant's annual (calendar year based) values.</p> <p>During the course of compiling that file, a mistake in the historical time series data used for the calculation of EF<sub>historical,y</sub> was corrected, leading to a revised value for this parameter (old, incorrect value: 11.69 kg N<sub>2</sub>O / tHNO<sub>3</sub>; new, CORRECT value: 12.09 kg N<sub>2</sub>O / tHNO<sub>3</sub>). The value has been updated and so have respective calculations (in XLS files as well as the PDD) for baseline emissions and emission reductions. Values for plants Hu-Chems III and Hu-Chems IV were not affected and were correct at any time.</p> <p>Further double checks have been performed in order to ensure that historic time series data as well as the calculations are correct which has been found to be the case.</p>		
<input checked="" type="checkbox"/> Changes in PDD	Section(s): Front page, Section A.1, B.6.2, B.6.3, B.6.4	New version No.: 4.1	
<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): Sheets for plant Hu-Chems II	New version No.: corresponding to PDD	

Finding	B7		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The corresponding file has been provided and checked. In line with the applied methodology ACM0019, page 12, Option (a) EF <sub>historical</sub> for each plant has been determined based on historic values obtained annually during the first crediting period. All values have been verified during the first crediting period. The validating DOE confirms that the values are correctly chosen and the lowest value has been considered.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B8		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	XLS calculation for moisture content:  The sources for all input parameters are not provided. Hence, the calculation is not traceable and adequacy could not be assessed.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	In fact, the XLS calculation sheet for moisture contents contains the relevant sections of the design documents, i.e. the process flow diagrams of each nitric acid plants, including respective process conditions. All necessary parameters (i.e. flow, temperature, pressure at that position in the process) are clearly available. The values from these design documents can be doubtlessly crosschecked with the values applied in the XLS calculation. The same design documents have also been provided to the DOE in the course of the validation process.  For the sake of clarity, further explanations will be added to the XLS calculation sheet for moisture content, so that the used values can be better traced. These updated file will be made available to the DOE as separate supporting document.		
	<input type="checkbox"/> Changes in PDD	Section(s): N/A	New version No.: N/A
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The moisture content related information has been provided in a separated XLS file to the ER calculation. It has been counterchecked with the design documentation. The calculation is thus deemed correct.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		



Finding	B9		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	XLS input parameter of volumetric flow for HU Chems II, III and IV: The source and way of deriving the above mentioned parameter shall be provided and explained.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>During the validation process, source XLS Files including the historic values of all relevant parameters (including the volumetric flow) have been provided to the DOE (separately for each plant). These XLS Files served as the source for all relevant parameters.</p> <p>Furthermore, the XLS Model for ex-ante ER Calculation (which will be co-submitted with the PDD and the validation report for requesting the renewal of the crediting period) includes the applied value as well as an explanation of the way, how this value has been determined.</p> <p>For the sake of clarity, more explanations will be added to the source XLS files. These updated files will be made available to the DOE as separate supporting documents.</p>		
	<input type="checkbox"/> Changes in PDD	Section(s): N/A	New version No.: N/A
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The requested information incl. explanations has been obtained.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B10		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	XLS water content for HU Chems II, III and IV: The temperature value in cell C9 is wrong.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>The incorrect value of 237.15 K for conversion from Celsius to Kelvin has been changed to the correct 273.15 K.</p> <p>However, the slightly changed results of the ex-ante moisture content calculation (respective sections of the PDD will be updated) have no influence to the fact, that the gaseous stream is considered dry as per methodological/tool threshold values.</p>		
	<input type="checkbox"/> Changes in PDD	Section(s): N/A	New version No.: N/A
	<input type="checkbox"/> Changes in XLS	Worksheet(s): N/A	New version No.: N/A

Finding	B10		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok, the value has been revised and it could be confirmed that the impact is negligible. However, revision has been checked and correctness is confirmed.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B11		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Clarification is requested w.r.t. the effects of the potential implementation of the Korean ETS.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>As a matter of fact, and as mentioned in the PDD, no regulation of N<sub>2</sub>O limitation is in place which would restrict the emission of N<sub>2</sub>O in Hu-Chems nitric acid plants Hu-Chems II, Hu-Chems III and HuChems IV. Respective evidence has been provided to the DOE.</p> <p>Even although the introduction of a Korean Emission Trading Scheme (ETS) is under discussion, there is currently no such ETS in place in Korea. Consequently, the implication on the CDM Project Activity arising from such an ETS in the future would have to be assessed (in accordance with the applied methodology) when legislation is effective to the project activity.</p>		
	<input type="checkbox"/> Changes in PDD	Section(s):	New version No.:
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The documentation provided to the validation team is considered to be sufficient to describe the current situation. However verifiers contracted for CP 2 should further review the situation regarding the implementation of the Korean ETS. Thus an additional FAR has been introduced.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	B12		
<b>Classification</b>	<input type="checkbox"/> CAR	<input type="checkbox"/> CL	<input checked="" type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During verification of MPs in CP 2 the implementation of the Korean ETS and its consequences for the plant shall be observed and considered to avoid double counting of emission reductions.		



Finding	B12		
<b>Classification</b>	<input type="checkbox"/> CAR	<input type="checkbox"/> CL	<input checked="" type="checkbox"/> FAR
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	-		
	<input type="checkbox"/> Changes in PDD	Section(s): -	New version No.: -
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	-		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input checked="" type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> The finding is closed		

Finding	D1		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<ul style="list-style-type: none"> <li>The enumeration of section A is not correct.</li> <li>XLS files provided show invalid text in almost all tabs cell C4. Correction is requested.</li> <li>Section B.6.2. Parameter EF<sub>default,y,IV</sub>: The headline of the table in "Value(s) applied" is not matching with the values shown (high vs medium pressure)</li> </ul>		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the PDD is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The identified minor issues will be addressed as follows: <ul style="list-style-type: none"> <li>The enumeration in the PDD will be corrected</li> <li>The invalid text will be removed</li> <li>The parameter headline of EF<sub>default,y,IV</sub> will be corrected in the PDD</li> </ul>		
	<input checked="" type="checkbox"/> Changes in PDD	Section(s): A, B.6.2.	New version No.: 4.1
	<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): All tables	New version No.: 4.1
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	All corrections as described by the PP have been incorporated in the respective documents. This has been checked by the validation team.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during subsequent verification(s) <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

## 5 VALIDATION ASSESSMENT SUMMARY

### 5.1 Notification to the UNFCCC

The project has been registered on 2007-01-22 and the first renewable crediting period has been started on the same day. The UNFCCC has sent an Email to PP on 2013-04-22 requesting whether PP wants to renew the CP. The PP sent the notification on 2013-04-26 replying to the Email received by UNFCCC. The UNFCCC sent a confirmation on the notification on 2013-04-29.<sup>/MAIL1/;MAIL2/</sup> As the UNFCCC has confirmed the receipt, the formal notification requirements for a directly adjacent 2<sup>nd</sup> crediting period are considered to be met for this project activity.

### 5.2 Project description

Basically the project activity did not change since finalization of the registered PDD. Therefore section A of the revised has basically only been migrated from the registered PDD version. Only a few editorial changes have been identified which do not impact the project design or the project's ability to generate emission reductions.

### 5.3 Participation

The names of the project participants as listed in the revised PDD (sections A.4. and appendix 1) are consistent with those listed on the dedicated UNFCCC project website as well as in the last version of the modalities of communication<sup>/MOC/</sup>. For the complete list of project participants please refer to table 2-2 of this report.

### 5.4 Applied Methodologies and tools

The project activity was registered under the following methodology (table 5-1):

**Table 5-1:** Applied methodology/ies at registration and RCP stage

At registration stage		At RCP stage	
Name of methodology	Version	Name of methodology	Version
AM0028 - Catalytic N <sub>2</sub> O destruction in the tail gas of Nitric Acid Plants	1.0	ACM0019 - N <sub>2</sub> O abatement from nitric acid production	2.0

The project was originally registered based on version 01 of the approved CDM Methodology AM0028. A CDM-PDD for the 2nd crediting period using the latest available Version 5.1.0 of AM0028 has been positively validated and a request for renewal of the crediting period was filed with the UNFCCC. After the CDM EB withdrew Version 5.1.0 of the methodology AM0028 in its 73rd meeting and excluded nitric acid plants from its applicability in the subsequent version, the PPs decided to withdraw the already filed request for renewal of the crediting period. A new revised CDM-PDD using the latest applicable methodology (ACM0019 Version 2) for this

kind of projects has been presented to the validation team. The change from methodologies has been discussed with the secretariat via e-mail and there is no requirement that does not allow updating the methodology at this stage.

The present report refers only to the latest update of the PDD according to the methodology ACM0019 (Version 2), early information related to AM0028 is not relevant for this report.

Furthermore the stated methodologies under Table 5-1 refer to the following methodological tools as listed in the Table 5-2 below.

**Table 5-2:** Applied methodological tools

At registration stage		At RCP stage	
Name of tool	Version	Name of tool	Version
Tool for the demonstration and assessment of additionality	2.0	-	-
-	-	Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion	02
-	-	Tool to determine the mass flow of a greenhouse gas in a gaseous stream	02.0.0

Furthermore to the stated tools for RCP also the tool for “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” version 3.0.1 has been applied. By means of checking the UNFCCC website it is confirmed that the selection of the applied methodology and methodological tools as well as RCP tool EB 66 Annex 47 has been done correctly in line with the applicable requirements for the RCP.

## 5.5 Methodology applicability conditions

All applicability conditions of the updated, applied methodology (ACM0019, Version 2) are met as detailed in annex 2 of this report. Thus the methodology is deemed fully applicable for the new crediting period and no request for deviation with regards to the applicability of the methodology is required.

## 5.6 Project Boundary

The project boundaries (geographic and also related to GHG sources and gases) are correctly given in the updated PDD, as described in section B.3 thereof and comply with the requirements of the methodology.

There are no other sources which are impacted by the project which are not addressed by the applied methodology.

## **5.7 Original Baseline validity and update**

### **5.7.1 Baseline scenario**

The baseline scenario identified at the validation of the project activity (CDM-PDD version 2 dated 22/07/2006) was the continuation of the pre-project situation in all three plants, i.e. the continuation of emitting N<sub>2</sub>O to the atmosphere, without the installation of N<sub>2</sub>O destruction or abatement technologies.

Basically, as per the project standard this scenario is not subject to re-assessment and thus deemed to be applicable for the next crediting period, however, as well, as per the methodology applied (ACM0019 Version 2) for the second crediting period, the baseline scenario is that the N<sub>2</sub>O emitted to the atmosphere with no N<sub>2</sub>O abatement measure being implemented.

However, the baseline itself (i.e. the calculation of baseline emissions) has been checked with regard to the continued validity of underlying assumptions and parameter values, in accordance with the Tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (Version 3.0.1). The assessment steps are described in the following subsections, and, in more detail, in the annex of this report.

### **5.7.2 Compliance of the baseline with relevant policies**

The baseline of the registered PDD has been assessed to be compliant with all relevant mandatroy national legislation and/or sectoral policies applicable for the project activity at the time of validation. During the first crediting period the PP has frequently reviewed the legal requirements and policies relevant for the baseline of the project. On the basis of this the PP has arrived at the conclusion that the baseline is still in line with all applicable legislations and policies.

The validation team has independently reviewed the host country legislation as well as current policies, such as

- Korean Clean Air Conservation Act<sup>/CACA/</sup> and
- Legislation about Assignment and Trading of GHG Emission<sup>/TMS/</sup>.

On the basis of this analysis the validation team confirms that the baseline is still in compliance with the currently applicable national legislation and other national and/or sectoral policies. Therefore the baseline did not need to be adjusted due to changes in this respect.

### 5.7.3 Impact of circumstances

As the baseline scenario might be affected by changed circumstances, e.g. market conditions, market prices etc. the PP has checked the baseline against such changes that have occurred since validation. This is of special importance if the baseline scenario is the continuation of the pre-project scenario.

In the current case no such changes have been identified by the project participants as

- still no revenues other than from CDM are gained from the project activity and
- thus changed market conditions are not likely to impact the PA.

The validation team has independently checked whether there are changes in circumstances which have an impact on the baseline. No such changes have been identified and thus it is deemed appropriate not to revise the baseline due to changes in circumstances.

### 5.7.4 Likelihood of investments

If the baseline scenario has been identified as the continuation of the pre-project scenario it is necessary to assess whether an investment and/or exchange of the baseline equipment (e.g. due to expiry of the equipment's lifetime) during the upcoming crediting period is to be deemed the most likely scenario. If so the baseline needs to be updated.

In case of an ACM0019 project there is no baseline equipment which is to be exchanged. Furthermore no other reasons for a possible investment – other than possible legal requirements – which might lead to an investment have been identified.

Thus the validation team confirms the conclusion that no changes to the baseline are required due to the likelihood of investments in equipment which impacts the baseline.

### 5.7.5 Validity of data and parameters determined ex-ante

The parameters which have been determined ex-ante in the registered PDD are not valid anymore since the methodology has been changed which requires different parameters as following:

Parameter	Definition	Value	Source
EF <sub>new,y</sub>	Baseline N <sub>2</sub> O emission factor for nitric acid production in year y (related to 100 per cent	As per the PDD	Methodology ACM0019

	pure acid)		
GWP <sub>N<sub>2</sub>O</sub>	Global Warming Potential of N <sub>2</sub> O	298 t CO <sub>2</sub> e/ t N <sub>2</sub> O	EB 69, Annex 3 (310 t CO <sub>2</sub> e/ t N <sub>2</sub> O in the reg. PDD)
Operating Pressure II	Operating pressure of the ammonia burner of Hu-Chems II	872 kPa	As per manufacturers specifications
EF <sub>historical,II</sub>	Historical baseline emission factor of the nitric acid of Hu-Chems II	12.09 kg N <sub>2</sub> O/t HNO <sub>3</sub>	Since the AM0028 was applied during the first crediting period, the PP choose option (a) to determine EF <sub>historical</sub> in line with page 12 of ACM0019. The basis to determine the lowest baseline emission factor is the data obtained during the first crediting period. The data from previous monitoring periods and formulae (division of annual quantity of N <sub>2</sub> O at the destruction facility inlet by the annual quantity of HNO <sub>3</sub> ) to calculate EF <sub>historical</sub> based on these data have been checked to confirm the applied value.
EF <sub>default,y,II</sub>	Default emission factor according to the operating pressure of the ammonia burner in year y (related to 100 per cent pure acid) of Hu-chems II	High pressure values as per the PDD	Pressure levels as per manufacturers specifications
P <sub>product,max,II</sub>	Design capacity of nitric acid production during the first crediting period of Hu-Chems II	116,800 t	As per manufacturers specifications
Operating pressure III	Operating pressure of the ammonia burner of Hu-Chems III	872 kPa	As per manufacturers specifications
EF <sub>historical,III</sub>	Historical baseline emission factor of the	11.26 kg N <sub>2</sub> O/t HNO <sub>3</sub>	Since the AM0028 was applied during

	nitric acid of Hu-Chems III		the first crediting period, the PP choose option (a) to determine $EF_{\text{historical}}$ in line with page 12 of ACM0019. The basis to determine the lowest baseline emission factor is the data obtained during the first crediting period. The data from previous monitoring periods and formulae (division of annual quantity of N <sub>2</sub> O at the destruction facility inlet by the annual quantity of HNO <sub>3</sub> ) to calculate $EF_{\text{historical}}$ based on these data have been checked to confirm the applied value.
$EF_{\text{default},y,\text{III}}$	Default emission factor according to the operating pressure of the ammonia burner in year y (related to 100 per cent pure acid) of Hu-Chems III	High pressure values as per the PDD	Pressure levels as per manufacturers specifications
$P_{\text{product,max,III}}$	Design capacity of nitric acid production during the first crediting period of Hu-Chems III	116,800 t	As per manufacturers specifications
Operating pressure IV	Operating pressure of the ammonia burner of Hu-Chems IV	335 kPa	As per manufacturers specifications
$EF_{\text{historical,IV}}$	Historical baseline emission factor of the nitric acid of Hu-Chems IV	5.70 kg N <sub>2</sub> O/t HNO <sub>3</sub>	Since the AM0028 was applied during the first crediting period, the PP choose option (a) to determine $EF_{\text{historical}}$ in line with page 12 of ACM0019. The basis to determine the lowest baseline emission factor is the data obtained during the first crediting period. The data from



			previous monitoring periods and formulae (division of annual quantity of N <sub>2</sub> O at the destruction facility inlet by the annual quantity of HNO <sub>3</sub> ) to calculate $EF_{\text{historical}}$ based on these data have been checked to confirm the applied value.
$EF_{\text{default},y,IV}$	Default emission factor according to the operating pressure of the ammonia burner in year y (related to 100 per cent pure acid) of Hu-chems IV	Medium pressure values as per the PDD	Pressure levels as per manufacturers specifications
$P_{\text{product,max},IV}$	Design capacity of nitric acid production during the first crediting period of Hu-Chems IV	467,200 t	As per manufacturers specifications
$R_u$	Universal ideal gases constant	8,314 Pa.m <sup>3</sup> /kmol.K	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
$MM_i$	Molecular mass of greenhouse gas i	44.02 kg/kmol	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
$P_n$	Total pressure at normal conditions	101,325 Pa	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
$T_n$	Temperature at normal conditions	273.15 K	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)

These ex-ante determined values have been appropriately considered and correctly applied in the updated PDD and emission reduction calculation.

Based on the above it can be summarized for chapter 5.7 and confirmed that the requirements as per tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" version 3.0.1 are met.



## 5.8 Additionality

The project's additionality has been demonstrated at registration stage. Also the change of the methodology to ACM0019 has no impact on the additionality. As per the project standard PPs are not requested to justify the additionality of the project again at RCP stage. Thus the corresponding parts have simply been transferred to the respective section of the applicable PDD template version 4.1.

It is confirmed that the transfer has been done appropriately. No further assessment regarding additionality has not been carried out by the validation team.

## 5.9 Monitoring Plan

In order to reflect the newly applied methodology (ACM0019 Version 2), the monitoring plan in the PDD has been updated. Following parameters are used. The values used for ex-ante estimation of emission reductions are based on historical values during the first crediting period (which was possible due to the fact, that similar parameters were monitored and used in the first period as well), unless stated otherwise. All values are reasonable and can be doubtlessly traced based on historic records.

Parameter	Definition	Value (ex-ante)
$P_{\text{production},y,\text{II}}$	Nitric acid produced in year $y$ of Hu-Chems II	80,000 t HNO <sub>3</sub>
$h_{y,\text{II}}$	Number of hours of operation in year $y$ of Hu-Chems II	6480 h
$h_{r,y,\text{II}}$	For tertiary N <sub>2</sub> O abatement, Number of hours ( $h$ ) in year $y$ where the abatement system is by-passed, underperforming or failed of Hu-Chems II	0 h
$V_{t,\text{db},\text{II}}$	Volumetric flow of the gaseous stream in time interval $t$ on a dry basis	38,200 m <sup>3</sup> dry gas/h
$V_{i,t,\text{db},\text{II}}$	Volumetric fraction of greenhouse gas $i$ in a time interval $t$ on a dry basis of plant Hu-Chems II	6.11E-05 m <sup>3</sup> gas $i$ /m <sup>3</sup> dry gas
$C_{\text{H}_2\text{O},t,\text{db},n,\text{II}}$	Moisture content of the gaseous stream at normal conditions, in time interval $t$ of Hu-Chems II	7,000 mg H <sub>2</sub> O/m <sup>3</sup> dry gas (estimation based on plant design documents)

FC <sub>i,j,y,II</sub>	Quantity of fuel type i combusted in process j during the year y of Hu-Chems II	228 t/y
W <sub>C,i,y,II</sub>	Weighted average mass fraction of carbon in fuel type i in year y of plant Hu-Chems II	0.82 tC/mass unit of the fuel
P <sub>production,y,III</sub>	Nitric acid produced in year y of Hu-Chems III	90,000 t HNO <sub>3</sub>
h <sub>y,III</sub>	Number of hours of operation in year y of Hu-Chems III	7200 h
h <sub>r,y,III</sub>	For tertiary N <sub>2</sub> O abatement, Number of hours (h) in year y where the abatement system is by-passed, underperforming or failed of Hu-Chems III	0 h
V <sub>t,db,III</sub>	Volumetric flow of the gaseous stream in time interval t on a dry basis	40,000 m <sup>3</sup> dry gas/h
V <sub>i,t,db,III</sub>	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis of plant Hu-Chems III	5.65E-05 m <sup>3</sup> gas i/m <sup>3</sup> dry gas
C <sub>H<sub>2</sub>O,t,db,n,III</sub>	Moisture content of the gaseous stream at normal conditions, in time interval t of Hu-Chems III	7,000 mg H <sub>2</sub> O/m <sup>3</sup> dry gas (estimation based on plant design documents)
FC <sub>i,j,y,III</sub>	Quantity of fuel type i combusted in process j during the year y of Hu-Chems III	262 t/y
W <sub>C,i,y,III</sub>	Weighted average mass fraction of carbon in fuel type i in year y of plant Hu-Chems III	0.82 tC/mass unit of the fuel
P <sub>production,y,IV</sub>	Nitric acid produced in year y of Hu-Chems IV	410,000 t HNO <sub>3</sub>
h <sub>y,IV</sub>	Number of hours of operation in year y of Hu-Chems IV	8,160 h
h <sub>r,y,IV</sub>	For tertiary N <sub>2</sub> O abatement, Number of hours (h) in year	0 h

	y where the abatement system is by-passed, underperforming or failed of Hu-Chems IV	
$V_{t,db,IV}$	Volumetric flow of the gaseous stream in time interval t on a dry basis	156,000 m <sup>3</sup> dry gas/h
$V_{i,t,db,IV}$	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis of plant Hu-Chems IV	3.05E-05 m <sup>3</sup> gas i/m <sup>3</sup> dry gas
$C_{H_2O,t,db,n,IV}$	Moisture content of the gaseous stream at normal conditions, in time interval t of Hu-Chems IV	3,000 mg H <sub>2</sub> O/m <sup>3</sup> dry gas (estimation based on plant design documents)

The validation team has duly assessed all the required changes due to the new methodological requirements and the re-assessment of the baseline. The validation team has concluded that

- all necessary changes have been appropriately reflected in the updated PDD,
- the monitoring plan in the PDD is in compliance with the applied monitoring methodology,
- the monitoring arrangements described in the PDD can be implemented and are feasible within the project design.

## 5.10 Calculation of GHG Emission Reductions

The calculation of ERs is done as per the applied methodology (ACM0019 v. 2). All changes due to the new methodology and the re-assessment of the baseline have been considered appropriately. The calculation in the Excel spreadsheets and the corresponding calculation tables in the PDD have been checked and no mistakes have been identified. The estimation of emission reductions for the 2<sup>nd</sup> crediting period is deemed transparent, plausible and conservative.

## 5.11 Crediting Period

As the secretariat has been notified within the specified timeframe, as detailed in table 5-1, the project's 2<sup>nd</sup> crediting period may start immediately after the expiration of the 1<sup>st</sup> one, given that all other applicable criteria are met.

It is thus confirmed that the start date (2014-01-22) and the length of the second crediting period (7 years) are in compliance with the project standard.

## **5.12 Environmental impacts**

Environmental impacts only need to be re-assessed with regards to their potential influence on the baseline determination. For the current case it is confirmed that the corresponding section has been correctly migrated to the revised version.

## **5.13 Local stakeholder consultation**

In line with the project standard the local stakeholder consultation is not to be repeated at the RCP stage. It is confirmed that the information included in the registered PDD has been correctly transferred to the revised PDD version.

## **5.14 PDD update**

The PDD has been revised on the basis of the latest applicable template version 4.1.

In line with the requirements of the project standard only the sections of the registered PDD relating to the baseline, estimated GHG emission reductions and the monitoring plan have been updated. All other sections have basically only been migrated to version 4.1. However, due to the change of the methodology (from AM0028 Version 1 to ACM0019 Version 2), respective adaptations where necessary as well.

It is confirmed that the information included in the registered PDD has been correctly transferred to the revised PDD version. Besides the changes made due to renewal of CP and some insignificant changes of editorial nature the DOE confirms that the transfer to VVS template contains no other material changes.

It has further been checked and found that the information included in the PDD sections and annexes that have not been part of the registered PDD are correct and in compliance with the project standard.

## 6 VALIDATION OPINION

Carbon CDM Korea Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to re-validate the project “Catalytic N<sub>2</sub>O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.” for the purpose of renewal of the crediting period. The validation is based on the relevant UNFCCC requirements.

In the course of the validation 8 Corrective Action Requests (CARs) and 4 Clarification Requests (CLs) were raised and successfully closed. In addition to this 1 FAR has been raised.

The review of the updated project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews have provided TÜV NORD JI/CDM Certification Program with sufficient evidence to validate the fulfillment of the stated criteria applicable for RCP.

In detail the conclusions can be summarized as follows:

- The PDD has been updated in accordance with section 12.9 of the Project Standard.
- The current baseline of the project is in line with the national and/or sectoral policies and circumstances at the time of requesting renewal of crediting period.
- The monitoring plan is transparent and adequate and in line with the applicable monitoring methodology (ACM0019 version 2.0.0).
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 8,642,580 tCO<sub>2</sub>e are most likely to be achieved within the second renewable crediting period of 7 years.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the renewal of the crediting period.

Essen, 2013-11-07



Rainer Winter

TÜV NORD JI/CDM Certification  
Program

Verification Team Leader

Essen, 2013-11-07



Stefan Winter

TÜV NORD JI/CDM Certification  
Program

Final Approval

## 7 REFERENCES

**Table 7-1:** Documents provided by the project participant

Reference	Document
<b>/CDC/</b>	<ul style="list-style-type: none"> <li>- Confirmation of Design Capacity of plants #2 and #3 from manufacturer Uhde dated 2006-07-20</li> <li>- Confirmation of Design Capacity of plants #4 from manufacturer Uhde dated 2006-07-20</li> </ul>
<b>/HCA/</b>	Letter of Approval from Republic of Korea for CARBON CDM KOREA Ltd., dated 2006-11-17
<b>/HCE/</b>	History of Catalyst Exchange
<b>/LMI/</b>	List of monitoring instruments
<b>/LOA/</b>	Letter of Approval from Germany for RWE Power AG, dated 2006-12-19
<b>/MAIL1/</b>	<ul style="list-style-type: none"> <li>- Invitation for notification by UNFCCC from 2013-04-22</li> <li>- Notification mail by the PP to the UNFCCC indicating the intention to renew the crediting period, dt. 2013-04-26</li> </ul>
<b>/MAIL2/</b>	Confirmation mail/letter by the UNFCCC in response to /MAIL1/ dt. 2013-04-29
<b>/PDD/</b>	<ul style="list-style-type: none"> <li>• Draft RCP Project Design document “Catalytic N<sub>2</sub>O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.” (Version No. 4.0, dated 2013-09-20) and intermediate version 3.0 and 3.1.</li> <li>• Final RCP Project Design document “Catalytic N<sub>2</sub>O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.” (Version No. 4.1, dated 2013-10-14)</li> </ul>
<b>/PDD-Reg/</b>	Registered Project Design Document named “Catalytic N <sub>2</sub> O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Corp.” (Version No. 2, dated 2006-07-22)
<b>/PID/</b>	Piping and Instrumentation Diagrams for plants II, III, IV
<b>/RDS/</b>	Reference list from DeNO <sub>x</sub> manufacturer Uhde for DeNO <sub>x</sub> systems installed at different Nitric Acid Plants
<b>/RES/</b>	Reference list from EnviNO <sub>x</sub> ® manufacturer Uhde for DeNO <sub>x</sub> systems installed at different Nitric Acid Plants

Reference	Document
<b>/SF/</b>	Evidence for expenditure for the Social Fund
<b>/XLS/</b>	<ul style="list-style-type: none"> <li>• Emission reduction calculation spreadsheet</li> <li>• File with historical information</li> <li>• File with calculation of moisture content</li> </ul>

**Table 7-2:** Background investigation and assessment documents

Reference	Document
<b>/BREF/</b>	IPPC BREF Document “Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers” (August 2007)
<b>/CACA/</b>	Clean Air Conservation Act – Article 15; table 8
<b>/CPM/</b>	TÜV NORD JI / CDM Certification Program Manual (incl. related procedures and forms)
<b>/GCP/</b>	UNFCCC: Guidelines for completing the Project Design Document Form , (v. 01.0, EB 66 Annex 8)
<b>/IPCC/</b>	<ul style="list-style-type: none"> <li>• IPCC Good Practice Guidance &amp; Uncertainty Management in National Greenhouse Gas Inventories, 2000</li> <li>• Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual</li> </ul>
<b>/KP/</b>	Kyoto Protocol (1997)
<b>/MA/</b>	Decision 3/CMP. 1 (Marrakesh – Accords & Annex to decision (17/CP.7))
<b>/METH-1/</b>	AM0028 - Catalytic N <sub>2</sub> O destruction in the tail gas of Nitric Acid Plants (Version 1.0)
<b>/METH-2/</b>	ACM0019 - N <sub>2</sub> O abatement from nitric acid production (Version 2.0)
<b>/PS/</b>	Clean Development Mechanism Project Standard, Version 5.0
<b>/RMP/</b>	Revised and approved Monitoring Plan
<b>/TMS/</b>	Legislation about Assignment and Trading of GHG Emission, published by the office of Prime Minister in May 2012

Reference	Document
<b>/TOOL1/</b>	Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion, Version 02
<b>/TOOL2/</b>	Tool to determine the mass flow of a greenhouse gas in a gaseous stream, Version 2.0.0
<b>/TVB/</b>	Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period (version 03.0.1; EB 66 A47)
<b>/VAL/</b>	Validation report dt. 2006-08-05, TÜV Süd
<b>/VAL-RMP/</b>	Validation opinion Revision of the Monitoring Plan dt. 2009-11-16, DNV
<b>/VVS/</b>	Validation and Verification Standard, Version 05.0

**Table 7-3:** Websites used

Reference	Link	Organization
<b>/law/</b>	<a href="http://www.law.go.kr">www.law.go.kr</a>	Korean Legislation
<b>/unfccc/</b>	<a href="http://www.unfccc.int">www.unfccc.int</a>	United Nations Framework Convention on Climate Change
<b>/ipcc/</b>	<a href="http://www.ipcc.ch">www.ipcc.ch</a>	IPCC

**Table 7-4:** List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organization / Function
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	G.S.Choi	Production Management Director / Senior Management Director, Huchems Fine Chemical Corp.
<b>/IM01</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	D. H. Kim	Deputy General Manager, Huchems Fine Chemical Corp.
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	H. S. Kim	Team Manager, Engineering Management Team, Huchems Fine Chemical Corp.
<b>/IM01/</b>	V	<input checked="" type="checkbox"/> Mr.	C.H. Yi	Assistant Chief Clerk, Maintenance



Reference	Mol <sup>1</sup>		Name	Organization / Function
		<input type="checkbox"/> Ms		Control Team, Huchems Fine Chemical Corp.
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	C.Y.Yu	Assistant Manager, Production 2 Team, Huchems Fine Chemical Corp.
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	D.H. Oh	Assistant Manager, Production 1 Team, Huchems Fine Chemical Corp.
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	J.Y. Joo	Team Manager, E & S Team, Huchems Fine Chemical Corp.
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	D.H. Kim	Section Chief, Carbon CDM Korea
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	A. Moser-Rammelmüller	Project Manager, Carbon Austria

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)

# ANNEX

- A1:** Validation Protocol
- A2:** Assessment of Applicability Criteria
- A3:** Appointment certificates of the team members

## ANNEX 1: VALIDATION PROTOCOL

**Table A-1: Requirements Checklist**

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<b>A. Description of Project Activity</b>				
<b>A.1. Purpose and general description of the project activity</b>				
<p>A.1.1. Is the description of the project activity in section A.1 correct ?</p> <p>(EB 66 Annex 8)</p> <p><i>Please check whether the information given is correct with regards to the actual situation and possible changes since the registration / last update of the PDD. Please also check whether the guidelines for completing the PDD form have been followed.</i></p>	<p>/PDD/ /unfccc/ /GCP/</p>	<p>The validation team has checked section A.1 of the updated PDD and confirms that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Section A.1 is in compliance with the guidelines for completing the PDD form <sup>/GCP/</sup>.</li> <li><input checked="" type="checkbox"/> The section A.1 of the revised PDD has been appropriately updated and reflects the actual situation. Relevant information previously included in other sections of the PDD has been considered.</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<b>A.2. Location of the project activity</b>				
A.2.1. Has the location of the project activity been	/PDD/	The validation team has checked section A.2 of the updated PDD	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>correctly described in section A.2? (EB 66 Annex 8)</p> <p><i>Please check whether the information given is correct with regards to the actual situation and possible changes since the registration / last update of the PDD. Please also check whether the guidelines for completing the PDD form have been followed.</i></p>	/unfccc/ /IM01/	<p>and confirms esp. on the basis of information gathered during the site visit that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Section A.2 is in compliance with the guidelines for completing the PDD form <sup>/GCP/</sup>.</li> <li><input checked="" type="checkbox"/> The section A.2 of the revised PDD has been appropriately updated and reflects the actual situation with regards to the following: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Host Party</li> <li><input checked="" type="checkbox"/> Region / State Province</li> <li><input checked="" type="checkbox"/> City / Town / Community</li> <li><input checked="" type="checkbox"/> Physical/geographical location incl. Longitude/Latitude</li> </ul> </li> </ul> <p>In this context the following findings have been identified: N/A</p>		
<b>A.3. Technology and/or measures</b>				
<p>A.3.1. Is the description of the technology employed in the revised PDD in accordance with the real situation?</p> <p><i>The content of the registered PDD shall be compared to the content of the revised PDD and the situation observed during the site visit. In case of changes of the</i></p>	/PDD/ /PDD-Reg/ /GCP/	<p>On the basis of the site visit and the desk review of the updated PDD the validation team confirms the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Section A.3 is in compliance with the guidelines for completing the PDD form <sup>/GCP/</sup>.</li> <li><input checked="" type="checkbox"/> The technology of the project has not been changed.</li> </ul>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<i>implemented technology this should be described in detail.</i>	/IM01/	<input checked="" type="checkbox"/> The description in the PDD reflects the actual situation and the section A.3 of the PDD has been migrated from the registered PDD without significant changes.  In this context the following findings have been identified: N/A		
<b>A.4. Parties and project participants</b>				
A.4.1. Are the names of the project participants of the registered project still consistent with the PPs as per this request for renewal of crediting period?  (VVS, Version 5.0, § 302)  <i>It should be referred to the project specific CDM website. The PPs listed shall be compared to the PPs listed in the revised PDD. Is the description of the technology employed in the revised PDD in accordance with the real situation?</i>	/PDD/ /PDD-Reg/ /GCP/ /IM01/ /LOA/ /HCA/	<i>Description:</i> The PPs included in the revised PDD are CARBON CDM KOREA Ltd. and RWE Power AG. In the registered PDD only the non-Annex 1 PP has been defined which is also CARBON CDM KOREA Ltd. As per the project specific CDM website the PPs quoted are CARBON CDM KOREA Ltd. and RWE Power AG.  <i>Validator's action:</i> The content of the PDDs has been compared. Besides the project specific UNFCCC homepage the LOAs have been checked to confirm the information.  <i>Conclusion:</i> The PPs defined in the PDD for RCP are in line with the project specific homepage and the LOAs.	OK	OK
<b>A.5. PDD editorial aspects</b>				
A.5.1. Have relevant sections of the registered PDD been updated?  (VVS, Version 5.0, § 302 and § 303)  <i>Please provide explanation whether the sections</i>	/PDD/ /PDD_REG/ /unfccc/	<i>Description:</i> The PDD is based on the latest PDD version template (v. 4.1) which is structured differently compared to the registered PDD. Especially the sections with regards to the applicability, the baseline, the emission reductions and the monitoring plan have been updated considering the latest version of the PDD template as	CAR D1	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p><i>relevant for the baseline, the estimated emission reductions and the monitoring plan have been updated.</i></p> <p><i>Also provide explanation whether the project participants have updated the PDD in accordance with section 12.9 of the Project Standard.</i></p>	<p>/GCP/ /METH-2/ /PS/</p>	<p>well as the requirements of the applied methodology.</p> <p><i>Validator's action:</i> The registered PDD as well as the revised PDD have been compared. Besides, the methodology has been checked to confirm the updated sections.</p> <p><i>Conclusion:</i> The PP has used the the most recent version of baseline and monitoring methodology applicable for the project activity. The PDD was updated acc. section 12.9 of the applicable Project Standard. However, minor issues have been identified which have been addressed in CAR D1.</p>		
<p>A.5.2. Have other sections been identified in the registered PDD which have been updated?</p>	<p>/PDD/ /PDD-REG/ /unfccc/ /METH-2/ /PS/</p>	<p><i>Description:</i> The PP revised the technological description by means of excluding of non relevant information about the nitric acid production process.</p> <p>In addition the Annex 1 project participant RWE Power AG which had not been defined in the registered PDD has been included in the updated version.</p> <p><i>Validator's action:</i> The registered PDD as well as the revised PDD have been compared. Besides, the project standard, methodology has been checked to confirm the updated sections.</p> <p><i>Conclusion:</i> The PP has updated the PDD acc. section 12.9 of the applicable Project Standard, all information required to understand the project activity technically and from a CDM perspective are included. Furthermore, the latest CDM-PDD template versoin 4.1. was used, requiring some formal changes. Since the PP has used the applicable methodology ACM0019 (Version 2) instead of the methodolgy AM0028 (Version 1) valid at the registration stage of the project, some other changes (especially with regard to the</p>	<p>CAR B2 CAR B3 CAR B6</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		<p>baseline, calculations and monitoring) were necessary.</p> <p>However, the following has been identified:</p> <p>CAR B2: Section B.3.: Information about the spatial extent of the project boundary as per the methodology is not provided.</p> <p>CAR B3: Section B.3., Table, "Operation of a tertiary N<sub>2</sub>O Abatement facility": The table shown is incomplete since CH<sub>4</sub> includes an incomplete justification and information is not provided whether N<sub>2</sub>O is included.</p> <p>CAR B6: Section B.6.2, Parameter EF<sub>new,y</sub>: The period considered for "Value(s) applied" is not correct, since 2<sup>nd</sup> crediting period starts in 2014.</p>		
<b>B. Project Baseline and Monitoring Plan</b>				
<b>B.1. Reference of the Methodology</b>				
<p>B.1.1. Which methodology/ tool has been applied in the registered PDD? Is this the latest applicable version?</p> <p>(VVS, Version 5.0, § 304 (b))</p> <p><i>The applied methodology(ies) and the tool(s) applied in the registered PDD shall be listed here. It shall be confirmed whether the latest applicable version at the time of submission of renewal of the crediting period has been</i></p>	<p>/unfccc/ /PDD/ /IM01/ /METH-2/</p>	<p><i>Description:</i> The following methodology has been used in the updated PDD:</p> <p>ACM0019: N<sub>2</sub>O abatement from nitric acid production (Version 02.0).</p> <p>This methodology refers to the following methodological tools:</p> <p>(1) Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion</p>	OK	OK



Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<i>applied.</i>		<p>(2) Tool to determine the mass flow of a greenhouse gas in a gaseous stream</p> <p><i>Validator's action:</i> The UNFCCC website has been checked to confirm the latest versions of the the applied methodology as well as the tools that the methodology refers to. Futhermore the revised PDD has been checked and crosschecked with the equipment installed on site.</p> <p><i>Conclusion:</i> The methodology applied in the revised PDD has been changed from AM0028 to ACM0019. In this context it is to be mentioned that the LPG (effectively propane) which is used in Hu-Chems II and III is used as reducing agent to the destruction facility.</p>		
<b>B.2. Applicability of the Methodology</b>				
<p>B.2.1. Have all applicability criteria defined in the methodology been met?</p> <p>(PS, Version 5.0, § 230)</p>	<p>/unfccc/ /PDD/ /METH-2/</p>	<p><i>Description:</i> Compliance with the applicability criteria as per the latest applied methodology have been justified in the relevant PDD section B.2 by the PP. The PP claims that all criteria are met.</p> <p><i>Validator's action:</i> The content of the PDD has been compared with the requirements of the methodology. Relevant evidence has been checked. For details please refer to Annex 2 of this report.</p> <p><i>Conclusion:</i> Annex 2 of this report provides a detailed assessment of all applicability requirements.</p> <p>In this context CL B1 has been raised.</p>	CL B1	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
B.2.2. In case one or more applicability criteria have not been met, has the PP a) select another applicable methodology, b) requested deviation from the methodology? (PS, Version 5.0, § 230 (c))	/PDD/	<i>Description:</i> As the PP did not identify applicability criteria which are not met, thus none of the options a) or b) were deemed appropriate.  <i>Validator's action:</i> No further action was taken by the VT as full compliance with the applicability criteria can only be assessed after closure of CL B1  <i>Conclusion:</i> As PP claims that all applicability criteria are met the point is deemed not appropriate. All applicability criteria are met however CL B1 has been raised.	CL B1	OK
<b>B.3. Validity and update of the baseline</b>  <i>The assessment of the continued validity and update of the baseline at the renewal of the crediting period is carried out according to the stepwise approach given in the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", EB 66/ Annex 47, reflecting also VVS §302 and PS §230.</i>				
<b>B.3.1. Baseline applied</b>				
B.3.1.1. What has been identified as original/current baseline?  <i>Describe the chosen BL scenario. Indicate whether it is in line with the applied methodology.</i>	/MTH-2/ /PDD/ /PDD-REG/	<i>Description:</i> The baseline is the same as per the registered PDD. The nitric acid production without the N <sub>2</sub> O destruction facility.  <i>Validator's action:</i> The registered and revised PDD have been checked and the content has been compared to the requirements of the applied methodology.  <i>Conclusion:</i> The baseline scenario has not been modified from the original scenario which is the pre-project situation and fully in line	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		with ACM0019. However, the baseline itself has been updated by considering updated parameter (as described in chapter 5.7.5). It is confirmed that the current baseline is in line with the applied methodology.		
<b>B.3.2. Step 1: Assess the validity of the current baseline for the next crediting period</b>  <i>The validity of the current baseline is assessed using the following Sub-steps:</i>				
<p>B.3.2.1. <i>Step 1.1: Assess compliance of the current baseline with relevant mandatory and/or sectoral policies</i></p> <p>Does the current baseline comply with all relevant mandatory national and/or sectoral policies which came into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period?</p> <p><i>If yes go to step 1.2, otherwise the baseline needs to be updated.</i></p> <p><i>Describe how this issue was validated. Consider also VVS §304.</i></p>	<p>/IM01/ /PDD/ /CACA/ /TVB/ /TMS/</p>	<p><i>Description:</i> Information in the PDD indicate that policies with impact on the project activity have not been changed.</p> <p><i>Validator's action:</i> In the course of the validation interviews with the project owner and the PP have been conducted to confirm this information. Furthermore the Korean Environmental Legislation has been checked. It could be confirmed that the Korean Clean Air Conservation Act<sup>/CACA/</sup> does not include any stipulations to destroy or reduce emissions of N<sub>2</sub>O. Regarding NO<sub>x</sub> the emission threshold value of 200 ppm has remained invariant since original validation.</p> <p>In addition to this other Korean Environmental policies have been checked. In this context the planned Korean Emissions trading scheme (ETS) has been reviewed. Currently it is planned to start this system in 2015. It is not clear to which extend this might impact the project baseline. Furthermore the target management system has been introduced<sup>/TMS/</sup> which includes reporting duties to the Korean Government. Currently it is not clear how this might impact the project activity. Therefore a CAR has been raised to further clarify this issue.</p> <p><i>Conclusion:</i> The validation team concluded that the information</p>	<p>CAR B11  FAR B12</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		provided in the PDD is insufficient. Hence, the following CAR B11 has been raised. In addition, FAR B12 is raised to ensure that possible impacts of the Korean ETS on the plant will be taken into account in future verifications.		
<p><b>B.3.2.2. Step 1.2: Assess the impact of circumstances</b></p> <p>Do new circumstances exist at the time of requesting renewal of the crediting period which make the continued validity of the baseline not plausible?</p> <p><i>Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. If new circumstances make the continued validity not plausible, then the current baseline needs to be updated for the subsequent crediting period.</i></p> <p><i>Describe how this issue was validated.</i></p>	<p>/IM01/ /TVB/</p>	<p><i>Description:</i> The PP did not identify any circumstances which might have impact on the project activity.</p> <p><i>Validator's action:</i> By mean of interview with the project operator it could be confirmed that new circumstances like changed market conditions did not occur. In this context it is to be mentioned that changes in circumstances are not very likely for this kind of project as no other revenues than CDM credits are generated.</p> <p><i>Conclusion:</i> No influence of circumstances which might impact the baseline has been observed.</p>	OK	OK
<p><b>B.3.2.3. Step 1.3: Assess whether the continuation of the use of current equipment(s) is technically possible or if rather an investment would be made.</b></p> <p>Does the remaining lifetime of the current equipment that would continue to be used exceed the crediting period for which renewal is requested (another 7 years)?</p>	<p>/PDD/ /TVB/ /RES/</p>	<p><i>Description:</i> The baseline scenario does not involve any use of equipment with regards to N<sub>2</sub>O abatement. Therefore no influence of remaining lifetime of equipment is to be considered in this context. However in this context the situation with regards to the SCR technology has been discussed. Lifetime of equipments widely exceeds the crediting period for which renewal is requested.</p> <p><i>Validator's action:</i> The justification of the PDD has been checked.</p> <p><i>Conclusion:</i> The provided justification within step 1.3 is assessed to</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.										
<p><i>The step should only be applied if the identified baseline in the previous crediting period was the continuation of the current / pre-project practice.</i></p> <p><i>Describe the steps taken to validate the remaining lifetime. Consider also VVS §303.</i></p>		be appropriate.												
<p><b>B.3.2.4. Step 1.4: Assessment of the validity of the data and parameters</b></p> <p>Are all data and parameters that were only determined at the start of the (previous) crediting period and not monitored during the (previous) crediting period still valid or should they be updated?</p> <p><i>Updates should be undertaken:</i></p> <ul style="list-style-type: none"><li><i>Where IPCC default values are used, the values should be updated if any default values have been adopted and published by the IPCC;</i></li><li><i>Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical emission does not exist anymore as a result of the CDM project</i></li></ul>	<p>/PDD/ /TVB/ /IPCC/</p>	<p>The validation team has checked the validity of the ex-ante parameters defined in the original PDD and confirms the following:</p> <p><input type="checkbox"/> All data and parameters determined ex-ante for the 1<sup>st</sup> crediting period are still valid.</p> <p><input checked="" type="checkbox"/> The following data and/or parameters determined ex-ante for the 1<sup>st</sup> crediting period are no longer valid and have been updated in accordance with the “Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of a crediting period”:</p> <table><tr><th>Parameter</th><th>GWP<sub>N2O</sub></th></tr><tr><td>Description</td><td>Global Warming Potential of N<sub>2</sub>O</td></tr><tr><td>Unit</td><td>tCO<sub>2</sub>/tN<sub>2</sub>O</td></tr><tr><td>Value</td><td>298</td></tr><tr><td>Assessment</td><td>Derived from relevant decisions by the CMP (2nd Kyoto protocol commitment period)It has been changed from 310 compared to the previous crediting period. The value has been correctly</td></tr></table>	Parameter	GWP <sub>N2O</sub>	Description	Global Warming Potential of N <sub>2</sub> O	Unit	tCO <sub>2</sub> /tN <sub>2</sub> O	Value	298	Assessment	Derived from relevant decisions by the CMP (2nd Kyoto protocol commitment period)It has been changed from 310 compared to the previous crediting period. The value has been correctly	OK	OK
Parameter	GWP <sub>N2O</sub>													
Description	Global Warming Potential of N <sub>2</sub> O													
Unit	tCO <sub>2</sub> /tN <sub>2</sub> O													
Value	298													
Assessment	Derived from relevant decisions by the CMP (2nd Kyoto protocol commitment period)It has been changed from 310 compared to the previous crediting period. The value has been correctly													

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.		
<i>activity</i>  <i>List the parameters and provide an assessment. Consider also PS §233.</i>		<table><tr><td></td><td>updated.</td></tr></table> It should be noted that the previously applied methodology AM0028 has been changed to ACM0019 which provides a different approach of deriving the emission reductions. Hence, new parameters have been introduced while others have been excluded. It is confirmed that the parameters defined ex-ante are correctly applied and derived from the applicable methodology and tools. Please also refer to section 5.7.5 in this report for further information.		updated.		
	updated.					
<b>B.3.3. Step 2: Update of the current baseline and the data and parameters</b>  <i>This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.</i>						

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p><b>B.3.3.1. Step 2.1: Update the current baseline.</b></p> <p>Has the baseline been updated according to the latest approved version of the methodology?</p> <p><i>The procedure shall be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period. .</i></p>	<p>/PDD/ /TVB/</p>	<p><i>Description:</i> No changes other than baseline parameters are deemed required.</p> <p><i>Validator's action:</i> The same has been confirmed from the checklist points B.3.2.1 to B.3.2.4 above.</p> <p><i>Conclusion:</i> The parameters have been updated in line with the applied methodology.</p>	OK	OK
<p><b>B.3.3.2. Step 2.2: Update the data and parameters</b></p> <p>Have all data and parameters that were identified in Step 1.4 above as not valid anymore been updated?</p> <p><i>Guidance in Step 1.4 shall be followed.</i></p>	<p>/PDD/ /XLS/ /IPCC/ /ippc/</p>	<p><i>Description:</i> The parameter updated for the baseline of the 1<sup>st</sup> renewal of crediting period are in accordance to the requirement of the applied methodology ACM0019.</p> <p><i>Validator's action:</i> The PDD and ER calculation sheet have been checked for verification of complete implementation of the updated baseline.</p> <p><i>Conclusion:</i> The updated baseline parameters have fully been implemented. All parameters as determined in the applied methodology ACM0019 are taken into account and correctly applied.</p>	OK	OK



Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<b>B.4. Algorithms and/or formulae used to determine emissions reductions</b>  <i>It is assessed whether the steps taken and the equations and parameters applied in the PDD to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected methodology including applicable tool(s).</i>				
<p>B.4.1. Are the equations applied correctly according to the applied approved methodology? (VVS, version 05.0, § 304 b), 306)</p> <p><i>Describe clearly the steps taken to assess whether the methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. Further take into consideration that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD.</i></p>	<p>/PDD/ /METH-2/</p>	<p><i>Description:</i> Section B.6.1. in the revised PDD includes the formulae as per the applied methodology.</p> <p><i>Validator's action:</i> Section B.6.1. has been compared to the requirements of the methodology.</p> <p><i>Conclusion:</i></p> <p><input type="checkbox"/> The equations are correctly applied according to the approved methodology. The way of calculating the baseline emissions, the project emissions and the emission reductions is transparent and traceable.</p> <p>The following mistakes have been identified in this context:</p> <p>CAR B4: Section B.6.1, Project Emissions: The parameters defined under Equation (5) are wrong (BE vs PE).</p> <p>CAR B5: Section B.6.1, Project Emissions, Footnote 6: The result could not be transparently tracked. Information shall be provided which values have been considered to derive 1.96</p>	<p>CAR B4</p> <p>CAR B5</p> <p>CL B7</p> <p>CL B8</p> <p>CL B9</p>	<p>OK</p>

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		<p>kg/m<sup>3</sup>.</p> <p>CL B7: XLS calculation for Hu Chems II, III, IV: The source of EF<sub>historical,II</sub> (same applies to III, IV) is not clear. The PDD refers to “Historical information from issuance reports of CDM-PDD documents”. Clarification is required and related evidence to justify the historical EFs shall be provided.</p> <p>CL B8: XLS calculation for moisture content: The sources for all input parameters are not provided. Hence, the calculation is not traceable and adequacy could not be assessed.</p> <p>CL B9: XLS input parameter of volumetric flow for HU Chems II, III and IV: The source and way of deriving the above mentioned parameter shall be provided and explained.</p> <p>CAR B10: XLS moisture content for HU Chems II, III and IV: The temperature value in cell C9 is wrong.</p>		
<p>B.4.2. In case the methodology allows for selection between options for equations or parameters it shall be determined whether adequate justification has been determined and correct equations and parameters have been used.</p> <p>(VVS, Version 5.0, §§ 97, 98)</p> <p><i>Assess the correct selection and application of methodological choices. Describe whether proper justification has been provided (based on the choice of the baseline scenario, context of the project activity and</i></p>	/PDD/ /METH-2/	<p><i>Description:</i> The way of calculating the emission reductions in terms of applicable equations and parameters is unambiguously defined by the methodology. No choice of equations or parameters is given.</p> <p>Options for equations have been correctly applied as long as stipulated by the methodology and applicable tools.</p> <p><i>Validator's action:</i> The PDD, the tools and the methodology have been checked to confirm this.</p> <p><i>Conclusion:</i> The way of calculating the ex-ante emission reductions</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<i>other evidence provided) and whether the correct equations and parameters have been used reflecting the relevant methodological choices.</i>		is in line with the methodology.		
<p>B.4.3. Have conservative assumptions been used when calculating the project emissions?</p> <p>(VVS, Version. 5.0, §§ 98)</p> <p><i>Describe clearly the steps taken to assess whether all the assumptions and data used by the PP are listed in the PDD including references and sources and are conservatively interpreted in the PDD.</i></p>	<p>/PDD/ /METH-2/ /XLS/</p>	<p><i>Description:</i> Project emissions from two sources of Hu-Chems II and III plants are identified, firstly from the non-destroyed N<sub>2</sub>O from the project activity and secondly from the operation of the N<sub>2</sub>O destruction facility. For Hu-Chems IV project emissions from the operation of the destruction facility are not applicable as no hydrocarbons are utilized.</p> <p>Project emissions from non-destroyed N<sub>2</sub>O will be measured continuously. Thus no element of conservativeness of assumptions is to be considered.</p> <p>With regards to hydrocarbons the assumption of a full oxidation is made. This constitutes a conservative assumptions. The use of hydrocarbons in plants Hu-Chems II and Hu-Chems III is monitored continuously and accounted for as project emissions as per the "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion" . However, the contribution of this source of the project emissions is small in comparison to the non-destroyed N<sub>2</sub>O.</p> <p><i>Validator's action:</i></p> <p>The validation team has checked all sources of project emissions with regards to assumptions that are included. The PDD and the methodology and the ER calculation sheet have been checked for this purpose.</p> <p><i>Conclusion:</i></p> <p>The main part of the PE is measured. Assumptions are only used</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.																				
		to caluculate project emissions due to hydrocarbons. The assumptions made are conservative.																						
<b>B.5. Monitoring of Emission Reductions</b> <i>It is assessed whether the monitoring plan is appropriate for the project activity and in line with the applied methodology.</i>																								
<b>B.5.1. Monitoring methodology</b> (VVS, Version 5.0, §§ 72 (e), 131, 132 (a) (i)) <i>Assess whether all applicable parameters listed in the methodology applied are included in the monitoring plan.</i> <i>Pl. check further whether the selection of parameters not to be monitored (section B.6.2) is appropriate and in line with the applied methodology.</i> <i>In case of different approaches can be chosen acc. to the methodology assess whether the selection of parameters is justified and correct.</i>	/PDD/ /METH-2/	The validation team has checked the validity of the monitoring parameters defined in the original PDD and confirms the following: <input type="checkbox"/> The monitoring methodology applied for the previous crediting period is still valid and no changes have been carried out. <input checked="" type="checkbox"/> The monitoring section of the revised PDD has been updated in order to be compliant with the monitoring methodology applied.  In this context the following findings have been identified: N/A	OK	OK																				
<b>Only to be assessed if the monitoring sections had to be updated in order to comply with the new methdology applied. Otherwise continue with section C.</b>  <b>B.5.2. Monitoring Parameters</b>	/PDD/ /METH-2/	<table><tr><td>Requirement</td><td>OK</td><td>Not OK</td><td>N/A</td></tr><tr><td>Label</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Data Unit</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Description</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Source of data</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table>	Requirement	OK	Not OK	N/A	Label	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Data Unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Description	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Source of data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OK	OK
Requirement	OK	Not OK	N/A																					
Label	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																					
Data Unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																					
Description	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																					
Source of data	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																					

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>(VVS, Version 5.0, § 132 (a), (ii))</p> <p><i>Indicate whether the provided information for the monitoring parameter complies with the approved methodology including applicable tool(s) in the aspects listed.</i></p> <p><i>For checking the use of international standards in the nomenclature, consider:</i></p> <p><i>a) Standard format (e.g. 1,000 representing one thousand and 1.0 representing one).</i></p> <p><i>b) Values shall be directly given in SI units – or additionally to original units transferred to SI.</i></p> <p><i>c) Short scale naming system: (Only) million = 10<sup>6</sup> and billion 10<sup>9</sup> shall be used.</i></p>		<p>Measurement equipment / measure method <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Monitoring frequency <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>QA/QC procedures <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Purpose of data <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Standard format <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>SI units <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Short scale naming <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>In detail the following issues have been identified: N/A</p>		

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>B.5.3. Are the means of monitoring of all parameters contained in the monitoring plan feasible within the project design?</p> <p>(VVS, Version 5.0, §§ 132 (b) (i), 133(b)) <i>Describe the steps undertaken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the project design.</i></p>	<p>/PDD/ /METH-2/ /IM01/ /RMP/ /VAL-RMP/</p>	<p><i>Description:</i></p> <p>Due to the methodology change several new parameters have been introduced as mentioned in previous sections of the validation report. The means of monitoring of the parameters have been described in PDD section 7.</p> <p><i>Validator's action:</i></p> <p>The validation team has carefully checked the differences in the monitoring plan, esp. with regards to changes from the currently applicable revised and approved monitoring plan. Further to this the situation on-site has been checked with regards to the feasibility of measuring the required parameters.</p> <p><i>Conclusion:</i></p> <p>The monitoring plan within the updated PDD is in full compliance with the monitoring methodology. Changes that are required are assessed to be feasible.</p>	OK	OK
<p>B.5.4. Is it likely that the monitoring arrangements described in the PDD can properly be implemented in the context of the project activity?</p> <p>(VVS, Version 5.0, § 132(b) (i)) <i>Assess whether the described monitoring arrangements are sufficient and realistic to enable a thorough monitoring. Pl. consider also special monitoring conditions, e.g. downtimes of monitoring equipment etc.</i></p>	<p>/PDD/ /METH-2/ /IM01/</p>	<p><i>Description:</i></p> <p>The monitoring arrangements as described in the PDD and checked during the site visit are in line with the methodology.</p> <p><i>Validator's action:</i></p> <p>The monitoring arrangements have been checked during the on-site visit and by means of interview with the plant personnel.</p> <p><i>Conclusion:</i></p> <p>The validation team has checked the monitoring setup in all 3 installations. During interview it was confirmed by the plant</p>	OK	OK

Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
		personnel that monitoring arrangements can be properly implemented. This is confirmed by the validation team.		
<p>B.5.5. Are the QA/QC procedures appropriate sufficient to ensure the emission reductions achieved from the project activity can be reported ex-post and verified?</p> <p>(VVS, Version 5.0, § 132(b) (ii)) Please consider the description given in section B.7.3. Describe which QA/QC provisions are considered. Address Quality Management System provisions, calibration and maintenance of equipment. Address further any review procedures.</p>	/PDD/ /METH-2/	<p><i>Description:</i></p> <p>The QA/QC procedures will not need to be changed significantly from the existing practice. With regards to the inlet volume flow measurement the same QA/QC practice as for the outlet measurement is planned.</p> <p><i>Validator's action:</i></p> <p>The validation team has checked the PDD and the applicable methodology to assess the appropriateness of the QA/QC procedures described in the updated PDD.</p> <p><i>Conclusion:</i></p> <p>All QA/QC procedures have been assessed as appropriate.</p>	OK	OK



Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
<p>B.5.6. Are procedures identified for data management?</p> <p>(VVS, Version 5.0, § 132(b) (ii))</p> <p><i>Check whether appropriate provisions are considered for data management including responsibilities, what records to keep, storage area of records and how to process performance documentation</i></p> <p><i>Check further the data archiving provisions for the project activity and ensure that provisions are made to archive data for the whole crediting period + 2 years.</i></p>	<p>/PDD/ /METH-2/ /IM01/</p>	<p><i>Description:</i></p> <p>The data management will basically not be changed from the existing procedure. For three additional monitoring requirements the existing procedures will be applied mutatis mutandis.</p> <p><i>Validator's action:</i></p> <p>The data management has been checked roughly, esp. with a focus on the changes. The existing data management procedures have been tested in the context of numerous verifications.</p> <p><i>Conclusion:</i></p> <p>On the basis of past experience and the tests carried out on-site the validation team has gained sufficient confidence that the data management procedures implemented are appropriate and effective.</p>	OK	OK
<p><b>C. Duration of the Project/ Crediting Period</b></p> <p><i>It is assessed whether the temporary boundaries of the project are clearly defined.</i></p>				
<p>C.1. What is the current crediting period?</p>	<p>/unfccc/</p>	<p><i>Description:</i> The dates of the first crediting period are 2007-01-22 to 2014-01-21.</p> <p><i>Validator's action:</i> The project specific UNFCCC website has been checked to confirm this.</p> <p><i>Conclusion:</i> The current crediting period has been correctly described in the PDD.</p>	OK	OK


Checklist Item (incl. guidance for the validation team)	Ref.	Validation Team Comments (justification and substantiation of information, data and evidence)	Draft Concl.	Final Concl.
C.2. Has the PP informed the CDM Secretariat about the intention to request renewal of crediting period 180 days prior to expiration of the current crediting period? Has an updated PDD been submitted? (PCP v. 5 § 248)	/MAIL1/ /MAIL2/	<p><i>Description:</i> The UNFCCC has sent an e-mail to PP on 2013-04-22 requesting whether PP wants to renew the CP. The PP forwarded an e-mail to the CDM Secretariat on 2013-04-26 indicating the intention to renew the crediting period and the assignment of the DOE.</p> <p>The CDM Secretariat confirmed the receipt of this notification on 2013-04-29.</p> <p><i>Validator's action:</i> The e-mail communication has been checked by the validation team.</p> <p><i>Conclusion:</i> The CDM Secretariat has been informed about the intention of renewal crediting period and UNFCCC has confirmed the receipt of the same. Therefore this point is considered met.</p>	OK	OK
C.3. Is the start and end date of the renewed crediting period clearly defined and reasonable?  <i>Check whether the envisaged starting date of the crediting period is realistic, taking into account the end date of the last crediting period.</i>	/PDD/	<p><i>Description:</i> The start date of the second crediting period is 2014-01-22 as defined in section C.2.2. in the revised PDD. The second crediting period is 7 years. Hence, the end date of the second crediting period is 2021-01-21.</p> <p><i>Validator's action:</i> The PDD has been checked.</p> <p><i>Conclusion:</i> The start and end dates of the second crediting period are clearly defined and realistic w.r.t. the dates of the first crediting period. The second crediting period starts immediately after the end of the first period. End of first crediting period 2014-01-21 and start of second crediting period 2014-01-22.</p>	OK	OK

## ANNEX 2: ASSESSMENT OF APPLICABILITY CRITERIA

Applicability Criteria	Evidence used	Draft Conclusion	Final Conclusion			Assessment of validation team (results and means of assessment)
			met	not met	N/A	
<b>#1:</b> This methodology (ACM0019) applies to project activities that introduce N <sub>2</sub> O abatement measures in nitric acid plants.	/PDD-REG/ /VAL/ /IM01/	met	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	During the site visit it could be confirmed that this criterion is met. Further the registered PDD as well as the validation report have been checked to confirm this.
<b>#2:</b> In the case that the nitric acid plant started commercial operation before the implementation of the CDM project activity, the project participants shall demonstrate that there was no secondary or tertiary N <sub>2</sub> O abatement technology installed in the respective nitric acid plant;	/VAL/ /PID/ /IM01/	CL B1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	By means of checking the validation report of the 1st crediting period, original PIDs and interview with the Project Owner, the validation team could confirm that the criterion is met.
<b>#3:</b> Continuous real-time measurements of the N <sub>2</sub> O concentration and the total gas volume flow can be carried out in the tail gas stream after the abatement of N <sub>2</sub> O emissions throughout the crediting period of the project activity;	/PDD-REG/ /VAL/ /IM01/	met	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	During the site visit, conducted interviews and document check it could be confirmed that appropriate measurement devices are installed at the tail gas stream. Technical adoptions in order to reflect requirements of ACM0019 (Version 2) are possible.

<p><b>#4:</b>                  No law or regulation which mandates the complete or partial destruction of N<sub>2</sub>O from nitric acid plants exists in the host country where the CDM project activity is implemented.</p>	<p>/IM01/                  /CACA/                  /TMS/</p>	<p>CL                  B11</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Interview with the project owner was conducted to confirm that no regulations exist, which would mandate the complete or partial destruction of N<sub>2</sub>O from nitric acid plants in the host country. This was further checked with existent corresponding regulations like the Clean Air Conservation Act and the Legislation about Assignment and Trading of GHG Emission.</p>
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## ANNEX 3: STATEMENTS OF COMPETENCE OF TEAM MEMBERS



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM Certification Program


**Mr. Paul Kim**

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
-	Host Country Expert South Korea	n/a

340 - Rev. 0, Date: 2013-04-02

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**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM Certification Program

**Mr. Rainer Winter**


SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2013-07-03
J1	Senior Assessor Technical Reviewer	2013-07-03
VCS	Senior Assessor Technical Reviewer	2013-07-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal Energy Generation	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
4.1	Cement Sector	
4.3	Iron and Steel	
4.5	Waste Heat Recovery	
5.1	Chemical Process Industries	
9.1	Metal Production	
11.1	Chemical Process Industries	
11.2	GHG Capture and Destruction	
12.1	Chemical Process Industries	
13.1	Waste Handling and Disposal	13.1.1 Waste Management

003 - Rev. 5, Date: 2011-08-01

003\_S01-F03\_2011-08-01\_rev5      S01-F03 rev0 / 2010-04-19



**Statement of Competence**  
Appointment and authorization according to the procedures of the TUV NORD J/CDM Certification Program

**Mr. Stefan Winter**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2014-06-30
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2014-06-30

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal energy generation	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
1.2	Renewable Energy	
2.2	Heat distribution	
3.1	Energy demand	
13.1	Waste handling and disposal	13.1.1 Waste management 13.1.2 Waste water management
13.2	Animal waste management	
15.2	Animal waste management	

163 - Rev. 2, Date: 2011-08-10

163\_S01-F03\_2011-08-10\_rev2      S01-F03 rev1 / 2011-08-02



**Statement of Competence**  
Appointment and authorization according to the procedures  
of the TUV NORD JICDM Certification Program

**Mr. Martin Saalmann**

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification) Technical Reviewer	2015-05-15
Jl	Senior Assessor Technical Reviewer	2015-05-15
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2015-05-15

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable energies	1.2.4 Solar
13.1	Waste management and disposal	13.1.1 Waste management 13.1.2 Waste water management

022 – Rev. 4, Date: 2012-05-16

022-001-F003\_2012-05-16\_rev4.doc

001-F003 rev2 / 2012-04-05



**Statement of Competence**  
Appointment and authorization according to the procedures  
of the TUV NORD JICDM Certification Program

**Mr. Dirk Speyer**

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification) Technical Reviewer	2015-07-10
VCS / ISO 14064-2	Lead Assessor Technical Reviewer	2015-07-10

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
4.4	Refinery
5.1	Chemical Process Industries
11.1	Chemical Process Industries
11.2	GHG Capture and Destruction
12.1	Chemical Process Industries

244 – Rev. 4, Date: 2012-07-11

244\_001-F003\_2012-07-11\_rev4.doc

001-F003 rev2 / 2012-04-05