



VERIFICATION AND CERTIFICATION REPORT

- 3RD PERIODIC –

RASHTRIYA CHEMICALS & FERTILIZERS
LIMITED

N₂O ABATEMENT IN HP NITRIC ACID PLANTS AT RASHTRIYA
CHEMICALS & FERTILIZERS LIMITED, INDIA

UNFCCC REF. No. : 2792

Monitoring Period: 2010-07-08 to 2010-12-04
(incl. both days)

Report No: 8106754168 – 11-094

Date: 2014-12-09

TÜV NORD CERT GmbH
JI/CDM Certification Program
Langemarckstraße, 20
45141 Essen, Germany
Phone: +49-201-825-3335
Fax: +49-201-825-2139
www.tuev-nord.de
www.global-warming.de

Verification Report:	Report No.	Rev. No.	Date of 1st issue:	Date of this rev.
	8106754168 – 11-094	0	2014-12-09	2014-12-09
Project:	Title:	Registration date:	UNFCCC-No.:	
	N ₂ O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India	2009-11-20	2792	
	Crediting period:	From:	To:	
	<input checked="" type="checkbox"/> Renewable (7y) <input type="checkbox"/> Fixed (10y)	2009-11-20	2016-11-19	
	Project Scale:			
	<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale			
Project Participant(s):	Client:			
	Rashtriya Chemicals & Fertilizers Limited			
	Non Annex 1 country:	Annex 1 country:		
	India	Switzerland		
	PP from non Annex 1 country:	PP from Annex 1 country:		
	Rashtriya Chemicals & Fertilizers Limited	Rashtriya Chemicals & Fertilizers Limited		
Applied methodology/ies:	Title:	No.:	Scope(s) / TA(s)	
	Catalytic reduction of N ₂ O inside the ammonia burner of nitric acid plants	AM0034, Version 3.2	05/5.1	
Monitoring period and monitoring report	Monitoring period (MP):		Monitoring Report:	
	From:	To:	No. of days:	Draft version:
	2010-07-08	2010-12-04	150	Version 1: dated 2010-09-28
				Version 5; 2014-09-10
Verification team / Technical Review and Final Approval:	Verification Team:		Technical review:	Final approval:
	Mr. Pankaj Patel (TL) ¹ Mr. Sanjay Dholakia (TM/TE) Mr. Indrapal Parmar (TM)		Mr. Dirk Speyer	Mr. Martin Saalman
Key dates of verification:	Publication of MR :	DVerR issued:	On-site (from):	On-site (to):
	2011-03-07	2012-04-18	2012-04-17	2012-04-17
Summary of Verification opinion	<p>Rashtriya Chemicals & Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 3rd periodic verification of the project: "N₂O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India", with regard to the relevant requirements for CDM project activities.</p> <p>As a result of this verification, the verifier confirms that:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> all operations of the project are implemented and installed as planned and described in the validated project design document, <input checked="" type="checkbox"/> the monitoring plan is in accordance with the applied approved CDM methodology, <input checked="" type="checkbox"/> the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately, <input checked="" type="checkbox"/> the monitoring system is in place and functional. The project has generated GHG emission reductions, and <input checked="" type="checkbox"/> the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. 			

¹ Mr. Jimmy Sah (Team Leader till 13/12/2013) left the TÜV India on 13/12/2013. Mr. Pankaj Patel was new team leader after 13/12/2013 onwards.



	TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as listed below (verified amount).		
Emission reductions: [t CO _{2e}]	Total verified amount	As per draft MR:	As per PDD:
	135,013	136,762	183,824 (447,305 tCO ₂ /annum)
		ER achieved up to 2012-12-31	ER achieved from 2013-01-01
		135,013	NA
Document information:	Filename:		No. of pages:
	2014-12-09 FVR RCF HP 11-094 3rd CDM VER_sa		110

Abbreviations:

AFR	Ammonia Gas Flow Rate to AOR
AIFR	Ammonia to Air Ratio
AOR	Ammonia Oxidation Reactor
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CEM	Continuous Emission Monitoring
CO₂	Carbon dioxide
CO_{2eq}	Carbon dioxide equivalent
CL	Clarification Request
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MP	Monitoring Plan
MR	Monitoring Report
NAP	Nitric Acid Production
NH₃	Ammonia
N₂O	Nitrous Oxide
OH	Operating Hours
OP	Operating Pressure
OT	Operating Temperature
PDD	Project Design Document
PP	Project Participant
RCF	Rashtriya Chemicals & Fertilizers Limited
TSG	Temperature of Stack Gas
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VSG	Volume flow rate of the Stack Gas
XLS	Emission Reduction Calculation Spread Sheet

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1. INTRODUCTION

Rashtriya Chemicals & Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 3rd periodic verification of the project

“N₂O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India”

with regard to the relevant requirements for CDM project activities. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered CDM project.

GHG data for the monitoring period was verified in detailed manner applying the set of requirements, audit practices and principles as required under the Validation and Verification Standard ^{/VVS/} of the UNFCCC.

This report summarizes the findings and conclusions of this 3rd periodic verification of the above mentioned UNFCCC registered project activity.

1.1. Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions. It includes the verification of the:

- implementation and operation of the project activity as given in the PDD,
- compliance with applied approved methodology and the provisions of the monitoring plan,
- data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,
- accuracy of the monitoring equipment,
- quality of evidence,
- significance of reporting risks and risks of material misstatements.

1.2. Scope

The verification of this registered project is based on the validated project design document ^{/PDD/}, the monitoring report ^{/MR/}, emission reduction calculation spreadsheet ^{/XLS/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- Article 12 of the Kyoto Protocol ^{/KP/},



-
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1 ^{/MA/}, and subsequent decisions made by the Executive Board and COP/MOP,
 - other relevant rules, including the host country legislation,
 - CDM Validation and Verification Standard ^{/VVS/},
 - monitoring plan as given in the registered PDD ^{/PDD/},
 - Approved CDM Methodology.

2. GHG PROJECT DESCRIPTION

2.1. Technical Project Description

The project activity entails installation of a secondary catalyst in the ammonia reactor at the High Pressure unit of nitric acid production unit of Rashtriya Chemicals and Fertilizers (RCF) plant.

Nitric Acid (HNO₃) is produced through the oxidation of ammonia (NH₃) on precious metal catalyst gauze in the ammonia burner of a nitric acid plant. Nitrous Oxide (N₂O) is an undesirable by-product gas produced in the manufacture of nitric acid. Waste N₂O from nitric acid production is typically released into the atmosphere as it does not have any economic value at emission levels typical of nitric acid manufacture. RCF uses secondary catalyst in the ammonia burner of nitric acid unit after primary catalyst; this leads to conversion of N₂O to N₂ before its release into the atmosphere. Thus leading to reduction in emission of the N₂O a potent GHG in to the atmosphere

The key parameters monitored for the project are given in table section 4 of table 2. Annex 1

The key parameters of the project are given in Table 2-1:

Table 2-1: Technical data of the project activity

Parameter	Unit	Value	
		Historical as in PDD	Design Value
Capacity of the plant	TPA	128,480	128,480
Operating temperature	°C	863 – 900	860 – 930
Operating Pressure	barg	6.60 – 6.26	7.65
Max Ammonia Flow	kg/h	5113	6076
Max. Ammonia to Air Ratio	-	11.9	11.5
Operating hours	hrs	2861	-

2.2. Project Location

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

Table 2-2: Project Location

No.	Project Location
Host Country	India
Region:	Mumbai
Project location address:	“Priyadarshini” Building Eastern Express Highway Sion.
Latitude:	18° 56' 33" N
Longitude:	72° 50' 9" E

2.3. Project Verification History

Essential events since the registration of the project are presented in the following Table 2-3.

Table 2-3: Status of previous Monitoring Periods

#	Item	Time	Status
1	Date of registration	2009-11-20	-
2	Start of crediting period	2009-11-20	Registered
3	1 st Monitoring period	2009-11-20 to 2010-02-12	Issued
4	Request for deviation from the monitoring plan	2011-11-08	Approved
5	Request for approval of changes to the CDM project activity for permanent change in Monitoring plan	2012-11-15	Approved
6	2 nd Monitoring period	2010-02-13 to 2010-07-07	Issued
6	3 rd Monitoring period	2010-07-08 to 2010-12-04	Ongoing

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

Table 2-3: Overview Post Registration Changes

#	Applicable from – to / as of	MP	Type of post registration change ¹⁾	Description	Status ²⁾ / Date
1	2009-11-20 to 2010-07-07	01, 02	TDfrMP	Request for deviation from the monitoring plan	Approved / 2011-11-08
2	20xx-xx-xx to 20xx-xx-xx	NA	TDfMM	NA	
3	20xx-xx-xx	NA	CrPDD	NA	
4	2010-07-08 onwards	3 rd onwards	PCfrMP	Request for approval of changes to the CDM project activity for permanent change in Monitoring plan	Approved/ 2012-11-15
5	20xx-xx-xx		PCfMM	NA	
6	20xx-xx-xx	NA	CoPD	NA	

- ¹⁾ 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
- ²⁾ Approval (by EB) or Acceptance (by DOE)

3. METHODOLOGY AND VERIFICATION SEQUENCE

3.1. Verification Steps

The verification consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the monitoring report
- A desk review of the Monitoring Report^{/MR/} submitted by the client and additional supporting documents with the use of customised verification protocol^{/CPM/} according to the Validation and Verification Standard^{/VVS/},
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions (if any)
- Final verification reporting
- Technical review
- Final approval of the verification.

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 verification 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 verification team, consisting of one team leader and 3 additional team members, was appointed.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the Table 3-1 below.

Table 3-1: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Pankaj Patel	TUV India Pvt. Ltd.	TM ^{A)}	LA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Jimmy Sah ²	TUV India Pvt. Ltd.	TM ^{A)}	LA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Indrapal Parmar	TUV India Pvt. Ltd.	TM ^{A)}	A	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sanjay Dholakia	TUV India Pvt. Ltd.	TM ^{A)}	LA	<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.	Dirk Speyer	TN CERT	TR ^{B)}	SA	<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.	Martin Winter	TN CERT	FA ^{B)}	SA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

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

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

^{A)} Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

^{B)} No team member

All team members contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Technical experts contributed to the assessment of special aspects of the project activity, e.g. technical or host country aspects.

In order to qualify further personnel the project team was accompanied by observers and/or trainees as indicated in the table above. They are usually not considered as team members.

² Jimmy Sah (TL) left the TUV India on 13/12/2013.

Statements of competence for the above mentioned team members are enclosed in annex 2 of this report.

3.4. Publication of the Monitoring Report

In accordance with the CDM M&P (§ 62) the draft monitoring report, as received from the project participants, has been made publicly available on the dedicated UNFCCC CDM website prior to the verification activity commenced. Comments received are taken into account in the course of the verification, if applicable.

3.5. Verification Planning

In order to ensure a complete, transparent and timely execution of the verification task the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

Risk analysis and detailed audit testing planning

For the identification of potential reporting risks and the necessary detailed audit testing procedures for residual risk areas table A-1 is used. The structure and content of this table is given in Table 3-2 below.

Table 3-2: Table A-1; Identification of verification risk areas

Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing				
Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
<i>The following potential risks were identified and divided and structured according to the possible areas of occurrence.</i>	<i>The potential risks of raw data generation have been identified in the course of the monitoring system implementation. The following measures were taken in order to minimize the corresponding risks.</i> <i>The following measures are</i>	<i>Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.</i>	<i>The additional verification testing performed is described. Testing may include:</i> - Sample cross checking of manual transfers of data - Recalculation - Spreadsheet 'walk throughs' to check links and equations - Inspection of calibration and maintenance	<i>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.</i>

Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
	<i>implemented:</i>		<i>records for key equipment</i> <i>- Check sampling analysis results</i> <i>Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</i>	

The completed table A-1 is enclosed in Annex 1 (table A-1) to this report.

Project specific periodic verification checklist

In order to ensure transparency and consideration of all relevant assessment criteria, a project specific verification protocol has been developed. The protocol shows, in a transparent manner, criteria and requirements, means and results of the verification. The verification protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet for verification
- It ensures a transparent verification process where the verifying DOE documents how a particular requirement has been proved and the result of the verification.

The basic structure of this project specific verification protocol for the periodic verification is described in Table 3-3.

Table 3-3: Table A-2; Structure of the project specific periodic verification checklist

Table A-2: Periodic verification checklist				
Checklist Item	Reference	Verification Team Comments	Draft Conclusion	Final Conclusion
<i>The checklist items in Table A-2 are linked to the various requirements the monitoring of the project should meet. The checklist is organised in various sections as per the requirements of the topic and the individual project activity. It further includes guidance for the verification team.</i>	<i>Gives reference to the information source on which the assessment is based on.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the verification 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 verification stage.</i>	<i>In case of a corrective action or a clarification the final assessment at the final verification stage is given.</i>

The periodic verification checklist (verification protocol) is the backbone of the complete verification starting from the desk review until final assessment. Detailed assessments and findings are discussed within this checklist and not necessarily repeated in the main text of this report.

The completed verification protocol is enclosed in Annex 1 (table A-2) to this report.

3.6. Desk review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

- the last revision of the PDD including the monitoring plan^{/PDD/},
- the last revision of the validation report^{/VAL/},
- documentation of previous verifications^{/VER/}
- the monitoring report, including the claimed emission reductions for the project^{/MR/},
- the emission reduction calculation spreadsheet^{/XLS/}.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.

3.7. On-site assessment

As most essential part of the verification exercise it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:

- The monitoring data were checked completely.
- An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised PDD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.
-

Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of Rashtriya Chemicals & Fertilizers Limited including the operational staff of the plant were interviewed. The main topics of the interviews are summarised in Table 3-4.

Table 3-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel 2. List of personnel interviewed is described under section 7.4	<ul style="list-style-type: none"> - General aspects of the project - Technical equipment and operation - Changes since validation / previous verification - Monitoring and measurement equipment - Remaining issues from validation/ previous verification - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan

Interviewed Persons / Entities	Interview topics
	<ul style="list-style-type: none">- Monitoring data management- Data uncertainty and residual risks- GHG emission reduction calculation- Procedural aspects of the verification- Maintenance- Environmental aspects

The list of interviewees is included in chapter 7.4.

3.8. Draft verification reporting

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification protocol is completed. This protocol together with a general project and procedural description of the verification and a detailed list of the verification findings form the draft verification report. This report is sent to the client for resolution of raised CARs, CLs and FARs.

3.9. Resolution of CARs, CLs and FARs

Nonconformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation or previous verifications requiring actions by the project participants to be verified during verification have not been resolved.

The verification team uses the term Clarification Request (CL), which is issued if:

- information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- the monitoring and reporting require attention and / or adjustment for the next verification period.

For a detailed list of all CARs, CLs and FARs raised in the course of the verification pl. refer to chapter 4.

3.10. Final reporting

Upon successful closure of all raised CARs and CLs the final verification report including a positive verification opinion can be issued. In case not all essential issues could finally be resolved, a final report including a negative verification opinion is issued.

The final report summarizes the final assessments w.r.t. all applicable criteria.

3.11. Technical review

Before submission of the final verification report a technical review of the whole verification 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 verification team and thus not involved in the decision making process up to the technical review.

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

3.12. Final approval

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

After this step the request for issuance can be started.

4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report^{/MR/}, the calculation spreadsheet^{/XLS/}, PDD^{/PDD/}, the Validation Report^{/VAL/} and other supporting documents, as well as from the on-site assessment and the interviews are summarised.

The summary of CAR, CL and FAR issued are shown in Table 4-1:

Table 4-1: Summary of CAR, CL and FAR

Verification topic	No. of CAR	No. of CL	No. of FAR
A – Description of project activity	03	0	0
B – Implementation of project activity	02	0	0
C – Description of monitoring system	02	0	0
D – Data and parameters	05	0	0
E - Calculation of Emission Reductions	03	0	0
SUM	15	0	0

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

Table 4-2: MR versions used for assessments

Version Nr.	Assessment Round
MR version 1 (Published)	Initial finding raised
MR version 2	DOE Assessment #1
MR version 3	DOE Assessment #2
MR version 4	Final MR

Finding:	A1
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unam-</i>	The following editorial mistakes have been observed;

Finding:	A1
<i>biguous style; address the context (e.g. section)</i>	<ul style="list-style-type: none"> The first page of MR is not consistent with the template. The emission reduction calculation sheet uses various colors to indicate scenarios however color index has not been provided for reference. All the numbers and the values in the MR are not in international standard.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<ul style="list-style-type: none"> The Monitoring report is now being submitted as per the new format, hence this point is not applicable under present circumstances. The emission reduction calculation sheet has been modified. Colour index is included in the 'Index' (first) sheet of the Emission Reduction calculation spread-sheet. All numbers and values in the Monitoring Report are written as per international standard (comma after every 3 digits).
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The MR is revised accordingly to rectify the editorial mistakes including the use of intern. standards for figures and values. Furthermore in the emission reduction calculation sheet supplement information related indicated scenarios has been explained. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	A2
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The annex 1 party is not consistent with the information mentioned on the project page for the project. Appropriate correction is required.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	This point has been addressed in the Monitoring Report (New Format). Kindly refer page number 3, Section-A-3 of the new MR.
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised MR has been checked and the corrections are appropriate. The authorized participants from Annex 1 (Switzerland) is Rashtriya Chemicals & Fertilizers Ltd. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	A3
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Finding:	A3		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the course of Verification progress, the MR template is no longer valid. Thus appropriate corrections are required.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The revised MR version 04, follows the VVS template and the same is the latest available.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The MR version 4 confirms to the latest template 4.0 available and confirms to VVS requirement. CAR is closed.		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding:	B1		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	As per EB 54 annex 34 the following information are missing; <ul style="list-style-type: none"> The relevant dates for operation, commissioning etc. are missing under Section A.1 of the MR. The details for shut down have been provided under Appendix II, however the reasons for the same are not provided. Process diagram as per section A.4 has not been provided. The details of the span gas used have not been described. The calibration procedure as per Appendix IV is not clear. 		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Above points have been addressed in the new MR as detailed below: <ul style="list-style-type: none"> The relevant dates for operation, commissioning etc. are included under Section A.1 on page no. 2 of the new MR. Appendix II, on page no 31 of new MR indicates duration and the reasons for the shutdown. Process diagram is incorporated on page no. 9 under section A.4 of new MR. The details of the span gas are described on page no. 7 of new MR. The calibration procedure which was part of old MR has been deleted and it is not part of new MR. 		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure,</i>	The MR is revised to consider the above points as follows; <ul style="list-style-type: none"> The relevant dates for operation, commissioning etc. are 		

Finding:	B1
additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	<p>included under Section A.1 on page no. 2 of the new MR.</p> <ul style="list-style-type: none"> Appendix II, on page no 31 of new MR indicates duration and the reasons for the shutdown. Process diagram is incorporated on page no. 9 under section A.4 of new MR. The details of the span gas are described on page no. 7 of new MR. The calibration procedure is revised. <p>The verifier concludes that the reported information has been checked and is according the situation observed during the audit. Therefore CAR is closed.</p>
Conclusion Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	B2
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding Describe the finding in unambiguous style; address the context (e.g. section)	The monitoring frequency for CEM system is observed to be every second; however the MR is inconsistent in this regard. Appropriate correction is required.
Corrective Action #1 This section shall be filled by the PP. It shall address the corrective action taken in details.	The monitoring frequency for CEM system is corrected to every second in new MR. Kindly refer page no 17, 18, 20 & 21 in new MR.
DOE Assessment #1 The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	The MR is revised to mention the monitoring frequency for CEM system to be every second. This frequency has been confirmed during the side visit. CAR is closed.
Conclusion Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	C1
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding Describe the finding in unambiguous style; address the context (e.g. section)	The review of the calibration details indicate that accuracy of the master calibrator/instruments is lower than the accuracy for the instrument being calibrated, thus the appropriateness of the calibration process is questionable. Further the implications of this fact need to be evaluated considering the requirements under EB 52 annex 60.
Corrective Action #1 This section shall be filled by the PP. It shall address the cor-	RCF has purchased new master instruments with accuracies better than the instruments which are calibrated with these master

Finding:	C1															
<i>corrective action taken in details.</i>	instruments.															
	The accuracies of the new Master Calibrators (Instruments) are as follows:															
	<table><tr><th>Sr. No.</th><th>Details of master instruments</th><th>Accuracy</th></tr><tr><td>01</td><td>FLUKE 6.5 DIGIT PRECISION MULTIMETER MODEL- 8846A, 240V</td><td>0.0024%</td></tr><tr><td>02</td><td>RTD CALIBRATOR FLUKE 712</td><td>0.025%</td></tr><tr><td>03</td><td>THERMOCOUPLE CALIBRATOR FLUKE 714</td><td>0.015%</td></tr><tr><td>04</td><td>PRESURE CALIBRATOR FLUKE-717 300G</td><td>0.015%</td></tr></table>	Sr. No.	Details of master instruments	Accuracy	01	FLUKE 6.5 DIGIT PRECISION MULTIMETER MODEL- 8846A, 240V	0.0024%	02	RTD CALIBRATOR FLUKE 712	0.025%	03	THERMOCOUPLE CALIBRATOR FLUKE 714	0.015%	04	PRESURE CALIBRATOR FLUKE-717 300G	0.015%
	Sr. No.	Details of master instruments	Accuracy													
	01	FLUKE 6.5 DIGIT PRECISION MULTIMETER MODEL- 8846A, 240V	0.0024%													
02	RTD CALIBRATOR FLUKE 712	0.025%														
03	THERMOCOUPLE CALIBRATOR FLUKE 714	0.015%														
04	PRESURE CALIBRATOR FLUKE-717 300G	0.015%														
In line with Audit observations related to Master instrument accuracies during subsequent Verification audit, CER calculations have been done considering extreme negative error in all the measuring instrument accuracies which is a conservative measure.																
Compliance with EB-70 Annex 03 para 238 (a) due to delay in calibration of stack pressure transmitter is also addressed in above considerations.																
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The revised MR provides the details for the calibration covering the entire monitoring period.</p> <p>The accuracies of the new master equipment are better than the equipment being calibrated.</p> <p>However for the current monitoring period the inaccuracies for each instrument listed above have been considered and a combined inaccuracy for the parameter has been established. The theoretical maximum error possible has been applied considering the error of the master calibrator and each equipment. Further in case multiple equipment applicable for a parameter the combine inaccuracy of the instruments has been applied. The combined inaccuracy for the parameter has been established on basis as the root of sum of squares of inaccuracies for each parameter.</p> <p>It was observed that the parameters under question do not have any direct impact on the emission reductions. However, and indirect marginal impact is recorded due to change in the range of values affected. In line with the conservative approach the combined negative error for each of the parameter has been established and applied. This leads to a reduction of CERs. The approach takes into account the maximum error possible, thus is assessed to be conservative and appropriate.</p> <p>Moreover, the calibrations with the new master equipments were conducted and no errors have been reported, However, the emission reductions have been calculated after application of maximum error for the parameters in question. The same is</p>															

Finding:	C1
	assessed to be in-line with the procedures as per VVS version 7.0. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	C2
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The MR does not provide procedures for data archiving. Appropriate corrections are required.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The procedures for data archiving is now described on page number-6 of new MR, under "Data collection and record keeping".
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised MR no provides the data archiving details. The situation descript has been observed during the audit. Therefore CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	D1
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>During the data review for NCSG following discrepancies have been observed;</p> <p>The period for November 2010 the values for NCSG have shown a distinctive increase compared to average value of NCSG. Justification for the same shall be provided.</p> <p>Further the values for NCSG for the dates of 19/11/2010 and 23/11/2010 were abnormally low, the reason for the same shall be provided.</p>
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	NCSG values for 19/11/2010 from 13 hr to 16 hr and for 23/11/2010 from 11 hr to 17 hr were low, due to chocking of filter in sample inlet line for N2O CEM system. On both the occasions, sample filter was replaced. For both the above referred occasions, emergency preparedness procedure has been applied wherein maximum NCSG value during the campaign period is substituted for the

Finding:	D1
	measured value. This is a conservative approach.
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The justification of low NCSG values are acceptable and has been confirmed based on the log sheet for replacement of sample filter. The verifier concludes, that the related data has been substituted with the maximum NCSG value measured during this monitoring period (2031.01 mg N2O/Nm3). This approach leads to lower ER. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	D2
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The valid data for NCSG and VSG is not traceable in the emission reduction sheet as the sorting for parameter of NCSG and VSG has been clubbed together. Appropriate corrections are required.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The CER calculation spread-sheet is corrected and sorting of VSG and NCSG values are now done in separate sheets. The valid data for NCSG and VSG is now traceable in CER calculation spread-sheet.
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The data sorting is now appropriate and a separate sheet is not available individually for each parameter. The Verification team checked the results of the data processing and confirms that the approach is correct. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	D3
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In the Annual Surveillance Test (AST) report for 2011, SGS recommended that measuring inaccuracy constants for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system. In this regard the conservativeness in the emission reduction calculation shall be demonstrated.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	During AST 2011, SGS has recommended that measuring inaccuracy constant for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system. Accordingly, to comply with the recommendation of SGS, all NCSG readings during the monitoring period are added with 62 and further used for CER calculation.
DOE Assessment #1	The recommendations during the Annual Surveillance Test

Finding:	D3
<i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	conducted in March 2011 by SGS, includes a change in the equation for NCSG. The verifier confirms that the revised constants have been correctly applied for emission reduction calculation leading to correct values. The emission reduction calculation has been checked to confirm the same. The same approach has also been followed in the 2 nd verification activity and is acceptable. CAR has been closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:	D4
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the data review it has been observed that during shut downs and start ups, the value for OH is zero however production has been recorded and vice-versa. However the details and conservativeness shall be demonstrated for the considering OH as zero during the period.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>Immediately after the start-up, plant operation is stabilized at well above 10% of the plant capacity. That is to say, plant operation is stabilized at well above $\{10\% * 352 \text{ (Plant capacity in MTPD)} / 24 = 1.467 \text{ MT / Hr}\}$.</p> <p>To be conservative, 10% of plant capacity i.e. 1.467 MT/Hr is considered to be cut-off value for deciding on Operating Hour value.</p> <p>Hence wherever hourly production is 1.467 MT/Hr and more and operating hour value is indicated as zero, in such case, as a conservative approach, operating hour value of 3600 seconds is entered manually in the Operating Hour column. Wherever hourly production is less than 1.467 MT/Hr and operating hour value is indicated as zero, in such case, operating hour value is considered to be zero as reported by the CEM system.</p> <p>CER calculation spread sheet is modified accordingly. This is a conservative approach.</p>
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The above justification for the approach for considering the OH is acceptable and conservative. Furthermore if the plant operation is less than 30 min during any particular hour, the value for that period would not be considered. The verifier concludes that the approach used is according the methodology and PDD, the CAR has been closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding:		D5		
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR			
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the review of the equipments disparity in the serial numbers were observed for the parameters of; AFR, OP and Air flow measuring instruments. Appropriate corrections are required.			
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Serial number of AFR, OP and Air flow measuring instruments are corrected.			
	Parameter	Serial no. as per old MR	Serial no. (Corrected) in new MR	
	AFR	S198744	S0198744	
S198745		S0198745		
S198746		S0198746		
	OP	1209936	01209936	
1209934		01209934		
1209937		01209937		
	Air flow measuring instruments	S198740	S0198740	
S198741		S0198741		
S198742		S0198742		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The serial numbers now provided were confirmed during the site visit and are appropriate. CAR is closed.			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed			

Finding:		E1		
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR			
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The MR does not provide the calculation procedure for emission reduction calculations. Appropriate corrections are required.			
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The calculation procedure for emission reduction calculations is provided in new Monitoring Report. Kindly refer page no. 27, Section E-2 of new MR.			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The emission reduction calculation procedure is now described in the MR. The verifier concludes reported procedures and results are correct. CAR is closed.			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed			



Finding:		E2		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR	
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The emission reduction calculation sheet incorporates circular reference, further the final value of emission reduction shall be a rounded down to ensure conservativeness. Appropriate corrections are required.			
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	In revised emission reduction calculation sheet, circular reference has been removed and the final value of emission reduction is rounded down to ensure conservativeness.			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The circular reference is removed, further the final value of Emission reduction has been rounded down. The same is acceptable. The verifier concludes that the emission reduction calculation sheet is correct. CAR is closed.			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed			

Finding:		E3		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR	
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The moving average emission factor calculation takes into account the emission factor for project campaign 1 however the same is not in line with the AM_CLA_204. Appropriate corrections are required.			
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	As per Recommendation by the Meth Panel (Date of Meth Panel meeting: 7-11 March 2011) on request for clarification (AM_CLA_0204) on Approved Methodologies (reference 'F-CDM-AM-Clar_Resp_ver 01.1 '). For the calculation of the moving average emission factor $EF_{ma,n}$, the emission factor of the first campaign shall be excluded if it is partially outside the crediting periods. Hence the CER calculations are performed in line with above recommendation from Meth panel.			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The moving average emission factor calculation has been revised to consider the emission factor from the second campaign. The same is in line with the clarification. CAR is closed.			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed			

5. SUMMARY OF VERIFICATION ASSESSMENTS

The following paragraphs include the summary of the final verification assessments after all CARs and CRs are closed out. For details of the assessments pl. refer to the discussion of the verification findings in chapter 4 and the verification protocol (Annex 1).

5.1. Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity.

Table 5-1: Project Parties and project participants

Characteristic	Party	Project Participant
Non-Annex 1	India	Rashtriya Chemicals & Fertilizers Limited
Annex 1	Switzerland	Rashtriya Chemicals & Fertilizers Limited

5.2. Implementation of the project

The DeN₂O catalyst at RCF HP nitric acid production plant was commissioned on 31/03/2009. The total capacity of the nitric acid plant is 352 tHNO₃/Day (100%). During the verification a site visit was carried out to confirm the physical installation at the site. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the registered PDD.

No changes in project equipment/meters have been observed for the current monitoring period.

Further there have been cases of downtimes for the CEM system as well as for the plant operation during the current monitoring period. The CEM system was down for a period of total 13 hours in which 709 hours were due to plant shut down, 466 hours the plant was kept under shut down due to high stock of the product. The reasons for the shutdown have been detailed under section Appendix II and the data during the shutdown period has not been considered for further analysis.

5.3. Project history

As per this section, verification team has performed the detailed study of project activity by means of site visit investigation, interviews, document review, data

analysis etc. In accordance with EB 48, Annex 66 & 67 and Para 226 of VVM version 2, the verification team has confirmed during the site visit that the operational equipment (physical installations) of the project activity are consistent with the registered PDD. There were no changes observed from the project activity as described in the registered PDD. However, a request for Deviation for the monitoring of Operating Hour has been submitted and same was accepted by CDM-EB on 08/11/2011 (<http://cdm.unfccc.int/Projects/deviations/38618>).

Further a Request for revision in Monitoring plan in accordance with the guidance from CDM EB under the Approval for Deviation has been submitted and approved by CDM EB on 15th November 2012. The revised monitoring plan is available on the project page (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1248695616.14/view>).

Furthermore as this is the 3rd periodic verification the issues open during the previous verification activity are required to be addressed. However no FAR was raised during the 2nd verification.

The project was registered under CDM EB on 20th November 2009. As required under the methodology AM0034 the baseline and historical campaign have been evaluated for the determination of the permitting operating range for the project. The baseline campaign and historical were conducted for the project, the details are as follows;

Historical Campaign 1	Date: 08/11/2005 to 12/03/2006
Historical Campaign 2	Date: 13/03/2006 to 14/11/2006
Historical Campaign 3	Date: 17/11/2006 to 17/06/2007
Historical Campaign 4	Date: 21/06/2007 to 18/01/2008
Historical Campaign 5	Date: 20/01/2008 to 01/07/2008
-	-
Baseline Campaign	Date: 04/09/2008 to 08/12/2008

Based on the historical and baseline campaigns the following parameters were determined:

Parameters	Unit	Historical/ Baseline Values	Specification of the facility	Permitted Range as per PDD
N ₂ O Concentration in the stack gas (NCSG _{BC})	mgN ₂ O/ Nm ³	4,054.1	-	-
Volume flow rate of the stack gas (VSG _{BC})	Nm ³ /h	49,077.4	-	-
Operating Hours (OH _{BC})	Hours	2,861	-	-
Nitric Acid (as 100%) (NAP)	tHNO ₃	43,326	-	-
Overall measure uncertainty of the monitoring system (UNC)	%	4.52	-	-
Ammonia gas flow rate (AFR _{max})	Kg/h	5,113	6,076	5113

Ammonia to Air Ratio (AIFR _{max})	%	11.9	11.5	11.5
Oxidation Temperature for each hour (OT _{normal})	Deg C	863-900	860-930	863-900
Oxidation Pressure for each hour (OP _{normal})	kPa	660-626	765	660-626

The values for the permitted range used during the monitoring period in line with the values in the registered PDD. The application of the permitted range as per the registered PDD is assessed to be correct and conservative thus CAR D6 has been closed.

The average historic campaign length (CL_{normal}) has been determined to be 44,435 t HNO₃/campaign while the baseline campaign length is 43,326 t HNO₃. Here, CL_n is greater than CL_{normal}. Hence Baseline is applicable. This is also in compliance of “Clarification to AM0034 (Version 02): Catalytic Reduction of N₂O inside the Ammonia Burner of Nitric Acid Plants” given in EB 51 Annex 12.

The normal gauze supplier for the project is RCF itself. The baseline gauze composition was reconfirmed to be 92% Pt, 8% Rh.

The secondary catalyst for the campaigns was supplied by M/s. BASF. The DeN₂O catalyst was installed under the Pt gauze in the Ammonia Oxidation Reactor (AOR) 31st March 2009. The catalyst was in operation during whole MP i.e. from 08-07-2010 to 04-12-2010.

It can be concluded that there was no exchange of equipment since installation of catalyst.

5.4. Post registration changes

The following post registration changes applicable for this monitoring period have been observed during the monitoring period.

However, a request for Deviation for the monitoring of Operating Hour has been submitted and same was accepted by CDM-EB on 2011-11-08 (<http://cdm.unfccc.int/Projects/deviations/38618>).

Further a Request for revision in Monitoring plan in accordance with the guidance from CDM EB under the Approval for Deviation has been submitted and approved by CDM EB on 15th November 2012. The revised monitoring plan is available on the project page (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1248695616.14/view>)

The Verification team would like to explain here that via PRC-7292-001 (which was approved 15-12-2012) it is clearly stated that changes to MP i.e. monitoring by means of Ammonia flow would be effective from 7th Jan 2012. In the post registration

changes (PRC) the validation opinion for the change #2 the timing of use of Ammonia and Temperature for monitoring of OH is stated. The details of the Operating Hour (OH) monitoring practice followed by RCF during the monitoring periods are as follows; Date of registration of the project activity: 2009-11-20

- 2009-11-20 to 2010-07-09 – OH is being monitored based on the flow of ammonia to the reactor
- 2010-07-09–2012-01-07 – OH is being monitored based on the measurement of reactor temperature, further deviation was sought for the change in approach.
- 2012-01-07 onwards – OH is again being monitored based on the flow of ammonia to the reactor as per the communication from CDM EB.

As per original validated and registered PDD, Operation Hour OH is required to be monitored as “Recorded at CEM system based on temperature limits of Reactor hours of daily operation of the plant during the project campaign”. However, during the baseline campaign Operating Hour was determined based on the flow of ammonia to the reactor during the baseline campaign.

A brief background about the conditions in the ammonia oxidation reactor during the nitric acid production process at RCF is described as follow: During any start up operations, an associate gas is fed to ignite the pilot burner and the temperature of 250°C is maintained which preheats the catalyst. Once the temperature is stable, the ammonia flow is introduced, since this being an exothermic reaction, the temperature of the reactor shoots up instantaneously. Once the reactor temperature of 860 °C is reached the plant is considered operational. However if within 10 min of ammonia introduction, the plant is not operational; the time safety lock would cause the plant to trip down leading to a total stoppage of plant operations. The safety lock is installed as a precaution as if the temperature is below 850°C it may lead to production of ammonium nitrate, which is an explosive material. Thus the time safety lock ensures that there is no delay of more than 10 min for the temperature to reach 860 °C once ammonia is fed in the reactor.

Similarly when ammonia flow is cut off while taking plant off stream, temperature also drops instantaneously which is much quicker than 10 min as the air is still supplied to the reactor to cool down the system for further inspection.

Thus, the parameter OH for the plant can in principle be monitored by using either of the two independent methods:

1. Based on the temperature limits of the reactor: the plant is considered operational only when the temperature of the ammonia reactor is $\geq 860^{\circ}\text{C}$.
2. Based on the introduction of ammonia flow to the reactor: the plant is considered operational during times the ammonia flow is introduced in the pre-heated reactor.

The time gap comparison between the two methods demonstrates marginally difference. The time difference can be maximum 10 min as per the time safety lock installed in RCF. Therefore both methods are considered equally good to record operating hours of the plant as the CEM system installed calculates the hourly average based on the data monitored at an interval of every 2 seconds. Further if the plant operation is less than 30 min during any particular hour, the value for that

period would not be considered. The difference of the two approaches would have an impact on the operating hour determination only during start-ups or shut downs when the temperature crosses the value of $\pm 860^{\circ}\text{C}$.

Thus both approaches can be considered to be not materially different in the context of this PA and the verifier estimates the influence as not materially

The verification team checked the documents related to post registration changes (PRC) to ensure that the monitoring of the project is correct and in line with registered monitoring plan and applied methodology.

5.5. Compliance with the monitoring plan

During the on-site visit, the verification team checked the implementation of monitoring system covering all the monitoring parameters as per the approved monitoring plan. The monitoring system and all applied procedures are observed not be completely in compliance to the registered monitoring plan. Thus CAR B2 was raised as the approach to calculate the Operating hour was not in line with the approach as per the registered monitoring plan.

Due to a different approach adopted for calculation of the parameter “Operating Hour” a Request for Deviation was submitted and same was accepted by CDM-EB on 2011-11-08 (<http://cdm.unfccc.int/Projects/deviations/38618>). Hence for the current monitoring period the parameter of OH has been monitored based on the flow of ammonia to the reactor which is consistent with the approach followed in the baseline scenario as well as the request for revision in the monitoring plan sought for the project activity.

5.6. Compliance with the monitoring methodology

The monitoring system is in compliance with the applied monitoring methodology (AM0034 version 3.2). The following requirements are compiled as required by AM0034 version 3.2.

Requirements for the automated monitoring system, i.e. the CEM installed at RCF plant supplied by M/s. ABB Limited;

- The Automated Measuring System installed for the project monitoring is by M/s ABB Ltd. in compliance to EN14181 and is certified by an external third party TÜV SÜD, Germany for its compliance to EN14181 and AM0034 (during QAL2).

- The N₂O analyser of make ABB AO2000 URAS 26 is continuous NDIR industrial photometer that can selectively measure concentrations of up to four sample components. The monitoring frequency is every second which is better than the required frequency of every 2 seconds as specified in the methodology. The analyser is equipped to measure only N₂O concentrations.
- The flow meter installed to measure the flow, temperature and pressure of the stack gas is from ABB which is based on dynamic differential pressure generated by the SDF flow sensor probe rod using the ABB's differential pressure transmitter.
- The temperature and pressure in the stack is continuously monitored automatically by the CEM (Continuous Emission Monitoring system) installed. The CEM is certified by third party TÜV SÜD, Germany for its compliance to EN14181 and AM0034 (during QAL2).

The CEM is subject to 3 level of test as per the requirement of EN14181 the tests are as follows;

- QAL 1 test report dated 23/06/2008 is provided by ABB the supplier of the automated measuring system for compliance of EN 14181 QAL 1.
- QAL 2 test is carried by a third party TÜV SÜD, which confirms the CEM complies to the requirement under EN14181. The QAL 2 test was carried on 21st to 23rd October 2008.
- QAL 3 tests of the analyser which carries out auto (zero and span gas) calibration on weekly basis and manual calibration w.r.t a span gas at an interval of 3 months.
- AST was carried in 2010 by SGS Netherland on 4th and 5th March 2010 and for the year 2011 it was carried on 1st, 2nd and 3rd March. In the Annual Surveillance Test (AST) report for 2011, SGS recommended that measuring inaccuracy constants for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system, further the VSG determination was found correct. Accordingly, to comply with the recommendation of SGS, all NCSG readings during the monitoring period are added with 62 and further used for CER calculation. Though the changes in constants are observed in 2011 reports however the same have been applied to the current monitoring period also. This is assessed to be conservative measure. The same has been described under CAR D3.

The total downtime during this Monitoring Period observed for the automated measuring system (CEM) installed in RCF during which the highest value of NCSG and VSG are applied is detailed as follows;

- Highest value of NCSG in the campaign applied (2031,01 mg/Nm³)
downtime of 15 hours due remote login problem;
- Highest value of VSG in the campaign (52,570 Nm³/h)

The total plant shut down was observed for 709 hours due to operational issues and maintenance.

The verifier confirms that highest value of NCSG and VSG are applied correctly for hours of downtime of the automated measuring system (CEM) installed in RCF.

Correct QAL 2 Correction Factors as per QAL 2 test in October 2008 were used for the monitoring:

Measuring Parameter	Correction Factor	
	A	B
N ₂ O	- 1979.8	494.9
Volume Flow	- 29898	7474.5
Temperature (stack gas flow)	-63.2	15.8
Pressure (stack gas flow)	-398	99.6

As mentioned before, during the Annual Surveillance Test conducted in March 2011 by SGS, a change in the equation for NCSG, was observed; SGS has recommended that measuring inaccuracy constants for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system. Accordingly, to comply with the recommendation of SGS, all NCSG readings during the Monitoring period are added with 62 and further used in for CER calculations. Though the correction is observed in March 2011 however it has been applied as conservative measure retrospectively. The calculations for the same are assessed and have been detailed and traceable in the emission reduction calculation sheet named "Raw Data". Due to application of the revised factor the emission reduction calculations are correctly determined.

Further, during the review of project documents, it was observed that the master calibrator for functions of temperature, pressure and flow were of lower accuracy than the actual instrument accuracy. Thus CAR C1 was raised. The PP has replaced the master calibrators considering the issue, however to address the same for the current monitoring period a conservative approach w.r.t to the maximum possible error has been applied leading to reductions in the Emission reductions. The same is detailed under section 4 (Verification findings) in of this report w.r.t closure of CAR C1.

Campaign length:

The length of project campaign is CL_n (45,534 tHNO₃ calculated for the complete campaign) which is higher than CL_{normal} (44,435 tHNO₃) hence adjustment in the emission factor for the project campaign is not required and the baseline is applicable. The same is in line with the requirements under EB 51, Annex 12.

Emission factor calculations for the project; Campaign 3:

- Baseline emission factor for the project is 0.0125 tN₂O/ tHNO₃
- Project emission factor during the campaign is 0.0026 tN₂O/ tHNO₃



- Moving average emission factor: According AM_CLA_0204 the calculation of the moving average emission factor $EF_{ma,n}$, the emission factor of the first campaign was excluded as it is partially outside the crediting period. $EF_{ma,n}$ is calculated as follows;

$$\begin{aligned}\text{Moving Average Emission Factor} &= EF_{ma,3} = (EF_2 + EF_3) / 2 \\ &= (0.0032 + 0.0026) / 2 \\ &= 0.0029 \text{ tN}_2\text{O} / \text{tHNO}_3\end{aligned}$$

5.7. Monitoring parameters

During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the PDD) have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist under Annex 2 table A-2 section D. CAR D1 to CAR D5 has been raised and subsequently closed during the verification.

As mentioned before, it was observed that the master calibrator for functions of temperature, pressure and flow were of lower accuracy than the actual instrument accuracy. Thus CAR C1 was raised. The PP has replaced the master calibrators considering the issue, however to address the same for the current monitoring period a conservative approach w.r.t to the maximum possible error has been applied leading to reductions in the Emission reductions. The same is detailed under section 4 (Verification findings) in of this report w.r.t closure of CAR C1.

As mentioned before, during the Annual Surveillance Test (AST) conducted by SGS in March 2011 it was observed that measuring inaccuracy constants for NCSG is 62. SGS has recommended that there should not be any deletion or addition of these constants and the same should be done modified in the CEM system. Accordingly the corrections were carried out by ABB. The revisions in the constants have been applied to the entire monitoring period leading to marginally higher project emissions, thereby lower emission reductions. This has been assessed to be conservative and appropriate.

The calibration details including the date, due date, frequency, accuracy of the meters, date, meter serial number^{/CAL/, /TS/} for each of the parameters monitored in the project activity are described as follows;

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Data Variable	Description	Data Unit	Instrument Type	Instrument Tag no.	Sr. No	Accuracy	Data of Previous calibration	Date of calibration	Calibration frequency	Next calibration conducted on	Calibration Agency
AFR	Amm gas to N001	Nm3/Hr	D.P Type Transmitter	FT120 211A	S01 987 44	± 0.075% of span	17/08/2009	06/08/2010	1 Year	19/04/2011	Plant
AFR	Amm gas to N001	Nm3/Hr	D.P Type Transmitter	FT120 211B	S01 987 45	± 0.075% of span	17/08/2009	06/08/2010	1 Year	19/04/2011	Plant
AFR	Amm gas to N001	Nm3/Hr	D.P Type Transmitter	FT120 211C	S01 987 46	± 0.075% of span	19/08/2009	06/08/2010	1 Year	19/04/2011	Plant
OP	Amm - inlet to N001	Barg	Pressure Transmitter	PT 120212 A	012 099 36	± 0.075% of span	19/08/2009	04/08/2010	1 Year	16/04/2011	Plant
OP	Amm - inlet to N001	Barg	Pressure Transmitter	PT 120212 B	012 099 34	± 0.075% of span	19/08/2009	04/08/2010	1 Year	16/04/2011	Plant
OP	Amm - inlet to N001	Barg	Pressure Transmitter	PT 120212 C	012 099 37	± 0.075% of span	19/08/2009	04/08/2010	1 Year	16/04/2011	Plant
NA	Amm - inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120212 A	NA	Deviation after calibration: 0.1% of F.S. value	19/08/2009	02/08/2010	1 Year	19/04/2011	Plant
NA	Amm - inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120212 B	NA	Deviation after calibration: 0.1% F.S. value	17/08/2009	02/08/2010	1 Year	19/04/2011	Plant
NA	Amm - inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120212 C	NA	Deviation after calibration: 0.1% F.S. value	17/08/2009	02/08/2010	1 Year	19/04/2011	Plant
NA	Air Flow-N001	Nm3/Hr	D.P Type Transmitter	FT 120213 A	S01 987 40	± 0.10% of span	17/08/2009	06/08/2010	1 Year	19/04/2011	Plant
NA	Air Flow-N001	Nm3/Hr	D.P Type Transmitter	FT 120213 B	S01 987 41	± 0.10% of span	17/08/2009	06/08/2010	1 Year	19/04/2011	Plant
NA	Air Flow-N001	Nm3/Hr	D.P Type Transmitter	FT 120213 C	S01 987 42	± 0.10% of span	19/08/2009	06/08/2010	1 Year	19/04/2011	Plant
NA	Air inlet to N001	Barg	Pressure Transmitter	PT120 214A	S01 987 60	± 0.075% of span	17/08/2009	05/08/2010	1 Year	18/04/2011	Plant
NA	Air inlet to N001	Barg	Pressure Transmitter	PT120 214B	S01 987 61	± 0.075% of span	19/08/2009	05/08/2010	1 Year	18/04/2011	Plant

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NA	Air inlet to N001	Barg	Pressure Transmitter	PT120 214C	S01 987 62	± 0.075% of span	19/08/2009	05/08/2010	1 Year	18/04/2011	Plant
NA	Air inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120214 A	NA	Deviation after calibration: 0.1% of F.S. value	17/08/2009	04/08/2010	1 Year	19/04/2011	Plant
NA	Air inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120214 B	NA	Deviation after calibration: 0.1% of F.S. value	19/08/2009	04/08/2010	1 Year	19/04/2011	Plant
NA	Air inlet to N001 temp	Deg.c ent	RTD with R/I converter	TT 120214 C	NA	Deviation after calibration: 0.1% of F.S. value	19/08/2009	04/08/2010	1 Year	19/04/2011	Plant
OT	Catalyst Temp ROO1	Deg.c ent	Temp. Transmitter	TT1203 32A	199 556	D/A Accuracy ± 0.03% of span	18/08/2009	02/08/2010	1 Year	20/04/2011	Plant
OT	Catalyst Temp ROO1	Deg.c ent	Temp. Transmitter	TT1203 33A	199 558	D/A Accuracy ± 0.03% of span	18/08/2009	02/08/2010	1 Year	20/04/2011	Plant
OT	Catalyst Temp ROO1	Deg.c ent	Temp. Transmitter	TT1203 34A	199 560	D/A Accuracy ± 0.03% of span	18/08/2009	02/08/2010	1 Year	20/04/2011	Plant
NCS G	N2O Analyser	Mg/m ³	N2O Analyser	AI 120400	024 007 122 8/24 00	Repeatability ≤ 0.5% of span	28/05/2010	28/8/10, 19/11/10	3 Months	2/2/11	Plant
VSG	Stack Flow	mBar	D.P Type Transmitter	FI12040 0	265 DS6 600 028 331	Base Accuracy ± 0.04%	06/07/2009	08/07/2010	1Year	21/04/2011	Plant
PSG	Stack Pressure	hPa	Pressure Transmitter	PI12040 0	119 894 9	0.5% of FSO	06/07/2009	08/07/2010	1Year	21/04/2011	Plant
TSG	Stack Temp	Deg.c ent	RTD with R/I converter	TI12040 0	NA	Linearity error : <0.1 % FS	06/07/2009	08/07/2010	1Year	21/04/2011	Plant

NAP	Product acid flow	T/hr	Mass flow meter	FI10121	SE N.-120 315 65, TRANS.-378 197 2	± 0.1% of rate	24/04/2008		3 Years	24/04/2011	External Agency
NA	Acid Density	gm/cc	Hydrometer	NA	NA	Least count: 0.001	28/5/2010	17/11/2010	6 months	16/5/2011	Plant
NA.	Acid Temperature	Deg C	Thermometer	NAG/L/TM-1	NA	Least count: 1	25/11/2009	18/11/2010	1 Year	25/10/2011	Plant

After appropriate corrections were carried out by the project participant it can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements. Thus the CARs have been closed out. The details of each issue is described under section 4 (Verification Findings) of this report.

5.8. Monitoring report

A draft monitoring report was submitted to the verification team by the project participants. The team has made this report publicly available prior to the start of the verification activities. No comments were received.

During the verification, mistakes and needs for clarification were identified; thereby raising CAR A1, CAR A2, and CAR B1 CAR B2 were raised. The PP has carried out the requested corrections so that it can be confirmed that the Monitoring report is complete and transparent and in accordance with the registered PDD and other relevant requirements. Thus the CARs are closed out. The details of each issue is described under section 4 (Verification Findings) of this report.

5.9. Sampling

5.9.1. Implementation of the sampling plan

No sampling was required to determine the monitored parameters.

5.9.2. Sampling approaches during verification

No sampling approaches were taken during the verification.

5.10. ER Calculation

During the verification mistakes in the ER calculation were identified. Thus CAR E1 to CAR E3 were raised and subsequently closed out as the final values of emission reductions were revised.

The same is detailed under section 4 (Verification findings) in of this report w.r.t closure of Findings.

A revised ER calculation was prepared by the PP and presented to the verification team. All raised issues were addressed appropriately so that all corresponding CARs could be closed out. Thus it is confirmed that the ER calculation is overall correct and conservative.

Results:

Parameter	Values During 3rd Monitoring Period	Unit
NAP	45,533.90	tHNO ₃
EF _{BL}	0.0125	tN ₂ O/tHNO ₃
EF _p	0.0029	tN ₂ O/tHNO ₃
GWP _{N₂O}	310	tCO _{2e} /tN ₂ O

$$\text{ER} = (0.0125 - 0.0029) * 45,533.90 * 310 = 135,013 \text{ tCO}_{2e}$$

The claimed emission reductions in this monitoring period from 08th July 2010 to 4th December 2010 are verified and found reasonable.

5.11. Quality Management

Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this CDM project activity have been defined. The procedures defined can be assessed as appropriate for the purpose. No significant deviations thereof have been observed during the verification.

The stack gas monitoring system is designed as an automatic process, so the involvement of the personnel during normal operation is minimal. In case of any deficiency, appropriate procedures are in place. For this monitoring system, the quality assurance and control procedure is also according to EN14181 which stipulates three levels:

- QAL1: the evaluation according to EN ISO14956 has been carried out by TUV SUD, Germany on 23/06/2008 before installation of CEM ^{/QAL/}.
- QAL 2 test is carried by a third party TUV SUD, which confirms the CEM complies to the requirement under EN14181. The QAL 2 test was conducted on 21st to 23rd October 2008 and the QAL 2 test in the year 2011 was carried out by TUV Rheinland from 24-27th October 2011.

- QAL 3 tests of the analyser which carries out auto calibration on weekly basis and manual calibration w.r.t a span gas at an interval of 3 months.
- AST was carried out in March 2010 by SGS Netherland on 4th and 5th March 2010 and for the year 2011 it was carried on 1st, 2nd and 3rd March. In the Annual Surveillance Test (AST) report for 2011, SGS recommended that measuring inaccuracy constants for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system. Accordingly, to comply with the recommendation of SGS, all NCSG readings during the monitoring period are added with 62 and further used for CER calculation. This is a conservative measure.

In order to operate and maintain the monitoring system, local operators and instrumentation engineers of the system have been trained by RCF and the equipment supplier. Furthermore the competence of the personnel was confirmed from training records also there is no change in relevant CDM personnel for all positions.

All monitoring devices have been calibrated and maintained periodically to ensure the accuracy of measurement. All calibrations were carried out per internationally accepted procedures.

All data have been archived electronically and/or in hard copy and was accessible during verification site visit, however CAR B1- B4 were raised during the audit and subsequently closed out. The details of each issue is described under section 4 (Verification Findings) of this report.

5.12. Actual emission reductions during the first commitment period and the period from 1 January 2013 onwards

The MR includes actual ER values achieved up to 31 December 2012 and actual values achieved from 1 January 2013 onwards as follows:

Table 5-2: Emission reductions before and after the end of 2012

	until 2012-12-31 ¹⁾	from 2013-01-01 ¹⁾	Sum
Emission reductions [tCO _{2e}]	135,013	-	135,013

¹⁾ Both days included

5.13. Comparison with ex-ante estimated emission reductions

The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD.



The emission reductions determined for the third project campaign covering the monitoring period from 08th July 2010 to 4th December 2010 (150 days) is 135,013 tCO_{2e}. The total emission reduction for the monitoring period is less than the PDD estimated value of 183,824 tCO_{2e} for 150 days (447,305 tCO_{2e}/annum).

5.14. Overall Aspects of the Verification

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

No issues have been identified indicating that the implementation of the project activity and the steps to claim emission reductions are not compliant with the UNFCCC criteria and relevant guidance provided by the COP/CMP and the CDM EB (clarifications and/or guidance).

5.15. Hints for next periodic Verification

There were no changes observed from the project activity as described in the registered PDD. The replacement of the master calibrator has been carried out and confirmed with the documentary evidence; however the actual implementation shall be confirmed during the next verification activity.



6. VERIFICATION AND CERTIFICATION STATEMENT

Rashtriya Chemicals & Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 3rd periodic verification of the project: “N₂O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India”, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to catalytic reduction of N₂O a potent GHG which is an undesirable by-product of nitric acid production process. This verification covers the period from 2010-07-08 to 2010-12-04(including both days).

In the course of the verification 15 Corrective Action Requests (CAR) were raised and successfully closed. No Clarification Requests (CR) were raised. Furthermore no FARs are raised to improve the monitoring system in the future. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the registered PDD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., AM0034, Version 3.2
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 3rd periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: **135,013** t CO_{2e}

Vadodara, 2014-12-09

Essen, 2014-12-09

Mr. Pankaj Patel

TÜV NORD JI/CDM Certification
Program

Verification Team Leader

Mr. Martin Saalman

TÜV NORD JI/CDM Certification
Program

Final Approval

7. REFERENCES

Table 7-1: Documents provided by the project participant(s)

Reference	Document
/AST/	<ul style="list-style-type: none"> Annual Surveillance Test conducted by SGS on 4th and 5th March 2010 Annual Surveillance Test conducted by SGS on 1st, 2nd, and 3rd March 2011
/ALARM/	Log book record for implementation of alarm for CEM system connected to the DCS monitoring room.
/BR/	Breakdown / Annual maintenance records for the respective equipments related to the for the project activity during the monitoring period
/CAL/	Calibration certificates for the monitoring equipments used during the monitoring period as per Appendix III of MR Version 03 and as described under section 5.8 of the Report.
/CHART/	Charts indicating concentration at various temperature, specific gravity for determination of concentration of product nitric acid
/CR/	Commissioning Certificates for 1. Secondary Catalyst in the ammonia reactor 2. All the stake monitoring equipments
/DCS/	Sample results of the following 1. Data of Ammonia to air ratio obtained transmitted from DCS 2. Oxidation temperature of each hour transmitted from DCS 3. Oxidation pressure of each hour transmitted from DCS
/DR-AM34/	Sample Daily Reports copies generated by the EMI 3000 software.
/GS/	Gauze fabrication contracts
/IAR/	Internal audit reports and results respective to the project activity
/INT/	Inter Log Diagram for RCF MP unit.
/ISO/	Copy of ISO 9001:2008 Certificate dated 6 th May 2010 valid till 19 th July 2013
/LAB/	Results of Plant Laboratory for average concentration of Nitric acid

Reference	Document
/LOG/	Log (Records) of the following are checked: <ul style="list-style-type: none"> N₂O concentration in the stake gas Operating Hour of the reactor Average concentration of nitric acid (%)
/LA/	Layout of the project activity site describing the metering position
/MR/	<ul style="list-style-type: none"> Monitoring report for the project version 01 dated 03/06/2010 based on which the Verification activity has been conducted Monitoring report for the project version 02 dated 23/07/2010 based on which the Verification activity has been conducted Monitoring report for the project version 03 dated 11/12/2012 based on which the Verification activity has been conducted. Monitoring report for the project version 04 dated 07/07/2014 based on which the Verification activity has been conducted. Monitoring report for the project version 05 dated 10/09/2014 based on which the Verification activity has been conducted.
/MEDAS/	Mail received from ABB by RCF regarding monitoring frequency of data acquisition system dated 2009-04-20
/ORG/	Organizational chart with roles and responsibility of operating personnel working on the project activity for data collection, archiving and monitoring activities (operational and management structure for the project activity)
/REPLACE/	Replacement equipment/meter/instrument records respective to the project activity during the Monitoring period.
/QAL/	Test Certificate for; <ul style="list-style-type: none"> QAL1 certificate, dated 23-06-2008 , QAL 2 report dated 11-11-2008 as per standard (EN 14181) (Test conducted on 21-23 October 2008) by TUV SUD Industrie Service GmbH QAL 2 report conducted on 24 – 27th October 2011 by TUV Rheinland.
/QMS/	Quality Management System of RCF
/SC/	The consent to operate by the Maharashtra Pollution Control Board dated 23/12/2011, valid till 01/08/2016
/TS/	Technical specification of all the equipment installed. <ol style="list-style-type: none"> Secondary Catalyst in the ammonia reactor All the stack monitoring equipments Technical specification of ABB A02000 URAS 26 for analyzing N₂O concentration

Reference	Document
/TRA/	Training records of the plant personal to carry out the continuous Emission Monitoring System by ABB
/XLS/	ER calculation sheets for the project activity (initial intermediate and final)

Table 7-2: Background investigation and assessment documents

Reference	Document
/AM0034/	AM0034, Version 3.2, "Catalytic reduction of N ₂ O inside the ammonia burner of nitric acid plants"
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GLMP/	Guidelines: Completing the Monitoring Report Form (CDM-MR-FORM)
/IPCC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (CDM-MR-FORM), Version 04.0
/PDD/	Project Design Document for CDM project: " <i>N₂O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India</i> " version 1.2, dated 2009-07-21
/PS/	CDM Project Standard
/VAL/	Validation Report for CDM project " <i>N₂O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India</i> " version 1, dated 2009-07-24
/VER/	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)
/VVS/	CDM Validation and Verification Standard (Version 07.0)

Table 7-3: Websites used

Reference	Link	Organisation
/cpcb/	http://cpcb.nic.in/	Central Pollution Control Board, India.
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/cd4cdm/	http://www.cd4cdm.org/	UNEP Risoe Centre

Table 7-4: List of interviewed persons

Reference	Mol ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	A.B. Khare	Dy.GM (Corporate), RCF,
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	N. R Kamat	DGM (Technical Services), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	R. Paradkar	DGM(Co-ordination), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	D. V. Bhagat	C.E (Plant), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dilip Deshmukh	Advisor (Projects), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	P.V. Kharate	Dy. CE (Plant), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	B.G Galgali	Operations Manager (Nitric Acid), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Girish D. Temgire	Dy. CE (corporate), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	D.K Srivastav	DGM (Chemical), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Uddhav More	MT (Corporate Technical), RCF

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)

ANNEX

- A1:** Verification Protocol
- A2:** Statements of Competence of
involved Personnel

ANNEX 1: VERIFICATION PROTOCOL

Table A-1: GHG calculation procedures and management control testing / detailed audit testing of residual risk areas and random testing

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
Raw data generation				
<ul style="list-style-type: none"> • Installation of measuring equipment • Dysfunction of installed equipment • Maloperation by operational personnel • Downtimes of equipment • Exchange of equipment • Change of measurement equipment characteristic • Insufficient accuracy • Change of technology 	<ul style="list-style-type: none"> • Installation of modern and state of the art equipment • Process control automation • Internal data review • Regular visual inspections of installed equipment • Only skilled and trained personnel operates the relevant equipment • Daily raw data checks • Immediate exchange of dysfunctional equipment • Stand-by duty is 	<ul style="list-style-type: none"> • Inadequate installation / operation of the monitoring equipment • Inadequate exchange of equipment • Change of personnel • Undetected measurement errors • Inappropriateness of Management system procedures w.r.t. monitoring plan requirements (e.g. substitute value strategies) • Non-application of management system procedures • Insufficient accuracy • Inappropriate QA/QC 	<ul style="list-style-type: none"> • Site – visit • Check of equipment • Check of technical data sheets • Check of suppliers information / guarantees • Check of calibration records, if applicable • Check of maintenance records • Counter-check of raw data and commercial data • Check of CDM management system • Check of CDM related procedures 	<ul style="list-style-type: none"> • See Table A-2

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
<ul style="list-style-type: none"> Accuracy of values supplied by Third Parties 	<ul style="list-style-type: none"> organized Training Internal audit procedures Internal check of QA/QC measures of involved Third Parties 	<ul style="list-style-type: none"> measures of Third Parties 	<ul style="list-style-type: none"> Application of CDM management system procedures Check of trainings Check of responsibilities Check of QA/QC documentation / evidences of involved Third Parties 	
Raw data collection and data aggregation				
<ul style="list-style-type: none"> Wrong data transfer from raw data to daily and monthly aggregated reporting forms IT Systems Spread sheet programming Manual data transmission Data protection Responsibilities 	<ul style="list-style-type: none"> Cross-check of data Plausibility checks of various parameters. Appropriate archiving system Clear allocation of responsibilities Application of CDM Management system procedures Usage of standard software solutions 	<ul style="list-style-type: none"> Unintended usage of old data that has been revised Incomplete documentation Ex-post corrections of records Ambiguous sources of information Non-application of management system procedures Manual data transfer mistakes 	<ul style="list-style-type: none"> Check of data aggregation steps Counter-calculation Data integrity checks by means of graphical data analysis and calculation of specific performance figures Check of management system certification Check of data archiving system 	<ul style="list-style-type: none"> See Table A-2

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
	(Spreadsheets) <ul style="list-style-type: none"> Limited access to IT systems Data protection procedures 	<ul style="list-style-type: none"> Unintended change of spread sheet programming or data base entries Problems caused by updating/upgrading or change of applied software 	<ul style="list-style-type: none"> Check of application of Management system procedures 	
Other calculation parameters				
<ul style="list-style-type: none"> Emission factors, oxidation factors, coefficients 	<ul style="list-style-type: none"> The values and data sources applied are defined in the PDD and monitoring plan 	<ul style="list-style-type: none"> Unintended or intended Modification of calculation parameters Wrong application of values Misinterpretations of the applied methodology and/ or the PDD Missing update of applicable regulatory framework (e.g. IPCC values) 	<ul style="list-style-type: none"> Update-check of regulatory framework Countercheck of the applied MP in the MR against the methodology and the PDD 	<ul style="list-style-type: none"> See Table A-2
Calculation Methods				

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
<ul style="list-style-type: none"> Applied formulae Miscalculation Mistakes in spread-sheet calculation 	<ul style="list-style-type: none"> Advanced calculation and reporting tools A CDM coordinator is in charge of the CDM related calculations Usage of tested / counterchecked Excel spreadsheets Involvement of external consultants 	<ul style="list-style-type: none"> The danger of miscalculation can only be minimized. 	<ul style="list-style-type: none"> Countercheck on the basis of own calculation. Spread sheet walk-through. Plausibility checks Check of plots 	<ul style="list-style-type: none"> See Table A-2
Monitoring reporting				
<ul style="list-style-type: none"> Data transfer to the author of the monitoring report Data transfer to the monitoring report Unintended use of outdated versions 	<ul style="list-style-type: none"> An experienced CDM consultant is responsible for monitoring reporting. CDM QMS procedures are defined 	<ul style="list-style-type: none"> The danger of data transfer mistakes can only be minimized Inappropriate application of QMS procedures 	<ul style="list-style-type: none"> Counter check with evidences provided. Audit of procedure application 	<ul style="list-style-type: none"> See Table A-2

Table A-2: (Project specific) Periodic Verification Checklist

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
A. Description of the project activity				
A.1. Purpose and general description of the project activity (F-CDM-FORM, Attachment, A.1) <i>Check if section A.1 of the MR includes the following:</i> <ul style="list-style-type: none"> - Purpose of the PA and the measures taken to reduce GHG emissions - Brief description of the installed technology and equipment - Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.) - Total emission reductions achieved in this monitoring period 	/MR/	<p>The verification team has checked section A.1 of the MR and confirms that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Purpose of the PA and the measures taken to reduce GHG emissions <input checked="" type="checkbox"/> Brief description of the installed technology and equipments <input type="checkbox"/> Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc) <input checked="" type="checkbox"/> Total emission reductions achieved in this monitoring period <p>In this context the following findings have been identified: Nevertheless CAR A1 is raised.</p>	CAR A1	OK
A.2. Location of project activity (F-CDM-FORM, Attachment, A.2) <i>Check if section A.2 of the MR reflects correctly the following:</i> <ul style="list-style-type: none"> - Host Party(ies) - Region / State / Province etc. - City / Town / Community etc. 	/MR/ /PDD/ /IM/	<p>The verification team has checked section A.2 of the MR and confirms by means of comparison with the information given in the PDD and 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"> <input checked="" type="checkbox"/> Host Party(ies) <input checked="" type="checkbox"/> Region / State / Province <input checked="" type="checkbox"/> City / Town / Community 	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
- <i>Physical / geographical location (e.g. Latitude and Longitude)</i>		<input checked="" type="checkbox"/> Physical / Geographical location In this context the following findings have been identified: N/A		
A.3. Parties and Project Participants (F-CDM-FORM, Attachment, A.3) <i>Check if section A.3 of the MR includes the following:</i> <ul style="list-style-type: none"> - <i>All PPs as displayed on the UNFCCC website</i> - <i>A correctly filled table as per the MR template</i> 	/MR/ /unfccc/	The verification team has checked section A.3 of the MR as well as the UNFCCC website and confirms that: <ul style="list-style-type: none"> <input type="checkbox"/> all PPs as displayed on the project related UNFCCC website are correctly listed <input checked="" type="checkbox"/> the table as per the template MR has been correctly filled In this context the following findings have been identified: The annex 1 party is not consistent with the information mentioned on the project page for the project. Appropriate correction is required.	CAR A2	OK
A.4. Reference of applied methodology (F-CDM-FORM, Attachment, A.4) <i>Check if section A.4 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> - <i>Reference to the applicable version of the methodology</i> - <i>Reference to the applicable version(s) of relevant methodological tools</i> - <i>Relevant EB decisions, if applicable</i> 	/MR/ /PDD/ /unfccc/	The verification team has checked section A.4 of the MR and confirms by means of comparison with the information given in the PDD and displayed on the UNFCCC website that the information provided is complete and correct with regards to the following: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Name and version of the applicable CDM Methodology <input checked="" type="checkbox"/> Name and version of applicable CDM methodological tools <input checked="" type="checkbox"/> Relevant EB decisions In this context the following findings have been identified:	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		N/A		
A.5. Crediting period of project activity (F-CDM-FORM, Attachment, A.5) <i>Check if section A.5 of the MR correctly includes the following:</i> <ul style="list-style-type: none"> - <i>Start date of the crediting period. In this context please check, if applicable, whether post registration changes to the start date have been accepted by the EB.</i> - <i>Length and type of the crediting period</i> 	/MR/ /unfccc/	<p>The verification team has checked section A.5 of the MR and confirms by means of comparison with the information displayed on the UNFCCC website that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Start date of the crediting period. <input checked="" type="checkbox"/> Type and length of the crediting period <p>In this context the following findings have been identified: N/A</p>	OK	OK
A.6. Publication of the Monitoring Report (VVS, § 243) <i>Check if the monitoring report has been made publicly available on the UNFCCC website before the verification commenced.</i> <i>Check if comments have been received and if yes, how they have been addressed.</i>	/unfccc/	<p>The verification team has ensured and confirms by means of checking the respective project information on the UNFCCC website that:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The draft monitoring report, as received from the project participants, has been made publicly available prior to the start of the verification activities. <input checked="" type="checkbox"/> No comments have been received. <p>In this context the following findings have been identified: N/A</p>	OK	OK
A.7. Compliance with standardized format of the Monitoring Report	/MRT/	The verification team has checked all sections of the MR and confirms by means of comparison with the MR template that:	CAR A3	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
(VVS, § 247 e) <i>Check (only) if the latest applicable MR template has been used. For compliance assessment with the MR guideline pl. refer to the respective MR sections.</i>		<input type="checkbox"/> the standardized MR template has been used In this context the following findings have been identified: The MR follows the VVM template, however the same is no longer valid, thus CAR A3 is raised.		
B. Implementation of project activity				
B.1. Description of implemented registered project activity (F-CDM-FORM, Attachment, B.1) <i>Check if section B.1 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> - Implementation status of the PA - Detailed description of installed technology(ies) / technical processes and equipment applied - Diagrams (where appropriate) 	/MR/ /PDD/ /PS/ /IM/	The verification team has checked section B.1 of the MR and confirms by means of comparison with the information given in the PDD, the project standard and information gathered during the site visit that: <input type="checkbox"/> the description of the implementation status of the PA is in line with the applicable provisions of the project standard <input type="checkbox"/> an appropriate description of the installed technology(ies), technical process and equipment incl.diagrams, where applicable, has been included In this context the following findings have been identified: As per EB 54 annex 34 the following information are missing; <ul style="list-style-type: none"> • The relevant dates for operation, commissioning etc. are missing under Section A.1 of the MR. • The details for shut down have been provided under Appendix II, however the reasons for the same are not provided. • Process diagram as per section A.4 has not been provided. • The details of the span gas used have not been described. • The calibration procedure as per Appendix IV is not clear. 	CAR B4	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>B.1.1. Initial project implementation (VVS; §§ 260 a, 261)</p> <p><i>Assess whether the project has been implemented and operated as per the registered PDD and are all physical features of the project in place?</i></p> <p><i>Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.</i></p> <p><i>Check if the project is still in compliance with the applicability conditions of the methodology.</i></p> <p><i>Also, discuss – if applicable – the necessity of PRC notifications / approvals.</i></p>	/IM01/ /PDD/	<p><i>Description:</i></p> <p>The project has been implemented and is operated as per the description in the registered PDD. The physical setup for the project remains the same.</p> <p><i>Verifier's action:</i></p> <p>The physical set up was verified during the site visit and discussed with the plant personnel for the operational procedures and is as per the description in the registered PDD.</p> <p><i>Conclusion:</i></p> <p>The project is implemented and operated as per the registered PDD.</p>	OK	OK
<p>B.1.2. Technical equipment changes (VVS; §§ 260 a, 261)</p> <p><i>Check if relevant technical equipment of the project activity has been exchanged or modified during the monitoring period. Further ensure that consistent notations of key equipment (meters etc.) in PDD, MR and calculation spreadsheet are applied</i></p> <p><i>Consider e.g. interviews with operational personnel, QMS records, maintenance records, instrument specifications.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring</i></p>	/IM01/ /PDD/	<p><i>Description:</i></p> <p>The project equipment has not changed; the same is described under section B.1.</p> <p><i>Verifier's action:</i></p> <p>The physical set up was verified during the site visit and discussed with the plant personnel for the operational procedures and is as per the description in the registered PDD.</p> <p><i>Conclusion:</i> The project equipment has not been exchanged.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to chapter B.2.</i></p>				
<p>B.1.3. Operation of the project activity (VVS; §§ 260 a, 261)</p> <p><i>Check if relevant operation modes of the project activity have been exchanged or modified during the monitoring period.</i></p> <p><i>Consider e.g. interviews with operational personnel, operation log sheets, data management system records.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to chapter B.2.</i></p>	/IM01/ /PDD/	<p><i>Description:</i></p> <p>The project equipment has not changed, the same is described under section B.1</p> <p>However, the monitoring frequency for CEM system is observed to be every second; however the MR is inconsistent in this regard. Appropriate correction is required.</p> <p><i>Verifier's action:</i></p> <p>The physical set up was verified during the site visit and discussed with the plant personnel for the operational procedures and is as per the description in the registered PDD.</p> <p><i>Conclusion:</i> The project equipment has not been exchanged. However pending CAR B2</p>	CAR B2	OK
<p>B.1.4. Incidents (VVS; §§ 260 a, 261)</p> <p><i>Identify if there have been any significant incidents, deviant operation modes and / or downtimes of the equipment?</i></p> <p><i>Consider e.g. interviews with operational personnel, operational log sheets, analysis of performance data.</i></p>	/IM01/	<p><i>Description:</i></p> <p>The downtime recorded during the monitoring period has been detailed along with the reason for downtime in the MR.</p> <p>The downtimes have been checked accordingly with the data log and is appropriate.</p> <p><i>Verifier's action:</i></p> <p>The downtimes were confirmed from the data records.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p><i>Conclusion:</i> No major incidents or downtimes were observed.</p>		
<p>B.1.5. Legislation Find out – esp. in the context of methodological requirements - whether relevant legislation with effect on the project activity in the host country has been changed.</p> <p>Assess, in case of changes, whether consequences for the PA with regard to relevant CDM requirements have been accounted for.</p> <p>In case of changes data sources shall be referenced.</p>	/IM01/	<p><i>Description:</i> The legislation with effect on the project has not changed during the monitoring period. The project activity requires monitoring effect due to change in the NO_x regulations, however the regulations for the same have not changed. There are no regulations in India for N₂O emissions.</p> <p><i>Verifier's action:</i> The consent to operate by the MPCB (Maharashtra State Pollution Control Board) has been checked and is valid till 31/10/2011 which covers the monitoring period.</p> <p><i>Conclusion:</i> The relevant host country legislation has not been changed.</p>	OK	OK
<p>B.1.6. Open issues from validation (VVS; § 248) <i>Check (esp. in case of 1st periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?</i></p>	/VAL/	<p><input checked="" type="checkbox"/> There were no open issues addressed in the validation report</p> <p><input type="checkbox"/> All open issues from the validation have been appropriately addressed.</p> <p><input type="checkbox"/> The following issues related to the validation have not yet been appropriately addressed:</p>	OK	OK
<p>B.1.7. Open issues from previous verification</p>	/VER/	<p><input checked="" type="checkbox"/> There were no open issues addressed in the previous verification report</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.												
(VVS; §§ 248, 319 h) <i>Check in case of further periodic verifications whether there are any open issues indicated in previous verification reports (FAR) and take into consideration the guidance as specified in VVS.</i>		<div><input type="checkbox"/> All open issues from the previous verification have been appropriately addressed.</div> <div><input type="checkbox"/> The following issues related to the previous verification have not yet been appropriately addressed:</div>														
B.2. Post registration changes																
B.2.1. Are post registration changes applicable to the proposed project activity?	/PDD/ /MR/ /IM01/	<div><input type="checkbox"/> No, by means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology. (Please proceed with section C)</div> <div><input checked="" type="checkbox"/> Yes, post registration changes have been identified and are assessed in detail in the subsequent steps. (Please proceed with B.2.2.)</div>	OK	OK												
B.2.2. Temporary deviations from the registered monitoring plan or applied methodology (TDfrMP; TDfMM) (F-CDM-FORM, Attachment, B.2.1; VVS §§ 286 - 291) <i>Indicate whether any temporary deviations have been applied during this monitoring period. In cases where approval has been sought from the EB please provide reference.</i>	/PS/ /unfccc/	<table><tr><td><input type="checkbox"/></td><td colspan="3">No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td><input checked="" type="checkbox"/></td><td colspan="3">The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC</td></tr><tr><td>1</td><td>Title</td><td colspan="2">The method of measurement of monitoring parameter Operating Hour of Plant (OH) calculated from operating temperature of reactor based measurement to Ammonia flow to Reactor</td></tr></table>	<input type="checkbox"/>	No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period			<input checked="" type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC			1	Title	The method of measurement of monitoring parameter Operating Hour of Plant (OH) calculated from operating temperature of reactor based measurement to Ammonia flow to Reactor		OK	OK
<input type="checkbox"/>	No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period															
<input checked="" type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC															
1	Title	The method of measurement of monitoring parameter Operating Hour of Plant (OH) calculated from operating temperature of reactor based measurement to Ammonia flow to Reactor														

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)			Draft Concl.	Final Concl.	
<i>If applied, provide a description of the deviation(s). This should include the reasons for the deviation(s), how it deviates from the monitoring plan and/or applied methodology(ies), the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Indicate if the deviation will lead to a reduction in the accuracy and if so, which conservative assumptions and discount factors have been applied.</i> <i>For deviation(s) that require prior approval by the Board, include the date of approval and reference number.</i>					based measurement		
				Status	<input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved		
				Appr.date	08-11-2011		
				Ref. No.	DEV-0395		
		2		Title			
				Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved		
				Appr.date			
				Ref.No.			
				<input checked="" type="checkbox"/>	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
				<input type="checkbox"/>	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
					1	Issue:	
					2	Issue:	
				<input type="checkbox"/>	The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:		
					1	Issue:	
					2	Issue:	

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.														
		<p><i>In cases of approved TDfrMP or TDfM the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each TDfrMP or TDfM for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>																
<p>B.2.3. Corrections (F-CDM-FORM, Attachment, B.2.2; VVS; §§ 292 - 294)</p> <p><i>Indicate whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.</i></p> <p><i>In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i></p> <p><i>Please check and report that the corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.</i></p>		<table><tr><td><input checked="" type="checkbox"/></td><td colspan="3">During the verification of the current MP no need for corrections has been identified.</td></tr><tr><td rowspan="3"><input type="checkbox"/></td><td colspan="3">The following corrections have been applied:</td></tr><tr><td>1</td><td>Issue:</td><td></td></tr><tr><td>2</td><td>Issue:</td><td></td></tr></table> <p><i>Detailed description and justification each correction:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>	<input checked="" type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.			<input type="checkbox"/>	The following corrections have been applied:			1	Issue:		2	Issue:		OK	OK
<input checked="" type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.																	
<input type="checkbox"/>	The following corrections have been applied:																	
	1	Issue:																
	2	Issue:																
<p>B.2.4. Permanent changes from the</p>		<table><tr><td><input type="checkbox"/></td><td colspan="3">No PCfrMP or PCfMM.have been submitted to the</td></tr></table>	<input type="checkbox"/>	No PCfrMP or PCfMM.have been submitted to the			OK	OK										
<input type="checkbox"/>	No PCfrMP or PCfMM.have been submitted to the																	

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>registered monitoring plan or applied methodology (PCfrMP; PCfMM) (F-CDM-FORM, Attachment, B.2.3; VVS; §§ 295 - 303)</p> <p><i>Indicate whether any permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring report.</i></p> <p><i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i></p>		UNFCCC prior to the current monitoring period		
		<input checked="" type="checkbox"/> The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC		
		1 Title N2O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India		
		Status <input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved		
		Appr.date 15-11-2012		
		Ref. No. CDM No: 2792		
		2 Title		
		Status <input type="checkbox"/> under approval; <input type="checkbox"/> approved		
		Appr.date		
		Ref.No.		
		<input type="checkbox"/> During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
		<input type="checkbox"/> An approval of the following PCfrMP or PCfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.		
		1 Issue:		
		2 Issue:		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.															
		<table><tr><td rowspan="3"><input type="checkbox"/></td><td colspan="2">The following PCfrMP or PCfMM for which appendix 1 of the PS is applicable have been applied:</td></tr><tr><td>1</td><td>Issue:</td><td></td></tr><tr><td>2</td><td>Issue:</td><td></td></tr></table> <p><i>In cases of approved PCfrMP or PCfMM the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each TDfrMP or TDfM for which appendix 1 is applicable:</i></p> <p>In this context the following findings have been identified:</p> <p>N/A</p>	<input type="checkbox"/>	The following PCfrMP or PCfMM for which appendix 1 of the PS is applicable have been applied:		1	Issue:		2	Issue:									
<input type="checkbox"/>	The following PCfrMP or PCfMM for which appendix 1 of the PS is applicable have been applied:																		
	1	Issue:																	
	2	Issue:																	
<p>B.2.5. Changes to the project design of the registered project activity (CoPD) <i>(F-CDM-FORM, Attachment, B.2.4; VVS; §§ 304 - 317)</i></p> <p><i>Indicate whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.</i></p> <p><i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the</i></p>		<table><tr><td><input checked="" type="checkbox"/></td><td colspan="2">No CoPD has been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td rowspan="4"><input type="checkbox"/></td><td colspan="2">The following CoPD has been approved or are under approval by the UNFCCC</td></tr><tr><td rowspan="4">1</td><td>Title</td><td></td></tr><tr><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td></td></tr><tr><td>Ref. No.</td><td></td></tr></table>	<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period		<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC		1	Title		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	Appr.date		Ref. No.		OK	OK
<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period																		
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	1	Title																	
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved																
		Appr.date																	
Ref. No.																			

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approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.		2	Title			
		Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved			
		Appr.date				
		Ref.No.				
		<input type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA			
		<input type="checkbox"/>	An approval of the following CoPD.is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.			
		1	Issue:			
		2	Issue:			
		<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:			
		1	Issue:			
		2	Issue:			
		<p><i>In cases of approved CoPD the EB guidance has been applied as follows:</i></p> <p><i>Detailed description and justification each CoPD for which appendix 1 of the CDM Project Standard is applicable:</i></p>				

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.		
		In this context the following findings have been identified: N/A				
C. Description of monitoring system						
C.1. Monitoring Plan – PDD Compliance (VVS, §§ 268-271) <i>Check if the monitoring plan is in accordance with the monitoring plan contained in the registered PDD (or any accepted revised MP).</i> <i>Please check esp. if</i> <ul style="list-style-type: none">- all parameters stated in the MP of the registered PDD have been monitored and updated as applicable- the monitoring equipment has been controlled and calibrated as per the MP- the monitoring results are consistently recorded as per the approved frequency- QA/QC procedures have been applied in accordance with the MP	/MR/ /PDD/	By means of comparison of the MR with the registered PDD (or any revisions thereof) the verification team has checked whether the MP is in compliance with the registered PDD. The outcome is as follows: <table border="1"><tr><td><input checked="" type="checkbox"/></td><td>The MP is completely in accordance with the last approved version of the MP.</td></tr></table> In this context the following findings have been identified: N/A	<input checked="" type="checkbox"/>	The MP is completely in accordance with the last approved version of the MP.	OK	OK
<input checked="" type="checkbox"/>	The MP is completely in accordance with the last approved version of the MP.					
C.2. Monitoring Plan – Meth Compliance (VVS, §§ 264-267) <i>Check if the monitoring plan is in accordance with the applied methodology.</i> <i>In case the methodology references applicable tools it</i>	/MR/ /PDD/ /AM9/ /T-FFC/ /T-EC/ /T-CAD/	By means of comparison of the MR with the applied CDM methodology and related tools the verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology. The outcome is as follows: <table border="1"><tr><td><input checked="" type="checkbox"/></td><td>The MP is completely in accordance with the approved</td></tr></table>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved	OK	OK
<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved					

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)			Draft Concl.	Final Concl.	
<i>has to be ensured that the MP is also compliant with those tools.</i> <i>Also please specify if monitoring aspects have been identified that are not specified in the methodology but may enhance the level of accuracy and completeness of the monitoring plan – this esp. applies for SSC PAs.</i>			methodology applied by the CDM project (last registered/approved version of the PDD)				
		☒	The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:				
			1	Title (of the tool)			Tool for the demonstration and assessment of additionality
				Version			5.2
				MP compliance			☐ full compliance ☐ findings have been raised ☒ N/A (for MP)
In this context the following findings have been identified:							
Regarding aspects that are not specified in the methodology the following issues have been identified which may enhance the level of accuracy and completeness of the MP:							
N/A							
C.3. Management System (VVS, § 252 (a) (iii)) <i>Check if the GHG data monitoring system can be assessed as appropriate.</i> <i>In case reference is made to a (certified) company</i>	/ISO/	<i>Description:</i> RCF is an ISO 9001 certified company, a separate CDM team has been appointed and all the equipments/instruments used in the CDM project are also included as a part of ISO procedures. However during the verification it was observed that the calibration details indicate that accuracy of the master			CAR C1	OK	

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>quality management system, check if all CDM related monitoring procedures have been fully integrated in the project participant's quality management system.</i></p> <p><i>In case of a stand-alone system, check how the GHG management system has been implemented and effectiveness is ensured.</i></p>		<p>calibrator/instruments is lower than the accuracy for the instrument being calibrated, thus the appropriateness of the calibration process is questionable. Further the implications of this fact need to be evaluated considering the requirements under EB 52 annex 60.</p> <p><i>Verifier's action:</i></p> <p>The data handling and recording procedures were discussed with the plant personnel also the ISO certificate was cross-checked to confirm the management systems.</p> <p><i>Conclusion:</i></p> <p>The management system for CDM has been integrated in the Quality management system.</p> <p>Nevertheless the following findings were relevant: CAR C1 related the lower accuracy of master calibrator instrument.</p>		
<p>C.4. Metering diagram (F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check first if the MR includes a metering diagram showing all relevant monitoring points.</i></p> <p><i>Check further if this diagram reflects the actual situation and is in line with the registered PDD and with the requirements of the applied methodology.</i></p>	/ISO/	<p><i>Description:</i></p> <p>The metering for the project has been described covering all the metering points.</p> <p><i>Verifier's action:</i></p> <p>The metering points have been confirmed during the site visit.</p> <p><i>Conclusion:</i></p> <p>The metering positions are implemented.</p>	OK	OK
<p>C.5. Roles and Responsibilities (F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check if all roles and positions of each person in the GHG data management process are clearly defined</i></p>	/ISO/ /ORG/	<p><i>Description:</i></p> <p>The roles and responsibility for the project is clearly defined, a separate CDM team has been formed at corporate level which looks into the aspects of the project beyond operational</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>and implemented as stated in the monitoring plan. Please consider the complete data trail from raw data generation to submission of the final data.</i></p> <p><i>Identify, if relevant personnel w.r.t. monitoring has been exchanged?</i></p> <p><i>If so, have appropriate training measures been carried out.</i></p> <p><i>In case of changes, assure that the implemented monitoring procedures have not been affected.</i></p>		<p>requirements.</p> <p><i>Verifier's action:</i></p> <p>RCF is ISO certified, further during the interview with the plant personnel, the roles and responsibilities for CDM were clearly demonstrated.</p> <p><i>Conclusion:</i> The roles and responsibilities of plant personnel were discussed and found acceptable.</p>		
<p>C.6. Emergency procedures for the monitoring system (F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check, as appropriate, whether relevant emergency procedures for the monitoring system have been included in the MR and assess whether these procedures have been implemented, when required</i></p>	/BR/	<p><i>Description:</i></p> <p>Emergency procedures for monitoring have been implemented, in line with the description in the registered PDD. The substitute value strategy for other parameter has been detailed.</p> <p><i>Verifier's action:</i></p> <p>The downtimes of the plant have been checked and the corresponding troubleshooting measures have been analyzed.</p> <p><i>Conclusion:</i></p> <p>The emergency procedures are established for parameters.</p>	OK	OK
<p>C.7. Data archive and data protection (PS §56 b)</p> <p>Check whether all records of monitoring parameters are archived according to the monitoring plan.</p> <p>Assess further whether appropriate measures have been taken in order to avoid unintended or intended</p>	/IM01/, /TS/	<p><i>Description:</i></p> <p>The data in the CEM is recorded in the soft copy, while the other hard copies of the documents shall be kept of two year after the crediting period or issuance of CERs whichever is later.</p> <p>The MR does not provide procedures for data archiving. Appropriate corrections are required. Thus CAR C2 has been</p>	CAR C2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
manipulation or loss of the measured data.		<p>raised.</p> <p><i>Verifier's action:</i></p> <p>The archiving procedure was checked for the CEM system and all the data for the parameters is available since the installation of the CEM system. The other documents for CDM are archived in hard copies and have been cross-checked.</p> <p><i>Conclusion:</i></p> <p>The data archiving procedure is assessed to be appropriate and in line with the requirements of the registered PDD.</p> <p>However the data protection is observed not to be in line with the PPD, thus CAR C2 has been raised.</p>		
D. Data and parameters				
D.1. Data and Parameters fixed ex ante				
<p>a) Compliance with registered PDD (F-CDM-FORM, Attachment; D1, VVS § 246 (d)) <i>Check whether the value applied is in compliance with the registered PDD.</i></p>	/PDD/	<p><i>Description:</i></p> <p>The parameters fixed ex ante are in compliance to the values as per the registered PDD.</p> <p><i>Verifier's action:</i></p> <p>The values have checked and confirmed with the registered PDD.</p> <p><i>Conclusion:</i></p> <p>The ex ante fixed values is in compliance to the registered PDD.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
b) Compliance with the applied methodology (F-CDM-FORM, Attachment; D1) <i>Check whether the value applied is in compliance with the applied methodology or any other tool.</i>	/PDD/	<i>Description:</i> The ex ante fixed parameter includes the baseline emission factor which has been computed in line with the applied methodology. <i>Verifier's action:</i> The parameters fixed ex ante are computed as per the applied methodology. <i>Conclusion:</i> The ex ante fixed values is in compliance to the registered PDD.	OK	OK
D.2. Data and Parameters monitored				
D.2.1. NCSG (mgN₂O/m³)		Description: N ₂ O concentration in the stack gas		
a) Measurement / Determination method (VVS, §§ 268, 271) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i>	/IM01/ /PDD/	<i>Description:</i> This parameter is measured through an ABB AO2000 URAS 26 continuous NDIR industrial photometer. Measurements are taken continuously and recorded by CEM every second. Based on the per second data, average values are calculated for every hour, the hourly values are used for statistical analysis (95% confidence level) based on which the values outside the permitted range is discarded. No changes on the measurement device have been identified since the implementation of this device.	CAR D1 CAR D2 CAR D3	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>		<p>During the data review for NCSG following discrepancies have been observed;</p> <p>The period for November 2010 the values for NCSG have shown a distinctive increase compared to average value of NCSG. Justification for the same shall be provided.</p> <p>Further the values for NCSG for the dates of 19/11/2010 and 23/11/2010 were abnormally low, the reason for the same shall be provided.</p> <p>Further, the valid data for NCSG and VSG is not traceable in the emission reduction sheet as the sorting for parameter of NCSG and VSG has been clubbed together. Appropriate corrections are required.</p> <p>Moreover, In the Annual Surveillance Test (AST) report for 2011, SGS recommended that measuring inaccuracy constants for NCSG which is 62 should not be subtracted and the value of this constant should be made zero in the system. In this regard the conservativeness in the emission reduction calculation shall be demonstrated.</p> <p><i>Verifier's action:</i></p> <p>The monitoring of the parameter was discussed with the plant personnel and also monitored under the QAL 2 Test and AST. The specification of instrument has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>plant.</p> <p><i>Conclusion:</i></p> <p>The monitoring of the parameter is as per the registered monitoring plan. Nevertheless the following findings are relevant: CAR D1, CAR D2 and CAR D3</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/CAL/	<p><i>Description:</i></p> <p>The supplier for the equipment is ABB, and the analyser was tested as per QAL 2 tested by TÜV Sud, Germany, the uncertainty of measurement for N₂O monitoring is reported as 4.52%, while the accuracy of the N₂O analyser is 3.44%.</p> <p>Calibration frequency of the N₂O is every 3 months manually, however the N₂O analyser is equipped with auto calibration procedures which carries out weekly calibration based on the QAL 3 procedures. Further Annual Surveillance Test (AST) was carried out in 2010 The result of AST test can be reported as “functional without defects”.</p> <p><i>Verifier’s action:</i></p> <ul style="list-style-type: none"> • The QAL 2 report by TÜV SUD, Germany is checked to confirm the uncertainty, while the specifications of analyser is provided by ABB • QAL 3 tests of the analyzer which carries out auto calibration on weekly basis. • analyser characteristics determined during QAL1 • AST tests (2010-2011) 	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p><i>Conclusion:</i></p> <p>The calibration report described in the MR does not cover the entire monitoring period. Thus CAR D2 is raised.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The values from the N₂O analyser is directly recorded in the CEM installed at RCF. The monitoring system is installed by ABB, Germany and the same is tested by third party, during QAL2 and AST.</p> <p><i>Verifier's action:</i></p> <p>The QAL 2 report and AST were checked to confirm the same. Furthermore the recording for the parameter and registered monitoring plan were checked</p> <p><i>Conclusion:</i></p> <p>The monitoring of the parameter is as per the registered monitoring plan, however pending findings are relevant for a final conclusion.</p>	CAR D1, CAR D2, CAR D3	OK
D.2.2. VSG (Nm³/h)		Description: Volume flow rate of the stack gas		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation</i></p>	/IM01/ /PDD/	<p><i>Description:</i></p> <p>The flow rate is measured based on the pressure-differential technique which continuously monitors the gas flow in the stack. A flow meter from ABB based on the pressure differential technique is installed with serial number (256DS6600028331) the TAG number is F1120400 and the range of measurement is</p>	CAR D2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>from 0 to 10 mbar.</p> <p>The sampling point is located at the height of 20 m in the stack.</p> <p>Recording is carried out every second based on which hourly average values are calculated which are further used for the statistical analysis (95% confidence level) and the values outside the confidence levels are discarded.</p> <p>The flow rate of the stack gas is directly measured and is recorded in the EMI 3000 software via the Data logger.</p> <p>No changes in the stack flow meter is observed during the monitoring period.</p> <p>However, the valid data for NCSG and VSG is not traceable in the emission reduction sheet as the sorting for parameter of NCSG and VSG has been clubbed together. Appropriate corrections are required.</p> <p><i>Verifier's action:</i></p> <p>The manual from the supplier (ABB) is checked in detail, also the monitoring is in line with the requirements of AM0034, as certified by a third party TÜV SÜD, Germany.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is in line with the registered monitoring plan. However pending CAR D2.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for</i></p>	/CAL/	<p><i>Description:</i></p> <p>The overall uncertainty w.r.t to stack flow monitoring is 2.89% (QAL 2 report section 10.5). The uncertainty in measurement has been considered for calculation of baseline emissions.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>		<p>The flow meter installed by ABB is of 0.075 accuracy class.</p> <p>The flow meter is under annual calibration as followed by RCF under its ISO 9000 procedure.</p> <p>In addition to annual calibration, the flow meter accuracy testing was a part of the QAL 2 test carried out by third Party TUV Sud, Germany and AST carried out by SGS Netherland meeting EN14181 standard</p> <p><i>Verifier's action:</i></p> <p>The calibration certificate along with the QAL 2 test report and AST was cross-checked to confirm the same.</p> <p>The calibration certificate along with the QAL 2 test report from TUV SUD, Germany and AST report by SGS, Netherland was cross-checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>The QA/QC procedures are assessed to be appropriate.</p> <p>The calibration for the equipment is as per the monitoring plan.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the</i></p>	<p>/MR/ /IM01/ /QAL/</p>	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The data recording is recorded directly in the CEM system. The CEM system is supplied by ABB and certified by TUV SUD, for its compliance to AM0034.</p>	CARD2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>		<p><i>Verifier's action:</i></p> <p>The QAL 2 report by TÜV SÜD, Germany is checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>The procedure for estimation of the values for the monitoring period is assessed to be correct. However Pending closure of CAR D2</p>		
D.2.3. OH (Hours)		Description: Operating hours		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	/IM01/ /PDD/	<p><i>Description:</i></p> <p>The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor.</p> <p>The operating hour for the plant can in principle be monitored by using either of two independent methods: Based on the temperature limits of the Reactor as described in the PDD or based on the ammonia flow to the reactor.</p> <p>However based the approved Request for revision of Monitoring plan, the operating hours as calculated in the plant are based on the ammonia flow to the reactor.</p> <p>Further, During the data review it has been observed that during shut downs and start ups, the value for OH is zero however production has been recorded and vice-versa. However the details and conservativeness shall be demonstrated for the considering OH as zero during the period.</p> <p><i>Verifier's action:</i></p>	CAR D4	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>Review of project documentation, process logic implemented at nitric acid plant. The procedures were discussed during the site visit with the plant personnel.</p> <p><i>Conclusion:</i> The operating hour are based on the temperature limit of the reactor. Once the reactor temperature of 860 °C is reached the plant is considered operational. However, pending CAR D4.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/CAL/	<p><i>Description:</i></p> <p>There are 3 temperature sensors in the reactor and the average value of the two nearest sensors is considered to reach a final value. The monitoring is done at every second. In case of failure of 1 sensor the values from the other two would be considered, however if two sensors fail then the plant would trip automatically.</p> <p>The range of measurement of the temperature sensors are 0-1200 °C. The accuracy in measurement is already taken into account for the monitoring system and is a party of emission reduction calculations.</p> <p><i>Verifier's action:</i></p> <p>The calibration certificates of the temperature measurement device was cross-checked to confirm the same.</p> <p>Review of project documentation, process logic implemented at nitric acid plant. The procedures were discussed during the site</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		visit with the plant personnel. Calibration certificates for OT and Ammonia flow instrumentation were checked. <i>Conclusion:</i> The calibration for the equipment is as per the monitoring plan. The monitoring of OH is in line with the Monitoring plan.		
c) Correctness (VVS, §§ 268, 271) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/IM01/ /MR/ /CAL/	<input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment) <i>Description:</i> The operating hour calculation as calculated in the plant are based on temperature in the reactor. However Pending CAR D4 <i>Verifier's action:</i> Review of project documentation, process logic implemented at nitric acid plant. The procedures were discussed during the site visit with the plant personnel. Calibration certificates for OT and Ammonia flow instrumentation were checked. <i>Conclusion:</i> The monitoring of OH is not appropriate for the start up period, thus CAR D4 has been raised	CAR D4	OK
D.2.4. NAP (tHNO₃)		Description: Nitric Acid (As 100%)		
a) Measurement / Determination method (VVS, §§ 268, 271) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the</i>	/IM01/ /PDD/ /TS/ /CHART/	<i>Description:</i> The total Nitric acid production is calculated based on the flow and concentration of nitric acid.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>The flow of nitric acid product is measured by a mass flow meter of make "Emerson process management" which is based on coriolis principle.</p> <p>The tag number of the flow meter is FI10121 and the serial number of the sensor is 12031565. The accuracy of the instrument is 0.1%. The range of the measurement is 0 - 40 t/hr</p> <p>The flow of nitric acid is monitored in the CEM system. Recording is for every seconds and daily average values are used.</p> <p>The dilute nitric acid concentration is measured at plant. Shift wise calculations are carried out and average value of the day is used for calculation.</p> <p>The concentration is determined by the specific gravity and temperature of the product nitric acid. The conversion chart from temperature and specific gravity to concentration is from Perry handbook of Chemical Engineers.</p> <p><i>Verifier's action:</i></p> <p>During the site visit the existence of the above mentioned equipment have been confirmed. The specification has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p><i>Conclusion:</i></p> <p>The monitoring is in line with the registered monitoring plan.</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/CAL/ /MM/	<p><i>Description:</i></p> <p>The tag number of the flow meter is FI10121 and the serial number of the sensor is 12031565. The accuracy of the instrument is 0.1%. The range of the measurement is 0 - 40 t/hr</p> <p>The instrument accuracy for the mass flow meter is stated as 0.1% and Calibration of flow meter is once in three years as per OEM recommendation.</p> <p>The same is in line with the registered monitoring plan.</p> <p>The calibration of hydrometer and thermometer is as per ISO 9001 procedures. The frequency is detailed as follows;</p> <p>Hydrometer – 6 months</p> <p>Thermometer – 1 year.</p> <p>The calibrations for the hydrometer and Thermometer are carried out by RCF and are traceable to National standards.</p> <p><i>Verifier's action:</i></p> <p>The calibration documents, reports and certificates were checked. The specification has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p><i>Conclusion:</i></p> <p>Calibration details are provided so far for the entire monitoring period.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The MR describes the calculation of the parameter, which is in line with the registered monitoring plan.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The value in the Monitoring report seems to be correct.</p>	OK	OK
D.2.5. TSG (Deg C)		Description: Temperature of stack gas		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p>	/IM01/ /PDD/ /TS/	<p><i>Description:</i></p> <p>The temperature of stack gas is measured at the sampling point located at a height of 20 m in the stack by RTD (PT 100) temperature meter. The tag number is TI12040. The range of measurement is 0-250 degree C.</p> <p>The temperature of the stack gas is measured by the CEM system at an interval of every 1 second.</p> <p>The value is used only for conversion of the stack gas readings from m³ to Nm³.</p> <p>The data is recorded directly in the CEM system.</p> <p><i>Verifier's action:</i></p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.		<p>The monitoring system is supplied by ABB and is in compliance to AM0034. The specification has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p><i>Conclusion:</i></p> <p>The determination method is in principle in line with the registered monitoring plan.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/CAL/ /MM/	<p><i>Description:</i></p> <p>The uncertainty in the temperature measurement at detailed in the QAL 2 report is 1.65%. The uncertainty of measurement is already a part in baseline emission calculations.</p> <p>Calibration frequency is once in a year. The testing for the instrument was a part in QAL 2 carried by TÜV SÜD, Germany and the AST carried out by SGS, Netherlands. Both the tests confirms the compliance to EN14181 as per the requirements under AM0034.</p> <p>The calibration of the temperature sensor is as per ISO 9001 procedures followed in the plant.</p> <p>Annual calibration of the temperature sensor is being carried out.</p> <p><i>Verifier's action:</i></p> <p>The QAL 2 test report is cross-checked to confirm the uncertainty of the parameter.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>The calibration reports are checked along with the QAL 2 test report and AST. The results are acceptable.</p> <p><i>Conclusion:</i> The most conservative assumptions are taken for emission reduction calculations. The QA/QC procedures are assessed to be correct.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The value in the Monitoring report is measured at every 2 second which is in compliance of the methodology.</p> <p><i>Verifier's action:</i> The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i> The value in the Monitoring report is assessed to be correct.</p>	OK	OK
D.2.6. PSG (hPa)		Description: Pressure of stack gas		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied</i></p>	/IM01/ /PDD/ /QAL/	<p><i>Description:</i> The pressure transmitter is located at the sampling point in the stack at a height of 20 m, the tag number is PI 12040 and the serial number of the meter is 1198949. The make of the instrument is Afriso. The meter is based on pressure differential</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>principle. The range of measurement is 0-1.6 bar absolute.</p> <p>The data is monitored at an interval of every 1 second. The data is used only for conversion from m³ to Nm³. The data is recorded directly in the CEM system.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable. Also the QAL 2 test report by TUV Sud, Germany certifies the compliance of the monitoring system as per AM0034.</p> <p><i>Conclusion:</i></p> <p>The parameter is determined in accordance with the registered monitoring plan.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in</i></p>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>The uncertainty of measurement as detailed in the QAL 2 report is 1.11%. The calculation of baseline emissions takes into account the uncertainty of measurement.</p> <p>Calibration is as per ISO 9001 procedure followed in the plant. The frequency for calibration is annual. The traceability is established to NABL standards.</p> <p>The calibration frequency is once in a year, however CAR C1 is raised due to lower accuracy of the Master calibrators.</p> <p><i>Verifier's action:</i></p> <p>The QAL 2 test report by TUV SUD, Germany is checked and found acceptable.</p>	CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Annex 2.</i>		<p>The calibration reports are checked and are acceptable.</p> <p><i>Conclusion:</i> The emission reduction calculation takes into account conservative assumptions. The QA/QC procedures are being followed.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The value in the Monitoring report is measured at every 1 second which is in compliance of the methodology.</p> <p><i>Verifier's action:</i> The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i> The value in the Monitoring report is correct.</p>	OK	OK
D.2.7. AFR (Kg NH₃/h)		Description: Ammonia gas flow rate to AOR		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation</i></p>	/IM01/ /PDD/	<p><i>Description:</i> The ammonia flow meter is based on differential pressure measurement principle. The sensors are located just before the reactor. The reading is taken at an interval of every 1 seconds.</p> <p>The tag number of the meters are FT 20211A, FT 20211B and FT 20211C. The serial numbers are S198744/45/46</p>	CAR D5	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>respectively.</p> <p>The differential pressure range of this instrument is 0-2500 mmWC.</p> <p>The parameter is ammonia gas flow to the reactor which is monitored in the DCS for plant performance; however the same is also stored in the CEM.</p> <p>During the review of the equipment's disparity in the serial numbers were observed for the parameters of AFR, OP and Air flow measuring instruments. Appropriate corrections are required. Thus CAR D5 is raised.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is as per the registered monitoring plan, however CAR D5 is raised.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures</i></p>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>The accuracy of the meter is 0.075.</p> <p>There are 3 measurements for the AFR and the average of the two closer values is considered. In case of failure of one meter the readings from the other two would be considered, however in case if two meter fails the plant would trip.</p> <p>The calibration of the flow meter is as per ISO 9000 procedure followed in the plant. The calibration frequency is annual. The calibration reports are traceable to NABL.</p>	CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</p> <p>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</p>		<p>Further CAR C1 is raised as the accuracy of the master calibrator are lower than the accuracy of the equipment.</p> <p>Verifier's action:</p> <p>The calibration reports are cross-checked to confirm the accuracy of the measurement.</p> <p>Conclusion:</p> <p>The QA/QC procedures are assessed to be appropriate. However pending CAR C1</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</p> <p>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</p> <p>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</p>	/MR/	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p>Description:</p> <p>The parameter is determined as per the registered monitoring plan, however pending CAR D5 and CAR C1</p> <p>Verifier's action:</p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p>Conclusion:</p> <p>The monitoring system is in line with registered monitoring plan. However, pending CAR D5 and CAR C1.</p>	CAR D5 CAR C1	OK
D.2.8. UNC (%)		Description: Overall measurement uncertainty of the monitoring system		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p>	/IM01/ /PDD/ /QAL/	<p>Description:</p> <p>The overall uncertainty for the monitoring system is calculated</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>by third party TUV Sud following the EN14181 guidelines. The report is referred as QAL 2 report.</p> <p>The measurement uncertainty is 4.52%.</p> <p>The frequency of measurement is once after the monitoring system is commissioned. The value is the same as specified in the registered PDD.</p> <p><i>Verifier's action:</i></p> <p>The QAL 2 Test report by TUV SUD, Germany is cross-checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>The parameter is in line with the value in the registered PDD.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of</i></p>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>The overall uncertainty of the measuring system is assessed to be 4.52%.</p> <p>The uncertainty has to be carried out only once after the commissioning thus it would not be carried out in future. The overall uncertainty is considered in the emission reduction calculations.</p> <p>It is by a third party TUV Sud, Germany following the EN14181 criteria as specified by the methodology. The value is as per the registered PDD.</p> <p><i>Verifier's action:</i></p> <p>The QAL 2 test report has been checked to confirm the values</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>the installed monitoring equipment in the table in Annex 2.</i>		and the QALity procedures confirm to EN14181. <i>Conclusion:</i> The emission reductions are based on conservative assumptions. The QA/QC procedures are assessed to be appropriate.		
c) Correctness (VVS, §§ 268, 271) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/MR/ /IM01/ /MR/ /QAL/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) <i>Description:</i> It is by a third party TUV Sud, Germany following the EN14181 criteria as specified by the methodology. The value is also mentioned in the registered PDD. <i>Verifier's action:</i> The value has been cross-checked with the registered PDD and QAL 2 test report and found matching. <i>Conclusion:</i> The value in the monitoring report is correct.	OK	OK
D.2.9. AIFR		Description: Ammonia to Air ratio		
a) Measurement / Determination method (VVS, §§ 268, 271) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation</i>	/IM01/ /PDD/ /DCS/	<i>Description:</i> Ammonia flow is recorded in the DCS, air flow is also recorded in the DCS, based on the two the ratio is calculated in the CEM system for every seconds and hourly average is recorded in the CEM system. There is no change in the monitoring equipment.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>The flow meter is based on the principle of Differential pressure; the range of measurement is 0-400 mmWC for air flow while the Ammonia flow is already detailed under the parameter 4.7. The parameter is determined as per the registered monitoring plan.</p> <p>The tag numbers for the meters are FT 120211A/B/C while the serial numbers of the air flow meters are S198744 /45 /46 respectively.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is as per the registered monitoring plan.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line</i></p>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>As the parameter is a ratio of two measured values, thus the calibration of air flow and ammonia flow is assessed to be accurate. The equipment is calibrated appropriately, no inaccuracy is observed. However CAR C1 is raised as the accuracy of the master calibrators are lower than the equipment accuracy.</p> <p>The Ammonia flow meter and Air flow meter shall be calibrated as per ISO procedures followed in the Plant. The calibration frequency is annual. The calibration records are traceable to NABL.</p>	CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>		<p><i>Verifier's action:</i></p> <p>The calibration reports are cross-checked to confirm the accuracy of the measurement.</p> <p>The measurement principle was discussed during the site visit with the plant personnel. The specification of the instruments have been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p><i>Conclusion:</i></p> <p>The calibration is appropriate and no inaccuracy of measurements is observed. The monitoring system is in line with registered monitoring plan.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/IM01/ /MR/ /QAL/	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The parameter is determined as per the registered monitoring plan.</p> <p>The air flow meter is based on the principle of differential pressure; the range of measurement is 0-400 mmWC for air flow while the Ammonia flow is already detailed under the parameter 4.7. The parameter is determined as per the registered monitoring plan.</p> <p>The tag numbers for the meters are FT 120211A/B/C while the serial numbers of the air flow meters are S198744 /45 /46</p>	CAR D5 CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>respectively.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The monitoring system is in line with registered monitoring plan. Pending CARs C1 and D5</p>		
D.2.10. OT_h (Deg C)		Description: Oxidation temperature of each hour		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	/IM01/ /PDD/ /QAL/	<p><i>Description:</i></p> <p>The temperature of the reactor is displayed in the DCS from where it is sent to the CEM. The recording is done at every seconds. There are 3 temperature sensors and the average of the two closer values is considered.</p> <p>The details of the temperature sensors are as follows; Make : Rosemount tolerance level 1%.</p> <p>Tag numbers/Serial numbers:</p> <ol style="list-style-type: none"> 1. TT 120332A/ 199556 2. TT 120333A/ 199558 3. TT 120334A/ 199560 <p>The range of measurement is 0-1200 °C.</p> <p>There is no case of equipment failure.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p><i>Verifier's action:</i></p> <p>The determination method and the procedure were discussed during the site visit with the plant personnel and DCS documents were checked.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is as per the registered monitoring plan.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/IM01/ /MR/ /QAL/	<p><i>Description:</i></p> <p>The tolerance level is 1%. The equipment is calibrated appropriately, no inaccuracy is observed.</p> <p>The temperature meter is calibrated as per ISO procedures followed in the Plant. The calibration frequency is annual. The calibration records are traceable to NABL. However CAR C1 is raised as the accuracy of the master calibrators are lower than the equipment accuracy.</p> <p><i>Verifier's action:</i></p> <p>The measurement principle was discussed during the site visit with the plant personnel. The specification of the instruments has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p>The calibration records were checked</p>	CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p><i>Conclusion:</i></p> <p>The accuracy is high, the monitoring system is in line with registered monitoring plan.</p> <p>The QA/QC procedures are assessed to be correct.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/IM01/ /MR/ /QAL/	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The parameter is determined as per the registered monitoring plan. However pending CAR C1.</p> <p><i>Verifier's action:</i></p> <p>The procedure and calculation were discussed during the site visit with the plant personnel and checked with the requirements.</p> <p><i>Conclusion:</i></p> <p>The monitoring system is in line with registered monitoring plan and the parameter is determined correct. However pending CAR C1.</p>	CAR C1	OK
D.2.11. OP_h (kPa)		Description: Oxidation pressure of each hour		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was</i></p>	/IM01/ /PDD/ /QAL/	<p><i>Description:</i></p> <p>The Oxidation pressure of the ammonia is recorded in the CEM. The recording is done every second and hourly average values</p>	CAR D5	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>are used. The details of the temperature sensors are as follows; Make: Emerson, tolerance level 1%; Tag numbers/Serial numbers: PT 120212 A/B/C.</p> <p>Further, During the review of the equipment disparity in the serial numbers were observed for the parameters of AFR, OP and Air flow measuring instruments. Appropriate corrections are required.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is as per the registered monitoring plan. However, CAR D5 is raised.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures</i></p>	<p>/CAL/ /QAL/</p>	<p><i>Description:</i></p> <p>The equipment is calibrated appropriately, no inaccuracy is observed. However CAR C1 is raised as the accuracy of the master calibrators are lower than the equipment accuracy.</p> <p>The accuracy of the pressure transmitter is mentioned wrongly in the MR, thus CAR D1 has been raised</p> <p>The temperature meter is calibrated as per ISO procedures followed in the plant. The calibration frequency is annual. The</p>	CAR C1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>		<p>calibration records are traceable to NABL.</p> <p><i>Verifier's action:</i></p> <p>The measurement principle was discussed during the site visit with the plant personnel. The specification of the instruments has been cross-checked with the supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p>The calibration records are checked and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The accuracy is high, the monitoring system is in line with registered monitoring plan. However CAR C1 is pending.</p> <p>The QA/QC procedures are assessed to be correct.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/MR/ /QAL/	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The parameter is determined as per the registered monitoring plan. However pending CAR D5</p> <p>The equipment is calibrated appropriately, no inaccuracy is observed.</p> <p>There is no case of equipment failure.</p> <p><i>Verifier's action:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The monitoring system is in line with registered monitoring plan.</p>	CAR C1 CAR D5	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		However pending CAR D5 and CAR C1		
D.2.12. GS_{project}		Description: Gauze Supplier for project campaign		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</p> <p>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</p> <p>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	/IM01/ /PDD/ /LOG/	<p>Description:</p> <p>The Gauze supplier for the project is RCF however the fabrication is done by private vendors.</p> <p>Verifier's action:</p> <p>The work order from RCF to fabricators is checked and found acceptable.</p> <p>Conclusion:</p> <p>The determination for the parameter is as per the registered PDD.</p>	OK	OK
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</p>	/LOG/	<p>Description:</p> <p>As the parameter is the name of the supplier thus calibration requirements are not applicable. However the parameter is assessed based on the work order issued by RCF.</p> <p>Verifier's action:</p> <p>The work order from RCF to fabricators is checked and found acceptable.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>		<p><i>Conclusion:</i></p> <p>The parameter does not have any effect on the emission reduction calculations.</p> <p>The QA/QC procedure is assessed appropriate as per the work order.</p>		
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/IM01/ /MR/ /LOG/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The Gauze supplier for the project is RCF however the fabrication is done by private vendors. No mistakes are identified.</p> <p><i>Verifier's action:</i></p> <p>The work order from RCF to fabricators is checked and found acceptable.</p> <p>.</p> <p><i>Conclusion:</i></p> <p>The determination for the parameter is as per the registered PDD.</p>	OK	OK
D.2.13. GC_{project}		Description: Gauze Composition during project campaign		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p><i>Describe how the monitoring parameter was measured / determined. Focus primarily on the</i></p>	/IM01/ /PDD/ /LOG/	<p><i>Description:</i></p> <p>The gauze composition is analysed by Third Party Ledoux & Company.</p> <p>The analysis report mentions the composition of the gauze</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>supplied by RCF. The composition of gauze is as follows;</p> <p>Rhodium: 8%</p> <p>Platinum: 92.00%</p> <p><i>Verifier's action:</i></p> <p>The analysis report by Ledoux & Company has been checked to confirm the composition.</p> <p><i>Conclusion:</i></p> <p>The determination for the parameter is as per the registered PDD.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>	/LOG/	<p><i>Description:</i></p> <p>The value is sourced from the analysis report of a third party (Ledoux & Company) which is an ISO 9001 certified company. Strict QA/QC procedures are being followed.</p> <p>Accuracy of the analysis report is assessed appropriate.</p> <p><i>Verifier's action:</i></p> <p>The web-link of the company is cross checked to confirm the applicability of its QA/QC procedures.</p> <p>http://www.ledoux.com/Quality_Control.html</p> <p><i>Conclusion:</i></p> <p>The emission reduction calculations are not directly related to</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		the parameter.		
c) Correctness (VVS, §§ 268, 271) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/IM01/ /MR/ /LOG/	<input type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment) <i>Description:</i> The gauze composition is analysed by Third Party Ledoux & Company. The analysis report mentions the composition of the gauze supplied by RCF. The composition of gauze is as follows; Rhodium: 8% Platinum: 92.00% <i>Verifier's action:</i> The analysis report by Ledoux & Company has been checked to confirm the composition. <i>Conclusion:</i> The determination for the parameter is as per the registered PDD.	OK	OK
D.2.14. EF_{reg}		Description: Emissions level set by incoming policies or regulations		
a) Measurement / Determination method (VVS, §§ 268, 271) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation</i>	/IM01/ /PDD/ /SC/	<i>Description:</i> The consent to operate by the Maharashtra Pollution Control Board dated 23/12/2011, valid till 01/08/2016 is checked and the plant is allowed to operate without any legal requirement related to N ₂ O emissions.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>level zero (DAL0)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>Government of India does not have any regulation for N₂O emissions till date.</p> <p><i>Verifier's action:</i></p> <p>The consent to operate for Rashtriya Chemicals & Fertilizers Ltd. is checked and found acceptable.</p> <p>The website for CPCB under the Ambient Air quality standards has been checked and no regulations w.r.t N₂O emissions are found.</p> <p>http://cpcb.nic.in/National_Ambient_Air_Quality_Standards.php</p> <p><i>Conclusion:</i></p> <p>There are no new regulations in the current monitoring period w.r.t N₂O emissions.</p>		
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p><i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p>	/SC/	<p><i>Description:</i></p> <p>The parameter refers to monitoring of the new regulations or policies by the government, thus accuracies of equipment and QA/QC procedures are not applicable.</p> <p><i>Justification of evidences:</i></p> <p>The consent to operate for Rashtriya Chemicals & Fertilizers Ltd. is checked and is valid.</p> <p><i>Conclusion:</i></p> <p>Accuracy calculations are not applicable for the parameter. QA/QC procedures are not applicable for the parameter.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>				
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	/IM01/ /MR/ /SC/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i></p> <p>The consent to operate by the Maharashtra Pollution Control Board dated 23/12/2011, valid till 01/08/2016 is checked and the plant is allowed to operate without any legal requirement related to N₂O emissions.</p> <p><i>Verifier's action:</i></p> <p>The consent to operate for Rashtriya Chemicals & Fertilizers Ltd. is checked and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The parameter is determined as per the registered PDD. No new regulations in the current monitoring period w.r.t N₂O emissions are identified.</p>	OK	OK
D.3. Sampling				

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>a) Implementation of sampling plan (F-CDM-FORM, Attachment; D3)</p> <p>Check whether the PP has applied a sampling approach to determine the monitored values (as per section D.2 above).</p> <p>If this is the case, please provide an assessment whether the PPs have correctly and sufficiently described the implemented sampling plan including</p> <p>a) Description of the implemented sampling design</p> <p>b) Collected data</p> <p>c) Analysis of collected data</p> <p>d) Demonstration on whether the required confidence/precision has been met.</p>	/PDD/ /MR/	<p><input checked="" type="checkbox"/> No sampling approach has been used by the PP to determine the monitored parameters</p> <p><u>OR.</u></p> <p><input type="checkbox"/> A sampling approach has been taken for the following monitored parameter:</p>	OK	OK
<p>b) Sampling during verification</p> <p>In case the VT has applied a sampling approach in the course of the verification the approach shall be described for each parameter.</p>	/PDD/ /MR/	<p><input checked="" type="checkbox"/> No sampling approach has been used by the VT to verify the monitored parameters</p> <p><u>OR.</u></p> <p><input type="checkbox"/> A sampling approach has been applied by the VT for the following monitored parameter:</p> <p>Parameter: Name_of Parameter</p> <p>Description:</p> <p>Conclusion:</p>	OK	OK


Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
E. Calculation of Emission reductions				
E.1. Traceability (VVS, §§ 247, 249) <i>Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spreadsheet shall be used. All applied formulae must be visible.</i>	/XLS/	<p><i>Description:</i></p> <p>The emission reduction sheet provides the raw data However the calculations are not traceable, further the MR does not provide the calculation procedure for emission reduction calculations. Appropriate corrections are required.</p> <p>Further The emission reduction calculation sheet incorporates circular reference, further the final value of emission reduction shall be a rounded down to ensure conservativeness.</p> <p><i>Verifier's action:</i></p> <p>The emission reduction sheet is cross checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>The calculations are not traceable, thus CAR E1and CAR E2 are raised.</p>	CAR E1 CAR E2	OK
E.2. Parameter consistency (VVS, § 249) <i>Assess whether all internal and external parameters and data used for calculation are applied consistently in the monitoring report and the calculation spreadsheet?</i> <i>Consider only the correct data exchange between the monitoring report and the calculation spreadsheet (if any). Further ensure the consistency of notations for all parameters in the PDD, MR and calculation</i>	/XLS/	<p><i>Description:</i></p> <p>The parameters are applied consistently, the calculations are not traceable in the emission reduction sheet. Thus CAR E1 is raised.</p> <p>The designations in the PDD and MR are consistent.</p> <p><i>Verifier's action:</i></p> <p>The emission reduction calculation sheet is checked and is acceptable. However pending CAR E1.</p>	CAR E1	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>spreadsheet.</i>		<p><i>Conclusion:</i></p> <p>The parameters are consistent in the PDD, MR and emission reduction calculation sheet. However, pending CAR E1.</p>		
<p>E.3. Correctness of calculation (VVS, §§ 279-280)</p> <p><i>Check if the applied formulae and methods for calculating baseline emissions, project emissions and leakage are in accordance with the monitoring plan and / or the approved methodology.</i></p> <p><i>Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.</i></p> <p><i>Check especially that no standard or old values have been used for calculation where calculations based on up-to-date data is required.</i></p>	/XLS/ /MR/ /PDD/	<p><i>Description:</i></p> <p>The emission reduction calculations are complete. The requirements of the registered PDD and monitoring methodology are applied correctly.</p> <p>However, the calculation of the moving average factor is not correct as the value of first campaign factor (EF1) is not in line with AM_CLA_204.</p> <p>.</p> <p><i>Verifier's action:</i></p> <p>The emission reduction calculation sheet is checked and is acceptable.</p> <p><i>Conclusion:</i> Latest values are used. The calculations are in line with the registered PDD and monitoring methodology, however Pending closure of CAR E3.</p>	CAR E3	OK
<p>E.4. Emission reductions table (F-CDM-FORM, Attachment, E.4)</p> <p><i>Check if the MR includes a summary table of the emission reductions calculation specifying separately</i></p> <ul style="list-style-type: none"> - Total baseline emissions 	/MR/	<p><input checked="" type="checkbox"/> The MR includes in section E.4 a summary table of the emission reductions calculation.</p> <p><input checked="" type="checkbox"/> The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately.</p> <p><input type="checkbox"/> The values as specified in the ER summary table are</p>	<p>CAR E1</p> <p>CAR E2</p> <p>CAR E3</p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<ul style="list-style-type: none"> - Total project emissions: - Total leakage - Total emission reductions. <p>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</p>		<p>correct; no issues have been identified during the verification which require changes in the ER calculation.</p> <p><input checked="" type="checkbox"/> During the verification issues with impact on the ER calculation have been identified. Thus subject to the closure of above listed findings the summary table in E.4 needs to be revised.</p> <p>In this context the following additional findings have been identified: CAR E1, E2, E3</p>		
<p>E.5. Comparison with ex-ante determined emission reductions (F-CDM-FORM, Attachment, E.5; E.6)</p> <p>Check if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD.</p> <p>Check further whether in case of an increase an appropriate explanation is included in the MR.</p> <p>Assess in case of a significant increase whether this is due to technical or organisational changes within or outside the control of the PP and – if this is case – whether the PRC have been considered appropriately.</p>	<p>/XLS/ /MR/ /PDD/</p>	<p><i>Description:</i></p> <p>The MR provides a comparison of estimated CERs and actual CERs observed during the monitoring period. A decrease in the CERs has been observed.</p> <p><i>Justification of evidences:</i></p> <p>The MR has been checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>The emission reductions in the current monitoring period are lower than the estimates in the PDD.</p>	OK	OK
<p>E.6. ER during the 1st commitment period and the period from 1 January 2013</p>	MR/	<p><input checked="" type="checkbox"/> The MR in section E.7 includes a summary table of the ER breakdown</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>onwards (F-CDM-FORM, Attachment, E.7)</p> <p>Check if the MR includes in chapter E.7 a breakdown of the actual ER into</p> <p>a) ER up to 2012-12-31 and</p> <p>b) ER from 2013-01-01 onwards</p> <p>The ERs for each period should be determined as per the actual generation. In cases where this is not possible or a cap has been applied a proportional (time related) approach should be chosen.</p>		<p>a) ER up to 2012-12-31 and</p> <p>b) ER from 2013-01-01 onwards</p> <p><input checked="" type="checkbox"/> The breakdown of the ERs during the first commitment period and from 2013-01-01 onwards is as follows:</p> <p><input checked="" type="checkbox"/> The ER have completely been generated during the first commitment period</p> <p><input type="checkbox"/> The ERs have completely been generated from 2013-01-01 onwards,</p> <p><input type="checkbox"/> The ERs have partly been generated during the first commitment period and partly from 2013-01-01 onwards.</p> <p><input checked="" type="checkbox"/> The breakdown of the ERs is correct, considering the applicable guidance.</p> <p>In this context the following additional findings have been identified:</p> <p>N/A</p>		

ANNEX 2: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



Statement of Competence
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

Mr. Pankaj Patel


SCHEME	STATUS	VALID UNTIL
CDM (Validation, Verification)	Lead Assessor	2016-06-21
VCS	Lead Assessor	2016-06-21

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
2.2	Heat Distribution	
3.1	Energy Demand	

31 - Rev.1 Date: 2014-01-09

Statement_of_Competence_2014_01_09_rev.1.doc S01-VA060-F20 rev3 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

Mr. Jimmy Sah


SCHEME	STATUS	VALID UNTIL
CDM Validation, Verification	Lead Assessor	2014-02-03
VCS	Lead Assessor	2014-02-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies

091 – Rev. 1, Date: 2011-07-27

091_S01-F003_2011-07-27_rev1 S01-F003 rev3 / 2010-04-19



Statement of Competence
Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program

Mr. Indrapal Parmar

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification)	2017-03-27
VCS / ISO 14064-2	Assessor	2017-03-27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energies	

191 - Rev. 3, Date: 2014-08-20

191_S01-VA060-F20_2014-08-20_rev3.doc S01-VA060-F20 rev3 / 2012-10-25

3rd Periodic Verification and Certification Report: N2O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India

TÜV NORD JI/CDM Certification Program

R-No: 8106754168 – 11-094



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Martin Saalmann

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2015-05-15
Ji	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_S01-F003_2012-05-16_rev4

S01-F003 rev0 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Dirk Speyer

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2016-04-16
VCS / ISO 14064-2	Senior Assessor	2016-04-16

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
16.1.1	Carbon Capture

244 - Rev. 7, Date: 2013-04-17

244_S01-VA060-F20_2013-04-17_rev7.doc

S01-VA060-F20 rev0 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Sanjay Dholakia

Authorization status for technical areas within sectoral scopes:

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

253 – Rev. 1, Date: 2011-03-25

253_S01-F003_2011-03-25_rev1

S01-F003 rev0 / 2010-04-19