



# Final Verification Report

- 1ST PERIODIC –

**RASHTRIYA CHEMICALS & FERTILIZERS  
LIMITED**

**N<sub>2</sub>O ABATEMENT IN HP NITRIC ACID PLANTS AT  
RASHTRIYA CHEMICALS & FERTILIZERS LIMITED,  
INDIA**

**UNFCCC REF. No. : 2792**

**Monitoring Period: 2009-11-20 to 2010-02-12**  
(incl. both days)

**Report No: 8106754168 – 10/167**

**Date: 2013-01-22**

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<b>Verification Report:</b>	<b>Report No.</b> 8106754168 – 10/167	<b>Rev. No.</b> 0	<b>Date of 1<sup>st</sup> issue:</b> 2013-01-22	<b>Date of this rev.</b> 2013-01-22
<b>Project:</b>	<b>Title:</b> N <sub>2</sub> O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India		<b>Registration date:</b> 2009-11-20	<b>UNFCCC-No.:</b> 2792
	<b>Host Country:</b> India		<b>Verification No.:</b> 1st periodic verification	
	<b>Crediting period:</b> <input checked="" type="checkbox"/> Renewable (7y) <input type="checkbox"/> Fixed (10y)		<b>From:</b> 2009-11-20	<b>To.:</b> 2010-02-12
	<b>Project Scale:</b> <input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale			
	<b>Project Participant(s):</b>		<b>Other involved Parties:</b>	
	<b>Host Party:</b> India		Switzerland	
	<b>Client:</b> Rashtriya Chemicals & Fertilizers Limited		<b>Project Owner:</b> Rashtriya Chemicals & Fertilizers Limited	
<b>Applied methodology/ies:</b>	<b>Title:</b> Catalytic reduction of N <sub>2</sub> O inside the ammonia burner of nitric acid plants		<b>No.:</b> AM0034, Version 3.2	<b>Scope(s) / TA(s)</b> 05/5.1
<b>Monitoring:</b>	<b>Monitoring period (MP):</b> 2009-11-20 to 2010-02-12 (both days included)		<b>No. of days:</b> 85	<b>MP No.</b> 01
<b>Monitoring report:</b>	<b>Title:</b> N <sub>2</sub> O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited, India		<b>Draft version:</b> Version 1: dated 03/06/2010	<b>Final version:</b> Version 4: 2012-12-06
<b>Verification team / Technical Review and Final Approval</b>	<b>Verification Team:</b> Mr. Rainer Winter (TL/TE) Mr. Mohinder Amarnath (TM) Mr. Jimmy Sah (TM) Mr. Sandip Saha (OT) Mr. Prasad Jakkaraju (TM)		<b>Technical review:</b> Mr. Dirk Speyer	<b>Final approval:</b> Mr. Stefan Winter
	<b>Emission reductions: [t CO<sub>2e</sub>]</b>	<b>Verified amount</b> 78,457 t	<b>As per draft MR:</b> 85,469 t	<b>As per PDD:</b> 447305 t/a
<b>Summary of Verification Opinion:</b>	<p>Rashtriya Chemicals &amp; Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: "N<sub>2</sub>O abatement in HP Nitric Acid plants at Rashtriya Chemicals &amp; 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"> <li><input checked="" type="checkbox"/> all operations of the project are implemented and installed as planned and described in the validated project design document,</li> <li><input checked="" type="checkbox"/> the monitoring plan is in accordance with the applied approved CDM methodology,</li> <li><input checked="" type="checkbox"/> the installed equipment essential for measuring parameters required for calculating emission reductions are not calibrated appropriately, thus procedures as per EB 52 annex 60 are applied</li> <li><input checked="" type="checkbox"/> the monitoring system is in place and functional. The project has generated GHG emission reductions, and</li> <li><input checked="" type="checkbox"/> the GHG emission reductions are calculated without material misstatements in</li> </ul>			



	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: <b>78,457 t</b> CO <sub>2e</sub>	
<b>Document information:</b>	<i>Filename:</i>	<i>No. of pages:</i>
	2012-12-22_S01-VA050-A1_RCF_HP1st final .doc	116

## **Abbreviations:**

<b>AFR</b>	<b>Ammonia Gas Flow Rate to AOR</b>
<b>AIFR</b>	<b>Ammonia to Air Ratio</b>
<b>AOR</b>	<b>Ammonia Oxidation Reactor</b>
<b>CA</b>	<b>Corrective Action / Clarification Action</b>
<b>CAR</b>	<b>Corrective Action Request</b>
<b>CDM</b>	<b>Clean Development Mechanism</b>
<b>CER</b>	<b>Certified Emission Reduction</b>
<b>CEM</b>	<b>Continuous Emission Monitoring</b>
<b>CO<sub>2</sub></b>	<b>Carbon dioxide</b>
<b>CO<sub>2eq</sub></b>	<b>Carbon dioxide equivalent</b>
<b>CL</b>	<b>Clarification Request</b>
<b>ER</b>	<b>Emission Reduction</b>
<b>FAR</b>	<b>Forward Action Request</b>
<b>GHG</b>	<b>Greenhouse gas(es)</b>
<b>MP</b>	<b>Monitoring Plan</b>
<b>NAP</b>	<b>Nitric Acid Production</b>
<b>NCSG</b>	<b>N<sub>2</sub>O Concentration in Stack Gas</b>
<b>NH<sub>3</sub></b>	<b>Ammonia</b>
<b>N<sub>2</sub>O</b>	<b>Nitrous Oxide</b>
<b>OH</b>	<b>Operating Hours</b>
<b>OP</b>	<b>Operating Pressure</b>
<b>OT</b>	<b>Operating Temperature</b>
<b>PDD</b>	<b>Project Design Document</b>
<b>PP</b>	<b>Project Participant</b>
<b>RCF</b>	<b>Rashtriya Chemicals and Fertilizers Limited</b>
<b>TSG</b>	<b>Temperature of Stack Gas</b>
<b>QA/QC</b>	<b>Quality Assurance / Quality Control</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>VSG</b>	<b>Volume flow rate of the Stack Gas</b>
<b>XLS</b>	<b>Emission Reduction Calculation Spread Sheet</b>

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## 1. INTRODUCTION

Rashtriya Chemicals & Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 1st periodic verification of the project

*“N<sub>2</sub>O 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 (HP) 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 Manual <sup>/VVM/</sup> of the UNFCCC.

This report summarizes the findings and conclusions of this 1st 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 <sup>/PDD/</sup>, the monitoring report <sup>/MR/</sup>, emission reduction calculation spread sheet <sup>/XLS/</sup>, 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 <sup>/KP/</sup>,



- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1 <sup>/MA/</sup>, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,
- CDM Validation and Verification Manual <sup>/VVM/</sup>,
- monitoring plan as given in the registered PDD <sup>/PDD/</sup>,
- Approved CDM Methodology AM0034 ver.3.2 “Catalytic reduction of N<sub>2</sub>O inside the ammonia burner of nitric acid plants”.

## 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 (HNO<sub>3</sub>) is produced through the oxidation of ammonia (NH<sub>3</sub>) on precious metal catalyst gauze in the ammonia burner of a nitric acid plant. Nitrous Oxide (N<sub>2</sub>O) is an undesirable by-product gas produced in the manufacture of nitric acid. Waste N<sub>2</sub>O 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 N<sub>2</sub>O to N<sub>2</sub> before its release into the atmosphere. Thus leading to reduction in emission of the N<sub>2</sub>O 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 Verification History

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

**Table 2-2:** Project verification history

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

## 2.3. Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity (Table 2-3).

**Table 2-3:** Project Parties and project participants

Characteristic	Project Participant	Party
Host party	Rashtriya Chemicals & Fertilizers Limited	India
Other involved party/ies	Rashtriya Chemicals & Fertilizers Limited	Switzerland

## 2.4. Project Location

The details of the project location are given in Table 2-4:

**Table 2-4:** 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

### 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<sup>/MR/</sup> submitted by the client and additional supporting documents with the use of customised verification protocol<sup>/CPM/</sup> according to the Validation and Verification Manual<sup>/VVM/</sup>,
- 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.

The sequence of the verification is given in the Table 3-1 below:

**Table 3-1:** Verification sequence Table

Topic	Time
Assignment of verification	2010-04-13
Publication of Monitoring Report	2010-06-07
On-site visit	2010-07-01 to 2010-07-02
Draft reporting finalised	2010-08-09
Final reporting finalised	2012-12-22
Technical review finalised	2012-12-22

#### 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 3-2 below.

**Table 3-2:** Involved Personnel

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme competence <sup>3)</sup>	Technical competence <sup>4)</sup>	Verification competence <sup>5)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Rainer Winter	TN CERT	TL/TE <sup>A)</sup>	SA	<input checked="" type="checkbox"/>	5.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Prasad Jakkaraju	TUV India Pvt. Ltd.	TM <sup>A)</sup>	LA	<input checked="" type="checkbox"/>	-	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Mohinder Amarnath	TUV India Pvt. Ltd.	TM <sup>A)</sup>	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.	Jimmy Sah	TUV India Pvt. Ltd.	TM <sup>A)</sup>	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.	Sandip Saha	TUV India Pvt. Ltd.	TM <sup>A)</sup>	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.	Dirk Speyer	TN CERT	TR <sup>B)</sup>	LA	<input checked="" type="checkbox"/>	5.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Stefan Winter	TN CERT	FA <sup>B)</sup>	SA	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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

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

<sup>4)</sup> As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ... while the previous criteria included A, B, C.....)

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

<sup>A)</sup> 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.

Statements of competence for the above mentioned team members are enclosed in annex 6 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 3-3 below.

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

<b>Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing</b>				
<b>Identification of potential reporting risk</b>	<b>Identification, assessment and testing of management controls</b>	<b>Areas of residual risks</b>	<b>Additional verification testing performed</b>	<b>Conclusions and Areas Requiring Improvement (including Forward Action Requests)</b>

**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.  The following measures are implemented:</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> <ul style="list-style-type: none"> <li>- Sample cross checking of manual transfers of data</li> <li>- Recalculation</li> <li>- Spreadsheet 'walk throughs' to check links and equations</li> <li>- Inspection of calibration and maintenance records for key equipment</li> <li>- Check sampling analysis results</li> </ul> <i>Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</i>	<i>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.</i>

The completed table A-1 is enclosed in the 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 3-4.

**Table 3-4:** Structure of the project specific periodic verification checklist

<b>Table A-2: Periodic verification checklist</b>				
<b>Checklist Item</b>	<b>Reference</b>	<b>Verification Team Comments</b>	<b>Draft Conclusion</b>	<b>Final Conclusion</b>
<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 VVM 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 the annex (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<sup>/PDD/</sup>,
- the last revision of the validation report<sup>/VAL/</sup>,
- documentation of previous verifications<sup>/VER/</sup>
- the monitoring report, including the claimed emission reductions for the project<sup>/MR/</sup>,
- the emission reduction calculation spreadsheet<sup>/XLS/</sup>.

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 on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- The duly calibration of all metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked completely.
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.

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 3-5.

**Table 3-5:** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
<ol style="list-style-type: none"> <li>1. Projects &amp; Operations Personnel, Rashtriya Chemicals &amp; Fertilizers Limited; India;</li> <li>2. List of personnel interviewed is described under section 7.4</li> </ol>	<ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Technical equipment and operation</li> <li>- Changes since validation</li> <li>- Monitoring and measurement equipment</li> <li>- Remaining issues from validation</li> <li>- Calibration procedures</li> <li>- Statutory Compliance</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> <li>- GHG emission reduction calculation</li> <li>- Procedural aspects of the verification</li> <li>- Maintenance</li> <li>- Environmental aspects</li> </ul>



### **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<sup>/MR/</sup>, the calculation spreadsheet<sup>/XLS/</sup>, PDD<sup>/PDD/</sup>, the Validation Report<sup>/VAL/</sup> 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 – General description of the project activity	01	0	0
B – Implementation of the project activity	03	0	0
C – Description of the monitoring system	03	0	0
D – Data and parameters monitored	04	01	0
E - Emission Reductions Calculation	03	0	0
<b>SUM</b>	<b>14</b>	<b>01</b>	<b>0</b>

**Table 4-2:** MR versions used for assessments

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

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).

Finding:	A1		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The contents as listed under EB 54 annex 34 shall be detailed in the Monitoring Report. A.1. Requested information related the project activity is missing. Correction is required.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The revised Monitoring Report has been modified as per new format of Monitoring Report as listed under EB 54 annex 34.		
<b>DOE Assessment #1</b> <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 is in compliance to the requirements under EB 54 annex 34. The template for MR has been followed correctly. Correct information is included. CAR is closed.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	B1		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The downtime recorded during the monitoring period are shown in the Monitoring Report, but detailed reasons and explanations for downtime are missing.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Revised Monitoring Report includes details of downtime in the Monitoring period, along with reasons for the downtime. Kindly refer Appendix - II.		
<b>DOE Assessment #1</b> <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 under section Annex 1 mentions the downtime observed for the project activity. The downtime was crosschecked with the values from the data logger and found correct and acceptable.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	B2		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor, however during the site visit it was observed that the operating hours as calculated in the plant are based on the ammonia flow to the reactor. Request for revision in MP/deviation from MP is required.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	A request for Deviation has been submitted to UNFCCC		
<b>DOE Assessment #1</b> <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>	A request for deviation has been submitted and the approval from UNFCCC is awaited.		
<b>Corrective Action #2</b>	<p>The operating hour for the plant can in principle be monitored by using either of two independent methods viza:</p> <ol style="list-style-type: none"> <li>Based on the temperature limits of the Reactor as described in the PDD.  The plant is considered operational only when the temperature of the ammonia reactor is <math>\geq 860</math> °C. The temperature measurement is at the interval of every seconds.</li> <li>Based on the ammonia flow to the reactor.  The plant is considered to be operational during the ammonia flow is introduced in the pre-heated reactor.</li> </ol> <p>Both the methods are equality good to record operating hours of the plant.</p> <p>It was decided by RCF to implement first method for HP Plant. However the logic was configured on 2<sup>nd</sup> method and this remained applicable during 20/11/2009 to 09/07/2010. The same was switched over to 1<sup>st</sup> method on 09/07/2010.</p> <p>The deviation I-DEV0395 was requested for the period from 20/11/2009 to 09/07/2010.</p> <p>UNFCCC has accepted the request for deviation to the monitoring and reporting process for the project campaigns included in the 1st and 2nd monitoring periods, provided that a revision of monitoring plan is requested in order to continue applying the procedure of monitoring the operating hours based on the ammonia flow to be consistent with the implemented procedure in the baseline campaign where operating hours were also determined as per the</p>		

Finding:	B2
	<p>ammonia flow.</p> <p>The deviation regarding the baseline campaign is accepted for the deviation period requested until the revision of the monitoring plan is approved, provided that the operating hours are monitored based on the flow of ammonia during the deviation period.</p> <p>In line with above recommendation from UNFCCC, procedure for monitoring the operating hours is changed from “procedure based on the reactor temperature” to “procedure based on ammonia flow to the reactor” on 07.01.2012 when plant was shut-down for primary catalyst replacement job.</p>
<b>DOE Assessment #2</b>	<p>The revision in Monitoring plan has been submitted in-line with the decision from CDM-EB, however for the current monitoring period the OH was monitored based on the flow limit of the reactor which is the approach followed in the baseline scenario also. Thus the approach is assessed to be correct and in line with the decision from CDMEB. According to the decision taken by CDM-EB (<a href="http://cdm.unfccc.int/Projects/deviations/38618">http://cdm.unfccc.int/Projects/deviations/38618</a>) “For the deviation to the monitoring and reporting process for the project campaigns included in the 1<sup>st</sup> monitoring period (20 November 2009 to 12 February 2010) and 2<sup>nd</sup> monitoring periods (13 February 2010 - 07 July 2010) ,provided that a revision of monitoring plan is requested in order to continue applying the procedure of monitoring the operating hours based on the ammonia flow to be consistent with the implemented procedure in the baseline campaign where operating hours were also determined as per the ammonia flow. The deviation regarding the baseline campaign is accepted for the deviation period requested until the revision of the monitoring plan is approved, provided that the operating hours are monitored based on the flow of ammonia during the deviation period”. Hence, CAR is closed.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	B3
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>The permitted range for the parameter of Oxidation Temperature, Oxidation Pressure, Ammonia Flow Rate and Ammonia - air ratio is not in compliance to the range as described in the PDD.</p>
<b>Corrective Action #1</b> <i>This section shall be filled by</i>	<p>Appropriate correction is done in revised Monitoring Report and</p>

Finding:	B3
<i>the PP. It shall address the corrective action taken in details.</i>	emission reduction sheet which now provides the permitted range in compliance to registered PDD.
<b>DOE Assessment #1</b> <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>	Reference PDD version 4 dated 06/12/2012 The Permitted ranges for the parameters have been revised considering the permitted range for the parameter of Oxidation Temperature, Oxidation Pressure, Ammonia Flow Rate and Ammonia - air ratio as provided in the registered PDD. The exclusion of the data sets beyond the permitted range for the statistical analysis is assessed to be appropriate, conservative and in compliance with the methodology AM0034 ver. 3 thus is acceptable. CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	C1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The substitute value strategy has to be reconsidered with regard to the requirements of the methodology "Downtime of Automated Measuring System" under Annex 1 of the methodology, further the metering positions are not described in the MR.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Monitoring Report (page no. 12) and CER calculation have been modified as per relevant clause in the methodology for "Downtime of Automated Measuring System" under Annex 1 and the metering positions are described in a separate diagram.  As per the procedure specified by the Methodology, the highest measured value of NCSG (2002.33 mg/Nm <sup>3</sup> ) and VSG (55190.1 Nm <sup>3</sup> /h) during the campaign have been substituted wherever applicable in the CER calculation sheet, for calculation of project emission factor. This is a conservative approach.
<b>DOE Assessment #1</b> <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 metering positions are described in the revised MR and are in accordance with the implementation at site. Further the CER calculation considers the correct substitute value as per the procedure specified by the Methodology. The highest measured value of NCSG (2002.33 mg/Nm <sup>3</sup> ) and highest measured value VSG (55190.1 Nm <sup>3</sup> /h) for the campaign have been applied for calculation of project emission factor calculation which are in line with methodology and the emergency preparedness of this project activity. During the Monitoring period 60h downtime for the N <sub>2</sub> O analyser and 5h for the stack gas flow meter have been

Finding:	C1
	observed, thus the highest value of NCSG and VSG have been correctly applied during the downtime of the analyser and flow meter. Thus, PP has appropriately considered the value of NCSG and VSG. Hence CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	C2
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The alarm system in the N <sub>2</sub> O analyzer room is not displayed in the control room as an emergency preparedness. Clarification is requested.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The signal of CEM system alarm from N <sub>2</sub> O analyser room has been brought to control room. This arrangement will display alarm of CEM system in control room also.
<b>DOE Assessment #1</b> <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 alarm system in the N <sub>2</sub> O analyser room has been relayed to the control room. The implementation has been confirmed during the visit to site. CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	C3
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The procedure of QAL 3 is not described in the MR. Appropriate corrections are required.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Monitoring Report has been modified to include the procedure of QAL 3 under the section C on page no. 8.
<b>DOE Assessment #1</b> <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>	Under QAL 3 the auto calibration of the N <sub>2</sub> O analyser is conducted on a weekly basis, further the manual calibration with a span gas is



Finding:	C3
<i>pass 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 at an interval of every three months. The QAL 3 procedures are detailed under section C of the revised MR and are found acceptable and in accordance with analyser's specification. CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	D1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<ol style="list-style-type: none"> <li>During the document review it was observed that the Date of calibration of N<sub>2</sub>O analyser was done on 28/05/2010 which contradicts with the date mentioned in MR (Appendix 2) and moreover the same does not cover the monitoring period.</li> <li>The instrument Tag Number for Stack pressure transmitter as in site is 1198949 which contradicts with the number stated in the MR in this regard correction is requested.</li> <li>Also there are no details about the operating pressure (OP) serial numbers and calibration dates. Substantiate the same with calibration certificates.</li> <li>The Calibration certificate for the following monitoring equipment need to be submitted               <ul style="list-style-type: none"> <li>Stack Flow DP transmitter dated 06/07/2010</li> <li>Stack Pressure transmitter dated 06/07/2010</li> <li>Stack temperature transmitter dated 06/07/2010</li> <li>Hydrometer dated 29/05/2010</li> </ul> </li> </ol>
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<ol style="list-style-type: none"> <li>Calibration of N<sub>2</sub>O analyzer was carried out on 28/05/2010. Due to typographical error, the date for the N<sub>2</sub>O analyzer calibration was mentioned as 27/05/2010. Further it may be noted that the calibration dates 27/02/2010 and 27/05/2010 mentioned in Appendix-II of MR revision 1 were not pertaining to the campaign period. Hence these dates have been corrected to 10/10/2009 and 16/12/2009 respectively in line with audit observation in Revised MR under Appendix – III.</li> <li>Serial number of stack gas pressure transmitter is 1198949. Due to typographical error, serial number of stack gas pressure transmitter was mentioned as 118949. Stack gas pressure transmitter serial number is corrected in revised MR. Kindly refer Annexure-III.</li> <li>Serial numbers and calibration dates for operating pressure</li> </ol>



Finding:	D1
	<p>transmitters (PT-120212A, PT-120212B, PT-120212C) are mentioned in revised MR under Appendix-III. Calibration certificates are submitted for your kind reference.</p> <p>4 Calibration certificates of stack flow DP transmitter, stack pressure transmitter, stack temperature transmitter and hydrometer are submitted.</p>
<p><b>DOE Assessment #1</b>  <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>	<ol style="list-style-type: none"> <li>1. Calibration dates in the revised MR is confirmed with the calibration report and is acceptable. Further the calibration dates provided cover the entire monitoring period. CAR is closed.</li> <li>2. Serial number of stack gas pressure transmitter is 1198949 which has been confirmed with the calibration report and during the on-site visit for the project activity. MR is corrected accordingly.</li> <li>3. Serial numbers and calibration dates for operating pressure transmitters (PT-120212A, PT-120212B, PT-120212C) are mentioned in revised MR under Appendix-III. The serial numbers have been confirmed with the Calibration certificates as well as during the on-site visit for the project activity and is found to be correct.</li> <li>4. 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.</li> </ol>
<p><b>Corrective Action #2</b></p>	<p>All measuring instruments have been calibrated with the new master instruments with better accuracy in April 2011. The calibration certificates of the measuring instruments and that of Master instruments are submitted.</p> <p>We have recalculated CERs, by considering extreme negative error in all the measuring instruments.</p> <p>The following points are mentioned for better understanding of method adopted:</p> <ol style="list-style-type: none"> <li>i) We try to illustrate the methodology followed by explaining the case of stack gas temperature transmitter (TI-301). Kindly refer to Combined Accuracy Sheet in the CER calculation sheet with negative error. The accuracy of the measuring instrument is 0.1%. There are two master instruments, one (Nagman 600 S) with</li> </ol>

Finding:	D1
	<p>an accuracy of 0.1% and the other one Fluke digital multimeter with accuracy of 0.2% which were used for calibration of subject temperature transmitter. The combined accuracy for the Master instruments works out to be <math>[\text{SQRT} \{(0.1^2) + (0.2^2)\} = 0.22\%]</math> i.e. to say by calibrating with these master instruments, the maximum negative error which can go unnoticed is <math>(0.22 - 0.1 = 0.12\%)</math> of Full scale i.e. <math>(0.12/100) \times \text{Range} = (0.12/100) \times 150 \text{ deg.C} = 0.19 \text{ deg.C}</math>. So in the work-sheet with negative error we have corrected the measured stack gas temperature value as (eg. <math>118.64 - 0.19 = 118.45 \text{ deg.C}</math>) and in the work-sheet with positive error we have corrected the measured stack gas temperature value as <math>(118.64 + 0.19 = 118.83 \text{ deg.C})</math>. Using this logic we have corrected all the measured values for all the other parameters and prepared two EXCEL sheets as described above.</p> <p>ii) While correcting the AIFR ratio [Ammonia Flow / (Ammonia Flow + Air Flow)] we have calculated combined accuracy for all the six instruments together, which is the most conservative approach.</p> <p>After correcting the stack gas flow, stack gas temperature values, actual volumetric flow is converted to NM<sup>3</sup> value using an equation <math>(P_n V_n / T_n = P_a V_a / T_a)</math> where P is in Atm, Temp is in deg.K and V<sub>a</sub> is in M<sup>3</sup>/hr) which is well illustrated in the EXCEL sheet.</p>
<b>DOE Assessment #2</b>	<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>Further the calibrations with the new master equipments were conducted in April 2011 and no errors have been reported for the</p>

Finding:	D1
	calibration of the equipment. However, the emission reductions have been calculated after application of maximum error for the parameters in question. The same is assessed to be in-line with the procedures as per EB 52 annex 60. CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	D2
<b>Classification</b>	<input type="checkbox"/> CAR <input checked="" type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>During the document review it was observed that the Date of previous &amp; current calibration of the following</p> <ol style="list-style-type: none"> <li>1 DP transmitter for Ammonia flow rate</li> <li>3 pressure transmitter for Ammonia inlet pressure</li> <li>3 RTDs for Ammonia inlet Temperature</li> <li>3 DP transmitter for Air flow rate</li> <li>3 pressure transmitter for Air inlet pressure</li> <li>3 RTDs for Air inlet Temperature</li> <li>3 temperature transmitter of Catalyst</li> <li>N<sub>2</sub>O analyser (3 months)</li> <li>DP transmitter of Stack flow</li> <li>Pressure transmitter for Stack</li> <li>RTD of Stack temperature</li> <li>Hydrometer for Acid density (6 months)</li> <li>Thermometer for Acid temperature</li> </ol> <p>has crossed the frequency of calibration as mentioned in PDD. In this regard clarification is requested why there was a deviation in the past. It was also observed that AST for year 2009 was not carried out. Further the procedures as per EB 52 annex 60 has not been complied with.</p>
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<ol style="list-style-type: none"> <li>1. Ammonia flow D.P transmitters were previously calibrated on 16/08/2008. Calibration frequency is of one year i.e. next calibration was due on 16.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 17/08/2009 and 19/08/2009 instead of 16.08.2009. Calibration certificates are submitted. The instrument was found OK.</li> <li>2. Ammonia gas Pressure transmitters were previously calibrated</li> </ol>

Finding:	D2
	<p>on 14/08/2008 &amp; 16/08/2008. Calibration frequency is of one year i.e. next calibration was due on 14.08.2009 and 16.08.2009 respectively. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 19/08/2009 instead of 14.08.2009 and 16.08.2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>3. Ammonia gas inlet temperature transmitters were previously calibrated on 16/08/2008. Calibration frequency is of one year. i.e. next calibration was due on 16.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 17/08/2009 and 19/08/2009 instead of 16.08.2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>4. Air flow D.P transmitters were previously calibrated on 14/08/2008 &amp; 16/08/2008. Calibration frequency is of one year. i.e. next calibration was due on 14.08.2009 and 16.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 17/08/2009 and 19/08/2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>5. Reactor inlet air Pressure transmitters were previously calibrated on 14/08/2008. Calibration frequency is of one year i.e. next calibration was due on 14.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 17/08/2009 and 19/08/2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>6. Calibrations of air inlet temperature were previously calibrated on 14/08/2008. Calibration frequency is of one year i.e. next calibration was due on 14.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 17/08/2009 and 19/08/2009 instead of 16.08.2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>7. Calibrations of temperature transmitter of catalyst were previously calibrated on 14/08/2008 &amp; 16/08/2008. Calibration frequency is of one year i.e next calibration was due on 14.08.2009 and 16.08.2009. However plant was shut-down from 13.08.2009 to 21.08.2009. Due to plant constraints during shut-down, calibration was done on 18/08/2009 instead of 16.08.2009. Calibration certificates are submitted. The instrument was found OK.</p>

Finding:	D2
	<p>For the points 1 to 7 above Delay in calibration does not have any impact on instrument indication and CER calculation as the plant was shut-down before the scheduled date of calibration i.e.16.08.2009 and was restarted only after the instrument calibration was completed on 18.08.2009.</p> <p>8. Calibration of N<sub>2</sub>O analyzer was carried out on 28/05/2010. Due to typographical error the calibration date for the N<sub>2</sub>O analyzer was mentioned as 27/05/2010 in Appendix-III. Appendix-III data is corrected in revised MR.</p> <p>9. Stack flow DP transmitter was previously calibrated on 01/07/2008. Calibration frequency is of one year. i.e. next calibration was due on 01.07.2009. However scheduled calibration could not be carried out on 01.07.2009 as plant was in operation. Hence the calibration was done during next available opportunity when there was plant shut-down on 06.07.2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>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 approach.</p> <p>Compliance with EB-52 Annex 60 due to delay in calibration of stack flow DP transmitter is also addressed in above considerations.</p> <p>10. Stack pressure transmitter was previously calibrated on 01/07/2008. Calibration frequency is of one year. i.e. the next calibration was due on 01.07.2009. However scheduled calibration could not be carried out on 01.07.2009 as plant was in operation. Hence the calibration was done during next available opportunity when there was plant shut-down on 06.07.2009. Calibration certificates are submitted. The instrument was found OK</p> <p>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.</p> <p>Compliance with EB-52 Annex 60 due to delay in calibration of stack pressure transmitter is also addressed in above considerations</p>

Finding:	D2
	<p>11. Stack temperature transmitter was previously calibrated on 01/07/2008. Calibration frequency is of one year. i.e. the next calibration was due on 01.07.2009. However scheduled calibration could not be carried out on 01.07.2009 as plant was in operation. Hence the calibration was done during next available opportunity when there was plant shut-down on 06.07.2009. Calibration certificates are submitted. The instrument was found OK.</p> <p>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.</p> <p>Compliance with EB-52 Annex 60 due to delay in calibration of stack temperature temperature is also addressed in above considerations</p> <p>12. Hydrometer was previously calibrated on 29/05/2009. Calibration frequency is of six months i.e next calibration was due on 29.11.2009. 29/11/2009 was a Sunday, a holiday. Therefore, the actual calibration was done on 30/11/2009 Calibration certificate is submitted. The instrument was found OK.</p> <p>13. Calibration of thermometer for acid temperature was previously done on 10/10/2008. Calibration frequency is of one year i.e. next calibration was due on 10.10.2009. However calibration was done on 29/09/2009. However this thermometer got broken on 25.11.2009. New Thermometer was calibrated on 25.11.2009 and was put to use.</p> <p>Further, Compliance with EB-52 Annex 60 para 4 (b) has been demonstrated as the AST for 2009 was not conducted. The AST for 2010 mentions that the CEM system is working in satisfactory conditions, thus the uncertainty identified in QAL 2 test has been applied for VSG (2.93%) and NCSG (3.44%), there by leading to a reduction of approx 1,775 CERs.</p>
<p><b>DOE Assessment #1</b>  <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>	<p>The revised MR provides the details for the calibration covering the entire monitoring period.  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.</p>



Finding:	D2
	<p>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>Further 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 assessed to be in-line with the procedures as per EB 52 annex 60.</p> <p>Further it was observed that AST for year 2009 was not carried out, thus the AST report of 2010 was checked to confirm the functioning of the CEM system. The AST of 2010 confirms the CEM system to be in line with the QAL2 report, thus in line with EB 52 annex 60 para 4 (b) the error in the monitoring for VSG and NCSG have been applied for emission reduction calculations. The error factor of 2.93% for VSG and 3.44% for NCSG has been applied, the values have been cross-checked with the QAL 2 report and is acceptable. Further the application of the error factor leads to a reduction of approximately 1,755 CERs. Thus the project is assessed to be in compliance to the methodology and EB 52 annex 60.</p> <p>Further the assessment of individual issues are as follows;</p> <ol style="list-style-type: none"> <li>1. Ammonia flow meter was previously calibrated on 16/08/2008. Calibration frequency is of one year, the next calibration was on 17/08/2009 and 19/08/2009 instead of 16.08.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment.</li> <li>2. Ammonia gas Pressure meters were previously calibrated on 14/08/2008 &amp; 16/08/2008, the calibration frequency is of one year. However, the calibration was done on 19/08/2009 instead of 14.08.2009 and 16.08.2009. But as the plant was under shut down thus there is no material impact of the same on emission</li> </ol>

Finding:	D2
	<p>reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>3. Ammonia gas inlet temperature monitoring equipment was previously calibrated on 16/08/2008. Calibration frequency is of one year. The next calibration was done on 17/08/2009 and 19/08/2009 instead of 16.08.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>4. Air flow meters were previously calibrated on 14/08/2008 &amp; 16/08/2008. Calibration frequency is of one year. However, calibration was done on 17/08/2009 and 19/08/2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>5. Reactor inlet air Pressure monitors were previously calibrated on 14/08/2008. Calibration frequency is of one year however, the next calibration was done on 17/08/2009 and 19/08/2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>6. Calibrations of air inlet temperature meter was previously calibrated on 14/08/2008. Calibration frequency is of one year. However, the next calibration was done on 17/08/2009 and 19/08/2009 instead of 16.08.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>7. Calibrations of temperature meter for the catalyst was previously calibrated on 14/08/2008 &amp; 16/08/2008. Calibration frequency is of one year, however the next calibration was done on 18/08/2009 instead of 16.08.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK</p> <p>8. The Calibration of N<sub>2</sub>O analyzer has been corrected in the</p>



Finding:	D2
	<p>revised MR.</p> <p>9. Stack flow DP transmitter was previously calibrated on 01/07/2008. Calibration frequency is of one year, however the next calibration was done on 06.07.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>10. Stack pressure monitor was previously calibrated on 01/07/2008. Calibration frequency is of one year, however the subsequent calibration was done on 06.07.2009. But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>11. Stack temperature meter was previously calibrated on 01/07/2008. Calibration frequency is of one year, however the next calibration was done on 06.07.2009. . But as the plant was under shut down thus there is no material impact of the same on emission reductions thus the procedure for delay in calibration is not applicable for this equipment. Calibration certificates are submitted, checked and found OK.</p> <p>12. Hydrometer was previously calibrated on 29/05/2009. Calibration frequency is of six months i.e next calibration was due on 29.11.2009. 29/11/2009 was a Sunday, a holiday. Therefore, the actual calibration was done on 30/11/2009 Calibration certificate is submitted. The instrument was found OK.</p> <p>13. Calibration of thermometer for acid temperature was previously done on 10/10/2008. Calibration frequency is of one year i.e. next calibration was due on 10.10.2009. However calibration was done on 29/09/2009. However this thermometer got broken on 25.11.2009. New Thermometer was calibrated on 25.11.2009 and was put to use. The same is confirmed with the plant records and the calibration records.</p> <p>CL D1 has been closed out</p>
<p><b>Conclusion</b> Tick the appropriate checkbox</p>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input checked="" type="checkbox"/> Appropriate action was taken</p> <p><input checked="" type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input type="checkbox"/> Additional action should be taken</p> <p><input checked="" type="checkbox"/> The project complies with the requirements</p>

Finding:		D3		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR	
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The ammonia to air ratio (10.3 %) described under appendix 1 does not fall between the range of historical value (11.9%) and Design data (11.5%). Correction is required in this regard.			
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Appendix-I has been modified in Revised Monitoring Report on page no. 32.			
<b>DOE Assessment #1</b> <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 has been revised. The ammonia to air ratio has been revised to consider 11.5% which is in-line with the registered PDD. CAR is closed.			
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements			

Finding:		D4																		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR																	
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Under the section 6 "Monitoring Parameters" of the MR, the tables for TSG, PSG and are not in compliance w.r.t the description of measurement methods and procedures as per EB 54 annex 34. Detailed elaboration is required.																			
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Monitoring Report has been modified. Kindly refer Section 'D 2' on page No. 22 & 24 of Revised Monitoring Report. The following table indicates the changes incorporated in the Monitoring Report. <table border="1" data-bbox="523 1585 1385 2018"> <thead> <tr> <th>Para meter</th> <th>Reference</th> <th>In Original MR</th> <th>In Modified MR</th> </tr> </thead> <tbody> <tr> <td rowspan="2">TSG</td> <td>Value(s) of monitored parameter:</td> <td>-</td> <td>Continuously Monitored</td> </tr> <tr> <td>Description of measurement methods and procedures to be applied:</td> <td>Probe (part of gas volume flow meter)</td> <td>Temperature transmitter(TI 120400) is used for measurement of stack gas temperature.  The accuracy of this instrument is ≤ 0.1 % of FS.</td> </tr> <tr> <td>PSG</td> <td>Value(s) of</td> <td>-</td> <td>Continuously Monitored</td> </tr> </tbody> </table>					Para meter	Reference	In Original MR	In Modified MR	TSG	Value(s) of monitored parameter:	-	Continuously Monitored	Description of measurement methods and procedures to be applied:	Probe (part of gas volume flow meter)	Temperature transmitter(TI 120400) is used for measurement of stack gas temperature.  The accuracy of this instrument is ≤ 0.1 % of FS.	PSG	Value(s) of	-	Continuously Monitored
Para meter	Reference	In Original MR	In Modified MR																	
TSG	Value(s) of monitored parameter:	-	Continuously Monitored																	
	Description of measurement methods and procedures to be applied:	Probe (part of gas volume flow meter)	Temperature transmitter(TI 120400) is used for measurement of stack gas temperature.  The accuracy of this instrument is ≤ 0.1 % of FS.																	
PSG	Value(s) of	-	Continuously Monitored																	

Finding:	D4			
		monitored parameter:		
		Description of measurement methods and procedures to be applied:	Probe (part of gas volume flow meter)	Pressure transmitter (PI 120400) is used for measurement of stack gas pressure. The accuracy of this instrument is 0.5 % of FSO.
	AIFR	Value(s) of monitored parameter:	-	Obtained from DCS
		Description of measurement methods and procedures to be applied:	Obtained from operating condition campaign transmitted from DCS	Ammonia to Air ratio is calculated in DCS using signals transmitted from Ammonia flow transmitters (Tag no. FI 120211) and Air Flow transmitters (Tag no FI 120213). This signal is transmitted to CEM system. Accuracy of ammonia flow transmitter is ± 0.075% of span and that of Air Flow Transmitter is ± 0.1% of span.
		QA/QC procedures applied:	-	Regular calibrations are carried out for Ammonia Flow transmitters FI 120211 and Air Flow transmitters FI 120213 as per ISO 9001 procedure.
<b>DOE Assessment #1</b> <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 monitoring parameters have been detailed as per the requirements of the EB 54, Annex 34. Reported information is correct and CAR has been closed.			
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements			

Finding:	D5		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR

Finding:	D5
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The value for the monitoring parameter EF <sub>reg</sub> has been described as zero, however the host country (India) does not specify any regulations w.r.t to N <sub>2</sub> O emissions, further correction is required.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	In the Revised Monitoring Report, status of monitoring parameter EF <sub>reg</sub> is corrected. In revised MR it is mentioned that “Currently India does not have any regulation w.r.t. N <sub>2</sub> O emissions”. Kindly refer Section D.2 on page number 27 of revised MR.
<b>DOE Assessment #1</b> <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 under section D.2 has been corrected appropriately.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	E1
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The project emission factor calculation is currently based on the complete campaign data however the same is not conservativeness. The emission factor for the monitoring period (20 <sup>th</sup> November 2009 to 12 <sup>th</sup> February 2010) has not been demonstrated.
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>Monitoring Report and CER Calculations have been revised wherein data for the period prior to registration date i.e.20.11.2009, is excluded for CER calculation.</p> <p>This is in line with the recommendation given by Meth Panel (Date of Meth Panel meeting: 7 - 11 March 2011) in response to request for clarification (AM_CLA_0204) of Approved Methodologies (reference 'F-CDM-AM-Clar_Resp_ver 01.1').</p> <p>Meth panel has recommended that “.... the emission reduction calculations should account for the project emissions which actually occurred within the crediting period, and that only the N<sub>2</sub>O concentration and flow rate data and the nitric acid production data within the crediting period should be used to calculate the emission factors of the first and the last project campaigns.”</p>

Finding:	E1
<b>DOE Assessment #1</b> <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>As per the clarification AM_CLA_204 the emission factor for a period consisting part campaigns shall be calculated for a period which is under the crediting period for the project activity. Thus the project emission factor has been calculated for the days which falls after the date of registration, i.e. 20/11/2009. Thus the calculation is acceptable and found correct.</p> <p>CAR is closed.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	E2
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Under section 8 “GHG calculations” of the MR there are two different values of the emission reductions mentioned.</p>
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>This was a typographical error and the same has been corrected in the revised Monitoring Report. Kindly refer page no. 30 of revised MR.</p>
<b>DOE Assessment #1</b> <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 error has been revised. The Emission reduction values are consistent and correct.</p> <p>CAR is closed.</p>
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	E3
<b>Classification</b>	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the</i>	<p>The comparison between ex-ante estimated values and verification period values does not provide a discussion of deviations.</p>

Finding:	E3
<i>context (e.g. section)</i>	
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Discussion on deviation between ex-ante estimated values and verification period values is incorporated in the Revised Monitoring Report under section E-5 and E-6 on page no. 31.
<b>DOE Assessment #1</b> <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>	Revised section E.5 of the MR describes the results of the deviations from the estimated CERs from the PDD for the corresponding number of days as that of current monitoring period. The total emission reductions in the monitoring period is less than the estimated values of the PDD because of lower catalyst efficiency as compared to the estimated (90%) efficiency in the PDD. CAR is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<div> <input type="checkbox"/> To be checked during the next periodic verification </div> <div> <input checked="" type="checkbox"/> Appropriate action was taken </div> <div> <input checked="" type="checkbox"/> Project documentation was corrected correspondingly </div> <div> <input type="checkbox"/> Additional action should be taken </div> <div> <input checked="" type="checkbox"/> The project complies with the requirements </div>

## **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. Implementation of the project**

The DeN<sub>2</sub>O catalyst at RCF HP nitric acid production plant was commissioned on 31/03/2009. The total capacity of the nitric acid plant is 352 tHNO<sub>3</sub>/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 while the plant was shut down for a period of 100 hours during the monitoring period. CAR B1 has been raised to mention the reasons for the shutdown times, subsequently the MR was revised. The reasons for the shutdown have been detailed under section Appendix II and thus CAR B1 was closed. The detailed assessment of the CAR is provided under section 4 (Verification Findings) of this report.

### **5.2. 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>). Furthermore as this is the 1<sup>st</sup> periodic verification the issues open during the validation activity are required to be addressed. However no FAR was raised during the project validation.



The project was registered under CDM EB on 20<sup>th</sup> 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: 01/07/2008 to 07/11/2008

Based on the historical and baseline campaigns the permitted ranges of for the parameters are established as follows;

Parameters	Unit	Historical/ Baseline Values	Specification of the facility	Permitted Range as per PDD
N <sub>2</sub> O Concentration in the stack gas ( NCSG <sub>BC</sub> )	mgN <sub>2</sub> O/Nm <sub>3</sub>	4,054.1	-	-
Volume flow rate of the stack gas (VSG <sub>BC</sub> )	Nm <sup>3</sup> /h	49,077.4	-	-
Operating Hours (OH <sub>BC</sub> )	Hours	2,861	-	-
Nitric Acid (as 100%) (NAP)	tHNO <sub>3</sub>	43,326	-	-
Overall measure uncertainty of the monitoring system (UNC)	%	4.52	-	-
Ammonia gas flow rate (AFR <sub>max</sub> )	Kg/h	5,113	6,076	5113
Ammonia to Air Ratio (AIFR <sub>max</sub> )	%	11.9	11.5	11.5
Oxidation Temperature for each hour (OT <sub>normal</sub> )	Deg C	863-900	860-930	863-900
Oxidation Pressure for each hour (OP <sub>normal</sub> )	kPa	660-626	765	660-626

The values for the permitted range were not in line with the values in the registered PDD, thus CAR B3 has been raised. Subsequently the revised MR and calculation sheet applies the permitted range as per the registered PDD, leading to exclusion of 590 data sets as the same are beyond the permitted range. The application of the permitted range as per the registered PDD is assessed to be correct and conservative thus CAR B3 has been closed.



The average historic campaign length (CL<sub>normal</sub>) has been determined to be 44,435 t HNO<sub>3</sub>/campaign while the baseline campaign length is 43,326 t HNO<sub>3</sub>/campaign. The secondary catalyst for the campaigns was supplied by M/s. BASF. The normal gauze supplier for the project is RCF itself. The baseline gauze composition was reconfirmed to be 92% Pt, 8% Rh. Furthermore as this is the 1<sup>st</sup> periodic verification thus there are no issues from former verifications.

### **5.3. Special events**

No special events with effect on the monitoring of the project have been observed during the monitoring period, except the reported situations in Appendix II regarding shutdowns of the nitric acid plant and the downtime of the automated measuring system (CEM).

### **5.4. 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 08/11/2011 (<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.

### **5.5. Compliance with the monitoring methodology**

The monitoring system is in compliance with the applied monitoring methodology (AM0034 version 3.2). The following requirements are complied 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 AM0034.
- The N<sub>2</sub>O 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

that the required frequency of every 2 seconds as specified in the methodology. The analyser is equipped to measure only N<sub>2</sub>O 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 TUV SUD, Germany for its compliance to AM0034.

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 TUV SUD, which confirms the CEM complies to the requirement under EN14181. The QAL 2 test was carried on 21<sup>st</sup> to 23<sup>rd</sup> October 2008.
- QAL 3 checks of the analyzer 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.
- Annual Surveillance Test was not conducted in 2009, however in line with EB 52 annex 60 para 4 (b) as the AST in 2010 was found satisfactory, the error % based on the QAL 2 has been applied in the Emission reduction calculations, further AST was carried in 2010 by SGS Netherland on 4<sup>th</sup> and 5<sup>th</sup> March 2010 and for the year 2011 it was carried on 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> 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 constant for VSG 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 correct and as a conservative measure.

The verifier confirms that highest value of NCSG and VSG are applied 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 <sub>2</sub> O	- 1979.8	494.9
VSG	- 29898	7474.5
TSG	-63.2	15.8
PSG	-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; it 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 D1 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 D1.

#### Campaign length:

The length of project campaign is CL<sub>n</sub> (43,449 tHNO<sub>3</sub> calculated for the complete campaign) which is less than CL<sub>normal</sub> (44,435 tHNO<sub>3</sub>) however CL<sub>BL</sub> (43,326 tHNO<sub>3</sub>) is even less than CL<sub>n</sub> and hence adjustment in the emission factor for the project campaign is not required, the same is in line with the requirements under EB 51, Annex 12.

#### Emission factor calculations for the project; Campaign 1:

- Baseline emission factor for the project is 0.0125 tN<sub>2</sub>O/ tHNO<sub>3</sub>
- Project emission factor during the campaign is 0.0037 tN<sub>2</sub>O/ tHNO<sub>3</sub>

- Moving average emission factor: As this is the first campaign in the crediting period thus the moving average emission factor for the campaign is the same as that of project emission factor. calculated as follows;

Further the project emission factor has been calculated in line with the Clarification AM\_CLA\_0204 , i.e. the project emission factor has been calculated for the period considering the days from 20<sup>th</sup> November 2009 to 12/02/2010 which are under the crediting period have been considered.

## 5.6. 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. related CARs and CLs have 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 then the actual instrument accuracy. 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. Further the details of the calibration covering the entire monitoring period has been described, however the validity of the calibration reports had expired during the verification activity. Subsequently as per CL D2 the latest calibration details are provided in the MR under appendix III, thus CL D2 was closed.

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 revision related this constant have been applied to the entire monitoring period leading to higher project emissions, thereby lower emission reductions. This has been assessed to be conservative and appropriate.

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.

## 5.7. 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 e.g. CAR A1, CAR B1 and CAR B2. 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.

## 5.8. ER Calculation

During the verification mistakes in the ER calculation were identified. Related CARs were raised and subsequently closed out as the final value of emission reductions were revised;

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 D1 and CL D1 were raised. The PP has replaced the master calibrators considering the issue in March 2011 and calibration of all the instruments were conducted in March 2011. No errors were observed. Thus 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 in line with para 4 of EB 52 annex 60. Further it was observed that AST for year 2009 was not carried out, thus the AST report of 2010 was checked to confirm the functioning of the CEM system. The AST of 2010 confirms the CEM system to be in line with the QAL2 report, thus in line with EB 52 annex 60 para 4 (b) the error in the monitoring for VSG and NCSG have been applied for emission reduction calculations. The error factor of 2.93% for VSG and 3.44% for NCSG has been applied. Further the application of the error factor leads to a reduction of approximately 1,755 CERs. Thus the approach is assessed to be conservative, appropriate and in compliance to EB 52 annex 60.

The same is detailed under section 4 (Verification findings) in of this report w.r.t closure of Findings. Further the details of the calibration covering the entire monitoring period has been described, however the validity of the calibration reports had expired during the verification activity. Subsequently as per CAR D1 and CL D1 the latest calibration details are provided in the MR under appendix III, thus findings were closed. Further the calibration details including the date, due date, frequency, accuracy of the meters, date, meter serial number<sup>CAL, /TS/</sup> for each of the parameters monitored in the project activity are described as follows;

Data Variable	Description	Data Unit	Instrument Tag no.	Sr. No	Accuracy	Data of Previous calibration	Date of calibration	Calibration frequency	Due date of calibration	Age/ncy of Calibration
---------------	-------------	-----------	--------------------	--------	----------	------------------------------	---------------------	-----------------------	-------------------------	------------------------

										n
AFR	Amm gas to N 001	Nm3/ Hr	FT120 211A	S198 744	± 0.075 % of span	16/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AFR	Amm gas to N 001	Nm3/ Hr	FT120 211B	S198 745	± 0.075 % of span	16/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AFR	Amm gas to N 001	Nm3/ Hr	FT120 211C	S198 746	± 0.075 % of span	16/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
OP	Amm - inlet to N001	Barg	PT 120212A	12099 36	± 0.075 % of span	16/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
OP	Amm - inlet to N001	Barg	PT 120212B	12099 34	± 0.075 % of span	16/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
OP	Amm - inlet to N001	Barg	PT 120212C	12099 37	± 0.075 % of span	14/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
AFR & AIFR	Amm - inlet to N001 temp	Deg.c ent	TT 120212A	NA	Deviati on after calibrat ion: 0.1% of F.S. value	16/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
AFR & AIFR	Amm - inlet to N001 temp	Deg.c ent	TT 120212B	NA	Deviati on after calibrat ion: 0.1% F.S. value	16/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AFR & AIFR	Amm - inlet to N001 temp	Deg.c ent	TT 120212C	NA	Deviati on after calibrat ion: 0.1% F.S. value	16/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AIFR	Air Flow-N001	Nm3/ Hr	FT 120213A	S198 740	± 0.10% of span	14/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AIFR	Air Flow-N001	Nm3/ Hr	FT 120213B	S198 741	± 0.10% of span	16/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant
AIFR	Air Flow-N001	Nm3/ Hr	FT 120213C	S198 742	± 0.10% of span	16/08/2 008	19/08/2 009	1 Year	18/08/ 2010	Plant
AIFR	Air inlet to N001	Barg	PT120 214A	S019 8760	± 0.075 % of	14/08/2 008	17/08/2 009	1 Year	16/08/ 2010	Plant



					span ±					
AIFR	Air inlet to N001	Barg	PT120 214B	S019 8761	0.075 % of span	14/08/2008	19/08/2009	1 Year	18/08/2010	Plant
AIFR	Air inlet to N001	Barg	PT120 214C	S019 8762	± 0.075 % of span	14/08/2008	19/08/2009	1 Year	18/08/2010	Plant
AIFR	Air inlet to N001 temp	Deg.c ent	TT 120214A	NA	Deviati on after calibrat ion: 0.1% of F.S. value	14/08/2008	17/08/2009	1 Year	16/08/2010	Plant
AIFR	Air inlet to N001 temp	Deg.c ent	TT 120214B	NA	Deviati on after calibrat ion: 0.1% of F.S. value	14/08/2008	19/08/2009	1 Year	18/08/2010	Plant
AIFR	Air inlet to N001 temp	Deg.c ent	TT 120214C	NA	Deviati on after calibrat ion: 0.1% of F.S. value	14/08/2008	19/08/2009	1 Year	18/08/2010	Plant
OT	Catalyst Temp ROO1	Deg.c ent	TT12033 2A	19955 6	D/A Accura cy ± 0.03% of span	14/08/2008	18/08/2009	1 Year	17/08/2010	Plant
OT	Catalyst Temp ROO1	Deg.c ent	TT12033 3A	19955 8	D/A Accura cy ± 0.03% of span	14/08/2008	18/08/2009	1 Year	17/08/2010	Plant
OT	Catalyst Temp ROO1	Deg.c ent	TT12033 4A	19956 0	D/A Accura cy ± 0.03% of span	16/08/2008	18/08/2009	1 Year	17/08/2010	Plant
NCS G	N2O Analyser	Mg/m 3	AI 120400	02400 71228 /2400	Repeat ability ≤ 0.5% of span	10/10/2009	16/12/2009	3 Months	15/03/2010	Plant
VSG	Stack Flow	mBar	FI12040 0	265D S660 00283 31	Base Accura cy ± 0.04%	01/07/2008	06/07/2009	1Year	05/07/2010	Plant
PSG	Stack Pressure	hPa	PI12040 0	11989 49	0.5% of FSO	01/07/2008	06/07/2009	1Year	05/07/2010	Plant
TSG	Stack Temp	Deg.c ent	TI12040 0	NA	Linearit y error	01/07/2008	06/07/2009	1Year	05/07/2010	Plant



					: <0.1 % FS					
NAP	Product acid flow	T/hr	FI10121	SEN.-12031565, TRANS.-3781972	± 0.1% of rate	NA	24/06/2008	3 Years	23/06/2011	Emerson Process Management Plant
NAP	Acid Density	gm/cc	NA	NA	Least count: 0.001	29/05/2009	30/11/2009	6 months	29/05/2010	Plant
NAP	Acid Temperature	Deg C	NAG/L/TM-1	NA	Least count: 1	29/09/2009	25/11/2009	1 Year	24/11/2010	Plant

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.

The emission reductions determined for the first project campaign covering the monitoring period from 20<sup>th</sup> November 2009 to 12<sup>th</sup> February 2010 (85 days) is 78,457 tCO<sub>2e</sub>. The claimed emission reductions in this monitoring period from 20<sup>th</sup> November 2009 to 12<sup>th</sup> February 2010 is verified and found conservative determined and reasonable.

Parameter	Unit	Values During Monitoring Period
NAP	tHNO <sub>3</sub>	28,755.66
EF <sub>BL</sub>	tN <sub>2</sub> O/tHNO <sub>3</sub>	0.0125
EF <sub>p</sub>	tN <sub>2</sub> O/tHNO <sub>3</sub>	0.0037
GWP <sub>N<sub>2</sub>O</sub>	tCO <sub>2e</sub> /tN <sub>2</sub> O	310

$$\begin{aligned}
 \text{ER} &= (0.0125 - 0.0037) * 28,755.66 * 310 \\
 &= 78,457 \text{ tCO}_{2e}
 \end{aligned}$$

## 5.9. 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, QAL2, QAL3) plus a Annual Surveillance Test (as described before).

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 and C3 were raised during the audit and subsequently closed out. The details of each issue is described under section 4 (Verification Findings) of this report.

## **5.10. 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 monitoring period from 20<sup>th</sup> November 2009 to 12<sup>th</sup> February 2010 (85 days) is 78,457 tCO<sub>2e</sub>. The total emission reduction for the monitoring period is less than the PDD estimated value of 104,167 tCO<sub>2e</sub> for 85 days (447,305 tCO<sub>2e</sub>/annum).

The calculated value was found to be proportionally lower than the ex-post determined value, thus no further justification was required, however the lower emission reductions observed is due to the lower catalyst efficiency as compared to the PDD estimated efficiency.

## **5.11. 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).

## **5.12. Hints for next periodic Verification**

No FAR has been raised during the verification which needs to be addressed during the next verifications.

## 6. VERIFICATION OPINION

Rashtriya Chemical and Fertilizers Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1<sup>st</sup> periodic verification of the project: “N<sub>2</sub>O 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 N<sub>2</sub>O a potent GHG which is an undesirable by-product of nitric acid production process. This verification covers the period from 2009-11-20 to 2010-02-12 (including both days).

In the course of the verification 14 Corrective Action Requests (CAR) and 01 Clarification Requests (CL) were raised and successfully closed. Furthermore no FARs are raised to improve the project 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 ie, AM0034 Ver 3.2
- the installed equipment essential for measuring parameters required for calculating emission reductions were not calibrated appropriately thus procedures as per EB 52 annex 60 are applied.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1<sup>st</sup> 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: **78,457 t** CO<sub>2e</sub>

Essen, 2013-01-22



Rainer Winter  
TÜV NORD JI/CDM Certification  
Program  
Verification Team Leader

Essen, 2013-01-22



Stefan Winter  
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"> <li>Annual Surveillance Test conducted by SGS on 4<sup>th</sup> and 5<sup>th</sup> March 2010</li> <li>Annual Surveillance Test conducted by SGS on 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> March 2011</li> </ul>
/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 04 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 hr transmitted from DCS
/DR-AM34/	Sample Daily Reports copies generated by the EMI 3000 software.
/GS/	Details for the Gauze monitoring; <ul style="list-style-type: none"> <li>Gauze fabrication contract with Hindustan Platinum Pvt. Ltd. dated August 06, 2009</li> <li>Gauze composition analysis report by Ledoux and Company dated July 30 2009</li> </ul>
/IAR/	Internal audit reports and results respective to the project activity
/INT/	Inter Log Diagram for RCF MP unit.

Reference	Document
/ISO/	Copy of ISO 9001:2008 Certificate dated 6 <sup>th</sup> May 2010 valid till 19 <sup>th</sup> July 2013
/LAB/	Results of Plant Laboratory for average concentration of Nitric acid
/LOG/	Log (Records) of the following are checked: <ul style="list-style-type: none"> <li>• N<sub>2</sub>O concentration in the stake gas</li> <li>• Operating Hour of the reactor</li> <li>• Average concentration of nitric acid (%)</li> </ul>
/LA/	Layout of the project activity site describing the metering position
/MR/	<ul style="list-style-type: none"> <li>• Monitoring report for the project version 01 dated 03/06/2010 based on which the Verification activity has been conducted</li> <li>• Monitoring report for the project version 02 dated 23/07/2010 based on which the Verification activity has been conducted</li> <li>• Monitoring report for the project version 03 dated 24/08/2012 based on which the Verification activity has been conducted</li> <li>• Final Monitoring report for the project version 04 dated 06/12/2012 based on which the Verification opinion has been concluded.</li> </ul>
/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"> <li>• QAL1 certificate, dated 23-06-2008 ,</li> <li>• QAL 2 report dated 11-11-2008 as per standard (EN 14181) (Test conducted on 21-23 October 2008)</li> <li>• and QAL 2 report conducted on 24 – 27<sup>th</sup> October 2011.</li> </ul>
/QMS/	Quality Management System of RCF
/SC/	Consent to operate from Maharashtra state pollution control board valid till 31/10/2011.
/TS/	Technical specification of all the equipment installed. <ol style="list-style-type: none"> <li>1. Secondary Catalyst in the ammonia reactor</li> <li>2. All the stack monitoring equipments</li> <li>3. Technical specification of ABB A02000 URAS 26 for analyzing N<sub>2</sub>O</li> </ol>

Reference	Document
	concentration
<b>/TRA/</b>	Training records of the plant personal to carry out the continuous Emission Monitoring System by ABB
<b>/XLS/</b>	ER calculation sheets for the project activity

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

Reference	Document
<b>/AM0034/</b>	AM0034, Version 3.2, "Catalytic reduction of N <sub>2</sub> O inside the ammonia burner of nitric acid plants"
<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
<b>/IPCC/</b>	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
<b>/KP/</b>	Kyoto Protocol (1997)
<b>/MA/</b>	Decision 3/CMP. 1 (Marrakesh – Accords)
<b>/PDD/</b>	Project Design Document for CDM project: " <i>N<sub>2</sub>O abatement in HP Nitric Acid plants at Rashtriya Chemicals &amp; Fertilizers Limited, India</i> " version 1.3, dated 2012-07-13
<b>/VAL/</b>	Validation Report for CDM project " <i>N<sub>2</sub>O abatement in HP Nitric Acid plants at Rashtriya Chemicals &amp; Fertilizers Limited, India</i> " version 1, dated 2009-07-24
<b>/VER/</b>	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)
<b>/VVM/</b>	UNFCCC Validation and Verification Manual (Version 01.2, EB 55)



**Table 7-3:** Websites used

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

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

Reference	Mol <sup>1</sup>		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.	R. Paradkar	C.E (Corporate Technical), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	C.M.T Britto	GM (Corporate), 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.	P.V. Kharate	Dy. CE (Plant), RCF
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Uddhav More	MT (Corporate Technical), RCF

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

# ANNEX

- A1:** Verification Protocol
- A2:** Appointment / Authorisation statements

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

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

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"> <li>Limited access to IT systems</li> <li>Data protection procedures</li> </ul>	<ul style="list-style-type: none"> <li>Unintended change of spread sheet programming or data base entries</li> <li>Problems caused by updating/upgrading or change of applied software</li> </ul>	<ul style="list-style-type: none"> <li>Check of application of Management system procedures</li> </ul>	
<b>Other calculation parameters</b>				
<ul style="list-style-type: none"> <li>Emission factors, oxidation factors, coefficients</li> </ul>	<ul style="list-style-type: none"> <li>The values and data sources applied are defined in the PDD and monitoring plan</li> </ul>	<ul style="list-style-type: none"> <li>Unintended or intended Modification of calculation parameters</li> <li>Wrong application of values</li> <li>Misinterpretations of the applied methodology and/ or the PDD</li> <li>Missing update of applicable regulatory framework (e.g. IPCC values)</li> </ul>	<ul style="list-style-type: none"> <li>Update-check of regulatory framework</li> <li>Countercheck of the applied MP in the MR against the methodology and the PDD</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>
<b>Calculation Methods</b>				

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"> <li>Applied formulae</li> <li>Miscalculation</li> <li>Mistakes in spread-sheet calculation</li> </ul>	<ul style="list-style-type: none"> <li>Advanced calculation and reporting tools</li> <li>A CDM coordinator is in charge of the CDM related calculations</li> <li>Usage of tested / counterchecked Excel spreadsheets</li> <li>Involvement of external consultants</li> </ul>	<ul style="list-style-type: none"> <li>The danger of miscalculation can only be minimized.</li> </ul>	<ul style="list-style-type: none"> <li>Countercheck on the basis of own calculation.</li> <li>Spread sheet walk-through.</li> <li>Plausibility checks</li> <li>Check of plots</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>
<b>Monitoring reporting</b>				
<ul style="list-style-type: none"> <li>Data transfer to the author of the monitoring report</li> <li>Data transfer to the monitoring report</li> <li>Unintended use of outdated versions</li> </ul>	<ul style="list-style-type: none"> <li>An experienced CDM consultant is responsible for monitoring reporting.</li> <li>CDM QMS procedures are defined</li> </ul>	<ul style="list-style-type: none"> <li>The danger of data transfer mistakes can only be minimized</li> <li>Inappropriate application of QMS procedures</li> </ul>	<ul style="list-style-type: none"> <li>Counter check with evidences provided.</li> <li>Audit of procedure application</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>

**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.
<b>A. General Description of the project activity</b>				
<b>A.1. Brief description of the project activity (EB 54 Annex 34, A.1)</b>  <i>Check if section A.1 of the MR includes the following:</i> <ul style="list-style-type: none"> <li>- Purpose of the PA and the measures taken to reduce GHG emissions</li> <li>- Brief description of the installed technology and equipments</li> <li>- Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.</li> <li>- Total emission reductions achieved in this monitoring period</li> </ul>	/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"> <li><input checked="" type="checkbox"/> Purpose of the PA and the measures taken to reduce GHG emissions</li> <li><input type="checkbox"/> Brief description of the installed technology and equipments</li> <li><input type="checkbox"/> Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc</li> <li><input type="checkbox"/> Total emission reductions achieved in this monitoring period</li> </ul> <p>In this context the following findings have been identified:</p> <p>The contents as listed under EB 54 annex 34 shall be detailed in the Monitoring Report. A.1. Requested information related the project activity is missing. Correction is required.</p>	<b>CAR A1</b>	OK
<b>A.2. Project Participants (EB 54 Annex 34, A.2)</b>  <i>Check if section A.2 of the MR includes the following:</i> <ul style="list-style-type: none"> <li>- All PPs as displayed on the UNFCCC website</li> </ul>	/MR/	<p>The verification team has checked section A.2 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"> <li><input checked="" type="checkbox"/> All PPs as displayed on the project related UNFCCC website are correctly listed</li> </ul>	<b>OK</b>	OK



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		
<b>A.3. Location of the Project Activity (EB 54 Annex 34, A.3)</b>  <i>Check if section A.3 of the MR reflects correctly the following:</i> <ul style="list-style-type: none"> <li>- Address of the project location</li> <li>- Latitude and Longitude</li> </ul>	/MR/ /PDD/ /IM/	<p>The verification team has checked section A.3 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"> <li><input checked="" type="checkbox"/> The address has been correctly given in the MR</li> <li><input checked="" type="checkbox"/> Latitude and Longitude are in line with the information given in the PDD and reflects the actual location of the PA.</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<b>A.4. Technical description of the project (EB 54 Annex 34, A.4)</b>  <i>Check if section A.4 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> <li>- Detailed description of the technology applied</li> <li>- Diagrams</li> </ul>	/MR/ /PDD/ /IM/	<p>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 information gathered during the site visit that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> The description of the technology applied is complete and appropriate</li> <li><input checked="" type="checkbox"/> Appropriate diagrams have been included in the description</li> </ul> <p>In this context the following findings have been identified: N/A</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>A.5. Title, reference and version of the baseline and monitoring methodology applied to the project</b> <b>(EB 54 Annex 34, A.5)</b> <i>Check if section A.5 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> <li>- Reference to the applicable version of the methodology</li> <li>- Reference to the applicable version(s) of relevant methodological tools</li> <li>- Relevant EB decisions, if applicable</li> </ul>	/MR/ /PDD/ /unfccc/	The verification team has checked section A.5 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"> <li><input checked="" type="checkbox"/> Name and version of the applicable CDM Methodology</li> <li><input checked="" type="checkbox"/> Name and version of applicable CDM methodological tools</li> <li><input checked="" type="checkbox"/> Relevant EB decisions</li> </ul> In this context the following findings have been identified: N/A	OK	OK
<b>A.6. Registration date of the project activity</b> <b>(EB 54 Annex 34, A.6)</b> <i>Check if section A.6 of the MR correctly includes the following:</i> <ul style="list-style-type: none"> <li>- Registration date</li> </ul>	/MR/ /unfccc/	The verification team has checked section A.6 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: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Registration date</li> </ul> In this context the following findings have been identified: N/A	OK	OK
<b>A.7. Crediting period of the PA and related information</b> <b>(EB 54 Annex 34, A.7)</b> <i>Check if section A.7 of the MR correctly includes the following:</i>	/MR/ /unfccc/	The verification team has checked section A.7 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: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Start date of the crediting period.</li> </ul>	OK	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"> <li>- 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.</li> <li>- Length and type of the crediting period</li> </ul>		<input checked="" type="checkbox"/> Type and length of the crediting period  In this context the following findings have been identified: N/A		
<b>A.8. Name of the responsible person(s) / entity/(ies)</b> <b>(EB 54 Annex 34, A.8)</b>  Check if section A.8 of the MR correctly includes the following: <ul style="list-style-type: none"> <li>- Contact information of the person(s)/entity(ies) responsible for completing the MR.</li> </ul>	/MR/ /IM/	The verification team has checked section A.8 of the MR and confirms by means of interviews with the PP that the information provided is complete and correct with regards to the following:  <input checked="" type="checkbox"/> Contact information of the person(s) / entity/(ies) responsible for completing the MR..  In this context the following findings have been identified: N/A	OK	OK
<b>B. Implementation of the project activity</b>				
<b>B.1. Implementation status of the project</b>				
<b>B.1.1. Initial project implementation</b> <b>(EB 55 Annex 1, §§ 182, 195-201)</b>  Assess whether the project has been implemented and operated as per the registered PDD and are all physical features of the project in place?  Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.	/IM01/ /PDD/	<b>Description:</b>  This is the first periodic verification for the project activity. 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.  <b>Justification of evidences:</b>  The physical set up was verified during the site visit and	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Also, discuss – if applicable – any approvals of the necessary request of notification or request for approval of changes from the project activity as described in the registered PDD (EB 48 Annex 66/67).</i>		discussed with the plant personnel for the operational procedures and is as per the description in the registered PDD.  <i>Conclusion:</i> The project is implemented and operated as per the registered PDD.		
<p><b>B.1.2. Technical equipment changes (EB 55 Annex 1, § 187)</b></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 report and the emission reduction calculation.</i></p> <p><i>Also, discuss –if applicable- any approvals of the necessary request of notification or request for approval of changes from the project activity as described in the registered PDD (EB 48 Annex 66/67).</i></p>	/IM01/	<p><i>Description:</i></p> <p>The project equipment has not changed, the same is described under section B.1</p> <p>However, it is observed that the permitted range for the parameter of Oxidation Temperature, Oxidation Pressure, Ammonia Flow Rate and Ammonia - air ratio is not in compliance to the range as described in the PDD. Thus CAR B3 is raised.</p> <p><i>Justification of evidences:</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 CAR B3 is raised.</p>	<b>CAR B3</b>	OK
<b>B.1.3. Operation of the project activity</b>	/IM01/	<i>Description:</i>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>(EB 55 Annex 1, § 195)</b></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>Also, discuss – if applicable – any approvals of the necessary request of notification or request for approval of changes from the project activity as described in the registered PDD (EB 48 Annex 66/67).</i></p>		<p>The plant produces the Nitric acid for the same capacity as per the details in the registered PDD. Operation modes have not changed.</p> <p>Further it is observed that the permitted range for the parameter of Oxidation Temperature, Oxidation Pressure, Ammonia Flow Rate and Ammonia - air ratio is not in compliance to the range as described in the PDD. Pending CAR B3.</p> <p><i>Justification of evidences:</i></p> <p>The physical set up was verified during the site visit and discussed with the plant personnel for the operational procedures and the same is as per the description in the registered PDD.</p> <p><i>Conclusion:</i></p> <p>Operation modes are as per the registered PDD. However CAR B3 is raised.</p>	<b>CAR B3</b>	OK
<p><b>B.1.4. Incidents</b> <b>(EB 55 Annex 1, § 187, 208a)</b></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 not been detailed along with the reason for downtime in the MR.</p> <p><i>Justification of evidences:</i></p> <p>To be discussed after closure of CAR B1</p> <p><i>Conclusion:</i></p> <p>CAR B1 is raised.</p>	<b>CAR B1</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>B.1.5. Legislation</b> Find out whether relevant legislation with effect on the project activity in the host country has been changed.  Assess, in case of changes, whether consequences for the PA with regard to relevant CDM requirements have been accounted for.  In case of changes data sources shall be referenced.	/IM01/	<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 <sub>x</sub> regulations, however the regulations for the same have not changed. There are no regulations in India for N <sub>2</sub> O emissions.  <i>Justification of evidences:</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.  <i>Conclusion:</i> The relevant host country legislation has not been changed.	OK	OK
<b>B.1.6. Open issues from validation</b> <i>(EB 55 Annex 1, §§ 181-183, 188c, 190c)</i>  Check (esp. in case of 1 <sup>st</sup> periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?	/VAL/	<input checked="" type="checkbox"/> There were no open issues addressed in the validation report  <input type="checkbox"/> All open issues from the validation have been appropriately addressed.  <input type="checkbox"/> The following issues related to the validation have not yet been appropriately addressed:	OK	OK
<b>B.1.7. Open issues from previous verification</b> <i>(EB 55 Annex 1, § 193)</i>  Check in case of further periodic verifications whether	/unfccc/	<input checked="" type="checkbox"/> There were no open issues addressed in the previous verification report  <input type="checkbox"/> All open issues from the previous verification have been appropriately addressed.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.																	
<i>there are any open issues indicated in previous verification reports (FAR) and take into consideration the guidance as specified in VVM.</i>		<input type="checkbox"/> The following issues related to the previous verification have not yet been appropriately addressed:																			
<b>B.1.8. Publication of the Monitoring Report</b> <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/ C/	<i>Description:</i> The Monitoring report is available on the project page. <i>Justification of evidences:</i> The project page has been checked to confirm the same. <a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1248695616.14/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1248695616.14/view</a>  <i>Conclusion:</i> The draft monitoring report, as received from the project participants, has been made publicly available prior to the start of the verification activities. No comments have been received.	OK	OK																	
<b>B.2. Requests for Revisions of MP</b> <b>(EB 55 Annex 1, §§ 201, 203, 219)</b> <i>Check (i) if there have been any requests for revisions of the monitoring plan in the past.and/or (ii) if there is a need for a RfRev. Make sure that the monitoring report reflects the application of the revision as approved by the EB, where applicable. Check in case of approved revisions if the date of approval has been included.</i>	/unfccc/	<table><tr><td><input type="checkbox"/></td><td colspan="3">No requests for revisions of the MP. have been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td rowspan="4"><input checked="" type="checkbox"/></td><td colspan="3">The following RfRev have been approved or are under approval by the UNFCCC</td></tr><tr><td>1</td><td>Title</td><td>PRC-2792-001</td></tr><tr><td>Status</td><td colspan="2"><input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved</td></tr><tr><td>Appr.date</td><td colspan="2">2012-11-15</td></tr></table>	<input type="checkbox"/>	No requests for revisions of the MP. have been submitted to the UNFCCC prior to the current monitoring period			<input checked="" type="checkbox"/>	The following RfRev have been approved or are under approval by the UNFCCC			1	Title	PRC-2792-001	Status	<input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved		Appr.date	2012-11-15		CAR B2	OK
<input type="checkbox"/>	No requests for revisions of the MP. have been submitted to the UNFCCC prior to the current monitoring period																				
<input checked="" type="checkbox"/>	The following RfRev have been approved or are under approval by the UNFCCC																				
	1	Title	PRC-2792-001																		
	Status	<input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved																			
	Appr.date	2012-11-15																			



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"></td><td>2</td><td>Title</td><td></td></tr><tr><td></td><td>Status</td><td><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td></tr><tr><td></td><td>Appr.date</td><td></td></tr></table>		2	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved		Appr.date						
	2	Title															
		Status		<input type="checkbox"/> under approval; <input type="checkbox"/> approved													
		Appr.date															
		<table><tr><td rowspan="2"></td><td colspan="3">During the verification of the current MP no need for a RfRev has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td></tr><tr><td colspan="3">The following revisions of the MP are to be requested from the EB for the current MP</td></tr></table>		During the verification of the current MP no need for a RfRev has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA			The following revisions of the MP are to be requested from the EB for the current MP										
	During the verification of the current MP no need for a RfRev has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA																
	The following revisions of the MP are to be requested from the EB for the current MP																
		<table><tr><td>1</td><td>Issue</td><td></td></tr></table>	1	Issue													
1	Issue																
		In this context the following findings have been identified: N/A															
<b>B.3. Requests for Deviations applied to this MP</b> <b>(EB 55 Annex 1, §§ 203, 211-219)</b>  <i>Check (i) if there have been any requests for deviations in the past.and/or (ii) if there is a need for a RfDev. Make sure that the monitoring report reflects the application of the deviation as approved by the EB, where applicable. Check in case of approved deviations if the approval date and reference number has been included.</i>  <i>Further check in case of approved RfDev whether the MR appropriately reflects the application of the EB</i>	/unfccc/	<table><tr><td><input type="checkbox"/></td><td colspan="3">No requests for deviations have been submitted to the UNFCCC prior to the current monitoring period</td></tr><tr><td rowspan="2"><input checked="" type="checkbox"/></td><td colspan="3">The following RfDev have been approved or are under approval by the UNFCCC</td></tr><tr><td>1</td><td>Title</td><td>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 based measurement.</td></tr></table>			<input type="checkbox"/>	No requests for deviations have been submitted to the UNFCCC prior to the current monitoring period			<input checked="" type="checkbox"/>	The following RfDev 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 based measurement.	<b>CAR B2</b>	OK
<input type="checkbox"/>	No requests for deviations have been submitted to the UNFCCC prior to the current monitoring period																
<input checked="" type="checkbox"/>	The following RfDev 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 based measurement.														

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)				Draft Concl.	Final Concl.		
guidance.				Status	<input type="checkbox"/> under approval; <input checked="" type="checkbox"/> approved				
				Ref. No.	I-Dev0395				
				Appr.date	08/11/2011				
		2	Title						
			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved					
			Ref. No.						
			Appr.date						
		<input type="checkbox"/>	In case of approved guidance of the EB: The monitoring report reflects the application of the EB guidance regarding the RfDev.						
		<input type="checkbox"/>	During the verification of the current MP no need for a RfDev has been indentified						
		<input type="checkbox"/>	The following deviations are to be requested from the EB for the current MP						
		1	Issue						
		In this context the following findings have been identified: CAR B2 has been raised in this regard							
<b>B.4. Initial verification</b> In case an initial verification has been carried out, check if all FARs, recommendations etc. can be	/IM01/	<input checked="" type="checkbox"/>	No initial verification has been carried out.			OK	OK		
		<input type="checkbox"/>	There are no open issues, recommendations etc. pending from the initial verification						

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>confirmed as existent for the periodic verification.</i>		<input type="checkbox"/> The following issues related to the initial verification have to be addressed:		
<b>C. Description of the monitoring system</b>				
<p><b>C.1. Management System</b> <b>(EB 55 Annex 1, § 184 a (iii))</b></p> <p><i>Check if the GHG data monitoring system can be assessed as appropriate.</i></p> <p><i>In case reference is made to a (certified) company 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>	/ISO/	<p><i>Description:</i></p> <p>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 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>Further, the date of calibration covering the entire monitoring period shall be provided. The due date of calibration as mentioned in the MR version 1 has crossed, thus actual calibration dates shall be provided.</p> <p><i>Justification of evidences:</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 systems for CDM has been integrated in the Quality management system.</p>	<p><b>CAR B2, CAR C2, CAR D1, CL-D2</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		Nevertheless the following findings were relevant: CAR B2, CAR C2, CAR D1, CL D2.		
<b>C.2. Metering diagram (EB 54 Annex 34, C)</b>  <i>Check first if the MR includes a metering diagram showing all relevant monitoring points..</i>  <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>	/ISO/	<i>Description:</i>  The metering for the project has not been described covering all the metering points. CAR C1 is raised.  <i>Justification of evidences:</i> The metering points have been confirmed during the site visit, however the MR does not describe the same.  <i>Conclusion:</i> The metering positions are implemented, however CAR C1 is raised.	<b>CAR C1</b>	OK .
<b>C.3. Roles and Responsibilities (EB 54 Annex 34, C)</b>  <i>Check if all roles and positions of each person in the GHG data management process are clearly defined 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>  <i>Identify, if relevant personnel w.r.t. monitoring has been exchanged?</i>  <i>If so, have appropriate training measures been carried out.</i>  <i>In case of changes, assure that the implemented monitoring procedures have not been affected.</i>	/ISO/ /ORG/	<i>Description:</i>  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 requirements.  <i>Justification of evidences:</i> RCF is ISO certified, further during the interview with the plant personnel, the roles and responsibilities for CDM were clearly demonstrated.  <i>Conclusion:</i> The roles and responsibilities of plant personnel were discussed and found acceptable.	<b>OK</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>C.4. Emergency procedures for the monitoring system</b> (EB 54 Annex 34, C)</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>The downtime recorded during the monitoring period must be detailed along with the reason for downtime in the MR.</p> <p>The substitute value strategy has to be reconsidered with regard to the requirements of the methodology “Downtime of Automated Measuring System” under Annex 1.</p> <p>The alarm system in the N<sub>2</sub>O analyzer room is not displayed or forwarded in the control room thus the emergency preparedness is questionable.</p> <p>Further the MR does not describe the procedure of QAL 3. Appropriate corrections are required.</p> <p><i>Justification of evidences:</i></p> <p>To be discussed after closure of CAR B1, C1 and CAR C2</p> <p><i>Conclusion:</i></p> <p>The findings CAR B1, CAR C1 and CAR C2 have been raised.</p>	<p><b>CAR B1</b></p> <p><b>CAR C1</b></p> <p><b>CAR C2</b></p> <p><b>CAR C3</b></p>	OK
<p><b>C.5. Data archive and data protection</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 manipulation or loss of the measured data.</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><i>Justification of evidences:</i></p> <p>The archiving procedure was checked for the CEM system and all the data for the parameters is available since the installation</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>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 arching procedure is assessed to be appropriate and in line with the requirements of the registered PDD.</p>		
<b>D. Data and parameters monitored</b>				
<b>D.1. NCSG (mgN<sub>2</sub>O/m<sup>3</sup>)</b>		<b>Description:</b> N <sub>2</sub> O concentration in the stack gas		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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>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 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.</p> <p>No changes on the measurement device have been identified since the implementation of this device.</p> <p>During the downtime of the CEM system the highest value observed during the monitoring period has been applied. The approach is conservative and in-line with AM0034.</p> <p><i>Justification of evidences:</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</p>	<p><b>CAR B3,</b> <b>CAR C1,</b> <b>CAR C3,</b> <b>CAR D1</b> <b>and</b> <b>CL-D2</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		supplier's manual. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.  <i>Conclusion:</i> The monitoring of the parameter is as per the registered monitoring plan. Nevertheless the following findings are relevant: CAR B3, CAR C1, CAR C3, CAR D1 and CL D2.		
<b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b> <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>	/CAL/ /QAL/	<i>Description:</i> Calibration frequency of the N <sub>2</sub> O is every 3 months manually, however the N <sub>2</sub> O analyser is equipped with auto calibration procedures which carries out weekly calibration based on the QAL 3 procedures. Further an Annual Surveillance Test (AST) shall be conducted in line with the requirements under ACM0034. 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 N <sub>2</sub> O monitoring is reported as 3.44%. <i>Justification of evidences:</i> Calibration documentation were checked to confirm the accuracy. <i>Conclusion:</i> No AST for 2009 was carried out. The calibration report described in the MR does not cover the entire monitoring period. During the AST in 2011 a correction in the equation for NCSG was observed. The same needs to be	<b>CAR C1,</b> <b>CAR C3,</b> <b>CAR D1</b> <b>and</b> <b>CL D2</b>	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		incorporated. Related CARs and CLs were raised (CAR C1, CAR C3, CAR D1 and CL D2).		
<p><b>c) QA/QC Procedure</b>  <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b>  <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>	/CAL/ /MM/	<p><i>Description:</i></p> <p>Calibration frequency of the N<sub>2</sub>O is every 3 months manually, however the N<sub>2</sub>O analyser is equipped with auto calibration procedures which carries out weekly calibration.</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 N<sub>2</sub>O monitoring is reported as 4.52%, while the accuracy of the N<sub>2</sub>O analyser is 3.44%.</p> <p>Annual Surveillance Test (AST) was carried out in 2010 The result of AST test can be reported as “functional without defects”. However during the AST 2011 a correction in the equation for NCSG was observed.</p> <p><i>Justification of evidences:</i></p> <ul style="list-style-type: none"> <li>• The QAL 2 report by TÜV SUD, Germany is checked to confirm the uncertainty, while the specifications of analyser is provided by ABB</li> <li>• QAL 3 tests of the analyzer which carries out auto calibration on weekly basis.</li> <li>• analyser characteristics determined during QAL1</li> <li>• AST tests (2010-2011)</li> </ul> <p><i>Conclusion:</i></p> <p>No AST for 2009 was carried out.</p>	<p><b>CAR C1, CAR C2 CAR C3, CAR D1 and CL D2</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The calibration report described in the MR does not cover the entire monitoring period. During the AST in 2011 a correction in the equation for NCSG was observed. The same needs to be incorporated. Related CARs were raised. (CARs C1, C2 C3, D1 and CL D2.)		
<p><b>d) Correctness</b> (EB 55 Annex 1, §§ 202, 206, 221e)</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</p> <p><i>Description:</i></p> <p>The values from the N<sub>2</sub>O 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>Justification of evidences:</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 conclusion:</p> <p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period.</p> <p>During the AST in 2011 a correction in the equation for NCSG was observed. The same needs to be incorporated.</p>	<p><b>CAR B2</b> <b>CAR B3</b> <b>CAR C1,</b> <b>CAR C3,</b> <b>CAR D1</b> <b>and</b> <b>CL D2</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		Clarification related the correct OH and use of the permitted range of the operational condition in AOR for the determination of this monitoring parameter is also requested. Furthermore clarification is requested related the correct substitute values. (CARs B2, B3 C1, C2, D1 and CL D2.)		
<b>D.2. VSG (Nm<sup>3</sup>/h)</b>		<b>Description:</b> Volume flow rate of the stack gas		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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 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 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 seconds based on which hourly average values are calculated which are further used for the statistical analysis (95% confidence level) and the values outside the permitted range 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><i>Justification of evidences:</i></p> <p>The manual from the supplier (ABB) is checked the details also the monitoring is in line with the requirements of AM0034, as</p>	<p><b>CAR B2</b></p> <p><b>CAR B3</b></p> <p><b>CAR C1,</b></p> <p><b>CAR G3,</b></p> <p><b>CAR D1</b></p> <p><b>CAR D4</b></p> <p><b>and</b></p> <p><b>CL D2</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>certified by a third party TÜV SÜD, Germany.</p> <p><i>Conclusion:</i></p> <p>The determination of the parameter is in principle in line with the registered monitoring plan, however pending findings are relevant for a conclusion:</p> <p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period. 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.</p> <p>Clarification related the correct OH and use of the permitted range of the operational condition in AOR for the determination of this monitoring parameter is also requested. Furthermore clarification is requested related the correct substitute values and the monitoring parameter TSG and PSG.</p> <p>(CARs B2, B3 C1, D1, D4 and CL D2.)</p>		
<p><b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/CAL/ /QAL/	<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).</p> <p><i>Justification of evidences:</i></p> <p>The calibration documentation as well certificate along with the QAL 2 test report from TÜV SÜD, Germany was cross-checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>No AST for 2009 was carried out.</p>	<p><b>CAR B2</b></p> <p><b>CAR B3</b></p> <p><b>CAR C1,</b></p> <p><b>CAR C3,</b></p> <p><b>CAR</b></p>	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 report described in the MR does not cover the entire monitoring period. 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.</p> <p>Clarification related the correct OH and use of the permitted range of the operational condition in AOR for the determination of this monitoring parameter is also requested. Furthermore clarification is requested related the correct substitute values and the monitoring parameter TSG and PSG.</p> <p>(CARs B2, B3 C1, D1, D4 and CL D2.)</p>	<p><b>D1</b> <b>CAR</b> <b>D3</b> <b>and</b> <b>CL-D2</b></p>	
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>/CAL/ /QAL/</p>	<p><i>Description:</i></p> <p>The flow meter installed by ABB is of 0.075 accuracy class.</p> <p>The flow meter shall be annual calibrated 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/AST carried out by third Party.</p> <p><i>Justification of evidences:</i></p> <p>The calibration documentation and certificates along with the QAL 2 test and AST report was cross-checked to confirm the same.</p> <p><i>Conclusion:</i></p> <p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period. The review of the calibration details</p>	<p><b>CAR</b> <b>B2</b> <b>CAR</b> <b>B3</b> <b>CAR</b> <b>C1,</b> <b>CAR</b> <b>C3,</b> <b>CAR</b> <b>D1</b> <b>CAR</b> <b>D4</b> <b>and</b></p>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		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. Furthermore clarification is requested related the correct substitute values and the monitoring parameter TSG and PSG. (CARs B2, B3 C1, D1, D3 and CL D2.)	CL-D2	
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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/ /QAL/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct</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 TÜV SÜD, for its compliance to AM0034.</p> <p><i>Justification of evidences:</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 B3, CAR D1, CAR D2 and CL D1.</p>	CAR B3, CAR D1, CAR D2 and CL-D1.	OK
<b>D.3. OH (Hours)</b>		<b>Description:</b> Operating hours		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard</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.</p>	CAR	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>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 plant is considered operational only when the temperature of the ammonia reactor is <math>\geq 860^{\circ}\text{C}</math>. The temperature measurement is at the interval of every seconds. Or: Based on the ammonia flow to the reactor. The plant is considered to be operational during the ammonia flow is introduced in the pre-heated reactor.</p> <p><i>Justification of evidences:</i></p> <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></p> <p>The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor, however during the site visit it was observed that the operating hours as calculated in the plant are based on the ammonia flow to the reactor. Request for revision in MP/deviation from MP is required. Pending CAR B2</p>	<b>B2</b>	
<p><b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/CAL/ /CAL/	<p><i>Description:</i></p> <p>The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor, however during the site visit it was observed that the operating hours as calculated in the plant are based on the ammonia flow to the reactor.</p> <p><i>Justification of evidences:</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.</p>	<b>CL-D2</b>	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>Calibration details are not provided so far for the entire monitoring period, thus CL D2 has been raised.</p>		
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>/CAL/ /CAL/</p>	<p><i>Description:</i></p> <p>The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor, however during the site visit it was observed that the operating hours as calculated in the plant are based on the ammonia flow to the reactor. Request for revision in MP/deviation from MP is required.</p> <p><i>Justification of evidences:</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.</p> <p><i>Conclusion:</i></p> <p>Based on closure of CAR B2 and CL 2.</p>	<p><b>CAR B2 CL-2</b></p>	<p>OK</p>
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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</i></p>	<p>/IM01/, /MR/, /CAL/</p>	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct</p> <p><i>Description:</i></p> <p>The operating hour calculation as described in the PDD is based on the temperature limits of the Reactor, however during the site visit it was observed that the operating hours as calculated in the plant are based on the ammonia flow to the reactor.</p> <p><i>Justification of evidences:</i></p> <p>Review of project documentation, process logic implemented at</p>	<p><b>CAR B2 CL-2</b></p>	<p>OK</p>

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>		<p>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.</p> <p><i>Conclusion:</i> Based on closure of CAR B2 and CL 2.</p>		
<b>D.4. NAP (tHNO<sub>3</sub>)</b>		<b>Description:</b> Nitric Acid (As 100%)		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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>/IM01/ /PDD/ /TS/ /CHART/</p>	<p><i>Description:</i></p> <p>The total Nitric acid production is calculated based on the flow and concentration of nitric acid.</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 in 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</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>handbook of Chemical Engineers.</p> <p><i>Justification of evidences:</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>		
<p><b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/CAL/	<p><i>Description:</i></p> <p>The instrument accuracy of Mass flow measurement of dilute Nitric acid is <math>\pm 0.1\%</math>.</p> <p><i>Justification of evidences:</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 not provided so far for the entire monitoring period, thus CAR D1 and CL D2 have been raised.</p>	<b>CAR D1 and CL D2</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>c) QA/QC Procedure</b> (EB 55 Annex 1, §§ 184b (vii), 205c, 206)</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>	/CAL/	<p><i>Description:</i></p> <p>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>Justification of evidences:</i></p> <p>The calibration reports cross-checked to confirm the correctness of the values. Pending CAR D2.</p> <p><i>Conclusion:</i></p> <p>The QA/QC procedures are assessed to be appropriate, however CAR D1 and CL D2 were raised.</p>	CAR D1 & CL D2	OK
<p><b>d) Correctness</b> (EB 55 Annex 1, §§ 202, 206, 221e)</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</i></p>	/IM01/ /MR/ /QAL/	<p><input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct</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>Justification of evidences:</i></p> <p>The procedure was discussed during the site visit with the plant personnel and found acceptable.</p>	CAR D1 & CL 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>be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>		<p><i>Conclusion:</i></p> <p>The value in the Monitoring report seems to be correct. However CAR D1 and CL D2 shall be closed before a final conclusion</p>		
<b>D.5. TSG (Deg C)</b>		<b>Description:</b> Temperature of stack gas		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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>/IM01/ /PDD/ /TS/</p>	<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 measure at every seconds.</p> <p>The value is used only for conversion of the stack gas readings from m<sup>3</sup> to Nm<sup>3</sup>.</p> <p>The data is recorded directly in the CEM system.</p> <p>However the MR does not describe the measurement procedure thus CAR D4 is raised. Also CAR D1 and CL D2 were raised.</p> <p><i>Justification of evidences:</i></p> <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. However CAR D1, CAR D4 and CL</p>	<p><b>CAR D4, CAR D1, CL-D2</b></p>	<p>OK</p>

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		D2 have been raised.		
<b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b> <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>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>The uncertainty in the temperature measurement at detailed in the QAL 2 report is 1.65%.</p> <p><i>Justification of evidences:</i></p> <p>The QAL 2 test report is cross-checked to confirm the uncertainty of the parameter. 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>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period. 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.</p> <p>However the MR does not describe the measurement procedure thus CAR D4 is raised. Also CAR D1 and CL D2 were raised.</p>	<b>CAR D4, CAR D1, CL D2</b>	OK
<b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b> <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>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>The calibration of the temperature sensor is as per ISO 9001 procedures followed in the plant. Annual calibration of the temperature sensor shall be carried out according NABL standard. Calibration frequency is once in a year. The testing for</p>	<b>CAR D4, CAR D1,</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>with the latest EB guidance.</i>		<p>the instrument was a part in QAL 2 and AST.</p> <p><i>Justification of evidences:</i></p> <p>The calibration reports were checked along with the QAL 2 test report/AST.</p> <p><i>Conclusion:</i></p> <p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period.</p> <p>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.</p> <p>Furthermore clarification is requested related the correct the monitoring parameter TSG and PSG.</p> <p>(CARs D1, D4 and CL D2.)</p>	<b>CL-D2</b>	
<p><b>d) Correctness</b></p> <p><b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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</i></p>	/IM01/ /MR/ /QAL/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct</p> <p><i>Description:</i></p> <p>The value in the Monitoring report is measured at every second which is in compliance of the methodology.</p> <p><i>Justification of evidences:</i></p> <p>The procedure was discussed during the site visit with the plant personnel. Furthermore the procedure for the data monitoring is cross-checked with the operating procedures in the plant.</p> <p><i>Conclusion:</i></p>	<b>CAR D4, CAR D1, CL-D2</b>	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>and descriptions of the CARs raised.</i>		<p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period.</p> <p>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.</p> <p>Furthermore clarification is requested related the correct the monitoring parameter TSG and PSG. (CARs D1, D4 and CL D2.)</p>		
<b>D.6. PSG (hPa)</b>		<b>Description:</b> Pressure of stack gas		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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>/IM01/ /PDD/ /QAL/</p>	<p><i>Description:</i></p> <p>The pressure transmitter is located at the sampling point in the stack at a height of 20 mt., 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 principle. The range of measurement is 0-1.6 bar absolute.</p> <p>The data is monitored at every second. The data is used only for conversion from m<sup>3</sup> to Nm<sup>3</sup>. The data is recorded directly in the CEM system. The sampling for the stack gas is carried at a height of 25m in the stack.</p> <p><i>Justification of evidences:</i></p> <p>The QAL 2 test and AST report is cross-checked to confirm the uncertainty of the parameter. The specification has been cross-checked with the supplier's manual. Furthermore the procedure</p>	<p><b>CAR D1, CAR D4 and CL D2</b></p>	<p>OK</p>

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		for the data monitoring is cross-checked with the operating procedures in the plant. <i>Conclusion:</i> The determination method is in principle in line with the registered monitoring plan. However CAR D1, CAR D4 and CL D2 have been raised.		
<b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b> <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>	/CAL/ /QAL/	<i>Description:</i> The uncertainty of measurement as detailed in the QAL 2 report is 1.11%. <i>Justification of evidences:</i> The QAL 2 test report is cross-checked to confirm the uncertainty of the parameter. 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. <i>Conclusion:</i> No AST for 2009 was carried out. The calibration report described in the MR does not cover the entire monitoring period. 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. However the MR does not describe the measurement procedure thus CAR D4 is raised. Also CAR D1 and CL D2 were raised.	<b>CAR D4, CAR D1, CL D2</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>c) QA/QC Procedure</b> (EB 55 Annex 1, §§ 184b (vii), 205c, 206)</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>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>Calibration is as per ISO 9001 procedure followed in the plant. The calibration reports were checked along with the QAL 2 test report/AST.</p> <p><i>Conclusion:</i></p> <p>No AST for 2009 was carried out.</p> <p>The calibration report described in the MR does not cover the entire monitoring period.</p> <p>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.</p> <p>Furthermore clarification is requested related the correct the monitoring parameter TSG and PSG.</p> <p>(CARs D1, D4 and CL D2.)</p>	CAR D4, CAR D1, CL-D2	OK
<p><b>d) Correctness</b> (EB 55 Annex 1, §§ 202, 206, 221e)</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</i></p>	/IM01/ /MR/ /QAL/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct</p> <p><i>Description:</i></p> <p>The value in the Monitoring report is measured at every second which is in compliance of the methodology and monitoring plan.</p> <p><i>Justification of evidences:</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 values used for the ER calculation seems to be correct. However CAR D1 and CL D2 shall be closed before a final</p>	CAR D4, CAR D1, CL-D2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>and descriptions of the CARs raised.</i>		conclusion.		
<b>D.7. AFR (Kg NH<sub>3</sub>/h)</b>		<b>Description:</b> Ammonia gas flow rate to AOR		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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 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 seconds.</p> <p>The tag number of the meters are FT 20211A, FT 20211B and FT 20211C. The serial numbers are S198744/45/46 respectively. 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>Nevertheless CAR D2 has been raised “The ammonia to air ratio (10.3 %) described under appendix 1 does not fall between the permitted range of historical value (11.9%) and Design data (11.5%). Correction is required in this regard.”</p> <p>Also refer CAR D3, CAR D1, CL D1</p> <p><i>Justification of evidences:</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 TÜV Sud, Germany certifies the compliance of the monitoring system as per AM0034.</p> <p><i>Conclusion:</i></p>	<b>CAR D3, CAR D1, CL D1</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		The determination of the parameter is as per the registered monitoring plan. However pending closure of CAR D3, CAR D1, CL D1		
<b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b> <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>	/CAL/ /QAL/	<i>Description:</i> The calibration reports mention the tolerance level of 1%. 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. The uncertainty of measurement is already a part in emission reduction calculations. <i>Justification of evidences:</i> The calibration reports are cross-checked to confirm the accuracy of the measurement. <i>Conclusion:</i> The emission reduction calculations based on conservative assumptions.	OK	OK
<b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b> <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>	/CAL/ /QAL/	<i>Description:</i> 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. <i>Justification of evidences:</i> The calibration reports are checked and found acceptable.	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> The QA/QC procedures are assessed to be appropriate.</p>		
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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 checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct</p> <p><i>Description:</i> The parameter is determined as per the registered monitoring plan.</p> <p><i>Justification of evidences:</i> The procedure was discussed during the site visit with the plant personnel and found acceptable. Also the QAL 2 test report by TÜV Sud, Germany certifies the compliance of the monitoring system as per AM0034.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with registered monitoring plan. The value in the Monitoring report seems to be correct. However CAR D1, CAR D3 and CL D2 shall be closed before a final conclusion.</p>	<p><b>CAR D1</b> <b>CAR D3</b> <b>CL D2</b></p>	OK
<b>D.8. UNC (%)</b>		<b>Description:</b> Overall measurement uncertainty of the monitoring system		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard</i></p>	/IM01/ /PDD/ /QAL/	<p><i>Description:</i> The overall uncertainty for the monitoring system is calculated by third party TÜV Sud following the EN14181 guidelines. The report is referred as QAL 2 report.</p> <p>The measurement uncertainty is 4.52%.</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>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 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>Justification of evidences:</i></p> <p>The QAL 2 Test report by TÜV SÜD, 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>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/CAL/ /QAL/	<p><i>Description:</i></p> <p>It is by a third party TÜV Süd, Germany following the EN14181 criteria as specified by the methodology.</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><i>Justification of evidences:</i></p> <p>The QAL 2 test report has been checked to confirm the values and the QALity procedures confirm to EN14181.</p> <p><i>Conclusion:</i></p> <p>The emission reductions are based on conservative assumptions.</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>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b> <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>	/CAL/ /QAL/	<b>Description:</b> It is by a third party TÜV Sud, Germany following the EN14181 criteria as specified by the methodology. The value is as per the registered PDD. The frequency is only once thus calibration requirements are not applicable. <b>Justification of evidences:</b> The QAL 2 test report has been checked to confirm the values and the Quality procedures confirm to EN14181. <b>Conclusion:</b> The QA/QC procedures are assessed to be appropriate.	OK	OK
<b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b> <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/, /QAL/	<input checked="" type="checkbox"/> Correct <input type="checkbox"/> Not correct <b>Description:</b> It is by a third party TÜV Sud, Germany following the EN14181 criteria as specified by the methodology. The value is also mentioned in the registered PDD. <b>Justification of evidences:</b> The value has been cross-checked with the registered PDD and QAL 2 test report and found matching. <b>Conclusion:</b> The value in the monitoring report is correct.	OK	OK
<b>D.9. AIFR</b>		<b>Description:</b> Ammonia to Air ratio		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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/ /DCS/	<p><i>Description:</i></p> <p>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.</p> <p>There is no change in the monitoring equipment.</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>Justification of evidences:</i></p> <p>The procedure was discussed during the site visit with the plant personnel. 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 MR does not describe the measurement procedures thus CAR D3 was raised.</p> <p>Also Refer CAR D1, CAR D3, CL D2</p>	<b>CAR D1, CAR D2, CAR D3 &amp; CL D2</b>	OK
<b>b) Accuracy</b>	/CAL/	<i>Description:</i>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/QAL/	<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 appropriately for this purpose. The tolerance level of the equipment for flow measurement is 1%.</p> <p><i>Justification of evidences:</i></p> <p>The calibration reports are cross-checked to confirm the accuracy of the measurement.</p> <p><i>Conclusion:</i></p> <p>Pending closure of CAR D1, CAR D2, CAR D3 &amp; CL D2</p>	<b>CAR D1, CAR D2, CAR D3 &amp; CL D1</b>	OK
<p><b>c) QA/QC Procedure</b></p> <p><b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>	/CAL/ /QAL/	<p><i>Description:</i></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> <p>However CAR D1, CAR D3, CAR D4 &amp; CL D2 were raised.</p> <p><i>Justification of evidences:</i></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 monitoring system is in line with registered monitoring plan. Nevertheless pending findings CAR D1, CAR D3, CAR D4 &amp; CL D2 should be solved for a final conclusion.</p>	<b>CAR D1, CAR D3, CAR D4 &amp; CL D2</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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</p> <p><i>Description:</i></p> <p>The parameter is determined as per the registered monitoring plan.</p> <p><i>Justification of evidences:</i></p> <p><i>Conclusion:</i></p> <p>The determination monitoring parameter is in line with registered monitoring plan; but pending closure of CAR D1, CAR D2, CAR D3 &amp; CL D2 before final assessment of the correctness.</p>	<b>CAR D1, CAR D3, CAR D4 &amp; CL D2</b>	OK
<b>D.10. OT<sub>h</sub> (Deg C)</b>		<b>Description:</b> Oxidation temperature of each hour		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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;</p> <p>Make : Yokogawa, tolerance level 1%.</p> <p>Tag numbers/Serial numbers:</p> <ol style="list-style-type: none"> <li>1. TT 120332A/ 199556</li> <li>2. TT 120333A/ 199558</li> <li>3. TT 120334A/ 199560</li> </ol>	<b>CAR D1, CAR D4 &amp; CL D2</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>The range of measurement is 0-1200 °C.</p> <p>There is no case of equipment failure.</p> <p>However CAR D1, CAR D3 &amp; CL D1 were raised</p> <p><i>Justification of evidences:</i> 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>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/IM01/ /MR/ /QAL/	<p><i>Description:</i></p> <p>The tolerance level is 1%.</p> <p><i>Justification of evidences:</i></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 accuracy is high, the monitoring system is in line with registered monitoring plan. But pending closure of CAR D1, CAR D2, CAR D3 &amp; CL D2 is required before final assessment.</p>	<b>CAR D1, CAR D3 &amp; CL D2</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>	/CAL/ /QAL/	<p><i>Description:</i></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.</p> <p>However CAR D1, CAR D3 &amp; CL D1 were raised</p> <p><i>Justification of evidences:</i></p> <p>The calibration records (dated 18/08/2009) were checked</p> <p><i>Conclusion:</i></p> <p>The QA/QC procedures are assessed to be correct; but pending closure of CAR D1, CAR D2, CAR D3 &amp; CL D2 is required before final assessment.</p>	<b>CAR D1, CAR D3 &amp; CL D2</b>	OK
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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 checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct</p> <p><i>Description:</i></p> <p>The parameter is determined as per the registered monitoring plan.</p> <p><i>Justification of evidences:</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.</p>	<b>OK</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>D.11. OP<sub>h</sub> (kPa)</b>		<b>Description:</b> Oxidation pressure of each hour		
<b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b> <i>Describe how the monitoring parameter was measured / determined.</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> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>	/IM01/ /PDD/ /QAL/	<b>Description:</b> The Oxidation pressure of the ammonia is recorded in the CEM. The recording is done every second and hourly average values 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. <b>Justification of evidences:</b> The procedure was discussed during the site visit with the plant personnel and found acceptable. <b>Conclusion:</b> The determination of the parameter is as per the registered monitoring plan.	OK	OK
<b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b> <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>	/CAL/ /QAL/	<b>Description:</b> The details for calibration are not described in the MR. CAR D1 is raised. <b>Justification of evidences:</b>  To be discussed after closure of CAR D1. <b>Conclusion:</b> Pending closure of CAR D1.	CAR D1	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b> <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>	/CAL/ /QAL/	<b>Description:</b> The details for calibration are not described in the MR. CAR D1 is raised. <b>Justification of evidences:</b> To be discussed after closure of CAR D1 <b>Conclusion:</b> Pending closure of CAR D1.	<b>CAR D1</b>	OK
<b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b> <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/ /QAL/	<input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct <b>Description:</b> The parameter is determined as per the registered monitoring plan. <b>Justification of evidences:</b> <b>Conclusion:</b> The monitoring system is in line with registered monitoring plan. Pending closure of CAR D1.	<b>CAR D1</b>	OK
<b>D.12. GS<sub>project</sub></b>		<b>Description:</b> Gauze Supplier for project campaign		
<b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b> <i>Describe how the monitoring parameter was</i>	/IM01/ /PDD/ /LOG/	<b>Description:</b> The Gauze supplier for the project is RCF however the fabrication is done by private vendors.	<b>OK</b>	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.</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><i>Justification of evidences:</i></p> <p>The work order from RCf to Hindustan Platinum Pvt. Ltd (HPPL) dated 6/08/2009 is checked and found acceptable.</p> <p><i>Conclusion:</i></p> <p>The determination for the parameter is as per the registered PDD.</p>		
<p><b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/LOG/	<p><i>Description:</i></p> <p>As the parameter is the name of the supplier thus calibration requirements are not applicable</p> <p><i>Justification of evidences:</i></p> <p>Not applicable</p> <p><i>Conclusion:</i></p> <p>The parameter does not have any effect on the emission reduction calculations.</p>	OK	OK
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>	/LOG/	<p><i>Description:</i></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><i>Justification of evidences:</i></p> <p>The work order from RCf to Hindustan Platinum Pvt. Ltd (HPPL) dated 6/08/2009 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>Conclusion:</i> The QA/QC procedure is assessed appropriate as per the work order.</p>		
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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</p> <p><i>Description:</i> The Gauze supplier for the project is RCF however the fabrication is done by private vendors. No mistakes are identified.</p> <p><i>Justification of evidences:</i> The work order from RCf to Hindustan Platinum Pvt. Ltd (HPPL) dated 6/08/2009 is checked and found acceptable.</p> <p><i>Conclusion:</i> The determination for the parameter is as per the registered PDD.</p>	OK	OK
<b>D.13. GC<sub>project</sub></b>		<b>Description:</b> Gauze Composition during project campaign		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</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/ /LOG/	<p><i>Description:</i> The gauze composition is analysed by Ledoux &amp; Company which is an ISO 9001-2000 certified.</p> <p>The analysis report mentions the composition of the gauze supplied by RCf to HPPL. The composition of gauze is as follows;</p> <p>Rhodium: 8%</p> <p>Platinum: 92.00%</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>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i>		<p><i>Justification of evidences:</i></p> <p>The analysis report by Ledoux &amp; Company dated 30/07/3009 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>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/LOG/	<p><i>Description:</i></p> <p>The value is sourced from the analysis report of a third party (Ledoux &amp; Company) which is an ISO 2001:9000 certified. Strict QA/QC procedures are being followed. Accuracy of the analysis report is assessed appropriate.</p> <p><i>Justification of evidences:</i> the web-link of the company is cross checked to confirm the applicability of its QA/QC procedures. <a href="http://www.ledoux.com/">http://www.ledoux.com/</a></p> <p><i>Conclusion:</i></p> <p>The emission reduction calculations are based on conservative assumptions.</p>	OK	OK
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>	/LOG/	<p><i>Description:</i></p> <p>The value is sourced from the analysis report of a third party (Ledoux &amp; Company) which is an ISO 2001:9000 certified. Strict QA/QC procedures are being followed.</p> <p><i>Justification of evidences:</i> the web-link of the company is cross checked to confirm the applicability of its QA/QC procedures. <a href="http://www.ledoux.com/">http://www.ledoux.com/</a></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> The QA/QC procedures are assessed to be appropriate.</p>		
<p><b>d) Correctness</b> <b>(EB 55 Annex 1, §§ 202, 206, 221e)</b></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</p> <p><i>Description:</i> The gauze composition is analysed by Ledoux &amp; Company which is an ISO 9001-2000 certified.</p> <p>The analysis report mentions the composition of the gauze supplied by RCf to HPPL. The composition of gauze is as follows;</p> <p>Rhodium: 8.00%</p> <p>Platinum: 92%</p> <p><i>Justification of evidences:</i> The analysis report by Ledoux &amp; Company dated 30/07/3009 has been checked to confirm the composition.</p> <p><i>Conclusion:</i> The determination for the parameter is as per the registered PDD.</p>	OK	OK
<b>D.14. EF<sub>reg</sub></b>		<b>Description:</b> Emissions level set by incoming policies or regulations		
<p><b>a) Measurement / Determination method</b> <b>(EB 55 Annex 1, §§ 184-185, 202-203)</b></p> <p><i>Describe how the monitoring parameter was measured / determined.</i></p> <p><i>Check if relevant equipment has been exchanged</i></p>	/IM01/ /PDD/ /SC/	<p><i>Description:</i> The consent to operate by the Maharashtra Pollution Control Board dated 17/01/2007, valid till 31/10/2011 is checked and the plant is allowed to operate without any legal requirement related to N<sub>2</sub>O emissions.</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>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 MR mentions the value as zero in this regard CAR D4 is raised.</p> <p><i>Justification of evidences:</i></p> <p>The consent to operate for Rashtriya Chemicals &amp; Fertilizers Ltd. is checked and found acceptable.</p> <p><i>Conclusion:</i></p> <p>There are no new regulations in the current monitoring period w.r.t N<sub>2</sub>O emissions. However Pending CAR D4</p>	<b>CAR D4</b>	OK
<p><b>b) Accuracy</b> <b>(EB 55 Annex 1, §§ 205c, 206a)</b></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>	/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 is not applicable.</p> <p><i>Justification of evidences:</i></p> <p>Not applicable.</p> <p><i>Conclusion:</i></p> <p>Accuracy calculations are not applicable for the parameter.</p>	<b>OK</b>	OK
<p><b>c) QA/QC Procedure</b> <b>(EB 55 Annex 1, §§ 184b (vii), 205c, 206)</b></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>QA/QC procedures are not applicable as the parameter refers to monitoring of the new regulations or policies by the government.</p> <p><i>Justification of evidences:</i></p> <p>The consent to operate for Rashtriya Chemicals &amp; Fertilizers Ltd. is checked and is valid.</p> <p><i>Conclusion:</i></p>	<b>OK</b>	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		QA/QC procedures are not applicable for the parameter.		
<p><b>d) Correctness</b> (EB 55 Annex 1, §§ 202, 206, 221e)</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</p> <p><i>Description:</i></p> <p>The consent to operate by the Maharashtra Pollution Control Board dated 17/01/2007, valid till 31/10/2011 is checked and the plant is allowed to operate without any legal requirement related to N<sub>2</sub>O emissions.</p> <p><i>Justification of evidences:</i></p> <p>The consent to operate for Rashtriya Chemicals &amp; 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 N<sub>2</sub>O emissions are identified.</p>	OK	OK
<b>E. Emission reductions calculation</b>				
<p><b>E.1. Traceability</b> (EB 55 Annex 1, § 182)</p> <p><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></p>	/XLS/	<p><i>Description:</i></p> <p>The emission reduction sheet provides the raw data and all the formulae use are visible.</p> <p><i>Justification of evidences:</i></p> <p>The emission reduction sheet is cross checked to confirm the same.</p> <p><i>Conclusion:</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.
		The calculations are traceable.		
<b>E.2. Parameter consistency</b> <b>(EB 55 Annex 1, § 186; EB 54 Annex 34 Pt.1)</b> <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, calculation spreadsheet.</i>	/XLS/	<i>Description:</i> The parameters are applied consistently, the calculations are traceable in the emission reduction sheet. The designations in the PDD and MR are consistent. However following issues are raised; The project emission factor calculation is currently based on the complete campaign data however to ensure conservativeness the emission factor for the monitoring period (20 <sup>th</sup> November 2009 to 12 <sup>th</sup> February 2010) shall be calculated. Under section 8 “GHG calculations” of the MR there are two different values of the emission reductions mentioned. <i>Justification of evidences:</i> The emission reduction calculation sheet was checked. <i>Conclusion:</i> The parameters are consistent in the PDD, MR and emission reduction calculation sheet. However CAR E1, CAR E2 were raised.	<b>CAR E1</b>  <b>CAR E2</b>	OK
<b>E.3. Parameter presentation</b> <b>(EB 54 Annex 34 Pt.1)</b> <i>Check if all values included in the MR are presented as per international standards</i> - <i>Format: Standard format (e.g. 1,000 represen-</i>	/MR/	<i>Description:</i> The values in the MR are as per International standards <i>Justification of evidences:</i> The MR is checked to confirm the same.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>ting one thousand and 1.0 representing one).</p> <ul style="list-style-type: none"> <li>Units: Values shall be directly given in SI units – or additionally to original units transferred to SI.</li> <li>Short scale naming system: (Only) million = 10<sup>6</sup> and billion 10<sup>9</sup> shall be used.</li> </ul>		<p><i>Conclusion:</i></p> <p>International standards have been followed.</p>		
<p><b>E.4. Correctness of calculation</b> <b>(EB 55 Annex 1, §§ 204-206)</b></p> <p>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.</p> <p>Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.</p> <p>Check especially that no standard or old values have been used for calculation where calculations based on up-to-date data is required.</p>	<p>/XLS/ /MR/ /PDD/</p>	<p><i>Description:</i></p> <p>The emission reduction calculations are complete. The requirements of the registered PDD and monitoring methodology is applied correctly.</p> <p>However, CAR E1, CAR E2 and CAR E3 raised.</p> <p><i>Justification of evidences:</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 B2, CAR B3, CAR D1, CAR E1, CAR E2.</p>	<p><b>CAR B2, CAR B3  CAR D1  CAR E1, CAR E2</b></p>	<p>OK</p>
<p><b>E.5. Emission reductions table</b> <b>(EB 54 Annex 34, E.4)</b></p> <p>Check if the MR includes a summary table of the emission reductions calculation specifying separately</p> <ul style="list-style-type: none"> <li>Total baseline emissions</li> </ul>	<p>/MR/</p>	<p><input checked="" type="checkbox"/> The MR includes in section E.4 a summary of the emission reductions calculation.</p> <p><input checked="" type="checkbox"/> The summary 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 are correct;</p>	<p><b>CAR B2, CAR B3</b></p>	<p>OK</p>

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"> <li>- Total project emissions:</li> <li>- Total leakage</li> <li>- Total emission reductions.</li> </ul> <p>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</p>		<p>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 B2, CAR B3, CAR D1, CAR E1, CAR E2, .</p>	<p><b>CAR D1</b></p> <p><b>CAR E1</b></p> <p><b>CAR E2</b></p>	
<p><b>E.6. Comparison with ex-ante determined emission reductions (EB 54 Annex 34, E.5; E.6)</b></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 which might require a notification / approval of changes (as per EB 48 Annex 66/67).</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 have been observed, The comparison between ex-ante estimated values and verification period values does not provide a discussion of deviations. Thus CAR E4 has been raised</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, however CAR E4 raised</p>	<p><b>CAR E3</b></p>	<p>OK</p>

## ANNEX 2: STATEMENTS OF COMPETENCE OF ALL INVOLVED PERSONNEL

TUV NORD Certification		
<b>Statement of Competence</b> Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program		
<b>Mr. Jimmy Sah</b>		
SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor	2014-02-03
Validation, Verification		
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_F003_2011-07-27_rev1		
S01-F003 rev0 / 2010-04-19		

TUV NORD Certification		
<b>Statement of Competence</b> Appointment and authorization according to the procedures of the TÜV NORD JI/CDM Certification Program		
<b>Mr. Prasad Jakkaraju</b>		
SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor	2014-02-02
VCS	Lead Assessor	2014-02-02
Authorization status for technical areas within sectoral scopes:		
CODE	TECHNICAL AREA	
1.2	Renewable Energies	
2.1	Electricity Distribution	
103 – Rev. 0, Date: 2011-03-25		
103_F003_2011-03-25_rev0		
S01-F003 rev0 / 2010-04-19		



**Statement of Competence**

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

**Mr. Stefan Winter**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor	2014-06-30
Validation, Verification		
VCS	Senior Assessor	2014-06-30

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal energy generation
1.2	Renewable Energies
13.1	Waste handling and disposal
13.2	Animal waste management
15.2	Animal waste management

163 – Rev. 1, Date: 2011-07-01

163\_S01-F003\_2011-07-01\_rev1

S01-F003 rev0 / 2010-04-19



**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	Lead Assessor (Validation, Verification) Technical Reviewer	2015-07-10
VCS / ISO 14064-2	Lead Assessor Technical Reviewer	2015-07-10

Authorization status for technical areas within sectoral scopes:

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

244 – Rev. 4, Date: 2012-07-11

244\_S01-F003\_2012-07-11\_rev4.doc

S01-F003 rev2 / 2012-04-05

Final 1st Periodic Verification Report: N<sub>2</sub>O abatement in HP Nitric Acid plants at Rashtriya Chemicals & Fertilizers Limited,  
India

TÜV NORD JI/CDM Certification Program

P-No: 8106754168 – 10/167



**Statement of Competence**

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

**Mr. Rainer Winter**

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

Authorization status for technical areas within sectoral scopes:

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

003 – Rev. 5, Date: 2011-08-01

003\_S01-F003\_2011-08-01\_rev5

S01-F003 rev0 / 2010-04-19



**Statement of Competence**

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

**Mr. Sandip Saha**

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification)	2015-08-22
VCS / ISO 14064-2	Assessor	2015-08-22

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable energies

275 – Rev. 2, Date: 2012-08-23

275\_S01-F003\_2012-08-23\_rev2.doc

S01-F003 rev2 / 2012-04-05



**Statement of Competence**

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

**Mr. Mohinder Amarnath B.J.**

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2013-06-21
VCS / ISO 14064-2	Lead Assessor	2013-06-21

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal Energy Generation*
1.2	Renewable Energies
3.1	Energy Demand
4.1	Cement Sector
4.5	Waste Heat Recovery*
13.1	Waste Handling and Disposal

\* Limited to validation and verification contracts signed by 17 June 2013

053 – Rev. 2, Date: 2012-11-08

053\_S01-VA060-F20\_2012-11-08\_rev2.doc

S01-VA060-F20 rev3 / 2012-10-25