




Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	Catalytic N ₂ O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea
Reference number of the project activity	0922
Version number of the verification and certification report	Version 2
Completion date of the verification and certification report	19/05/2016
Monitoring period number and duration of this monitoring period	<ul style="list-style-type: none"> Monitoring period number: 10th (The 1st monitoring period for 2nd crediting period) Duration: 27/06/2014 ~ 26/06/2015
Version number of monitoring report to which this report applies	Version 2.0
Crediting period of the project activity corresponding to this monitoring period	27/06/2014~26/06/2021 (Renewable,7 years)
Project participant(s)	Hanwha Corporation
Host Party	Republic of Korea
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	<ul style="list-style-type: none"> Sectoral scope: 5_Chemical industries Selected methodology: ACM0019 Version 02.0.0 (N₂O abatement from nitric acid production) No standardized baseline(s) applicable
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	242,526 tCO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	203,384 tCO ₂ e
Name of DOE	Korean Foundation for Quality (KFQ)
Name, position and signature of the approver of the verification and certification report	Soon Hong YEOM  Managing Director of Sustainability management institute

SECTION A. Executive summary

Korean Foundation for Quality (KFQ) has performed periodic verification of the CDM project “Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC)” in Ulsan, Republic of Korea”, UNFCCC Registration Ref. No. 0922 for the period from 27/06/2014 to 26/06/2015. This report contains the findings from the verification and a certification statement for the certified emission reductions.

Verification objective

Verification is the periodic, thorough and independent assessment and ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period. Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC)” for the period from 27/06/2014 to 26/06/2015 in accordance with paragraph 62 of CDM modalities and procedures.

Verification scope

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the renewed and approved PDD (hereinafter referred to as “the registered PDD”) and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place.
- The monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of CERs and verifiable and in accordance with applicable CDM requirements.
- The monitoring plan complies with the monitoring methodology and the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology including applicable tools and compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology.
- Data is recorded and stored as per the monitoring methodology ACM0019 (version 01) and the calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

Furthermore, it was KFQ’s objective to identify any concerns related to the conformity of the actual project activity and its operation with the registered project design document and determine whether any deviation or proposed or actual changes in the implementation or operation of the project activity comply with the requirements of the Project Standard.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified. The verification is incorporating both quantitative and qualitative information on emission reductions.

Verification process

KFQ has made publicly available the monitoring report received from the project participants. Only verification activities after the publication of the monitoring report on the UNFCCC CDM website have been used as a basis for conclusion of verification.

The verification process includes desk review of the monitoring report published (and any updated versions, if available), emission reduction calculation spreadsheets and other supporting documents and data. Further, onsite assessments and interviews with those involved in project management and operations are conducted. This is followed by preparation of verification report summarizing desk review and on-site assessment findings (i.e. CARs, CLs, and FARs). Upon successful closing of the CARs and CLs raised (if any), the final verification report is prepared. The final report then undergoes a technical review and final approval according to KFQ's internal quality assurance procedures.

The data presented in the monitoring report were assessed by review of the detailed project documentation and production records, as well as by interviews with personnel at Hanwha Corporation and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results, as well as to verify the correct application of the approved monitoring methodology. Furthermore, this has enabled the verification team to assess and determine that the implementation and operation of the project activity as well as the steps taken to report emission reductions in compliance with the CDM criteria and relevant guidance provided by the Board.

In addition, all parameters, as required (and as applicable) by the monitoring methodology ACM0019 (version 02) as well as the monitoring plan and the management system were assessed during the site visit.

Description of the project activity

The CDM project has introduced tertiary N₂O reduction technology which consists of the catalyst as well as the reactor in Nitric acid production line.

In order to monitor the N₂O reduction, the tail gas volume flow and the nitrous oxide concentration at the outlet of the DeN₂O unit are monitored through the Automated Measuring System(AMS) including non-dispersion infrared absorption analyzer(NDIR) which is applicable to European standards and norms (EN 14181) and recorded.

The physical components including the equipment for N₂O abatement and monitoring the N₂O reduction were confirmed as proposed in the registered PDD.

Project Title	Catalytic N ₂ O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea (PDD version 12, dated 06/05/2014)
UNFCCC Registration Number	0922
Project Participant	Hanwha Corporation
Baseline and monitoring methodology	ACM0019 (version 02)
Location of the project	Address : 32, Sannam-gil, Onsan-eup, Ulju-gun, Ulsan city GPS Coordinates: Longitude : 129.3392106°E, Latitude : 35.4139980°N
Date of registration	03/05/2007
PDD (2 nd crediting period)	Version 12 of 06/05/2014
Validation (2 nd credit period)	Validation report of 07/05/2014 by DNV
Renewal date	06/08/2014
2 nd crediting period	27/06/2014 to 26/06/2021
Monitoring period of this verification	27/06/2014 to 26/06/2015 (365 days)
Approved date of Temporary deviation	24/04/2016 * PRC Reference No.: PRC-0922-001

Conclusion

KFQ has performed the verification of the emission reductions reported for the project activity “Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan” in the republic of Korea (UNFCCC Registration Ref. No. 0922) for the period from 27/06/2014 to 26/06/2015.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. All relevant records of data from the ABB data logging, DCS and records from the production logs of the nitric acid production have been examined and verified for the reporting period.

KFQ also confirms that the GHG emission reductions are calculated without material misstatements. Our opinion refers to the project’s GHG emissions and resulting GHG emission reductions reported, both determined using the valid and registered project’s baseline, its monitoring plan and its associated documents.

The implementation of the project resulted in 203,384 tCO₂e of emission reductions during the monitoring period from 27/06/2014 to 26/06/2015 which is within the renewal, second crediting period from 27/06/2014 to 26/06/2021. In our opinion, the GHG emission reductions reported for the project in the MR (Version 2) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0019 (version 02), monitoring plan in the PDD and approved temporary deviation from the monitoring methodology.

KFQ is able to certify that the emission reductions from the “Catalytic N₂O destruction project in the tail gas of Nitric Acid Plants of the Hanwha Corporation (HWC) in Ulsan” in Korea during the period from 27/06/2014 to 26/06/2015 amount to 203,384 tCO₂e.

SECTION B. Verification team, technical reviewer and approver**B.1. Verification team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1	Team Leader	IR	PARK	Sang Yeon	KFQ	√	√	√	√
2	Verifier	IR	CHO	Jin Seok	KFQ	√	√	√	√

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1	Technical reviewer	IR	YOON	Sung Han	KFQ
2	Approver	IR	YEOM	Soon Hong	KFQ

Please refer to Appendix 2 below for demonstration of how the team meets the competence required for the verification.

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1	Number of Monitoring parameters	L	Methodology and tool require a rather low number of monitoring parameters	The KFQ verification team included two verifiers in total and all of them participate in on-site to cover/ review all monitoring parameters in a complete and detailed manner. In the previous verification, there was no significant change on verified ER compared to ER in Monitoring report (v.1)
2	Error rate in Monitoring report'	M	This is the 1 st monitoring period (of 2 nd crediting period) applying new methodology. Thus, expert organization is involved in compilation of MR as well as calculation	In response of that risk, the KFQ verification team focuses on systematic consistency and error checks
3	Familiarity with Monitoring system	L	This is 10th monitoring period (1 st period of Second crediting period). Application of new methodology does not impact on the familiarity of monitoring system. Expert organization is involved in the periodic inspection of monitoring equipment	In response to that risk, the KFQ verification team checks the existence of any and all monitoring instruments as well as their valid calibration, independently from the fact that the PP would already be familiar with the monitoring system. Nevertheless, the relatively new parts of the monitoring system introduced in the 2nd crediting period will be checked especially
4	QA/QC	M	Some of QA/QC implementation including calibration has not been indicated in the MR (v.1) and not contained in the evidence package	The KFQ verification team focuses on periodic calibration and QA/QC activities performed as per EN 14181. Additionally, the KFQ verification team also focuses on crosschecking as well as plausibility check in order to ensure data quality
5	Data flow	L	Transferred to the spreadsheet automatically	In response to that risk, the KFQ verification team checks the safeguard measures for raw data and crosschecked raw data with the MS Excel spreadsheets on a random sampling basis, in an extent to ensure the functioning of the transferring system.
6	Recalculation	M	Calculation is performed in	Firstly check any omissions of

			<i>excel spreadsheet applying formulae. However, recalculation is done by manually.</i>	<i>events for recalculation. And then review all recalculation.</i>
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KFQ's verification plan draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. KFQ planned the verification by obtaining evidence and other information and explanations that KFQ considers necessary to give reasonable assurance on the reported GHG emission reductions on the basis of risk level identified and materiality concept in accordance with "Guideline of application of materiality in verifications (ver. 02).

C.2. Consideration of materiality in conducting the verification

There were findings impacting on the total amount of emission reductions as described in "Appendix 4. Clarification requests, corrective action requests and forward action requests" of this report. The verification team has considered that the findings could impact on the total emission reductions to the considerable level.

Accordingly, the verification team reviewed the characteristics of findings impacting on emission reductions and found that these findings were relating with calculation and data handling for events. And these findings are independent and not a systematic error that would reoccur or be in other emission source or parameter.

Consequently, there is no need to further check raw data and the application of raw data to the excel spreadsheet. However the verification team have checked all calculation process again, application of QAL2 correction factor and application of applied methodology newly in this monitoring period including data handling for each event in order to reach a reasonable level of assurance that the claimed emission reductions in the MR are free from material error, omission or misstatement as the CARs resulted in the error amount exceeding the materiality threshold

SECTION D. Means of verification

D.1. Desk review

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The monitoring report version 1.0 (14/09/2015) submitted by the PP and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is shown in appendix 3 of this report. The monitoring report was made publicly available on the UNFCCC website on 16/09/2015.

The aim of the assessment in the desk review was to:

- Verify the compliance of the MR with the guidance for completing the monitoring report form
- Verify the completeness of the data and the information presented in the MR,
- Check the compliance of the MR with respect to the monitoring plan and verify that the applied methodology was carried out. Particular attention to coverage of all monitoring parameters, the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid,

- Review the calculations and assumptions used to obtain the GHG data and ER
- Evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

D.2. On-site inspection

On 07 October 2015, KFQ performed a physical site inspection and on-site interviews with project stakeholders to:

Duration of on-site inspection: 07/10/2015				
No.	Activity performed on-site	Site location	Date	Team member
1.	Confirm the implementation and operation of the project	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO
2	Review the data flow for generating, aggregating and reporting the monitoring parameters	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO
3	Confirm the correct implementation of procedures for operations and data collection	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO
4	Cross-check the information provided in the MR documentation with other sources	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO
5	Check the monitoring equipment against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO
6	Identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.	Onsan plant	07/10/2015	Sang Yeon PARK Jin Seok CHO

D.3. Interviews

A list of the persons interviewed during this verification activity is included in table below.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1	Woo	BomJe	Hanwha Corporation	07/10/2015	General support	Sang Yeon PARK Jin Seok CHO
2	LEE	MinHo	Hu-Chems Fine Chemicals Corp	07/10/2015	Facilities, instruments and analysis, QA/QC calculation	Sang Yeon PARK Jin Seok CHO
3	PARK	SangHyuk	Eco Network Co., Ltd.	07/10/2015	CDM coordination	Sang Yeon PARK Jin Seok CHO
	MOON	SeonYoung		07/10/2015		
	KIM	YeWon		07/10/2015		

D.4. Sampling approach

Random sampling has been applied as PPs did not apply a sampling approach in accordance with VVS 09.0.

Since automatic transferred system to the spreadsheet is in place, crosscheck for data in spreadsheet against raw data was done based on random sampling after confirming safeguard

measure for raw data in ABB data logging and DCS and transferring system. Sampling plan which the verification team planned was revised as stated section D.1 above.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	0	0	0
Compliance of the project implementation with the registered PDD	1	0	0
Post-registration changes	0	0	0
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	0	0	0
Compliance of monitoring activities with the registered monitoring plan	1	2	0
Compliance with the calibration frequency requirements for measuring instruments	0	0	0
Assessment of data and calculation of emission reductions or net removals	0	2	0
Others (please specify): Management system	1	0	0
Total	3	4	0

The objective of this phase of the verification was to resolve any issues which were needed to be clarified prior to KFQ's conclusion that i) the project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD, ii) the monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan including any guidance provided by the Board regarding deviations from the provisions of a registered/revised plan and/or methodology and iii) the data and calculation of GHG emission reductions are correct.

A corrective action request (CAR) is issued, where:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- 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 verification(s) to be verified during next verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

All findings were satisfactorily addressed by the project participant in the MR.

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	KFQ has checked the MR provided by the PP against the latest MR form in order to determine, whether the MR is in compliance with it.
Findings	The PP submitted the MR to DOE and the report was completed in accordance with

	the Monitoring Report Form (Version 05.1). It is identified during document review that the MR has no blank section.
Conclusion	The verification team confirms that the final MR (version 2) is in compliance with the latest version of monitoring report form (Version 05.1) and the instruction therein.

E.2. Remaining forward action requests from validation and/or previous verification

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There were no remaining forward action requests raised from validation and/or previous verification.

E.3. Compliance of the project implementation with the registered project design document

Means of verification	<p>Physical project implementation During the on-site visit, the KFQ verification team visually inspected the installations of the DeNOx system and all instrumentations necessary for the monitoring of the emission reductions and checked, whether all physical features of the CDM Project activity, including the data collection systems and storage, have been implemented in accordance with the registered PDD. Also, the KFQ verification team reviewed the documentation in respect of start-up and operation of the DeN₂O system, monitoring instrument specifications including containing details such as instrument history and measuring ranges.</p> <p>Project operation The verification team checked the operational records and other relevant information (Appendix 3) and interviewed relevant plant staff on the actual operation. Also daily reports, event log files, maintenance & calibration reports and logging data were checked by the KFQ verification team, especially with regard to times with shutdowns and issues, as indicated in the monitoring report.</p>
Findings	<p><u>Compliance of the project implementation with the registered PDD</u></p> <p>The project was implemented and maintains its operation as described in the registered PDD. During the on-site visit KFQ inspected the installation of the DeN₂O Unit and all instrument necessary for the monitoring of the emission reductions. All physical features (technology, project equipment and monitoring/metering equipment) of the project are in place as per the registered PDD.</p> <p>The commercial operation of the nitric acid plant was started on January in 2005 and the project was registered on 03 May 2007. And then, the DeN₂O unit has been in operation since 27 June 2007 and it was confirmed by checking the operation and Certificates of Guarantee test run issued by the catalyst and reactor supplier. By operation of DeN₂O unit on 27 June 2007, PP has changed the starting date of crediting period from 01 July 2007 to 27 June 2007, and this change was accepted by UNFCCC.</p> <p>As terminate the 1st crediting period, the project was renewed on 06 Aug 2014 and it starts the 2nd crediting period for 27/06/2014~ 26/06/2021. The verification team confirmed it through the information of UNFCCC and interview at on-site.</p> <p>The verification team confirmed through visual inspection and instrument specifications containing history and measuring range that all physical features of the CDM project activity including data collection systems and storage have been implemented in accordance with the registered PDD (v.12, dated 06/05/2014).</p> <p><u>Actual operation of the project during the monitoring period:</u></p> <p>For this monitoring period, lasting 365 days, the operation of the DeN₂O unit was stopped due to the reasons given in the monitoring report. It was confirmed by KFQ through checking documented shut down report, the daily operation records, ABB data logging and DCS etc., and no emission reduction is claimed during these downtimes in a conservative manner.</p>

	<p>KFQ confirms that no emissions reductions were claimed for those periods when shutdowns of Nitric acid plant and/or DeN₂O unit due to overhaul, replacement of catalyst and emergency shutdown etc. were occurred. And it is clearly and correctly implemented in excel spread sheet.</p> <p>In addition, the events regarding to the operation of the DeN₂O unit mentioned in the MR were confirmed by KFQ through checking the daily operation record and data logging system. The value during the period relevant to these events were excluded for the calculation of emission reduction in MR(v.1). However, it needs to demonstrate that the data or events are treated in accordance with the applied methodology, ACM0019 (v.2). /Refer to CAR ID 03 (b) when the issues (for N₂O concentration and mass flow indicated in the MR) occurred. Also, the verification team found that the application of 'P_{product, y}' for the project is not consistent with the actual situation. / Refer to CL ID 03.</p>
Conclusion	<p>KFQ confirms that the project has been implemented according to the description in the registered PDD. The raised CAR 03 and CL 03 have been completely resolved.</p> <p>KFQ confirms that the recalculations of N₂O emissions for the observed issues were done in accordance with the registered PDD, applied methodology and the requirements from VVS. And the procedure for recalculation of N₂O emissions during the observed periods for each issue is clearly and correctly implemented in excel spread sheet.</p> <p>The verification team specifically confirms that</p> <ul style="list-style-type: none"> • All physical features of the proposed CDM project activity including data collection systems and storage are in place and in accordance with the registered PDD; and • All other relevant information provided in the monitoring report is fully in accordance with respective information stated in the registered PDD; and • The information on project operation, the management system and quality assurance are complete, correct and in accordance with the registered PDD and; • The management system and quality assurance and related procedures have implemented as described in the monitoring report and in accordance with the registered PDD.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Regarding the compliance with the EN14181, the suitability test of QAL1 was not available for the flowmeter during the 1st crediting period and thus, it's required the temporary deviation as per paragraph 100 of EB47th meeting report. Thus, prior approval for temporary deviation from the registered monitoring plan submitted to the Board on 23/12/2015 and it was approved on 24/04/2016.

Please refer to the details on the temporary deviation from PRC ref. PRC-0922-001
: <http://cdm.unfccc.int/PRCContainer/DB/prcp315706268/view>

E.4.2. Corrections

There were no post registration changes identified by verification team during this verification.

E.4.3. Changes to the start date of the crediting period

There were no post registration changes identified by verification team during this verification

E.4.4. Inclusion of a monitoring plan to a registered project activity

There were no post registration changes identified by verification team during this verification.

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

There were no post registration changes identified by verification team during this verification.

E.4.6. Changes to the project design of a registered project activity

There were no post registration changes identified by verification team during this verification.

E.4.7. Types of changes specific to afforestation and reforestation project activities

Not Applicable.

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The KFQ verification team reviewed the monitoring plan contained in the registered PDD against the approved methodology, ACM0019 (Version 02) and the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 3) which is applied by the project activity.
Findings	The KFQ verification team found that there are no incompliances between the applicable monitoring plan, the applied methodology ACM0019 (Version 02) and the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 3). Furthermore it was found that there are no standardized baselines applied in the project activity.
Conclusion	KFQ confirms that the monitoring plan in the registered PDD is in accordance with the approved methodology, ACM0019 (Version 02) and the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 3) applied by the project activity (no standardized baselines are used in the project activity).

E.6. Compliance of monitoring activities with the registered monitoring plan**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

Means of verification	'Data and parameters fixed ex-ante' listed in the monitoring report have been crosschecked & reviewed against – as applicable – the monitoring plan contained in the registered PDD as well as applied methodology (ACM0019 _version 02) including applicable tools and other relevant CDM related documentation.			
Findings	'Data and parameters fixed ex-ante' have been reviewed against the registered PDD, applied methodology (ACM0019 _version 02) and Tool to determine the mass flow of a greenhouse gas in a gaseous steam (version 3.0.0).			
	Detailed assessment on 'Data and parameters fixed ex ante' is as below;			
	Data/parameter (unit, description)	Source of data	Value(s) applied	Assessment
	• Operating pressure (KPa.	Manufacturer specifications	High pressure	According to the historical records of the operating condition of

	Operating pressure of the Ammonia burner)			the ammonia burner, all the recorded hourly operating pressure were higher than 600kPa, thus, according to the methodology, high pressure's default N ₂ O baseline emission factor is applied for this project.
	• EF _{historical} (kgN ₂ O/tHNO ₃ , Historical baseline emission factor of the Nitric acid plant)	Historical information from issuance reports of CDM-PDD documents	9.47	For plants that used AM0028 in the first crediting period, the lowest baseline emission factor obtained in one calendar year during the 1 st crediting period.
	• EF _{default,y} (kgN ₂ O/tHNO ₃ , Default emission factor according to the operating pressure of the ammonia burner in year y)	PDD / ACM0019 (ver. 2)	12.4(in 2014) 12.2(in 2015)	According to the applied methodology ACM0019 (ver. 02), EF _{default,y} during the year of 2014, 2015 is 12.4 and 12.2 kgN ₂ O/tHNO ₃ respectively. The default N ₂ O emissions factors are correctly applied in the Monitoring report as per the applied methodology ACM0019 (ver. 02)
	• EF _{new,y} (kgN ₂ O/tHNO ₃ , Baseline N ₂ O emission factor for nitric acid production in year y)	PDD / ACM0019 (ver. 2)	3.50(in 2014) 3.40(in 2015)	According to the applied methodology ACM0019 (ver. 02), EF _{new,y} during the year of 2014, 2015 is 3.50 and 3.40 kgN ₂ O/tHNO ₃ respectively. The default N ₂ O baseline emissions factors are correctly applied in the Monitoring report as per the applied methodology ACM0019 (ver. 02)
	• P _{product, max} (t Product, Design capacity of nitric acid production during the 1 st crediting period)	PDD	107,100	According to the applied methodology ACM0019 (ver. 02), P _{product, max} should be the designed capacity applied during the 1 st crediting period. In the registered PDD, the value of 107,100t/y was applied.
	• GWP _{N₂O} (tCO ₂ e/tN ₂ O, Global warming potential of N ₂ O)	Relevant decision by the CMP	298	According to the "Application of the global warming potentials to clean development mechanism project activities and

				programme of activities for the second commitment period of the Kyoto Protocol", all the CDM project shall apply updated GWP value since 1 January 2013. For N ₂ O, the value of 298 shall be applied from 1 January 2013 onwards.
	• Ru (Pa.m ³ /kmol.K, Universal ideal gases constant)	PDD / "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (ver. 3.0.0)	8,314	According to "Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 3.0.0", the universal ideal gases constant is 8,314 Pa.m ³ /kmol.K.
	• MMi (kg/kmol, Molecular mass of greenhouse gas i)	PDD / "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (ver. 3.0.0)	44.02	According to "Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 3.0.0", the molecular mass of N ₂ O is 44.02 kg/kmol.
	• P _n (Pa, Total pressure at normal condition)	PDD / "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (ver. 3.0.0)	101,325	According to "Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 3.0.0", Total pressure at normal condition is 101,325Pa.
	• T _n (K, Temperature at normal conditions)	PDD / "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (ver. 3.0.0)	273.15	According to "Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 3.0.0", Temperature at normal conditions is 273.15K.
Conclusion	KFQ confirms that 'data and parameters fixed ex-ante' have been correctly and completely applied in accordance with the registered PDD, applied methodology (ACM0019 _version 02) and Tool to determine the mass flow of a greenhouse gas in a gaseous steam (version 3.0.0).			

E.6.2. Data and parameters monitored

The monitoring report lists each parameter required by the monitoring plan and the information flow for each parameter is provided in the MR. The verification team confirms that the MR includes all parameters and the monitored data at the interval required by the methodology and the monitoring plan contained in the registered PDD. The monitoring has been carried out in accordance with the monitoring plan, and all parameters were monitored and determined as per the monitoring Plan except the parameters monitored according to the approved PRC. The completeness of monitoring and compliance with monitoring plan were assessed and summarized as below;

Information flow

The common data flow systems have been used in the project activity for the following parameters:

- Nitric acid production ($P_{\text{production},y}$)
- Operating parameter of the nitric acid plant (flow of HNO_3 produced for determining h_y)
- Volumetric flow, temperature and pressure of the tail gas stream ($V_{t,db}$)
- Volumetric fraction of N_2O in the tail gas stream ($v_{i,t,db}$)
- Quantity of Natural gas combusted in the DeN_2O unit ($\text{FC}_{i,j,y}$)

The data from each transmitter, detector and flow meter is continuously measuring and transferred to ABB data logging system and DCS system. Thus collected and processed data, i.e. calculation, raw data, calculated values, are stored in the server continuously and available in the network system as digital values. Also it is generated aggregated monthly data sheets based on the raw data stored at the delegated server.

The verification of the information flow (where applicable) of all monitoring parameters was successfully done by means of the following documents and cross checks.

Data generation and aggregation:

- Monthly data sheet from ABB data logging system
- Data sheet downloaded from DCS system for the monitoring period
- Monthly Natural gas analysis data provided from NG supplier
- Calibration records and certificates on instrument
- Certificate of analysis of the standard test gas for analyzer calibration

Aggregation to recording:

- Data cross check between values from analyzers / transmitters and values in control room

Calculation and reporting:

- Crosscheck of implemented calculations in Excel sheets against the PDD formulae

The verification team assessed the information flow and data collection system and confirms that it meets the requirements of the registered PDD and the monitoring plan as per the applied methodology ACM0019 (version 02). In addition, Intervals (measuring frequency, reading frequency, recording frequency) of each instrument are also verified through display panel at on-site and DCS generated reports, and concluded that Intervals were set in accordance with ACM0019 (version 02), monitoring plan contained in the registered PDD and approved temporary deviation from the registered monitoring plan.

Detailed assessment on data and parameters monitored is described as below;

Data/Parameter	$P_{\text{product},y}$
Data Unit	t HNO_3
Description	Nitric acid produced in the monitoring period n
Source of data used	Measuring device (Flow meter)
Value(s)	88,952 t HNO_3 (total value in the monitoring period)
Means of verification	The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied

	<p>measuring device & related equipment for generation, aggregation, recording and reporting. The verification team checked the DCS monthly sheet and compared the values reported in the excel spreadsheets. All results have been verified against the requirements out of the monitoring plan and the applied methodology.</p> <p>Furthermore, procedures and records on calibration, maintenance and QA/QC activities have been reviewed, discussed in interviews and checked against the requirements out of the monitoring plan and the applied methodology.</p>
Findings	<p>The nitric acid production (as 100% HNO₃) is determined based on 'produced HNO₃ flow' and 'produced HNO₃ concentration'. Thus, produced HNO₃ flow, temperature and density for concentration are automatically monitored by a Coriolis mass flow meter at the product line before storage tanks and 'HNO₃ concentration' is checked by the accredited 3rd party. Consequently, the measured amount of HNO₃ from the meter is sent to the DCS and converted to the amount of HNO₃ as 100%.</p> <p>P_{product,y} is sourced from the ERP report and flow meter as per the monitoring plan. However, <i>the verification team could not check the ERP report on-site visit. <u>Refer to CAR ID 01</u></i></p>
Conclusion	<p>The raised CAR ID 01 is resolved.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan.</p>

Data/Parameter	h_y
Data Unit	h
Description	Number of hours of operation in a monitoring period n
Source of data used	Measuring device (Nitric acid flow meter)
Value(s)	7,879 (total value in the monitoring period)
Means of verification	According to the monitoring plan in the registered PDD, the value for this parameter is from ERP report. KFQ has checked, whether this has been correctly determined in the MS Excel sheets based on the ERP report and event log, in accordance with the PDD and the monitoring plan.
Findings	<p>According to the monitoring plan, the source of data is ERP (Enterprise Resource Planning) Report. However, it was found that PP has applied the operation hour of HNO₃ flow meter in the monthly data sheet and 'h_y', is counted considering only the normal operation hour. Resultantly, PP excluded all events (including scheduled shut-down, overhaul and the events occurred in DeNOx unit) in the h_y, regardless of h_{r,y}. <i>The applied value for this parameter (h_y) is not consistent with that in the source of data and it's not correctly applied according to the methodology. <u>Refer to CAR ID 02.</u></i></p>
Conclusion	<p>The raised CAR ID 02 is resolved.</p> <p>KFQ confirms that the source of data from HNO₃ flow meter reflects the operating condition of the plant than data on the ERP report itself.</p> <p>KFQ confirms as well that the monitoring of 'h_y' has been carried out in accordance with the monitoring plan.</p> <p>The QA/QC procedures are suitable and have been applied in accordance with the monitoring plan.</p>

Data/Parameter	h_{r,y}
Data Unit	h
Description	<p>Number of hours of operation in a monitoring period n where:</p> <p>For tertiary N₂O abatement, the abatement system is by-passed, underperforming or failed.</p>

Source of data used	Measuring device
Value(s)	336
Means of verification	<p>According to the monitoring plan in the registered PDD, the value for this parameter is from ERP report. And as per the applied methodology, this parameter is determined based on measured data, applying following formula.</p> $F_{N_2O, tail\ gas, h} > EF_{existing, y} \times P_{NA, h}$ <p>KFQ has checked, whether this has been correctly determined in the MS Excel sheets based on the ERP report and event log, in accordance with the PDD and the respective monitoring plan.</p>
Findings	<p>According to the monitoring plan, the source of data is ERP (Enterprise Resource Planning) Report. However, it was found that PP has applied the operation hour of HNO₃ flow meter in the monthly data sheet and the value of 'h_{r,y}' is 0 in MR(v.1). For reporting 'h_{r,y}', it shall be considered the by-passed, underperforming or failed operation hour occurred from DeNOx unit. Nevertheless, PP was already excluded the failed hour from the parameter of 'h_y'.</p> <p>Consequently, <i>the applied value for this parameter (h_{r,y}) is not consistent with that in the source of data and it's not correctly applied according to the methodology./ Refer to CAR ID 02.</i></p>
Conclusion	<p>The raised CAR ID 02 is resolved.</p> <p>KFQ confirms that the source of data from HNO₃ flow meter reflects the operating condition of the plant than data on the ERP report itself.</p> <p>KFQ confirms as well that the monitoring of Number of hours of operation in a monitoring period (h_{r,y}) has been carried out in accordance with the monitoring plan. The QA/QC procedures are suitable and have been applied in accordance with the monitoring plan.</p>

Data/Parameter	V_{t,db}
Data Unit	Nm ³ dry gas/h
Description	Volumetric flow of the gaseous stream in time interval t on a dry basis
Source of data used	Measuring device (flow meter)
Value(s)	265,590 Nm ³ dry gas (Total volume in the monitoring period)
Means of verification	<p>The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied measuring device & related equipment for generation, aggregation, recording and reporting. Furthermore, the KFQ verification team performed data checks between trend curves (generated from raw data) and DCS monthly sheet. Furthermore, the verification team checked the DCS monthly sheet and the values reported in the excel spreadsheets. All results have been verified against the requirements out of the monitoring plan, the applied methodology and the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 03.0.0).</p> <p>Furthermore, procedures and records on calibration, maintenance as well as QA/QC and EN 14181 related activities have been reviewed, discussed in interviews and checked against the requirements out of the monitoring plan and the applied methodology.</p>
Findings	<p>The differential pressure transmitter has been installed in the stack at the end of the tail gas line. For calculation of volume flow at standard condition, the press transmitter and temperature detector have been equipped. Each meter's location has been confirmed by physical inspection during the on-site visit.</p> <p>It was found that the data from each transmitters and detector is continuously measuring (read every 1 second) and average values are hourly recorded. The generated flow rate data is transferred to ABB data logging system and it generates the temperature and pressure compensated flow rate data.</p> <p>The verification team checked the monthly data sheet on the DeN₂O unit including the measured flow rate, pressure and temperature as well as a compensated flow rate. And the data was verified comparison with the hourly value of data records of ABB data logging system at the project site.</p> <p>Also, the verification team checked the flow rate data in the ER calculation sheet is automatically generated on a system and correctly compensated as a Standard</p>

	<p>Conditions. Thus, the verification team concluded all data is reliable and consistent with cross check sources.</p> <p>The calibration and maintenance routines for the parameter are the responsibility of Hanwha Ulsan plant. QA/QC is covered by EN 14181, especially QAL 2 reference measurements (calibration). Valid calibration covering the whole monitoring period is available for the used equipment. The correction factor out of the calibration curve determined during the QAL 2 reference measurement (calibration).</p> <p>The QAL2 reference measurement was performed by an accredited laboratory during 13 to 15 January 2014 and it is valid for this monitoring period.</p> <p>However it was found that it was described that the monitoring system for N₂O concentration and mass flow of the tail gas is to be installed and maintained in accordance with the EN 14181 in the MR(version 1). <i>Nevertheless, please explain how the monitoring system meets the standard of EN 14181 in more detail in the MR. Especially, the correction factors derived from the calibration curve of the QAL2 audit shall be applied to both the N₂O concentration and the mass flow of the tail gas. However, the correction factor derived from QAL2 was not applied in the calculation of N₂O concentration and mass flow. /Refer to CAR ID 03 (a).</i></p> <p><i>In addition, the data when the issues (for N₂O concentration and mass flow indicated in the monitoring report) occurred was not treated in accordance with the provision (Para.26(d)) of the applied methodology, ACM0019(v.2)/ Refer to CAR ID 03 (b).</i></p>
Conclusion	<p>The raised CAR ID 03 is resolved.</p> <p>For resolving the CAR ID 03, PP applied the prior approval for temporary deviation from the registered monitoring plan and it was approved by EB on 24/04/2016.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it.</p> <p>KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan, the applied methodology and the approved temporary deviation from the registered monitoring plan.</p>

Data/Parameter	V_{i,t,db}
Data Unit	m ³ gas i/m ³ dry gas
Description	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis
Source of data used	Measuring device (NDIR)
Value(s)	1.977m ³ N ₂ O / Nm ³ dry gas (Total volumetric fraction in the monitoring period)
Means of verification	<p>The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied measuring device & related equipment for generation, aggregation, recording and reporting. Furthermore, the KFQ verification team performed data checks between trend curves (generated from raw data) and DCS monthly sheet. Furthermore, the verification team checked the DCS monthly sheet, QAL2 & 3 results and the values reported in the excel spreadsheets. All results have been verified against the requirements out of the monitoring plan and the applied methodology.</p> <p>Furthermore, procedures and records on calibration, maintenance and QA/QC activities have been reviewed, discussed in interviews and checked against the requirements out of the monitoring plan and the applied methodology.</p>
Findings	<p>The NDIR analyzer of the tail gas supplied by ABB is used for monitoring this parameter. The sample tube is located in the stack at the end of the tail gas line, and sample gas was leaded to the analyzer house where the analyzer was installed. The location has been confirmed by physical inspection during the on-site visit.</p> <p>It was found that the every second data from a NDIR is transferred to the ABB data logging system and hourly average concentration of N₂O is automatically generated.</p>

	<p>The verification team could check the hourly average N₂O concentration in the monthly data sheet and the N₂O concentration on the monthly data sheet was consistency with the data in the ER calculation sheet. Thus, the verification team concluded all data is reliable and consistent with cross check sources.</p> <p>The calibration and maintenance routines for the parameter are the responsibility of Hanwha Ulsan plant. QA/QC is covered by EN 14181, especially QAL 2 reference measurements (calibration). Valid calibration covering the whole monitoring period is available for the used equipment. The correction factor out of the calibration curve determined during the QAL 2 reference measurement (calibration).</p> <p>The QAL 1 report for N₂O analyzer was verified at the installation phase during the 1st verification and the verification team confirms that the analyzer has not been changed since the operation of DeN₂O unit. And the QAL2 reference measurement was performed by an accredited laboratory during 13 to 15 January 2014 and it is valid for this monitoring period.</p> <p>Nevertheless, the correction factor derived from QAL2 was not applied in the calculation of N₂O concentration and mass flow according to the approved methodology. /Refer to CAR ID 03 (a).</p> <p>In addition, the data when the issues(for N₂O concentration and mass flow indicated in the monitoring report) occurred was not treated in accordance with the provision (Para.26(d)) of the applied methodology, ACM0019(v.2)/ Refer to CAR ID 03 (b).</p>
Conclusion	<p>The raised CAR ID 03 is resolved.</p> <p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it.</p> <p>KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that the equipment used for monitoring of this parameter is calibrated in accordance with the monitoring plan, the applied methodology as well as methodological tools. Details on calibration are given in section E.7 below.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan and the applied methodology.</p>

Data/Parameter	C_{H2O,t,db,n}
Data Unit	mg H ₂ O/m ³ dry gas
Description	Moisture content of the gaseous stream at normal conditions, in time interval t
Source of data used	Measurements according to the USEPA CF42 method 4 – Gravimetric determination of water content
Value(s)	0.0041 kgH ₂ O/m ³ dry gas (in 2015) 0.0070 kgH ₂ O m ³ dry gas (in 2014)
Means of verification	The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan by document review.
Findings	<p>Gravimetric determination of water content was performed by the qualified, external entity SGS as per USEPA CF42 method 4. Repeated measurements (that coincided with the QAL 2 reference measurements), performed during 13 to 15 January 2014 and during 15 to 16 January 2015, respectively. Intervals are in accordance with “Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 2.0.0” and with ACM0019 (version 2).</p> <p>The moisture content of the gaseous stream measured is significantly below the maximum threshold value of 0.05 kg H₂O/m³ dry gas.</p>
Conclusion	<p>KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it.</p> <p>KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.</p> <p>KFQ confirms that QA/QC procedures are suitable and have been applied in accordance with the monitoring plan & relevant tool by the performing institute (SGS).</p>

Data/Parameter	$FC_{i,j,y}$
Data Unit	Nm ³ /y
Description	Quantity of Natural gas combusted in the tertiary N ₂ O abatement facility during the year y
Source of data used	Measuring device (Integral orifice meter)
Value(s)	150,583 (Total volume in the monitoring period)
Means of verification	The KFQ verification team checked, whether the monitoring activities in relation to this parameter comply with the monitoring plan by physically inspecting the applied measuring device & related equipment for generation, aggregation, recording and reporting. Furthermore, the verification team checked the raw data and the values reported in the excel spreadsheet. All results have been verified against the requirements out of the monitoring plan, the applied methodology.
Findings	The orifice flow meter located at the burner inlet of DeN ₂ O unit and it is automatically compensated the normal condition. The measured Natural gas flow is continuously measuring and average values are hourly recorded in the ABB data logging system. It was found that the value in the monitoring report is correct against raw data.
Conclusion	KFQ confirms that the monitoring of this parameter has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.

Data/Parameter	$w_{c,i,y}$
Data Unit	tC/tNG
Description	Weighted average mass fraction of carbon in Natural gas in year y
Source of data used	Values provided by the fuel supplier
Value(s)	0.758
Means of verification	The KFQ verification team checked the invoices and their application as well as calculation in excel spreadsheet.
Findings	The local supplier (Kyungdong City Gas Corporation) has provided the PP with the information on the Natural gas (including NCV, density and contents etc.). It was found that the daily data on density of NG was correctly used in the ER calculation sheet. However, <i>it was found that the value for the parameter was monitored complying with the monitoring plan but the verification team found that '$w_{c,i,y}$' and '$\rho_{i,y}$' were not applied the weighted average value and the calculation of '$w_{c,i,y}$' is not correctly applied in ER calculation sheet ./Please refer to CAR ID 04</i>
Conclusion	The raised CAR ID 04 is resolved. . KFQ confirms that the monitoring of this parameter and calculation has been carried out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.

Data/Parameter	$\rho_{i,y}$
Data Unit	t/Nm ³
Description	Weighted average density of carbon in Natural gas in year y
Source of data used	Values provided by the fuel supplier
Value(s)	0.000787
Means of verification	The KFQ verification team checked the invoices and their correct application in excel spreadsheet.
Findings	The local supplier (Kyungdong City Gas Corporation) has provided the PP with the information on the Natural gas (including NCD, density and contents etc.). It was found that the daily data on density of NG was correctly used in ER calculation. However, <i>it was found that the value for the parameter was monitored complying with the monitoring plan but the verification team found that '$w_{c,i,y}$' and '$\rho_{i,y}$' were not applied the weighted average value./Please refer to CAR ID 04</i>
Conclusion	The raised CAR ID 04 is resolved. KFQ confirms that the monitoring of this parameter and calculation has been carried

	out in accordance with the monitoring plan and any monitoring activities comply with it. KFQ confirms that monitoring results of this parameter are consistently recorded as per the approved frequency.
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E.6.3. Implementation of sampling plan

Means of verification	N/A
Findings	N/A
Conclusion	N/A

E.7. Compliance with the calibration frequency requirements for measuring instruments

The validation team confirms that the calibration frequency requirements for measuring instruments comply with ACM0019 (version 2) and the monitoring plan in the registered PDD. Calibration frequency of each instrument was checked through the Instrument specifications. Intervals (measuring frequency, reading frequency and recording frequency) for each instrument are also verified through display panel at on-site and DCS generated reports. It is concluded that instruments were set in accordance with ACM0019 (version 2), the monitoring plan in the registered PDD and approved temporary deviation from the registered monitoring plan. Detailed assessment for instruments is as below.

Data/Parameter	P _{product,y}		
Data Unit	tHNO ₃		
Description	Nitric acid produced in the monitoring period y		
I.D/ Serial No.	10-FT-512/ J405D802000		
Type	Coriolis mass flow meter	Accuracy level	0.15
Calibration Entity	FM Tech Co., Ltd.	Calibration frequency	15 Months
Previous calibration	-		
Latest calibration	16/06/2014 (Validity 15/09/2015)		
The applied period of max. permissible error when applicable	N/A		
Means of verification/comments	The KFQ validation team has visually checked the physical existence of the instrument. The KFQ validation team has checked the calibration records & instrument history against the calibration requirements as per the applied methodology and the monitoring plan as well as instrument specifications including manufacturer recommended frequencies.		
Findings	Meter's location has been confirmed by physical inspection during on-site visit. It was verified calibration was carried out within defined frequency as per the specification of the monitoring equipment, and there was no delayed calibration occurred. Also calibration results were within specified error range, and the calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.		
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan and the applied methodology.		

Data/Parameter	V _{t,db}
Data Unit	m ³ dry gas/h
Description	Volumetric flow of the gaseous stream in time interval t on a dry basis
Means of verification/comments	The KFQ verification team has visually checked the physical existence of the instrument. The KFQ verification team has checked the calibration records &

	instrument history against the calibration requirements as per the applied methodology and the monitoring plan as well as instrument specifications including EN 14181 required frequencies.		
Findings	<p>It was found that the instrument, as stated in the monitoring report, physically exists and could be identified by the serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.</p> <p>In accordance with EN14181, QAL 2 reference measurement as per required standards was performed by the qualified entity SGS during 13 to 15 January 2014. However, it was found that errors in the monitoring report were found as described below and PP needs to explain how the monitoring system meets the standard of EN 14181 in more detail in the MR. / Refer to CAR ID 03.</p>		
Conclusion	<p>The raised CAR ID 03 is resolved.</p> <p>For resolving the CAR ID 03, PP applied the prior approval for temporary deviation from the registered monitoring plan and it was approved by EB on 24/04/2016.</p> <p>KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology as well as approved PRC.</p>		
Equipment #1			
I.D/ Serial No.	10-FT-562/ 1 st equipment: 0553 05121501010, 2 nd equipment: 0712 07030214002		
Type	Differential pressure transmitter	Accuracy level	± 0.075% of span
Calibration Entity	HISCO	Calibration frequency	15 months
Previous calibration	12/09/2013		
Latest calibration	29/09/2014 (Validity: 28/12/2015)		
The applied period of max. permissible error when applicable	N/A		
Means of verification/comments	The KFQ validation team has visually checked the physical existence of the instrument. The KFQ validation team has checked the calibration records & instrument history against the calibration requirements as per the applied methodology and the monitoring plan including EN 14181 required frequencies.		
Findings	<p>Meter's location has been confirmed by physical inspection during on-site visit. According to EN 14181, QAL2 reference measurement was performed by SGS during 13 to 15 January 2014.</p> <p>Calibration certificates (QAL 2) were reviewed by the verification team, and It was verified that the calibrations were carried out for a measuring range comparable with the actual measuring range and calibration results were within specified error range. The calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.</p> <p>The calibrations of monitoring instruments were properly implemented according to the calibration frequency. Nevertheless, the validity of below instruments in MR(v.1) is not consistent with the actual evidence./ Refer to CLID 02</p>		
Conclusion	<p>The verification team confirms that calibrations were carried out in accordance with EN 14181 as per ACM0019 (version 2). Thus, it is concluded that the accuracy and the calibration interval of the monitoring instrument are controlled and calibrated in accordance with the monitoring plan and ACM0019 (version 2).</p> <p>Therefore, the monitoring equipment is valid for the monitoring period.</p>		
Equipment #2			
I.D/ Serial No.	10-PT-362/ 1 st equipment: 0712 07030214003, 2 nd equipment: 9853 00002001004		
Type	Absolute Pressure Transmitter	Accuracy level	± 0.075% of span
Calibration Entity	HISCO	Calibration frequency	15 months
Previous calibration	12/09/2013		
Latest calibration	29/09/2014 (Validity: 28/12/2015)		
The applied period of max. permissible error when applicable	N/A		

Means of verification/comments	Meter's location has been confirmed by physical inspection during on-site visit. Calibration certificate for the transmitter were reviewed by the verification team, and it was verified that the calibrations were carried out for a measuring range comparable with the actual measuring range and calibration results were within specified error range. The calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.		
Findings	It is identified that the calibrations of monitoring instruments were properly implemented according to the calibration frequency. Nevertheless, the validity of below instruments in MR (v.1) is not consistent with the actual evidence. /Refer to CL ID 02.		
Conclusion	The raised CL ID 02 is resolved. The finding is closed and the verification team confirms that calibrations were carried out in accordance with the monitoring plan and ACM0019 (version 2). Thus, it is concluded that the accuracy and the calibration interval of the monitoring instrument are controlled and calibrated in accordance with the monitoring plan and ACM0019 (version 2). Therefore, the monitoring equipment is valid for the monitoring period.		
Equipment #3			
I.D/ Serial No.	10-TT-162/ 1 st equipment: WS-7M423, 2 nd equipment: WS-7M140		
Type	Absolute Pressure Transmitter	Accuracy level	± 0.3% of span
Calibration Entity	HISCO	Calibration frequency	15 months
Previous calibration	12/09/2013		
Latest calibration	30/09/2014 (Validity: 29/12/2015)		
The applied period of max. permissible error when applicable	N/A		
Means of verification/comments	Meter's location has been confirmed by physical inspection during on-site visit. Calibration certificate for the transmitter were reviewed by the verification team, and it was verified that the calibrations were carried out for a measuring range comparable with the actual measuring range and calibration results were within specified error range. The calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.		
Findings	It is identified that the calibrations of monitoring instruments were properly implemented according to the calibration frequency. Nevertheless, the validity of the instruments in MR (v.1) is not consistent with the actual evidence./Refer to CL ID 02.		
Conclusion	The raised CL ID 02 is resolved. The finding is closed and the verification team confirms that calibrations were carried out in accordance with the monitoring plan and ACM0019 (version 2). Thus, it is concluded that the accuracy and the calibration interval of the monitoring instrument are controlled and calibrated in accordance with the monitoring plan and ACM0019 (version 2). Therefore, the monitoring equipment is valid for the monitoring period.		

Data/Parameter	$V_{i,t,db}$		
Data Unit	m ³ gas i/m ³ dry gas		
Description	Volumetric fraction of greenhouse gas i in a time interval t on a dry basis		
I.D/ Serial No.	10-AT-062/ 3.346996.7		
Type	NDIR analyzer	Accuracy level	± 0.02%
Calibration Entity	SGS	Calibration frequency	36 months (EN 14181/QAL 2)
Previous calibration	-		
Latest calibration	13/01/2014~15/01/2014 (validity: 14/01/2017)		
The applied period of max. permissible error when applicable	N/A		
Means of verification/comments	The KFQ validation team has visually checked the physical existence of the instrument. The KFQ validation team has checked the calibration records & instrument history against the calibration requirements as per the applied methodology and the monitoring plan including EN 14181 required frequencies.		

Findings	<p>It was found that the instrument, as stated in the monitoring report, physically exists and could be identified by the serial number. It was found that the instrument has been calibrated regularly and as per the defined requirements. It was found, that the instrument had a valid calibration covering the whole verification period and was working within the specified error ranges as per available, suitable certificates.</p> <p>The QAL 1 report for N₂O analyzer was verified at the installation phase during the 1st verification and the verification team confirms that the analyzer has not been changed since the operation of DeN₂O unit.</p> <p>In accordance with EN14181, QAL 2 reference measurement as per required standards was performed by the qualified entity SGS during 13/01/2014 to 15/01/2014. Valid QAL1 certification was found to be in place and available.</p> <p>Furthermore, the analyzer is self-calibrated (zero, span) using a set of certified calibration gases in accordance with EN 14181. The calibration gases applied were valid in the verifying period and cover the range of measurement. Detailed supplier certificates including information on concentration, accuracy and stability are available. The accuracy of the applied gases is $\pm 1\%$ and consistent to the PDD.</p> <p>Review for zero/span test result was conducted and found all are within allowable error and thus no adjustment in raw data was needed.</p> <p>The location of the analyzer house, sample take-off point and sample line to the analyzer house have been confirmed by physical inspection during on-site visit. Also, the verification team confirms the analyzer was properly functioned and controlled during the monitoring period according to the EN14181 standard.</p> <p>It was verified that the calibrations were carried out for a measuring range comparable with the actual measuring range and calibration results were within specified error range. The calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.</p>
Conclusion	KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology.

Data/Parameter	FC_{i,j,y}		
Data Unit	Nm ³ /y		
Description	Quantity of natural gas combusted in the tertiary N ₂ O abatement facility during the year y		
I.D/ Serial No.	10-FT-563/ 1 st equipment: 0712C2932575001001, 2 nd equipment: 02357885		
Type	Differential pressure transmitter with pressure,/temperature	Accuracy level	1 st equipment: $\pm 0.2\%$ 2 nd equipment: $\pm 0.075\%$
Calibration Entity	HISCO	Calibration frequency	15 Months
Previous calibration	12/09/2013		
Latest calibration	29/09/2014 (validity: 28/12/2015)		
The applied period of max. permissible error when applicable	N/A		
Means of verification/comments	The KFQ validation team has visually checked the physical existence of the instrument. The KFQ validation team has checked the calibration records & instrument history against the calibration requirements as per the applied methodology and the monitoring plan.		
Findings	Meter's location has been confirmed by physical inspection during on-site visit. Calibration certificate for the transmitter were reviewed by the verification team, and it was verified that the calibrations were carried out for a measuring range comparable with the actual measuring range and calibration results were within specified error range. The calibrations confirmed proper functioning of the monitoring equipment and were valid for the monitoring period.		

	However, the validity of the instruments in MR (v.1) is not consistent with the actual evidence. / Refer to CL ID 02.
Conclusion	The raised CL ID 02 is resolved. KFQ confirms that the calibration has been conducted as per the calibration frequency requirements and that the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan, the applied methodology.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>KFQ has reviewed data, parameters and calculations with respect to calculation of the baseline GHG emissions and checked them against the requirements out of the applied methodology (ACM0019_Version 02.0) and the registered PDD as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations. Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PPs have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p>																																																
Findings	<p>Baseline emissions are calculated as below:</p> $BE_n = \frac{P_{\text{project},y} * EF_{\text{existing},y} + \max\{P_{\text{product},y} - P_{\text{product,max}}, 0\} * EF_{\text{new},y} * (h_y - h_{r,y})}{h_y} * GWP_{N_2O} * 10^{-3}$ <table><tr><th>Year/Period</th><th>EF_{existing,y}</th><th>EF_{new,y}</th><th>P_{project,y}</th><th>P_{product,max}</th></tr><tr><th>Unit</th><th>kgN₂O/tHNO₃</th><th></th><th>tHNO₃</th><th></th></tr><tr><td>27/06/2014~31/12/2014</td><td>9.47</td><td>3.50</td><td>44,569</td><td>55,164</td></tr><tr><td>01/01/2015~26/06/2015</td><td>9.47</td><td>3.40</td><td>44,383</td><td>51,936</td></tr><tr><td>Total monitoring period 27/06/2014~26/06/2015</td><td>9.47</td><td>-</td><td>88,952</td><td>107,100</td></tr></table> <table><tr><th>Year/Period</th><th>h_y</th><th>h_{r,y}</th><th>GWP_{N₂O}</th><th>BE_y</th></tr><tr><th>Unit</th><th>h</th><th></th><th>-</th><th>tCO₂-e</th></tr><tr><td>27/06/2014~31/12/2014</td><td>4,075</td><td>278</td><td rowspan="3">298</td><td>120,469</td></tr><tr><td>01/01/2015~26/06/2015</td><td>3,804</td><td>58</td><td>119,968</td></tr><tr><td>Total monitoring period 27/06/2014~26/06/2015</td><td>7,879</td><td>336</td><td>240,437</td></tr></table> <p>* The value is conservatively rounded down.</p> <p>A complete set of data for baseline emission calculations covering the monitoring period has been provided to KFQ and reviewed during verification as explained E.6.1 and E.6.2 above. Equation and Formulae in emission reductions spreadsheet were reviewed against the methodology, the monitoring plan of the registered PDD.</p> <p>The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed for this project activity. It was also confirmed that the assumptions, emission factors that were applied in the calculations have been justified. This was verified by cross-checking in detail the formulae described and applied in the monitoring report and implemented in the emission reduction calculation spreadsheet against the formulae in the PDD, the applied methodology (ACM0019, Version 2) as well as the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 3).</p> <p>As outlined above, the input data for calculating the baseline emissions, the calculating process and the result are complete and transparent. Therefore, KFQ can confirm the accuracy of the emission reductions.</p> <p>Please refer to CAR 1 and CAR 2</p>	Year/Period	EF _{existing,y}	EF _{new,y}	P _{project,y}	P _{product,max}	Unit	kgN ₂ O/tHNO ₃		tHNO ₃		27/06/2014~31/12/2014	9.47	3.50	44,569	55,164	01/01/2015~26/06/2015	9.47	3.40	44,383	51,936	Total monitoring period 27/06/2014~26/06/2015	9.47	-	88,952	107,100	Year/Period	h _y	h _{r,y}	GWP _{N₂O}	BE _y	Unit	h		-	tCO ₂ -e	27/06/2014~31/12/2014	4,075	278	298	120,469	01/01/2015~26/06/2015	3,804	58	119,968	Total monitoring period 27/06/2014~26/06/2015	7,879	336	240,437
Year/Period	EF _{existing,y}	EF _{new,y}	P _{project,y}	P _{product,max}																																													
Unit	kgN ₂ O/tHNO ₃		tHNO ₃																																														
27/06/2014~31/12/2014	9.47	3.50	44,569	55,164																																													
01/01/2015~26/06/2015	9.47	3.40	44,383	51,936																																													
Total monitoring period 27/06/2014~26/06/2015	9.47	-	88,952	107,100																																													
Year/Period	h _y	h _{r,y}	GWP _{N₂O}	BE _y																																													
Unit	h		-	tCO ₂ -e																																													
27/06/2014~31/12/2014	4,075	278	298	120,469																																													
01/01/2015~26/06/2015	3,804	58		119,968																																													
Total monitoring period 27/06/2014~26/06/2015	7,879	336		240,437																																													

Conclusion	The calculation of baseline emissions for the respective monitoring period was checked by the verification team and found to be correct and complete. Also the calculation was carried out in accordance with the formulae and methods described in the PDD, the applied methodology (ACM0019, Version 2) as well as the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 3)".
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E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	<p>KFQ has reviewed data, parameters and calculations with respect to calculation of the baseline GHG emissions and checked them against the requirements out of the applied methodology (ACM0019_Version 02.0) and the registered PDD as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations. Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PPs have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p>												
Findings	<p>Project emissions are calculated as below:</p> $PE_n = PE_{N_2O,n} + PE_{CO_2,tertiary,n}$ <table><tr><th>Year/Period</th><th>PE_{N₂O,n}</th><th>PE_{CO₂,tertiary,n}</th><th>*PE_n</th></tr><tr><th>Unit</th><th>tCO₂e</th><th>tCO₂e</th><th>tCO₂e</th></tr><tr><td>Total monitoring period 27/06/2014~26/06/2015</td><td>36,723</td><td>329</td><td>37,052</td></tr></table> <p>* The value is conservatively rounded up.</p> <p>A complete set of data for project emission calculations covering the monitoring period has been provided to KFQ and reviewed during verification as explained E.6.1 and E.6.2 above. Equation and Formulae in emission reductions spreadsheet were reviewed against the methodology and the monitoring plan.</p> <p>The verification team confirms that appropriate methods and formulae for calculating project emissions have been followed for this project activity. This was verified by cross-checking in detail the formulae described and applied in the monitoring report and implemented in the emission reduction calculation spreadsheet against the formulae in the PDD, the applied methodology (ACM0019, Version 2) as well as the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 3) and "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 2).</p> <p>As outlined above, the input data for calculating the project emissions, the calculating process and the result are complete and transparent. Therefore, KFQ can confirm the accuracy of the project emissions.</p> <p>Please refer to CAR 3 and CAR4</p>	Year/Period	PE _{N₂O,n}	PE _{CO₂,tertiary,n}	*PE _n	Unit	tCO ₂ e	tCO ₂ e	tCO ₂ e	Total monitoring period 27/06/2014~26/06/2015	36,723	329	37,052
Year/Period	PE _{N₂O,n}	PE _{CO₂,tertiary,n}	*PE _n										
Unit	tCO ₂ e	tCO ₂ e	tCO ₂ e										
Total monitoring period 27/06/2014~26/06/2015	36,723	329	37,052										
Conclusion	<p>KFQ confirms that all required data for calculation of the project GHG emissions were available for the whole verification period and no data were missing due to any non-monitoring of activity levels or non-activity parameters.</p> <p>KFQ confirms that suitable cross-checking of data was possible and has been performed as described.</p> <p>KFQ confirms that the PPs have followed appropriate methods and formulae for calculating project GHG emissions have been followed.</p> <p>KFQ confirms that any emission factors, GWPs and default values and reference values– as applicable – that were applied in the calculation have been justified and correctly applied. No assumptions were used.</p> <p>KFQ confirms, that the calculation of the project GHG emissions for the covered monitoring period is fully complete and based on suitable and verifiable evidence</p>												

E.8.3. Calculation of leakage GHG emissions

Means of verification	KFQ has checked, whether leakage emissions (if any) were determined by the PPs in accordance with the applied methodology, the PDD and the monitoring plan.
Findings	Any leakage emissions sources are deemed to be negligible according to ACM0019 (version 3).
Conclusion	KFQ confirms that the PPs approach with regard to leakage GHG emissions is correct and that no leakage GHG emissions need to be considered in the project based on the applied methodology.

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>KFQ has reviewed data, parameters and calculations with respect to calculation of the GHG emission reductions and checked them against the requirements out of the applied methodology (ACM0019_Version 02.0) and the registered PDD as well as relevant tools applied.</p> <p>KFQ has also assessed the completeness, quality and appropriateness of the data, parameters and calculations. Furthermore, KFQ has assessed, whether any assumptions, emission factors, default values, GWPs or other reference values – as applicable – used by the PPs have been justified and correctly applied, in line with the requirements.</p> <p>KFQ has further crosschecked – as applicable - any information with other sources available, such as but not limited to production log sheets, meters available in the operators control room or on-site, etc.</p> <p>Means of verification in respect of baseline GHG emissions, project GHG emissions and leakage GHG emissions that form the basis for calculation of the GHG emission reductions are stated in detail in sections E.8.1., E.8.2. and E.8.3. above.</p>
Findings	<p>The calculation of baseline emissions, project emissions and emission reductions for the respective monitoring period was checked by the verification team and found to be correct as well as carried out in accordance with the formulae and methods described in the monitoring methodology ACM0019 (version 2) and the monitoring plan as per the registered PDD.</p> <p>A complete set of data covering the monitoring period has been provided to KFQ and reviewed during verification. Activity levels and non-activity (ex-ante) parameters have been monitored in accordance with the monitoring plan. The verification team confirms that all emission factors and default values (ex-ante values from the PDD) have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report and have been correctly applied. There is no uncertainty related to manual transfer of data used in the calculation of emission reduction since the monitored parameters are automatically collected by the ABB data logging system and DCS system. There were no errors in the transfer of data for the calculation of emissions reductions. KFQ confirms that rounding of digits has been applied both correctly and conservatively.</p> <p>Spreadsheet, including corresponding re-calculations of data during events as described in the monitoring report, was made available for the verification team. The recalculations are in line with the applied methodology ACM0019 (version 2) , the monitoring plan as per the registered PDD and the approved temporary deviation from the registered monitoring plan and have been checked and found to be correct.</p>
Conclusion	KFQ confirms that the calculation of emission reductions for the respective monitoring period is correct and complete and the calculation was carried out in accordance with the formulae and methods described in in the PDD, the applied methodology (ACM0019, Version 2) as well as the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 3.0).

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	KFQ compared the ex-ante estimation of emission reductions in the registered PDD
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	with the emission reductions reported by the PPs in the monitoring report.
Findings	<p>KFQ compared the ex-ante estimation of emission reductions in the PDD and the reported emission reductions in the MR (v1). The annual emission reductions for this monitoring period were estimated as 242,526 tonnes of CO₂ equivalents during the 365 days of the monitoring period. The reported emission reductions in the MR (v1) during the monitoring period are 168,753 tonnes of CO₂ equivalents. However, the verification team found that emission reduction was not correctly calculated especially due to operation hour (h_y). Please refer to CAR 1, CAR 2, CAR 3 and CAR 4.</p> <p>After the corrective action, the emission reduction reported by PP is 203,384 tCO₂e during the 365 days of the monitoring period and it is also lower than the value estimated in the PDD.</p>
Conclusion	<p>KFQ confirms that the overall emission reductions of the project activity were clearly below the ex-ante estimation in the PDD. KFQ confirms the reported emission reductions in the MR (v.2) decreased around 16 % compared to the ex-ante estimation of emission reductions in the PDD and no increase in the actual GHG emission reductions was observed during the verification period. KFQ confirms that the emission reductions claimed by the PPs are reasonable.</p>

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	As per the specific instructions of the CDM-VCR-FORM, in this section it is to be explained how the cause of any increase in the actual GHG emission reductions in this monitoring period were assessed in accordance with the applicable verification requirements in the VVS. As there is no actual increase of actual GHG emission reductions (refer to E.8.5), the section is therefore not applicable in this verification period.
Findings	N/A
Conclusion	N/A

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	As described in detail in <i>Section E</i> of this report, all relevant aspects of the project activity have been assessed in order to determine, whether the claimed emission reductions by the PPs are correctly determined, reasonable and fairly stated and based on verifiable evidence and in accordance with the applied methodology and the registered PDD.
Findings	<p>A complete set of data covering the monitoring period has been provided to KFQ and reviewed during verification. Activity levels and non-activity (ex-ante) parameters have been monitored in accordance with the monitoring plan. The verification team confirms that all emission factors and default values (ex-ante values from the PDD) have been correctly justified.</p> <p>The calculation of emission reductions for the respective monitoring period was checked by the verification team and found to be correct and complete. Also the calculation was carried out in accordance with the formulae and methods described in the PDD, the applied methodology (ACM0019, Version 2) as well as the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream, version 3.0.0. and 'Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 2).</p>
Conclusion	KFQ confirms that the GHG emission reduction reported in the MR and claimed by the PPs are correctly determined with 203,384 tCO ₂ e for the covered monitoring period between 27/06/2014 to 26/06/2015. This implies that 100% of the reported GHG emission reduction in the monitoring period has been achieved in a period after the end of 31/12/2012, i.e. the 1 st commitment period is untouched by this verification period.

SECTION F. Internal quality control

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According to KFQ's Procedure for deciding whether to proceed request for issuance, the final verification report and verification findings were underwent a technical review before being submitted to the project participants for requesting issuance CERs. The technical review was performed by technical review team composed of a person qualified in accordance with KFQ's qualification scheme for CDM project validation and verification.

SECTION G. Verification opinion

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Through the verification for the monitoring report of the CDM project activity : "Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea" in accordance with VVS (version 9.0), KFQ could confirm that:

- The project activity has been implemented and operated as per the registered PDD (Version 12, 06/05/2014).
- The installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately.
- The monitoring plan in the registered PDD is as per the applied methodology,
- The monitoring in the MR is as per the monitoring plan and approved temporary deviation from monitoring methodology on 24/04/2016.
- The monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, and approved methodology including applicable tool(s) and generated GHG emission reductions data.
- The GHG emission reductions in the MR (Version 2) are calculated without material misstatements.

KFQ's verification opinion refers to the project's GHG emissions and resulting GHG emission reductions reported both determined due to the valid and registered project's baseline, its monitoring plan and its associated documents.

Based on the information we have seen and evaluated, we confirm the followings:

Project Title	Catalytic N ₂ O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea
UNFCCC Reference Number	0922
Date of registration	03/05/2007
Registered PDD	06/05/2014 (Version 12)-Applying the renewed PDD (Renewal date: 06/08/2014)
Methodology applied	ACM0019 (Version 2)
The latest version of Monitoring Report	2 (dated 02/05/2015)
Crediting period	27/06/2014 to 26/06/2021 (Renewable, 7yrs)
Monitoring period	27/06/2014 to 26/06/2015 (365 days)
Approved date of Temporary deviation	24/04/2016 * PRC reference No.: PRC-0922-001

Total GHG emission Reductions Verified	Baseline emissions: 240,437 tonnes CO _{2e} Project emissions: 37,052 tonnes CO _{2e} Leakage: 0 tonnes CO _{2e} Emission reductions: <u>203,384 tonnes CO_{2e}</u>
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SECTION H. Certification statement

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Korean Foundation for Quality has performed the periodic verification of the emission reductions that have been reported for the CDM project activity: "Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea" (UNFCCC Registration Ref. No. 0922) for the period from 27 June 2014 to 26 June 2015.

The project participants are responsible for the collection of data in accordance with the monitoring plan in the registered PDD and the reporting of GHG emissions reductions from the project. It is KFQ's responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

KFQ conducted the verification on the basis of the monitoring methodology ACM0019 (Version 2), the registered PDD (dated 06/05/2014, version 12), the validation opinion-crediting period renewal (dated 12/02/2014, rev.01), the latest MR (dated 02/05/2016, version 2) and the temporary deviation from the registered monitoring plan (approved 24/04/2016).

KFQ's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. KFQ planned and performed the verification by obtaining evidence and other information and explanations that KFQ considers necessary to give reasonable assurance on the reported GHG emission reductions.

In our opinion, the GHG emissions reductions of the "Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea" (UNFCCC Registration Ref. No. 0922) for the period from 27 June 2014 to 26 June 2015 are fairly stated in the MR (version 2).

The data generation, aggregation, recording, calculation and reporting of GHG emission reductions were correctly conducted on the basis of the approved baseline and monitoring methodology ACM0019 (Version 2), the monitoring plan in the registered PDD and the approved temporary deviation from the registered monitoring plan.

Hence, KFQ is able to certify that the emission reductions of the "Catalytic N₂O Abatement Project in the Tail Gas of the Nitric Acid Plant of the Hanwha Corporation (HWC) in Ulsan, Republic of Korea" during the period from 27 June 2014 to 26 June 2015 are 203,384 tons of CO₂ equivalent.

Signed on behalf of the Korean Foundation for Quality

Signature : 

Name : Soon Hong YEOM, Managing Director

Date : 19 May 2016

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Automated Measuring System
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification Request
CMP	COP/MOP Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DCS	Distributed Control System
DOE	Designated Operational Entity
FAR	Forward Action Request
GC	Gas chromatography
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KFQ	Korean Foundation for Quality
MP	Monitoring Plan
MR	Monitoring Report
NA	Nitric Acid
N ₂ O	Nitrous oxide
PDD	Project Design Document
PP	Project participant
PS	Clean Development Mechanism Project Standard
QMS	Quality Management System
SCR	Selective catalytic reduction
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATE OF COMPETENCE

Name: Sang Yeon PARK

Qualification:

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

Scopes of Expertise:

Technical Area (TA)

- 1.2 Renewables
- 3.1 Energy demand
- 5.2 Caprolactam, nitric and adipic acid
- 13.1 Solid waste and wastewater

She is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 03 March 2015

Sustainability Management Institute
Yu Shim JEONG



CERTIFICATE OF COMPETENCE

Name: Jin Seok CHO

Qualification:

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

Scopes of Expertise:

Technical Area (TA)

- 1.2 Renewables
- 13.1 Solid waste and wastewater
- 13.2 Manure

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 03 March 2015

Sustainability Management Institute
Sang Yeon PARK



CERTIFICATE OF COMPETENCE

Name: Sung Han YOON

Qualification:

	Validation	Verification
-Lead auditor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
-Auditor	<input type="checkbox"/>	<input type="checkbox"/>
-Technical Expert	<input type="checkbox"/>	<input type="checkbox"/>
-Local Expert	<input type="checkbox"/>	<input type="checkbox"/>

Scopes of Expertise:

Technical Area (TA)

- 1.1 Thermal energy generation
- 1.2 Renewables
- 5.1 Chemical Industry
- 5.2 Caprolactam, nitric and adipic acid
- 11.1 Emissions of fluorinated gases
- 13.1 Solid waste and wastewater
- 13.2 Manure

He is approved as the qualification above according to the KFQ's procedure of Qualifying and Maintaining of Auditor on 3 March 2015.

Sustainability Management Institute
Sang Yeon PARK

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Project participants	Monitoring report : • MR10_2CP_ver1.0 • MR10_2CP_ver2.0	Ver. 1 (16/09/2015) Ver. 2 (02/05/2016)	Project participant
2	Project participants	Calculation spreadsheet of emission reductions • Hanwha_CERs_DATA_Sheet_v.1. • Hanwha_CERs_DATA_Sheet_v.2	Ver. 1 (16/09/2015) Ver. 2 (02/05/2016)	Project participants
3	Project participants	CDM Project Design Document : 'Catalytic N2O Abatement project in the tail gas of the nitric acid plant of the HWC in Ulsan (Ref. No.:0922) version 12 (06/05/2014)	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1170949600.29/view	Others
4	TÜV SÜD Industrie Service GmbH	CDM Validation Report: Catalytic N2O Abatement project in the tail gas of the nitric acid plant of the HWC in Ulsan (Ref. No.:0922). (08/02/2007)	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1170949600.29/view?cp=1	Others
5	DNV	CDM Validation Opinion (Renewal): 'Catalytic N2O Abatement project in the tail gas of the nitric acid plant of the HWC in Ulsan (Ref. No.:0922) Report No. 2014-9033 (12/02/2014)	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1341912725.05/view	Others
6	KFQ	CDM Verification Report Catalytic N2O Abatement project in the tail gas of the nitric acid plant of the HWC in Ulsan-9 th monitoring, Report No. 2015-01 (04/02/2015)	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1170949600.29/view?cp=1	other
7	Hanwha Corporation	CDM Monitoring Manual of HWC	July 2014	Project participant
8	Hanwha Corporation	Daily operation report (excel files, pdf files) - ABB logging file - DCS Event log files Summary shutdowns & observations	27/06/2014~27/06/2015	Project participants
9	Endress+Hauser	Manual on Mass flow meter (Proline Promass 801, Endress+ Hauser)	May 2010	Project participants
10	FMTech	Flow meter of HNO3 production - Calibration result on flow meter (FT-512)	16/06/2014	Project participants
11	Kyungdong LG gas supplier	Analysis report of Natural gas	06/2014~06/2015	Project participants
12	HISCO	Flow meter of Natural gas - Calibration result on flow meter (FT-503)	12/09/2013 2014/09/29	Project participants
13	HISCO	Flow meter at outlet of DeN2O unit - Calibration result on flow meter (FT-562)	12/09/2013 29/09/2014	Project participants
14	HISCO	Flow meter at outlet of DeN2O unit Calibration result on Pressure Transmitter (PT-362)	12/09/2013 29/09/2014	Project participants
15	HISCO	Flow meter at outlet of DeN2O unit Calibration result on Temperature Detector (TT-162)	12/09/2013 30/09/2014	Project participants
16	SGS	EN14181 AST Validation N2O measurements at HWC	15~16/01/2015	Project participants
17	TUVSUD	QAL1 report of N2O analyser	-	Project participants

CDM-VCR-FORM

18	AIRTEC	QAL2 report according EN14181	17~21/01/2011	Project participants
19	SGS	EN14181 QAL2 N2O and flow measurements at the HWC outlet Nitric acid plant	13~15/01/2014	Project participants
20	Innotech	Zero & Span test - Calibration report (zero&span test) - N2O analyser weekly check sheet	05/06/2014~27/06/2015	Project participants
21	Deokyang	Certificate of Analysis on Standard Gas(N2O/N2)	15/01/2014 04/07/2014 24/09/2014 14/01/2015 16/06/2015	Project participants
22	Ministry of Environment	Clean Air Conservation Act of the Republic of Korea	2013~2015 (20/01/2015, latest)	Others
23	Office for Government Policy Coordination	Framework Act on Low Carbon, Green Growth	31/10/2013 (latest)	Others
24	Ministry of Knowledge, Economy	The confirmation letter from the Ministry of Knowledge and Economy (stated that CDM project facilities do not have any target obligation on GHG emissions from this GHG and Energy Target Scheme)	21/10//2011	Project participants
25	CDM Executive Board	Clean Development Mechanism Validation and Verification Standard, version 09.0.	20/02/2015	Others
		Clean Development Mechanism Project Standard, version 09.0.	20/02/2015	
		Clean Development Mechanism Project Cycle Procedure, version 09.0.	20/02/2015	
		ACM0019 (ver. 1) "N ₂ O abatement from nitric acid production"	03/06/2011	
		Tool to determine the mass flow of a greenhouse gas in a gaseous steam, version 3.0.0	27/11/2015	
		Standard for application of the global warming potentials to clean development mechanism project activities and programme of activities for the second commitment period of the Kyoto Protocol, version 01.0	13/09/2012	
		Guideline on the application of materiality in verifications , version 02.0	20/02/2015	
		Standard: Sampling and surveys for CDM project activities and programme of activities, version 05.0	16/10/2015	
26	KFQ	Validation report on post registration change (PRCs)- Temporary deviation	23/12/2015	
27	UNFCCC	PRC approval information :http://cdm.unfccc.int/PRCCContainer/DB/prcp315706268/view	Approved on 24/04/2016	

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	-	Section no.	-	Date: -
Description of FAR				
N/A				
Project participant response				Date: 16/06/2015
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				Date: 22/06/2015
N/A				

Table 2. CL from this verification

CL ID	01	Section no.	C	Date: 13/10/2015
Description of CL				
The contact information in Appendix 1 of MR(v.1) is not consistent with the person who is in charge of operation and management in 'CDM monitoring manual of HWC'.				
Project participant response				Date: 03/11/2015
Updated manual is submitted to the verification team and it was revised on 20/10/2015. And the change of MoC (reflecting the change of contract person) requested.				
Documentation provided by project participant				
MR (v.2), CDM monitoring manual of HWC				
DOE assessment				Date: 03/05/2016
The contact information in A.6 and Appendix 1 in MR (v.2) is revised and it is consistent with the information of 'CDM monitoring manual of HWC'.				

CL ID	02	Section no.	E.7	Date: 13/10/2015
Description of CL				
The calibrations of monitoring instruments were properly implemented according to the calibration frequency. Nevertheless, the validity of below instruments in MR(v.1) is not consistent with the actual evidence. - Tag. No.: PT-362, TT-162, FT-562, FT-563, AT-062				
Project participant response				Date: 03/11/2015
The validity of pointed instruments are all corrected in MR.				
Documentation provided by project participant				
MR(v.2), certificate of instrument				
DOE assessment				Date: : 03/10/2015
The validity of the instrument is correctly revised in MR(v.2) and it is consistent with the certificate of instrument.				

CL ID	03	Section no.	B.1	Date: 11/12/2015
Description of CL				
Regarding a monitoring of $P_{\text{product,max}}$, it is described in SECTION B of the monitoring report that Daily basis production during the period was also within the permitted range, mentioned in the PDD. However, the verification team found that actual situation (on 20 Jan 2015 and 21 Jan 2015) is not the same and the daily production of these two days exceeded.				
Project participant response				Date: 01/12/2015
It needs to be clarified that the daily threshold of 306ton/day is not specified as a monitoring parameter as per the methodology and the PDD and a value of maximum daily production as a reference for estimating of ex-ante $P_{\text{product,max}}$. There is no permitted range of daily basis production and threshold of yearly basis production is indicated for monitoring the $P_{\text{product,max}}$ in the PDD. Although above 2 days are beyond the daily basis production, it does not impact the emission reduction and the yearly production by this project is not over the threshold of the yearly production. Consequently, we mentioned the misinformation in MR(v.1) and thus, the revised MR (v.2) which deleted the relevant sentence is submitted to the verification team.				
Documentation provided by project participant				
MR (v.2)				
DOE assessment				Date: 03/05/2016
This clarification request was raised from UNFCCC audit team during the performance audit and it concluded that the information in MR is a kind of misstatement. Thus, the verification team could confirm that this raised clarification is clearly solved throughout the correction of the MR (v.2).				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.3, E.6.2					Date:	13/10/2015			
Description of CAR												
As for the parameter, 'HNO ₃ produced (P _{product,y})', the verification team found the below:												
<div>- According to the monirotring plan, P_{product,y} is sourced from the ERP report and flow meter. However, <i>the verification team could not check the ERP report on-site visit.</i> And please provide the data of 'produced HNO₃ concentration'.</div>												
Project participant response									Date:	03/11/2015		
HNO ₃ ERP report and the data of 'produced HNO ₃ concentration' was provided to the verification team. As for the ERP report, it is recorded the data from the daily stock of HNO ₃ tank considered the sales amount. Thus, it's not reflected the actual production of HNO ₃ due to the sales and stocks. Thus, we applied the HNO3 production monitored by the flow meter.												
Documentation provided by project participant												
ER calculation sheet(v.2), HNO ₃ ERP report, Data on 'produced HNO ₃ concentration'												
DOE assessment									Date:	03/05/2016		
The verification team found that the HNO ₃ production on the ERP report does not reflect the actual amount of HNO ₃ production. Compared the monthly data sheet (measuring from the flow meter) with ERP report, HNO ₃ production from the monthly data sheet is higher than the data of ERP report and it is more accurate approach under reporting the HNO ₃ production of the plant.												
	HNO ₃ production (ton HNO ₃ /month)											
Source of data	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-14	May-14	
Magnetic meter	12,005	8,381	11,349	9,416	11,754	11,444	13,304	10426	12,476	12,373	8,062	
ERP report	11,995	8,275	11,185	9,395	11,725	11,280	13,345	10,125	12,270	12,120	7,645	
* Above data is not a production of 100% HNO ₃ and it is based on about 67% HNO ₃ for crosschecking the production between the ERP report and Magnetic flow as a reference data.												
Thus, PP applied the data from the flow meter after crosschecking ERP data. The data of 'produced HNO ₃ concentration' were also checked with data from the Corioris meter and data by 3 rd Party. Consequently the verification team confirms that HNO ₃ produced (P _{product,y}) are correctly applied in ER calculation sheet (v.2).												

CAR ID	02	Section no.	E.6.2	Date: 13/10/2015
Description of CAR				
<p>As for the parameter, 'h_y' and 'h_{r,y}', the verification team found the below:</p> <ul style="list-style-type: none"> - The source of data for 'h_y' and 'h_{r,y}' is from ERP report as per the monitoring plan of the registered PDD. However, verification team found that PP has applied the operation hour of HNO₃ flow meter in the monthly data sheet. - The applied value for two parameters (h_y, h_{r,y}) are not consistent with that in the source of data and it's not correctly applied according to the methodology <ul style="list-style-type: none"> * For reporting 'h_y', it is practically counted only the normal operation hour (except scheduled shut-down and overhaul) of the plant. Nevertheless, PP excluded the hours occurred all events (ex, scheduled shut-down, overhaul and the events in DeNOx unit). * For reporting 'h_{r,y}', it shall be considered the by-passed, underperforming or failed operation hour occurred from DeNOx unit according to the methodology. Nevertheless, PP was already excluded the failed hour from the parameter of 'h_y'. 				
Project participant response				Date: 02/05/2016
<p>Values of two parameters (h_y and h_{r,y}) have been applied according to the monitoring plan and applied methodology. h_y and h_{r,y} has been applied according to the applied methodology and the details on</p> <ul style="list-style-type: none"> - h_y is considered the operation time except of the scheduled shutdown and overhaul period during the monitoring period - h_{r,y} is recalculated by the equation of Case 1 (For nitric acid plants that have used AM0028 in the 1st crediting period) in the methodology. 				
Documentation provided by project participant				
MR (v.2), ER calculation sheet (v.2)				
DOE assessment				Date: : 03/05/2016
<p>The verification team could confirm that h_y and h_{r,y} are appropriately applied as per the applied methodology and the monitoring plan.</p> <p>Number of hours of operation (h_y) is correctly counted except only the scheduled shutdown and overhaul period during the monitoring period. Number of hours (h_{r,y}) is also correctly recalculated as per the monitoring plan and applied methodology.</p>				

CAR ID	03	Section no.	E.6.2, E.7	Date: 13/10/2015
Description of CAR				
<p>As for the determination of F_{N₂O,tail,gas,h_r}</p> <ul style="list-style-type: none"> - It was described that the monitoring system for N₂O concentration and mass flow of the tail gas is to be installed and maintained in accordance with the EN 14181 in the MR (version 1). Nevertheless, please explain how the monitoring system meets the standard of EN 14181 (QAL Certifications) in more detail in the MR. Especially, the correction factors derived from the calibration curve of the QAL2 audit shall be applied to both the N₂O concentration and the mass flow of the tail gas. However, the correction factor derived from QAL2 was not applied in the calculation of N₂O concentration and mass flow. - Please demonstrate that the data when the event (for N₂O concentration and mass flow indicated in the MR) occurred was treated in accordance with the provision (Para.26(d)) of the applied methodology, ACM0019(v.2). 				
Project participant response				Date: 02/05/2016
<ul style="list-style-type: none"> - Regarding the compliance with the EN14181, the suitability test of QAL1 was not available for the flowmeter during the 1st crediting period and thus, it is required the temporary deviation as per paragraph 100 of EB 47th meeting report. Therefore, prior approval for temporary deviation from the registered monitoring plan submitted to the Board on 23/12/2015 and it was approved by EB on 24/04/2016. According to the accepted corrective action, we applied the correction factors derived from the calibration curve of the QAL2 audit for both N₂O concentration and the mass flow of the tail gas which is same approach in the methodology. - There is no applied data for either the N₂O concentration or mass flow of the tail gas are not available for more than 1/3 of any hour while the plant was in operation during the monitoring period. And the values observed during five operating hours before and after a plant start-up and shut-down is checked in ER calculation sheet and it is not used for the maximum values for this monitoring period. 				
Documentation provided by project participant				
<p>PRC approval information: http://cdm.unfccc.int/PRCContainer/DB/prcp315706268/view</p> <p>ER calculation sheet (v.2)</p>				
DOE assessment				Date: : 03/05/2016
<p>The verification team confirms that PP has dealt with the data according to the EN14181 and approved temporary deviation in MR(v.2) in the ER calculation sheet(v.2).</p> <p>Also, the list of event occurred is reported in MR (v.2) and its data was treated in accordance with approved monitoring plan of the registered PDD and approved temporary deviation of PRC.</p>				

CAR ID	04	Section no.	E.2	Date: 13/10/2015
Description of CAR				
In the calculation of 'project emissions from the operation of the tertiary N ₂ O abatement facility (PE _{CO2,tertiary,y} or PE _{FC,j,y}), 'the weighted average mass fraction of carbon(W _{c,i,y})' and 'the weighted average density of fuel type(ρ _{i,y})' were applied in the calculation. However, the verification team found that the weighted average value was not applied to 'W _{c,i,y} ' and 'ρ _{i,y} ' and the calculation of 'W _{c,i,y} ' is not correctly applied in ER calculation sheet.				
Project participant response				Date: 02/05/2016
'The weighted average mass fraction of carbon (W _{c,i,y})' and 'the weighted average density of fuel type(ρ _{i,y})' are correctly applied in the ER calculation and it is submitted to the verification team.				
Documentation provided by project participant				
MR(v.2), ER calculation sheet (v.2)				
DOE assessment				Date: 03/05/2016
The verification team confirms that it is correctly applied in the ER calculation sheet(v.2) as per the methodology and revised MR(v.2).				

Table 4. FAR from this verification

FAR ID	-	Section No.	-	Date: -
Description of FAR				
N/A				
Project participant response				Date: n/a
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				Date: n/a
N/A				