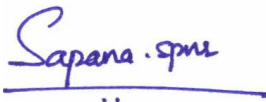




**Verification and certification report form for CDM project activities
(Version 01.0)**

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	N2O Abatement Project of Capro Corporation
Reference number of the project activity	4665
Version number of the verification and certification report	Version 02
Completion date of the verification and certification report	16/02/2016
Monitoring period number and duration of this monitoring period	5th Monitoring period 01/01/2013 to 15/11/2013 (first and last days included)
Version number of monitoring report to which this report applies	Version 2.1
Crediting period of the project activity corresponding to this monitoring period	The crediting period is 09/06/2011 - 08/06/2021
Project participant(s)	Capro Corporation; Hyosung Ebara Engineering Co., Ltd.; and Hyosung Corporation
Host Party	Republic of Korea
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral scope: 5 : Chemical industries AM0028 Version 05 N2O destruction in the tail gas of Nitric Acid or Caprolactam Production Plants
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	577,691 tCO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	472,010 tCO ₂ e
Name of DOE	Bureau Veritas Certification Holding SAS
Name, position and signature of the approver of the verification and certification report	 Ms Sapana Pednekar Quality Manager- Operations

SECTION A. Executive summary

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Hyosung Ebara Engineering Co., Ltd. has commissioned Bureau Veritas Certification to conduct the 5th periodic verification of N₂O Abatement Project of Capro Corporation (hereafter referred to as "the Project", UNFCCC reference No.4665) covering the monitoring period from 01/01/2013 to 15/11/2013, which is located in Bugok-dong, Nam-gu, Ulsan, the south-eastern part of the Republic of Korea.

The purpose of the Project is to reduce N₂O emissions of the tail gas emitted from Caprolactam production process in Capro Corporation by installing catalytic N₂O destruction system. The annual estimated emission reductions are 660,995tCO₂e.

The objective of CDM verification is to conduct a thorough, independent assessment of the registered project activities. In carrying out its verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. In particular, this assessment shall:

- (a) Ensure that the project activity has been implemented and operated as per the registered PDD or any approved revised PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- (b) Ensure that 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, verifiable, and in accordance with applicable CDM requirements;
- (c) Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan or any revised approved monitoring plan, and the approved methodology including applicable tool(s);
- (d) Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions. It is based on the validated and registered project design document, the monitoring report, emission reduction calculation spreadsheet, and supporting documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The verification is not meant to provide any consulting service towards the PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

The verification is consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the registered project design documents. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 472,010 tons of CO₂e for the monitoring period.

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	Tan	Wenbin	China	√	√	√	√

Note: IR: Internal Resources, EI: External Individuals

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	Tian	Pin	Bureau Veritas Certification Holding SAS
2.	Specialist Supporting ITR	IR	Geng	Yan	Bureau Veritas Certification Holding SAS
3.	Approver	IR	Pednekar	Sapana	Bureau Veritas Certification Holding SAS

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	Human error in the quantification of emissions	Low	During the onsite visit, the verification team has onsite verify the data collection procedures based on computer systems including DCS, DCU, EEU, and etc., which is described in the following 错误!未找到引用源。 , and the verification team has confirmed that there is no data transfer error by comparing the data records provided by the PP to the onsite stored data in the monitoring systems. Then all the data and	The risk assessment for this project was developed as following three major steps: a) the monitoring data records were checked to be complete data set to reasonably calculate the total emission reductions achieved during the monitoring period; b) The monitoring system and data collocation and transfer procedures were checked by documents review, on-site visit and interview to sufficiently

		<p>information has been checked during document review and the verification team can confirm that the data used in the ER calculation spreadsheet is consistent with the data records provided by the PP.</p> <p>Regarding the special events occurred during this monitoring period, the special events of the Plant I and Plant II of the monitoring report have been checked and found consistent with the information recorded in the EEU. The following actions to the events are checked reliable and conservative.</p> <p><u>Actions to the events</u></p> <p>For the events related N₂O Abatement System (NAS), the data on N₂O concentration and volume flow rate measured at the inlet and exit of the destruction facility are cancelled. However, the data of the natural gas input and CH₄ concentration measured at destruction facility outlet are accepted to adopt a conservative manner.</p> <p>For the events resulted from the malfunctions, inspections, and blackout of product facility, it is deleted that not only the data indicating AOR operation conditions, and productivity of the caprolactam, but also the data on N₂O concentration and volume flow rate which are measured in N₂O Abatement System (NAS) in.</p>	<p>ensure the monitoring system customized for the project design is robust and effective to ensure the high quality of monitoring data.;</p> <p>c) The emission reduction calculation was checked with the monitoring data records, no error within the data set was identified by the verification team.</p>
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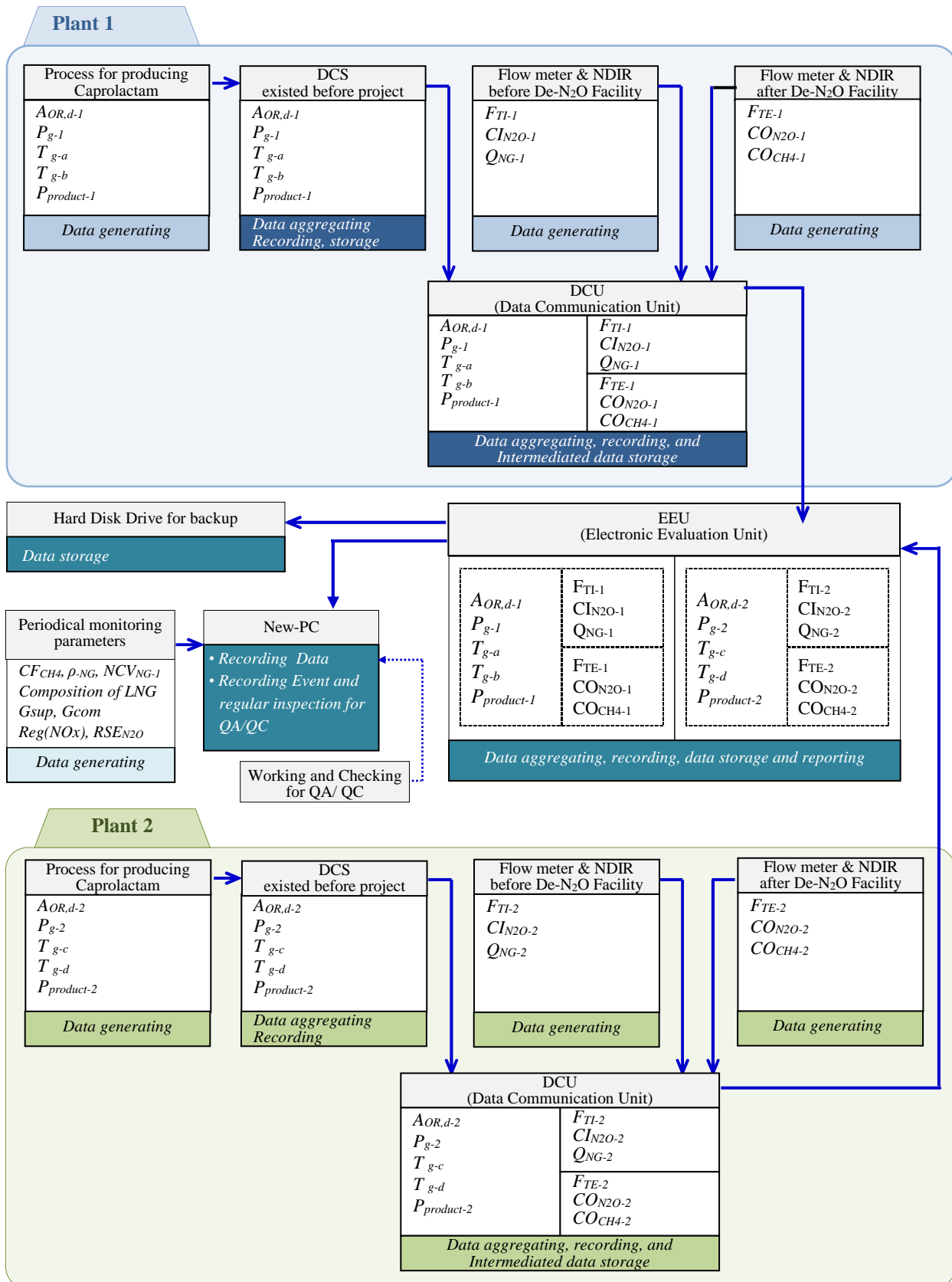


Figure 1 Data Collecting Flow

C.2. Consideration of materiality in conducting the verification

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As verified by on-site inspection and document review to all the onsite stored data in the monitoring systems and data records provided by the PP for verification, the verification team can conclude that the claimed emission reductions of during the monitoring period 01/01/2013 to 15/11/2013 are free from material errors, omissions or misstatements, with a reasonable level of assurance. For details please refer to section E.8 of this report.

SECTION D. Means of verification

D.1. Desk review

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After receiving the Monitoring Report Version 1.2 dated 29/12/2015, Bureau Veritas Certification made it publicly available on the UNFCCC CDM dedicated website on 04/01/2016. (<http://cdm.unfccc.int/Issuance/MonitoringReports/gotoIss?id=BVQI1451549700.43>).

The assessment of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 2.1 dated 10/02/2016 /2/ and emission reduction calculation spreadsheet version 2 dated 10/02/2016 /3/. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

The Monitoring Report Version 1.2 dated 29/12/2015 submitted by the project participant was also web hosted on the UNFCCC-CDM web site on 04/01/2016 and thus, was available in the public domain.

In addition to the monitoring documentation provided by the project participants, the DOE reviews:

- (a) The registered PDD, and the monitoring plan contained in the registered PDD /28/;
- (b) The validation report /29/;
- (c) Previous verification reports /30/;
- (d) The applied monitoring methodology /32/;
- (e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /33/;
- (f) Other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, laboratory analysis or national regulations).

D.2. On-site inspection

Duration of on-site inspection: 03/02/2016 and 04/02/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	Management interview - Implementation & Operation - Monitoring System - Information flow - Management & Operation Procedure	project site	03/02/2016	Mr. Tan Wenbin
2.	Site visit - Inspection of installations including N ₂ O abatement system (NAS) and monitoring system - Observation of monitoring practice ¹ (data generating system and storage system, data records)	Project site	03/02/2016	

¹ On the site visit date, the AORs were shut down and the NAS were not in operation. However the verification team observed the monitoring practice during the previous verifications, and the verification team can confirm that the monitoring system has not been changed since the 2nd verification by onsite inspection, interviews, and document review.

	- Interviews with relevant personnel (operation procedure, training)			
3.	Documents review - Implementation - Calibration - Quality Assurance of Automated measuring system - QA/QC procedures - Qualification & Training - Data records - Cross-check data - ER calculations	Project site	03/02/2016 and 04/02/2016	
4.	Close meeting - Summary of findings - Follow-up actions	Project site	04/02/2016	

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Park	Byang-Yang	Capro Corporation	03/02/2016	Status of the CDM project implementation. Any changes of the CDM project;	Mr. Tan Wenbin
2.	Kim	Si-Kwang	Capro Corporation		The Project on-site inspection – the evidences of construction, status and operation of key equipment, parameters monitoring and data processing activities, monitor equipment and calibration;	
3.	Choi	Cheong-Jeong	Capro Corporation		Compliance of the project implementation with the registered project design document;	
4.	Lee	Myung-Jin	Capro Corporation		Compliance with National Laws and Regulations.	
5.	Lee	Hyun-Woo	Capro Corporation		Quality Management; organizational structure, responsibilities and competencies. Internal QA/QC Management procedures and document control (QA/QC)	
6.	Shin	Yong-Kyu	Capro Corporation		Environmental Impacts Preparation of Monitoring Report.	
7.	Bae	Han-Seong	Capro Corporation		Compliance of the monitoring plan with the monitoring methodology; Compliance of monitoring with the monitoring plan; Assessment of data and calculation of GHG emission	

8.	Lee	Hong-Jeong	Capro Corporation		reductions.	
9.	Lee	Hyun-Jung	Hyosung Ebara Engineering Co., Ltd.			
10.	Choi	Yung-Yul	Hyosung Corporation			

D.4. Sampling approach

>>
N/A

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	-	-	-
Compliance of the project implementation with the registered PDD	-	1	-
Post-registration changes	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	1	-
Others (please specify)	-	-	-
Total	0	2	0

SECTION E. Verification findings**E.1. Compliance of the monitoring report with the monitoring report form**

Means of verification	<p>Through cross-check and comparison, to confirm if the applied monitoring report form is valid and listed in UNFCCC website.</p> <p>Through document review of the provided monitoring report (MR) /2/ and comparison with the latest MR template, the verification team confirm:</p> <ul style="list-style-type: none"> • The MR /2/ used the latest form available at UNFCCC website. • The MR /2/ is complete and meets all requirements of Instructions for filling out the monitoring report form /36/ and “Clean development mechanism project standard” /34/.
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Findings	N/A
Conclusion	According to Para. 382 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that the monitoring report /2/ was in compliance with relevant monitoring report form and instructions therein.

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

>>

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

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

Means of verification	<p>The verification team has performed an on-site inspection to assess:</p> <p>a) If all physical features (technology, project equipment, and monitoring and metering equipment) of the registered CDM are in place. The verification team has applied the GPS instruments to check the project location and geo-coordinates.</p> <p>b) If the PP has operated the project activity as per the PDD /28/.</p> <p>Bureau Veritas Certification has performed an on-site visit and found that the Project has been put into operation in compliance with the registered PDD. No notification or approval of changes has been requested for the Project. During the site visit, no changes from the project activity as described in the registered PDD have been observed or identified. Hence there is no need to request for notification or approval of changes.</p> <p>Caprolactam is produced by cyclohexane, ammonia, and sulphur as its primary raw materials. The existing caprolactam plants for this proposed project activity employ Raschig process other than HPO process, which converts Ammonium Carbonate to Ammonium Nitrite through the reacting with Nitrogen Oxide, and Ammonium Nitrite converted to Hydroxylamine Disulfonate and thence to Hydroxylamine Sulfate. Within the Caprolactam production process, ammonia is oxidized in the four AORs to generate NO and NO₂. Nitrous oxide (N₂O) is generated as an undesired by-product through the side reaction of ammonia oxidation as follows:</p> $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O} \text{ (Main reaction)}$ $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2 \text{ (Desired in the NO oxidation process)}$ $4\text{NH}_3 + 3\text{O}_2 \rightarrow 2\text{N}_2 + 6\text{H}_2\text{O} \text{ (Side reaction)}$ $4\text{NH}_3 + 4\text{O}_2 \rightarrow 2\text{N}_2\text{O} + 6\text{H}_2\text{O} \text{ (Side reaction generating N}_2\text{O and release N}_2\text{O in the tail gas)}$ <p>N₂O is recognized as a potent greenhouse gas with a Global Warming Potential (GWP) of 298 compared to carbon dioxide (CO₂), i.e. GWP_{N₂O} = 298. De-N₂O system (NAS, N₂O abatement system) used in this project is to destruct the N₂O included in tail gas by catalyst without any reducing agent. Then greenhouse gas emission reductions are generated. The annual estimated emission reductions are 660,995tCO₂e.</p> $2\text{N}_2\text{O} \rightarrow 2\text{N}_2 + \text{O}_2$ <p>The catalytic reactor designed by Hyosung Ebara Engineering Co., Ltd. was derived from RTO (Regenerative Thermal Oxidizer), to save the energy required for catalytic reaction to decompose N₂O, and this N₂O</p>
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destruction facility is the so-called "Regenerative Catalytic System". Liquefied natural gas (LNG, hereafter "natural gas") is used in this system as a fuel, not reducing agent, to supply the energy required for the de-N₂O catalytic reaction. The N₂O decomposing catalyst is provided by CRI, a wholly owned subsidiary of the Shell Group of Company, and it is designed and installed by Hyosung Ebara Engineering Co., Ltd.

The implementation history of the Project is shown in the following Table 1:

Table 1 Implementation history

Date/time	Events
16/11/2010	Started Construction of N ₂ O abatement system /4/
20/04/2011	Commissioning started (Plant 1) /5/
27/04/2011	Commissioning started (Plant 2) /6/
02/05/2011	Completed Construction of N ₂ O abatement system and the N ₂ O abatement system started normal operation /7/
23/05/2011~27/05/2011	Field Test for Quality Assurance of installation and calibration of AMS (QAL2) /17/
26/09/2011~29/09/2011	Additional Field Test for Quality Assurance of installation and calibration of AMS (QAL2) /17/
14/05/2012~17/05/2012	Annual surveillance test (AST) for Quality Assurance of AMS /19/
23/05/2013~25/05/2013	Taking Annual surveillance test (AST) for Quality Assurance of AMS for Plant 1 /20/
22/05/2013~23/05/2013	Taking Annual surveillance test (AST) for Quality Assurance of AMS for Plant 2 /21/

Bureau Veritas Certification checked the documented evidence /4/5/6/7/17/ and can confirm the above implementation history is consistent with the documented evidence. Besides, the special events of the Plant I and Plant II included in the section B of the monitoring report are consistent with the information recorded in the EEU /8/.

Findings	<p>CAR-1:</p> <p>The dates when the ASTs were conducted in 2013 are found inconsistent with the evidence.</p> <p>This CAR is closed after the dates were corrected according to the documented evidence/20/ /21/.</p>
Conclusion	<p>According to Para. 385 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that:</p> <p>The implementation status and equipments installation of the project activity are consistent with the PDD /28/;</p> <p>The actual operation of the CDM project activity is as per the PDD /28/ by the PP;</p>

- | | |
|--|---|
| | <ul style="list-style-type: none"> Information (data and variables) provided in the monitoring report /2/ is in accordance with that stated in the PDD /28/. |
|--|---|

E.4. Post-registration changes

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

>>

As per the conclusion in section E.5 and E.6, there are no temporary deviations from registered monitoring plan or applied methodology.

E.4.2. Corrections

>>

As per the conclusion in section E.3, there are no corrections for the Project.

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

>>

There are no changes to the start date of the crediting period for the Project.

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

>>

The verification team has checked the registered PDD /28/ to confirm the inclusion of a monitoring plan to the Project.

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

>>

As per the conclusion in section E.5 and E.6, no permanent changes from registered monitoring plan or monitoring methodology occurred in the Project.

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

>>

As per the conclusion in section E.3, no permanent changes from registered monitoring plan or monitoring methodology occurred in the Project.

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

>>

N/A

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

Means of verification	<p>The monitoring plan of the Project has been assessed against the monitoring methodology AM0028 Version 05 /32/.</p> <p>Through review of the registered monitoring plan against the monitoring methodology AM0028 Version 05 /32/, the verification team confirmed that the monitoring plan in the PDD /28/ is in accordance with the applied monitoring methodology AM0028 Version 05 /32/.</p> <p>The on-site assessment further demonstrated there are no monitoring aspects of the Project that are not specified in the methodology AM0028</p>
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	Version 05 /32/.
Findings	N/A
Conclusion	<p>Bureau Veritas Certification verification team confirms that the monitoring plan in the PDD is in accordance with the applied methodology, i.e. AM0028 Version 05 /32/.</p> <p>Therefore, the Project is also in compliance with Para. 388 of VVS Version 09.0 /33/.</p>

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	<p>The data and parameters fixed ex-ante reported in the MR /2/ have been checked against the PDD /28/ and the applied methodology /32/ by the verification team, including the following parameters:</p> <p>GWP_{N_2O} and GWP_{CH_4} global warming potentials of N_2O and CH_4</p> <p>$P_{product, max}$ Design capacity of caprolactam production</p> <p>historical production data of AORs:</p> <p>$A_{OR, hist}$ maximum ammonia flow rate</p> <p>$T_{g, hist}$ and $P_{g, hist}$ operating temperature and pressure range</p> <p>$G_{sup, hist}$ and $G_{com, hist}$ ammonia oxidation catalyst supplier and composition</p> <p>$OXID_{HC}$ Oxidation factor of natural gas with two or more molecules of carbon</p> <p>EF_{CH_4} and ρ_{CH_4} methane emission factor and density</p> <p>M_i length of measuring interval</p> <p>Reg_{NO_x} national regulation on NO_x emissions</p> <p>Bureau Veritas Certification compared the values included in the section D.1 of the monitoring report to those values included in the section B6.2 of the registered PDD and can confirm that the values of these parameters included in the monitoring report are the same as those in the registered PDD, except for the GWP_{N_2O} and GWP_{CH_4}. The values of the GWP_{N_2O} and GWP_{CH_4} are updated as per the EB 69 Report, Annex 3 for the 2nd commitment period, since this monitoring period started on 01/01/2013. Bureau Verification Certification can confirm that this is reasonable.</p>
Findings	N/A
Conclusion	<p>In conclusion, according to Para. 392 and 393 of VVS (Version 09.0) /33/ and based on the verification team's local and sectorial knowledge, Bureau Veritas Certification confirms that:</p> <p>The data and parameters fixed ex-ante have been correctly listed. Parameters fixed ex-ante for required parameters have been verified by checking the information flow and in compliance with the monitoring plan of the PDD.</p>

E.6.2. Data and parameters monitored

Means of verification	According to Para. 390 of VVS Version 09.0 /33/, Bureau Veritas Certification has performed the following activities to determine whether the
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monitoring of parameters related to the GHG emission reductions has been implemented in accordance with the registered monitoring plan.

(a) Through the on-site inspection of the monitoring system, interview with the operation staff, document review including relevant records, procedures and technical specifications, the verification team has assessed the implementation of the registered monitoring plan followed by the PP;

(b) The parameters stated in the registered monitoring plan have been checked by means above;

(c) The verification team has checked the installation of the monitoring equipments by onsite inspection against the registered PDD;

(d) The Data records stored in the EEU and HDD /8/, Supplier information on catalyst delivery confirmation document /9/, Production Log /12/, and AMS records /13/ were checked by the verification team to confirm the monitoring results;

(e) Based on the interview with the top management and operation staff and the review of the CDM Monitoring & Management Manual /4/, the verification team has assessed the quality assurance and quality control procedures applied by the PP.

No sampling plan was involved in the project activity.

Monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

[Management and Operation]

The PP has operated the Project as per the registered PDD. The monitoring organization has been set up and all monitoring staffs have been trained /27/. The monitoring parameters are measured by the PP as per the approved frequency included in the registered PDD. CDM Monitoring & Management Manual and CDM monitoring internal training records /26//27/ have been provided and verified by Bureau Veritas Certification. Bureau Veritas Certification also checked the emergency procedures contained in the CDM Monitoring & Management Manual /26/ and is able to confirm that it complies with the registered PDD.

[Metering System]

Monitoring points are shown in the following Figure 2 and Figure 3. The monitoring equipments were installed as per the following diagram, where the monitoring parameters are indicated. Bureau Veritas Certification has onsite checked the monitoring equipments and reviewed the Diagram of production process included in the registered PDD and is able to confirm the information of monitoring points provided in the monitoring report is valid. Bureau Veritas Certification also onsite checked the tag No. of the monitoring equipments, which are included in the monitoring report, and can confirm that they are consistent with those in the registered PDD, except for the tag No. of the monitoring parameters of the N₂O concentration and CH₄ concentration at destruction facility outlet (CO_{N2O-1}, CO_{CH4-1}, CO_{N2O-2}, and CO_{CH4-2}). These four tag numbers are changed for distinguishing each other. All the monitoring equipment have been properly installed, maintained, calibrated and recorded according to relevant standard.

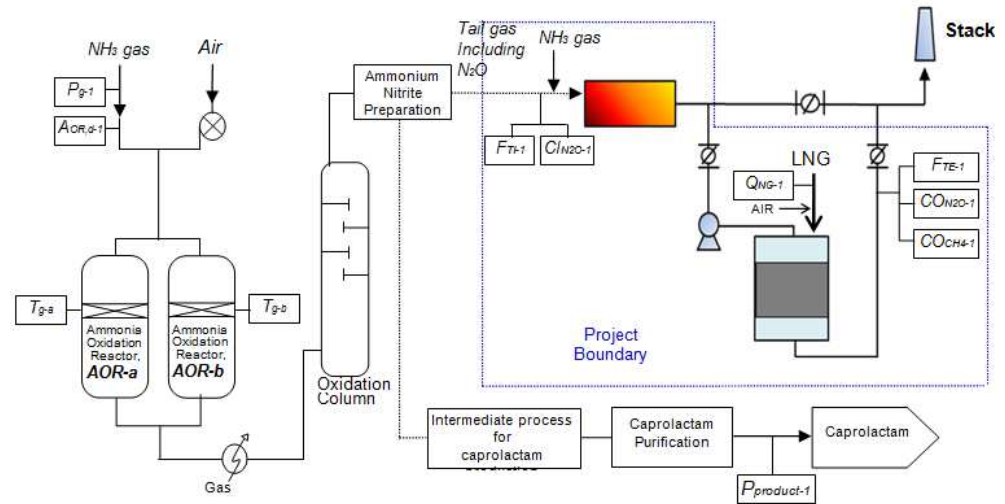


Figure 2 Monitoring points of Plant 1

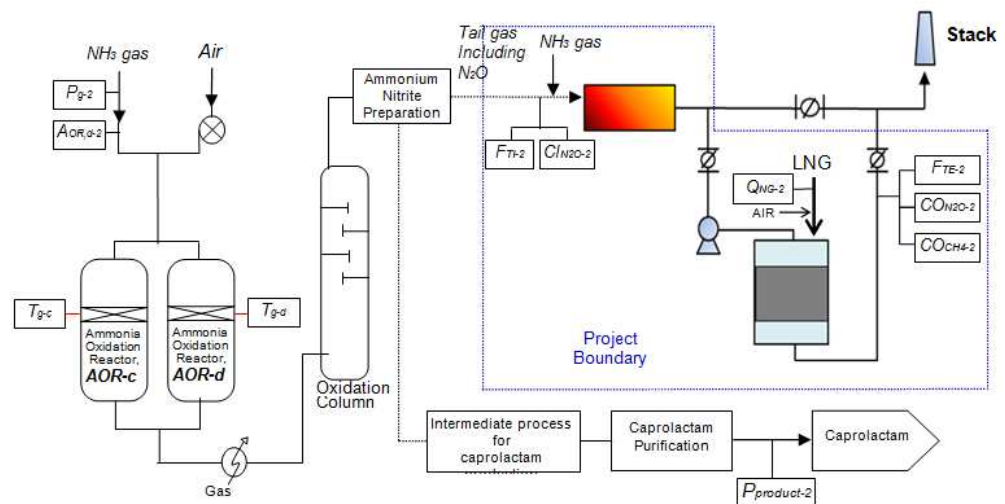


Figure 3 Monitoring points of Plant 2

The metering equipments are listed in the following Table 2

Table 2 metering equipments

Monitoring parameters	Metering equipments
$A_{OR,d-1}$ and $A_{OR,d-2}$	Differential pressure transmitter with normalizing functions
P_{g-1} and P_{g-2}	Pa gauge
T_{g-a} , T_{g-b} , T_{g-c} and T_{g-d}	Thermocouples
F_{TI-1} and F_{TI-2}	Ultrasonic flow meters with normalizing functions
F_{TE-1} and F_{TE-2}	Ultrasonic flow meters with normalizing functions
CI_{N2O-1} and CI_{N2O-2}	Non-dispersion infrared absorption analyzer (NDIR)
CO_{N2O-1} and CO_{N2O-2}	Non-dispersion infrared absorption analyzer (NDIR)
Q_{NG-1} and Q_{NG-2}	Flow meter with normalizing functions
CO_{CH4-1} and CO_{CH4-2}	Non-dispersion infrared absorption analyzer

(NDIR), same as CO_{N2O-1} and CO_{N2O-2} $P_{product-1}$ and $P_{product-2}$

Mass flow meters

Note: the subscripts 1 and 2 refer to the Plant I and Plant II respectively, while the subscripts a, b, c, and d refer to the four AORs.

The data of the AOR operating parameters (A_{OR} , T_g , P_g) and the productivity of caprolactam ($P_{product}$) are logged and stored by the existed DCS (Distributed Control System) which has been independently operated for Plant I and II before the implementation of this project.

Besides, the data of DAS (Data Acquisition System) is newly installed to log the relevant data to the N_2O decomposition amount and CH_4 emission by operating N_2O abatement system. DAS consists of an 'Electronic Evaluation Unit (EEU)' and two of 'Data Communication Units (DCUs)' located at Plant I and II.

Major function of DCU is to record the raw measurement data from Automated Measuring System (AMS), i.e. N_2O emission at the two monitoring points of the inlet and outlet of N_2O destruction facility, and to transmit those to EEU. DCU can store temporarily the record of raw measurement data with the ring memory of 16days minute values. In addition, the data of AOR operation and caprolactam productivity are delivered from DCS and recorded by DCU respectably, and then transmitted to EEU. Q_{NG} is measured by Flow meter separately installed from AMS and CO_{CH_4} are also measured at the outlet by dual channel-NDIR by which the concentration of N_2O and CH_4 is measured separately. Therefore it is aggregated, recorded and stored by EEU that not only the AMS data but also the AOR data and productivity data. However, if there is a discrepancy between the DCS data and the EEU and/or DCU data, DCS data should be taken. Bureau Veritas Certification randomly checked some data stored in the DCS system and the EEU and/or DCU system comparing to the documented data records provided by the PP to verify and no discrepancy between the provided data records and onsite stored data was found.

Bureau Veritas Certification checked the Data records stored in the EEU and HDD /8/ and can confirm that the information of the DCU, EEU, External Hard Disk Drive (HDD) provided in the Table C.1 of the monitoring report is valid. The new PC for back-up is in-place to display and record the hourly data from EEU, the monthly data of supplied LNG, and the other information including the events list, working diary and so on.

[Quality Assurance of Automated measuring system]

The latest European Norm EN 14181:2004 which is required to be used as the basis for selecting and operating the automated measuring system (AMS) under methodology AM0028 Version 05, stipulates three levels of Quality Assurance Levels (QAL), and one Annual Surveillance Test (AST) /16//17//18//19//20//21/.

QAL1 is a quality test procedure, which shall be conducted before the installation of the measurement equipments in the plants. The test was performed by the manufacturer of the AMS. The monitoring report shows the records of QAL1 of the AMS equipments in the Table C.2 (a) Information of the quality assurance of tested AMS located in Plant I and Table C.2 (b) Information of the quality assurance of tested AMS located in Plant II. Bureau Vertias Certification checked the QAL 1 records of the AMS monitoring equipments /16/ is able to confirm that the information provided

in the Table C.2 (a) and Table C.2 (b) in the monitoring report is consistent with the documented evidence /16/, the evaluation has been carried out by the manufacturer before installation of AMS, and the evaluation is deemed to be acceptable.

QAL2 is a procedure to calibrate the AMS and determine the variability of the measured values obtained by it, so as to demonstrate the suitability of the AMS for its application, following its installation. The QAL2 test was performed twice, from 23/05/2011 to 27/05/2011 and from 26/09/2011 to 29/09/2011 by AIR-TEC /17/. Bureau Veritas Certification checked the QAL2 test reports /17/ and can confirm that the reports conclude that the AMS complies with QAL2 requirements within EN 14181. The results to the tests for QAL2 were summarized on the QAL 2 reports in the major items following:

- (a) Section of the location of measurement
- (b) Duly installation of the monitoring equipment
- (c) Correct choice of measurement range
- (d) Calibration of AMS using the standard-Reference-Method(SRM) as guidance
- (e) Calibration curve either as linear regression or as straight line from absolute zero to centre of a scatter-plot
- (f) Calibration of the standard deviation at the 95% confidence interval

QAL3 is a procedure to maintain and demonstrate the results obtained during normal operations of an AMS, by checking that the zero and span characteristics are consistent with those determined during QAL1. QAL 3 has been implemented since the project start up, which includes:

- (a) Permanent quality assurance during the plant operation by the operating staff
- (b) Assurance of reliable and correct operation of the monitoring equipment
- (c) Regular controls : zero point, span, drift, meet schedule of manufacturer maintenance intervals

The Bureau Vertias Certification checked the zero/span test records /18/ and is able to confirm that the QAL3 test complies with the requirements within EN 14181 and the results were without significant deviation.

The AST is a procedure for annual surveillance tests on the system to ensure that its performance remains as previously determined. The annual surveillance test has been carried out in 2012 and 2013. Bureau Veritas Certification checked the annual surveillance test reports /19//20//21/ and can confirm that the AST tests comply with the requirements within EN 14181.

According to the registered monitoring plan, the parameters required by the monitoring plan and the way Bureau Veritas Certification has verified the information flow including the values in the monitoring reports are described below:

Parameters required to be monitored by AMS ($F_{Ti,i}$, $Cl_{N2O,i}$, $F_{TE,i}$ and $CO_{N2O,i}$; $F_{Ti,i}$,

$Cl_{N2O,i}$, $F_{TE,i}$ and $CO_{N2O,i}$) /13/

The Parameters required to be monitored by AMS include the following

parameters:

$F_{Ti,i}$ (F_{Ti-1} and F_{Ti-2}) Volume flow rate at the inlet of the destruction facility

$F_{TE,i}$ (F_{TE-1} and F_{TE-2}) Volume flow rate at the exit of the destruction facility

$Cl_{N2O,i}$ (Cl_{N2O-1} and Cl_{N2O-2}) N_2O concentration at destruction facility inlet

$CO_{N2O,i}$ (CO_{N2O-1} and CO_{N2O-2}) N_2O concentration at destruction facility outlet

Raw measurement data of volume flow rate parameters is measured using Ultrasonic flow meters with normalizing functions, while raw measurement data of N_2O concentration parameters is measured using Non-dispersion infrared absorption analyzers (NDIR). DCUs record the raw measurement data, and transmit those to EEU. The hourly recording frequency is more frequently than the requirements in the registered PDD.

The parameter F_{Ti} is determined conservatively as per the procedure described in the monitoring report. In order to achieve conservative approach, the measured inlet flow (F_{Ti}) would be adjusted to the value (F_{Ti}^*) by the below equation.

$$F_{Ti}^* = \min \left[F_{Ti}; \left(\frac{F_{TE}}{1 + VEF} - Q_{NG} \times \frac{Q_{NG \text{ combustion Gas}}}{Q_{NG}} \right) \right]$$

Where:

F_{Ti}^* Conservative volume flow at the inlet of destruction facility used for emission reduction calculation (Nm^3/h)

F_{Ti} Measurement value by a flow meter at inlet of destruction facility (Nm^3/h)

F_{TE} Measurement value by a flow meter at outlet of destruction facility (Nm^3/h)

Q_{NG} Natural gas input for re-heating the tail gas (Nm^3/h)

$Q_{NG \text{ combustion gas}}$ Combustion gas of natural gas (Nm^3/h)

VEF Volumetric Expansion Factor

Bureau Veritas has checked the Emission Reductions Calculation Spreadsheet and can confirm that the calculation of the $Q_{NG \text{ combustion gas}}$ is correct and this conservative approach is correctly applied to determine the F_{Ti} . VEF was determined as 0.001. This value of VEF is applied as a fixed official value. Bureau Veritas Certification checked the documented evidence /10/ and can confirm the determination of the VEF complies with the registered PDD.

Parameters recorded by DCS ($P_{\text{product},y}$, $T_{g,d}$, $P_{g,d}$, $A_{OR,d}$) /12/

$P_{\text{product},y}$ ($P_{\text{product-1}}$ and $P_{\text{product-2}}$) Plant output of caprolactam

$T_{g,d}$ (T_{g-a} , T_{g-b} , T_{g-c} and T_{g-d}) Actual daily (d) operating temperature of the ammonia oxidation reactor

$P_{g,d}$ (P_{g-1} and P_{g-2}) Actual operating pressure of the ammonia oxidation reactor on day d

$A_{OR,d}$ ($A_{OR,d-1}$ and $A_{OR,d-2}$) Actual ammonia flow rate to the ammonia

oxidation reactor (AOR)

Raw measurement data of plant output of caprolactam is measured using mass flow meter, raw measurement data of operating temperature of the AORs is measured using thermocouple, raw measurement data of operating pressure of the AORs is measured using pressure gauge, while raw measurement data of ammonia flow rate to the AORs is measured using differential pressure transmitter with normalizing functions. DCSs record the raw measurement data, and transmit those to DCUs. The hourly recording frequency is more frequently than the requirement in the registered PDD. Cross-check of amount of the produced caprolactam ($P_{\text{product},y}$) is performed on the basis of stock change data and weighbridge data. Bureau Veritas Certification checked the data of stock change and weighbridge, and can confirm that the crosscheck process of the $P_{\text{product},y}$ is reasonable and valid, and no error was found between the reported values and the stock change/weighbridge data.

Bureau Veritas Certification has checked the information flows for generating, aggregating and reporting the monitoring parameters, raw data for AMS parameters and DCS parameters and the data monitoring procedures including the monitoring frequency and data transference of the these parameters through the onsite checking the monitoring system, interactions with the management representatives and operators of the PP and document review, and can confirm that they are in compliance with the requirements included in the methodology AM0028 Version 05. Bureau Veritas Certification has verified and cross-checked the reported values by comparing randomly sampled values from the data records provided by the PP to the values onsite stored in the EEU to check whether there is error in the data transfer, and Bureau Veritas Certification can confirm that there are no errors in the data transfer.

Parameters related to ammonia oxidation catalyst (G_{sup} , G_{com})

G_{sup} Supplier of the ammonia oxidation catalyst, and

G_{com} Composition of the ammonia oxidation catalyst

Bureau Veritas Certification can confirm that the data of G_{sup} and G_{com} sourced from the Supplier information on catalyst delivery confirmation document /9/ is realistic.

Parameters related to natural gas (Type_{HC} , CF_{CH_4} , $Q_{\text{NG},y}$, ρ_{NG} , CO_{CH_4})

Type_{HC} (Type of hydrocarbon / Natural gas) and CF_{CH_4} (Methane content of hydrocarbon, natural gas) are sourced from natural gas supplier KyungDong city gas CO., Ltd. $Q_{\text{NG},y}$ (Natural gas input for re-heating the tail gas) is measured using flow meter with normalizing functions, and the hourly recording frequency is more frequently than the requirement in the registered PDD. ρ_{NG} (Density of the natural gas) is sourced from monthly report provided by the fuel supplier. CO_{CH_4} (Methane concentration at destruction facility outlet) is measured using non-dispersion infrared absorption analyzer with dual-channel as a gas path and the hourly recording frequency is more frequently than the requirement in the registered PDD.

Calculated parameters ($Q_{\text{CH}_4,d}$, $Q_{\text{HC},y}$, ρ_{HC} , EF_{NG} , EF_{HC} , $\text{SE}_{\text{N}_2\text{O}}$)

$Q_{\text{CH}_4,d}$ Methane part of the natural gas used

It is calculated with the following formula:

$$Q_{\text{CH}_4,y} = Q_{\text{NG},y} \times \text{CF}_{\text{CH}_4}$$

$Q_{HC,y}$ The hydrocarbon with two or more molecules of carbon in natural gas

It is calculated with the following formula:

$$Q_{HC,y} = Q_{NG,y} \times (1 - CF_{CH_4})$$

ρ_{HC} Density of the hydrocarbon with two or more molecules of carbon in natural gas

It is calculated with the following formula:

$$\rho_{HC} = (\rho_{NG} - \rho_{CH_4} \times CF_{CH_4}) / (1 - CF_{CH_4})$$

EF_{NG} Emission factor of the natural gas

It is calculated with the following formula:

$$EF_{NG} = COEF_{NG} \times NCV_{NG} / \rho_{NG} \times 44/12$$

Where

$COEF_{NG}$ Carbon Emission factor of natural gas [tC/TJ]

15.3[tC/TJ] is applied to this project as Ex-ante value by IPCC DEFAULT VALUES OF CARBON CONTENT of "Natural Gas" in TABLE 1.3 (2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2, Energy)

NCV_{NG} Net calorific value of the natural gas [TJ/Nm³]

For this project, NCV_{NG} is offered by KOGAS.

ρ_{NG} Density of the natural gas[t/Nm³]

For this project, based on data source by natural gas supplier.

EF_{HC} Emission factor of the hydrocarbon with two or more molecular of carbon, which is existed as a contents of the natural gas

It is calculated with the following formula:

$$EF_{HC} = (EF_{NG} \times \rho_{NG} - EF_{CH_4} \times \rho_{CH_4} \times CF_{CH_4}) / (1 - CF_{CH_4}) / \rho_{HC}$$

Where

EF_{NG} : CO₂ emission factor of NG[tCO₂/tNG

ρ_{NG} : Density of natural gas (tNG/m³)

EF_{CH_4} : CO₂ emission factor of CH₄(tCO₂/tCH₄).

ρ_{CH_4} : Density of methane (tCH₄/ m³).

CF_{CH_4} : Methane fraction in the natural gas

SE_{N_2O} N₂O emission rate per ton of caprolactam

It is calculated with the following formula:

	<p>$SE_{N_2O,period} = QI_{N_2O,period} / P_{product,period} \times 1000$</p> <p>Where, $QI_{N_2O,y}$ means Quantity of N_2O emissions at the inlet of the destruction facility (t N_2O)</p> <p>$OXID_{CH_4}$ Oxidation factor of CH_4 in natural gas for re-heating tail gas</p> <p>It is calculated with the following formula:</p> $OXID_{CH_4} = \{ Q_{CH_4} - \left(\sum_i^n F_{TE,i} \times CO_{CH_4,i} \times 10^{-6} \right) \} / Q_{CH_4} \times 100$ <p>Regarding the above formulae, both the subscripts d (day) and y means the period. Bureau Veritas Certification can confirm that the above formulae are correct and calculation of these parameters is valid.</p> <p>Reg_{NO_x} (National regulation on NO_x emissions) and $RSE_{N_2O,y}$ (regulatory limit of N_2O emissions per unit of outlet of caprolactam)</p> <p>According to the "Clean Air Conservation Act", one of the National environmental legislation, Ministry of Environment, the permitted values of NO_x emissions is $4.10714E-7$ tNO_x/Nm³ (as a NO_2 concentration). According to the National legislation in Republic of Korea, there is no regulatory limit of N_2O emissions per unit of outlet of caprolactam ($RSE_{N_2O,y}$).</p> <p>Bureau Veritas Certification has verified the information flow provided in the monitoring report /2/ through onsite check and document review, i.e. interactions with the management representatives and operators of the PP, checking the nitric acid production line, checking the monitoring system, checking the monitoring management and organization, reviewing the CDM monitoring & management manual /26/, training records /27/ and all the data records /8/ and can confirm that the information flow of all the monitoring parameters complies with the monitoring plan and the methodology AM0028 Version 05.</p>
Findings	N/A
Conclusion	<p>Corresponding to the paragraph 392 and 393 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that:</p> <ul style="list-style-type: none"> The monitoring has been carried out in accordance with the monitoring plan contained in the PDD /28/. All parameters required by the monitoring plan have been sufficiently monitored and correctly listed. The monitored data for required parameters have been verified by checking the whole information flow.

E.6.3. Implementation of sampling plan

Means of verification	No sampling plan has been applied in the project.
Findings	N/A
Conclusion	N/A

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

Means of verification	<p>All the monitoring equipments were calibrated in accordance with the requirements included in the monitoring plan. The calibration information is listed in the following Table 3.</p> <p>Bureau Veritas Certification has on-site checked the monitoring equipments</p>
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	which are not auto calibrated and verified the calibration records /22/ issued by the calibration organizations and the accreditation certificates /24/ of the calibration organizations. Each calibration was conducted within the accreditation period of the calibration organizations. Bureau Veritas Certification can confirm that all the monitoring equipments are within suitable accuracy level and consistent with the registered PDD. The calibration frequency complies with the requirements of the Monitoring Plan.
Findings	N/A
Conclusion	Corresponding to the paragraph 400 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that: <ul style="list-style-type: none"> The calibration is conducted at the frequency as specified by the methodology /32/ and the monitoring plan contained in the PDD /28/.

Table 3 Calibration information of the monitoring equipment

Monitoring equipment type	Tag number	Monitoring parameter ²	Serial number	Accuracy class	Calibration frequency	Last calibration date ³	Validity
Differential pressure transmitter with normalizing functions	FIC-1201	A _{OR,d-1}	10530360038 (before replacement)	± 0.1%	Every 2 years	11/01/2012	Yes
			1210 80055040028 (after replacement)	± 0.1%	Every 2 years	18/04/2012	Yes
	2FIC-1201	A _{OR,d-2}	10530360080 (before replacement)	± 0.1%	Every 2 years	11/03/2012	Yes
			1210 80055040029 (after replacement)	± 0.1%	Every 2 years	18/04/2012	Yes
Gauge pressure (Pa gauge)	PI-1205	P _{g-1}	10530360183 (before replacement)	± 0.1%	Every 2 years	11/01/2012	Yes
			1211 80055040030 (after replacement)	± 0.1%	Every 2 years	18/04/2012	Yes
	2PI-1205	P _{g-2}	10530360212 (before replacement)	± 0.1%	Every 2 years	11/03/2012	Yes
			1211 80055040031 (after replacement)	± 0.1%	Every 2 years	18/04/2012	Yes
Thermocouples	TI-1204	T _{g-a}	2170447 (before replacement)	Maximum error 300°C: +0.00°C 500°C: +0.35°C 700°C: +0.98°C	Every 2 years	13/05/2011	Yes
			124011 (after replacement)	Maximum error 300°C: -0.7°C 500°C: -0.1°C 700°C: -0.7°C	Every 2 years	18/04/2012	Yes
	TI-1206	T _{g-b}	2170445 (before replacement)	Maximum error 300°C: +0.00°C 500°C: +0.35°C 700°C: +0.98°C	Every 2 years	17/10/2011	Yes
			124012 (after replacement)	Maximum error 300°C: -0.7°C 500°C: -0.1°C 700°C: -0.7°C	Every 2 years	18/04/2012	Yes
	2TI-1204	T _{g-c}	24001 (before replacement)	Maximum error 300°C: -0.7°C	Every 2 years	23/05/2011	Yes

² The measuring instruments for A_{OR,d-1} and A_{OR,d-2} were replaced on 12/10/2012, the measuring instruments for P_{g-1} and P_{g-2} were replaced respectively on 21/10/2012 and 12/10/2012, the measuring instruments for T_{g-a} and T_{g-b} were replaced on 19/10/2012, and the measuring instruments for T_{g-c} and T_{g-d} were replaced on 21/10/2012. Bureau Veritas Certification has checked the replacement record **Error! Reference source not found.** and can confirm the replacement did not impact the monitoring activity. The accuracy class of the instrument before and after the replacement complies with the requirement of the registered PDD.

³ Equipments including Ultrasonic flow meters with normalizing functions and NDIRs are calibrated by everyday of every 2 weeks at 24:00 of the scheduled day. Plant 1 was shut down after 6:00 on 10/10/2013 and plant 2 was shut down after 16:00 on 15/11/2013. Therefore 09/10/2013 or 14/11/2013 is actually the last date of auto calibration, which is reasonable.

Monitoring equipment type	Tag number	Monitoring parameter ²	Serial number	Accuracy class	Calibration frequency	Last calibration date ³	Validity
				500°C: -0.1°C 700°C: -0.7°C			
			124008 (after replacement)	Maximum error 300°C: -0.7°C 500°C: -0.1°C 700°C: -0.7°C	Every 2years	18/04/2012	Yes
	2TI-1206	T _{g-d}	24002 (before replacement)	Maximum error 300°C: -0.7°C 500°C: -0.1°C 700°C: -0.7°C	Every 2years	23/05/2011	Yes
			124007 (after replacement)	Maximum error 300°C: -0.7°C 500°C: -0.1°C 700°C: -0.7°C	Every 2years	18/04/2012	Yes
Ultrasonic flow meters with normalizing functions	FI-1521	F _{TI-1}	• HEAD A: 1217007 • HEAD B: 1217008 • Evaluation Unit : 1216861 • Case of Evaluation : 1216999	< 2%	Every day by Auto calibration manner	09/10/2013	Yes
	2FI-1521	F _{TI-2}	• HEAD A: 1217011 • HEAD B: 1217012 • Evaluation Unit : 1216866 • Case of Evaluation : 1217002	< 2%	Every day by Auto calibration manner	14/11/2013	Yes
Ultrasonic flow meters with normalizing functions	FI-1522	F _{TE-1}	• HEAD A: 1217009 • HEAD B: 1217010 • Evaluation Unit : 1216862 • Case of Evaluation : 1217001	< 2%	Every day by Auto calibration manner	09/10/2013	Yes
	2FI-1522	F _{TE-2}	• HEAD A: 1217013 • HEAD B: 1217014 • Evaluation Unit : 1216867 • Case of Evaluation : 1217003	< 2%	Every day by Auto calibration manner	14/11/2013	Yes
Non-dispersion infrared absorption analyzer (NDIR)	AI-1521	Cl _{N2O-1}	AO-748	>95% (repeatability)	Every 2 weeks	27/09/2013	Yes
	2AI-1521	Cl _{N2O-2}	AO-749	>95% (repeatability)	Every 2 weeks	31/10/2013	Yes
Non-dispersion infrared absorption analyzer (NDIR)	AI-1522(a) AI-1522(b)	CO _{N2O-1} and CO _{CH4-1}	AO-750	>95% (repeatability)	Every 2 weeks	27/09/2013	Yes
	2AI-1522(a) 2AI-1522(b)	CO _{N2O-2} and CO _{CH4-2}	AO-751	>95% (repeatability)	Every 2 weeks	31/10/2013	Yes
Flow meter with normalizing functions	FI-1523	Q _{NG-1}	02319622	±0.90%	Every 2 years	08/03/2012	Yes
	2FI-1523	Q _{NG-2}	02319623	±0.90%	Every 2 years	08/03/2012	Yes
Mass flow meters	FR-7705	P _{product-1}	F1013202000	± 0.10%	Every 2 years	20/01/2012	Yes
	2FI-7705	P _{product-2}	28 529138	± 0.15%	Every 2 years	16/10/2012	Yes

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	According to the Para.402 of VVS Version 09.0 /33/, the verification team has performed the following activities to assess the data and calculations of GHG emission reductions achieved by the Project as per the methodology /32/:
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(a) Through desk review and on-site inspection on the monthly electricity reports and electricity invoice, to verify that a complete set of data for the specified monitoring period is available.

(b) Information provided in the monitoring report /2/ has been cross-checked with other sources /8//9//10//11//12//13/.

(c) Review the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the PDD /28/, and the methodology /32/;

(d) Review emission factors, IPCC default values, GWPs and other reference values as per the PDD /28/.

Bureau Vertias Certification has checked the daily average of the production ($P_{product,y}$) of caprolactam during this monitoring period and can confirm that the daily average of the production ($P_{product,y}$) did not exceed the design capacity ($P_{product,max}$) for both nitric acid plants.

Since $P_{product,y} < P_{product,max}$, baseline emissions (BE) for the period can be calculated as follows for this period:

$$BE_{period} = BE_{period, within permit range} + BE_{period, out of permit range}$$

When the daily average of the operating conditions were within the permitted range, the baseline emissions during these days are recalculated as follows according to the methodology AM0028 Version 05 and the registered PDD:

$$BE_{period, within permit range} = \left(\sum_i^n F_{TI,i} \times CI_{N_2O,i} \times M_i \right) \times GWP_{N_2O}$$

Where

M_i Length of Measuring Interval (hr), (1hr)

GWP_{N_2O} Global warming potential of the N_2O , (298: default value).

n Number of intervals during this period

$F_{TI,i}$ Volume flow rate at the inlet of the DF during interval (Nm^3/hr)

$CI_{N_2O,i}$ N_2O concentration in the tail gas of the DF inlet during interval (tN_2O/ Nm^3)

When the daily average of the operating conditions were out of the permitted range, the baseline emissions during these days are recalculated as follows,

$$BE_{\text{daily, out of permit range}} = P_{\text{product, day}} \times EF_{N_2O} \times GWP_{N_2O} / 1000$$

$$BE_{\text{period, out of permit range}} = \sum BE_{\text{daily, out of permit range}}$$

Where

$BE_{\text{daily, out of permit range}}$ The daily daseline emission for the respective day in which AOR operation conditions were outside of “permitted range (tonCO₂/day)

$P_{\text{product, day}}$ The daily output of caprolactam for the respective day in which AOR operation conditions were outside of permitted range (ton caprolactam/day)

EF_{N_2O} N₂O Emission factor to the process of caprolactam production (kgN₂O/ton caprolactam)

Emission factor of N₂O (EF_{N_2O}) is the lowest value among (a) $EF_{N_2O,IPCC}$, (b) $SE_{N_2O,y}$ and (c) any related value as a result of legal regulation(e.g. $RSE_{N_2O,y}$). See the section E.1 of the monitoring report. There is no applicable $RSE_{N_2O,y}$ in the host country. Bureau Veritas Certification can conclude that it is reasonable to use the $EF_{N_2O,IPCC}$ as the EF_{N_2O} since it is the lowest value among the options, and this recalculation procedure complies with the methodology AM0028 Version 05 and the monitoring plan.

The PP monitored the operating conditions parameters including the operating temperature and pressure, and the baseline emissions during the days when the daily average of the operating conditions were out of the permitted range, are recalculated with the daily output of caprolactam $P_{\text{product, day}}$ multiply the default IPCC value $EF_{N_2O,IPCC}$. Bureau Vertias Certificaiton has checked the data records /8//12/ and can confirm the results included in the Table. E1-3 and Table. E1-4 of the monitoring report are consistent with the data records /8//12/.

Bureau Veritas Certification has checked the records of all the monitoring parameters, and can confirm that the monitored values of the parameters included in the emission reductions calculation spreadsheet /3/ and the monitoring report version 2.1 /2/ are consistent with the documented evidences. Bureau Veritas Certification has checked the calculation of the baseline emissions included in the emission reductions calculation spreadsheet, and can confirm that the calculation of the baseline emissions is correct and reasonable, and the $BE_{\text{period}} = 534,665\text{tCO}_2\text{e}$.

Findings

CAR-2: Time of several events or situation included in the Section B.1 of the monitoring report is not exactly consistent with the documented evidence, and several events or situation occurred in this monitoring period are not reported in the MR.

	<p>The PP revised the Section B.1 of the monitoring report and corrected time of the events or situation and supplemented the events or situations to be consistent with the documented evidence.</p> <p>Since some starting time and ending time of the events or situation have been revised or supplemented, the baseline emissions, the project emissions and the emission reductions of have been revised accordingly.</p> <p>This CAR is closed.</p>
Conclusion	<p>Corresponding to the paragraph 403 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that:</p> <ul style="list-style-type: none"> • A complete set of data for the monitoring period is available. • Information on the baseline GHG emission calculation provided in the monitoring report /2/ has been cross-checked with other sources. • Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document. • There are no assumptions applied. • Appropriate emission factor of the power grid has been correctly applied.

E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	<p>The verification team has reviewed the project emission calculation as per the PDD /28/ and the applied methodology /32/.</p> <p>The emission due to the project activity are composed of (a) the emissions of not destroyed N₂O, (b) on-site emissions due to the hydrocarbons (Natural Gas) use as input to the N₂O destruction facility, and (c) the emissions from the operation of the destruction facility.</p> <p>Hydrocarbons can be used as reducing agent and/or re-heating the tail gas to enhance the catalytic N₂O reduction efficiency. In this project, natural gas is used for re-heating the tail gas to enhance the catalytic N₂O reduction efficiency</p> $PE_{period} = PE_{ND,period} + PE_{HC,period} = PE_{ND,period} + HCE_{C,period} + HCE_{NC,period} =$ $\left(\sum_i^n F_{TE,i} \times CO_{N2O,i} \times M_i \right) \times GWP_{N2O}$ $+ [(\rho_{HC} \times Q_{HC,y} \times EF_{HC} \times OXID_{HC}/100) + (\rho_{CH4} \times Q_{CH4,y} \times EF_{CH4} \times OXID_{CH4}/100)]$ $+ [\rho_{CH4} \times Q_{CH4,y} \times GWP_{CH4} \times (1-OXID_{CH4}/100)]$ <p>PE_{period} : Project emissions (tCO₂e)</p> <p>PE_{ND} : Project emissions from N₂O not destroyed (tCO₂e)</p> <p>$HCE_{C,y}$: Converted hydrocarbons emissions (tCO₂e)</p>
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	<p>HCE_{NC} : Methane emissions (tCO₂e)</p> <p>n : Number of intervals during the year (period⁻¹)</p> <p>M_i : Length of Measuring Interval (hr), (1hr : set value at instrument for this project)</p> <p>$F_{TE,i}$: Volume flow rate at the exit of the DF during interval i (Nm³/hr)</p> <p>$CO_{N2O,i}$: N₂O concentration in the tail gas of the DF exit during interval i (tN₂O/ m³)</p> <p>GWP_{CH4} : Global warming potential of CH₄, 25 (default value)</p> <p>GWP_{N2O} : Global warming potential of the nitrous oxide, 298 (default value)</p> <p>ρ_{CH4} : Density of methane (tCH₄/m³), 0.000716</p> <p>ρ_{HC} : Density of HC (tHC/m³)</p> <p>EF_{CH4} : CO₂ emission factor of CH₄ (tCO₂e/tCH₄), 2.75</p> <p>EF_{HC} : CO₂ emission factor of HC with two or more carbon molecule in natural gas (tCO₂e/tHC)</p> <p>$Q_{CH4,y}$: Methane used in period (Nm³/period)</p> <p>$Q_{HC,y}$: HC with two or more carbon molecule in natural gas used in period (Nm³/period)</p> <p>$OXID_{CH4}$: Oxidation factor of methane (%)</p> <p>$OXID_{HC}$: Oxidation factor of HC(%), 100% (Fixed value)</p> <p>Bureau Veritas Certification has checked the records of the monitoring parameters and can confirm that the monitored values of the parameters included in the emission reductions calculation spreadsheet /3/ and the monitoring report version 2.1 /2/ are consistent with the documented evidences. Bureau Veritas Certification has checked the calculation of the project emissions included in the emission reductions calculation spreadsheet, and can confirm that the calculation of the project emissions is correct and reasonable, and the PE_{period} = 62,655tCO₂e.</p>
Findings	N/A
Conclusion	<p>Corresponding to the paragraph 403 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that:</p> <ul style="list-style-type: none"> • A complete set of data for the monitoring period is available.

	<ul style="list-style-type: none"> Information on the project GHG emission calculation provided in the monitoring report /2/ has been cross-checked with other sources. Calculations of project emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document.
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E.8.3. Calculation of leakage GHG emissions

Means of verification	The verification team has reviewed the leakage calculation as per the PDD /28/ and the applied methodology /32/. As per the registered PDD, heat exchange is conducted in De-N ₂ O system, and the installation of the N ₂ O destruction facility does not result in significant additional energy consumption at the caprolactam production plant, and therefore no leakage is expected at this project, and the LE _{period} = 0.
Findings	N/A
Conclusion	<p>Corresponding to the paragraph 403 of VVS Version 09.0 /33/, Bureau Veritas Certification verification team confirms that:</p> <ul style="list-style-type: none"> A complete set of data for the monitoring period is available. Information on the leakage GHG emission calculation provided in the monitoring report /2/ has been cross-checked with other sources. Calculations of leakage have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document.

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

Means of verification	<p>The verification team has reviewed the calculation of GHG emission reductions in the final MR /2/ and the ER spreadsheet /3/ as per the PDD /28/ and the applied methodology /32/. The emission reductions during the monitoring period from 01/01/2013 to 15/11/2013 are calculated as:</p> $ER_{period} = BE_{period} - PE_{period} - LE_{period}$ $= 534,665 - 62,655 - 0$ $= 472,010 \text{ tCO}_2\text{e}$ <p>The emission reductions are recalculated for the periods when special events happened. Bureau Veritas Certification has checked the information and data records /8//11//12//13/ during these periods and can confirm that the information provided in the monitoring report and the emission reductions are consistent with the data records /8//11//12//13/. Bureau can conclude the recalculation method is conservative. The data of the volume flow rate and N₂O concentration at the inlet and outlet of the destruction facility have been excluded from the emission reduction calculation, which is conservative since the N₂O quantity at the outlet cannot be more than the N₂O quantity at the inlet of the destruction facility because of its N₂O destruction function. Natural gas input for re-heating the tail gas (Q_{NG-1}) and CH₄ concentration at destruction facility outlet (CO_{CH4-1}) are included to calculate the project emissions.</p>
Findings	N/A
Conclusion	Corresponding to the paragraph 403 of VVS Version 09.0 /33/, Bureau

	<p>Veritas Certification verification team confirms that:</p> <ul style="list-style-type: none"> • A complete set of data for the monitoring period is available. • Information provided in the monitoring report /2/ has been cross-checked with other sources; • Calculations of baseline emissions, and project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document. • There are no assumptions in emission reductions calculation. • Appropriate emission factor of the power grid has been correctly applied.
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E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	<p>The comparison of actual GHG emission reductions with estimates in PDD /28/ has been checked and re-calculated by the verification team.</p> <p>Based on the above assessment, the emission reduction during the monitoring period (01/01/2013 to 15/11/2013) is verified as 472,010 tCO₂e. According to the PDD, the annual emission reductions were estimated as 660,995 tCO₂e, while the value of estimated emission reductions during this monitoring period in the PDD /28/ are 577,691 tCO₂e (660,995 tCO₂e * 319 days/365 days), the verified emission reductions are lower than the estimated value in the monitoring period.</p>
Findings	N/A
Conclusion	<p>Corresponding to the paragraph 256 of CDM Project Standard Version 09.0 /33/, the verification team can confirm that:</p> <p>A comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring period with the estimates in the PDD /28/ has been provided in the Monitoring Report /2/.</p> <p>The verification team confirms that the calculation of the comparison is correct.</p>

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

Means of verification	<p>The verified emission reductions are less than the estimated value in the monitoring period. Thus, no remarks need to be provided in the MR /2/. The verified emission reductions are less than the estimated value in the monitoring period. Thus, no remarks need to be provided in the MR /2/.</p>
Findings	N/A
Conclusion	<p>The actual GHG emission reductions are lower than the estimates in the PDD /28/. The PP provides the reasonable cause of increase in the actual GHG emission reductions.</p>

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	<p>The verification team has reviewed the monitoring report with the meter reading records, electricity transaction notes to assess whether the GHG</p>
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	<p>emission reductions or removals has been correctly calculated based on a pro-rata approach.</p> <p>The current monitoring period starts after 31/12/2012.</p> <p>Thus, for this monitoring period, the emission reductions are 0 tCO₂e during the first commitment period; and the emission reductions are 472,010tCO₂e from 01/01/2013 onwards.</p>
Findings	N/A
Conclusion	<p>According to Para.254 of CDM Project Standard Version 09.0 /33/, Bureau Veritas Certification verification team confirms that the project participants has calculated GHG emission reductions or removals based on a pro-rata approach in the following manner:</p> <p>The amount of emission reductions or removals achieved in the monitoring period for each GHG has be allocated proportionally to the duration of the period up to 31 December 2012 and the period from 1 January 2013 onwards before multiplying with the GWPs for the respective periods.</p>

SECTION F. Internal quality control

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The verification report underwent an Internal Technical Review (ITR) before requesting issuance of CERs for the project activity.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader.

After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

SECTION G. Verification opinion

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Bureau Veritas Certification has conducted the 5th periodic verification of N₂O Abatement Project of Capro Corporation, CDM Registration Reference Number 4665, owned by Capro Corporation; Hyosung Ebara Engineering Co., Ltd.; and Hyosung Corporation, which is located in Bugok-dong, Nam-gu, Ulsan, the south-eastern part of the Republic of Korea, and applying the methodology

AM0028 Version 05, on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

Bureau Veritas Certification confirms that the project is implemented as planned and described in the validated and registered project design documents. Installed equipments being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 472,010 tons of CO₂e for the monitoring period.

Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, approved monitoring plan and its associated documents.

SECTION H. Certification statement

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Bureau Veritas Certification has performed the 5th periodic verification of N2O Abatement Project of Capro Corporation, CDM Registration Reference Number 4665, which is located in Bugok-dong, Nam-gu, Ulsan, the south-eastern part of the Republic of Korea, and applying the methodology AM0028 Version 05. The verification was performed based on the requirements set by the CDM and relevant guidance provided by CMP and the CDM Executive Board.

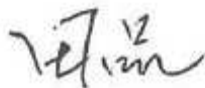
The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of Capro Corporation; Hyosung Ebara Engineering Co., Ltd.; and Hyosung Corporation is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the monitoring plan. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification has verified the project Monitoring Report version 2.1 dated 10/02/2016 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as described in the registered project design documents. Installed equipments being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions as a CDM project.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

Reporting period:	01/01/2013 to 15/11/2013	
Baseline emissions:	534,665	t CO ₂ equivalents
Project emissions:	62,655	t CO ₂ equivalents
Leakage emissions:	0	t CO ₂ equivalents
Emission Reductions:	472,010	t CO ₂ equivalents



Mr. Tian Pin
Internal Technical Reviewer
16/02/2016



Mr. Tan Wenbin
Team Leader
16/02/2016

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Automated Measuring System
AOR	ammonia oxidation reactor
AST	Annual Surveillance Test
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DAS	Data Acquisition System
DCS	Distributed Control System
DCU	Data Communication Units
DOE	Designated Operational Entity
EEU	Electronic Evaluation Unit
FAR	Forward Action Request
GHG	Green House Gas(es)
HDD	Hard Disk Drive
HNO ₃	Nitric Acid
LNG	Liquefied Natural Gas
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NAS	N ₂ O Abatement System, also called destruction facility and De-N ₂ O Facility
N ₂ O	Nitrous Oxide
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
QAL	Quality Assurance Levels
RTO	Regenerative Thermal Oxidizer
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Mr. Pin Tian	Bureau Veritas Certification, China	<p>Technical Reviewer, Climate Change Lead Verifier</p> <p>He holds a MEng in Industrial Engineering. Before joining BV in 2009, he gained two years working experience in project management in various industrial sectors. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and has successfully completed the course assessment for ISO 14064.</p> <p>He is qualified for TA 1.1, TA 1.2 and TA 8.1</p>
Mr. Tan Wenbin	Bureau Veritas Certification, China	<p>Team Leader, Climate Change Lead Verifier,</p> <p>He holds a bachelor degree in Geology and a master degree in Structural Geology. He gained more than 2 years' technical experience in Petroleum Exploitation and Storage & Transportation sector and more than 3 year's experiences in coal mining sector in P.R China. He obtained the certificate of Climate Change Lead Verifier and Auditor for ISO 14001, and ISO 50001.</p> <p>He is qualified for TA 1.2, TA 5.2 and TA 8.1</p>
Ms. Geng Yan	Bureau Veritas Certification, China	<p>Specialist, Climate Change Lead Verifier</p> <p>Team Member, Climate Change Lead Verifier.</p> <p>She holds a Master Degree in Ecology and a bachelor degree in Forestry. She has 2 years of technical experience in CDM in P.R China before joining Bureau Veritas Certification. She obtained the certificate of CDM Lead Verifier and Lead Auditor for EMS ISO 14001. She has successfully completed the course assessment for the ISO 14064:2006.</p> <p>She is qualified for TA1.1, TA5.2, TA14.1, TA15.1</p>

Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1.	Hyosung Corporation	Monitoring Report Version 1.2	Dated 29/12/2015	PP
2.	Hyosung Corporation	Final monitoring report Version 2.1	Dated 10/02/2016	PP
3.	Hyosung Corporation	Emission reductions calculation spreadsheet Version 2	Dated 10/02/2016	PP
4.	/	Record of construction start	Dated on 16/11/2010	PP
5.	/	Record of commissioning start of Plant 1	Dated 20/04/2011	PP
6.	/	Record of commissioning start of Plant 2	Dated 27/04/2011	PP
7.	/	Record of completing construction of N2O abatement system	Dated 02/05/2011	PP
8.	Capro Corporation	Data records stored in the EEU and HDD	/	PP
9.	/	Supplier information on catalyst delivery confirmation document	/	PP
10.	/	Statement on the Volumetric Expansion Factor (VEF) by CRI Catalyst Company	Dated 05/2011	PP
11.	Capro Corporation	Process shutdown log	/	PP
12.	Capro Corporation	Production Log	/	PP
13.	Capro Corporation	AMS records	/	PP
14.	/	European Norm EN 14181:2004 Stationary source emissions - Quality assurance of automated measuring systems	/	PP
15.	/	Air quality - Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty (ISO 14956:2002)	/	PP
16.	/	QAL 1 records of the AMS monitoring equipments	/	PP
17.	/	Reports of QAL2 tests conducted from	/	PP

		23/05/2011 to 27/05/2011 and from 26/09/2011 to 29/09/2011 for the AMS installed for the Plant 1 and Plant 2, issued by AIRTEC		
18.	/	QLA3 zero/span test records	/	PP
19.	/	Reports of Annual surveillance test (AST) conducted from 14/05/2012 to 17/05/2012 for Quality Assurance of AMS	/	PP
20.	/	Reports of Annual surveillance test (AST) conducted from 22/05/2013 to 23/05/2013 for Quality Assurance of AMS for Plant 1	/	PP
21.	/	Reports of Annual surveillance test (AST) conducted from 23/05/2013 to 25/05/2013 for Quality Assurance of AMS for Plant 2	/	PP
22.	/	Calibration records of the monitoring equipments	/	PP
23.	/	Replacement records of the monitoring equipments	/	PP
24.	/	Accreditation certificates of the calibration organizations	/	PP
25.	/	Test report of the D-EMS 2000 System	Dated 07/2011	PP
26.	Capro Corporation	CDM Monitoring & Management Manual	/	PP
27.	Capro Corporation	CDM and Monitoring Internal Training Records	/	PP
28.	/	Registered PDD Version 8.1	Dated 24/05/2011	PP
29.	TUV-SUD	Validation report Version 4.1	Dated 14/02/2016	PP
30.	/	Previous monitoring reports	/	PP
31.	Verification DOE	Previous verification reports	/	PP
32.	UNFCCC CDM-EB	Methodology AM0028 Version 05	/	Others
33.	UNFCCC CDM-EB	Validation and verification standard	Dated 20/02/2015	Others

CDM-VCR-FORM

		Version 09.0		
34.	UNFCCC CDM-EB	Project standard Version 09.0	Dated 20/02/2015	Others
35.	UNFCCC CDM-EB	Project cycle procedure Version 09.0	Dated 20/02/2015	Others
36.	UNFCCC CDM-EB	Monitoring report form Version 05.1	/	Others

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

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

FAR ID	N/A	Section no.	N/A	Date : N/A
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				

Table 2. CL from this verification

CL ID	N/A	Section no.	N/A	Date: N/A
Description of CL				
Project participant response				Date: N/A
Documentation provided by project participant				
DOE assessment				Date: N/A

Table 3. CAR from this verification

CAR ID	CAR-1	Section no.	E.3	Date: 03/02/2016
Description of CAR				
The dates when the ASTs were conducted in 2013 are found inconsistent with the evidence.				
Project participant response				Date: 10/02/2016
The dates when the ASTs were conducted in 2013 have been corrected to be consistent with the evidence /20//21/.				
Documentation provided by project participant				
<i>Revised monitoring report.</i>				
DOE assessment				Date: 14/02/2016
Bureau Veritas Certification has checked the revised monitoring report and can confirm that the revised dates when the ASTs were conducted in 2013 are consistent with the evidence /20//21/. This CAR is closed.				

CAR ID	CAR-2	Section no.	E.8.1	Date: 03/02/2016
Description of CAR				
Time of several events or situation included in the Section B.1 of the monitoring report is not exactly consistent with the documented evidence, and several events or situation occurred in this monitoring period are not reported in the MR.				
Project participant response				Date: 10/02/2016
Section B.1 of the monitoring report has been revised. Time of the events or situation has been corrected and the missing events or situations have been supplemented to be consistent with the documented evidence /8//11//12//13/.				
Since some starting time and ending time of the events or situation have been revised or supplemented, the baseline emissions, the project emissions and the emission reductions of have been revised accordingly.				
Documentation provided by project participant				
<i>Revised monitoring report and emission reductions calculation spreadsheet.</i>				
DOE assessment				Date: 14/02/2016

Bureau Veritas Certification has checked the revised monitoring report and can confirm that the information of the time of the events or situation included in the Section B.1 of the monitoring report has been corrected or supplemented to be consistent with the documented evidence /8//11//12//13/.

Bureau Veritas Certification has also checked the revised emission reductions calculation spreadsheet and compared to the original version of emission reductions calculation spreadsheet, and can confirm that the calculation of the baseline emissions, project emissions and emission reductions have been correctly revised according to the revised starting time and ending time of the events or situation.

This CAR is closed.

Table 4. FAR from this verification

FAR ID	N/A	Section No.	N/A	Date : N/A
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				

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>	
01.0	23 March 2015	Initial publication.	
Decision		Class:	Regulatory
Document		Type:	Form
Business		Function:	Issuance
Keywords: project activities, verifying and certifying			