




**Validation report form for post-registration changes for
CDM project activities
(Version 03.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Catalytic abatement of N ₂ O in Nitric Acid Plant of Shiraz Petrochemical Company (UNPA reference number: 8249)
Process track	<input checked="" type="checkbox"/> Prior approval <input type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report	01
Completion date of the validation report	05/12/2019
Type(s) of PRCs	<input type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ¹ <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan <input type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents <input checked="" type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	Version 11, Dated 04/12/2019
Project participants	Shiraz Petrochemical Company Mehr Renewable Energies Company Climate Protection Finance AG
Host Party	Iran
Applied methodologies and standardized baselines	AM0028 / version 05.1.0 "Catalytic N ₂ O destruction in the tail gas of nitric acid or caprolactam production plants"
Mandatory sectoral scopes	Sectoral Scope (5): Chemical industries
Conditional sectoral scopes, if applicable	NA
Name and UNFCCC reference number of	Carbon Check (India) Private Ltd.

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

the DOE	(E-0052)
Name, position and signature of the approver of the validation report	Amit Anand, CEO 

SECTION A. Executive summary

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Purpose, general description and location of the project activity:

The Project Participant, Climate Protection Finance AG, has commissioned the DOE, Carbon Check (India) Private Ltd. (CC IPL) to perform an independent validation of the post registration changes of the CDM Project Activity “Catalytic abatement of N₂O in Nitric Acid Plant of Shiraz Petrochemical Company” in Islamic Republic of Iran (hereafter referred to as “Project Activity”).

The objective of the project activity is to reduce the emission of Nitrous Oxide (N₂O), which is a greenhouse gas, from tail gas of Nitric Acid production process in the Nitric Acid Plant of Shiraz Petrochemical Company (SPC) by installing a catalytic N₂O abatement system. N₂O is an undesired by-product of ammonia oxidation reaction (to produce nitric acid). The project activity includes installation of a DeN₂O-DeNO_x unit at the tail gas of nitric acid plant, which is decomposing N₂O and NO_x by chemical reaction over a catalytic bed to N₂ and O₂. This abatement unit utilizes a catalytic bed to decompose N₂O to its elements N₂ and O₂, thereby reducing GHG emissions. The plant utilizes Natural Gas as fuel for heating the tail gas and some ammonia to decompose NO_x emissions, which results in some project emissions. In the baseline scenario Nitrous Oxide (an undesired by product) of ammonia oxidation reaction (to produce nitric acid) and was released to atmosphere in absence of any regulation to restrict N₂O emissions in Iran.

PP proposes the following four project design changes:

- The value of the ex-ante fixed parameter “Historical operating temperature range of the ammonia oxidation reactor” ($T_{g,hist}$), was stated as 840⁰ C – 860⁰ C in the registered PDD. PP proposes to change this value to 862⁰ C – 874⁰ C.
- As per the registered PDD, for the ex-ante estimation of emission reductions, “N₂O concentration at the inlet of the N₂O destruction facility” ($Cl_{N_2O,i}$) was assumed as 1,120 ppmv and “N₂O concentration at destruction facility outlet” ($CO_{N_2O,i}$) as 120 ppmv (i.e. 90% efficiency). Based on the actual monitored value, PP proposes to change the value of inlet concentration of N₂O to 2,014.7 ppmv for the ex-ante estimation of emission reductions and outlet concentration as 201.47 ppmv (90% efficiency).
- Change in the AOR catalyst from “woven” to “knitted” type with its composition remaining same (90% Pt and 10% Rh)
- Change in the GWP values for N₂O and CH₄ in line with EB 69, Annex 3

Scope of validation:

This validation is an independent and objective review of the post registration changes in the registered PDD /B04/. The scope of the validation of post registration changes is to determine whether there are proposed or actual changes to the project design of the registered CDM project activity. CC IPL also determined whether the description in the revised PDD /1/ submitted by project participants, which describe the nature and extent of the actual changes, accurately reflects the implementation, operation and monitoring of the modified project activity.

The validation of post registration changes in the revised PDD /1/ were based on the following:

- (i) Approved methodology AM0028 (version 05.1) /B02/
- (ii) Revised PDD (in track change and clean mode) /1/
- (iii) CDM VVS for Project Activities (version 02.0) /B01-1/
- (iv) CDM PS for Project Activities (version 02.0) and /B01-2/
- (v) CDM PCP for Project Activities (version 02.0) /B01-3/
- (vi) Relevant decisions, guidance and clarifications of the CMP and CDM EB

Validation process:

The validation process for post registration changes includes the following steps:

- (a) Contract with project participants and appointment of validation team and technical review team
- (b) Desk review of the revised PDD by validation team and planning of onsite visit
- (c) On site visit and follow up interviews by the validation team
- (d) Reporting and closure of findings (CARs/CLs/FARs) and preparation of validation report
- (e) Independent technical review of the validation report
- (f) Issuance of final validation report to the contracted PP and submission to UNFCCC for approval of post registration changes as appropriate.

The description in the revised PDD (version 11; dated 04/12/2019) /1/ meets all relevant UNFCCC requirements for the CDM PDD and correctly applies the selected baseline and monitoring methodology /B02/.

The version of the template for PDD was the latest version. CCIPL confirms that the revised PDD as provided by the PP complies with the instructions for completion of the PDD. Furthermore, CCIPL through review of revised PDD /1/ confirms that the information included in the new form is materially the same as the information in the registered PDD.

The Validation team confirms the contractual relationship signed on 12/02/2019 in between the DOE, Carbon Check (India) Private Ltd., and the PP, Climate Protection Finance AG. The team assigned to the validation meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence. The validation team has conducted a thorough contract review as per UNFCCC and Carbon Check's procedures and requirements.

The report is based on the assessment of the revised PDD undertaken through application of standard auditing techniques including but not limited to document reviews and stakeholder interviews, review of the applicable/applied methodology and its underlying formulae and calculations.

This report contains the findings and resolutions from the validation and a validation opinion on the proposed post-registration changes thus confirming the revised project design as document is sound and reasonable and meets the stated requirements and identified criteria.

The validation confirms that the implementation of the post registration changes is in line with the applied methodology and all other applicable tools and guidance.

This report is the combined assessment opinion for all the changes that are proposed in the PDD and request is submitted for prior approval by CDM EB.

SECTION B. Validation team, technical reviewer and approver

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B.1. Validation 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/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader/ Technical Expert	IR	Agarwalla	Sanjay Kumar	CCIPL	X	X	X	X
2.	Local Expert	IR	Mehrani	Neda	CCIPL		X	X	

B.2. Technical reviewer and approver of the validation report on PRCs

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	Singh	Vikash Kumar	CCIPL
2.	Technical expert to Technical Reviewer	IR	Nesari	R V	CCIPL
3.	Approver	IR	Anand	Amit	CCIPL

SECTION C. Means of validation**C.1. Desk/document review**

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List of all documents reviewed or referenced during the validation is provided in Appendix-3 below.

C.2. On-site inspection

Duration of on-site inspection: 06/01/2019 to 07/01/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PDD	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani

	against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable			
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani
7.	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	SPC plant, Shiraz, Iran	06/01/2019 to 07/01/2019	Sanjay Kumar Agarwalla, Neda Mehrani

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Ahadi	Mohammad Sadegh	Mehr Renewable Energy	06/01/2019 to 07/01/2019	Project implementation and operation management, monitoring procedure, data and information flow, QA/QC Procedures CER calculation and completeness of monitoring report	Sanjay Kumar Agarwalla, Neda Mehrani
2.	Bazdar	Elahe	Mehr Renewable Energy	06/01/2019 to 07/01/2019	CER calculation and completeness of monitoring report	Sanjay Kumar Agarwalla, Neda Mehrani
3.	Madadi	Mohammad	SPC	06/01/2019 to 07/01/2019	Project implementation and operation, monitoring procedure, data and information flow, QA/QC Procedures	Sanjay Kumar Agarwalla, Neda Mehrani
4.	Babak	Dehghanpur		06/01/2019 to 07/01/2019	Project implementation and operation, monitoring procedure, data and information flow, QA/QC Procedures	Sanjay Kumar Agarwalla, Neda Mehrani
5.	Famarzi	Zarir	SPC	06/01/2019 to 07/01/2019	Plant operation and maintenance	Sanjay Kumar Agarwalla, Neda Mehrani
6.	Golab Fetoosh	Mohammad Hadi	SPC	06/01/2019 to 07/01/2019	Operation and Maintenance of monitoring instrument including calibration	Sanjay Kumar Agarwalla, Neda Mehrani
7.	Karami	Abdolmarim	SPC	06/01/2019 to 07/01/2019	Operation and Maintenance of monitoring instrument including calibration	Sanjay Kumar Agarwalla, Neda Mehrani
8.	Ghanbari	Darab	SPC	06/01/2019 to 07/01/2019	Plant operation and maintenance	Sanjay Kumar Agarwalla, Neda Mehrani
9.	Sherafati	Keivan	SPC	06/01/2019 to 07/01/2019	Plant operation and maintenance	Sanjay Kumar Agarwalla, Neda Mehrani
10.	Parisai	Mohammad Sadegh	SPC	06/01/2019 to 07/01/2019	Plant operation and maintenance	Sanjay Kumar Agarwalla, Neda Mehrani
11.	Talebshokr	Farzad	SPC	06/01/2019 to	Shift operator and log recording	Sanjay Kumar Agarwalla,

			07/01/2019		Neda Mehrani
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C.4. Sampling approach

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Not applicable.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	-	-	-
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	-	-	-
Corrections	-	-	-
Changes to the start date of the crediting period	-	-	-
Inclusion of a monitoring plan	-	-	-
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents	-	-	-
Changes to the project design	-	-	-
Changes specific to afforestation and reforestation project activities	-	-	-
Others (please specify)	-	-	-
Total	-	-	-

SECTION D. Validation findings**D.1. Compliance with PDD form**

Means of validation	DR, I
Findings	-
Conclusion	<p>The revised PDD /1/ has been completed using the latest available template of CDM-PDD-FORM /B03-2/ and has been submitted in both track change and clean versions.</p> <p>Both the registered /B04/ and revised PDD /1/ were reviewed for the consistency of the information and it is confirmed that the information transferred from the previous template to the new template is materially the same as in the registered PDD /B04/ except the changes due to the proposed PRC.</p> <p>This confirms to the requirements of §278 and 279 of the VVS for project activities (version 02.0) /B01-1/.</p> <p>Furthermore, in accordance with §280 (a) of VVS for project activities (version 02.0) /B01-1/, the validation team confirms that:</p> <ul style="list-style-type: none"> (i) The revised PDD /1/ is compliant with the valid version of the CDM-PDD-Form /B03-2/ and instructions therein; and (ii) The information transferred to the revised PDD /1/ is materially the same as that provided in the registered PDD /B04/.

D.2. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

Means of validation	Not applicable
Findings	Not applicable
Conclusion	Not applicable

D.3. Corrections

Means of validation	Not applicable
Findings	Not applicable

Conclusion	Not applicable
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D.4. Changes to the start date of the crediting period

Means of validation	Not applicable
Findings	Not applicable
Conclusion	Not applicable

D.5. Inclusion of a monitoring plan

Means of validation	Not applicable
Findings	Not applicable
Conclusion	Not applicable

D.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

Means of validation	Not applicable
Findings	Not applicable
Conclusion	Not applicable

D.7. Changes to the project design

Means of validation	The changes in the project design have been validated by document review, on-site inspection visit, review of registered and revised PDD.
Findings	-
Conclusion	<p>The current project design involves changes compared to the project design in the registered project activity. The following project design changes are being proposed:</p> <p>1) The value of the ex-ante fixed parameter “Historical operating temperature range of the ammonia oxidation reactor” ($T_{g,hist}$), was stated as 840° C – 860° C in the registered PDD. PP proposes to change this value to 862° C – 874° C.</p> <p><u>Assessment by the validation team:</u></p> <p>In the registered PDD, the validated historical AOR temperature (for the period 21/03/2010 to 20/03/2011) was 862 – 860°C /B04/ /6/. Further, the PP has provided the AOR temperature records for the period 21/03/2010 to 20/11/2016 (i.e. for the pre DCS period) which shows the range from 840 – 862°C /2/, which is almost in the same range as in the registered PDD for the ex-ante fixed parameter “$T_{g,hist}$” which was based on the historical temperature readings from the plant for the period 21/03/2010 to 20/03/2011. However, PP has provided the data for the post DCS installation /3/, which was verified during the on-site visit by reviewing the plant records, showing the AOR temperature range from 862-874 °C for the period 20/01/2017 to 22/09/2018 /7/. It is observed that there is an average increase of about 1.7% in the AOR temperature post installation of DCS, although the operating conditions remains same /11/. As clarified by the PP, the DCS records are deemed to be accurate and with the possibility of the pre DCS records having some error. It is correct that in the registered PDD, the ex-ante fixed parameter ‘historical operating temperature range of the ammonia oxidation reactor, “$T_{g,hist}$” was based on historical data. But as clarified by PP, post installation of the DCS, it is observed that the historical temperature recorded pre DCS was not correct. The validation team is able to confirm this based on the fact that there is no change in the operating conditions of the plant pre DCS and post DCS installation (AOR pressure, Nitric Acid production, Ammonia consumption) /2/. Accordingly possibility of change in the operating temperature is ruled out and concluded that the historical temperature presented in the registered PDD was not correct. Now as the historical temperature presented was not correct (i.e. were erroneous), it is being proposed through this PRC, a change in the ex-ante value of historical AOR temperature by selecting new historical data measured in AOR from 20/01/2017-22/09/2018 /7/. Therefore, project participants based on new historical data, request to change the ex-ante value of permitted operating temperature range from</p>

840-860 °C to 862-874 °C. The validation team also noted the content of the ruling note of CDM EB on the rejection note of this PRC submitted earlier when it is stated /17/:

“Additionally, the Board acknowledges the justification provided by the PP and DOE that the $T_{g,hist}$ fixed at the time of registration (840 – 860 °C) maybe incorrect or not reliable. Therefore use of the $T_{g,hist}$ based on operating temperature data obtained after the installation of the Distributed Control System (DCS) in 2017 (862 – 874 °C) as a correction to historical data could be allowed as a special case (maintaining Option (a)), provided the PP and DOE wish to opt for the same and submit this as a post registration change request for further consideration by the Board”.

In the above context, the proposed change in the ex-ante fixed parameter “Historical operating temperature range of the ammonia oxidation reactor ($T_{g,hist}$)”, by correction, to 862-874 °C is deemed acceptable to the validation team.

As per the applied methodology:

“in order to determine the permitted range of the operating temperature and pressure in the ammonia oxidation reactor, the project applicant has the obligation to determine the operating temperature and pressure range by:

(a) Firstly, data on historical temperature and pressure ranges; or, if no data on historical temperatures and pressures are available; then

(b) Secondly, by range of temperature and pressure stipulated in the operating manual for the existing equipment; or, if no operating manual is available or the operating manual gives insufficient information; then

(c) Thirdly, by literature reference (e.g. from Ullmanns Encyclopedia of Industrial Chemistry, Fifth, completely revised edition, Volume A 17, VCH, 1991, P. 298, Table 3. or other standard reference work or literature source)”

As per paragraph 309 (b) of the VVS for project activities, version 02.0 /B01-1/, the following are confirmed:

- *When the changes occurred:* The design change was noted by the PP when the DCS monitoring system was installed.

- *Reasons for these changes taking place:* As stated above, PP could note this change once the DCS monitoring system was installed

- *Whether the changes would have been known prior to the registration of the CDM project activity:* PP had not known this change prior to the registration of the CDM project activity

- *How the changes would impact on the overall operation/ability of the CDM project activity to deliver emission reductions:* With the stated project design change (correct application of the ex-ante historical temperature range of AOR), the emission reductions will be correctly calculated as per the applied methodology

- *Whether the revised estimation of emission reductions due to the change takes into account the applicable limits in accordance with the “CDM project standard for project activities”:* There is no revision in estimation of emission reductions due to the stated project design change. Furthermore, the project activity is a large scale project and there is no limit on emission reductions as per the CDM project standard for project activities.

The validation team deemed this project design change for the fixed ex-ante parameter acceptable.

2) As per the registered PDD, for the ex-ante estimation of emission reductions, “ N_2O concentration at the inlet of the N_2O destruction facility” ($Cl_{N_2O,i}$) was assumed as 1,120 ppmv and “ N_2O concentration at destruction facility outlet” ($CO_{N_2O,i}$) as 120 ppmv (i.e. 90% efficiency).

Based on the actual monitored value, PP proposes to change the value of inlet concentration of N₂O to 2,014.7 ppmv for the ex-ante estimation of emission reductions and outlet concentration as 201.47 ppmv (90% efficiency).

Assessment by the validation team:

In the registered PDD, for the ex-ante estimation of emission reductions, PP had used the IPCC 2006 default value for N₂O concentration as 1,120 ppmv in the tail gas (inlet to the DeN₂O-DeNO_x unit). This value was used in absence of any actual monitored data available at the time of PDD registration. However, post installation of the DeN₂O-DeNO_x unit and monitoring of N₂O concentration in the tail gas, it is observed that its average value is 2,014.7 ppmv for the period 20/01/2017 to 22/09/2018 /7/. The monitored value was verified during the on-site visit document review by the validation team. Hence PP has proposed a PRC in this respect for values of inlet and outlet concentration of the N₂O in the DeN₂O-DeNO_x unit as 2,014.7 ppmv and 201.47 ppmv (assuming 90% destruction of N₂O) respectively for the ex-ante estimation of emission reductions. It is noted that in the registered PDD, page 9, also it was stated "*It is notable that the estimates of GHG emission reductions are made for reference purpose only and actual emission reductions will be based on monitored data and may differ from this estimate*". Hence the validation team deemed this change, based on the actual monitored data, to be more realistic and hence acceptable. The validation team has reviewed the revised emission reduction calculation /12/ and deemed the revision as acceptable which is based on actual monitored value. Due to this proposed PRC and also adoption of updated values of GWP for second commitment period, the annual average ex-ante emission reductions have increased from 418,730 to 731,361 tCO₂e.

As per paragraph 309 (b) of the VVS for project activities, version 02.0 /B01-1/, the following are confirmed:

- *When the changes occurred:* The design change was noted by the PP when the DCS monitoring system was installed once the CDM project (DeN₂O-DeNO_x system) was commissioned and N₂O concentration data in the tail gas was available.
- *Reasons for these changes taking place:* As stated above, PP could note this change once the DCS monitoring system was installed
- *Whether the changes would have been known prior to the registration of the CDM project activity:* PP had not known this change prior to the registration of the CDM project activity as there was no monitoring system at site for N₂O concentration in the tail gas.
- *How the changes would impact on the overall operation/ability of the CDM project activity to deliver emission reductions:* With the stated project design change (application of more realistic value of N₂O concentration in the tail gas for the purpose of ex-ante estimation of emission reductions), the ex-ante ERs in the PDD will be more realistic
- *Whether the revised estimation of emission reductions due to the change takes into account the applicable limits in accordance with the "CDM project standard for project activities":* The project activity is a large scale project and there is no limit on emission reductions as per the CDM project standard for project activities.

The validation team deemed this project design change acceptable.

3) Change in the AOR catalyst from "woven" to "knitted" type with its

composition remaining same (90% Pt and 10% Rh)

During the on-site visit interviews and document review /9/ it was confirmed that the composition of the catalyst being used in the AOR is 90% Pt and 10% Rh which is same as stated in the registered PDD /B04/. But it was noted that as per the recommendation of the catalyst supplier /9/, the catalyst type had been changed from “woven” to “knitted” in April 2018 /10/. The validation team based on its sectoral expertise confirms that this change in type of catalyst (without altering the composition of the catalyst, i.e. 90% Pt and 10% Rh), does not have any negative impact on the plant operation and rather may lead to better efficiency of HNO₃ production, i.e. decrease the N₂O concentration in the tail gas. Hence this is deemed acceptable to the validation team. Further it was noted that in the registered PDD, section B.6.2 in the table for the parameter “G_{com,hist}”, PP had stated the catalyst composition as 90% Pt and 10% Pd and this typographical error has been corrected to 90% Pt and 10% Rh which is consistent with other sections of the PDD and also the evidence from the technology supplier. The validation team deemed the above change catalyst type from woven to knitted acceptable.

As per paragraph 309 (b) of the VVS for project activities, version 02.0 /B01-1/, the following are confirmed:

- *When the changes occurred:* The design change was done in April 2018.
- *Reasons for these changes taking place:* As stated above, the change in catalyst type (without altering in the composition) was done on the recommendation of the catalyst supplier for better efficiency of the nitric acid plant.
- *Whether the changes would have been known prior to the registration of the CDM project activity:* PP had not known this change prior to the registration of the CDM project activity.
- *How the changes would impact on the overall operation/ability of the CDM project activity to deliver emission reductions:* With the stated change in catalyst type, nitric acid production efficiency is expected to increase and thereby decreasing the concentration of N₂O in the tail gas and thus emission reductions are expected to decrease.
- *Whether the revised estimation of emission reductions due to the change takes into account the applicable limits in accordance with the “CDM project standard for project activities”:* The project activity is a large scale project and there is no limit on emission reductions as per the CDM project standard for project activities.

The validation team deemed this project design change acceptable.

4) Change in the GWP values for N₂O and CH₄ as per EB 69, Annex 3:

PP has updated the GWP values in line with EB 69, Annex 3 as the crediting period for the project activity falls in second commitment period. This is deemed acceptable to the validation team. Accordingly PP has submitted revised emission reduction calculation sheet which is found to be appropriate.

Based on on-site visit inspection and document review, the verification team confirms that the above project design changes do not have any adversely impact on the compliance of the additionality, monitoring plan, the level of accuracy of the monitoring activity, the applied monitoring methodology including applicable tool(s) thereby complying paragraphs 303 and 309 of CDM VVS for project activities, version 02.0 /B01-1/.

Further in line with paragraph 303 of CDM VVS for project activities, version 02.0, the validation team has assessed the effect of the project design changes as below:

a) Additionality of the registered CDM project activity:

As per section B.5 of the registered PDD, "*Because the installation of a DeN₂O unit (Tertiary measure) needs considerable investment, and has no economical/financial benefit except benefits related to CDM, Simple cost analysis (option I) is applied*". The above stated PRCs do not have any impact on project capital cost, operation cost and other terms which adversely affected project additionality.

Thus the verification team confirms that the project design changes do not adversely affects the additionality of the project activity and the project activity still remains additional.

b) Scale of the registered CDM project activity:

The project is a large scale project activity and the project design changes do not adversely affect the scale of the project activity,

c) Applicability and application of the applied methodology under which the CDM project activity has been registered;

The applicability conditions of the applied methodology AM0028, version 05.1.0 are demonstrated as below:

Applicability Criteria	Justification / Assessment
The applicability is limited to the existing production capacity measured in tonnes of nitric acid or caprolactam, where the commercial production had began no later than 31 December 2005. The definition of "existing" production capacity is applied for the process with the existing ammonia oxidization reactor where N ₂ O is generated and not for the process with new ammonia oxidizer. Existing production "capacity" is defined as the designed capacity, measured in tonnes of nitric acid or caprolactam per year;	SPC has only one nitric acid plant commissioned in 1986 with the capacity of 600t/d (x 330 d/yr = 198,000ton/yr) and this capacity has not been changed since then. Thus this condition is satisfied.
Existing caprolactam plants are limited to those employing the Raschig process not using any external sources of nitrogen compounds other than feed ammonia, or those employing the HPO® process that may use nitric acid as an external nitrogen source for caprolactam production in addition to feed ammonia;	This condition is not applicable to the project because it is a nitric acid production plant.
The project activity will not result in shut down of an existing N ₂ O destruction or abatement facility at the nitric acid or caprolactam production plant;	SPC has no N ₂ O destruction or abatement facility currently. This criterion is still applicable.
The project activity shall not affect the nitric acid or caprolactam production level;	The applied technology targets the tail gas, therefore has no influence on the nitric acid production. In case of market demand for nitric

		acid or ammonium nitride, SPC may increase the production, however the reason is not due to this project. This criterion is still applicable.
	The project activity will not cause an increase in NO _x emissions;	Even though there is no adverse effect of the applied DeN ₂ O technology on NO _x emission of the plant, the unit works as DeNO _x as well, thus NO _x emissions will distinctively decreased. Nevertheless SPC currently and without any DeNO _x unit, is in compliance with the NO _x regulation in Iran. This criterion is still applicable.
	In case a DeNO _x unit is already installed prior to the start of the project activity, the installed De-NO _x is a Selective Catalytic Reduction (SCR) De-NO _x unit;	Until now, no any DeNO _x unit has been installed in nitric acid plant of SPC. This criterion is still applicable.
	The N ₂ O concentration in the flow at the inlet and the outlet of the catalytic N ₂ O destruction facility is measurable. Furthermore, for a caprolactam plant using the HPO® process, the N ₂ O concentration in the gas flow between the ammonia oxidation reactor and the absorption column is also measurable, and the N ₂ O in the product flow from the absorption column to the HPO® process area is quantifiable.	The project activity will be equipped to the real time measurement systems at the upstream and downstream of the DeN ₂ O unit. Thus the N ₂ O concentration in the flow at the inlet and outlet of the system will be measured. The project activity is not aimed at the caprolactam production plant. This criterion is still applicable.
<p>Hence it is confirmed that the project design changes (do not adversely affect the methodology and the applicable tools applicability criteria.</p> <p>d) The compliance of the monitoring plan with the applied monitoring methodology:</p> <p>The verification team confirms that due to the project design change, there is no change in the monitoring plan of the registered PDD and the monitoring methodology.</p> <p>The verification team further confirms that due to the stated project design changes, there will not be any adverse impact on the project boundary and any associated leakages; the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan and thus complying paragraph 309 of VVS for project activities, version 02.0 /B01-1/.</p> <p>The verification team confirms that the proposed project design changes comply with the requirements of the Project Standard for project activities, version 02.0 /B01-2/ thereby complying paragraph 308 of VVS for project activities, version 2.0 /B01-1/.</p>		

D.8. Changes specific to afforestation and reforestation project activities

Means of validation	Not applicable
Findings	Not applicable
Conclusion	Not applicable

SECTION E. Internal quality control

>>

The final validation report passed a technical review before being submitted to the UNFCCC Executive Board. A technical reviewer qualified in accordance with the CCIPL's qualification scheme for CDM validation and verification performed the technical review.

SECTION F. Validation opinion

>>

Carbon Check (India) Private Ltd. (CC IPL) has performed the validation of the post-registration changes for the registered CDM Project Activity "Catalytic abatement of N₂O in Nitric Acid Plant of Shiraz Petrochemical Company" having UNFCCC reference number 8249. During the validation of the post-registration changes to the project activity, project design changes have been identified. The post registration changes (PRC) to registered project activity has been validated in line with the requirements of CDM PCP for project activities (version 02.0) /B01-3/, CDM PS for project activities (version 02.0) /B01-2/ and CDM VVS for project activities (version 02.0) /B01-1/. In line with §308 of CDM VVS for project activities (version 02.0), CCIPL confirms that the post registration changes information in the revised PDD (version 11, Dated 04/12/2019) /1/ reflects post-registration changes related to the registered PDD /B04/.

The validation was performed on the basis of rules and requirements defined by UNFCCC for the CDM project activities. The review of the revised PDD /1/, supporting documentation and subsequent follow-up actions (including interviews), have provided CCIPL with sufficient evidence to determine the fulfilment of stated criteria.

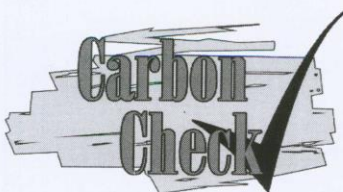
The description in the revised PDD /1/ meets all relevant UNFCCC requirements for the CDM and correctly applies the selected baseline and monitoring methodology.

This report is the assessment opinion for the changes that are proposed in the revised PDD /1/ and request is submitted for acceptance of the Board as a part of prior approval request.

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DR	Document review
DOE	Designated Operational Entity
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FAR	Forward Action Request
FVR	Final verification Report
GHG	Greenhouse gas(es)
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IR	Internal resource
MRE	Mehr Renewable Energies
PDD	Project Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control/Quality assurance
RMP	Revised Monitoring Plan
SPC	Shiraz Petrochemical Company
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Sanjay Agarwalla

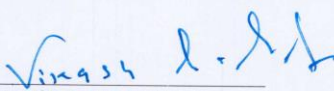
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:


Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Expert ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input checked="" type="checkbox"/>	TA 9.2	<input checked="" type="checkbox"/>	TA 13.2	<input type="checkbox"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input checked="" type="checkbox"/>	TA 8.1	<input type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input type="checkbox"/>
TA 2.1	<input checked="" type="checkbox"/>	TA 5.1	<input checked="" type="checkbox"/>	TA 9.1	<input checked="" type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		



Mr. Vikash Kumar Singh
Compliance Officer



Mr. Amit Anand
CEO

Date of Approval
24/12/2018

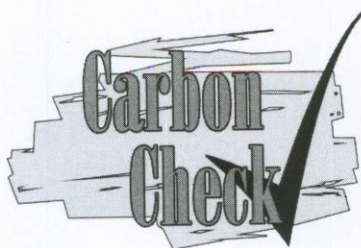
Valid Till
23/12/2019

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision

¹ India

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Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
Tel: +91 120 4373114| URL: www.carboncheck.co.in
e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator ☒ Team Leader ☒ Technical reviewer ☒
 Verifier ☒ Technical Expert ☒ Local Expert¹ ☒

In the following Technical Areas:

TA 1.1 ☒ TA 3.1 ☒ TA 5.2 ☐ TA 9.2 ☐ TA 13.2 ☒
 TA 1.2 ☒ TA 4.1 ☒ TA 8.1 ☐ TA 10.1 ☐ TA 14.1 ☐
 TA 2.1 ☐ TA 5.1 ☐ TA 9.1 ☐ TA 13.1 ☒

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

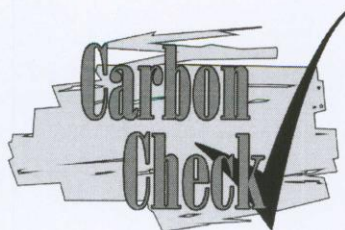
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24/12/2018	Annual Revision

¹ India, South Africa

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 e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Ramchandra Nesari

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator ☐ Team Leader ☐ Technical reviewer ☐
 Verifier ☐ Technical Expert ☒ Local Assessor¹ ☒

In the following Technical Areas:

TA 1.1 ☒ TA 3.1 ☒ TA 5.2 ☒ TA 9.2 ☒ TA 13.2 ☐
 TA 1.2 ☒ TA 4.1 ☒ TA 8.1 ☐ TA 10.1 ☒ TA 14.1 ☐
 TA 2.1 ☐ TA 5.1 ☒ TA 9.1 ☒ TA 13.1 ☒

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
23/12/2019

Revision History of the Document

26/12/2014	Initial Adoption
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24/12/2017	Annual Revision
24/12/2018	Annual Revision

¹ India

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 Registered in India: U74930DL2012PTC232495
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 Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in
 e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	MRE	Revised PDD (in track change and clean mode)	Version 11, dated 04/12/2019	PP
2	SPC	Evidence No.1_Daily Data-AOR Tem., Pres., Ammonia Flow and Acid 2010-2018	-	PP
3	SPC	Evidence No. 2_SPC DCS Installation NOM	-	PP
4	Heurtey Industries	Evidence No. 3_AOR Temperature Range by Manufacture_3100-NN-03 SH 3	-	PP
5	SPC	Evidence No. 4_SPC ISO document, Form No. QF-NIA-001.6, log-sheet for daily operating data recording (810-885° C)	-	PP
6	SPC	Evidence No. 5_Daily AOR T&P_ PDD Data_21.03.2010-20.03.2011	-	PP
7	SPC	Evidence No. 6_Daily AOR_Monitored Data_20.01.2017-22.09.2018	-	
8	SPC	Evidence No. 7_Daily CDM Plant Logsheet_21.03.2017-22.09.2018	-	PP
9	Hindustan Platinum Private Limited	- Evidence No. 8_AOR Catalyst_Knitted Specification_by supplier - Evidence No.15_AOR Catalyst_Woven Specification_by supplier	-	PP
10	SPC	Evidence No. 9_SPC NA R&M Report_Knitted Catalyst Replaced_28.04.2018	-	PP
11	SPC	Evidence No. 10_Daily Normalized Data-AOR Catalyst replacement Impact_20.01.2017-22.09.2018	-	PP
12	MRE	Revised Emission reduction calculation spread sheet	Version 08, Dated 22/05/2019	PP
13	SPC	Evidence No.11_SPC Monitoring Report_ER Calculation Sheet-Ver.02_05032019	-	PP
14	SPC	Evidence No.12_QAL1_1403N-MTR-Flowmeter and Analyzer	-	PP
15	SPC	Evidence No. 13_QAL2_EZN2O-2017-09-0004-QAL2 AMS program SPC_final	-	PP
16	SPC	Evidence No.14_QAL3_and other Calibration Certificates	-	PP
17	UNFCCC	Ruling note : Rationale for the rejection of PRC-8249-001	https://cdm.unfccc.int/filestorage/e/x/t/extfile-20191202093937609-PostReg_rule30.pdf/PostReg_rule30.pdf?t=VFd8cTlxM3pufDCTJOExqgoHskLeRqCijmRK	UNFCCC
B01	UNFCCC	1. Validation and Verification Standard for project activities, version 02.0 2. Project Standard for project activities, version 02.0 3. Project Cycle Procedure for project activities, version 02.0	http://cdm.unfccc.int/	Others
B02	UNFCCC	Applied baseline and monitoring methodology, AM0028 / version 05.1.0 “Catalytic N2O destruction in the tail gas of nitric acid or caprolactam production plants”	http://cdm.unfccc.int/	Others
B03	UNFCCC	1. CDM PRCV FORM and Instructions for filling out the PRC Validation form, version 03.0	http://cdm.unfccc.int/	Others

		2. CDM PDD FORM and Instruction for filling the form, version 11		
B04	UNFCCC	Registered PDD (version 08 dated 16/09/2012) and corresponding validation reports.	http://cdm.unfccc.int/	Others
B05	Web sites	Websites: 1. http://cdm.unfccc.int/	-	Others

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

Table 1. CLs from this validation

CL ID	xx	Section no.	Date: DD/MM/YYYY
Description of CL			
-			
Project participant response			Date: DD/MM/YYYY
-			
Documentation provided by project participant			
-			
DOE assessment			Date: DD/MM/YYYY
-			

Table 2. CARs from this validation

CAR ID	xx	Section no.	Date: DD/MM/YYYY
Description of CAR			
-			
Project participant response			Date: DD/MM/YYYY
-			
Documentation provided by project participant			
-			
DOE assessment			Date: DD/MM/YYYY
-			

Table 3. FARs from this validation

FAR ID	xx	Section no.	Date: DD/MM/YYYY
Description of FAR			
-			
Project participant response			Date: DD/MM/YYYY
-			
Documentation provided by project participant			
-			
DOE assessment			Date: DD/MM/YYYY
-			

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make editorial improvements.
02.0	31 October 2017	Revision to align with the requirements in the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: post-registration change, project activities, validation report		