






Validation opinion for post registration changes

Title of project activity:		
Project for the catalytic reduction of N ₂ O emissions with a secondary catalyst inside the ammonia reactor of the No. 9 nitric acid plant at African Explosives Ltd ("AEL"), South Africa		
CDM reference number:	DNV project No.:	
1171	PRJC-494445-2013-CCS-NOR	
Date:	Validation of the changes were conducted:	
04/07/2014	<input type="checkbox"/> Prior to the commencement of a verification of the project activity <input checked="" type="checkbox"/> When performing a verification of the project activity	
Work carried out by (name & signature):	Work verified by (name & signature):	Approved by (name & signature):
 Rafi-ud-Din Khawaja	 Ravi Kumar Prabhu	 Michael Lehmann

Overview of post registration changes

Type of post registration change		Are the changes of a type specified in Appendix 1 of the CDM Project Standard? Note: In case of "No", prior approval by the EB is required
A: Temporary deviations from the registered monitoring plan and/or monitoring methodology (refer to section A)		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
Applicable period for proposed deviations (inclusive):	From DD/MM/YYYY start date of the earliest included deviation to DD/MM/YYYY end date of the latest included deviation)	
B: Corrections (refer to section B)		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
C: Changes to the start date of the crediting period (refer to section C) <i>Prior approval by the CDM EB is not required in case of (a) bringing forward the start date up to one year earlier or (b) postponing the start date by up to one year (by up to two years for project activities in LDCs).</i>		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
Proposed start date of the crediting period:	DD/MM/YYYY (changed from DD/MM/YYYY)	
D: Permanent changes from the registered monitoring plan or applied methodology		<input checked="" type="checkbox"/> Yes

(refer to section D)	<input type="checkbox"/> No <input type="checkbox"/> No post registration change of this type
E a): Changes to the project design of a registered project activity (refer to section E)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type
E b): Changes to the programme design of a registered PoA (refer to section E)	Note: All changes to the programme design of a registered PoA require prior approval by the EB. <input checked="" type="checkbox"/> No post registration change of this type
F. Changes specific to afforestation or reforestation project activities (refer to section F)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> No post registration change of this type

A. Temporary deviations from the registered monitoring plan and/or monitoring methodology

Not Applicable.

B. Corrections

Not Applicable

C. Changes to the start date of the crediting period

Not Applicable

D. Permanent changes from the registered monitoring plan or applied methodology

D.1 Description of the revision of the monitoring plan

The NAP in tHNO₃ (metric tonnes of 100% concentrated nitric acid during each project campaign) as per PDD of 05 April 2007 is monitored by mass balance calculation and flow measurements. A detailed method is given in the the PDD dated 05 April 2007 for mass balance calculations where delivery volumes are measured by flow meter. The AEL 9 plant has a coriolis flow meter installed at the nitric acid product outlet before it goes into the production storage tank to determine mass of nitric acid produced.

A Flexim Ultrasonic flow meter has been installed since 2 August 2011 in parallel to the Coriolis mass flow meter, initially for testing purposes. However, from the start of the first project campaign of the monitoring period (PC13) on 20 June 2012 and thus for the entire monitoring period from 12 March 2012 to 13 March 2013, the values from the new ultrasonic flow meter were recorded and utilized for NAP. Thus, the NAP monitoring practice as described in the PDD has been permanently changed since the start of this monitoring period, and thus changes to the PDD are submitted as post registration changes in the PDD along with the issuance request for the monitoring period from 12 March 2012 to 13 March 2013. For the

updated NAP monitoring practice, refer to updated attached version 3.0 of the PDD dated 1 July 2014.

D.2 Assessment of the revision of the monitoring plan

The proposed change is a change in accordance with Appendix 1 of the CDM project standard and thus does not require prior approval by the EB as further explained below.

The following from Appendix 1 is relevant for this project:

(b) Change of accuracy/type/model of meter(s) as per a power purchase agreement (PPA);

The above paragraph from Appendix 1 relates to electricity meters. However, since the change of the meter from a coriolis flow meter to a flexim ultrasonic flow meter was beyond project participant's control (as further explained below), it is DNV's opinion that the above paragraph of Appendix 1 is equally applicable to change of the meter that occurred in this project as well.

DNV has reviewed a motivation document by AEL from August 2011 for change of the meter from a coriolis flow meter to a flexim ultrasonic flow meter. For meter replacement (that had gone bad due to corrosion), it was evident that installing a meter of the same type as previously installed was not an available option due to the following reasons:

- Higher acid temperature that leaves the NO_x column at No. 9 nitric acid plant (around 65°C) and at this temperature nitric acid becomes highly corrosive (The acid temperature at No. 11 nitric acid plant is more than 20°C lower than the No. 9 nitric acid plant). In order to be able to use same type of the mass flow meter, cooling the nitric acid was considered a possible option. However, the costs and time frame of such a project was far too long and costly. Thus the option of cooling the nitric acid was disregarded.
- Higher costs associated with alternative materials of construction for the mass flow measurement tubes. These materials may include zirconium, tantalum and titanium and do not fully guarantee that they would last long enough to justify the extra cost. And thus the option of using alternative materials of construction for the mass flow measurement tubes was also disregarded.

The only possible option for No. 9 nitric acid plant that was first tested on No. 11 nitric acid plant was installing a flexim ultrasonic flow meter. In these tests the flexim ultrasonic flow meter was monitored for long term accuracy by comparing monitored values and their standard deviations with the values monitored by mass flow meter.

The proposed revision of the monitoring plan ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions.

The proposed revision of the monitoring plan is in accordance with the approved monitoring methodology applicable to the project activity whilst ensuring the conservativeness of the emission reductions calculation.

The changes to the monitoring plan contained in the registered PDD proposed by the project participants are in compliance with the applied methodology and do not reduce the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan.

The Flexim Ultrasonic flow meter is of better or at least equal accuracy than the Coriolis mass flow meter, thus the change of the flow meter type is not likely to lead to a reduction in the accuracy of the calculation of emission reductions. The installation of new flow meter will also enable direct measurement of the acid flow, thereby eliminating the requirement of

apportioning of the acid production between the no. 9 and no. 11 plants, as per the registered PDD.

The proposed revisions ensure that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision. Further, the proposed revisions are in accordance with the monitoring methodology.

E. Changes to the project or programme design of a registered project activity or PoA

Not Applicable.

F. Changes specific to afforestation or reforestation project activities

Not Applicable.

Validation opinion

The change of monitoring practice for NAP in tHNO_3 from Coriolis mass flow meter to Flexim Ultrasonic flow meter ensures that the level of accuracy or completeness in the monitoring and verification process is not reduced as a result of the revisions. Further, the proposed changes are not likely to lead to a reduction in the accuracy of the calculation of emission reductions.

Thus DNV recommends the approval of the proposed changes to the monitoring plan contained in the updated PDD version 3.0 of 1 July 2014.

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