Comments and Suggestions for Improvement for

AM0028: Catalytic destruction of N2O in the tail gas of Nitric Acid and Caprolactam Production facilities

and

AM0034: Catalytic reduction of N2O inside the ammonia burner of nitric acid plants

Submitted by CDM Watch

24 March 2011

In 2010 we commissioned an in-depth evaluation of nitric acid projects under the CDM (AM0028 and AM0034, see: http://sei-us.org/publications/id/354 and our comments submitted on 15 February 2011). Since then we have found some additional very pertinent information that potentially greatly impacts how baseline emissions are established. The comments below elaborate on our newest findings.

COMMENT:

Baseline Emissions:

The technologies to avoid and destroy N2O emissions at nitric acid plants can be classified based on the process location of the treatment device:

- **Primary abatement: prevents N2O being formed in the ammonia burner.**
  This abatement method requires modifications of the oxidation gauzes so that the oxidation process is optimized and production of N2O and other unwanted by-products is minimized.
- **Secondary abatement: destroys N2O in the burner after the ammonia oxidation catalyst.**
  This abatement method requires installing a secondary N2O destruction catalyst below the primary catalyst inside the oxidation reactor. The CDM methodology AM0034 is specifically for nitric acid plants that install such a secondary catalyst.
- **Tertiary abatement: destroys N2O from the tail gas.**
  This abatement technology is installed downstream of the absorption tower and based on either thermal or catalytic decomposition. CDM methodology AM0028 is aimed at nitric acid (and caprolactam) plants that install tertiary treatment.

AM0028 and AM0034 only deal with N2O destruction. We therefore have serious concerns that project developers avoid to install a primary gauze that would minimize the formation of N2O in order to maximize the amount of CERs. In other words, there is a perverse incentive to create more N2O than is economically necessary by using a sub-optimal primary gauze that does not minimize N2O formation.

There is circumstantial evidence that project developers as well as gauze manufacturers who directly profit from CER revenue have not been using or promoting types of gauzes that reduce N2O creation (although these have been commercially available for a few years) possibly because they do not want to decrease their CER revenue.

AM0028[1] clearly states that the best available, economically viable technology has to be taken as the baseline scenario:

> ***Step 1: Identify technically feasible baseline scenario alternatives to the project activity***
> The baseline scenario alternatives should include all technically feasible options which are realistic and credible.
>
> ***Step 1a: The baseline scenario alternatives should include all possible options that are technically***
> ***feasible to handle N2O emissions. These options are, inter alia:***
> - […]The installation of an N2O destruction or abatement technology:
>   - Primary or secondary measures for N2O destruction or abatement. (AM0028 version 5)

Yet none of the projects seem to be using the following primary gauzes that, according to the manufacturer reduce baseline N_2O emissions by approximately 30%:

Ravinda Heraeus FTCplus:

This producer sells a primary gauze that he claims reduces N_2O formation significantly:

> *FTC*plus*, which reduces the nitrous oxide emission at source. FTC*plus *has been commercially available since 2000. After installation, the emissions of nitrous oxide have been reduced on average by more than 30% over extended campaign lengths in many industrial applications. FTC and FTC*plus *consist of a number of metallic gauze layers and can be installed in virtually any reactor. No changes to the reactor itself and no additional catalyst is required in order to operate FTC*plus*. Both FTC and FTC*plus *catalyst systems can be delivered in form of individual gauze layers or pads or mounted on the Stretcher.*
> (http://www.ravindraheraeus.com/products/ftcgauzes.htm , accessed on Feb 17, 2011)

Heraeus further states that this type of gauze is less expensive than more conventional gauzes:

> *FTC is designed to reduce total production costs: the cost savings are primarily achieved by reducing precious metal losses and reducing the precious metal weight of the installed catalyst. FTC does away with the requirement of catchment systems to be installed in the reactor. To accomplish this, FTC systems utilise specially developed, complex alloys which enable the total weight of precious metals required to be substantially reduced. When compared to conventional catalyst systems, cost reductions of up to 35% per tonne of nitric acid produced have been achieved in numerous industrial applications. This result has been achieved without sacrificing ammonia conversion efficiency or campaign length. On the contrary, ammonia conversion efficiencies are bench marked over even extended campaigns. FTC is suitable for virtually all reactor types.*
> (http://www.ravindraheraeus.com/products/ftcgauzes.htm , accessed on Feb 17, 2011)

Johnson Matthey (JM), another major primary catalyst producer also offers a similar type of gauze called Eco-Cat. JM does not state the N2O emissions of this primary gauze on their website. We have consulted with industry experts and according to our research this gauze type reduces N_2O emissions by about 30%. JM is also producing a secondary catalyst which destroys the N2O and is used heavily in CDM projects (AM0034). They promote their secondary catalysts and their CDM work on their website: http://www.n2oabatement.noble.matthey.com/site.asp?siteid=1106

A study done for the European Commission in 2009 seems to confirm the availability of such low emitting gauzes:

[1] AM0034 explicitly refers to the baseline scenario identification procedure applicable to AM0028. Thus, the same requirements apply to all AM0034 CDM projects.

The most common [primary] catalyst is a 90% Palladium / 10% Rhodium gauze constructed from squares of fine wires. Up to 5% palladium is used to reduce costs. A reduction of up to 30% N2O may be achieved with an improved platinum-based catalyst. (p.11)

This requires modifications to the ammonia oxidation gauzes in order to reduce N2O formation. According to gauze suppliers, as much as 30-40% reduction of N2O formation can be achieved in conventional nitric acid plants. (p.13)

(European Commission 2009: Methodology for the free allocation of emission allowances in the EU ETS post 2012. Sector report for the chemical industry. http://ec.europa.eu/clima/documentation/ets/docs/BM%20study%20-%20Chemicals.pdf, p.11 accessed on Feb 17, 2011)

According to the Risoe CDM Pipeline, as of Feb 1, 2011, there were 57 registered nitric acid projects and 7 projects at validation and 18.3 million CERs have been issued for this project type. Assuming that the claims by Heraeus and the findings of the above study are correct, the low- N_2O emitting primary gauzes are fully competitive and applicable to almost all nitric acid plants, resulting in the baseline emissions for all nitric acid CDM projects being overestimated by 30% or even more. This means that nitric acid projects have been over-credited CERs by 30%, which results in a surplus issuance of 5.5 million CERs as of to date.

PROPOSAL:

The methods AM0028 and AM0034 already clearly state that *technically feasible baseline scenario alternatives to the project activity have to be used.* We would like to request that the UNFCCC secretariat closely examines the issues elaborated above, specifically:

- Why are these types of low emitting gauzes not considered in the baseline scenario identification and the subsequent calculations of baseline emissions in the PDDs of nitric acid CDM projects?
- Are there any technical or economic stumbling blocks that would provide reasonable justification why these low emitting gauzes are not used or considered?

If over-crediting occurred due to the omission of the lower baseline scenario with these types of gauzes, the over-crediting has to be immediately stopped.