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Att: CDM Executive Board

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Your ref.:	Our ref.:	Date:
CDM Ref 0765	YKK/TRIKA	27 June 2008

Response to request for review

Catalytic N_2O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical Fine Chemical (0765)

Dear Members of the CDM Executive Board,

We refer to the issues raised in the requests for review raised by four Board members concerning DNV's request for issuance for project activity 0765 "Catalytic N_2O destruction project in the tail gas of three Nitric Acid Plants at Hu-Chems Fine Chemical" and would like to provide the following clarifications for your perusal and review.

Introduction

For all three Hu-Chems Fine Chemical nitric acid plants, it must be noted that the quality assurance and quality control procedures in terms of equipment operation and maintenance as well as data reporting are covered by project operator's management system which is certified to comply with ISO 9001:2000 and ISO 14001:2004 valid until November 2008.
Furthermore, it is to be noted that the excel sheet submitted for issuance are not including all data presented to DNV during verification because some of these data are regarded as sensitive operating information for Hu-Chems Fine Chemical. Example of excel sheets, not submitted for request for issuance, but used in the verification, are attached to this response in order to better explain the verification procedure.

Comment 1:

The DOE is requested to clarify how it has verified:

The daily plant output of HNO3 as required by the methodology since, the monitoring report mentions only the total value in the monitoring period.

DNV Response:

The procedure for the determination of nitric acid produced (in 100% concentration) is a part of the above mentioned quality management system as the nitric acid is one of Hu-Chems Fine Chemicals major products.

The nitric acid produced (recorded as 100% nitric acid) is determined from the volume flow measured with Vortex magnetic flow meters, the nitric acid density and concentration. The hourly volume flow rate in m^3/h is available from Hu-Chems Fine Chemical distributed control system (DCS). The nitric acid in tons 100% concentration is manually calculated from the volume flow, density and concentration of the acid (obtained from laboratory measurements and by using a

density table for nitric acid). The density and concentration of the acid is determined every 8 hours. The daily average of the acid concentration and density are calculated and used for the specific day. The nitric acid production parameter is available in Hu-Chems Fine Chemical daily reports (see Attachment A). The nitric acid in tons 100% concentration is manually transferred to the CDM Delta-V distributed control system by the responsible project manager from Hu-Chems Fine Chemical. From the Delta-V system daily reports are generated where the nitric acid parameter is presented as daily values (see example of daily report from Delta V in Attachment B).

CARBON CDM Korea Ltd., one of the project participants, prepares excel sheets (one for each nitric acid plant) in order to present all parameters as required by AM0028 in an overall format. These files include the daily values of 100% nitric acid production and the data are transferred from the Delta-V system. Further these excel sheets include an automatic check of each daily value of nitric acid produced in order to see if the production is below the defined design capacity (see examples of excel file in Attachment C).

During the site visit, DNV checked the calibration of the monitoring equipment and the operation condition during the monitoring period. In order to verify that the aggregated values for nitric acid produced as presented in the monitoring report, DNV conducted crosschecking by sampling randomly picked days of the raw data (concentration, density and volume flow), and compared the values determined from raw data with the DCS data from Hu-Chems Fine Chemical (Appendix A) and the daily data in the spread sheet prepared by CARBON CDM Korea Ltd. From these checks it can be observed if calculations are wrong or manually transferred data are not correctly transferred from Hu-Chems Fine Chemical daily production reports to the Delta V distributed control system. For the verified period no material mistakes were observed. Further all daily actual output of 100% HNO_3 during the monitoring period was found to be clearly below the design capacity as can be seen from the below table.

In Appendix A, B and C the consistency of the daily values can be observed for 1 October 2007.

	Hu-Chems Fine Chemical II	Hu-Chems Fine Chemical III	Hu-Chems Fine Chemical IV
Design Capacity of HNO3 (tons/day)	320 (116 800 tHNO3/yr)	320 (116 800 tHNO3/yr)	1280 (467 200 tHNO3/yr)
Daily actual average output range of HNO_3 during the monitoring period (tons/day)	15 - 302	10 -314	200-1241
Daily average daily actual output of HNO_3 during the monitoring period (tons/day)	279.7	290.7	1209

Comment 2:
The DOE is requested to clarify how it has verified:
That the actual average daily operating temperature and pressure in ammonia oxidation reactor were within the specified range stated in the PDD, as daily information is not reported in the monitoring report.

DNV Response:
a) The actual average daily operating temperature in ammonia oxidation reactor

The operating temperatures in the ammonia oxidation reactors are automatically collected by Hu-Chems Fine Chemical distributed control system (DCS) and then automatically transferred to the Delta V distributed control system serving the CDM project. The Delta V distributed control

system generates daily reports including all monitored parameters as required by AM0028 including the ammonia oxidation temperatures (see Appendix B). Hence for ammonia oxidation temperatures there are no manual transpositions.

The temperatures in ammonia oxidation reactor are monitored as follows:

Hu-Chems Fine Chemical II

The temperature in the ammonia oxidation reactor is monitored by three thermocouples delivered by M-SYSTEM model KTS- 6LA-C-X. Two are used for CDM project (322-TT-2-115 and 322-TT-2-116). Based on these two thermocouples the Delta-V distributed control system automatically calculates and reports the average temperature.

Hu-Chems Fine Chemical III.

The temperature in the ammonia oxidation reactor is monitored by three thermocouples delivered by Honeywell, type 10JT-6A6-R in Two are used for CDM project (323-TT-3-115 and 323-TT-3-116). Based on these two thermocouples the Delta-V distributed control system automatically calculates and reports the average temperature.

Hu-Chems Fine Chemical IV

The temperature in the ammonia oxidation reactor is monitored by three thermocouples delivered by Emerson, type 644HAE7J6Q4M5 in. Two thermocouples are used for CDM project (324-TT-4-106A and 324-TT-4-106C). Based on these two thermocouples the Delta-V distributed control system automatically calculates and reports the average temperature.

CARBON CDM Korea Ltd., prepares excel files including the actual daily average ammonia oxidation temperatures for all three nitric acid plants (see Appendix C). Further these excel sheets include an automatic check of each daily average value of the ammonia oxidation temperatures in order to see if the operation have been within the permitted operating ranges.

CARBON CDM Korea Ltd., also prepares detailed excel files including data for days where the operation are less than 24 hours per day or where there are other events that requires re-calculations. For such days the average temperatures are calculated from the actual number of hours in operation.

During the site visit, DNV checked the calibration of monitoring equipment and the operation condition during the monitoring period. Further, DNV conducted crosschecking by sampling randomly picked days and compared the data from the Hu-Chems Fine Chemicals DCS, with the data available in the Delta V daily reports (see Attachment B) and the daily average data in the spread sheets prepared by CARBON CDM Korea Ltd. (see Appendix C). Further the detailed excel files were checked for the periods of shut down or periods with operating hours less than 24 hours per day. From this procedure DNV confirmed that all daily recordings were found to be within the permitted range as can be seen from the below table.

	Hu-Chems Fine Chemical II	Hu-Chems Fine Chemical III	Hu-Chems Fine Chemical IV
Historical operating temperature range AOR (°C)	880-910	880-910	860-910
Actual daily average range of the temperature during the monitoring period (°C)	888.1-895.8	888.6 -898.2	873.1 -898.8
Actual daily average of the temperature during the monitoring period (°C)	893.3	895.5	890.7

b) The actual average daily operating pressure in the ammonia oxidation reactor

The operating pressure representing the pressure in the ammonia oxidation reactors are measured in the primary air supply lines of the three acid plants. The operating pressures are automatically collected by Hu-Chems Fine Chemical distributed control system (DCS) and then automatically transferred to the Delta V distributed control system serving the CDM project. The Delta V distributed control system generates daily reports including all monitored parameters as required by AM0028 including the ammonia oxidation pressures (see Appendix B). Hence for ammonia oxidation pressures there are no manual transpositions.

CARBON CDM Korea Ltd., prepares excel files including the actual daily ammonia oxidation pressures for all three nitric acid plants (see Appendix C). Further these excel sheets include an automatic check of each average daily value of ammonia oxidation pressure in order to see if the operation have been within the permitted operating ranges.

CARBON CDM Korea Ltd., also prepares detailed excel files including data for days where the operation are less than 24 hours per day or where there are other events that requires re-calculations. For such days the average daily pressures are calculated from the actual number of hours in operation.

During the site visit, DNV checked the calibration of monitoring equipment and the operation condition during the monitoring period. Further, DNV conducted crosschecking by sampling randomly picked days and compared the data from the Hu-Chems Fine Chemicals DCS, with the data available in the Delta V daily reports (see Attachment B) and the daily average data in the spread sheets prepared by CARBON CDM Korea Ltd. (see Appendix C). Further the detailed excel files were checked for the periods of shut down or periods with operating hours less than 24 hours per day. From this procedure DNV confirmed that all daily recordings were found to be within the permitted range as can be seen from the below table.

	Hu-Chems Fine Chemical II	Hu-Chems Fine Chemical III	Hu-Chems Fine Chemical IV
Historical operating pressure range AOR (barg)	5.0-9.8	5.5-9.8	2.2-4.4
Actual daily average range of the pressure during the monitoring period(barg)	8.3 -9.0	8.0-9.3	3.5-3.6
Actual daily average of the pressure during the monitoring period (barg)	8.7	8.9	3.6

Comment 3:

The DOE is requested to clarify how it has verified:
That the actual daily ammonia flow rate in the ammonia oxidation reactor is lower than the maximum historical ammonia input to the reactor.

DNV Response:

The ammonia inlet flows to the ammonia oxidation reactors are monitored by flow meters (model UNE11-SMS4 in Hu-Chems II and model EJA110-DMS4B-32DD-D4 in Hu-Chems III, supplied by YOKOGAWA and model CMF400M452NQBZ in Hu-Chems IV, supplied by Emerson) and automatically collected by Hu-Chems Fine Chemical distributed control system (DCS) and then automatically transferred to the Delta V distributed control system serving the CDM project. The Delta V distributed control system generates daily reports including all monitored parameters as required by AM0028 including the ammonia oxidation pressures (see Appendix B). Hence for ammonia inlet flows to the ammonia oxidation reactors there are no manual transpositions.

CARBON CDM Korea Ltd., prepares excel files including the actual daily ammonia inlet flows for all three nitric acid plants (see Appendix C). Further these excel sheets include an automatic check of each average daily value of ammonia inlet flows oxidation in order to see if the operation have been within the permitted operating ranges.

CARBON CDM Korea Ltd., also prepares detailed excel files including data for days where the operation are less than 24 hours per day or where there are other events that requires re-calculations. For such days the average daily ammonia flows are calculated from the actual number of hours in operation.

During the site visit, DNV checked the calibration of monitoring equipment and the operation condition during the monitoring period. Further, DNV conducted crosschecking by sampling randomly picked days and compared the data from the Hu-Chems Fine Chemicals DCS, with the data available in the Delta V daily reports (see Attachment B) and the daily average data in the spread sheets prepared by CARBON CDM Korea Ltd. (see Appendix C). Further the detailed excel files were checked for the periods of shut down or periods with operating hours less than 24 hours per day. From this procedure DNV confirmed that all daily recordings were found to below the max. historical value as can be seen from the below table.

	Hu-Chems Fine Chemical II	Hu-Chems Fine Chemical III	Hu-Chems Fine Chemical IV
Daily Historical Max (t/day)	91.8	92.5	355.5
Daily Average range of ammonia flow rate during the monitoring period (t/day)	18.2- 86.6	7.3-88.4	73.2- 354.3
Daily Average of ammonia flow rate during the monitoring period (t/day)	79.8	82.3	343.9

We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully
for DET NORSKE VERITAS CERTIFICATION AS

Michael Lehmann
Technical Director
Climate Change Services

Trine Kopperud
Project Manager
Climate Change Services

Attachments:

A. Example of Hu-Chems Fine Chemical daily reports for 1 October 2007.
B. Example of the CDM Delta-V daily reports (.mdi files) for 1 October 2007.
   Delta-V daily report for nitric acid plant 2
   Delta-V daily report for nitric acid plant 3
   Delta-V daily report for nitric acid plant 4
C. Example of excel sheets prepared by CARBON CDM Korea Ltd.:

Excel sheet for nitric acid plant 2: HUC_II_MR_4_corrected draft_final_dg.xls
Excel sheet for nitric acid plant 3: HUC_III_MR_4_corrected draft_final_dg.xls
Excel sheet for nitric acid plant 4: HUC_IV_MR_4_corrected draft_final_dg.xls