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# VERIFICATION AND CERTIFICATION REPORT

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**Nitrogénművek Zrt.**

**N2O emissions reduction project at  
the new nitric acid plant of  
Nitrogénművek Zrt.**

**Monitoring period 01/01/2008 – 31/12/2008**

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**SGS Climate Change Programme**  
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Date of Issue: 09 <sup>th</sup> July 2009	Project No.: JI.VER0038
Project Title N2O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.	Organisational Unit: SGS United Kingdom Limited
Revision Number 05	Client: Nitrogénművek Zrt.

**Summary:**

SGS United Kingdom Ltd has performed a first periodic verification of the JI project "N2O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.". The verification includes confirming the implementation of a revised monitoring plan compared to the MP of the validated PDD and the application of a slightly adapted monitoring methodology compared to the methodology used for the baseline and monitoring setting in the validated PDD. A site visit was conducted to verify the data submitted in the monitoring report.

The project has installed a catalyst in the new acid plant that will reduce the N2O content of the tail gas by 85% (to 150 ppm) as a result of catalytic processes taking place at medium temperature (400-500°C).

During the verification assessment no CARs and NIRs were raised. 1 Observation was raised.

SGS confirms that the project is implemented in accordance with the validated Project Design Document. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions and the resulting GHG emission reductions reported and related to the valid project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in an emission reduction of **834,200 tCO<sub>2</sub>e** during the period of 01/01/2008 to 31/12/2008.

Subject:		
JI Project Verification		<b>Indexing terms</b>
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## Abbreviations

AST	(quality assurance aspects of automated measurement systems (AMS)) Reporting and approval.
CAR	Corrective Action Request
CO <sub>2</sub>	Carbon Dioxide
CV	Calorific value
DOE	Designated Operational Entity
DR	Document Review
ERU	Emission Reduction Unit
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
KWh	Kilo Watt Hour
I	Interview
JI	Joint Implementation
MWh	Mega Watt Hour
MP	Monitoring Plan
MR	Monitoring Report
N <sub>2</sub> O	Nitrous Oxide
NG	Natural Gas
NIR	New Information Request
OBS	Observation
PDD	Project Design Document
PP	Project Participant(s)
PPM	Parts Per Million
QAL	Quality Assurance Level (quality assurance aspects of automated measurement systems (AMS))
SV	Site Visit
UNFCCC	United Nations Framework Convention on Climate Change

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## 1. Introduction

### 1.1 Objective

SGS United Kingdom Ltd has been contracted by Nitrogénművek Zrt. to perform an independent verification of its JI Project "N<sub>2</sub>O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.". JI projects under "Track Two" must undergo periodic audits and verification of emission reductions as the basis for issuance of Emission Reductions Units (ERUs). The project has been identified on the UNFCCC website under Track One, but still an independent verification was requested (<http://ji.unfccc.int/JIITLProject/DB/GSZRV07J6MCQRD8BAZ3MN839PHNZE5/details>).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The emissions report conforms with the requirements of the monitoring plan in the validated PDD, the approved methodology (if applicable) and the monitoring plan; and
- The data reported are complete and transparent.

### 1.2 Scope

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated project design document and the monitoring report. The project is assessed against the requirements of the Kyoto Protocol, the JI related rules and guidance.

SGS has, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 Project Activity and Period Covered

Nitrogénművek Zrt. is a family owned company established in 1931. It is the only Hungarian nitrogen-based fertilizer manufacturer having production capacities for both ammonia and fertilizer, with a market share of approximately 70%. The company has 10 daughter companies and employs 720 people. Nitrogénművek Zrt. started its operation at its present structure on 1<sup>st</sup> February 1990.

In 2006 the company installed a N<sub>2</sub>O emissions reduction catalyst in its new nitric acid plant. The catalyst reduces the N<sub>2</sub>O content of the tail gas by 85% (to 150 ppm) as a result of catalytic processes taking place at medium temperature (400-500°C). Installed in the waste gas treatment reactor, the catalyst will additionally ammonia feed for its operation.

Title of Project Activity:	N <sub>2</sub> O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.
UNFCCC Registration No:	HU1000012
Monitoring Period Covered in this Report	01/01/2008 to 31/12/2008
Project Participants	Nitrogénművek Zrt.
Location of the Project Activity:	H-8105 <u>Pétfürdő</u> Hősök tere 14 P.O. Box 450 Hungary

## 2. Methodology

### 2.1 General Approach

SGS's approach to the verification is a two-stage process.

In the first stage, SGS completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

At the end of this stage, SGS produced a Periodic Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

Using the Periodic Verification checklist, SGS verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the monitoring report. This verification report describes the findings of this assessment.

### 2.2 Verification Team for this Assessment

<b>Name</b>	<b>Role</b>	<b>SGS Office</b>
Irma Lubrecht	Lead Assessor	SGS Netherlands
Imre Király	Local Assessor	SGS Hungary
Dirk Peeters	Expert	SGS Belgium

### 2.3 Means of Verification

#### 2.3.1 Review of Documentation

The validated PDD, the monitoring reports submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached in section 8 of this report.

### 2.3.2 Site Visits

As part of the verification, a site visit was conducted on 12<sup>th</sup>-13<sup>th</sup> May 2009. The lead assessor, local assessor and the expert visited the site and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.

The results of the site visits are recorded in the verification checklist which is used as an internal report only.

The evidences have been checked and collected. The revised monitoring report is attached with this verification report.

Organization	Person interviewed
Nitrogénművek Zrt, Management	Istvan Blazsek – General Manager
Nitrogénművek Zrt., HSE dept.	Mr. Sándor Bálint,
Nitrogénművek Zrt., HSE dept.	Mrs. Katalin Almásy – Environmental Engineer
Nitrogénművek Zrt., HSE dept.	Mr. László Zelovics – Head of Department of Environmental Protection, Safety and Technology
Nitrogénművek Zrt., QMS dept.	Mrs. Mária Chronowszki – QS Manager,
Nitrogénművek Zrt., Headquarter	Mr. Pál Székely – Techn. Advisor,
Nitrogénművek Zrt., Nitric Acid Plant	Mr. László Dobos – Plant Manager
Nitrogénművek Zrt., Nitric Acid Plant	Mr József Szabó – Technical Supervisor
Nitrogénművek Zrt., Nitric Acid Plant	Mrs. Orsolya Gáspár – Technician
Nitrogénművek Zrt., Nitric Acid Plant	Mr Róbert Kovács – Technician

### 2.4 Reporting of Findings

As an outcome of the verification process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the team shall raise a New Information Request (NIR) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- I. the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- II. the verification has identified misstatements in the reported emission reductions. Emission reductions with misstatements shall be discounted based on the verifiers ex-post determination of the achieved emission reductions

The verification process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification actors. These have no impact upon the completion of the verification activity.

Corrective Action Requests and New Information Requests are detailed in Periodic Verification Checklist. The Project Developer is given the opportunity to “close” outstanding CARs and respond to NIRs and Observations.

### 2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

### 3. Verification Findings

#### 3.1 Project Documentation and Compliance with the validated PDD

The project can be found on the UNFCCC website under Track 1 (<http://ji.unfccc.int/JIITLProject/DB/GSZRV07J6MCQRD8BAZ3MN839PHNZE5/details>). |<

The parameters mentioned in the monitoring plan are described in the revised monitoring report dated 15/05/2009.

During voluntary preliminary and first verification a revision of the monitoring plan was validated after receipt of Monitoring Report rev 1.

#### 3.2 Monitoring Results

Relevant data are collected with a frequency of 10 values per second, the treatment of the data is done with a software package of Emerson (commercially available).

The following parameters have been verified:

##### Key factor 1: Operating time

The temperature of 800°C (reactor) is reached after 3 minutes of start up of the NH<sub>3</sub> incineration (start up and shut down of the NH<sub>3</sub> incineration happens only a few times per year). When the incineration of NH<sub>3</sub> is shut down it takes a few seconds to cool down below 800°C (criterion to stop). The time of start up and shut down is logged in a shift diary. This has been verified by the assessment team and was found to be satisfactory. The operating time is the only manual parameter in this project.

The nitric acid plant shut down from 3<sup>rd</sup> – 31<sup>st</sup> August for maintenance. As a consequence the amount of operational hours in that month differs from the average amount of hours during the monitoring period. As a result of the financial crisis the plant shut down completely at the end of October 2008. No production in November and December 2008.

Period	Reported value in hrs	Verified value in hrs	Describe how issue was solved
January 2008	636	636	No issues
February 2008	696	696	No issues
March 2008	506	506	No issues
April 2008	587	587	No issues
May 2008	744	744	No issues
June 2008	720	720	No issues
July 2008	744	744	No issues
August 2008	86	86	No issues
September 2008	720	720	No issues
October 2008	464	464	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues



Key factor 2: Quantity of gaseous ammonia to the ammonia combustion reactor (FIC0237)

The quantity of gaseous ammonia is measured by a flow meter with throttle (Orifice  $\pm 0.5\%$  accuracy), with temperature and pressure compensation (accuracy of circle related to the measured value  $<2.5\%$ ).

Instrument specification and test protocol (by Emerson Process Management, manufacturer of equipment) received for flow meter, thermocouple and pressure transmitter. For the flow meter, (FE0237) there is also a "dimensional check certificate" from Mattech (/13/).

A new data collection system was introduced within the company, called PHD. This system was implemented between April 2008 and October 2008. The nitric acid plant only got the PHD system in October 2008, just before the shutdown of the plant (20/10/2008 to 01/03/2009). The majority of the monitoring data was collected by the DCS system. This data was manually copied to the excel spreadsheet containing values only, and sent on to Katalin Almásy, an environmental engineer who is responsible for the monitoring data and calculations. Manual transfer has been witnessed and it was observed that it is highly unlikely that errors will occur from this transfer.

Period	Reported value in Nm <sup>3</sup> /h	Verified value in Nm <sup>3</sup> /h	Describe how issue was solved
January 2008	23,674	23,674	No issues
February 2008	25,174	25,174	No issues
March 2008	22,254	22,254	No issues
April 2008	23,185	23,185	No issues
May 2008	22,883	22,883	No issues
June 2008	20,767	20,767	No issues
July 2008	24,064	24,064	No issues
August 2008	22,849	22,849	No issues
September 2008	22,912	22,912	No issues
October 2008	23,819	23,819	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

Key factor 3: Natural gas consumption of ammonia production

The company's provider of natural gas (based in Ukraine) was not able to deliver NG as per the contract because of the Gazprom crisis in the summer of 2008. The company is now purchasing NG on the stock market.

The nitric acid plant shut down from 3<sup>rd</sup> – 31<sup>st</sup> August for maintenance. As a consequence the amount of natural gas in that month differs from the average amount of NG during the monitoring period. However, the amount of NG is still very high as the combustion reactor needs a lot of NG to start up and arrive at the required temperature. Figures were verified by the assessment team and were found to be in order.

Due to the financial crisis the plant was shut down from 20/10/2008 until 01/03/2009.

Data are collected from the company's SAP system once a month. Total amount of natural gas used for the ammonia production is divided by the total amount of ammonia production.

Period	Reported value in gNm <sup>3</sup> /t NH <sub>3</sub>	Verified value in gNm <sup>3</sup> /t NH <sub>3</sub>	Describe how issue was solved
January 2008	1087	1087	No issues
February 2008	1082	1082	No issues
March 2008	1451	1451	No issues
April 2008	1185	1185	No issues
May 2008	1096	1096	No issues
June 2008	1100	1100	No issues
July 2008	1113	1113	No issues
August 2008	2388	2388	No issues
September 2008	1082	1082	No issues
October 2008	1081	1081	No issues

Period	Reported value in gNm <sup>3</sup> /t NH <sub>3</sub>	Verified value in gNm <sup>3</sup> /t NH <sub>3</sub>	Describe how issue was solved
November 2008	0	0	No issues
December 2008	0	0	No issues

Key factor 4: Quantity of nitric acid produced:

Data is monitored with a mass flow meter from Micro Motion and transferred to the company's SAP system once a month. Parameter is of minor importance to the project but required by the ERPA.

The calibration report of the manufacturer was received and reviewed, dated 25/09/2006 (/14/). Instruments are to be calibrated once every 5 years.

The nitric acid plant shut down for maintenance from 3-31 August 2008. As a consequence the amount of nitric acid is much lower compared to the other months of the monitoring period. Figures were verified and found to be in order.

Period	Reported value in t/month	Verified value in t/month	Describe how issue was solved
January 2008	43,142	43,142	No issues
February 2008	47,942	47,942	No issues
March 2008	33,612	33,612	No issues
April 2008	38,134	38,134	No issues
May 2008	46,764	46,764	No issues
June 2008	45,259	45,259	No issues
July 2008	49,080	49,080	No issues
August 2008	5,374	5,374	No issues
September 2008	45,315	45,315	No issues
October 2008	31,340	31,340	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

Key factor 5: Quantity of natural gas to the combined reactor (FIQ0834)

The quantity of natural gas to the combined reaction is measured by a Rotameter (volume-flow meter  $\pm 1.5\%$  accuracy) with temperature and pressure compensation (accuracy of circle related to the measured value  $< 2.65\%$ ). The volume-flow measured is automatically compensated and converted to normal state (101325 Pa, 273,15 K) by DCS.

Instrument specification and test protocol (Emerson Process Management) received for PT 100 (temperature; manufacturer Rosemount, same group as Emerson) and pressure transmitter (Rosemount) (/15/).

A new data collection system was introduced within the company, called PHD. This system was implemented between April 2008 and October 2008. The nitric acid plant only got the PHD system in October 2008, just before the shutdown of the plant. The majority of the monitoring data was collected by the DCS system.

The company's provider of natural gas (based in Ukraine) was not able to deliver NG as per the contract because of the Gazprom crisis in the summer of 2008. The company is now purchasing NG on the stock market. The nitric acid plant shut down for maintenance from 3-31 August 2008. As a consequence the amount of nitric acid is much lower compared to the other months of the monitoring period. Figures were verified and found to be in order. Due to the financial crisis the plant was shut down from 20/10/2008 until 01/03/2009.

Manual transfer has been witnessed and it was observed that the spreadsheet is copied from the DCS to the calculations spreadsheet (Ctrl-C; Ctrl-V, values only). It is unlikely that errors will occur from this transfer.

Data from May 2008 (18,736) and September 2008 (24,371) were verified.

the logbook for calamities was reviewed for the whole monitoring period. Restarts are described in accordance with the dates in the MR.

Period	Reported value in gNm3/month	Verified value in gNm3/month	Describe how issue was solved
January 2008	15,804	15,804	No issues
February 2008	17,684	17,684	No issues
March 2008	12,837	12,837	No issues
April 2008	17,771	17,771	No issues
May 2008	18,736	18,736	No issues
June 2008	18,205	18,205	No issues
July 2008	19,680	19,680	No issues
August 2008	2,121	2,121	No issues
September 2008	24,731	24,731	No issues
October 2008	18,864	18,864	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

**Key factor 8: Quantity of gaseous ammonia to the combined reactor (FIQ0801)**

The quantity of gaseous ammonia to the combined reactor is measured by a Coriolis-type mass-flow meter  $\pm 0.15$  % accuracy (accuracy of circle related to the measured value  $< 0.6\%$  (/16)).

A new data collection system was introduced within the company, called PHD. This system was implemented between April 2008 and October 2008. The nitric acid plant only got the PHD system in October 2008, just before the shutdown of the plant. The majority of the monitoring data was collected by the DCS system.

Due to the financial crisis the plant was shut down from 20/10/2008 until 01/03/2009.

Data are derived from the DCS and manually copied to spreadsheet containing values only, and sent on to Katalin Almásy, the environmental engineer responsible for the monitoring data and calculations. Manual transfer has been witnessed and it was observed that that the spreadsheet is copied from the DCS to the calculations spreadsheet (Ctrl-C; Ctrl-V values). It is unlikely that errors will occur from this transfer.

Data from May 2008 and September 2008 was verified and no differences were observed. The nitric acid plant shut down for maintenance from 3-31 August 2008. As a consequence the amount of gaseous ammonia to the reactor is much lower compared to the other months of the monitoring period. Figures were verified and found to be in order.

Logbook for calamities was reviewed for the whole monitoring period. Restarts are described in accordance with the dates in the MR.

Period	Reported value in t/month	Verified value in t/month	Describe how issue was solved
January 2008	57.71	57.71	No issues
February 2008	77.65	77.65	No issues
March 2008	57.23	57.23	No issues
April 2008	67.90	67.90	No issues
May 2008	76.84	76.84	No issues
June 2008	76.25	76.25	No issues
July 2008	80.30	80.30	No issues
August 2008	9.44	9.44	No issues
September 2008	80.18	80.18	No issues
October 2008	55.61	55.61	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

Key factor 10: N<sub>2</sub>O concentration at the inlet of combined reactor (AIR0802B)

N<sub>2</sub>O concentration at the inlet of EnviNOx reactor is measured by Horiba VA-3011.

Status signals (binary outputs) are implemented to recognise failures of the sampling system, calibration or failure of the analyser, the range of the analyser (auto range installed). These alarms can be read in the control room. If an alarm occurs, it is recorded in the shift log (with date and operator name), the maintenance team is signalled, description of the problem and the repair actions carried out are registered in the shift log (with date and name of maintenance personnel). After repair, it is checked by the shift leader, if the operation is fine it is confirmed by his signature. The shift log was found to be in order.

Test report (/18/) of the installation from the supplier (Horiba) is present, the analyser has a type approval (by TÜV), a QAL 1 report (/17/) is available for the O<sub>2</sub> measurement. No QAL 1 report for N<sub>2</sub>O available. Manual transfer has been witnessed and it was observed that the spreadsheet is copied from the DCS to the calculations spreadsheet (Ctrl-C; Ctrl-V values). It is highly unlikely that errors will occur from this transfer.

Data from May 2008 and September 2008 were verified.

Logbook for calamities was reviewed for the whole monitoring period. Restarts are described in accordance with the dates in the MR.

Data of shutdowns were reviewed and it was observed that the average period of the meter being out of range was 4 minutes, which was found to be acceptable. These shutdowns happened on:

07/04/2008: technical problems – signal of analyser changed to Emerson (back-up system).

13/05/2008: analyser back to Horiba.

04/08/2008: shut down for maintenance. Maintenance lasted until 30/08/2008.

Calibrations of the analyser were carried out on:

08/02/2008; 22/04/2008; 20/06/2008; 25/06/2008; 26/06/2008; 01/09/2008

Period	Reported value in ppmv	Verified value in ppmv	Describe how issue was solved
January 2008	1363	1363	No issues
February 2008	1195	1195	No issues
March 2008	1146	1146	No issues
April 2008	1157	1157	No issues
May 2008	1163	1163	No issues
June 2008	1140	1140	No issues
July 2008	1156	1156	No issues
August 2008	1066	1066	No issues
September 2008	1042	1042	No issues
October 2008	1088	1088	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

Key factor 11: O<sub>2</sub> volume concentration in the tail gas emitted

Data are analysed by a Horiba CMA 622

O<sub>2</sub> volume concentration in the tail gas emitted is measured by O<sub>2</sub> volume concentration Horiba CMA 622. All data is recorded by DCS. Status signals (binary outputs) are implemented to recognise failures of the sampling system, calibration or failure of the analyser, the range of the analyser (auto range installed). These alarms can be read in the control room. If an alarm occurs, it is recorded in the shift log (with date and operator name), the maintenance team is signalled, description of problem and repair actions taken are registered in the shift log (with date and name of maintenance personnel). After repair, it is checked by the shift leader and if the operation is fine it is confirmed by his signature. The shift log was found to be in order.

Calibration gas was checked and found to be in order. Calibrations of the analyser are undertaken once a month and a note is made in the shift logbook and the calamity logbook. No paper trail of these calibrations is available.

Calibration certificates for analyser were checked and found to be in order.

No meters were malfunctioning during this monitoring period. Manual transfer has been witnessed and it was observed that the spreadsheet is copied from the DCS to the calculations spreadsheet (Ctrl-C; Ctrl-V values). It is unlikely that errors will occur from this transfer.

Logbook for calamities was reviewed for the whole monitoring period. Restarts are described in accordance with the dates in the MR.

Periodic (preventive) maintenance of the analysers (key factors 11, 12 and 13) is done during periods of shut down of the NH<sub>3</sub> reactor (3-31 August 2008).

Period	Reported value in %	Verified value in %	Describe how issue was solved
January 2008	2.94	2.94	No issues
February 2008	2.96	2.96	No issues
March 2008	2.77	2.77	No issues
April 2008	2.78	2.78	No issues
May 2008	2.78	2.78	No issues
June 2008	2.76	2.76	No issues
July 2008	2.80	2.80	No issues
August 2008	2.68	2.68	No issues
September 2008	2.70	2.70	No issues
October 2008	2.80	2.80	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

**Key factor 12: N<sub>2</sub>O concentration in the tail gas emitted (AI0808, AIR0808)**

N<sub>2</sub>O concentration in the tail gas emitted is measured by Horiba VA-3001. Status signals (binary outputs) are implemented to recognise failures of the sampling system, calibration or failure of the analyser, the range of the analyser (auto range installed). These alarms can be read in the control room. If an alarm occurs, it is recorded in the shift log (with date and operator name), the maintenance team is signalled, description of problem and repair actions taken are registered in the shift log (with date and name of maintenance personnel). After repair, it is checked by the shift leader and if the operation is fine is confirmed by his signature. The shift log was found to be in order.

Manual calibration by plant personnel is performed once a month. The results of these calibrations are not recorded but stored in the analyser. It is advisable to keep the values for zero and span before and after each calibration in order to evaluate the drift between two calibrations (or to perform just a control of zero and span and keep this on SPC control charts).

Manual transfer has been witnessed and it was observed that the spreadsheet is copied from the DCS to the calculations spreadsheet (Ctrl-C; Ctrl-V values). It is highly unlikely that errors will occur from this transfer.

Data from May 2008 and September 2008 were verified.

The logbook for calamities was reviewed for the whole monitoring period. Restarts are described in accordance with the dates in the MR.

Data of shut downs were reviewed and it was observed that the average period of the meter being out of range was 4 minutes, which was found to be acceptable.

These shutdowns happened on: 07/04/2008: technical problems – signal of analyser changed to Emerson (back-up system).

13/05/2008: analyser back to Horiba.

04/08/2008: shut down for maintenance. Maintenance lasted until 30/08/2008.

Calibrations of the analyser were carried out on:

08/02/2008; 22/04/2008; 20/06/2008; 25/06/2008; 26/06/2008; 01/09/2008

Period	Reported value in ppmv	Verified value in ppmv	Describe how issue was solved
January 2008	17.2	17.2	No issues
February 2008	3.4	3.4	No issues
March 2008	4.9	4.9	No issues
April 2008	5.0	5.0	No issues
May 2008	2.4	2.4	No issues
June 2008	1.6	1.6	No issues
July 2008	1	1	No issues
August 2008	10.9	10.9	No issues
September 2008	9	9	No issues
October 2008	4	4	No issues
November 2008	0	0	No issues
December 2008	0	0	No issues

All CARs and NIRs are described in detail in Annex 1 to this report.

### **3.3 Remaining Issues, CAR's, FAR's from Previous Validation or Verification**

There are no remaining issues from validation.

### **3.4 Project Implementation**

Project is fully operational. During voluntary preliminary and first verification a revision of the monitoring plan was validated after receipt of Monitoring Report rev 1.

### **3.5 Completeness of Monitoring**

Monitoring of all key factors was found to be complete and transparent. Full details of issues regarding monitoring parameters can be found above.

### **3.6 Accuracy of Emission Reduction Calculations**

Following an uncertainty analysis (/31/), it was observed that the total uncertainty of the baseline calculation is 7.95%. This is regarded as unacceptable. As this project does not use an approved methodology a 5% threshold for uncertainty is deemed acceptable. The baseline calculations have been deducted by 2.95%.

### **3.7 Quality of Evidence to Determine Emission Reductions**

Critical parameters used for the determination of the Emission Reductions are discussed in section 3.2 above.

### **3.8 Management System and Quality Assurance**

QA/QC procedures have been checked and confirmed the fulfilment of JI requirements. Roles and responsibilities were checked to be according to organisation chart in validated PDD. Relevant staff is trained and understands the MR and its calculations, as verified during site visit. The company is ISO9001 and ISO14001 certified.

### **3.9 Data from External Sources**

Three sets of data from external sources were used:

1. Key factor 6: Caloric value of natural gas: verified from supplier's info
2. Key factor 7: CO<sub>2</sub> emission factor of natural gas: decree of the Hungarian Government
3. GWP N<sub>2</sub>O: IPCC 2006.

## 4. Overview of Results

### Assessment against the Provisions of Decision 17/CP.7:

Is the project documentation in accordance with the requirements of the validated PDD and relevant provision of decision 16/CP.7, EB decisions and guidance and the COP/MOP?

*The project is not registered as a Track 2 project but listed as Track 1. The results of the compliance assessment are recorded in the verification checklist which is used as an internal report only.*

Have on-site inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?

*Yes. Irma Lubrecht, Imre Király and Dirk Peeters visited the site and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.*

*The results of the site visits are recorded in the verification checklist which is used as an internal report only.*

*The evidences have been checked and collected. The revised monitoring report version 2 dated 15/05/2009 is attached with this verification report.*

Has data from additional sources been used? If yes, please detail the source and significance.

*Caloric value of natural gas has been verified from supplier's info; CO<sub>2</sub> emission factor of natural gas has been verified from the decree of the Hungarian Government and the GWP of N<sub>2</sub>O has been derived from IPCC 2006.*

Please review the monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.

*Project has revised the monitoring plan compared to the monitoring plan of the validated PDD but changes have no material impact on the key factors for the calculations of the emission reductions. Following FAR 1 raised during voluntary preliminary and first verification a revision of the monitoring plan was validated*

Have any recommendations for changes to the monitoring methodology for any future crediting period been issued to the project participant?

*No recommendations were made concerning changes to the monitoring methodology.*

Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the JI project activity, based on the data and information using calculation procedures consistent with those contained in the project design document and the monitoring plan.

*The total amount of ERUs for 01/01/2008 to 31/12/2008 estimated in the validated PDD was. 777,713 tCO<sub>2</sub>e. The total amount of emission reductions realised and verified in the same period is 834,200 t CO<sub>2</sub>e. The difference between the estimated value in the PDD and the verified value is due to the fact that the acid production was higher than anticipated in the PDD during this monitoring period.*

Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the project design document. Project participants shall address the concerns and supply relevant additional information.

*No concerns related to the conformity of the actual project activity and its operation with the project design document.*

## 5. Calculation of Emission Reductions

Following an uncertainty analysis (/31/), it was observed that the total uncertainty of the baseline calculation is 7.95%. This is regarded as unacceptable. As this project does not use an approved methodology a 5% threshold for uncertainty is deemed acceptable. The baseline calculations have been deducted by 2.95%.

Calculation of emission reductions was conducted as follows:

Total amount of emission reductions: Baseline emissions – project line emissions

$$(866564 * 0.975) - 6800 = 834200 \text{ t CO}_2\text{e}$$



## 6. Recommendations for Changes in the Monitoring Plan

The project has been recommended to change some of the key factors as the key factors mentioned in the original monitoring report (version 1 dated 18/03/2009) were not relevant for the calculations of the emission reductions.

It was furthermore recommended to insert the number of the key factor and the tag number into the table on the last page to ensure easy cross checking.

It was recommended to maintain a paper trail of the company's own calibrations of the gas analysers (for O<sub>2</sub> (key factor 11), N<sub>2</sub>O at the inlet of the combustion factor (key factor 10) and N<sub>2</sub>O in the tail gas (key factor 12)).

## 7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Nitrogénművek Zrt. to perform the verification of the emission reductions reported for the JI project “N2O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.” in the period of 01/01/2008 to 31/12/2008.

The verification is based on the validated project design document, the monitoring report and all working documents for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the JISC and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in Monitoring Report version 2 dated 15/05/2009.

The management of Nitrogénművek Zrt. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the Monitoring Report dated 15/05/2009. The development and maintenance of records and reporting procedures are in accordance with the monitoring report, including the calculation and determination of GHG emission reductions from the project. All NIRs and CARs concerning this project were successfully closed out.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions from the project for the period of 01/01/2008 to 31/12/2008 and on the calculation of GHG emission reductions from the project for the period of 01/01/2008 to 31/12/2008 based on the reported emissions in the Monitoring Report version 2 dated 15/05/2009 for the period of 01/01/2008 to 31/12/2008.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, SGS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated. Our expert's opinion is that the monitoring methodology used by the project is best industry practice and that the methodology calculates the emission reductions conservatively by considering all possible sources of project emissions and considering the uncertainty factor in the calculations. The total uncertainty of the baseline was higher than 5%, therefore the project was requested to reduce the baseline to meet this limit. The total amount of emission reductions was consequently reduced.

SGS confirms that the project is mainly implemented as described in the validated project design documents. Alterations made to the monitoring methodology compared to the validated monitoring plan are of minor importance to data collection or accuracy with regards to the calculation of emission reductions. The project is using its own project specific methodology. This methodology calculates the emission reductions in a conservative way by considering all possible sources of project emissions and considered the uncertainty factor in the calculation.

Based on the information we have seen and evaluated, we confirm the following:

Name and Reference Number of Project	N2O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt.
Validated PDD and Approved Methodology used for Verification	N <sub>2</sub> O emissions reduction project at the new acid plant at Nitrogénművek Rt. October 2004. The project is using its own project specific methodology. This methodology calculates the emission reductions in a conservative way by considering all possible sources of project emissions and considered the uncertainty factor in the calculation.
Applicable Period	01-01-2008 to 31-12-2008
Total GHG Emission Reductions Verified	834 200 t CO <sub>2</sub> e

**Signed on behalf of the Verification Body by Authorized Signatory**



Signature:

Name: Siddharth Yadav

Date: 13<sup>th</sup> July 2009

## 8. Document References

ID	Documents	Description
1	N2O emissions reduction project at the new acid plant at Nitrogénművek Rt. – Project Idea Note 2004	Project Idea Note
2	N2O emissions reduction project at the new acid plant at Nitrogénművek Rt. – Project Design Document, 2005	Project Design Document
3	Determination of the N2O Emissions Reduction Project at the new acid plant at Nitrogénművek Rt - 2005	Determination Report SGS
4	N2O emissions reduction project at the new nitric acid plant of Nitrogénművek Zrt. Monitoring report for the period between 1st January 2008. and 31st December 2008 version 1 dated 15/05/2009.	Monitoring Report
5	Calculations_to_JI_Monitoring_Report_2008_.xls	Calculation spreadsheet
6	Tail gas flow calculation-r.doc”	
7	ME 7.5.-S-K1 Procedure for Nitric Acid Plant	QA/QC Procedure
8	KU-1 Instruction for calibration laboratory	
9	Job descriptions	
10	Internal QS training 2007	
11	Internal QS audits 2008	
12	Monthly record from ‘MOL Földgázz szállító Zrt.’ From January to December 2008	
13	Key factor 2 (ref. MP): instrument specification and test protocol (by Emerson Process Management, manufacturer of equipment) received for flow meter, thermocouple and pressure transmitter. For the flow meter, there is also a “dimensional check certificate” from Mattech.	
14	Key factor 4 (ref. MP): mass flow meter from Micro Motion: “Transmitter configuration report” and calibration report of the manufacturer received	
15	Key factor 5 (ref. MP): instrument specification and test protocol (by Emerson Process Management) received for PT 100 (temperature; manufacturer Rosemount, same group as Emerson) and pressure transmitter (Rosemount).	
16	Key factor 8 (ref. MP): mass flow meter from Micro Motion: “Transmitter configuration report” and calibration report of the manufacturer received	
17	Key factor 11 (ref. MP): QAL 1 certificate	QAL1 TÜV Horiba
18	Key factor 11, 12 and 13 (ref. MP): maintenance and calibration report, test report and calibration protocol	
19	P&ID of tail gas treatment	
20	Certificates of calibration gases	
21	Drawing: tail gas stack H102	
22	Print screen of monitor control room on 6/2/2008, ±15h23: “Tail gas treatment emission” and “Tail gas treatment”	
23	Test report	QAL2 report
25	FT 0802 nat. gas meter.pdf	ISO17025 calibration report of NG flow meter

ID	Documents	Description
26	IPCC 2006	
27	Decree CO2e emission factor of natural gas	
28	AU4i	Preliminary verification checklist SGS
29	AU4	Periodic verification checklist SGS
30	Findings Overview	SGS
31	Key factor – accuracy calculation_new	

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