VERIFICATION REPORT

GEOTHERMAL ENERGY IN ORADEA – AREA II AND BEIUS IN ROMANIA

(ITL Project ID: RO1000081)

Verification Period:
1 January 2008 to 31 December 2008 and
1 January 2009 to 31 December 2009

REPORT NO. 2010-0663
REVISION NO. 01

DET NORSKE VERITAS

VERIFICATION REPORT

Date of first issue: 15 November 2010	Project No.: PRJC-220225—2010-CCS-NOR	
Recommended for approval Ole A. Flagstad	Approved by: Ole Andreas Flagstad	Organisational unit: Climate Change Services
Client: Danish Energy Agency	Client ref.: Inge Gerhardt-Pedersen	

DET NORSKE VERITAS
CERTIFICATION AS

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Summary:

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions reported for the "Geothermal Energy in Oradea – area II and Beius in Romania" (ITL Project ID RO1000081), JI-track 1 project, for the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009.

In our opinion, the GHG emission reductions reported for the project in the monitoring reports (Version 02 and 03) of 12 November and 15 November 2010 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the monitoring plan contained in the Project Design Document of July 2004, version 2.3.

Det Norske Veritas Certification AS is able to verify that the emission reductions from the "Geothermal Energy in Oradea – area II and Beius in Romania" during the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009 amount to 27 503 tCO_2 and 25 249 tCO_2, which is total 52 752 tonnes of CO_2 equivalent.

Report No.: 2010-0663	Subject Group: Environment
Report title: Geothermal Energy in Oradea – area II and Beius in Romania	
Work carried out by: Zuzana Andrtová, Lumír Němeček, Mario Vöröš	
Work verified by: Ole A Flagstad, Agnes Dudek	
Date of this revision: 17 December 2010	Rev. No.: 01 / Number of pages: 15

Indexing terms

Key words Climate Change Kyoto Protocol Validation Join Implementation Mechanism	Service Area Verification Market Sector Process Industry

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Abbreviations

AIE	Accredited Independent Entity
ARCE	Romanian Agency for Energy Consumption
BS	Baseline Study
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CHP	Combined heat and power
CET	Centrala Electrica de Termoficare
DEA	Danish Energy Agency
DEA	Danish Environmental Agency
DH	District heating
DNV	Det Norske Veritas Certification AS
EPA	Environmental protection agency
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
MP	Monitoring Plan
PDD	Project Design Document
QA	Quality Assurance
QC	Quality Control
RMEWM	Romanian Ministry of Environment and Water Management
RNIS	Romanian National Institute of Statistics
UNFCCC	United Nations Framework Convention on Climate Change

Conversion Factors and Definitions

GJ to kWh	1 GJ = 277.78 kWh
kWh to J	1 kWh = 3 600 000 J
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
GES	Gross energy supply (total energy demand of DH system including losses in boiler system, in distribution pipe network, under buildings)
NED	Net energy demand (energy demand in buildings, excluding losses in basement)

1 INTRODUCTION

Danish Energy Agency (DEA) has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of the emission reductions reported for the "Geothermal Energy in Oradea – area II and Beius in Romania" (the project) in the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009. This report contains the findings from the verification and a verification statement for the certified emission reductions.

1.1 Objective

Verification is the periodic independent review and *ex post* determination by an Accredited Independent Entity (AIE) of the monitored reductions in GHG emissions that have occurred as a result of a Joint Implementation (JI) project activity during a defined verification period.

The objective of this verification was to verify the emission reductions reported for the "Geothermal Energy in Oradea – area II and Beius in Romania" for the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009.

DNV is an Independent Entity accredited by the Joint Implementation Supervisory Committee (JISC) for all sectoral scopes.

1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

1.3 Description of the Project Activity

Project Parties:	S.C. Transgex S.A. in Romania and the Danish Energy Agency (DEA) in Denmark
Title of project activity:	Geothermal Energy in Oradea – area II and Beius in Romania
ITL Project ID:	RO1000081 (JI track-1)
Project Entity:	Mr. Alin Iacobescu, Director General of Transgex Str. Vasile Alecsandri nr. 2, Oradea Bihor 410072 Tel./Fax +40 259 431 965 / 040 256 413 022 E-mail transgex@rdsor.ro

	Mr. Mihai Brasoveanu, Task Manager for Climate Change within DEA Romania Mobile + 40 745 511 529 E-mail deamihai@gmail.com
Location of the project activity:	Oradea, Beius (Romania).
Project's JI crediting period:	1 January 2008 to 31 December 2012
Period verified in this verification:	1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009

The project is proposed as a JI Track-1 project between Romania and the DEA and includes the upgrade and development of the district heating system (DHS) of two cities (Oradea - Area II and Beius) in Romania. The project aims to substitute previously used fossil fuels (lignite and heavy oil) with geothermal energy resources.
The project generates CO_2 emission reductions originating from the substitution of fossil fuels by geothermal energy resources.

1.4 Methodology for Determining Emission Reductions

The project aims to substitute previously used fossil fuels (lignite and heavy oil) with geothermal energy resources. It means that the project generates CO_2 emission reductions originating from the substitution of fossil fuels by geothermal energy resources.

The emission reductions are calculated of base consumption energy in localities defined as Area II in Oradea and in Beius City, which was previously connected in CET I plant in Oradea and which are connect to wells 3001 and 3003 in Beius and previously was connect to Beius DHS.

The emission reduction in Oradea - Area II are calculated as difference between estimated emissions from combustion of natural gas and lignite and emissions from natural fired peak load boilers at the geothermal heating plant with emissions produced by electricity produced from other fossil fired power plants, which increase in result of no production in CET I.

The emission reductions in Beius are calculated as emission from combustion of heavy oil and natural gas, which is replaced by geothermal energy of JI project.

The monitored parameters are quantity of supplied energy from geothermal heating plant in Oradea, energy supplied to block of flats, hospitals and other buildings in Beius as defined boundaries (Area II and Beius) in the PDD /1/.

2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

i) the review of the calculations of the emission reductions from the substitution of fossil fuels by geothermal energy in Oradea and Beius /6//7/;

ii) review of the primary record from individual measurement devices /9//14/ and Taransex account IT system records /13/;

iii) review of invoices for fuels to peak load boilers /12/;

iv) review of data from CET I /11/;

v) review of primary data from geothermal heating plant /10/

Verification team

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
Project manager	Rinaldo	Mats	Norway	✓						
Technical team leader / JI verifier	Andrtová	Zuzana	Czech Republic		✓	✓	✓			
Sector expert / trainee verifier / GHG auditor	Němeček	Lumír	Czech Republic		✓	✓	✓			✓
JI Verifier	Vöröš	Mario	Slovak Republic					✓		
Technical reviewer	Flagstad	Ole	Norway						✓	✓
Sector competence input to TR	Dudek	Agnes	Norway							✓

Duration of verification

Preparations: *26 March 2010*

On-site verification: *From 7 April 2010 to 8 April 2010*

Reporting, calculation checks and QA/QC: *From 16 April 2010 to 17 December 2010*

2.1 Review of Documentation

The key documents for the project, Project Design Document (PDD) /1/, Monitoring report version 1 /6//7/ and Unqualified validation report prepared by SGS /3/ was provided by project participant for review of documentation prior site visit. The determination report /3/ was named unqualified validation report as it was concluded prior to the establishing of JI Track 1 procedure in Romania /19/. DNV also notes that the PDD registered by the Romanian authorities /1/ is dated prior to the Unqualified validation report /3/, but DNV concludes that Romanian authorities has found this PDD sufficient for JI track-1 in Romania as it is registered as the official PDD for the project.

Further verification report from previous verification period 2007 (prior to JI crediting period) issued by DNV /8/ was reviewed in desk review phase.

The local records as calibration protocols for measurement devices /9/, records from monitoring sites /14/, local EPA records and training records were provided to demonstrate project implementation on site.

As the first version of verification reports did not fulfil requirements included in the monitoring part of the PDD /2/ and the scope of project area II did not correspond with description in the PDD /1/, Monitoring reports of the project were updated after site visit and version 2 and 3 /4//5//6//7/ was provided together with additional evidences /9//10//11//12//13//14/ to verifier.

2.2 Site Visits

The Oradea's office of Transgex was visited on 7 and 8 April 2010 by Zuzana Andrtová, Lumír Němeček and Mario Vöröš of DNV. Data monitoring and meeting with responsible persons were arranged as well as review of the thermal plant and monitoring devices at monitoring points in Oradea and Beius. The technical information about individual wells was provided after the site visit.
During this site visit, representatives of DNV interviewed key personnel of the plant and responsible persons from Transgex's account department and verified the project was realized according to PDD /1/ and Monitoring plan /2/. The records related to measurement devices /9/ were confirmed by the real situation on individual monitoring points. The heat consumption was verified by cross-checking with primary records from reading of measurement /10/ and with account record used for invoicing /13/.

The personnel interviewed are summarized in the table below:

Name	Organization and position	Topic of interview
Mihai Brasoveanu	DEA, Task Manager for Climate Change within DEA Romania	Implementation of the project, QA/QC of the project
Alin Iacobescu	Director General of Transgex	Introduction with the project
Alexandru Cristian Dragan	Coordinator of DEA Romania project for monitoring	Monitoring report preparation, QA/QC of the project
Stefan Olah	Senior Geologist of Transgex	Project coordination, project's condition and location of the wells
accountants	Transgex	Records related to invoicing
Mutiu Ionel	Metrologist of Transgex	Calibration of the measurement devices, presentation of measurement points

2.2.1 Audit Programme

7 April 2010
09:00 Opening meeting in Transgex offic

9:30 Information about project – changes from PDD, status of implementation, environmental impact monitoring (EPA reports)
10:30 Site visit – Oradea (Lumír Němeček with supervision of Mario Vöröš)
Review of site
Data management
Measuring devices
Technology employed
10:30 Review of emission reduction calculation for Oradea (Zuzana Andrtová)
Review of records related metrology requirements for measurement devices
Review calculation of Monitoring report – raw data, data transportation
Training requirements
16:30 Close meeting of 1st day

8 April 2010
09:00 Opening meeting in Transgex office
9:30 Information about Beius – changes from PDD, status of implementation, environmental impact monitoring (EPA reports)
10:30 Site visit – Beius Plant (Lumír Němeček with supervision of Mario Vöröš)
Review of site
Measuring devices on individual measuring points
Technology employed
10:30 Review of emission reduction calculation for Beius (Zuzana Andrtová)
Review of records related metrology requirements for measurement devices
Review calculation of Monitoring report – raw data, data transportation
Training requirements
15:30 Preparation to Summing up
16:30 Close meeting – Summing up

2.3 Reporting of Findings

A corrective action request (CAR) is issued, where:

i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable JI requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

Six CARs, four CLs and one FAR were identified during the site visit. The issues related quality of monitoring reports, group of consumer included to the emission reduction calculation and the demonstration of calibration procedures. All issues were addressed in

second respective third versions of Monitoring reports as it is presented in Appendix A of this report.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the "Geothermal Energy in Oradea – area II and Beius in Romania" for the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009.

3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

The previous verification /8/ issued one FAR, where was not exact specify what kind of update is requested. Thus the FAR was transferred to CL for this verification requested better arrangement of monitoring records and monitoring report as well as update of information related to monitoring and calibration intervals in accordance with legal requirements. For detail see Appendix A.

3.2 Project Implementation

The project was determined prior to the establishment of Track I procedures in Romania /19/. Some technical presumptions from the determination was not realized. The proposed volume of production heat in Oradea Area II was not reached thus the proposed reduction was fulfilled from other Areas wells production in "pre" Kyoto period emission reduction calculation. These consumers were excluded from calculation of emission reduction for 2008 and 2009 period. See CAR 1 for details. After excluding these consumers, geothermal heat plant is included in Oradea Area II only for both periods.

On the other side the Beius area increased number of consumers from 2008 to 2009. As it is in accordance with scope of the project, it was accepted after verification of primary data /14/.

The information from CET I related to energy, heat and fuels /11/ was not available during site visit but it was received later and applied transparently to calculation.

Monitoring points are established in consumers places and the information about monitoring devices are included in excel table /9/ with collection of certificates for the same. Small deviations in excel table /9/, which were identified during the site visit, were corrected in the several following days. See Appendix A and follow chapter.

Data handling did not follow the best practice for these periods but resulted information included in monitoring reports was possible to verify. See Appendix A, where the open issues are summarized.

3.3 Completeness of Monitoring

Monitoring methodology description is not well arranged in the PDD /1/ and monitoring plan /2/ regarding to advancing JI procedures and requirements. Final version of monitoring reports /4//5//6//7/ reflect this development in JI procedures as well as requested improvement of Monitoring report and develop information about monitoring methodology and emission

reduction calculation on good standard as well as informs well arranged about individual parameters.

Maintenance and calibration of individual heat meters or flow meters mostly correspond with standards but there were a few small nonconformities (see Appendix A) found in this part on low level (the missing calibration records for two consumers resulted in excluding the same from calculation) compared with quantity of metering devices.

All parameters sourced from CET I /11/ was not available on the site but the evidence was provided later on. The list of these parameters is included in the monitoring reports /6//7/ now simultaneously with description of the calculation steps and based on this it will be collected better in the next verification.

Details for individual parameters are below in the following tables.

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Energy supplied from the geothermal heating plant
Measuring frequency:	continuously
Reporting frequency:	Read daily, reported monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Heat meter switching type Supercal 431 and changed in 2008 to Supercal 531
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No it is not stated in the PDD, but accuracy is in compliance with local legislation and calibration is provided by accredited laboratory /9/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	6 years
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Calibration interval is 6 years according to the PDD but 4 year interval is requested by national legislation. The project will carry out calibrations according to national regulation (4 year interval).
Company performing the calibration:	SC Fluid Group Hagen SRL Carei
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	Three certificates were provided and they cover both reporting period (21 April 2005, 5 December 2008 and 27 October 2009) /9/.
If applicable, has the reported data been cross-checked with other available data?	The primary data Parametri PTG /10/ was crosschecked with invoices.
How were the values in the monitoring report verified?	The data from monitoring report was crosschecked with Parametri PTG /10/
Does the data management (from	Yes, how was described above, the data was

monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	crosschecked with invoices.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Hot water supplied to consumers from Beius wells
Measuring frequency:	continuously
Reporting frequency:	Read and reported monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Flow meters types WEHRLE ETW, GROUP MTW, ZENNER MTW, AN SPX, SIMENS ULTRAHEAT, MEINECKE WPD, SENSUS WPD, HIDROMETER, MTW Contor group, SPX-AN, POLLU COM
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No, it is not stated in the PDD, but accuracy is in compliance with local legislation, calibration is provided by accredited laboratory /9/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	4 years
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Calibration interval is 6 years according to the PDD but 4 year interval is requested by national legislation. The project will carry out calibrations according to national regulation (4 year interval).
Company performing the calibration:	SC Fluid Group Hagen SRL Carei / BRML Laboratory Oradea
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	The certificates were checked with the calibration table provide by PP. All certificates was in compliance with requirements
If applicable, has the reported data been cross-checked with other available data?	The primary data from devices' tables were crosschecked with invoicing data.

How were the values in the monitoring report verified?	The primary data from devices' tables were crosschecked with invoicing data and data in monitoring report.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, how was described above, the data was crosschecked with invoices.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD):	Heat supplied to consumers in Beius
Measuring frequency:	continuously
Reporting frequency:	Read and reported monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Heat meter types WEHRLE MTW, SONTEX, ZENNER (calculator), POLLU COM, JUMO, SUPERCAL, AEM LUXTERM, PT 500
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No, it is not stated in the PDD, but accuracy is in compliance with local legislation, calibration is provided by accredited laboratory /9/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	4 years
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Calibration interval is 6 years according to the PDD but 4 year interval is requested by national legislation. The project will carry out calibrations according to national regulation (4 year interval).
Company performing the calibration:	SC Fluid Group Hagen SRL Carei
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	The certificates were checked with the calibration table provided by PP. All of them were in compliance with requirements.
If applicable, has the reported data been	The primary data Parametri PTG was

cross-checked with other available data?	crosschecked with invoices.
How were the values in the monitoring report verified?	The data from monitoring report was crosschecked with Parametri PTG
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, how it was described above, the data was crosschecked with invoices.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

3.4 Accuracy of Emission Reduction Calculations

First versions of the monitoring spreadsheets /6//7/ were provided without any information about sources for several parameters and contained consumers outside project borders. These problems were excluded in next versions as well as excluding consumers, for which were not possible to evidence their consumption (CAR1 and 2)

Updated versions /6//7/ are better arranged and clearly follow calculation methodology.

The emission factor for electricity production of 203.67 $kgCO_2/GJ$ is based on the ERUPT 2001 default 2005 Romanian value /20/ for both of periods.
The efficiency of 42.4% is assumed for the boilers for heat generation and 14.4% for the electricity production in 2008 period and the efficiency of 40.5% is assumed for the boilers for heat generation and 15% for the electricity production in 2009 period /11/.

The annual average electric efficiency of the CET is obtained annually as well as the annual average thermal plant efficiency. Data for the evaluation of the efficiency were presented during verification /11/.

The heat energy supplied by the geothermal heating plants has been measured by calibrated meters /9/. The calibration certificates were available and were checked. The status of the measuring equipment was also a topic of the audit carried out by the local EPA. The accuracy of the metering devices is in compliance with the local legislation. As the accuracy level is not stated directly in the PDD, it is sufficient for JI project purpose too.

Used conversion factors and definitions are summarized on top of this report in abbreviation section for better clarity.

3.5 Quality of Evidence to Determine Emission Reductions

The supplied heat energy /14/, input data necessary for the calculations of the emission reductions /13//10//12/, have been reviewed and approved by the plant manager of the site.

The calculation of the emission reductions and the collection of the monitoring data were inspected by the local EPA, too.

The external data for the electricity produced by the other power plants have been provided by the operator of CET I /11/.

The presented data has been evidenced by primary records of monthly reading for individual heat of flow meters /14/, temperature difference for individual wells and primary records of heat plant /10/. The second versions of the Monitoring reports /4//5//6//7/ corresponded with the provided evidences as well as invoiced values /13/.

3.6 Management System and Quality Assurance

The monitoring and reporting of the heat energy is a part of the normal operation of the Transgex personnel. The expected quality of data is assured by the appropriate and regularly checked meters.

Transgex has implemented and operated the quality management system in accordance with the requirements of the ISO 9001:2000 standard. The monitoring activity as well as the control of the PDD is a subject of the internal audits. The controlling role of the local EPA is also of importance.

4 VERIFICATION STATEMENT

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions that have been reported for the "Geothermal Energy in Oradea – area II and Beius in Romania" (ITL Project ID RO1000081) for the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project. DNV does not express any opinion on the selected baseline scenario or on the validated and registered PDD.

DNV conducted the verification on the basis of the monitoring plan contained in the registered Project Design Document of July 2004, version 2.3 and the monitoring report (Version 02) dated 12 November and 15 November 2010. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions of the "Geothermal Energy in Oradea – area II and Beius in Romania" (ITL project ID RO1000081) for the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009 are fairly stated in the monitoring report (Version 02) dated 12 November and 15 November 2010.

The GHG emission reductions were calculated correctly on the basis of the monitoring plan contained in the registered PDD of July 2004, version 2.3.

Det Norske Veritas Certification AS is able to verify that the emission reductions from the "Geothermal Energy in Oradea – area II and Beius in Romania" during the period 1 January 2008 to 31 December 2008 and 1 January 2009 to 31 December 2009 amount to 27 503 tCO2 and 25 249 tonnes of CO_2 equivalent.

Prague and Oslo, 17 December 2010

Zuzana Andrtová

JI Verifier
DNV Prague, Czech Republic

Ole Andreas Flagstad

Approver,
Det Norske Veritas Certification AS

5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.

/1/ Grue & Hornstrup Consulting Engineers, *Project Design Document: Geothermal Energy in Oradea - Area II and Beius*, Version 2.3, July 2004 (PDD) http://ji.unfccc.int/UserManagement/FileStorage/TVF81O2X3S0IJP7DYZ5CMR4NBU6HLQ

/2/ Grue & Hornstrup Consulting Engineers, *Monitoring Plan: Geothermal Energy in Oradea - Area II and Beius*, Version 2.3, July 2004 (MP) http://ji.unfccc.int/UserManagement/FileStorage/TVF81O2X3S0IJP7DYZ5CMR4NBU6HLQ

/3/ SGS Climate Change Programme, *Validation of Geothermal Energy in Oradea-Area II and Beius, Romania. Unqualified Validation Report*, Project Number: 6853-dk, 24 December 2004 (Determination Report)

/4/ JI Monitoring report Geothermal energy in Oradea – Area II and Beius, Monitoring period 01/01/08 – 31/12/08 version 2 dated 12 November 2010

/5/ JI Monitoring report Geothermal energy in Oradea – Area II and Beius, Monitoring period 01/01/09 – 31/12/09 version 3 dated 15 November 2010 (previous version 2 dated 12 November 2010)

/6/ Monitoring Report Oradea Final 2008 Final.xlsx dated 12 November 2010 (previous version Monitoring report Oradea 2008 v1.xls dated 24 March 2010)

/7/ Monitoring Report Oradea Final 2009 Final.xlsx dated 12 November 2010 (previous version Monitoring Report 2009_oradea V2.xls dated 24 March 2010)

/8/ Det Norske Veritas Certification AS (DNV), *Periodic Verification of Geothermal Energy Project in Oradea Area II and Beius in Romania*, Report No. 2009-9123, 15 July 2009 (previous verification report)

/9/ Calibration Table_Oradea.xls and Calibration Table_Beius.xls and certificates for geothermal heat plan dated 21 April 2005, 5 December 2008 and 27 October 2009 (repairing)

/10/ Parametri PTG for periods 19 December 2006 till 7 December 2008 and 8 December 2008 till present – primary records of geothermal heating plant

/11/ S.C. Electrocentrale Oradea S.A: Fax Nr. 0259/431965 – requested data about electrical and thermal energy production at CET Oradea in years 2008 and 2009 dated 2 February 2009 and 26 January 2010

/12/ Invoices for natural gas for 2008 (0006454, 0007504 and 001674) and 2009 (0018275, 0019285 and DGVPJ 1642)

/13/ Reports from invoicing system covered 2008 and 2009 years

/14/ Primary records of individual heat and flow meters covered 2008 and 2009 years

/15/ EPA: Records from semi-annually checking dated 31 June 2008, 31 December 2008, 31 June 2009 and 31 December 2009

/16/ Training records of Transgex

Background documents related to the design and/or methodologies employed in the design or other reference documents.

/17/ JI Supervisory Committee, Determination and verification manual, version 01 adopted at JISC 19

/18/ JI Supervisory Committee, Guidance on criteria for baseline setting and monitoring, version 02 adopted at JISC18

/19/ Ministry of Environment and Water Management (MEWM), *National procedure for using Joint Implementation (JI) mechanism under Track I (National JI Track I Procedure)* (Romanian JI Track I Procedure)
http://ji.unfccc.int/UserManagement/FileStorage/AWBVICCKC5KW215L28BETVJZ1YHUN6

/20/ Ministry of Economic Affairs of the Netherlands, *Operational Guidelines for Project Design Documents of Joint Implementation Projects. Volume 2a: Baseline Studies, Monitoring and Reporting - A guide for project developers*, Version 2, October 2001 (ERUPT 2001)

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APPENDIX A

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	The measured points included to input values in Oradea have to be from Area II only. The evidence has to be provided for all sites. Which points are summarized in one column has to be clearly defined.	Consumers in Oradea located outside Area 2 have been excluded. The Monitoring Reports (Report and Excel calculation spreadsheet) for the years 2008 and 2009 have been revised in accordance. In relation to the Monitoring Report Excel Calculation Spreadsheet it should be mentioned that the spreadsheet was slightly modified. Initially the Monitoring was based on the heat invoices. However during the last verification site visit carried out by DNV in April 2010 it became obvious that between invoices and actual meter reading there were slight differences due to individual heat supply agreements with consumers. Accordingly it was decided to shift the approach and base the monitoring on actual meter reading rather than the invoicing. Log sheets for heat and flow meter readings for the respective consumers for the years 2008 and 2009 have been provided.	The evidences as well as update of monitoring reports were provided to DNV. Final versions of monitoring reports contain only consumers from Area II, which corresponds with Monitoring plan and the source for thermal water is clearly marked for demonstration of border fulfilment in monitoring reports . DNV found this approach as acceptable. The CAR is closed
CAR 2	Errors has to be corrected (SC PERIND SA, SC METALICA for 2009) in Monitoring report.	These consumers were finally excluded from calculation and their consumption was not taken into account.	As the consumers were excluded, the CAR is closed.

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 3	MR has to be improved: the notes in part of changes have to be included and translated to English; calculation has to be clear – not only numbers, etc. The text part was not provided yet (the template for this part is included in the PDD - paragraph 3.2.6 of the MP has to be provided)	The respective Monitoring Reports for 2008 and 2009 have been revised in accordance with the template provided in the latest PDD	Monitoring reports were improved in the terms of PDD requests and the excel files for calculation of emission reduction were improved for better clarity of calculation. The CAR is closed.
CAR 4	The recording for annex V in 2009 has to be changed according to real invoices months.	The respective Monitoring Excels calculation spreadsheet for 2009 has been corrected in accordance.	The final version is in accordance with real invoicing. The CAR is closed.
CAR 5	It was found some missing calibration records (as for 11419242/BISERICA ORTODOXA BEIUS, 6274617/PAROHIA ROMANO CATOLICA, 11419242/BISERICA ORTODOXA BEIUS).	As per information obtained from the owners, the calibration certificates for the following meters have been lost and thus are not available for the years 2008 and 2009: 11419242/BISERICA ORTODOXA BEIUS 6274617/PAROHIA ROMANO CATOLICA 11419242/BISERICA ORTODOXA BEIUS Calibration certificates from the year 2010 will be provided shortly: Calibration BISERICA ORTODOXA Calibration PAROHIA ROMANO CATOLICA Calibration BISERICA ORTODOXA BEIUS	Consumers were excluded from monitoring reports in cases were the project owner could not demonstrate proper calibration and the records related to consumption were not consistent with presented numbers in monitoring reports and records presented on site. The CAR is closed

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL4	As the FAR1 from previous verification report did not exact assess, the inconsistencies in the PDD has to be updated in next period as minimum - monitoring intervals, monitored parameters, rules for archiving of data, rules for including or excluding new points in Beius.	The Monitoring Reports for the years 2008 and 2009 have been improved accordingly. A table was included with monitoring parameters, intervals, source of data etc. In relation to rules for including/excluding consumers in Beius please refer to CL 1.	As the monitoring reports were improved to good level with proper recording and sorting of all parameters, the CL is closed.

Forward action requests from previous verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
FAR 1			

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
FAR 1	The calculation was found as not possible to clearly review in the first version of monitoring report. The recording has to be improved for the next monitoring period for clear evidencing of production as it was provided in corrected reports for this year.		

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CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 6	The Ramolisa meter is not correspond with records – according to calibration certificate it is OK, it means that the table for monitoring devices has to be updated.	The calibration table for monitoring devices has been updated in accordance. In this context please review the following documents: - Calibration Table (Ramolisa marked in yellow) - Calibration certificate for Ramolisa meter	The provided updated calibration table /9/ contains correct information from calibration record. The CAR is closed

Clarification requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	The rules for including or excluding consumers from MR in case Beius area has to be clarified	In Beius the project encompasses the two wells 3001 and 3003 along with associated consumers as well as new consumers to be connected. This is in line with the requirements as per PDD; which is based on the capacity of these two wells.	The explanation is sufficient. The CL is closed.
CL 2	Confirmation from CET I about efficiency of electricity is needed	Respective confirmation from CET I for the efficiency of the electricity production for the year 2008 and 2009 have been provided.	Provided evidence /11/ demonstrates efficiency of CET I for requested years. The CL is closed
CL3	The calculation for individual consumers is not possible to clearly review. The recording has to be improved for clear evidencing of production.	The Monitoring Reports for the years 2008 and 2009 have been improved accordingly. In this context please also see Corrective Action Request 1.	The reporting was improved and DNV found the way as sufficient The CL is closed.