VERIFICATION REPORT

GEOTHERMAL ENERGY IN ORADEA – AREA II AND BEIUS IN ROMANIA

(ITL Project ID: RO1000081)

Monitoring Period:
1 January 2010 to 31 December 2010

REPORT NO. 2011-0416

REVISION NO. 01

DET NORSKE VERITAS

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VERIFICATION REPORT

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Recommended for approval Ole A. Flagstad	Approved by Ole A. Flagstad	Organisational unit: Climate Change and Evnironmental Services
Client: Danish Energy Agency	Client ref.: Mihai Brasoveanu	

DNV CLIMATE CHANGE SERVICES AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: 994 774 352 MVA

Summary:

DNV Climate Change Services 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 2010 to 31 December 2010.

In our opinion, the GHG emission reductions reported for the project in the monitoring report (Version 02) of 10 April 2011 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.

DNV Climate Change 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 2010 to 31 December 2010 amount to **31 232** tonnes of CO_2 equivalent.

Report No.: 2011-0416	Subject Group: Environment	
Report title: Geothermal Energy in Oradea – area II and Beius in Romania		
Work carried out by: Zuzana Andrtová		
Work verified by: Ole Andreas Flagstad, Agnes Dudek		
Date of this revision: 27 May 2011	Rev. No.: 01	Number of pages: 15

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development 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
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
RMEF	Romanian Ministry of Environment and Forests
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 has commissioned DNV Climate Change Services 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 2010 to 31 December 2010. 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 monitoring 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 2010 to 31 December 2010.

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 (Host) 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 2010 to 31 December 2010

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 connected to wells 3001 and 3003 in Beius and previously was connected 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 /4//5/;

ii) review of the primary record from individual measurement devices /11/;

iii) review of invoices for fuels to peak load boilers /10/;

iv) review of data from CET I /9/;

v) review of primary data from geothermal heating plant /8/

vi) records on validation and/or calibration of the used measuring equipment /7/

Verification team

				Type of involvement					
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA1.2 competence
Team leader (Verifier)	Andrtová	Zuzana	Czech Republic	✓	✓	✓	✓		✓
Technical reviewer	Flagstad	Ole	Norway					✓	
TA input to TR	Dudek	Agnes	Norway						✓

Duration of verification

Preparations: *9 March 2011*

On-site verification: *From 15 March 2011 to 16 March 2011*

Reporting, calculation checks and QA/QC: *From 24 March 2011 to 27 May 2011*

2.1 Review of Documentation

All important documents related to projects were reviewed during desk review. This documentation covers PDD /1/ and monitoring plan /2/, both oh them version 2.3 from July 2004, Monitoring report for period 1 January 2010 – 31 December 2010 version 1 /4/ and its excel attachment /5/ dated 4 February 2011 as well as Unqualified validation report for the project produced by SGS /3/ and previous verification report of DNV covers verification period of years 2008 and 2009 /6/. The Unqualified validation report /3/ was used for determination purpose because 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.

The local records as calibration protocols for measurement devices /7/, records from monitoring sites /8//11/, local EPA records /12/, CET data /9/, invoices for natural gas /10/, Project procedures /15/, QA/QA records /13/ and training records /14/ were provided to demonstrate project implementation on site.

The requested update of monitoring report, which arises from small incorrectness and inconsistencies, were realized in second version of Monitoring report /4/ dated 10 April 2011.

2.2 Site Visits

The Oradea's office of Transgex and individual measured points as well as geothermal heat plant were visited on 15 and 16 March 2011 by Zuzana Andrtová of DNV.
During this site visit, representative of DNV interviewed key personnel of the plant and responsible persons from Transgex's and consultant agency and verified that the project was realized according to PDD /1/ and Monitoring plan /2/ except deviation described in the monitoring report, which were verified during the previous verification. These deviations do not have influence to accuracy of the monitored parameters and they don't change the baseline interpretation. The records related to measurement devices /7/ 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 /8/ and with primary records of individual follow or heat meters /11/. The other supporting documents /9//10//12//13//14//15/ presented by Transgex confirmed correctness of rest input parameters in the excel attachment /5/ and QA/QC process of this project.

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, Project coordination
Alin Iacobescu	Director General of Transgex	Introduction with the project
Alexandru Cristian Dragan	Coordinator of DEA Romania projects for monitoring	Monitoring report preparation, QA/QC of the project
Thomasss Bosse Borges	Grue + Hornstrup A/S, consultant	Monitoring report preparation, QA/QC of the project
Stefan Olah	Senior Geologist of Transgex	Project manager, project's condition and location of the wells
Mutiu Ionel	Metrologist of Transgex	Calibration of the measurement devices, presentation of measurement points
Petrut Florin	Engineer – economist of Transgex	Primary records presentation
Prodesev Nicolas	Chief of objects of Transgex	Primary records presentation, measurement points
Heresea Ionut	Economist of Transgex	Primary records presentation

2.2.1 Audit Programme

15 March 2011

09:00 Opening meeting

9:30 Information about project (JI project manager)
- changes from PDD

- status of implementation
- environmental impact monitoring (EPA reports)

10:30 Site visit – Oradea and Beius (Oradea and Beius managers, plant operators)
- Review of site – Geothermal heating plant and sample of measurement points (Measuring devices)
- Data management in Beius and in the heating plant, responsibilities
- Technology employed
- Calibration and maintenance, review of records related metrology requirements for measurement devices

17:30 Close meeting of 1st day

16 March 2011

09:00 Review of emission reduction calculation (JI project manager, persons responsible for data)
- Review calculation of Monitoring report – raw data, data handling
- Data related to wells
- External data (CET, fuels information)
- Break downs, changes and other problem related to heat production

13:30 QA/QC of the project (JI project manager)
- Assessment of Management system and Quality assurance, authority and responsibility, internal audit
- Procedures for the calculation of emission reductions and the preparation of monitoring report
- Storage of data
- Routines for handling, archiving and securing of all required data
- Procedures for training of monitoring personnel
- Procedures to handle unexpected problems and access to data

15:00 Open issues (JI project manager, responsible persons)

15:30 Preparation to Summing up

17:00 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 monitoring period.

Two CARs and three CLs have been identified during this verification. CARs asked about update of Monitoring report and updating details to procedure related to measurement of well temperature. The CLs were requests related to details updates to individual internal procedures of the project. All issues were solved in the updated documents provided DNV for review.

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 2010 to 31 December 2010.

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

One FAR remains from previous verification. The FAR was related to improvement of Monitoring report in terms of clarity information. The Provided Monitoring report /4//5/ for this period as well as presented internal procedures related to JI project /15/ demonstrate big and sufficient improvement from first version of Monitoring report presented last year. Thus the FAR was closed.

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 were not realized (increasing efficiency of CET I due to modernization, connection of local consumers to well 4767 etc.). Project is in compliance with description in the PDD /1/ except the connection of local consumers to well 4767.

The connection of consumers in area Beius, available through connection to two wells (3001 or 3003), is increasing and it is variable as it depends on contracts with consumers. The situation is fully in accordance with the PDD /1/.

The demonstration of no modernization of CET I is presented as well as real data from the monitoring period (related to energy, heat and fuels) by S.C. Electrocentrale Oradea S.A. during the site visit /9/. The data are correctly applied in the calculation of emission reduction /5/ for the same period.

Monitoring points are established in consumers places (Beius) and in geothermal heating plant /7/ with collection of certificates for the same. The validity of all was confirmed during the site visit and corresponds with the PDD /1/. The calibration of the metering devices is realized in 4 years intervals, which is shorter period than is supposed in the PDD /1/ but the period is requested by local legislation. The calibration period is shorter than in the PDD /1/ thus fulfils sufficiently PDD's requirements.

Data handling was focus of improvement in time from previous verification and current situation is on standard level, which provides good results in traceability, monitoring and archiving of all data from primary sources to emission reduction calculation and presentation.

All wells were in operation during the monitored period and the operational time is correctly reflected in second version of excel attachment /5/ of Monitoring report (see CAR1).

DNV can confirm that that the physical location, emission sources, baseline scenario of the project has not changed and the changes are consistent with the JI specific approach and CDM methodology upon which the determination was prepared for the project. From the technical point of view these changes do not create any specific problems and are acceptable. Hence

DNV confirms that the conditions defined by the paragraph 33 of the JI guidelines (Data used share reliable and provide a transparent picture of the emission reductions or enhancements of net removals monitored.) are still met for the project and the original determination opinion does not change.

3.3 Completeness of Monitoring

Monitoring methodology description is not well arranged in the PDD /1/ and monitoring plan /2/ regarding JI procedures and requirements at the time of issuance. Current Monitoring report /4//5/, reflect this development in JI procedures as well as requested improvement of Monitoring report. The report develops information about monitoring methodology and emission reduction calculation on good standard as well as information about individual parameters. Only small changes were requested as findings from site visit (see CAR1) and based on this it was improved in second version of the Monitoring report /4//5/.

Maintenance and calibration of individual heat meters or flow meters correspond with standards and provided certificates /7/ cover all monitoring period. The management of metrology is on very good level, especially in the light of situation, when all metering devices are owned by customers.

The details about metering devices are presented in tables below.

All parameters related CET I /9/ was provided by S.C. Electrocentrale Oradea S.A. as official letter. The list of these parameters is included in the monitoring report /4/ and correctly applied in calculation of emission reduction /5/. The description of individual steps of calculation is described in the Monitoring report as reaction to FAR1 from previous verification. This description complements the lack of information in the PDD /1/ and the Monitoring plan /2/.

	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 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 /7/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	4 years (6 years according to PDD)
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	Calibration interval is 6 years according to the PDD but 4 year interval is requested by national legislation. The project has been carried out calibrations according to national regulation (4

represent good monitoring practise?	year interval), which is shorter period.
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?	Two certificates were provided and they cover whole reporting period (27 October 2009 and 15 March 2010) /7/.
If applicable, has the reported data been cross-checked with other available data?	The primary data Parametri PTG /8/ was crosschecked with invoices.
How were the values in the monitoring report verified?	The data from monitoring report was crosschecked with Parametri PTG /8/
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):	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 /7/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	4 years (6 years according to PDD)
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD	Calibration interval is 6 years according to the PDD but 4 year interval is requested by national

does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	legislation. The project has been carried out calibrations according to national regulation (4 year interval), which is shorter period.
Company performing the calibration:	SC Fluid Group Hagen SRL Carei / BRML Laboratory Oradea and Control group
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 /7/. 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 data from monitoring report was crosschecked with primary data /11/.
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 /7/. Thus the accuracy represents good monitoring practice.
Calibration frequency /interval:	4 years (6 years according to PDD)

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 has been carried y out calibrations according to national regulation (4 year interval), which is shorter period.
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 /7/. All of them were 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 data from monitoring report was crosschecked with primary data.
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

The emission reduction calculation description is well arranged in the Monitoring report /4//5/.

The emission factor for electricity production of 203.67 $kgCO_2/GJ$ is based on the ERUPT 2001 default 2005 Romanian value /20/ for this periods.
The efficiency of 37% is assumed for the boilers for heat generation and 14% for the electricity production in 2010 period /9/.

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 site visit /9/.

The heat energy supplied by the geothermal heating plants has been measured by calibrated meters /7/ as well as heat energy/hot water supplied to individual consumers in Beius /7/. 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.

The emission reduction for monitoring period is 31 232 tonnes of CO_2 equivalent. The PDD supposed 23 853.55 tonnes of CO_2 equivalent, which is lower value than is real calculation. The higher number follows from unexpected better efficiency of CET I /9/ than estimated in the baseline study and the calculation there on project emissions reduction (i.e. baseline was supposed lower than is in reality).

3.5 Quality of Evidence to Determine Emission Reductions

All parameters records as the supplied heat energy /8//11/, input data necessary for the calculations of the emission reductions /9//10/, have been reviewed and approved by the plant manager of the site /13/. The calculation of the emission reductions and the collection of the monitoring data were inspected by the local EPA /12/ too.

The external data for the electricity produced by the other power plants have been provided by the operator of CET I /9/.

The presented data has been evidenced by primary records of monthly reading for individual heat of flow meters /11/, temperature difference for individual wells /16/ and primary records of heat plant /8/.

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 /13/. The controlling role of the local EPA /12/ is also of importance.

The big improvement from previous period was observed and this improvement satisfies all requirements of JI track 1 procedures /19/ as well as Determination and verification manual /17/.

4 VERIFICATION STATEMENT

DNV Climate Change Services 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 Number No. RO1000081) for the period 1 January 2010 to 31 December 2010.

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 10 April 2011. 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 2010 to 31 December 2010 are fairly stated in the monitoring report (Version 02) dated 10 April 2011.

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.

DNV Climate Change 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 2010 to 31 December 2010 amount to 31 232 tonnes of CO_2 equivalent.

Prague and Oslo, 27 May 2011

Zuzana Andrtová

JI Verifier
DNV Prague, Czech Republic

Ole A. Flagstad

JI Service Responsible,
DNV Climate Change 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 1 January 2010 – 31 December 2010 version 1 dated 4 February 2011 and version 2 dated 10 April 2010

/5/ 110203 Monitoring Report Oradea Final 2010.xlsx dated 4 February 2011 and version dated 10 April 2010

/6/ Det Norske Veritas Certification AS (DNV), *Periodic Verification of Geothermal Energy Project in Oradea Area II and Beius in Romania*, Report No.2010-0663, 17 December 2010 (previous verification report)

/7/ Calibration Table: Contoare cu filtru JI - Beius 2010.xls and Contoare cu filtru JI - Geoterm 2010.xls and certificates individual flow and heat meters (details for individual certificates are presented as a tables)

/8/ Parametri PTG for periods 8 December 2008 till present – primary records of geothermal heating plant

/9/ S.C. Electrocentrale Oradea S.A: Fax with requested data about electrical and thermal energy production at CET Oradea in year 2010 dated 1 February 2011

/10/ Invoices for natural gas for 2010 (DGVPJ 2161, DGVPJ 2557, DGVPJ 5988) from 31 January 2010, 28 February 2010 and 31 December 2010

/11/ Primary records of individual heat and flow meters covered 2010 year

/12/ EPA: Records from semi-annually checking dated 28 June 2010 and 5 January 2011

/13/ QA/QC checklists from monthly review dated 28 January 2010, 25 February 2010, 30 March 2010, 29 April 2010, 27 May 2010, 30 June 2010, 31 July 2010, 30 August 2010, 29 September 2010, 29 October 2010, 30 November 2010 and 28 December 2010

/14/ Training records of Transgex dated 12 March 2010 and 2 March 2011

/15/ Assembly of procedures, version 2 dated 2 February 2011

/16/ Primary records for well temperature for well 3001 and for well 3003 covered 2010 period

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/ Romanian Ministry of Environment and Forests (RMEF), *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 Monitoring report should be updated about follow information: • The names of the consumer should correspond with excel sheet (but it is not necessary to mention them twice) • Changes in monitoring procedures should cover efficiency of CET as well as changes in the monitoring frequency • The data in excel sheet should be change in accordance with reality for temperatures in wells 3003/3001 in October and November	The Monitoring Report has been updated as follows: - Names of the consumers have been adjusted within the Monitoring Report so they correspond with the Monitoring Report Excel Calculation Spreadsheet - The calculation of the efficiency of the CET as well as monitoring frequency thereof have been included under Changes within the Monitoring Report - The Monitoring Report Excel Calculation Spreadsheet has been and respective calculations have been revised in accordance. In this context it should be mentioned that additional spreadsheet for the recording of the daily well temperature has been included into the Monitoring Report Excel Calculation Spreadsheet. In this context please also note that the respective form for well temperature recordings F03_Well-temperature has been set up for daily temperature recordings	The revised monitoring report was accepted and changes in calculation result were confirmed by evidences found during the site visit. The CAR is closed
CAR 2	The daily temperature setting, information about metering device and procedure for break down of the thermometer should be included in the Procedure P05_Well Temperature.	Respective revisions have been made to Procedure P05_Well Temperature	The procedure was updated and first daily temperature was set as relevant. The average from previous days is chosen for emergency situation. 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 archiving period and the servicing work for electronic data (i.e. keeping of their readability) is not clarified in the Procedure P01_Records and Documents Keeping.	The archiving period has been indicated in the Procedure P01_Records and Documents Keeping	The archiving period is chosen throughout the crediting period in the updated version of the procedure, which is sufficient. The CL is closed
CL 2	Procedure P06_QA check list _Annual covers step 4, which requested monthly checklist however it is about annual check list.	Procedure P06_QA Check List_Annual has been adjusted in accordance	The procedure is has been updated correctly. The CL is closed.
CL 3	It is not described in the procedures, what happen if the meter is break down. However it is determined – the consumed flow or heat is not calculated as the most conservative approach.	An additional Procedure has been developed (P07_Breakdown) indicating, that in case of meter breakdown (heat meter, flow meter, temperature sensor etc.) respective data shall be neglected in the emission reduction calculations	The described process was included to the added procedure. 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	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.	The recording was improved and clearly responsibility was addressed to all employees involved in the monitoring process.	This verification confirmed improvement of primary recording as well as improvement in Monitoring report. The FAR is closed

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	NA		

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