INITIAL VERIFICATION REPORT

INITIAL VERIFICATION OF GEOTHERMAL ENERGY PROJECT IN COUNTRY

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DET NORSKE VERITAS

INITIAL VERIFICATION REPORT

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Summary:

S. C. TRANSGEX S. A. commissioned DET NORSKE VERITAS Certification (DNV) to perform an initial verification of the GEOTHERMAL ENERGY Joint Implementation Project in two towns of Romania, in Oradea and Beius. This report summarises the findings of this initial verification.

The initial verification was carried out in accordance with the IETA/PCF Validation and Verification Manual (VVM) prepared for the initial verification and by reviewing the project's baseline study and monitoring plan and the project validation report. During the verification visit district heating systems of Oradea and Beius were visited. On-site inspections and interviews with the staff were carried out during these visits .

In summary, it is DNV's opinion that the project is implemented in accordance with the project design documents and the monitoring system is in place and functional.

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Abbreviations

ARCE	Romanian Agency for Energy Consumption
BS	Baseline Study
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH_4	Methane
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DEPA	Danish Environmental Protection Agency
DH	District Heating
DNV	Det Norske Veritas
DNA	Designated National Authority
EPA	Environmental Protection Agency
ERU	Emission Reduction Units(s)
FAR	Forward Action Request
GES	Gross Energy Supply (total energy demand of DH system including losses boiler system, distribution pipe network, under buildings and buildings)
GHG	Greenhouse gas(es)
GJ	Giga Joule (1GJ = 277,78 kWh)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt hour (1.0 kWh = 3 600 000 Joule)
L/s	Litre per second
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NED	Net Energy Demand (energy demand in building, excluding losses in basement)
NGO	Non-governmental Organisation
PDD	Project Design Document
RMWEP	Romanian Ministry of Water and Environmental Protection
QA	Quality Assurance
QC	Quality Control
UNFCCC	United Nations Framework Convention for Climate Change

1 INTRODUCTION

S. C. TRANSGEX S. A. commissioned DET NORSKE VERITAS Certification (DNV) to perform an initial verification for GEOTHERMAL ENERGY project, which includes the conversion of the district heating systems by substitution of fossil fuels (lignite, natural gas and oil) with geothermal energy resources in two towns of Romania (Oradea, Beius). This report summarises the findings of the initial verification.

During the initial verification DNV Certification has assessed the readiness of the project in order to provide the assurance for TRANSGEX and DEPA that the project generates verifiable emission reduction. The initial verification visit was performed on 8-9 February of 2006 in Romania.

1.1 Objective

The objective of the initial verification of GEOTHERMAL ENERGY project in Romania was to verify that the project was implemented in accordance with the project design document (PDD), that the monitoring system is in place and fully functional as well as to assure that the project generates emission reduction as predicted in the project design document.

1.2 Scope

The initial verification has addressed the following aspects:

- Follow up of the observations of the Validation protocol checklist 24-12-2004Validation protocol checklist 24-12-2004[1] provided by TRANSGEX on 23rd March 2006.
- Project implementation and status
- Implementation of the monitoring plan
- Internal data resources
- External data resources
- Environmental and social indicators
- Management and operational system

The initial verification process was carried out in accordance with the IETA/PCF Validation and Verification Manual (VVM).

During the initial verification DNV assumed that the proposed BAU baseline and the calculation methods for determining CO_2 emission reductions had previously been validated by an independent entity and were accepted by both Denmark and Romania as the sponsor and host country. Hence, the appropriateness of the proposed BAU baseline was not assessed.

1.3 GHG Project Description

The GEOTHERMAL ENERGY project is proposed as a Joint Implementation project between Romania and the Danish Environmental Protection Agency and includes the upgrade and development of the heat district system of two towns (Oradea and Beius) in Romania. The project aims to substitute previously used fossil fuels (lignite, natural gas and oil) with geothermal energy resources. The key components of the present project are listed below not in absolute order of priority:

- Use of renewable energy resources
- Production of carbon dioxide neutral energy
- Improvement of the social standard in Romania

The project generates carbon dioxide emission reductions originating from substituting fossil fuels with geothermal energy resources. The crediting period is from 2005 to 2012, which was established according to agreement between the Romanian Ministry of Water and Environmental Protection and Danish Environmental Protection Agency.

2 METHODOLOGY

The initial verification was carried out in accordance with the IETA/PCF Validation and Verification Manual (VVM) and a customised verification checklist was prepared for this activity.

DNV prepared for the initial verification by reviewing of the monitoring plan guideline and the draft of the validation report's checklist provided by TRANSGEX. Other documents such as the project design document and baseline study were also available for review during the visit. The project related documents were prepared by Grue & Hornstrup Consulting Engineers, Danmark.

During the site visit on 8-9 February of 2006 DNV personnel carried out on-site inspections and interviews with the staff of the plants in Oradea and Beius. The on-site inspections also included a review of the work instructions for the different monitoring and reporting tasks, performance records, observation of collection of measurements and checking of calibration of the measuring equipment.
A special focus was given on the proper implementation of the project as described by the project design document and the readiness of the system to deliver verifiable emission reductions.

In accordance with the Validation and Verification Manual, findings established during the initial verification can either be seen as a non-fulfilment of criteria that must ensure the proper implementation of the project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CAR) are issued, where:

i) there is a clear deviation concerning the implementation of the project as defined by the PDD;
ii) requirements set by the MP or qualifications in a validation opinion have not been met; or
iii) there is a risk that the project would not be able to deliver (high quality) CERs or ERUs.

Forward action requests (FAR) are issued, where:

iv) the actual status requires a special focus on this item for the next consecutive verification, or
v) an adjustment of the MP is recommended.

The verification team may also use the term Clarification Request, which would be where:

vi) additional information is needed to fully clarify an issue.

The initial verification of the GEOTHERMAL ENERGY project identified one Forward Action request (FAR).
The follow up of the corrective action and clarification requests is given in the initial verification checklist in Appendix A.

3 INITIAL VERIFICATION FINDINGS

This section summarises the findings the initial verification. The findings are also documented in the initial verification checklist is given in Appendix A.

3.1 Remaining issues, CARs, FARs from previous validation

There are 3 major, 6 minor corrective action requests and 5 observations identified during the determination/validation of the project. The follow up of these are given in the initial verification checklist in Appendix A.

3.1.1 Conclusion

Response to corrective action requests and observations identified during the determination/validation of the project has been evaluated as a desktop study based on the Validation Protocol Checklist 24-12-2004[1] provided by TRANSGEX.

3.2 Project Implementation

3.2.1 Discussion

Oradea

The new geothermal heating plant consuming the thermal water of the geothermal production well 4767 was in operation, with the new heat exchanger units, pump system with variable speed drive and two new peak gas boilers and measuring equipment installed. In consequence of the consumable water exploitation capacities only three substations (Nr.512, 513, 514) were connected to the new heating plant. The reconstruction of the well 1717 has not been carried out. The drilling of the new production well is planned to supply the further two substations (Nr. 510, 511) and together with this work the reconstruction of the well 1717 should be performed. The substations are equipped with new plate heat exchangers and main supply pump units.

Further consumers (Lotus shopping centre, Yellowstone shoe factory and furniture factory) were connected to the geothermal heating systems consuming the geothermal water of the well doublet 4081 and 4797. (The utilised geothermal water is re-injected by the doublet).

Beius

The new geothermal well 3003 was drilled and the primary pipe network was extended to connect this to the geothermal heating system. Some new consumers were connected directly to the new production well and further two new substations were connected to the geothermal heating system. The individual consumers and the new substations also have new plate heat exchanger units.

3.2.2 Conclusion

The project is implemented, can produce GHG emission reductions in accordance with the Kyoto Protocol.

3.3 Internal data

3.3.1 Discussion

Oradea

The project substitutes the heat energy previously supplied by CET I from cogeneration of electricity and heat energy by utilisation of the local geothermal energy resources. The operation of the CET I will be decreased as a consequence of the thermal energy utilisation. The electricity no longer produced by CET I is assumed to be compensated by other fossil fuels fired power plants supplying electricity to the grid. The total emission reduction of the project is calculated from the emission reduction achieved by the substitution of fossil fuels by geothermal energy utilisation and subtracting this from the emissions of the other electricity power plants operating in Romania. The amount of the heat energy supplied to the primary network represents the internal data for the calculation of the emission reduction realised by the project. The heat energy data are measured by S.C. TRANSGEX S.A. with monthly frequency.

There are new natural gas fired peak load boilers, but it is assumed that these will operate only for a few days per year. The amount of the natural gas fired and its calorific value will be monitored and recorded.

Beius

The project substitutes the heat energy supplied by the fossil fuel (mainly heavy oil) fired in the individual boilers by the local geothermal energy resources. The emission from combustion of heavy oil and natural gas can be estimated using the emission factors. The geothermal energy is CO_2 –neutral and the emission reductions from the existing individual fossil fired boilers are equal to the amount of heat generated by the project multiplied with the named emission factors. The heat energy data also are measured by S.C. TRANSGEX S.A. with a monthly frequency.

The heat energy data are measured by S.C. TRANSGEX S.A. with monthly frequency by reading the ultrasonic heat flow meters at the substations and the volume flow rate meters and integrators for the consumers connected.

3.3.2 Conclusion

The internal data collection underlies sufficient routines.

3.4 External data

3.4.1 Discussion

External data are used for the calculation of the emission reduction generated by the projects for Oradea. To estimate the GHG emission data will be collected for the specific type of fossil fuel, the calorific value of the lignite, heavy oil and natural gas, the net energy of the fuel entering CET I and net energy supplied by CET I in terms of heat and electricity to calculate the emission reduction substituting fossil fuels in CET I as well as the electricity production of other power plants supplying the electricity to the grid to calculate the emission of the combusted fossil fuels to compensate the decreased operation of CET I.

The specific type of fossil fuel, the calorific value of the heavy oil and natural gas will be monitored in Beius.

S.C. TRANSGEX S.A. will collects the necessary data directly from the CET I and from the National Institute of Statistics.

3.4.2 Conclusion

The certainty and availability of the required data is ensured.

3.5 Environmental and Social Indicators

3.5.1 Discussion

The geothermal projects in Oradea – Area II and Beius will generate environmental benefits within the area of reducing the emission SO_2, NO_x, and particles from the existing fossil fired boilers.

Utilisation of the local energy resource generates lower energy process for heat consumers and generate better indoor comfort.

The project creates new jobs in the construction and industrial sectors.

Utilisation of the local energy resource means less import of foreign fossil fuels.

3.5.2 Findings

This task is allocated for the local EPAs, so the performance of this can not be verified.

3.5.3 Conclusion

The geothermal energy project in Oradea and in Beius will generate environmental and social benefits, but the monitoring of these impacts should be defined.

3.6 Management and Operational System

3.6.1 Discussion

The employees of S.C. TRANSGEX S.A. have special knowledge and great experience in the establishment/operation of geothermal wells and utilisation of the geothermal energy resources. The importance of the utilisation of this resource in relation of the GHG emission reduction is absolute clear.

The description of the project and the monitoring system is given in the PDD and its attachment, the MP. These documents are available at the responsible S.C. TRANSGEX S.A.

The availability of the necessary data for the calculation of the GHG emission reduction is ensured. The data collected are stored electronically and in printed form.

The introduction of quality management system in accordance with the ISO 9001 or similar standards was not planned for the project operators. The QA system should be based on the inspection of the monitoring procedure by an independent third party having the necessary knowledge and professional experience in the area. It is recommended that the local EPAs should be responsible for this third party activity.

3.6.2 Findings

The inspection has not been carried out by the local EPA until the time of the verification audit.

3.6.3 Conclusion

This task is allocated for the local EPAs, but the performance of this can not be verified.

4 INITIAL VERIFICATION STATEMENT

DET NORSKE VERITAS Certification Ltd. has performed an initial verification of the Geothermal Energy in Oradea – Area II and Beius project in Romania. The initial verification was carried out in accordance with the IETA/PCF Validation and Verification Manual (VVM). DET NORSKE VERITAS prepared for the initial verification by reviewing the project design document, the monitoring plan as well as the draft determination report provided by TRANSGEX. Eventually DET NORSKE VERITAS in the period 8-9 February of 2006 visited both project sites, Oradea and Beius. On-site inspections and interviews with the staff of the geothermal heating plants were carried out at these site visits.

The initial verification revealed that the project is implemented as planned. The geothermal heating systems have been constructed.

The monitoring systems on sites were also operated in compliance with the relevant monitoring plan. The data collection measures are in its place, and the measuring equipments are calibrated by accredited organisation.

The initial verification identified one Forward Action Request:

- There are some tasks defined in the project documents that are allocated for the local EPAs, but the achievement of these can not be verified.

The above request should be addressed to ensure the subsequent verification of achieved emission reductions. This should be submitted as indispensable information to the verifier before the next consecutive verification, and must be completed as soon as possible in order to ensure accurate reporting of ERUs generated by the project.

In summary, it is DET NORSKE VERITAS's opinion that the project is implemented as planned, that it's monitoring system is in place and fully functional and that the project will generate verifiable emission reduction.

The initial verification is based on the information made available the engagement conditions detailed in this report. Hence, DET NORSKE VERITAS can not be held liable by any party for decisions made or not made based on this report which is related to falsified or incorrectly presented information.

5 REFERENCES

Category 1 Documents:

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 initial verification conclusions, and are usually further checked through interviews with key personnel.

/1/ Project Design Document – Geothermal Energy in Oradea Area II and Beius (October 2003 – Version 2.2.)

/2/ Monitoring Plan – Geothermal Energy in Oradea Area II and Beius (October 2003 – Version 2.2.)

/3/ Validation protocol checklist 24-12-2004[1]

Category 2 Documents:

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

/4/ International Emission Trading Association (IETA) World Bank's Prototype Carbon Found (PCF): Validation and Verification Manual (http:/www.ieta.org/VVM/VVM.htm)

Persons interviewed:

Persons interviewed during the initial verification, or persons contributed with other information that are not included in the documents listed above.

/5/ Mr Alin Iacobescu – General Director of TRANSGEX

/6/ Mr Miron Sferle – Marketing Manager of TRANSGEX

/7/ Mr István Oláh – Geologist of TRANSGEX

/8/ Mr Ionel Mutin – Technological Manager of TRANSGEX

/9/ Mr Emil Oaie – Local Manager of TRANSGEX in Beius

/10/ Mr Nico Silviu Odobasianu – Mayor of Beius