VERIFICATION REPORT

OJSC

"OBLTEPLOCOMUNENERGO"

VERIFICATION OF THE DISTRICT HEATING SYSTEM REHABILITATION OF CHERNIHIV REGION

PERIODIC 2008

REPORT NO. UKRAINE/VER#0044/2009

REVISION NO. 01

BUREAU VERITAS CERTIFICATION

VERIFICATION REPORT

Date of first issue:	Organizational unit:
20/07/2009	Bureau Veritas Certification Holding SAS
Client:	**Client ref.:**
OJSC Oblteplocomunenergo	Mr. Yuriy Barbarov

Summary:

Bureau Veritas Certification has made the verification of the "District Heating System Rehabilitation of Chernihiv Region" project of OJSC "Oblteplocomunenergo" located in Chernihiv, Ukraine on the basis of UNFCCC criteria for the JI, as well as criteria given to provide for consistent project operations, monitoring and reporting, as well as the host country criteria.

The verification scope is defined as a periodic independent review and post determination by the Accrediting Entity of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: i) desk review of the Monitoring Report, Project Design Document and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.
The first output of the verification process is a list of Clarification Requests, Corrective Actions Requests, Forward Actions Requests (CL, CAR and FAR), presented in Appendix A.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions. The GHG emission reduction is calculated without material misstatements.

Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and monitoring, and its associated documents. Based on information seen and evaluated we confirm that the implementation of the project has resulted in 52874,4 t CO2e reductions during period from 01/01/2008 up to 31/12/2008.

On the behalf of verification team, Flavio Gomes, the Bureau Veritas Certification Holding SAS Global Product Manager for Climate Change, approved final version of the Verification Report and it is signed by Ivan Sokolov authorized Bureau Veritas Certification Holding SAS Local product manager for Climate Change in Ukraine.

Report No.:	Subject Group:
UKRAINE/VER#0044/2009	JI

Project title:
District Heating System Rehabilitation of Chernihiv Region

Work carried out by:
Team Leader : Flavio Gomes
Team Member : Ivan Sokolov
Team Member : Nadiia Kaiun
Specialist Oleg Skoblyk
Specialist Kateryna Zinevych

Work verified by:
Ashok Mammen

Date of this revision:	Rev. No.:	Number of pages:
20/07/2009	01	64

Indexing terms

☒ No distribution without permission from the Client or responsible organizational unit

☐ Limited distribution

☐ Unrestricted distribution

Abbreviations change / add to the list as necessary

AIE	Accredited Independent Entity
BVCH	Bureau Veritas Certification Holding SAS
CAR	Corrective Action Request
CER	Certified Emission Reductions
CL	Clarification Request
CO_2	Carbon Dioxide
FAR	Forward Action Request
GHG	Green House Gas(es)
IETA	International Emissions Trading Association
JI	Joint Implementation
JISC	JI Supervisory Committee
MoV	Means of Verification
MP	Monitoring Plan
PCF	Prototype Carbon Fund
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
DH	District Heating

Table of Contents *Page*

1 INTRODUCTION

OJSC “Oblteplocomunenergo” has commissioned Bureau Veritas Certification to verify the emissions reductions of its JI project "District Heating System Rehabilitation of Chernihiv Region" (hereafter called “the project”) at Chernihiv, Ukraine, UNFCCC JI Reference Number UA1000048.
This report summarizes the findings of the second periodic verification of the project, performed on the basis of criteria given to provide for consistent project operations, monitoring and reporting, and contains a statement for the verified emission reductions.
The order includes the second periodic verification of the project. Report is based on the Periodic Verification Report Template Version 3.0, December 2003, both part of the Validation and Verification Manual (VVM) published by International Emission Trading Association (IETA).

Second periodic verification has been performed with the account of findings and conclusions of the integral initial and first periodic verification report No. UKRAINE/VER#0008/2008 version 01 dated 20/07/2009.

The results of the determination were documented by "Climate and Energy" of TÜV Süddeutschland in the report: "Determination of the “District Heating System Rehabilitation of Chernigiv Region” JI-Project, Ukraine", Report No. 453859 dated 2004, May 25th. The changed monitoring plan was determined during initial verification (BVCH report No.UKERAINE/VER#0008/2008).

During the verification process the agreement between OJSC “Oblteplocomunenergo” and previous project Party “E-energy B.V”, the Netherlands, was cancelled (see Section 7, Agreement on Termination of the Agreement on Purchase of Emission Reduction Unit (ERU). The new agreement regarding emission reduction trade between OJSC “Oblteplocomunenergo” and Deutche Bank AG was signed (see Section 7, Emission Reductions Purchase Agreement). All the documents were checked by the verification team and found valid and satisfactory.

Project is approved by the Ministry of Environment in Ukraine and Ministry of Economical Affairs in Netherlands (Letters of approval are presented). Since the one of the project Parties was changed from the Netherlands to Germany approval from Federal Environment Agency and German Emission Trading Authority was also received (see Section 7).

1.1 Objective

Verification is the periodic independent review and ex post determination by the AIE of the monitored reductions in GHG emissions during defined verification period.

The objective of verification can be divided in Initial Verification and Periodic Verification.
Initial Verification: The objective of an initial verification is to verify that the project is implemented as planned, to confirm that the monitoring system is in place and fully functional, and to assure that the project will generate verifiable emission reductions. A separate initial verification prior to the project entering into regular operations is not a mandatory requirement.
Periodic Verification: The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; furthermore the periodic verification evaluates the GHG emission reduction data and express a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is free of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records.
The verification follows UNFCCC criteria referring to the Kyoto Protocol criteria, the JI/CDM rules and modalities, and the subsequent decisions by the JISC, as well as the host country criteria.

1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination by the AIE of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the determinated project design document including the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. Bureau Veritas Certification has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the verification, focusing on the identification of significant risks of the project implementation and the generation of ERUs.
The verification is not meant to provide any consulting towards the Client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

The audit team has been provided with a Monitoring Report version 2 and underlying data records, covering the period 01 January 2008 to 31 December 2008 inclusive.

1.3 GHG Project Description

The project main goal is fuel consumption reduction, in particular reduction of natural gas consumption (which is imported to Ukraine), coal and fuel oil consumption by means of district heating system rehabilitation in the Chernihiv region. Such fuel consumption reduction will result in decrease of greenhouse gas emissions (CO2 mainly). The purpose of the project is sustainable development of the region through implementation of energy saving technologies.

Chernihiv region's district heating (DH) utility (system of heat supply enterprises) supplies and sells heat energy in forms of heat and hot water to local consumers, namely households, municipal consumers and state-owned organizations. It is a natural monopolist of heat production in the region. Heat supply market in the region is stable for years.

The project was initiated in 2002 to rehabilitate Chernihiv region's district heating system, including boiler and distribution network equipment replacement and rehabilitation.

The 124 boiler-houses with 458 boilers (total maximal connected load 423.9 Gkal/hour, 2002) and 227 km of heat distributing networks in Chernihiv city and Chernihiv Region, which belong to "Oblteplocomunenergo" are involved in the project as well as the 65 boiler-houses with 223 boilers (total maximal connected load 173.8 Gkal/hour, 2002) and 125 km of heat distributing networks in Chernihiv Region, which belong to other heat supply enterprises that empowered OJSC "Oblteplocomunenergo" to represent their interests in this project.

The total number of boiler-houses which are involved in the project is 189 with 681 boilers (435 of which are for reconstruction and replacement within this project) and 352 km heat distribution networks (198 of which are for reconstruction and replacement within this project). This is approximately 80% of Chernihiv regional DH system, and project may be expanded by including the other DH objects in the region.

After complete project implementation 32.8 mln. Nm3 of natural gas, 890 tons of heavy oil and 6358 tons of coal will be saved annually. Such reduction of fuel consumption is based on increase of the boiler efficiencies and reduction of heat losses in networks. The following activities will ensure fuel saving:

- Replacement of old boilers by new highly efficient boilers;
- Upgrading of boilers,
- Upgrading of boilers' burners;
- Installation of heat utilizers, including condensation ones;
- Fuel switch from coal and fuel oil to gas;
- Decreasing pipelines length and replacing the 4-pipe lines by 2-pipe lines, with application of the new insulation and the pre-insulated pipes.

Estimated project annual reductions of GHG emissions, in particular CO2, are from 6.2 thousand tons to 66.7 thousand tons in 2003 – 2010, and by

about 79 thousand tons per year starting from 2011, comparing to business-as-usual or baseline scenario.

Implementation of the project will provide substantial economic, environmental, and social benefits to the Chernihiv region. Social impact of the project is positive since after project implementation heat supply service will be improved and tariffs for heat energy will not be raised to cover construction costs. Environmental impact of the project is expected to be very positive as an emission of the greenhouse and toxic gases such as CO2, NOx, and CO will be reduced. Also due to a better after-implementation service, some part of population will cease to use electric heaters thus reducing electricity consumption, which is related to power plants emissions of CO2, SOx, NOx, CO and particulate matter.

OJSC “Oblteplocomunenergo” fulfils annual minimal repairing of the DH system to keep it working. Particularly it executes repairing of network’s parts and boilers that might cause accidents. More economically feasible and realistic scenario without carbon credits sales is a baseline scenario with very slow reconstruction activities than to make a major overhaul of the heating system. Tariffs for heat do not include the resources for prospective reconstruction of the district heating system, only the resources for probable necessary repairing after possible accidents. Minimal annual repairing doesn’t lead to drooping of baseline emissions because of degradation of the whole system with efficiency droop at other objects, the overall actual emissions of Supplier would stay on the same level. This scenario is less environmentally favourable for the nearest future (including first commitment period 2008-2012), since GHGs emissions of Supplier will continue to be kept at the same level or even higher, but economically such scenario is more attractive.
Estimated project risks are limited and minimized. Ukraine has claimed district heating and municipal energy sector as a priority for the national energy-saving development.

2 METHODOLOGY

The verification is as a desk review and field visit including discussions and interviews with selected experts and stakeholders.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual (IETA/PCF) a verification protocol is used as part of the verification. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:
It organises, details and clarifies the requirements the project is expected to meet; and

It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification;

The verification protocol consists of one table under Initial Verification checklist and four tables under Periodic verification checklist. The different columns in these tables are described in Figure 1.

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification procedures.

The completed verification protocol is enclosed in Appendix A to this report.

Initial Verification Protocol Table 1			
Objective	**Reference**	**Comments**	**Conclusion (CARs/FARs)**
The requirements the project must meet	Gives reference to where the requirement is found.	Description of circumstances and further comments on the conclusion	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance of the stated requirements. Forward Action Request (FAR) indicates essential risks for further periodic verifications.

Periodic Verification Checklist Protocol Table 2: Data Management System/Controls		
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table.	A score is assigned as follows: • Full - all best-practice expectations are implemented. • Partial - a proportion of the best practice expectations is implemented • Limited - this should be given if little or none of the system component is in place.	Description of circumstances and further commendation to the conclusion. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non compliance with stated requirements. The corrective action requests are numbered and presented to the client in the verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications.

Periodic Verification Protocol Table 3: GHG calculation procedures and management control testing

Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
Identify and list potential reporting risks based on an assessment of the emission estimation procedures, i.e. ➢ the calculation methods, ➢ raw data collection and sources of supporting documentation, ➢ reports/databases/information systems from which data is obtained. Identify key source data. Examples of source data include metering records, process monitors, operational logs, laboratory/analytical data, accounting records, utility data and vendor data. Check appropriate calibration and maintenance of equipment, and assess the likely accuracy of data supplied. Focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations, ➢ unclear origins of data, ➢ accuracy due to technological limitations, ➢ lack of appropriate data protection measures? For example, protected calculation cells in spreadsheets and/or password restrictions.	Identify the key controls for each area with potential reporting risks. Assess the adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include (not exhaustive): ➢ Understanding of responsibilities and roles ➢ Reporting, reviewing and formal management approval of data; ➢ Procedures for ensuring data completeness, conformance with reporting guidelines, maintenance of data trails etc. ➢ Controls to ensure the arithmetical accuracy of the GHG data generated and accounting records e.g. internal audits, and checking/ review procedures; ➢ Controls over the computer information systems; ➢ Review processes for identification and understanding of key process parameters and implementation of calibration maintenance regimes ➢ Comparing and analysing the GHG data with previous periods, targets and benchmarks. When testing the specific internal controls, the following questions are considered: 1. Is the control designed properly to ensure that it would either prevent or detect and correct any significant misstatements? 2. To what extent have the internal controls been implemented according to their design;	Identify areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks Areas where data accuracy, completeness and consistency could be improved are highlighted.

	3. To what extent have the internal controls (if existing) functioned properly (policies and procedures have been followed) throughout the period? 4. How does management assess the internal control as reliable?	

Periodic Verification Protocol Table 4: Detailed audit testing of residual risk areas and random testing		
Areas of residual risks	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including Forward Action Requests)**
List the residual areas of risks (Table 2 where detailed audit testing is necessary. In addition, other material areas may be selected for detailed audit testing.	The additional verification testing performed is described. Testing may include: 1. Sample cross checking of manual transfers of data 2. Recalculation 3. Spreadsheet 'walk throughs' to check links and equations 4. Inspection of calibration and maintenance records for key equipment ➢ Check sampling analysis results ➢ Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.	Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties should be highlighted. Errors and uncertainty can be due to a number of reasons: ➢ Calculation errors. These may be due to inaccurate manual transposition, use of inappropriate emission factors or assumptions etc. ➢ Lack of clarity in the monitoring plan. This could lead to inconsistent approaches to calculations or scope of reported data. ➢ Technological limitations. There may be inherent uncertainties (error bands) associated with the methods used to measure emissions e.g. use of particular equipment such as meters. ➢ Lack of source data. Data for some sources may not be cost effective or practical to collect. This may result in the use of default data which has been derived based on certain assumptions/conditions and which will therefore have varying applicability in different situations. The second two categories are explored with the site personnel, based on their knowledge and experience of the processes. High risk process parameters or source data (i.e. those with a significant influence on the reported data, such as meters) are reviewed for these uncertainties.

Verification Protocol Table 5: Resolution of Corrective Action and Clarification Requests			
Report clarifications and corrective action requests	**Ref. to checklist question in tables 2/3**	**Summary of project owner response**	**Verification conclusion**
If the conclusions from the Verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Tables 2, 3 and 4 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the verification team should be summarized in this section.	This section should summarize the verification team's responses and final conclusions. The conclusions should also be included in Tables 2, 3 and 4, under "Final Conclusion".

Figure 1 Verification protocol tables

2.1 Review of Documents

The Monitoring Report (MR) version 2 submitted by OJSC „Oblteplocomunenergo" and additional background documents related to the project design and baseline, i.e. country Law, Project Design Document (PDD), applied methodology, Kyoto Protocol, Clarifications on Verification Requirements to be Checked were reviewed.

The verification findings presented in this report relate to the project as described in the PDD version 11 and Project Monitoring Report version 2 for the year 2008.

2.2 Follow-up Interviews

On 27/02/2009 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of OJSC „Oblteplocomunenergo" and subordinated branches "Nizhynteplomerezhi" Ltd, ME "Prilukiteplovodopostachannya", ME "Bahmachteplomerezhi", PEHN "Borznateplocomunenergo" and ME "Nosivski teplovi merezhi" were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
JSC „Oblteplocomunenergo”, “Nizhynteplomerezhi” Ltd ME “Prilukiteplovodopostachannya” ME “Bahmachteplomerezhi” PEHN “Borznateplocomunenergo” ME “Nosivski teplovi merezhi”	Organizational structure. Responsibilities and authorities. Training of personnel. Quality management procedures and technology. Rehabilitation /Implementation of equipment (records). Metering equipment control. Metering record keeping system, database.
Local Stakeholder: District State Administration	Social impacts. Environmental impacts.
Consultant: Institute of Engineering Ecology	Baseline methodology. Monitoring plan. Monitoring report. Deviations from PDD.

2.3 Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the GHG emission reduction calculation.

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 verification opinion have not been met; or
iii) there is a risk that the project would not be able to deliver (high quality) 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 (CL), which would be where:
vi) additional information is needed to fully clarify an issue.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

3 VERIFICATION FINDINGS

In the following sections, the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

1) The findings from the desk review of the original project activity documents and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in Appendix A.
2) The conclusions for verification subject are presented.

The discussions and the conclusions that followed the preliminary verification report and possible corrective action requests are encapsulated in this section.

3.1 Remaining issues CAR's, FAR's from previous verification

One task of verification is to check the remaining issues from the previous validation or issues which are clearly defined for assessment in the PDD. The Initial and First verification report, prepared by Bureau Veritas Certification Holding SAS does not include any open issue.

Determination of PDD version 11 versus PDD version 10

At first the PDD for this project -"District Heating System Rehabilitation of Chernihiv Region", - was developed and submitted to ERUPT-4. This PDD version 04 from May 13, 2004, was determined by TUV SUD (Report # 453859 from May 25, 2004). Because of absence of the Ukraine National procedure at that period the Letter of Approval was not properly issued, and contract with Netherlands was not signed.

After organizing of JISC, PDD for this project was re-made in the new form, and its version 06 dated August 30, 2007, was sent to TUV SUD for re-determination. This version was published at the UNFCCC site for global stakeholder process. During the re-determination, the Determination Protocol from 13 November 2007 was received from TUV SUD with clarification requests and corrective action requests. After meeting of all requirements of determinator, the last PDD Version 10, dated July 14, 2008, was created and Report # 453859 was re-confirmed on November 17, 2008.

PDD Version 10 distinguishes from published Version 06 by:

- more detailed description of justification of the baseline chosen;
- the additionality of the project activity is demonstrated with using the "Tool for the demonstration and assessment of additionally" that was valid at that time (Version 04);

- containing more detailed monitoring plan.

PDD Version 11 dated 09 July, 2009 was designed because of change of the project partners. On December, 2008 the Agreement on termination of the Agreement on purchase of emission reduction unit between the JSC “Oblteplocomunenergo” and the company “E energy B.V.” was signed. On July, 2009 – Emission reduction purchase agreement was signed between the JSC “Oblteplocomunenergo” and the Deutsche Bank AG.

3.2 Project Implementation

3.2.1 Discussion

The scrutiny of a proper implementation of a project was a key issue of an Initial Verification, in order to have a climate change project ready for successful operation. The project is implemented in the boiler-houses undertaking the JI project activities.
The project was initiated in 2002 to rehabilitate Chernihiv region’s district heating system, including boiler and distribution network equipment replacement and rehabilitation.
The 124 boiler-houses with 458 boilers (total maximal connected load 423.9 Gkal/hour, 2002) and 227 km of heat distributing networks in Chernihiv city and Chernihiv Region, which belong to “Oblteplocomunenergo” are involved in the project as well as the 65 boiler-houses with 223 boilers (total maximal connected load 173.8 Gkal/hour, 2002) and 125 km of heat distributing networks in Chernihiv Region, which belong to other heat supply enterprises that empowered OJSC “Oblteplocomunenergo” to represent their interests in this project.
The total number of boiler-houses which are involved in the project is 189 with 681 boilers (435 of which are for reconstruction and replacement within this project) and 352 km heat distribution networks (198 of which are for reconstruction and replacement within this project). The following activities ensuring fuel saving were performed before 2008:

- Replacement of old boilers by new highly efficient boilers;
- Upgrading of boilers,
- Upgrading of boilers’ burners;
- Installation of heat utilizers, including condensation ones;
- Fuel switch from coal and fuel oil to gas;
- Decreasing pipelines length and replacing the 4-pipe lines by 2-pipe lines, with application of the new insulation and the pre-insulated pipes.

According to the project activities the following equipment was implemented before 2008:

Replacement of boilers				**Reconstruction of boilers**		**Reconstruction of boiler-house**		**Heat supply networks**	
KSVa-0,63	3	VK-21	4	Replacement of burners	20	Installation of heat utilizers	5	Total rconstructed pipe length in 2-pipe calculation with insulation, m	12510
KSVa-1,25	2	MH 120	60	Adjustment	67	Switch to individual heating system		Total rconstructed pipe length in 2-pipe calculation with pre-insulation, m	4168,3
KSVa-2,0	6	Witomax-1,75	2	Lining	41	Individual Heating Points		Insulation, m	300
KSVa-3,15	3	Protherm - 85	2	Flushing	38	Switch in water mode	2		
KVaS-0,8	1	Protherm - 50	2	Waterwall tube	9	Mini-boilers, Load trans.	41		
KVP-1200	2	RBI - 1740	1	Hydrodynamic cleaning	3				
KVP-600	2	Fakel-G	4	Convective part	1				
MVK-5	3	KCT-50	1						
NIISTU-5	17	KGB-100	7						
Protherm -120	46	KGB-50	4						
RIELLO-1000	6	Rivnotherm - 100	2						
Riello-2000	1	KBNG-2,5	4						
RIELLO-500	9	KVV-3,15	3						
RIELLO-600	9	Nadiya	2						
RIELLO-700	3	Sophiya	2						
STG-100	10	Major	2						
TVG-8	1	Konvector	2						
Total		**228**		**Total**	**179**	**Total**	**48**	Total reconstructed pipe length in 2-pipe calculation, m	**16739**

Measurement equipment is in place and calibrated. All required metering systems have been identified. Some of the were checked during the site visit on the sampling basis. The following meters are relevant for the calculation of emission reductions: РГК-100, РГК-600 produced by Ivano-Frankivsk plant JSC "Promprylad", ЛГК-80, ЛГК-200 produced by Ivano-Frankivsk plant JSC "Promprylad», G10 and G650 produced by Ivano-Frankivsk plant JSC "Promprylad», GMS- G10 and G250 produced by "Arsenal" plant. Kiev city, G-10 РЛ produced by DP "Novator". Khmelnitsk city, G-16 produced by "Aktaris" plant, G-7 produced by "Vizar" plant.

Used meters are within their calibration period. They comply with the appropriate standards.
According to the Monitoring Plan the volume of consumed natural gas was corrected by measurement error using the principle of conservatism. Natural gas consumption in the reported year that used for Project emissions calculations was increased on the level of accuracy of gas flue meters installed at the every boiler-house.
The Monitoring Plan defines the responsibilities to consolidate the data required for emission reduction calculations. Calculations are transparent and restricted to entering annually the production data into a predefined Excel spreadsheet.

3.2.2 Findings

None.

3.2.3. Conclusion

The project complies with the requirement.

3.3 Internal and External Data

3.3.1 Discussion

The 17 parameters are monitored within the projects but only one of them (volume of natural gas consumption) is measured directly. The remaining monitoring parameters used in calculation of the baseline and project line emissions are taken as statistic data.

The following parameters need to be obtained according to the monitoring plan:

- Fuel Natural gas consumption at boiler-houses (for natural gas in 1000 m^3, for coal in ton, for heavy oil in ton, manually recorded every day)
- Average annual Heating Value of fuel (MJ/m^3 for natural gas, MJ/kg for coal and heavy oil, data is provided by natural gas suppliers usually 3 times per month, quality certificate is given by coal and heavy oil supplier's for every consignment)
- Average daily outside temperature during the heating season (^0C (K), recorded every day of heating season
- Average inside temperature during the heating season (^0C (K), recorded once per heating season)
- Number of Customers (contracts with population, organizations and legal entities are concluded directly with OJSC

„Oblteplocomunenergo” and Chernihiv region enterprises, they are updated once per year)

- Heating area (total, m^2 the revise is made in case of new contracts with Customers or in case of contracts break)
- Average heat transfer factor of heated buildings in the base year (W/m^2*K, heat transfer factor is recorded ones per year at recording of connection or disconnection of any heating area to boiler-houses included in project)
- Heating area of buildings (previously existed in the base year) with the renewed (improved) thermal insulation in the reported year (m^2, once per year)
- Heating area of newly connected buildings (assumed with the new (improved) thermal insulation) in the reported year (m^2, once per year)
- Heat transfer factor of buildings with the new thermal insulation (W/m^2*K)
- Duration of the heating period (hours, once per year)
- Duration of the hot water supply period (hours, once per day)
- Maximum connected load to the boiler-house that is required for heating (MW, once per year)
- Connected load to the boiler-house, that is required for hot water supply service (MW, once per year)
- Standard specific discharge of hot water per personal account (kWh/h, once per year)
- Carbon emission factor (for natural gas, coal and heavy oil kt CO_2/TJ once per year)
- Recalculating factor for average load during heating period (once per year)

The records are maintained on daily and annually basis, the boiler operation is statutory, so the chances of misstatement in the records are hereby low. In fact records are taken every 2 hours (manually) or semi-continuously where correctors are present (electronically), and after that manual daily summarizing record is performed. In both cases (manual or semi-continuous) monitoring is within the PDD version 11 where records are required every 2 hours.

As mentioned above the responsibility for data collection, measurements, calibration, data recording and storage for each boiler–house is carried by the team leaded by the head of production department Mr. Victor Olejnik, who is responsible for the implementation and management of the monitoring process at the OJSC “Oblteplocomunenergo”, “Nizhynteplomerezhi” Ltd, ME “Prilukiteplovodopostachannya”, ME “Bahmachteplomerezhi”, PEHN “Borznateplocomunenergo”, ME “Nosivski teplovi merezhi”.

Dr. Vladimir Gomon, Managing Engineer of European Institute for safety, security, insurance and environmental techniques, is responsible for baseline and monitoring methodology development.
Dr. Dmitri Paderno, vice director of Engineering Ecology, is responsible for baseline and monitoring methodology development.
Ms. Tetiana Grechko, senior engineer of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development and data processing.
In October 2007 European Institute for safety, security, insurance and environmental techniques carried out a comprehensive training "Organization and training of special group for necessary data collection according with Monitoring plan".In addition there were deployed trained engineers with good experience in operation and maintenance of the boiler equipment and academically qualified to carry out the task.
The external data used are following:
Natural gas consumption at boiler houses data are presented in the table below.

Enterprise	Natural gas consumption at boiler houses data for 2008, m^3
OJSC „Oblteplocomunenergo",	93115.7
"Nizhynteplomerezhi" Ltd	22889.5
ME "Prilukiteplovodopostachannya"	1594.5
ME "Bahmachteplomerezhi"	1989.4
PEHN "Borznateplocomunenergo"	600.0
ME "Nosivski teplovi merezhi"	684.9

Average annual Heating Value of Natural Gas – used values are presented in the table below.

Enterprise	Average annual heating value of Natural gas for 2008, MJ/m^3
OJSC „Oblteplocomunenergo",	34.9
"Nizhynteplomerezhi" Ltd	34.8
ME "Prilukiteplovodopostachannya"	34.8
ME "Bahmachteplomerezhi"	34.8

PEHN “Borznateplocomunenergo”	34.9
ME “Nosivski teplovi merezhi”	35.0

Daily outside temperature during the heating season - Daily outside temperature is taken by dispatcher of OJSC „Oblteplocomunenergo” from Chernihiv Meteorological Centre from 10 to 11 a.m. every day of heating season for every town.

Heat transfer factor of buildings - for calculation of Heat transfer factor of buildings for every boiler-house, the method of weighted average value was used, that depends on heating area of existing buildings and heating area of the new buildings. Values of the heat transfer factor for existing buildings were taken from SNiP 2-3-79 (1998) - not higher than 0.63. Values of the heat transfer factor of new buildings were taken according to State Buildings Norms (B.2.6-31:2006) - not higher than 0.36.

Heat transfer factor of new buildings and buildings with new thermal insulation - Not higher than 0.36, according to State Buildings Norms (B.2.6-31:2006).

Standard specific discharge of hot water per personal account - standard specific discharges of hot water per personal account for different types of consumers are presented in “KTM 204 Ukraine 244-941”.

Carbon emission factor for different fuels, which is determinated in PDD and is confirmed in the Monitoring Report 2 for the year 2008 without deviations.

- Cef (natural gas) = 0.0561ktCO_2/TJ
- Cef (mazut) = 0.0774 ktCO_2/TJ
- Cef (coal) = 0.0946 ktCO_2/TJ

3.3.2 Findings

None

3.3.3 Conclusion

The project complies with the requirements. According to the methodology the grid factor is calculated – this is in compliance with UNFCCC requirements.

3.4 Environmental and Social Indicators

3.4.1 Discussion

No environmental and social indicators are defined in the monitoring plan.

The auditor team on site met a sample of local stakeholders. They expressed their deep appreciations for the project. As per them the project has brought sustainable development in to the Chernihiv Region through implementation of energy saving technologies, as well as improving of living comfort through improving of heat and hot water supply service quality and reliability.

3.4.2 Findings

None

3.4.3. Conclusion

The project complies with the JI requirements as well as with the local requirements.

3.5 Management and Operational System

3.5.1 Discussion

In order to ensure a successful operation of a Client project and the credibility and verifiability of the emissions reductions achieved, the project must have a well defined management and operational system.
The “Oblteplocomunenergo” complies with all legal and statutory requirements of the Ukrainian Government and the same were made available to the verification team. Appropriate procedures reflect commitment in management and operational control. Job descriptions, technological instructions are in place. Calibration and maintenance procedures are followed according statutory requirements of Ukraine.

3.5.2 Findings

During 2008 at the every registration point of the OJSC “Oblteplocomunenergo” were introduced gas consumption correctors of the following types: ОЕ 22 Дміz, ОЕ 22 ААiz and ОЕ VPT with modems, by way of which information is carried out every hour to united server, installed at the JSC “Oblteplocomunenergo” calculating center. During 2008 gas consumption correctors “Floutek TM-3-4” were installed at the several boiler-houses of “Nizhynteplomerega” Ltd. In addition registration of natural gas consumption in paper journal is carried out too.

3.5.2 Conclusion

The Monitoring Report and the Management and Operational Systems are eligible for reliable project monitoring.

4 SECOND PERIODIC VERIFICATION FINDINGS

4.1 Completeness of Monitoring

4.1.1 Discussion

The reporting procedures reflect the monitoring plan completely. It is confirmed that the monitoring report does comply with the monitoring methodology and PDD. However there is one particular deviation – the amount of emission reductions stated in Monitoring Report 2 for the year 2008 differs from the stated in the Monitoring Plan in PDD version10.

All parameters were determined as prescribed. The complete data is stored electronically and documented. The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the all 17 parameters listed in the monitoring plan.

According to PDD version 11, emission reductions during 2008 monitoring period were expected 48676 t CO2 e. According Monitoring Report version 2 emission reductions achieved are 52172.5 t CO2 e. The difference in the emission reductions are explained as follows:

1. Determination is based on conservative approach; this means that the most unfavourable variant is considered with the further possibility to verify real reductions.
2. Real calorific characteristics (factors) of fuel could differ from PDD ones.
3. Fuel consumption is not stable, and it is difficult to predict season deviations affecting heat production.
4. The baseline was calculated accordingly for each year using developed methodology that was determined, so the PDD baseline was only prediction.
5. Equipment and measures were implemented faster then it was expected by PDD. It is mentioned in the PDD that equipment and measures will be implemented approximately till 2009, but all that was planned according to the project was done in the period from 2004-2007. The list of implemented measures is the follows:

- Replacement of old boilers by the new highly efficient boilers;

- Upgrading / replacement of boilers' burners;
- Switching of load from boiler-houses with obsolete equipment to modern equipped boiler houses and CHP plants and units.
- Installation of heat utilizers, including condensation ones;
- Switching of boiler-houses from coal and fuel oil to natural gas;
- Improving of the network organization;
- Application of the new insulation and the pre-insulated pipes;
- Installation of combined heat and power production units;
- Installation of frequency controllers at electric drives of exhausting-blowing equipment and hot water pumps motors.

Calculating emission reduction in the PDD was based on the conservative approach (according to the requirements of the determinating organization). Emission reduction was calculated in accordance with proposed modification of efficiency factor for boilers and loss change in the heat distributing networks through insulation.

At the same time some measures' results that were difficult to foresee, for example, "network management improvement" that is developed in network length reduction, replacement 4-pipes system with 2-pipes one etc., lead to additional essential reduction of fuel expense that was not taken into account in the PDD but influence the monitoring results.

According to the emission reduction 2005-2007 verification results it can be assumed that emission reduction in 2008-2012 also will be higher than in PDD.

4.1.2 Findings

None

4.1.3 Conclusion

The project complies with the requirements.

4.2 Accuracy of Emission Reduction Calculations

4.2.1 Discussion

Due to the methodology corrections for data uncertainty should be made. The audit team confirms that emission reduction calculations have been performed according to the Monitoring Plan and to the calculation methodology reported in the Section D.1. of the Monitoring Report version 2.

Possible uncertainties and errors for such type project may arise from two main reasons: measurement and stipulation. Measurement error is due to metering equipment inaccuracies. Stipulation occurs when some values are required to complete calculations, but these values cannot be measured directly. In these cases estimates are used in place of actual measurements, and therefore error may be introduced. The stipulation error itself may be estimated based on the expected accuracy of the stipulated values.

The project error can be calculated from the two error components described above. The total project error (Standard Error, SE) can be calculated by taking the square root of the sum of the squares of the individual error components, as below:
$SE = \sqrt{[(\text{measurement error})^2 + (\text{stipulation error})^2]}$

The monitoring plan developed for this project does not rely on any estimates and is therefore free of any stipulation errors.

Thus, $SE = \sqrt{[(\text{measurement error})^2 + (0)^2]} = (\text{measurement error})$

Although the project has 17 monitoring parameters, only one of them (volume of natural gas consumption) is measured directly. The remaining monitoring parameters used in calculation of the baseline and project line emissions are taken as statistic data. Furthermore, they are used for adjustment factors calculation. Calculations of adjustment factors are based on reported and base year parameters ratio. For example, temperature change factor is calculated as ratio of inside and outside temperature differences in reported and base years: $K_2 = (T_{in\ r} - T_{out\ r}) / (T_{in\ b} - T_{out\ b})$. Therefore any error in statistic data will be cancelled.

The volume of natural gas consumption measurement errors which impact the Standard Error and their level of accuracy are: ± 1.0 % (usual value for the majority of meters).
Corresponding metered values of natural gas consumption, according to the conservatism principle, are increased by accuracy of meters.

4.2.2 Findings

None

4.2.3 Conclusion

The project complies with the requirements. Data correction regarding accuracy of the meters was checked onsite and found to be adequate.

4.3 Quality Evidence to Determine Emissions Reductions

4.3.1 Discussion

Concerning verification the calculation of emission reductions is based on internal data. The origin of those data was explicitly checked. Further on, entering and processing of those data in the monitoring workbook Excel sheet was checked where predefined algorithms compute the annual value of the emission reductions. All equations and algorithms used in the different workbook sheets were checked. Inspection of calibration and maintenance records for key equipment was performed for all relevant meters.
Necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the various parameters on a daily basis.

4.3.2 Findings

None

4.3.3 Conclusion

The project complies with the requirements.

4.4 Management System and Quality Assurance

4.4.1 Discussion

The roles and responsibilities for monitoring of emission reductions are defined for the verification of measurement, data collection as well as for the preparation of monitoring report.
The responsibility for data collection for each boiler-house is carried out by the team leaded by the head of production department Mr. Victor Olejnik, who is responsible for the implementation and management of the monitoring process at the OJSC “Oblteplocomunenergo”, “Nizhynteplomerezhi” Ltd, ME “Prilukiteplovodopostachannya”, ME “Bahmachteplomerezhi”, PEHN “Borznateplocomunenergo”, ME “Nosivski teplovi merezhi”. In October 2007 European Institute for safety, security, insurance and environmental techniques carried out a comprehensive training “Organization and training of special group for necessary data collection according with Monitoring plan”. In addition the developers of the project are responsible for baseline and monitoring methodology development and data processing. In particularly:
Dr. Vladimir Gomon, Managing Engineer of European Institute for safety, security, insurance and environmental techniques, is responsible for baseline and monitoring methodology development.
Dr. Dmitri Paderno, vice director of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development.

Ms. Tetiana Grechko, senior engineer of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development and data processing.
As far as the main activity of OJSC "Oblteplocomunenergo" and other regional enterprises will not change in course of the JI project implementation, the special technical trainings for personnel are not necessary. The technical personnel of the enterprise has sufficient knowledge and experience for implementation of the project activity and maintenance of the usual equipment.

OJSC "Oblteplocomunenergo" provides personnel retraining according to protection of labor norms. The enterprise has the Labor protection department, which is responsible for raising the level of personnel skills and trainings.

In course of the JI project development, specialists of Institute of Engineering Ecology and then also of the European Institute for safety, security, insurance and environmental techniques carried out a comprehensive consultations and trainings for involved representatives of OJSC "Oblteplocomunenergo" and other regional enterprises on the necessary data collection according to Monitoring plan for the project.

4.4.2 Findings

None

4.4.3 Conclusion

The project complies with the requirements.

5 PROJECT SCORECARD

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	**Project Emissions**	**Calculated Emission Reductions**	
Completeness	Source coverage/ boundary definition	✓	✓	✓	All relevant sources are covered by the monitoring plan and the boundaries of the project are defined correctly and transparently.
Accuracy	Physical Measurement and Analysis	✓	✓	✓	State-of-the-art technology is applied in an appropriate manner. Appropriate backup solutions are provided.

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Calculated Emission Reductions	
	Data calculations	✓	✓	✓	Emission reductions are calculated correctly
	Data management & reporting	✓	✓	✓	Data management and reporting were found to be satisfying.
Consistency	Changes in the project	✓	✓	✓	Results are consistent to underlying raw data.

6 SECOND PERIODIC VERIFICATION STATEMENT

Bureau Veritas Certification has performed a verification of the JI project "District Heating System Rehabilitation of Chernihiv Region". The verification is based on the currently valid documentation of the United Nations Framework Convention on the Climate Change (UNFCCC).

The management of the OJSC "Oblteplocomunenergo" is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the project on the basis set out within the project Monitoring and Verification Plan indicated in the final PDD version 11. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project is the responsibility of the management of the project.

Bureau Veritas Certification verified the Project Monitoring Report version 02 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as planned and described in validated and registered project design documents. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions.

Bureau Veritas Certification can confirm that the GHG emission reduction is calculated without material misstatements. Our opinion relates to the project's GHG emissions and resulting GHG emissions reductions reported and related to the valid and registered project baseline and

monitoring, and its associated documents. Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01/01/2008 to 31/12/2008
Baseline emissions : 316601, 6 t CO2 equivalents.
Project emissions : 263727, 2 t CO2 equivalents.
Emission Reductions : 52874, 4 t CO2 equivalents.

7 REFERENCES

Category 1 Documents:
Documents provided that relate directly to the GHG components of the project.

/1/ Project Design Document, version 10, dated 14 of July 2008

/2/ Project Design Document, version 11, dated 9 of July 2009

/3/ Monitoring Report version 01 , dated 20 of February 2009

/4/ Monitoring Report version 02 , dated 14 of July 2009

/5/ Initial and First Verification Report, performed by Bureau Veritas Certification Holding SAS, No. 2008 version 01 dated 15 of November 2008

/6/ Approval notice concerning the project activity “District Heating System Rehabilitation of Chernihiv Region) from Federal Environment Agency; German Emission Trading Authority dated 26 of May 2009.

/7/ Agreement on termination of the agreement on purchase of emission reduction unit (ERU) between OJSC “Oblteplocomunenergo” and E-Energy B.V. dated 22 of December 2008.

/8/ Emission reductions purchase agreement between OJSC “Oblteplocomunenergo” and Deutsche Bank AG dated 21 of July 2009.

/9/ Letter of Approval of Ukrainian Ministry of Environment Protection, № 5411-к/10/3-10 from 14.05.07

Category 2 Documents:

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

/10/ Documents checked during the verification onsite are presented in Annex C

Persons interviewed:

List of persons interviewed during the verification or persons that contributed with other information that are not included in the documents listed above.

/1/ Nazym Volodymyr – Director of the the ME “Prilukiteplovodopostachannya”

/2/ Gavrysh Andriy – Chief engineer of the ME “Prilukiteplovodopostachannya”

/3/ Trohymenko Valentina – Head of the industry and technical department of the ME “Prilukiteplovodopostachannya”

/4/ Isayenko Lubov – Director of the “Nizhynteplomeregi” Ltd

/5/ Kotil Pavlo – Technical director of the “Nizhynteplomeregi” Ltd

/6/ Shkolniy Volodymyr - Director in chief of the “Nizhynteplomeregi” Ltd

/7/ Shybika Vadym – Director of the “Borznateplocomunenergo”

/8/ Teterya Aleksey – Head of the technical development department of the JSC “Oblteplocomunenergo

/9/ Grechko Tetyana – Senior engineer of the Institute of Engineering Ecology

- o0o -

APPENDIX A: COMPANY JI PROJECT VERIFICATION PROTOCOL

Initial Verification Protocol Table 1

Objective	Reference	Comments	Conclusion (CARs/FARs)
1. Opening Session			
1.1. Introduction to audits	/3/	The intention and the target of the audit were illustrated to the participants of the audit. Participants at the audit were the following persons: Verification team: Mr. Ivan Sokolov Lead Auditor, Bureau Veritas Ukraine, Mrs. Nadezhda Kaiiun, Auditor, Bureau Veritas Ukraine, Oleg Skoblik, specialist, Bureau Veritas Ukraine, Kateryna Zinevych, specialist, Bureau Veritas Ukraine. Interviewed persons: Oblteplocomunenergo: Victor Olejnik , Head of production department and Oleksiy Teterya, Head of technical development department are responsible for supervising data collection, measurements, calibration, data recording and storage at JSC “Oblteplocomunenergo”. Volodymyr Nazim, Director, Valentyna Trofymenko, Chief of production department, and Andriy Gavrysh, Chief Engineer; are responsible for supervising data collection, measurements, calibration, data recording and storage at ME “Prilukiteplovodopostachannya”. Vadym Shybika, Director, is responsible for supervising data collection, measurements, calibration, data recording and storage at PEHN “Borznateplocomunenergo”.	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		Lubov Isayenko, Director, Volodymyr Shkolniy, Director in chief, and Pavlo Kotil, Technical director, are responsible for supervising data collection, measurements, calibration, data recording and storage at "Nizhynteplomerezhi" Ltd. Dr. Vladimir Gomon, Managing Engineer of European Institute for safety, security, insurance and environmental techniques, is responsible for baseline and monitoring methodology development Institute of Engineering Ecology: Ms. Tetiana Grechko, senior engineer of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development and data processing.	
1.2. Clarification of access to data archives, records, plans, drawings etc.	/3/	The verification team got open access to all required plans, data, records, drawings and to all relevant facilities.	OK
1.3. Contractors for equipment and installation works	/3/	Project has been implemented as defined in the PDD and the implementation is evidenced by statements of work completion.	OK
1.4. Actual status of installation works	/3/	Implementation of boiler houses rehabilitation and network rehabilitation is realized according to the project plan. In several cases replacement of network pipes with different (from planned before) diameters took place. Varva filial of JSC "Volodar" refused to participate in the project. Same changers also were made in the monitoring methodology developed for "District Heating" projects in	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		Ukrainian conditions". Those changes concerned Adjustment factors calculations and allow to calculate GHG emissions reduction more transparent.	
2. Open issues indicated in validation report			
2.1. Missing steps to final approval	/5,8/	Based on the validation report the verification team identified no missing steps. The project has been approved by NFP.	OK
3. Implementation of the project			
3.1. Physical components	/3/	Project has been implemented as defined in the PDD with some deviations. The systems are installed and are in operation.	OK
3.2. Project boundaries	/3/	Yes, the project boundaries are as defined in the PDD.	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
3.3. Monitoring and metering systems	/3/	The installations have the metering and measurement devices such as gas flow meters, electric power consumption meters to monitor parameters related to project. All equipments are of reputed make and included in the structured calibration plans where they are periodically calibrated. The procedures have been documented for the equipment operation.	OK
3.4. Data uncertainty	/3/	All measuring equipment corresponds to the regulatory requirements on accuracy of meters and measurement deviations that is calculated and certified. This ensures the required by the technology level of uncertainty of the estimations.	OK
3.5. Calibration and quality assurance	/3/	All monitoring equipment is part of detailed calibration plan. The strict control is maintained over the calibration process. On the date of verification, Calibration records of the measuring and monitoring equipment has been verified at site. All the meters have been found to be calibrated regularly as per determined calibration plan for each site.	OK
3.6. Data acquisition and data processing systems	/3/	Before 2008 registration of Natural gas consumption at boiler houses of JSC „Oblteplocomunenergo" was carried out by the following scheme: 1. Every 2 hours operator of a boiler house read the values of inside air temperature, temperature of the natural gas and gas pressure at the entrance to the boiler-house. Natural gas consumption is measured by gas flow meters, installed at the every boiler-house. Every day	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		operator of a boiler house make registration of daily gas consumption in the special paper journal. 2. Instrument readings were summarized daily and transferred to JSC „Oblteplocomunenergo" calculating center. 3. Every decade calculating center transferred data to gas supplying company. During 2008 at the every registration point the gas consumption correctors of the following types: ОЕ 22 ДМiz, ОЕ 22 ААiz and ОЕ VPT with modems were installed, by way of which information is carried out every hour to united server, installed at the JSC „Oblteplocomunenergo" calculating center. During 2008 gas consumption correctors "Флоутек ТМ-3-4" were installed at the several boiler-houses of "Nizhynteplomerezhi" Ltd. All measuring equipment and calibration is presented in Annex 4. of the Monitoring Report version 02.	
3.7. Reporting procedures	/3/	The Monitoring Plan defines the responsibilities to consolidate the data required for emission reduction calculations. Calculations are transparent and restricted to entering annually the production data into a predefined Excel spreadsheet.	OK
3.8. Documented instructions	/3/	Section B.3. Data processing and archiving (including software used) of the Monitoring Report version 02 provides with the necessary information relating the procedures for the monitoring, measurements and reporting. These were verified onsite and found satisfactory.	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
3.9. Qualification and training	/3/	The overall authority of the project is personally supervised by Victor Olejnik , Head of production department, who has further delegated responsibility to Oleksiy Teterya for collection and compilation of all data related to this JI Project. In addition each site has deployed trained engineers with good experience in operation and maintenance of the equipment and academically qualified to carry out the task. The responsibilities and authorities are described for each individual in job descriptions as required statutorily.	OK
3.10. Responsibilities	/3/	The overall authority of the project is personally supervised by Victor Olejnik , Head of production department, who has further delegated responsibility to Oleksiy Teterya for collection and compilation of all data related to this JI Project. In addition each site has deployed trained engineers with good experience in operation and maintenance of the equipment and academically qualified to carry out the task. The responsibilities and authorities are described for each individual in job descriptions as required statutorily.	OK
3.11. Troubleshooting procedures	/3/	Procedure exists to react in the case incorrect data appear or equipment failure. Any problem occurring that concerns this project is to be reported immediately to the project manager, who takes the appropriate measures.	OK
4. Internal Data	/3/		

Objective	Reference	Comments	Conclusion (CARs/FARs)
4.1. Type and sources of internal data	/3/	The internal parameters are obtained according to the monitoring plan: monitoring report, Annex2 contains internal parameters that are monitored.	OK
4.2. Data collection	/3/	The responsibility for data collection is described in the monitoring plan. Natural gas consumption at boiler houses of JSC „Oblteplocomunenergo" was carried out by the following scheme: 1. Every 2 hours operator of a boiler house read the values of inside air temperature, temperature of the natural gas and gas pressure at the entrance to the boiler-house. Natural gas consumption is measured by gas flow meters, installed at the every boiler-house. Every day operator of a boiler house make registration of daily gas consumption in the special paper journal. 2. Instrument readings were summarized daily and transferred to JSC „Oblteplocomunenergo" calculating center. 3. Every decade calculating center transferred data to gas supplying company. During 2008 at the every registration point the gas consumption correctors of the following types: OE 22 ДMiz, OE 22 AAiz and OE VPT with modems were installed, by way of which information is carried out every hour to united server, installed at the JSC „Oblteplocomunenergo" calculating center. During 2008 gas consumption correctors "Флоутек ТМ-3-4" were installed at the several boiler-houses of "Nizhynteplomerezhi" Ltd. In the Monitoring report there is not mentioned the particular	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		temperature and pressure which should be taken by the operator of the boiler-house.	
4.3. Quality assurance	/3/	Section B.3. Data processing and archiving (including software used) of the Monitoring Report version 02 provides with the necessary information relating the procedures for the monitoring, measurements and reporting. These were verified onsite and found satisfactory.	OK
4.4. Significance and reporting risks	/3/	As the records are maintained on daily basis and the consumption natural gas is a statutory records the chances of misstatement are hereby low.	OK
5. External Data	/3/		
5.1. Type and sources of external data	/3/	The external data used are following: •Emission factor of fuels – IPCC values are used. •Calorific Values of fuels – calculated values are used. The external parameters are obtained according to the monitoring plan: monitoring report, Annex2 contains external parameters that are monitored.	**OK**
5.2. Access to external data	/3/	Origin of the external data is indicated in the monitoring report, Annex2.	**OK**
5.3. Quality assurance	/3/	See chapter 5.1.	**OK**

Objective	Reference	Comments	Conclusion (CARs/FARs)
5.4. Data uncertainty	/3/	See chapter 5.1.	**OK**
5.5. Emergency procedures	/3/	See chapter 5.1.	**OK**
6. Environmental and Social Indicators			
6.1. Implementation of measures	/3/	Environmental and social indicators are not defined in the monitoring plan. Hence the question is not applicable. But the client takes action on a voluntary basis regarding environmental and social issues: The auditor team on site was informed on local stakeholders opinion. They expressed their appreciations for the project. As per them the project has brought improvements in heat supply system, which the project has brought in.	**OK**
6.2. Monitoring equipment	/3/	See chapter 6.1.	**OK**
6.3. Quality assurance procedures	/3/	See chapter 6.1.	**OK**
6.4. External data	/3/	See chapter 6.1.	**OK**
7. Management and Operational System	/3/		
7.1. Documentation	/3/	The company complies with all legal and statutory requirements of the Ukraine and the same were made available to the verification team. JSC “Oblteplocomunenergo” has all the necessary permissions and licenses, issued by the State Inspection on Labor Safety, that allow	**OK**

Objective	Reference	Comments	Conclusion (CARs/FARs)
		performing of the following activities: 1. to operate, repair and install the steam and hot-water boilers, steam and hot-water pipelines; 2. to perform building and installation works; 3. to perform designing works; 4. to conduct adjustment and alignment of fuel-using equipment.	
7.2. Qualification and training	/3/	The overall authority of the project is personally supervised by Victor Olejnik , Head of production department, who has further delegated responsibility to Oleksiy Teterya for collection and compilation of all data related to this JI Project. In addition each site has deployed trained engineers with good experience in operation and maintenance of the equipment and academically qualified to carry out the task. The responsibilities and authorities are described for each individual in job descriptions as required statutorily.	**OK**
7.3. Allocation of responsibilities	/3/	The responsibilities and authorities are described for each individual in job descriptions as required statutorily. Persons working at sites are aware of their responsibilities, and relative records are maintained.	**OK**
7.4. Emergency procedures	/3/	The emergency procedures with respect to operation controls are available in data control	**OK**
7.5. Data archiving	/3/	Data are archived in the physical and electronic forms and then stored electronically.	**OK**
7.6. Monitoring report	/3/	Calculations are laid down in the monitoring report.	**OK**

Objective	Reference	Comments	Conclusion (CARs/FARs)
7.7. Internal audits and management review	/3/	In the Section C.3 of the Monitoring Report version 2 internal audits and control measures are performed. JSC "Oblteplocomunenergo" has its own heat technical laboratory that is authorized to calibrate the measurement devices for own needs and for other enterprises. JSC "Oblteplocomunenergo" makes calibration of the measurement equipment for "Nizhynteplomerezhi" Ltd. Calibration procedure for ME "Nosivski teplovi merezhi" is made by JSC "Chernihivgas service center", for ME "Bahmachteplomerezhi" and PEHN "Borznateplocomunenergo" – by JSC "Chernihiv State center of standardization, metrology and certification". "Derzhspozhyvstandart" of Ukraine and JSC "Chernihiv State center of standardization, metrology and certification" make calibration of the measurement equipment for ME "Prilukiteplovodopostachannya". Performance review for the project is made by Technical development department.	OK

Periodic Verification Checklist Protocol Table 2: Data Management System/Controls

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
1. Defined organizational structure, responsibilities and competencies		
1.1. Position and roles	Full	The chairman of JSC “Oblteplocomunenergo”, Mr. Yuriy Barbarov, appointed a responsible person, Mr. Victor Olejnik, for the implementation and management of the monitoring process at the JSC “Oblteplocomunenergo”, “Nizhynteplomerezhi” Ltd, ME “Prilukiteplovodopostachannya”, ME “Bahmachteplomerezhi”, PEHN “Borznateplocomunenergo”, ME “Nosivski teplovi merezhi”. Mr. Victor Olejnik is responsible for supervising data collection, measurements, calibration, data recording and storage. Dr. Vladimir Gomon, Managing Engineer of European Institute for safety, security, insurance and environmental techniques, is responsible for baseline and monitoring methodology development. Dr. Dmitri Paderno, vice director of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development. Ms. Tetiana Grechko, senior engineer of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development and data processing.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
1.2. Responsibilities	Full	Victor Olejnik , Head of production department and Oleksiy Teterya , Head of technical development department are responsible for supervising data collection, measurements, calibration, data recording and storage at JSC “Oblteplocomunenergo”. Volodymyr Nazim, Director, Valentyna Trofymenko, Chief of production department, and Andriy Gavrysh, Chief Engineer; are responsible for supervising data collection, measurements, calibration, data recording and storage at ME “Prilukiteplovodopostachannya”. Vadym Shybika, Director, is responsible for supervising data collection, measurements, calibration, data recording and storage at PEHN “Borznateplocomunenergo”. Lubov Isayenko, Director, Volodymyr Shkolniy, Director in chief, and Pavlo Kotil, Technical director, are responsible for supervising data collection, measurements, calibration, data recording and storage at “Nizhynteplomerezhi” Ltd. Dr. Vladimir Gomon, Managing Engineer of European Institute for safety, security, insurance and environmental techniques, is responsible for baseline and monitoring methodology development Institute of Engineering Ecology: Ms. Tetiana Grechko, senior engineer of Institute of Engineering Ecology, is responsible for baseline and monitoring methodology development and data processing.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
1.3. Competencies needed	Full	The overall authority of the project is personally supervised by Victor Olejnik , Head of production department, who has further delegated responsibility to Oleksiy Teterya for collection and compilation of all data related to this JI Project. In addition each site has deployed trained engineers with good experience in operation and maintenance of the equipment and academically qualified to carry out the task. The responsibilities and authorities are described for each individual in job descriptions as required statutorily.
2. Conformance with monitoring plan		
2.1. Reporting procedures		The monitoring plan is as per the registered PDD. The applauded version of PDD is publicly available at the site http://ji.unfccc.int/UserManagement/FileStorage/9W3V1LSP08NF56YJHBGRTXUZMA7CI4 where it was placed during determination process. The monitoring methodology developed for “District Heating” projects in Ukrainian conditions” was used in monitoring process.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
2.2. Necessary Changes	Full	Implementation of boiler houses rehabilitation and network rehabilitation is realized according to the project plan. In several cases replacement of network pipes with different (from planned before) diameters took place. Varva filial of JSC "Volodar" refused to participate in the project. Same changers also were made in the monitoring methodology developed for "District Heating" projects in Ukrainian conditions". Those changes concerned Adjustment factors calculations and allow to calculate GHG emissions reduction more transparent.
3. Application of GHG determination methods		
3.1. Methods used	Full	The reporting procedures reflect the monitoring plan content. The calculation of the emission reduction is correct.
3.2. Information/process flow	Full	The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the various parameters on regular basis. Before 2008 registration of Natural gas consumption at boiler houses of JSC „Oblteplocomunenergo" was carried out by the following scheme: 1. Every 2 hours operator of a boiler house read the values of temperature, pressure and gas consumption on gas-meters, installed at the every boiler-house, and made registration in the special paper journal. 2. Instrument readings were summarized daily and transferred to JSC „Oblteplocomunenergo" calculating center.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
		3. Every decade calculating center transferred data to gas supplying company. During 2008 at the every registration point the gas consumption correctors of the following types: ОЕ 22 ДМiz, ОЕ 22 ААiz and ОЕ VPT with modems were installed, by way of which information is carried out every hour to united server, installed at the JSC „Oblteplocomunenergo" calculating center. During 2008 gas consumption correctors "Флоутек ТМ-3-4" were installed at the several boiler-houses of "Nizhynteplomerezhi" Ltd. Monthly data for the last month, with printout of daily bulletin and final bulletin, are transfered to gas supplying company.
3.3. Data transfer	Full	The complete data is stored electronically and also the part of Management information system which is controlled by accounts
3.4. Data trails	Full	The necessary procedures have been defined in internal procedures and additional internal documents relevant for the determination of the all the parameters listed in the monitoring plan
4. Identification and maintenance of key process parameters		
4.1. Identification of key parameters	Full	The critical parameters for the determination of GHG emissions are the parameters listed in section D of the approved PDD

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
4.2. Calibration/maintenance	Full	The company maintains the elaborate calibration plan for each of the equipment. The audit team verified the status for all the equipment at the sites sampled for the audit and found them to be complying with the plan.
5. GHG Calculations		
5.1. Use of estimates and default data	Full	The carbon emission factor & Net calorific values is used as a predetermined default value which has been defined in the PDD and confirmed during validation of the project.
5.2. Guidance on checks and reviews	Full	Internal audits and control measures are performed. JSC “Oblteplocomunenergo” has its own heat technical laboratory that is authorized to calibrate the measurement devices for own needs and for other enterprises. JSC “Oblteplocomunenergo” makes calibration of the measurement equipment for “Nizhynteplomerezhi” Ltd.
5.3. Internal validation and verification	Full	Monitoring procedure for JI Project includes the responsibility and frequency for carrying out internal audits. The audit team did verify all the parameters listed in monitoring report
5.4. Data protection measures		The necessary procedures relating to Information technology are in place to provide necessary data security, and also prevent the unauthorized use of the same.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
5.5. IT systems	Full	The IT system is server based and located in head quarters in Chernihiv and has full fledged manpower. The department is also supported by the internal guidelines and procedures to allocate roles and rights for each user. Additionally it clearly defines the responsibility, authority for back up, archiving and protection of data and equipments.

Periodic Verification Protocol Table 3: GHG calculation procedures and management control testing		
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**
Potential reporting risks based on an assessment of the emission estimation procedures can be expected in the following fields of action: ➢ the calculation methods, ➢ raw data collection and sources of supporting documentation, ➢ reports/databases/information systems from which data is obtained. Key source data applicable to the project assessed are hereby: ➢ metering records (gas and power consumption per heat generated), ➢ process monitors (heat generation), ➢ operational logs (metering records), ➢ laboratory/analytical data (for energy content of fuels), ➢ accounting records, Appropriate calibration and maintenance	Regarding the potential reporting risks identified in the left column the following mitigation measures have been observed during the document review and the on site mission: Key source data for this parameter are: • meter reading. • Invoices and record for Fuels (and coal) for consumption and purchase. The metering equipments are installed appropriately in the enclosure panels and same are of reputed make. Calculation methods: The reporting procedures reflect the monitoring plan content and the calculation of the emission reduction is correct and also additionally deducting the project emissions caused by fossil fuel.	The issue remaining is the way the data obtained is used to calculate the emission reduction in a conservative manner according to the approach prescribed in the PDD as well as the way data obtained is used to calculate the emissions reductions.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
of equipment resulting in high accuracy of data supplied should be in place. It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may include: ➢ manual transfer of data/manual calculations, ➢ position of the metering equipment, ➢ unclear origins of data, ➢ accuracy due to technological limitations, ➢ lack of appropriate data protection measures (for example, protected calculation cells in spreadsheets and/or password restrictions).		

Periodic Verification Protocol Table 4: Detailed audit testing of residual risk areas and random testing

Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including Forward Action Requests)
The issue remaining is the way the data obtained is used to calculate the emission reduction in a conservative manner according to the approach prescribed in the PDD.	There has been a complete check of data transferred from daily consumption and generation readings to the calculation tool. There was no error in such transfer. The correct installation of the metering equipment can be confirmed.	Having investigated the residual risks, the audit team comes to the following conclusion: Immediate action is not needed with respect to the current emission reduction calculation. Those corrections have been considered during the verification process, so no residual risk is open.

Verification Protocol Table 5: Resolution of Corrective Action and Clarification Requests

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
N/A	N/A	N/A	N/A

APPENDIX B: VERIFICATION TEAM

The verification team consists of the following personnel:

Flavio Gomes, M.Sci. (civil engineering)

Team Leader

Bureau Veritas Certification, Climate Change Verifier
Flavio Gomes is a Chemical and Safety Engineer graduated from «UNICAMP – Universidade Estadual de Campinas», with a MSc title in Civil Engineer (Sanitation). He spent four years at RIPASA Pulp and Paper as Environmental Process Engineer. He is, since 2006 the Global Manager for Climate Change. Previously and since 1997, he was senior consultant for Bureau Veritas Consulting in fields of Environment, Health, Safety, Social Accountability and Sustainability audit and management systems. He also acted as Clean Development Mechanism verifier, and Social/Environmental Report auditor, in the name of Bureau Veritas Certification. Flavio is pursuing his PhD on Energy Management at the Imperial College – London.

Ivan G. Sokolov, Dr. Sci. (biology, microbiology)
Team member

Bureau Veritas Ukraine HSE Department manager.

He has over 25 years of experience in Research Institute in the field of biochemistry, biotechnology, and microbiology. He is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered), Quality Management System (IRCA registered), Occupational Health and Safety Management System, and Food Safety Management System. He performed over 130 audits since 1999. Also he is Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and Lead Tutor of the IRCA registered ISO 9000 QMS Lead Auditor Training Course. He has undergone intensive training on Clean Development Mechanism /Joint Implementation and he is involved in the validation of 6 JI projects.

Nadiya Kaiiun, M. Sci. (environmental science)
Team member

Bureau Veritas Ukraine HSE Department project manager.

She has graduated from National University of Kyiv-Mohyla Academy with the Master Degree in Environmental Science. She is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered). She performed over 15 audits since 2008. She has undergone intensive training on Clean Development Mechanism /Joint Implementation and she is involved in the validation of 6 JI projects.

Oleg Skoblyk, Specialist (Energy Management)
Team member

Bureau Veritas Ukraine HSE Department project manager.

He has graduated from National Technical University of Ukraine 'Kyiv Polytechnic University" with specialty Energy Management. He is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered). He performed over 10 audits since 2008. He has undergone intensive training on Clean Development Mechanism /Joint Implementation and he is involved in the validation of 3 JI projects.

Kateryna Zinevych, M. Sci. (environmental science)
Team member

Bureau Veritas Ukraine HSE Department project manager.

She has graduated from National University of Kyiv-Mohyla Academy with the Master Degree in Environmental Science. She is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered). She performed 6 audits since March of 2009. She has undergone intensive training on Clean Development Mechanism /Joint Implementation and she is involved in the validation of 3 JI projects.

Ashok Mammen - PhD (Oils & Lubricants)

Bureau Veritas Certification Internal reviewer
Over 20 years of experience in chemical and petrochemical field. Dr. Mammen is a lead auditor for environment, safety and quality management systems and a lead verifier for GHG projects. He has been involved in the validation and verification processes of more than 60 CDM/JI and other GHG projects.

APPENDIX C: DOCUMENTS CHECKED DURING VERIFICATION

Nizhyn city, Parameters name Impartial proof		
Shevchenka, 4		
1.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Heat network replacement from ТК-5 to ТК-36 (September 2008).
Podvojskogo, 2		
2.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex “Флоутек ТМ-3-4” at boiler-house Podvojskogo,2. (June 2008).
Shevchenko, 109 (СНР №6)		
3.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Reconstruction of main heat network from boiler-house Shevchenko, 109 (July 2008).
Nizhatynska, 18		
4.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Heat network reconstruction from ТК-17 (September 2008)
Prylutska, 133		
5.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Prylutska,133 (June 2008)
Krapyvyanskogo, 2		
6.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Krapyvyanskogo,2 (June 2008).
7.		Photo, passport of gas flow meter G650 РГ-К-1-30-01-Ч-Ex 200-1600-1,6-01 №0109. dated 30.01.04.
8.		Photo, results of defining main relative error. Gas meter G650 РГ-К Ex. Dated 21.07.2008
9.		Photo, results of defining main relative error. Gas meter G650 РГ-К Ex. Dated 29.05.2006
10.		Photo, passport power unit ИПИ 12/3 АЧСА 436234.005-01 #266. dated 27.12.06
11.		Photo, passport of interface transformer RS232/BELL202 АЧСА.468153. 002 ПС #1675.

		dated 27.12.06
12.		Photo, passport of measuring management complex «ФЛОУТЕК ТМ3-4»№2-933. dated 01.12.2008
13.		Photo, principle technological scheme of work at the boiler house.
14.		Photo, regime card of water heating boiler НІІСТУ-5 №7. dated 24.09.2008.
15.		Photo, boiler#4. registration #4
16.		Photo, regime card of water heating boiler НІІСТУ-5 №6. dated 04.11.2008.
17.		Photo, regime card of water heating boiler НІІСТУ-5 №5. dated 22.10.2008.
18.		Photo, measuring management complex «ФЛОУТЕК ТМ3-4» transformer corrector ПК-2 #2-935. Produced 2006.
19.		Photo, power unit ИПИ 12/3 №266. Produced 2006.
20.		Photo, interface transformer RS232/BELL 202 #1675. Produced 2006.
21.		Photo, daily logbook
22.		Photo, boiler house
Esypenko, 15		
23.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Esypenko, 15 (June 2008)
Synyakivska, 75		
24.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Gas burners replacement, Synyakivska, 75b (September 2008)
Shevchenko, 99B		
25.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Heat network reconstruction Part T3, T4 (August 2008)
Shevchenko, 109		
26.		Photo, passport of gas flow meter ЛГ-К-Ex 200-1600-1,0-01 №5653. dated 30.06.99.

27.	Photo, passport of gas flow meter РГ-К-Ex 1000-1/20-01-4 №0114. dated 05.04.2005
28.	Photo, results of defining main relative error. Gas meter РГК-1000Ex. Dated 03.04.2007
29.	Photo, passport of gas flow meter ЛГ-К-Ex 200-1600-1,6-01 №5679. dated 22.06.99.
30.	Photo, results of defining main relative error. Gas meter ЛГК-200-2. Dated 22.06.2007
31.	Photo, results of defining main relative error. Gas meter ЛГК-200-1600. Dated 08.08.2005
32.	Photo, certificate of acceptance absolute pressure transformator with analogue out ППС.3-РА №10.06.300876. date of issuance 31.10.2006
33.	Photo, manual for absolute pressure transformator with analogue out ППС.3-РА.
34.	Photo, passport of absolute pressure transformator with analogue out ППС.3-РА №10.06.300876. last calibration 05.11.2008
35.	Photo, certificate #1707/A for calibration working equipment automatic measuring unit of natural gas consumption. Dated 05.11.2008
36.	Photo, results of metrological attestation. Dated 15.05.2007
37.	Photo, protocol of state metrological attestation #064. dated 15.05.2007
38.	Photo, protocol of state metrological attestation #063. dated 15.05.2007
39.	Photo, certificate for calibration working equipment: gas volume and volume expenditure meter ОЕ -22ЛА №0140. dated 05.11.2008
40.	Photo, passport of working equipment: heat transformator ТСП100П1187 №828. last calibration 05.11.2008.
41.	Photo, certificate of acceptance absolute pressure transformator with analogue out ППС.3-РА №10.06.300847. date of issuance 17.10.2004
42.	Photo, certificate #1708/A for calibration working equipment automatic measuring unit of natural gas consumption. Dated 05.11.2008
43.	Photo, protocol of state metrological attestation #066. dated 15.05.2007

44.	Photo, protocol of state metrological attestation #065. dated 15.05.2007
45.	Photo, certificate for calibration working equipment:gas volume and volume expenditure meter ОЕ -22ЛА №0141. dated 05.11.2008
46.	Photo, passport of absolute pressure transformator with analogue out ППС.3-РА №04.06.300661. last calibration 05.11.2008
47.	Photo, passport of working equipment: heat transformator ТСП100П1187 №1383. last calibration 05.11.2008.
48.	Photo, certificate of acceptance absolute pressure transformator with analogue out ППС.3-РА №04.06.300661. date of issuance 11.04.2006
49.	Photo, manual for gas volume and volume expenditure meter ОЕ -22ЛА.
50.	Photo, electric energy metering journal.
51.	Photo, heating boiler #2278. Registration #2301. Produced 1979.
52.	Photo, principle technological scheme of work at the boiler house.
53.	Photo, regime card of boiler ПТБМ-30М. Dated 26.01.2007
54.	Photo, temperature chart of boiler’s heating system for 2009.
55.	Photo, shift transfer-acceptance journal
56.	Photo, gas meter ЛГК-200-1600-1,0-01-Ex #5653
57.	Photo, regular power unit БП-1к-1 #0226.
58.	Photo, gas volume and volume expenditure meter ОЕ -22ЛА №0139.
59.	Photo, gas volume and volume expenditure meter ОЕ -22ЛА №0140.
60.	Photo, water heating boiler ДКВР-10/13№6317. Registration #2312. Produced 1976.
61.	Photo, gas volume and volume expenditure meter ОЕ -22ЛА №0141.

Shevchenko, 116 (CHP№1)		
62.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Heat network reconstruction (July 2008)
Shevchenko, 43		
63.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Shevchenko, 43 (June 2008)
Kotsubynskoho, 1		
64.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Kotsubynskoho, 1 (June 2008)
Ch. Kozacha, 3		
65.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Ch.Kozacha,3 (June 2008)
Moskovska, 17		
66.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Moskovska, 17 (June 2008)
Nezalegnosti, 34		
67.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Nezalegnosti, 34 (August 2008)
Nezalegnosti, 44		
68.	Performed works	Act of putting into operation objects that where built, overhauled, reconstructed and up-dated. Assembling the complex «Флоутек ТМ-3-4» at boiler-house Nezalegnosti, 44 (September 2008)
“Nizhynteplomerezhi” Ltd		
69.	Performed works	Bilateral act of gas consumption in December 2008 between “Nizhynteplomerezhi” Ltd and “Nizhynmizhraygas” (31.12.08)

70.		Act of natural gas delivery in January 2008 (29.02.08)
71.		Contract №120 for thermal energy supply between “Nizhynteplomerezhi” Ltd and Nizhyn Central City Hospital (28.08.07)
72.		Contract №09-2 for hydro meteorological information supply between “Nizhynteplomerezhi” Ltd and Chernihiv regional hydro meteorological centre. (30.12.08)
73.		Certificate of checking working measuring equipment: consumption automatic measurement unit. Dated 05.11.2008.
74.		Photo, results of metrological attestation. Dated 21.05.2007
75.		Photo, protocol certificate of state metrological attestation #071. Dated 21.05.2007
76.		Photo, protocol certificate of state metrological attestation #071. Dated 21.05.2007
77.		Certificate of checking working measuring equipment: gas volume expenditure and volume meter ОЕ22ЛА#0139. Dated 05.11.2008.
78.		Photo, passport of resistance heat transformer ТСП-1187 №737. dated 23.06.2005
79.		Photo, results of defining main relative error. Gas meter ЛГК-200-Ex. Dated 12.12.2007
80.		Photo, results of defining main relative error. Gas meter ЛГК-200-2. Dated 22.06.2007
81.		Photo, results of defining main relative error. Gas meter ЛГК-200-1600. Dated 08.08.2005
82.		Photo, results of defining main relative error. Gas meter ЛГК-200-2. Dated 12.06.2003
Pryluky,		
Kostyantynivska, 110		
83.	Primary data collection	Gas consumption daily report. (26.02.09)
84.		Photo, monthly report on gas consumption. Dated 12.2008
85.		Photo, daily report on gas consumption. Dated 08.12.2008
86.		Photo, act #418 of acceptance performed works. Dated 12.2007
87.		Photo, inquiry on a price of performed works. Dated 01.2005
88.		Photo, act #1 of acceptance performed works. Dated 2005

89.	Photo, program of gas expenditure registration
90.	Photo, contract #53/08 for reconstruction works performance. Dated 07.10.2008
91.	Photo, invoice #СФ0000422. Dated 12.11.2008. Invoice #СФ0000418. Dated 11.11.2008. Invoice #СФ0000367. Dated 09.10.2008.
92.	Photo, act #397 of acceptance performed works. Dated 11.2008
93.	Photo, act #398 of acceptance performed works. Dated 11.2008
94.	Photo, act #399 of acceptance performed works. Dated 11.2008
95.	Photo, act #400 of acceptance performed works. Dated 11.2008
96.	Photo, inquiry on a price of performed works. Dated 11.2008
97.	Photo, report on expenditure of production materials in comparison to producing norms. Dated 11.2008.
98.	Photo, city plan of Pryluky
99.	Photo, contract on central heating, hot and cold water supply services. Dated 01.12.2008
100.	Photo, act of acceptance-transferring natural gas for producing heat energy for budget organizations and other consumers. Dated 24.03.2008
101.	Photo, act of acceptance-transferring natural gas for producing heat energy for budget organizations and other consumers. Dated 31.01.2009
102.	Photo, act of acceptance-transferring natural gas for producing heat energy for budget organizations and other consumers. Dated 31.12.2008
103.	Photo, act of acceptance-transferring natural gas for producing heat energy for budget organizations and other consumers. Dated 30.11.2008
104.	Photo, act of acceptance-transferring natural gas for producing heat energy for budget organizations and other consumers. Dated 31.10.2008
105.	Photo, heating module МН120 еко «БЕРНАРД»№07118089
106.	Photo, heating module МН120 еко «БЕРНАРД»№07107880
107.	Photo, gas meter GMS-G160-80-1,0-У2-НЧ #108003. dated 2005.

108.		Photo, passport of gas volume corrector КПЛГ-1.02Р №02500. Dated 26.02.08.
109.		Graphic scheme of the heat network at boiler-house Kostyantinivska, 110.
110.		Photo, passport of gas meter G10РЛ #453010. dated 20.02.07
111.		Photo, passport of gas meter G10РЛ #453020. dated 20.02.07
112.		Photo, passport of gas meter G2,5РЛ #7026828.
113.		Photo, technical descriptions and usage instructions of automatic registration equipment ЭТНА-СИГМА. Dated 2005.
114.		Photo, passport of a standard diagram with angle measurement way of pressure change#632. dated 23.12.2005
115.		Photo, certificate of state metrological attestation #39.0001.06. dated 05.01.2006
116.		Photo, protocol certificate of state metrological attestation #001
117.		Photo, certificate of equipment calibration#39-1/1221. dated 28.12.2007
118.		Photo, passport of a standard diagram with angle measurement way of pressure change#633. dated 23.12.2005
119.		Photo, act of measuring pipeline inner diameter of flow-measuring equipment. Dated 05.01.2006
120.		Photo, passport of flow-measuring equipment ГРУ. Dated 17.04.2006
121.		Photo, certificate #887 of equipment calibration ДК#633. dated 29.12.2007
122.		Photo, passport of pressure sensor МИДА-13П-ДА-01Ex. Dated 07.07.2006
123.		Photo, passport of regular power unit БПБ-24 ЭТНА.426431.001 ПС. Dated 2005
124.		Photo, passport of gas volume meter «ЭТНА-СИГМА» ВРКА.30045344.001 ПС. Dated 2005.
125.		Photo, passport of pressure sensor МЕТРАН 100 ДО 1440 №180233. Dated 2004.
126.		Photo, passport of pressure sensor МЕТРАН 100 ДД 1420 №243412. Dated 27.09.2005.
127.		Photo, boiler #1, number 1455.
1st Travnya str., 73		
128.	Primary data collection	Photo, passport of gas meter GMS-G65-40-1,0-У2-НЧ #015573. dated 16.01.08
Sadova str., 104		

129.		Photo, passport of gas volume corrector КПЛГ-1.02Р№02170. Dated 05.12.07
130.		Photo, passport of gas meter GMS-G160-80-1,0-У2-НЧ #108003. dated 01.11.2005.
Kostyantinivska str.,115		
131.		Photo, passport of gas volume corrector КПЛГ-1.02Р №02195. Dated 10.12.07
132.		Photo, gas meter GMS-G65-40-1,0-У2-НЧ #015573. dated 16.01.08
133.		Photo, passport of gas meter GMS-G65-40-1,0-У2-НЧ #114956. dated 27.11.07
Kyivska, 200		
134.	Primary data collection	Graphic scheme of the heat network at boiler-house, Kyivska, 200.
135.		Photo, certificate of state metrological attestation #39.0262.06. dated 18.04.2006
136.		Photo, protocol certificate of state metrological attestation #062
137.		Photo, certificate of equipment calibration#39-1/0355. dated 30.05.2008
138.		Photo, passport of parameters measurement equipment. Dated 29.05.08
139.		Photo, passport of a standard diagram with angle measurement way of pressure change#046. dated 17.04.2006
140.		Photo, act of measuring pipeline inner diameter of flow-measuring equipment. Dated 01.11.1999.
141.		Photo, technical descriptions and usage instructions of automatic registration equipment ЭТНА-СИГМА. Dated 2006.
142.		Photo, passport of flow-measuring equipment ГРУ. Dated 17.04.2006
143.		Photo, gas pipeline scheme.
144.		Photo, gas pressure sensor МЕТРАН 100 ДД 1420 №264102. Dated 12.2005.
145.		Photo, gas pressure sensor МЕТРАН 100 ДД 1440 №264082. Dated 12.2005.
146.		Photo, daily log-book.
147.		Photo, operational boiler-house journal
148.		Photo, boiler #2 КВГ 7,56 №2272
Lenina str., 200		
149.		Photo, act of putting into operation alarm and automatic safety of boiler КВГ-7,56 №2. dated

		02.12.1996.
“Borznateplocomunenergo”		
150.	Primary data collection	Photo, results of defining main relative error. Gas meter G-100. Dated 22.03.2007
151.		Photo, results of defining main relative error. Gas meter G-100TEMP. Dated 13.03.2007
152.		Photo, passport of gas flow meter G-100 TEMP 1/50 #020605. dated 29.08.2002
153.		Photo, calibration results of gas flow meter G-100 TEMP 1/50 #020605. dated 29.08.2002
154.		Photo, results of defining main relative error. Gas meter G-100TEMP. Dated 06.02.2009
155.		Photo, results of defining main relative error. Gas meter G-100TEMP. Dated 05.06.2008
Sverdlova str., 22		
156.	Primary data collection	Photo, passport of gas flow meter G-100 TEMP 1/50 #060906. dated 11.09.2006
157.		Photo, certificate of acceptance of gas volume corrector КПЛГ-1.02Р №02997. Dated 25.09.2008
158.		Photo, gasification of central district hospital’s boiler house scheme
159.		Photo, inference #185/108 of the complex state expertise on the gasification of the central boiler-house at Sverdlova str.,22. dated 25.12.2002
160.		Photo, monthly report of contracted loading for December. Dated 30.12.2008.
161.		Photo, internal pipeline scheme of the boiler house.
162.		Photo, control paper for 02.2009.
163.		Photo, gas volume corrector КПЛГ-2.01Р №02997. Produced 09.2008.
164.		Photo, gas flow meter G-100 TEMP 1/50 #060906. Produced 2006.
165.		Photo, boiler «Провітерм» №С0209040159 СОО. Produced 09.2002.
Lenina str., 2		
166.		Photo, certificate of acceptance of gas volume corrector КПЛГ-2.01Р №03112. Dated 17.10.2008
167.		Photo, passport of of gas volume corrector КПЛГ-2.01Р №03112. Dated 17.10.2008
168.		Photo, boiler-house gasification scheme

169.	Photo, inference #7/2 of the complex state expertise on the gasification of the central boiler-house at Lenina str.,2. dated 09.03.2006
170.	Photo, internal pipeline scheme of the boiler house.
171.	Photo, technical maintenance and gas equipment reconstruction journal
172.	Photo, gas flow meter КПЛГ-2.01Р#03112
173.	Photo, gas flow meter G-100 #020605. produced 2002.
174.	Photo, boiler «Провітерм» №06031001049 СОО. Produced 03.2006.
175.	Photo, boiler «Провітерм» №06031001049 СОО. Produced 03.2006.

Other documents

176.	Photo, additional contract #1 to the contract #06/08-1270 БО-39 on natural gas supply from 29.09.2008. dated 26.11.2006.
177.	Photo, working project manual. Book #1
178.	Photo, act#50 of transfer-acceptance transferred natural gas. Dated 12.2008
179.	Photo, act of transfer-acceptance natural gas for heating purposes. Dated 31.01.2009
180.	Photo, act#50 of transfer-acceptance transferred natural gas. Dated 01.2009
181.	Photo, act of transfer-acceptance natural gas for heating purposes. Dated 31.12.2008
182.	The contract №08-21 of supply of meteorological information. Dated 22.10.2008
183.	The contract №07-18 of supply of meteorological information. Dated 17.10.2007
184.	SNiP 2-3-79 (1998)
185.	State Buildings Norms (В.2.6-31:2006)
186.	КТМ 204 Ukraine 244-941

Nezalegnosti str., 2

187.	Photo, monthly report of contracted loading for December. Dated 29.12.2008.