VERIFICATION REPORT

ME "KHARKIVSKY TEPLOVI MEREZHI"

VERIFICATION OF THE REHABILITATION OF THE DISTRICT HEATING SYSTEM IN KHARKIV CITY

FOURTH PERIODIC FOR 2010

REPORT NO. UKRAINE-VER/0232/2011

REVISION NO. 01

BUREAU VERITAS CERTIFICATION

Report No: UKRAINE-ver/0232/2011

VERIFICATION REPORT

Date of first issue: 05/04/2011	Organizational unit: Bureau Veritas Certification Holding SAS
Client: ME "Kharkivski teplovi merezhi"	Client ref.: Mr. Sergey Andreev

Summary:
Bureau Veritas Certification has made the 4th periodic verification of the project « Rehabilitation of the District Heating System in Kharkiv City», project of "ME "Kharkivski teplovi merezhi" located in Kharkiv city, Ukraine, and applying the JI Specific Approach, on the basis of UNFCCC criteria for the JI, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

The verification scope is defined as a periodic independent review and ex post determination by the Accredited Entity of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: i) desk review of the project design 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, Corrective Actions Requests, Forward Actions Requests (CR, CAR and FAR), presented in Appendix A.

In summary, Bureau Veritas Certification confirms that the project is implemented as per determined changes. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reduction is calculated without material misstatements, and the ERUs issued totalize 367384.52 tons of CO_2eq for the monitoring period of 01.01.2010 to 31.12.2010.

Our opinion relates to the project's GHG emissions and resulting GHG emission reductions reported and related to the approved project baseline and monitoring, and its associated documents.

Report No.: UKRAINE-ver/0232/2011	Subject Group: JI	
Project title: « Rehabilitation of the District Heating System in Kharkiv City »		
Work carried out by: Oleg Skoblyk – Team Leader, Lead Verifier Rostislav Topchiy – Team Member, Verifier Vitaliy Minyaylo – Team Member, Verifier trainee		
Work reviewed by: Ivan Sokolov – Internal Technical Reviewer		
Work approved by: Flavio Gomes – Operational Manager		
Date of this revision: 05/04/2011	Rev. No.: 01	Number of pages: 37

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1 INTRODUCTION

ME “Kharkivski teplovi merezhi” has commissioned Bureau Veritas Certification to verify the emissions reductions of its JI project "Rehabilitation of the District Heating System in Kharkiv City" (hereafter called “the project”) at Kharkiv city, Ukraine.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

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

The objective of verification can be divided in Initial Verification and Periodic Verification.

UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

1.2 Scope

The verification scope is defined as an independent and objective review of the project design document, 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.

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

1.3 Verification Team

The verification team consists of the following personnel:

Oleg Skoblyk
Bureau Veritas Certification Team Leader, Climate Change Lead Verifier

Rostislav Topchiy
Bureau Veritas Certification Team Member, Climate Change Verifier

Vitaliy Minyaylo
Bureau Veritas Certification, Team Member, Climate Change Verifier Trainee

This verification report was reviewed by:

Ivan Sokolov
Bureau Veritas Certification, Internal Technical Reviewer

2 METHODOLOGY

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

In order to ensure transparency, a verification protocol was customized for the project, according to the version 01 of the Joint Implementation Determination and Verification Manual, issued by the Joint Implementation Supervisory Committee at its 19 meeting on 04/12/2009. 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 organizes, details and clarifies the requirements a JI project is expected to meet;
- 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 completed verification protocol is enclosed in Appendix A to this report.

2.1 Review of Documents

The Monitoring Report (MR) submitted by “Institute of Engineering Ecology” and additional background documents related to the project design and baseline, i.e. country Law, Project Design Document (PDD), Approved CDM methodology (if applicable) and/or Guidance on criteria for baseline setting and monitoring, Host party criteria, Kyoto Protocol, Clarifications on Verification Requirements to be Checked by an Accredited Independent Entity were reviewed. Answering the AIE’s CARs and CLs project participant has issued new version of the Monitoring Report – version 2.

The verification findings presented in this report relate to the Monitoring Report version(s) 2.0 and project as described in the determined PDD.

2.2 Follow-up Interviews

On 16-17/03/2011 Bureau Veritas Certification performed on-site interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of “Institute of Engineering Ecology” and ME "Kharkivski teplovi merezhi" were interviewed during site visit (see References for the list of

interviewed persons). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
ME "Kharkivski teplovi merezhi"	➢ Organizational structure. ➢ Responsibilities and authorities. ➢ Training of personnel. ➢ Quality management procedures and technology. ➢ Implementation of equipment (records). ➢ Metering equipment control. ➢ Metering record keeping system, database.
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.

If the Verification Team, in assessing the monitoring report and supporting documents, identifies issues that need to be corrected, clarified or improved with regard to the monitoring requirements, it should raise these issues and inform the project participants of these issues in the form of:

(a) Corrective action request (CAR), requesting the project participants to correct a mistake that is not in accordance with the monitoring plan;

(b) Clarification request (CL), requesting the project participants to provide additional information for the AIE to assess compliance with the monitoring plan;

(c) Forward action request (FAR), informing the project participants of an issue, relating to the monitoring that needs to be reviewed during the next verification period.

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 CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow up visit are described in the Verification Protocol in Appendix A.

The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 02 Corrective Action Requests, 02 Clarification Requests, and 01 Forward Action Requests.

The number between brackets at the end of each section corresponds to the DVM paragraph (see references).

3.1 Project approval by Parties involved (90-91)

Written project approval by Netherlands and Ukraine has been issued by the DFP of that Party when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest.

The abovementioned written approval is unconditional.

3.2 Project implementation (92-93)

The project main goal is fuel consumption reduction, in particular reduction of natural gas (which is imported to Ukraine) and coal consumption, by means of district heating system rehabilitation in Kharkiv City, including boiler and distribution network equipment replacement and rehabilitation, installation of combined heat and power production plants and frequency controllers. Such reduction of fuel consumption will result in decrease of greenhouse gas emissions (CO_2 and N_2O). The purpose of the project is sustainable development of the region through implementation of energy saving technologies.

Municipal Enterprise (ME) "Kharkivski teplovi merezhi" is one of the main enterprises in field of production and distribution of the heat energy in Kharkiv City. It sells heat energy in forms of heat, hot water and steam, to local consumers, namely households, municipal consumers and state-owned organizations. Besides ME "Kharkivski teplovi merezhi", heat energy is produced by CHP-5 and CHP-3 stations, which have no their own distribution network, but have consumers, with which they have signed contracts for heat energy supply. Therefore they forced to have contractual relations with ME "Kharkivski teplovi merezhi" concerning to heat energy distribution to their consumers. Surplus of produced heat

energy is sale to ME "Kharkivski teplovi merezhi". Heat supply market in the region is stable for years.

The project was initiated in 2004 to rehabilitate Kharkiv City's district heating system, including boiler and distribution network equipment replacement and rehabilitation, and installation of combined heat and power production plants (CHP) as well as frequency controllers. Project includes 277 boiler-houses with 610 boilers, CHP-4 station and 1411,5 km of heat distributing networks, that are managed by ME "Kharkivski teplovi merezhi".

Project provides installation of cogeneration units of JSC "Pervomaiskdieselmash" (Ukraine) - 3 gas engine-generator machines DvG1A-630, with total capacity 1890 kW at boiler houses of Saltivskiy Living Area (KSZHM).

CHP-4 does not produce electricity in present. The electricity production ended in 1983, and there are no scheduled measures for plant reconstruction except frequency controllers installation. Only networks that distribute heat from CHP-4 are scheduled to be replaced within the project, and load from several boiler-houses will be switched to it. The frequency controller has been installed in 2008.

The project employs the increase in fuel consumption efficiency to reduce greenhouse gas emissions relative to current practice. Over 157.3 million Nm3 of natural gas and 354 tonn of coal will be saved annually starting from 2012. Such reduction of fuel consumption is based on increase of the boiler efficiencies, reduction of heat losses in networks and CHP and frequency controllers installation. The following activities will ensure fuel saving:

- Replacement of old boilers by the new highly efficient boilers;
- Switching of load from boiler-houses with obsolete equipment to modern equipped boiler houses and CHP plants and units.
- Switching of boiler-houses from coal to natural gas;
- Improving of the network organization;
- Application of the pre-insulated pipes;
- Installation of combined heat and power production units;
- Installation of frequency controllers at electric drives of draught-blowing equipment and hot water pumps motors.

The actual operation of the proposed project is presented bellow.

Implemented energy saving measures	Volume of performed works (number of boilers, etc.) 2004-2009	Volume of performed works (number of boilers, etc.) 2010	Total
Switch load to other boiler houses and CHP	57	3	60
Carrying out of boiler house from basement with gas furnace plant organizing	9	1	10
Furnace plant organizing	3	-	3
Liquidation or reconstruction of heating points	37	14	51
Replacement of boilers	102	23	125
Heat exchangers replacement	42	11	53
Frequency controllers installation	66	7	73
Heat utilisers installation		1	1
Additional energy saving measures			
Replacement of heating surface	78	10	88
Switch boiler in hot - water mode	1	-	1
Installation of automatic system of regulation on boilers	2	-	2
Pre-insulated network replacement, m	141783	46566	188349
Usual pipe network replacement, m	121600		121600
Restoration of pipes insulation, m	65864		65864

3.3 Compliance of the monitoring plan with the monitoring methodology (94-98)

The monitoring occurred in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website.

For calculating the emission reductions or enhancements of net removals, key factors, such as Fuel consumption at boiler-houses (for natural gas and coal in 1000 m^3 and t manually recorded every day), Average annual Heating Value of fuel (MJ/m^3 for natural gas, MJ/t for coal, data are provided by natural gas suppliers usually monthly, quality certificate is given by coal supplier's for every consignment), Average 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 concludes directly with ME "Kharkivski teplovi merezhi". They are updated once per year.), Heating area (total, m^2, the information is collected at the sale departments of ME "Kharkivski teplovi merezhi" by the certificates of owners in accordance with technical passport of building.), 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 and coal kt CO_2/TJ once per year), Recalculating factor for average load during heating period (once per year), Electric power consumption, (Electric power consumption was measured at the boiler houses and CHP, in the heating area of which reconstruction and liquidation of HDS will take place, HDS that will be reconstructed and liquidated, boiler houses and HDS, where frequency controllers will be installed.), influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project were taken into account, as appropriate.

Measurement equipment is in place and calibrated. All required metering systems have been identified and checked on the sampling basis. The following meters are relevant for the calculation of emission reductions:

GMS-G-10 .... GMS-616	Produced by "Arsenal" plant Kiev city
ВРСГ	Produced by "Electroprylad" Kazan city
ВК-011	Produced by "Energooblik" Kharkiv city
LG-K-80...200	Produced by Ivano-Frankivsk plant JSC "Promprylad"
G-6...250	Produced by Ivano-Frankivsk plant JSC "Promprylad"
RGK-40 ... 400	Produced by Ivano-Frankivsk plant JSC "Promprylad"
ВК-G10-T	Produced by Dnipropetrovsk city-Czech Republic
DELTA G-16	Produced in Slimburzhe city, France
METRIX-6	Produced in Czech Republic
Corrector КПЛГ-2.01	Produced by "Radmirteh" Kharkiv city
Corrector КПЛГ-1.02	Produced by "Radmirteh" Kharkiv city

Used meters are within their calibration period. They comply with the appropriate standards.

According to the Monitoring Plan the volume of consumed natural gas and consumed power was corrected by measurement error using the principle of conservatism. Natural gas consumption and power consumption in the reported year that used for Project emissions calculations were increased on the level of accuracy of gas flue meters and electricity 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.

Monitoring equipment of this project is sections of relating energy resources measurements. The main element of the measurement section is a primary transducer (meter) that is subject to periodic inspection or calibration. SE "Kharkivstandardmetrology" authorized body, entitled to conduct inspection and calibration of measuring equipment is third party involved.

Data sources used for calculating emission reductions or enhancements of net removals, such as (plant records, reports of Metrological Centre,

Rules of rendering of heat and hot water supply service to population" № 1497 from 30.12.1997, Statistics of ME "Kharkivski teplovi merezhi", State Buildings Norms, Rules of technical exploitation of heating equipment and networks, KTM 204 Ukraine 244-94, Annex C of the Operational Guidelines for Project Design Documents of Joint Implementation Projects [Volume 1: General guidelines; Version 2.2], Table 8 "Emission Factors for the Ukrainian grid 2006-2012" of Annex 2 "Standardized Emission Factors for the Ukrainian Electricity Grid) are clearly identified, reliable and transparent.

Emission factors, including default emission factors, are selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice.

3.4 Revision of monitoring plan (99-100)

Not applicable.

3.5 Data management (101)

The data and their sources, provided in monitoring report, are clearly identified, reliable and transparent.

The implementation of data collection procedures is in accordance with the monitoring plan, including the quality control and quality assurance procedures.

The function of the monitoring equipment, including its calibration status, is in order.

The evidence and records used for the monitoring are maintained in a traceable manner.

The data collection and management system for the project is in accordance with the monitoring plan.

Registration of Natural gas consumption at boiler houses of ME "Kharkivski teplovi merezhi" is carried out by the following scheme:

1. All boiler-houses are equipped with gas flow meters.

2. For automatic fuel control: gas flue commercial system, installed at gas distributing units of the boiler-houses, that consist of - gas flow meter and automatic corrector for temperature and pressure. Gas consumption registered automatically. Operators of all boiler-houses register the instrument readings in the paper journals "Journal of registration of boiler-house's operation parameters" every day.

3. At the boiler-houses that are not equipped with gas volume correctors (at present about 10% of the total number of boiler-houses), operators

register parameters of gas: temperature and pressure in these journals every 2 hours. These parameters are used to bring gas consumption to normal conditions.

4. Every day operators transfer values of gas consumption to dispatcher of the regional branch of ME "Kharkivski teplovi merezhi" by phone. Monthly they transfer the paper report.

5. Regional branches transfer data to Techno-Economic Activities Department (TEA) of Production-Technical Service (PTS) of ME "Kharkivski teplovi merezhi" where they are storing and used for payments with gas suppliers.

The General director of ME "Kharkivski teplovi merezhi", Mr. Sergey Andreev, appointed the responsible person, Mr. Andriy Repin, for the implementation and management of the monitoring process at the ME "Kharkivski teplovi merezhi". Mr. Andriy Repin is responsible for supervising of data collection, measurements, calibration, data recording and storage.

The producer of the new (never used at this enterprise before, for example: cogeneration units, foreign produced boilers, etc.) equipment installation provide trainings for personnel.

ME "Kharkivski teplovi merezhi" 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.

Measurement equipment calibration was carried out by DE "Kharkiv center of standardization, metrology and calibration" for gas flow meters and JSC "Kharkivoblenergo" for electricity meters.

Any problem occurring that concerns this project is to be reported immediately to the project manager, who takes the appropriate measures.

3.6 Verification regarding programmes of activities (102-110)

Not applicable.

4 VERIFICATION OPINION

Bureau Veritas Certification has performed the 4th periodic verification of the project « Rehabilitation of the District Heating System in Kharkiv City» Project in Ukraine, which applies the JI Specific approach. The verification was performed on the basis of UNFCCC criteria and host

country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The verification consisted of the following three phases: i) desk review of the project design 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 management of Institute of Engineering Ecology 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 final PDD version 04 and revised monitoring plan. 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 2.0 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as per determined changes. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the project is generating 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 approved 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 01/01/2010 to 31/12/2010

Baseline emissions	:	2236775.63	t CO_2 equivalents.
Project emissions	:	1869391.11	t CO_2 equivalents.
Emission Reductions	:	367384.52	t CO_2 equivalents.

5 REFERENCES

Category 1 Documents:
Documents provided by ME "Kharkivski teplovi merezhi" of the company that relate directly to the GHG components of the project.

/1/ Monitoring Report, version 01, 04 February 2011

/2/ Monitoring Report, version 02, 04 April 2011

/3/ Project Design Document, version 4, dated 24 of November 2008

/4/ Letter of Approval from National Environmental Investment Agency of Ukraine № 1144/23/7 dated 24.12.2008

/5/ Letter of Approval from Ministry of Economic Affairs of Netherlands 2008JI10 dated 19 December 2008

/6/ Excel spreadsheet of the emission reductions calculation version

/7/ Determination and Verification Manual, version 01

Category 2 Documents:
Background documents related to the design and/or methodologies employed in the design or other reference documents.

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96.	Photo 96 Gas boiler outdoor Kolbiterm KTN № 50751
97.	Photo 97 Electricity meter
98.	Photo 98 Gas Meter Rotary GMS G16 № 053316
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102.	Photo 102 Operational logbook
103.	Photo 103 Register of defects and malfunctions logbook
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105.	**Chaplygina, 12** Photo 105 Liquidated boiler house
106.	**Poltavskiy shliah, 110** Photo 106 Gas meter DTK-40 Inv. № 10160
107.	Photo 107 Gas volume corrector KPLG-2.01R
108.	Photo 108 Logbook of the boiler room
109.	Photo 109 Electricity meter CA-4-195 Inv. № 031900
110.	Photo 110 Certificate № 182 Boiler Operator Novikova L.I.
111.	Photo 111 Certificate №9559 boiler operator Chugunov V.V.
112.	Photo 112 Operating logbook

113.	Photo 113 Shifts logbook
114.	Photo 114 Register of defects and malfunctions logbook
115.	Photo 115 Gas Meter Rotary WP-K-Ex
116.	Photo 116 Metrological Certificate of rotary gas meter RG-K-40 valid to 24/06/2012
117.	Photo 117 Passport corrector gas volume KPLG-2.01R Inv. Number 01249 with information about the verification 29/06/2010
118.	Photo 118 The act of replacing the electricity meter
119.	**Electrovozna, 7a** Photo 119 Gas flow logbook
120.	Photo 120 Fuel and energy resources logbook
121.	Photo 121 Register of defects and malfunctions logbook
122.	Photo 122 Training on occupational safety logbook
123.	Photo 123 Production manual main and auxiliary equipment
124.	Photo 124 Gas meter LG-K-200-1600
125.	Photo 125 Gas volume corrector KPLG-1.02R Inv. № 00532
126.	Photo 126 Electricity meter SA4U-I672
127.	Photo 127 Passport corrector gas volume KPLG-1.02R Inv. Number 00532 with information about the verification 12/02/2010
128.	Photo 128 Passport gas meter LG-K-200-1600
129.	Photo 129 Metrological certificate gas meter LG-K-200-1600 valid to 16/09/2012
130.	Photo130 Act of sealing electricity meter SA4U-I672 of 14.06.2006
131.	**Other photo and documents** Photo 131 Production manual boiler DKVR 4 / 13 boiler house Pomerki, 70
132.	Photo 132 License №2 on the coal quality Grade A Class AB of the State holding company of the Ministry of Coal Industry of Ukraine from 14.07.2010
133.	Photo 133 Passport electricity meter CT-EA05D1 with information about the certification 04 March 2009
134.	Photo 134 The act of sealing electricity meter in boiler house Gv. Zaliznychikiv, 37
135.	Passport Volume corrector gas KPLH-1.02R boiler house Pomerki, 70
136.	Training on occupational safety logbook Pomerki, 70
137.	Official note "Kharkivteplozbut" for information on the number of consumers

	of hot water, heating area.
138.	Act number 1007 acceptance of the works in April 2010. Reconstruction of boiler houses. DAN-225 heat exchanger. Elektrovozna, 7A
139.	Act number 1008 acceptance of the works in April 2010. Reconstruction of boiler houses. DAN-185 heat exchanger. Elektrovozna, 7A
140.	Act number 248 acceptance of the works in May 2010. Reconstruction of boiler houses Elektrovozna, 7A
141.	Act number 1148 acceptance of the works in May 2010. Installation of pipes of heat exchangers Elektrovozna, 7A
142.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Ordzhonikidzevskiy Branch
143.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Zhovtneviy Branch
144.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Moscovskiy Branch
145.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Leninskiy Branch
146.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Kievskiy branch
147.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Dzerzhinskiy Branch
148.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Kominternivs'kiy Branch
149.	Standard ecological form 2TP-Air 2010 ME "Kharkivski teplovi merezhi" Chervonozavods'kiy Branch
150.	Information about absence of change isolation connected buildings 2010.
151.	Readiness Act of ME "Kharkivski teplovi merezhi" to work in the heating season 2010-2011
152.	Schedule of heating season 2010-2011.
153.	Schedule preparation of facilities to work in the heating season 2010-2011.
154.	Schedule in repairing boilers and heating systems Chervonozavodskiy branch ME "Kharkivski teplovi merezhi" in 2010.
155.	Regulations of capital and emergency repairs of heating systems and hot water supply systems in Kharkiv. 2004.
156.	Comparative analysis of citizens' requests for quality services, received in the ME "Kharkivski teplovi merezhi" in 2009-2010.
157.	Order № 803 from 14 April 2010 of Kharkiv Mayor "On termination of the

	heating season in Kharkiv"
158.	Order №2753 from 28 September 2010 of Kharkiv Mayor "About the beginning of heating season in Kharkiv"
159.	Order №2886 from 05. November 2010 "Amendments to the order of mayor of Kharkiv on the beginning of heating season in Kharkiv" of 28 september 2010 № 2753 "
160.	Letters Kharkiv Regional Centre for Hydrometeorology of monitoring air temperature
161.	Act number 217 acceptance of the works for April 2010. Reconstruction on Chaplygina, 12. Installation of instrumentation and automation facilities.
162.	Act number 98 Acceptance of the works for February 2010. Reconstruction on Chaplygina, 12. Liquidation boiler house.
163.	Act number 99 Acceptance of the works for February 2010. Reconstruction on Chaplygina, 12. Liquidation boiler house.
164.	Act number 160 acceptance of the works for March 2010. Reconstruction on Chaplygina, 12. Liquidation boiler house.
165.	Act number 161 acceptance of the works for March 2010. Reconstruction on Chaplygina, 12. Liquidation boiler house
166.	Act number 571 acceptance of the works for September 2010. Reconstruction on Chaplygina, 12. Liquidation boiler house
167.	Act number 192 acceptance of the works for April 2010. Reconstruction of heating a house on Gv. Zheleznodorozhnykiv, 37
168.	Act number 279 acceptance of the works in May 2010. Reconstruction of heating a house on Gv. Zheleznodorozhnykiv, 37
169.	Act number 280 of the reception of the works for April 2010. Reconstruction of heating a house on Gv.Zheleznodorozhnykiv, 37.
170.	Act number 117 of the reception of the works in July 2010. Reconstruction of boiler on Ivanivska, 22.
171.	Act number 118 acceptance of the works in July 2010. Reconstruction of boiler on Ivanivska, 22.
172.	Act № 7-7 reception of the works in July 2010. Reconstruction of boiler on Ivanivska, 22.
173.	Act number 33 Acceptance of the works in January 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
174.	Act number 35 Acceptance of the works for February 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
175.	Act number 5 Acceptance of the works for April 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.

176.	Act № 989 acceptance of the works in October 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
177.	Act № 989-1 Acceptance of the works in October 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
178.	Act № 989-2 Acceptance of the works in October 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
179.	Act number 1 receiving construction in November 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
180.	Act number 3 reception building works in November 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
181.	Act number 2/9 Acceptance of contract work completed in November 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
182.	Act number 34 Acceptance of the works in January 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
183.	Act № 34-1 acceptance of the works in November 2010. Overhaul Boiler NYYSTU-5 Krasnodarska, 104.
184.	Act number 554 acceptance of the works for August 2010. DKVR boiler overhaul 4 / 13, Pomerki, 70.
185.	Act number 634 acceptance of the works for September 2010. DKVR boiler overhaul 4 / 13, str. Pomerki, 70.
186.	Act number 88 Acceptance of the works for February 2010. Overhaul Boiler DKVR, Pomerki, 70.
187.	Act number 682 acceptance of the works in October 2010. DKVR boiler overhaul 4 / 13, Pomerki, 70.
188.	Act number 778 acceptance of the works in November 2010. DKVR boiler overhaul 4 / 13, Pomerki, 70.
189.	Act number 40 Acceptance of the works in January 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
190.	Act number 59 Acceptance of the works for February 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
191.	Act number 40 Acceptance of the works in January 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
192.	Act number 135 acceptance of the works for March 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.

193.	Act number 151 acceptance of the works in January 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
194.	Act number 1 acceptance of construction works in May 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
195.	Act number 1 / 570 558 2010 acceptance of the works. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262
196.	Act number 4 / 570 588 acceptance of construction works in December 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262.
197.	Act number 4 / 570 588 reception of the works in November 2010. elimination of inefficient boilers Gagarina 244, 250, 266 connected to the boiler on Gagarina, 262
198.	SNiP 2-3-79 (1998)
199.	State Buildings Norms (B.2.6-31:2006)
200.	Order No. 159 dated 31.03.2011 on terms of storage of monitoring relevant documents for JI project is issued by General director of ME "Kharkivski teplovi merezhi".
201.	KTM 204 Ukraine 244-941

Persons interviewed:

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

/1/	Andreev S.Yu. – general director ME " Kharkivski teplovi merezhi"
/2/	Repin A. P. – Head of the Production-Technical Department at ME " Kharkivski teplovi merezhi", Manager of the JI Project;
/3/	Sudakevich Z.G. – Manager of the supporting group of the JI Project in the Production-Technical Department
/4/	Lechenko E.V. – head of boiler house (Gagarina, 262)
/5/	Suleymanova N.I. – boiler house operator (Gagarina, 262)
/6/	Eremenko A.S. – boiler house master (Gagarina, 262)
/7/	Strel'nikov I.G. – section chief (Moskovskiy district)
/8/	Avakian A.Z. – chief-metrologist (Moskovskiy district)
/9/	Gnedoy B.V. - boiler house operator (Krasnodarska, 104)
/10/	Gerachenko N.F. – section chief (Kiyevski district)

/11/	Nefidov V.I. – boiler house head-master (Pomerki, 70)
/12/	Duchina E.A. – boiler-house operator (Pomerki, 70)
/13/	Timofeev V.V. – head engineer (Dzerginskiy district)
/14/	Mataherii G. M. - boiler house head-master (Ivanivska, 22)
/15/	Naumenko I.M. - boiler house operator (Gv. Zaliznychnikiv, 37)
/16/	Chugunov V.V. - boiler house operator (Poltavskiy Shliah, 110)
/17/	Novikova L.E. - boiler house operator (Poltavskiy Shliah, 110)
/18/	Kalupanov V.S. – metal worker
/19/	Chagovets Ye.A. – boiler-house operator

APPENDIX A: "REHABILITATION OF THE DISTRICT HEATING SYSTEM IN KHARKIV CITY" VERIFICATION PROTOCOL

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
Project approvals by Parties involved				
90	Has the DFPs of at least one Party involved, other than the host Party, issued a written project approval when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest?	DFPs of both Parties (Ukraine, Netherlands) have issued written project approvals (LoAs) when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines.	OK	OK
91	Are all the written project approvals by Parties involved unconditional?	Yes, all the written project approvals by Parties involved are unconditional.	OK	OK
Project implementation				
92	Has the project been implemented in accordance with the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	At the time of previous and current monitoring periods the delay in the installation of some project units as to the determined PDD was noted. In several cases replacement of different (from planed before) diameters of network pipes takes place. Installation of frequency controllers and cogeneration units are not finished yet. It is postponed because of significant increasing of natural gas price and corresponding shift of the prioprities for implementation of the energy saving measures. CL 01. Please provide justification for the difference of amount of ERU's for the reported year in the PDD and MR. CL 02 . Please provide justification for the difference of amount of Baseline emissions for the reported year in the PDD and MR.	CL 01 CL 02	OK
93	What is the status of operation of the project during the monitoring period?	On the whole project has been implemented as defined in the PDD and the implementation is evidenced by statements of work completion (see list of verified documents).	OK	OK
Compliance with monitoring plan				

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
94	Did the monitoring occur in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website?	Yes, monitoring occurs in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and verified changes and is so listed on the UNFCCC JI website.	OK	OK
95 (a)	For calculating the emission reductions or enhancements of net removals, were key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project taken into account, as appropriate?	All key factors influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project were taken into account, as appropriate for calculating the emission reductions or enhancements of net removals.	OK	OK
95 (b)	Are data sources used for calculating emission reductions or enhancements of net removals clearly identified, reliable and transparent?	Gas consumption registered automatically. Operators of all boiler-houses register the instrument readings in the paper journals “Journal of registration of boiler-house’s operation parameters” every day. At the boiler-houses that are not equipped with gas volume correctors (at present about 10% of the total number of boiler-houses), operators register parameters of gas: temperature and pressure in these journals every 2 hours. These parameters are used to bring gas consumption to normal conditions. Every day operators transfer values of gas consumption to dispatcher of the regional branch of ME "Kharkivski teplovi merezhi" by phone. Monthly they transfer the paper report. Regional branches transfer data to Techno-Economic Activities Department (TEA) of Production-Technical Service (PTS) of ME "Kharkivski teplovi merezhi" where they are storing and used for payments with gas suppliers. CAR 01. In MR № 4, section B 2.1 and Annex 1 the exact reference to the data source must be indicated.	CAR 01	OK
95 (c)	Are emission factors, including default emission	Emission factors, including default emission factors are	FAR 01	OK

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	factors, if used for calculating the emission reductions or enhancements of net removals, selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice?	presented in Section B.2.1 and Annex 1 of the MR. FAR 01. In order to meet the JISC requirements on data saving and archiving, an Order on archiving of all project related documentation for two years after the last ERU transmission should be developed and included to the Emission Monitoring Manual. All persons responsible for data collection and monitoring should be aware of the provisions of this Order.		
95 (d)	Is the calculation of emission reductions or enhancements of net removals based on conservative assumptions and the most plausible scenarios in a transparent manner?	Yes, the calculation of emission reductions or enhancements of net removals are based on conservative assumptions and the most plausible scenarios in a transparent manner.	OK	OK
Applicable to JI SSC projects only				
96	Is the relevant threshold to be classified as JI SSC project not exceeded during the monitoring period on an annual average basis? If the threshold is exceeded, is the maximum emission reduction level estimated in the PDD for the JI SSC project or the bundle for the monitoring period determined?	N/a	N/a	N/a
Applicable to bundled JI SSC projects only				
97 (a)	Has the composition of the bundle not changed from that is stated in F-JI-SSCBUNDLE?	N/a	N/a	N/a
97 (b)	If the determination was conducted on the basis of an overall monitoring plan, have the project participants submitted a common monitoring report?	N/a	N/a	N/a
98	If the monitoring is based on a monitoring plan that provides for overlapping monitoring periods, are the monitoring periods per	N/a	N/a	N/a

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	component of the project clearly specified in the monitoring report? Do the monitoring periods not overlap with those for which verifications were already deemed final in the past?			
Revision of monitoring plan				
Applicable only if monitoring plan is revised by project participant				
99 (a)	Did the project participants provide an appropriate justification for the proposed revision?	During this verification monitoring plan has not been revised.	N/a	N/a
99 (b)	Does the proposed revision improve the accuracy and/or applicability of information collected compared to the original monitoring plan without changing conformity with the relevant rules and regulations for the establishment of monitoring plans?	N/a	N/a	N/a
Data management				
101 (a)	Is the implementation of data collection procedures in accordance with the monitoring plan, including the quality control and quality assurance procedures?	All data necessary for the CO2 emission reductions calculation is collected. The scheme of data flow and a description of reporting procedures introduced in Monitoring report. Training logbook and Results of operator training were presented to the verification team during the site visit. Position and roles of person in the GHG data management process are defined in the monitoring report and are implemented on-site. CAR 02. Section A.3 paragraph 4 MR incorrectly stated the name of the residential area Saltovskiy.	CAR 02	OK
101 (b)	Is the function of the monitoring equipment, including its calibration status, is in order?	Calibration is conducted by State Center of Metrology and Standardization. The documents that confirmed calibration	OK	OK

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
		were provided for the verification team.		
101 (c)	Are the evidence and records used for the monitoring maintained in a traceable manner?	Data collection are clearly defined in the monitoring report and are implemented on-site.	OK	OK
101 (d)	Is the data collection and management system for the project in accordance with the monitoring plan?	All data necessary for the CO2 emission reductions calculation is collected. The scheme of data flow is introduced in Monitoring report.	OK	OK
Verification regarding programs of activities (additional elements for assessment)				
102	Is any JPA that has not been added to the JI PoA not verified?	N/A	N/A	N/A
103	Is the verification based on the monitoring reports of all JPAs to be verified?	N/A	N/A	N/A
103	Does the verification ensure the accuracy and conservativeness of the emission reductions or enhancements of removals generated by each JPA?	N/A	N/A	N/A
104	Does the monitoring period not overlap with previous monitoring periods?	N/A	N/A	N/A
105	If the AIE learns of an erroneously included JPA, has the AIE informed the JISC of its findings in writing?	N/A	N/A	N/A
Applicable to sample-based approach only				
106	Does the sampling plan prepared by the AIE: (a) Describe its sample selection, taking into account that: (i) For each verification that uses a sample-based approach, the sample selection shall be sufficiently representative of the JPAs in the JI PoA such extrapolation to all JPAs identified for that verification is reasonable, taking into account differences among the	N/A	N/A	N/A

DVM Paragraph	Check Item	Initial finding	Draft Conclusion	Final Conclusion
	characteristics of JPAs, such as: − The types of JPAs; − The complexity of the applicable technologies and/or measures used; − The geographical location of each JPA; − The amounts of expected emission reductions of the JPAs being verified; − The number of JPAs for which emission reductions are being verified; − The length of monitoring periods of the JPAs being verified; and − The samples selected for prior verifications, if any?			
107	Is the sampling plan ready for publication through the secretariat along with the verification report and supporting documentation?	N/A	N/A	N/A
108	Has the AIE made site inspections of at least the square root of the number of total JPAs, rounded to the upper whole number? If the AIE makes no site inspections or fewer site inspections than the square root of the number of total JPAs, rounded to the upper whole number, then does the AIE provide a reasonable explanation and justification?	N/A	N/A	N/A
109	Is the sampling plan available for submission to the secretariat for the JISC.s ex ante assessment? (Optional)	N/A	N/A	N/A
110	If the AIE learns of a fraudulently included JPA, a fraudulently monitored JPA or an inflated number of emission reductions claimed in a JI PoA, has the AIE informed the JISC of the fraud in writing?	N/A	N/A	N/A

Table 2 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project participant response	Verification team conclusion
CL 01. Please provide justification for the difference of amount of ERU's for the reported year in the PDD and MR.	92	As it is described in PDD, the method for prognostic calculations used in PDD and the approach for calculation of actual emission reduction in monitoring plan are principally different. Estimated (stated in the PDD, section D.1.4) amount of emission reductions is based on the prognostic calculations with taking into account the prognostic efficiency of boilers, prognostic estimation of efficiency of some energy saving measures from ones described in PDD that are calculable (not all of them), and without account of any future conditions (which is impossible in principle). The minimum assured result of implementation of the energy saving measures was adopted in PDD, and in cases when it was impossible to express this result in figures – was not taken into account though had to be for sure positive. Moreover, according to the conservative approach, the effect of these measures was considered only for the next year after their implementation, thugh emission reductions were achieved starting directly from time of their implementation.	Explanation provided is exhaustive. Issue is closed.

		In contrast to PDD, calculations in a MRs are based on actual achieved results of the project implementation with taking into account the actual (both internal and external) conditions for district heating in a reported year (see PDD sections B1, D.1.1 and/or MR section A.5.1). This approach eliminates any possibility of reduction of fuel consumption and correspondingly GHG emission due to incomplete delivery of heat to consumers, is the most appropriate, precise, corresponding to the conservative approach, and the most closely reflects the aims, goals and spirit of Kyoto Protocol. Moreover, the measures that enable to achieve the largest effect are implemented with first-priority, and implementation of the scheduled measures at the majority of objects is accompanied with additional/ associated minor measures that are not predictively calculable. Thus the results of these two approaches should be different by definition. All calculations in a MRs are namely justification of the reality of actually achieved emission reductions in course of implementation energy saving measures in accordance with the PDD.	

CL 02 . Please provide justification for the difference of amount of Baseline emissions for the reported year in the PDD and MR.	92	As it is described in PDD, the Baseline emissions for prognostic calculations used in PDD and the approach for calculation of actual emission reduction in monitoring plan are principally different. In PDD (section D.1.4), the Baseline emissions for any reported year were calculated as emissions in the base year. According to the project specific approach described in PDD (section B1 and D.1.1) and MR (section A.5.1), in MR the Baseline emissions for the reported year were calculated as emissions in the base year, corrected in view of the actual (both internal and external, such as: net calorific value of fuel, quality of heating service, weather changes, changes in customers' number, etc.) conditions in the reported year, - the Dynamic Baseline assumption. Thus the results of these two approaches should be different by definition. Calculations in the MR justify the reality of corrected Baseline emissions corresponding to the reported year, in accordance with the PDD.	Explanation is accepted. Issue is closed
CAR 01. In MR № 4, section B 2.1 and Annex 1 the exact reference to the data source must be indicated.	95 (b)	This is provided in the MR version 02.	CAR 01 is closed
FAR 01. In order to meet the JISC requirements on data saving and archiving, an Order on archiving of all project related documentation for two years after the last ERU transmission should be developed and included to the Emission Monitoring Manual. All persons responsible for data collection and monitoring should be aware of the provisions of this Order.	95 (c)	Order No. 159 dated 31.03.2011 on terms of storage of monitoring relevant documents for JI project is issued by General director of ME "Kharkivski teplovi merezhi". This Order is provided to AIE.	FAR 01 is closed

CAR 02. Section A.3 paragraph 4 MR incorrectly stated the name of the residential area Saltovskiy.	101 (a)	This is corrected in the MR version 02.	CAR 02 is closed

APPENDIX B: VERIFICATION TEAM

Oleg Skoblyk, Specialist (Power Management)
Team Leader, Climate Change Lead Verifier
Bureau Veritas Ukraine HSE Department project manager

Oleg Skoblyk has graduated from National Technical University of Ukraine 'Kyiv Polytechnic University" with specialty Power Management. He has successfully completed IRCA registered Lead Auditor Training Course for Environment Management Systems and Quality Management Systems. Oleg Skoblyk has undergone intensive training on Clean Development Mechanism /Joint Implementation and he is involved in the determination/verification of 52 JI projects.

Rostislav Topchiy (chemical and ecological engineering)
Team member, Climate Change Verifier
Bureau Veritas Ukraine Health, Safety and Environment Project Manager

He is a Lead auditor of Bureau Veritas Certification for Environment Management System, Quality Management System, Occupational Health and Safety Management System. He performed over 180 audits since 2004. He has successfully completed Climate Change Verifier Training Course and he participated as verifier in the verification of 10 JI projects.

Vitaliy Minyaylo (chemical and ecological engineering)
Team member, Climate Change Verifier trainee
Bureau Veritas Ukraine,
Health, Safety and Environment Department Project Manager

He has successfully completed IRCA registered Lead Auditor Training Course for Environment Management Systems, Quality Management Systems, Occupational Health and Safety Management System.

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

Internal Technical Reviewer, Climate Change Lead Verifier, Bureau Veritas Certification Holding SAS Local Climate Change Product Manager for Ukraine

Acting CEO Bureau Veritas Black Sea District

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 140 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 is Lead Tutor of the Clean Development Mechanism /Joint Implementation Lead Verifier Training Course and he was involved in the determination/verification over 60 JI/CDM projects.