VERIFICATION REPORT
GLOBAL CARBON BV

VERIFICATION OF THE
IMPROVEMENT OF THE ENERGY EFFICIENCY AT ENERGOMASHSPETSSTAL (EMSS), KRAMATORSK, UKRAINE

INITIAL AND 1ST PERIODIC (2008)

REPORT NO. UKRAINE-/0016/2008

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BUREAU VERITAS CERTIFICATION

Report No: UKRAINE-0016/2008

VERIFICATION REPORT

Date of first issue: 6 November 2009	Organizational unit: Bureau Veritas Certification Holding SAS
Client: Global Carbon BV	Client ref.: Mr. Lennard de Klerk

Summary:

Bureau Veritas Certification has made the verification of the "Improvement of the Energy efficiency at Energomashspetsstal (EMSS), Kramatorsk, Ukraine" project of Global Carbon BV located in Kramatorsk, 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 Accredited Independent 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 generating 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 117 881 t CO2e reductions during period from 01/01/2008 up to 31/12/2008.

Report No.: UKRAINE--/0016/2008	Subject Group: JI	
Project title: Improvement of the Energy efficiency at Energomashspetsstal (EMSS), Kramatorsk, Ukraine		
Work carried out by: Team Leader : Nadiia Kaiun Team Member : Kateryna Zinevych Team Member : Oleg Skoblyk Specialist : Pavel Rosen		
Work verified by: Leonid Yaskin		
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Indexing terms

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Abbreviations

AIE	Accredited Independent Entity
BVCH	Bureau Veritas Certification Holding SAS
CAR	Corrective Action Request
CL	Clarification Request
CO_2	Carbon Dioxide
ERU	Emission Reduction Unit
FAR	Forward Action Request
GHG	Green House Gas(es)
IETA	International Emissions Trading Association
IEEC	Institute for Environment and Energy Conservation
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

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1 INTRODUCTION

Global Carbon BV has commissioned Bureau Veritas Certification to verify the emissions reductions of its JI project "Improvement of the Energy efficiency at Energomashspetsstal (EMSS), Kramatorsk, Ukraine" (hereafter called “the project”) at Kramatorsk, Ukraine, UNFCCC JI Reference Number 0104.
This report summarizes the findings of the 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 initial and first periodic verification of the project for 2008.
This report includes the findings of the initial and first periodic verification. It is based on the Initial Verification Report Template Version 3.0, December 2003 and 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).
Initial and first periodic verification has been performed as one integrated activity. It consisted of a desk review of the project documents including PDD, monitoring plan, determination report, monitoring report and further documentation.
The results of the determination were documented by Bureau Veritas Certification Holding SAS in the report: “Improvement of the Energy efficiency at Energomashspetsstal (EMSS), Kramatorsk, Ukraine” Report No. UKRAINE/0003/2007 dated August 31st, 2009 See Section 7).
Project is approved by the National Environmental Investment Agency of Ukraine and Ministry of Economical Affairs in Netherlands (Letters of approval are presented, see Section 7) and registered under Track 2.

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. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.
The verification follows UNFCCC criteria referring to the Kyoto Protocol criteria, the JI 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 Designated Operational Entity of the monitored reductions in GHG emissions. The verification is based on the submitted monitoring report and the determined 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 3.1 dated 16th of November 2009 and underlying data records, covering the period 01 January 2008 to 31 December 2008 inclusive (see Section 7).

1.3 GHG Project Description

The project activity consists of the energy efficiency measures at the premises of EMSS by the implementation of four subprojects:

Subproject 1. Reconstruction of thermal and heating furnaces – there are 35 thermal and heating furnaces in operation in different shops at the premises of EMSS. The main goal of this subproject is the reduction of the natural gas (NG) consumption on 26 of these furnaces by commissioning of new automated NG burners (this enables to maintain the required temperature inside of the furnace) and by implementation of new thermal insulation for the walls, front doors and roofs of the furnaces.

Each reconstructed furnace has a natural gas flow meter with pressure and temperature sensors in order to calculate normal cubic meters of natural gas burned in the furnace. Information from flow meters, pressure and temperature sensors are transmitting to the control and monitoring computer system. The computer system started to calculate natural gas consumption into normal cubic meters since the end of 2008. So, recalculating from m^3 to the Nm^3 was done manually based on standardized methodology. The archiving period for the log files is at least one year. Information that corresponds to the natural gas consumption in 2008 has been burned on CDs. These CDs are stored until the end of crediting period plus two years.
Every half-finished product that processes through the furnaces has its own unique certificate. This certificate reflects all operations performed on the product and the weight on the exit of every workshop. So, the weight of half-finished products that proceed through each furnace could be easily monitored. Information from the certificates is saved in the log books in order to simplify the monitoring process.
A report including natural gas consumption and weight of half finished products is generating on a monthly basis. The report is signing by Head of Energy Saving Department, Head of corresponding workshop and approved by Chief Engineer.
Every furnace has specific natural gas consumption factor. This factor is using for the daily basis meter's checking procedure. In case specific natural gas consumption is deviating from the factor, furnace is shutting down for the checking procedures.

Subproject 2. Installation of a new vacuum system – Installation of a new vacuum system for the vacuumed steel production. The old vacuum system used heat and electricity. The reconstructed vacuum system uses only electricity.
Electricity that is consumed during the vacuum process is metered by meters, dedicated especially for this system. Information from meters is coming to the control and monitoring computer system of the vacuumator. A computer system records information about every vacuumation session, including melt passport, time and electricity consumption. The archiving period for the log files is at least one year. Information that corresponds to the electricity consumption in 2008 has been burned on CDs. These CDs are stored until the end of crediting period plus two years.
The vacuumator has a specific electricity consumption factor. In case the electricity consumption is deviating from the factor, the facility is shutting down to perform troubleshooting procedures.
The steel to the vacuum degasser (VD) is coming either from ladle furnace (LF) or from the electric arc furnace (EAF) in special ladle. Each ladle with liquid steel has unique certificate of melt.

Subproject 3. Installation of an arc ladle furnace – New arc ladle furnace is installed for the steel production. This means that the part of

the process of the steel preparation is doing in the ladle from which the steel will be cast into the forms. As a result there is reduction of the electricity consumption.
LF is a comprehensive solution for high quality steel melting has been installed in the Steel Making Workshop (SMW). The main electricity consumers of the SMW are powered by the following scheme.
Close Distribution Unit (CDU) #1,2 are electricity powering points for the EAFs (EAF50 #1, EAF100 #3, EAF100 #5 and EAF12) and LF. CDUs are powering from Transformers (T1, and T2) and Autotransformers (AT1 and AT2). EAFs and LF could be powered from any of the Transformers or Autotransformers. Commercial electricity meters are installed on each of the Transformers and Autotransformer. Cross-checking of the meters is performed by the following formulae:
$\sum$(AT1+ AT2 +T1 + T2) - $\sum$(EAF50 #1 + EAF100 #3 + EAF100 #5+ EAF12+LF)≤ 1.5%

In case difference is more than 1.5%, verification of meters is performed. The defective meter is substituted within one day.
The data from electricity meters concerning electricity consumption is transmitted to the control and monitoring computer system continuously. The computer system records information about each melt process, including melt certificate. This certificate includes information about the number of EAF where steel was melted, steel content, amount of electricity consumed during melting and weight of steel. The archiving period for the log files is at least one year. All melt certificates for the year 2008 has been burned to CDs. These CDs are stored until the end of crediting period plus two years.

Subproject 4. Modernization of press equipment – Replacing the old pump system, serving the 15,000 ton press, with a new one, more effective pump system. The number of old pumps is 24 (with 500 kW installed capacity each), and the number of new pumps will be 11 (with 800 kW installed capacity each).
Serving motors of the press pump station are powered from the 6kV line. Substation 110/6 kV has two transformers (Tp1 and Tp2). Each transformer has a commercial electricity meter. There are some additional consumers on the 6kV line. The check of meters is performed using the following formulae:
$\sum$(Tp1+Tp2) - $\sum$(Consumers+Pump Station) ≤ 1.5%
In case difference is more than 1.5%, verification of meters is performing. Defective meter is substituted within one day.
All data concerning electricity consumption is transmitted to the control and monitoring computer system. The press has a special registry log book, where working time of press is logged, among other data.

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 (see Section 7). 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	A score is assigned as follows: • Full - all best-practice expectations are implemented.	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

mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table.	• 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.	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	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.	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.

spreadsheets and/or password restrictions.	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; 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 1.0 dated 31 of August 2009 submitted by Global Carbon BV 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. To address Bureau Veritas Certification corrective action and clarification requests, Global Carbon BV revised the MR and resubmitted it on 3rd of November 2009 as version 3.0. This version was revised into 3.1 after Internal Technical Review.

The verification findings presented in this report relate to the project as described in the PDD version 3.9 and Monitoring Report version 3.1.

2.2 Follow-up Interviews

On 16/09/2009 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of EMSS, developer and local stakeholders were interviewed (see 7 References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Energomashspetsstal (EMSS)	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.
Local Stakeholder: District State Administration	Social impacts. Environmental impacts.
Consultant: Global Carbon BV	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.

Findings established during the initial verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CAR) are issued, where:
i) there is a clear deviation concerning the implementation of the project as defined by the PDD;
ii) requirements set by the MP or qualifications in a 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.

In the final verification report, 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 determination/verification

One task of the verification is to check the remaining issues from the previous determination and verification or issues which are clearly defined for assessment in the PDD. The determination report prepared by Bureau Veritas Certification Holding SAS notes following open issues.

Corrective Action Request 2 (CAR2):

A Letter of Endorsement for the proposed project was issued in April 2007.There is no evidence of written project approvals by the Parties involved.

Response

Letter of Approval № 540/23/07 issued by the National Environmental Investments Agency of from 29th of July 2008 and Approval of Voluntary participation in a Joint Implementation project of Ministry of Economical Affairs in Netherlands №20097JI01, dated 3 of March 2009 were received.

Conclusion of the Verification team

Evidencing documents were seen and found satisfactory.

3.2 Project Implementation

3.2.1 Discussion

The sub-project implementation schedule has changed against some delays:

- SP1. Heating and thermal furnaces were commissioned with delay compared to the schedule. One of the furnaces (namely, heating furnace #18) was put into operation ahead of schedule;
- SP2. A new vacuum system was put into operation at the end of the February 2008 only. That is why ERs of this subproject have been generated since March of 2008;
- SP4. Press was commissioned at the end of August 2008. So, emission reductions for this subproject were generated since September 2008.

Activity	**Date of start up according to PDD**	**Date of start up actual**
Subproject 1. Reconstruction of thermal and heating furnaces		
Thermal #1, Thermal workshop	2006	2006
Thermal #2, Thermal workshop	2006	2006
Thermal #9, Thermal workshop	2006	2006
Thermal #10, Thermal workshop	2006	2006
Thermal #30, Forge Press workshop	April 2008	May 2008
Thermal #18, Forge Press workshop	July 2008	December 2008
Heating #7, Forge Press Workshop	July 2008	October 2008
Heating #8, Forge Press Workshop	2007	2007
Heating #9, Forge Press Workshop	2007	2007
Heating #10, Forge Press Workshop	2007	February 2008
Subproject 2. Installation of a new vacuum system	May 2007	February 2008
Subproject 3. Installation of an arc ladle furnace	April 2007	April 2007

Activity	Date of start up according to PDD	Date of start up actual
Subproject 4. Modernization of press equipment	December 2007	August 2008

3.2.2 Findings

Corrective Action Request (CAR) 1
Please provide evidence of project approval from the Dutch side.

Response

Evidence of project approval from the Dutch side is provided. See supporting document SD1.

Conclusion of the verification team

Issue is closed.

Clarification Request (CL) 1
In the PDD version 3.9. and in Monitoring Report version 1 in the section A.3. it is stated that the goal of the project is the reduction of the natural gas consumption on 26 of 35 furnaces but in the monitoring report version 1 section A.6 only 10 furnaces are mentioned. Please clarify.

Response

According to the PDD (Section A.4.2), reconstruction of the 26 furnaces will be done during 2008-2009. That is why only ten of 26 furnaces were reconstructed during the year 2008 and mentioned in the Monitoring report.

Conclusion of the verification team

Issue is closed.

Clarification Request (CL) 2
Please clarify the cause of the deviation from the schedule.

Response

The main cause of the deviation from the schedule is the lack of financing.

Conclusion of the verification team
Issue is closed.

Clarification Request (CL) 3
Section B of the Monitoring Report version 1 states that there are some additional consumers on 6 kV line. Please clarify do they have influence on the project? If so, how is their influence monitored and measured?

Response
Additional consumers on the line 6kV do not have any influence on the project nor on the baseline or project emissions.

Conclusion of the verification team

Issue is closed.

3.2.3 Conclusion

The project complies with the requirements.

3.3 Internal and External Data

3.3.1 Discussion

The monitoring approach in the Monitoring Plan of the PDD version 3.9 requires monitoring and measurement of variables and parameters necessary to quantify the baseline emissions and project emissions in a conservative and transparent way.
The parameters that are determined to quantify the baseline and project emissions are presented in the Table 1 below.

Table 1. Projectline measurable variables

Data variable	Data unit	Method of calculation	Meters used for calculation (see MR version 3.1)
$NG_{tf,y}$, quantity of NG, used by the 26 reconstructed furnaces	1,000 Nm^3	$NG_{tf,y} = m^3 \times \frac{P \times T_N}{P_N \times T \times K \times 1000}$ Where: m^3 = volume of NG at working condition, m^3; P = pressure of NG at working condition, MPa; TN = 293.15K; PN = 0.101325MPa; T = (273.15 + t) temperature of NG	m^3 = (NG1,..., NG10); P = (PR1,..., PR10); t = (TP1,..., TP10).

		at working condition, K; K = 0.9998 factor of compressibility of NG.	
EL_{VD}, electricity consumed by the new vacuum system (VD)	MWh	$EL_{VD} = \frac{EL \times K_{TR}}{1000}$, Where: EL = electricity consumption, monitored at VD, kWh; K_{TR} = 600/5 transformation factor, (TR22,...,TR29).	EL= (EL6+EL7+EL8+EL9)
EL_{LF}, Electricity consumed by the ladle furnace	MWh	$EL_{LF} = \frac{EL \times K_{TR,current} \times K_{TR,voltage}}{1000}$, Where: EL = electricity consumption, monitored at LF, kWh; $K_{TR,current}$ = 500/5, transformation factor of current transformer, (TR16, TR17, TR18); $K_{TR,voltage}$ = 35000/100, transformation factor of voltage transformer, (TR19, TR20, TR21);	EL=EL5
EL_{EAF}, Electricity consumed by the EAFs	MWh	$EL_{EAF} = EL_{EAF50} + EL_{EAF100\#3} + EL_{EAF100\#5}$, With $EL_{EAF50} = EL_{50}$, $EL_{EAF100\#3} = \frac{EL_{100\#3} \times K_{TR100\#3,current} \times K_{TR100\#3,voltage}}{1000}$, $EL_{EAF100\#5} = \frac{EL_{100\#5} \times K_{TR100\#5,current} \times K_{TR100\#5,voltage}}{1000}$, Where: EL_{EAF50} = electricity consumption, monitored at EAF50, MWh; $EL_{EAF100\#3}$ = electricity consumption, monitored at EAF100#3, kWh; $K_{TR100\#3,current}$ = 600/5, transformation factor of current transformer, (TR6, TR7); $K_{TR100\#3,voltage}$ = 35000/100, transformation factor of voltage transformer, (TR8, TR9, TR10);	EL_{EAF50} = EL1 $EL_{EAF100\#3}$ = EL2 $EL_{EAF100\#5}$ = (EL3 + EL4)

		$EL_{EAF100\#5}$ = electricity consumption, monitored at EAF100#3, kWh; $K_{TR100\#5,current}$ = 600/5, transformation factor of current transformer, (TR11, TR12); $K_{TR100\#5,voltage}$ = 35000/100, transformation factor of voltage transformer, (TR13, TR14, TR15);	
EL_{PR}, electricity consumed by the new pumps of the 15,000 tonnes press	MWh	$EL_{PR} = \frac{EL \times K_{TR,current} \times K_{TR,voltage}}{1000}$, Where: EL = electricity consumption, monitored at press, kWh; $K_{TR,current}$ = 1500/5, transformation factor of current transformer, (TR30); $K_{TR,voltage}$ = 6000/100, transformation factor of voltage transformer, (TR31).	EL = EL10

Table 2. Baseline measurable variables

Data variable	Source of data	Data unit	Method of calculation	Meters used for calculation
$PRST_{tf}$, the production level of each of the 26 reconstructed thermal and heating furnaces	Measuring devices of the thermal shop and forge and press shop	Tonnes	$PRST_{tf}$ is a result of direct measurement (weighing) of the of half-finished products proceeded through each furnace	WM1-WM4
$PRVS_{VD}$, the production volume of vacuumed steel	Measuring devices of the VD	Tonnes	$PRVS_{VD}$ is a result of direct measurement (weighing) of the steel proceeded through VD	WM5
PRES, the production volume of electro steel	Measuring devices of the electro steel shop	Tonnes	*PRES* is a result of direct measurement (weighing) of the steel proceeded through LF	WM5

T_{pp}, working hours of press	Server at energy saving department	hours	T_{pp} is the sum from registry log book records	Registry log-book on press

The list of monitoring equipment, which is used in all the sub-projects is present in the Monitoring Report version 3.1 Tables 2-7. All the monitoring equipment is to be checked and calibrated according calibration plans

3.3.2 Findings

Corrective Action Request (CAR) 2

The meter Energia 9 #11786 is not mentioned in the table 2 List of electric meters of the MR version 1.0 but is used in the metering process.
For all transformers TR1-TR31 in the Table 3 List of transformers in the MR version 1.0 wrong calibration dates are indicated. According to the calibration certificates the date of last calibration is 13.05.09, which differs from the dates of last calibration mentioned in the MR.
In the Table 3 List of transformers in the MR version 1.0 there are transformers (TPOL-35 #6, #17, ZNOM-35 #1135076, #1144166, #1144170, NTMI-6-66-UZ #412) that were replaced by others.
In the Table 4 List of natural gas meters of the MR version 1.0 for natural gas meters NG5-8 wrong calibration dates are indicated according to the certificates of calibration.
In the Table 5 List of temperature meters in the MR version 1.0 temperature meter TSPU-205 #8359 is mentioned in the table but is not used in the project according to the present documents and information collected during the site-visit.
In the Table 5 List of temperature meters in the MR version 1.0 for temperature meter TCMU-274-05 wrong calibration date is indicated according to the certificate of calibration.
In the Table 6 List of pressure meters in the MR version 1.0 for pressure meters PR3,4,10 wrong calibration dates are indicated according to the certificates of calibration.
In the Table 7 List of weighting machines of the MR version 1.0 WM5 has different names in the MR and in the passport and certificate of calibration while the serial number and other parameters correspond.
In the Table 7 List of weighting machines of the MR version 1.0 for weighting machines WM1-WM4 wrong calibration dates are indicated according to the certificates of calibration.
Please provide appropriate clarifications according all the meters and correct appropriately.

Response

The meter Energia 9 #11786 is using for the reactive current metering, thus it is not used in the metering process of the project.
The dates of calibration for the transformers have been corrected. See latest version of the Monitoring report.
The types and serial numbers of transformers have been corrected. See latest version of the Monitoring report.
Calibration dates of natural gas meters of the MR version 1.0 natural gas meters NG5-8 have been corrected. See latest version of the Monitoring report.
Temperature meter TSPU-205 #8359 is using as a reserve and has been deleted from the latest version of the Monitoring report.
Data corresponds to WMs have been corrected. See latest version of the Monitoring report.

Conclusion of the verification team

Issue is closed.

Corrective Action Request (CAR) 3
In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for transformers is 1 year while in the Table 3 the calibration interval for all the transformers is 4 years. Please provide appropriate clarifications and correct if necessary.

Response

Calibration interval for transformers is 4 years. Corrections have been made in Section B.1.3 of the MR.

Conclusion of the verification team

Issue is closed.

Clarification Request (CL)11
Quantity of NG, used by the reconstructed furnaces, is not measured as per PDD, but calculated by a formula, which includes measured values of NG temperature and pressure. Measurement of NG temperature and pressure was not included in MP in PDD. Please clarify.

Response

The latest version of MP (PDD, section D.1.1) stated that the source of the data for the variable *NGtf,y* (quantity of NG, used by the 26 reconstructed furnaces) is a **measuring devices** of the workshop. So, in order to get normalized volume of natural gas combusted at workshop,

temperature and pressure data has been used.
Temperature and pressure measuring devices were installed after MP was developed as a part of NG measuring equipment. The formula for calculation used in MR is specific for vortex flow meter and it is not applicable for other type of gas meter (i.e. orifice flow meter). Decision on the type of flow meter was optional and therefore it was not included into the PDD. For year 2008 calculation was performed manually using formula. Fore year 2009 the calculation was performed for the part of furnaces automatically using the same devices yielding figures of NG quantity directly in Nm3 and since 2010 for all furnaces figures will be obtained in Nm3. This is explained in the MR for 2008. The formula is incorporated into the measuring equipment controller.

Conclusion of the verification team

Explanation is accepted and CL is closed.

Forward Action Request (FAR) 1
Monitoring Report does not provide information how LCV of NG was calculated monthly based on data from suppliers and what value was used in calculation by formula (2). Please explain and correct.

Response

Calculations are performed monthly, and sum of figures for 12 months give annual result. Formula will be modified for the next monitoring period which is 9 months.

Conclusion of the verification team

Issue will be closed during next verification.

Clarification Request (CL) 6
No documentation for the electricity meter Energia 9 #43898 was provided onsite. Please clarify if this meter is a part of JI project and provide necessary documentation.

Response

Electricity meter Energia 9 #43898 is a part of JI. Documentation is provided (see SD2).

Conclusion of the verification team

Issue is closed.

Clarification Request (CL) 7
Electric meter Energia 9 #43887 is used in the project but is not mentioned in the MR version 1.0 and its documentation was not provided to the verification team. Please clarify.

Response

Electric meter Energia 9 #43887 is not the part of the JI project. This meter is using for reactive current metering.

Conclusion of the verification team

Issue is closed.

Clarification Request (CL) 8

In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for electricity meters is 6 years, while in the table 2 of this MR some electricity meters have 4 years of calibration interval. Please clarify.

Response

According to the GOST 26035-83, calibration interval for the meters produced before 01.01.1988 is four years and for the meters produced after 01.01.1988 is six years. GOST is provided as a supporting document (see SD4).

Conclusion of the verification team

Issue is closed.

3.3.3 Conclusion

The project complies with the requirements.

3.4 Environmental and Social Indicators

3.4.1 Discussion

The project improved efficiency of use of natural gas, electricity and heat at the enterprise and thus leaded to decrease of harmful emissions. This project by reducing GHG emissions contributes towards a better environment and hence works towards social well-being for all. Project implementation will lead to improvement of ecological climate of the region, increase of payments to the budgets of all levels for social needs, prevention of reduction of working places and better working conditions at EMSS.

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

Subproject 1. Reconstruction of thermal and heating furnaces. Information from flow meters, pressure and temperature sensors are transmitting to the control and monitoring computer system. The computer system started to calculate natural gas consumption into normal cubic meters since the end of 2008. So, recalculating from m^3 to the Nm^3 was done manually based on standardized methodology. The archiving period for the log files is at least one year. Information that corresponds to the natural gas consumption in 2008 has been burned on CDs. These CDs are stored until the end of crediting period plus two years.

Every half-finished product that processes through the furnaces has its own unique certificate. This certificate reflects all operations performed on the product and the weight on the exit of every workshop. So, the weight of half-finished products that proceed through each furnace could be easily monitored. Information from the certificates is saved in the log books in order to simplify the monitoring process.

A report including natural gas consumption and weight of half finished products is generating on a monthly basis. The report is signing by Head of Energy Saving Department, Head of corresponding workshop and approved by Chief Engineer.

Subproject 2. Installation of a new vacuum system. Information from meters is coming to the control and monitoring computer system of the vacuumator. A computer system records information about every vacuumation session, including melt passport, time and electricity consumption. The archiving period for the log files is at least one year. Information that corresponds to the electricity consumption in 2008 has been burned on CDs. These CDs are stored until the end of crediting period plus two years.

Subproject 3. Installation of an arc ladle furnace.The data from electricity meters concerning electricity consumption is transmitted to the control and monitoring computer system continuously. The computer system records information about each melt process, including melt certificate. This certificate includes information about the number of EAF where steel was melted, steel content, amount of electricity consumed during melting and weight of steel. The archiving period for the log files is at least one year. All melt certificates for the year 2008 has been burned to CDs. These CDs are stored until the end of crediting period plus two years.

Subproject 4. Modernization of press equipment. All data concerning electricity consumption is transmitted to the control and monitoring computer system. The press has a special registry log book, where working time of press is logged, among other data.

3.5.2 Findings

Forward Action Request (FAR) 2

For better understanding please provide information/process flow diagram, describing the entire process from raw data to reported totals is developed.

Response

Corrections have been made in the text of MR (Section C.1.1. footnote 1). Required information will be included in the next Monitoring Report in a more transparent way.

Conclusion of the verification team

Issue will be closed during next verification.

3.5.2 Conclusion

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

4 FIRST 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.

All parameters were determined as prescribed. The complete data is stored electronically and documented. The necessary procedures have been defined in internal procedures.

According to PDD version 3.9, emission reductions during 2008 monitoring period were expected to be 141 722 t CO2 e. According to Monitoring Report version 1 emission reductions achieved are 117 881 t CO2 e.

4.1.2 Findings

Clarification Request (CL) 4

Please provide the clarification on the difference of the amount of emission reductions in PDD and Monitoring Report.

Response
The reasons for the difference in the amount of the ERUs are the following:

- The amount of semi-finish products processed in the furnaces is different from what was estimated in the PDD.
- The amount of steel melted in LF and processed in the VD is different from what was estimated in the PDD.

The working time of press is different from what was estimated in the PDD.

Conclusion of the verification team
Issue is closed.

4.1.3 Conclusion

The project complies with the requirements.

4.2 Accuracy of Emission Reduction Calculations

4.2.1 Discussion

The audit team confirms that emission reduction calculations have been performed according to the Monitoring Plan.
According to the Article 10 paragraph 1 of the Ukrainian Law "On Metrology and Metrological Activity" measurement results can be used in case if appropriate characteristics of errors and uncertainty are known. Characteristics of errors are presented in the passports of the equipment. The level of uncertainty is considered as low which is why it can be neglected in the calculations.
Project consists of the 105 monitoring parameters. Some of the parameters that are used in the calculation of the baseline and project emissions are measured directly with the use of special equipment while others are estimated with the use of appropriate coefficients.

4.2.2 Findings

Clarification Request (CL) 5
Please provide information on how the level of uncertainty is taken into account.

Response

The data received directly from meters is taken with the level of uncertainty taking into account.

Conclusion of the verification team

Issue is closed.

Clarification Request (CL) 9

Please provide more information on quality assurance of the external data. While quality assurance of the internal data is presented in a clear way, description of the quality assurance of the external data can be more transparent.

Response

The documents that confirmed the external data (calorific value of natural gas, efficiency of the boiler at KramCHP) are provided. See SD3, SD5.

Conclusion of the verification team

Issue is closed.

4.2.3 Conclusion

The project complies with the requirements.

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 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 general management of the monitoring team is implemented by the Deputy Chief Engineer of the EMSS through supervising and coordinating activities of his subordinates, such as the head of Energy Saving Department, the head of Steel Making Shop, Press-Forging Shop and Thermal Shop. On-site day-to-day (operational) management is implemented by the heads of corresponding shops. The technological process data is logged into the PCs continuously. The PCs at reconstructed furnaces, LF, VD, etc., have not only monitoring but control functions as well. Keeping the PCs in a working condition is a responsibility of the Department of the automated control systems.

All data necessary for the CO_2 emission reductions calculation is collected in the Energy Saving Department. The head of the Energy Saving Department is making calculations on a monthly basis. The general supervision of the monitoring system is executed by the Deputy Chief Engineer.

For this monitoring period the names of the personnel involved is as follows:

- Deputy Chief Engineer: A. Masyuk
- Head of Energy Saving Department: A. Suprun
- Head of the Steel Making Shop: A. Gorkusha
- Head of the Press-Forging Shop: N. Bondar
- Head of the Thermal Shop: V. Stankov

All contracts for the equipment supplying include chapter describing personnel training. Training is providing by equipment producers.

CO_2 emission reductions calculations are performing on the monthly basis by the head of the Energy Saving Department. All energy sources flows (such as electricity and natural gas) are logged on the server in the Energy Saving Department. Hence the head of Department checks the correctness of measurements by the indirect calculations.

4.4.2 Findings

Clarification Request (CL) 10
Please provide information concerning the internal audits.

Response

The team of EMSS (see Section B, flowchart 1 of the Monitoring Report) collecting data on a monthly basis. Those monthly reports were checked by JI consultant Global Carbon BV.

EMSS is as well certified under ISO 9001, which requires performance of the internal audits.

Conclusion of the verification team

Issue is closed.

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.
	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 INITIAL AND FIRST PERIODIC VERIFICATION STATEMENT

Bureau Veritas Certification has performed a verification of the JI project "Improvement of the Energy efficiency at Energomashspetsstal (EMSS), Kramatorsk, Ukraine". The verification is based on the currently valid

documentation of the United Nations Framework Convention on the Climate Change (UNFCCC).

The management of the EMSS 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 3.9. 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 3.1 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 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 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 : 224 584 t CO2 equivalents.
Project emissions : 106 702 t CO2 equivalents.
Emission Reductions : 117 881 t CO2 equivalents.

7 REFERENCES

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

/1/ Project Design Document, version 3.9 dated 31 of August 2008

/2/ Monitoring Report version 1.0, dated 31st of August 2009

/3/ Monitoring Report version 3.0 dated 3rd of November 2009

/4/ Monitoring Report version 3.1 dated 16th of November 2009

/5/ Determination Report by Bureau Veritas Certification Holding SAS dated 31st of August 2009

/6/ Letter of Approval of National Environmental Investments Agency of Ukraine, № 48/23/7 from 23.01.2009

/7/ Approval of Voluntary participation in a Joint Implementation project of Ministry of Economical Affairs in Netherlands №20097JI01, dated 3 of March 2009

Category 2 Documents:

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

/8/ 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/ Bondar Nikolay, the Head of the Forge Press workshop

/2/ Chubar Oleg, the Head of the environmental safety department

/3/ Garkusha Aleksandr, the Head of the Steel Making workshop

/4/ Malenko Mikhail, the Head of bureau of the energy department

/5/ Masyuk Aleksandr, Deputy Chief Engineer

/6/ Philenko Aleksandr, the profkom representative, deputy of the City Hall

/7/ Polyachenko Vladimir, Head of the personnel training centre

/8/ Romanenko Sergey, the Head of the automation department

/9/ Smirnof Sergey, the Chief metrologist

/10/ Stankov Vitaliy, the Head of the Thermal workshop

/11/ Suprun Aleksandr, Head of the energy saving department

/12/ Zubkov Aleksandr, the Chief Engineer

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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	/4/	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, Mrs. Kateryna Zinevych, Auditor, Bureau Veritas Ukraine, Mr. Oleg Skoblyk, Auditor, Bureau Veritas Ukraine, Mr. Pavel Rosen, Auditor, Bureau Veritas Ukraine. Interviewed persons: EMSS: Bondar Nikolay, the Head of the Forge Press workshop Chubar Oleg, the Head of the environmental safety departement Garkusha Aleksandr, the Head of the Steel Making workshop Malenenko Mikhail, the Head of bureau of the energy department Masyuk Aleksandr, Deputy Chief Engineer	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		Philenko Aleksandr, the profkom representative, deputy of the City Hall Polyachenko Vladimir, Head of the personnel training centre Romanenko Sergey, the Head of the automation departement Smirnov Sergey, the Chief metrologist Stankov Vitaliy, the Head of the Thermal workshop Suprun Aleksandr, Head of the energy saving department Zubkov Aleksandr, the Chief Engineer	
1.2. Clarification of access to data archives, records, plans, drawings etc.	/4/	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	/4/	Project has been implemented as defined in the PDD version 3.9 and the implementation is evidenced by statements of work completion (see list of verified documents).	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
1.4. Actual status of installation works	/4/	There are no deviations from the PDD made final at the JISC meanwhile project implementation schedule has faced some delays. Clarification Request (CL) 1 In the PDD version 3.3. and in Monitoring Report version 1.0. in the section A.3. it is stated that the goal of the project is the reduction of the natural gas consumption on 26 of 35 furnaces but in the monitoring report version 1 section A.6 only 10 furnaces are mentioned. Please clarify.	CL1
2. Open issues indicated in validation report			
2.1. Missing steps to final approval	/4/	Based on the validation report the verification team identified no missing steps. The project has been approved by both NFPs. The Letters of Approval were presented to the verification team. Corrective Action Request (CAR) 1 Please provide evidence of approval from the Dutch side.	CAR1
3. Implementation of the project			
3.1. Physical components	/4/	Project implementation schedule has faced some delays: SP1. Heating and thermal furnaces are commissioning with delay in compare with the schedule. One of the furnaces (namely, heating furnace #18) was put into operation ahead a schedule.	

Objective	Reference	Comments	Conclusion (CARs/FARs)
		SP2. New vacuum system was put into operation at the end of the February 2008, only. That is why ERs of this subproject are generated since March of 2008. SP3. Arc ladle furnace is operated since April 2007. Start up was done in accordance to the schedule. SP4. Press was commissioned at the end of the August 2008. So monitoring period for this subproject has started since September 2008. <u>Clarification Request (CL) 2</u> Please clarify the cause of the deviation from the schedule. <u>Clarification Request (CL) 3</u> Section B of the Monitoring Report version 1 states that there are some additional consumers on 6 kV line. Please clarify do they have influence on the project? If so, how is their influence monitored and measured?	CL2 CL3
3.2. Project boundaries	/4/	Yes, the project boundaries are as defined in the PDD version 3.9.	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
3.3 Emission reductions achieved	/4/	In the PDD version 3.9 the amount of emission reduction units in 2008 is stated as 141 722 t CO_2 while in the Monitoring Report version 1.0 the amount of ERU's for 2008 is 106 702. Clarification Request (CL) 4 Please provide the clarification on the difference of the amount of emission reductions in PDD and Monitoring Report.	CL4
3.4. Monitoring and metering systems	/4/	**SP1. Reconstruction of thermal and heating furnaces.** Information from flow meters, pressure and temperature sensors from reconstructed furnaces is transmitting to the control and monitoring computer system. The computer system accepts data on natural gas consumption into normal cubic meters since the end of 2008. So, recalculating from m^3 to the Nm^3 was done manually (see Table 10) based on standardized methodology. All information about technological process is saved continuously. The archiving period for the log files is at least one year. Information that corresponds to the natural gas consumption in 2008 has been burned on CDs. Every half-finished product that process through the furnaces has own unique certificate, which reflects all operations performed on the product and the weight on the exit of every workshop. Information from the certificates is saved in the log books in order to simplify the monitoring	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		process. A report including natural gas consumption and weight of half finished products is generating on a monthly basis. The report is being signed by Head of Energy Saving Department, Head of corresponding workshop and approved by Chief Engineer. Every furnace has specific natural gas consumption factor. This factor is used for the daily basis meter's checking procedure. **SP 2. Installation of a new vacuum system.** Electricity that is consumed during the vacuum process is metered by meters, dedicated especially for this system. Information from meters is coming to the control and monitoring computer system of vacuumator. A computer system records information about every vacuumation session, including melt passport, time and electricity consumption. The archiving period for the log files is at least one year. Information that corresponds to the electricity consumption in 2008 has been burned on CDs. The steel to the vacuum degasser (VD) coming either from ladle furnace (LF) or from the electric arc furnace (EAF) in special ladle. Each ladle with liquid steel has unique certificate of melt. **SP 3. Installation of an arc ladle furnace.** The data from electricity meters concerning electricity consumption is transmitted to the control and monitoring	

Objective	Reference	Comments	Conclusion (CARs/FARs)
		computer system continuously. The computer system records information about each melt process, including melt certificate. This certificate includes information about the number of electric arc furnaces where steel was melted, steel content, amount of electricity consumed during melting and weight of steel. The archiving period for the log files is at least one year. All melt certificates for the year 2008 has been burned to CDs. **SP 4. Modernization of press equipment.** Serving motors of the press pump station are powered from the 6kV line. Sub-station 110/6 kV has two transformers. Each transformer has a commercial electricity meter. All data concerning electricity consumption is transmitted to the control and monitoring computer system. The press has a special registry log book, where working time of press is logged, among other data.	
3.5. Data uncertainty	/4/	Clarification Request (CL) 5 Please provide information on how the level of uncertainty is taken into account.	CL5

Objective	Reference	Comments	Conclusion (CARs/FARs)
3.6. Calibration and quality assurance	/4/	All the calibration procedures are performed according to the detailed calibration plan. On the date of verification, calibration records of the measuring and monitoring equipment have been verified on site. The list of all monitoring equipment with all the serial numbers and calibration dates is presented in the Monitoring Report version 1.0. <u>Corrective Action Request (CAR) 2</u> The meter Energia 9 #11786 is not mentioned in the table 2 List of electric meters of the MR version 1.0 but is used in the metering process of the project. All transformers TR1-31 in the Table 3 List of transformers in the MR version 1.0 have wrong calibration dates. According to the calibration certificates the date of last calibration is 13.05.09, which differs from the dates of last calibration mentioned in the MR. In the Table 3 List of transformers in the MR version 1.0 there are transformers (TPOL-35 #6, #17, ZNOM-35 #1135076, #1144166, #1144170, NTMI-6-66-UZ #412) that were replaced by others. In the Table 4 List of natural gas meters of the MR version 1.0 natural gas meters NG5-8 have wrong calibration dates according to the certificates of calibration. In the Table 5 List of temperature meters in the MR version 1.0 temperature meter TSPU-205 #8359 is mentioned in the	CAR2

Objective	Reference	Comments	Conclusion (CARs/FARs)
		table but is not used in the project according to the present documents and information collected during the site-visit. In the Table 5 List of temperature meters in the MR version 1.0 temperature meter TCMU-274-05 has wrong calibration date according to the certificate of calibration. In the Table 6 List of pressure meters in the MR version 1.0 pressure meters PR3,4,10 have wrong calibration dates according to the certificates of calibration. In the Table 7 List of weighting machines of the MR version 1.0 WM5 has different names in the MR and in the passport and certificate of calibration while the serial number and other parameters correspond. In the Table 7 List of weighting machines of the MR version 1.0 WM1-4 have wrong calibration dates according to the certificates of calibration. Please provide appropriate clarifications according all the meters and correct if necessary. <u>Corrective Action Request (CAR) 3</u> In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for transformers is 1 year while in the Table 3 the calibration interval for all the transformers is 4 years. Please provide appropriate clarifications and correct if necessary. <u>Clarification Request 6</u> No documentation for the electricity meter Energia 9 #43898	CAR3 CL6

Objective	Reference	Comments	Conclusion (CARs/FARs)
		was provided onsite. Please clarify if this meter is a part of JI project and provide necessary documentation. Clarification Request 7 Electric meter Energia 9 #43887 is the part of the JI project but is not mentioned in the MR version 1.0 and its documentation was not provided to the verification team. Please clarify. Clarification Request 8 In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for electricity meters is 6 years, while in the table 2 of this MR some electricity meters have 4 years of calibration interval. Please clarify.	CL7 CL8
3.7. Data acquisition and data processing systems	/4/	**SP 1. Reconstruction of thermal and heating furnaces.** Information from flow meters, pressure and temperature sensors are transmitting to the control and monitoring computer system. All information about technological process is saved continuously. The archiving period for the log files is at least one year. Information that corresponds to the natural gas consumption in 2008 has been burned on CDs. Every half-finished product that process through the furnaces has its own unique certificate. This certificate reflects all operations performed on the product and the weight on the exit of every workshop. So, the weight of half-finished products that proceed through each furnace could be easily monitored. Information from the certificates is	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		saved in the log books in order to simplify the monitoring process. A report including natural gas consumption and weight of half finished products is generating on a monthly basis. The report is signing by Head of Energy Saving Department, Head of corresponding workshop and approved by Chief Engineer. **SP 2. Installation of a new vacuum system.** Information from meters is coming to the control and monitoring computer system of vacuumator. A computer system records information about every vacuumation session, including melt passport, time and electricity consumption. The archiving period for the log files is at least one year. Information that corresponds to the electricity consumption in 2008 has been burned on CDs. **SP 3. Installation of an arc ladle furnace.** The data from electricity meters concerning electricity consumption is transmitted to the control and monitoring computer system continuously. The computer system records information about each melt process, including melt certificate. This certificate includes information about the number of EAF where steel was melted, steel content, amount of electricity consumed during melting and weight of steel. The archiving period for the log files is at least one year. All melt certificates for the year 2008 has been burned to CDs. **SP 4. Modernization of press equipment.**	

Objective	Reference	Comments	Conclusion (CARs/FARs)
		All data concerning electricity consumption is transmitted to the control and monitoring computer system. The press has a special registry log book, where working time of press is logged, among other data. The following figure presents electricity supplying system of the press with metering points.	
3.8. Reporting procedures	/4/	All data necessary for the CO_2 emission reductions calculation is collected in the Energy Saving Department. The head of the Energy Saving Department is making calculations on a monthly basis. The general supervision of the monitoring system is executed by the Deputy Chief Engineer.	OK
3.9. Documented instructions	/4/	Section C.1. of the Monitoring Report version 1.0. Data processing and archiving (including software used) of the Monitoring Report version 1.0 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)
3.10. Qualification and training	/4/	All contracts for the equipment supplying include chapter describing personnel training. Training is provided by equipment producers. New centre for professional qualification was found in February 2008. This centre is responsible for qualification trainings and attestation of all the employees. At the moment centre consist of 20 employees. All the training plans and reports were presented to the verification team during site visit.	OK
3.11. Responsibilities	/4/	The general management of the monitoring team is implemented by the Deputy Chief Engineer of the EMSS through supervising and coordinating activities of his subordinates, such as the head of Energy Saving Department, the head of Steel Making Shop, Press-Forging Shop and Thermal Shop. On-site day-to-day (operational) management is implemented by the heads of corresponding shops. The technological process data is logged into the PCs continuously. The PCs at reconstructed furnaces, LF, VD, etc., have not only monitoring but control functions as well. Keeping the PCs in a working condition is a responsibility of the Department of the automated control systems. All data necessary for the CO_2 emission reductions calculation is collected in the Energy Saving Department. The head of the Energy Saving Department is making	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
		calculations on a monthly basis. The general supervision of the monitoring system is executed by the Deputy Chief Engineer. For this monitoring period the names of the personnel involved is as follows: • Deputy Chief Engineer: A. Masuk • Head of Energy Saving Department: A. Suprun • Head of the Steel Making Shop: A. Gorkusha • Head of the Press-Forging Shop: N. Bondar • Head of the Thermal Shop: V. Stankov	
3.12. Troubleshooting procedures	/4/	Every day the Energy Saving Department reports to the Chief Engineer about energy resources consumption by EMSS. That report is the result of analyzing of the data logging on a dedicated server. So, in case of any meter failure, data discrepancy will be found within one day. The meter will be substituted by working one. CO_2 emissions reduction will be calculated by cross-checking method for this period.	OK
4. Internal Data			
4.1. Type and sources of internal data	/4/	The control and monitoring system can be divided into an electrical part, a gas part and steel weight part. **Electrical measurements** For the purpose of monitoring the emission reductions the following parameters are measured:	

Objective	Reference	Comments	Conclusion (CARs/FARs)
		• Electricity consumption at EAFs; • Electricity consumption at arc ladle furnace; • Electricity consumption at vacuum degasser; • Electricity consumption at press' pump station. **Natural gas measurements** For the purpose of monitoring the emission reductions the following parameters are measured: • Natural gas consumption at nine reconstructed heating and thermal furnace. **Steel weight measurement** For the purpose of monitoring the emission reductions the following parameters are measured: • Weight of steel proceeded through the arc ladle furnace; • Weight of steel proceeded through the vacuum degasser; • Weight of half-finished products proceeded through reconstructed heating and thermal furnaces. <u>Clarification Request (CL)11</u> Quantity of NG, used by the reconstructed furnaces, is not measured as per PDD, but calculated by a formula, which includes measured values of NG temperature and pressure. Measurement of NG temperature and pressure was not included in MP in PDD. Please clarify.	CL11

Objective	Reference	Comments	Conclusion (CARs/FARs)
4.2. Data collection	/4/	See section 3.5 of this protocol. All data necessary for the CO_2 emission reductions calculation is collected in the Energy Saving Department. The head of the Energy Saving Department is making calculations on a monthly basis. The general supervision of the monitoring system is executed by the Deputy Chief Engineer.	OK
4.3. Quality assurance	/4/	CO_2 emission reductions calculations are performing on the monthly basis by the head of the Energy Saving Department. All energy sources flows (such as electricity and natural gas) logging on the server in the Energy Saving Department. So, head of Department could check the correctness of measurements by the indirect calculations.	OK
4.4. Significance and reporting risks	/4/	Every day the Energy Saving Department reports to the Chief Engineer about energy resources consumption by EMSS. That report is the result of analyzing of the data logging on a dedicated server. So, In case of any meter failure, data discrepancy will be found within one day. The meter will be substitute by working one. CO_2 emissions reduction will be calculated by cross-checking method for this period.	OK
5. External Data			
5.1. Type and sources of external data	/4/	See section B.2.1. of the MR version 1.0. Forward Action Request (FAR) 1	FAR1

Objective	Reference	Comments	Conclusion (CARs/FARs)
		Monitoring Report does not provide information how LCV of NG was calculated monthly based on data from suppliers and what value was used in calculation be formula (2). This issue was evidently the overlook in DR since it is unclear what to do with 12 different values of LHV. Either use the average or the lowest (conservative). Please explain and correct.	
5.2. Access to external data	/4/	See section B.2.1. of the MR version 1.0.	OK
5.3. Quality assurance	/4/	Clarification Request (CL) 9 Please provide more information on quality assurance of the external data. While quality assurance of the internal data is presented in a clear way, description of the quality assurance of the external data can be more transparent.	CL9
5.4. Data uncertainty	/4/	See CL5.	CL5
5.5. Emergency procedures	/4/	Every day the Energy Saving Department reports to the Chief Engineer about energy resources consumption by EMSS. That report is the result of analyzing of the data logging on a dedicated server. So, in case of any meter failure, data discrepancy will be found within one day. The meter will be substituted by working one. CO_2 emissions reduction will be calculated by cross-checking method for this period.	OK

Objective	Reference	Comments	Conclusion (CARs/FARs)
6. Environmental and Social Indicators			
6.1. Implementation of measures	/4/	The project improved efficiency of use of natural gas, electricity and heat at the enterprise and thus leaded to decrease of harmful emissions.	OK
6.2. Monitoring equipment	/4/	See section B.2.6. of the MR version 1.0.	OK
6.3. Quality assurance procedures	/4/	See section B.2.6. of the MR version 1.0.	OK
6.4. External data	/4/	See section B.2.6. of the MR version 1.0.	OK
7. Management and Operational System			
7.1. Documentation	/4/	The company complies with all legal and statutory requirements of the Ukraine and the same were made available to the verification team. EMSS has all the necessary permissions and licenses.	OK
7.2. Qualification and training	/4/	See chapter 3.10. of this Table of this protocol	OK
7.3. Allocation of responsibilities	/4/	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

Objective	Reference	Comments	Conclusion (CARs/FARs)
7.4. Emergency procedures	/4/	See chapter 3.12 and 5.5. of this Table of this protocol	OK
7.5. Data archiving	/4/	Data are archived in the physical and electronic forms and then stored in Planning Department.	OK
7.6. Monitoring report	/4/	Data information is laid down in the monitoring report version 1.0.	OK
7.7. Internal audits and management review	/4/	CO_2 emission reductions calculations are performing on the monthly basis by the head of the Energy Saving Department. All energy sources flows (such as electricity and natural gas) logging on the server in the Energy Saving Department. So, head of Department could check the correctness of measurements by the indirect calculations.	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	For this monitoring period the names of the personnel involved is as follows: • Deputy Chief Engineer: A. Masyuk • Head of Energy Saving Department: A. Suprun • Head of the Steel Making Shop: A. Gorkusha • Head of the Press-Forging Shop: N. Bondar • Head of the Thermal Shop: V. Stankov
1.2.	Full	See section B.2.for the scheme of responsibilities within the monitoring team.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
Responsibilities		The general management of the monitoring team is implemented by the Deputy Chief Engineer of the EMSS through supervising and coordinating activities of his subordinates, such as the head of Energy Saving Department, the head of Steel Making Shop, Press-Forging Shop and Thermal Shop. On-site day-to-day (operational) management is implemented by the heads of corresponding shops. The technological process data is logged into the PCs continuously. The PCs at reconstructed furnaces, LF, VD, etc., have not only monitoring but control functions as well. Keeping the PCs in a working condition is a responsibility of the Department of the automated control systems.
1.3. Competencies needed	Full	The responsibilities and authorities are described for each individual in job descriptions as required statutorily. Training needs were identified in advance and training was delivered that was checked onsite.
2. Conformance with monitoring plan		
2.1. Reporting procedures	Full	The monitoring plan is as per the registered PDD version 3.9. The applauded version of PDD version 3.9. is publicly available at the site http://ji.unfccc.int/JI_Projects/DB/VY889VYDTR7YGFRYTY9TXLB4AWBLUR/PublicPDD/IVJBACXLGFD21BA49H52H5MTW35ZTL/view.html where it was placed during determination process. The monitoring methodology developed for specifically for this project 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	Project implementation schedule has faced some delays: SP1. Heating and thermal furnaces are commissioning with delay in compare with the schedule. One of the furnaces (namely, heating furnace #18) was put into operation ahead a schedule. SP2. New vacuum system was put into operation at the end of the February 2008, only. That is why ERs of this subproject are generated since March of 2008. SP3. Ladle furnace is operated since April 2007. Start up was done in accordance to the schedule. SP4. Press was commissioned at the end of the August 2008. So crediting period for this subproject has started since September 2008.
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	See section 3.4 of the Table 1 of this protocol. Forward Action Request (FAR) 2 Please provide information/process flow diagram, describing the entire process from raw data to reported totals is developed.
3.3. Data transfer	Full	See section 3.4 of the Table 1 of this protocol.

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
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 version 3.9.
4.2. Calibration/maintenance	Full	The company maintains the elaborate calibration plan for each of the equipment. The audit team verified the status of all the equipment at the sites sampled for the audit and found them to be complying to the plan.
5. GHG Calculations		
5.1. Use of estimates and default data	Full	See section B.2.1. of the MR version 1.0.
5.2. Guidance on checks and reviews	Full	CO_2 emission reductions calculations are performing on the monthly basis by the head of the Energy Saving Department. All energy sources flows (such as electricity and natural gas) logging on the server in the Energy Saving Department. So, head of Department could check the correctness of measurements by the indirect

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks
		calculations.
5.3. Internal validation and verification		Monitoring procedure for JI Project includes the responsibility and frequency for carrying out internal audits. Clarification Request 10 Please provide information concerning the internal audits.
5.4. Data protection measures	Full	The necessary procedures relating to Information technology are in place to provide necessary data security, and also prevent the unauthorized use of the same.
5.5. IT systems	Full	Data is collected in electronic database.

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 , ➢ process monitors, ➢ 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 version 3.9 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
Corrective Action Request (CAR) 1 Please provide evidence of approval from the Dutch side.	2.1.	Evidence of approval from the Dutch side provided. See supporting document SD1.	Evidence was satisfactory. Issue is closed.
Corrective Action Request (CAR) 2 The meter Energia 9 #11786 is not mentioned in the table 2 List of electric meters of the MR version 1.0 but is used in the metering process of the project. All transformers TR1-31 in the Table 3 List of transformers in the MR version 1.0 have wrong calibration	3.6.	The meter Energia 9 #11786 is using for the reactive current metering, thus it is not used in the metering process of the project. The dates of calibration for the transformers have been corrected. See latest version of the Monitoring report. The types and serial numbers of transformers have been corrected. See latest version of the Monitoring report.	Explanation and evidences provided were found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
dates. According to the calibration certificates the date of last calibration is 13.05.09, which differs from the dates of last calibration mentioned in the MR. In the Table 3 List of transformers in the MR version 1.0 there are transformers (TPOL-35 #6, #17, ZNOM-35 #1135076, #1144166, #1144170, NTMI-6-66-UZ #412) that were replaced by others. In the Table 4 List of natural gas meters of the MR version 1.0 natural gas meters NG5-8 have wrong		Calibration dates of natural gas meters of the MR version 1.0 natural gas meters NG5-8 have been corrected. See latest version of the Monitoring report.	

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
calibration dates according to the certificates of calibration. In the Table 5 List of temperature meters in the MR version 1.0 temperature meter TSPU-205 #8359 is mentioned in the table but is not used in the project according to the present documents and information collected during the site-visit. In the Table 5 List of temperature meters in the MR version 1.0 temperature meter TCMU-274-05 has wrong calibration date according to the		Temperature meter TSPU-205 #8359 is using as a reserve and has been deleted from the latest version of the Monitoring report.	

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
certificate of calibration. In the Table 6 List of pressure meters in the MR version 1.0 pressure meters PR3,4,10 have wrong calibration dates according to the certificates of calibration. In the Table 7 List of weighting machines of the MR version 1.0 WM5 has different names in the MR and in the passport and certificate of calibration while the serial number and other parameters correspond. In the Table 7 List of		Data corresponds to WMs have been corrected. See latest version of the Monitoring report.	

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
weighting machines of the MR version 1.0 WM1-4 have wrong calibration dates according to the certificates of calibration. Please provide appropriate clarifications according all the meters and correct if necessary.			
Corrective Action Request (CAR) 3 In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for transformers is 1 year while in the Table 3 the calibration interval	3.6.	Calibration interval for transformers is 4 years. Corrections have been made in Section B.1.3 of the MR	Explanation and evidences provided were found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
for all the transformers is 4 years. Please provide appropriate clarifications and correct if necessary.			
Forward Action Request (FAR) 1 Monitoring Report does not provide information how LCV of NG was calculated monthly based on data from suppliers and what value was used in calculation by formula (2). Please explain and correct.	5.1	Calculations are performed monthly, and sum of figures for 12 months give annual result. Formula will be modified for the next monitoring period which is 9 months.	Issue will be closed during next verification.
Forward Action Request (FAR) 2 For better understanding please	3.2. of the Table 2	Corrections has been made in the text of MR (Section C.1.1. footnote 1)	Issue will be closed during next verification.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
provide information/process flow diagram, describing the entire process from raw data to reported totals is developed.			
Clarification Request (CL) 1 In the PDD version 3.9. and in Monitoring Report version 1 in the section A.3. it is stated that the goal of the project is the reduction of the natural gas consumption on 26 of 35 furnaces but in the monitoring report version 1 section A.6 only 10 furnaces are mentioned. Please	1.4.	According to the PDD (Section A.4.2), reconstruction of the 26 furnaces will be done during 2008-2009. That is why only ten of 26 furnaces were reconstructed during the year 2008 and mentioned in the Monitoring report.	Explanation provided was found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
clarify.			
Clarification Request (CL) 2 Please clarify the cause of the deviation from the schedule.	3.1.	The main cause of the deviation from the schedule is the lack of financing.	Explanation provided was found satisfactory. Issue is closed.
Clarification Request (CL) 3 Section B of the Monitoring Report version 1 states that there are some additional consumers on 6 kV line. Please clarify do they have influence on the project? If so, how is their influence monitored and measured?	3.1.	Additional consumers on the line 6kV does not have any influence on the project nor on the baseline or project emissions.	Explanation provided was found satisfactory. Issue is closed.
Clarification Request (CL) 4	3.3	The reasons for the difference in the amount of the ERUs are the following:	Explanation provided was found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
Please provide the clarification on the difference of the amount of emission reductions in PDD and Monitoring Report.		• The amount of semi-finish products processed in the furnaces is different from what was estimated in the PDD. • The amount of steel melted in LF and processed in the VD is different from what was estimated in the PDD. • The working time of press is different from what was estimated in the PDD.	
Clarification Request (CL) 5 Please provide information on how the level of uncertainty is taken into account.	3.5.	The data received directly from meters is taken with the level of uncertainty taking into account.	Explanation provided was found satisfactory. Issue is closed.
Clarification Request (CL) 6 No documentation for the electricity meter Energia 9 #43898 was provided onsite. Please clarify if this meter is a part of JI	3.6.	Electricity meter Energia 9 #43898 is a part of JI. Documentation is provided (see SD2).	Explanation provided was found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
project and provide necessary documentation.			
Clarification Request (CL) 7 Electric meter Energia 9 #43887 is the part of the JI project but is not mentioned in the MR version 1.0 and its documentation was not provided to the verification team. Please clarify.	3.6.	Electric meter Energia 9 #43887 is not the part of the JI project. This meter is using for reactive current metering.	Explanation provided was found satisfactory. Issue is closed.
Clarification Request (CL) 8 In the section B.1.3. of the MR version 1.0 it is stated that the calibration interval for electricity meters is 6 years, while in the table 2 of this MR	3.6.	According to the GOST 26035-83, calibration interval for the meters produced before 01.01.1988 is four years and for the meters produced after 01.01.1988 is six years. GOST is provided as a supporting document (see SD4).	Explanation provided was found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
some electricity meters have 4 years of calibration interval. Please clarify.			
Clarification Request (CL) 9 Please provide more information on quality assurance of the external data. While quality assurance of the internal data is presented in a clear way, description of the quality assurance of the external data can be more transparent.	5.3	The documents that confirmed the external data (calorific value of natural gas, efficiency of the boiler at KramCHP) are provided. See SD3, SD5.	Explanation provided was found satisfactory. Issue is closed.
Clarification Request (CL) 10 Please provide information concerning the	5.3. Table 2	The team of EMSS (see Section B, flowchart 1 of the Monitoring Report) collecting data on a monthly basis. Those monthly reports were checked by JI consultant Global Carbon BV.	Explanation provided was found satisfactory. Issue is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
internal audits.			
Clarification Request (CL) 11 Quantity of NG, used by the reconstructed furnaces, is not measured as per PDD, but calculated by a formula, which includes measured values of NG temperature and pressure. Measurement of NG temperature and pressure was not included in MP in PDD. Please clarify.	4.1	The latest version of MP (PDD, section D.1.1) stated that the source of the data for the variable NGtf,y (quantity of NG, used by the 26 reconstructed furnaces) is a measuring devices of the workshop. So, in order to get normalized volume of natural gas combusted at workshop, temperature and pressure data has been used. Temperature and pressure measuring devices were installed after MP was developed as a part of NG measuring equipment. The formula for calculation used in MR is specific for vortex flow meter and it is not applicable for other type of gas meter (i.e. orifice flow meter). Decision on the type of flow meter was optional and therefore it was not included into the PDD. For year 2008 calculation was performed manually using formula. Fore year 2009 the calculation was performed for the part of furnaces automatically using the same devices yielding figures of NG quantity directly in Nm3 and	Explanation is accepted and CL is closed.

Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Verification conclusion
		since 2010 for all furnaces figures will be obtained in Nm3. This is explained in the MR for 2008. The formula is incorporated into the measuring equipment controller.	

APPENDIX B: VERIFICATION TEAM

The verification team consists of the following personnel:

Nadiya Kaiiun, M.Sci. (environmental science)
Team Leader, Lead Verifier

Bureau Veritas Ukraine HSE Department 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.

Kateryna Zinevych, M.Sci. (environmental science)
Verifier

Bureau Veritas Ukraine HSE Department 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 5 JI projects.

Oleg Skoblyk, Engineer (Energy Management)
Climate Change Verifier
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.

Pavel Rosen, M. Sci. Energy auditor **(Power Management) specialist**
He has graduated from National Technical University of Ukraine "Kyiv Polytechnic Institute" Institute of Energy Saving and Power Management Specialty "Power Management". He is a Deputy Chief on the energy saving issues at JSC «Yuzhteploenergomontazh». He managed and took part in holding of 4 energy audits. Over all he performed 13 energy audits.

The Verification Report was reviewed by:

Leonid Yaskin, PhD (thermal engineering)
Internal Technical Reviewer
Bureau Veritas Certification Rus General Director- Lead Auditor, Lead Tutor, Verifier
He has over 30 years of experience in heat and power R&D, engineering, and management, environmental science and investment analysis of projects. He worked in Krrzhizhanovsky Power Engineering Institute, All-Russian Teploelectroproject Institute, JSC Energoperspectiva. He worked for 8 years on behalf of European Commission as a monitor of Technical Assistance Projects. He is a Lead auditor of Bureau Veritas Certification for Quality Management Systems (IRCA registered), Environmental Management System (IRCA registered), Occupational Health and Safety Management System (IRCA registered). He performed over 250 audits since 2002. Also he is a Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and a Lead Tutor of the IRCA registered OHSAS 18001 Lead Auditor Training Course. He is an Assuror of Social Reports. He has undergone intensive training on Clean Development Mechanism /Joint Implementation and was/is involved in the determination of over 20 JI projects.

APPENDIX C: DOCUMENTS CHECKED DURING VERIFICATION

1. Set of weight measuring instruments. 01 ВКТ-200М. Passport 2164-00-000 ПС from March 2006.
2. Passport #09-22 of ТСМУ Metran -274-05 Ser. #655355. Date of calibration 17.09.2008.
3. Passport #09-22 of ТСМУ Metran -274-05 Ser. #655358. Date of calibration 16.09.2008.
4. Passport. Vortical transducer ser. #5480 from 18.02.2009.
5. Passport. Vortical transducer ser. #5482 from 18.02.2009.
6. Passport. Vortical transducer ser. #5483 from 18.02.2009.
7. Passport. Resistance transducer ser. #8360 from 23.09.2008.
8. Passport. Resistance transducer ser. #8362 from 23.09.2008
9. Passport. Resistance transducer ser. #8365 from 23.09.2008.
10. Passport. Thermal element ser.#655340 from December 2008.
11. Passport СПГК.5070.000.00 ПС. Pressure-sensing element Metran-100. #600466/2 275890.
12. Passport. Ба 4.728.036 ПС. Current transformers. Т-0,66-1; ТШ-0,66-1.
13. Passport. Crane scales. Ser. #VK0115047. Date of the last verification 11.12.2008.
14. Passport. Crane scales. Ser. #КР205122. Date of the last verification 11.12.2008.
15. Passport. Crane scales. Ser. #КР506149. Date of the last verification 11.12.2008.
16. Passport. Crane scales. Serial #КР806148. Last verification date 11/12/2008.
17. Vortex flow transducers ИРВИС-К300. Passport ИРВС 9102.0000.00 ПС. Kazan, 2005.
18. Protocol of the calibration. Метран-100-ДИ #422353 dated 29/08/2008.
19. Certificate of the device calibration #02-09 dated 10/02/2009.
20. Certificate of the device calibration #05-10 dated 25/05/2009, valid to 25/05/2010.
21. Certificate of the device calibration #05-11 dated 25/05/2009, valid to 25/05/2010.
22. Certificate of the device calibration #12-35. Метран-100-ДИ-1131. Valid from 05/12/2008 to 05/12/2009.
23. Certificate of the device calibration #12-36. Метран-100-ДИ-1131. Valid from 05/12/2008 to 05/12/2009.
24. Certificate of the device calibration. Метран-100-ДИ #000088 dated 02/04/2009.
25. Certificate of the device calibration. Метран-100-ДИ #376707 dated 09/03/2009.

Certificate of the device calibration. Метран-100-ДИ #387352 dated
26. 18/02/2009.
Certificate of the working measure equipment verification #325 dated
27. 05/03/2008, valid to 05/03/2010.
Certificate of the working measure equipment verification #326 dated
28. 05/03/2008, valid to 05/03/2010.
Certificate of the working measure equipment verification #327 dated
29. 05/03/2008, valid to 05/03/2010.
Certificate of the working measure equipment verification #328 dated
30. 05/03/2008, valid to 05/03/2010.
31. Current transformer and voltage furnace transformer at the ЭСПЦ.