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# VERIFICATION REPORT

## IMPLEMENTATION OF ARC FURNACE STEELMAKING PLANT "ELECTROSTAL" AT KURAKHOVO, DONETSK REGION

ITL Project ID: UA1000181

Second Periodic Verification
for the period:
01.06.2010 – 28.02.2011

Report No. TUR009JI – VR2
Revision 02

TÜV Rheinland

# VERIFICATION REPORT

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|---|---|---|
| Date of first issue:<br>18th of April 2011 | Project No.<br>UA1000181 | TUV Rheinland Group |
| | Organizational Unit:<br>TUV Rheinland Group | |
| Client:<br>Global Carbon BV | Client Ref.:<br>Denis Rzhanov | |

Summary:

TUV Rheinland Group has performed the verification of emission reductions reported for the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" (ITL Project ID UA1000181) for the period from the 1st of June 2010 till the 28th of February 2011.

The purpose of verification is to assess the reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks generated by a JI project and reported by the project participants through the monitoring report in accordance with paragraph 37 of the JI guidelines.

In our opinion, the greenhouse gas (GHG) emission reductions reported for the project in the monitoring report (Version 2.0) dated 19th of April 2011 are fairly stated and are accurate and free of material errors, omissions, or misstatements.

During the monitoring period the project has been implemented in accordance with the Project Design Document Version 2.0 dated 27th of May 2010.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring plan contained in the Project Design Document Version 2.0 dated 27th of May 2010.

TUV Rheinland Group is able to verify that the emission reductions from the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" during the period from the 1st of June 2010 till the 28th of February 2011 amount to 301 043 tonnes of $CO_2$ equivalent.

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|---|---|
| Report No:<br>TUR009JI – VR2 | Subject Group:<br>JI |
| Report Title:<br>IMPLEMENTATION OF ARC FURNACE STEELMAKING PLANT "ELECTROSTAL" AT KURAKHOVO, DONETSK REGION | |
| Work carried out by:<br>Irina Danilkina, *Team Leader*<br>Dmitry Rakovich<br>Tatyana Slovatizkaya | |
| Work verified by:<br>Dr. Valeriy Yakubovskiy | |

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|---|---|---|
| Date of this revision:<br>20th of April 2011 | Rev. No:<br>02 | Number of Pages:<br>27 |

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# 1. INTRODUCTION

Global Carbon BV has commissioned TUV Rheinland Group (TUV Rheinland) to carry out the verification and emission reductions reported for the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" (the project) in the period from the 1st of June 2010 till the 28th of February 2011. This report contains the findings from the verification and conclusion on the verified amount of emission reductions (verification opinion).

## 1.1 Objective

Verification is the periodic independent review and *ex post* determination by an Independent Entity (IE) of the monitored reductions in GHG emissions that have occurred as a result of a Joint Implementation (JI) project activity during a defined verification period.

The purpose of verification is to assess the reductions in anthropogenic emissions by sources or enhancements of anthropogenic removals by sinks generated by a JI project and reported by the project participants through the monitoring report in accordance with paragraph 37 of the JI guidelines[1].

The objective of this verification was to verify emission reductions reported for the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" for the period from the 1st of June 2010 till the 28th of February 2011.

TUV Rheinland is an accredited Designated Operational Entity (DOE) under the Clean Development Mechanism (CDM) and is a provisionally acting accredited independent entity under Joint Implementation (JI) scheme.

## 1.2 Scope

The scope of this verification is the assessment of:

- Project implementation in accordance with the Project Design Document (PDD);
- Compliance with the monitoring plan, including the revision of the monitoring plan;
- Calculation of emission reductions and expression of a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data are accurate and free of material errors, omissions, or misstatements;
- Quality and management of data and verification that reported GHG emission reductions data is sufficiently supported by evidence.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for corrective actions in order to provide for more accurate future monitoring and reporting.

## 1.3 Description of the project

The project activity details are summarized below:

[1] http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=2

| | |
|---|---|
| **Project Parties involved:** | Ukraine (Host) and The Netherlands |
| **Title of the project:** | Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region |
| **ITL Project ID:** | UA1000181 |
| **Baseline and monitoring methodology:** | JI Specific Approach based on PDD ver.2.0 dated 27th of May 2010 |
| **Project entity participant:** | "Electrostal" Ltd, 70 Industrial zone, Kurakhovo, Donetsk region, 85612, Ukraine |
| **Other project participants:** | Global Carbon BV, Graadt van Roggenweg 328, Building D, 3531 AH Utrecht,The Netherlands |
| **Location of the project:** | Premises of the Electrostal Plant of the "Electrostal" Ltd, 70 Industrial zone, Kurakhovo, Donetsk region, 85612, Ukraine |
| **Crediting period of the project:** | From 01/04/2008 to 31/12/2012 |
| **Period verified in this report:** | From 01/06/2010 to 28/02/2011 |
| **Period verified in previous verification report:** | From 01/04/2008 to 31/05/2010 |

The purpose of this project is to reduce emissions of greenhouse gases by using modern technologies to improve steel production in the Ukraine. The project envisages the construction of a green field steel manufacturing plant, based on a modern electric arc furnace (EAF). The EAF installed allows production of steel from almost 100% scrap metal feedstock. The new production facility will use less carbon intensive method to produce steel than a typically used by the majority of existing Ukrainian enterprises. This will allow reducing of GHG emissions. The project is expected to generate 1 956 668 tonnes of $CO_2$ equivalent of emission reductions during the crediting period.

The project has been registered as Track 1 JI project with the PDD ver.2.0 dated 27th May 2010 (the PDD). The documentation on the project including the PDD, Approvals by the Parties Involved, Determination Report, Initial and First Periodic Verification report is available at: http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details and at http://www.carbonunitsregistry.gov.ua/en/publication/content/781.htm

## 1.4 Methodology for the determination of Emission Reductions

The emission reductions are calculated as the difference between baseline emissions and project emissions. The baseline emissions are calculated as the product of the steel produced by the project steelmaking plant and global baseline emission factor for steel produced. The global baseline emission factor for steel produced has been calculated and fixed *ex ante* in the PDD ver.2.0 dated 27th of May 2010.

The project emissions are calculated as the sum of GHG emissions associated with: electrodes consumption by EAF; oxygen consumption; electricity consumption by EAF and ladle furnace (LF); natural gas consumption; anthracite consumption; lime consumption; electrodes consumption by LF. For the calculation of project emissions the default emission factors for electrodes consumption, natural gas consumption, anthracite consumption and lime consumption provided by IPCC were used. Emission factor for electricity consumption has been sourced from "Standardized emission factors for the Ukrainian

electricity grid" Version 5 Global Carbon B.V., 2007. Emission factor for oxygen consumption has been conservatively calculated in the PDD. These emission factors have been fixed *ex ante.*

According to the PDD steel production levels for baseline and for the project scenario are considered to be the same.

# 2. METHODOLOGY

The verification process has been carried out using TUV Rheinland internal procedures. In order to ensure transparency, a check-list for verification was customized for the project, according to the Joint Implementation Determination and Verification Manual Version 01, issued by the Joint Implementation Supervisory Committee at its 19th meeting on 04/12/2009. The check-list for verification shows, in a transparent manner, criteria (requirements) for verification and the results from verifying the identified criteria. The check-list for verification serves the following purposes:

- It organizes details and clarifies the requirements a JI project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed check-list for verification is enclosed in Appendix A to this report.

The verification process (steps) taken include: desk review of the documentation, project site visit, interview with project participants, follow-up exchanges and resolution of outstanding issues.

## 2.1 Verification Team

The work for this verification has been carried out by the following team:

| Role: | Name: | Country | Type of work | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Desk Review | Site Visit | Reporting | Supervision | Technical Review | Expert Input |
| Team Leader/JI Verifier | Irina Danilkina | Ukraine | ☑ | ☑ | | ☑ | | |
| JI Verifier/Technical Expert | Dmitry Rakovich | Ukraine | ☑ | ☑ | ☑ | | | ☑ |
| Sector Specialist | Tatyana Slovatizkaya | Ukraine | | ☑ | | | | ☑ |
| Technical Reviewer | Valeriy Yakubovskiy | Ukraine | | | | | ☑ | |

The duration of verification is as follows:

| | |
|---|---|
| Preparations and desk review: | From 04/04/2011 to 08/04/2011 |
| Site visit and interviews: | 08/04/2011 |
| Reporting, Resolution of Issues, QA/QC: | From 08/04/2011 to 20/04/2011 |

## 2.2 Review of Documentation

Project participants provided TUV Rheinland all needs document for document review. The monitoring report version 1.0 dated 21/03/2011 [3] has been assessed as part of the verification. In addition, the project's Project Design Document [1] and project's determination report [2] as well as first and initial

verification report [4] were also reviewed. Supporting documents, such as, technical reports [24-32] of the steelmaking plant, acceptance-transfer certificates [15-23] and meter passports with calibration protocols [8-14] etc. were available during the site visit.

Information and formulas provided in the monitoring report was compared with PDD and stated data sources.

To address TUV Rheinland corrective action and clarification requests, project participants revised the monitoring report and resubmitted it as version 2.0 dated 19/04/2011.

The verification findings presented in this report relate to the monitoring report versions 1.0 and 2.0 and project as described in the PDD ver.2.0 dated 27th of May 2010.

## 2.3 Site Visit

The steel making plant of the "Electrostal" Ltd has been visited on the 8th of April 2011 by the TUV Rheinland Verification Team of Irina Danilkina, Tatyana Slavatizkaya and Dmitry Rakovich. Supporting documents related to the project were presented at the administrative office of "Electrostal" Ltd in Kurakhovo, Donetsk Region on that date. During this site visit, representatives of TUV Rheinland have interviewed key personnel of the plant and verified that during the monitoring period project has been operating as planned.

The personnel interviewed are summarized in the table below:

| Name | Organization and position | Topic of interview |
|---|---|---|
| Denis Rzhanov | Global Carbon BV, Team Leader | QA/QC of the project, Project management |
| Natalya Belskaya | Global Carbon BV, Project Developer | Reporting and calculation of emission reductions, data sources |
| Yevgeniy Altukhov | Global Carbon BV, Representative in South-East Ukraine | Project management, site visit |
| Denis Blinov | Electrostal, Deputy Head of Plant | QA/QC of the project, Project management, Project implementation, Personnel training |
| Alexander Serov | Electrostal, Technical Department Head | Operational reporting, logbooks, plant visit, monitoring equipment |
| Valeriy Dmitrenko | Electrostal, Energy Department Head | Operational reporting, logbooks |
| Nikanor Frolov | Electrostal, Metrologist | Monitoring equipment |
| Anastasiya Malashenkova | Electrostal, Environmental Engineer | Operational reporting |
| Vladimir Larin | Electrostal, Senior Foreman of CCM | Operational reporting, logbooks |
| Tatyana Isotova | Electrostal, Certification Engineer | |
| Sergey Tolmachev | Electrostal, Senior Foreman of EAF and LF | Operational reporting, logbooks |
| V.S. Hrapun | Electrostal, Plant Electrician | Operational reporting, logbooks |
| A.M. Ushakov | Electrostal, Head of Technical Control Unit | Operational reporting, logbooks |
| A.D. Mladenov | Electrostal, Head of Scrap Base | Operational reporting, logbooks |

## 2.4 Resolution of Clarification, Corrective and Forward Action Requests

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

- Corrective action request (CAR), requesting the project participants to correct a mistake that is not in accordance with the monitoring plan;
- Clarification request (CL), requesting the project participants to provide additional information for the AIE to assess compliance with the monitoring plan;
- Forward action request (FAR), informing the project participants of an issue, relating to the monitoring that needs to be reviewed during the next verification period.

The verification of the project resulted in 13 Corrective Action Requests and 4 Clarification Requests. There was no unresolved FARs from previous verification.

TUV Rheinland made an objective assessment as to whether the actions taken by the project participants and presented in Appendix B of this report satisfactorily resolve the issues raised and should concluded its findings of the verification.

# 3. VERIFICATION FINDINGS

This section summarizes the findings from the verification of the emission reductions reported for the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" for the period from the 1st of June 2010 till the 28th of February 2011.

## 3.1 Remaining Issues, CARs, FARs from Previous Verification

Not applicable as there were no remaining issues, CARs, FARs from previous verification.

## 3.2 Project Implementation

The first melting at the Arc Furnace Steelmaking Plant "Electrostal" has been completed on the 2nd of March 2008. All necessary equipment for the operation of the plant has been installed before this date. Official commissioning of the plant has been performed on the 16th of December 2008 and the delay since the first melting has been explained by complexity of this bureaucratic procedure.

Therefore the project can be considered as implemented and its normal operation has been verified by the Verification Team on-site.

| Activity | Date in accordance with PDD | Actual date |
|---|---|---|
| Starting date of the project | 27 February 2006 | 27 February 2006 |
| First melting | 2 March 2008 | 2 March 2008 |
| Official commissioning | - | 16 December 2008 |

The total emission reductions amount reported for the period from the 1st of June 2010 till the 28th of February 2011 was verified to be 301 043 tCO2e. The emission reductions are lower than that the emission reduction of 333 568 tCO2e predicted in the registered PDD, taking into account that the verification period is only 7 months of 2010 and 2 months of 2011. The lower emission reductions for the verification period are attributed to the lower demand for steel that has not been possible to predict exactly at the time PDD has been drafted.

The verifiers can confirm, through the visual inspection that all physical features of the proposed JI project activity including data collecting and storage systems have been implemented, the project is completely operational and has been implemented as described in the PDD.

## 3.3 Project Approval by Parties Involved

The project has been approved by the DFPs of the Parties Involved and documentation is available:

1) Letter of Approval by the Netherlands ref. 2010JI11 issued at 22 April 2010

2) Letter of Approval by the Ukraine ref. 1243/23/7 issued at 19 August 2010

Evidence is is available at:
http://ji.unfccc.int/JIITLProject/DB/4THB9WT0PK6F721UQA5H6PTHZEXT4C/details and at
http://www.carbonunitsregistry.gov.ua/en/publication/content/781.htm

## 3.4 Compliance of the monitoring plan with the monitoring methodology

The determined monitoring plan is contained in the registered PDD that is available on the UNFCCC JI website (See Section 1.3 of this report). There were no deviations from this monitoring plan as well as no open issues since last verification.

For calculating the emission reductions key factors influencing the baseline emissions as well as risks associated with the project were taken into account, as appropriate.

Such factors as:

- Sectoral reform policies and legislation;
- Forecast level of steel production;
- Global Emission factor for steel production under the baseline;

have been taken into account.

For more detailed information, please, refer to the determined and registered PDD version 2.0.

The monthly technical reports of the Electrostal have been identified as the data source for the following monitoring parameters: steel production, EAF electrode consumption, oxygen consumption, anthracite consumption, lime consumption, LF electrode consumption. This data source is based on the existing reporting system of the company and is clearly identified, reliable and transparent.

Receipts for natural gas and monthly technical notes (raports) have been identified as the data source for the monitoring of natural gas consumption. This data source is based on the commercial metering system of the company and is clearly identified, reliable and transparent.

The receipts of the supplier have been identified as data sources used for the monitoring of electricity consumption. This data source is based on the commercial metering system of the company and is clearly identified, reliable and transparent.

The emission factors used to calculate emission reductions are selected in accordance with the registered PDD. The choice of these emission factors is appropriately justified in the PDD and in general accuracy and reasonableness are carefully balanced. Emission factor for global baseline emission factor for steel produced is referenced to the registered determined PDD and corresponds with it. Baseline emission factor for electrodes consumption during the steelmaking process; baseline emission factor for natural gas consumption during the steelmaking process; baseline emission factor for anthracite consumption during the steelmaking process are referenced to the 2006 IPCC Guidelines. The baseline emission factor for lime consumption during the steelmaking process is referenced to the 2006 IPCC Guidelines. Baseline emission factor for oxygen consumption during the steelmaking process is correctly referenced to the PDD.

The calculation of emission reductions is done based on conservative assumptions and the most plausible scenarios in a transparent manner.

The initial finding of the Verification Team, resolution of any CARs, CLs and FARs raised and review of such resolution is provided in the Appendixes A and B to this report.

## 3.5 Data Management and Quality

Data collection procedure is carried out in accordance with the monitoring plan, including the quality control and quality assurance procedures and has been checked by the Verification Team on-site. The monitoring plan is presented in the section D of the registered PDD. The data and their sources, provided in monitoring report, are clearly identified, reliable and transparent.

The monitoring equipment employed by the project has functioned in accordance with the monitoring plan and in general is in order. The verification team has verified that the reported metering devices are in fact installed and operational. The metering devices have appropriate documentation, such as passports and calibration certificates. Calibration has been performed in accordance with the procedures of the Host Party and evidence of these calibrations has been provided (calibration certificates and/or evidence of calibration in the passports of the devices). It has been verified that the calibration did occur at the correct calibration intervals for all metering devices.

The evidence and records used for the monitoring are maintained in a traceable manner. Verification Team has got access to all necessary data on monitoring system and emission reductions and received necessary evidence on site.

The data collection and management system for the project is in accordance with the monitoring plan as described in the registered PDD. Roles and responsibilities of the technical staff in the framework of the monitoring are described in the monitoring report. 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. Data relevant to the emission reduction calculation are daily registering in the log books. During the operation, there are minor variations in its level. Therefore, any measurement error can be easily identified, in case of getting values that significantly differ from the common (in case of equal conditions). Relevant education has been provided in case of lack of qualification. Education was provided by "Electrostal" plant, equipment producers and specialized organizations.

The initial finding of the Verification Team, resolution of any CARs, CLs and FARs raised and review of such resolution is provided in the Appendixes A and B to this report.

## 4. VERIFICATION OPINION

TUV Rheinland Group (TUV Rheinland) has performed the verification of the emission reductions that have been reported for the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" (ITL Project ID UA1000181) for the period from the 1st of June 2010 till the 28th of February 2011.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is TUV Rheinland's responsibility to express an independent verification opinion - conclusion on the verified amount of emission reductions from the project.

TUV Rheinland has conducted the verification on the basis of the monitoring plan contained in the registered Project Design Document Version 2.0 dated 27th of May 2010 and the Monitoring Report Version 2.0 dated 19 April 2011.

The verification included the assessment of:

- Project implementation in accordance with the Project Design Document (PDD);
- Compliance with the monitoring plan;
- Calculation of emission reductions and expression of a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data are accurate and free of material errors, omissions, or misstatements;
- Quality and management of data and verification that reported GHG emission reductions data is sufficiently supported by evidence.

TUV Rheinland's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. TUV Rheinland planned and performed the verification by obtaining evidence and other information and explanations that TUV Rheinland considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated, accurate and free of material errors, omissions, or misstatements.

In our opinion the GHG emissions reductions of the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" (ITL Project ID UA1000181) for the period from the 1st of June 2010 till the 28th of February 2011 are fairly stated, accurate and free of material errors, omissions, or misstatements in the Monitoring Report Version 2.0 dated 19 April 2011.

The GHG emission reductions were calculated correctly on the basis of the monitoring plan contained in the registered Project Design Document Version 2.0 dated 27th of May 2010.

TUV Rheinland Group is able to verify that the emission reductions from the "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" (ITL Project ID UA1000181) for the period from the 1st of June 2010 till the 28th of February 2011 amount to 301 043 tonnes of $CO_2$ equivalent.

Kiev, 20th of April 2011

## APPENDIX A – CHECK LIST FOR VERIFICATION

| DVM paragraph | Check Item | Initial Finding | Action requested to project participants | Review of project participants' action | Conclusion |
|---|---|---|---|---|---|
| **Project approvals by Parties Involved** | | | | | |
| 90 | Has the DFPs of at least one Party involved, other than the host Party, issued a written project approval when submitting the first verification report to the secretariat for publication in accordance with paragraph 38 of the JI guidelines, at the latest? | The project has been approved by the DFPs of the Parties Involved and documentation is available:<br>1) Letter of Approval by the Netherlands ref. 2010JI11 issued at 22 April 2010<br>2) Letter of Approval by the Ukraine ref. 1243/23/7 issued at 19 August 2010 | - | - | OK |
| 91 | Are all the written project approvals by Parties involved unconditional? | All the written project approvals by Parties involved are unconditional. "Electrostal" Ltd. And Global Carbon BV legal entities authorized by the designated focal points of the Parties Involved to participate in the JI project. | - | - | OK |
| **Project implementation** | | | | | |
| 92 | Has the project been implemented in accordance with the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website? | The project has been implemented in accordance with the registered PDD. This JI project is registered as Track 1 project and information is available (See Section 1.3 of this report). | - | - | OK |
| 93 | What is the status of operation of the project during the monitoring period? | During the monitoring period that covers time period between the 01/06/2010 and 28/02/2011 the project operated as planned. The first steel has been produced in March of 2008 in accordance with the registered PDD and official commissioning took place on 16/12/2008. After this the project has reached its planned operational capacity and has been operating during the whole monitoring period. | - | - | OK |

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| | | The verification team has verified during the site visit that the project, being an EAF steelmaking facility, is operational and evidence exists that it has operated during the whole monitoring period. | | | |
| **Compliance with monitoring plan** | | | | | |
| 94 | Did the monitoring occur in accordance with the monitoring plan included in the PDD regarding which the determination has been deemed final and is so listed on the UNFCCC JI website? | The determined monitoring plan is contained in the registered PDD ver. 2.0. that is available on the UNFCCC JI website. There were no deviations from this monitoring plan as well as no open issues since last verification. | - | - | OK |
| 95 (a) | For calculating the emission reductions or enhancements of net removals, were key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions or net removals and the activity level of the project and the emissions or removals as well as risks associated with the project taken into account, as appropriate? | For calculating the emission reductions key factors, e.g. those listed in 23 (b) (i)-(vii) above, influencing the baseline emissions as well as risks associated with the project were taken into account, as appropriate.<br>For more detailed information, please, refer to Section B.2. of the determined and registered PDD version 2.0. | - | - | OK |
| 95 (b) | Are data sources used for calculating emission reductions or enhancements of net removals clearly identified, reliable and transparent? | The monthly technical reports of the LLC Electrostal have been identified as the data source for the following monitoring parameters: steel production, EAF electrode consumption, oxygen consumption, anthracite consumption, lime consumption, LF electrode consumption. This data source is based on the existing reporting system of the company and is clearly identified, reliable and transparent. | CAR 01: Please update the calculation of emission reductions in accordance with correct version of the technical reports and explain the differences between versions of the technical reports. Correct and final versions of the | See Appendix B | OK |

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| | | However, during the verification site-visit it has been found that the monitoring report provided by the project participants is based on outdated version of the technical reports. Some of the reported data are different in the technical reports. The monitoring report also is not clear on whether the technical reports are used as the data source for the oxygen consumption. The technical note (raport) that has been provided by the project participants on site for the oxygen consumption in January 2011 does not contain source figures for the amount reported in the monitoring report and calculation spreadsheet. The technical report of LLC Electrostal for January 2011 contains only specific consumptions of oxygen.<br>Receipts for natural gas and monthly technical notes (raports) have been identified as the data source for the monitoring of natural gas consumption. This data source is based on the commercial metering system of the company and is clearly identified, reliable and transparent. However, the technical note (raport) for the natural gas consumption in January 2011 provided by the project participants on site did not contain the source figures for the natural gas consumption presented in the monitoring report and calculation spreadsheet.<br>The receipts of the supplier have been identified as data sources used for the monitoring of electricity consumption. This data source is based on the commercial metering system of the company and is clearly | technical reports need to be provided.<br><br>CL 01: Please provide correct data source for the oxygen consumption and explain the figure used in the monitoring report. Clear explanation on which sources of oxygen consumption are excluded and why is required.<br><br>CL 02: Data source used for monitoring of the natural gas consumption needs to be clarified. Clear explanation on which sources of natural gas consumption are excluded and why is required.<br><br>CAR 02: Please provide the correct reference code used to identify electricity consumption by the project in the receipts that have been identified as the applicable data source.<br><br>CL 03: It needs to be clarified what data sets from the receipts are used for calculation of the | | |

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| | | identified, reliable and transparent. However, the receipt for January of 2011 [22] that has been provided by the project participants and checked by the verification team does not provide the source figures for the number reported in the spreadsheet used to calculate emission reductions. The monitoring report mentions code T1 as the code to identify electricity consumption by the project in receipt. However, the receipt for January of 2011 [22] that has been provided by the project participants and checked by the verification team does not contain such code. | electricity consumption and why. Clear explanation on which sources of electricity consumption are excluded and why is required. | | |
| 95 (c) | Are emission factors, including default emission factors, if used for calculating the emission reductions or enhancements of net removals, selected by carefully balancing accuracy and reasonableness, and appropriately justified of the choice? | The emission factors used to calculate emission reductions are selected in accordance with the registered PDD ver. 2.0. The choice of these emission factors is appropriately justified in the PDD ver. 2.0 and in general accuracy and reasonableness are carefully balanced. However sources and references for the emission factors need to be updated in order to provide greater transparency for their choice. Emission factor for global baseline emission factor for steel produced is referenced to the registered determined PDD and corresponds with it, but detailed description and calculation is not provided in the monitoring report. Baseline emission factor for electrodes consumption during the steelmaking process; baseline emission factor for natural gas consumption during the steelmaking process; baseline emission factor for anthracite consumption during the steelmaking process are referenced | CAR 03: Please, include calculation and explanation of the global baseline emission factor for steel produced into the monitoring report.<br><br>CAR 04: Please provide complete reference and explanation of any calculation for the baseline emission factor for electrodes consumption during the steelmaking process.<br><br>CAR 05: Please provide complete reference and explanation of any calculation for the baseline emission factor for natural | See Appendix B | OK |

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| | | to the 2006 IPCC Guidelines but the values are not traceable to the source referenced. The baseline emission factor for lime consumption during the steelmaking process is referenced to the 2006 IPCC Guidelines but the reference is incomplete. Baseline emission factor for oxygen consumption during the steelmaking process is correctly referenced to the PDD ver. 2.0 but the value presented in the monitoring report is incorrect. | gas consumption during the steelmaking process.<br><br>CAR 06: Please provide complete reference and explanation of any calculation for the baseline emission factor for anthracite consumption during the steelmaking process.<br><br>CAR 07: Please provide complete reference for the baseline emission factor for lime consumption during the steelmaking process.<br><br>CAR 08: Please correct the value of baseline emission factor for oxygen consumption during the steelmaking process in accordance with the registered PDD in the Table B.2.1 of the monitoring report. | | |
| 95 (d) | Is the calculation of emission reductions or enhancements of net removals calculated based on conservative assumptions and the most plausible scenarios in a transparent manner? | The calculation of emission reductions is done based on conservative assumptions and the most plausible scenarios in a transparent manner. Project emissions are presented as the sum of the emissions values by components of the steel making process. The following sources of emissions can be | CAR 09: Please, update and correct Equations 1 and 2 in the monitoring report.<br><br>CAR 10: Please, provide correct description and explanation of the | See Appendix B | OK |

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| | | observed during the EAF operation:<br>1. Electrodes consumption by EAF<br>2. Oxygen consumption<br>3. Electricity consumption by EAF and LF<br>4. Natural gas consumption<br>5. Anthracite consumption<br>6. Lime consumption<br>7. Electrodes consumption by LF<br>However, the formula marked as Equation 1 in the monitoring report needs to be updated to be more transparent as it contains 7 components for project emissions and only 6 components are presented as Equations 2-7. Also, Equation 2 contains an error in the arguments.<br>The calculation of the baseline emissions is based on the JI specific approach in accordance with the registered PDD and rests on the global baseline emission factor for steel produced. This factor is applied to the steel production level which is assumed equal in both project and baseline scenario.<br>The calculation of emission reductions is done by subtracting the project emissions from the baseline emissions. However, the explanation after the Equation 10 in the monitoring report is not correct. | arguments in Equation 10 of the monitoring report. | | |
| **Data management** | | | | | |
| 101 (a) | Is the implementation of data collection procedures in accordance with the monitoring plan, including the quality control and quality assurance procedures? | Data collection procedure is carried out in accordance with the monitoring plan, including the quality control and quality assurance procedures and has been checked by the verification team on-site. The monitoring plan is presented in the section D | - | - | OK |

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| | | of the registered PDD ver.2.0. | | | |
| 101 (b) | Is the function of the monitoring equipment, including its calibration status, is in order? | The monitoring equipment employed by the project has functioned in accordance with the monitoring plan and in general is in order. The verification team has verified that the reported metering devices are in fact installed and operational. The metering devices have appropriate documentation, such as passports and calibration certificates. Calibration has been performed in accordance with the procedures of the Host Party and evidence of these calibrations has been provided (calibration certificates and/or evidence of calibration in the passports of the devices). It has been verified that the calibration did occur at the correct calibration intervals for all metering devices. However, it has been found that calibration of the Floor Scales S/N: 73642 has been performed on 28/01/2011 while 29/01/2013 is mentioned in the monitoring report as the next calibration date. Also, for this device the calibration interval of 3 years is mentioned in the monitoring report. Correct calibration interval needs to be clarified for Floor Scales S/N: 73642. The monitoring report mentions calibration procedures and the body responsible for calibration. However, the list of devices presented in the table B.1.3 of the monitoring report contains device Leader VG-1 that is not used for monitoring and details are not provided in the Table B.1.2 of the monitoring report. Details on Flowtech meter that is used for monitoring are not provided in the table B.1.3. | CL 04: Please, clarify the correct calibration interval for the Floor Scales S/N: 73642 and mention the actual last calibration date of the device as well as correct date of the next calibration.<br><br>CAR 11: Please update the tables B.1.3. and B.1.2 of the monitoring report to include all devices used for monitoring. | See Appendix B | OK |

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| 101 (c) | Are the evidence and records used for the monitoring maintained in a traceable manner? | The evidence and records used for the monitoring are maintained in a traceable manner. Verification team has got access to all necessary data on monitoring system and emission reductions and received necessary evidence on site. However, necessary data storage and archiving procedure has not been defined in the monitoring plan and has not been presented in the PDD. Data archiving period is not established. | CAR 12: Please submit any documented instruction which indicates that the data monitored and required for verification are to be kept for at least two years after the last transfer of ERUs. | See Appendix B | OK |
| 101 (d) | Is the data collection and management system for the project in accordance with the monitoring plan? | The data collection and management system for the project is in accordance with the monitoring plan as described in the registered PDD. Roles and responsibilities of the technical staff in the framework of the monitoring are described in the monitoring report. 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. Data relevant to the emission reduction calculation are daily registering in the log books. During the operation, there are minor variations in its level. Therefore, any measurement error can be easily identified, in case of getting values that significantly differ from the common (in case of equal conditions). Relevant education has been provided in case of lack of qualification. Education was provided by "Electrostal" plant, equipment producers and specialized organizations. The information on trainings of the monitoring personnel in the monitoring | CAR 13: Please submit any evidence of the training of monitoring personnel to the verification team and include this information to the monitoring report. | See Appendix B | OK |

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| | | report is insufficient and mentions "working in the turbine workshop" which does not seem relevant to this project. | | | |

## APPENDIX B – RESOLUTION OF CARs, CLs, FARs

| Action requested to project participants | Project participants' action | Conclusion |
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| CAR 01: Please update the calculation of emission reductions in accordance with correct version of the technical reports and explain the differences between versions of the technical reports. Correct and final versions of the technical reports need to be provided. | Calculation of emission reductions was updated in accordance with correct version of the technical reports. The difference can be explained by human factor presence. All data achieved during the monitoring period are continuously checking by project participants.<br><br>As it is written in the monitoring report the main source for the technical reports (which are the main source for MR) are Brief reports from EAF and LF departments (melting passports). These Brief Reports are based on electronic database filled in automatically, in accordance with meters readings.<br><br>After analyzing of all information sources necessary corrections was made and corrected technical reports were issued.<br><br>Corrected versions of the technical reports were provided to the audit team during site visit.<br><br>Please find corrected calculation Excel model and revised Monitoring Report, version 2.0 | Updated calculations were provided. Issue is closed. |
| CAR 02: Please provide the correct reference code used to identify electricity consumption by the project in the receipts that have been identified as the applicable data source. | As a source of information used of electricity acts that include electricity consumption on the transformer #1 (see p.3 of Acts "T1-110/35 kV" for period 06-12.2010 and p.4 "Tr № 1" first 3 digits for period 01-02.2011) | Correct code has been added to the monitoring report ver. 2.0. Issue is closed. |
| CAR 03: Please, include calculation and explanation of the global baseline emission factor for steel produced into the monitoring report. | Calculation and explanation of the global baseline emission factor for steel produced was determined ex-ante in registered PDD (Annex 3, Key elements for the monitoring plan, page 50). and can be found under the following hyperlink: http://www.neia.gov.ua/nature/doccatalog/document?id=117623<br><br>Also as it is stated in the registered Monitoring plan, Emission factor for EAF is assumed ex-ante for all crediting period. This factor is based on data (IPCC, Worldsteel and Electrostal data) available for the moment of developing PDD. Taking into account that all parameters in the formula was determined ex-ante, there is no need to include this formula to the monitoring report.<br><br>Nevertheless to make Monitoring Report more transparent, relevant reference was put as an explanation of source used. | References were included in the monitoring report ver. 2.0. Issue is closed. |

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| | Please find corrected calculation Excel model and revised Monitoring Report, version 2.0 (Section D.3.2) | |
| CAR 04: Please provide complete reference and explanation of any calculation for the baseline emission factor for electrodes consumption during the steelmaking process. | Emission factor for electrodes consumption during the steelmaking process was calculated by following approach:<br><br>$EF_{electrodes,y} = CC_{electrodes,y} \times {}^{44}/_{12}$ , where:<br><br>$CC_{electrodes,y}$ - carbon content in the electrodes, kg C/kg. This parameter is equal to 0.82 in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Metal Industry Emission (table 4.3, page 27);<br>44/12 – ratio of molecular weights of CO2 and carbon (describes the process of oxidation (combustion) of the electrodes).<br><br>Having this, Emission factor for electrodes consumption during the steelmaking process is equal to 3.007 t CO2/t.<br><br>Relevant explanation was added to the MR, version 2.0 (Section B.2.1). Also explanation of the sources used was added to the Excel calculation model. Please find revised. | References and explanation were included in the monitoring report ver. 2.0. Issue is closed. |
| CAR 05: Please provide complete reference and explanation of any calculation for the baseline emission factor for natural gas consumption during the steelmaking process. | Emission factor for natural gas consumption during the steelmaking process was calculated by following approach:<br><br>$EF_{NG,y} = \frac{EF_{NG,IPCC,y} \times NCV_{NG,default} \times 4.187}{1000000}$ , where:<br><br>$EF_{NG,IPCC,y}$ – default emission factor for natural gas combustion, kg CO2/TJ. This parameter is equal to 56100 or 56.1 kg CO2/ GJ in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction (table 1.4, page 24);<br>$NCV_{NG,default}$ –NCV for natural gas. The value equal to 8000 kcal/m3 is used at Electrostal plant and many others as a default value.<br>4.187 – transition coefficient. 1 kcal = 4.187 kJ.<br>1000000 – transition coefficient to obtain resulting figure in tCO2/1000 m3<br><br>Having this, Emission factor for natural gas combustion during the steelmaking process is equal to 1.189 t CO2/1000 m3.<br><br>Relevant explanation was added to the MR, version 2.0 (Section B.2.1). Also explanation of the sources used was added to the Excel calculation model. Please find revised. | References and explanation were included in the monitoring report ver. 2.0. Issue is closed. |
| CAR 06: Please provide complete reference and explanation of any calculation for the baseline emission | Emission factor for anthracite consumption during the steelmaking process was calculated by following approach:<br><br>$EF_{antracite,y} = \frac{EF_{anthracite,IPCC,y} \times NCV_{anthracite,y}}{10^9}$ ,<br>where: | References and explanation were included in the monitoring report ver. 2.0. Issue is closed. |

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| factor for anthracite consumption during the steelmaking process. | $EF_{anthracite,IPCC,y}$ – default emission factor for anthracite combustion, kg CO2/TJ. This parameter is equal to 98 300 kg CO2/TJ in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction (table 1.4, page 23);<br>$NCV_{anthracite,y}$ –NCV for anthracite. This parameter is equal to 23 865 kJ/kg in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction (table 1.2, page 18);<br>$10^9$ – transition coefficient to obtain resulting figure in tCO2/t<br><br>Having this, Emission factor for anthracite consumption during the steelmaking process is equal to 2.346 t CO2/t.<br><br>Relevant explanation was added to the MR, version 2.0 (Section B.2.1). Also explanation of the sources used was added to the Excel calculation model. Please find revised. | |
| CAR 07: Please provide complete reference for the baseline emission factor for lime consumption during the steelmaking process. | Emission factor for lime consumption during the steelmaking process is based on value for dolomitic lime for developing countries, in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Chapter 3, Table 2.4.<br><br>Relevant explanation was added to the MR, version 2.0 (Section B.2.1). Also explanation of the sources used was added to the Excel calculation model. Please find revised. | References and explanation were included in the monitoring report ver. 2.0. Issue is closed. |
| CAR 08: Please correct the value of baseline emission factor for oxygen consumption during the steelmaking process in accordance with the registered PDD in the Table B.2.1 of the monitoring report. | Table B.2.1 in the monitoring report were corrected.<br><br>Please find revised MR, version 2.0 (Section B.2). | Corrections were made in the monitoring report ver. 2.0. Issue is closed. |
| CAR 09: Please, update and correct Equations 1 and 2 in the monitoring report. | Equations 1 and 2 in the monitoring report were corrected.<br><br>Please find revised MR, version 2.0 (Section D). | Corrections were made in the monitoring report ver. 2.0. Issue is closed. |
| CAR 10: Please, provide correct description and explanation of the arguments in Equation 10 of the | Correct description and explanation of the arguments in Equation 10 of the monitoring report was provided.<br><br>Please find revised MR, version 2.0 (Section D.3.4). | Corrections were made in the monitoring report ver. 2.0. Issue is closed. |

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| monitoring report. | | |
| CAR 11: Please update the tables B.1.3. and B.1.2 of the monitoring report to include all devices used for monitoring. | Correct tables B.1.3. and B.1.2 of the monitoring report was provided.<br><br>Please find revised MR, version 2.0 (Section B.1.2 and Section B.1.3). | Corrections were made in the monitoring report ver. 2.0. Issue is closed. |
| CAR 12: Please submit any documented instruction which indicates that the data monitored and required for verification are to be kept for at least two years after the last transfer of ERUs. | Order #41 dated 25.05.2010 was signed by general director of Electrostal plant.<br><br>Please find the file:<br>20110412_Electrostal_Order_data_archiving.pdf | Information has been added to the monitoring report ver. 2.0 and evidence has been provided. Issue is closed. |
| CAR 13: Please submit any evidence of the training of monitoring personnel to the verification team and include this information to the monitoring report. | All technical staff working with new equipment has necessary permissions and had successfully completed relevant training. "Electrostal" Ltd has the license (License of Ministry of Education and Science of Ukraine No 363304) which allows providing education on working specialties concerning iron and steel works. All work on the proposed JI project does not require extensive maintenance effort for monitoring.<br><br>The best practice for monitoring for JI project should not influence (or minimally influence) on common monitoring practice, used in the plant. Therefore, existing statistical documents (Technical Reports, etc.) were used as a source of data. All metering devices used for metering the data, necessary for ER calculations are regularly checked and calibrated, in accordance with internal rules and relevant legislation.<br>All data needed for ER calculation were collected by Global Carbon representatives and after that recalculated into the value of emission reductions.<br><br>Please find file: 20110416_Electrostal_License.pdf | Information has been added to the monitoring report ver. 2.0 and evidence has been provided. Issue is closed. |
| CL 01: Please provide correct data source for the oxygen consumption and explain the figure used in the monitoring report. Clear explanation on which sources of oxygen consumption are | As a source of information used of technical reports that include oxygen consumption in the following departments:<br>• area furnace and stove-busket<br>• area of continuous casting machine<br>• electric steelmaking department<br>These departments are the only technological consumers of oxygen at the plant. Some consumers were not taking into account, like scrap area. The reason for this is that consumer has no matter to technological needs. | Clarification has been provided. Issue is closed. |

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| excluded and why is required. | | |
| CL 02: Data source used for monitoring of the natural gas consumption needs to be clarified. Clear explanation on which sources of natural gas consumption are excluded and why is required. | As a source of information used of technical reports that include natural gas consumption in the following departments:<br>• area furnace and stove-busket<br>• area of continuous casting machine<br>• preparation area of steel ladles<br>• preparation area of industrial ladle<br>• electric steelmaking department<br>These departments are the only technological consumers of natural gas at the plant. Some consumers were not taking into account, like scrap area. The reason for this is that consumer has no matter to technological needs. | Clarification has been provided. Issue is closed. |
| CL 03: It needs to be clarified what data sets from the receipts are used for calculation of the electricity consumption and why. Clear explanation on which sources of electricity consumption are excluded and why is required. | The meter "Alpha A1140" № 01144644 used for accounting electricity consumption by EAF and LF. This meter counts the consumption of active power, consumption of reactive power and generation of reactive power. | Clarification has been provided. Issue is closed. |
| CL 04: Please, clarify the correct calibration interval for the Floor Scales S/N: 73642 and mention the actual last calibration date of the device as well as correct date of the next calibration. | Calibration interval for the Floor Scales S/N: 73642 in the monitoring report were corrected.<br><br>Please find revised MR, version 2.0 (Table B.1.2). | Clarification has been provided. Issue is closed. |

## REFERENCES

1. Project Design Document "Implementation of Arc Furnace Steelmaking Plant "Electrostal" at Kurakhovo, Donetsk Region" Version 2.0 dated 27th May 2010
2. Determination Report NO. UKRAINE/0111/2010 Rev. 01 dated 04/06/2010
3. Second Periodic Annual JI Monitoring Report Version 1.0 dated 21 March 2011
4. Initial and First Periodic Verification Report No UKRAINE/0131/2010 Rev.02 dated 16.09.2010 (01.04.2008 – 31.05.2010)
5. Letter of Approval by the Netherlands ref. 2010JI11 issued at 22 April 2010
6. Letter of Approval by the Ukraine ref. 1243/23/7 issued at 19 August 2010
7. Second Periodic Annual JI Monitoring Report Version 2.0 dated 19 April 2011
8. Passport of the meter EA 02RAL-BE4, ser. №01144644. Verification date 13/09/2006.
9. Passport BBET – 150 ser. №061202763. Certificate of the verification dated 21/06/2010.
10. Passport automobile electrical metric scale BTA-60 ser. №061002044. Certificate of verification dated 22/06/2010.
11. Passport weight meter 4BDU_1500. Certificate of verification dated 28/01/2011.
12. Passport natural gas meter Flowtek. Certificate of verification dated 12/11/2009.
13. Passport oxygen meter Optimass8000. Certificate of verification dated 03/01/2011.
14. Passport measurement device BCS_M584. Certificate of verification dated 05/08/2010.
15. Statement of acceptance - transferring of the electricity for June 2010 of LLC "Electrostal" dated 01/07/2010.
16. Statement of acceptance - transferring of the electricity for July 2010 of LLC "Electrostal" dated 01/08/2010.
17. Statement of acceptance - transferring of the electricity for August 2010 of LLC "Electrostal" dated 01/09/2010.
18. Statement of acceptance - transferring of the electricity for October 2010 of LLC "Electrostal" dated 01/10/2010.
19. Statement of acceptance - transferring of the electricity for September 2010 of LLC "Electrostal" dated 01/11/2010.
20. Statement of acceptance - transferring of the electricity for November 2010 of LLC "Electrostal" dated 01/12/2010.
21. Statement of acceptance - transferring of the electricity for December 2010 of LLC "Electrostal" dated 01/01/2010.
22. Statement of acceptance - transferring of the electricity for January 2011 of LLC "Electrostal" dated 01/02/2011.
23. Statement of acceptance - transferring of the electricity for February 2011 of LLC "Electrostal" dated 01/03/2011.
24. Technical report of the steel complex LLC "Electrostal for June 2010
25. Technical report of the steel complex LLC "Electrostal for July 2010
26. Technical report of the steel complex LLC "Electrostal for August 2010
27. Technical report of the steel complex LLC "Electrostal for September 2010
28. Technical report of the steel complex LLC "Electrostal for October 2010
29. Technical report of the steel complex LLC "Electrostal for November 2010
30. Technical report of the steel complex LLC "Electrostal for December 2010
31. Technical report of the steel complex LLC "Electrostal for January 2011
32. Technical report of the steel complex LLC "Electrostal for February 2011".
33. Statement of evidence on the electricity counters for January 2011.
34. Statement of evidence on the electricity counters for February 2011.

35. Statement of evidence on the electricity counters for August 2010.
36. Technical report on oxygen consumption for January 2011.
37. Technical report on natural gas consumption for January 2011.
38. Production reports of the technical report CCM 2010 (December 2010).
39. Production reports of the technical report CCM 2010 (June 2010).
40. Daily reports on production of CCM
41. Journal of accounting electrical energy.
42. Technical report on argon consumption for January 2011.
43. Journal of accounting resistance electrodes EAF.
44. Technical report of EAF and LF area for January 2011.
45. License #363304 for provision of educational services issued to LLC "Electrostal" (valid till 26/06/2012).
46. Order of LLC "Electrostal" #41 for data archiving.
47. Calculation Spreadsheet ver.1.0 dated 21 March 2011
48. Calculation Spreadsheet ver.2.0 dated 19 April 2011