Monitoring report

over period: 01.01.2008 – 31.12.2010

JOINT IMLEMENTATION PROJECT

“Energy efficiency increase in steelmaking and sinter plants JSC “Zaporizhstal”, Ukraine”

The Project Developer

General Director CJSC “National Carbon Sequestration Foundation”	_____	Fedorov Y.N.

Seal

The Project Owner

Deputy Chairman of Board, Technical Director JSC “Zaporizhstal”	_____	Putnoki A.U.

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Zaporizhya

June 2011

Contents

Section A. General description of the project and monitoring

A.1. Title of the project

Energy efficiency increase in steelmaking and sinter plants JSC "Zaporizhstal", Ukraine

Sectoral scope: (3) Energy demand, (9) Metal production

Version: 04

Date: 30.06.2011

A.2. Short description of the project

JSC "Zaporizhstal" is implementing project for energy efficiency increase in steelmaking and sinter plants by introduction of new gas burners with spay and niche technology.

Project includes installation of gas burners with spray and niche technology designed by CJSC "ZPK "Specgazprom" on aggregates in steelmaking and sinter plants (table A.2-1). The gas burners with spray and niche technology have same construction and technological qualities that provide to more effective combustion of natural gas by steel and sinter production in comparison with other types of burners. That provides to the decrease of natural gas consumption in the metallurgical works and as a result to GHG emissions reductions from fuel combustion. Natural gas is used in steelmaking plant for metal heating by steel smelting and in sinter plant for firing of sinter charge by sinter production.

The technical maintenance of the gas burners with spray and niche technology is provided by properly trained and qualified staff of JSC "Zaporizhstal" in accordance with actual regulations. The professional skill of staff is tested yearly at sinter and open-hearth plant JSC "Zaporizhstal".

Table A.2-1. The gas burners installed on aggregates in steelmaking and sinter plants of JSC "Zaporizhstal"

№	Aggregate	Type of burner	Number	Data of installation
1.	Two-bath steel melting aggregate #1	SNG-33M	4	September 2005
2.	Open-hearth furnaces # 2	SNG-33VS SNG-55SV	3 2	January 2006 January 2009
3.	Open-hearth furnaces # 5	SNG-33VS SNG-55SV	3 2	December 2005 March 2009
4.	Open-hearth furnaces # 6	SNG-33VS SNG-55SV	3 2	February 2006 July 2009
5.	Open-hearth furnaces # 7	SNG-33VS SNG-55SV	3 2	February 2006 February 2009
6.	Open-hearth furnaces # 8	SNG-33VS SNG-55SV	3 2	December 2005 March 2009
7.	Open-hearth furnaces # 10	SNG-33VS SNG-55SV	3 2	January 2006 February 2009
8.	Open-hearth furnaces # 11	SNG-33VS	3	December 2005
9.	Open-hearth furnaces # 12	SNG-33VS SNG-55SV	3 2	January 2006 May 2009

№	Aggregate	Type of burner	Number	Data of installation
10.	Sinter machines # 2[1]	SNG-22AG	4	June 2006
11.	Sinter machines # 3	SNG-22AG	4	April 2007
12.	Sinter machines # 4	SNG-22AG	4	August 2006
13.	Sinter machines # 5	SNG-22AG	4	October 2006
14.	Sinter machines # 6	SNG-22AG	4	November 2007

A.3. Stages of the project implementation

The decision to implement the project on the installation of gas burners with spray and niche technology in sinter and steelmaking plants at the JSC "Zaporizhstal" was taken in 2005. The replacement of gas burners is implemented stepwise in 2005-2009. The work documentation is elaborated for each aggregate for new gas burners installation in period of installation works. The final replacement of traditional burners in the burner with spray and niche technology is made in 2009.

The JI-project "Energy efficiency increase in steelmaking and sinter plants JSC "Zaporizhstal", Ukraine" is approved by the Host party (Ukraine) and by the Sponsor party (United Kingdom). The Letters of Approval are attached to the monitoring report. The Project participants are provided below.

Party involved	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ukraine (Host Party)	• JSC "Zaporizhstal"	No
United Kingdom (Sponsor Party)	• Ohana LLP	No

CJSC "National Carbon Sequestration Foundation" is not a project participant.

A.4. Deviations and corrections of approved PDD

Absent.

A.5. Monitoring period

Date of the start of monitoring: 01.01.2008

Date of the end of monitoring: 31.12.2010

[1] The gas burners with spray and niche technology (SNG-22AG) were not installed on the sinter machine #1 because the sinter machine #1 is to replace with new sinter machine.

A.6. Monitoring results for the current period

Period of monitoring	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
01.01.2008 - 31.12.2008	457,104	-	545,793	88,689
01.01.2009 - 31.12.2009	342,816	-	440,868	98,052
01.01.2010 - 31.12.2010	394,066	-	488,137	94,071
Total: 01.01.2008 - 31.12.2010	1,193,986	-	1,474,798	280,812

A.7. Methodology used for monitoring of GHGs emission reductions

Baseline and monitoring plan for the project "Energy efficiency increase in steelmaking and sinter plants JSC "Zaporizhstal", Ukraine" is determined based on a JI specific approach in accordance with paragraph 9(a) "Guidance on criteria for baseline setting and monitoring", (Version 02)[2].

A.8. Deviations and corrections of approved monitoring plan

Absent.

A.9. Changes since the last verification

Absent.

A.10. Person(s) responsible for the preparation and submission of the monitoring report

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[2] Source: http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf

Section B. Main activity according to the monitoring plan

B.1. Initial data for monitoring

B.1.1. List of fixed parameters for all monitoring period

№	Data variable	Description	Data unit	Source of data
1.	$SFC_{NG,F-i,BL}$	Specific natural gas consumption for steel production in i- steel-smelting furnace in the baseline scenario	Furnace number / kg of standard fuel / t: 1 / 21.32; 2 / 99.71; 5 / 100.79; 6 / 99.87; 7 / 92.48; 8 / 97.24; 10 / 100.56; 11 / 88.32; 12 / 99.81	Calculated based on data of technical reports JSC "Zaporizhstal" for September 2003 – February 2006. The justification is provided in the Annex 3 of the PDD.
2.	$SFC_{NG,SINTER,BL}$	Specific natural gas consumption for firing of sinter charge in sinter plant in the baseline scenario	5.66 kg of standard fuel / t	Calculated based on data of technical reports JSC "Zaporizhstal" for August 2004 – July 2006. The justification is provided in the Annex 3 of the PDD.
3.	$n_{C,j}$	Number of the carbon moles per mole of natural gas j-component	$n_{C,CH4} = 1$; $n_{C,C2H6} = 2$; $n_{C,C3H8} = 3$; $n_{C,C4H10} = 4$; $n_{C,C5H12} = 5$; $n_{C,C6H14} = 6$; $n_{C,CO2} = 1$; $n_{C,N2} = 0$; $n_{C,O2} = 0$.	IPCC Guidelines for National Greenhouse Gas Inventories, 2006 – Volume 2: Energy, Chapter 4: Fugitive Emissions, p. 4.45
4.	ρ_{CO2}	CO_2 density under the standard conditions (293 K, 101.3 kPa)	1.831 kg/m^3	Methodology of the calculation of the pollution emissions into the atmosphere during the associated petroleum gas flaring, Research institute "Atmosphere", 1998.

The list of the fixed parameters for all monitoring period and their values are determined according to the approved monitoring plan stated in the PDD version 02 dated on 15.03.2011.

The conversion factor of natural gas into standard fuel (k_{NG}) was monitored during the current monitoring period (01.01.2008-31.12.2010) instead of reference data use. The monitoring of conversion factor (k_{NG}) is provided as described in the section B.1.2 of the monitoring report based on actual net calorific value of natural gas included in the monitoring plan (ID-11.2, $NCV_{NG,m}$). The monitoring of conversion factor (k_{NG}) is in accordance with the approved monitoring plan and Annex 3 of the PDD.

B.1.2. List of parameters that are monitored throughout the crediting period

№	Data variable	Description	Data unit	Source of data
1.	ID-1 $FC_{NG,F-1,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #1 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
2.	ID-2 $FC_{NG,F-2,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #2 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
3.	ID-3 $FC_{NG,F-5,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #5 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
4.	ID-4 $FC_{NG,F-6,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #6 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
5.	ID-5 $FC_{NG,F-7,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #7 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
6.	ID-6 $FC_{NG,F-8,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #8 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
7.	ID-7 $FC_{NG,F-10,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #10 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
8.	ID-8 $FC_{NG,F-11,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #11 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
9.	ID-9 $FC_{NG,F-12,PJ,m}$	natural gas consumption for steel production in steel-smelting furnace #12 in the project scenario	t of standard fuel	Calculated parameter. Data source: Technical report of steelmaking plant.
10.	ID-10 $FC_{NG,SINTERPLANT,PJ,m}$	natural gas consumption for firing of sinter charge in sinter plant in the project scenario	thousand m^3	Measured parameter. Data source: Technical report of gaseous plant.
11.	ID-11 $W_{j,NG,m}$	molar fraction of j-component of natural gas	fraction	Measured parameter. Data source: Certificate of physical and chemical parameters of gaseous fuel.
12.	ID-11.2 $NCV_{NG,m}$	net calorific value of natural gas	kcal/m^3	Measured parameter. Data source: Certificate of physical and chemical parameters of gaseous fuel.

13.	ID-12 $P_{STEEL,F\text{-}i,PJ,m}$	steel production in i- steel-smelting furnace in the project scenario	t	Measured parameter. Data source: Technical report of steelmaking plant.
14.	ID-13 $P_{SINTER,PJ,m}$	sinter production in sinter plant in the project scenario	t	Measured parameter. Data source: Technical report of sinter plant.
15.	$FC'_{NG,STEELPLANT,PJ,m}$	total natural gas consumption in steel plant in the project scenario	thousand m^3	Measured parameter. Data source: Calculation of energy resources consumption by consumers.
16.	$FC'_{NG,F\text{-}i,PJ,m}$	natural gas consumption in i-steel-smelting furnace in the project scenario	thousand m^3	Measured parameter. Data source: Calculation of energy resources consumption by consumers.
17.	k_{NG}	Conversion factor of natural gas into standard fuel	t of standard fuel/thousand m^3	Calculated parameter. Data source: Calculated as actual net calorific value of natural gas (ID-11.2) divided into 7,000 kcal/kg of standard fuel. This is in accordance to the Annex 3 of the PDD.

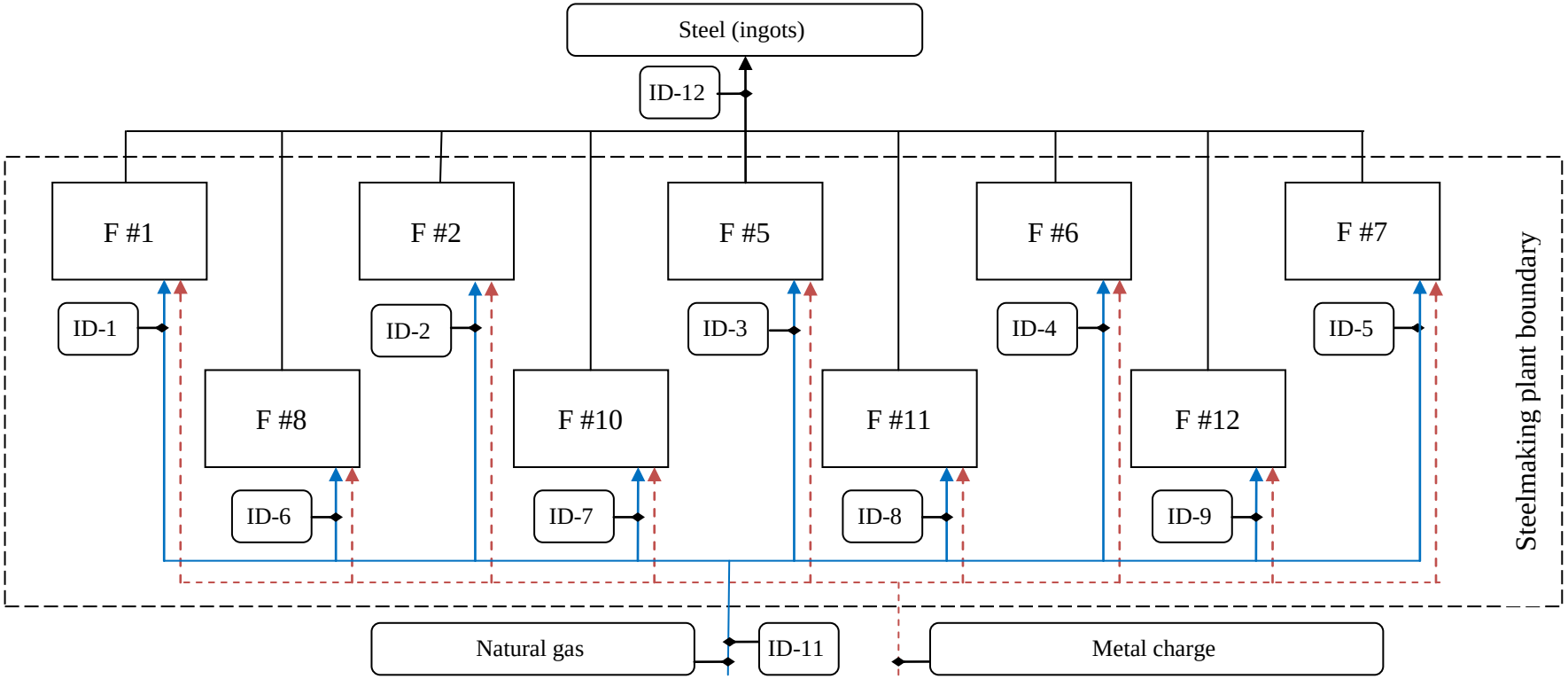
The monitoring procedures of the above provided parameters are presented in the section B.2 of the monitoring report. The information about measuring devices used for monitoring parameters recording is provided in the section B.3 of the monitoring report.

The calculated parameters (ID: 1-9) that are monitored through the crediting period are determined monthly by Central Laboratory JSC "Zaporizhstal" based on measuring data according to the formulae stated in the Annex 3 of the PDD version 02 dated on 15.03.2011 and in the section B.1.4.1 of the monitoring report. The procedures of measuring and recording of parameters used for calculation of monitoring parameters (ID: 1-9) are included in the monitoring plan.

B.1.3. Scheme of monitoring points

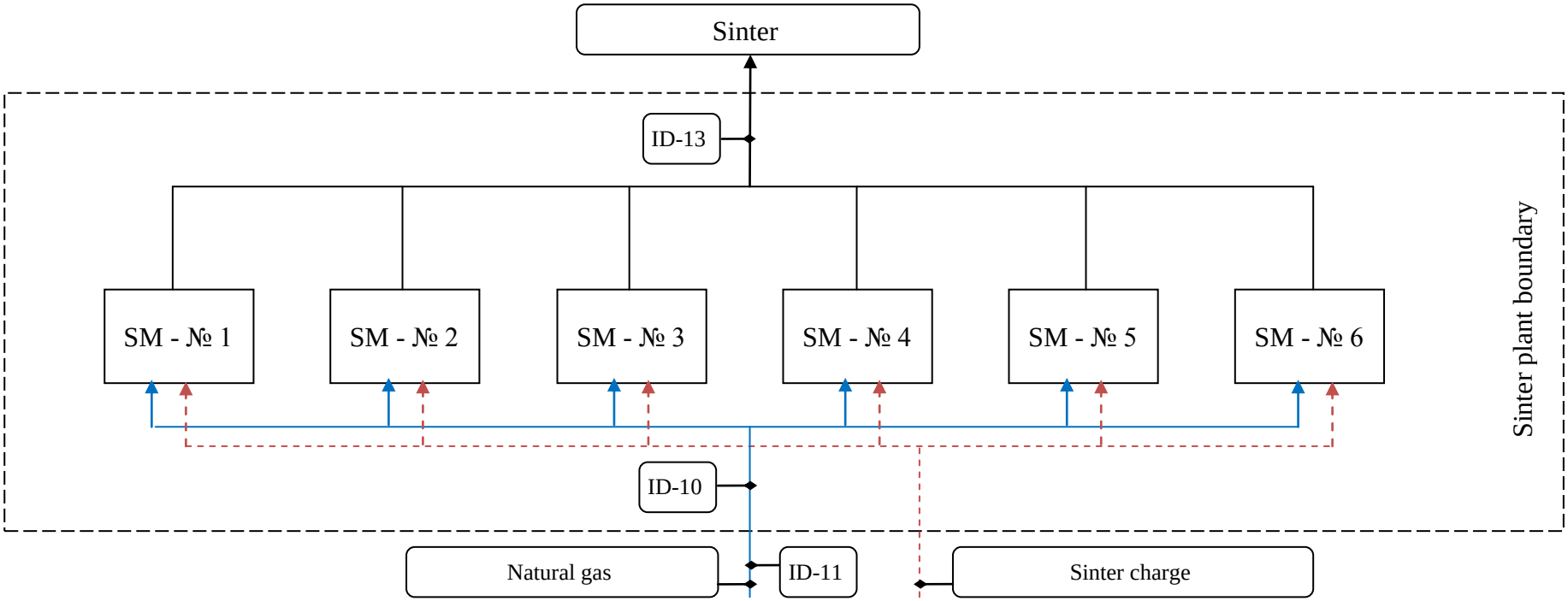
The monitoring points of GHGs emissions are shown in the following figure B.1.3-1 and B.1.3-2.

Figure B.1.3-1. Principal scheme of monitoring point location in steelmaking plant



F – Steel-smelting furnace (F #1 - Two-bath steel melting aggregate; F #2, 5, 6, 7, 8, 10, 11, 12 – Open hearth furnaces).

Figure B.1.3-2. Principal scheme of monitoring point location in sinter plant



SM – Sinter machine

B.1.4. Formulas used in monitoring plan

B.1.4.1. Formulas used to calculate project emissions

Project emissions

(1) $PE_y = PE_{STEELPLANT,y} + PE_{SINTERPLANT,y}$

PE_y - CO_2 project emissions, tCO_2

$PE_{STEELPLANT,y}$ - CO_2 emissions from fuel combustion in steelmaking plant in the project scenario, tCO_2

$PE_{SINTERPLANT,y}$ - CO_2 emissions from fuel combustion in sinter plant in the project scenario, tCO_2

y - year

Steelmaking plant

(1.1) $PE_{STEELPLANT,y} = \Sigma (FC_{NG,F\text{-}i,PJ,m} * EF_{CO2,NG,m})$

$PE_{STEELPLANT,y}$ - CO_2 emissions from fuel combustion in steelmaking plant in the project scenario, tCO_2

$FC_{NG,F\text{-}i,PJ,m}$ - natural gas consumption for steel production in i- steel-smelting furnace in the project scenario, t of standard fuel

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/ t of standard fuel

i - steel-smelting furnace # 1, 2, 5, 6, 7, 8, 10, 11, 12

m - month

y - year

The natural gas consumption for steel production in i-steel-smelting furnace in the project scenario ($FC_{NG,F\text{-}i,PJ,m}$) is calculated by Central laboratory JSC "Zaporizhstal" using the formulae:

(1.1.1) $FC_{NG,F\text{-}i,PJ,m} = \{[(FC'_{NG,STEELPLANT,PJ,m} - \Sigma FC'_{NG,F\text{-}i,PJ,m}) / (\Sigma P_{STEEL,F\text{-}i,PJ,m}) * P_{STEEL,F\text{-}i,PJ,m}] + FC'_{NG,F\text{-}i,PJ,m}\} * k_{NG}$

$FC_{NG,F\text{-}i,PJ,m}$ - natural gas consumption for steel production in i-steel-smelting furnace in the project scenario, t of standard fuel

$FC'_{NG,STEELPLANT,PJ,m}$ - total natural gas consumption in steel plant in the project scenario, thousand m^3

$FC'_{NG,F\text{-}i,PJ,m}$ - natural gas consumption in i-steel-smelting furnace in the project scenario, thousand m^3

$P_{STEEL,F\text{-}i,PJ,m}$ - steel production in i-steel-smelting furnace in the project scenario, t

k_{NG} - conversion factor of natural gas into standard fuel, t of standard fuel/thousand m^3

Sinter plant

(1.2) $PE_{SINTERPLANT,y} = \Sigma (FC_{NG,SINTERPLANT,PJ,m} * k_{NG} * EF_{CO2,NG,m})$

$PE_{SINTERPLANT,y}$ - CO_2 emissions from fuel combustion in sinter plant in the project scenario, tCO_2

$FC_{NG,SINTERPLANT,PJ,m}$ - natural gas consumption for firing of sinter charge in sinter plant in the project scenario, thousand m^3

k_{NG} - conversion factor of natural gas into standard fuel, t of standard fuel/thousand m^3

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/ t of standard fuel

m - month

y - year

CO_2 emission factor from natural gas combustion[3]

(1.3) $EF_{CO2,NG,m} = \Sigma (W_{j,NG,m} * n_{C,j} * \rho_{CO2}) / NCV_{NG,m} * 7000$

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/t of standard fuel

$W_{j,NG,m}$ - molar fraction of j-component of natural gas, fraction

$n_{C,j}$ - number of the carbon moles per mole of natural gas j-component

ρ_{CO2} - CO_2 density under the standard conditions (293 K, 101.3 kPa), kg/m^3

$NCV_{NG,m}$ - net calorific value of natural gas, kcal / m^3

7000 - calorific value of standard fuel, kcal / kg

j - CH_4, C_2H_6, C_3H_8, C_4H_{10}, C_5H_{12}, C_6H_{14}, CO_2, N_2, O_2

m - month

B.1.4.2. Formulas used to calculate baseline emissions

Baseline emissions

(2) $BE_y = BE_{STEELPLANT,y} + BE_{SINTERPLANT,y}$

BE_y - CO_2 baseline emissions, tCO_2

$BE_{STEELPLANT,y}$ - CO_2 emissions from fuel combustion in steelmaking plant in the baseline scenario, tCO_2

$BE_{SINTERPLANT,y}$ - CO_2 emissions from fuel combustion in sinter plant in the baseline scenario, tCO_2

y - year

Steelmaking plant

(2.1) $BE_{STEELPLANT,y} = \Sigma (FC_{NG,F\text{-}i,BL,m} * EF_{CO2,NG,m})$

$BE_{STEELPLANT,y}$ - CO_2 emissions from fuel combustion in steelmaking plant in the baseline scenario, tCO_2

$FC_{NG,F\text{-}i,BL,m}$ - natural gas consumption for steel production in i-steel-smelting furnace in the baseline scenario, t of standard fuel

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/ t of standard fuel

i - steel-smelting furnace # 1, 2, 5, 6, 7, 8, 10, 11, 12

m - month

y - year

[3] The calculation of CO_2 emission factor from natural gas combustion (formulae 1.3) is based on stoichiometric CO_2 formation from carbon molecules contented in gaseous component of natural gas.

(2.1.1) $FC_{NG,F\text{-}i,BL,m} = P_{STEEL,F\text{-}i,PJ,m} * SFC_{NG,F\text{-}i,BL} * 10^{-3}$

$FC_{NG,F\text{-}i,BL,m}$ - natural gas consumption for steel production in i- steel-smelting furnace in the baseline scenario, t of standard fuel

$P_{STEEL,F\text{-}i,PJ,m}$ - steel production in i- steel-smelting furnace in the project scenario, t

$SFC_{NG,F\text{-}i,BL}$ - specific natural gas consumption for steel production in i- steel-smelting furnace in the baseline scenario, kg of standard fuel/t

i - steel-smelting furnace # 1, 2, 5, 6, 7, 8, 10, 11, 12

m - month

Sinter plant

(2.2) $BE_{SINTERPLANT,y} = \Sigma (FC_{NG,SINTERPLANT,BL,m} * EF_{CO2,NG,m})$

$BE_{SINTERPLANT,y}$ - CO_2 emissions from fuel combustion in sinter plant in the baseline scenario, tCO_2

$FC_{NG,SINTERPLANT,BL,m}$ - natural gas consumption for firing of sinter charge in sinter plant in the baseline scenario, t of standard fuel

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/ t of standard fuel

m - month

y - year

(2.2.1) $FC_{NG,SINTERPLANT,BL,m} = P_{SINTER,PJ,m} * SFC_{NG,SINTER,BL} * 10^{-3}$

$FC_{NG,SINTERPLANT,BL,m}$ - natural gas consumption for firing of sinter charge in sinter plant in the baseline scenario, t of standard fuel

$P_{SINTER,PJ,m}$ - sinter production in sinter plant in the project scenario, t

$SFC_{NG,SINTER,BL}$ - specific natural gas consumption for firing of sinter charge in sinter plant in the baseline scenario, kg of standard fuel/t

m - month

CO_2 emission factor from natural gas combustion[4]

(2.3) $EF_{CO2,NG,m} = \Sigma (W_{j,NG,m} * n_{C,j} * \rho_{CO2}) / NCV_{NG,m} * 7000$

$EF_{CO2,NG,m}$ - CO_2 emission factor from natural gas combustion, tCO_2/t of standard fuel

$W_{j,NG,m}$ - molar fraction of j-component of natural gas, fraction

$n_{C,j}$ - number of the carbon moles per mole of natural gas j-component

ρ_{CO2} - CO_2 density under the standard conditions (293 K, 101.3 kPa), kg/m^3

$NCV_{NG,m}$ - net calorific value of natural gas, kcal / m^3

7000 - calorific value of standard fuel, kcal / kg

j - CH_4, C_2H_6, C_3H_8, C_4H_{10}, C_5H_{12}, C_6H_{14}, CO_2, N_2, O_2

[4] The calculation of CO_2 emission factor from natural gas combustion (formulae 2.3) is based on stoichiometric CO_2 formation from carbon molecules contented in gaseous component of natural gas.

m - month

B.1.4.3. Formulas used to calculate emission reductions

(3) $ER_y = BE_y - PE_y$

ER_y - CO_2 emission reductions, tCO_2

BE_y - CO_2 baseline emissions, tCO_2

PE_y - CO_2 project emissions, tCO_2

y - year

B.2. Procedures and scheme of monitoring

In monitoring of GHGs emission reductions by the project "Energy efficiency increase in steelmaking and sinter plants JSC "Zaporizhstal", Ukraine" participate following departments of JSC "Zaporizhstal":

1. Laboratory of environment protection;
2. Bureau of industrial heat energy and fuel and energy recording (Bureau of IHE and FER);
3. Open-hearth plant;
4. Sinter plant;
5. Control equipment and automatization department of Open-hearth plant;
6. Control equipment and automatization department of Sinter plant;
7. Department of product-weighting systems of Slabbing mill shop;
8. Department of product-weighting systems of Sinter plant.

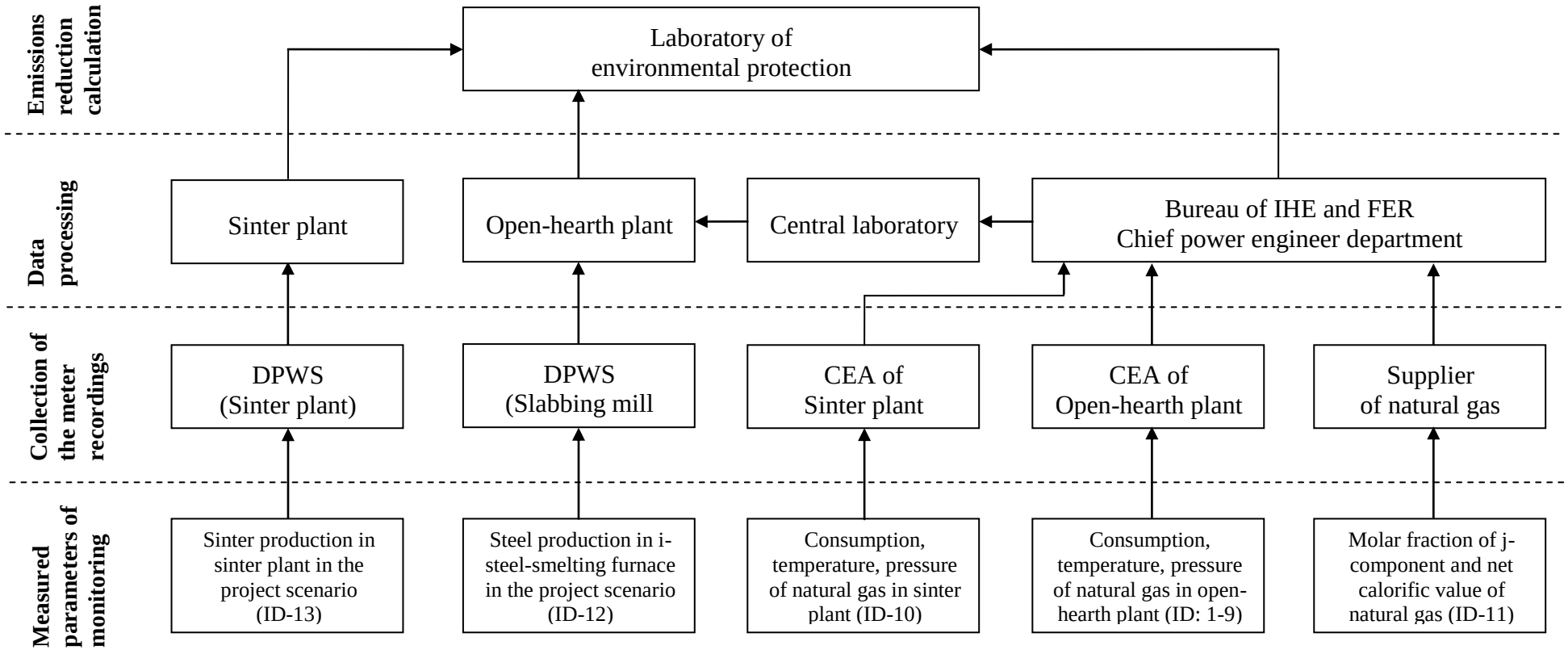
Principle scheme of monitoring data collection and carrying is shown on the figure B.2-1. Units JSC "Zaporizhstal" included in the monitoring of GHGs emissions reduction, responsible specialists and their functions are shown in the table B.2-1.

B.3. Meters included in the monitoring plan

B.3.1. Information of used meters

The information of used meters including data about their types, functions, calibration's and verification's data are provided in the table B.3.1-1.

Fig. B.2-1. Principle scheme of the monitoring data collection, delivery and processing[5]



[5] CEA – control equipment and automatization; Bureau of IHE and FER – bureau of industrial heat energy and fuel and energy recording; DPWS – Department of product-weighting systems

Table B.2-1. Description of the principle scheme of monitoring data collection, delivery and processing.

№	Department	Responsible persons	Function for monitoring	Frequency
1.	Supplier of natural gas	-	Provides daily measurement of the physical-chemistry parameters of the natural gas. Delivers the results of the measurement to the Bureau of IHE and FER daily by telephone and monthly on paper.	Monthly
2.	Control equipment and automatization department of Open-hearth plant	Master CEA	Takes charts of consumption, temperature, pressure of the natural gas during the day. Delivers the charts to the Bureau of IHE and FER.	Daily
3.	Control equipment and automatization department of Sinter plant	Master CEA	Takes charts of consumption, temperature, pressure of the natural gas during the day. Delivers the charts to the Bureau of IHE and FER.	Daily
4.	Department of product-weighting systems of Sinter plant	Weigher	Weigher performs weighting produced sinter (ID-13) and records the data in the invoice and the automatic control system "steel-rolled metal". The invoices are delivered several times a day to the accounting department of sinter plant.	Daily

5.	Department of product-weighting systems of Slabbing mill shop	Weigher	Weigher performs weighting produced steel (ID-12) and records the data in the invoice and the automatic control system "steel-rolled metal". The invoices are delivered several times a day to the accounting department of open-hearth plant.	Daily
6.	Bureau of industrial heat energy and fuel and energy recording	Power-engineer	Power-engineer collects monthly the physical-chemistry parameters of the natural gas from the Supplier of natural gas on paper. Delivers the volume fraction of j-components and net calorific value of natural gas (ID-11) to Laboratory of environmental protection. Archives the data on paper and electronic. Bureau of IHE and FER collects daily from CEA of open-hearth plant and CEA of sinter plant data on paper charts about consumption, temperature, pressure of the natural gas. Power-engineer of Bureau of IHE and FER estimates the consumption of natural gas according to the planimetrist's instruction. Data about fuel consumption are recorded and archived in computer system for fuel and energy recording. Data about natural gas consumption in sinter plant (ID-10) and open-hearth plant are recorded in the automatic control system "Fuel-energy resources recording". Data about natural gas consumption in sinter plant (ID-10) are delivered to Laboratory of environmental protection and archived on paper and electronic.	Daily / monthly

7.	Central Laboratory	Engineer	Calculates the natural gas consumption for steel production in steel-smelting furnaces (ID:1-9) based on data about natural gas consumption achieved from Bureau of IHE and FER and data about steel production taken from the automatic control system "steel-rolled metal". Data about natural gas consumption for steel production in steel-smelting furnaces (ID:1-9) are recorded in the automatic control system "steel-rolled metal".	Monthly
8.	Open-hearth plant	Economist	Collects data about steel production (ID-12) from accounting department of open-hearth plant and data about natural gas consumption for steel production in steel-smelting furnaces (ID:1-9) from the automatic control system "steel-rolled metal", compiles the monthly technical report of open-hearth plant. Data about steel production (ID-12) and data about natural gas consumption for steel production in steel-smelting furnaces (ID:1-9) are delivered to Laboratory of environmental protection and archived on paper and electronic.	Monthly
9.	Sinter plant	Economist	Collects data about sinter production (ID-13) from the accounting department of sinter plant, compiles the monthly technical report of sinter plant. Data about sinter production (ID-13) are delivered to Laboratory of environmental protection and archived on paper and electronic.	Monthly

10.	Laboratory of environmental protection	Head	Collects data about natural gas consumption for steel production in steel-smelting furnaces (ID:1-9) and steel production (ID-12) from open-hearth plant, data about natural gas consumption for sinter production (ID-10), chemical composition and net calorific value of natural gas (ID-11) from Bureau of IHE and FER, data about sinter production (ID-13) from sinter plant on paper and electronic. Head of Laboratory of environmental protection calculates GHG emissions reduction in excel format. Initial data for monitoring (according to the monitoring plan), emissions reduction calculation, results of calculation are archived in Laboratory of environmental protection on paper and electronic.	Monthly
11.	-	Technical director	Approves the monitoring report.	Yearly

Table B.3.1-1. Meters used for GHG emission reductions monitoring[6]

№	Parameter	Type of meters	Serial number	Location / function	Verification / Calibration	Date				
						Last	2008	2009	2010	Next
1	Natural gas consumption in sinter plant	Метран-100ДД	67542	Gaseous depart.	C	28.11.07	24.11.08	23.11.09	18.11.10	18.11.11
		Диск-250	82670	Sinter plant	C	25.05.07	03.03.08	26.03.09	01.04.10	01.04.11
2	Pressure of natural gas	Метран-100ДИ	67496	Gaseous depart.	C	28.11.07	25.11.08	24.11.09	18.11.10	18.11.11
		Диск-250	120994	Sinter plant	C	22.05.07	03.03.08	26.03.09	01.04.10	01.04.11
3	Temperature of natural gas	Флоутек[7]	583	Gaseous depart.	V	-	-	-	29.07.10	29.07.12
		Флоутек	497	Gaseous depart.	V	-	05.08.08	-	-	29.07.12
		Флоутек	582	Gaseous depart.	V	15.08.06	-	-	-	29.07.12
4	Sinter production	Weigher BB-200	359	Sinter plant	V	03.10.07	09.10.08	07.10.09	06.10.10	06.10.11
5	Natural gas consumption – burners right	Сафир 5420	10251684	OHP[8] F-1	C	-	-	05.05.09	06.05.10	06.05.11
		Диск-250	82721	OHP F-1	C	-	-	05.05.09	06.05.10	06.05.11
		ДМ-3583	2328	OHP F-1	C	25.05.07	22.05.08	-	-	-
		КСД-3	104934	OHP F-1	C	25.05.07	22.05.08	-	-	-
6	Natural gas consumption – burners left	Сафир М-5410	08147118	OHP F-1	C	-	-	05.05.09	06.05.10	06.05.11
		Диск-250	82828	OHP F-1	C	-	-	05.05.09	06.05.10	06.05.11
		ДМ-3583	57955	OHP F-1	C	25.05.07	22.05.08	-	-	-
		КСД-3	191690	OHP F-1	C	25.05.07	22.05.08	-	-	-
7	Natural gas consumption – tuyeres right	Сафир 5420	09276441	OHP F-1	C	15.05.07	26.05.08	05.05.09	06.05.10	06.05.11
		Диск-250	91012	OHP F-1	C	15.05.07	26.05.08	05.05.09	06.05.10	06.05.11

[6] The meters that have not a calibration date were not in operation or replaced by new meters.
[7] The verification frequency of the Флуотек meters is once every 2 years. The provided meters ## 497, 582, 583 are used for replacement of meters that are to be verified.
[8] OHP – Open-hearth plant, F – Steel-smelting furnace (F #1 - Two-bath steel melting aggregate; F #2, 5, 6, 7, 8, 10, 11, 12 – Open hearth furnaces).

№	Parameter	Type of meters	Serial number	Location / function	Verification / Calibration	Date				
						Last	2008	2009	2010	Next
8	Natural gas consumption – tuyeres left	Сафир	09311428	OHP F-1	C	16.05.07	26.05.08	05.05.09	06.05.10	06.05.11
		Диск-250	90225	OHP F-1	C	16.05.07	26.05.08	05.05.09	06.05.10	06.05.11
9	Natural gas consumption – burners (drying) right	ДМ-3583	9673	OHP F-1	C	-	-	05.05.09	07.05.10	07.05.11
		КСД-250	73492	OHP F-1	C	-	-	05.05.09	07.05.10	07.05.11
		ДМ3583	6143	OHP F-1	C	29.05.07	26.05.08	-	-	-
		КСД-3	164694	OHP F-1	C	29.05.07	26.05.08	-	-	-
10	Natural gas consumption – burners (drying) left	ДМ-3583	1848	OHP F-1	C	-	-	05.05.09	06.05.10	06.05.11
		КСД-250	73493	OHP F-1	C	-	-	05.05.09	06.05.10	06.05.11
		ДМ-3583	7000	OHP F-1	C	29.05.07	26.05.08	-	-	-
		КСД-3	141189	OHP F-1	C	29.05.07	26.05.08	-	-	-
11	Natural gas consumption total	ДМ-3583	39799	OHP F-2	C	22.05.07	23.05.08	06.05.09	14.05.10	14.05.11
		КСД-3	104922	OHP F-2	C	22.05.07	23.05.08	06.05.09	14.05.10	14.05.11
12	Natural gas consumption – tuyeres	ДМ-3583	5609	OHP F-2	C	29.05.07	26.05.08	06.05.09	14.05.10	14.05.11
		КСД-3	275787	OHP F-2	C	29.05.07	26.05.08	06.05.09	14.05.10	14.05.11
13	Natural gas consumption total	Сафир 5420	10245836	OHP F-5	C	-	03.04.08	08.05.09	12.05.10	12.05.11
		Диск-250М	3801	OHP F-5	C	-	03.04.08	08.05.09	12.05.10	12.05.11
		ДМ-3583	814	OHP F-5	C	30.04.07	-	-	-	-
		КСД-3	262510	OHP F-5	C	30.04.07	-	-	-	-
14	Natural gas consumption – tuyeres	ДМ-3583	52357	OHP F-5	C	03.05.07	06.05.08	08.05.09	12.05.10	12.05.11
		КСД-3	203102	OHP F-5	C	03.05.07	06.05.08	08.05.09	12.05.10	12.05.11
15	Natural gas consumption – auxiliaries	ДМ-3583	20759	OHP F-5	C	01.06.07	03.06.08	03.06.09	14.06.10	14.06.11
		КСД-250	364557	OHP F-5	C	01.06.07	03.06.08	03.06.09	14.06.10	14.06.11

№	Parameter	Type of meters	Serial number	Location / function	Verification / Calibration	Date				
						Last	2008	2009	2010	Next
16	Natural gas consumption total	ДМ-3583	2341	OHP F-6	C	30.05.07	21.05.08	14.05.09	14.05.10	14.05.11
		КСД-3	223739	OHP F-6	C	30.05.07	21.05.08	14.05.09	14.05.10	14.05.11
17	Natural gas consumption – tuyeres	ДМ-3583	61757	OHP F-6	C	30.05.07	21.05.08	14.05.09	14.05.10	14.05.11
		КСД-250	68574	OHP F-6	C	30.05.07	21.05.08	14.05.09	14.05.10	14.05.11
18	Natural gas consumption total	Сафир 5420	04691392	OHP F-7	C	-	-	15.05.09	18.05.10	18.05.11
		Диск-250	5358	OHP F-7	C	-	-	15.05.09	18.05.10	18.05.11
		ДМ-3583	81275	OHP F-7	C	30.05.07	21.05.08	-	-	-
		КСД-3	164634	OHP F-7	C	30.05.07	21.05.08	-	-	-
19	Natural gas consumption – tuyeres	ДМ-3583	45042	OHP F-7	C	10.05.07	12.05.08	15.05.09	18.05.10	18.05.11
		КСД-3	191554	OHP F-7	C	10.05.07	12.05.08	15.05.09	18.05.10	18.05.11
20	Natural gas consumption total	ДМ-3583	4713	OHP F-8	C	11.05.07	14.05.08	18.05.09	21.05.10	21.05.11
		КСД-3	224123	OHP F-8	C	11.05.07	14.05.08	18.05.09	21.05.10	21.05.11
21	Natural gas consumption – tuyeres	ДМ-3583	83336	OHP F-8	C	11.05.07	14.05.08	18.05.09	21.05.10	21.05.11
		КСД-3	233716	OHP F-8	C	11.05.07	14.05.08	18.05.09	21.05.10	21.05.11
22	Natural gas consumption – auxiliaries	ДМ-3583	61899	OHP F-8	C	25.06.07	19.06.08	19.06.09	11.06.10	11.06.11
		КСД-250	73494	OHP F-8	C	25.06.07	19.06.08	19.06.09	11.06.10	11.06.11
23	Natural gas consumption total	ДМ-3583	4747	OHP F-10	C	06.06.07	02.06.08	02.06.09	01.06.10	01.06.11
		КСД-3	163506	OHP F-10	C	06.06.07	02.06.08	02.06.09	01.06.10	01.06.11
24	Natural gas consumption – tuyeres	ДМ-3583	4899	OHP F-10	C	06.06.07	02.06.08	02.06.09	01.06.10	01.06.11
		КСД-3	147465	OHP F-10	C	06.06.07	02.06.08	02.06.09	01.06.10	01.06.11
25	Natural gas consumption – auxiliaries	ДМ-3583	2148	OHP F-10	C	25.06.07	19.06.08	19.06.09	17.06.10	17.06.11
		КСД-250	73505	OHP F-10	C	25.06.07	19.06.08	19.06.09	17.06.10	17.06.11

№	Parameter	Type of meters	Serial number	Location / function	Verification / Calibration	Date				
						Last	2008	2009	2010	Next
26	Natural gas consumption total	ДМ-3583	11421	OHP F-11	C	01.06.07	05.06.08	04.06.09	04.06.10	04.06.11
		КСД-3	264661	OHP F-11	C	01.06.07	05.06.08	04.06.09	04.06.10	04.06.11
27	Natural gas consumption – tuyeres	ДМ-3583	43637	OHP F-11	C	01.06.07	05.06.08	04.06.09	07.06.10	07.06.11
		КСД-3	264663	OHP F-11	C	01.06.07	05.06.08	04.06.09	07.06.10	07.06.11
28	Natural gas consumption total	ДМ-3583	4889	OHP F-12	C	07.06.07	09.06.08	09.06.09	09.06.10	09.06.11
		КСД-3	262396	OHP F-12	C	07.06.07	09.06.08	09.06.09	09.06.10	09.06.11
29	Natural gas consumption – tuyeres	ДМ-3583	86693	OHP F-12	C	07.06.07	09.06.08	09.06.09	09.06.10	09.06.11
		КСД-3	176478	OHP F-12	C	07.06.07	09.06.08	09.06.09	09.06.10	09.06.11
30	Natural gas consumption for cutting	ДМ-3583	6218	Cutting OHP	C	21.06.07	17.06.08	17.06.09	17.06.10	17.06.11
		КСД-3	141191	Cutting OHP	C	21.06.07	17.06.08	17.06.09	17.06.10	17.06.11
31	Pressure of natural gas	ДМ-3583	81725	Cutting OHP	C	20.06.07	19.06.08	19.06.09	17.06.10	17.06.11
		КСД-3	264697	Cutting OHP	C	20.06.07	19.06.08	19.06.09	17.06.10	17.06.11
32	Natural gas consumption – mixer 1	Сафир	09332509	Mixer OHP	C	01.03.07	26.06.08	25.06.09	21.06.10	21.06.11
		Диск-250	90643	Mixer OHP	C	01.03.07	26.06.08	25.06.09	21.06.10	21.06.11
33	Natural gas consumption – mixer 2	Сафир 5420	09328507	Mixer OHP	C	-	15.09.08	25.06.09	21.06.10	21.06.11
		Диск-250М	5456	Mixer OHP	C	-	15.09.08	25.06.09	21.06.10	21.06.11
		ДМ-3583	25495	Mixer OHP	C	14.06.07	-	-	-	-
		КСД-3	104945	Mixer OHP	C	17.05.07	-	-	-	-
34	Natural gas consumption – mixers auxiliaries	Сафир 5420	10253454	Mixer OHP	C	-	04.09.08	25.06.09	21.06.10	21.06.11
		Диск-250М	3828	Mixer OHP	C	-	04.09.08	25.06.09	21.06.10	21.06.11
		ДМ-3583	81750	Mixer OHP	C	31.05.07	-	-	-	-
		КСД-3	191725	Mixer OHP	C	31.05.07	-	-	-	-

№	Parameter	Type of meters	Serial number	Location / function	Verification / Calibration	Date				
						Last	2008	2009	2010	Next
35	Pressure of natural gas	МЭД	11233	OHP	C	20.06.07	19.06.08	19.06.09	17.06.10	17.06.11
		КСД-3	169827	OHP	C	20.06.07	19.06.08	19.06.09	17.06.10	17.06.11
36	Pressure of natural gas on gas distribution plant west	Метран	77669	Gaseous depart.	C	26.11.07	25.11.08	24.11.09	18.11.10	18.11.11
		Диск-250	28146	Gaseous depart.	C	26.11.07	25.11.08	24.11.09	18.11.10	18.11.11
37	Pressure of natural gas on gas distribution plant east	Метран	67501	Gaseous depart.	C	26.11.07	24.11.08	23.11.09	18.11.10	18.11.11
		Диск-250	64229	Gaseous depart.	C	26.11.07	24.11.08	23.11.09	18.11.10	18.11.11
38	Steel production	Wagon weigher	04/1E	Slabbing mill	C	22.09.07	22.09.08	22.09.09	22.09.10	22.09.11

B.3.2. Procedures of verification

Automation and metrological department of JSC "Zaporizhstal" is responsibility for organization of monitoring meters calibration and verification.

Calibration of meters are provided by Laboratory of meters' setup and testing and JSC "Zaporizhstal".

Verification of meters are provided by State enterprise "Zaporizhzhya' Scientific production centre of standardization, metrology and certification".

B.4. Monitoring of project's impact on the environment

The environmental impacts' monitoring includes the quantitative definition of the industrial activity impacts on the environment for the current period. The environmental monitoring includes recording the polluting agents' emissions into the atmosphere, manufacturing sewage release, formation and allocation of the manufacturing wastes.

The project's environmental impact monitoring is provided by the Laboratory of the environment protection of the JSC "Zaporizhstal" in compliance with the existing procedures and host party legislation:

- the Ukrainian Law "Environmental protection" from 25.06.91 # 1264-XII;
- the Ukrainian Law "Atmosphere protection" from 16.10.1992 # 2707-XII;
- Standard JSC "Zaporizhstal" STP 6.4-02-08 "Environmental management".

The project implementation provides to the decrease of negative environmental impact because of pollutant emission reductions from fuel combustion (table B.4-1). There are not other environmental impacts factors by project implementation as waste water, industrial waste, electro-magnetic and ionizing radiation, etc.

Table B.4-1. Results of pollutant emissions monitoring at JSC "Zaporizhstal" in 2008-2010 and comparison with average pollutant emissions before project implementation, t/year[9]

№	Pollutant	2004-2005 (before project)	2008	2009	2010
1.	NO_x	3,080.721	1,188.380	1,051.915	1,382.547
2.	SO_2	130.517	6.487	4.173	31.807
3.	CO	1,966.083	259.535	265.848	180.638
4.	Total	5,177.320	1,454.402	1,321.936	1,594.992

The above provided data show that the project does not lead to negative impacts on the environment and transboundary effect.

The record of the data on the project environmental impacts is provided on the basis of the approved instrumental measuring and calculation methods:

- GKD 34.02.305-2002 "Air pollutant emissions from power installations. Determination methodology";

[9] Data source: Reports on air protection for 2004-2005, 2008-2010. Form № 2-TP Air (annual).

- GOST 17.2.4.06-90 "Environment protection. Atmosphere. Determination methods of rate and expenditure of gas-dust flows from stationary emissions sources;
- GOST 17.2.4.07-90 "Environment protection. Atmosphere. Determination methods of pressure and temperature of gas-dust flows from stationary emissions sources;
- RD 52.04.59-85 "Environment protection. Atmosphere. Requirements for accuracy of industrial emissions control. Methodology guidance;
- KND 211.2.3.063-98. Environment protection and natural resources conservation. Measurement assurance;
- Operating instruction for gas analyzer Delta 65-3;
- Operating instruction for gas analyzer Termit 5000.

The measuring of pollutant emissions (NO_x, SO_2, CO) is provided by the Laboratory of environment protection two times a year using the meters (gas analyzers: Delta 65-3, Termit 5000). The Laboratory of the environment protection has an attestation for measuring of pollutant emissions.[10] The measuring equipments are verified.[11] The calculation of all pollutant emissions is provided quarterly.

The quality assurance of environmental monitoring at the JSC "Zaporizhstal" is ensured by Integrated Management System of quality, environmental protection and labour safety. The quality control of environmental monitoring at the JSC "Zaporizhstal" is provided by State environmental inspectorate for Zaporizhzhya region.[12]

The information on the project environmental impacts is archived at the JSC "Zaporizhstal".

The following actions are undertaken for environment protection in steel and sinter plants JSC "Zaporizhstal":

- Atmosphere:

  Sinter machine #1 is equipped with a two-stage gas treatment unit consisting of dry inertial dust collector (1 stage) and 2 MP-VTI scrubbers (2 stage), preceded by a dusting of the steel lattice plates irrigated water;

  Sinter machine # 2-4 are equipped with a two-stage gas treatment unit consisting of 5 operating in parallel Venturi tubes (1 stage) and 2 MP-VTI scrubbers (2 stage) with irrigated walls;

  Sinter machine # 5-6 are equipped with a gas treatment unit consisting of 6 cyclones CN-15, 2 horizontal slotted Venturi tubes and scrubbers - spray catcher 8-SKU 1,2;

  Open-hearth furnaces and two-bath steel melting aggregate are equipped with a two-stage gas treatment unit consisting of 10 operating in parallel Venturi tubes and spray catcher system (two cyclones - spray catcher, tank, mud sump).

- Water:

  Organization of water-supply with water recycling system.

- Industrial waste:

  Industrial metal waste is returned to production, and other waste is to be disposed in accordance with applicable licenses and permits.

JSC "Zaporizhstal" has necessary permissions in area of environmental impact of the project activity. The actual permission for air pollutant emissions:

[10] The attestation certificate of the Laboratory of environment protection is attached.
[11] The verification certificates are attached.
[12] The certificates of control are attached.

- Permission #2310136600-39 for air pollutant emissions for a period 30.12.2009 – 29.12.2019, given by Ministry for Environmental Protection of Ukraine on 30.12.2009.

B.5. Information of special equipment regimes exploitation

The special equipment regimes exploitation includes the situations when the main project equipment and measuring devices are exploited in nonstandard conditions because of defects, trouble, malfunction, etc. The special equipment regimes can potential affect the change of monitoring parameters and as a result the GHG emissions reduction monitoring.

The troubleshooting procedures for main project equipment and measuring devices are clearly described in the section C.3.

During the monitoring period (01.01.2008-31.12.2010) the special equipment regimes exploitation were not registered. Therefore, there are no deviations from the monitoring plan of GHGs emissions because of special equipment regimes exploitation.

B.6. Processing and storage of information

All necessary information for monitoring of GHGs emission reductions are stored in paper and electronic files and will be saved till the crediting period and for two years after the last operation with ERUs from the project. The procedures of monitoring data archiving and responsible person are determined by STP 8.2-13-10 “Monitoring of GHG emission reductions” and other internal documents. The description of data processing and storage is described in the section B.2. of the monitoring report.

Section C. Quality control (QC) and quality assurance (QA) procedures

C.1. Internal audit and checking measures

Quality control of GHG emission reductions monitoring is a part of system of regular measures in order to make data more complete and right and to avoid mistakes in documentation and achieving of data.

Quality of the GHG emission reductions monitoring is ensured by integrated management system JSC "Zaporizhstal" corresponding to the international standards ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007, ILO-OSH 2001, ISO 10002:2004 and Standard JSC "Zaporizhstal" STP 8.2-13-10 "Monitoring of GHG emission reductions".

The QA/QC procedures include:

- quality assurance of the measured monitoring parameters;
- quality assurance of monitoring data processing and recording;
- quality assurance of monitoring data archiving;
- quality control of internal documentation, archiving data, calculation correctness.

The description of the QA/QC procedures:

1. Quality assurance of the measured monitoring parameters

The responsible department/person: Department of Automation and Metrology / Head of Department.

The QA procedures: Department of Automation and Metrology provides the calibration and organizes the verification of meters included in the monitoring plan during the year in accordance with Plan of meters' calibration and verification.

The frequency: Continuously during the year in accordance with Plan of meters' calibration and verification.

The Regulations: STP 7.6-01-03 "Measurement assurance. General provisions." STP 7.6-07-03 "Organization and order of meters calibration and verification". Plan of meters' calibration and verification. STP 8.2-13-10 "Monitoring of GHG emission reductions".

The reporting documentation: Measuring devices certificates.

2. Quality assurance of monitoring data processing and recording

The responsible department/person: Bureau of industrial heat energy and fuel and energy recording / Power-engineer; Central Laboratory / Engineer; Open-hearth plant / Economist; Sinter plant / Economist.

The QA procedures: Power-engineer of Bureau of industrial heat energy and fuel and energy recording process the data about consumption, temperature, pressure of natural gas and physical-chemistry parameters of the natural gas using the Program "Fuel-energy resources recording" and in excel format in computer on work place. Engineer of Central Laboratory process the data about natural gas consumption in open-hearth plant and steel production in excel format in computer on work place. Economists of open-hearth plant and sinter plant compiles the technical reports using the automatic control system "steel-rolled metal".

The responsible department for assurance of computers and automatic control systems is Department of automatic control systems. The testing of the computers and software is provided periodical by Department of automatic control systems. The data protection is assured by access registration, antivirus software, data duplication and archiving.

The frequency: Monthly.

The Regulations: Job instructions. Instruction of planimetrist. STP 8.2-13-10 "Monitoring of GHG emission reductions".

The reporting documentation: Technical reports of fuel-energy resources consumption. Technical report of open-hearth plant. Technical report of sinter plant.

3. Quality assurance of monitoring data archiving

The responsible department/person: Bureau of industrial heat energy and fuel and energy recording / Deputy chief of Power engineer department, Open-hearth plant / Head of plant, Sinter plant / Head of plant, Department of Automation and Metrology / Head of Department, Laboratory of environment protection / Head of Department.

The QA procedures: The responsible departments archive initial reports (technical reports of fuel-energy resources consumption, technical report of open-hearth plant, technical report of sinter plant, measuring devices certificates) in electronic and paper format.

The frequency: Continuously during the crediting period and two years after this.

The Regulations: Job instructions. Instruction of planimetrist. STP 8.2-13-10 "Monitoring of GHG emission reductions".

The reporting documentation: Technical reports of fuel-energy resources consumption. Technical report of open-hearth plant. Technical report of sinter plant. Measuring devices certificates

4. Quality control of internal documentation, archiving data, calculation correctness.

The responsible department/person: Bureau of industrial heat energy and fuel and energy recording / Deputy chief of Power engineer department, Open-hearth plant / Head of plant, Sinter plant / Head of plant, Department of Automation and Metrology / Head of Department, Laboratory of environment protection / Head of Department.

The QC procedures: Control of internal documentation and their archiving.

The frequency: Monthly

The Regulations: Job instructions. STP 8.2-13-10 "Monitoring of GHG emission reductions".

The reporting documentation: Technical reports of fuel-energy resources consumption. Technical report of open-hearth plant. Technical report of sinter plant. Measuring devices certificates

C.2. Participation of third parties

Verification of meters are provided by State enterprise "Zaporizhzhya' Scientific production centre of standardization, metrology and certification".

C.3. Procedures of emergencies finding

The procedures of emergencies finding (troubleshooting) include the procedures of identification, registration and elimination of defects, trouble, malfunction, etc. in the main project equipment and measuring devices.

The procedures of troubleshooting for main project equipment:

The procedures (incl. responsibility, frequency, etc.) of troubleshooting for main equipment are determined by Instructions of equipment exploitation and Job instructions. Shift foremen of open-

hearth and sinter plants provide the inspection of main and auxiliary equipment (incl. gas burners). The information of discovered defects is recorded in Operation journals. The elimination of defects (maintenance) is provided by departments JSC "Zaporizhstal".

The procedures of troubleshooting for measuring devices:

The procedures (incl. responsibility, frequency, etc.) of troubleshooting for measuring devices are determined by STP 7.6-01-03 "Measurement assurance. General provisions.", STP 7.6-07-03 "Organization and order of meters calibration and verification", Job instructions of Control equipment and automation department.

The staff of Control equipment and automation department provides periodically the inspection and maintenance of measuring devices. The information about defects, trouble (and provided calibration/verification) is recorded in meters certificates. In case of meters breakdown the measuring devices are to be replaced by reserved devices. If the expected monitoring data are not available during the monitoring period because of measuring devices malfunction the monitoring data are to be calculated based on average data for previous period (for natural gas consumption, sinter production and natural gas chemical composition) and determined based on certificates of melting (for steel production).

During the monitoring period (01.01.2008-31.12.2010) the special equipment regimes exploitation because of defects, trouble, malfunction of main project equipment and measuring devices were not registered. Therefore, there are no deviations from the monitoring plan of GHGs emissions because of special equipment regimes exploitation.

Section D. Results of GHGs emission reductions monitoring

D.1. GHGs project emissions

Results of project emissions monitoring for the period (01.01.2008-31.12.2010) are shown below. The calculation of the project emissions is provided in the attached excel files.[13]

Table D.1-1. GHG emissions in project scenario in 2008-2010, t CO_2 equivalent

№	Month	2008	2009	2010
1.	January	43,421	30,476	29,968
2.	February	38,726	30,815	28,548
3.	March	44,935	29,363	34,267
4.	April	42,484	27,792	27,206
5.	May	43,903	22,915	34,931
6.	June	41,714	25,807	33,312
7.	July	43,627	30,066	34,976
8.	August	40,116	27,577	30,542
9.	September	33,208	28,839	32,412
10.	October	28,621	33,998	34,721
11.	November	26,415	27,657	33,502
12.	December	29,934	27,511	39,681
13.	Total	457,104	342,816	394,066

D.2. GHGs baseline emissions

Results of baseline emissions monitoring for the period (01.01.2008-31.12.2010) are shown below. The calculation of the baseline emissions is provided in the attached excel files.

Table D.2-1. GHG emissions in baseline scenario in 2008-2010, t CO_2 equivalent

№	Month	2008	2009	2010
1.	January	51,339	36,339	34,348
2.	February	48,202	39,470	33,825
3.	March	54,724	37,257	41,016
4.	April	51,634	35,082	37,255
5.	May	53,406	31,291	42,898

[13] The calculation of the project emissions, baseline emissions and emission reductions is attached in the excel files:
2011-04-27_Monitoring 2008_Zaporizhstal_OHF-SP_rus_ver.02.1,
2011-04-27_Monitoring 2009_Zaporizhstal_OHF-SP_rus_ver.02.1,
2011-04-27_Monitoring 2010_Zaporizhstal_OHF-SP_rus_ver.02.1

№	Month	2008	2009	2010
6.	June	53,670	33,967	39,763
7.	July	51,748	40,912	42,203
8.	August	44,405	36,354	41,129
9.	September	37,753	35,861	40,941
10.	October	30,626	41,718	45,715
11.	November	31,177	38,799	42,399
12.	December	37,109	33,818	46,645
13.	Total	545,793	440,868	488,137

D.3. Leakages

Not applicable.

D.4. Calculation of GHGs emission reductions

Table D.4-1. Calculation of GHGs emission reductions in 2008

№	Month	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	January	43,421	-	51,339	7,918
2.	February	38,726	-	48,202	9,476
3.	March	44,935	-	54,724	9,789
4.	April	42,484	-	51,634	9,150
5.	May	43,903	-	53,406	9,503
6.	June	41,714	-	53,670	11,956
7.	July	43,627	-	51,748	8,121
8.	August	40,116	-	44,405	4,289
9.	September	33,208	-	37,753	4,545
10.	October	28,621	-	30,626	2,005
11.	November	26,415	-	31,177	4,762
12.	December	29,934	-	37,109	7,175
13.	Total	457,104	-	545,793	88,689

Table D.4-2. Calculation of GHGs emission reductions in 2008 by sources

№	Emission source	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	Steelmaking plant	416,937	-	495,662	78,725
2.	Sinter plant	40,167	-	50,131	9,964
3.	Total	457,104	-	545,793	88,689

Table D.4-3. Calculation of GHGs emission reductions in 2009

№	Month	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	January	30,476	-	36,339	5,863
2.	February	30,815	-	39,470	8,655
3.	March	29,363	-	37,257	7,894
4.	April	27,792	-	35,082	7,290
5.	May	22,915	-	31,291	8,376
6.	June	25,807	-	33,967	8,160
7.	July	30,066	-	40,912	10,846
8.	August	27,577	-	36,354	8,777
9.	September	28,839	-	35,861	7,022
10.	October	33,998	-	41,718	7,720
11.	November	27,657	-	38,799	11,142
12.	December	27,511	-	33,818	6,307
13.	Total	342,816	-	440,868	98,052

Table D.4-4. Calculation of GHGs emission reductions in 2009 by sources

№	Emission source	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	Steelmaking plant	309,051	-	397,058	88,007
2.	Sinter plant	33,765	-	43,810	10,045
3.	Total	342,816	-	440,868	98,052

Table D.4-5. Calculation of GHGs emission reductions in 2010

№	Month	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	January	29,968	-	34,348	4,380
2.	February	28,548	-	33,825	5,277
3.	March	34,267	-	41,016	6,749
4.	April	27,206	-	37,255	10,049
5.	May	34,931	-	42,898	7,967
6.	June	33,312	-	39,763	6,451
7.	July	34,976	-	42,203	7,227
8.	August	30,542	-	41,129	10,587
9.	September	32,412	-	40,941	8,529
10.	October	34,721	-	45,715	10,994
11.	November	33,502	-	42,399	8,897
12.	December	39,681	-	46,645	6,964
13.	Total	394,066	-	488,137	94,071

Table D.4-6. Calculation of GHGs emission reductions in 2010 by sources

№	Emission source	Project emissions (tCO_2-eq.)	Leakages (tCO_2-eq.)	Baseline emissions (tCO_2-eq.)	Emission reductions (tCO_2-eq.)
1.	Steelmaking plant	359,893	-	442,833	82,940
2.	Sinter plant	34,173	-	45,304	11,131
3.	Total	394,066	-	488,137	94,071

D.5. Deviations of actual emission reductions from emission reductions determined in PDD

Table D.5-1. Deviations of actual emission reductions from emission reductions estimated in PDD in 2008-2010, t CO_2 equivalent

№	Parameter	2008	2009	2010
1.	Estimated data (PDD)	90,778	99,797	85,145
2.	Actual data	88,689	98,052	94,071
3.	Deviations[14]	-2,089 (-2.30%)	-1,745 (-1.75%)	+8,926 (+10.48%)

[14] Deviations are calculated as the difference between actual (monitoring report) and estimated (PDD) data. Deviations = (Actual data – Estimated data).

Deviations of actual emission reductions in 2008-2009 from estimated in the PDD can be in general explained by more detailed calculation of GHG emission reductions for current monitoring period based on actual monitoring data.

The GHG emission reductions were in 2010 on 8,926 t CO_2 equivalent (10.48%) more as estimated data in the PDD. That can be explained by increase of steel production in 2010 on 67,460 t in comparison to the forecasted values used for GHG emission reductions estimation on stage of PDD elaboration.