Developer of Documentation:
LLC «Energy Technology Company «Energoalians»

Director

_________________ Astashov O.M.
(signature)

PS

Emissions Source Owner:
PJSC «Creamgas»

Head of the Board

_________________ Dribnyi V.I.
(signature)

PS

MONITORING REPORT

(period 01/01/2008 – 30/09/2012)

Joint Implementation Project

Reduction of Natural Gas Emissions at PJSC «Creamgas»

Simferopol, 2012

Monitoring report of JI project «Reduction of Natural Gas Emissions at PJSC «Creamgas»

Monitoring period: 01/01/2008-30/09/2012

Version: 02 as of 08/11/2012

Contents:

Appendix A.[1] Calculation of greenhouse gas emission reductions at the JI Project «Reduction of Natural Gas Emissions at PJSC «Creamgas» for period (from January 01, 2008 to September 30, 2012).

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[1] Appendix A is given in electronic form

Section A. General project activity and monitoring information

A.1. Title of the project

Reduction of Natural Gas Emissions at PJSC «Creamgas».

A.2. Status of JI project

JI project «Reduction of Natural Gas Emissions at PJSC «Creamgas» was determined by Bureau Veritas Certification, determination report No. UKRAINE-DET/0642/2012 as of 19/09/2012. The project was approved by State Environmental Investment Agency of Ukraine (Letter of Approval №3078/23/7 dated 18/10/2012) and the Ministry of the Environment of Estonia (Letter of Approval №12-1/8652 as of 12/10/2012). The ITL project ID is UA1000452.

A.3. Short description of the project activity

As a result of unscheduled rehabilitation of gas-distributing points (GDP), cabinet-type gas-distributing points (CGDP) and gas armature of gas-distributing networks carried out by PJSC «Creamgas» the following greenhouse gases (GHG) emission reductions were achieved in accordance with this project for the monitoring period from January 01, 2008 to September 30, 2012[2]:

Table.1. GHG emissions reductions.

	2008	2009	2010	2011	01/01/2012 – 31/03/2012
Methane emissions reduction for the period, m^3	42 435 496	46 910 730	50 325 976	53 153 680	42 093 555
GHG emissions reduction for the period, tCO_2e.	638 773	706 193	757 547	800 113	633 626
Total methane emissions reduction for the period of monitoring, m^3	234 919 438				
Total GHG emissions reduction for the period of monitoring, tCO_2e.	3 536 198				

A.4. Monitoring period

Starting date: 01/01/2008
Closing date: 30/09/2012

[2] The presented values of GHG emission reductions are approximated to integers.

A.5. Methodology applied to the project activity

A.5.1. Baseline determination methodology

The JI Specific Approach has been applied that based on the Methodology AM0023 version 4.0 « Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities»[3] approved by Clean Development Mechanism Executive Board with clarification related to the method of leakage volume measurement and stated in section A.4 of the determined PDD version 03 dated 19/09/2012.

Baseline was chosen according to the requirements of «Guidance on criteria for baseline setting and monitoring», version 03, according to Guidance for users of Project Design Document forms for Joint Implementation projects, version 04.

A.5.2. Monitoring methodology

For quantitative estimation and preparation of the report on emission reduction on the ground of baseline and project activity the Specific Approach, based on approved monitoring methodology AM0023, version 4.0, specifying the methods of leakage measurement (section A.4 of PDD version 03 dated 19/09/2012) was used.
The uncertainty of the method of measurement was taken into account in the course of GHG emission reduction calculation (see section D of PDD, version 03 dated 19/09/2012).

A.6. Status of implementation including time table for major project parts

In accordance with PDD, version 03 dated 19/09/2012, the project boundaries include the places of methane leakages due to non hermeticity of gas equipment GDP (CGDP), gas armature, flanged and threaded joints of gas-distributing networks of PJSC «Creamgas». In total the project’s boundaries include equipment of 1 475 GDP (CGDP) and 14 690 units of gas armature. During the accounting monitoring period were repaired (replaced) gas equipment of 431 GDP (CGDP) and 5 140 units of gas armature. PJSC «Creamgas» complete repairs of the gas equipment of all GDP (CGDP) and all gas armatures, which was included to the JI project boundaries, during accounting monitoring period. Quantity of repaired (replaced) equipment of GDP (CGDP) and gas armature of gas-distributing networks of PJSC «Creamgas» by periods is given in Table 2:

[3] Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities”, ver. 4.0

Table 2. Quantity of repaired GDP (CGDP) and repaired (replaced) gas armature of gas pipelines by periods.

Period	**Quantity of GDP (CGDP), where in the gas equipment was repaired (replaced)**	**Quantity of repaired (replaced) gas armature of gas-distributing networks**
2004	369	2 938
2005	516	3 673
2006	159	2 204
2007	-	735
Total from 2004 till 2007	1 044	9 550
2008	80	1 469
2009	57	1 469
2010	70	735
2011	86	735
January 2012 – March 2012	138	732
Total	**1 475**	**14 690**

The list of GDP (CGDP) and gas armature, which was repaired during accounting monitoring period are presents in Appendix A[4]

Project measures for current monitoring period (January 01, 2008 – September 30, 2012) also involved subsequent Purposeful Examination and Technical Maintenance (PETM) of all gas equipment of GDP (CGDP) and gas armature, which were repaired (replaced) out of schedule for the whole period of JI project.

The gas equipment of GDP (CGDP) and gas armature of gas pipelines repaired (replaced) during previous periods of project activity is inspected regularly, as component part of standard monitoring activity, to ascertain, that they do not become the source of emissions again.

Current repair of gas equipment according to the Monitoring Plan, given in PDD, version 03, is carried out once per year, and maintenance is performed once per half-year.

[4] Annex A «Calculation of GHG emission reductions at the JI Project "Reduction of Natural Gas Emissions at PJSC «Creamgas» for the period from 01/01/2008 to 30/09/2012» is given in electronic form

Measurements of volume of methane leakages of repaired (replaced) gas equipment of GDP (CGDP) and gas armature of gas pipelines of PJSC «Creamgas» don’t exceed the volume of leakages measured after the first repair of equipment.

Samples of repaired (replaced) equipment of GDP (CGDP) are shown in Pic. 1-2.

Pic. 1. Repaired GDP, Simferopol City, Leksina Str., 11, register # 58

Pic. 2. Repaired CGDP, Andrusovo village, Tykhyi Lane, 7, register # 867

A.7. Possible deviations and revisions to the registered PDD

There are no significant deviations from the registered version of PDD.

According to the JI Specific Approach, based on methodology AM0023, version 4.0 GHG emission reductions within the framework of this project are calculated ex post. The expected calculated values of volumes of GHG emission reductions listed in the determined PDD, version 03 dated 19/09/2012 are differ from actually received reductions for the current monitoring period by 2,9%. There is one reason for this. Estimations of emission reductions given in the determined PDD version 03 dated 19/09/2012 are preliminary and based on theoretical calculations, statistical estimates, as well as on the basis of initial measurements performed at facilities of PJSC «Creamgas» gas distribution infrastructure before the beginning of the project implementation.

A.8. Possible deviations or revisions to the registered monitoring plan

There are no deviations to the registered monitoring plan.

A.9. Persons responsible for preparation and submission of monitoring report

Leader of the Working Team, chief engineer of PJSC «Creamgas» Gorobets Z.G. is responsible for monitoring report on behalf of PJSC «Creamgas» and Director Astashov O.M. is responsible for the report on behalf of LLC «Energy Technology Company «Energoalians».

Section B. Key monitoring activities

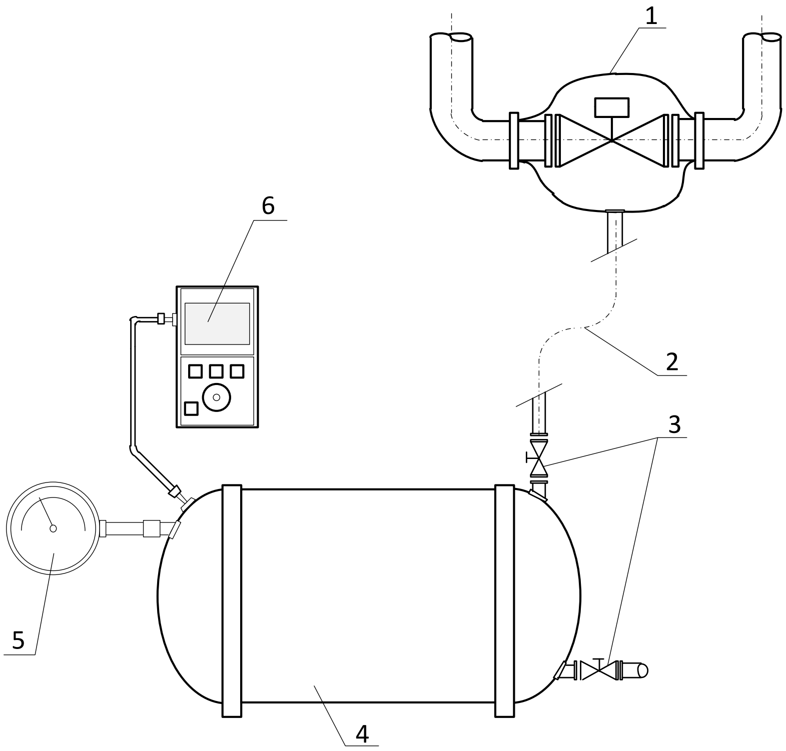
B.1.1. Applied equipment

Control and monitoring system is divided into three parts:
1) measurement of the amount of methane leakages before repair (replacement) of gas equipment;
2) measurement of the amount of methane leakages after the repair (replacement) of gas equipment;
3) archiving and processing of obtained results.

The measurement of natural gas leakages volumes are made on the basis of technology of the «calibrated bag» that is described in the approved CDM methodology AM0023, version 4.0 «Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities». One of the problems of the use of this methodology is difficulty of armature volume calculation used for measuring, and also the initial volume of air, at determination of gas volume that entered the «bag».
To solve these problems a special setting was made on the base of plastic tank of the known volume (0,11 m^3), a package, plastic hose and manometer (see Pic.3). All connections were executed hermetically.

Pic. 3. Photo of device for methane emissions quantitative measuring.

Scheme of device is given on Picture 4.



Pic.4. Scheme of device for quantitative measuring of methane leakages.

Legend:
1. Hermetic bag.
2. Hose.
3. Cock.
4. Hermetic tank.
5. Manometer.
6. Gas analyzer Ex-Tec ® HS 660

Gas analyzer Ex-Tec ® HS 660. For determination of methane concentration in a sample a high-precision gas analyzer of Ex-Tec ® HS 660 is used. Its photo is given in Figure 5.

Pic.5. Photo of the Ex-Tec ® HS 660 gas analyzer.

Gas analyzer has the following characteristics:

- explosion-proof (CENELEC).
  calibration: Methane CH_4/natural gas, propane C_3H_8;
- methane detection upon control of pipeline networks (ppm range);
- gas detection at the internal installations (ppm range);
- alarm when approaching the lower explosion limit (%UEG or Vol.%-range);
- measurement of concentration upon gas contamination and purging of lines (Vol.%-range);
- measurement of concentration in probe aperture (Vol.%-range).

A relative error amounts in 10% that corresponds to the standard EN 50054/57[5]

After an exposure and emission measuring repair or replacement of gas equipment GDP (CGDP) and gas armature of gas pipelines is executed with the use of modern materials of sealers (GOST 7338-90[6], GOST 5152-84[7] or GOST 10330-76[8]) and complete replacement of worn out equipment by new and modern one of European manufacturers or their analogues of domestic production.

[5] Electrical apparatus for the detection and measurement of combustible gases. General requirements and testing methods.
[6] «Rubber and rubber-fabric plates»
[7] «Stuffing»
[8] «Scutched flax fibre. Technical conditions»

B.1.2. Calibration procedure

Devices that require calibration procedures and used in the monitoring of methane leakages are

- gas analyzer Ex-Tec ® HS 660. Inter-calibration interval is 1 year;
- manometer "Д-59Н-100-1.0 6 kPa", inter-checking interval is 1 year;
- thermometer type TL-4, inter-checking interval is 2 years.
- second meter " SOS pr-2b-2", Inter-calibration interval is 2 years;
- barometer aneroid BAMM-1, Inter-calibration interval is 2 years.

As a result of verification (calibration) the certificate confirming the technical serviceability of device is issued.

B.1.3. Involvement of Third Parties

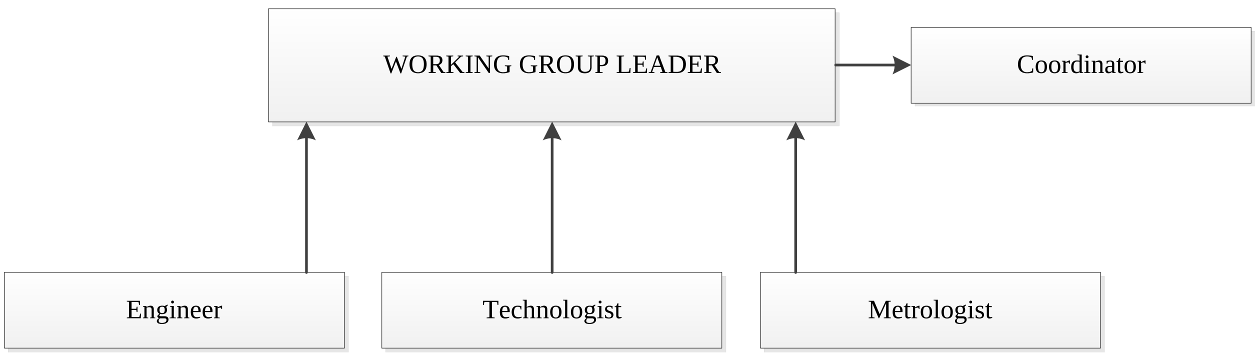
SE «AnalitgasService», «Crimeastandartmetrology».

State Enterprises «AnalitgasService» and «Crimeastandartmetrology» are the enterprise which executes state checking and calibration of gas analyzers, manometers, thermometers and other instruments which used during measurements.

B.2. Data collection (accumulated data for the whole monitoring period)

B.2.1. The operational and management structure in order to enable the project operator implement the monitoring plan

Co-ordination of work of all departments and services of PJSC «Creamgas» is carried out in relation to introduction of JI project by the Working group created by Order of PJSC «Creamgas» management № 216 dated 09/04/2004. The new line-up of the Working team was approved according to the Order of the PJSC «Creamgas» management № 2 dated 11/01/2005, № 25 dated 06/01/2006 and №706 dated 06/12/2011 and is presented on Pic. 6.



Pic.6. Structure of the Working group.

Gorobets Z.G. - Head of the Working team who is responsible for the formation of a JI activity plan and scope of the resources required;
Andrushko M.I. - Senior Engineer of the Working team who is responsible for measurement organization and repairing of leaks at GDP (CGDP) gas distribution networks equipment;
Olonov I.V. – Engineer of the Working team who is responsible for gathering information and making necessary calculations that are provided in the JI project Monitoring plan;
Prudnikova S.A. - Technologist of the Working team who is responsible for co-ordination with other departments of PJSC «Creamgas»;
Chichkanov O.M. - Coordinator of the Working team who is responsible for storing, archiving and making backup copies of information achieved as the results of measurements and calculations as well as from documents relating to the JI project;
Ponkratov M.V. - Metrologist of the Working team ensures availability of calibrated measuring equipment for carrying out of the JI project.

B.2.2. List of parameters used in the course of calculation

The parameters given in Table 3 are used in the course of calculations.

Table. 3. Parameters used in the course of GHG emissions calculations.

Identification number	Data variable	Source of data	Data unit measurement	Form of representation of obtained data	Comments
1. i	The sequence number GDP (CGDP), bolt, tap, valve, where methane emissions are found , removed and then checked	Leakage measurement activities	Dimensionless	Electronic	Corresponding number is appropriated to leakage found at device. List of gas equipment GDP (CGDP), shut-off devices (bolts, taps, valves), flanged and threaded joints is given in Accompanying document 1 to the PDD version 03. Inspection is carried out after repair.
2. Ti	Time	Records of investigation results	The amount of hours of exploitation of equipment on which leakages were found during a year	Electronic	Quantity of hours of exploitation during a year from the moment of its repair (replacement)

Identification number	**Data variable**	**Source of data**	**Data unit measurement**	**Form of representation of obtained data**	**Comments**
3. Data	Date	Data on repair (replacement) and monitoring (register)	Date of repair (replacement) and monitoring	Electronic	Date of rehabilitation used together with the quantity of hours of equipment exploitation to determine the total number of hours of operation. In the case of repeated leakages the date is the date of last inspection, which showed no leakages
4. GWP_{CH4}	Global Warming Potential for methane	IPCC	$tCO_2e/\ tCH_4$	Electronic	Project developer will conduct monitoring of any changes in Global Warming Potential for methane published by IPCC and approved by COP
5. $F_{CH4,i}$	Leakage speed for each found leakage	Leakage measurement activity	m^3CH_4/h	Electronic	It is calculated by using the largest deviation of device error (10% for gas analyzer)
6. t	Gas temperature	Data of measurements of glass mercury thermometer TL-4	^0C	Electronic	It is measured for determination of CH_4 density.
7. P	Gas pressure	Data of measurements of barometer BAMM-1	MPa	Electronic	It is measured for determination of CH_4 density.
8. URi	Vagueness factor of emission measuring equipment	Information given by manufacturer and/or IPCC	%	Electronic	If possible, 95% confidence interval is measured, advice of Good Practice Guidelines presented in section 6 2000 IPCC. If the manufacturer of leakage measurement equipment states uncertainty interval without specifying the confidence interval, it can be considered as 95%.
9. *Vbag*	Tank capacity	Data of measurements of flow meter	m^3	Electronic	Tank is filled with water. Quantity of water measured by flow meter shall be a tank capacity. Measurement showed that the volume capacity is 0.11 m^3.

Identification number	Data variable	Source of data	Data unit measurement	Form of representation of obtained data	Comments
10. $w_{sampleCH4,i}$	Methane concentration in a sample	Data of measurements of gas analyzer Ex-Tec ® HS 660.	%	Electronic	The concentration of methane in the sample (in tank) of leakage *i* is the difference between the concentration of methane in the sample at the beginning and end of measurement. Concentration is measured by gas analyzer Ex-Tec ® HS 660.
11. τ_i	Time when methane concentration in tank reaches a certain level	Data of measurements of second meter "SOS pr-2b-2"	seconds	Electronic	Time during which the concentration of methane in tank reaches a certain level is determined by the second meter. Measurement begins with the opening tap on the tank lid and ends in 180 seconds.

B.2.3. Data concerning leakages

There are no leakages during the project implementation (JI Specific Approach on the basis of the approved Methodology AM0023, version 3.0 also as well as Methodology AM0023, version 4.0 doesn't provide for leakages).

B.3. Data processing and archiving

All data will be processed and archived in electronic and/or paper form and kept till 31/12/2019.

B.4. Extraordinary situations and disturbances

There were no extraordinary situations for current monitoring period (from 01/01/2008 to 30/09/2012) at gas distribution networks of PJSC «Creamgas».

B.5. Procedures for detection and elimination of failures at gas-distributing points and gas-distribution networks of PJSC «Creamgas»

Detection, elimination and registration of failures and extraordinary situations at shut-off stations of PJSC «Creamgas» are carried out according to the Gas Supply Safety Rules of Ukraine.

B.6. External data (type, source, access)

Such external data are using for monitoring:

Data/Parameter	GWP_{CH4},
Unit	tCO_2e/tCH_4
Description	Global Warming Potential for methane
Periodicity of measuring/ of monitoring	Constantly
Source of data that was (will be) applied	IPCC
The value of data (for ex - ante calculations/ determinations)	21
Confirmation of data choice or description of method and measuring procedures that were (will be) applied	-
Procedures of management of quality / providing of quality of measuring that were (will be) applied	The responsible for monitoring person checks the data annually.
Comments	The project developer monitors any changes in global warming potential for methane published IPCC (IPCC Second Assessment Report: Climate Change 1995 (SAR)) and accepted COP. The value of GWP for methane is provided on the UNFCCC web-site: http://unfccc.int/ghg_data/items/3825.php

Data/Parameter	URi
Unit	%
Description	Factor of vagueness of equipment of emissions measuring
Periodicity of measuring/ of monitoring	Annually
Source of data that was (will be) applied	IPCC
The value of data (for ex - ante calculations/ determinations)	95
Confirmation of data choice or description of method and measuring procedures that were	Methodology of AM0023, version 3.0

(will be) applied	
Procedures of management of quality / providing of quality of measuring that were (will be) applied	The responsible for monitoring person checks the data annually
Comments	Estimated where possible, 95% confidence interval, advice of IPCC presented in division 6 of *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000*[9]. If the producer of equipment of emissions measuring declares the area of vagueness without clarification of confidence interval, it can be accepted 95%

B.7. Level of measuring equipment error

Relative error of gas analyzer Ex-Tec ® HS 660 is 10%; this corresponds to standard EN 50054/57. Relative error of manometer “D-59N-100-1.0 6 kPa” is 2.5%, error of barometer aneroid BAMM-1 not more than +/- 0.2 kPa, thermometer of TL-4 type has 1st class of accuracy.

[9] IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000

Section C. Quality assurance and quality control measures

C.1. Documented procedures and management plan

C.1.1. Roles and responsibilities

Chief engineer of PJSC «Creamgas» Gorobets Z.G. manages the project. She manages and coordinates the activity of all departments and services of PJSC «Creamgas» during of JI Project activity. Working Group is responsible for collection and processing of parameters.
Structure of data collection and Project management is given in Section B.2 of this Monitoring Report.

C.1.2. Trainings

Special training for work with new equipment is not needed. All trainings concerning the project were held by the equipment suppliers and their cost is included into the cost of equipment.

C.2. Internal audits and control measures

Under the guidance of a Working group PJSC «Creamgas» formed a group for measurement of all necessary parameters provided for by the methane leakage monitoring plan.
Monitoring measurements are performed by trained personnel according to the Methods of measurements. Data on Monitoring measurements are recorded in paper form directly in the course of measurements. Then, on the basis of paper data the single electronic database of leakage monitoring measurements is formed.

Current repair of gas equipment GDP (CGDP) and gas armature of gas-distribution networks is carried out once per year, and maintenance is performed once per half-year.

Repaired gas equipment is inspected regularly as component part of standard monitoring activity, to ascertain, that it doesn't become the source of emissions again.

C.3. Information on factors of social influence of the project and its effect upon environment

As a result of project implementation the quality of gas supply of the region population will be improved.
Also there will be will reduction of natural gas losses, reduction of GHG emissions which cause greenhouse effect and climate change. The level of safety of gas pipelines operation will be increased.

Section D. Calculation of greenhouse gases emission reductions

D.1. Project emissions

Using the method of leakage volume by means of airtight container the volume of project methane leakage of one device *i* may be calculated by the formula:

$F^{+}_{CH4,i,P} = V_{bag} * w_{sampleCH4,i} * 3600 / \tau_i$ where (1)

$F^{+}_{CH4,i,P}$ - methane leakage through leakages *i* from untight element after reconstruction (m^3/h);
V_{bag} - capacity of airtight tank for measurement (m^3);
$w_{sampleCH4,i}$ - methane concentration in leakage sample *i*, which is the difference of the concentration at the beginning and at the end of measurement (%);
τ_i - average duration of tank filling for leakage *i* after reconstruction (seconds).

Adjustment of methane leak rate to standard conditions:
Methane leak rate obtained as a result of measurements is adjusted to normal[10] conditions ($P_н$ = 0.1013 MPa, $T_н$ = 0 °C) in accordance with the following formula:

$$F_{CH_4,i,P} = \frac{F^{+}_{CH_4,i} \cdot 273 \cdot P}{0{,}1013 \cdot (273+t)}$$, where (2)

$F_{CH_4,i,P}$ – project methane leak rate (after the repair, replacement) for piece of equipment *i*, adjusted to normal[10] conditions, m^3/h;
$F^{+}_{CH4,i}$ - methane leak rate through leaky piece of equipment *i* after the repair (replacement), m^3/h;
P – gas pressure in the tank, MPa;
t – gas temperature in the tank, °C.

Annual methane leakages shall be calculated by the formula:

$Q_{yP} = ConvFactor * \Sigma[F_{CH4P} * T_{i,y} * UR_i)] * GWP_{CH4} * 0.9$, where (3)

Q_{yP} - methane emissions for certain period for reconstructed device (tCO_2e).
ConvFactor - coefficient of m^3CH_4 conversion into tCH_4 subject to the normal[10] conditions (0°C and 101.3 kPa); it is 0.0007168 tCH_4/m^3CH_4
UR_i - coefficient of uncertainty of measurement methods (95%);
$T_{i,y}$ - time in hours for corresponding component *i* and during which it was functioning (period of monitoring) *y*;

[10] Standard DSTU 4313:2004 "Natural flammable gas. Measuring of consumptions. Terms and definition of notions"

GWP_{CH4} - Global Warming Potential for methane (21 tCO_2e/tCH_4);
0.9 - coefficient taking into account the equipment error.

Estimated project emissions are given in Table 4[11].

Table 4. Project emissions tCO_2e

	2008	2009	2010	2011	01/01/2012 – 31/03/2012
Volumes of project GHG emissions for the period, tCO_2e.	99 852	107 901	114 659	121 253	96 876
Total volumes of project GHG emissions for the monitoring period, tCO_2e.	540 541				

D.2. Baseline emissions

Using the method of leakage volume by means of airtight container the volume of baseline methane leakage of one device *i* may be calculated by the formula:

$$F^{-}_{CH_{4,i,B}} = V_{bag} * w_{sampleCH4,i} * 3600 / \tau_i \quad \text{where} \qquad (4)$$

$F^{-}_{CH_{4,i,B}}$ - methane leakage through leakages *i* from untight element before reconstruction (m^3/h);
V_{bag} - capacity of airtight tank for measurement (m^3);
$w_{sampleCH4,i}$ - methane concentration in leakage sample *i*, which is the difference of the concentration at the beginning and at the end of measurement (%);
τ_i - average duration of tank filling for leakage *i* after reconstruction (seconds).

Methane leak rate obtained as a result of measurements is adjusted to normal[12] conditions ($P_н$ = 0,1013 MPa, $T_н$ = 0 °C) in accordance with the following formula:

$$F_{CH_{4,i,B}} = \frac{F^{-}_{CH_{4,i}} \cdot 273 \cdot P}{0{,}1013 \cdot (273+t)}, \text{ where} \qquad (5)$$

$F_{CH_{4,i,B}}$ – baseline methane leak rate (volume) for element *i*, adjusted to normal[13] conditions (before the repair, replacement), m^3/h;

[11] The presented values of project GHG emission are approximated to integers.
[12] Standard DSTU 4313:2004 "Natural flammable gas. Measuring of consumptions. Terms and definition of notions"

$\bar{F}_{CH_{4},i}$ – methane leak rate through leaky piece of equipment *i* before the repair (replacement), m³/h;
P – gas pressure in the tank, MPa;
t – gas temperature in the tank, °C.

Annual methane leakages shall be calculated by the formula:

$$Q_{yB} = ConvFactor * \Sigma[F_{CH4y} * Ti,y * (1 - UR_i)] * GWP_{CH4} * 0.9 \quad \text{where} \qquad (6)$$

Q_{yP} - methane emissions for certain period for device before reconstruction (tCO_2e).
ConvFactor - coefficient of m^3CH_4 conversion into tCH4 subject to the normal[13] conditions (0°C and 0.1013 MPa); it is 0.0007168 tCH_4/m^3CH_4;
URi - The uncertainty range for the measurement method applied to leak *i* (equal 95%);
$T_{i,y}$ - Time in hours for corresponding component *i* and during which it was functioning (period of monitoring) *y*;
GWP_{CH4} - Global Warming Potential for methane (21 tCO_2e/tCH_4);
0.9 - coefficient taking into account equipment error.

Emissions that will take place in case of absence of rehabilitation measures are given in Table 5[14].

Table 5. Baseline emissions tCO_2e.

	2008	2009	2010	2011	01/01/2012 – 31/03/2012
Volumes of baseline GHG emissions for the period, tCO_2e.	738 625	814 040	872 206	921 366	730 502
Total volumes of baseline GHG emissions for the monitoring period, tCO_2e.	4 076 739				

D.3. Leakages

No leakages within the project implementation are observed (using JI Specific Approach, based on the approved Methodology AM0023, version 4.0 such as the methodology AM0023, version 4.0, leakages are not foreseen).

[13] Standard DSTU 4313:2004 "Natural flammable gas. Measuring of consumptions. Terms and definition of notions"
[14] The presented values of baseline GHG emission are approximated to integers.

D.4 Emissions reduction as a result of project implementation JI project for current period (January 2008 - September 2012)

Emissions reduction as a result of project implementation is calculated as difference between baseline and project emissions.

Quantity of Emission Reduction Units (ERUs) in t CO_2e is calculated under the formula:

$$ERU = \sum[Q_{yB} - Q_{yP}] \quad \text{, where} \qquad (7)$$

ERU– Emission Reduction Units, tCO_2e;
Q_{yP} – project emissions, tCO_2e;
Q_{yB} – baseline emissions, tCO_2e.

In the Table 6 provided to reduce emissions for the monitoring period (January 2008 - September 2012) as a result of project implementation[15].

Table 6. Emission reductions tCO_2e.

	2008	2009	2010	2011	01/01/2012 – 31/03/2012
Quantity of GHG emission reduction for the period, tCO_2e.	638 773	706 139	757 547	800 113	633 626
Total quantity of GHG emission reduction for the monitoring period, tCO_2e.	3 536 198				

[15] The presented values of GHG emission reductions are approximated to integers.