OINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 – in effect as of: 15 June 2006

CONTENTS

Annexes

List Of Abreviation used in PDD

CDM – Clean Development Mechanisms
CGDP – Cabinet gas-distribution post
GDP – Gas-distribution post
JI – Joint Implemntation
OJSC – Open joint stock company
PETM - Purposeful examination and technical maintenance
PDD – Project Design Document
SRUGCO - Safety regulations of Ukraine gas-distribution system operation

SECTION A. General description of the project

A.1. Title of the project:

"Reduction of natural gas emissions at OJSC "Odesagas" gate stations and gas distribution networks"

Version of Project Design Documentation: 06.

Date: 10 December 2009.

A.2. Description of the project:

OJSC Odesagas is the company uniting gas supply facilities of 26 districts in Odesa region and gas supply facility in Odesa, and providing natural gas transportation and supply to industrial and domestic consumers. OJSC Odesagas controls 1917 gas-distribution posts, cabinet gas-distribution posts, among them 1851 (GDP, CGDP) are the OJSC Odesagas property. The structure of current gas transportation rates does not include depreciation and investment needs and costs of gas distribution enterprises, which does not ensure receipt of funds for performance of necessary repair works and modernization of gas networks, purchase of appropriate engineering equipment and components, and also results in increase of natural gas leakage at the infrastructure of OJSC Odesagas.

At the moment OJSC Odesagas only detects leakages with the help of detectors according to the Ukrainian Gas Supply System Safety Rules in order to avoid emergency and explosive situations. Measurement of the leakage volume, its registration and accounting are not performed, and appropriate measuring devices are missing. According to the conducted research leakage volume of natural gas for OJSC Odesagas can make 41 million m^3 per year.

The purpose of the project is reduction of natural gas (methane) leakage in gas-distribution posts, and in cabinet gas-distribution posts. The main sources of leakage are junctions of the elements of GDP and cabinet gas-distribution posts CGDP. Many connecting parts of GDP and CGDP require repair in the result of quick wear of compactor elements. Within the scope of the project for repair of GDP and CGDP equipment, for the purpose of leakage elimination, modern compacting isolation hermetic materials will be used, former service and repair practice based on rubberized asbestos fabric and rubber gaskets, and compacting padding made of cotton fiber with fat soakage and asbestos graphite filler, which results in additional gas leakage and greenhouse gas emissions into the air, will be changed.

The project activity includes:

- Implementation of purposeful examination and technical maintenance of gas-distribution posts and cabinet gas-distribution posts – modern and economically most efficient practice, which allows not only detection of leaking areas, but also determination of leakage volume (i.e., potential volume of gas leakage reduction). This is key information for substantiation of types of repair and priority choice of its objects, which is important under short financing for elimination of all leakages. This activity will include purchase and calibration of modern measuring equipment, appropriate training of employees, development of monitoring map with the list of all equipment components to be regularly examined, creation of leakage data collection and storage system, and implementation of internal audit and quality system for elimination and accounting of methane leakage.
- Detection and measurement of leakage: monitoring system of leakages, including eliminated leakages (repaired equipment components) will be exercised on a regular basis (once in four days or once in a week, depending on the type of equipment) by specially trained personnel. Each component

will be checked according to the monitoring map, and detected leakage will be duly marked with individual number; gas leakage volumes will be measured and registered in the database.

- Elimination of all detected leakages: repair of leaking junctions of GDP and CGDP elements within the scope of this project will vary from replacement of gaskets and wedge plugs, use of new sealants or compacting hermetic materials (such as Gore-Tex), to capital repair and replacement of safety valves of pressure regulators, piston rods, installation of natural gas gauges. Repaired GDP and CGDP equipment components will be regularly checked as a part of a standard monitoring program (see above) to make sure they have not become the source of leakage again.

Duration of the project is not limited, as PETM, monitoring and leakage elimination programs are aimed to become a part of work of OJSC Odesagas. Reduction of emissions equivalent to CO2 is stated for three periods of crediting (18 years) according to modality and Joint Implementation Procedures.

A.3. Project participants:

Invited Party	Business Name of Project participant	Please state whether Invited Party is willing to be considered Project Participant **(YES/NO)**
Ukraine **(HOST PARTY)**	OJSC Odesagas	**YES**
SWITZERLAND	VEMA SA	**YES**

A.4. Technical description of the project:

A.4.1. Location of the project:

The project is located in Odesa region, in the southern part of Ukraine (**Picture 1**).

Pic. 1. Map of Ukraine with regions and neighboring countries.

A.4.1.1. Host Party(-ies):

The project is located on the territory of Ukraine.

Ukraine is a country in the East Europe, which has ratified Kyoto Protocol to UN Framework Convention as of February 04, 2004, enters the list of countries given in the Annex 1, and meets the requirements for participation in Joint Implementation projects.

A.4.1.2. Region/State/Province etc.:

The project is located in Odesa region. List and addresses of project areas presented in Register of Equipment of Gas-Distribution Posts (see Appendix C).

A.4.1.3. City/Town/Community etc.:

Odesa City and Odesa regional cities, towns and villages. See Register of Equipment of Gas-Distribution Posts in Appendix C.

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

Odesa and Odesa region are located in the southern part of Ukraine on the Black Sea shore. Odesa region is the largest (33,31 thousand km^2) by area region in Ukraine. It includes 26 districts with the population 2,402 million people living in 14 cities, 23 urban settlements there are some large industrial enterprises and public utility objects located in 201 villages.

Pic. 2. Main cities of Odesa region where the project will be implemented

A.4.2. Technology(-ies) to be employed, or measures, operations or actions to be implemented by the project:

1. Design and implementation of natural gas leakage measurement method.
To measure leakage volume of natural gas it was decided to use the method based on the Calibrated Bag Technology described in the approved baseline strategy AM0023 "Reduction of natural gas leakage from compressors and shut-off stations". One of the problems incurred by using this method is difficult accounting of the volume of the valves measurements are done on, and of the initial air volume upon determination of gas volume received in the bag. A special device was designed and developed to solve these problems. It is made on the basis of a plastic capacity of a certain volume, package, plastic hose and pressure gauges connected with each other (see Annex 3). All junctions are sealed.

Gas analyzer EX-TEC® SR5. To determine methane concentration in the sample a high-precision gas analyzer EX-TEC® SR5 is used.

- explosion-proof (CENELEC).
- gas 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).

Relative error makes 10%, which conforms to EN 50054/57 Standard.

After detection and measurement of leaks appropriate repair of leaking areas will be done in the junctions of GDP and CGDP elements, which will include both use of modern compacting sealing hermetic materials (Gore-tex technologies) and full replacement of worn equipment with new one.

Detailed information on the measuring methods used in leakage monitoring is given in the Annex 3.

2. Implementation of modern sealing hermetic material for leakage elimination
Sealing hermetic material Gore-tex is a ductile self-lubricating material which removes rod leaks and has almost eternal service life. It is simple in use and creates an integral cylinder in the form of a gasket around respective element of equipment. In most cases of its use dismantling of equipment is not required. This material is not inclined to destruction during long period of use, has low friction factor and is perfect for use in the wide temperature range from -260 C to +340 C. This material is inert against most usual chemicals and does not absorb gases. It prevents from rod wear.

3. Replacement of shut-off and regulating valves.

Shut-off and regulating valves. The scope of the project also implies and has partially performed from its very beginning replacement of morally and technically worn and obsolescent shut-off and regulating valves produced in the USSR, with the valves produced by European companies Pietro Fiorentini (www.fiorentini.com/), Actaris (www.actaris.com/), Tartarini (http://www.fisherregulators.com/tartarini/).

4. Installation of natural gas central management system.
To increase efficiency of using gas-distribution system and for the purpose of prompt response to the damage in the network, centralized natural gas management system is planned to be mounted in all gas-distribution posts. Increase of efficiency of using gas-distribution system will allow reduction of natural gas leaks.

During implementation of the project manufacturer and equipment used in detection and elimination of leaks can be replaced depending on the availability of modern best technologies and equipment.

Selection of devices and materials will depend on the size, source of leak and operating mode of system component where this leak has been detected using modern PETM system of shut-off stations and gas-distribution networks, including:

- identification of basic conditions – upon using measuring devices described above;
- Registration of results and determination of priority in elimination of leaks, which ensures the highest efficiency of this work upon scarcity of repair means.
- Data analysis and evaluation of reduction of natural gas leaks and volumes of emission reduction.
- Development of a plan of future examinations and further monitoring of junctions of GDP and CGDP elements inclined to leaks, and monitoring of already eliminated leaks.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

Project activity, which includes reconstruction of GDP (CGDP), sealing of shut-off and regulating valves, leak monitoring are aimed to reduce the volume of natural gas leaks through leakiness and maintenance of leak proofness of equipment at the gas distribution posts. Reduction of natural gas leaks will result in reduction of CH_4 emissions.

Subject to the absence of the proposed project all equipment, including old equipment with less leak proofness than that of proposed equipment, but yet operable one, will be operated for a long time in the usual mode, and reduction of emissions will not take place.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

During implementation of the project the following emission reductions will be reached at each of project stages:

Duration of previous crediting period	Years
2005-2007	3
Years	**Expected annual emission reductions in tons of CO_2 equivalent**
2005	40000
2006	120000
2007	190000
Total for 2005 - 2007	**350000**
Average annual expected emission reductions for the previous crediting period (in tons of CO_2 equivalent)	**116666**

Duration of crediting period	Years
2008-2012	5
Years	**Expected annual emission reductions in tons of CO_2 equivalent**
2008	265000
2009	345000
2010	460000
2011	460000
2012	460000
Total for 2008 - 2012	**1990000**
Average annual expected emission reductions for the crediting period (in tons of CO_2 equivalent)	**398000**

Duration of latter crediting period	Years
2013-2022	10
Years	**Expected annual emission reductions in tons of CO_2 equivalent**
2013	460000
2014	460000
2015	460000
2016	460000
2017	460000
2018	460000
2019	460000
2020	460000
2021	460000
2022	460000

Total for 2013 - 2022	**4600000**
Average annual expected emission reductions for the latter crediting period (in tons of CO_2 equivalent)	**460000**

Table 3. Estimated amount of CO_2 emission reduction

Description of formula used for calculation of emission reduction is given in the paragraph D.1.4.

Operation of the system of leakage detection and elimination, and further maintenance of tightness of equipment created under the Project does not have any time limitation. Therefore the Project will give reductions of methane emissions after termination of crediting period.

A.5. Project approval by the Parties involved:

The project has been already supported by the representative body of the Government of Ukraine – National Environmental Investment Agency, which issued a Letter of Endorsement in November 2009. Therefore organizational risks for the project have been minimized.

The project was initiated in 2005.

January 12, 2005 –Working group was organized, the main purpose of which is project performance ensuring.

February 02 2005 – A contract was signed between OJSC Odesagas and Engineering and technological institute "Biotekhnika" UAAN for carrying out examination of gas-distribution posts of OJSC Odesagas, included to the project, development of monitoring program for emissions and development of project design documents (PDD).

2005 – First reconstruction works have been performed under this project.

2009 – PIN was provided to National Environmental Investment Agency.

November 2009 – National Environmental Investment Agency issued a Letter of Endorsement for the project of Joint Implementation (№ 1310/23/7 as of 05/11/2009).

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

There is approved methodology AM0023 "Reduction of natural gas leakage at compressor or measurement gas line stations" within the scope of Clean Development Mechanism to measure and to calculate natural gas leakage (http://cdm.unfccc.int).

Methodology AM0023/Version 03 states that it can be applied for the projects for natural gas leak reduction at compressor, gas-distribution stations in the system of main gas lines, as well as for equipment of gas-distribution systems, including gas-pressure adjusting stations.

Appropriateness of application of this methodology in this project arises from the following analysis.

In accordance with Methodology AM0023/version 03 the following three conditions shall be fulfilled:

1. Companies – operators of gas-distribution networks do not use the system allowing systematic detection and elimination of methane leaks by the moment of project implementation;
2. Natural gas leaks can be detected and measured precisely;
3. Monitoring system can be implemented to make sure eliminated methane leaks will not occur again.

The project fully conforms to the second and the third conditions and also to the first condition subject to some notes given below.

As to the *first condition,* before the beginning of the project OJSC Odesagas ensures only detection of leaks with the help of detectors in accordance with Ukrainian Gas Supply Systems Safety Rules in order to avoid emergency and explosive situations. Measurement of leak volumes, it's monitoring and reporting are not done, and appropriate measuring devices have been missing. Theoretic calculations of natural gas leak volumes of OJSC Odesagas can make 41 million m^3 per year (see Appendix B).

According to the results of international experience and data received from the regions where this material has been already applied, Gore-Tex Shelf-Life shall significantly reduce leak volumes at the gland-sealed shutters.

Moreover, because of the lack of up-to-date equipment for detection and measurement of leak volume, it is supposed that an effective program for detection and elimination of leaks could not be applied in the absence of the project. The Companies which were mainly motivated by the safety condition and could only detect the fact of leakage itself, but could not measure its volume.
In other words, we want to say the system for detection and elimination of leaks was not able to eliminate leaks of OJSC Odesagas was not able to eliminate leaks included to this Project.

Under the *second condition,* purchase of up-to-date equipment for detection and measurement of leak volume and actual measurement of leak volume at the shutters have shown that leaks can be detected and measured precisely subject to application of modern practices and equipment.

Under the *third condition,* implementation of step-by-step procedures, creation of comprehensive database and use of additional equipment will enable reliable monitoring of repaired shutters and detection of newly appeared leaks (See Annex 3 to Monitoring Plan). On-site training of personnel and quality control at all stages will allow accurate realization of Monitoring Plan.

Preconditions

There are only 2 options of pre conditions, which can be considered as possible and reliable alternatives for the Project:

1. Keeping the current system for detection and elimination of leaks;
2. Implementation of this Project not as JI project.

The arguments given in these PDD (see section B.2 below) prove that sticking to current operational system for detection and elimination of leaks is the most probable development scenario upon the Project absence.

Therefore, this scenario can be taken as Preconditions.

Emissions Reductions

The method for determination of emission reductions volume based on methodologys of AM0023/version 03 implies preliminary evaluation of emissions with further determination of their actual volume.

In accordance with Methodology AM0023/version 03 emission reduction level is calculated in the following order:

1. Current natural gas leak detection and elimination practice is evaluated and described. Precise and transparent criteria for determination of whether detection and elimination of methane emissions will be done subject to the absence of this Project, are established.
2. The terms for equipment replacement subject to the absence of this Project are determined.
3. Leak data collected during implementation of the Project.
4. Repair effectiveness is checked during monitoring.
5. On the basis of data collected upon performance of previous steps
actual volume of methane emission reduction is calculated.

Applicability of these steps of this Project is described below.

Step 1. Evaluation and description of current practice for emission detection and elimination.

Methodology AM0023/version 03 stipulates that "Calculation of emission reduction volume shall take into account only those types of emissions which are not detected and not eliminated in accordance with the currently used practice". As it was mentioned before, methodology used in this project does not fully conform to the original AM0023, but it was developed on the basis of the methodology AM0023. Therefore, this method is a deviation from methodology AM0023. According to applied methodology all gland-sealed shutters have been included into the project, i.e. have been examined and repaired even though they are regularly examined under the existing maintenance system. From the other side, all shutters would be repaired using modern sealing hermetic material Gore-Tex, not taking into account the fact whether any leak was detected or not, for the purpose of further prevention of leaks. At the moment traditional material used in the repair works at the gas-distribution networks of OJSC Odesagas represented in this project ensures only temporary short-term elimination of natural gas leak, while sealing hermetic material Gore-Tex provided for by the Project ensures reliable elimination of natural gas leaks for a long time.

Step 2. Terms for equipment replacement

Starting from 2005, upon detection of natural gas (methane) leaks repair of shutters is performed in accordance with the measures provided for in this project. Replacement of components which are not

subject to repair is exercised only in the exceptional cases, and there is no plan for such replacements. Inclusion of any similar cases of potential replacement of components to the emission reduction calculations is not reasonable as they will not produce any significant effect on the Project result – level of methane emission reduction. It shall be also pointed out that within the scope of this Project sealing hermetic material will be replaced at all shutters, even where leaks have been detected only at some of them.

Step 3. Data collection during project implementation.

Data collection on methane emissions has been organized together with repair works on all shutters this Project applies to. Detection of natural gas leaks has been performed with the help of detectors on the basis of catalytic oxidation/heat conductivity. Repair works at the shutters have been performed after measurement of methane leak volumes. To measure methane leak volumes (as a part of natural gas) a method designed by ITI Biotekhnika of UAAN by the order of OJSC Odesagas in 2005 has been used. The method is based on using the device on the basis of leak-proof capacity of a certain volume and gas analyzer EX-TEC® SR5 (See Annex 3).

By its principle this method is similar to the method of Calibrated Bag implemented in version 03 of methodology AM0023. After publication of methodology AM0023, version 03, it was decided to keep to the previously used method for the following reasons:

- Methodology represented in the methodology AM0023 does not take into account volume of equipment being the object of measurement;
- Use of sealed pack (bag) does not allow making precise measurements because of very difficult determination of the initial pack volume in the blown-up state;
- Use of pack according to the method described in the methodology AM0023 does not allow permanent control of methane concentration in it, which can result in formation of explosive mix of methane and air, operation with which is hazardous even upon using antistatic pack.

After repair works a new measurement will be taken and on-going monitoring will be conducted to ensure methane emission was eliminated on long-term basis.

Collected data will be included to the report according to the monitoring plan performance. All data are kept in the database. Each report on monitoring plan will contain full information from such database (Annex 3 of this project design documents).

Step 4. Requirements to monitoring procedures

Step 4 implies monitoring of Project elements to check whether any repeated methane emission occur. Monitoring plan for this Project applies to all repaired shutters. Frequency of measures for detection and measurement of emissions at the shutters where they have been already eliminated shall be indicated in the Monitoring plan. For those components where repeated natural gas leaks were not detected, methane emissions from the component will be considered equal to zero for the whole period after the last inspection/monitoring. For those components where repeated methane emissions are detected, methane emission volume shall be measured using measuring devices, with the accuracy comparable to the accuracy corresponding to (or no worse than) the accuracy of equipment used in the primary examination. It will be considered that such volume of emissions remained at the same level, starting from the date after the last shutter repair performed in accordance with the Project, or after the last examination of eliminated emissions, depending on which event occurred later, which conforms to requirements established in the Methodology AM0023/version 03. Such methane emissions will be eliminated repeatedly, after which new measurement of methane emission volume will be done.

Collected data will be included to the regular reports according to monitoring plan. All data are kept in the database. Each report on monitoring plan performance will contain full information from such database (Annex 3 of this project design documents).

Step 5. Calculation of methane emission reduction.

Methane emission reduction received in the result of the Project is determined as the different between emissions measured before repair (Step 3) and after repair (Step 4). In case (hypothetically) if emissions after repair are more than those measured before repair, negative reduction of methane emissions will be indicated for a particular component. In other words the Methodology provides for the case when methane emissions during Project performance exceed emissions determined in the source conditions.

Description of Baseline and substantiation of its selection are given in the section B.2. below.

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

In accordance with the Methodology AM0023/version 03, in the last revision of "Tool for Demonstration and Assessment of additionality " approved by CD EB, used to prove project additionality. .Tool for demonstration and assessment of additionality, version 5.2 is used is also used in these PDD.

Step 1 – Detection of alternatives for Project implementation, which conform to the effective legislation and regulations of Ukraine.

Step 1a – Determination of alternatives to Project implementation.

Only two alternative scenarios can be considered for the Project:

Alternative 1: current situation will stay as it is – business as usual;
Alternative 2: the measures provided for by the Project will be exercised without using JI mechnisms under article 6 of Kyoto Protocol of UN Framework Convention On Climate Change.

Alternative 1:Continuing current practice of detection and elimination of natural gas leaks and therefore methane emissions is the most realistic and reliable alternative for the Project, as this alternatives implies minimal costs for OJSC Odesagas.

OJSC Odesagas does not receive any financial benefits from methane emission reduction. Natural gas payment rates/fees system in Ukraine provides for reduction of the cost of natural gas in case of leak reduction. Payment for methane emissions within established limits, which is currently fixed, is hard or impossible to be charged because of the absence of measurement technology and large amount of insufficient emissions spread over large area.

Alternative 2: In accordance with Methodology AM0023/version 03, for identifying preconditions it is necessary to determine "whether such measures for methane emission reduction from such important components as shutter units, blow valves, rod seals and pressure release valves have been performed or are expected to be performed, using methane emission detection and measurement technologies similar to those described in this methodology". Until now OJSC Odesagas has not performed any measures for actual inspection and technical maintenance which would exceed the frames of safety requirements established by the regulations. Type and volumes of technological leaks in Ukrainian gas-distribution

networks have been mainly unknown till the first direct inspections and preventive examinations exercised for evaluation of possibilities of project implementation as JI project under article 6 of Kyoto Protocol to UN Framework Convention On Climate Change. Evaluation of net volume of gas consumption and its leaks were approximate, as most end consumers do not have gas meters and issuance of invoices for payment was done on the basis of state norms.

Moreover, OJSC Odesagas does not have any incentives or funds for implementation of the measures provided for by the Project upon the absence of its support by JI mechnanisms under article 6 of Kyoto Protocol to UN Framework Convention On Climate Change (step 1.2, step 2 and step 3 below). The Project provides for additional expenses for measuring equipment, up-to-date sealing hermetic materials and personnel training. OJSC Odesagas does not have any financial incentives to cover such costs for implementation of this Project or similar measures represented in this project, except for possible proceeds received under the flexible mechanisms under Kyoto Protocol.

Evaluation: OJSC Odesagas will not cover expenses incurred by implementation of Alternative 2. Therefore Alternative 1 appears to be the most realistic scenario alternative for Project implementation.

Step 1b – Conformance to effective Ukrainian laws and regulations.

Alternative 1: Current practice for detection and elimination of natural gas leaks and therefore – methane emissions, conforms to all effective laws and regulations of Ukraine. The legislation allows natural gas leaks and methane emissions during natural gas transportation. The regulations determine only periodicity of equipment inspection to be performed by gas-distribution organizations in order to detect natural gas leaks. The practice for natural gas leak detection in OJSC Odesagas conforms to the indicated regulations. Control of conformance to regulations is exercised by means of annual revisions performed by the authorized bodies.

The project also conforms to existing regulatory requirements in Ukraine concerning detection of natural gas leaks and methane emission at the gas-distribution objects, and to any other applicable legislative norms; currently existing program of OJSC Odesagas for planned detection of natural gas leaks will be implemented together with application of more up-to-date methods for detection and measurement of natural gas leaks and therefore – methane emissions, and measures for long-term elimination of natural gas leaks and methane emissions, provided for by this Project.

Conclusion: selected realistic conservative and reliable scenario (alternative 1) fully conforms to compulsory requirements and norms of the Ukrainian law.

Step 2 – Investment Analysis

Step 2a – Determination of applicable analysis method.

As Project implementation does not bring any other financial or economic benefit except for the proceeds from Project implementation itself, which can be received under the mechanism determined by section 6 of Kyoto Protocol to UN Framework Convention On Climate Change, a simple cost analysis is used to determine that suggested implementation of the Project is economically less efficient subject to the absence of such proceeds, in accordance with additionality tools.
Currently available Procedure for Rates Formation approved by the National Commission For Energy Market Adjustment does not allow receiving benefits in case of reduction of natural gas leaks. The whole economic burden is connected with natural gas leaks is transferred to the end consumer of natural gas.

The following steps have been done in accordance with additionality tools of the CDM EB "Tool for demonstration and assessment of additionality", version 5.2.

Step 2b – Alternative 1. Use of simple cost analysis.

Project implementation will require costs in addition to existing costs for performance of measures for detection and elimination of natural gas leaks and methane emissions. Additional costs of Project implementation include the costs of:

- Procurement and use of up-to-date equipment for detection and measurement of methane emissions (gas analyzer EX-TEC® SR5);
- Procurement and implementation of sealing hermetic materials Gore-Tex of different type and diameter;
- Replacing outdated shut-off and regulating valves with new valves produced in Europe (Pietro Fiorentini, Actaris, Tartarini);
- Installation of natural gas meters in all gas-distribution posts of the project;
- Personnel training to perform actual preventive examination and technical maintenance, and to use and to maintain sealing hermetic materials Gore-Tex, shut-off and regulating valves Pietro Fiorentini, Actaris, Tartarini, natural gas meters;
- Systematic data collection and management;
- Systematic and long-term efficiency control of elimination of detected natural gas leaks.

Sealing hermetic material Gore-Tex Shelf-Life will be used during implementation of the Project. In accordance with preliminary monitoring results, sealing hermetic material Gore-Tex is much more effective, but also 20 times more expensive than sealing hermetic materials used in the current practice. In the result of this practice all natural gas leaks are passed to the end consumers, and OJSC Odesagas has not causes for purchasing and installation of sealing hermetic material Gore-Tex.

At the moment of project beginning gas-distribution posts of OJSC Odesagas use outdated shut-off and regulating valves produced in the USSR, which yields in its tightness to new samples produced in Europe, but is much more expensive. Therefore, installation of new equipment, Pietro Fiorentini, was done only once and could not be used for regular practice due to lack of funds.

There was also no natural gas accounting/management at gas-distribution posts of OJSC Odesagas at the moment of project beginning due to high price of meters and equipment required for their installation. Installation and implementation of central accounting/management system of natural gas will allow operative monitoring of gas flow inside the network, increase of effectiveness of using gas-distribution system.

Application of Kyoto mechanisms to this project makes these measures economically efficient and is the only way for their implementation.

OJSC Odesagas does not get any direct economic benefit from reduction of methane emissions, which is achieved during Project implementation, not accounting proceeds from selling reduction units, as under existing tariff system all network gas leaks are transferred to the end consumers of natural gas.

We shall also take into account that in Ukraine methane is not included to the list of ecologically hazard gases and therefore is not punished by ecological fines. Therefore, OJSC Odesagas does not face any

financial difficulties in connection with payments of fines for environmental pollution, therefore it will not receive any financial benefit upon emission reduction from the point of view of reduction of payments for pollution.

As emission reduction does not bring any economic benefit to OJSC Odesagas and implementation of this project do not bring any economic benefit to other project participants, including the project owner, except for the benefit formed under the Joint Implementation Project (JI), we can make a conclusion that Project implementation without receiving proceeds under JI causes obstacles for investments.

Conclusion: In connection therewith it is obvious that this project is economically unattractive without registration of the project as JI, which proves additionality of this project.

Step 3 – Barrier Analysis

The Project is the first project of such type, and therefore there are some types of barriers. OJSC Odesagas faces serious financial barriers, and lack of potential and experience in using new approaches and measuring equipment for detection and elimination of gas leaks at its objects, including:

- Organizational barrier.

Insufficient potential of labor and technical resources of OJSC Odesagas for implementation and carrying out directed examination, technical maintenance and reconstruction of all shut-off stations and overland gas-distribution stations. It is connected with the absence of qualified personnel: during the last years the company faced significant outflow of qualified personnel, and newly recruited employees do not have enough experience and knowledge yet.

- Absence of special technical knowledge.

At the moment of project beginning available qualified personnel did not have experience in using equipment and methods for measuring gas leak volumes: equipment (gas analyzer) used by OJSC Odesagas ensures only detection of leaks, and volume of leaks is not measured and fixed. Therefore, project implementation requires time to gain practical experience in measurement of natural gas leak volumes.

- Financial barrier.

Financial barriers are connected with the structure of existing tariffs for gas transportation and distribution, which does not include depreciation, maintenance and investment needs of gas-distribution enterprises, which leads to permanent lack of funds and impossibility of timely performance of capital repair and provision of budget needed for operation of equipment and ongoing structured investment into modernization and development of gas-distribution infrastructure.

Step 4 – Common Practice Analysis.
Step 4a – Analysis of other activity similar to that suggested in the Project.

The absence of financial incentives described for Step 2 and barriers described in Step 3 are true not only for OJSC Odesagas, but they are also typical for other companies operating low-pressure gas-distribution networks in Ukraine. Therefore existing practice for detection and elimination of methane emissions represented in the variant of source conditions selected for this Project is the common one for Ukraine.

In general, most of Ukrainian gas companies use the same devices for detection of natural gas leaks as used in Odesa region. Sealing hermetic materials used for reduction of leaks also differ a little by the regions. Gas enterprises of Ukraine do not have equipment for measuring natural gas leak volumes. Programs for detection and elimination of natural gas leaks used in Ukraine are also aimed to satisfy safety requirements and to prevent accidents.

Step 4b – Description of common practice

Beside this Project and other projects implemented as JI, there are no other programs for direct detection and elimination of natural gas leaks at the gas-distribution networks implemented in Ukraine. The projects provides for using up-to-date technologies and equipment for detection and measurement of natural gas leaks. This equipment and its application are rather new.
Perspectives to receive financing for the Project under the mechanism established in section 6 of Kyoto Protocol to UN Framework Convention on Climate Change allowed its developer to prepare this Project. Therefore, we can think that any actions similar to those provided for in this Project are developed and implemented in Ukraine in expectation of proceeds in accordance with the mechanisms established in section 6 of Kyoto Protocol to UN Framework Convention on Climate Change.

Conclusion: Measures similar to those provided for in this Project can be performed now only subject to receipt of expected proceeds from implementation of mechanism established in section 6 of Kyoto Protocol to UN Framework Convention on Climate Change. Therefore, this Project is deemed meeting additionality criteria.

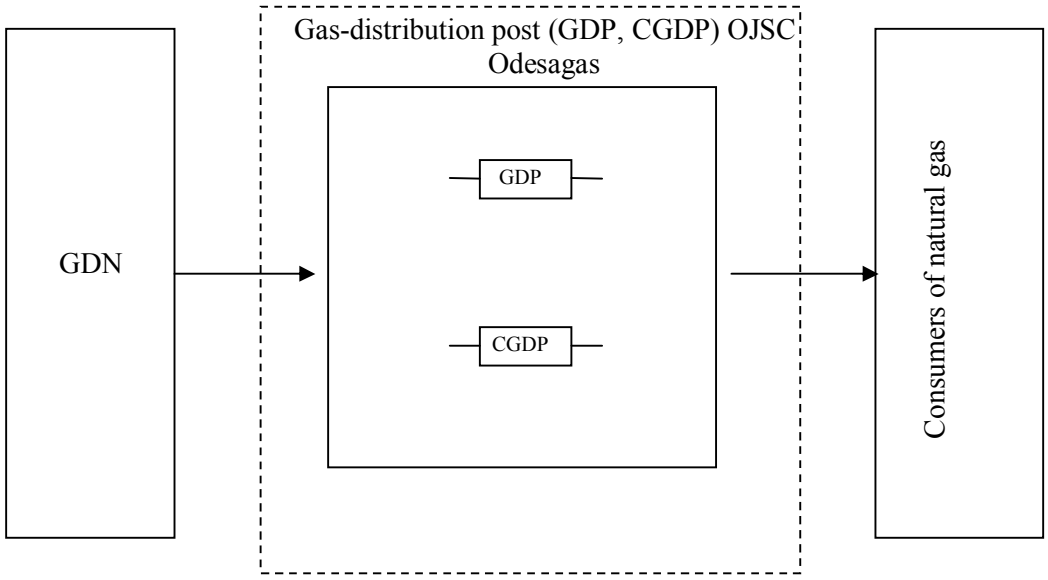
Step 5 – Impact of JI Revenue

Expected financial benefit from JI mechanisms and emission reduction units issuance will be the only source of revenue from the Project. Those financial revenue will make the Project economically attractive.

B0.3. Description of how the definition of the project boundary is applied to the project:

Sources of greenhouse gases and project boundary:

Project boundary for a basic scenario are marked with dashed line at the scheme (**Fig. 3)**



Pic. 3 Project boundary scheme:

Project boundary includes methane emissions only because of leakage of gas-distribution posts of OJSC Odesagas located in Odesa city and Odesa region and are OJSC Odesagas property in number 1851 (GDP, CGDP).

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Baseline formation date: 20/09/2005
Baseline has been determined by Engineering Technological Institute "Biotekhnika" of UAAN.

ITI Biotekhnika UAAN.
Odesa, Ukraine.
Address: Ukraine, 65125, Odesa, 1, Velyka Arnautska
Telephone: +(380) 48 725-12-11

SECTION C. Duration of the project / Crediting period

C0.1. Starting date of the project:

Beginning of project activity: 12/01/2005. Date of Decision of the Board of Directors of OJSC Odesagas on the Project beginning.

C0.2. Expected operational lifetime of the project:

Project expected life cycle is 18 years. Operation of the system of leakage detection and elimination, and further maintenance of tightness of equipment created under the Project does not have any time limitation. Following conservative principle, we will take the life cycle and respective crediting period for further calculations equal to 18 years/216 months (2005-2022).

C0.3. Length of the crediting period:

The project relates to the first period of obligations and makes 5 years (January 01, 2008 – December 31, 2012).

Starting date of the crediting period was the date of the first actions on project implementation, - January 12, 2005. The expected end date of the crediting period is December 31, 2022. Therefore, length of the crediting period will make 8 years/96 months).

If after first obligation period according to Kyoto Protocol it will be prolong then project credition period will be prolong to December 31, 2022. Total project credition period (previous credition period, credition period and latter credition period) is 18 years/216 months.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

For the purpose of quantitative evaluation and execution of reports on emission reduction on the basis of baseline and on project activities, approved monitoring methodology AM0023 will be used – "Reduction of natural gas leaks at compressor and gas-distribution stations of main gas lines" with allowances on the method of leak volume measurement indicated in the item B.1. above.

After detection and measurement of leakage at shut-off stations a detailed monitoring program will be developed for each such element of shut-off station and gas-distribution network. Implementation of such program will become a part of JI project. Monitoring will include emissions from newly detected leakage sources and control of already repaired equipment, where gas leakage was detected before.

Under the JI project the group of OJSC Odesagas executed a Register of Equipment of Gas-Distribution Posts (See Appendix C), which includes full information about all gas-distribution stations of the Project, and which is regularly updated upon reconstruction.

All related data connected with calculation of emission reduction will be kept in the electronic database. Every monitoring report will include full information from this database.

D.1.1. Option 1 - Monitoring of the emissions in the project scenario and the baseline scenario:

At the moment of project beginning there was no single methodology for measurement and monitoring of methane emissions in Ukraine. Therefore OJSC Odesagas concluded a contract with Engineering-Technological Institute "Biotekhnika" of UAAN for development of measuring method and monitoring program for methane emissions.
Monitoring plan was developed on the basis of monitoring plan given in the methodology AM0023 "Reduction of natural gas leakage from compressors and shut-off stations" (Revision 03) with some allowances on measuring method of methane emission volume, described in the item B.1. above, and detailed monitoring methodology are described in the Annex 3.

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	**Data variable**	**Source of data**	**Data unit**	**Measured (m), calculated (c), estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic/ paper)**	**Comment**
1. i	Number	Leak detected, eliminated and then measured again	Number	m	One time	100%	Electronic	A detected leak is awarded a respective number in the specially created Register of Equipment of Gas-Distribution Posts
2. Ti	Time	Number of hours of equipment operation where leakage was detected	Number of hours during the year	m	Constant	100%	Electronic	Number of hours of equipment operation during a year after its replacement (repair)
3.	Date	Reconstruction and monitoring data	Reconstruction and monitoring data	m	Constant	100%	Electronic	Date of reconstruction used together with the number of hours of equipment operation for determination of the total number of operation hours. In case of repeated leakage it is taken

								according to the date of the last inspection which showed the absence of leakage.
4. GWP_{CH4}	Global warming potential	IPCC	Tones of CO_2 equivalent	c	Constant	100%	Electronic	Project developer will carry out monitoring of any changes in the global warming potential for methane, published by IPCC and approved by COP.
5. $F_{CH4,i}$	Leakage rate	Methane leakage rate for each detected leak	m_3 CH_4/hr	m	Annually	100%	Electronic	
6.	Temperature and pressure	Gas temperature and pressure	◦C and kPa	m	Constant/From time to time	100%	Electronic	Measured for determination of CH_4 density. Note: Notwithstanding the measurements, multiple variants are not expected because temperature and has at different stations are taken as constant.

7. UR_i	Uncertainty factor for leakage measuring equipment	Information provided by manufacturer and/or IPCC GPG	Part	m or e	From time to time	100%	Electronic	Evaluated where possible. 95% - confidence interval, advise of the methodology given in the section 6 2000 IPCC Good Practice Methodology If manufacturer of leakage measuring equipment states domain of uncertainty without specification of confidence interval, it can be taken as 95%.
8. *Vbag*	Capacity volume	Measurement data	m^3	m	One time	100%	Electronic and paper	Capacity is filled with water. Amount of water measured by flow meter will be capacity volume. Measurement showed that capacity volume is $0.87m^3$
9. $w_{sampleCH4,i}$	Methane concentration in a	Reports on performed measurements	%	m	Every time upon measureme	100%	Electronic	Methane concentration in a sample (in the

	sample				nts			capacity) of flow *i*. is the difference between methane concentration in the sample in the beginning and in the end of measurement. Concentration is measured with the help of gas analyzer EX-TEC® SR5.
10. t_i	Time	Reports on performed measurements	seconds	m	Every time upon measurements	100%	Electronic	Time during which concentration of methane in the capacity reaches certain level is determined with the help of stopwatch. Measurement starts from the moment the tap on the tank cap is opened and ends when concentration of methane inside the capacity reaches certain level.

According to the effective legislation, all measuring equipment in Ukraine shall satisfy established norms of appropriate standards and pass periodical inspections (once a year).

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

Using the measurement method for leakage volume with the help of leak proof capacity, volume of methane leakage from one piece of equipment can be calculated by the formula:

$$F_{CH4,iP} = Vbag * w_{sampleCH4,i} * 3600 / t_i$$

Where:
$F_{CH4,P}$ = Methane leakage through leak point *i* through leakage element after reconstruction (m^3/h);
Vbag = Volume of leakproof tank for measurement (m^3);
$w_{sampleCH4,i}$ = Concentration of methane in the leak sample *i* which is the difference of concentrations in the beginning and in the end of measurement (%);
t_i = Average time of filling in the tank for leakage *i* after reconstruction (seconds)

Annual methane leakage is calculated by the formula:

$$Q_{yP} = ConvFactor * \Sigma[F_{CH4P} * Ti,y * (1 - UR_i)] * GWP_{CH4} * 0.9$$

Where:
Q_{yP} = Methane emissions for the period y, for equipment which passed reconstruction (tCO_2equivalents).
ConvFactor = $м^3CH_4$ -tCH_4 conversion ratio at the standard temperatures and pressure (0 C and 101.3 kPa) it makes 0.0007168 $tCH_4/м^3CH_4$
URi = Factor taking into account uncertainty of measurement method;
$T_{i,y}$ = Time (in hours) for respective component i, during which it worked during the period of consideration (monitoring period) y, taking into account the methodology given above (e.g., deduction for non-accounted leaks)
GWP_{CH4} = Methane Global Warming Potential (21 tCO_2eq/tCH_4)
0.9= Equipment Error Factor.

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	**Data variable**	**Source of data**	**Data unit**	**Measured (m), calculated (c), estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic/ paper)**	**Comment**
1. *Vbag*	Capacity volume	Measurement data	m^3	m	One time	100%	Electronic and paper	Capacity is filled with water. Amount of water measured by flow meter will be capacity volume. Measurement showed that capacity volume is $0.87m^3$

2. $w_{sampleCH4,i}$	Methane concentration in a sample	Reports on performed measurements	%	m	Every time upon measurements	100%	Electronic	Methane concentration in a sample (in the capacity) of flow *i.* is the difference between methane concentration in the sample in the beginning and in the end of measurement. Concentration is measured with the help of gas analyzer EX-TEC® SR5.

3. t_i	Time	Reports on performed measurements	seconds	m	Every time upon measurements	100%	Electronic	Time during which concentration of methane in the capacity reaches certain level is determined with the help of stopwatch. Measurement starts from the moment the tap on the tank cap is opened and ends when concentration of methane inside the capacity reaches certain level.

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

Using the measurement method for leakage volume with the help of leak proof capacity, volume of methane leakage from one equipment can be calculated by the formula:

$$F_{CH4,iB} = Vbag * w_{sampleCH4,i} * 3600 / t_i$$

Where:
$F_{CH4,P}$ = Methane leakage through leak point *i* through leakage element before reconstruction (m^3/h);
Vbag = Volume of leak proof tank for measurement (m^3);
$w_{sampleCH4,i}$ = Concentration of methane in the leak sample *i* which is the difference of concentrations in the beginning and in the end of measurement (%);
t_i = Average time of filling in the tank for leakage *i* after reconstruction (seconds)

Annual methane leakage is calculated by the formula:

$$Q_{yB} = ConvFactor * \Sigma[F_{CH4B} * Ti,y * (1 - UR_i)] * GWP_{CH4} * 0.9$$

Where:
Q_{yP} = Methane emissions for the period y, for equipment before reconstruction (tCO_2equivalents).
ConvFactor = $м^3CH_4$ -tCH_4 conversion ratio at the standard temperatures and pressure (0 C and 101.3 kPa) it makes 0.0007168 $tCH_4/м^3CH_4$
URi = Factor taking into account uncertainty of measurement method;
$T_{i,y}$ = Time (in hours) for respective component i, during which it worked during the period of consideration (monitoring period) y, taking into account the methodology given above (e.g., deduction for non-accounted leaks)
GWP_{CH4} = Methane Global Warming Potential (21 tCO_2eq/tCH_4)
0.9= Equipment Error Factor.

D.1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	**Data variable**	**Source of data**	**Data unit**	**Measured (m), calculated (c), estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic/ paper)**	**Comment**

Direct monitoring of emission reduction is not used.

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

Direct monitoring of emission reduction is not used.

D.1.3. . Treatment of leakage in the monitoring plan:

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	**Data variable**	**Source of data**	**Data unit**	**Measured (m), calculated (c), estimated (e)**	**Recording frequency**	**Proportion of data to be monitored**	**How will the data be archived? (electronic/ paper)**	**Comment**

Methodology AM0023 does not provide for the leakage.

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

No leakage is expected.

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

Number of Emission Reduction Units, tons of CO_2 equivalent:

$ERU = \sum[Q_{yB} - Q_{yP}]$

ERU - Emission Reduction Units, tons of CO_2 equivalent;
Q_{yP} – estimated emissions, tons of CO_2 equivalent;
Q_{yB} – basic emissions, tons of CO_2 equivalent;

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

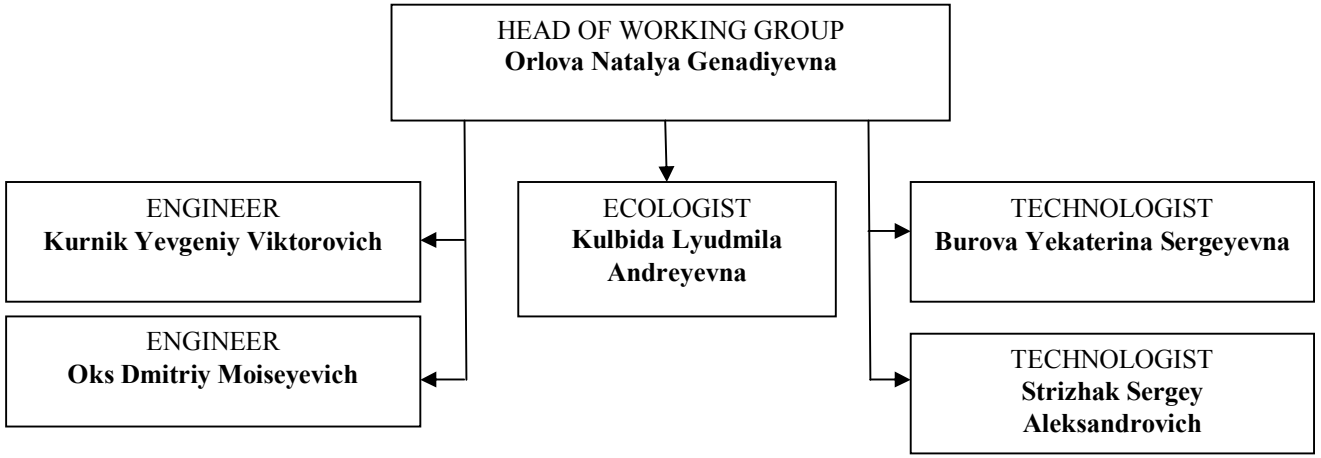
Implementation of this Project does not provide for any negative environmental impact (See section F). Therefore data collection on environmental impacts of the Project is not required. There are no laws or normative documents in Ukraine requiring collection of such information.

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	**Uncertainty level of data (high/medium/low)**	**Explain QA/QC procedures planned for these data, or why such procedures are not necessary.**
Data	**Uncertainty level of data (High/Medium/Low)**	**Explain QA/QC procedures planned for these data, or why such procedures are not necessary.**
1.	Low	Each leak will be tagged with a number and monitored after repair for any additional leaks
2.	Low	Data loggers will be installed wherever possible for machines that turn off frequently to measure hourly usage
3.	Low	Work orders, receipts and other records will be kept in addition to repair logs
4.	Low	Project participants will keep track of any new GWPs adopted by the COP
5.	Low	Leak rates will be measured and double checked before repair-major discrepancies will warrant a third test. In other words, if a hi-flow sampler is used to measure the rate of a leak, if the results of two tests are far apart, the testing should continue until two measurements have results very close together (to reduce any inaccuracies in the testing process). Should the hi-flow sampler or other equipment need recalibration or adjustment to ensure their accuracy, the project participants will take the necessary action to do so
6.	Low	Data recording equipment will be calibrated and double checked on a regular basis
7.	Med/Low	The IPCC GPG will be consulted in compiling uncertainty estimates
8.	Low	Volume of leakproof tank does not change with time, therefore constant check-up of its volume is not required.
9.	Low	Gas analyzer EX-TEC® SR5 meets the requirements of European standard EN50054/57 and passes annual inspections.

10.	Low	Stop watch is a simple device and is not included to the list of devices which are subject to annual inspection. The only factor that influences the accuracy of time measurement of operator's work. Stop watch can be checked.

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan

Coordination of work of all departments and services of OJSC Odesagas concerning project implementation is carried out by specially created Working Group. The structure of Working Team is given on the picture 4.



Pic.4 Working Group Structure

Sergiy Oleksandrovych Stryzhak and Lyudmyla Andriyivna Kulbida are responsible for collection of all information provided for by monitoring plan, and for making all necessary settlements. Archiving of all received information in the result of measurements and settlements is done under guidance of Kateryna Sergiyivna Burova. The head of working team (Nataliya Genadiyivna Orlova) on the basis of received information determines plan of measures under the Project and scope of resources required. Technical maintenance of the Project is carried out by Dmytro Moyseyovych Oks and Yevgen Viktorovych Kurkin.

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

ITI Biotekhnika UAAN.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Evaluation of estimated project emissions has been done on the basis of data received by the monitoring plan given in the item D.1.1.2 and in the Annex 3. Measurements and calculations done by Engineering-Technological Institute "Biotekhnika" UAAN according to the determined monitoring plan of emissions have shown that estimated methane emissions make 10.4 mln m^3 per annum, which makes 158 thousand tons of CO2 eq. (see tables 3, 5).

E.2. Estimated leakage:

Methodology AM0023 does not provide for the leakage (see table 5).

E.3. The sum of E.1. and E.2.:

Estimated emissions + Leakage = ~ 158000 + 0 = ~ 158000 tons of CO_2 eq (see table 5).

E.4. Estimated baseline emissions:

Baseline emissions have been evaluated similar to the project emissions using the formulae given in D.1.1.4. Baseline emissions make 41 mln m^3 of natural gas per annum, which makes 618 thousand tons of CO2eq (see table 5).

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Annual reduction of greenhouse gas emissions starting from the year 2010 (completion of full reconstruction of gas-distribution posts) makes:

Estimated emission reductions = Baseline emissions – (Project emissions + Estimated Leakage) =

618000 - 158000 = 460000 t CO_2 / year.

E.6. Table providing values obtained when applying formulae above:

Year	Estimated project emissions (tons of CO_2 equivalent)	Estimated leakage (tones of CO_2 equivalent)	Estimated baseline emissions (tons of CO_2 equivalent)	Estimated emission reductions (tons of CO_2 equivalent)
2005	618000	0	578000	40000
2006	618000	0	498000	120000
2007	618000	0	428000	190000
Total for 2004-2007	**1854000**	**0**	**1504000**	**350000**
2008	618000	0	353000	265000
2009	618000	0	273000	345000
2010	618000	0	158000	460000
2011	618000	0	158000	460000
2012	618000	0	158000	460000
Total for 2008-2012	**3090000**	**0**	**1100000**	**1990000**
2013	618000	0	158000	460000
2014	618000	0	158000	460000
2015	618000	0	158000	460000
2016	618000	0	158000	460000
2017	618000	0	158000	460000
2018	618000	0	158000	460000
2019	618000	0	158000	460000
2020	618000	0	158000	460000
2021	618000	0	158000	460000
2022	618000	0	158000	460000
Total for 2013-2022	**6180000**	**0**	**1580000**	**4600000**
Total (tones of CO_2 equivalent)	**11124000**	**0**	**4184000**	**6940000**

Table 5. Estimated CO_2 emissions

SECTION F. Environmental impacts

F0.1. Documentation on the analysis of the environmental impacts of the project, including trans boundary impacts, in accordance with procedures as determined by the host Party:

According to ecological norms of Ukraine natural gas emissions into the air are not considered polluting. Therefore no ecological permissions are required. The only environmental impact is reduction of natural gas emissions into the air.

Implementation of this project will allow increasing safe operation of gas equipment, which in its turn will reduce probability of explosions or fires. Experience of OJSC «Odesagas» employees and observance of SRUGCO norms will allow reduction to minimum of the probability of emergencies during the project implementation.

Transboundary effects from project activity according to their definition in the text of the Convention on Transboundary Pollution At Big Distances ratified by Ukraine will not take place.

Implementation of the Project does not provide for any harmful environmental impacts.

F0.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Implementation of the Project does not provide for any significant harmful environmental impacts.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

As the project activities do not imply any negative environmental impacts and negative social effect, no consultation with stakeholders has been held.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Supplier:

Organisation:	OJSC Odesagas
Street/P.O.Box:	Odaria
Building:	1
City:	Odesa
State/Region:	Odesa region
Postal code:	65003
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Fax:	
E-mail:	odgaz.odessa.ua
URL:	
Represented by:	
Title:	Executive Director
Salutation:	
Last name:	Gerasymenko
Middle name:	Oleksandrovych
First name:	Vitaliy
Department:	
Phone (direct):	+38(050)316 53 17
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Mobile:	
Personal e-mail:	

Project Partner

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Postcode/ZIP:	Case postale 170 CH-1222 Vésenaz
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E-Mail:	vema@bluewin.ch
URL:	
Represented by:	

Title:	Mr
Salutation:	Director
Last name:	Bortnik
Middle name:	
First name:	Valentin
Department:	
Mobile:	
Direct FAX:	+41 (22) 855 09 79
Direct tel:	+41 (22) 855 09 69
Personal e-mail:	vema@bluewin.ch

Annex 2

Baseline Information

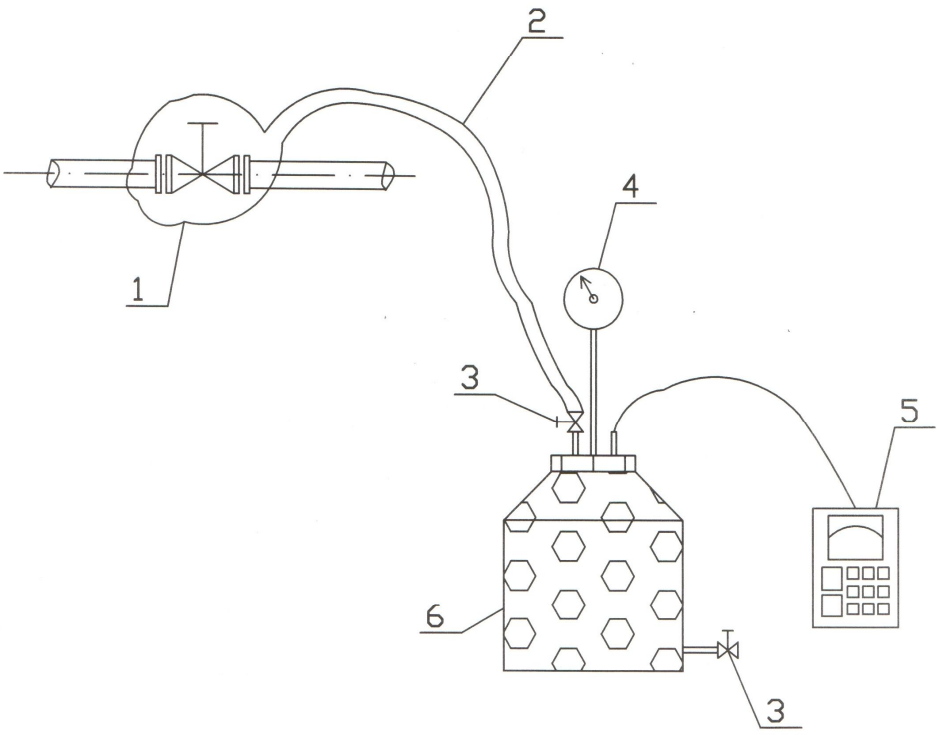
Baseline information is included to the main text of Project documentation. See Section B.

Annex 3

Monitoring plan

As there has been no method and equipment in Ukraine for detection of methane leaks through equipment leakage at the beginning of the project, ITI Biotekhnika UAAN has developed a plant on the basis of leakproof tank and gas analyzer EX-TEC® SR5.

The scheme of the plant is given on the picture 5.



Marks

1. *Hermetic bag*
2. *Hose pipe*
3. *Cock*
4. *Manometer*
5. *Gas analyzerEX-TEC SR5*
6. *Hermetic tank.*

Pic.5 Scheme of methane leakage measuring plant

Methane leakage measuring method.

Working team:
Master of operation department of street gas lines and house inlets.
Master of gas-regulating post (GRP)
Locksmith for operation and repair of gas equipment at GRP – 2 persons
Locksmith of operation department of street gas lines and house inlets – 1 person

Necessary materials and equipment:

1) Wrenches, tools;
2) High-sensitive gas analyzer EX-TEC® SR5– 1 piece;
3) Leakproof tank, leakproof bag, hose, sealant, adhesive tape;
4) Pressure gauge;
5) Fire extinguisher.

Procedure of natural gas leakage measurement at the equipment of gas-regulating post (GRP):

1. Air GRP. Measure gas contamination of the premises with the help of gas analyzer EX-TEC® SR5.
2. Install the tank (6). Put plastic bag (1) on the measured element (shutter, filter, pressure adjustor etc.)
3. Connect bag and tank with a hose (2) Stick junctions for leaktightness with adhesive tape Measure methane concentration in a tank.
4. Open tap (3)
5. Count the time for filling the tank with methane using stop watch.
6. Stop measurement when concentration of CH4 in the tank reaches 1%. In case of little leakage, to save time the measurements are stopped after a certain period of time from the beginning (at least 2 minutes) and methane concentration at the moment of finishing measurement is registered.
7. Gas concentration in the tank is determined with the help of high-sensitive gas analyzer EX-TEC SR-5 (2).
8. Gas pressure control is done with pressure gauge «D-59N-100-1.0 6kPa»
9. Shut off tap (3) after measurement Disconnect hose from the tank Take GRP from the room. Open taps (3) and (7) for airing. Repeat measurement at least for three times.
10. After finishing measurements, remove detected gas leaks and repeat measurements.

PROGRAM
of initial monitoring measurements for shut-off stations and gas-distribution networks of OJSC Odesagas

Contents:
The purpose of initial measurements is:

1. receipt of more reliable evaluation of methane leakage volume from the system, (EXCEPT FOR leakage connected with operation, technical maintenance or emergencies), and in the result of that, determination of potential profit from PSO-project and volume of repair works/replacement of equipment which can be required subject to attractive payback period of deposited investments;
2. determination of proprieties in respect of works to be performed at the objects, and in respect of their arrangement at these objects;
3. accumulation of some initial experience of using measuring equipment; determination of issues to be solved or improved (such as additional measuring equipment, accuracy rate, required training of appropriate workers) before the beginning of project in order to ensure its proper operation.

PSO depends of determination, measurement, elimination and monitoring of leakage. In case measurements are required, the most important question at the initial stage is receipt of a demonstrative example of leakage at the shut-off station and gas-distribution networks. If performance of full examination of all elements at each station turns out to be insufficient, it is necessary to select the most demonstrative and typical elements. For example, station workers shall have a grounded opinion as to which equipment is better for certain objects and under which conditions – inspection of these two questions shall be done. Some questions shall be systematically determined during initial measurements:

- the areas of leakage of strands and value (instructions for specialized use of accounting meters shall be attached to the maximal possible extent);
- the areas with relatively little leakages;
- where opportunities for repair and/or replacement (such equipment as gaskets and flanges) require rather small costs;
- the areas with nig leakage elimination of which will not require big costs.

Quality information (e.g. difficulties in measurements at particular valves because of limited access to them) shall be also recorded where possible, in order to ease planning and performance of the project. Flow meters shall be able to store and to upload data – if there is such an option, it shall be used in addition to manual registration of meter indicators. Nomination/numbering system shall be agreed BEFORE THE BEGINNING of measurements.

Tables given below shall be of explanatory and actual character, and not of directive and regulatory character.

Measuring devices leaks have been measured with:

1. Calibrated leakproof tank of certain capacity bag capacity ____m^3 at pressure ____kPa.

2. Gas analyzer EX-TEC® SR5.
3. Pressure gauge;

Monitoring group

1. _____
2. _____
3. _____
4. _____

Management _____
_____

Table 1Information about the object – Gas-distribution post_____

There is a logbook of technical inspection of equipment (service logbook kept by inspectors) - once in four days, by appropriate authorized serviceman. Leakage shall be specified in the report logbook. Gas contamination is determined using gas detector for the purpose of fulfilment of PBSGU requirements and to prevent emergencies.

Current repair is done once a year, technical maintenance - once in six months.

Object (object code by register)	Inlet/outlet gas pressure, (MPa)	Inlet/outlet gas temperature, °C	% CH_4 (methane) in gas

Table 2Leakage report as of _____

Order number	Position	Measurement of air flow sample		Time for filling in calibrated bag, sec	Time leakage of methane, m^3/h	Annual greenhouse gas leakage, tons of CO2/year
		Initial concentration, %	Sample concentration, %			
1	2	3	4	5	6	7
1	Shutter before entrance to the object					
2	Entrance shutter					
3	T-valve with pressure gauge					
4	Filter					
5	Bypass shutter					
6	T-valve with manometer					
7	Bypass shutter					
8	Pressure gauge					
9	PZK					
10	Pressure controller					
11	Exit shutter					

12	Guide bar with valves (number of valves a the impulse gas line).					
13	PSK					
14	Pressure gauge					
15	Shutter at the exit from the object					
Second line of reduction						
16	Entrance shutter					
17	T-valve with pressure gauge					
18	Filter					
19	Pressure gauge					
20	PZK					
21	Pressure controller					
22	Exit shutter					
23	Guide bar with valves					
24	PSK					
25	Pressure gauge					

Explanations to Table 2
(1) Order number of equipment by the register
(2) Name of equipment
(3) Initial concentration – methane concentration in leakproof tank before the beginning of measurement (volume percent).
(4) Sample concentration – methane concentration in leakproof tank after the end of measurement (volume percent).
(5) Filling time (seconds).
(6) Methane leakage is calculated in the following way:

$F_{CH4,i} = V_{бак} * c_{CH4,i} * 3600 / t_i$

Where:

$F_{CH4,P}$ = Methane leakage through leak point *i* through leakage element (m^3/h);

$V_{бак}$ = Volume of leakproof tank for measurement (m^3);

$c_{CH4,i}$ = Concentration of methane in the leak sample *i* which is the difference of methane concentrations in the sample in the beginning and in the end of measurement (%);
t_i = Average time of filling in the tank for leakage *i* (seconds)

(7) Annual methane leakage is calculated by the formula:

$$Q = K_{tCH4/м^3CH4} * \sum F_{CH4} * Ti,y * 0.95 * GWP * 0.9$$

Where:
Q_{yP} = Methane emissions for the period y (tCO_2equivalents). In case if the plant has been replaced in connection with the project activities before the beginning of project activities, its reduction is taken into account only in case it has not been replaced without the project.
$K_{tCH4/м^3CH4}$= м³ CH_4/t CH_4 conversion factor at the standard temperature and pressure (0 C and 101.3 kPa) it makes 0.0007168 $tCH_4/м^3CH_4$
i = All leaks included to the calculation of reductions and satisfying the above-given conditions
$F_{CH4,i}$ = Methane leakage through leak point *i* through leakage element (m³/h);
0.95 = Factor taking into account uncertainty of measurement method;
$T_{i,y}$ = Time (in hours) for respective component i, during which it worked during the period of consideration (monitoring period) y, taking into account the methodology given above (e.g., deduction for non-accounted leaks)
GWP_{CH4} = Methane Global Warming Potential (21 tCO_2eq/tCH_4)
0.9= Equipment Error Factor.

Note:

a. Measurement of natural gas leakage volume has been done at the most typical objects.
b. Only technical leakage measurements have been monitored.

CORRECTION AMOUNT OF METHANE EMISSION TO STANDARD CONDITIONS

All results of measuring methane emission amount were corrected to standard conditions ($P_н$ = 0,1013 МПа, $T_н$ = 273 К) used formula:

$$F_{CH_4} = \frac{F \cdot 273 \cdot P}{0{,}1013 \cdot (273+t)}$$

де F – amount of methane emission, m^3/h;
P – gas pressure in tank, MPa;
t – gas temperature in tank, °C.