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## LETTER OF ALEXANDER G. ANANENKOV, DEPUTY CHAIRMAN OF OAO GAZPROM MANAGEMENT COMMITTEE

#### Dear readers!

On behalf of OAO Gazprom Management Committee I am presenting you our corporate Environmental Report 2010.

*Gazprom Group* activities have got a strategic meaning for the development of the Russia's economy; make a significant contribution to ensure its gradual and innovative progress. Along with it *Gazprom* gas got a clear understanding of the necessity to maintain the balance between strategic targets of the business development and environmental protection – the essence of living of the present and future generations.

For many years one of our company's main goals has been to ensure the equilibrium of economic and nature protection values. This has been practically reached by the implementation of different programs of technical re-equipment; production modernization and energy efficiency improve, as well as the detailed assessment and minimization of possible environmental risks, which relate to new construction projects.

The implementation of *Gazprom Group* companies' ongoing activities in environmental protection considers the specifications of production facilities, nature and climate, as well as social and economic peculiarities of the regions. The issues of environmental security and rational nature use are the integral component of the cooperation agreements signed between *Gazprom* and local authorities of the Russian Federation in the areas of our company's operations.

*Gazprom* has intensively participated in environmental programs, provided support to the special protected areas and the territories of traditional nature use, catered for the preservation of biodiversity.

The complex approach towards the environmental security enables *Gazprom* to successfully deploy high technologies of environmental protection, advanced systems and standards of environmental management and steadily achieve its environmental targets.

The present Environmental Report will provide you with the current data on the corporate environmental management system, environmental performance of *Gazprom Group* in 2010 and further objectives, which our company has focused on.

Deputy Chairman of Management Committee of OAO Gazprom, Chairman of Coordination Committee for Environmental Protection and Energy Efficiency

Alm

A.G. Ananenkov

## **INTRODUCTION**

The Environmental Report 2010 integrates information about *Gazprom Group* companies' implementation of Environmental policy, including parameters and measures approved to mitigate the impact on air, water resources and lands. The Report contains data on environmental management and funding, investments in research and development, technical modernization, which were aimed at elevating of environmental security of the production complex.

The environmental data performed by the production activities were formally collected from *Gazprom Group* companies' and exposed to an accurate processing. The Report provides the data performed in total by *Gazprom Group*, OAO Gazprom (including the retrospective analysis of 5 years) and single *Gazprom Group* companies, which contribute much to the analyzed scope of activities.

Hereinafter the term OAO Gazprom refers to the heading company of *Gazprom Group*, i.e. Open Joint Stock Company Gazprom with its 100% subsidiary companies and organizations. The term *Gazprom Group* or *Gazprom* hereinafter refers to the companies incorporated by OAO Gazprom itself and additional group of subsidiary companies. The term *Gazprom Neft Group* or *Gazprom Neft* hereinafter likewise stands for the company of OAO Gazprom Neft and its subsidiaries. The term *Gazprom energoholding* stands for the company of OAO Gazprom energoholding and its subsidiaries (OAO Mosenergo, OAO OGK-2, OAO OGK-6, OAO OGK-1, OAO TGK-1).

The list of OAO Gazprom subsidiary companies and organizations, which have reported on their environmental protection activities, is given below:

- «Gazprom dobycha Astrakhan» «Gazprom dobycha Krasnodar» «Gazprom dobycha Krasnoyarsk» «Gazprom dobycha Nadym» «Gazprom dobycha Noyabrsk» «Gazprom dobycha Orenburg» «Gazprom dobycha Urengoy» «Gazprom dobycha Yamburg» «Gazprom bureniye» «Gazprom pererabotka» «Novo-Urengoy gas and chemistry complex» «Gazprom UGS» «Gazprom liquefied natural gas» «Gazpromavia» «Gazpromtrans» «Gazflot» «Gazprom invest Vostok» «Gazprom invest Zapad» «Gazprom invest Yug» «Gazprom podzemremont Orenburg «Gazprom podzemremont Urengoy» «Gazprom energo»
- «Gazprom transgaz Volgograd»
- «Gazprom transgaz Yekaterinburg»
- «Gazprom transgaz Kazan»
- «Gazprom transgaz-Kuban»
- «Gazprom transgaz Makhachkala»
- «Gazprom transgaz Moscow»
- «Gazprom transgaz Nizhny Novgorod»
- «Gazprom transgaz Samara»
- «Gazprom transgaz Saint-Petersburg»
- «Gazprom transgaz Saratov»
- «Gazprom transgaz Stavropol»
- «Gazprom transgaz Surgut»
- «Gazprom transgaz Tomsk»
- «Gazprom transgaz Ufa»
- «Gazprom transgaz Ukhta»
- «Gazprom transgaz Tchaikovsky»
- «Gazprom transgaz Yugorsk»
- «Gazprom neft shelf»
- «Gazprom dobycha shelf»
- «Gazprom tsentrremont»
- «Gazprom sotsinvest»
- «Yamalgazinvest»

*Gazprom Group* will stand for OAO Gazprom (all above mentioned subsidiaries) and the following companies:

«Purgaz»

- «Tsentrgaz»
- «Gazpromregiongaz»
- ${}^{\rm «Regiongazholding} {}^{\rm »}$
- «Zapsibgazprom»
- Vostokgazprom Group
- Gazprom Neft Group
- «Gazprom neft Orenburg»

«Daltransgaz»

- «Sakhalin Energy Investment Company Ltd»
- «SeverEnergia» and its subsidiaries
- «Kaunasskaya HPS»
- «Severneftegazprom»
- «Gazprom neft Orenburg»
- «Gazpromtrubinvest»

Gazprom energoholding and its subsidiaries

- «Mosenergo»
- «OGK-2»
- «OGK-6»
- «TGK-1»
- «Murmanskaya CHP»

## **ENVIRONMENTAL MANAGEMENT**

### ESTABLISHMENT AND EVOLUTION OF THE GAZPROM GROUP ENVIRONMENTAL MANAGEMENT SYSTEM

The *Gazprom* environmental management system (EMS) is a vertical highly developed structure, which integrates various environmental management units ranging from OAO Gazprom Management, subsidiaries and other companies of *Gazprom Group* to environmental divisions of affiliated companies.

The supreme element of the *Gazprom Group* environmental management system is the Management Committee of OAO Gazprom. The complex management of the environmental protection is performed by the Coordination Committee of OAO Gazprom for environmental protection and energy efficiency, which was established by the Order of OAO Gazprom № 280 as of October 17, 2007. The Coordination Committee is headed by the Deputy Chairman of Management Committee A.G. Ananenkov. The Coordination Committee includes the majority of the Management Committee members and heads of OAO Gazprom profile departments.

The implementation of the *Gazprom* corporate Environmental Policy and decisions of the Coordination Committee in *Gazprom* subsidiary organizations is controlled by the corporate special administrative division – Directorate of energy-saving and environment of Department of gas transporting, underground storage and utilization.

The Coordination Committee regular sessions are dedicated to the actual problems of environmental protection and the broad scale evaluation of the *Group* environmental protection measures. The protocol decisions generated by the Committee are the basis for the *Gazprom Group* decisionmakers.

In 2010 the Coordination Committee for environmental protection and energy efficiency held a number of sessions upon the following:

- review of the Gazprom Group performance 2009, work on the economy of energy resources and energy efficiency improve in subsidiaries. In order to meet the provision of the State council presidium for state regulation of environmental protection as of May 27, 2010, the Coordination Committee ordered to inventor and identify OAO Gazprom objects with accumulated environmental damage, as well as to develop recommendations upon the complex of measures to enable the liquidation of the damage and provide for the creation and updating of the best available technologies registry applicable to the gas industry.
- deployment of tested technologies and innovations aimed at energy efficiency improve. The heads of subsidiary organizations are ordered to consider the implementation of energy efficient innovative projects, including the waste heat recovery, in revised corporate programs on energy saving for 2011–2013.
- provision of environmental security during the development of Severo-Kamennomysskoye field. The respective assignments were delivered:

Gazprom VNIIGAZ LLC will be in charge of the integral environmental assessment of the project solutions upon the development of Severo-Kamennomysskoye field under the general scheme of the Ob Gulf field exploration and develop the site specific environmental and fishery requirements.

Gazprom dobycha Yamburg Ltd. will cooperate with the administration of Yamal-Nenets autonomous district upon the social and economic issues and environmental offsets, which are to be included in the draft Cooperation Agreement between OAO Gazprom and the Administration of Yamalo-Nenets autonomous district.

OAO Gazprom Environmental inspection performance in 2009 and future plans. Gazprom Gaznadzor Ltd. shall ensure the switch to the complex audit of environmental management systems, which will be additional to the revision of the consistency with the environmental legislation in subsidiaries, which launched the EMS.

- review and approval of the draft OAO Gazprom Energy Saving Concept for 2011–2020. It is ordered to hold an industry wide session to elevate the awareness of the subsidiaries about the OAO Gazprom energy efficiency requirements.
- measures aimed at lowering the methane emissions resultant from the maintenance of linear section of gas main pipelines. As a result of a thorough analysis subsidiary organizations are subject to the full supply with the equipment set necessary for hot tapping and carrying out of application tests of Smart PlagTM technology.
- preparation of OAO Gazprom environmental management system for the certification under the ISO 14001. OAO Gazprom structure division heads are therefore ordered to ensure the participation of profile specialists in training seminar. The internal and assessment audit shall also be in place.
- draft report of OAO Gazprom sustainable development for 2008–2009. The report creation is approved.





### **PROVISIONS OF THE OAO GAZPROM ENVIRONMENTAL POLICY**

#### **UNDERLYING PRINCIPLE OF THE GAZPROM BUSINESS:**

ustainable development construed as intensive economic growth accompanied by maximal conservation of natural resources and preservation of a favorable natural environment for future generations.

#### **GOALS AND COMMITMENTS**

Guaranteeing compliance with all standards set by the Russian Federation legislation and international legal acts related to environmental protection, as well as observing the principles of the Russian Federation Ecological Doctrine.	Securing resource conservation, reducing negative environmental impacts and taking all possible measures to conserve the climate and biodiversity as well as to compensate for possible environmental damage.
Enhancing energy efficiency of production processes at all stages.	Consistently streamlining both the Company's environmental activity and its management system.
Preventing pollutions, which means giving priority to preventive actions aimed at non-admission of negative environmental impacts over actions aimed at elimination of consequences of such impacts.	Continuously improving labor and industrial safety at its production facilities and ensuring that working conditions meet the requirements of safety and hygiene standards.
Taking into account the interests and rights of indigenous minorities with respect to their traditional lifestyle and original habitat retention.	Effectuating gasification of population centers and expanding utilization of natural gas as vehicle fuel for the purpose of enhancing the living standards and security of Russia's population.

### **ENVIRONMENTAL MANAGEMENT SYSTEM**

The *Gazprom Group* environmental system is based on the corporate Environmental Policy of OAO Gazprom and subsidiary environmental policies, which consider the business peculiarities and focus on lowering the environmental impact. Thus companies are consistent with the legal environmental requirements and capable of controlling and preventing pollutions, as well as ensuring permanent elevation of environmental performance.

OAO Gazprom is the first Russian oil and gas company, which endorsed a volunteer "Environmental Policy" (1996). Today the 3rd Edition of the Environmental Policy is approved by the provision of OAO Gazprom Management Committee N $_{\rm P}$  45 as of September 25, 2008 is in effect.

The OAO Gazprom Environmental Policy defines the deployment of a properly designed environmental management system as an effective tool, which enables to achieve corporate strategic environmental targets. The system will be based on the requirements of the international standard ISO 14001. In order to meet the decisions made by the OAO Gazprom Coordination Committee for environmental protection and energy efficiency № 39 as of February 9, 2009, the ad hoc Working Group on Improving the OAO Gazprom Environmental Management System was created.

*Gazprom* endorsed the scope of the system operation, determining its structure, which is "Coordination of the environmental management and energy saving systems of (100%) subsidiary companies". This means the corporate environmental management system has a two-level hierarchy. The upper (corporate) level is the coordination of the subsidiaries' EMS. And the lower level is the subsidiaries' control of environmental aspects of their own activities.

The document base of corporate guidelines and standards on environmental protection, nature use and energy saving is the crucial element of the *Gazprom* environmental management system.

OAO Gazprom environmental management system incorporates a document package based on the ISO 14001 requirements, which determine the structure and functioning of environmental management system elements, including target setting, planning, implementation, control and assessment of the EMS performance.

OAO Gazprom EMS functioning is determined by the following:

- Guidelines on the environmental management system of OAO Gazprom.
- Manual on the identification of environmental aspects in the environmental management system of OAO Gazprom.
- Guidelines on the internal audit of the environmental management system of OAO Gazprom.

In accordance with the Manual on the identification of environmental aspects in the EMS of OAO Gazprom a number of lists of the most important environmental aspects were prepared in subsidiary companies, which are covered by the scope of the system operation. In the majority of cases the most important environmental aspects in 2010 are recognized as atmosphere emissions of methane resultant from gas main pipelines maintenance and nitrogen oxides resultant from compressor stations (CS) operation, waste water discharges and solid waste disposal.

Within the EMS approval in 2010 the company approved its Corporate Environmental Targets of OAO Gazprom, which refer to the adequate environmental aspects of OAO Gazprom business activities.

### Environmental performance of OAO Gazprom in 2010 (compared to the base year of 2008)

- methane emissions reduction 5.4%;
- lowering of the payment for exceeding the allowed environmental impact 83%;
- Iowering of the share of landfilling waste 8.3%
- lowering of the gas specific auxiliary consumption 6.3%;
- stabilizing the nitrogen oxides specific emissions in gas transportation;
- Iaunch of the environmental management system in consistency with the ISO 14001 requirements – in progress upon schedule.

*Gazprom* pays much attention to preventive environmental protection measures. Therefore the following structures are developed:

OAO Gazprom Environmental Inspection – a corporate level division in charge of the industrial environmental control, environmental expertise system – in prior to the state environmental expertise all project materials are subject to the OAO Gazprom environmental expertise.

Environmental research and development and scientific studies are an integral part of the system. To date the production environmental monitoring and industrial environmental control are highly functioning systems in place. The company has got a well developed system of the professional qualification upgrade, which ensures our environmental specialists' high level of professional skills and knowledge.

As of 2010 the following companies' environmental management systems were confirmed to meet the international standard ISO 14 001 "Gazprom dobycha Astrakhan", "Gazprom dobycha Orenburg", "Gazprom transgaz Stavropol", "Gazprom transgaz Ukhta", "Gazprom transgaz Samara", "Gazprom transgaz Tomsk", "Gazprom transgaz Makhachkala", "Gazprom transgaz St. Petersburg", "Gazprom transgaz Tchaikovsky", "Gazprom VNIIGAZ", OAO "Mosenergo", OAO "OGK-2", OAO "TGK-1", OAO "Tomskneft" and "Sakhalin Energy Investment Company Ltd.".

According to the targets set and the schedule approved by the end of 2012 29 subsidiaries of *Gazprom*, included into the first phase of the EMS (which are all subsidiaries of production, transport, storage and processing of natural gas and condensate) will have operated environmental management systems, which will meet the ISO 14001. In 2010 6 subsidiaries were subject to the internal audit of the EMS, 1407 specialists of *Gazprom* and subsidiaries completed training courses on the EMS.

As usual the Energy-Saving and Environment Directorate of Department for Gas transporting, underground storage and utilization summed up the results of the contest for environmental divisions and specialists of *Gazprom*. The 2010 winners were:

- «Gazprom best environmental service» Environmental protection division of Gazprom transgaz Stavropol.
- Gazprom best environmental specialist»: K.E. Anufriev chief of Environmental division of Gazprom transgaz Volgograd; A.V. Makhorin – deputy chief of Technical progress and environmental protection division of Gazprom dobycha Urengoy; D.A. Neretin – chief of Environmental protection division of Gazprom transgaz Samara.

### REGULATORY FRAMEWORK OF GAZPROM RATIONAL NATURE USE AND ENVIRONMENTAL PROTECTION

*Gazprom* develops and improves the base of corporate standards in the field of environmental protection.

In 2010, OAO Gazprom boosted the development of an existing corporate database of standards of the series "Regulations document for the design, construction and operation of OAO Gazprom facilities" by endorsing the following environmental protection guidelines:

- STO Gazprom 077-2010 "Methods of assessing the effectiveness of environmental measures";
- **STO** Gazprom 078-2010 "Corporate list of fixed assets used in the environmental protection";
- STO Gazprom 2-1.19-415-2010 "Environmental monitoring. General requirements";
- STO Gazprom 2-1.19-416-2010 "Industrial environmental control in waste management. The procedure of organization and execution";
- STO Gazprom 092-2011 "Consolidated cadaster of production and consumption waste of OAO Gazprom subsidiaries";
- STO Gazprom 2-3.5-529-2011 "Recycling of waste resultant from gas compressor stations and gas pipelines cleaning";
- STO Gazprom 2-3.2-532-2011 "Standards of industrial wastes generation and ways of disposal and recycling during drilling and well overhaul repair";
- STO Gazprom 2-1.19-540-2011 "Standards of pollutant emissions from gas production, transport and storage";
- STO Gazprom 2-1.19-541-2011 "Accounting of total pollutants emissions from the combustion in turbine gas compressor units";
- R Gazprom 2-1.19-417-2010 "Environment planning in Gazprom";
- STO Gazprom 2 -1.19-519-2010 "Environmental protection requirements of the sewer systems OAO Gazprom constructions sites, and the selection criteria for storm water treatment facilities";
- Gazprom 2-1.19-542-2011 "Air protection in the design of compressor stations and the linear part sections of pipelines";
- Gazprom 081-2010 "The evaluation criteria and performance indicators of environmental services of OAO Gazprom subsidiaries",

Also the following was endorsed by Gazprom in the corporate system of civil protection:

- STO Gazprom 2-1.2-414-2010 "Typical provisions on radiation safety service of the of a OAO Gazprom subsidiary",
- STO Gazprom 2-1.2-469-2010 "Control of radiation safety in the subsidiaries of OAO Gazprom",
- STO Gazprom 2-1.2-482-2010 "The system of measures to ensure radiation safety in OAO Gazprom".

*OAO Gazprom Neft* in 2010 also adopted a number of newly designed and updated previously existing standards for environmental safety, including:

- Standard of the Company "Procedure of ensuring environmental safety of the Company's production activities." SC -16.02.09;
- Instruction of the Company "The system of production and consumption waste management of the Company" M-16.02.09-01;
- Instruction of the Company "Organization of remediation measures for oil contaminated lands" M-02.16.09-02;
- Guidance document of the Company "Instructions of quality standards application for reclamation of land contaminated with oil and oil products", M-02.16.09-03;
- Guidance document of the Company, "Instructions for the identification of oil contaminated land with the natural recoverability, and land that is naturally recovered" M-2.16.09-04;
- Instructions of the Company "A complex of measures to reduce the amount of production and consumption waste" M-02.16.09-05;
- Instruction of the Company "Guidelines for the organization of licensing, permits, recordkeeping and reporting to ensure environmental security" M-2.16.09-06;

- User Companies "Guidelines for the assessment of environmental safety of acquired assets" M-16.02.09-07;
- Instruction of the Company "Identification and assessment of environmental aspects" M-2.16.09-08;
- Instruction of the Company "Determining competence of environmental specialists" M-02.16 .09-09;
- Registry of significant environmental aspects of the Sh-16.02.2009-01; Classificatory of the Company's waste. KT-167.

## **ENVIRONMENTAL PERFORMANCE AND ENERGY SAVING**

### **AIR PROTECTION**

In 2010 the total pollutant emissions from stationary sources of *Gazprom Group* companies amounted to 3,225.28 tons, including the sites of OAO Gazprom subsidiaries – 2,310.38 thousand tons, *Gazprom energoholding* emitted 589.00 thousand tons, 289.4 thousand tons was shared by *Gazprom Neft Group* and 36.5 thousand tons refer to other companies of *Gazprom Group*.

Gazprom Group impact on the air			
	2008	2009	2010
Pollutant emissions, kilotons	3,340.7	3391.1	3,225.3
including major pollutants:			
Carbon monoxide	785.5	645.8	666.8
Nitrogen oxides	339.4	335.3	377.4
Sulfur dioxide	248.6	249.1	296.1
Hydrocarbons (including methane)	1,712.4	1,859.8	1,589.1



Priority pollutants for the *Group* are hydrocarbons (mostly methane), carbon monoxide, nitrogen oxides, sulfur dioxide, which account for 91% of the total pollutant emission.

In the *Group* gross pollutant emissions 97% of hydrocarbons (methane) refer to OAO Gazprom subsidiaries of natural gas and gas condensate production, transportation, underground storage and processing. Particulate emissions are mostly amounted for by the energy sector of *Gazprom*, volatile organic compounds (VOCs) – the sector of oil production and refining.



In 2010, gross pollutant emissions from stationary sources of Gazprom Group amounted to 95.1% if compared to the previous year. The dynamics of emissions of individual companies was multidirectional.

The highest increase in total emissions was observed:

- in the sector of *Gazprom* oil production and refining, by 88.2 thousand tons due to increased production;
- in the energy sector in total by 68.7 thousand tons that was due to a substantial increase in emis-sions of OGK-6, associated with a 20% increase in power generation. Moreover, the statistics of 2010 covered the performance of OAO Murmanskaya CHP. The observed increase in emissions of sulfur dioxide and carbon monoxide was associated with the use of sour and high-ash coals as a fuel at some CHP.

The overall dynamics of the *Group* pollutant emissions in 2010 was mainly influenced by emissions reduction in OAO Gazprom.

In the natural gas production sector of Gazprom the extraction increased by 10% but the total emissions fell by more than 33% (102.1 thousand tons), which was primarily caused by the elimination of associated gas flaring in Gazprom dobycha Urengoy.

Despite the increase of transmission work by 12% the emissions from *Gazprom* gas main pipeline facilities decreased by 10% (204.0 thousand tons) in relation to 2009. This was achieved primarily by minimizing the gas venting when carrying out repair work on the linear sections of gas main pipelines.





The largest share of *Gazprom* gross emissions was covered by gas mains, which formed about 92% of all methane emissions.





#### **CORPORATE POLICY ON CLIMATE PROTECTION**

The corporate climate policy is based on the provisions of the Energy Strategy of Russia through 2030 and Ecological Doctrine of the Russian Federation. Under this policy the company takes a number of liabilities for a complex of measures to conserve the Earth's climate.

The main components of the Gazprom ongoing climate policy are:

#### Participation in international activities of international organizations

Specialists of *Gazprom* are part of the Program Committee of the International Gas Union for Sustainable Development. They have been intesively involved in the research group on greenhouse gas emissions reduction.

*Gazprom* participated in the preparation of the industry Guideline "Reduction of Greenhouse Gas Emissions", which aims to identify and disseminate best practices at all stages of production process.

#### The development of normative documents in accordance with international agreements

*Gazprom* has developed a set of regulations to ensure compliance with the Framework Convention on Climate Change (UNFCCC). More than ten documents are used in preparing the inventory, accounting and control of greenhouse gas emissions and emission reduction projects.

#### Research of greenhouse gas emissions

Since 1992, *Gazprom* has held research on the problem of key greenhouse gas emissions (carbon dioxide and methane) in the gas industry. Priority tasks here are: the creation of corporate control systems, inventory and accounting of greenhouse gases, including methane, of all the process and fugitive emission sources both in *Gazprom* and its subsidiaries and organizations, as well as the development of measures aimed at reducing greenhouse gas emissions.

On an ongoing basis through programs of scientific and technical cooperation, *Gazprom* experts share experiences, conduct joint research work on the problem of greenhouse gas emissions in particular with companies such as E. ON Ruhrgas, GDF SUEZ, Gasunie of the Netherlands. In addition, together with E. ON Ruhrgas *Gazprom* executed studies of possibilities for the practical application of advanced hydrogen technologies.

Regularly at the sites of its subsidiaries *Gazprom* selectively performs instrumental studies to assess the amount of methane losses and statistical analysis of research on greenhouse gas emissions in the areas of construction and operation objects of *Gazprom*, including the involvement of foreign specialists and independent experts.

Within the project "Joint Measurement Studies of the Methane Emissions from Process Equipment" specialists of Gazprom VNIIGAZ, Gazprom Transgaz Samara and Pacific Northwest National Laboratory measured methane emissions from compressors, equipped with "dry" and "wet" compressors seals and leaks from process equipment (valves and vent stacks) of Syzran compressor station as well as the adjacent linear part of a gas pipeline. The total volume of methane leaks was 0.0002% of the volume of gas transported by Syzransky LPU MG. These studies confirm minimal the level of greenhouse gas emissions at the production facilities of OAO Gazprom compared to other companies.

In 2010, pilot (qualification) experimental gas pumping testing of a mobile compressor stations was held in the area of main gas pipeline of Ust-Buzuluk LPU MG Gazprom transgaz Volgograd. *Gazprom* has been actively working to replace the wet compressor seals with dry. In 2010, a complex of scientific researches was conducted to assess pollutant emissions from wet and dry gas compressor seals.

#### Activities on adaptation to climate change

Within the annual comprehensive ecological and technological expedition of the Yamal-2010 the company conducted a study of the possibility of hazardous geocryological processes development on the peninsula Yamal in the area of *Gazprom* operations and the peninsula adjacent areas such as the Kara Sea. The company also made the forecast of the dynamics of climate and permafrost conditions in the area. In addition, the pipeline Bovanenkovo – Ukhta was exposed to a comprehensive monitoring, including the assessment of thermal effects on the permafrost.

#### Arrangements for mitigation of climate change

*Gazprom* is implementing the program of modernization and improvement of facilities, programs, energy saving, increased use of associated petroleum gas. *Gazprom* implements the best available practices and technologies in the field of resources and to protect the environment. *Gazprom* actively participates in regional gasification, gasification of road transport, increasing the proportion of associated gas use. All these help to reduce the climate impact.

#### The implementation of targeted projects to reduce greenhouse gas emissions

Together with Mitsubishi and NipponOil *Gazprom Neft* has implemented a project on utilization of associated petroleum gas on the Ety-Purovskoe field in the Yamalo-Nenets autonomous district. This project is a joint implementation (JI) it was approved by the Ministry of Economic Development of Russia in August 2010 and Sberbank of Russia signed a contract with the Japanese Sumitomo Corporation on emission reduction trading. Under the JI, *Gazprom Neft* has brought about construction of a number of sites, operation and maintenance of them.

The most promising and best for joint implementation projects of *Gazprom*, which were verified, include projects "Use of mobile compressor stations (MCS) for pumping natural gas from sections of main gas pipeline" and "Practical utilization of associated petroleum gas on Urengoy oil gas and condensate field".

#### **Disclosure of information**

*Gazprom* has published annual environmental reports, answered the information needs of various organizations. Since 2009, OAO Gazprom, along with other international companies has been involved in a project of international investment partnership Carbon Disclosure Project (CDP), to which the company has annually sent informational materials to the questionnaire on climate change issues to be published on the Internet.

Based on the data provided by *Gazprom* the World Wildlife Fund (WWF-Russia) in 2010 released an analytical overview on the status of accounting for methane emissions and reporting in the context of the prospects of reducing methane emissions from oil and gas sector in Russia.

#### **USING THE APG**

*Gazprom's* activities to reduce (stop) flaring of associated petroleum gas (APG) are significant for reducing greenhouse gas emissions and resource saving.

The level of associated gas utilized by *Gazprom Group* in 2010 averaged 64%. On the *Gazprom* fields this level reached 82% (in 2009 – 81.8%), while Gazprom dobycha Orenburg, Gazprom pererabotka and Gazprom Neft Orenburg already use 100% of APG. Gazprom dobycha Urengoy commissioned two compressor stations, which run on APG. This allowed to raise the APG use up to 95%.



Using the APG in Gazprom Group		
	2009	2010
APG resources billion m <sup>3</sup>	6.3	6.6
Utilization of the APG	59.0 %	64.0 %

*Gazprom Neft* has successfully completed the medium-term investment program for 2008–2010 "Utilization and efficiency improve of associated gas usage." On OAO Gazprom Neft fields the use of APG in 2010 was at 55.1% (in 2009 – 48.1%).

In 2011 it is expected that the implementation of the Tomskgazprom program of APG use, which includes building of a gas pipeline and compressor stations since 2009, will result in *Gazprom* APG use of at least 95% in 2012.

*Gazprom Group* increased the use of APG by 14.5% for the period 2007–2010.

#### **GASIFICATION OF TRANSPORT**

The activities of *Gazprom Group* make a significant contribution to the greening of the motor complex in Russia by promoting the production of motor fuel, construction of gas filling stations and production of gasoline and diesel fuel that meet international standards of Euro-3 and Euro-5.

Currently, of all the motor fuel mix and technologies natural gas provides the most environmentally friendly exhaust emissions from motor vehicles. The switch of cars from gasoline to natural gas causes the 5 times lowering of average emissions harmful substances, and twice the noise impact.

The world market of natural gas vehicles (NGV) is developing rapidly. The number of vehicles that use methane as a fuel, exceeded 13 million. According to the forecast of the Working Group 5.3 of the International Gas Union, in 2020 the growth of NGV will make 50 million units, by 2030 more than 100 million units. The appropriate legal framework is being now developed. At the end of 2010 there were more than 18 thousand CNG FS in the world, the demand for CNG in 2010 grew by 20%.

The concept of long-term socio-economic development of the Russian Federation until 2020, considers promoting the use of natural gas as motor fuel as one of the priorities of oil and gas industry and increase national competitiveness.

*Gazprom* is actively working on development of the Russian NGV sector and is the ultimate leader of the national gas fuel market. *Gazprom* is working with suppliers of gas filling equipment with state and municipal government, economic, and scientific centers, international organizations and foreign partners, creating new infrastructure facilities in different regions of the country.

Realization of Corporate Target Program for Development of gas filling network and fleet equipment running on natural gas, which in 2007 was approved by Chairman of the Management Committee of OAO Gazprom A. Miller. The program provides for commissioning of at least 200 CNG FS in different regions of Russia and increase of the gas filling network capacity to 2.6 billion m<sup>3</sup> per year, which will enlarge the number of vehicles and agricultural equipment running on CNG by more than 50 thousand units in 2015. Expected environmental effects of the implementation of the Program – reducing emissions by more than 1 million tons in CO<sub>2</sub>-equivalent.

Currently, the Russian fleet of NGV is estimated at more than 86 thousand units. Demand for compressed natural gas (CNG) in 2010 amounted to 345 million m<sup>3</sup>.

In the 60 regions of the Russian Federation 255 CNG FS are operated, of which 206 are owned by *Gazprom*. The highest CNG consumption in the country is observed on the Territories of Stavropol and Krasnodar, regions of Sverdlovsk, Chelyabinsk, Kabardino-Balkaria and North Ossetia.



In order to promote initiatives for the implementation of *Gazprom's* gas fuel with non-profit partnership National Natural Gas Vehicle Association, it holds annually Exhibition GasSUF, International Scientific and Practical Conference "Gas in motors 2010" and auto caravans "Blue Corridor".

The auto caravans involve natural gas vehicles of serial manufacture (trucks, buses and cars made in Russia and abroad). In the cities along the route, they arrange scientific and practical seminars with participation of heads of local administrations, representatives of the automotive industry, academic experts and exhibitions of Natural Gas Vehicle Technology. Specialists of Gazprom VNIIGAZ measured the composition of exhaust gases, which confirm the ecological purity of CNG as motor fuel.

Caravans held within "Blue Corridor":

2008 – St. Petersburg – Novgorod – Tver – Moscow

2009 – Rostov-on-Don – Krasnodar – Novorossiysk – Sochi

2010 – the Moscow-Ryazan, Penza, Togliatti, Ulyanovsk, Naberezhnye Chelny, Kazan, Nizhny Novgorod.

*Gazprom* has taken part in developing a comprehensive program promoting the use of natural gas and liquefied petroleum gas as motor fuel in the framework of the instructions of the Government of the Russian Federation as of 11.10.2010,  $N_{\rm P}$  EP-P9-54pr.

In 2008, *Gazprom* took the initiative to prepare and implement the federal program "Blue Fuel to White Olympics", the essence of which is integrated gasification of the Sochi transportation network in time for the XXII Olympic Winter Games and XI Paralympic Winter Games in Sochi in 2014. The environmentalization of the transport fleet will significantly reduce harmful emissions into the resort area air and contribute to the formation of "green" image of the Winter Olympics in 2014.

*Gazprom* has made a huge effort to prepare a draft concept of the federal program, which is submitted to the Ministry of Energy, ANO "Sochi 2014 Organizing Committee and the Olimpstroy".

Preparation of the federal target program "Blue Fuel to White Olympics" is included into Complex program of promoting the use of natural gas and liquefied petroleum gas as a motor fuel. The program was developed in the framework of the instructions endorsed by the Government of the Russian Federation dated 11.10.2010, № EP-P9-54pr.

In 2010 OAO Gazprom subsidiary actively participated in the program of transport gasification, and 1961 vehicles units were switched to gas.



*Gazprom Neft Group*, which operates the largest refineries in Russia, have considered the direction of market development for gasoline and diesel fuels as a short-term perspective that meets international standards of Euro-3 and Euro-5.

Gazprom Omsk Oil Refinery:

- began production of high octane gasoline and diesel fuels that comply with Euro-3 in 2008;
- in 2009, after reconstruction of the diesel hydrotreating plant was able to produce diesel fuel, suitable environmental class Euro-5 and improve the quality of all diesel fuel produced by OOR. The sulfur content in the hydrotreated fuel does not exceed 10 ppm. The content of aromatic hydrocarbons also complies with Euro-5;
- in 2010, the light naphtha isomerization unit Izomalk-2 was commissioned. This unit is of great importance to *Gazprom Neft*. The main goal is to increase the production of gasoline meeting the requirements of Euro-4, Euro-5. Through the introduction of technological scheme of the OOR isomerization unit the oil refining and production volume of motor gasoline were increased. Isomerizate produced by the Izomalk-2 unit, is considered the most valuable component for high-octane fuel containing no olefin and aromatic hydrocarbons.

### WATER USE AND PROTECTION OF WATER RESOURCES

In 2010 *Gazprom Group's* companies withdrew (received) 6,258.98 million m<sup>3</sup> of water and 97.6% of it was used for own needs. Waste water was 5,701.00 million m<sup>3</sup>.

Enlarged figures of Gazprom Group water use, million m <sup>3</sup>	
Water intake	6,258.98
including water from natural sources	6,021.75
Totally used for	6,109.70
Household and drinking purposes	43.20
production purposes	5,988.10
irrigation, agriculture and other needs of the	121.40
Waste water total	5,701.00
including those into the surface water bodies	5,364.05
among them normatively clean and normatively treated	5,348.88

Many of the *Group* companies, including subsidiaries and the organization of *Gazprom*, have an important social function for the residential water supply and directing it to their waste water treatment plants.

In 2010, the following amount of water was transferred to third parties by:

- Gazprom energy companies 119.5 million m<sup>3</sup>
- OAO Gazprom subsidiaries 18.6 million m<sup>3</sup>



\* The statistics of 2008 did not cover the performance of JSC "TGK-1", "Sakhalin Energy IC Co., Ltd."





The surface water bodies are the main source of water for *Gazprom energoholding*. In *Gazprom* and *Gazprom Neft* a large amount of water intake comes from groundwater sources.



In the total water use for the production needs of *Gazprom Group's* 98% (5,872.20 million m<sup>3</sup>) is accounted for by the energy sector of the *Gazprom Group* as it is the most water-intensive business area. The increase in water consumption and waste water in 2010 against 2009 was mostly associated with an increase of *Gazprom Group's* production of electricity and heat by 6.1%.

Water consumption for production needs of *Gazprom neft Group* and other oil companies amounted to 66.99 million m<sup>3</sup>, OAO Gazprom – 25.73 million m<sup>3</sup> in other companies of *Gazprom* – 23.18 million m<sup>3</sup>. Despite the increase in water use for industrial purposes by 5.5%, caused by an increase in production and processing of hydrocarbons, natural gas transportation and electricity generation, *Gazprom Group* reduced water consumption for household and drinking purposes by 7.8%.

Organizational and technical measures, such as the installation of flow rate measurement, installation and commissioning of shut-off valve systems, resulted in significant savings of water.

The power energy sector amounts for 98.5% (5,618.05 million m<sup>3</sup>) of the total *Gazprom Group* waste water, which are primarily discharged to surface water bodies, the quality of the waste water meets the category criteria of "clean (untreated)" and "normatively treated at waste water treatment plants".

99.7% of *Gazprom Group* discharge into surface water bodies is represented by sewage, that is normatively clean and normatively treated at facilities.

The structure of the waste water in *Gazprom neft Group* and other oil companies is fundamentally different: here 99% out of 28.83 million m<sup>3</sup> of waste water is injected into underground horizon (to maintain the reservoir pressure), and in case of surface water bodies, the terrain and pits amount for only about 1% (0.27 million m3).

The Sakhalin Energy objects discharged 24.61 million  $m^3$  into surface water, including the normatively clean (untreated) – 23.02 million  $m^3$ , normatively treated – 0.9 million  $m^3$  and insufficiently treated – 0.7 million  $m^3$  (less than 3%.)

*Gazprom* pays much attention to management of water resources and surface water protection. Despite the increase in production in 2010, *Gazprom* observed reduction in total water consumption and water use (by reducing water use for household and drinking purposes).



Gazprom reduced water intake in 2010 by 18.8% compared to 2009.

A specialized subsidiary of *Gazprom* – JSC Gazprom energo, carries out management of electricity, heat, water and sanitation in order to meet the needs of subsidiaries of OAO Gazprom.



Gazprom energo main subscribers are the subsidiaries and entities such as Gazprom dobycha Astrakhan, Gazprom dobycha Nadym, Gazprom dobycha Orenburg, Gazprom dobycha Urengoy, Gazprom dobycha Yamburg; Gazprom transgaz Surgut, Gazprom transgaz Ukhta, Gazprom Transgaz Yugorsk; Gazprom burenie.

In 2010 Gazprom energo accepted about 30% of the total waste water from the *Gazprom* facilities into its branch network.

Performance of Gazprom energo in 2010, thousand m <sup>3</sup>			
Gazprom Energo subsidiary	Water delivered to Gazprom subsidiaries	Water received from Gazprom subsidiaries for the treatment and disposal	
Severny (North)	14.23	13.39	
Yuzhny (South)	5,556.00	5,190.02	
Yuzhno-Uralsky (South Ural)	3,184.00	2,531.24	
Nadymsky	490.31	346.67	
Urengoysky	1,778.55	1,264.86	
Total	1,1023.09	9,346.19	

A large proportion of the water consumption structure of gas transmission subsidiaries (35%) is defined by their number. The most water-intensive sector in the gas industry is natural gas and gas condensate processing.



The majority - 13,079.70 thousand m<sup>3</sup> (44%) of waste water from facilities of OAO Gazprom, was discharged into the surface waters, into underground horizon - 2880.08 thousand m<sup>3</sup> (10%), the terrain - 1403.86 thousand m<sup>3</sup>, the fields of filtration and irrigation, storage and sewage network amount for a total of 41% (1,189.99 thousand m<sup>3</sup>) of waste water.



In 2010, the overall declining trend of waste water discharge into surface water bodies retained because of implementing water saving measures and reducing the waste water from gas pipeline facilities.



Improving the effectiveness of existing treatment facilities, new technologies of waste water treatment can provide regulatory quality of waste water treatment. The total capacity of sewage treatment plants of *Gazprom Group* in 2010 amounted to -153.263 million m<sup>3</sup>. Half of the regulatory effluent was exposed to biological treatment, 39% – mechanical treatment, 12% – physical-chemical treatment.



One of the ways of water management is implementation of systems of water sequential reuse and water recycling.

Performance of the water saving systems in G	azprom Group, 2010, million m³/year
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	Water consumption	
	in the systems water recycling	water sequential reuse
Gazprom Group, total	13,433.47	268.41
including		
Gazprom energoholding	12,698.42	111.26
OAO Gazprom	376.98	0.80
Gazprom Neft Group	358.07	156.35

*Gazprom Group*, understanding the great importance to save and protect water resources, annually allocates funding of these purposes about 60% of operating costs and over 50% of capital investments directed at protecting the environment.

### PRODUCTION AND CONSUMPTION WASTE MANAGEMENT

Production and consumption waste management is among the most significant environmental aspects associated with great environmental risks. In this regard, *Gazprom Group* is striving to introduce the most modern practices and technologies into production to minimize waste.

In 2010 the *Gazprom Group* companies generated in 5,600.27 thousand tons of production and consumption waste. The main contribution to the waste generation was made by energy companies of *Gazprom energoholding* – 80% waste generated (the majority was presented by the ash and sludge (ASW) from solid fuels combustion in power plants, IV–V class of hazard). The share of OAO Gazprom in the total annual waste generation is approximately 7%, *Gazprom Neft Group* – 11%.





\*The statistics of 2008 did not cover the performance of JSC "TGK-1", "Sakhalin Energy IC Co., Ltd."

In relation to 2009 an increase in the amount of waste generated in 2010 was observed due to:

- increasing the number of ASW due to increased power generation and the combustion of high-ash coals at a number of power plants of *Gazprom energoholding*;
- growth in drilling, production and processing of oil and gas.

In 2010 *Gazprom Group* production facilities delivered 832.1 thousand tons of waste to third parties and placed 4,386.7 thousand tons in proper landfills and disposal.



The bulk of waste placed on its own landfills and disposal was covered by the ASW of power generating companies – OGK-2, OGK-6 – total of 92%. In order to reduce negative environmental impacts of ash disposal in OAO "OGK-2", in 2010 the company organized and implemented activities for technical recultivation of ash dumps with the restoration of Protective facilities, executed regular industrial control and monitored the impact of ash disposal on the environment, applied dust suppression system.

Reduction of the accumulated waste by the end of the year in the *Gazprom Group* was enabled by the transfer of waste to other organizations for utilization, disposal, recycling and/or placement, as well as greater neutralization of waste in its own production.

Compared to the year 2009 Gazprom Group:

- increased the amount of waste delivery to other entities by 6%,
- reduced the accumulated waste by the end of the year by 42%.

During the reporting period, OAO Gazprom' subsidiaries generated 408.84 kilotons of waste, which is 43.84 kilotons (12%) higher than the performance for the same period of 2009 (364.99 kilotons). The main contribution to this increase in 2010 was made by gas production companies (drilling waste).



At the facilities of OAO Gazprom subsidiaries 437.7 thousand tons of waste was under account (including 14.7 thousand tons available at the beginning of the year and 14.2 thousand tons received from other companies). Out of this amount 203.8 thousand tons were transferred to third parties, 147.8 thousand tons were placed in the proper disposal facilities.

In 2010 OAO Gazprom used and disposed in its own production 23% of waste more than in 2009.

*Gazprom Neft* facilities covered 15% of the total waste. In 2010 to solve the problems of waste landfilling and processing the company started the construction of three landfills for industrial and solid waste.

#### **OIL CONTAMINATED WASTE HANDLING**

Environmentally sound management of oil sludge is an important aspect of *Gazprom* environmental management, especially in oil and gas production and processing companies. In 2010, at the *Gazprom Group* facilities generated 58.82 kilotons of oily waste, which are mainly represented by slurry of oil treatment plants, sludge treatment tanks and pipelines of oil and petroleum products, floating film of oil traps. Most of the oily waste refers to the III class of hazard. The main contribution to this was made by the subsidiaries of *Gazprom Neft Group* and OAO Gazprom.



In 2010 the OAO Gazprom subsidiaries turned over 12.7 thousand tons of oil sludge, of which 74% (9.4 thousand tons) were generated in 2010 and 26% (3.3 thousand tons) remained from the previous year's performance.

Most of oily waste cannot be applied in own production, hence they are delivered to specialized organizations. The amount of oily waste placed in own storage facilities in 2010 made 22.41 kilotons, of which 90% belongs to the *Gazprom Neft* companies.

*Gazprom* pays great attention to the safe handling of oily waste, particularly in northern areas, conducts studies and implements technologies for efficient disposal and utilizing of oily waste.

Many subsidiaries use units, including mobile facilities, for thermal decontamination of oily wastes.

*Gazprom dobycha Nadym* to extract hydrocarbons from the sludge generated during cleaning of pipelines and equipment use separating tank and oil separator. Hydrocarbons are released as a finished product. In 2010, Medvezhinskoye gas production department used 0.282 tons of sludge.

*Gazprom dobycha Orenburg* since 2005 the Orenburg gas processing plant has applied the facility decontamination and disposal of sludge to produce a mineral powder PUN (sludge waste product) as an additive to asphalt mixtures. In 2010, the company conducted research on the application of asphalt concrete mixture with the addition of PUN on the experimental road section and certification tests on the use of PUN as a mineral powder, in accordance with GOST 9128 at MP-2.

The technological specifications was developed for the use of the mineral powder based on PUN in the asphalt mixture. The technology, regulations and procedures of the process were determined as well as of its individual stages (operations), modes of manufacture of asphalt mixtures using the mineral powder on the basis of PUN, performance requirements of product quality, safe working conditions and operating regulations. Results of certification tests confirmed the compliance of the mineral powder PUN with GOST R 52129-2003 for the blacktop.

Gazprom dobycha Orenburg got the conformity certificate № ROSS RU.SL47.N00064 for serial production of the GPP product recycling activated sludge-mineral powder MP-2.

In 2010, *Gazprom Neft* conducted similar pilot-scale tests in its subsidiary Muravlenkovskneft of the chemical method of treatment of oily waste in Western Siberia. The proposed method is based on the properties of oxide mineral sorbent to increase the surface area of 15–30 times and converted to volumetric binder with a high adsorption capacity for high-molecular substances, particularly for

petroleum hydrocarbons. Processed product complies with GOST R 52129-2003 mineral powder for asphalt and organic compounds and can be used as an additive or a part in the production of building materials and structures.

In order to reduce negative impacts on the environment from waste disposal in 2010 *Gazprom Neft* implemented the program on processing of oily waste using thermal method of neutralization and technology of bioremidiation based on microbial degradation of petroleum hydrocarbons to produce ground-soils belonging to IV class of hazard. The new product is used as a dumping ground for technical roads, reclamation of ravines, or to create a lawn.

The subsidiary of *Gazprom burenie* – "Astrakhanburgaz" conducted microbiological treatment of drill cuttings, as a result of which the use of neutralized sludge as a construction dumping ground for roads was confirmed.

In 2010 the companies of the *Gazprom Group* disposed of more than 13 tons of oily waste by thermal and microbiological methods.

# LAND PROTECTION AND LIQUIDATION OF THE ACCUMULATED ENVIRONMENTAL DAMAGE

*Gazprom Group* companies are constantly carrying out an inventory of land allocated for temporary use, and control over their timely surrender of land users after the restoration of mechanical and biological methods of remediation.

In 2010 *Gazprom Group* executed the account for the disturbed lands at the beginning of the year with an area of 59 thousand hectares, including waste lands 5.2 thousand hectares; at the end of the year -74.4 thousand hectares, including 5.7 hectares of waste lands.

The main part of the land was disturbed during construction -74%, as well as field development and production of hydrocarbons -26%.



Most of the damaged land accounted for by *Gazprom Neft Group*. This is associated with the development of new oil fields.

In 2010 *Gazprom Group* reclaimed in total 9.8 thousand hectares of lands, including: 49% of the land – under forest plantations, 46% – under arable and other farmland, 5% – under the water and other purposes. At the same time, *Gazprom* reclaimed 6.8 hectares of land, which was 70% of the relevant lands of the *Group*; Severneftegazprom – 1.7 thousand hectares (17%).

In 2010, *Gazprom* disturbed 8.4 hectares of lands. The main growth related to scheduled preventive and major repairs of gas mains, as well as in connection with work on the practical implementation of the mega-project "Yamal" (arrangement of the license areas, construction of BCS and other objects). The area of reclaimed land for the year 2010 amounted to 6.8 thousand hectares, of which agricultural land and forest plantations – 66%.





A key minimize of the industrial impact on land and soil is to reduce the allotment of land for temporary and permanent use. To do this, a complex of organizational and technological activities was applied: technology of modular construction of commercial buildings from prefabricated elements, cluster arrangement of wells in oil fields, the techniques of horizontal and directional drilling. Environmental effects from the use of advanced drilling techniques is achieved by reducing the amount of drilling waste, land allocation under the sludge pits, exceptions and violations of land pollution in their construction and operation, and filter pollutants in the underlying horizons.

Preservation of the territories integrity is assisted by the packaging systems of multiline gas networks in one technical corridor, anticipating the construction of roads and highways, preparation of construction sites, production of construction works on the permafrost only in winter.

*Gazprom Group* puts into practice innovative methods of of hydrocarbon contamination removal and rehabilitation of disturbed land using biological technologies.

The technologies allow reclamation of particular climatic conditions that can reduce costs and increase the speed of reclamation. Effective methods of land remediation contaminated by hydro-carbons using new biological products containing microorganisms-destructors and enabling land biological treatment at low temperatures, was tried by OAO Gazprom and *Gazprom Neft* in the Yamal Peninsula.

In 2010, *Gazprom Neft Group's* upstream developed and implemented a program for the remediation of sludge pits, contaminated and degraded sites. It is possible to reduce the negative environmental impact on the areas, which the Company got from previous users. The area of oil-polluted land in *Gazprom Neft* at the end of the year amounted to 131.858 ha. In 2010 Gazprom Neft reclaimed:

- 155 sludge pits,
- 101 hectares of contaminated land,
- 696 hectares of damaged land.

A Gazprom burenie subsidiary – "Astrakhanburgaz" conducted microbiological purification of soil from oil pollution and treatment of drill cuttings, as a result of which the use of neutralized sludge as a construction dumping ground for roads was confirmed.

The methods of fitoremidiation are extensively used for contaminated lands. Growing herbs with an extensive root system allows to create optimal conditions for decomposition of hydrocarbons at the expense of improving gas exchange in the soil and its concentration of biologically active substances secreted by plant roots. Depending on climatic conditions various stable mixture of herbs are used, they are good bioindicators of the degree of the sites remediation.

For the management of land resources, prevention of soil contamination, remediation and prevention of land degradation in 2010, the *Gazprom* companies executed a large complex of activities, including:

- technical and biological reclamation of disturbed lands, biological treatment of soil contaminated with petroleum products
- the transfer of specialized organizations in industrial and consumer waste, including sludge, the disposal
- supervisory control of construction projects and major repairs for compliance with the law on land protection
- production of eco-analytical control and monitoring;
- amenities, landscaping, etc.

In order to implement the decision of the meeting of the Presidium of the State Council on the improvement of state regulation in the environmental field as of May 27, 2010 Gazprom identified and recorded objects with accumulated environmental damage (AED) in the zone of legal liability of subsidiaries and organizations of OAO Gazprom. The main categories of objects and scope of AED; indicative costs of responding to AED objects "inherited" from previous land users. These objects include abandoned wells, requiring the elimination of contaminated and littered areas of land, illegal dumps waste, etc.

Every year, its subsidiaries and organizations Gazprom liquidate the AED, identified in the area of its legal liability, in accordance with developed plans of cleaning the contaminated areas (eg, Plan stripping area of buffer zone of the Astrakhan gas complex of old landfills) and the Plan of organizational and technical measures.

#### Accidents

In 2010, 12 accidents took place in OAO Gazprom, of which. 8 accidents refer to transmission pipelines (Gazprom transgaz Kazan, Gazprom transgaz Makhachkala, Gazprom transgaz St. Petersburg, Gazprom transgaz Yugorsk), 3 crashes happened on the main condensate (Gazprom pererabotka) and an accident at the well № 114 Yamsoveyskoye oil and gas field (Gazprom dobycha Nadym). In order to avoid the gas inflammation Gazprom Gazobezopasnost took all necessary measures for protection from fire of adjacent operating gas wells.



In 2010 one accident took place on the Vyngapurskoe field (*Gazprom Neft*) recorded due to categorical malfunction of the pipeline. The number of oil breakthroughs was less on 17, 5% than in 2009.

When investigating the causes of accidents *Gazprom* establishes the factors that influenced the occurrence of accidents, evaluates the adequacy and optimization of protective equipment and precautionary measures in the field of industrial and environmental safety.

### PROTECTION OF BIODIVERSITY

The year 2010 was declared as the International Year of Biodiversity by the UNO and *Gazprom* made a worthy contribution to this event. For *Gazprom* preservation of the natural richness of our country is not only the declaration of corporate environmental policy, but a reason for practical actions.

*Gazprom transgaz Tomsk* declared 2010 the Year of Environmental Protection, organized a series of environmental events in the regions of operations:

- An Ecological marathon all affiliates of the Company in one day planted 3,500 trees from Kamchatka to Omsk, of which 3,000 were cedars.
- from Omsk to Kamchatka employees of subsidiaries of the Company removed rubbish from parks, water conservation and recreational areas.
- releasing juveniles of valuable fish species in the Ob-Irtysh basin.
- work for the protection of pine plantations in Western Siberia from forest pests pine sawfly (Neodiprion sertifer).
- an action "Revival of Nature Monument Peninsula Sugun" (Novosibirsk region). Peninsula Sugun is considered a reference site with the preserved steppe. The fire, which swept here in spring of 2010 nearly destroyed woody vegetation, burned habitats of rare and red-listed species of plants and animals. During the action scavenging, removal of damaged and planting new trees were held. The action was aimed at promoting the conservation of habitat white-tailed eagles, listed in the International Red Book, as well as nesting cormorant and the Dalmatian pelican.
- the international conference "Environmental protection in gas industry", which was attended by representatives of the Gazprom management and subsidiaries and foreign companies. Each participant received a symbolic gift – a sampling of the Siberian cedar.
*Gazprom* allocated funding of 16 million rubles to Gazprom transgaz Tomsk to provide charitable assistance of Special Protected Areas (SPAs) at the federal level, among them:

- Kedrovaya Pad" one of the oldest in the country (this territory has been under special protection since 1916), created in order to preserve the undisturbed forests of southern Primorye habitats to more than fifty species of rare flora and fauna species, including leopard of Ussuri.
- Anyuiskiy National Park, is home to 43 species of animals listed in the Red Book of the Russian Federation, 25 species – in the International Red Book, 44 species – attributed to species protected by the Convention CITES. More than two thirds of the national park is the habitat of the Amur tiger.
- Kirzinsky State Reserve, is in difficult financial condition. In the reserve is inhabited by about 250 species of birds, 50 species of mammals, 7 species of amphibians and three species of reptiles, 11 fish species. The wetlands are extremely favorable for the protection of waterfowl and marsh fowl during the breeding, molting and rest during migrations.

The *Sakhalin-2* project is always associated with the maximum attention to the risk of environmental harm. In 2010, Sakhalin Energy continued executing landscape-ecological and geological monitoring in the area of its production facilities, as well as monitoring of terrestrial biota and river communities, surface water and sediments in the zone of influence of the onshore pipeline and processing facility, environmental monitoring in the marine area impact of offshore pipelines, platforms and the offshore LNG plant. Special attention is paid to the conservation of wild salmon on Sakhalin Island and its habitat. The proximity of the Piltun-Astokhskoye field, which is being developed under the Sakhalin-2 project, to an area of summer-autumn feeding grounds of the Okhotsk-Korean gray whale causes heightened environmental safety during all operations. The 4D seismic study executed in July 2010 enabled to clarify the field status in operation. The program of environmental monitoring and minimizing the impact on gray whales was fully implemented, and agreed with the Advisory Group on the Conservation of Populations of these animals.

Within the participation of *Gazprom* in the development program of the Sochi region, in 2010 *Gazprom sotsinvest* complied with a set of compensatory measures, including relocation of about three hundred adult red book animals from the Olympic construction area, as well as the movement of large quantities of eggs and fry; 2387 specimens of plants were transplanted, including red-listed species. These activities will result in a maximal reduction of impact on the unique flora and fauna of the region and conservation of recreational resources of the territory.

*Gazprom dobycha Shelf* implemented activities for the conservation of habitats of birds and marine mammals to minimize negative impacts during the construction of the Shtokman field facilities.

*Gazprom dobycha Urengoy* in 2010 implemented a program to identify rare and protected plant and animal species around the Urengoyskoye oil, gas and condensate field under the agreement between the Government of the Yamalo-Nenets Autonomous District and OAO Gazprom. According to the results-processing materials the field research revealed 17 species of rare and endangered plants and animals such as flattened moss, Siberian aster, aster alpine, small thrift-box, lizard, golden eagle, a small (tundra) swan, red-breasted goose, white-tailed eagle, etc.

This work resulted in a plan of measures aimed at protecting rare and endangered species occurring in the areas of Gazprom dobycha Urengoy economic activity.

*Gazprom pererabotka* together with the National Park Yudygva and the UNDP/GEF project "Strengthening of the Komi Republic system of special protection areas to Conserve Virgin Forest Biodiversity in the Pechora River Headwaters" held a seminar for the area employees to contribute to ecological tourism development. Pechora-Ilych State Nature Reserve and National Park Yugydva are located on the territory of the Komi Republic and refer to World Legecy sites of UNESCO. More than half of the park is occupied by natural forests that belong to the only large tracts of pristine northern taiga in Europe. The Siberian spruce, fir and cedar are the dominant species in the forests. Here the key locations of rare species are concentrated, including endemic, species of plants, many of which are included in the national and international Red Books. The most common species in the Park: the northern deer, ermine, elk, wolverine, bear, marten, weasel, white fox. Mink and wild boar were brought here as a result of migration. The forests are rich in wood grouse, black grouse, hazel grouse and ptarmigan. The waters of the park are inhabited by salmon, Siberian grayling, peled, trout, whitefish and other fish.

The gas pipeline "Northern Lights" passes along the southern boundary of the national park. This section of the pipeline and pipeline transportation are within the responsibility of *Gazprom transgaz Ukhta*. An environmental monitoring program of these territories was designed and implemented in the area of the pipeline passage, which is an integral part of the activities of Gazprom pererabotka and Gazprom transgaz Ukhta.

In 2010 "OGK-2" held yearly work to restore ecological community of the Novotroitsk reservoir (Stavropol SDPS) and the reservoir on the River Shelon (Pskov SDPS). Stavropol SDPS took part in the implementation of the Programme "Environmental Rehabilitation of Novotroitsk reservoir in 2010–2012" developed by the Ministry of Natural Resources and Environmental Protection of the Stavropol Territory. Avtovskaya HPS installed and commissioned fish protection facilities.

*Gazprom Neft*, in association with Russian specialists of the World Wildlife Fund (WWF) in 2010 executed the environmental impact assessment of economic activity on the Arctic shelf in terms of threats to the populations of sea mammals in the Pechora Sea, namely:

- identify the most vulnerable species of marine mammals living in the Pechora Sea,
- evaluate the background state of key ecosystem components for the identified vulnerable species of marine mammals, the Pechora Sea,
- identify the main factors of the environmental negatively impact and the types of planned activities for production and transportation of hydrocarbons;
- prepare proposals to minimize adverse impacts on vulnerable marine ecosystems of the Pechora Sea and the conservation of marine mammals and their habitats.

### **ENERGY SAVING**

*Gazprom* has consistently pursued a policy of energy saving and energy efficiency of production processes. This work is being conducted by the Company in a systematic manner using the mechanisms of medium-and long-term planning.

In 2010 the "Energy Saving Program of OAO Gazprom for 2007–2010" was successfully finalized. Implementation provided by its energy-saving measures allowed to save approximately 2.7 MMtce including major activities in 2010:

Business Type	Natura millio	Natural gas, million m <sup>3</sup>		Electricity, million kW•h		Thermal power, Gcal	
	Plan	Fact	Plan	Fact	Plan	Fact	
Transport	1,154.1	2,062.0	127.6	150.4	106.9	89.3	
Production	108.0	216.3	4.7	11.3	6.6	8.8	
UGS	8.95	12.5	0.1	2.1	1.1	1.1	
Processing	22.6	16.9	16.1	17.8	43.1	100.1	
Total *	1,293.7	2,307.7	149.3	181.6	157.7	200.2	

\*including other business activities

The bulk of the energy saving potential was realized in the main gas transmission, extraction and processing of gas, gas condensate and oil.

Savings resulted from the widespread use of innovations.

In the gas transport sectors these innovations related to the equipment for process operations and maintenance eliminating gas loss: technology of gas forwarding from the linear sections of gas mains under repair; technology of gas use for own needs while repairing compressor shops; technology scrubber venting, eliminating the direct loss of purge gas into the atmosphere, as well as a software and computer system for optimization of gas transmission.

In production of natural gas, gas condensate and oil: advanced technology of testing and repair of wells, improved GCU, the effective units of gas treatment, combined technologies of gas utilization, Coiled Tubing Technology.



As per the order of *Gazprom* on Nov. 25, 2009 N $_{\odot}$  399 from 1 January 2010 implementation of energy saving measures and the deployment of more efficient technologies and equipment allowed to establish standards of specific gas auxiliary consumption for the gas production and transportation companies 23% lower than the standards acting in accordance with the order of the Ministry of Energy of Russia from 07.02.2003 N $_{\odot}$  60.

In 2010, the meetings of the Management Committee and the Board of Directors of OAO Gazprom addressed issues of energy-saving technologies implementation in *Gazprom's* program and set objectives to improve energy efficiency and implementation of energy saving potential with the requirements of the Federal Law of November 23, 2009 Nº 261-FZ.

In accordance with these requirements, as well as the requirements of the above mentioned Federal Law and other regulations in 2010 the following was achieved:

- Approval and implementation of a "Program of mandatory energy audits of OAO Gazprom subsidiaries for 2010". Holding of mandatory energy audits of 15 subsidiaries.
- Implementation of activities upon bringing the project documentation for OAO Gazprom facilities under reconstruction and development in compliance with the requirements of the above-mentioned Federal law. Modification of regulation as well as provision of the design documentation expertise for compliance with energy efficiency requirements.
- The decision as of on January 1, 2011 to cease the use of light bulbs of 100 watts or more in subsidiaries.

In 2010, the system wide promotion of Gas Energy Saving in OAO Gazprom subsidiaries was implemented for the first time. The work performance for 2010 within the "Temporal order on gas saving incentive in Gazprom", adopted in late 2009, was finalized and a number of subsidiaries professionals directly involved in the measures implementation were awarded.

The following was adopted in 2010 to develop the corporate policies on energy efficiency and saving: "The concept of energy saving and efficiency of Gazprom for the period 2011–2020."

- (Approved by Order of Gazprom on December 28, 2010 № 364)
- "Energy Saving Program of OAO Gazprom for 2011–2013."

(Approved by the Deputy Chairman of *Gazprom* A.G. Ananenkov December 8, 2010)

"The concept of energy saving and efficiency of *Gazprom* for the period 2011–2020" defined the main tasks for the period:

- maximizing the potential of energy efficiency in all activities of the Company on the basis of public support for energy-saving policy of *Gazprom* and improve power management,
- energy efficiency organizations in *Gazprom* subsidiaries through the application of innovative technologies and equipment,
- ensuring reduction of technogenic impact on the environment.





Targets for energy efficiency of industrial processes in Gazprom for the period 2011–2020:

- reduction of natural gas specific auxiliary use and losses in the main activities of the Company – no less than 11.4%,
- greenhouse gas emission reductions no less than 48,6 million tons of CO<sub>2</sub>-equivalent.

In accordance with the concept, the common technically feasible potential of energy saving for the period through 2020 is estimated at 28.2 million tons of fuel equivalent (Including 25.7 billion m<sup>3</sup> of natural gas).

According to the Energy Saving Program of OAO Gazprom for 2011–2013 the planned indicators of the total cost of FER saving will be 6.4 million tons of equivalent fuel.

## **PREVENTION OF NEGATIVE ENVIRONMENTAL IMPACT**

## PROJECTS ENVIRONMENTAL ASSESSMENT

In strict compliance with the international and Russian legislation companies of *Gazprom Group* assess the environmental impact of planned economic activities at all stages of design – from concept to the investment of construction projects.

Environmental assessment of projects includes a number of stages, the most important of which are Environmental Impact Assessment (EIA) and environmental expertise.

The EIA procedure is carried out by companies of *Gazprom Group* on the basis of engineering and environmental studies in the areas of proposed construction. The research study examines the state of environmental components (air, surface and groundwater, soil and vegetation, wildlife and mineral resources), the level of technogenic impact. The research results provide estimate of the expected impacts of planned economic activity and possible changes in the environment and related implications for society. The obtained data are taken into account when developing design solutions based on the selection of the most environmentally and economically feasible option among available alternatives. In the development projects that affect the scope of the interests of other countries, EIA is carried out in a transboundary context, according to the Espoo Convention.

Since 1994 OAO Gazprom has conducted an internal corporate expertise of projects in prior to the submission of design documentation for the state expertise. Corporate expertise is carried out to improve the quality of design materials of *Gazprom*, including the composition of technological solutions and institutional arrangements that ensure the necessary level of environmental protection. Currently, its procedure is regulated by the standard – STO Gazprom 2-2.1-031-2005 "Regulations on the expertise of design and project documentation in *Gazprom*".

Corporate environmental review conducted by the Directorate for Energy-Saving and Environment of the *Gazprom*' Department of gas transporting, underground storage and utilization at the stage of technical tasks and technical requirements setting for the design of facilities, as well as composing the project documentation.

In 2010, technical specifications and technical requirements for the design of 110 objects of the reconstruction, modernization and construction were exposed to the examination, as well as design and project documentation of 133 facilities of renovation, modernization and construction.

Terms of reference for the design and project documentation of a number of key projects of *Gazprom* were discussed and agreed, such as:

- "Gas supply of the Kamchatka region. Turn Gas Supply to Petropavlovsk-Kamchatsky. Project design for Kshukskoye and Nizhne – Kvakchinskoye condensate fields",
- "Complex target program of modernization, reconstruction and development of automated process control systems for facilities of OAO Gazprom for 2011-2015",
- "Gas Supply of the Kamchatka region". Turn Gas Supply to Petropavlovsk-Kamchatsky. The gas main pipeline of GCTU-2 Nizhnekvakchinskogo GCF-AGRS of Petropavlovsk-Kamchatsky",
- "Expansion of pipeline capacity of Russia Turkey on the section of Izobilnoye Dzhubga to supply gas to the pipeline Dzhubga – Lazarevskoye – Sochi (OTP)"
- "Gas main pipeline Sakhalin Khabarovsk Vladivostok"
- Substantiation of investments into construction of South Stream gas pipeline",
- "The investment plan of creating a large-scale network of CNG filling stations in Europe with the participation of Gazprom, etc".

## ENVIRONMENTAL INSURANCE

The most significant environmental risks of the *Group's Gazprom* are the risks of environmental damage as a result of direct or indirect negative impact, exceeding the permissible level set: emissions of air pollutants and other substances, discharges of pollutants, other substances and microorganisms into the surface of water bodies, underground water bodies and catchment areas, pollution of subsoil, soil, waste disposal and consumption, noise and thermal pollution.

Management of environmental risks is carried out at all stages of the life cycle of the *Gazprom Group* objects from the design to the organization of environmental control and monitoring during construction and operating of facilities. An important element in risk management is the use of best available technologies in the design, technical upgrading and modernization of production facilities.

SOGAZ Insurance Group has implemented and continually improving a comprehensive system of insurance, which provides insurance and environmental risks of *Gazprom Group* environmental reimbursement.

The responsibility scope of SOGAZ on the liability insurance programs of integrated risk insurance for the period from 01.01.2010. to 31.12.2010. accounted for 39 billion rubles, insurance payments for environmental risks of the *Group Gazprom* – 31.5 million rubles.

### INDUSTRIAL ENVIRONMENTAL MONITORING AND CONTROL

In accordance with Russian legislation and the corporate regulations all the companies *Gazprom Group* are subject to regular industrial environmental monitoring (IEM) and production environmental control (PEC).

The system of the *Gazprom* IEM has a high level of technical equipment, which include stationary and mobile laboratories, meteorological and aerological control posts, automated control posts and monitoring wells.

*Gazprom* has operated and integrated the automated PEC systems in its facilities into the dispatch control. In some cases the PEC systems, which enable to provide a current environmental status assessment, are integrated into the systems of regional environmental monitoring.

The corporate environmental system is designed to monitor: pollutant emissions from organized sources, air quality within the sanitary protection zone and settlements, noise impact, quality of underground and surface waste and domestic water, geological and soil cover status. The rules, procedures and peculiarities of the environmental monitoring system operation are regulated by the industrial and legal documents, including the internal guidelines of *Gazprom*.

In 2010 *Gazprom* invested 1,025 million rubles into its industrial environmental monitoring and control.



Development of automated systems for PEM is provided by the design documentation for construction of gas pipelines: Yamal – Europe, SRTO – Torzhok, North-European Gas Pipeline (on the site Gryazovets – Vyborg), Altai, Pochinki – Gryazovets, Bovanenkovo – Ukhta, Minsk – Vilnius – Kaunas – Kaliningrad, as well as the development of the Bovanenkovo, Yamburg and Polar oil and gas and the Shtokman gas condensate fields (justification of investments).

By 2015 Gazprom kosmicheskie Systemi is planning to deply the existing satellite communication system "Yamal" and Space Information System "Yamal", which will also include a system of LEO satellites and space-based surveillance Smotr. The objectives of the Smotr System, will be not only to control the technical state of pipelines and infrastructure, exploration, accounting and control property, land use, cadastre, etc., but also detecting and monitoring processes that threaten the safety of facilities, monitoring of emergency situations and to assess environmental damage caused by accidents and natural disasters.

Industrial Environmental Control held at the level of each subsidiary, in addition to the level of *Gazprom* established and successfully operates a specialized body – the Environmental Inspection of OAO Gazprom.

In 2010, the Environmental Inspection of OAO Gazprom worked in the following areas:

- monitoring of compliance with the requirements of Russian environmental legislation, corporate rules and regulations for the protection of the environment subsidiaries and contractors working on major capital construction object organize
- internal audits of environmental management system within to the improvement of the Gazprom EMS,
- methodological support of environmental organizations and subsidiaries of *Gazprom*, including advisory on environmental legislation,
- interaction with government controls and oversight in the field of environmental protection.

In 2010 Environmental Inspection, *Gazprom* held 631 inspections in 56 subsidiary companies and organizations, which is 24% more than in 2009, including: in 7 gas production, 17 gas transmission companies, 18 subsidiaries of Gazprom UGS, the production objects Gazprom drilling, Gazprom energy, Gazprom pererabotka, Novourengoysky GCP and 26 other affiliated organizations (LLC Gazpromregiongas, Gazprom Avia, Gazprom szhizhenny gas and etc.). A total of 11,373 *Gazprom* industrial facilities were inspected.

As a result 414 acts were issued, and the results of audits with recommendations for improving environmental performance were presented to the management of the audited organizations.

The total number of violations detected in all operation objects in 2010 decreased by 6% if compared with 2009 and by 20% in the gas transport companies of OAO Gazprom.

*Gazprom* pays much attention to compliance with environmental legislation and standards for the Company's construction of subcontracting organizations. In 2010, the Environmental Inspection made 76 inspections (2 times as many as in 2009) of construction projects and major repairs of unified gas supply system (UGSS) of *Gazprom*, including gas pipelines Pochinki – Gryazovets, Bovanenkovo – Ukhta North-European gas pipeline, Sakhalin – Khabarovsk – Vladivostok, "Unit-2 of Nizhne-Kvakchikskogo GCF – AGRS of Petropavlovsk-Kamchatsky, objects Development of

Kshukskoye and Nizhne-Kvakchikskoye condensate fields, Construction of the enomanian-aps deposits of Bovanenkovskoye NGKM on Yamal peninsula and other construction projects and major repairs.

## STATE ENVIRONMENTAL CONTROL

As a result of the 2010 inspection by authorized state bodies in the field of environmental protection, including the Federal Service for Supervision of Natural Resources, the Federal Agency for Fisheries, the Federal Agency for Water Resources, Environmental Prosecutor Office and others, no major violations of environmental legislation of the Russian Federation on the part of *Gazprom Group* companies were revealed.

Total fines paid were 1.8 million rubles (10% less than in 2009). *Gazprom Neft Group* paid 531 thousand rubles, TGK-1 – 276 thousand rubles. Fines paid by subsidiary companies and organizations of *Gazprom* for violations of environmental protection in 2010 amounted to 557.5 thousand rubles, which was 239 thousand rubles less than 2009.

In 2010, at the sites of *Gazprom* subsidiaries 32 state control inspection were held, during which 143 violations were revealed, of which 70% were challenged in courts. A similar situation arises in cases not regulated by environmental laws and requires solutions at the state level. All violations identified during inspections of state environmental agencies and not contested in court, were eliminated by the due date.

For the Environmental reimbursement Group Gazprom paid 15.9 million rubles, including:

OAO Gazprom Neft – 14,2 million rubles for the environmental damage resulting from oil spills on Vyngapurskoye oil field; 34 thousand rubles for destruction of soil-cover,

OJSC "TGK-1" – 1.2 million rubles for exceeding the oil concentration in the discharge to the river Krasnenkaya from Avtovskaya CHP,

JSC "Gazprom dobycha Nadym" – 347 thousand rubles (for unauthorized air emissions of harmful pollutants in the accident at the well № 114 Yamsoveyskoye GC field, LLC "Gazprom dobycha Nadym").

## FINANCING OF ENVIRONMENTAL PROTECTION

*Gazprom Group* has been increasing funding for environmental protection. In 2010 these costs amounted to more than 20.5 billion rubles, which was 1.6 billion rubles more than in 2009 due to growth of investment in fixed capital by 22.5% and increased costs for overhaul of fixed production assets of the Environment by 29.1%. The largest contribution to the funding is provided by *Gazprom*.

Gazprom Group investments in environmental protection, million rubles							
	2008	2009	2010				
Current expenditure on environmental protection							
Gazprom Group	17,162.25	10,376.47	10,289.84				
including Gazprom	6,598.10	6,141.97	6,577,51				
Costs for major repairs of basic production assets of the environmental protection							
Total, Gazprom Group	1,428.77	962.68	1243.22				
including Gazprom	879.68	728.15	1,068,08				
Fixed capital investments aimed at environmental protection and rational use of natural resources							
Gazprom Group	3,493.70	6,323,59	7,744.44				
including Gazprom	2,497.99	5,649.77	6,171.90				
The fee for a negative impact on the environment							
Gazprom Group	2,678.80	1,218.41	1,234.38				
including Gazprom	647.44	616.22	426.92				
Total funding							
Total, Gazprom Group	24,763.52	18,881.15	20,511.88				
including Gazprom	10,623.21	13,136.11	14,244,41				

The main contribution is made by: Gazprom - 80%, energy companies of  $Gazprom \, energo-holding - 14\%$ .



The funding of 2050.30 million rubles allocated for protection and rational use of land was aimed at; air protection – 499.07 million rubles; land protection from waste (construction of facilities and sites for waste disposal) – 656.79 million rubles; land security and rational use – 2050.30; protection and reproduction of fish stocks – 114.43 million rubles. The largest investments were made in the protection and rational utilization of water resources – 4423.84 million rub.



The current year's expenditures for environmental protection include *Gazprom Group* payment for protection and rational utilization of water resources, which made 5,768.67 million rubles (56%), air protection – 1,658.21 million rubles (16%), environmental protection (land resources) from industrial and consumer waste – 1,806.7 million rubles (18%) for the remediation of land – 1,056.27 million rubles (10%).

The amount of payment for negative impact on the environment of *Gazprom Group* on the whole, compared with 2009 slightly increased, mainly due to increase payments of *Gazprom energoholding* as a result of increasing energy production and use of ash and sulfur-intensive coal fuel at a number of plants.



On the whole the *Group's* structure of payment for negative impact on the environment is dominated by waste disposal – 685.01 million rubles.; the payments for air emissions are made to the budgets of different levels – 409.31 million rubles; for waste water discharge – 140.05 million rubles.



The payment for excessive impact *Gazprom Group* proved to originate from the lack of permits for waste water discharge (126.8 million rubles) and disposal of industrial and consumption waste (100.4 million rubles.). It was in some cases associated with long periods of standards pending and issuing by government authorized agencies, of permits for emissions, discharges and waste disposal.

In 2010, the amount of payment for negative impact on the environment in subsidiary companies and organizations of *Gazprom* was 426.7 million rubles, which was 189.5 million rubles (30.75%) lower than in 2009. This was reached by means reducing the excessive (exceeding the limits of payments) by 140.8 million rubles. (2009 – 201.02 million rubles). The fine for exceeding the standards of the negative impact on the environment was mainly associated with delayed clearance of the permits and the lack of a clear legal restricting regulation and permitting of waste water discharges to the terrain.

The payment for excessive impact decreased in comparison with 2009 for *Gazprom Group* by 102.5 million rubles, for OAO Gazprom by 140.8 million rubles.

## SCIENTIFIC AND TECHNICAL FRAMEWORK OF ENVIRONMENTAL PROTECTION

### **RESEARCH AND DEVELOPMENT**

Implementation of technical and technological innovation, solving urgent environmental problems of industrial activity in the *Gazprom Group* companies is based on researches conducted by leading Russian scientific organizations. Among them are respected industry research and design institutes, such as VNIIGAZ, NIIgazekonomika, Podzemgazprom, VNIPIgazdobycha, Promgaz, SevKavNIPIgaz, TyumenNIIgiprogaz, Giprogaztsentr, Giprospetsgaz. *Gazprom Group* companies have long-standing scientific relations with the Russian Academy of Science, Moscow State University n.a. M.V. Lomonosov, Tyumen State University, Russian State University of Oil and Gas n.a. I.M. Gubkin, etc.

At the joint meeting of the Presidium of the Siberian Affiliate of Russian Academy of Sciences and Gazprom (Nadym) devoted to the prospects of implementing the scientific development of academic institutions for integrated development of the Yamal Peninsula, *Gazprom* once again stressed that the implementation of major strategic projects, such as the mega-project "Yamal", focuses on the widespread use of innovative technologies and the latest energy-saving equipment to improve environmental safety and energy efficiency in the region.

In 2010 the company launched the program of scientific and technical cooperation for 2010–2012. signed by *Gazprom* and the Administration of Yamal-Nenets Autonomous District. The program provides a series of environmental measures in developing oil and gas fields on the Yamal Peninsula. The program includes annual complex ecological and technological expeditions, among which "Yamal-2010" was held.

The expedition was participated in by representatives of *Gazprom VNIIGAZ LLC* and a number of specialist from other leading institutions: the Institute of Environmental Geoscience RAS (Moscow), State Hydrological Institute, "GU SHI (St.-Petersburg), OAO SibNATs "(Tyumen), etc.

The aim of the expedition was to determine the level of anthropogenic impact on the environment and test technologies for the rehabilitation of degraded and contaminated lands. During the expedition a number of tasks were executed:

- study the hydrological regime of the territory Bovanenkovskoye OGC field, the intensity of hazardous permafrost processes, complicating the extraction and transport of hydrocarbons in the Yamal Peninsula in the area of operations of *Gazprom* and adjacent to the peninsula area of the Kara Sea,
- test of technology and recovery activities degraded and contaminated land Bovanenkovskoye field group of *Gazprom*, the measurements of noise from equipment, vehicles and construction equipment and analysis used schemes and technologies for waste management.

The research resulted in the forecast of the dynamics of climate and permafrost conditions of the territories of priority development of the Yamal Peninsula, the modern environmental maps of disturbed and contaminated land, proposals on the optimal scheme of waste management system, prioritizing criteria and ecological – economic substantiation for selecting pilot sites of remediation.

In addition, a comprehensive monitoring was conducted for the corridor route Bovanenkovo – Ukhta, including an assessment of the current environmental conditions (weather, ice, permafrost, hydrology), the state of natural ingredients (water environment, land cover, wildlife, marine mammals, including protected species), background concentrations of pollutants in the corridor route, thermal effects on the permafrost, etc.

*TyumenNllgiprogaz* in 2010 held engineering and environmental surveys on the first site Achimov of Urengoyskoye OGC field, Novyurengoyskoye, Vostochnourengoyskoye and several other fields. The obtained data were used to develop sections of EIA, including the characteristics of the modern

environment around the objects under development; possible impact on the environment taking into account the features of the object, calculation of damages to land users in the agricultural lands, forests, wildlife, wild plants, etc.; forecast changes in the future and measures to minimize impacts on the environment.

*Nilgazeconomika* in 2010 developed a list of corporate fixed assets used in environmental protection (STO Gazprom). Another focus of the institute was made on searching the modern method of assessing the economic efficiency of gas saving performance using the performance of investment projects, as well as the determination of the economic benefit of gas savings in the production chain: production, transportation, storage, processing and distribution of gas. As a result of these studies the methodology of calculating the economic effectiveness of measures to reduce gas losses in *Gazprom* was prepared.

*Podzemgazprom* within its research and development designed a normative documents regulating the monitoring of the degradating environmental impacts during construction and operation of underground storage facilities in salty reservoirs and permafrost rocks.

*NPC Podzemgidromineral* analyzed modern practice of alternative and renewable sources of energy saving purposes; studied and designed the technology of micro clearing of methanol content water flows from condensate fields. The company gave the techno-economic evaluation of extraction of rare and precious items from the associated and underground waters of *Gazprom* oil fields; the entity developed: technological rules for designing pilot production for the joint development of residual hydrocarbons and formation of industrial water, a feasibility study of joint production and development of residual hydrocarbons and the formation of industrial water; developed technical solutions and recommendations to reduce the level of ground water at the sites of preparation and transportation of gas in the *Gazprom* system.

Within its R&D program *Gazprom dobycha Astrakhan* methodological basis for calculating emissions and the project assessment procedure to assess dust emission of sulfur from the processes of production, storage, loading-unloading and transportation.

As a result of its research *Gazprom dobycha Orenburg* developed basic technical solutions to reduce harmful emissions into the atmosphere and reduce the preparation time of the process equipment for preventive maintenance (under adverse weather conditions), suggested ways of gas utilization technology during the outage, implemented as a mobile degassing unit.

*Gazprom dobycha Yamburg* held geo-ecological research, which resulted in the development of systems for assessing and monitoring the environmental situation in relation to the impact on ambient air in the Far North, formulated methodological approaches and the main criteria for retrospective evaluation of prospective geo-ecological situation in the area of Gazprom dobycha Yamburg, created software for the calculation of greenhouse gas emissions.

Based on the technical documentation of *Gazprom transgaz Yekaterinburg* ZAO Uromgaz developed a prototype natural gas liquefier for the production of LNG as motor fuel for diesel locomotives of the Sverdlovsk Railway.

Special vehicles with modern in-line gas engine for repair welding on the gas pipelines and the transportation of passengers (Ural-4320-1912AP, URAL-3255AP) were manufactured. The company prepared technical and design documentation for the creation of mobile platforms for gas supply facilities in Minsk during the repair work, as well as tubeless supply of settlements in areas with poor power and transport infrastructure. These technical solutions were aimed at making air emissions of nitrogen oxides and carbon, sulfur dioxide 1.2–3.5 times as low, eliminating emissions of soot and coal ash.

As part of research performed by order of *Gazprom transgaz Saratov*, a study of oil contamination removal efficiency for the soil (in the CS "Severnaya-1") was executed using a biological product based on immobilized porous carrier glass phosfatic association of microorganisms-degraders of hydrocarbons. The laboratory analysis and field experiments showed high effectiveness with the oxidation-prone heavy hydrocarbon fractions.

The research-based analysis of the impact on ambient air of methane emissions in the area of *Gazprom transgaz Stavropol* production facilities allowed to develop a normative document "Organization of production control sources methane emissions from gas transport company".

*Gazprom transgaz Surgut* developed recommendations for the gas transmission companies to reduce GHG emission as per the results of the correspondent research, as well as made the forecast

of greenhouse gas emissions by 2012 and compiled a list of priority actions to stabilize and reduce GHG emissions.

*Tomsk Gazprom* (Gazprom Vostok Group). The research carried out in order to reduce production waste by means of utilization resulted in the technical conditions for a product of environmental purposes (sludge-peat soil and sludge-peat-soil mixture). The company set rules of mixtures usage for revegetation of forest areas damaged during construction, registered in accordance with the preset procedure.

*Gazprom Neft* held research and development of new technologies for the remediation of contaminated lands and sludge pits considering the specific landscape, biochemical conditions and economic costs; decontamination technologies for remediation of drill cuttings slurry ponds, creation of mobile systems for recycling waste of oil and gas extraction; developed project of reconstruction of the landfill and industrial waste on the South side of Priobskoe (PIR) field, made the environmental assessment in the fields of Gazpromneft-Khantos and affiliated "Muravlenkovskneft."

In 2010 the company held a geo-ecological research of the territory around JSC Moscow Oil Refinery and water protection zone of the Moscow river. The results of this research, allowed to obtain reliable data on subsurface accumulations of hydrocarbons to determine the best technologies for the rehabilitation of contaminated territories. The development of a comprehensive rehabilitation program for contaminated territories of Moscow Oil Refinery and the protection zone the Moscow river was launched.

Together with scientists of Tyumen State University Gazpromneft-Noyabrskneftegaz plans to implement a project to create a fundamentally new technology in environmental management, which will make the production virtually waste-free, ie supposed to create a mobile facility for processing all types of waste.

*Gazprom Group* has an effective system of managing and implementing scientific and technological activities and has a considerable experience in creating innovative resource-saving and energy efficient technologies.

## DEPLOYMENT OF THE ENVIRONMENTAL PROTECTION TECHNOLOGIES AND EQUIPMENT

Environmental security of the *Gazprom Group* activity is largely determined by the intensity of technological and technical solutions application in the basic production process, so one of the most effective tools to manage the impact on the environment and one of the *Group* the priorities is the modernization of production facilities and energy efficiency.

In its subsidiary companies and organizations of *Gazprom* the Group implemented comprehensive programs for reconstruction and technical re-equipment of gas production until 2010 and the reconstruction and modernization of gas transportation facilities, booster compressor stations and compressor stations, underground gas storage for the period 2007–2010. Program included the replacement of obsolescent gas production and transportation equipment with modern designs, the introduction of automated control systems and optimization of both individual objects and the system at large. In 2010 "Energy Saving Program of OAO Gazprom for 2007–2010" was successfully completed, it was developed as per the concept of energy efficiency of *Gazprom* for the period 2001–2010.

In 2010 the company developed a block of new corporate programs such as a comprehensive program of reconstruction and technical re-equipment of gas production facilities for the period 2011–2015, comprehensive program of reconstruction and modernization of gas transportation facilities, BCS and CS of gas storage in 2011–2015., overhaul repair program for gas production of OAO Gazprom in 2011–2015. etc. A special emphasis here is made on the Integrated Environmental Programme of OAO Gazprom for the period 2010-2014.

OAO Gazprom in 2010 introduced the technical and technological solutions aimed at reducing emissions of pollutants into the air (including reducing gas consumption for its own needs and

technological losses), reducing the noise from compressor stations (CS), and others; continues the implementation of low emission combustion chambers PST on GCU with the nitrogen oxide range of 50 mg/Nm<sup>3</sup>, which corresponds with the best foreign achievements. In order to reduce the discharge of inadequately treated waste water the company built new and upgraded existing sewage treatment facilities.

*Gazprom dobycha Astrakhan* in order to improve the integrated management of the raw material, ensure industrial and environmental safety carried out work on reconstruction of AGCC. In order to improve the environmental performance of the fuel the company implemented the project "Expansion of sites NoNo3, 6 of gas condensate processing at the gas processing plant."

*Gazprom dobycha Krasnodar* in two gas field offices implemented new multi-component composition of the surface-active substances, which allows more efficient removal of the fluid from the well and to reduce the potential emissions of the gas in the atmosphere; installed modern boilers modification, which results in the used thermal energy savings.

*Gazprom dobycha Nadym* took large-scale measures in the construction of nature conservation and implementation of new technologies to protect environment in the areas the Yamal Peninsula fields. Costs for construction of nature conservation objects made 2,623.521 million rubles.

Among measures reducing negative impacts on air were:

- introduction of resource-saving technology of columns heating in operating gas wells after prolonged inactivity or maintenance. In August 2010 this allowed to restart the entire well fund (103 units) after stopping the gas field without release of natural gas in the atmosphere.
- the introduction of advanced technology of researching wells "Function of Influence", with which half of the fund of production wells were exposed to annual gasdynamic research. Environmental effect expressed in reducing natural gas emissions into the atmosphere by an average of 60% per well.
- gasdynamic technology change log for geophysical studies without release of natural gas in the atmosphere – measurements were made at 10 wells in the operation in the plume-gas pipeline. Modernization of drainage system condensate from process plants, followed by burning at the gas-flare industrial waste water from the steam boiler enabled to reduce discharges to the industrial

sewage, stop dumping sewage into the river Hae-Yaha and eliminate the need to use this water body.

The cost of nature conservation objects were more than 2.6 billion rubles.

*Gazprom dobycha Noyabrsk* embedded well control devices on meters without releasing gas in the atmosphere and the automated gas leakage control system. The company replaced heating unit the block of TEG fire regeneration, and renewed replaceable flow parts of five GCU.

*Gazprom dobycha Orenburg* within the program of technical re-equipment of gas production facilities of Orenburg oil gas and condensate field carried out reconstruction of treatment facilities with the creation of closed drainage water management system for Orenburg gas processing plant, which reduced the discharge of nitrates from the sewage plant.

*Gazprom dobycha Urengoy* in 2010 reduced mass emissions of pollutants into the atmosphere by 58%: the construction of CS-1,2 decreased carbon dioxide emissions related to APG burning in flares by 104.5 thousand tons; improving of the hydrocarbon fuel burning efficiency enabled to reduce emissions of carbon monoxide from BCS; the company reduced natural gas releases into the atmosphere during the wells research. Improving the efficiency of sewage treatment ensured reduction of suspended solids and sewage.

*Gazprom dobycha Yamburg* for the purposes of energy saving and reduction of environmental impact took measures to optimize gas equipment - routine-testing and commissioning of gas burners of diethylene glycol regeneration unit, boilers and gas burners water pumping, water storage tanks.

*Gazprom transgaz Volgograd* to reduce emissions of nitrogen oxides resultant from GCU operation installed 4 sets of low-emission combustion chambers PST-GTK-10 and on GCU GTK-10, to reduce methane emissions from the linear part of gas pipeline in Volgograd and Rostov regions the company made welded joints instead of tie-coils.

With the use of modern equipment supplied by TD "Williamson" *Gazprom transgaz Yekaterinburg* made more than 40 hot tappings without venting and stopping the transport of gas on pipelines. It projected the optimization of the functioning of the gas transportation system and efficient use of fuel gas for gas compressor by means of a computer software "Astra". The company is constantly improving technology of the linear part of gas pipeline repairs while minimizing the gas venting

through the bypass in the low-pressure and consumer network. In 2010, in order to detect possible leakage of natural gas a number of helicopter surveys of gas mains and branch pipelines was conducted using laser methane detector "DLS-Pergamum". All identified gas leaks on the linear part of the pipeline were eliminated.

*Gazprom transgaz Kazan* in order to reduce methane emissions into the atmosphere replaced obsolete equipment and introduced a range of modern technologies: forwarding to the low-pressure gas network; hot tapping on gas distribution pipelines, automation of gas heaters on the GDS and the optimization of transport regime of gas by reducing the number of GCU along the gas mains, running a constant volume of gas transported; replacement of obsolete boilers with modern equipment.

*Gazprom transgaz Makhachkala* optimized gas heaters operation of the GDS, thereby reducing gas consumption during repair work and lowered the temperature of gas ourtlow. The company also held a helicopter survey of the gas pipeline technical condition with a laser detector of gas leakage.

*Gazprom transgaz Nizhny Novgorod* executed major overhaul of sludge beds of sewage treatment plants KOS-600 in the Volga LPUMG and preventive maintenance of KOS-100 in Pochinkovskoye LPUMG; the power lines are equipped with bird protection devices in Morkinskoye, Semenovskoye, Penzenskoye LPUMG.

*Gazprom transgaz Samara* replaced engine NK-36 with a two-zone combustion chamber in Toliatti LPUMG to reduce emissions of pollutants into the atmosphere, installed 2 sets of burners PST-100-03 on the GTK-10-4 at the Pavlovskoye LPUMG, conducted routine-commissioning of gas heaters and boilers in the Srednevolzhskoye GDS and Ulyanovskoye LPUMG, continued work on vehicles switching to gas fuel.

*Gazprom transgaz Saratov* reduced emissions by 30.4 kilotons by replacing the lamellated regenerators with the tube ones at GTK-10, replacing the burner chambers of fuel gas pre-mix in compressor units, replacing of the suction chamber for an integrated air scrubber and replacing blocks of odorization. In order to reduce industrial and environmental risks executed an overhaul of underwater passages of the rivers Volga and Irgiz

*Gazprom transgaz Stavropol* forwarded gas into the low-pressure gas network in all LPUMG. In Astrakhan LPUMG for repairing the pipeline composite joints were used, which allowed to reduce methane emissions. Optimization of the boilers and gas heaters to GDS by carrying out repair and commissioning and use of secure cards enabled to reduce emissions of nitrogen oxides in the atmosphere. The company converted 28 units to natural gas.

*Gazprom transgaz Surgut* to prevent emergency situations, including environmental impacts on the pipeline, repaired four underwater passages, reisolated 87.9 km of gas pipeline with partial replacement of pipes (19.9 km) and the eliminated defects (16,545 pcs) identified during the in-line inspection. To reduce the impact on water resources the following was done: overhaul repair of waste water treatment "Biodisk" installation of the rotational residential complex (RRC), testing and commissioning of the installation of waste water treatment "Biodisk-350" and reconstruction of the RRC treatment facilities. The company performed tests of 20 sets of water deferrization installation "Galvatek". The cost of vehicle conversion to gas made 1.15 million rubles.

*Gazprom Transgaz Tomsk* in accordance with the reconstruction program through 2012 is planning to upgrade six electric drive compressor stations, which will be one of the most modern facilities of gas transport units in the system of *Gazprom*. In 2010, the replacement of two gas compressor units type IPD 4000-2 with oil seals with the new Electric Curtain gas pumping units (EGPA 4,0 / 820-56/1, 26-P) resulted in a decrease of gas flow on degassing vents of oil seal centrifugal compressors. During the year, the technologies of gas evacuation from the pipeline were applied during scheduled preventive work. In order to protect underground water sources the sites of Volodinskaya and Parabelskaya were reconstructed.

*Gazprom transgaz Ufa* installed ventilation filter systems to remove welding fumes and removal of aerosols from soldering, mounted the extraction systems for the collection of wood waste and installed dust control unit.

Gazprom transgaz Ukhta achieved optimization of the gas distribution in the GTS by the use of software and mathematical systems "Astra" and "Agate." To reduce emissions of nitrogen oxides in combustion products of gas turbine GCU in 2010 the company installed 12 low emission combustion chambers (SCC-10-4, SCC-10IR, GT-750-6) in its six subsidiaries and reconstructed shop № 4 of CS-11 with the installation of two gas compressor units GTK-10-4-16 GTNR-16, which are

specifically designed to eliminate any gas venting from the compressor contours at start up/shutdown. Additionally, the unit can be used in cogeneration schemes, which significantly improves the environmental and energy efficiency characteristics of the equipment of the CS, provides savings of natural gas. The reconstruction of the shop number 1 of the CS-22 Babaevo resulted in replacement of five GPA-C-6, 3 with three more powerful units C-10 B, which will reduce the per unit emissions of nitrogen oxides and carbon monoxide. The lamellated regenerators of GCU GTK-10-4, GT-750-6 at CS-3, 11,16 were replaced with tubular ones, which will increase the capacity of gas turbines and increase the efficiency of GCU. The steel welded joints were used for the repair of linear sections of gas mains avoiding gas venting into the atmosphere.

*Gazprom transgaz Tchaikovsky* removed ball valves leaking taps to reduce methane emissions into the atmosphere in all its subsidiaries (LPUMG), using modern sealants and equipment. In Almaznoye LPUMG it upgraded metering rate and gas quality control. To reduce water consumption in Kungur and Votkinsk LPUMG the company installed electromagnetic devices of the type "Vzlyot."

*Gazprom transgaz Yugorsk* applied advanced technological solutions to reduce methane emissions into the atmosphere: part of the gas bypass from the pipeline under repair, gas reuse for own needs of the compressor workshop (CW), the use of gas released from during the CW scheduled preventive repair, optimizing the distribution of gas, centralized operational control and management of major and subsidiary facilities. As a result of these actions the company prevented the loss of natural gas of 342,492.1 thousand m<sup>3</sup> (in terms of methane – 232,894.6 tons). Environmental effects in monetary terms amounted to 42759.4 thousand rubles.

The *Omsk Refinery* (*Gazprom Neft Group*) set new product and raw material storage tanks, equipped with modern aluminum pontoons, which reduce hydrocarbon emissions into the atmosphere. In 2010, the company commissioned light naphtha isomerization unit "Izomalk-2". The deployment of this unit is of great importance to *Gazprom Neft*. The main goal is to increase the production of gasoline that goes in compliance with requirements of Euro-4, Euro-5.

Power generation companies *Gazprom energoholding* carried out a large range of activities with significant environmental and energy-saving effect.

*Mosenergo* in accordance with the Company's investment program for 2010, introduced new technologies and equipment to reduce emissions, discharges, noise impact of TES of Mosenergo. These include:

- introduction of staged combustion technology for power boiler (EK-6) CHP-26;
- introduction of noise attenuation on the main safety valve of the three boilers (EK-3, 4 of CHP-7, EK-5 of CHP-17), on exhauster of two boilers EK-8 CHP-21, EK-21 of HPP-1 in suction blast fans of four boilers (EK-7, EK-8, EK-9 of CHP-12, EK-5 of CHP-26),
- reconstruction and adjusting neutralizers of wash water regenerative air heaters and water regeneration of chemical water treatment – in three subsidiaries (SDPS-3, CHP-20, 26),
- introduction of emission control devices on 7 power boilers (EK-4 of HPP-1, EK-3 of CHP-7, EK-7 EK-8 of CHP-9, EK-9, EK-10 of CHP-12, EK-6 of CHP-21),
- introduction of control metering devices for water intakes at CHP-9 and CHP-12.

*OAO "OGK-2"* performed a replacement of dust extraction units on the station boilers Ne Ne 1A, 2A, 5bl at Troitskaya SDPS, reconstruction of electrostatic precipitators on the blocks st.N7 and N4, scrubbers of boiler unit ZB. At the Serovskaya SDPP the execution of overhauls of dust extraction units at two power boilers (Ne Ne 5, and 7) resulted in reducing the emissions of coal ash by 93.7 tons. At the Surgutskaya SDPS-1, the company reconstructed the gas supply system and installed co-current low-emission burners type GMPV-50 (AMAKS) and achieved reduction of pollutant emissions into the atmosphere by 8% compared to 2009 year as well as preserved the power generation by optimizing the fuel combustion process.

*OAO OGK-6* in the Novocherkassk SDPS a technical re-installation of dust extraction unit of the block 5 (house 5 "A") improved its efficiency from 98% to 99.2%, decreased the emission of ash into the atmosphere, increased the reliability of gas treatment equipment. At Krasnoyarsk SDPS-2 the waste water discharge was reduced in 2010 by means of repairing the sewage treatment unit for oily waste water, as well as took measures to clean up water-protection zone, pontoon traps in industrial storm water drainage ditches and mountain ash – sludge pile.

OAO TGK-1 stopped dumping sewage into open water bodies through deployment of recycling and drain-free water supply at Pravoberezhnaya CHP. At the Cascade of Vuoksinskiye HPS two hydropower units with total capacity of 60 MW were put into operation, which enabled a twofold reduction of engine oil consumption and reduce the diversion of water for technical needs of 30 % because of lower regulatory leakage through the turbine blades.

### **GAZPROM PRIZE IN SCIENCE AND TECHNOLOGY 2010**

In order to stimulate the development and introduction of new technologies, *Gazprom* awards annually a corporate prize for science and technology. The Evaluation Committee reviews the research, design and development activities in priority areas of extraction, transportation, storage, processing and use of natural gas, which end up with creation of (improving) and effective application of OAO Gazprom of new equipment, instruments, equipment materials, etc. As a general rule, most scientific and technical works nominated for the award should reflect both economic as well as the ecological benefits.

In 2010, Gazprom Prize for Science and Technology was awarded for:

Development and deployment of a centralized modeling and optimization system for Gazprom gas transport systems, based on software complex "Astra-gas"

Supervisors: B.S. Posyagin (Gazprom), A.L. Kutyrev, D.N. Levitsky, V.N. Tsybul'nyk (Gazprom razvitie), V. G. Gerke, V. Yu. Podmarkov, V.V. Rubel (Gazprom), V.A. Grabovets, O.A. Stepanenko (Gazprom transgaz Samara) V.N. Vishnyakov (Gazpromtsentrremont)

Result: a unique vertically-integrated information management system of dispatch control of complex multilevel transmission system (GTS), a superior performance to all of the most well-known foreign analogues. The development was implemented at all levels of *Gazprom* dispatch control, it covered more than 10 thousand objects in each gas transport facility, with a detailed scheme of gas supply to a separate crane platform. A single information space provides an effective coordination of dispatching services in the operational management of process equipment in the full-time contingencies and emergencies. Implementation of this system reduces operating and environmental risks at gas mains.

Improving the technology of hydrocarbons extraction from natural gas at the helium plant of LLC "Gazprom dovycha Orenburg"

Supervisors: A.N. Mokshaev, A.A. Bryukhov, N.N. Gesko, A.V. Isaev and D.V. Panteleyev (LLC "Gazprom dobycha Orenburg"), N.N. Kislenko (Gazprom razvitie), A.N. Bessonov, G.I. Fedorov (LLC LENNIICHIMMASH)

In order to increase production of the most liquid and expensive hydrocarbon products, improve quality and reduce production costs the helium plant of Gazprom dobycha Orenburg stepwisely solved the problems of natural gas treatment technology optimization, its liquefaction and fracking. Modernization of natural gas cooling, the introduction of a new method for the regeneration and cooling of zeolites in the adsorption process provided an increase in process equipment productivity and reduction of operating costs. Resource-saving effect achieved through the ability to obtain additional commercial product – helium, ethane, NGLs.

### Decision support system for operational dispatch management of Gazprom mining Urengoy field collector

Supervisors: S.V. Sorokin, S.V. Bondar, M.G. Yarullin (Gazprom dobycha Urengoy), V.V.Nikanorov, A.M. Paramonov, V.N. Shashukov (Gazprom), L.I. Berner, Yu.M. Zeldin, A.V. Roshchin (ZAO Atlantic TransgazSistema), N.V. Dvoryanchikov (OAO "Gazavtomatika")

Result: a fundamentally new information decision support system for management of complex gas transportation facilities – infield collector (IC) of Gazprom dobycha Urengoy.

The system provides a comprehensive multivariate analysis of the IC operating mode and automation of identifying a contingency or emergency, which allows significantly reduce the time to localize emergency site, minimize the loss of gas, increase production and ecological safety of the operation of gas-condensate fields in the region.

# **GAZPROM KEY PROJECTS AND ENVIRONMENTAL PROTECTION**

Issues of environmental security in the key projects of *Gazprom* refer to the corporate priorities. The following projects are already underway.

*Yamal megaproject* – exploration of Bovanenkovskoye GC field and construction of the GTS Bovanenkovo– Ukhta.

Design decisions completely excluded discharge of sewage into streams, provides gas radial system collecting from the well clusters and a number of technological activities at the facilities of the main transport, aimed at significantly reducing greenhouse gas emissions. Special technical solutions were developed to implement the methods for safe disposal of waste, preservation of permafrost stability. Actions were taken to protect biodiversity, including technical and biological reclamation of land; avoidance of the construction during the spring nesting birds, the use of fish protection devices during water withdrawal from surface sources, ensuring the natural migration of reindeer herds by means of special passages across the linear communication. A specialized information system "SIS-Yamal" was designed, which contains blocks of information that to find the optimal solution for the environmentally oriented design, construction and operation of Bovanenkovo OGC field infrastructure facilities and gas pipelines. "SIS-Yamal" allows to exchange data with other information systems, using new data for the mathematical modeling of the possible environmental impact of engineering facilities.

The *Nord Stream project* designed to fit the specifications of this unique region and will be built using proven environmentally friendly technologies.

After the launch of the two threads the Nord Stream will be the most powerful offshore pipeline system in the world. By the operators have estimated 55 billion cubic meters of gas will be transported through the pipeline each year, which is an equivalent of 280 additional tankers of oil and 600–700 tankers carrying liquefied natural gas. In terms of electricity – 50 coal-fired power plants, 39 nuclear power plants, more than 10 thousand square kilometers to accommodate facilities for wind turbines and 320 thousand square kilometers of cornfields for the production of biofuels – an area that is over 8 times the territory of the Netherlands.

Before the start of construction work a detailed and comprehensive environmental impacts assessment was carried out. In late 2009 – early 2010 all necessary permits were obtained, and in April 2010 the project moved to the implementation stage – pipes laying on the seabed began.

The construction of the Nord Stream is carried out in compliance with the strictest environmental standards. Simulation results showed that the produced dredging will not have a significant impact on the marine ecosystem due to the relatively high rate of sedimentation of suspended solids. As part of the environmental monitoring program, Nord Stream monitors water quality before, during and after work in order to confirm the simulation results and to comply with permits.

Plough towage for the pipeline trenching is being carried out by a special vessel «Far Samson», recognized in Norway as "The Vessel of 2009", the installed energy-efficient hybrid propulsion system, and engines equipped with catalytic converters, which reduces nitrogen oxide emissions by 95%. To minimize the impact on the environment the suspension of construction is foreseen for the time of spawning herring, and migrating of birds.

*Sakhalin-2 project* In the project documents for both phases of the Sakhalin-2 a detailed environmental impact assessment is made, including an accurate calculation of all types of negative impacts and develop methods for their prevention or minimization. Project documentation received the endorsement of the State Ecological Expertise of the Ministry of Natural Resources of the Russian Federation.

On the Molikpaq platfroms, PA-B and LUN-A neutralized waste drilling mud is injected into the reservoir, excluding the contamination of the Okhotsk Sea, both during drilling and during operation of offshore platforms.

To ensure the protection of marine sites of pipelines from damage by ice along the coastline it was decided to bury pipes to a depth of 5 m below the seabed.

Booster stations, which is located at the site of onshore pipeline system, is equipped with a nitrogen oxide suppression. Crossings over streams and rivers of Sakhalin are constructed in such a way that does not impede salmon migration during the spawning season. In order to minimize possible risks of harm to the environment in case of accidents as a result of earthquakes a seismic monitoring throughout the pipeline is in place.

LNG project, Sakhalin-2 involves energy efficient gas liquefaction technology specially developed by the Shell. A key element of the plant security is the flare unit, which eliminates the emissions of unflared hydrocarbon gas into the air. The construction of cryogenic tanks for LNG storage provides the primary drainage and the use of evaporative gas as fuel.

For LNG transport gas tankers with double hull in the cargo side and energy-efficient motors are used. A permanent integrated geo-ecological monitoring in the zone of influence of the land pipeline and onshore processing facility is organized as well as the environmental monitoring in the marine zone of influence of offshore pipelines, platforms and the LNG plant offshore units.

The program of monitoring and minimizing the impact on gray whales is being implemented, as agreed with the Consultative Group on their conservation.

*Pipeline Dzhubga – Lazarevskoye – Sochi* is included in the program of building Olympic facilities and development of Sochi mountain resort approved by the Russian government, and should become the basis of preservation of favorable ecological situation in the region. The project received a positive conclusion of the State Ecological Expertise and FGU Glavgosexpertiza Russia.

Construction is being run in compliance with all environmental regulations and requirements adopted in the international practice, as well as using the state-of-the-art technical means and technologies to minimize the technological impact on the environment. Thus, by choosing the optimal method of crossing the coastline – directional drilling, a significant reduction of the impact on vulnerable ecosystems of the coastal zone was achieved. Marine version of the pipeline construction to minimize the alienation of agricultural and forest lands, and lands of specially protected natural territories.

Schedule pipeline construction was designed to meet the seasonal life cycles of native fauna, the construction is carried out avoiding changes in the landscape. Design decisions and the organization of an offshore site to minimize impact on the Black Sea ecosystem: the pipeline route was selected against the topographic features of the seabed, before starting the pipeline laying the company executed clearance of the chosen route of extraneous contaminating objects.

*Pipeline Sakhalin – Khabarovsk – Vladivostok* as per the Government Decree as of 28.11.2009 № 965 is included in list of objects providing for the Summit of APEC in Vladivostok 2012, the project is implemented in three subjects of the Russian Federation and the length of the main line is 1836.7 km; branches to Vladivostok and the Russky island - 238.9 km, offshore section – 40.4 km. The construction started in November 2009. Commissioning of the first starting complex is scheduled for the 3rd quarter of 2011 (gas supplies in Vladivostok and Russky island).

Measures to ensure ecological safety in the construction and operation of the pipeline and its infrastructure facilities are provided in the project document, which received a positive conclusion of the state ecological expertise (approved by Order № 25 of RTN 22.01 .2010) and state expertise of design documentation and engineering survey results (conclusion FGU Glavgosexpertiza of Russia from 04.05.2010 № 344-10/GGE-6607/02), including measures aimed at preventing and reducing risks of accidents with possible environmental consequences.

The main measures to ensure environmental safety and minimize environmental damage are:

- minimizing the passage of a line in the areas of complicated engineering geological conditions and increased risk of dangerous exogenous processes, as well as passages through the special protected areas of different levels at which not legally regulated;
- use of high duty pipes in sections in the complex engineering-geological conditions areas, including crossings active tectonic faults and offshore areas in accordance with specifically developed technical requirements;
- organization of geotechnical monitoring based on modern software and tracking tool for any malfunction with the ability to alert and prompt action on critical areas;
- use of modern technologies and equipment for waste water treatment;
- implementation of the construction activities for bank protection in places of water bodies crossing, prevention of water erosion, landslides and other hazards of exogenous processes, ensuring the fire safety measures during construction, reclamation of disturbed lands;

- implementation of industrial environmental monitoring during the pipeline construction;
- determination of the composition and amount of negative impacts on environmental components during construction and operation of the pipeline (emissions, discharges, waste disposal, impact on flora and fauna, including aquatic resources), as defined in the consolidated budget calculation of payments to compensate unpreventable damages and payments for negative impact on the environment.

In implementing self-monitoring of environmental services, Gazprom invest Vostok, in cooperation with the bodies corporate (Environmental Inspection of *Gazprom*) and state environmental control, has been taking measures on identification of violations during the construction and organization address identified violations and their consequences.

*Gas supply in Kamchatka Region* – In cooperation with public organizations in the region the audit of subcontractors was carried out for compliance with the environmental legislation. Subcontractors have been trained to provide competent and responsible implementation of environmental requirements. The development of specific environmental and fishery management requirements was arranged for geological study, exploration and production of hydrocarbons using the West Kamchatka subsoil. At all sites the waste will be subjected to the maximum recycling and coastal reclamation, the establishment of systems for oil spill response is also provided.

Shtokman gas condensate field. The nature of the Arctic is highly sensitive and vulnerable to anthropogenic impact. In this respect for the Russian and international environmental standards, respect for the environment and the prevention of negative impacts on marine and terrestrial ecosystems of the Arctic zone is the project priority during construction and operation of the Shtokman gas condensate field.

Since 2002, in preparation of the Shtokman project for implementation, numerous researches were performed that contribute to decisions on designing objects of the Shtokman gas condensate field. In October 2006, the Federal Service for Supervision of Natural Resources (Rosprirodnadzor) issued a positive conclusion of the state ecological examination of the investment justification in the project arrangement of the first phase of the Shtokman field to the production and sea transportation of liquefied gas.

In the first phase of the project Shtokman Development AG developed an integrated basic design of the entire production chain, from drilling wells to transmission the supply licensee of ready products to markets. The complex engineering surveys and studies developed design documentation for the international (FEED) and the Russian standards, prepared a set of technical specifications. The project risks were evaluated and correspondent of risk reduction methods were identified. The offshore facilities were subject to the preliminary state inspection.

Gazprom dobycha Shelf prepared the basic technical solutions of the second and third phase of the Shtokman gas condensate field development. Particular attention is paid to ensuring technological, environmental and fire safety for future extraction and transportation of hydrocarbons.

### **OVERSEAS EXPLORATION PROJECTS OF GAZPROM**

Gazprom zarubezhneftegaz, being the operator OAO Gazprom is implementing projects on exploration and development of oil and gas fields and forming of oil and gas industry outside the Russian Federation. These projects include geological exploration:

- in the license block NEC-OSN -97 / 1 (block 26), located in the Indian offshore Bay of Bengal,
- in the block 112 (taking into account the expansion of space) and 129-132 units of the shelf of the Socialist Republic of Vietnam,
- in Aktumsukskom, Agyinskom, Shahpahtinskom license blocks Ustyurt region of the Republic of Uzbekistan
- in the license areas of the Republic of Tajikistan (Sarikamysh, Sargazon, West Shaambary and Rengan)
- in licensed premises of the Kyrgyz Republic (Kugart, East Maylisu-VI);
- preparatory for exploration on the Turkmen Caspian shelf.





#### India

Implemented measures to protect the environment and monitoring the quality of seawater for the content of petroleum products in the wells construction area. Carried out studies of wildlife in the working area.

The total cost of environmental protection during the project implementation for 2010 amounted to 5.1 million rubles.

#### Vietnam

Implemented measures to protect the environment and monitoring the quality of seawater for the content of petroleum products during geophysical research in the wells construction area. The total cost of environmental protection during the project implementation for 2010 amounted to 11.6 million rubles.

#### The Republic of Uzbekistan

Developed a draft statement on the environmental impact (EIS) and a draft statement on the environmental consequences of the Project of geological exploration drilling. The remediation of the soil after the wells construction was conducted.

The total cost of environmental protection during the project implementation for 2010 amounted to 1.8 million rubles.

#### The Republic of Tajikistan

Engineers and environmental surveys and statements of environmental impact for the licensed area Sarikamysh, Sargazon, Rengan and West Shaambary.

The total cost of environmental protection during the project implementation for 2010 amounted to 10.1 million rubles.

## ENVIRONMENTAL PROTECTION COOPERATION

## PARTICIPATION IN REGIONAL ENVIRONMENTAL PROJECTS AND PROGRAMS

According to the Concept of the company's participation in the gasification of Russian regions and within the Eastern Gas Program, the project "South Stream", "Nord Stream", "The Shtokman field", mega-project "Yamal" in the reporting year *Gazprom* signed a number of contracts and cooperative agreements with the regional authorities. Such documents in 2010, were signed with the Government of Leningrad, Irkutsk, Yaroslavl, Tyumen region, Yamal-Nenets Autonomous District, the Republic of Sakha (Yakutia), Krasnodar, Perm.

These include the following measures:

- the establishment of an integrated environmental monitoring system;
- implementation of measures to minimize the induced pressure on the regions, the preservation
  of their environment, as well as the unique culture of the peoples living there;
- the creation and development of social and environmentally sound production infrastructure with the development of *Gazprom Group* in the regions;
- the provision of ecological safety and environmental management in the regions.

In reporting year *Gazprom dobycha Krasnodar* created a necessary prerequisites for maintaining ecological balance in the Primorsko-Akhtarsk district of the Krasnodar Territory and the development of tourism in the territory of the municipality. In 2010 the Company ended the arrangement of the coastline, designed to protect Yasienskaya spit in Primorsko-Akhtarsk area from being destroyed by waves of the Azov Sea. By expanding the area Yasienski spit it became possible to prevent the collapse of this unique natural formation on separate islands.

*Gazprom dobycha Nadym* took part the competition of 100 best enterprises in Ecology and Safety of Russia of the IV regional Yamal gas forum in March 2010 and was awarded with gold medal in the category "Innovative research and development technology" for the presentation "Ecology. Protecting the natural environment. New technologies." Also in the reporting year the Company conducted a public hearing, which resulted in signed contracts, and donations of agreements on cooperation with the social movements of indigenous peoples of the north of Yamal and social movement of the District "Yamal to descendants!". Under the agreements the Company has committed itself to make up for the damage to natural resources and ecology of municipalities in the construction and operation in the license areas. The total amount of compensation payments under the contract in terms of costs for environmental protection in 2010–2011 is 1,326.2 million rubles.

In 2010, *Gazprom dobycha Urengoy* in accordance with agreements with the Administrations of Pur and Nadym areas in 2010 provided funds for environmental activities in the amount of 14.275 million rubles, including Purovsk District – 1,147 million rubles, Nadym – 6.510 million rubles, Krasnoselkupsky – 4.880 million rubles. As per the agreement with CJSC Nydinskoe and District Public Movement "Yamal to descendants!" made a donation of 2.188 million rubles.

*Gazprom transgaz Stavropol* is actively cooperating with the executive authorities of subjects of the Russian Federation and regional administrations in the location of production facilities, providing accountability in the field of environmental protection and informing the implementation of environmental measures.

In order to develop the municipal program "Environmental Protection in the Neftekumsk municipal district of the Stavropol Territory in 2010–2012" Reed-Burunskim LPUMG submitted proposals to the Directorate of Agriculture and Environmental Protection Administration Neftekumsk district.

Svetlograd LPUMG with Blagodarnenskoy district administration developed a municipal program of "Environmental Protection in Blagodarnenskogo Municipal District at 2011–2013".

Nevinnomysskaya LPUMG annually to its proposals for participation in the municipal environmental program of the city.

Mozdok LPUMG specialists are actively cooperating with the government agency "House of Nature" on preparation of environmental courses, designed for wide audience ("Ecology of Home", "Eco-News: Golden Autumn is dangerous for health and climate", etc.).

*Gazprom transgaz Ukhta*, in accordance with agreement on cooperation between Vologda Oblast Authorities and *Gazprom* in 2010 built two landfills for disposal of construction and municipal solid waste in Babaevo in subsection Kaduy Vologda region. Subsidiaries of the Company are working closely with the municipal administrations, Gryazovets with Nyuksenitsa of Vologda region, taking part in the beautification of the territories of these communities, including snow removal, and cleaning and garbage removal, planting of ornamental shrubs and trees of rare tree species, as well as mowing the lawn, greenery maintenance.

*Gazprom sotsinvest* under the contract with the FGU Sochi National Park in 2010 held ecological monitoring of the park land leased *Gazprom* for the construction and subsequent operation of the facilities. During the construction a large range of environmental activities were in place:

- strict adherence to rules and regulations during construction to avoid soil erosion;
- restriction of construction period from June to September in the areas adjacent to the territory of the Caucasian State Nature Biosphere Reserve, in order to avoid disturbance factor for hoofed animals and brown bears during their migration and wintering;
- habitat identification and transplant of red-listed species of herbaceous plants from the area of construction works on other sites;
- the prohibition of hunting and intermediate felling in areas of the Sochi National Park, adjacent to the construction site;
- annual monitoring of natural complexes and objects of the Sochi National Park.

Representatives of *Gazprom invest Vostok* for making operational decisions upon problems relating to environmental protection during the construction, participated in meetings of the Working Group of coordination and effective cooperation in matters related with the project "Gas supply in Kamchatka Oblast", as well as in the meetings of the Interdepartmental Commission for the efficient use of natural resources and environmental safety established by the Plenipotentiary Presidential Representative in the Far Eastern federal district.

*Yamalgazinvest* has developed a program of measures to reduce human impact on water bodies and riparian zones during construction underwater navigation, as well as plans for the integration of significant environmental aspects based on the specifics of construction and the features of the construction projects location.

*Gazflot* in 2010 developed a "Gazprom Program for compensation and environmental measures aimed at preserving the ecosystem of Ob and Taz for 2010–2014", which was agreed with the governor of YNAD D.N. Kobylkin and approved by the Chairman of the Management Committee of OAO Gazprom, A.B. Miller. Such a program already existed in 2004–2008 and was the basis for fruitful co-operation of the Company with the indigenous population and local authorities. The program includes newly adopted activities such as:

- Amelioratory fishing of predatory, weed and low-value fishes in the waters of the Ob and Taz Bays; evaluation of living aquatic resources in rivers and lakes in the Yamal region;
- installation of water treatment plants with capacity of 500 m<sup>3</sup> per day in Gaz-Sale;
- an ethnological expertise in exploration of the Ob and Taz Bays;
- preservation of native habitat and traditional economic activities of indigenous people leading a nomadic life, support for small businesses, aimed at the development of folk crafts of Indigenous Peoples of the North, and much more.

*OGK-2* subsidiary Stavropol SDPS has participated in the Environmental Council of the Ministry of Natural Resources for the Stavropol Territory for a few years. In the reporting year, a report on the environmental situation in the Stavropol region was submitted to the Council. The report contained measures upon the environmental improvement (in terms of the impact of the production activity of the subsidiary and ways to reduce it).

## **INTERNATIONAL COOPERATION**

In 2010, the international activities of the Company were focused on further development of cooperation with international organizations, intergovernmental bodies cooperation on energy efficiency and environmental protection, the leading foreign companies and research centers and the implementation of major international projects Nord Stream and South Stream "Eastern Gas Program", the project of the Shtokman field and Yamal megaproject.

Representatives of *Gazprom* participated in the research groups of the International Gas Union ("The integrity of the gas transportation systems and reduction of adverse impacts on the environment" of the Working Committee "Gas Transport" and "Greenhouse Gas Emissions Reduction" of the Program Committee "Sustainable Development").

Analytical reviews were prepared on environmental issues in gas transport, as well as the first edition of the section "Exploration, production and gas storage" of the industrial guidance on the best practices of greenhouse gas emissions reduction to be further presented at World Gas Conference in June 2012 (Kuala Lumpur, Malaysia).

On the basis of the Cooperation Agreement between the Federal Service for Hydrometeorology and Environmental Monitoring, representatives of *Gazprom* in the governmental delegation in 2010, participated in the 16th session of the Conference of the Parties to the UN Framework Convention on Climate Change and the 6th Meeting of the Parties to the Kyoto Protocol (Cancun, Mexico).

At the request of the Federal Agency for Science and Innovation representatives of Gazprom VNIIGAZ and Gazprom Marketing&Trading were included in the Oil and Gas Subcommittee of the International Partnership "Methane-to-markets".

Within the project "Joint Measurement Study of Methane Emissions from Process Equipment" specialists of *Gazprom*, Pacific Northwest National Laboratory measured methane emissions from process equipment of a compressor station and the linear part of a gas main pipeline. The representative of Gazprom transgaz Samara attended a meeting of the Partnership "Natural Gas STAR" (1–3 November 2010, New Orleans, USA) and reported on methods applied to greenhouse gas emissions measurements.

Under the leadership of the Ministry of Energy of the Russian Federation, OAO Gazprom in 2010 participated in inter-state cooperation on energy efficiency: The Joint Committee on the Memorandum of Understanding between the Russian Ministry of Energy and the Ministry of Economic Affairs, Ministry of Petroleum and Energy, Ministry of Natural Resources of Canada, Ministry of Economic Development and Energy of Sweden, the Ministry of Economic Development of Italy etc.

On the basis of agreements with foreign oil companies and in accordance with the programs of scientific and technical cooperation, Gazprom has been working on environmental protection and energy efficiency:

- ten technical dialogues with E.on Ruhrgas,
- three technical dialogues with BASF / Wintershall,
- three technical dialogues with the GDF-Suez,
- two technical dialogues with Gasunie,
- the two technical dialogues with the Agency of Natural Resources and Energy, Ministry of Economy, Trade and Industry of Japan,
- technical dialogue with the China National Petroleum Corporation.

The technical dialogue, "Optimization of a CS operation in order to reduce the loss of fuel gas and emissions into the atmosphere" between GDF SUEZ and specialists of OAO Gazprom and Gazprom VNIIGAZ visited the compressor station of Saint-Martin-de-Crau (France) where they got acquainted with the methodology of studies on the detection of methane emissions from leaks of process equipment. In addition to the technical dialogue, "Environmental Protection in the production of LNG" representatives of Gazprom VNIIGAZ and Ecological and Analytical Center of Gas Industry participated in the seminar "LNG Security", visited the LNG terminal near Marseille – Foss Kawau. A number

of reports was made during the seminar on environmental and industrial safety in the design, construction and operation of plants and LNG terminals.

15–16 of December 2010 in Noyabrsk under the direction of the Member of the Management Committee, Chief of Strategic Development Department of *Gazprom* Vlada Rusakova and Director of Research and Innovation of GDF SUEZ Mark Floret held a large meeting of coordinators of scientific and technological cooperation (STC) of the companies. At the meeting the parties discussed the results of the Programme of the STC in 2010. The participants made presentations on the interaction between *Gazprom* and GDF SUEZ upon Energy Efficiency and Environmental Protection. In accordance with the activities of the delegation of *Gazprom* and GDF SUEZ the participants visited the production facilities of Vyngayakhinskoye gas field of Gazprom dobycha Noyabrsk.

In November 2010, GDF SUEZ and *Gazprom* arranged a training for specialists of OAO Gazprom subsidiaries on the program "The organization of environmental management in enterprises in accordance with international standard ISO 14001". The company supported the decision to continue this training on a regular basis.

During the committee meeting of the European Business Congress "Industry and Construction" (29 April 2010, Gelendzhik) talks with representatives of Italian companies Eni S.p.a. were held on "Preparation of proposals for the introduction of energy efficient technologies and engineering for compressor stations, the linear part of gas main pipelines and gas distribution stations". The sides noted the economic and environmental benefits of gasification of transport and shared their national experiences in this field.

### **INFORMATION DISCLOSURE**

In accordance with Russian law *Gazprom Group* companies form and present to the state executive authorities of the Russian Federation, reporting on the environmental performance of industrial activities, the correspondent measures taken and the respective funding. These data are used in the preparation of the annual reports on the Environmental Protection in the Russian Federation, statistical and analytical instruments.

According to the commitments, the company of *Gazprom Group* provide public access to environmental information, including publications in the federal and local mass media and corporate websites. Published texts of environmental policy or environmental obligations of companies, annual environmental reports and special bulletins and reports on corporate legal documents and other materials to form an idea of environmental protection activities.

Information about current and future activities of *Gazprom Group* environmental and energy efficiency is published in the leading Russian mass media, the corporate magazine "Gazprom", "Gazovaya Promyshlennost" and "Sibirskaya neft" in the regional business media and industry-specific editions.

Many of the companies of the *Group* since 2007 have been publishing reports on activities related to sustainable development, in which considerable attention is paid to environmental security and protection. In 2010 the first report on the sustainable development of *Gazprom* was published.

On its corporate web site www.gazprom.com *Gazprom* publishes much information on the corporate environmental protection policy, annual environmental reports, updated meeting agenda and decision made by the Gazprom Coordination Committee for the environmental protection and energy efficiency, activities carried out by *Gazprom* in ecology and environmental protection, ecological safety and environmental management. The Annual Report of OAO Gazprom provides sections covering the issues of environmental protection and energy saving. Since 1995, the company has been publishing the Environmental Report of OAO Gazprom.

The public inquiry is satisfied by the full media coverage of the activities of *Gazprom* on the gasification of Russian regions, in the implementation of the Eastern Gas Program, the international project "Nord Stream", "Sakhalin-2" and "Sakhalin-3", "South Stream", the Shtokman field, projects being developed in the Sochi region.

Not only in official documents and information materials *Gazprom Group* companies disseminate reliable environmental information on their activities, but also through participation in industryspecific and annual forums, conferences, exhibitions. For example, at the International Forum "Oil and Gas of Eastern Siberia" the results of successful long-term contract with the Ministry of Energy to create a methodology for monitoring the Eastern Gas Program was reviewed. Issues of environmental safety and environmental performance of the Eastern Gas Program are discussed in the framework of the VI Baikal Economic Forum.

Development and support of projects are also accompanied by public hearings. For example, in Yar-Sale (Yamalregion, Yamal-Nenets), publichearings "The energy companies relationship with the population leading a nomadic life on the inter-settlement territory of the municipal district of Yamal", which was dedicated the use of innovative technologies in the construction of the Bovanenkovo field facilities. Public hearings on the group project for the construction of production wells in the oilfield Prirazlomnoye with sea offshore platform were held, which were devoted to the basic technical solutions of the Project activities on environmental emergency prevention and oil spill response.

As a part of the Shtokman gas condensate field (GCF) project Gazprom dobycha Shelf together with Piter Gaz held public hearings in Teriberka in the Kola area of Murmansk region upon the draft EIA and the integrated program of marine engineering survey for the design of the second and third phases of the Shtokman field. Residents of the village were provided with comprehensive information about the package of measures aimed at eliminating the risks in conducting engineering surveys for both the environment and for fisheries.

In 2010 Gazprom sotsinvest held 12 public hearings on the preparation of EIA materials for design of facilities within the Program of Olympic objects construction and development of Sochi as a mountain resort, approved by the RF Government Decree of 29 December 2007 № 991. The public

desks were arranged for citizens and stakeholders to get familiarized with all aspects of environmental support and projects implementation.

Gazprom dobycha Irkutsk in conjunction with the municipal administrations of Ekhirit-Bulagat, Ossinsky Bokhanskij, Kazachinsko-Lena, Zhigalovo and Ust-Kut areas held public hearings on the project documentation for construction of exploratory wells in Bokhanskij and South-Ust-Kut licensed areas. Information on the activities of the construction of these wells were published in regional newspapers.

## CONCLUSION

One of *Gazprom* major principles is the minimization of the technological specific impact on environment.

The average breakdown of *Gazprom Group* adverse impact on the environment of the Russian Federation is 16–17% of gross emissions from stationary sources; less than 0.1% of waste water discharges into the surface water bodies; less than 0.14 % of industrial and consumption waste.

Compared to 2008 in 2010 the following was achieved by *Gazprom Group* in line with the production increase:

- decrease of pollutant emissions by 115.5 kilotons, which was mainly caused by the reduction of hydrocarbon (methane) emissions by 7.2 % and carbon oxides by 15% (118.7 kilotons).
- increase of associated gas utilization by 6.2%
- increase the amount of industrial and consumption waste reused and neutralized in own companies by 23%, as well as decrease the accumulative waste by the end of the year by 42 %.

*Gazprom Group* evaluates its environmental risks and take adequate measures to minimize the technogenic impact. *Gazprom* has been steadily and systematically implementing programs of technical modernization, deploying energy efficient equipment and practices. Every year *Gazprom* increases its investment into the main environmental assets, which made 7.74 billion rubles in 2010.

Here are the strategic directions of *Gazprom Group* towards the environmental protection, which have got a significant environmental countrywide effect for the Russian Federation:

- energy and resource saving;
- best avaliable technologies use;
- undertaking preventive measures on the emergencies associated with an environmental negative effect;
- gasification of regions and development of the gas motor market;
- development and implementation of corporate programs, participation in regional and federal programs, which ensure environmental security;
- improvement of the environmental management systems;
- scientific studies and practical actions upon the renovation and preservation of biodiversity as the main indicator of the ecosystem safety;
- international cooperation on environmental protection.

*Gazprom*: focusing on the environment.

## GLOSSARY

**APG** – associated petroleum gas – mixture of gases and non-hydrocarbon and hydrocarbon vapors coming from oil wells and oil separation.

**Biodiversity (biological diversity)** – diversity of living organisms in all spheres including onshore, marine and other water ecosystems, which determine their ecological complexes.

**Booster compressor station** – Gas production site station which provides for the gas compression to prepare it in accordance with the project quantitative and qualitive indicators of the given field and projected pressure of gas main pipeline.

**CHP** – cogeneration heat and power plant.

**CNG** – compressed natural gas.

**CNG FS** – compressed natural gas filling station.

**Environmental control** – system of measures of prevention, identification and avoidance of environmental legislation violation, ensuring the conformity of entities and economic facilities with the requirements, including norms and guiding documents in environmental protection.

#### **CS** – compressor station.

**EIA (Environmental impact assessment)** – identification, analysis and accounting of direct and indirect effects of environmental impact of projected economic or other activity aimed at supporting the decision about the possibility of implementation.

**EMS** – environmental management system.

**Energy saving** – implementation of legal, organizational, scientific, production, technical and economic measures aimed at efficient (rational) use (spending) of fuel energy resources and involving renewable energy into the process. Energy saving is an important objective in conservation of natural resources.

**Environment** – combination of natural, natural and anthropogenic and anthropogenic objects.

**Environmental damage** – negative change in environment caused by pollution which resulted in degradation of natural ecosystems and deficit of natural resources. Environmental expertise – ensuring the conformity of document package, justifying the projected activities associated with expertise object's economic or other activities, with the technical regulations and environmental legislation in order to prevent the environmental impact.

**Environmental management** – part of the corporate management system, which has a well designed structure, aimed at achieving objectives enumerated in the environmental policy.

**Environmental monitoring** – complex system of observing the environmental state, assessment and projecting of changes in environment under natural and anthropogenic factors.

**Environmental protection requirements** (also – nature protection requirements) – conditions, restrictions or their combination applicable to economic and other activities, which are set by laws, other legal acts, environmental norms, state standards and other guiding documents on environmental protection.

**Environmental risk** – probability of an event that may cause negative environmental effect associated with economic or other activities, natural and anthropogenic catastrophic situation.

**Environmental security** – nature and paramount human values exposure to threats of negative impact initiated by economic and other activities natural and technogenic catastrophic situations.

**EP (environmental protection)** – activity aimed at preservation and restoration of nature environment, rational use and reproduction of natural resources, prevention of negative impact initiated by economic or other activity and liquidation of its effects (also – nature protection).

### FER – fuel energy resources.

**Gazprom Group, the Group, Gazprom** – "OAO Gazprom" refers to the heading company of *Gazprom Group*, i.e. Open Joint Stock Company Gazprom with its 100% subsidiary companies and organizations. This report refers to the list of subsidiaries, based on the environmental reporting principle endorsed by OAO Gazprom.

GCF - gas condensate field.

GCU – gas compressor unit.

**GDS** – gas distribution station.

**GHG** – greenhouse gases – are assumed to cause the global warming effect. The greenhouse gases are the following (in the order of Earth warming potential): water steam, carbon dioxide, methane, ozone, sulfurylfuoride and nitrogen oxide.

GPP – gas and/or condensate processing plant.

**GTS** – gas transport system.

**HPS** – heat and power station.

**IEC** – industrial environmental control

NGL –natural gas liquids (broad fraction of light hydrocarbons).

**LNG** – liquefied natural gas.

LPUMG – linear production unit of main gas pipeline.

**Natural complex** – complex of functionally interconnected natural objects, which have common geographic and other correspondent features.

**Natural object** – natural ecosystems, landscape and their components, which sustained their properties. **Natural resources** – environmental components, natural, natural and anthropogenic objects, which are or can be involved in economic or other activities as energy sources, manufacturing and consumption as well as have consuming value.

**Negative environmental impact** – economic or other activities, which initiate negative **OGCF** – oil gas condensate field.

**Pollutant** – pollutant substance – a substance or mixture which initiates negative environmental impact in case it amount and/or concentration exceeds the preset limit values for chemicals, radio active components and others and microorganisms.

**Quality of environment** – state of the environment specified with a number of indicators such as physical, chemical, biological and others.

R&D – research and development.

**RRC** – rotational residential complex.

**SDPS** – state district power station.

**SPA** – special protected area. A part of land, water and air space territory of a great value for nature protection, science, recreation, health and others, which is subject to a special protection regime and fully or partially subtracted from the lands available for business activities as per the decision of governmental authorities. Special protected areas refer to the national endowments.

**UGS** – underground gas storage.

**Waste allocation object** – a facility specifically designed allocation of waste (landfill, sludge storage, tailing pond, rock dump etc).

**Waste management** – activity on waste collection, accumulation, utilization, neutralization, transporting and allocating.

## **ADDRESSES AND CONTACTS**

#### GAZPROM

16 Nametkina St., 117997, Moscow, V-420, GSP-7, Russian Federation www.gazprom.ru

### DEPARTMENT OF GAS TRANSPORTING, UNDERGROUND STORAGE AND UTILIZATION

Directorate of energy-saving and environment Tel.: (495) 719-27-51. Fax: (495) 719-69-65

#### INFORMATION AND COMMUNICATIONS DEPARTMENT

Public Relations Directorate Public Relations Division Tel.: (495) 719-32-82, (495) 719-12-83. Fax: (495) 718-63-85

### ASSET MANAGEMENT AND CORPORATE RELATIONS DEPARTMENT

Shareholder and Equity Relations Division Tel.: (495) 719-49-86, (495) 719-27-86. Fax: (495) 719-39-37

### FINANCE AND ECONOMY DEPARTMENT

Investor relations division Tel.: (495) 719-44-48. Fax: (495) 719-35-41

### ECOLOGICAL AND ANALYTICAL CENTER OF GAS INDUSTRY

16 Nametkina St., 117997, Moscow, GSP-7, Russian Federation Tel./fax: (495) 420-21-23