JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

>>

"The utilization of associated petroleum gas (APG) of the Sugmut oilfield JSC "Gazpromneft - Noyabrskneftegaz" taking into account the effective use of APG of the Romanovo oilfield"

Sectoral scopes:

10. Fugitive emissions from fuels (solids, oil and gas).

Version: 02
Date: 11.12.2011

A.2. Description of the project:

>>

The Sugmut oilfield is located in 95 km north-westward from the city of Noyabrsk; and in 50 km westward from the city of Muravlenko, the Yamal-Nenets Autonomous Okrug (Area), Western Siberia. The oilfield has been under development since 1970. Commercial production started in 1995. The Romanovo oilfield, located on the territories of districts Purovsky and Nadymovsky, Yamalo-Nenetzky autonomous okrug. The Romanovo oilfield was discovered in 1987, and its development started in 2000. Currently the both oilfields are being developed and operated by JSC "Gazpromneft-Noyabrskneftegaz" (GPN-NNG), a subsidiary company of Moscow-based JSC "Gazprom neft" (GPN).

In process of oil treatment at the booster pump stations (BPS) #1,2,3,3A of Sugmut oilfield associated petroleum gas is separated from the crude oil. Some part of extracted APG from Sugmut oilfield as well as whole APG separated from the crude oil on Romanovo oil-field (not efficient use at this oilfield) has been historically directed under the pressure of separation through the existing field gas pipeline to Muravlenko gas processing plant (GPP) owned by «Sibur Holding».
Remaining bigger volume of the separated APG has been burned at the flares of BPS-1,2,3,3A of Sugmut oilfield as the Company had no economic incentive to efficiently utilize it.

Project purpose

The project is aimed at the efficient utilization of associated petroleum gas (APG) that otherwise would have been flared at the BPS # 1,2,3,3A of the Sugmut oilfield and hence at reduction of CO2 and CH4 emissions under condition of the efficient use of APG of the Romanovo oilfield. GPN-NNG expects that the sales of emission reduction units (ERUs) under Joint Implementation mechanism of Kyoto Protocol will improve the economic efficiency of the project.

Project description

Having at disposal a considerable APG resource Gazpromneft-Noyabrskneftegaz Company undertakes activities to increase the level of its efficient utilization. For this purpose, the project envisages the construction of a new 71.3 km gas pipeline (looping) with diameter of 720 mm in parallel with the existing field pipeline with a diameter of 430mm from the BPS-2 of Sugmut oilfield to Muravlenko GPP (Sibur Holding), as well as laying of a new 8,5 km gas pipeline section with a diameter of 530mm to the BPS-3A of Sugmut oilfield. See detailed layout of the project facilities at the Figure 4.2.3 below.

These new gas pipelines increase the total capacity of the gas transmission system at the Sugmut oilfield and provide the necessary transportation of the most part of APG under the separation pressure from all BPS of the field to Muravlenko GPP.

At Muravlenko GPP project APG as well as APG from Romanovo oilfield is processed with the yield of the dry stripped gas and NGLs. The dry gas is compressed under high pressure into the main gas pipeline «Urengoy-Chelyabinsk» and NGL are fed into the condensate pipeline «Urengoy-Surgut».

Project history:

February 2007. Presentation had been prepared by the date of Meeting of Investment Committee of JSC "Gazprom neft" with the estimates of the economic efficiency for APG utilization projects at Sugmut and Romanovo oilfield. It showed that these projects are economically unprofitable, but due to considerable CO2 emission reductions the purpose of using the earnings from ERUs sales for improving the economic efficiency of the projects was set. Therefore, by decision fixed in the Minutes of the Meeting of Investment Committee # 6 taking place at JSC "Gazprom neft" on 16.02.2007 it was determined to implement this project with applying the norms of the Kyoto Protocol.

April 2007. Cost estimate documentation for the project was approved.
May 2007. Construction works started.
December 2007. Commissioning of the project took place on 26.12.2007.

Baseline scenario

Under the baseline scenario all extracted APG at the BPS-1,2,3,3A of the Sugmut and Romanovo oilfield (except historically utilized APG volume) would have been flared that would lead to considerable CO_2 and CH_4 emissions (as a result of incomplete flare combustion).

Continuation of flaring under this scenario is determined by the lack of sufficient incentives for APG utilization project, which is confirmed by the following facts:

- At the time of decision-making sectoral policies and legislation did not provide real mechanisms for efficient APG utilization;
- Considerable capital expenditures for establishing APG utilization infrastructure and low APG costs and hence,
- Lack of investment attractiveness of these project types.

Emission reductions

As a result the project activity will lead to prevention of APG flaring in amount of 943183 ths. m^3 in the period of 2008-2012**.** That will result in a considerable amount of CO2 emission reductions, which make **2 710 960 tons of CO_2 equivalents** over the mentioned period.

A.3. Project participants:

>>

Party involved	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A - Russian Federation (Host Party)	JSC Gazpromneft-Noyabrskneftegaz	No
Party B	To be determined within 12 months after approval of the project by the Russian Government	-

A.4. Technical description of the project:

A.4.1. Location of the project:

>>

A.4.1.1. Host Party(ies):

>>

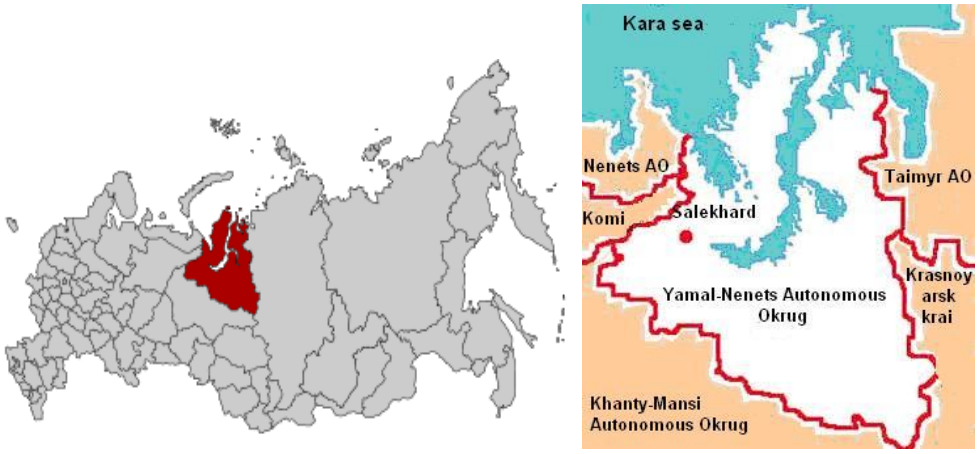
Russian Federation

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

>>

The project is being realized in Pur district, Yamal-Nenets Autonomous Okrug (YNAO), Tyumen oblast, which is a subject of the Russian Federation. YaNAO is located in the Arctic zone of West-Siberian Plain and occupies a vast area of 769,250 square kilometres. The capital of YaNAO is the city of Salekhard that is located 1976 km north-east from Moscow. The population of YNAO is 543,651 people. It is more than a half of YNAO is located behind the Polar Circle; a smaller part is situated at east side of Ural Mountains.

Figure A 4.1.2. Location of Yamal Nenets Autonomous Okrug

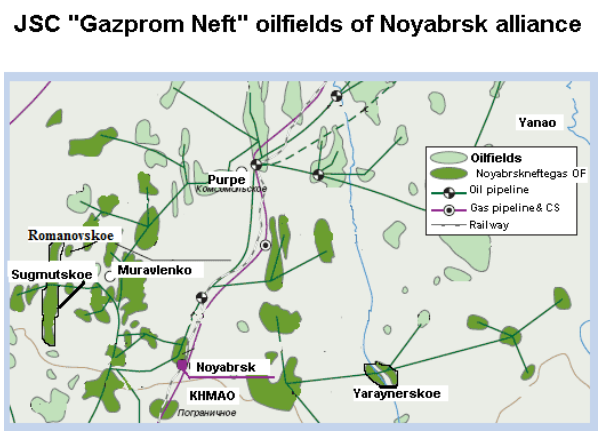


Permafrost and proximity to the Kara sea determines the local climate that is characterized by lengthy winters (up to 8 months), short summers, strong winds and small depth of snow cover. A main natural wealth of YaNAO is the huge resource of hydrocarbons including gas, oil and condensate. YaNAO is the world's

largest gas province with 37% of the world's deposits of the natural gas and with 90% of all-Russian deposits.

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

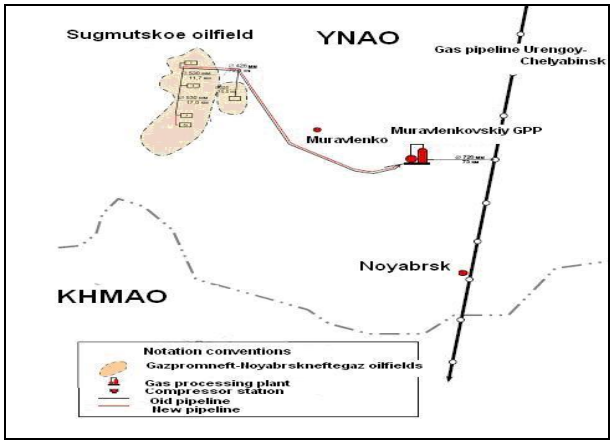
>> Figure A.4.1.3 LAYOUT of PUR DISTRICT



Sugmut and Romanovo oilfields are located in Pur district, YaNAO, in 95 km north-westward from the city of Noyabrsk; and in 50 km westward from the city of Muravlenko. 90% of oil and 50% of gas is produced on the territory of the Pur district. Out of 175 gas, gas-condensate and oil fields explored in YaNAO 114 fields are located on the territory of the Pur district.

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

Fig. A.4.1.4. Schematic diagram of the project activity



Boost pumping stations (BPS) №1,2,3,3A are located directly at the Sugmut and Romanovo oilfield area; in Pur district, YaNAO, in 95 km north-westward from the city of Noyabrsk; and in 50 km westward from the city of Muravlenko.
APG at the exit from the BPS under its separation pressure (6-8atm.) feeding into old field gas pipelines (including new pipeline (looping) with the total length of 80 km to the Muravlenko GPP as well as partially burned in the flares of BPS-1,2,3,3 A.

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

Process description

APG at the exit from the BPS-1,2,3,3A of the Sugmut oilfield and the exit from the BPS under separation pressure feeds into the oilfield pipelines, where it is mixed and transported through the old and the newly-built gas pipelines to the Muravlenko GPP. APG gas pipelines are equipped with electricity-driven valves and gas flow switching points. Electricity for the pipeline valves and gas flow switching points as well for APG processing operations at Muravlenko GPP is imported from the regional power supplier, JSC «Tyumenenergo».

At Muravlenko GPP APG is passing through fractionating with the yield of dry stripped gas and natural gas liquids (NGL). Dry gas is pumped into the main gas pipeline Urengoy-Chelyabinsk. NGL pumped into the products pipe line Urengoy-Surgut. Personnel passed training for operation of the gas pipeline installations in process of starting-up and adjustment works.

Table A 4.2. Technical characteristics the project activity

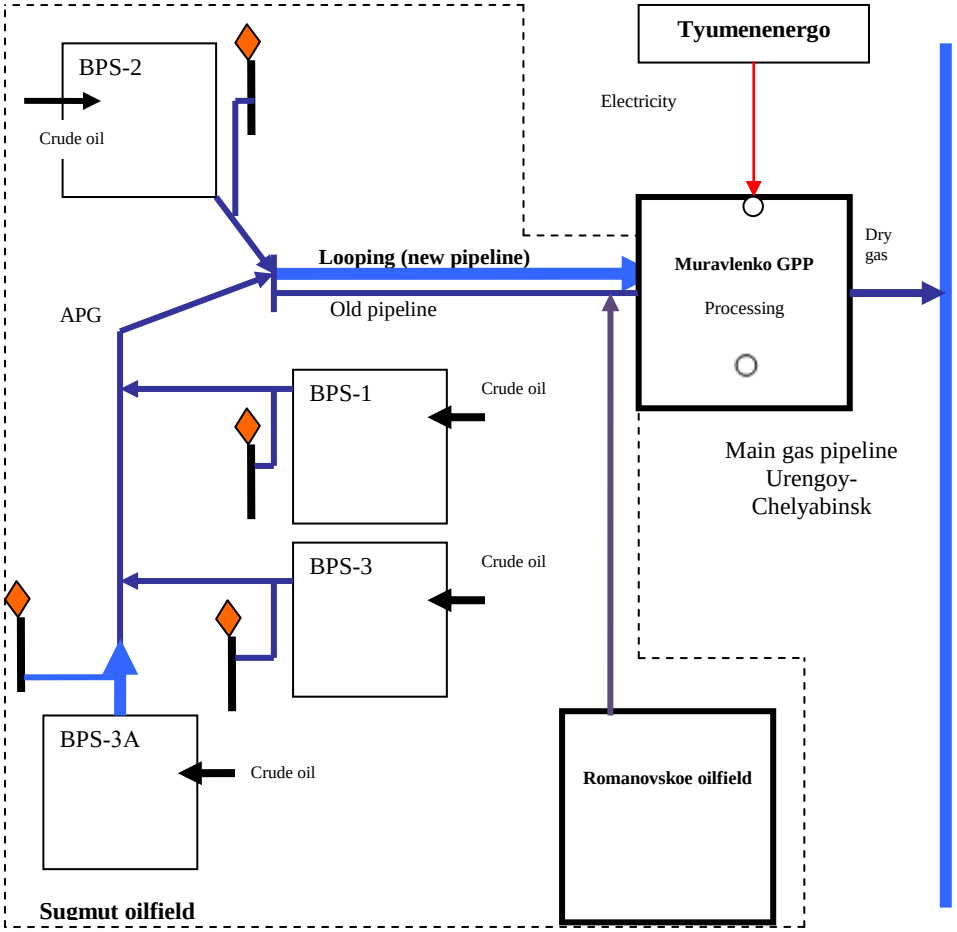
#	Item	Value
1.	APG density	0.886 kg/m^3
2.	Initial outlet pressure at BPS of Sugmut and Romanovo oilfields	6-8 bar
3.	Inlet pressure at Muravlenko GPP	1.1 bar
4.	Total length of the new gas pipeline including: - Looping - Gas pipeline section at BPS 3A - Gas pipeline section from BPS of Romanovo oilfield to old pipeline at Sugmut oilfield	79.8 km 71.3 km 8.5 km 8.8 km
5.	Pipeline diameter and wall thickness: - Looping - Gas pipeline section at BPS 3A - Gas pipeline section from BPS of Romanovo oilfield to old pipeline at Sugmut oilfield	 720*8 mm 530*8mm 325*8mm
6.	Maximum throughput capacity of the new gas pipeline	445 mln.m^3/year

Implementation schedule of the project:

Sugmut history:
April 2007. Cost estimate documentation for the project was approved.
May 2007. Construction works started.
December 2007. Commissioning of the project took place on 26.12.2007 Order #454

Romanovo history:
September 2007. Commissioning of the project on 20.09.2007 Order #345

Figure. A.4.2.3. APG utilization process layout



BPS – boost pumping station;
APG – associated petroleum gas;
GPP – gas processing plant;

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

>>

Under the project activity the considerable volume of separated APG that was previously flared will be efficiently used through injection into the new gas pipeline (looping) and transportation to the Muravlenko GPP for processing with the yield of the dry stripped gas and gas liquids. This will prevent the CO_2 and CH_4 emissions, which would have been under the baseline scenario in the case of flaring this APG volume on the BPS-1,2,3,3A stacks. In the absence of the project activity it would be impossible to reach the mentioned reductions as the national sectoral policies and economic situation in the oil&gas industry do not ensure real mechanisms for efficient APG utilization:

In Russia, the laws and resolutions designed to regulate the APG use did not enforce oil companies to minimize flaring. In fact, if the utilization is economically infeasible APG may be uselessly flared. At the same time, the waste of the natural resource has to be compensated with environmental payments in the

various budgets and with provision of polluting substances in surface layer of air below the maximum allowable concentration level. Even a 95% APG efficient utilization requirement introduced in some license agreements could not prevent its flaring. According to information provided in such reliable sources as *Vedomosti* and *Reuters*, in 2009 APG flaring rose up in RF to 64.3% as compared with 24.4% in 2006. It testifies for the insufficient enforcement of this requirement that cannot motivate the oil company to efficiently utilize APG. On the other hand, the oil companies are extremely reluctant to implement construction of APG collecting and transport infrastructure as due to huge financial expenditures, low APG prices, uncertainty and non-transparency with access to the gas transmission system such a kind of projects represent the considerable investment risk.

This argumentation provided in B section in the greater detail evidences that reduction of APG flaring and, hence, of CO2 emissions is only possible under the proposed project activity.

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

>>

	Years
Length of the crediting period:	5
Year	Estimate of annual emission reductions in tonnes of CO_2equivalent
2008	816208
2009	716500
2010	603036
2011	356590
2012	218626
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	2710960
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	542192

A.5. Project approval by the Parties involved:

>>

On September 15, 2011 the Chairman of the Russian Federation Government, V. Putin, signed Resolution 740 "On measures for realization of Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change" [1]. This document depicts a JI-project approval procedure in the Russian Federation.

According to item 8 of the Provision the approval of projects will be carried out by the Ministry of Economic Development of the Russian Federation [2] subject to results of competitive selection of applications submitted by proponents of potential JI-projects. Competitive selection of demands is carried out by the operator of carbon units (Sberbank of RF) according to the item 5 of the Government Decree of the Russian Federation № 843.

The order of Ministry of Economic Development «On approval of competitive selection rules submitted for the purpose of the approval of projects implemented according to the article 6 of the Kyoto Protocol to the

[1] http://www.government.ru/gov/results/8030/
[2] Приказ Минэкономразвития № 485 от 23.11.2009 - http://merit.consultant.ru/doc.asp?ID=10297

UN Framework Convention on Climate Change» defines requirements to a structure and a content of the application. The application structure includes «the positive expert opinion on the project design documentation prepared according to the international requirements by the accredited independent entity chosen by the applicant».

Thus, according to the legislation of the Russian Federation in the field of JI projects realization, the Project approval is possible after reception of the positive determination opinion from AIE.

SECTION B. Baseline

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

>>

Description and justification of the baseline chosen will be provided based on provisions of Guidelines for users of the JI PDD form (version 04) and in accordance with appendix B of the JI guidelines and the "Guidance on criteria for baseline setting and monitoring" using the following JI-specific step-wise approach:

Step. 1. Indication and description of the approach chosen regarding the baseline setting.

Step. 2. Application of the approach chosen.

The following is a detailed presentation of the two steps:

Step. 1. Indication and Description of the Approach Chosen Regarding the Baseline Setting

The baseline is determined through considerations of various alternative scenarios with regard to the proposed project activity. As criteria for choosing the baseline scenario the key factors will be determined. All alternatives will be considered in terms of influence on them of these factors. The alternative scenario, which is the least negatively influenced by the key factors, will be chosen as the baseline.
Therefore, the following stages of determining the baseline scenarios are envisaged:

a) Description of alternative scenarios.

b) Description of the key factors.

c) Analysis of the influence of the key factors on the alternatives.

d) Choosing the most plausible alternative scenario.

Step. 2. Application of the Approach Chosen

As alternatives the following two scenarios are considered:

Alternative scenario 1. Continuation of common practice for APG utilization, i.e. the combustion of APG in the flares at BPS-1,2,3,3A at the Sugmut oilfield .

Alternative scenario 2. The project itself (without being registered as a JI activity), i.e. construction of the new pipeline from the BPS-2 Sugmut oilfield to Muravlenko GPP for increase of efficient APG utilization produced by BPS-1,2,3,3A by its injection into the new gas pipeline and feeding to Muravlenko GPP.

None of the alternatives contradict the current legislation and may be discussed in the further analysis.

Analysis does not consider variants related to installation of APG-fuelled power generating capacities, f. e. gas turbine&piston power plants. There is no deficit of power at the Sugmut oilfield, the electricity is imported from the centralized grid «Tyumenenergo» and distributed through the well-developed transformation and distribution system.

The analysis also does not consider variants related to the injection of APG to reservoir for pressure maintenance at Sugmut oilfield as «Gazpromneft-NNG» uses water for this purpose.

The analysis also does not consider variants related to the processing of APG immediately at the Sugmut oilfield with production of methanol and other commercial products due to lack of potential customers near

the oilfield as well as a significant remoteness of transport infrastructure (nearest railway station is located in 60 km).

a) Description of alternative scenarios.

Alternative scenario 1. Continuation of common practice of APG utilization, i.e. the combustion of APG in the flares at BPS-1,2,3,3A of the Sugmut oilfield.

GPN-NNG Company is producing oil and gas at Sugmut oilfield. In a process of oil treatment at the BPS-1,2,3,3A associated petroleum gases are extracted from the crude oil. Under this alternative «project part» of APG would be completely flared at the BPS-1,2,3,3A (excluding a part of APG that historically utilized into old gas pipeline) leading thus to significant CO2 and CH4 emissions into the atmosphere. To maintain reservoir pressure at Sugmut oilfield the water is used. Electricity supply of the field is provided from the centralized grid «Tyumenenergo».

The APG volumes that would be flared under this scenario are presented in the following table:

Table B.1.1. APG to be flared at BPS-1,2,3,3A of Sugmut oilfield in 2008-2012

Item	Unit	2008	2009	2010	2011	2012
BPS-1,2,3,3A	ths. m^3	289711	237331	215677	124206	76258

Under environmental legislation an enterprise is required to calculate the quantities of polluting emissions including methane, carbon oxide, nitrogen oxides etc and to make quarterly environmental payments according to norms set by Russian Government's Decree № 344 dd 12/06/2003[3] and by partially revised Decree № 410 dd. 01/07/2005[4]. In below table the environmental payments made by GPN-NNG Company for APG flaring over the previous years are presented.

Table B 1.2. Environmental payments for APG flaring at BPS-1,2,3,3A of Sugmut oilfield[5]

Item	Unit	2008	2009	2010
Environmental Payments	ths rubles	418	329	301

The Governmental Regulation № 7 of the 8 January 2009 "On measures to stimulate the reduction of air pollution products from the flaring of associated gas in flares"[6] introduces new rules for the calculation of the environmental payments for polluting emissions. As per Regulation the payments for polluting emissions, starting with January 1, 2012, caused by APG flaring in quantities exceeding 5% of total APG recovered will be calculated as for above-limit emissions with the application of supplementary coefficient of 4.5 .

Under the scenario, approximately 0.82 mln. m^3 of methane a year would be emitted in the atmosphere from 2012. In this case environmental payments would be about 0,65 million roubles a year or 5.87 million roubles for the period 2012-2020.

[3] «On norms of payments for the emissions in atmospheric air of the polluting substances by stationary and mobile sources, for discharge of polluting substances in surface and underground water objects, for disposal of production and consumption waste»
[4] «On alterations in annex # 1 to the Decree of the Government of Russian Federation dd 12/06/2003 # 344»

[5] Information was presented by the environmental department of Gazpromneft-Noyabrskneftegaz Company

[6] http://government.ru/gov/results/6475/

Table B 1.3 Calculations of environmental payments for the APG flaring at BPS-1,2,3,3A of Sugmut oilfield

	CH_4 volume into the atmosphere as the result of the incomplete burning	Coefficient (governmental regulation № 7 8 January 2009)	Payment rate for above-limit CH_4 emissions (governmental regulation №344 12 June 2003)[7]	Share of CH_4 subject to application of coefficient and payment rate as per columns 3 and 4	Amount of environmental payments
1	*2*	*3*	*4*	*5*	*6*
year	*ths m3*		*rubles/tonne*	*%*	*mln rub/ year*
2012	1205	4,5	250	95	0,949
2013	828				0,652
2014	756				0,595
2015	765				0,602
2016	772				0,608
2017	779				0,614
2018	782				0,616
2019	784				0,618
2020	786				0,619
	7459				5,8

Alternative scenario 2. The project itself (without being registered as a JI activity), i.e. construction of the new pipeline from the BPS-2 Sugmut oilfield to Muravlenko GPP for increase of APG utilization produced by BPS-1,2,3,3A by its injection into the new pipeline and feeding to Muravlenko GPP

Under this scenario 2 big volume of separated APG will be efficiently used through both: injection into the new pipeline system (looping) and transportation via gas pipeline to the Muravlenko GPP[8] . This will prevent the CO_2 and CH_4 emissions, which would have been under the scenario 1 when all volume of APG recovered is flared.

In process of oil treatment at the booster pump stations (BPS) #1,2,3,3A associated petroleum gas is separated from the crude oil. Some part of extracted APG from Sugmut oilfield as well as a big part of extracted APG from Romanovo oilfield has been historically directed under the pressure of separation through the existing field gas pipeline to Muravlenko gas processing plant (GPP) owned by «Sibur Holding.

The project envisages construction of a new 71.3 km gas pipeline (looping) with a diameter of 720 mm to an existing old field pipeline with a diameter of 430mm from the BPS-2 to Muravlenko GPP (Sibur Holding), as well as construction of a new 8,5 km pipeline with a diameter of 530mm to the BPS-3A. These pipelines will increase the throughput capacity of gas transportation system at Sugmut oilfield and provide the necessary transport of the most part of APG at the separation pressure from all BPS to Muravlenko GPP.

At Muravlenko GPP project APG is being fractionated with the yield of dry stripped gas and NGLs. Dry gas at a high pressure feeds into Gazprom main gas pipeline «Urengoy-Chelyabinsk» and NGLs feed into the condensate pipeline «Urengoy-Surgut». This products substitute the consumption of the organic fuels and their derivatives such as the natural gas, fuel oil, gasoline etc. Therefore, this project is the resource saving activity that will not lead to recovery of additional fossil fuels and production of their derivatives

[7] http://government.consultant.ru/page.aspx?8411;756042

[8] This APG volume does not include the historically utilized APG part(~32% of overall APG utilized) per annum. This figure is estimated as the average volume historically utilized over the past periods of 2004-2007

The main directions of APG utilization at Sugmut oil field are presented in the following tables:

Table B 1.4 The balance of APG at BPS-1,2,3,3A at Sugmut oilfield.

Item	Unit	2008	2009	2010	2011	2012
APG recovery,	ths m^3	381479	303009	295685	235919	177489
Volume of APG directed into gas pipeline (inc. looping) from Sugmut oilfield	ths m^3	331387	283307	280253	220027	165137
Max capacity of old pipeline in Sugmut oilfiled	ths. m3	131376	131376	131376	131376	131376
Volume of APG historically directed into old pipeline from Romanovo oilfield	ths. m3	89700	85400	66800	35555	42497
Volume of APG historically directed into old pipeline from Sugmut oilfield	ths m3	41676	45976	64576	95821	88879
«Project» volume of APG directed into new pipeline (looping) from Sugmut oilfield	ths m^3	289711	237331	215677	124206	76258

For realization of this alternative the sum of 744466mln. rubles[9] is necessary to invest.

b) Description of the key factors.

A baseline shall be established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, legislation, the economic situation in the project sector etc. The following key factors that affect a baseline shall be taken into account, e.g.:

- Sectoral reform policies and legislation;
- Economic situation in oil&gas sector in terms of APG utilization;
- Availability of capital (including investment barrier);
- APG prices.

c) *Analysis of the influence of the key factors on the alternatives*

Further on the detailed consideration of each alternative taking into account the key factors is provided.

Sectoral reform policies and legislation

[9] For reference see presentation at the investment committee #6 JSC Sibneft-Noyabrskneftegaz, Moscow, 2007.

State sectoral policy in the field of APG utilization lacks clear balanced mechanisms allowing to implement, to monitor and to enforce APG efficient utilization requirements. Regulation of APG utilization issues is carried out by following normative –legal documents:

- Federal Law «On subsoils» # 2395 dd. 21.02. 1992.
- Resolution of Supreme Council of Russian Federation # 3314.1 dd. 15.06.1992 "On procedure of introduction into operation of Regulation on subsoil licensing procedure".
- Law of Khanty Mansi autonomous okrug (KhMAO) # 15.03 dd. 18.04.1996"On subsoil use".
- Resolution of the Government of Russian Federation dd. 12.06.2003 # 344 "On norms of payments for polluting emissions into the atmosphere by stationary and mobile sources, for discharges of polluting substances in surface and subsurface water objects and for disposal of production and consumption wastes".
- Resolution of the Government of Russian Federation dd. 01.06.2005 # 410 "On introduction of deviations in the appendix 1" of Resolution dd. 12.06.2003 # 344 ".
- Resolution of the Government of Russian Federation dd. 08.01.2009 # 7 "On measures on stimulation of polluting atmosphere air reduction by products of associated petroleum gas combustion at flare stacks".

All these legislative documents have not enforced companies, to present day, to minimize gas flaring. APG utilization measures proposed by a number of documents define environmental payments for consumption of natural resources and the sanitary quality norm of atmosphere air expressed through maximum allowable concentration (MAC) of polluting substance in the ambient air. In fact, the real point of these documents is that if utilization is economically infeasible APG may be uselessly flared. At the same time, the waste of the natural resource has to be compensated with environmental payments in the various budgets and with provision of polluting substances in surface layer of air below MAC-level.

It should also be noted that in some regions (particularly in KhMAO) regional authorities supervising subsoil management include in license agreements to be signed with oil companies the condition of 95% APG utilization. Nevertheless this measure could not prevent flaring neither in KhMAO nor in YaNAO. For example, in 2009 seven biggest oil companies in RF flared 19,96 bln m^3 of APG or 64,3% of the overall APG recovery[10]. It can be explained that the condition is not enforced, i.e. non-fulfillment of the condition can not be resulted in cancellation of the right of use of the oil field; otherwise the APG flaring level would be at 5%. Therefore this condition is inessential and cannot be a reason to motivate a company to start APG utilization project.

Thus, neither sectoral reforms nor legislation make GPN-NNG directly reduce APG flaring and do not motivate to utilize APG. The level of environmental payments for APG flaring the Company has to pay is incomparably low against investments in APG utilization. Even the increase of the level of those payments, which the Company will have to pay under the regulation # 7 dd. 08.01.2009 from 2012 till 2020, is lower by an order of magnitude than the sum of investment in this project. Appropriately, the key factor favors continuation of APG flaring under *Scenario 1*. On the contrary, implementation of *Scenario 2* is not provided under the influence of this factor.

Economic situation in the oil&gas sector in terms of APG utilization

Efficient utilization of APG has always been a burden for oil companies in Russia because there have been many uncertainties and problems on this way that turned realization of this resource saving activity into difficult-to-implement task.

[10] Source of information - http://www.lenta.ru/news/2010/03/22/gas/

First of all, many oil companies face with the premature fall of long-run recovery forecasts due to imperfection of reliable geological forecasting and of instrumental metering of resources to be recovered. That creates uncertainty with regard to how much oil and APG will be extracted and used in the near term.

Secondly, the facilities for the utilization of the APG are usually not integrated in the oil field production schemes. As a rule, there is no developed APG treatment and transportation infrastructure in areas of hydrocarbon recovery. APG utilization is carried out relatively well on sites with infrastructure that was built in the Soviet era of 70s-80s of the last century and was financed from the state budget. Therefore, APG utilization projects may imply a construction of the new infrastructure for collection, treatment, and transport of the APG and require high investment costs that may bring inadequate returns for the oil companies. This is due to low APG prices for remote oil fields with long distances to the gas processing facilities or consumption markets.

Thirdly, the oil companies also face structural barriers such as limited access to the existing gas processing and transmission infrastructure. The Russian market of gas transportation and processing is highly monopolized by JSC "Gazprom" and JSC "Sibur". When organizing access to trunk gas pipeline system the natural gas is getting a priority over APG. This is due to the fact that the gas market is formed under the influence of the natural gas as it requires lesser (comparatively with APG), under otherwise equal conditions, recovery, transportation and connection-to-pipeline costs. Besides, low marketability of APG is explained by the quality of its treatment as the stripped gas does not always meets the gas pipeline acceptance standards. This situation hampers the equal access for the oil companies coming in with APG to trunk gas pipeline system and gas processing plants. Neither Gazprom nor Sibur are economically accountable to the State and the oil companies for groundless refusal in accepting APG for processing and transmission or for breach of obligation for reporting APG at recovery, processing and transmission. This circumstance do not favors the fulfillment of APG utilization requirement as stipulated in the license agreement.

The adverse conditions of APG utilization described above are also applicable to Scenario 2. The GPN-NNG Company had to build a new 80 km gas pipeline investing considerable capital funds. Too low APG price which the Company has to sell it for cannot provide the profitability for this project as NPV is negative (see B2 section). The Company expects that ERUs sales could help improving project economics.

Therefore, this factor unfavorably effects realization of *Scenario 2*, i.e. on APG utilization project at the Sugmut oil field, making thus *Scenario 1* be a most plausible alternative for the baseline.

Availability of capital (including investment barriers)

For *Scenario 1* no investment capital is required. Nevertheless, APG flaring necessitates making environmental payments in amount approximately 350 thousand rubles a year. The source of funding for these payments is included in the production cost of oil recovered under the routine activity of the Company.

Despite the Company raised the large financial resources in amount of 744,466 million roubles to construct the new gas pipeline, the project represents a considerable financial risk due to the low economic efficiency (see Section B2 for details). In common typical investment practice the funds are available for a profitable commercial activity but not for the projects with negative NPV. Therefore the obvious investment barrier exists for *Scenario 2*.

APG prices

Regulated prices for APG at the entry of the gas processing plants are too low to encourage development of new APG transport facilities. According to the Regulation issued by the Ministry of Economic Development of Russian Federation "On wholesale prices for petroleum (associated) gas to be realized for gas treatment plants for further processing" APG price ranged within 73 – 442 rubles per ths. depending on liquids content.

The APG price used in the investment analysis made for this project is 337 rubles per ths. cubic meters[11], which is too low to return investments (see section B2). Break-even point may be achieved at 657 rubles per ths. m^3 that is almost two times greater than the price set by the Ministry of Economic Development and Trade .

As the project's profitability depends on the APG price the *Scenario 2* is highly vulnerable to the influence of this factor.

d) Choosing the most plausible alternative scenario.

To summarize considerations above the influence of the factors on each scenario is expressed through the factor analysis in the following table.

Table B 1.5. Factor analysis

#	Factor	Scenario 1	Scenario 2
1.	Sectoral reform policies and legislation	Favors to implementation	Does not provide implementation
2.	Economic situation in the oil&gas sector in terms of APG utilization	Makes this scenario the most plausible candidate for baseline	Unfavorably effects on its realization
3.	Availability of capital (including investment barrier)	No influence	Represents investment barrier for this scenario
4.	APG prices	No influence	Makes the project unprofitable due to low APG price

Based on the conducted analysis it is quite obvious that the key factors favor the implementation of Scenario 1 and affect negatively Scenario 2. Therefore, Scenario 1, i.e., *Continuation of common practice for APG utilization, i.e. the combustion of APG in the flares at BPS-1,2,3,3A at the Sugmut oilfield*, is **the baseline scenario.**

The key information and data used to establish the baseline:

Fixed values determined once at the stage of verification and are available throughout the entire period 2008-2010

Data/Parameter	**$FC_{hisAPG\ max}$**
Data unit	ths m^3 (under standard conditions)
Description	Maximum capacity of historical pipeline at Sugmut oilfield
Time of determination/monitoring	constant
Source of data (to be) used	Technical documentation of production testing of Sugmut oilfield at , Volume 2, from 15.05.1989, made by «GiproTumenneftegas» (Table 1.20, page 42, about 131376 ths. m3-hydraulic calculation of the gas pipeline at the maximum oil production
Value of data applied (for ex-ante calculations/determinations)	131376

[11] Order of the Ministry of Economic Development and Trade dd. 30/04/2002 # 117

Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.
QC/QA procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ρ_{CH4}
Data unit	kg/m^3
Description	CH_4 density at standard conditions (temperature of 20 °C (293.15 K, 68 °F) and an absolute pressure of 101.325 kPa (14.696 psi, 1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) used	Thermal Design of Boilers (Norm-based method), NPO CKTI, SPb, 1998
Value of data applied (for exante calculations/determinations)	0.668
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CH_4 density is necessary to calculate the emission factor for APG flaring
QC/QA procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ρ_{CO2}
Data unit	kg/m^3
Description	CO_2 density at standard conditions (temperature of 20 °C (293.15 K, 68 °F) and an absolute pressure of 101.325 kPa (14.696 psi, 1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) used	Thermal Design of Boilers (Norm-based method), NPO CKTI, SPb, 1998
Value of data applied (for exante calculations/determinations)	1.842
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CO_2 density is necessary to calculate the emission factor for APG flaring
QC/QA procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	**GWP_{CH4}**
Data unit	tCO_2/tCH_4.

Description	Global Warming Potential of methane required for the calculation of CH_4 emission factor from APG flaring at BPS-1,2,3,3A
Time of determination/monitoring	constant
Source of data (to be) used	Decision 2/CP.3 **http://unfccc.int/resource/docs/cop3/07a01.pdf#page=31** Climate Change 1995, The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22. http://unfccc.int/ghg_data/items/3825.php
Value of data applied (for exante calculations/determinations)	21
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Global Warming Potential of methane is needed to calculate the CH_4 emission factor due to the combustion of the APG.
QC/QA procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	**Nc**	
Data unit	unit	
Description	Quantity of carbon moles in a mole of a component of APG	
Time of determination/monitoring	constant	
Source of data (to be) used	Natural science	
Value of data applied (for ex-ante calculations/determinations)	Carbon dioxide, CO2	1
	methane, CH4	1
	ethane, C2H6	2
	propane, C3H8	3
	i-butane, C4H10	4
	n-butane, C4H10	4
	i-pentane, C5H12	5
	c-pentane, C5H12	5
	n-pentane, C5H12	5
	hexane, C6H14	6
	geptane, C7H16	7
	octane, C8H18	8
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Quantity of carbon moles in a mole of a component of APG is needed to calculate the CO2 emission factor due to the combustion of the APG.	
QC/QA procedures (to be) applied	Reference data	
Any comment	-	

Data/Parameter	ε
Data unit	Fractions
Description	Unburned carbon factor for soot combustion of APG in flare units
Time of determination/monitoring	Determined once at the PDD development stage
Source of data (to be) used	"Guidelines for Calculation of Air Pollutant Emission from APG Flaring" developed by the Scientific Research Institute for Atmospheric Air Protection in Saint-Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	0.035 (3.5%)
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The value is prescribed by the calculation guidelines for real data
QA/QC procedures (to be) applied	Based on reference data
Any comment	-

Data/Parameter	NCV_{NG}
Data unit	Kcal/m3
Description	Net calorific value of the natural gas recommended of GOST
Time of determination/monitoring	Constant
Source of data (to be) used	(GOST 5542-87)
Value of data applied (for exante calculations/determinations)	7600
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Used data are verified information from the official source of the GOST.
QC/QA procedures (to be) applied	Used data are verified information from the official source of the GOST
Any comment	-

The parameters to be directly monitored

Data/Parameter	**FC_{APG_GPP}**					
Data unit	ths m^3 (under standard conditions)					
Description	Main source of the baseline emissions. APG produced in the baseline would be mostly flared, with the exception of the part that has been historically transported to GPP.					
Time of determination/monitoring	annually					
Source of data (to be) used	Calculated parameter (based on measured from gas meter at BPS-1,2,3,3A)					
Value of data applied (for ex-ante		**2008**	**2009**	**2010**	**2011**	**2012**

calculations/determinations)		331387	283307	280253	220027	165137	
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.						
QC/QA procedures (to be) applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".						
Any comment	-						

Data/Parameter	**FC_{APG_PJ}**					
Data unit	ths m^3 (under standard conditions)					
Description	Total volume of APG transported to the Muravlenko GPP from Sugmut oilfield into new pipeline (looping)					
Time of determination/monitoring	annually					
Source of data (to be) used	Calculated parameter (based on measured from gas meter at BPS-1,2,3,3A and calculation parameter of total volume of APG transported to the Muravlenko GPP)					
Value of data applied (for ex-ante calculations/determinations)		**2008**	**2009**	**2010**	**2011**	**2012**
		289711	237331	215677	124206	76258
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.					
QC/QA procedures (to be) applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".					
Any comment	-					

Data/Parameter	Chemical composition of APG at BPS-1,2,3,3A of Sugmut oilfield				
Data unit	%				
Description	Chemical composition under standard conditions of APG required for the calculation of emissions factor from flaring at BPS-1,2,3,3A				
Time of determination/monitoring	Mounthly (based on minimal CH4 data for each BPS)				
Source of data (to be) used	Gas chromatograph Crystallux 4000M				
Value of data applied (for ex-ante calculations/determinations)		**2008**	**2009**	**2010**	**2011**	**2012**
	Carbon dioxide, CO2	1,23%	1,32%	1,47%	1,339%	1,339%
	methane, CH4	72,42%	68,65%	71,33%	70,799%	70,799%
	ethane, C2H6	5,21%	5,55%	5,42%	5,392%	5,392%
	propane, C3H8	9,79%	10,91%	9,34%	10,013%	10,013%
	i-butane, C4H10	1,59%	1,93%	1,83%	1,784%	1,784%
	n-butane, C4H10	3,93%	5,17%	4,71%	4,603%	4,603%
	i-pentane, C5H12	0,96%	1,29%	1,11%	1,118%	1,118%
	c-pentane, C5H12	0,00%	0,00%	0,00%	0,080%	0,080%

	n-pentane, C5H12	1,44%	1,83%	1,57%	1,613%	1,613%
	hexane, C6H14	1,61%	1,78%	1,59%	1,659%	1,659%
	geptane, C7H16	0,01%	0,01%	0,01%	0,000%	0,000%
	octane, C8H18	0,01%	0,01%	0,01%	0,000%	0,000%
	hydrogen sulfide, H2S	0,00%	0,00%	0,00%	0,000%	0,000%
	nitrogen, N2	1,57%	1,45%	1,59%	1,538%	1,538%
	oxygen, O2	0,00%	0,00%	0,00%	0,00%	0,00%
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The chemical composition is needed to identify the volume fraction of carbon, methane and VOC and calculate the CO2 emission rates due to the combustion of the project gas. The chemical composition to 2008-2010 based on real measured data from each BPS. Data to 2011-2012 based on average annual data from real period 2008-2010					
QC/QA procedures (to be) applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".					
Any comment	-					

Data/Parameter	**FC_{APG_Rom}**				
Data unit	ths m^3 (under standard conditions)				
Description	Volume of APG directed into the old pipeline from Romanovo oilfield				
Time of determination/monitoring	annually				
Source of data (to be) used	Flow meter DKS-0.6-300				
Value of data applied (for ex-ante calculations/determinations)	**2008**	**2009**	**2010**	**2011**	**2012**
	89700	85400	66800	35555	42497
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation. APG flow is measured with precise and regularly calibrated metering devices				
QC/QA procedures (to be) applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".				
Any comment	-				

Data/Parameter	**$EF_{CH4,F}$**				
Data unit	$tCO_2e/ths.m^3$				
Description	Methane emission factor by APG flaring at BPS-1,2,3,3A				
Time of determination/monitoring	Once a month				
Source of data (to be) used	APG emission factor calculated data				
Value of data applied (for exante calculations/determinations)	**2008**	**2009**	**2010**	**2011**	**2012**
	0,356	0,337	0,350	0,348	0,348
Justification of the choice of data or description of measurement methods and	Methane emission factor is needed to calculate the CO2e emission rates due to the flaring of APG at BPS-1,2,3,3A				

procedures (to be) applied	
QC/QA procedures (to be) applied	Main monitoring devices are verified and calibrated “Tyumen center for standardization, metrology and certification”.
Any comment	-

Data/Parameter	**SEC**
Data unit	kWt/ths.m3
Description	Specific electricity consumption at GPP for compression of the APG supplied under project activity
Time of determination/monitoring	Annual
Source of data (to be) used	Annual technical documentation at GPP
Value of data applied (for exante calculations/determinations)	**2008**: 452; **2009**: 473; **2010**: 496; **2011**: 474; **2012**: 481
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Necessary to calculate the electricity consumption at GPP. The chemical composition to 2008-2010 based on real measured data at CS. Data to 2011-2012 based on average annual data from real period 2008-2010
QC/QA procedures (to be) applied	Based on measurements carried out by the GPP. All measurements are conducted with instruments calibrated and attorneys' Tyumen center of standardization, metrology and certification ".
Any comment	-

Baseline emissions from APG flaring (taking into account incomplete burning) at BPS-1,2,3,3A of Sugmut oilfield:

$$\mathbf{BE = FC_{APG\_PJ}*(\sum avEF_{CO2,APG} + \sum av\ EF_{CH4,F})} \quad (1)$$

BE – emission from baseline, tCO_2.
$\mathbf{FC_{APG\_PJ}}$ – APG volume utilized in the project, i.e. transported to Muravlenko GPP through the new gas pipeline (looping), ths m^3
$\mathbf{\sum av\ EF_{CO2,APG}}$ – annual average CO_2 emission factor by APG flaring at each BPS-1,2,3,3A bases on minimal monthly data of APG (methane) composition at each BPS, tCO2/ths. m^3
$\mathbf{\sum av\ EF_{CH4,F}}$ – annual average CH_4 emission factor (in terms of CO2 equivalent) by APG flaring at each BPS-1,2,3,3A bases on minimal monthly data of APG (methane) composition at each BPS, tCO2e/ths. m^3

$$\mathbf{FC_{APG\_PJ} = FC_{APG\_GPP} - FChis_{APG}} \quad (2)$$

$\mathbf{FC_{APG\_GPP}}$ – total volume of APG transported to the Muravlenko GPP, ths m^3
FChisAPG - historical utilized part of APG**,** which is transported to the Muravlenko GPP. Calculated parameter basis on historical technical documentation of Sugmut oilfield development and APG data of utilized volume from Romanovskoe oilfield.

$$\mathbf{FChis_{APG} = FChis_{APG\ max} - FC_{APG\_Rom}} \quad (3)$$

$\mathbf{FChis_{APG\ max}}$ – maximum capacity of historical pipeline, ths m^3 (technical documentation of production testing of Sugmut oilfield at , Volume 2, from 15.05.1989, made by «GiproTumenneftegas» (Table 1.20, page 42, about 131376 mln. m3-hydraulic calculation of the gas pipeline at the maximum oil production).

$\mathbf{FC_{APG\_Rom}}$ - utilized volume of APG from Romanovskoe oilfield**,** which is transported to the Muravlenko GPP into the old pipeline, ths.m3

$$\mathbf{\sum av\ EF_{CO2,APG} = \sum cp(y_{CO2} + (Nc_{CH4}*y_{CH4} + \sum_j Nc_{VOCj} * y_{VOC\ i}))*\rho_{CO2}*FE} \quad (4)$$

y_{CO2}, y_{CH4} y_{VOC} – annual average volumetric fractions of carbon, methane and volatile organic compounds VOC in APG at BPS-1,2,3,3A Sugmut oilfield bases on minimal monthly data of APG (methane) composition at each BPS, (information source – gas test protocol).
Nc_{CH4}, $\sum_j Nc_{VOCj}$ – quantity of carbon moles in a mole of methane and VOC accordingly ($\sum_j Nc_{VOCj}$ where j is the singular volatile hydrocarbon component.)
ρCO_2 – CO_2 density at 20°C is taken equal to 1.842 kg/m3.
FE –efficiency of APG combustion in a flare is taken equal to 0.965

Due to incomplete combustion of APG flaring part of APG extracted to the atmosphere is not oxidizing. NII Atmosphere methodic determines the efficiency of underburning 3.5% is not burned completely, which causes methane emissions to the atmosphere. Methane emission factor in terms of CO2-eq. determined as follows:

$$\mathbf{\sum avEF_{CH4,F} = \sum cp\ y_{CH4}*\rho_{CH4}*(1\text{-}FE)*GWP_{CH4}} \quad (5)$$

$\mathbf{y_{CH4}}$– annual average volumetric fractions of methane in APG at BPS-1,2,3,3A Sugmutskoe oilfield bases on monthly minimal data of methane composition at each BPS, (information source – gas test protocol at standard conditions).

$\mathbf{\rho_{CH4}}$– the density of methane CH4 under standard conditions, equal to 0.668 kg/m^3

FE - APG flaring efficiency, equal to 0,965

$\mathbf{GWP_{CH4}}$ – global warming potential for methane, equal to 21 tCO_2/tCH_4

Emissions outside the project boundary associated with the baseline come from the following sources:

Leakage effect is determined as net change of antropogenic emissions outside the project boundary:

$$\mathbf{LE = LE_{BL} - L} \qquad (6)$$

Where:
$\mathbf{LE_{BL}}$ -is the emissions outside the project boundary that would have occurred without project activity
L - is the emissions outside the project boundary occur due to the project.

Total emissions outside the project boundary that would have occurred without project activity:

$$\mathbf{LE_{BL} = LE_{NG,rec} + LE_{NG\ GT}} \qquad (7)$$

Where:

$\mathbf{LE_{NG,rec}}$ **-** Emissions due to production of the natural gas at gas fields

$\mathbf{LE_{NG\ GT}}$ **-** Leakage due to combustion of the natural gas in gas turbines at gas treatment plants

Emissions due to production of the natural gas at gas fields

The emissions are determined by the following formula:

$$\mathbf{LE_{NG,rec} = FC_{APG\_PJ} * EF_{NG\ prod} * GWP_{CH4}} \qquad (8)$$

$\mathbf{FC_{APG\_PJ}}$ is the project volume of the APG supplied to Muravlenko GPP, ths. m^3;

$\mathbf{EF_{NG\ prod}}$ –coefficient of losses from natural gas production operations provided by annual GAZPROM ENVIRONMENTAL REPORT, %

$\mathbf{GWP_{CH4}}$ – is the global warming potential for methane, equal to 21tCO_2/tCH_4.

Leakage due to combustion of the natural gas in gas turbines at gas treatment plants

$\mathbf{GWP_{CH4}}$ – is the global warming potential for methane, equal to 21tCO_2/tCH_4.

Leakage due to combustion of the natural gas in gas turbines at gas treatment plants

$$\mathbf{LE_{NG\ GT} = (SFC_{GT} * FC_{APG\_PJ} * EF_{CO2,GT})/l_{com}} \qquad (9)$$

SFC_{GT} is a specific fuel consumption (natural gas) in modern gas turbines for compressing and processing of natural gas supplied to a gas treatment plant, in m3 NG combusted/ths.m3 NG compressed:

$$SFC_{GT} = ((SEC_p * C)/ \acute{\varepsilon}_{modern\ GT})/NCV_{NG} \quad (10)$$

SEC_p is average specific electricity consumption at Muravlenko GPP at APG compressing&processing operations, kWh/ths.m3

C is coefficient of conversion from kWh to cal, 1kWh=0,86*10^6 cal

$\acute{\varepsilon}_{modern\ GT}$ is a efficiency of modern gas turbine, taken =34% (this value is close to the equivalent thermal efficiency of electric grid Ural with emission factor 0,606 tCO2/MWh)

NCV_{NG} is net calorific value of the natural gas (according to GOST 5542-87), kcal/m^3

$EF_{CO2,GT}$ – CO_2 emission factor due to the natural gas combustion in gas turbine drives at gas treatment plant, tCO_2/ths. m^3

$$EF_{CO2,GT} = (y_{CO2\ ng} + (Nc_{CH4} * y_{CH4\ NG} + \sum Nc_{VOC} * y_{VOC\ NG})) * \rho_{CO2} * FE_{GT} \quad (11)$$

$y_{CO2\ NG}$, $y_{CH4\ NG}$, $y_{VOC\ NG}$ – volume fraction of carbon, methane and VOC of natural gas in a plant for processing gas[12] ;

Nc_{CH4}, $\sum Nc_{VOC}$ – number of moles of carbon in methane and VOC accordingly. ($\sum Nc_{VOC}$ where j is the singular volatile hydrocarbon component)

ρ_{CO2} – density of CO_2 at 20°C is assumed to be 1.842 кг/$м^3$.

FE_{GT} – efficiency of gas combustion in gas turbines is assumed to be 1.

l_{com} is a specific coefficient of correction at first pressure at gas turbine work (average natural gas pressure at wells is 50ata-APG from 1st stage of separation-7ata), calculated parameter

$$l_{com} = ((P_{2\,p}/P_{1\ ng})^{((1,31-1)/1,31))-1}) / ((P_{2\,p}/P_{1apg})^{((1,31-1)/1,31))-1)} \quad (12)$$

1,31 – adiabat of methane (CH4)

$P_{2\,p}$- pressure inlet at gas pipeline, 75 ata (Gazprom pressure standard of gas transport)

$P_{1\ ng}$ – average pressure of natural gas at main gas well of Urengoy region, calculated parameter (50 ata at 2008 year)[13]

$P_{1\ apg}$– average pressure of APG at 1 stage of separation of all BPS of Sugmut oilfield, project parameter (7 ata)[14].

[12] Typical composition of the natural gas is as follows: 91,9% CH4, 0,58% CO2, 0,68% N2 and 6,84% non-methane hydrocarbons by volume). Information source: IPCC 2006 Volume 2 Chapter 4, p. 4.58, Table. 4.2.4.

[13] http://www.indpg.ru/nefteservis/2008/04/20007.html. Table 1-Текущее устьевое давление, ата

[14]Technical information of project pipeline and BPS, ата

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

>>

The analysis provided in subsection B.1. clearly demonstrates that the proposed project is not a baseline.

A JI-specific approach is chosen for justification of additionality. For this purpose provision a) is chosen defined in paragraph 2 of the annex I to the Guidance on criteria for baseline setting and monitoring version 02. 1 i.e: (a) Provision of traceable and transparent information showing that the baseline was identified on the basis of conservative assumptions, that the project scenario is not part of the identified baseline scenario and that the project will lead to reductions of anthropogenic emissions by sources or enhancements of net anthropogenic removals by sinks of GHGs.

This section demonstrates that the project provides reductions in emissions by sources that are additional to any that would otherwise occur, using the following step-wise approach

Step 1. Indication and description of the approach applied

Step 2. Application of the approach chosen

Step 3. Provision of additionality proofs

And finally the explanations are provided on how CO2 emission reductions are achieved.

Below this approach is provided in the greater detail.

Step 1. Indication and description of the approach applied

A JI-specific approach is based on an explanation that the project activity would not have occurred anyway due to existence of *the financial barrier* and that the project is not *a common practice.*

Financial barrier is justified further through the investment analysis.

Step 2. Application of the approach chosen

Financial barrier

Financial barrier is justified through the investment analysis and includes the evaluation of the project's financial efficiency. If the results of the analysis show that the project is financially unattractive without being registered as JI-activity than it will be a clear evidence of the project's additionality.

The investment analysis result is quantitative definition of such a economic efficiency indicator as net present value (NPV). Estimation of investment attractiveness of the project was made by specialists of JSC GPN-NNG with the involvement of the central office of JSC Gazprom-neft.

For estimation capital investments 744,466 million rubles[15](of we remake calculations with the investment cost proportional to the APG amount delivered to Muravlenko GPP from the Sugmut oilfield/ base capital -

[15] See the investment analysis spreadsheet model *IAS_Sugmut&Romanov APG utilization*. The total investment sum of 1161 mln. rubles was divided between Sugmut and Romanov projects proportionally to APG amounts delivered to Muravlenko GPP in the following way:

744,466 mln. Rubles is allocated to Sugmut (64,15% of total APG delivered) and

1161 million rubles (less VAT) spent for construction of the new gas pipeline from Sugmut oil field to Muravlenko GPP according to investment presentation.

The project starts in 2007 and ends in 2020; at that 375,7 million m^3 of APG are utilized in 2008 with a decline to minimal value of 27,3 million m^3 in 2020. As per order № 117 from 30/04/2002 of Ministry of Economic Development of Russian Federation[16] the APG sale price is 337 rubles per thousand m^3 which is the base price. Also further calculations were provided to evaluate the project's efficiency at the two-fold increased APG price and to find the project's break-even point. Discount rate is 15%.

The outcomes of the estimations are presented in the following table:

Table B2. The outcomes of the estimations of the project's efficiency

APG sale price	NPV
337 rubles/ths m^3	-403,5 mln rubles
657 rubles/ths m^3	0 mln rubles

Conclusion:

1. At APG sale price that was effective on the date of the project start the project is absolutely unattractive from investor's point of view.
2. Break-even point (when NPV = 0) may be reached at APG sale price equal to 657 rubles/ths. m^3. But this price is beyond of APG price span set by the Ministry, therefore it cannot be applicable for the estimation.

Sensitivity analysis

The sensitivity analysis is made with the use of the economical spreadsheet model developed by GPN specialists for the presentation of this project on the Investment Committee. Sensitivity of the project NPV to deviation of such factors as the investment cost, APG price&volume, operational costs and discount factor were assessed. The results of the analysis are presented in the table below.

416,534 mln. Rubles (35,88% of total APG delivered) is allocated to Romanov.

[16] http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=36987

Table B 2.1. Results of sensitivity analysis

Deviation	Investment	APG price	Opex	APG volume	Discount factor
-50%	-25 982	-635 059	-373 895	-635 059	-370 604
-40%	-100 666	-585 497	-379 834	-585 497	-377 707
-30%	-176 087	-537 542	-385 772	-537 542	-384 558
-20%	-251 527	- 492 003	-391 711	-492 003	-391 154
-10%	-327 262	-447 140	-397 649	-447 140	-397 496
0%	-403 588	-403 588	-403 588	-403 588	-403 588
10%	-479 914	-360 036	-409 526	-360 036	-409 435
20%	-556 853	-317 192	-415 465	-317 192	-415 044
30%	-634 216	-274 585	-421 403	-274 585	-420 423
40%	-711 579	-231 977	-427 342	-231 977	-425 580
50%	-789 666	-189 408	-433 280	-189 408	-430 525

Thus, even considerable deviations (from -50% till +50%) of above mentioned factors cannot make enhance the project NPV. This demonstrates that the project stays economically inefficient even if the economic factors will considerably improve.

Analysis of common practice

This stage supplements the estimations provided above with the analysis of prevalence of APG utilization activities, particularly, through the construction of gas transportation infrastructure in the oil&gas sector, which represents the criteria of additionally for the project activity.

Description of common situation in the industry

The level of APG flared has increased over a three-year period of 2006-2009 from 14,1 bln. m^3 in 2006[17] till 19,96 bln. m3 in 2009[18]. Simultaneously, APG recovery dropped from 57,9 bln. m3 in 2006 to 31 bln. m^3 in 2009. Thereby, a share of APG flaring in 2006 was at 24,4% and by 2010 it rose up to 64,3%.

To explain the reasons of flaring of such considerable gas amounts the various aspects related to APG utilization are to be addressed:

[17] http://ru.reuters.com/article/idRUANT32989120080213

[18] Source of information - http://www.lenta.ru/news/2010/03/22/gas/

From legislatorial point of view there is the package of resolutions, laws and other documents (see the list of these documents in the subsection B1) which are to regulate APG utilization issues. But the lack of real mechanisms allowing to monitor and to enforce implementation of APG utilization makes little progress in this regard. A striking example of such a regulation is a 95% utilization requirement included in some license agreements. Particularly this practice is widespread in Khanty-Mansiysk Autonomous Okrug. Nevertheless this measure could not prevent the rise of APG flaring in 2009 as oil companies cannot mostly implement APG utilization activities due to economic and structural reasons. As far as the above-said requirement is not enforced its non-fulfillment does not lead to the cancellation of the right to develop the oil field. Therefore this requirement cannot force or motivate the oil company to utilize APG.

It should be noted that APG utilization (particularly through feeding into trunk gas pipeline system) requires substantial material expenditures for establishing transport and treatment infrastructure. Therefore, in most cases such projects are not economically efficient for the companies having oil fields located remotely from gas transport system. Among the reasons to negatively influence the APG utilization efficiency are:

- Substantially lower gas debits of oil wells as compared with the gas well debits;
- Considerably lower APG pressure;
- Presence of considerable amounts of hydrocarbon liquids in APG;
- Need for construction of branching field gas collecting pipelines due to substantial remoteness of the oil fields from gas transport system;
- Low APG sale price to cover expenditures due to implementation of utilization activities.

Besides, the structural aspect impedes efficient APG utilization. The existing trunk gas transmission system (GTS) is unable to provide APG transportation from locations of major APG recovery and delivery to consumers because of too busy schedule. Vast majority of the gas pumped through the trunk gas pipeline system makes the natural gas come from the senoman gas fields of Yamal-Nenets Autonomous Okrug (YaNAO) and, hence, the natural gas has a priority over APG when providing access to the GTS. The access to the GTS of independent APG producers is limited and is allowed if the spare capacity is available[19]. Besides, it is extremely difficult to confirm the availability or the lack of the spare capacity, which is making the problem of access non-transparent and difficult-to-do issue. Another problem arisen hereof is the absence of long-term contracts for gas transportation signed with the private companies that making situation with APG utilization unpredictable.

Conclusion:

All the aspects considered demonstrate that APG utilization (particularly through pumping into GTS) has not become a common practice in Russian Federation. Statistical data show APG flaring increase in 2006-2009. Despite the existence of the relevant legislatorial documents APG utilization is not duly monitored and enforced. On the other hand, the oil companies are extremely reluctant to implement construction of APG collecting and transport infrastructure as due to huge financial expenditures, low APG prices, uncertainty and non-transparency with access to GTS such a kind of projects represent the considerable investment risk.

These considerations are fully applicable for the proposed project, which is economically inefficient due to high capital expenditures for establishing APG transport infrastructure and low APG price.

[19] According to Resolution of the Government of Russian Federation # 334 dd 03.05.01"On providing access of independent entities to the gas transmission system of Gazprom"

http://www.businesspravo.ru/Docum/DocumShow_DocumID_24698.html

Therefore

- This proposed project activity is not a result of state policy for the encouragement of oil companies to utilize APG.
- Project activity is not widely spread in the oil&gas industry of Russia.

Thus, the project activity is not a common practice that means it is *additional*.

Step 3. Provision of additionality proofs

The information to support above argumentation is contained in the following documents:

- Technical description of the construction of gas pipeline from Sugmut oil field to Muravlenko GPP.
- License agreement №CLX 02131 NE for the development of Sugmut oilfield.
- Addendum №1 dd. 15.10.2009 to License agreement №CLX 02131 NE for the development of Sugmut oilfield.
- Protocol of investment committee № 6 of Gazprom neft, Moscow, dated 16.02.2007.
- Presentation to investment committee № 6 of Gazprom neft, Moscow

Explanations on how emission reductions are achieved

Baseline emissions
Under the baseline scenario APG (excluding the part of APG that feeds in the oil pipeline) recovered at BPS-1,2,3,3A of Sugmut oilfield and used in the project would be flared. Flare stacks are not able to provide complete combustion and non-oxidized hydrocarbons including methane contained in APG are partially released to the atmosphere. At that carbon dioxide CO_2 and methane CH_4 would be emitted. For the estimates of incompleteness of APG combustion at flare stacks, NII Atmosphere methodic determines the efficiency of underburning 3.5% is not burned completely, which causes methane emissions to the atmosphere. CO_2 emissions and CH_4 emissions (in terms of CO2 equivalent) are determined as product of APG amount used in the project (i.e. equal to APG volume transported to Muravlenko GPP through new gas pipeline) and the appropriate CO2 and CO2e emission factor.

Project emissions
Under the project activity APG will be efficiently used through injection into the field's gas pipeline system and transportation to the gas processing plant (GPP). Therefore, CH4 physical leaks from APG transportation into new gas pipeline to GPP are taken place in this situation. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.)

Leakage
Leakage effect is estimated as the net change in GHG emissions occurred outside the project boundary.

Emission sources outside the project boundary attributable to the project activity

Apart the project emissions there are also CO_2 emissions occurring outside the project boundary in the power grid where the electricity is produced to supply processing operations at the GPP and compression of the dry stripped gas into GTS after APG has been processed and second tape emissions (leaks) -methane (CH4) physical leaks during APG processing at Muravlenko GPP. The project provides for the increase of APG transportation to Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH4 fugitive leaks during the transportation of the project APG will be also increased outside the project boundary. Electricity amount is determined multiplying APG used in the project by the specific electricity consumption coefficient. CO_2 emissions outside the project boundary (leakage) are determined as a product of the electricity imported from the grid for processing and compressing APG used in the project and the appropriate value of CO_2 grid emission factor. CH4 amount is determined by multiplying APG used in the project by the specific losses coefficient during the processing APG.

Emissions outside the project boundary attributable to the Baseline
Without the project end consumers would have been used the volume of natural gas which energy equivalent is equal to the volume of associated gas delivered to the gas main pipeline by the project. Accordingly, the extraction of natural gas will cause GHG emissions due to methane physical loss . Also, emissions will occur during the natural gas processing and compression at stations of gas treatment. NG is combusted as the fuel at the gas turbine compressors gears.

Emission reduction
Emission reduction is determined through deduction of the project emissions and leakage effect from the baseline emissions. Detailed calculations are presented in the section E.

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

>>
The project boundary embraces CO2 and CH4 emission sources reasonably attributable to the project activity which are above (1%) of the overall quantity of CO2 emissions. In the following table the emission sources and GHG types are considered as to including them in the baseline or project boundary.

Table B 3.1. Emission sources

Scenario	Source	GHG type	Include/Do not include	Comment
Baseline	APG flaring	CO_2	Included	Main baseline emission source
		N_2O	not included	Negligibly small [20]
		CH_4	Included	Incomplete burning (3.5% of APG volume to be flared)
Project	Methane emissions that occur during transportation of APG through new pipeline to Muravlenko GPP	CO_2	not included	Negligibly small
		CH_4	Include	Main project emission source
		N_2O	not included	Negligibly small

[20] See Sugmut APG utilization_model.xls

Scenario	Source	GHG type	Included/ not included	Comment
Emission sources outside the project boundary attributable to the project activity	Fossil fuel use for electricity production in the grid to supply the processing of the APG at Muravlenko GPP due to the project activity	CO2	Included	Main leakage source[21]
	Methane (CH4) physical leaks during APG processing at Muravlenko GPP;	CH_4	Included	Main leakage source (physical leaks)[22]
	Methane (CH4) physical leaks during transportation of the stripped dry gas through the trunk gas pipeline.	CH_4	not included	Negligibly small
Emissions outside the project boundary attributable to the Baseline	NG production (well losses)	CO_2	not included	Negligibly small
		N_2O	not included	Negligibly small [23]
		CH_4	Include	Main leakage emission source
	NG processing (burning of fuel gas at gas turbine gear of gas treatment plant)	CO_2	Include	Main leakage emission source
		N_2O	not included	Negligibly small [24]
		CH_4	not included	Negligibly small

[21] See Sugmut calculations 18.08.2011 (with Rom).xls

[22] See Sugmut calculations 18.08.2011 (with Rom).xls

	Methane emissions that occur during transportation of NG from gas wells to Gazprom treatment plant	CH_4	not included	Negligibly small

Leakage assessment

In accordance with "Guidance on criteria for baseline setting and monitoring", (Version 02) the leakage is determined as "the net change of anthropogenic emissions by sources and/or removals by sinks of GHGs which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project." In case the potential leakage is determined the project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected.[25] The main emissions potentially attributable to leakage in the context of the project are emissions arising from:

- fossil fuel use for electricity production in the grid to supply the processing of the APG at Muravlenko GPP due to the project activity;
- methane (CH_4) physical leaks during APG processing at Muravlenko GPP;
- methane (CH_4) physical leaks during transportation of the stripped dry gas through the trunk gas pipeline.

Below, explanations on considering or not considering each leakage source for calculations of emission reductions are provided.

1. The project provides for the increase of electricity consumption at Muravlenko GPP as a result of processing of APG under project activity, therefore the emissions from fossil fuel use for electricity production in the grid will be also increased. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO_2 a year), and hence must be taken into account for CO2 emission reductions calculation.

2. The project provides for the increase of APG consumption for processing at Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH_4 emissions (leaks) during processing of the project APG will be also increased. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.

3. Commercial APG will displace an equivalent quantity of the natural gas delivered otherwise to end customers. As the equivalent amount of natural gas would be transported under the baseline, the leaks in the both scenarios are equal, which do not lead to additional emissions. Therefore these emissions can be neglected.

The main emissions potentially attributable to leakage in the context of the baseline are emissions arising from:

[25] In accordance with the paragraph 18 of the Guidance on criteria for baseline setting and monitoring (Version 02).

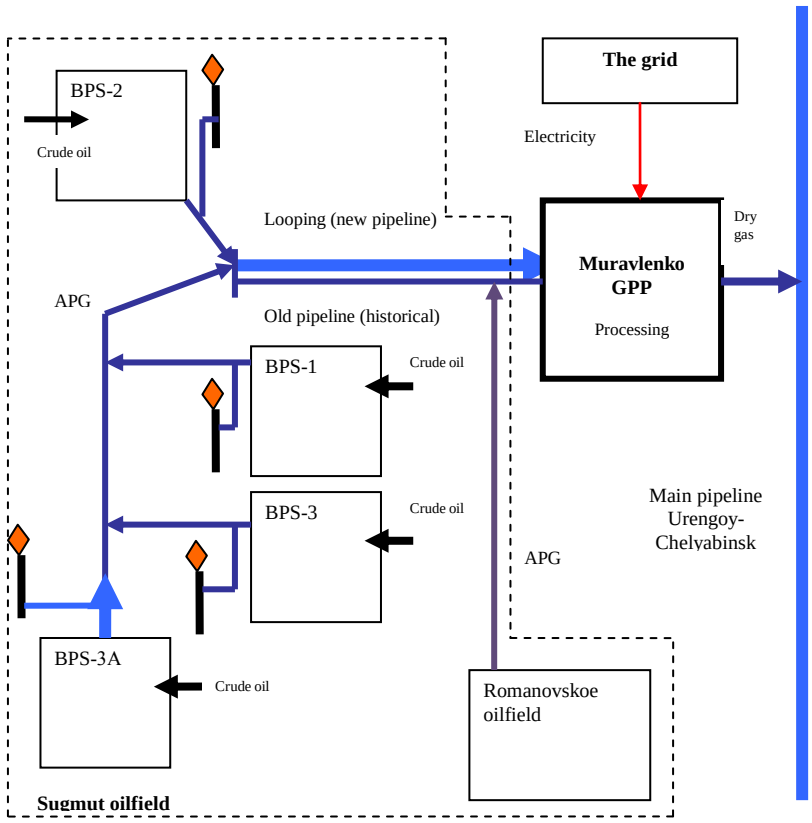
- Leaks due to production of natural gas at gas fields.
- Leaks due to combustion of the natural gas in gas turbines at gas treatment plants.

Below, explanations on considering or not considering each leakage source for calculations of emission reductions are provided.

4. The project provides for the decrease of NG consumption at the end-users that commercial APG will displace an equivalent quantity of the natural gas delivered otherwise to end customers, therefore to reduce emissions from natural gas and processing. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO_2 a year), and hence must be taken into account for CO2 emission reductions calculation. Commercial APG will displace an equivalent quantity of the natural gas delivered otherwise to end customers. As the equivalent amount of natural gas would be transported under the baseline, the leaks in the both scenarios are equal, which do not lead to additional emissions. Therefore these emissions can be neglected.

Schematically the project boundary embraces BPS -1,2,3,3A of Sugmut oilfield including new gas pipeline (looping).

Figure B.3.1. The project boundary



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

>>

Date of baseline setting: 11.12.2011.

The baseline has been designed by: National Carbon Sequestration Foundation – (NCSF, Moscow);
Contact persons:

Marat Latypov
Head of Project Development Department
Tel +7 499 788 78 35 ext 103
E-mail: LatypovMF@ncsf.ru

Timofey Besedovskiy,
Lead expert of Project Development Department;
Tel +7 499 788 78 35 ext. 108
E-mail: BesedovskiyTN@ncsf.ru

National Carbon Sequestration Foundation is not a participant of the Project.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

>>

The project's starting date is 01.05.2007. This first date of gas pipeline (looping) construction works.

C.2. Expected operational lifetime of the project:

>>

Expected operational lifetime of the project is 13 years and 4 months or 160 months: from 01.01.2008 till 01.05.2020

C.3. Length of the crediting period:

>>

Crediting period is determined within the budget period of Kyoto Protocol from 01.01.2008 till 31 December 2012 and makes 5 years or 60 months.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

>>

For description and justification of the monitoring plan a JI specific approach is used for this project. This approach is based on the provisions of JI guidelines on baseline setting and monitoring version 02 and includes the following steps:

Step 1. Indication and description of the approach chosen regarding monitoring

Step 2. Application of the approach chosen

Below the approach chosen is provided in a greater detail.

Step 1. Indication and description of the approach chosen regarding monitoring

Emission sources

Baseline emissions

Under the baseline scenario all extracted APG at the BPS-1,2,3,3A of Sugmut oilfield (without APG volume that was historically utilized) would have been flared that would lead to considerable CO_2 и CH_4 emissions. Due to incomplete combustion of APG flaring part of APG extracted to the atmosphere is not oxidizing. NII Atmosphere methodology determines the efficiency of underburning 3.5% is not burned completely, which causes methane emissions to the atmosphere. Methane emission factor in terms of CO2-eq. determined as follows by gas test results based on parameters determined in volume emissions of polluting substances by stationary sources at Sugmut oilfield

Project emissions

Under the project activity big volume of extracted APG will be efficiently used through injection into the newly-laid pipeline (looping) and transportation to the Muravlenko GPP. This will prevent the CO_2 and CH_4 emissions, which would have been under the baseline scenario in the case of flaring this APG volume on the BPS-1,2,3,3A stacks. Therefore, project emissions take place in this situation (physical leaks of methane through the pipeline walls are taken into account because the quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.)

For this purpose, the project envisages construction of a new 71.3 km pipeline (looping) with a diameter of 720 mm in parallel with the existing field pipeline with a diameter of 430mm from the BPS-2 to Muravlenko GPP (owned by Sibur Holding), as well as construction of a new 8,5 km pipeline section with a diameter of 530mm to the BPS-3A. These pipelines can increase the overall capacity of gas transportation system at Sugmut oilfield and provide the necessary transport of the most part of APG under the separation pressure from all BPS of Sugmut oilfield to Muravlenko GPP.

Electricity for operation of valves on the new gas pipeline supplied from the regional power system of «Tyumenenergo», which also leads to CO2 emissions on the power plants caused by the organic fuel combustion to generate the electric power. However, these emissions are also not considered because these are negligibly small (less than 2000tCO_2) [26].
Physical leaks of methane through the pipeline walls are taken into account because the quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.)

Emissions outside the project boundary occur due to the project
At Muravlenko GPP project APG is fractionated with the yield of the dry stripped gas and NGLs. Dry gas under high pressure is directed into the Gazprom main gas pipeline «Urengoy-Chelyabinsk» and NGLs is fed into the condensate pipeline «Urengoy-Surgut». The electricity consumption at the Muravlenko GPP for processing of the project APG and compressing the output products into the pipelines will cause considerable CO_2 emissions in the power grid.
The project provides for the increase of APG consumption for processing at Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH4 emissions (leaks) during processing of the project APG will be also increased. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.) [27]

Emissions outside the project boundary associated with the baseline
Losses for natural gas production are recommended for use in annual Gasprom environmental reported for period 2008-2010[28] .
To determine the emissions during preparation of natural gas we use conservative value of consumption of fuel gas at gas processing plants is based on the energy equivalent of fuel gas of modern gas turbine with an efficiency of 34%, based on PS-90 with a recently installed in the fields of Gazprom as the main fund of gas wells located in the compressor operating mode, ie, there is a need to compress the gas before it enters the pipeline since the wellhead pressure in main gas fields is not enough[29]

[26] See Sugmut APG utilization_model.xls

[27] See Sugmut APG utilization_model.xls

[28] http://gazprom.ru/interactive-reports/report2010/ru/

[29] http://www.indpg.ru/nefteservis/2008/04/20007.html

Furthermore, because of conservatism for the fuel gas flow rate reduction factor is applied as an adjustment to the pressure difference, unnecessarily gas turbines require less compressed natural gas to a final pressure of 75 atmospheres, since the average wellhead pressure at the wells of natural gas is much greater than the pressure in PNG first stages of separation. Hence the work done by the gas turbine to the end of compression will be less.

Key emission factors

Leakage outside the project boundary arising from the consumption of electricity for the tech needs (processing) at Muravlenko GPP is calculated the product of the specific coefficient of electricity consumption per cubic meter of processed gas and the volume of APG utilized under the project and fixed grid emission factor provided in the determination of emissions as the product of coefficient of consumed electricity on tech needs and fixed grid emission factor provided in approved project documentation "Installation two GTPP-400 at the Surgut GRES-2, OGK-4, Tyumen region, Russia", version 04, Annex 2.

We used emission factors from approved PDD "Installation two GTPP-400 at the Surgut GRES-2, OGK-4, Tyumen region, Russia" in order to be conservative. As a matter of fact this PDD provides emission factors for period 2008-2010 that are really bigger than the factor provided in Operational Guidelines for Project Design Documents of Joint Implementation Projects and proposed by Ministry of Economic Affairs of the Netherlands, May 2004 and Baseline study 2010 made by Lahmeyer Int. in April 2010:
-emission factor calculated for the exact energy system - 0,606 tCO2/MWh
-emission factors from Netherlands study (table 2)-0,557 tCO2/MWh
-emission factors from Baseline study 2010 made by Lahmeyer Int. for Ural region -0,582 tCO2/MWh

Specific coefficient of electricity consumption per cubic meter of pumped gas at Muravlenko GPP for the corresponding time period is provided by «Noyabrsk GPC» of Sibur Holding.

For 2008, the coefficient of electricity consumption made- 452 kWh/ths.m^3.
For 2009, the coefficient of electricity consumption made- 472 kWh/ths.m^3.
In 2010, it was - 496 kWh/ths.m^3.

For determining the baseline emissions the following monitoring points will be used:

Variables to be monitored

Based on that, the monitoring of the following parameters should be provided:

1. Volume of APG directed into pipeline to GPP from Sugmut oilfield.
2. Composition of extracted APG at BPS-1,2,3,3A at Sugmut oilfield.
3. Volume of APG directed into the old pipeline from Romanovo oilfield.

Maximum capacity of the old pipeline from Sugmut oilfield assumed to be constant according to feasibility study[30] for reasons of conservatism.

The monitoring points to determine these variables are represented on the following figure.

Figure D.1.1. Monitoring points

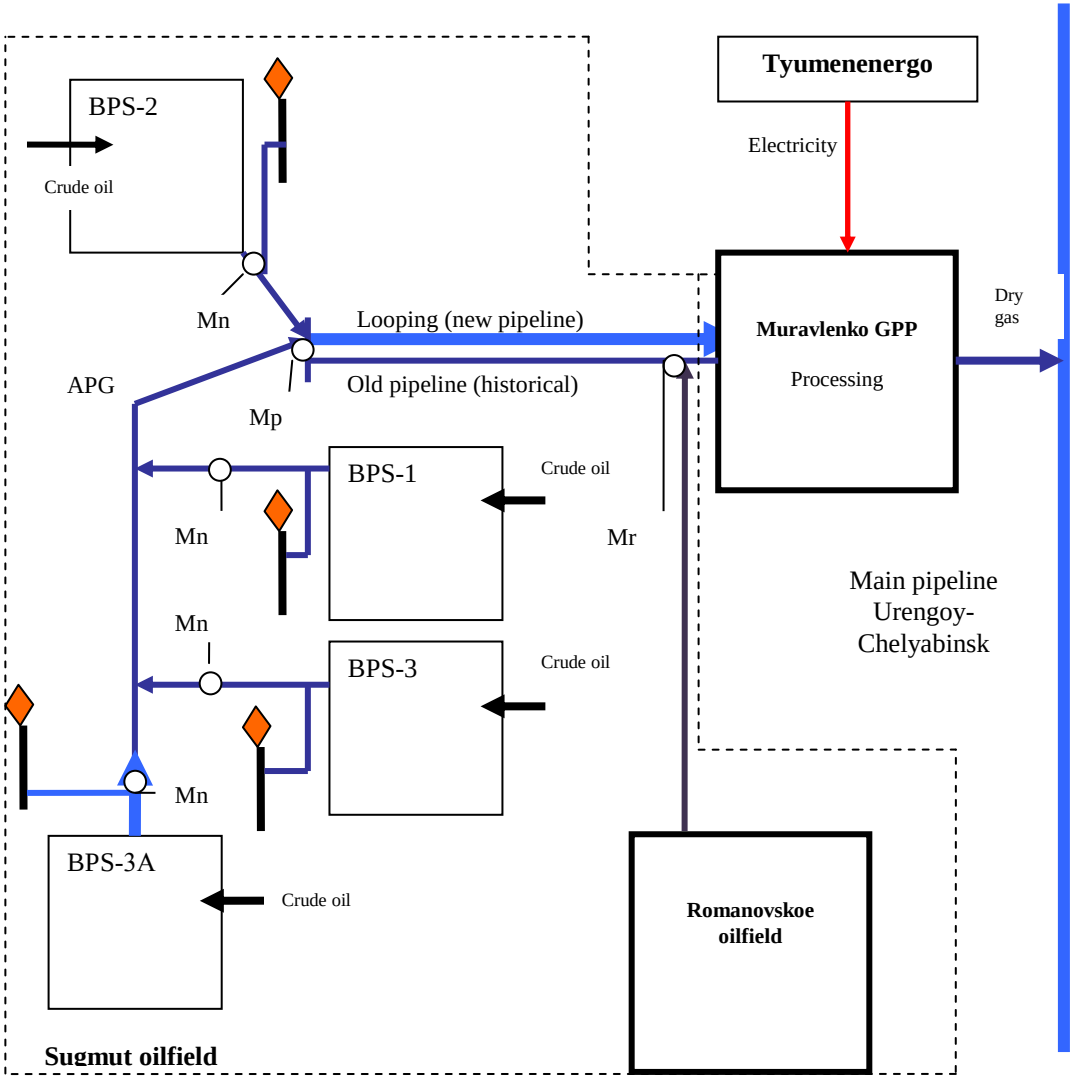
Description of monitoring points

Mp	*Volume of APG directed into pipeline to GPP from Sugmut oilfield.*
Mn	*Composition of extracted APG at BPS-1,2,3,3A at Sugmut oilfiled.*
Mr	*Volume of APG directed into the old pipeline from Romanovo oilfield.*

Legend

○	Monitoring points	→	Stream of crude oil
◆	APG flaring	→	Electricity import from the grid
GPP	Gas processing plant	→	Stream of APG for old pipeline
BPS	Boost pump station	→	Stream of project APG

[30] technical documentation of production testing of Sugmut oilfield at , Volume 2, from 15.05.1989, made by «GiproTumenneftegas»


Tyumenenergo
Electricity
BPS-2
Crude oil
Mn
Looping (new pipeline)
Muravlenko GPP
Processing
Dry gas
APG
Old pipeline (historical)
Mp
BPS-1
Crude oil
Mn
Mr
Main pipeline Urengoy-Chelyabinsk
Mn
BPS-3
Crude oil
Mn
BPS-3A
Crude oil
Romanovskoe oilfield
Sugmut oilfield

Step 2. Application of the approach chosen

See the following subsections.

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

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
Mn	*Chemical composition of extracted APG at BPS-1,2,3,3A at Sugmut oilfiled.*	*Gas chromatograph Crystallux 4000M*	*% vol.*	*m*	*monthly*	*100%*	*Paper and electronically*	*Analysis is made by the chemical – analytic laboratory*
Mp	*Total volume of APG directed into pipeline to GPP from Sugmut oilfield.*	*Flow meter DKS-400*	*ths m^3*	*m*	*Annually*	*100%*	*electronically*	*Flow meter is installed at the gate output collector*
Mr	*Volume of APG directed into the old pipeline from Romanovo*	*Flow meter DKS-150*	*ths m^3*	*m*	*Annually*	*100%*	*electronically*	*Flow meter is installed at the gate output BPS*

	oilfield.							

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

>>

Project emissions from APG transport operation throughout looping at Sugmut oilfield to Muravlenko GPP:

$$\mathbf{PE = E_{tr} * FC_{APG\_PJ} * 1000 * \sum cpy_{CH4} * \rho_{CH4} * GWP_{CH4}} \quad (1)$$

PE – project emission from APG transport operations, tCO2

$\mathbf{FC_{APG\_PJ}}$ **–** APG volume utilized in the project, i.e. transported to Muravlenko GPP through the new gas pipeline (looping), ths m^3

$\mathbf{E_{tr}}$ – IPCC specific coefficient from gas transport operations (Default carbon emission factors listed in the 2006 IPCC Guidelines on National GHG Inventories (transportation of the natural gas) volume 2 Chapter 4, table 4.2.5)

$\mathbf{\sum cpy_{CH4}}$– annual average volumetric fractions of methane in APG at BPS-1,2,3,3A Sugmutskoe oilfield bases on monthly minimal data of methane composition at each BPS, (information source – gas test protocol at standard conditions).

$\mathbf{\rho_{CH4}}$– the density of methane CH4 under standard conditions, equal to 0.668 kg/m^3

$\mathbf{GWP_{CH4}}$ – global warming potential for methane, equal to 21 tCO_2/tCH_4

$$\mathbf{FC_{APG\_PJ} = FC_{APG\_GPP} - FChis_{APG}} \quad (2)$$

$\mathbf{FC_{APG\_GPP}}$ – total volume of APG transported to the Muravlenko GPP, ths m^3

FChisAPG **-** historical utilized part of APG**,** which is transported to the Muravlenko GPP. Calculated parameter basis on historical technical documentation of Sugmut oilfield development and APG data of utilized volume from Romanovskoe oilfield.

$$\mathbf{FChis_{APG} = FChis_{APG\ max} - FC_{APG\_Rom}} \quad (3)$$

$\mathbf{FChis_{APG\ max}}$ – maximum capacity of historical pipeline, ths m^3 (technical documentation of production testing of Sugmut oilfield at , Volume 2, from 15.05.1989, made by «GiproTumenneftegas» (Table 1.20, page 42, about 131376 mln. m3-hydraulic calculation of the gas pipeline at the maximum oil production).

$\mathbf{FC_{APG\_Rom}}$ **-** utilized volume of APG from Romanovskoe oilfield**,** which is transported to the Muravlenko GPP into the old pipeline, ths.m3

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
Mn	*Chemical composition of extracted APG at BPS-1,2,3,3A at Sugmut oilfiled.*	*Gas chromatograph Crystallux 4000M*	*% vol.*	*m*	*monthly*	*100%*	*Paper and electronically*	*Analysis is made by the chemical – analytic laboratory*
Mp	*Total volume of APG directed into pipeline to GPP from Sugmut oilfield.*	*Flow meter DKS-400*	*ths m^3*	*m*	*Annually*	*100%*	*electronically*	*Flow meter is installed at the gate output collector*
Mr	*Volume of APG directed into the old pipeline from Romanovo oilfield.*	*Flow meter DKS-150*	*ths m^3*	*m*	*Annually*	*100%*	*electronically*	*Flow meter is installed at the gate output of BPS -*

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

>>

Baseline emissions from APG flaring (taking into account incomplete burning) at BPS-1,2,3,3A of Sugmut oilfield:

$$\mathbf{BE = (FC_{APG\_PJ} * (\sum avEF_{CO2,APG} + \sum av\ EF_{CH4,F}))} \quad (4)$$

BE – baseline emission from APG flaring, tCO_2.

$\mathbf{FC_{APG\_PJ}}$ – APG volume utilized in the project, i.e. transported to Muravlenko GPP through the new gas pipeline (looping), ths m^3

$\mathbf{\sum av\ EF_{CO2,APG}}$ – annual average CO_2 emission factor by APG flaring at each BPS-1,2,3,3A bases on minimal monthly data of APG (methane) composition at each BPS, tCO2/ths. m^3

$\mathbf{\sum av\ EF_{CH4,F}}$ – annual average CH_4 emission factor (in terms of CO2 equivalent) by APG flaring at each BPS-1,2,3,3A bases on minimal monthly data of APG (methane) composition at each BPS, tCO2e/ths. m^3

$$\mathbf{\sum av\ EF_{CO2,APG} = \sum av(y_{CO2} + (Nc_{CH4} * y_{CH4} + \sum_j Nc_{VOCj} * y_{VOC\,i})) * \rho_{CO2} * FE} \quad (5)$$

y_{CO2}, y_{CH4} y_{VOC} – annual average volumetric fractions of carbon, methane and volatile organic compounds VOC in APG at BPS-1,2,3,3A Sugmut oilfield bases on minimal monthly data of APG (methane) composition at each BPS, (information source – gas test protocol).

Nc_{CH4}, $\sum_j Nc_{VOCj}$ – quantity of carbon moles in a mole of methane and VOC accordingly ($\sum_j Nc_{VOCj}$ where j is the singular volatile hydrocarbon component.)

ρCO_2 – CO_2 density at 20°C is taken equal to 1.842 kg/m3.

FE –efficiency of APG combustion in a flare is taken equal to 0.965

Due to incomplete combustion of APG flaring part of APG extracted to the atmosphere is not oxidizing. NII Atmosphere methodic determines the efficiency then 3.5% is not burned completely, which causes methane emissions to the atmosphere. Methane emission factor in terms of CO2-eq. determined as follows:

$$\mathbf{\sum avEF_{CH4,F} = \sum_{cp} y_{CH4} * \rho_{CH4} * (1\text{-}FE) * GWP_{CH4}} \quad (6)$$

$\mathbf{y_{CH4}}$– annual average volumetric fractions of methane in APG at BPS-1,2,3,3A Sugmutskoe oilfield bases on monthly minimal data of methane composition at each BPS, (information source – gas test protocol at standard conditions).

$\mathbf{\rho_{CH4}}$– the density of methane CH4 under standard conditions, equal to 0.668 kg/m^3

FE - APG flaring efficiency, equal to 0,965

GWP_{CH4} – global warming potential for methane, equal to 21 tCO_2/tCH_4

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

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

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

>>

Option not used

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

Emissions outside the project boundary occur due to the project:

1. Extraction, pre-treatment, and in-field distribution of APG at Sugmut oilfield (so-called *technological losses*).
2. Transportation of the commercial stripped dry gas through the gas pipeline system.
3. Methane (CH_4) physical leaks during APG processing at Muravlenko GPP.
4. CO_2 emissions associated with fossil fuel use for electricity production in the grid to supply the processing of the APG under project activity at Muravlenko GPP.

Nevertheless, the leakages numbered 1-2 are not considered due to the following reasons:

1. According to the approved in LLC «Zapolyarneft» standards of APG process losses, they are constitute 1,05% of amount APG extraction[31]. However, they would have been, and under the baseline, since these standards are focused on BPS equipment and are not the new pipeline.
2. Commercial APG will displace an equivalent quantity of the natural gas by end customers that would be otherwise used. As the equivalent amount of natural gas would be transported under the baseline, the leaks in the both scenarios are equal, which do not lead to additional emissions. Therefore these emissions are neglected.
3. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.)

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
Me	*Specific electricity consumption coefficient at Muravlenko GPP during processing of APG under project activity*	*Request information on the specific electricity consumption from Muravlen-ko GPP*	*kWh/ths.m3*	*c*	*annually*	*100%*	*electronically*	Source of information is the technical documenta-tion.
Ml	*Specific losses coefficient from processing operations at Muravlenko GPP under project activity*	*Request information on the specific losses coefficient from processing operations at Muravlenko GPP*	*%*	*c*	*annually*	*100%*	*electronically*	Source of information is the technical documenta-tion.

[31]Approved in LLC «Zapolyarneft» standards of APG process losses in 2008 year

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

>>

Leakage effect is determined as net change of antropogenic emissions outside the project boundary:

$$LE = LE_{BL} - L \quad (7)$$

Where:

LE_{BL} is the emissions outside the project boundary that would have occurred without project activity

L is the emissions outside the project boundary occur due to the project

Emissions outside the project boundary associated with the project activity come from the following sources:

$$L = L_E + L_{proc} \quad (8)$$

LCO_2 emissions associated with fossil fuel use for electricity production in the grid to supply the processing of the APG under project activity at Muravlenko GPP are calculated according to the following formula:

$$L_E = SEC_{APG} * FC_{APG\_PJ} * EF_{CO2,ELEC} \quad (9)$$

SEC_{APG} – specific electricity consumption at Muravlenko GPP during the processing of APG under project activity, kWh/ths.m3[32]. This parameter is available annually on request from the operator of Muravlenko GPP, the «Noyabrskiy GPC». It's not fixed value, value depends on the volume pumped by the compressor station.

FC_{APG_PJ} - volume of APG transported to the Muravlenko GPP through the new pipeline under the project activity, at standard conditions, ths m^3

$EF_{CO2,ELEC}$– CO_2 grid emission factor, tCO_2/MWh

[32] Standard parameter provided by LLC «Noyabrskiy GPC» JSC «Sibur Holding» for Muravlenko GPP. For 2008 the coefficient of electricity to processing of APG volume under project (amounted to 452,34 KWh/ths.m3). For 2009, the coefficient of electricity to processing of APG volume under project (amounted to 472.9 KWh/ths.m3). In 2010- 496KWh/ths.m3. This parameter may be presented to the auditor.

Emissions associated with methane (CH_4) physical leaks during APG processing at Muravlenko GPP are calculated according to the following formula:

$$\mathbf{L_{proc} = E_{proc} * FC_{APG\_PJ} * 1000 * \sum cpy_{CH4} * \rho_{CH4} * GWP_{CH4}} \quad (10)$$

FC_{APG_PJ} - volume of APG transported to the Muravlenko GPP through the new pipeline under the project activity, at standard conditions, ths m^3

E_{proc} – specific losses coefficient from processing operations at Muravlenko GPP

$\sum cpy_{CH4}$– annual average volumetric fractions of methane in APG at BPS-1,2,3,3A Sugmutskoe oilfield bases on minimal monthly data of APG (methane) composition at each BPS, (information source – gas test protocol at standard conditions). Monitored in the monitoring of parameter – composition of the APG (Mn)

ρ_{CH4}– the density of methane CH4 under standard conditions, equal to 0.668 kg/m^3

GWP_{CH4} – global warming potential for methane, equal to 21 tCO_2/tCH_4

Emissions outside the project boundary associated with the baseline come from the following sources:

Total emissions associated with the baseline:

$$\mathbf{LE_{BL} = LE_{NG,rec} + LE_{NG\ GT}} \quad (11)$$

Emissions due to production of the natural gas at gas fields

The emissions determined by the following formula:

$$\mathbf{LE_{NG,rec} = FC_{APG\_PJ} * E_{NG\ prod} * GWP_{CH4}} \quad (12)$$

FC_{APG_PJ} is the project volume of the APG supplied to Muravlenko GPP, ths. m^3;

$EF_{NG\ prod}$ –coefficient of losses from natural gas production operations provided by annual GAZPROM ENVIRONMENTAL REPORT, %

GWP_{CH4} – is the global warming potential for methane, equal to 21tCO_2/tCH_4.

Emissions from the combustion of the natural gas in gas turbines at gas treatment plants

GWP_{CH4} – is the global warming potential for methane, equal to $21tCO_2/tCH_4$.

Leakage due to combustion of the natural gas in gas turbines at gas treatment plants

$$LE_{NG\ GT} = (SFC_{GT} * FC_{APG\_PJ} * EF_{CO2,GT})/l_{com} \quad (13)$$

SFC_{GT} is a specific fuel consumption (natural gas) in modern gas turbines for compressing and processing of natural gas supplied to a gas treatment plant, in m3 NG combusted/ths.m3 NG compressed:

$$SFC_{GT} = ((SEC_p * C)/ \acute{\varepsilon}_{modern\ GT})/NCV_{NG} \quad (14)$$

SEC_p is average specific electricity consumption at Muravlenko GPP at APG compressing&processing operations, kWh/ths.m3

C is coefficient of conversion from kWh to cal, 1kWh=0,86*10^6 cal

$\acute{\varepsilon}_{modern\ GT}$ is a efficiency of modern gas turbine, taken =34% (this value is close to the equivalent thermal efficiency of electric grid Ural with emission factor 0,606 tCO2/MWh)

NCV_{NG} is net calorific value of the natural gas (according to GOST 5542-87), kcal/m^3

$EF_{CO2,GT}$ – CO_2 emission factor due to the natural gas combustion in gas turbine drives at gas treatment plant, tCO_2/ths. m^3

$$EF_{CO2,GT} = (y_{CO2\ ng} + (Nc_{CH4} * y_{CH4\ NG} + Nc_{VOC} * y_{VOC\ NG})) * \rho_{CO2} * FE_{GT} \quad (15)$$

$y_{CO2\ NG}$, $y_{CH4\ NG}$, $y_{VOC\ NG}$ – volume fraction of carbon, methane and VOC of natural gas in a plant for processing gas[33];

Nc_{CH4}, $\sum Nc_{VOC}$ – number of moles of carbon in methane and VOC accordingly.

ρ_{CO2} – density of CO_2 at 20°C is assumed to be 1.842 кг/$м^3$.

[33] Typical composition of the natural gas is as follows: 91,9% CH4, 0,58% CO2, 0,68% N2 and 6,84% non-methane hydrocarbons by volume). Information source: IPCC 2006 Volume 2 Chapter 4, p. 4.58, Table. 4.2.4.

FE_{GT} – efficiency of gas combustion in gas turbines is assumed to be 1.

l_{com} is a specific coefficient of correction at first pressure at gas turbine work (average natural gas pressure at wells is 50ata-APG from 1st stage of separation-7ata), calculated parameter

$$l_{com} = ((P_{2p}/P_{1ng})^{((1,31-1)/1,31))-1}) / ((P_{2p}/P_{1apg})^{((1,31-1)/1,31))-1} \quad (16)$$

P_{2p}- pressure inlet at gas pipeline, 75 ata (Gasprom pressure standart of gas transport)

P_{1ng} – average pressure of natural gas at main gas well of Urengoy, calculated parameter (50 ata at 2008 year)[34]

P_{1apg}– average pressure of APG at 1 stage of separation of all BPS of Sugmut oilfield, project parameter (7 ata)[35]

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

>>

$$ER = BE - PE - LE \quad (17)$$

ER – CO_2 emission reductions due to the project, tCO_2
BE - CO_2 emission of baseline
PE -CO_2 emission of project
LE – Leakage, tCO_2

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

>>

Information concerning the environmental impact is presented according to Russian legislation[36].

[34] http://www.indpg.ru/nefteservis/2008/04/20007.html. Table 1-Текущее устьевое давление, ата

[35] Technical information of project pipeline and BPS, ата

[36] THE FEDERAL LAW "ABOUT PROTECTION OF ATMOSPHERIC AIR" (ON MAY, 4TH 1999 Г N 96-FZ)

According to the environmental legislation the company should control emissions of pollutants, waste water release, create and supply the wastes management system and should provide reports in authorized state bodies (Federal service on ecological, technological and nuclear supervising). In JSC «Gazpromneft-Noyabrskneftegas» work on environmental protection is managed by the Department of Environmental Safety and Environmental Protection of the Management of protection of labour, industrial and fire safety.

JSC "GPN-NNG" in stipulated dates provides official statistical reports and forms to legal state bodies including:

- 2-TP (air) – data on air protection including the information on number of captured and neutralized pollutants, detailed information on particular emissions of pollutants, number of emission sources, measures on emission reductions in atmosphere and emissions of separate groups of emission sources;
- 2-TP (water resources) – data on water usage including the information on water consumption from natural sources, waste water releases and concentration of pollutants in water, water capacity etc. waste water treatment facilities;
- 2-TP (wastes) – data on originating, usage, deactivation, transport and storage of wastes, including annual balance of wastes separated according their types and classes of danger.

On designing stage the sources and kinds of impact were analyzed, the evaluation of up-to-date condition of pollution was carried out, the preliminary forecast of condition was done and the environmental protection measures were planned. In process of the environmental impact evaluation the following components of environment were taken into account:

- earth;
- air;
- engineering and geological conditions;
- geomorphologic conditions;
- landscape complexes;
- soil;
- fauna.

According to the results of environmental studies and preliminary assessment of the impact on the environment of the planned economic activity, location of the planned facility "Construction of Sugmut oilfield. Pipeline BPS-2 Sugmutskoe oilfield - Muravlenko GPP" does not entail irreversible processes. The preliminary environmental impact is assessed as local, short-term and reversible.

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary

Mn, Mp, Mr D.1.2.1	low	Main monitoring devices are verified and calibrated by "Tyumen center for standardization, metrology and certification".

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

>>

The operational and management structure for the monitoring of emission reductions for the project will be adapted to the management system existing in Gazpromneft-Noyabrskneftegas Company. All measurements, were carried out as part of monitoring, are in accordance with the law "On uniformity of measurements" N 102-FZ dated 26/06/2008

Roles and responsibilities of persons, departments and organizations providing such a monitoring are presented in the following table:

№№	Organizations	Position/Department	Tasks	Comments
1.	NCSF, Moscow	Project Development Department	Calculates factual emission reductions in accordance with formulas presented in the section D. Prepares the Monitoring Reports.	Submits the Monitoring Reports (MR) to Gas & liquid hydrocarbon marketing department of Gazprom neft Company
2.	Gazprom neft, Moscow	Gas & liquid hydrocarbon marketing department	Coordination of works for preparation of the MR between NCSF, GH-NNG and Muravlenkovskneft (branch of GPN-NNG operating the project)	Approves Monitoring Reports (MR) Submits aMR for verification. Submits a verified MR in Muravlenkovskneft branch of Gazpromneft-Noyabrskneftegas
3.	Noyabrsk GPC (Sibur holding company), Noyabrsk	Administration	Preparation and submission of annual production data needed for leakage calculation	Submission of annual production data for leakage calculations to Gas & liquid hydrocarbon market department of Gazprom neft, Moscow
4.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Deputy general director of oil &gas preparation and delivery department	Approval of the balance of gas production	Submission of annual production data for emission reduction calculations to Gas & liquid hydrocarbon marketing department of Gazprom neft, Moscow
5.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Oil &gas preparation and delivery department	Analysis of data on the company's activities during the reporting period and preparation the balance of gas production	Submission of the balance of gas production for approval to the deputy general director of oil &gas preparation

				and delivery department
6.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Gas collection and delivery department	Collection of daily data for monthly APG balance	The balance includes the following information • Gas Resources • Gas production • The volume of gas burned in flares • The volume of gas used for tech needs, including technological losses • The volume of utilization gas Providing data for the gas balance for analysis in oil &gas preparation and delivery department
7.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Chemical-analytical laboratory	Preparation of monthly gas test results on APG composition (BPS-1,2,3,3A)	Submits tests results for analyses to the Gas collection and delivery department
8.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Central Dispatching Office	Collection of daily data	Submits daily data for analyses to the Gas collection and delivery department
9.	Muravlenkovskneft, branch of GPN-NNG, Muravlenko town	Shift operators at BPS-1,2,3,3A Sugmut oilfield and BPS of Romanovo oilfield	Collection of daily data	Data is fixed in a mode log and is submitted to the production-dispatching office

Necessary data for the calculation of greenhouse gas emission reductions are collected as it is usually carried out at the Muravlenkovskneft, so monitoring does not require any other additional information as compared with already collected under routine activities.

All quantitative data are on-line monitored, which is a usual, everyday practice: data from the monitoring checkpoints sensors, except data on APG composition, are transferred to the automated metering devices and are simultaneously registered with the electronic workstation database and displayed at the screens of the operator of BPS-1,2,3,3A Sugmut oilfield and BPS of Romanovo oilfield

All gas tests data are carried out by the certified Chemical-Analytical Laboratory that provides the necessary accuracy class.

Based on daily statistics monthly gas production balances are generated.

Calculation of CO2 emission reductions is carried out on the basis of the annual performance data of Muravlenkovskneft at the Sugmut&Romanovo oilfield and of the Noyabrsk GPC at Muravlenko GPP:

The completed and signed monthly gas production balances, reflecting the monthly values of variables specified in the monitoring plan are submitted at the Gas & Liquid Hydrocarbon Marketing Department (G&LHMD) of Gazprom neft. G&LHMD conducts internal audits of the data for the purpose the wrong formulation and errors.
Annually G&LHMD makes a request to Noyabrsk GPC «Sibur Holding Ltd» to provide the annual operational data at Muravlenko GPP needed for leakage calculation.
Annually, this department provides an annual summary of the gas production balance along with monthly data of APG composition from BPS-1,2,3,3A of Sugmut oilfield as well as annual data of electricity consumption per unit of output volume at the Muravlenko GPP to the Project Development Department NCSF Company for the calculation of the annual CO2 emissions reductions and preparation of the monitoring report.

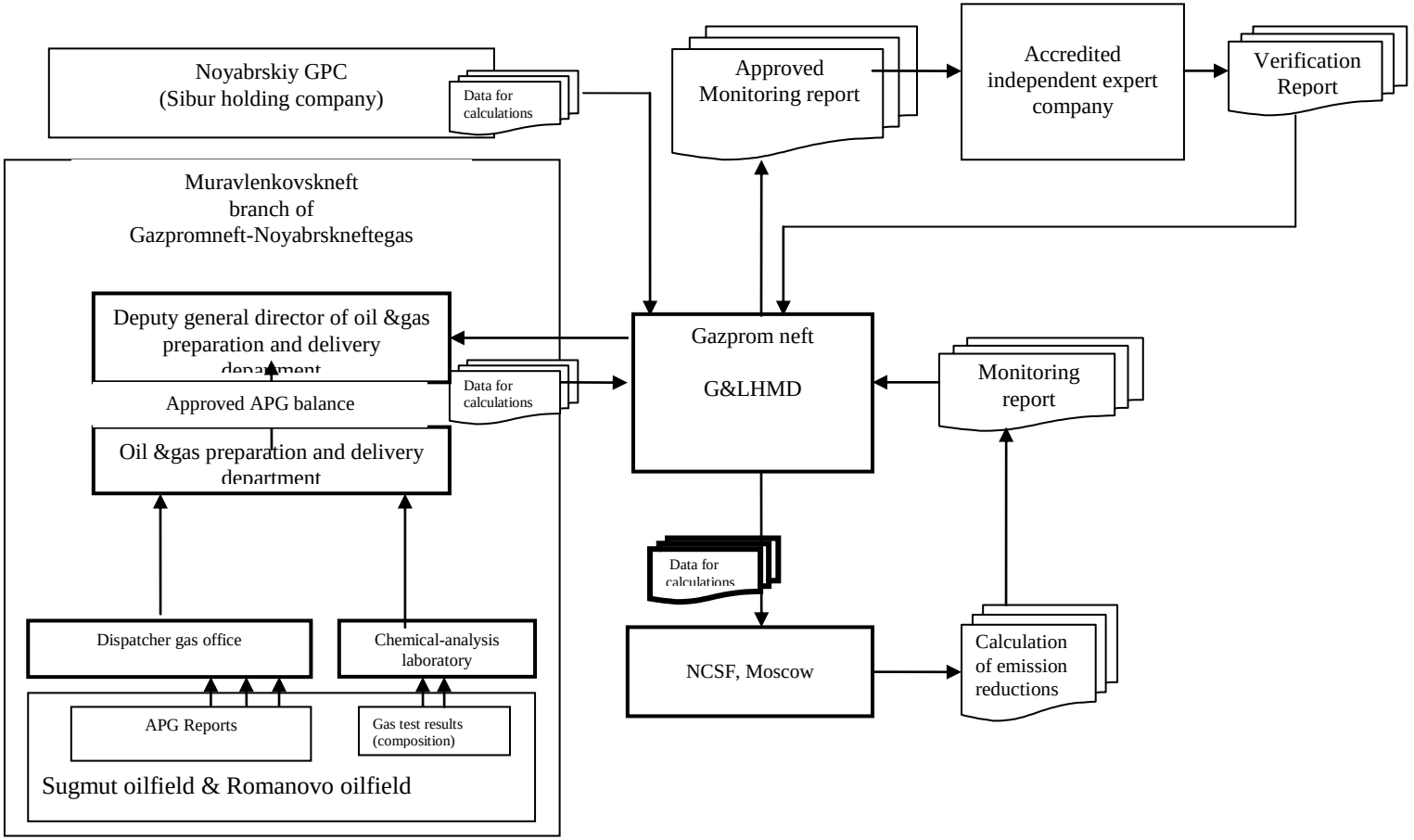
Annual monitoring report is sent to the G&LHMD of Gazprom neft Company for approval. Approved annual monitoring report is submitted to the accredited independent entity for the verification of achieved emission reductions.

Storage of monitoring data in G&LHMD carried out in electronic form on the network resources. Shelf life -5 years. Data of the APG composition stored in paper form- 5 years. All monitored data (for period 2008-2012) carried out in electronic form and paper form 5 years after the last transfer of ERUs.

All units (inc. flow meter and gas test units) under the monitoring plan of duplication (backup). However, if the backup device failure, then the APG amount calculation is carried out according to the adopted in GPN-NNG instructions for determining the gas factor and the amount of dissolved gas, extracted from the subsoil (RD39-0147035-225-88 dated 31.12.87)

Schematically, the monitoring structure looks as follows:

Figure D.3. Operational and management structure of the monitoring



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

>>

The monitoring plan was established by National Carbon Sequestration Foundation – (NCSF, Moscow);

Contact persons:

Timofey Besedovskiy,
Lead expert of Project Development Department;
Tel +7 499 788 78 35 ext. 108
Fax +7 499 788 78 35 ext. 107
E-mail: BesedovskiyTN@ncsf.ru

National Carbon Sequestration Foundation is not a participant of the Project.

SECTION E. Estimation of greenhouse gas emission reductions

For estimating CO2 emissions resulting from implementation of project and baseline emissions the formulas presented in section D are used.

Initial volume of APG recovered, flared and utilized comes from the approved forecast balance of Sugmut oilfield dated 15/09/2010 and presented by Gazpromneft-Noyabrskneftegaz.
Initial volume of APG recovered, flared and utilized comes from the approved actual balance 2007-2011 of Romanovo oilfield dated 08.2011 and presented by Gazpromneft-Noyabrskneftegaz.
Initial volume of APG recovered, flared and utilized for 2012 comes from the forecast balance of Romanovo oilfield dated 08.2012 and presented by Gazpromneft-Noyabrskneftegaz.

Baseline emissions are determined as the product of APG to be utilized under the project and appropriate CO_2 or CH_4 emission factor. For defining CO_2 and CH_4 emission factors of APG burned in flares, the approaches proposed in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Subchapter 4.2. Fugitive emissions from oil and natural gas systems) are applied.

Project emissions occurred due to electricity consumption for technical needs of the new gas pipeline and to CH4 emissions during transportation of APG to GPP are negligibly small and therefore, are not taken into account.
The project provides for the increase of APG transportation to Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH4 emissions (physical leaks) during the transportation of the project APG will be also increased in project boundary. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.

E.1. Estimated project emissions:

>>
The project provides for the increase of APG transportation to Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH4 emissions (physical leaks) during the transportation of the project APG will be also increased in project boundary. The quantitative assessment provided shows that these emissions are significant (higher than 2000 tCO2 a year), and hence must be taken into account for CO2 emission reductions calculation.

Table E 1.1. Calculation of project emission from CH4 phisycal leaks during the transporting APG to the Muravlenko GPP due to the project activity in 2008-2012

Item	Index	Unit	**2008**	**2009**	**2010**	**2011**	**2012**
IPCC CH4 coefficient for gas transporting operations	Etr	%	0,0011	0,0011	0,0011	0,0011	0,0011
APG used in the project	FC_{APG_PJ}	ths.m^3	289711	237331	215677	124206	76258
Global warming potential for methane	GWP_{CH4}	tCO_2/tCH_4	21	21	21	21	21
Project Emissions from APG transport operations to GPP	PE	tCO2	**4847**	**3763**	**3554**	**2078**	**1276**

E.2. Estimated leakage:

>>

Emissions outside the project boundary occur due to the project

Emissions outside the project boundary arising from the consumption of electricity for the tech needs (processing) at Muravlenko GPP is calculated the product of the specific coefficient of electricity consumption per cubic meter of processed gas and the volume of APG utilized under the project and fixed grid emission factor provided in the determination of emissions as the product of coefficient of consumed electricity on tech needs and fixed grid emission factor provided in approved project documentation "Installation GTPP-400 at the Surgut GRES-2, OGK-4, Tyumen region, Russia", version 04, Annex 2.

Specific coefficient of electricity consumption per cubic meter of pumped gas at Muravlenko GPP for the corresponding time period is provided by «Noyabrsk GPC» of Sibur Holding.
The estimation of leakage is presented in the following table.

Table E 2.1. Calculation of emissions outside the project boundary occur due to the projectfrom electricity consumption due to the project activity in 2008-2012

Item	Index	Unit	**2008**	**2009**	**2010**	**2011**	**2012**
Specific electricity consumption in GPP	SEC_{APG}	kWh/ths.m^3	452,34	472,9	496	496	496
APG used in the project	FC_{APG_PJ}	ths.m^3	289711	237331	215677	124206	76258
Grid emission factor	$EF_{CO2,ELEC}$	tCO2/MWh	0,606	0,606	0,606	0,606	0,606
Emissions from electricity consumption	Le	tCO2	79415	68027	64827	35661	22225

Emissions outside the project boundary arising from the increase of APG consumption for processing at Muravlenko GPP due to supply of additional volume of APG under the project activity, therefore the CH4 emissions (leaks) during processing of the project APG will be also increased.
CH4 amount is determined multiplying APG used in the project by the specific losses coefficient during the processing APG.

The specific losses coefficient during the processing APG at Muravlenko GPP for the corresponding time period is provided by «Noyabrsk GPC» of Sibur Holding.
For 2008, the coefficient of losses made 1,13%. For 2009, the coefficient made 0,73%. In 2010, it was 1,44%.
The estimation of leakage is presented in the following table.

Table E 2.2. Calculation of emissions outside the project boundary occur due to the project from tech losses during the processing APG due to the project activity in 2008-2012

Item	Index	Unit	**2008**	**2009**	**2010**	**2011**	**2012**
Specific losses coefficient	Eproc	%	1,13	0,73	1,44	0,73	0,73
APG used in the project	FC_{APG_PJ}	ths.m^3	289711	237331	215677	124206	76258

Global warming potential for methane	GWP_{CH4}	tCO_2/tCH_4	21	21	21	21	21
Emissions from tech losses at GPP	Lproc	tCO2	33260	16684	31076	13881	8522

Table E 2.3. Total emissions outside the project boundary occur due to the project in 2008-2012

Item	Index	Unit	**2008**	**2009**	**2010**	**2011**	**2012**
Emissions from electricity consumption	Le	tCO2	79415	68027	64827	35661	22225
Emissions from tech losses at GPP	Lproc	tCO2	33260	16684	31076	13881	8522
Total emissions outside the project boundary occur due to the projecteakage	L	tCO2	112675	84711	95903	49541	30747

Emissions outside the project boundary

Emissions outside the project boundary without the project

Total emissions outside the project boundary that would have occurred without project include the following:

- Emissions due to production of natural gas at gas fields.
- Emissions due to combustion of the natural gas in gas turbines at gas treatment plants.
- Emissions due to treatment and compressing of the natural gas at gas treatment plants.

These emissions are further considered in the estimation.

Table E 2.4 Emissions due to production of the natural gas at gas fields in 2008-2012

Item	Units	**2008**	**2009**	**2010**	**2011**	**2012**
APG used in the project - The volume of the project apg transportation to Muravlenkovskiy GPP without of historical volume	ths. m^3	289711	237331	215677	237331	215677
Gazprom losses during gas production at gas wells	%	0,00070	0,00052	0,00029	0,00029	0,00029
Global warming potential for methane	GWP_{CH4}	21	21	21	21	21
CO2 emission due to Gasprom gas production	**tCO2**	4249	2573	1336	806	517

Table E 2.5 Emissions due to combustion of the natural gas in gas turbines at gas treatment plants in 2008-2012

Item	Units	2008	2009	2010	2011	2012
The specific gas consumption on Gazprom treatment plants during the processing&compressing of the NG under baseline with effic-34% (modern gas turbine)	m3/ths.m3	158	158	158	158	158
CO2 emission factor from gas burning in gas turbine in treatment plants of Gazprom gas fields (standard chemical composition from IPCC 2006)	tCO2/ths.m3	2,106	2,106	2,106	2,106	2,106
APG used in the project -The volume of the project APG transportation to Muravlenkovskiy GPP without of historical volume	ths.m3	289711	237331	215677	124206	76258
Coefficient of pressure correction	-	7,6	7,6	7,6	7,6	7,6
CO2 emission due to Gasprom gas treatment plants during the NG processing	tCO2	12656	10368	9422	5426	3331

Table E 2.6 Total emissions outside the project boundary without the project

Item	Units	**2008**	**2009**	**2010**	**2011**	**2012**
Leakage due to production of the natural gas at gas fields	tCO2e	2573	1336	806	517	2573
CO2 emission due to Gasprom gas treatment plants during the NG processing	tCO2	12656	10368	9422	5426	3331
Total emissions outside the project boundary without the project	tCO_2e	15192	11537	9482	5497	3398

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

>>

Item	Units	**2008**	**2009**	**2010**	**2011**	**2012**
Sum PE+LE	tCO_2e	100616	75533	88699	45387	28174

E.4. Estimated baseline emissions:

>>

In absence of the project activity all APG (without historically utilized part) would have been burned in the flare stacks at BPS -1,2,3,3A of Sugmut oilfield leading to CO_2 and CH_4 emissions.

Table E 4.1. Total baseline emissions from APG flaring at BPS -1,2,3,3A in 2008-2012

Item	Index	Unit	2008	2009	2010	2011	2012
APG used in the project	FC_{APG_PJ}	$ths.m^3$	289711	237331	215677	124206	76258
CO_2 emission factor	$EF_{CO2,APG}$	$tCO_2/ths.\ m^3$	2,81	3,00	2,86	2,89	2,89
CO_2 emissions from APG flaring at BPS	$BE_{CO2,F}$	tCO_2	813807	712041	616204	358802	220292
APG used in the project	FC_{APG_PJ}	$ths.\ m^3$	289711	237331	215677	124206	76258
CH_4 emission factor in terms of CO_2	$EF_{CH4,F}$	$tCO_2/ths.\ m^3$	0,356	0,337	0,350	0,348	0,348
CH_4 emissions (in terms of CO_2)	$BE_{CH4,F}$	tCO_2e	103017	79991	75531	43175	26508
Total baseline emissions	BE	tCO_2	916824	792033	691735	401978	246800

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

>>

Emission reductions resulting from the project are calculated using the formula in section D.1.4. Numeric values are given in section E.6.

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

>>

Year	Estimated project emissions (tonnes of CO_2 equivalent)	Estimated leakage (tonnes of CO_2 equivalent)	Estimated baseline emissions (tonnes of CO_2 equivalent)	Estimated emission reductions (tonnes of CO2 equivalent)
2008	4847	112675	933729	816208
2009	3763	84711	804974	716500
2010	3554	95903	702493	603036
2011	2078	49541	408210	356590

2012	1276	30747	250648	218626
Total (tonnes of CO_2 equivalent)	15518	373576	3100054	2710960

SECTION F. Environmental impacts

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

>>

According to the State Committee for Ecology and Natural Resources of the Russian Federation Decree dated 15.04.2000, #r 372 "On compliance with regulations regarding the planned economic (and other) actions and their ecological impact", developers must include environmental issues into the project design documentation.

The section "Environment Protection" (EP) is integrated into the design documentation of this project. The design documentation was prepared in 2007 (section №3 of the technical documentation "Construction of Sugmut oilfield. Pipeline BPS-2 Sugmut oilfield - Muravlenko GPP", Giprotyumenneftegaz).

Based on the outcomes of the environmental section the permission on emissions of polluting substances by stationary sources was issued for the period of 03.05.2007 – 31.12.2011[37].

The technical design documentation "Construction of Sugmut oilfield. Pipeline BPS-2 Sugmut oilfield - Muravlenko GPP" has obtained the positive opinions issued by the Federal State Entity "GlavGosExpertiza Rossii" №418-08/EGE-0500/01 dated 18.11.2008.

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

>>

Project represents itself the environment-friendly activity, as it is directed at reducing APG flaring at BPS-1,2,3,3A of Sugmut oilfield. Thereby this leads to significant methane emissions reductions in the amount of 141 787 tCO_2e in the period of 2008 - 2012. As a result of reductions from incomplete burning of APG at BPS-1,2,3,3A of Sugmutskoe oilfield.

SECTION G. Stakeholders' comments

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

>>

No consultations with stakeholders regarding the project are required for the following reasons:

1. GPN-NNG leases a land allotted to the Sugmut oil field from a local government administration. Prior to the oil field development GPN-NNG had observed the required consultation with local population discussing the environmental issues, which might arise with regard of such activities.

[37] Resolution # 6 dd. 03.05.2007. Rostechnadzor.

2. The project site is located on the territory leased by GPN-NNG beyond water protection areas, reindeer pastures and animals' migration paths. This allotment does not fall into the category of a land of priority natural management.

3. The Project will enhance a local environmental background as its implementation will reduce the pollution with harmful substances coming out from the APG flaring.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	Joint Stock Company Gazpromneft-Noyabrskneftegaz
Street/P.O.Box:	59/87, Lenina Street
Building:	-
City:	Noyabrsk
State/Region:	-
Postal code:	629807
Country:	Russian Federation
Phone:	+7 (3496) 37-63-68
Fax:	+7 (3496) 37-60-20
E-mail:	nng@yamal.gazprom-neft.ru
URL:	http://nng.gazprom-neft.ru
Represented by:	AkimovVitaliy Viktorovich
Title:	Head of gas collection, preparation and delivery section department, deputy head of gas and oil preparation department
Form of addressing:	Mr.
Last name:	Akimov
Middle name:	Vitaliy
First name:	Viktorovich
Department:	Gas collection, preparation and delivery section department
Phone (direct):	+7 (3496) 37-63-68
Fax (direct):	+7 (3496) 37-60-20
Mobile:	-
Personal e-mail:	http://nng.gazprom-neft.ru

NCSF is not the project participant

ANNEX 2

BASELINE INFORMATION

The key information and data used to establish the baseline:

Fixed values determined once at the stage of verification and are available throughout the entire period 2008-2010

Data/Parameter	**$FC_{hisAPG\ max}$**
Data unit	ths m^3 (under standard conditions)
Description	Maximum capacity of historical pipeline at Sugmut oilfield
Time of determination/monitoring	constant
Source of data (to be) used	Technical documentation of production testing of Sugmut oilfield at , Volume 2, from 15.05.1989, made by «GiproTumenneftegas» (Table 1.20, page 42, about 131376 ths. m3-hydraulic calculation of the gas pipeline at the maximum oil production
Value of data applied (for ex-ante calculations/determinations)	131376
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.
QC/QA procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ρ_{CH4}
Data unit	kg/m^3
Description	CH_4 density at standard conditions (temperature of 20 °C (293.15 K, 68 °F) and an absolute pressure of 101.325 kPa (14.696 psi, 1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) used	Thermal Design of Boilers (Norm-based method), NPO CKTI, SPb, 1998
Value of data applied (for exante calculations/determinations)	0.668
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CH_4 density is necessary to calculate the emission factor for APG flaring
QC/QA procedures (to be) Applied	Reference data
Any comment	-

Data/Parameter	ρ_{CO2}
Data unit	kg/m^3

Description	CO_2 density at standard conditions (temperature of 20 °C (293.15 K, 68 °F) and an absolute pressure of 101.325 kPa (14.696 psi, 1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) used	Thermal Design of Boilers (Norm-based method), NPO CKTI, SPb, 1998
Value of data applied (for exante calculations/determinations)	1.842
Justification of the choice of data or description of measurement methods and procedures (to be) applied	CO_2 density is necessary to calculate the emission factor for APG flaring
QC/QA procedures (to be) Applied	Reference data
Any comment	-

Data/Parameter	**GWP_{CH4}**
Data unit	tCO_2/tCH_4
Description	Global Warming Potential of methane required for the calculation of CH_4 emission factor from APG flaring at BPS-1,2,3,3A
Time of determination/monitoring	constant
Source of data (to be) used	Decision 2/CP.3 **http://unfccc.int/resource/docs/cop3/07a01.pdf#page=31** Climate Change 1995, The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report, page 22. http://unfccc.int/ghg_data/items/3825.php
Value of data applied (for exante calculations/determinations)	21
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Global Warming Potential of methane is needed to calculate the CH_4 emission factor due to the combustion of the APG.
QC/QA procedures (to be) Applied	Reference data
Any comment	-

Data/Parameter	**Nc**
Data unit	unit
Description	Quantity of carbon moles in a mole of a component of APG
Time of determination/monitoring	constant
Source of data (to be) used	Natural science

Value of data applied (for ex-ante calculations/determinations)	Carbon dioxide, CO2	1
	methane, CH4	1
	ethane, C2H6	2
	propane, C3H8	3
	i-butane, C4H10	4
	n-butane, C4H10	4
	i-pentane, C5H12	5
	c-pentane, C5H12	5
	n-pentane, C5H12	5
	hexane, C6H14	6
	geptane, C7H16	7
	octane, C8H18	8
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Quantity of carbon moles in a mole of a component of APG is needed to calculate the CO2 emission factor due to the combustion of the APG.	
QC/QA procedures (to be) applied	Reference data	
Any comment	-	

Data/Parameter	ε
Data unit	Fractions
Description	Unburned carbon factor for soot combustion of APG in flare units
Time of determination/monitoring	Determined once at the PDD development stage
Source of data (to be) used	"Guidelines for Calculation of Air Pollutant Emission from APG Flaring" developed by the Scientific Research Institute for Atmospheric Air Protection in Saint-Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	0.035 (3.5%)
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The value is prescribed by the calculation guidelines for real data
QA/QC procedures (to be) applied	Based on reference data
Any comment	-

The parameters to be directly monitored

Data/Parameter	**FC_{APG_GPP}**
Data unit	ths m^3 (under standard conditions)
Description	Main source of the baseline emissions. APG produced in the baseline would be mostly flared, with the exception of the part that has been historically transported to GPP.
Time of determination/monitoring	annualy

Source of data (to be) used	Calculated parameter (based on measured from gas meter at BPS-1,2,3,3A)
Value of data applied (for ex-ante calculations/determinations)	**2008**: 331387; **2009**: 283307; **2010**: 280253; **2011**: 220027; **2012**: 165137
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.
QC/QA procedures (to be) Applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".
Any comment	-

Data/Parameter	**FC_{APG_PJ}**
Data unit	ths m^3 (under standard conditions)
Description	Total volume of APG transported to the Muravlenko GPP from Sugmut oilfield into new pipeline (looping)
Time of determination/monitoring	annualy
Source of data (to be) used	Calculated parameter (based on measured from gas meter at BPS-1,2,3,3A and calculation parameter of total volume of APG transported to the Muravlenko GPP)
Value of data applied (for ex-ante calculations/determinations)	**2008**: 289711; **2009**: 237331; **2010**: 215677; **2011**: 124206; **2012**: 76258
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation.
QC/QA procedures (to be) Applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".
Any comment	-

Data/Parameter	Chemical composition of APG at BPS-1,2,3,3A of Sugmut oilfield
Data unit	%
Description	Chemical composition under standard conditions of APG required for the calculation of emissions factor from flaring at BPS-1,2,3,3A
Time of determination/monitoring	Mounthly (based on minimal CH4 data for each BPS)
Source of data (to be) used	Gas chromatograph Crystallux 4000M

Value of data applied (for ex-ante calculations/determinations)

	2008	2009	2010	2011	2012
Carbon dioxide, CO2	1,23%	1,32%	1,47%	1,339%	1,339%
methane, CH4	72,42%	68,65%	71,33%	70,799%	70,799%
ethane, C2H6	5,21%	5,55%	5,42%	5,392%	5,392%
propane, C3H8	9,79%	10,91%	9,34%	10,013%	10,013%

	i-butane, C4H10	1,59%	1,93%	1,83%	1,784%	1,784%
	n-butane, C4H10	3,93%	5,17%	4,71%	4,603%	4,603%
	i-pentane, C5H12	0,96%	1,29%	1,11%	1,118%	1,118%
	c-pentane, C5H12	0,00%	0,00%	0,00%	0,080%	0,080%
	n-pentane, C5H12	1,44%	1,83%	1,57%	1,613%	1,613%
	hexane, C6H14	1,61%	1,78%	1,59%	1,659%	1,659%
	geptane, C7H16	0,01%	0,01%	0,01%	0,000%	0,000%
	octane, C8H18	0,01%	0,01%	0,01%	0,000%	0,000%
	hydrogen sulfide, H2S	0,00%	0,00%	0,00%	0,000%	0,000%
	nitrogen, N2	1,57%	1,45%	1,59%	1,538%	1,538%
	oxygen, O2	0,00%	0,00%	0,00%	0,00%	0,00%
Justification of the choice of data or description of measurement methods and procedures (to be) applied	The chemical composition is needed to identify the volume fraction of carbon, methane and VOC and calculate the CO2 emission rates due to the combustion of the project gas. The chemical composition to 2008-2010 based on real measured data from each BPS. Data to 2011-2012 based on average annual data from real period 2008-2010					
QC/QA procedures (to be) Applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".					
Any comment	-					

Data/Parameter	**FC_{APG_Rom}**				
Data unit	ths m^3 (under standard conditions)				
Description	Volume of APG directed into the old pipeline from Romanovo oilfield				
Time of determination/monitoring	annually				
Source of data (to be) used	Flow meter DKS-0.6-300				
Value of data applied (for ex-ante calculations/determinations)	**2008**	**2009**	**2010**	**2011**	**2012**
	89700	85400	66800	35555	42497
Justification of the choice of data or description of measurement methods and procedures (to be) applied	APG volume is needed for baseline emissions calculation. APG flow is measured with precise and regularly calibrated metering devices				
QC/QA procedures (to be) Applied	Main monitoring devices are verified and calibrated "Tyumen center for standardization, metrology and certification".				
Any comment	-				

Data/Parameter	**$EF_{CH4,F}$**				
Data unit	$tCO_2e/ths.m^3$				
Description	Methane emission factor by APG flaring at BPS-1,2,3,3A				
Time of determination/monitoring	Once a month				
Source of data (to be) used	APG emission factor calculated data				
Value of data applied (for ex-ante calculations/determinations)	**2008**	**2009**	**2010**	**2011**	**2012**

		0,356	0,337	0,350	0,348	0,348
Justification of the choice of data or description of measurement methods and procedures (to be) applied	Methane emission factor is needed to calculate the CO2e emission rates due to the flaring of APG at BPS-1,2,3,3A					
QC/QA procedures (to be) Applied	Main monitoring devices are verified and calibrated “Tyumen center for standardization, metrology and certification”.					
Any comment	-					

Annex 3

MONITORING PLAN

Please see section D

- - - - -