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

CONTENTS

Annexes

SECTION A. General Description of the project

A.1. Title of the project:

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Utilization of associated petroleum gas at the fields of Companies of TNK-BP Group, Orenburg oblast

Sectoral scope: 10 (Fugitive emissions from fuels)

Version: 02
26.04.2012

A.2. Description of the project:

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The project activity is carried out at the four groups of fields located at the territory of Orenburg region: Pokrovskaya, Bobrovskaya, West and East ones. The project foresees the construction of a system for collection and transportation of associated petroleum gas at the territories of Buzuluksky, Kurmanaevsky, Pervomaisky, Perevolotsky areas. The development of fields is carried out by OJSC «Orenburgneft» – a subsidiary production unit of TNK-BP.

Situation before the project realization

In accordance with the oil preparation technology the associated petroleum gas (APG) is allocated at the production objects. APG is a by-product during the oil separation before its supply in pipelines. One ton of oil can contain from 1-2 to a few thous. m^3. The produced oil comes to the separation station, where it is separated from APG. The separation takes place stepwise. APG of the last separation stages is burned at the flare plants due to the absence of necessary transport infrastructure, insufficient capacity of APG collection system and the absence of customers at the production sites. APG of the first stages of separation at some fields is supplied to the gas-processing plants (GPP). At some fields the utilization of APG is completely absent.

The gas utilization at the fields of Pokrovskaya group constitutes less than 60%. The collected APG is realized at the Otradnensky GPP. The utilization from Pasmurovsky, Ryabinovsky, Gremiachinsky, Pronkinsky, Malakhovsky, Kodiakovsky group of fields is absent.

The structures for APG utilization is practically absent at the objects of oil preparation and transportation of Bobrovskaya group of fields. The existing infrastructure of gas collection is not complete. The collected APG is transported to the Neftegorsky GPP. The level of associated petroleum gas utilization constitutes less than 70%.

Before putting into operation of the first stage of Zaikynsky GPP (ZGPP) at the fields of West group the unstripped gas is supplied to the inlet of gas pipeline "Orenburg-Samara" through the common gas pipeline. Since 2001 the gas has the treatment in the volume of 1.1 billion $м^3$/year at the first turn of ZGPP, but the total gas of last separation stages has flaring. The level of gas utilization is 80%

The practically total APG volume has the flaring at the fields of East group. The level of gas utilization is 10%.

Project objective

The current project is directed for the useful utilization of APG, which could be otherwise burned in the flare plants of the oil production objects of Orenburg region, and therefore for the GHG reduction. The company is waiting that the ERUs sales within the frameworks of joint implementation will improve the project's cost efficiency.

Description of Project
The company TNK-BP with available significant APG resource attempts to increase the level of its useful utilization. The project foresees the construction for this purpose of APG collection system for the consequent gas transportation at GPP of Orenburg region.

The system of APG collection at Pokrovskaya group foresees for this purpose the construction of Pasmurovskaya GCS and two gas pipelines for gas transportation.

System of APG collection at Bobrovskaya Group foresees the construction of Gerasimovskaya, Tananikskaya, Dolgovskaya, Savelovskaya and Kurmanaevskaya GCS's. The five gas pipelines are putting into operation for the APG transportation.

System of APG collection at Western Group of fields foresees the construction of Rostashinskaya GCS and gas pipelines for gas transportation.

System of APG collection at Eastern Group of fields foresees the construction of Vakhitovskaya GCS and one as pipeline for APG transportation and processing.

Project's history
The project was established in the end of 2005 for solving the problem of associated petroleum gas flaring in Orenburg region. At the stage of decision making of the project's implementation as JI. The project's management group made an assessment of the possibility of use carbon credits in the framework of KP as additional source of project's financing. These decisions were fixed in the TNK-BP Protocol of 21.11.2006. The financial memorandum was approved in 2007. In 2008 the approved variant underwent the changes in connection with increasing volume of works, changing cost of equipment and putting into operation the additional objects. The revised financial memorandum was approved by Committee on Investments of JSC «TNK-BP Management».

Baseline scenario
The volume of APG utilized by the project in accordance to basic scenario could be burned in the flares that could result in the considerable GHG emissions: CO_2 and CH_4 (as a result of incomplete flaring). The continuation of APG flaring for this scenario is connected with the restrictions for increasing the useful usage if APG that is confirmed by the following facts:

- the policy in this industry and legislation don't provide the real mechanisms of efficient APG utilization for the moment of making a decision on the project realization;
- the considerable capital costs for the creation of infrastructure for the efficient usage of APG and the low prices for APG.

Emission reduction
This project will result in the prevention of APG flaring in the volume of 1.205 billion m^3 in the period of 2008-2012. In this case the GHG emission reduction will constitute 3 852 922 tonnes of CO_2-equivalent for the pointed period.

A.3. Project participants:

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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)	Legal entity A1: TNK-BP	No
Party B: Switzerland (Other Party)	Legal entity B1: Vitol S.A.	No

TNK-BP is a leading Russian oil company and is among the top ten privately-owned oil companies in the world in terms of crude oil production. The company was established in 2003 as a result of the merger of BP's Russian oil and gas assets and the oil and gas assets of Alfa, Access/Renova group (AAR). BP and AAR each own 50% of TNK-BP. The shareholders of TNK-BP also own close to 50% of Slavneft oil company.

TNK-BP is a vertically integrated oil company with a diversified upstream and downstream portfolio in Russia and Ukraine. The company's upstream operations are located primarily in West Siberia (Khanty-Mansiysk and Yamalo-Nenets Autonomous Districts, Tyumen Region), East Siberia (Irkutsk Region), and Volga-Urals (Orenburg Region). In 2010 the company produced on average 1.74 mboed (excluding its 50% share in Slavneft).[1]

A.4. Technical description of the project:

A.4.1. Location of the project:

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Russian Federation, Volga Federal District, Orenburg region

A.4.1.1. Host Party(ies):

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Russian Federation

[1] http://www.tnk-bp.ru/en/company

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

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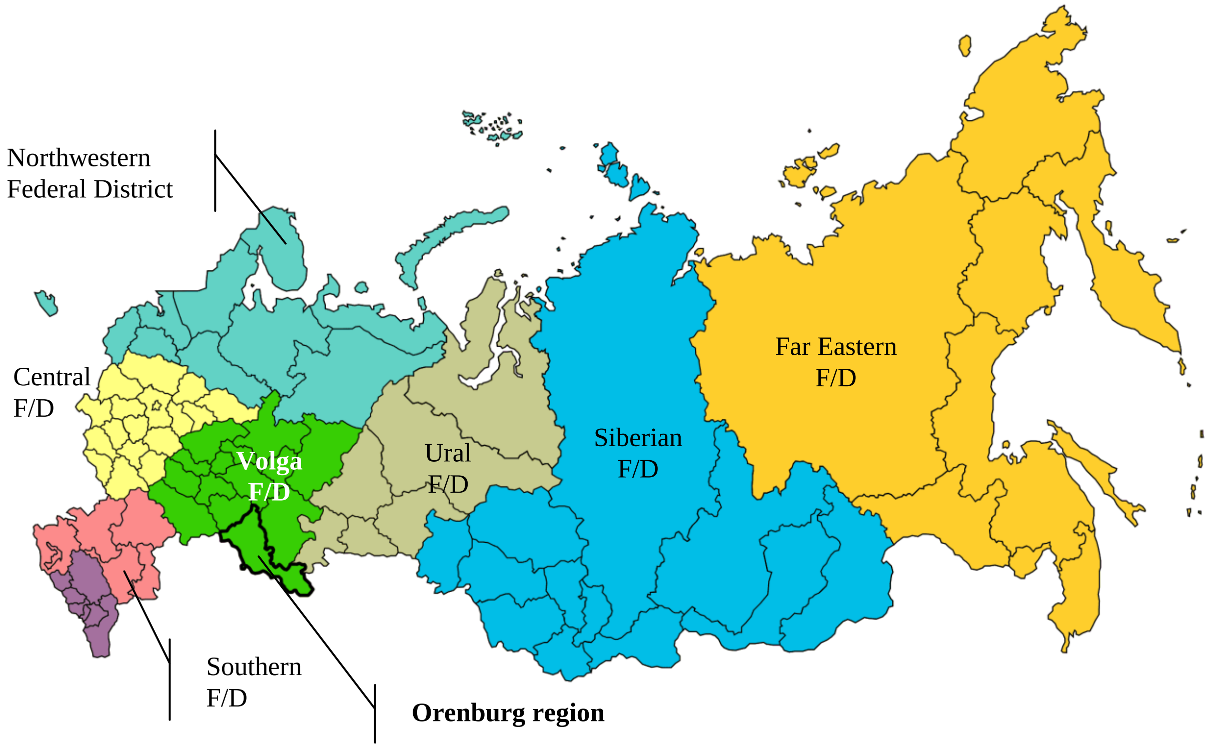
Figure A.4.1.2. Orenburg Area on the map of the Russian Federation



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

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1. Pasmurovskoye field, Pasmurovskaya GCS: Buzuluksky area, 35 km at North from city Buzuluk, coordinates - 53º01.0’ of northern latitude, 52º19.6’ of eastern longitude[2]
2. Gerasimovskoye field, Gerasimovskaya GCS: Kurmanaevsky area, 60 km from city Buzuluk, coordinates - 52º41.3’ of northern latitude, 51º34.3’ of eastern longitude.
3. Tananykskoye field, Tananykskaya GCS: Kurmanaevsky area, 30 км. At West to village Kurmanaevka, coordinates - 52º33.8’ of northern latitude, 51º37.8’ of eastern longitude
4. Dolgovskoye field, Dolgovskaya GCS: Kurmanaevsky area, 35 km from city Buzuluk, coordinates - 52º28.4’ of northern latitude, 51º45.7’ of eastern longitude
5. Kurmanaevskoye field, Kurmanaevskaya GCS: Kurmanaevsky area, 35 km at South from city Buzuluk, coordinates - 52º31.0’ of northern latitude, 51º57.9’ of eastern longitude
6. Savelovskoye field, Savelovskaya GCS: Kurmanaevsky area, 35 km from city Buzuluk, coordinates - 52º35.6’ of northern latitude, 52º01.8’ of eastern longitude
7. Rostashinskoye field, Savelovskaya GCS: Pervomaisky area, 15 km at North from regional center Pervomaisky, coordinates - 52º03.6’ of northern latitude, 51º37.2’ of eastern longitude
8. Vakhitovskoye field, Vakhitovskaya GCS: Perevolotsky area, coordinates - 52º17’ of northern latitude, 54°27’ of eastern longitude.

[2] License for the right of subsoil utilization

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

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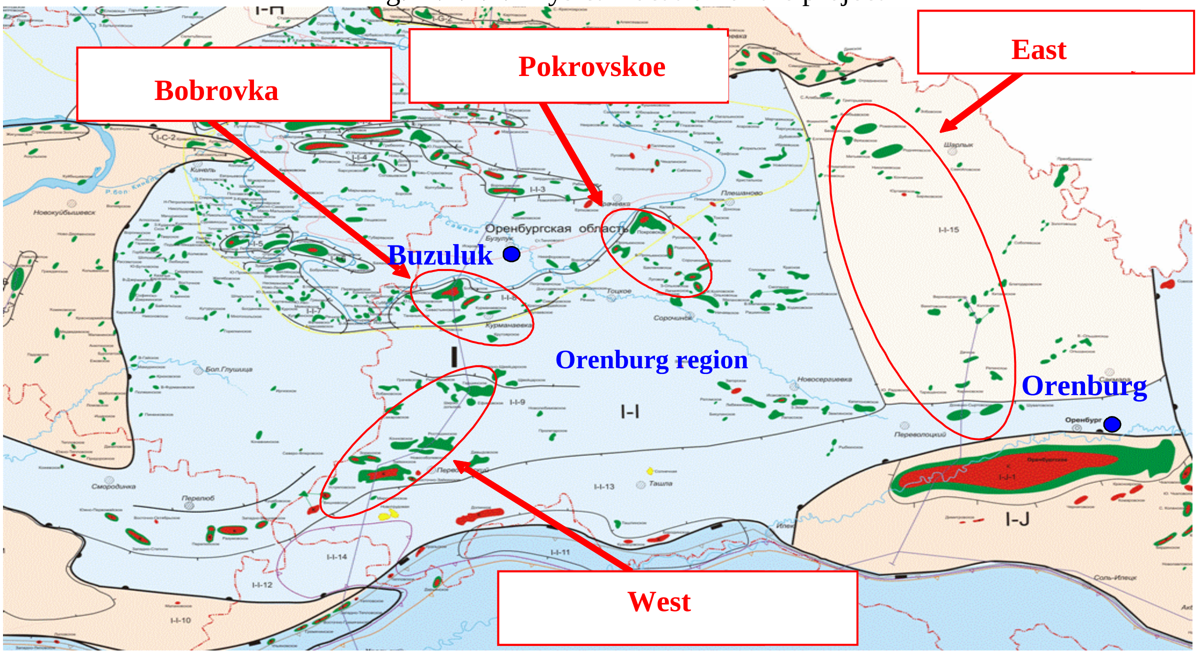
Fig. A.4.1.4. Physical location of the project



Orenburg region is situated in the boundary of Europe and Asia in the basin of the middle current of the Ural. It has boundaries with Kazakhstan, Tatarstan, Bashkortostan, Chelyabinsk, Samara and Saratov regions. Area of the region is 124 thousand sq. km. Length from west to east is 750 km.

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

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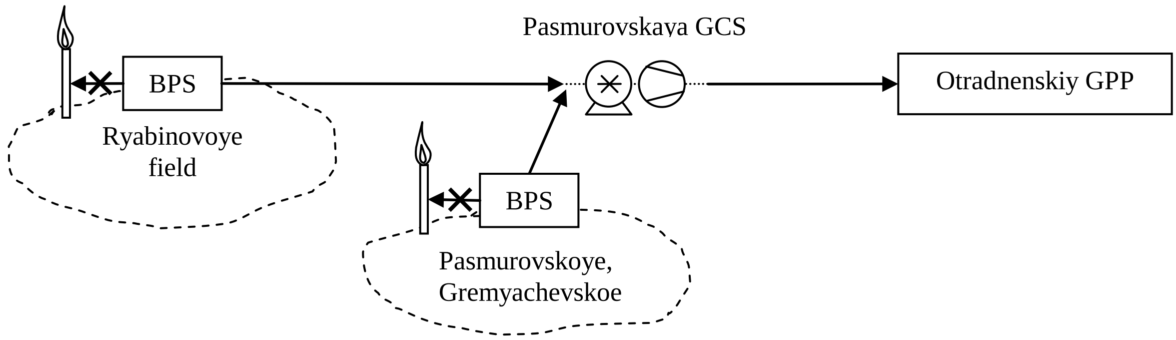
Description of the process

Pokrovskaya group of fields

The system of APG collection foresees the construction of Pasmurovskaya GCS, gas pipeline ø219 mm with length 17 km from Pasmurovskaya GCS to the point of branch jointing for the transportation of associated petroleum gas through the section of gas pipeline «Pokrovskaya GCS - Otradnensky GPP» and gas pipeline ø219 mm with length 30 km from Ryabinovaya BPS (booster pump station) to Pasmurovskaya GCS .

The associated petroleum gas of Pokrovskaya group of fields comes for the compression at Pasmurovskaya GCS from Pasmurovskaya and Ryabinovaya BPS, where there is the APG allocation. The oil-gas saturated mixture (OSM) comes to the Pasmurovskaya BPS from the wells of Pasmurovskoye and Gremiachinskoye fields. The OSM is coming to the Ryabinovaya BPS from the wells of Ryabinovoye field.

Figure 4.2.1 Pokrovskaya group of fields



Bobrovskaya group of fields
The system of APG collection foresees the construction of Gerasimovskaya, Tananykskaya, Dolgovskaya, Savel'evskaya and Kurmanaevskaya GCS. The following gas pipelines are putting into operation for APG transportation:

- Dolgovskaya GCS—a point of branch jointing in gas pipeline of Bobrovskaya GCS-Neftegorsky GPP with ø273 mm and a length 12.1 km;
- Krutoyarskaya BPS—Kurmanaevskaya GCS with ø219 mm and a length 12.88 km;
- Skvortsovskaya BPS—Kurmanaevskaya GCS with ø159 mm and a length 21.89 km;
- Kurmanaevskaya GCS—to the existing Bobrovskaya GCS at Neftegorsky GPP with ø377 mm and a length 22.3 km;
- Savel'evskaya GCS – to the existing Bobrovskaya GCS and at Neftegorsky GPP with ø273 mm and a length 10.17 km.

The APD allocated at the Gerasimovskaya PWSU (preliminary water separation unit) is coming to the Gerasimovskaya GCS. The ASG is separated from OSM coming from the well of Gerasimovskoye field.

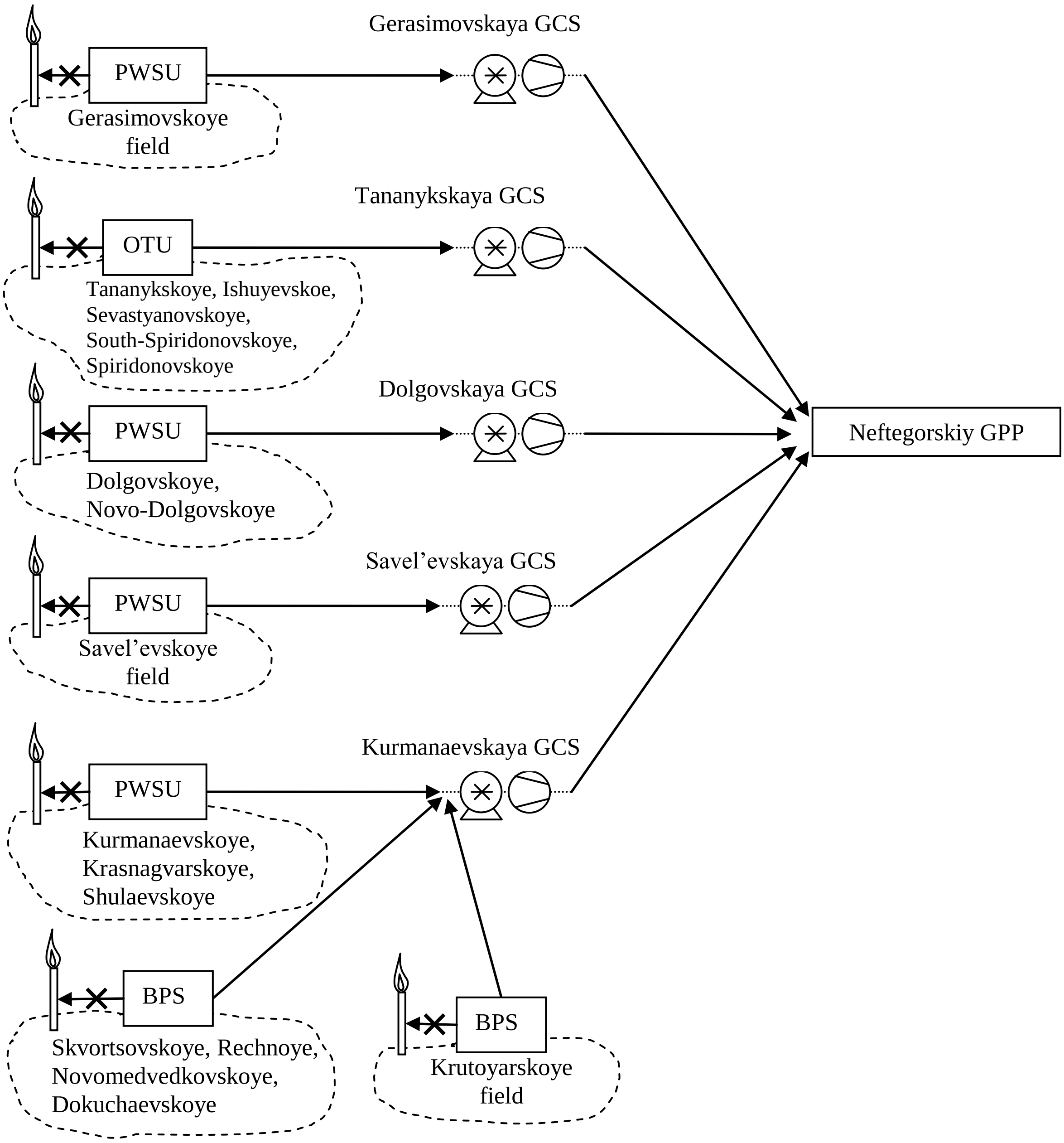
Tananykskaya GCS is compressing the gas from Tananykskaya OTU (oil treatment unit), where the APG is coming in turn from the wells of Tananykskoye, Ishuevskoye, Sevastianovskoye, Spiridonovskoye and Juzhno-Spiridonovskoye fields.

The associated petroleum gas of Dolgovskoye and Novo-Dolgovskoye fields is allocated at Dolgovskaya PWSU. After it the gas is compressed at the Dolgovskaya GCS.

The OSM from well of Savel’evsky ridge is coming to Savel’evskaya PWSU. It is compressed at Savel'evskaya GCS after APG allocation at PWSU.

The associated petroleum gas of Kurmanaevskaya GCS is coming for compression from Kurmanaevskaya PWSU, Skvortsovskaya BPS and Krutoyarskaya BPS. The OSM for Kurmanaevskaya PWSU is coming from the wells of Kurmanaevskoye, Krasnogvargeiskoye and Shulaevskoye fields. The OSM for Skvortsovskaya BPS is coming from the wells of Skvortsovskoye, Rechnoye and Novo-Madvedkinskoye Dokuchaevskoye deposits. The APG of Krutoyarskoye field is allocated at the Krutoyarskaya BPS.

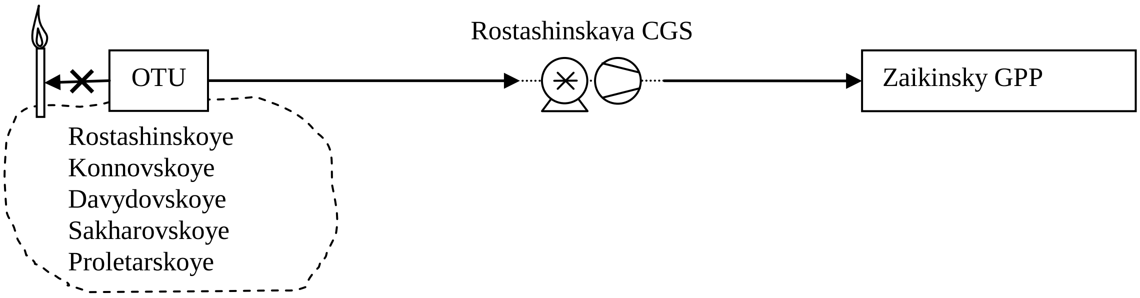
Figure 4.2.2 Bobrovskaya group of fields



Western group of fields
The system of APG at the Western group of fields foresees the construction of Rostashinskaya GCS.

Rostashinskaya GCS is compressing the APG of Rostashinskoye, Konnovskoye, Davydkovskoye, Sakharovskoye and Proletarskoye fields. The realized variant for utilization of burned gas of the end stages o separation of Rostashinskaya OTU consists of the construction of a plant for gas compression and supplying this gas together with a gas of the first stage to the Zaikinsky GPP. The construction of gas pipeline «Rostashi— Zaikinsky GPP» with a diameter 700 mm and a length 19.5 km is foreseen for the APG transportation.

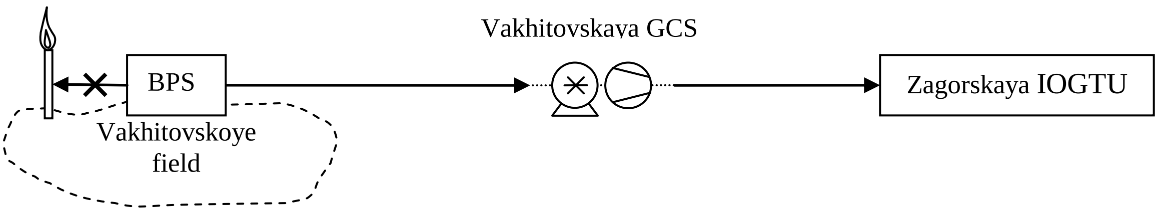
Figure 4.2.3 Western group of fields



Eastern group of fields

The system of APG collection of Eastern group of fields foresees the construction of Vakhitovskaya GCS, which will be compressing the APG of Vakhitovskoye field. The collected gas is transported to the Zagorskaya plant of complex oil and gas preparation (IOGTU) devoted to «Terminal Ltd. » for processing. The project foresees for it the construction of gas pipeline Vakhitovskaya GCS-Zagorskaya IOGTU with diameter 325 mm and length 105 km

Figure. 4.2.4 Eastern group of fields



Compression equipment

The APG compression at Pasmurovskaya, Gerasimovskaya, Tananykskaya, Dolgovskaya, Kurmanaevskaya, Savel'evskaya and Rostshinskaya GCS is carried out at the compression units consisting of screw compressor and electric engine.

The gas compressors with the integrated gas-piston engines are used at Vakhitovskaya GCS. The centrifugal turbocompressor is used at Rostashinskaya GCS.

Table 4.2.1 Characteristics of compressor equipment of GCS

#	GCS	Parameters of GCS			Characteristics of compressor equipment		
		Capacity, mln.m^3/ year	Initial pressure, at	Final pressure, at	Type / brand	Number, pieces	Capacity of 1 compressor, thous.m^3/day
1.	Pasmurovskaya	26.28	0.1	7.2	electric drive (Takat 50.07)	1	72
2.	Gerasimovskaya	5.2	1.64	5	electric drive (DKKS-600)	1	14.4
3.	Tananykskaya	11.3	0.25	7	electric drive (DKKS-1300)	1	31.2
4.	Dolgovskaya	26.2	3.7	8.1	electric drive (Takat 50.07)	1	72
5.	Kurmanaevskaya	78.8	0.3	7.8	electric drive (Takat 50.07)	3	72
6.	Savel'evskaya	26.2	1.2	7.4	electric drive (Takat 50.07)	1	72

#	GCS	Parameters of GCS			Characteristics of compressor equipment		
		Capacity, mln.m^3/ year	Initial pressure, at	Final pressure, at	Type / brand	Number, pieces	Capacity of 1 compressor, thous.m^3/day
7.	Rostashinskaya	260	3.8	18	centrifugal gas engine (Solar C-160V)	2	347.5
8.	Vakhitovskaya	210	4.5	26	Gas-piston engine (AJAX 2804)	3	240

Table 4.2.2 Timetable of project realization

Object	2007	2008	2009
Pokrovskaya group			
Pasmurovskaya GCS		■	
Gas pipeline «Ryabinovaya BPS—Pasmurovskaya GCS»		■	
Gas pipeline «Pasmurovskaya GCS—Pokrovskaya GCS-Otradnensky GPP»		■	
Bobrovskaya group			
Gerasimovskaya GCS			■
Tananykskaya GCS			■
Dolgovskaya GCS		■	
Gas pipeline «Dolgovskaya GCS —Bobrovskaya GCS-Neftegorsky GPP»		■	
Kurmanaevskaya GCS	■		
Gas pipeline «Krutiyarskaya BPS— Kurmanaevskaya GCS»	■		
Gas pipeline «Skvortsovskaya BPS— Kurmanaevskaya GCS»	■		
Gas pipeline «Kurmanaevskaya GCS — Bobrovskaya GCS -Neftegorsky GPP»	■		
Savel'evskaya GCS		■	
Gas pipeline «Savel'evskaya GCS—Bobrovskaya GCS-Neftegorsky GPP»			■
West group			
Rostashinskaya GCS		■	
Gas pipeline «Rostashi—Zaikinsky GPP»			■
East group			
Vakhitovskaya GCS			■
Gas pipeline «Vakhitovskay GCS—Zagorskaya IOGTU»			■

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:

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Within the frameworks of project activity the considerable amount of allocated APG, which was burned before in the flares will be efficiently used by means of compression and pumping in the gas pipeline for the consequent transportation to GPP. It will prevent the emissions of carbon dioxide CO_2 and methane CH_4, which could appear in the basis scenario due to APG flaring. If this project were absent, it couldn't be possible to reach the mentioned reductions, because the national branch policy and economic situation of oil-and-gas industry would not provide the real balanced mechanisms for the efficient usage of APG.

In Russia the laws and statements intended for the regulation of APG utilization have stimulated insufficiently the attempt of oil companies to minimize APG flaring. If the economic expedience of processing was absent, the APG could be burned in flares without purposeful utilization. At the same time, the negative of impact on the environment 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.. Even the demand of useful 95%-utilization of APG that was introduced in some license agreements couldn't prevent its flaring. The oil companies fulfill quite reluctantly the creation of infrastructure on

APG collection and transportation. It is connected with the fact that due to the huge financial expenditure, the low price if APG, the uncertainty and non-transparency with the access to gas-transport system, such projects represent the considerable investment risk.
The given demonstration, which will be presented in details in Section B, testifies that the reduction of APG flaring and consequently the reduction of GHG emission is possible only within the frameworks of suggested project activity.

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

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	Years
Length of the crediting period	5
Year	Estimate of annual emission reductions in tonnes of CO_2 equivalent
2008	90 317
2009	809 497
2010	1 007 526
2011	1 023 936
2012	921 647
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	3 852 922
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	770 584

A.5. Project approval by the Parties involved:

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The Statement of RF Government no.780 «On measures on realizing the article 6 of Kyoto protocol to UNFCCC»[5] was adopted on 15 September 2011. The document approves the Standing on realizing the article 6 of Kyoto Protocol in RF. This document describes the procedure of JI-projects acceptance.

In accordance with item 4 of Statement, the acceptance of projects will be carried out by RF Ministry of economic development on the basis of consideration of entered project applications. The consideration of applications is carried out by the operator of carbon units (Sberbank of Russia) correspondingly to the item 10 of RF Government Statement no.780.

Accordingly to the item 7 of Statement, the parts of application include the «positive opinion of experts for the project documentation prepared in accordance with the international requirements by the independent organ chosen by applicant ».

Thus, in accordance with RF legislation in the area of JI-projects realization, the approval of Project is possible after receiving the positive conclusion of the independent accredited organ.

[5] Statement of RF Government no.780 on 15.09.2011 -

SECTION B. Baseline

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

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According to paragraph 9 of the – Guidance on criteria for the baseline setting and monitoring, version 03, the project participants may select either:

(a) An approach for baseline setting and monitoring developed in accordance with appendix B of the JI guidelines (JI-specific approach); or
(b) A methodology for baseline setting and monitoring approved by the Executive Board of the clean development mechanism (CDM);
(c) An approach for baseline setting and monitoring already taken in comparable JI cases.

In the proposed project a JI specific approach to set the baseline scenario and the monitoring plan is used.

The description and justification of the chosen baseline will be carried out on the basis of regulations «Guidelines for users of the JI PDD form» (version 04) and in accordance with application B «Guidance on criteria for baseline setting and monitoring» by using the following stepwise approach:

Step 1. Indication and description of the approach chosen regarding the baseline setting
Step 2. Application of the approach chosen.

These steps are presented below at greater length.

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

The baseline is determined on the basis of consideration of the different alternative variants for the situation development including the suggested project activity. The key factors will be determined as the criteria for choosing the basic scenario. All alternatives will be considered as a subject of these factors effect in them. The alternative scenario, for which the key factors have the less negative effect, will be chosen as a baseline.

Thus, the following stages are foreseen for the baseline determination:

a) Description of alternative variants.
b) Description of key factors.
c) Analysis of key factors effect on the pointed alternative.
d) Choice of the most plausible scenario.

Step 2. Application of the approach chosen.

The following scenarios are considered as the alternative ones:

Alternative scenario 1. Flaring of APG at Orenburg region deposits;

Alternative scenario 2. Project itself (the proposed project activity undertaken without being registered as a JI project activity) that is expressed in the useful APG utilization, i.e. the construction of GCS and gas pipelines for gas compression and further transportation.

No any claimed alternatives contradict the currently effective legislation and can be used in the further analysis.

The analysis doesn't concern the variants related to the implementation of generating power plants used the APG as a fuel, for example, gas turbine power plants and combine-cycle electric generating plants.

The electricity deficiency is absent at the fields. The power supply is carried out from UES of Ural using the development system of transformation and distribution. The analysis doesn't include also the variants connected with APG reinjection into the gas field stratum for supporting the pressure in fields. APG fanning to increase pressure in drills is not possible because of specific conditions of reservoirs. The water is used for this purpose. And the analysis doesn't include as well the variants related to the APG processing directly at the fields with obtaining methanol and other commercial products because of absence the potential customers of these products immediately near the given field, as there is quite nearby the GPP with the total processing cycle and also due the very remote transport infrastructure.

a) Description of alternative scenarios.

Alternative scenario 1. Flaring of APG at Orenburg region deposits;

When the separation of oil takes place, the APG escapes, and it could be burned in full in the flare plants. The volume of APG, which could be burned within the frameworks of given scenario, is presented in the following table:

Table B.1.1. APG for flaring at Orenburg region deposits

Indicator	Unit	2008	2009	2010	2011	2012
APG combustion	mln. m^3	27.418	231.083	329.538	325.766	290.853

In accordance with legislation in the area of environmental protection the enterprise should calculate the volumes of pollutants emission including methane, carbon oxide, nitrogen oxides etc. as well as to carry out quarterly the payments for environmental pollution by the norms installed in the Statement of RF Government no.344 adopted in 12.06.2003[6] and partially changed by RF Government Statement no.410 adopted in 01.07.2005[7]. Therefore the payments for pollutants emission will be the following:

Table B 1.2. Payments for pollutants emission during the APG flaring on Orenburg region deposits

Indicator	Unit.	2008	2009	2010	2011	2012
Emission payments	mln. rubles	2.2	15.7	26.8	25.3	101.6

Accordingly to RF Governmental Statement no.7 adopted on 8th January 2009 «On measures for stimulation of the reduction of polluting atmospheric air by the products of APG flaring»[8] the payment for pollutants emission formed under APG combustion of flare plants in the volume exceeded 5% from the total APF volume is calculated since the 1st January 2012 as for the excessive emission volumes by applying the rising coefficient - 4.5.

Alternative scenario 2. Project itself (the proposed project activity undertaken without being registered as a JI project activity) that is expressed in the useful APG utilization, i.e. the construction of GCS and gas pipelines for gas compression and further transportation.

The realization of this scenario requires the investments about 213.8 million US$ (5.35 billion RUB).

This scenario prevents the emission of CO_2 and CH_4, which could be within the frameworks of Scenario 1 in the case of APG flaring. The constructed gas pipelines and GCS provide the APG gathering and transportation from Orenburg region fields to gas processing plants, which are located beyond the project boundaries.

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[6] Statement no.344 adopted on 12th June 2003 «On norms of payments for pollutants emission in atmospheric air by stationary and portable sources, pollutants discharges in the surface and underground water objects, placing of production and consumption waste

[7] Statement no.410 adopted on 1st July 2005 «On alternation of Apex no. 1 attached to Statement no.344 adopter on 12th June 2001»

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

APG is subject at the GPP to processing with obtaining DSG (dry stripped gas) and BFLH (broad fraction of light hydrocarbons). Then DSG is supplied under high pressure to the gas main Orenburg-Samara. The BFLH is subject to the further deep processing and consequent delivery to customer in the form of target components.

The DSG substitutes the consumption of such organic fuels as the natural gas etc. Therefore the project under consideration represents the resource-saving activity, which doesn't result in the production and consumption of additional fossil fuel.

a) Description of key factors

The baseline will be built up taking into account the corresponding national policy in this industry and such circumstances as the initiatives on reforming, legislation, economic situation in the industry, where the project is realized. The following key factors influenced on baseline will be considered:

- Policy on reforming the industry and legislation;
- Economic situation in oil and gas industry as to APG utilization;
- Availability of capital (including the investment barrier);
- Costs for APG.

b) Analysis of key factors effect in the pointed alternatives

The detailed consideration of each alternative factor is presented below taking into account the key factors.

Policy of reforming industry and legislation

The state policy in the area of APG utilization doesn't possess the balanced mechanisms allowing to carry out the monitoring, to carry out and strengthen the actions of the fulfillment of requirements of effective APG utilization. The main position for regulating the problems on APG utilization is contained in the following reference-legal documents:

- Federal Law «On mineral resources» no.2395 adopted in 21.02.1992.
- Statement of Supreme Council of Russian Federation no.3314.1 in 15.06.1992 «On the rules of consummation of the Status of licensing the usage of mineral resources ».
- RF Governmental Statement no.344 in 12.06.2003 «On the norm of payment for emission of pollutants in atmospheric air by stationary and portable sources, discharges of contaminating substances in the surface and underground water objects, placing of production and consumption waste».
- RF Governmental Statement no.410 in 01.06.2005 «On the alteration in apex no.1 to the RF Governmental Statement no.344 adopted on 12th June 2003».
- RF Governmental Statement no.7 in 08.01.2009 «On the measures for stimulation of reducing the atmospheric air contamination by the products of APG flaring in the flare plants ».

All these legal documents don't provide up to now the realization of mechanism resulting in the sharp reduction of APG flaring. The measures on regulating the APG utilization suggested by some legal documents are reduced to the determination of ecological payments for using the natural resources and the sanitary standard of atmospheric air quality expressed by maximum permissible concentration (MAC) of pollutants in atmospheric air. Indeed, the real meaning of these documents is so that with economic inexpedience of processing, APG could be burned in flare. In this case the negative of impact on the environment 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 be noted that in some regions the bodies of regional power controlling the topics of natural resources management include in the license agreement concluded with oil companies the condition about 95%-utilization of APG. Nevertheless, this measure couldn't prevent the flare combustion in Orenburg region. It could be explained by the fact that this condition doesn't possess the sufficient legal effect, i.e. if this condition is not fulfilled, the oil-and-gas company is not disentitled to use the field. The additional stimuli are therefore necessary for motivation of the beginning of APG utilization project realization.

Thus, neither sector reforms nor legislation are sufficient for TNK-BP motivation for APG utilization at the fields of Orenburg region. The level of ecological payments, which the Company should pay for APG combustion, is incomparably lower as to the investments in APG utilization. Even the increasing the level of payments, which Company will pay from 2012 to 2020 in connection with the Governmental Statement no.7 adopted in 08.01.2009, is significantly lower the sum of investments in this project. Correspondingly this key factor promotes to continuing the APG flaring within the frameworks of *Scenario 1*. And vice versa, the influence of this factor doesn't provide the realization of *Scenario 2*.

Economic situation in oil-and-gas industry as to the APG utilization

The target usage of APG was practically always for oil companies in Russia the undesirable factor accompanying to the oil production, because there are many uncertainties and problems on the way of transformation of this awkward task in the resource-saving activity.

The objects providing the high level of target usage (utilization) of APG usually are not integrated in the production schemes of oil fields. As a rule, there are no developed infrastructure and sometimes of transportation of APG at the territory of hydrocarbon extraction. APG are comparatively well utilized at the sites, where the infrastructure was created in 70-s - 80-s years of last century in the conditions of planned economy and financing from the funds of State budget. The projects of APG utilization could include the construction of new infrastructure on APG collection, preparation and transportation and demands the high investment outlay, which, as a rule, can't provide the adequate economic effect for investors – oil companies. It takes place due to the low APG prices for oil fields being in the distance from gas processing plants and consumer's markets.

The oil companies are also faced with such structural barriers, as the limited access to the existing gas processing and gas-transporting.

The Russian market of gas transportation and processing is highly monopolized by OJSC «Gasprom». Historically the natural gas has a priority over APG, when the access to the gas main was organized. It took place due to the fact that the gas market was formed under the influence of natural gas, as with the same other conditions the natural gas demands the less (in comparison with APG) expenditures for its production, transportation and connection with gas pipeline. In addition, the low competitiveness of APG is explained by the quality of its preparation, as the DSG corresponds not always to the standards of gas acceptance in gas mains. This situation created the obstacle for organizing the equal access to the header pipe and gas processing plants for oil companies that came to the market with APG. Gasprom is not accountable before the State for the groundless refusal in acceptance of APG for transportation and processing. This circumstance doesn't promote also to the fulfillment of condition on APG utilization in accordance with license agreement.

The unfavorable and pointed above conditions of APG utilization are also applied to the Scenario 2. Company TNK-BP should construct the system of APG collection investing the considerable capital outlays. Too low price of APG, with which the Company is obliged to sell APG, is not sufficient for achievement of profitability for this Project, while the value of NPV is negative (see Section B2). The Company is waiting that the ERUs sales will be able to improve the economics of project.

Therefore, this factor influence unfavorably on realization of *Scenario 2* making in such way *Scenario 1* the most probable alternative for the baseline.

Availability of capital (including the investment barrier)

The investment capital is unnecessary for *Scenario 1*. Nevertheless, the flare combustion of APG makes the necessary fulfillment of ecological payments on the average 34 mln. rubles per year. The source of financing of such payments is included in the cost of oil production within the frameworks of everyday activity of Company.

In spite of the fact that the Company attracted the large financial resources, the project represents the considerable financial risk due to its low economic efficiency (see the details in Section B2). For typical investment practice the financing is accessible for the commercial activity, but not for the projects with negative NPV. Therefore there is the evident investment barrier for *Scenario 2*.

Prices for APG
The low level of prices for APG in the entrance to the gas processing plants is insufficient for promoting the development of new transport objects of APG. The price for APG used in the investment analysis for the given project constitutes about 24 $/ths.m^3 and that doesn't provide ROI (see section B2).

As the project efficiency depends on the APG price, *Scenario 2* is extremely vulnerable from the effect of this factor.

d) Choice of the most plausible scenario.
For summing up the considerations presented above, the influence of factors on each scenario is expressed by means of analysis in the following table.

Table B.1.5. Factor analysis

№	Factor	Scenario 1	Scenario 2
1.	Policy of reforming the energy industry and legislation	Promotes to fulfillment	Doesn't provide the fulfillment
2.	Economic situation in oil-gas sector concerning APG utilization	Makes this scenario the most probable candidate for baseline	Effects unfavorably on its realization
3.	Availability of capital (incl. investment barrier)	No influence	Represents the investment barrier fir this scenario
4.	Prices for APG	No influence	Make the project unprofitable because of low price for APG

If to rely on the fulfilled analysis, it is quite evident that the key factors promote to fulfill the Scenario of 1 and negatively effect of Scenario 2. Therefore Scenario 1 «*Continuation of generally accepted practice for APG utilization, i.e. the APG flaring at Orenburg region fields»* is **the baseline scenario**.

Key information and data for construction of baseline:

Fixed values determined once at the stage of determination and accessible over a period of 2008-2012

Data/Parameter	ρ_{CH4}
Data unit	kg/m^3
Description	Density of methane (CH_4) under standard conditions: temperature 20 °C (293.15 K) and absolute pressure 101.325 kPa (1 atm.)
Time of determination/monitoring	Fixed ex-ante parameter
Source of data (to be) use	Thermal design of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	0.668
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Methane density is necessary for calculation of emission coefficient under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ρ_{CO2}
Data unit	kg/m^3
Description	Density of carbon dioxide (CO_2) under standard conditions (temperaturea 20 °C (293.15 K) and absolute pressure 101.325 kPa (1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) use	Thermal calculation of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	1.842
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Density of carbon dioxide is necessary for calculation of emission coefficient under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	GWP_{CH4}
Data unit	tCO_2/tCH_4
Description	Potential of global warming methane is required for calculation of CH_4 emission factor under APG flaring
Time of determination/monitoring	Fixed ex-ante parameter
Source of data (to be) use	Solution 2/CP.3

	http://unfccc.int/resource/docs/cop3/07a01.pdf#page=31 Climate change 1995, Science of climate change: Conclusion for politicians and technical resolution of the Report of Working group I, p. 22. http://unfccc.int/ghg_data/items/3825.php
Value of data applied (for ex ante calculations/determinations)	21
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Potential of global warming is necessary for calculation of emission factor under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	Nc
Data unit	-
Description	A number of carbon mole in a mole of APG component
Time of determination/monitoring	Is determined once at the stage of project documentation development
Source of data (to be) use	Natural science
Value of data applied (for ex ante calculations/determinations)	Carbon dioxide, CO_2: 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 Heptane, C7H16: 7 octane, C8H18: 8
Justification f the choice of data or description of measurement methods and procedures (to be) applied	This parameter is necessary for calculating the emission of CO_2 under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ε
Data unit	share
Description	A share of unburned APG in flare under thermal black type of combustion
Time of determination/monitoring	Is determined once at the stage of project documentation development

Source of data (to be) use	«Methods for determining the pollutants emission under APG flaring », NII on atmospheric air protection, Saint-Petersburg,1998
Value of data applied (for ex ante calculations/determinations)	0.035
Justification f the choice of data or description of measurement methods and procedures (to be) applied	This parameter is necessary for calculating the emission of CO_2 under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Parameters which are monitoring directly

Data/Parameter	$V_{APG\_PJ,i}$
Data unit	mln.m^3 (under standard conditions)
Description	The volume of APG supplied to GCS. Main source of baseline emission. APG produced in the frameworks of baseline could be APG flaring.
Time of determination/monitoring	hourly
Source of data (to be) use	Gas flow meter
Value of data applied (for ex ante calculations/determinations)	see table below
Justification f the choice of data or description of measurement methods and procedures (to be) applied	APG volume is necessary for the calculation of baseline emission.
OA/QC procedures (to be) applied	The main measuring devices are verified and calibrated by FSE «Center of standardization and metrology», Orenburg
Any comment	-

Item	2008	2009	2010	2011	2012
$\sum V_{APG\_PJ,i}$	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	0.000	0.576	3.050	1.252	1.626
Dolgovskaya GCS	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	0.000	4.484	28.058	22.768	13.828
Savel'evskaya GCS	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	0.000	47.083	135.736	145.862	109.560

Data/Parameter	w_{CO2}, w_{CH4} w_{VOC}
Data unit	vol %
Description	Chemical composition of APG for Gas Compression Station. It is necessary for calculation of emission under APG flaring
Time of determination/monitoring	quarterly

<table>
<tr><td>Source of data (to be) use</td><td>Flow gas chromatograph</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>
<table>
<tr><td></td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2012</td></tr>
<tr><td>methane, CH4</td><td colspan="5" rowspan="15">file:
«TNK-BP_Orenburg_APG_ERs_ver.2.xls»</td></tr>
<tr><td>ethane, C2H6</td></tr>
<tr><td>propane, C3H8</td></tr>
<tr><td>i-butane, C4H10</td></tr>
<tr><td>n-butane, C4H10</td></tr>
<tr><td>i-pentane, C5H12</td></tr>
<tr><td>n-pentane, C5H12</td></tr>
<tr><td>hexane, C6H14</td></tr>
<tr><td>geptane, C7H16</td></tr>
<tr><td>octane, C8H18</td></tr>
<tr><td>nonane, C9H20</td></tr>
<tr><td>carbon dioxide, CO2</td></tr>
<tr><td>hydrogen sulfide, H2S</td></tr>
<tr><td>oxygen, O2</td></tr>
<tr><td>nitrogen, N2</td></tr>
</table>
</td></tr>
<tr><td>Justification f the choice of data or description of measurement methods and procedures (to be) applied</td><td>As annual values the most conservative quarter values in reporting year are accepted</td></tr>
<tr><td>OA/QC procedures (to be) applied</td><td>The device is verified and calibrated by FSE «Center of standardization and metrology», Samara and CJSC of Pilot plants «Chromat»</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Baseline GHG emission under APG flaring (taking into account the incomplete combustion)

$$\mathbf{BE_y = 1000 \times \sum_i [V_{APG\_PJ,i,y} \times (EF_{CO2,F,i,y} + EF_{CH4,F,i,y})]} \qquad (1)$$

Where:

BE_y – Total GHG baseline emissions from flaring of APG for year *y*, tCO_2-e;
$V_{APG\_PJ,i,y}$ – volume of APG supplied to GCS_i, mln. m^3;
$EF_{CO2,F,i,y}$ –CO_2 emission factor under APG flaring at Orenburg region fields, tCO_2/thous. m^3;
$EF_{CH4,F,i,y}$ –CH_4 emission factor under APG flaring at Orenburg region fields, tCO_2-e/thous. m^3.

$$\mathbf{EF_{CO2,F,i,y} = [w_{CO2,i,y} + (Nc_{CH4} \times w_{CH4,i,y} + \sum_j Nc_{VOCj} \times w_{VOCj,i,y})] \times \rho_{CO2} \times} \eta_{flare} \qquad (2)$$

Where:

$w_{CO2,i,y}$, $w_{CH4,i,y}$, $w_{VOCj,i,y}$ – volumetric fractions of components in APG determined by means of values of APG chemical composition (for methane) at GCS_i (the source of information – the Protocol of gas analysis), vol %;
Nc_{CH4}, $\sum_j Nc_{VOCj}$ – the amount of carbon moles in a methane mole and VOC correspondingly ($\sum_j Nc_{VOCj}$ where j is a component of VOC);
ρ_{CO2} – density of CO_2 under 20°C, which is equal to 1.842 kg/m^3;
η_{flare} –efficiency of APG flaring, which is equal to 0.965 and is dimensionless. $\eta_{flare} = 1 - \varepsilon$ where:
ε –share of unburned APG in flare under thermal black type of combustion, which is equal to 0.035, dimensionless.

Due to the incomplete combustion a part of APG is emitted into atmosphere without oxidation; the methods of SRI «Atmosphere» determines the efficiency of such incomplete burning as 3.5% (0.035) that results the methane emission into atmosphere. The emission factor of methane in terms of CO_2-equivalent is determined in the following way:

$$\mathbf{EF_{CH4,F,i,y} = w_{CH4,i,y} \times \rho_{CH4} \times (1-\eta_{flare}) \times GWP_{CH4}} \qquad (3)$$

Where:

$\mathbf{w_{CH4,i,y}}$ – annual average volume fraction of methane in APG calculated on the basis of data on methane content in APG (the source of information is the Protocol of gas analysis);

$\boldsymbol{\rho_{CH4}}$– density of methane CH_4 under standard conditions is equal to 0.668 kg/m^3;

η_{flare} – efficiency of APG flaring is equal to 0.965, dimensionless;

$\mathbf{GWP_{CH4}}$ – global warming potential of methane - 21 tCO_2/tCH_4.

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 presented in Section B.1. shows clearly that the suggested Project is not a baseline.

The JI-specific approach was chosen for substantiation of additionality.
For this purpose we chose the condition (a) determined in Annex 1 to «Guidance on criteria for baseline setting and monitoring», namely: «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 of GHGs».

It is demonstrated in this Section that the Project provides the reduction of emissions' from the sources, which are *additional* to the emissions, which could take place in other case. The following step-by-step approach was used for it:

Step 1. Identification and description of the approach applied
Step 2. Application of the approach chosen
Step 3. Provision of additionality proofs

In conclusion the explanations are given on the way, by means of which the GHG reductions are achieved.

Step 1. Identification and description of the approach applied
The JI-specific approach is based on the provision of explanations that the Project activity couldn't take place in any case due to existence of *financial barrier* and that this activity is not the *common practice.*

The existence of financial barrier is presented below with using of investment analysis.

Step 2. Application of the approach chosen

<u>*Financial barrier*</u>

The proof of financial barrier existence is carried out by means of investment analysis, which includes the evaluation of Project's economic efficiency. If the results of analysis show that the Project is not attractive in the financial sense without taking into account its registration as a JI-project, it is the direct demonstration of project's additionality.

Assessment of project's investment attractiveness was executed by TNK-BP specialists. In the process of the project's investment analysis the following data was used:

- capital investments constitutes 213.8 million USD
- projects lifetime is 20 years
- the project's output product is APG with an average price of 24 \$/ths.m^3
- discount rate is defined in accordance with the approved economic conditions for operational business planning of oil output: 12%

For calculation of project's economic efficiency TNK-BP macro-parameters were used, including discount rate, inflation rate, hard currency exchange rate, netbacks for gas products, preconditions of electricity prices increase, etc.
Assessment of operational expenses was done by analogs with the existing facilities of OAO "Orenburgneft".
Project's terminal cost over the calculation horizon with expenses for liquidation is assumed zero and is not taken into account in calculation of money.

The result of investment analysis is the quantitative determination of such indicator of economic efficiency as the Net Present Value (NPV).

The capital investments at the rate of 213.8 mln. US$ directed for the construction of gas compression stations and gas pipelines from GCS to gas-collection net were taken into account for the fulfillment of evaluation. The discount rate was taken in Company as 12% and was active at the date of Project commencement. The price of APG at the date of realization was fixed by the corresponding solutions of planning-investment committees.

The results of estimated are presented below.

Table B.2.1 Results of evaluating the Project efficiency

NPV:	**-73.7 mln. US$**
Payback period:	**Project is not repaid**

Conclusion: With the APG price regulated in company TNK-BP and being valid at the date of Project commencement, the Project is absolutely unattractive from the viewpoint of investor.

Sensitivity analysis
The sensitivity analysis was fulfilled with using the economic model developed by specialists of TNK-BP. The project NPV is sensitive to the deviations of such factors as investment outlay, APG volume, operating expenses.

Table B.2.2 Sensitivity analysis

Parameter	NPV= - 73.7 mln US$	
	+	-
Capex (+15%; -5%)	-98.1	-65.5
Operational expenditure (+10%;-5%)	-83.4	-69.0
APG cost (+10%;-10%)	-64.7	-82.3
APG volume (+10%;-10%)	-62.7	-83.6

Thus, even the deviations (from -10% to +10%) from above mentioned factors couldn't improve the project's NPV. It rectifies that the project is still not efficient in economic sense, even if the economic factors would be significantly improved.

Analysis of common practice

This Section supplements the estimates presented above with the analysis of activity occurrence for APG utilization, in particular, by means of construction of gas-transport infrastructure of oil-and-gas industry that represents *the criterion of additionality* for project activity.

Description of general situation in industry

There is not the project-analogue similar to the project under consideration. APG utilization (particularly through pumping into gas-transport system) has not become a common practice in Russian Federation. 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 the difficult-to-implement task.

From the legal viewpoint there are the packet of Statements, laws and other documents (see the list of documents in Section B1), which should regulate the topics of APG utilization. However the absence of real mechanisms allowing to carry out the monitoring and to stimulate in the balanced manner the realization of projects of APG utilization doesn't provide the progressive solution of the problem. The striking example of such regulation is the requirement of 95%-utilization of APG included in some license agreements. Nevertheless this measure couldn't prevent the increased combustion of APG in 2009 and 2010, because the oil companies in the majority of cases were not be able to fulfill the activity connected with APG utilization due to the reasons of economic and structural nature. At the present time the non-fulfillment of mentioned requirement doesn't result in the denial of right for development of oil field. Therefore this requirement motivates insufficiently the oil company for utilization no less than 95% of APG.

It should be noted that the APG utilization (especially by means of supply in the main gas pipeline systems) demand the considerable material resources for implementation of compressing, transport and processing infrastructure. Therefore the similar projects are not economically efficient in the majority of cases for the companies having the oil fields located in large distance of gas-transporting systems. The reasons effecting negatively on the efficiency of APG utilization are:

- Substantially smaller productions of oil wells for APG in comparison with the productions of gas wells;
- Much less APG pressure at the well head; as consequence the necessity of compression for delivery at the considerable distance;
- Availability in APG the considerable amounts of liquid hydrocarbons;
- Necessity to construct the more branched system of gas-collecting field pipelines because of significant remoteness of a majority of fields from gas-transport systems;
- Low selling value of APG for settlement of investment outlay connected with the projects of effective utilization of petroleum gas.

The structural aspect creates also the obstacle for the efficient APG utilization. The existing main-line gas-transport system has due to its full utilized capacity the restrictions for delivery to customers of processing products from the fields, where the main resources and the processing volumes of APG are concentrated. The access to gas-transport system is assigned only with the existence of spare capacities in this system[11]. In this case it is extremely difficult to confirm the existence or absence of spare capacities that makes the problem of access not quite transparent and sometimes awkward. Another problem being the consequence of this situation is the absence of long-term contracts for gas transportation that makes the situation with APG utilization unpredictable.

[11] Correspondingly to the Russian Federation Government Statement «On provision of the access of independent organizations to the gas-transport system of OAO «Gasprom» with final wording no. 334 on 03.05.2001.

Conclusion:
The aspects considered above show that the APG utilization (especially by means of injection into the gas-transport system) didn't become as yet the common practice in Russian Federation. In spite of existence of corresponding legislative documents the monitoring is not carried out properly, and there are no measures enforcing to utilize the APG. On the other hand, the oil companies implement very reluctantly the provision of infrastructure on APG collection and transportation, because such projects represent the considerable investment risk due to the huge financial needs, the low prices for APG, the uncertainty and absence of transparency in the questions of access to the gas-transport system. In Russia these projects are implemented only as a JI.

These considerations are completely applicable for the suggested project, which is economically not efficient because of the high capital expenses for the introduction of transport infrastructure and low process for APG.

Therefore:

- The suggested project activity is not the result of adopted public policy concerning the stimulation of oil companies for the useful APG utilization.
- The activity within the frameworks of presented project is not prevailing in the oil-and-gas industry of Russia.

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

Step 3. Provision of additionality proofs
The information for confirming the argumentativeness presented above contains in the following documents:

- License agreement on the development of Orenburg region fields.

Explanations of the matter, how the reduction of greenhouse gases' emissions are achieved

GHG baseline emissions
Within the frameworks of basic scenario the APG allocated at the Orenburg region fields (and used in the project) could be burned in flare. In this case the GHG emissions could occur including CO_2 and CH_4. The flare plants are not able to secure the complete combustion of APG, and the unoxidized hydrocarbons including methane and contained in APG are partially released in atmosphere. For evaluating the incomplete combustion of APG in flare (unburned carbon), the value of incomplete combustion is assumed equal to 3.5% as it is recommended by SRI «Atmosphere». The emissions of carbon dioxide CO_2 and methane CH_4 expressed in CO_2 - equivalent are determined as a product of the APG volume used in the project and the corresponding GHG emission factor.

GHG project emissions
Within the frameworks of project's activity the main part of APG will have the useful application by means of APG compression and transportation to GPP for the further delivery in the gas-transport system. The emissions, which will occur in the outside power system with generation of electric energy for providing the GCS operation are taken in account during calculations, as they constitutes more than 1% from designed emissions. The physical leakage of methane with the compression of APG at GCS will occur as well within the frameworks of project activity. They will be also considerable. The physical leakage of methane will also take place with APG transportation through the new pipelines from GCS to GPP.

Leakage due to project's realization

Nevertheless, the emissions (leakage) will occur outside the project boundaries. They will take place at the GPP with the APG consumption for providing the GPP operation with the project volume of APG (processing operations). There were as well the emissions (the physical loss of methane) under processing operations at GPP.

Reductions of greenhouse gases emissions
The emissions' reductions are determined by means of subtraction of the project emissions and leakage from the baseline emissions.

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

>>
The project boundary includes the sources of GHG emission related to the project activity. The evaluation of emission takes into account those GHG's, which contribute significantly (more than 1%) in the general volume of GHG emission. The analysis of emission sources and GHG type for the subject of their including in the project boundary is presented in the following Table.

Table B.3.1: Sources of GHG emission included or not included in the boundaries of project

Scenario	Источник	GHG type	Should be included?	Comments
Baseline	APG flaring	CO_2	Included	Main emission source
		N_2O	Not included	Insignificantly small
		CH_4	Included	Incomplete combustion (3.5% the volume of APG combusted)
Project	Consumption of electricity by GCS	CO_2	Included	Main source of emission
		N_2O	Not included	Insignificantly small
		CH_4	Not included	Insignificantly small
	Combustion of APG in gas engines of GCS	CO_2	Included	Main source of emission
		N_2O	Not included	Insignificantly small
		CH_4	Not included	Insignificantly small
	Methane leaks with compressing APG at GCS	CO_2	Not included	Insignificantly small
		CH_4	Included	Main source of emission
		N_2O	Not included	Insignificantly small
	Methane leaks with transportation of APG	CO_2	Not included	Insignificantly small
		N_2O	Not included	Insignificantly small
		CH_4	Included	Main source of emissions

Evaluation of leakage
In accordance with «Guidance on criteria for baseline setting and monitoring» the leakage is determined as the «net change of anthropogenic emissions by sources and/or removals by sinks of GHG, which occurs outside the project boundary, and that can be measured and is directly attributable to the JI project. … 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». The Project foresees the APG usage as GPP as a result of APG processing. The main potential emissions, which are the potential leakage in the context of Project, are the emission occurring as a result of:

- Consumption of APG as a fuel in the processing operation at GPP of Orenburg region
- Physical leaks of methane in the processing operation at GPP of Orenburg region

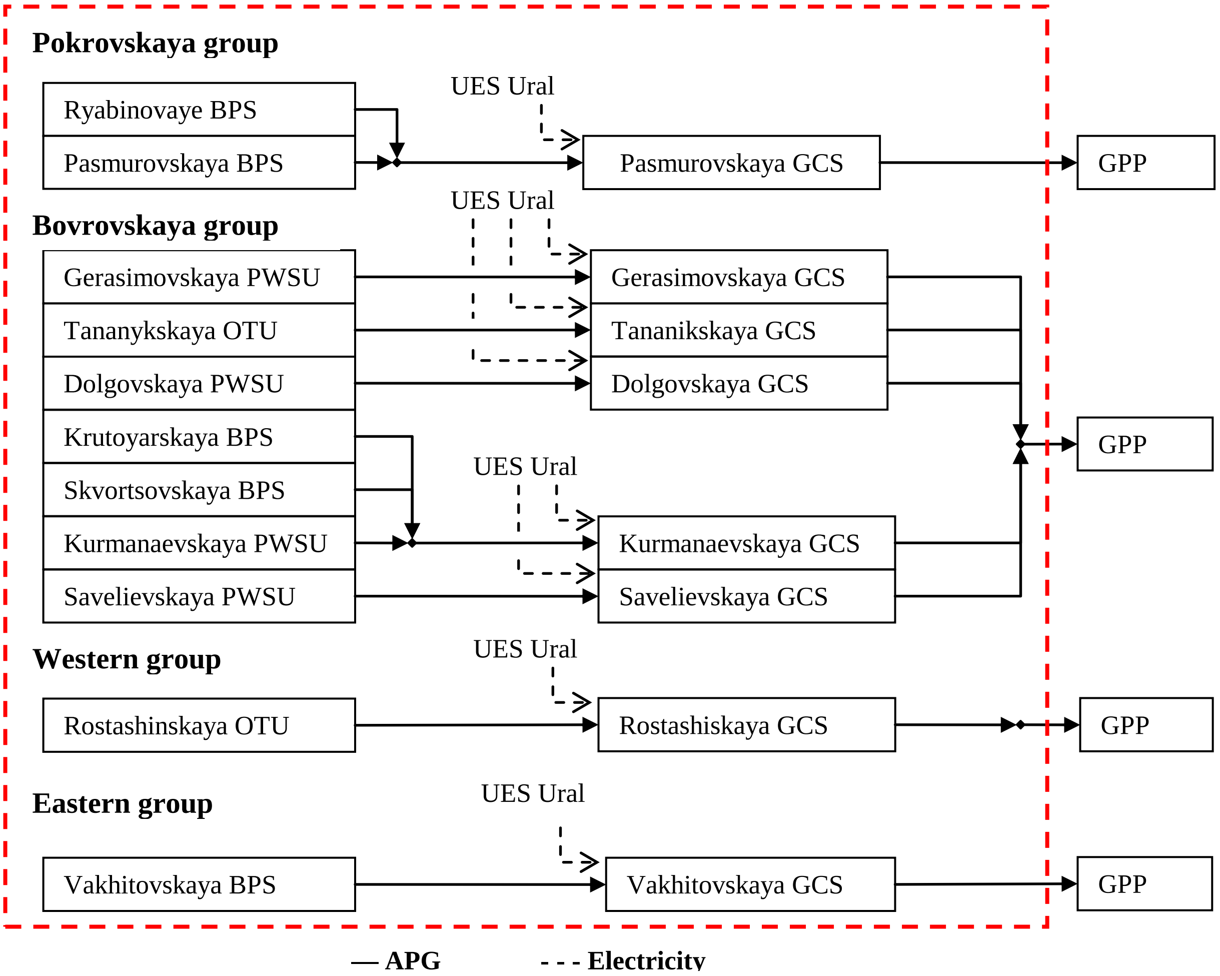
Table B.3.2: Leakage

Scenario	Source	GHG type	Should be included?	Comments
Leakage due to the project activity	Consumption of APG as a fuel in the processing operation at GPP of Orenburg region	CO_2	Included	Main source of emissions

	Physical leaks of methane with processing APG at GPP	CH_4	Included	Main source of emissions

In diagram form the project boundaries cover the fields of Orenburg region including the new gas pipelines and gas compression stations.

Figure B.3.1. Project boundary



BPS - Booster Pump Station
OTU - Oil Treatment Unit
PWSU - Preliminary Water Separation Unit
GCS - Gas Compression Station
GPP - Gas-Processing Plant
UES - United Electricity System

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

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Baseline setting date: 10.04.2012

Baseline was set and baseline calculations were conducted by:

Closed Joint-Stock Company «National Carbon Sequestration Foundation» (NCSF, Moscow).

NCSF is not a project participant.

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

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The date of project beginning is 15.12.2006. The date corresponds to the beginning of financing of the project.

C.2. Expected operational lifetime of the project:

>>

The expected operational lifetime of the project correspond to the design life of GCS service and constitutes 20 years or 240 months from 15.12.2006 to 15.12.2026

C.3. Length of the crediting period:

>>

The crediting period in correspondence with budget period of Kyoto protocol constitutes 5 years or 60 months from 01 January 2008 to 31 December 2012.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

>>

JI-specific approach developed for the given JI-project is used for the description and substantiation of monitoring plan. This approach is based on the positions of Section D of "Guidance on monitoring, JI guidelines on baseline setting and monitoring version 03" and includes the following steps:

Step 1. Identification and description of the approach chosen regarding monitoring
Step 2. Application of the approach chosen

The more detailed description of chosen approach is presented below.

Step 1. Identification and description of the approach chosen regarding monitoring
Sources of greenhouse gases emission
Emissions in baseline
The APG is burned in baseline at the flare plants that results in the emissions of CO_2 and CH_4. The atmospheric emission of methane occur due the incomplete flaring. The methods of NII «Atmosphere» determine the incomplete burning as 3.5%. The coefficient of methane emission in terms of CO_2 equivalent is determined by means of results of gas analysis of APG components composition.

Emission on the project
The following values are taken into account during the calculation of project emissions:

1. physical loss of methane in gas transport system;
2. physical loss of methane during the APG compression in GCS;
3. emission of CO_2 under APG combustion if gas engines at Rostashinskaya and Vakhitovskaya GCS;
4. emission of CO_2 under the electricity consumption by GCS from power system of Ural.

Leakage

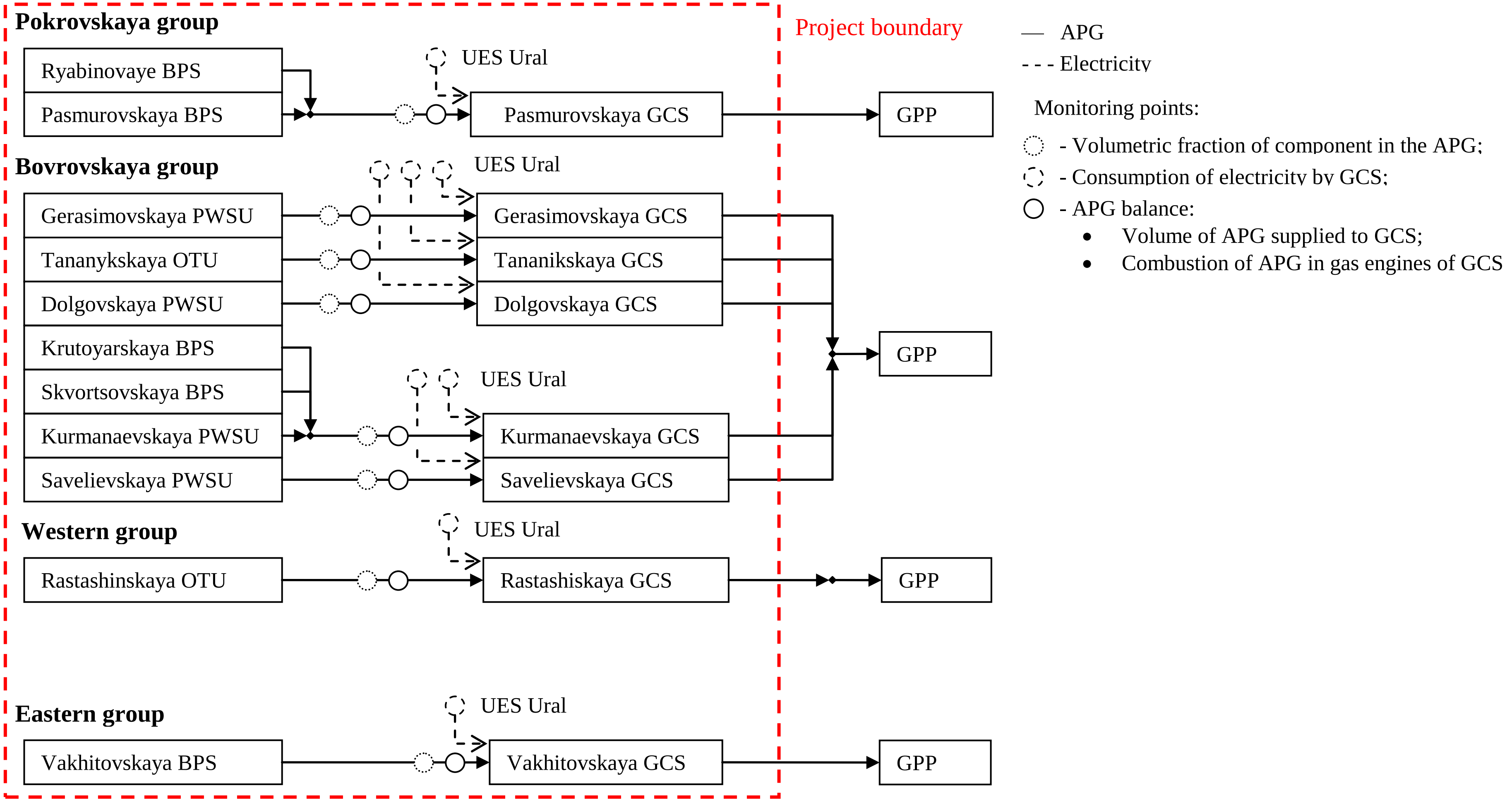
1. Consumption of APG as a fuel in the processing operation at GPP of Orenburg region;
2. Physical leaks of methane with processing APG at GPP

Data and parameters that are not monitored throughout the crediting period, but are determined only once (and thus remain fixed throughout the crediting period)

Table D.1.1: Data and parameters that are fixed during the crediting period

#	Parameter	Index	Unit	Value	Data source
1.	Density of methane (CH_4) under standard conditions: 20 °C, 101.325 kPa	ρ_{CH4}	kg/m^3	0.668	Thermal design of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
2.	Density of carbon dioxide (CO_2) under standard conditions: 20 °C, 101.325 kPa	ρ_{CO2}	kg/m^3	1.842	Thermal design of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
3.	Global warming potential of methane	GWP_{CH4}	tCO_2/tCH_4	21	Climate change 1995, Science of climate change: Conclusion for politicians and technical resolution of the Report of Working group I, p. 22.
4.	A share of unburned APG in flare under thermal black type of combustion	ε	-	0.035	«Methods for determining the pollutants emission under APG flaring», SRI on atmospheric air protection, Saint-Petersburg,1998
5.	Default emission factors for fugitive emissions (Gas Transmission)	E_{TR}	$GgCH_4$/mln. m^3	0.0011	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Chapter 4, Table 4.2.5.)
6.	Default emission factors for fugitive emissions (Gas Processing)	E_P	$GgCH_4$/ mln. m^3	0.0011	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Chapter 4, Table 4.2.5.)
7.	CO_2 emission factor of UES Ural grid (demand-side carbon emission factor, i.e. transmission and distribution losses in the grid were taken into account).	EF_{grid_Ural}	tCO_2/MWh	2008 – 0.631 2009 – 0.631 2010 – 0.638 2011 – 0,668 2012 – 0,712	«Development of the electricity carbon emission factors for Russia», 2010, Lahmeyer International by order of European Bank for Reconstruction and Development.
8.	Average leaks due to processing and compressing of APG at GPP	E_{P_GPP}	%	0.2%	Statistical report DN-6, 2008-2011, OJSC «Orenburgneft»
9.	Average specific APG consumption per ths. cubic meter of processing/compressing APG at GPP	SFC_{FC_GPP}	m^3/ths.m^3	47	Statistical report DN-6, 2008-2011, OJSC «Orenburgneft»

Figure D.1.1: Location of monitoring points



Step 2. Application of the approach chosen
See the next Section.

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
M-1	**$EC_{GCS,i}$** – consumption of electricity by GCS_i	Electricity meter	MWh	m	daily	100%	electronic/paper	
M-2	**$V_{APG\_PJ,i}$** – volume of APG supplied to GCS_i	Vortex flowmeter	mln.m^3	m	hourly	100%	electronic/paper	
M-3	**$V_{APG\_GCS,i}$** – combustion of APG in gas engines of GCS_i	Vortex flowmeter	mln.m^3	m	hourly	100%	electronic/paper	
M-4	**w_{CO2}, w_{CH4} w_{VOC}** – volumetric fraction of component in APG	Chromatograph	vol.%	m	quarterly	100%	electronic/paper	

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 CO_2-e emissions for year *y*:

$$PE_y = PE_{EC\_GCS,y} + PE_{APG\_GCS,y} + PE_{P\_GCS,y} + PE_{TR,y} \quad (4)$$

Where

$PE_{EC\_GCS,y}$ - CO_2 emissions from electricity consumption at GCS, tCO_2;

$PE_{APG\_GCS,y}$ - CO_2 emissions from APG combustion in gas engines of GCS, tCO_2;

$\mathbf{PE_{P\_GCS,y}}$ – leaks of CH_4 with compression of project volume of APG, tCO_2-e;
$\mathbf{PE_{TR,y}}$ – leaks of CH_4 with transportation of project volume of APG, tCO_2-e;

Project CO_2 emissions from electricity consumption at GCS for year *y*:

$$\mathbf{PE_{EC\_GCS,y} = \sum_i EC_{GCS,i,y} \times EF_{grid\_Ural,y}} \quad (5)$$

Where:
$\mathbf{EC_{GCS,i,y}}$ – consumption of electricity by GCS_i, MWh;
$\mathbf{EF_{grid\_Ural,y}}$ – CO_2 emission factor of UES Ural grid (demand-side carbon emission factor), tCO_2/MWh;

Project CO_2 emissions from APG combustion in gas engines of GCS, tCO_2-e for year *y*:

$$\mathbf{PE_{APG\_GCS,y} = 1000 \times \sum_i (V_{APG\_GCS,i,y} \times EF_{CO2,APG,i,y})} \quad (6)$$

Where:
$\mathbf{V_{APG\_GCS,i,y}}$ – combustion of APG in gas engines of GCS_i, mln.m^3;
$\mathbf{EF_{CO2,APG,i,y}}$ – CO_2 emission factor under APG combustion in gas engines of GCS_i, tCO_2/ thous. m^3.

CO_2 emission factor under APG combustion in gas engines of GCS for year *y*, tCO_2/thous. m^3;

$$\mathbf{EF_{CO2,APG,i,y} = [w_{CO2,i,y} + (Nc_{CH4} \times w_{CH4,i,y} + \sum_j Nc_{VOCj} \times w_{VOC,j,i,y})] \times \rho_{CO2}} \quad (7)$$

Where:
$\mathbf{w_{CO2,i,y}, w_{CH4,i,y}\ w_{VOC,j,i,y}}$ – volumetric fraction of component in the APG, vol %;
$\mathbf{Nc_{CH4}, \sum_j Nc_{VOCj}}$ – the amount of carbon moles in a methane mole and VOC correspondingly ($\sum_j Nc_{VOCj}$ where j is a component of VOC);
$\mathbf{\rho_{CO2}}$ – density of CO_2 under 20°C, which is equal to 1.842 kg/m^3;

Leaks of CH_4 with APG transportation for year *y*, tCO_2-e:

$$\mathbf{PE_{TR,y} = 1000 \times E_{TR} \times \sum_i [(V_{APG\_PJ,i,y} - V_{APG\_GCS,i,y}) \times w_{CH4,i,y}] \times GWP_{CH4}} \quad (8)$$

Where:
$\mathbf{E_{TR}}$ – default emission factors for fugitive emissions (Gas Transmission, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Chapter 4, Table 4.2.5.), 0.0011 $GgCH_4$/ mln. m^3;
$\mathbf{V_{APG\_PJ,i,y}}$ – volume of APG supplied to GCS_i, mln.m^3;
$\mathbf{V_{APG\_GCS,i,y}}$ – combustion of APG in gas engines of GCS_i, mln.m^3;
$\mathbf{w_{CH4,i,y}}$ – volumetric fractions of methane in APG determined by means of values of APG chemical composition (for methane) at GCS (the source of information – the Protocol of gas analysis), vol %;

GWP_{CH4} – global warming potential of methane, tCO_2/tCH_4.

Leaks of CH_4 with compression of project volume of APG, tCO_2-e:

$$PE_{P\_GCS,y} = 1000 \times E_P \times \sum_i (V_{APG\_PJ,i,y} \times w_{CH4,i,y}) \times GWP_{CH4} \quad (9)$$

Where:
E_P – default emission factors for fugitive emissions (Gas Processing, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Chapter 4, Table 4.2.5.), 0.0011 $GgCH_4$/ mln. m^3;

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
M-2	**$V_{APG\_PJ,i}$** – volume of APG supplied to GCS_i	Vortex flowmeter	mln. m^3	m	hourly	100%	electronic/paper	
M-4	**w_{CO2}, w_{CH4} w_{VOC}** – volumetric fraction of component in APG	Chromatograph	vol.%	m	quarterly	100%	electronic/paper	

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 GHG emission under APG flaring (taking into account the incomplete combustion)

$$BE_y = 1000 \times \sum_i [V_{APG\_PJ,i,y} \times (EF_{CO2,F,i,y} + EF_{CH4,F,i,y})] \quad (1)$$

Where:
BE_y – Total GHG baseline emissions from flaring of APG for year *y*, tCO_2-e;

$\mathbf{V_{APG\_PJ,i,y}}$ – volume of APG supplied to GCS_i, mln. m^3;
$\mathbf{EF_{CO2,F,i,y}}$ –CO_2 emission factor under APG flaring at Orenburg region fields, tCO_2/thous. m^3;
$\mathbf{EF_{CH4,F,i,y}}$ –CH_4 emission factor under APG flaring at Orenburg region fields, tCO_2-e/thous. m^3.

$$\mathbf{EF_{CO2,F,i,y} = [w_{CO2,i,y} + (Nc_{CH4} \times w_{CH4,i,y} + \sum_j Nc_{VOCj} \times w_{VOCj,i,y})] \times \rho_{CO2}} \times \eta_{flare} \quad (2)$$

Where:

$\mathbf{w_{CO2,i,y}}$, $\mathbf{w_{CH4,i,y}}$, $\mathbf{w_{VOCj,i,y}}$ – volumetric fractions of components in APG determined by means of values of APG chemical composition (for methane) at GCS_i (the source of information – the Protocol of gas analysis), vol %;
$\mathbf{Nc_{CH4}}$, $\mathbf{\sum_j Nc_{VOCj}}$ – the amount of carbon moles in a methane mole and VOC correspondingly ($\sum_j Nc_{VOCj}$ where j is a component of VOC);
$\mathbf{\rho_{CO2}}$ – density of CO_2 under 20°C, which is equal to 1.842 kg/m^3;
η_{flare} –efficiency of APG flaring, which is equal to 0.965 and is dimensionless. η_{flare} **= 1 -** ε where:
ε –share of unburned APG in flare under thermal black type of combustion, which is equal to 0.035, dimensionless.

Due to the incomplete combustion a part of APG is emitted into atmosphere without oxidation; the methods of SRI «Atmosphere» determines the efficiency of such incomplete burning as 3.5% (0.035) that results the methane emission into atmosphere. The emission factor of methane in terms of CO_2-equivalent is determined in the following way:

$$\mathbf{EF_{CH4,F,i,y} = w_{CH4,i,y} \times \rho_{CH4} \times (1-\eta_{flare}) \times GWP_{CH4}} \quad (3)$$

Where:

$\mathbf{w_{CH4,i,y}}$ – annual average volume fraction of methane in APG calculated on the basis of data on methane content in APG (the source of information is the Protocol of gas analysis);
$\mathbf{\rho_{CH4}}$– density of methane CH_4 under standard conditions is equal to 0.668 kg/m^3;
η_{flare} – efficiency of APG flaring is equal to 0.965, dimensionless;
$\mathbf{GWP_{CH4}}$ – global warming potential of methane - 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

Not applicable

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):

Not applicable

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

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
M-2	$\mathbf{V_{APG\_PJ,i}}$ – volume of APG supplied to GCS_i	Vortex flowmeter	mln.m^3	m	hourly	100%	electronic/paper	
M-3	$\mathbf{V_{APG\_GCS,i}}$ – combustion of APG in gas engines of GCS_i	Vortex flowmeter	mln.m^3	m	hourly	100%	electronic/paper	
M-4	$\mathbf{w_{CO2}}$, $\mathbf{w_{CH4}}$ $\mathbf{w_{VOC}}$ – vol. fraction of component in APG	Chromatograph	vol.%	m	quarterly	100%	electronic/paper	

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

>>

Leakage for year *y*, tCO_2-e:

$$LE_y = L_{P\_GPP,y} + L_{FC\_GPP,y} \quad (10)$$

Where:

$L_{P\_GPP,y}$ – CH_4 leaks due to processing and compressing of APG at GPP, tCO_2-e;

$L_{FC\_GPP,y}$ – emission from APG consumption in GPP during APG processing and compressing, tCO_2.

CH_4 leaks due to processing and compressing of APG at GPP, tCO_2-e:

$$L_{P\_GPP,y} = 1000 \times E_{P\_GPP} \times \sum_i [(V_{APG\_PJ,i,y} - V_{APG\_GCS,i,y}) \times w_{CH4,i,y}] \times \rho_{CH4} \times GWP_{CH4} \quad (11)$$

Where:

E_{P_GPP} – average leaks due to processing and compressing of APG at GPP, %;

$V_{APG\_PJ,i,y}$ – volume of APG supplied to GCS_i, mln.m^3;

$V_{APG\_GCS,i,y}$ – combustion of APG in gas engines of GCS_i, mln.m^3;

$w_{CH4,i,y}$ – volumetric fractions of methane in APG determined by means of values of APG chemical composition (for methane) at GCS (the source of information – the Protocol of gas analysis), vol %;

ρ_{CH4} – density of methane under standard conditions, kg/m^3;

GWP_{CH4} – global warming potential of methane, tCO_2/tCH_4.

Emission from APG consumption in GPP during APG processing and compressing, tCO_2:

$$L_{FC\_GPP,y} = SFC_{FC\_GPP} \times \sum_i [(V_{APG\_PJ,i,y} - V_{APG\_GCS,i,y}) \times EF_{CO2,APG,i,y}] \quad (12)$$

Where:

SFC_{FC_GPP} – average specific APG consumption per ths. cubic meter of processing/compressing APG at GPP, m^3/ths.m^3;

$V_{APG\_PJ,i,y}$ – volume of APG supplied to GCS_i, mln.m^3;

$V_{APG\_GCS,i,y}$ – combustion of APG in gas engines of GCS_i, mln.m^3;

$EF_{CO2,APG,i,y}$ – CO_2 emission factor under APG combustion at GPP, tCO_2/ths.m^3.

$$EF_{CO2,APG,i,y} = [w_{CO2,i,y} + (Nc_{CH4} \times w_{CH4,i,y} + \sum_j Nc_{VOCj} \times w_{VOCj,i,y})] \times \rho_{CO2} \quad (13)$$

Where:

$w_{CO2,i,y}$, $w_{CH4,i,y}$, $w_{VOCj,i,y}$ – volumetric fractions of components in APG determined by means of values of APG chemical composition (for methane) at GCS_i (the source of information – the Protocol of gas analysis), vol %;

Nc_{CH4}, $\sum_j Nc_{VOCj}$ – the amount of carbon moles in a methane mole and VOC correspondingly ($\sum_j Nc_{VOCj}$ where j is a component of VOC);
ρ_{CO2} – density of CO_2 under 20°C, which is equal to 1.842 kg/m^3.

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):

>>
The following equation shall be used to calculate emission reductions:

$$ER_y = BE_y - PE_y - LE_y \quad (14)$$

Where:
ER_y – Emission reduction in the year *y*, tCO_2-e
BE_y – Baseline emissions, tCO_2-e
PE_y – Project emissions, tCO_2-e
LE_y – Leakage, tCO_2-e

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:

>>
The information on the project's environmental impact will be presented in accordance with RF legislation. In accordance with legislation in the area of environmental protection, the enterprise should control the pollutants emission and waste disposals, should organize and provide the management of production and consumption waste, should present the installed reports in the authorized public bodies (Federal service on ecological, technological and nuclear supervision). The activity on environmental protection in JSC "Orenburgneft" is organized by the Department of labor protection, industrial safety, environmental protection. The environmental department prepares in the target dates and presents to the authorized state bodies the official reports and forms including:

- 2-TP (air) – the data on air medium protection including the information on the amount of collected and neutralized pollutants, the detailed information on emission of concrete pollutants, the amount os emission sources, the measures on reduction of emissions in atmosphere and the emissions from the separate groups of pollution sources;
- 2-TP (water resources) – the data on water usage including the information on water consumption from the natural sources, sewage disposals and pollutants contents in water, capacity of water etc. for treatment facilities;
- 2-TP (waste) – the data on formation, utilization, waste neutralization, transportation and disposal of production and consumption waste including the annual balance of waste separately on the types and classes of hazard.

The sources and kinds of effect were considered at the design, the evaluation of modern state of contamination was carried out, the preliminary forecast of the state was fulfilled, and the measures on environmental protection were outlined. In this case the assessment of environmental impact and the assessment of generated damage taking into account the nature-protective measures foreseen by project are presented below for the following environmental components: ground, atmospheric air, geotechnical conditions, geomorphological conditions, landscape complexes, soil, fauna.
In accordance of ecological substantiation and preliminary assessment of environmental impact from the scheduled economic activity, the placement of objects of APG collection and transportation system will not result in the irreversible processes. The preliminary environmental impact is estimated as local, short-term and acceptable.

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.
Table D.1.1.1. *M-1*	Low	Accounting of electricity consumption at GCS is carried out by means of electricity meters Alpha A1700/A1800. Calibration of instruments is carried out by manufacturer Elster Metronica
Table D.1.1.1. *M-2, M-3*	Low	Assembly of accounting APG coming to GCS consists of vortex flow meter and pressure and temperature transducers. Calibration of instruments is carried out by FSE «Center of standardization and metrology», city Orenburg
Table D.1.1.1. *M-4*	Low	The components composition of APG is determined by means of chromatographs. Calibration of instruments is carried out by FSE «Center of standardization and metrology», city Samara and CJSC of Pilot plants «Chromat»

The emergency procedure
According to Instructions on operation of measuring units there are two APG flow lines at the outlet of GCS (working Line 1 and back-up Line 2). In the case when Line 1 is under repair, then AGP volume is supplied from GCS to GGP through Line 2

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 «Orenburgneft». The Monitoring plan is based on the national standard GOST R “State system for ensuring the uniformity of measurements.
TableD.3.1 Roles and responsibilities of persons, departments and organizations carrying out the monitoring

#	Company	Position/department	Responsibilities	Comments
1.	CJSC «NCSF», Moscow	Department of projects development	1. Calculation of actual emission reductions 2. Drawing up of accounts on monitoring	
2.	OJSC «TNK-BP Management»,	Department of controlling and	1. Coordination of works on preparation of	

#	Company	Position/department	Responsibilities	Comments
	Moscow	tariffs formation OJSC «TNK-BP Management»	monitoring reports 2. Approval of monitoring reports 3. Transfer of approved monitoring reports to the company-varifier	
3.	OJSC «Orenburgneft»	Governing body	Preparation and communications of annual production data in OJSC «TNK-BP Management»	
4.	Zaikinsky GPP	Central technical service	Data consolidation and execution of annual and monthly balances of APG	
5.	Zaikinsky GPP	Central plant laboratory	Carrying out of analysis on component compositions of APG	
6.	OGMD «Buzulukneft».	Department of preparation and transportation of oil and gas	Composition of daily balances of APG	GCS: Pasmurovskaya, Gerasimovskaya, Tananykskaya, Dolgovskaya, Kurmanaevskaya Savel’evskaya, Rostashinskaya
7.	OGMD «Buzulukneft»».	Power engineering department	Accounting of electricity consumption at GCS	GCS: Pasmurovskaya, Gerasimovskaya, Tananykskaya, Dolgovskaya, Kurmanaevskaya Savel’evskaya, Rostashinskaya
8.	OGMD «Sorochinskneft»	Department of preparation and transportation of oil and gas	Composition of everyday balances of APG	Vakhitovskaya GCS
9.	OGMD «Sorochinskneft»	Power engineering department	Accounting of electricity consumption at GCS	Vakhitovskaya GCS

The operative accounting of APG produced at the fields of Orenburg region is carried out by OJSC “Orenburgneft”, which includes Zaikinsky GPP, oil-and gas production management department (OGMD) «Sorochinskneft» и OGMD «Buzulukneft».

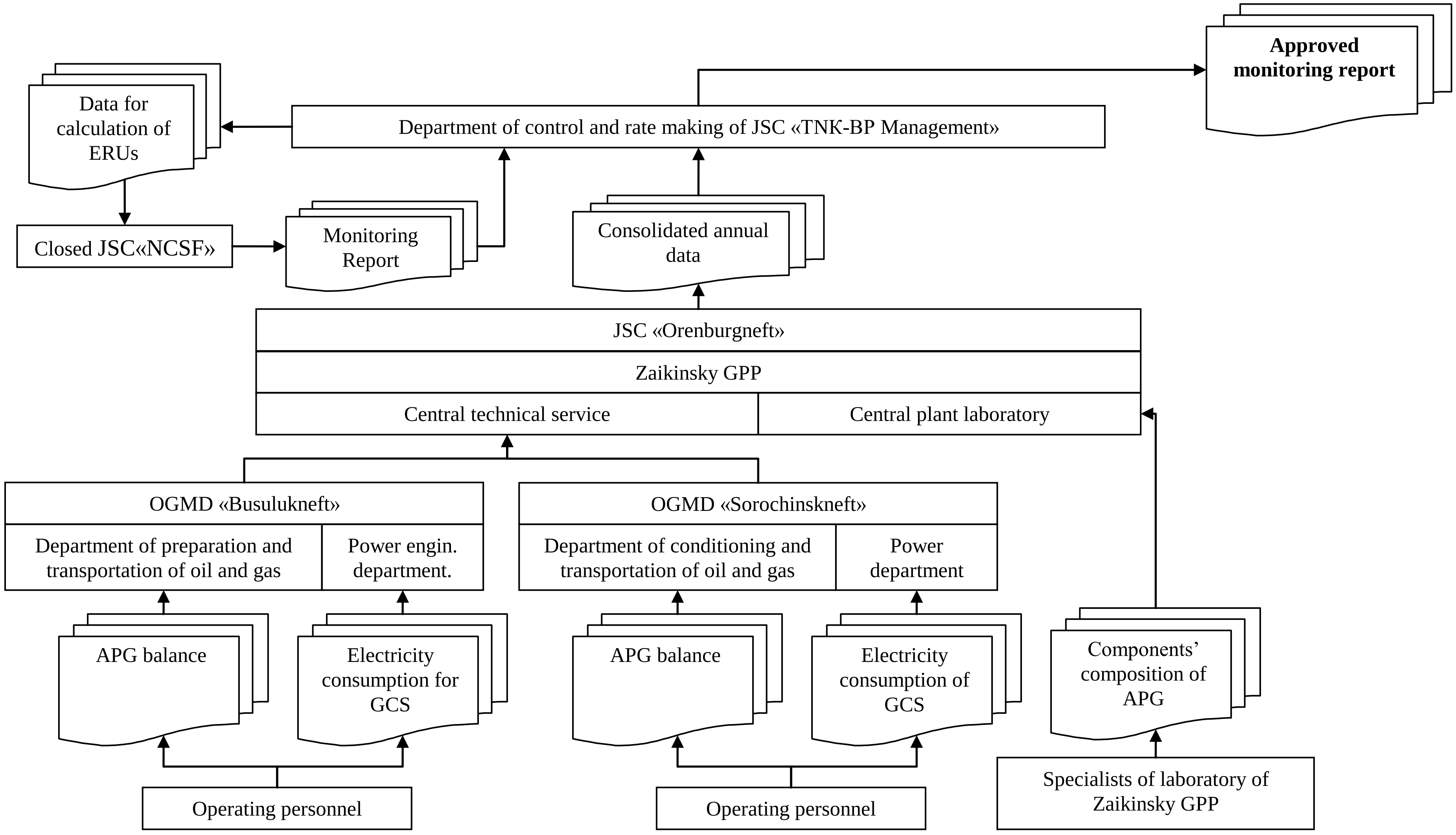
The operative personnel of OGMD «Buzulukneft», OGMD «Sorochinskneft» and Zaikinsky GPP carries out the preliminary collection of information on the volumes of gas used for auxiliaries, burned in the flaring systems of areal objects, the gas directed in gas pipelines for the further transport and a preparation on the data of accounting nodes for gas and fixes them on the regime sheets of the plant fir their object. The transfer of data to the operative personnel of gas treatment object (GCS) takes place after collection of information for consolidation. After the consolidation of data the operative personnel of gas treatment transfers the information to the Central technical service (CTS) of Zaikinsky GPP. The consolidation, monitoring and analysis of the volumes of APG production and realization take place in CTS of Zaikinsky GPP. Then the specialists of CTS of Zaikinsky GPP are posting the composite operative information to the specialists of the department of preparation and transportation of oil and gas and in the CTS of OGMD «Sorochinskneft» and OGMD «Buzulukneft». The specialists of OGMD «Sorochinskneft» and OGMD «Buzulukneft» form the summary daily. The monthly balance of gas is constituted by the specialists of CTS of Zaikinsky GPP with the joint participatiom of specialists from the departments of preparation and transportation of oil and gas OGMD of «Sorochinskneft» and OGMD «Buzulukneft». The monthly balance of APG is formed on the basis of monthly gas balances. This balance together with the data on the components composition of APG and the electricity consumption at GCS is transferred to the Department of control and formation of tariffs of OJSC «TNK-BP Management». This department present annually the data summary in the department of projects development of CJSC «National Carbon Sequestration

Foundation» for the fulfillment of annual calculations of GHG emission reductions and drawing up of accounts on monitoring. When the annual report on monitoring is ready, it should be approved in the Department of control and formation of tariffs of OJSC «TNK-BP Management». The approved annual report is transferred to the independent expert company for carrying out the annual verification of achieved emission reductions.

All relevant data for monitoring will be stored during two years after the last transfer of ERUs under this Project.

The structure of monitoring of reductions during project's realization has the following diagram form.

Fig D 3.1 Operating and managerial structure of monitoring



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

>>

The developer of monitoring plan:

Closed Joint-Stock Company «National Carbon Sequestration Foundation» (NCSF, Moscow).

NCSF is not a project participant.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

>>

Table E.1.1. Project CO_2 emissions from electricity consumption at GCS

Item	Index	Unit	2008	2009	2010	2011	2012
Consumption of electricity by GCS	$\sum EC_{GCS,i,y}$	MWh	3 798	12 965	16 197	14 526	15 640
Pasmurovskaya GCS	$EC_{GCS,1}$	MWh	102	2 662	2 844	1 772	2 426
Gerasimovskaya GCS	$EC_{GCS,2}$	MWh	4	750	379	531	553
Tananykskaya GCS	$EC_{GCS,3}$	MWh		283	818	406	502
Dolgovskaya GCS	$EC_{GCS,4}$	MWh	439	2 696	2 835	2 491	2 674
Kurmanaevskaya GCS	$EC_{GCS,5}$	MWh	2 749	3 652	3 144	2 067	2 903
Savel'evskaya GCS	$EC_{GCS,6}$	MWh	372	2 004	2 627	2 349	2 327
Rostashinskaya GCS	$EC_{GCS,7}$	MWh	134	574	451	549	525
Vakhitovaksa GCS	$EC_{GCS,8}$	MWh		345	3 099	4 361	3 730
Emission factors for UES Ural	$EF_{grid\_Ural,y}$	tCO_2/MWh	0.631	0.631	0.638	0.668	0.712
Project CO_2 emissions from electricity consumption at GCS	$PE_{EC\_GCS,i,y}$	tCO_2	**2 397**	**8 181**	**10 334**	**9 703**	**11 135**

Table E.1.2. Project CO_2 emissions from APG combustion in gas engines of GCS

Item	Index	Unit	2008	2009	2010	2011	2012
Combustion of APG in gas engines of GCS	$V_{APG\_GCS,i,y}$	mln.m^3	0.000	4.431	8.527	6.503	7.560
Rostashinskaya GCS	$V_{APG\_GCS,7}$	mln.m^3	0.000	2.529	2.318	2.469	2.439
Vakhitovaksa GCS	$V_{APG\_GCS,9}$	mln.m^3	0.000	1.902	6.209	4.034	5.122
CO_2 emission factor under APG combustion in gas engines of GCS_i	$EF_{CO2,APG,i,y}$	tCO_2/ths.m^3					
Rostashinskaya GCS	$EF_{CO2,APG,7}$	tCO_2/ths.m^3	3.461	4.379	3.560	4.236	3.909
Vakhitovaksa GCS	$EF_{CO2,APG,9}$	tCO_2/ths.m^3	2.807	2.861	2.914	2.646	2.807
Project CO_2 emissions from APG combustion in gas engines of GCS	$PE_{APG\_GCS,y}$	tCO_2	**0**	**16 516**	**26 344**	**21 132**	**23 908**

Table E.1.3. Leaks of CH_4 with APG transportation

Item	Index	Unit	2008	2009	2010	2011	2012
Default emission factors for fugitive emissions (Gas Transmission)	E_{TR}	$GgCH_4$/ mln.m^3	0.0011	0.0011	0.0011	0.0011	0.0011
Global warming potential of methane	GWP_{CH4}	tCO_2/ tCH_4	21	21	21	21	21
Volume of APG supplied to GCS	$\sum V_{APG\_PJ,i}$	mln.m^3	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	$V_{APG\_PJ,1}$	mln.m^3	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	$V_{APG\_PJ,2}$	mln.m^3	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	$V_{APG\_PJ,3}$	mln.m^3	0.000	0.576	3.050	1.252	1.626

Item	Index	Unit	2008	2009	2010	2011	2012
Dolgovskaya GCS	$V_{APG\_PJ,4}$	mln.m^3	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	$V_{APG\_PJ,5}$	mln.m^3	0.000	4.484	28.058	22.768	13.828
Savel'evskaya GCS	$V_{APG\_PJ,6}$	mln.m^3	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	$V_{APG\_PJ,7}$	mln.m^3	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	$V_{APG\_PJ,8}$	mln.m^3	0.000	47.083	135.736	145.862	109.560
Combustion of APG in gas engines of GCS	$\sum V_{APG\_GCS,i}$	mln.m^3	0.000	4.431	8.527	6.503	7.560
Pasmurovskaya GCS	$V_{APG\_GCS,1}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Gerasimovskaya GCS	$V_{APG\_GCS,2}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Tananykskaya GCS	$V_{APG\_GCS,3}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Dolgovskaya GCS	$V_{APG\_GCS,4}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Kurmanaevskaya GCS	$V_{APG\_GCS,5}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Savel'evskaya GCS	$V_{APG\_GCS,6}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Rostashinskaya GCS	$V_{APG\_GCS,7}$	mln.m^3	0.000	2.529	2.318	2.469	2.439
Vakhitovaksa GCS	$V_{APG\_GCS,8}$	mln.m^3	0.000	1.902	6.209	4.034	5.122
Volumetric fractions of methane in APG	$w_{CH4,i}$	%					
Pasmurovskaya GCS	$w_{CH4,1}$	%	48%	53%	47%	50%	49%
Gerasimovskaya GCS	$w_{CH4,2}$	%	39%	38%	34%	30%	35%
Tananykskaya GCS	$w_{CH4,3}$	%	26%	20%	35%	22%	26%
Dolgovskaya GCS	$w_{CH4,4}$	%	34%	37%	39%	23%	33%
Kurmanaevskaya GCS	$w_{CH4,5}$	%	43%	59%	49%	47%	49%
Savel'evskaya GCS	$w_{CH4,6}$	%	25%	41%	41%	40%	37%
Rostashinskaya GCS	$w_{CH4,7}$	%	48%	33%	44%	30%	39%
Vakhitovaksa GCS	$w_{CH4,8}$	%	58%	57%	56%	61%	58%
$\sum_i[(FC_{APG\_PJ,i,y} - FC_{APG\_GCS,i,y}) \times y_{CH4,i,y}]$	$\sum_i$	mln.m^3	13.183	91.989	156.264	148.123	131.259
Pasmurovskaya GCS	i=1	mln.m^3	0.244	8.809	7.410	11.760	9.203
Gerasimovskaya GCS	i=2	mln.m^3	0.000	1.766	0.811	0.890	1.181
Tananykskaya GCS	i=3	mln.m^3	0.000	0.116	1.080	0.272	0.418
Dolgovskaya GCS	i=4	mln.m^3	0.000	9.072	9.367	5.226	7.873
Kurmanaevskaya GCS	i=5	mln.m^3	0.000	2.636	13.815	10.595	6.818
Savel'evskaya GCS	i=6	mln.m^3	0.000	5.400	8.947	7.998	6.753
Rostashinskaya GCS	i=7	mln.m^3	12.939	38.303	42.688	25.545	38.605
Vakhitovaksa GCS	i=8	mln.m^3	0.000	25.887	72.147	85.837	60.407
Leaks of CH_4 with APG transportation	**PE_{TR}**	**tCO_2-e**	**305**	**2 125**	**3 610**	**3 422**	**3 032**

Table E.1.4. Leaks of CH_4 with compression of project volume of APG

Item	Index	Unit	2008	2009	2010	2011	2012
Default emission factors for fugitive emissions (Gas Processing)	**E_P**	$GgCH_4$/ mln.m^3	0.0011	0.0011	0.0011	0.0011	0.0011
Global warming potential	**GWP_{CH4}**	tCO_2/	21	21	21	21	21

Item	Index	Unit	2008	2009	2010	2011	2012
of methane		tCH_4					
Volume of APG supplied to GCS	**$\sum V_{APG\_PJ,i}$**	mln.m^3	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	**$V_{APG\_PJ,1}$**	mln.m^3	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	**$V_{APG\_PJ,2}$**	mln.m^3	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	**$V_{APG\_PJ,3}$**	mln.m^3	0.000	0.576	3.050	1.252	1.626
Dolgovskaya GCS	**$V_{APG\_PJ,4}$**	mln.m^3	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	**$V_{APG\_PJ,5}$**	mln.m^3	0.000	4.484	28.058	22.768	13.828
Savel’evskaya GCS	**$V_{APG\_PJ,6}$**	mln.m^3	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	**$V_{APG\_PJ,7}$**	mln.m^3	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	**$V_{APG\_PJ,8}$**	mln.m^3	0.000	47.083	135.736	145.862	109.560
Volumetric fractions of methane in APG	**$w_{CH4,i}$**	%					
Pasmurovskaya GCS	**$w_{CH4,1}$**	%	48%	53%	47%	50%	49%
Gerasimovskaya GCS	**$w_{CH4,2}$**	%	39%	38%	34%	30%	35%
Tananykskaya GCS	**$w_{CH4,3}$**	%	26%	20%	35%	22%	26%
Dolgovskaya GCS	**$w_{CH4,4}$**	%	34%	37%	39%	23%	33%
Kurmanaevskaya GCS	**$w_{CH4,5}$**	%	43%	59%	49%	47%	49%
Savel’evskaya GCS	**$w_{CH4,6}$**	%	25%	41%	41%	40%	37%
Rostashinskaya GCS	**$w_{CH4,7}$**	%	48%	33%	44%	30%	39%
Vakhitovaksa GCS	**$w_{CH4,8}$**	%	58%	57%	56%	61%	58%
$\sum(FC_{APG\_PJ,i,y} \times y_{CH4,i,y})$	**$\sum_i$**	mln.m^3	13.183	93.903	160.752	151.308	135.168
Pasmurovskaya GCS	i=1	mln.m^3	0.244	8.809	7.410	11.760	9.203
Gerasimovskaya GCS	i=2	mln.m^3	0.000	1.766	0.811	0.890	1.181
Tananykskaya GCS	i=3	mln.m^3	0.000	0.116	1.080	0.272	0.418
Dolgovskaya GCS	i=4	mln.m^3	0.000	9.072	9.367	5.226	7.873
Kurmanaevskaya GCS	i=5	mln.m^3	0.000	2.636	13.815	10.595	6.818
Savel’evskaya GCS	i=6	mln.m^3	0.000	5.400	8.947	7.998	6.753
Rostashinskaya GCS	i=7	mln.m^3	12.939	39.127	43.717	26.289	39.552
Vakhitovaksa GCS	i=8	mln.m^3	0.000	26.977	75.606	88.278	63.369
Leaks of CH_4 with compression of project volume of APG	**$PE_{P\_GCS,y}$**	**tCO_2-e**	**305**	**2 169**	**3 713**	**3 495**	**3 122**

Table E.1.5. Project GHG emissions

Item	Index	Unit	2008	2009	2010	2011	2012
CO_2 emissions from electricity consumption at GCS	**$PE_{EC\_GCS,y}$**	tCO_2	2 397	8 181	10 334	9 703	11 135
CO_2 emissions from APG combustion in gas engines of GCS	**$PE_{APG\_GCS,y}$**	tCO_2	0	16 516	26 344	21 132	23 908
Leaks of CH_4 with transportation of project volume of APG	**$PE_{TR,y}$**	tCO_2-e	305	2 125	3 610	3 422	3 032
Leaks of CH_4 with compression of project volume of APG	**$PE_{P\_GCS,y}$**	tCO_2-e	305	2 169	3 713	3 495	3 122
Project GHG emissions	**PE_y**	**tCO_2-e**	**3 006**	**28 991**	**44 000**	**37 752**	**41 198**

E.2. Estimated leakage:

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Table E.2.1. CH_4 leaks due to processing and compressing of APG at GPP

Item	Index	Unit	2008	2009	2010	2011	2012
Average leaks due to processing and compressing of APG at GPP	E_{P_GPP}	%	0.2%	0.2%	0.2%	0.2%	0.2%
Global warming potential of methane	GWP_{CH4}	tCO_2/tCH_4	21	21	21	21	21
Density of CH_4	ρ_{CH4}	kg/m^3	0.668	0.668	0.668	0.668	0.668
$\sum[(FC_{APG\_PJ,i,y} - FC_{APG\_GCS,i,y}) \times y_{CH4,i,y}]_i$	$\sum_i$	tCO_2-e	13.183	91.989	156.264	148.123	131.259
CH_4 leaks due to processing and compressing of APG at GPP	L_{P_GPP}	**tCO_2-e**	**317**	**2 211**	**3 756**	**3 560**	**3 155**

Table E.2.2. Emission from APG consumption in GPP during APG processing and compressing

Item	Index	Unit	2008	2009	2010	2011	2012
Average specific APG consumption per ths. cubic meter of processing/ compressing APG at GPP	SFC_{APG_GPP}	m^3/ths.m^3	47	47	47	47	47
Volume of APG supplied to GCS	$\sum V_{APG\_PJ,i}$	mln.m^3	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	$V_{APG\_PJ,1}$	mln.m^3	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	$V_{APG\_PJ,2}$	mln.m^3	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	$V_{APG\_PJ,3}$	mln.m^3	0.000	0.576	3.050	1.252	1.626
Dolgovskaya GCS	$V_{APG\_PJ,4}$	mln.m^3	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	$V_{APG\_PJ,5}$	mln.m^3	0.000	4.484	28.058	22.768	13.828
Savel'evskaya GCS	$V_{APG\_PJ,6}$	mln.m^3	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	$V_{APG\_PJ,7}$	mln.m^3	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	$V_{APG\_PJ,8}$	mln.m^3	0.000	47.083	135.736	145.862	109.560
Combustion of APG in gas engines of GCS	$\sum V_{APG\_GCS,i}$	mln.m^3	0.000	4.431	8.527	6.503	7.560
Pasmurovskaya GCS	$V_{APG\_GCS,1}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Gerasimovskaya GCS	$V_{APG\_GCS,2}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Tananykskaya GCS	$V_{APG\_GCS,3}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Dolgovskaya GCS	$V_{APG\_GCS,4}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Kurmanaevskaya GCS	$V_{APG\_GCS,5}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Savel'evskaya GCS	$V_{APG\_GCS,6}$	mln.m^3	0.000	0.000	0.000	0.000	0.000
Rostashinskaya GCS	$V_{APG\_GCS,7}$	mln.m^3	0.000	2.529	2.318	2.469	2.439
Vakhitovaksa GCS	$V_{APG\_GCS,8}$	mln.m^3	0.000	1.902	6.209	4.034	5.122
CO_2 emission factor under APG combustion	$EF_{CO2,APG,i}$	tCO_2/ths.m^3	3.463	3.743	3.227	3.312	3.371
Pasmurovskaya GCS	$EF_{CO2,APG,1}$	tCO_2/ths.m^3	3.604	3.388	3.744	3.442	3.545

Item	Index	Unit	2008	2009	2010	2011	2012
Gerasimovskaya GCS	$EF_{CO2,APG,2}$	$tCO_2/ths.m^3$	2.815	3.080	3.660	3.563	3.280
Tananykskaya GCS	$EF_{CO2,APG,3}$	$tCO_2/ths.m^3$	4.287	4.768	3.853	4.240	4.287
Dolgovskaya GCS	$EF_{CO2,APG,4}$	$tCO_2/ths.m^3$	3.354	3.163	3.436	4.555	3.627
Kurmanaevskaya GCS	$EF_{CO2,APG,5}$	$tCO_2/ths.m^3$	3.423	2.709	3.022	2.850	3.001
Savel'evskaya GCS	$EF_{CO2,APG,6}$	$tCO_2/ths.m^3$	4.184	3.151	3.143	3.008	3.372
Rostashinskaya GCS	$EF_{CO2,APG,7}$	$tCO_2/ths.m^3$	3.461	4.379	3.560	4.236	3.909
Vakhitovaksa GCS	$EF_{CO2,APG,8}$	$tCO_2/ths.m^3$	2.807	2.861	2.914	2.646	2.807
$\sum[(FC_{APG\_PJ,i,y} - FC_{APG\_GCS,i,y}) \times EF_{CO2,APG,i,y}]_i$	$\sum_i$	tCO_2	94.961	848.281	1035.963	1057.350	954.942
Pasmurovskaya GCS	i=1	tCO_2	1.839	56.647	59.151	80.195	65.952
Gerasimovskaya GCS	i=2	tCO_2	0.000	14.441	8.756	10.715	11.029
Tananykskaya GCS	i=3	tCO_2	0.000	2.749	11.751	5.307	6.971
Dolgovskaya GCS	i=4	tCO_2	0.000	76.643	83.499	101.588	85.643
Kurmanaevskaya GCS	i=5	tCO_2	0.000	12.150	84.803	64.889	41.498
Savel'evskaya GCS	i=6	tCO_2	0.000	41.554	68.431	60.151	61.763
Rostashinskaya GCS	i=7	tCO_2	93.122	514.817	342.152	359.287	388.934
Vakhitovaksa GCS	i=8	tCO_2	0.000	129.281	377.419	375.217	293.152
Emission from APG consumption in GPP during APG processing and compressing	L_{FC_GPP}	tCO_2	**4 470**	**39 934**	**48 770**	**49 777**	**44 956**

Table E.2.3. Total leakage

Item	Index	Unit	2008	2009	2010	2011	2012
CH_4 leaks due to processing and compressing of APG at GPP	L_{P_GPP}	tCO_2-e	317	2 211	3 756	3 560	3 155
Emission from APG consumption in GPP during APG processing and compressing	L_{FC_GPP}	tCO_2	4 470	39 934	48 770	49 777	44 956
Total leakage	**LE**	tCO_2-e	**4 787**	**42 145**	**52 526**	**53 337**	**48 110**

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

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Table E.3.1. The sum of E.1. and E.2.

Item	Index	Unit	2008	2009	2010	2011	2012
Project emissions (E.1.)	PE_y	tCO_2-e	3 006	28 991	44 000	37 752	41 198
Leakage (E.2.)	LE	tCO_2-e	4 787	42 145	52 526	53 337	48 110
The sum of (E.1.) and (E.2.)	$\sum$	tCO_2-e	**7 793**	**71 136**	**96 526**	**91 089**	**89 308**

E.4. Estimated baseline emissions:

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Table E.4.1. CO_2 emission factor under APG flaring

Item	Index	Unit	2008	2009	2010	2011	2012

Item	Index	Unit	2008	2009	2010	2011	2012
Pasmurovskaya GCS	$EF_{CO2,F,1}$	tCO_2/ths. m^3	3.478	3.269	3.613	3.321	3.420
Gerasimovskaya GCS	$EF_{CO2,F,2}$	tCO_2/ths. m^3	2.717	2.972	3.532	3.438	3.165
Tananykskaya GCS	$EF_{CO2,F,3}$	tCO_2/ths. m^3	4.137	4.601	3.718	4.091	4.137
Dolgovskaya GCS	$EF_{CO2,F,4}$	tCO_2/ths. m^3	3.237	3.052	3.316	4.396	3.500
Kurmanaevskaya GCS	$EF_{CO2,F,5}$	tCO_2/ths. m^3	3.303	2.615	2.917	2.750	2.896
Savel'evskaya GCS	$EF_{CO2,F,6}$	tCO_2/ths. m^3	4.038	3.041	3.033	2.903	3.254
Rostashinskaya GCS	$EF_{CO2,F,7}$	tCO_2/ths. m^3	3.340	4.225	3.435	4.088	3.772
Vakhitovaksa GCS	$EF_{CO2,F,8}$	tCO_2/ths. m^3	2.709	2.761	2.812	2.553	2.709

Table E.4.2. CH_4 emission factor under APG flaring

Item	Index	Unit	2008	2009	2010	2011	2012
Pasmurovskaya GCS	$EF_{CH4, F,1}$	tCO_2-e/ths. m^3	0.235	0.259	0.230	0.248	0.243
Gerasimovskaya GCS	$EF_{CH4, F,2}$	tCO_2-e/ths. m^3	0.193	0.185	0.166	0.145	0.172
Tananykskaya GCS	$EF_{CH4, F,3}$	tCO_2-e/ths. m^3	0.126	0.098	0.174	0.107	0.126
Dolgovskaya GCS	$EF_{CH4, F,4}$	tCO_2-e/ths. m^3	0.167	0.184	0.189	0.115	0.164
Kurmanaevskaya GCS	$EF_{CH4, F,5}$	tCO_2-e/ths. m^3	0.210	0.289	0.242	0.228	0.242
Savel'evskaya GCS	$EF_{CH4, F,6}$	tCO_2-e/ths. m^3	0.125	0.201	0.202	0.196	0.181
Rostashinskaya GCS	$EF_{CH4, F,7}$	tCO_2-e/ths. m^3	0.236	0.160	0.218	0.148	0.190
Vakhitovaksa GCS	$EF_{CH4, F,8}$	tCO_2-e/ths. m^3	0.284	0.281	0.273	0.297	0.284

Table E.4.3. Baseline GHG emission under APG flaring

Item	Index	Unit	2008	2009	2010	2011	2012
Volume of APG supplied to GCS	$\sum V_{APG\_PJ,i}$	mln.m^3	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	$V_{APG\_PJ,1}$	mln.m^3	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	$V_{APG\_PJ,2}$	mln.m^3	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	$V_{APG\_PJ,3}$	mln.m^3	0.000	0.576	3.050	1.252	1.626
Dolgovskaya GCS	$V_{APG\_PJ,4}$	mln.m^3	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	$V_{APG\_PJ,5}$	mln.m^3	0.000	4.484	28.058	22.768	13.828
Savel'evskaya GCS	$V_{APG\_PJ,6}$	mln.m^3	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	$V_{APG\_PJ,7}$	mln.m^3	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	$V_{APG\_PJ,8}$	mln.m^3	0.000	47.083	135.736	145.862	109.560
GHG emissions		tCO_2-e					
Pasmurovskaya GCS		tCO_2-e	1 894	58 989	60 719	83 163	68 162
Gerasimovskaya GCS		tCO_2-e	0	14 803	8 848	10 777	11 223
Tananykskaya GCS		tCO_2-e	0	2 709	11 870	5 255	6 932
Dolgovskaya GCS		tCO_2-e	0	78 415	85 176	100 598	86 511
Kurmanaevskaya GCS		tCO_2-e	0	13 019	88 618	67 820	43 394
Savel'evskaya GCS		tCO_2-e	0	42 751	70 428	61 973	62 917
Rostashinskaya GCS		tCO_2-e	96 215	526 694	359 604	369 713	403 939
Vakhitovaksa GCS		tCO_2-e	0	143 253	418 789	415 726	327 877

Item	Index	Unit	2008	2009	2010	2011	2012
GHG baseline emissions from flaring of APG	**BE_y**	**tCO_2-e**	**98 110**	**880 633**	**1 104 052**	**1 115 024**	**1 010 955**

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

>>

Table E.5.1: Difference representing the emission reductions within the crediting period

Item	Index	Unit	2008	2009	2010	2011	2012
GHG emission reductions	ER_y	tCO_2-e	98 110	880 633	1 104 052	1 115 024	1 010 955

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

>>

Table E.6.1: Project, baseline, and emission reductions within the crediting period

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 CO_2 equivalent)
2008	3 006	4 787	98 110	90 317
2009	28 991	42 145	880 633	809 497
2010	44 000	52 526	1 104 052	1 007 526
2011	37 752	53 337	1 115 024	1 023 936
2012	41 198	48 110	1 010 955	921 647
Total (tonnes of CO_2 equivalent)	154 947	200 905	4 208 774	3 852 922

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:

>>

In correspondence with the Statement of State Committee on ecology and natural resources of Russian Federation on 15.04.2000 № 372 «On approvement of provisions for fulfillment of planned economic and other measures and their affect on ecology» the designers should include the environmental impact assessment in the project documentation.

Section "Environmental protection" is included in the technical documentation of the project.

Table F 1.1 List of permissions for emissions into the atmosphere

GCS	Permission for emissions into the atmosphere	Name of the body which issued the permission
Pasmurovskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia
Gerasimovskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia
Tananykskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia
Dolgovskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia
Kurmanaevskaya GCS	Permission № 325/1	Federal Environmental Industrial and Nuclear Supervision

		service of Russia
Savel'evskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia
Rostashinskaya GCS	Permission № 172	Federal Environmental Industrial and Nuclear Supervision service of Russia

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:

>>

The project activity has no negative environmental effect, because it is suggested for the reduction of APG flaring. It results in the considerable reduction of methane emission due to decreasing the APG flaring at the fields of Orenburg region.

SECTION G. Stakeholders' comments

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

>>

The project was gone through examination with a main stakeholder, Rostechnadzor, which is a Russian governmental organization to control implementation of activities in all industrial and energy sectors in the Russian Federation. After examination the project was awarded with the positive conclusion.JSC «Orenburgneft» rents the piece of land, where there are the oil fields, from the local administration. Before the field development the company carried out the necessary consultations with the local population and discussed the nature-protective problems, which could arise in connection with company activity.

The rented pieces are not the parts of land categories with the priority of nature-protective management.

The project improves the ecological environment, because its realization decreases the pollutants effect from the APG flaring.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

Organisation:	TNK-BP
Street/P.O.Box:	Begovaya
Building:	3/1
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Fax:	+7 495 777 77 07
E-mail:	company@tnk-bp.com
URL:	www.tnk-bp.ru
Represented by:	
Title:	Mr.
Salutation:	
Last name:	Mesropov
Middle name:	
First name:	Andreas
Department:	Regulatory Support, Regulation and Tariff Design
Phone (direct):	+7 495 777 77 07 ext. 2305
Fax (direct):	
Mobile:	+79036241151
Personal e-mail:	avmesropov@tnk-bp.com

This template shall not be altered. It shall be completed without modifying/adding headings or logo, format or font.

Annex 2

BASELINE INFORMATION

Key information and data for construction of baseline:

Fixed values determined once at the stage of determination and accessible over a period of 2008-2012

Data/Parameter	ρ_{CH4}
Data unit	kg/m^3
Description	Density of methane (CH_4) under standard conditions: temperature 20 °C (293.15 K) and absolute pressure 101.325 kPa (1 atm.)
Time of determination/monitoring	Fixed ex-ante parameter
Source of data (to be) use	Thermal design of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	0.668
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Methane density is necessary for calculation of emission coefficient under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	ρ_{CO2}
Data unit	kg/m^3
Description	Density of carbon dioxide (CO_2) under standard conditions (temperaturea 20 °C (293.15 K) and absolute pressure 101.325 kPa (1 atm).
Time of determination/monitoring	Fixed parameter
Source of data (to be) use	Thermal calculation of boiler (normative method), SPA TsKTI, Saint Petersburg, 1998
Value of data applied (for ex ante calculations/determinations)	1.842
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Density of carbon dioxide is necessary for calculation of emission coefficient under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	GWP_{CH4}
Data unit	tCO_2/tCH_4
Description	Potential of global warming methane is required for calculation of CH_4 emission factor under APG flaring
Time of determination/monitoring	Fixed ex-ante parameter
Source of data (to be) use	Solution 2/CP.3 http://unfccc.int/resource/docs/cop3/07a01.pdf#page=31 Climate change 1995, Science of climate change: Conclusion for politicians and technical resolution of the Report of Working group I, p. 22. http://unfccc.int/ghg_data/items/3825.php
Value of data applied (for ex ante calculations/determinations)	21
Justification f the choice of data or description of measurement methods and procedures (to be) applied	Potential of global warming is necessary for calculation of emission factor under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Data/Parameter	Nc
Data unit	-
Description	A number of carbon mole in a mole of APG component
Time of determination/monitoring	Is determined once at the stage of project documentation development
Source of data (to be) use	Natural science
Value of data applied (for ex ante calculations/determinations)	see table below
Justification f the choice of data or description of measurement methods and procedures (to be) applied	This parameter is necessary for calculating the emission of CO_2 under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Value of data applied:

Carbon dioxide, CO_2	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
Heptane, C7H16	7
octane, C8H18	8

Data/Parameter	ε
Data unit	share
Description	A share of unburned APG in flare under thermal black type of combustion
Time of determination/monitoring	Is determined once at the stage of project documentation development
Source of data (to be) use	«Methods for determining the pollutants emission under APG flaring », NII on atmospheric air protection, Saint-Petersburg,1998
Value of data applied (for ex ante calculations/determinations)	0.035
Justification f the choice of data or description of measurement methods and procedures (to be) applied	This parameter is necessary for calculating the emission of CO_2 under APG flaring
OA/QC procedures (to be) applied	Reference data
Any comment	-

Parameters which are monitoring directly

Data/Parameter	$V_{APG\_PJ,i}$
Data unit	mln.m^3 (under standard conditions)
Description	The volume of APG supplied to GCS. Main source of baseline emission. APG produced in the frameworks of baseline could be APG flaring.
Time of determination/monitoring	hourly
Source of data (to be) use	Gas flow meter
Value of data applied (for ex ante calculations/determinations)	see table below
Justification f the choice of data or description of measurement methods and procedures (to be) applied	APG volume is necessary for the calculation of baseline emission.
OA/QC procedures (to be) applied	The main measuring devices are verified and calibrated by FSE «Center of standardization and metrology», Orenburg
Any comment	-

Item	**2008**	**2009**	**2010**	**2011**	**2012**
$\sum V_{APG\_PJ,i}$	27.418	231.083	329.538	325.766	290.853
Pasmurovskaya GCS	0.510	16.722	15.797	23.302	18.607
Gerasimovskaya GCS	0.000	4.689	2.392	3.007	3.363
Tananykskaya GCS	0.000	0.576	3.050	1.252	1.626
Dolgovskaya GCS	0.000	24.235	24.300	22.301	23.612
Kurmanaevskaya GCS	0.000	4.484	28.058	22.768	13.828
Savel’evskaya GCS	0.000	13.188	21.773	19.995	18.318
Rostashinskaya GCS	26.908	120.106	98.431	87.278	101.938
Vakhitovaksa GCS	0.000	47.083	135.736	145.862	109.560

<table>
<tr><td>Data/Parameter</td><td>w_{CO2}, w_{CH4} w_{VOC}</td></tr>
<tr><td>Data unit</td><td>vol %</td></tr>
<tr><td>Description</td><td>Chemical composition of APG for Gas Compression Station. It is necessary for calculation of emission under APG flaring</td></tr>
<tr><td>Time of determination/monitoring</td><td>quarterly</td></tr>
<tr><td>Source of data (to be) use</td><td>Flow gas chromatograph</td></tr>
<tr><td>Value of data applied
(for ex ante calculations/determinations)</td><td>
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<tr><td></td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2012</td></tr>
<tr><td>methane, CH4</td><td colspan="5" rowspan="15">file:
«TNK-BP_Orenburg_APG_ERs_ver.2.xls»</td></tr>
<tr><td>ethane, C2H6</td></tr>
<tr><td>propane, C3H8</td></tr>
<tr><td>i-butane, C4H10</td></tr>
<tr><td>n-butane, C4H10</td></tr>
<tr><td>i-pentane, C5H12</td></tr>
<tr><td>n-pentane, C5H12</td></tr>
<tr><td>hexane, C6H14</td></tr>
<tr><td>geptane, C7H16</td></tr>
<tr><td>octane, C8H18</td></tr>
<tr><td>nonane, C9H20</td></tr>
<tr><td>carbon dioxide, CO2</td></tr>
<tr><td>hydrogen sulfide, H2S</td></tr>
<tr><td>oxygen, O2</td></tr>
<tr><td>nitrogen, N2</td></tr>
</table>
</td></tr>
<tr><td>Justification f the choice of data or description of measurement methods and procedures (to be) applied</td><td>As annual values the most conservative quarter values in reporting year are accepted</td></tr>
<tr><td>OA/QC procedures (to be) applied</td><td>The device is verified and calibrated by FSE «Center of standardization and metrology», Samara and CJSC of Pilot plants «Chromat»</td></tr>
<tr><td>Any comment</td><td>-</td></tr>
</table>

Annex 3

MONITORING PLAN

See Section D

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