MONITORING REPORT

Joint Implementation Project at Yety-Purovskoe Oil Field

JI Monitoring Report No.: 2
Monitoring period: 01 January – 31 December 2010
UNFCCC Reference No.: 0184
Project Investor: JSC "Gazpromneft-Noyabrskneftegaz"

Version 2.0
11 Apr 2011

Validated by:

Nikolay Eliseev
Director of
Gas and Liquid Hydrocarbons
Marketing Department
JSC "Gazprom Neft"

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SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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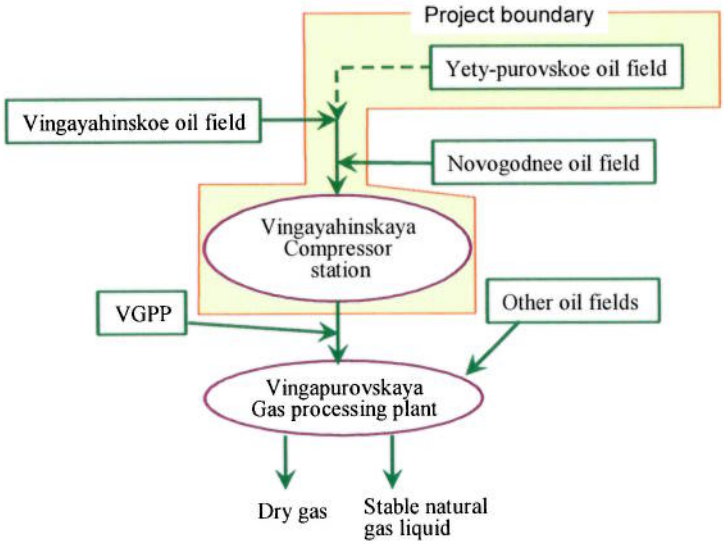
1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions

Before the project activity, the Yety-Purovskoe oil field has been flaring the associated gas, a by-product of crude oil production.

Vingayahinskoe oil field, the existing oil field near-by, has been supplying its associated gas to Vingayahinskaya Compressor Station through an existing pipeline constructed during the Soviet Union Era. Then, it is compressed to increase the pressure to transport to Vingapurovskaya gas processing plant. At the Vingapurovskaya gas processing plant, it is separated into dry gas and stable natural gas liquid components.

In this project activity, associated gas pipeline is constructed from Yety-Purovskoe oil field to the existing pipeline, which enables to transport the associated gas of Yety-Purovskoe that would otherwise have to be flared (ie. burned and emitted as CO_2).

The associated gas from the Yety-Purovskoe oil field is supplied through the newly constructed pipeline, commingled with associated gas from Vingayahinskoe oil field. Then through the Vingayahinskaya Compressor Station, it is supplied to Vingapurovskaya gas processing plant, where it is separated into dry gas and stable natural gas liquid components.



The dry gas, supplied to the existing pipeline network, is consumed domestically mainly as a fuel source by substituting dry gas of the existing pipeline network with similar carbon emission value. Therefore, the project reduces anthropogenic GHG emissions through the recovery and utilization of gas which would otherwise be flared.

The stable natural gas liquid produced from the recovered associated gas is supplied to Noyabrsk where it is efficiently used by substituting relevant fuel and material. Therefore, using the stable natural gas liquid, produced from the recovered associated gas which would otherwise been flared, also reduces anthropogenic GHG emissions

According to the methodology, the project boundary includes gas recovery, pre-treatment, transportation infrastructure. Therefore, the project boundary is composed of Yety-Purovskoe oil field, Vingayahinskaya Compressor Station and the pipeline in-between them as is shown in the figure.

2. Brief description of the installed technology and equipments

The associated gas pipeline was constructed from DNS-1 and 2 of Yety-Purovskoe oil-field up to connection to the existing pipeline from Vingayahinskoe oil-field going to Vingayahinskaya Compressor Station.

All initial data has been accepted on the basis of design assignment approved by the General Director of JSC Gazpromneft-Noyabrskneftegaz on 17.04.2008.
Main initial data for design of gas line is:

- initial pressure (not exceeding), 1.6 MPa
- final pressure (at least), 0.35MPa
- Initial gas temperature, 27°C

The diameter and length is:

from DNS-1 of Yety-Purovskoe oil-field up to connection to connection point to pipeline from DNS-2 of Yety-Purovskoe oil-field	273x10mm (L-10,865km)
from DNS-2 of Yety-Purovskoe oil-field up to connection to connection point to pipeline from DNS-1 of Yety-Purovskoe oil-field	530x8mm (L-19,225km);
from connection point from DNS-1 and 2 of Yety-Purovskoe oil-field up to connection to the existing pipeline from Vingayahinskoe oil-field going to Vingayahinskaya Compressor Station	530x8mm (L-41,155km).

The associated gas is supplied by its well-head pressure alone; therefore, compressor is not required for supplying the associated gas to the Vingayahinskaya Compressor Station.

3. Relevant dates for the project activity
   Starting date of the project
   - Construction: April 2009
   - Commissioning: Aug 2009
   - Continued operation period: approximately 20 years

4. Total emission reductions achieved in this monitoring period

757,376 ton CO2

A.2. Project Participants

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Participants to the project activity are the following:

Party involved	Legal entity project participant	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Russia (Host Party)	JSC Gazprom Neft *1	No
	JSC Gazpromneft-Noyabrskneftegaz *2	No
Japan	JX Nippon Oil & Energy Corporation *3	No
	Mitsubishi Corporation *4	No

*1: Joint Stock Company Gazprom Neft, an open joint-stock company established under the laws of the Russian Federation having state registration number (OGRN) 1025501701686, and whose legal address is at Galernaya Street, 5, Letter A, city of St. Petersburg, 190000, Russian Federation and the principal address is at 125 A, Profsoyuznaya Street, Moscow, 117647, Russian Federation

*2: Joint Stock Company Gazpromneft-Noyabrskneftegaz, an open joint-stock company established under the laws of the Russian Federation having state registration number (OGRN) 1028900703963, and whose legal address is at Lenina Street, 59/87, city of Noyabrsk, the Yamal-Nenets autonomous district, 629807, Russian Federation

*3: JX Nippon Oil & Energy Corporation, with its principal office at 6-3, Otemachi 2-chome, Chiyoda-ku, Tokyo 100-8162 Japan

*4: Mitsubishi Corporation, a company incorporated and existing under the laws of Japan with its principal place of business located at 3-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo 100-8086, Japan

A.3. Location of the project activity:

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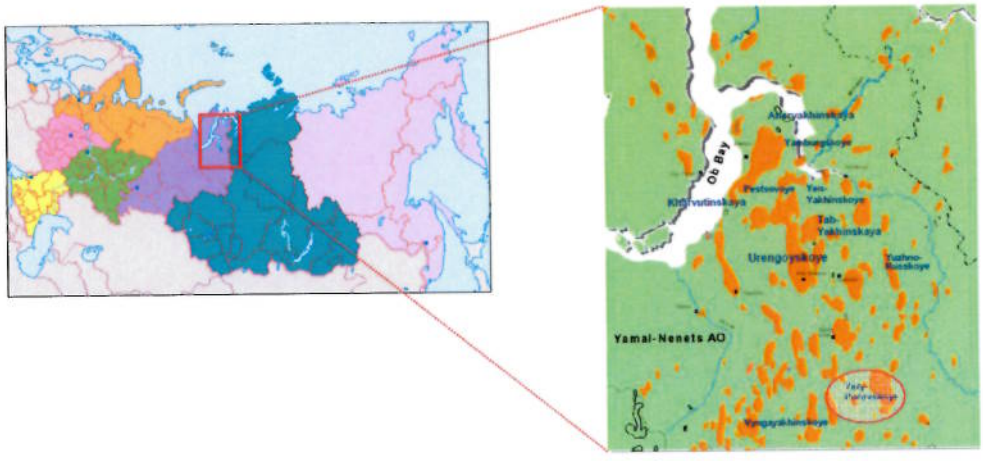
The project activity is carried out at the Yety-Purovskoe oil field which is located in the Yamal-Nenets autonomous district.

Detailed geographic information such as North latitude and East longitude is mentioned in the license agreement.



A.4. Technical description of the project

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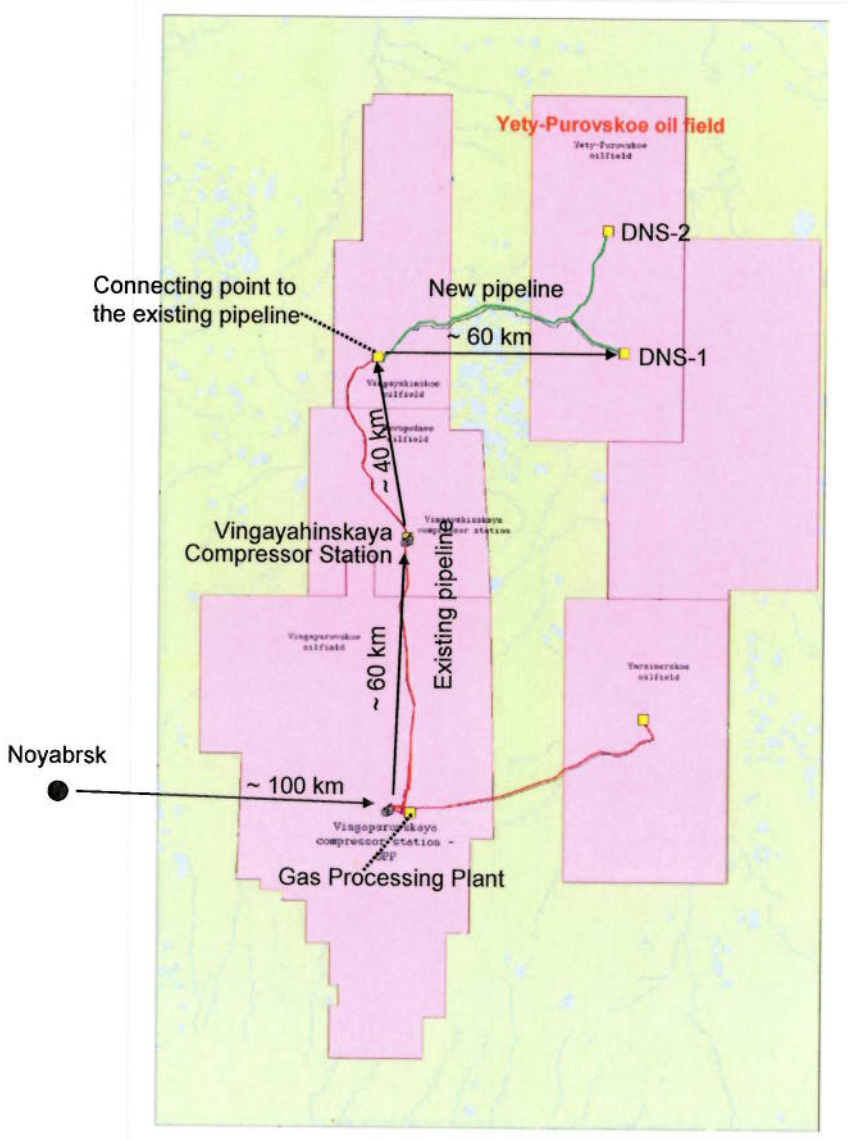
Below is the figure around the Yety-Purovskoe oil field. There are several oil fields located near-by some of which has existing pipelines that were constructed during the Soviet Union Era when the feasibility of installation of pipeline was not strictly evaluated. Such oil fields have been supplying their associated gas using the existing pipeline.

The project activity is composed of construction of the associated gas pipeline from the Yety-Purovskoe oil field to the near-by oil field (Vingayahinskoe oil field), located about 60 km distance from Yety-Purovskoe oil field, where it is tied-in to the existing pipeline. After commingled with the associated gas from the Vingayahinskoe oil field, the associated gas of Yety-Purovskoe is supplied to the Vingayahinskaya Compressor Station, located about 40 km distance from Vingayahinskoe oil field, where it is compressed to increase the pressure to transport to Vingapurovskaya gas processing plant, 60 km away from the compressor station. At the Vingapurovskaya gas processing plant, it is separated into dry gas and stable natural gas liquid components. About 100 km away from the gas processing plant, there is a city Noyabrsk with population of more than 100,000.

Detailed geographic information such as North latitude and East longitude is mentioned in the license agreement.



A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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The project activity is based on the methodology and tools indicated below:

- The monitoring methodology AM0009 version 04: "Recovery and utilization of gas from oil wells that would otherwise be flared or vented"
- Methodological tool: "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion"
- Methodological tool: "Tool to calculate baseline, project and/or leakage CO2 emissions from electricity combustion"

A.6. Name of responsible person(s)/entity(ies):

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Satoru Uchida
General Manager
Global Business Department
JX Nippon Oil & Energy Corporation
6-3, Otemachi 2-chome, Chiyoda-ku
Tokyo 100-8162 Japan
Telephone: 81-3- 6275-5104
Fax: 81-3- 5160-9851
E-mail: yety@eneos.co.jp

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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Construction started in April 2009 and operation commissioned in Aug 2009.
There is no event which may impact the applicability of the methodology

B.2. Revision of the monitoring plan

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QA and QC procedure was upgraded to improve the accuracy.

The installed measurement equipment for $V_{F1,y}$ (Orifice meter DKS-0,6-300) would not allow the precise measurement after the construction of the gas pipeline and was upgraded to the ultrasonic flow meter Panametrics GM 868 to improve the accuracy of measurement.
With regard to the $V_{F1,y}$ and $V_{F2,y}$ PDD mentions that the accuracy level is in the range ±1% while this monitoring report mentions that it is in the range ±2~5%. Since the PDD was drafted before the operation start, the tentative assumption was used. Therefore, it does not mean that the accuracy level was weakened but it means that more actual figure is used in the monitoring report.

The operational and management structure of monitoring was improved by providing the actual scheme of the data and documents check and thus this amendment improves accuracy of the monitoring.

SECTION C. Description of the monitoring system

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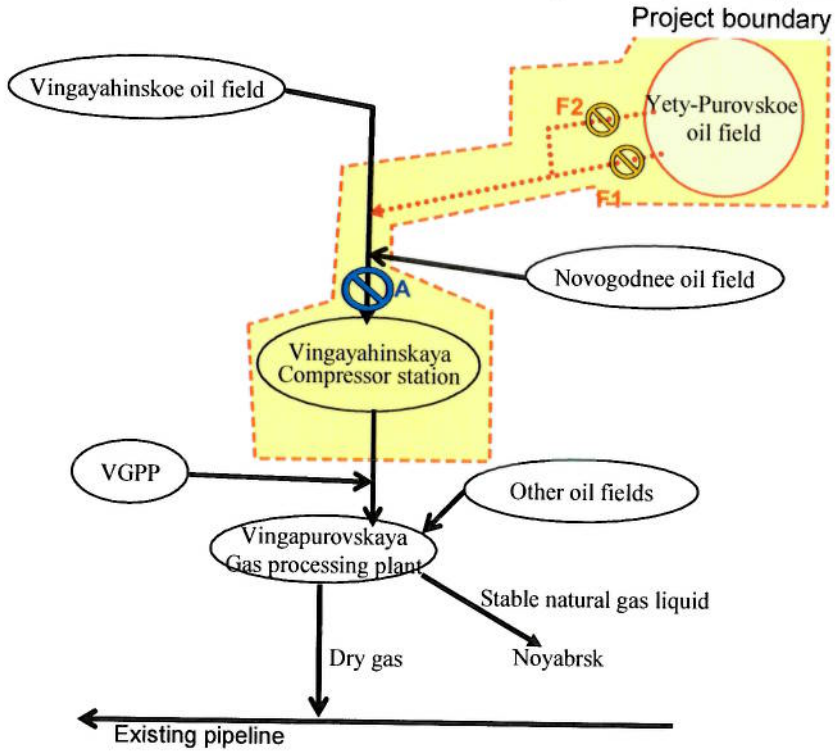
(1) Project boundary and the monitoring points

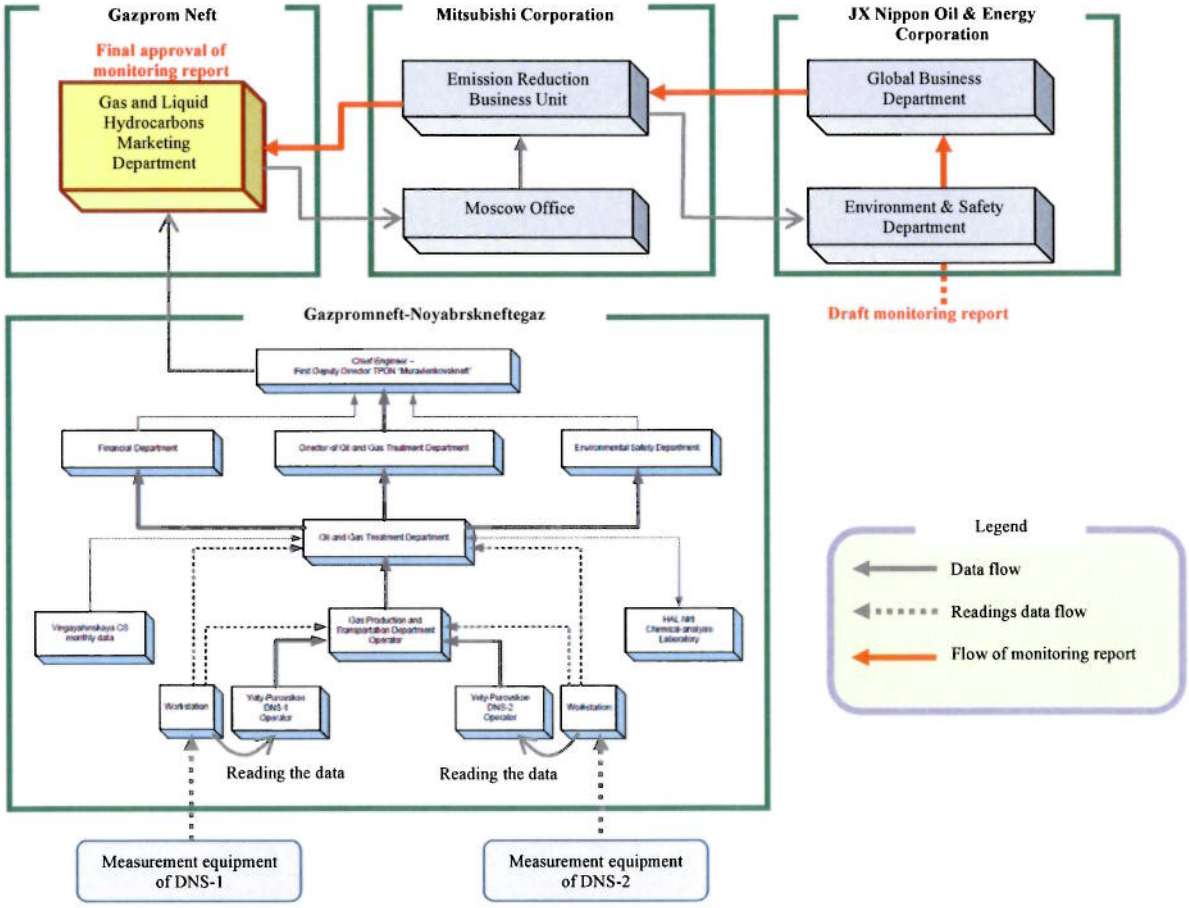
In accordance to the methodology, the project boundary includes gas recovery, pre-treatment, transportation infrastructure. Therefore, the project boundary is composed of Yety-Purovskoe oil field, Vingayahinskaya Compressor Station and the pipeline in-between them.

The monitoring point is composed of:
- Flow volume of the exit of the Yety-Purovskoe oil field (point F1 and F2), which represents the supplied volume of associated gas from the Yety-Purovskoe oil field.
- Gas composition of the exit of the oil field (point F1 and F2), which is used to calculate the net calorific value of the recovered gas.
- Flow volume of the entry of the Vingayahinskaya compressor station (point A), which is used to calculate the CO2 emission as a result of consuming electricity for transportation of the recovered gas.



(2) Operational and management structure of monitoring

Operational and management structure of monitoring is as shown here.
There are Qualification Improvement Courses for Personnel as an extensive trainings and maintenance efforts.



(3) Procedure of drafting the monitoring report

After collecting the data based on the operational and management structure, Gazprom Neft submits it to JX Nippon Oil & Energy Corporation. Then JX Nippon Oil & Energy Corporation drafts the monitoring report based on the data submitted by Gazprom Neft and Gazprom Neft confirms the content.

SECTION D. Data and parameters

D.1-1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	$EF_{CO2, methane}$
Data unit:	**tCO2 / TJ**
Description:	CO2 emission factor for methane
Source of data used:	CDM methodology AM0009 version 04
Value(s) :	49.55 tCO2 / TJ
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Additional comment:	

D.1-2. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	$EF_{EL,oilfield, y}$, $EF_{EL,CS, y}$
Data unit:	**tCO2 / MWh**
Description:	CO2 emission factor of grid electricity
Source of data used:	CDM methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Value(s) :	1.3 tCO2 / MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Additional comment:	

D.1-3. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	$TDL_{j,y}$
Data unit:	**%**
Description:	Average technical transmission and distribution losses for providing electricity to source in year y.
Source of data used:	CDM methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Value(s) :	20 %
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Additional comment:	

D.2-1. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	$V_{FL,y}$
Data unit:	**S m^3**
Description:	Quantity of associated gas recovered from Yety-Purovskoe oil field
Measured /Calculated /Default:	Measured

Source of data:	Measured at the exit of Yety-Purovskoe oil field at point F1
Value(s) of monitored parameter:	4,283,000 m^3 (Mar 2010 ~ Dec 2010 total)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Ultrasonic flow meter (Panametrics GM 868)
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	
QA/QC procedures applied:	Measurement equipment is maintained in accordance with the following state standards: GOST R 8.615-2005 "State system for ensuring the uniformity of measurements. The measuring of quantity of taken from bowels oil and oil gas. General metrological and technical requirements" and GOST 8.586.(1-5)-2005 "State system for ensuring the uniformity of measurements. Measurements of liquids and gases flow rate and quantity by means of orifice instruments". The measured volume is converted to the standard cubic meter using temperature and pressure measurement at the time to measurement. With normal care in installation and instrumentation, the inaccuracy of the flow measurement is in the range ±2~5%. It was calibrated in 31 Jan 2008 and it will be calibrated in 31 Dec 2012.

D.2-2. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	**$V_{F2,y}$**
Data unit:	**S m^3**
Description:	Quantity of associated gas recovered from Yety-Purovskoe oil field
Measured /Calculated /Default:	Measured
Source of data:	Measured at the exit of Yety-Purovskoe oil field at point F2
Value(s) of monitored parameter:	381,331,000 m^3 (Jan 2010 ~ Dec 2010 total)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Ultrasonic flow meter (Panametrics GM 868)
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	
QA/QC procedures applied:	Measurement equipment is maintained in accordance with the following state standards: GOST R 8.615-2005 "State system for ensuring the uniformity of measurements. The measuring of quantity of taken from bowels oil and oil gas. General metrological and

	technical requirements" and GOST 8.586.(1-5)-2005 "State system for ensuring the uniformity of measurements. Measurements of liquids and gases flow rate and quantity by means of orifice instruments". The measured volume is converted to the standard cubic meter using temperature and pressure measurement at the time to measurement. With normal care in installation and instrumentation, the inaccuracy of the flow measurement is in the range ±2~5% It was calibrated in 15 Aug 2007 and it will be calibrated in 31 Jan 2012.

D.2-3. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	**$NCV_{RG,F1,y}$**
Data unit:	**MJ / S m3**
Description:	Net calorific value of recovered gas calculated based on the composition measured at point F1
Measured /Calculated /Default:	Measured and calculated based on "Physical Properties of Hydrocarbon Systems, Volume 1, Chapter 3, Table 3.2 (a)"
Source of data:	Gas composition measured at point F1
Value(s) of monitored parameter:	46.46 MJ/m3 (Mar 2010 ~ Dec 2010 average)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas chromatograph (Crystallux - 4000M)
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Net calorific value of gas ($NCV_{RG,F1,y}$) is calculated based on measured compositional data as denoted by: $NCV_{RG,F1,y} = \sum_i HC_{i,F1,y} \cdot NCV_{i,F1,y}$ $HC_{i,F1,y}$ Is the gas composition with hydrocarbon type i (%) at point F1 during the period y in m^3 $NCV_{i,F1,y}$ Is the net calorific value of hydrocarbon type i in year y
QA/QC procedures applied:	Measurement equipment is maintained in accordance with the following state standard: GOST 26703-93 "Analytical gas chromatographs. Specifications and testing methods". It is inspected by state authority. The date of the last calibration is 13 Jul 2010 and the date of the next calibration is 13 Jul 2011.

D.2-4. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	**$NCV_{RG,F2,y}$**
Data unit:	**MJ / S m3**
Description:	Net calorific value of recovered gas calculated based on the composition measured at point F2
Measured /Calculated /Default:	Measured and calculated based on "Physical Properties of Hydrocarbon Systems, Volume 1, Chapter 3, Table 3.2 (a)"

Source of data:	Gas composition measured at point F2
Value(s) of monitored parameter:	45.07 MJ/m3 (Jan 2010 ~ Dec 2010 average)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas chromatograph (Crystallux - 4000M)
Measuring/ Reading/ Recording frequency:	Monthly
Calculation method (if applicable):	Net calorific value of gas ($NCV_{RG,F2,y}$) is calculated based on measured compositional data as denoted by: $NCV_{RG,F2,y} = \sum_i HC_{i,F2,y} \cdot NCV_{i,F2,y}$ $HC_{i,F2,y}$ Is the gas composition with hydrocarbon type i (%) at point F2 during the period y in m^3 $NCV_{i,F2,y}$ Is the net calorific value of hydrocarbon type i in year y
QA/QC procedures applied:	Measurement equipment is maintained in accordance with the following state standard: GOST 26703-93 "Analytical gas chromatographs. Specifications and testing methods". It is inspected by state authority. The date of the last calibration is 13 Jul 2010 and the date of the next calibration is 13 Jul 2011.

D.2-5. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	**$V_{A,y}$**
Data unit:	**S m^3**
Description:	Quantity of associated gas supplied to Vingayahinskaya Compressor Station measured at point A
Measured /Calculated /Default:	Measured
Source of data:	Measured at the entrance of Vingayahinskaya Compressor Station measured at point A
Value(s) of monitored parameter:	627,399,000 m^3 (Jan 2010 ~ Dec 2010 total)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Orifice meter (Flo Boos 407)
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	

QA/QC procedures applied:	Measurement equipment is maintained in accordance with the following state standards: GOST R 8.615-2005 "State system for ensuring the uniformity of measurements. The measuring of quantity of taken from bowels oil and oil gas. General metrological and technical requirements" and GOST 8.586.(1-5)-2005 "State system for ensuring the uniformity of measurements. Measurements of liquids and gases flow rate and quantity by means of orifice instruments". The measured volume is converted to the standard cubic meter using temperature and pressure measurement at the time to measurement. With normal care in installation and instrumentation, the accuracy of the flow measurement is ±1%. It was calibrated in 11 Aug 2010 and it will be calibrated in 11 Aug 2012.

D.2-6. Data and parameters monitored	
(Copy this table for each data and parameter. To report multiple values, a table may be used)	
Data / Parameter:	**$EC_{P,i,CS,y}$**
Data unit:	**MWh**
Description:	Electricity consumed specifically for the transportation of associated gas in the Vingayahinskaya Compressor Station
Measured /Calculated /Default:	Measured
Source of data:	Measured electric data in the Vingayahinskaya Compressor Station
Value(s) of monitored parameter:	108,550,704 MWh (Jan 2010 ~ Dec 2010 total)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Electricity meter (SET-4TM.03)
Measuring/ Reading/ Recording frequency:	Continuously
Calculation method (if applicable):	
QA/QC procedures applied:	Measurement equipment is inspected by state authority in accordance with state standard GOST 52320-2005 "Electricity metering equipment (a.c). General requirements. Tests and test conditions. Part 11: Meters for electric energy". With normal care in installation and instrumentation, the accuracy of the measurement is ±1%. It was calibrated in 26 Feb 2006 (Serial number: 102060189) and in 13 Dec 2005 (Serial number: 112053016). The next calibration is scheduled in 26 Feb 2016 (Serial number: 102060189) and in 13 Dec 2015 (Serial number: 112053016).

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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The baseline of project activity is:

$$BE_y = (V_{F1,y} * NCV_{RG,F1,y} + V_{F2,y} * NCV_{RG,F2,y}) * EF_{CO2,methane}$$

Where:

BE_y	Are the baseline emissions during the period y in tons of CO_2 equivalents.
$V_{F1,y}$	Is the volume of gas recovered from Yety-Purovskoe oil field and measured at point F1 in Figure D during the period y in m^3.
$V_{F2,y}$	Is the volume of gas recovered from Yety-Purovskoe oil field and measured at point F2 in Figure D during the period y in m^3.
$NCV_{RG,F1,y}$	Net calorific value of recovered gas measured at point F1 during the period y (TJ/Sm3)
$NCV_{RG,F2,y}$	Net calorific value of recovered gas measured at point F2 during the period y (TJ/Sm3)
$EF_{CO2,methane}$	CO2 emission factor for methane (tCO2/TJ)

(1) $V_{F1,y}$, $V_{F2,y}$

The measured data is:

	$V_{F1,y}$	$V_{F2,y}$
	m3	m3
Jan	0	27,615,000
Feb	0	29,060,000
Mar	282,000	32,288,000
Apr	492,000	32,318,000
May	481,100	33,284,000
Jun	496,200	32,704,000
Jul	469,300	33,341,000
Aug	336,400	25,282,000
Sep	435,500	33,150,000
Oct	478,300	34,701,000
Nov	423,200	33,480,000
Dec	389,000	34,108,000
Total	4,283,000	381,331,000

(2) $NCV_{RG,F1,y}$

Below is the measured gas composition at point F1 and its simple average during the project period (Mar 10 - Dec 10).

	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Oct 10	Nov 10	Dec 10	Average
Nitrogen	0.776	0.794	0.776	0.780	0.789	0.758	0.786	0.762	0.777	0.782	0.778
Carbon dioxide	0.326	0.321	0.307	0.281	0.317	0.356	0.379	0.362	0.378	0.382	0.341
Methane	76.248	76.261	77.113	77.652	77.249	76.291	76.464	76.186	76.486	76.079	76.601
Ethane	8.106	7.819	7.467	7.766	7.966	7.668	8.423	8.177	8.268	8.603	8.026
Propane	6.862	6.886	6.723	6.988	6.591	6.778	6.234	6.950	6.768	6.777	6.756
i-butane	1.590	1.541	1.523	1.377	1.575	1.558	1.525	1.524	1.521	1.589	1.532
n-butane	2.569	2.589	2.384	1.385	1.285	1.355	1.386	1.328	1.291	1.228	1.680
i-pentane	1.084	1.434	1.364	1.339	1.338	1.440	1.585	1.576	1.552	1.571	1.428
n-pentane	1.072	0.923	0.854	0.938	1.416	1.424	1.432	1.576	1.559	1.538	1.273
i-hexanes	1.368	1.433	1.489	1.495	1.475	1.372	1.788	1.559	1.421	1.452	1.485

Based on the composition of F1, net calorific value ($NCV_{RG,F1,y}$) is calculated as:

	Composition (%) (2010 average)	Heat value (MJ/m3)[1]	=C * D / 100 (MJ/m3)
	=C	=D	
Oxygen		0.000	
Nitrogen	0.778	0.000	0.00
Carbon dioxide	0.341	0.000	0.00
Methane	76.601	33.936	26.00
Ethane	8.026	60.395	4.85
Propane	6.756	86.456	5.84
i-butane	1.532	112.031	1.72
n-butane	1.680	112.384	1.89
i-pentane	1.428	138.044	1.97
n-pentane	1.273	138.380	1.76
i-hexanes	1.485	164.075	2.44
Total			46.46

(3) $NCV_{RG,F2,y}$

Below is the measured gas composition at point F2 and its simple average during the project period (Jan 10 - Dec 10).

[1] Physical Properties of Hydrocarbon Systems, Volume 1, Chapter 3, Table 3.2 (a)

	Jan 10	Feb 10	Mar 10	Apr 10	May 10	Jun 10	Jul 10	Aug 10	Sep 10	Oct 10	Nov 10	Dec 10	Average
Nitrogen	0.596	0.597	0.594	0.663	0.675	0.781	0.677	0.657	0.685	0.561	0.576	0.581	0.637
Carbon dioxide	1.066	1.068	1.063	1.109	1.128	0.877	1.076	1.131	1.142	1.059	1.046	1.016	1.065
Methane	72.119	72.139	72.254	72.281	72.513	80.069	78.266	73.047	71.436	71.211	71.457	71.368	73.180
Ethane	12.860	12.835	12.756	12.239	12.466	8.765	9.957	12.354	12.426	13.168	12.274	12.674	12.064
Propane	8.886	8.869	8.862	8.886	8.792	5.976	6.591	8.180	8.241	8.952	9.268	9.278	8.398
i-butane	1.258	1.303	1.289	1.340	1.222	0.870	0.876	1.363	1.432	1.333	1.221	1.287	1.233
n-butane	2.083	2.080	2.069	2.187	1.992	1.387	1.277	2.244	2.460	2.434	2.634	2.334	2.098
i-pentane	0.387	0.395	0.398	0.432	0.365	0.340	0.340	0.438	0.577	0.480	0.552	0.570	0.439
n-pentane	0.386	0.380	0.350	0.426	0.355	0.340	0.461	0.418	0.633	0.478	0.559	0.539	0.444
i-hexanes	0.359	0.336	0.365	0.437	0.492	0.597	0.478	0.169	0.969	0.325	0.414	0.354	0.441

Based on the composition of F2, net calorific value ($NCV_{RG,F2,y}$) is calculated as:

	Composition (%) (2010 average)	Heat value (MJ/m3)[2]	=C * D / 100 (MJ/m3)
	=C	=D	
Oxygen		0.000	
Nitrogen	0.637	0.000	0.00
Carbon dioxide	1.065	0.000	0.00
Methane	73.180	33.936	24.83
Ethane	12.064	60.395	7.29
Propane	8.398	86.456	7.26
i-butane	1.233	112.031	1.38
n-butane	2.098	112.384	2.36
i-pentane	0.439	138.044	0.61
n-pentane	0.444	138.380	0.61
i-hexanes	0.441	164.075	0.72
Total			45.07

(4) Baseline emission

Based on the above, each parameters are:

$V_{F1,y}$	4,283,000	m3
$V_{F2,y}$	381,331,000	m3
$NCV_{RG,F1,y}$	46.46	MJ/m3
$NCV_{RG,F2,y}$	45.07	MJ/m3
$EF_{CO2,methane}$	49.55	tCO2/TJ (Given value in accordance with AM0009 version 04)

Therefore, in accordance with the formulae, baseline emission (BE_y) can be calculated as:

$$BE_y = (V_{F1,y} * NCV_{RG,F1,y} + V_{F2,y} * NCV_{RG,F2,y}) * EF_{CO2,methane}$$
$$= \underline{861,455\ tCO2}$$

[2] Physical Properties of Hydrocarbon Systems, Volume 1, Chapter 3, Table 3.2 (a)

E.2. Project emissions calculation

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Project emissions are calculated as follows:

$$PE_y = PE_{CO2,\ fossilfuels,\ y} + PE_{CO2,elec,y}$$

with

$$PE_{CO2,\ fossilfuels,\ y} = PE_{CO2,\ fossilfuels,\ oilfield,\ y} + PE_{CO2,\ fossilfuels,\ CS,\ y}$$

$$PE_{CO2,elec,y} = PE_{CO2,EC,oilfield,\ y} + PE_{CO2,EC,\ CS,\ y}$$

where:

$PE_{CO2,\ fossilfuels,\ y}$	CO2 emission due to consumption of fossil fuel for the recovery, pre-treatment, transportation, and if applicable, compression of the recovered gas.
$PE_{CO2,elec,y}$	CO2 emissions due to the use of electricity for the recovery, pre-treatment, transportation, and if applicable, compression of the recovered gas.
$PE_{CO2,\ fossil\ fuels,\ oil\ field,y}$	Are the CO2 emission due to consumption of fossil fuel other than the recovered gas due to the project activity at the Yety-Purovskoe oil field during the period y in tons of CO2. The estimation of the emission is described in (2) below.
$PE_{CO2,\ fossilfuel,CS\ y}$	Are the CO2 emission due to consumption of fossil fuel other than associated gas due to the project activity at the Vingayahinskaya Compressor Station during the period y in tons of CO2 The estimation of the emission is described in (4) below.
$PE_{CO2,\ EC,\ oilfield,\ y}$	Is the CO2 emission due to grid electricity during the period y in tons of CO2, which is specifically used for transportation of associated gas at the Yety-Purovskoe oil field. The estimation of the emission is described in (3) below.
$PE_{CO2,\ EC,\ CS,\ y}$	Is the CO2 emission due to consumption of grid electricity as a result of the project activity at the Vingayahinskaya Compressor Station during the period y in tons of CO2 The estimation of the emission is described in (5) below.

(1) CO2 emission by using associated gas as a fuel source at the oil field

It is expected that associated gas produced but not exported via pipeline is emitted as CO_2, through in-house consumption including fuel combustion for recovery, which is already offset from the baseline emission since baseline emission is based on the volume of gas monitored at point F1 and F2.

(2) CO2 emission due to consumption of other fuels at the oil field ($PE_{CO2,\ fossil\ fuels,\ oil\ field,y}$)

During the monitoring period other fossil fuels was not used for this project activity.

(3) CO2 emission due to consumption of electricity supplied from outside ($PE_{CO2,\ EC,\ oilfield,\ y}$)

CO_2 emission at the oil field as a result of using grid electricity is negligible. Therefore, it is not included in the project emission calculation.

(4) CO_2 emission due to transportation of the associated gas at the at the Vingayahinskaya Compressor Station as a result of using fossil fuel other than associated gas ($PE_{CO2,\ fossilfuel,CS\ y}$)

During the monitoring period other fossil fuel was not used for this project activity.

(5) CO_2 emission due to consumption of grid electricity as a result of the project activity at the Vingayahinskaya Compressor Station ($PE_{CO2, EC, CS, y}$)

Grid electricity is used to transport the associated gas at the Vingayahinskaya Compressor Station. It is expected that the grid electricity would be consumed in proportion to the quantity of associated gas supplied to the Vingayahinskaya Compressor Station.

CO_2 emission during the transportation as a result of using grid electricity can be denoted as:

$$PE_{CO2,EC,CS,y} = \frac{(V_{F1,y} + V_{F2,y})}{V_{A,y}} * EC_{PJ,CS,y} * EF_{EL,CS,y} * (1 + TDL_{j,y})$$

Where:

$PE_{CO2, EC, CS, y}$	Is the CO_2 emission due to consumption of grid electricity as a result of the project activity at the Vingayahinskaya Compressor Station during the period y in tons of CO_2
$V_{F1, y}$	Is the volume of gas recovered from Yety-Purovskoe oil field and measured at point F1 in Figure D during the period y in m^3.
$V_{F2, y}$	Is the volume of gas recovered from Yety-Purovskoe oil field and measured at point F2 in Figure D during the period y in m^3.
$V_{A, y}$	Is the volume of the associated gas supplied to the Vingayahinskaya Compressor Station which is measured at point A in Figure D during the period y in m^3.
$EC_{PJ,CS, y}$	Is the quantity of grid electricity consumed for the project activity at the Vingayahinskaya Compressor Station during the period y.
$EF_{EL,CS,y}$	Is the CO_2 emission factor of electricity supplied from outside to the Vingayahinskaya Compressor Station in ton CO_2/MWh. Since it is difficult to access the relevant information to calculate the CO2 emission factor, the default factor 1.3 tCO2/MWh is used in accordance with "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source in year y. Since it is difficult to access the relevant information, the default factor 20% is used in accordance with "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

The allocation formula is based on volume basis instead of mass basis. The main reason is to make the formulae and monitoring simpler. It may be argued that the consumption of fossil fuel to generate electricity to operate the compressor would be in proportion to the mass of gas supplied and not in proportion to the volume of gas supplied. The associated gas from Vingayahinskoe oil field and Novogodnee oil field, which commingles with the Yety-Purovskoe oil field in the Vingayahinskaya Compressor Station, has similar or higher molecular weight. In addition, it is used just for the allocation of project emission calculation as a result of grid electricity consumption in the Vingayahinskaya Compressor Station. Therefore, using the formulae has negligible impact to the ERU or more accurately, it results in increased estimation of project emission which leads to conservative ERU calculation result. Thus, the formulae can be justified. As for the molecular weight of associated gas of other oil field, it is confidential so it is shown to AIE.

The measured data is:

	$V_{F1,y}$	$V_{F2,y}$	$V_{A,y}$	$EC_{PJ,CS,y}$
	m3	m3	m3	MWh
Jan	0	27,615,000	45,677,000	8,206,227
Feb	0	29,060,000	45,946,000	8,588,765
Mar	282,000	32,288,000	51,829,000	9,388,523
Apr	492,000	32,318,000	52,091,000	8,951,457
May	481,100	33,284,000	53,631,000	9,193,537
Jun	496,200	32,704,000	55,054,000	9,293,747
Jul	469,300	33,341,000	57,300,000	9,679,703
Aug	336,400	25,282,000	42,815,000	7,389,364
Sep	435,500	33,150,000	55,937,000	9,258,089
Oct	478,300	34,701,000	57,068,000	9,591,655
Nov	423,200	33,480,000	54,486,000	9,374,295
Dec	389,000	34,108,000	55,565,000	9,635,342
Total	4,283,000	381,331,000	627,399,000	108,550,704

Based on the above, $PE_{CO2, EC, CS, y}$ is calculated as 104,080 tCO2

(6) Total of (1) ~ (5)

Based on the calculation result, each parameters of project emission is:

$PE_{CO2, fossil\ fuels, oil\ field,y}$	Not applicable
$PE_{CO2, EC, oilfield, y}$	Not applicable
$PE_{CO2, fossilfuel,CS\ y}$	Not applicable
$PE_{CO2, EC, CS, y}$	104,080 tCO2

The total project emission (PE) is: 104,080 ton CO2

E.3. Leakage calculation

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Since leakage is not required to taken into consideration in accordance with the AM0009 version 04, it is not taken into consideration.

E.4. Emission reductions calculation / table

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Total baseline emissions: 861,455 ton CO2
Total project emissions: 104,080 ton CO2
Total leakage: Not applicable
Total emission reductions: 757,376 ton CO2

E.5. Comparison of actual emission reductions with estimates in the PDD

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Item	Values applied in ex-ante calculation of the PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	1,066,505 ton CO2	757,376 ton CO2

E.6. Remarks on difference from estimated value in the PDD

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The difference between the ex-ante calculation of the PDD and the actual value during the monitoring period is caused by the insufficient input capacity of the gas processing plant during several periods of time in 2010.