MONITORING REPORT

Yety-Purovskoe oil field associated gas recovery and utilization project

JI Monitoring Report No.: 3
Monitoring period: 01 January – 31 March 2012
UNFCCC Reference No.: RU1000200
Project Investor: JSC "Gazpromneft-Noyabrskneftegaz"

Version 2.0
22 May 2012

Validated by:

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JSC "Gazprom Neft"

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Monitoring period: Jan 2011– Mar 2012

SECTION A. General description of the project activity

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

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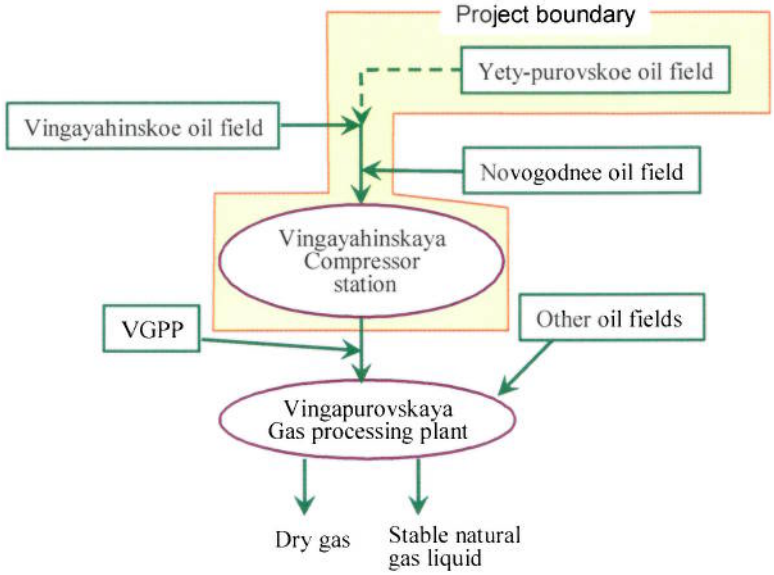
1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions

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

2011 Jan – Dec: 701,084 ton CO_2
2012 Jan – Mar: 139,739 ton CO_2

Total: 840,823 ton CO_2

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 3-5 Pochtamtskaya Street, Saint-Petersburg, 190000, 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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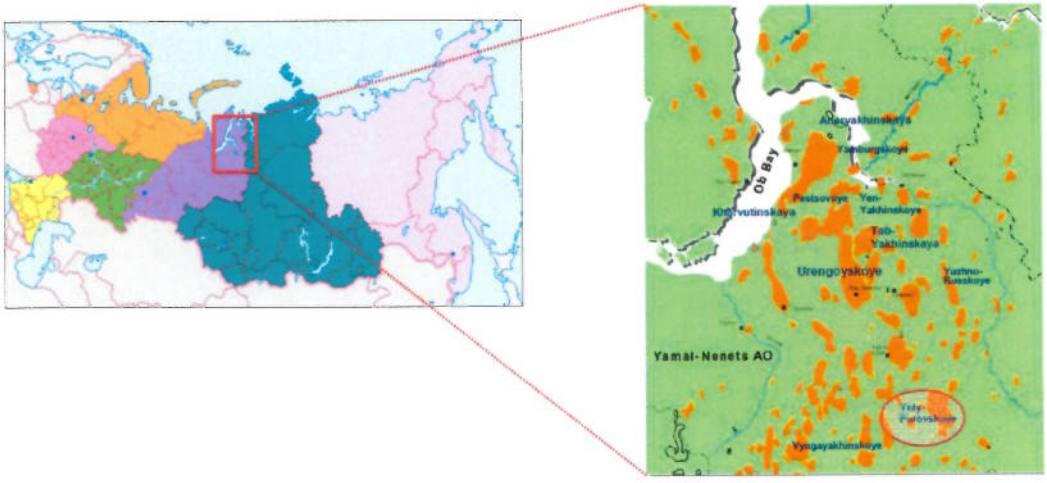
The project activity is carried out at the Yety-Purovskoe oil field which is located in the Yamal-Nenets autonomous district.

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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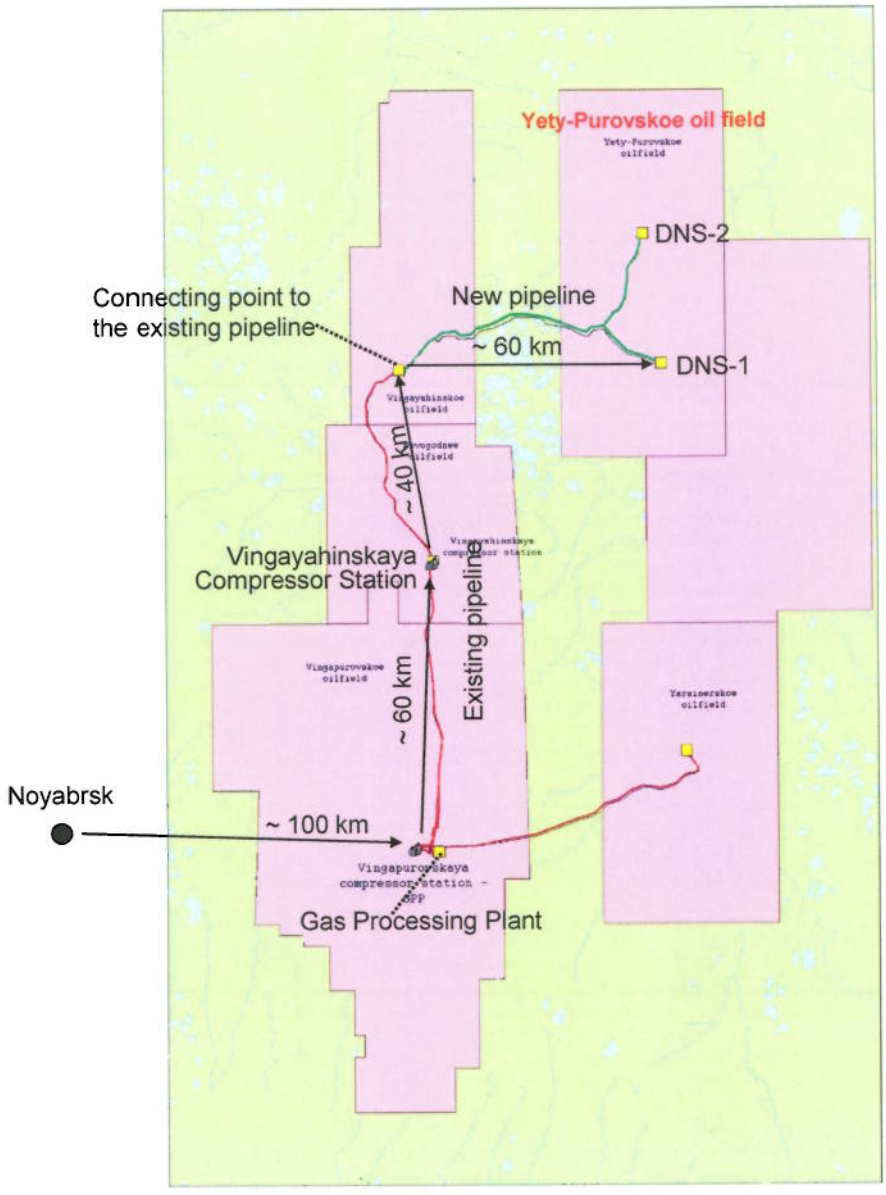
Below is the figure around the Yety-Purovskoe oil field. There are several oil fields located near-by some of which has existing pipelines that were constructed during the Soviet Union Era when the feasibility of installation of pipeline was not strictly evaluated. Such oil fields have been supplying 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 CO_2 emissions from fossil fuel combustion"
- Methodological tool: "Tool to calculate baseline, project and/or leakage CO_2 emissions from electricity combustion"

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

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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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The electricity consumption of the Yety-Purovskoe would have increased as a result of the project activity but it is negligible. Therefore, it is not included in the monitoring plan.

Additional period: 1st quarter (January-March) of year 2012 was included in monitoring report. Additional data (the volume of gas recovered from Yety-Purovskoe oil field and measured at point F1, F2 in Figure D during the period y in m^3; gas composition at point F1, F2; 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; the quantity of grid electricity consumed for the project activity at the Vingayahinskaya Compressor Station during the period y) was gathered for 1st quarter of 2012.
Emissions reduction calculation for 1st quarter of year 2012 performed.
As far as additional data was used the applicability of methodology was not affected.

QA and QC procedure was upgraded to improve the accuracy.

To improve the accuracy of measurement, measurement equipment for $V_{F1,y}$ was upgraded to ultrasonic flow meter (Panametrics GM 868).
With regard to the $V_{F1,y}$, and $V_{F2,y}$, PDD mentiones 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 stars, 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.

Operational and management structure of monitoring was improved by checking more respective people checks the data and document and thus this change improves accuracy of the monitoring.

B.3. Request for deviation applied to this monitoring period

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There is no deviation from the monitoring plan.

B.4. Notification or request of approval of changes

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SECTION C. Description of the monitoring system

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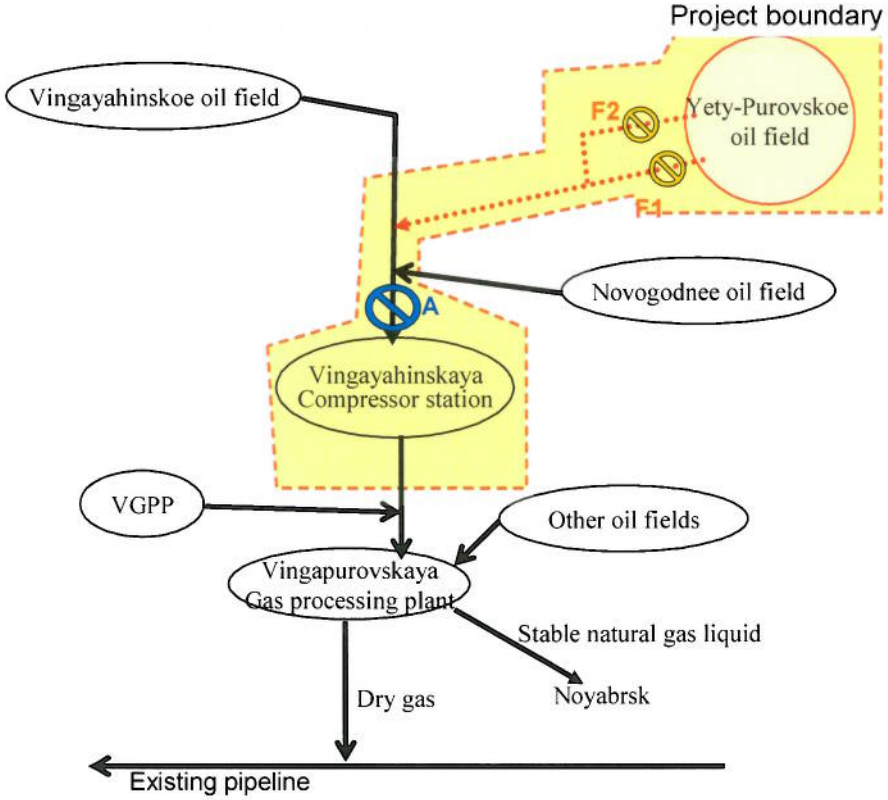
(1) Project boundary and the monitoring points

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.

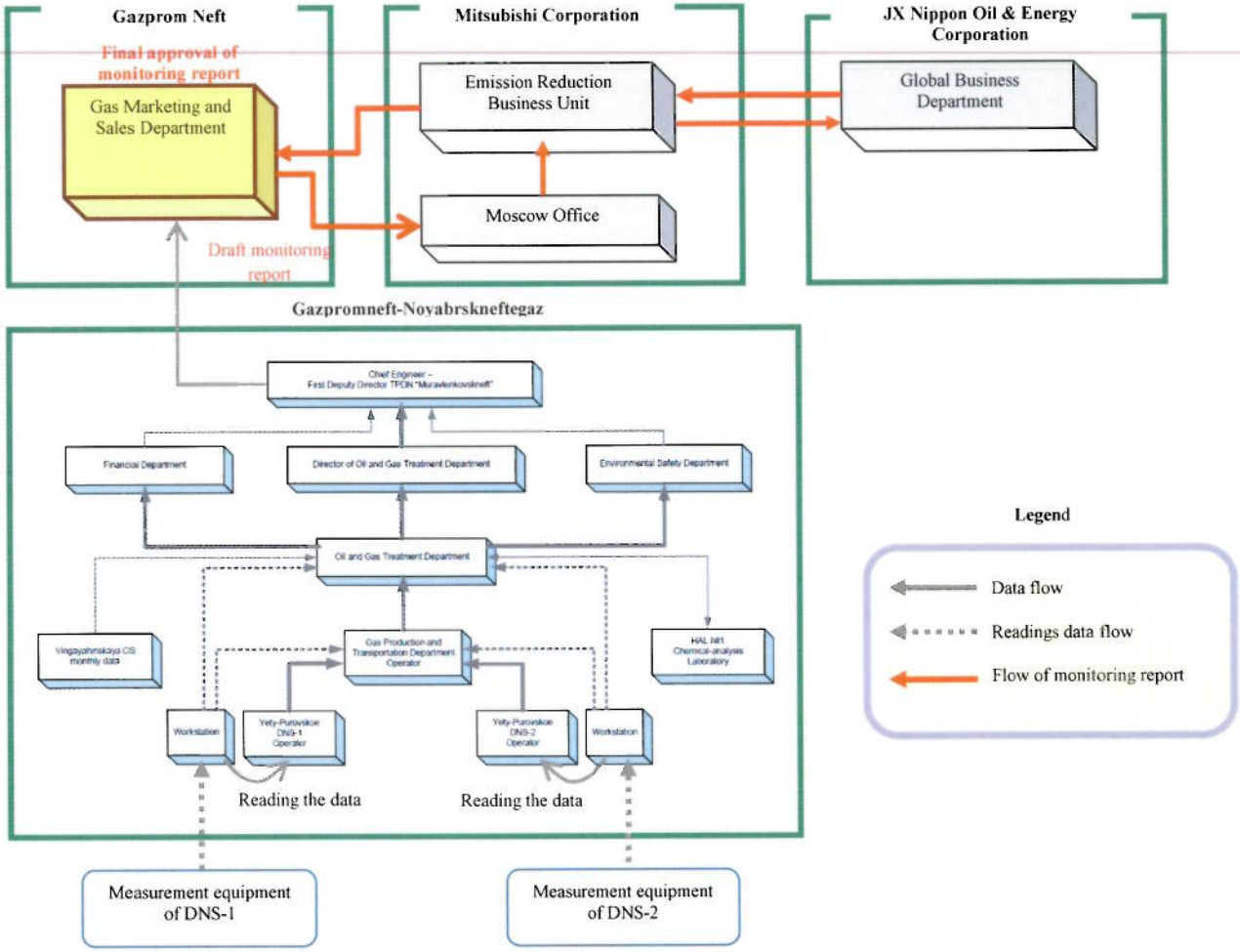
The monitoring point is composed of:

- 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 CO_2 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, Gazpromneft-Noyabrskneftegaz submits it to Gazprom Neft. Then Gazprom Neft drafts the monitoring report to finalizing it.

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:	**tCO_2 / TJ**
Description:	CO_2 emission factor for methane
Source of data used:	CDM methodology AM0009 version 04
Value(s) :	49.55 tCO_2 / 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:	**tCO_2 / MWh**
Description:	CO_2 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 tCO_2 / 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:	26,177,322 m^3 (Jan 2011 ~ Dec 2011 total) 16,972,607 m^3 (Jan 2012 ~ Mar 2012 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)	Vortical flow meter (Prowirl)
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 ±3-4%. It was calibrated in 22 Dec 2011 and it will be calibrated in 22 Dec 2014.

For year 2011:

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:	$\mathbf{V_{F1,y}}$
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:	26,177,322 m^3 (Jan 2011 ~ Dec 2011 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:	313,168,678 m^3 (Jan 2011 ~ Dec 2011 total) 49,339,393 m^3 (Jan 2012 ~ Mar 2012 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)	Vortical flow meter (Prowirl)
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 ±3-4% It was calibrated in 28 Dec 2011 and it will be calibrated in 28 Dec 2014.

For year 2011:

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:	313,168,678 m^3 (Jan 2011 ~ Dec 2011 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 m^3**
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:	42.85 MJ/m^3 (Jan 2011 ~ Dec 2011 average) 45.54 MJ/m^3 (Jan 2012 ~ Mar 2012 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
Measuring/ Reading/	Monthly

Recording frequency:	
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.

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 m^3**
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:	47.11 MJ/m^3 (Jan 2011 ~ Dec 2011 average) 48.13 MJ/m^3 (Jan 2012 ~ Mar 2012 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
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.

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:	703,001,000 m^3 (Jan 2011 ~ Dec 2011 total) 197,312,000 m^3 (Jan 2012 ~ Mar 2012 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 ±3-4% 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:	113,576,452 MWh (Jan 2011 ~ Dec 2011 total) 30,948,207 MWh (Jan 2012 ~ Mar 2012 total)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission
Monitoring equipment (type, accuracy class, serial number, calibration	Electricity meter

frequency, date of last calibration, validity)	
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). It will be calibrated in 26 Feb 2016 (Serial number: 102060189) and in 13 Dec 2015 (Serial number: 112053016).

Table D.2-7. Metering equipments, used in monitoring (applicable for year 2012)

Type, serial number	Data of the last calibration/verification	Calibration/verification valid until
APG treated by GTPP		
Unit for operational metering of associated gas at Ety-Pur oil field (DNS-1)		
Gas flow rate computer ABAC № 157	28/09/2010	28/09/2014
Flow meter Prowirl 72F1F-SE0FA1CAA0AW № E3152302000	30/03/2011	30/03/2015
Flow meter Prowirl 72F1F-SE0FA1CAA0AW № E3152102000	01/03/2011	01/03/2015
Temperature transducer Metran-276 № 809329	13/12/2011	13/12/2012
Temperature transducer Metran-276 № 809326	20/12/2011	20/12/2012
Pressure transducer Metran-150 № 1002245	19/01/2011	
Pressure transducer Metran-150 № 1002257	20/12/2011	20/12/2015
Unit for operational metering of associated gas at Ety-Pur oil field (DNS-2)		
Gas flow rate computer ABAC № 140	28/09/2010	28/09/2014
Flow meter Prowirl 72F1F-SE0FA1CAA0AW № E30BA202000	01/03/2011	01/03/2015
Flow meter Prowirl 72F1F-SE0FA1CAA0AW № E3047A02000	01/03/2011	01/03/2015
Temperature transducer TSPU Metran 276MP № 809345	26/12/2011	26/12/2012

Temperature transducer TSPU Metran 276MP № 809348	26/12/2011	26/12/2012
Pressure transducer Metran-150 № 1002254	19/01/2011	
Pressure transducer Metran-150 № 1002255	19/01/2011	
Unit for quality control of treated APG		
Gas chromatograph Kristallux 4000M	22/11/2011	22/11/2012
Chemical laboratory	07/12/2009	07/12/2004

Table D.2-8. Metering equipments, used in monitoring (applicable for year 2011)

Type, serial number	Data of the last calibration/verification	Calibration/verification valid until
APG treated by GTPP		
Unit for operational metering of associated gas at Ety-Pur oil field (DNS-1)		
Information data processing device "IM 2300" № MX239	13/03/2009	13/03/2012
Narrowing device № 1125	09/08/2010	
Pressure transducer Metran-150 №-43-Ex-DI № 62740	07/04/2008	07/04/2011
Pressure transducer Metran 22Ex №38461	24/03/2011	24/03/2012
Temperature transducer TSM-50M/B14 № 0193	15.04.2009	
Pressure difference transducer JUMO	13/01/2011	13/01/2012
Pressure difference transducer JUMO	13/01/2011	13/01/2012
Unit for operational metering of associated gas at Ety-Pur oil field (DNS-2)		
Flow meter GE Panametrics GM868	15/08/2007	15/08/2011
Metran-100-Ex-Di	08/10/2008 (year of putting into operation)	08/10/2011
Temperature transducer TSPU Metran 274-06 № 543760	21/04/2010	21/04/2011
Unit for quality control of treated APG		
Gas chromatograph Kristallux 4000M MKUB.415338.001	23/11/2010	
Chemical laboratory	07/12/2009	07/12/2004

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/Sm^3)
$NCV_{RG,F2,y}$	Net calorific value of recovered gas measured at point F2 during the period y (TJ/Sm^3)
$EF_{CO2,methane}$	CO_2 emission factor for methane (tCO_2/TJ)

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

The measured data is:

2011(Jan – Dec)

	$V_{F1,y}$ m^3	$V_{F2,y}$ m^3
Jan	298,520	33,154,480
Feb	404,050	29,555,950
Mar	579,620	32,080,380
Apr	552,290	30,137,710
May	734,830	32,128,170
Jun	842,400	31,157,600
Jul	870,480	31,859,520
Aug	2,617,870	29,932,130
Sep	3,595,940	14,194,060
Oct	5,435,753	16,366,247
Nov	4,934,208	16,133,792
Dec	5,311,361	16,468,639
Total	26,177,322	313,168,678

2012 (Jan – Mar)

	$V_{F1,y}$ m^3	$V_{F2,y}$ m^3
Jan	6,529,325	15,870,675
Feb	5,157,750	16,085,250
Mar	5,285,532	17,383,468
Total	16,972,607	49,339,393

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

Below is the measured gas composition at point F1 and its simple average during the project period

2011(Jan – Dec)

	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Average
Nitrogen	0.706	0.724	0.714	0.744	0.725	0.679	0.758	0.955	0.814	0.789	0.828	0.831	0.772
Carbon dioxide	0.304	0.779	0.455	0.587	0.494	0.555	0.698	0.845	0.558	0.716	0.472	0.306	0.564
Methane	80.291	77.728	82.707	82.214	82.321	83.543	82.208	82.164	82.467	81.603	79.248	84.146	81.720
Ethane	8.896	7.755	6.475	7.658	6.681	6.652	7.921	7.644	7.075	7.564	7.671	7.987	7.498
Propane	5.354	4.460	3.882	3.939	3.973	3.964	3.863	3.568	4.239	3.572	3.802	3.435	4.004
i-butane	1.391	1.656	1.153	1.341	1.214	1.073	1.304	1.258	1.087	1.331	1.410	1.126	1.278
n-butane	1.694	2.442	1.552	1.527	1.650	1.438	1.413	1.368	1.376	1.462	1.645	1.110	1.556
i-pentane	0.480	1.172	0.761	0.631	0.800	0.643	0.615	0.650	0.479	0.780	1.048	0.338	0.700
n-pentane	0.402	1.258	0.618	0.487	0.680	0.658	0.410	0.458	0.315	0.577	0.898	0.206	0.581
i-hexanes	0.483	2.026	1.682	0.873	1.462	0.795	0.810	1.090	1.591	1.607	2.978	0.516	1.326

2012 (Jan – Mar)

	Jan-12	Feb-12	Mar-12	Average
Nitrogen	1.043	0.726	0.829	0.866
Carbon dioxide	0.437	0.345	0.349	0.377
Methane	79.007	76.927	82.112	79.349
Ethane	7.346	7.561	7.282	7.396
Propane	3.627	6.223	3.047	4.299
i-butane	1.419	1.625	1.315	1.453
n-butane	1.678	2.731	1.308	1.906
i-pentane	1.127	1.044	0.832	1.001
n-pentane	0.951	1.023	0.601	0.858
i-hexanes	3.365	1.796	2.326	2.495

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

2011 (Jan – Dec)

	Composition (%) (2011 average)	Heat value (MJ/m3)	=C * D / 100 (MJ/m3)
	=C	=D	
Oxygen		0.000	
Nitrogen	0.772	0.000	0.00
Carbon dioxide	0.564	0.000	0.00
Methane	81.720	33.936	27.73
Ethane	7.498	60.395	4.53
Propane	4.004	86.456	3.46
i-butane	1.278	112.031	1.43
n-butane	1.556	112.384	1.75
i-pentane	0.700	138.044	0.97
n-pentane	0.581	138.380	0.80
i-hexanes	1.326	164.075	2.18
total			42.85

2012 (Jan – Mar)

	Composition (%) (2009 average)	Heat value (MJ/m3)	=C * D / 100 (MJ/m3)
	=C	=D	
Oxygen		0.000	
Nitrogen	0.866	0.000	0.00
Carbon dioxide	0.377	0.000	0.00
Methane	79.349	33.936	26.93

Ethane	7.396	60.395	4.47
Propane	4.299	86.456	3.72
i-butane	1.453	112.031	1.63
n-butane	1.906	112.384	2.14
i-pentane	1.001	138.044	1.38
n-pentane	0.858	138.380	1.19
i-hexanes	2.495	164.075	4.09
total			45.54

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

Below is the measured gas composition at point F2 and its simple average during the project period.

2011 (Jan – Dec)

	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Average
Nitrogen	0.720	0.815	0.691	0.767	0.596	0.652	0.682	0.761	0.650	0.994	0.897	0.675	0.742
Carbon dioxide	1.108	1.100	1.147	0.988	1.032	1.075	1.183	1.159	1.250	1.199	1.180	1.129	1.129
Methane	69.390	69.958	71.772	68.749	72.248	72.459	70.585	70.395	70.272	70.056	65.974	71.457	70.276
Ethane	12.172	12.251	12.422	11.932	12.756	11.927	12.300	12.489	12.676	12.639	12.054	12.841	12.372
Propane	8.909	9.059	9.043	9.420	8.862	8.540	9.257	9.287	9.087	9.571	10.654	8.754	9.203
i-butane	1.629	1.684	1.354	1.905	1.290	1.251	1.608	1.611	1.553	1.579	2.072	1.460	1.583
n-butane	2.895	2.703	2.191	3.311	2.070	1.976	2.658	2.645	2.557	2.480	3.418	2.281	2.599
i-pentane	0.734	0.675	0.480	0.884	0.403	0.528	0.597	0.581	0.589	0.477	0.697	0.357	0.583
n-pentane	0.970	0.687	0.479	0.932	0.380	0.581	0.565	0.550	0.564	0.427	0.743	0.285	0.597
i-hexanes	1.473	1.068	0.423	1.112	0.363	1.011	0.566	0.524	0.802	0.579	2.311	0.762	0.916

2012 (Jan – Mar)

	Jan-10	Feb-10	Mar-10	Average
Nitrogen	1.869	0.647	0.663	1.060
Carbon dioxide	1.237	1.127	1.223	1.196
Methane	66.313	73.104	66.261	68.559
Ethane	12.700	12.322	12.487	12.503
Propane	9.592	8.160	9.965	9.239
i-butane	1.735	1.360	2.056	1.717
n-butane	2.975	2.239	3.861	3.025
i-pentane	0.833	0.443	1.166	0.814
n-pentane	0.885	0.427	1.216	0.843
i-hexanes	1.861	0.172	1.102	1.045

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

2011 (Jan – Dec)

	Composition (%) (2011 average)	Heat value (MJ/m3)	=C * D / 100 (MJ/m3)
	=C	=D	
Oxygen		0.000	
Nitrogen	0.742	0.000	0.00
Carbon dioxide	1.129	0.000	0.00
Methane	70.276	33.936	23.85
Ethane	12.372	60.395	7.47
Propane	9.203	86.456	7.96
i-butane	1.583	112.031	1.77
n-butane	2.599	112.384	2.92
i-pentane	0.583	138.044	0.81
n-pentane	0.597	138.380	0.83
i-hexanes	0.916	164.075	1.50
total			47.11

2012 (Jan – Mar)

	Composition (%) (2009 average)	Heat value (MJ/m^3)	=C * D / 100 (MJ/m^3)
	=C	=D	
Oxygen		0.000	
Nitrogen	1.060	0.000	0.00
Carbon dioxide	1.196	0.000	0.00
Methane	68.559	33.936	23.27
Ethane	12.503	60.395	7.55
Propane	9.239	86.456	7.99
i-butane	1.717	112.031	1.92
n-butane	3.025	112.384	3.40
i-pentane	0.814	138.044	1.12
n-pentane	0.843	138.380	1.17
i-hexanes	1.045	164.075	1.71
total			48.13

(4) Baseline emission

Based on the above, each parameters are:

2011 (Jan – Dec)

$V_{F1,y}$	26,177,322	m^3
$V_{F2,y}$	313,168,678	m^3
$NCV_{RG,F1,y}$	42.85	MJ/m^3
$NCV_{RG,F2,y}$	47.11	MJ/m^3
$EF_{CO2,methane}$	49.55	tCO_2/TJ (Given value in accordance with AM0009 version 4)

2012 (Jan – Mar)

$V_{F1,y}$	16,972,607	m^3
$V_{F2,y}$	49,339,393	m^3
$NCV_{RG,F1,y}$	45.54	MJ/m^3
$NCV_{RG,F2,y}$	48.13	MJ/m^3
$EF_{CO2,methane}$	49.55	tCO_2/TJ (Given value in accordance with AM0009 version 4)

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

2011 (Jan – Dec)

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

= 786,610 tCO_2

2012 (Jan – Mar)

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

=155,965 tCO_2

E.2. Project emissions calculation

>>

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:

$PE_{CO2,\ fossilfuels,\ y}$	CO_2 emission due to consumption of fossil fuel for the recovery, pre-treatment, transportation, and if applicable, compression of the recovered gas.
$PE_{CO2,elec,y}$	CO_2 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 CO_2 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 CO_2. The estimation of the emission is described in (2) below.
$PE_{CO2,\ fossilfuel,CS\ y}$	Are the CO_2 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 CO_2 The estimation of the emission is described in (4) below.
$PE_{CO2,\ EC,\ oilfield,\ y}$	Is the CO_2 emission due to grid electricity during the period y in tons of CO_2, 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 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 The estimation of the emission is described in (5) below.

(1) CO_2 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) CO_2 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) CO_2 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 CO_2 emission factor, the default factor 1.3 tCO_2/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:

2011 (Jan – Dec)

	$V_{F1,y}$	$V_{F2,y}$	$V_{A,y}$	$EC_{PJ,CS,y}$
	m3	m3	m3	kWh
Jan	298,520	33,154,480	53,751,000	9,437,402
Feb	404,050	29,555,950	50,566,000	8,764,346
Mar	579,620	32,080,380	56,101,000	9,454,169
Apr	552,290	30,137,710	55,093,000	9,092,853
May	734,830	32,128,170	62,925,000	10,288,513
Jun	842,400	31,157,600	61,307,000	10,148,462
Jul	870,480	31,859,520	63,769,000	10,297,767
Aug	2,617,870	29,932,130	65,247,000	10,412,911
Sep	3,595,940	14,194,060	36,139,000	4,885,294
Oct	5,435,753	16,366,247	64,710,000	10,085,714
Nov	4,934,208	16,133,792	65,388,000	10,113,281
Dec	5,311,361	16,468,639	68,005,000	10,595,740
Total	26,177,322	313,168,678	703,001,000	113,576,452

2012 (Jan – Mar)

	$V_{F1,y}$	$V_{F2,y}$	$V_{A,y}$	$EC_{PJ,CS,y}$
	m3	m3	m3	kWh
Jan	6,529,325	15,870,675	68,291,000	10,736,230
Feb	5,157,750	16,085,250	61,818,000	9,671,716
Mar	5,285,532	17,383,468	67,203,000	10,540,261
Total	16,972,607	49,339,393	197,312,000	30,948,207

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

2011 (Jan – Dec): 85,526 tCO_2
2012 (Jan – Mar): 16,226 tCO_2

(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
$PE_{CO2,EC,CS,y}$	85,526 tCO_2 (Jan – Dec, 2011) 16,226 tCO_2 (Jan – Mar, 2012)

The total project emission (PE) is: 2011 (Jan – Dec): 85,526 tCO_2
2012 (Jan – Mar): 16,226 tCO_2

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: 786,610 tCO_2 (Jan – Dec, 2011)
155,965 tCO_2 (Jan – Mar, 2012)

Total project emissions: 85,526 tCO_2 (Jan – Dec, 2011)
16,226 tCO_2 (Jan – Mar, 2012)

Total leakage: Not applicable
Total emission reductions: 701,084 ton CO_2 (Jan – Dec, 2011)
139,739 ton CO_2 (Jan – Mar, 2012)
840,823 ton CO_2 (Jan, 2011 –Mar, 2012)

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)	873,134 ton CO_2 (Jan – Dec, 2011)	701,084 ton CO_2 (Jan – Dec, 2011)
	168,358 ton CO_2 =673,432 ton CO_2 (Jan – Dec, 2012) * 1/4	139,740 ton CO_2 (Jan – Mar, 2012)

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

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