Monitoring report form for CDM project activity
(Version 07.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT		
Title of the project activity	Associated Gas Recovery and Utilization at Block 9	
UNFCCC reference number of the project activity	6817	
Version number of the PDD applicable to this monitoring report	6.0	
Version number of this monitoring report	02	
Completion date of this monitoring report	25/07/2020	
Monitoring period number	5th monitoring period	
Duration of this monitoring period	01/01/2020-31/05/2020	
Monitoring report number for this monitoring period	n/a	
Project participants	The Government of the Sultanate of Oman, represented by the Ministry of Oil & Gas Oman Trading International Carbon Rooster Advisory Services B.V.	
Host Party	Oman	
Applied methodologies and standardized baselines	AM0009 "Recovery and utilization of gas from oil wells that would otherwise be flared or vented" (Version 06.0.0)	
Sectoral scopes	Sectoral scope 10: Fugitive emission from fuels (solid, oil, gas).	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0 tCO_2e	153,427 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	170,373	

SECTION A. Description of project activity

A.1. General description of project activity

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The Associated Gas Recovery and Utilization at Block 9 project (hereafter referred to as the Project) is located at Safah oil field, A'Dhahirah Region, The Sultanate of Oman. The project is operated by Occidental of Oman Inc. under a development and production sharing agreement with the Ministry of Oil and Gas.

The purpose of the project activity is to deliver recovered gas to the national gas pipeline to meet energy needs of end-users, and also to reduce local air pollution due to flaring.

The recovery process comprises three main stages including the separation stage where gas is separated from oil and water, the compression stage where gas is compressed for transportation to gas plant, and the processing stage where gas is processed to fit with conditions of gas pipeline for further transportation to end-users. Main equipment necessary for the proposed project activity comprises electric motor-driven reciprocating and screw compressors installed at several locations on site, and a network of pipelines for gas transportation.

The scenario existing prior to the start of the implementation of the proposed project activity is flaring of associated gas at the oil production site, the operation of the existing oil and gas infrastructure without processing of any recovered associated gas, and the use of gas-lift gas from the same source and quantity as under the project activity in the gas-lift system. The baseline scenario is the same as the scenario existing prior to the start of implementation of the proposed project activity. The project reduces greenhouse gases emissions as the utilization of recovered gas displaces the use of non associated gas or other fossil sources at end-users.

The total estimated amount of associated gas to be recovered during crediting period is about 2.1 billion m^3 while average methane content is estimated at about 70%. The project activity is expected to reduce emissions by approximately 775,250 tonnes of CO_2 equivalent annually over the crediting period.

The date of the project construction started is 14 May 2009 and the project start operation on 08 Dec 2009, the project was fully commissioned on 29 Oct 2010.

The Project processes 50,977,246.728 Nm^3 associated gas and the total emission reduction is 153,427 tCO_2e in the monitoring period (01/01/2020-31/05/2020).

A.2. Location of project activity

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The proposed project is located at Block 9, Safah oil field in A'Dhahirah Region of Northern Oman. Approximate coordinates of Safah gas processing plant are east longitude of 55°27'40" and north latitude of 23°11'20". The project includes four other locations: Far West (23°09'11"N, 55°27'03"E), Satellite (23°10'39"N, 55°29'52"E), Jalal (22°55'50"N, 55°48'16"E), and Wadi Latham (22°52'50"N, 55°48'16"E).

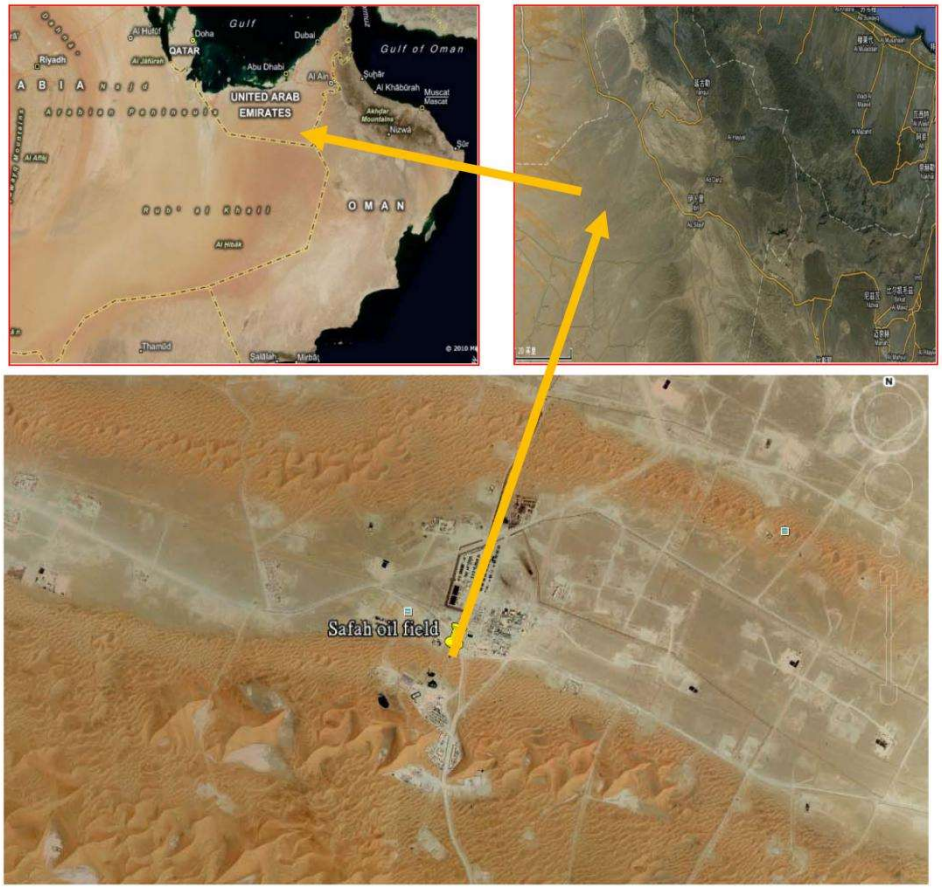

Figure 1 Location of the project

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Oman (Host)	The Government of the Sultanate of Oman, represented by the Ministry of Oil & Gas	No
United Arab Emirates	Oman Trading International	No
Netherlands	Carbon Rooster Advisory Services B.V.	No

A.4. References to applied methodologies and standardized baselines

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AM0009: Recovery and utilization of gas from oil wells that would otherwise be flared or vented (Version 06.0.0);

Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 1);
Tool for the demonstration and assessment of additionality (Version 06.1.0).

For more information, please refer to:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html.

A.5. Crediting period type and duration

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The project has been registered on 31 Dec 2012.
The fixed crediting period is chosen by the project which is from 31/12/2013 to 30/12/2020.
The first monitoring period is: 31/12/2013 – 31/12/2018.
The second monitoring period is: 01/01/2019 – 30/06/2019.
The third monitoring period is: 01/07/2019 – 15/11/2019.
The fourth monitoring period is: 16/11/2019 – 31/12/2019.
The fifth monitoring period is: 01/01/2020 – 31/05/2020.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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The proposed project activity aims to recover associated gas flow that was before flared at 5 different locations in Safah oil field. When oil is extracted from the wells, it comes to the surface together with sands, water and gas. The mixture is then stored into tanks to rest for a period so that through gravity, oil, water and sands are recovered from the bottom of the tank and gas is recovered from the top of the tank. This is called the phase separation. Only oil, gas, sands and water are recovered during phase separation at each location. After that gas is compressed and transported to a processing plant on-site owned by onsite operator where it will be processed then further transported and sold by onsite operator to National Gas pipeline. Part of the gas is consumed onsite to provide electricity to the project activity. Expected annual gross gas volumes to be recovered as part of the project activity are on average 41.13 mmscfd over its lifetime. On average about 1.78 mmscfd of the recovered gas will be used annually in captive power plant on-site to supply electricity to the project activity. The captive gas power plant is owned and operated by on-site operator and the gas is delivered free of charge to the power plant. Expected average net gas volumes delivered to National pipeline is 37.02mmscfd after deduction of onsite gas consumption due to project activity and deduction of a shrinkage factor due to gas treatment at gas plant for the purpose of meeting the specifications of the National pipeline.

Table 1 project implementation timeline

Location	Number of compressors	Start construction	Full commissioning
CPF	4	14-May-2009	08-Dec-2009
FW	2	02-Jan-2010	03-Jul-2010
SAT	1	14-Jan-2010	03-Sep-2010
JAL	1	19-Jan-2010	08-Aug-2010
WL	3	07-Jan-2010	29-Oct-2010

The project activity mainly comprises the installation of compressor packages at five different locations, including compressor, motor, scrubbers, suction and discharge bottles, coolers, as well as installation of a pipeline network. Technology employed by the proposed project activity mainly includes the following equipment:

• Purchase and installation of a vapour recovery unit (VRU) for the central production boot flare (CPF) in Safah. The VRU package includes 4 screw compressors (2 prime units & 2 stand-by units) with associated knock out drums, lube oil systems and air coolers. The boot flare will be re-routed to the vapour recovery unit which will recover gas from the crude tank degassers and various other low pressure sources currently flared. The recovered gas will be sent to the gas plant for processing.

• Reduction of the Far West (FW) flare by a series of new pipelines and re-routes.

• Addition of electrical driven reciprocating compressor at the Satellite (SAT) facility as well as electrical infrastructures including transformers and relays to support the high voltage and low

voltage demands of the compressor. A new motor control center and switch gear room will be installed. The recovered gas will be sent to the gas plant for processing.

• Addition of electrical motor driven reciprocating compressor at Jalal (JAL) as well as electrical infrastructure including transformers and relays to support the high voltage and low voltage demands of the compressor. The recovered gas will be sent to the gas plant for processing.

• Addition of electrical motor driven reciprocating compressors at Wadi Latham (WL) as well as electrical infrastructure including new motor control center and switch gear building, transformers and relays to facilitate the high voltage and low voltage demands of the compressors. The recovered gas will be sent to the gas plant for processing.

• Addition of electrical motor driven reciprocating compressors at Far West (FW) facility. The recovered gas will be sent to the gas plant for processing.

• The pipeline system mainly consists of a 16” 93.8km line from Safah to National pipeline and a 12” 58.2km line from Wadi Latham to Far West; 12” 4km line from Satellite to Central Production Flare; 16” 4.2km line from Far West to Central Production Flare; and 4” 2km line from Jalal connected to Wadi Latham-Far West line.

The below figure provides an overview of the network.

Figure 2 Pipeline network of the project

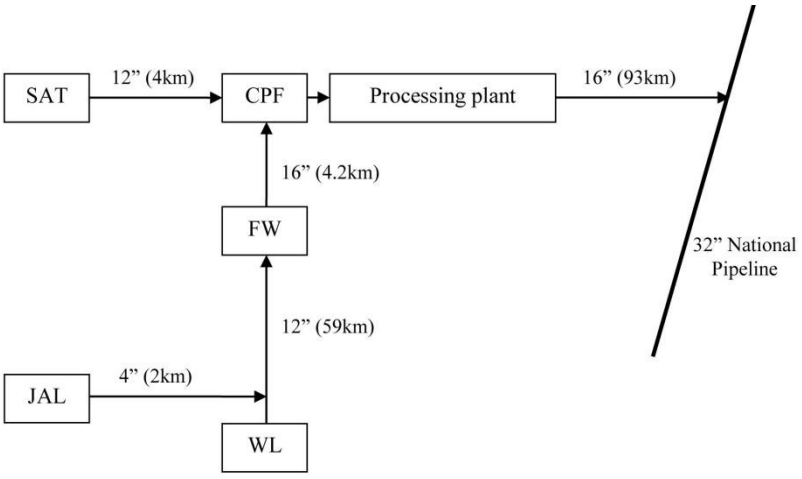

Figure 3 Flow diagram of the project boundary

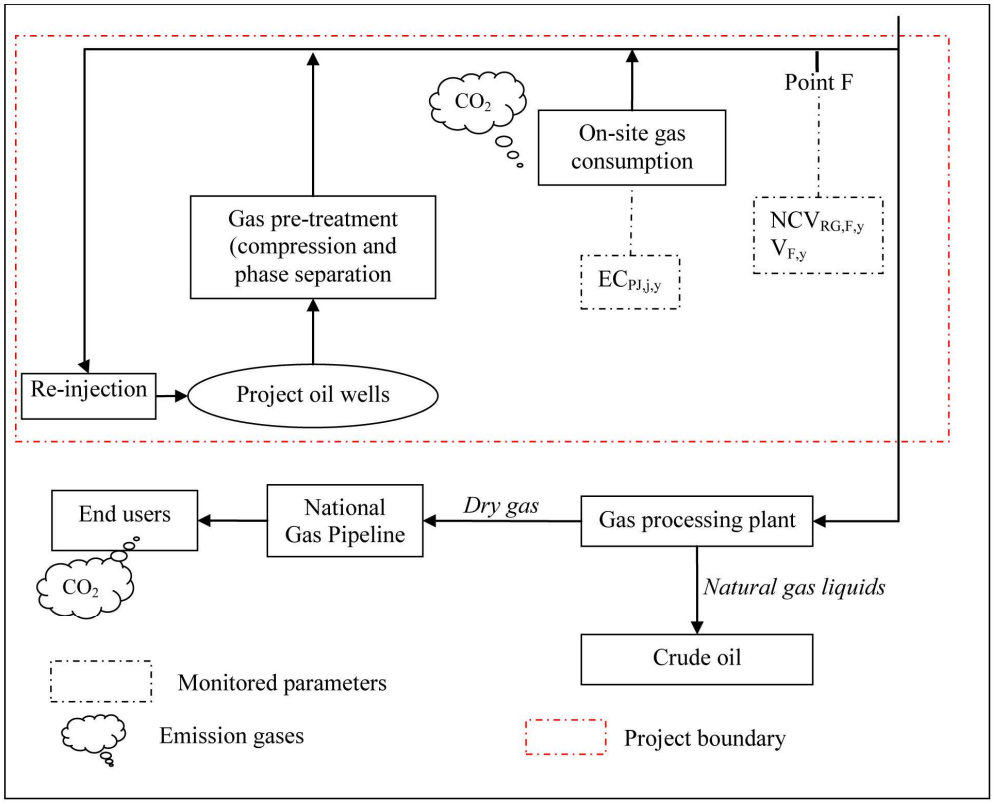

Table 2 Main equipment and technical parameters in the project

Location	Parameter	Value
CPF	Capacity (MMSCFD)	4 * 5.399
	Manufacturer	Vilter
	Type	VSG-2101
	Rated Power (BHP)	541
FW	Capacity (MMSCFD)	2 * 12.5
	Manufacturer	Ariel Corporation
	Type	JGK/4
	Rated Power (BHP)	2540
SAT	Capacity (MMSCFD)	1 * 30
	Manufacturer	Ariel Corporation
	Type	JGD/4
	Rated Power (BHP)	4140
JAL	Capacity (MMSCFD)	1 * 12.5
	Manufacturer	Ariel Corporation
	Type	JGC/4
	Rated Power (BHP)	4140
WL	Capacity (MMSCFD)	3 * 12.5
	Manufacturer	Ariel Corporation
	Type	JGC/4
	Rated Power (BHP)	4140

Table 3 Milestone of the Project

No.	Date	Milestone
1	14/05/2009	The Project construction started
2	08/12/2009	Operation started
3	29/10/2010	Fully commissioning
4	31/12/2012	Registered as a CDM project
5	31/12/2013 – 31/12/2018	The first monitoring period
6	01/01/2019 – 30/06/2019	The second monitoring period
7	01/07/2019 – 15/11/2019	The third monitoring period
8	16/11/2019 – 31/12/2019	The fourth monitoring period
9	01/01/2020 – 31/05/2020	The fifth monitoring period

As per stated in the registered PDD, according to manufacturer specifications, compressors lifetime should be of 15 years. The project activity was fully commissioned since 29/10/2020, according to the registered PDD, the expected operational lifetime of the project activity is 10 years, therefore, the project is expected to be operated till 28/10/2020. During this monitoring period, the project runs smoothly following the designing of the registered PDD.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

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Not applicable.

B.2.2. Corrections

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Not applicable.

B.2.3. Changes to the start date of the crediting period

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The crediting period was changed from 01/01/2013 - 31/12/2019 to 31/12/2013 - 30/12/2020 (Fixed)

B.2.4. Inclusion of monitoring plan

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Not applicable.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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Not applicable.

B.2.6. Changes to project design

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Not applicable.

B.2.7. Changes specific to afforestation or reforestation project activity

>>
Not applicable.

SECTION C. Description of monitoring system

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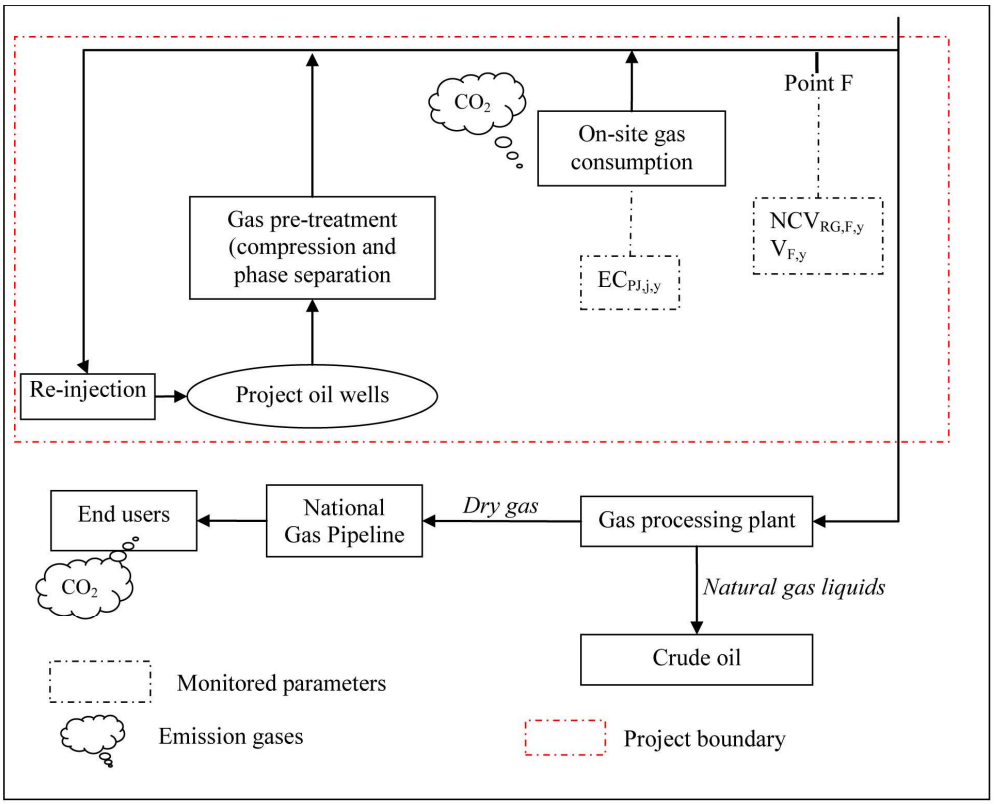
The monitoring of the emission reductions will be carried out according to the scheme shown in below Figure 4. The overall responsibility for the monitoring process will be held by the Monitoring Officer which will be selected among senior staff of the operating entity on-site. Some of the monitoring tasks will be delegated as indicated Figure 5. Measurements of the associated gas volumes recovered and project electricity consumption will fall under the responsibility of lead operators at each location who report to the Central Production Facility.

Figure 4 Monitoring diagram



The monitoring officer will be responsible for collecting and performing plausibility check of the measurements. The monitoring reports and calculation of emission reductions will be prepared by experienced CDM consultant. The selection procedure, tasks and responsibilities of the monitoring officer are detailed as below:

Selection procedure:

The monitoring officer will be appointed by the general manager of the entity operating the project. The monitoring officer will be selected from among the senior technical or managerial staff.

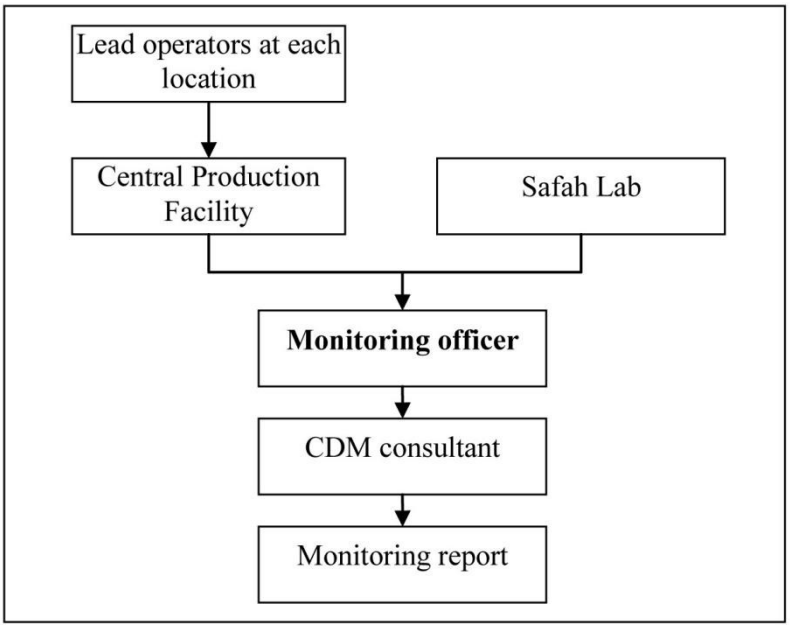
Tasks and responsibilities:

The monitoring officer will be responsible for carrying out the following tasks:

- Supervise and verify metering and recording: The monitoring officer will coordinate with the lead operators at each location to ensure and verify adequate metering and recording of volumes of gas recovered at each location. The monitoring officer will also coordinate with the lab at Safah gas plant to ensure proper measurement of net calorific values of recovered gas.
- Collect data: The monitoring officer will collect volumes of recovered associated gas and net calorific values.
- Monitoring report: The monitoring officer will coordinate with CDM consultant to prepare periodic monitoring reports including calculation of emission reductions on the basis of

measured results. The monitoring officer will be provided with a calculation template in electronic form by the project's CDM advisors

Figure 5 Responsibilities for measurements and reporting emission reductions



Emergencies:

In case of emergencies, the project entity will not claim emission reductions due to the project activity for the duration of the emergency. The project entity will follow the following procedure for declaring the emergency period to be over:

1. The project entity will ensure that all requirements for monitoring of emission reductions have been re-established.
2. The monitoring officer will sign a statement declaring the emergency situation has ended and normal operations have resumed.

Monitoring of volume of recovered gas ($V_{F,y}$)

Gas flow meters (FM_{CPF}, FM_{FW}, FM_{WL}, FM_{JAL}, FM_{SAT}) at each location: CPF, FW, WL, JAL, SAT will measure the volumes of recovered gas after pre-treatment and after part of the recovered gas is used on-site. The total value for parameter $V_{F,y}$ will be equal to the sum of volumes of recovered gas at each location.

The recorded gas volume is automatically converted to the national standard condition, namely 101.325kpa, 25℃ follow ISO 6976.

The results from the gas flow meters are recorded by the lead operators for each month at each location and report to monitoring officer. The monitoring officer aggregated those data and reported them to Manager who would check and archive them, as well as manage the regular data back-up. All data collected as part of monitoring should be archived electronically and be kept at least for 2 years after the end of the last crediting period.

The calibration for the gas meters was conducted annually according to the national measurement standard and regulation by the qualified measurement technology verification institution authorized by the Oman government.

In summary, all the meters have been working normally and calibrated according to the registered monitoring plan and relevant national standards.

Table 4 Description of gas flow meters at each location

Meter	Meter SN	Accuracy	Calibration date	Validity
FM_{CPF}	8944587	0.04%	10/10/2019	09/10/2020
FM_{FW}	10080142	0.04%	n/a	n/a
FM_{WL}	8635299	0.04%	10/10/2019	09/10/2020
FM_{JAL}	10031201	0.04%	n/a	n/a
FM_{SAT}	8791784	0.04%	n/a	n/a

During this monitoring period, only CPF and WL recovered gas, therefore, the parameter of $V_{F,y}$ was monitored and calculated only for CPF and WL location during this monitoring period, which is consistent with the estimation in the registered PDD.

Monitoring Net calorific value of recovered gas ($NCV_{RG,F,y}$)

The net calorific value (volume based) of the recovered gas in TJ/standard cubic meter will be calculated according to the following method:

$$NCV_{RG,F,y} = \frac{\Sigma(X_i \times NCV_i)}{\Sigma(X_i)}$$

Xi = molar fraction of the individual component i in the recovered gas sample at least monthly.

NCV_i = Net Calorific Value (volume based) of the individual component i as per ISO/DP 6976:1995 standard for a combustion reference temperature of 25^0C and the same metering reference condition used for parameter $V_{F,y}$.

Gas composition measurements are undertaken in line with international fuel standards under the responsibility of the on-site lab located at Safah gas plant. Samples are taken monthly through chromatography gas analyzer. Calibration frequency of the chromatography gas analyzer is every 6 months under ISO 17025. For this monitoring period, the chromatography gas analyzer was calibrated on 24/10/2019 and 24/04/2020

NCV will be calculated as the sum of molar fraction of each individual component in the natural gas sample multiplied by net calorific value of each individual component in the natural gas sample as referenced in ISO/DP 6976:1995 standard for a combustion reference temperature of 25°C. The average NCV during the period y is defined as the arithmetic average of NCV for the samples taken during the same period.

During this monitoring period, only CPF and WL recovered gas, therefore, the parameter of $NCV_{RG,F,y}$ was monitored and calculated only for CPF and WL location during this monitoring period, which is consistent with the estimation in the registered PDD.

Monitoring of electricity consumption $EC_{PJ,j,y}$

Electricity meters will measure electricity consumed by equipment at each project location. The total value for parameter $EC_{PJ,j,y}$ will be equal to the sum of electricity consumption at each location.

$EC_{PJ,j,y}$ is continuous measured by the lead operators for each month at each location and report to monitoring officer. Calibration is performed annually.

Table 5 Description of electricity meters at each location

Meter	Meter SN	Accuracy	Calibration date	Validity
M_{CPF}	P13C3830	0.5s	29/11/2019	28/11/2020
M_{FW}	P13C3894	0.5s	n/a	n/a
M_{WL}	P13C1273	0.5s	29/11/2019	28/11/2020
M_{JAL}	P13C3859	0.5s	n/a	n/a
M_{SAT}	P13C3857	0.5s	n/a	n/a

During this monitoring period, only CPF and WL recovered gas, therefore, the parameter of $\underline{EC_{PJ,j,y}}$ was monitored and calculated only for CPF and WL location during this monitoring period, which is consistent with the estimation in the registered PDD.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	$EF_{CO2,Methane}$
Unit	tCO_2/TJ
Description	CO_2 emission factor for methane
Source of data	Calculated in line with procedures and data presented in ISO 6976:

Unit	Value	Source
Carbon Content of Methane	12,011 kg/kmol	ISO 6976: Table 1
CO_2 Emission Factor for Methane	44.01 kg/kmol	ISO 6976: Table 1
NCV of Methane (at 25^0C)	802.60 kJ/mol	ISO 6976: Table 3

Value(s) applied	54.834 tCO_2/TJ
Choice of data or measurement methods and procedures	ISO 6976:
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	---

Data/Parameter	$TDL_{j,y}$
Unit	-
Description	Average technical transmission and distribution losses for providing electricity to source j year y
Source of data	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption";
Value(s) applied	0
Choice of data or measurement methods and procedures	Scenario B "Electricity consumption from an off-grid captive power plant" of the "Tool to calculate baseline, project and/or leakage emission from electricity consumption" applies.
Purpose of data/parameter	Calculation of project emissions
Additional comments	---

Data/Parameter	$EF_{EL,j,y}$
Unit	tCO_2/yr
Description	Emission factor for electricity generation for source j in year y
Source of data	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption";
Value(s) applied	1.3
Choice of data or measurement methods and procedures	Scenario B, Option B2 is applied as per registered PDD.
Purpose of data/parameter	Calculation of project emissions
Additional comments	---

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$V_{F,y}$
Unit	Nm^3
Description	Volume of the total recovered gas measured at point F in methodology Figure 2 in year y.
Measured/calculated/ default	Measured by gas flow meters
Source of data	Gas flow meters (FM_{CPF}, FM_{FW}, FM_{WL}, FM_{JAL}, FM_{SAT}) installed at point F of each location
Value(s) of monitored parameter	50,977,246.728
Monitoring equipment	Volume of gas is metered through a differential pressure flow meters (FM_{CPF}, FM_{FW}, FM_{WL}, FM_{JAL}, FM_{SAT}) installed at point F of each location. Please refer to Table 4 for more details.
Measuring/reading/recording frequency	Data will be measured continuously and recorded monthly.
Calculation method (if applicable)	The total value for parameter $V_{F,y}$ will be equal to the sum of volumes of recovered gas at each location.
QA/QC procedures	Gas flow meters calibration frequency is annual. The calibration for the gas meters was conducted annually according to the national measurement standard and regulation by the qualified measurement technology verification institution authorized by the Oman government. Gas flow meters accuracy is 0.04%. Lead operators at each location are responsible for monitoring and reporting to Central Production Facility. Please reference to Table 4 for the details of gas flow meters. The total recovered gas volume is crosschecked with commercial data.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	--

Data/Parameter	$NCV_{RG,F,y}$
Unit	TJ/Nm^3
Description	Average net calorific value of recovered gas at point F in methodology Figure 2 in year y
Measured/calculated/ default	On site measurement and calculated
Source of data	Gas composition measurements are undertaken in line with international fuel standards under the responsibility of the on-site lab located at Safah gas plant. Samples are taken monthly through chromatography gas analyser. Monthly NCV will be calculated as the sum of molar fraction of each individual component in the natural gas sample multiplied by net calorific value of each individual component in the natural gas sample as referenced in ISO/DP 6976:1995 standard for a combustion reference temperature of 25°C. The average NCV during the period y is defined as the arithmetic average of NCV for the samples taken during the same period.
Value(s) of monitored parameter	Please refer to the ER sheet for more detail.

Monitoring equipment	Samples are taken monthly through chromatography gas analyser.
Measuring/reading/recording frequency	Sampling and compositional analysis and calculation of net calorific value monthly.
Calculation method (if applicable)	Monthly NCV will be calculated as the sum of molar fraction of each individual component in the natural gas sample multiplied by net calorific value of each individual component in the natural gas sample as referenced in ISO/DP 6976:1995 standard for a combustion reference temperature of 25°C. The average NCV during this monitoring period is defined as the arithmetic average of NCV for the samples taken during the same period.
QA/QC procedures	Measurements are done as per ISO10715; Compositional analysis is in accordance with ISO 6974; Routine maintenance and calibration in accordance with ISO 10723; Calibration of the chromatography gas analyser is performed every 6 months, as per ISO 17025 and ISO6141. For this monitoring period, the chromatography gas analyser was calibrated on 24/10/2019 and 24/04/2020.
Purpose of data/parameter	Calculation of baseline emissions.
Additional comments	---

Data/Parameter	$EC_{PJ,j,y}$
Unit	MWh/yr
Description	Quantity of electricity consumed by the project electricity consumption source j in year y
Measured/calculated/ default	$EC_{PJ,j,y}$ will be equal to the sum of electricity consumption at point F of each location.
Source of data	Electricity meters installed at point F of each location.
Value(s) of monitored parameter	5,164.4
Monitoring equipment	Electricity meters, please refer to Table 5 for more details.
Measuring/reading/recording frequency	Continuous measurement and monthly recorded
Calculation method (if applicable)	$EC_{PJ,j,y}$ will be equal to the sum of electricity consumption at point F of each location.
QA/QC procedures	Accuracy is 0.5s. Electricity meters will be calibrated annually in accordance with local requirements. Please reference to Table 5 for the details of electricity meters. The total consumed electricity is crosschecked with confirmation letter.
Purpose of data/parameter	Calculation of project emissions
Additional comments	--

D.3. Implementation of sampling plan

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Not applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

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According to the methodology AM0009 Version 06.0.0, the emissions reduction by the project is calculated as follows:

$BE_y = V_{F,y} \times NCV_{RG,F,y} \times EF_{CO_2,Methane}$

Where:

BE_y = Baseline emissions in year y, (tCO_2e)

$V_{F,y}$ = Volume of total recovered gas measured at point F, in year y, (10_4Nm^3)

$NCV_{RG,F,y}$ = Average net calorific value of recovered gas at point F in year y, (TJ/Nm_3)

$EF_{CO2,Methane}$ = CO_2 emission factor for methane (tCO_2/TJ)

$EF_{CO2,Methane}$ is ex-ante determined in the registered CDM-PDD which is 54.834 tCO_2/TJ. The average $NCV_{RG,F,y}$ during this monitoring period is defined as the arithmetic average of NCVs for the samples taken during the same period.

Calculation of $NCV_{CPF,F,y}$ (TJ/Nm3)					
	Jan-20	**Feb-20**	**Mar-20**	**Apr-20**	**May-20**
$NCV_{CPF,m}$	0.00006331	0.00006273	0.00006271	0.00006217	0.00006229
$NCV_{CPF,F,y}$	**0.00006264**				

Calculation of $NCV_{WL,F,y}$ (TJ/Nm3)					
	Jan-20	**Feb-20**	**Mar-20**	**Apr-20**	**May-20**
$NCV_{WL,m}$	0.00004121	0.00004117	0.00004113	0.00004105	0.00004122
$NCV_{WL,F,y}$	**0.00004115**				

Annual gains at methodology figure 2 Point F (after deduction of internal consumption) (Nm3)					
	CPF	**WL**	**FW**	**JAL**	**SAT**
01/01/2020-31/01/2020	7,535,924.332	2,901,162.122	0	0	0
01/02/2020-29/02/2020	7,692,892.563	2,728,519.059	0	0	0
01/03/2020-31/03/2020	7,807,415.524	2,273,127.791	0	0	0
01/04/2020-30/04/2020	7,673,080.502	2,477,040.184	0	0	0
01/05/2020-31/05/2020	7,570,739.409	2,317,345.242	0	0	0
Total	**38,280,052.330**	**12,697,194.398**	**0**	**0**	**0**

CPF	**$V_{F,y}$**	**$NCV_{CPF,F,y}$**	**$EF_{CO2,Methane}$**	**BE_y**
Monitoring period	**Volume of total recovered gas (Nm^3)**	**Net calorific value of recovered gas (TJ/Nm3)**	**CO2 emission factor for methane (tCO2/TJ)**	**Baseline emissions (tCO2e)**
01/01/2020-31/01/2020	7,535,924.332	0.00006264	54.834	25,886
01/02/2020-29/02/2020	7,692,892.563		54.834	26,425
01/03/2020-31/03/2020	7,807,415.524		54.834	26,819
01/04/2020-30/04/2020	7,673,080.502		54.834	26,357
01/05/2020-31/05/2020	7,570,739.409		54.834	26,006
Total	38,280,052.330			131,493

WL	$V_{F,y}$	$NCV_{WL,F,y}$	$EF_{CO2,Methane}$	BE_y
Monitoring period	**Volume of total recovered gas (Nm^3)**	**Net calorific value of recovered gas (TJ/Nm3)**	**CO2 emission factor for methane (tCO2/TJ)**	**Baseline emissions (tCO2e)**
01/01/2020-31/01/2020	2,901,162.122	0.00004115	54.834	6,546
01/02/2020-29/02/2020	2,728,519.059		54.834	6,157
01/03/2020-31/03/2020	2,273,127.791		54.834	5,129
01/04/2020-30/04/2020	2,477,040.184		54.834	5,589
01/05/2020-31/05/2020	2,317,345.242		54.834	5,229
Total	12,697,194.398			28,650

Total all locations						
Monitoring period	**$BE_{CPF,y}$ (tCO2e)**	**$BE_{WL,y}$ (tCO2e)**	**$BE_{FW,y}$ (tCO2e)**	**$BE_{JAL,y}$ (tCO2e)**	**$BE_{SAT,y}$ (tCO2e)**	**Baseline emissions (tCO2e)**
01/01/2020-31/01/2020	25,886	6,546	-	-	-	32,432
01/02/2020-29/02/2020	26,425	6,157	-	-	-	32,582
01/03/2020-31/03/2020	26,819	5,129	-	-	-	31,948
01/04/2020-30/04/2020	26,357	5,589	-	-	-	31,946
01/05/2020-31/05/2020	26,006	5,229	-	-	-	31,235
Total	131,493	28,650				160,143

E.2. Calculation of project emissions or actual net removals

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Project emissions are calculated as follows:

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

Where:

PE_y	=	Project emissions in year y, (tCO_2e)
$PE_{CO2,fossilfuels,y}$	=	CO_2 emissions due to consumption of fossil fuels for the recovery, pre-treatment, transportation, and if applicable, compression of the recovered gas up to the point F in year y (tCO_2e)
$PE_{CO2,elec,y}$	=	CO_2 emissions due to the use of electricity for recovery, pre-treatment, transportation and if applicable, compression of the recovered gas up to the point F in year y (tCO_2e)

According to PDD section B.6.1, there is no direct consumption of fossil fuels as part of the Project activity therefore above equation can be simplified as:

$PE_y = PE_{CO2,y} = PE_{EC,y}$

$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,,y} \times (1+TDL_{j,y})$

Average technical transmission and distribution losses for providing electricity to source j in year y ($TDL_{j,y}$) is set at 0% as the project consumes electricity from an off-grid captive power plant, and $EF_{EL,j,y}$ is set at $1.3tCO_2/MWh$ as it is a project electricity consumption source, which is the conservative default value set in the tool.

$EC_{PJ,j,y}$ recorded by electricity meters						
Unit: MWh	CPF	WL	FW	JAL	SAT	Total
01/01/2020-31/01/2020	451.2	583.2	0	0	0	1034.4
01/02/2020-29/02/2020	536.8	569.6	0	0	0	1106.4
01/03/2020-31/03/2020	540.4	495.2	0	0	0	1035.6
01/04/2020-30/04/2020	481.2	547.6	0	0	0	1028.8
01/05/2020-31/05/2020	467.6	491.6	0	0	0	959.2

	$EC_{PJ,j,y}$	$EF_{EL,j,y}$	$TDL_{j,y}$	$PE_{EC,y}$
Year	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh)	Emission factor for electricity generation for source j in year y (tCO2/MWh)	Average technical transmission and distribution losses for providing electricity	Project emissions from electricity consumption (tCO2)
01/01/2020-31/01/2020	1,034.4	1.3	0%	1,345
01/02/2020-29/02/2020	1,106.4	1.3	0%	1,439
01/03/2020-31/03/2020	1,035.6	1.3	0%	1,347
01/04/2020-30/04/2020	1,028.8	1.3	0%	1,338
01/05/2020-31/05/2020	959.2	1.3	0%	1,247
Total	5,164.4	1.3	0%	6,716

E.3. Calculation of leakage emissions

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According to the registered PDD, there is no leakage emission considered, thus LEy = 0.

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals ($t CO_2e$)	Project GHG emissions or actual net GHG removals ($t CO_2e$)	Leakage GHG emissions ($t CO_2e$)	GHG emission reductions or net anthropogenic GHG removals ($t CO_2e$)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	160,143	6,716	0	0	153,427	153,427

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period ($t CO_2e$)	Amount estimated ex ante for this monitoring period in the PDD ($t CO_2e$)
153,427	170,373

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

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The crediting period was changed from 01/01/2013 - 31/12/2019 to 31/12/2013 - 30/12/2020 (Fixed). Since the PP chose 10-year fixed crediting period at the time of registration from 01/01/2013 to 31/12/2019, the registered PDD didn't include the information for the estimated ex ante emission reductions for year 2020.

As per stated in the registered PDD, according to manufacturer specifications, compressors lifetime should be of 15 years. The project activity was fully commissioned since 29/10/2010, according to the registered PDD, the expected operational lifetime of the project activity is 10 years, therefore, the project is expected to be operated till 28/10/2020. During this monitoring period, the project runs smoothly following the designing of the registered PDD.

According to the registered PDD and validation report, the projected gross gas gains (mmscfd) for the proposed CDM project at FW, WL, JL and SAT locations were calculated through multiplying the expected oil production (BOPD) by the Gas/Oil Ratio (GOR) of 0.002495 for Block 9, as confirmed in a statement from Occidental to DOE dated 23/12/2012 under name “statement gas and gains”. In the “statement gas and gains”, the oil production forecast didn’t include oil production forecast for year 2020 as it’s a statement for the clarifications for the information in PDD. However, as per the “statement gas and gains” stated: Article IX “Production capacity and allowance production” of the Petroleum Agreement, Occidental of Oman estimates annually the anticipated and feasible capacity of the contract area for the production of petroleum during the succeeding years.

As per the 2008 expected oil production statement provided by Occidental of Oman, which also included 2008 expected oil production for year 2020, the 2008 expected oil production statement for WL location is 1686.55 BOPD. Therefore, the gross gas gains expected at the investment decision in 2008 is calculated as: Gross gas gains (mmscfd) = 1686.55* 0.002495=4.2079;

As per described in the registered PDD and validation report, expected gross gains at CPF were estimated based on actual gas volumes flared prior to implementation of the proposed project and the maximum gas recovery capacity installed as part of the CDM project. It was expected at validation that overall oil production at CPF is expected to continue to increase during the lifetime of the proposed CDM project rather than decline. Below information referred at validation: “Oxy's expected gross production in Oman from existing projects is expected to grow to between 220,000 and 240,000 BOEPD by 2014 with additional potential from existing exploration projects.”[1].Therefore, 10.00mmscfd of gross gas gain was estimated for year 2009-2019.

Accordingly, 10.00mmscfd was estimated for year 2020 for CPF.

As per calculation of the ER spreadsheet following the same approach and input parameters in the PDD, ER spreadsheet for registration, and AM0009 and the applicable tools, the estimated emission reduction for year 2020 at the investment decision is 410,242 tons.

The monitoring period (01/01/2020-31/05/2020) is 152 days. Therefore, the amount estimated ex ante for this monitoring period is calculated as: 410,242*152/366=170,373 tons.

E.6. Remarks on increase in achieved emission reductions

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The actual ERs is less than estimation at the investment decision.

E.7. Remarks on scale of small-scale project activity

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Not applicable.

[1] http://www.rigzone.com/news/article.asp?a_id=93540&rss=true

Document information

Version	*Date*	*Description*
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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