

**RESPONSE FROM DOE BVCH TO THE
Request For Registration Incomplete for "Associated Gas Recovery and
Utilization at Block 9" - Ref No. 6817**

QUESTION 1:

The DOE is requested to state if the baseline methodology is correctly applied to calculate project/baseline emissions, leakage and emission reductions as per VVM v1.2 paragraph 92(d).

The DOE should provide a validation opinion on how paragraph 5 of AM0009, version 04, part III has been complied with, considering that it was not confirmed that the estimated emission reductions are based on estimates provided in the survey used for defining the terms of the underlying oil production project as per the production sharing contract.

RESPONSE TO QUESTION 1:

1.a DOE statement in VR rev02

It was stated in the Validation Report Revision 02 on page 27:

*“Based on the described means of validation the validation team confirms that:
... (d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, and emission reductions; the correctness was validated by reproducing the calculations on the excel sheet.” (end of quotation)*

1.b A validation opinion on how paragraph 5 of AM0009, version 04, part III has been complied with

As confirmed in a statement from the Ministry of Oil & Gas to DOE dated 23 November 2011 /33/, on-site operations at Block 9 fall under the (Suneinah Block) Petroleum Agreement /28/ which was signed on December 7, 1975 between the Government of the Sultanate of Oman and Quintana International, Ltd. and authorized by the Sultani Decree No. 51 of 1975 dated December 3, 1975. In the Petroleum Agreement, the term “Quintana International, Ltd.” includes its successors and assigns. Occidental of Oman, Inc. (“Occidental”) became sole operator of Block 9 effective June 8, 1983, after an assignment dated February 22, 1983, was approved by the Government pursuant to the Sultani Decree No. 37 of 1983.

Article IX “Production capacity and allowance production” of the Petroleum Agreement paragraph 9.2 states: “Within a reasonable time prior to the commencement of regular exports or any commercial sale, whichever shall occur first, and annually thereafter or at such other times as the Management Committee may decide, Quintana shall submit to the Management Committee its planning and estimates showing the anticipated and feasible capacity or range of capacities of the contract area for the production of petroleum during each of the succeeding years”.

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 23rd December 2012 hereby provided to DOE named “statement gas and gains” /46/. The 2008 expected oil production volumes at each location are summarized in the below table. Please refer to Occidental of Oman letter to DOE dated 02 December 2011 /32/ for related gas gains.

Table 1: 2008 Oil production forecast (in BOPD)

	FW	WL	JL	SAT
31-Dec-10	5052.57	11641.48	4633.77	9040.57
31-Dec-11	4642.27	12082.40	4144.06	8079.26
31-Dec-12	4588.05	12565.73	4807.50	6971.74
31-Dec-13	3959.62	11531.98	4877.03	5972.19
31-Dec-14	3307.87	9510.67	4014.31	5456.38
31-Dec-15	2549.34	7478.94	3198.29	4780.87
31-Dec-16	2180.20	6535.17	2443.38	4334.93
31-Dec-17	1435.43	4760.69	1891.01	3988.42
31-Dec-18	877.94	3451.66	1552.32	3772.82
31-Dec-19	795.77	2569.98	1317.78	3528.49

Expected gross gains at Central Production Facilities (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. The reason is that overall oil production at this location is expected to continue to increase during the lifetime of the proposed CDM project rather than decline, through the operationalization of new wells. Such information is publicly available:

“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.”

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

In conclusion, this confirms that projected gas gains at each location are based on estimates of the underlying oil production.

QUESTION 2:

The DOE is requested to include information on how it has validated the input values to the financial calculations as per VVM v 1.2 paragraph 114 (a).

In particular, 1) the capital expenditure considering the detailed information about similar CDM projects used to crosscheck the input value was not provided, and the DOE has not explained why the investment cost of projects from other countries are considered appropriate data used to crosscheck the project activity; 2) gas price considering it is not clear when the data source (gas purchase agreement) was available; 3) liquid price considering the DOE has not explained why the input value has been changed from 55 USD/barrel as listed in the GSC PDD to 45 USD/barrel in the final PDD; 4) the gas/liquid volume considering it is not clear how the estimated value was crosschecked.

RESPONSE TO QUESTION 2:

2.1 Capital expenditures

The value for total investment used in PDD is taken from the operator's internal Project Authorization Request and amounts to 86,066,460 USD. DOE was provided main actual

invoices related to the implementation of the proposed project activity. Actual invoices amount to 88,859,850 USD /47/, of which around 85% relates to equipment, 8% to construction and 8% to electrical works. Design phase related invoices are not provided which is conservative. Hence, the capital costs used in PDD's investment analysis are in line with actual costs.

2.2 Gas price

According to Article 5 of the Gas Purchase Agreement (GPA) effective April 29th 2003, which was made available to DOE /22/, the gas price is US\$ 0.85 per MMBTU (Gross Heating Value), escalated at 1.5% per annum, with the first escalation effective the first day of the 49th 'Contract Month'.

As per GPA Article 1, paragraph 1.1, 'Contract Month' starts from the 'First Gas Date'. The definition of 'First Gas Date' as per GPA Article 2, paragraph 2.2 is as follows: The date of first delivery of natural gas, but no later than January 1st 2004.

As evidenced by actual gas invoice dated December 1st 2012 and provided to DOE /48/, the current gas price is **0.91569 US\$ per MMBTU** (or 1056.70787941018 US\$ per MMSCF). It confirms that the 'First Gas Date' was January 1st 2004 and that first escalation occurred in 2008.

Such information was available at investment decision therefore the IRR and PDD have been revised accordingly. The updated value is conservative for the additionality assessment.

2.3 Liquid price

In line with VVM v.01.2 paragraph 111, the DOE conducted a thorough assessment of all parameters and assumptions used in financial calculations. As for the price applied in IRR for liquids, the following CAR 16 (e) was raised: *"Official oil price for budget purposed at investment decision 55 USD/barrel (for 2008). Official information was not provided to the DOE."*

Project participants responded through providing a copy of the Sultanate of Oman's **State General Budget for the Financial Year 2008 which uses 45\$/brl** as budgeted oil price /26/. The value is valid as the budget was published on 1st January 2008, while investment decision was taken April 1st 2008. The value is applicable because liquids recovered are 'Natural Gas Liquids' or 'condensate' and are swollen into the crude oil for sales therefore revenues from condensate are estimated at crude oil price. There is no LNG production.

2009 State Budget was made publicly available January 1st 2009 and was therefore unknown at the time of investment decision. Nevertheless, **budgeted oil price in the State General Budget for the Financial Year 2009 is also 45\$/brl**. A copy of the 2009 budget is hereby provided to DOE /49/.

Consequently, the price applied for liquids in IRR was revised to 45\$/brl because the 55\$/brl liquid price in the published PDD is neither valid nor applicable, even more than a year after the start of the proposed project activity. Moreover, if for conservativeness the value of 55USD/brl was to be applied in financial analysis, the IRR would be 10.81% and would not cross the 11.5% benchmark.

2.4 gas/liquid volume

2.4.1 Actual recovered gas volumes

Table below provides actual gas gains in 2012 due to implementation of the CDM project at CPF location. The values are in line with values projected in PDD. Evidence is provided to DOE; please see evidence “statement gas and gains” /46/.

Table 2: CPF actual gas gains

Month-Yr	Recovered Gas
	MMscfd
Jan-12	10.23
Feb-12	11.86
Mar-12	9.82
Apr-12	6.9
May-12	8.82
Jun-12	8.45
Jul-12	10.63
Aug-12	10.85
Sep-12	10.8
Oct-12	9.33
Nov-12	8.6
Dec-12	8.08

At other locations, existing metering equipment does not for the time being allow specific measurement of gas volumes recovered by the proposed CDM project. However, actual gas volumes can be calculated from actual oil production volumes at these locations using the Gas/Oil Ratio (GOR) of 0.002495 for Block 9. The following table provides a comparison of calculated actual gas gains and the projected values used for investment decision and in PDD:

Table 3: Actual /projected gross gas gains – FW, WL, JAL and SAT (MMSCFD)

		2010	2011	2012
Actual gas gains calculated based on oil production volumes	FW	2.55	6.26	10.07
	WL	27.62	33.87	37.50
	JAL	6.01	4.40	5.90
	SAT	0.00	0.00	0.44
	Total	46.18	54.53	63.92
2008 Projected gas gains (PDD values)	FW	10.21	13.58	16.65
	WL	18.45	24.35	28.35
	JAL	6.56	5.34	6.99
	SAT	8.16	9.36	4.19
	Total	53.37	62.63	66.19
difference		-7.19	-8.10	-2.27

The values used in PDD are on the high side compared to actual values, which is conservative for the assessment of additionality. Please see evidence “statement gas and gains” /46/.

2.4.2 Actual recovered NGL volumes

All natural gas volumes (associated and non-associated) produced and recovered from all wells within Block 9 are transported and treated at Safah gas plant for the purpose of meeting specifications of the national pipeline. All these volumes go through the same treatment process and generate condensate as by-product (also referred to as ‘Natural Gas Liquids’ or NGL). Thus, it is not technically feasible to specifically monitor the actual amount of NGL recovered that is directly attributable to the proposed CDM project.

Nevertheless, as explained in the ‘Liquid Gain From Flare Reduction Project’ report previously provided to DOE, NGL volumes are a direct function of gas volumes. As actual gas volumes are lower than projected volumes, subsequent actual NGL volumes are also lower since they strictly follow a similar trend compared projected NGL volumes. Hence, values for NGL volumes used in PDD are conservative in the assessment of additionality. Please see evidence “statement gas and gains” /46/.

QUESTION 3:

The DOE is requested to report how it has validated common practice analysis as per VVM v 1.2 paragraph 121. In doing so, the DOE shall provide a further validation opinion on how CAR14 (e) was considered closed.

RESPONSE TO QUESTION 3:

CAR 14 (e): “Please check information that the Oman Ministry of Oil and Gas had enacted laws to cut flaring of associated gas where it is economically viable, particularly within PDO's concession. Since the 1970's, PDO has invested an estimated US\$800 million in initiatives aimed at capturing gas for utilization in power stations in the interior, as well as a resource for power and water schemes:

<http://www.tbpetroleum.com.br/news/see/id/17141/titulo/Petroleum+Devt+Oman+Plans+to+Halve+Flared+Gas+Volume+in+Block+Six>”

Legal aspects

It was stated in the Validation Report rev.02 on page 20:

“The DOE confirms that all the realistic and credible alternative scenarios (G2, G6, P3, P4, and O1) outlined above are permitted by law or other (industrial agreements and standards. There are no laws or other regulations (e.g. environmental regulations) which implicitly restrict some of the alternatives.

This is evidenced in the report “Regulation of Associated Gas Flaring and Venting, A Global Overview and Lessons from International Experience” published by the Global Gas Flaring Reduction Public-Private Partnership of the World Bank /38/, which states that for the Sultanate of Oman: The operator may “lift, process, and market associated gas jointly with the national oil company, subject to a negotiated gas agreement” and “use associated gas in operations or reinject or flare gas, subject to relevant consents”. Besides, the report further explains that: “Permission to flare gas that cannot be marketed and that exceeds operational requirements is granted by the minister's written consent.” (end of quotation)

Hence, there is no Law that binds operators to cut flaring where economically viable. This can be evidenced in case of the proposed CDM project activity by the renewal of environmental permit (7th renewal) issued by the Ministry of Environment and Climate affairs on July 25th 2010 /40/. Legal aspects are discussed in PDD section B.4 step 2.

In the Validation Report rev.02, CAR 14 (e) was withdrawn due to information in <http://www.tbpetroleum.com.br/news/see/id/17141/titulo/Petroleum+Dev+Oman+Plans+to+Halve+Flared+Gas+Volume+in+Block+Six>

The referenced document states:

“Petroleum Development Oman (PDO) is planning to cut the volume of gas flared within its sprawling Block Six concession by half over the next five years. Oman Daily Observer quoted John Malcolm, Managing Director of PDO, as saying that the flaring reduction target is part of a wider strategy aimed at conserving natural gas as a resource for power generation, water desalination, industrialization, and other usages, while also promoting energy efficiency, reducing greenhouse gas emissions, and harnessing the potential of renewable energy sources.” (end of quotation).

Hence, the PDO plan to reduce gas flaring is not induced by any Omani legal requirement.

Associated gas at PDO concession

Due to expiry of version 05.2.1 of the “Tool for the demonstration and assessment of additionality”, the analysis of the extent to which the proposed project type has already diffused in the relevant sector and region (common practice test) has been revised in the latest PDD version 6.0, and discussed following the sub-steps described in paragraph 47 of the “Tool for the demonstration and assessment of additionality” version 06.1.0. Paragraph 47 is applicable as the greenhouse gas emission reduction activities as part of the proposed project fall within Measure type (a) “Fuel and feedstock switch” listed in paragraph 6 of the Tool. This was confirmed with UNFCCC CDM helpdesk /50/.

Hence, the applicable output range of the proposed CDM project activity has been calculated between 18.5 mmscfd and 55.52 mmscfd gas as per paragraph 47 Step 1. After that, during the identification of all plants that deliver the same output within the applicable range, it was found that the output of Block 6, which is PDO concession and the object of CAR 14 (e), is significantly over the applicable range, with 493mmscfd, according to official company press release available online² /51/.

Therefore in line with the “Tool for the demonstration and assessment of additionality” version 06.1.0, CAR 14(e) can be closed on the basis that the proposed CDM project activity is in compliance with mandatory legislation and regulations taking into account the enforcement in Oman, and that activities at PDO do not fall within the applicable common practice test output range of the proposed CDM project activity.

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http://pdointernet.pdo.co.om/Press%20Releases/_PressReleaseFile_PDO%20Announces%20Strong%202011%20Results%20in%20Production-%20Reserves-%20Safety%20and%20Omani%20National%20Employment20127287370.pdf

Category 2 Documents:

- /46/ Statement from onsite operator (Dec. 2012) regarding estimation of gas gains and actual volumes ("statement gas and gains")
- /47/ Project invoices (total 36 invoices provided)
- /48/ Oxy B9 Monthly Gas invoice, Nov. 2012
- /49/ Oman State General Budget 2009
- /50/ email communication with UN's CDM helpdesk
- /51/ Press release from Petroleum Development Oman