PERIODIC MONITORING REPORT

Version 00, 10th August 2010

Project Title

"Waste heat recovery from Process Gas Compressors (PGCs), Mumbai high south (offshore platform) and using the recovered heat to heat process heating oil."

UNFCCC Reference No. 0814

Date of Registration – 5-Feb-2007

Crediting Period – 05-Feb-2007 – 04 February 2017

PDD Referred – Version 02, dated 13-October-2006

Methodology Referred – AMS.II.D. Version 07, dated 28-November-2005

Current Monitoring Period – From 01-April-2009 to 30-June-2010 (Both days inclusive)

Project Location

Mumbai South Platform (MSP), Mumbai high, India.

Oil and Natural Gas Corporation (ONGC) Limited

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1.0 Project Description

The project activity recovers heat from the exhaust flue gases of two 'Process Gas Compressors' (PGC)[1], (used for compressing the associated gas in crude oil production activities), installed at ONGC's offshore Mumbai South platform (MSP). The MSP is a new platform and the waste heat recovery system is installed with the process gas compressor. This is the first platform in ONGC having process gas compressor with waste heat recovery unit. ONGC has installed waste heat recovery units (WHRU) at each of the PGC exhaust points, and the waste heat is used to heat process oil which is further used to heat various process streams in the crude oil production activities. The project activity has reduced the consumption of fossil fuels (natural gas), which would otherwise be used for heating of process oil for crude oil production activities.

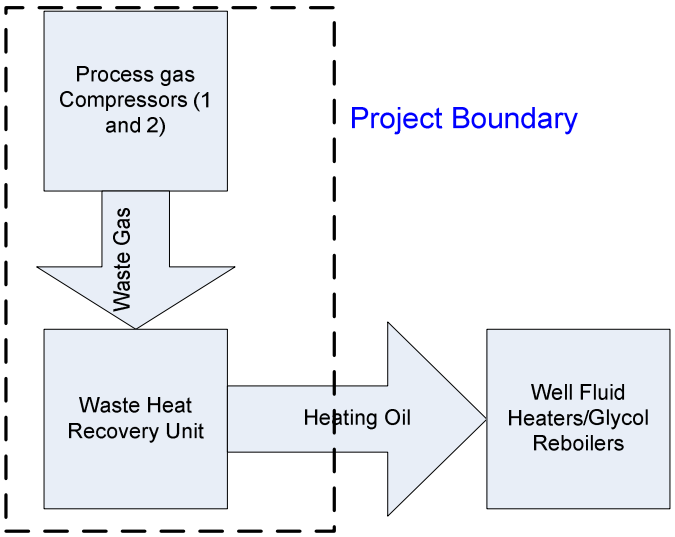
The WHRU is designed to extract heat from exhaust flue gases of process gas compressors and heat the well fluid and glycol reboiler in the glycol regeneration system. In the project activity the exhaust flue gases from PGC, which are at a very high temperature (approximate 450-500 deg C), is brought into contact with circulating process oil through a WHRU. The waste heat of exhaust flue gases of PGC is gained by the process oil, which is circulated from discharge of hot oil pump to the WHRU, through heat transfer. The hot process oil is circulated through two glycol re-boilers in the glycol regeneration system to heat glycol solution.

[1] http://cdm.unfccc.int/Projects/DB/DNV-CUK1166521170.66/view

2.0 Statement regarding the current status of the project activity

The Project has been completed as planned and as described in the Project Design Document (PDD).

The purpose of the project activity is to recover heat from the exhaust flue gases of two 'Process Gas Compressors' (PGC), (used for compressing the associated gas in crude oil production activities),installed at ONGC's offshore Mumbai South platform (MSP). After the project activity project proponent has not made any changes in the project boundary.



3.0 Monitoring Period Information

ONGC has installed waste heat recovery units (WHRU) at each of the PGC exhaust points, and the waste heat is being used to heat process oil which is further used to heat various process streams in the crude oil production activities. For the present monitoring report, the monitoring period shall encompass the period from 01.04.2009 to 30.06.2010. The CERs claimed in current monitoring period is 4854 tCO_2. The CERs claimed are in line with estimation made in registered PDD. In comparison to the registered PDD, the claimed CERs for the period are 27 % less.

4.0 Baseline emissions Calculations

$E_d = Q_{oil} \times S_{oil} \times (T_{oil,\,in} - T_{oil,\,out}) \times H$

E_d – Energy recovered by WHRU in a day d (GJ per day)

Q_{oil} - Flow rate of Heating Oil (Tonne/ Hour)

S_{oil} – Specific heat of Heating Oil (Kj/Kg/^{0}C)

$T_{oil,\,in}$ – Inlet temperature of Heating Oil (^{0}C)

$T_{oil,\,out}$ – Outlet temperature of Heating Oil (^{0}C)

H – Working hours per day (Hours)

$$Ey = \sum_{1}^{d} E_d$$

Ey – Energy recovered by WHRU in year y (GJ per year)

d – Working days per year (days)

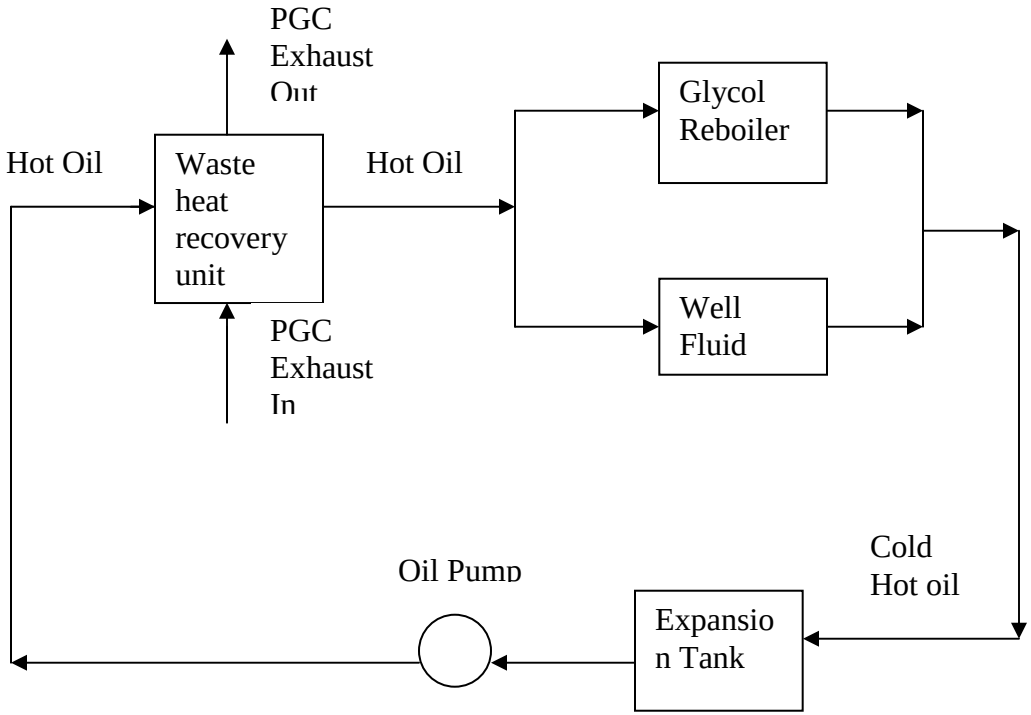
$$BEy = Ey \times EF_{NG}$$

BEy = Baseline emission for energy saved during year y

EF_{NG} – Emission Factor for Natural Gas (tCO2e/GJ) (Source: IPCC 1996)

5.0 Parameters being monitored according to Monitoring Plan

The waste heat recovery unit is designed to extract heat from the exhaust flue gases of process gas compressors and further used to heat well fluid and glycol re-boiler in the glycol regeneration system. The system includes hot process oil expansion tank, hot process oil circulation pumps, hot process oil filters, hot process oil dump coolers and well fluid heaters. The recirculation of hot process oil takes place from the discharge of the hot process oil pump to the waste heat recovery units for picking up the heat from the exhaust flue gases. The hot process oil after picking up heat in the WHRU is available at 230^0C. Hot process oil is then circulated through (a) two glycol re-boilers in the glycol regeneration system to heat the glycol solution and (b) well fluid heaters to heat the well fluid. The outlet hot process oil from the heaters and re-boilers is collected back in the header, which is connected to hot process oil expansion tank. The cold hot process oil from this expansion tank is in continuous recirculation. The flow diagram is shown below:



Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
1	Q_{oil} (Flowrate of heating oil)	Plant Data	Tonne/hr	M	Continuous	100%	Electronic/Paper	Monitored continuously and recorded daily Retention Period: Crediting period + 2 years Instrument used: online flowmeter
2	$T_{oil,in}$ (Inlet temp. of heating Oil)	Plant Data	^0C	M	Continuous	100%	Electronic/Paper	Monitored continuously and recorded daily Retention Period: Crediting period + 2 years Instrument used: Online temperature sensor based on thermocouple.
3	$T_{oil,out}$ (Outlet temp. of heating Oil)	Plant Data	^0C	M	Continuous	100%	Electronic/Paper	Monitored continuously and recorded daily Retention Period: Crediting period + 2 years Instrument used: Online temperature sensor based on thermocouple
4	H (Running Hours per day)	Plant Data	Hours	M	Continuous	100%	Electronic/Paper	Monitored continuously and recorded daily Retention Period: Crediting period + 2 years
5	D (working days per year)	Plant Data	Days	M	Continuous	100%	Electronic/Paper	Monitored continuously and recorded daily Retention Period: Crediting period + 2 years

Measures to ensure the Results / uncertainty analysis

Sl No	Parameters used to determine Baseline	Unit	Remark
1	Q_{oil} (Flow rate of heating oil)	Tonne/hr	Monitored continuously and recorded daily
2	T_{oil}, in (inlet temp. of heating Oil)	^{0}c	Monitored continuously and recorded daily
3	$T_{oil,out}$ (Outlet temp. of heating Oil)	^{0}c	Monitored continuously and recorded daily
4	H (Running Hours per day)	Hours	Monitored continuously and recorded daily
5	D (working days per year)	Days	Monitored continuously and recorded daily

Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1	*Low*	*ISO 9001 or similar management system will be used to retrieve data*
2	*Low*	*ISO 9001 or similar management system will be used to retrieve data*
3	*Low*	*ISO 9001 or similar management system will be used to retrieve data*
4	*Low*	*ISO 9001 or similar management system will be used to retrieve data*

5	*Low*	*ISO 9001 or similar management system will be used to retrieve data*

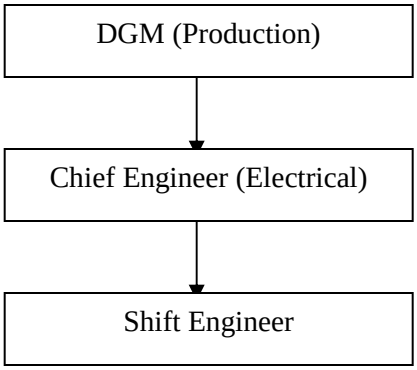
6.0 Details on Calibration of Monitoring Instruments

Sr No.	Item	Instrument Tag	Date of Calibration[2]
1.	Hot oil flow rate of WHRU – PGC A	FT – 54410	20/12/2008
			29/06/2009
			21/12/2009
			10/06/2010
2.	Hot oil flow rate of WHRU – PGC B	FT – 54420	20/12/2008
			29/06/2009
			21/12/2009
			10/06/2010
3.	Hot Oil outlet temperature PGC A	TT54413	24/12/2008
			27/10/2009
			21/12/2009
			09/06/2010
4.	Hot Oil outlet temperature PGC B	TT54423	24/12/2008
			27/10/2009
			21/12/2009
			10/06/2010

5.	Hot oil temperature inlet	TT54541	25/12/2008
			27/10/2009
			20/12/2009
			08/06/2010

7.0 Roles & Responsibilities

The operational and management structure that is monitoring the project activity is shown below:



Roles and Responsibilities:

1. DGM (Production):

· Has the overall responsibility of monitoring measurements and reporting.

· Internal audit and performance conformance review

· Reviewing of records and dealing with monitored data

2. Chief Engineer (Electrical):

· To assist DGM in record handling, record checks, and review

· To assist DGM in internal audits

· Check the data recorded by shift engineer

3. Shift Engineer:

· Collect and record appropriate data mentioned in the monitoring table as per the monitoring frequency.

Annex I

Train A (01st April 2009 – 31st December 2009)

	Energy Saved (MJ)	Emission Reduction (tCO_2)
Apr 2009	1941	109
May 2009	1715	96
Jun 2009	1999	112
Jul 2009	2234	125
Aug 2009	2238	126
Sep 2009	2765	155
Oct 2009	2350	132
Nov 2009	2649	149
Dec 2009	1851	104
Total	**19744**	**1108**

Train B (01st April 2009 – 31st December 2009)

	Energy Saved (MJ)	Emission Reduction (tCO_2)
Apr 2009	1969	110
May 2009	1590	89
Jun 2009	1963	110
Jul 2009	1942	109
Aug 2009	2236	125
Sep 2009	2780	156
Oct 2009	2735	153
Nov 2009	2629	148
Dec 2009	1877	105
Total	**19721**	**1106**

Train A (01st January 2010 – 30th June 2010)

	Energy Saved (MJ)	Emission Reduction (tCO_2)
Jan 2010	2271	127
Feb 2010	2894	162
Mar 2010	2519	141
Apr 2010	5129	288
May 2010	6040	339
Jun 2010	6585	369
Total	**25438**	**1427**

Train B (01st January 2010 – 30th June 2010)

	Energy Saved (MJ)	Emission Reduction (tCO_2)
Jan 2010	2117	119
Feb 2010	2822	158
Mar 2010	3129	176
Apr 2010	1812	102
May 2010	5540	311
Jun 2010	6197	348
Total	**21616**	**1213**

Emission Reductions

	Emission Reductions (tCO_2)	
	Train A	**Train B**
(01st April to 31st December) 2009	1108	1106
(1st January to 30th June) 2010	1427	1213
Total	**4854**	

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