APPENDIX VIII: GAS SAMPLE ANALYSIS

LABORATORY -VS- MUDLOGGING CO_2 MEASURMENTS

WELL NAME	METHANE LAB % MOL BY VOL (AMDEL)	CO_2 LAB % MOL BY VOL (AMDEL)	METHANE DRILLING OVER WAARRE SST (% METHANE) (GEOSERVICES)	CO_2 DRILLING (%) OVER WAARRE SST (GEOSERVICES)	CO_2 RFS CHAMBER (%) (GEOSERVICES)
McIntee 1	82.56	2.15	90 – 92	0.1193	1.33
Tregony 1	82.35	0.17	58 – 81	0.1029	0.19
Croft 1	86.24	2.38	85 – 90	0.2769	2.18
Lavers 1	81.74	0.47	82 – 90	0.0786	0.46
Naylor 1	82.8	1.0	93 – 97	0.0921	1.00
Buttress 1	13.04	84.47	94 – 95	4.69 – 6.60	5.00*

* Analysed approximately 18 hours after balloon filled.

CHANGES OF CO_2 CONCENTRATION WITH LAPSED TIME AFTER FILLING A BALLOON WITH 100% CO_2.

TIME LAPSED FROM FILLING BALLOON	MEASURED %
0 hours	100% CO_2
4 hours	66.5% CO_2
8 hours	32.3% CO_2
12 hours	10.4% CO_2
16 hours	0.96% CO_2

Discussion:

CO_2 levels detailed in the midstream are significantly lower than expected due to absorption of CO_2 into the drilling mud and dilution due to chemical reaction. The ability of CO_2 to pass through a balloon membrane over time must be accounted for when taking wellsite samples using this technique.

PETROLEUM SERVICES GAS ANALYSIS

Method GL-01-01 ASTM D 1945-96 (modified)

Client: SANTOS Ltd Report # LQ11280

Sample: BUTTRESS-1
Revees Lower Chamber

GAS	MOL %
Nitrogen	1.68
Carbon Dioxide	84.47
Methane	13.04
Ethane	0.51
Propane	0.17
I-Butane	0.03
N-Butane	0.04
I-Pentane	0.01
N-Pentane	0.01
Hexanes	0.02
Heptanes	0.01
Octanes and higher h'cs	0.01
Total	100.00

(0.00 = less than 0.01%)

The above results are calculated on an air and water free basis assuming only the measured constituents are present. These constants are derived from GPSA SI Engineering Data Handbook 1998. The following parameters are derived from ISO 6976 and are calculated from the above composition at 15°C and 101.325 kPa (abs).

Average Molecular Weight	40.06
Lower Flammability limit	33.74
Upper Flammability limit	106.20
Ratio of upper to lower	3.15
Wobbe Index	4.76
Compressibility Factor	0.9967
Ideal Gas Density (Rel to air = 1)	1.383
Real gas Density (Rel to air = 1)	1.387
Ideal Nett Calorific Value MJ/m3	5.05
Ideal Gross Calorific Value MJ/m3	5.60
Real Nett Calorific Value MJ/m3	5.07
Real Gross Calorific Value MJ/m3	5.62
Gross calorific value of water-saturated gas MJ/m3	5.47

This report relates specifically to the sample submitted for analysis.

Approved Signatory _____

Accreditation No. 2013
Date : 21-01-02

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PETROLEUM SERVICES GAS ANALYSIS

Method GL-01-01 ASTM D 1945-96 (modified)

Client: SANTOS Ltd Report # LQ11280

Sample: BUTTRESS-1
Revees Lower Chamber
Sample Taken at 5000 kPag

GAS	MOL %
Nitrogen	1.35
Carbon Dioxide	84.80
Methane	13.01
Ethane	0.50
Propane	0.16
I-Butane	0.03
N-Butane	0.04
I-Pentane	0.01
N-Pentane	0.01
Hexanes	0.02
Heptanes	0.01
Octanes and higher h'cs	0.06
Total	100.00

(0.00 = less than 0.01%)

The above results are calculated on an air and water free basis assuming only the measured constituents are present. These constants are derived from GPSA SI Engineering Data Handbook 1998. The following parameters are derived from ISO 6976 and are calculated from the above composition at 15°C and 101.325 kPa (abs).

Average Molecular Weight	40.16
Lower Flammability limit	33.12
Upper Flammability limit	105.64
Ratio of upper to lower	3.19
Wobbe Index	4.84
Compressibility Factor	0.9967
Ideal Gas Density (Rel to air = 1)	1.387
Real gas Density (Rel to air = 1)	1.391
Ideal Nett Calorific Value MJ/m^3	5.15
Ideal Gross Calorific Value MJ/m^3	5.70
Real Nett Calorific Value MJ/m^3	5.17
Real Gross Calorific Value MJ/m^3	5.72
Gross calorific value of water-saturated gas MJ/m^3	5.58

This report relates specifically to the sample submitted for analysis.

Approved Signatory

Accreditation No. 2013
Date : 22-01-02

PETROLEUM SERVICES GAS ANALYSIS

Method GL-01-01 ASTM D 1945-96 (modified)

Client: SANTOS Ltd Report # LQ11381

Sample: BUTTRESS-1
Cyl# EX 392

GAS	MOL %
Nitrogen	1.73
Carbon Dioxide	75.67
Methane	21.27
Ethane	0.84
Propane	0.27
I-Butane	0.05
N-Butane	0.06
I-Pentane	0.02
N-Pentane	0.01
Hexanes	0.03
Heptanes	0.03
Octanes and higher h'cs	0.02
Total	100.00

(0.00 = less than 0.01%)

The above results are calculated on an air and water free basis assuming only the measured constituents are present. These constants are derived from GPSA SI Engineering Data Handbook 1998. The following parameters are derived from ISO 6976 and are calculated from the above composition at 15°C and 101.325 kPa (abs).

Average Molecular Weight	37.73
Lower Flammability limit	20.64
Upper Flammability limit	65.03
Ratio of upper to lower	3.15
Wobbe Index	8.02
Compressibility Factor	0.9968
Ideal Gas Density (Rel to air = 1)	1.303
Real gas Density (Rel to air = 1)	1.307
Ideal Nett Calorific Value MJ/m3	8.27
Ideal Gross Calorific Value MJ/m3	9.16
Real Nett Calorific Value MJ/m3	8.29
Real Gross Calorific Value MJ/m3	9.19
Gross calorific value of water-saturated gas MJ/m3	8.97

This report relates specifically to the sample submitted for analysis.

Approved Signatory _____

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