SOUTH AUSTRALIA

DEPARTMENT OF MINES AND ENERGY

OPEN FILE ENVELOPE NO. 7283/2

PEL 5 AND PEL 6, MURTA BLOCK

EROMANGA AND COOPER BASINS

KOREE 1

TEST REPORTS

Submitted by

Santos Ltd

1990

ENVELOPE 7283/2

TENEMENT: PEL 5 and PEL 6, Murta Block; Eromanga and Cooper Basins

TENEMENT HOLDER: Santos Ltd (operator), Vamgas Ltd, Delhi Petroleum Pty Ltd and SAGASCO Resources Ltd

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DEPARTMENT OF MINES AND ENERGY - SOUTH AUSTRALIA
DEPARTMENTAL MEMORANDUM

18 April, 1991

TO : Director, Oil, Gas & Coal

FROM : Richard McDonough

SUBJECT : KOREE PATCHAWARRA FWS COMPOSITION

SR 27/4/7283/0

The full well stream composition of the Patchawarra formation reservoir fluid for Koree has been calculated by mathematical recombination of gas and liquid samples taken from Koree #1, DST #1, and is listed below :

Component	recombined stream (mol%)
N2	1.21
CO2	7.82
C1	64.82
C2	10.46
C3	6.76
i-C4	1.11
n-C4	2.40
i-C5	0.80
n-C5	1.04
C6	0.89
C7	1.24
C8+	1.45
total	100.00

It should be noted that, due to insufficient reserves, the well was plugged and abandoned.

This work has been done as part of the update for the 1991 Reserves Atlas.

Richard McDonough 18/4/91

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KOREE FWS COMPOSITION

FORMATION : Patchawarra

SOURCE : KOREE #1, DST #1 RECOMBINATION

CALCULATION DATE : 18 April, 1991

The full well stream composition of the Patchawarra formation reservoir fluid for Koree has been calculated by mathematical recombination of gas and liquid samples taken from Koree #1, DST #1, and is listed below :

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It should be noted that, due to insufficient reserves, the well was plugged and abandoned.

METHOD

The raw data is presented in the Appendix. This presents AMDEL analyses of HP separator gas, stock tank liquid, flash gas from stock tank liquid and the mathematically recombined HP separator liquid.

A plot of Log K vs $(Tc)^2$ for both the flash gas/flash liquid and HP gas/recombined liquid is also shown in the Appendix. Analysis of the HP gas/recombined liquid plot shows that there is a reasonable straight line fit to the data. It was decided that no adjustment to the data was required and the recombination should proceed normally.

The separator gas rate was reported to be 3.4 mmcfd. This was converted to a molar flow rate by multiplying by the ideal gas molar volume. The stock tank liquid rate was reported to be 160 bcpd. The molar flow rate was calculated by multiplying the volume rate by the density and dividing by the calculated stock tank liquid molecular weight.

In order to perform the recombination, the HP liquid rate must be calculated. This is done by calculating the relative proportions of stock tank liquid and gas produced from the HP liquid. The stock tank rate is then divided by the ratio of liquids produced to feed volume.

The HP liquid and gas samples are then recombined according to the ratio of the molar flow rates.

The workings for this calculation are attached.

Richard McDonough 18/4/91

KOREE #1 : DST #1
==========

RAW DATA :
==========

ideal gas molar volume		379.49	ft3/lb-mole
g/cc ---> lb/ft3		62.43	
separator gas rate	=	3.4	mmcfd
	=	8959.393	lb-mole/day
stock tank liquid rate	=	160	bcpd
	=	393.67	lb-moles/day

STOCK TANK FLUID ANALYSIS
==========

From the AMDEL report, the high pressure liquid yielded 381 cc of liquid and 20.0 litres of gas at 25.1 deg C.

moles of gas produced

P =	101.325	kPa	
R =	8.314		
V =	20	litres	
T =	25.1	deg C	298.1 Kelvin

n = P*V/(R*T)
= 0.817664 moles

moles of liquid produced
---

liquid volume	=	381	cc
measured liquid density @ 25.1 deg C	=	0.7135	g/cc
	=	44.54	
liquid mass	=	271.8435	grams
mole weight of liquid	=	101.67	
moles of liquid	=	2.673707	moles

molar ratio of gas and liquid to feed

for 100 moles of HP separator liquid

gas produced	=	23.42
liquid produced	=	76.58

calculate HP molar flow rates

stock tank liquid rate	=	393.67	lb-moles/day
HP liquid rate	=	514.06	lb-moles/day
HP gas rate	=	8959.39	lb-moles/day

recombination ratio

liquids ratio	=	0.054263
gas ratio	=	0.945737

MATHEMATICAL RECOMBINATION

	HP GAS	HP LIQ	K=Yi/Xi	recombined stream
N2	1.27	0.10	12.70	1.21
CO2	8.18	1.63	5.02	7.82
C1	68.21	5.74	11.88	64.82
C2	10.79	4.62	2.34	10.46
C3	6.67	8.28	0.81	6.76
i-C4	1.03	2.52	0.41	1.11
n-C4	2.11	7.50	0.28	2.40
i-C5	0.51	5.83	0.087	0.80
n-C5	0.56	9.45	0.059	1.04
C6	0.42	9.09	0.046	0.89
C7	0.19	19.61	0.010	1.24
C8+	0.06	25.63	0.002	1.45
total	100.00	100.00		100.00

MOLECULAR WEIGHT OF STOCK TANK LIQUID

	Xi	mol wt	Xi*MW
N2	0.00		0.00
CO2	0.00		0.00
C1	0.00		0.00
C2	0.20	30.07	0.06
C3	2.31	44.10	1.02
i-C4	2.36	58.12	1.37
n-C4	6.12	58.12	3.56
i-C5	6.69	72.15	4.83
n-C5	11.41	72.15	8.23
C6	11.32	86.18	9.76
C7	25.72	100.20	25.77
C8+	33.87	139.00	47.08
TOTAL	100.00		101.67

AMDEL CORE SERVICES

AMDEL CORE SERVICES GAS ANALYSIS

Method GL-01-01
ASTM D 1945-81 (modified)
Report # 009/354

Client: SANTOS Ltd.

Sample: KOREE 1, DST-1
Separator: 340 psi
Date: 10/5/90
Cylinder #EX242

GAS	MOL %
Nitrogen	1.27
Carbon Dioxide	8.18
Methane	68.21
Ethane	10.79
Propane	6.67
I-Butane	1.03
N-Butane	2.11
I-Pentane	0.51
N-Pentane	0.56
Hexanes	0.42
Heptanes	0.19
Octanes and higher h'c	0.06
Total	100.00

(0.00 = less than 0.01%)

Calculated Gas Density
(Air = 1) : 0.841

Calorific Value (15.0 deg C, 101.325 kPa)

Gross:	1230 BTU/CU Ft	45.81 MJ/CU.M
Nett:	1117 BTU/CU Ft	41.62 MJ/CU.M

Gross calorific value of water-saturated gas 45.01 MJ/CU.M
Average Molecular Weight = 24.304

All results are calculated on the basis that only the measured constituents are present. This report relates specifically to the sample tested; it also relates to the entire batch insofar as the sample is truly representative of the batch.

Approved Signatory B Tamke.

Date 16-Jun-90

AMDEL CORE SERVICES PTY LIMITED - Method GL-01-01

(ASTM D 1945-81, modified)

This method conforms to ASTM D 1945-81, "Analysis of Natural Gas by Gas Chromatography"; however, this standard is quite general and permits considerable scope in the configuration of equipment and processing of results.

Tests carried out by Amdel Limited in May and June 1987 indicate that the repeatability of our analyses conforms to that specified in the standard. This being the case, we maintain that our analyses will reach the reproducibility requirement also. These precision estimates are:

Component Level, (mol. %)	Repeatability	Reproducibility
0.01 to 1	0.03	0.06
1 to 5	0.05	0.10
5 to 25	0.15	0.20
Over 25	0.30	0.60
C_6 and heavier fractions*	5% of amount	10% of amount

* The standard assumes calculation of results into C_6 and $C_{7(+)}$ fractions.

The repeatability is the value below which, in 95% of cases, the difference between two single values obtained under the same conditions may be expected to lie. Reproducibility is defined similarly but refers to analyses carried out by, for example, different operators, different days or different laboratories.

For the sake of uniformity and client's convenience, we retain two decimal place reporting.

AMDEL CORE SERVICES

AMDEL CORE SERVICES
High Pressure Liquid Analysis - Method GL-02-03

Client: SANTOS Ltd. Report # 009/354

Sample: KOREE 1, DST-1
Separator: 340 psi
Date: 10/4/90, Cylinder #EX244

After compression to a pressure greater than that at which it was collected, the sample was flashed to atmosphere at 25°C.

The volume of each is then measured and the density of the oil determined. Both fractions are then analysed chromatographically. Mathematical recombination of the results gives an analysis of the sample as received.

The sample yielded 381 mls of liquid
and 20.0 litres of gas at 25.1 °C.

Flash Gas Analysis

Component Gas	Mol (%)
Nitrogen	0.43
Carbon Dioxide	6.70
Methane	23.64
Ethane	18.39
Propane	26.39
I-Butane	3.03
N-Butane	11.85
I-Pentane	3.19
N-Pentane	3.40
Hexanes	2.20
Heptanes	0.68
Octanes and Higher Hydrocarbons	0.10
Total	100.00
Calculated Gas Density (rel air =1)	1.393

Calorific Value (15.0 deg C, 101.325 kPa)

Gross:	2130.24 BTU/CU Ft	79.35 MJ/CU.M
Nett:	1956.87 BTU/CU Ft	72.89 MJ/CU.M
Gross calorific value of water-satura		77.99 MJ/CU.M

Average Molecular Weight = 40.126

This report relates specifically to the sample tested; it also relates to the batch insofar as the sample is representative of the batch.

Approved Signatory R Tamke.

Date 16-Jun-90

AMDEL CORE SERVICES
High Pressure Liquid Analysis -Method GL-02-03
Flash Liquid Analysis

NATA Certificate
Page 2 of 3

Report # 009/354

16-Jun-90

Client: SANTOS Ltd.

Sample: KOREE 1, DST-1
Separator: 340 psi
Date: 10/4/90, Cylinder #EX244

Boiling Point Range (Deg.C)	Component	Weight%	Mol%
-88.6	Ethane	0.06	0.20
-42.1	Propane	1.00	2.31
-11.7	I-Butane	1.35	2.36
-0.5	N-Butane	3.50	6.12
27.9	I-Pentane	4.75	6.69
36.1	N-Pentane	8.10	11.41
36.1-68.9	C-6	9.60	11.32
80.0	Benzene	0.00	0.00
68.9-98.3	C-7	16.76	17.00
100.9	Methylcyclohexane	8.21	8.50
110.6	Toluene	0.20	0.22
98.3-125.6	C-8	12.76	11.35
136.1-144.4	Ethylbenz+Xylenes	2.48	2.37
125.6-150.6	C-9	7.85	6.25
150.6-173.9	C-10	7.32	5.23
173.9-196.1	C-11	4.13	2.69
196.1-215.0	C-12	3.06	1.83
215.0-235.0	C-13	2.43	1.34
235.0-252.2	C-14	1.60	0.82
252.2-270.6	C-15	1.36	0.65
270.6-287.8	C-16	0.80	0.36
287.8-302.8	C-17	0.54	0.23
302.8-317.2	C-18	0.61	0.24
317.2-330.0	C-19	0.42	0.16
330.0-344.4	C-20	0.29	0.10
344.4-357.2	C-21	0.26	0.09
357.2-369.4	C-22	0.22	0.07
369.4-380.0	C-23	0.11	0.03
380.0-391.1	C-24	0.07	0.02
391.1-401.7	C-25	0.08	0.02
401.7-412.2	C-26	0.07	0.02
412.2-422.2	C-27	0.01	0.00
>422.2	C-28+	0.00	0.00
	Total	100.00	100.00

(0.00 = LESS THAN 0.01%)

The above boiling point ranges refer to the normal paraffin hydrocarbon boiling in that range. Aromatics, branched hydrocarbons, naphthenes and olefins may have higher or lower carbon numbers but are grouped and reported according to their boiling points.

Oil Parameters:

Specific Gravity	@	23.0 °C	0.7135	
Specific Gravity	@	15.6 °C	0.7208	
API Gravity			64.81	
Specific Gravity of C8+ fraction			0.8025	(calc)
Average molecular weight of C-8+ fraction			139	

AMDEL CORE SERVICES
High Pressure Liquid Analysis - Method GL-02-03
Calculated Composition of Total Sample as Received

NATA Certificate

Report # 009/354

16-Jun-90

Client: SANTOS Ltd.

Sample: KOREE 1, DST-1
Separator: 340 psi
Date: 10/4/90, Cylinder #EX244

Boiling Point Range (Deg.C)	Component	Weight%	Mol%
-195.8	Nitrogen	0.03	0.10
-78.5	Carbon Dioxide	0.83	1.63
-164	Methane	1.06	5.74
-88.6	Ethane	1.60	4.62
-42.1	Propane	4.21	8.28
-11.7	I-Butane	1.69	2.52
-0.5	N-Butane	5.04	7.50
27.9	I-Pentane	4.86	5.83
36.1	N-Pentane	7.87	9.45
36.1-68.9	C-6	9.05	9.09
80.0	Benzene	0.00	0.00
68.9-98.3	C-7	15.05	13.02
100.9	Methylcyclohexane	7.28	6.42
110.6	Toluene	0.18	0.17
98.3-125.6	C-8	11.35	8.61
136.1-144.4	Ethylbenz+Xylenes	2.20	1.79
125.6-150.6	C-9	6.96	4.70
150.6-173.9	C-10	6.49	3.95
173.9-196.1	C-11	3.66	2.06
196.1-215.0	C-12	2.71	1.38
215.0-235.0	C-13	2.16	1.01
235.0-252.2	C-14	1.42	0.62
252.2-270.6	C-15	1.21	0.49
270.6-287.8	C-16	0.71	0.27
287.8-302.8	C-17	0.48	0.17
302.8-317.2	C-18	0.54	0.18
317.2-330.0	C-19	0.37	0.12
330.0-344.4	C-20	0.26	0.08
344.4-357.2	C-21	0.23	0.07
357.2-369.4	C-22	0.20	0.05
369.4-380.0	C-23	0.10	0.03
380.0-391.1	C-24	0.06	0.02
391.1-401.7	C-25	0.07	0.02
401.7-412.2	C-26	0.06	0.01
412.2-422.2	C-27	0.01	0.00
>422.2	C-28+	0.00	0.00
	Total	100.00	100.00

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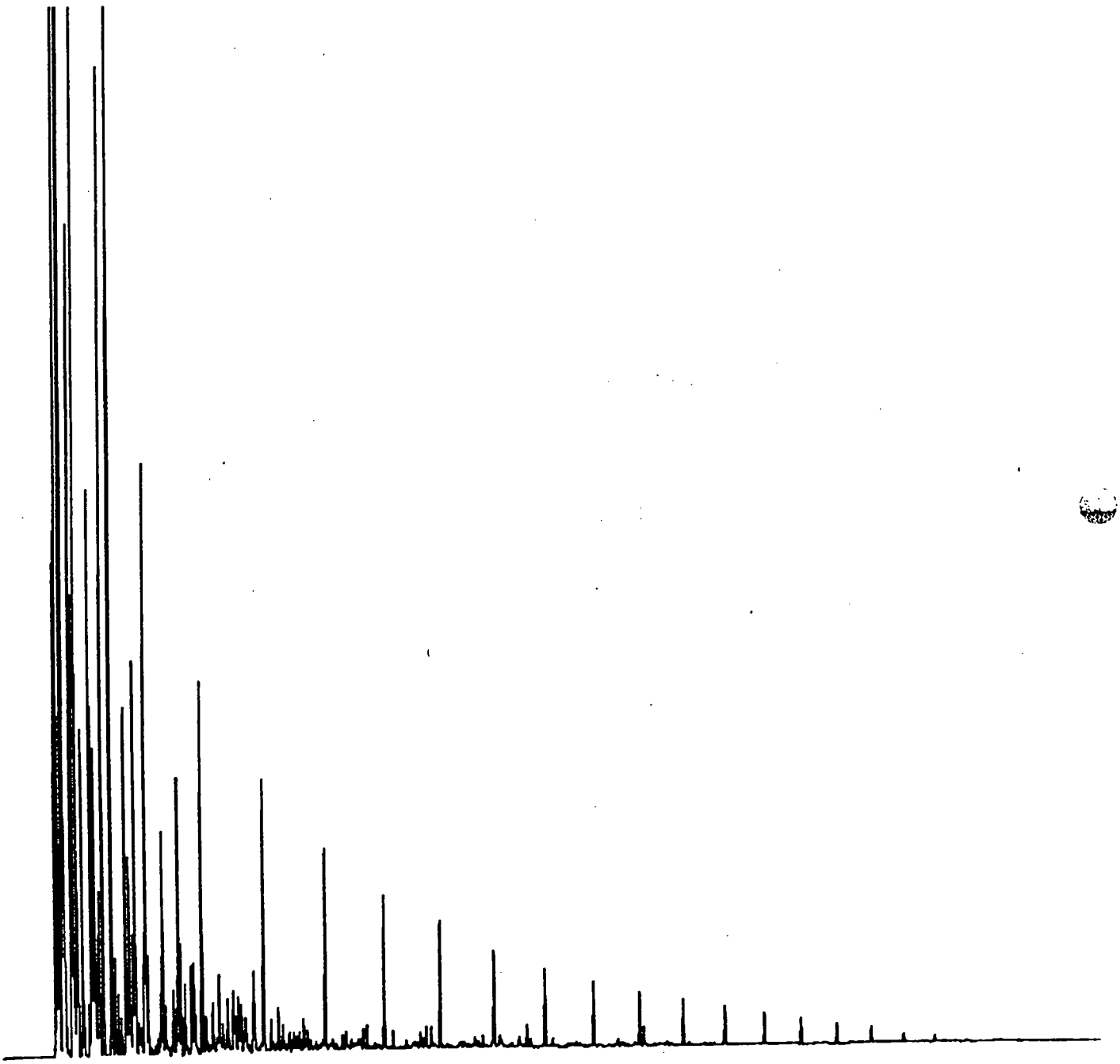
KOREE 1 DST 1 10/5/90 009/354



KOREE 1, DST-1-4
Separator: 340 psi
Date: 10/4/90

***** Flash Gas Flash Liquid
ooooo HP Gas Recombined Liquid