

DEPT. NAT. RES & ENV

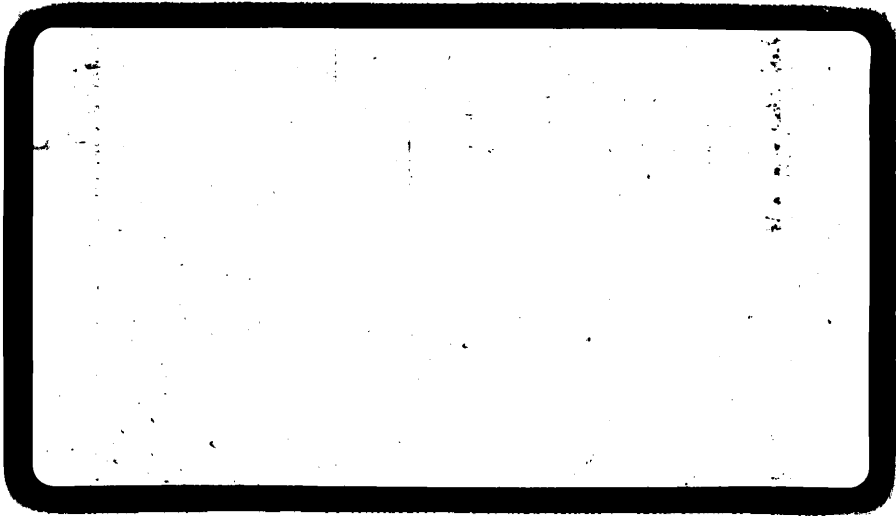


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HYDROCARBON REPORTS.
GIPPSLAND BASIN.

BREAM - 4A
BRELAB.

H/c Box



RESERVOIR FLUID ANALYSIS



OIL and GAS DIVISION

PARTIAL RESERVOIR FLUID STUDY ¹ A SEP 1982
for
ESSO AUSTRALIA LTD
AUSTRALIA
BREAM 4A

SEE ESSO LETTER 14-9-1982 ON BREAM-4A
CORRESPONDENCE FILE

Reservoir Fluid Division



CORE LABORATORIES

Reservoir Fluid Division



M/S ESSO AUSTRALIA LTD
P O Box 372
Sale 3850
AUSTRALIA

August 6, 1982

ATTENTION: MR A K KHURANA

SUBJECT: PARTIAL RESERVOIR
FLUID STUDY
BREAM 4A
AUSTRALIA
SFL 82108

Gentlemen

Subsurface oil sample was collected from the subject well and this sample was submitted to our laboratory for use in a partial reservoir fluid study. Presented in the following report are the results of this study as requested by M/s Esso Australia.

As a quality check, the room temperature bubble point pressure of the sample was initially determined. At 70°F, the subsurface sample in cylinder 1053/81 was found to have a bubble point pressure of 1712 psig. The results of the preliminary quality checks are reported on page two of the report.

The hydrocarbon composition of the subsurface fluid was determined through heptanes plus utilizing low temperature fractional distillation along with routine chromatography. The results of this distillation in term of both mol percent and weight percent are presented on page three.

A known quantity of the reservoir fluid was charged to a high pressure visual cell and thermally expanded to the reported reservoir temperature of 181°F. During a constant composition expansion at this temperature, the fluid was found to have a bubble point pressure of 2242 psig. The volumetric data and the pressure-volume measurements of the fluid can be found on page four and five respectively.

At this stage of the study, the compositional analysis and the bubble point pressure of the subsurface fluid at the reservoir temperature were telexed to the client. A representative of M/s Esso Australia, on assessing the reported data decided that the subsurface oil sample was not representative of the reservoir oil and hence we were instructed to perform only a viscosity test at reservoir temperature.

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Page 2

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The viscosity of the subsurface sample was measured over a wide range of pressures at 181°F in a rolling ball viscosimeter. The viscosity of the sample was found to vary from a minimum of 0.280 centipoise at the bubble point pressure to a maximum of 0.788 centipoise at atmospheric pressure. The results of the viscosity measurements are tabulated on page five and shown in graphic form on page six.

Thank you for the opportunity to be of service. Please do not hesitate to contact us should you require further information.

Very truly yours

A handwritten signature in cursive script, appearing to read "John Savickas".

JOHN SAVICKAS
Manager
Singapore Reservoir Fluid Laboratory

encl: 7 copies

JS/pv/mh

Company ESSO AUSTRALIA LTD Date Sampled _____
Well BREAM 4A State _____
Field _____ Country AUSTRALIA

FORMATION CHARACTERISTICS

Formation Name _____
Date First Well Completed _____ 19____
Original Reservoir Pressure _____ PSIG @ _____ FT
Original Produced Gas-Oil Ratio _____ SCF/Bbl
Production Ratio _____ Bbl/Day
Separator Pressure and Temperature _____ PSIG _____ °F
Oil Gravity at 60°F _____ °API
Datum _____ Ft Subsea
Original Gas Cap _____

WELL CHARACTERISTICS

Elevation 2/m FT
Total Depth _____ FT
Producing Interval _____ FT
Tubing Size and Depth _____ In to _____ Ft
Productivity Index _____ Bbl/D/Psi @ _____ Bbl/Day
Last Reservoir Pressure 2746 PSIG @ 6379.6 FT
Date _____ 19____
Reservoir Temperature 181 °F _____ FT
Status of Well _____
Pressure Gauge _____
Normal Production Rate _____ Bbl/Day
Gas-Oil Ratio _____ SCF/Bbl
Separator Pressure and Temperature _____ PSIG _____ °F
Base Pressure _____ PSIA
Well Making Water _____ % Cut

SAMPLING CONDITIONS

Sampled at _____ 6379.6 _____ FT
Status of Well _____
Gas-Oil Ratio _____ SCF/Bbl
Separator Pressure and Temperature _____ PSIG _____ °F
Tubing Pressure _____ PSIG
Casing Pressure _____ PSIG
Sampled by _____
Type Sample _____

REMARKS:

SUMMARY OF SAMPLE RECEIVED IN LABORATORY

Bottom hole oil sample contained in cylinder 1053/81

Opening pressure of oil cylinder : 1190 psig at 70°F

Water recovered : 0 cc

Bubble point : 1712 psig at 70°F

Approximate sample volume : 608 ccs

HYDROCARBON ANALYSIS OF RESERVOIR FLUID SAMPLE

<u>Component</u>	<u>Mol Percent</u>	<u>Weight Percent</u>
Hydrogen Sulfide	0.00	0.00
Carbon Dioxide	1.12	0.64
Nitrogen	0.12	0.04
Methane	36.56	7.60
Ethane	7.22	2.81
Propane	6.57	3.75
Iso-Butane	1.95	1.47
N-Butane	3.89	2.93
Iso-Pentane	1.74	1.63
N-Pentane	2.18	2.04
Hexanes	0.91	1.02
Heptanes plus	37.74	76.07
	<hr/>	<hr/>
	100.00	100.00

Properties of Heptanes plus

API gravity at 60°F	<u>43.6</u>
Density, Gm/Cc at 60°F	<u>0.8075</u>
Molecular weight	<u>156</u>

VOLUMETRIC DATA OF RESERVOIR FLUID SAMPLE

- 1 Saturation pressure (bubble-point pressure) 2242 PSIG @ 181 °F
- 2 Specific volume of saturation pressure: ft³/lb 0.02562 @ 181 °F
- 3 Thermal expansion of saturated oil @ 5000 PSIG = $\frac{V@ 181 \text{ }^\circ\text{F}}{V@ 75 \text{ }^\circ\text{F}}$ = 1.07124
- 4 Compressibility of saturated oil @ reservoir temperature: Vol/Vol/PSI:

From 5000 PSIG to 4000 PSIG = 13.56 X 10

From 4000 PSIG to 3000 PSIG = 15.99 X 10

From 3000 PSIG to 2242 PSIG = 18.75 X 10

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PRESSURE-VOLUME RELATIONS AT 181°F

Pressure PSIG	Relative Volume (1)	Y Function (2)
5000	0.9569	
4000	0.9700	
3000	0.9858	
2600	0.9930	
2500	0.9950	
2400	0.9969	
2300	0.9988	
2242	Bubble Point Pressure	1.0000
2195		1.0106
2154		1.0204
2077		1.0401
1975	1.0696	1.931
1856	1.1091	1.891
1708	1.1683	1.841
1549	1.2475	1.790
1395	1.3465	1.734
1250	1.4655	1.684
1104	1.6244	1.630
960	1.8329	1.579
777	2.2279	1.506
609	2.8248	1.434
450	3.8171	1.368

(1) Relative Volume : V/Vsat is barrels at indicated pressure per barrel at saturation pressure.

(2) Y Function =
$$\frac{(P_{sat}-P)}{(P_{abs})(V/V_{sat}-1)}$$

VISCOSITY DATA AT 181°F

<u>Pressure</u> <u>PSIG</u>		<u>Oil Viscosity</u> <u>Centipoise</u>
5000		0.334
4000		0.315
3000		0.295
2600		0.287
2400		0.284
<u>2242</u>	Bubble Point Pressure	0.280
2000		0.298
1700		0.324
1400		0.351
1100		0.380
800		0.414
500		0.458
200		0.522
0		0.788

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VISCOSITY OF RESERVOIR FLUID AT 181°F

Company ESSO AUSTRALIA LTD Formation _____
Well BREAM 4A State _____
Field _____ Country AUSTRALIA

