

A. C. N. # 008 130 667  
A. B. N. 22 170 907 251

**February 6, 2004**  
**PO Box 410**  
**Magill,**  
**SA 5072**

**Santos Limited**  
**GPO Box 2319**  
**Adelaide**  
**SA 5000**

**Subject: Partial PVT study**  
**Well: Casino # 3**  
**File: S-23038**

**Attention: Mr. Mike Lahiff**

**Dear Sir,**

Three MDT bottom hole and three sets of separator samples from the above well were received by Petrolab in November 2003. The contents of these containers were transferred into Petrolab cylinders and used for partial PVT analyses of which we are presenting the results in the following report.

We thank Santos Limited for the opportunity to be of service. Please do not hesitate in contacting us should you require any further information or if we can assist you in any other way.

Yours Sincerely,

Jan G. Bon  
Manager



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## BOTTOM HOLE SAMPLES

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Company : Santos Limited  
Well : Casino # 3

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### FIELD CHARACTERISTICS :

Field Name	:	Casino
Formation Name	:	Waarre C
Date first well completed	:	n/a
Original reservoir pressure (psig)	:	2857
@ datum	:	2017.4 mRT (Lgr)
Liquid gravity (°API @ 60 °F)	:	

### WELL CHARACTERISTICS:

Depth datum	:	2017.4	mRT (Lgr)
Kelly Bushing	:	22.4	m (above MSL)
Total depth	:	2122	mRT (Lgr)
Perforated interval	:	2002-2011	mRT (Lgr)
Tubing size (inch)	:	n/a	
Tubing shoe	:	n/a	
Reservoir temperature (°F)	:	190	
Last reservoir pressure (psig)	:	2857	mRT (Lgr)
@ datum	:	2017.4	
date	:	October 31 2003	
Status of well	:	P&A	

### SAMPLING CONDITIONS

Gas cylinders No.	:	5072A	A2106	1657A	A2633
Liquid cylinders No.	:	7597 - MA	6808 - MA		7276 - MA
Date sampled	:	Nov. 8 2003	Nov. 9 2003	Nov. 9 2003	Nov. 9 2003
Time sampled	:	15:10 hrs	03:35 hrs	09:32 hrs	15:15 hrs
Depth sampled (mMDBRT)	:	2004-2013	2004-2013	2004-2013	2004-2013
Choke size (inch)	:	64/64	36/64		64/64
Bottom hole pressure (psig)	:	2707	2815		2714
Bottom hole temperature (°C)	:	91	93		92
Tubing head pressure (psig)	:	1821	2367		1848
Tubing head temperature (°C)	:	46	38		51
Separator pressure (psig)	:	694	376		558
Separator temperature (°C)	:	31	31		23
Liquid rate (STB/day)	:	N/A	N/A		N/A
Water cut (%)	:	--	--		--
Gas rate (MMscf/d)	:	44.96	19.56		44.5
Field Gas Compressibility	:	0.908	0.950	0.908	0.919
Field Compressibility factor (Fpv)	:	1.0495	1.0261	1.0495	1.0432
Field Gas Gravity (air =1)	:	0.608	0.604	0.608	0.608
Field Gas Gravity factor	:	1.2825	1.2867	1.2825	1.2825
Produced field GOR (SCF/STB)	:	> 1,000,000	> 1,000,000	> 1,000,000	> 1,000,000
Lab Compressibility	:	0.915	0.953	0.953	0.923
Lab Compressibility factor (Fpv)	:	1.0454	1.0244	1.0244	1.0409
Lab Gas gravity	:	0.592	0.595	0.595	0.595
Lab Gas gravity factor (Fg)	:	1.2997	1.2964	1.2964	1.2964
Corrected GOR (SCF/STB)	:	> 1,000,000	> 1,000,000	> 1,000,000	> 1,000,000
Sampled By	:	Schlumberger	Schlumberger	Schlumberger	Schlumberger



### TRANSFER DETAILS

#### BOTTOM HOLE SAMPLES

Sample Identification	Sampled In	Sampling Depth	Opening Press @ Temperature	Transferred to Petrolab Cyl. #	Sample Volume (cc)
MRMS Pos 1	MPSR - 503	2006.8	4500 psig @ 23°C	L - 022	450
MRMS Pos 2	MPSR - 500	1985.2	4200 psig @ 24°C	L - 207	450
MRMS Pos 4	MPSR - 313	2006.8	3500 psig @ 22°C	L - 357	450

### TRANSFER DETAILS

#### SEPARATOR LIQUID SAMPLES

Sample Number	Sampled In	Sampling Press & Temperature	Matched with Sample Nos.	Transferred to Petrolab Cyl. #	Sample Volume (cc)
1.04	7597 - MA	694 psig @ 31°C	5072A	L - 510	450
1.06	6808 - MA	376 psig @ 31°C	A2106	L - 209	450
1.13	7276 - MA	558 psig @ 23°C	A2633	L - 014	555

### TRANSFER DETAILS

#### SEPARATOR GAS SAMPLES

Sample Number	Sampled In	Sampling Press & Temperature	Matched with Sample Nos.	Transferred to Petrolab Cyl. #	Sample Volume (cc)
1.05	5072A	694 psig @ 31°C	7597 - MA	PA - 3441	20,000
1.07	A2106	376 psig @ 31°C	6808 - MA	EE - 7982	20,000
1.09	1657A	--	--	EE - 8592	20,000
1.14	A2633	558 psig @ 23°C	7276 - MA	PA - 3424	20,000



Compositional Analysis of MDT 503 (position # 1) Bottom Hole Gas Reservoir Fluid in Cylinder # L-022

Component	Stock Tank		Stock Tank		Reservoir	
	Liquid	Gas	Liquid	Gas	Liquid	Gas
	Mol %	Mol %	Mol %	Mol %	Mol %	Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00	0.00	0.00
Carbon Dioxide	CO2	0.01	0.74	0.74	0.74	0.74
Nitrogen	N2	0.00	2.18	2.18	2.18	2.18
Methane	C1	0.57	94.57	94.50	94.50	94.50
Ethane	C2	0.07	1.80	1.80	1.80	1.80
Propane	C3	0.06	0.44	0.44	0.44	0.44
Iso-Butane	iC4	0.03	0.07	0.07	0.07	0.07
N-Butane	nC4	0.04	0.07	0.07	0.07	0.07
Iso-Pentane	iC5	0.03	0.02	0.02	0.02	0.02
N-Pentane	nC5	0.04	0.02	0.02	0.02	0.02
Hexanes	C6	2.81	0.02	0.02	0.02	0.02
Heptanes	C7	11.40	0.05	0.06	0.06	0.06
Octanes	C8	8.23	0.02	0.03	0.03	0.03
Nonanes	C9	11.96	0.00	0.01	0.01	0.01
Decanes	C10	14.19	0.00	0.01	0.01	0.01
Undecanes	C11	12.03	0.00	0.01	0.01	0.01
Dodecanes	C12	10.95	0.00	0.01	0.01	0.01
Tridecanes	C13	8.31	0.00	0.01	0.01	0.01
Tetradecanes	C14	5.93	0.00	0.00	0.00	0.00
Pentadecanes	C15	5.28	0.00	0.00	0.00	0.00
Hexadecanes	C16	2.61	0.00	0.00	0.00	0.00
Heptadecanes	C17	2.33	0.00	0.00	0.00	0.00
Octadecanes	C18	1.25	0.00	0.00	0.00	0.00
Nonadecanes	C19	0.76	0.00	0.00	0.00	0.00
Eicosanes Plus	C20+	1.12	0.00	0.00	0.00	0.00
<b>TOTAL</b>		100.00	100.00	100.00	100.00	100.00
<b>Ratios</b>						
Molar Ratio	:	0.0007	0.9993	1.0000	1.0000	1.0000
Mass Ratio	:	0.0061	0.9939	1.0000	1.0000	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	--	-- @ PT*	-- @ PT*
Gas Liquid Ratio	:	1.0000 bbl @ SC	> 1000000 SCF	--	--	--
<b>Stream Properties</b>						
Molecular Weight	:	147.6	17.04	17.1	17.1	17.1
Density obs. (gm/cc)	:	0.7902 @ 60 °F	--	--	-- @ PT*	-- @ PT*
Gravity (AIR = 1.000)	:	47.4 °API @ 60 °F	0.589	--	-- °API	-- °API
GHV (BTU/scf)	:	--	1014	--	--	--
<b>Hexanes Plus Properties</b>						
Mol %	:	99.15	0.09	0.16	0.16	0.16
Molecular Weight	:	148.64	95.78	119.38	119.38	119.38
Density (gm/cc @ 60 °F)	:	0.7914	0.6834	0.7387	0.7387	0.7387
Gravity (°API @ 60 °F)	:	47.13	75.35	59.86	59.86	59.86
<b>Heptanes Plus Properties</b>						
Mol %	:	96.34	0.07	0.14	0.14	0.14
Molecular Weight	:	150.53	99.14	124.58	124.58	124.58
Density (gm/cc @ 60 °F)	:	0.7934	0.6880	0.7474	0.7474	0.7474
Gravity (°API @ 60 °F)	:	46.68	73.98	57.65	57.65	57.65
<b>Dodecanes Plus Properties</b>						
Mol %	:	38.53	0.00	0.02	0.02	0.02
Molecular Weight	:	192.31	--	192.31	192.31	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232	0.8232	0.8232
Gravity (°API @ 60 °F)	:	40.22	--	40.22	40.22	40.22
<b>Eicosanes Plus Properties</b>						
Mol %	:	1.12	0.00	0.00	0.00	0.00
Molecular Weight	:	299.14	--	299.14	299.14	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707	0.8707	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86	30.86	30.86

\* (P)ressure : 2845 psig \* (T)emperature : 203 °F



Compositional Analysis of MDT 500 (position # 2) Bottom Hole Gas Reservoir Fluid in Cylinder # L-207

Component	Stock Tank	Stock Tank	Reservoir
	Liquid Mol %	Gas Mol %	Fluid Mol %
Hydrogen Sulphide	H2S	0.00	0.00
Carbon Dioxide	CO2	0.01	0.73
Nitrogen	N2	0.00	2.09
Methane	C1	0.57	94.58
Ethane	C2	0.07	1.74
Propane	C3	0.07	0.47
Iso-Butane	iC4	0.04	0.10
N-Butane	nC4	0.05	0.10
Iso-Pentane	iC5	0.04	0.03
N-Pentane	nC5	0.04	0.02
Hexanes	C6	2.81	0.04
Heptanes	C7	11.39	0.06
Octanes	C8	8.23	0.02
Nonanes	C9	11.96	0.01
Decanes	C10	14.18	0.01
Undecanes	C11	12.03	0.00
Dodecanes	C12	10.95	0.00
Tridecanes	C13	8.31	0.00
Tetradecanes	C14	5.92	0.00
Pentadecanes	C15	5.28	0.00
Hexadecanes	C16	2.61	0.00
Heptadecanes	C17	2.32	0.00
Octadecanes	C18	1.25	0.00
Nonadecanes	C19	0.76	0.00
Eicosanes Plus	C20+	1.12	0.00
TOTAL		100.00	100.00

**Ratios**

Molar Ratio	:	0.0007	0.9993	1.0000
Mass Ratio	:	0.0061	0.9939	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	-- @ PT*
Gas Liquid Ratio	:	1.0000 bbl @ SC	> 1000000 SCF	--

**Stream Properties**

Molecular Weight	:	147.6	17.10	17.2
Density obs. (gm/cc)	:	0.7902 @ 60 °F	--	-- @ PT*
Gravity (AIR = 1.000)	:	47.4 °API @ 60 °F	0.592	-- °API
GHV (BTU/scf)	:	--	1019	--

**Hexanes Plus Properties**

Mol %	:	99.11	0.14	0.21
Molecular Weight	:	148.64	98.64	115.64
Density (gm/cc @ 60 °F)	:	0.7914	0.6873	0.7287
Gravity (°API @ 60 °F)	:	47.13	74.18	62.50

**Heptanes Plus Properties**

Mol %	:	96.30	0.10	0.17
Molecular Weight	:	150.53	104.50	123.23
Density (gm/cc @ 60 °F)	:	0.7934	0.6949	0.7406
Gravity (°API @ 60 °F)	:	46.68	71.92	59.38

**Dodecanes Plus Properties**

Mol %	:	38.52	0.00	0.02
Molecular Weight	:	192.31	--	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232
Gravity (°API @ 60 °F)	:	40.22	--	40.22

**Eicosanes Plus Properties**

Mol %	:	1.12	0.00	0.00
Molecular Weight	:	299.14	--	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86

\* (P)ressure : 2845 psig \* (T)emperature : 203 °F



Compositional Analysis of MDT 313 (position # 4) Bottom Hole Gas Reservoir Fluid in Cylinder # L-357

Component	Stock Tank		Reservoir
	Liquid Mol %	Gas Mol %	Fluid Mol %
Hydrogen Sulphide	H2S	0.00	0.00
Carbon Dioxide	CO2	0.01	0.76
Nitrogen	N2	0.00	2.06
Methane	C1	0.57	94.50
Ethane	C2	0.07	1.76
Propane	C3	0.06	0.44
Iso-Butane	iC4	0.03	0.09
N-Butane	nC4	0.05	0.10
Iso-Pentane	iC5	0.04	0.03
N-Pentane	nC5	0.04	0.02
Hexanes	C6	2.81	0.04
Heptanes	C7	11.39	0.07
Octanes	C8	8.23	0.05
Nonanes	C9	11.96	0.03
Decanes	C10	14.18	0.02
Undecanes	C11	12.03	0.01
Dodecanes	C12	10.95	0.01
Tridecanes	C13	8.31	0.01
Tetradecanes	C14	5.92	0.00
Pentadecanes	C15	5.28	0.00
Hexadecanes	C16	2.61	0.00
Heptadecanes	C17	2.32	0.00
Octadecanes	C18	1.25	0.00
Nonadecanes	C19	0.76	0.00
Eicosanes Plus	C20+	1.12	0.00
TOTAL		100.00	100.00

**Ratios**

Molar Ratio	:	0.0007	0.9993	1.0000
Mass Ratio	:	0.0061	0.9939	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	-- @ PT*
Gas Liquid Ratio	:	1.0000 bbl @ SC	> 1000000 SCF	--

**Stream Properties**

Molecular Weight	:	147.6	17.10	17.2
Density obs. (gm/cc)	:	0.7902 @ 60 °F	--	-- @ PT*
Gravity (AIR = 1.000)	:	47.4 °API @ 60 °F	0.592	-- °API
GHV (BTU/scf)	:	--	1019	--

**Hexanes Plus Properties**

Mol %	:	99.12	0.18	0.24
Molecular Weight	:	148.64	110.61	126.58
Density (gm/cc @ 60 °F)	:	0.7914	0.7024	0.7308
Gravity (°API @ 60 °F)	:	47.13	69.75	61.94

**Heptanes Plus Properties**

Mol %	:	96.30	0.14	0.20
Molecular Weight	:	150.53	118.21	128.84
Density (gm/cc @ 60 °F)	:	0.7934	0.7112	0.7407
Gravity (°API @ 60 °F)	:	46.68	67.26	59.35

**Dodecanes Plus Properties**

Mol %	:	38.52	0.01	0.02
Molecular Weight	:	192.31	275.00	183.95
Density (gm/cc @ 60 °F)	:	0.8232	0.8228	0.8054
Gravity (°API @ 60 °F)	:	40.22	40.30	44.02

**Eicosanes Plus Properties**

Mol %	:	1.12	0.01	0.00
Molecular Weight	:	299.14	--	276.78
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8265
Gravity (°API @ 60 °F)	:	30.86	--	39.55

\* (P)ressure : 2845 psig \* (T)emperature : 203 °F



### Surface Samples Validity Check

**Saturation Pressure : 80 @ 71 °F**

Surface Samples Set # 1

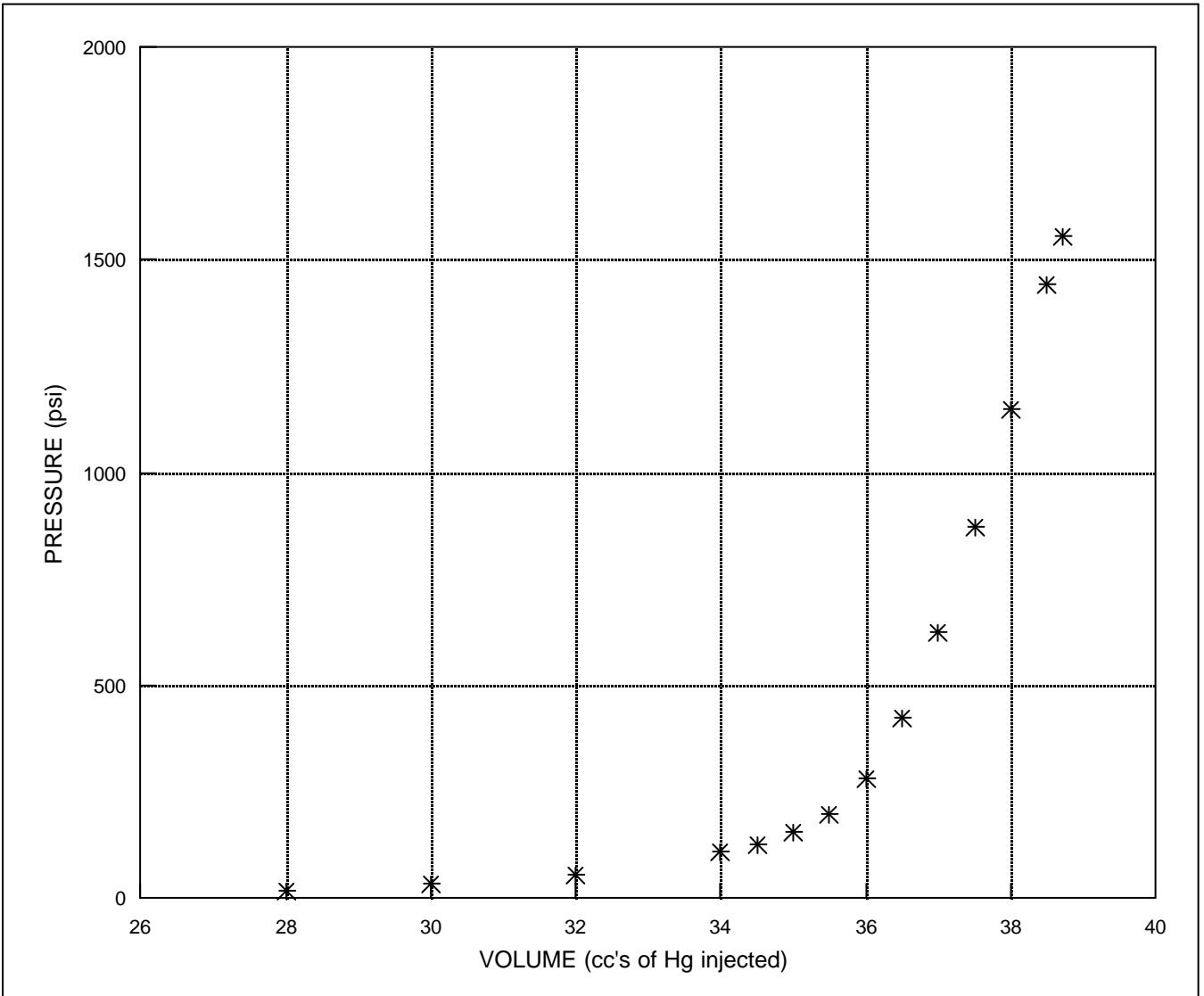
Sampling Conditions

Date	:	Nov. 08, 2003
Pressure	:	694 lpcm
Temperature	:	88 °F

Cylinder #	:	PA - 3441 (Gas)
Opening Pressure	:	660 lpcm @ 118 °F

Cylinder #	:	L - 510 (Liq)
Opening Pressure	:	50 lpcm @ 71 °F

Volume (cc's)	Pressure (psi)
28.00	16
30.00	31
32.00	52
34.00	108
34.50	126
35.00	153
35.50	197
36.00	282
36.50	424
37.00	625
37.50	872
38.00	1151
38.50	1442
38.70	1555







### Surface Samples Validity Check

**Saturation Pressure : 205 @ 71 °F**

Surface Samples Set # 2

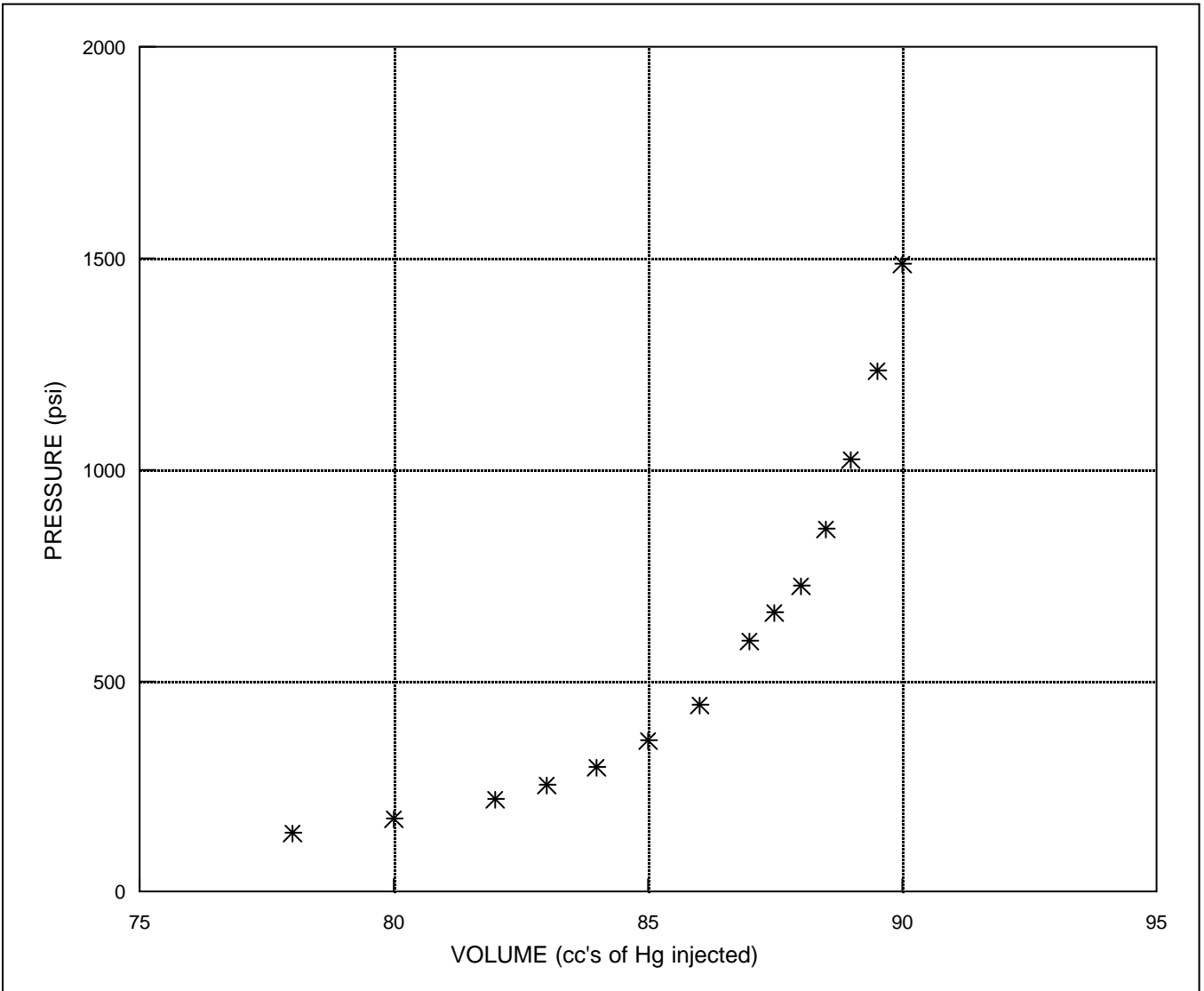
Sampling Conditions

Date	:	Nov. 09, 2003
Pressure	:	376 lpcm
Temperature	:	88 °F

Cylinder #	:	EE - 7982 (Gas)
Opening Pressure	:	470 lpcm @ 129 °F

Cylinder #	:	L - 209 (Liq)
Opening Pressure	:	50 lpcm @ 71 °F

Volume (cc's)	Pressure (psi)
78.00	142
80.00	174
82.00	220
83.00	254
84.00	298
85.00	360
86.00	445
87.00	594
87.50	661
88.00	727
88.50	861
89.00	1026
89.50	1235
90.00	1490





### Surface Samples Validity Check

**Saturation Pressure : 315 @ 71 °F**

Surface Samples Set # 3

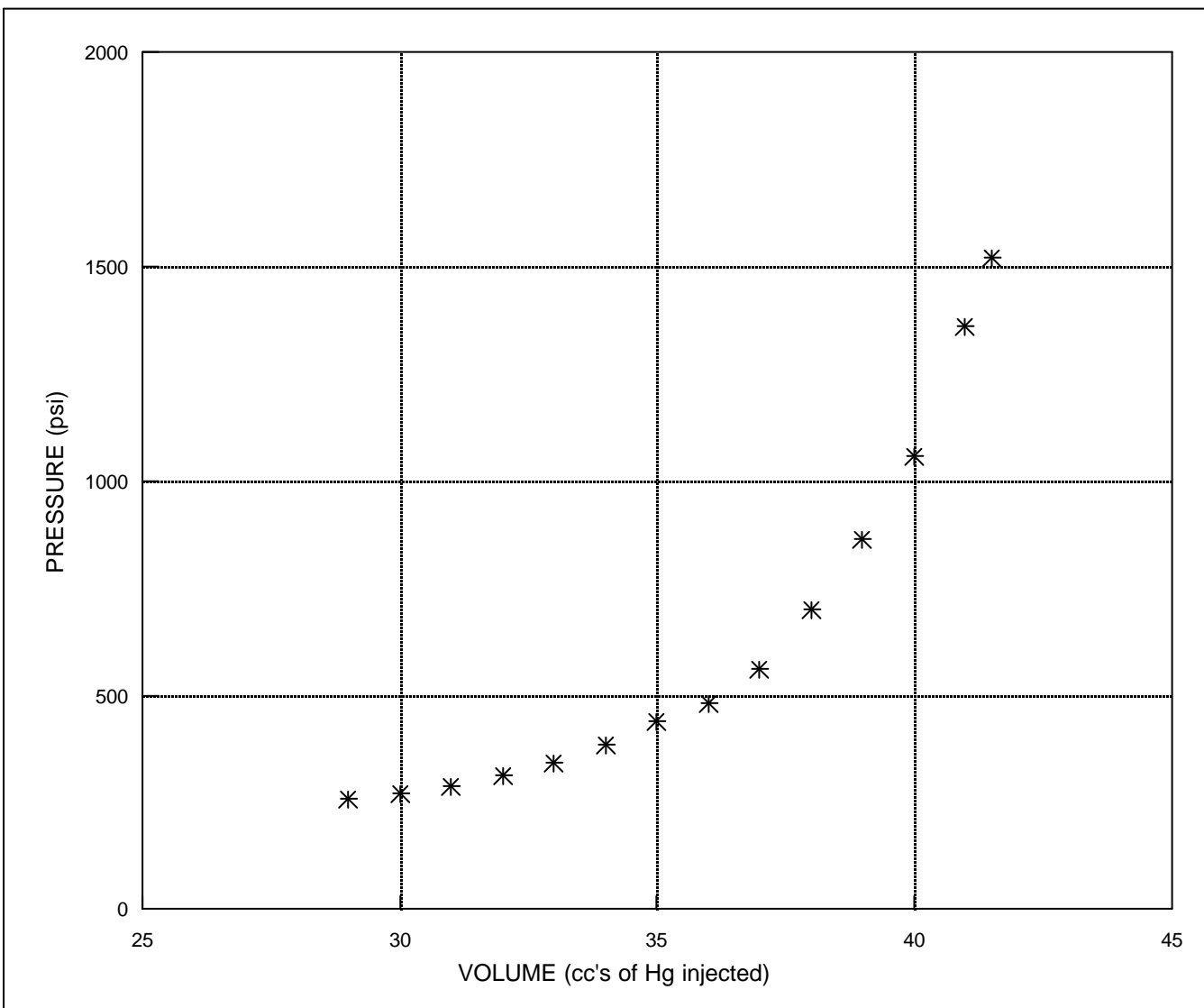
Sampling Conditions

Date	:	Nov. 09, 2003
Pressure	:	558 lpcm
Temperature	:	73 °F

Cylinder #	:	PA - 3424 (Gas)
Opening Pressure	:	630 lpcm @ 109 °F

Cylinder #	:	L - 014 (Liq)
Opening Pressure	:	50 lpcm @ 71 °F

Volume (cc's)	Pressure (psi)
29.00	257
30.00	272
31.00	288
32.00	312
33.00	344
34.00	383
35.00	438
36.00	481
37.00	563
38.00	702
39.00	865
40.00	1058
41.00	1363
41.50	1520





## COMPOSITIONAL ANALYSIS OF

### Separator Gas

Cylinder # PA - 3441

Component	Mol %	GPM	Pressure Base	:	14.696	
Hydrogen Sulphide	H2S	0.00	Zsc	:	0.998	
Carbon Dioxide	CO2	0.89				
Nitrogen	N2	2.02	Mol Weight	:	17.126	
Methane	C1	94.41	Gas Gravity	:	0.592	
Ethane	C2	1.91	0.509			
Propane	C3	0.45	0.124	Pc	:	666.4
Iso-Butane	iC4	0.08	0.026	Tc	:	349.8
N-Butane	nC4	0.07	0.022			
Iso-Pentane	iC5	0.02	0.007			
N-Pentane	nC5	0.01	0.004	Mol Weight C6+	:	100.1
Hexanes	C6	0.03	0.012	Density C6+	:	0.6893
Heptanes	C7	0.05	0.023			
Octanes	C8	0.04	0.020	Mol Weight C7+	:	104.5
Nonanes	C9	0.02	0.011	Density C7+	:	0.6950
Decanes	C10	0.00	0.000			
Undecanes	C11	0.00	0.000	Mol Weight C12+	:	--
Dodecanes	C12	0.00	0.000	Density C12+	:	--
Tridecanes	C13	0.00	0.000			
Tetradecanes	C14	0.00	0.000			
Pentadecanes	C15	0.00	0.000	Heating Value (BTU/ft3)		
Hexadecanes	C16	0.00	0.000	Gross	:	1018
Heptadecanes	C17	0.00	0.000	Nett	:	917
Octadecanes	C18	0.00	0.000			
Nonadecanes	C19	0.00	0.000	Wobbe Index	:	1322
Eicosanes Plus	C20+	<u>0.00</u>	<u>0.000</u>			
TOTAL		100.00	0.758	Zpt *	:	0.915

\* (P)ressure : 694 psig \* (T)emperature : 88 °F  
Sample Taken: November 08, 2003  
Laboratory Opening Pressure : 660 psig @ 48 °C



## COMPOSITIONAL ANALYSIS OF

### Separator Gas

#### Cylinder # EE - 7982

Component	Mol %	GPM	Pressure Base :	14.696
Hydrogen Sulphide	H2S	0.00	Zsc :	0.998
Carbon Dioxide	CO2	0.89		
Nitrogen	N2	2.15	Mol Weight :	17.200
Methane	C1	94.15	Gas Gravity :	0.595
Ethane	C2	1.95	0.520	
Propane	C3	0.44	0.121	Pc :
Iso-Butane	iC4	0.09	0.029	Tc :
N-Butane	nC4	0.11	0.035	350.2
Iso-Pentane	iC5	0.03	0.011	
N-Pentane	nC5	0.02	0.007	Mol Weight C6+ :
Hexanes	C6	0.04	0.016	99.4
Heptanes	C7	0.06	0.028	Density C6+ :
Octanes	C8	0.05	0.026	0.6882
Nonanes	C9	0.02	0.011	Mol Weight C7+ :
Decanes	C10	0.00	0.000	104.1
Undecanes	C11	0.00	0.000	Density C7+ :
Dodecanes	C12	0.00	0.000	0.6944
Tridecanes	C13	0.00	0.000	Mol Weight C12+ :
Tetradecanes	C14	0.00	0.000	--
Pentadecanes	C15	0.00	0.000	Density C12+ :
Hexadecanes	C16	0.00	0.000	--
Heptadecanes	C17	0.00	0.000	Heating Value (BTU/ft3)
Octadecanes	C18	0.00	0.000	Gross :
Nonadecanes	C19	0.00	0.000	1019
Eicosanes Plus	C20+	<u>0.00</u>	<u>0.000</u>	Nett :
TOTAL		100.00	0.804	919
				Wobbe Index :
				1322
				Zpt * :
				0.953

\* (P)ressure : 376 psig \* (T)emperature : 88 °F  
Sample Taken: November 09, 2003  
Laboratory Opening Pressure : 470 psig @ 54 °C



## COMPOSITIONAL ANALYSIS OF

### Separator Gas

#### Cylinder # EE - 8592

Component	Mol %	GPM	Pressure Base	:	14.696	
Hydrogen Sulphide	H2S	0.00	Zsc	:	0.998	
Carbon Dioxide	CO2	0.85				
Nitrogen	N2	1.87	Mol Weight	:	17.155	
Methane	C1	94.48	Gas Gravity	:	0.593	
Ethane	C2	1.96	0.523			
Propane	C3	0.42	0.115	Pc	:	666.4
Iso-Butane	iC4	0.08	0.026	Tc	:	350.5
N-Butane	nC4	0.11	0.035			
Iso-Pentane	iC5	0.03	0.011			
N-Pentane	nC5	0.02	0.007	Mol Weight C6+	:	99.2
Hexanes	C6	0.04	0.016	Density C6+	:	0.6880
Heptanes	C7	0.07	0.032			
Octanes	C8	0.05	0.026	Mol Weight C7+	:	103.5
Nonanes	C9	0.02	0.011	Density C7+	:	0.6937
Decanes	C10	0.00	0.000			
Undecanes	C11	0.00	0.000	Mol Weight C12+	:	--
Dodecanes	C12	0.00	0.000	Density C12+	:	--
Tridecanes	C13	0.00	0.000			
Tetradecanes	C14	0.00	0.000			
Pentadecanes	C15	0.00	0.000	Heating Value (BTU/ft3)		
Hexadecanes	C16	0.00	0.000	Gross	:	1023
Heptadecanes	C17	0.00	0.000	Nett	:	922
Octadecanes	C18	0.00	0.000			
Nonadecanes	C19	0.00	0.000	Wobbe Index	:	1328
Eicosanes Plus	C20+	<u>0.00</u>	<u>0.000</u>			
TOTAL		100.00	0.802	Zpt *	:	1.000

\* (P)ressure : -- psig \* (T)emperature : -- °F  
Sample Taken: November 09, 2003  
Laboratory Opening Pressure : 460 psig @ 47 °C



## COMPOSITIONAL ANALYSIS OF

### Separator Gas

Cylinder # PA - 3424

Component	Mol %	GPM	Pressure Base	:	14.696	
Hydrogen Sulphide	H2S	0.00	Zsc	:	0.998	
Carbon Dioxide	CO2	0.87				
Nitrogen	N2	2.18	Mol Weight	:	17.211	
Methane	C1	94.11	Gas Gravity	:	0.595	
Ethane	C2	1.94	0.517			
Propane	C3	0.46	0.126	Pc	:	665.9
Iso-Butane	iC4	0.10	0.033	Tc	:	350.3
N-Butane	nC4	0.12	0.038			
Iso-Pentane	iC5	0.03	0.011			
N-Pentane	nC5	0.02	0.007	Mol Weight C6+	:	99.4
Hexanes	C6	0.04	0.016	Density C6+	:	0.6882
Heptanes	C7	0.06	0.028			
Octanes	C8	0.05	0.026	Mol Weight C7+	:	104.1
Nonanes	C9	0.02	0.011	Density C7+	:	0.6944
Decanes	C10	0.00	0.000			
Undecanes	C11	0.00	0.000	Mol Weight C12+	:	--
Dodecanes	C12	0.00	0.000	Density C12+	:	--
Tridecanes	C13	0.00	0.000			
Tetradecanes	C14	0.00	0.000			
Pentadecanes	C15	0.00	0.000	Heating Value (BTU/ft3)		
Hexadecanes	C16	0.00	0.000	Gross	:	1020
Heptadecanes	C17	0.00	0.000	Nett	:	919
Octadecanes	C18	0.00	0.000			
Nonadecanes	C19	0.00	0.000	Wobbe Index	:	1322
Eicosanes Plus	C20+	<u>0.00</u>	<u>0.000</u>			
TOTAL		100.00	0.813	Zpt *	:	0.923

\* (P)ressure : 558 psig \* (T)emperature : 73 °F  
Sample Taken: November 09, 2003  
Laboratory Opening Pressure : 630 psig @ 43 °C

## DISTILLATION OF STOCK TANK LIQUID SAMPLE

(Hexanes to Dodecanes Plus)

<b>C6 PLUS PROPERTIES OF STOCK TANK LIQUID</b>								
		<b>Cut</b>		<b>Molecular</b>			<b>Density</b>	<b>API</b>
		(°C)	<b>Mol %</b>	<b>Weight</b>	<b>Weight %</b>	<b>Volume %</b>	<b>(gm/cc)</b>	<b>Gravity</b>
Hexanes	C6	59 - 84	1.80	98.7	1.17	1.27	0.7271	62.9
Heptanes	C7	85 - 112	11.29	99.5	7.43	7.85	0.7446	58.4
Octanes	C8	113 - 138	11.04	108.8	7.95	8.30	0.7530	56.2
Nonanes	C9	139 - 162	12.20	124.6	10.06	10.40	0.7612	54.2
Decanes	C10	163 - 185	16.17	137.9	14.76	15.04	0.7719	51.6
Undecanes	C11	186 - 206	11.78	150.2	11.71	11.77	0.7828	49.1
Dodecanes Plus	C12+	> 207	35.72	198.4	46.92	45.37	0.8140	42.2
TOTAL			100.00		100.00	100.00		

<b>C6 PLUS PROPERTIES OF RECOMBINED RESERVOIR FLUID</b>								
		<b>Cut</b>		<b>Molecular</b>			<b>Density</b>	<b>API</b>
		(°C)	<b>Mol %</b>	<b>Weight</b>	<b>Weight %</b>	<b>Volume %</b>	<b>(gm/cc)</b>	<b>Gravity</b>
Hexanes	C6	59 - 84	16.67	84.4	7.02	7.95	0.6864	74.5
Heptanes	C7	85 - 112	29.16	96.4	13.16	14.12	0.7246	63.6
Octanes	C8	113 - 138	25.00	107.2	12.44	12.97	0.7461	58.0
Nonanes	C9	139 - 162	12.50	122.1	6.97	7.10	0.7632	53.7
Decanes	C10	163 - 185	4.17	137.9	3.06	3.08	0.7719	51.6
Undecanes	C11	186 - 206	4.17	150.2	2.43	2.41	0.7828	49.1
Dodecanes Plus	C12+	> 207	8.33	200.0	54.92	52.37	0.8153	41.9
TOTAL			100.00		100.00	100.00		



FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY  
On Stock Tank Oil from atmospheric flash of sample in cylinder # L - 510

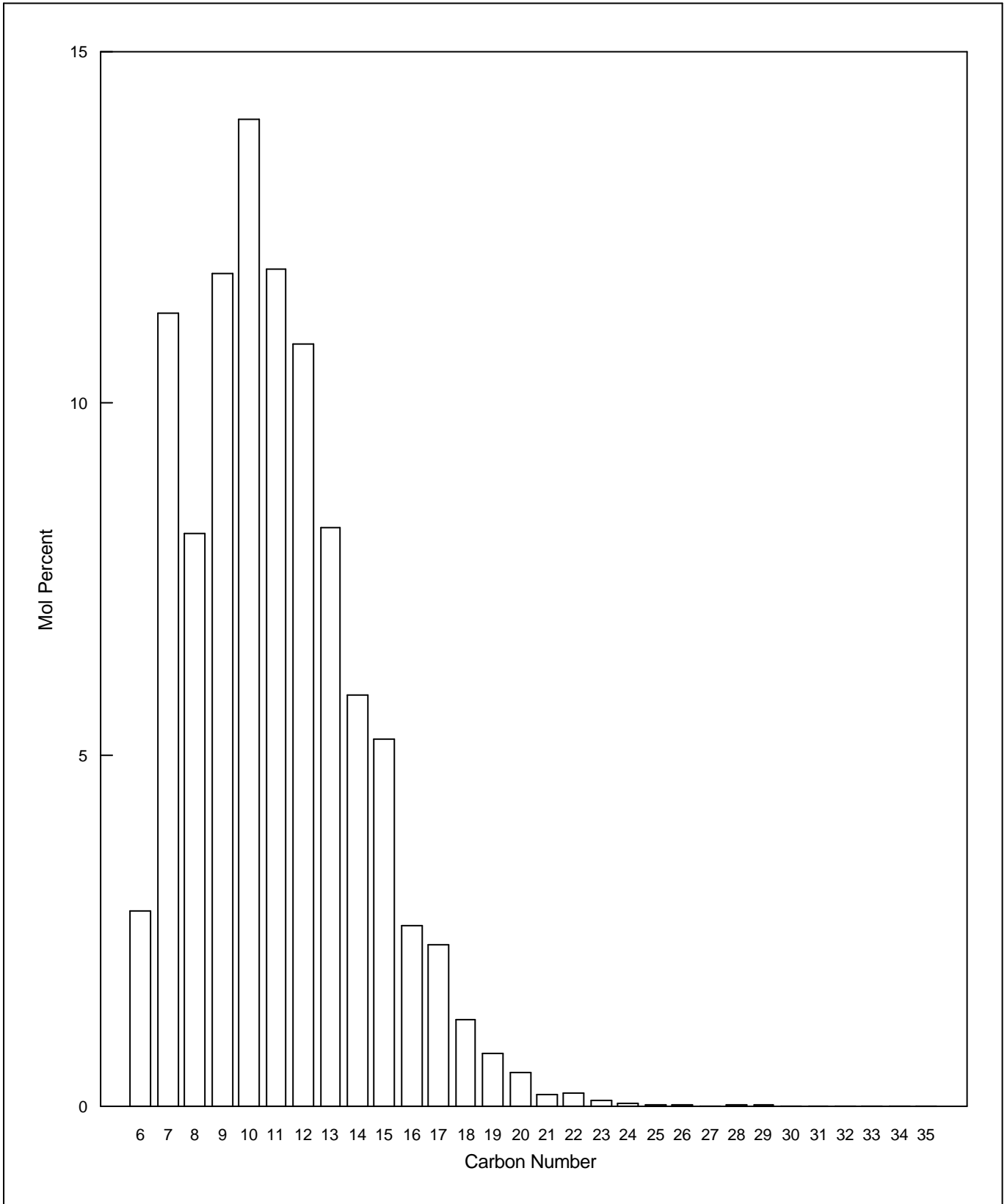
Component		Mol %
Hexanes minus	C6-	1.94
Hexanes	C6	2.78
Heptanes	C7	11.27
Octanes	C8	8.14
Nonanes	C9	11.83
Decanes	C10	14.03
Undecanes	C11	11.90
Dodecanes	C12	10.83
Tridecanes	C13	8.22
Tetradecanes	C14	5.86
Pentadecanes	C15	5.22
Hexadecanes	C16	2.58
Heptadecanes	C17	2.30
Octadecanes	C18	1.24
Nonadecanes	C19	0.75
Eicosanes	C20	0.49
Heneicosanes	C21	0.18
Docosanes	C22	0.19
Tricosanes	C23	0.08
Tetracosanes	C24	0.05
Pentacosanes	C25	0.03
Hexacosanes	C26	0.02
Heptacosanes	C27	0.01
Octacosanes	C28	0.03
Nonacosanes	C29	0.03
Triacontanes	C30	0.00
Hentriacontanes	C31	0.00
Dotriacontanes	C32	0.00
Tritriacontanes	C33	0.00
Tetracontanes	C34	0.00
Pentatriacontanes Plus	C35+	0.00
TOTAL		100.00

Molecular Weight Calculated * :	147.7
Density @ 60 °F Calculated * :	0.7889
Molecular Weight Measured :	
Density @ 60 °F Measured :	

\*Calculation based on generalized properties as published by Katz and Firoozabadi



FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY  
On Stock Tank Oil from atmospheric flash of sample in cylinder # L - 510





## COMPOSITIONAL ANALYSIS OF SEPARATOR LIQUID

Cylinder # L - 510

Component	Stock Tank		Separator
	Liquid Mol %	Gas Mol %	Liquid Mol %
Hydrogen Sulphide	H2S	0.00	0.00
Carbon Dioxide	CO2	0.03	0.41
Nitrogen	N2	0.00	0.20
Methane	C1	0.52	19.13
Ethane	C2	0.23	1.49
Propane	C3	0.48	1.12
Iso-Butane	iC4	0.31	0.43
N-Butane	nC4	0.43	0.51
Iso-Pentane	iC5	0.31	0.29
N-Pentane	nC5	0.19	0.17
Hexanes	C6	2.76	2.16
Heptanes	C7	11.21	8.77
Octanes	C8	8.09	6.33
Nonanes	C9	11.76	9.20
Decanes	C10	13.95	10.91
Undecanes	C11	11.83	9.25
Dodecanes	C12	10.77	8.42
Tridecanes	C13	8.17	6.39
Tetradecanes	C14	5.83	4.56
Pentadecanes	C15	5.19	4.06
Hexadecanes	C16	2.57	2.01
Heptadecanes	C17	2.29	1.79
Octadecanes	C18	1.23	0.96
Nonadecanes	C19	0.75	0.58
Eicosanes Plus	C20+	1.10	0.86
<b>TOTAL</b>		<b>100.00</b>	<b>100.00</b>

### Ratios

Molar Ratio	:	0.7820	0.2180	1.0000
Mass Ratio	:	0.9644	0.0356	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	1.0976 @ PT*
Gas Liquid Ratio	:	1.0000 bbl @ SC	> 200 SCF	--

### Stream Properties

Molecular Weight	:	146.1	19.34	118.5
Density obs. (gm/cc)	:	0.7882 @ 60 °F	--	0.7446 @ PT*
Gravity (AIR = 1.000)	:	47.9 °API @ 60 °F	0.669	58.3 °API
GHV (BTU/scf)	:	--	1134	--

### Hexanes Plus Properties

Mol %	:	97.49	0.03	76.25
Molecular Weight	:	148.64	95.67	148.64
Density (gm/cc @ 60 °F)	:	0.7914	0.6832	0.7914
Gravity (°API @ 60 °F)	:	47.13	75.40	47.13

### Heptanes Plus Properties

Mol %	:	94.73	0.02	74.09
Molecular Weight	:	150.53	101.50	150.53
Density (gm/cc @ 60 °F)	:	0.7934	0.6911	0.7934
Gravity (°API @ 60 °F)	:	46.68	73.06	46.68

### Dodecanes Plus Properties

Mol %	:	37.89	0.00	29.63
Molecular Weight	:	192.31	--	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232
Gravity (°API @ 60 °F)	:	40.23	--	40.23

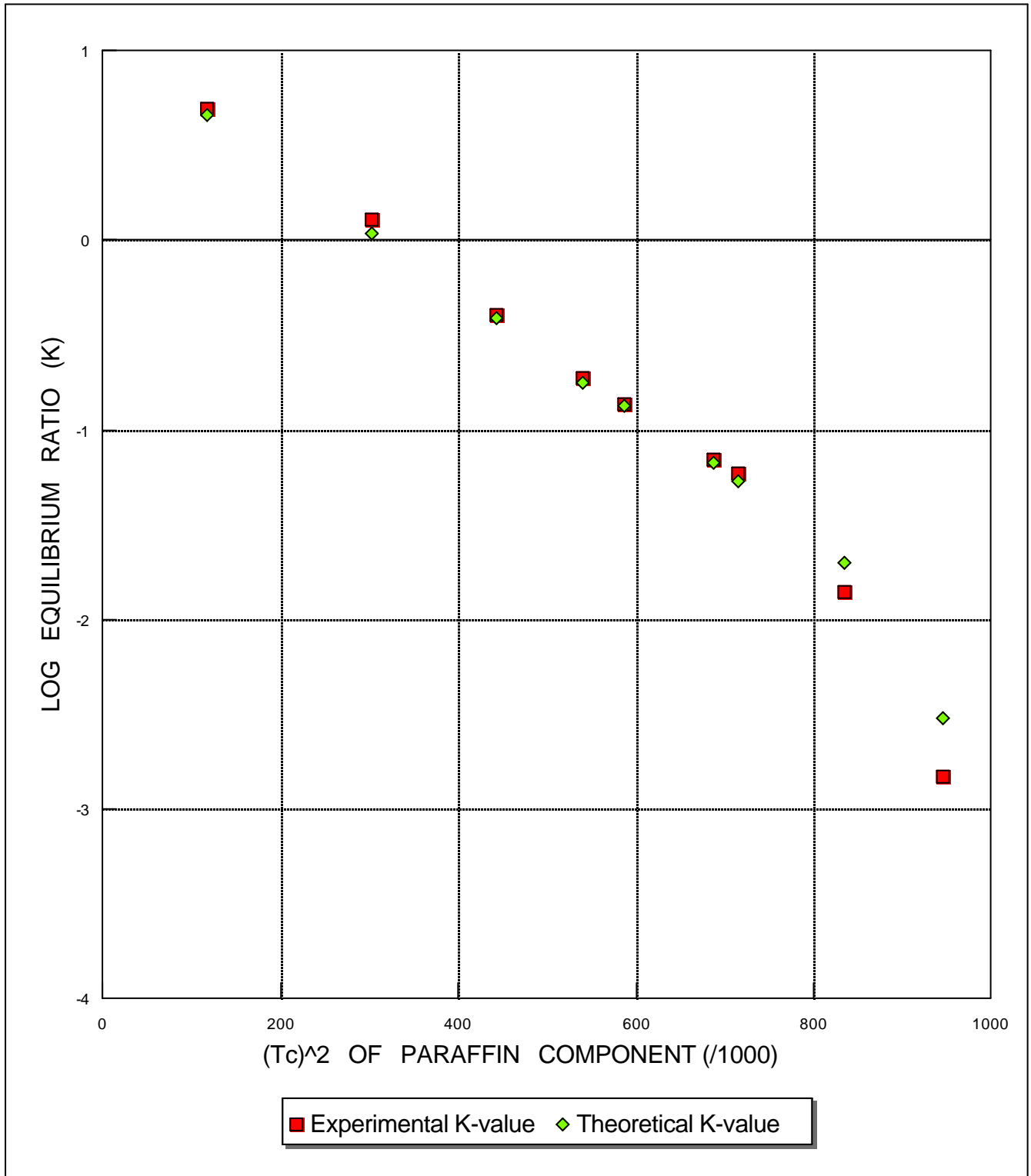
### Eicosanes Plus Properties

Mol %	:	1.10	0.00	0.86
Molecular Weight	:	299.14	--	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86

\* (P)ressure : 694 psig \* (T)emperature : 88 °F

## SEPARATOR SAMPLES QUALITY CHECK

On Separator Samples From Gas Cylinder # PA-3410 and Liquid Cylinder # L-418





COMPOSITIONAL ANALYSIS OF RECOMBINED RESERVOIR FLUID  
Using Separator Samples

Component	Cyl # L - 510		Cyl # PA - 3441	
	Separator Liquid	Mol %	Separator Gas	Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00
Carbon Dioxide	CO2	0.41	0.89	0.89
Nitrogen	N2	0.20	2.02	2.02
Methane	C1	19.13	94.41	94.34
Ethane	C2	1.49	1.91	1.91
Propane	C3	1.12	0.45	0.45
Iso-Butane	iC4	0.43	0.08	0.08
N-Butane	nC4	0.51	0.07	0.07
Iso-Pentane	iC5	0.29	0.02	0.02
N-Pentane	nC5	0.17	0.01	0.01
Hexanes	C6	2.16	0.03	0.03
Heptanes	C7	8.77	0.05	0.06
Octanes	C8	6.33	0.04	0.05
Nonanes	C9	9.20	0.02	0.03
Decanes	C10	10.91	0.00	0.01
Undecanes	C11	9.25	0.00	0.01
Dodecanes	C12	8.42	0.00	0.01
Tridecanes	C13	6.39	0.00	0.01
Tetradecanes	C14	4.56	0.00	0.00
Pentadecanes	C15	4.06	0.00	0.00
Hexadecanes	C16	2.01	0.00	0.00
Heptadecanes	C17	1.79	0.00	0.00
Octadecanes	C18	0.96	0.00	0.00
Nonadecanes	C19	0.58	0.00	0.00
Eicosanes Plus	C20+	0.86	0.00	0.00
TOTAL		100.00	100.00	100.00

**Ratios**

Molar Ratio	:	0.0009	0.9991	1.0000
Mass Ratio	:	0.0063	0.9937	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	370.3669 @ PT**
Gas Liquid Ratio	:	1.0000 bbl @ SC	911055 SCF ***	--

**Stream Properties**

Molecular Weight	:	118.5	17.13	17.2
Density obs. (gm/cc)	:	0.7446 @ 60 °F *	--	0.3197 @ PT**
Gravity (AIR = 1.000)	:	58.3 °API @ 60 °F	0.592	310.6 °API
GHV (BTU/scf)	:	--	1018	--

**Hexanes Plus Properties**

Mol %	:	76.25	0.14	0.21
Molecular Weight	:	148.64	100.14	116.18
Density (gm/cc @ 60 °F)	:	0.7914	0.6893	0.7294
Gravity (°API @ 60 °F)	:	47.13	73.59	62.32

**Heptanes Plus Properties**

Mol %	:	74.09	0.11	0.18
Molecular Weight	:	150.53	104.55	122.11
Density (gm/cc @ 60 °F)	:	0.7934	0.6950	0.7381
Gravity (°API @ 60 °F)	:	46.68	71.91	60.03

**Dodecanes Plus Properties**

Mol %	:	29.63	0.00	0.02
Molecular Weight	:	192.31	--	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232
Gravity (°API @ 60 °F)	:	40.23	--	40.23

**Eicosanes Plus Properties**

Mol %	:	0.86	0.00	0.00
Molecular Weight	:	299.14	--	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86

\* (P)ressure : 694 psig \* (T)emperature : 88 °F

\*\* (P)ressure : 2845 psig \* (T)emperature : 203 °F

\*\*\* 911055 SCF / SEP BBL @ PT = 1000000 SCF / ST BBL  
1000000 = 1000000 \* (1.2992 \* 1.0453) / (1.2992 \* 1.0453)



COMPOSITIONAL ANALYSIS OF RECOMBINED RESERVOIR FLUID  
Using Separator Samples

Component	Cyl # L - 209	Cyl # EE - 7982	Reservoir
	Separator Liquid	Separator Gas	Fluid
	Mol %	Mol %	Mol %
Hydrogen Sulphide	H2S 0.00	0.00	0.00
Carbon Dioxide	CO2 0.41	0.89	0.89
Nitrogen	N2 0.20	2.15	2.15
Methane	C1 19.13	94.15	94.08
Ethane	C2 1.49	1.95	1.95
Propane	C3 1.12	0.44	0.44
Iso-Butane	iC4 0.43	0.09	0.09
N-Butane	nC4 0.51	0.11	0.11
Iso-Pentane	iC5 0.29	0.03	0.03
N-Pentane	nC5 0.17	0.02	0.02
Hexanes	C6 2.16	0.04	0.04
Heptanes	C7 8.77	0.06	0.07
Octanes	C8 6.33	0.05	0.06
Nonanes	C9 9.20	0.02	0.03
Decanes	C10 10.91	0.00	0.01
Undecanes	C11 9.25	0.00	0.01
Dodecanes	C12 8.42	0.00	0.01
Tridecanes	C13 6.39	0.00	0.01
Tetradecanes	C14 4.56	0.00	0.00
Pentadecanes	C15 4.06	0.00	0.00
Hexadecanes	C16 2.01	0.00	0.00
Heptadecanes	C17 1.79	0.00	0.00
Octadecanes	C18 0.96	0.00	0.00
Nonadecanes	C19 0.58	0.00	0.00
Eicosanes Plus	C20+ 0.86	0.00	0.00
TOTAL	100.00	100.00	100.00

**Ratios**

Molar Ratio	:	0.0009	0.9991	1.0000
Mass Ratio	:	0.0063	0.9937	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	369.2769 @ PT**
Gas Liquid Ratio	:	1.0000 bbl @ SC	909004 SCF ***	--

**Stream Properties**

Molecular Weight	:	118.5	17.20	17.3
Density obs. (gm/cc)	:	0.7429 @ 60 °F *	--	0.3213 @ PT**
Gravity (AIR = 1.000)	:	58.8 °API @ 60 °F	0.595	308.4 °API
GHV (BTU/scf)	:	--	1019	--

**Hexanes Plus Properties**

Mol %	:	76.25	0.17	0.24
Molecular Weight	:	148.64	99.35	113.61
Density (gm/cc @ 60 °F)	:	0.7914	0.6882	0.7242
Gravity (°API @ 60 °F)	:	47.13	73.90	63.70

**Heptanes Plus Properties**

Mol %	:	74.09	0.13	0.20
Molecular Weight	:	150.53	104.08	120.03
Density (gm/cc @ 60 °F)	:	0.7934	0.6944	0.7338
Gravity (°API @ 60 °F)	:	46.68	72.08	61.14

**Dodecanes Plus Properties**

Mol %	:	29.63	0.00	0.02
Molecular Weight	:	192.31	--	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232
Gravity (°API @ 60 °F)	:	40.23	--	40.23

**Eicosanes Plus Properties**

Mol %	:	0.86	0.00	0.00
Molecular Weight	:	299.14	--	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86

\* (P)ressure : 376 psig \* (T)emperature : 88 °F

\*\* (P)ressure : 2845 psig \* (T)emperature : 203 °F

\*\*\* 909004 SCF / SEP BBL @ PT = 1000000 SCF / ST BBL  
1000000 = 1000000 \* (1.2963 \* 1.0245) / (1.2963 \* 1.0245)



COMPOSITIONAL ANALYSIS OF RECOMBINED RESERVOIR FLUID  
Using Separator Samples

Component	Cyl # L - 014 Separator Liquid		Cyl # PA - 3424 Separator Gas		Reservoir Fluid
	Mol %		Mol %		Mol %
Hydrogen Sulphide	H2S	0.00	0.00	0.00	0.00
Carbon Dioxide	CO2	0.41	0.87	0.87	0.87
Nitrogen	N2	0.20	2.18	2.18	2.18
Methane	C1	19.13	94.11	94.04	94.04
Ethane	C2	1.49	1.94	1.94	1.94
Propane	C3	1.12	0.46	0.46	0.46
Iso-Butane	iC4	0.43	0.10	0.10	0.10
N-Butane	nC4	0.51	0.12	0.12	0.12
Iso-Pentane	iC5	0.29	0.03	0.03	0.03
N-Pentane	nC5	0.17	0.02	0.02	0.02
Hexanes	C6	2.16	0.04	0.04	0.04
Heptanes	C7	8.77	0.06	0.07	0.07
Octanes	C8	6.33	0.05	0.06	0.06
Nonanes	C9	9.20	0.02	0.03	0.03
Decanes	C10	10.91	0.00	0.01	0.01
Undecanes	C11	9.25	0.00	0.01	0.01
Dodecanes	C12	8.42	0.00	0.01	0.01
Tridecanes	C13	6.39	0.00	0.01	0.01
Tetradecanes	C14	4.56	0.00	0.00	0.00
Pentadecanes	C15	4.06	0.00	0.00	0.00
Hexadecanes	C16	2.01	0.00	0.00	0.00
Heptadecanes	C17	1.79	0.00	0.00	0.00
Octadecanes	C18	0.96	0.00	0.00	0.00
Nonadecanes	C19	0.58	0.00	0.00	0.00
Eicosanes Plus	C20+	0.86	0.00	0.00	0.00
TOTAL		100.00	100.00	100.00	100.00

**Ratios**

Molar Ratio	:	0.0009	0.9991	1.0000
Mass Ratio	:	0.0063	0.9937	1.0000
Liquid Ratio (bbl/bbl)	:	1.0000 @ SC	--	372.8016 @ PT**
Gas Liquid Ratio	:	1.0000 bbl @ SC	917737 SCF ***	--

**Stream Properties**

Molecular Weight	:	118.5	17.21	17.3
Density obs. (gm/cc)	:	0.7501 @ 60 °F *	--	0.3216 @ PT**
Gravity (AIR = 1.000)	:	57.0 °API @ 60 °F	0.595	308.1 °API
GHV (BTU/scf)	:	--	1020	--

**Hexanes Plus Properties**

Mol %	:	76.25	0.17	0.24
Molecular Weight	:	148.64	99.35	113.61
Density (gm/cc @ 60 °F)	:	0.7914	0.6882	0.7242
Gravity (°API @ 60 °F)	:	47.13	73.90	63.70

**Heptanes Plus Properties**

Mol %	:	74.09	0.13	0.20
Molecular Weight	:	150.53	104.08	120.03
Density (gm/cc @ 60 °F)	:	0.7934	0.6944	0.7338
Gravity (°API @ 60 °F)	:	46.68	72.08	61.14

**Dodecanes Plus Properties**

Mol %	:	29.63	0.00	0.02
Molecular Weight	:	192.31	--	192.31
Density (gm/cc @ 60 °F)	:	0.8232	--	0.8232
Gravity (°API @ 60 °F)	:	40.23	--	40.23

**Eicosanes Plus Properties**

Mol %	:	0.86	0.00	0.00
Molecular Weight	:	299.14	--	299.14
Density (gm/cc @ 60 °F)	:	0.8707	--	0.8707
Gravity (°API @ 60 °F)	:	30.86	--	30.86

\* (P)ressure : 558 psig \* (T)emperature : 73 °F

\*\* (P)ressure : 2845 psig \* (T)emperature : 203 °F

\*\*\* 917737 SCF / SEP BBL @ PT = 1000000 SCF / ST BBL  
1000000 = 1000000 \* (1.2959 \* 1.0406) / (1.2959 \* 1.0406)

## WATER ANALYSIS

Customer Sample ID	1.01	1.02	1.03
Date	03/11/2003	07/11/2003	08/11/2003
Sample Source	Drilling Fluid	Brine	Stock Tank Water
Sample Type	Water	Water	Water

Test/Reference	Unit			
<b>PROPERTIES:</b>				
pH at Measured Temp.		6.2	6.6	3.8
Measured Temp.	°C	22	22	22
Electrical Conductivity @ 25°C	µS/cm	71700	192000	23400
Resistivity @ 25°C	M.Ohm	0.14	0.05	0.43
<b>ANIONS mg/L</b>				
Hydroxide as OH	mg/L	<1	<1	<1
Carbonate as CO3	mg/L	<1	<1	<1
Bicarbonate as HCO3	mg/L	2369	225	<1
Chloride as Cl	mg/L	28885	91914	8802
Nitrate as NO3	mg/L	2	3	2
Sulphate as SO4	mg/L	154	2369	1202
Total Anions	mg/L	31410	94511	10006
<b>ANIONS meq/L</b>				
Hydroxide as OH	meq/L	<0.01	<0.01	<0.01
Carbonate as CO3	meq/L	<0.01	<0.01	<0.01
Bicarbonate as HCO3	meq/L	39	4	<0.01
Chloride as Cl	meq/L	813.66	2589.13	247.94
Nitrate as NO3	meq/L	0.03	0.05	0.03
Sulphate as SO4	meq/L	3.21	49.32	25.03
Total Anions	meq/L	855.73	2642.19	273.00
<b>CATIONS mg/L</b>				
Potassium as K	mg/L	23400	77400	2980
Sodium as Na	mg/L	3510	11480	3340
Calcium as Ca	mg/L	363	478	878
Magnesium as Mg	mg/L	258	1582	476
Total Cations	mg/L	27531	90940	7674
<b>CATIONS meq/L</b>				
Potassium as K	meq/L	598.47	1979.54	76.21
Sodium as Na	meq/L	152.68	499.35	145.28
Calcium as Ca	meq/L	18.11	23.85	43.81
Magnesium as Mg	meq/L	21.23	130.21	39.18
Total Cations	meq/L	790.49	2632.95	304.48
<b>DERIVED PARAMETERS</b>				
Ion balance (Diff * 100/Sum)	%	3.96	0.18	5.45
Acceptance Criteria	%	5	5	5
Satisfactory		Yes	Yes	No
Total Alkalinity (calc as CaCO3)	mg/L	1942	184	0
Total Cations + Anions	mg/L	58941	185451	17680
Hardness (calc as CaCO3)	mg/L	1969	7708	4153
Calculated Total Dissolved Solids	mg/L	45888	122880	14976

## WATER ANALYSIS

Customer Sample ID	1.04	1.06	1.13
Depth	7597 ma	6808 ma	7276 ma
Sample Source	Separator Liquid	Separator Liquid	Separator Liquid
Sample Type	Water	Water	Water

Test/Reference	Unit			
<b>PROPERTIES:</b>				
pH at Measured Temp.		7.3	7.5	6.6
Measured Temp.	°C	22	22	22
Electrical Conductivity @ 25°C	µS/cm	13500	6660	9080
Resistivity @ 25°C	M.Ohm	0.74	1.50	1.10
<b>ANIONS mg/L</b>				
Hydroxide as OH	mg/L	<1	<1	<1
Carbonate as CO3	mg/L	<1	<1	<1
Bicarbonate as HCO3	mg/L	360	285	360
Chloride as Cl	mg/L	4320	2149	2750
Nitrate as NO3	mg/L	1	<0.1	<0.1
Sulphate as SO4	mg/L	243	117	75
Total Anions	mg/L	4923	2551	3185
<b>ANIONS meq/L</b>				
Hydroxide as OH	meq/L	<0.01	<0.01	<0.01
Carbonate as CO3	meq/L	<0.01	<0.01	<0.01
Bicarbonate as HCO3	meq/L	6	5	6
Chloride as Cl	meq/L	121.69	60.54	77.46
Nitrate as NO3	meq/L	0.01	<0.01	<0.01
Sulphate as SO4	meq/L	5.06	2.44	1.56
Total Anions	meq/L	132.66	67.64	84.92
<b>CATIONS mg/L</b>				
Potassium as K	mg/L	2710	1405	2340
Sodium as Na	mg/L	1130	345	333
Calcium as Ca	mg/L	57	85	51
Magnesium as Mg	mg/L	150	60	48
Total Cations	mg/L	4047	1895	2772
<b>CATIONS meq/L</b>				
Potassium as K	meq/L	69.31	35.93	59.85
Sodium as Na	meq/L	49.15	15.01	14.48
Calcium as Ca	meq/L	2.84	4.24	2.54
Magnesium as Mg	meq/L	12.35	4.94	3.95
Total Cations	meq/L	133.65	60.12	80.83
<b>DERIVED PARAMETERS</b>				
Ion balance (Diff * 100/Sum)	%	0.37	5.89	2.47
Acceptance Criteria	%	5	5	5
Satisfactory		Yes	No	Yes
Total Alkalinity (calc as CaCO3)	mg/L	295	233	295
Total Cations + Anions	mg/L	8970	4446	5957
Hardness (calc as CaCO3)	mg/L	760	459	325
Calculated Total Dissolved Solids	mg/L	8640	4262	5811





## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY

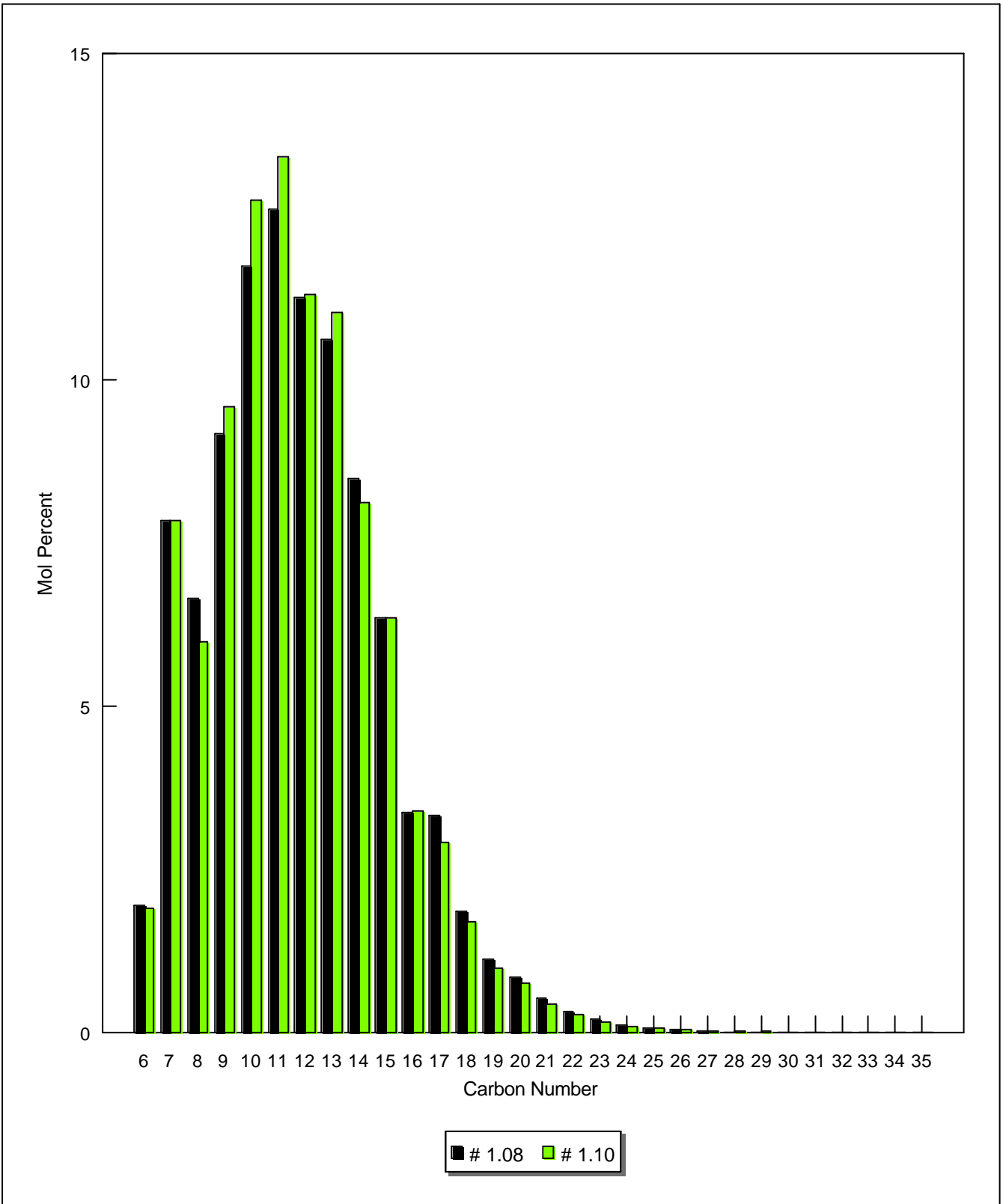
Stock tank 20lt drum  
# 1.08

Stock tank 20lt drum  
# 1.10

Component	Mol %	Mol %
Hexanes minus	C6- 1.61	1.00
Hexanes	C6 1.95	1.90
Heptanes	C7 7.83	7.85
Octanes	C8 6.65	5.97
Nonanes	C9 9.16	9.57
Decanes	C10 11.73	12.75
Undecanes	C11 12.61	13.41
Dodecanes	C12 11.26	11.31
Tridecanes	C13 10.62	11.03
Tetradecanes	C14 8.48	8.11
Pentadecanes	C15 6.35	6.35
Hexadecanes	C16 3.36	3.39
Heptadecanes	C17 3.31	2.90
Octadecanes	C18 1.84	1.70
Nonadecanes	C19 1.11	0.97
Eicosanes	C20 0.84	0.75
Heneicosanes	C21 0.53	0.42
Docosanes	C22 0.32	0.26
Tricosanes	C23 0.21	0.15
Tetracosanes	C24 0.12	0.09
Pentacosanes	C25 0.06	0.06
Hexacosanes	C26 0.03	0.03
Heptacosanes	C27 0.02	0.01
Octacosanes	C28 0.00	0.01
Nonacosanes	C29 0.00	0.01
Triacosanes plus	C30 0.00	0.00
Hentriacontanes	C31 0.00	0.00
Dotriacontanes	C32 0.00	0.00
Tritriacontanes	C33 0.00	0.00
Tetratriacontanes	C34 0.00	0.00
Pentatriacontanes Plus	C35+ 0.00	0.00
<b>TOTAL</b>	<b>100.00</b>	<b>100.00</b>

Molecular Weight Calculated *	:	158.2	157.6
Density @ 60 °F Calculated *	:	0.7985	0.7982
° API @ 60 ° F Measured	:	46.5	46.9
Density @ 60 °F Measured	:	0.7944	0.7926

## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY





## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY

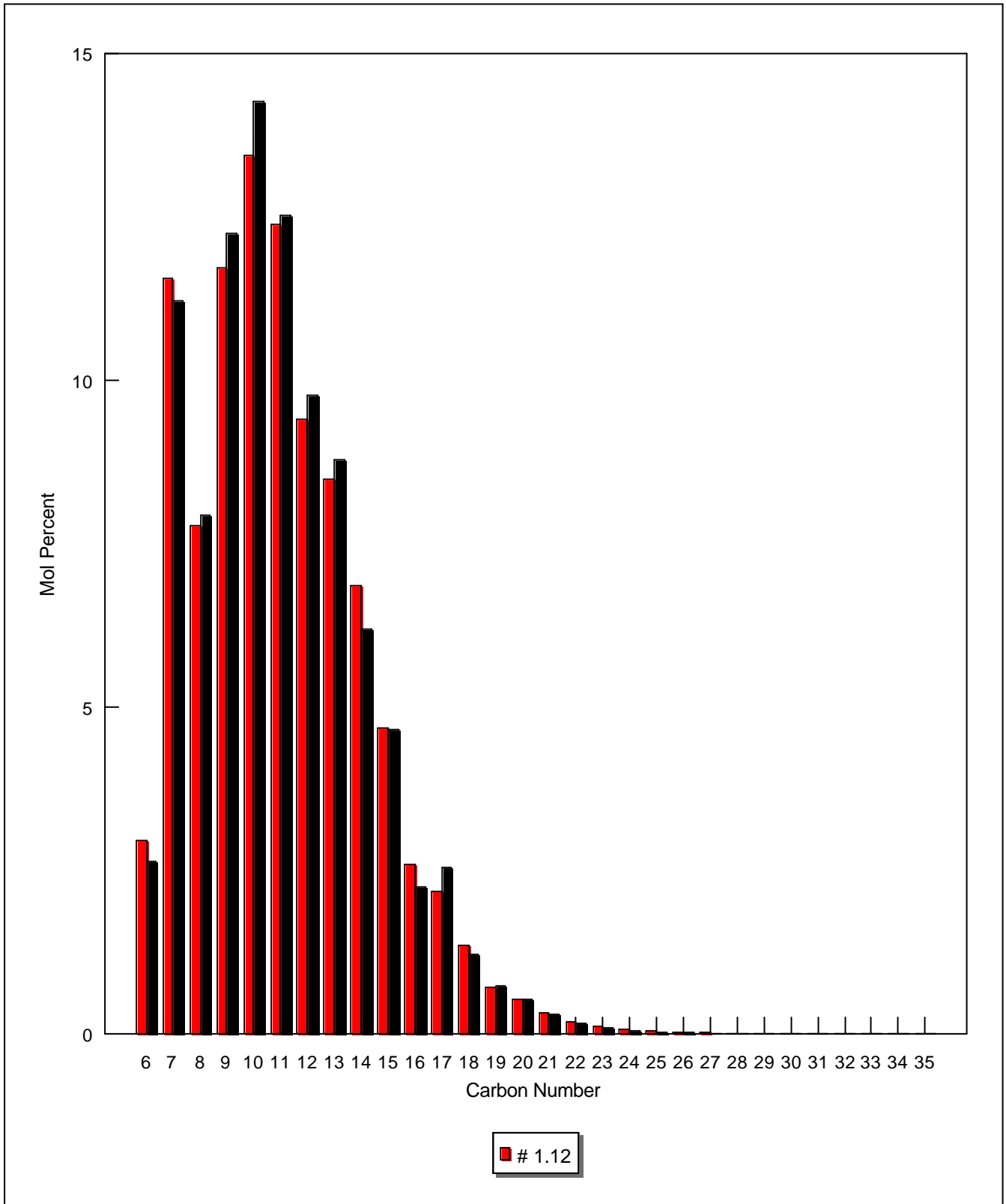
Stock tank 20lt drum  
# 1.12

Stock tank 20lt drum  
# 1.15

Component	Mol %	Mol %
Hexanes minus	C6- 2.70	1.95
Hexanes	C6 2.95	2.64
Heptanes	C7 11.55	11.22
Octanes	C8 7.77	7.92
Nonanes	C9 11.72	12.25
Decanes	C10 13.43	14.27
Undecanes	C11 12.37	12.52
Dodecanes	C12 9.40	9.76
Tridecanes	C13 8.48	8.77
Tetradecanes	C14 6.86	6.19
Pentadecanes	C15 4.68	4.66
Hexadecanes	C16 2.59	2.24
Heptadecanes	C17 2.17	2.55
Octadecanes	C18 1.34	1.20
Nonadecanes	C19 0.71	0.72
Eicosanes	C20 0.52	0.52
Heneicosanes	C21 0.32	0.30
Docosanes	C22 0.18	0.16
Tricosanes	C23 0.12	0.09
Tetracosanes	C24 0.07	0.04
Pentacosanes	C25 0.04	0.02
Hexacosanes	C26 0.02	0.01
Heptacosanes	C27 0.01	0.00
Octacosanes	C28 0.00	0.00
Nonacosanes	C29 0.00	0.00
Triacosanes plus	C30 0.00	0.00
Hentriacontanes	C31 0.00	0.00
Dotriacontanes	C32 0.00	0.00
Tritriacontanes	C33 0.00	0.00
Tetratriacontanes	C34 0.00	0.00
Pentatriacontanes Plus	C35+ 0.00	0.00
<b>TOTAL</b>	<b>100.00</b>	<b>100.00</b>

Molecular Weight Calculated *	:	147.1	147.3
Density @ 60 °F Calculated *	:	0.7882	0.7885
° API @ 60 ° F Measured	:	48.5	47.8
Density @ 60 °F Measured	:	0.7852	0.7886

## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY





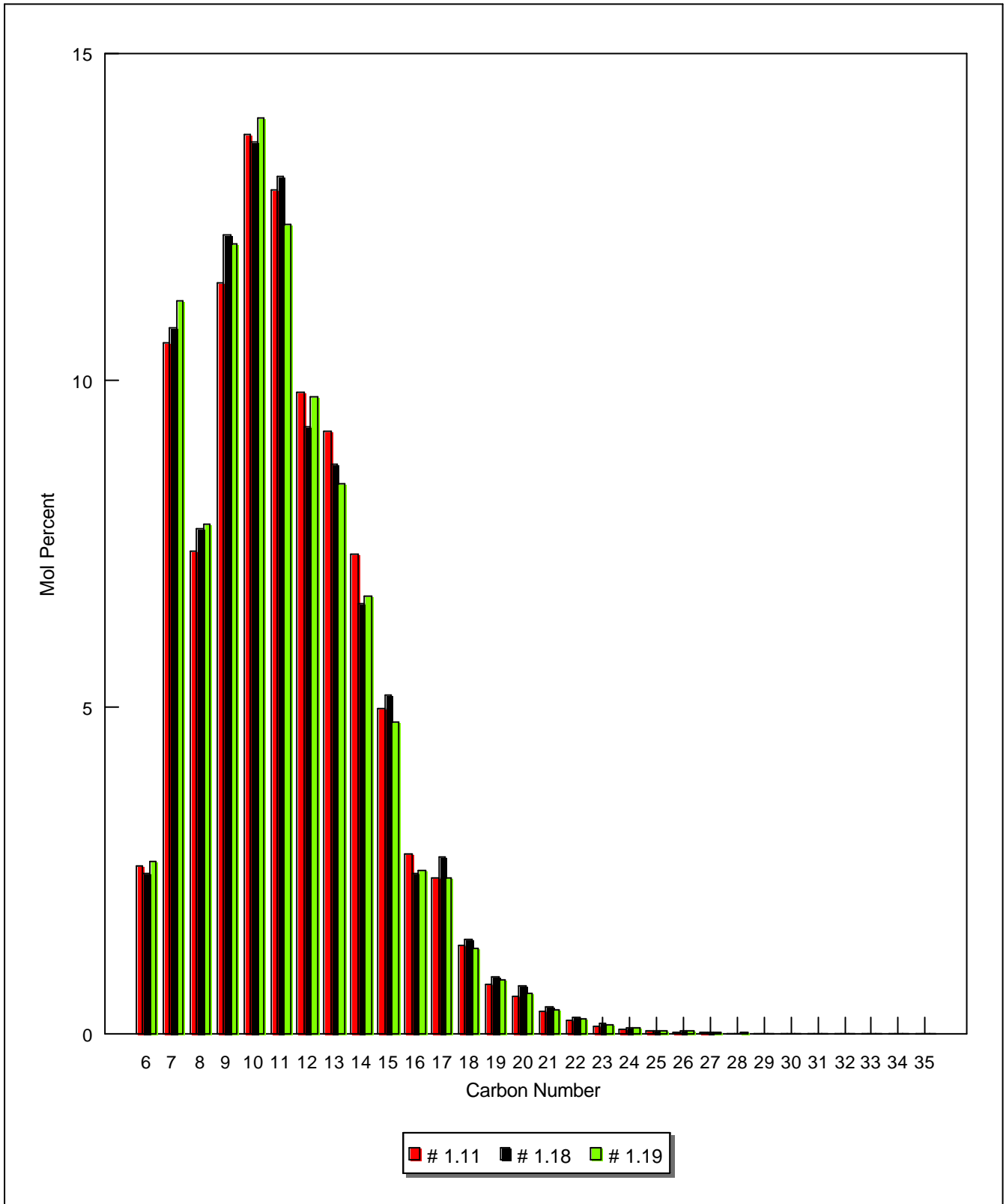
## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY

Stock tank 1lt tin    Stock tank 1lt tin    Stock tank 1lt tin  
# 1.11                    # 1.18                    # 1.19

Component	Mol %	Mol %	Mol %	
Hexanes minus	C6-	1.38	1.12	1.74
Hexanes	C6	2.56	2.44	2.63
Heptanes	C7	10.57	10.80	11.21
Octanes	C8	7.37	7.73	7.79
Nonanes	C9	11.48	12.21	12.08
Decanes	C10	13.77	13.64	14.00
Undecanes	C11	12.91	13.12	12.39
Dodecanes	C12	9.82	9.29	9.74
Tridecanes	C13	9.21	8.72	8.42
Tetradecanes	C14	7.34	6.57	6.68
Pentadecanes	C15	4.97	5.18	4.76
Hexadecanes	C16	2.74	2.45	2.49
Heptadecanes	C17	2.39	2.71	2.39
Octadecanes	C18	1.35	1.44	1.31
Nonadecanes	C19	0.76	0.87	0.82
Eicosanes	C20	0.57	0.73	0.61
Heneicosanes	C21	0.34	0.40	0.36
Docosanes	C22	0.21	0.24	0.23
Tricosanes	C23	0.12	0.15	0.14
Tetracosanes	C24	0.07	0.08	0.08
Pentacosanes	C25	0.04	0.05	0.05
Hexacosanes	C26	0.02	0.05	0.05
Heptacosanes	C27	0.01	0.01	0.02
Octacosanes	C28	0.00	0.00	0.01
Nonacosanes	C29	0.00	0.00	0.00
Triacosanes plus	C30	0.00	0.00	0.00
Hentriacontanes	C31	0.00	0.00	0.00
Dotriacontanes	C32	0.00	0.00	0.00
Tritriacontanes	C33	0.00	0.00	0.00
Tetratriacontanes	C34	0.00	0.00	0.00
Pentatriacontanes Plus	C35+	0.00	0.00	0.00
TOTAL		100.00	100.00	100.00

Molecular Weight Calculated *	:	150.4	150.6	148.8
Density @ 60 °F Calculated *	:	0.7917	0.7920	0.7901
° API @ 60 ° F Measured	:	47.6	47.9	48.2
Density @ 60 °F Measured	:	0.7893	0.7879	0.7867

## FINGERPRINT ANALYSIS BY CAPILLARY GAS CHROMATOGRAPHY





### PONA ANALYSIS 1 It TIN : 1.11

H/C TYPE	Weight%	Liquid vol%	Mol %
<b>Paraffins</b>	<b>55.653</b>	<b>58.327</b>	<b>52.638</b>
<b>Naphthenes</b>	<b>24.155</b>	<b>23.473</b>	<b>27.527</b>
<b>Aromatics</b>	<b>11.172</b>	<b>9.743</b>	<b>12.018</b>
<b>Unknowns</b>	<b>9.021</b>	<b>8.457</b>	<b>7.817</b>
<b>Average molecular weight :</b>		<b>129.16</b>	
<b>Average Specific gravity :</b>		<b>0.688</b>	

Component	Weight%	Liquid vol %	Mole %
1 C 3	0.032	0.048	0.090
2 i C 4	0.163	0.224	0.352
3 n C 4	0.144	0.188	0.311
4 22 DMC 3	0.317	0.390	0.551
5 i C 5	0.344	0.419	0.598
6 n C 5	0.424	0.511	0.736
7 22 DMC 4	0.073	0.085	0.106
8 CYC 5	0.063	0.064	0.113
9 23 DMC 4	0.125	0.143	0.182
10 2 MC 5	0.408	0.471	0.593
11 3 MC 5	0.255	0.289	0.371
12 n C 6	0.858	0.981	1.248
13 22 DMC 5	0.062	0.070	0.078
14 M CYC 5	0.920	0.928	1.370
15 24 DMC 5	0.070	0.078	0.087
16 223 TMC 4	0.032	0.035	0.040
17 BZ	0.400	0.344	0.642
18 33 DMC 5	0.050	0.054	0.062
19 CYC 6	1.939	1.880	2.888
20 2 MC 6	0.465	0.517	0.582
21 23 DMC 5	0.164	0.178	0.205
22 11 DMCYC 5	0.132	0.131	0.168
23 3 MC 6	0.464	0.510	0.580
24 t 13 DMCYC 5	0.266	0.271	0.339
25 c 13 DMCYC 5	0.287	0.291	0.367
26 3 EC 5	-	-	-
27 t 12 DMCYC 5	0.450	0.460	0.574
28 n C7	1.847	2.039	2.310
29 MCYC 6	5.412	5.309	6.909
30 22 DMC 6	0.098	0.107	0.108
31 ECYC 5	0.116	0.114	0.148
32 25 DMC 6	0.299	0.325	0.328
33 24 DMC 6	0.141	0.153	0.155
34 tc 124 TMCYC 5	0.183	0.181	0.204
35 234 TMC 5	0.064	0.067	0.070
36 tc 123 TMCYC 5	0.197	0.193	0.220
37 233 TMC 5	0.017	0.018	0.019
38 TOL	1.561	1.359	2.123
39 23 DMC 6	0.107	0.113	0.117
40 2 M 3 EC 5	0.108	0.113	0.118



	Component	Weight%	Liquid vol %	Mole %
41	2 MC 7	0.818	0.885	0.898
42	4 MC 7	0.242	0.259	0.265
43	34 DMC 6	0.065	0.068	0.071
44	tt 124 TMCYC 5	-	-	-
45	3 MC 7	0.632	0.675	0.694
46	1 M 2 E CYC 5	1.128	1.137	1.260
47	t 14 DMCYC 6	0.551	0.545	0.615
48	C 8-N	0.228	0.221	0.255
49	C 8-P	-	-	-
50	C 8-N	0.035	0.034	0.039
51	C 8-N	0.129	0.125	0.145
52	c 1 M 3 ECYC 6	0.237	0.236	0.236
53	C 8-P	0.015	0.016	0.016
54	t 12 DMCYC 6	0.628	0.595	0.701
55	n C 8	3.458	3.715	3.794
56	C 8-N	0.389	0.377	0.435
57	unk	0.071	0.070	0.076
58	C 9-P	0.084	0.088	0.082
59	unk	0.127	0.118	0.145
60	C 9-P	0.195	0.205	0.191
61	C 9-P	0.538	0.565	0.526
62	n C 3 CYC 5	1.286	1.251	1.437
63	N	0.021	0.020	0.023
64	113 TMCYC 6	0.342	0.331	0.340
65	C 9-P	0.504	0.529	0.492
66	C 9-P	0.059	0.062	0.058
67	N	0.064	0.062	0.072
68	N	0.066	0.063	0.073
69	N	0.099	0.095	0.111
70	E BZ	0.471	0.410	0.556
71	114 TMCYC 6	0.269	0.264	0.267
72	unk	-	-	-
73	unk	0.051	0.049	0.053
74	m+p XYL	0.271	0.239	0.320
75	C 9-P	1.530	1.607	1.495
76	23 DMC 7	-	-	-
77	C 9-P	-	-	-
78	4 MC 8	1.369	1.436	1.338
79	2 MC 8	0.106	0.112	0.104
80	C 9-P	-	-	-
81	3 MC 8	0.884	0.926	0.864
82	N	0.157	0.154	0.176
83	o XYL	0.092	0.079	0.109
84	unk	0.659	0.630	0.699
85	unk	-	-	-
86	1 M 2 PCYC 5	0.243	0.233	0.241
87	t 1 M 4 ECYC 6	0.559	0.529	0.555
88	c 1 M 4 ECYC 6	0.444	0.430	0.441
89	N	-	-	-
90	N	0.179	0.173	0.177





Company : Santos Limited  
Well : Casino # 3

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	Component	Weight%	Liquid vol %	Mole %
91	N	-	-	-
92	n C9	5.822	6.123	5.689
93	1 M 1 ECYC 6	0.464	0.444	0.461
94	C 9-N	0.126	0.121	0.125
95	i PBZ	0.108	0.095	0.113
96	C 10-P	-	-	-
97	C 9-N	0.216	0.207	0.214
98	C 9-N	0.811	0.776	0.805
99	C 10-P	-	-	-
100	C 10-P	0.289	0.300	0.255
101	unk	0.183	0.174	0.177
102	C 10-P	-	-	-
103	s BCYC 5	0.897	0.858	0.890
104	C 10-P	-	-	-
105	C 10-P	-	-	-
106	3 MC 9	0.836	0.866	0.737
107	C 10-P	0.214	0.222	0.188
108	unk	-	-	-
109	unk	-	-	-
110	n PBZ	0.679	0.595	0.708
111	N	0.327	0.310	0.293
112	unk	-	-	-
113	unk	-	-	-
114	m E TOL	0.719	0.628	0.750
115	p E TOL	0.748	0.655	0.780
116	135 TM BZ	0.856	0.747	0.893
117	N	-	-	-
118	C 10-N	1.117	1.055	0.998
119	C 10-P	0.123	0.125	0.108
120	2 MC 9	0.471	0.488	0.415
121	o E TOL	0.471	0.403	0.491
122	C 10-P	0.388	0.402	0.342
123	36 DMC 8	0.226	0.234	0.199
124	N	0.077	0.073	0.069
125	C 10-N	0.037	0.035	0.033
126	124 TM BZ	0.960	0.827	1.000
127	C 10-N	0.062	0.059	0.056
128	N	0.354	0.335	0.317
129	C 10-N	-	-	-
130	N	0.533	0.504	0.476
131	N	-	-	-
132	N	0.073	0.069	0.066
133	C 10-P	-	-	-
134	n C 10	8.231	8.525	7.242
135	unk	0.267	0.250	0.249
136	unk	0.112	0.105	0.105
137	123 TM BZ	0.267	0.226	0.279
138	unk	0.432	0.406	0.390
139	unk	0.497	0.467	0.449
140	unk	-	-	-



	Component	Weight%	Liquid vol %	Mole %
141	unk	-	-	-
142	C 10-A	0.294	0.258	0.274
143	C 10-N	1.260	1.191	1.126
144	C 11-P	0.734	0.750	0.588
145	unk	0.166	0.157	0.145
146	C 10-N	0.782	0.739	0.699
147	unk	-	-	-
148	unk	-	-	-
149	C 10-A	-	-	-
150	C 10-A	-	-	-
151	C 10-A	0.275	0.242	0.257
152	unk	0.050	-	-
153	C 10-A	0.177	0.155	0.165
154	unk	-	-	-
155	unk	0.201	0.190	0.176
156	unk	0.578	0.546	0.505
157	unk	-	-	-
158	C 10-A	0.598	0.526	0.559
159	C 11-P	0.384	0.393	0.308
160	C 11-P	1.067	1.090	0.855
161	C 11-P	0.138	0.141	0.111
162	C 10-A	-	-	-
163	C 11-P	1.104	1.128	0.885
164	C 10-A	0.218	0.192	0.204
165	unk	0.283	0.268	0.244
166	unk	-	-	-
167	unk	0.141	0.133	0.122
168	C 10-A	0.208	0.183	0.195
169	n C 11	8.911	9.105	7.144
170	unk	0.241	0.228	0.208
171	C 10-A	0.241	0.212	0.225
172	unk	-	-	-
173	C 10-A	0.656	0.576	0.612
174	unk	0.061	0.057	0.050
175	unk	0.474	0.445	0.390
176	unk	0.336	0.315	0.276
177	unk	0.532	0.499	0.438
178	unk	0.770	0.723	0.634
179	C 12-P	0.120	0.121	0.088
180	unk	0.219	0.207	0.180
181	unk	0.123	0.116	0.101
182	unk	0.584	0.549	0.478
183	unk	0.422	0.397	0.346
184	C 11-A	0.503	0.443	0.426
185	unk	1.013	0.953	0.830
186	C 12-P	0.712	0.718	0.524
187	C 11-A	0.399	0.351	0.337
188	unk	0.429	0.403	0.351
189	n C 12	8.254	8.322	6.075

'The symbol " - " signifies < 0.005%



**PONA ANALYSIS 20 lt DRUM : 1.15**

H/C TYPE	Weight%	Liquid vol%	Mol %
<b>Paraffins</b>	<b>54.841</b>	<b>57.541</b>	<b>51.856</b>
<b>Naphthenes</b>	<b>23.503</b>	<b>22.890</b>	<b>26.979</b>
<b>Aromatics</b>	<b>11.458</b>	<b>10.003</b>	<b>12.281</b>
<b>Unknowns</b>	<b>10.198</b>	<b>9.566</b>	<b>8.884</b>
<b>Average molecular weight :</b>		<b>128.55</b>	
<b>Average Specific gravity :</b>		<b>0.680</b>	

Component	Weight%	Liquid vol %	Mole %
1 C 3	0.028	0.042	0.080
2 i C 4	0.143	0.197	0.308
3 n C 4	0.130	0.169	0.279
4 22 DMC 3	0.288	0.355	0.499
5 i C 5	0.320	0.389	0.554
6 n C 5	0.397	0.479	0.688
7 22 DMC 4	0.069	0.081	0.101
8 CYC 5	0.060	0.061	0.108
9 23 DMC 4	0.121	0.138	0.175
10 2 MC 5	0.395	0.457	0.573
11 3 MC 5	0.248	0.282	0.359
12 n C 6	0.844	0.965	1.224
13 22 DMC 5	0.061	0.068	0.076
14 M CYC 5	0.910	0.918	1.351
15 24 DMC 5	0.070	0.079	0.087
16 223 TMC 4	0.032	0.035	0.039
17 BZ	0.397	0.342	0.636
18 33 DMC 5	0.050	0.055	0.062
19 CYC 6	1.939	1.882	2.881
20 2 MC 6	0.470	0.523	0.586
21 23 DMC 5	0.165	0.180	0.206
22 11 DMCYC 5	0.132	0.132	0.169
23 3 MC 6	0.469	0.516	0.585
24 t 13 DMCYC 5	0.269	0.275	0.342
25 c 13 DMCYC 5	0.290	0.295	0.370
26 3 EC 5	-	-	-
27 t 12 DMCYC 5	0.455	0.465	0.579
28 n C7	1.883	2.080	2.349
29 MCYC 6	5.518	5.418	7.026
30 22 DMC 6	0.100	0.109	0.110
31 ECYC 5	0.139	0.137	0.176
32 25 DMC 6	0.286	0.312	0.313
33 24 DMC 6	0.145	0.157	0.158
34 tc 124 TMCYC 5	0.169	0.167	0.188
35 234 TMC 5	0.084	0.088	0.092
36 tc 123 TMCYC 5	0.202	0.198	0.225
37 233 TMC 5	0.018	0.019	0.020
38 TOL	1.601	1.395	2.172
39 23 DMC 6	0.109	0.116	0.119
40 2 M 3 EC 5	0.111	0.117	0.122



	<b>Component</b>	<b>Weight%</b>	<b>Liquid vol %</b>	<b>Mole %</b>
41	2 MC 7	0.839	0.908	0.918
42	4 MC 7	0.249	0.267	0.273
43	34 DMC 6	0.067	0.070	0.073
44	tt 124 TMCYC 5	-	-	-
45	3 MC 7	0.650	0.695	0.712
46	1 M 2 E CYC 5	1.157	1.168	1.290
47	t 14 DMCYC 6	0.565	0.560	0.630
48	C 8-N	0.234	0.227	0.261
49	C 8-P	-	-	-
50	C 8-N	0.150	0.145	0.167
51	C 8-N	0.132	0.128	0.147
52	c 1 M 3 ECYC 6	0.246	0.245	0.243
53	C 8-P	0.015	0.016	0.017
54	t 12 DMCYC 6	0.645	0.612	0.718
55	n C 8	3.559	3.827	3.895
56	C 8-N	0.399	0.387	0.444
57	unk	0.071	0.071	0.077
58	C 9-P	0.084	0.089	0.082
59	unk	0.129	0.121	0.147
60	C 9-P	0.199	0.209	0.194
61	C 9-P	0.551	0.579	0.537
62	n C 3 CYC 5	1.319	1.284	1.470
63	N	0.021	0.020	0.023
64	113 TMCYC 6	0.348	0.337	0.344
65	C 9-P	0.517	0.544	0.504
66	C 9-P	0.060	0.063	0.058
67	N	0.066	0.064	0.073
68	N	0.067	0.064	0.075
69	N	0.102	0.097	0.113
70	E BZ	0.485	0.423	0.571
71	114 TMCYC 6	0.275	0.270	0.272
72	unk	-	-	-
73	unk	0.051	0.050	0.054
74	m+p XYL	0.278	0.245	0.327
75	C 9-P	1.569	1.649	1.529
76	23 DMC 7	-	-	-
77	C 9-P	-	-	-
78	4 MC 8	1.401	1.470	1.366
79	2 MC 8	0.110	0.117	0.107
80	C 9-P	-	-	-
81	3 MC 8	0.907	0.951	0.884
82	N	0.163	0.160	0.181
83	o XYL	0.097	0.083	0.114
84	unk	0.676	0.647	0.715
85	unk	-	-	-
86	1 M 2 PCYC 5	0.250	0.239	0.247
87	t 1 M 4 ECYC 6	0.572	0.542	0.567
88	c 1 M 4 ECYC 6	0.454	0.440	0.450
89	N	-	-	-
90	N	0.189	0.183	0.187



	Component	Weight%	Liquid vol %	Mole %
91	N	-	-	-
92	n C9	5.908	6.220	5.759
93	1 M 1 ECYC 6	0.476	0.456	0.472
94	C 9-N	0.131	0.126	0.130
95	i PBZ	0.111	0.098	0.116
96	C 10-P	-	-	-
97	C 9-N	0.219	0.210	0.217
98	C 9-N	0.827	0.793	0.819
99	C 10-P	-	-	-
100	C 10-P	0.294	0.304	0.258
101	unk	0.189	0.180	0.182
102	C 10-P	-	-	-
103	s BCYC 5	0.908	0.870	0.899
104	C 10-P	-	-	-
105	C 10-P	-	-	-
106	3 MC 9	0.915	0.948	0.804
107	C 10-P	0.220	0.228	0.194
108	unk	-	-	-
109	unk	-	-	-
110	n PBZ	0.690	0.605	0.718
111	N	0.335	0.317	0.298
112	unk	-	-	-
113	unk	-	-	-
114	m E TOL	0.722	0.631	0.751
115	p E TOL	0.734	0.644	0.764
116	135 TM BZ	0.871	0.761	0.906
117	N	-	-	-
118	C 10-N	1.116	1.056	0.995
119	C 10-P	0.126	0.129	0.111
120	2 MC 9	0.471	0.489	0.414
121	o E TOL	0.471	0.404	0.490
122	C 10-P	0.389	0.403	0.342
123	36 DMC 8	0.230	0.238	0.202
124	N	0.081	0.077	0.072
125	C 10-N	0.040	0.038	0.035
126	124 TM BZ	0.958	0.827	0.997
127	C 10-N	0.066	0.062	0.059
128	N	0.354	0.335	0.316
129	C 10-N	-	-	-
130	N	0.494	0.467	0.440
131	N	-	-	-
132	N	0.078	0.074	0.070
133	C 10-P	-	-	-
134	n C 10	8.106	8.403	7.121
135	unk	0.273	0.256	0.254
136	unk	0.119	0.112	0.111
137	123 TM BZ	0.276	0.233	0.287
138	unk	0.430	0.404	0.388
139	unk	0.499	0.469	0.45
140	unk	0.290	0.272	0.261



	Component	Weight%	Liquid vol %	Mole %
141	unk	1.248	1.173	1.125
142	C 10-A	0.729	0.641	0.679
143	C 10-N	0.172	0.163	0.153
144	C 11-P	0.771	0.789	0.617
145	unk	0.172	0.163	0.150
146	C 10-N	0.771	0.729	0.687
147	unk	-	-	-
148	unk	-	-	-
149	C 10-A	-	-	-
150	C 10-A	-	-	-
151	C 10-A	0.272	0.240	0.254
152	unk	0.054	-	-
153	C 10-A	0.176	0.155	0.164
154	unk	-	-	-
155	unk	0.207	0.195	0.180
156	unk	0.570	0.539	0.496
157	unk	-	-	-
158	C 10-A	0.580	0.511	0.541
159	C 11-P	0.389	0.398	0.311
160	C 11-P	1.042	1.066	0.833
161	C 11-P	0.142	0.145	0.114
162	C 10-A	-	-	-
163	C 11-P	1.086	1.111	0.869
164	C 10-A	0.218	0.192	0.203
165	unk	0.276	0.262	0.238
166	unk	-	-	-
167	unk	0.141	0.134	0.122
168	C 10-A	0.204	0.179	0.190
169	n C 11	8.467	8.659	6.772
170	unk	-	-	-
171	C 10-A	0.238	0.209	0.222
172	unk	-	-	-
173	C 10-A	0.466	0.410	0.434
174	unk	0.056	0.052	0.046
175	unk	0.777	0.731	0.638
176	unk	-	-	-
177	unk	0.521	0.490	0.428
178	unk	0.742	0.697	0.609
179	C 12-P	0.119	0.120	0.088
180	unk	0.220	0.207	0.179
181	unk	0.125	0.118	0.102
182	unk	0.563	0.530	0.460
183	unk	0.404	0.381	0.330
184	C 11-A	0.485	0.427	0.409
185	unk	0.956	0.901	0.782
186	C 12-P	0.685	0.691	0.503
187	C 11-A	0.398	0.350	0.336
188	unk	0.440	0.414	0.360
189	n C 12	7.670	7.740	5.631

'The symbol " - " signifies < 0.005%



**TRACE METALS & SULPHUR**  
**Additive Elements by ASTM D 5185**

Element	SAMPLE ID :	SAMPLE ID :	Units
	1LT TIN 1.11	20LT DRUM 1.15	
Silver*	0	0	mg/kg
Aluminium*	0	0	mg/kg
Boron*	0	0	mg/kg
Barium*	0	0	mg/kg
Calcium*	0	0	mg/kg
Chromium*	0	0	mg/kg
Copper*	0	0	mg/kg
Iron*	0	0	mg/kg
Magnesium*	0	0	mg/kg
Manganese*	0	0	mg/kg
Molybdiium*	0	0	mg/kg
Sodium*	0	0	mg/kg
Nickel*	1	1	mg/kg
Phosphorous*	0	0	mg/kg
Lead*	0	0	mg/kg
Silicon*	0	0	mg/kg
Tin*	0	0	mg/kg
Titanium*	0	0	mg/kg
Vanadium*	1	1	mg/kg
Zinc*	0	0	mg/kg
Mercury	80	80	ppb
Sulphur (ASTM D5453)	72.62	80.02	mg/kg