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LABORATORIES

ENERPLUS CORPORATION

ROSELEA UNIT-1

SECTION 1: SAMPLE VALIDATION (DEAD OIL COMPOSITION)

SECTION 2: RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

SECTION 3: DIFFERENTIAL LIBRATION RESULTS

SECTION 4: MULTI-STAGE SEPARATOR TEST

FINAL REPORT

Prepared for



By

Weatherford Laboratories (Canada) Ltd.

1338A – 36th Avenue N.E.

Calgary, Alberta

Canada T2E 6T6

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www.weatherfordlabs.com

September 16, 2011

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VIRDEN OFFICE

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**ENERPLUS CORPORATION
ROSELEA UNIT-1**

**SECTION 1
SAMPLE VALIDATION (DEAD OIL COMPOSITION)**

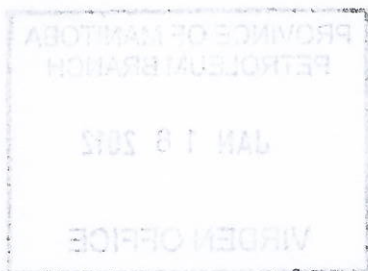
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SECTION 1
SAMPLE VALIDATION

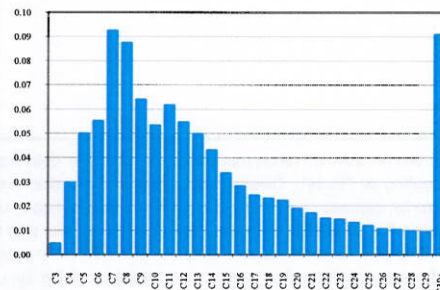
TABLE 1-1
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
OIL SAMPLE COLLECTION DATA

Project File:	CL-50439
Operator Name:	ENERPLUS RESOURCES FUND (CANADA)
Pool or Zone:	LODGEPOLE
Field or Area:	VIRDEN ROSELEA
Well Location:	100/10-25-010-26W1M
Fluid Sample:	SC7894
Sample Description:	FLASHED OIL
Sampling Company:	Hycal Energy
Name of Sampler:	NC
Sampling Date:	January 20, 2011
Sampling Point:	TREATER PRODUCTION LINE
Sampling Temperature:	Ambient
Sampling Pressure:	Atmospheric

SECTION 1 SAMPLE VALIDATION

TABLE 1-2
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
COMPOSITIONAL ANALYSIS OF FLASHED OIL

Boiling Point (F)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N ₂	0.0000	0.0000	Total Sample
-109.3	Carbon Dioxide	CO ₂	0.0000	0.0000	
-76.6	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 205.98
-259.1	Methane	C ₁	0.0000	0.0000	
-128.0	Ethane	C ₂	0.0000	0.0000	
-44.0	Propane	C ₃	0.0047	0.0010	C₆₊ Fraction
10.9	i-Butane	i-C ₄	0.0058	0.0016	
30.9	n-Butane	n-C ₄	0.0238	0.0067	Molecular Weight 218.90
82.0	i-Pentane	i-C ₅	0.0221	0.0078	Mole Fraction 0.9157
97.0	n-Pentane	n-C ₅	0.0279	0.0098	Density (g/cc) 0.8571
97 - 156	Hexanes	C ₆	0.0508	0.0212	
156 - 208.9	Heptanes	C ₇	0.0552	0.0269	C₇₊ Fraction
208.9 - 258.1	Octanes	C ₈	0.0643	0.0356	
258.1 - 303.1	Nonanes	C ₉	0.0538	0.0335	Molecular Weight 227.49
303.1 - 345	Decanes	C ₁₀	0.0471	0.0325	Mole Fraction 0.8605
345 - 385	Undecanes	C ₁₁	0.0617	0.0441	Density (g/cc) 0.8621
385 - 419	Dodecanes	C ₁₂	0.0547	0.0428	
419 - 455	Tridecanes	C ₁₃	0.0498	0.0423	C₁₂₊ Fraction
455 - 486	Tetradecanes	C ₁₄	0.0431	0.0398	
486 - 519.1	Pentadecanes	C ₁₅	0.0336	0.0336	Molecular Weight 304.91
519.1 - 550	Hexadecanes	C ₁₆	0.0282	0.0304	Mole Fraction 0.5018
550 - 557	Heptadecanes	C ₁₇	0.0243	0.0280	Density (g/cc) 0.8929
557 - 603	Octadecanes	C ₁₈	0.0231	0.0281	
603 - 626	Nonadecanes	C ₁₉	0.0223	0.0284	C₃₀₊ Fraction
626 - 651.9	Eicosanes	C ₂₀	0.0189	0.0253	
651.9 - 675	Heneicosanes	C ₂₁	0.0171	0.0242	Molecular Weight 584.92
675 - 696.9	Docosanes	C ₂₂	0.0149	0.0221	Mole Fraction 0.0911
696.9 - 716	Tricosanes	C ₂₃	0.0145	0.0224	Density (g/cc) 0.9843
716 - 736	Tetracosanes	C ₂₄	0.0133	0.0213	
736 - 755.1	Pentacosanes	C ₂₅	0.0121	0.0202	
755.1 - 774	Hexacosanes	C ₂₆	0.0108	0.0188	
774.1 - 792	Heptacosanes	C ₂₇	0.0105	0.0191	
792.1 - 809.1	Octacosanes	C ₂₈	0.0099	0.0187	
809.1 - 826	Nonacosanes	C ₂₉	0.0095	0.0186	
Above 826	Tricontanes Plus	C ₃₀₊	0.0911	0.2587	
NAPHTHENES					
120.0	Cyclopentane	C ₅ H ₁₀	0.0044	0.0015	
162.0	Methylcyclopentane	C ₆ H ₁₂	0.0165	0.0067	
178.0	Cyclohexane	C ₆ H ₁₂	0.0205	0.0084	
214.0	Methylcyclohexane	C ₇ H ₁₄	0.0204	0.0097	
AROMATICS					
176.0	Benzene	C ₆ H ₆	0.0000	0.0000	
231.1	Toluene	C ₇ H ₈	0.0027	0.0012	
277 - 282	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0056	0.0029	
291.9	o-Xylene	C ₈ H ₁₀	0.0046	0.0024	
336.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0063	0.0037	
Total			1.0000	1.0000	



Note: Physical Properties Calculated Based on GPA 2145-00 Physical Constants

GC ID: 9797

ID: 1613-1863--11032



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LABORATORIES

ENERPLUS CORPORATION ROSELEA UNIT-1

SECTION 2 RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

FINAL REPORT

Prepared for



By

Weatherford Laboratories (Canada) Ltd.
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SECTION 2 - RESERVOIR FLUID STUDY

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RESULTS AND DISCUSSION

The Sample Validation study was conducted on the RECOMBINED sample SC7894 collected from the well 100/10-25-010-26W1M of the VIRDEN ROSELEA reservoir.

A small portion of the sample was flashed at atmospheric pressure to measure the oil formation volume factor and the solution gas-oil ratio from test conditions to stock tank conditions.

Compositional analyses were subsequently performed on the flashed phases using gas chromatography methods. The molecular weight of the flashed liquid phase was measured using the freezing point technique.

Based on these results, the selected sample was mathematically recombined to the measured solution gas-oil ratio.

[Table 1](#) summarizes the sample collection and transfer data.

The main PVT parameters measured along with the material balance check performed are given in [Table 2](#). The calculated formation volume factor compared to the measured one indicates very good agreement and is an indicator of overall data quality.

[Table 3](#) through [5](#) provide the composition analyses of recombined fluid, flashed oil at stock tank conditions and flashed gas at standard conditions.

SECTION 2
RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

TABLE 2-1
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
SAMPLE COLLECTION DATA

Project File:	CL-50439	
Company:	ENERPLUS RESOURCES FUND (CANADA)	
Pool:	LODGEPOLE	
Field:	VIRDEN ROSELEA	
Well Location:	100/10-25-010-26W1M	
Fluid Sample:	SC7894	
Sample Description:	RECOMBINED	
Sampling Company:	HYCAL ENERGY	
Name of Sampler:	NC	
Sampling Date:	20-Jan-11	
Sampling Point:	TREATER PRODUCTION LINE	
Sampling Temperature:	Ambient	
Sampling Pressure:	Atmospheric	
Reservoir Temperature:	86.0 F	303.2 K
Reservoir Pressure:	N/A psia	N/A MPa
Initial Reservoir Pressure (Pi)	N/A psia	N/A MPa
Depth of Reported Pi	N/A mMD	N/A mss

SECTION 2 RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

TABLE 2-2
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
MAIN PVT RESULTS

INITIAL RESERVOIR CONDITIONS

Reservoir Pressure	N/A psia	N/A MPa
Reservoir Temperature:	86.0 F	303.2 K

SINGLE-STAGE SEPARATOR TEST @ 1,691 psia (11.66 MPa) AND 86.0 F (303.2 K)

At Separator Test Conditions		
Oil Formation Volume Factor	1.0624 res.bbl/STB	1.0624 res.m ³ /m ³
Solution Gas-Oil Ratio	121.42 scf/STB	21.63 m ³ /m ³
Oil Density	0.8389 g/cm ³	838.9 kg/m ³
At Tank Conditions		
Residual Oil Density	0.8528 g/cm ³	852.8 kg/m ³
API Gravity	34.43	34.43

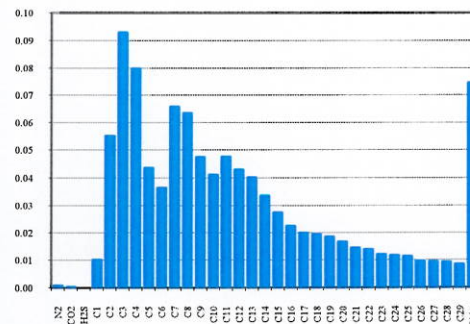
SINGLE-STAGE SEPARATOR TEST - MATERIAL BALANCE CHECK

Oil FVF @ 1691 psia (11.66 MPa) (Measured)	1.0624	res.bbl/STB (res.m ³ /m ³)
Oil FVF @ 1691 psia (11.66 MPa) (Calculated)	1.0625	res.bbl/STB (res.m ³ /m ³)
Absolute Relative Error	0.0043	(%)

SECTION 2 RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

TABLE 2-3
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
COMPOSITIONAL ANALYSIS OF RESERVOIR FLUID

Boiling Point (F)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N ₂	0.0007	0.0001	Total Sample
-109.3	Carbon Dioxide	CO ₂	0.0003	0.0001	
-76.6	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 176.25
-259.1	Methane	C ₁	0.0100	0.0009	
-128.0	Ethane	C ₂	0.0551	0.0094	
-44.0	Propane	C ₃	0.0929	0.0232	C₆₊ Fraction
10.9	i-Butane	i-C ₄	0.0201	0.0066	
30.9	n-Butane	n-C ₄	0.0598	0.0197	Molecular Weight 226.53
82.0	i-Pentane	i-C ₅	0.0256	0.0105	Mole Fraction 0.7146
97.0	n-Pentane	n-C ₅	0.0180	0.0074	Density (g/cc) 0.8609
97 - 156	Hexanes	C ₆	0.0336	0.0165	
156 - 208.9	Heptanes	C ₇	0.0388	0.0220	C₇₊ Fraction
208.9 - 258.1	Octanes	C ₈	0.0476	0.0309	
258.1 - 303.1	Nonanes	C ₉	0.0396	0.0288	Molecular Weight 234.04
303.1 - 345	Decanes	C ₁₀	0.0366	0.0296	Mole Fraction 0.6540
345 - 385	Undecanes	C ₁₁	0.0475	0.0396	Density (g/cc) 0.8651
385 - 419	Dodecanes	C ₁₂	0.0430	0.0393	
419 - 455	Tridecanes	C ₁₃	0.0401	0.0398	C₁₂₊ Fraction
455 - 486	Tetradecanes	C ₁₄	0.0334	0.0360	
486 - 519.1	Pentadecanes	C ₁₅	0.0273	0.0320	Molecular Weight 307.03
519.1 - 550	Hexadecanes	C ₁₆	0.0224	0.0282	Mole Fraction 0.4157
550 - 557	Heptadecanes	C ₁₇	0.0200	0.0268	Density (g/cc) 0.8932
557 - 603	Octadecanes	C ₁₈	0.0195	0.0277	
603 - 626	Nonadecanes	C ₁₉	0.0186	0.0277	C₃₀₊ Fraction
626 - 651.9	Eicosanes	C ₂₀	0.0167	0.0261	
651.9 - 675	Heneicosanes	C ₂₁	0.0144	0.0238	Molecular Weight 584.92
675 - 696.9	Docosanes	C ₂₂	0.0140	0.0241	Mole Fraction 0.0746
696.9 - 716	Tricosanes	C ₂₃	0.0120	0.0217	Density (g/cc) 0.9843
716 - 736	Tetracosanes	C ₂₄	0.0116	0.0218	
736 - 755.1	Pentacosanes	C ₂₅	0.0114	0.0223	
755.1 - 774	Hexacosanes	C ₂₆	0.0097	0.0197	Recombination Parameters
774.1 - 792	Heptacosanes	C ₂₇	0.0094	0.0199	
792.1 - 809.1	Octacosanes	C ₂₈	0.0092	0.0203	Gas-Oil Ratio (cc/cc) 21.63
809.1 - 826	Nonacosanes	C ₂₉	0.0085	0.0194	Dead Oil Density (g/cc) 0.8528
Above 826	Tricontanes Plus	C ₃₀₊	0.0746	0.2475	Dead Oil MW (g/mol) 205.81
120.0	NAPHTHENES				
120.0	Cyclopentane	C ₅ H ₁₀	0.0028	0.0011	
162.0	Methylcyclopentane	C ₆ H ₁₂	0.0126	0.0060	
178.0	Cyclohexane	C ₆ H ₁₂	0.0144	0.0069	
214.0	Methylcyclohexane	C ₇ H ₁₄	0.0140	0.0078	
176.0	AROMATICS				
176.0	Benzene	C ₆ H ₆	0.0000	0.0000	
231.1	Toluene	C ₇ H ₈	0.0019	0.0010	
277 - 282	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0040	0.0024	
291.9	o-Xylene	C ₈ H ₁₀	0.0038	0.0023	
336.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0045	0.0031	
Total			1.0000	1.0000	



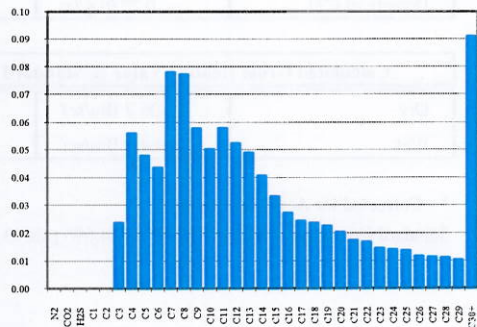
Note: Physical properties are calculated based on GPA 2145-00 physical constants

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SECTION 2 RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

TABLE 2-4
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
COMPOSITIONAL ANALYSIS OF FLASHED OIL

Boiling Point (F)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N ₂	0.0000	0.0000	Total Sample
-109.3	Carbon Dioxide	CO ₂	0.0000	0.0000	
-76.6	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 205.81
-259.1	Methane	C ₁	0.0000	0.0000	Density (g/cc) 0.8459
-128.0	Ethane	C ₂	0.0000	0.0000	
-44.0	Propane	C ₃	0.0237	0.0051	C₆₊ Fraction
10.9	i-Butane	i-C ₄	0.0117	0.0033	
30.9	n-Butane	n-C ₄	0.0444	0.0125	Molecular Weight 227.04
82.0	i-Pentane	i-C ₅	0.0275	0.0097	Mole Fraction 0.8723
97.0	n-Pentane	n-C ₅	0.0203	0.0071	Density (g/cc) 0.8611
97 - 156	Hexanes	C ₆	0.0401	0.0168	
156 - 208.9	Heptanes	C ₇	0.0471	0.0229	C₇₊ Fraction
208.9 - 258.1	Octanes	C ₈	0.0581	0.0322	
258.1 - 303.1	Nonanes	C ₉	0.0483	0.0301	Molecular Weight 234.50
303.1 - 345	Decanes	C ₁₀	0.0447	0.0309	Mole Fraction 0.8288
345 - 385	Undecanes	C ₁₁	0.0580	0.0414	Density (g/cc) 0.8652
385 - 419	Dodecanes	C ₁₂	0.0525	0.0410	
419 - 455	Tridecanes	C ₁₃	0.0490	0.0416	C₁₂₊ Fraction
455 - 486	Tetradecanes	C ₁₄	0.0408	0.0377	
486 - 519.1	Pentadecanes	C ₁₅	0.0334	0.0334	Molecular Weight 307.03
519.1 - 550	Hexadecanes	C ₁₆	0.0273	0.0295	Mole Fraction 0.5073
550 - 557	Heptadecanes	C ₁₇	0.0244	0.0281	Density (g/cc) 0.8932
557 - 603	Octadecanes	C ₁₈	0.0238	0.0290	
603 - 626	Nonadecanes	C ₁₉	0.0227	0.0289	C₃₀₊ Fraction
626 - 651.9	Eicosanes	C ₂₀	0.0204	0.0272	
651.9 - 675	Heneicosanes	C ₂₁	0.0176	0.0249	Molecular Weight 584.92
675 - 696.9	Docosanes	C ₂₂	0.0170	0.0252	Mole Fraction 0.0910
696.9 - 716	Tricosanes	C ₂₃	0.0147	0.0227	Density (g/cc) 0.9843
716 - 736	Tetracosanes	C ₂₄	0.0142	0.0228	
736 - 755.1	Pentacosanes	C ₂₅	0.0139	0.0233	
755.1 - 774	Hexacosanes	C ₂₆	0.0118	0.0206	
774.1 - 792	Heptacosanes	C ₂₇	0.0114	0.0208	
792.1 - 809.1	Octacosanes	C ₂₈	0.0112	0.0212	
809.1 - 826	Nonacosanes	C ₂₉	0.0104	0.0203	
Above 826	Tricontanes Plus	C ₃₀₊	0.0910	0.2587	
NAPHTHENES					
120.0	Cyclopentane	C ₅ H ₁₀	0.0034	0.0012	
162.0	Methylcyclopentane	C ₆ H ₁₂	0.0137	0.0056	
178.0	Cyclohexane	C ₆ H ₁₂	0.0174	0.0071	
214.0	Methylcyclohexane	C ₇ H ₁₄	0.0170	0.0081	
AROMATICS					
176.0	Benzene	C ₆ H ₆	0.0000	0.0000	
231.1	Toluene	C ₇ H ₈	0.0023	0.0010	
277 - 282	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0049	0.0025	
291.9	o-Xylene	C ₈ H ₁₀	0.0046	0.0024	
336.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0055	0.0032	
Total			1.0000	1.0000	



Note: Physical properties are calculated based on GPA 2145-00 physical constants

GC ID: 9941

SECTION 2 RESERVOIR FLUID STUDY (RECOMBINED SAMPLE)

TABLE 2-5
ENERPLUS RESOURCES FUND (CANADA) - VIRDEN ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - SAMPLE SC7894
SAMPLE VALIDATION
COMPOSITIONAL ANALYSIS OF FLASHED GAS

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0041	0.0042		
Carbon Dioxide	CO ₂	0.0014	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0555	0.0556		
Ethane	C ₂	0.3054	0.3058		
Propane	C ₃	0.4069	0.4075	265.711	1491.838
i-Butane	i-C ₄	0.0583	0.0584	45.251	254.063
n-Butane	n-C ₄	0.1297	0.1299	97.039	544.827
i-Pentane	i-C ₅	0.0171	0.0171	14.836	83.295
n-Pentane	n-C ₅	0.0073	0.0073	6.285	35.289
Hexanes	C ₆	0.0042	0.0042	4.113	23.091
Heptanes	C ₇	0.0096	0.0096	10.527	59.104
Octanes	C ₈	0.0004	0.0004	0.536	3.010
Nonanes	C ₉	0.0000	0.0000	0.000	0.000
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	444.298	2494.516
Propanes Plus	C ₃₊	0.6335	0.6345	444.298	2494.516
Butanes Plus	C ₄₊	0.2267	0.2270	178.587	1002.678
Pentanes Plus	C ₅₊	0.0386	0.0387	36.297	203.788

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	42.22 kg/kmol	42.22 lb/lb-mol	Ppc	627.6 psia	4.33 MPa
Specific Gravity	1.4575 (Air = 1)	1.4575 (Air = 1)	Tpc	635.6 R	353.1 K
MW of C7+	96.48 kg/kmol	96.48 lb/lbmol	Ppc*	627.3 psia	4.32 MPa
Density of C7+	0.7230 g/cc	723.0 kg/m3	Tpc*	635.3 R	352.9 K

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,406.7 Btu/scf	89.84 MJ/m3	Dry	2,212.8 Btu/scf	82.60 MJ/m3
Wet	2,364.8 Btu/scf	88.27 MJ/m3	Wet	2,174.3 Btu/scf	81.16 MJ/m3

* - Corrected for Acid Gas Content

Standard Conditions: 60 F (288.7 K) @ 14.696 psia (0.101325 MPa)

GC ID: 4472



Weatherford[®]
LABORATORIES

**ENERPLUS CORPORATION
ROSELEA UNIT-1**

**SECTION 3
DIFFERENTIAL LIBERATION RESULTS**

FINAL REPORT

Prepared for



By

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RESULTS AND DISCUSSION

The reservoir fluid study was conducted on a RECOMBINED sample from Well 100/10-25-010-26W1M of ROSELEA UNIT-1 Lodgepole reservoir.

The sample collection data is provided in Table 3-1 and the sample validation data is given in Appendix A.

The PVT cell was charged with a portion of the live oil sample and a constant composition expansion experiment (CCE) was performed on the oil. Table 1-3 provides the CCE results of the average compressibility of the reservoir fluid at pressures above the bubblepoint. Table 3-4 contains the complete CCE results with the exception of the data already presented in Table 3-3. Figure 3-1 is the relative total volume (V/V_{sat}) data and Y-function.

Table 3-5 contains various property measurements made on the differentially liberated oil below the bubblepoint including live oil density, oil formation volume factor and gas-oil ratios, which are shown in Figures 3-2 through 3-4, respectively.

Table 3-6 contains a summary of the properties of the differentially liberated gas including gas gravities, deviation factors, gas formation volume factors and gas expansion factors. The gas deviation factor (Z), gas formation volume factor and gas expansion factor, and gas gravity are shown in Figures 3-5 through 3-7, respectively.

Table 3-7 provides the results of the reservoir fluid viscosity measurements. This data is represented by Figures 3-8 and 3-9. Gas phase viscosity was calculated using the compositional data and the Lee, Gonzalez, Eakin correlation.

Table 3-8 summarizes the effluent gas compositions from each pressure stage during the differential liberation experiment. Figures 3-10 shows this data plotted on semi-log co-ordinates.

Table 3-9 presents the compositional analysis of the residual oil at completion of the experiment.

Table 3-10 provides the correlations of the measured PVT Data.

Appendix B contains the material balance check performed for this experiment. It is displayed as formation volume factors so that the balance can be checked on a point by point basis. Appendix C contains the compositional analyses of the liberated gases from the differential liberation test.

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

SUMMARY

ENERPLUS CORPORATION - ROSELEA WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE RESERVOIR FLUID STUDY MAIN PVT RESULTS

INITIAL RESERVOIR CONDITIONS

Reservoir Pressure	N/A psia	N/A MPa
Reservoir Temperature:	86 F	30 C

CONSTANT COMPOSITION EXPANSION @ 86.0 F (30 C)

Saturation Pressure	176 psia	1.21 MPa
Compressibility @ Reservoir Pressure	2.87552E-06 psia ⁻¹	4.170593E-04 MPa ⁻¹
Compressibility @ Saturation Pressure	3.4803E-06 psia ⁻¹	5.047751E-04 MPa ⁻¹

DIFFERENTIAL LIBERATION @ 86.0 F (303.2 K)

At Saturation Pressure		
Oil Formation Volume Factor	1.0788 res.bbl/STB	1.0788 res.m ³ /m ³
Solution Gas-Oil Ratio	131.64 scf/STB	23.44 m ³ /m ³
Oil Density	0.8341 g/cm ³	834.1 kg/m ³
Oil Viscosity	2.995 cp	2.995 mPa.s
At Ambient Pressure		
Residual Oil Density	0.8465 g/cm ³	846.5 kg/m ³
Residual Oil Viscosity	5.490 cp	5.490 mPa.s
At Tank Conditions		
Residual Oil Density	0.8604 g/cm ³	860.4 kg/m ³
API Gravity	32.96	32.96

SINGLE-STAGE SEPARATOR TEST

At Saturation Pressure		
Oil Formation Volume Factor	1.0685 res.bbl/STB	1.0685 res.m ³ /m ³
Solution Gas-Oil Ratio	121.42 scf/STB	21.63 m ³ /m ³
At Tank Conditions		
Residual Oil Density	0.8528 g/cm ³	852.8 kg/m ³
API Gravity	34.43	34.43

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TABLE 3-1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
SAMPLE COLLECTION DATA

Project File:	CL-50439
Operator Name:	ENERPLUS CORPORATION
Pool or Zone:	LODGEPOLE
Field or Area:	ROSELEA UNIT-1
Well Location:	100/10-25-010-26W1M
Fluid Sample:	RECOMBINED
Sampling Company:	WEATHERFORD LABORATORIES
Name of Sampler:	DM
Sampling Date:	15-Feb-11
Sampling Point:	WELLHEAD
Sampling (Separator) Temperature:	
Sampling (Separator) Pressure:	
Reservoir Temperature:	86.0 F
Reservoir Pressure:	N/A psia
Initial Reservoir Pressure (Pi)	30.0 C
Depth of Reported Pi	N/A MPa
	N/A psia
	N/A mMD
	N/A MPa
	N/A mss

-320.4	Nitrogen	N2	0.0007	0.0001	Total Sample	
-109.3	Carbon Dioxide	CO2	0.0003	0.0001		
-76.6	Hydrogen Sulphide	H2S	0.0000	0.0000	Molecular Weight	176.29
-259.1	Methane	C1	0.0099	0.0009		
-128.0	Ethane	C2	0.0547	0.0093	C6+ Fraction	
-44.0	Propane	C3	0.0924	0.0231		
10.9	i-Butane	i-C4	0.0200	0.0066	Molecular Weight	226.24
30.9	n-Butane	n-C4	0.0596	0.0197		
82.0	i-Pentane	i-C5	0.0256	0.0105	Mole Fraction	0.7187
97.0	n-Pentane	n-C5	0.0180	0.0074		0.8608
97 - 156	Hexanes	C6	0.0336	0.0164	C7+ Fraction	
156 - 208.9	Heptanes	C7	0.0388	0.0220		
208.9 - 258.1	Octanes	C8	0.0476	0.0309	Molecular Weight	234.11
258.1 - 303.1	Nonanes	C9	0.0396	0.0288		
303.1 - 345	Decanes	C10	0.0366	0.0295	Mole Fraction	0.6810
345 - 385	Undecanes	C11	0.0475	0.0396		0.8651
385 - 419	Dodecanes	C12	0.0430	0.0393	C12+ Fraction	
419 - 455	Tridecanes	C13	0.0401	0.0398		
455 - 486	Tetradecanes	C14	0.0334	0.0360	Molecular Weight	307.03
486 - 519.1	Pentadecanes	C15	0.0273	0.0319		0.4157
519.1 - 550	Hexadecanes	C16	0.0224	0.0282	Mole Fraction	0.8932
557 - 603	Heptadecanes	C17	0.0200	0.0268		
603 - 626	Octadecanes	C18	0.0195	0.0277	Density (g/cc)	
626 - 651.9	Nonadecanes	C19	0.0186	0.0277		
651.9 - 675	Eicosanes	C20	0.0167	0.0261		
675 - 696.9	Henecosanes	C21	0.0144	0.0238		
696.9 - 716	Docosanes	C22	0.0140	0.0241		
716 - 736	Tricosanes	C23	0.0120	0.0217		
736 - 755.1	Tetracosanes	C24	0.0116	0.0218		
755.1 - 774	Pentacosanes	C25	0.0114	0.0223		
774.1 - 792	Hexacosanes	C26	0.0097	0.0197		
792.1 - 809.1	Heptacosanes	C27	0.0094	0.0199		
809.1 - 826	Octacosanes	C28	0.0092	0.0203		
Above 826	Nonacosanes	C29	0.0085	0.0194		
	Tricontanes Plus	C30+	0.0746	0.2475		
120.0	Cyclopentane	C5H10	0.0041	0.0016		
162.0	Methylcyclopentane	C6H12	0.0126	0.0060		
178.0	Cyclohexane	C6H12	0.0144	0.0069		
214.0	Methylcyclohexane	C7H14	0.0140	0.0078		
176.0	Benzene	C6H6	0.0000	0.0000		
231.1	Toluene	C7H8	0.0019	0.0010		
277 - 282	Ethylbenzene & p,m-Xylene	C8H10	0.0040	0.0024		
291.9	o-Xylene	C8H10	0.0038	0.0023		
336.0	1,2,4-Trimethylbenzene	C9H12	0.0045	0.0031		
Total			1.0000	1.0000		

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-3

ENERPLUS CORPORATION - ROSELEA
 WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
 RESERVOIR FLUID STUDY
 OIL COMPRESSIBILITY @ 86.0 F (30.0 C)

Pressure Range		Average Compressibility (psi ⁻¹)
From (psia)	To (psia)	
2013	1513	2.8755E-06
1513	1013	3.0234E-06
1013	813	3.1899E-06
813	613	3.2713E-06
613	413	3.3452E-06
413	213	3.4004E-06
213	176 Psat	3.4803E-06

Pressure Range		Average Compressibility (MPa ⁻¹)
From (MPa)	To (MPa)	
13.88	10.43	4.1706E-04
10.43	6.98	4.3851E-04
6.98	5.60	4.6266E-04
5.60	4.22	4.7446E-04
4.22	2.85	4.8518E-04
2.85	1.47	4.9319E-04
1.47	1.21 Psat	5.0478E-04

Psat - Saturation Pressure

2013	13.88	0.994294	0.8389
1513	10.43	0.995725	0.8377
1013	6.98	0.997233	0.8365
813	5.60	0.997869	0.8359
613	4.22	0.998523	0.8354
413	2.85	0.999191	0.8348
213	1.47	0.999871	0.8342
176 Psat	1.21	1.000000	0.8341
167	1.15	1.000566	95.4038
158	1.09	1.001331	85.7293
147	1.01	1.002674	73.9050
136	0.94	1.004746	62.0806
124	0.85	1.008543	49.1813
114	0.78	1.014180	38.4319
108	0.74	1.019729	31.9823
103	0.71	1.026696	26.6076
98	0.67	1.037573	21.2329
88	0.61	1.095638	10.4835
81	0.56	1.397510	2.9589

[1] Volume at indicated pressure per volume at saturation pressure

[2] Y Function = ((Psat-P)/P)/(Relative Volume - 1)

Psat - Saturation Pressure

SECTION 3
DIFFERENTIAL LIBERATION RESULTS

TABLE 3-5
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION OIL PROPERTIES @ 86.0 F (30.0 C)

Pa)	Oil Density (g/cm ³)	Oil Formation Volume Factor [1]	Total Formation Volume Factor [2]	Gas-Oil Ratio		Gas-Oil Ratio	
				Solution (scf/STB)	Liberated (scf/STB)	Solution (m ³ /m ³)	Liberated (m ³ /m ³)
3.88	0.8389	1.0726	1.0726	131.64	0.00	23.44	0.00
0.43	0.8377	1.0742	1.0742	131.64	0.00	23.44	0.00
5.98	0.8365	1.0758	1.0758	131.64	0.00	23.44	0.00
5.60	0.8359	1.0765	1.0765	131.64	0.00	23.44	0.00
4.22	0.8354	1.0772	1.0772	131.64	0.00	23.44	0.00
2.85	0.8348	1.0779	1.0779	131.64	0.00	23.44	0.00
1.47	0.8342	1.0787	1.0787	131.64	0.00	23.44	0.00
1.21	0.8341	1.0788	1.0788	131.64	0.00	23.44	0.00
0.71	0.8407	1.0605	1.3240	119.86	11.78	21.35	2.10
0.50	0.8432	1.0523	1.8142	106.58	25.06	18.98	4.46
0.39	0.8449	1.0452	2.5064	93.11	38.53	16.58	6.86
0.30	0.8465	1.0391	3.3790	82.19	49.45	14.64	8.81
0.09	0.8501	1.0086	15.0105	0.00	131.64	0.00	23.44

4 g/cm³ (860.4 kg/m³) @ 60 F (15.6 C)

oil at indicated pressure and temperature per barrel (cubic meter) of residual oil @ 60 F (15.6 C).
s) of oil and liberated gas at the indicated pressure and temperature per barrel (cubic meter) of residual oil @ 60 F (15.6 C).
Standard conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa).

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-6
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS PROPERTIES @ 86.0 F (30.0 C)

Pressure		Gas Gravity		Gas Density (g/cm ³)	Gas Deviation Factor (-)	Gas Formation Volume Factor [1]
(psia)	(MPa)	Incremental (Air = 1)	Cumulative (Air = 1)			
2013	13.88					
1513	10.43					
1013	6.98					
813	5.60					
613	4.22					
413	2.85					
213	1.47					
176 Psat	1.21					
103	0.71	1.1464	1.1464	0.0099	0.9417	0.1256
73	0.50	1.2705	1.2122	0.0078	0.9475	0.1707
56	0.39	1.3551	1.2622	0.0063	0.9536	0.2129
43	0.30	1.4399	1.3014	0.0051	0.9598	0.2657
13	0.09	1.3551	1.3349	0.0063	0.9895	0.5972

[1] Cubic feet (meters) of gas at indicated pressure and temperature per cubic feet (meter) @ standard conditions

Psat - Saturation pressure

- Standard conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-7

ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION FLUID VISCOSITY @ 86.0 F (30.0 C)

Pressure (psia)	Oil Viscosity (cp=mPa.s)	Gas Viscosity (cp=mPa.s)	Oil - Gas Viscosity Ratio
713	4.92	3.224	
513	3.54	3.143	
313	2.16	3.061	
176 Psat	1.21	2.995	
103	0.71	3.507	0.00941
73	0.50	3.887	0.00900
56	0.38	4.200	0.00874
43	0.29	4.455	0.00850
13	0.09	5.490	0.00786
			372.54
			431.83
			480.43
			523.98
			698.65
Psat - Saturation Pressure			

	0.71	0.50	0.39	0.30	0.09
N2	0.0152	0.0078	0.0045	0.0025	0.0006
CO2	0.0037	0.0026	0.0020	0.0012	0.0003
H2S	0.0000	0.0000	0.0000	0.0000	0.0000
C1	0.2050	0.0943	0.0398	0.0178	0.0025
C2	0.4462	0.4458	0.4143	0.3390	0.1413
C3	0.2471	0.3432	0.4075	0.4645	0.4499
i-C4	0.0225	0.0300	0.0382	0.0512	0.0911
n-C4	0.0464	0.0600	0.0733	0.0928	0.2105
i-C5	0.0100	0.0114	0.0139	0.0201	0.0640
n-C5	0.0033	0.0043	0.0063	0.0101	0.0391
C6	0.0002	0.0002	0.0002	0.0004	0.0003
C7+	0.0003	0.0003	0.0002	0.0003	0.0005
Total	1.0000	1.0000	1.0000	0.9999	1.0000

Calculated Properties of Total Sample @ Standard Conditions

MW (g/mol)	33.21	36.80	39.25	39.25	49.20
Gravity (Air=1.0)	1.1464	1.2705	1.3551	1.3551	1.6985

Calculated Properties of C7+ @ Standard Conditions

MW (g/mol)	103.30	100.25	100.85	100.85	101.22
Density (g/cc)	0.7362	0.7310	0.7317	0.7317	0.7316

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

**TABLE 3-9
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
COMPOSITIONAL ANALYSIS OF RESIDUAL OIL**

Boiling Point (F)		Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	0.0000	0.0000	Total Sample
-109.3	Carbon Dioxide	0.0000	0.0000	Molecular Weight
-76.6	Hydrogen Sulphide	0.0000	0.0000	
-259.1	Methane	0.0000	0.0000	
-128.0	Ethane	0.0000	0.0000	
-44.0	Propane	0.0076	0.0015	C6+ Fraction
10.9	i-Butane	0.0055	0.0014	
30.9	n-Butane	0.0215	0.0057	Molecular Weight
82.0	i-Pentane	0.0185	0.0060	Mole Fraction
97.0	n-Pentane	0.0140	0.0046	Density (g/cc)
97 - 156	Hexanes	0.0355	0.0139	
156 - 208.9	Heptanes	0.0470	0.0214	
208.9 - 258.1	Octanes	0.0606	0.0314	
258.1 - 303.1	Nonanes	0.0479	0.0279	
303.1 - 345	Decanes	0.0508	0.0328	
345 - 385	Undecanes	0.0557	0.0372	Molecular Weight
385 - 419	Dodecanes	0.0560	0.0409	Mole Fraction
419 - 455	Tridecanes	0.0508	0.0403	Density (g/cc)
455 - 486	Tetradecanes	0.0470	0.0405	
486 - 519.1	Pentadecanes	0.0392	0.0366	
519.1 - 550	Hexadecanes	0.0348	0.0351	
557 - 603	Heptadecanes	0.0271	0.0291	
603 - 626	Octadecanes	0.0302	0.0344	Molecular Weight
626 - 651.9	Nonadecanes	0.0278	0.0332	Mole Fraction
651.9 - 675	Eicosanes	0.0249	0.0311	Density (g/cc)
675 - 696.9	Heneicosanes	0.0206	0.0272	
696.9 - 716	Docosanes	0.0190	0.0263	
716 - 736	Tricosanes	0.0171	0.0247	
736 - 755.1	Tetracosanes	0.0159	0.0239	
755.1 - 774	Pentacosanes	0.0157	0.0246	
774.1 - 792	Hexacosanes	0.0130	0.0212	
792.1 - 809.1	Heptacosanes	0.0127	0.0215	
809.1 - 826	Octacosanes	0.0117	0.0206	
Above 826	Nonacosanes	0.0107	0.0195	
	Tricontanes Plus	0.0975	0.2587	
120.0	Cyclopentane	0.0028	0.0009	
162.0	Methylcyclopentane	0.0128	0.0049	
178.0	Cyclohexane	0.0168	0.0064	
214.0	Methylcyclohexane	0.0182	0.0081	

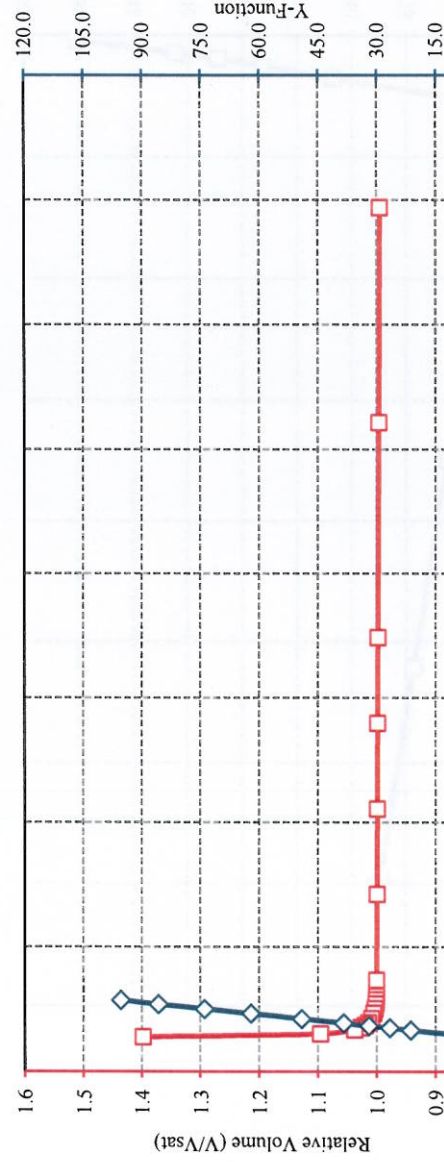
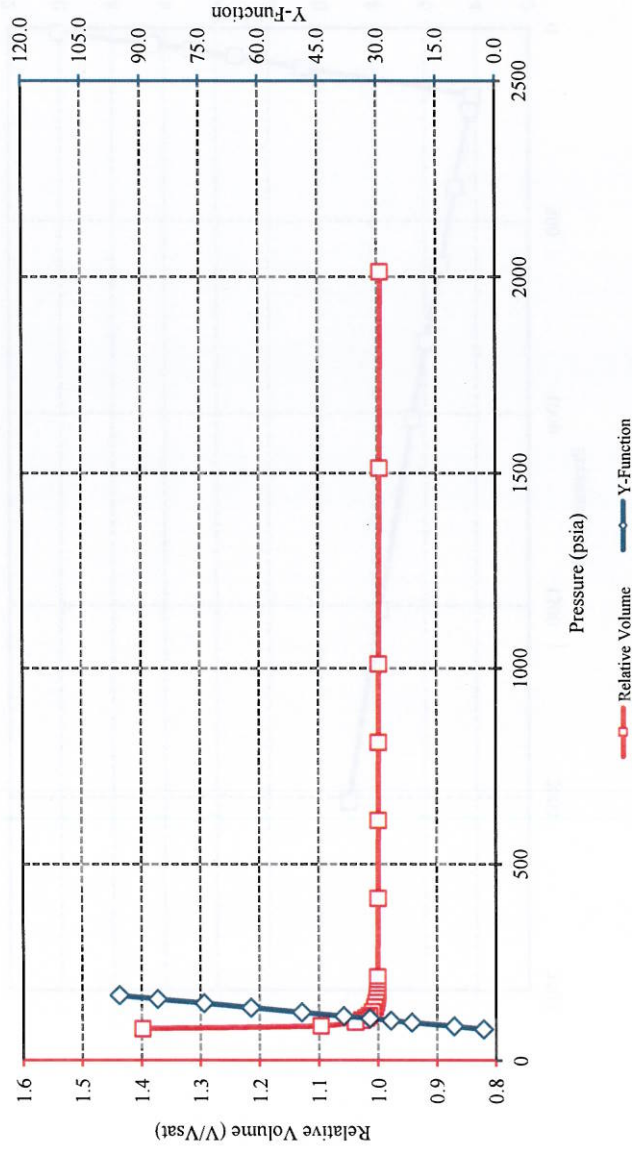
SECTION 3 DIFFERENTIAL LIBERATION RESULTS

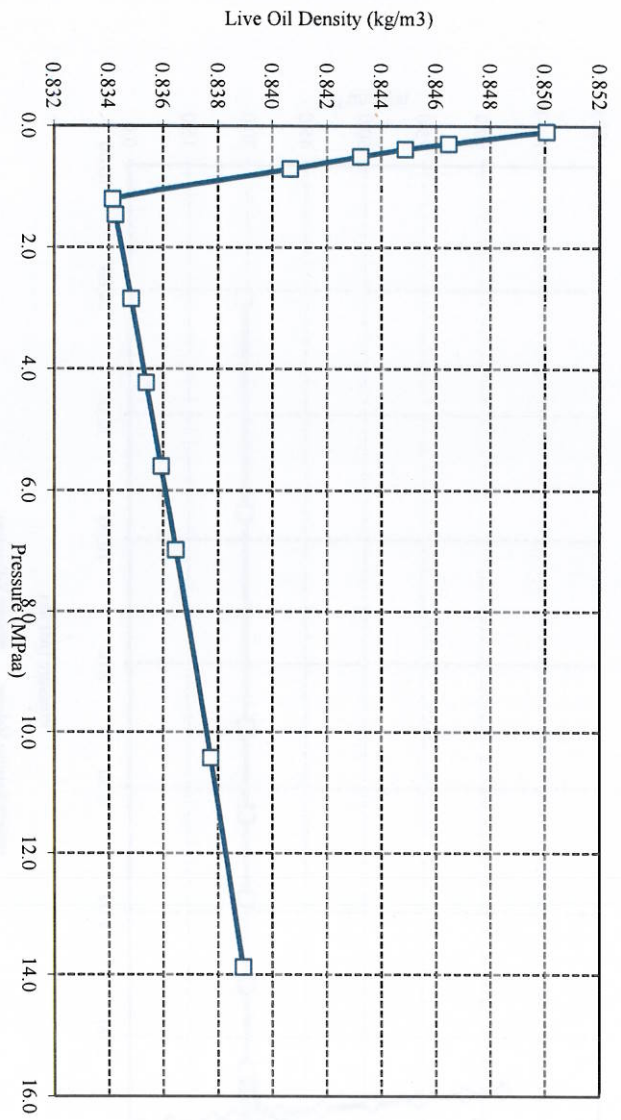
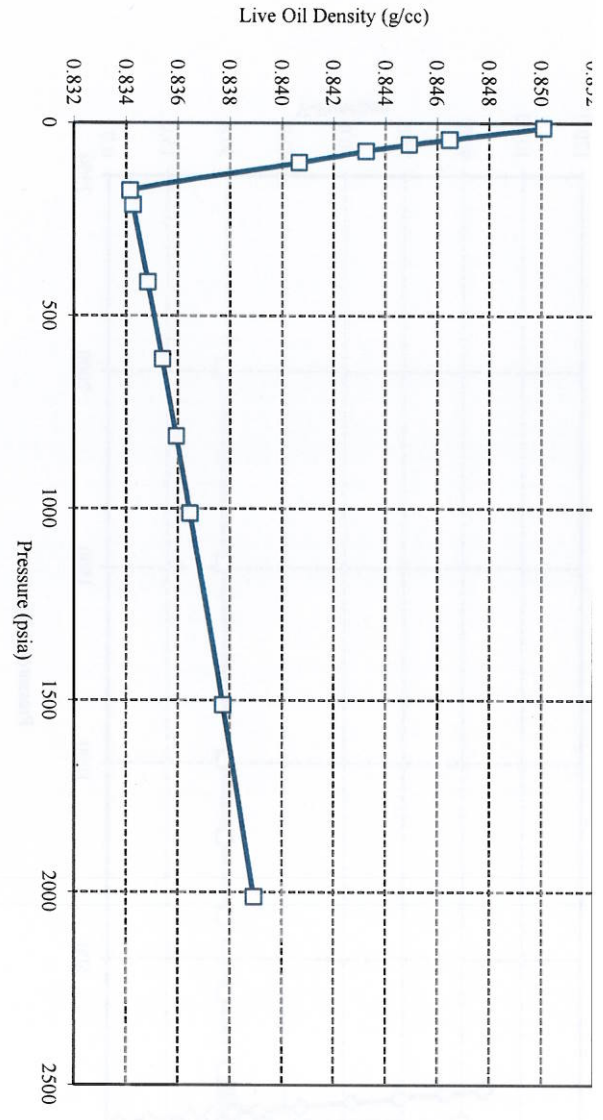
TABLE 3-10
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
CORRELATIONS OF MEASURED PVT LABORATORY DATA

CONSTANT COMPOSITION EXPANSION @ 86.0 F (30.0 C)		
Relative Volume (V/Vsat)	(P >= Psat)	$y = (-0.000016x^2 + 2.107552x + 0.464679) / (2.101370x + 1.569268)$ R Squared = 0.998847
Relative Volume (V/Vsat)	(P <= Psat)	$y = (0.002081x^2 + 0.359223x + 20.237782) / (1.037622x + -38.412772)$ #VALUE!
DIFFERENTIAL LIBERATION @ 86.0 F (30.0 C)		
Live Oil Density (g/cc)	(P >= Psat)	$y = (0.000001x^2 + 0.158447x + 0.200144) / (0.190384x + 0.299884)$ R Squared = 0.828211
Live Oil Density (g/cc)	(P <= Psat)	$y = (-0.000018x^2 + 0.163470x + 0.233481) / (0.193156x + 0.272863)$ R Squared = 0.920141
Oil FVF [1]	(P >= Psat)	$y = (-0.000001x^2 + 0.209052x + 0.228227) / (0.194489x + 0.119406)$ R Squared = 0.753811
Oil FVF [1]	(P <= Psat)	$y = (0.000224x^2 + 1.116104x + 0.005967) / (1.071674x + 0.359471)$ R Squared = 0.994584
GOR (vol/vol)	(P <= Psat)	$y = (0.010103x^2 + 7.758067x + -102.567308) / (0.345370x + 18.586299)$ R Squared = 0.655235
Oil Viscosity (cp=mPa.s)	(P >= Psat)	$y = (0.000072x^2 + 0.616031x + 0.203399) / (0.193255x + 0.328227)$ R Squared = 0.968361
Oil Viscosity (cp=mPa.s)	(P <= Psat)	$y = (-0.000797x^2 + 0.352676x + 12.289147) / (0.083320x + 2.056031)$ R Squared = 0.871010
y is the measured parameter and x = P/Psat, dimensionless		
[1] Barrels (Cubic meters) of oil at indicated pressure and temperature per barrel (cubic meter) of residual oil @ 60 F (15.6 C).		
[2] Cubic feet (meters) of gas at indicated pressure and temperature per cubic feet (meter) @ standard conditions		

**SECTION 3
DIFFERENTIAL LIBERATION RESULTS**

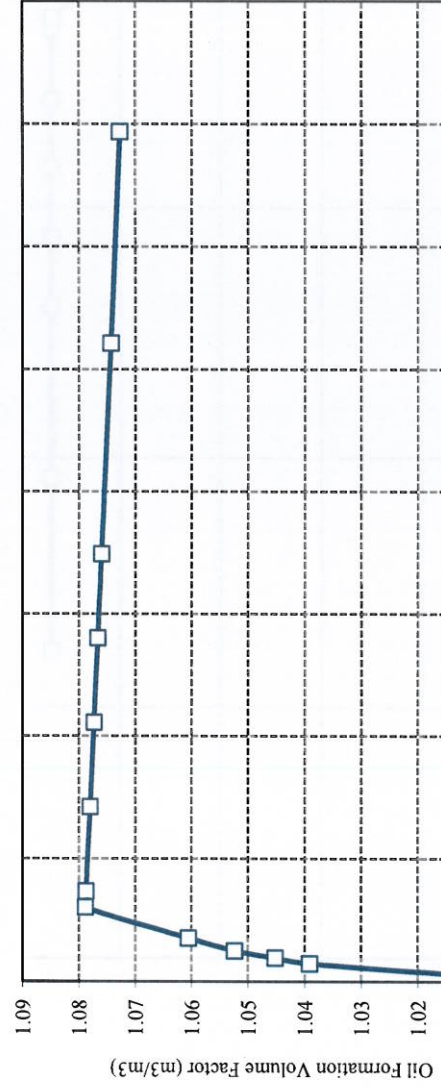
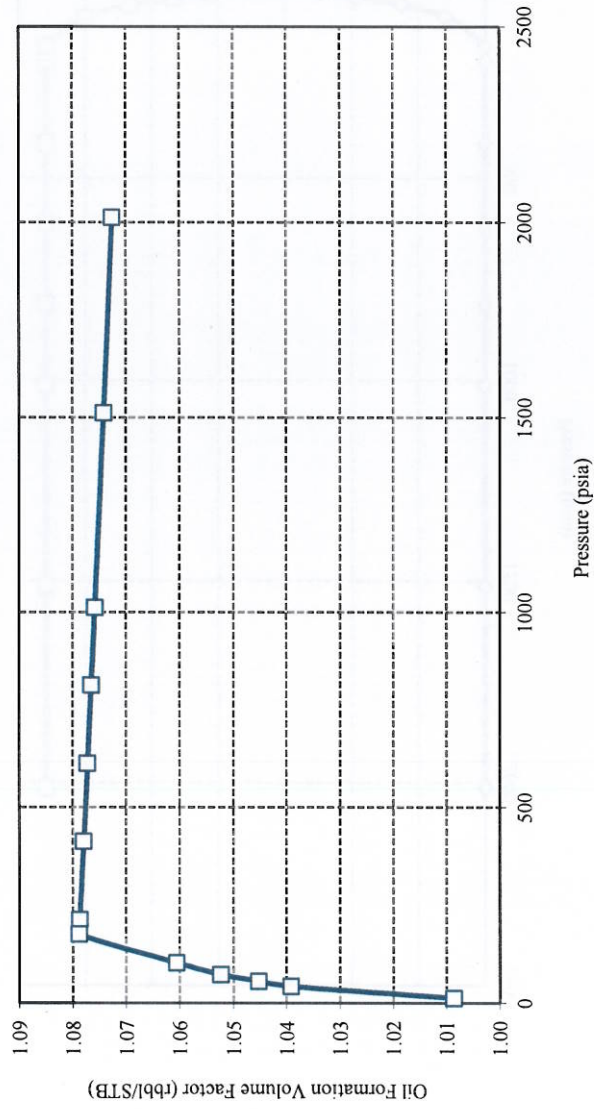
**FIGURE 3-1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
CONSTANT COMPOSITION EXPANSION @ 86.0 F (30.0 C)**

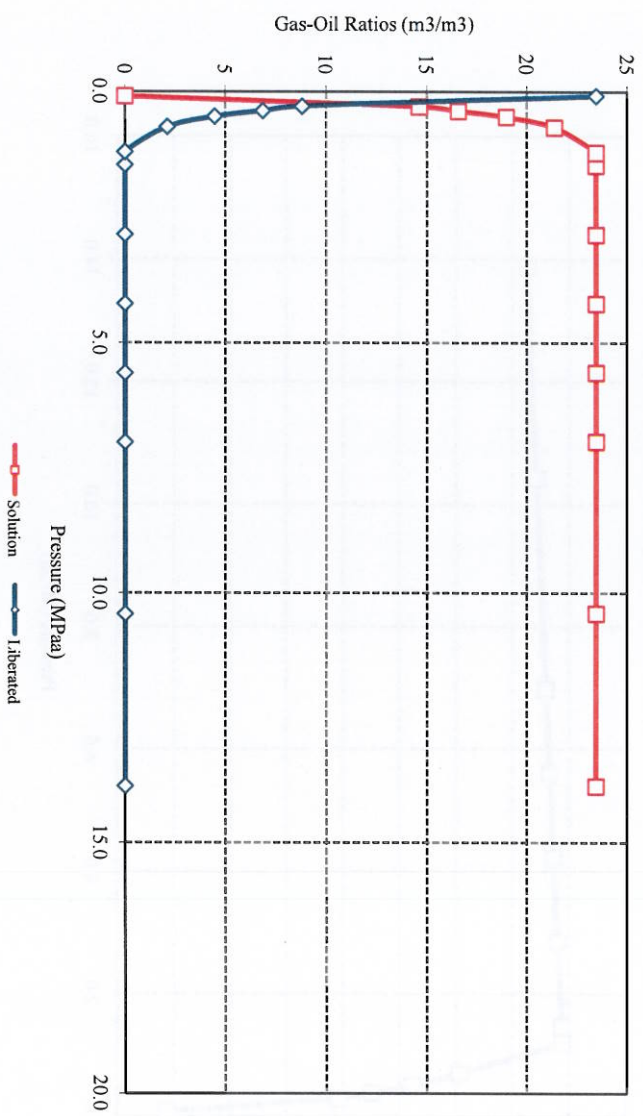
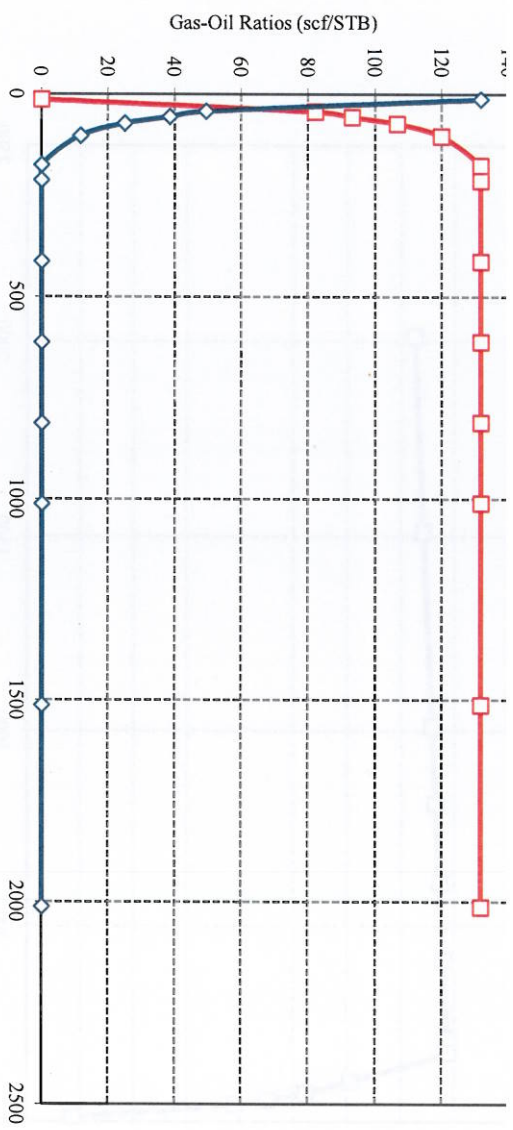




**SECTION 3
DIFFERENTIAL LIBERATION RESULTS**

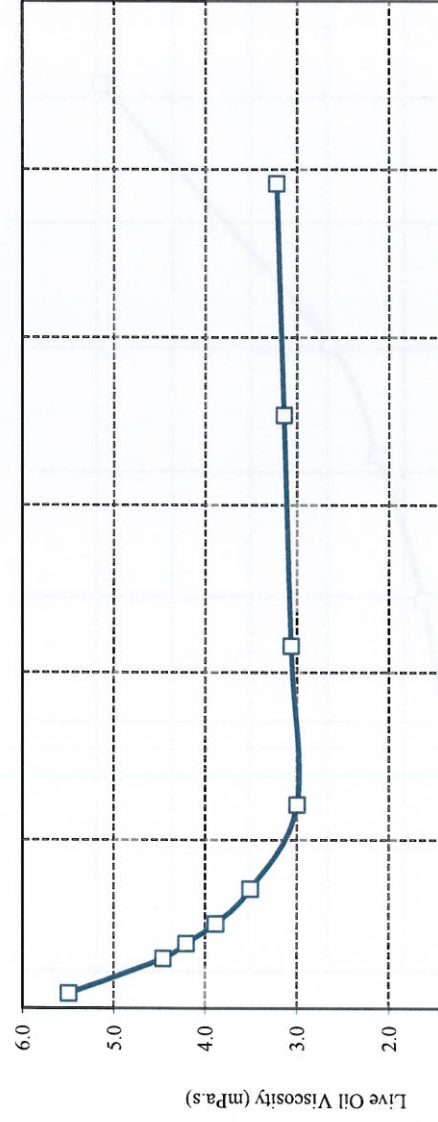
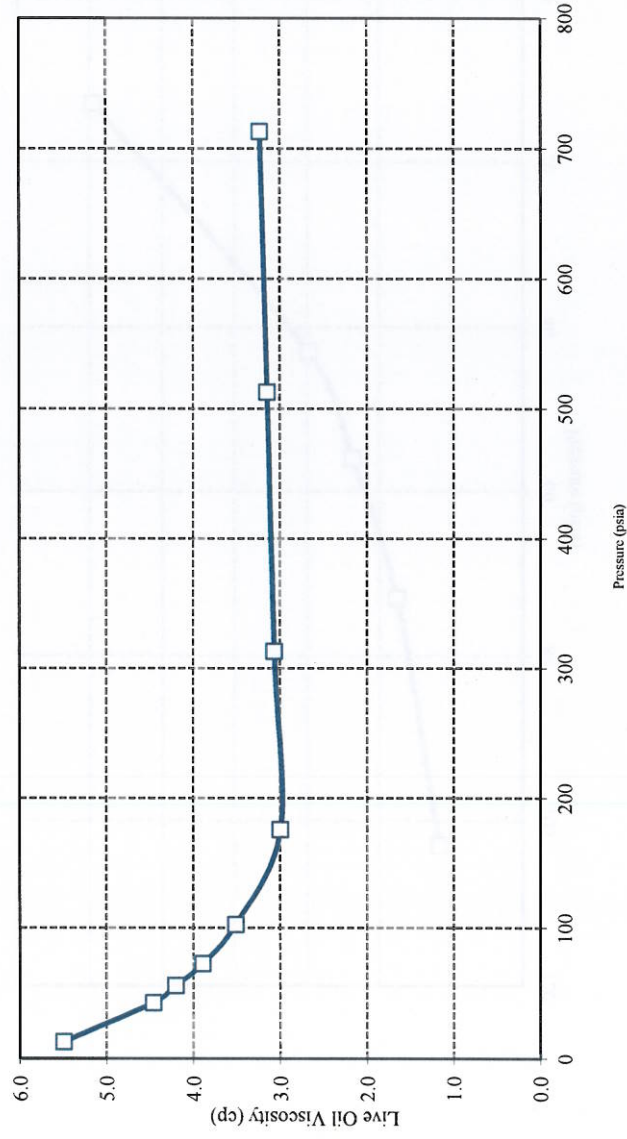
**FIGURE 3-3
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION OIL FORMATION VOLUME FACTOR @ 86.0 F (30.0 C)**

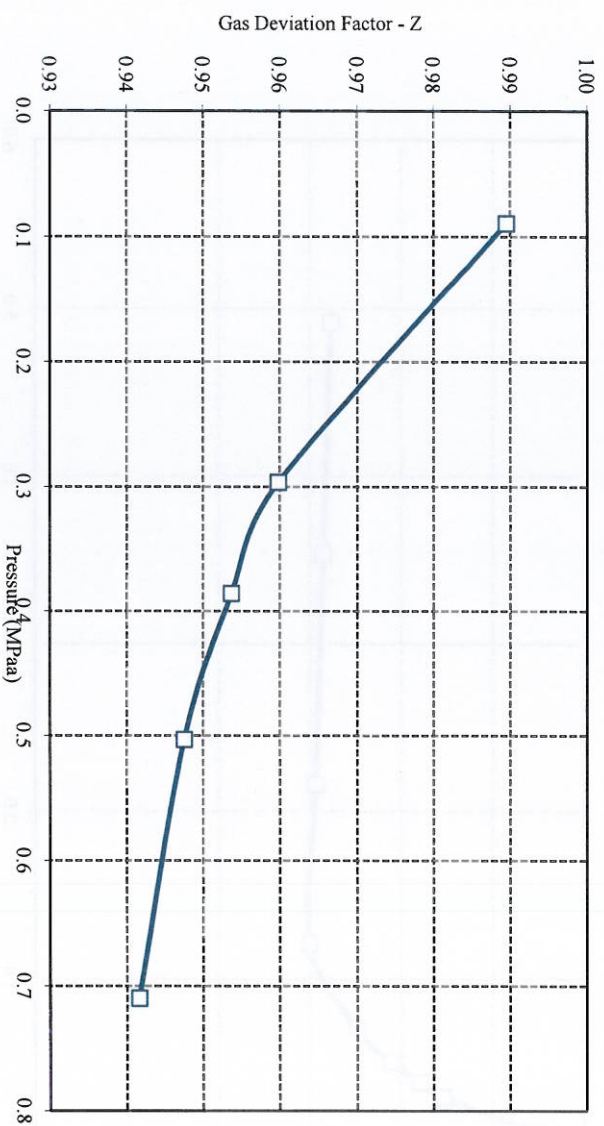
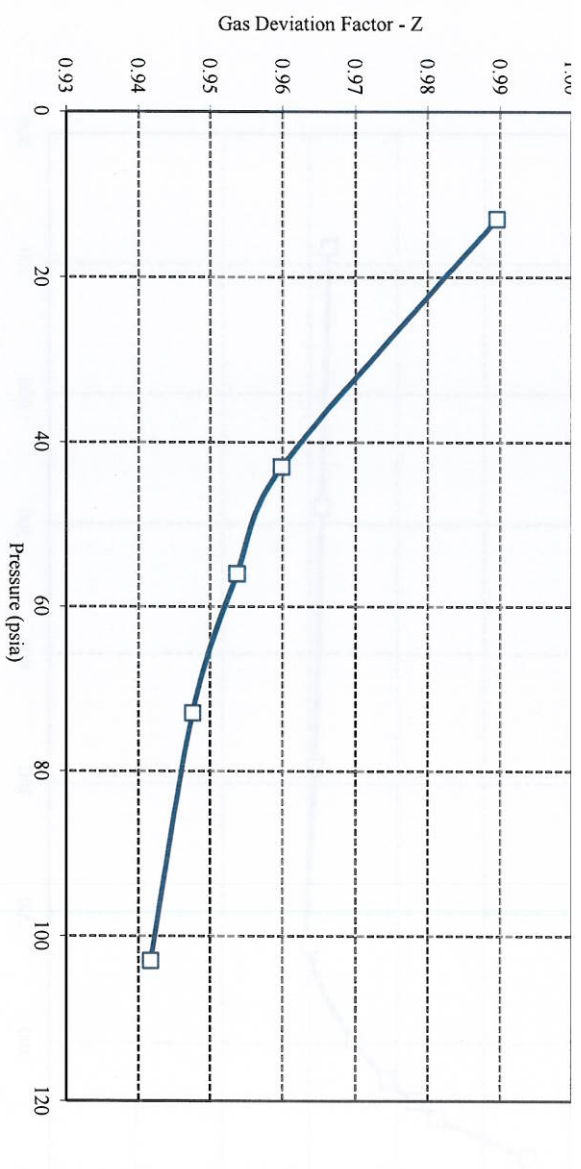




SECTION 3 DIFFERENTIAL LIBERATION RESULTS

FIGURE 3-5
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION OIL VISCOSITY @ 86.0 F (30.0 C)

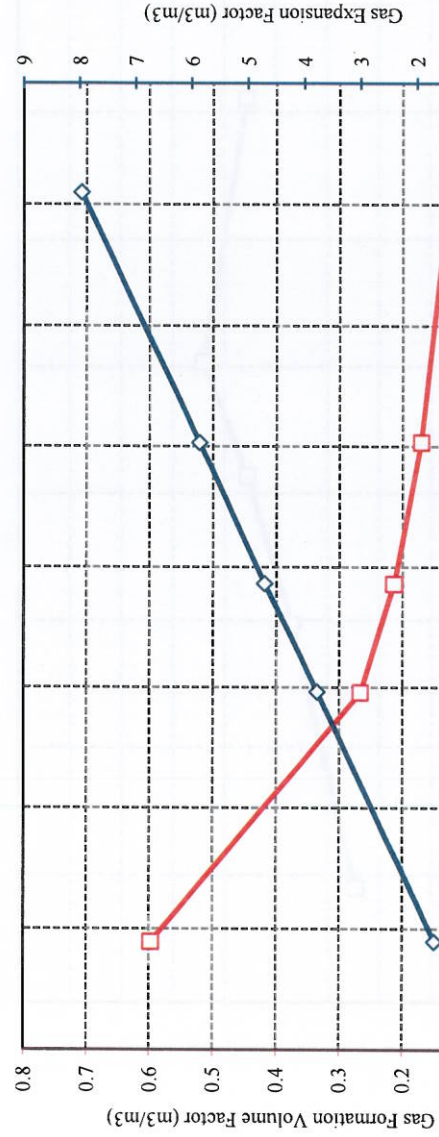
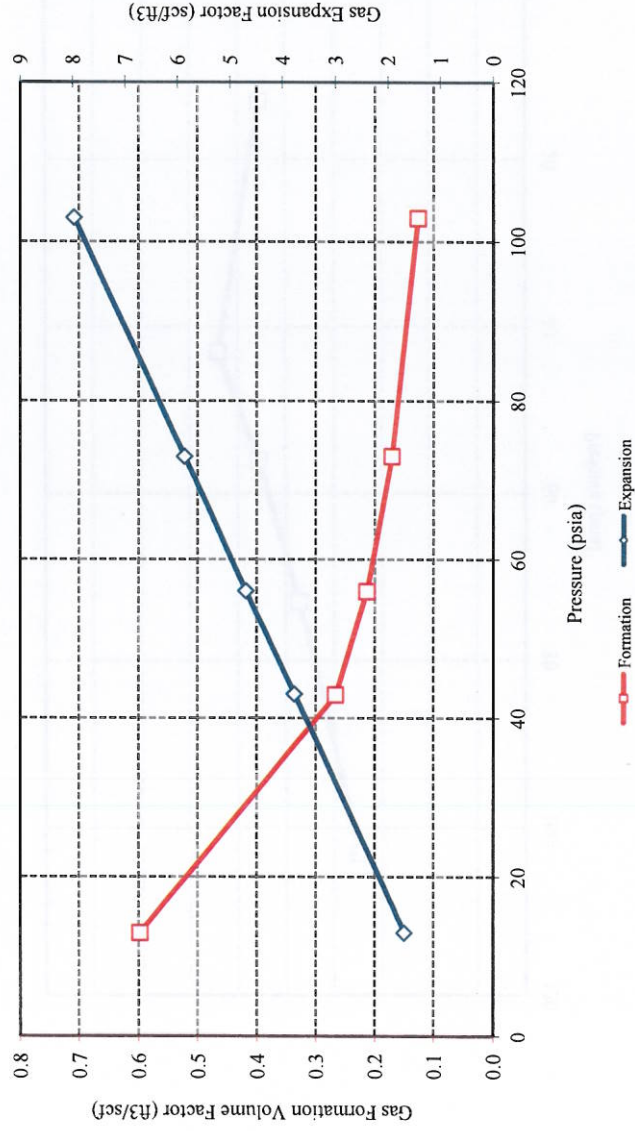


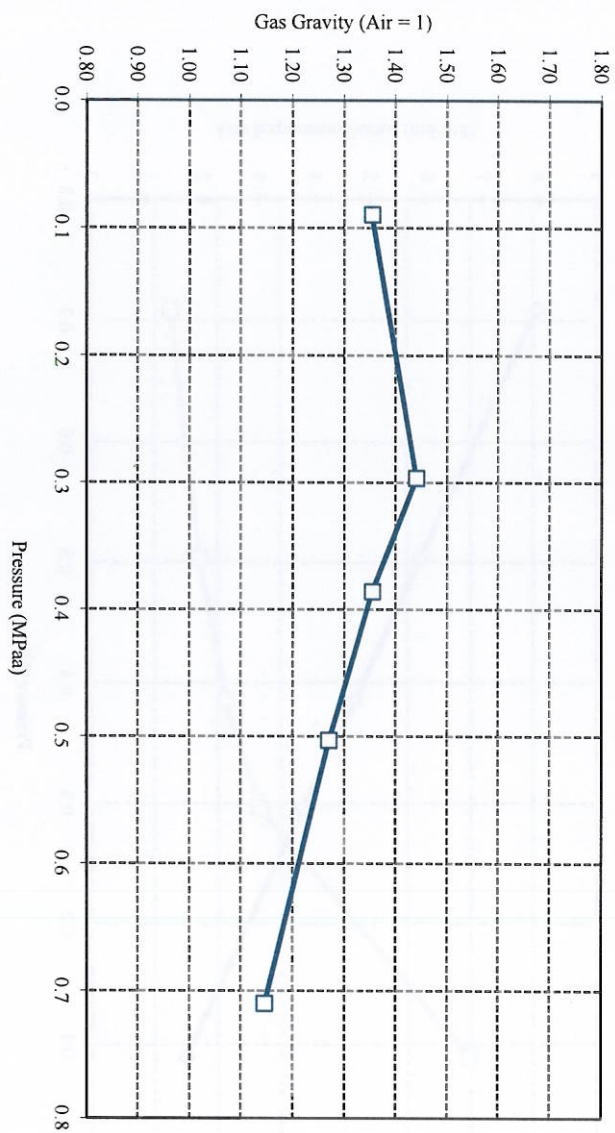
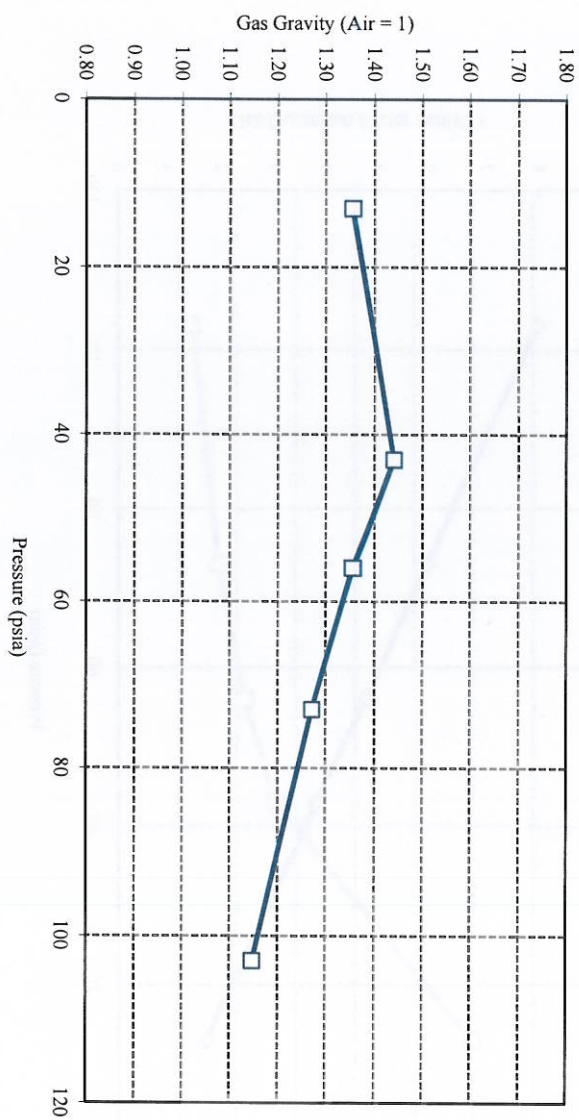


SECTION 3
DIFFERENTIAL LIBERATION RESULTS

FIGURE 3-7

ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS VOLUME FACTORS @ 86.0 F (30.0 C)

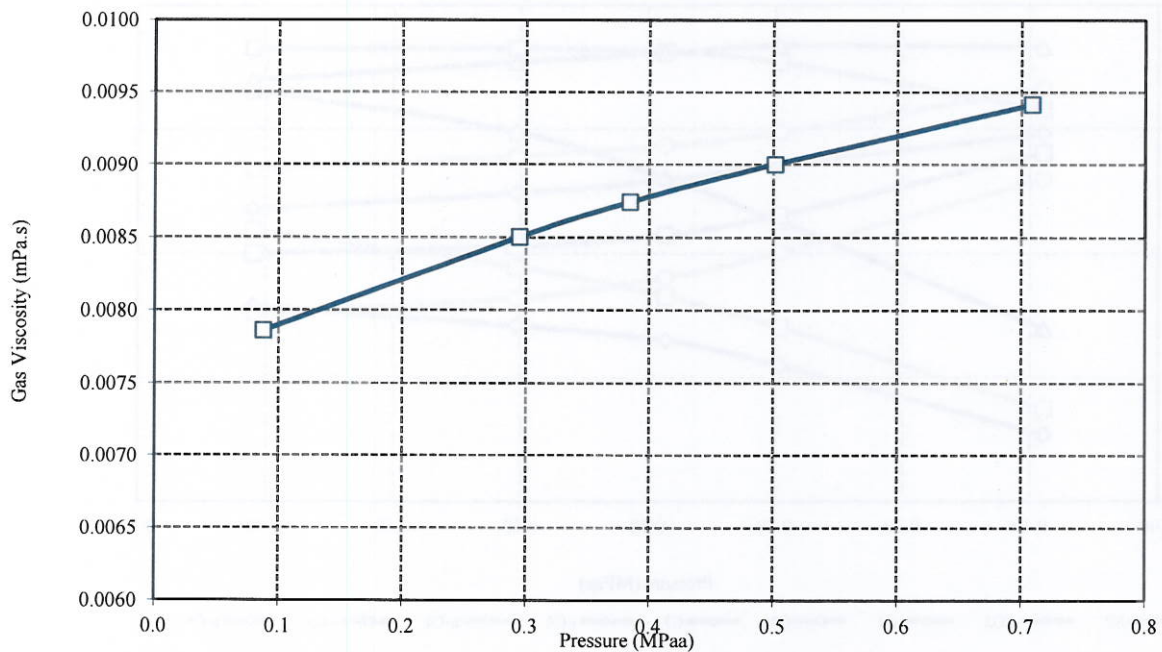
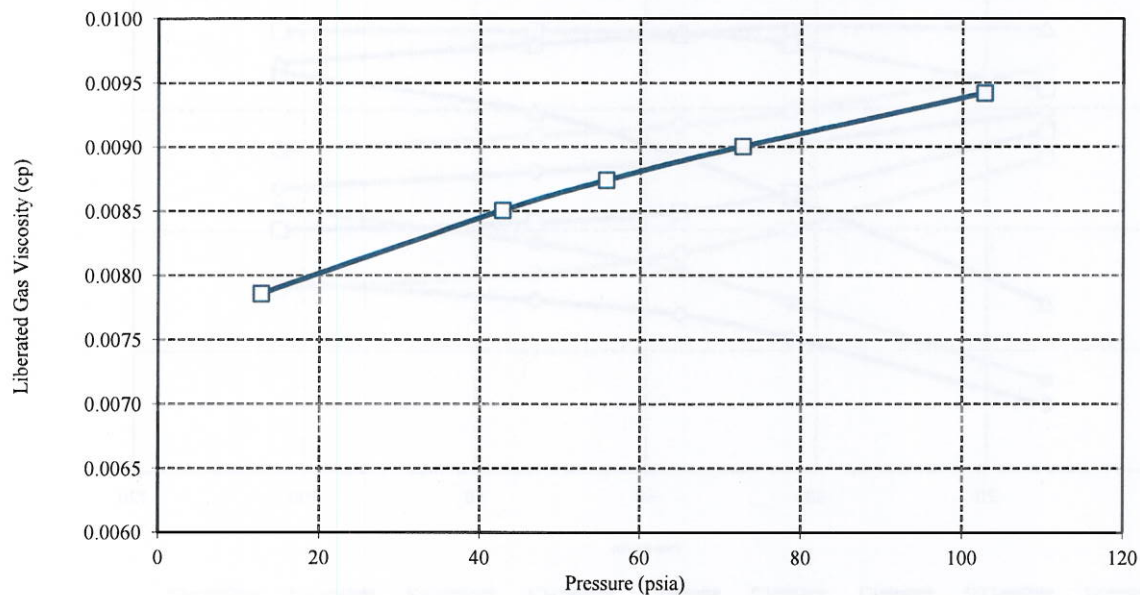




SECTION 3

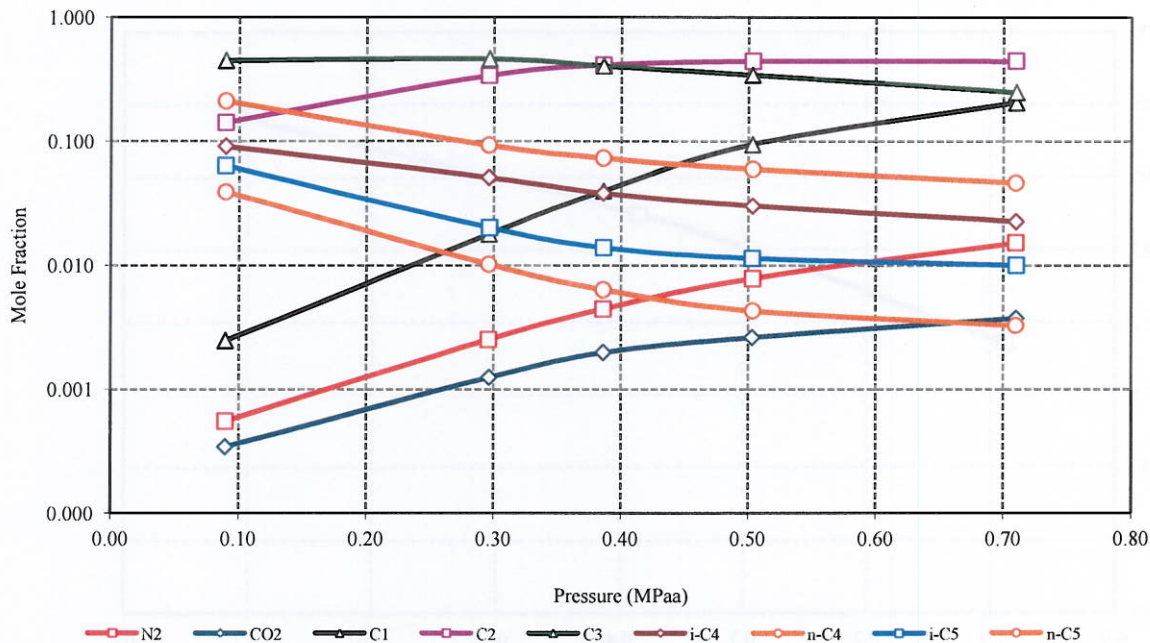
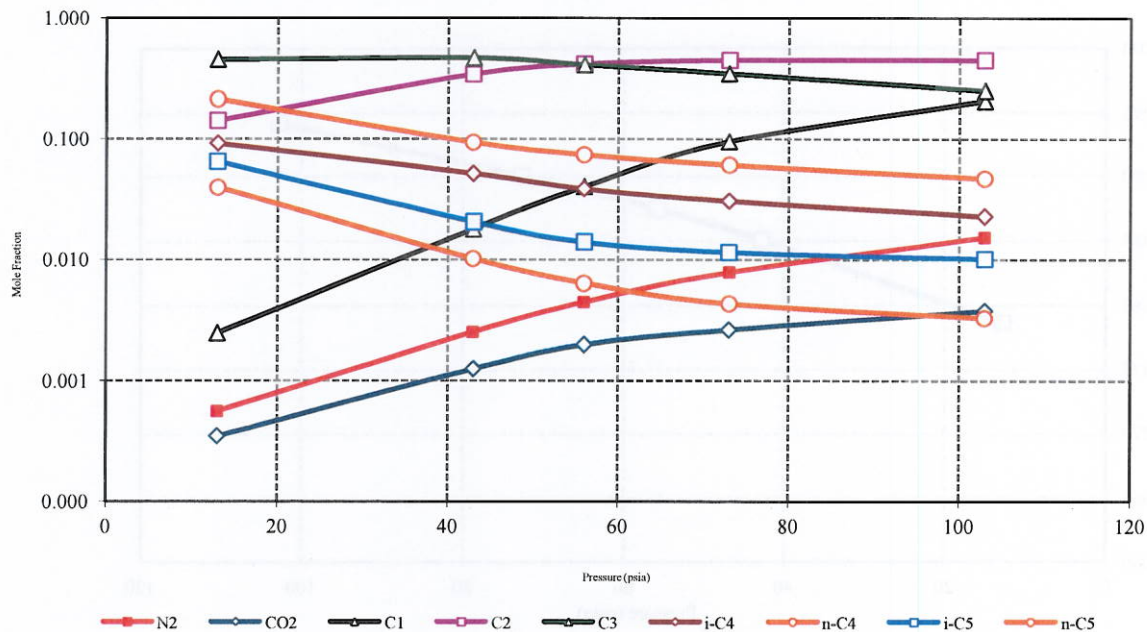
DIFFERENTIAL LIBERATION RESULTS

FIGURE 3-9
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS VISCOSITY @ 86.0 F (30.0 C)



SECTION 3
DIFFERENTIAL LIBERATION RESULTS

FIGURE 3-10
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
LIBERATED GAS COMPOSITION PROFILE @ 86.0 F (30.0 C)



APPENDIX A

SAMPLE VALIDATION

Sample ID	Sample Name	Sample Type	Sample Location	Sample Date	Sample Time	Sample Status	Sample Notes
1	Sample 1	Water	Location 1	2023-01-01	10:00	Completed	Sample 1: Water, Location 1, 2023-01-01, 10:00, Completed
2	Sample 2	Water	Location 2	2023-01-01	11:00	Completed	Sample 2: Water, Location 2, 2023-01-01, 11:00, Completed
3	Sample 3	Water	Location 3	2023-01-01	12:00	Completed	Sample 3: Water, Location 3, 2023-01-01, 12:00, Completed
4	Sample 4	Water	Location 4	2023-01-01	13:00	Completed	Sample 4: Water, Location 4, 2023-01-01, 13:00, Completed
5	Sample 5	Water	Location 5	2023-01-01	14:00	Completed	Sample 5: Water, Location 5, 2023-01-01, 14:00, Completed
6	Sample 6	Water	Location 6	2023-01-01	15:00	Completed	Sample 6: Water, Location 6, 2023-01-01, 15:00, Completed
7	Sample 7	Water	Location 7	2023-01-01	16:00	Completed	Sample 7: Water, Location 7, 2023-01-01, 16:00, Completed
8	Sample 8	Water	Location 8	2023-01-01	17:00	Completed	Sample 8: Water, Location 8, 2023-01-01, 17:00, Completed
9	Sample 9	Water	Location 9	2023-01-01	18:00	Completed	Sample 9: Water, Location 9, 2023-01-01, 18:00, Completed
10	Sample 10	Water	Location 10	2023-01-01	19:00	Completed	Sample 10: Water, Location 10, 2023-01-01, 19:00, Completed
11	Sample 11	Water	Location 11	2023-01-01	20:00	Completed	Sample 11: Water, Location 11, 2023-01-01, 20:00, Completed
12	Sample 12	Water	Location 12	2023-01-01	21:00	Completed	Sample 12: Water, Location 12, 2023-01-01, 21:00, Completed
13	Sample 13	Water	Location 13	2023-01-01	22:00	Completed	Sample 13: Water, Location 13, 2023-01-01, 22:00, Completed
14	Sample 14	Water	Location 14	2023-01-01	23:00	Completed	Sample 14: Water, Location 14, 2023-01-01, 23:00, Completed
15	Sample 15	Water	Location 15	2023-01-01	00:00	Completed	Sample 15: Water, Location 15, 2023-01-01, 00:00, Completed
16	Sample 16	Water	Location 16	2023-01-01	01:00	Completed	Sample 16: Water, Location 16, 2023-01-01, 01:00, Completed
17	Sample 17	Water	Location 17	2023-01-01	02:00	Completed	Sample 17: Water, Location 17, 2023-01-01, 02:00, Completed
18	Sample 18	Water	Location 18	2023-01-01	03:00	Completed	Sample 18: Water, Location 18, 2023-01-01, 03:00, Completed
19	Sample 19	Water	Location 19	2023-01-01	04:00	Completed	Sample 19: Water, Location 19, 2023-01-01, 04:00, Completed
20	Sample 20	Water	Location 20	2023-01-01	05:00	Completed	Sample 20: Water, Location 20, 2023-01-01, 05:00, Completed
21	Sample 21	Water	Location 21	2023-01-01	06:00	Completed	Sample 21: Water, Location 21, 2023-01-01, 06:00, Completed
22	Sample 22	Water	Location 22	2023-01-01	07:00	Completed	Sample 22: Water, Location 22, 2023-01-01, 07:00, Completed
23	Sample 23	Water	Location 23	2023-01-01	08:00	Completed	Sample 23: Water, Location 23, 2023-01-01, 08:00, Completed
24	Sample 24	Water	Location 24	2023-01-01	09:00	Completed	Sample 24: Water, Location 24, 2023-01-01, 09:00, Completed
25	Sample 25	Water	Location 25	2023-01-01	10:00	Completed	Sample 25: Water, Location 25, 2023-01-01, 10:00, Completed
26	Sample 26	Water	Location 26	2023-01-01	11:00	Completed	Sample 26: Water, Location 26, 2023-01-01, 11:00, Completed
27	Sample 27	Water	Location 27	2023-01-01	12:00	Completed	Sample 27: Water, Location 27, 2023-01-01, 12:00, Completed
28	Sample 28	Water	Location 28	2023-01-01	13:00	Completed	Sample 28: Water, Location 28, 2023-01-01, 13:00, Completed
29	Sample 29	Water	Location 29	2023-01-01	14:00	Completed	Sample 29: Water, Location 29, 2023-01-01, 14:00, Completed
30	Sample 30	Water	Location 30	2023-01-01	15:00	Completed	Sample 30: Water, Location 30, 2023-01-01, 15:00, Completed
31	Sample 31	Water	Location 31	2023-01-01	16:00	Completed	Sample 31: Water, Location 31, 2023-01-01, 16:00, Completed
32	Sample 32	Water	Location 32	2023-01-01	17:00	Completed	Sample 32: Water, Location 32, 2023-01-01, 17:00, Completed
33	Sample 33	Water	Location 33	2023-01-01	18:00	Completed	Sample 33: Water, Location 33, 2023-01-01, 18:00, Completed
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37	Sample 37	Water	Location 37	2023-01-01	22:00	Completed	Sample 37: Water, Location 37, 2023-01-01, 22:00, Completed
38	Sample 38	Water	Location 38	2023-01-01	23:00	Completed	Sample 38: Water, Location 38, 2023-01-01, 23:00, Completed
39	Sample 39	Water	Location 39	2023-01-01	00:00	Completed	Sample 39: Water, Location 39, 2023-01-01, 00:00, Completed
40	Sample 40	Water	Location 40	2023-01-01	01:00	Completed	Sample 40: Water, Location 40, 2023-01-01, 01:00, Completed
41	Sample 41	Water	Location 41	2023-01-01	02:00	Completed	Sample 41: Water, Location 41, 2023-01-01, 02:00, Completed
42	Sample 42	Water	Location 42	2023-01-01	03:00	Completed	Sample 42: Water, Location 42, 2023-01-01, 03:00, Completed
43	Sample 43	Water	Location 43	2023-01-01	04:00	Completed	Sample 43: Water, Location 43, 2023-01-01, 04:00, Completed
44	Sample 44	Water	Location 44	2023-01-01	05:00	Completed	Sample 44: Water, Location 44, 2023-01-01, 05:00, Completed
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52	Sample 52	Water	Location 52	2023-01-01	13:00	Completed	Sample 52: Water, Location 52, 2023-01-01, 13:00, Completed
53	Sample 53	Water	Location 53	2023-01-01	14:00	Completed	Sample 53: Water, Location 53, 2023-01-01, 14:00, Completed
54	Sample 54	Water	Location 54	2023-01-01	15:00	Completed	Sample 54: Water, Location 54, 2023-01-01, 15:00, Completed
55	Sample 55	Water	Location 55	2023-01-01	16:00	Completed	Sample 55: Water, Location 55, 2023-01-01, 16:00, Completed
56	Sample 56	Water	Location 56	2023-01-01	17:00	Completed	Sample 56: Water, Location 56, 2023-01-01, 17:00, Completed
57	Sample 57	Water	Location 57	2023-01-01	18:00	Completed	Sample 57: Water, Location 57, 2023-01-01, 18:00, Completed
58	Sample 58	Water	Location 58	2023-01-01	19:00	Completed	Sample 58: Water, Location 58, 2023-01-01, 19:00, Completed
59	Sample 59	Water	Location 59	2023-01-01	20:00	Completed	Sample 59: Water, Location 59, 2023-01-01, 20:00, Completed
60	Sample 60	Water	Location 60	2023-01-01	21:00	Completed	Sample 60: Water, Location 60, 2023-01-01, 21:00, Completed
61	Sample 61	Water	Location 61	2023-01-01	22:00	Completed	Sample 61: Water, Location 61, 2023-01-01, 22:00, Completed
62	Sample 62	Water	Location 62	2023-01-01	23:00	Completed	Sample 62: Water, Location 62, 2023-01-01, 23:00, Completed
63	Sample 63	Water	Location 63	2023-01-01	00:00	Completed	Sample 63: Water, Location 63, 2023-01-01, 00:00, Completed
64	Sample 64	Water	Location 64	2023-01-01	01:00	Completed	Sample 64: Water, Location 64, 2023-01-01, 01:00, Completed
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66	Sample 66	Water	Location 66	2023-01-01	03:00	Completed	Sample 66: Water, Location 66, 2023-01-01, 03:00, Completed
67	Sample 67	Water	Location 67	2023-01-01	04:00	Completed	Sample 67: Water, Location 67, 2023-01-01, 04:00, Completed
68	Sample 68	Water	Location 68	2023-01-01	05:00	Completed	Sample 68: Water, Location 68, 2023-01-01, 05:00, Completed
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75	Sample 75	Water	Location 75	2023-01-01	12:00	Completed	Sample 75: Water, Location 75, 2023-01-01, 12:00, Completed
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77	Sample 77	Water	Location 77	2023-01-01	14:00	Completed	Sample 77: Water, Location 77, 2023-01-01, 14:00, Completed
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79	Sample 79	Water	Location 79	2023-01-01	16:00	Completed	Sample 79: Water, Location 79, 2023-01-01, 16:00, Completed
80	Sample 80	Water	Location 80	2023-01-01	17:00	Completed	Sample 80: Water, Location 80, 2023-01-01, 17:00, Completed
81	Sample 81	Water	Location 81	2023-01-01	18:00	Completed	Sample 81: Water, Location 81, 2023-01-01, 18:00, Completed
82	Sample 82	Water	Location 82	2023-01-01	19:00	Completed	Sample 82: Water, Location 82, 2023-01-01, 19:00, Completed
83	Sample 83	Water	Location 83	2023-01-01	20:00	Completed	Sample 83: Water, Location 83, 2023-01-01, 20:00, Completed
84	Sample 84	Water	Location 84	2023-01-01	21:00	Completed	Sample 84: Water, Location 84, 2023-01-01, 21:00, Completed
85	Sample 85	Water	Location 85	2023-01-01	22:00	Completed	Sample 85: Water, Location 85, 2023-01-01, 22:00, Completed
86	Sample 86	Water	Location 86	2023-01-01	23:00	Completed	Sample 86: Water, Location 86, 2023-01-01, 23:00, Completed
87	Sample 87	Water	Location 87	2023-01-01	00:00	Completed	Sample 87: Water, Location 87, 2023-01-01, 00:00, Completed
88	Sample 88	Water	Location 88	2023-01-01	01:00	Completed	Sample 88: Water, Location 88, 2023-01-01, 01:00, Completed
89	Sample 89	Water	Location 89	2023-01-01	02:00	Completed	Sample 89: Water, Location 89, 2023-01-01, 02:00, Completed
90	Sample 90	Water	Location 90	2023-01-01	03:00	Completed	Sample 90: Water, Location 90, 2023-01-01, 03:00, Completed
91	Sample 91	Water	Location 91	2023-01-01	04:00	Completed	Sample 91: Water, Location 91, 2023-01-01, 04:00, Completed
92	Sample 92	Water	Location 92	2023-01-01	05:00	Completed	Sample 92: Water, Location 92, 2023-01-01, 05:00, Completed
93	Sample 93	Water	Location 93	2023-01-01	06:00	Completed	Sample 93: Water, Location 93, 2023-01-01, 06:00, Completed
94	Sample 94	Water	Location 94	2023-01-01	07:00	Completed	Sample 94: Water, Location 94, 2023-01-01, 07:00, Completed
95	Sample 95	Water	Location 95	2023-01-01	08:00	Completed	Sample 95: Water, Location 95, 2023-01-01, 08:00, Completed
96	Sample 96	Water	Location 96	2023-01-01	09:00	Completed	Sample 96: Water, Location 96, 2023-01-01, 09:00, Completed
97	Sample 97	Water	Location 97	2023-01-01	10:00	Completed	Sample 97: Water, Location 97, 2023-01-01, 10:00, Completed
98	Sample 98	Water	Location 98	2023-01-01	11:00	Completed	Sample 98: Water, Location 98, 2023-01-01, 11:00, Completed
99	Sample 99	Water	Location 99	2023-01-01	12:00	Completed	Sample 99: Water, Location 99, 2023-01-01, 12:00, Completed
100	Sample 100	Water	Location 100	2023-01-01	13:00	Completed	Sample 100: Water, Location 100, 2023-01-01, 13:00, Completed

SECTION 3

DIFFERENTIAL LIBERATION RESULTS

TABLE 3-A1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
COMPOSITIONAL ANALYSIS OF RESERVOIR FLUID

Boiling Point (F)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties	
-320.4	Nitrogen	N ₂	0.0007	0.0001	Total Sample	
-109.3	Carbon Dioxide	CO ₂	0.0003	0.0001		
-76.6	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight	176.29
-259.1	Methane	C ₁	0.0099	0.0009	Density (g/cc)	0.8186
-128.0	Ethane	C ₂	0.0547	0.0093		
-44.0	Propane	C ₃	0.0924	0.0231	C₆₊ Fraction	
10.9	i-Butane	i-C ₄	0.0200	0.0066		
30.9	n-Butane	n-C ₄	0.0596	0.0197	Molecular Weight	226.24
82.0	i-Pentane	i-C ₅	0.0256	0.0105	Mole Fraction	0.7187
97.0	n-Pentane	n-C ₅	0.0180	0.0074	Density (g/cc)	0.8608
97 - 156	Hexanes	C ₆	0.0336	0.0164		
156 - 208.9	Heptanes	C ₇	0.0388	0.0220	C₇₊ Fraction	
208.9 - 258.1	Octanes	C ₈	0.0476	0.0309		
258.1 - 303.1	Nonanes	C ₉	0.0396	0.0288	Molecular Weight	234.11
303.1 - 345	Decanes	C ₁₀	0.0366	0.0295	Mole Fraction	0.6810
345 - 385	Undecanes	C ₁₁	0.0475	0.0396	Density (g/cc)	0.8651
385 - 419	Dodecanes	C ₁₂	0.0430	0.0393		
419 - 455	Tridecanes	C ₁₃	0.0401	0.0398	C₁₂₊ Fraction	
455 - 486	Tetradecanes	C ₁₄	0.0334	0.0360		
486 - 519.1	Pentadecanes	C ₁₅	0.0273	0.0319	Molecular Weight	307.03
519.1 - 550	Hexadecanes	C ₁₆	0.0224	0.0282	Mole Fraction	0.4157
	Heptadecanes	C ₁₇	0.0200	0.0268	Density (g/cc)	0.8932
557 - 603	Octadecanes	C ₁₈	0.0195	0.0277		
603 - 626	Nonadecanes	C ₁₉	0.0186	0.0277	C₃₀₊ Fraction	
626 - 651.9	Eicosanes	C ₂₀	0.0167	0.0261		
651.9 - 675	Heneicosanes	C ₂₁	0.0144	0.0238	Molecular Weight	584.92
675 - 696.9	Docosanes	C ₂₂	0.0140	0.0241	Mole Fraction	0.0746
696.9 - 716	Tricosanes	C ₂₃	0.0120	0.0217	Density (g/cc)	0.9843
716 - 736	Tetracosanes	C ₂₄	0.0116	0.0218		
736 - 755.1	Pentacosanes	C ₂₅	0.0114	0.0223		
755.1 - 774	Hexacosanes	C ₂₆	0.0097	0.0197	Recombination Parameters	
774.1 - 792	Heptacosanes	C ₂₇	0.0094	0.0199		
792.1 - 809.1	Octacosanes	C ₂₈	0.0092	0.0203	Gas-Oil Ratio (cc/cc)	21.63
809.1 - 826	Nonacosanes	C ₂₉	0.0085	0.0194	Dead Oil Density (g/cc)	0.8528
Above 826	Tricontanes Plus	C ₃₀₊	0.0746	0.2475	Dead Oil MW (g/mol)	205.81
	NAPHTHENES					
120.0	Cyclopentane	C ₅ H ₁₀	0.0041	0.0016		
162.0	Methylcyclopentane	C ₆ H ₁₂	0.0126	0.0060		
178.0	Cyclohexane	C ₆ H ₁₂	0.0144	0.0069		
214.0	Methylcyclohexane	C ₇ H ₁₄	0.0140	0.0078		
	AROMATICS					
176.0	Benzene	C ₆ H ₆	0.0000	0.0000		
231.1	Toluene	C ₇ H ₈	0.0019	0.0010		
277 - 282	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0040	0.0024		
291.9	o-Xylene	C ₈ H ₁₀	0.0038	0.0023		
336.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0045	0.0031		
Total			1.0000	1.0000		

Note: Physical Properties calculated based GPA 2145-00 physical constants

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-A2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
COMPOSITIONAL ANALYSIS OF FLASHED OIL

Boiling Point (F)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N ₂	0.0000	0.0000	Total Sample
-109.3	Carbon Dioxide	CO ₂	0.0000	0.0000	
-76.6	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 205.81
-259.1	Methane	C ₁	0.0000	0.0000	Density (g/cc) 0.8459
-128.0	Ethane	C ₂	0.0000	0.0000	
-44.0	Propane	C ₃	0.0237	0.0051	C₆₊ Fraction
10.9	i-Butane	i-C ₄	0.0117	0.0033	
30.9	n-Butane	n-C ₄	0.0444	0.0125	Molecular Weight 227.04
82.0	i-Pentane	i-C ₅	0.0275	0.0097	Mole Fraction 0.8723
97.0	n-Pentane	n-C ₅	0.0203	0.0071	Density (g/cc) 0.8611
97 - 156	Hexanes	C ₆	0.0401	0.0168	
156 - 208.9	Heptanes	C ₇	0.0471	0.0229	C₇₊ Fraction
208.9 - 258.1	Octanes	C ₈	0.0581	0.0322	
258.1 - 303.1	Nonanes	C ₉	0.0483	0.0301	Molecular Weight 234.50
303.1 - 345	Decanes	C ₁₀	0.0447	0.0309	Mole Fraction 0.8288
345 - 385	Undecanes	C ₁₁	0.0580	0.0414	Density (g/cc) 0.8652
385 - 419	Dodecanes	C ₁₂	0.0525	0.0410	
419 - 455	Tridecanes	C ₁₃	0.0490	0.0416	C₁₂₊ Fraction
455 - 486	Tetradecanes	C ₁₄	0.0408	0.0377	
486 - 519.1	Pentadecanes	C ₁₅	0.0334	0.0334	Molecular Weight 307.03
519.1 - 550	Hexadecanes	C ₁₆	0.0273	0.0295	Mole Fraction 0.5073
	Heptadecanes	C ₁₇	0.0244	0.0281	Density (g/cc) 0.8932
557 - 603	Octadecanes	C ₁₈	0.0238	0.0290	
603 - 626	Nonadecanes	C ₁₉	0.0227	0.0289	C₃₀₊ Fraction
626 - 651.9	Eicosanes	C ₂₀	0.0204	0.0272	
651.9 - 675	Heneicosanes	C ₂₁	0.0176	0.0249	Molecular Weight 584.92
675 - 696.9	Docosanes	C ₂₂	0.0170	0.0252	Mole Fraction 0.0910
696.9 - 716	Tricosanes	C ₂₃	0.0147	0.0227	Density (g/cc) 0.9843
716 - 736	Tetracosanes	C ₂₄	0.0142	0.0228	
736 - 755.1	Pentacosanes	C ₂₅	0.0139	0.0233	
755.1 - 774	Hexacosanes	C ₂₆	0.0118	0.0206	
774.1 - 792	Heptacosanes	C ₂₇	0.0114	0.0208	
792.1 - 809.1	Octacosanes	C ₂₈	0.0112	0.0212	
809.1 - 826	Nonacosanes	C ₂₉	0.0104	0.0203	
Above 826	Tricontanes Plus	C ₃₀₊	0.0910	0.2587	
NAPHTHENES					
120.0	Cyclopentane	C ₅ H ₁₀	0.0034	0.0012	
162.0	Methylcyclopentane	C ₆ H ₁₂	0.0137	0.0056	
178.0	Cyclohexane	C ₆ H ₁₂	0.0174	0.0071	
214.0	Methylcyclohexane	C ₇ H ₁₄	0.0170	0.0081	
AROMATICS					
176.0	Benzene	C ₆ H ₆	0.0000	0.0000	
231.1	Toluene	C ₇ H ₈	0.0023	0.0010	
277 - 282	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0049	0.0025	
291.9	o-Xylene	C ₈ H ₁₀	0.0046	0.0024	
336.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0055	0.0032	
Total			1.0000	1.0000	

Note: Physical Properties calculated based GPA 2145-00 physical constants

SECTION 3 DIFFERENTIAL LIBERATION RESULTS

**TABLE 3-A3
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
COMPOSITIONAL ANALYSIS OF FLASHED GAS**

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0041	0.0041		
Carbon Dioxide	CO ₂	0.0014	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0551	0.0552		
Ethane	C ₂	0.3030	0.3035		
Propane	C ₃	0.4038	0.4044	263.702	1480.556
i-Butane	i-C ₄	0.0579	0.0580	44.909	252.141
n-Butane	n-C ₄	0.1287	0.1289	96.305	540.707
i-Pentane	i-C ₅	0.0169	0.0170	14.723	82.665
n-Pentane	n-C ₅	0.0073	0.0073	6.238	35.022
Hexanes	C ₆	0.0042	0.0042	4.082	22.916
Heptanes	C ₇	0.0095	0.0096	10.447	58.657
Octanes	C ₈	0.0004	0.0004	0.532	2.987
Nonanes	C ₉	0.0000	0.0000	0.000	0.000
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		0.9924	0.9924	440.938	2475.651
Propanes Plus	C ₃₊	0.6288	0.6297	440.938	2475.651
Butanes Plus	C ₄₊	0.2249	0.2253	177.236	995.095
	C ₅₊	0.0384	0.0384	36.022	202.247

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	41.90 kg/kmol	41.90 lb/lb-mol	Ppc	622.8 psia	4.29 MPa
Specific Gravity	1.4465 (Air = 1)	1.4465 (Air = 1)	Tpc	174.63 F	79.25 C
MW of C7+	0.96 kg/kmol	0.96 lb/lbmol	Ppc*	622.5 psia	4.29 MPa
Density of C7+	0.7230 g/cc	723.0 kg/m3	Tpc*	174.33 F	79.05 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,388.5 Btu/scf	89.16 MJ/m3	Dry	2,196.1 Btu/scf	81.97 MJ/m3
Wet	2,346.9 Btu/scf	87.60 MJ/m3	Wet	2,157.9 Btu/scf	80.55 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

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SECTION 3

DIFFERENTIAL LIBERATION RESULTS

APPENDIX B

DIFFERENTIAL LIBERATION - MATERIAL BALANCE

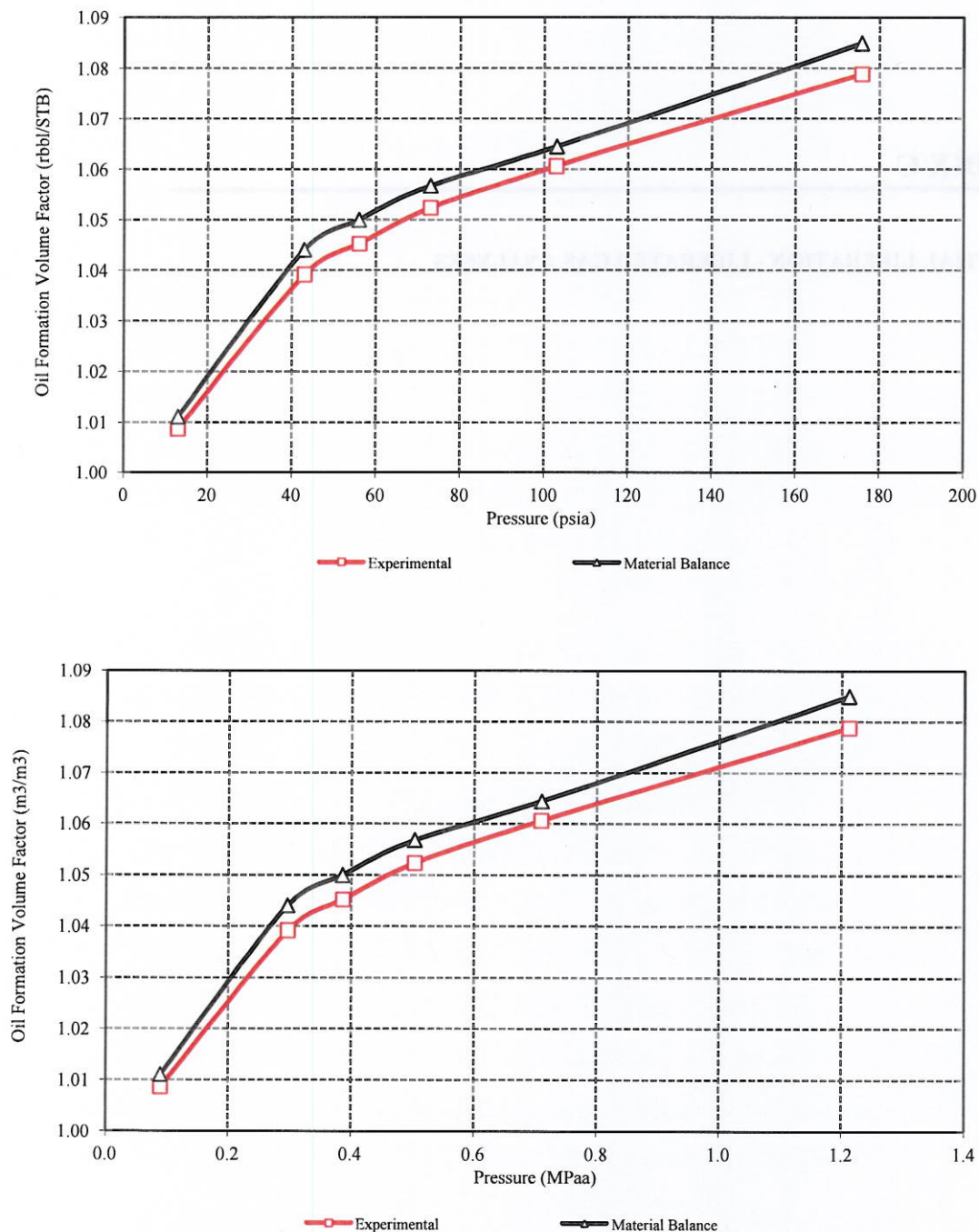
SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-B1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION @ 86.0 F (30.0 C) - MATERIAL BALANCE

Pressure		Measured Oil FVF [1]	Calculated Oil FVF [1]	Absolute Relative Error (%)
(psia)	(MPa)			
176 Psat	1.21	1.0788	1.0848	0.5572
103	0.71	1.0605	1.0644	0.3606
73	0.50	1.0523	1.0568	0.4205
56	0.39	1.0452	1.0500	0.4560
43	0.30	1.0391	1.0440	0.4658
13	0.09	1.0086	1.0110	0.2363
[1] (res bbl/STB) (res m3/m3) Psat - Saturation Pressure - Tank conditions: 60 F (15.6 C) @ 13 psia (0.09 MPaa)				

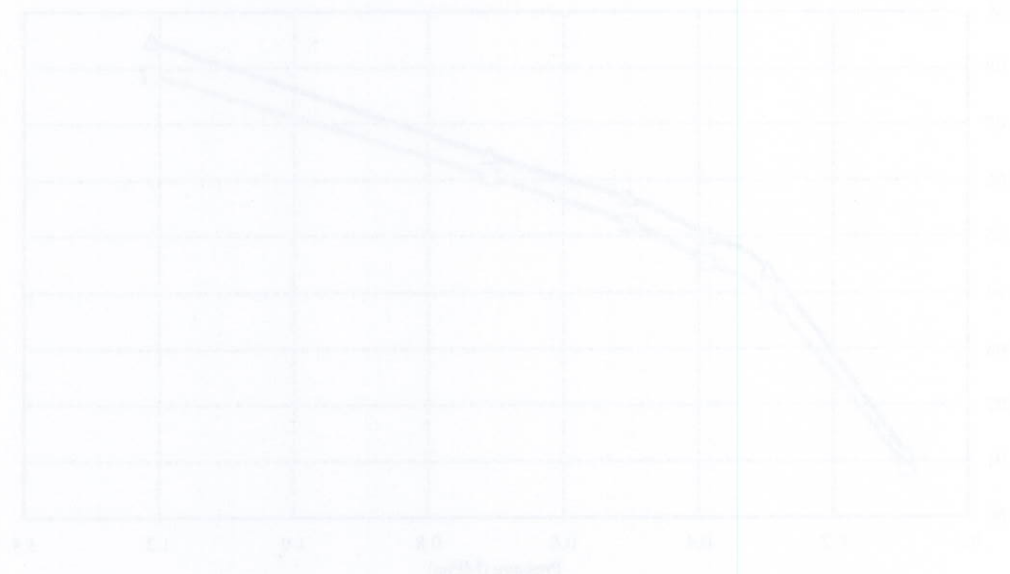
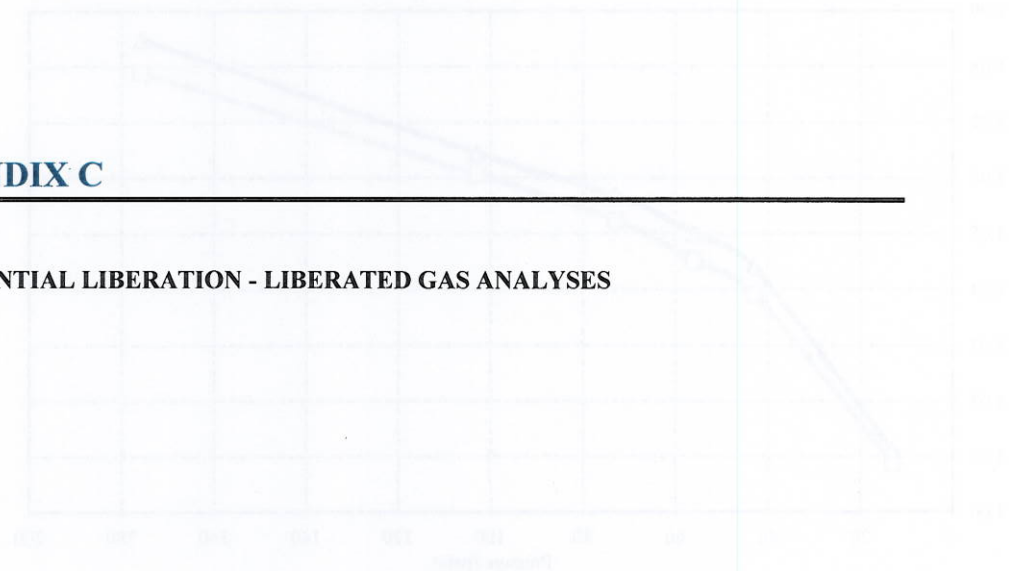
SECTION 3 DIFFERENTIAL LIBERATION RESULTS

FIGURE 3-B1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION @ 86.0 F (30.0 C) - MATERIAL BALANCE



APPENDIX C

DIFFERENTIAL LIBERATION - LIBERATED GAS ANALYSES



SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-C1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS COMPOSITION @ 103 psia (0.71 MPaa)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0152	0.0153		
Carbon Dioxide	CO ₂	0.0037	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.2050	0.2058		
Ethane	C ₂	0.4462	0.4479		
Propane	C ₃	0.2471	0.2481	161.382	906.081
i-Butane	i-C ₄	0.0225	0.0226	17.447	97.954
n-Butane	n-C ₄	0.0464	0.0466	34.746	195.079
i-Pentane	i-C ₅	0.0100	0.0101	8.731	49.017
n-Pentane	n-C ₅	0.0033	0.0033	2.801	15.726
Hexanes	C ₆	0.0002	0.0002	0.148	0.831
Heptanes	C ₇	0.0001	0.0001	0.158	0.886
Octanes	C ₈	0.0001	0.0001	0.154	0.867
Nonanes	C ₉	0.0000	0.0000	0.044	0.247
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	225.610	1266.689
Propanes Plus	C ₃₊	0.3298	0.3310	225.610	1266.689
Butanes Plus	C ₄₊	0.0827	0.0830	64.228	360.608
	C ₅₊	0.0138	0.0138	12.036	67.575

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	33.21 kg/kmol	33.21 lb/lb-mol	P _{pc}	660.7 psia	4.56 MPa
Specific Gravity	1.1464 (Air = 1)	1.1464 (Air = 1)	T _{pc}	89.53 F	31.95 C
MW of C ₇₊	103.30 kg/kmol	103.30 lb/lbmol	P _{pc} *	659.8 psia	4.55 MPa
Density of C ₇₊	0.7362 g/cc	736.2 kg/m3	T _{pc} *	88.83 F	31.55 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	1,898.9 Btu/scf	70.88 MJ/m3	Dry	1,739.5 Btu/scf	64.93 MJ/m3
Wet	1,865.8 Btu/scf	69.65 MJ/m3	Wet	1,709.3 Btu/scf	63.80 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

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SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-C2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS COMPOSITION @ 73 psia (0.50 MPaa)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0078	0.0078		
Carbon Dioxide	CO ₂	0.0026	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0943	0.0945		
Ethane	C ₂	0.4458	0.4470		
Propane	C ₃	0.3432	0.3441	224.149	1258.485
i-Butane	i-C ₄	0.0300	0.0301	23.309	130.870
n-Butane	n-C ₄	0.0600	0.0602	44.915	252.177
i-Pentane	i-C ₅	0.0114	0.0114	9.921	55.701
n-Pentane	n-C ₅	0.0043	0.0043	3.706	20.808
Hexanes	C ₆	0.0002	0.0002	0.161	0.905
Heptanes	C ₇	0.0002	0.0002	0.176	0.991
Octanes	C ₈	0.0001	0.0001	0.135	0.760
Nonanes	C ₉	0.0000	0.0000	0.000	0.000
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	306.469	1720.672
Propanes Plus	C ₃₊	0.4495	0.4506	306.469	1720.672
Butanes Plus	C ₄₊	0.1062	0.1065	82.320	462.187
	C ₅₊	0.0162	0.0162	14.096	79.140

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	36.80 kg/kmol	36.80 lb/lb-mol	Ppc	653.5 psia	4.51 MPa
Specific Gravity	1.2705 (Air = 1)	1.2705 (Air = 1)	Tpc	131.03 F	54.95 C
MW of C7+	100.25 kg/kmol	100.25 lb/lbmol	Ppc*	652.9 psia	4.50 MPa
Density of C7+	0.7310 g/cc	731.0 kg/m3	Tpc*	130.43 F	54.65 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,106.9 Btu/scf	78.64 MJ/m3	Dry	1,933.3 Btu/scf	72.17 MJ/m3
Wet	2,070.2 Btu/scf	77.27 MJ/m3	Wet	1,899.7 Btu/scf	70.91 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

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SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-C3
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS COMPOSITION @ 56 psia (0.39 MPaa)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0045	0.0045		
Carbon Dioxide	CO ₂	0.0020	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0398	0.0399		
Ethane	C ₂	0.4143	0.4151		
Propane	C ₃	0.4075	0.4083	266.091	1493.970
i-Butane	i-C ₄	0.0382	0.0383	29.628	166.345
n-Butane	n-C ₄	0.0733	0.0734	54.819	307.781
i-Pentane	i-C ₅	0.0139	0.0139	12.044	67.622
n-Pentane	n-C ₅	0.0063	0.0064	5.455	30.627
Hexanes	C ₆	0.0002	0.0002	0.225	1.265
Heptanes	C ₇	0.0001	0.0001	0.135	0.761
Octanes	C ₈	0.0001	0.0001	0.083	0.463
Nonanes	C ₉	0.0000	0.0000	0.012	0.068
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	368.492	2068.901
Propanes Plus	C ₃₊	0.5396	0.5406	368.492	2068.901
Butanes Plus	C ₄₊	0.1321	0.1323	102.401	574.931
	C ₅₊	0.0206	0.0207	17.954	100.805

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	39.25 kg/kmol	39.25 lb/lb-mol	Ppc	645.8 psia	4.45 MPa
Specific Gravity	1.3551 (Air = 1)	1.3551 (Air = 1)	Tpc	156.43 F	69.15 C
MW of C7+	100.85 kg/kmol	100.85 lb/lbmol	Ppc*	645.4 psia	4.45 MPa
Density of C7+	0.7317 g/cc	731.7 kg/m3	Tpc*	156.03 F	68.85 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,245.1 Btu/scf	83.81 MJ/m3	Dry	2,062.2 Btu/scf	76.98 MJ/m3
Wet	2,206.1 Btu/scf	82.35 MJ/m3	Wet	2,026.3 Btu/scf	75.64 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

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SECTION 3 DIFFERENTIAL LIBERATION RESULTS

TABLE 3-C4
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS COMPOSITION @ 43 psia (0.30 MPaa)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0025	0.0025		
Carbon Dioxide	CO ₂	0.0012	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0178	0.0178		
Ethane	C ₂	0.3390	0.3394		
Propane	C ₃	0.4645	0.4651	303.348	1703.147
i-Butane	i-C ₄	0.0512	0.0513	39.733	223.080
n-Butane	n-C ₄	0.0928	0.0929	69.405	389.675
i-Pentane	i-C ₅	0.0201	0.0201	17.454	97.998
n-Pentane	n-C ₅	0.0101	0.0101	8.704	48.871
Hexanes	C ₆	0.0004	0.0004	0.369	2.074
Heptanes	C ₇	0.0003	0.0003	0.336	1.885
Octanes	C ₈	0.0001	0.0001	0.117	0.658
Nonanes	C ₉	0.0000	0.0000	0.000	0.000
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	439.457	2467.332
Propanes Plus	C ₃₊	0.6395	0.6403	439.457	2467.332
Butanes Plus	C ₄₊	0.1749	0.1752	136.109	764.185
	C ₅₊	0.0310	0.0310	26.971	151.430

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	41.71 kg/kmol	41.71 lb/lb-mol	Ppc	634.0 psia	4.37 MPa
Specific Gravity	1.4399 (Air = 1)	1.4399 (Air = 1)	Tpc	177.83 F	81.05 C
MW of C7+	98.21 kg/kmol	98.21 lb/lbmol	Ppc*	633.7 psia	4.37 MPa
Density of C7+	0.7268 g/cc	726.8 kg/m3	Tpc*	177.53 F	80.85 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,381.2 Btu/scf	88.89 MJ/m3	Dry	2,189.1 Btu/scf	81.71 MJ/m3
Wet	2,339.8 Btu/scf	87.34 MJ/m3	Wet	2,151.0 Btu/scf	80.29 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

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SECTION 3 DIFFERENTIAL LIBERATION RESULTS

**TABLE 3-C5
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
RESERVOIR FLUID STUDY
DIFFERENTIAL LIBERATION GAS COMPOSITION @ 13 psia (0.09 MPaa)**

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0006	0.0006		
Carbon Dioxide	CO ₂	0.0003	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0025	0.0025		
Ethane	C ₂	0.1413	0.1414		
Propane	C ₃	0.4499	0.4501	293.800	1649.544
i-Butane	i-C ₄	0.0911	0.0911	70.689	396.884
n-Butane	n-C ₄	0.2105	0.2106	157.502	884.296
i-Pentane	i-C ₅	0.0640	0.0640	55.613	312.237
n-Pentane	n-C ₅	0.0391	0.0391	33.612	188.714
Hexanes	C ₆	0.0003	0.0003	0.264	1.481
Heptanes	C ₇	0.0003	0.0003	0.341	1.912
Octanes	C ₈	0.0001	0.0001	0.102	0.571
Nonanes	C ₉	0.0001	0.0001	0.077	0.433
Decanes	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	611.999	3436.072
Propanes Plus	C ₃₊	0.8553	0.8556	611.999	3436.072
Butanes Plus	C ₄₊	0.4054	0.4055	318.198	1786.528
	C ₅₊	0.1038	0.1038	90.008	505.348

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	49.20 kg/kmol	49.20 lb/lb-mol	P _{pc}	594.5 psia	4.10 MPa
Specific Gravity	1.6985 (Air = 1)	1.6985 (Air = 1)	T _{pc}	233.53 F	111.95 C
MW of C7+	101.22 kg/kmol	101.22 lb/lbmol	P _{pc} *	594.4 psia	4.10 MPa
Density of C7+	0.7316 g/cc	731.6 kg/m3	T _{pc} *	233.43 F	111.85 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,784.8 Btu/scf	103.95 MJ/m3	Dry	2,565.3 Btu/scf	95.75 MJ/m3
Wet	2,736.3 Btu/scf	102.14 MJ/m3	Wet	2,520.6 Btu/scf	94.09 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

GC No.: 4642



Weatherford®
LABORATORIES

**ENERPLUS CORPORATION
ROSELEA UNIT-1**

**SECTION 4
MULTI-STAGE SEPARATOR TEST**

FINAL REPORT

Prepared for

enerPLUS
CORPORATION

By

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SECTION 4 - MULTI-STAGE SEPARATOR TEST

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RESULTS AND DISCUSSION

The multi-stage separator test was conducted on a RECOMBINED sample prepared from Well 100/10-25-010-26W1M of ROSELEA UNIT-1 Lodgepole reservoir.

The sample collection data is provided in Table 4-1 and the sample validation data is given in Appendix A.

Table 4-2 provides the compositional analysis of the RECOMBINED sample.

Table 4-3 contains various oil property measurements performed on the multi-stage separator test including live oil density, oil formation volume factor and gas-oil ratios.

Table 4-4 contains a summary of the gas properties including gas gravities, deviation factors, gas formation volume factors and gas expansion factors.

Table 4-5 presents the compositional analysis of the residual oil at completion of the experiment.

Appendix B contains the material balance check performed for this experiment. It is displayed as formation volume factors so that the balance can be checked on a point by point basis. Appendix C contains the compositional analyses of the liberated gases from the multi-stage separator test.

SECTION 4
MULTI-STAGE SEPARATOR TEST

SUMMARY

ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MAIN PVT RESULTS

INITIAL RESERVOIR CONDITIONS

Reservoir Pressure	N/A psia	N/A MPa
Reservoir Temperature:	86.0 F	30.0 C

MULTI-STAGE SEPARATOR TEST

Saturation Pressure	176 psia	1.21 MPa
At Saturation Pressure		
Oil Formation Volume Factor	1.0769 res.bbl/STB	1.0769 res.m ³ /m ³
Solution Gas-Oil Ratio	125.74 scf/STB	22.39 m ³ /m ³
Oil Density	0.8341 g/cm ³	834.1 kg/m ³
At Ambient Pressure		
Residual Oil Density	0.8590 g/cm ³	859.0 kg/m ³
Residual Oil Density	0.8590 g/cm ³	859.0 kg/m ³
API Gravity	33.23	33.23

SINGLE-STAGE SEPARATOR TEST

At Saturation Pressure		
Oil Formation Volume Factor	1.0685 res.bbl/STB	1.0685 res.m ³ /m ³
Solution Gas-Oil Ratio	121.42 scf/STB	21.63 m ³ /m ³
At Tank Conditions		
Residual Oil Density	0.8528 g/cm ³	852.8 kg/m ³
API Gravity	34.43	34.43

SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
SAMPLE COLLECTION DATA

Project File:	CL-50439	
Operator Name:	ENERPLUS CORPORATION	
Pool or Zone:	LODGEPOLE	
Field or Area:	ROSELEA UNIT-1	
Well Location:	100/10-25-010-26W1M	
Fluid Sample:	RECOMBINED	
Sampling Company:	WEATHERFORD LABORATORIES	
Name of Sampler:	DM	
Sampling Date:	15-Feb-11	
Sampling Point:	WELLHEAD	
Sampling Temperature:		
Sampling Pressure:		
Reservoir Temperature:	86.0 F	30.0 C
Reservoir Pressure:	N/A psia	N/A MPa
Initial Reservoir Pressure (Pi)	N/A psia	N/A MPa
Depth of Reported Pi	N/A mMD	N/A mss

SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF RESERVOIR FLUID

Boiling Point (F)			Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N2	0.0007	0.0001	Total Sample
-109.3	Carbon Dioxide	CO2	0.0003	0.0001	
-76.6	Hydrogen Sulphide	H2S	0.0000	0.0000	Molecular Weight 176.25
-259.1	Methane	C1	0.0100	0.0009	
-128.0	Ethane	C2	0.0551	0.0094	
-44.0	Propane	C3	0.0929	0.0232	C6+ Fraction
10.9	i-Butane	i-C4	0.0201	0.0066	
30.9	n-Butane	n-C4	0.0598	0.0197	Molecular Weight 226.53
82.0	i-Pentane	i-C5	0.0256	0.0105	Mole Fraction 0.7174
97.0	n-Pentane	n-C5	0.0180	0.0074	Density (g/cc) 0.8609
97 - 156	Hexanes	C6	0.0336	0.0165	
156 - 208.9	Heptanes	C7	0.0388	0.0220	
208.9 - 258.1	Octanes	C8	0.0476	0.0309	C7+ Fraction
258.1 - 303.1	Nonanes	C9	0.0396	0.0288	
	Decanes	C10	0.0366	0.0296	Molecular Weight 234.04
345 - 385	Undecanes	C11	0.0475	0.0396	Mole Fraction 0.6810
385 - 419	Dodecanes	C12	0.0430	0.0393	Density (g/cc) 0.8651
419 - 455	Tridecanes	C13	0.0401	0.0398	
455 - 486	Tetradecanes	C14	0.0334	0.0360	
486 - 519.1	Pentadecanes	C15	0.0273	0.0320	C12+ Fraction
519.1 - 550	Hexadecanes	C16	0.0224	0.0282	
550 - 557	Heptadecanes	C17	0.0200	0.0268	Molecular Weight 307.03
557 - 603	Octadecanes	C18	0.0195	0.0277	Mole Fraction 0.4157
603 - 626	Nonadecanes	C19	0.0186	0.0277	Density (g/cc) 0.8932
626 - 651.9	Eicosanes	C20	0.0167	0.0261	
651.9 - 675	Heneicosanes	C21	0.0144	0.0238	
675 - 696.9	Docosanes	C22	0.0140	0.0241	
696.9 - 716	Tricosanes	C23	0.0120	0.0217	
716 - 736	Tetracosanes	C24	0.0116	0.0218	
736 - 755.1	Pentacosanes	C25	0.0114	0.0223	
755.1 - 774	Hexacosanes	C26	0.0097	0.0197	
774.1 - 792	Heptacosanes	C27	0.0094	0.0199	
792.1 - 809.1	Octacosanes	C28	0.0092	0.0203	
809.1 - 826	Nonacosanes	C29	0.0085	0.0194	
Above 826	Tricontanes Plus	C30+	0.0746	0.2475	
120.0	Cyclopentane	C5H10	0.0028	0.0011	
162.0	Methylcyclopentane	C6H12	0.0126	0.0060	
178.0	Cyclohexane	C6H12	0.0144	0.0069	
214.0	Methylcyclohexane	C7H14	0.0140	0.0078	
176.0	Benzene	C6H6	0.0000	0.0000	
231.1	Toluene	C7H8	0.0019	0.0010	
277 - 282	Ethylbenzene & p,m-Xylene	C8H10	0.0040	0.0024	
291.9	o-Xylene	C8H10	0.0038	0.0023	
336.0	1, 2, 4-Trimethylbenzene	C9H12	0.0045	0.0031	
Total			1.0000	1.0000	

SECTION 4
MULTI-STAGE SEPARATOR TEST

TABLE 4-3
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR OIL PROPERTIES

Pressure		Temperature		Oil Density (g/cm ³)	Oil Formation Volume Factor [1]	Total Formation Volume Factor [2]	Gas-Oil Ratio		Gas-Oil Ratio	
(psia)	(MPa)	(F)	(C)				Solution (scf/STB)	Liberated (scf/STB)	Solution (m ³ /m ³)	Liberated (m ³ /m ³)
176 Psat	1.21	86	30.0	0.8341	1.0769	1.0769	125.74	0.00	22.39	0.00
56	0.39	60	15.7	0.8481	1.0310	3.714	53.43	72.31	9.52	12.88
53	0.37	120	49.0	0.8457	1.0250	4.66	41.00	84.74	7.30	15.09
13	0.09	60	15.6	0.8590	1.0000	13.561	0.00	125.74	0.00	22.39
Density of Residual Oil = 0.8590 g/cm ³ (859.0 kg/m ³) @ 60 F (15.6 C)										
API Gravity of Residual Oil = 33.2										
[1] Barrels (Cubic meters) of oil at indicated pressure and temperature per barrel (cubic meter) of residual oil @ 60 F (15.6 C).										
[2] Total barrels (cubic meters) of oil and liberated gas at the indicated pressure and temperature per barrel (cubic meter) of residual oil @ 60 F (15.6 C).										
Psat - Saturation Pressure										

SECTION 4
MULTI-STAGE SEPARATOR TEST

TABLE 4-4
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR GAS PROPERTIES

Pressure		Temperature		Gas Gravity		Gas Density (g/cm ³)	Gas Deviation Factor (-)	Gas Formation Volume Factor [1]	Gas Expansion Factor [2]
(psia)	(MPa)	(F)	(C)	Incremental (Air = 1)	Cumulative (Air = 1)				
176 Psat	1.21	86	30.0						
56	0.39	60	15.7	1.0423	1.0423	0.00500	0.9713	0.2084	4.799
53	0.37	120	49.0	1.3759	1.0912	0.00564	0.9638	0.2406	4.156
13	0.09	60	15.6	1.0423	1.0753	0.00500	0.9854	0.5609	1.783

[1] Cubic feet (meters) of gas at indicated pressure and temperature per cubic feet (meter) @ standard conditions
 [2] Cubic feet (meters) of gas @ standard conditions per cubic feet (meter) @ indicated pressure and temperature.
 Psat - Saturation pressure
 - Standard conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

SECTION 4

MULTI-STAGE SEPARATOR TEST

TABLE 4-5
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF RESIDUAL OIL

Boiling Point (F)			Mole Fraction	Mass Fraction	Calculated Properties
-320.4	Nitrogen	N2	0.0000	0.0000	Total Sample
-109.3	Carbon Dioxide	CO2	0.0000	0.0000	
-76.6	Hydrogen Sulphide	H2S	0.0000	0.0000	Molecular Weight 225.48
-259.1	Methane	C1	0.0000	0.0000	
-128.0	Ethane	C2	0.0000	0.0000	
-44.0	Propane	C3	0.0032	0.0006	C6+ Fraction
10.9	i-Butane	i-C4	0.0030	0.0008	
30.9	n-Butane	n-C4	0.0129	0.0033	Molecular Weight 232.79
82.0	i-Pentane	i-C5	0.0138	0.0044	Mole Fraction 0.9565
97.0	n-Pentane	n-C5	0.0106	0.0034	Density (g/cc) 0.8268
97 - 156	Hexanes	C6	0.0315	0.0121	
156 - 208.9	Heptanes	C7	0.0456	0.0203	
208.9 - 258.1	Octanes	C8	0.0624	0.0316	C7+ Fraction
258.1 - 303.1	Nonanes	C9	0.0556	0.0316	
	Decanes	C10	0.0521	0.0329	Molecular Weight 238.13
345 - 385	Undecanes	C11	0.0569	0.0371	Mole Fraction 0.9226
385 - 419	Dodecanes	C12	0.0547	0.0390	Density (g/cc) 0.8310
419 - 455	Tridecanes	C13	0.0552	0.0428	
455 - 486	Tetradecanes	C14	0.0503	0.0424	
486 - 519.1	Pentadecanes	C15	0.0405	0.0370	C12+ Fraction
519.1 - 550	Hexadecanes	C16	0.0362	0.0357	
550 - 557	Heptadecanes	C17	0.0304	0.0320	Molecular Weight 303.68
557 - 603	Octadecanes	C18	0.0293	0.0327	Mole Fraction 0.5916
603 - 626	Nonadecanes	C19	0.0291	0.0339	Density (g/cc) 0.8686
626 - 651.9	Eicosanes	C20	0.0237	0.0289	
651.9 - 675	Heneicosanes	C21	0.0221	0.0286	
675 - 696.9	Docosanes	C22	0.0194	0.0263	
696.9 - 716	Tricosanes	C23	0.0176	0.0248	
716 - 736	Tetracosanes	C24	0.0163	0.0239	
736 - 755.1	Pentacosanes	C25	0.0161	0.0247	
755.1 - 774	Hexacosanes	C26	0.0142	0.0227	
774.1 - 792	Heptacosanes	C27	0.0131	0.0217	
792.1 - 809.1	Octacosanes	C28	0.0127	0.0219	
809.1 - 826	Nonacosanes	C29	0.0107	0.0190	
Above 826	Tricontanes Plus	C30+	0.0997	0.2587	
120.0	Cyclopentane	C5H10	0.0023	0.0007	
162.0	Methylcyclopentane	C6H12	0.0118	0.0044	
178.0	Cyclohexane	C6H12	0.0159	0.0059	
214.0	Methylcyclohexane	C7H14	0.0179	0.0078	
176.0	Benzene	C6H6	0.0000	0.0000	
231.1	Toluene	C7H8	0.0008	0.0003	
277 - 282	Ethylbenzene & p,m-Xylene	C8H10	0.0051	0.0024	
291.9	o-Xylene	C8H10	0.0009	0.0004	
336.0	1, 2, 4-Trimethylbenzene	C9H12	0.0060	0.0032	
Total			1.0000	1.0000	

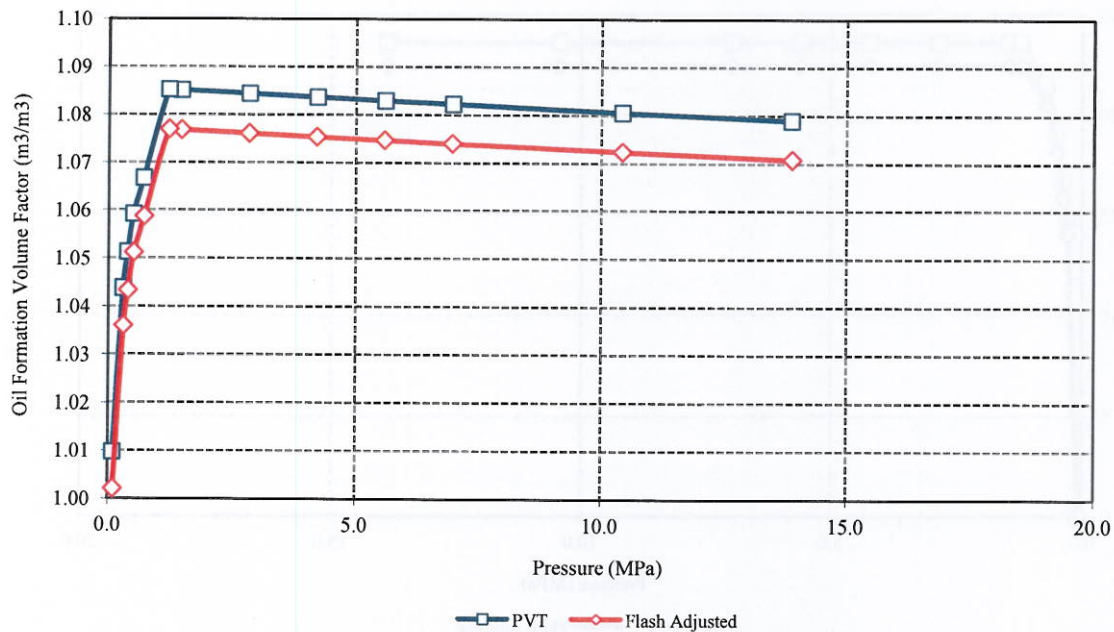
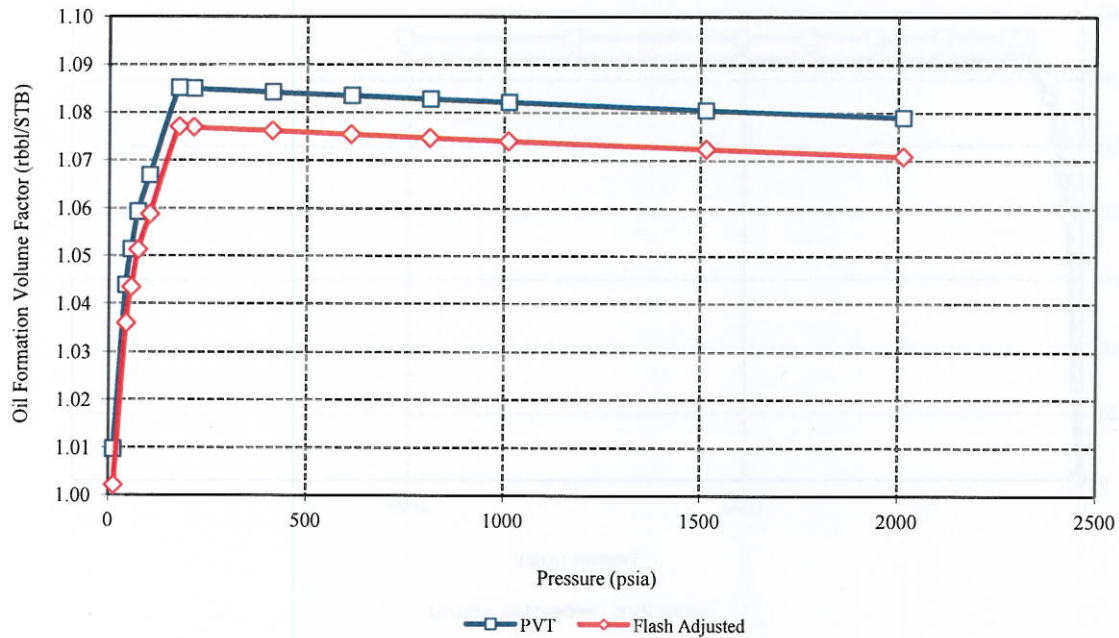
SECTION 4
MULTI-STAGE SEPARATOR TEST

TABLE 4-6
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
FLASH ADJUSTED DIFFERENTIAL LIBERATION DATA

Pressure		Oil Formation Volume Factor		Solution Gas-Oil Ratio			
(psia)	(MPa)	PVT	Flash Adjusted	PVT (scf/STB)	Flash Adjusted (scf/STB)	PVT (m ³ /m ³)	Flash Adjusted (m ³ /m ³)
2013	13.88	1.0790	1.0708	132.41	125.73	23.58	22.39
1513	10.43	1.0805	1.0723	132.41	125.73	23.58	22.39
1013	6.98	1.0821	1.0739	132.41	125.73	23.58	22.39
813	5.60	1.0828	1.0746	132.41	125.73	23.58	22.39
613	4.22	1.0835	1.0753	132.41	125.73	23.58	22.39
413	2.85	1.0843	1.0760	132.41	125.73	23.58	22.39
213	1.47	1.0850	1.0768	132.41	125.73	23.58	22.39
176 Psat	1.21	1.0851	1.0769	132.41	125.73	23.58	22.39
103	0.71	1.0668	1.0587	120.56	114.48	21.47	20.39
73	0.50	1.0592	1.0512	107.21	101.80	19.09	18.13
56	0.39	1.0513	1.0434	93.66	88.93	16.68	15.84
43	0.30	1.0438	1.0359	82.67	78.50	14.72	13.98
13	0.09	1.0097	1.0021	0.00	0.00	0.00	0.00
Psat - Saturation Pressure							

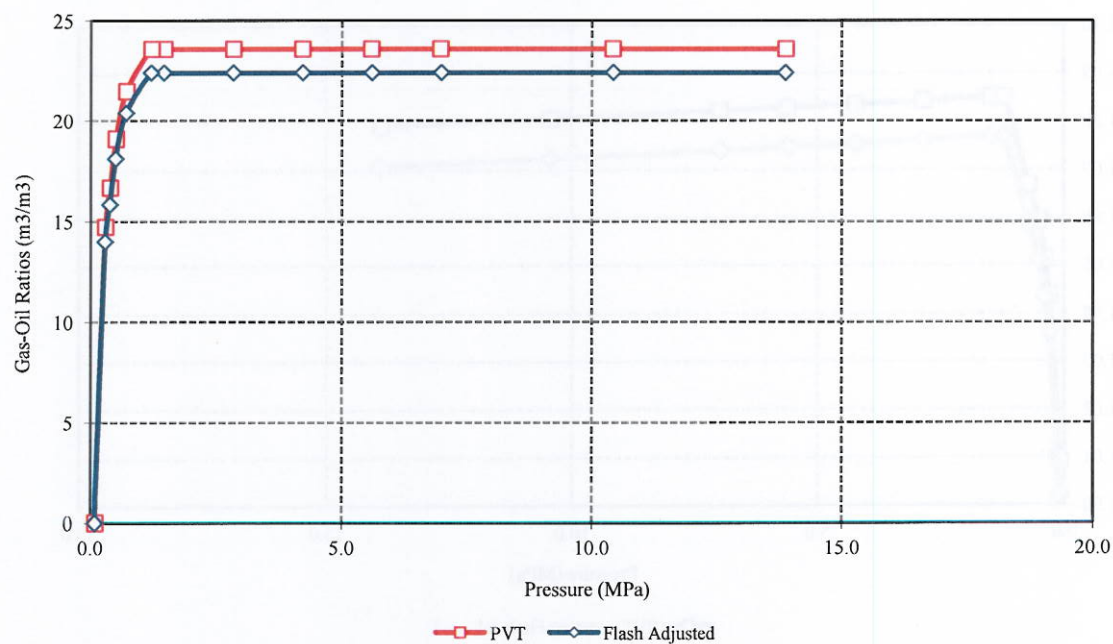
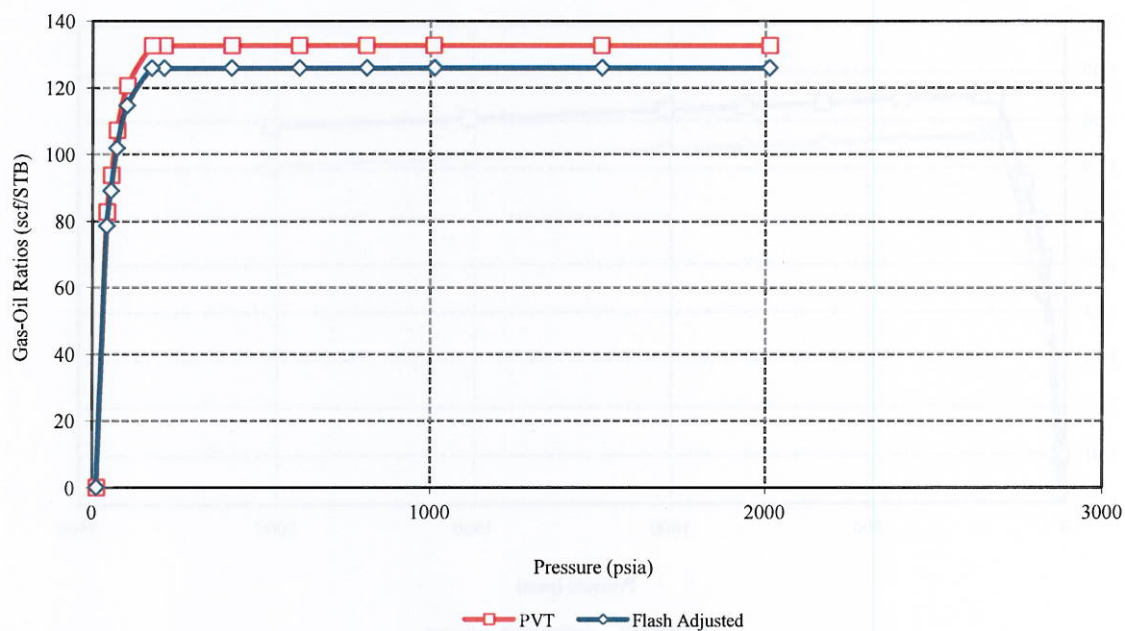
SECTION 4
MULTI-STAGE SEPARATOR TEST

FIGURE 4-1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
DIFFERENTIAL LIBERATION OIL FORMATION VOLUME FACTOR @ 86.0 F (30.0 C)



SECTION 4 MULTI-STAGE SEPARATOR TEST

FIGURE 4-2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
DIFFERENTIAL LIBERATION GAS-OIL RATIOS @ 86.0 F (30.0 C)



SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-1
ENERGY CORPORATION - MODEL 44
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF RESERVOIR FLUID

Sample No.	Sample Name	Sample Type	Sample Location	Sample Depth	Sample Volume	Sample Weight
1	1-1	1-1	1-1	1-1	1-1	1-1
2	2-1	2-1	2-1	2-1	2-1	2-1
3	3-1	3-1	3-1	3-1	3-1	3-1
4	4-1	4-1	4-1	4-1	4-1	4-1
5	5-1	5-1	5-1	5-1	5-1	5-1
6	6-1	6-1	6-1	6-1	6-1	6-1
7	7-1	7-1	7-1	7-1	7-1	7-1
8	8-1	8-1	8-1	8-1	8-1	8-1
9	9-1	9-1	9-1	9-1	9-1	9-1
10	10-1	10-1	10-1	10-1	10-1	10-1
11	11-1	11-1	11-1	11-1	11-1	11-1
12	12-1	12-1	12-1	12-1	12-1	12-1
13	13-1	13-1	13-1	13-1	13-1	13-1
14	14-1	14-1	14-1	14-1	14-1	14-1
15	15-1	15-1	15-1	15-1	15-1	15-1
16	16-1	16-1	16-1	16-1	16-1	16-1
17	17-1	17-1	17-1	17-1	17-1	17-1
18	18-1	18-1	18-1	18-1	18-1	18-1
19	19-1	19-1	19-1	19-1	19-1	19-1
20	20-1	20-1	20-1	20-1	20-1	20-1
21	21-1	21-1	21-1	21-1	21-1	21-1
22	22-1	22-1	22-1	22-1	22-1	22-1
23	23-1	23-1	23-1	23-1	23-1	23-1
24	24-1	24-1	24-1	24-1	24-1	24-1
25	25-1	25-1	25-1	25-1	25-1	25-1
26	26-1	26-1	26-1	26-1	26-1	26-1
27	27-1	27-1	27-1	27-1	27-1	27-1
28	28-1	28-1	28-1	28-1	28-1	28-1
29	29-1	29-1	29-1	29-1	29-1	29-1
30	30-1	30-1	30-1	30-1	30-1	30-1
31	31-1	31-1	31-1	31-1	31-1	31-1
32	32-1	32-1	32-1	32-1	32-1	32-1
33	33-1	33-1	33-1	33-1	33-1	33-1
34	34-1	34-1	34-1	34-1	34-1	34-1
35	35-1	35-1	35-1	35-1	35-1	35-1
36	36-1	36-1	36-1	36-1	36-1	36-1
37	37-1	37-1	37-1	37-1	37-1	37-1
38	38-1	38-1	38-1	38-1	38-1	38-1
39	39-1	39-1	39-1	39-1	39-1	39-1
40	40-1	40-1	40-1	40-1	40-1	40-1
41	41-1	41-1	41-1	41-1	41-1	41-1
42	42-1	42-1	42-1	42-1	42-1	42-1
43	43-1	43-1	43-1	43-1	43-1	43-1
44	44-1	44-1	44-1	44-1	44-1	44-1
45	45-1	45-1	45-1	45-1	45-1	45-1
46	46-1	46-1	46-1	46-1	46-1	46-1
47	47-1	47-1	47-1	47-1	47-1	47-1
48	48-1	48-1	48-1	48-1	48-1	48-1
49	49-1	49-1	49-1	49-1	49-1	49-1
50	50-1	50-1	50-1	50-1	50-1	50-1
51	51-1	51-1	51-1	51-1	51-1	51-1
52	52-1	52-1	52-1	52-1	52-1	52-1
53	53-1	53-1	53-1	53-1	53-1	53-1
54	54-1	54-1	54-1	54-1	54-1	54-1
55	55-1	55-1	55-1	55-1	55-1	55-1
56	56-1	56-1	56-1	56-1	56-1	56-1
57	57-1	57-1	57-1	57-1	57-1	57-1
58	58-1	58-1	58-1	58-1	58-1	58-1
59	59-1	59-1	59-1	59-1	59-1	59-1
60	60-1	60-1	60-1	60-1	60-1	60-1
61	61-1	61-1	61-1	61-1	61-1	61-1
62	62-1	62-1	62-1	62-1	62-1	62-1
63	63-1	63-1	63-1	63-1	63-1	63-1
64	64-1	64-1	64-1	64-1	64-1	64-1
65	65-1	65-1	65-1	65-1	65-1	65-1
66	66-1	66-1	66-1	66-1	66-1	66-1
67	67-1	67-1	67-1	67-1	67-1	67-1
68	68-1	68-1	68-1	68-1	68-1	68-1
69	69-1	69-1	69-1	69-1	69-1	69-1
70	70-1	70-1	70-1	70-1	70-1	70-1
71	71-1	71-1	71-1	71-1	71-1	71-1
72	72-1	72-1	72-1	72-1	72-1	72-1
73	73-1	73-1	73-1	73-1	73-1	73-1
74	74-1	74-1	74-1	74-1	74-1	74-1
75	75-1	75-1	75-1	75-1	75-1	75-1
76	76-1	76-1	76-1	76-1	76-1	76-1
77	77-1	77-1	77-1	77-1	77-1	77-1
78	78-1	78-1	78-1	78-1	78-1	78-1
79	79-1	79-1	79-1	79-1	79-1	79-1
80	80-1	80-1	80-1	80-1	80-1	80-1
81	81-1	81-1	81-1	81-1	81-1	81-1
82	82-1	82-1	82-1	82-1	82-1	82-1
83	83-1	83-1	83-1	83-1	83-1	83-1
84	84-1	84-1	84-1	84-1	84-1	84-1
85	85-1	85-1	85-1	85-1	85-1	85-1
86	86-1	86-1	86-1	86-1	86-1	86-1
87	87-1	87-1	87-1	87-1	87-1	87-1
88	88-1	88-1	88-1	88-1	88-1	88-1
89	89-1	89-1	89-1	89-1	89-1	89-1
90	90-1	90-1	90-1	90-1	90-1	90-1
91	91-1	91-1	91-1	91-1	91-1	91-1
92	92-1	92-1	92-1	92-1	92-1	92-1
93	93-1	93-1	93-1	93-1	93-1	93-1
94	94-1	94-1	94-1	94-1	94-1	94-1
95	95-1	95-1	95-1	95-1	95-1	95-1
96	96-1	96-1	96-1	96-1	96-1	96-1
97	97-1	97-1	97-1	97-1	97-1	97-1
98	98-1	98-1	98-1	98-1	98-1	98-1
99	99-1	99-1	99-1	99-1	99-1	99-1
100	100-1	100-1	100-1	100-1	100-1	100-1

SECTION 4

MULTI-STAGE SEPARATOR TEST

TABLE 4-A1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF RESERVOIR FLUID

Boiling Point (K)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
77.4	Nitrogen	N ₂	0.0007	0.0001	Total Sample
194.6	Carbon Dioxide	CO ₂	0.0003	0.0001	
212.8	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 176.25
111.5	Methane	C ₁	0.0100	0.0009	Density (g/cc) 0.8185
184.3	Ethane	C ₂	0.0551	0.0094	
231.0	Propane	C ₃	0.0929	0.0232	C₆₊ Fraction
261.5	i-Butane	i-C ₄	0.0201	0.0066	
272.6	n-Butane	n-C ₄	0.0598	0.0197	Molecular Weight 226.53
301.0	i-Pentane	i-C ₅	0.0256	0.0105	Mole Fraction 0.7174
309.3	n-Pentane	n-C ₅	0.0180	0.0074	Density (g/cc) 0.8609
309.3 - 342	Hexanes	C ₆	0.0336	0.0165	
342 - 371.4	Heptanes	C ₇	0.0388	0.0220	C₇₊ Fraction
371.4 - 398.8	Octanes	C ₈	0.0476	0.0309	
398.8 - 423.8	Nonanes	C ₉	0.0396	0.0288	Molecular Weight 234.04
	Decanes	C ₁₀	0.0366	0.0296	Mole Fraction 0.6810
447 - 469.3	Undecanes	C ₁₁	0.0475	0.0396	Density (g/cc) 0.8651
469.3 - 488.2	Dodecanes	C ₁₂	0.0430	0.0393	
488.2 - 508.2	Tridecanes	C ₁₃	0.0401	0.0398	C₁₂₊ Fraction
508.2 - 525.4	Tetradecanes	C ₁₄	0.0334	0.0360	
525.4 - 543.8	Pentadecanes	C ₁₅	0.0273	0.0320	Molecular Weight 307.03
543.8 - 560.9	Hexadecanes	C ₁₆	0.0224	0.0282	Mole Fraction 0.4157
560.9 - 564.8	Heptadecanes	C ₁₇	0.0200	0.0268	Density (g/cc) 0.8932
564.8 - 590.4	Octadecanes	C ₁₈	0.0195	0.0277	
590.4 - 603.2	Nonadecanes	C ₁₉	0.0186	0.0277	C₃₀₊ Fraction
603.2 - 617.5	Eicosanes	C ₂₀	0.0167	0.0261	
617.5 - 630.4	Heneicosanes	C ₂₁	0.0144	0.0238	Molecular Weight 584.92
630.4 - 642.5	Docosanes	C ₂₂	0.0140	0.0241	Mole Fraction 0.0746
642.5 - 653.2	Tricosanes	C ₂₃	0.0120	0.0217	Density (g/cc) 0.9843
653.2 - 664.3	Tetracosanes	C ₂₄	0.0116	0.0218	
664.3 - 674.9	Pentacosanes	C ₂₅	0.0114	0.0223	
674.9 - 685.4	Hexacosanes	C ₂₆	0.0097	0.0197	Recombination Parameters
685.4 - 695.4	Heptacosanes	C ₂₇	0.0094	0.0199	
695.4 - 704.9	Octacosanes	C ₂₈	0.0092	0.0203	Gas-Oil Ratio (cc/cc) 21.63
704.9 - 714.3	Nonacosanes	C ₂₉	0.0085	0.0194	Dead Oil Density (g/cc) 0.8528
Above 714.3	Tricontanes Plus	C ₃₀₊	0.0746	0.2475	Dead Oil MW (g/mol) 205.81
NAPHTHENES					
322.0	Cyclopentane	C ₅ H ₁₀	0.0028	0.0011	
345.4	Methylcyclopentane	C ₆ H ₁₂	0.0126	0.0060	
354.3	Cyclohexane	C ₆ H ₁₂	0.0144	0.0069	
374.3	Methylcyclohexane	C ₇ H ₁₄	0.0140	0.0078	
AROMATICS					
353.2	Benzene	C ₆ H ₆	0.0000	0.0000	
383.8	Toluene	C ₇ H ₈	0.0019	0.0010	
409.3 - 412	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0040	0.0024	
417.5	o-Xylene	C ₈ H ₁₀	0.0038	0.0023	
442.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0045	0.0031	
Total			1.0000	1.0000	

Note: Physical Properties calculated based on GPA 2145-00 physical constants

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SECTION 4
MULTI-STAGE SEPARATOR TEST

TABLE 4-A2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF FLASHED OIL

Boiling Point (K)	Component Name	Chemical Symbol	Mole Fraction	Mass Fraction	Calculated Properties
77.4	Nitrogen	N ₂	0.0000	0.0000	Total Sample
194.6	Carbon Dioxide	CO ₂	0.0000	0.0000	
212.8	Hydrogen Sulphide	H ₂ S	0.0000	0.0000	Molecular Weight 205.81
111.5	Methane	C ₁	0.0000	0.0000	Density (g/cc) 0.8459
184.3	Ethane	C ₂	0.0000	0.0000	
231.0	Propane	C ₃	0.0237	0.0051	C₆₊ Fraction
261.5	i-Butane	i-C ₄	0.0117	0.0033	
272.6	n-Butane	n-C ₄	0.0444	0.0125	Molecular Weight 227.04
301.0	i-Pentane	i-C ₅	0.0275	0.0097	Mole Fraction 0.8723
309.3	n-Pentane	n-C ₅	0.0203	0.0071	Density (g/cc) 0.8611
309.3 - 342	Hexanes	C ₆	0.0401	0.0168	
342 - 371.4	Heptanes	C ₇	0.0471	0.0229	C₇₊ Fraction
371.4 - 398.8	Octanes	C ₈	0.0581	0.0322	
398.8 - 423.8	Nonanes	C ₉	0.0483	0.0301	Molecular Weight 234.50
	Decanes	C ₁₀	0.0447	0.0309	Mole Fraction 0.8288
447 - 469.3	Undecanes	C ₁₁	0.0580	0.0414	Density (g/cc) 0.8652
469.3 - 488.2	Dodecanes	C ₁₂	0.0525	0.0410	
488.2 - 508.2	Tridecanes	C ₁₃	0.0490	0.0416	C₁₂₊ Fraction
508.2 - 525.4	Tetradecanes	C ₁₄	0.0408	0.0377	
525.4 - 543.8	Pentadecanes	C ₁₅	0.0334	0.0334	Molecular Weight 307.03
543.8 - 560.9	Hexadecanes	C ₁₆	0.0273	0.0295	Mole Fraction 0.5073
560.9 - 564.8	Heptadecanes	C ₁₇	0.0244	0.0281	Density (g/cc) 0.8932
564.8 - 590.4	Octadecanes	C ₁₈	0.0238	0.0290	
590.4 - 603.2	Nonadecanes	C ₁₉	0.0227	0.0289	C₃₀₊ Fraction
603.2 - 617.5	Eicosanes	C ₂₀	0.0204	0.0272	
617.5 - 630.4	Heneicosanes	C ₂₁	0.0176	0.0249	Molecular Weight 584.92
630.4 - 642.5	Docosanes	C ₂₂	0.0170	0.0252	Mole Fraction 0.0746
642.5 - 653.2	Tricosanes	C ₂₃	0.0147	0.0227	Density (g/cc) 0.9843
653.2 - 664.3	Tetracosanes	C ₂₄	0.0142	0.0228	
664.3 - 674.9	Pentacosanes	C ₂₅	0.0139	0.0233	
674.9 - 685.4	Hexacosanes	C ₂₆	0.0118	0.0206	
685.4 - 695.4	Heptacosanes	C ₂₇	0.0114	0.0208	
695.4 - 704.9	Octacosanes	C ₂₈	0.0112	0.0212	
704.9 - 714.3	Nonacosanes	C ₂₉	0.0104	0.0203	
Above 714.3	Tricontanes Plus	C ₃₀₊	0.0910	0.2587	
NAPHTHENES					
322.0	Cyclopentane	C ₅ H ₁₀	0.0034	0.0012	
345.4	Methylcyclopentane	C ₆ H ₁₂	0.0137	0.0056	
354.3	Cyclohexane	C ₆ H ₁₂	0.0174	0.0071	
374.3	Methylcyclohexane	C ₇ H ₁₄	0.0170	0.0081	
AROMATICS					
353.2	Benzene	C ₆ H ₆	0.0000	0.0000	
383.8	Toluene	C ₇ H ₈	0.0023	0.0010	
409.3 - 412	Ethylbenzene & p,m-Xylene	C ₈ H ₁₀	0.0049	0.0025	
417.5	o-Xylene	C ₈ H ₁₀	0.0046	0.0024	
442.0	1, 2, 4-Trimethylbenzene	C ₉ H ₁₂	0.0055	0.0032	
Total			1.0000	1.0000	

Note: Physical Properties calculated based on GPA 2145-00 physical constants

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SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-A3
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
COMPOSITIONAL ANALYSIS OF FLASHED GAS

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0041	0.0042		
Carbon Dioxide	CO ₂	0.0014	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0555	0.0556		
Ethane	C ₂	0.3054	0.3058		
Propane	C ₃	0.4069	0.4075	265.711	1491.838
i-Butane	i-C ₄	0.0583	0.0584	45.251	254.063
n-Butane	n-C ₄	0.1297	0.1299	97.039	544.827
i-Pentane	i-C ₅	0.0171	0.0171	14.836	83.295
n-Pentane	n-C ₅	0.0073	0.0073	6.285	35.289
Hexanes	C ₆	0.0042	0.0042	4.113	23.091
Heptanes	C ₇	0.0096	0.0096	10.527	59.104
Octanes	C ₈	0.0004	0.0004	0.536	3.010
Nonanes	C ₉	0.0000	0.0000	0.000	0.000
	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	444.298	2494.516
Propanes Plus	C ₃₊	1.9389	1.9403	888.597	4989.032
Butanes Plus	C ₄₊	1.6335	1.6345	888.597	4989.032
Pentanes Plus	C ₅₊	1.1684	1.1686	577.634	3243.131

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	42.22 kg/kmol	42.22 lb/lb-mol	Ppc	627.6 psia	4.33 MPa
Specific Gravity	1.4575 (Air = 1)	1.4575 (Air = 1)	Tpc	175.93 F	79.95 C
MW of C7+	0.97 kg/kmol	0.97 lb/lbmol	Ppc*	627.3 psia	4.32 MPa
Density of C7+	0.7230 g/cc	723.0 kg/m3	Tpc*	175.63 F	79.75 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,406.7 Btu/scf	89.84 MJ/m3	Dry	2,212.8 Btu/scf	82.60 MJ/m3
Wet	2,364.8 Btu/scf	88.27 MJ/m3	Wet	2,174.3 Btu/scf	81.16 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

GC No.: 4472

APPENDIX B

MULTI-STAGE SEPARATOR TEST - MATERIAL BALANCE

SECTION 4
MULTI-STAGE SEPARATOR TEST

TABLE 4-B1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR - MATERIAL BALANCE

Pressure		Measured	Calculated	Absolute
(psia)	(MPa)	Oil FVF [1]	Oil FVF [1]	Relative Error (%)
176 Psat	1.21	1.0769	1.0651	1.1056
56	0.39	1.0310	1.0282	0.2709
53	0.37	1.0250	1.0267	0.1618
13	0.09	1.0000	1.0000	0.0004
<p>[1] (res bbl/STB) (res m3/m3)</p> <p>Psat - Saturation Pressure</p> <p>- Tank conditions: 60 F (15.6 C) @ 13 psia (0.09 MPaa)</p>				

MULTI-STAGE SEPARATOR TEST - LIBERATED GAS ANALYSES

SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-C1
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR GAS COMPOSITION @ 56 psia (0.39 MPaa) AND 60.3 F (15.7 C)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0242	0.0243		
Carbon Dioxide	CO ₂	0.0036	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.3189	0.3200		
Ethane	C ₂	0.4230	0.4245		
Propane	C ₃	0.1697	0.1703	110.808	622.133
i-Butane	i-C ₄	0.0145	0.0146	11.268	63.263
n-Butane	n-C ₄	0.0280	0.0281	20.972	117.746
i-Pentane	i-C ₅	0.0046	0.0046	4.007	22.496
n-Pentane	n-C ₅	0.0021	0.0021	1.819	10.213
Hexanes	C ₆	0.0023	0.0023	2.235	12.546
Heptanes	C ₇	0.0088	0.0088	9.590	53.840
Octanes	C ₈	0.0003	0.0003	0.396	2.224
Nonanes	C ₉	0.0000	0.0000	0.050	0.282
	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	161.144	904.743
Propanes Plus	C ₃₊	0.2304	0.2312	161.144	904.743
Butanes Plus	C ₄₊	0.0607	0.0609	50.336	282.610
Pentanes Plus	C ₅₊	0.0181	0.0182	18.096	101.601

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	30.19 kg/kmol	30.19 lb/lb-mol	Ppc	663.7 psia	4.58 MPa
Specific Gravity	1.0423 (Air = 1)	1.0423 (Air = 1)	Tpc	51.43 F	10.75 C
MW of C7+	96.50 kg/kmol	96.50 lb/lbmol	Ppc*	662.7 psia	4.57 MPa
Density of C7+	0.7230 g/cc	723.0 kg/m3	Tpc*	50.73 F	10.35 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	1,724.4 Btu/scf	64.37 MJ/m3	Dry	1,577.0 Btu/scf	58.87 MJ/m3
Wet	1,694.4 Btu/scf	63.25 MJ/m3	Wet	1,549.6 Btu/scf	57.84 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

GC No.: 4648

SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-C2
ENERPLUS CORPORATION - ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR GAS COMPOSITION @ 53 psia (0.37 MPaa) AND 120.2 F (49.0 C)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0015	0.0016		
Carbon Dioxide	CO ₂	0.0020	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0693	0.0694		
Ethane	C ₂	0.4101	0.4109		
Propane	C ₃	0.3454	0.3461	225.549	1266.347
i-Butane	i-C ₄	0.0409	0.0410	31.769	178.367
n-Butane	n-C ₄	0.0877	0.0879	65.598	368.300
i-Pentane	i-C ₅	0.0154	0.0154	13.398	75.222
n-Pentane	n-C ₅	0.0066	0.0066	5.677	31.875
Hexanes	C ₆	0.0048	0.0048	4.669	26.214
Heptanes	C ₇	0.0157	0.0158	17.227	96.719
Octanes	C ₈	0.0005	0.0005	0.614	3.448
Nonanes	C ₉	0.0000	0.0000	0.055	0.310
	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	364.556	2046.803
Propanes Plus	C ₃₊	0.5171	0.5181	364.556	2046.803
Butanes Plus	C ₄₊	0.1717	0.1720	139.007	780.456
Pentanes Plus	C ₅₊	0.0431	0.0432	41.640	233.789

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	39.85 kg/kmol	39.85 lb/lb-mol	Ppc	641.5 psia	4.42 MPa
Specific Gravity	1.3759 (Air = 1)	1.3759 (Air = 1)	Tpc	156.73 F	69.35 C
MW of C7+	96.40 kg/kmol	96.40 lb/lbmol	Ppc*	641.1 psia	4.42 MPa
Density of C7+	0.7228 g/cc	722.8 kg/m3	Tpc*	156.33 F	69.05 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,285.0 Btu/scf	85.29 MJ/m3	Dry	2,099.3 Btu/scf	78.36 MJ/m3
Wet	2,245.2 Btu/scf	83.81 MJ/m3	Wet	2,062.7 Btu/scf	77.00 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

GC No.: 4655

SECTION 4 MULTI-STAGE SEPARATOR TEST

TABLE 4-C3
ENERPLUS CORPORATION- ROSELEA
WELL 100/10-25-010-26W1M - LODGEPOLE - RECOMBINED SAMPLE
MULTI-STAGE SEPARATOR TEST
MULTI-STAGE SEPARATOR GAS COMPOSITION @ 13 psia (0.09 MPaa) AND 60.1 F (15.6 C)

Component Name	Chemical Symbol	Mole Fraction		Liquid Volume	
		As Analyzed	Acid Gas Free	STB/MMscf	mL/m3
Nitrogen	N ₂	0.0066	0.0066		
Carbon Dioxide	CO ₂	0.0011	0.0000		
Hydrogen Sulphide	H ₂ S	0.0000	0.0000		
Methane	C ₁	0.0180	0.0181		
Ethane	C ₂	0.3240	0.3244		
Propane	C ₃	0.4321	0.4326	282.194	1584.379
i-Butane	i-C ₄	0.0563	0.0563	43.683	245.257
n-Butane	n-C ₄	0.1195	0.1196	89.390	501.883
i-Pentane	i-C ₅	0.0186	0.0186	16.154	90.696
n-Pentane	n-C ₅	0.0070	0.0070	6.005	33.715
Hexanes	C ₆	0.0041	0.0041	3.972	22.301
Heptanes	C ₇	0.0123	0.0123	13.490	75.737
Octanes	C ₈	0.0004	0.0004	0.488	2.742
Nonanes	C ₉	0.0000	0.0000	0.045	0.253
	C ₁₀	0.0000	0.0000	0.000	0.000
Undecane	C ₁₁	0.0000	0.0000	0.000	0.000
Dodecanes Plus	C ₁₂₊	0.0000	0.0000	0.000	0.000
Total		1.0000	1.0000	455.421	2556.962
Propanes Plus	C ₃₊	0.6503	0.6510	455.421	2556.962
Butanes Plus	C ₄₊	0.2182	0.2184	173.227	972.583
Pentanes Plus	C ₅₊	0.0424	0.0424	40.154	225.444

Calculated Gas Properties @ Standard Conditions			Calculated Pseudocritical Properties		
Molecular Weight	42.96 kg/kmol	42.96 lb/lb-mol	Ppc	627.0 psia	4.32 MPa
Specific Gravity	1.4833 (Air = 1)	1.4833 (Air = 1)	Tpc	184.73 F	85.85 C
MW of C7+	96.41 kg/kmol	96.41 lb/lbmol	Ppc*	626.8 psia	4.32 MPa
Density of C7+	0.7228 g/cc	722.8 kg/m3	Tpc*	184.43 F	84.65 C

Calculated Gross Heating Value @ Standard Conditions			Calculated Net Heating Value @ Standard Conditions		
Dry	2,444.4 Btu/scf	91.24 MJ/m3	Dry	2,248.1 Btu/scf	83.92 MJ/m3
Wet	2,401.9 Btu/scf	89.66 MJ/m3	Wet	2,209.0 Btu/scf	82.45 MJ/m3

Standard Conditions: 60 F (15.6 C) @ 14.696 psia (0.101325 MPaa)

GC No.: 4655