

PRODUCTIVITY AND BUILDUP TEST REPORT

On Well

WASKADA LAM Unit No.1

103/13-24-001-26W1/00

Lower Amaranth: 1177.0 – 1703.3 mKB

Test Date: July 11 – 21, 2011

Prepared for:

PENN WEST ENERGY TRUST

Prepared by:

FEKETE ASSOCIATES INC.

September 23, 2011

PENN WEST ENERGY TRUST
Suite 200, 207 – 9th Ave. S.W.
Calgary, Alberta
T2P 1K3

ATTENTION: TREVOR THOMPSON

Re: Productivity & Buildup Test Report
WASKADA LAM Unit No. 1 103/13-24-001-26W1/00
Amaranth: 1177.0 – 1703.3 mKB
Test Date: July 11 – 21, 2011

An acoustic well sounder buildup test was conducted on the subject well to establish the current reservoir pressure, flow characteristics and productivity of the Amaranth formation. The test data have been analyzed and the results are presented in this report.

The raw data, analysis, report PDF, and PAS files are included in the CD attached to the original copy of this report.

If you should have any further questions or concerns, please do not hesitate to contact the undersigned or Reza Ali at 403.213-4200.

Sincerely,

FEKETE ASSOCIATES INC.

Gordon Severin
Well Test & Production Data Analyst

GS/fb

Frank Brunner, R.E.T.
Senior Technical Advisor,
Well Testing

REPORT DISTRIBUTION

Two (2) Copies of the Report to:

PENN WEST ENERGY TRUST
Calgary, Alberta

Attention: TREVOR THOMPSON

Summary of Results

WASKADA LAM Unit No. 1 103/13-24-001-26W1/00
Lower Amaranth: 1177.0 – 1703.3 mKB
Test Date: July 11 - 21, 2011

TEST RESULTS

PRESSURE SUMMARY		Metric		Field	
Final Calculated Buildup Pressure (2011/07/21)	(p)	2815	kPaa	408	psia
Final Calculated Flowing Sandface Pressure (2011/07/11)	(p _{wfo})	2580	kPaa	374	psia

PRODUCTION AND DELIVERABILITY					
Final Oil Rate (2011/07/11)	(q _o)	2.9	m ³ /d	18	bbl/d
Final Gas Rate (2011/07/11)	(q _g)	1.8	10 ³ m ³ /d	65	Mcf/d
Final Water Rate (2011/07/11)	(q _w)	5.7	m ³ /d	36	bbl/d
Cumulative Oil Production (to 2011/07/11)		2679	m ³	16850	bbl
Maximum Oil Rate (based on final oil rate)	(q _{omax})	5.1	m ³ /d	32.1	bbl/d

RESERVOIR CHARACTERISTICS – Hz Multi-frac Model w/Boundaries		Field		Metric	
Average Reservoir Pressure (History Match)	(p_R)	4184	kPaa	607	psia
Horizontal Permeability	(k _{xy})	0.14	mD	0.15	md
Permeability in X Direction	(k _x)	0.06	mD	0.06	md
Permeability in Y Direction	(k _y)	0.37	mD	0.37	md
Net Vertical Pay	(h)	30	m	98	ft
Effective Horizontal Wellbore Length (provided)	(L _e)	526	m	1727	ft
Effective Fracture Half Length	(x _{fy})	25	m	82	ft
Fracture Conductivity	(F _{CD})	20		20	
Reservoir Length (assumed)	(X _e)	1600	m	5249	ft
Reservoir Width (assumed)	(Y _e)	400	m	1312	ft
Location of Well From X Axis (assumed)	(X _w)	800	m	2625	ft
Location of Well From Y Axis (assumed)	(Y _w)	200	m	656	ft

Discussion/ Conclusions

WASKADA LAM Unit No. 1 103/13-24-001-26W1/00
Lower Amaranth: 1177.0 – 1703.3 mKB
Test Date: July 11 - 21, 2011

BACKGROUND AND TEST OVERVIEW

The WASKADA LAM UNIT No.1 well was drilled vertically to a depth of 615 mKB before starting to build angle. Drilling continued until the Amaranth formation was penetrated, and then, the lateral section of the wellbore was drilled out to a TD of 1852mKB MD (910.9 mKB TVD). Production casing (139.7 mm) was then landed at TD and cemented in place.

Completion operations commenced on February 18, 2010, when a Mongoose frac tool assembly was RIH on the end of 73 mm coiled tubing. The BHA packer was set at 1703.0 mKB, and on the following day, the toe was perforated (abrasive cut) over the interval of 1703.0 – 1703.3 mKB MD. The interval was subsequently hydraulically frac'd, placing 10 tonnes of sand blended in 15.8 m³ of water into the formation, and this procedure was repeated 14 times along the length of the horizontal wellbore over the additional gross interval of 1177.0 – 1663.3 mKB. Details of the perforations and stimulation operations are summarized in the table below.

Stage #	Treatment Interval (m KB MD)	Sand Pumped (tonne)	Fluid Pumped (m3)
1	1703.0 – 1703.3	10	15.8
2	1663.0 – 1663.3	10	15.4
3	1627.0 – 1627.3	10	15.1
4	1588.0 – 1588.3	10	14.7
5	1550.0 – 1550.3	10	14.4
6	1512.0 – 1512.3	10	14.0
7	1473.0 – 1473.3	10	13.7
8	1433.0 – 1433.3	10	14.0
9	1398.0 – 1398.3	10	13.0
10	1360.0 – 1360.3	10	12.6
11	1321.0 – 1321.3	10	12.2
12	1282.0 – 1282.3	10	11.9
13	1244.0 – 1244.3	10	11.5
14	1204.0 – 1204.3	10	11.2
15	1177.0 – 1177.3	10	10.9
Total		150	199.7

WASKADA LAM Unit No. 1 103/13-24-001-26W1/00
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BACKGROUND AND TEST OVERVIEW (cont'd)

Following the 15 stage hydraulic fracture treatment, a "WR" plug was RIH on the end of coiled tubing and set at 163 mKB and services were released. The well remained suspended until February 27, at which time, the "WR" plug was retrieved and an N₂ assisted coiled tubing cleanout was conducted to the PBTD of 1708 mKB MD.

The well remained standing until March 2, at which time, 73 mm production tubing was RIH and landed at 908.6 mKB MD. Shortly thereafter, the pump and rods were installed, tested and primed.

Commercial oil and gas production commenced May 21, 2010. Oil production peaked on May 21, 2010, at 24 m³/d and fell to a daily average of 3.0 m³/d by July 2011.

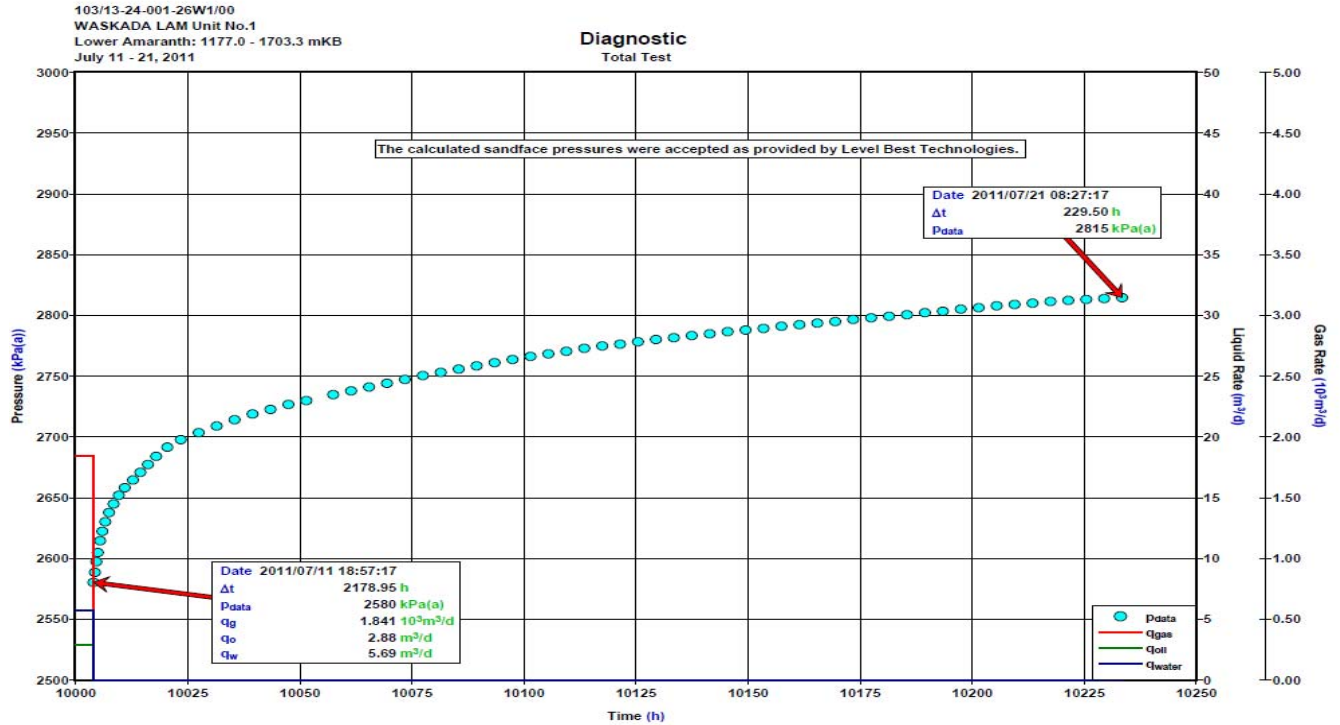
On July 11, 2011, an automated acoustic well sounder, c/w surface pressure recorder, was connected to the annulus and a fluid depression test was initiated. The well was then shut-in at a final oil rate of 2.9 m³/d, a gas rate of 1.8 10³m³/d, and a water rate of 5.7 m³/d. The subsequent automated samplings of the fluid level and corresponding casing pressure were collected until July 21 ($\Delta t = 230$ hrs), when the AWS equipment was rigged out. The pressure calculations to MPP (911.5 mKB TVD), were conducted by the AWS service provider and have been accepted as presented.

During the May 21, 2010 to July 11, 2011 production period, a total of 2679 m³ of oil, 698 10³m³ of gas, and 2542 m³ of water were produced.

The plot on the following page displays the calculated bottomhole pressures measured during the test and oil, gas and water rates measured just prior to shut-in on July 11.

WASKADA LAM Unit No. 1 103/13-24-001-26W1/00
Lower Amaranth: 1177.0 – 1703.3 mKB
Test Date: July 11 - 21, 2011

BACKGROUND AND TEST OVERVIEW (cont'd)

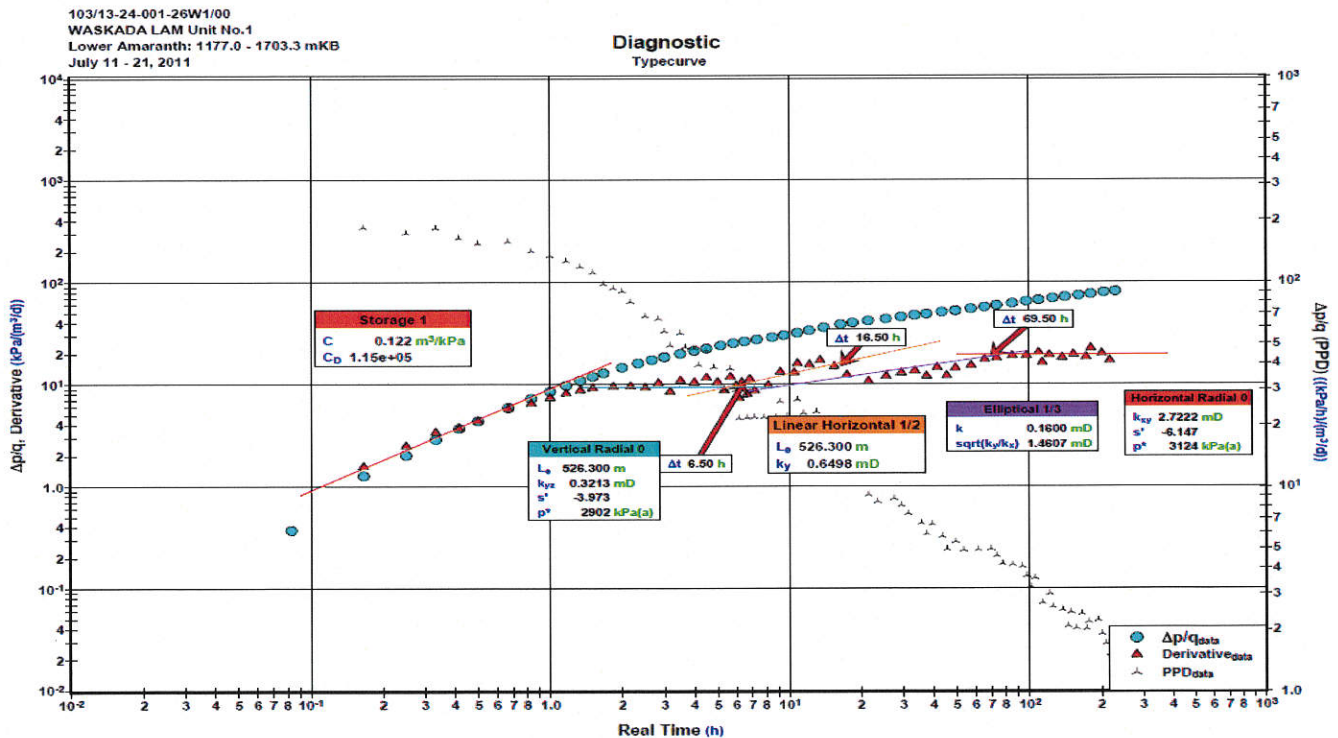


The properties of the oil have been taken from the PVT data supplied by Penn West. A saturation pressure (P_b) of 4326 kPaa is reported and the solution gas/oil ratio is estimated to be $43.3 \text{ m}^3/\text{m}^3$.

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DIAGNOSTIC ANALYSIS

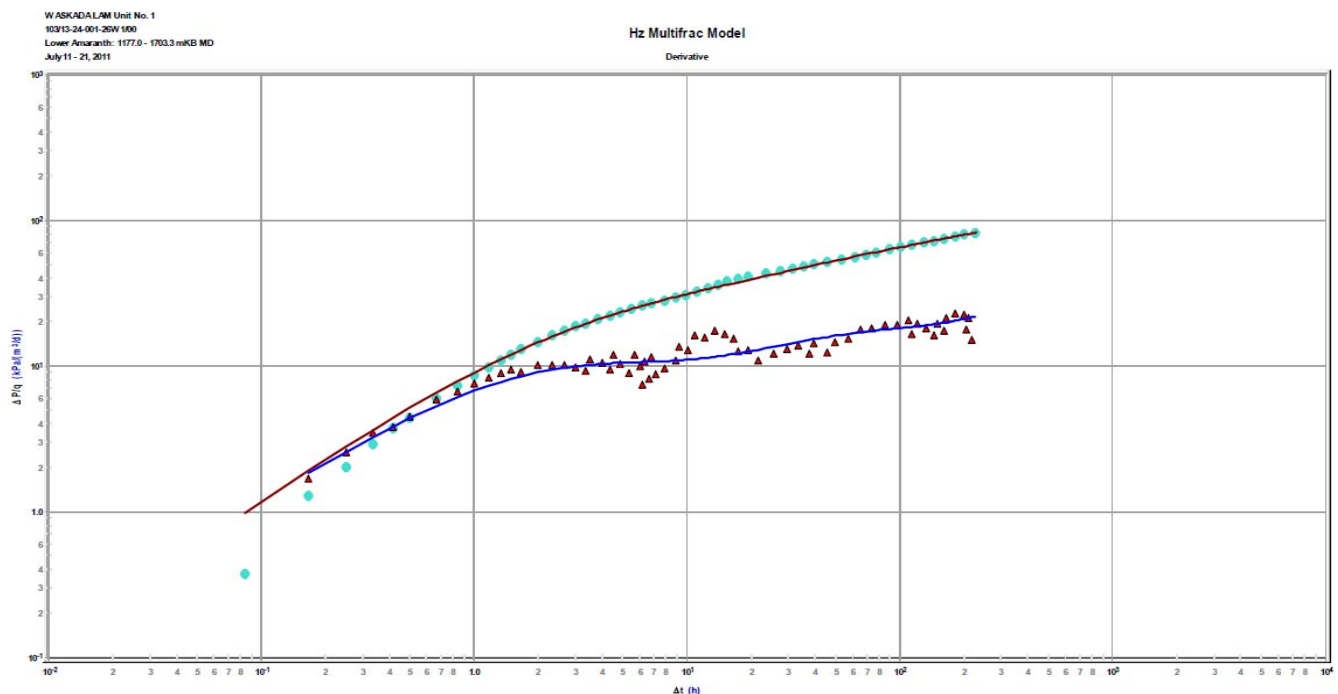
To determine the reservoir flow characteristics affecting the pressure behavior, a type-curve and pressure derivative plot of the buildup was generated (shown on the following page). Although multiple fractures likely impact the flow pattern, conventional horizontal well methodology is initially applied to the buildup trends to provide preliminary permeability and skin estimates to commence subsequent history matching. Therefore, any values shown on the following plot should be viewed as qualitative. Wellbore storage and vertical radial flow appear to be developed within about 7 hours of shut-in. After vertical radial flow dissipates, the derivative exhibits a $\frac{1}{2}$ slope trend (indicating linear horizontal flow) to about 17 hours of shut-in. The derivative then transitions to an apparent $\frac{1}{3}$ slope until about 70 hours of shut-in, indicating elliptical flow (transitional flow regime between linear horizontal and horizontal radial flow). Thereafter, the derivative changes trend and follows what could be interpreted as a zero slope (indicating horizontal radial flow) to the end of the test.



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CONCLUSIONS

History matching was undertaken utilizing the **Horizontal Multi-frac Model**. Assuming an effective horizontal wellbore length of 526 m, a reasonable match to the observed pressure data was achieved with a horizontal permeability (k_{xy}) of 0.14 md. The corresponding fracture half-length was calculated to be 25 m. The drainage area could not be determined from the test, and a $\frac{1}{4}$ section drainage area (1600 x 400 meters) is assumed. The plot below displays the match obtained with the typecurve and pressure derivative.



The final calculated buildup pressure on July 21, 2011 (after 230 hrs of shut-in) was 2815 kPaa. Assuming a $\frac{1}{4}$ section drainage area (1600 x 400 meters), the model calculates a current reservoir pressure of 4184 kPaa.

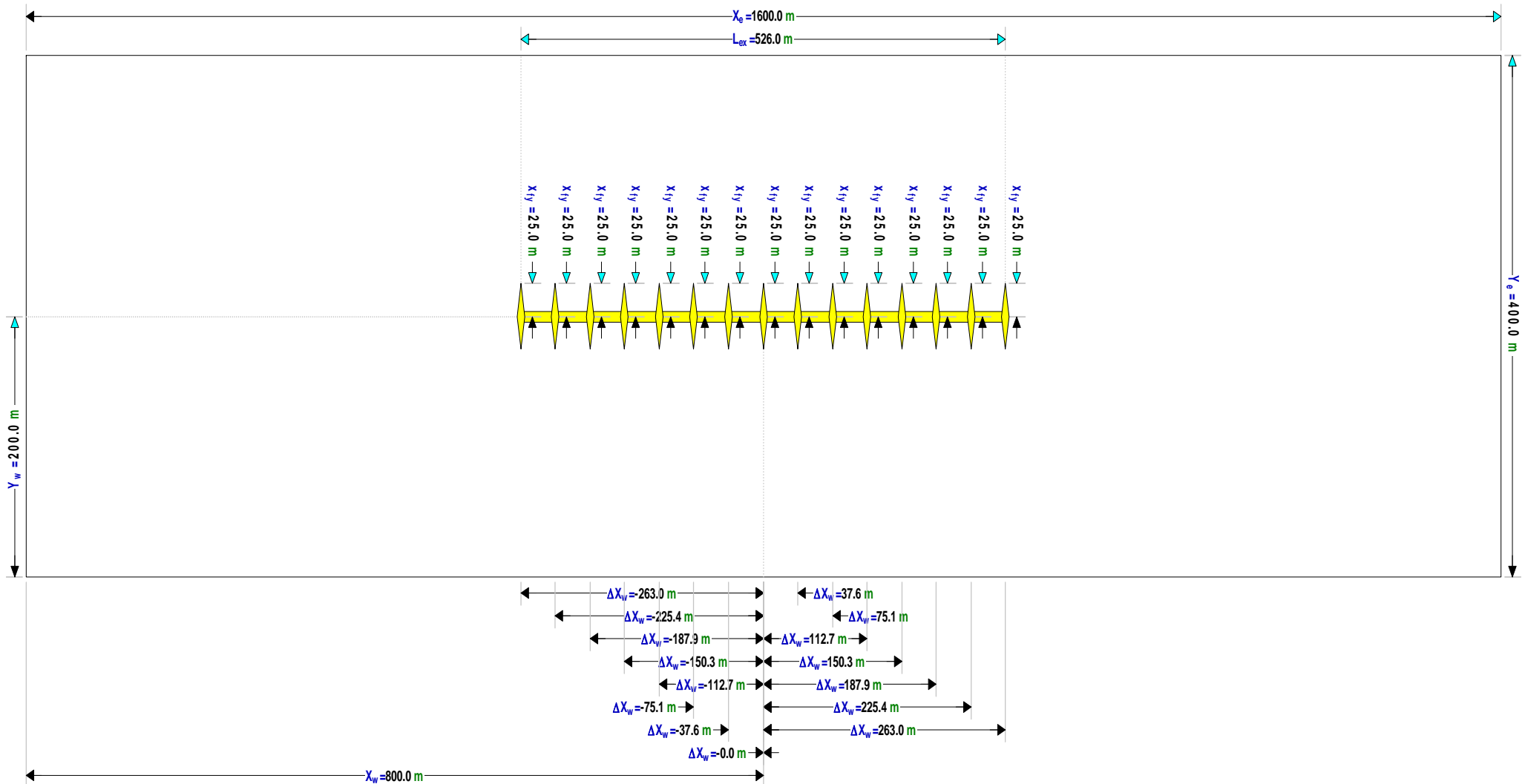
Based on the final producing conditions on July 11, 2011 ($q = 2.9$ m³/d @ $p_{wf} = 2580$ kPaa) and a reservoir pressure of 4184 kPaa, an inflow performance relationship curve was generated, and indicates a maximum oil rate (assuming the sandface flowing pressure could be lowered to zero) of 5.1 m³/d.

Models

Hz Multifrac Model

Schematic

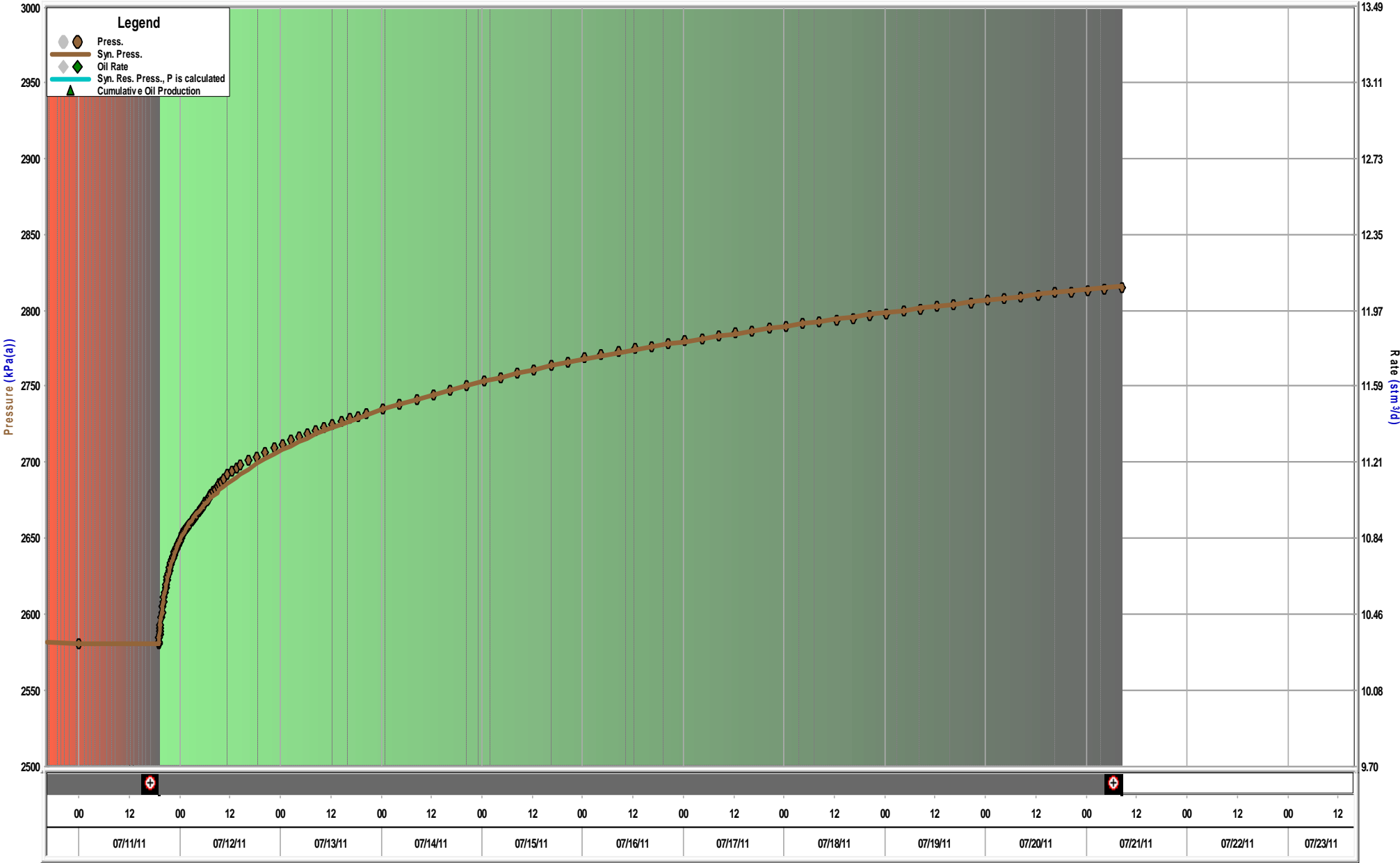
WASKADA LAM Unit No.1
Lower Amaranth: 1177.0 - 1703.3 mKB
July 11 - 21, 2011



W ASKADA LAM Unit No. 1
103/13-24-001-26W 1/00
Lower Amaranth: 1177.0 - 1703.3 mKB MD
July 11 - 21, 2011

Hz Multifrac Model

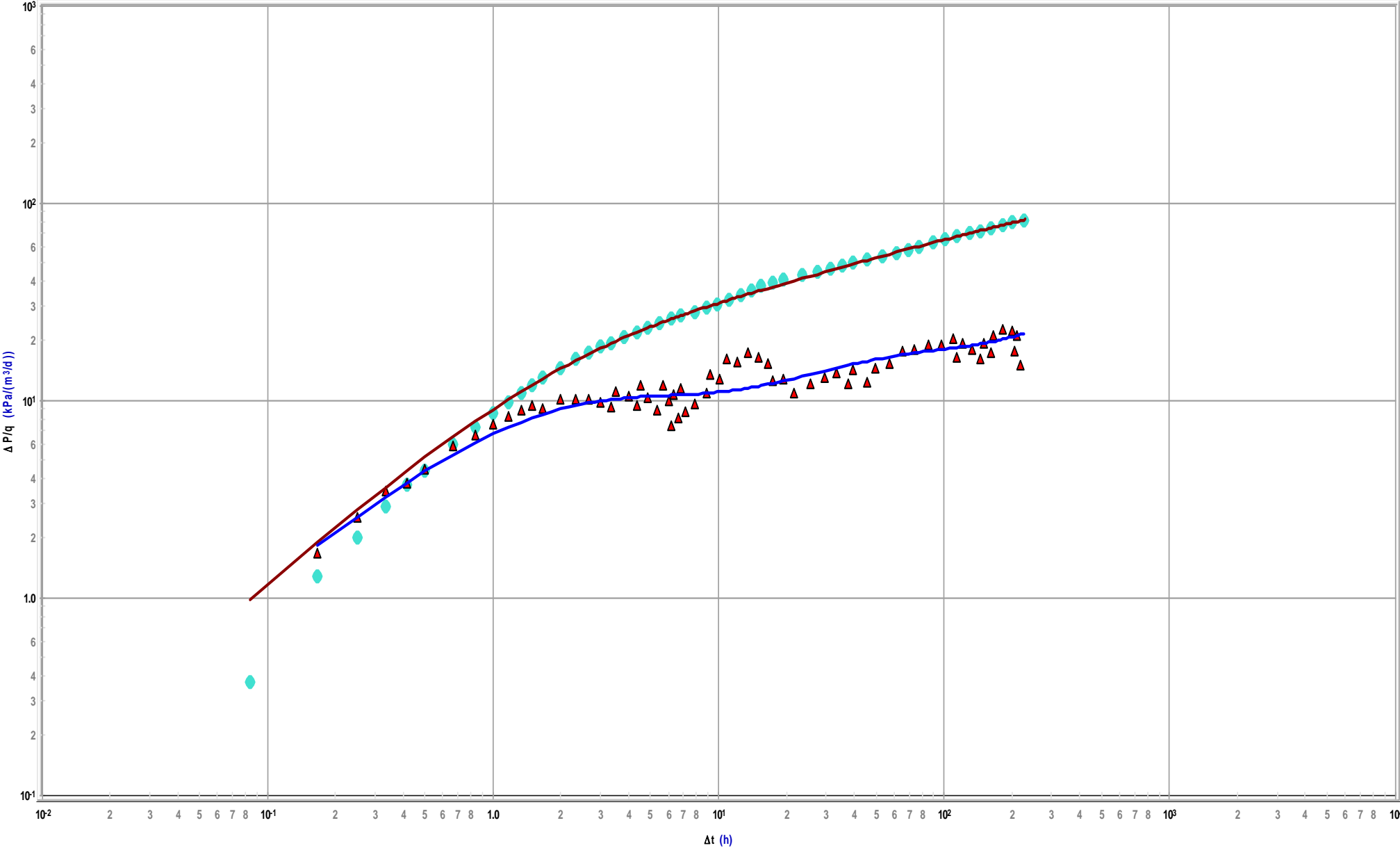
Welltest History



WASKADA LAM Unit No. 1
103/13-24-001-26W 1/00
Lower Amaranth: 1177.0 - 1703.3 mKB MD
July 11 - 21, 2011

Hz Multifrac Model

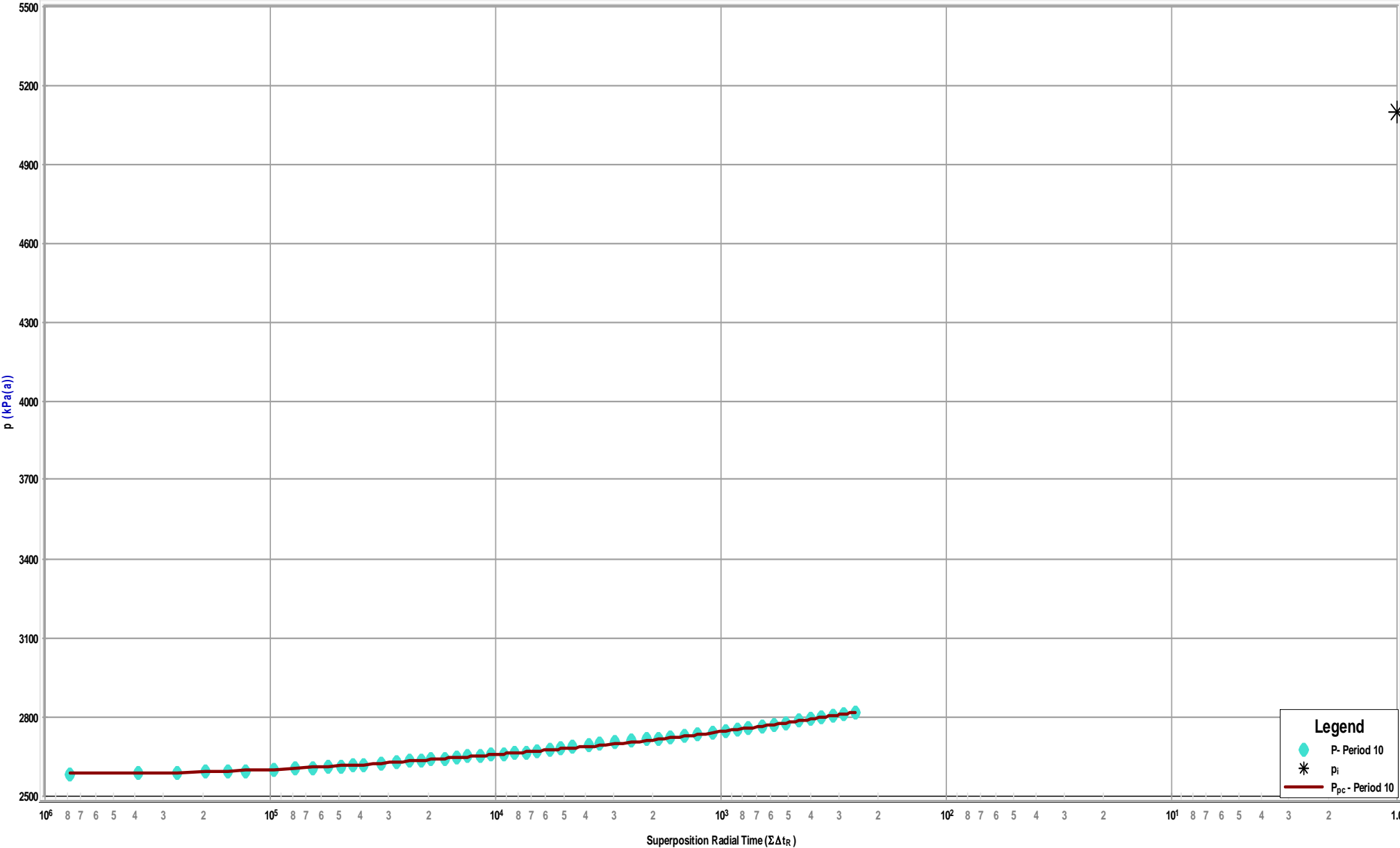
Derivative



W ASKADA LAM Unit No. 1
103/13-24-001-26W 1/00
Lower Amaranth: 1177.0 - 1703.3 mKB MD
July 11 - 21, 2011

Hz Multifrac Model

Radial Build-Up



Oil Model - Horizontal Multifrac Model

WASKADA LAM Unit No.1
103/13-24-001-26W1/00
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Model Results

Skin Damage (s_d)	-4.000	Reservoir Length (X_e)	1600.0 m
Permeability x-direction (k_x)	0.0570 mD	Reservoir Width (Y_e)	400.0 m
Permeability y-direction (k_y)	0.3650 mD	Well Location in X-direction (X_w)	800.0 m
Horizontal to Vertical Permeability Ratio (k_h / k_v)	1.000	Well Location in Y-direction (Y_w)	200.0 m
Number of Fractures (#Fracs)	15	Effective Wellbore Length (L_e)	526.300 m
Fracture Half Length (x_{fy})	25.0 m		
Dimensionless Fracture Conductivity (F_{CD})	20.000		

Reservoir Parameters

Reservoir Temperature (T_R)	45.0 °C	Net Pay (h)	30.0 m
Dimensionless Storage 1 (C_{D1})	14000.0	Total Porosity (ϕ_t)	13.00 %
		Wellbore Radius (r_w)	0.091 m
		Drainage Area (A_D)	64.0 ha
		Gas Saturation (S_g)	0.00 %
		Oil Saturation (S_o)	50.00 %
		Water Saturation (S_w)	50.00 %
		Formation Compressibility (c_f)	6.3246e-07 1/kPa
		Total Compressibility (c_t)	1.3396e-06 1/kPa
		Gas Compressibility (c_g)	2.1659e-04 1/kPa
		Water Compressibility (c_w)	4.4959e-07 1/kPa
		Oil Compressibility (c_o)	9.6464e-07 1/kPa

Fluid Properties

Reservoir Temperature (T_{resv})	45.0 °C
Reservoir Pressure (p_{resv})	4600 kPa(a)
Oil Gravity (γ_o)	37.2 °API
Bubble Point Pressure (p_{bp})	4326 kPa(a)
Oil Formation Volume Factor (B_o)	1.122
Oil Viscosity (μ_o)	1.5352 mPa.s
Oil Compressibility (c_o)	1.0674e-06 1/kPa
Solution Gas Ratio (R_s)	43.30 m ³ /m ³
Oil Correlation	Vasquez and Beggs
Oil Viscosity Correlation	Beggs & Robinson

I.P.R.

Liquid IPR

Inflow Performance Relationship

WASKADA LAM Unit No.1
103/13-24-001-26W1/00
Lower Amaranth: 1177.0 - 1703.3 mKB
July 11 - 21, 2011

Test Data

Bubble Point Pressure (p_{bp}) 4326 kPa(a)
Reservoir Pressure (p_R) 4184 kPa(a)
Test Pressure (p_{wf}) 2580 kPa(a)
Oil Test Rate (q_o) 2.9 m³/d
Water Test Rate (q_w) 5.7 m³/d

Results

Maximum Oil Rate ($q_{o(max)}$) 5.1 m³/d
Maximum Total Rate ($q_{t(max)}$) 19.9 m³/d
Maximum Water Rate ($q_{w(max)}$) 14.8 m³/d

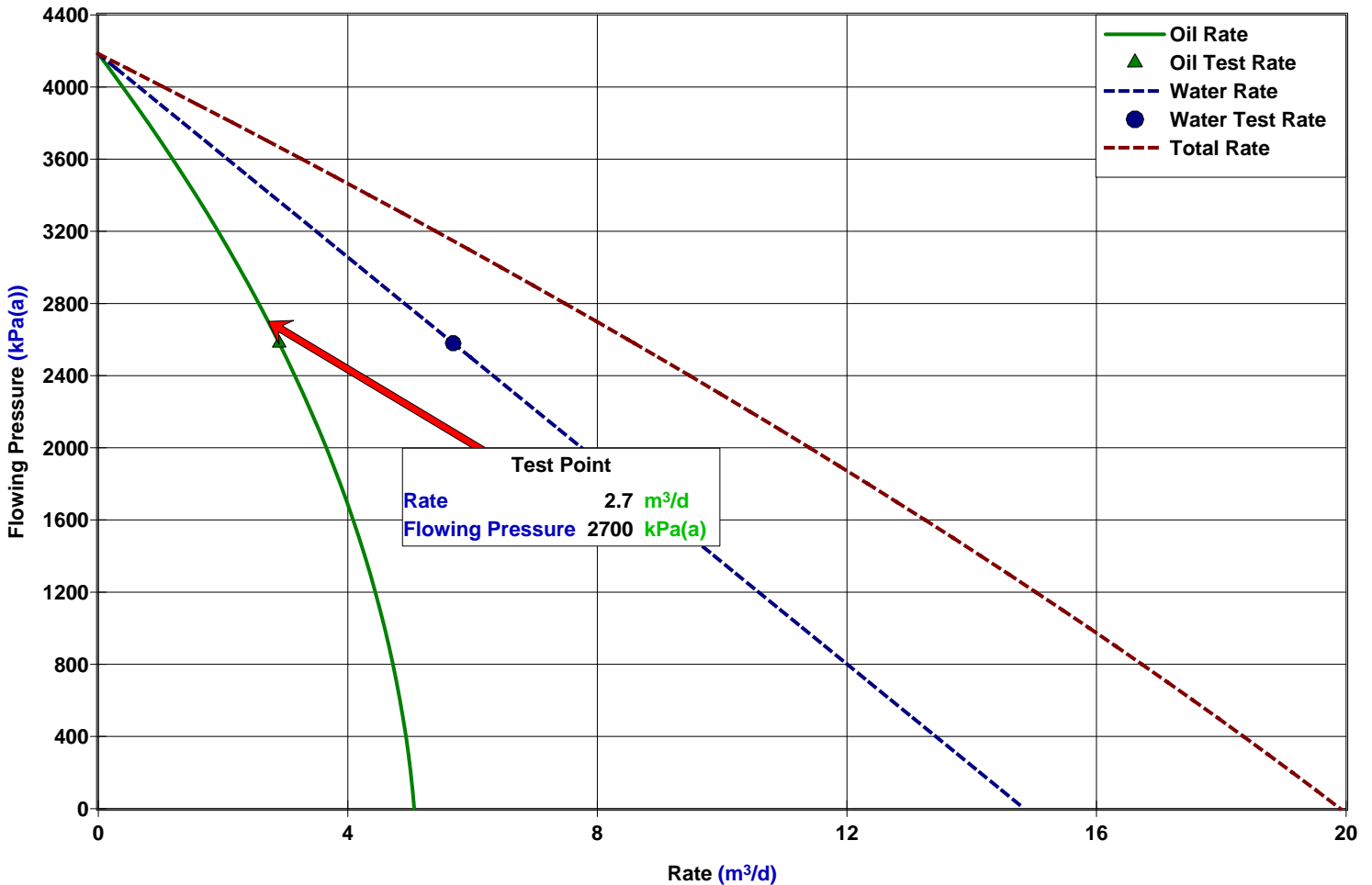
Note * Test Point

** Bubble Point

Oil IPR based on Vogel's Equation
(Quadratic Curve Factor = 0.2)

Flowing Pressure	Oil Rate	Water Rate	Total Rate
kPa(a)	m ³ /d	m ³ /d	m ³ /d
0	5.1	14.8	19.9
300	5.0	13.8	18.8
600	4.8	12.7	17.6
900	4.7	11.6	16.3
1200	4.4	10.6	15.0
1500	4.2	9.5	13.7
1800	3.9	8.5	12.3
2100	3.5	7.4	10.9
2400	3.2	6.3	9.5
2580*	2.9	5.7	8.6
2700	2.7	5.3	8.0
3000	2.3	4.2	6.5
3300	1.7	3.1	4.9
3600	1.2	2.1	3.3
3900	0.6	1.0	1.6
4184	0.0	0.0	0.0

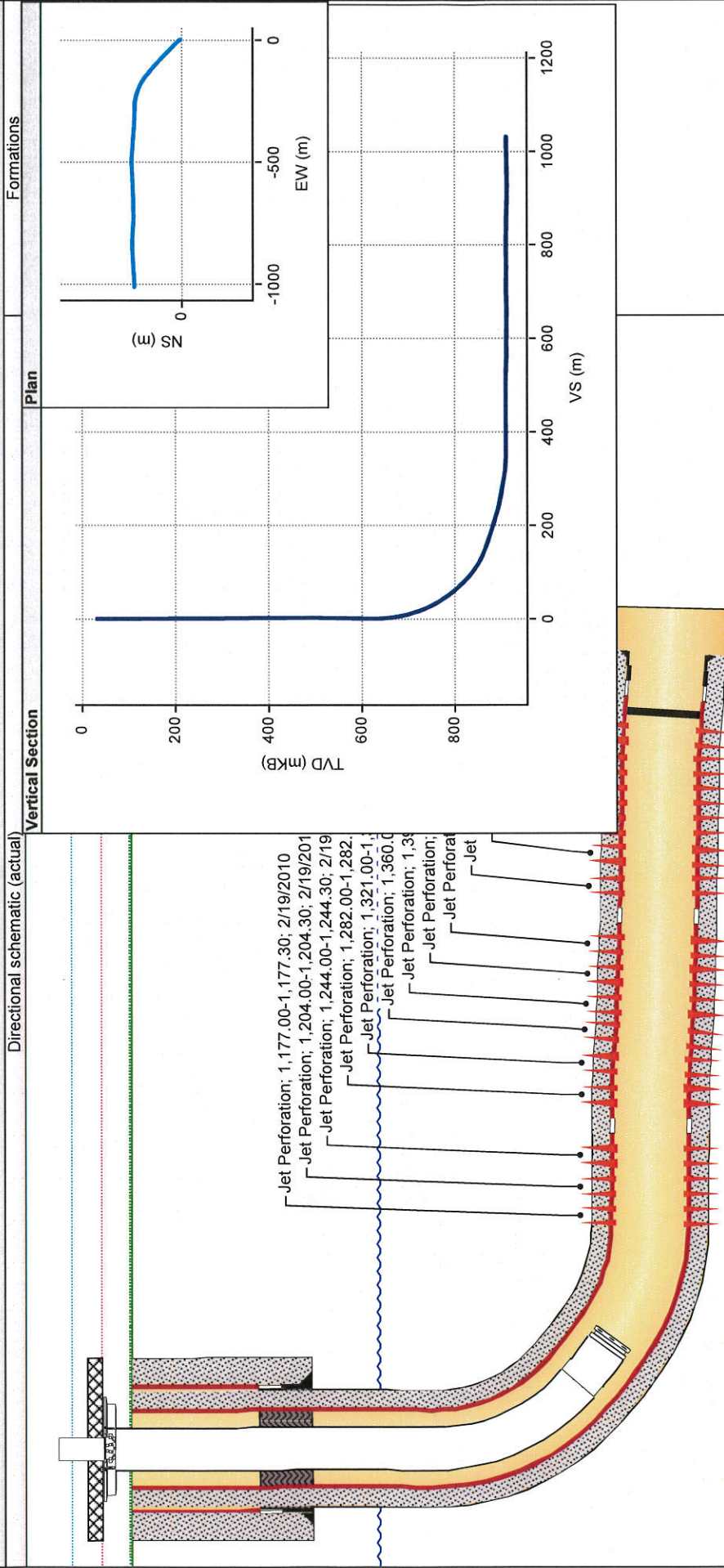
IPR



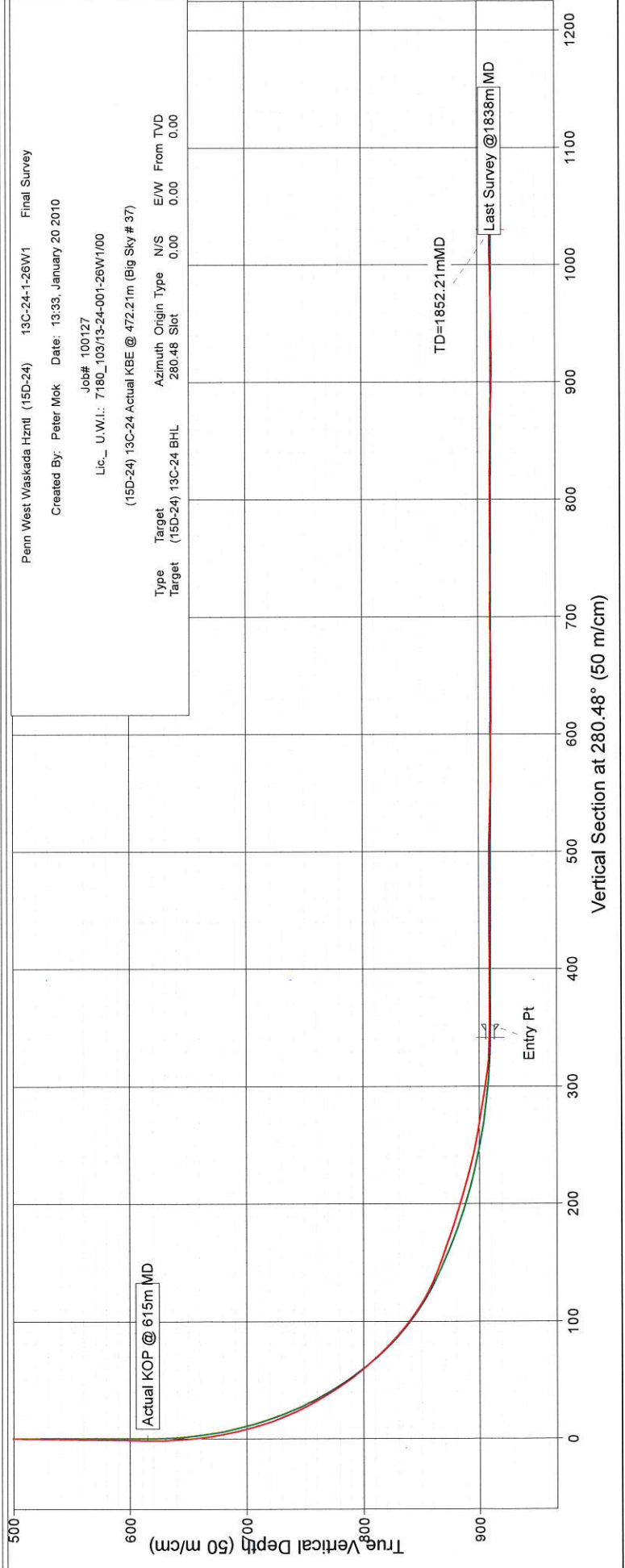
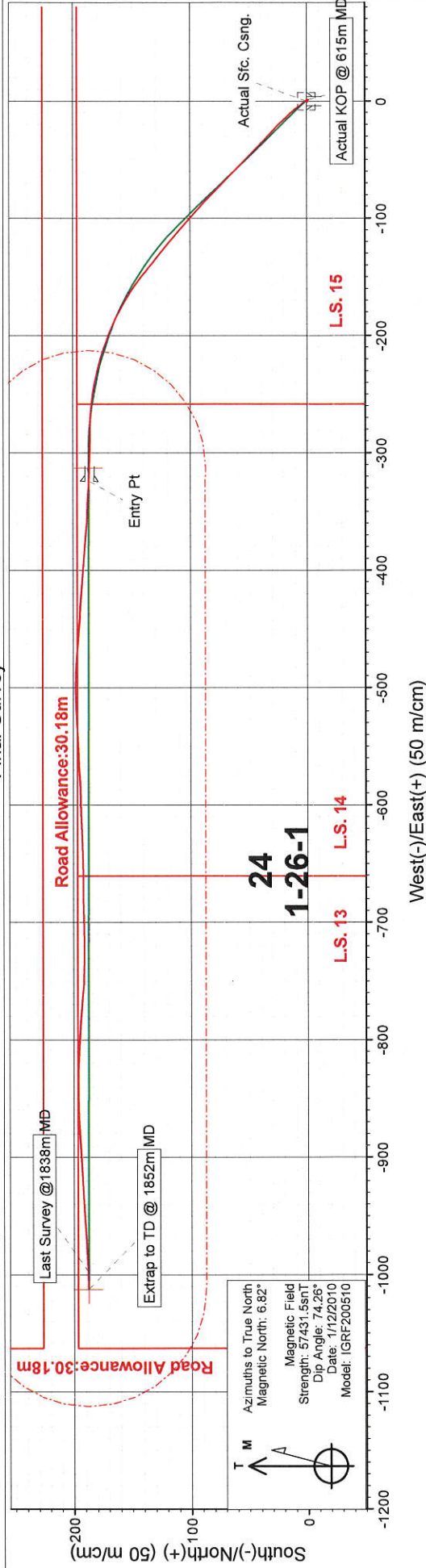
Wellbore

Well Name: WASKADA LAM UNIT NO. 1 HNZTL A13-24-1-26 (WPM)

Bottom Hole API/UWI	Surface Legal Location	License #	Well Configuration Type	Ground Elevation (m)	Casing Flange Elevation (m)	KB-Ground Distance (m)	KB-Casing Flange Distance (m)
HZ - Original Hole, 8/3/2011 10:40:27 AM							



Note: Directional schematic does not correlate to other tracks.



Penn West Waskada Hznrl (15D-24) 13C-24-1-26W1 Final Survey

Created By: Peter Mck Date: 13:33, January 20 2010

Job# 100127

Lic_ UWI: 7180_103/13-24-001-26W1/00

(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37)

Type	Target	Target	Azimuth	Origin	Type	N/S	E/W	From	TVD
Target	(15D-24)	13C-24 BHL	280.48	Slot		0.00	0.00	0.00	0.00

Cathedral Energy Services

Survey Report

Company:	Penn West Petroleum Ltd.	Local Co-ordinate Reference:	Well 13C-24-1-26W1
Project:	Waskada	TVD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Site:	Penn West Waskada Hzntrl (15D-24)	MD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Well:	13C-24-1-26W1	North Reference:	True
Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	Final Survey	Database:	EDM R5000 CATHEDRAL Multi Users

Project	Waskada		
Map System:	Universal Transverse Mercator	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 14N (102 W to 96 W)		

Site	Penn West Waskada Hzntrl (15D-24)		
Site Position:		Northing:	5,435,387.24 m
From:	Map	Easting:	366,152.45 m
Position Uncertainty:	0.00 m	Slot Radius:	335.28 mm
		Latitude:	49.06
		Longitude:	-100.83
		Grid Convergence:	-1.38 °

Well	13C-24-1-26W1		
Well Position	+N/-S	0.00 m	Northing: 5,435,387.24 m
	+E/-W	0.00 m	Easting: 366,152.45 m
Position Uncertainty	0.00 m	Wellhead Elevation:	m
		Latitude:	49.06
		Longitude:	-100.83
		Ground Level:	467.61 m

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	1/12/2010	6.82	74.26	57,431

Design	Final Survey				
Audit Notes:	Well Licence:7180				
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(m)	(m)	(m)	(°)	
	0.00	0.00	0.00	280.48	

Survey Program	Date	1/20/2010			
From (m)	To (m)	Survey (Wellbore)	Tool Name	Description	
0.00	1,852.00	Survey Update (Hz)	MWD		

Survey											
Measured Depth (m)	Inc. (°)	Az. (°)	Vertical Depth (m)	Sub Sea Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Closure Distance (m)	Closure Azimuth (°)	Dogleg Rate (°/30m)	Formations / Comments
0.00	0.00	0.00	0.00	-472.21	0.00	0.00	0.00	0.00	0.00	0.00	
261.00	0.00	0.00	261.00	-211.21	0.00	0.00	0.00	0.00	0.00	0.00	Actual Sfc. Csgng.
278.52	0.00	276.80	278.52	-193.69	0.00	0.00	0.00	0.00	0.00	0.00	
384.87	0.90	211.80	384.87	-87.34	-0.71	-0.44	0.30	0.84	211.80	0.25	
488.87	0.40	96.80	488.86	16.65	-1.45	-0.51	0.24	1.53	199.42	0.33	
594.94	1.10	102.20	594.92	122.71	-1.71	0.85	-1.15	1.91	153.44	0.20	
604.41	1.20	101.00	604.39	132.18	-1.74	1.04	-1.34	2.03	149.22	0.33	
613.91	0.90	68.10	613.89	141.68	-1.74	1.21	-1.50	2.11	145.21	2.09	
615.00	0.88	61.83	614.98	142.77	-1.73	1.22	-1.52	2.12	144.76	2.73	Actual KOP @ 615m MD
623.41	1.10	18.20	623.39	151.18	-1.62	1.30	-1.58	2.08	141.20	2.72	

Cathedral Energy Services

Survey Report

Company:	Penn West Petroleum Ltd.	Local Co-ordinate Reference:	Well 13C-24-1-26W1
Project:	Waskada	TVD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37)
Site:	Penn West Waskada Hznrl (15D-24)	MD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37)
Well:	13C-24-1-26W1	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	Final Survey	Database:	EDM R5000 CATHEDRAL Multi Users

Survey

Measured Depth (m)	Inc. (°)	Az. (°)	Vertical Depth (m)	Sub Sea Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Closure Distance (m)	Closure Azimuth (°)	Dogleg Rate (°/30m)	Formations / Comments
632.93	2.80	338.70	632.90	160.69	-1.32	1.25	-1.47	1.81	136.57	6.53	
642.36	4.70	329.70	642.31	170.10	-0.77	0.97	-1.09	1.24	128.46	6.31	
651.84	6.60	326.10	651.74	179.53	0.02	0.47	-0.46	0.47	87.77	6.11	
661.30	8.70	319.80	661.12	188.91	1.02	-0.30	0.48	1.06	343.74	7.16	
670.78	11.30	319.70	670.45	198.24	2.27	-1.36	1.75	2.65	329.10	8.23	
680.21	13.60	321.70	679.66	207.45	3.85	-2.64	3.30	4.67	325.49	7.44	
689.70	15.60	321.50	688.85	216.64	5.72	-4.13	5.10	7.06	324.17	6.32	
699.17	17.80	320.00	697.92	225.71	7.83	-5.85	7.18	9.77	323.21	7.10	
708.66	20.50	320.80	706.88	234.67	10.23	-7.84	9.57	12.88	322.54	8.58	
718.21	22.20	318.20	715.77	243.56	12.87	-10.10	12.27	16.36	321.88	6.11	
727.70	24.60	317.20	724.48	252.27	15.65	-12.63	15.27	20.12	321.09	7.69	
737.23	26.90	316.80	733.07	260.86	18.68	-15.46	18.60	24.25	320.39	7.26	
746.75	29.10	316.60	741.47	269.26	21.93	-18.52	22.20	28.71	319.82	6.94	
756.17	31.00	313.80	749.63	277.42	25.28	-21.85	26.08	33.41	319.16	7.52	
765.67	33.00	313.10	757.68	285.47	28.74	-25.50	30.30	38.42	318.41	6.42	
775.23	35.10	313.20	765.60	293.39	32.40	-29.41	34.81	43.76	317.77	6.59	
784.72	37.70	312.80	773.24	301.03	36.24	-33.53	39.56	49.37	317.23	8.25	
794.19	39.80	314.20	780.62	308.41	40.32	-37.83	44.53	55.29	316.83	7.21	
803.67	40.60	314.80	787.87	315.66	44.61	-42.19	49.60	61.40	316.60	2.81	
813.17	42.60	314.40	794.97	322.76	49.04	-46.68	54.82	67.70	316.41	6.37	
822.63	45.30	313.90	801.78	329.57	53.61	-51.39	60.28	74.26	316.21	8.63	
832.08	47.90	314.20	808.27	336.06	58.38	-56.33	66.00	81.12	316.03	8.28	
841.56	50.20	314.70	814.48	342.27	63.40	-61.44	71.94	88.28	315.90	7.38	
851.01	50.00	313.80	820.55	348.34	68.46	-66.63	77.97	95.53	315.78	2.28	
860.49	51.90	313.70	826.52	354.31	73.55	-71.95	84.12	102.89	315.63	6.02	
869.97	54.80	312.80	832.18	359.97	78.76	-77.49	90.52	110.48	315.47	9.46	
879.40	57.00	312.90	837.46	365.25	84.07	-83.21	97.11	118.29	315.29	7.00	
888.87	58.60	313.90	842.51	370.30	89.57	-89.03	103.84	126.29	315.17	5.73	
898.35	61.20	313.20	847.26	375.05	95.22	-94.98	110.71	134.49	315.07	8.45	
907.90	63.50	312.20	851.70	379.49	100.96	-101.19	117.87	142.94	314.93	7.74	
917.41	65.90	310.60	855.76	383.55	106.64	-107.64	125.24	151.52	314.73	8.84	
926.90	68.50	309.20	859.44	387.23	112.25	-114.35	132.86	160.24	314.47	9.18	
936.39	69.70	309.10	862.82	390.61	117.85	-121.23	140.64	169.07	314.19	3.80	
945.84	72.10	309.80	865.91	393.70	123.52	-128.12	148.45	177.97	313.95	7.90	
955.34	72.20	308.20	868.83	396.62	129.21	-135.15	156.40	186.98	313.71	4.82	
964.84	72.70	309.90	871.69	399.48	134.92	-142.19	164.35	196.01	313.50	5.36	
974.34	73.00	308.20	874.49	402.28	140.64	-149.23	172.32	205.06	313.30	5.22	
983.80	73.10	305.20	877.25	405.04	146.05	-156.49	180.44	214.05	313.02	9.11	
993.30	74.00	303.00	879.94	407.73	151.15	-164.03	188.79	223.06	312.66	7.24	
1,002.79	73.90	300.00	882.57	410.36	155.92	-171.81	197.30	232.01	312.22	9.12	
1,012.28	73.70	296.70	885.21	413.00	160.25	-179.83	205.97	240.87	311.70	10.04	
1,021.74	74.60	294.60	887.80	415.59	164.18	-188.03	214.75	249.62	311.13	7.01	

Cathedral Energy Services

Survey Report

Company:	Penn West Petroleum Ltd.	Local Co-ordinate Reference:	Well 13C-24-1-26W1
Project:	Waskada	TVD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Site:	Penn West Waskada Hznrl (15D-24)	MD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Well:	13C-24-1-26W1	North Reference:	True
Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	Final Survey	Database:	EDM R5000 CATHEDRAL Multi Users

Survey

Measured Depth (m)	Inc. (°)	Az. (°)	Vertical Depth (m)	Sub Sea Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Closure Distance (m)	Closure Azimuth (°)	Dogleg Rate (°/30m)	Formations / Comments
1,031.93	75.00	292.70	890.47	418.26	168.13	-197.04	224.33	259.02	310.47	5.52	
1,041.62	75.60	290.30	892.93	420.72	171.56	-205.76	233.53	267.90	309.82	7.42	
1,050.99	77.50	287.70	895.11	422.90	174.53	-214.37	242.54	276.43	309.15	10.13	
1,060.37	78.80	285.60	897.04	424.83	177.16	-223.17	251.66	284.94	308.44	7.78	
1,069.74	79.70	283.40	898.78	426.57	179.46	-232.08	260.85	293.37	307.71	7.50	
1,079.11	80.10	280.90	900.43	428.22	181.40	-241.10	270.07	301.72	306.96	7.98	
1,088.49	79.90	277.90	902.06	429.85	182.91	-250.21	279.30	309.94	306.17	9.47	
1,097.87	80.20	274.80	903.68	431.47	183.93	-259.39	288.51	317.99	305.34	9.81	
1,107.25	80.70	273.50	905.23	433.02	184.60	-268.62	297.71	325.93	304.50	4.40	
1,116.62	81.70	271.50	906.67	434.46	185.01	-277.87	306.88	333.82	303.66	7.09	
1,126.00	83.70	271.50	907.86	435.65	185.25	-287.17	316.07	341.73	302.83	6.40	
1,135.38	86.90	271.90	908.63	436.42	185.53	-296.51	325.30	349.77	302.03	10.31	
1,144.75	87.20	271.00	909.11	436.90	185.77	-305.86	334.55	357.86	301.27	3.03	
1,154.13	87.60	272.10	909.53	437.32	186.02	-315.23	343.80	366.02	300.55	3.74	
1,163.10	90.00	271.52	909.72	437.51	186.30	-324.19	352.67	373.91	299.88	8.26	Entry Pt
1,163.48	90.10	271.50	909.72	437.51	186.31	-324.57	353.04	374.25	299.86	8.05	
1,172.85	91.10	274.20	909.62	437.41	186.78	-333.93	362.33	382.62	299.22	9.22	
1,182.23	89.80	271.80	909.55	437.34	187.27	-343.30	371.63	391.05	298.61	8.73	
1,191.60	90.10	272.10	909.56	437.35	187.59	-352.66	380.89	399.45	298.01	1.36	
1,200.97	90.50	275.30	909.51	437.30	188.19	-362.01	390.20	408.00	297.47	10.33	
1,210.34	90.10	274.60	909.46	437.25	189.00	-371.34	399.52	416.68	296.97	2.58	
1,219.68	90.50	274.30	909.41	437.20	189.73	-380.66	408.81	425.32	296.49	1.61	
1,229.05	90.50	274.50	909.33	437.12	190.44	-390.00	418.13	434.01	296.03	0.64	
1,238.41	90.00	275.30	909.29	437.08	191.24	-399.32	427.44	442.76	295.59	3.02	
1,247.78	90.00	273.80	909.29	437.08	191.99	-408.66	436.76	451.51	295.16	4.80	
1,257.15	90.30	273.80	909.26	437.05	192.61	-418.01	446.07	460.25	294.74	0.96	
1,266.52	90.30	274.50	909.22	437.01	193.29	-427.36	455.38	469.04	294.34	2.24	
1,275.89	89.40	271.20	909.24	437.03	193.75	-436.72	464.67	477.77	293.92	10.95	
1,285.26	90.10	275.20	909.28	437.07	194.27	-446.07	473.96	486.54	293.53	13.00	
1,294.63	89.90	272.50	909.28	437.07	194.90	-455.42	483.27	495.37	293.17	8.67	
1,304.01	90.70	276.00	909.23	437.02	195.60	-464.77	492.59	504.25	292.82	11.48	
1,313.39	89.60	275.00	909.21	437.00	196.50	-474.11	501.94	513.21	292.51	4.75	
1,322.76	88.20	272.10	909.39	437.18	197.08	-483.46	511.23	522.08	292.18	10.31	
1,332.13	87.50	271.00	909.74	437.53	197.33	-492.82	520.48	530.85	291.82	4.17	
1,341.50	88.50	270.20	910.07	437.86	197.43	-502.18	529.71	539.59	291.46	4.10	
1,350.87	87.50	269.00	910.39	438.18	197.36	-511.54	538.90	548.30	291.10	5.00	
1,360.24	87.40	266.00	910.81	438.60	196.96	-520.89	548.03	556.89	290.71	9.60	
1,369.62	89.40	267.30	911.07	438.86	196.41	-530.25	557.13	565.46	290.32	7.63	
1,379.00	90.00	266.00	911.12	438.91	195.86	-539.62	566.24	574.06	289.95	4.58	
1,388.37	90.70	267.30	911.06	438.85	195.31	-548.97	575.33	582.68	289.58	4.73	
1,397.75	90.50	267.70	910.97	438.76	194.90	-558.34	584.47	591.38	289.24	1.43	
1,407.12	89.60	268.80	910.96	438.75	194.62	-567.71	593.63	600.14	288.92	4.55	

Cathedral Energy Services

Survey Report

Company:	Penn West Petroleum Ltd.	Local Co-ordinate Reference:	Well 13C-24-1-26W1
Project:	Waskada	TVD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37)
Site:	Penn West Waskada Hznrl (15D-24)	MD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37)
Well:	13C-24-1-26W1	North Reference:	True
Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	Final Survey	Database:	EDM R5000 CATHEDRAL Multi Users

Survey

Measured Depth (m)	Inc. (°)	Az. (°)	Vertical Depth (m)	Sub Sea Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Closure Distance (m)	Closure Azimuth (°)	Dogleg Rate (°/30m)	Formations / Comments
1,416.49	88.50	266.10	911.11	438.90	194.20	-577.06	602.76	608.87	288.60	9.33	
1,425.86	88.90	266.60	911.33	439.12	193.60	-586.41	611.84	617.55	288.27	2.05	
1,435.23	89.80	269.40	911.43	439.22	193.28	-595.78	620.99	626.34	287.97	9.42	
1,444.60	90.00	268.90	911.45	439.24	193.14	-605.14	630.18	635.22	287.70	1.72	
1,453.97	89.60	269.00	911.48	439.27	192.97	-614.51	639.36	644.10	287.43	1.32	
1,463.35	89.50	266.40	911.55	439.34	192.59	-623.88	648.50	652.93	287.16	8.32	
1,472.72	90.20	266.60	911.58	439.37	192.02	-633.24	657.60	661.71	286.87	2.33	
1,482.10	90.90	268.80	911.49	439.28	191.64	-642.61	666.74	670.58	286.61	7.38	
1,491.47	91.10	269.20	911.33	439.12	191.48	-651.98	675.93	679.51	286.37	1.43	
1,500.84	91.90	270.70	911.08	438.87	191.47	-661.34	685.13	688.50	286.15	5.44	
1,510.21	91.70	269.00	910.79	438.58	191.45	-670.71	694.34	697.49	285.93	5.48	
1,519.58	90.60	270.20	910.60	438.39	191.38	-680.07	703.54	706.49	285.72	5.21	
1,528.95	88.90	268.40	910.64	438.43	191.27	-689.44	712.73	715.48	285.51	7.93	
1,538.31	88.90	267.70	910.82	438.61	190.95	-698.80	721.87	724.41	285.28	2.24	
1,547.68	89.80	268.70	910.92	438.71	190.65	-708.16	731.02	733.38	285.07	4.31	
1,557.05	89.30	268.00	911.00	438.79	190.38	-717.53	740.18	742.35	284.86	2.75	
1,566.42	90.00	271.00	911.06	438.85	190.30	-726.89	749.38	751.39	284.67	9.86	
1,575.79	90.80	272.70	910.99	438.78	190.60	-736.26	758.64	760.53	284.51	6.02	
1,585.16	90.50	270.80	910.88	438.67	190.89	-745.62	767.90	769.67	284.36	6.16	
1,594.53	90.80	274.10	910.78	438.57	191.29	-754.98	777.18	778.84	284.22	10.61	
1,603.90	89.80	274.10	910.73	438.52	191.96	-764.33	786.49	788.07	284.10	3.20	
1,613.28	89.50	274.70	910.79	438.58	192.68	-773.68	795.82	797.31	283.98	2.15	
1,622.65	90.50	273.90	910.79	438.58	193.38	-783.02	805.13	806.55	283.87	4.10	
1,632.02	89.80	273.00	910.76	438.55	193.95	-792.38	814.43	815.77	283.75	3.65	
1,641.39	88.20	273.10	910.92	438.71	194.44	-801.73	823.72	824.97	283.63	5.13	
1,650.75	88.90	272.30	911.16	438.95	194.89	-811.08	832.99	834.16	283.51	3.41	
1,660.12	89.20	271.90	911.32	439.11	195.23	-820.44	842.26	843.35	283.38	1.60	
1,669.50	90.70	271.30	911.32	439.11	195.49	-829.82	851.53	852.53	283.26	5.17	
1,678.88	89.90	271.10	911.28	439.07	195.69	-839.19	860.79	861.71	283.13	2.64	
1,688.26	87.90	267.90	911.46	439.25	195.61	-848.57	869.99	870.82	282.98	12.07	
1,697.64	87.50	269.00	911.83	439.62	195.35	-857.94	879.16	879.90	282.83	3.74	
1,707.02	88.20	266.80	912.18	439.97	195.01	-867.31	888.31	888.96	282.67	7.38	
1,716.39	89.50	266.90	912.37	440.16	194.49	-876.66	897.41	897.98	282.51	4.17	
1,725.77	89.30	266.70	912.47	440.26	193.97	-886.02	906.52	907.01	282.35	0.90	
1,735.15	90.20	267.70	912.51	440.30	193.51	-895.39	915.65	916.07	282.20	4.30	
1,744.87	89.70	267.00	912.52	440.31	193.06	-905.10	925.12	925.46	282.04	2.66	
1,754.35	90.70	266.60	912.49	440.28	192.53	-914.57	934.33	934.61	281.89	3.41	
1,763.90	91.10	265.60	912.34	440.13	191.88	-924.09	943.58	943.81	281.73	3.38	
1,773.38	91.20	268.50	912.15	439.94	191.40	-933.56	952.80	952.98	281.59	9.18	
1,782.94	90.30	265.60	912.02	439.81	190.90	-943.10	962.10	962.23	281.44	9.53	
1,792.49	90.40	266.50	911.96	439.75	190.25	-952.63	971.34	971.44	281.29	2.84	

Cathedral Energy Services

Survey Report

Company:	Penn West Petroleum Ltd.	Local Co-ordinate Reference:	Well 13C-24-1-26W1
Project:	Waskada	TVD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Site:	Penn West Waskada Hzntrl (15D-24)	MD Reference:	(15D-24) 13C-24 Actual KBE @ 472.21m (Big Sky # 37,
Well:	13C-24-1-26W1	North Reference:	True
Wellbore:	Hz	Survey Calculation Method:	Minimum Curvature
Design:	Final Survey	Database:	EDM R5000 CATHEDRAL Multi Users

Survey											
Measured Depth (m)	Inc. (°)	Az. (°)	Vertical Depth (m)	Sub Sea Depth (m)	+N/-S (m)	+E/-W (m)	Vertical Section (m)	Closure Distance (m)	Closure Azimuth (°)	Dogleg Rate (°/30m)	Formations / Comments
1,801.95	91.50	265.10	911.81	439.60	189.55	-962.06	980.49	980.56	281.15	5.65	
1,811.43	91.80	267.60	911.53	439.32	188.95	-971.52	989.68	989.72	281.01	7.96	
1,820.90	91.40	267.90	911.27	439.06	188.58	-980.98	998.92	998.94	280.88	1.58	
1,830.38	90.80	266.60	911.09	438.88	188.12	-990.45	1,008.14	1,008.15	280.75	4.53	
1,838.00	90.30	268.30	911.01	438.80	187.78	-998.06	1,015.57	1,015.57	280.66	6.98	Last Survey @1838m MD
1,852.00	90.30	268.30	910.94	438.73	187.37	-1,012.05	1,029.25	1,029.25	280.49	0.00	Extrap to TD @ 1852m MD

Targets										
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (m)	+N/-S (m)	+E/-W (m)	Northing (m)	Easting (m)	Latitude	Longitude
(15D-24) 13C-24 BHL	- survey misses target center by 1.45m at 1852.00m MD (910.94 TVD, 187.37 N, -1012.05 E)	0.00	0.00	912.21	187.30	-1,012.75	5,435,598.95	365,144.52	49.06	-100.85
- Point										
(15D-24) 13C-24 ICP	- survey misses target center by 0.93m at 1151.70m MD (909.43 TVD, 185.94 N, -312.80 E)	0.00	0.00	910.21	186.45	-312.75	5,435,581.19	365,844.30	49.06	-100.84
- Point										

261.00	261.00	Actual Sfc. Csng.	152.40
1,163.10	909.72	Entry Pt	152.40

Survey Annotations				
Measured Depth (m)	Vertical Depth (m)	Local Coordinates		Comment
		+N/-S (m)	+E/-W (m)	
615.00	614.98	-1.73	1.22	Actual KOP @ 615m MD
1,838.00	911.01	187.78	-998.06	Last Survey @1838m MD
1,852.00	910.94	187.37	-1,012.05	Extrap to TD @ 1852m MD

Checked By: _____ Approved By: _____ Date: _____

Diagnostics

103/13-24-001-26W1/00

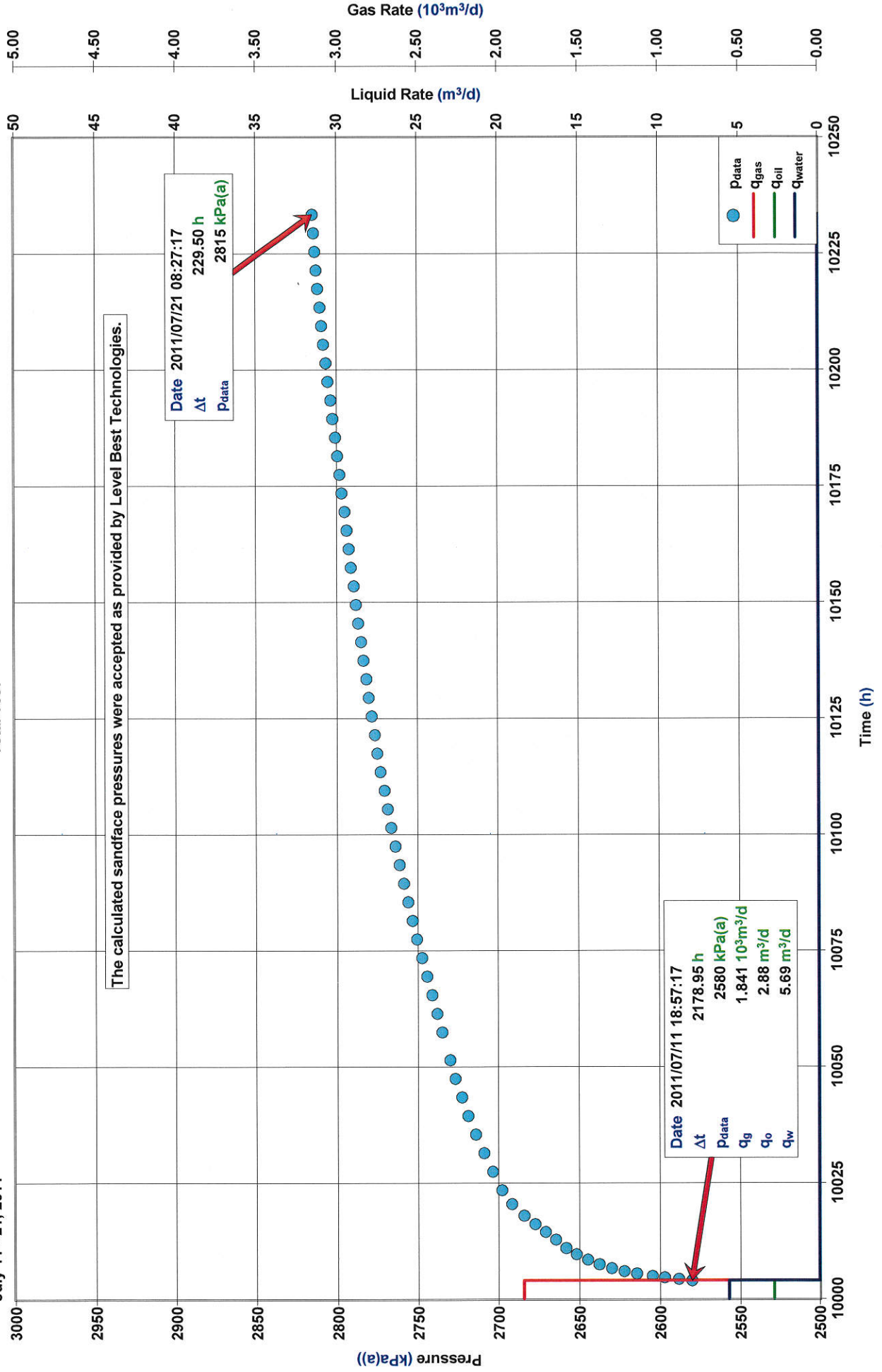
WASKADA LAM Unit No.1

Lower Amaranth: 1177.0 - 1703.3 mKB

July 11 - 21, 2011

Diagnostic

Total Test



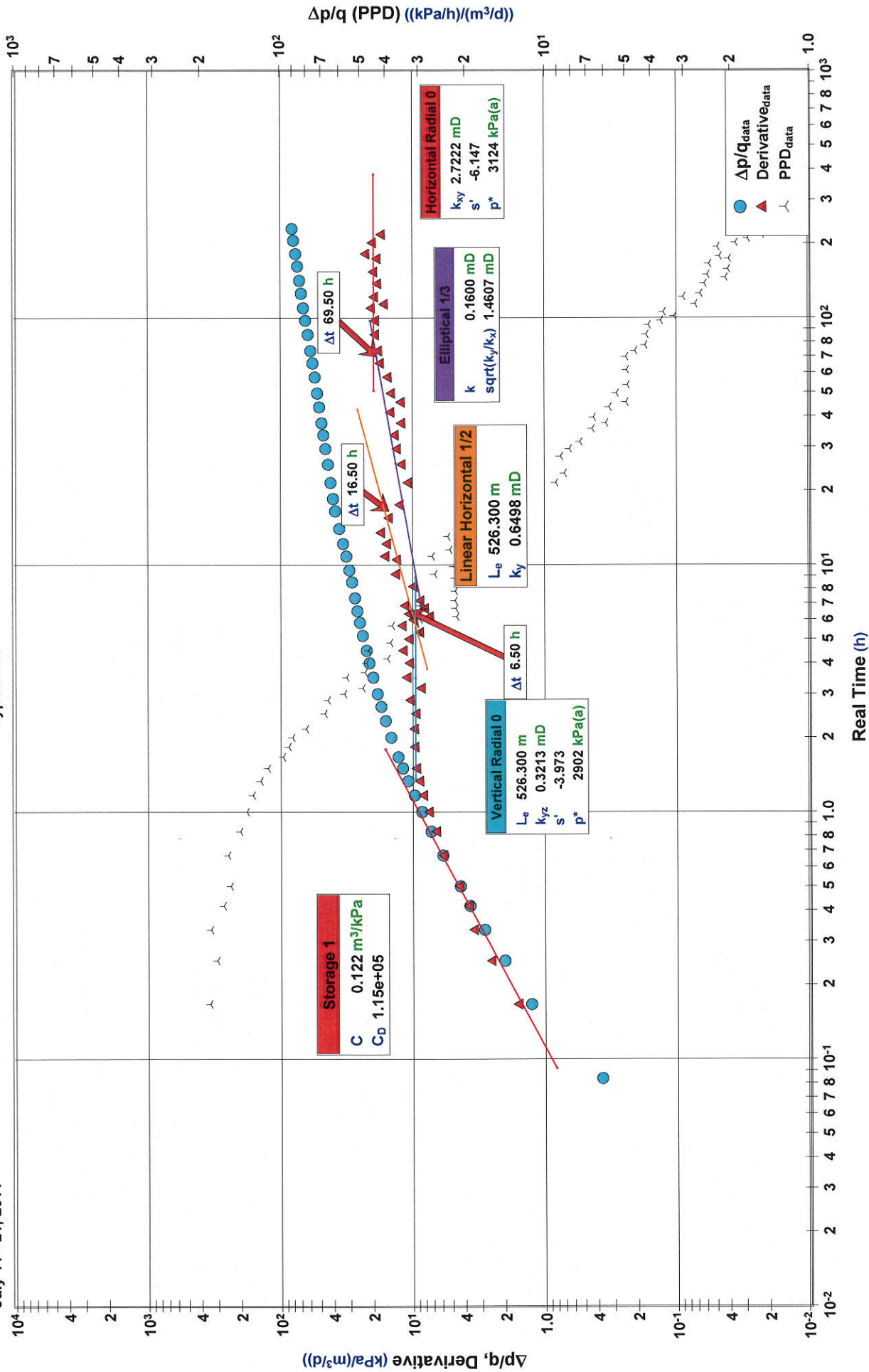
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WASKADA LAM Unit No.1

Lower Amaranth: 1177.0 - 1703.3 mKB

July 11 - 21, 2011

Diagnostic Typecurve



WASKADA LAM Unit No.1

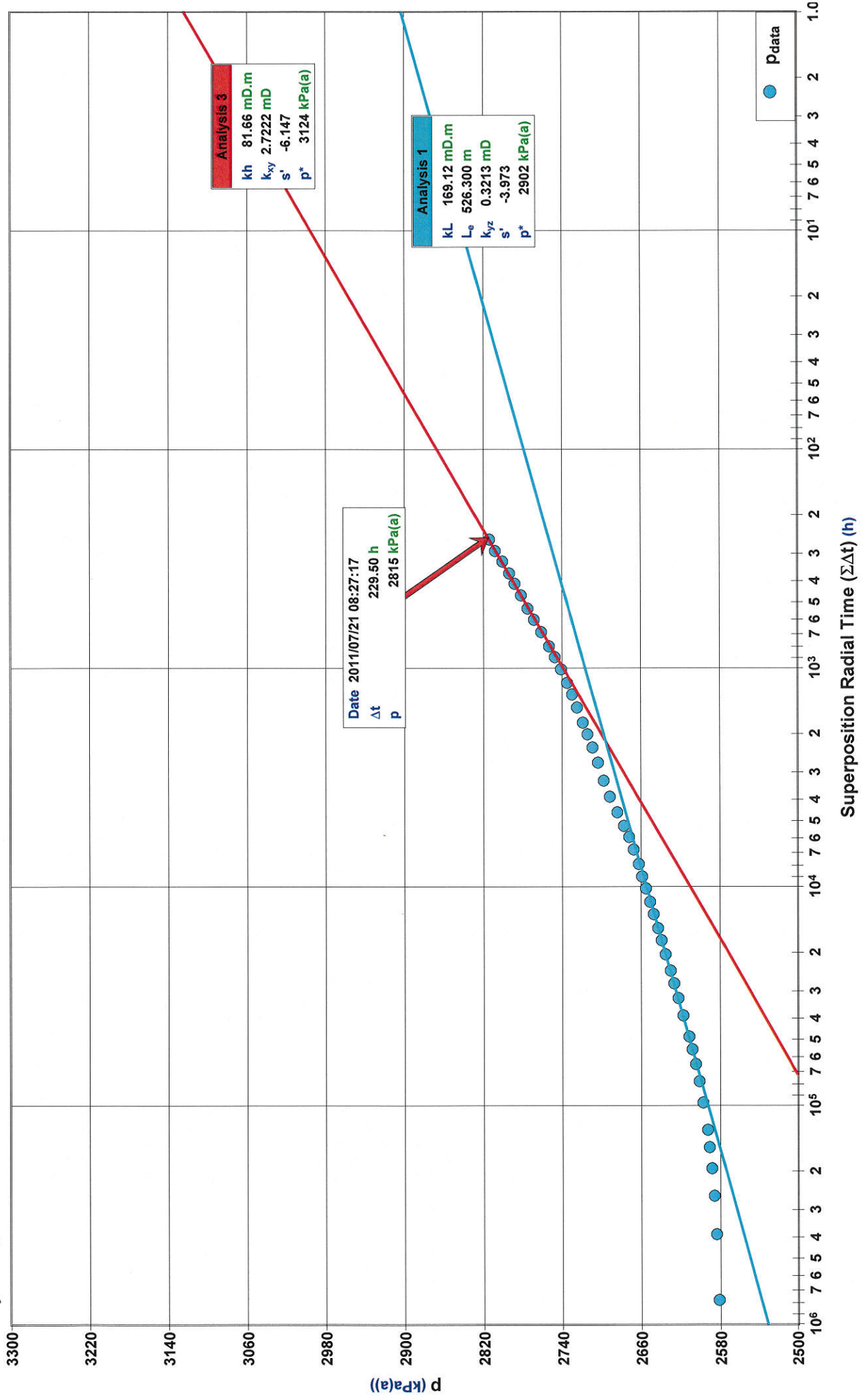
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Lower Amaranth: 1177.0 - 1703.3 mKB

July 11 - 21, 2011

Diagnostic

Radial



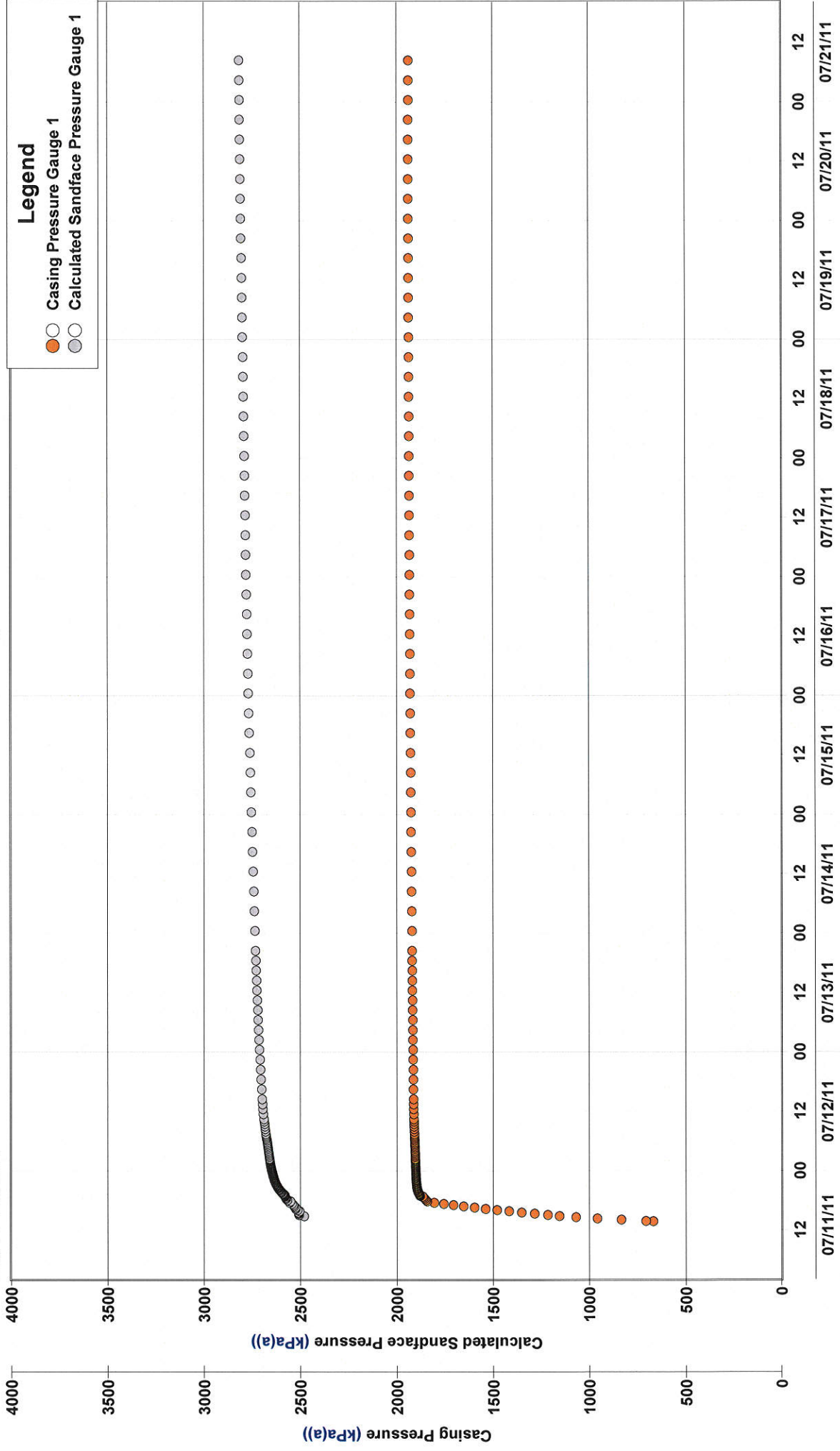
WASKADA LAM Unit No.1

103/13-24-001-26W1/00

Lower Amaranth: 1177.0 - 1703.3 mKB

July 11 - 21, 2011

Gauge 1



Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
1	0/05/20 23:00	0.0000	0.0000				0.000	0.0	0.0
2	0/05/21 00:00	1.0000	1.0000					10.0	33.4
3	0/05/22 00:00	25.0000	25.0000					31.1	7.9
4	0/05/23 00:00	49.0000	49.0000				0.000	20.8	20.6
5	0/05/24 00:00	73.0000	73.0000				1.690	8.4	20.6
6	0/05/25 00:00	97.0000	97.0000				1.690	12.1	21.7
7	0/05/26 00:00	121.0000	121.0000				3.099	29.6	17.7
8	0/05/27 00:00	145.0000	145.0000				3.381	26.6	9.5
9	0/05/28 00:00	169.0000	169.0000				3.099	28.3	8.7
10	0/05/29 00:00	193.0000	193.0000					27.1	8.6
11	0/05/30 00:00	217.0000	217.0000				3.099	27.2	9.3
12	0/05/31 00:00	241.0000	241.0000				3.381	18.7	10.2
13	0/06/01 00:00	265.0000	265.0000				3.944	18.7	10.1
14	0/06/02 00:00	289.0000	289.0000				3.944	19.5	10.6
15	0/06/03 00:00	313.0000	313.0000				2.817	20.8	10.9
16	0/06/04 00:00	337.0000	337.0000					21.2	10.6
17	0/06/05 00:00	361.0000	361.0000					20.9	10.7
18	0/06/06 00:00	385.0000	385.0000				2.817	21.7	10.9
19	0/06/07 00:00	409.0000	409.0000				2.536	20.8	10.5
20	0/06/08 00:00	433.0000	433.0000				2.254	23.5	10.8
21	0/06/09 00:00	457.0000	457.0000					20.9	10.7
22	0/06/10 00:00	481.0000	481.0000					21.6	10.3
23	0/06/11 00:00	505.0000	505.0000					21.4	10.8
24	0/06/12 00:00	529.0000	529.0000					21.4	10.2
25	0/06/13 00:00	553.0000	553.0000					21.6	10.8
26	0/06/14 00:00	577.0000	577.0000					21.4	10.6
27	0/06/15 00:00	601.0000	601.0000				2.254	22.1	8.5
28	0/06/16 00:00	625.0000	625.0000				1.690	21.0	9.2
29	0/06/17 00:00	649.0000	649.0000				1.972	20.1	10.2
30	0/06/18 00:00	673.0000	673.0000					21.7	11.4
31	0/06/19 00:00	697.0000	697.0000					11.7	5.5
32	0/06/20 00:00	721.0000	721.0000				1.972	10.7	6.6
33	0/06/21 00:00	745.0000	745.0000				2.817	9.2	6.3
34	0/06/22 00:00	769.0000	769.0000				1.409	9.8	7.6
35	0/06/23 00:00	793.0000	793.0000					10.0	7.6
36	0/06/24 00:00	817.0000	817.0000					9.7	8.0
37	0/06/25 00:00	841.0000	841.0000				1.409	9.7	8.0
38	0/06/26 00:00	865.0000	865.0000				0.000	0.0	0.0
39	0/06/27 00:00	889.0000	889.0000				1.127	10.0	8.0
40	0/06/28 00:00	913.0000	913.0000				1.409	10.2	7.8
41	0/06/29 00:00	937.0000	937.0000				1.127	10.2	8.0
42	0/06/30 00:00	961.0000	961.0000				1.127	10.2	8.1
43	0/07/01 00:00	985.0000	985.0000				1.409	9.7	8.2
44	0/07/02 00:00	1009.0000	1009.0000				1.409	10.1	7.8
45	0/07/03 00:00	1033.0000	1033.0000				0.000	9.3	7.5
46	0/07/04 00:00	1057.0000	1057.0000				1.409	13.4	7.9
47	0/07/05 00:00	1081.0000	1081.0000					9.5	7.9
48	0/07/06 00:00	1105.0000	1105.0000					9.6	7.7
49	0/07/07 00:00	1129.0000	1129.0000				1.409	10.8	7.8
50	0/07/08 00:00	1153.0000	1153.0000				1.690	11.5	8.4
51	0/07/09 00:00	1177.0000	1177.0000					11.4	9.0
52	0/07/10 00:00	1201.0000	1201.0000					12.4	11.8
53	0/07/11 00:00	1225.0000	1225.0000				1.690	11.4	8.3
54	0/07/12 00:00	1249.0000	1249.0000				0.000	9.9	8.9
55	0/07/13 00:00	1273.0000	1273.0000				1.690	10.1	8.9
56	0/07/14 00:00	1297.0000	1297.0000				1.409	14.2	6.3
57	0/07/15 00:00	1321.0000	1321.0000				1.409	10.0	9.1
58	0/07/16 00:00	1345.0000	1345.0000				1.127	10.1	7.8
59	0/07/17 00:00	1369.0000	1369.0000				1.409	9.7	8.4
60	0/07/18 00:00	1393.0000	1393.0000				1.409	9.9	9.1
61	0/07/19 00:00	1417.0000	1417.0000				0.000	10.0	8.1
62	0/07/20 00:00	1441.0000	1441.0000				1.690	9.0	8.4
63	0/07/21 00:00	1465.0000	1465.0000					9.2	9.3
64	0/07/22 00:00	1489.0000	1489.0000					9.5	7.7
65	0/07/23 00:00	1513.0000	1513.0000				1.690	9.4	8.2
66	0/07/24 00:00	1537.0000	1537.0000				1.972	10.5	9.0
67	0/07/25 00:00	1561.0000	1561.0000				1.972	10.2	8.4
68	0/07/26 00:00	1585.0000	1585.0000				1.690	11.3	6.6
69	0/07/27 00:00	1609.0000	1609.0000					9.4	11.2
70	0/07/28 00:00	1633.0000	1633.0000				1.690	8.8	11.4
71	0/07/29 00:00	1657.0000	1657.0000				1.409	9.0	8.1
72	0/07/30 00:00	1681.0000	1681.0000				1.972	9.4	6.8
73	0/07/31 00:00	1705.0000	1705.0000				1.690	9.0	7.2
74	0/08/01 00:00	1729.0000	1729.0000				1.972	9.2	8.5
75	0/08/02 00:00	1753.0000	1753.0000				1.690	8.7	7.8
76	0/08/03 00:00	1777.0000	1777.0000				1.972	7.4	5.1

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
77	0/08/04 00:00	1801.0000	1801.0000				1.690	7.3	5.0
78	0/08/05 00:00	1825.0000	1825.0000					7.3	5.1
79	0/08/06 00:00	1849.0000	1849.0000					7.3	5.0
80	0/08/07 00:00	1873.0000	1873.0000					7.8	5.6
81	0/08/08 00:00	1897.0000	1897.0000					7.3	5.2
82	0/08/09 00:00	1921.0000	1921.0000					7.1	5.0
83	0/08/10 00:00	1945.0000	1945.0000				1.690	7.5	3.3
84	0/08/11 00:00	1969.0000	1969.0000				1.409	7.3	4.9
85	0/08/12 00:00	1993.0000	1993.0000				1.690	7.1	5.2
86	0/08/13 00:00	2017.0000	2017.0000				1.690	3.6	4.6
87	0/08/14 00:00	2041.0000	2041.0000				1.409	7.2	5.0
88	0/08/15 00:00	2065.0000	2065.0000				1.972	7.6	5.6
89	0/08/16 00:00	2089.0000	2089.0000				1.409	7.2	4.8
90	0/08/17 00:00	2113.0000	2113.0000				1.409	7.1	5.4
91	0/08/18 00:00	2137.0000	2137.0000				1.127	7.0	10.5
92	0/08/19 00:00	2161.0000	2161.0000				1.409	6.9	8.9
93	0/08/20 00:00	2185.0000	2185.0000				1.690	7.1	7.1
94	0/08/21 00:00	2209.0000	2209.0000				1.409	7.1	9.5
95	0/08/22 00:00	2233.0000	2233.0000				1.690	7.3	7.9
96	0/08/23 00:00	2257.0000	2257.0000				1.972	7.3	5.1
97	0/08/24 00:00	2281.0000	2281.0000					7.4	5.0
98	0/08/25 00:00	2305.0000	2305.0000				1.972	7.3	4.1
99	0/08/26 00:00	2329.0000	2329.0000				1.690	7.2	3.6
100	0/08/27 00:00	2353.0000	2353.0000				1.972	8.3	6.9
101	0/08/28 00:00	2377.0000	2377.0000					6.8	5.6
102	0/08/29 00:00	2401.0000	2401.0000					7.4	5.2
103	0/08/30 00:00	2425.0000	2425.0000					7.4	5.0
104	0/08/31 00:00	2449.0000	2449.0000				1.972	7.0	5.0
105	0/09/01 00:00	2473.0000	2473.0000				2.536	7.3	4.2
106	0/09/02 00:00	2497.0000	2497.0000					7.2	4.9
107	0/09/03 00:00	2521.0000	2521.0000					7.1	4.8
108	0/09/04 00:00	2545.0000	2545.0000					7.2	4.9
109	0/09/05 00:00	2569.0000	2569.0000				2.536	7.1	5.0
110	0/09/06 00:00	2593.0000	2593.0000				2.254	7.0	5.0
111	0/09/07 00:00	2617.0000	2617.0000				1.972	7.3	4.8
112	0/09/08 00:00	2641.0000	2641.0000				1.972	7.3	4.7
113	0/09/09 00:00	2665.0000	2665.0000				2.536	7.6	4.7
114	0/09/10 00:00	2689.0000	2689.0000				1.972	6.0	5.2
115	0/09/11 00:00	2713.0000	2713.0000					6.9	5.0
116	0/09/12 00:00	2737.0000	2737.0000					7.4	5.1
117	0/09/13 00:00	2761.0000	2761.0000					7.2	4.8
118	0/09/14 00:00	2785.0000	2785.0000					7.3	2.3
119	0/09/15 00:00	2809.0000	2809.0000					7.3	4.9
120	0/09/16 00:00	2833.0000	2833.0000				1.972	7.2	4.5
121	0/09/17 00:00	2857.0000	2857.0000				2.254	7.6	5.2
122	0/09/18 00:00	2881.0000	2881.0000				2.254	7.1	5.3
123	0/09/19 00:00	2905.0000	2905.0000				1.409	7.1	4.9
124	0/09/20 00:00	2929.0000	2929.0000				1.690	6.8	4.7
125	0/09/21 00:00	2953.0000	2953.0000				1.690	6.7	4.2
126	0/09/22 00:00	2977.0000	2977.0000				2.254	7.3	5.5
127	0/09/23 00:00	3001.0000	3001.0000					7.9	6.2
128	0/09/24 00:00	3025.0000	3025.0000				2.254	8.1	6.1
129	0/09/25 00:00	3049.0000	3049.0000				2.817	8.1	7.9
130	0/09/26 00:00	3073.0000	3073.0000				3.099	8.1	5.2
131	0/09/27 00:00	3097.0000	3097.0000				2.536	8.3	5.7
132	0/09/28 00:00	3121.0000	3121.0000				2.254	8.0	5.1
133	0/09/29 00:00	3145.0000	3145.0000				2.536	8.0	5.5
134	0/09/30 00:00	3169.0000	3169.0000				2.254	8.6	5.8
135	0/10/01 00:00	3193.0000	3193.0000				2.536	8.2	3.8
136	0/10/02 00:00	3217.0000	3217.0000				3.099	8.3	1.9
137	0/10/03 00:00	3241.0000	3241.0000				1.972	8.8	3.3
138	0/10/04 00:00	3265.0000	3265.0000				2.254	9.6	5.3
139	0/10/05 00:00	3289.0000	3289.0000				2.536	7.2	5.4
140	0/10/06 00:00	3313.0000	3313.0000				2.254	6.9	5.5
141	0/10/07 00:00	3337.0000	3337.0000					6.8	5.3
142	0/10/08 00:00	3361.0000	3361.0000				2.254	6.8	3.1
143	0/10/09 00:00	3385.0000	3385.0000				2.536	6.5	4.2
144	0/10/10 00:00	3409.0000	3409.0000				2.817	7.0	5.6
145	0/10/11 00:00	3433.0000	3433.0000				2.536	8.6	4.9
146	0/10/12 00:00	3457.0000	3457.0000				2.254	7.0	5.4
147	0/10/13 00:00	3481.0000	3481.0000				2.536	6.7	5.5
148	0/10/14 00:00	3505.0000	3505.0000				2.254	6.3	3.5
149	0/10/15 00:00	3529.0000	3529.0000					6.3	4.7
150	0/10/16 00:00	3553.0000	3553.0000				2.254	7.0	5.6
151	0/10/17 00:00	3577.0000	3577.0000				2.536	7.0	6.2
152	0/10/18 00:00	3601.0000	3601.0000				0.000	0.0	0.0

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
153	0/10/25 00:00	3769.0000	3769.0000				0.000	0.0	0.0
154	0/10/26 00:00	3793.0000	3793.0000				1.690	4.5	3.8
155	0/10/27 00:00	3817.0000	3817.0000				2.254	6.6	6.7
156	0/10/28 00:00	3841.0000	3841.0000				2.254	6.6	6.6
157	0/10/29 00:00	3865.0000	3865.0000				1.972	6.6	5.9
158	0/10/30 00:00	3889.0000	3889.0000				2.254	6.6	5.5
159	0/10/31 00:00	3913.0000	3913.0000				2.254	6.4	6.2
160	0/11/01 00:00	3937.0000	3937.0000				0.000	0.0	0.0
161	0/11/12 00:00	4201.0000	4201.0000				0.000	0.0	0.0
162	0/11/13 00:00	4225.0000	4225.0000				1.972	4.3	3.6
163	0/11/14 00:00	4249.0000	4249.0000				2.254	4.7	5.6
164	0/11/15 00:00	4273.0000	4273.0000				1.690	4.8	7.0
165	0/11/16 00:00	4297.0000	4297.0000				1.690	4.9	6.8
166	0/11/17 00:00	4321.0000	4321.0000				1.972	4.7	3.7
167	0/11/18 00:00	4345.0000	4345.0000				1.409	4.6	5.8
168	0/11/19 00:00	4369.0000	4369.0000					5.0	6.4
169	0/11/20 00:00	4393.0000	4393.0000					4.8	5.8
170	0/11/21 00:00	4417.0000	4417.0000					4.6	4.8
171	0/11/22 00:00	4441.0000	4441.0000				1.409	4.8	5.3
172	0/11/23 00:00	4465.0000	4465.0000				1.690	4.0	5.8
173	0/11/24 00:00	4489.0000	4489.0000				1.409	4.2	5.2
174	0/11/25 00:00	4513.0000	4513.0000				1.690	3.9	6.3
175	0/11/26 00:00	4537.0000	4537.0000				1.690	4.1	6.2
176	0/11/27 00:00	4561.0000	4561.0000				1.409	4.0	5.9
177	0/11/28 00:00	4585.0000	4585.0000				1.409	3.9	5.9
178	0/11/29 00:00	4609.0000	4609.0000				1.690	4.5	5.3
179	0/11/30 00:00	4633.0000	4633.0000				1.127	4.9	6.0
180	0/12/01 00:00	4657.0000	4657.0000				1.409	5.7	6.5
181	0/12/02 00:00	4681.0000	4681.0000				1.690	3.8	5.0
182	0/12/03 00:00	4705.0000	4705.0000				1.690	4.7	4.7
183	0/12/04 00:00	4729.0000	4729.0000				0.000	4.7	5.3
184	0/12/05 00:00	4753.0000	4753.0000				1.690	3.9	4.8
185	0/12/06 00:00	4777.0000	4777.0000					3.5	4.1
186	0/12/07 00:00	4801.0000	4801.0000				1.690	3.7	4.7
187	0/12/08 00:00	4825.0000	4825.0000				1.409	3.6	4.6
188	0/12/09 00:00	4849.0000	4849.0000					2.9	3.0
189	0/12/10 00:00	4873.0000	4873.0000					3.8	2.8
190	0/12/11 00:00	4897.0000	4897.0000					3.2	3.7
191	0/12/12 00:00	4921.0000	4921.0000				1.409	3.4	3.2
192	0/12/13 00:00	4945.0000	4945.0000				1.127	3.0	4.8
193	0/12/14 00:00	4969.0000	4969.0000				1.127	3.0	4.8
194	0/12/15 00:00	4993.0000	4993.0000				1.409	3.7	4.6
195	0/12/16 00:00	5017.0000	5017.0000				1.690	3.3	4.7
196	0/12/17 00:00	5041.0000	5041.0000				1.409	3.0	4.7
197	0/12/18 00:00	5065.0000	5065.0000				1.690	3.8	5.1
198	0/12/19 00:00	5089.0000	5089.0000				1.690	2.9	4.9
199	0/12/20 00:00	5113.0000	5113.0000				1.409	3.5	4.9
200	0/12/21 00:00	5137.0000	5137.0000				1.409	3.9	4.4
201	0/12/22 00:00	5161.0000	5161.0000				1.127	5.6	8.6
202	0/12/23 00:00	5185.0000	5185.0000				1.409	5.2	9.3
203	0/12/24 00:00	5209.0000	5209.0000					5.3	8.2
204	0/12/25 00:00	5233.0000	5233.0000					6.0	8.7
205	0/12/26 00:00	5257.0000	5257.0000					5.4	8.1
206	0/12/27 00:00	5281.0000	5281.0000					4.9	8.5
207	0/12/28 00:00	5305.0000	5305.0000					5.7	8.4
208	0/12/29 00:00	5329.0000	5329.0000				1.409	5.5	7.1
209	0/12/30 00:00	5353.0000	5353.0000				1.690	4.5	7.9
210	0/12/31 00:00	5377.0000	5377.0000				1.690	6.3	8.3
211	1/01/01 00:00	5401.0000	5401.0000				1.409	5.8	8.0
212	1/01/02 00:00	5425.0000	5425.0000				1.409	4.2	7.8
213	1/01/03 00:00	5449.0000	5449.0000				1.690	5.0	8.9
214	1/01/04 00:00	5473.0000	5473.0000				1.409	5.3	7.0
215	1/01/05 00:00	5497.0000	5497.0000				1.409	5.9	4.7
216	1/01/06 00:00	5521.0000	5521.0000				1.127	4.6	6.6
217	1/01/07 00:00	5545.0000	5545.0000				1.127	5.5	7.0
218	1/01/08 00:00	5569.0000	5569.0000				1.409	5.3	5.6
219	1/01/09 00:00	5593.0000	5593.0000				1.127	5.0	6.3
220	1/01/10 00:00	5617.0000	5617.0000				1.127	5.8	5.6
221	1/01/11 00:00	5641.0000	5641.0000				1.409	6.4	5.8
222	1/01/12 00:00	5665.0000	5665.0000				1.127	5.7	7.9
223	1/01/13 00:00	5689.0000	5689.0000				1.409	5.3	5.9
224	1/01/14 00:00	5713.0000	5713.0000				1.409	4.8	7.1
225	1/01/15 00:00	5737.0000	5737.0000				1.127	8.1	11.7
226	1/01/16 00:00	5761.0000	5761.0000				1.409	13.3	10.6
227	1/01/17 00:00	5785.0000	5785.0000					11.9	13.3
228	1/01/18 00:00	5809.0000	5809.0000				1.409	10.2	11.5

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
229	1/01/19 00:00	5833.0000	5833.0000				1.127	10.1	12.2
230	1/01/20 00:00	5857.0000	5857.0000					9.2	11.6
231	1/01/21 00:00	5881.0000	5881.0000					13.3	12.2
232	1/01/22 00:00	5905.0000	5905.0000				1.127	11.7	12.9
233	1/01/23 00:00	5929.0000	5929.0000				1.409	11.0	10.6
234	1/01/24 00:00	5953.0000	5953.0000					10.5	11.8
235	1/01/25 00:00	5977.0000	5977.0000					12.5	12.7
236	1/01/26 00:00	6001.0000	6001.0000				1.409	8.3	11.8
237	1/01/27 00:00	6025.0000	6025.0000				0.845	8.9	10.9
238	1/01/28 00:00	6049.0000	6049.0000				1.127	10.8	13.8
239	1/01/29 00:00	6073.0000	6073.0000					11.7	9.2
240	1/01/30 00:00	6097.0000	6097.0000					10.8	10.8
241	1/01/31 00:00	6121.0000	6121.0000					10.1	11.0
242	1/02/01 00:00	6145.0000	6145.0000					9.7	10.4
243	1/02/02 00:00	6169.0000	6169.0000					9.3	7.9
244	1/02/03 00:00	6193.0000	6193.0000					25.4	12.9
245	1/02/04 00:00	6217.0000	6217.0000					10.1	4.3
246	1/02/05 00:00	6241.0000	6241.0000					8.7	11.0
247	1/02/06 00:00	6265.0000	6265.0000				1.127	10.1	10.8
248	1/02/07 00:00	6289.0000	6289.0000				0.845	9.5	12.0
249	1/02/08 00:00	6313.0000	6313.0000				1.127	9.0	15.9
250	1/02/09 00:00	6337.0000	6337.0000					7.5	10.5
251	1/02/10 00:00	6361.0000	6361.0000				1.127	9.4	11.3
252	1/02/11 00:00	6385.0000	6385.0000				1.409	2.9	5.1
253	1/02/12 00:00	6409.0000	6409.0000					3.3	5.2
254	1/02/13 00:00	6433.0000	6433.0000					3.2	4.7
255	1/02/14 00:00	6457.0000	6457.0000					3.2	4.8
256	1/02/15 00:00	6481.0000	6481.0000					3.3	5.1
257	1/02/16 00:00	6505.0000	6505.0000					3.3	3.8
258	1/02/17 00:00	6529.0000	6529.0000				1.409	3.2	4.0
259	1/02/18 00:00	6553.0000	6553.0000				1.127	3.5	4.2
260	1/02/19 00:00	6577.0000	6577.0000				1.409	3.1	3.7
261	1/02/20 00:00	6601.0000	6601.0000					3.2	4.3
262	1/02/21 00:00	6625.0000	6625.0000					3.2	4.2
263	1/02/22 00:00	6649.0000	6649.0000				1.409	3.2	5.5
264	1/02/23 00:00	6673.0000	6673.0000				1.690	3.2	5.2
265	1/02/24 00:00	6697.0000	6697.0000				1.690	3.1	3.9
266	1/02/25 00:00	6721.0000	6721.0000				1.127	3.1	4.6
267	1/02/26 00:00	6745.0000	6745.0000				1.690	3.0	6.3
268	1/02/27 00:00	6769.0000	6769.0000				1.690	3.0	5.4
269	1/02/28 00:00	6793.0000	6793.0000				1.409	3.1	4.4
270	1/03/01 00:00	6817.0000	6817.0000				1.409	3.4	5.0
271	1/03/02 00:00	6841.0000	6841.0000				1.690	3.1	5.0
272	1/03/03 00:00	6865.0000	6865.0000				1.409	3.2	5.5
273	1/03/04 00:00	6889.0000	6889.0000				1.690	3.0	4.3
274	1/03/05 00:00	6913.0000	6913.0000				1.409	3.0	5.2
275	1/03/06 00:00	6937.0000	6937.0000				1.690	3.2	5.3
276	1/03/07 00:00	6961.0000	6961.0000					3.0	4.8
277	1/03/08 00:00	6985.0000	6985.0000					3.0	4.1
278	1/03/09 00:00	7009.0000	7009.0000					2.9	4.7
279	1/03/10 00:00	7033.0000	7033.0000					2.8	4.9
280	1/03/11 00:00	7057.0000	7057.0000					3.0	5.6
281	1/03/12 00:00	7081.0000	7081.0000				1.690	2.9	4.1
282	1/03/13 00:00	7105.0000	7105.0000				1.409	3.1	5.2
283	1/03/14 00:00	7129.0000	7129.0000				1.690	3.0	4.8
284	1/03/15 00:00	7153.0000	7153.0000				1.572	3.7	2.4
285	1/03/16 00:00	7177.0000	7177.0000				2.169	3.2	4.9
286	1/03/17 00:00	7201.0000	7201.0000				2.009	2.6	5.9
287	1/03/18 00:00	7225.0000	7225.0000				2.050	3.4	4.9
288	1/03/19 00:00	7249.0000	7249.0000				2.348	3.3	5.0
289	1/03/20 00:00	7273.0000	7273.0000				2.507	3.6	5.6
290	1/03/21 00:00	7297.0000	7297.0000				2.248	2.9	5.1
291	1/03/22 00:00	7321.0000	7321.0000				2.577	2.8	4.3
292	1/03/23 00:00	7345.0000	7345.0000				2.398	3.4	4.8
293	1/03/24 00:00	7369.0000	7369.0000				2.358	3.2	3.9
294	1/03/25 00:00	7393.0000	7393.0000				1.721	3.1	3.5
295	1/03/26 00:00	7417.0000	7417.0000				2.020	3.0	4.9
296	1/03/27 00:00	7441.0000	7441.0000				1.602	2.8	4.6
297	1/03/28 00:00	7465.0000	7465.0000				2.223	2.4	4.7
298	1/03/29 00:00	7489.0000	7489.0000				1.851	3.1	5.5
299	1/03/30 00:00	7513.0000	7513.0000				1.920	3.6	4.3
300	1/03/31 00:00	7537.0000	7537.0000				0.478	3.1	5.3
301	1/04/01 00:00	7561.0000	7561.0000				2.269	3.7	4.7
302	1/04/02 00:00	7585.0000	7585.0000				2.318	2.8	4.7
303	1/04/03 00:00	7609.0000	7609.0000				2.501	3.3	5.8
304	1/04/04 00:00	7633.0000	7633.0000				2.251	3.6	4.3

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
305	1/04/05 00:00	7657.0000	7657.0000				2.613	3.2	5.3
306	1/04/06 00:00	7681.0000	7681.0000				0.000	0.0	0.0
307	1/04/12 00:00	7825.0000	7825.0000				0.000	0.0	0.0
308	1/04/13 00:00	7849.0000	7849.0000				2.149	3.2	4.4
309	1/04/14 00:00	7873.0000	7873.0000				2.328	2.9	4.6
310	1/04/15 00:00	7897.0000	7897.0000				2.507	3.3	6.6
311	1/04/16 00:00	7921.0000	7921.0000				2.269	3.3	5.0
312	1/04/17 00:00	7945.0000	7945.0000				2.149	3.1	4.9
313	1/04/18 00:00	7969.0000	7969.0000				2.139	3.3	5.1
314	1/04/19 00:00	7993.0000	7993.0000				0.507	0.9	1.1
315	1/04/20 00:00	8017.0000	8017.0000				1.831	3.0	5.1
316	1/04/21 00:00	8041.0000	8041.0000				1.861	3.4	4.6
317	1/04/22 00:00	8065.0000	8065.0000				1.920	2.7	4.5
318	1/04/23 00:00	8089.0000	8089.0000				1.910	3.6	5.3
319	1/04/24 00:00	8113.0000	8113.0000				1.970	3.1	4.6
320	1/04/25 00:00	8137.0000	8137.0000				1.821	2.6	5.2
321	1/04/26 00:00	8161.0000	8161.0000				1.771	3.0	4.7
322	1/04/27 00:00	8185.0000	8185.0000				1.761	3.3	4.8
323	1/04/28 00:00	8209.0000	8209.0000				1.731	2.9	4.5
324	1/04/29 00:00	8233.0000	8233.0000				2.239	3.1	4.8
325	1/04/30 00:00	8257.0000	8257.0000				1.741	2.6	4.1
326	1/05/01 00:00	8281.0000	8281.0000				1.781	3.2	4.9
327	1/05/02 00:00	8305.0000	8305.0000				2.060	3.0	4.6
328	1/05/03 00:00	8329.0000	8329.0000				2.109	3.0	5.0
329	1/05/04 00:00	8353.0000	8353.0000				2.109	3.3	4.8
330	1/05/05 00:00	8377.0000	8377.0000				2.149	3.2	6.0
331	1/05/06 00:00	8401.0000	8401.0000				1.880	3.2	4.8
332	1/05/07 00:00	8425.0000	8425.0000				2.159	3.1	4.9
333	1/05/08 00:00	8449.0000	8449.0000				2.060	3.2	5.0
334	1/05/09 00:00	8473.0000	8473.0000				2.010	3.2	5.1
335	1/05/10 00:00	8497.0000	8497.0000				1.831	3.1	5.4
336	1/05/11 00:00	8521.0000	8521.0000				1.920	3.2	4.9
337	1/05/12 00:00	8545.0000	8545.0000				1.831	3.2	5.1
338	1/05/13 00:00	8569.0000	8569.0000				1.851	3.2	4.9
339	1/05/14 00:00	8593.0000	8593.0000				1.741	3.1	5.2
340	1/05/15 00:00	8617.0000	8617.0000				1.761	3.0	4.9
341	1/05/16 00:00	8641.0000	8641.0000				1.851	3.1	4.9
342	1/05/17 00:00	8665.0000	8665.0000				1.841	3.0	5.3
343	1/05/18 00:00	8689.0000	8689.0000				1.811	3.2	5.1
344	1/05/19 00:00	8713.0000	8713.0000				1.980	3.0	4.8
345	1/05/20 00:00	8737.0000	8737.0000				1.960	3.1	5.2
346	1/05/21 00:00	8761.0000	8761.0000				1.900	3.1	5.0
347	1/05/22 00:00	8785.0000	8785.0000				1.930	3.1	5.3
348	1/05/23 00:00	8809.0000	8809.0000				2.000	3.1	5.8
349	1/05/24 00:00	8833.0000	8833.0000				1.960	3.1	5.2
350	1/05/25 00:00	8857.0000	8857.0000				1.980	3.1	5.4
351	1/05/26 00:00	8881.0000	8881.0000				1.930	3.0	5.4
352	1/05/27 00:00	8905.0000	8905.0000				1.910	3.0	5.3
353	1/05/28 00:00	8929.0000	8929.0000				1.851	2.8	5.4
354	1/05/29 00:00	8953.0000	8953.0000				1.960	2.8	5.2
355	1/05/30 00:00	8977.0000	8977.0000				1.960	3.2	5.6
356	1/05/31 00:00	9001.0000	9001.0000				1.970	3.1	4.8
357	1/06/01 00:00	9025.0000	9025.0000				1.950	3.0	5.5
358	1/06/02 00:00	9049.0000	9049.0000				1.950	3.1	5.0
359	1/06/03 00:00	9073.0000	9073.0000				2.159	3.0	5.2
360	1/06/04 00:00	9097.0000	9097.0000				2.050	3.0	5.9
361	1/06/05 00:00	9121.0000	9121.0000				2.089	2.8	5.0
362	1/06/06 00:00	9145.0000	9145.0000				2.089	2.9	4.7
363	1/06/07 00:00	9169.0000	9169.0000				2.010	2.8	5.2
364	1/06/08 00:00	9193.0000	9193.0000				2.069	3.2	5.1
365	1/06/09 00:00	9217.0000	9217.0000				2.020	2.9	5.0
366	1/06/10 00:00	9241.0000	9241.0000				2.129	2.9	5.5
367	1/06/11 00:00	9265.0000	9265.0000				2.159	3.0	5.6
368	1/06/12 00:00	9289.0000	9289.0000				1.960	3.1	5.6
369	1/06/13 00:00	9313.0000	9313.0000				1.990	3.2	6.2
370	1/06/14 00:00	9337.0000	9337.0000				1.910	3.2	5.1
371	1/06/15 00:00	9361.0000	9361.0000				1.801	3.1	5.3
372	1/06/16 00:00	9385.0000	9385.0000				1.781	3.0	4.5
373	1/06/17 00:00	9409.0000	9409.0000				1.831	2.8	4.9
374	1/06/18 00:00	9433.0000	9433.0000				1.910	2.8	5.4
375	1/06/19 00:00	9457.0000	9457.0000				2.020	2.3	6.1
376	1/06/20 00:00	9481.0000	9481.0000				2.060	3.2	5.0
377	1/06/21 00:00	9505.0000	9505.0000				1.920	3.0	4.9
378	1/06/22 00:00	9529.0000	9529.0000				2.249	3.1	5.6
379	1/06/23 00:00	9553.0000	9553.0000				2.099	3.1	5.1
380	1/06/24 00:00	9577.0000	9577.0000				2.060	3.1	5.3

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
381	1/06/25 00:00	9601.0000	9601.0000				2.109	3.2	5.1
382	1/06/26 00:00	9625.0000	9625.0000				2.119	3.1	5.3
383	1/06/27 00:00	9649.0000	9649.0000				2.139	3.3	5.4
384	1/06/28 00:00	9673.0000	9673.0000				2.040	3.0	5.4
385	1/06/29 00:00	9697.0000	9697.0000				2.040	3.0	4.7
386	1/06/30 00:00	9721.0000	9721.0000				2.020	3.1	5.3
387	1/07/01 00:00	9745.0000	9745.0000				2.040	3.2	5.3
388	1/07/02 00:00	9769.0000	9769.0000				2.069	3.2	5.8
389	1/07/03 00:00	9793.0000	9793.0000				1.960	3.0	5.4
390	1/07/04 00:00	9817.0000	9817.0000				1.890	3.0	5.5
391	1/07/05 00:00	9841.0000	9841.0000				2.069	3.0	5.9
392	1/07/06 00:00	9865.0000	9865.0000				2.030	3.0	5.5
393	1/07/07 00:00	9889.0000	9889.0000				2.060	3.1	5.4
394	1/07/08 00:00	9913.0000	9913.0000				1.890	3.1	5.2
395	1/07/09 00:00	9937.0000	9937.0000				1.930	3.0	5.5
396	1/07/10 00:00	9961.0000	9961.0000				1.771	2.8	4.5
397	1/07/11 00:00	9985.0000	9985.0000				1.841	2.9	5.7
398	1/07/11 18:57	10003.9547	10003.9547		1880.18	2580.38	1.841	2.9	5.7
399	1/07/11 19:02	10004.0381	10004.0381		1881.56	2581.45	0.000	0.0	0.0
400	1/07/11 19:07	10004.1214	10004.1214		1882.89	2584.04			
401	1/07/11 19:12	10004.2047	10004.2047		1884.15	2586.18			
402	1/07/11 19:17	10004.2881	10004.2881		1885.34	2588.63			
403	1/07/11 19:22	10004.3714	10004.3714		1886.48	2591.02			
404	1/07/11 19:27	10004.4547	10004.4547		1887.55	2592.96			
405	1/07/11 19:37	10004.6214	10004.6214		1889.52	2597.43			
406	1/07/11 19:47	10004.7881	10004.7881		1891.27	2601.29			
407	1/07/11 19:57	10004.9547	10004.9547		1892.81	2604.92			
408	1/07/11 20:07	10005.1214	10005.1214		1894.17	2608.37			
409	1/07/11 20:17	10005.2881	10005.2881		1895.35	2611.63			
410	1/07/11 20:27	10005.4547	10005.4547		1896.30	2614.65			
411	1/07/11 20:37	10005.6214	10005.6214		1897.10	2617.52			
412	1/07/11 20:47	10005.7881	10005.7881		1897.74	2619.82			
413	1/07/11 20:57	10005.9547	10005.9547		1898.30	2622.44			
414	1/07/11 21:07	10006.1214	10006.1214		1898.78	2624.58			
415	1/07/11 21:17	10006.2881	10006.2881		1899.22	2626.67			
416	1/07/11 21:27	10006.4547	10006.4547		1899.58	2628.69			
417	1/07/11 21:37	10006.6214	10006.6214		1899.91	2630.27			
418	1/07/11 21:47	10006.7881	10006.7881		1900.21	2632.23			
419	1/07/11 21:57	10006.9547	10006.9547		1900.49	2633.77			
420	1/07/11 22:07	10007.1214	10007.1214		1900.74	2635.27			
421	1/07/11 22:17	10007.2881	10007.2881		1900.99	2636.36			
422	1/07/11 22:27	10007.4547	10007.4547		1901.22	2637.85			
423	1/07/11 22:37	10007.6214	10007.6214		1901.45	2639.34			
424	1/07/11 22:47	10007.7881	10007.7881		1901.66	2640.39			
425	1/07/11 22:57	10007.9547	10007.9547		1901.86	2641.86			
426	1/07/11 23:07	10008.1214	10008.1214		1902.06	2642.90			
427	1/07/11 23:17	10008.2881	10008.2881		1902.25	2643.94			
428	1/07/11 23:27	10008.4547	10008.4547		1902.42	2644.96			
429	1/07/11 23:37	10008.6214	10008.6214		1902.59	2646.40			
430	1/07/11 23:47	10008.7881	10008.7881		1902.76	2647.42			
431	1/07/11 23:57	10008.9547	10008.9547		1902.92	2648.43			
432	1/07/12 00:07	10009.1214	10009.1214		1903.07	2649.43			
433	1/07/12 00:17	10009.2881	10009.2881		1903.22	2650.44			
434	1/07/12 00:27	10009.4547	10009.4547		1903.36	2651.01			
435	1/07/12 00:37	10009.6214	10009.6214		1903.51	2652.01			
436	1/07/12 00:47	10009.7881	10009.7881		1903.65	2653.01			
437	1/07/12 00:57	10009.9547	10009.9547		1903.79	2654.01			
438	1/07/12 01:07	10010.1214	10010.1214		1903.93	2654.58			
439	1/07/12 01:17	10010.2881	10010.2881		1904.07	2655.15			
440	1/07/12 01:27	10010.4547	10010.4547		1904.22	2656.16			
441	1/07/12 01:37	10010.6214	10010.6214		1904.36	2656.74			
442	1/07/12 01:47	10010.7881	10010.7881		1904.50	2657.31			
443	1/07/12 01:57	10010.9547	10010.9547		1904.64	2658.31			
444	1/07/12 02:07	10011.1214	10011.1214		1904.78	2658.89			
445	1/07/12 02:17	10011.2881	10011.2881		1904.92	2659.47			
446	1/07/12 02:27	10011.4547	10011.4547		1905.06	2660.04			
447	1/07/12 02:47	10011.7881	10011.7881		1905.34	2661.20			
448	1/07/12 03:07	10012.1214	10012.1214		1905.61	2662.35			
449	1/07/12 03:27	10012.4547	10012.4547		1905.89	2663.50			
450	1/07/12 03:47	10012.7881	10012.7881		1906.16	2664.65			
451	1/07/12 04:07	10013.1214	10013.1214		1906.44	2665.81			
452	1/07/12 04:27	10013.4547	10013.4547		1906.72	2667.41			
453	1/07/12 04:47	10013.7881	10013.7881		1907.00	2668.57			
454	1/07/12 05:07	10014.1214	10014.1214		1907.29	2669.75			
455	1/07/12 05:27	10014.4547	10014.4547		1907.59	2670.94			
456	1/07/12 05:47	10014.7881	10014.7881		1907.89	2672.13			

Pressure/Production Summary

Item	Date Clock Time	Time	Cumulative Time	Tubing Pressure	Casing Pressure	Calculated Sandface Pressure	Gas Rate	Oil Rate	Water Rate
	YYYY/MM/DD HH:mm:ss h		h	kPa(a)	kPa(a)	kPa(a)	10 ³ m ³ /d	m ³ /d	m ³ /d
457	1/07/12 06:07	10015.1214	10015.1214		1908.20	2673.76			
458	1/07/12 06:27	10015.4547	10015.4547		1908.51	2674.97			
459	1/07/12 06:47	10015.7881	10015.7881		1908.83	2676.18			
460	1/07/12 07:07	10016.1214	10016.1214		1909.15	2677.40			
461	1/07/12 07:27	10016.4547	10016.4547		1909.48	2678.63			
462	1/07/12 07:57	10016.9547	10016.9547		1909.97	2680.47			
463	1/07/12 08:27	10017.4547	10017.4547		1910.46	2682.32			
464	1/07/12 08:57	10017.9547	10017.9547		1910.93	2684.15			
465	1/07/12 09:27	10018.4547	10018.4547		1911.38	2685.52			
466	1/07/12 09:57	10018.9547	10018.9547		1911.83	2687.33			
467	1/07/12 10:27	10019.4547	10019.4547		1912.26	2688.68			
468	1/07/12 11:27	10020.4547	10020.4547		1912.97	2691.66			
469	1/07/12 12:27	10021.4547	10021.4547		1913.52	2694.03			
470	1/07/12 13:27	10022.4547	10022.4547		1913.90	2695.78			
471	1/07/12 14:27	10023.4547	10023.4547		1914.16	2697.85			
472	1/07/12 16:27	10025.4547	10025.4547		1914.54	2700.96			
473	1/07/12 18:27	10027.4547	10027.4547		1914.94	2703.65			
474	1/07/12 20:27	10029.4547	10029.4547		1915.34	2706.34			
475	1/07/12 22:27	10031.4547	10031.4547		1915.80	2709.11			
476	1/07/13 00:27	10033.4547	10033.4547		1916.27	2711.90			
477	1/07/13 02:27	10035.4547	10035.4547		1916.76	2714.26			
478	1/07/13 04:27	10037.4547	10037.4547		1917.23	2716.60			
479	1/07/13 06:27	10039.4547	10039.4547		1917.71	2718.96			
480	1/07/13 08:27	10041.4547	10041.4547		1918.16	2720.83			
481	1/07/13 10:27	10043.4547	10043.4547		1918.62	2722.71			
482	1/07/13 12:27	10045.4547	10045.4547		1919.04	2725.01			
483	1/07/13 14:27	10047.4547	10047.4547		1919.44	2726.84			
484	1/07/13 16:27	10049.4547	10049.4547		1919.83	2728.65			
485	1/07/13 18:27	10051.4547	10051.4547		1920.21	2729.99			
486	1/07/13 20:27	10053.4547	10053.4547		1920.58	2731.78			
487	1/07/14 00:27	10057.4547	10057.4547		1921.30	2734.89			
488	1/07/14 04:27	10061.4547	10061.4547		1922.03	2738.01			
489	1/07/14 08:27	10065.4547	10065.4547		1922.76	2741.14			
490	1/07/14 12:27	10069.4547	10069.4547		1923.50	2744.28			
491	1/07/14 16:27	10073.4547	10073.4547		1924.24	2747.43			
492	1/07/14 20:27	10077.4547	10077.4547		1924.98	2750.59			
493	1/07/15 00:27	10081.4547	10081.4547		1925.71	2753.26			
494	1/07/15 04:27	10085.4547	10085.4547		1926.42	2755.92			
495	1/07/15 08:27	10089.4547	10089.4547		1927.11	2758.56			
496	1/07/15 12:27	10093.4547	10093.4547		1927.79	2761.20			
497	1/07/15 16:27	10097.4547	10097.4547		1928.44	2763.80			
498	1/07/15 20:27	10101.4547	10101.4547		1929.07	2766.38			
499	1/07/16 00:27	10105.4547	10105.4547		1929.67	2768.46			
500	1/07/16 04:27	10109.4547	10109.4547		1930.24	2770.51			
501	1/07/16 08:27	10113.4547	10113.4547		1930.77	2773.01			
502	1/07/16 12:27	10117.4547	10117.4547		1931.28	2774.98			
503	1/07/16 16:27	10121.4547	10121.4547		1931.76	2776.46			
504	1/07/16 20:27	10125.4547	10125.4547		1932.21	2778.39			
505	1/07/17 00:27	10129.4547	10129.4547		1932.63	2780.28			
506	1/07/17 04:27	10133.4547	10133.4547		1933.04	2781.69			
507	1/07/17 08:27	10137.4547	10137.4547		1933.42	2783.54			
508	1/07/17 12:27	10141.4547	10141.4547		1933.79	2784.91			
509	1/07/17 16:27	10145.4547	10145.4547		1934.13	2786.72			
510	1/07/17 20:27	10149.4547	10149.4547		1934.47	2788.06			
511	1/07/18 00:27	10153.4547	10153.4547		1934.79	2789.37			
512	1/07/18 04:27	10157.4547	10157.4547		1935.10	2791.16			
513	1/07/18 08:27	10161.4547	10161.4547		1935.40	2792.46			
514	1/07/18 12:27	10165.4547	10165.4547		1935.70	2793.75			
515	1/07/18 16:27	10169.4547	10169.4547		1935.99	2795.04			
516	1/07/18 20:27	10173.4547	10173.4547		1936.27	2796.80			
517	1/07/19 00:27	10177.4547	10177.4547		1936.56	2798.09			
518	1/07/19 04:27	10181.4547	10181.4547		1936.84	2799.37			
519	1/07/19 08:27	10185.4547	10185.4547		1937.11	2800.64			
520	1/07/19 12:27	10189.4547	10189.4547		1937.35	2802.37			
521	1/07/19 16:27	10193.4547	10193.4547		1937.57	2803.59			
522	1/07/19 20:27	10197.4547	10197.4547		1937.77	2805.28			
523	1/07/20 00:27	10201.4547	10201.4547		1937.94	2806.45			
524	1/07/20 04:27	10205.4547	10205.4547		1938.06	2808.05			
525	1/07/20 08:27	10209.4547	10209.4547		1938.14	2809.13			
526	1/07/20 12:27	10213.4547	10213.4547		1938.15	2810.13			
527	1/07/20 16:27	10217.4547	10217.4547		1938.10	2811.55			
528	1/07/20 20:27	10221.4547	10221.4547		1937.98	2812.41			
529	1/07/21 00:27	10225.4547	10225.4547		1937.81	2813.22			
530	1/07/21 04:27	10229.4547	10229.4547		1937.59	2813.98			
531	1/07/21 08:27	10233.4547	10233.4547		1937.35	2814.71			

Reservoir Information

Simmi Saharan

Subject: FW: Data for Buildups
Attachments: Penn West Waskada 3-3 Reservoir Fluid Study.pdf; 103-13-24-001-26W1 Directional Survey.pdf; 102-13-31-001-25W1 Directional Survey.pdf; 103-13-24-001-26W1 Production.xlsx; 102-13-31-001-25W1 Production.xlsx; 102-13-31-001-25W1 Frac Program.pdf; 103-13-24-001-26W1 Frac Program.pdf; 103-13-24-001-26W1 Wellbore Schematic.pdf; 102-13-31-001-25W1 Wellbore Schematic.pdf; 102-13-31-001-25W1 Completion Reports.pdf; 102-13-31-001-25W1 Drilling Reports.pdf; 103-13-24-001-26W1 Drilling Reports.pdf; 103-13-24-001-26W1 Completion Reports.pdf

From: Trevor Thompson [<mailto:Trevor.Thompson@pennwest.com>]

Sent: August-04-11 2:30 PM

To: Reza Ali

Subject: Data for Buildups

Reza,

Attached is the data for those buildups. All of the data should be there.

102/13-31-1-25W1

Net Pay: 18.9m

Porosity: 13%

Sw: 50%

103/13-24-1-26W1

Net Pay: 30.0m

Porosity: 13%

Sw: 50%

Trevor

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Reservoir Fluid Study
For

Penn West Exploration

Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00

Sampled: February 23, 2011

Laboratory File Number: 52134-2011-0649 (Calgary)
Sampling File Number: 52138-2011-1039 (Estevan)
Date: April 27, 2011

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April 27, 2011

Penn West Exploration

200, 207 9th Ave S.W.

Calgary, AB

T2P 1K3

Attention: Andrew Seto

Subject: Reservoir Fluid Study

Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00

Laboratory File Number: 52134-2011-0649 (Calgary)

Sampling File Number 52138-2011-1039 (Estevan)

Separator fluid samples were collected from the subject location by representatives of Core Laboratories Canada Ltd. on February 23rd, 2011. The samples were then submitted to our Calgary laboratory for use in a reservoir fluid study.

The enclosed report contains a brief description of the laboratory tests and procedures that were followed in the lab, the laboratory results in tabular and graphical formats, the compositional data, and concluding remarks.

The reservoir fluid was recombined to a saturation pressure of 4 220 kPag at the reservoir temperature of 45.0 °C. 1.5 litres of reservoir fluid was recombined for this study and upcoming miscibility projects.

Core Laboratories is committed to customer satisfaction and welcomes your feedback. You can e-mail the General Manager with your comments at pscanada.feedback@corelab.com.

Yours truly,

CORE LABORATORIES CANADA LTD.

Dale McIlesh

PVT Data Evaluator

/DMc

enclosure

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SUMMARY OF PVT DATA

Reported Reservoir Conditions

Reservoir Pressure	7 398	kPa(g)
Reservoir Temperature	45.0	°C

Pressure-Volume Relations

Saturation Pressure	4 233	kPa(g)
Avg. Single-Phase Compressibility	9.71	E-7 v/v/kPa (34 474 to 4 233 kPa(g))
Thermal Exp. @ 34 474 kPa(g)	1.02398	V at 45.0 °C / V at 15.0 °C

Differential Vaporization Data (at 4 233 kPa(g) and 45.0 °C)

Solution Gas/Oil Ratio	43.3	m ³ / m ³ of residual oil at 15.0 °C
Relative Oil Volume	1.151	m ³ / m ³ of residual oil at 15.0 °C
Density of Reservoir Fluid	788.5	kg/m ³

Reservoir Fluid Viscosity

1.53 mPa-s at 4 233 kPa(g) and 45.0 °C
--

Separator Test Results

Separator Conditions		Formation Volume Factor (A)	Total Solution Gas/Oil Ratio (B)	Tank Oil Gravity (°API at 15.6 °C)
kPa(g)	°C			
1 103	2.0	1.122	37.9	37.2

(A) Cubic metres of saturated oil per cubic metre of stock tank oil at 15.0 °C.

(B) Total standard cubic metres of gas per cubic metre of stock tank oil at 15.0 °C.

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PROJECT OBJECTIVE & SCOPE

The objective of the reservoir fluid study is to determine the PVT properties of the reservoir fluid from the **Penn West Waskada Unit No. 5 Hz 3-3-2-26W1** well.

The scope of the study entails the compositional analysis of the separator oil and gas, physical recombination of the separator gas and liquid samples to produce a recombined reservoir fluid, pressure-volume relations of the recombined reservoir fluid, differential vaporization test on the recombined fluid, reservoir fluid viscosity measurements, separator test of the recombined reservoir fluid and the compositional analysis of the recombined reservoir fluid. A routine oil analysis is included in the compositional data section of this report.

ANALYTICAL SUMMARY

Sample Analysis and Verification

A. Separator Gases

Gas analyses are performed on the HP 6890 gas chromatograph. Three columns are employed in this technology. One column is used to detect inert components such as helium, hydrogen, nitrogen and oxygen. The second column detects lighter hydrocarbon components to propane, carbon dioxide and hydrogen sulphide. The third column detects heavier C3+ hydrocarbons. Argon is used as a carrier gas in the first column and helium in the second and third. The extended gas analysis to decanes plus is performed with the use of the HP 6890 gas chromatograph. Its technique is described below in the reservoir fluid analysis section.

The gas samples are heated to temperatures considerably above sampling temperature to ensure complete homogeneity including the revaporization of any possible condensables. Finally, the heated gas samples are injected into the chromatographs for analysis.

The separator gas compositions can be found on page **16** of this report.

B. Separator Liquids

Initially, the room temperature saturation pressures of the separator liquid samples are determined, as a means of a quality check, by incremental additions of an inert hydraulic fluid. Separator liquids are analyzed by high temperature flash. In this process, an aliquot of separator liquid is flashed to atmospheric pressure at a controlled rate and elevated temperature. The evolved gas is collected, quantified and analyzed. The residual liquid is also quantified and analyzed. The separator liquid composition is arrived at by mathematically recombining the individual flashed gas and residual liquid compositions.

The separator liquid composition is included on pages **17 & 18** of this report.

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Analytical Summary...continued

C. K-Value Analysis

The final sample verification step is the generation of a K-value plot from the compositional analysis of the separator gas and liquid samples. This step confirms equilibrium was established between the gas and liquid in the separator at the time of sampling and that the samples were collected properly. Refer to page **19** for the illustration.

D. Reservoir Fluid Composition

The composition of the recombined reservoir fluid, as per the separator oils, is also determined by high temperature flash. The resulting composition is detailed on pages **20 & 21** of this report.

Laboratory Physical Recombination

A. Sample Preparation

Prior to recombination, a number of sample preparation steps are necessary. First, the separator gas must be condensed into an evacuated, high-pressure cylinder. This is accomplished by immersing the high-pressure cylinder in liquid nitrogen. The high-pressure cylinder is attached to the source cylinder and the contents of the source cylinder are transferred by pressure drop to the high-pressure cylinder. The source cylinder is heated to a temperature considerably above sampling temperature to ensure single-phase transfer. Once the condensing process is completed, the vapour contents in the high-pressure cylinder are brought to room temperature and stabilized at a reference pressure.

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Analytical Summary...continued

B. Physical Recombination

The physical recombination was performed as follows. An evacuated, high-pressure, windowed cell was heated to the reported reservoir temperature of **45.00 °C**. A measured aliquot of pressured separator liquid was injected into the cell. A measured aliquot of pressured separator gas was then added to the cell. The contents of the cell were put into single phase by increasing the pressure, through hydraulic fluid injection, and vigorous agitation. The saturation pressure of this initial mixture was then visually determined and found to be less than the target saturation pressure of **4 220 kPa(g)**. A second aliquot of separator gas was added and the resulting fluid's saturation pressure visually determined. This pressure was found to be approximately **4 220 kPa(g)**. The contents of the cell were once again put into single phase by increasing the pressure, through hydraulic fluid injection, and vigorous agitation. This recombined reservoir fluid was then monophasically transferred from the cell to a high-pressure, stainless steel, storage cylinder.

PVT Experiments

A. Pressure-Volume Relations Test

A measured aliquot of the reservoir fluid is transferred, under pressure, to a high-pressure, windowed cell and stabilized at a working pressure significantly above the bubblepoint pressure. The cell is then heated to the reported reservoir temperature of **45.00 °C** and again stabilized at the working pressure. The cell pressure is lowered by withdrawing the inert hydraulic fluid. Reservoir fluid volumes in the cell are determined at several pressure increments both above and below the saturation pressure. The saturation pressure (bubblepoint) itself is confirmed by visual observation through the cell window and is repeated twice.

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Analytical Summary...continued

The results of this test are reported in the form of a ratio of reservoir fluid volume at any pressure to the reservoir fluid volume at saturation conditions (relative volume or V/V_{sat}). The relative volume data is then used to calculate single-phase oil compressibilities and densities.

The data from this test is tabulated on pages **10, 11** and illustrated on page **25** of this report.

B. Differential Vaporization

At the completion of the pressure-volume relations test, the reservoir fluid is put into single phase and stabilized at the working pressure and reservoir temperature. The pressure in the cell is then lowered, through hydraulic fluid withdrawal, to a predetermined pressure below the saturation pressure. The gas and oil phase portions of the system are allowed to separate and establish equilibrium. Once equilibrium is reached, the liberated gas is removed, at constant pressure, quantified and its relative density to air measured. The volume of oil remaining in the cell is also determined. The pressure is reduced again and the procedure repeated until the final pressure (atmospheric) is reached.

The stepwise pressure reduction allows for the examination of two-phase properties as a function of pressure depletion during primary production. Specifically, the liberated gas relative density, gas deviation (Z) factor, gas formation volume factor, solution gas-oil ratio, oil formation volume factor and oil phase density are determined at each pressure stage.

The data generated from the differential vaporization test is tabulated on pages **12 & 13** and illustrated on pages **26 to 30** of this report.

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Analytical Summary...continued

C. Reservoir Fluid Viscosity

An aliquot of the recombined reservoir fluid is transferred, in single phase, to a piston-style viscometer that is preheated to the reservoir temperature. Inside the viscometer chamber a low mass piston is magnetically forced back and forth in the sample fluid. The time required for the piston to move a fixed distance is then very accurately related to the fluid viscosity and displayed directly as viscosity in centipoise (cP). A number of calibrated pistons of various sizes are available to cover a wide range of viscosities. The measurement is started at a pressure above the reservoir pressure and is lowered through a relief valve to the next required pressure level. For pressures below the saturation pressure, the sample is stabilized at the selected pressure in an external cell by removing the liberated gas from oil phase in such a way as to allow only the stabilized oil to fill the measuring chamber.

The viscosity of the liberated gas at each pressure level below the saturation pressure is calculated, based on a correlation by Lee, Eakin & Gonzalez, using the liberated gas properties determined in the differential vaporization test.

The viscosity data is tabulated on page 14 and illustrated on pages 30 & 31 of this report.

D. Separator Test

A measured aliquot of the reservoir fluid is transferred to a scale separator and flashed at separator conditions equal to those that prevailed in the field at the time of sampling. Specifically, flash to 1 103 kPa(g) and 2 °C and then to atmospheric pressure and 15.0 °C. At each stage, the liberated gas is removed and quantified after equilibrium has been reached. The volume of oil remaining at each stage is also determined. This data is presented in the form of solution gas-oil ratios (total and individual stage), formation volume factor, stock tank oil gravity

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Analytical Summary...continued

and liberated gas relative densities. The total gas-oil ratio and the formation volume factor from this test are adjusted, as documented in the Data Adjustment section of this report, using data from the pressure-volume relations test and the differential vaporization test.

The results from the separator test can be found on page **15** of this report.

General

A. Illustrations

Where applicable, analytical expressions best representing the PVT data reported and the corresponding statistical summaries have been provided. Refer to pages **25 to 31** of this report.

B. Data Adjustment

The total solution gas-oil ratio and the formation volume factor from the multi-stage separator test have been adjusted such that this data can be used directly in volumetric and material balance calculations. Complete documentation is provided on pages **32 to 34**. The adjusted data is tabulated on page **35** and is illustrated on pages **36 and 37** of this report.

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CONCLUSIONS & OBSERVATIONS

Based on the information received from **Penn West Exploration**, the data contained in this report and the observations made during the course of this study, the following can be concluded.

1. The reservoir fluid was recombined to a saturation pressure of **4 233 kPa(g)** at the reported reservoir temperature of **45.00 °C**. The reservoir fluid yielded a GOR of 11.7 m³/m³ sep at a pressure of 1 103 kPa(g) and 2 °C, and it yielded a total GOR of 37.9 m³/m³.
2. The physically recombined reservoir fluid exhibited the behaviour of a medium gravity oil system (37.2 °API).
3. The adjusted data should be used in volumetric and material balance calculations.

Core Laboratories can recommend and perform additional tests to further define or characterize the reservoir.

TABULAR DATA

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VOLUMETRIC DATA
(at 45.0 °C)

Saturation Pressure (Psat)	4 233 kPa(g)
Density at Psat	788.5 kg/m ³
Thermal Exp. @ 34 474 kPa(g)	1.02398 V at 45.0 °C / V at 15.0 °C

AVERAGE SINGLE-PHASE COMPRESSIBILITIES

Pressure Range kPa(g)			Single-Phase Compressibility v/v/kPa
--------------------------	--	--	--

34 474	to	27 579	8.69 E -7
27 579	to	20 684	9.15 E -7
20 684	to	13 790	9.81 E -7
13 790	to	4 233	11.35 E -7

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PRESSURE-VOLUME RELATIONS
(at 45.0 °C)

Pressure kPa(g)	Relative Volume (A)	Y-Function (B)	Density kg/m ³
34 474	0.9706		812.4
27 579	0.9765		807.5
20 684	0.9826		802.5
13 790	0.9893		797.1
10 342	0.9929		794.2
7 398	0.9961		791.6
5 516	0.9984		789.8
4 233	1.0000		788.5
4 226	1.0005	3.240	
4 192	1.0030	3.222	
4 144	1.0066	3.197	
4 089	1.0109	3.169	
3 978	1.0201	3.113	
3 765	1.0404	3.004	
3 427	1.0808	2.831	
3 061	1.1402	2.644	
2 703	1.2218	2.461	
2 358	1.3337	2.285	
2 048	1.4783	2.127	
1 744	1.6840	1.972	
1 551	1.8665	1.873	

(A) Relative Volume: V/V_{sat} or volume at indicated pressure per volume at saturation pressure.

(B) Where: $Y\text{-Function} = \frac{(P_{\text{sat}} - P)}{(P_{\text{abs}}) * (V/V_{\text{sat}} - 1)}$

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DIFFERENTIAL VAPORIZATION

(at 45.0 °C)

Oil Properties

Pressure kPa(g)	Oil Density kg/m ³	Relative Oil Volume Bod (A)	Relative Total Volume Btd (B)	Solution Gas/Oil Ratio Rsd (C)	Liberated Gas/Oil Ratio Rld
b»4 233	788.5	1.1514	1.1514	43.3	0.0
3 806	789.3	1.1480	1.1940	41.6	1.7
3 103	790.9	1.1417	1.3007	38.5	4.8
2 413	792.9	1.1342	1.4873	35.0	8.3
1 724	795.6	1.1247	1.8643	30.8	12.5
1 062	799.2	1.1120	2.7726	25.5	17.8
717	801.9	1.1025	3.9583	21.9	21.4
0	821.2	1.0268		0.0	43.3

Gravity of Residual Oil = 36.2 °API at 15.6 °C
Density of Residual Oil = 843.2 kg/m³ at 15.0 °C

- (A) Cubic metre of oil at indicated pressure and temperature per cubic metre of residual oil at 15.0 °C.
(B) Cubic metres of oil plus liberated gas at indicated pressure and temperature per cubic metre of residual oil at 15.0 °C.
(C) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of residual oil at 15.0 °C.

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DIFFERENTIAL VAPORIZATION

(at 45.0 °C)

Gas Properties

Pressure kPa(g)	Incremental Gas Relative Density (A)	Cumulative Gas Relative Density (A)	Incremental Deviation Factor Z	Gas Formation Volume Factor Bg (B)	Gas Expansion Factor 1/Bg (C)
b»4 233					
3 806	0.825	0.825	0.944	0.02704	36.98
3 103	0.831	0.829	0.950	0.03316	30.16
2 413	0.848	0.837	0.955	0.04251	23.52
1 724	0.883	0.853	0.962	0.05899	16.95
1 062	0.947	0.881	0.970	0.09333	10.72
717	1.003	0.901	0.976	0.13336	7.50
0	1.524	1.216			

(A) Air = 1.000

(B) Cubic metres of gas at indicated pressure and temperature per cubic metre at 101.325 kPa(a) and 15.0 °C.

(C) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre at indicated pressure and temperature.

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
52134-2011-0649

RESERVOIR FLUID VISCOSITY
(at 45 °C)

Pressure kPa(g)	Oil Viscosity mPa·s	Gas Viscosity * mPa·s	Oil/Gas Viscosity Ratio
34 474	2.19		
27 579	2.04		
20 684	1.89		
13 790	1.74		
10 342	1.66		
7 398	1.60		
5 516	1.56		
4 233	1.53		
3 806	1.52	0.0118	129
3 103	1.54	0.0115	134
2 413	1.60	0.0113	142
1 724	1.72	0.0109	157
1 062	1.91	0.0105	182
717	2.07	0.0102	202
0	3.01		

* Gas Viscosity data calculated from correlation of Lee A.L., Gonzalez M.H., and Eakin B.E., "The Viscosity of Natural Gases", Journal of Petroleum Technology, August, 1966, pp. 997-1000.

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
52134-2011-0649

SEPARATOR TEST OF RESERVOIR FLUID

Flash Conditions		Gas/Oil Ratio (m ³ /m ³)	Gas/Oil Ratio (m ³ /STm ³)	Stock Tank Oil Gravity at 15.6 °C (°API)	Formation Volume Factor Bofb (C)	Separator Volume Factor (D)	Specific Gravity of Flashed Gas (Air=1.000)	Oil Phase Density (kg/m ³)
kPa(g)	°C	(A)	(B)					
4 233	45.0							786.2
1 103	2.0	11.7	12.4			1.055	0.824	826.3
0	15.0	25.5	25.5	37.2	1.122	1.000	1.255	838.2
Rsfb =				37.9				

(A) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of oil at indicated pressure and temperature.

(B) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of stock tank oil at 15.0 °C.

(C) Cubic metres of saturated oil at 4 233 kPa(g) and 45.0 °C per cubic metre of stock tank oil at 15.0 °C.

(D) Cubic metres of oil at indicated pressure and temperature per cubic metre of stock tank oil at 15.0 °C.

COMPOSITIONAL DATA



EXTENDED GAS ANALYSIS

K0000076 - 1

CONTAINER IDENTITY

7234

WELL LICENSE NUMBER

52134-2011-0649

LABORATORY FILE NUMBER

Penn West Exploration

OPERATOR

16

PAGE

102/03-03-002-26W1/00

LOCATION (UWI)

Penn West Waskada Unit No.5 Hz 3-3-2-26

WELL NAME

KB ELEV (m)

GR ELEV (m)

Waskada

FIELD OR AREA

Lower Amaranth

POOL OR ZONE

Core Lab - Estevan

SAMPLER

TEST TYPE AND NO.

TEST RECOVERY

Test Separator Meter Run at 7-3

	POINT OF SAMPLE				SAMPLE POINT ID			
	PUMPING	FLOWING	GAS LIFT	SWAB				
	WATER	m ³ /d	OIL	m ³ /d	GAS	m ³ /d		

TEST INTERVAL or PERFS (meters)

1103

SEPARATOR

RESERVOIR

OTHER

1100 @ 9 °C

CONTAINER WHEN SAMPLED

1100 @ 22 °C

CONTAINER WHEN RECEIVED

2.0

SEPARATOR

OTHER

Temperatures, °C

10:00 Hrs

Pressures, kPa (gauge)

2011 02 23

DATE SAMPLED (Y/M/D)

2011 02 28

DATE RECEIVED (Y/M/D)

2011 03 02

DATE ANALYZED (Y/M/D)

TUN

ANALYST

AMT. AND TYPE CUSHION

@ °C

MUD RESISTIVITY

COMPONENT	MOLE FRACTION AIR FREE AS RECEIVED	MOLE FRACTION AIR FREE ACID GAS FREE	mL/m ³ AIR FREE AS RECEIVED
H ₂	0.0001	0.0001	
He	0.0003	0.0003	
N ₂	0.1243	0.1255	
CO ₂	0.0092	0.0000	
H ₂ S	0.0006	0.0000	
C ₁	0.6762	0.6830	
C ₂	0.1225	0.1237	435.3
C ₃	0.0501	0.0506	184.1
iC ₄	0.0042	0.0042	18.3
C ₄	0.0087	0.0088	36.6
iC ₅	0.0013	0.0013	6.3
C ₅	0.0013	0.0013	6.3
C ₆	0.0007	0.0007	3.7
C ₇₊	0.0005	0.0005	2.8
Total	1.0000	1.0000	693.4

CALCULATED GROSS HEATING VALUE MJ/m³ @ 15°C & 101.325 kPa (abs.)		CALCULATED VAPOR PRESSURE kPa (abs.) @ 40 °C	
40.61		101.5	
MOISTURE FREE		PENTANES PLUS	
CALCULATED TOTAL SAMPLE PROPERTIES (AIR=1) @ 15°C & 101.325 kPa			
MOISTURE FREE AS SAMPLED			
0.918 kg/m³		21.7	
DENSITY		RELATIVE MOLECULAR MASS	
CALCULATED PSEUDOCRITICAL PROPERTIES			
AS SAMPLED		ACID GAS FREE	
4476.1 kPa (abs)		209.8 K	
pPc		pTc	
C7+PROPERTIES @ 15°C & 101.325 kPa		MOLE FRACTION	
723.8 kg/m³		0.0005900	
DENSITY		FIELD	
MOLECULAR WEIGHT		GASTEC	
HYDROGEN SULPHIDE			

REMARKS:

H2S determined in the field by Gastec = 590ppm

NOTE: THE GROSS HEATING VALUE HAS BEEN CALCULATED IN ACCORDANCE TO
AGA REPORT #5 AND ALL PROPERTIES HAVE BEEN CALCULATED UTILIZING
PHYSICAL CONSTANTS AND BOILING POINT GROUPING.



HYDROCARBON LIQUID ANALYSIS

V0007711 - 2		7234	52134-2011-0649
CONTAINER IDENTITY	METER ID	WELL LICENSE NUMBER	LABORATORY FILE NUMBER
	Penn West Exploration		17
	OPERATOR		PAGE
102/03-03-002-26W1/00	Penn West Waskada Unit No.5 Hz 3-3-2-26		
LOCATION (UWI)	WELL NAME	KB ELEV (m)	GR ELEV (m)
Waskada	Lower Amaranth	Core Lab - Estevan	
FIELD OR AREA	POOL OR ZONE	SAMPLER	

TEST TYPE AND NO.	TEST RECOVERY					
Test Separator Sight Glass at 7-3						
	POINT OF SAMPLE					
	SAMPLE POINT ID					
	PUMPING	FLOWING	GAS LIFT	SWAB		
	WATER	m ³ /d	OIL	m ³ /d	GAS	m ³ /d
TEST INTERVAL or PERFS (meters)						
1103	1100 @ 9 °C	@ °C	2.0			
SEPARATOR	RESERVOIR	OTHER	CONTAINER WHEN SAMPLED	CONTAINER WHEN RECEIVED	SEPARATOR	OTHER
10:30 Hrs	Pressures, kPa (gauge)				Temperatures, °C	
2011 02 23	2011 02 28	2011 03 18	DH	@ °C		
DATE SAMPLED (Y/M/D)	DATE RECEIVED (Y/M/D)	DATE ANALYZED (Y/M/D)	ANALYST	AMT. AND TYPE CUSHION	MUD RESISTIVITY	

COMPONENT	MOLE FRACTION	MASS FRACTION	LIQUID VOLUME FRACTION	mL/m ³
N ₂	0.0020	0.0004	0.0004	2.9
CO ₂	0.0015	0.0004	0.0004	3.4
H ₂ S	0.0000	0.0000	0.0000	0.0
C ₁	0.0427	0.0044	0.0118	96.6
C ₂	0.0540	0.0104	0.0234	191.9
C ₃	0.0851	0.0241	0.0381	312.7
iC ₄	0.0165	0.0062	0.0088	72.0
C ₄	0.0573	0.0214	0.0294	241.1
iC ₅	0.0242	0.0112	0.0144	118.1
C ₅	0.0340	0.0157	0.0201	164.5
C ₆₊	0.6827	0.9058	0.8532	6,995.1
Total	1.0000	1.0000	1.0000	8,198.3

OBSERVED PROPERTIES OF C ₆₊ RESIDUE (15/15°C)		
853.6 kg/m ³	0.8543	34.3
DENSITY	RELATIVE DENSITY	API @ 15.5 °C
207		
RELATIVE MOLECULAR MASS		
CALCULATED PROPERTIES OF TOTAL SAMPLE (15/15°C)		
804.0 kg/m ³	0.8047	44.5
DENSITY	RELATIVE DENSITY	API @ 15.5 °C
155.85		
RELATIVE MOLECULAR MASS		
GAS EQUIVALENT		
0.1220 10 ³ m ³ Gas/m ³ Liquid (E ³ m ³ /m ³)		

REMARKS: Refer to page 18 for the extended analysis of hexanes plus.

NOTE: All Properties have been calculated utilizing physical constants.



HYDROCARBON LIQUID ANALYSIS

Operator: Penn West Exploration
 Well: Penn West Waskada Unit No.5 Hz 3-3-2-26
 Sample Point: Test Separator Sight Glass at 7-3

Page: 18
 File: 52134-2011-0649-2-V0007711
 Date: 2011 03 18

Analysis of C₆₊ Fraction

Boiling Point: Range (° C)	Component	Carbon Number	Mole Fraction	Mass Fraction	Liq. Vol. Fraction
36.1- 68.9	Hexanes	C ₆	0.0432	0.0222	0.0263
68.9- 98.3	Heptanes	C ₇	0.0446	0.0266	0.0304
98.3-125.6	Octanes	C ₈	0.0591	0.0402	0.0447
125.6-150.6	Nonanes	C ₉	0.0430	0.0329	0.0357
150.6-173.9	Decanes	C ₁₀	0.0452	0.0383	0.0410
173.9-196.1	Undecanes	C ₁₁	0.0391	0.0342	0.0340
196.1-215.0	Dodecanes	C ₁₂	0.0313	0.0301	0.0295
215.0-235.0	Tridecanes	C ₁₃	0.0308	0.0322	0.0311
235.0-252.2	Tetradecanes	C ₁₄	0.0238	0.0269	0.0257
252.2-270.6	Pentadecanes	C ₁₅	0.0238	0.0293	0.0276
270.6-287.8	Hexadecanes	C ₁₆	0.0182	0.0240	0.0224
287.8-302.8	Heptadecanes	C ₁₇	0.0160	0.0226	0.0209
302.8-317.2	Octadecanes	C ₁₈	0.0152	0.0226	0.0209
317.2-330.0	Nonadecanes	C ₁₉	0.0146	0.0229	0.0210
330.0-344.4	Eicosanes	C ₂₀	0.0115	0.0189	0.0172
344.4-357.2	Heneicosanes	C ₂₁	0.0095	0.0165	0.0149
357.2-369.4	Docosanes	C ₂₂	0.0094	0.0170	0.0153
369.4-380.0	Tricosanes	C ₂₃	0.0083	0.0157	0.0140
380.0-391.1	Tetracosanes	C ₂₄	0.0077	0.0152	0.0136
391.1-401.7	Pentacosanes	C ₂₅	0.0071	0.0146	0.0130
401.7-412.2	Hexacosanes	C ₂₆	0.0062	0.0132	0.0118
412.2-422.2	Heptacosanes	C ₂₇	0.0059	0.0131	0.0115
422.2-431.7	Octacosanes	C ₂₈	0.0051	0.0117	0.0102
431.7-441.1	Nonacosanes	C ₂₉	0.0048	0.0117	0.0102
441.1 PLUS	triacontanes Plus	C ₃₀₊	0.0871	0.3125	0.2716
80.0	Benzene	C ₆ H ₆	0.0029	0.0014	0.0012
110.6	Toluene	C ₇ H ₈	0.0100	0.0055	0.0049
136.1-138.9	Ethylbenzene, p + m-Xylene	C ₈ H ₁₀	0.0152	0.0096	0.0087
144.4	o-Xylene	C ₈ H ₁₀	0.0034	0.0022	0.0019
168.9	1,2,4 Trimethylbenzene	C ₉ H ₁₂	0.0048	0.0034	0.0031
48.9	Cyclopentane	C ₅ H ₁₀	0.0039	0.0016	0.0017
72.2	Methylcyclopentane	C ₆ H ₁₂	0.0103	0.0052	0.0054
81.1	Cyclohexane	C ₆ H ₁₂	0.0110	0.0055	0.0055
101.1	Methylcyclohexane	C ₇ H ₁₄	0.0107	0.0063	0.0063
	TOTAL		0.6827	0.9058	0.8532
Mole Fraction of C7+					0.6356
Mass Fraction of C7+					0.8820
Liquid Volume Fraction of C7+					0.8252
Calculated Relative Molecular Mass of C7+					216
Calculated Relative Density of C7+					0.8608
Calculated Density of C7+ (kg/m3)					860.0

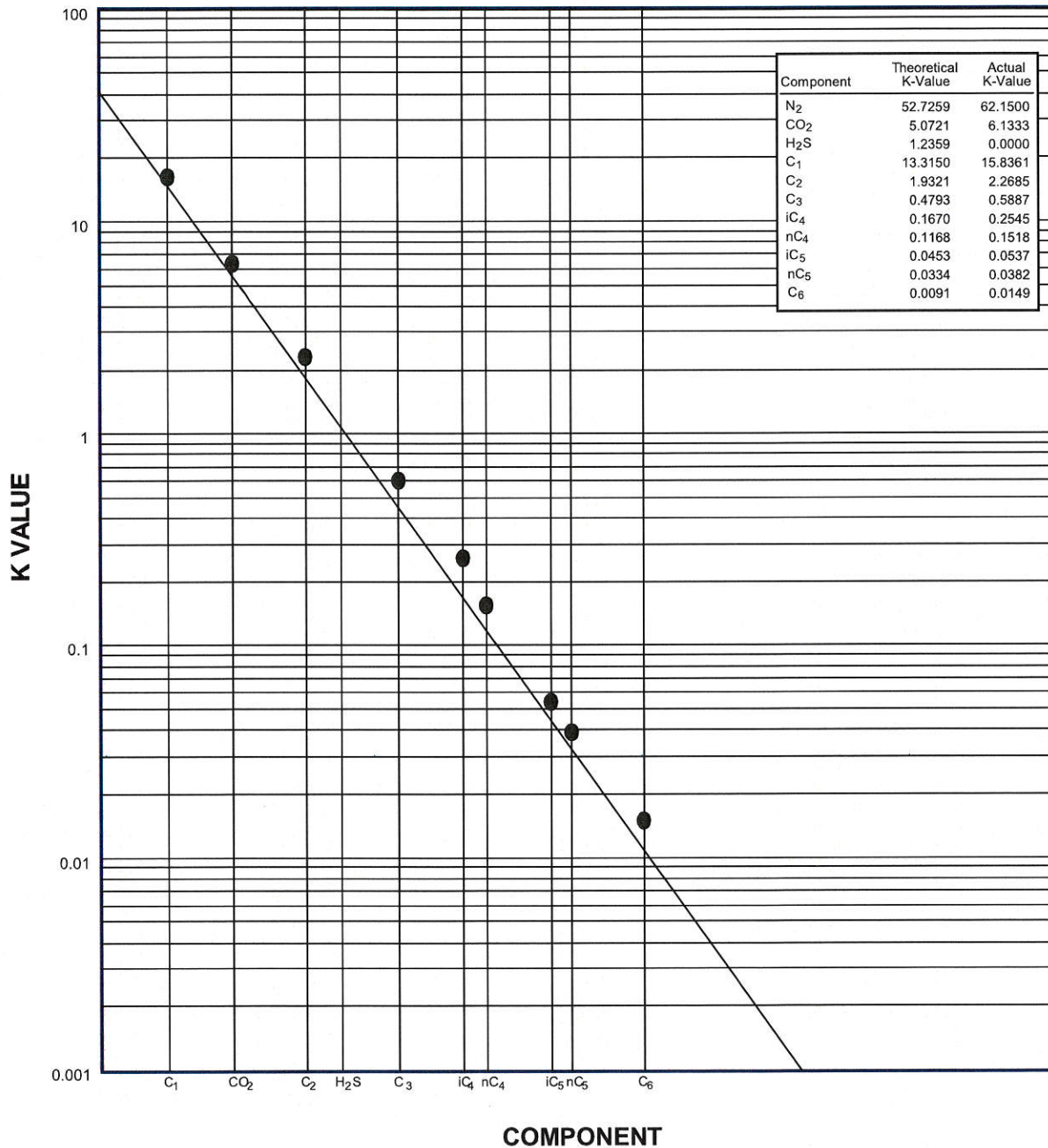


K-VALUE ANALYSIS

Operator: Penn West Exploration
Well: Penn West Waskada Unit No.5 Hz 3-3-2-26
Sample Point: Test Separator Meter Run at 7-
Pressure: 1103 kPa Temperature: 2.0 °C

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File: 52134-2011-0649
Date: 2011 02 23

● Actual K-Value
— Theoretical K-Value





HYDROCARBON LIQUID ANALYSIS

B0001079 - 6	METER ID	7234	52134-2011-0649
CONTAINER IDENTITY	Penn West Exploration	WELL LICENSE NUMBER	LABORATORY FILE NUMBER
	OPERATOR		20
			PAGE
102/03-03-002-26W1/00	Penn West Waskada Unit No.5 Hz 3-3-2-26		
LOCATION (UWI)	WELL NAME	KB ELEV (m)	GR ELEV (m)
Waskada			
FIELD OR AREA	POOL OR ZONE	SAMPLER	
TEST TYPE AND NO.		TEST RECOVERY	
Recombined Reservoir Fluid			
POINT OF SAMPLE		SAMPLE POINT ID	
PUMPING		FLOWING	
WATER		GAS LIFT	
m ³ /d		SWAB	
OIL		m ³ /d	
GAS		m ³ /d	
TEST INTERVAL or PERFS (meters)			
1103		1100 @ 9 °C	
SEPARATOR		CONTAINER WHEN SAMPLED	
RESERVOIR		OTHER	
OTHER		CONTAINER WHEN RECEIVED	
10:30 Hrs		2.0	
Pressures, kPa (gauge)		SEPARATOR	
2011 02 23		OTHER	
DATE SAMPLED (Y/M/D)		Temperatures, °C	
2011 02 28			
DATE RECEIVED (Y/M/D)			
2011 04 13			
DATE ANALYZED (Y/M/D)			
RWS			
ANALYST			
AMT. AND TYPE CUSHION			
@ °C			
MUD RESISTIVITY			

COMPONENT	MOLE FRACTION	MASS FRACTION	LIQUID VOLUME FRACTION	mL/m ³
N ₂	0.0116	0.0023	0.0022	17.0
CO ₂	0.0022	0.0007	0.0006	5.0
H ₂ S	0.0001	0.0000	0.0000	0.2
C ₁	0.0998	0.0111	0.0293	225.7
C ₂	0.0623	0.0130	0.0288	221.4
C ₃	0.0832	0.0255	0.0398	305.7
iC ₄	0.0156	0.0063	0.0089	68.1
C ₄	0.0540	0.0218	0.0295	227.2
iC ₅	0.0217	0.0109	0.0138	105.9
C ₅	0.0308	0.0155	0.0194	149.0
C ₆₊	0.6187	0.8929	0.8277	6,365.0
Total	1.0000	1.0000	1.0000	7,690.2

OBSERVED PROPERTIES OF C ₆₊ RESIDUE (15/15°C)		
853.3 kg/m ³	0.8541	34.3
DENSITY	RELATIVE DENSITY	API @ 15.5 °C
208		
RELATIVE MOLECULAR MASS		
CALCULATED PROPERTIES OF TOTAL SAMPLE (15/15°C)		
790.9 kg/m ³	0.7916	47.4
DENSITY	RELATIVE DENSITY	API @ 15.5 °C
143.82		
RELATIVE MOLECULAR MASS		
GAS EQUIVALENT		
0.1300 10 ³ m ³ Gas/m ³ Liquid (E ³ m ³ /m ³)		

REMARKS: Refer to page 21 for the extended analysis of hexanes plus.

NOTE: All Properties have been calculated utilizing physical constants.



HYDROCARBON LIQUID ANALYSIS

Operator: Penn West Exploration
 Well: Penn West Waskada Unit No.5 Hz 3-3-2-26
 Sample Point: Recombined Reservoir Fluid

Page: 21
 File: 52134-2011-0649-6-B0001079
 Date: 2011 04 13

Analysis of C₆₊ Fraction

Boiling Point: Range (° C)	Component	Carbon Number	Mole Fraction	Mass Fraction	Liq. Vol. Fraction
36.1- 68.9	Hexanes	C ₆	0.0410	0.0241	0.0279
68.9- 98.3	Heptanes	C ₇	0.0434	0.0297	0.0332
98.3-125.6	Octanes	C ₈	0.0492	0.0384	0.0417
125.6-150.6	Nonanes	C ₉	0.0396	0.0347	0.0369
150.6-173.9	Decanes	C ₁₀	0.0393	0.0382	0.0400
173.9-196.1	Undecanes	C ₁₁	0.0361	0.0363	0.0353
196.1-215.0	Dodecanes	C ₁₂	0.0293	0.0322	0.0309
215.0-235.0	Tridecanes	C ₁₃	0.0288	0.0344	0.0325
235.0-252.2	Tetradecanes	C ₁₄	0.0221	0.0288	0.0268
252.2-270.6	Pentadecanes	C ₁₅	0.0223	0.0313	0.0290
270.6-287.8	Hexadecanes	C ₁₆	0.0170	0.0258	0.0236
287.8-302.8	Heptadecanes	C ₁₇	0.0150	0.0243	0.0220
302.8-317.2	Octadecanes	C ₁₈	0.0140	0.0240	0.0216
317.2-330.0	Nonadecanes	C ₁₉	0.0138	0.0248	0.0222
330.0-344.4	Eicosanes	C ₂₀	0.0103	0.0193	0.0172
344.4-357.2	Heneicosanes	C ₂₁	0.0092	0.0184	0.0162
357.2-369.4	Docosanes	C ₂₂	0.0088	0.0183	0.0161
369.4-380.0	Tricosanes	C ₂₃	0.0077	0.0167	0.0146
380.0-391.1	Tetracosanes	C ₂₄	0.0073	0.0165	0.0144
391.1-401.7	Pentacosanes	C ₂₅	0.0064	0.0151	0.0130
401.7-412.2	Hexacosanes	C ₂₆	0.0058	0.0142	0.0123
412.2-422.2	Heptacosanes	C ₂₇	0.0053	0.0137	0.0117
422.2-431.7	Octacosanes	C ₂₈	0.0047	0.0125	0.0107
431.7-441.1	Nonacosanes	C ₂₉	0.0045	0.0124	0.0106
441.1 PLUS	Triacontanes Plus	C ₃₀₊	0.0635	0.2614	0.2224
80.0	Benzene	C ₆ H ₆	0.0030	0.0016	0.0014
110.6	Toluene	C ₇ H ₈	0.0088	0.0055	0.0049
136.1-138.9	Ethylbenzene, p + m-Xylene	C ₈ H ₁₀	0.0111	0.0080	0.0071
144.4	o-Xylene	C ₈ H ₁₀	0.0031	0.0022	0.0020
168.9	1,2,4 Trimethylbenzene	C ₉ H ₁₂	0.0060	0.0049	0.0043
48.9	Cyclopentane	C ₅ H ₁₀	0.0039	0.0019	0.0019
72.2	Methylcyclopentane	C ₆ H ₁₂	0.0121	0.0070	0.0071
81.1	Cyclohexane	C ₆ H ₁₂	0.0131	0.0075	0.0074
101.1	Methylcyclohexane	C ₇ H ₁₄	0.0132	0.0088	0.0088
	TOTAL		0.6187	0.8929	0.8277
	Mole Fraction of C7+				0.5738
	Mass Fraction of C7+				0.8669
	Liquid Volume Fraction of C7+				0.7979
	Calculated Relative Molecular Mass of C7+				217
	Calculated Relative Density of C7+				0.8611
	Calculated Density of C7+ (kg/m3)				860.4

REMARKS:



Company Name: Penn West Exploration

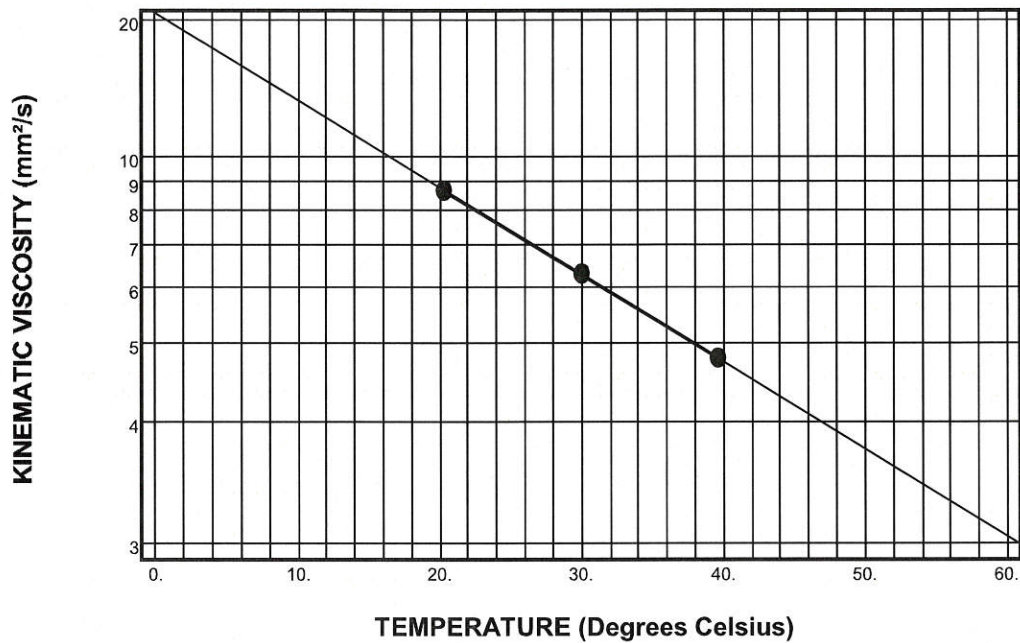
Well Name: Penn West Waskada Unit No.5 Hz 3-3-2-26

Location: 102/03-03-002-26W1/00

Sampled From: Test Separator Sight Glass at 7-3

Sampling Date: 2011 02 23

VISCOSITY - TEMPERATURE CHART

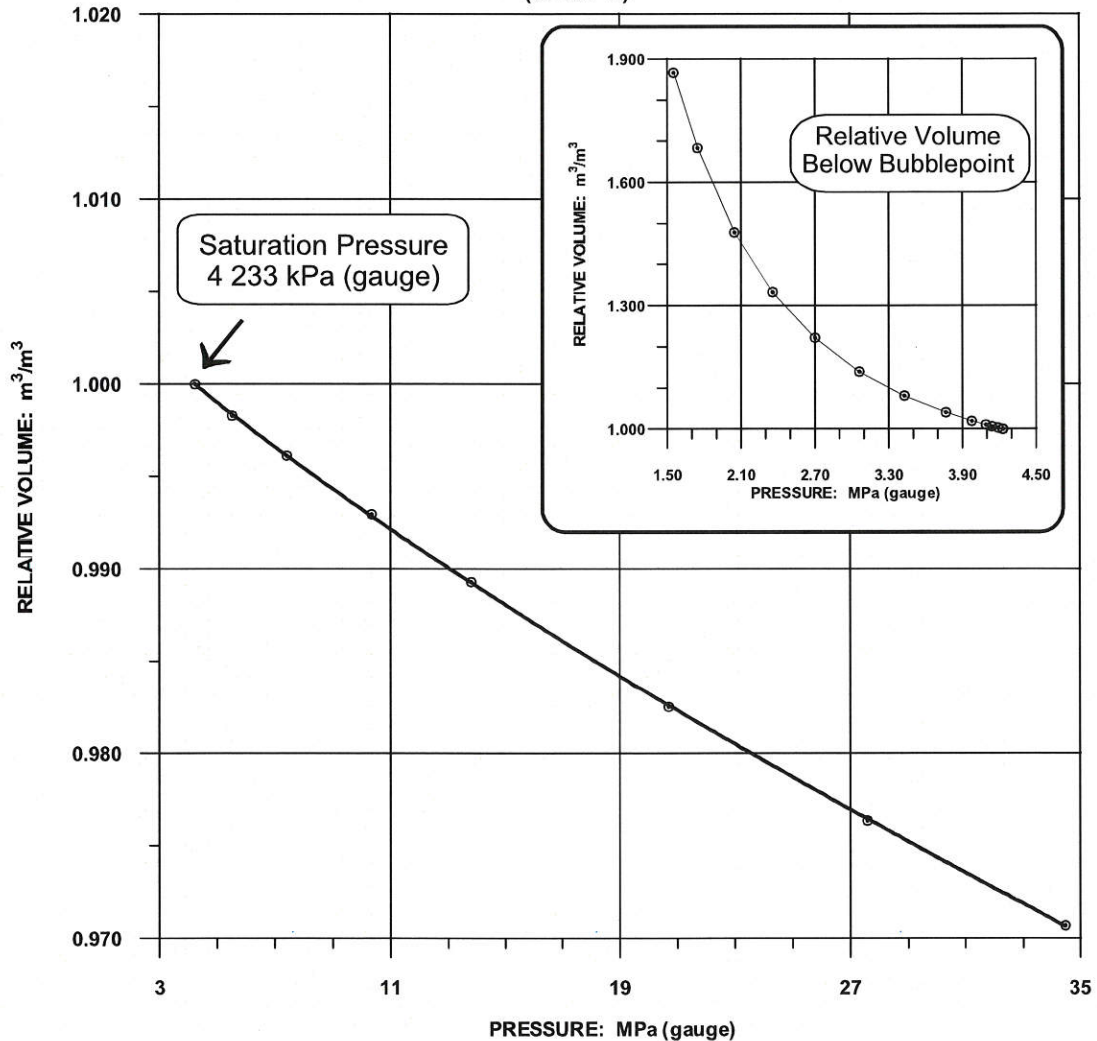


REMARKS: Water Content check for PVT Study.

ILLUSTRATIONS

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
52134-2011-0649

RELATIVE VOLUME (V/Vs)
 (at 45.0 °C)



Analytical Expression (above bubblepoint)

$$1.0067E00 + 1.8688E-03 * (Xd)^{0.500} - 8.5888E-03 * (Xd)^{0.750}$$

where; Xd is defined as (P / Psat)

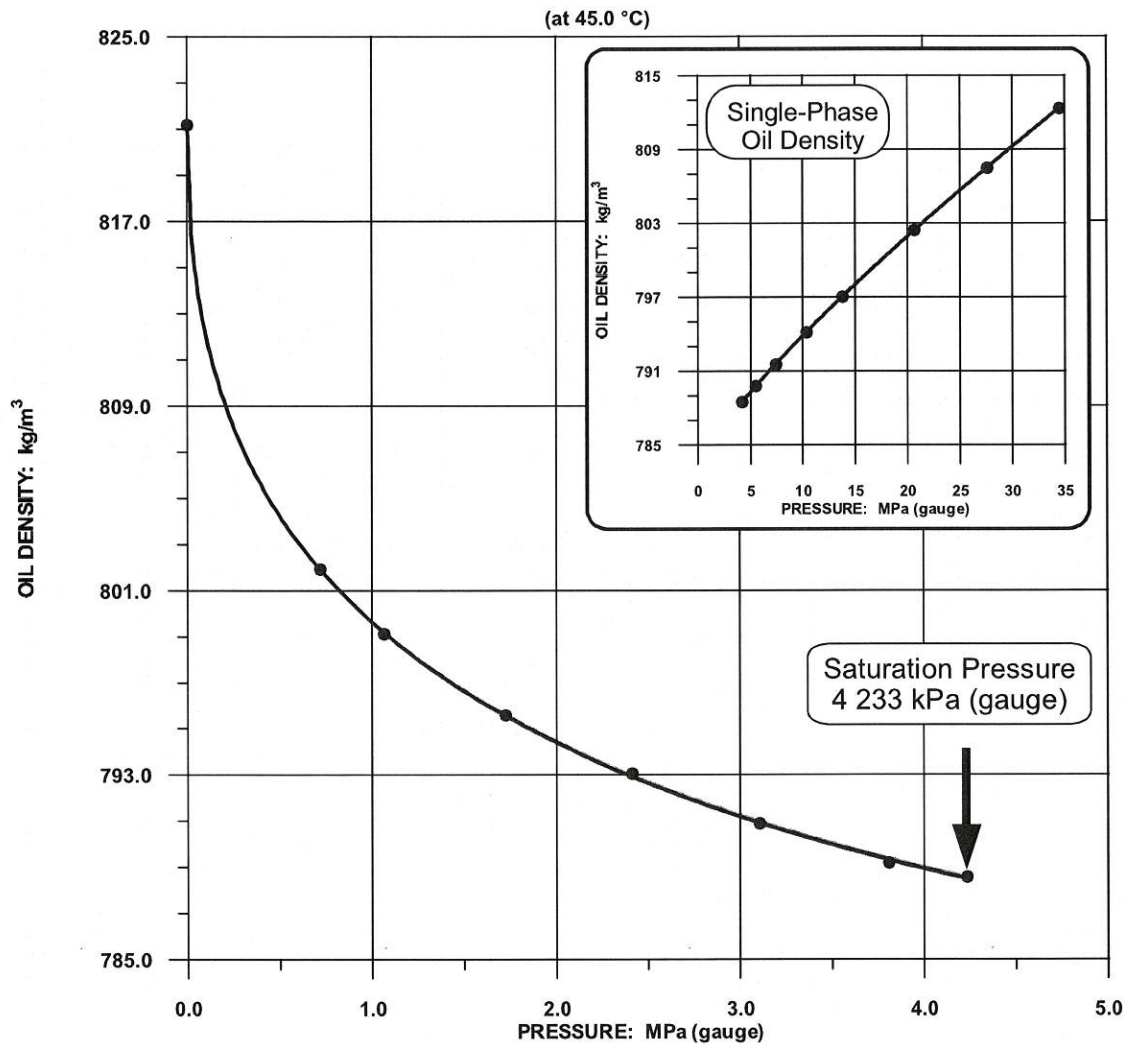
Statistical Summary

r squared: 0.999961
 Confidence Interval (+/-): 0.00008
 Confidence: 99 %

Legend

⊙ Laboratory Data
 ----- Confidence Limits
 _____ Analytical Expression

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
52134-2011-0649
OIL DENSITY



Analytical Expression (below bubblepoint)

$$8.2119\text{E}+02 - 1.2256\text{E}+02 * (X_d)^{0.501} + 8.9878\text{E}+01 * (X_d)^{0.598}$$

where; X_d is defined as (P / P_{sat})

Statistical Summary

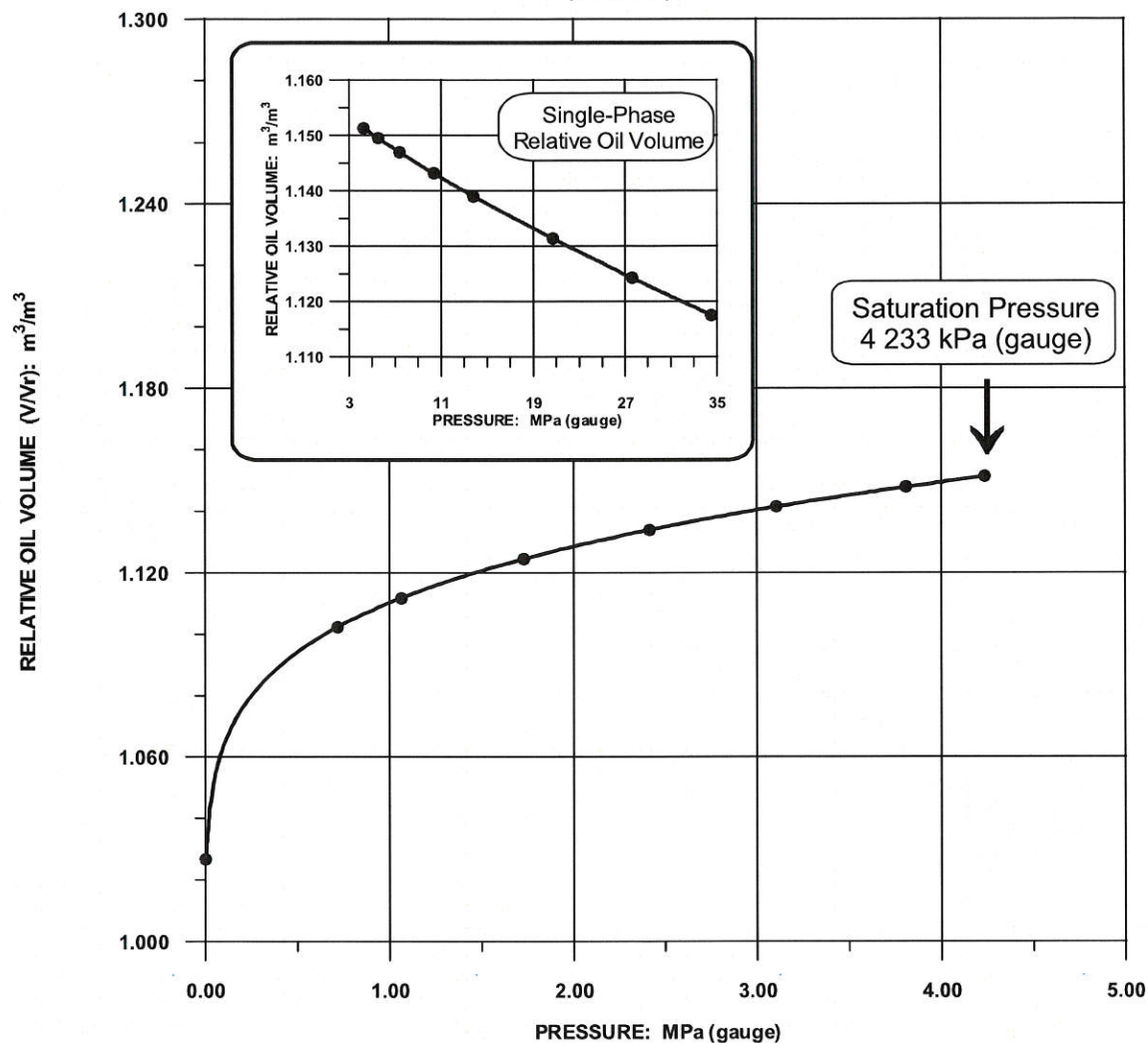
r squared: 0.999941
 Confidence Interval (+/-): 0.102
 Confidence: 99 %

Legend

● Laboratory Data
 ----- Confidence Limits
 ————— Analytical Expression

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
52134-2011-0649

RELATIVE OIL VOLUME (V/Vr)
 (at 45.0 °C)



Analytical Expression (below bubblepoint)

$$1.0268E00 + 5.0801E-02 * P^{0.170} - 6.1207E-02 * P^{0.040}$$

where; P is defined as pressure, kPa(g)

Statistical Summary

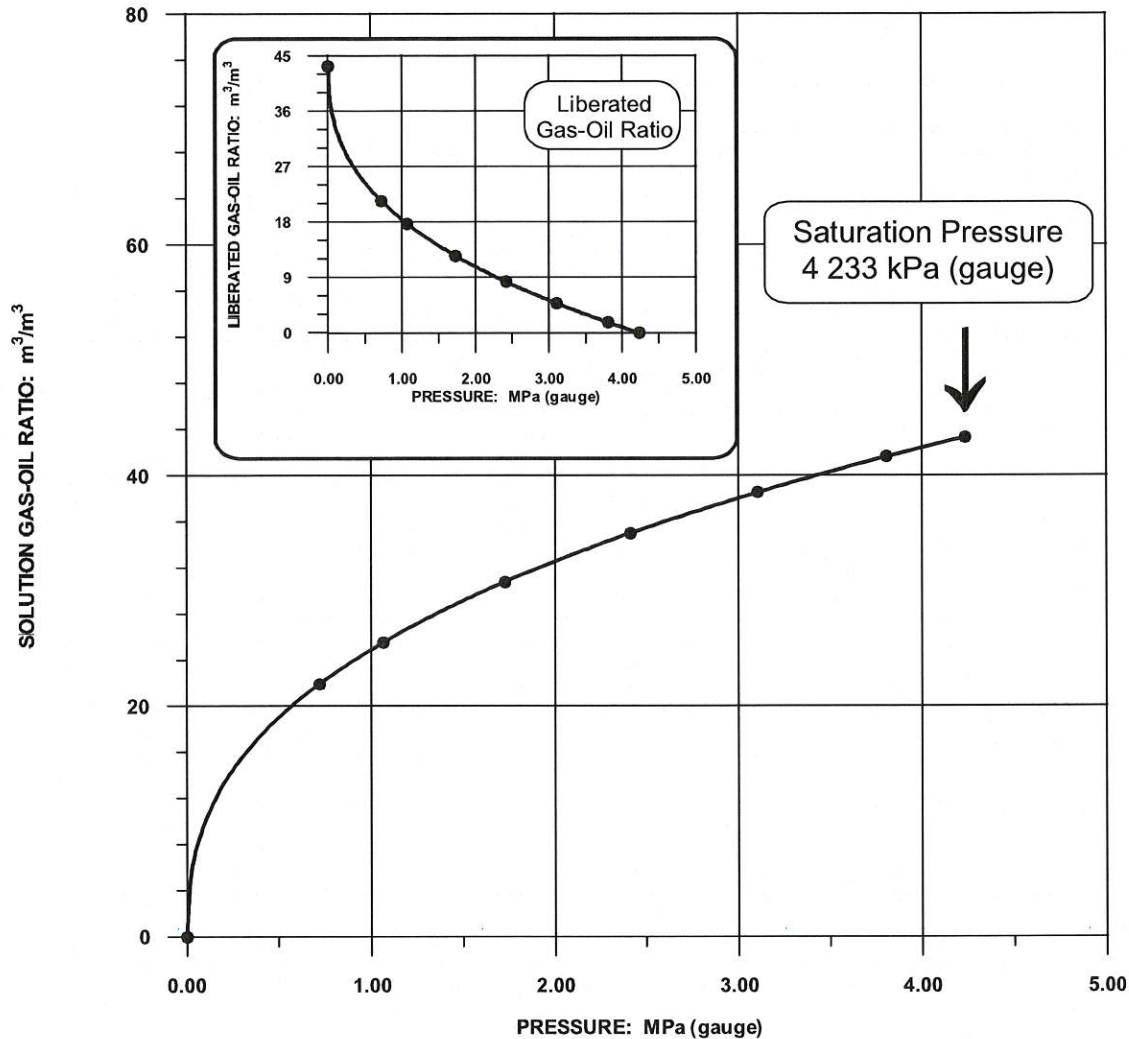
r squared: 0.999999
 Confidence Interval (+/-): 0.00004
 Confidence: 99 %

Legend

● Laboratory Data
 --- Confidence Limits
 — Analytical Expression

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
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GAS-OIL RATIOS
(at 45.0 °C)



Analytical Expression (Solution GOR - below bubblepoint)

$$2.1648E00 * P^{0.449} - 6.6560E-01 * P^{0.514}$$

where; P is defined as pressure, kPa(g)

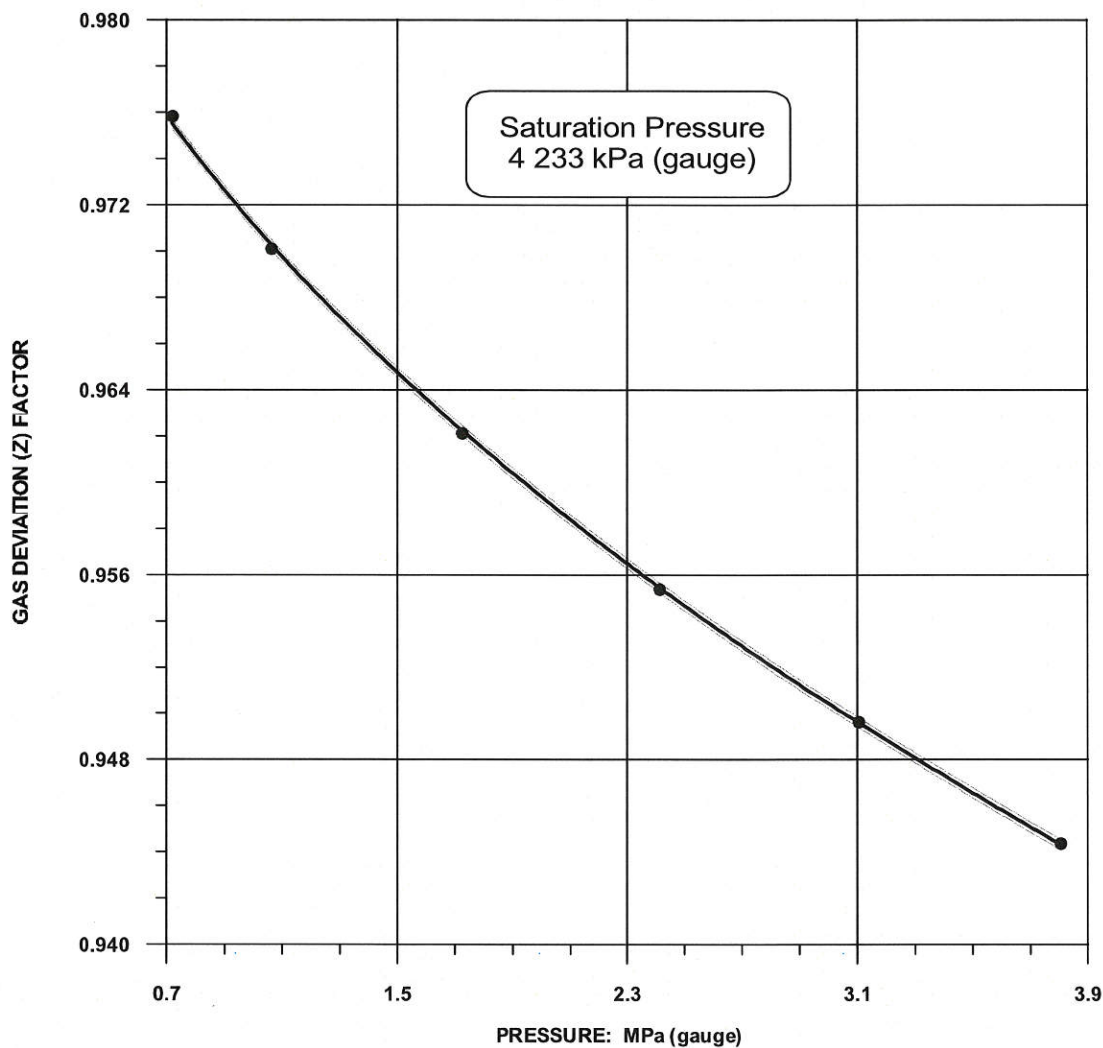
Statistical Summary

r squared: 0.999999
Confidence Interval (+/-): 0.02
Confidence: 99 %

Legend

● Laboratory Data
----- Confidence Limits
———— Analytical Expression

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
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GAS DEVIATION (Z) FACTOR
 (at 45.0 °C)



Analytical Expression

$$1.0000E00 - 6.0161E-02 * (X_d)^{0.500} + 1.4751E-03 * (X_d)^{1.000}$$

where; X_d is defined as (P / P_{sat})

Statistical Summary

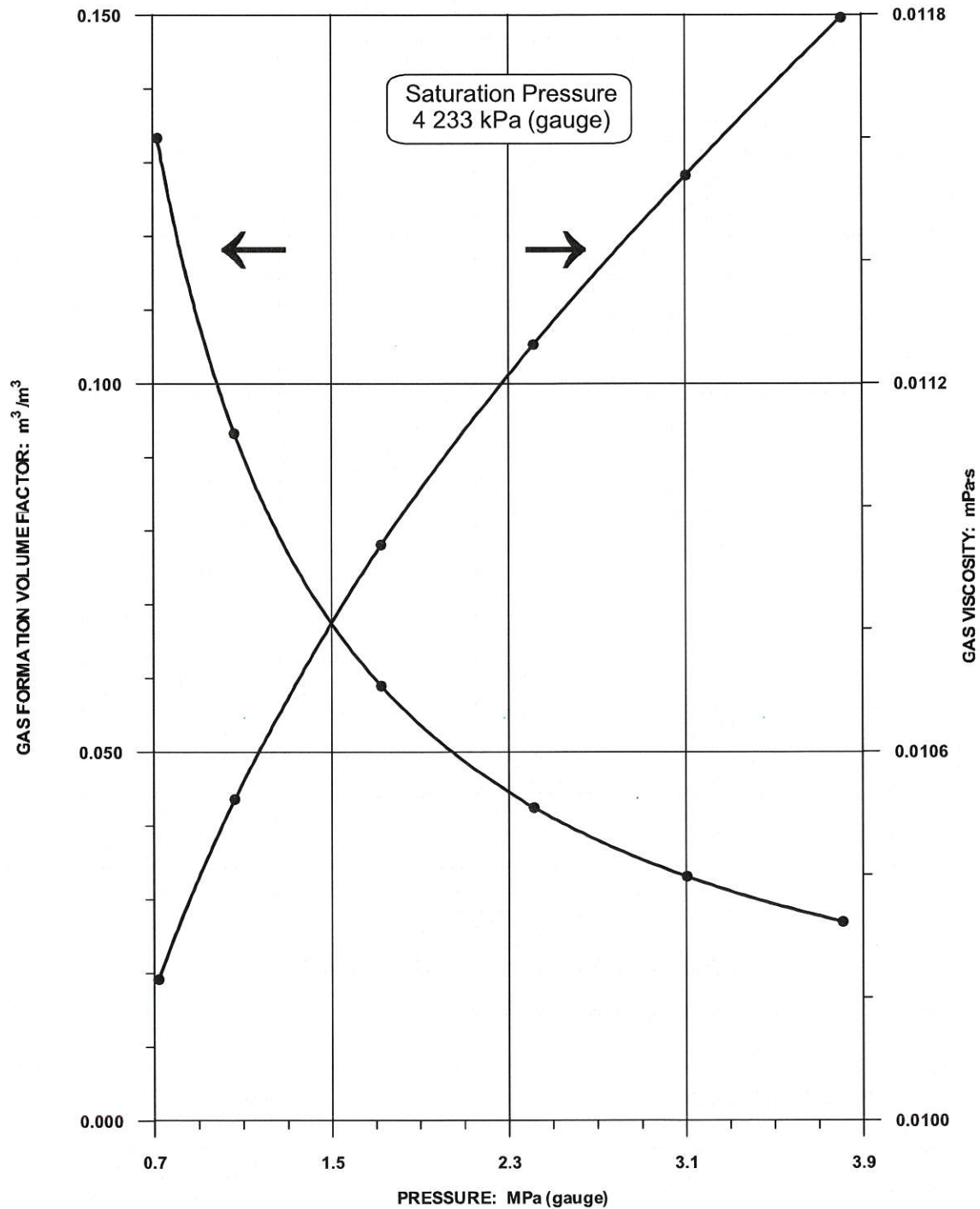
r squared: 0.999930
 Confidence Interval (+/-): 0.0002
 Confidence: 99 %

Legend

● Laboratory Data
 ----- Confidence Limits
 ————— Analytical Expression

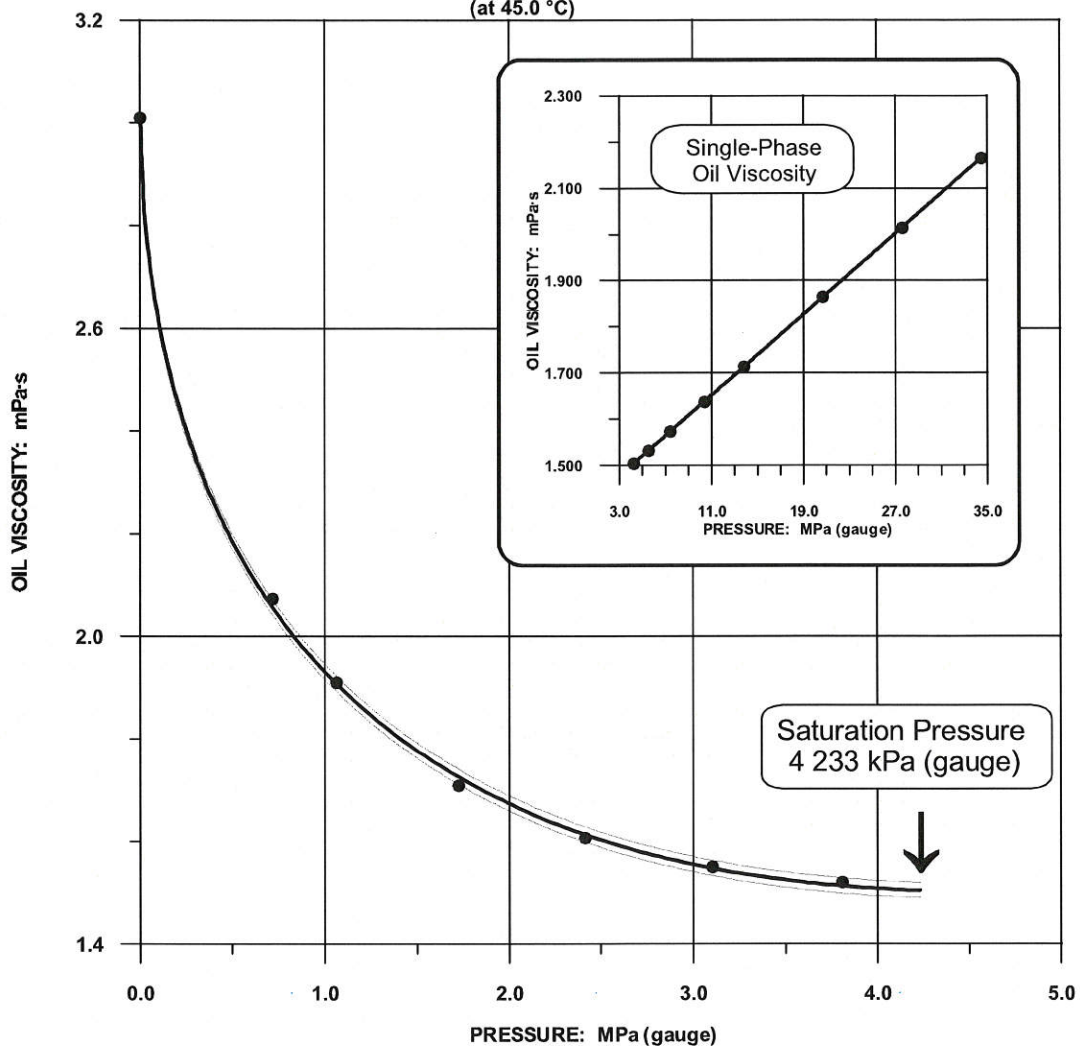
Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
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GAS FORMATION VOLUME FACTOR & GAS VISCOSITY
(at 45.0 °C)



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OIL VISCOSITY
 (at 45.0 °C)



Analytical Expression (below bubblepoint)

$$3.0105E00 + 1.6175E00 * (X_d)^{1.107} - 3.1001E00 * (X_d)^{0.550}$$

where; X_d is defined as (P / P_{sat})

Statistical Summary

r squared: 0.999901
 Confidence Interval (+/-): 0.0073
 Confidence: 99 %

Legend

● Laboratory Data
 --- Confidence Limits
 — Analytical Expression

DATA ADJUSTMENT

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
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INTRODUCTION TO DATA ADJUSTMENT

Reservoir fluids, while being produced, simultaneously undergo two different thermodynamic processes. One is the flash separation process, which occurs in surface separation facilities, and the second is insitu reservoir fluid expansion ultimately resulting in differential equilibrium separation of gas and oil in the reservoir during reservoir pressure decline.

Flash separation data are referenced to reservoir fluid volumes at saturation pressure (bubblepoint). The data are useable only at the specific instant when the reservoir pressure is equal to the saturation pressure as determined in the PVT study.

It is therefore necessary to adjust flash separation data to account for the insitu changes in reservoir fluid properties that will occur during primary pressure depletion. Both the flash solution gas-oil ratio data (R_s) and the flash formation volume factor data (B_o) require adjustment for pressures above and below the saturation pressure.

A. Solution Gas-Oil Ratio (R_s)

Pressure above P_s : No correction is required, as no gas will escape from solution at pressures above the saturation pressure. Therefore, R_s is equal to flash R_s at all pressures in excess of P_s .

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Pressures below Ps: Due to insitu differential equilibrium separation of gas and oil, flash separator data must be corrected as follows:

$$R_s = R_{sfb} - (R_{sdb} - R_{sd}) * (B_{ofb} / B_{odb})$$

where: **R_s** = Adjusted solution gas-oil ratio

R_{sfb} = Total gas-oil ratio from flash at saturation pressure

R_{sdb} = Gas-oil ratio from differential liberation at saturation pressure

R_{sd} = Gas-oil ratio from differential liberation at pressure less than saturation pressure

B_{ofb} = Formation volume factor from flash at saturation pressure

B_{odb} = Relative oil volume from differential liberation at saturation pressure

This correction must be made for all D.V. gas-oil ratio data points below saturation pressure.

B. Formation Volume Factor (Bo)

Pressure above Ps: Because flash formation volume factors are referenced to a volume at saturation pressure, Bo at pressures above saturation pressure must be corrected to account for oil compressibility. The adjustment is:

$$B_o = B_{ofb} * V/V_{sat}$$

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where; **Bo** = Adjusted flash formation volume factor for pressures above saturation pressure

Bofb = Formation volume factor from flash at saturation pressure

V/Vsat= Relative volume from pressure volume relations at pressure above saturation pressure

Pressure below Ps: Because insitu oil shrinkage occurs due to differential gas liberation at pressures below the saturation pressure (Ps), flash formation volume factors which are referenced to a volume at saturation pressure must be corrected to reflect insitu reservoir fluid shrinkage. The adjustment is as follows:

$$\mathbf{Bo} = \mathbf{Bod} * \mathbf{Bofb} / \mathbf{Bodb}$$

where: **Bo** = Adjusted flash formation volume factor for pressures below saturation pressure

Bod = Relative oil volume from differential liberation at pressure below saturation pressure

Bofb = Formation volume factor from flash at saturation pressure

Bodb = Relative oil volume from differential liberation at saturation pressure

This adjustment must be made for all D.V. relative oil volumes below saturation pressure.

The above adjustments have been made on your behalf and are reported on the following pages.

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DIFFERENTIAL VAPORIZATION
ADJUSTED TO SEPARATOR CONDITIONS*

Pressure kPa(g)	Solution Gas/Oil Ratio Rs (A)	Formation Volume Factor Bo (B)	Gas Formation Volume Factor (C)	Oil Density kg/m³	Oil/Gas Viscosity Ratio
34 474	37.9	1.089		812.4	
27 579	37.9	1.096		807.5	
20 684	37.9	1.103		802.5	
13 790	37.9	1.110		797.1	
10 342	37.9	1.114		794.2	
r» 7 398	37.9	1.118		791.6	
5 516	37.9	1.120		789.8	
b» 4 233	37.9	1.122		788.5	
3 806	36.3	1.119	0.02704	789.3	129
3 103	33.2	1.113	0.03316	790.9	134
2 413	29.8	1.105	0.04251	792.9	142
1 724	25.7	1.096	0.05899	795.6	157
1 062	20.6	1.084	0.09333	799.2	182
717	17.0	1.074	0.13336	801.9	202

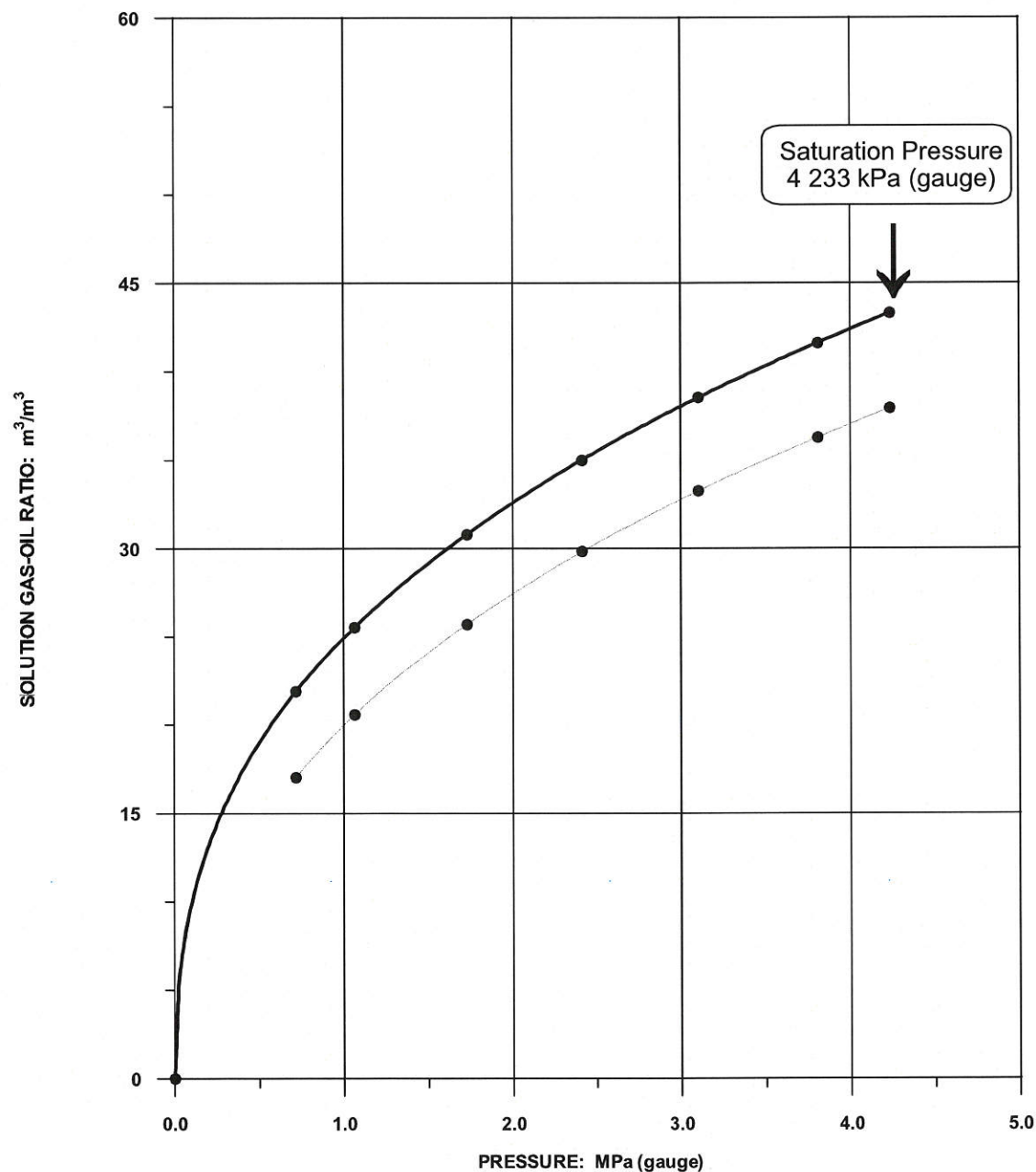
*Separator Conditions	
First Stage Stock Tank	1 103 kPa(g) at 2.0 °C 0 kPa(g) at 15.0 °C

(A) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of stock tank oil at 15.0 °C.

(B) Cubic metre of oil at indicated pressure and temperature per cubic metre of stock tank oil at 15.0 °C.

(C) Cubic metres of gas at indicated pressure and temperature per cubic metre at 101.325 kPa(a) and 15.0 °C.

ADJUSTED SOLUTION GAS-OIL RATIOS

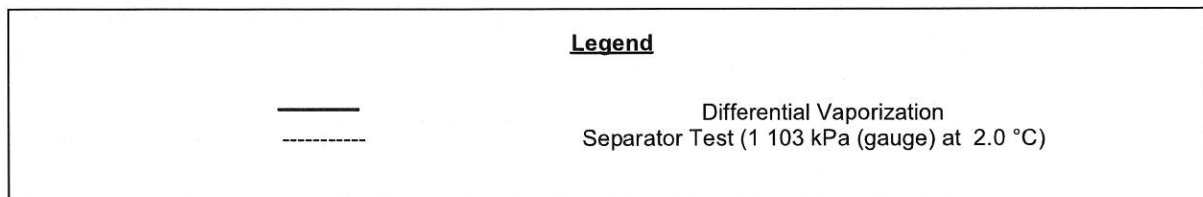
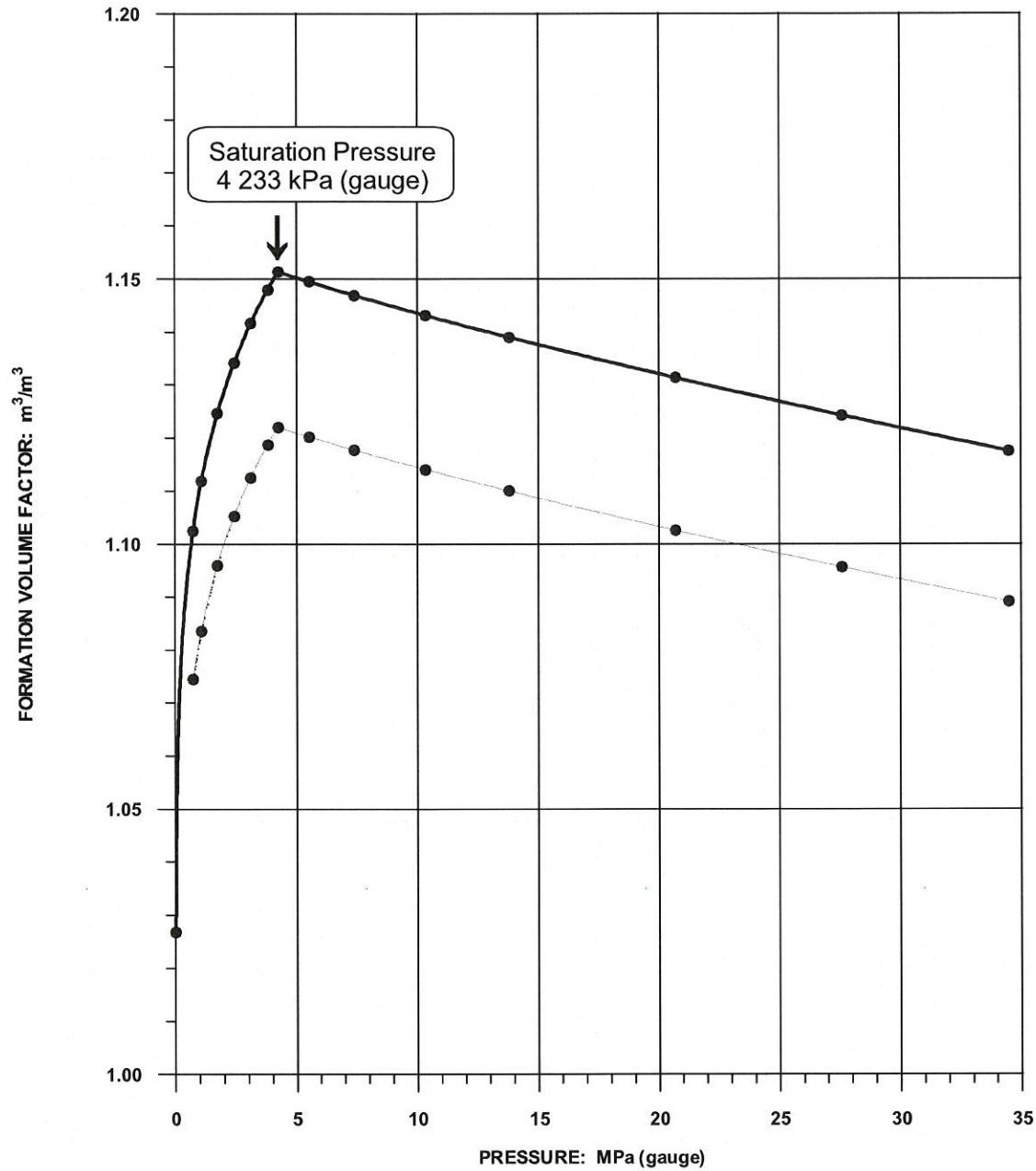


Legend

—
 - - -

Differential Vaporization
 Separator Test (1 103 kPa (gauge) at 2.0 °C)

ADJUSTED FORMATION VOLUME FACTORS



APPENDIX

Penn West Exploration
Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00
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SEPARATOR TEST OF RESERVOIR FLUID

Flash Conditions		Gas/Oil Ratio (m ³ /m ³) (A)	Gas/Oil Ratio (m ³ /STm ³) (B)	Stock Tank Oil Gravity at 15.6 °C (°API)	Formation Volume Factor Bofb (C)	Separator Volume Factor (D)	Specific Gravity of Flashed Gas (Air=1.000)	Oil Phase Density (kg/m ³)
kPa(g)	°C							
4 233	45.0							786.7
0	15.0	55.8	55.8	34.2	1.186	1.000	1.342	853.5
			Rsfb = 55.8					

(A) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of oil at indicated pressure and temperature.

(B) Cubic metres of gas at 101.325 kPa(a) and 15.0 °C per cubic metre of stock tank oil at 15.0 °C.

(C) Cubic metres of saturated oil at 4 233 kPa(g) and 45.0 °C per cubic metre of stock tank oil at 15.0 °C.

(D) Cubic metres of oil at indicated pressure and temperature per cubic metre of stock tank oil at 15.0 °C.

Penn West Exploration

Penn West Waskada Unit No.5 Hz 102/03-03-002-26W1/00

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Report prepared by

Report approved by

**Dale McIesh
PVT Data Evaluator**

**Dawson Milbury
PVT Specialist**

Test Data

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_production
103132400126W100	21/05/2010 0:00	62.72	0	209.79	15
103132400126W100	22/05/2010 0:00	195.76	0	49.44	24
103132400126W100	23/05/2010 0:00	130.72	0	129.33	24
103132400126W100	24/05/2010 0:00	52.9	0.06	129.71	24
103132400126W100	25/05/2010 0:00	76.37	0.06	136.25	24
103132400126W100	26/05/2010 0:00	186.2	0.11	111.47	24
103132400126W100	27/05/2010 0:00	167.2	0.12	59.51	24
103132400126W100	28/05/2010 0:00	178.15	0.11	54.92	24
103132400126W100	29/05/2010 0:00	170.66	0.11	54.04	24
103132400126W100	30/05/2010 0:00	170.98	0.11	58.63	24
103132400126W100	31/05/2010 0:00	117.32	0.12	63.97	24
103132400126W100	01/06/2010 0:00	117.88	0.14	63.28	24
103132400126W100	02/06/2010 0:00	122.85	0.14	66.62	24
103132400126W100	03/06/2010 0:00	131.03	0.1	68.5	24
103132400126W100	04/06/2010 0:00	133.23	0.1	66.68	24
103132400126W100	05/06/2010 0:00	131.28	0.1	67.25	24
103132400126W100	06/06/2010 0:00	136.57	0.1	68.44	24
103132400126W100	07/06/2010 0:00	131.09	0.09	66.3	24
103132400126W100	08/06/2010 0:00	147.7	0.08	68.13	24
103132400126W100	09/06/2010 0:00	131.35	0.08	67.06	24
103132400126W100	10/06/2010 0:00	136	0.08	64.73	24
103132400126W100	11/06/2010 0:00	134.43	0.08	68.06	24
103132400126W100	12/06/2010 0:00	134.49	0.08	64.29	24
103132400126W100	13/06/2010 0:00	135.56	0.08	67.87	24
103132400126W100	14/06/2010 0:00	134.62	0.08	66.55	24
103132400126W100	15/06/2010 0:00	139.15	0.08	53.28	24
103132400126W100	16/06/2010 0:00	131.79	0.06	57.94	24
103132400126W100	17/06/2010 0:00	126.44	0.07	63.91	24
103132400126W100	18/06/2010 0:00	136.19	0.07	71.4	24
103132400126W100	19/06/2010 0:00	73.28	0.07	34.85	24
103132400126W100	20/06/2010 0:00	66.99	0.07	41.2	24
103132400126W100	21/06/2010 0:00	57.87	0.1	39.69	24
103132400126W100	22/06/2010 0:00	61.58	0.05	47.56	24
103132400126W100	23/06/2010 0:00	63.16	0.05	47.49	24
103132400126W100	24/06/2010 0:00	61.14	0.05	50.14	24
103132400126W100	25/06/2010 0:00	60.89	0.05	50.26	24
103132400126W100	26/06/2010 0:00	0	0	0	0
103132400126W100	27/06/2010 0:00	62.78	0.04	50.32	24
103132400126W100	28/06/2010 0:00	63.91	0.05	48.88	24
103132400126W100	29/06/2010 0:00	63.91	0.04	50.39	24
103132400126W100	30/06/2010 0:00	64.1	0.04	51.02	24
103132400126W100	01/07/2010 0:00	61.02	0.05	51.27	24
103132400126W100	02/07/2010 0:00	63.35	0.05	49.19	24
103132400126W100	03/07/2010 0:00	58.56	0	46.93	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_production
103132400126W100	04/07/2010 0:00	84.23	0.05	49.95	24
103132400126W100	05/07/2010 0:00	59.7	0.05	49.76	24
103132400126W100	06/07/2010 0:00	60.45	0.05	48.44	24
103132400126W100	07/07/2010 0:00	67.81	0.05	49.07	24
103132400126W100	08/07/2010 0:00	72.21	0.06	52.71	24
103132400126W100	09/07/2010 0:00	71.52	0.06	56.8	24
103132400126W100	10/07/2010 0:00	78.07	0.06	74.29	24
103132400126W100	11/07/2010 0:00	71.52	0.06	52.4	24
103132400126W100	12/07/2010 0:00	62.21	0	56.17	24
103132400126W100	13/07/2010 0:00	63.35	0.06	56.11	24
103132400126W100	14/07/2010 0:00	89.58	0.05	39.38	24
103132400126W100	15/07/2010 0:00	63.09	0.05	57.05	24
103132400126W100	16/07/2010 0:00	63.41	0.04	49.13	24
103132400126W100	17/07/2010 0:00	60.77	0.05	53.03	24
103132400126W100	18/07/2010 0:00	62.4	0.05	57.18	24
103132400126W100	19/07/2010 0:00	62.91	0	50.64	24
103132400126W100	20/07/2010 0:00	56.74	0.06	52.78	24
103132400126W100	21/07/2010 0:00	57.87	0.06	58.31	24
103132400126W100	22/07/2010 0:00	59.51	0.06	48.5	24
103132400126W100	23/07/2010 0:00	59.38	0.06	51.46	24
103132400126W100	24/07/2010 0:00	66.05	0.07	56.8	24
103132400126W100	25/07/2010 0:00	64.16	0.07	52.84	24
103132400126W100	26/07/2010 0:00	71.15	0.06	41.45	24
103132400126W100	27/07/2010 0:00	59.38	0.06	70.71	24
103132400126W100	28/07/2010 0:00	55.42	0.06	71.96	24
103132400126W100	29/07/2010 0:00	56.74	0.05	50.76	24
103132400126W100	30/07/2010 0:00	59.38	0.07	42.96	24
103132400126W100	31/07/2010 0:00	56.3	0.06	44.98	24
103132400126W100	01/08/2010 0:00	58	0.07	53.41	24
103132400126W100	02/08/2010 0:00	54.73	0.06	49.19	24
103132400126W100	03/08/2010 0:00	46.24	0.07	32.02	24
103132400126W100	04/08/2010 0:00	45.92	0.06	31.39	24
103132400126W100	05/08/2010 0:00	45.61	0.06	31.77	24
103132400126W100	06/08/2010 0:00	45.79	0.06	31.7	24
103132400126W100	07/08/2010 0:00	48.94	0.06	34.98	24
103132400126W100	08/08/2010 0:00	45.79	0.06	32.65	24
103132400126W100	09/08/2010 0:00	44.73	0.06	31.26	24
103132400126W100	10/08/2010 0:00	47.05	0.06	20.88	24
103132400126W100	11/08/2010 0:00	46.05	0.05	31.01	24
103132400126W100	12/08/2010 0:00	44.73	0.06	32.52	24
103132400126W100	13/08/2010 0:00	22.52	0.06	29.06	12
103132400126W100	14/08/2010 0:00	44.98	0.05	31.39	24
103132400126W100	15/08/2010 0:00	47.74	0.07	35.29	24
103132400126W100	16/08/2010 0:00	44.98	0.05	30.13	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	17/08/2010 0:00	44.79	0.05	34.22	24
103132400126W100	18/08/2010 0:00	43.97	0.04	65.86	24
103132400126W100	19/08/2010 0:00	43.66	0.05	56.05	24
103132400126W100	20/08/2010 0:00	44.79	0.06	44.41	24
103132400126W100	21/08/2010 0:00	44.54	0.05	59.63	24
103132400126W100	22/08/2010 0:00	45.79	0.06	49.44	24
103132400126W100	23/08/2010 0:00	46.11	0.07	31.77	24
103132400126W100	24/08/2010 0:00	46.61	0.07	31.26	24
103132400126W100	25/08/2010 0:00	46.05	0.07	25.67	24
103132400126W100	26/08/2010 0:00	45.1	0.06	22.33	24
103132400126W100	27/08/2010 0:00	52.02	0.07	43.34	24
103132400126W100	28/08/2010 0:00	42.78	0.07	35.04	24
103132400126W100	29/08/2010 0:00	46.3	0.07	32.96	24
103132400126W100	30/08/2010 0:00	46.49	0.07	31.2	24
103132400126W100	31/08/2010 0:00	44.1	0.07	31.58	24
103132400126W100	01/09/2010 0:00	45.86	0.09	26.67	24
103132400126W100	02/09/2010 0:00	45.1	0.09	30.82	24
103132400126W100	03/09/2010 0:00	44.54	0.09	30.38	24
103132400126W100	04/09/2010 0:00	45.17	0.09	30.76	24
103132400126W100	05/09/2010 0:00	44.79	0.09	31.64	24
103132400126W100	06/09/2010 0:00	43.84	0.08	31.58	24
103132400126W100	07/09/2010 0:00	46.11	0.07	30.32	24
103132400126W100	08/09/2010 0:00	45.79	0.07	29.38	24
103132400126W100	09/09/2010 0:00	48	0.09	29.63	24
103132400126W100	10/09/2010 0:00	37.55	0.07	32.58	24
103132400126W100	11/09/2010 0:00	43.22	0.07	31.2	24
103132400126W100	12/09/2010 0:00	46.55	0.07	32.21	24
103132400126W100	13/09/2010 0:00	45.48	0.07	30.45	24
103132400126W100	14/09/2010 0:00	45.98	0.07	14.41	24
103132400126W100	15/09/2010 0:00	46.05	0.07	30.51	24
103132400126W100	16/09/2010 0:00	45.54	0.07	28.18	24
103132400126W100	17/09/2010 0:00	48.06	0.08	32.65	24
103132400126W100	18/09/2010 0:00	44.54	0.08	33.28	24
103132400126W100	19/09/2010 0:00	44.35	0.05	30.63	24
103132400126W100	20/09/2010 0:00	42.46	0.06	29.25	24
103132400126W100	21/09/2010 0:00	42.02	0.06	26.67	24
103132400126W100	22/09/2010 0:00	45.92	0.08	34.47	24
103132400126W100	23/09/2010 0:00	49.44	0.08	39.06	24
103132400126W100	24/09/2010 0:00	51.14	0.08	38.37	24
103132400126W100	25/09/2010 0:00	50.95	0.1	49.82	24
103132400126W100	26/09/2010 0:00	50.64	0.11	32.77	24
103132400126W100	27/09/2010 0:00	52.46	0.09	35.86	24
103132400126W100	28/09/2010 0:00	50.45	0.08	31.96	24
103132400126W100	29/09/2010 0:00	50.26	0.09	34.79	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	30/09/2010 0:00	53.97	0.08	36.3	24
103132400126W100	01/10/2010 0:00	51.65	0.09	23.84	24
103132400126W100	02/10/2010 0:00	52.46	0.11	11.7	24
103132400126W100	03/10/2010 0:00	55.61	0.07	20.82	24
103132400126W100	04/10/2010 0:00	60.45	0.08	33.4	24
103132400126W100	05/10/2010 0:00	45.42	0.09	34.16	24
103132400126W100	06/10/2010 0:00	43.66	0.08	34.53	24
103132400126W100	07/10/2010 0:00	42.59	0.08	33.15	24
103132400126W100	08/10/2010 0:00	42.46	0.08	19.25	24
103132400126W100	09/10/2010 0:00	40.95	0.09	26.73	24
103132400126W100	10/10/2010 0:00	44.29	0.1	35.04	24
103132400126W100	11/10/2010 0:00	54.35	0.09	30.7	24
103132400126W100	12/10/2010 0:00	43.78	0.08	33.84	24
103132400126W100	13/10/2010 0:00	42.21	0.09	34.53	24
103132400126W100	14/10/2010 0:00	39.88	0.08	22.21	24
103132400126W100	15/10/2010 0:00	39.82	0.08	29.38	24
103132400126W100	16/10/2010 0:00	43.97	0.08	35.35	24
103132400126W100	17/10/2010 0:00	43.72	0.09	39.19	24
103132400126W100	18/10/2010 0:00	0	0	0	0
103132400126W100	19/10/2010 0:00	0	0	0	0
103132400126W100	20/10/2010 0:00	0	0	0	0
103132400126W100	21/10/2010 0:00	0	0	0	0
103132400126W100	22/10/2010 0:00	0	0	0	0
103132400126W100	23/10/2010 0:00	0	0	0	0
103132400126W100	24/10/2010 0:00	0	0	0	0
103132400126W100	25/10/2010 0:00	0	0	0	0
103132400126W100	26/10/2010 0:00	28.12	0.06	23.72	18
103132400126W100	27/10/2010 0:00	41.58	0.08	42.4	24
103132400126W100	28/10/2010 0:00	41.33	0.08	41.33	24
103132400126W100	29/10/2010 0:00	41.58	0.07	37.05	24
103132400126W100	30/10/2010 0:00	41.71	0.08	34.72	24
103132400126W100	31/10/2010 0:00	40.26	0.08	39	24
103132400126W100	01/11/2010 0:00	0	0	0	0
103132400126W100	02/11/2010 0:00	0	0	0	0
103132400126W100	03/11/2010 0:00	0	0	0	0
103132400126W100	04/11/2010 0:00	0	0	0	0
103132400126W100	05/11/2010 0:00	0	0	0	0
103132400126W100	06/11/2010 0:00	0	0	0	0
103132400126W100	07/11/2010 0:00	0	0	0	0
103132400126W100	08/11/2010 0:00	0	0	0	0
103132400126W100	09/11/2010 0:00	0	0	0	0
103132400126W100	10/11/2010 0:00	0	0	0	0
103132400126W100	11/11/2010 0:00	0	0	0	0
103132400126W100	12/11/2010 0:00	0	0	0	0

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	13/11/2010 0:00	27.36	0.07	22.9	16
103132400126W100	14/11/2010 0:00	29.63	0.08	35.29	24
103132400126W100	15/11/2010 0:00	30.45	0.06	43.91	24
103132400126W100	16/11/2010 0:00	31.01	0.06	42.46	24
103132400126W100	17/11/2010 0:00	29.5	0.07	23.46	24
103132400126W100	18/11/2010 0:00	29.19	0.05	36.61	24
103132400126W100	19/11/2010 0:00	31.52	0.05	40.45	24
103132400126W100	20/11/2010 0:00	30.07	0.05	36.55	24
103132400126W100	21/11/2010 0:00	29.13	0.05	30.13	24
103132400126W100	22/11/2010 0:00	30.19	0.05	33.28	24
103132400126W100	23/11/2010 0:00	24.91	0.06	36.74	24
103132400126W100	24/11/2010 0:00	26.73	0.05	32.77	24
103132400126W100	25/11/2010 0:00	24.66	0.06	39.82	24
103132400126W100	26/11/2010 0:00	25.54	0.06	39	24
103132400126W100	27/11/2010 0:00	24.97	0.05	37.18	24
103132400126W100	28/11/2010 0:00	24.66	0.05	36.99	24
103132400126W100	29/11/2010 0:00	28.12	0.06	33.53	24
103132400126W100	30/11/2010 0:00	30.95	0.04	37.99	24
103132400126W100	01/12/2010 0:00	35.98	0.05	40.89	24
103132400126W100	02/12/2010 0:00	23.78	0.06	31.2	24
103132400126W100	03/12/2010 0:00	29.57	0.06	29.44	24
103132400126W100	04/12/2010 0:00	29.31	0	33.34	24
103132400126W100	05/12/2010 0:00	24.53	0.06	30.07	24
103132400126W100	06/12/2010 0:00	22.27	0.06	25.54	24
103132400126W100	07/12/2010 0:00	23.15	0.06	29.75	24
103132400126W100	08/12/2010 0:00	22.33	0.05	28.75	24
103132400126W100	09/12/2010 0:00	18.49	0.05	18.68	24
103132400126W100	10/12/2010 0:00	23.9	0.05	17.61	24
103132400126W100	11/12/2010 0:00	20.26	0.05	23.21	24
103132400126W100	12/12/2010 0:00	21.58	0.05	20.13	24
103132400126W100	13/12/2010 0:00	19	0.04	30.07	24
103132400126W100	14/12/2010 0:00	19.06	0.04	30.13	24
103132400126W100	15/12/2010 0:00	23.34	0.05	28.62	24
103132400126W100	16/12/2010 0:00	20.95	0.06	29.25	24
103132400126W100	17/12/2010 0:00	19.06	0.05	29.25	24
103132400126W100	18/12/2010 0:00	23.97	0.06	32.02	24
103132400126W100	19/12/2010 0:00	18.31	0.06	30.51	24
103132400126W100	20/12/2010 0:00	21.7	0.05	30.63	24
103132400126W100	21/12/2010 0:00	24.72	0.05	27.74	24
103132400126W100	22/12/2010 0:00	35.35	0.04	54.1	24
103132400126W100	23/12/2010 0:00	32.4	0.05	58.19	24
103132400126W100	24/12/2010 0:00	33.09	0.05	51.52	24
103132400126W100	25/12/2010 0:00	37.49	0.05	54.66	24
103132400126W100	26/12/2010 0:00	34.03	0.05	50.89	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	27/12/2010 0:00	31.01	0.05	53.15	24
103132400126W100	28/12/2010 0:00	35.54	0.05	53.09	24
103132400126W100	29/12/2010 0:00	34.72	0.05	44.66	24
103132400126W100	30/12/2010 0:00	28.31	0.06	49.76	24
103132400126W100	31/12/2010 0:00	39.69	0.06	51.9	24
103132400126W100	01/01/2011 0:00	36.48	0.05	50.26	24
103132400126W100	02/01/2011 0:00	26.67	0.05	49	24
103132400126W100	03/01/2011 0:00	31.26	0.06	56.05	24
103132400126W100	04/01/2011 0:00	33.53	0.05	43.78	24
103132400126W100	05/01/2011 0:00	36.93	0.05	29.57	24
103132400126W100	06/01/2011 0:00	28.68	0.04	41.77	24
103132400126W100	07/01/2011 0:00	34.41	0.04	43.72	24
103132400126W100	08/01/2011 0:00	33.53	0.05	35.16	24
103132400126W100	09/01/2011 0:00	31.2	0.04	39.44	24
103132400126W100	10/01/2011 0:00	36.67	0.04	35.1	24
103132400126W100	11/01/2011 0:00	40.32	0.05	36.55	24
103132400126W100	12/01/2011 0:00	35.86	0.04	49.69	24
103132400126W100	13/01/2011 0:00	33.4	0.05	37.24	24
103132400126W100	14/01/2011 0:00	30.45	0.05	44.73	24
103132400126W100	15/01/2011 0:00	50.95	0.04	73.79	24
103132400126W100	16/01/2011 0:00	83.54	0.05	66.81	24
103132400126W100	17/01/2011 0:00	74.67	0.05	83.41	24
103132400126W100	18/01/2011 0:00	63.85	0.05	72.59	24
103132400126W100	19/01/2011 0:00	63.22	0.04	77	24
103132400126W100	20/01/2011 0:00	57.68	0.04	73.16	24
103132400126W100	21/01/2011 0:00	83.92	0.04	76.62	24
103132400126W100	22/01/2011 0:00	73.79	0.04	81.08	24
103132400126W100	23/01/2011 0:00	69.13	0.05	66.74	24
103132400126W100	24/01/2011 0:00	66.18	0.05	74.48	24
103132400126W100	25/01/2011 0:00	78.44	0.05	79.83	24
103132400126W100	26/01/2011 0:00	52.4	0.05	74.42	24
103132400126W100	27/01/2011 0:00	56.11	0.03	68.44	24
103132400126W100	28/01/2011 0:00	67.81	0.04	86.68	24
103132400126W100	29/01/2011 0:00	73.85	0.04	58.12	24
103132400126W100	30/01/2011 0:00	67.94	0.04	67.94	24
103132400126W100	31/01/2011 0:00	63.28	0.04	69.45	24
103132400126W100	01/02/2011 0:00	61.27	0.04	65.55	24
103132400126W100	02/02/2011 0:00	58.69	0.04	49.82	24
103132400126W100	03/02/2011 0:00	159.97	0.04	80.96	24
103132400126W100	04/02/2011 0:00	63.6	0.04	27.05	24
103132400126W100	05/02/2011 0:00	54.54	0.04	69.2	24
103132400126W100	06/02/2011 0:00	63.66	0.04	68	24
103132400126W100	07/02/2011 0:00	59.63	0.03	75.42	24
103132400126W100	08/02/2011 0:00	56.49	0.04	100.02	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_production
103132400126W100	09/02/2011 0:00	47.05	0.04	66.11	24
103132400126W100	10/02/2011 0:00	58.94	0.04	70.96	24
103132400126W100	11/02/2011 0:00	18.24	0.05	32.33	24
103132400126W100	12/02/2011 0:00	20.63	0.05	32.4	24
103132400126W100	13/02/2011 0:00	20.26	0.05	29.25	24
103132400126W100	14/02/2011 0:00	20.07	0.05	30.19	24
103132400126W100	15/02/2011 0:00	20.95	0.05	31.83	24
103132400126W100	16/02/2011 0:00	20.95	0.05	23.59	24
103132400126W100	17/02/2011 0:00	20.38	0.05	25.16	24
103132400126W100	18/02/2011 0:00	21.89	0.04	26.55	24
103132400126W100	19/02/2011 0:00	19.5	0.05	23.21	24
103132400126W100	20/02/2011 0:00	20	0.05	26.8	24
103132400126W100	21/02/2011 0:00	20.13	0.05	26.67	24
103132400126W100	22/02/2011 0:00	19.94	0.05	34.72	24
103132400126W100	23/02/2011 0:00	19.94	0.06	32.9	24
103132400126W100	24/02/2011 0:00	19.44	0.06	24.78	24
103132400126W100	25/02/2011 0:00	19.19	0.04	29.06	24
103132400126W100	26/02/2011 0:00	19	0.06	39.44	24
103132400126W100	27/02/2011 0:00	18.87	0.06	34.09	24
103132400126W100	28/02/2011 0:00	19.19	0.05	27.68	24
103132400126W100	01/03/2011 0:00	21.45	0.05	31.45	24
103132400126W100	02/03/2011 0:00	19.19	0.06	31.45	24
103132400126W100	03/03/2011 0:00	20.19	0.05	34.72	24
103132400126W100	04/03/2011 0:00	18.87	0.06	27.36	24
103132400126W100	05/03/2011 0:00	19	0.05	32.84	24
103132400126W100	06/03/2011 0:00	20.44	0.06	33.34	24
103132400126W100	07/03/2011 0:00	18.93	0.06	29.94	24
103132400126W100	08/03/2011 0:00	18.56	0.06	26.04	24
103132400126W100	09/03/2011 0:00	18.49	0.06	29.44	24
103132400126W100	10/03/2011 0:00	17.74	0.06	31.08	24
103132400126W100	11/03/2011 0:00	18.62	0.06	35.04	24
103132400126W100	12/03/2011 0:00	18.49	0.06	25.48	24
103132400126W100	13/03/2011 0:00	19.37	0.05	32.77	24
103132400126W100	14/03/2011 0:00	18.93	0.06	29.94	24
103132400126W100	15/03/2011 0:00	23.15	55.8	15.35	24
103132400126W100	16/03/2011 0:00	20.44	76.99	30.57	24
103132400126W100	17/03/2011 0:00	16.29	71.31	36.93	24
103132400126W100	18/03/2011 0:00	21.32	72.75	30.57	24
103132400126W100	19/03/2011 0:00	20.7	83.34	31.2	24
103132400126W100	20/03/2011 0:00	22.46	88.99	34.91	24
103132400126W100	21/03/2011 0:00	18.24	79.8	31.83	24
103132400126W100	22/03/2011 0:00	17.3	91.46	27.24	24
103132400126W100	23/03/2011 0:00	21.58	85.11	30.45	24
103132400126W100	24/03/2011 0:00	20.13	83.7	24.53	24

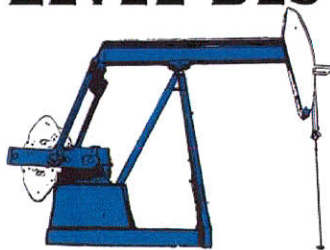
well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_production
103132400126W100	25/03/2011 0:00	19.25	61.09	22.08	24
103132400126W100	26/03/2011 0:00	18.81	71.69	30.7	24
103132400126W100	27/03/2011 0:00	17.68	56.86	28.87	24
103132400126W100	28/03/2011 0:00	15.16	78.89	29.63	24
103132400126W100	29/03/2011 0:00	19.69	65.69	34.41	24
103132400126W100	30/03/2011 0:00	22.65	68.16	27.05	24
103132400126W100	31/03/2011 0:00	19.19	16.95	33.03	24
103132400126W100	01/04/2011 0:00	22.96	80.52	29.82	24
103132400126W100	02/04/2011 0:00	17.74	82.27	29.38	24
103132400126W100	03/04/2011 0:00	20.95	88.76	36.42	24
103132400126W100	04/04/2011 0:00	22.9	79.89	26.8	24
103132400126W100	05/04/2011 0:00	19.94	92.73	33.09	24
103132400126W100	06/04/2011 0:00	0	0	0	0
103132400126W100	07/04/2011 0:00	0	0	0	0
103132400126W100	08/04/2011 0:00	0	0	0	0
103132400126W100	09/04/2011 0:00	0	0	0	0
103132400126W100	10/04/2011 0:00	0	0	0	0
103132400126W100	11/04/2011 0:00	0	0	0	0
103132400126W100	12/04/2011 0:00	0	0	0	0
103132400126W100	13/04/2011 0:00	20.38	76.28	27.93	24
103132400126W100	14/04/2011 0:00	18.43	82.64	29.06	24
103132400126W100	15/04/2011 0:00	20.57	88.99	41.2	24
103132400126W100	16/04/2011 0:00	20.57	80.52	31.58	24
103132400126W100	17/04/2011 0:00	19.69	76.28	30.82	24
103132400126W100	18/04/2011 0:00	20.63	75.93	32.21	24
103132400126W100	19/04/2011 0:00	5.66	18.01	7.11	6
103132400126W100	20/04/2011 0:00	18.68	64.98	32.02	24
103132400126W100	21/04/2011 0:00	21.51	66.04	29.13	24
103132400126W100	22/04/2011 0:00	16.92	68.16	28.24	24
103132400126W100	23/04/2011 0:00	22.65	67.8	33.65	24
103132400126W100	24/04/2011 0:00	19.69	69.92	28.62	24
103132400126W100	25/04/2011 0:00	16.23	64.63	32.46	24
103132400126W100	26/04/2011 0:00	18.93	62.86	29.38	24
103132400126W100	27/04/2011 0:00	20.88	62.51	30.19	24
103132400126W100	28/04/2011 0:00	18.49	61.45	28.56	24
103132400126W100	29/04/2011 0:00	19.75	79.46	30.45	24
103132400126W100	30/04/2011 0:00	16.48	61.8	25.79	22
103132400126W100	01/05/2011 0:00	19.94	63.21	31.08	24
103132400126W100	02/05/2011 0:00	18.75	73.1	28.81	24
103132400126W100	03/05/2011 0:00	18.75	74.87	31.7	24
103132400126W100	04/05/2011 0:00	20.63	74.87	30.32	24
103132400126W100	05/05/2011 0:00	19.94	76.28	37.55	24
103132400126W100	06/05/2011 0:00	20.38	66.74	30.32	24
103132400126W100	07/05/2011 0:00	19.56	76.63	31.01	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	08/05/2011 0:00	20.13	73.1	31.58	24
103132400126W100	09/05/2011 0:00	20.32	71.34	32.08	24
103132400126W100	10/05/2011 0:00	19.19	64.98	34.03	24
103132400126W100	11/05/2011 0:00	20	68.16	30.76	24
103132400126W100	12/05/2011 0:00	20.19	64.98	32.27	24
103132400126W100	13/05/2011 0:00	20.07	65.69	30.7	24
103132400126W100	14/05/2011 0:00	19.69	61.8	32.84	24
103132400126W100	15/05/2011 0:00	19.12	62.51	30.7	24
103132400126W100	16/05/2011 0:00	19.31	65.69	31.08	24
103132400126W100	17/05/2011 0:00	18.87	65.33	33.34	24
103132400126W100	18/05/2011 0:00	19.88	64.27	32.21	24
103132400126W100	19/05/2011 0:00	19	70.28	30.32	24
103132400126W100	20/05/2011 0:00	19.19	69.57	32.4	24
103132400126W100	21/05/2011 0:00	19.69	67.45	31.58	24
103132400126W100	22/05/2011 0:00	19.63	68.51	33.03	24
103132400126W100	23/05/2011 0:00	19.63	70.98	36.61	24
103132400126W100	24/05/2011 0:00	19.19	69.57	32.65	24
103132400126W100	25/05/2011 0:00	19.19	70.28	33.97	24
103132400126W100	26/05/2011 0:00	18.75	68.51	33.84	24
103132400126W100	27/05/2011 0:00	18.68	67.8	33.53	24
103132400126W100	28/05/2011 0:00	17.8	65.69	34.16	24
103132400126W100	29/05/2011 0:00	17.68	69.57	32.9	24
103132400126W100	30/05/2011 0:00	19.82	69.57	35.23	24
103132400126W100	31/05/2011 0:00	19.25	69.92	30.45	24
103132400126W100	01/06/2011 0:00	19	69.22	34.53	24
103132400126W100	02/06/2011 0:00	19.25	69.22	31.2	24
103132400126W100	03/06/2011 0:00	19	76.63	32.84	24
103132400126W100	04/06/2011 0:00	19.06	72.75	36.99	24
103132400126W100	05/06/2011 0:00	17.68	74.16	31.39	24
103132400126W100	06/06/2011 0:00	18.37	74.16	29.63	24
103132400126W100	07/06/2011 0:00	17.87	71.34	32.52	24
103132400126W100	08/06/2011 0:00	20.07	73.45	32.14	24
103132400126W100	09/06/2011 0:00	18.37	71.69	31.39	24
103132400126W100	10/06/2011 0:00	18.12	75.57	34.66	24
103132400126W100	11/06/2011 0:00	19	76.63	35.04	24
103132400126W100	12/06/2011 0:00	19.44	69.57	35.04	24
103132400126W100	13/06/2011 0:00	20	70.63	38.88	24
103132400126W100	14/06/2011 0:00	19.94	67.8	31.83	24
103132400126W100	15/06/2011 0:00	19.25	63.92	33.65	24
103132400126W100	16/06/2011 0:00	19.06	63.21	28.18	24
103132400126W100	17/06/2011 0:00	17.61	64.98	30.89	24
103132400126W100	18/06/2011 0:00	17.74	67.8	33.97	24
103132400126W100	19/06/2011 0:00	14.34	71.69	38.25	24
103132400126W100	20/06/2011 0:00	19.82	73.1	31.45	24

well_location	production_date	Oil (bbl/d)	Gas (mmscf/d)	Water (bbl/d)	hours_on_p roduction
103132400126W100	21/06/2011 0:00	18.93	68.16	30.82	24
103132400126W100	22/06/2011 0:00	19.37	79.81	35.16	24
103132400126W100	23/06/2011 0:00	19.31	74.51	32.27	24
103132400126W100	24/06/2011 0:00	19.56	73.1	33.09	24
103132400126W100	25/06/2011 0:00	20.07	74.87	32.02	24
103132400126W100	26/06/2011 0:00	19.63	75.22	33.65	24
103132400126W100	27/06/2011 0:00	20.57	75.93	34.22	24
103132400126W100	28/06/2011 0:00	19.12	72.4	33.72	24
103132400126W100	29/06/2011 0:00	18.93	72.4	29.25	24
103132400126W100	30/06/2011 0:00	19.56	71.69	33.4	24
103132400126W100	01/07/2011 0:00	20.38	72.4	33.53	24
103132400126W100	02/07/2011 0:00	20.13	73.45	36.17	24
103132400126W100	03/07/2011 0:00	18.87	69.57	34.09	24
103132400126W100	04/07/2011 0:00	19.12	67.1	34.28	24
103132400126W100	05/07/2011 0:00	18.87	73.45	37.05	24
103132400126W100	06/07/2011 0:00	18.87	72.04	34.41	24
103132400126W100	07/07/2011 0:00	19.5	73.1	33.97	24
103132400126W100	08/07/2011 0:00	19.31	67.1	32.46	24
103132400126W100	09/07/2011 0:00	18.87	68.51	34.6	24
103132400126W100	10/07/2011 0:00	17.68	62.86	28.31	21
103132400126W100	11/07/2011 0:00	18.12	65.33	35.79	24
103132400126W100	12/07/2011 0:00	17.61	66.39	33.91	24
103132400126W100	13/07/2011 0:00	0	0	0	0
103132400126W100	14/07/2011 0:00	0	0	0	0
103132400126W100	15/07/2011 0:00	0	0	0	0
103132400126W100	16/07/2011 0:00	0	0	0	0
103132400126W100	17/07/2011 0:00	0	0	0	0
103132400126W100	18/07/2011 0:00	0	0	0	0
103132400126W100	19/07/2011 0:00	0	0	0	0
103132400126W100	20/07/2011 0:00	0	0	0	0
103132400126W100	21/07/2011 0:00	0	0	0	0
103132400126W100	22/07/2011 0:00	0	0	0	0
103132400126W100	23/07/2011 0:00	0	0	0	0
103132400126W100	24/07/2011 0:00	0	0	0	0
103132400126W100	25/07/2011 0:00	0	0	0	0
103132400126W100	26/07/2011 0:00	17.36	64.98	30.01	24
103132400126W100	27/07/2011 0:00	19.19	72.04	31.01	24
103132400126W100	28/07/2011 0:00	20.51	71.34	32.21	24
103132400126W100	29/07/2011 0:00	18.49	74.16	28.5	24
103132400126W100	30/07/2011 0:00	20	69.22	32.4	24
103132400126W100	31/07/2011 0:00	19.75	69.92	31.01	24
103132400126W100	01/08/2011 0:00	19.06	61.09	31.83	24
103132400126W100	02/08/2011 0:00	17.55	0	32.02	24

ACOUSTIC PRESSURE SURVEY
BUILD-UP TEST

LEVEL BEST



TECHNOLOGIES LTD.

WASKADA LAM UNIT NO. 1 HZNTL A13-24-1-26

103/13-24-001-26W1/0

Surface Location: 103/15-24-001-26W1/0 (HZTL)

License: 007180

Field: WASKADA MB

Formation: AMRANTH

Pool: LOWER AMARANTH A

JULY 2011

DATA COLLECTION SERVICES

Prepared by: Sean Chakowski, C.E.T. (NR-Tec Ltd.)

Date: 2011-Jul-20

Prepared for: BRAD CALDWELL
PENN WEST PETROLEUM

NR-Tec Ltd.

P.O. Box 36028 Lakeview RPO, Calgary, Alberta, Canada T3E 7C6

Tel: (403) 283-1416 Fax: (403) 206-7783

<http://www.nr-tec.com>

PENN WEST PETROLEUM

**ACOUSTIC PRESSURE SURVEY (BUILD-UP)
WASKADA LAM UNIT NO. 1 HZNTL A13-24-1-26
103/13-24-001-26W1/0
WASKADA MB
POOL: LOWER AMARANTH A
2011-JUL-11 TO 2011-JUL-21**

TEST SUMMARY:

- An acoustic well sounder instrument was installed into the casing on 2011-07-11 at 13:45 hours. The fluid level was at 30.1 joints. An annular fluid depression test was conducted.
- The well was shut-in on 2011-07-11 at 18:57 hours to start the build-up.
- The build-up test was concluded on 2011-07-21 at 08:27 hours.
- A final bottomhole pressure of 2,815 kPa (absolute) was calculated at the mid-point of the producing interval after 9.6 days of shut-in.
- The rate of change in pressure during the last 8.0 hours of shut-in is 0.19 kPa/hr.

PRESSURE DATA CALCULATIONS:

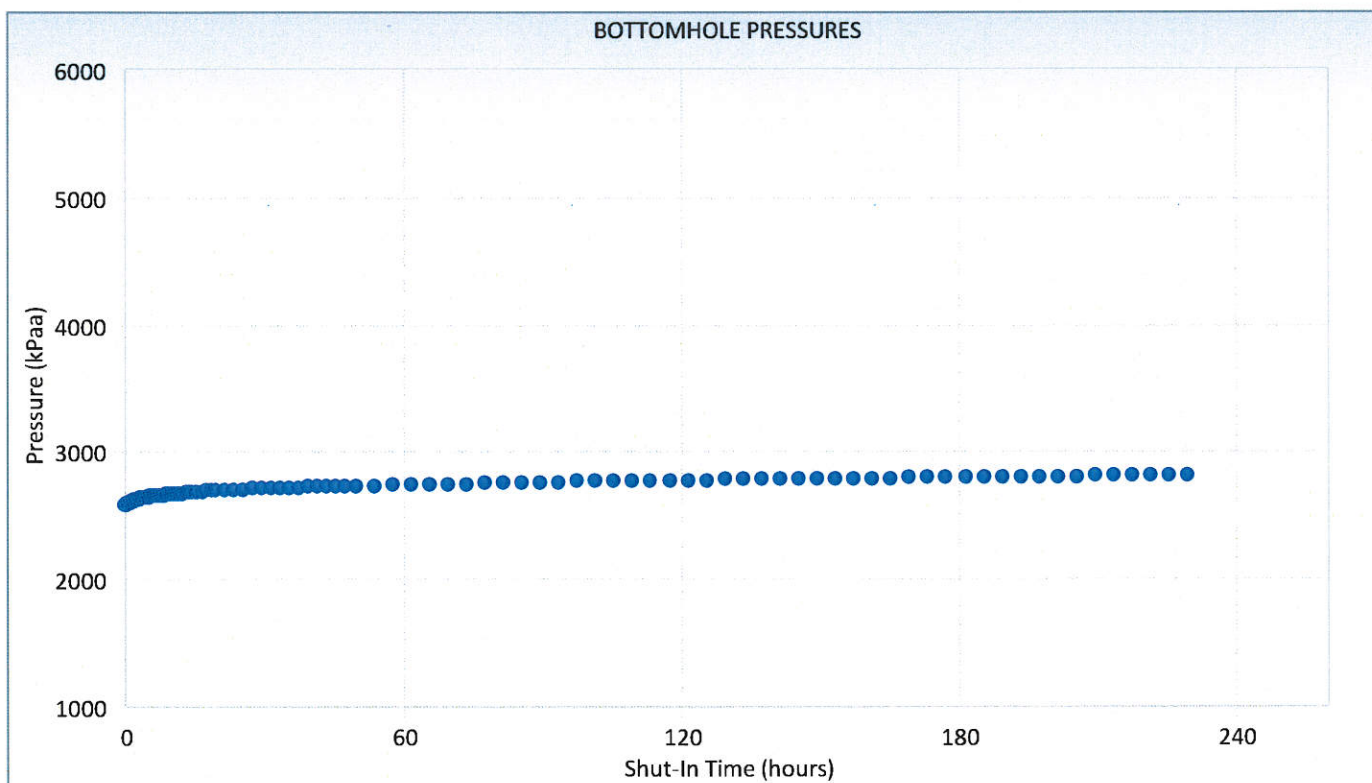
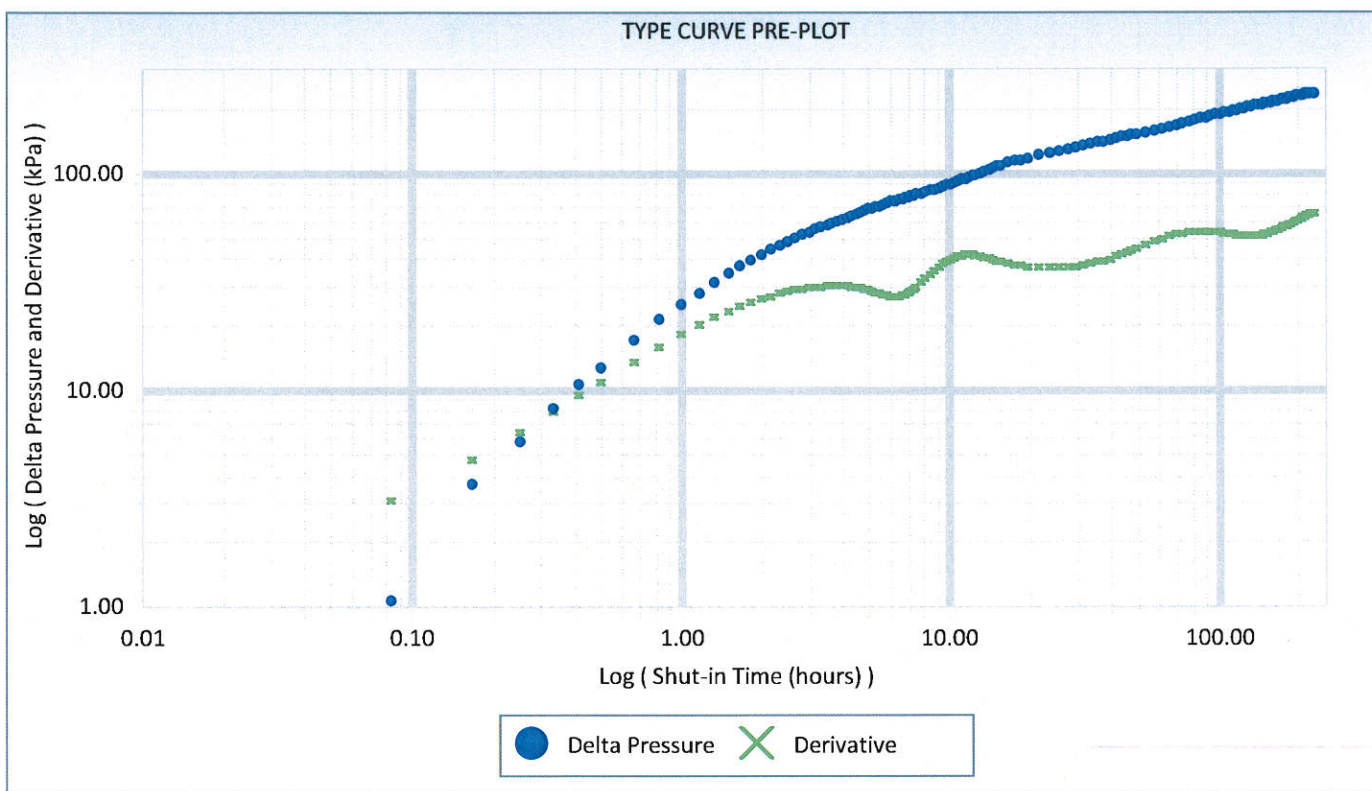
- The bottomhole pressures were calculated using the following information:

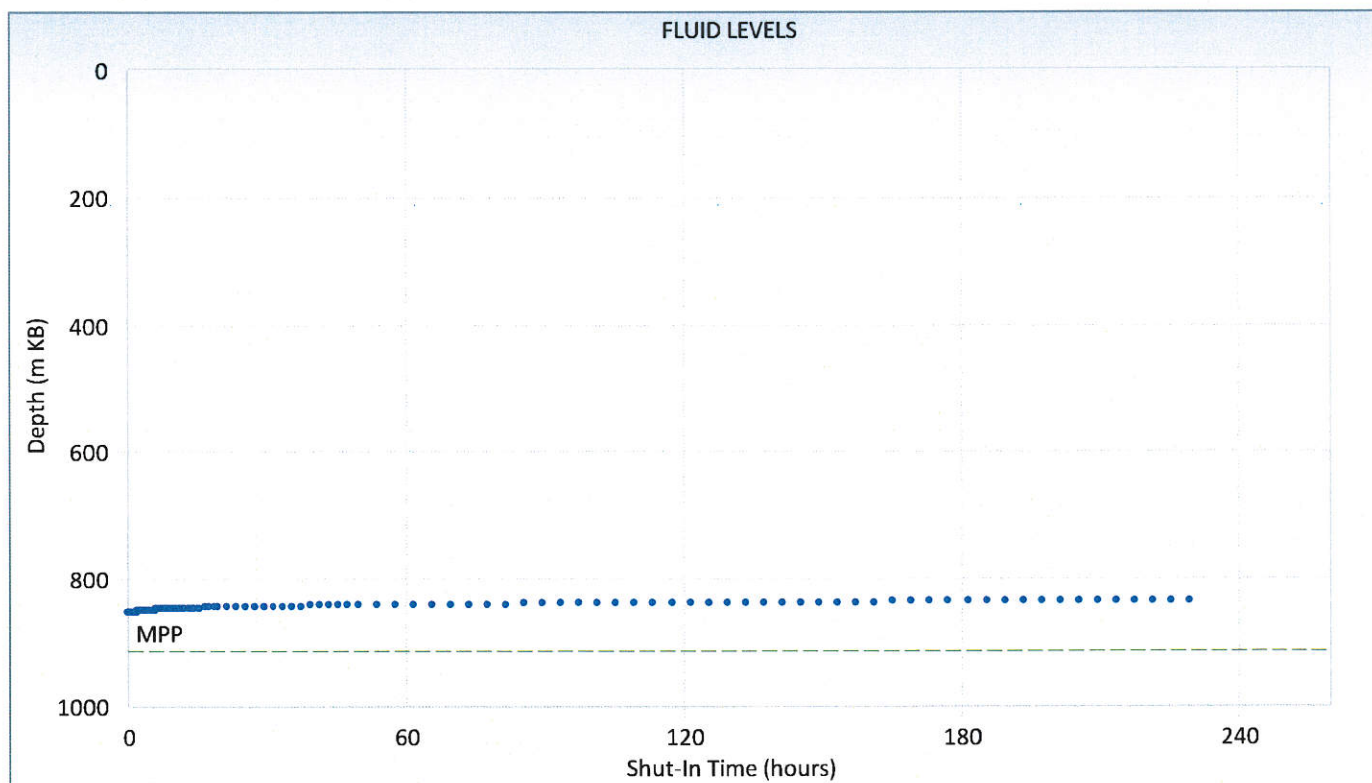
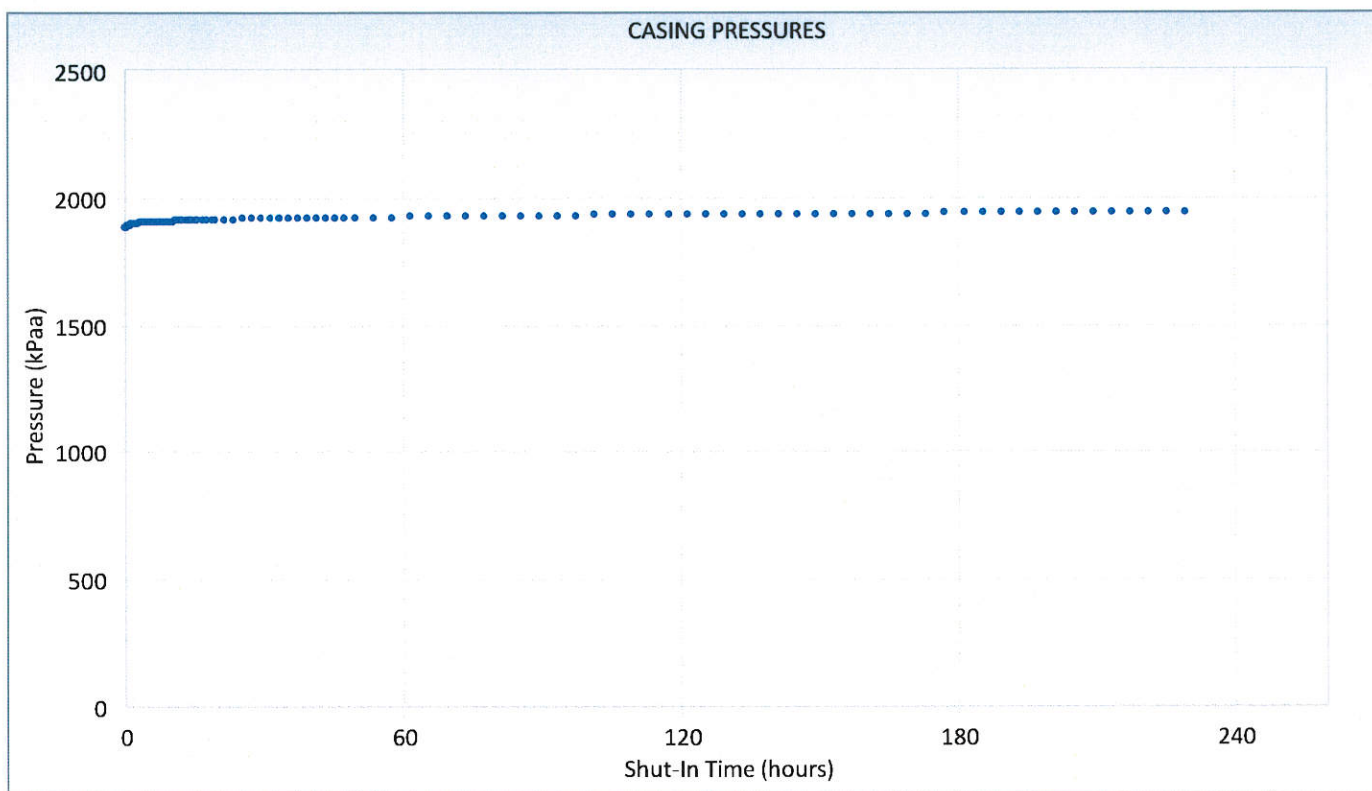
Atmospheric Pressure	93.0 kPa
Formation Depth	911.45 m KB (TVD) / 1,440.15 m KB
Oil Gravity	37.79 °API
Water Gravity	1.067
Gas Gravity	0.750
Oil Production	3.16 m ³ /d
Water Production	4.93 m ³ /d
Gas Production	1.62 E ³ m ³ /d
Bottomhole Temperature	50.00 °C

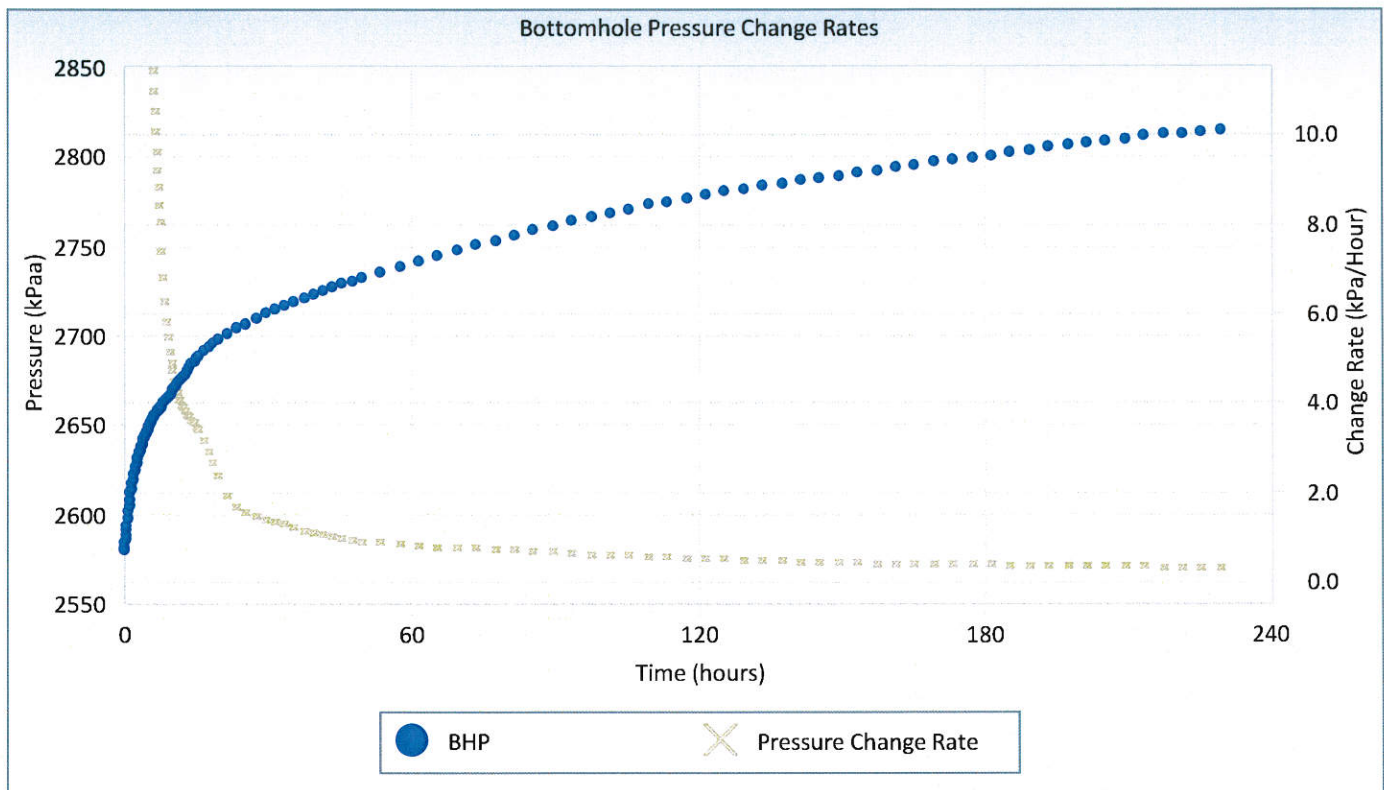
ATTACHMENTS:

ACOUSTIC WELLSOUNDER PRESSURE SURVEY DATA
TYPE CURVE PRE-PLOT
BOTTOMHOLE PRESSURE VERSUS TIME
CASING PRESSURE VERSUS TIME
FLUID LEVEL VERSUS TIME









ACOUSTIC WELLSOUNDER PRESSURE SURVEY

COMPANY: PENN WEST PETROLEUM	POOL: LOWER AMARANTH A	U.W.I.: 103/13-24-001-26W1/0
FIELD: WASKADA MB	WELL STATUS: OIL	WELL NAME: WASKADA LAM UNIT NO. 1 HZNTL A13-24-1-26
SHUT-IN: 2011-Jul-11 @ 18:57:17	LICENSE: 007180	SURFACE LCN.: 103/15-24-001-26W1/0 (HZTL)

ELEVATIONS:

Kelly Bushing (KB): 472.20 m
Ground Level (GL): 467.50 m
KB to GL: 4.70 m

FLUID PROPERTIES:

Gas Gravity: 0.750
Oil Gravity: 37.790 °API
Water Gravity: 1.067

TEMPERATURES:

Surface: 2.50 °C
Reservoir: 50.00 °C

PRODUCTION RATES:

Gas: 1.62 E³m³/d
Oil: 3.16 m³/d
Water: 4.93 m³/d

PRODUCING INTERVAL:

Top: 909.56 m KB (TVD)
1,177.00 m KB (MD)
Bottom: 912.05 m KB (TVD)
1,703.30 m KB (MD)
Mid-Point: 911.45 m KB (TVD)
1,440.15 m KB (MD)

NOTES:

All calculated depths have been corrected to True Vertical Depth.

NO.	TEST			JOINTS TO	SURFACE PRESSURE (kPaa)	GAS COLUMN			OIL COLUMN			EMULSION COLUMN			PRESSURE @ MPP
	TIME (hours)	DATE	TIME			HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	
1	(5.195)	2011-Jul-11	13:45:34	30.10	669.6	289.3	0.063	18.2	558.0	7.877	4395.4	59.5	9.219	548.1	5631.4
2	(5.139)	2011-Jul-11	13:48:58	31.49	706.5	302.6	0.067	20.2	544.7	7.875	4289.5	59.5	9.222	548.3	5564.4
3	(4.889)	2011-Jul-11	14:03:58	36.55	833.4	351.2	0.079	27.7	496.0	7.871	3904.3	59.5	9.231	548.8	5314.2
4	(4.639)	2011-Jul-11	14:18:58	43.04	957.8	413.6	0.091	37.5	433.7	7.868	3412.1	59.5	9.243	549.5	4956.8
5	(4.389)	2011-Jul-11	14:33:58	54.49	1069.1	523.6	0.101	52.9	323.7	7.869	2546.8	59.5	9.269	551.0	4219.9
6	(4.139)	2011-Jul-11	14:48:58	80.05	1155.0	759.9	0.108	82.2	87.4	7.878	688.7	59.5	9.325	554.4	2480.3
7	(3.889)	2011-Jul-11	15:03:58	80.67	1216.0	764.7	0.114	87.3	82.6	7.874	650.2	59.5	9.325	554.4	2507.8
8	(3.639)	2011-Jul-11	15:18:58	81.88	1284.2	773.9	0.121	93.5	73.4	7.870	577.6	59.5	9.325	554.4	2509.7
9	(3.389)	2011-Jul-11	15:33:58	83.16	1352.1	783.3	0.127	99.9	64.0	7.866	503.2	59.5	9.325	554.4	2509.5
10	(3.139)	2011-Jul-11	15:48:58	84.52	1417.2	793.0	0.134	106.2	54.3	7.862	426.7	59.5	9.325	554.4	2504.5
11	(2.889)	2011-Jul-11	16:03:58	85.62	1479.8	800.5	0.140	112.1	46.8	7.859	368.0	59.5	9.324	554.4	2514.3
12	(2.639)	2011-Jul-11	16:18:58	86.68	1539.0	807.3	0.146	117.8	40.0	7.855	314.3	59.5	9.324	554.3	2525.4
13	(2.389)	2011-Jul-11	16:33:58	88.01	1597.1	815.5	0.152	123.8	31.8	7.852	249.6	59.5	9.324	554.3	2524.8
14	(2.139)	2011-Jul-11	16:48:58	89.11	1652.9	822.2	0.157	129.4	25.1	7.848	197.2	59.5	9.324	554.3	2533.8
15	(1.889)	2011-Jul-11	17:03:58	90.35	1706.3	829.2	0.163	134.9	18.1	7.845	142.0	59.5	9.324	554.3	2537.6
16	(1.639)	2011-Jul-11	17:18:58	91.56	1758.0	835.6	0.168	140.3	11.7	7.842	92.0	59.5	9.323	554.3	2544.6
17	(1.389)	2011-Jul-11	17:33:58	92.66	1806.7	841.0	0.173	145.4	6.3	7.839	49.3	59.5	9.323	554.3	2555.6
18	(1.139)	2011-Jul-11	17:48:58	93.95	1843.5	846.8	0.177	149.5	0.4	7.837	3.5	59.5	9.323	554.3	2550.8
19	(0.889)	2011-Jul-11	18:03:58	93.65	1849.9	845.5	0.177	149.9	1.8	7.836	13.7	59.5	9.323	554.3	2567.8
20	(0.639)	2011-Jul-11	18:18:58	93.62	1856.1	845.4	0.178	150.4	1.9	7.836	14.8	59.5	9.322	554.2	2575.5
21	(0.389)	2011-Jul-11	18:33:58	93.76	1861.8	846.0	0.178	151.0	1.3	7.836	10.0	59.5	9.322	554.2	2577.0
22	(0.139)	2011-Jul-11	18:48:58	93.80	1866.2	846.2	0.179	151.4	1.1	7.835	8.6	59.5	9.322	554.2	2580.4
23	0.000	2011-Jul-11	18:57:17	94.23	1880.2	848.0	0.180	152.9	—	—	—	58.7	9.322	547.3	2580.4
24	0.083	2011-Jul-11	19:02:17	94.20	1881.6	847.9	0.180	153.0	1.1	7.834	8.3	57.8	9.322	538.6	2581.4
25	0.167	2011-Jul-11	19:07:17	94.17	1882.9	847.8	0.181	153.1	1.1	7.834	8.3	57.9	9.322	539.7	2584.0
26	0.250	2011-Jul-11	19:12:17	94.15	1884.2	847.7	0.181	153.2	1.1	7.834	8.3	58.0	9.322	540.5	2586.2
27	0.333	2011-Jul-11	19:17:17	94.12	1885.3	847.6	0.181	153.3	1.1	7.833	8.3	58.1	9.322	541.7	2588.6
28	0.417	2011-Jul-11	19:22:17	94.09	1886.5	847.4	0.181	153.4	1.1	7.833	8.4	58.2	9.322	542.8	2591.0



NO.	TEST	DATE	TIME	JOINTS TO LIQUID	SURFACE PRESSURE (kPaa)	GAS COLUMN			OIL COLUMN			EMULSION COLUMN			PRESSURE @ MPP
	TIME (hours)					HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	
29	0.500	2011-Jul-11	19:27:17	94.07	1887.6	847.4	0.181	153.4	1.1	7.833	8.4	58.3	9.322	543.6	2583.0
30	0.667	2011-Jul-11	19:37:17	94.01	1889.5	847.1	0.181	153.6	1.1	7.833	8.4	58.6	9.322	545.9	2597.4
31	0.833	2011-Jul-11	19:47:17	93.96	1891.3	846.9	0.181	153.7	1.1	7.833	8.5	58.8	9.321	547.9	2601.3
32	1.000	2011-Jul-11	19:57:17	93.91	1892.8	846.7	0.182	153.8	1.1	7.833	8.5	59.0	9.321	549.8	2604.9
33	1.167	2011-Jul-11	20:07:17	93.86	1894.2	846.5	0.182	153.9	1.1	7.833	8.5	59.2	9.321	551.8	2608.4
34	1.333	2011-Jul-11	20:17:17	93.81	1895.3	846.2	0.182	153.9	1.1	7.833	8.6	59.4	9.321	553.8	2611.6
35	1.500	2011-Jul-11	20:27:17	93.76	1896.3	846.0	0.182	154.0	1.1	7.833	8.6	59.6	9.321	555.8	2614.7
36	1.667	2011-Jul-11	20:37:17	93.71	1897.1	845.8	0.182	154.0	1.1	7.833	8.7	59.8	9.321	557.8	2617.5
37	1.833	2011-Jul-11	20:47:17	93.67	1897.7	845.6	0.182	154.0	1.1	7.833	8.7	60.0	9.321	559.4	2619.8
38	2.000	2011-Jul-11	20:57:17	93.62	1898.3	845.4	0.182	154.0	1.1	7.833	8.7	60.2	9.321	561.4	2622.4
39	2.167	2011-Jul-11	21:07:17	93.58	1898.8	845.2	0.182	154.1	1.1	7.833	8.7	60.4	9.321	563.0	2624.6
40	2.333	2011-Jul-11	21:17:17	93.54	1899.2	845.1	0.182	154.1	1.1	7.833	8.8	60.6	9.321	564.6	2626.7
41	2.500	2011-Jul-11	21:27:17	93.50	1899.6	844.9	0.182	154.1	1.1	7.833	8.8	60.7	9.321	566.2	2628.7
42	2.667	2011-Jul-11	21:37:17	93.47	1899.9	844.7	0.182	154.1	1.1	7.834	8.8	60.9	9.321	567.5	2630.3
43	2.833	2011-Jul-11	21:47:17	93.43	1900.2	844.6	0.182	154.1	1.1	7.834	8.9	61.1	9.321	569.1	2632.2
44	3.000	2011-Jul-11	21:57:17	93.40	1900.5	844.4	0.182	154.1	1.1	7.834	8.9	61.2	9.321	570.3	2633.8
45	3.167	2011-Jul-11	22:07:17	93.37	1900.7	844.3	0.182	154.1	1.1	7.834	8.9	61.3	9.321	571.6	2635.3
46	3.333	2011-Jul-11	22:17:17	93.35	1901.0	844.2	0.183	154.1	1.1	7.834	8.9	61.4	9.321	572.4	2636.4
47	3.500	2011-Jul-11	22:27:17	93.32	1901.2	844.1	0.183	154.1	1.1	7.834	8.9	61.5	9.321	573.6	2637.8
48	3.667	2011-Jul-11	22:37:17	93.29	1901.4	843.9	0.183	154.1	1.1	7.834	8.9	61.7	9.321	574.9	2639.3
49	3.833	2011-Jul-11	22:47:17	93.27	1901.7	843.8	0.183	154.1	1.1	7.834	9.0	61.8	9.321	575.7	2640.4
50	4.000	2011-Jul-11	22:57:17	93.24	1901.9	843.7	0.183	154.1	1.1	7.834	9.0	61.9	9.321	577.0	2641.9
51	4.167	2011-Jul-11	23:07:17	93.22	1902.1	843.6	0.183	154.1	1.1	7.834	9.0	62.0	9.321	577.8	2642.9
52	4.333	2011-Jul-11	23:17:17	93.20	1902.3	843.5	0.183	154.1	1.2	7.834	9.0	62.1	9.321	578.6	2643.9
53	4.500	2011-Jul-11	23:27:17	93.18	1902.4	843.4	0.183	154.1	1.2	7.834	9.0	62.2	9.321	579.5	2645.0
54	4.667	2011-Jul-11	23:37:17	93.15	1902.6	843.3	0.183	154.0	1.2	7.834	9.0	62.3	9.321	580.7	2646.4
55	4.833	2011-Jul-11	23:47:17	93.13	1902.8	843.2	0.183	154.0	1.2	7.834	9.1	62.4	9.321	581.6	2647.4
56	5.000	2011-Jul-11	23:57:17	93.11	1902.9	843.1	0.183	154.0	1.2	7.834	9.1	62.5	9.321	582.4	2648.4
57	5.167	2011-Jul-12	00:07:17	93.09	1903.1	843.0	0.183	154.0	1.2	7.834	9.1	62.6	9.321	583.2	2649.4
58	5.333	2011-Jul-12	00:17:17	93.07	1903.2	842.9	0.183	154.0	1.2	7.834	9.1	62.7	9.321	584.1	2650.4
59	5.500	2011-Jul-12	00:27:17	93.06	1903.4	842.9	0.183	154.0	1.2	7.834	9.1	62.7	9.321	584.5	2651.0
60	5.667	2011-Jul-12	00:37:17	93.04	1903.5	842.8	0.183	154.0	1.2	7.834	9.1	62.8	9.321	585.3	2652.0
61	5.833	2011-Jul-12	00:47:17	93.02	1903.7	842.7	0.183	154.0	1.2	7.834	9.1	62.9	9.321	586.2	2653.0
62	6.000	2011-Jul-12	00:57:17	93.00	1903.8	842.6	0.183	154.0	1.2	7.834	9.1	63.0	9.321	587.0	2654.0
63	6.167	2011-Jul-12	01:07:17	92.99	1903.9	842.6	0.183	154.0	1.2	7.834	9.2	63.0	9.321	587.5	2654.6
64	6.333	2011-Jul-12	01:17:17	92.98	1904.1	842.5	0.183	154.0	1.2	7.834	9.2	63.1	9.321	587.9	2655.2
65	6.500	2011-Jul-12	01:27:17	92.96	1904.2	842.4	0.183	154.0	1.2	7.834	9.2	63.2	9.321	588.7	2656.2
66	6.667	2011-Jul-12	01:37:17	92.95	1904.4	842.4	0.183	154.0	1.2	7.834	9.2	63.2	9.321	589.2	2656.7
67	6.833	2011-Jul-12	01:47:17	92.94	1904.5	842.3	0.183	154.0	1.2	7.834	9.2	63.3	9.321	589.6	2657.3
68	7.000	2011-Jul-12	01:57:17	92.92	1904.6	842.2	0.183	154.0	1.2	7.834	9.2	63.3	9.321	590.4	2658.3
69	7.167	2011-Jul-12	02:07:17	92.91	1904.8	842.2	0.183	154.0	1.2	7.834	9.2	63.4	9.321	590.9	2658.9
70	7.333	2011-Jul-12	02:17:17	92.90	1904.9	842.1	0.183	154.1	1.2	7.834	9.2	63.4	9.321	591.3	2659.5
71	7.500	2011-Jul-12	02:27:17	92.89	1905.1	842.1	0.183	154.1	1.2	7.834	9.2	63.5	9.321	591.7	2660.0
72	7.667	2011-Jul-12	02:37:17	92.87	1905.3	842.0	0.183	154.1	1.2	7.834	9.2	63.6	9.321	592.6	2661.2
73	7.833	2011-Jul-12	02:47:17	92.85	1905.6	841.9	0.183	154.1	1.2	7.834	9.2	63.7	9.321	593.4	2662.3
74	8.000	2011-Jul-12	02:57:17	92.83	1905.9	841.8	0.183	154.1	1.2	7.834	9.2	63.8	9.321	594.3	2663.5
75	8.167	2011-Jul-12	03:07:17	92.81	1906.2	841.7	0.183	154.1	1.2	7.834	9.3	63.8	9.321	595.1	2664.7
76	8.333	2011-Jul-12	03:17:17	92.79	1906.4	841.6	0.183	154.1	1.2	7.834	9.3	63.9	9.321	596.0	2665.8
77	8.500	2011-Jul-12	03:27:17	92.76	1906.7	841.5	0.183	154.1	1.2	7.834	9.3	64.1	9.321	597.3	2667.4
78	8.667	2011-Jul-12	03:37:17	92.74	1907.0	841.4	0.183	154.1	1.2	7.834	9.3	64.2	9.321	598.2	2668.6
79	8.833	2011-Jul-12	03:47:17	92.72	1907.3	841.3	0.183	154.1	1.2	7.834	9.3	64.3	9.321	599.0	2669.7
80	9.000	2011-Jul-12	03:57:17	92.70	1907.6	841.2	0.183	154.1	1.2	7.834	9.3	64.4	9.321	599.9	2670.9
81	9.167	2011-Jul-12	04:07:17	92.68	1907.9	841.1	0.183	154.1	1.2	7.834	9.4	64.5	9.321	600.8	2672.1
82	9.333	2011-Jul-12	04:17:17	92.65	1908.2	841.0	0.183	154.1	1.2	7.834	9.4	64.6	9.321	602.1	2673.8
83	9.500	2011-Jul-12	04:27:17	92.63	1908.5	840.9	0.183	154.1	1.2	7.834	9.4	64.7	9.321	602.9	2675.0
84	9.667	2011-Jul-12	04:37:17	92.61	1908.8	840.8	0.183	154.2	1.2	7.834	9.4	64.8	9.321	603.8	2676.2
85	9.833	2011-Jul-12	04:47:17	92.59	1909.2	840.7	0.183	154.2	1.2	7.834	9.4	64.9	9.321	604.7	2677.4



NO.	TEST TIME (hours)	DATE	TIME	JOINTS TO LIQUID	SURFACE PRESSURE (kPaa)	GAS COLUMN			OIL COLUMN			EMULSION COLUMN			PRESSURE @ MPP
						HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	
86	12.500	2011-Jul-12	07:27:17	92.57	1909.5	840.6	0.183	154.2	1.2	7.834	9.4	65.0	9.321	605.5	2678.6
87	13.000	2011-Jul-12	07:57:17	92.54	1910.0	840.4	0.183	154.2	1.2	7.834	9.5	65.1	9.321	606.8	2680.5
88	13.500	2011-Jul-12	08:27:17	92.51	1910.5	840.3	0.184	154.2	1.2	7.834	9.5	65.2	9.321	608.2	2682.3
89	14.000	2011-Jul-12	08:57:17	92.48	1910.9	840.1	0.184	154.2	1.2	7.834	9.5	65.4	9.321	609.5	2684.1
90	14.500	2011-Jul-12	09:27:17	92.46	1911.4	840.0	0.184	154.2	1.2	7.834	9.5	65.5	9.321	610.4	2685.5
91	15.000	2011-Jul-12	09:57:17	92.43	1911.8	839.9	0.184	154.3	1.2	7.834	9.5	65.6	9.321	611.7	2687.3
92	15.500	2011-Jul-12	10:27:17	92.41	1912.3	839.8	0.184	154.3	1.2	7.834	9.6	65.7	9.321	612.6	2688.7
93	16.500	2011-Jul-12	11:27:17	92.36	1913.0	839.6	0.184	154.3	1.2	7.835	9.6	66.0	9.321	614.8	2691.7
94	17.500	2011-Jul-12	12:27:17	92.32	1913.5	839.4	0.184	154.3	1.2	7.835	9.6	66.2	9.321	616.6	2694.0
95	18.500	2011-Jul-12	13:27:17	92.29	1913.9	839.2	0.184	154.3	1.2	7.835	9.7	66.3	9.321	617.9	2695.8
96	19.500	2011-Jul-12	14:27:17	92.25	1914.2	839.0	0.184	154.3	1.2	7.835	9.7	66.5	9.321	619.7	2697.9
97	21.500	2011-Jul-12	16:27:17	92.19	1914.5	838.7	0.184	154.3	1.2	7.835	9.7	66.8	9.321	622.4	2701.0
98	23.500	2011-Jul-12	18:27:17	92.14	1914.9	838.5	0.184	154.3	1.2	7.835	9.8	67.0	9.321	624.7	2703.6
99	25.500	2011-Jul-12	20:27:17	92.09	1915.3	838.2	0.184	154.3	1.3	7.835	9.8	67.3	9.321	626.9	2706.3
100	27.500	2011-Jul-12	22:27:17	92.04	1915.8	838.0	0.184	154.3	1.3	7.835	9.8	67.5	9.321	629.2	2709.1
101	29.500	2011-Jul-13	00:27:17	91.99	1916.3	837.7	0.184	154.3	1.3	7.835	9.9	67.8	9.321	631.5	2711.9
102	31.500	2011-Jul-13	02:27:17	91.95	1916.8	837.5	0.184	154.3	1.3	7.835	9.9	67.9	9.321	633.3	2714.3
103	33.500	2011-Jul-13	04:27:17	91.91	1917.2	837.3	0.184	154.3	1.3	7.835	9.9	68.1	9.321	635.2	2716.6
104	35.500	2011-Jul-13	06:27:17	91.87	1917.7	837.1	0.184	154.3	1.3	7.835	10.0	68.3	9.321	637.0	2719.0
105	37.500	2011-Jul-13	08:27:17	91.84	1918.2	837.0	0.184	154.3	1.3	7.835	10.0	68.5	9.321	638.4	2720.8
106	39.500	2011-Jul-13	10:27:17	91.81	1918.6	836.8	0.184	154.3	1.3	7.835	10.0	68.6	9.321	639.8	2722.7
107	41.500	2011-Jul-13	12:27:17	91.77	1919.0	836.6	0.184	154.3	1.3	7.835	10.0	68.8	9.321	641.6	2725.0
108	43.500	2011-Jul-13	14:27:17	91.74	1919.4	836.5	0.184	154.3	1.3	7.835	10.0	69.0	9.321	643.0	2726.8
109	45.500	2011-Jul-13	16:27:17	91.71	1919.8	836.3	0.185	154.3	1.3	7.835	10.1	69.1	9.321	644.4	2728.6
110	47.500	2011-Jul-13	18:27:17	91.69	1920.2	836.2	0.185	154.3	1.3	7.835	10.1	69.2	9.321	645.4	2730.0
111	49.500	2011-Jul-13	20:27:17	91.66	1920.6	836.1	0.185	154.3	1.3	7.835	10.1	69.4	9.321	646.8	2731.8
112	53.500	2011-Jul-14	00:27:17	91.61	1921.3	835.8	0.185	154.4	1.3	7.835	10.1	69.6	9.321	649.1	2734.9
113	57.500	2011-Jul-14	04:27:17	91.56	1922.0	835.6	0.185	154.4	1.3	7.835	10.1	69.9	9.321	651.5	2738.0
114	61.500	2011-Jul-14	08:27:17	91.51	1922.8	835.3	0.185	154.4	1.3	7.835	10.2	70.1	9.320	653.8	2741.1
115	65.500	2011-Jul-14	12:27:17	91.46	1923.5	835.0	0.185	154.4	1.3	7.835	10.2	70.4	9.320	656.2	2744.3
116	69.500	2011-Jul-14	16:27:17	91.41	1924.2	834.8	0.185	154.4	1.3	7.835	10.2	70.7	9.320	658.6	2747.4
117	73.500	2011-Jul-14	20:27:17	91.36	1925.0	834.5	0.185	154.5	1.3	7.836	10.2	70.9	9.320	660.9	2750.6
118	77.500	2011-Jul-15	00:27:17	91.32	1925.7	834.3	0.185	154.5	1.3	7.836	10.2	71.1	9.320	662.8	2753.3
119	81.500	2011-Jul-15	04:27:17	91.28	1926.4	834.1	0.185	154.5	1.3	7.836	10.3	71.3	9.320	664.7	2755.9
120	85.500	2011-Jul-15	08:27:17	91.24	1927.1	833.9	0.185	154.5	1.3	7.836	10.3	71.5	9.320	666.6	2758.6
121	89.500	2011-Jul-15	12:27:17	91.20	1927.8	833.7	0.185	154.6	1.3	7.836	10.3	71.7	9.320	668.6	2761.2
122	93.500	2011-Jul-15	16:27:17	91.16	1928.4	833.5	0.185	154.6	1.3	7.836	10.3	71.9	9.320	670.5	2763.8
123	97.500	2011-Jul-15	20:27:17	91.12	1929.1	833.3	0.186	154.6	1.3	7.836	10.3	72.1	9.320	672.4	2766.4
124	101.500	2011-Jul-16	00:27:17	91.09	1929.7	833.1	0.186	154.6	1.3	7.836	10.3	72.3	9.320	673.8	2768.5
125	105.500	2011-Jul-16	04:27:17	91.06	1930.2	833.0	0.186	154.6	1.3	7.836	10.4	72.5	9.320	675.3	2770.5
126	109.500	2011-Jul-16	08:27:17	91.02	1930.8	832.8	0.186	154.6	1.3	7.836	10.4	72.7	9.320	677.2	2773.0
127	113.500	2011-Jul-16	12:27:17	90.99	1931.3	832.6	0.186	154.7	1.3	7.836	10.4	72.8	9.320	678.7	2775.0
128	117.500	2011-Jul-16	16:27:17	90.97	1931.8	832.5	0.186	154.7	1.3	7.836	10.4	72.9	9.320	679.6	2776.5
129	121.500	2011-Jul-16	20:27:17	90.94	1932.2	832.3	0.186	154.7	1.3	7.836	10.4	73.1	9.320	681.1	2778.4
130	125.500	2011-Jul-17	00:27:17	90.91	1932.6	832.2	0.186	154.7	1.3	7.836	10.4	73.2	9.320	682.5	2780.3
131	129.500	2011-Jul-17	04:27:17	90.89	1933.0	832.1	0.186	154.7	1.3	7.836	10.4	73.3	9.320	683.5	2781.7
132	133.500	2011-Jul-17	08:27:17	90.86	1933.4	831.9	0.186	154.7	1.3	7.836	10.4	73.5	9.320	685.0	2783.5
133	137.500	2011-Jul-17	12:27:17	90.84	1933.8	831.8	0.186	154.7	1.3	7.836	10.5	73.6	9.320	685.9	2784.9
134	141.500	2011-Jul-17	16:27:17	90.81	1934.1	831.7	0.186	154.7	1.3	7.836	10.5	73.8	9.320	687.4	2786.7
135	145.500	2011-Jul-17	20:27:17	90.79	1934.5	831.6	0.186	154.7	1.3	7.836	10.5	73.9	9.320	688.4	2788.1
136	149.500	2011-Jul-18	00:27:17	90.77	1934.8	831.4	0.186	154.8	1.3	7.836	10.5	74.0	9.320	689.3	2789.4
137	153.500	2011-Jul-18	04:27:17	90.74	1935.1	831.3	0.186	154.8	1.3	7.836	10.5	74.1	9.320	690.8	2791.2
138	157.500	2011-Jul-18	08:27:17	90.72	1935.4	831.2	0.186	154.8	1.3	7.836	10.5	74.2	9.320	691.8	2792.5
139	161.500	2011-Jul-18	12:27:17	90.70	1935.7	831.1	0.186	154.8	1.3	7.836	10.5	74.3	9.320	692.8	2793.8
140	165.500	2011-Jul-18	16:27:17	90.68	1936.0	831.0	0.186	154.8	1.3	7.836	10.5	74.4	9.320	693.7	2795.0
141	169.500	2011-Jul-18	20:27:17	90.65	1936.3	830.8	0.186	154.8	1.3	7.836	10.6	74.6	9.320	695.2	2796.8
142	173.500	2011-Jul-19	00:27:17	90.63	1936.6	830.7	0.186	154.8	1.3	7.836	10.6	74.7	9.320	696.2	2798.1



NO.	TEST TIME	DATE	TIME	JOINTS TO LIQUID	SURFACE PRESSURE (kPaa)	GAS COLUMN			OIL COLUMN			EMULSION COLUMN			PRESSURE @ MPP (kPaa)
	(hours)					HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	HEIGHT (m)	GRADIENT (kPa/m)	PRESSURE (kPa)	
143	177.500	2011-Jul-19	04:27:17	90.61	1936.8	830.6	0.186	154.8	1.4	7.836	10.6	74.8	9.320	697.2	2799.4
144	181.500	2011-Jul-19	08:27:17	90.59	1937.1	830.5	0.186	154.8	1.4	7.836	10.6	74.9	9.320	698.1	2800.6
145	185.500	2011-Jul-19	12:27:17	90.56	1937.3	830.3	0.186	154.8	1.4	7.836	10.6	75.1	9.320	699.6	2802.4
146	189.500	2011-Jul-19	16:27:17	90.54	1937.6	830.2	0.186	154.8	1.4	7.836	10.6	75.2	9.320	700.6	2803.6
147	193.500	2011-Jul-19	20:27:17	90.51	1937.8	830.1	0.186	154.8	1.4	7.836	10.7	75.3	9.320	702.1	2805.3
148	197.500	2011-Jul-20	00:27:17	90.49	1937.9	829.9	0.186	154.8	1.4	7.836	10.7	75.4	9.320	703.1	2806.4
149	201.500	2011-Jul-20	04:27:17	90.46	1938.1	829.8	0.186	154.7	1.4	7.836	10.7	75.6	9.320	704.6	2808.1
150	205.500	2011-Jul-20	08:27:17	90.44	1938.1	829.7	0.186	154.7	1.4	7.836	10.7	75.7	9.320	705.6	2809.1
151	209.500	2011-Jul-20	12:27:17	90.42	1938.2	829.6	0.186	154.7	1.4	7.836	10.7	75.8	9.320	706.6	2810.1
152	213.500	2011-Jul-20	16:27:17	90.39	1938.1	829.4	0.186	154.7	1.4	7.836	10.7	76.0	9.320	708.0	2811.6
153	217.500	2011-Jul-20	20:27:17	90.37	1938.0	829.3	0.186	154.6	1.4	7.837	10.7	76.1	9.320	708.0	2812.4
154	221.500	2011-Jul-21	00:27:17	90.35	1937.8	829.2	0.186	154.6	1.4	7.837	10.8	76.2	9.320	710.0	2813.2
155	225.500	2011-Jul-21	04:27:17	90.33	1937.6	829.1	0.186	154.6	1.4	7.837	10.8	76.3	9.320	711.0	2814.0
156	229.500	2011-Jul-21	08:27:17	90.31	1937.3	829.0	0.186	154.5	1.4	7.837	10.8	76.4	9.320	712.0	2814.7



ANNULAR FLUID DEPRESSION TEST

COMPANY: PENN WEST PETROLEUM	POOL: LOWER AMARANTH A	U.W.I.: 103/13-24-001-26W1/0
FIELD: WASKADA MB	WELL STATUS: OIL	WELL NAME: WASKADA LAM UNIT NO. 1
	LICENSE: 007180	HZNTL A13-24-1-26
		SURFACE LCN.: 103/15-24-001-26W1/0 (HZTL)

ELEVATIONS:

Kelly Bushing (KB): 472.20 m
 Ground Level (GL): 467.50 m
 KB to GL: 4.70 m

FLUID PROPERTIES:

Gas Gravity: 0.750
 Oil Gravity: 37.790 °API
 Water Gravity: 1.067

SURFACE UNIT:

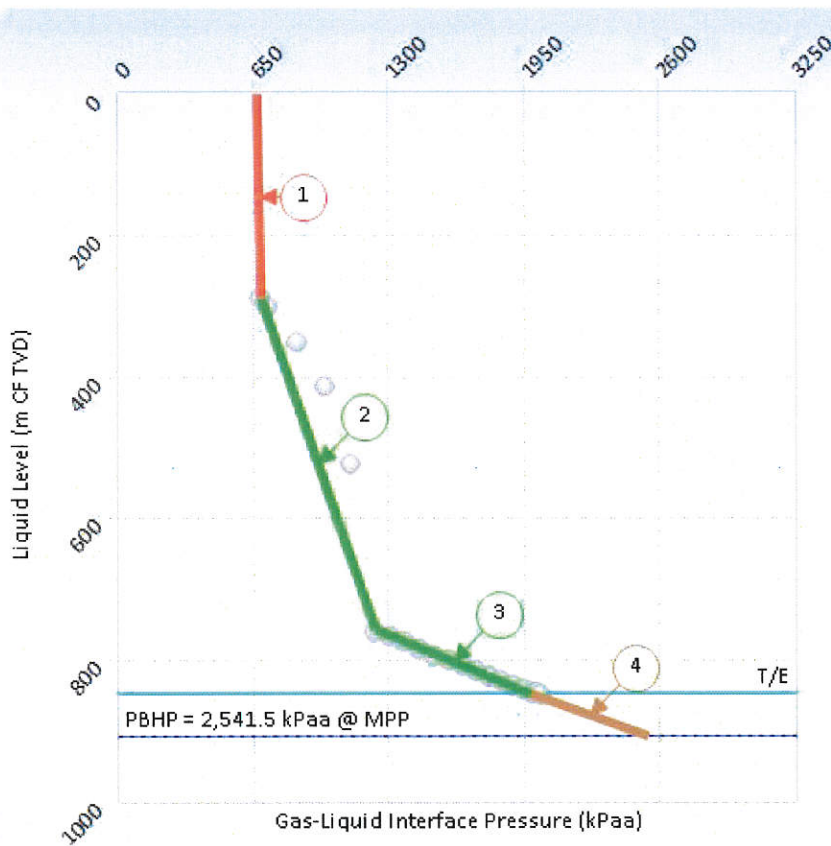
Tubing Pressure: 576.6 kPa
 Pumping Speed: 4.7 SPM
 Stroke Length: 236.2/93.0 cm/inch

PRODUCTION RATES:

Gas: 1.62 E³m³/d
 Oil: 3.16 m³/d
 Water: 4.93 m³/d

PRODUCING INTERVAL:

Top: 909.56 m KB (TVD)
 1,177.00 m KB (MD)
 Bottom: 912.05 m KB (TVD)
 1,703.30 m KB (MD)
 Mid-Point: 911.45 m KB (TVD)
 1,440.15 m KB (MD)



TEST START: 2011-JUL-11 @ 13:45:34

No.	Elapsed Time (hours)	Joints To Fluid	Liquid Level (m CF TVD)	Surface Pressure (kPaa)	Interface Pressure (kPaa)
1	0.000	30.10	289.26	669.6	687.8
2	0.057	31.49	302.62	706.5	726.7
3	0.307	36.55	351.25	833.4	861.1
4	0.557	43.04	413.61	957.8	995.2
5	0.807	54.49	523.64	1069.1	1122.1
6	1.057	80.05	759.88	1155.0	1237.2
7	1.307	80.67	764.72	1216.0	1303.3
8	1.557	81.88	773.90	1284.2	1377.7
9	1.807	83.16	783.32	1352.1	1451.9
10	2.057	84.52	793.02	1417.2	1523.4
11	2.307	85.62	800.47	1479.8	1592.0
12	2.557	86.68	807.28	1539.0	1656.8
13	2.807	88.01	815.51	1597.1	1720.9
14	3.057	89.11	822.16	1652.9	1782.3
15	3.307	90.35	829.19	1706.3	1841.2
16	3.557	91.56	835.56	1758.0	1898.3
17	3.807	92.66	841.00	1806.7	1952.0
18	4.057	93.95	846.85	1843.5	1993.0
19	4.307	93.65	845.54	1849.9	1999.8
20	4.557	93.62	845.41	1856.1	2006.4
21	4.807	93.76	846.02	1861.8	2012.8
22	5.057	93.80	846.20	1866.2	2017.6
23	5.195	94.23	848.04	1880.2	2033.1

NO.	Column Length (m)	Average Gradient (kPa/m)	Column Pressure (kPa)	Column Type
1	289.3	0.063	18.2	Gas Column
2	466.7	1.179	550.2	Oil Column
3	91.5	8.117	742.7	Oil Column
4	59.2	9.473	560.8	Emulsion Column