



DRILL STEM TEST REPORT

Prepared For: **Valhalla Exploration llc**

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

ATTN: Adam Nighswonger

Boye 1-16

6-16s-10w Ellsworth

Start Date: 2015.06.13 @ 00:00:00

End Date: 2015.06.13 @ 00:00:00

Job Ticket #: 01037 DST #: 1

Eagle Testers
1309 Patton Road Great Bend, Kansas 67530
620-791-7394

Printed: 2015.06.13 @ 17:46:27



DRILL STEM TEST REPORT

Valhalla Exploration llc

6-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01037

DST#: 1

ATTN: Adam Nighswonger

Test Start: 2015.06.13 @ 00:00:00

GENERAL INFORMATION:

Formation: **Arbuckle**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:00:00

Time Test Ended: 00:00:00

Test Type: Conventional Bottom Hole (Initial)

Tester: Gene Budig

Unit No: 70

Interval: **3300.00 ft (KB) To 3353.00 ft (KB) (TVD)**

Reference Elevations: 1884.00 ft (KB)

Total Depth: 3553.00 ft (KB) (TVD)

1874.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

Serial #: 9119

Inside

Press@RunDepth: 1145.56 psia @ 3347.34 ft (KB)

Capacity: 5000.00 psia

Start Date: 2015.06.13

End Date: 2015.06.13

Last Calib.: 1899.12.30

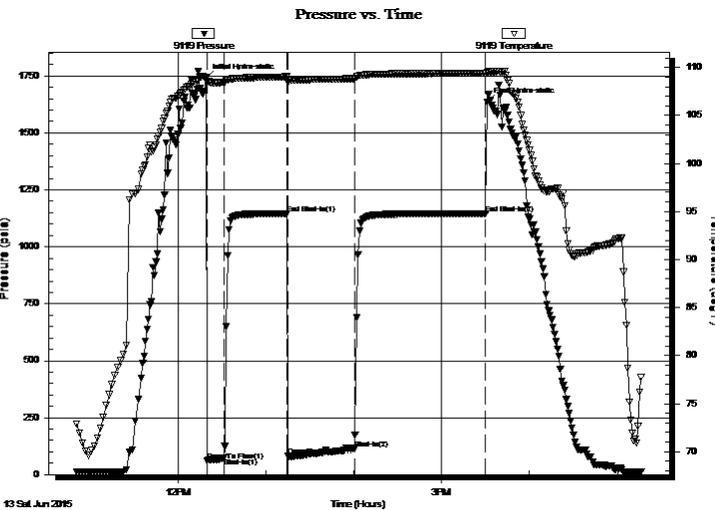
Start Time: 10:51:00

End Time: 17:16:00

Time On Btm: 2015.06.13 @ 12:19:30

Time Off Btm: 2015.06.13 @ 15:31:00

TEST COMMENT: 1ST OPENING 10 MINUTES WEAK BLOW BUILT TO 4 INCHES INTO THE WATER
1ST SHUT-IN 45 MINUTES-NO BLOW BACK
2ND OPENING 45 MINUTES FAIR BLOW BUILT TO THE BOTTOM OF 5 GALLON BUCKET IN 22 MINUTES
2ND SHUT-IN 90 MINUTES-NO BLOW BACK



PRESSURE SUMMARY

Time (Min.)	Pressure (psia)	Temp (deg F)	Annotation
0	1742.06	109.00	Initial Hydro-static
1	60.60	108.56	Open To Flow (1)
12	72.82	108.44	Shut-In(1)
55	1145.37	109.02	End Shut-In(1)
56	82.92	108.39	Open To Flow (2)
101	113.15	108.83	Shut-In(2)
191	1145.56	109.38	End Shut-In(2)
192	1634.20	109.51	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
0.00	120 GAS IN THE PIPE	0.00
140.00	CLEAN GASSY OIL 40 GAS 60 OIL	1.96
40.00	OIL AND GAS CUT MUD	0.56
0.00	10 GAS 20 OIL 70 MUD	0.00
0.00	GRAVITY 44 CORRECTED	0.00

Gas Rates

	Choke (inches)	Pressure (psia)	Gas Rate (Mcf/d)



DRILL STEM TEST REPORT

Valhalla Exploration llc

6-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01037

DST#: 1

ATTN: Adam Nighswonger

Test Start: 2015.06.13 @ 00:00:00

GENERAL INFORMATION:

Formation: **Arbuckle**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:00:00

Time Test Ended: 00:00:00

Test Type: Conventional Bottom Hole (Initial)

Tester: Gene Budig

Unit No: 70

Interval: **3300.00 ft (KB) To 3353.00 ft (KB) (TVD)**

Reference Elevations: 1884.00 ft (KB)

Total Depth: 3553.00 ft (KB) (TVD)

1874.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

Serial #: **9139** Outside

Press@RunDepth: 1144.68 psia @ 3347.34 ft (KB)

Capacity: 5000.00 psia

Start Date: 2015.06.13

End Date: 2015.06.13

Last Calib.: 2015.06.13

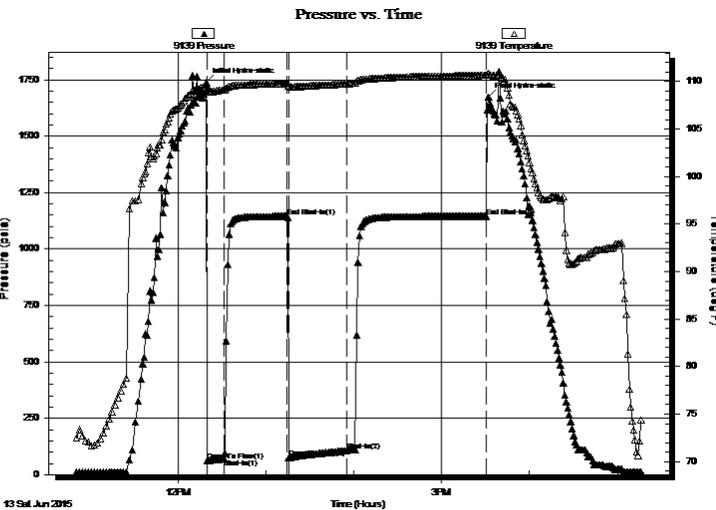
Start Time: 10:51:00

End Time: 17:16:00

Time On Btm: 2015.06.13 @ 12:19:30

Time Off Btm: 2015.06.13 @ 15:32:00

TEST COMMENT: 1ST OPENING 10 MINUTES WEAK BLOW BUILT TO 4 INCHES INTO THE WATER
1ST SHUT-IN 45 MINUTES-NO BLOW BACK
2ND OPENING 45 MINUTES FAIR BLOW BUILT TO THE BOTTOM OF 5 GALLON BUCKET IN 22 MINUTES
2ND SHUT-IN 90 MINUTES-NO BLOW BACK



PRESSURE SUMMARY

Time (Min.)	Pressure (psia)	Temp (deg F)	Annotation
0	1737.35	109.39	Initial Hydro-static
1	60.48	108.90	Open To Flow (1)
12	71.32	109.12	Shut-In(1)
55	1144.45	109.81	End Shut-In(1)
56	75.50	109.51	Open To Flow (2)
96	105.19	109.75	Shut-In(2)
191	1144.68	110.64	End Shut-In(2)
193	1672.93	110.81	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
0.00	120 GAS IN THE PIPE	0.00
140.00	CLEAN GASSY OIL 40 GAS 60 OIL	1.96
40.00	OIL AND GAS CUT MUD	0.56
0.00	10 GAS 20 OIL 70 MUD	0.00
0.00	GRAVITY 44 CORRECTED	0.00

Gas Rates

	Choke (inches)	Pressure (psia)	Gas Rate (Mcf/d)



DRILL STEM TEST REPORT

TOOL DIAGRAM

Valhalla Exploration llc

6-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01037

DST#: 1

ATTN: Adam Nighswonger

Test Start: 2015.06.13 @ 00:00:00

Tool Information

Drill Pipe:	Length: 3300.00 ft	Diameter: 3.80 inches	Volume: 46.29 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 20000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 2.25 inches	Volume: 0.00 bbl	Weight to Pull Loose: 68000.00 lb
			Total Volume: 46.29 bbl	Tool Chased 0.00 ft
Drill Pipe Above KB:	29.00 ft			String Weight: Initial 49000.00 lb
Depth to Top Packer:	3300.00 ft			Final 50000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	52.34 ft			
Tool Length:	81.34 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
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Shut In Tool	5.00			3276.00	
Hydraulic tool	5.00			3281.00	
Jars	7.00			3288.00	
Safety Joint	2.00		Fluid	3290.00	
Top Packer	5.00			3295.00	
Packer	5.00			3300.00	29.00 Bottom Of Top Packer
Anchor	5.00			3305.00	
Change Over Sub	0.75			3305.75	
Drill Pipe	30.84			3336.59	
Change Over Sub	0.75			3337.34	
Anchor	10.00			3347.34	
Recorder	0.00	9119	Inside	3347.34	
Recorder	0.00	9139	Outside	3347.34	
Bullnose	5.00			3352.34	52.34 Anchor Tool

Total Tool Length: 81.34



DRILL STEM TEST REPORT

FLUID SUMMARY

Valhalla Exploration llc

6-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01037

DST#: 1

ATTN: Adam Nighswonger

Test Start: 2015.06.13 @ 00:00:00

Mud and Cushion Information

Mud Type: Gel Chem
Mud Weight: 9.00 lb/gal
Viscosity: 46.00 sec/qt
Water Loss: 8.79 in³
Resistivity: ohm.m
Salinity: 7400.00 ppm
Filter Cake: 1.00 inches

Cushion Type:
Cushion Length: ft
Cushion Volume: bbl
Gas Cushion Type:
Gas Cushion Pressure: psia

Oil API: deg API
Water Salinity: ppm

Recovery Information

Recovery Table

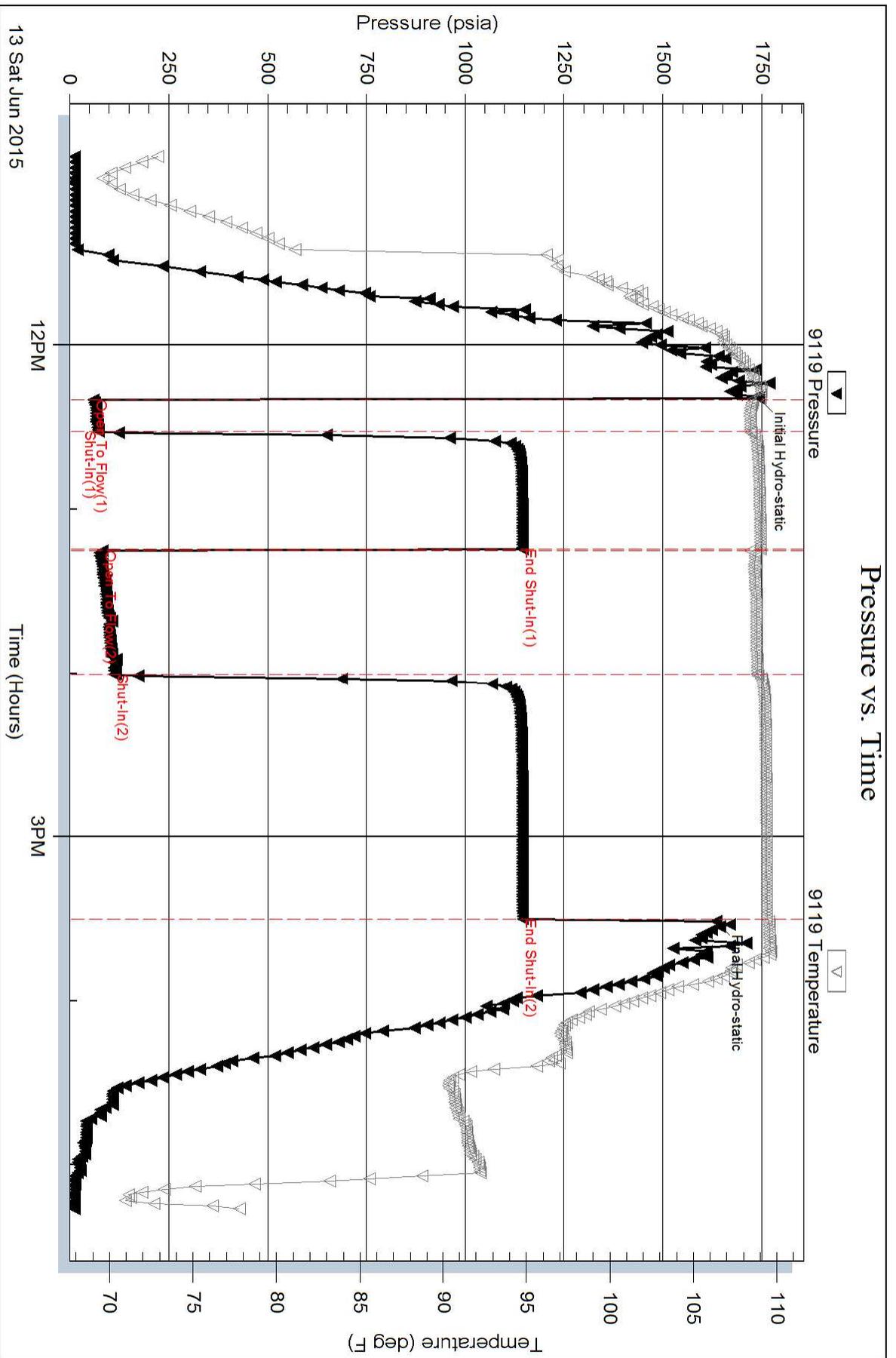
Length ft	Description	Volume bbl
0.00	120 GAS IN THE PIPE	0.000
140.00	CLEAN GASSY OIL 40 GAS 60 OIL	1.964
40.00	OIL AND GAS CUT MUD	0.561
0.00	10 GAS 20 OIL 70 MUD	0.000
0.00	GRAVITY 44 CORRECTED	0.000

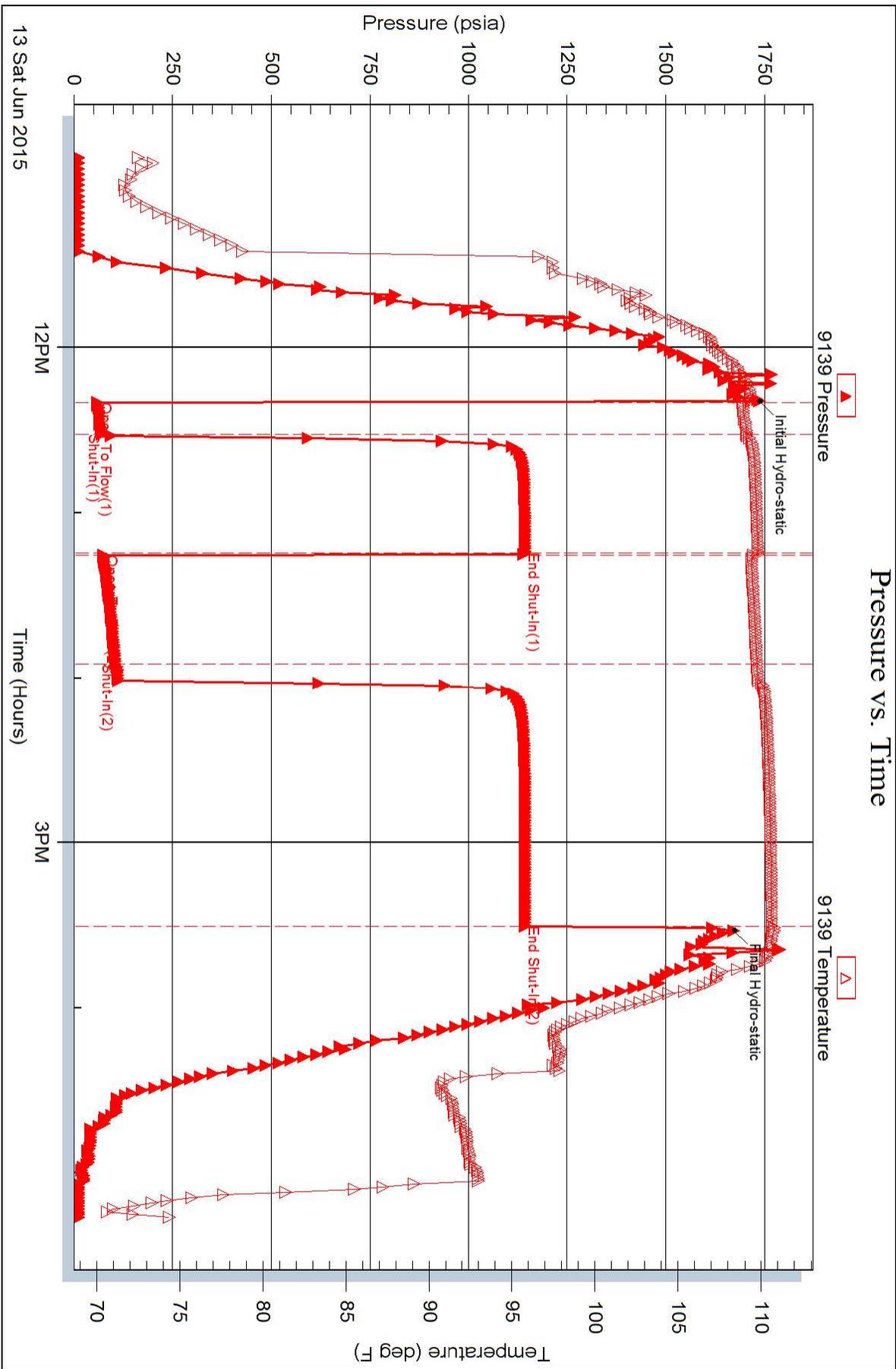
Total Length: 180.00 ft Total Volume: bbl

Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:

Laboratory Name: Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Valhalla Exploration llc**

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

ATTN: Adam Nighswonger

Boye 1-16

16-16s-10w Ellsworth

Start Date: 2015.06.14 @ 00:00:00

End Date: 2015.06.14 @ 00:00:00

Job Ticket #: 01038 DST #: 2

Eagle Testers
1309 Patton Road Great Bend, Kansas 67530
620-791-7394

Printed: 2015.06.14 @ 07:55:10



DRILL STEM TEST REPORT

Valhalla Exploration llc
 8100 East 22nd Street North Building 1800-2
 Wichita, Kansas 67226
 ATTN: Adam Nighswonger

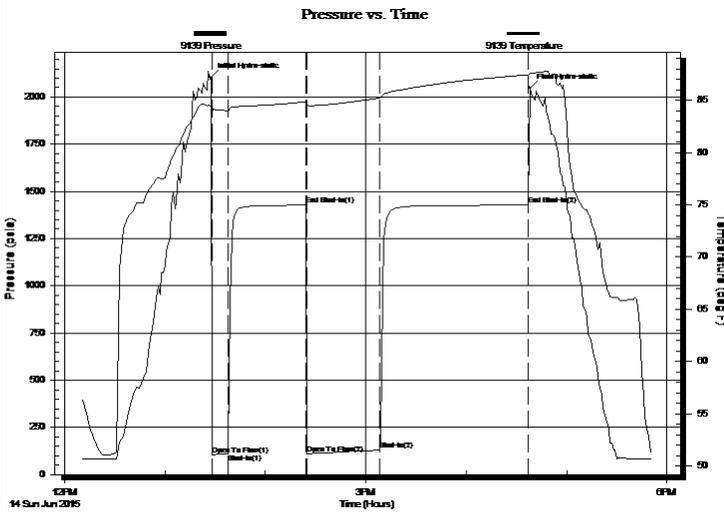
16-16s-10w Ellsworth
Boye 1-16
 Job Ticket: 01038 **DST#: 2**
 Test Start: 2015.06.14 @ 00:00:00

GENERAL INFORMATION:

Formation: **Arbuckle**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 00:00:00
 Time Test Ended: 00:00:00
 Interval: **3353.00 ft (KB) To 3361.00 ft (KB) (TVD)**
 Total Depth: 3361.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Gene Budig
 Unit No:
 Reference Elevations: 1884.00 ft (KB)
 1874.00 ft (CF)
 KB to GR/CF: 10.00 ft

Serial #: 9139 Outside
 Press @ Run Depth: 1427.50 psia @ 3356.00 ft (KB) Capacity: 5000.00 psia
 Start Date: 2015.06.14 End Date: 2015.06.14 Last Calib.: 2015.06.14
 Start Time: 12:10:00 End Time: 17:51:30 Time On Btm: 2015.06.14 @ 13:27:30
 Time Off Btm: 2015.06.14 @ 16:38:00

TEST COMMENT: 1st Opening 10 Minutes weak surface blow through out
 1st Shut-in 45 Minutes
 2nd Opening 45 Minutes-no blow for 7 minutes then very weak surface blow through out
 2nd Shut-in 90 Minutes



PRESSURE SUMMARY

Time (Min.)	Pressure (psia)	Temp (deg F)	Annotation
0	2103.39	84.39	Initial Hydro-static
1	105.81	83.90	Open To Flow (1)
10	109.08	84.01	Shut-In(1)
57	1427.35	84.85	End Shut-In(1)
57	110.07	84.50	Open To Flow (2)
101	129.59	85.23	Shut-In(2)
190	1427.50	87.44	End Shut-In(2)
191	2048.89	87.61	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
5.00	thick heavy mud	0.07
10.00	muddy w ater 20% mud 80% Water	0.14
	chlorides 12000	

Gas Rates

	Choke (inches)	Pressure (psia)	Gas Rate (Mcf/d)



DRILL STEM TEST REPORT

TOOL DIAGRAM

Valhalla Exploration llc

16-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01038

DST#: 2

ATTN: Adam Nighswonger

Test Start: 2015.06.14 @ 00:00:00

Tool Information

Drill Pipe:	Length: 3334.00 ft	Diameter: 3.80 inches	Volume: 46.77 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: inches	Volume: 0.00 bbl	Weight set on Packer:	20000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 2.25 inches	Volume: 0.00 bbl	Weight to Pull Loose:	62000.00 lb
			<u>Total Volume: 46.77 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	3.00 ft			String Weight: Initial	48000.00 lb
Depth to Top Packer:	3353.00 ft			Final	48000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	8.00 ft				
Tool Length:	30.00 ft				
Number of Packers:	1	Diameter: 6.75 inches			
Tool Comments:					

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
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Shut In Tool	5.00			3336.00	
Hydraulic Tool	5.00			3341.00	
Jars	5.00			3346.00	
Safety Joint	2.00			3348.00	
Packer	5.00			3353.00	22.00 Bottom Of Top Packer
Anchor	3.00			3356.00	
Recorder	0.00	9119	Inside	3356.00	
Recorder	0.00	9139	Outside	3356.00	
Bullnose	5.00			3361.00	8.00 Anchor Tool
Total Tool Length:	30.00				



DRILL STEM TEST REPORT

FLUID SUMMARY

Valhalla Exploration llc

16-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01038

DST#: 2

ATTN: Adam Nighswonger

Test Start: 2015.06.14 @ 00:00:00

Mud and Cushion Information

Mud Type: Gel Chem
Mud Weight: 9.00 lb/gal
Viscosity: 46.00 sec/qt
Water Loss: 8.80 in³
Resistivity: ohm.m
Salinity: 74000.00 ppm
Filter Cake: 1.00 inches

Cushion Type:
Cushion Length: ft
Cushion Volume: bbl
Gas Cushion Type:
Gas Cushion Pressure: psia

Oil API: deg API
Water Salinity: ppm

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	thick heavy mud	0.070
10.00	muddy water 20% mud 80% Water	0.140
	chlorides 12000	

Total Length: 15.00 ft Total Volume: 0.210 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

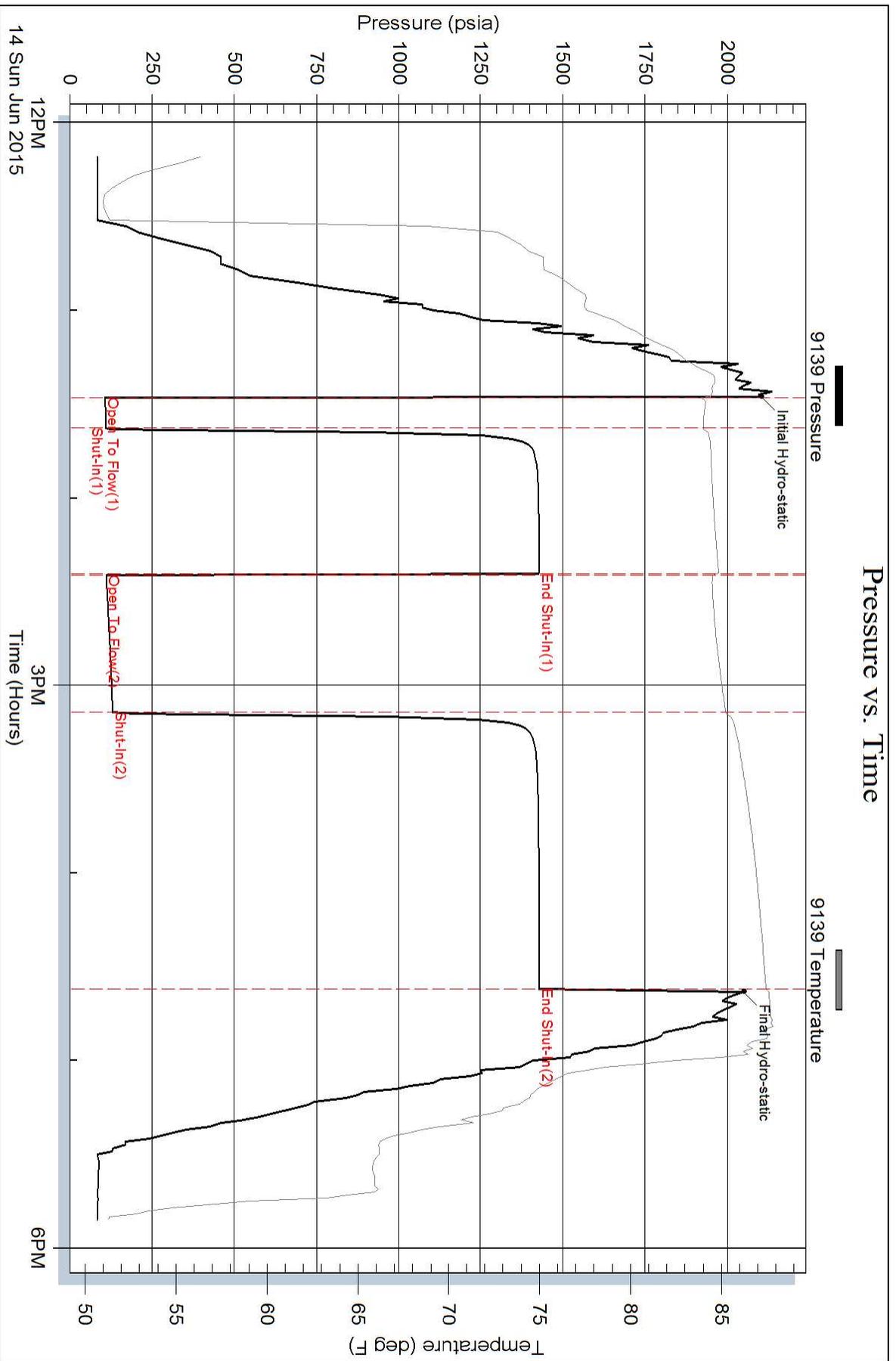
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

Pressure vs. Time





DRILL STEM TEST REPORT

Prepared For: **Valhalla Exploration llc**

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

ATTN: Adam Nighswonger

Boye 1-16

16-16s-10w Ellsworth

Start Date: 2015.06.14 @ 00:00:00

End Date: 2015.06.14 @ 00:00:00

Job Ticket #: 01034 DST #: 3

Eagle Testers
1309 Patton Road Great Bend, Kansas 67530
620-791-7394

Printed: 2015.06.14 @ 21:03:10

Valhalla Exploration llc
16-16s-10w Ellsworth
Boye 1-16
DST # 3
Arbuckle
2015.06.14



DRILL STEM TEST REPORT

Valhalla Exploration llc

16-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01034

DST#: 3

ATTN: Adam Nighswonger

Test Start: 2015.06.14 @ 00:00:00

GENERAL INFORMATION:

Formation: **Arbuckle**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:00:00

Time Test Ended: 00:00:00

Test Type: Conventional Bottom Hole (Initial)

Tester: GENE BUDIG

Unit No:

Interval: 3368.00 ft (KB) To 3376.00 ft (KB) (TVD)

Reference Elevations: 1884.00 ft (KB)

Total Depth: 3376.00 ft (KB) (TVD)

1874.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

Serial #: 9139 Outside

Press @ RunDepth: 1156.90 psia @ 3371.00 ft (KB)

Capacity: 5000.00 psia

Start Date: 2015.06.14

End Date: 2015.06.14

Last Calib.: 2015.06.14

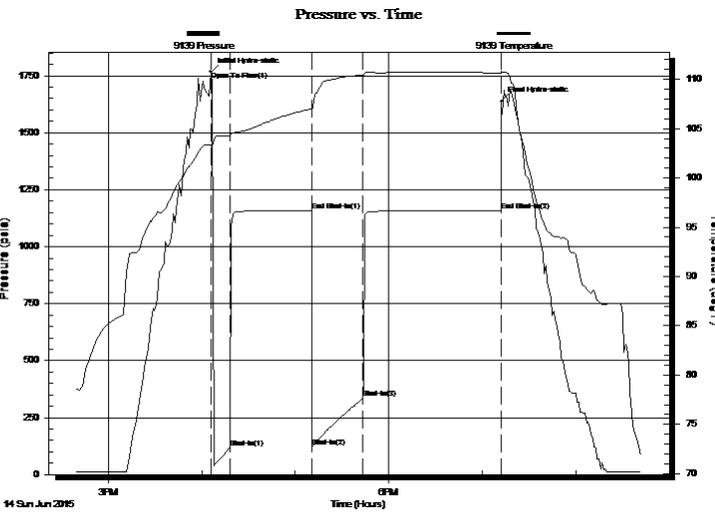
Start Time: 14:39:45

End Time: 20:41:45

Time On Btm: 2015.06.14 @ 16:05:45

Time Off Btm: 2015.06.14 @ 19:12:15

TEST COMMENT: 1ST Opening 10 Minutes fair blow built to the bottom of a 5 gallon bucket in 5 minutes
1st Shut-In 45 Minutes-No blow back
2nd Opening 30 Minutes-Fair blow built to the bottom of a 5 gallon bucket in 7 minutes
2nd Shut-In 90 Minutes-no blow back



PRESSURE SUMMARY

Time (Min.)	Pressure (psia)	Temp (deg F)	Annotation
0	1767.41	103.33	Initial Hydro-static
1	1731.48	103.29	Open To Flow (1)
13	118.10	104.26	Shut-In(1)
65	1156.67	107.00	End Shut-In(1)
65	122.65	106.82	Shut-In(2)
98	333.90	110.43	Shut-In(3)
186	1156.90	110.66	End Shut-In(2)
187	1637.93	110.85	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
675.00	water chlorides 12000	9.47

Gas Rates

Choke (inches)	Pressure (psia)	Gas Rate (Mcf/d)



DRILL STEM TEST REPORT

Valhalla Exploration llc

16-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01034

DST#: 3

ATTN: Adam Nighswonger

Test Start: 2015.06.14 @ 00:00:00

GENERAL INFORMATION:

Formation: **Arbuckle**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:00:00

Time Test Ended: 00:00:00

Test Type: Conventional Bottom Hole (Initial)

Tester: GENE BUDIG

Unit No:

Interval: 3368.00 ft (KB) To 3376.00 ft (KB) (TVD)

Reference Elevations: 1884.00 ft (KB)

Total Depth: 3376.00 ft (KB) (TVD)

1874.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

Serial #: 9119

Inside

Press @ Run Depth: 1158.00 psia @ 3371.00 ft (KB)

Capacity: 5000.00 psia

Start Date: 2015.06.14

End Date:

2015.06.15

Last Calib.:

2015.06.14

Start Time: 20:15:00

End Time:

02:18:00

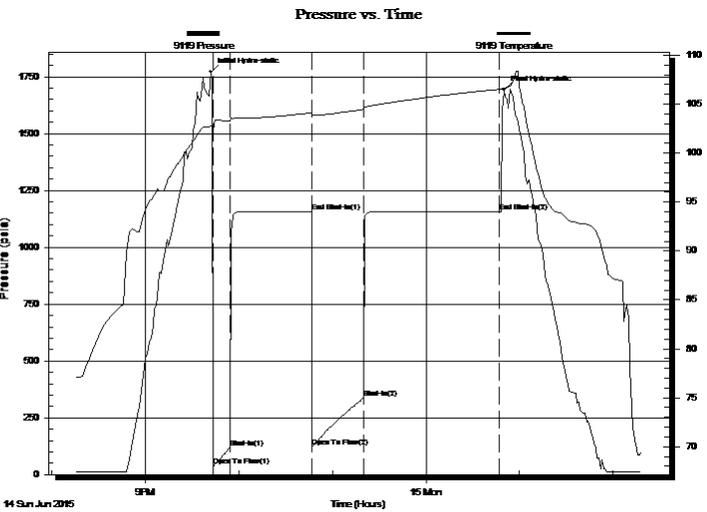
Time On Btm:

2015.06.14 @ 21:42:00

Time Off Btm:

2015.06.15 @ 00:50:00

TEST COMMENT: 1ST Opening 10 Minutes fair blow built to the bottom of a 5 gallon bucket in 5 minutes
1st Shut-In 45 Minutes-No blow back
2nd Opening 30 Minutes-Fair blow built to the bottom of a 5 gallon bucket in 7 minutes
2nd Shut-In 90 Minutes-no blow back



PRESSURE SUMMARY

Time (Min.)	Pressure (psia)	Temp (deg F)	Annotation
0	1771.95	102.73	Initial Hydro-static
2	38.57	102.17	Open To Flow (1)
13	118.84	103.23	Shut-In(1)
65	1158.03	104.12	End Shut-In(1)
65	123.23	103.83	Open To Flow (2)
98	337.27	104.46	Shut-In(2)
185	1158.00	106.51	End Shut-In(2)
188	1692.10	106.66	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
675.00	water chlorides 12000	9.47

Gas Rates

	Choke (inches)	Pressure (psia)	Gas Rate (Mcf/d)



DRILL STEM TEST REPORT

TOOL DIAGRAM

Valhalla Exploration llc

16-16s-10w Ellsworth

8100 East 22nd Street North Building 1800-2
Wichita, Kansas 67226

Boye 1-16

Job Ticket: 01034

DST#: 3

ATTN: Adam Nighswonger

Test Start: 2015.06.14 @ 00:00:00

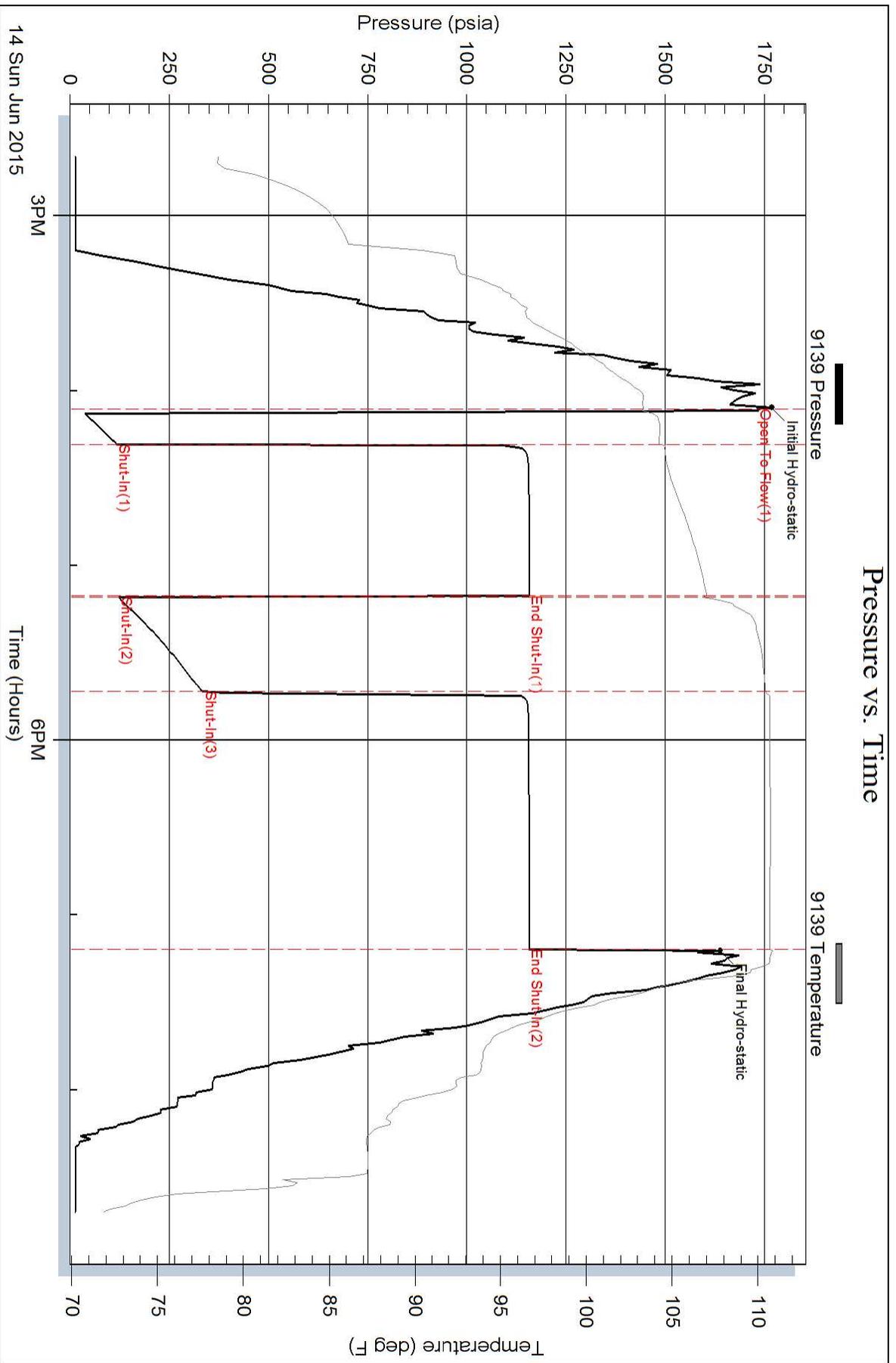
Tool Information

Drill Pipe:	Length: 3356.00 ft	Diameter: 3.80 inches	Volume: 47.08 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer:	20000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 2.25 inches	Volume: 0.00 bbl	Weight to Pull Loose:	74000.00 lb
			<u>Total Volume: 47.08 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	10.00 ft			String Weight: Initial	48000.00 lb
Depth to Top Packer:	3368.00 ft			Final	50000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	8.00 ft				
Tool Length:	30.00 ft				
Number of Packers:	1	Diameter: 6.75 inches			
Tool Comments:					

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
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Shut In Tool	5.00			3351.00	
Hydraulic Tool	5.00			3356.00	
Jars	5.00			3361.00	
Safety Joint	2.00			3363.00	
Packer	5.00			3368.00	22.00 Bottom Of Top Packer
Anchor	3.00			3371.00	
Recorder	0.00	9119	Inside	3371.00	
Recorder	0.00	9139	Outside	3371.00	
Bullnose	5.00			3376.00	8.00 Anchor Tool
Total Tool Length:	30.00				

Pressure vs. Time



Pressure vs. Time

