GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

COMPANY Murfin Drilling Co., Inc.
LEASE Jones 'B' #3-9
FIELD
LOCATION 660' FNL + 1980' FWL
SEC 9 TWSP 1S RGE 37W
COUNTY Cheyenne STATE KS

CONTRACTOR Murfin Drilling Co., Inc. Rig #14
SPUD 5/14/14 COMP 5/23/14
RTD 4740' LTD 4737'
MUD UP 3520' TYPE MUD Chem

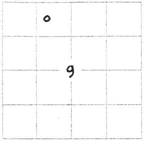
ELEVATIONS
KB 3212'
DF
GL 3202'
Measurements Are All From K.B.

CASING
SURFACE 8⅝" @ 200' w/200sx
PRODUCTION 5½" @ 4732'

ELECTRICAL SURVEYS
DI/GR Dual Por
Sonic Micro

SAMPLES SAVED FROM 3520 TO RTD
DRILLING TIME KEPT FROM 3520 TO RTD
SAMPLES EXAMINED FROM 3520 TO RTD
GEOLOGICAL SUPERVISION FROM 3500 TO RTD
GEOLOGIST ON WELL Ken Wallace

FORMATION TOPS	LOG	SAMPLES
Anhydrite	3179 (+33)	3180 (+32)
B/Anhydrite	3212 (0)	3215 (-3)
Neva	3636 (-424)	3640 (-428)
Foraker	3748 (-536)	3751 (-539)
Lansing	4183 (-971)	4186 (-974)
Stark	4399 (-1187)	4400 (-1188)
B/KC	4457 (-1245)	4457 (-1245)
Pawnee	4576 (-1364)	4576 (-1364)
Cherokee	4664 (-1452)	4671 (-1459)
RTD		4740 (-1528)
LTD	4737 (-1525	

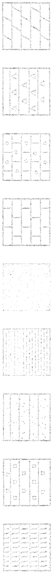


REMARKS Production casing was set to further evaluate zones of interest.

Ken Wallace

5/12/14 - off - rain
5/13/14 - Haul loads
5/14/14 - Finish MIRT
5/15/14 - Depth 226': set surface casing:
5/16/14 - Depth 2090, dev ½° @ 1235',
5/17/24 - Depth 3585, dev ½° @ 3500'
5/18/14 - Depth 4065,
5/19/14 - Depth 4256, DST #1 (D zone)
5/20/14 - Depth 4310, DST #2 (G zone)
5/21/14 - Depth 4410, DST #3 (H/J zones)
5/22/14 - Depth 4596, DST #4 (Pawnee)
5/23/14 - RTD 4740, Ran Log, Set casing

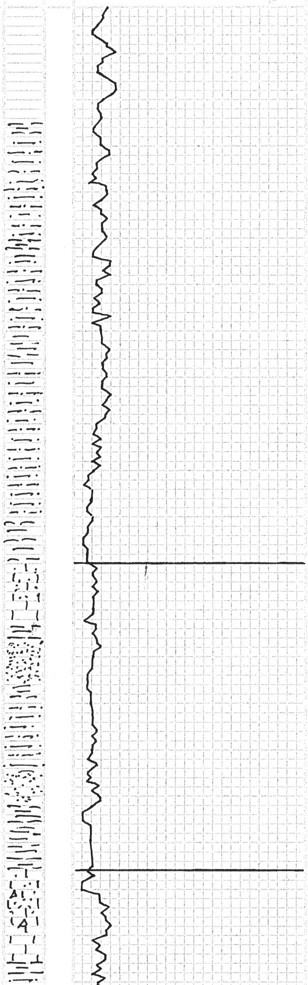
LEGEND



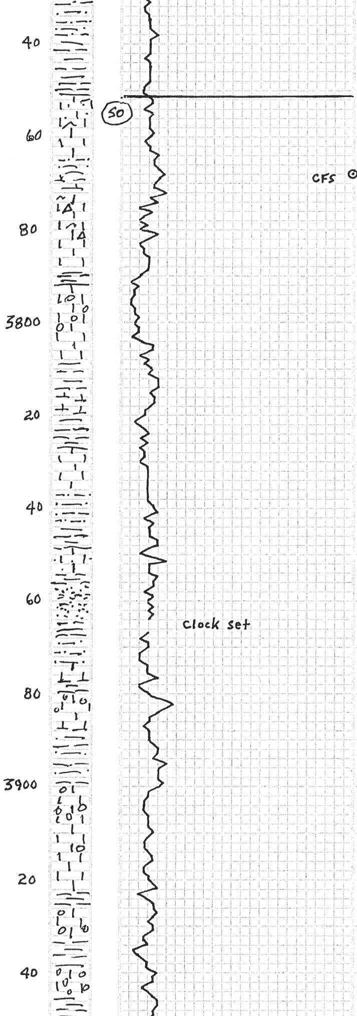
SCALE " = 100'

7505

LOG 7706



DEPTH	SAMPLE DESCRIPTIONS	REMARKS
3520		
40		Pipe Strap @ 3549' Strap 3.14' Short No correction made
60	Sh, red, sm gy, slty	
80		
	A.A.	
3600		Morgan Mud @ 4600': Vis 74 wt 8.8 Lcm 4
20		
	Sh, red, gummy	
40	Ls, buff, sdy, sl stn, NFO, NO, NF	Neva 3640(-428)
60	Ss, lt gy, vfgd, gd ϕ, soft, NS, NO, NF	
	Sh, red gummy, slty	
80		
	A.A. w/ Ss, ltgy, vfgd, NS, NO, NF	
	Sh, red	
3700		
	Ls, tan-ltgy, sdy, sm fxln, cky, foss, Δty, NS, NO, NF	Red Eagle 3706 (-494)
20	Ls, AA, sl odor, more foss, NSFO, NF	



Slst, red & sh, red

Foraker 3751
(-539)

Ls, off-wh, lt gy, sdy, foss, gppt ϕ, sm vgϕ, GSFO, dk sct stn-sm sat stn, sm bled oil, sl Δ, PFL, NO

⊙ slst, purpl, calc; sh, gy

Ls, dk gy, fxln, dse, foss, sm tan/dkgy motld, sl Δ, NS, NO NF

Ls, buff-tan, granul, sm fxln, foss, NO, NS, NF

sh, gy, red

Ls, cm-tan, ool, foss, sm fxln-cky, ppt ϕ, NS, NO, NF

sh, gy, red

Ls, dkgy, argl, foss, NS

Ls, buff, sdy, sl foss, cky, tr lt stn, pvg ϕ, tr Δ, NFO, NO, NF

sh, red, slty, sm grn sh

Ls, pink, argl, sdy, foss, NS, NO, NF

ss, buff, vfgd, glauco, calc, NS, NO, NF

Slst, red w/ sh, gy, grn, red, tr purpl Δ

Ls, tan, ool, foss, NS, NO, NF

sh, red, slty

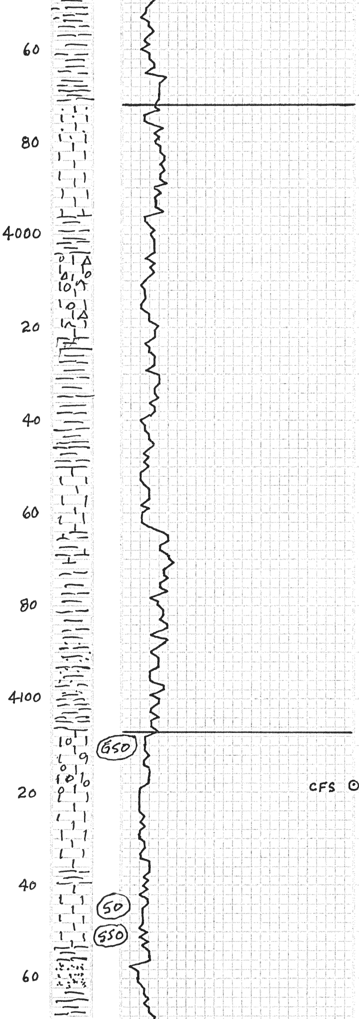
Ls, offwh, ool (lg oolts) foss, much dd stn, NVϕ, NFO, NO, NF

Ls, wh, fxln, foss, sl ool, cky, NO, NS, NF

Ls, tan, ool, foss, NS, NO, NF

sh, red, sm gy, grn

Ls, tan, v ool, foss, tr dd stn, NFO, NO, NF



sh, red, grn, gy

Topeka 3972
(-760)

Ls, buff, sdy, sl foss, NS, NO, NF

Ls AA w/ interbd red sh

sh, red

Ls, cm-tan, fxln, dse, cky inpt, sl ool/foss, Δty, NO, NS, NF

sh, red, grn (wxy), gy

sh, red

Ls, tan-lt gy, fxln, dse, sl cky, NO, NS, NF

sh, red, grn; sm Ls, arlg, lt grn

Morgan Mud @ 4086; vis 62
wt 9.2
Lcm 3

sh, red gummy, gy, grn

A.A. Sdy inpt

Oread 4107
(-895)

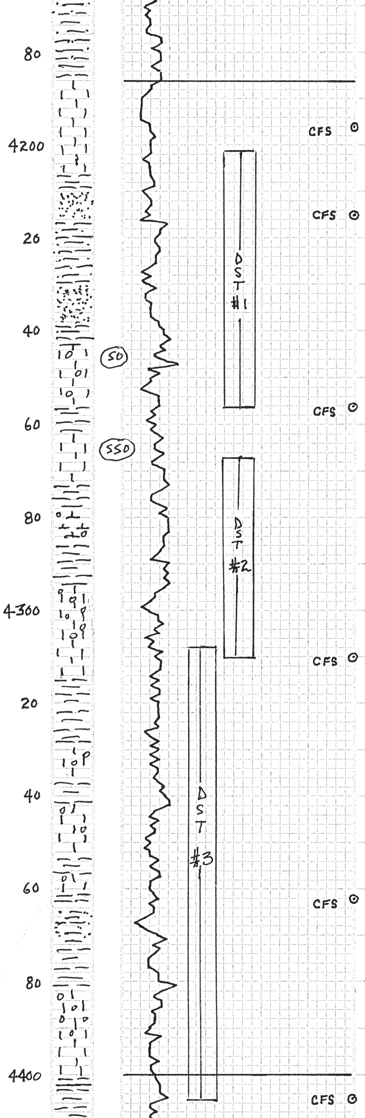
Ls, wh-tan, ool, foss, cky inpt, fvg ø, sct dkstn, sm cky Ls w/ fpptø, ESFO, NO, dull FL pyr

Ls, cm-wh, fxln, cky, sl ool, NS

Ls, mgy, fxln, dse, foss, lpc SSFO, NO, NFL

Ls, tan-gy, fxln, dse, cky inpt, cky Ls w/ ppptø, SSFO, tr FO, NO, tr FL

SS, buff-lt gy, vfgd, NO NS, NF



sh, red gummy, sm slty

Lansing 4186
(-974)

Ls, tan-lt gy, fxh, dse, fw pcs p ugϕ, stary oil, NFO, NO, NF

Ls, tan dse, fxln, sl cky, sl Δ, NO, NS, NF

sh, red, dk grn

SS, lt gy, vfgd, well srtd, sat dd stn, NFO, NO, NF

sh, red, slty

SS, ltgy-grn, vfgd, NS, NO, NF

sh, red, slty

Ls, offwh, ool, foss, sm fxln, gd ugϕ, GSFO, sl odor, FFL

Morgan Mud @
4256; vis 57
wt 9.3
lcm 2

Ls, gy, sl ool, foss, cky, NS, NO, NF

sh, red, brn, gy, grn

Ls, lt gy, fxln, cky, p ugϕ, sct stn, SSFO, NO, mstly barren, tr FL

sh, red, brn, grn

Ls, dkgy, ool, foss, argl, NS, NO, NF

sh, red, brn, grn

Ls, offwh-gy, ool, foss, gd pptϕ & vgϕ, f IGϕ, GSFO, tr odor, tr FL

Morgan Mud @
4310; vis 56
wt 9.2
lcm 8

Ls, lt gy, fxln, cky, foss, NS, NO, NF

sh, red, gy, pyr

Ls, brn, crs xln, foss, sl ool, sl dd stn, NFO, NO, NF

sh, red, grn, gy, lamine

Ls, gy, fxln, cky, sl foss, tr dd stn, NFO, NO, NF

Ls, buff, ool, foss, cky, sl ool, foss, tr dd stn, NFO NO, NF

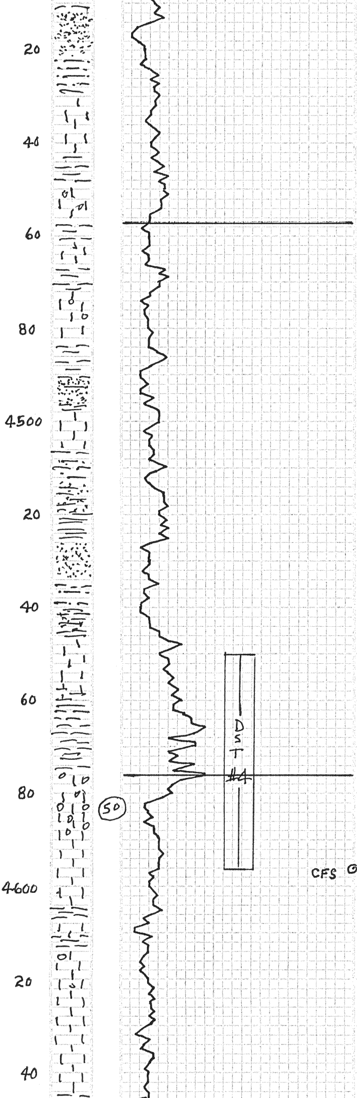
slst, brn, red, sdy in pt

sh, red, calc

Ls, offwh, ool, foss, f pptϕ & vgϕ, F-GSFO, lt stn, sl odor, lt even stn, pFL

Stark 4400
(-1188)

sh, dk gy



ss, ltred/pink, vfgd, NS, NO, NF

Morgan Mud @ 4420; vis 69
wt 9.1
lcm 6

sh red, slst red

Ls, tan, ool, foss; Ls, gy-mgy, fxln, cky, NS, NO, NF

sh, red, gy, grn, pyr

Ls, offwh, sl ool, cky, tr vg ϕ, tr ddstn, NFO, NO, NF

B/KC 4457
(-1245)

Ls, gy, fxln, cky, NS, NO, NF

sh, red, brn, grn

Ls, buff-gy, ool, foss, sm fxln, cky, NS, NO, NF

sh, red, grn, gy

ss, red, vfgd, NS, NO, NF

Ls, ltgy, fxln, sl foss, NO, NS, NF

sh, red, brn, sdy

sh, red, gy

ss, red, fgd, NS, NO, NF

sh, brngy, sdy

Ls, wh-ltgy, ool, foss, dse, NVϕ, NO, NS, NF

sh, gy, red

Pawnee 4576
(-1364)

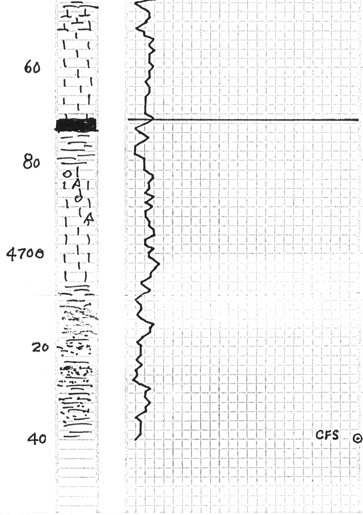
Ls, offwh, ool, foss, crs oolts, p-f IGϕ & oocϕ, sm vgϕ, sct stn, F-GSO, sl odor, PFL

Morgan Mud @ 4597; vis 76
wt 9.1
lcm 9

Ls, mgy, fxln, cky, NS, NO, NF

Ls, gy-tan, ool mpt, fxln, cky, NS, NO, NF

Ls, mgy, fxln, cky, NS, NO, NF



Ls, dkgy, argl, foss, organ matter

Ls, tan, ool in pt, mstly fxln, sl cky, NS, NO, NF

Cherokee 4671
(−1459)

sh, bl, dkgy

sh, gy, red, brn, grn

Ls, tan, ool, foss, sm fxln, sl Δty, NS, NO, NF

Ls, cm-tan, sl ool, mstly fxln, cky, NS, NO, NF

sh, grn, red, brn, gy

AA w/ cl ss clusters, vp srtd, cgrd, NS, NO, NF

vc sh (red, gy, purple), ss, vcgd, psrtd AA; sm large indv sd grns (org, cl), NO, NS, NF

RTD 4740

TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Muffin Drilling Co., Inc.

250 N. Water, Ste 300
Wichita Ks 67202

ATTN: Ken Wallace

9-1S-37W

Jones B #3-9

Job Ticket: 58302 **DST#: 1**

Test Start: 2014.05.19 @ 01:46:00

GENERAL INFORMATION:

Formation: **Lans - D**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 03:45:30
Time Test Ended: 09:47:00

Test Type: Conventional Bottom Hole (Initial)
Tester: Royal Fisher
Unit No: #54

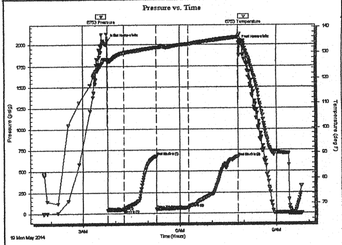
Interval: 4201.00 ft (KB) To 4256.00 ft (KB) (TVD)
Total Depth: 4256.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 3212.00 ft (KB)
3202.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 6753 **Inside**
Press@RunDepth: 66.40 psig @ 4202.00 ft (KB)
Start Date: 2014.05.19 End Date: 2014.05.19
Start Time: 01:46:00 End Time: 09:47:00

Capacity: 8000.00 psig
Last Calib.: 2014.05.19
Time On Btm: 2014.05.19 @ 03:45:15
Time Off Btm: 2014.05.19 @ 07:49:45

TEST COMMENT: 30 - IF - *Surface blow* built to 6 1/4"
60 - ISI - No Return
60 - FF - Weak surface started 4 mins in and built to 1 1/4"
90 - FSI - No Return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2046.27	127.39	Initial Hydro-static
1	33.31	126.59	Open To Flow (1)
31	44.68	129.83	Shut-In(1)
91	679.63	131.97	End Shut-In(1)
92	49.73	131.84	Open To Flow (2)
151	66.40	133.25	Shut-In(2)
244	669.07	135.97	End Shut-In(2)
245	2022.04	136.64	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
94.00	GOCM - 50M - 40o - 10G	0.46
15.00	Free Oil	0.07

Gas Rates

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

TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

250 N. Water, Ste 300
Wichita Ks 67202

ATTN: Ken Wallace

9-1S-37W

Jones B #3-9

Job Ticket: 58303 **DST#: 2**

Test Start: 2014.05.19 @ 21:47:00

GENERAL INFORMATION:

Formation: **Lans - G**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 23:53:45
Time Test Ended: 04:54:00

Interval: 4267.00 ft (KB) To 4310.00 ft (KB) (TVD)
Total Depth: 4310.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

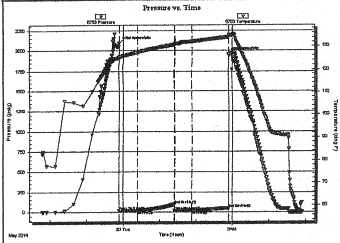
Test Type: Conventional Bottom Hole (Initial)
Tester: Royal Fisher
Unit No: #54

Reference Elevations: 3212.00 ft (KB)
3202.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 6753 **Inside**
Press@RunDepth: 21.22 psig @ 4268.00 ft (KB)
Start Date: 2014.05.19 End Date: 2014.05.20
Start Time: 21:47:00 End Time: 04:54:00

Capacity: 8000.00 psig
Last Calib.: 2014.05.20
Time On Btm: 2014.05.19 @ 23:53:15
Time Off Btm: 2014.05.20 @ 02:54:00

TEST COMMENT: 30 - IF - No Surface blow
60 - ISI - No Return
30 - FF - No Surface blow
60 - FSI - No Return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2091.14	125.02	Initial Hydro-static
1	16.66	124.66	Open To Flow (1)
31	18.28	127.32	Shut-In(1)
91	95.71	130.58	End Shut-In(1)
92	20.46	130.61	Open To Flow (2)
121	21.22	132.06	Shut-In(2)
181	49.08	133.98	End Shut-In(2)
181	1955.00	134.63	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
2.00	OSM - 100M - oil spots	0.01

Gas Rates

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

TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

250 N. Water, Ste 300
Wichita Ks 67202

ATTN: Ken Wallace

9-1S-37W

Jones B #3-9

Job Ticket: 58304 **DST#: 3**

Test Start: 2014.05.20 @ 18:52:00

GENERAL INFORMATION:

Formation: **Lans. 'J'**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 20:59:00
Time Test Ended: 03:53:00

Test Type: Conventional Bottom Hole (Initial)
Tester: Royal Fisher
Unit No: #54

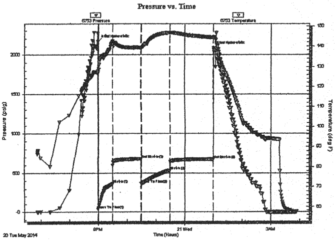
Interval: 4307.00 ft (KB) To 4405.00 ft (KB) (TVD)
Total Depth: 4405.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 3212.00 ft (KB)
3202.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 6753 **Inside**
Press@RunDepth: 534.41 psig @ 4308.00 ft (KB)
Start Date: 2014.05.20 End Date: 2014.05.21
Start Time: 18:52:00 End Time: 03:53:00

Capacity: 8000.00 psig
Last Calib.: 2014.05.21
Time On Btm: 2014.05.20 @ 20:58:45
Time Off Btm: 2014.05.21 @ 01:00:30

TEST COMMENT: 30 - IF - Surface blow built to bottom of bucket in 8 mins
60 - ISI - No Return
60 - FF - Surface blow built to bottom of bucket in 21 mins.
90 - FSI - No Return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2162.32	127.78	Initial Hydro-static
1	36.11	126.45	Open To Flow (1)
31	360.41	142.23	Shut-In(1)
91	680.71	139.11	End Shut-In(1)
91	361.18	138.94	Open To Flow (2)
151	534.41	146.67	Shut-In(2)
241	677.57	144.33	End Shut-In(2)
242	2081.73	144.28	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
846.00	MW - 5M - 95W	6.77
292.00	OSWM - 65M - 35W - oil spots	4.10

Gas Rates

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

TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

250 N. Water, Ste 300
Wichita Ks 67202

ATTN: Ken Wallace

9-1S-37W

Jones B #3-9

Job Ticket: 58305 **DST#: 4**

Test Start: 2014.05.21 @ 22:21:00

GENERAL INFORMATION:

Formation: **Pawnee**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 00:21:45
Time Test Ended: 05:14:15

Test Type: Conventional Bottom Hole (Initial)
Tester: Royal Fisher
Unit No: #54

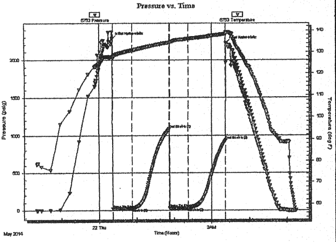
Interval: 4550.00 ft (KB) To 4596.00 ft (KB) (TVD)
Total Depth: 4596.00 ft (KB) (TVD)
Hole Diameter: 7.88 Inches Hole Condition: Good

Reference Elevations: 3212.00 ft (KB)
3202.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 6753 **Inside**
Press@RunDepth: 31.79 psig @ 4551.00 ft (KB)
Start Date: 2014.05.21 End Date: 2014.05.22
Start Time: 22:21:00 End Time: 05:14:15

Capacity: 8000.00 psig
Last Calib.: 2014.05.22
Time On Btm: 2014.05.22 @ 00:21:30
Time Off Btm: 2014.05.22 @ 03:22:45

TEST COMMENT: 30 - IF - Surface blow built to 1/4"
60 - ISI - No Return
30 - FF - No Surface blow
60 - FSI - No Return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2281.53	127.80	Initial Hydro-static
1	20.53	126.81	Open To Flow (1)
31	25.18	130.70	Shut-In(1)
91	1087.13	134.44	End Shut-In(1)
91	30.37	134.02	Open To Flow (2)
122	31.79	136.19	Shut-In(2)
181	938.67	138.36	End Shut-In(2)
182	2224.29	139.33	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
6.00	OSM - 100M - Oil Spots	0.03

Gas Rates

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