GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

COMPANY Murfin Drilling Co., Inc

LEASE Verna Poore # 2-7

FIELD

LOCATION 560' FSL, 990' FEL,

SEC 7 TWSP 1s RGE 35w

COUNTY Rawlins STATE Ks

CONTRACTOR Murfin Drilling Co., Inc. Rig #3

SPUD 10/13/18 COMP 10/23/18

RTD 4540' LTD 4543'

MUD UP 3650' TYPE MUD Chem

ELEVATIONS

KB 3236'

DF

GL 3231'

Measurements Are All From KB

CASING

SURFACE 8 5/8" @ 303' w/ 285 sx

PRODUCTION 5 1/2" @ 4533' w/ 600 sx

ELECTRICAL SURVEYS

DI w/ GR, CND, Micro, Sonic

SAMPLES SAVED FROM 3650 TO RTD

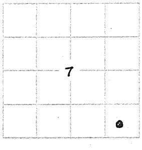
DRILLING TIME KEPT FROM 3650 TO RTD

SAMPLES EXAMINED FROM 3650 TO RTD

GEOLOGICAL SUPERVISION FROM 3750 TO RTD

GEOLOGIST ON WELL Ken Wallace

FORMATION TOPS	LOG	SAMPLES
Anh	3134 (+102)	3133 (+103)
B/Anh	3170 (+66)	3172 (+64)
Red Eagle	3692 (-456)	3694 (-458)
Foraker	3741 (-505)	3742 (-506)
Topeka	3948 (-712)	3956 (-720)
Oread	4061 (-825)	4067 (-831)
Lansing	4170 (-934)	4171 (-935)
Stark Sh	4382 (-1146)	4385 (-1149)
BKC	4438 (-1202)	4437 (-1201)
RTD		4540
LTD	4543	



REMARKS

Production casing set to further evaluate DST results.

Ken Wallace

10/13/18 - MIRT
10/14/18 - Depth 303'. 8 5/8" set @ 303'
10/15/18 - Depth 1775'
10/16/18 - Depth 3145'
10/17/18 - Depth 3720'
10/18/18 - Depth 4170'
10/19/18 - Depth 4244'. Ran DST #1
10/20/18 - Depth 4333'. Ran DST #2
10/21/18 - Depth 4386' - Ran DST #3 & #4
10/22/18 - RTD 4540 - Logging
10/23/18 - RTD 4540 - 5 1/2" Casing set @ 4533'

LEGEND

▨ Anhydrite
▨ Salt
▨ Sandstone
▨ Shale
▨ Carb sh
▨ Limestone
▨ Ool.Lime
▨ Chert
▨ Dolomite

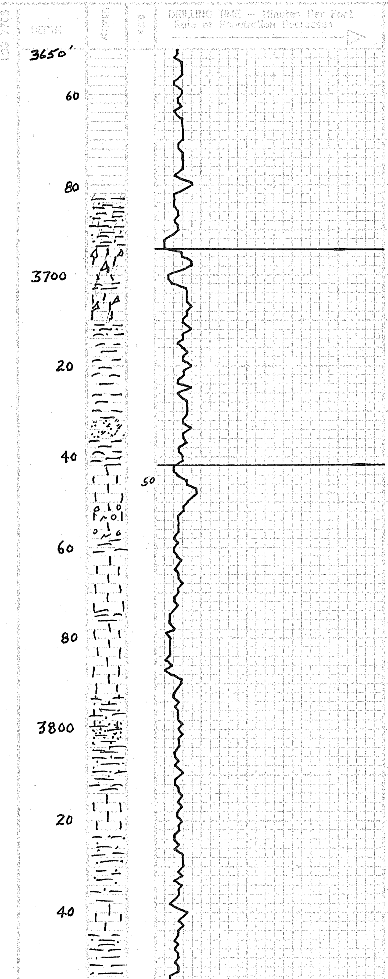
SCALE " = 100'

DEPTH

DRILLING TIME — Minutes Per Foot
Rate of Penetration Decreases

SAMPLE DESCRIPTIONS

REMARKS



sh, rd, slty

Ls, lt gy-m gy, fxln, sm grnlr, abd org Δ, sl foss, NS

sh, rd, slty

SS, gnsh-gy, v fgd

sh, lt grn, gy

Ls, off-wh, grnl, gd ppt ϕ, gd ppt stn, ussfo, sl Fl, No odor

Ls, lt gy-m gy, ool, sl foss, NS

sh, grn, gy

Ls, lt-m gy, fxln, cky, sty (bone, lt gy) NS

Ls, dol, lt brn, fxln-sucro, sl foss, fr vg & foss cast ϕ, NS

Sh, rd, slty, calc

sm vfgd ss, rd

Ls, lt gy, fxln, ool npt, cky, NS

sh, rd, slty

Ls, wh, fxln, dse, foss, NS

sh, rd, gummy, sm slst, pyt

Mud- Morgan Mud (MM)

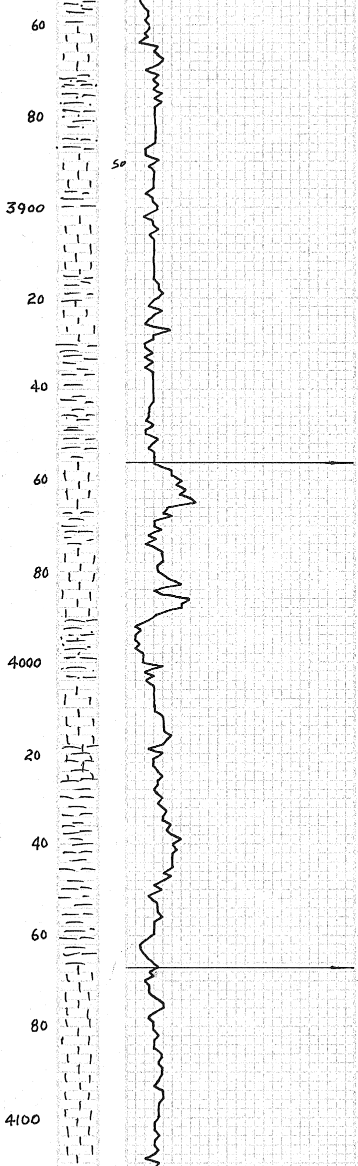
DST's-Trilobite

Pipe Strap @ 3553'
Strap 0.17' short
(No correction)

Red Eagle
3694 (-458)

MM @ 3725'
Wt. 8.7
Vis 79
Cl 700
LCM 4

Foraker
3742 (-506)



Ls, lt gy, fxln, sm ool, cky, NS

sh, rd, slty

Ls, wh-tan, ool-fxln, foss, gd ppt ϕ, gd vug ϕ, tarry oil, tr fo, NO, NFL

Ls, tan, offwh, ool, sm m gy Ls fxln, NS

sh, rd

Ls, offwh, ool, foss, sm grnsh gy Ls, gralr, NS

sh, red

Topeka
3956 (-720)

Ls, wh, granlr (sd?), sm lt brn-tan, fxln-ool, Ls NS

sh, rd gummy

Ls, wh-lt gy, vfxln-micro, dse, sl foss, sl cky, NS

Ls, AA, sm ool, dd stn, pry

sh, gy, rd, slty

Ls, offwh-gy, fxln, sm gralr, sl cky, NS

sh, purple, calc

sh, rd-purple

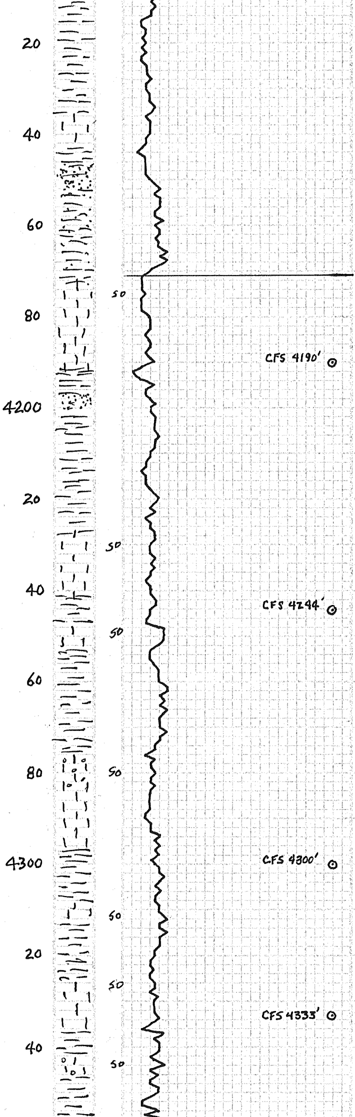
sh, dk gy, gy

Oread
4067 (-831)

Ls, wh, ool, foss, f intrgrl ϕ, NS, NO

Ls, lt gy, sm tan, fxln, dse, NS

Ls, md gy-gy, fxln, dse, cky, NS



sh, gy, sm dk gy-bl

Ls, gy-tan, dse, fxln, cky
NS

sh, gy: ss, lt gy, vfgd, NS K

sh, rd, slty, sdy

Lansing
4171 (-935)

Ls, tan, micro-fxln, dse, f-gd vg & ppt ϕ, gd tarry stn, ssfo on bk, NO, NFL

MM @ 4176'
wt. 9.1
Vis 58
Cl 700
LCM 5

Ls, tan-lt gy, fxln, dse, sl cky, NS

sh, gy, rd

ss, lt gy, vfgd, s&P tex, gd IGϕ, dk stn, calc cemt, NFO, NO, NFL

sh, rd, gy

Ls, tan-wh, micro-fxln, sl foss, f vg & ppt ϕ, gd sptd-sat stn, sm edge stn, SSFO on bk, No od, NFL, sm pyr

sh, rd, gy, grn

Ls, lt gy, micro-fxln, dse, sl foss, sl cky, tr vg & ppt ϕ, edge stn, Nfo, No od, NFL

MM @ 4254'
wt. 8.8
Vis 63
Cl 1500
LCM 5

sh, rd, brk rd, gy

Ls, tan-off wh, ool, sm f-md xln, gd IGϕ, gsfo & gbb, gd od, gd sat stn, sl FL.

Ls, gy, micro-fxln, cky, NS

sh, lt gy, soft, rd

Ls, tan, fxln, dse, gd vgϕ, dk sptd stn, sm sat stn, SSFO on bk, SS gbb, VS od NFL

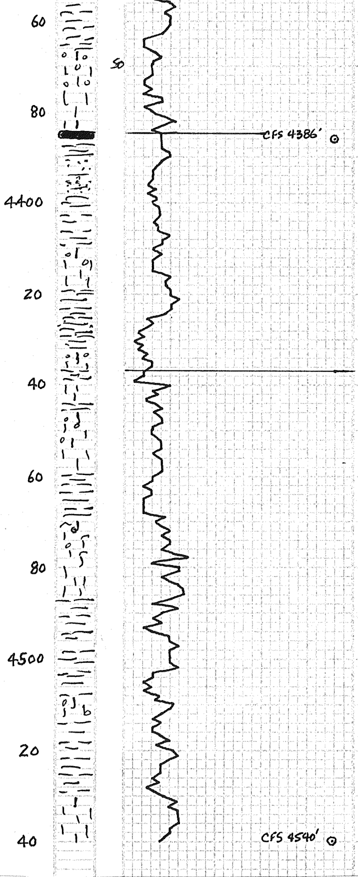
sh, rd

Ls, off wh, sm lt gy, fxln, gd ppt ϕ, p vgϕ, gd dk stn, vssfo on bk

MM @ 4333'
wt. 9.0
Vis 60
Cl 1600
LCM 6

sh, gy, rd

Ls, wh, f-mxln, ool in pt, f vg ϕ, dk stn, NSfo, No od, mstly dd stn, NFL



Sh, rd, gy

Ls, lt gy, ool, sm mxln, sl foss, gd IGφ, g ppt φ, sm bldg oil, gd spotd - sat stn, g sfo on bk, gd odor, sl FL

Stark sh
4385(-1149)

Sh, bl, dk gy

Sh, rd, slty

MM @ 4386'
Wt. 9.1
Vis 53
cl 1800
Lcm 5

Ls, tan, ool, foss, NS, NFL

Ran buttm bit
4386 - RTD

Sh, rd, gummy, slty in pt

Mound City
4437(-1201)

Ls, tan, ool, fxln in pt, foss, NS

Ls, lt gy, fxln, sl ool, ckq, NS, NFL

Sh, rd, sm grn

Ls, gy, sm purple strks, sl ool in pt, foss (coral), NS NFL

Sh, rd, gy, grn, purple

AA, tr Δ

Ls, gy, ool, foss, NS

Sh, rd, gy

Ls, gy, micro - fxln, vcky NS

TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co INC

250 N. Water
STE 300
Wichita, KS 67202
ATTN: Ken Wallace

7-1S.-35W **Rawlins, KS**

Verna Poore # 2-7

Job Ticket: 64123 **DST#: 1**

Test Start: 2018.10.18 @ 18:10:00

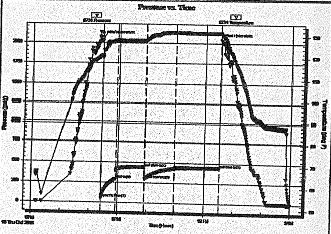
GENERAL INFORMATION:

Formation:	**Lansing "A - D"**		
Deviated:	No Whipstock: ft (KB)	Test Type:	Conventional Bottom Hole (Initial)
Time Tool Opened:	20:25:50	Tester:	Martine Salinas
Time Test Ended:	02:59:40	Unit No:	82
Interval:	**4104.00 ft (KB) To 4244.00 ft (KB) (TVD)**	Reference Elevations:	3236.00 ft (KB)
Total Depth:	4244.00 ft (KB) (TVD)		3231.00 ft (CF)
Hole Diameter:	7.88 inches Hole Condition: Good	KB to GR/CF:	5.00 ft

Serial #: 8734 **Outside**

Press@RunDepth:	428.95 psig @ 4105.00 ft (KB)			Capacity:	8000.00 psig
Start Date:	2018.10.18	End Date:	2018.10.19	Last Calib.:	2018.10.19
Start Time:	18:10:00	End Time:	02:59:40	Time On Btm:	2018.10.18 @ 20:25:40
				Time Off Btm:	2018.10.19 @ 00:32:00

TEST COMMENT: 30-IF-S.blow built to B.O.B (12 inches) @ 6 mins (blow increased to 41 1/2")
60-ISI-No blow
60-FF-S.blow built to B.O.B (12 inches) @ 13 1/2 mins (blow increased to 29 3/4")
90-FSI-No blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2062.82	120.78	Initial Hydro-static
1	53.86	119.92	Open To Flow (1)
31	293.79	127.49	Shut-In(1)
90	445.04	127.72	End Shut-In(1)
91	297.26	127.68	Open To Flow (2)
152	428.95	131.36	Shut-In(2)
246	443.75	131.18	End Shut-In(2)
247	2038.08	130.78	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
315.00	MSW 2%M, 98%W	2.81
275.00	GHMCW 5%G, 42%M, 53%W	3.86
350.00	SOSWCM 1%O, 15%W, 84%M	4.91

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

7-1S.-35W **Rawlins, KS**

Verna Poore # 2-7

Job Ticket: 64124 **DST#: 2**

Test Start: 2018.10.19 @ 14:08:00

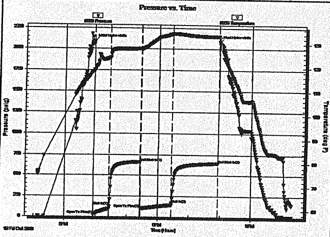
GENERAL INFORMATION:

Formation:	**LKC "G"**		
Deviated:	No Whipstock: ft (KB)	Test Type:	Conventional Bottom Hole (Initial)
Time Tool Opened:	15:55:20	Tester:	Martine Salinas
Time Test Ended:	22:18:00	Unit No:	82
Interval:	**4254.00 ft (KB) To 4300.00 ft (KB) (TVD)**	Reference Elevations:	3236.00 ft (KB)
Total Depth:	4300.00 ft (KB) (TVD)		3231.00 ft (CF)
Hole Diameter:	7.88 inches Hole Condition: Good	KB to GR/CF:	5.00 ft

Serial #: 8959 **Inside**

Press@RunDepth:	141.75 psig @ 4255.00 ft (KB)	Capacity:	8000.00 psig
Start Date:	2018.10.19	End Date:	2018.10.19
Last Calib.:	2018.10.19		
Start Time:	14:08:00	End Time:	22:18:00
Time On Btm:	2018.10.19 @ 15:55:10		
Time Off Btm:	2018.10.19 @ 19:57:00		

TEST COMMENT: 30 - IFP - S.blow built to 8"
60 - ISI - S.blow back @ 2 mins died @ 30 mins
60 - FFP - S.blow built to B.O.B (12 inches) @ 46 mins (blow increased to 14 1/4")
90 - FSI -S.blow back built to 3/4" & died @ 42 mins



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2091.79	119.15	Initial Hydro-static
1	26.92	118.37	Open To Flow (1)
31	97.47	124.07	Shut-In(1)
91	661.93	127.84	End Shut-In(1)
91	105.74	127.67	Open To Flow (2)
151	141.75	134.22	Shut-In(2)
241	646.35	133.16	End Shut-In(2)
242	2087.72	132.41	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
120.00	SOMCW10%O, 20%M, 70%W	0.59
60.00	OCWM 20%O, 20%W, 60%M	0.32
62.00	OCM 40%O, 60%M	0.87
20.00	MCO 30%M, 70%O	0.28
10.00	CGO 30%G, 70%O	0.14
0.00	156' GIP	0.00

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

7-1S.-35W **Rawlins, KS**

Verna Poore # 2-7

Job Ticket: 64125 **DST#: 3**

Test Start: 2018.10.20 @ 07:51:00

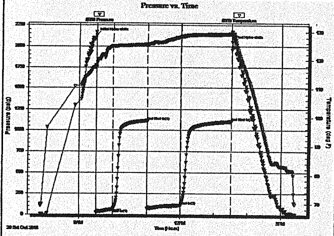
GENERAL INFORMATION:

Formation:	**G' & H**		
Deviated:	No Whipstock: ft (KB)	Test Type:	Conventional Bottom Hole (Initial)
Time Tool Opened:	09:30:20	Tester:	Martine Salinas
Time Test Ended:	15:25:00	Unit No:	82
Interval:	**4294.00 ft (KB) To 4333.00 ft (KB) (TVD)**	Reference Elevations:	3236.00 ft (KB)
Total Depth:	4333.00 ft (KB) (TVD)		3231.00 ft (CF)
Hole Diameter:	7.88 inches Hole Condition: Good	KB to GR/CF:	5.00 ft

Serial #: 8959 **Inside**

Press@RunDepth:	111.67 psig @ 4295.00 ft (KB)	Capacity:	8000.00 psig
Start Date:	2018.10.20	End Date:	2018.10.20
Last Calib.:	2018.10.20		
Start Time:	07:51:00	End Time:	15:25:00
Time On Btm:	2018.10.20 @ 09:30:10		
Time Off Btm:	2018.10.20 @ 13:31:39		

TEST COMMENT: 30-IFP-S.blow built to 10 1/4"
60-ISI-No blow
60-FFP-S.blow built to 10"
90FSI-S.blow @ 4 mins died @ 20 mins



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2135.04	118.35	Initial Hydro-static
1	26.00	117.35	Open To Flow (1)
30	64.12	125.03	Shut-In(1)
91	1107.97	125.63	End Shut-In(1)
91	71.26	125.52	Open To Flow (2)
151	111.67	128.30	Shut-In(2)
241	1103.32	129.28	End Shut-In(2)
242	2054.81	129.72	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
73.00	SOHWCM 10%O, 40%W, 50%M	0.36
124.00	GOCM 2%G, 16%O, 82%M	0.79
0.00	124' GIP	0.00

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

7-1S.-35W **Rawlins, KS**

Verna Poore # 2-7

Job Ticket: 64726 **DST#: 4**

Test Start: 2018.10.21 @ 01:50:00

GENERAL INFORMATION:

Formation: **LKC " J "**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 04:27:40
Time Test Ended: 09:12:30

Interval: 4331.00 ft (KB) To 4386.00 ft (KB) (TVD)
Total Depth: 4386.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

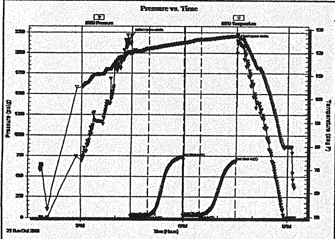
Test Type: Conventional Bottom Hole (Reset)
Tester: Martine Salinas
Unit No: 82

Reference Elevations: 3236.00 ft (KB)
3231.00 ft (CF)
KB to GR/CF: 5.00 ft

Serial #: 8959 **Inside**
Press@RunDepth: 32.34 psig @ 4332.00 ft (KB)
Start Date: 2018.10.21 End Date: 2018.10.21
Start Time: 01:50:00 End Time: 09:12:30

Capacity: 8000.00 psig
Last Calib.: 2018.10.21
Time On Btm: 2018.10.21 @ 04:27:20
Time Off Btm: 2018.10.21 @ 07:31:50

TEST COMMENT: 30-IF-S.blow built to 2" & decreased to 1 1/2"
60-ISI-No blow
30-FF-No blow
60-FSI-No blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2216.94	119.94	Initial Hydro-static
1	22.37	119.33	Open To Flow (1)
31	27.37	121.52	Shut-In(1)
91	742.54	124.06	End Shut-In(1)
92	29.70	123.85	Open To Flow (2)
121	32.34	125.45	Shut-In(2)
183	690.49	127.08	End Shut-In(2)
185	2144.86	127.36	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
15.00	OSM 3%O, 97%M	0.07

* Recovery from multiple tests

Gas Rates

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