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DRILLING TIME AND SAMPLE LOG

OPERATOR: Murfin Drilling Co., Inc.
LEASE: Shaw-Albers WELL NO.: 1-6
FIELD: Wildcat
LOCATION: 1275'FSL, 2185'FEL (NE, NW, SW, SE)
SEC.: 6 TWP: 6S RANGE: 29W
COUNTY: Sheridan STATE: KS
API NO.: 15-179-21341-00-00

ELEVATIONS
KB 2802'
GL 2791'
Measurements are all from KB

CONTRACTOR: Murfin Drilling Co., Inc., Rig #2
COMMENCED: September 20, 2013 COMPLETED: 9/26/13
ROTARY TOTAL DEPTH: 4220 LOG TOTAL DEPTH: 4224'
GEOLOGICAL SUPERVISION FROM: 3580' to: T.D.
MUD-UP DEPTH: 3307' MUD TYPE: Chemical Polymer

CASING RECORD
SURFACE: 8 5/8", 23# @265', circ.
PRODUCTION: None-P&A.

FORMATION	SAMPLE TOP	SAMPLE SUBSEA	LOG TOP	LOG SUBSEA	STRUCTURAL COMPARISON
Stone Corral Anhy.	2548	(+254)	2548	(+254)	+1
Base Anhydrite	2582	(+220)	2583	(+219)	-0-
Topeka Fm.	3684	(-882)	3683	(-881)	-5'
Lecompton Ls.	3801	(-999)	3798	(-996)	-5'
Heebner Shale	3860	(-1058)	3863	(-1061)	-11'
Toronto Ls.	3889	(-1087)	3894	(-1092)	-12'
Lansing Group	3906	(-1104)	3908	(-1106)	-12'
Stark Shale	4063	(-1261)	4066	(-1264)	-12'
Base KS. City Gp.	4110	(-1308)	4112	(-1310)	-11'
Lenapah Ls.	4149	(-1347)	4151	(-1349)	-17'
Total Depth	4220		4224		

WIRELINE SURVEYS
Pioneer Energy Services (Log-Tech): Dual Comp. Porosity, Dual Induction, BHC Sonic and Micro log

LOCATION MAP
6
Location Murfin Shaw-Albers #1-6

Reference Well for Structural Comparison: MDC R+T Shaw #1-32 (NE 32-5S-29W)
Comments and Recommendations: Recommended well be plugged and abandoned.

DST # 1 ZONE: Toronto, Lansing 'A' + 'B' Zones
INTERVAL: 3858'-3937'

Pressures:	Time	Press.	RECOVERY
1. Initial Hydrostatic		1983 psi	116' Hvy. Oil cut watery Mud
2. Initial Flow: Start	0	33 psi	(60% oil, 10% SW., 30% Mud)
3. Initial Flow: End	30	72 psi	117' Hvy Oil + Water cut Mud
4. Initial Shut-in: End	60	1244 psi	(50% oil, 20% SW., 40% Mud)
5. Final Flow: Start	0	80 psi	Blow Desc:
6. Final Flow: End	60	109 psi	I.F.-4" in 30 Min.
7. Final Shut-in: End	90	1264 psi	I.S.I.-No blow
8. Final Hydrostatic		1997 psi	F.F.-No blow
			F.S.I.-No blow

BHT: 116°F
Rw: N.A.

Strap 1.15 long, Deviation 3/4°

DST # 1
Interval: 3858-3937'
8673 Chart
Depth: 3859'

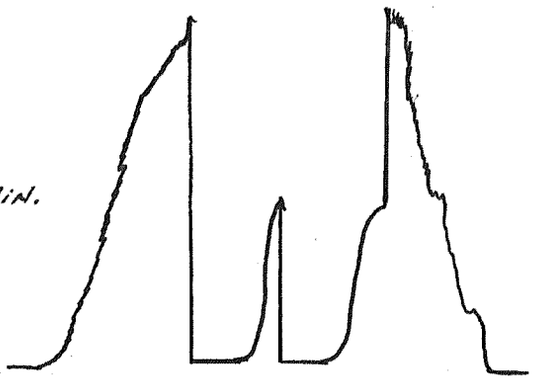
DST # 2 ZONE: Lansing 'E' + 'F' Zones
INTERVAL: 3956'-3980'

DST # 2
Interval: 3956'-80'
8673 Chart
Depth: 3957'

Pressures:	Time	Press.	RECOVERY
1. Initial Hydrostatic		2063 psi	2' Clean Oil
2. Initial Flow: Start	0	18 psi	1' Oil cut Mud
3. Initial Flow: End	30	19 psi	(60% oil)
4. Initial Shut-in: End	30	939 psi	
5. Final Flow: Start	0	22 psi	Blow Desc:
6. Final Flow: End	30	23 psi	I.F.-Surf. Blow-Died 4 Min.
7. Final Shut-in: End	30	907 psi	ISI-No blow
8. Final Hydrostatic		1958 psi	F.F.-Surf.-Died 30 sec.
			FSI-No blow

BHT: 114°F

Rw: _____



DST # 3 ZONE: Kansas City 'J' Zone

INTERVAL: 4030'-4070'

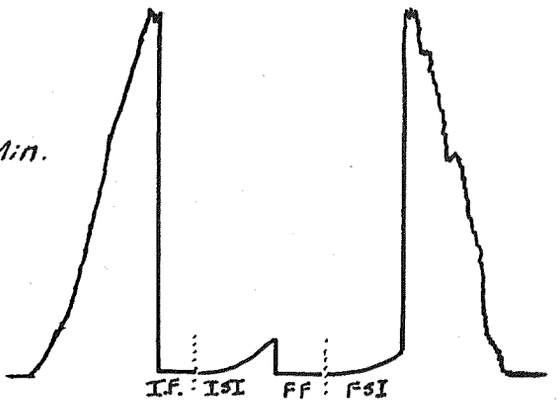
Pressures:	Time	Press.	RECOVERY
1. Initial Hydrostatic		2010 psi	2' Oil spotted Mud
2. Initial Flow: Start	0	18 psi	
3. Initial Flow: End	30	18 psi	
4. Initial Shut-in: End	60	211 psi	Blow Desc:
5. Final Flow: Start	0	18 psi	I.F.-Surf. blow, died 20 Min.
6. Final Flow: End	30	21 psi	ISI-No blow
7. Final Shut-in: End	60	124 psi	F.F.-No blow
8. Final Hydrostatic		1966 psi	FSI-No blow

BHT: 111°F

Rw: _____

DST # 3 8673 Chart

Interval: 4030'-4070' Depth: 4031'



ABBREVIATIONS USED

ROCK TYPES:

Ls - limestone
Sh - Shale
Ss - Sandstone
Slts - Siltstone
Cgl - Conglomerate
Cht - Chert
Qtz - Quartzite
Gran - Granite
Dol - Dolomite
Chlk - chalky

COLOR:

Wh - White
Crm - Cream
Clr - Clear
Rd - Red
Grn - Green
Gry - Grey
Blk - Black
Mot - Mottled

HARDNESS:

Sft - Soft
M.Sft - Moderately soft
Hrd - Hard
V.Hrd - Very hard

FABRIC:

Fn.grn - finegrained
VFG - Very fine grained
Med - Medium
Crs - Coarse
Det - Detrital
Fossi - Fossiliferous
Xln - Crystalline
Mxln - Microcrystalline
Ool - Oolitic
Oom - Oomoldic
Mat - Matrix

OTHER TERMS:

fl - Fluorescence (of oil)
min fl - mineral fluorescence
pyr - pyritic
glau - glauconitic
carb - carbonaceous
stn - stain (of oil)
cut - oil cut
AA - as above
ø - porosity
NSFOC - no stain, fluorescence, odor, or cut (of oil)
smpl - sample
perm - permiability
F.O. - free oil
vug - vugular
tr - trace
w/ - with

MODIFIERS:

gd - Good
fr - Fair
pr - Poor
ex - excellent
v - very
w - well
tr - trace
occ - occasional
vis - visible
N - no
gran - granular
intgran - intergranular
PP - pinpoint
dd - dead
ppy - peppy

TEXTURE:

One - Dense
Cly - Clayey
Fri - Friable
Earth - Earthy
Hack - Hackly
Fiss - Fissile
Vit - Vitreous
Vug - Vugular
Mic - Micritic

OIL SHOWS

- ○ Weak Oil Show
- ◔ Fair Oil Show
- ◑ Good Oil Show
- ◉ Excellent Oil Show

Rate of Penetration (Minutes per foot)

.5 1 2 3 4 5 6 7 8 9 10

2500

Drilling with PDC Bit

2550

Stone Corral Anhydrite (+254') (log top)

Base of Anhydrite (+220')

2600

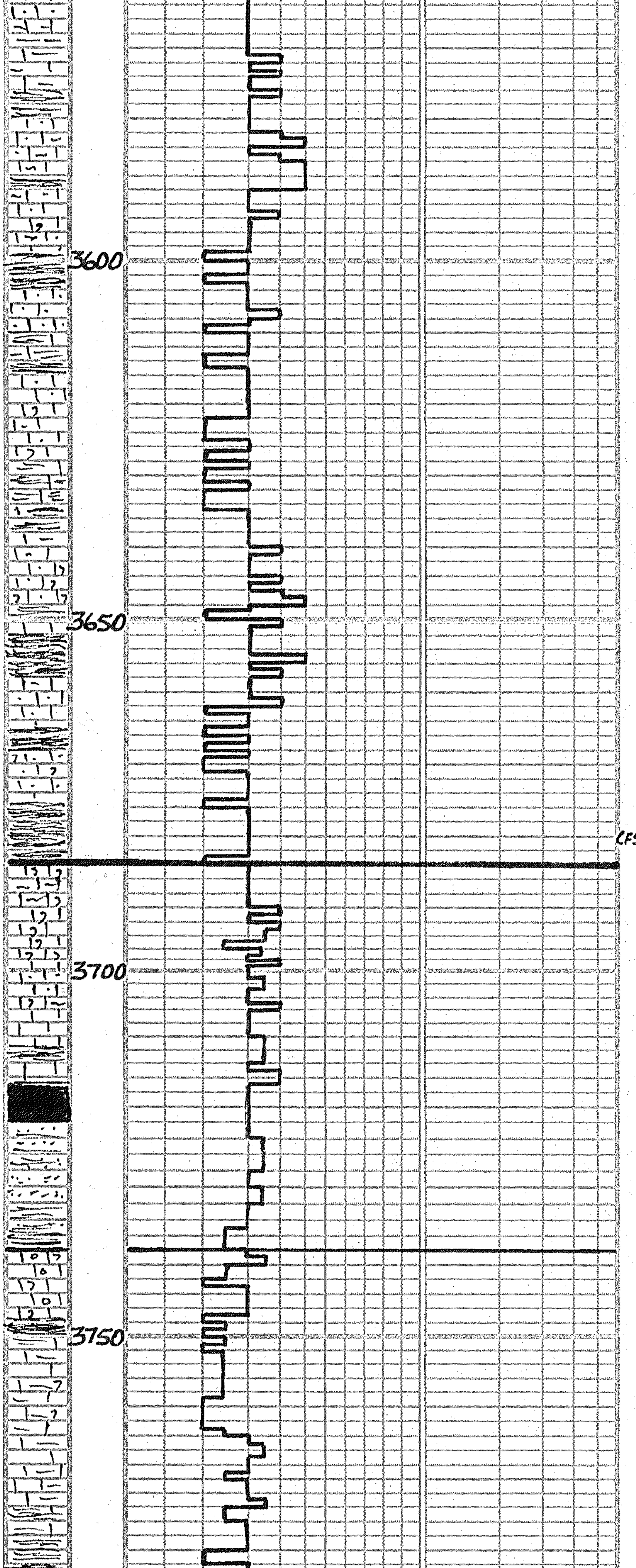
Displace Mud System at 3307'

3550

Start 1' drilling time at 3560'

Start 10' wet and dry samples at 3580'

Sh. gry-blk, m-sft, dns, earthy,



tr. carb., tr. rd. brn.

Ls: crm.-gry., hrd., dns., fn-VFG xln., foss-v. foss, tr. sndy. NØNSFOC

Sh: m.hrd-m.sft., dns., earthy, occ. carb.

Ls: crm-gry., hrd., dns., fnxln., sh. stnd. occ. foss., tr. v. pr. intpart. Ø NSFOC

Ls: crm-tan-gry., hrd., dns., fn-VFG xln., occ. foss., occ. sndy, tr. sh. stnd. NØNSFOC

Ls: gry.-crm., sft.-hrd., dns., VFG xln. sh. stnd., occ. foss., tr. sndy. NØNSFOC

Ls: crm.-lt. gry., hrd., dns., VFG-mxln. tr. foss., occ. sndy.-v. sndy, tr. gry. sh. stnd. NØNSFOC

Ls: crm.-lt. gry., m.sft.-sl. chky.-hrd., dns., fn-VFG xln., occ. foss. occ. sndy. NØNSFOC

Ls: crm-gry., hrd.-m.sft., occ. sl. chky. occ. foss., occ. sndy. NØNSFOC

tr. Sh: gry.-dk. gry., m.sft.-m.hrd., dns., earthy.-hackly, tr. pyr.

Sh: A.A., occ. rd. brn., hrd.-sft. + clay, earthy

Ls: crm.-lt. gry., hrd., dns., VFG xln., foss-v. foss, tr. sndy. NØNSFOC

Ls: crm-gry., hrd., dns., VFG-mxln. mic. occ. foss.-v. foss., tr. sndy. tr. sh. stnd-rd. NØNSFOC

Sh: lt-dk. gry., m.sft.-m.hrd., dns., earthy.-hackly, tr. sndy-slty

Ls: gry.-crm., hrd., dns., VFG-mxln. mic. sh. stnd., occ. foss NØNSFOC

Ls: gry.-crm., hrd., dns.-m.sft.-sft. chky., occ. foss., tr. sndy. NØNSFOC

Ls: gry-crm., hrd.-m.sft., dns., tr. foss., sndy.-v. sndy.-calc. Ss: gry., v.f.g., hrd., dns., pr. srtd.-tr. chky. A.A. NØNSFOC

Sh: gry.-dk. gry., m.sft.-m.hrd., dns., hackly

Ls: crm.-gry., hrd.-m.sft. + chky., foss-v. foss., VFG-mxln. mic. NØNSFOC

Ls: crm.-lt. gry., hrd-m.hrd., dns., VFG-mxln., mic., foss.-v. foss., abun. rd. sh. stn. NØNSFOC

Topeka Fm. (-882')

Ls: crm., hrd-sft. + chky., VFG-mxln. occ. foss., tr. sh. stnd., tr. mic. tr.-occ. sndy. NØNSFOC

Ls: A.A., occ. v. sndy.-calc. Ss: gry., hrd., dns., VFG, w. srtd., v. w. cmtd. No vis. Ø NSFOC

SS: A.A., occ. fri. A. No vis Ø NSFOC

Sh: rd. brn.-dk. gry., m.sft. dns., occ. sndy., earthy.

Ls: crm. hrd., dns., occ. foss. NØNSFOC

Ls: crm., hrd.-sft. + chky., VFG-mxln., foss.-v. foss.-grnstn., occ. VFG p.p. moldic-oom.? Ø, tr. pr. NSFOC

Ls: crm., hrd.-sft. + chky., VFG-mxln. foss.-v. foss + ool. w/ tr. pp. vug Ø NSFOC

Deer Creek Ls. (-936')

Ls: A.A., more foss., tr. fr-pp vug oom. Ø A.A. NSFOC

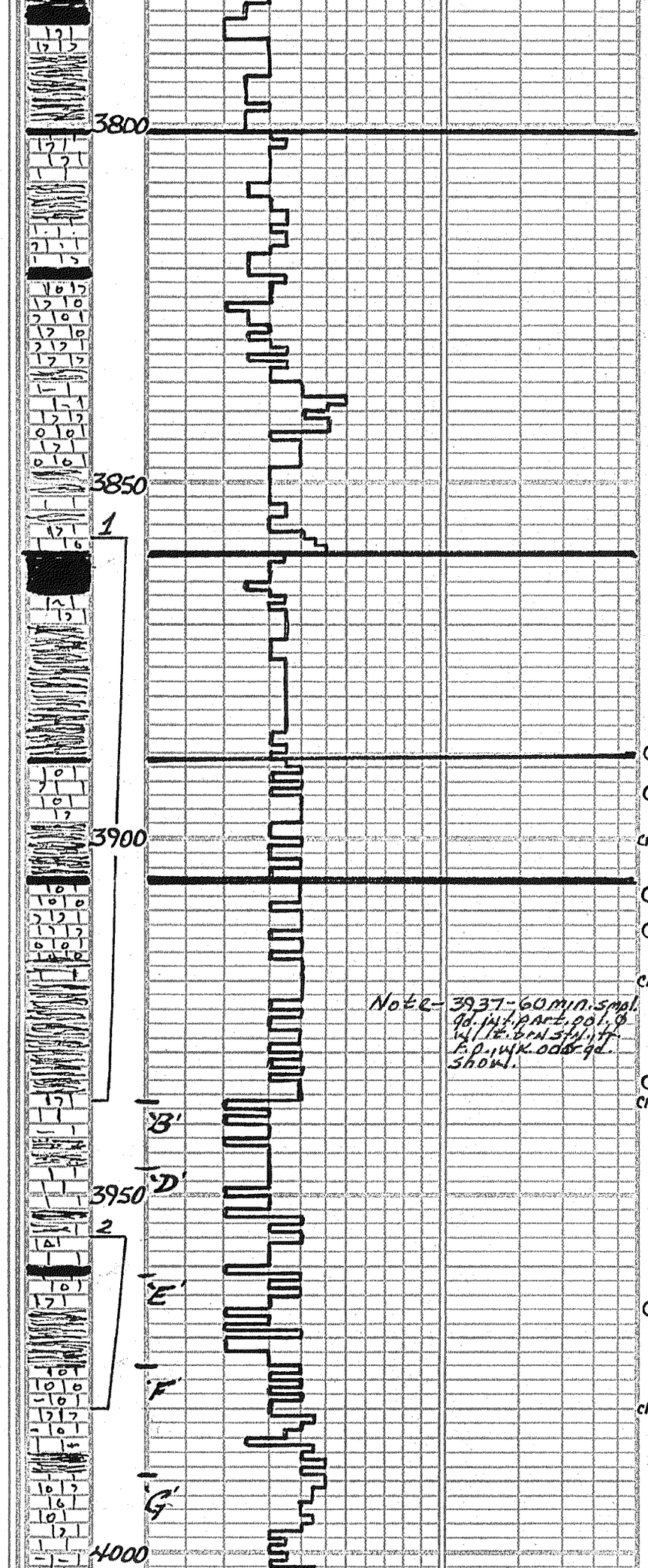
Sh: gry.-grn.-dk. gry.-rd. brn., m.sft dns., earthy-hackly

Ls: crm-wh., hrd., dns., mic-sft. + chky., VFG-mxln., tr. foss. NØNSFOC

Ls: crm-gry., hrd., dns., VFG-mxln. mic., occ. foss., sh. stnd. NØNSFOC

Sh: gry.-blk., m.hrd., dns., hack.

Sh: gry.-blk., m.sft.-m.hrd., dns.,



occ. carb., earthy - hackly

Ls: crm-tan-gry., hrd-sft+chiky., VFG-mxln, occ. foss-v. foss. NΦNSFOC

Ls: crm, hrd.-sft.+chiky. VFG-mxln, fr. mic., fr. foss. NΦNSFOC

Sh: gry.-rd. brn, m. sft., earthy

Ls: crm-wh, hrd.-sft+chiky. VFG mxln-mxln, occ. foss. NΦNSFOC fr. Sh. A.A.

Lacompton Ls. (-999')

Ls: crm., hrd-sft.+chiky., VFG-mxln., foss., fr. sndy NΦNSFOC

Sh: gry.-blk., m. sft.-m. hrd., dns. occ. carb., earthy

fr. Sh: gry., m. sft., earthy

Ls: crm. sft.+chiky.-hrd. dns., mic., VFG-mxln., occ. v. foss. +ool-grnstn. NΦNSFOC

DST #1
3858'-3937'
Rec. 233' HOCWM
2pp. IHP 507 0:1
Deviation 3/4°
strap 1.15' long

Sh: dk. gry., m. sft., earthy

Ls: crm., hrd.-m. sft., VFG-mxln. mic., fr. cht., fr. chiky., occ sh. stn., foss. +ool, NΦNSFOC

Ls: A.A., fr. pr. int. oolΦNSFOC

fr. Sh: gry., m. sft., dns., earthy

Ls: crm.-gry., sft.+chiky.-hrd., dns., fr. mic., occ foss. +ool. fr. sh. stnd. NΦNSFOC

Sh: blk., m. hrd.-m. sft., dns., carb.

Heebner Shale (-1058')

Ls: fan-brn., hrd., dns., VFG xln., fr. foss+sh. stnd. NΦNSFOC

fr. Ls: A.A. NΦNSFOC

Mud Check @ 3900'
M.W. 8.9 Chl. 1,300
Vis. 54 Solids 4.3%
W.L. 6.0 LCM 6#

Sh: gry.-gry. grn., slty.-sndy. sft.-v. sft., earthy.-c/layey

Ls: wh.-crm., hrd., dns., VFG xln., occ. foss. +ool. w/ pcc. pr.-fr. moldic Vug. Φ-most VFG, dk. brn-blk. oil stn., ex. cut+fl., wk. odor, NOF.O.

Toronto Ls. (-1087')
Fair Show

Ls: A.A., Vug.+pp. Vug Φ around foss. grns.; ? perm., dk. brn, stn., ex cut+fl., VSSFO, No odor

Weak Show

Sh: gry. grn., m. sft., dns.) earthy

Sh: A.A. occ. rd brn, s.ft. earthy

Lansing Group (-1104')

Ls: wh.-crm, hrd., dns., VFG xln., occ. foss. +ool. w/ fr.-pr. fn-VFG. pp. Vug. Φ, dk. stn., No odor, No F.O. gd. cut

Weak Show

Ls: A.A., occ. Φ vug show A.A., 1-2 pc. w/ gd. int. oolΦ w/ dk. stn. No odor, NOF.O., ex. cut+fl., ? perm

Weak Show

Sh: rd. brn., s.ft.-m. s.ft., earthy

Sh: rd. brn-gry.-blk., m. sft.-m. hrd., earthy, occ. slty., fr. hackly

Ls: crm-gry., hrd., dns., VFG-mxln mic., fr. foss., fr. sh. stn. NΦNSFOC

Sh: A.A., Ls: crm, hrd. dns., VFG-mxln. mic., rare pc. w/ pp. vug Φ, show A.A., V? perm.

Good Show-60 Min.
Very Weak Show

Mud Check @ 3937'
M.W. 9.0 Solids 5%
Vis. 56 Chl. 1,100 ppm
W.L. 6.0 LCM 6#

Sh: gry. grn.-rd brn., m. sft., dns., occ. slty-sndy

Ls: crm., hrd., dns., VFG-mxln., w/ fr. pr. Vug Φ, blk oil stn. V.F. wk. show)

Sh: A.A.

Ls: crm.-lt. gry., hrd., dns., VFG-mxln. mic., abun. org. cht., rare foss. NΦNSFOC

DST #2
3956'-3980'
Rec. 2'CO
1'OCM

Ls: crm., hrd., dns., VFG xln., occ. foss. +ool. w/ occ. fr.-pr. Vug. Φ, sgme, moldic, brn. oil stn., gd. cut+fl., No F.O., No odor, ? perm.

Weak Show

Ls: crm.-lt. gry., s.hrd., dns., fn xln-mxln. +chiky., fr. rex. fd., 1-2 pc./tray. w/ Vug, oom. Φ+fr. int. ool, Vug. Φ dk brn. stn. gd. cut+fl., No odor, No F.O.

Weak Show

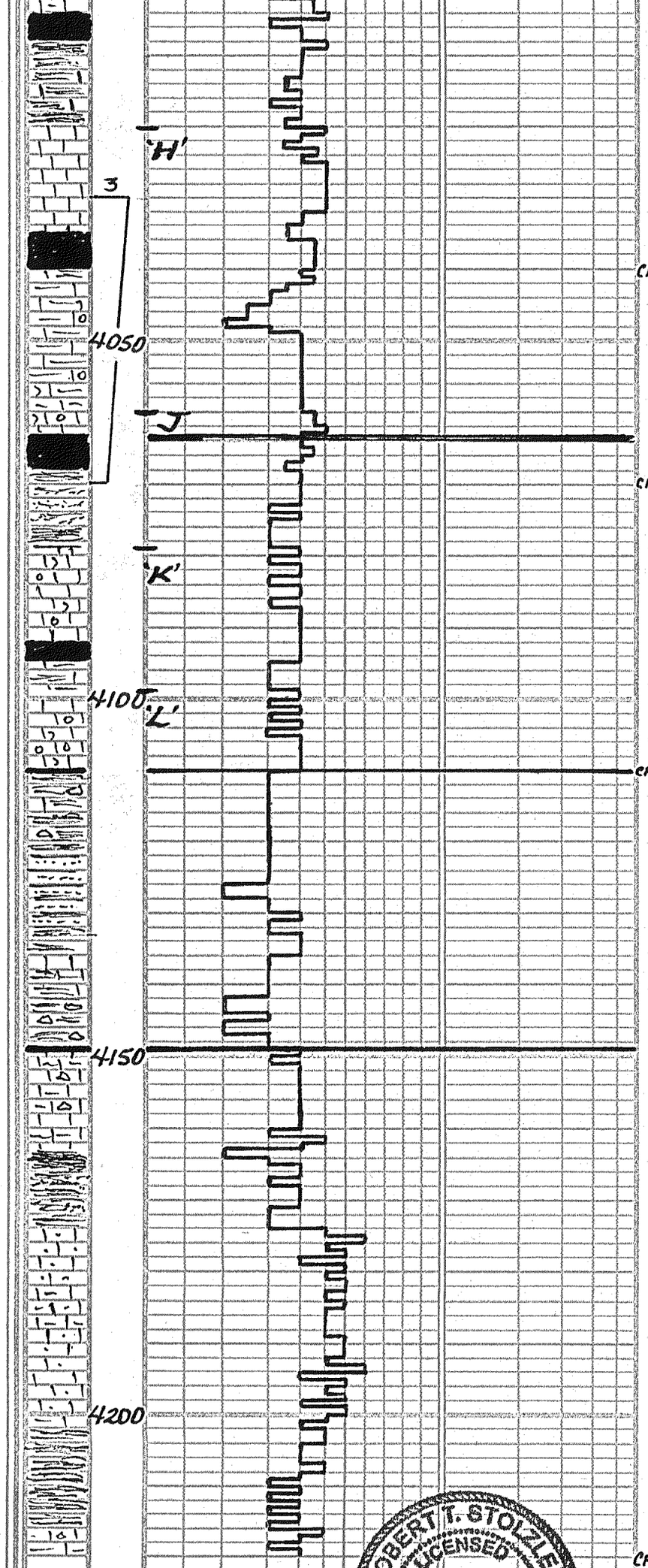
Sh: rd brn-gry., m. sft., dns., earthy

Ls: crm-lt. gry., hrd., dns., fn xln.-mxln., +chiky., fr. cht., occ. foss. +ool., fr. sh. stnd. NΦNSFOC

Ls: A.A., more chiky., occ. wh. cht. fr. pr. moldic Φ NSFOC

Sh: rd. brn-dk. gry., m. sft., dns. earthy

Sh: rd brn-blk., m. sft., dns. carb. earthy



Ls: crm.-tan-brn., hrd., dns., VFG-mxln., mic., fr. chk., fr. chiky., fr. foss. w/ pr. moldic ϕ NSFOC

Ls: crm-tan, hrd, dns., VFG-mxln. mic, occ. VFG. ool. + foss. w/ pr.-fr. VFG int part. ϕ NSFOC, 1pc. w/ brn. oil stn., fr. cut fl. V. V. wk. show

Ls: crm-tan, hrd, dns., VFG-mxln, mic. fr. rexlzd., fr.-rare foss. + ool. A.A. w/ fr.-pr. VFG int part. ϕ A.A. NSFOC

Ls: crm.-lt. gry., hrd, dns., VFG-mxln. mic., fr. chk., fr. chik., occ. foss. w/ fr. VFG ϕ A.A. NSFOC

CFS

Sh: gry.-blk., sft.-m. hrd., carb. earthy

Sh: rd. brn.-gry.-blk., m. sft., sndy.-slty., earthy

DST #3
4030-4070'
Rec: 2'OSM

Ls: crm-gry., hrd, dns., fn-mxln., mic occ foss., sh. stnd, pebb. surf. NϕNSFOC

Ls: crm., hrd.-m. hrd, dns., VFG-mxln, foss. + ool. w/ fr.-gd. fn. vug. int. part. ϕ, fr. moldic ϕ, dk. brn. stn., ex. cut fl., gd. odor, SFO.

Good Show

Ls: A.A., less ϕ, fr. dd. stn. w/ shows A.A., wk. odor, SSFO

Fair Show

Stark Shale
(-1261')

CFS

Sh: gry.-blk., m. sft. dns., carb., earthy

Sh: rd. brn., -dk. gry., m. hrd., dns., occ. slty.-sndy., fr. Ss: gry. m. hrd., dns., mod. srtd., fn. grnd., w. cmtd. No Vis ϕ NSFOC

Ls: crm-gry. hrd., dns., VFG-mxln, mic., fr. foss. + ool. w/ pr.-fr. int part. vug. ϕ., dk. brn stn., fr. cut fl. & spc.-v. thin zone, VFG ϕ

Very Weak Show

Ls: A.A. more foss. + ool. occ. sh. stnd. NϕNSFOC

Mud Check @ 4070'
M.W. 9.0 solids 5%
W.L. 6.0 Chl. 1,100

Sh: rd. brn.-gry. grn., m. sft.-mhrd dns., occ. slty., earthy

Vis. 58 LCM 4#

Sh: A.A. occ. dk. gry.-blk., earthy

Ls: crm.-lt. gry., hrd, dns. fnxln-mxln., mic., occ. foss. + ool., occ. sh. stnd. NϕNSFOC

CFS

Ls: A.A. NϕNSFOC

Base of Kansas City Group
(-1308')

Sh: rd. brn.-gry., sft. + clayey.-m. sft., dns., earthy., occ. sndy.-v. sndy.

Sh: A.A.

Ss: rd. brn., m. hrd., dns., sh'ly, fn. grnd., pr. srtd., sub rnd., v. w. cmtd. NϕNSFOC

Sh: Cg: rd brn.-gry.-ylw., moth., m. hrd-m. sft., sndy., earthy

Ls: crm., hrd., dns., VFG-mxln. mic., rare foss., pebb. surf. NϕNSFOC

Cg: Sh: A.A., Ls: crm-ylw, stnd., foss. pelletal, occ. Sh. stnd. rd. brn., occ. pebb. surf. NϕNSFOC

Lenapah Ls.
(-1347')

Cg: Sh: rd. brn.-mpr-gry., m. sft., earthy, sndy.

Ls: crm., hrd.-m. sft., VFG xln., abun rd. sh. stnd., occ. pebb. NϕNSFOC

Cg: Sh: mar.-rd. brn-gry., v. sft. + clayey-m. sft., earthy-sndy.

Ls: crm-tan, hrd, dns., VFG xln., abun. sh. stn. NϕNSFOC

Sh: gry., m. hrd, dns., sndy.-v. sndy earthy

Ls: crm-gry., hrd, dns., VFG-mxln. occ. sndy., rare foss. NϕNSFOC

Ls: gry.-crm., hrd, dns., VFG-mxln., sndy.-v. sndy. NϕNSFOC

Ls: crm.-gry., hrd., dns., VFG-mxln. mic., occ. sndy., rare foss. NϕNSFOC

Ls: crm-gry., hrd.-m. sft., VFG-mxln. occ. chiky., occ. sndy. NϕNSFOC

Sh: gry.-mar.-rd. brn., m. sft.-sft., sndy.-slty., earthy

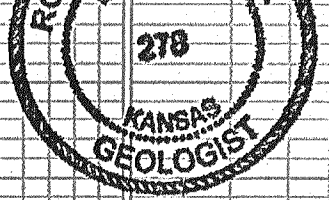
Sh: gry.-rd. brn.-maroon, m. sft.-sft. + clayey., sndy.-v. sndy. earthy

Ls: crm.-gry., hrd., dns., VFG-mxln. mic., sh. stnd., pebb. surf. NϕNSFOC

CFS

D.T.D 4220'

ROBERT T. STOLZLE
LICENSED



L.T.D. 4224
Deviation 3¼°
Robert Stolfe
9/26/13