

ROBERT STOLZLE

CONSULTING PETROLEUM GEOLOGIST

AAPO Corr. # 3244

6211 G. 20101 OT, W.

Geodent, KD 07052 - 0240

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DRILLING TIME AND SAMPLE LOG

OPERATOR: Murfin Drilling Co. Inc.
 LEASE: Brown WELL NO.: 1-30
 FIELD: Wildcat
 LOCATION: 550' FNL, 1820' FWL (SE. NW. NE. NW)
 SEC.: 30 TWP: 4S RANGE: 30W
 COUNTY: DeCATUR STATE: KS
 API NO.: 15-039-21190-00-00

CONTRACTOR: Murfin Drilling Co. Inc., Rig # 2
 COMMENCED: 4:30 p.m. Sept. 7, 2013 COMPLETED: 9/15/13
 ROTARY TOTAL DEPTH: 4500' LOG TOTAL DEPTH: 4506'

GEOLOGICAL SUPERVISION FROM: 3570 to: T.D.
 MUD-UP DEPTH: 3310' MUD TYPE: Chemical Polymer

FORMATION	SAMPLE		LOG		STRUCTURAL CORRECTION
	TOP	SECTA	TOP	SECTA	
Stone Over Ashy Base of Anhydrite	2606 (+240)		2610 (+236)		-3'
	N.A.		2643 (+203)		-5'
Topokz Em.	3687 (-841)		3692 (-846)		-20'
Haberer Shale	3852 (-1006)		3856 (-1010)		-18'
Lansing Group	3904 (-1058)		3908 (-1062)		-22'
Star-K Shale	4066 (-1226)		4069 (-1223)		-17'
Bassks (F.Y. GP.	4114 (-1268)		4119 (-1273)		-19'
Rainee ls.	4225 (-1379)		4230 (-1384)		-16'
Charokred Shale	4309 (-1463)		4315 (-1469)		-16'
Mi. ss.	4432 (-1586)		4439 (-1593)		-32'
Total Depth	4500'		4506'		

ELEVATIONS
 KB 2846'
 GL 2835'
 Measurements are all from KB

CASING RECORD
 SURFACE: 5 1/2" 8 5/8"
23# @ 221' CIVIL.
 PRODUCTION: None-RH

WIRELINE SURVEYS
 Baker Energy Services; Microlog, BHC Sonic, Dual Comp. Boosty and Dual Induction Logs were run

LOCATION W/P

Location	
Brown #1-30	30

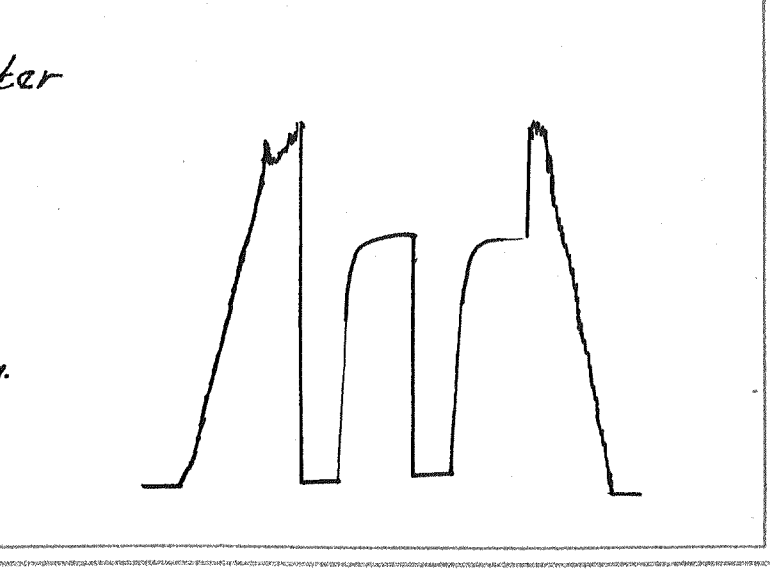
Reference Well for Structural Comparison: MDC Gilbert #126 WNE 26 T45 R31W
 Comments and Recommendations: Recommended well be plugged and abandoned.

DST # 1 ZONE: Toronto, Lansing A' & B' Zones
 INTERVAL: 3845'-3930'

DST # 1 8874 Chart
 Interval: 3845'-3930' Depth: 3846'

Pressures:	Time	Press.	RECOVERY
1. Initial Hydrostatic		1912 psi	80' Mudcut Water (20% Mud)
2. Initial Flow: Start	0	18 psi	
3. Initial Flow: End	30	39 psi	
4. Initial Shut-in: End	60	1314 psi	Blow Desc:
5. Final Flow: Start	0	43 psi	I.F. - 2" in 30 Min.
6. Final Flow: End	30	62 psi	I.S.I. - No blow
7. Final Shut-in: End	60	1308 psi	F.F. - 1/2" in 30 Min.
8. Final Hydrostatic		1842 psi	F.S.I. - No blow

BHT: 116°F.
 Rv: .094 @ 72°F.
85,000 ppm chlorides
 Strap 1' short
 Deviation 1/2°



DST # 2 ZONE: Lansing E', F' & G' Zones
 INTERVAL: 3945'-3980'

DST # 2 8874 Chart
 Interval: 3945'-80' Depth: N.A.

(minutes per foot)

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

2600

Drilling with PDC Bit

Stone Coral Anhydrite (+240')

2650

Base of Anhydrite (-207')

3550

Trip for Button Bit

start 10' wet & dry samples and 1' drilling time at 3570'

Sh: lt-dk. gry., v. sft., clayey - m. sft., earthy

Ls: gry., m. sft. - m. hrd., dns., v. fl. xln. foss. NØ NSFOC

Ls: A, A, NØ NSFOC

Sh: lt-dk. gry., sft., clayey, m. hrd. sndy - v. sndy, earthy

Sh: A, A. Ls: crm-gry., hrd., dns., v. fl. - m. xln., foss., occ. sndy. NØ NSFOC

Sh: rd. brn., sft., clayey, Ls: crm., hrd., dns., v. fl. - mx. xln. mic. foss., Abun. sh. sft. - sdbb

suff., sndy. NØ NSFOC

3600



3650

3100

3150

3800

Ls: crm. - lt. gry., hrd., dns., VEG-mxN.
 occ. foss., sandy, w.c.mfd. NΦNSFOC
 Ss: VEG, mod. strd., w.c.mfd. NΦNSFOC
 Sh: dk. gry., m. hrd., dns., earthy

Sh: rd. bn. - gry., sft. + clay - m. sft.,
 earthy, cavings
 Ls: A.A., less. sandy NΦNSFOC
 Ls: crm. - lt. gry., m. hrd. - sft. + chiky.
 foss. + sh. std. NΦNSFOC
 Sh: rd. bn. - gry. gen., sft., clayey -
 earthy

Sh: A.A., abun. rd. sh. cavings
 Ls: crm., sft. + chiky - hrd., dns.,
 mic., VEG-mxN., occ. foss.
 NΦNSFOC
 Ls: crm. - lt. gry., sft. + chik. - hrd.,
 dns., VEG-mxN., mic., occ.
 foss., occ. sandy NΦNSFOC

Ls: A.A., less. chiky. NΦNSFOC

Sh: rd. bn. - mar. - dk. gry., m. hrd.,
 fr. sft. + clayey, earthy
 Sh: A.A.
 Ls: crm. - gry. - mar. sh. std., VEG
 xN., rare foss. NΦNSFOC

Abun. clayey, rd. sh. cavings??

Ls: A.A., tr. sh. std.
 NΦNSFOC
 Ls: crm., hrd., dns., VEG-mxN.,
 mic., occ. sh. std., occ. foss.
 NΦNSFOC

Sh: rd. bn., sft., earthy-clayey
 Ls: crm., hrd. - sft. + chiky, dns.,
 VEG xN., foss. - f. foss., occ.
 moldic φ NSFOC
 Sh: dk. gry. - blk., m. hrd., hackly
 Ls: crm., m. sft. - hrd., dns., VEG-
 mxN., foss. - v. foss. w. occ.
 gd. moldic φ NSFOC

Ls: crm. - sft. - hrd., VEG xN., foss. -
 v. foss. - pk. stn. w. occ. ex.
 int part. + Vug. moldic φ - VEG.
 NSFOC

Ls: crm. - tan, hrd. - sft. A.A., less
 foss. NΦNSFOC
 Ss: tan, p. hrd., dns., fr. VEG, mod.
 w. strd., v. w. c.mfd. NΦNSFOC
 Ss: A.A., occ. sft. + fr. A.A., moldic φ
 NSFOC

Ls: crm. - gry., hrd., dns., VEG-mxN.,
 mic., occ. foss., sh. std. NΦNSFOC
 Ls: crm. - lt. gry., hrd., dns., VEG-
 mxN., foss. - v. foss., tr. sandy - v.
 sandy, sh. std. NΦNSFOC
 Sh: tr. dk. gry. - blk., dns., hack., carb.

Ls: crm., hrd., dns., VEG xN., foss. -
 v. foss., tr. sandy. NΦNSFOC
 Sh: blk., m. sft. - m. hrd., dns., carb.
 earthy-hackly
 Sh: A.A.

Ls: crm. - gry., sft. + chiky - hrd., dns.
 VEG xN., foss. NΦNSFOC

Ls: crm. - gry., hrd. - m. sft., dns., tan xN.
 mxN., mic., occ. foss., tr. sandy,
 fr. sh. std. NΦNSFOC

Sh: lt. dk. gry., sft., clay - earthy
 Ls: crm. - tan, hrd., dns., foss., VEG xN.
 abun. sh. std. NΦNSFOC
 Sh: dk. gry. - blk., m. hrd., dns., hackly

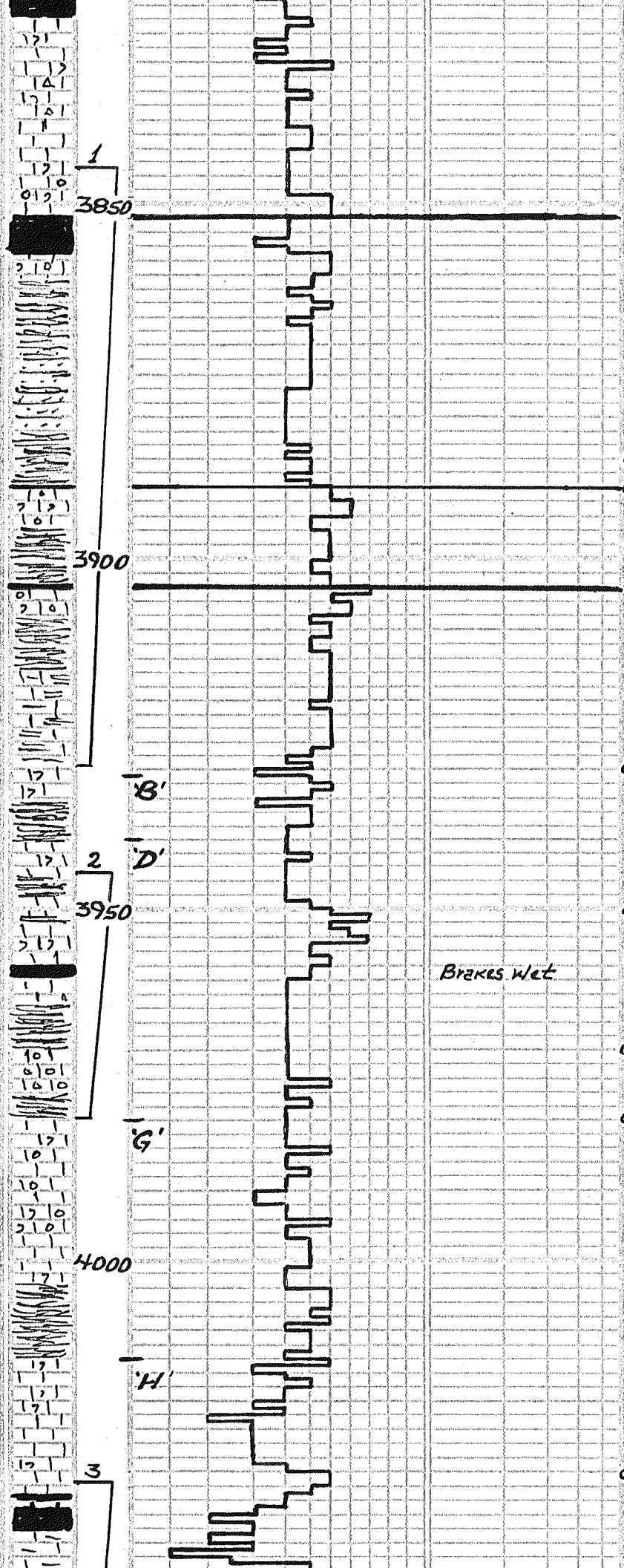
Ls: crm. - gry., hrd., dns., VEG-mxN.,
 foss. + abun. dk. sh. stn., NΦNSFOC
 Sh: gry. - rd. bn., sft. - m. sft., earthy-
 hackly

Sh: A.A., occ. clayey
 Ls: crm. - gry., hrd., dns., VEG-mxN.,
 foss. + sh. std., occ. sandy.
 NΦNSFOC

Ls: crm., m. sft. - hrd., dns., VEG-mxN.,
 occ. foss., occ. VEG. pp. Vug. φ around
 foss. - gn. - dk. blk., od. oil stn., No
 odor, No f. O, fr. cut + fl., v. wk. show

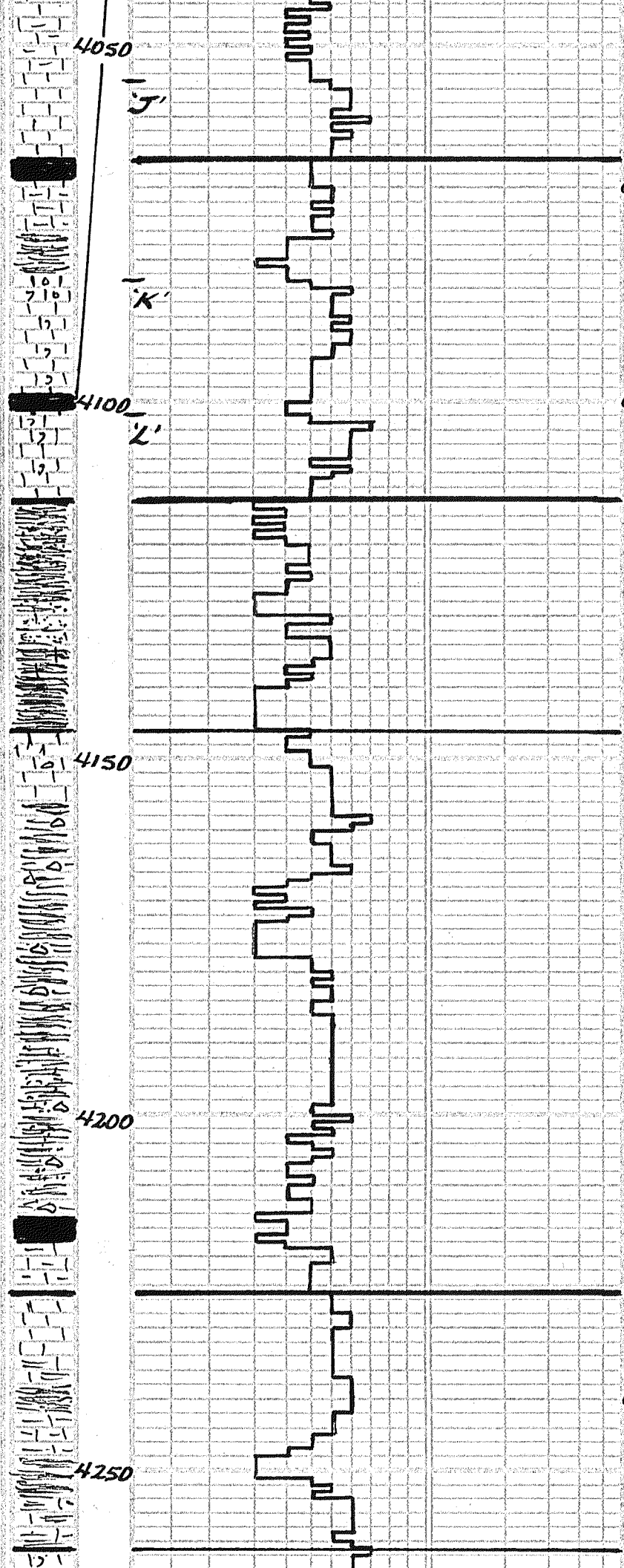
TOPEKA Fm.
 (-841')

Mud Check @ 3780'
 M. wt. 8.8 lb./gal.
 Vis. 63 sec. qt.
 WL. 6.0 ml./30 min.
 Solids 3.6%
 chl. 1,100 ppm
 LCM 3.0 lbs./bbl.



Ls: erm., hrd., sft., chiky, VFG-
 mxln., occ. foss. NΦ NSFOC
 Sh: dk. gry. - blk., m. sft. - m. hrd.,
 carb., hackly
 tr. sh. A.A., occ. gry. grn.
 Ls: erm-wh., hrd.-m. sft., dns., VFG-
 mxln., mic., occ. chky, tr. foss.,
 tr. sdy. NΦ NSFOC
 Ls: erm., sft.-hrd., dns., FNXN-mxln.
 tr. chl. occ. foss. NΦ NSFOC
 Sh: blk., sft.-m. sft., carb.-coaly.,
 earthy
 Sh: A.A.
 Ls: erm-tan, hrd., dns., VFG-mxln.
 mic., tr. chl., occ. foss.
 NΦ NSFOC
 Ls: erm.-gry.-tan, m. sft.-hrd., dns.
 VFG-mxln., mic., tr. pyr., occ.
 foss. + ool. NΦ NSFOC
 Ls: A.A. NΦ NSFOC
 Sh: rd. brn.-gry., sft., sdy. - v.
 sdy-sfts. earthy
 Ls: erm., hrd., dns., VFG-mxln., occ. foss.
 + ool. w/ occ. int. ool. + vug. φ - lg. vugs.
 hyp. dk. stn., ex. cut. + fl., No F.O.
 No odor
 Sh: rd. brn.-lt. gry., sft., earthy
 Ls: wh.-erm., hrd., dns., VFG-mxln., occ.
 qd. vug. φ - int. part. dk. brn. stn. wk.
 odor, SSFO, qd. cut. + fl., ?perm.
 Ls: erm-tan, hrd., dns., VFG-mxln., sft.
 int. part. vug. φ, dk. grn. stn. wk.
 odor, No F.O., qd. cut. + fl., ?perm.
 Ls: erm., hrd., dns., VFG-mxln., occ. foss.
 + ool. w/ occ. VFG pp. vug. φ, tr. int. vug.
 φ, dk. brn.-blk. oil stn., tr. wk. cut.
 fl., No odor, No F.O. Very wk. show
 Ls: A.A., occ. pr. pp. φ + tr. int. vug. φ
 dk. brn.-blk. stn. A.A. v. wk. show
 Sh: rd. brn., sft., earthy, sly
 tr. Ls. w/ vug. φ + blk. tan oil - 60 min. smpl. chl. 1, 100
 Solids 5.7%
 LCM 4#
 Sh: rd. brn.-gry. grn., m. sft.-m. hrd.,
 dns., sly, earthy-hackly
 Ls: wh.-erm., hrd.-sft. chiky, VFG
 -mxln., tr. mic., rare foss., 2-3 pc.
 pr. vug. moldic φ NSFOC
 Ls: wh.-lt. gry., hrd.-sft. chiky, VFG-
 mxln., occ. VFG pp. vug. φ + tr. lgr. vug.
 φ w/ qd. lt. dk. brn. oil stn., wk. odor,
 tr. F.O., qd. ex. cut. + fl., ?perm.
 Ls: A.A. w/ VFG lgr. vug. φ + shows
 A.A.
 Sh: gry.-gry. grn.-rd. brn., m. sft.-
 m. hrd., dns., hackly
 Sh: A.A.
 Ls: erm., hrd., dns., VFG-mxln., occ. ool.
 -v. ool. w/ tr. pr. tr. vug. int. part. φ
 -VFG- NSFOC
 Sh: rd. brn.-gry. grn.-dk. gry.-CAVINGS?
 m. sft.-m. hrd., dns., earth-hack.
 Ls: erm., hrd., dns., VFG-mxln., mic.
 occ. foss. + ool. NΦ NSFOC
 Sh: A.A. CAVINGS ± 90% smpl.
 Ls: erm., hrd., dns., VFG-mxln., mic.
 occ. foss. + ool., tr. NΦ NSFOC
 Chik., tr. mic., tr. sdy
 Ls: erm.-gry., hrd., dns., VFG-mxln.
 mic., occ. foss. + ool. NΦ NSFOC
 Sh: rd. brn.-gry. grn., sft. clayey.-
 m. sft., earthy, occ. sdy
 Sh: A.A., tr. blk., earth.
 Ls: erm.-gry., hrd., dns., VFG-mxln.
 mic., occ. foss., tr. sh. sdy,
 NΦ NSFOC
 Ls: erm.-lt. gry., hrd., dns.-sft. +
 chiky, VFG-mxln., mic., occ. foss.,
 tr. VFG pp. vug. moldic? φ NSFOC
 Ls: A.A. NΦ NSFOC
 Sh: rd. brn., sft.-m. sft., clay-earthy
 gry. grn.-blk., m. sft.-m. hrd.,
 dns., hackly
 Ls: wh.-erm., hrd., dns., VFG-mxln., foss

DST #1
 3845'-3930'
 Rec: 80' MCW
 DAVLATION 1/2°
 STRAPI'SHORE
Heebner
Shale
 (-1006')
Weak Show
Toronto Ls.
 (-1044)
Fair-Weak Show
Lansing Group
 -1058'
Weak-Fair Show
Mud Check @ 3930'
 M.W. 9.1
 V.S. 69
 WL. 6.0
 Solids 5.7%
 LCM 4#
DST #2
 3945'-3980'
 Rec: 20' WCM
Weak Show
Mud Check @ 3998'
 M.W. 8.8
 V.S. 52
 WL. 6.8
 Solids 3.5%
 chl. 900
 LCM 4#
DST #3
 4032'-4100'
 Rec: 30' Mud



-v. foss., w. tr. - qd. brn. stn., tr. - qd. cut + fl., wk. odor, No F.O.
 Ls: A.A., lgr. vugs, occ. moldic, dk. brn. stn., qd. cut, + fl., tr. - wk. odor, No F.O., better perm.
 Ls: A.A. w/ ϕ + show A.A., less ϕ
 Sh: rd. brn - gry. grn - blk, m. sft., dns., earthy, hackly, tr. carb.
 Sh: A.A., occ. sndy, occ. ls. pebb.
 Ls: crm - gry., hrd., dns., vfg - mxln, mic., occ. foss., sh. std. N ϕ NSFOC
 Ls: crm - lt. gry., hrd., dns., vfg - mxln, mic., occ. foss. +ool., part. pe. w/ tr. pr. vgs. ϕ , phyl. dk. oil stn., No odor No F.O., qd. cut, + fl., v. perm.
 Ls: crm - lt. gry., hrd., dns., vfg - mxln, mic., tr. chiky, occ. foss., N ϕ NSFOC
 Sh: dk. gry. - blk, m. sft., dns., earthy - hackly
 Sh: lt. dk. gry. - rd. brn, m. sft. - m. hrd. dns., earthy - hackly
 Ls: wh. - crm., hrd. - m. sft., dns., vfg - mxln, tr. foss., N ϕ NSFOC
 Ls: crm - tan, hrd., dns., tr. sft. chiky, vfg - mxln, mic., tr. foss., tr. sh. std. occ. pebb. surf. N ϕ NSFOC
 Sh: A.A. occ. gry. grn - rd. brn, mott.
 Sh: gry. grn - rd. brn, v. sft. + clayey - m. sft., earthy, sft., sndy.
 tr. ss. dk. gry., m. hrd., dns., vfg - vfg, mod. sft., w. rnd. w. cm. N ϕ NSFOC
 Sh: A.A. 1-2 pc. eq. ss. A.A. N ϕ NSFOC
 Ls: crm - tan, hrd., dns., vfg - mxln, mic., rare foss., sh. std. N ϕ NSFOC
 Ls: crm - tan, hrd. - sft. + chiky, occ. v. foss. +ool. - grn stn. - w/ pr. - tr. int part. ϕ NSFOC
 Sh: rd. brn - gry., sft., clay. earthy tr. Ls: A.A. N ϕ NSFOC
 Sh: dk. gry. - mar. - rd. brn, m. sft. - m. hrd., occ. sndy, occ. ls. pebb. earthy - hackly
 Sh: dk. gry. - rd. brn, m. hrd. - m. sft., sndy, hackly
 Ls: crm, hrd., dns., vfg - mxln, mic., occ. sh. std., pass pebb., N ϕ NSFOC
 Cg: sh. dk. gry. - gry. grn - rd. brn, sft. - m. hrd., dns., occ. sndy, occ. ls. pebbles, earthy - hackly
 Cg: sh. rd. brn, v. sft. + clayey, - m. hrd. mar., hackly, occ. sndy, occ. ls. pebb., pass. bit balled up.
 Sh: rd. brn - mar. - dk. gry., sft. + clayey - m. hrd., dns., earthy, tr. sndy. tr. Ls: A.A.
 Sh: mar. - rd. brn - gry., m. sft. - m. hrd. dns., occ. sndy - v. sndy, tr. ls. pebb., earthy
 Sh: dk. gry. - blk, occ. rd. brn, m. hrd. - sft. + clayey, earthy, tr. carb.
 Ls: crm, hrd., dns., vfg - mxln, mic., occ. foss. N ϕ NSFOC
 Ls: crm - lt. gry., hrd., dns., tr. m. sft., sli. chiky, occ. foss., mxln - mic. N ϕ NSFOC
 Ls: crm - lt. gry., hrd., dns., vfg - mxln, mic., occ. foss. - v. foss. N ϕ NSFOC
 Sh: lt. dk. gry., m. sft. - m. hrd., earthy
 Sh: gry. - blk, m. sft., sndy, - sft., - m. hrd., dns., hackly, occ. carb.
 Sh: A.A., less sndy.
 Ls: crm - tan - gry., hrd., dns., vfg - mxln, foss., sh. std. N ϕ NSFOC
 Ls: crm - tan - gry., hrd., dns., vfg - mxln, foss., sh. std. N ϕ NSFOC

Fair-Weak Show
Fair Show
Stark Shale (-1220')

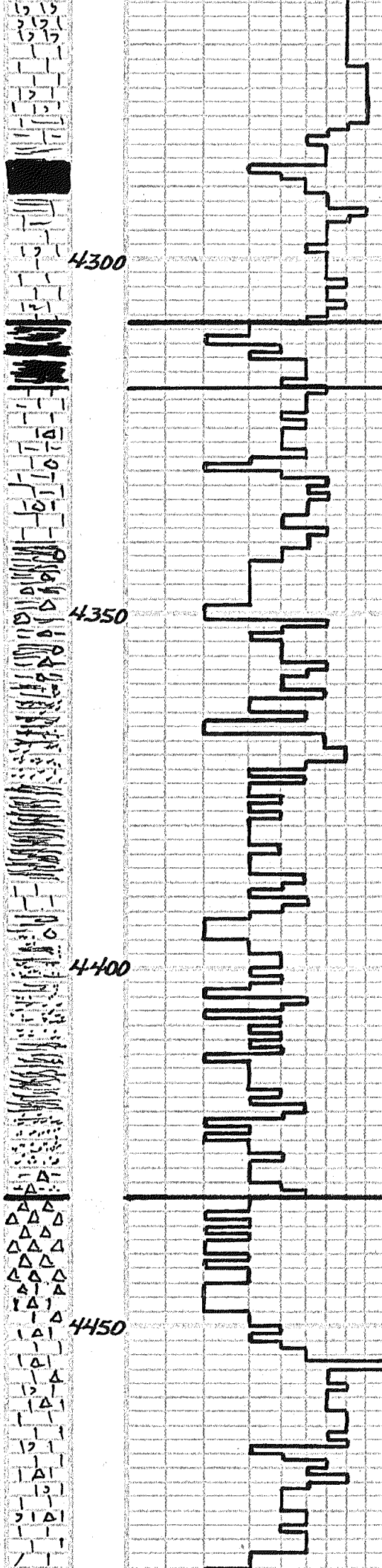
Weak Show
Mudcheck @ 4101'
M.w. 8.8 chl. 900
V.S. 50 LCM 4
W.L. 6.8
Solids 3.5%

Base of Ks. (City Group (-1268'))

Lenapah Ls.

Pawnee Ls. (-1379')

Lenapah Pawnee Ls.



Verdigris Ls.

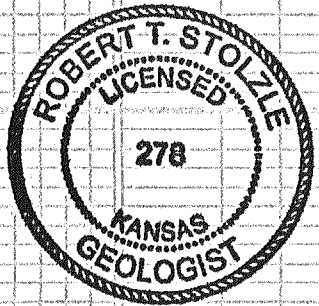
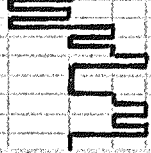
Ls: gry, hrd, dns, VEG XIN, rare
 foss, tr. TAN NQNSFOC
 Ls: A.A. NQNSFOC
 Sh: gry-bik, m. sft, m. hrd, dns,
 hack, tr. carb.
 Sh: A.A.
 Ls: crm-tan-gry, hrd, dns, VEG-
 mxln, rare foss, tr. sh. stnd.
 NQNSFOC
 Ls: crm-tan, hrd, dns, VEG-mxln,
 mic, dec. foss-v. foss.
 NQNSFOC
 Sh: gry-bik, m. hrd, dns, hack, carb
 Ls: crm-tan, tr. gry, hrd, dns,
 VEG-mxln, mic, dec. foss.
 NQNSFOC
 Ls: crm-tan, hrd, dns, VEG-mxln,
 mic, occ. foss, tr. sh. stnd, occ.
 pebb. surf. NQNSFOC
 Sh: dk. gry, m. sft, dns, hackly
 Ls: A.A. Abun: pebb. surf. NQNSFOC
 dec. chiky.
 Sh: dk. gry-mar-rd. brn, m. hrd-
 m. sft, earthy-hackly
 Sh: dk. gry-mar-rd. brn, m. hrd-
 sft, clayey, tr. sdy. Abun: ls pebb
 Ls: crm-tan, hrd, dns, mxln, mic,
 rare foss, Abun: sh. stnd. NQNSFOC
 Cg: sh: dk. gry-mar-rd. brn, sft-
 m. hrd, dns, earthy-hack.
 Abun: ls. pebb. wh-crm-tan,
 hrd, dns, sh. stnd. NQNSFOC
 Cg: sh: rd. brn, v. sft, clayey, occ
 sdy, ls. pebbles A.A.
 Cg: sh: rd. brn-gry, sft-m. hrd,
 occ. sdy-v. sdy, tr. ss, wh,
 m. hrd, dns, tr. VEG, mod. w. sft
 w. rd, w. cmtd. ? NQNSFOC
 Cg: sh: A.A., tr. ss: A.A. green shnd
 ls. pebbles NQNSFOC
 Cg: sh: rd. brn-dk. gry-mar, v. sft
 clayey-m. hrd, dns, occ. sdy-
 v. sdy, less ls. pebb.
 Cg: sh: varie, sft-m. hrd, sdy,
 ls. pebb. NQNSFOC
 Ss: wh, m. sft, fni A, fni VEG, mod.
 sft, sub ind, w. cmtd. NQNSFOC
 Cg: sh: varie, sft-m. hrd, dns, occ.
 sdy, less ls, clay-earthy
 Cg: sh: A.A., tr. ch. pebb. sh. stnd,
 tr. ss: wh-crm, m. hrd, dns, tr.
 VEG, mod. w. sft, sub ind, w. cmtd.
 No vis. QNSFOC
 ch: wh-ylw, hrd, dns, vit, occ
 weathered w/ fr-gd. vuq. Q, looks
 old - 100% SiO2. NSFOC
 pass. Altered Ss.
 ch: A.A., less trip, rare QNSFOC
 Ls: wh-crm, m. hrd, dns, VEG XIN,
 rare foss, rare pp. QNSFOC
 dec. sft, chiky
 ch: wh-ylw, hrd, dns, vit, NQNSFOC
 Ls: wh-crm, hrd, dns, VEG XIN,
 rare foss, tr. chik. NQNSFOC
 Ls: crm, hrd, dns, VEG XIN, occ.
 chiky, sft, occ. foss. NQNSFOC
 tr. ch: wh-ylw, hrd, dns, vit.
 NQNSFOC
 Ls: wh-crm, hrd, dns, fni, VEG XIN,
 occ. sft, chik, foss. NQNSFOC
 tr. ch: wh-ylw, hrd, dns, vit.
 NQNSFOC
 Ls: A.A., tr. fr. vuq. QNSFOC
 tr. A.A. el. rare w. NQNSFOC

Cherokee
Shale
(-1463')

Mudcheck @ 4399'
 M.w. 9.1 lb. gal.
 Vis. 64 sec. 1qt.
 W.L. 6.4 ml/30min.
 Chl. 900 ppm
 Solids 5.7%
 LCM 4#

Mississippian
(Osage-Kinderhook?)
(-1586')

4500



CFS

Doligry. hrd., dns., VFGXIN, occ. fr.
 Vug. ϕ NSFOC
 Doligry. hrd., dns., VFGXIN, fr. foss.
 w/ Vug. moldic ϕ NSFOC
 occ. Ls. crm. hrd., dns., foss.,ool.
 w/ fr. Vug. moldic ϕ NSFOC

D.T.D. 4500'
 L.T.D. 4506'

Robert Stolze
 9/15/13