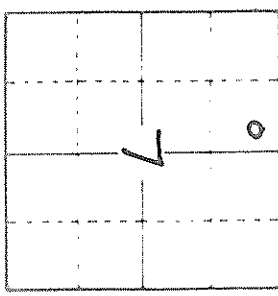


# GEOLOGIST'S REPORT

DRILLING TIME & SAMPLE LOG

COMPANY <u>Bereco LLC</u>		ELEVATIONS	
LEASE <u>Ezel Arnold</u>	NO. <u>7-3</u>	KB <u>3328</u>	
LOCATION <u>3351 EML + 3040' FEL</u>		DF <u>3326</u>	
SEC <u>7</u>	TWP <u>29S</u>	GL <u>3316</u>	
COUNTY <u>Stanton</u>	STATE <u>Kansas</u>	MEASUREMENTS ARE	
FIELD <u>Arroyo Northeast</u>		ALL FROM <u>KB</u>	
CONTRACTOR <u>Bereco Dalg. Rig #1</u>		CASING RECORD	
COMM. <u>5-6-2016</u>	COMP. <u>5-18-2016</u>	<u>858</u> of <u>1710</u> w/ <u>730</u> SX	
RTD <u>5674</u>	LTD _____	qt _____ w/ _____ SX	
No. of DST'S <u>None</u>	No. of CORES <u>None</u>	qt _____ w/ _____ SX	
SAMPLES SAVED FROM <u>3500</u>	TO <u>TD</u>	EL LOG ADDRESS: <u>GR</u>	
DRILLING TIME KEPT FROM <u>3500</u>	TO <u>TD</u>	<u>Den. Meuf. G. R. Caliper</u>	
SAMPLES EXAMINED FROM <u>3500</u>	TO <u>TD</u>	<u>ML. Sonic</u>	
GEOLOGICAL SUPERVISION FROM <u>4226</u>	TO <u>TD</u>		
GEOLOGIST ON WELL <u>Edwin H. Grievens</u>			

FORMATION TOPS	SAMPLE	LOG	SUBSEA
<u>Base Heebner</u>	<u>3705</u>		
<u>Lansing Fm</u>	<u>3765</u>		
<u>Marionaton</u>	<u>4359</u>		
<u>Ft. Scott</u>	<u>4530</u>		
<u>Morrow Fm</u>	<u>5013</u>		
<u>St. Genevieve</u>	<u>5536</u>		
<u>St. Louis</u>	<u>5612</u>		
<u>TD</u>	<u>5674</u>		

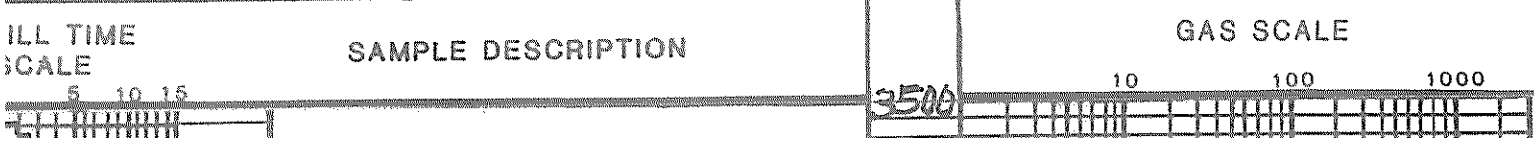


API# 15-187-21327

MARKS Earth-Tech had an unmanned gas detection trailer on this well from 3500 feet to total depth.

Thank you,  
Edwin H. Grievens  
Geologist

<b>LITHOLOGY</b> SANDSTONE LIMESTONE SHALE CHERT		<b>CHROMATOGRAPH</b> HOT WIRE BY TOTAL GAS VOLUME	C1 = METHANE C2 = ETHANE C3 = PROPANE C4 = ISOBUTANE C5 = BUTANE C6 = ISOPENTANE C7 = PENTANE
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Sh. v. drk gray to black-carb.

3700

Base Heebner = C  
3705-377

Lms. grayish tan; cryptocr. packstn  
to sub-lithogr.; dul. yel. fluor.; No cut  
No vis por.

sh. H. gray to lt. green, soft & mushy  
when wet; silty lps

Interbedded Limestones

① Faster Dalg Lms. hv. trs. wht to crn,  
chlk & crn to tan; crypto to v.v. fn  
xln; sub-chlk, sub-sucro to trs.  
sucro.; dul. yel. fluor.; No cut;  
w/ widely scattered trs. pr. micro-pp. por.

② Slower Dalg. Lms. grayish tan to tan; crypto  
to v.v. fn. xln; trs. sub-chlk, sub-sucro,  
packstn & sl. trs. sub-lithogr.; dul. yel.  
fluor. lps; No cut; No vis por

Sh. med. to drk. gray, slitov. calc

LEANSING = C  
3765-437

Interbedded Limestones

3800

① Faster Dalg Lms. trs. to hv. trs. wht  
to crn-chlk to grayish. tan to tan;  
crypto. to v.v. fn xln; sub-chlk,  
sub-sucro. to sucro.; scattered  
trs. phantom oolitic to trs. oolitic;  
dul. yel. to dul. lt. yel. fluor.; No cut  
scattered trs. to hv. trs. pr. to cr  
micro-pp. por. ~~tr. pr.~~ interxln  
por. lps.

② Slower Dalg. Lms. lt. gray. to tan;  
crypto. to v.v. fn xln; trs. sub-chlk,  
sub-sucro., packstn & trs. sub-lithogr.  
trs. phantom oolitic to trs. oolitic  
dul. lt. yel. fluor. No cut; No vis  
por

3900

Lms. v. to extra. abn wht. to crn chlk  
trs. w/ chlk oolites & tan; crypto  
to v.v. fn. xln; v. to extraly  
oolitic & pr. sl. to v. oolitic;  
MATRIX trs. sub-chlk, sub-sucro.  
to sucro. & packstn, mottled  
yell. to glen yel. fluor.; No cut  
abn. PR. qrdng to excell.



Lms. v. to extra. abn. wht to grayish  
trs. w/dolk oolites + tan; crypto  
to v. v. tan. xln. j. v. to extremely  
oolitic; matrix trs. sub-chk, sub-sucro.  
to sucro. + packstn. mottled  
yell. to gldeh yel. fluor. ; No cut  
abn. pr. grading to exell.  
oolitic por. w/ trs poor  
to slt. trs fair micro pp. por  
Quest. Perm

4000

Lms. H. gray to tanish H. gray, crypto  
to v. v. tan. xln. ; sub-chk, sub-sucro.  
+ packstn. idul. yel. fluor. ; No cut  
No vis for

- Lms. similar 3947-4014
- Lms similar 4014-4022
- Lms similar 3947-4014

Lms. H. to med. gray - slt. to  
v. sltly and grayish tan to tan;  
crypto. to v. v. tan. xln. sub-chk, sub-sucro.  
+ packstn. ; trs dull  
yel. fluor. ; No cut ; No vis for

4100

Lms. v. abn. wht. to grayish + CRM  
to H. tan; crypto. to v. v. tan. xln. j.  
v. to extremely oolitic for slt. to  
oolitic; matrix sub-chk, sub-sucro.  
+ packstn. idul. H. to H. yel. fluor. ;  
No cut ; abn. pr. grading to exell. oolitic  
por. Quest. Perm

Lms. similar 4047-4134

Lms similar 4134-4156

4200

Adjusted Agitator to  
4976 So Would Read Gas

Total Hall in entrance

Lms similar 4134-4156

4200

Adjusted Agitator Ht  
4926 So Would Read Gas

Interbedded Limestones

① Lms. trs. crm to wht.-chlk + crm,  
lt. tan to tan; gryish. lps; crypto.  
to v.v. fu. xln. j sub-chlk, sub-sucro  
& packstn. j dul. lt. yel. to tes lt. yel  
fluor. j No cut; No Vis Por.

② Lms. lt. to med. gray w/ trs. drk.  
gry; sli to v. shly. j crypto. to  
v.v. fu. xln. j sub-chlk for shly. +  
packstn. No fluor. j No cut;  
No Vis Por. j becoming more  
shly. w/ depth

4300

sh lt., med. to drk. gry. j faly to  
extraly. calc. grdingo to  
shly. Lms.

Lms. trs. wht. to crm-chlk + lt. gry  
crm. to tan; crypto. to v.v. fu.  
xln. j trs. chlk, sub-chlk, trs.  
sub-sucro. + packstn. trs. foss.  
dul. yel. to dul. lt. yel. fluor. j  
No cut; No Vis Por

Lms. extra. abu. wht. to crm-chlk  
w/ chlk. colites lps + lt. tan to tan,  
grayish. lps; crypto. to v.v. fu. xln.  
v. to extraly oolitic for sli. to  
oolitic. matrix sub-chlk, sub-sucro  
+ packstn. j dul. yel. fluor. j No cut  
v. abu. fd. j qd. to excel  
oolitic por. j Quest. Perm

4400

Marmaton  
4357-1031

Interbedded Limestones

① Lms. lt., med. to drk. gray.  
sli to v. shly w/ gryish. tan  
to tan; crypto. to v.v. fu. xln. j  
sub-chlk for shly. j sub-sucro +  
packstn. j trs. w/ dul. yel. fluor  
No cut; No Vis Por.

② Some of Faster. Drlg.  
maybe similar 4385-4414

Interbedded Limestones  
 ① Lms. lt., med. to drk. gray. -  
 sli. to v. shly w/ grayish tan  
 to tan crypto. to v. v. fn. xln. j  
 sub-chlk. to shly. j sub-sucro +  
 packstn. j trs. w/ dul. yel. fluor  
 No cut; No vis por.

② Some of Foster. Drlg.  
 maybe similar 4385-4414  
 or stringing in samples  
 from above

Sh. v. drk. gray to black carb.  
 Lms. med to drk. gray. - shly crypto xln  
 sub-chlk to shly. j packstn. j No fluor  
 No cut; No vis por

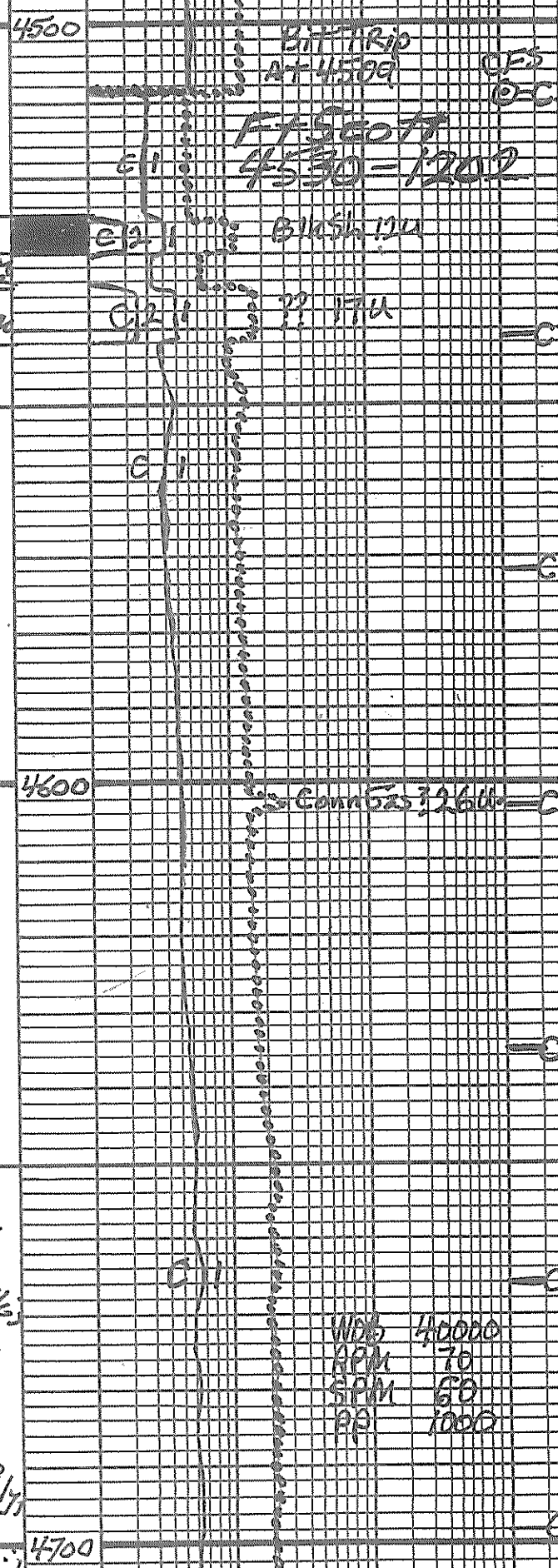
4535-4552 Lms. trs. whit to cream dul  
 + grayish tan to tan crypto  
 to v. v. fn. xln. j sub-chlk.  
 sub-sucro. to sucro.

zbn. phantom oolitic to  
 sli. trs oolitic; dul. lt.  
 to h. yel. fluor; No cut  
 zbn. pr. to fn. micro-pp  
 por + poss. interxln por

4542-4896 Interbedded  
 Limestones + Shales

① Lms. trs. wht. to cream-chlk +  
 tan, grayish. 1P's; crypto. to  
 v. v. fn. xln. j sub-chlk, sub-sucro,  
 packstn. + sub-lithographic;  
 zbn. w/ phantom oolites to  
 scattered hv trs oolitic;  
 dul. yel. to trs. yel. fluor. j  
 No cut; No vis por

② Lms. lt., med to drk. gray. -  
 sli. to extrly. shly. j crypto  
 to v. v. fn. xln. j sub-chlk to shly.  
 gradnd to calc shales,  
 trs. sub-sucro + packstn. j





ami. yel. to dk gray sl. + tuor. j  
 No Cut; No Vis Por  
 ② Lms. lt. med to dk. gray -  
 sh. to extly. shly. j crypto  
 to v. v. fr. v. m. j sub-bllk to shly  
 gradnd to calc shales

TAS. sub-subcrop packages  
 w/ trs sub-lithographic  
 No fluor; No Cut; No Vis Por.

③ Sh. med. j dk. to v. dk. gray  
 sh. to extly. calc gradng to  
 shly. Lmsts.

④ scattered shs v. dk. gray  
 to black-carb.-looking  
 increasing w/ depth

SEM 50  
 PP 1000

4700

Zoned. Fans

4800

C3 2-1

WDB 40000  
 RPM 70  
 SPM 68 1??  
 AP 700 1??

4900

C3 2-1

Sk Gas? 300

4896-4945 Interbedded  
 Lmsts + Shs similar 4542-4896  
 w/ more + thicker blk-carb.  
 Shales

Recycle? 270

4945-5034

300 Sh 500

4945-5034

60x 460  
 1460

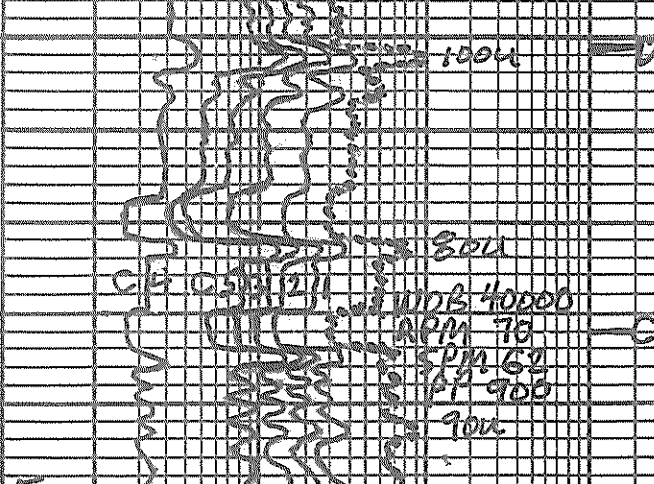
4945-5034 Interbedded  
 Limestones and Shales  
 similar 4542-4896

1500

4896-4945 Interbedded  
Lmsts + Shs similar 4542-4896  
w/more + thicker blk-carb.  
Shales

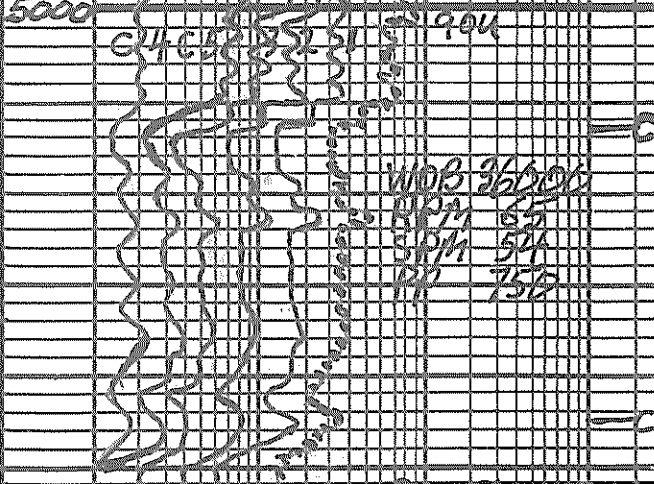


4945-5034 Interbedded  
Limestones and Shales  
similar 4542-4896



← MORROW E-log Pick →

5034-5068 Interbedded  
Lmsts + Shs similar  
4542-4896 w/scattered  
trs. v. f. n. gr. Qtz sds to  
siltstns



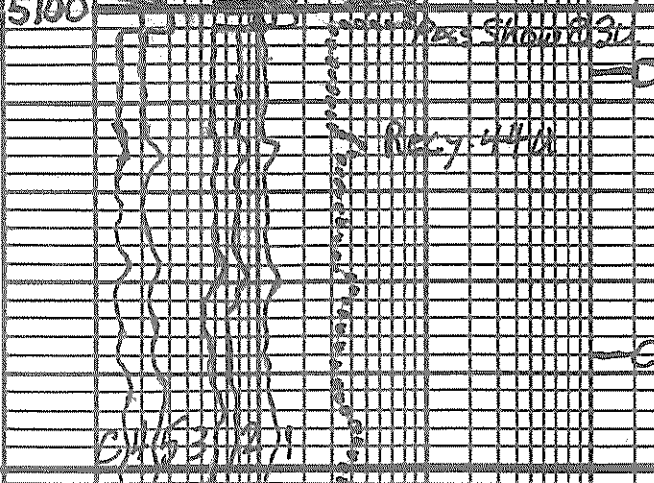
① Siltstn lt. gray to lt. green  
from glauc. to chlorite

No fluor. No cut; No vis por.  
② 5055-5063 Qtz sds to siltstn  
brn. w/trs. v. f. n. embedded  
Qtz grs - all ang. j. v. pr. to 1/3  
fr to gd. sort; trs to abn. finely  
disseminated pyrite; No cut;  
hvy. trs. pr. to trs. fr. intergr. por

5068-5340 Sh. med. gray, soft,  
silky luster lps to drk. gray -  
splintery; trs. to hvy trs pyrite  
w/scattered lms. beds; lt. to  
med. gray, gradng. to tan;  
crypto. to v. v. f. n. - j. trs sli  
to v. poss. j. v. sli trs, sub-sacro  
packets to sub-lithogr. zaphis



v. sli trs v. dull yel. fluor; No cut  
No vis por





5068-5340 Sh med gray, soft  
w/silky luster IP's to drk gray  
splintery IP's; trs. to huytrs.  
pyrite w/scattered Lms.  
beds. H. to med. grs grading  
to tan; crypta to v. fu. xlu.  
trs. sli to v. foss. j v. sli trs  
sub-sugro. j packstone to  
sub-lithographic; v. sli trs  
v. dul. H. yel. fluor. No cuts  
No Uis POR.

5200

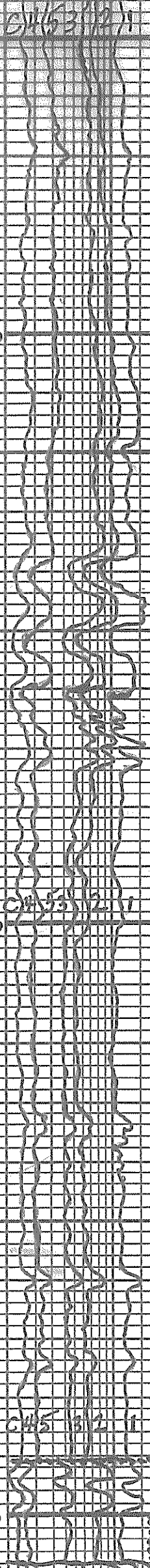
WDS 36000  
APM 65  
SPM 84  
PP 750

5340-5376 Lm + Qtz Sdst.  
40% are 100% Lm grs grading  
to 5 to 10% are 100%  
Qtz grs. j Lms. H. gray to  
tan; v. fu. to med + trs.  
coarse grs; composed of  
Lm grs. dolites + foss fragm  
matrix sub-sugro to fine  
sugro + packstn. sli to v. fu.  
glauc + pr. chloritic; No fluor. No  
cut; No Uis POR. and Qtz sds  
H. gray to tanish H. gray. j v. fu.  
to v. fu., silt-filled; ang. j prly  
sorted; sli to v. glauc + chloritic  
No fluor. No Uis v. sli trs v. pr  
micro-pp. por IP's

5300

5376-5408 Sh. med. gray-soft;  
silky luster IP's; + drk. gray  
splintery; huytrs. of Lm  
+ Qtz Sdsts. from above  
stringing in samples  
5408-5435 Qtz Sdst. H. gray  
whitish. gray to grayish. tan  
v. v. fu. to fu. w/huytrs. to  
abn. coarse gr. j ang. w/trs.  
to huytrs. sub-ang. to  
sub rounded; prly sort.  
fair oil odor; mostly sli to  
frly glauc + chloritic  
sli trs. pyrite; huytrs. w/gld. yel.  
fluor. w/faint to gd stringing cuts  
huytrs. w/tan oil stain; huytrs

5400



splintered; huytes. of km  
 + Qtz sdsts. from above  
 stringing in samples  
 5408-5435 Qtz sdst. H. gray  
 whitish gray to grayish tan  
 v.v. fn. to v. fn. w/huytes. to  
 abn. coarse gr.; ang. w/huytes.  
 to huytes. sub-ang. to  
 sub-angled; prly sort.  
 fair oil odor; mostly silt to  
 fine glauc. or chlorite  
 silt. res. pyrite; huytes. w/gldn. yel.  
 fluor. w/faint to gd stringing cuts  
 huytes. w/tan oil stain; huytes  
 large clusters w/fr. to gd intergr  
 por; sm. clusters have fr to gd  
 intergr. por; v. abn loose Qtz  
 gres;

5435-5444 Sh. med gray soft  
 w/silt. cluster lps + dr. gray - splintered  
 w/tan lms. gray to tan; crypto to v. v. fn. to  
 sub-micro. to p. crypto. to v. v. fn. to  
 No lms; No Uis Por

5444-5455 Qtz sdst H. gray to lt. tan from  
 oil stain; fair oil odor; v.v. fn. to v. fn. w/huytes  
 med. gr.; ang. pr. to fr. w/huytes good  
 sort; scattered silt. res. w/plane  
 +/or chlorite; brk. yel. fluor  
 w/flush cut to faint to gd stringing  
 cuts; abn. pr. to fr. to huytes. gd to  
 res. excel micro-p. to intergr  
 por; sm. clusters v. variable  
 abn loose Qtz gres

A  
 B  
 C

5455-5464 similar 5408  
 to 5435 w/v. abn more  
 sub-angled to rounded

B. 5464-5471 Qtz sdst tanish  
 wht. j.v.v. fn. to v. fn. w/huytes. to  
 med. gr. j. res. w/med gray sh. gres.  
 ang. to res. sub-ang. sub-angled

D  
 E

to silt. res rounded; pr to fr  
 + res gd sort; abn. dr. yel.  
 to gldn. yel. fluor. w/flush  
 + faint to gd stringing cuts  
 abn. pr. to fr. to res. gd  
 micro. to v. v. fn. to intergr. por  
 sm. clusters v. variable  
 abn loose Qtz gres; fr. oil odor

G 5471-5486 Qtz sdst H. gray  
 grayish. crm., grayish tan to res  
 v. lt. tan; v.v. fn. to v. fn. w/huytes  
 to med gr.; ang. j. prly sort.  
 silt-filled lps; res. silt to calc  
 res. w/finely disseminated pyr.  
 res. w/huytes sh. gres. rnd to ang.  
 res. yel. to res. gldn. yel. fluor  
 w/faint. to gd. stringing cuts  
 huytes. to abn. pr. to fr. intergr.  
 por; abn. loose Qtz gres.  
 huytes are med to coarse gr.

D. 5486-5500 Qtz sdst H. gray  
 whitish gray to grayish wht + res tanish  
 gray; v.v. fn. to v. fn. w/huytes. fn  
 to res med + silt. res coarse gr.  
 ang. w/huytes. sub-ang to rounded  
 scattered res pyritic to res w/  
 finely disseminated pyrite  
 silt. res w/yel. fluor. w/faint to fr  
 stringing cuts; huytes. pr. to fr  
 + res. gd. intergr. por in small  
 clusters; sm. clusters v. variable

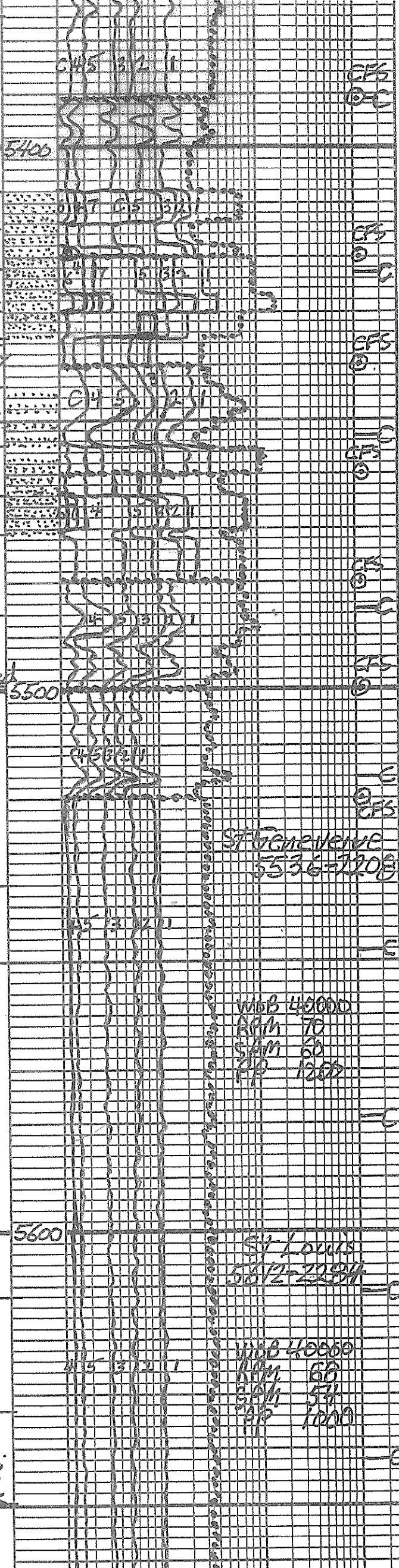
abn loose Qtz gres. w/prob.  
 interbeds, sh. med to dk  
 gray + res brownish red to reds

E 5500-5536 Shs + Lms  
 1. shs. brownish reds to reds  
 2. Lms. pink + reds; crypto to v. v. fn.  
 v. v. fn. to v. v. fn. w/huytes. to  
 res Qtz gres - v. v. fn. - ang.

G  
 H

matrix sub-chalk + sub-succo  
 Not fluor; No Uis; No Uis Por  
 3. Lms (res in top of Zn to v. abn  
 in bottom Zn) gres + tan to tan  
 crypto to v. v. fn. v. v. fn. to v. v. fn.  
 oolitic cut res Qtz gres - v. v. fn. - ang.  
 matrix fine sub-chalk + sub-succo  
 v. d. yel. fluor; No Uis; No Uis Por

E 5536-5612 Lms similar  
 Number 3 description from  
 5500 + 5536



ST. LOUIS  
 5536-5612

MOB 40000  
 RPM 70  
 SAM 60  
 RP 1200

St. Louis  
 5512-5536

MOB 40000  
 RPM 60  
 SAM 50  
 RP 1000



H 2. Lms (Tras in top of Zn to v. abn in bottom Zn) g. resist tan to tan cryptoto v. v. med. extaly. macro-oolitic w/ tras. Oolites - vitreous - sug; matrix fass sub-chalk sub-sucro v. dul. yel. fluor. No cut; No Vis for

AP 1000

C

E 5536-5612 Lms similar Number 3 description from 5500-5536

I G Lms. tras. vit. to cam. chalk w/ chalk oolites IP's +. H. tan to tan, grayish, IP's; cryptoto v. v. xlu. v. oolitic (sm, med + lg) matrix sub-chalk, tras sub-sucro + p. chert. dul. yel. fluor. No cut; No Vis for w/ tras Chert H. orange to tan gray to tan; tan to op. q. l. e

CPS

⊙

H 5633-5650 Lms. extra abn w/ to crm-chalk abn w/ chalk oolites and tan; cryptoto v. v. med. extaly oolitic (med, lg + tras suc) matrix sub-chalk, sub-sucro + s. l. tras sucro; dul. yel. fluor. No cut; tras p. micro-pp por IP's w/ tras chert gray to tan op. q. l. e to tan.

I Lms. similar 5612-5633 w/ tras Chert gray to tan; op. q. l. e to tan.

# TD 5674

778 in Bit Into  
Bit #1 PDG 1710 to 4509  
Bit #2 New Smith F27 INV  
in 4509 out TD 5674

Dev. SURV

1. 659 3/40	3. 4509 10
2. 1710 3/40	4. 5674 TD

Cir Points

1. 4509	6. 5460
2. 5076	7. 5480
3. 5391	8. 5500
4. 5420	9. 5520
5. 5440	10. 5674

Daily Drilg Progress

1. 3728	At 7:00AM	5-11-16
2. 4450	At 7:00AM	5-12-16
3. 4692	At 7:00AM	5-13-16
4. 4969	At 7:00AM	5-14-16
5. 5246	At 7:00AM	5-15-16
6. 5469	At 7:00AM	5-16-16
7. 5614	At 7:00AM	5-17-16
8. 5674	At 7:00AM	5-18-16

No DST Were Run

Mud Info:

5-11	5-12	5-13	5-14	5-15	5-16
11:35A	11:05A	2:35A	10:5A	7:10A	7:30A
4033	4509	4804	5014	5274	5488



Cir Points  
 1. 4509 6.5460  
 2. 5076 7.5480  
 3. 5391 8.5500  
 4. 5420 9.5520  
 5. 5440 10.5674

Daily Drlg Progress  
 1. 3728 AT 7:00AM 5-11-16  
 2. 4450 AT 7:00AM 5-12-16  
 3. 4692 AT 7:00AM 5-13-16  
 4. 4969 AT 7:00AM 5-14-16  
 5. 5246 AT 7:00AM 5-15-16  
 6. 5469 AT 7:00AM 5-16-16  
 7. 5614 AT 7:00AM 5-17-16  
 8. 5674 AT 7:00AM 5-18-16

No DST Were Run

Mud Info:						
Day	5-11	5-12	5-13	5-14	5-15	5-16
Time	11:35A	11:05A	2:35A	10:35A	9:10A	7:30A
Depth	4033	4509	4804	5014	5274	5488
WT	8.95	9.3	9.3	9.1	9.25	9.15
Vis	47	50	50	66	77	77
PV	14	15	14	18	20	18
YP	15	16	16	21	22	21
SS	14/42	16/46	15/46	17/64	19/22	17/61
WL	8.8	9.2	9.2	8.8	8.4	7.6
Cake	1/32	1/32	1/32	1/32	1/32	1/32
pH	10.5	10.5	10.0	9.0	9.5	9.5
Chl	600	1100	1200	1600	1000	600
C2	20	20	20	20	20	20
LLM	8.5	13.0	13.0	14.0	14.0	13.0

OPERATOR Berexco LLC LOCATION 335'FNL + 3040'FEL  
 LEASE Earl Arnold NO. 7-3 SEC. 7 TWP. 29S RANG. 40W  
 ELEVATION 3328KB RTD 5674 COUNTY Stanton STATE Kansas