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**GEOLOGIST'S REPORT**  
 DRILLING TIME AND SAMPLE LOG

OPERATOR Cobalt Energy, L.L.C.  
 LEASE Brothers "A" WELL NO. 1-11  
 FIELD shallow water  
 LOCATION 1709' FSL & 1735' F.W.L.  
 SEC. 11 TWP. 20S RGE. 33W  
 COUNTY Scott STATE Kansas

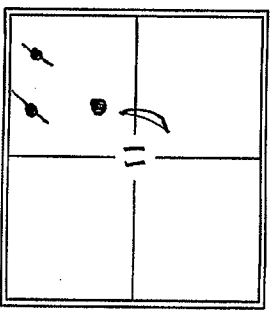
CONTRACTOR Murfin drlg co. Rig 22  
 COMM. 10-10-2016 COMP. 10-23-2016  
 RTD 4780' LOG TD 4782'  
 SAMPLES SAVED FROM 2500-2900+3500' TO RTD  
 DRILLING TIME KEPT FROM 2100' TO RTD  
 SAMPLES EXAMINED FROM 2500-2900+3500' TO RTD  
 GEOLOGICAL SUPERVISION FROM 1500 ft. TO RTD  
 MUD UP 1500 TYPE MUD Chemoval

FORMATION	TOP	LOG DATUM	TOP SAMPLE DATUM	STRUCT. COMP.
Bohydrite	2130	1831	2130 +831	+1
KRIDER	2610	1351	2610 +351	+9
Heebner	3804	-843	3804-843	+11
Lansing	3850	-889	3850-877	413
Stark	4200	-1247	4200-1247	49
BKC	4281	-1320	4281-1320	+6
Marmaton	4306	-1345	4303-1342	+6
Altamont	4333	-1372	4333-1372	+11
Lawnee	4384	-1423	4383-1422	+11
Lawnee Sta.	4417	-1456	4418-1457	+11
Cherokee sh.	4454	-1493	4454-1493	+11
Morrow sh.	4578	-1617	4578-1617	+13
Morrow sd.	4613	-1652	4612-1651	+6
MISSISSIPPI	4674	-1713	4673-1712	-17
Miss St Louis	Not picked			

ELEVATION  
 KB 2961'  
 DF 2950'  
 Measurements Are All From KB.

CASING RECORD  
 SURFACE 8 5/8" @ 270'  
W190 SX  
 PRODUCTION 5 1/2"

ELECTRICAL SURVEYS,  
 Pioneer Energy Services  
 Dual Induction/Puls-Neu  
 Sonic-Micro



REFERENCE WELL FOR STRUCTURAL COMPARISON Shallow water Refining  
Wassinger "A" 1 w/2 SE SW Sec 11-20S-33W, 2944 KB.

DATE	DEPTH	NO	SIZE	NAME	TYPE	DEPTH OUT	FEET	HOURS
10-10-16	Spud well	A	12 1/4	HTC	GIC-1	270	270	4 1/2
10-11-16	270' surface	1	7 7/8	HTC	GX22	4246	3976	136
10-12-16	1262' drlg (100')	2	7 7/8	HTC	GX22	4300	54	8
10-13-16	2285' drlg 42'	3	7 7/8	HTC	DP 506	4780	480	32 1/4
10-14-16	2625' drlg 73'							
10-15-16	3075' drlg							
10-16-16	3560' drlg -4-							
10-17-16	3945' drlg -5-							
10-18-16	4162' drlg -6-							
10-19-16	4300' by trips -7-					Board	2068.06'	
10-20-16	4485' drlg -8-					Strap	2065.73'	
10-21-16	4590' drlg 23-9-					diff	2.33'S	
10-28-16	4660' drlg 4-10-							
10-23-16	4780' Logging -11-							

FORMATION	INTERVAL	DESCRIPTION OF SHOW	LOG ANALYSIS
KRIDER	2610-2625	Dolomite tan-H. Brown, xln w/ scry xln, dr. dull floor, across chips no rock - detector may not be peer	DST-1
Heebner	3804-3804	limstone - tan & r-7, sly + 570 in. pr. rcs w/ fcs & dr. sd. 800' 12 U.K. 12' 12'	DST-2
Morrow sd	4622-4629	sandstone, cgsr, 546 rounded, clusters w/ f 5FD + drk. flaky sta in good condition of 25-40 U.K. + dull floor	DST-4 DST-3
	4641-4648	fair - good set sta in porosity	

No.	Interval
1	2584-2625
2	4518-4590
3	4581-4660
4	4549-4640
	///

REMARKS AND RECOMMENDATIONS  
Page 1 of 1

DRILL STEM TESTS

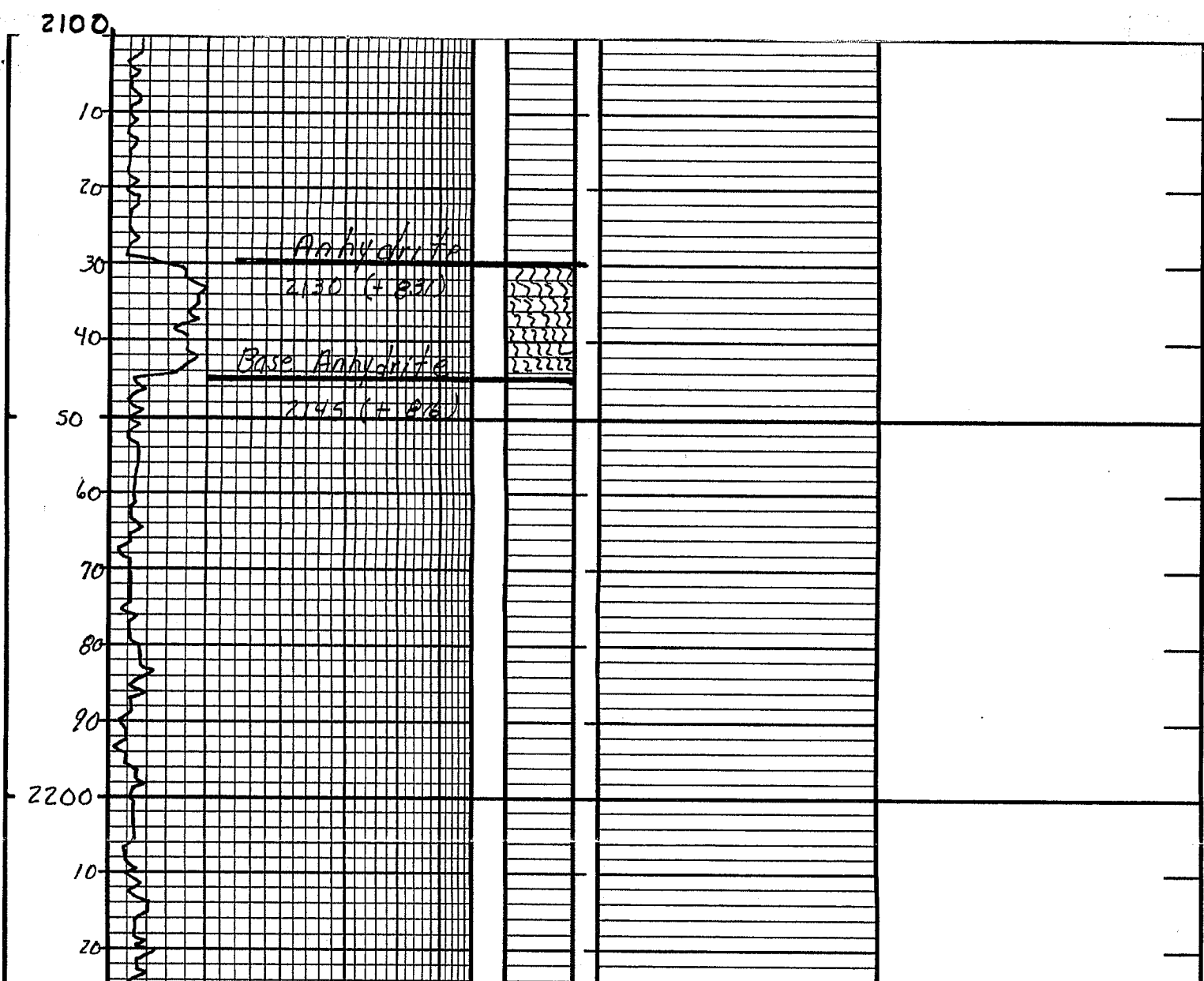
No.	Interval	IFP/Time	ISIP/Time	FFP/Time	FSIP/Time	HH-FHH	RECOVERY
1	2584-2625 41'	* # 10-17 30"	* # 105 60"	* # 18-22 60"	* # 97 90"	1183 / 1182	20' mud
2	4518-4590 72'	* # 12-19 30"	* # 774 45"	* # 17-20 30"	* # 642 45"	2166 / 2153	5' mud PACKER FAILURE
3	4581-4660 79'						
4	4549-4660 111'	* # 219-591 30"	* # 1100 60"	* # 619-934 60"	* # 1094 90"		2410' Flow GMO + Gmud diamond testing

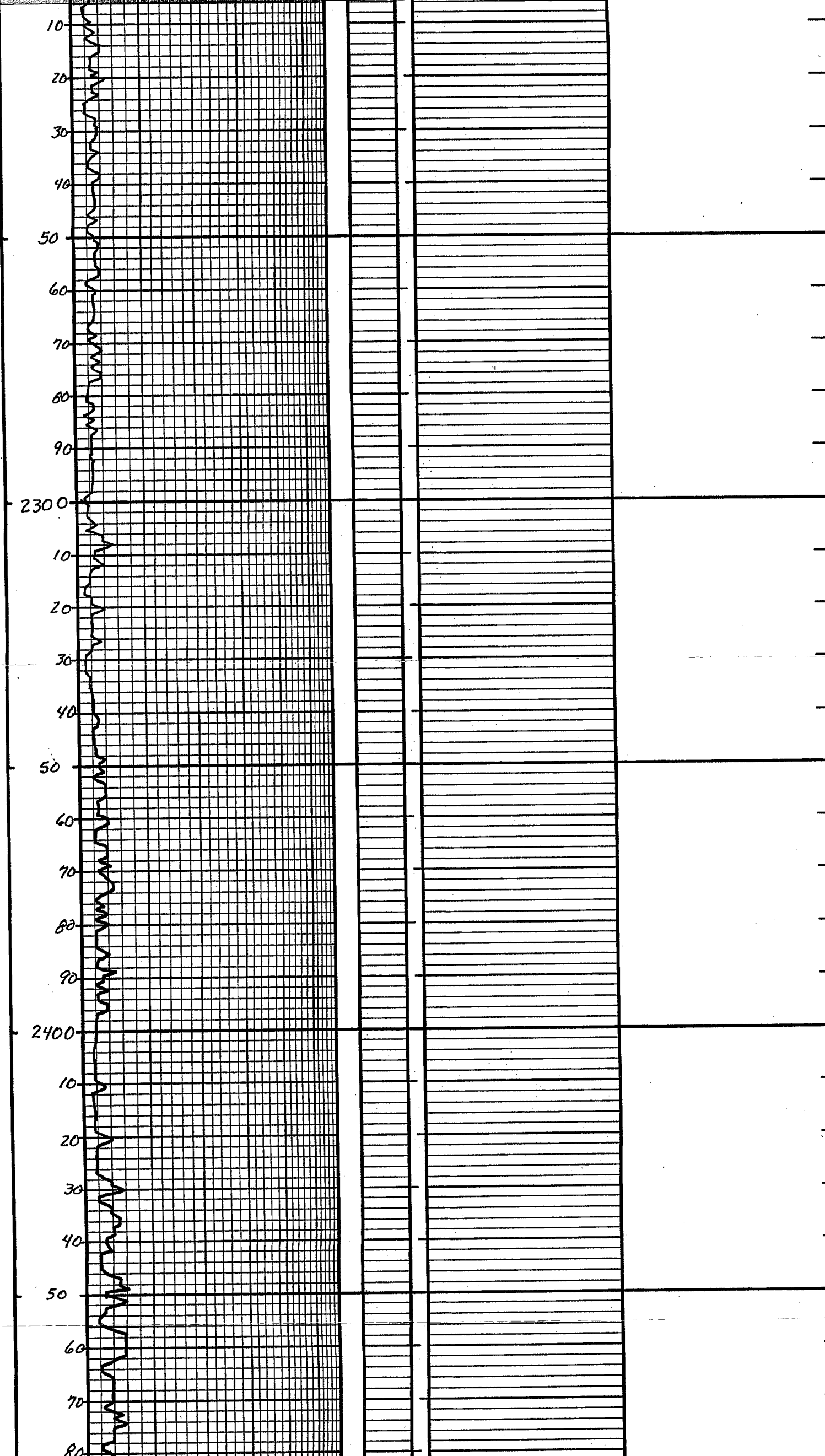
REMARKS AND RECOMMENDATIONS with the success of dst #4, production pipe will be set to further evaluate

Respectfully,

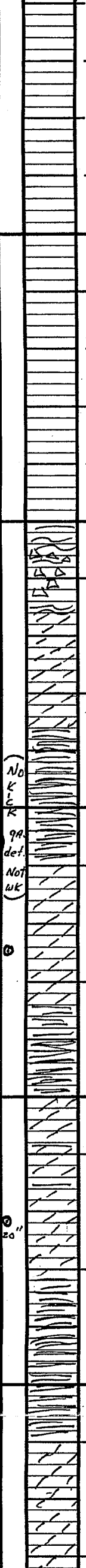
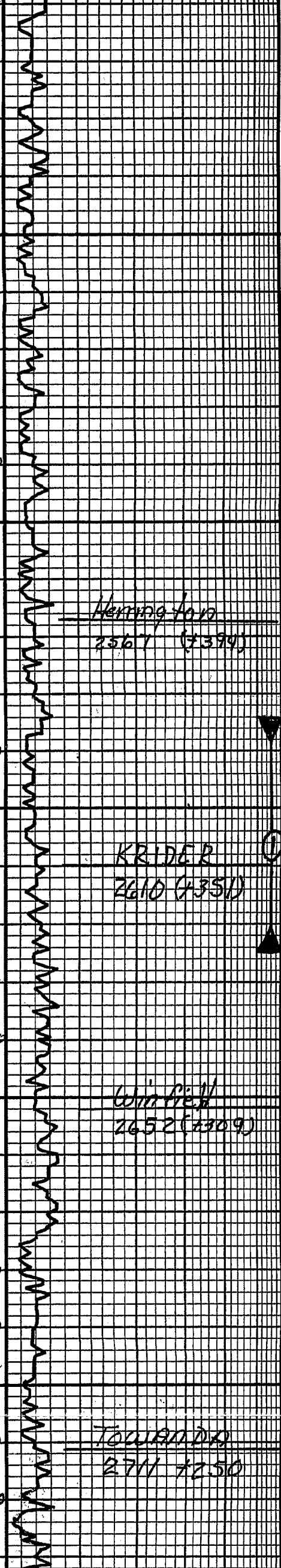
Greg A. Wood

Retroleum Geologist  
10-23-2016





60  
70  
80  
90  
2500  
10  
20  
30  
40  
50  
60  
70  
80  
90  
2600  
10  
20  
30  
40  
50  
60  
70  
80  
90  
2700  
10  
20  
30



sh-gry-mar-onh  
sl. chky

sh-gry-mar-onh  
sl. chky

sh-gry-mar; onh  
sl. chky

dal tan xln, mostly  
tight fx, pr of N.S.  
(No kick)

dal tan xln, tight  
N.V.P. N.S.

sh gry - drx gry MAR

dal tan - H brn xln w  
scz# xln of dull  
floor.

dal - tan - H brn - xln -  
tighter -> No vis of  
dull floor

dal tan - H brn, xln - tight  
fx. N.V.P. shly

sh. gry - mar

dal. tan - H brn - xln -  
sl. foss - pr of N.S.  
No kick

dal - tan - H brn - in xln  
tight - N.V.P. N.S.  
No kick

sh. gry - mar

sh - gry - mar

dal - tan - in xln - tight  
N.V.P. N.S. No floor  
sl. foss

dal tan - xln - sec w/ pr  
N.V.P. N.S. No floor  
sl. foss

dal - tan - H brn - in xln

samples start - 2500'

DST Nal 2584' - 2625'  
surface blow  $\rightarrow$  1 3/4" 1st op  
wk blow 1/4"  $\rightarrow$  1/2" 2nd op

30" 60" 60" 90"

Rec: 20' mud N.S.

SIP: 105" - 97"  
FP: 10" - 17" + 18" - 22"  
HP: 1183" - 1182"  
T = 93°

dst-1 chart

25 unit increase  
will check E-109

Herring fan  
2567 (7394)

KRIDER  
2610 (7351)

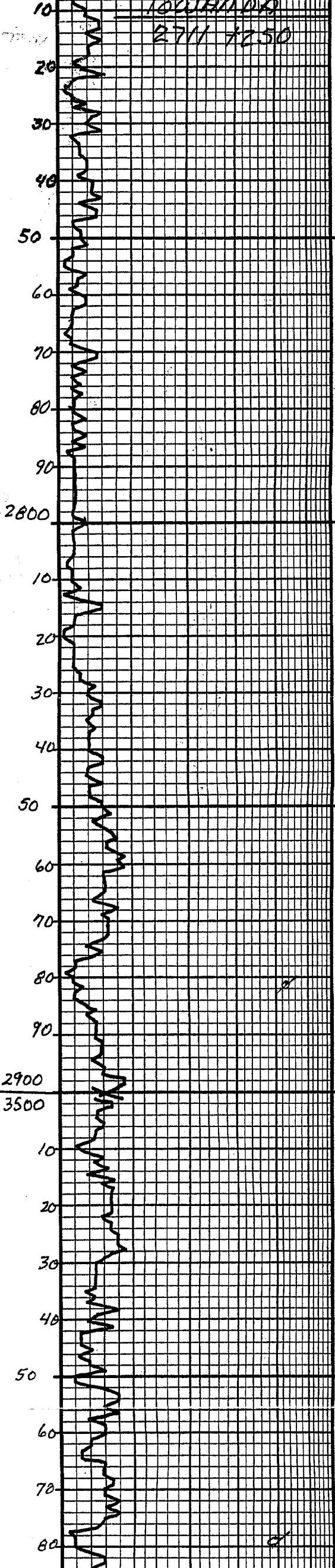
Winfield  
2652 (7309)

TOWANDA  
2711 (7250)

(No  
kick)

99  
det.  
Not  
uk

20"



100LHMNDR  
2711 7250

dal - tan - fr - xln - tight  
NLS, NO floor  
sli foss

25 unit increase  
will check E-109

dal - tan - xln - sec w/ pr  
NLS, NO floor  
sli foss

dal - tan - H brn - fr - xln  
scat pr of chky - NLS  
No floor - sli foss

sh - gry - MAR - GRN

dal - ls. tan - Crm,  
fr - xln, some foss  
xln of NLS. No kick

dal - ls. tan - xln →  
Crm - xln, sli chky  
scat of NLS No  
kick

ls. brn - ool, tight  
pr - NLS. No kick  
sli

sh - med - dk GRV  
- red

sh gry - MAR

ls. tan - brn - fr - xln - dse  
sli foss - NLS  
No kick

ls. tan - brn q/a - NLS  
sli foss NLS. No kick

ls. tan - Crm, fr - xln  
foss w/ fr, foss of  
sli chky, NLS. No kick

START ΔT @ 3500

ls. tan - brn - ool - dk  
blk plates, tight pr.  
NLS

sh - gry - MAR - dk GRV

ls. tan - H brn, fr - xln - dse  
NLS

ls. tan, fine xln, sli foss  
pr - foss of sli chky  
NLS

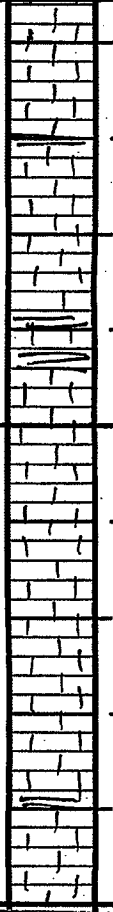
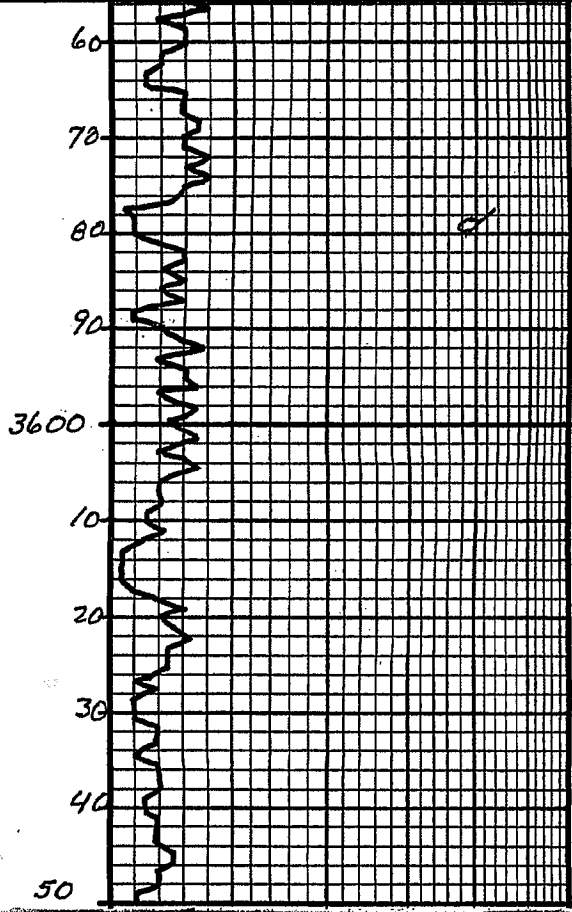
sh dk GRV - MAR

ls. H tan - Crm, fr - xln -  
sli chky NLS

ls. tan - Crm, fr - xln - chky  
NLS

sh - dk GRV - blk

ls. tan - H brn ool w/



ls. H. tan - Crm. fr. xln -  
sl: chky N.S.

ls. tan - Crm. fr. xln - chky  
N.S.

sh. dk. gr. - blk

ls. tan - H. brn. ool w/  
poor ool. N.S.

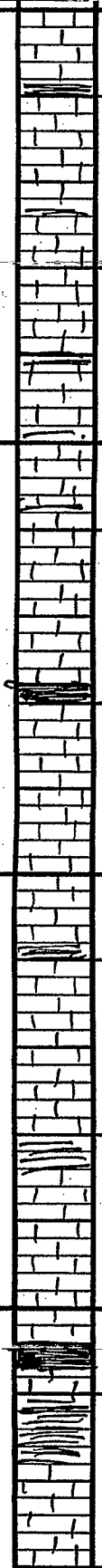
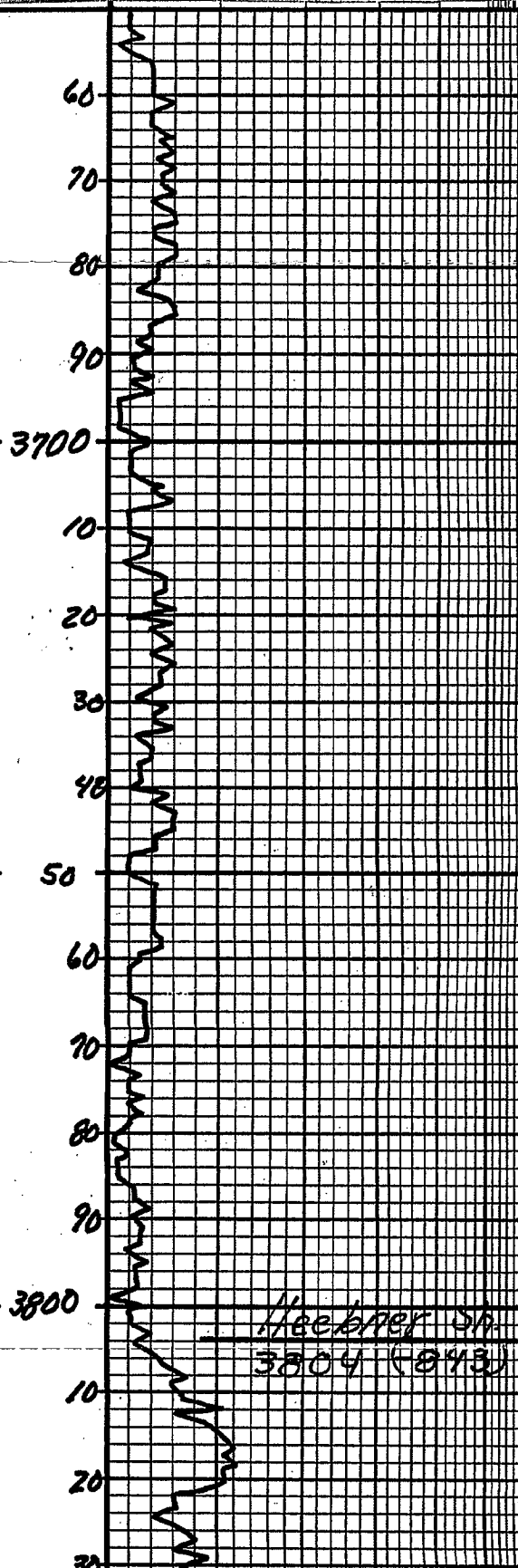
sh. gry - mar

ls. tan - fine xln, to plat  
sl: chky

ls. tan, foss w/ pr - fr  
foss. V - chky - N.S.

ls. tan - fr - xln. sl.  
foss, sca # p - N.S. chky

sh. gry's



ls. tan - ool w/ fr ool  
N.S.

ls. tan - H. brn. xln - ool  
ls. tight rx. N.S. No  
kick

ls. tan - H. brn. fr - xln  
-dse, N.S. N.S.

ls. tan - H. brn. gry. dse  
sl: chky, N.S. N.S.

shly

ls. H. tan - tan, fr - xln -  
sl: chky - N.S.

ls. tan - Crm. gry. fr - xln  
sl: foss - sl: chky. N.S.  
N. blk. sh. carb

ls. tan, gry. fr - xln.  
V - sl: foss - tight rx,  
N.S. sl: chky

ls. H. tan. ool w/ fair ool  
N.S. No kick,  
sl: chky

ls. tan, six + ool w/ fr  
suc - ool. N.S., sl: chky

sh. gry - mar

sh. blk carb  
ls. tan - fr - xln, sl: foss  
tight - chky

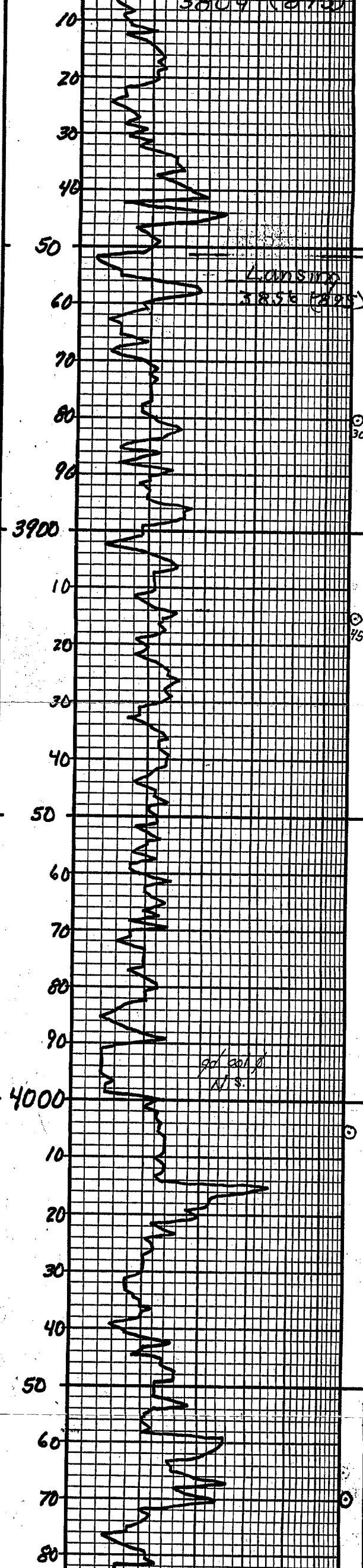
sh. - dk. gry - mar

ls. tan - gry - Crm. fr - xln  
sl: foss, sca # foss of  
N.S. No kick, sl: chky

Neubaer Sh  
3804 (043)

SUK.

3009 (215)

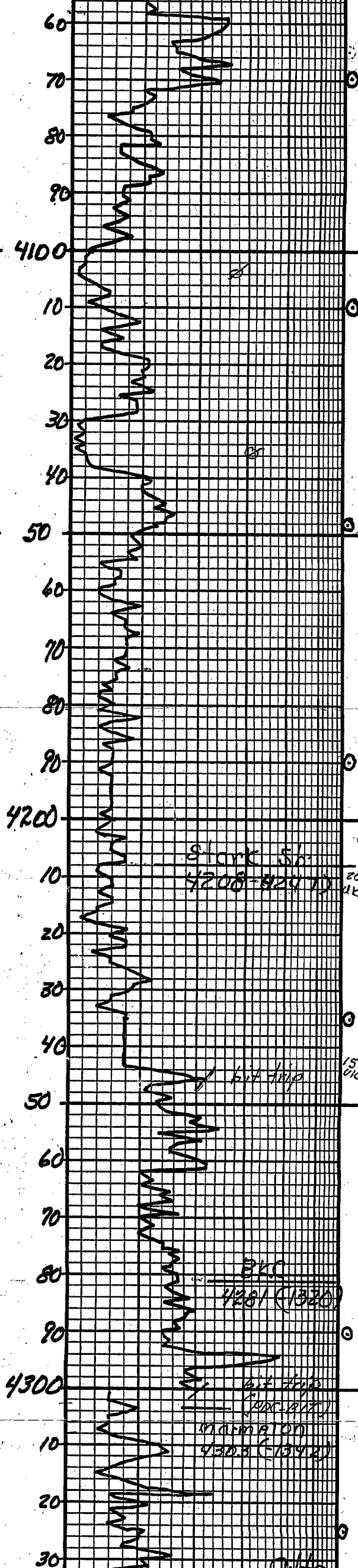


10	sh - drk gry - MAR
20	ls. tan - gry - Crm. fr-xln sl. foss, scatt foss of N.S. No Kick, sl. Chk
30	ls. tan - Crm - Gry foss w/ scatt foss of, sl. Chk
40	ls. tan - fr-xln - fight ry N.S.
50	sh - Grys - MAR
60	ls. tan fr-xln, fight rx NVA N.S.
70	ls. tan ool w/ scatt fair ool of N.S. No Kick. gry of Δ
80	ls. tan. dse, NVA N.S.
90	sh - gry - MAR
3900	ls. tan fr-xln foss w/ scatt foss of
10	ls. tan fr-xln. foss w/ fair pp. foss of. V. Chky N.S. No Kick
20	ls. tan - fr-xln - dse, N.S. sh - GRy - MAR
30	ls. tan - fr-xln - ool - dse, NVA N.S.
40	ls. tan - Crm - ool w/ pr ool of sl. Chky N.S. N.K.
50	ls. tan - ool w/ pr ool of N.S. No Kick
60	ls. tan - fr-xln - fight rx, NVA N.S. sl. Chky
70	ls. tan - fr-xln - dse, NVA N.S. inc Chk
80	sh. drk gry - med gry
90	ls. tan - fr-xln - dse Chky N.S.
4000	ls. H tan - Gry - Crm. fr-xln - dse, Chky N.S.
10	ls. tan - Gry - ool w/ scatt ool of N.S. Chky N.K.
20	ls. H tan - H Gry oolitic w/ good inter-ool of. N.S. No Kick
30	ls. H tan - H Gry, dse - NVA - N.S.
40	ls. tan - fr-xln - dse NVA, N.S. sl. Chky
50	ls. tan - fr-xln - dse NVA N.S.
60	ls. tan - fr-xln - dse NVA N.S.
70	ls. tan - Gry - fr-xln - dse same Δ N.S.
80	sh. drk gry MAR
90	sh. gry MAR
10	ls. tan - Gry fr-xln sl. foss scatt pp. foss of N.S. N.K.
20	ls. brn - Crm fr-xln. foss, 2 pc's w/ dse in foss of NVA. No odor, No Kick
30	ls. Crm - fr-xln - dse, N.S. wh. gry fr. of foss Δ.

LOUISIANA  
3856 (215)

ool ool of  
N.S.



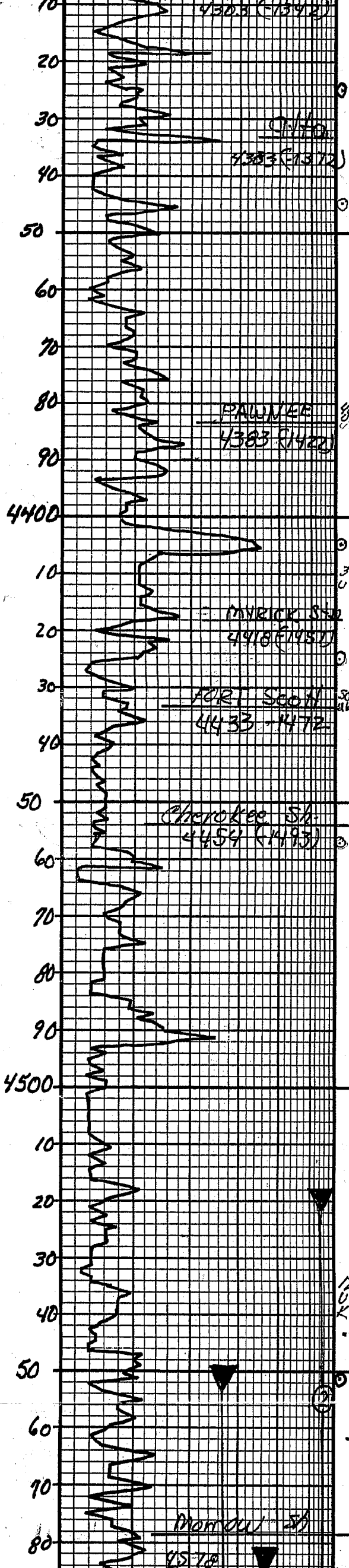


1s. tan-GRY fn-xln sl-foss  
 scatt pp-foss of N.S. N.K.  
 1s. brn-crm. fn-xln-foss, 2  
 pr's w/ dgs in foss of  
 N.S. No odor, No Kick  
 1s. Crm. fn-xln-dse, N.S.  
 wh-gry tr op foss Δ.  
 sh. blk Cor h ISUK  
 1s. Crm. fn-xln sl-foss w/  
 fair-poor foss of wh-gry  
 foss fresh op Δ N.S.  
 1s. tan, fn-xln, scatt foss of  
 1s. tan-dolitic, w/ good  
 inter ool of N.S. No Kick  
 1s. tan-crm-ool w/ fr-  
 ed inter-ool of N.S.  
 + sh-gry-mar  
 1s. 1/2 ool-xln, w/ pr  
 fair of N.S.  
 1s. tan-ft tan, fn-xln-N.S.  
 shly  
 1s. tan-crm, ool-ool w/  
 good ool of 2 pr's  
 w/ dgs in of No K.O. No  
 oil, NO KICK fr Δ  
 1s. tan-brn-gry, fn-xln  
 -dse, N.S. N.S. fr Δ  
 sh. drk-blk  
 1s. Crm-gry, fn-xln-  
 foss w/ poor foss of  
 N.S. sl. chky  
 1s. Crm-ft tan-gry, fn-xln  
 sl. chky. N.S.  
 1s. ft tan-crm, ool-sl-ool  
 w/ fair ool + ool of sl. chky  
 N.S. No Kick  
 1s. tan-brn, fn-xln-  
 sl. foss, scatt poor of  
 N.S.  
 1s. tan-brn, fn-xln-  
 dse, sl. foss, N.S. N.S.  
 sh. blk Cor h-  
 1s. Crm-ft tan, fn-xln-sl  
 foss, pr-N.S. N.S. No  
 odor-No Kick  
 1s. tan-brn, fn-xln-sl, foss  
 pr of N.S. shly  
 1s. tan, fn-xln, foss-w/  
 pr-ft foss of N.S.  
 1/2 Kick  
 sh. drk GRY-blk  
 1s. tan ool w/ poor ool  
 of N.S.  
 1s. tan, fn-xln-sl, foss-  
 sl. ool-pr of N.S.  
 1s. tan-fn-xln-dse  
 sl. foss, poor foss of  
 N.S.  
 shly  
 1s. tan-gry, fn-xln-N.S.  
 sh. gry-mar  
 sh. gry-grn-mar  
 1s. tan-brn, fn-xln-tight  
 pr-N.S. NO Kick  
 sh. gry  
 1s. tan-sl ool-N.S.  
 N.S. No Kick-No odor  
 1s. tan-brn, fn-xln-ool  
 pr-N.S. N.S. No  
 odor  
 1s. tan-brn-ool-xln-dse  
 pr ool of mostly tight pr  
 N.S. No Kick  
 1s. tan-ft tan, fn-xln-N.S.

BIT TRIP short button  
bit to longer button bit

bit trip from longer  
buttons f. PDC-





Ls. tan-brn - ool - xln - ool  
 N.S. No Kick

Ls. tan-brn - ool - xln - dse  
 ool d. mostly light rx  
 N.S. No Kick

Ls. tan-brn - sl. foss - N.S.  
 SH-GRY-MAR

SHLY

Ls. tan-brn - sl. foss pr. N.S.  
 N.S., No Kick

SH. grys + mar

Ls. tan-brn - xln - sl. foss, N.S.  
 N.S.

SHLY

SH. blk Carb.

Ls. tan, tan-xln - v. ss  
 foss. pr. N.S.

Ls. tan oolitic w/ fr-pr  
 ool d. N.S. No odor

SH. black Carb

Ls. Crm-tan xln - foss - ool  
 w/ pr. N.S. No odor

Ls. Crm-tan - sl. ool pr  
 ool d. N.S., No odor

SH-BLK - Carb

Ls. tan - Crm, ool - scatt  
 ool d. matt, sl. - chky  
 N.S. No odor

Ls. ool - matt - scatt  
 ool d. N.S. No odor

SH. blk carb

Ls. tan, tan-xln - sl. foss  
 N.S.

Ls. tan - tan - str ool  
 pr ool d. N.S.

SH. blk - Carb

Ls. tan-brn-xln - sl. ool  
 N.S.

Ls. tan-brn-xln - sl. ool  
 N.S. SHLY

SH. gry-mar-grn

Ls. tan-brn-xln, sl.  
 foss. pr - N.S. N.S.

Ls. tan-brn - shly

Ls. tan-brn-xln-sl.  
 foss w/ fr. spt d. str  
 + spt d. pr. fr pp-  
 foss d. ch. odor

Ls. tan-brn-xln-sl. foss  
 fr. str. fr. pr. in pp-  
 v. faint odor

Ls. tan, tan-xln, sl. foss  
 fr. str. 3-4 pieces. N.S.  
 faint odor

SH. gry-dk gry

Ls. tan-brn - tan-xln -  
 dse, N.S. N.S.

\* did small short trip  
 circ. dst-2.  
 Rig got stuck @ 2340  
 pulled out bit and  
 will return. CF dst 2.  
 driller thinks bit is  
 balled up coming out.  
 No problems w/ (conventional)  
 bits on trips -?-\*

DST No. 2 4518-4590

wk blow 1st op. No blow 2nd op

30" 45" 30" 45"

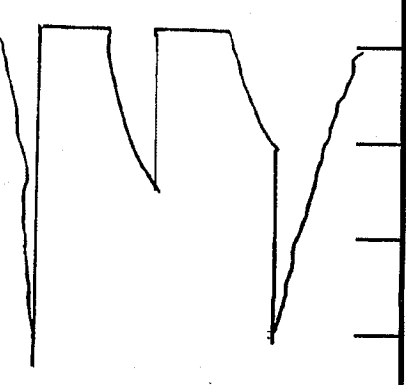
Rec: 5' mud

SIP: # 774-642 #

DST No. 2 4518-4590

WK blow 1st op. No blow 2nd op  
30" 45" 30" 45"  
Rec: 5' mud  
# 774-642  
SIP: 774-642  
FP: 12'-19" + 17'-20"  
HP: 2166# - 2153#  
T = 117°

Chart dist-2

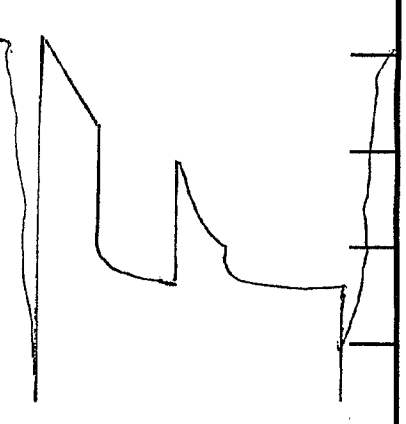


(-PKR FAILURE-)  
DST No. 3 4581-4660

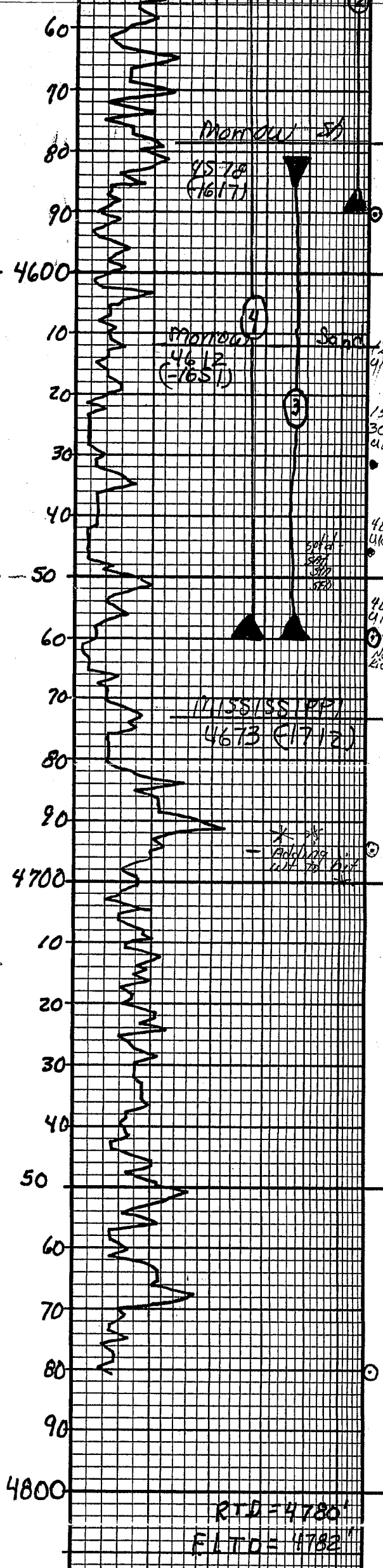
DST No. 4 4549-4660  
BoB 2" 1st open, 1" BB  
BoB 2 1/2" 2nd op, No BB  
30" 60" 60" 90"

Rec: 2015' 9sq-mdy oil, 86% oil  
95' " " " " 66% oil  
180' sl. wtry mud 73% oil  
120' sl. wtry oil 44% oil  
2410' Total rec  
SIP: 1100# FP 219-59 1/4 6-26  
1094# 619-934

Chart dist-4

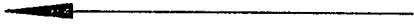


mud: 60 vis, 9.4 wt  
9.0 wL good mud  
throughout well \*



Ls. tan fr-xln-sh. foss  
fr. sh. 3-4 pieces. NTO  
faint odor  
sh-gry-dk gry  
Ls. tan-brn-fr-xln-  
also, NTO N.S.  
sh. gry-s-grn-mar  
sh-varicolored  
sdstone, clear, sub-md clusters  
fr. pr. fair odor  
dull flour  
sdstone q/a-shly  
sdstone, clear, atzitic, sub-  
md clusters, SEP + clastic  
dead oil when broken.  
Fair odor, dull flour  
also set oil str ind  
sh + siltstone, N.S.  
sh-siltstone  
ss atzitic w/ sep  
+ clayey oil spots on  
sd gry fr. - grt color  
Ls. tan fr-xln-tight N.S.  
shly - sh. stars. Gd  
flour  
Ls. cm-gry-ool-xln  
w/ pr ool & chky N.S.  
Ls. (rm xln-ool - N.S.  
sh-gry-mar + siltstone  
sh. shly faint odor N.S.  
shly  
Ls. cm-tan fr-xln-Vst.  
foss, tight rx - N.S. shly  
Ls. cm-H tan fr-xln-sh  
ool-tight rx, NVO N.S.  
shly  
Ls. (rm-H tan fr-xln, some  
ool ls, pr. shly N.S.  
Ls. H tan-tan, fr-xln-  
shly ool, NVO, N.S.  
Ls. tan-fr-xln, tight rx  
NVO N.S.  
Ls. H tan, fr-xln-ool  
pr ool - NVO N.S.  
Ls. tan-ool, w/ grt fr ool &  
N.S. - no odor  
Ls. tan-H brn, fr-xln -  
tight rx, NVO N.S.  
Ls. tan-H brn, fr-xln -  
tight rx N.S.  
Ls. tan-ool, fair rx, N.S.

RTD = 4780'  
ELTD = 4782'

90 4800	RTD = 4780' FLT D = 4782'			mud: 60 VIS, 9.4 WT 9.0 WL good mud throughout well *
5" 10" 15" 20" 25"	DRILLING TIME Minutes/Foot	LITHOLOGY	SAMPLE DESCRIPTIONS	REMARKS
 Rate of Penetration Increases				

COMPANY Cobalt Energy L.L.C.  
 LEASE Boothers "A" 1-11  
 LOCATION 1709' E 1/4 & 1735' E 1/4 SEC. 11 TWP 20S RNG 33W  
 COUNTY Scott STATE Kansas

ELEVATION: 2961 K.B.