Max R. Lovely

GEOLOGIST'S REPORT

DRILLING TIME AND SAMPLE LOG

COMPANY Ritchie Exploration, Inc.
LEASE #1 Durler 14D
FIELD Thunder
LOCATION NW SE SE
SEC 14 TWSP 27 RGE 24W
COUNTY Ford STATE KS

ELEVATIONS
KB 2475
DF
GL 2465
Measurements Are All From KB

CONTRACTOR Val Rig #1
SPUD 7-17-13 COMP 7-29-13
RTD 5125 LTD 5126
MUD UP 3654 TYPE MUD Chem

CASING
SURFACE 8 5/8" @ 354'
PRODUCTION

ELECTRICAL SURVEYS
Dual Ind
Comp N/D

FORMATION TOPS AND STRUCTURAL POSITION

FORMATION	SAMPLE TOP	ELECTRIC LOG TOP	SUB-SEA DATUM	STRUCTURAL POSITION A	B	C
Anhydrite	1498	1496	979	991		
Base Anhydrite	1534	1534	941	948		
Stotler	3500	3502	-1027	-1024		
Heebner	4161	4166	-1680	-1686		
Lansing	4281	4284	-1809	-1805		
Muncie SH	4472	4474	-1999	-1992		
Stark SH	4599	4600	-2125	-2118		
Marmaton	4732	4741	-2226	-2254		
Pawnee	4811	4817	-2342	-2325		
Cherokee SH	4862	4864	-2389	-2378		
Huck	4950	4953	-2478	-2465		
Atoka SH	4964	4966	-2491	-2478		
Morrow	4981	4981	-2506	-2492		
Mississippi	4998	5001	-2526	-2514		

REFERENCE WELLS FOR STRUCTURE

A Ritchie #1 Potosi-Simon 1480' FSL, 1020' FWL 13-27-24W
B
C

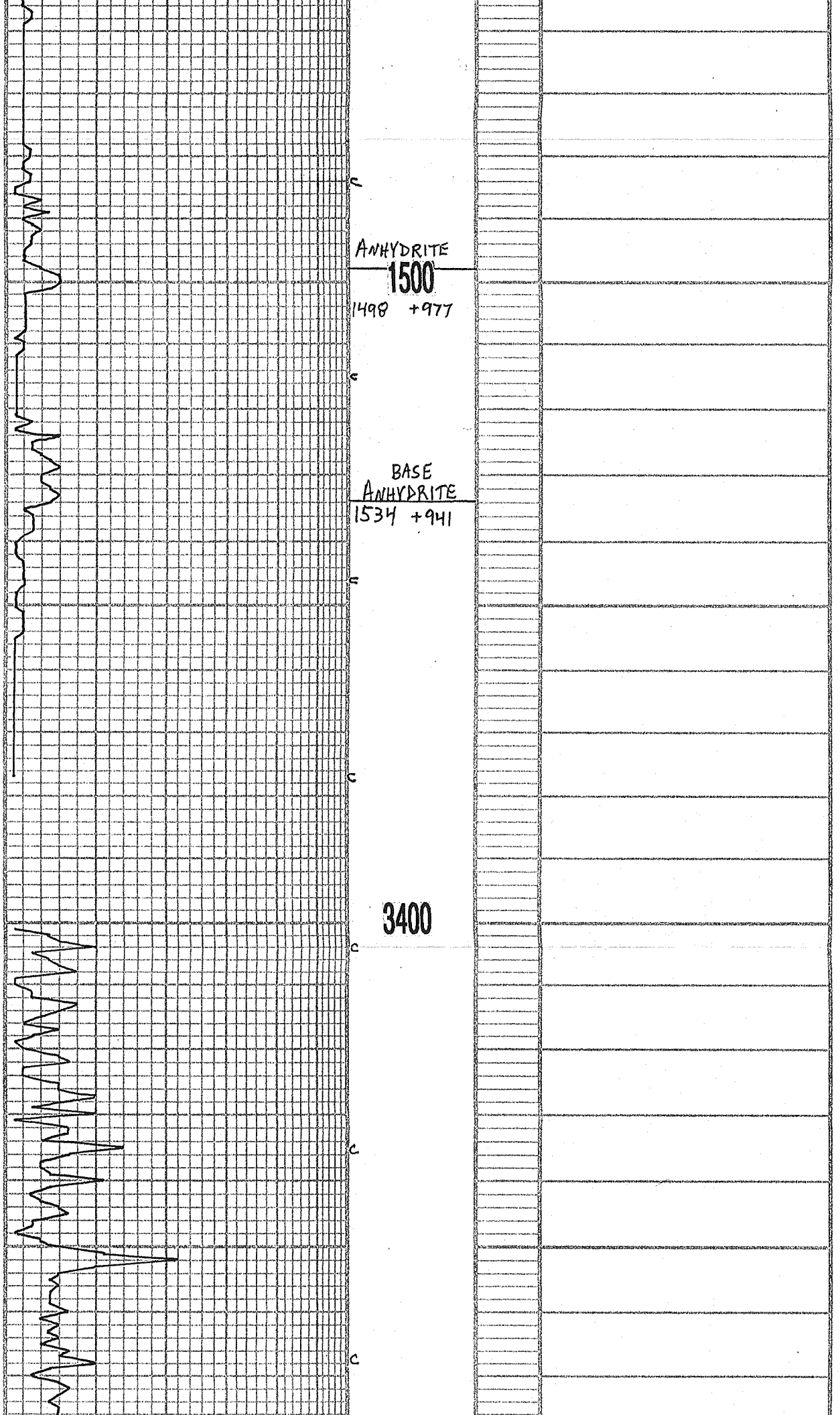
REMARKS

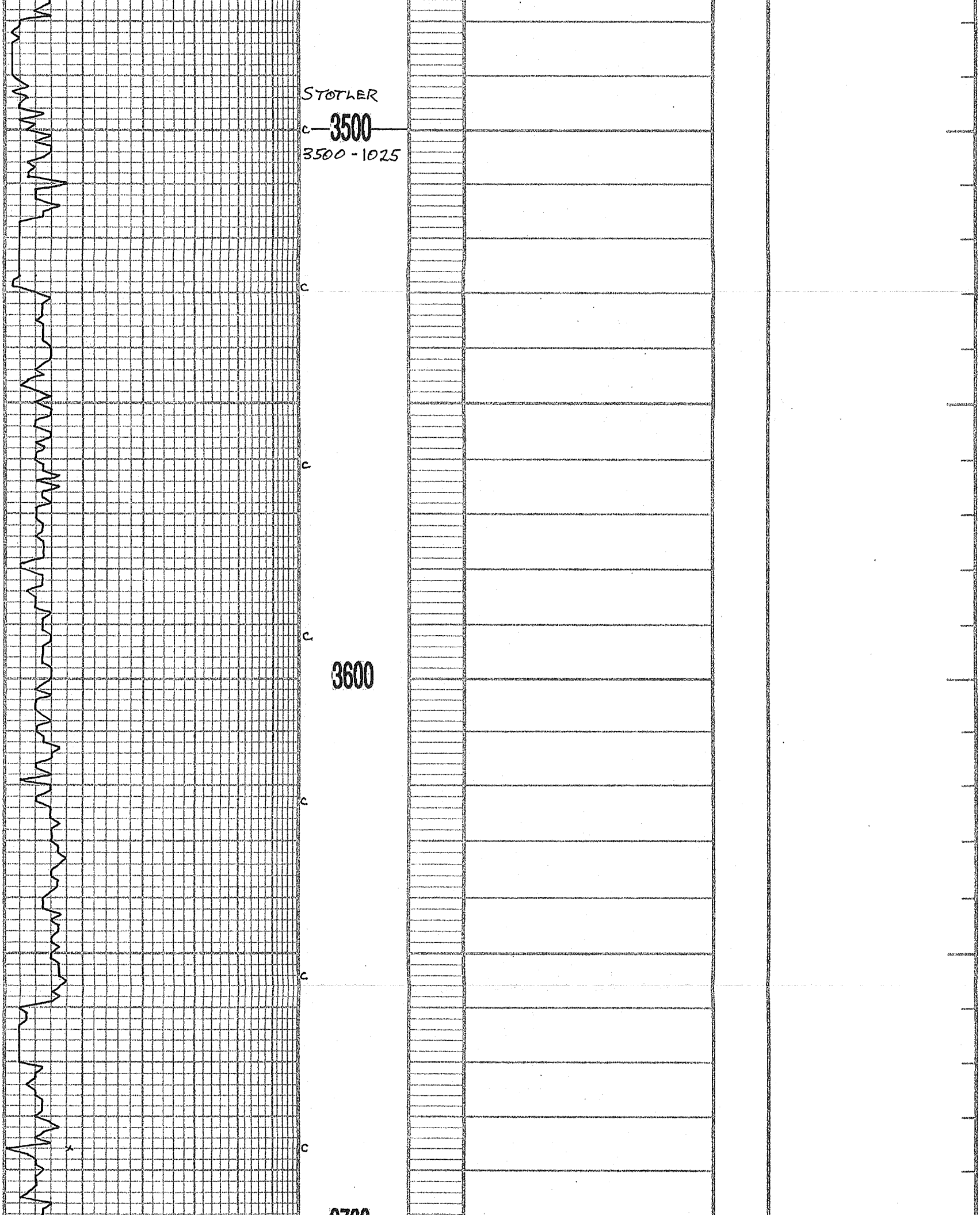
LEGEND

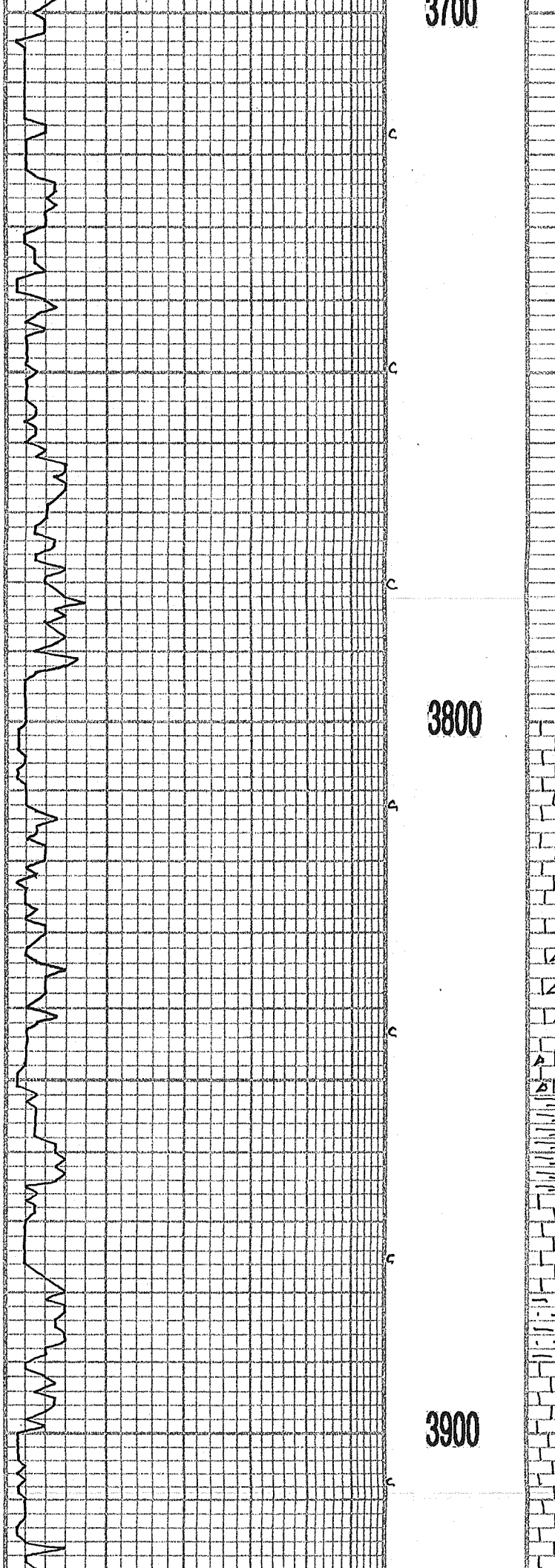
Dolomite
Chert
Ool. Lime
Limestone
Carb sh
Shale
Sandstone
Salt
Anhydrite

REMARKS
OIL SHOWS
SAMPLE DESCRIPTIONS
LITHOLOGY
DEPTH

DRILLING TIME IN MINUTES PER FOOT
Rate of Penetration Decreases
5" 10" 15" 20" 25"


ANHYDRITE
1500
1498 +977
BASE
ANHYDRITE
1534 +941
3400


STOTLER
3500
3500 - 1025
3600



MUD CHECK
VIS 53 WT 8.55
CHLOR 2,400 LCM ½
FILT 8.8

LS. BRN, M XTLN, CRS TXT, S→M HRD, F→G XTLN Ø. NS

A. A.

LS, CRM, VF XTLN, S→M HRD, NO VIS Ø, NS

CHT, SCT, BLK, WHT FOSS W/N, FRESH, LS A A.

SH, LT GRY

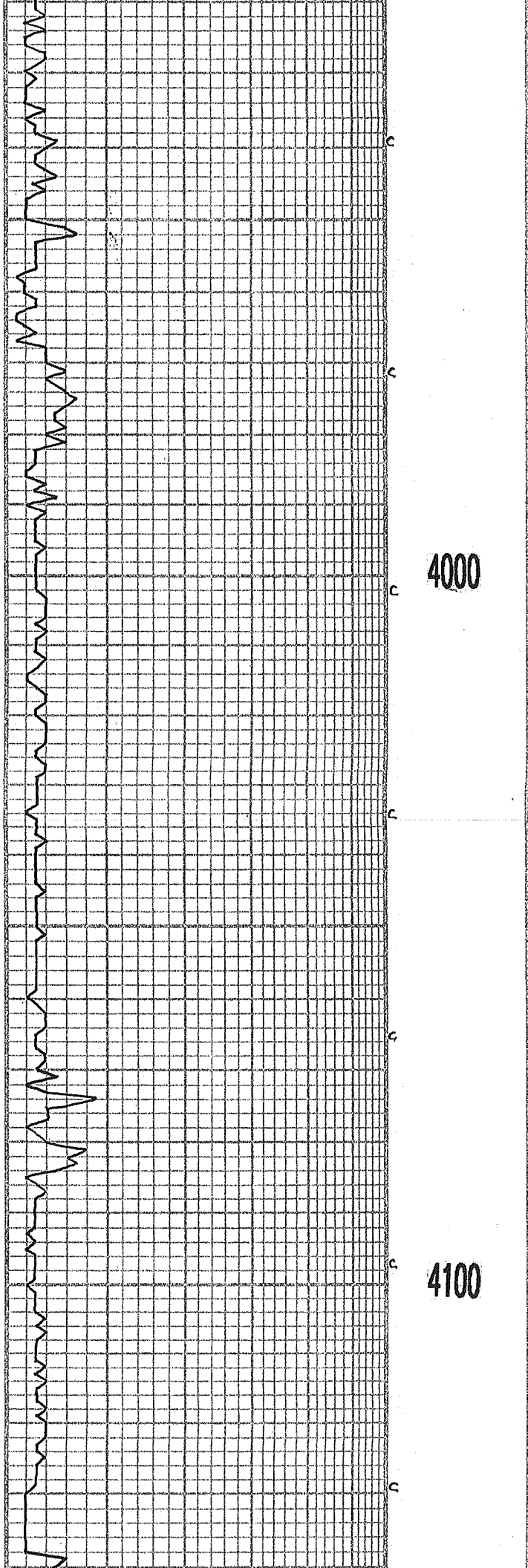
LS, CRM, F XTLN, SOFT, V ALGAL, NS, G FOSS Ø

GEO ON LOC ≈ @ 3870'

SLTSTN, DK BRN, V SNDY

LS. CRM, F XTLN, V SOFT, SL CHLKY, MOSTLY "ROTTEN", G Ø NS

LS. CRM, WHT, VF XTLN, HRD, PCS, V DNS, VP→TITE Ø, NS



LS, CRM, GRY, TAN, FXTLN, MOSTLY DNS, SCT PCS GRNLR TXT, VPØ, NS

LS, GRY, VF XTLN, HRD, V DNS, ABUN SML FOSS → ALGAL, TITE, NS

LS, CRM → TAN, F XTLN, HRD, V W CMT'D ALGAL, PØ, NS

LS, LTGRY, VF XTLN, DNS, M HRD, NO APPØ, NS

LS, LTGRY, A.A., INCR WHTCHT, NS

A.A.

SH, GRY → DK GRY

LS, TAN, FXTLN, M HRD, F→GØ, NS

A.A.

SH, GRY

LS, TAN, BUFF, F→M XTLN, HRD, BRTTL, GRNLR TXT, SCT FOSS, PXTLN Ø, NS

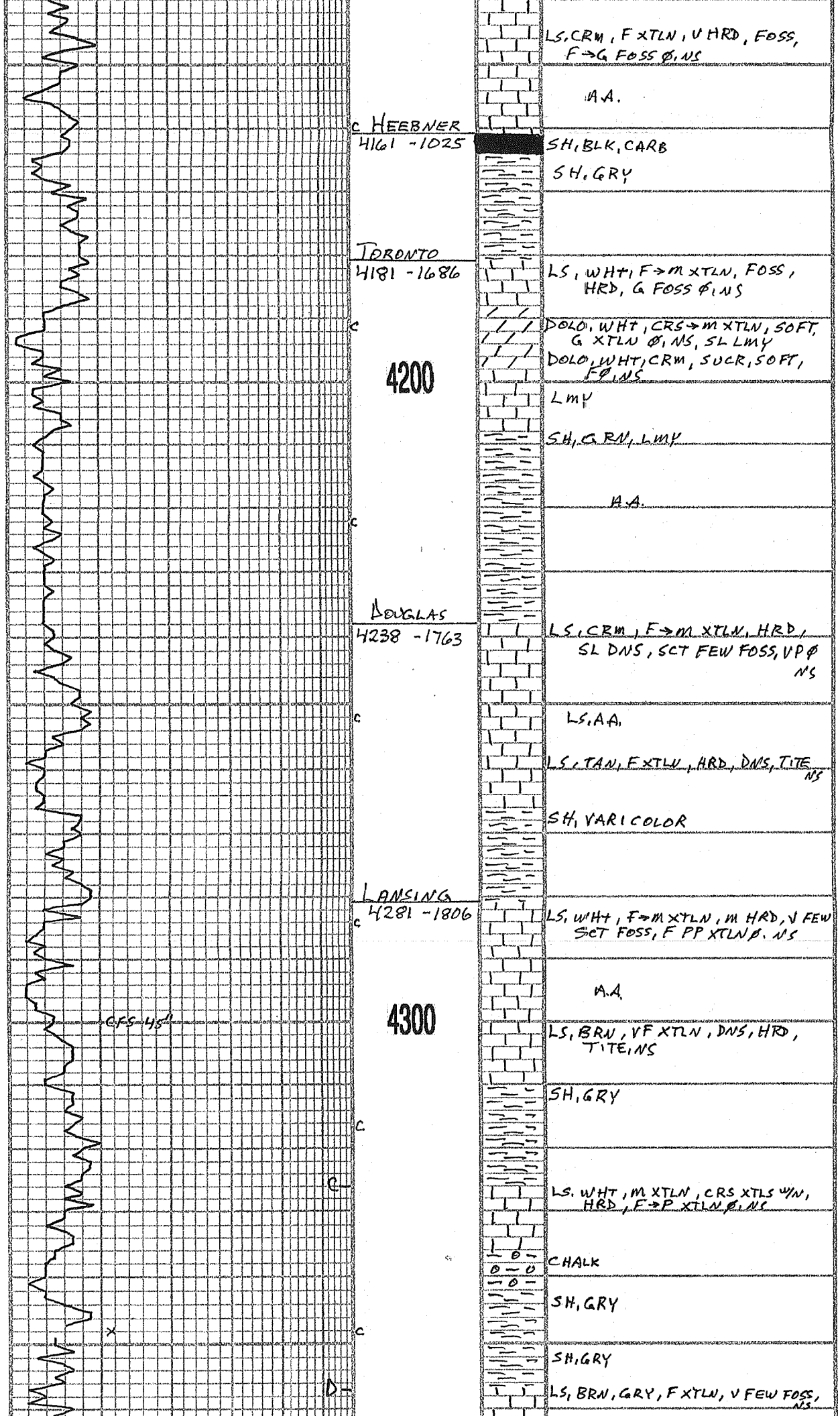
LS, AA., SOFT, INCR GILS STNG

SAMPLES POOR

LS, AA, CHLKY

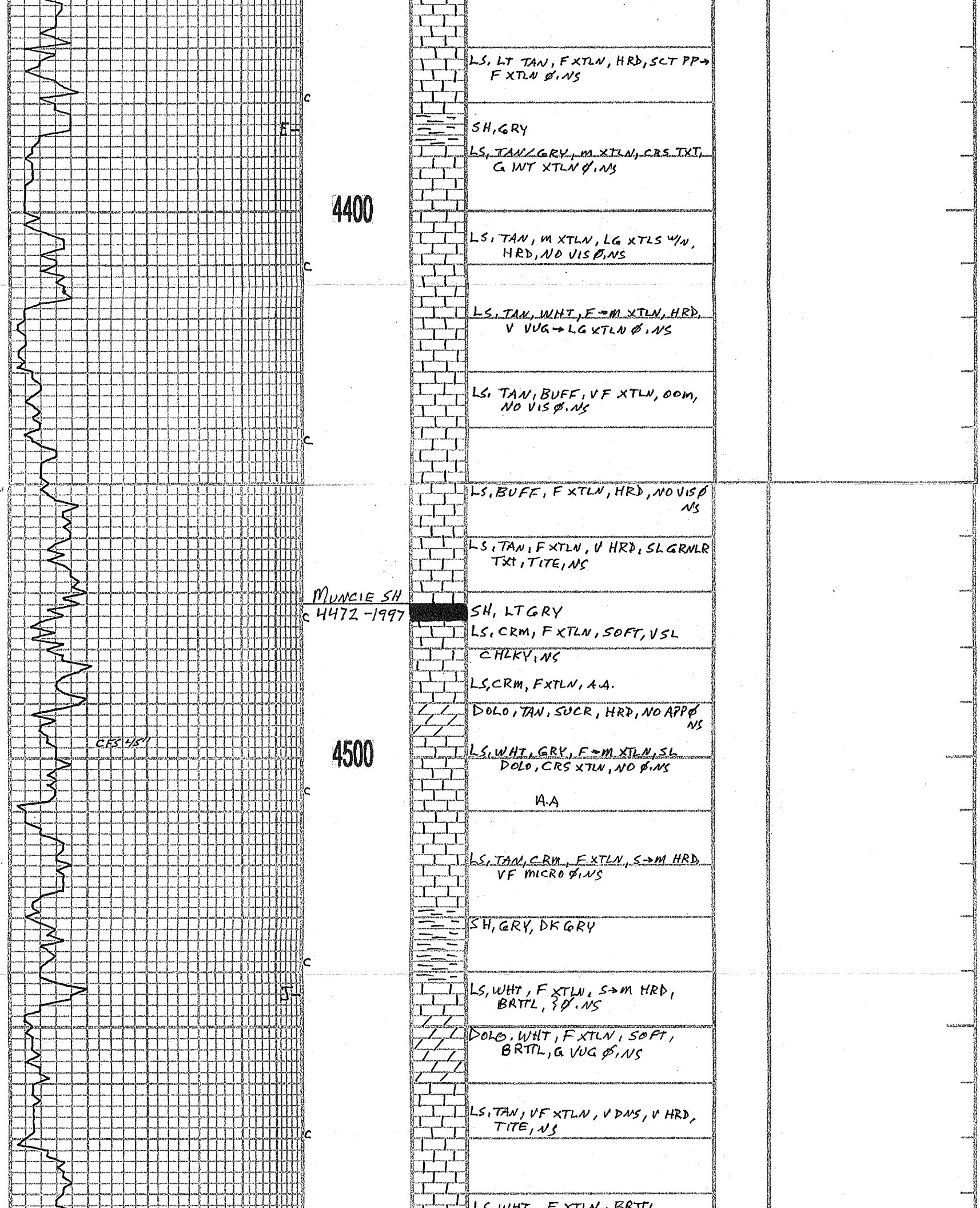
LS, LTGRY, TAN, F XTLN, BRTTL, HRD W/ PCS, FØ, NS

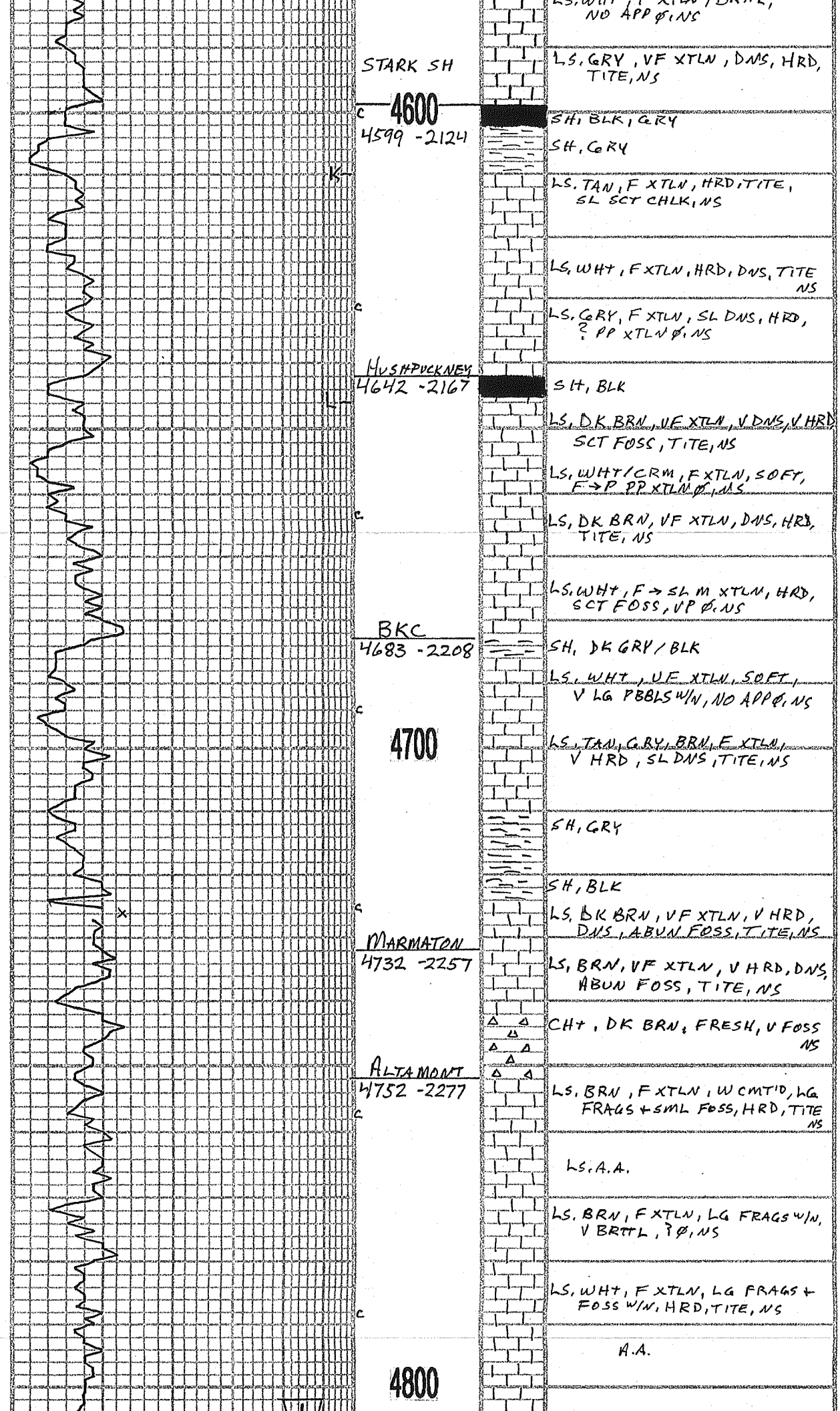
LS, TAN, CRM, F→M XTLN, SOFT, V GRNLR TXT, GØ, NS

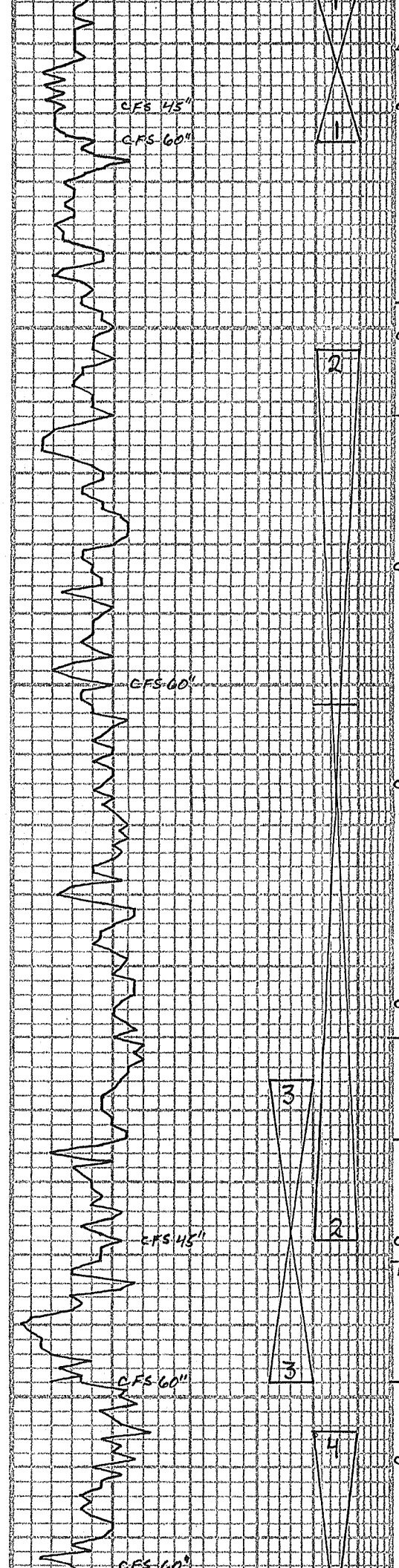


MUD CHECK
VIS 58 WT 9.0
CHLOR 4,200 LCM 1
FILT 13.6

7:AM 7-24-13
DRLG @ 4350'


LS, LT TAN, F XTLN, HRD, SCT PP→ F XTLN Ø, NS
SH, GRY
LS, TAN/GRY, M XTLN, CRS TXT, G INT XTLN Ø, NS
4400
LS, TAN, M XTLN, LG XTLS W/N, HRD, NO VIS Ø, NS
LS, TAN, WHT, F→M XTLN, HRD, V VUG→LG XTLN Ø, NS
LS, TAN, BUFF, VF XTLN, OOM, NO VIS Ø, NS
LS, BUFF, F XTLN, HRD, NO VIS Ø NS
LS, TAN, F XTLN, V HRD, SL GRNLR TXT, TITE, NS
MUNCIE SH
4472 -1997
SH, LT GRY
LS, CRM, F XTLN, SOFT, VSL CHLKY, NS
LS, CRM, F XTLN, A.A.
DOLO, TAN, SUCR, HRD, NO APP Ø NS
CFS 4/5"
4500
LS, WHT, GRY, F→M XTLN, SL DOLO, CRS XTLN, NO Ø, NS
A.A
LS, TAN, CRM, F XTLN, S→M HRD, VF MICRO Ø, NS
SH, GRY, DK GRY
LS, WHT, F XTLN, S→M HRD, BRTTL, Ø, NS
DOLO, WHT, F XTLN, SOFT, BRTTL, G VUG Ø, NS
LS, TAN, VF XTLN, V DNS, V HRD, TITE, NS


LS, WHT, F XTLN, DNS, HRD, TITE, NS, NO APP Ø, NS
STARK SH
4600
4599 -2124
LS, GRY, VF XTLN, DNS, HRD, TITE, NS
SH, BLK, GRY
SH, GRY
LS, TAN, F XTLN, HRD, TITE, SL SCT CHLK, NS
LS, WHT, F XTLN, HRD, DNS, TITE NS
LS, GRY, F XTLN, SL DNS, HRD, ? PP XTLN Ø, NS
MUSHPUCKNEY
4642 -2167
SH, BLK
LS, DK BRN, VF XTLN, V DNS, V HRD SCT FOSS, TITE, NS
LS, WHT/CRM, F XTLN, SOFT, F → P PP XTLN Ø, NS
LS, DK BRN, VF XTLN, DNS, HRD, TITE, NS
LS, WHT, F → SL M XTLN, HRD, SCT FOSS, VP Ø, NS
BKC
4683 -2208
SH, DK GRY/BLK
LS, WHT, VF XTLN, SOFT, V LG PBBLS W/N, NO APP Ø, NS
4700
LS, TAN, GRY, BRN, F XTLN, V HRD, SL DNS, TITE, NS
SH, GRY
SH, BLK
LS, DK BRN, VF XTLN, V HRD, DNS, ABUN FOSS, TITE, NS
MARMATON
4732 -2257
LS, BRN, VF XTLN, V HRD, DNS, ABUN FOSS, TITE, NS
CHT, DK BRN, FRESH, V FOSS NS
ALTAMONT
4752 -2277
LS, BRN, F XTLN, W CMT'D, LG FRAGS + SML FOSS, HRD, TITE NS
LS. A.A.
LS. BRN, F XTLN, LG FRAGS W/N, V BRTTL, ? Ø, NS
LS, WHT, F XTLN, LG FRAGS + FOSS W/N, HRD, TITE, NS
A.A.
4800
K
L
x
VIS 54
WT 9.0
4694' - 51 STANDS
SHORT TRIP
7:AM 7-25-13,
DRLG @ 4710'
MUD CHECK
VIS 53 WT 9.0
CHLOR 6,000 - P.T MUD
FILT 12.6 LCM 1
DST #1 4802 - 4824
30.45.45.60
IF: 3½" ISI: surf
FF: BOB 27 MIN FSI: surf
REC: 150' G.I.P



SH, GRY

LS, TAN, F XTLN, SOFT, BRTL, LT SCT FLUOR STNG, NO ODOR — FEW DCS STNG

LS, WHT, CRM, V F XTLN, G XTLN OIL FILL Ø, HVY FLUOR ⊙ SPTS ON BRK, LT RAINBOW N CUP V LT OIL, G XTLN → SL VUG Ø, LESS GAS W/ DEPTH — G ODOR ON BRK LT ODOR GASSY

LS. TAN/CRM, F XTLN

SH, BLK, GRY

CHT, WHT, SMOKE, ODAQ, FRESH, SHARP

LS, LT GRY, F XTLN, V HRD, DNS, TITE, NS

SH, BLK

LS. TAN, BUFF, F XTLN, HRD, TITE, NS

LS, BRN / TAN / GRY, M → CRS XTLN, V FOSS, VP XTLN Ø, NS

LS. CRM / WHT, F XTLN, S → M HRD, SCT EDGE FLUOR STNG, VP MICRO Ø 1 Pc W/ MICRO FLUOR OIL SPTS ON BRK — NO ODOR

SH, BLK

LS, BRN, VF XTLN, SUCR TXT, HRD, DNS, TITE, NS

A.A.

LS. DK BRN / GRY, VF XTLN, DNS, V HRD, TITE, NS

LS. GRY / WHT, VF XTLN, DNS, V HRD, NS

LS, LT TAN, VF XTLN, HRD, DNS, TITE, NS

SH, GRY

LS, TAN, F XTLN, HRD, DNS, SCT FLUOR STNG, VF SCT MICRO FLUOR OIL SPTS ON BRK — V LT ODOR

LS, WHT, F XTLN, SOFT, G EVEN FLUOR STNG, G FLUOR FO ON BRK MOSTLY SCT STNG W/ MICRO OIL SPTS ON BRK

LS, TAN, F XTLN, M HRD, DNS, TITE, NS

SH, GRN

LS, TAN, F XTLN, M HRD, SL DNS, PCS SAT FLUOR STNG, V FEW FO ON BRK, MOSTLY FIBROUS FLUOR — ? ODOR

SH, GRY, MUSTARD

SS, CLR, UNCONSOL, P SORT, SUB RND → RND, NO VIS SHO

LS. TAN, WHT, V F XTLN, DNS, HRD, BLK TARRY DD OIL ON FRAC PLANES — FO-TRA " CUP

LS, WHT, F → M XTLN, V HRD, SL DOLO - SUCR, F GRN'D, HRD, NO VIS Ø, NS

LS. CRM, F → M XTLN, BRTL, F INT XTLN Ø, NS

LS, WHT, V G GRN Y W/ WEA CHT STRKS HRD, CHT W/ G FLUOR OIL SAT STNG → — TR GAS V LT OIL

F → G INT XTLN Ø, (FO DROP

90' 50CM, 5% OIL

FP: 41-61, 61-78
SIP: 824-749
HP: 2354-2318
3824: 25 STND SHORT TRIP
7:AM 7-26-13
DST #1 @ 4824'
MUD CHECK
VIS 50 WT 9.1
CHLOR 7,000 LCM 2
FILT 6.4

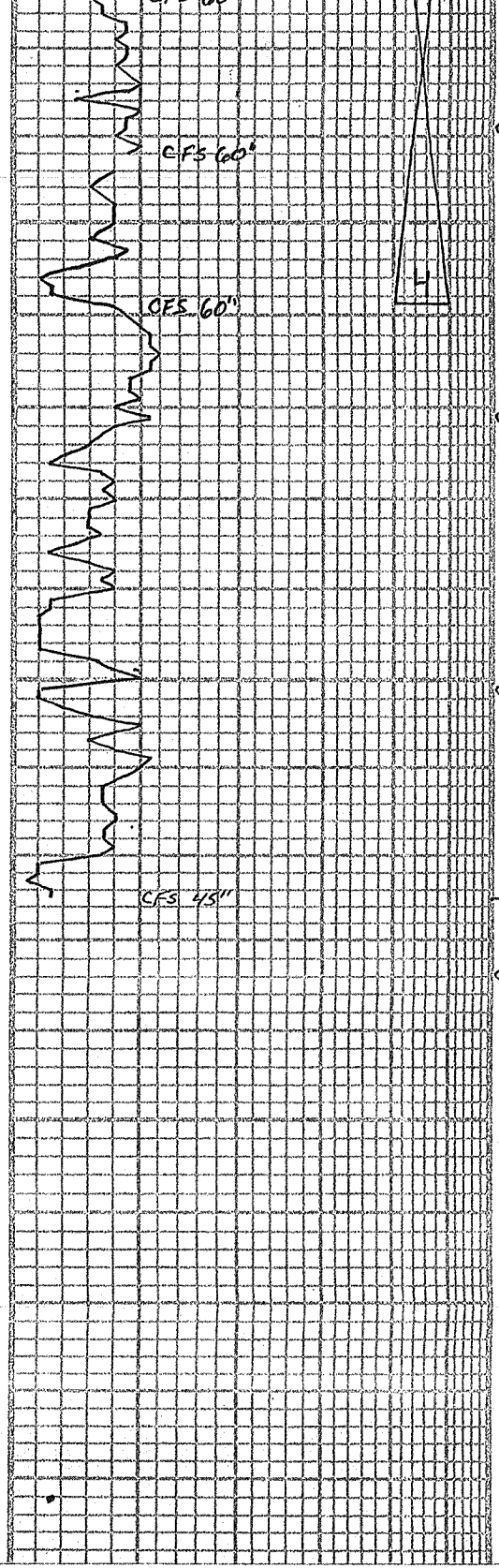
DST #2 4853-4978
30.45.60.90
IF: BOB 1¼ MIN ISI: NR
FF: BOB IMMED FSI: NR
@ FF: 209 MCF
10" 81.5 MCF
20" 66.61 MCF - STAB
REC: 100' M
FP: 114-118, 119-118
SIP: 1513-1506
HP: 2441-2402

DST #3 4956-4998
GTS 18" 30.45.60.90
IF: BOB 1½ MIN, gg 36 MCF
ISI: V WK SURF BLO
FF: BOB IMMED FSI: NR
gg: 46 MCF. STAB
REC: 45' OSM, 1% OIL
FP: 79-61, 50-56
SIP: 1532-1531
HP: 2466-2420

STRAP 4978.33
BOARD 4978.01
long .32

7:AM 7-27-13
DST #2 @ 4978'
MUD CHECK
VIS 48 WT 9.1
CHLOR 8,000 LCM 2
FILT 8

7:AM 7-28-13
DST #3 @ 4998'
MUD CHECK
VIS 54 WT 9.3
CHLOR 8,000 LCM 2
FILT 8.8



CHT, WHT, LMY, FOSS, V HRD, TITE
LS, TAN, V F XTLN, V DNS + HRD, TITE, NS, SCT FOSS
LS. TAN, F XTLN, HRD, SL SCT CHT - PEACH, NO VIS Ø, NS
LS. BUFF, F → M XTLN, M HRD, NO FOSS, NO VIS Ø, NS
LS. BUFF, F XTLN, ABUN M → CRS XTLS W/N, M HRD, SL BRTTL, NO APP Ø, NS
DOLO, GRY, TAN, GRNY, SOFT
LS WHT, F XTLN, DNS, V HRD, SCT BRN CHT, NS
CHT, WHT, V FOSS, FRESH, SHARP NS
LS, CRM, BUFF, F → M XTLN, BRTTL, SOFT, P XTLN Ø, NS
CHT, WHT, SCT GRY NODES W/N, FRESH, NS
LS, BUFF, F → M XTLN, HRD, P XTLN Ø → TITE, NS
DOLO, WHT, BLK MINS W/N, SUCR, ? Ø, NS
LS. BUFF, F XTLN, HRD, SL DNS, NO APP Ø, NS
LS. WHT, F XTLN, V CLEAN, HRD, DNS, TITE, NS
LS, WHT, V SOFT, F → M XTLN, BRTTL, NS

RTD

& ODOR

W/TRAV LT STNG

DST #4 5005 - 5059
30.45.30.45
IF: Y2" ISI: NR
FF: dead, flush, dead
REC: 30' m w/OIL SHOW
FP: 51-57, 60-66
SIP: 985 - 893
HP: 2504 - 2453

7:AM 7-29-13
DRLG @ 5084'

10 STND SHORT TRIP
COND & 1 Y2 HRS

MUD CHECK
VIS 54 WT 9.2
CHLOR 8,000 LCM 2
FILT 8.0