



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Winder South 8

**Location** Sec. 9-T6N-R67W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** Patterson 346

**API Number** 05-123-43405-00

**Field** Wattenberg

**Geographic Region** DJ Basin

**Drilling Completed** 10/6/2016

**Spud Date** 9/30/2016

**Surface Coordinates** SHL: 2308'FNL, 388' FEL, Sec. 9 T6N R67W

Lat: 40.502672  
Long: -104.890268

**Bottom Hole Coordinates** PBHL: 1211'FSL, 460' FWL, Sec. 8 T6N R67W

**Ground Elevation** 4,856'

**K.B. Elevation** 4,880.5'

**Logged Interval** 5,000' MD To 7,100'

**Total Depth** 17,248'

**Formation** Codell

**Type of Drilling Fluid** Oil Based Mud

## Operator

**Company** Extaction Oil & Gas

**Address** 1888 Sherman St., Suite 200  
Denver, CO 80203

## Geologist

**Name** Jared Rouse

**Company** Extraction Oil & Gas

## Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

**Address** 1888 Sherman St., Suite 200  
Denver, CO 80203

## Other

**Equipment** ML-589

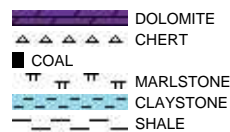
**Comments** Start: 9-30-16  
TD: 10-6-16

**Services Provided** 2-man Logging  
On Site Geosteering

**Logger Names** Dominic Pitre / Degan Barber

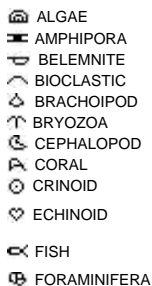
**Address** ALS Empirica  
6510 Guhn Road  
Houston, Texas 77040

## Rock Types



## Accessories

### Fossils



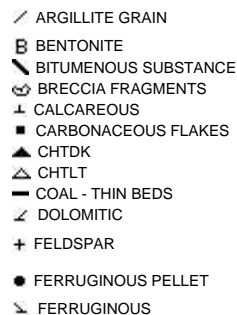
### Fossil



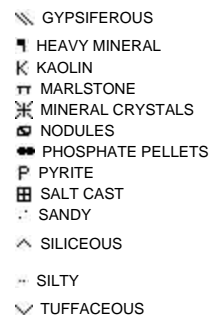
### Minerals



### ARGILLACEOUS



### GLAUCONITE

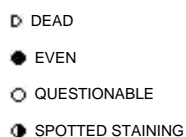


### Stringer

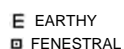


## Other Symbols

### Oil Show



### Porosity



### ORGANIC

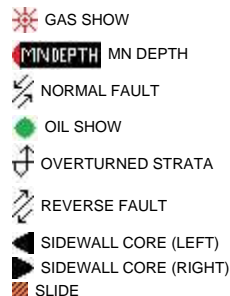


### VUGGY

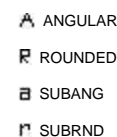
### Engineering



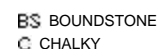
### FORMATION TOP



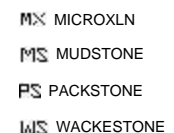
### Rounding



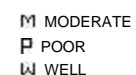
### Textures



### LITHOGRAPHIC



### Sorting



F FRACTURE

X INTERCRYSTALLINE

Φ INTEROOLITIC

MOLDIC

↓ CORE - LOST

■ CORE - RECOVERED

⋮ DST INTERVAL

⚡ FAULT

DS SURVEY

TRIP GAS

◁ WIRELINE TESTED - LEFT

▷ WIRELINE TESTED - RT

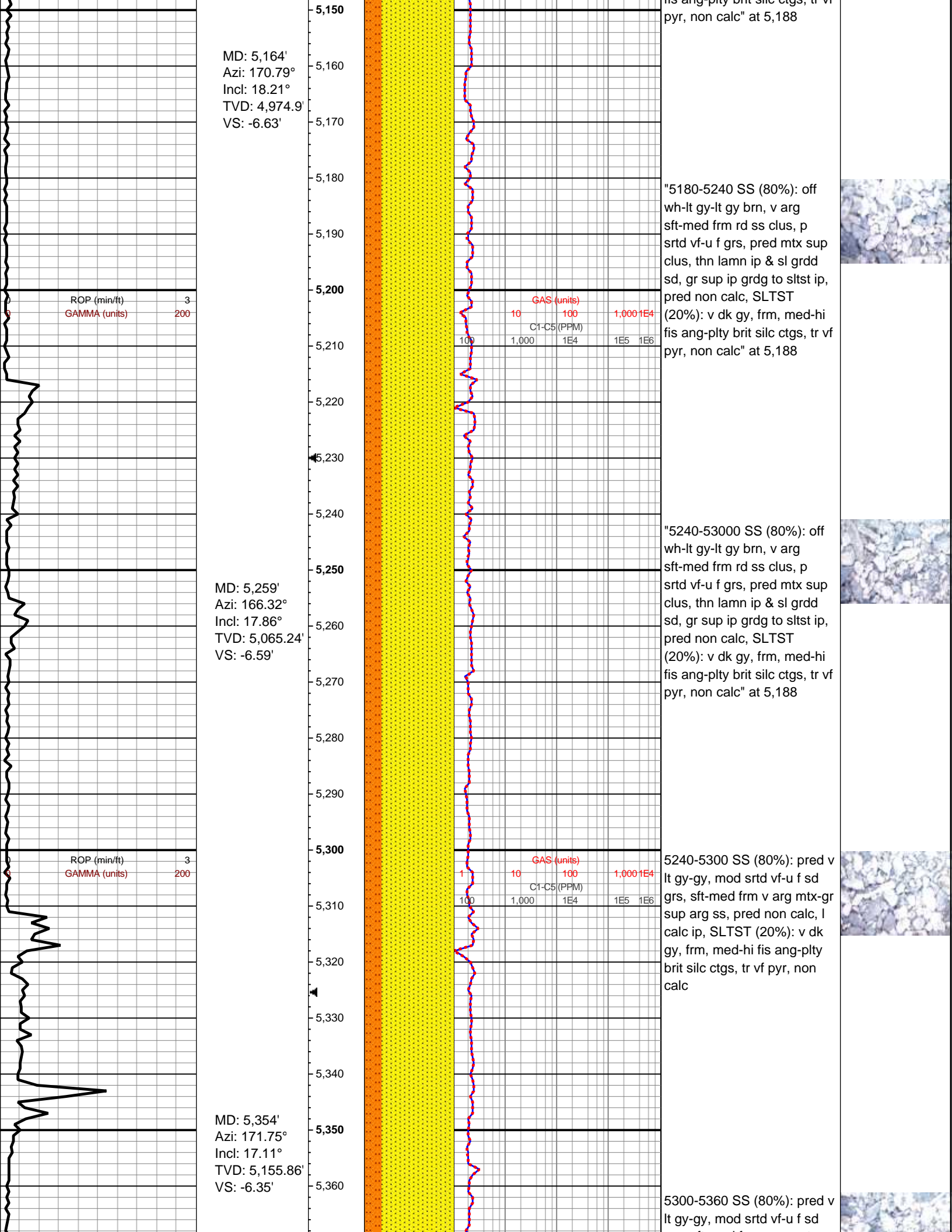
CC CRYPTOXLN

E EARTHY

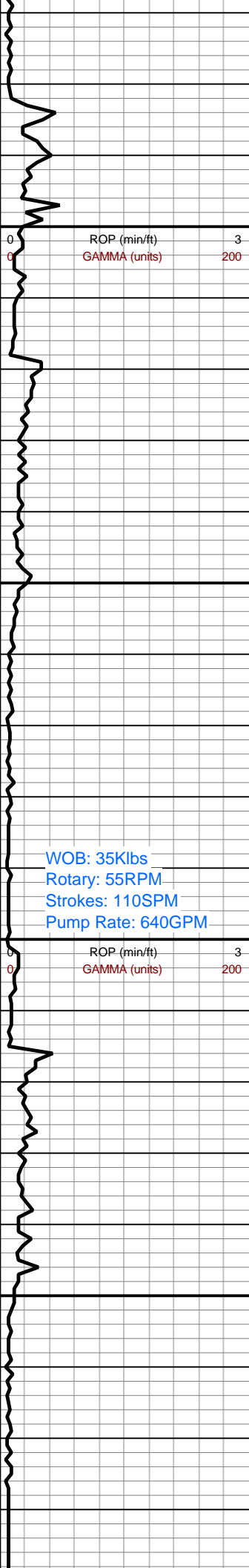
FX FINELYXLN

GS GRAINSTONE

ROP ROP — GAMMA - - -		Depth Labels	% Lith	Total Gas & Chromatograph GAS ..... C1 ——— C2 - - - C3 - . . . C4 - . . . . C5 ————	Lithology Descriptions	Images
Surveys						
Extraction og Winder South 8						
Weld County, Colorado Spud Date: 9-30-16 Surface Casing @ 1,564' 2-man logging / Geosteering Began: 9-30-16		4,960				
100 units = 1% Methane 10000 units = 100% Methane		4,970				
All Depth's Correspond to Driller's Pipe Tally		4,980				
		4,990		Bit #: 1 Type: X516 Size: 7 7/8 Depth In: 1,565" Jets: 8x13 S/N: JM4361		
		5,000				
ROP (min/ft) 3 GAMMA (units) 200		5,010		GAS (units) 10 100 1,000 1E4 C1-C5 (PPM)	5000-5060 SS (80%): off wh-lt gy v arg SS, brn hue ip, sft-med frm ctgs, pred mtx sup SS clus, p srted vf-u f grs, pred non calc, SLTST (20%): v dk gy, frm, med-hi fis ang-plty brit silc ctgs, tr vf pyr, non calc	
WOB: 37Klbs Rotary: 56RPM Strokes: 220SPM Pump Rate: 640GPM		5,020				
		5,030				
		5,040				
		5,050				
		5,060				
	MD: 5,069' Azi: 169.02° Incl: 17.62° TVD: 4,884.51' VS: -7.35'	5,070			5060-5120 SS (80%): off wh-lt gy v arg SS, brn hue ip, sft-med frm ctgs, pred mtx sup SS clus, p srted vf-u f grs, pred non calc, SLTST (20%): v dk gy, frm, med-hi fis ang-plty brit silc ctgs, tr vf pyr, non calc	
		5,080				
		5,090				
		5,100				
ROP (min/ft) 3 GAMMA (units) 200		5,110		GAS (units) 10 100 1,000 1E4 C1-C5 (PPM)		
		5,120				
		5,130			"5120-5180 SS (80%): off wh-lt gy-lt gy brn, v arg sft-med frm rd ss clus, p srted vf-u f grs, pred mtx sup clus, thn lamn ip & sl grdd sd, gr sup ip grd to sltst ip, pred non calc, SLTST (20%): v dk gy, frm, med-hi fis ang-plty brit silc ctgs, tr vf	
		5,140				

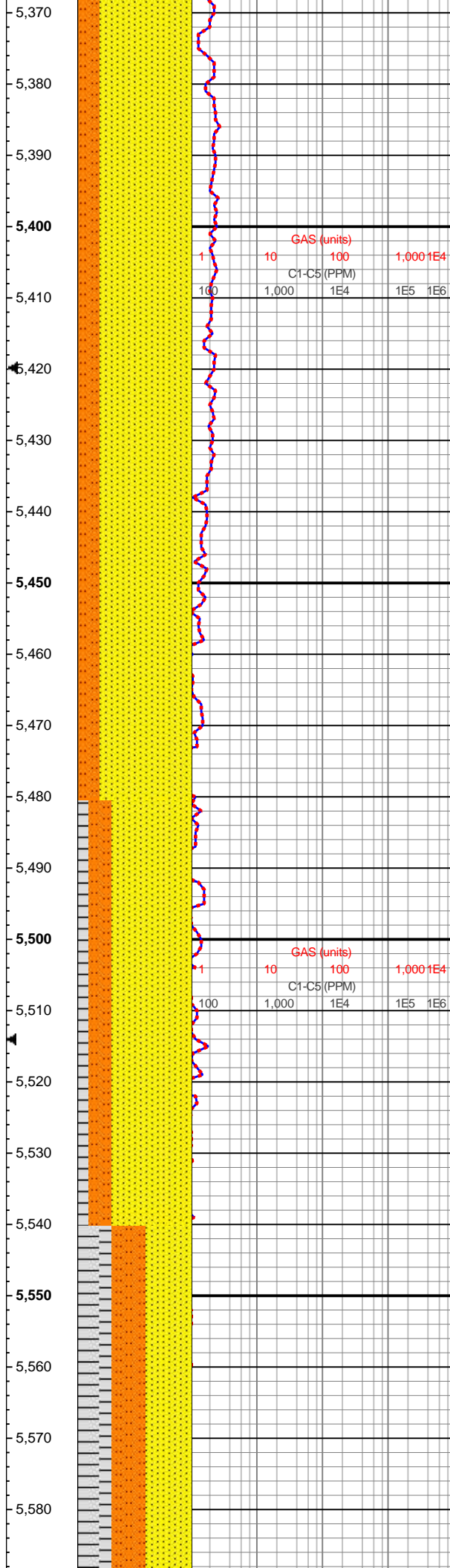






MD: 5,448'  
Azi: 173.08°  
Incl: 19.46°  
TVD: 5,245.11'  
VS: -4.32'

MD: 5,543'  
Azi: 170.13°  
Incl: 18.76°  
TVD: 5,334.88'  
VS: -2.63'



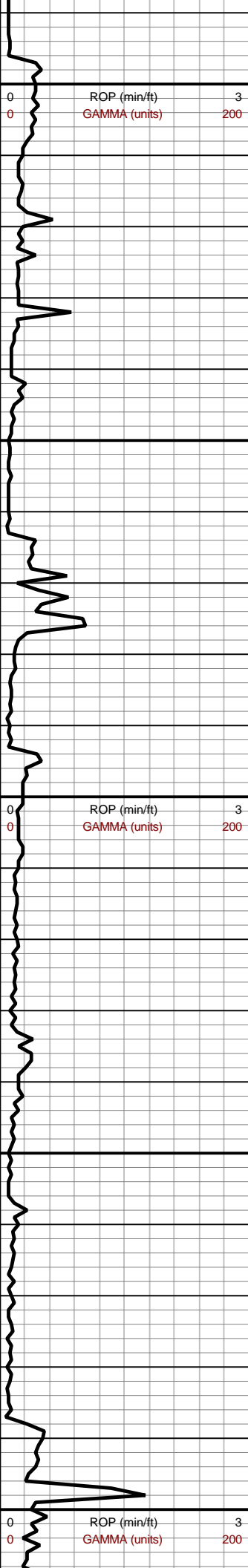
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, SLTST (20%): v dk  
gy, frm, med-hi fis ang-pty  
brit silc ctgs, tr vf pyr, non  
calc

5420-5480 SS (80%): pred v  
lt gy-gy, mod srtd vf-u f sd  
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, SLTST (20%): v dk  
gy, frm, med-hi fis ang-pty  
brit silc ctgs, tr vf pyr, non  
calc

5480-5540 SS (70%): pred v  
lt gy-gy, mod srtd vf-u f sd  
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, wi decr sd grdg to  
SH/SDY SH (10%): lt gy-gy,  
sft-med frm, l fis rd-gumbo  
ctgs, sdy-slty ip grdg to v arg  
SS, non calc, SLTST (20%):  
v dk gy, frm, med-hi fis  
ang-pty brit silc ctgs, tr vf  
pyr, non calc

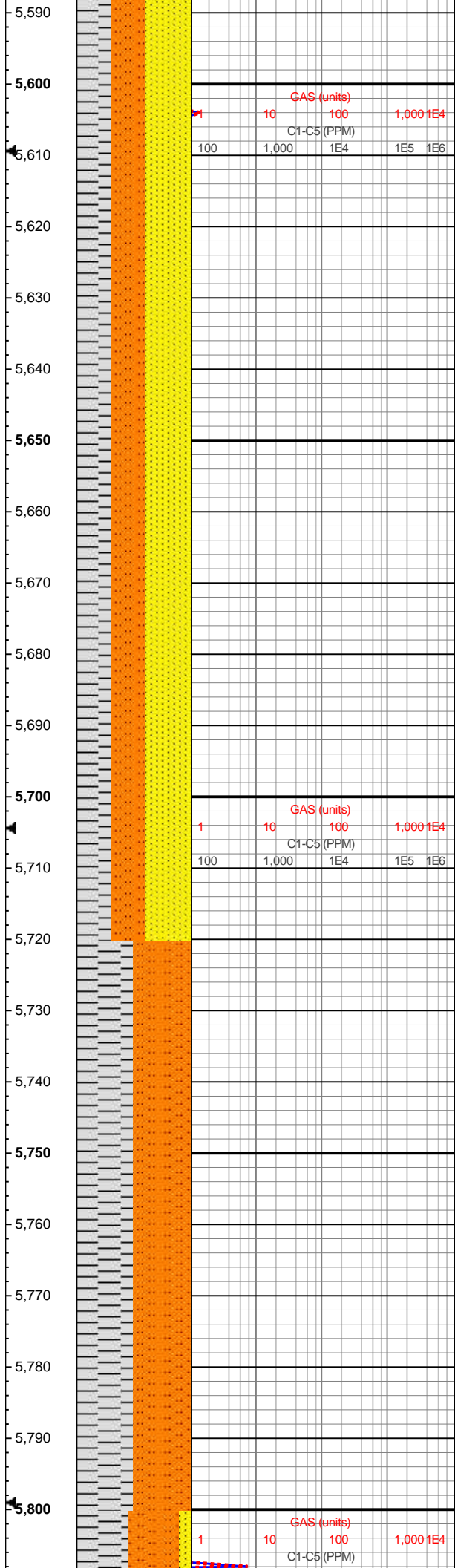
5540-5600 SS (40%): pred v  
lt gy-gy, mod srtd vf-u f sd  
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, wi decr sd grdg to  
SH/SDY SH (30%): lt gy-gy,  
sft-med frm, l fis rd-gumbo  
ctgs, sdy-slty ip grdg to v arg  
SS, non calc, SLTST (30%):  
v dk gy, frm, med-hi fis  
ang-pty brit silc ctgs, silc vn  
ip, tr vf pyr, non calc





MD: 5,638'  
Azi: 170.44°  
Incl: 19.33°  
TVD: 5,424.68'  
VS: -1.67'

MD: 5,733'  
Azi: 176.01°  
Incl: 21.46°  
TVD: 5,513.73'  
VS: 1.12'



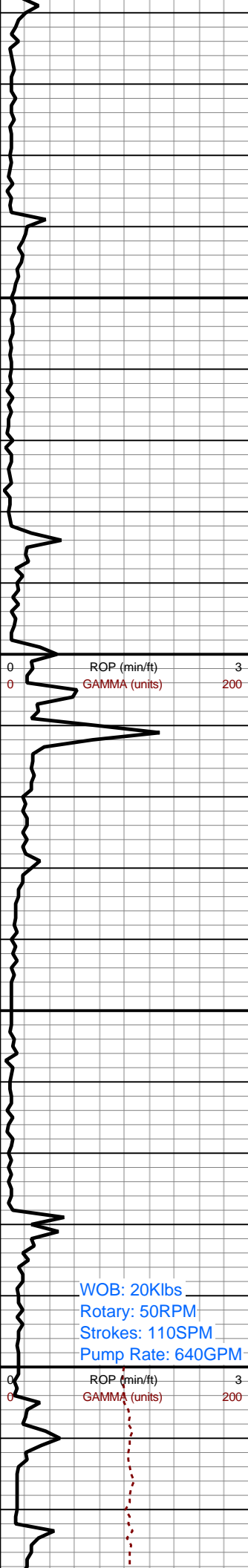
5600-5660 SS (40%): pred v  
lt gy-gy, mod srted vf-u f sd  
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, wi decr sd grdg to  
SH/SDY SH (30%): lt gy-gy,  
sft-med frm, l fis rd-gumbo  
ctgs, sdy-sltly ip grdg to v arg  
SS, non calc, SLTST (30%):  
v dk gy, frm, med-hi fis  
ang-pty brit silc ctgs, silc vn  
ip, tr vf pyr, non calc

5660-5720 SS (40%): pred v  
lt gy-gy, mod srted vf-u f sd  
grs, sft-med frm v arg mtx-gr  
sup arg ss, pred non calc, l  
calc ip, wi decr sd grdg to  
SH/SDY SH (30%): lt gy-gy,  
sft-med frm, l fis rd-gumbo  
ctgs, sdy-sltly ip grdg to v arg  
SS, non calc, SLTST (30%):  
v dk gy, frm, med-hi fis  
ang-pty brit silc ctgs, silc vn  
ip, tr vf pyr, non calc

5720-5780 SH (50%): lt  
gy-gy, sft-med frm, l-mod fis  
rd-sb blkly ctgs, thn lamn,  
sdy-sltly ip, non calc, SLTST  
(50%): v dk gy-blk, frm-brit  
med-hi fis sb blkly-pty ctgs,  
silc vn ip, tr vf pyr, non calc

5780-5840 SH (50%): lt



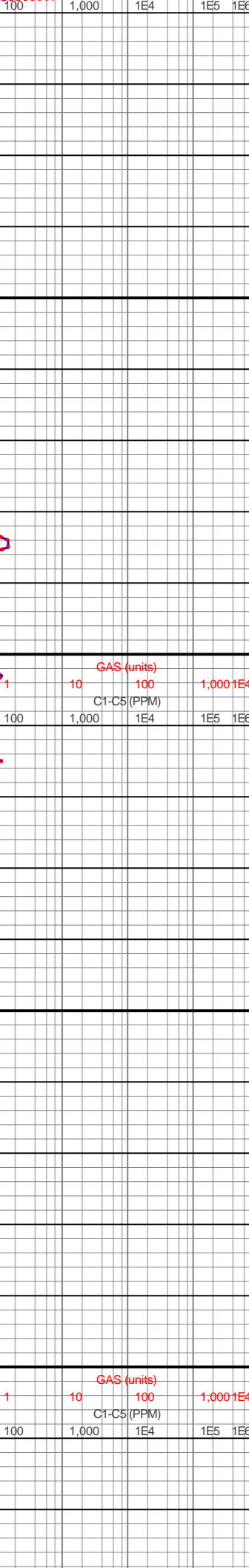
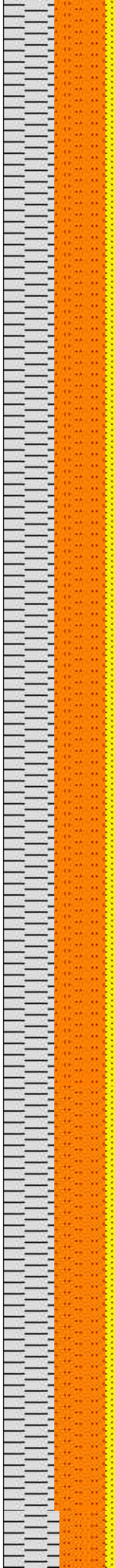
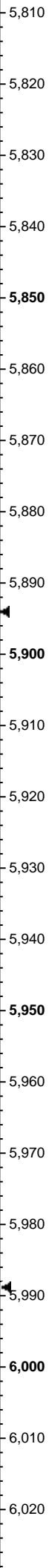


MD: 5,828'  
Azi: 170.44°  
Incl: 21.48°  
TVD: 5,602.15'  
VS: 3.98'

MD: 5,922'  
Azi: 171.85°  
Incl: 18.9°  
TVD: 5,690.37'  
VS: 5.44'

WOB: 20Klbs  
Rotary: 50RPM  
Strokes: 110SPM  
Pump Rate: 640GPM

MD: 6,017'  
Azi: 170.15°  
Incl: 20.39°  
TVD: 5,779.84'  
VS: 6.81'



gy-gy, sft-med frm, l-mod fis  
rd-sb blkly ctgs, thn lamn,  
sdy-slty ip, non calc, SLTST  
(50%): v dk gy-blk, frm-brit  
med-hi fis sb blkly-pty ctgs,  
silc vn ip, tr vf pyr, non calc

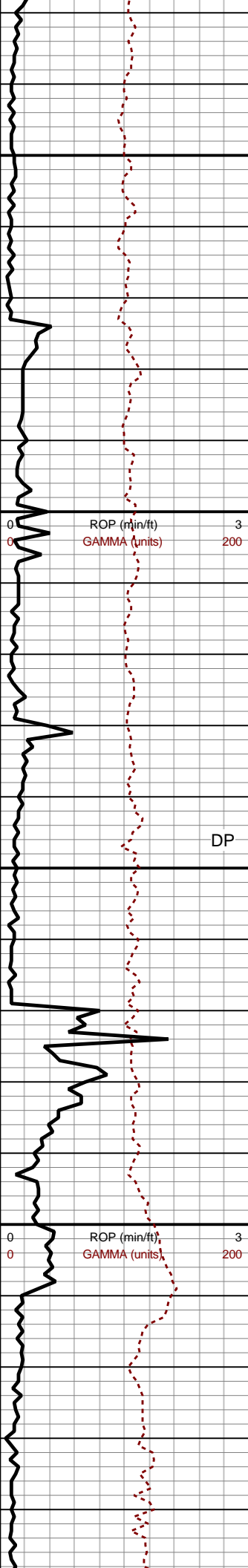
5840-5900 SLTST (55%): v  
dk gy-blk, frm-brit med-hi fis  
sb blkly-pty ctgs, slty tex, silc  
vn ip, tr vf pyr, non calc, SH  
(45%): lt gy-gy, sft-med frm,  
l-mod fis rd-sb blkly ctgs, thn  
lamn, sdy-slty ip, non calc, tr  
calc ip

5900-5960 SLTST (55%): v  
dk gy-blk, frm-brit med-hi fis  
sb blkly-pty ctgs, slty tex, silc  
vn ip, tr vf pyr, non calc, SH  
(45%): lt gy-gy, sft-med frm,  
l-mod fis rd-sb blkly ctgs, thn  
lamn, sdy-slty ip, non calc, tr  
calc ip

5960-6020 SLTST (45%): v  
dk gy-blk, frm-brit med-hi fis  
sb blkly-pty ctgs, slty tex, wvy  
silc vn ip, tr vf pyr, non calc,  
wi sdy intbds ip, SH (45%):  
lt gy-gy, sft-med frm, l-mod  
fis rd-sb blkly ctgs, thn lamn,  
sdy-slty ip, non calc, tr calc  
ip, grdg to sdy sh, SS (10%):  
v lt gy-lt gy-gy, mod strtd vf-u f  
sd grs, sft-med frm v arg  
mtx-gr sup arg ss, non-l  
calc

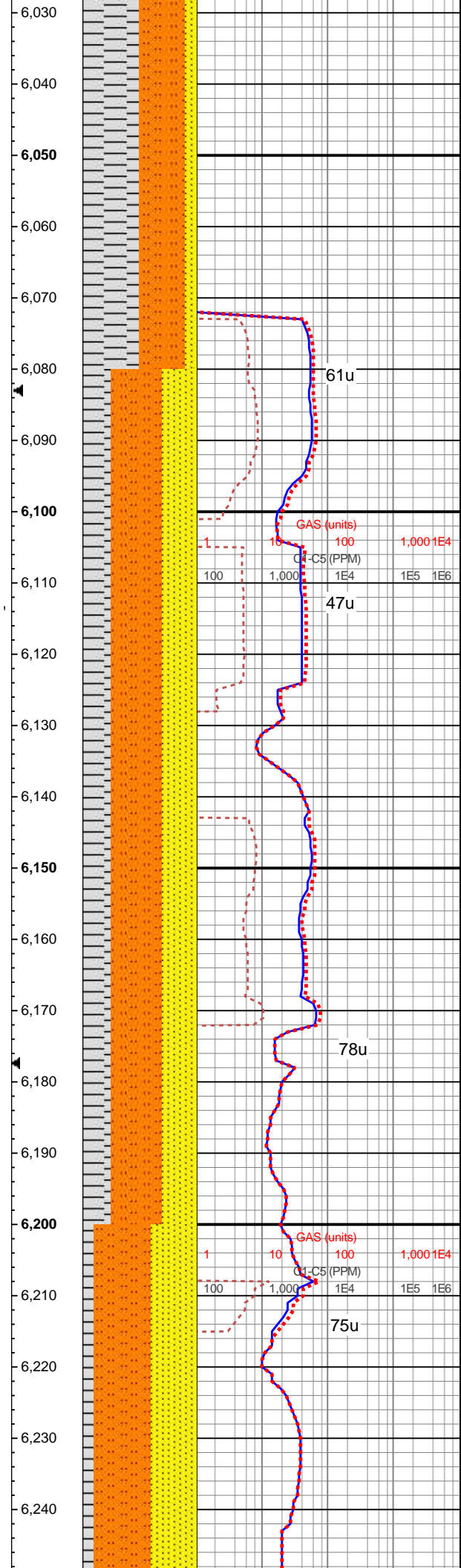






MD: 6,111'  
Azi: 171.52°  
Incl: 20.28°  
TVD: 5,867.71'  
VS: 8.12'

MW: 9.1  
VIS: 47  
MD: 6,206'  
Azi: 168.09°  
Incl: 20.7°  
TVD: 5,956.7'  
VS: 8.85'



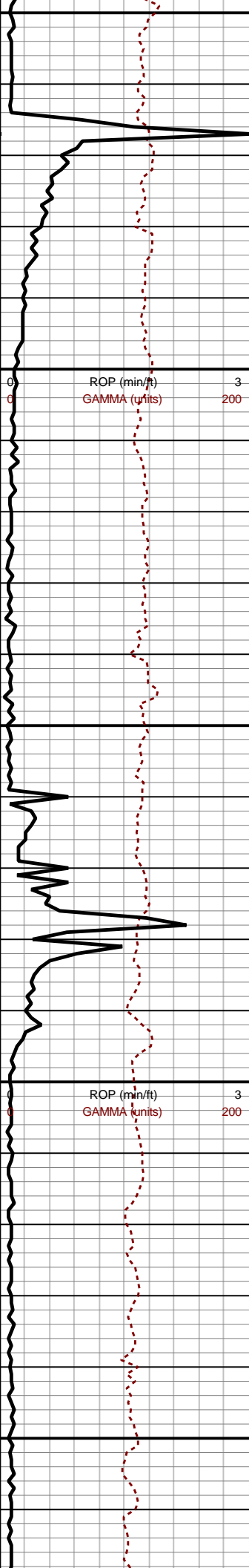
6020-6080 SH/SDY SH (60%): lt gy-gy, sft-med frm, l-mod fis rd-sb blkly ctgs, sm arg-sdy-slty tex ip, wi 10% sdy intbds, non calc, SLTST (40%): v dk gy, frm, med-hi fis ang-pty brit silc ctgs, silc vn ip, tr vf pyr, sdy lamn ip, non calc

6080-6140 SLTST (45%): med gy- gy, sme dk gy, frm-hd, blkly- sb blkly, mod arg, pred intbdd w f v sd; SS (30%): pred medgy- brn sd grs, pred bf- offwht-ltgy sil cmt mtx, occ dk arg cmt, mod- v trnsl sd grs, pred fri-frm grn sup clus, sme mtx sup clus, pred vf- f grd sd, sme sl calc, intbdd w slt; SLTY SH (25%): lt brn- tn, sme gy, sl frm- fiss, intbdd w v f sd

6140-6200 SLTST (45%): med gy- gy, sme dk gy, frm-hd, blkly- sb blkly, mod arg, pred intbdd w f v sd; SS (30%): pred medgy- brn sd grs, pred bf- offwht-ltgy sil cmt mtx, occ dk arg cmt, mod- v trnsl sd grs, pred fri-frm grn sup clus, sme mtx sup clus, pred vf- f grd sd, sme sl calc, intbdd w slt; SLTY SH (25%): lt brn- tn, sme gy, sl frm- fiss, intbdd w v f sd

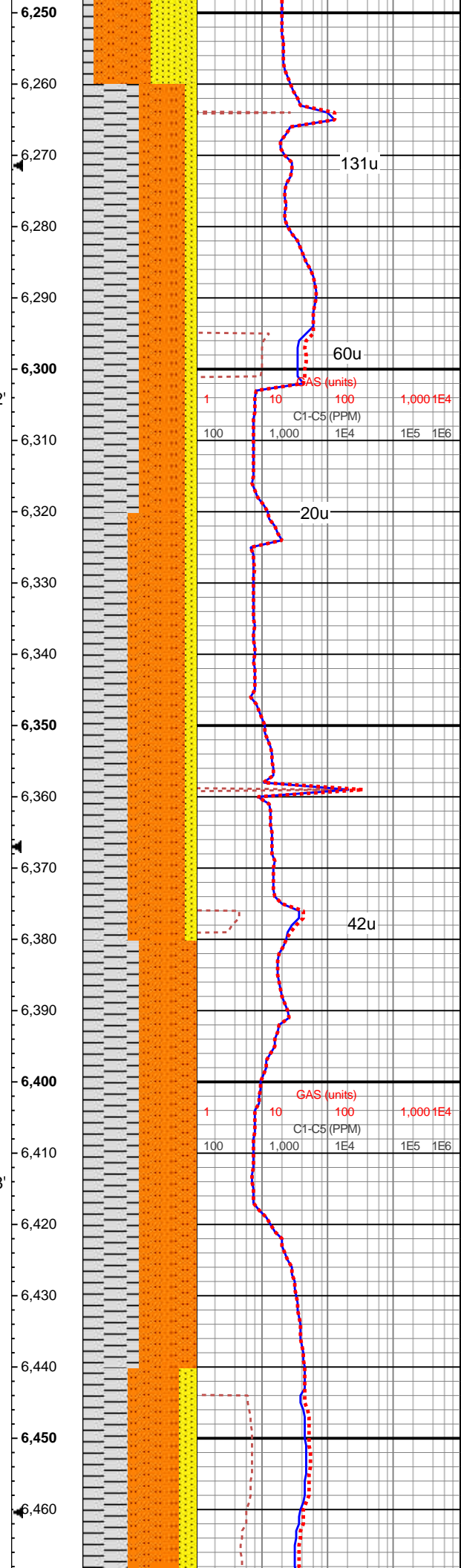
6200-6260 SLTST (55%): med gy- gy, sme dk gy, frm-hd, blkly- sb blkly, mod arg, pred intbdd w f v sd; SS (45%): pred medgy- brn sd grs, pred bf- offwht-ltgy sil cmt mtx, occ dk arg cmt, mod- v trnsl sd grs, pred fri-frm grn sup clus, sme mtx





MD: 6,301'  
Azi: 170.39°  
Incl: 21.55°  
TVD: 6,045.32'  
VS: 9.31'

MD: 6,411'  
Azi: 173.87°  
Incl: 19.67°  
TVD: 6,148.28'  
VS: 11.7'



min grt sup clus, sme max  
sup clus, pred vf- f grd sd,  
sme sl calc, intbdd w slty sh

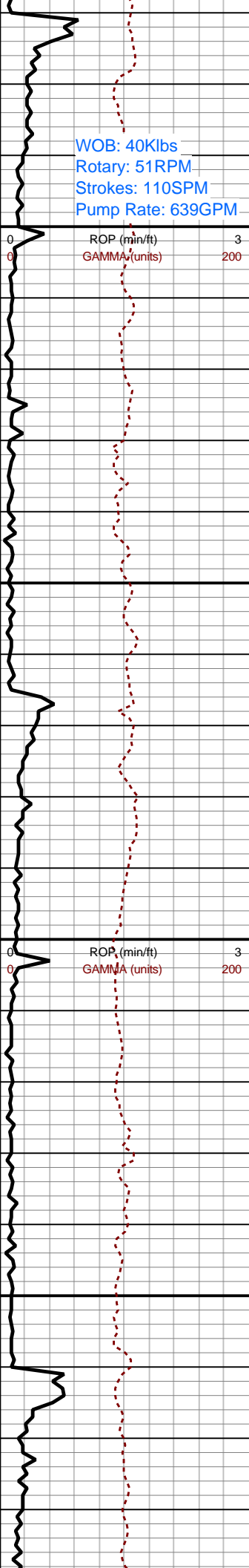
6260-6320 SLTST (50%): v  
dk gy-blk, frm-brit med-hi fis  
sb blk-pty ctgs, slty tex, wvy  
silc vn ip, tr vf pyr, tr c pyr  
strg, non calc, SH (40%): lt  
gy-gy, sft-med frm, l-mod fis  
rd-sb blk ctgs, thn lamn,  
sdy-slty ip, non calc, tr calc  
ip, grdg to SS (10%): v lt gy-lt  
gy-gy, mod srted vf-u f sd grs,  
sft-med frm v arg mtx-gr sup  
arg ss, non-l calc

6320-6380 SLTST (50%): v  
dk gy-blk, frm-brit med-hi fis  
sb blk-pty ctgs, slty tex, silc  
vn ip, tr vf pyr, non calc, SH  
(50%): lt gy-gy, sft-med frm,  
l-mod fis rd-sb blk ctgs, thn  
lamn, sdy-slty ip, non calc, tr  
calc ip wi sdy sh

6380-6440 SLTST (55%): v  
dk gy-blk, frm-brit med-hi fis  
sb blk-pty ctgs, slty tex,  
com silc vn ip, tr vf pyr, non  
calc, SH (40%): lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blk ctgs, thn lamn, sdy-slty  
ip, non calc, tr calc ip, wi rr  
SS/SDY SH: lt gy-gy, sft-med  
frm, l-mod fis rd-sb blk  
ctgs, sm arg-sdy-slty tex ip,  
non-l calc ip

6440-6500 SLTST (45%): v  
dk gy-blk, frm-brit med-hi fis

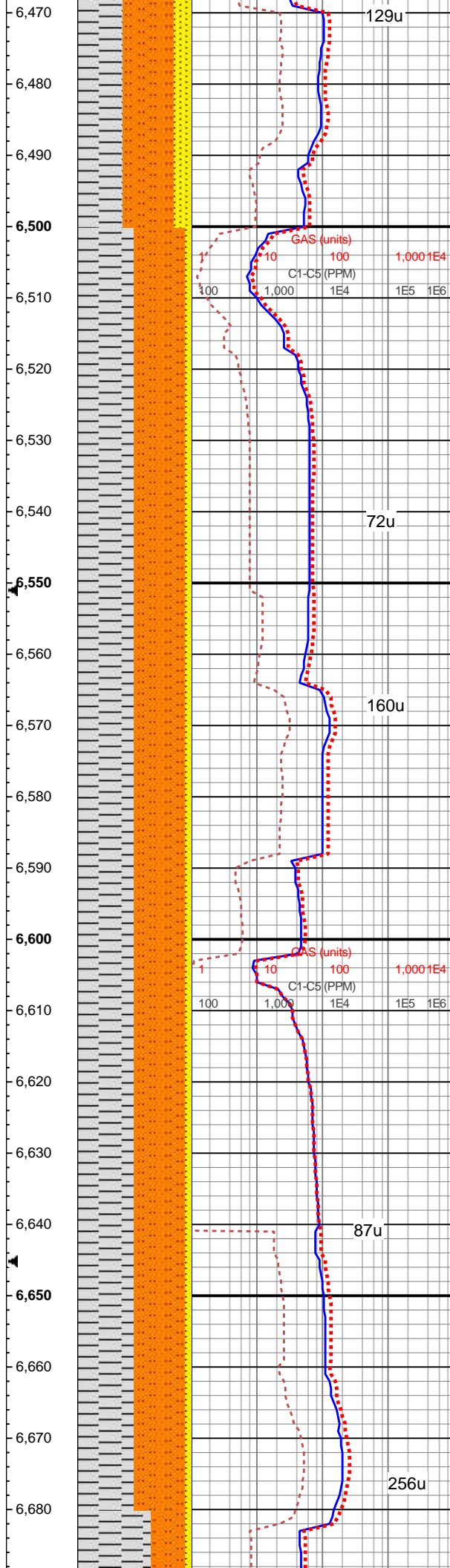




MD: 6,505'  
Azi: 172.63°  
Incl: 19.5°  
TVD: 6,236.84'  
VS: 14.3'

MD: 6,599'  
Azi: 170.07°  
Incl: 19.68°  
TVD: 6,325.4'  
VS: 15.86'

MD: 6,684'



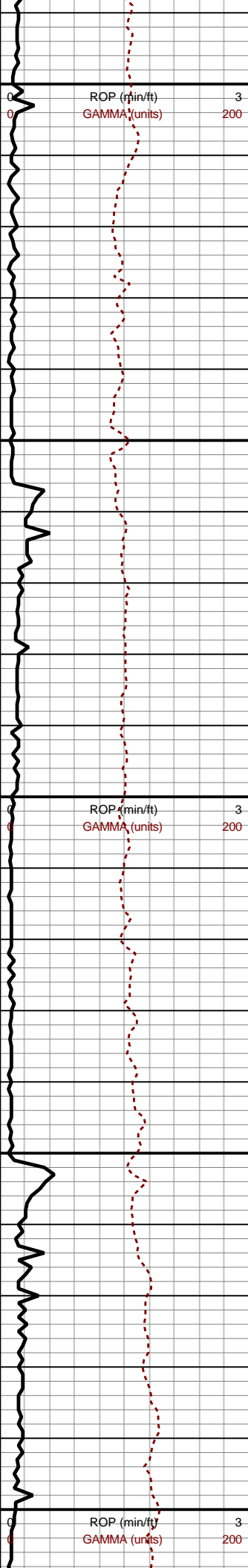
sb blkly-pty ctgs, slty tex,  
com silc vn ip, tr vf pyr, non  
calc, SH (40%): lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blkly ctgs, thn lamn, sdy-slty  
ip, non calc, tr calc ip, wi  
15% SS/SDY SH: lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blkly ctgs, sm arg-sdy-slty  
tex ip, non-l calc ip

6500-6560 SLTST (45%): v  
dk gy-blk, frm-brit med-hi fis  
sb blkly-pty ctgs, slty tex,  
com silc vn ip, tr vf pyr, non  
calc, SH (35%): lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blkly ctgs, thn lamn, sdy-slty  
ip, non calc, tr calc ip, SDY  
SH (15%): lt gy-gy-gy brn,  
vf-u f mod srted grs, pred mtx  
sup clus wi arg cmt, non-l  
calc ip, SS (5%): off wh-lt gy,  
s&p, vf-u f grs, gr sup ss  
clus cons wi silc cmt, arg  
cmt ip, non calc

6560-6620 SLTST (45%): v  
dk gy wi occ thn wvy gy silc  
vn, frm-brit med-hi fis sb  
blkly-pty ctgs, slty tex grdg to  
sdy intbds ip, tr vf pyr, non  
calc, SH (40%): lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blkly ctgs, thn lamn, sdy-slty  
ip, non calc, tr calc ip, SDY  
SH (10%): lt gy-gy-gy brn,  
vf-u f mod srted grs, pred mtx  
sup clus wi arg cmt, non-l  
calc ip, SS (5%): off wh-lt gy,  
s&p, vf-u f grs, gr sup ss  
clus cons wi silc cmt, arg  
cmt ip, non calc

6620-6680 SLTST (45%): v  
dk gy-blk, frm-brit med-hi fis  
sb blkly-pty ctgs, slty tex,  
com silc vn ip, tr vf pyr, non  
calc, SH (35%): lt gy-gy,  
sft-med frm, l-mod fis rd-sb  
blkly ctgs, thn lamn, sdy-slty  
ip, non calc, tr calc ip, SDY  
SH (15%): lt gy-gy-gy brn,  
vf-u f mod srted grs, pred mtx  
sup clus wi arg cmt, non-l  
calc ip, SS (5%): off wh-lt  
gy, s&p, vf-u f grs, gr sup ss  
clus cons wi silc cmt, arg  
cmt ip, non calc

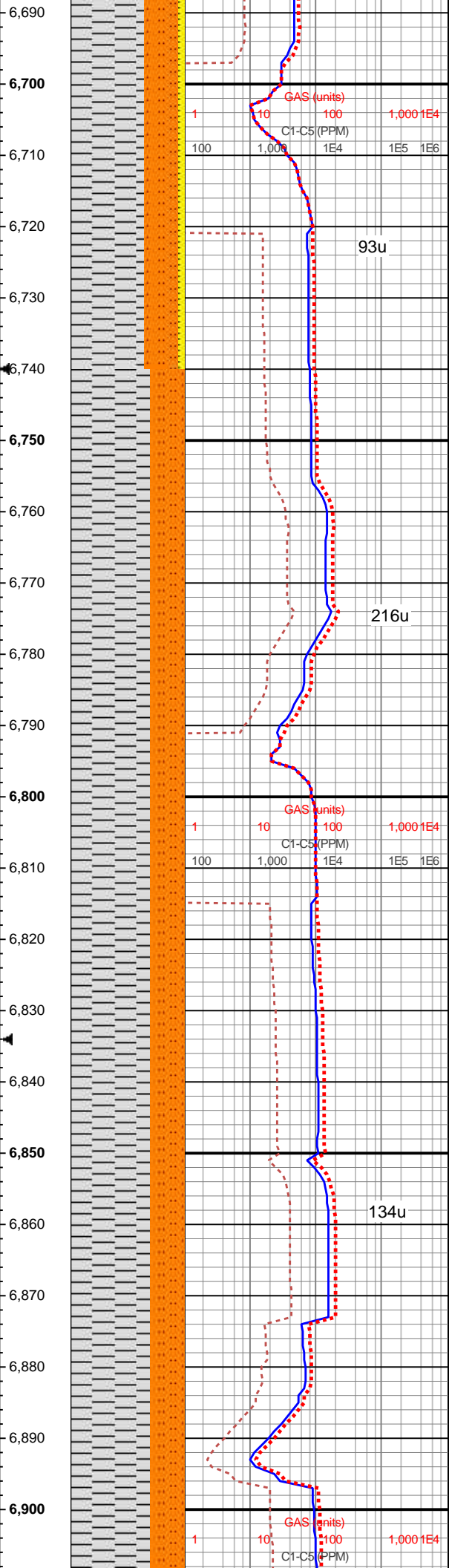




MD: 6,694'  
Azi: 175.45°  
Incl: 19.93°  
TVD: 6,414.79'  
VS: 18.26'

MD: 6,789'  
Azi: 172.03°  
Incl: 19.72°  
TVD: 6,504.16'  
VS: 21.2'

MD: 6,883'  
Azi: 170.68°  
Incl: 20.9°  
TVD: 6,592.31'  
VS: 22.8'



6680-6740 SH (65%): lt gy-gy, med frm-frm, l-mod fis sb rd-sb blkly tab ctgs, pred sm tex, occ sdy-slty ip, non calc, SLTST (30%): v dk gy, frm-brit, med-hi fis ang-pty ctgs, tr vf pyr, silc, rr sdy intbds & lamn, non calc, wi rr SS (5%): off wh-lt gy, mod strtd vf-u f sd grs, med frm-sli fri pred mtx sup ss clus cons wi arg cmt grdng to sh ip, gr sup ip, non-l calc

6740-6800 SH (70%): lt gy-gy-gy brn, med frm-frm, l-mod fis sb rd-sb blkly ctgs, sm arg-slty tex wi thn lamn, tr vf pyr, non calc, SLTST (30%): v dk gy-blk, frm-brit, med-hi fis ang-pty silc ctgs, rr wvy silc vn, tr vf pyr, non calc

6800-6860 SH (70%): lt gy-gy-gy brn, med frm-frm, l-mod fis sb rd-sb blkly tab ctgs, sm-slty tex wi thn lamn, tr vf pyr, non calc, SLTST (30%): v dk gy, frm-brit, med-hi fis ang-pty ctgs, tr vf pyr, silc, rr sdy intbds & lamn, tr silc vn, non calc

6860-6920 SH (70%): lt gy-gy-gy brn, med frm-frm, l-mod fis sb rd-sb blkly ctgs, sm arg-slty tex wi thn lamn, tr vf pyr, non calc, SLTST (30%): v dk av-blk, frm-brit.







