

# COLUMBINE LOGGING

Scale: 5' / 100'  
Measured Depth Log

Well Name NCLP AA07-69-1AHNC(HORZ)

Location SEC 4 T6N R63W

State COLORADO

County WELD

Country USA

Rig Number H&P 322

API Number 05-123-39110

Field WATTENBERG

Region DJ BASIN

Drilling Completed 8/11/2014

Spud Date 8/3/2014

Surface Coordinates

LAT: 40.50873°N

LONG: 104.45095°W

75' FSL

75' FWL

Bottom Hole Coordinates

PROJECTED:

165' FNL

1530' FEL

Ground Elevation 4703'

K.B. Elevation 4727'

Logged Interval 6065' To 13335

Total Depth 13335

Formation NIOBRARA "C" CHALK

Type of Drilling Fluid MUD;WATER;POLY

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200  
Denver, CO 80202

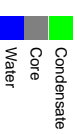
Geologist

Name MIKE GREENE;JERED KARR;ZACH UBER

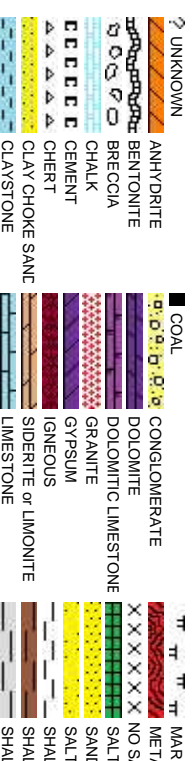
Company COLUMBINE LOGGING INC.

Address 2385 S. LIPAN ST  
DENVER, COLORADO 80223  
(303) 289-7764

Zone Color Coding



Rock Types



## Accessories

<b>Fossils</b>	GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL
INOCERAMUS	B BENTONITE	K KAOLIN	ANHYDRITE STRINGER
ALGAE	O OOLITE	BIT BITUMENOUS SUBSTANCE	BENTONITE STRINGER
AMPHIPORA	O OSTRACOD	BRE BRECCIA FRAGMENTS	COAL STRINGER
BELEMNITE	P PELECYPOD	C CALCAREOUS	DOLOMITE STRINGER
BIOCLASTIC	P PELLET	C CARBONACEOUS FLAKES	GYPSUM STRINGER
BRACHIOPOD	R RISOLITE	CHT CHERT	LIMESTONE STRINGER
BRYOZOA	P PLANT REMAINS	COAL - THIN BEDS	MARLSTONE (CALC) STRG
CEPHALOPOD	S SCAPHOPOD	D DOLOMITIC	MARLSTONE (DOL) STRG
CORAL	S STROMATOPOROID	F FELDSPAR	SANDSTONE STRINGER
CRINOID	F FERRUGINOUS PELLET	S SILTY	SHALE STRINGER
ECHINOID	F FERRUGINOUS	T TUFFACEOUS	SILTSTONE STRINGER
FISH	A ANHYDRITIC		
FORAMINIFERA	G GLAUCONITE	<b>Stringer</b>	
F FOSSIL	G GYPSIFEROUS		

## Other Symbols

<b>Oil Show</b>	P PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	E EARTHY
V VUGGY	FAULT	WIRELINE TESTED - RT	FINELYXLN	
<b>Engineering</b>	FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE	
D DEAD	GAS SHOW	MIN DEPTH	L LITHOGRAPHIC	
E EVEN	OIL SHOW		MX MICROXLN	
Q QUESTIONABLE	BIT			
SPOTTED STAINING	CONNECTION (UP)	<b>Rounding</b>	MS MUDSTONE	
		A ANGULAR	PS PACKSTONE	
<b>Porosity</b>	CONNECTION (DOWN)			
CONNECTION GAS	NORMAL FAULT	R ROUNDED	WS WACKESTONE	
E EARTHY	CONNECTION GAS (LEFT)	B SUBANG		
F FENESTRAL	TRIP GAS	R SUBRAND		
<b>Textures</b>	F FRACTURE	CASING	M MODERATE	
INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	P POOR	
INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	W WELL	
M MOLDIC	CORE - LOST	SLIDE		
O ORGANIC	CORE - RECOVERED	SURVEY	CX CRYPTOXLN	

Gas  
Pressure  
Seal

STONE  
MORPHIC  
AMPLE  
STONE  
PEPPER SAND  
E COLORED  
E GRAY

SHALY SANDSTONE  
SHALY SILTSTONE  
SILTSTONE  
TILL  
TUFF  
WELEDDED TUFF

Slide/Rotate

ROP  
ROP

Total Gas & Chromatograph

GAS  
C1  
C2  
C3  
C4

Depth Labels

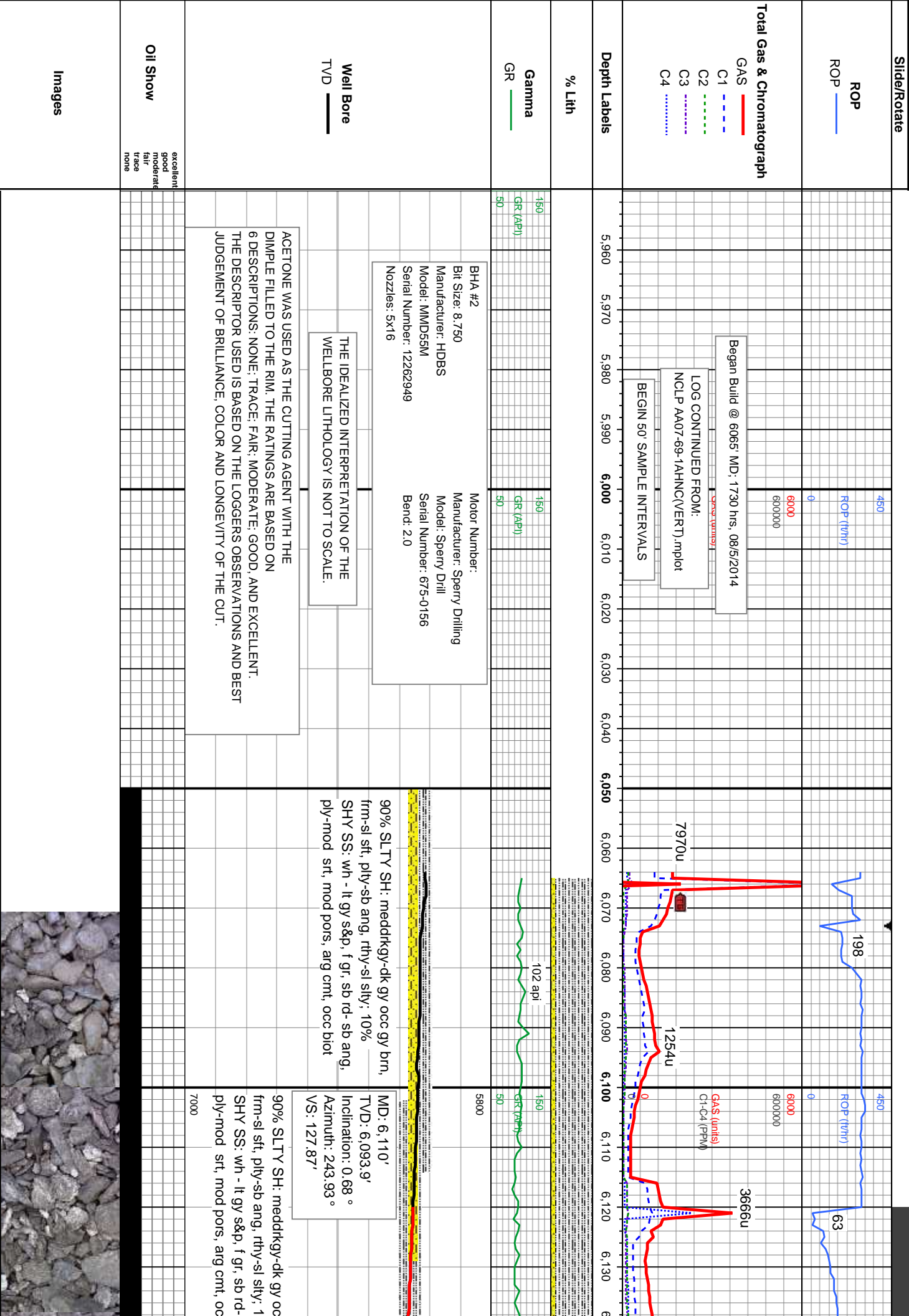
% Lith

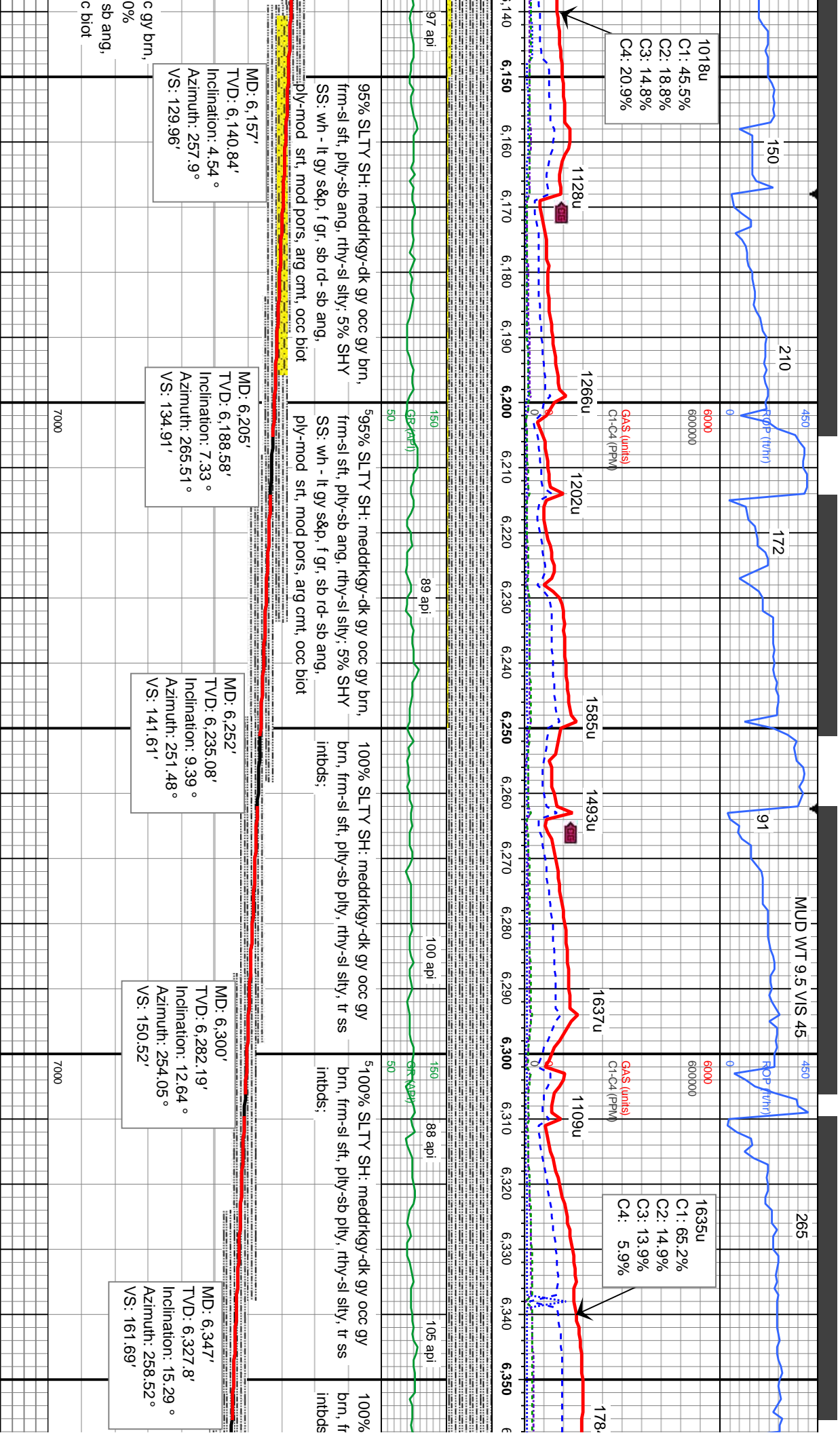
Gamma  
GR

Well Bore  
TVD

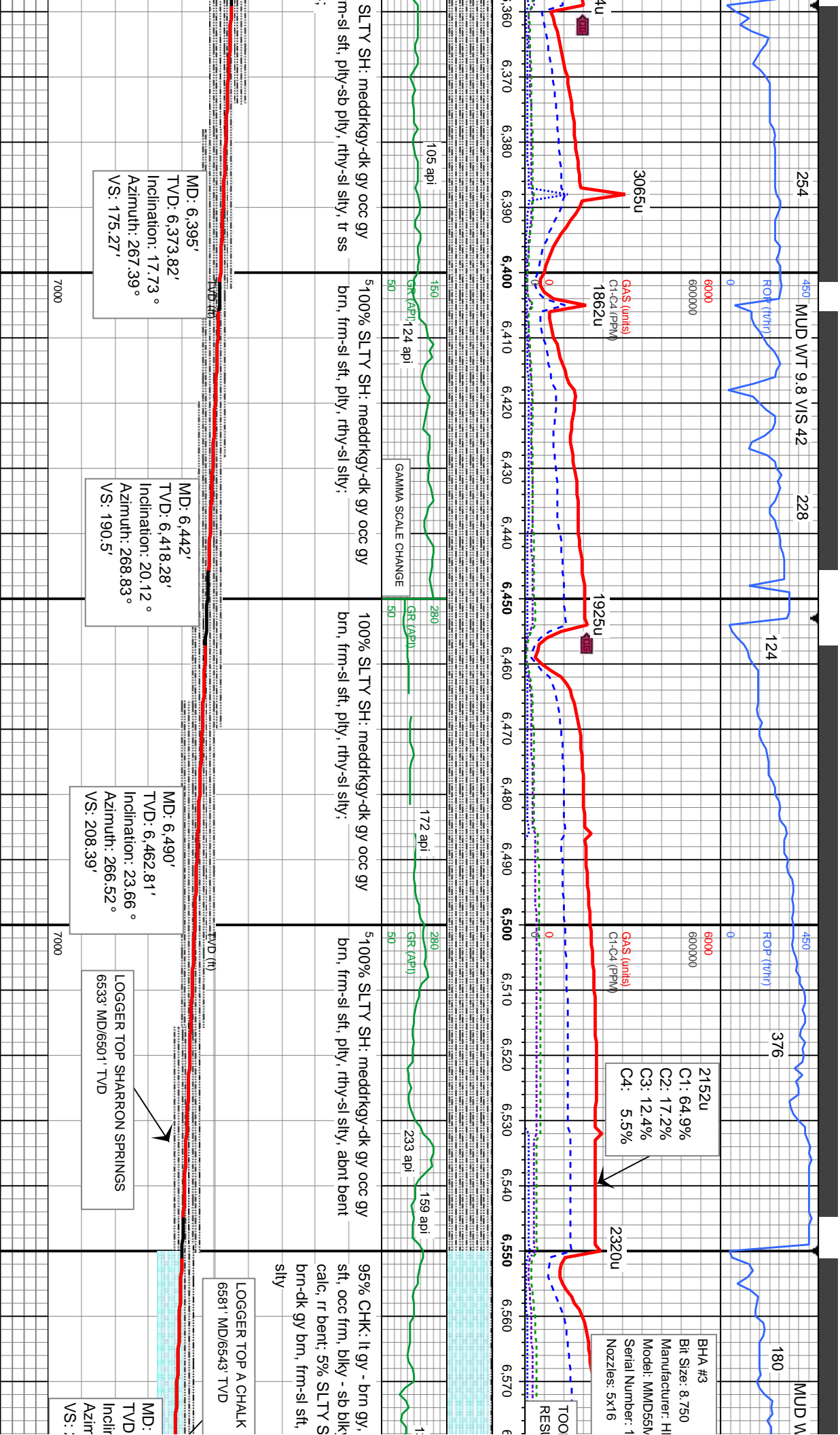
Oil Show

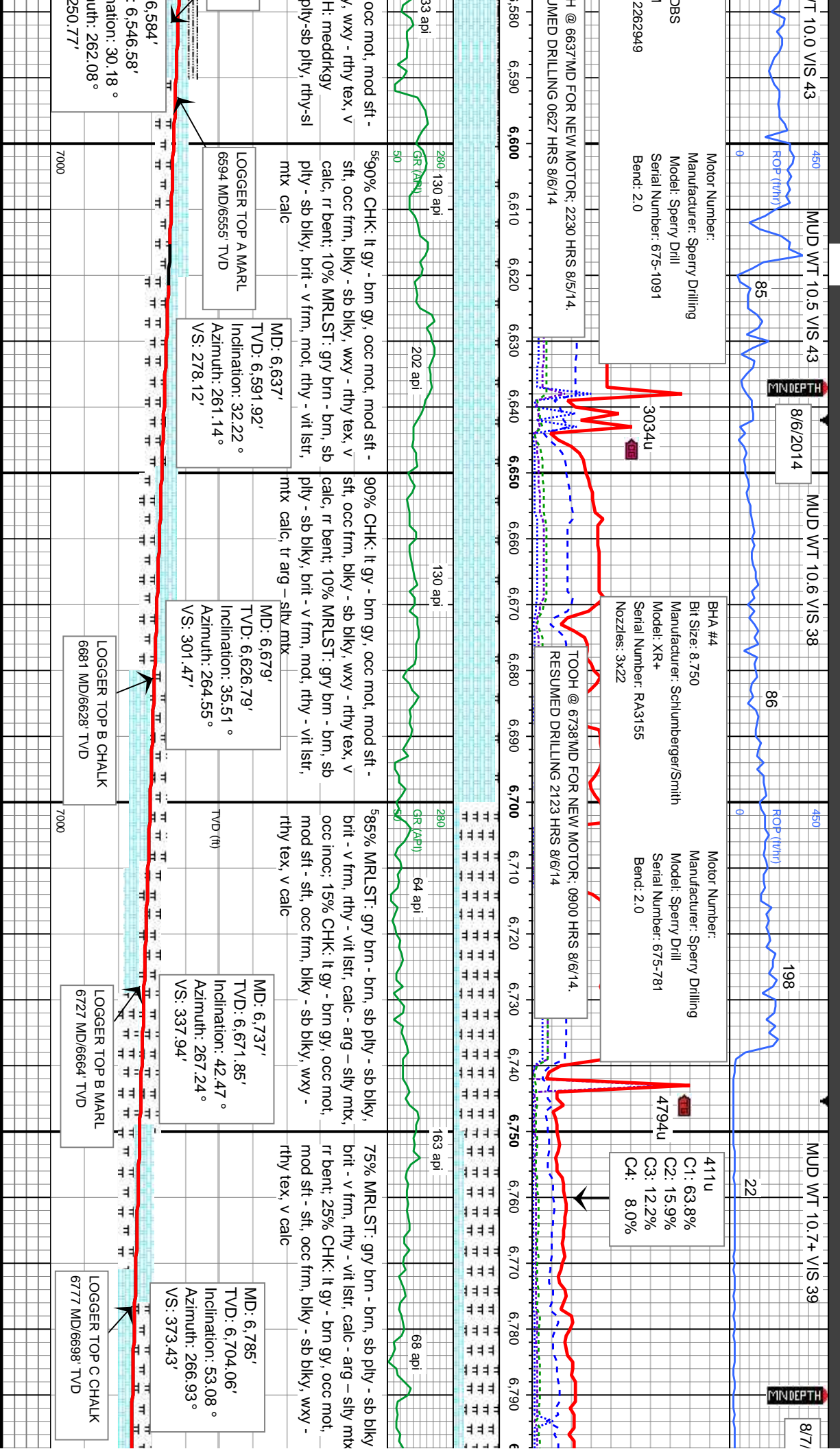
Images



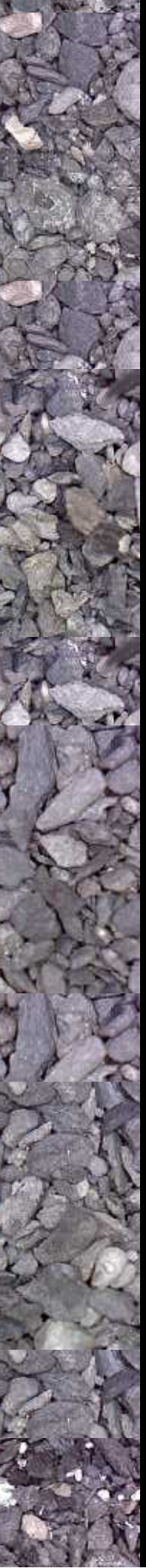
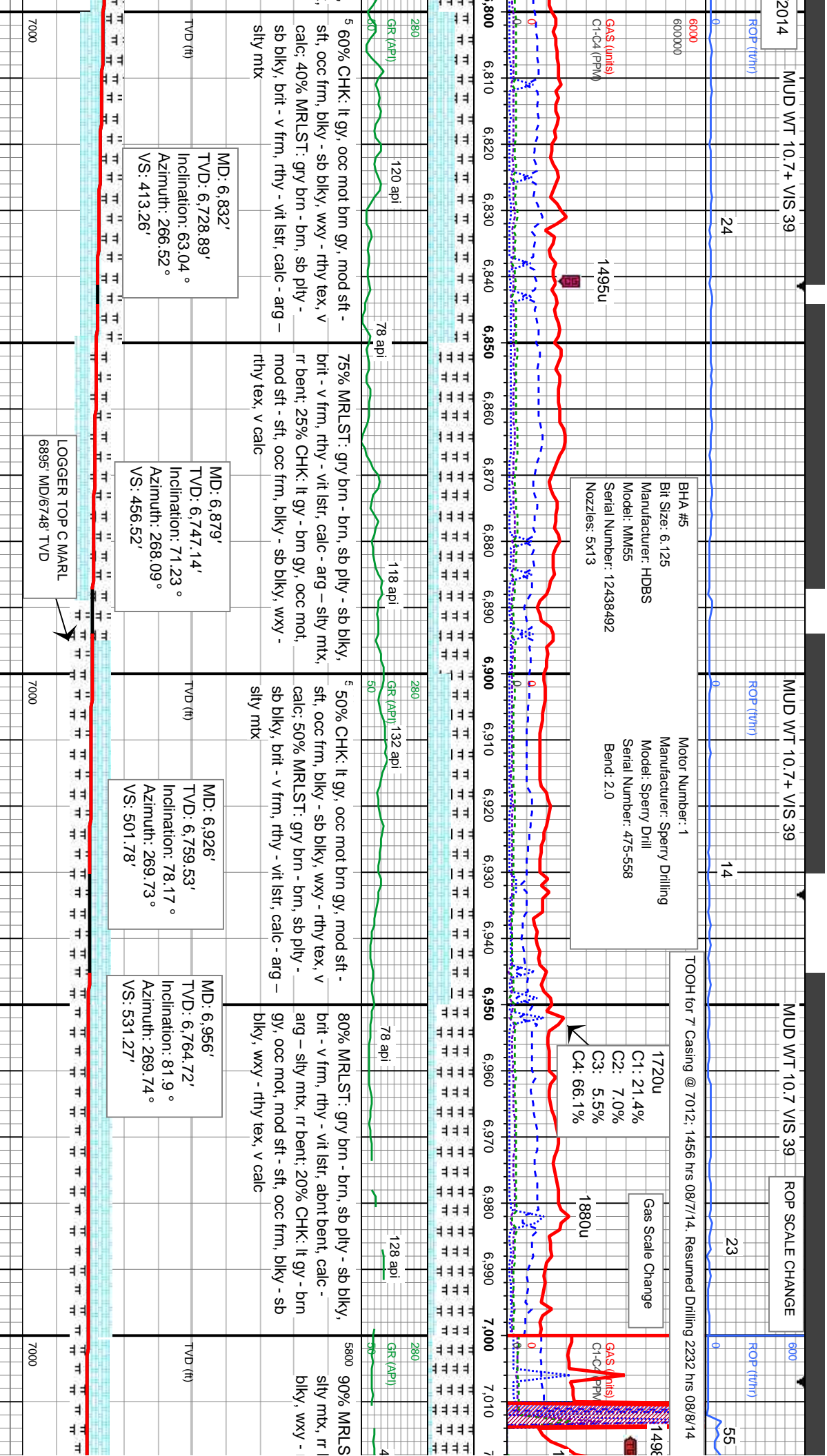












MUD WT 9.6 VIS 40 247

ROP (in/hr)

8/9/2014

MINDEPTH

MUD WT 9.5 VIS 40

ROP (in/hr)

2109u

3000

46

2277u

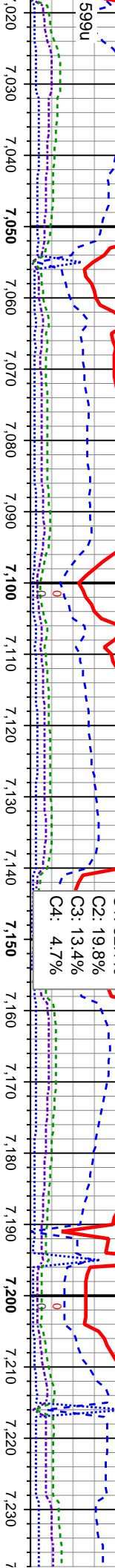
3000

1711u

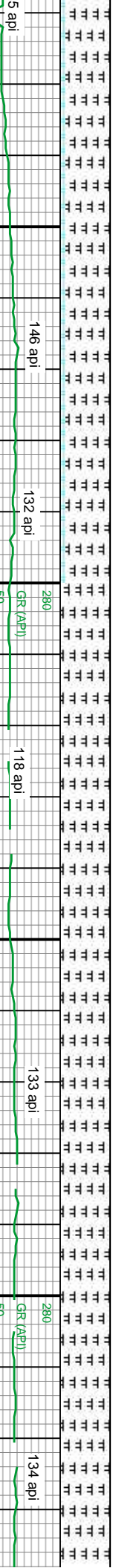
G:1256u  
Cl-C4 (PPM)

GAS (units)  
Cl-C4 (PPM)

1087u  
C1: 62.1%  
C2: 19.8%  
C3: 13.4%  
C4: 4.7%



7,020 7,030 7,040 7,050 7,060 7,070 7,080 7,090 7,100 7,110 7,120 7,130 7,140 7,150 7,160 7,170 7,180 7,190 7,200 7,210 7,220 7,230



5 api 146 api 132 api 280 GR (API) 50 118 api 133 api 280 GR (API) 50 134 api

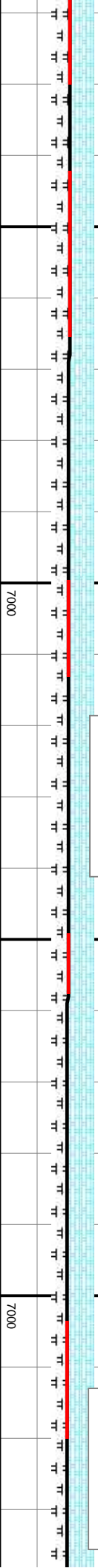
ent: 10% CHK: lt gy - brn gy, occ mot, mod sft - sft, occ frm, blk - sb  
thly tex, v calc  
100% MRLST: gry brn - brn, sb ply - sb blk, brit - v frm, rthy - vit lst, calc mtx - tr arg -  
sly mtx, r chk

TVD (ft)

MD: 7,131'  
TVD: 6,777.03'  
Inclination: 90.03 °  
Azimuth: 268.99 °  
VS: 705.46'

TVD (ft)

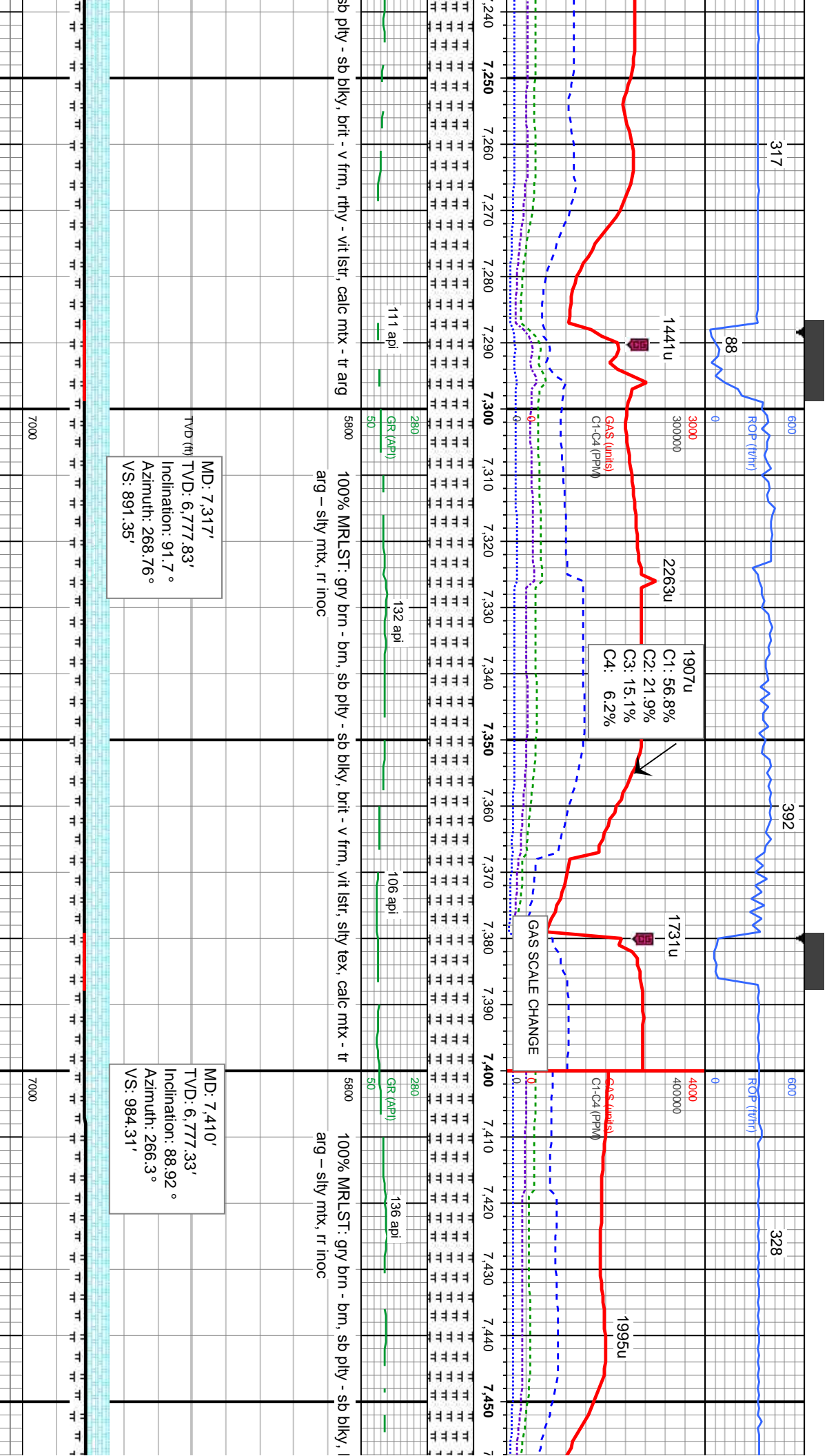
MD: 7,224'  
TVD: 6,778.11'  
Inclination: 88.64 °  
Azimuth: 267.55 °  
VS: 798.4'

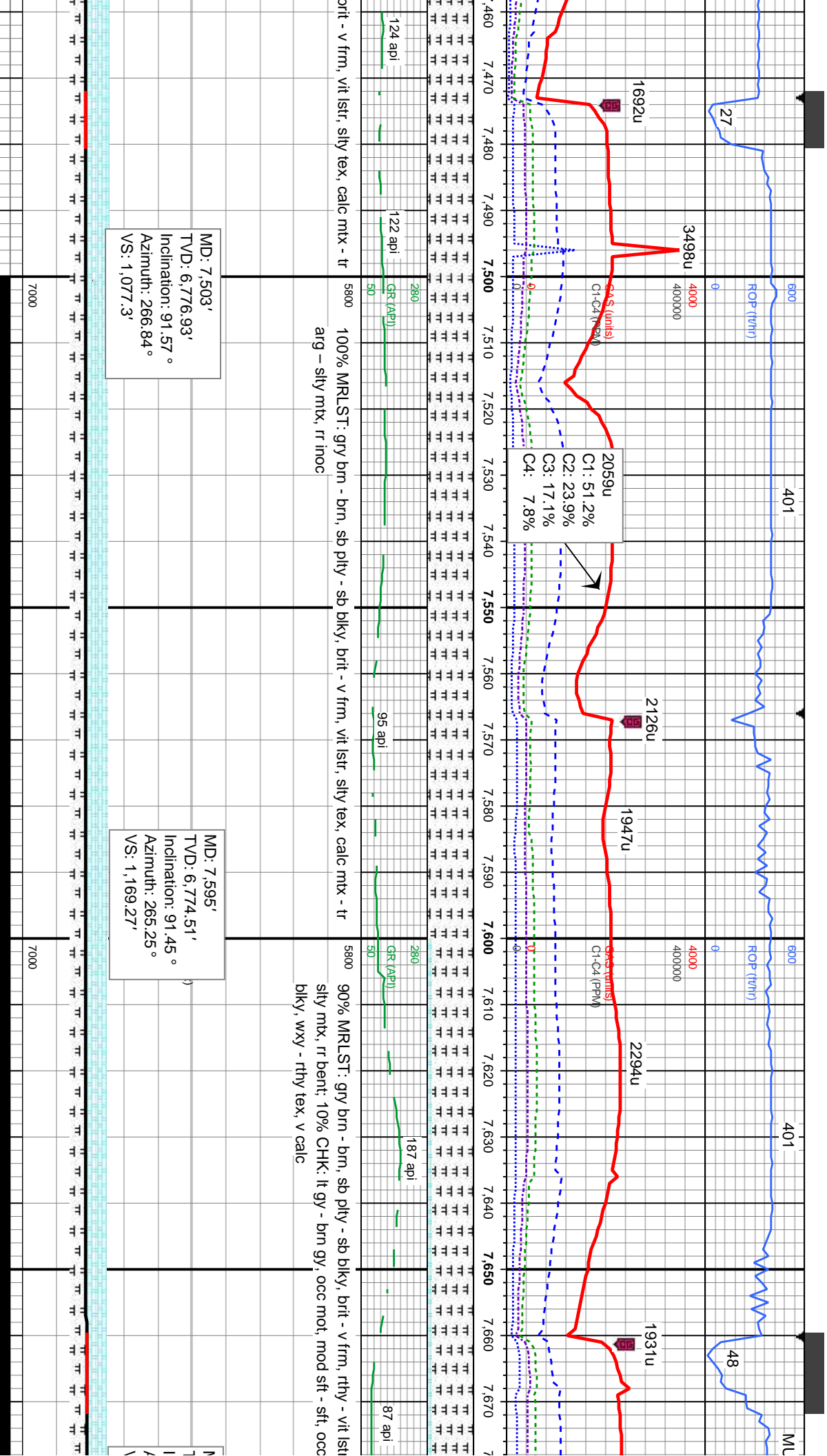


7000 7000







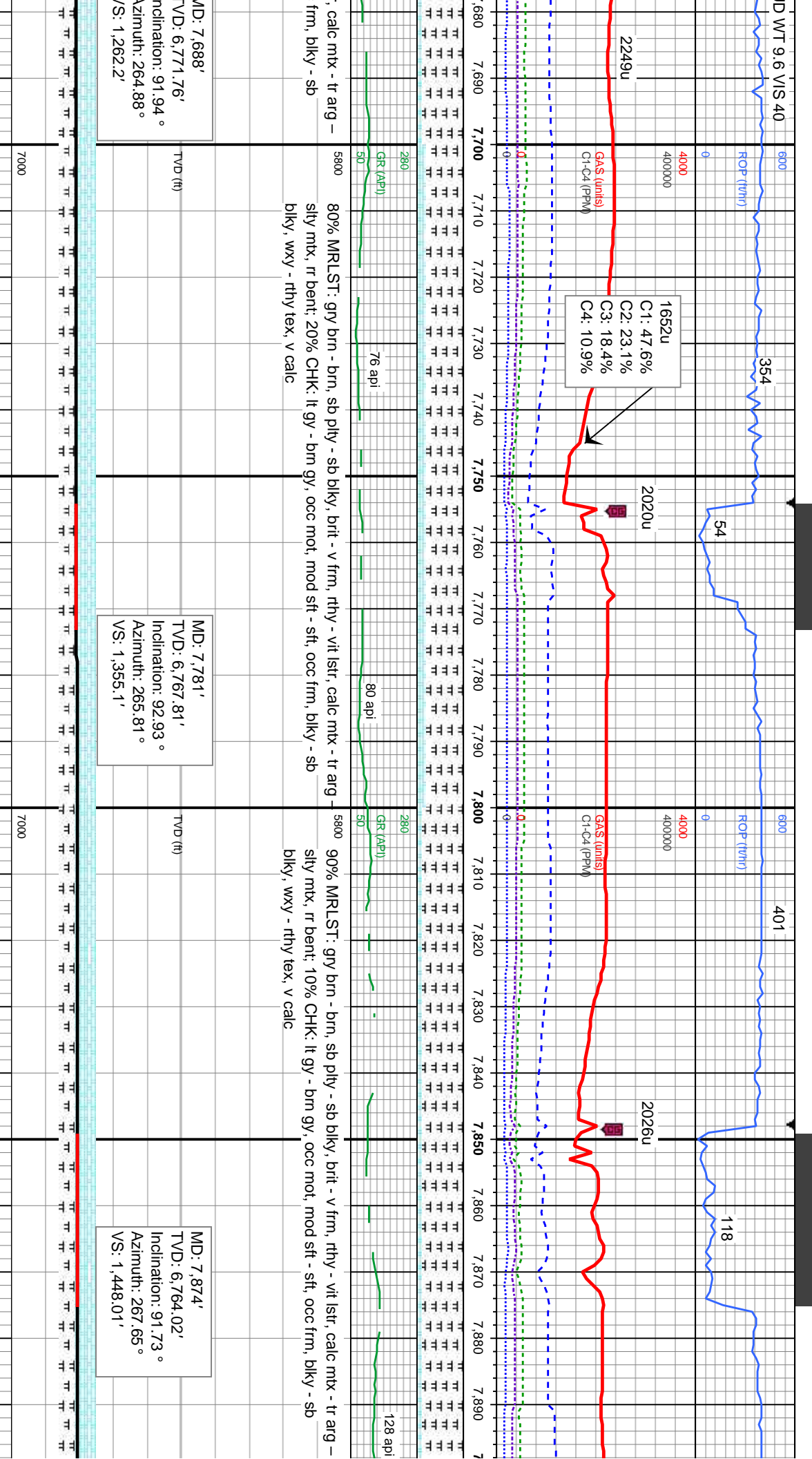


MD: 7,503'  
TVD: 6,776.93'  
Inclination: 91.57°  
Azimuth: 266.84°  
VS: 1,077.3'

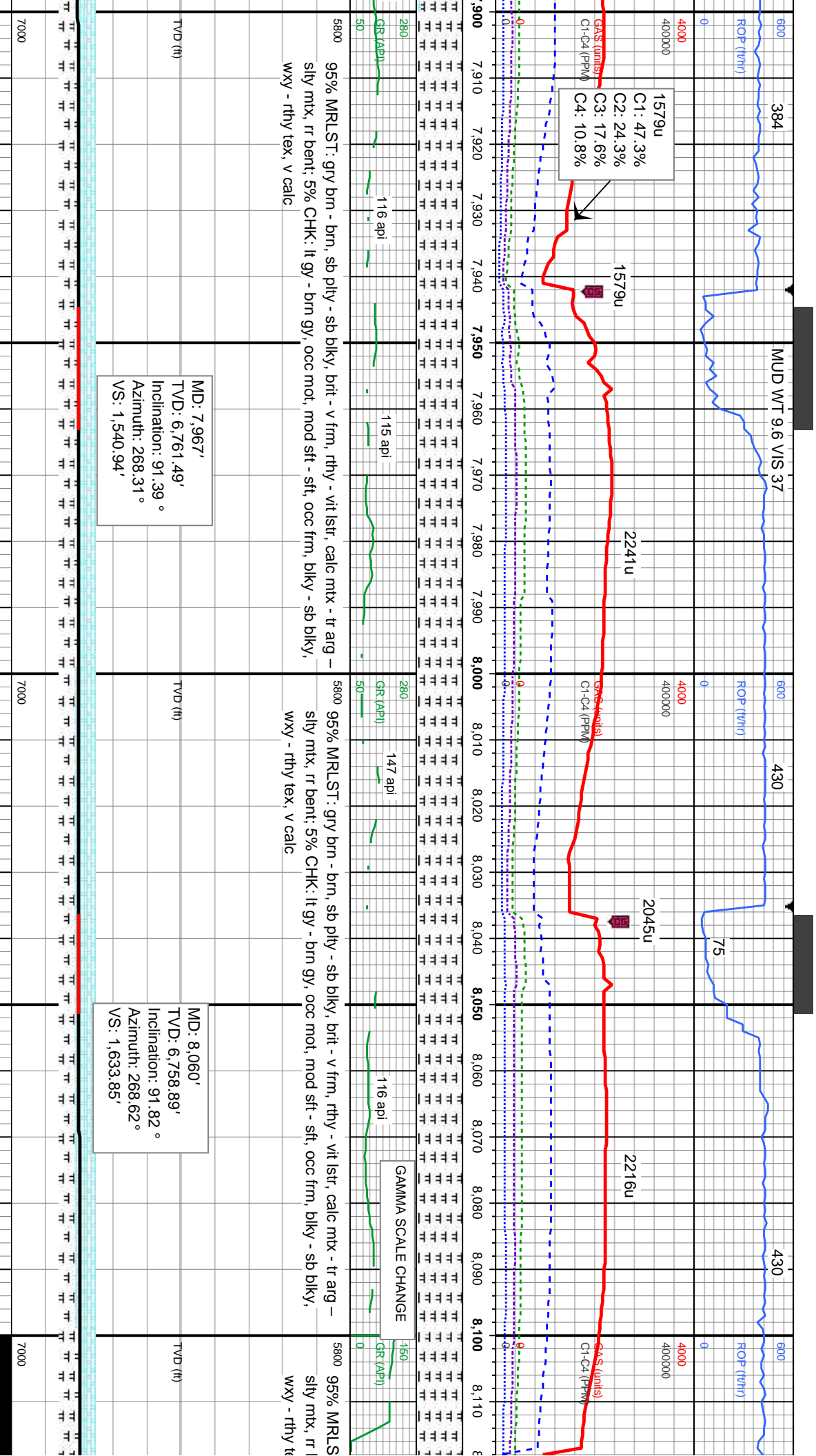
MD: 7,595'  
TVD: 6,774.51'  
Inclination: 91.45°  
Azimuth: 265.25°  
VS: 1,169.27'

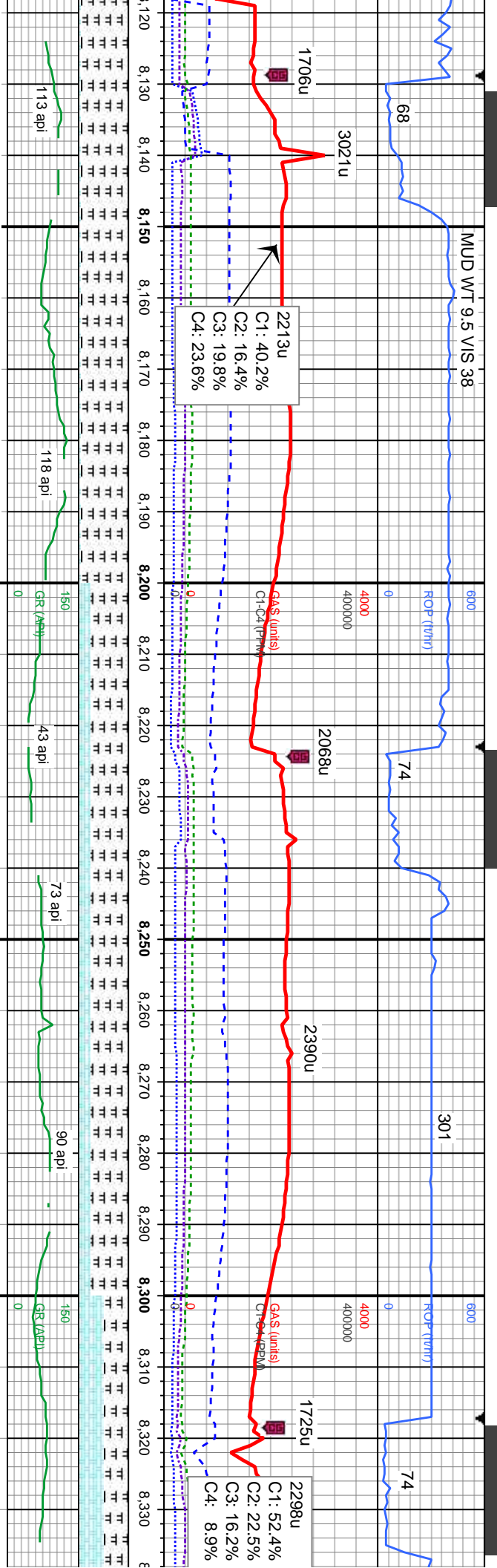








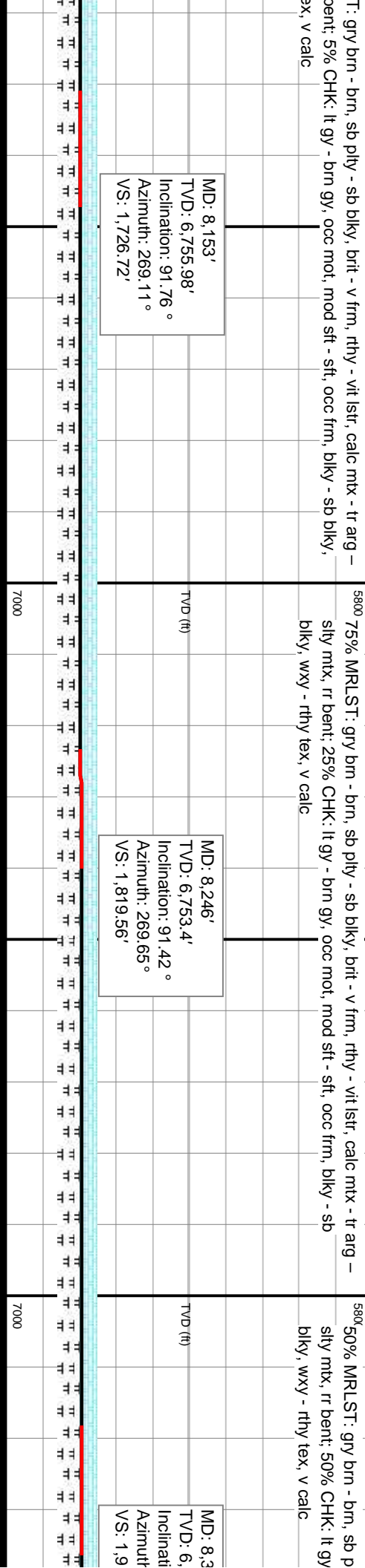




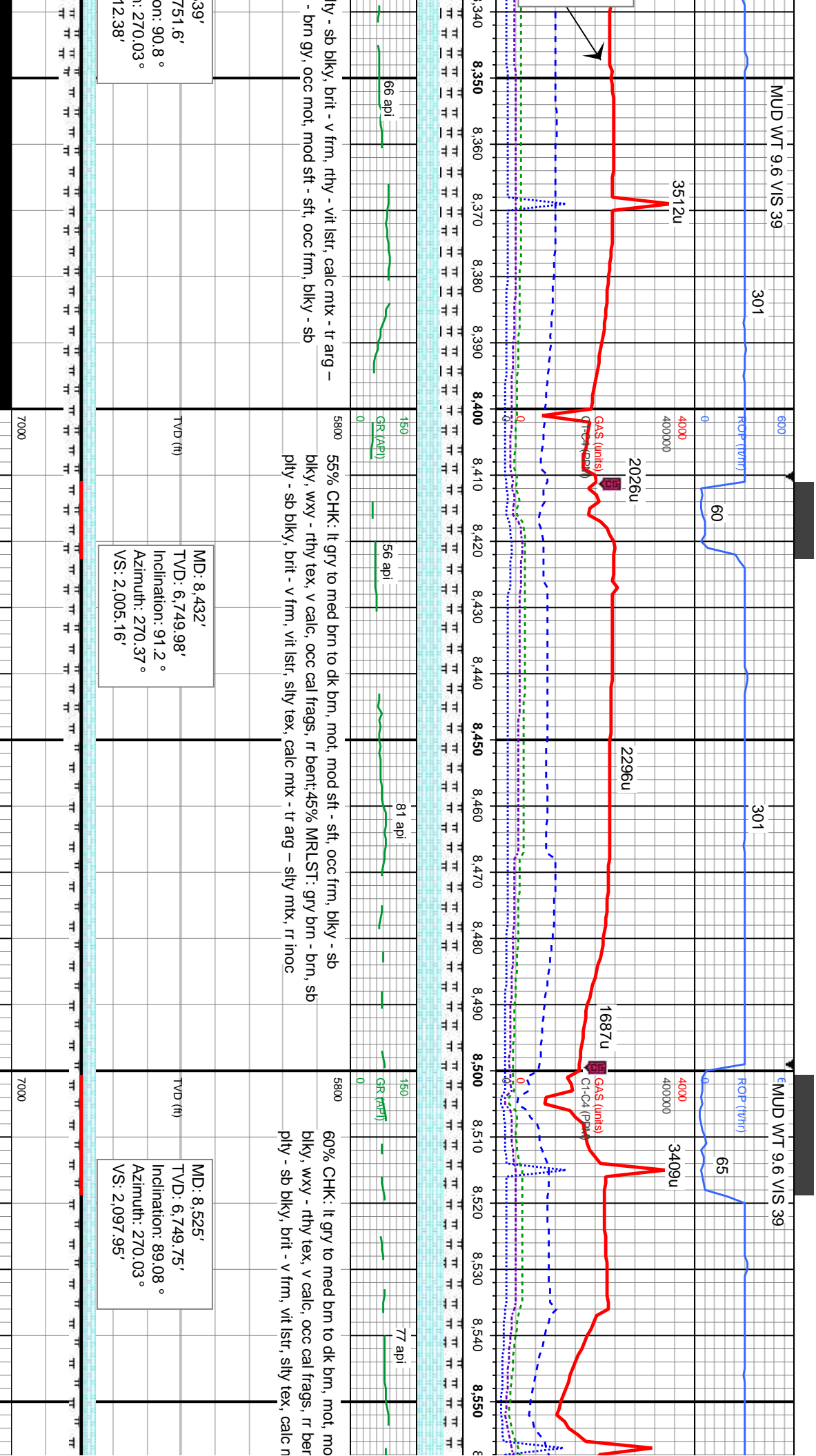
MD: 8,153'  
TVD: 6,755.98'  
Inclination: 91.76°  
Azimuth: 269.11°  
VS: 1,726.72'

MD: 8,246'  
TVD: 6,753.4'  
Inclination: 91.42°  
Azimuth: 269.65°  
VS: 1,819.56'

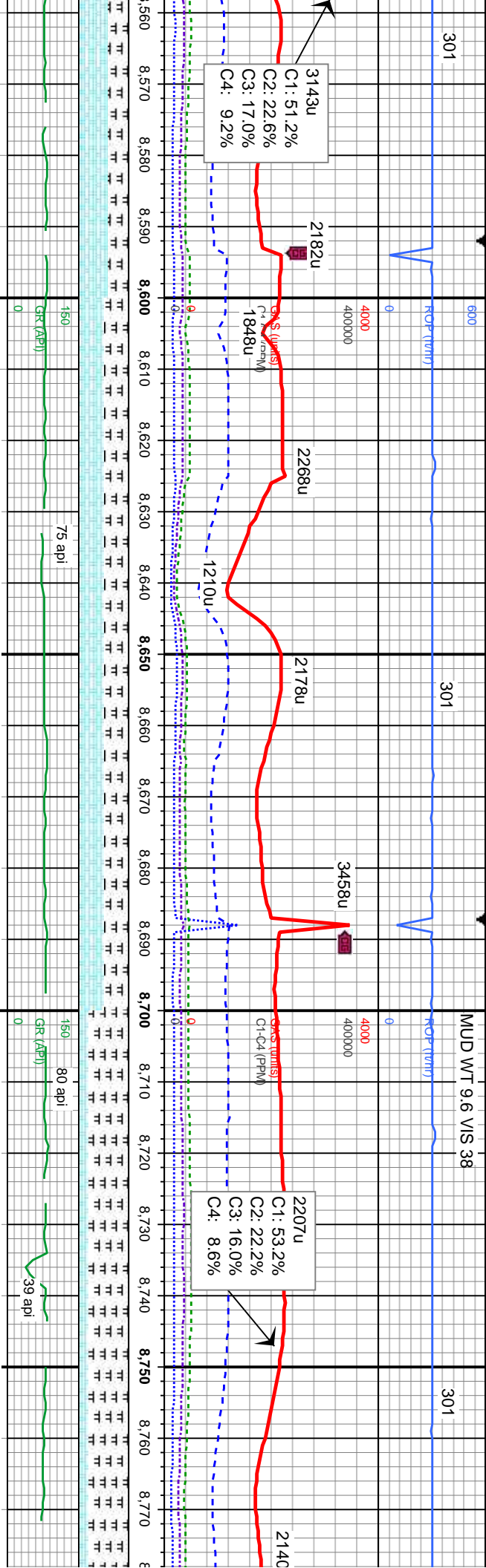
MD: 8,3  
TVD: 6,  
Inclinati  
Azimuth  
VS: 1,9











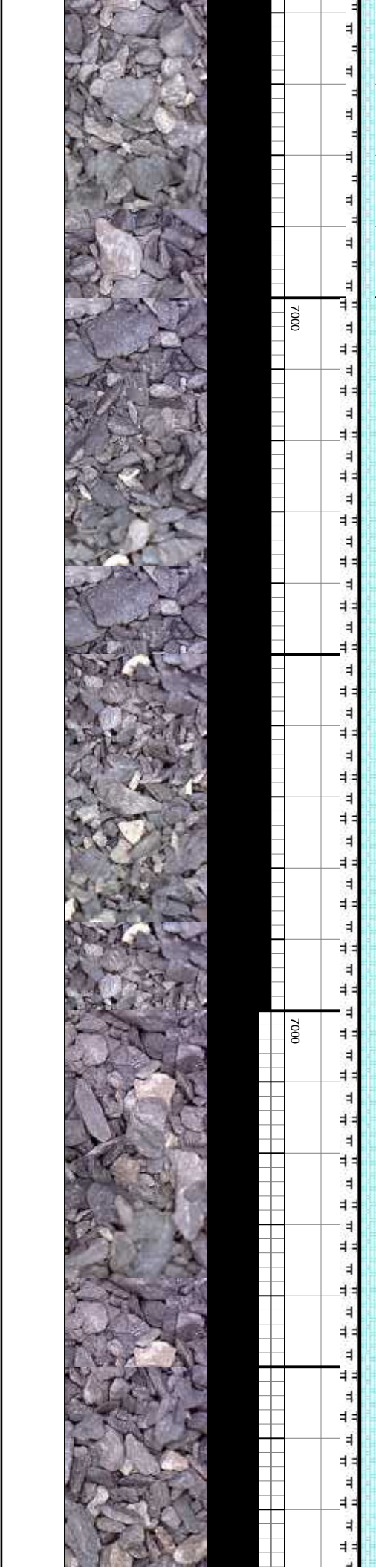
d sft - sft, occ frm, blk - sb  
t:40% MRLST: gry brn - brn, sb  
mx - tr arg - silty mtx, rr inoc

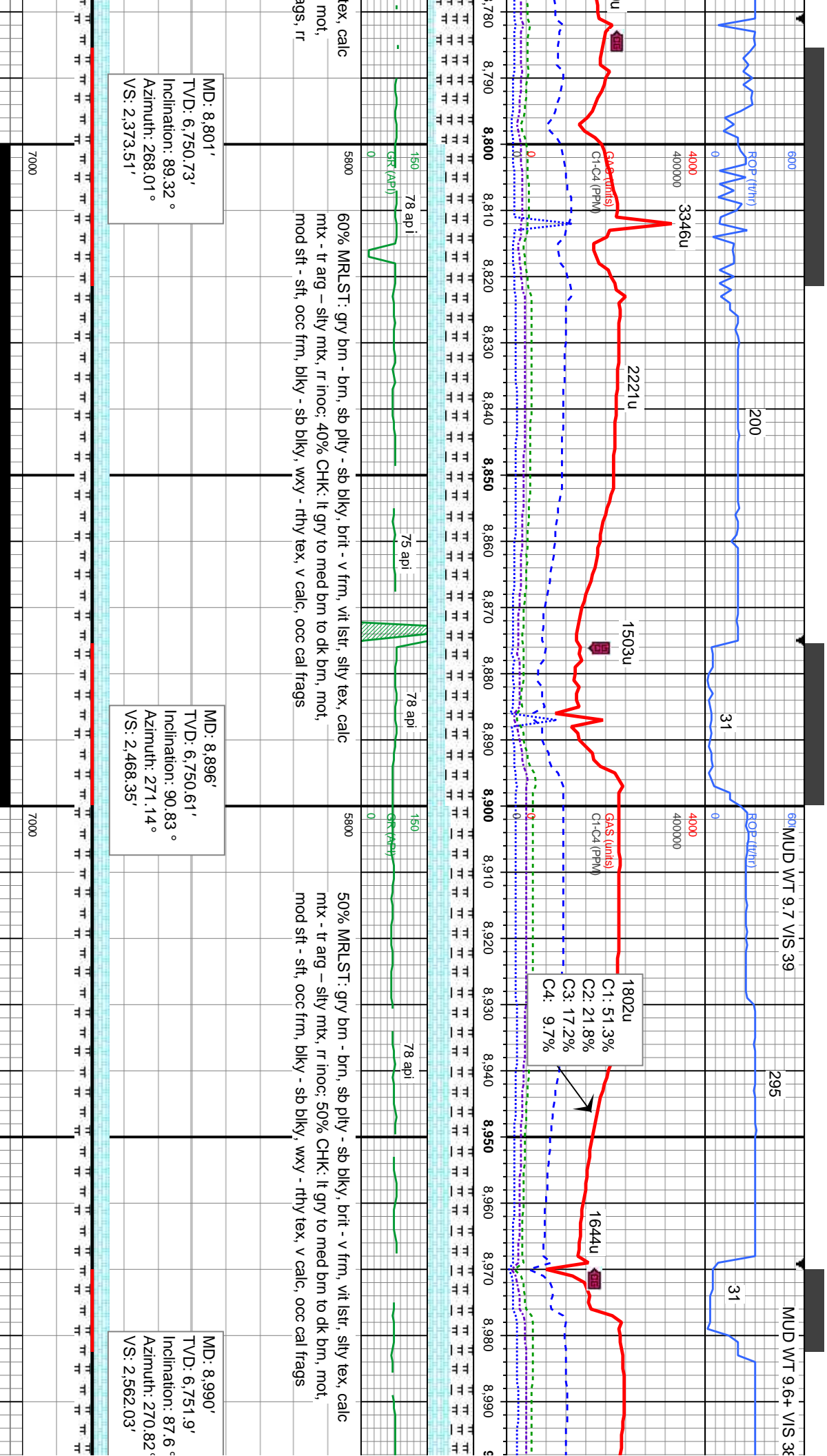
MD: 8,618'  
TVD: 6,750.5'  
Inclination: 90 °  
Azimuth: 270.27°  
VS: 2,190.75'

50% CHK: It gry to med brn to dk brn, mot, mod sft - sft, occ frm, blk - sb  
blk, wxy - rthy tex, v calc, occ cal frags, rr bent;50% MRLST: gry brn - brn, sb  
ply - sb blk, brt - v frm, vit lstr, silty tex, calc mtx - tr arg - silty mtx, rr inoc

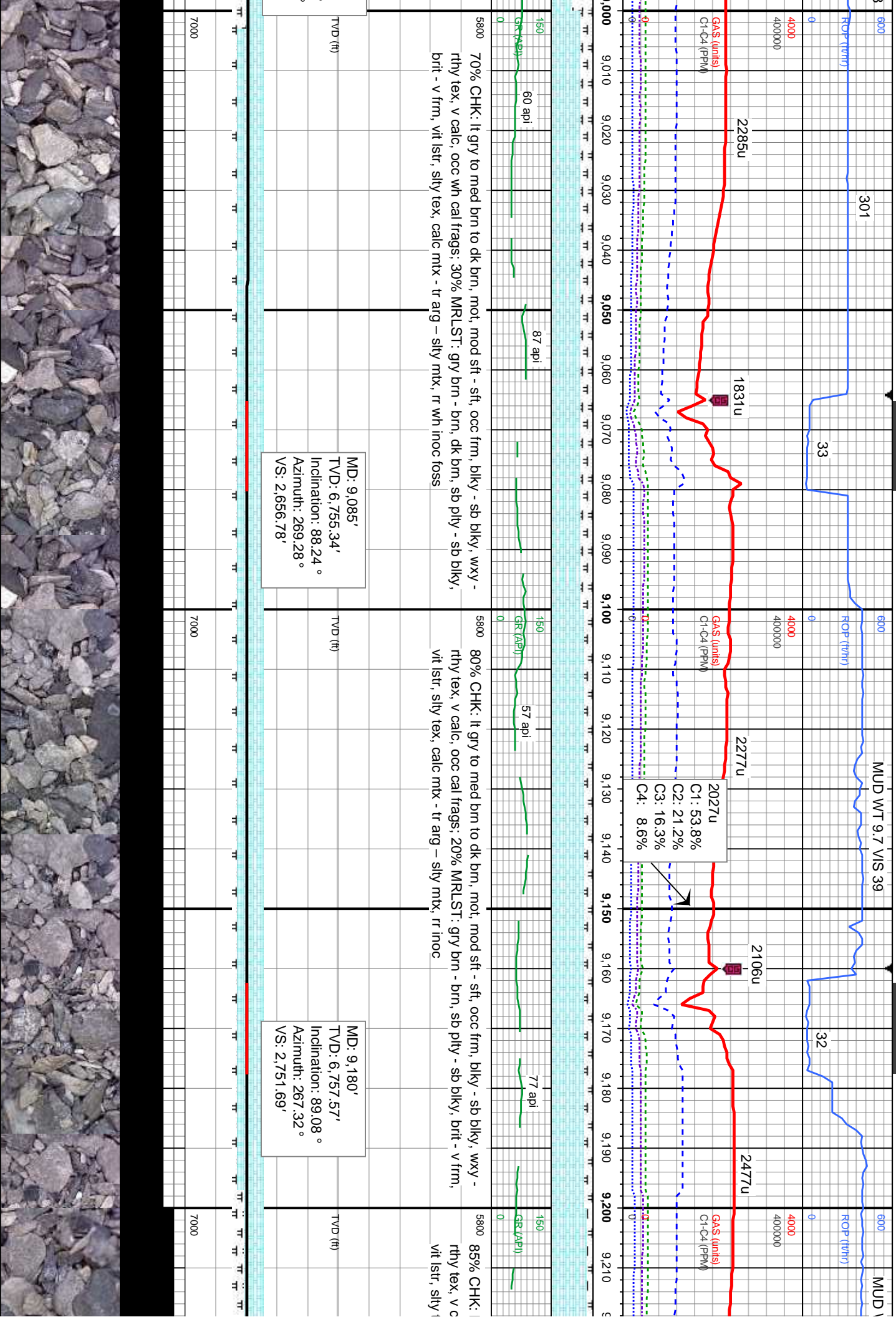
MD: 8,710'  
TVD: 6,750.34'  
Inclination: 90.19 °  
Azimuth: 269.48°  
VS: 2,282.59'

80% MRLST: gry brn - brn, sb ply - sb blk, brt - v frm, vit lstr, silty  
mtx - tr arg - silty mtx, rr inoc; 20% CHK: It gry to med brn to dk brn,  
mod sft - sft, occ frm, blk - sb blk, wxy - rthy tex, v calc, occ cal fra

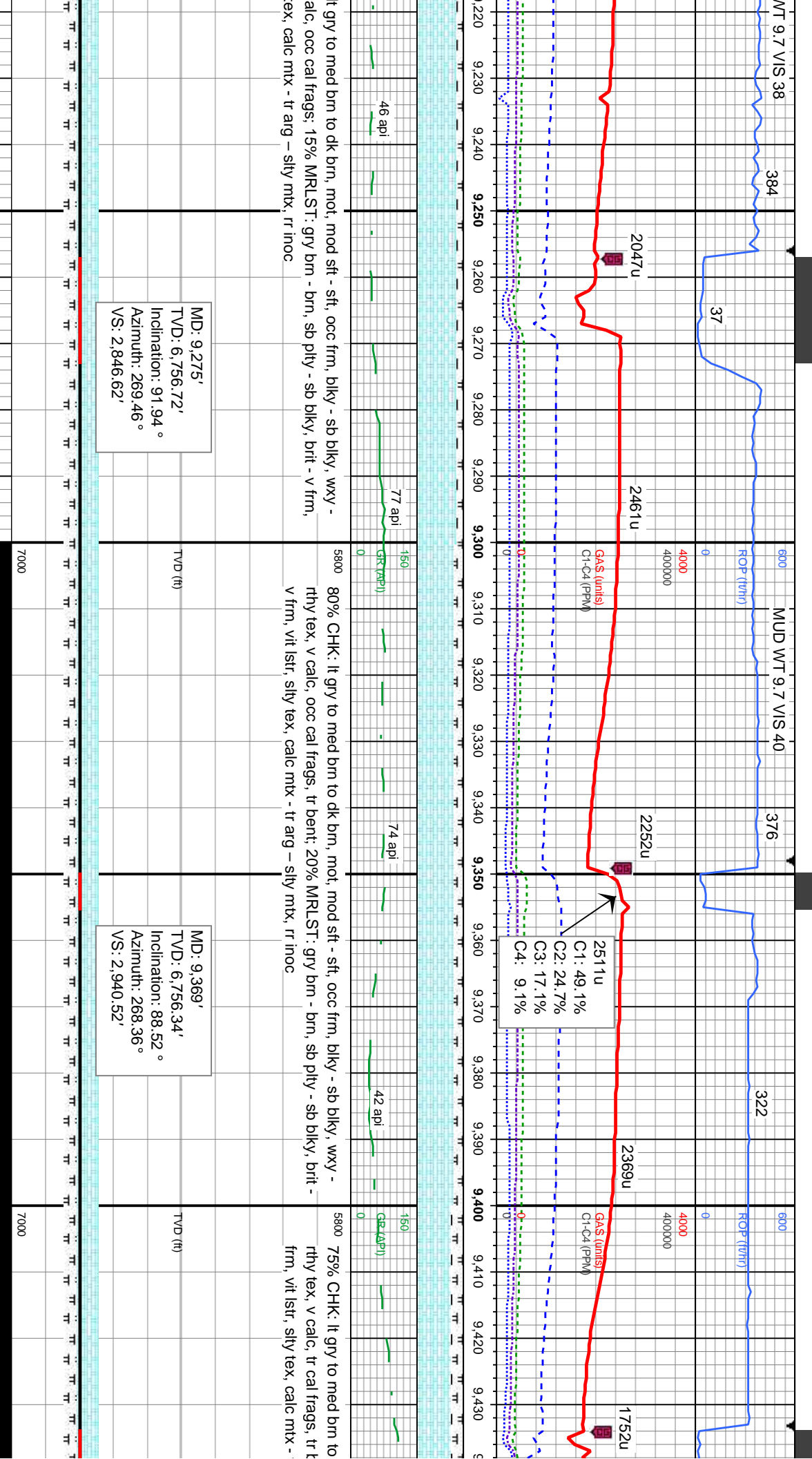












MUD WT 9.6+ VIS 38

328

MUD WT 9.6 VIS 39

322

38

ROP (ft/hr)

ROP (ft/hr)

ROP (ft/hr)

4000

4000

4000

2415u

2293u

2445u

1883u

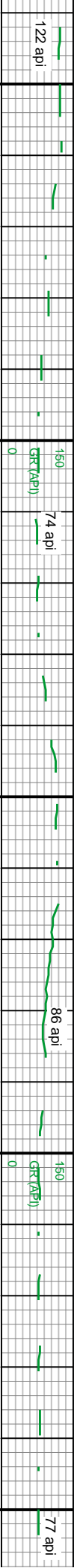
GAS (lbm)

GAS (lbm)

GAS (lbm)

C1: 55.2%  
C2: 21.8%  
C3: 15.4%  
C4: 7.6%

9,440 9,450 9,460 9,470 9,480 9,490 9,500 9,510 9,520 9,530 9,540 9,550 9,560 9,570 9,580 9,590 9,600 9,610 9,620 9,630 9,640 9,650



dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
ent; 25% MRLST: gry brn - brn, sb ply - sb blkly, brit - v  
tr arg - silty mtz

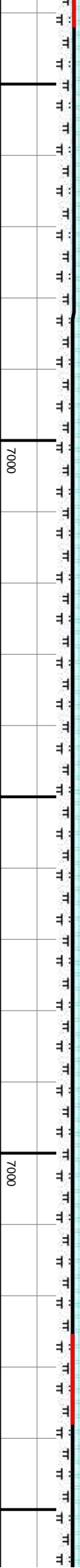
5800 80% CHK: lt gry to med brn to dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
rthy tex, v calc, tr cal frags, tr bent; 20% MRLST: gry brn - brn, sb ply - sb blkly, brit - v  
frm, vit lstr, silty tex, calc mtz - tr arg - silty mtz

5800 75% CHK: lt gry to med brn to dk brn, mot, mod s  
rthy tex, v calc, tr cal frags, scat bent; 25% MRLS  
blkly, brit - v frm, vit lstr, silty tex, calc mtz - tr arg -

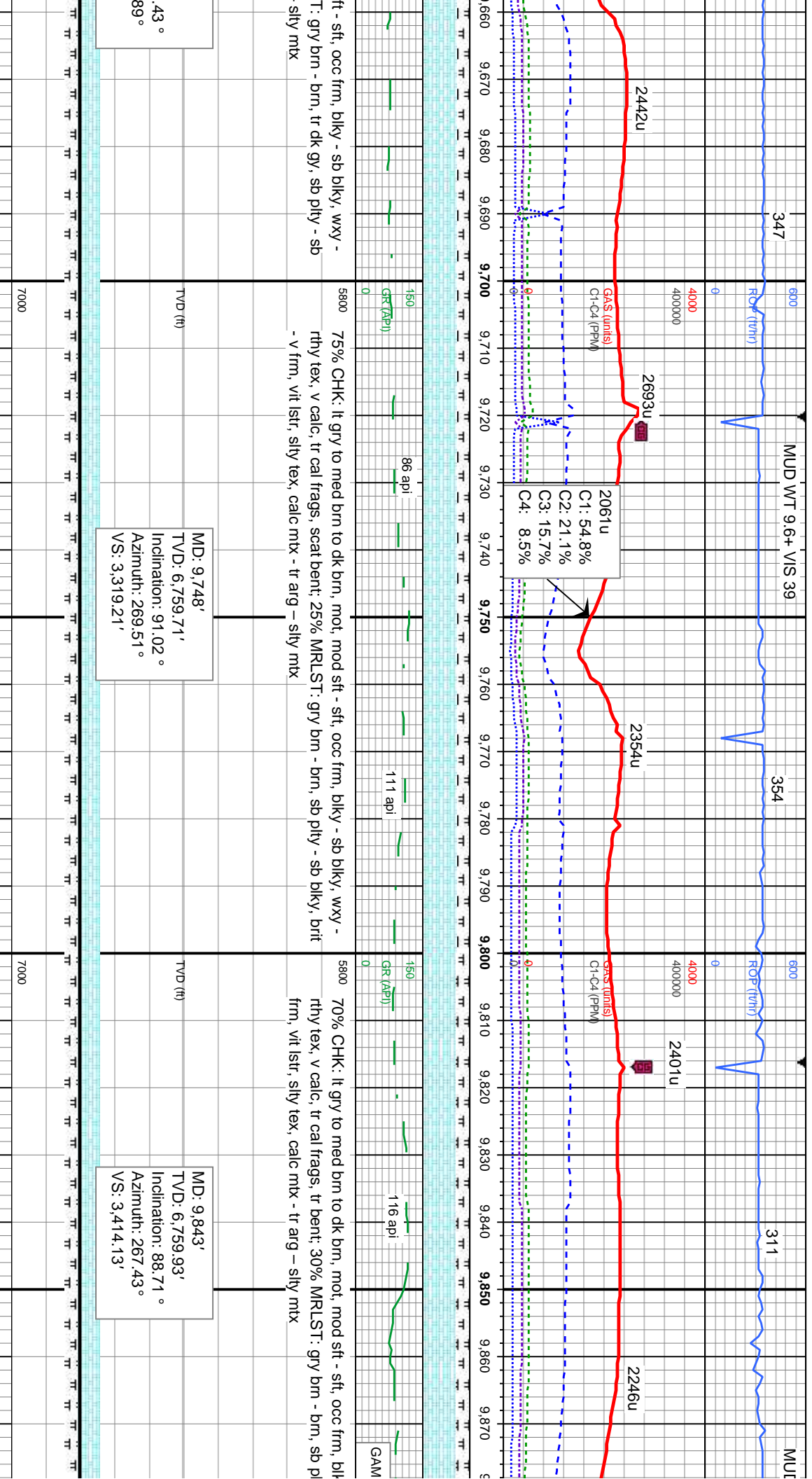
MD: 9,464'  
TVD: 6,758.23'  
Inclination: 89.2 °  
Azimuth: 268.28 °  
VS: 3,035.45'

MD: 9,559'  
TVD: 6,760.07'  
Inclination: 88.58 °  
Azimuth: 267.84 °  
VS: 3,130.39'

MD: 9,654'  
TVD: 6,760.9'  
Inclination: 90  
Azimuth: 268.  
VS: 3,225.32'









WT 9.7 VIS 40

ROP (ft/hr)

22

347

ROP (ft/hr)

32

8/10/14

MUD WT 9.6+ VIS 40

ROP (ft/hr)

2188u

1598u

2244u

1623u

2389u

2471u

GAS (units)  
Cl-C4 (ppm)

GAS (units)  
Cl-C4 (ppm)

2332u  
C1: 49.3%  
C2: 23.9%  
C3: 17.5%  
C4: 9.3%

MA SCALE CHANGE

GR (API)

111 API

GR (API)

106 API

142

ty - sb blkly, wxy -  
ty - sb blkly, brit - v  
70% CHK: It gry to med brn to dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
rthy tex, v calc; 30% MRLST: gry brn - brn, sb ply - sb blkly, brit - v frm, vit lstr, silty tex,  
calc mtx - tr arg - silty mtx

75% CHK: It gry to med brn to dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
rthy tex, v calc, tr cal frags, scat bent; 25% MRLST: gry brn - brn, sb ply - sb blkly, brit  
- v frm, vit lstr, silty tex, calc mtx - tr arg - silty mtx

TVD (ft)

MD: 9,938'  
TVD: 6,761.54'  
Inclination: 89.35 °  
Azimuth: 267.36 °  
VS: 3,509.11'

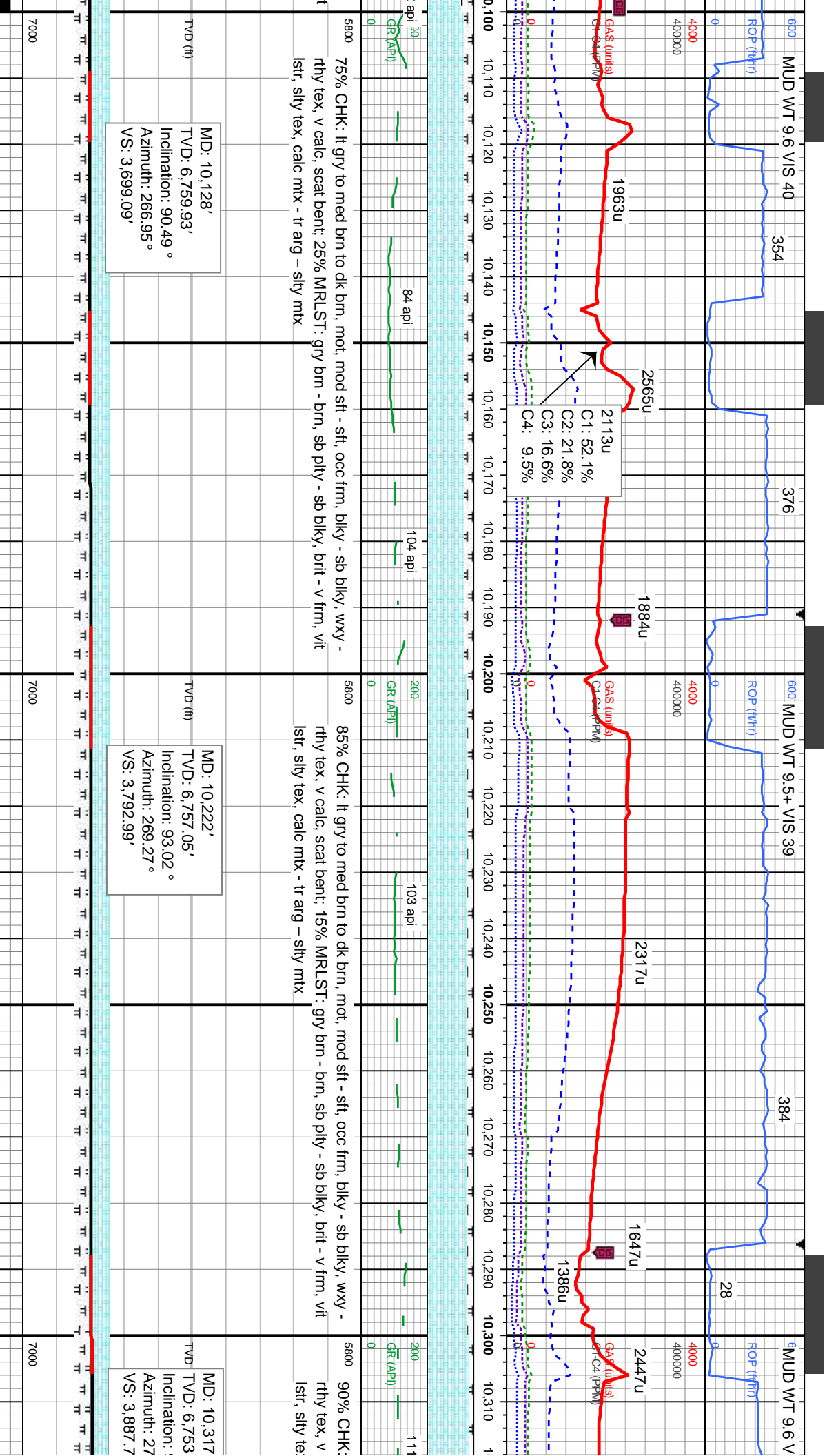
TVD (ft)

MD: 10,033'  
TVD: 6,761.21'  
Inclination: 91.05 °  
Azimuth: 266.29 °  
VS: 3,604.1'

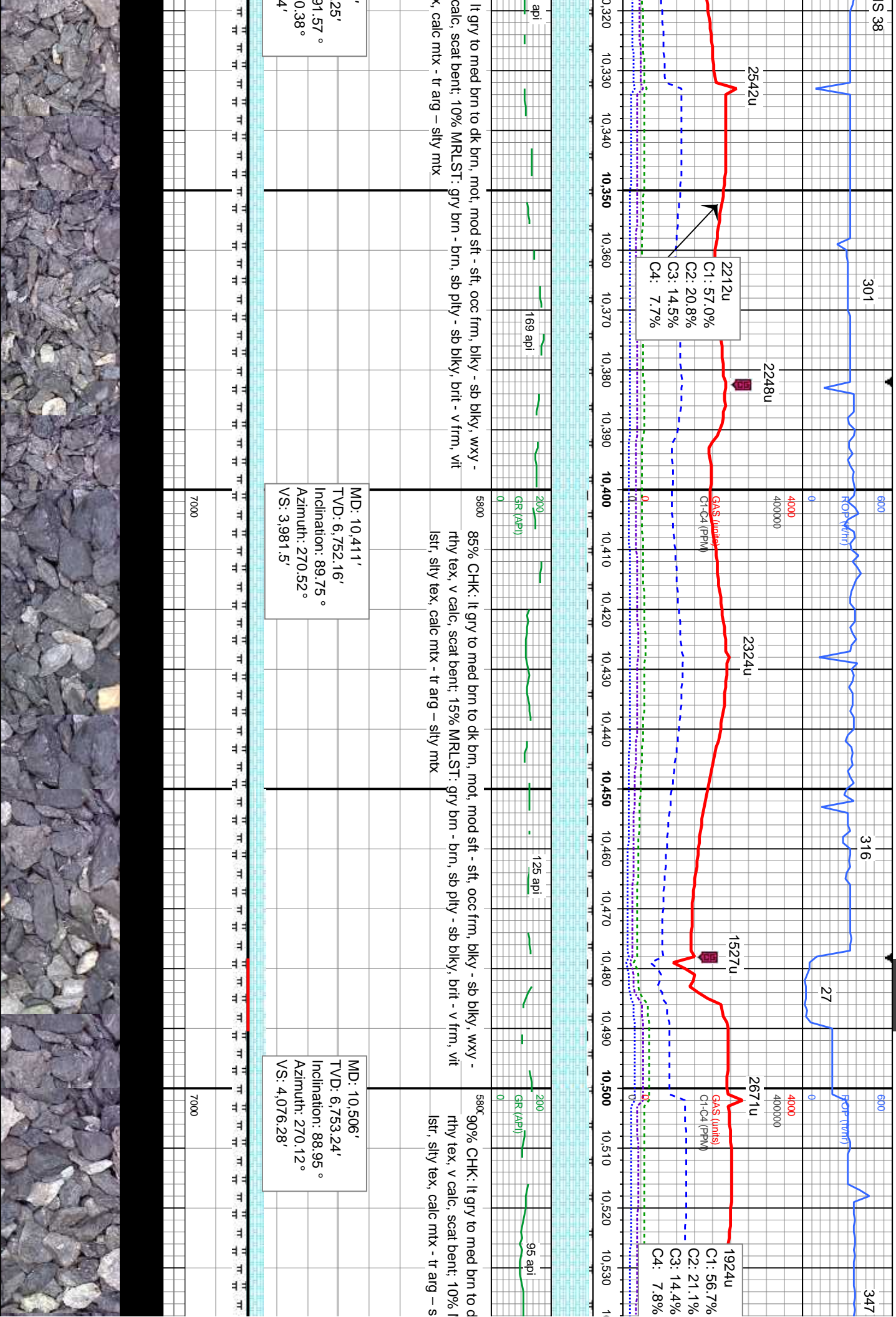
7000

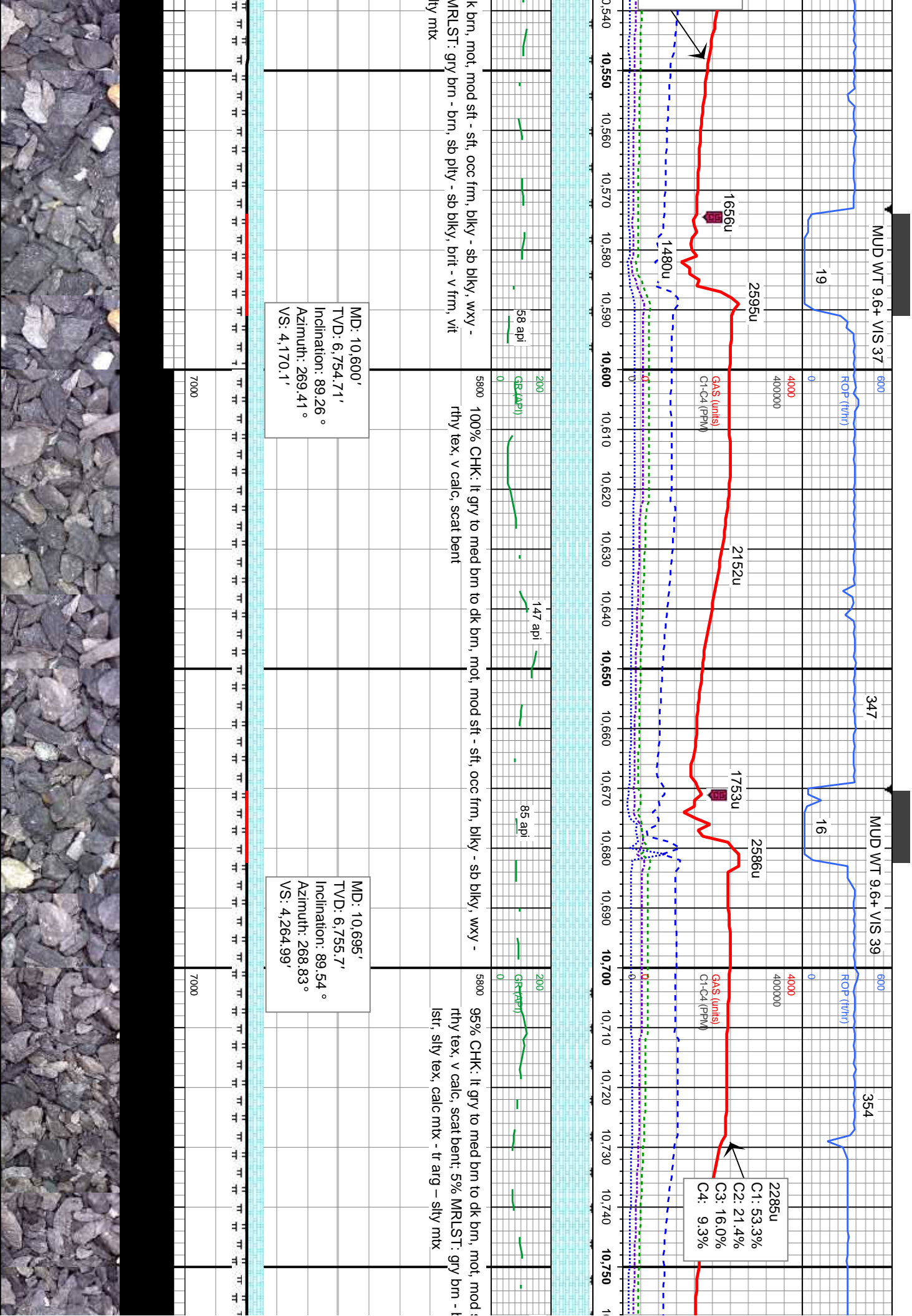
7000





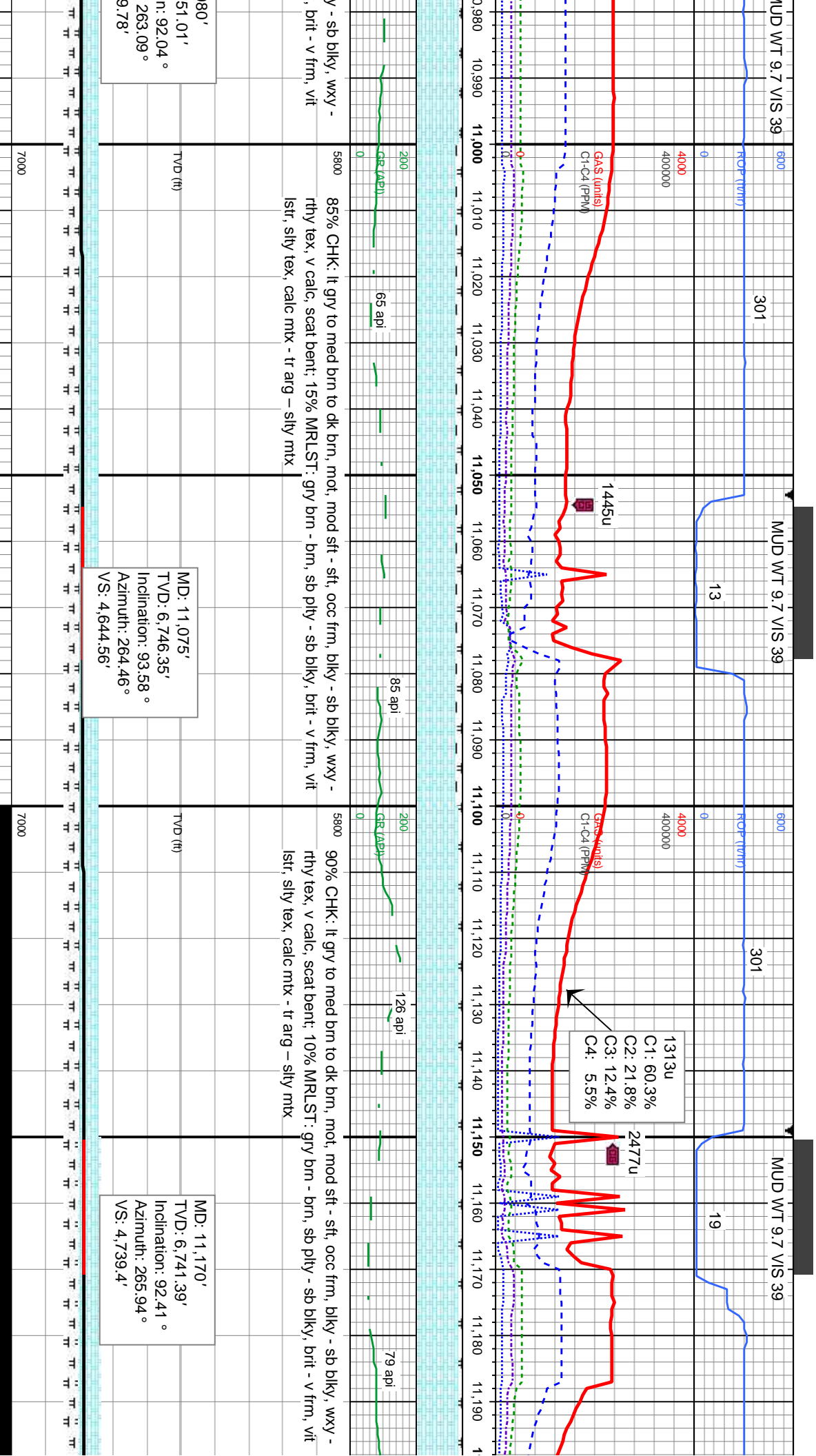




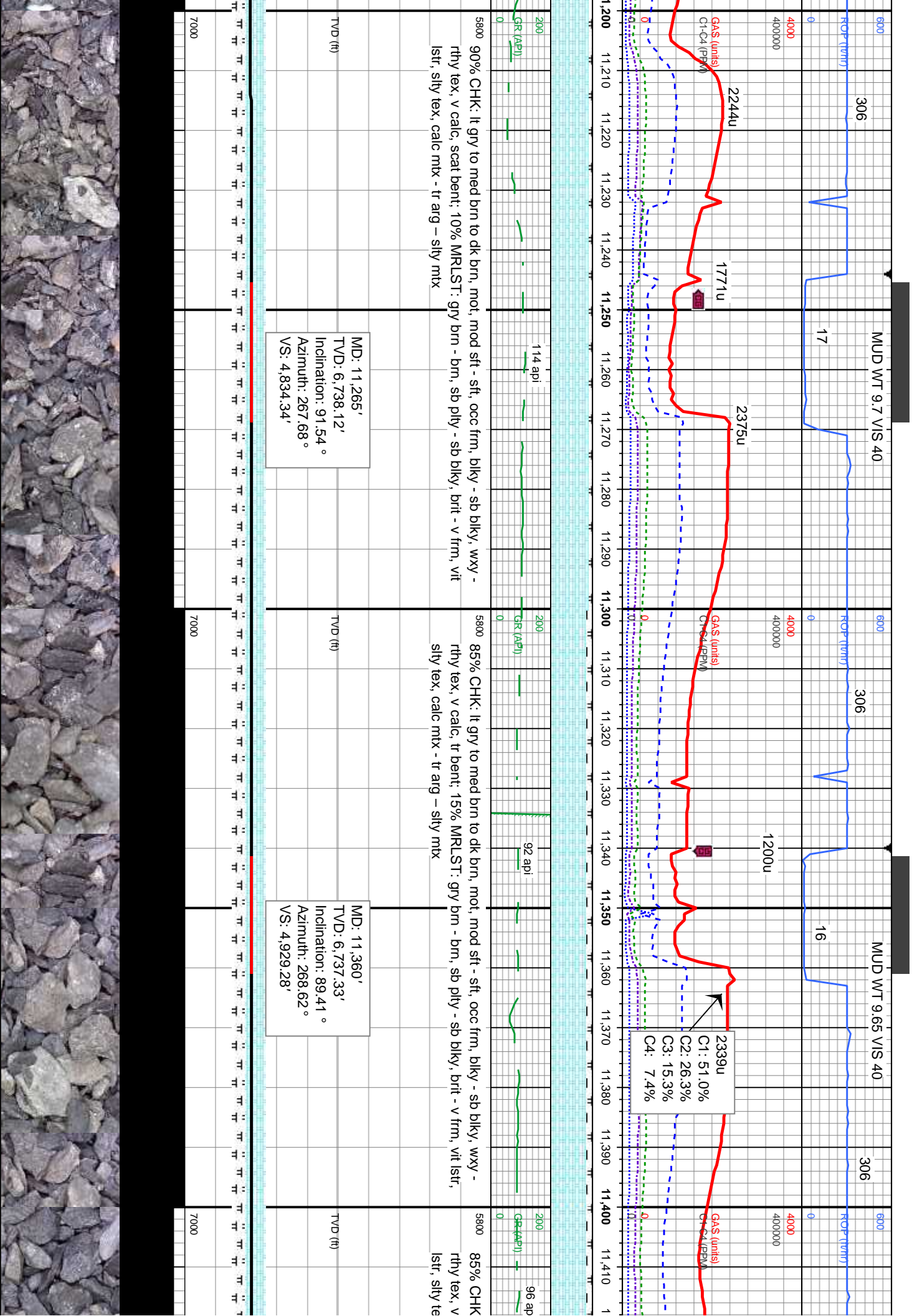


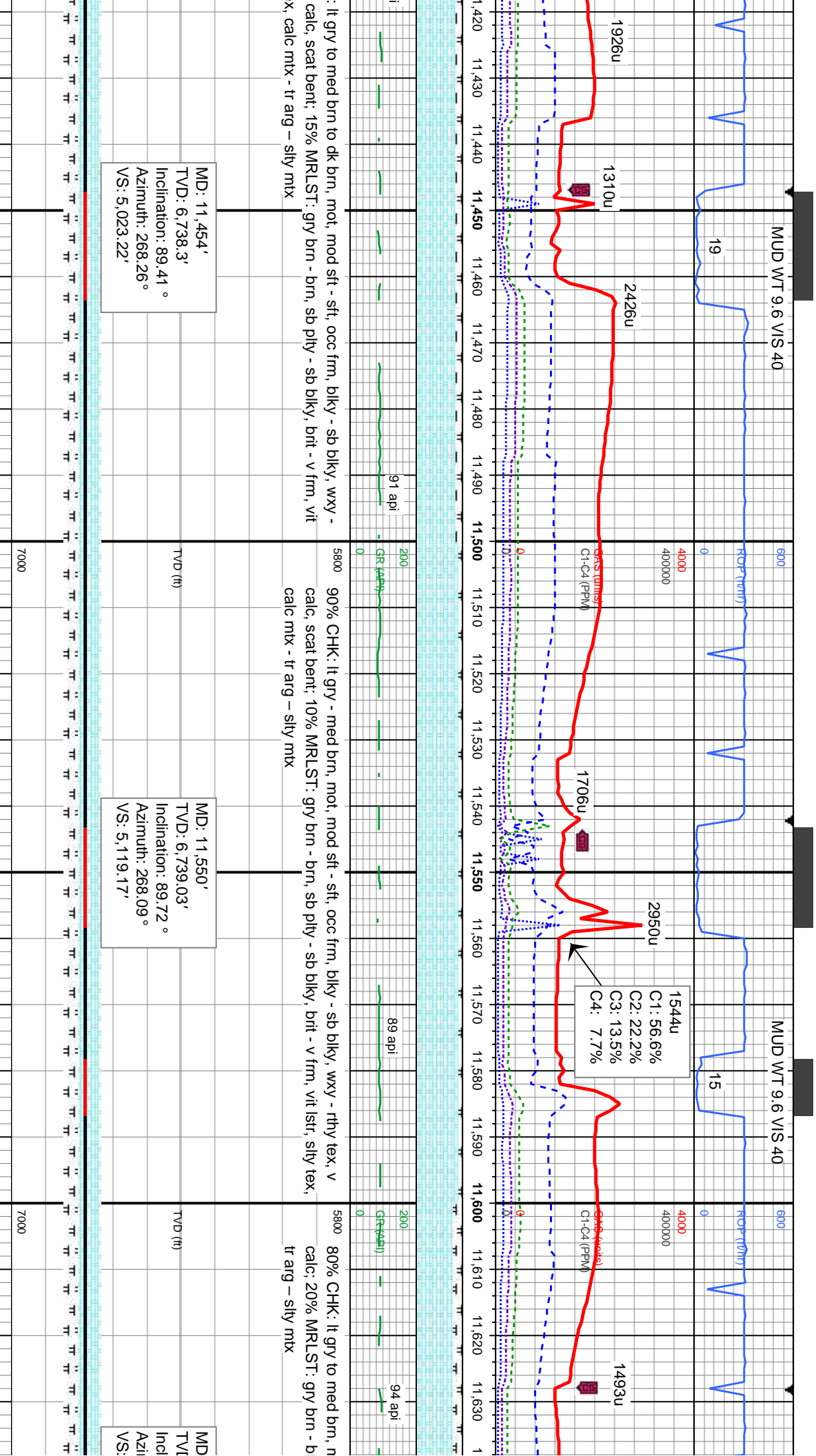




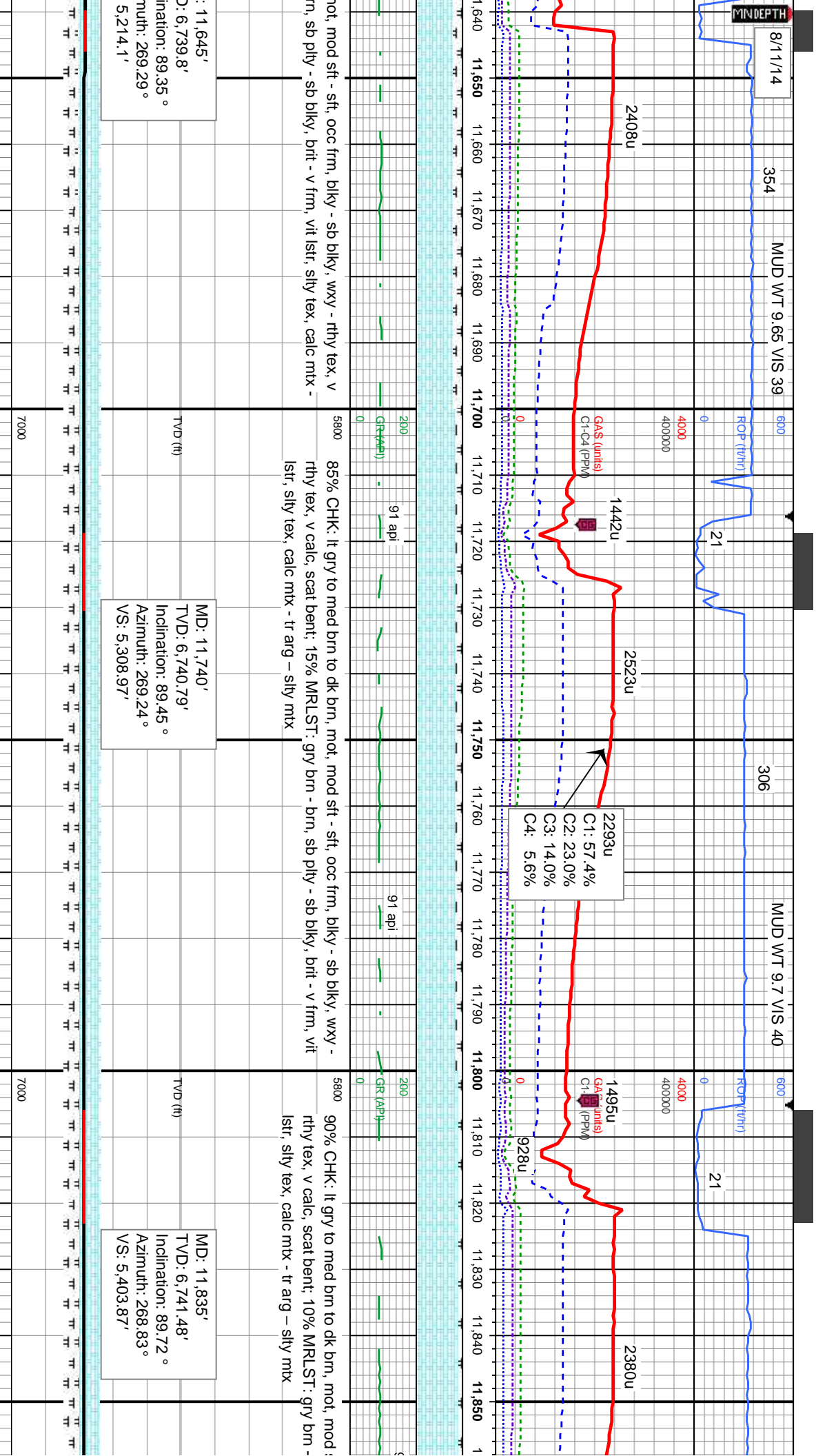


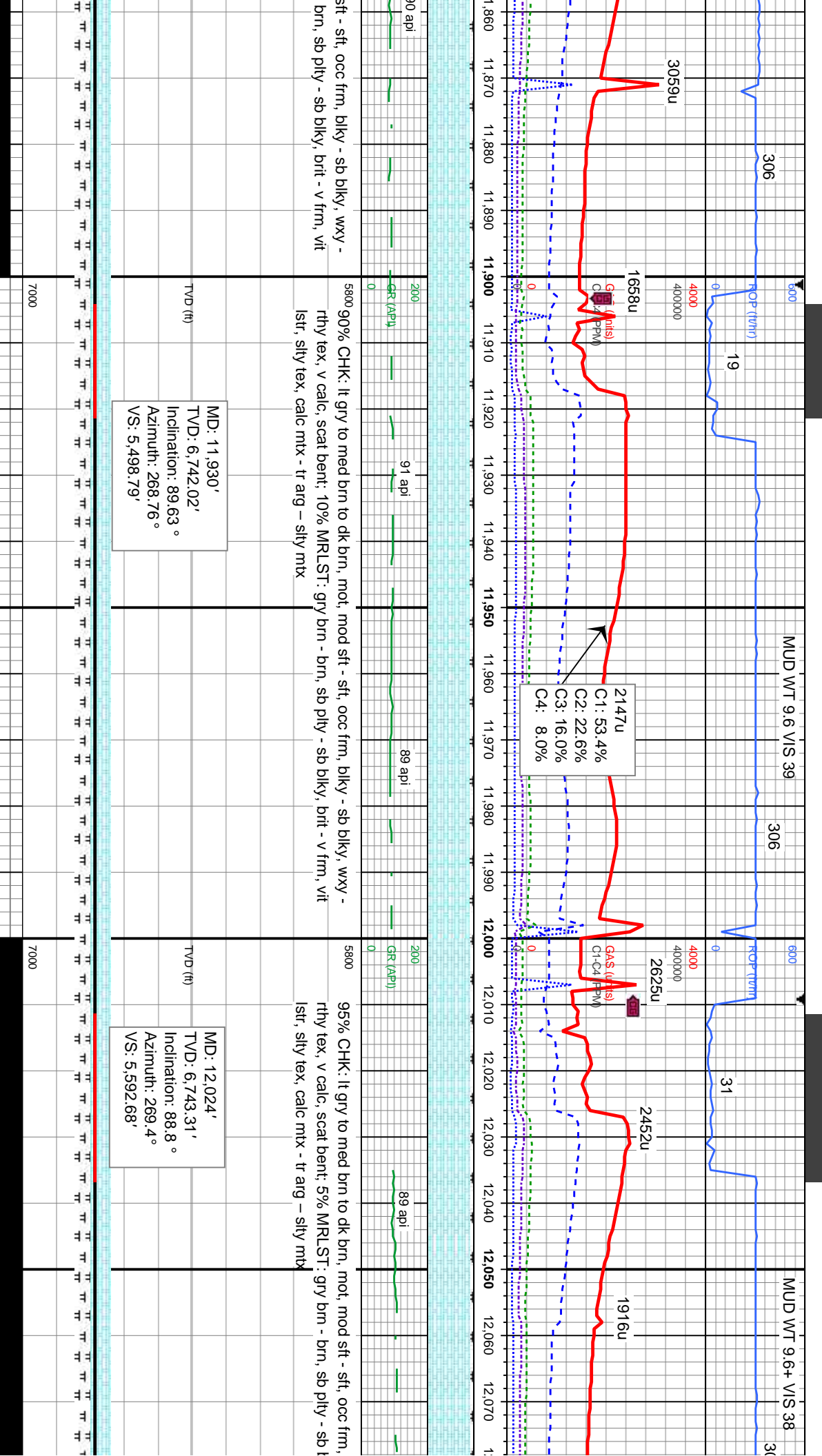




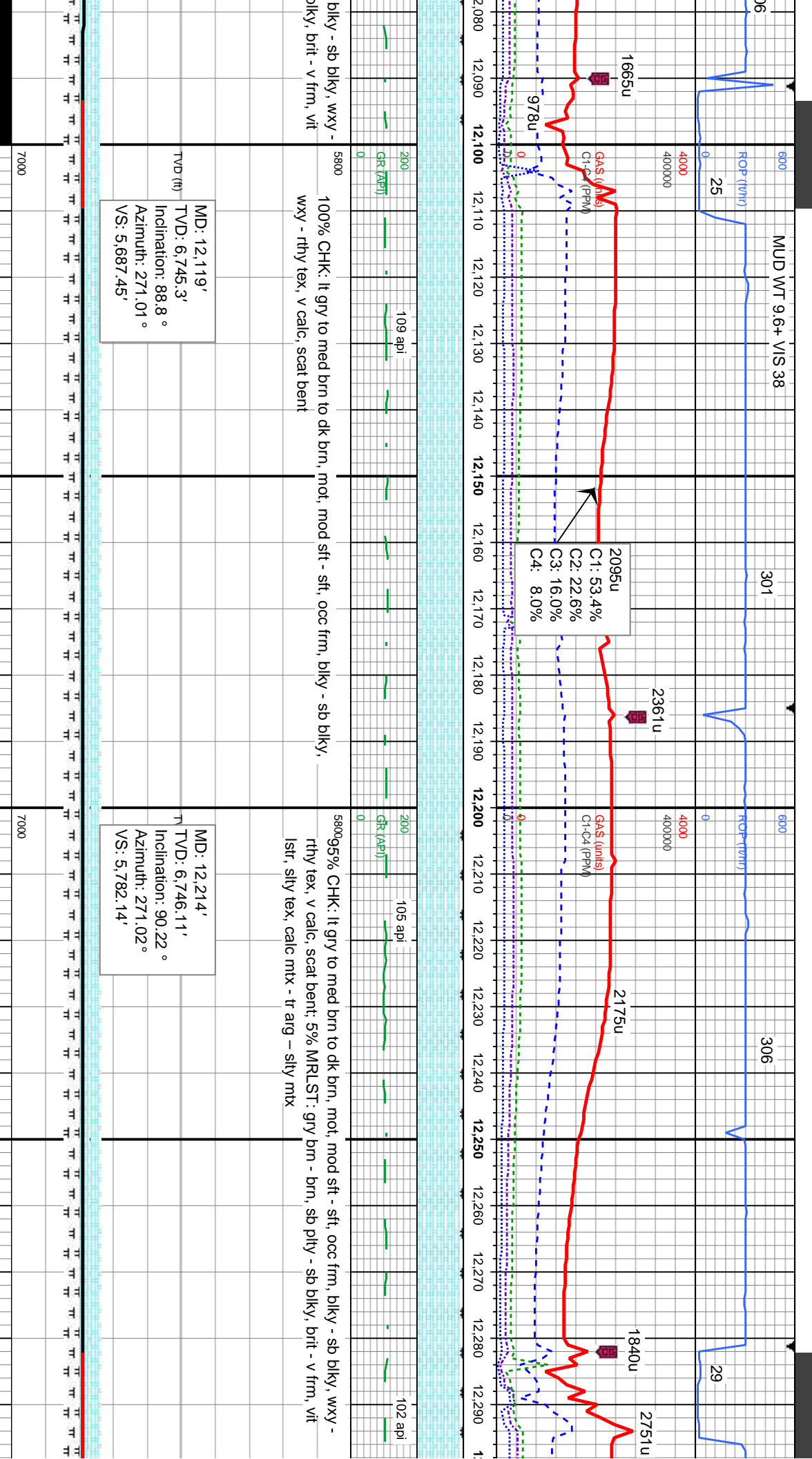


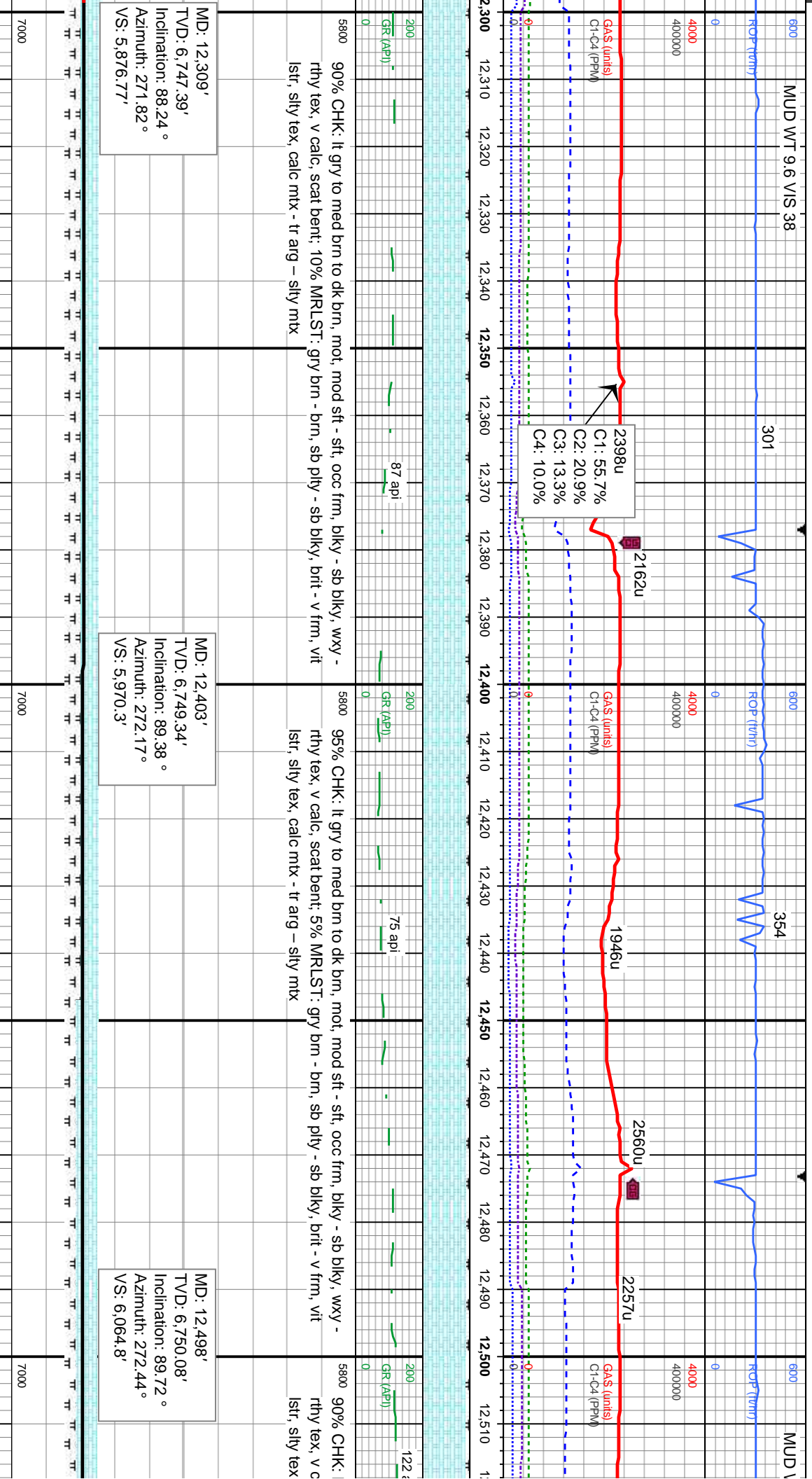














WT 9.6+ VIS 38

301

301

301

1685u  
C1: 59.5%  
C2: 21.4%  
C3: 13.3%  
C4: 5.8%

2473u

1723u

GAS (units)  
C1-C4 (PPM)

2241u

2640u

GAS (units)  
C1-C4 (PPM)

1501u  
C1: 59.5%  
C2: 20.5%  
C3: 13.5%  
C4: 6.5%

lt gry to med brn to dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
calc, scat bent; 10% MRLST: gry brn - brn, sb ply - sb blkly, brit - v frm, vit  
calc mtx - tr arg - silty mtx

95% CHK: lt gry to med brn to dk brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy -  
rthy tex, v calc, scat bent; 5% MRLST: gry brn - brn, sb ply - sb blkly, brit - v frm, vit  
lstr, silty tex, calc mtx - tr arg - silty mtx

90% CHK: lt gry to med brn  
rthy tex, v calc, scat bent; 10%  
lstr, silty tex, calc mtx - tr arg

MD: 12,593'  
TVD: 6,750.42'  
Inclination: 89.88 °  
Azimuth: 271.73 °  
VS: 6,159.34'

MD: 12,688'  
TVD: 6,749.85'  
Inclination: 90.8 °  
Azimuth: 271.69 °  
VS: 6,253.93'

TVD (ft)

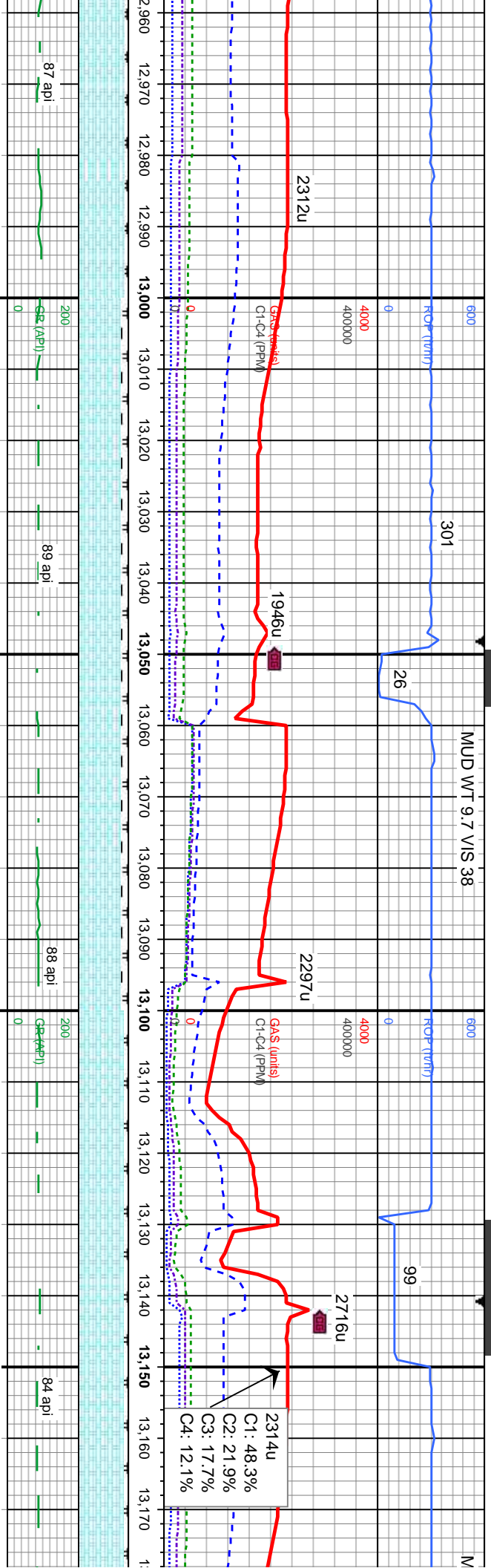
7000

7000









ft - sft, occ frm, blkly - sb blkly, wxy -  
n, sb ply - sb blkly, brit - v frm, vit

85% CHK: It gry to med brn, mot, mod sft - sft, occ frm, blkly - sb blkly, wxy - rthy tex, v  
calc: 15% MRLST: gry brn - brn, sb ply - sb blkly, brit - v frm, vit lstr, silty tex, calc mtx -  
tr arg - silty mtx, tr inoc foss

90% CHK: It gry to med brn to dk brn, mot, mod sft - sft, occ frm,  
rthy tex, v calc, scat bent: 10% MRLST: gry brn - brn, sb ply - sb  
lstr, silty tex, calc mtx - tr arg - silty mtx, tr wh inoc foss

MD: 12,971'  
TVD: 6,753.86'  
Inclination: 90.77 °  
Azimuth: 269.93°  
VS: 6,536.17'

TVD (ft)

MD: 13,066'  
TVD: 6,753.63'  
Inclination: 89.51 °  
Azimuth: 266.94°  
VS: 6,631.1'

TVD (ft)

MD: 13,161'  
TVD: 6,754.67'  
Inclination: 89.23 °  
Azimuth: 264.88°  
VS: 6,726.09'

TVD (ft)



