



Scale: 5" / 100'  
Measured Depth Log

Well Name Morning Fresh 37C-15HZ

Location NW NE Sec 15 T3N R66W

State COLORADO

County WELD

Country USA

Rig Number ENSIGN 138

API Number 05-123-37012

Field WATTENBERG

Region DJ BASIN

Drilling Completed 6/24/2014

Spud Date 6/17/2014

Surface Coordinates 250' FNL  
1830' FEL

Bottom Hole Coordinates 1' FSL  
1680' FEL

Ground Elevation 4885'

K.B. Elevation 4898'

Logged Interval 7000' To 12175'

Total Depth 12175'

Formation CODELL

Type of Drilling Fluid LSND, H2O

Operator

Company Anadarko

Address Granite Tower  
1099 18th St, Suite #1800  
Denver, CO 80202

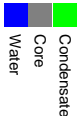
Geologist

Name Zach Uber & Jeramy Murray & John Sabroske

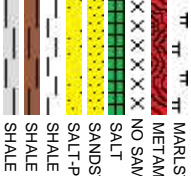
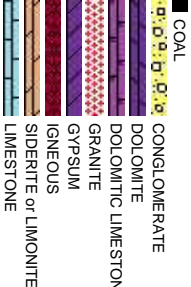
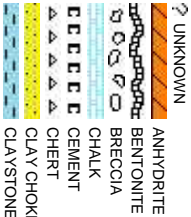
Company Columbine Logging, Inc.

Address 2385 S Lipan St  
Denver, CO 80223

Zone Color Coding



Rock Types





Slide/Rotate

ROP SCALE:  
0 - 750 FT/HR

ROP  
ROP —  
GAMMA —

GAMMA SCALE:  
0 - 300 API

Total Gas & Chromatograph

GAS —  
C1 - -  
C2 - -  
C3 - -  
C4 - -

PASON TOTAL GAS  
IN "GAS10000" UNITS

Depth Labels

% Lith

100' SAMPLE INTERVALS

Bit Data

Type: SDI 611  
Size: 8.75  
Jets: 3x14/3x15

Well Bore  
TVD —

Oil Show

EMFTSR

Images

COLUMBINE LOGGING INC.  
RIGGED UP ON 06/18/2014

100% SLTY SH: lt-med gy brn, sme dk gy, mot lp, frm-hd, sb bly-sb ply, silty tex, sl calc, tr pyr, tr SS strg, tr bent, sl calc; OIL SHOW: dim lt yel-gn slow cut, dim yel-gn blotchy ring, no sin, no od

90% SLTY SH: lt-med gy brn, sme dk gy, n abnt bent, v sl calc; 10% CHK: lt gy-med gy OIL SHOW: mod brl gn cut, dul gn ring, blo

TVD (ft)

MD: 7,034'  
TVD: 6,994.77'  
Inclination: 24.77 °  
Azimuth: 196.31 °  
VS: -12.88'

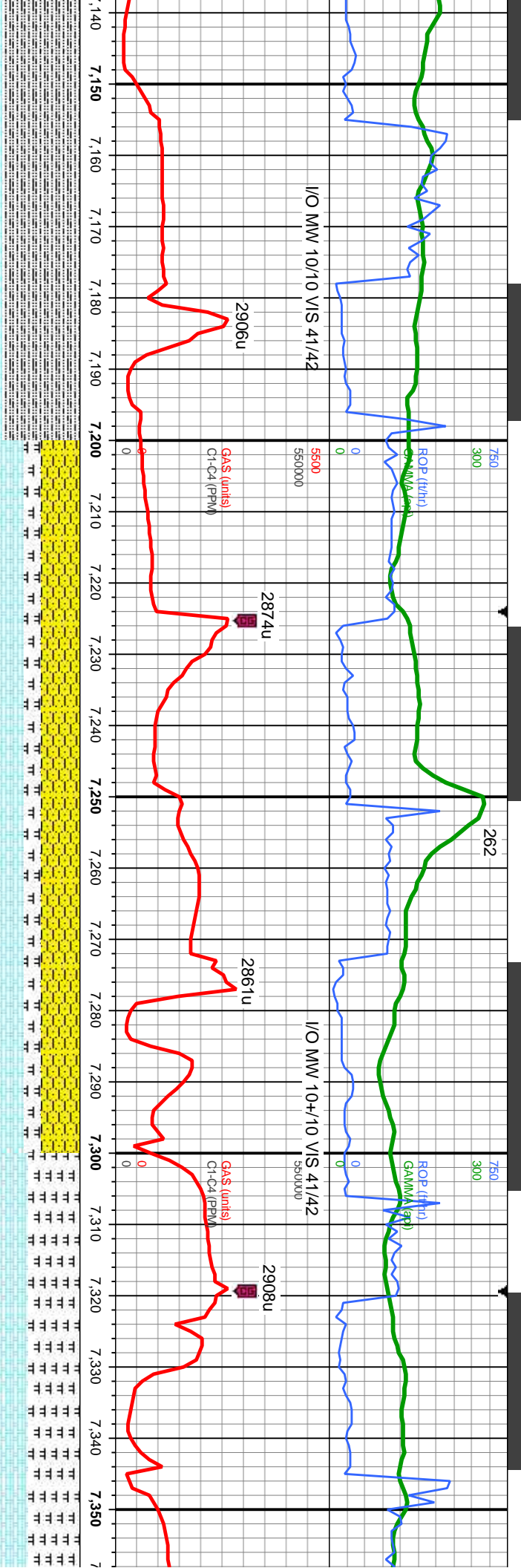
MD: 7,081'  
TVD: 7,036.72'  
Inclination: 28.86 °  
Azimuth: 189.53 °  
VS: 7.84'

MD: 7,130'  
TVD: 7,078.55'  
Inclination: 33.84 °  
Azimuth: 187.48 °  
VS: 33.1'

TVD (ft)

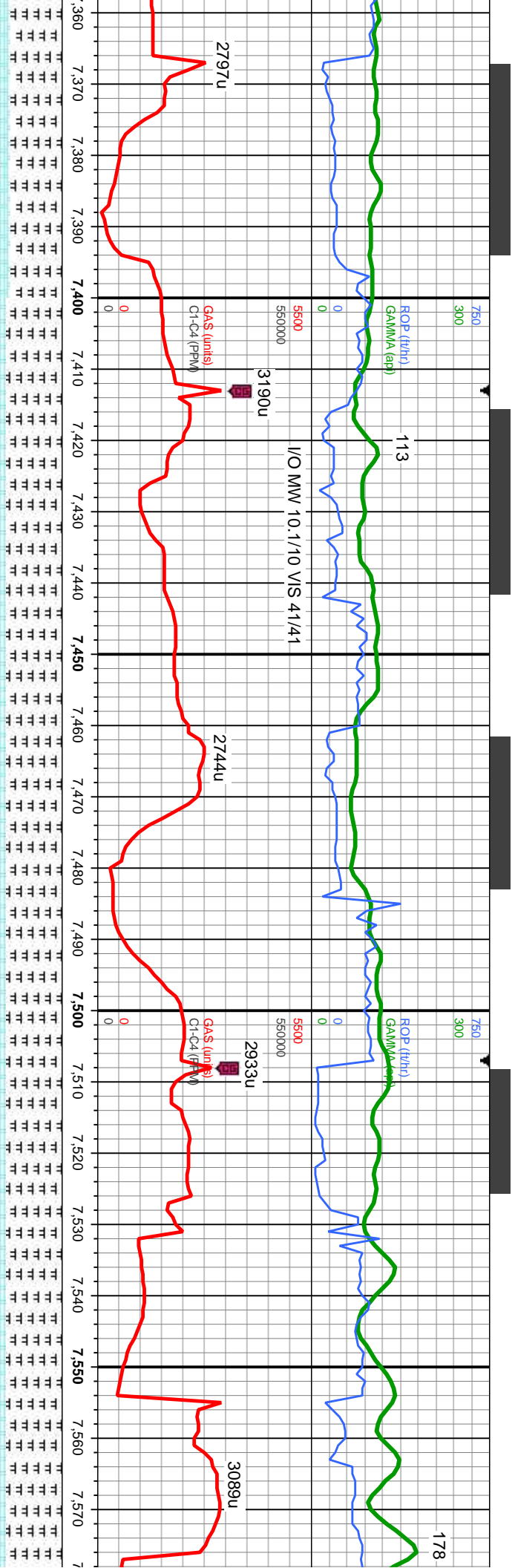






Sharon Springs Top:		Niobrara Top:		Niobrara B Chalk Top:	
MD: 7,130'		MD: 7,194'		MD: 7,228'	
TVD: 7,079'		TVD: 7,130'		TVD: 7,193'	
MD: 7,177'		MD: 7,225'		MD: 7,319'	
TVD: 7,116.66'		TVD: 7,153.9'		TVD: 7,220.5'	
Inclination: 37.8°		Inclination: 40.4°		Inclination: 50.01°	
Azimuth: 185.68°		Azimuth: 183.36°		Azimuth: 179.48°	
VS: 60.47'		VS: 90.67'		VS: 156.84'	
mot ip, frm-hd, sb blk-y-sb pily, silty tex, sl calc, tr pvr, tr SS stryg, wh incl, mot ip, blk-y - sb pily, rthy tex, frm-fri, v calc, tr fos, icky yel resd sln, no od		45% SHL Y SS: lt-med gy brn, sme dk gy, mot ip, stri ip, frm-hd, sb blk-y-sb pily, silty tex, sl calc, tr bent, 35% CHK: lt gy-med gy, wh incl, mot ip, blk-y - sb pily, rthy tex, frm-fri, v calc, tr fos, 20% MRLST: med-dk gy, mot ip, wh incl, sb blk-y-sb pily, rthy tex, frm-hd, v calc, OIL SHOW: bri bl-wh string mlky cut, sme yel min flr, mod bl resd ring, no od		60% MRLST: dk-med gy, speckl wh cal, mod frm, brit-fri li CHK: med-lt gy-bl gy, blk-y-sb pily, rthy-wxy tex, sft-mod fr mlky cut, tr yel min flr, mod bl-wh resd ring, no od	
8000		8000		8000	





MD: 7,366'  
TVD: 7,249.2'  
Inclination: 54.71 °  
Azimuth: 180.59 °  
VS: 194.04'

MD: 7,413'  
TVD: 7,274.78'  
Inclination: 59.31 °  
Azimuth: 180.7 °  
VS: 233.45'

MD: 7,460'  
TVD: 7,296.97'  
Inclination: 64.34 °  
Azimuth: 180.62 °  
VS: 274.87'

MD: 7,507'  
TVD: 7,315.9'  
Inclination: 68.13 °  
Azimuth: 180.06 °  
VS: 317.88'

MD: 7,554'  
TVD: 7,331.63'  
Inclination: 72.77 °  
Azimuth: 180.39 °  
VS: 362.15'

Niobrara C Chalk Top:  
MD: 7412'  
TVD: 7274'

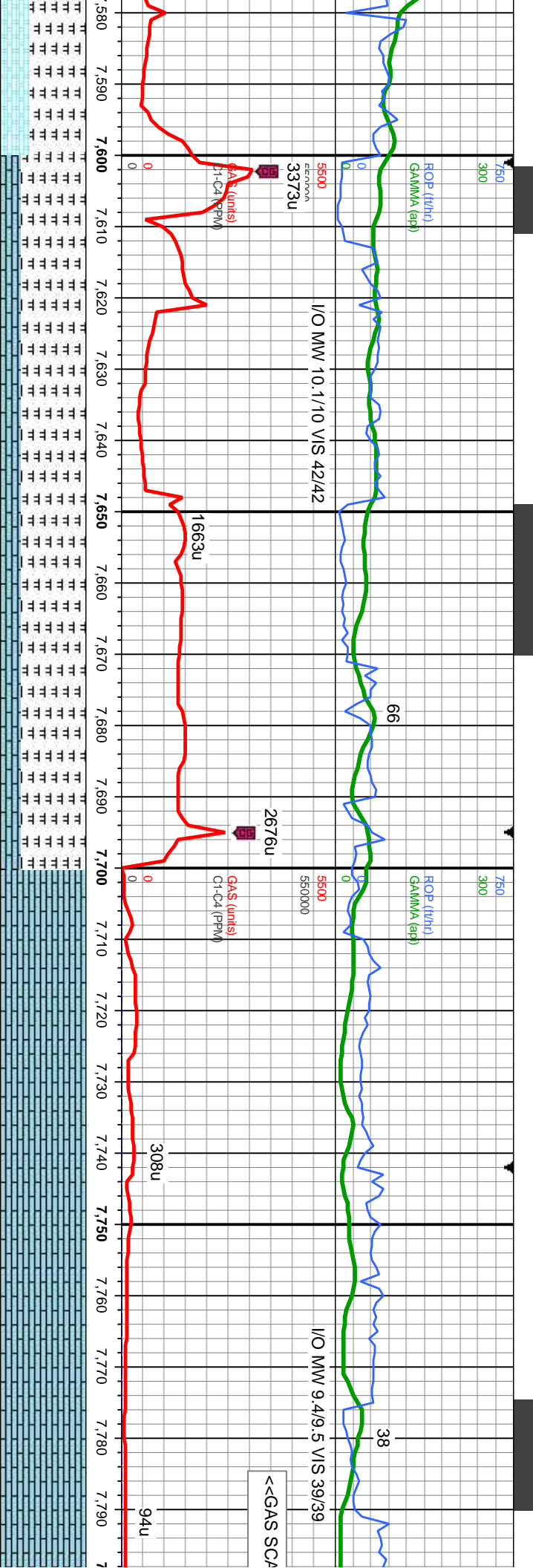
65% MR.LST: dk-med gy, speckl wh cal, mod frm, brt-frt ip, silty-gt tex, blk-y-sb blk-y, calc: 40%  
65% MR.LST: dk-med gy, speckl wh cal, mod frm, brt-frt ip, silty-gt tex, blk-y-sb blk-y, calc: 40%  
calc: 35% CHK: med-ht-gy-bl gy, blk-y-sb ply, rthy-wxy tex, sft-mod frm, brt-frt, v c  
bl string mky cut, tr yel min flwr, mod bl-wh resd ring, no od

65% MR.LST: dk-med gy, speckl wh cal, mod frm, brt-frt ip, silty-gt tex, blk-y-sb blk-y, tr wh inoc foss,  
calc: 35% CHK: med-ht-gy-bl gy, blk-y-sb ply, rthy-wxy tex, sft-mod frm, brt-frt, v calc.COIL SHOW: bri  
bl string mky cut, tr yel min flwr, mod bl-wh resd ring, no od

65% MR.LST: dk-med gy, speckl wh cal, mod frm, brt-frt ip, silty-gt tex, blk-y-sb blk-y, m  
foss, calc: 35% CHK: med-ht-gy-bl gy, blk-y-sb ply, rthy-wxy tex, sft-mod frm, brt-frt, v c  
SHOW: bri bl string mky cut, tr yel min flwr, mod bl-wh resd ring, no od







TOOH @ 7699' MD FOR  
INTERMEDIATE CASING  
15:42 HRS ON 06/19/14

RESUME DRILLING @  
18:08 HRS ON 06/21/14

MD: 7,601'  
TVD: 7,344.12'  
Inclination: 76.4 °  
Azimuth: 181.35 °  
VS: 407.45'

MD: 7,648'  
TVD: 7,353.81'  
Inclination: 79.8 °  
Azimuth: 181.31 °  
VS: 453.43'

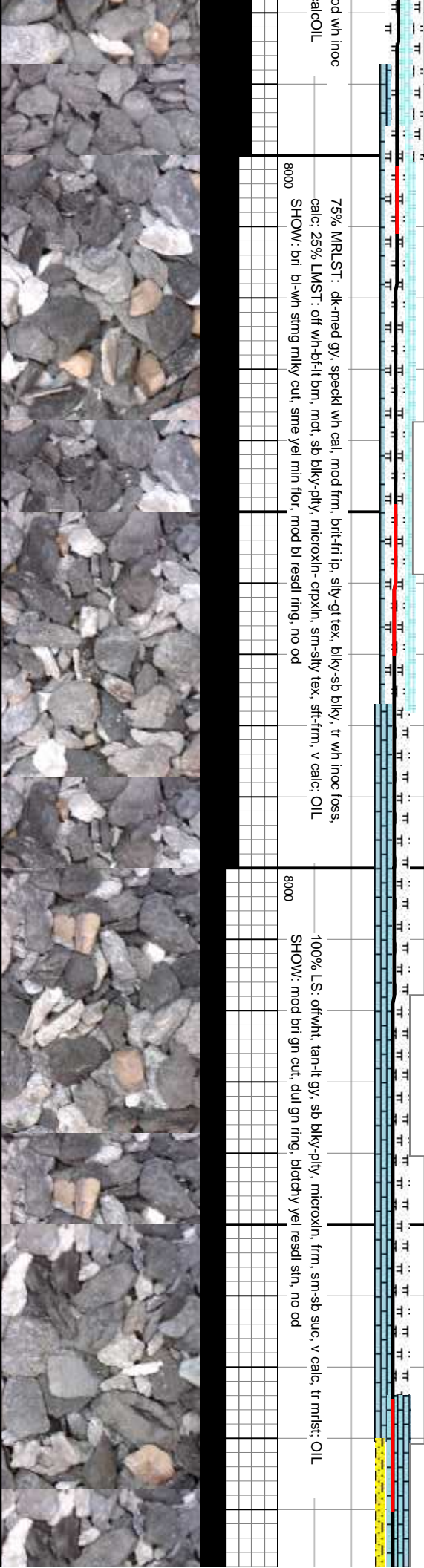
**Bit Data**  
Type: Varrel VS513D  
Size: 6.12  
Jets: 5x16

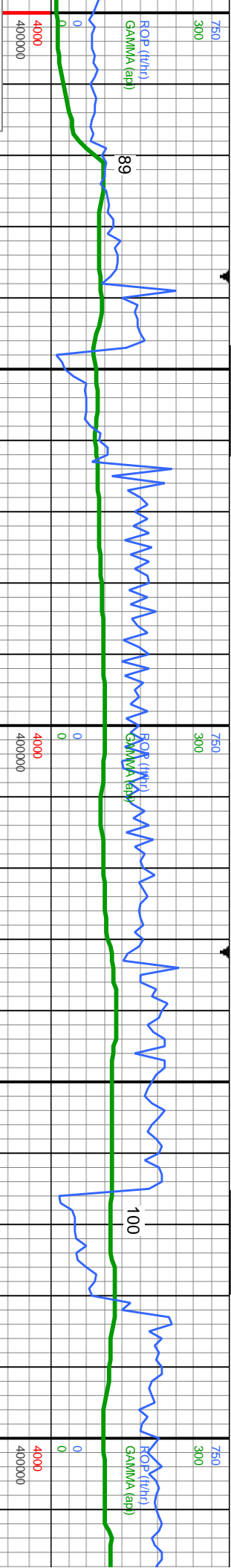
MD: 7,729'  
TVD: 7,364.76'  
Inclination: 84.66 °  
Azimuth: 181.39 °  
VS: 533.66'

MD: 7,792'  
TVD: 7,369.38'  
Inclination: 86.9 °  
Azimuth: 180.06 °  
VS: 596.49'

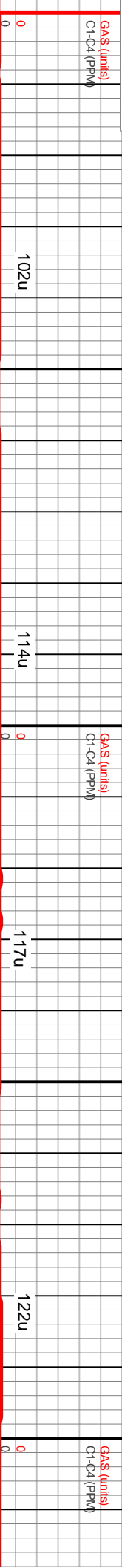
75% MRLST: dk-med gy, speckl wh cal, mod frm, brit-fri ip, silty-gt tex, biky-sb biky, tr wh inoc foss, calc; 25% LMST: off wh-bf-t brn, mot, sb biky-ply, microxn- cnpxn, sm-sily tex, sft-frm, v calc; OIL  
SHOW: bri bl-wh string milky cut, sme yel min flr, mod bl resd ring, no od

100% LS: offwhnt, tan-t gy, sb biky-ply, microxn, frm, sm-sb suc, v calc, tr mlst; OIL  
SHOW: mod bri gn cut, dul gn ring, blotchy yel resd stn, no od

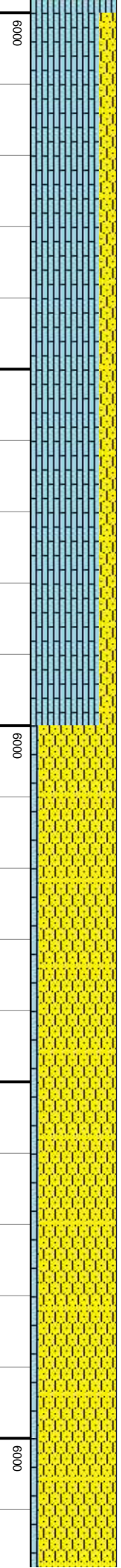




GA\$ (units)  
Ct-C4 (PPM)



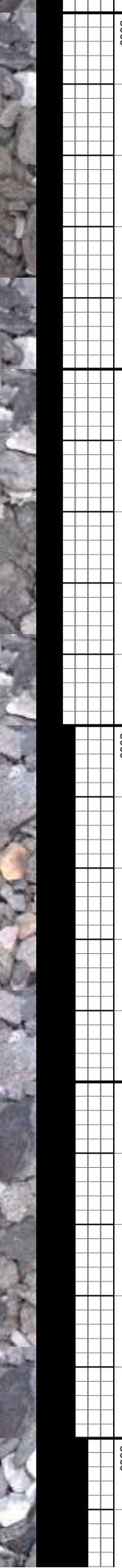
GA\$ (units)  
Ct-C4 (PPM)



GA\$ (units)  
Ct-C4 (PPM)



GA\$ (units)  
Ct-C4 (PPM)



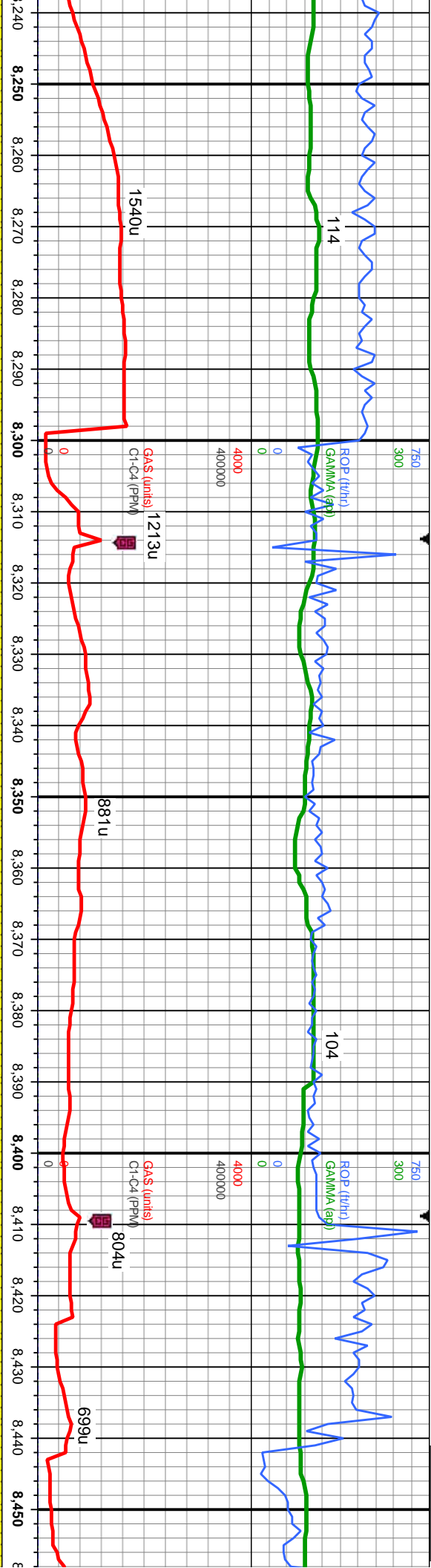
GA\$ (units)  
Ct-C4 (PPM)











MD: 8,264'  
TVD: 7,364.95'  
Inclination: 92.19 °  
Azimuth: 175.31 °  
VS: 1,067.07'

TVD (ft)

MD: 8,359'  
TVD: 7,361.11'  
Inclination: 92.44 °  
Azimuth: 174.61 °  
VS: 1,161.48'

TVD (ft)

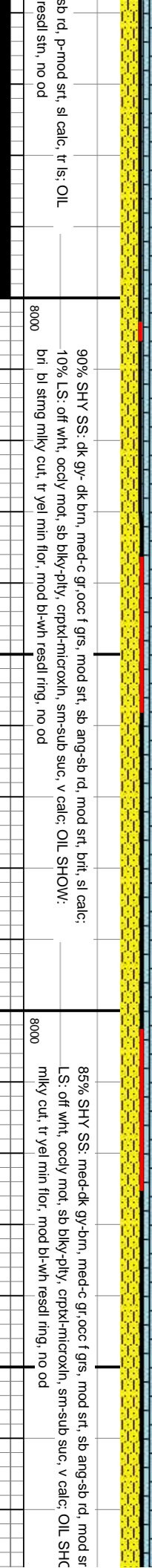
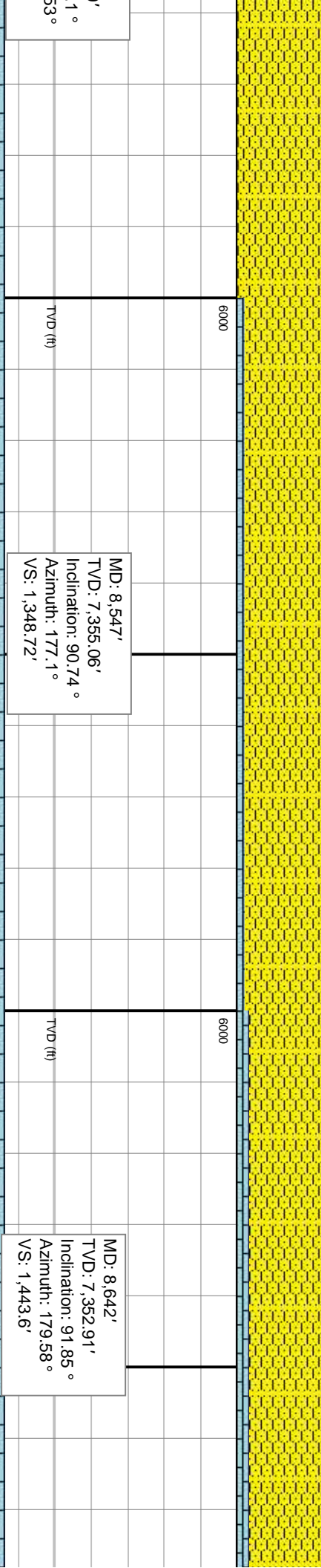
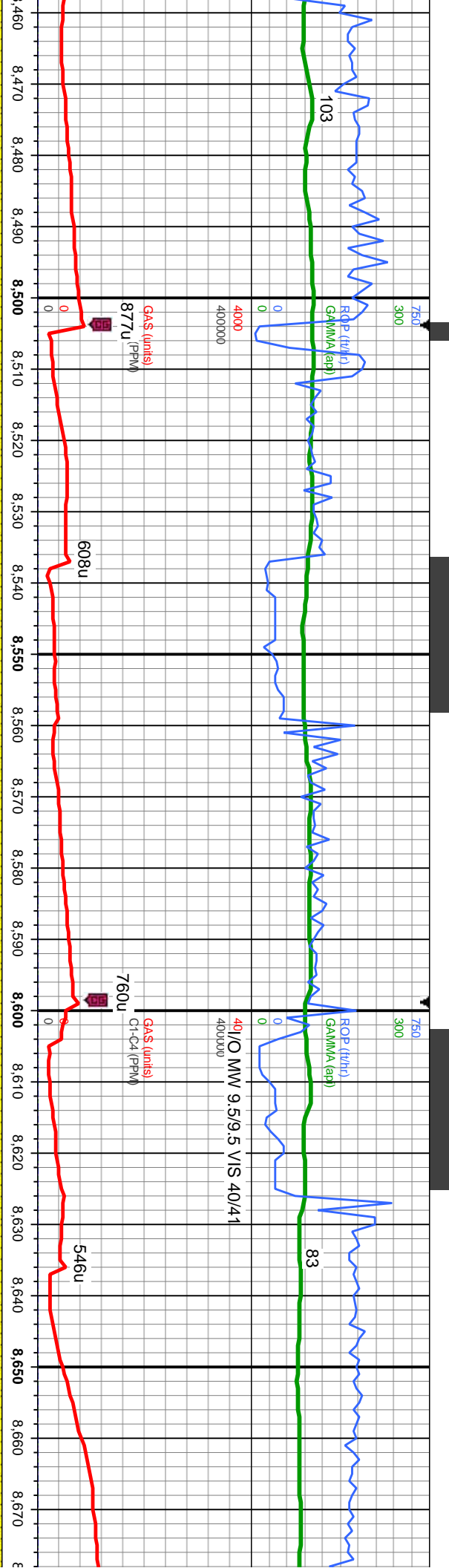
MD: 8,453'  
TVD: 7,357.39'  
Inclination: 92  
Azimuth: 176.3  
VS: 1,254.99'

100% SHY SS: dk gy-dk brn, s&p, lse-sft, med-c gr, sb ang-sb rd, p-mod srt, sl calc, tr ls; OIL SHOW: bri lt bl-wh milky string cut, bri wh thk ring, solid bri bl resd stn, no od

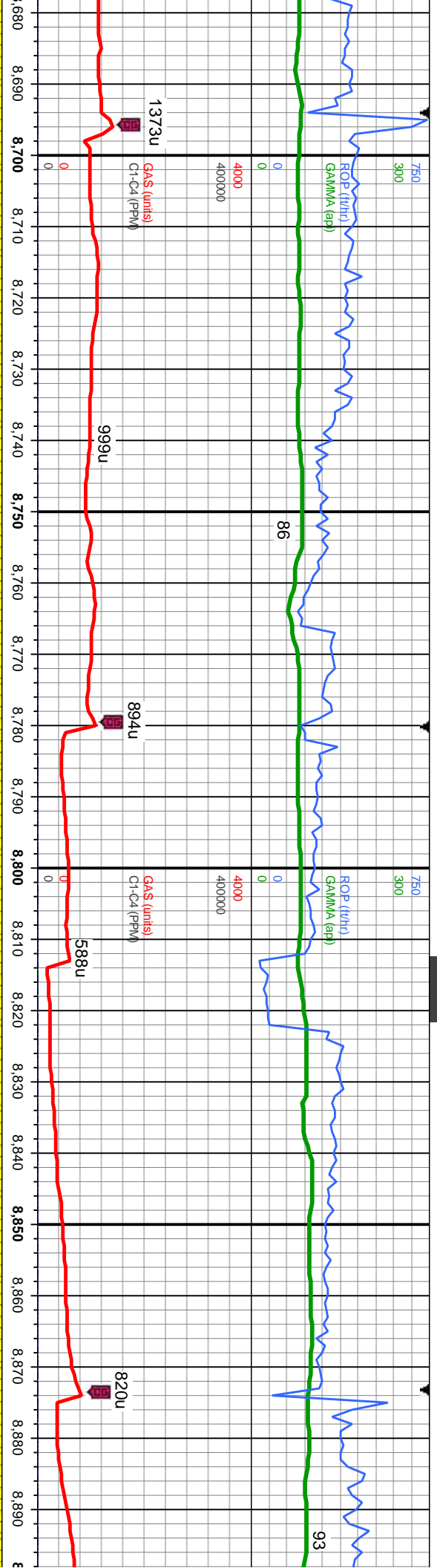
100% SHY SS: dk gy-dk brn, s&p, lse-sft, med-c gr, sb ang-sb rd, p-mod srt, sl calc, tr ls; OIL SHOW: bri lt bl-wh milky string cut, bri wh thk ring, solid bri bl resd stn, no od

100% SHY SS: dk gy-dk brn, s&p, lse-frm, f-med gr, sb ang-sb rd, p-mod srt, sl calc, tr ls; OIL SHOW: bri lt bl-wh milky string cut, bri wh thk ring, solid bri bl resd stn, no od









6000

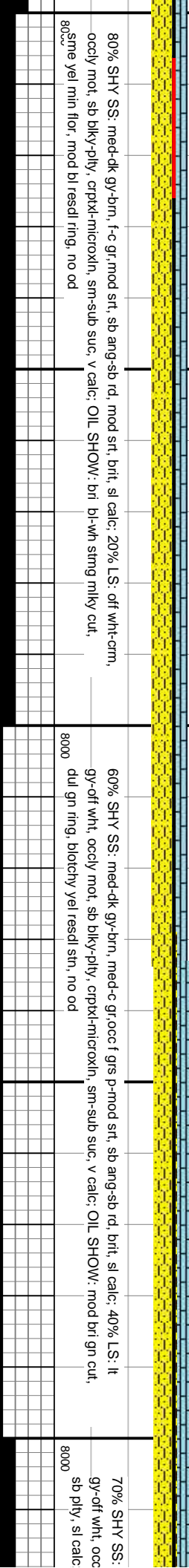
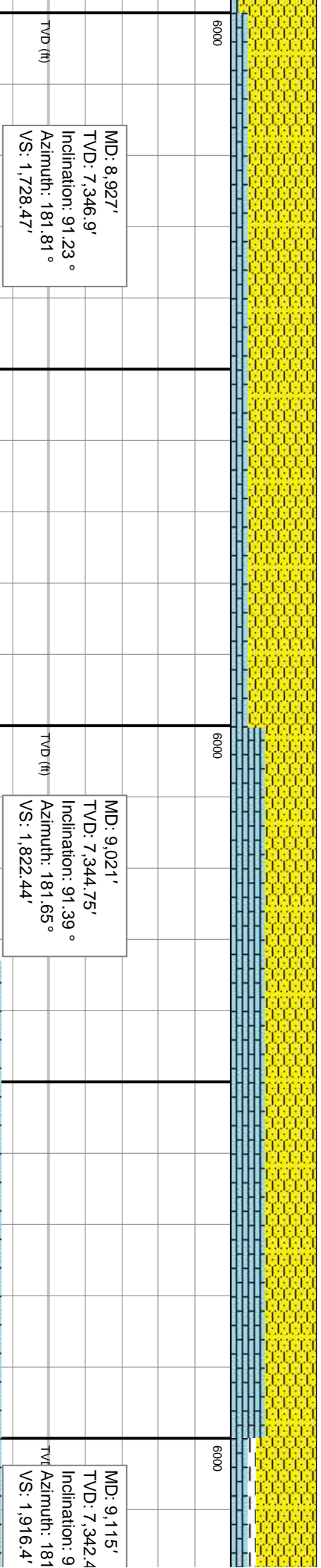
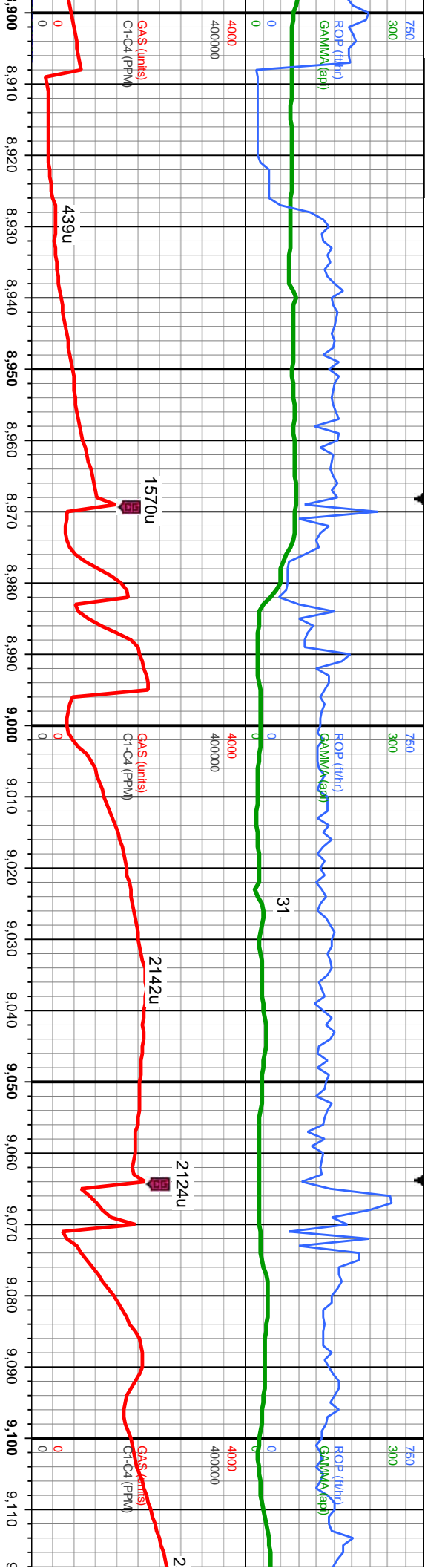
6000

MD: 8,737'  
TVD: 7,350.31'  
Inclination: 91.29 °  
Azimuth: 179.43 °  
VS: 1,538.53'

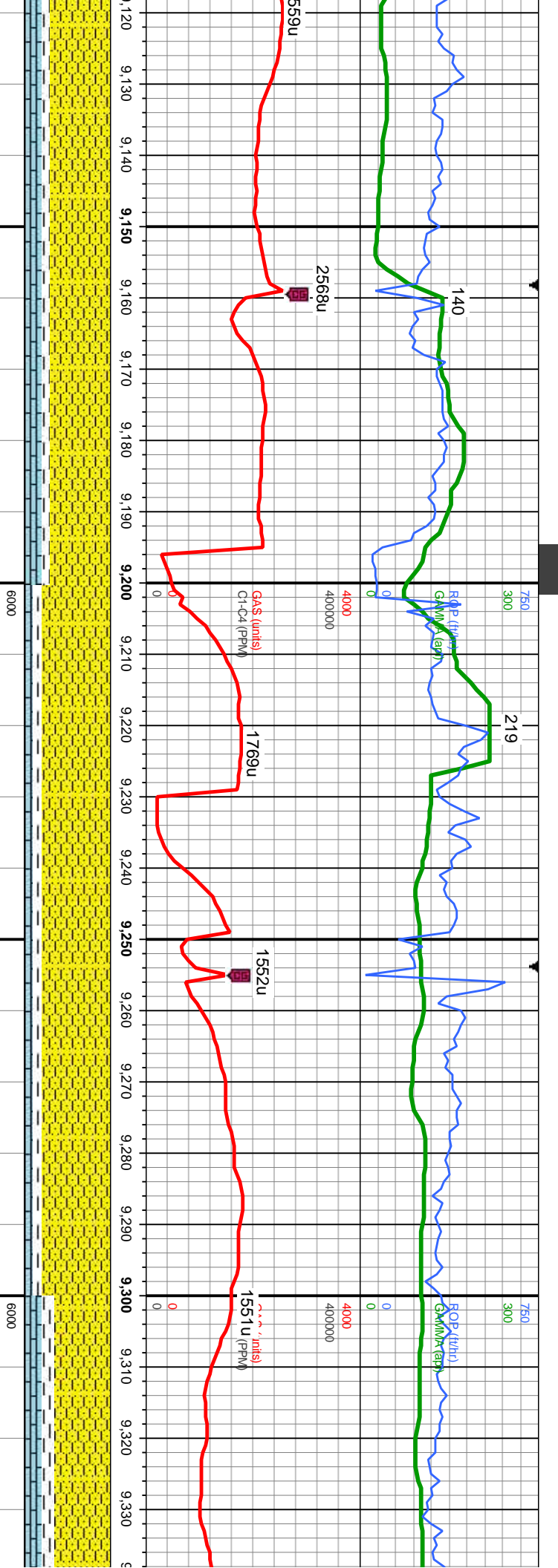
MD: 8,831'  
TVD: 7,348.6'  
Inclination: 90.8 °  
Azimuth: 179.93 °  
VS: 1,632.49'

1, brit, sl calc; 15% — LW: bri bl string	90% SHY SS: med-dk gy-brn, med-c gr, occ f grs, mod srt, sb ang-sb rd, mod srt, brit, sl calc; 10% — LS: off wht, oocly mot, sb blk-y-ply, crptx-microxln, sm-sub suc, v calc; OIL SHOW: bri bl string 8000 milky cut, tr yel min flr, mod bl-wh resd ring, no od	90% SHY SS: med-dk gy-brn, med-c gr, occ f grs, mod srt, sb ang-sb rd, mod srt, brit, sl calc; 10% — LS: off wht, oocly mot, sb blk-y-ply, crptx-microxln, sm-sub suc, v calc; OIL SHOW: bri bl string 8000 milky cut, tr yel min flr, mod bl-wh resd ring, no od
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MD: 9,211'  
TVD: 7,341.08'  
Inclination: 90.15 °  
Azimuth: 181.97 °  
VS: 2,012.38'

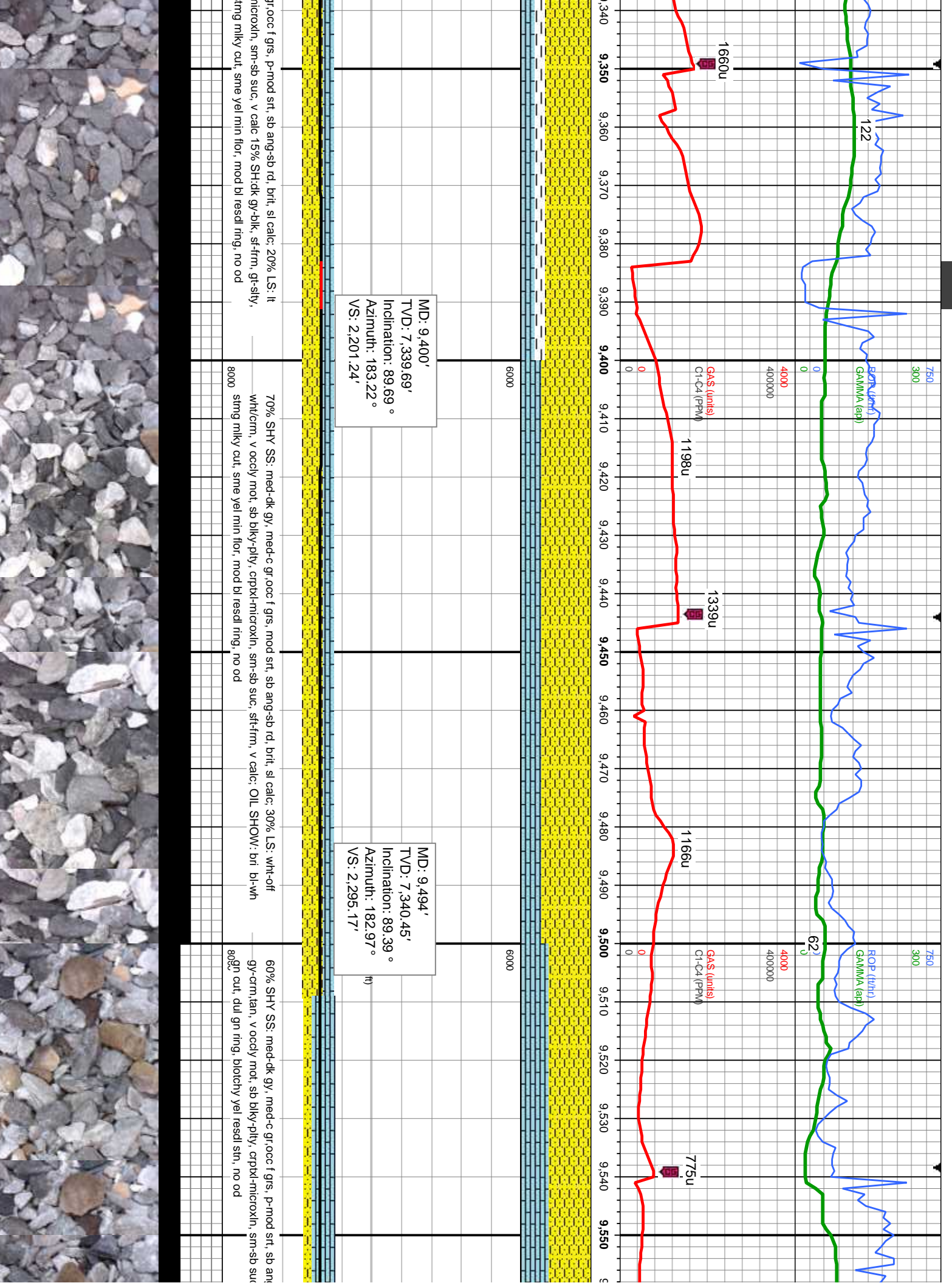
MD: 9,305'  
TVD: 7,340.2'  
Inclination: 90.92 °  
Azimuth: 183.47 °  
VS: 2,106.33'

med-dk gy-brn, med-c gr:occ f gfs, mod srt, sb ang-sb rd, brit, sl calc: 20% LS: lt  
lv mot, sb blk-y-pty, crptxl-microxln, sm-sub suc, v calc 10% SH:dk gy, sf-firm, gr-sltly,  
OIL SHOW: bri bl-wh string milky cut, sme yel min flor, mod bl resdl ring, no od

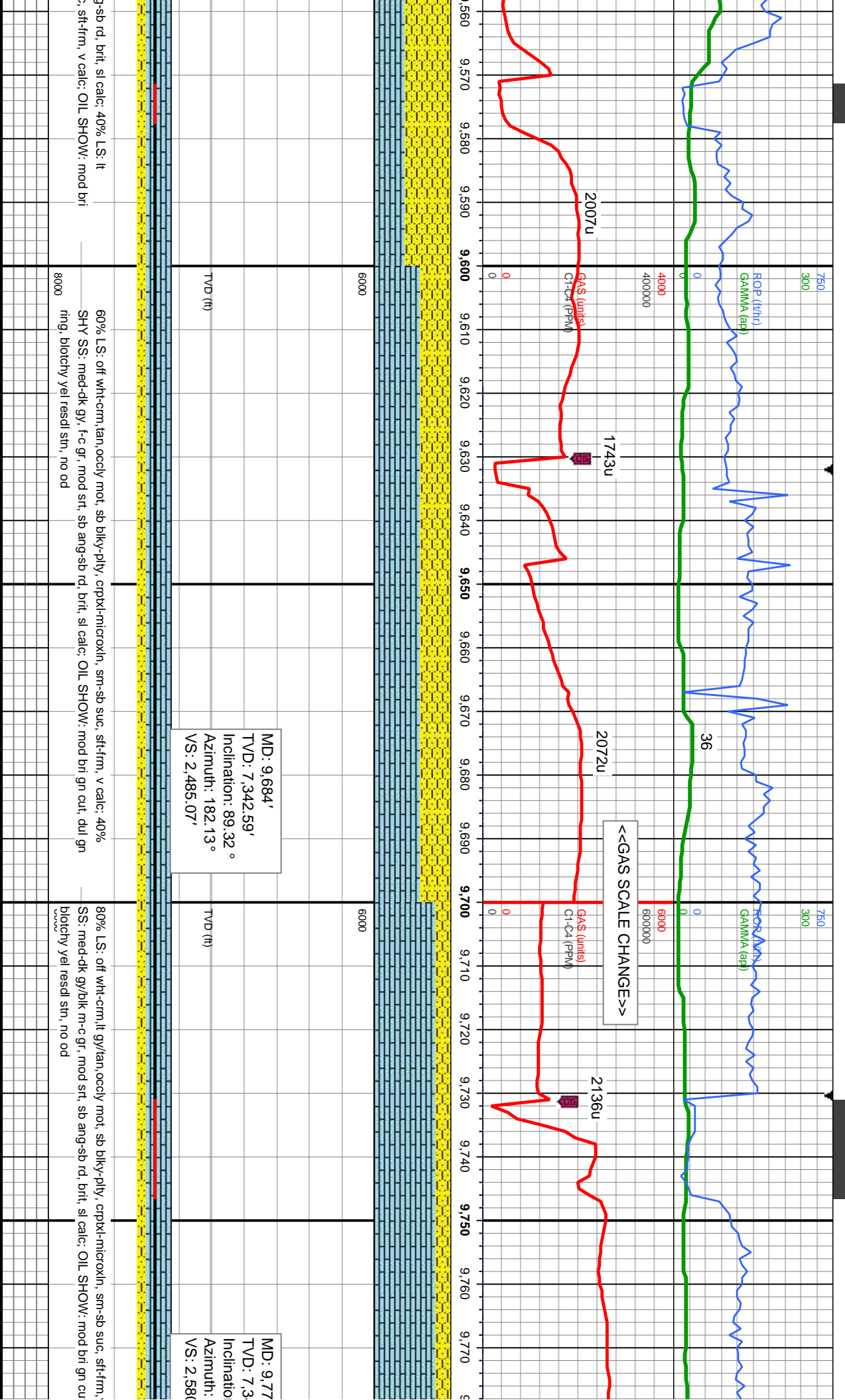
80% SHY SS: med-dk gy-lt brn, med-c gr:occ f gfs, p-mod srt, sb ang-sb rd, brit, sl calc: 10% LS: lt  
gy-off wht, occly mot, sb blk-y-pty, crptxl-microxln, sm-suc, v calc 10% SH:dk gy-blk, sf-firm, gr-sltly,  
sb pty, sl calc: OIL SHOW: bri bl-wh string milky cut, sme yel min flor, mod bl resdl ring, no od

65% SHY SS: med-dk gy, s&p med-c g  
gy-crm, occly mot, sb blk-y-pty, crptxl-r  
sb pty, sl calc: OIL SHOW: bri bl-wh s







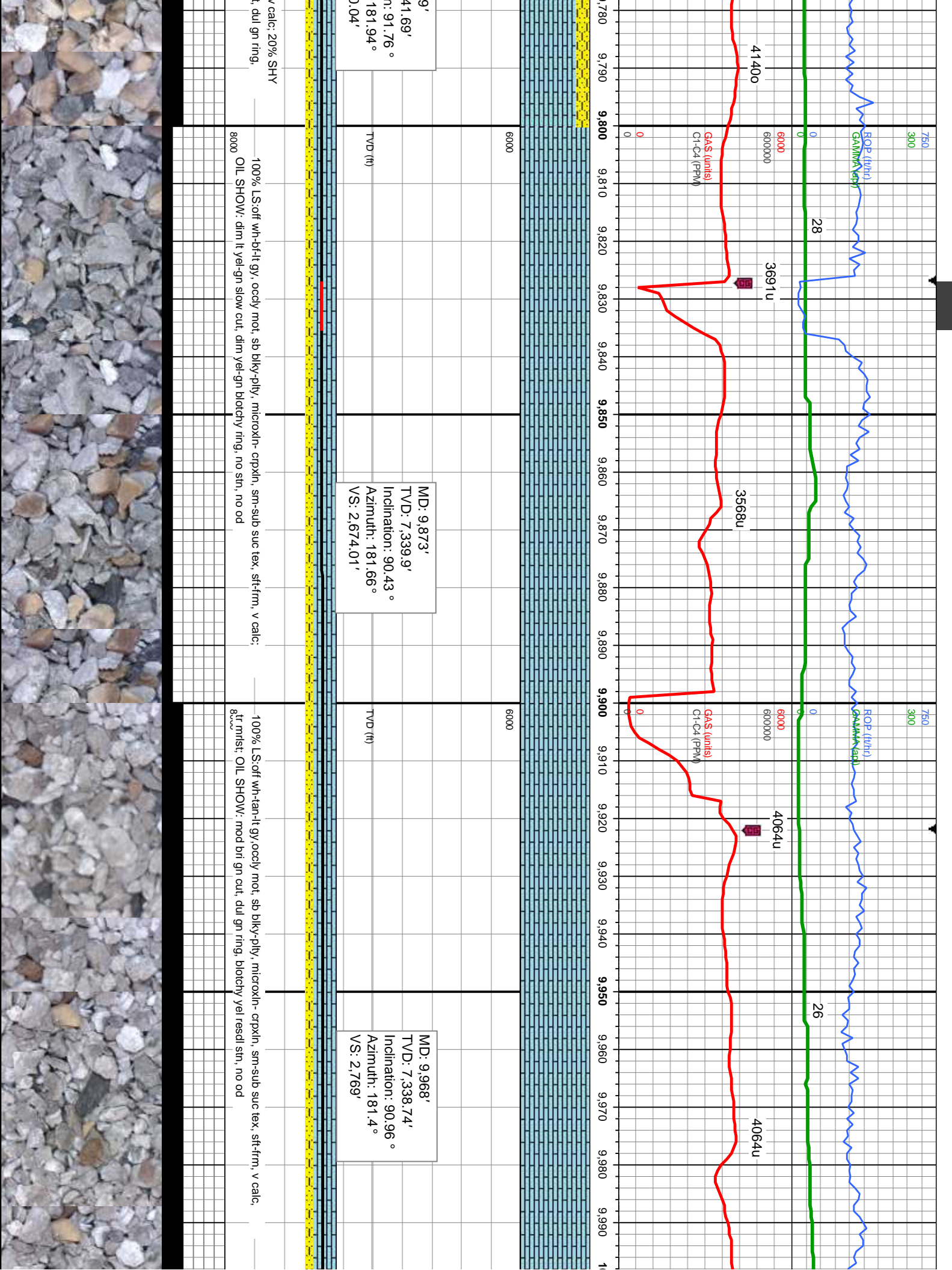


9-sb rd, brit, sl calc; 40% LS: lt  
2, sft-firm, v calc; OIL SHOW: mod bri

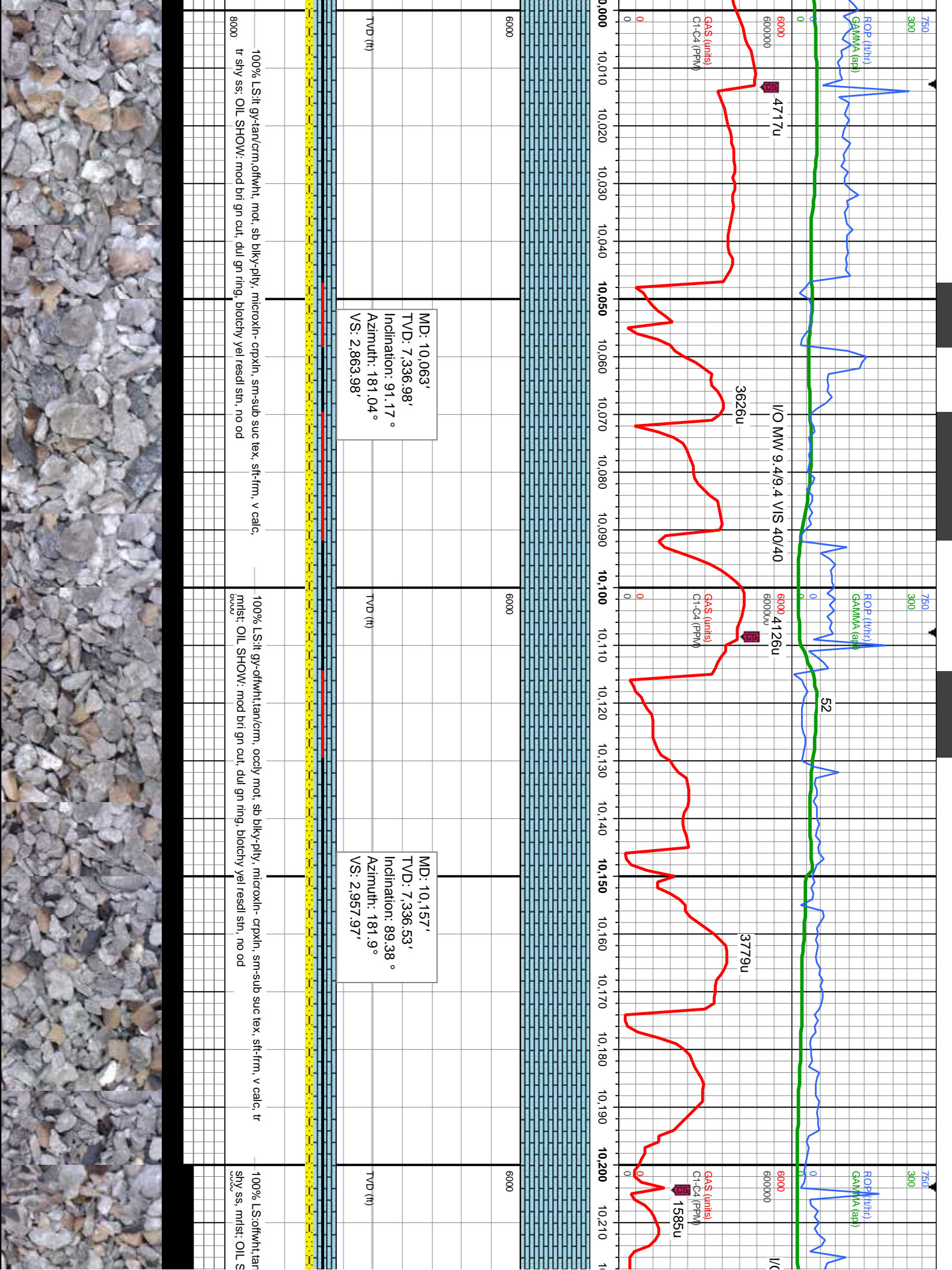
60% LS: off wht-crm, tan, occy mot, sb blk-y-pty, crptx-microxln, sm-sb suc, sft-firm, v calc; 40%  
SHY SS: med-dk gy, f-c gr, mod srt, sb ang-sb rd, brit, sl calc; OIL SHOW: mod bri gn cut, dul gn  
ring, blotchy yel resdl stn, no od

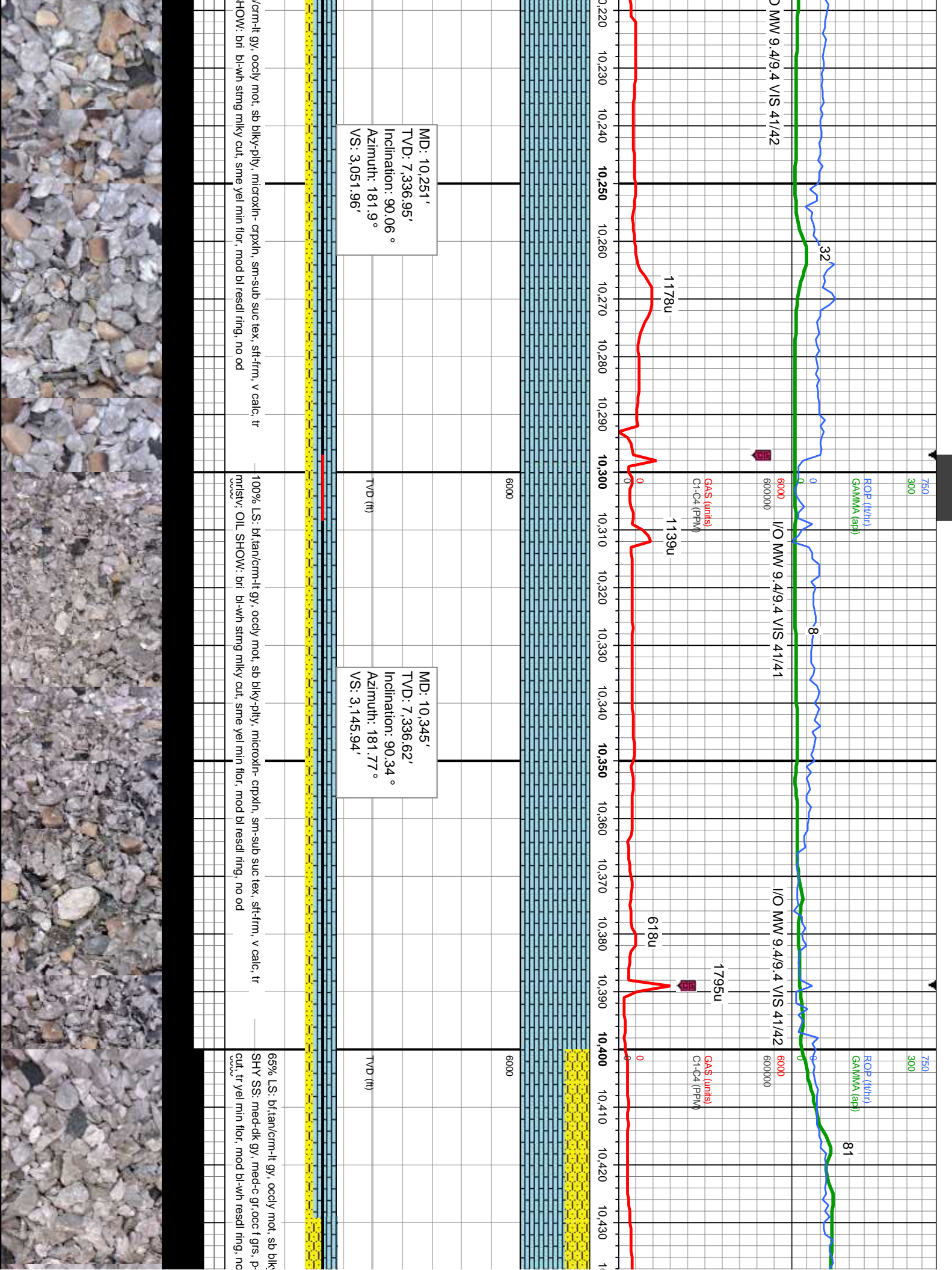
80% LS: off wht-crm, lt gy/tan, occy mot, sb blk-y-pty, crptx-microxln, sm-sb suc, sft-firm,  
SS: med-dk gy/blk m-c gr, mod srt, sb ang-sb rd, brit, sl calc; OIL SHOW: mod bri gn cu  
blotchy yel resdl stn, no od



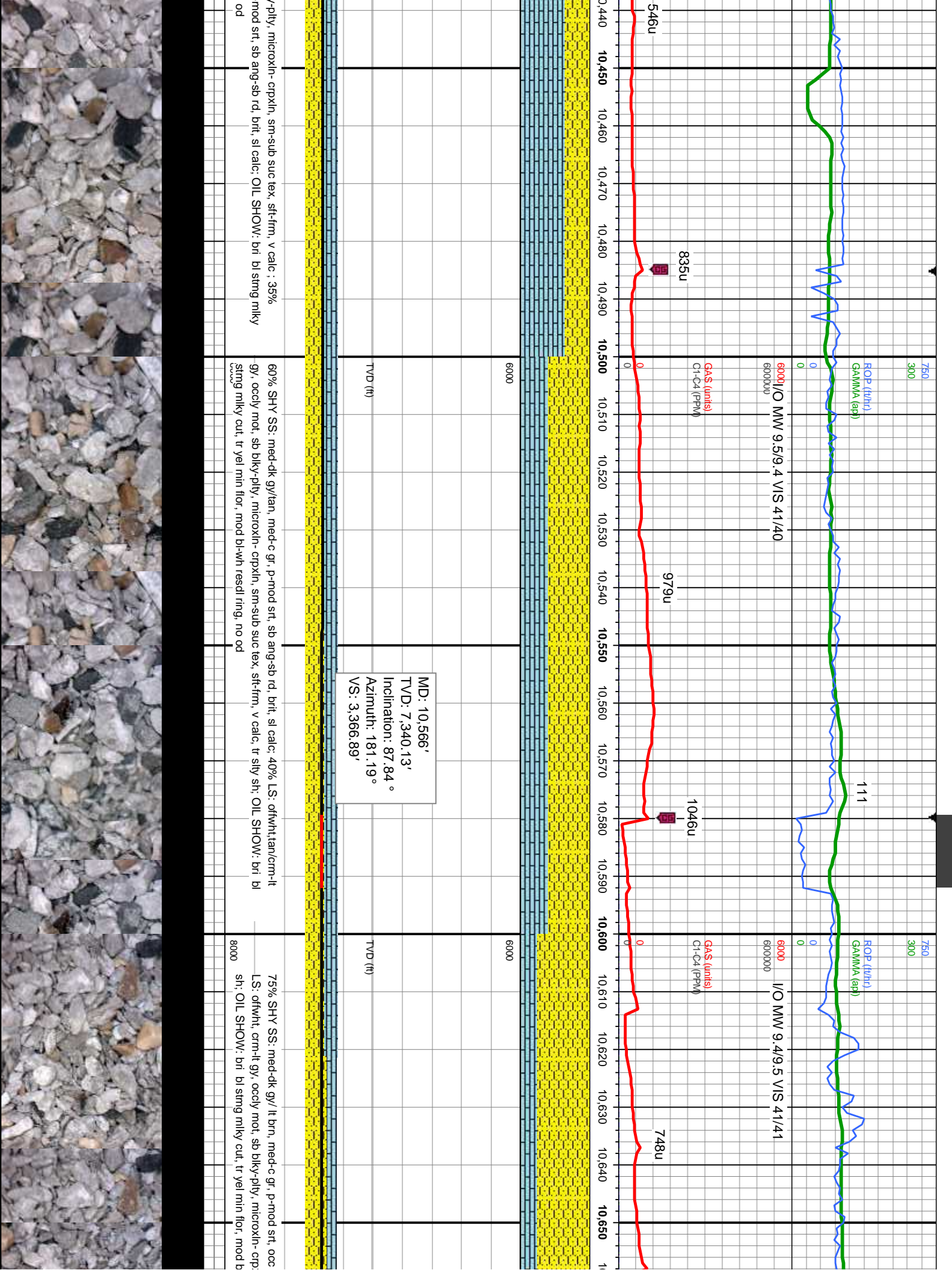


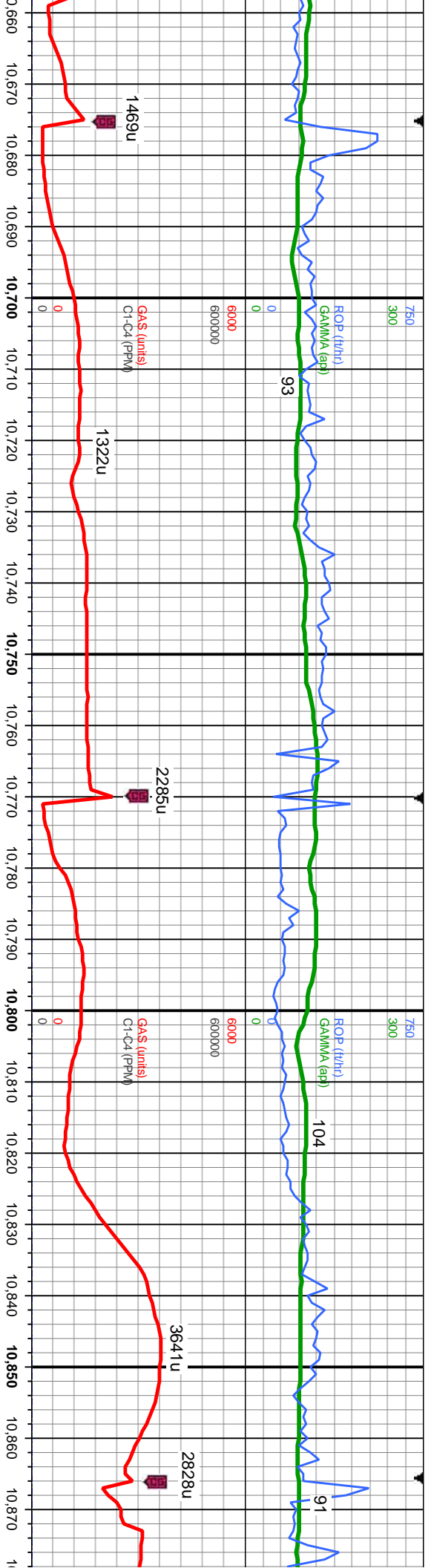












MD: 10,723'  
TVD: 7,343.98'  
Inclination: 89.35°  
Azimuth: 181.99°  
VS: 3,523.82'

MD: 10,817'  
TVD: 7,345.07'  
Inclination: 89.32°  
Azimuth: 181.29°  
VS: 3,617.81'

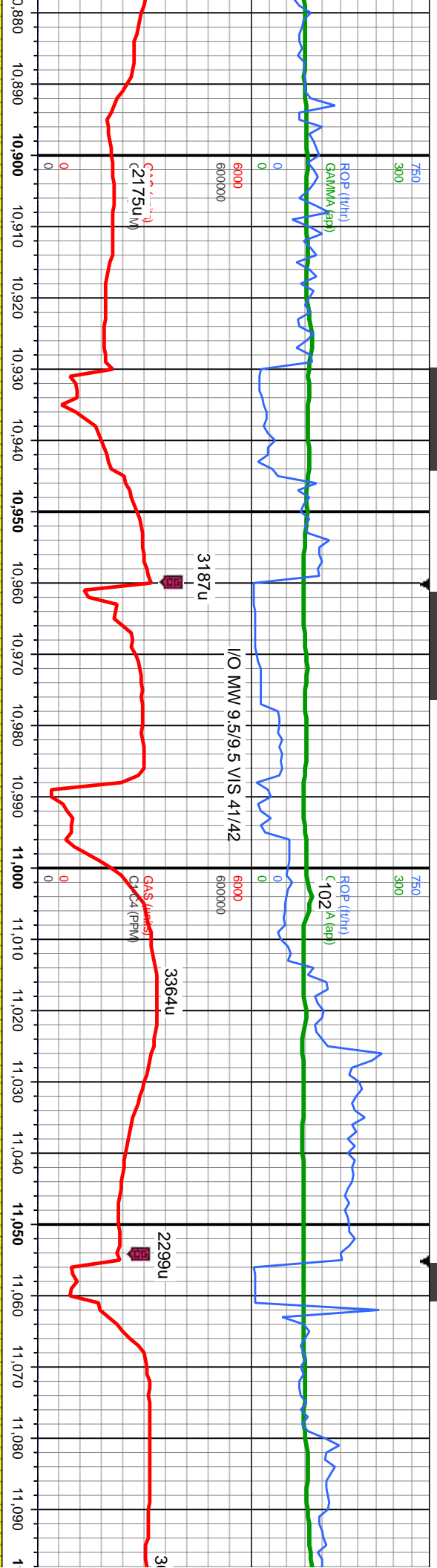
f grs, sb ang-sb rd, brlt, v sl calc, 25%  
kln, sm-sub suc tex, sft-frm, v calc, tr  
l-wh resd ring, no od

90% SHY SS: med-dk gy, med-c gr, p-mod srt, sb ang-sb rd, brlt, sl calc, 10% LS: offwh/bf, crm-it gy,  
occy mot, sb blk-y-ply, microxln- crpxln, sm-sub suc tex, sft-frm, v calc, tr sh, OIL SHOW: bri bl string  
mily cut, tr yel min flor, mod bl-wh resd ring, no od

70% SHY SS: med-dk gy, s&p med-c gr, occ f grs, p-mod srt, sb ang-sb rd, brlt, sl ca  
gy-crm, occy mot, sb blk-y-ply, crpxln-microxln, sm-sb suc, v calc, 20% SH: dk gy-blk  
80% sb ply, sl calc, OIL SHOW: bri bl-wh string mily cut, sme yel min flor, mod bl resd r







MD: 10,912'  
TVD: 7,346.23'  
Inclination: 89.29 °  
Azimuth: 180.52 °  
VS: 3,712.8'

MD: 11,006'  
TVD: 7,344.82'  
Inclination: 92.43 °  
Azimuth: 180.66 °  
VS: 3,806.78'

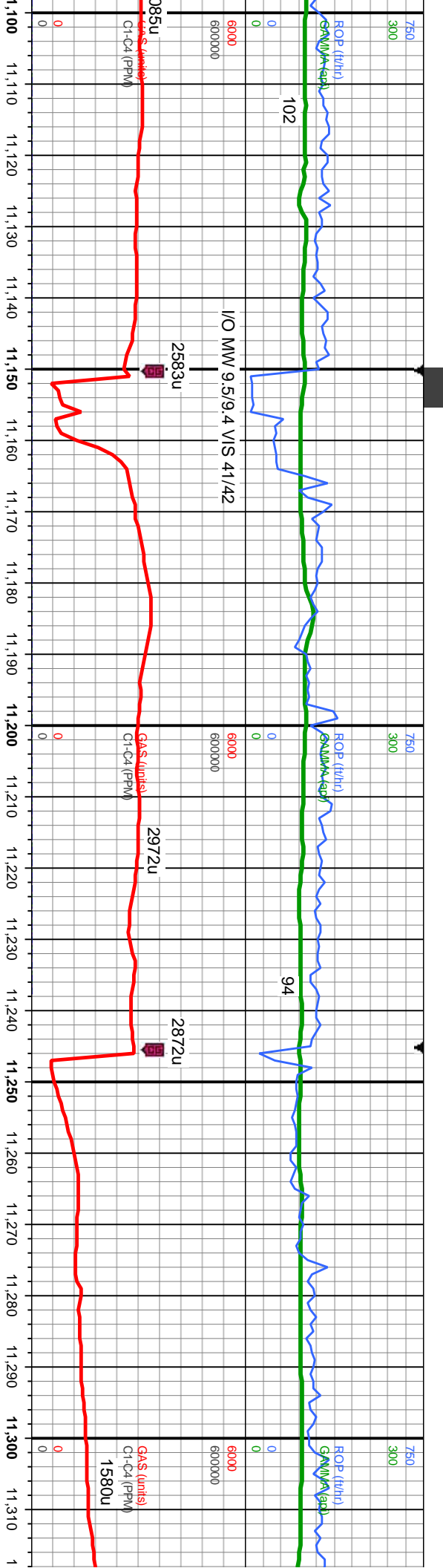
MD: 11,  
TVD: 7,  
Inclinati  
Azimuth  
VS: 3,9

ic: 10% LS: lt  
s: firm, gt-sily,  
ng, no od

100% SHY SS: med-dk gy, med-c gr, p-mod srt, sb ang-sb rd, brlt, sl calc, tr ls, tr sh, OIL  
SHOW: bri bl string milky cut, tr yel min flr, mod bl-wh resdl ring, no od: OIL SHOW: dim  
lt yel-gn slow cut, dim yel-gn blotchy ring, no sn, no od

100% SHY SS: med-dk gy, med-c gr, p-mod srt, sb ang-sb rd, brlt, sl calc, tr ls, tr sh, OIL  
SHOW: bri lt bl-wh milky string cut, bri wh thk ring, solid bri bl resdl srt, no od





MD: 11,196'  
TVD: 7,340.63'  
Inclination: 89.78 °  
Azimuth: 179.71 °  
VS: 3,996.69'

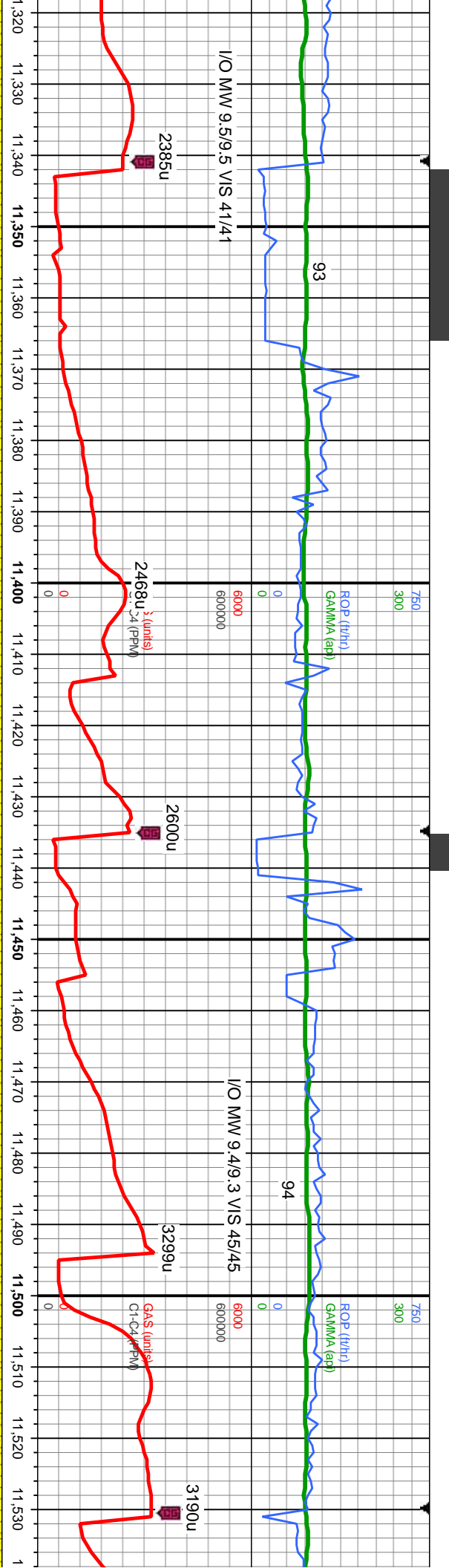
MD: 11,291'  
TVD: 7,340.86'  
Inclination: 89.94 °  
Azimuth: 179.07 °  
VS: 4,091.66'

100% SHY SS: med-dk gy, med-c gr, p-mod srt, sb ang-sb rd, brit, sl calc, tr ls, tr sh, OIL  
SHOW: bri bl string milky cut, tr yel min flor, mod bl-wh resd ring, no od

100% SHY SS: dk gy-dk brn, c gr, occ f gr, sb ang-sb md, p-mod srt, fin brit, mod-gd cons, v sl  
calc, tr fos frag, OIL SHOW: bri lt bl-wh milky string cut, bri wh thk ring, solid bri bl resd str, no od







MD: 11,385'  
TVD: 7,340.4'  
Inclination: 90.62°  
Azimuth: 181.15°  
VS: 4,185.65'

TVD (ft)

SS: dk gy-dk brn, c gr, occ f gr, sb ang-sb mnd, p-mod srt, fri brt, mod-gd cons, v sl  
lg; OIL SHOW: brl bl sting milky cut, tr yel min flor, mod bl-wh resd ring, no od

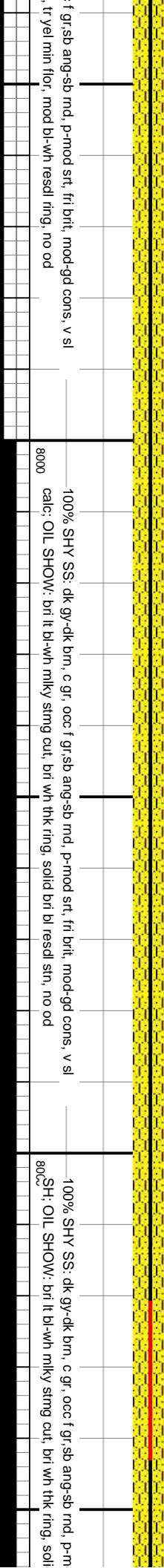
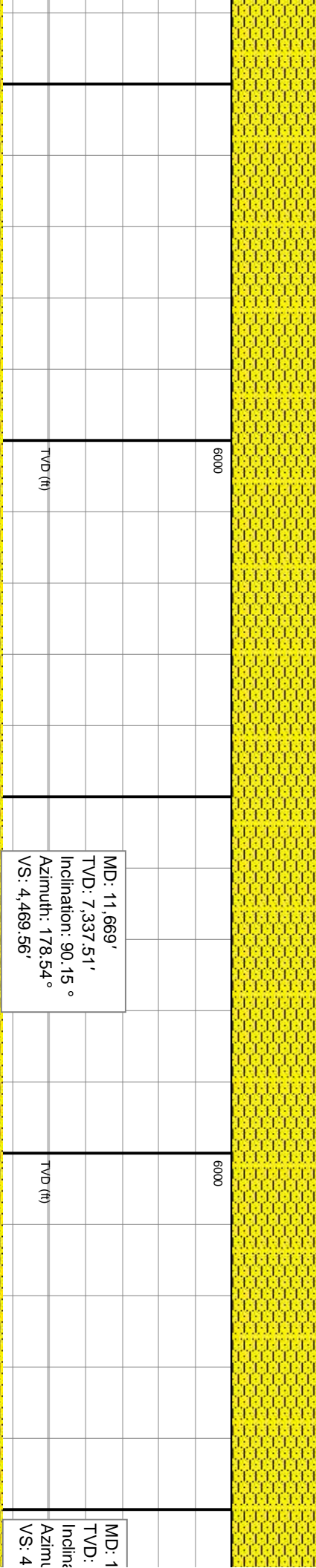
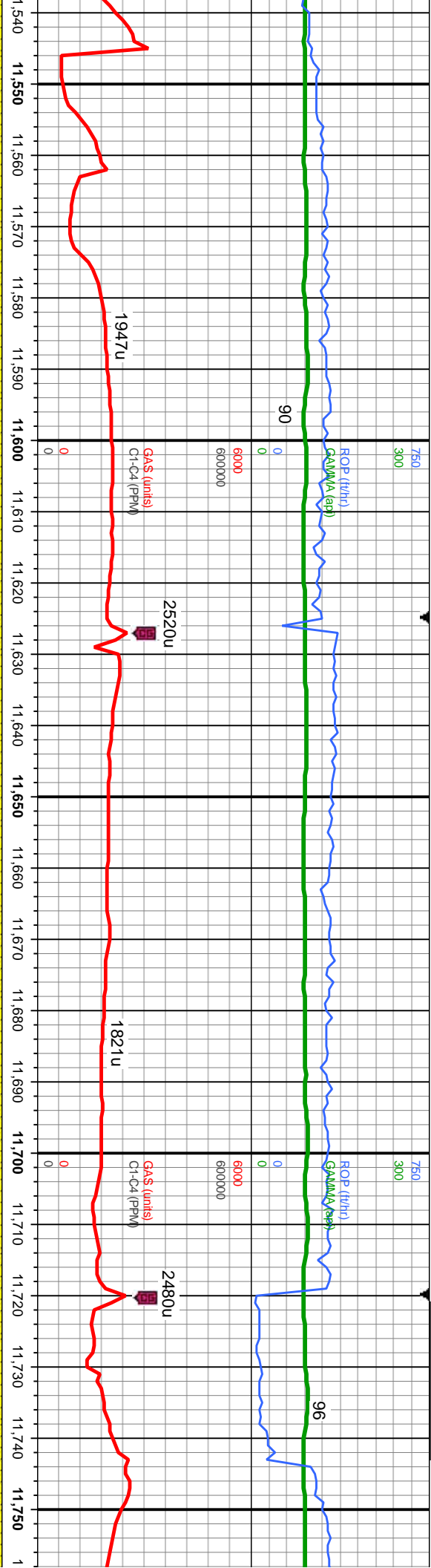
100% SHY SS: dk gy-dk brn, c gr, occ f gr, sb ang-sb mnd, p-mod srt, fri brt, mod-gd cons, v sl  
calc; OIL SHOW: brl bl sting milky cut, tr yel min flor, mod bl-wh resd ring, no od

MD: 11,480'  
TVD: 7,339.18'  
Inclination: 90.86°  
Azimuth: 180.44°  
VS: 4,280.64'

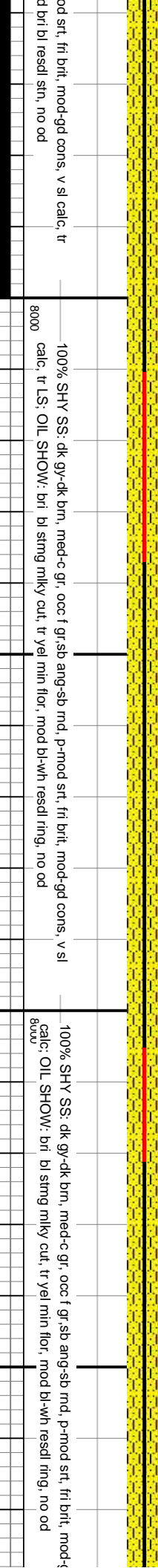
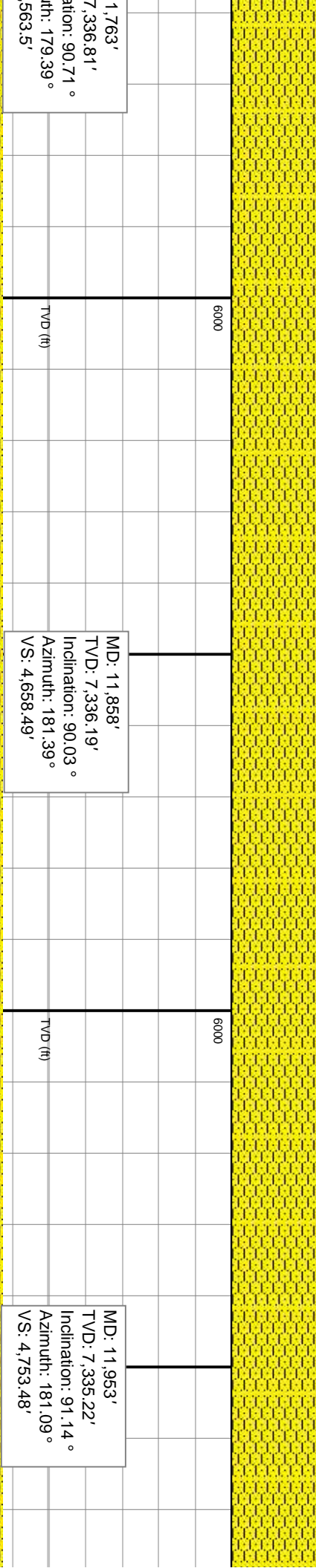
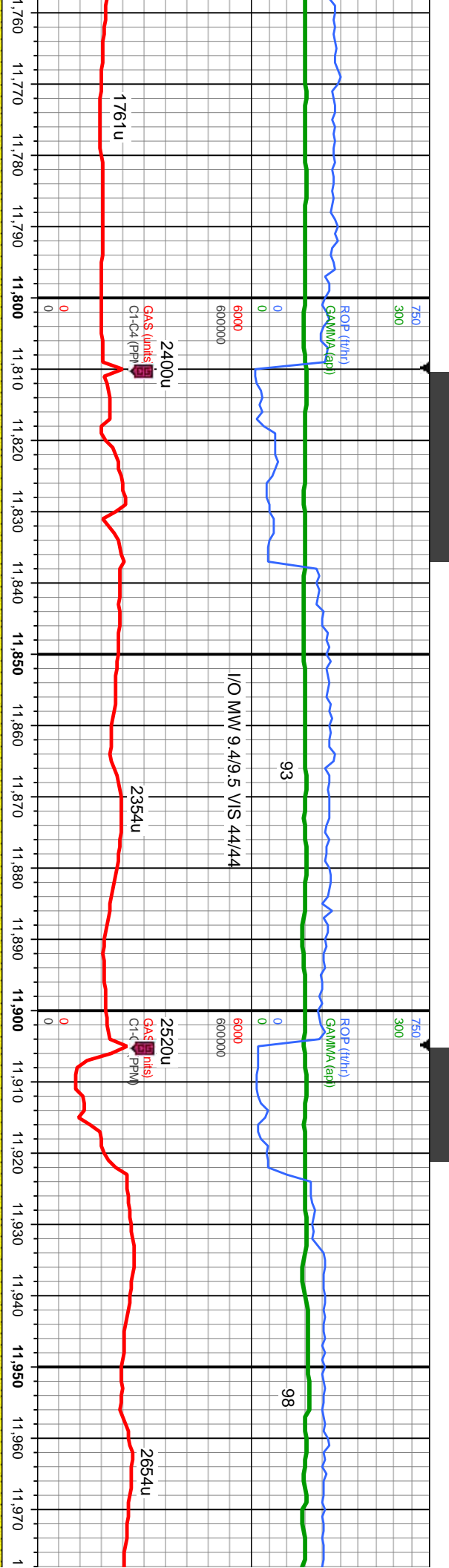
TVD (ft)

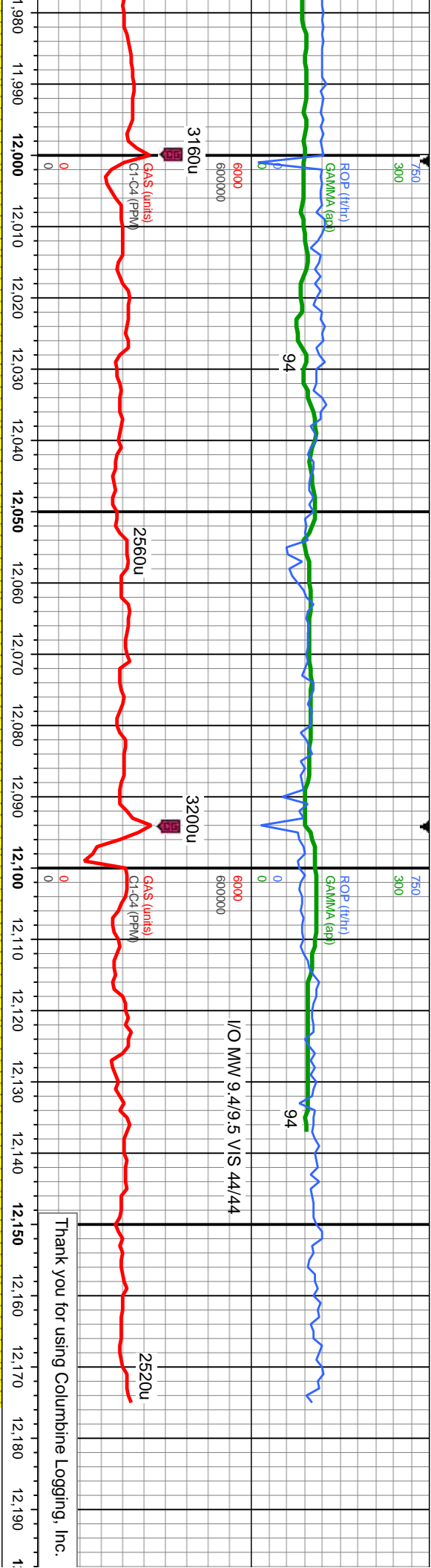
100% SHY SS: dk gy-dk brn, c gr, occ  
calc; OIL SHOW: brl bl sting milky cut











TD @ 12175' MD @ 11:19  
HRS MST on 6/24/14

PTB

MD: 12,048'  
TVD: 7,332.21'  
Inclination: 91.11 °  
Azimuth: 180.08 °  
VS: 4,848.48'

MD: 12,129'  
TVD: 7,331.66'  
Inclination: 89.66 °  
Azimuth: 178.6 °  
VS: 4,929.44'

MD: 12,175'  
TVD: 7,331.93'  
Inclination: 89.66 °  
Azimuth: 178.6 °  
VS: 4,975.41'

100% SHY SS: dk gy-dk brn, med-c gr, occ f gr, sb ang-sb rnd, p-mod srt, fri brit, mod-gd cons, v sl  
calc, tr LS; OIL SHOW: brl bl stmg mlky cut, tr yel min flr, mod bl-wh resd ring, no od

100% SHY SS: dk gy-dk brn, med-c gr, occ f gr, sb ang-sb rnd, p-mod srt, fri  
brit, mod-gd cons, v sl calc, tr LS; OIL SHOW: brl bl stmg mlky cut, tr yel min  
flr, mod bl-wh resd ring, no od





