



Scale: 5" / 100'  
Measured Depth Log

Well Name Oscar Y10-74-1HC HORZ

Location SEC 10 T2N R64W

State COLORADO

County WELD

Country USA

Rig Number H&P 315

API Number 05-123-38204

AFE # 200199

Region DJ BASIN

Field WATTENBERG

Spud Date 11/16/2014

Drilling Completed 11/27/2014

Surface Coordinates NWSE SEC 10 T2N R64W

2,380' FSL; 1,985' FEL

LAT/LON: 40.15223/-104.53520

Bottom Hole Coordinates

NWNE SEC 3 T2N R64W  
75' FNL; 1,815' FEL

Ground Elevation 4,922'

K.B. Elevation 4,946'

Logged Interval 6,433' To 14,684'

Total Depth 14,684'

Formation CODELL

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 BROADWAY SUITE 2200  
DENVER, CO 80202

Geologist

Name MARK COLE; ZACH UBER

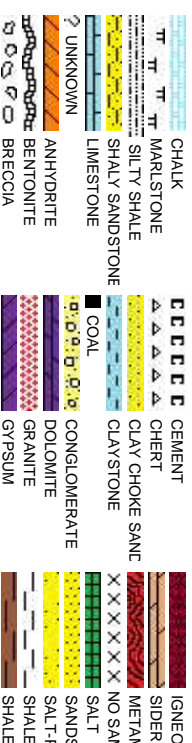
Company COLUMBINE LOGGING, INC

Address 602 S LIPAN ST  
DENVER, CO 80223

Zone Color Coding



Rock Types



## Accessories

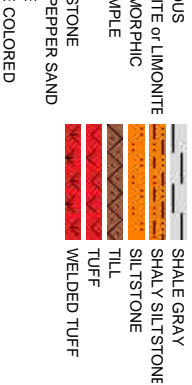
<b>Fossils</b>	F FOSSIL	— ARGILLACEOUS	✓ GLAUCONITE	✓ TUFFACEOUS
GASTROPOD	/ ARGILLITE GRAIN	✓ GYPSIFEROUS		
OOLITE	B BENTONITE	✓ HEAVY MINERAL		
OSTRACOD	✓ BITUMENOUS SUBSTANCE	✓ INOCERAMUS		ANHYDRITE STRINGER
BELEMNITE	BRECCIA FRAGMENTS	K KAOLIN		BENTONITE STRINGER
BIOCLASTIC	✓ PELLET	✓ CARBONACEOUS	✓ MARLSTONE	COAL STRINGER
BRACHIOPOD	✓ PISOLITE	✓ CARBONACEOUS FLAKES	✓ MINERAL CRYSTALS	DOLOMITE STRINGER
BRYOZOA	PLANT REMAINS	✓ CHTDK	✓ NODULES	GYPSUM STRINGER
CEPHALOPOD	✓ PLANT SPORES	✓ CHTLT	✓ PHOSPHATE PELLETS	LIMESTONE STRINGER
CORAL	SCAPHOPOD	— COAL - THIN BEDS	P PYRITE	MARLSTONE (CALC) STRG
CRINOID	STROMATOPOROID	✓ DOLOMITIC	SALT CAST	MARLSTONE (DOL) STRG
ECHINOID	+	FELDSPAR	✓ SANDY	SANDSTONE STRINGER
FISH	• FERRUGINOUS PELLET	✓ FERRUGINOUS	✓ SILICEOUS	— SHALE STRINGER
FORAMINIFERA	ANHYDRITIC	✓ FERRUGINOUS	✓ SILTY	SILTSTONE STRINGER

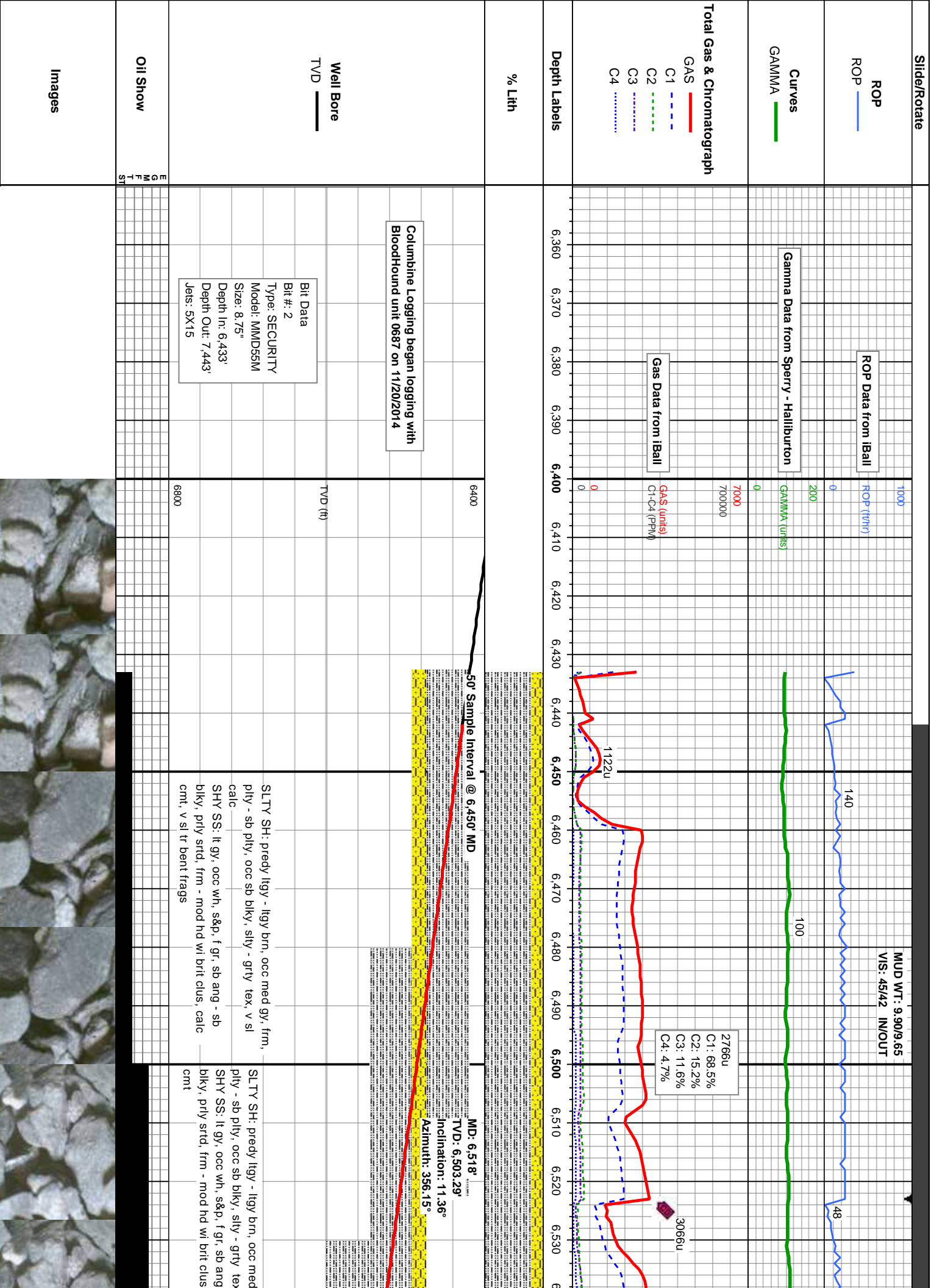
## Stringer

## Other Symbols

<b>Oil Show</b>	○ ORGANIC	■ CORE - RECOVERED	TRIP GAS	E EARTHY
P PINPOINT	✓ VUGGY	⋮ DST INTERVAL	WIRELINE TESTED - LEFT	FX FINELYXLN
● DEAD	● EVEN	FAULT	▷ WIRELINE TESTED - RT	BS GRAINSTONE
○ QUESTIONABLE	<b>Engineering</b>	FORMATION TOP	<b>Rounding</b>	L LITHOGRAPHIC
● SPOTTED STAINING	▲ BIT	✱ GAS SHOW		MX MICROXLN
<b>Porosity</b>	▼ CONNECTION (DOWN)	MINDEPTH	▲ ANGULAR	MS MUDSTONE
◄ CONNECTION (LEFT)	► CONNECTION (RIGHT)	✓ NORMAL FAULT	R ROUNDED	PS PACKSTONE
□ FENESTRAL	➡ CONNECTION GAS	● OIL SHOW	B SUBANG	WS WACKESTONE
F FRACTURE	➡ CONNECTION GAS UP	↕ OVERTURNED STRATA	P SUBRND	
X INTERCRYSTALLINE	➡ CONNECTION GAS LEFT	↔ REVERSE FAULT		
◊ INTEROOLITIC	CONNECTION GAS DOWN...	▲ SIDEWALL CORE (LEFT)	<b>Textures</b>	
✂ MOLDIC	↓ CORE - LOST	▲ SIDEWALL CORE (RIGHT)	BS BOUNDSTONE	M MODERATE
		■ SLIDE	C CHALKY	P POOR
		05 SURVEY	CS CRYPTOXLN	W WELL

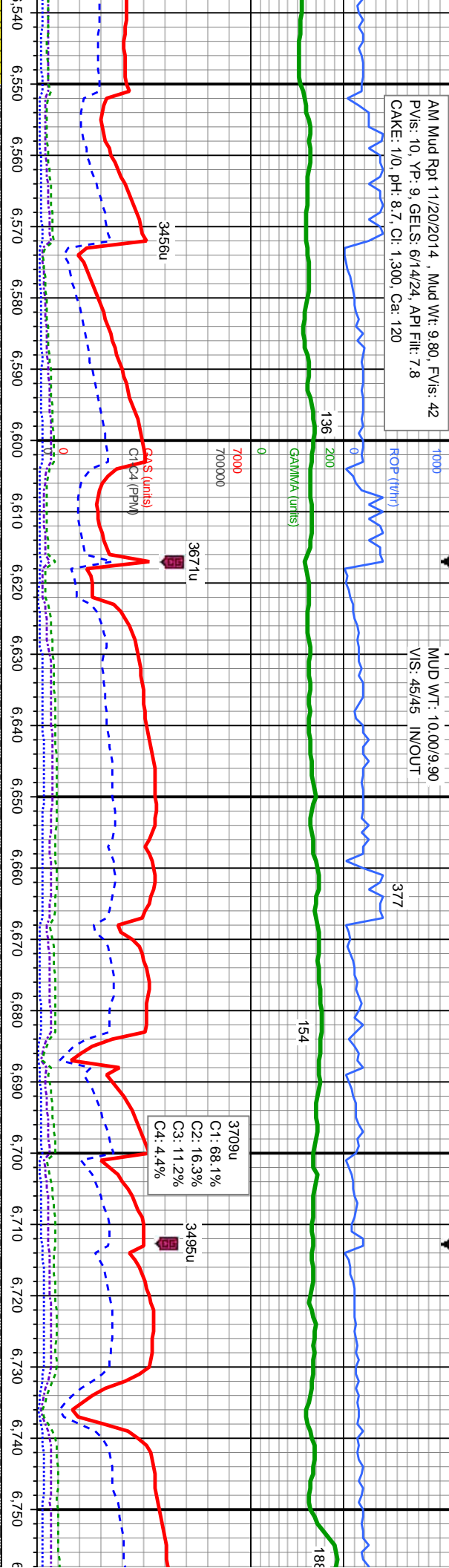
## Sorting







AM Mud Rpt: 11/20/2014 , Mud Wt: 9.80, FV/s: 42  
PV/s: 10, YP: 9, GELS: 6/14/24, API Filtr: 7.8  
CAKE: 1/0, pH: 8.7, CI: 1,300, Ca: 120



MD: 6,565'  
TVD: 6,549.07'  
Inclination: 14.77°  
Azimuth: 354.43°

MD: 6,613'  
TVD: 6,595.16'  
Inclination: 17.57°  
Azimuth: 352.43°

MD: 6,660'  
TVD: 6,639.63'  
Inclination: 20.19°  
Azimuth: 353.64°

SCALE CHANGE

6650 25' Sample Interval @ 6,750' MD

MD: 6,755'  
TVD: 6,727.36'  
Inclination: 25.0°  
Azimuth: 6.83°

gy, frm,  
i, sl calc  
sb  
SLTY SH: predy ltgy - ltgy brn, occ med gy, frm,  
ply - sb ply, occ sb blkly, slty - grty tex, sl calc

SLTY SH: predy ltgy - ltgy brn, sme med gy, sft -  
frm, predy ply - sb ply, occ sb blkly, slty - grty  
tex, sl calc

SLTY SH: predy ltgy - ltgy brn, sme med gy, sft -  
frm, predy ply - sb ply, occ sb blkly, slty - grty  
tex, sl calc

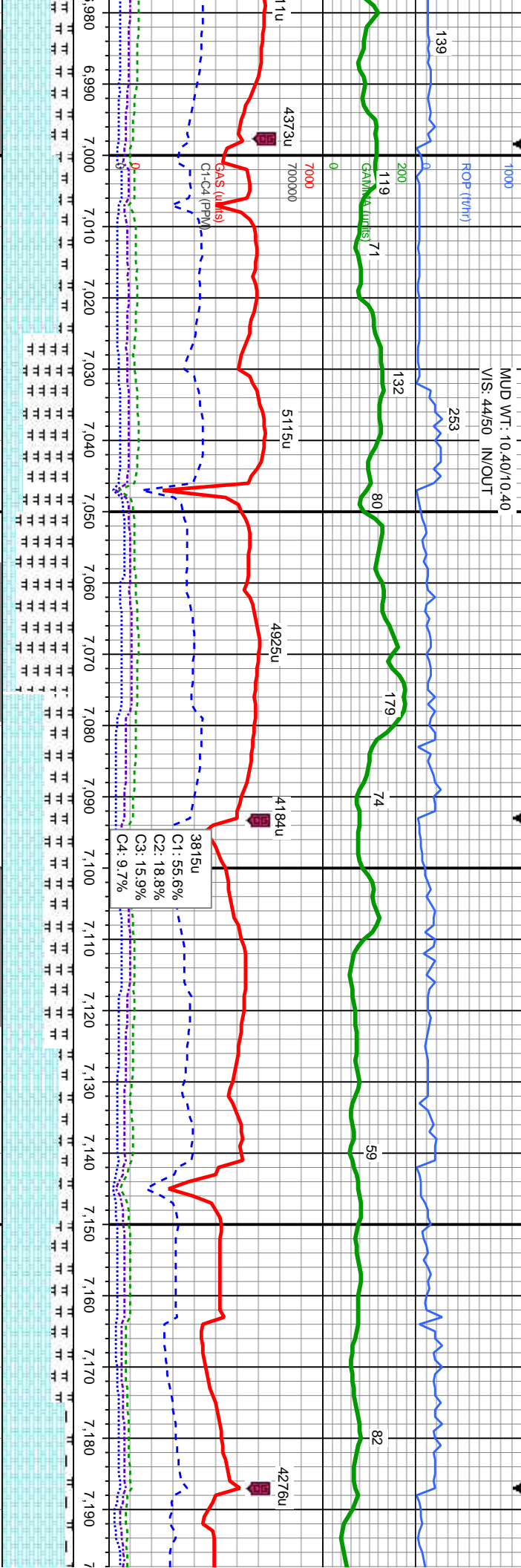
SLTY SH: predy ltgy - ltgy brn, sme med gy, sft -  
frm, predy ply - sb ply, occ sb blkly, slty - grty  
tex, sl calc

SLTY SH: predy ltgy - ltgy brn, sme med gy, sft -  
frm, predy ply - sb ply, occ sb blkly, slty - grty  
tex, sl calc



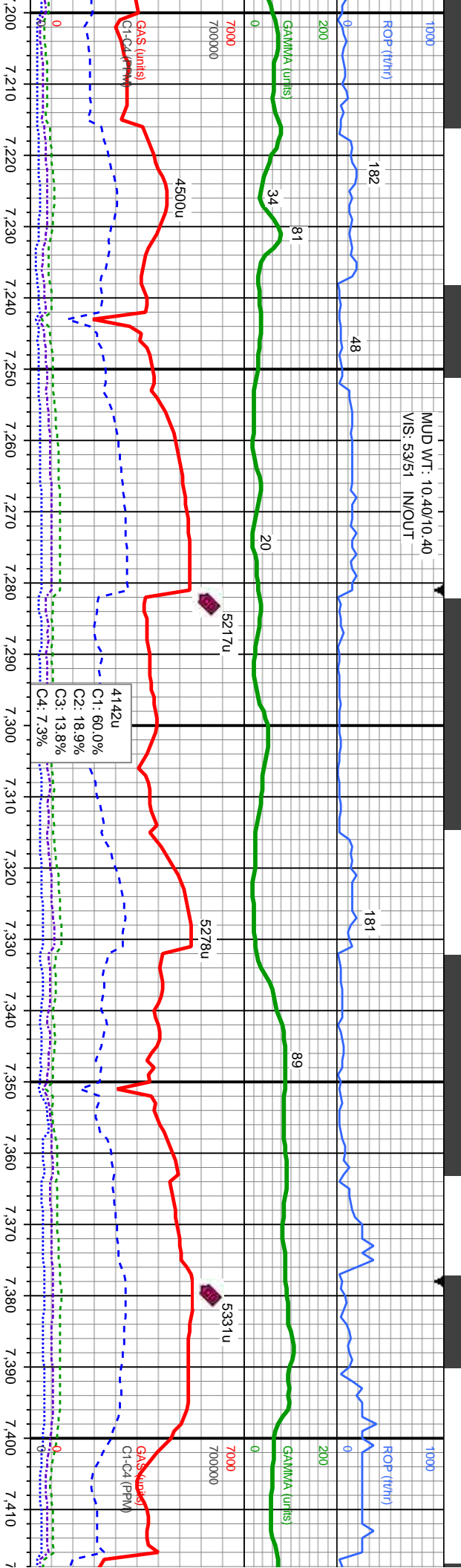






SCALE CHANGE		C CHALK		Nio C Marl Top @		Nio D Chalk Top @			
MD: 6.992'	TVD: 6.914.31'	MD: 7.039'	TVD: 6.943.21'	MD: 7.087'	TVD: 6.969.24'	MD: 7.134'	TVD: 6.990.64'	MD: 7.182'	TVD: 7.008.92'
Inclination: 49.96°		Inclination: 54.14°		Inclination: 60.14°		Inclination: 65.68°		Inclination: 69.54°	
Azimuth: 356.72°		Azimuth: 355.75°		Azimuth: 355.44°		Azimuth: 355.08°		Azimuth: 356.11°	
CHK: It tan - lly, mot wi wh, lam, v sft - frm, sb pty - sb blk, rhy tex, v calc, sme bent, sme fos frag		CHK: It tan - lly, mot wi wh, lam, v sft - frm, sb pty - sb blk, rhy tex, v calc, tr bent, tr fos frag		CHK: off wh - v lt tan - lly, lam, frm - mod hd, sb pty - sb blk, v calc, no bent, tr fos frag		CHK: off wh - v lt tan - lly, lam, frm - mod hd, sb pty - sb blk, v calc, no bent, tr fos frag		CHK: off wh - v lt tan - lly, lam, frm - mod hd, sb pty - sb blk, v calc, no bent, tr fos frag	
MRL: It - med gy, rr blk, frm - hd, sb pty - sb blk, sily - grty tex		MRL: It - med gy, rr blk, frm - hd, sb pty - sb blk, sily - grty tex		MRL: It - med gy, rr blk, frm - hd, sb pty - sb blk, sily - grty tex		MRL: It - med gy, rr blk, frm - hd, sb pty - sb blk, sily - grty tex		MRL: It - med gy, rr blk, frm - hd, sb pty - sb blk, sily - grty tex	
7300									





Fort Hays Top @  
7.233' MD: 7.025' TVD

MD: 7.277'  
TVD: 7.035.96'  
Inclination: 77.15°  
Azimuth: 356.05°  
D CHALK

Codell Top @  
7.337' MD: 7.046' TVD

MD: 7.389'  
TVD: 7.051.13'  
Inclination: 86.8°  
Azimuth: 359.72°

TVD (ft)

TVD (ft)

CHK: off wh - v lt tan - ltgy, lam, frm - mod hd, sb  
ply - sb blk, v calc, no bent, tr fos frag  
MRL: lt - med gy, rr blk, frm - hd, sb ply - sb blk,  
sily - grty tex  
LS: wh-off wh, microxin - cryptoxin, sft - sily frm, v  
calc / 300

LS: wh-off wh - lt tan, microxin - cryptoxin, sft -  
frm, occ hd, v calc

LS: wh-off wh - lt tan, microxin - cryptoxin, sft -  
frm, occ hd, v calc;  
SHY SS: lt - med gy, sme s&p, f gr, sb ang - sb  
blk, prly strd, frm - mod hd w/ brit clus, calc  
cnt

LS: wh-off wh - lt tan, microxin - cryptoxin, sft -  
frm, occ hd, v calc  
SHY SS: lt - med gy, sme s&p, f gr, sb ang - sb  
blk, prly strd, frm - mod hd w/ brit clus, calc  
cnt, v sl tr bent frags;  
SLTY SH: predy ltgy - ltgy brn, occ med gy, frm,  
ply - sb ply, occ sb blk, sily - grty tex, v sl  
calc

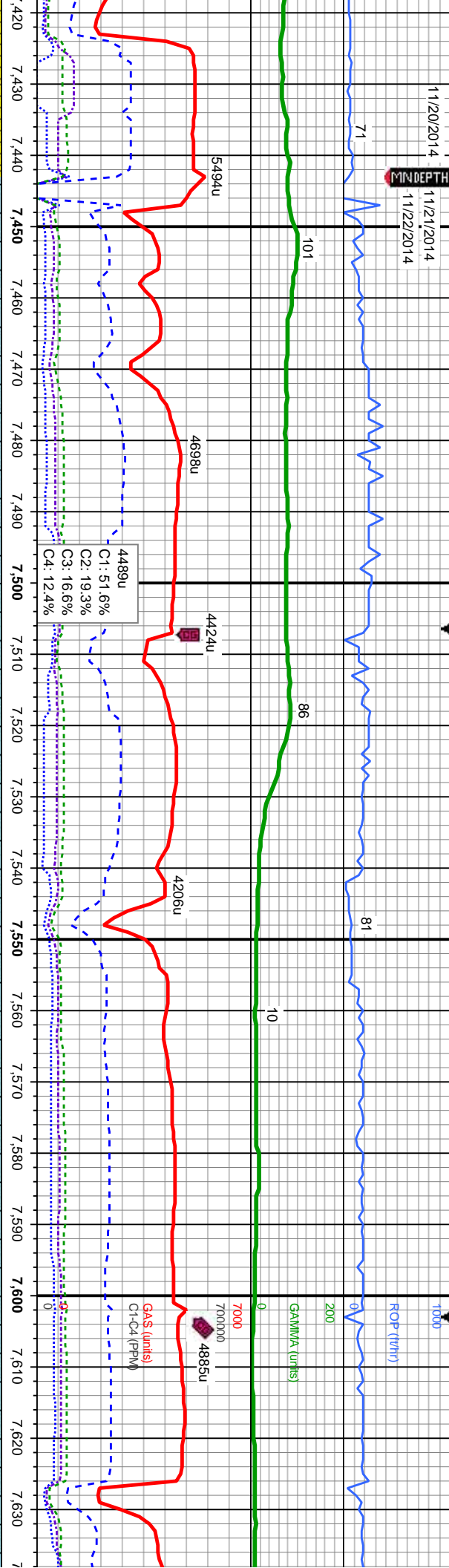
SHY SS: lt gy, occ  
blk, prly strd, frm  
cnt  
SLTY SH: predy lt  
ply - sb ply, occ





11/20/2014 11/21/2014  
11/22/2014

MINDEPTH



TOOH @ 7,443 MD  
to run 7" casing

Bit Data  
Bit #: 3  
Type: ULTERRA  
Model: U516S  
Size: 6.12"  
Depth In: 7,443  
Jets: 5X13

50' Sample Interval @ 7,450' MD  
MD: 7,480'  
TVD: 7,052.38'  
Inclination: 91.63°  
Azimuth: 359.14°

MD: 7,543'  
TVD: 7,051.13'  
Inclination: 90.65°  
Azimuth: 357.02°

6900

MD: 7,636'  
TVD: 7,05  
Inclination:  
Azimuth:

wh, s&p, f gr, sb ang - sb  
- mod hd w brit clus, calc  
- llyy brn, occ med gy, frm,  
sb blkly, silty - grty tex, sl calc

90% SHY SS: lt - med gy, occ wh, s&p, f gr, sb  
ang - sb blkly, prty strd, frm - mod hd w brit clus,  
calc cnt  
10% LS: wh-off wh - lt tan, microxln - cryptoxln,  
sft - frm, occ hd, v calc

50% SHY SS: lt - med gy, occ wh, s&p, f gr, sb  
ang - sb blkly, prty strd, frm - mod hd w brit clus,  
calc cnt  
50% LS: wh-off wh - lt tan, microxln - cryptoxln,  
sft - frm, occ hd, v calc

100% LS: wh-off wh - lt tan, microxln - cryptoxln,  
sft - frm, occ hd, v calc

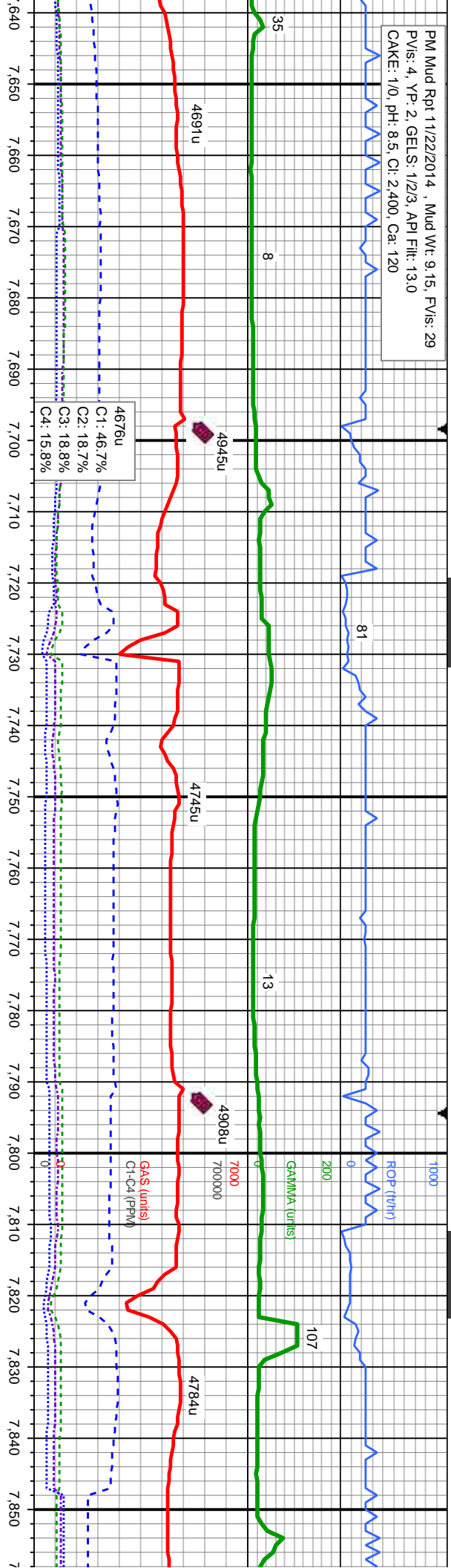
100% LS: wh-off wh - lt tan, microxln -  
sft - frm, occ hd, v calc

TVD (ft)





CAKE: 1/0, pH: 8.5, Cl: 2,400, Ca: 120



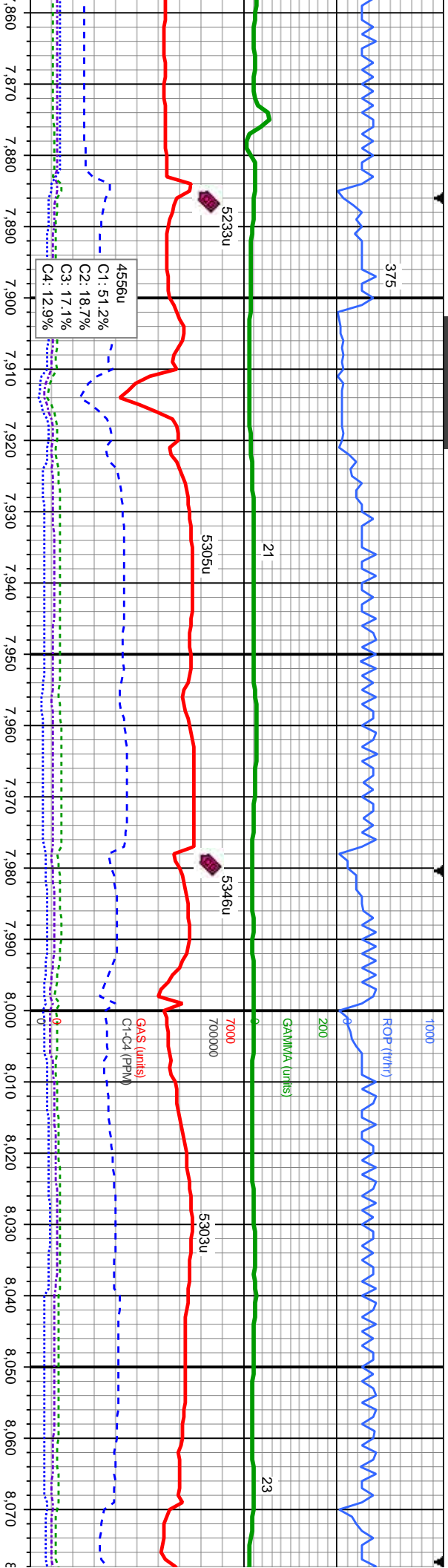
MD: 7,733'  
TVD: 7,049.39'  
Inclination: 91.51°  
Azimuth: 357.26°

MD: 7,826'  
TVD: 7,046.84'  
Inclination: 91.63°  
Azimuth: 357.49°

10% SHY SS: lt - med gy, occ wh, s&p, f gr, ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmnt  
90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc

10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly srt'd, frm - mod hd w/ brt' clus, calc cmt			
90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc			
7390			

10% St-  
ang - st  
calc cm  
90% LS  
st - frm



MD: 7.920'  
TVD: 7.046.11'  
Inclination: 89.26°  
Azimuth: 357.69°

6900

MD: 8.013'  
TVD: 7.046.31'  
Inclination: 90.49°  
Azimuth: 358.06°

TVD (ft)

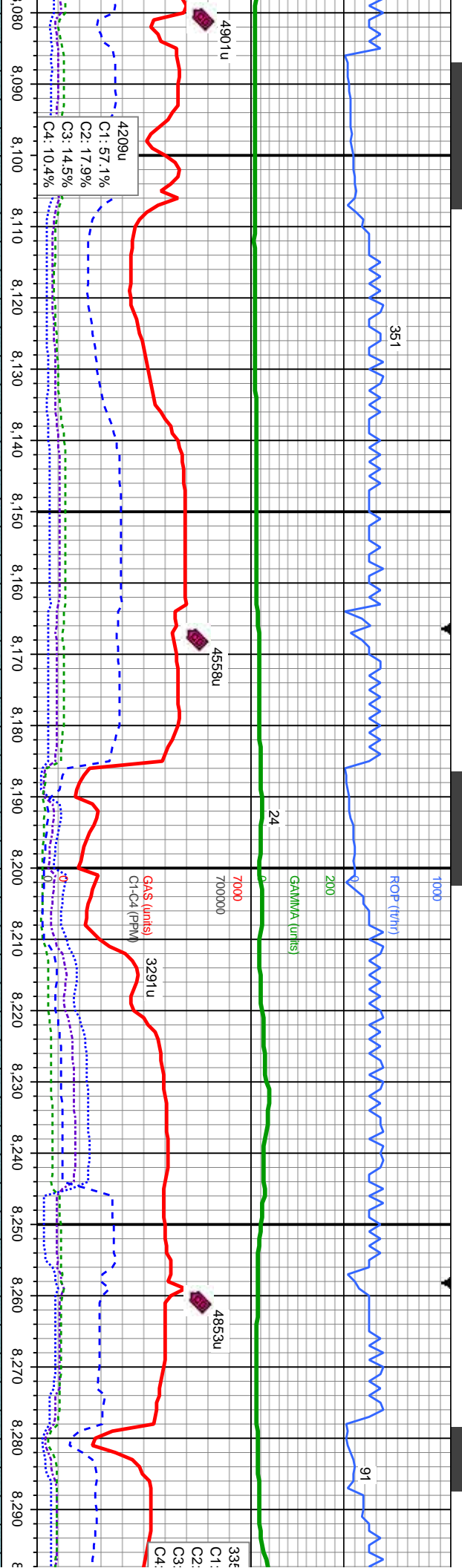
10% SHY SS: lt - med gy, occ wh, s&g, f gr, sb  
ang - sb blkly, prly strd, frm - mod hd w/ brit clus,  
calc cmt  
90% LS: wh-off wh - lt tan, microxin - cryptoxin,  
sft - frm, occ hd, v calc

10% SHY SS: lt - med gy, occ wh, s&g, f gr, sb  
ang - sb blkly, prly strd, frm - mod hd w/ brit clus,  
calc cmt  
90% LS: wh-off wh - lt tan, microxin - cryptoxin,  
sft - frm, occ hd, v calc

10% SHY SS: lt - med gy, occ wh, s&g, f gr, sb  
ang - sb blkly, prly strd, frm - mod hd w/ brit clus,  
calc cmt  
90% LS: wh-off wh - lt tan, microxin - cryptoxin,  
sft - frm, occ hd, v calc







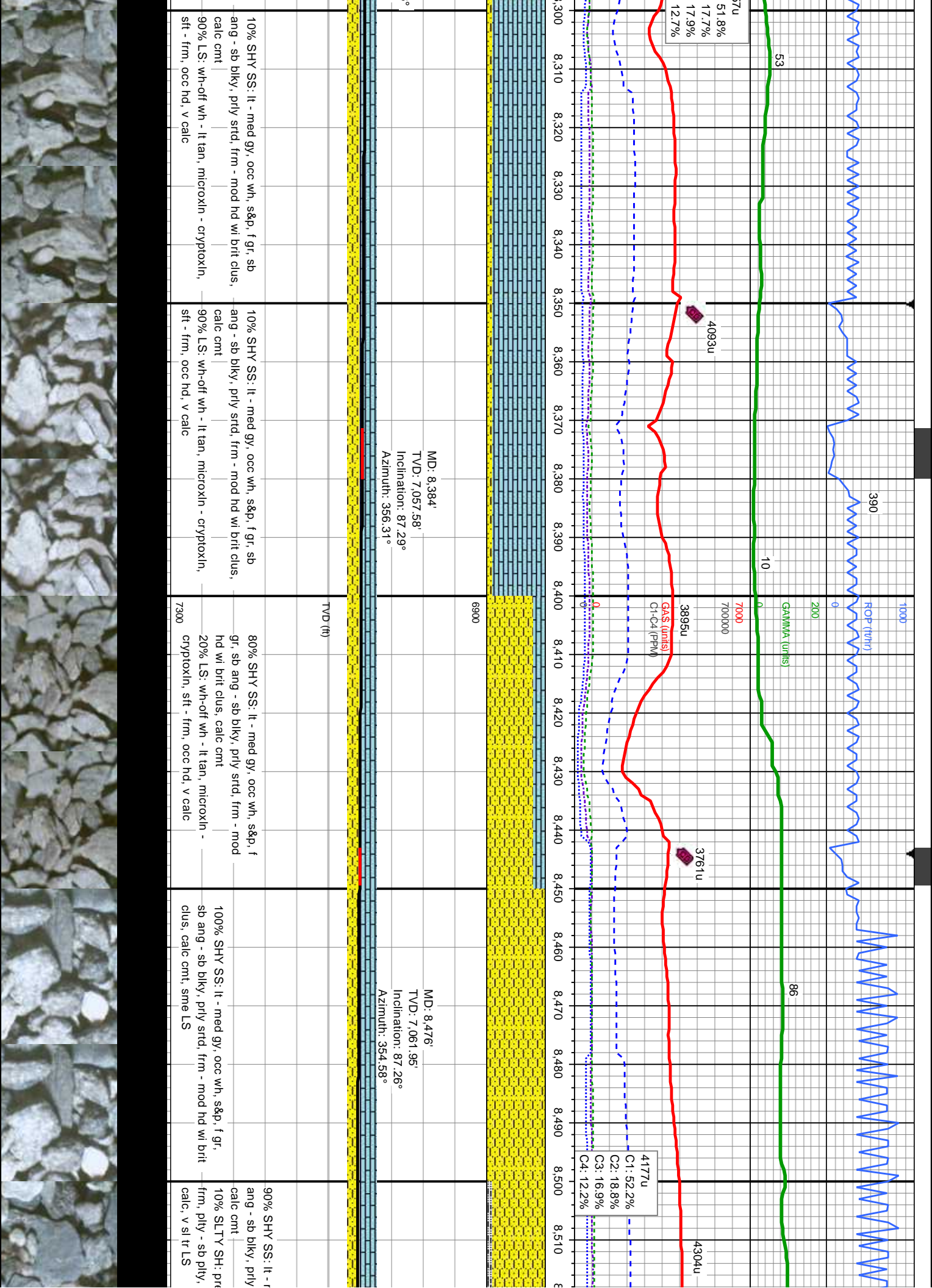
MD: 8,106'  
TVD: 7,046.47'  
Inclination: 89.32°  
Azimuth: 357.32°

MD: 8,198'  
TVD: 7,049.06'  
Inclination: 87.45°  
Azimuth: 358.36°

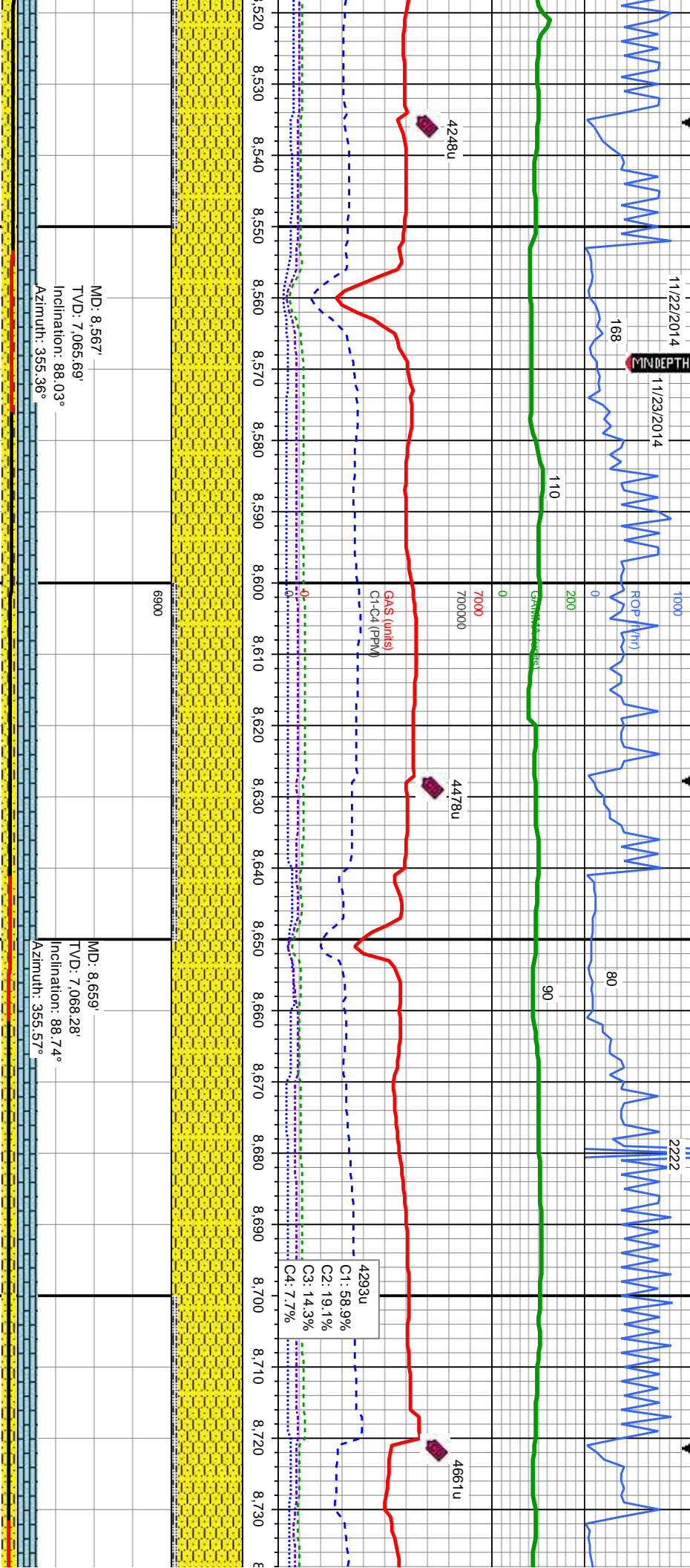
MD: 8,291'  
TVD: 7,053.25'  
Inclination: 87.38°  
Azimuth: 356.75°

c wh, s&p, f gr, sb mod hd wi brit clus, microxln - cryptoxln,	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc
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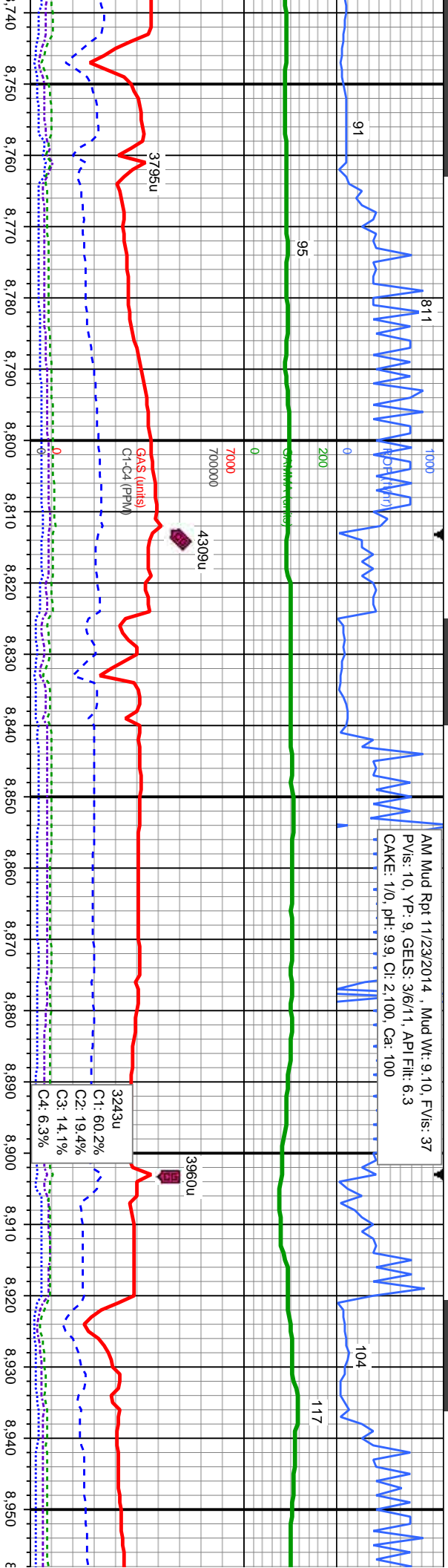




med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, v sl tr LS
med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	90% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt
med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	10% SLTY SH: predy lly - lly brn, occ med gy, frm, ply - sb ply, occ sb blkly, slty - grly tex, sl calc, v sl tr LS
med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, v sl tr LS
med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	90% SHY SS: lt - med gy, occ wh, s&p, - sb blkly, prly strd, frm - mod hd wi brit cmt
med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus,	10% SLTY SH: predy lly - lly brn, occ frm, ply - sb ply, occ sb blkly, slty - grly calc, v sl tr LS



AM Mud Rpt 11/23/2014 , Mud Wt: 9.10, FVIs: .37  
PVs: 10, YP: 9, GEELS: 3/6/11, API Filtr: 6.3  
CAKE: 1/0, pH: 9.9, Cl: 2.100, Ca: 100



3243u  
C1: 60.2%  
C2: 19.4%  
C3: 14.1%  
C4: 6.3%

MD: 8.751'  
TVD: 7,069.59'  
Inclination: 89.63°  
Azimuth: 357.8°

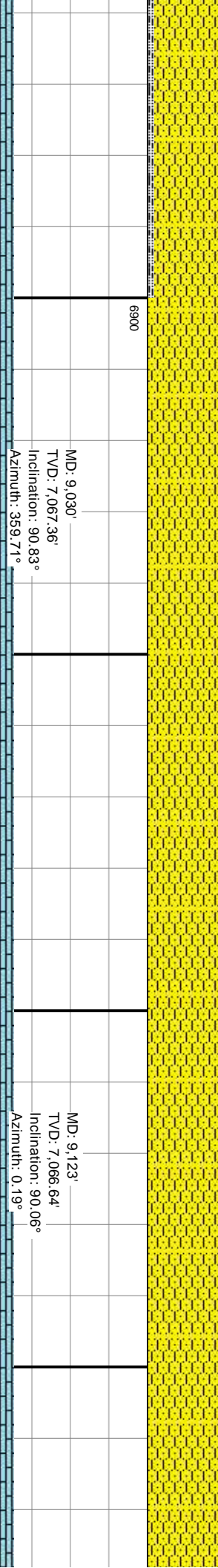
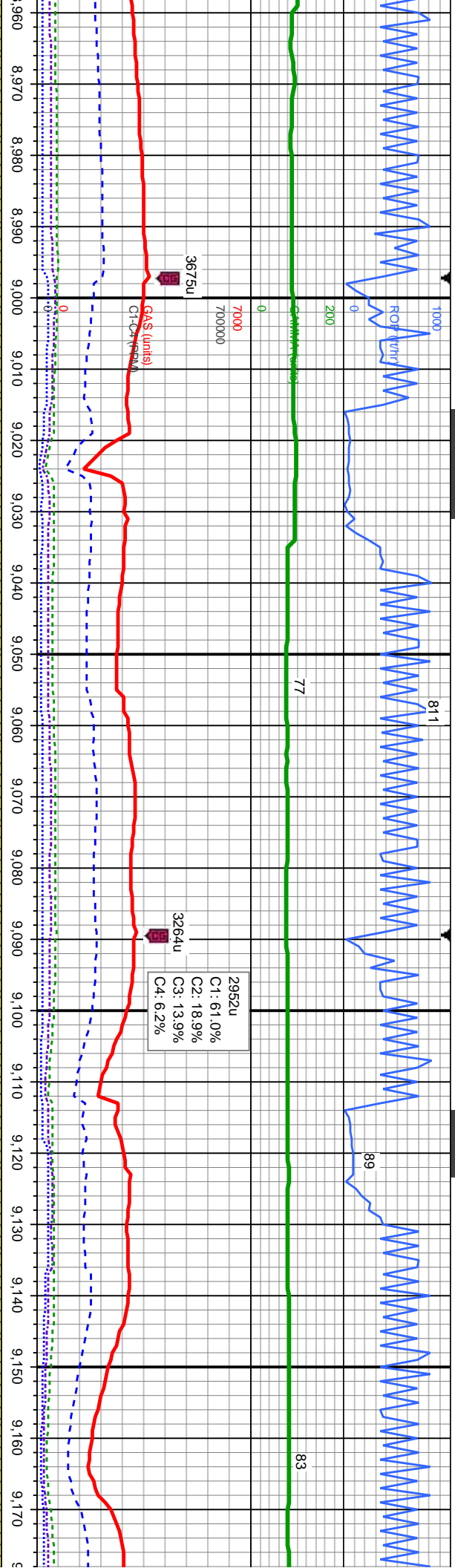
MD: 8.844'  
TVD: 7,069.64'  
Inclination: 90.31°  
Azimuth: 358.69°

MD: 8.936'  
TVD: 7,068.73'  
Inclination: 90.83°  
Azimuth: 359.08°

gr, sb ang	90% SHY SS: lt - med gy, occ wh, s&p, f gr,	90% SHY SS: lt - med gy, occ wh, s&p, f gr,	90% SHY SS: lt - med gy, occ wh, s&p, f gr,
clus, calc	sb ang - sb blkly, prly strd, frm - mod hd wi brit	sb ang - sb blkly, prly strd, frm - mod hd	sb ang - sb blkly, prly strd, frm - mod hd wi brit
med gy,	10% SLTY SH: predy ltgy - ltgy brn, occ med	10% SLTY SH: predy ltgy - ltgy brn, occ	10% SLTY SH: predy med gy, occ dk gy, frm,
tex, sl	gy, frm, pily - sb pily, occ sb blkly, slty - grty	med gy, frm, pily - sb pily, occ sb blkly, slty	pily - sb pily, occ sb blkly, slty - grty tex, sl
	tex, sl calc	grty tex, sl calc, v sl tr LS	calc, v sl tr LS

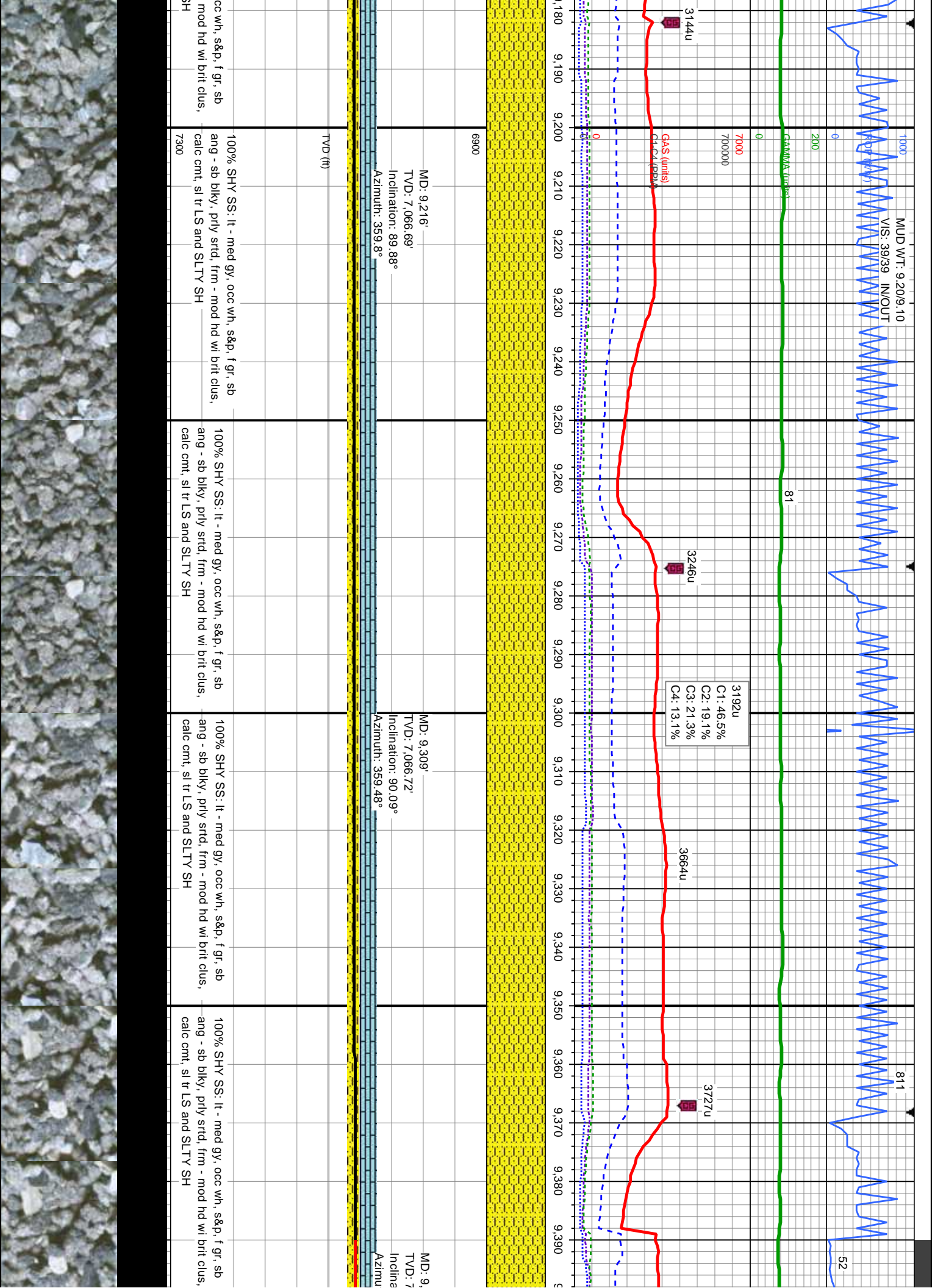




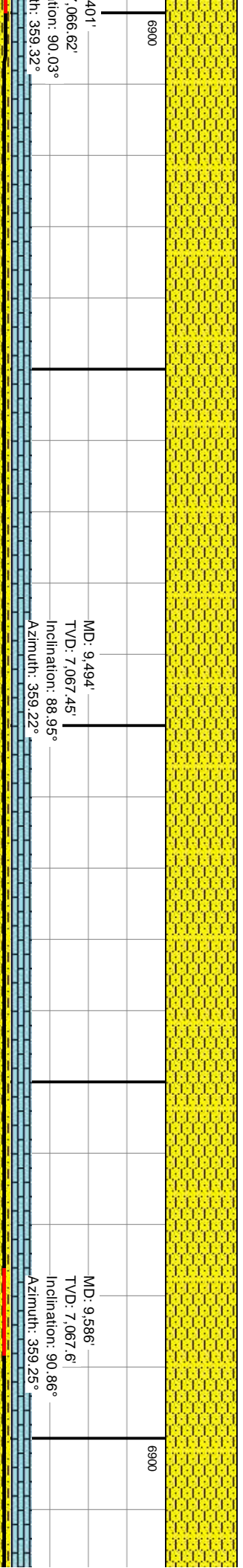
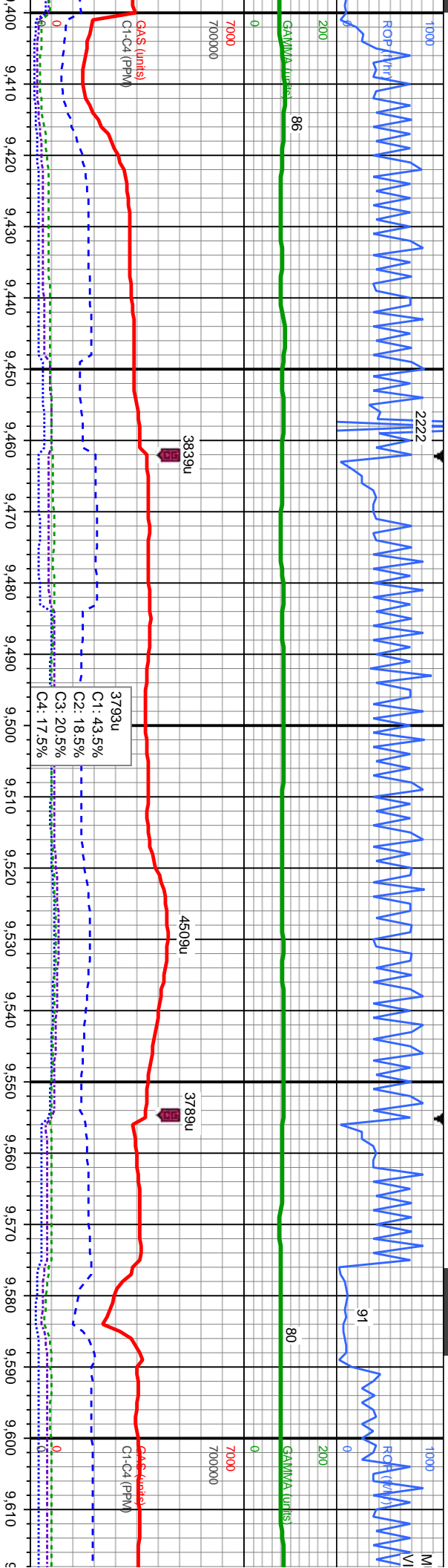


HY SS: lt - med gy, occ wh, s&p, f gr, - sb blkly, prly strd, frm - mod hd wi brit calc cmt	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH
SLTY SH: predy med gy, occ dk gy, frm, b ply, occ sb blkly, silty - grty tex, sl sl tr LS	7300		



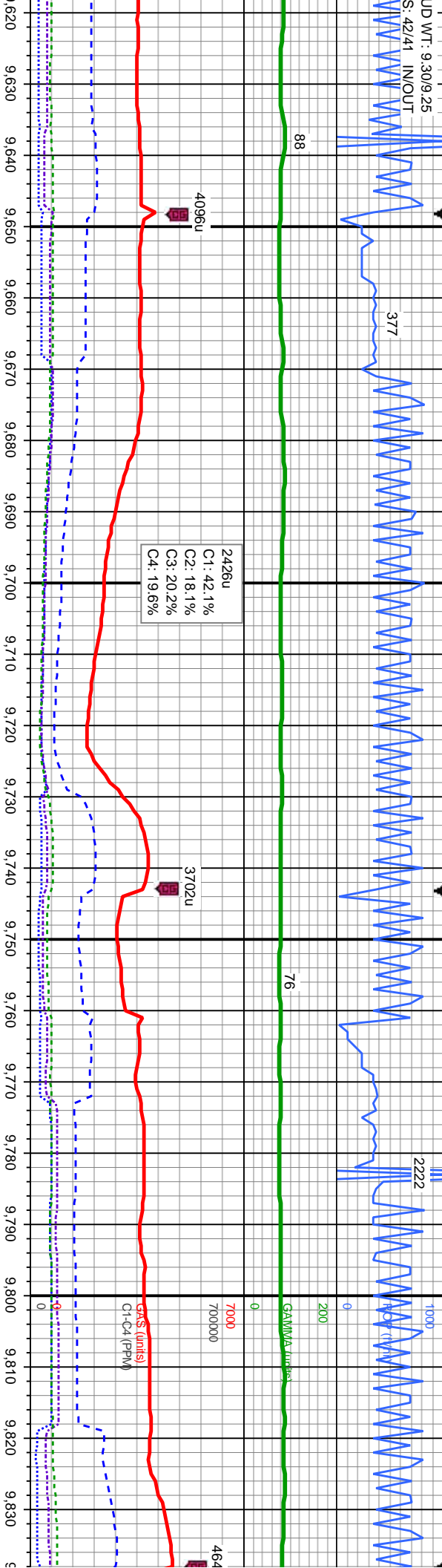






100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH
7300	7300	7300	7300





MD: 9.681'  
TVD: 7,066.07'  
Inclination: 90.99°  
Azimuth: 359.2°

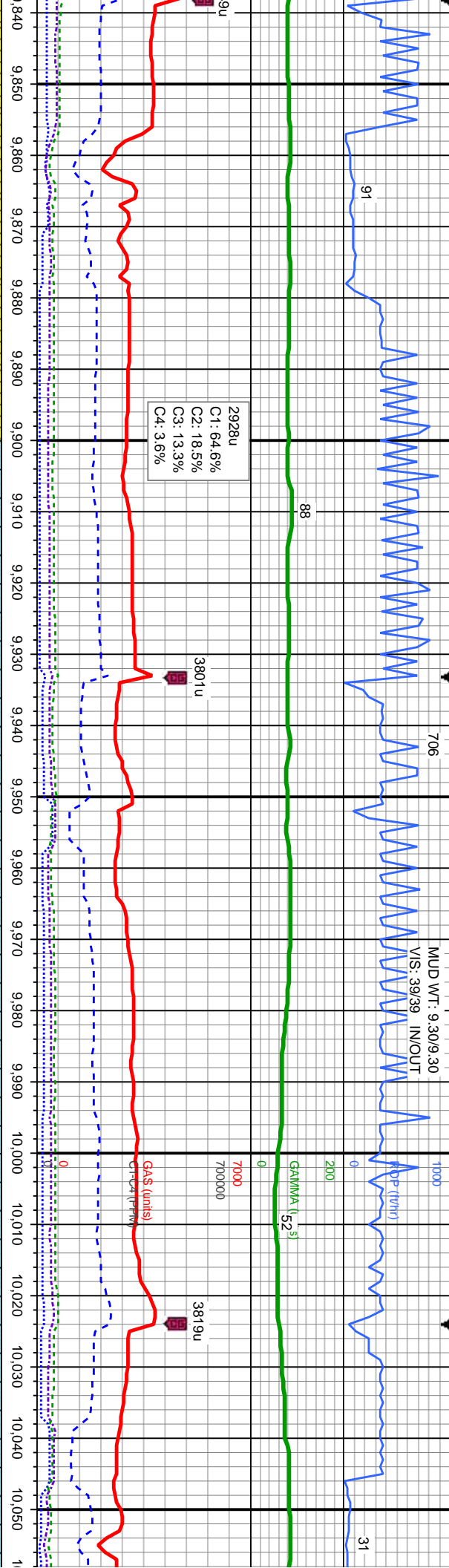
MD: 9.776'  
TVD: 7,064.25'  
Inclination: 91.2°  
Azimuth: 357.94°

med gy, occ wh, s&p, f gr, sb strd, frm - mod hd wi brit clus, and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sl tr LS and SLTY SH
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TVD (ft)







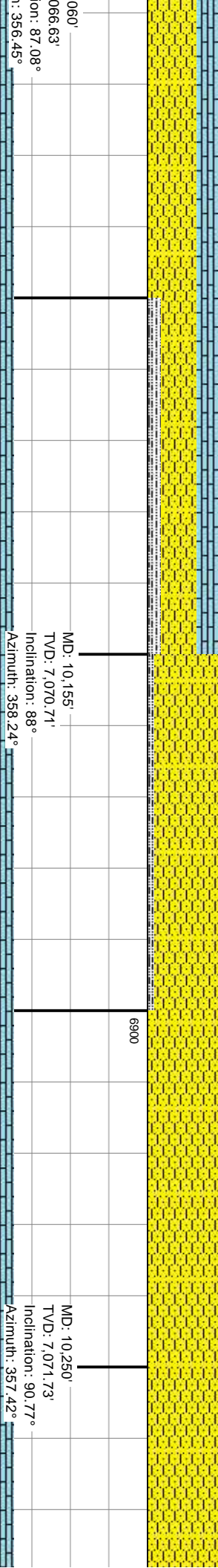
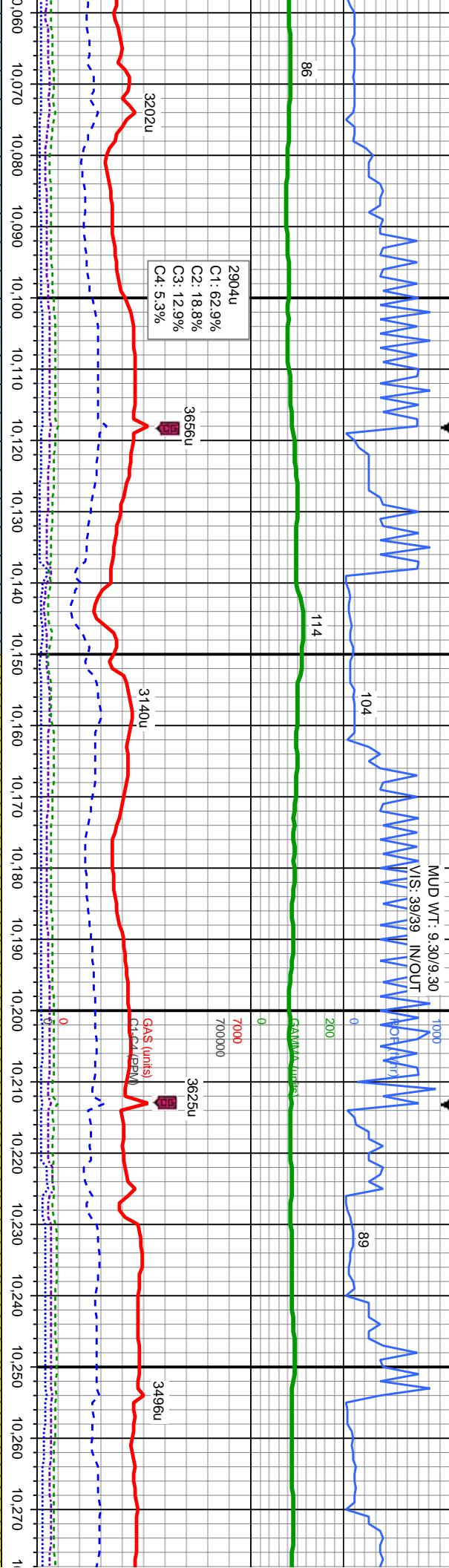
MD: 9.871'  
TVD: 7,063.07'  
Inclination: 90.22°  
Azimuth: 359.1°

MD: 9.965'  
TVD: 7,063.55'  
Inclination: 89.2°  
Azimuth: 357.46°

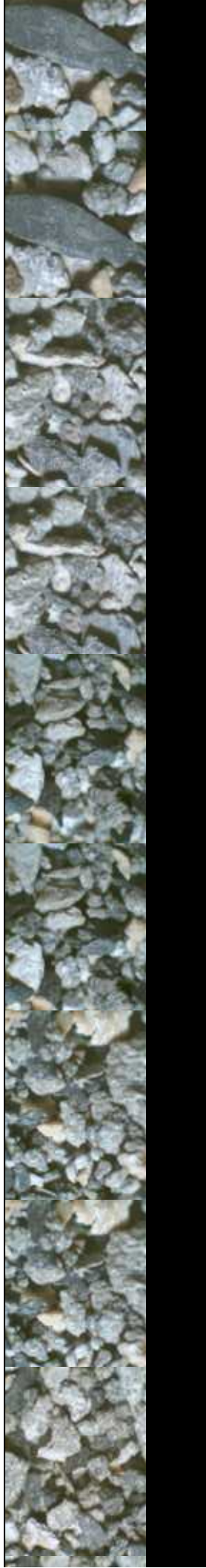
MD: 10.  
TVD: 7.  
Inclinat  
Azimuth

f gr, sb brit clus,	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt, sft tr LS and SLTY SH	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt 30% LS: wh-off wh - lt tan, microxin - cryptoxln, sft - frm, occ hd, v calc	60% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt 40% LS: wh-off wh - lt tan, microxin - cryptoxln, sft - frm, occ hd, v calc	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cmt 30% LS: wh-off wh - lt tan, microxin - cryptoxln, sft - frm, occ hd, v calc	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cm 30% LS: sft - frm



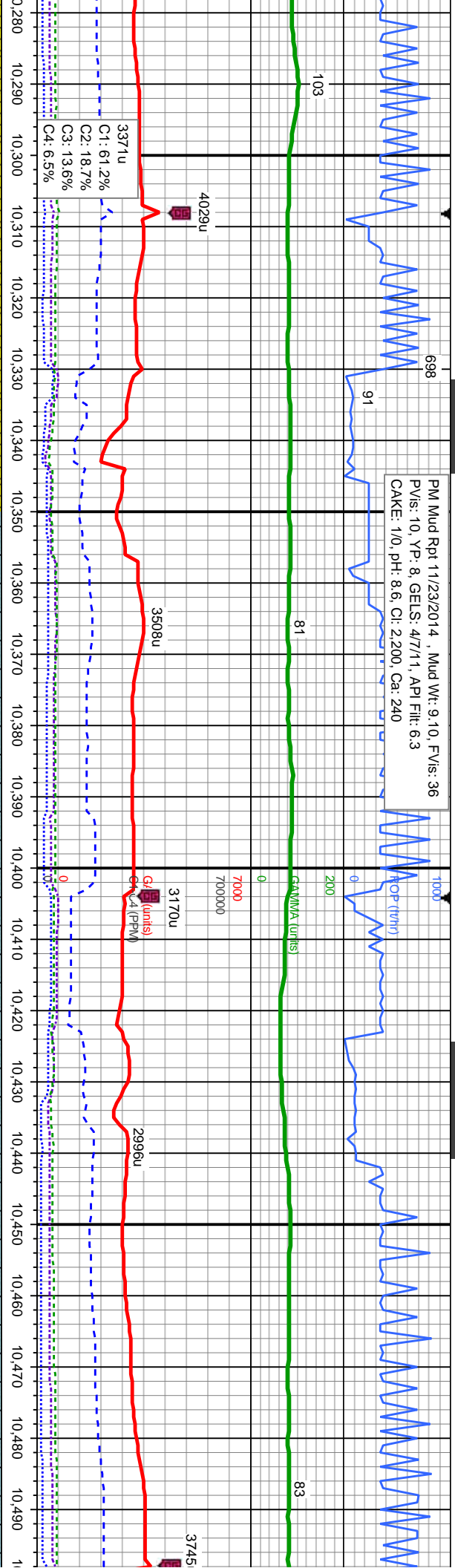


060'	MD: 10.155'
066.63'	TVD: 7.070.71'
Ion: 87.08°	Inclination: 88°
Ion: 356.45°	Azimuth: 358.24°
50% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt	90% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt, wi tr LS
30% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	10% SLTY SH: predy med gy, occ dk gy, frm, ply - sb ply, occ sb blkly, silty - grty tex, sl calc
20% SLTY SH: predy med gy, occ dk gy, frm, ply - sb ply, occ sb blkly, silty - grty tex, sl calc	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt, wi tr LS and SLTY SH
7300	7300





PM Mud Rpt 11/23/2014 , Mud Wt: 9.10, FV/s: 36  
PV/s: 10, YP: 8, GELS: 4/7/11, API Filtr: 6.3  
CAKE: 1/0, pH: 8.6, Cl: 2.200, Ca: 240



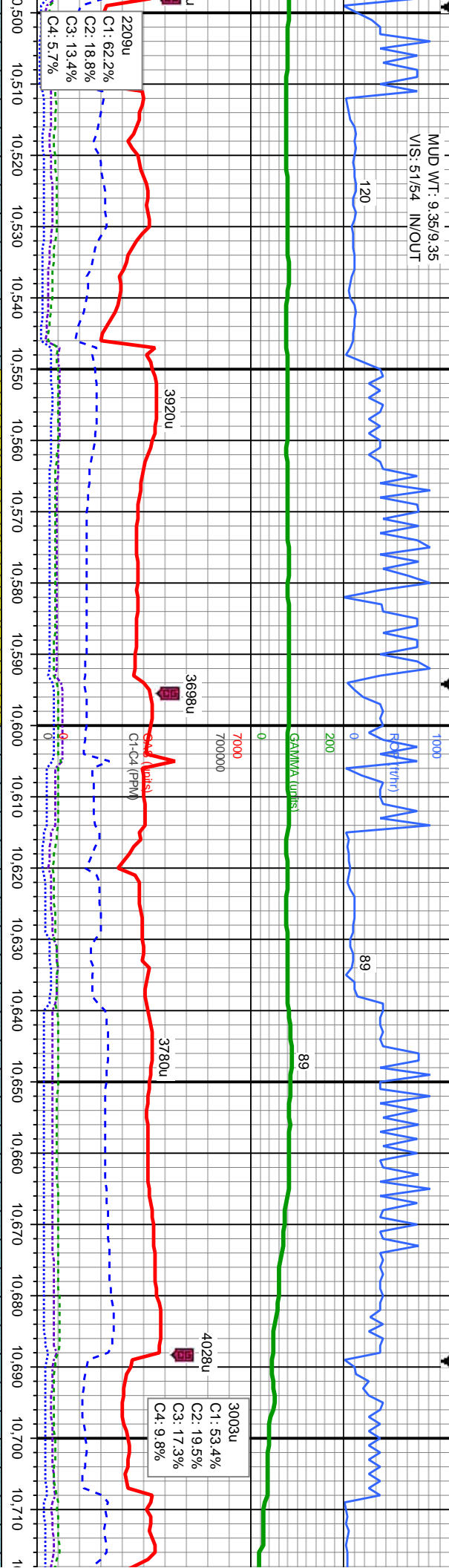
MD: 10.345'  
TVD: 7,069.33'  
Inclination: 92.13°  
Azimuth: 0.09°

MD: 10.439'  
TVD: 7,068.96'  
Inclination: 88.31°  
Azimuth: 358.07°

cc wh, s&p, f gr, sb mod hd wi brit clus, SH	100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt, wi tr LS and SLTY SH	80% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 20% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	80% SHY SS: lt - med gy, occ wh, s&p, f gr, sb sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 20% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc	80% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 20% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, v calc
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MUD WT: 9.36/9.35  
VIS: 51/54 IN/OUT



MD: 10.534'  
TVD: 7,070.16'  
Inclination: 90.25°  
Azimuth: 357.67°

MD: 10.629'  
TVD: 7,068.67'  
Inclination: 91.54°  
Azimuth: 0.1°

80% SHY SS: lt - med gy, occ wh, s&p, f gr, sb  
ang - sb blkly, prly strd, frm - mod hd wi brit clus,  
calc cnt  
20% LS: wh-off wh - lt tan, microxln - cryptoxln,  
sft - frm, occ hd, v calc

100% SHY SS: lt - med gy, occ wh, s&p, f gr, sb  
ang - sb blkly, prly strd, frm - mod hd wi brit clus,  
calc cnt

90% SHY SS: lt - med gy, occ wh, s&p, f  
gr, sb ang - sb blkly, prly strd, frm - mod hd  
wi brit clus, calc cnt  
10% LS: wh-off wh - lt tan, microxln -  
cryptoxln, sft - frm, occ hd, v calc

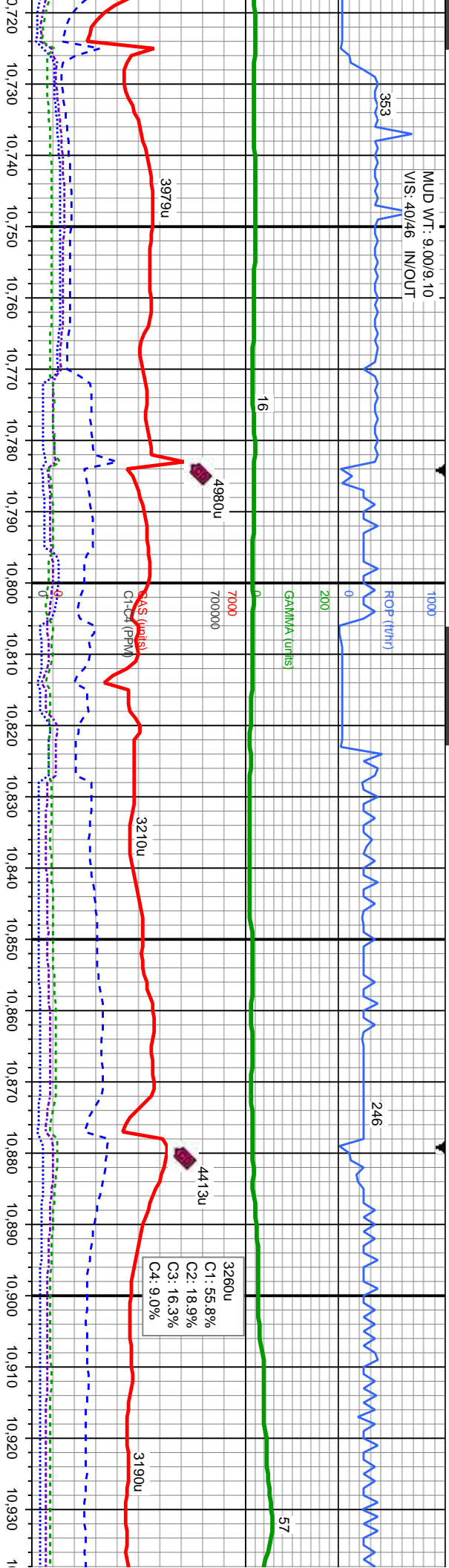
70% SHY SS: lt - med gy, occ wh, s&p, f  
gr, sb ang - sb blkly, prly strd, frm - mod hd  
wi brit clus, calc cnt  
30% LS: wh-off wh - lt tan, microxln -  
cryptoxln, sft - frm, occ hd, occ wh inoc  
foss, v calc

20% SHY SS: lt - r  
ang - sb blkly, prly  
calc cnt  
80% LS: wh-off wh  
sft - frm, occ hd, c





MUD WT: 9.00/9.10  
VIS: 40/46 IN/OUT



MD: 10.724'  
TVD: 7.067.32'  
Inclination: 90.09°  
Azimuth: 0.56°

MD: 10.819'  
TVD: 7.066.28'  
Inclination: 91.17°  
Azimuth: 1.48°

MD: 10.914'  
TVD: 7.063.49'  
Inclination: 92.19°  
Azimuth: 1.37°

med gy, occ wh, s&p, f gr, sb  
strd, frm - mod hd w brit clus,  
- lt tan, microxin - cryptoxln,  
occ wh inoc foss, v calc

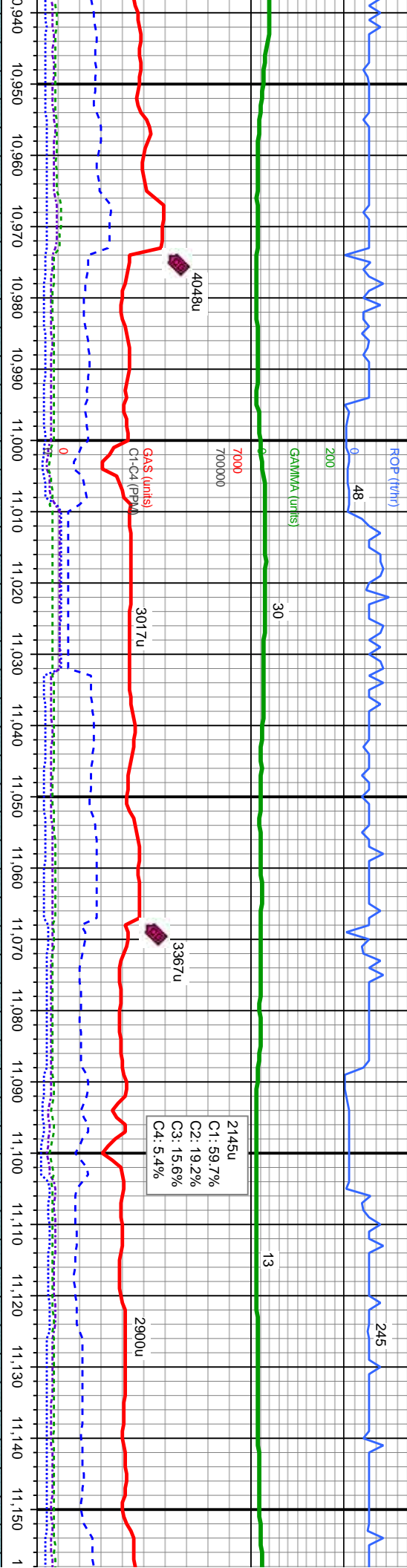
100% LS: wh-off wh - lt tan, microxin - cryptoxln,  
sft - frm, occ hd, v calc

100% LS: wh-off wh - lt tan, microxin -  
cryptoxln, sft - frm, occ hd, v calc

100% LS: wh-off wh - lt tan, microxin - cryptoxln,  
sft - frm, occ hd, v calc

20% SHY SS: lt - med gy, occ wh, s&p,  
ang - sb blkly, prly strd, frm - mod hd w  
calc cnt  
80% LS: wh-off wh - lt tan, microxin - c  
sft - frm, occ hd, occ wh inoc foss, v ce





MD: 11,009'  
TVD: 7,060.12'  
Inclination: 91.88°  
Azimuth: 2.36°

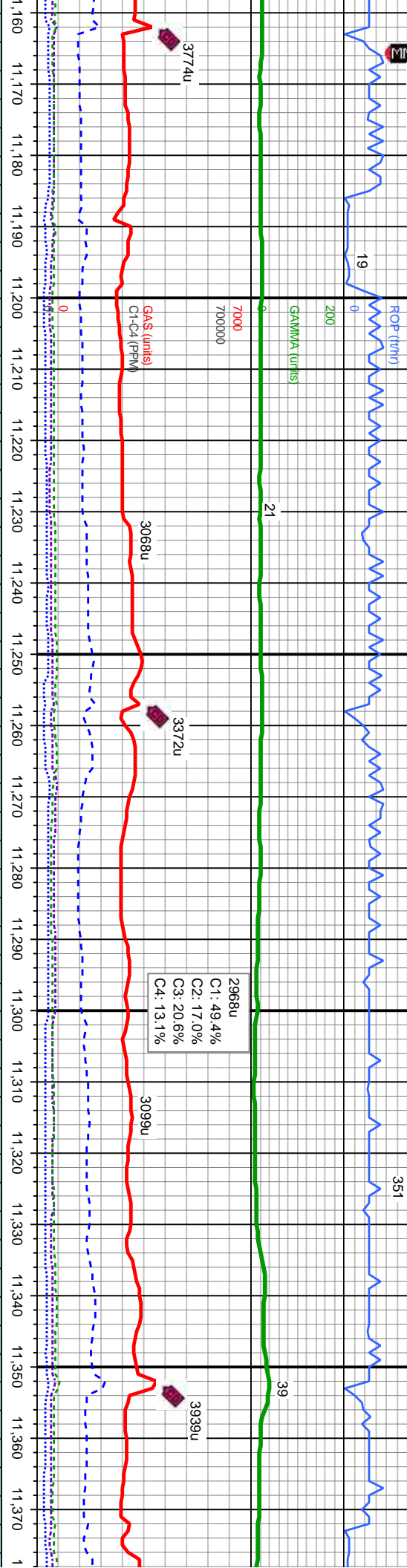
MD: 11,104'  
TVD: 7,058.3'  
Inclination: 90.31°  
Azimuth: 3.12°

TVD (ft)

f gr, sb brit clus,					
100% LS: wh-off wh - lt tan, microxn - cryptoxn, sft - frm, occ hd, v calc, occ scat calcite, sme	100% LS: wh-off wh - lt tan, microxn - cryptoxn, sft - frm, occ hd, v calc, sme SHY	100% LS: wh-off wh - lt tan, microxn - cryptoxn, sft - frm, occ hd, v calc, sme SHY	100% LS: wh-off wh - lt tan, microxn - cryptoxn, sft - frm, occ hd, v calc, occ scat calcite	100% LS: wh-off wh - lt tan, microxn - cryptoxn, sft - frm, occ hd, v calc	100% L sft - frm
SHY SS	SS				
7300					







MD: 11,199'  
TVD: 7,058.64'  
Inclination: 89.29°  
Azimuth: 3.43°

MD: 11,293'  
TVD: 7,058.66'  
Inclination: 90.68°  
Azimuth: 3.68°

TVD (ft)

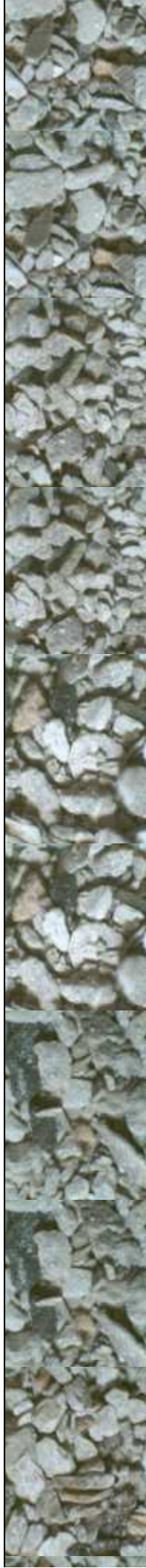
100% LS: wh-off wh, lt tan, microxin - cryptoxin, sft - frm, occ hd, v calc

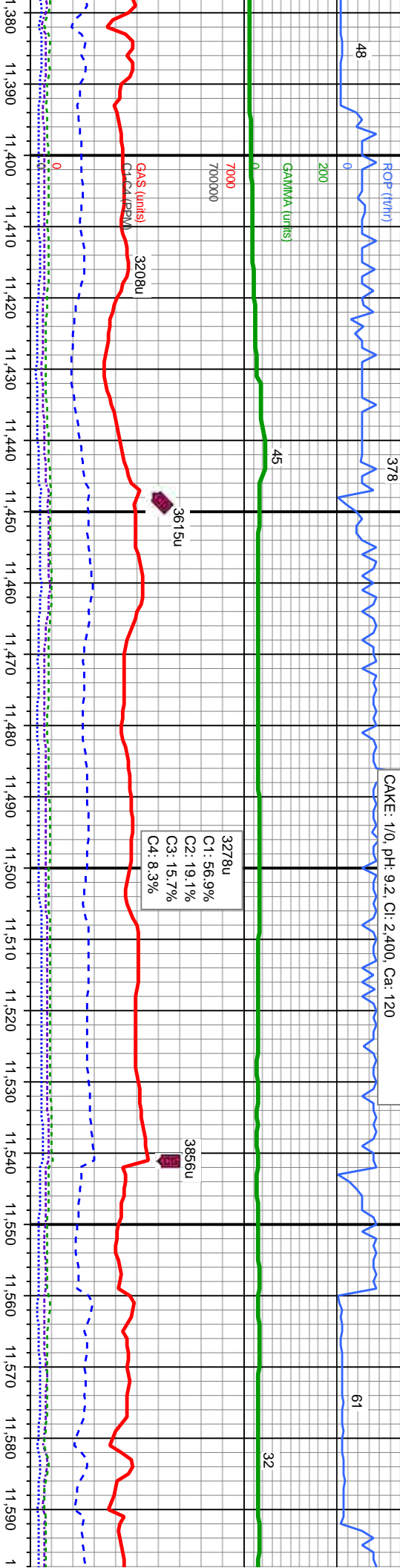
100% LS: wh-off wh, lt tan- crm, microxin - cryptoxin, sft - frm, occ hd, v calc

100% LS: wh-off wh, lt tan- crm, microxin - cryptoxin, sft - frm, occ hd, v calc

100% LS: wh-off wh, lt tan- crm, microxin - cryptoxin, sft - frm, occ hd, v calc, v sl tr SHY SS

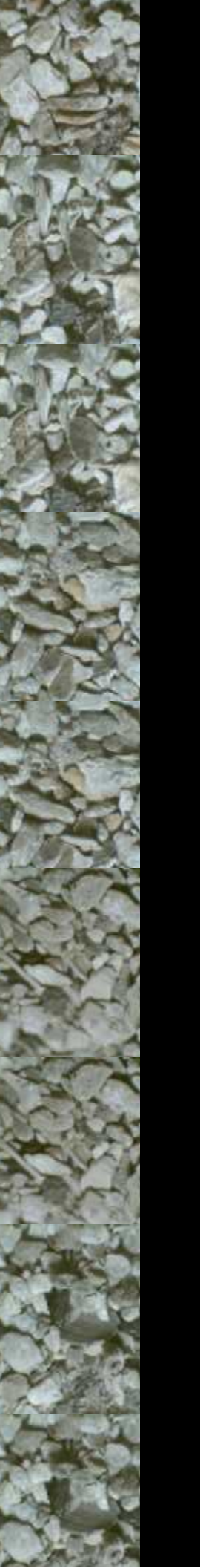
100% LS: wh-off wh, lt tan- crm, microxin - cryptoxin, sft - frm, occ hd, v calc, v sl tr SHY SS



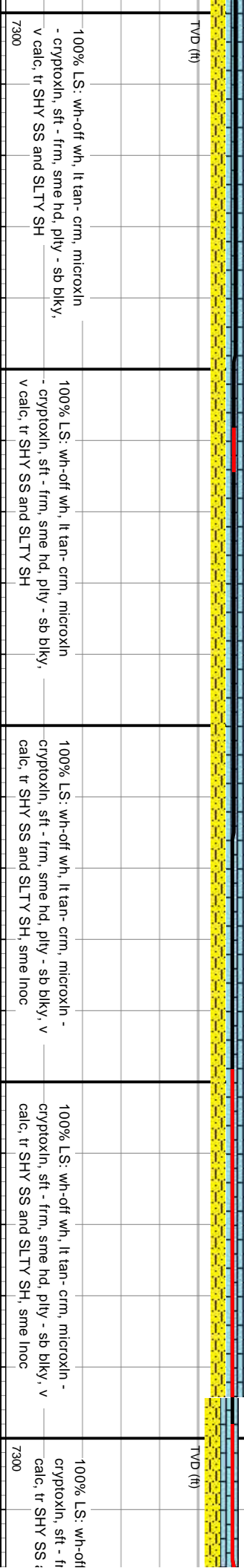
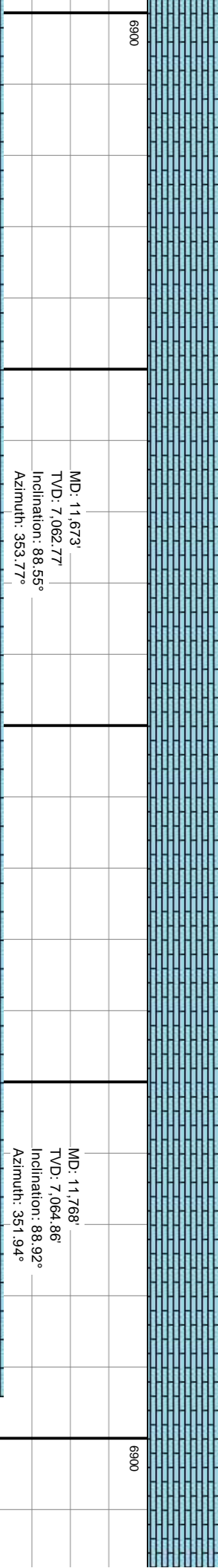
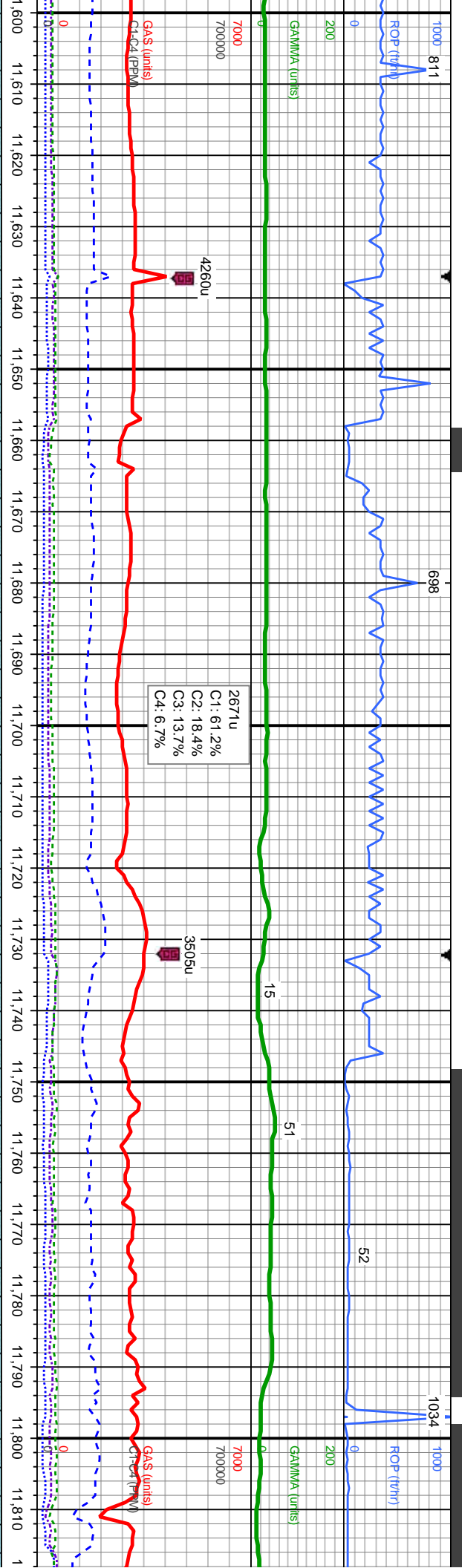


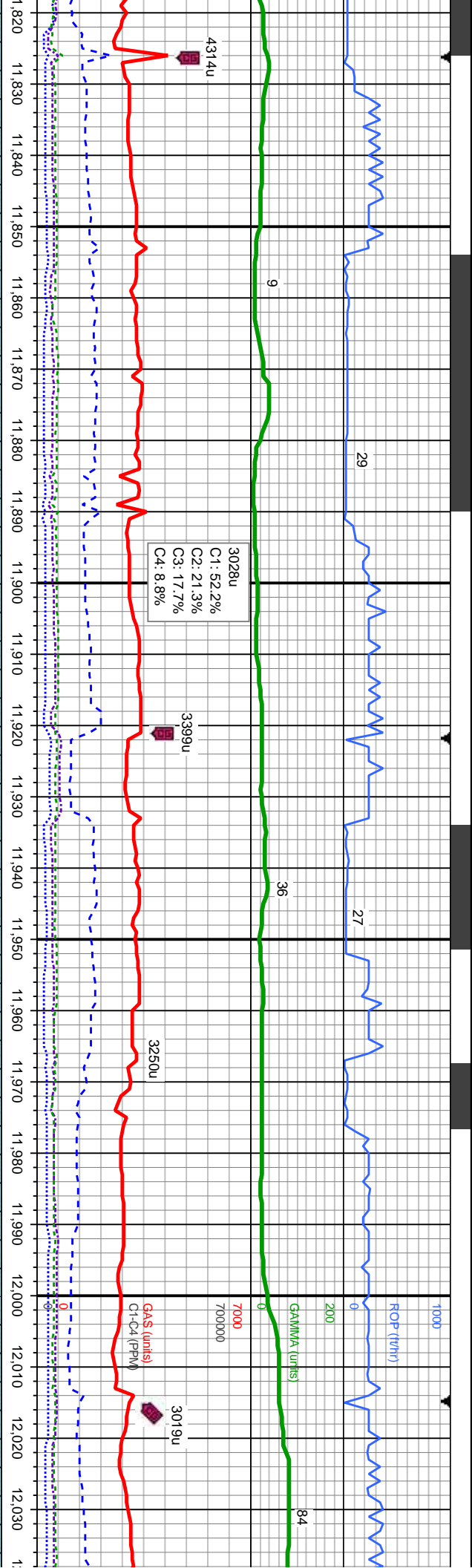
MD: 11,388' TVD: 7,058.79' Inclination: 89.17° Azimuth: 2.4°	6900	MD: 11,483' TVD: 7,059.57' Inclination: 89.88° Azimuth: 3.91°
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100% LS: wh-off wh, lt tan- crm, microxln - cryptoxln, sft - frm, occ hd, v calc, tr SHY SS	7300	100% LS: wh-off wh, lt tan- crm, microxln - cryptoxln, sft - frm, occ hd, v calc, tr SHY SS	100% LS: wh-off wh, lt tan- crm, microxln - cryptoxln, sft - frm, sme hd, pily - sb blkyy, v calc, tr SHY SS and SLTY SH	100% LS: wh-off wh, lt tan- crm, microxln - cryptoxln, sft - frm, sme hd, pily - sb blkyy, v calc, tr SHY SS and SLTY SH
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MD: 11,863'  
TVD: 7,062.62'  
Inclination: 93.79°  
Azimuth: 357.84°

D CHALK

MD: 11,958'  
TVD: 7,058.63'  
Inclination: 91.02°  
Azimuth: 0.24°

FT HAYS

CODELL

TVD (ft)

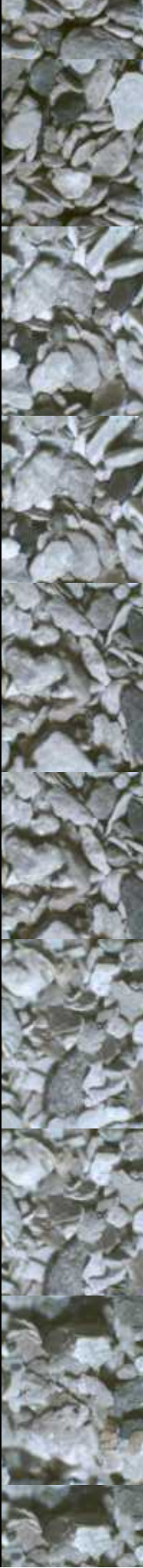
wh, lt tan- crm, microxln -  
m, sme hd, pily - sb blkly, v  
and SLTY SH, tr Inoc

100% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH

100% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH

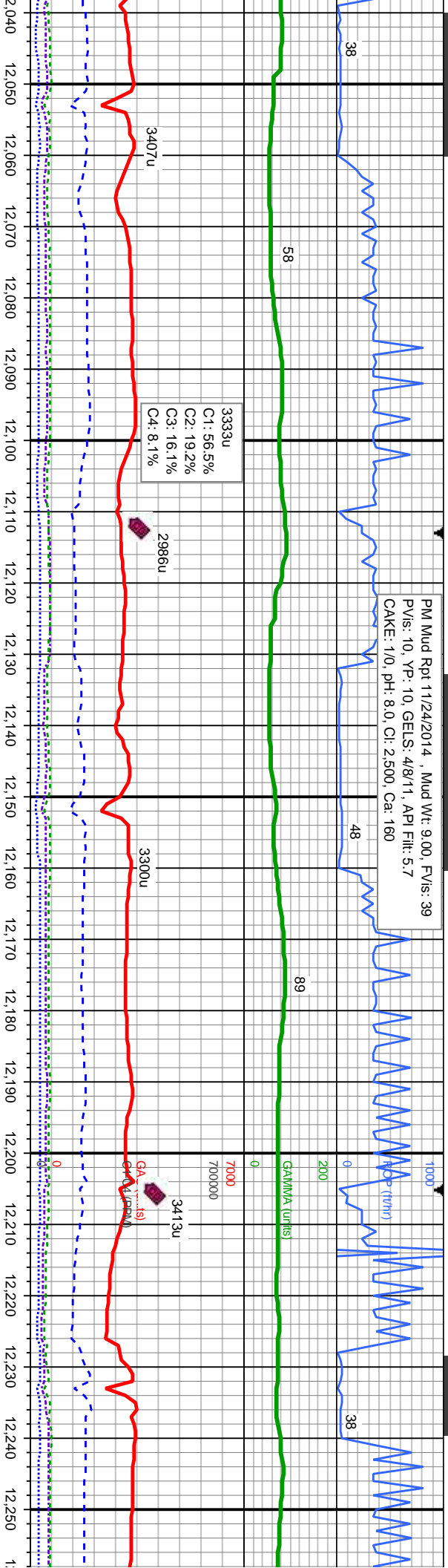
100% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH

40% LS: wh-off wh, lt tan- crm, microxln  
cryptoxln, sft - frm, sme hd, pily - sb blkly  
tr SHY SS and SLTY SH  
60% CHK: off wh - v lt tan - lgy, lam, fr  
hd, sb pily - sb blkly, v calc  
7300





PM Mud Rpt: 11/24/2014 , Mud Wt: 9.00, FV/s: 39  
PV/s: 10, YP: 10, GELS: 4/8/11, API Filtr: 5.7  
CAKE: 1/0, pH: 8.0, CI: 2,500, Ca: 160



MD: 12,052'  
TVD: 7,058.15'  
Inclination: 89.57°  
Azimuth: 2.14°

MD: 12,147'  
TVD: 7,058.71'  
Inclination: 89.75°  
Azimuth: 2.23°

MD: 12,242'  
TVD: 7,058.87'  
Inclination: 90.06°  
Azimuth: 0.51°

40% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v calc,  
tr SHY SS and SLTY SH  
60% CHK: off wh - v lt tan - ltgy, lam, frm - mod  
hd, sb pily - sb blkly, v calc

40% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH  
60% CHK: off wh - v lt tan - ltgy, lam, frm -  
mod hd, sb pily - sb blkly, v calc

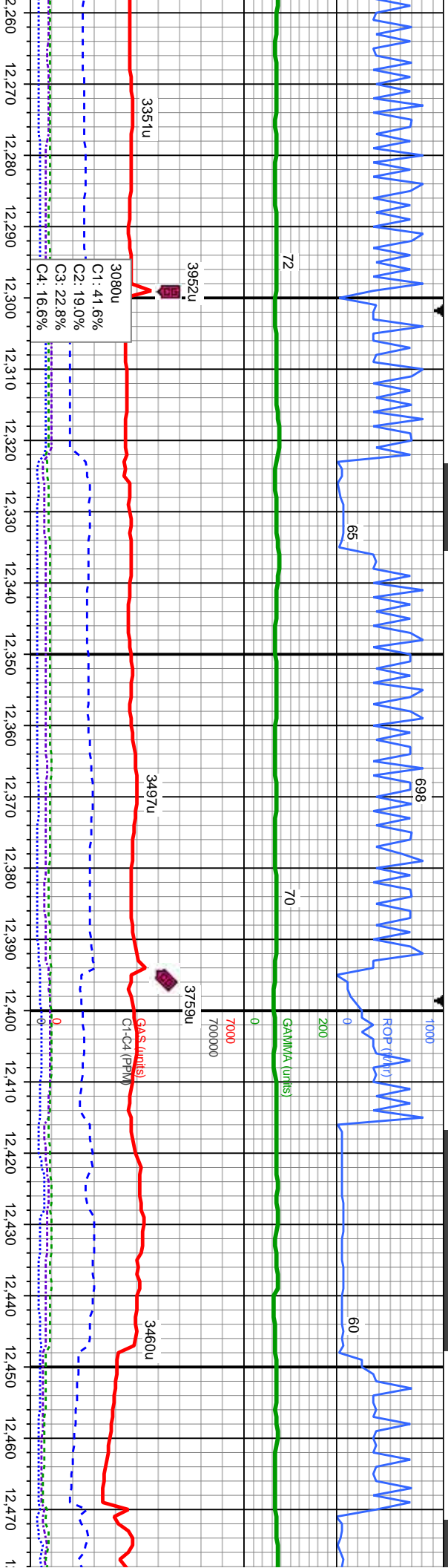
40% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH  
60% CHK: off wh - v lt tan - ltgy, lam, frm -  
mod hd, sb pily - sb blkly, v calc

50% LS: wh-off wh, lt tan- crm, microxln -  
cryptoxln, sft - frm, sme hd, pily - sb blkly, v  
calc, tr SHY SS and SLTY SH  
50% CHK: off wh - v lt tan - ltgy, lam, frm -  
mod hd, sb pily - sb blkly, v calc

60% L  
cryptic  
calc, t  
40% C  
mod r

TVD (ft)





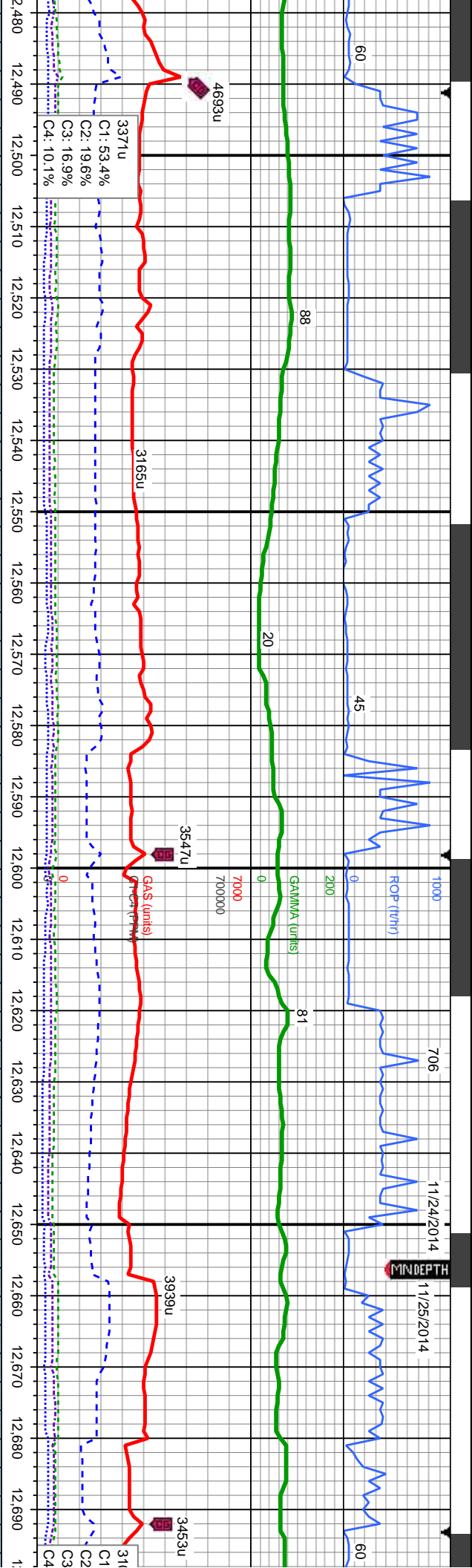
MD: 12,337'  
TVD: 7,060.07'  
Inclination: 88.49°  
Azimuth: 357.73°

MD: 12,432'  
TVD: 7,061.01'  
Inclination: 90.37°  
Azimuth: 357.03°

S: wh-off wh, lt tan- crm, microxin - xln, sft - frm, sme hd, pily - sb blkly, v r SHY SS and SLTY SH	60% LS: wh-off wh, lt tan- crm, microxin - cryptoxln, sft - frm, sme hd, pily - sb blkly, v calc, tr SHY SS and SLTY SH	70% LS: wh-off wh, lt tan- crm, microxin - cryptoxln, sft - frm, sme hd, pily - sb blkly, v calc, tr SHY SS	70% LS: wh-off wh, lt tan- crm, microxin - cryptoxln, sft - frm, sme hd, pily - sb blkly, v calc, tr SHY SS	70% LS: wh-off wh, lt tan- crm, microxin - cryptoxln, sft - frm, sme hd, pily - sb blkly, v calc, tr SHY SS
hd, sb pily - sb blkly, v calc, tr calcite	mod hd, sb pily - sb blkly, v calc, tr calcite	hd, sb pily - sb blkly, v calc, tr calcite	mod hd, sb pily - sb blkly, v calc, tr calcite	hd, sb pily - sb blkly, v calc, tr calcite







MD: 12,527'  
TVD: 7,063.09'  
Inclination: 87.13°  
Azimuth: 359.18°

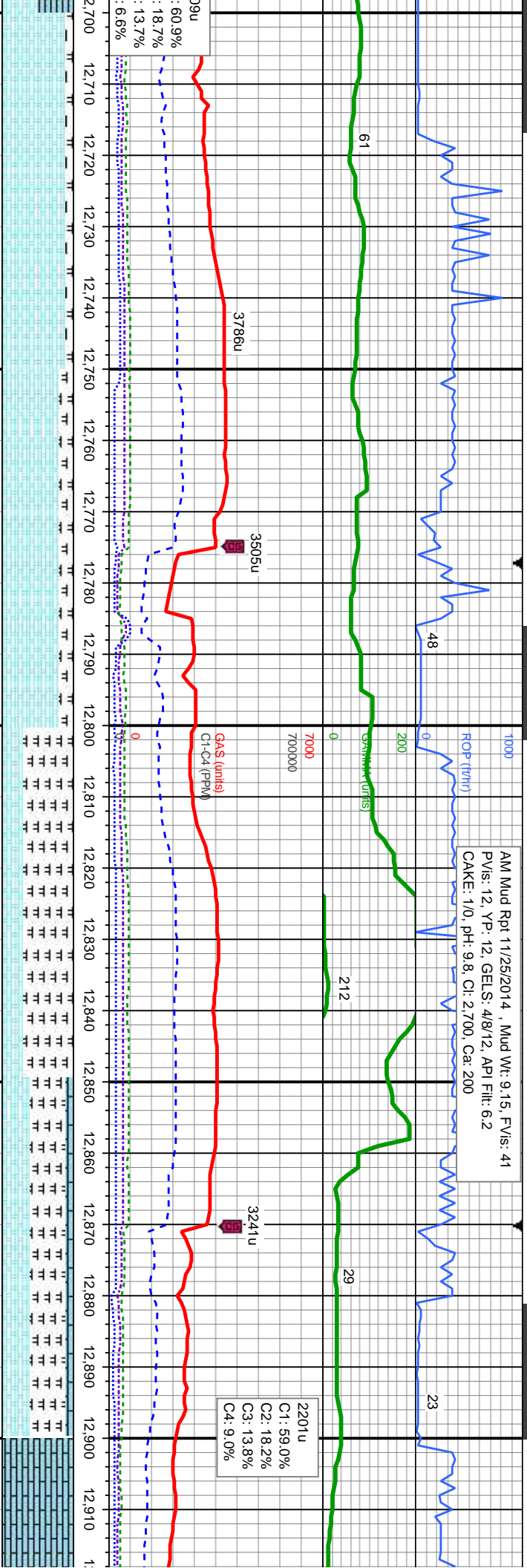
MD: 12,622'  
TVD: 7,064.85'  
Inclination: 90.74°  
Azimuth: 1.69°

TVD (ft)

60% LS: wh-off wh, lt tan- crm, microxn - cryptoxln, sft - frm, sme hd, pily - sb blk, v calc, tr SHY SS	80% LS: wh-off wh, lt tan- crm, microxn - cryptoxln, sft - frm, sme hd, pily - sb blk, v calc, tr SHY SS	60% LS: wh-off wh, lt tan- crm, microxn - cryptoxln, sft - frm, sme hd, pily - sb blk, v calc, tr SHY SS	50% LS: wh-off wh, lt tan- crm, microxn - cryptoxln, sft - frm, sme hd, pily - sb blk, v calc, tr SHY SS and SLTY SH
40% CHK: off wh - v lt tan - ltgy, lam, frm - mod hd, sb pily - sb blk, v calc, sme calcite	20% CHK: off wh - v lt tan - ltgy, lam, frm - mod hd, sb pily - sb blk, v calc, sme calcite	40% CHK: off wh - v lt tan - ltgy, lam, frm - mod hd, sb pily - sb blk, v calc, sme calcite	50% CHK: off wh - v lt tan - ltgy, lam, frm - mod hd, sb pily - sb blk, v calc, abnt calcite
tr calcite		7300 calcite	



AM Mud Rpt 11/25/2014 , Mud Wt: 9.15, FVis: 41  
PVs: 12, YP: 12, GELS: 4/8/12, API Fil: 6.2  
CAKE: 1/0, pH: 9.8, CI: 2.700, Ca: 200



MD: 12,717'  
TVD: 7,062.63'  
Inclination: 91.94°  
Azimuth: 3.01°

D CHALK

FT HAYS

CODELL

MD: 12,812'  
TVD: 7,060.1'  
Inclination: 91.11°  
Azimuth: 3.25°

D CHALK

FT HAYS

CODELL

MD: 12,907'  
TVD: 7,059.49'  
Inclination: 89.63°  
Azimuth: 2.76°

90% CHK: off wh - v lt tan - lly, lam, frm - mod  
hd, sb ply - sb blk, v calc, tr SLTY SH and  
SHY SS  
10% MRL: lt - med gy, rr blk, frm - hd, sb ply -  
sb blk, silty - grty tex, tr LS

80% CHK: off wh - v lt tan - lly, lam, frm - mod  
hd, sb ply - sb blk, v calc, tr SLTY SH and  
SHY SS  
20% MRL: lt - med gy, rr blk, frm - hd, sb ply -  
sb blk, silty - grty tex, tr LS

30% CHK: off wh - v lt tan - lly, lam, frm - mod  
hd, sb ply - sb blk, v calc  
70% MRL: lt - med gy, rr blk, frm - hd, sb ply -  
sb blk, silty - grty tex

40% CHK: off wh - v lt tan - lly, lam, frm - mod hd,  
sb ply - sb blk, v calc  
50% MRL: lt - med gy, rr blk, frm - hd, sb ply - sb  
blk, silty - grty tex  
10% LS: wh-off wh, lt tan- crm, microxin -  
cryproxin, sft - frm, sme hd, ply - sb blk, v calc

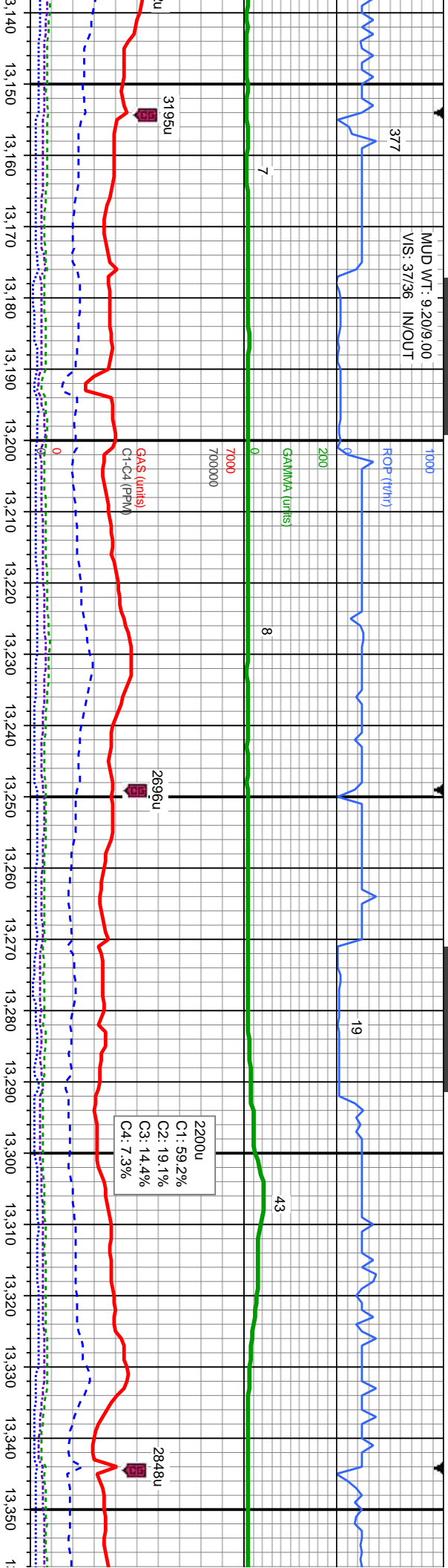
100% LS: predy v  
microxin - crypto  
blk, v calc, wt tr







MUD WT: 9.20/9.00  
V/S: 37/36 IN/OUT



MD: 13,191'  
TVD: 7,061.38'  
Inclination: 89.38°  
Azimuth: 6.96°

MD: 13,285'  
TVD: 7,063.71'  
Inclination: 87.78°  
Azimuth: 7.01°

TVD (ft)

100% LS: pred wh-off wh, sme lt tan- crm,  
microxin - cryptoxin, frm - mod hd, ply - sb blk,  
v calc, tr SHY SS

100% LS: pred wh-off wh, sme lt tan- crm,  
microxin - cryptoxin, frm - mod hd, ply - sb blk,  
v calc, tr SHY SS

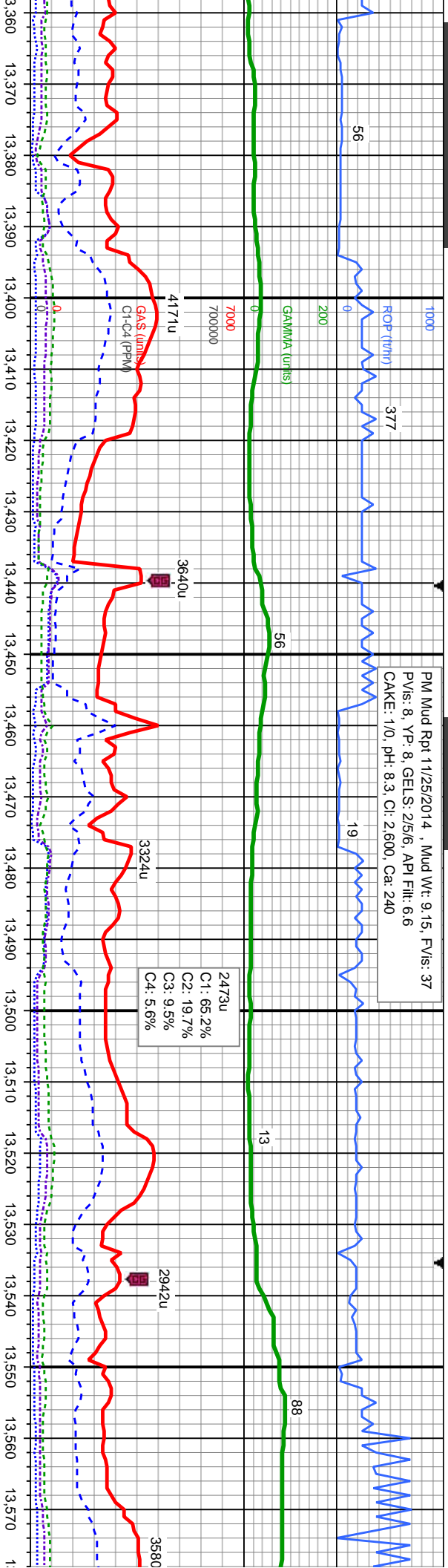
100% LS: pred wh-off wh, sme lt tan- crm,  
microxin - cryptoxin, frm - mod hd, ply - sb blk,  
v calc, tr SHY SS

100% LS: pred wh-off wh, sme lt tan- crm,  
microxin - cryptoxin, frm - mod hd, ply - sb blk,  
v calc, tr SHY SS





PM Mud Rpt 11/25/2014 , Mud Wt: 9.15, FV/s: 37  
PV/s: 8, YP: 8, GELS: 25/6, API Filtr: 6.6  
CAKE: 1/0, pH: 8.3, CI: 2.600, Ca: 240



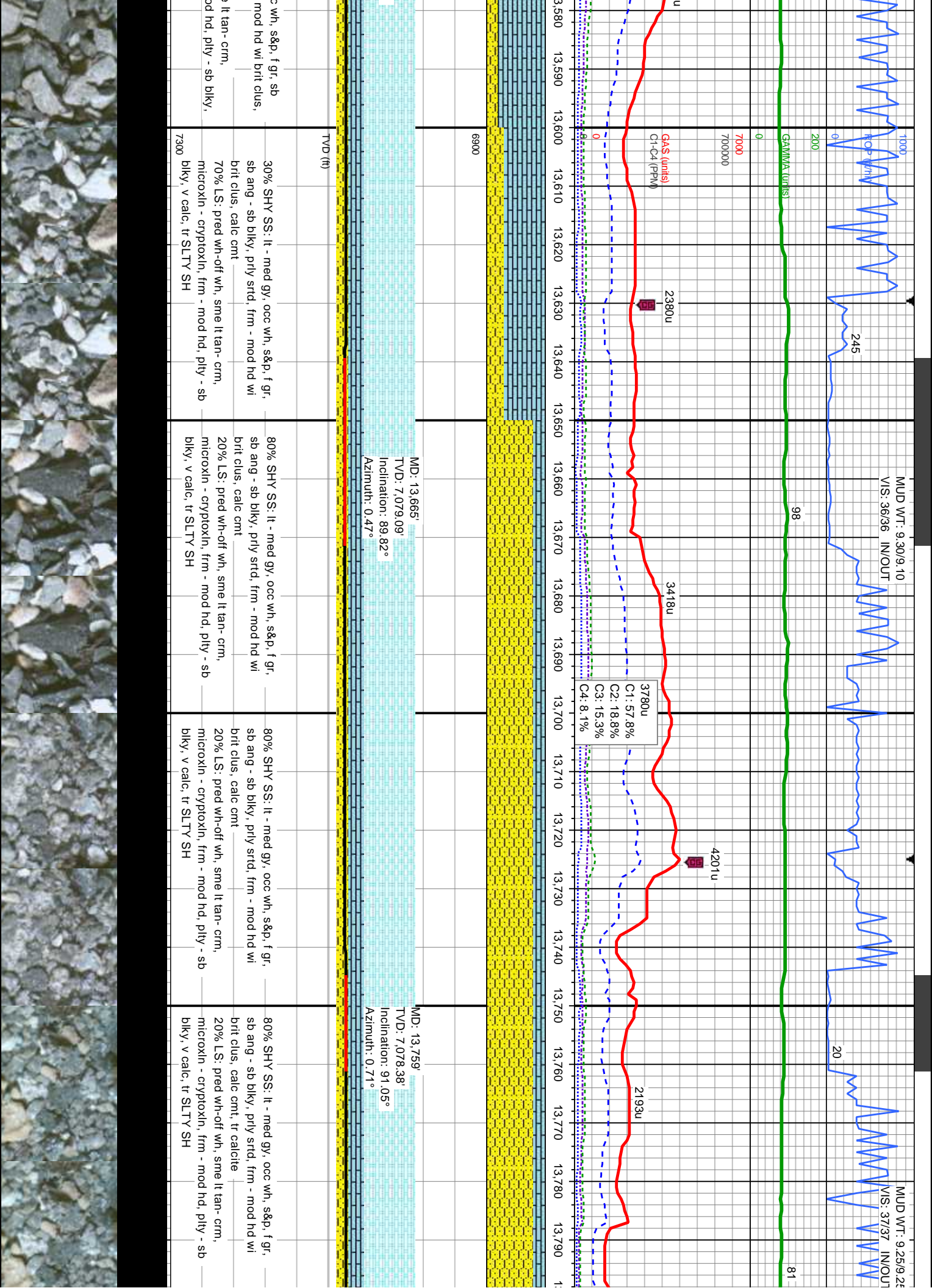
MD: 13,380'  
TVD: 7,068.54'  
Inclination: 86.39°  
Azimuth: 4.05°

MD: 13,475'  
TVD: 7,073.42'  
Inclination: 87.72°  
Azimuth: 2.7°

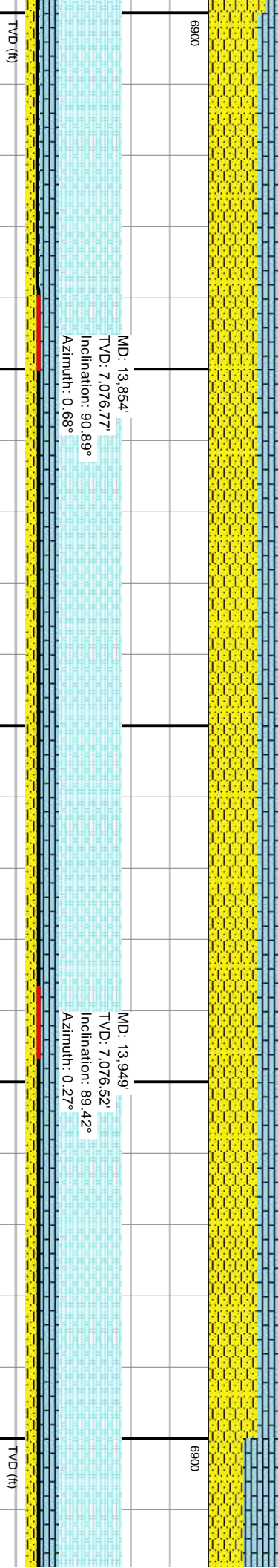
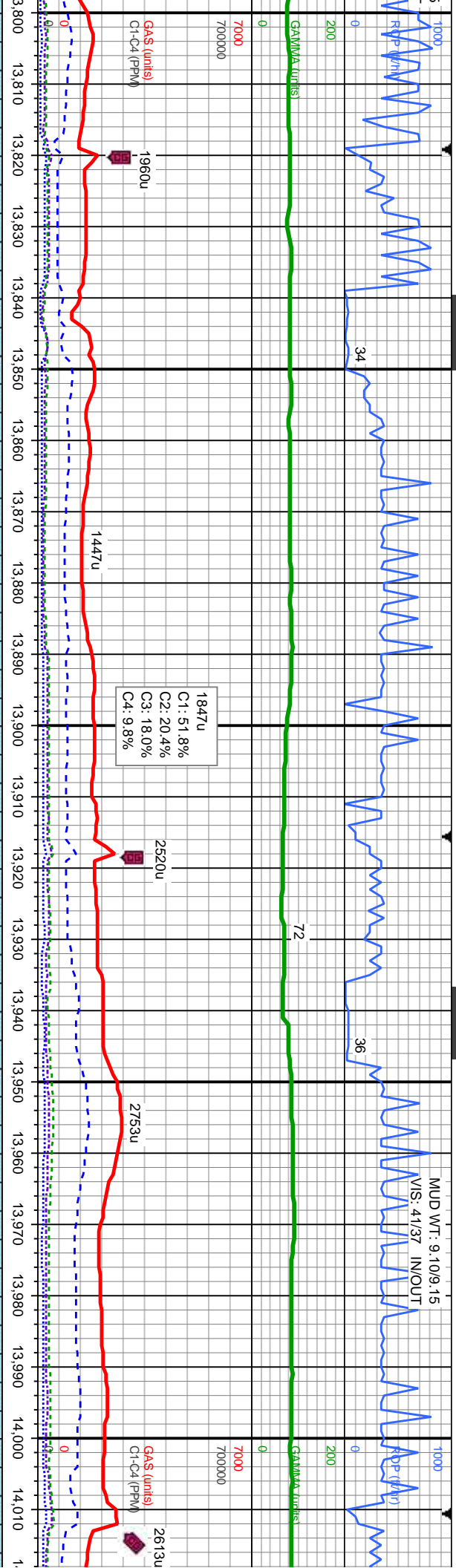
MD: 13,570'  
TVD: 7,077.13'  
Inclination: 87.81°  
Azimuth: 1.06°

100% LS: pred wh-off wh, sme lt tan- crm, microxin - cryptoxin, frm - mod hd, pily - sb blkly, v calc, tr SHY SS and blk SH	7300
10% SHY SS: lt - med gy, occ wh, s&g, f gr, sb ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmt	
90% LS: pred wh-off wh, sme lt tan- crm, microxin - cryptoxin, frm - mod hd, pily - sb blkly, v calc, tr SLTY SH	
20% SHY SS: lt - med gy, occ ang - sb blkly, prly strd, frm - calc cmt	
80% LS: pred wh-off wh, sme microxin - cryptoxin, frm - m v calc, tr SLTY SH	

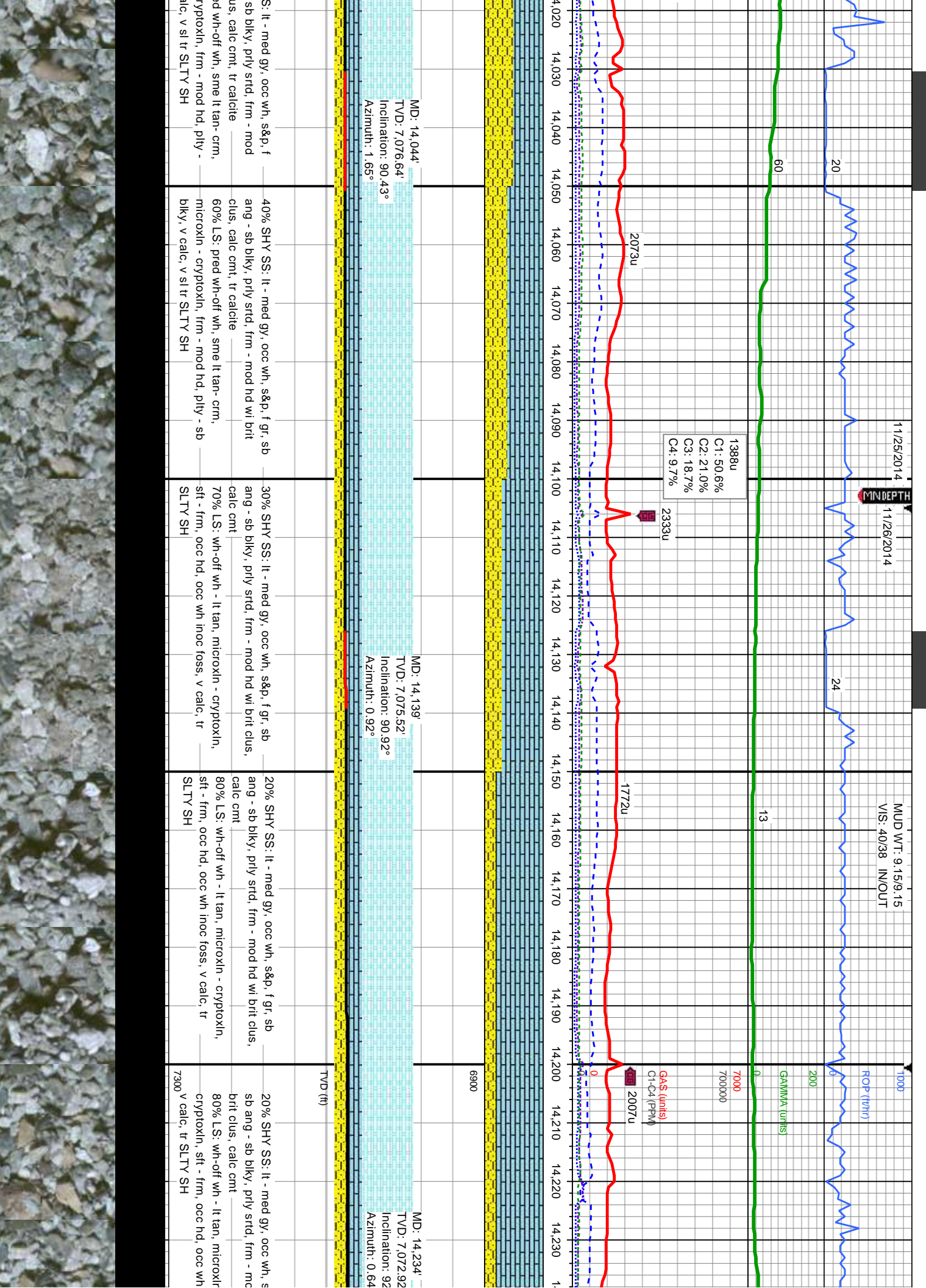








7300	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmt, tr calcite 30% LS: pred wh-off wh, sme lt tan- crm, microxln - cryptoxln, frm - mod hd, pily - sb blkly, v calc, v sl tr SLTY SH	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmt, tr calcite 30% LS: pred wh-off wh, sme lt tan- crm, microxln - cryptoxln, frm - mod hd, pily - sb blkly, v calc, v sl tr SLTY SH	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmt, tr calcite 30% LS: pred wh-off wh, sme lt tan- crm, microxln - cryptoxln, frm - mod hd, pily - sb blkly, v calc, v sl tr SLTY SH	70% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd w/ brit clus, calc cmt, tr calcite 30% LS: pred wh-off wh, sme lt tan- crm, microxln - cryptoxln, frm - mod hd, pily - sb blkly, v calc, v sl tr SLTY SH	50% SHY S gr, sb ang - hd w/ brit cl 50% LS: pre microxln - c
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11/25/2014  
11/26/2014

MUD WT: 9.15/9.15  
VIS: 40/38 IN/OUT

1388u  
C1: 50.6%  
C2: 21.0%  
C3: 18.7%  
C4: 9.7%

GAS (units)  
C1-C4 (PPM)

2073u

2333u

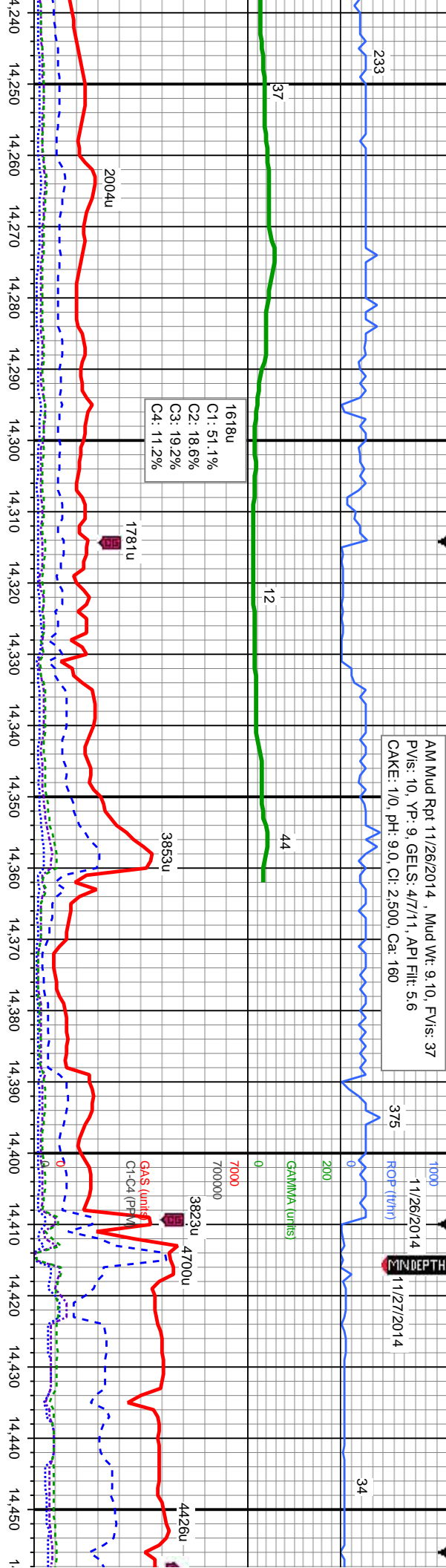
1772u

2007u

TVD (ft)



AM Mud Rpt 11/26/2014 , Mud Wt: 9.10, FVis: 37  
PVis: 10, YP: 9, GELS: 4/7/11, API Filtr: 5.6  
CAKE: 1/0, pH: 9.0, Cl: 2,500, Ca: 160



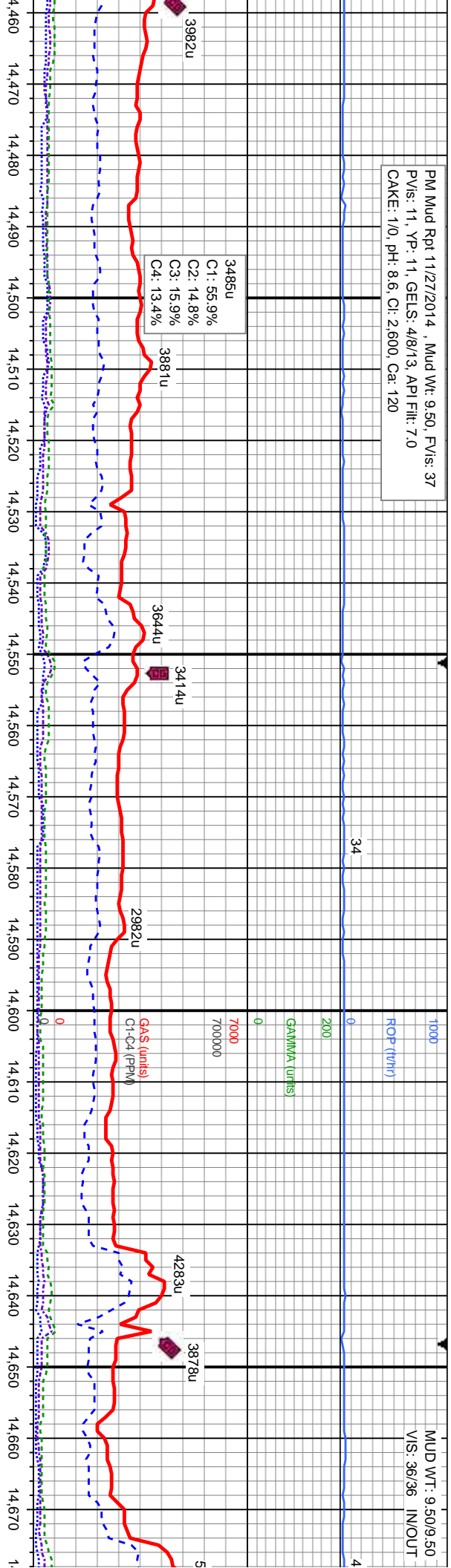
6900	TOOH TO CHANGE OUT
Proj From Survey	BHA @ 14,415' MD

Well	MD: 14,329'	MD: 14,349'	MD: 14,413'
TVD: 7,069.68'	TVD: 7,069.02'	TVD: 7,066.67'	
Inclination: 91.69°	Inclination: 92.1°	Inclination: 92.1°	
Azimuth: 0.81°	Azimuth: 0.97°	Azimuth: 0.97°	

	TVD (ft)	
&p, f gr, hd wi - inoc foss,	20% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 80% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, occ wh inoc foss, v calc, tr SLTY SH	20% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 80% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, tr fos frags, v calc, tr blk SLTY SH
	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, tr fos frags, v calc, tr blk SLTY SH	10% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blkly, prly strd, frm - mod hd wi brit clus, calc cnt 90% LS: wh-off wh - lt tan, microxln - cryptoxln, sft - frm, occ hd, tr fos frags, v calc, tr blk SLTY SH
	7300	



MUD WT: 9.50/9.50  
VIS: 36/36 IN/OUT



6900

D CHALK

FT HAYS

CODELL

TV D (ft)

it  
- it tan, microxln - cryptoxln,  
- blkly, prly strd, frm - mod hd wi brit clus,  
- wh-off wh - lt tan, microxln - cryptoxln,  
- occ hd, tr fos frags, v calc, tr blk SLTY

20% SHY SS: lt - med gy, occ wh, s&p, f gr, sb ang - sb blk, ply strd, frm - mod hd w/ brit clus, -calc cmt

80% LS: wh-off wh - lt tan, microxln - cryptoxln, stf - frm, occ hd, tr fos frags, v calc, tr blk SLTY SH

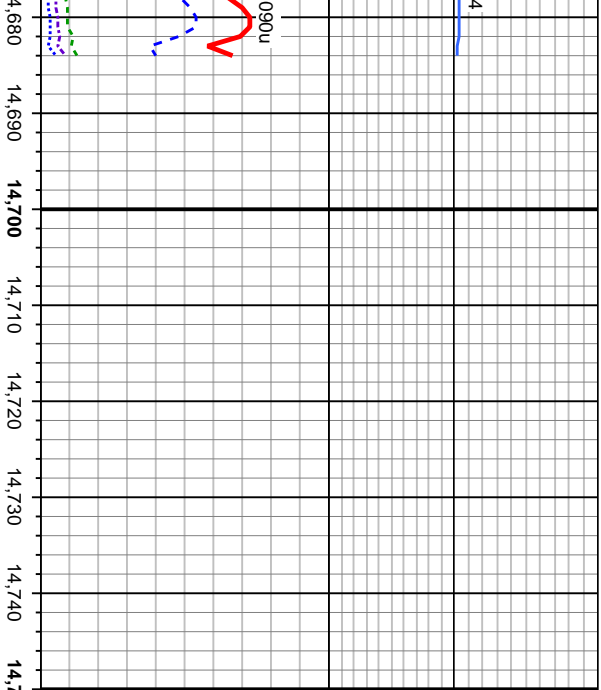
20% SHY SS: lt - med gy, occ wh, s&p, f gr, sb  
amt - sb blkly, prly strd, frm - mod hd wi brit clus,  
calc cnt  
80% LS: wh-off wh - lt tan, microxin - cryptoxin,  
sft - frm, occ hd, tr fos frags, v calc, tr blk SLTY  
SH

30% SHY SS: lt - med gy, occ wh, s&p, f  
gr, sb ang, sb biky, prly srld, frm - mod hd  
wt brtt clus, calc cmt, lt calcite  
70% LS: wh-off wh - lt tan, microxln -  
cryptoxln, sft - frm, occ hd, t fos frags, v  
calc, sl tr blk SLTY SH

30% SHY SS: lt - med gy, o  
sb ang - sb blkly, prly strd, f  
brit clus, calc cmt, sme calcd  
70% LS: wh-off wh - lt tan, r  
cryptoxln, sft - frm, occ hd,  
SLTY SH







From Survey		14,349' MD:	
TD @ 14,684' MD @ 19:37 hrs MST		on 11/27/2014	
Dip: 7,056.74'		Inclination: 92.1°	
Dip: 0.97°		Inclination: 92.1°	
See Corresponding Vertical Log		Oscar Y10-74-1HC VERT	
Wellsite Geological Services		Provided By Columbine Logging	
v calc, tr blk		v calc, tr blk	
microxn -		microxn -	
m - mod hd wi		m - mod hd wi	
s&p, f gr,		s&p, f gr,	
wh, s&p, f gr,		wh, s&p, f gr,	