

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Bulleit Federal PC LG04-62HN HORZ

Location SEC 4 T8N R59W

State COLORADO

Country USA

API Number 05-123-38758

Region DJ BASIN

Spud Date 2/16/2014

County WELD

Rig Number H&P 315

AFE # 137848

Field WILDCAT

Drilling Completed 2/26/2014

Surface Coordinates SESE SEC 4 T8N R59W
430' FSL; 300' FEL

LAT/LON: 40.68528/-103.97292

Bottom Hole Coordinates SWSW SEC 4 T8N R59W
660' FSL; 660' FWL

Ground Elevation 4,814'

K.B. Elevation 4,838'

Logged Interval 5,403' To 10,307'

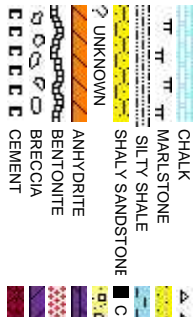
Total Depth 10,307'

Formation NIOBRARA B CHALK

Type of Drilling Fluid LSND

Company Noble Energy Inc
Address 1625 BROADWAY
DENVER, CO 80202

Name MARK COLE, N
Company COLUMBINE LOGGING
Address 2385 S LIPAN ST
DENVER, CO 80229



Operator

AY SUITE 2200
0202

Geologist

ATHAN MURPHY, JACK WEINERTH
OGGING, INC

ST
0223

Rock Types

	CHERT		SIDERITE or LIMONITE		SHALE GRAY
	CLAY CHOKE SANC		LIMESTONE		SHALY SILTSTONE
	CLAYSTONE		METAMORPHIC		SILTSTONE
	GNEOL		NO SAMPLE		TUFF
	CONGLOMERATE		SALT		WELDED TUFF
	DOLOMITE		SANDSTONE		
	GRANITE		SALT-PEPPER SAND		
	GYPSUM		SHALE		
	IGNEOUS		SHALE COLORED		

Accessories

Fossils	F FOSSIL	ARGILLACEOUS	GLAUCONITE	TUFACEOUS
GASTROPOD	ARGILLITE GRAIN	GYPSIFEROUS		Stringer
OOLITE	B BENTONITE	HEAVY MINERAL		ANHYDRITE STRINGER
OSTRACOD	BITUMINOUS SUBSTANCE	INOCERAMUS		BENTONITE STRINGER
BELEMNITE	BRECCIA FRAGMENTS	KAOLIN		COAL STRINGER
BIOCLASTIC	CALCAREOUS	MARLSTONE		DOLOMITE STRINGER
BRACHIOPOD	CARBONACEOUS FLAKES	MINERAL CRYSTALS		GYPSUM STRINGER
PISOLITE	CHTDK	NODULES		LIMESTONE STRINGER
BRYOZOA	PLANT REMAINS	PHOSPHATE PELLETS		LIMESTONE (CALC) STRG
CEPHALOPOD	PLANT SPORES	COAL - THIN BEDS		MARLSTONE (DOL) STRG
CORAL	SCAPHOPOD	DOLOMITIC	SALT CAST	
CRINOID	STROMATOPOROID	FELDSPAR	SANDY	SANDSTONE STRINGER
ECHINOID				
FISH	Minerals	FERRUGINOUS PELLET	SILTY	SHALE STRINGER
FORAMINIFERA	ANHYDRITIC	FERRUGINOUS		SILTSTONE STRINGER

Other Symbols

Oil Show	O ORGANIC	CORE - RECOVERED	TRIP GAS	E EARTHY
DEAD	P PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	FINELYXLN
EVEN	V VUGGY	FAULT	WIRELINE TESTED - RT	GS GRAINSTONE
QUESTIONABLE	Engineering	FORMATION TOP	L LITHOGRAPHIC	MX MICROXLN
	GAS SHOW		Rounding	
SPOTTED STAINING	BIT	MN DEPTH	A ANGULAR	MS MUDSTONE
Porosity	CONNECTION (DOWN)	NORMAL FAULT	R ROUNDED	PS PACKSTONE
CONNECTION (LEFT)	CONNECTION (RIGHT)	OIL SHOW	B SUBANG	WS WACKESTONE
FENESTRAL	CONNECTION GAS	OVERTURNED STRATA	R SUBRND	
F FRACTURE	CONNECTION GAS UP	REVERSE FAULT		Textures
INTERCRYSTALLINE	CONNECTION GAS LEFT	SIDEWALL CORE (LEFT)	BS BOUNDSTONE	M MODERATE
INTERCOOLITIC	CONNECTION GAS DOWN...	SIDEWALL CORE (RIGHT)	C CHALKY	P POOR
MOLDIC	CORE - LOST	SLIDE	CX CRYPTOXLN	W WELL
		SURVEY		

Slide/Rotate

ROP

ROP

Curves
GAMMA

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Depth Labels

% Lith

Well Bore
TVD

Oil Show

Images

ROP data from iBall

Gamma data from Sperry - Halliburton

Gas data from iBall

2/21/2014, Mud Wt: 9.90, FVIs: 35
PVIs: 11, YP: 8, GELS: 3/7/13, API Fil: 7.0
CAKE: 1/0, pH: 9.1, Cl: 1,300, Ca: 140

MUD WT:
VIS: 48/47

ROP (ft/hr)

125

198

GAMMA (units)

47u

GAS (units)

C1: 96.8%
C2: 1.9%
C3: 0.9%
C4: 0.4%

472u

5,340 5,350 5,360 5,370 5,380 5,390 5,400 5,410 5,420 5,430 5,440 5,450 5,460 5,470 5,480 5,490 5,500 5,510

Columbine Logging began logging with
BloodHound unit 0687 on 2/21/2014

MD: 5,393'
TVD: 5,361.33'
Inclination: 0.67°
Azimuth: 5.24°
VS: -209.79'

50' Sample Interval @ 5,450' MD

Bit Data

Bit #: 2
Type: Ulterra
Model: UD516
Size: 8.75"
Depth In: 5,403'
Jets: 8x12

TVD (ft)

SLTY SH: pred lt gy brn, sme med gy, frm -
mod hd, pily - sb pily, occ sb blk, silty - grty
tex, v sl calc
SHY SS: lt gy, s&g, vfg, sb ang - sb rd, pily
srd, mod hd wi brt clus, sl calc cnt
5750

SLTY SH: pred lt gy brn, sme med gy, frm -
mod hd, pily - sb pily, occ sb blk, silty - grty
tex, v sl calc
SHY SS: lt gy, s&g, vfg, sb ang - sb rd, pily
srd, mod hd wi brt clus, sl calc cnt

SLTY SH: pred
mod hd, pily - s
tex, v sl calc
SHY SS: lt gy, s
srd, mod hd wi

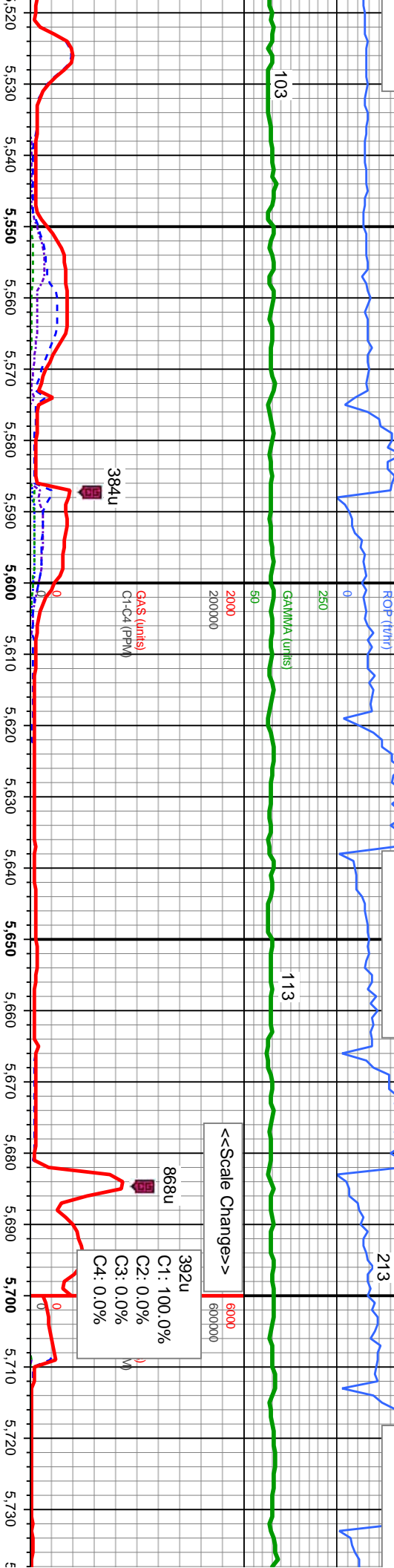
ESTIMATE



10.00/9.90
IN/OUT

MUD WT: 10.10/10.05
VIS: 43/39 IN/OUT

MUD WT: 10.60/1
VIS: 40/38 IN/OUT



MD: 5,534'
TVD: 5,501.29'
Inclination: 12.05 °
Azimuth: 275.88 °
VS: -195.08'

MD: 5,582'
TVD: 5,547.72'
Inclination: 17.21 °
Azimuth: 275.06 °
VS: -182.98'

MD: 5,629'
TVD: 5,592.18'
Inclination: 20.59 °
Azimuth: 271.95 °
VS: -167.77'

MD: 5,677'
TVD: 5,636.6'
Inclination: 23.92 °
Azimuth: 271.16 °
VS: -149.59'

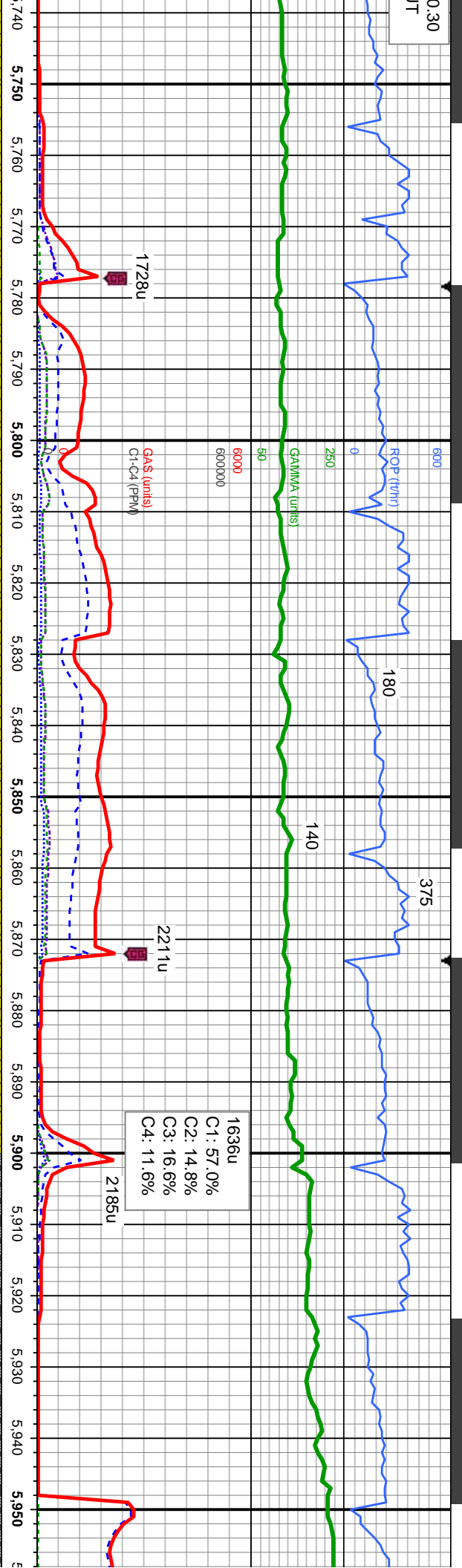
MD: 5,724'
TVD: 5,679.01'
Inclination: 27.09 °
Azimuth: 271.29 °
VS: -129.36'

lt gy brn, sme med gy, frm -
b pily, occ sb blkly, slty - grty
brit clus, sl calc cmt

SLTY SH: pred lt gy brn, sme med gy, frm -
mod hd, pily - sb pily, occ sb blkly, slty - grty
tex, v sl calc
SHY SS: lt gy, s&g, vfg, sb ang - sb rd, pily
srtd, mod hd wi brit clus, sl calc cmt

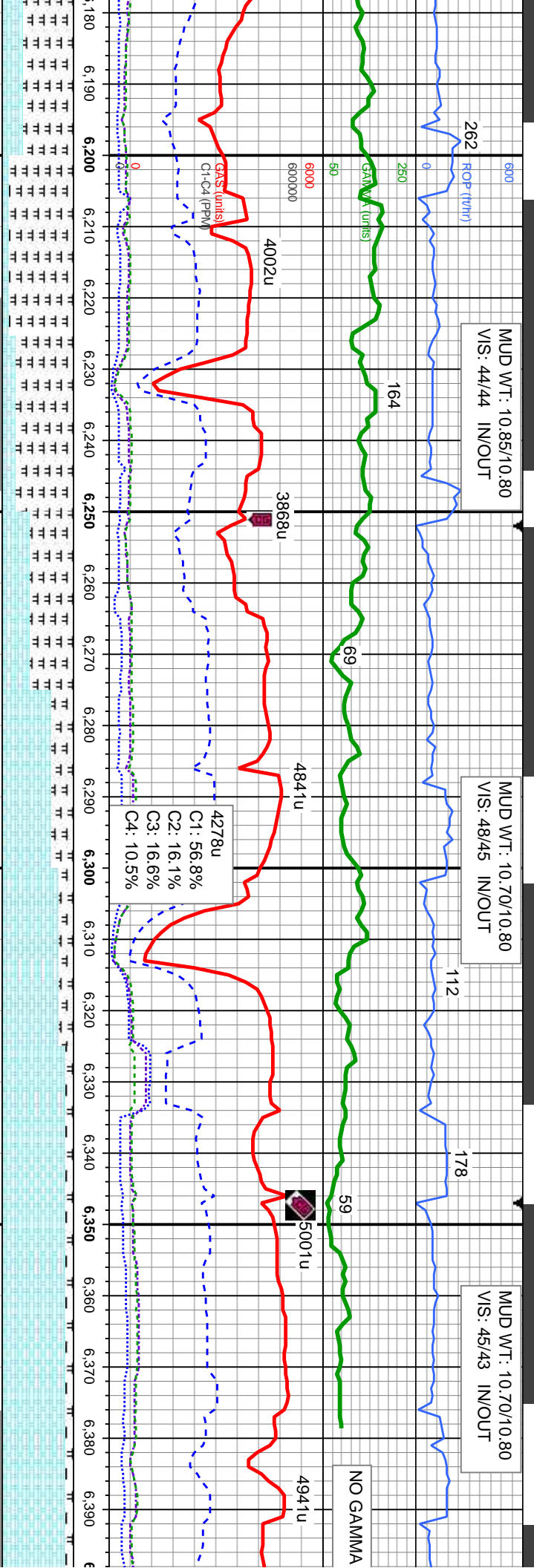
SLTY SH: pred lt gy brn, sme med gy, frm -
mod hd, pily - sb pily, occ sb blkly, slty - grty
tex, v sl calc
SHY SS: lt gy, s&g, vfg, sb ang - sb rd, pily
srtd, mod hd wi brit clus, sl calc cmt

SLTY SH: pred lt gy brn, sme med gy, frm -
mod hd, pily - sb pily, occ sb blkly,
tex, v sl calc
SHY SS: lt gy, s&g, vfg, sb ang - s
srtd, mod hd wi brit clus, sl calc cr



		MD: 5,772' TVD: 5,721.23' Inclination: 29.75 ° Azimuth: 268.5° VS: -106.54'		MD: 5,819' TVD: 5,761.19' Inclination: 33.73 ° Azimuth: 267.13° VS: -81.9'		<<Scale Change>>		MD: 5,867' TVD: 5,800.09' Inclination: 37.95 ° Azimuth: 265.53° VS: -53.95'		MD: 5,914' TVD: 5,836.17' Inclination: 41.77 ° Azimuth: 264.44° VS: -24.08'		25' Sample Interval @ 5,500'		MD: 5,914' TVD: 5,836.17' Inclination: 41.77 ° Azimuth: 264.44° VS: -24.08'		MD: 5,914' TVD: 5,836.17' Inclination: 41.77 ° Azimuth: 264.44° VS: -24.08'	
gy, firm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty	SLTY SH: pred lt gy brn, sme med gy, frm -	mod hd, pily - sb pily, occ sb blkly, silty - grty
stly - grty	tex, v sl calc	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt	SHY SS: lt gy, s&p, vfg, sb ang - sb rd, pily	srd, mod hd wi brit clus, sl calc cnt
b rd, pily	6000	6000		6000		6000		6000		6000		6000		6000		6000	





MUD WT: 10.85/10.80
VIS: 44/44 IN/OUT

MUD WT: 10.70/10.80
VIS: 48/45 IN/OUT

MUD WT: 10.70/10.80
VIS: 45/43 IN/OUT

Nio B Chalk Top @
6,232' MD; 6,017' TVD

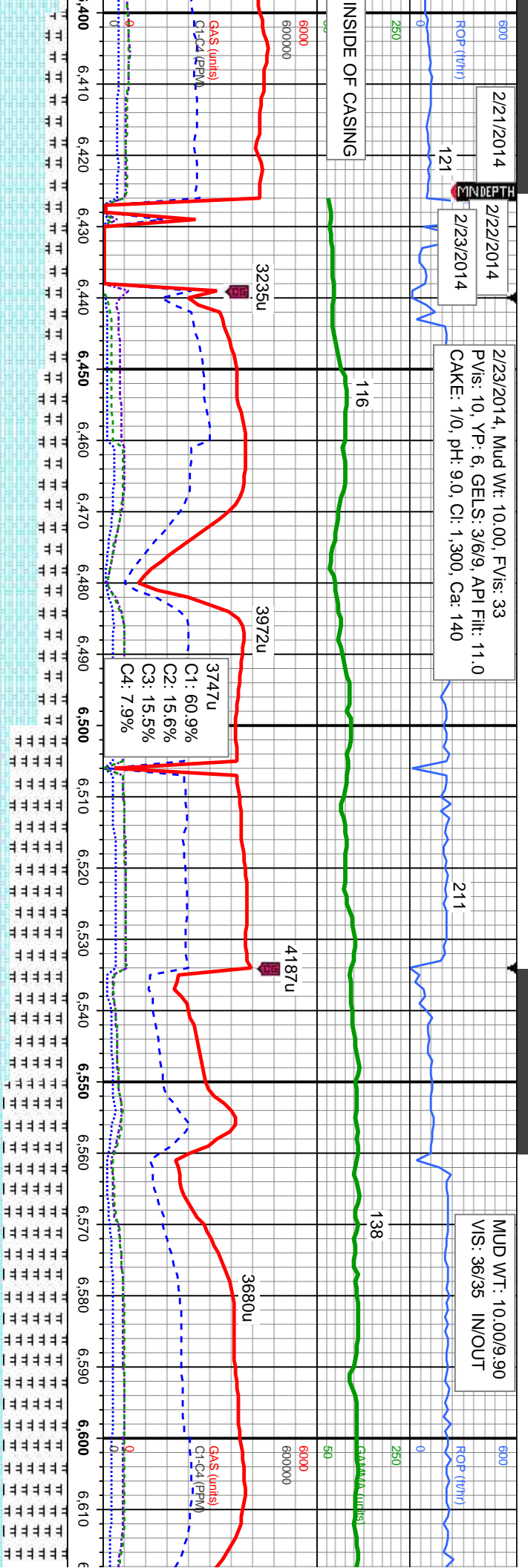
<<Scale Change>>

MD: 6,198' TVD: 6,004.53' Inclination: 66.22° Azimuth: 266.99° VS: 200.75'	MD: 6,246' TVD: 6,022.01' Inclination: 71.05° Azimuth: 267.99° VS: 245.28'	MD: 6,293' TVD: 6,035.56' Inclination: 75.42° Azimuth: 267.58° VS: 290.14'	MD: 6,336' TVD: 6,044.94' Inclination: 79.37° Azimuth: 268.6° VS: 331.98'	MD: 6,371' TVD: 6,050.41' Inclination: 82.65° Azimuth: 269.74° VS: 366.5'
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Bit Data
Bit #: 3
Type: Smith
Model: SDI513
Size: 6.12"
Depth In: 6,425'
Jets: 5x13

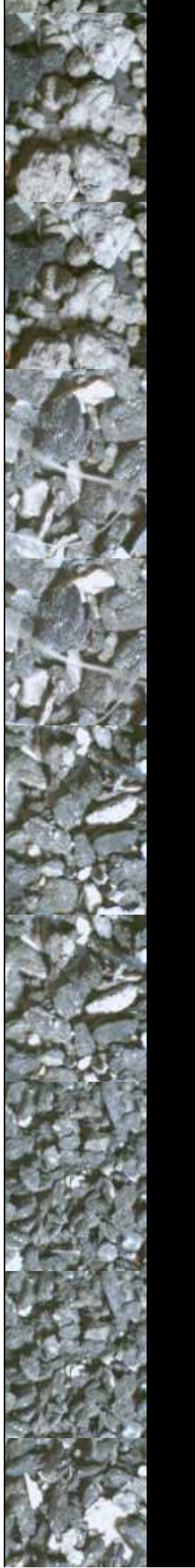
stft - mod hd, sb ply - pty, sily - grty tex CHK: pred tan wi wh, sme lgy, mot, lam, sft MRL: lt - med gy, occ blk, sft - mod hd, sb - frm, sb ply - sb blk, rthy tex, v calc, sme bent 6200	stft - mod hd, sb ply - pty, sily - grty tex CHK: pred tan wi wh, sme lgy, mot, lam, sft MRL: lt - med gy, occ blk, sft - mod hd, sb - frm, sb ply - sb blk, rthy tex, v calc, sme bent 6200	stft - mod hd, sb ply - pty, sily - grty tex CHK: pred tan wi wh, sme lgy, mot, lam, sft MRL: lt - med gy, occ blk, sft - mod hd, sb - frm, sb ply - sb blk, rthy tex, v calc, sme bent 6200	stft - mod hd, sb ply - pty, sily - grty tex CHK: pred tan wi wh, sme lgy, mot, lam, sft MRL: lt - med gy, occ blk, sft - mod hd, sb - frm, sb ply - sb blk, rthy tex, v calc, sme bent 6200	stft - mod hd, sb ply - pty, sily - grty tex CHK: pred tan wi wh, sme lgy, mot, lam, sft MRL: lt - med gy, occ blk, sft - mod hd, sb - frm, sb ply - sb blk, rthy tex, v calc, sme bent 6200
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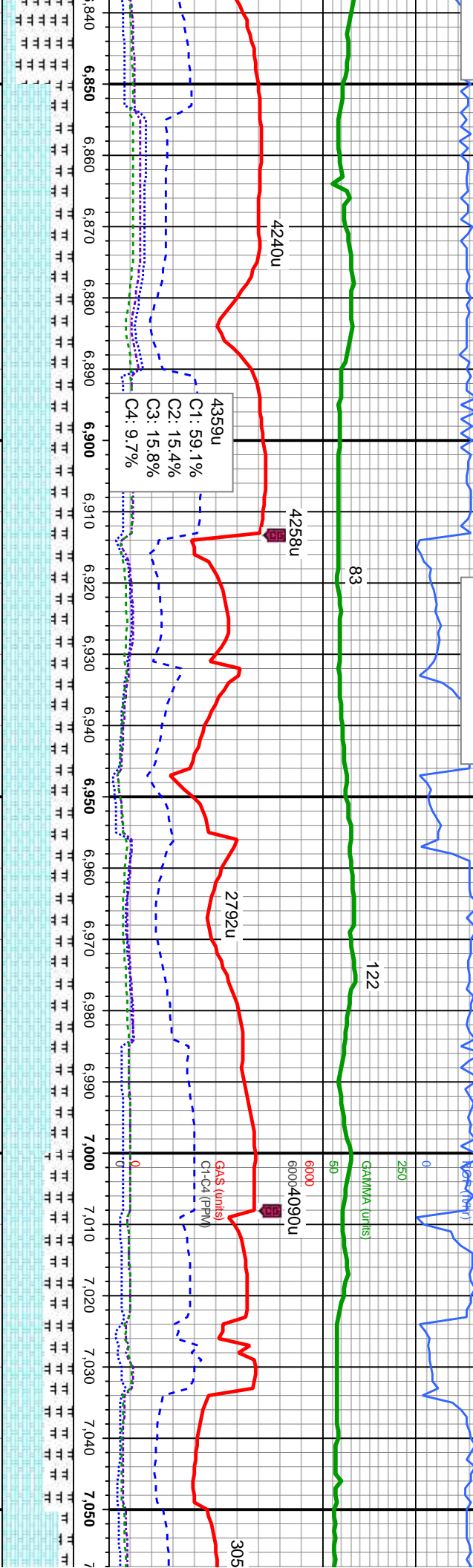


5380	TOOH @ 6,425' MD to run 7" casing	50 Sample Interval @ 6,450' MD	5380
MD: 6,425' TVD: 6,054.81' Inclination: 88 ° Azimuth: 269.7° VS: 420.25'			
MD: 6,471' TVD: 6,059.45' Inclination: 86.98 ° Azimuth: 270.79° VS: 466.01'			
MD: 6,566' TVD: 6,062.44' Inclination: 89.41 ° Azimuth: 270.63° VS: 560.92'			

70% CHK: pred tan wi wh, sme ltgy, mot, lam, sft - frm, sb pily - sb blk, rthy tex, v calc	60% CHK: pred tan wi wh, sme ltgy, mot, lam, sft - frm, sb pily - sb blk, rthy tex, v calc	20% CHK: pred tan wi wh, sme ltgy, mot, lam, sft - frm, sb pily - sb blk, rthy tex, v calc	10% CHK: pred tan wi wh, sme ltgy, mot, lam, sft - frm, sb pily - sb blk, rthy tex, v calc	10% CHK: pred lam, sft - frm, sb pily - sb blk, rthy tex, v calc
30% MRL: lt - med gy, occ blk, sft - mod hd, sb pily - pily, silty - grty tex, sme bent	40% MRL: lt - med gy, occ blk, sft - mod hd, sb pily - pily, silty - grty tex, sme bent	80% MRL: lt - med gy, occ blk, sft - mod hd, sb pily - pily, silty - grty tex, sme bent	90% MRL: lt - med gy, occ blk, sft - mod hd, sb pily - pily, silty - grty tex, abnt bent, sme fos	90% MRL: lt - m sb pily - pily, silty fos
6250				6250



10/10.00
N/OUT
MUD WT: 10.10/10.10
VIS: 37/37 IN/OUT



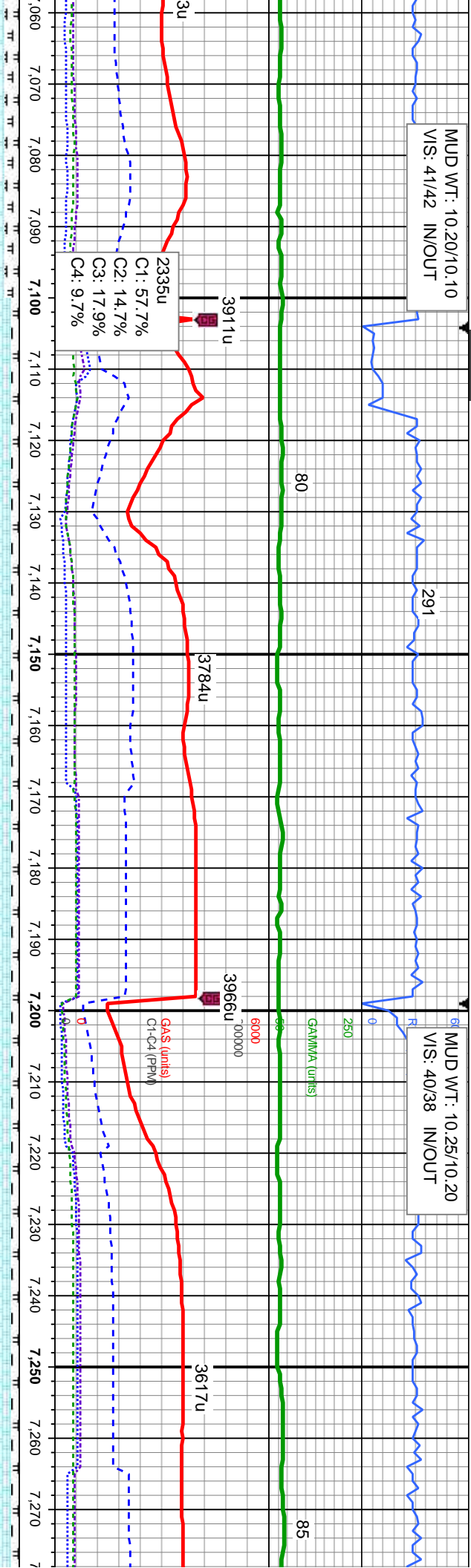
MD: 6,851' TVD: 6,060.57' Inclination: 90.99 ° Azimuth: 271.84 ° VS: 845.8'	MD: 6,946' TVD: 6,058.25' Inclination: 91.82 ° Azimuth: 268.61 ° VS: 940.7'	MD: 7,041' TVD: 6,055.69' Inclination: 91.26 ° Azimuth: 267.92 ° VS: 1,035.44'
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70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, sme bent, tr fos	70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, sme bent, tr fos	70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, sme bent, tr fos	80% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, sme bent, tr fos
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MUD WT: 10.20/10.10
VIS: 41/42 IN/OUT

MUD WT: 10.25/10.20
VIS: 40/38 IN/OUT



MD: 7,135'
TV/D: 6,054.51'
Inclination: 90.18 °
Azimuth: 267.02 °
VS: 1,129.1'

MD: 7,230'
TV/D: 6,054.38'
Inclination: 89.97 °
Azimuth: 266.5 °
VS: 1,223.67'

CHK: pred tan wi wh, sme ltyg, mot, frm, sb ply - sb blk, rthy tex, v calc
R.L: lt - med gy, occ blk, sft - mod hd, - ply, silty - grty tex, tr bent, tr fos

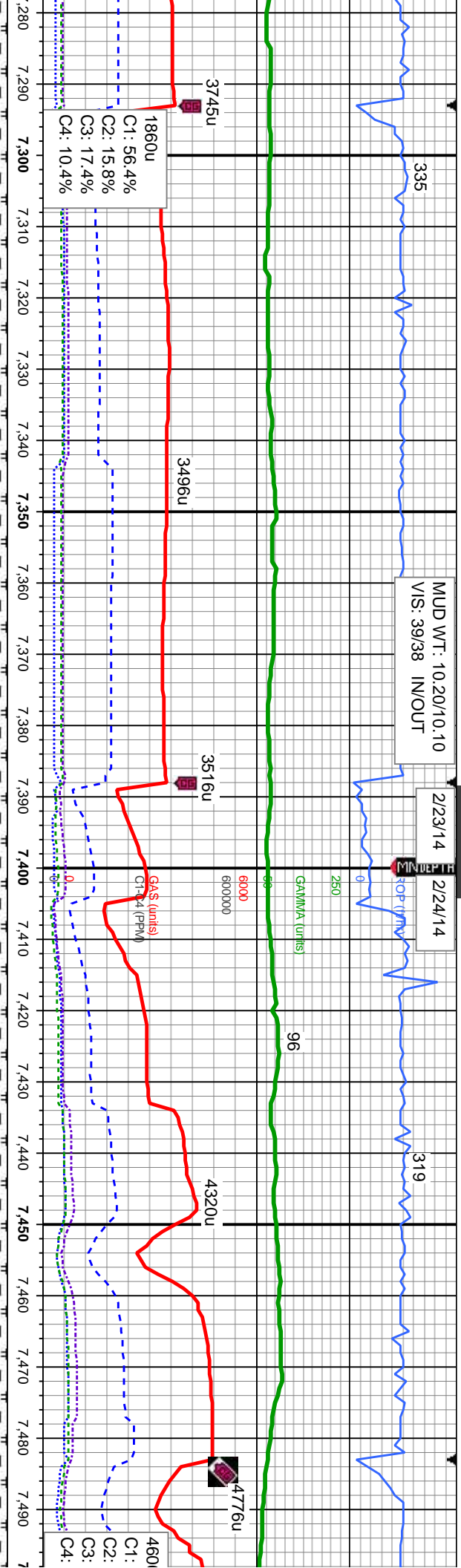
90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc
10% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos

90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc
10% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, no fos

90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc
10% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, no fos

90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc
10% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, no fos



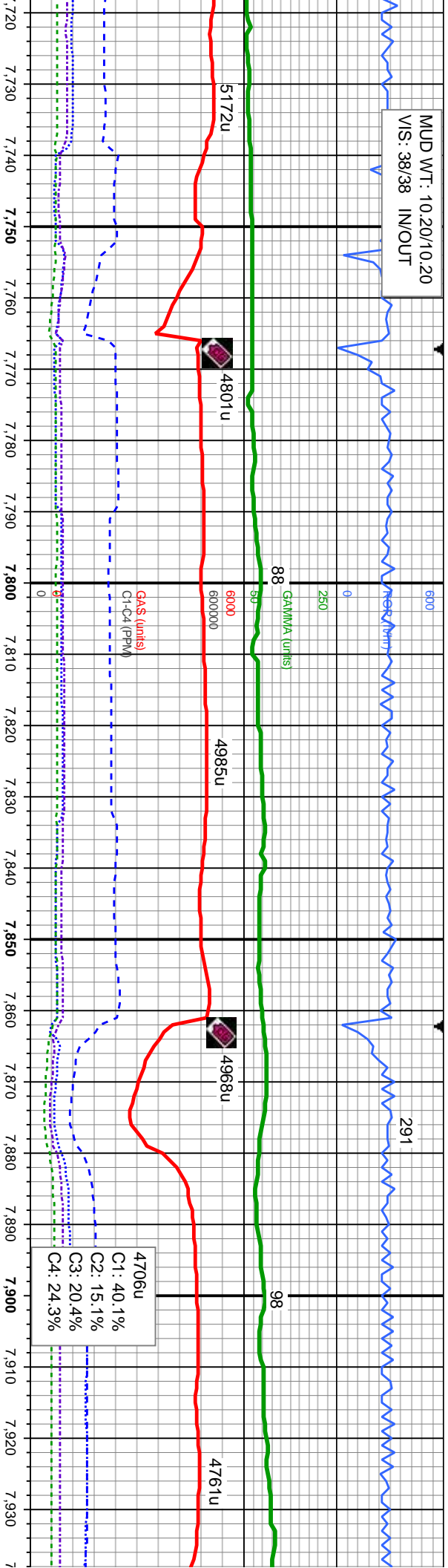


MD: 7,325'	MD: 7,420'
TV/D: 6,054.89'	TV/D: 6,055.12'
Inclination: 89.41°	Inclination: 90.31°
Azimuth: 265.35°	Azimuth: 267.74°
VS: 1,318.09'	VS: 1,412.62'

90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, no fos	90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, no fos	90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, no fos
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MUD WT: 10.20/10.20
VIS: 38/38 IN/OUT

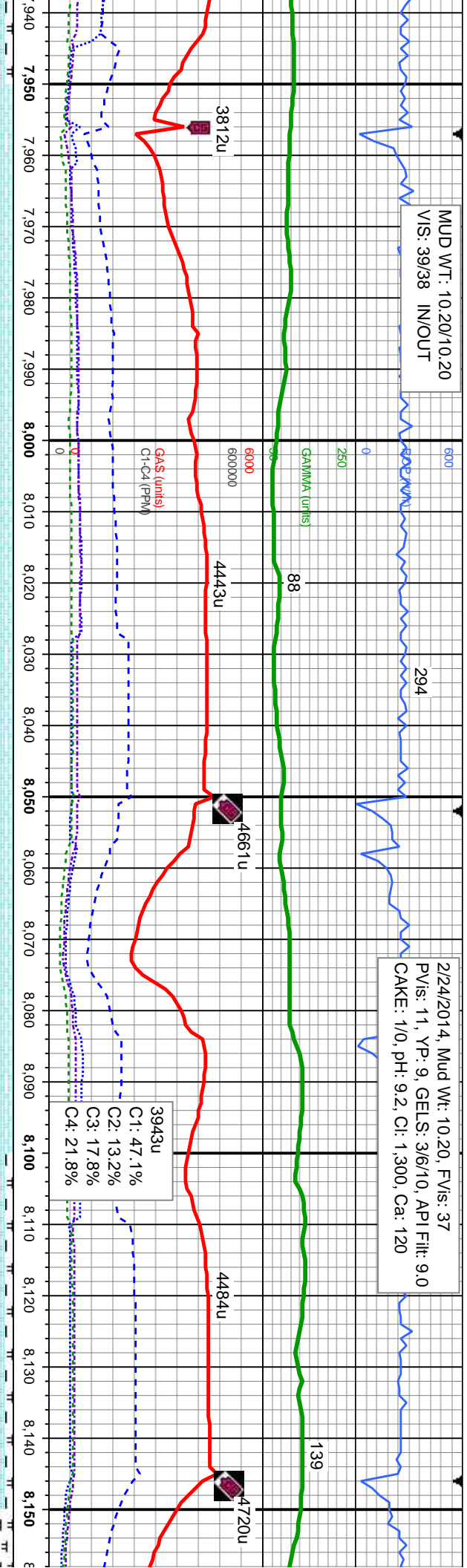


MD: 7,799'
TVD: 6,054.25'
Inclination: 90.31°
Azimuth: 267.98°
VS: 1,790.46'

MD: 7,894'
TVD: 6,053.51'
Inclination: 90.59°
Azimuth: 268.54°
VS: 213.36'

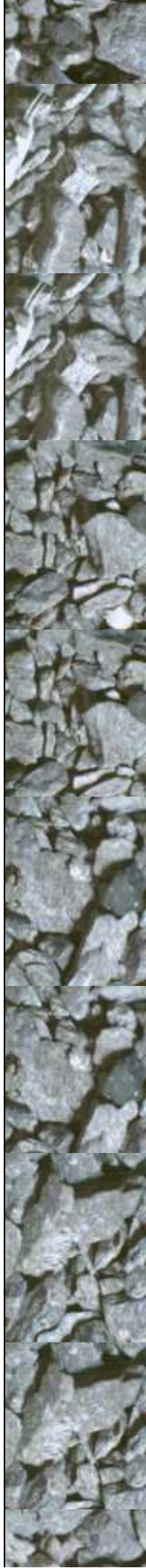
tan wi wh, sme lgy, mot, pty - sb blk, rthy tex, v calc,	100% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc, no bent, tr fos	90% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	90% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	90% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos
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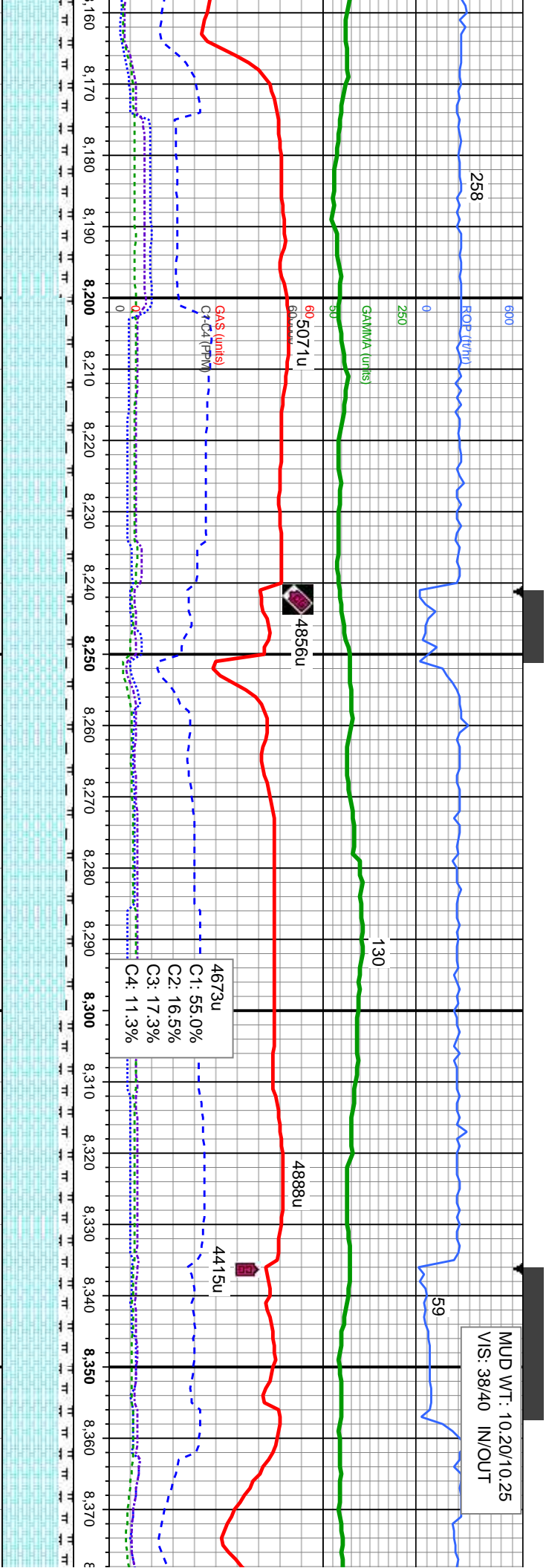




	MD: 7,989' TVD: 6,052.49' Inclination: 90.65 ° Azimuth: 268.51 ° VS: 210.92'	5850
	MD: 8,083' TVD: 6,051.22' Inclination: 90.89 ° Azimuth: 268.64 ° VS: 208.58'	

mot, ex, v calc mod hd, tr fos	100% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc, no bent, tr fos	100% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc, no bent, tr fos	100% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc, no bent, tr fos	90% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc, 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	80% C lam, sf 20% M sb pty
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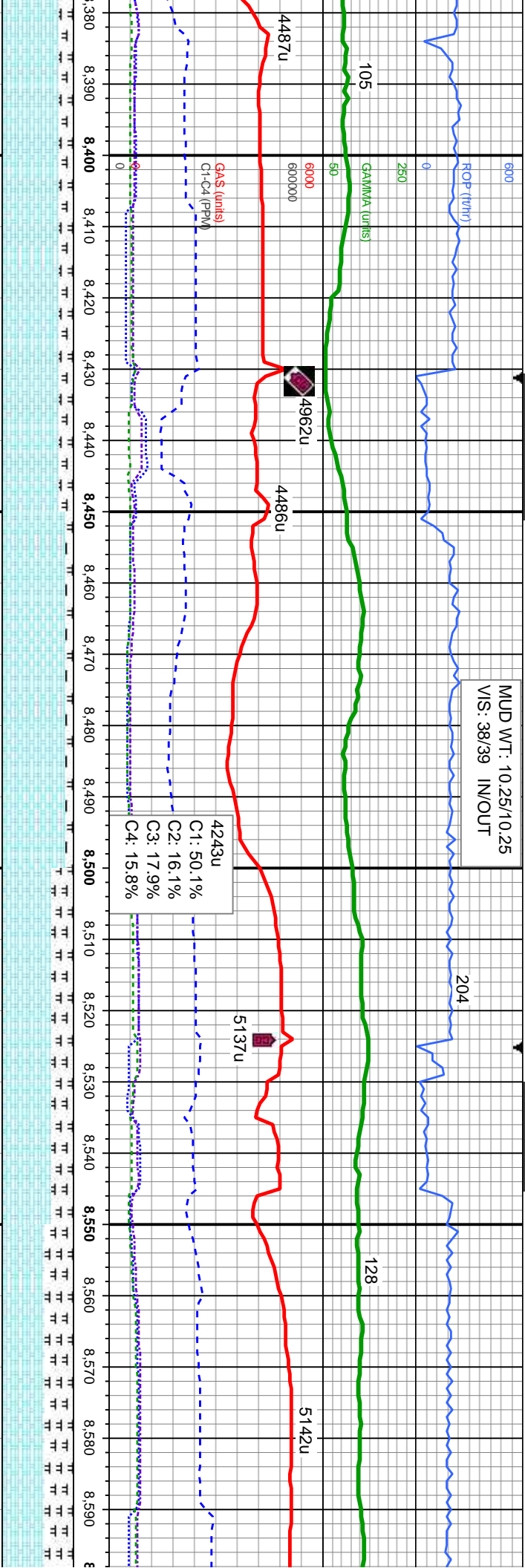




MD: 8,178' TVD: 6,049.33' Inclination: 91.39° Azimuth: 268.73° VS: 206.41'	5850		MD: 8,273' TVD: 6,046.8' Inclination: 91.66° Azimuth: 268.2° VS: 203.87'		MD: 8,368' TVD: 6,044.76' Inclination: 90.8° Azimuth: 267.7° VS: 200.47'
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HK: pred tan wi wh, sme ltyg, mot, - frm, sb pty - sb blk, rthy tex, v calc RL: lt - med gy, occ blk, sft - mod hd, - pty, silty - grty tex, no bent, tr fos	90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	80% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	80% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos
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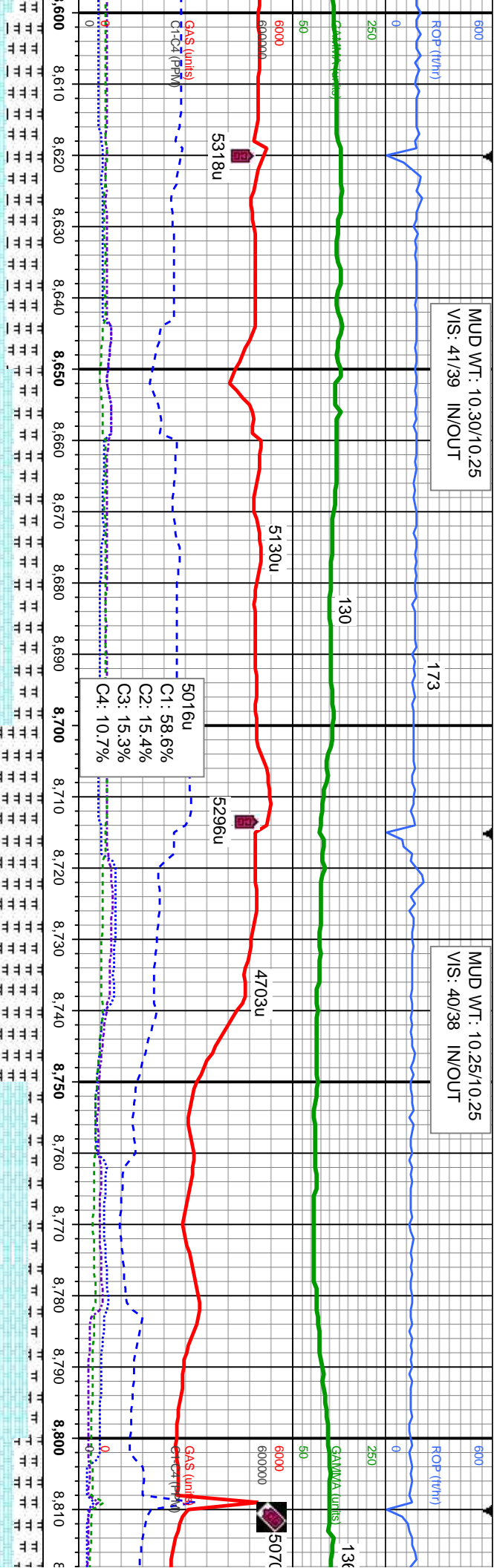




5850	MD: 8.462' TVD: 6,044.13' Inclination: 89.97° Azimuth: 268.82° VS: 197.61'
	MD: 8.557' TVD: 6,045.07' Inclination: 88.89° Azimuth: 269.31° VS: 196.06'

80% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	90% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	70% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	60% CHK: pred tan wi wh, sme lgy, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos
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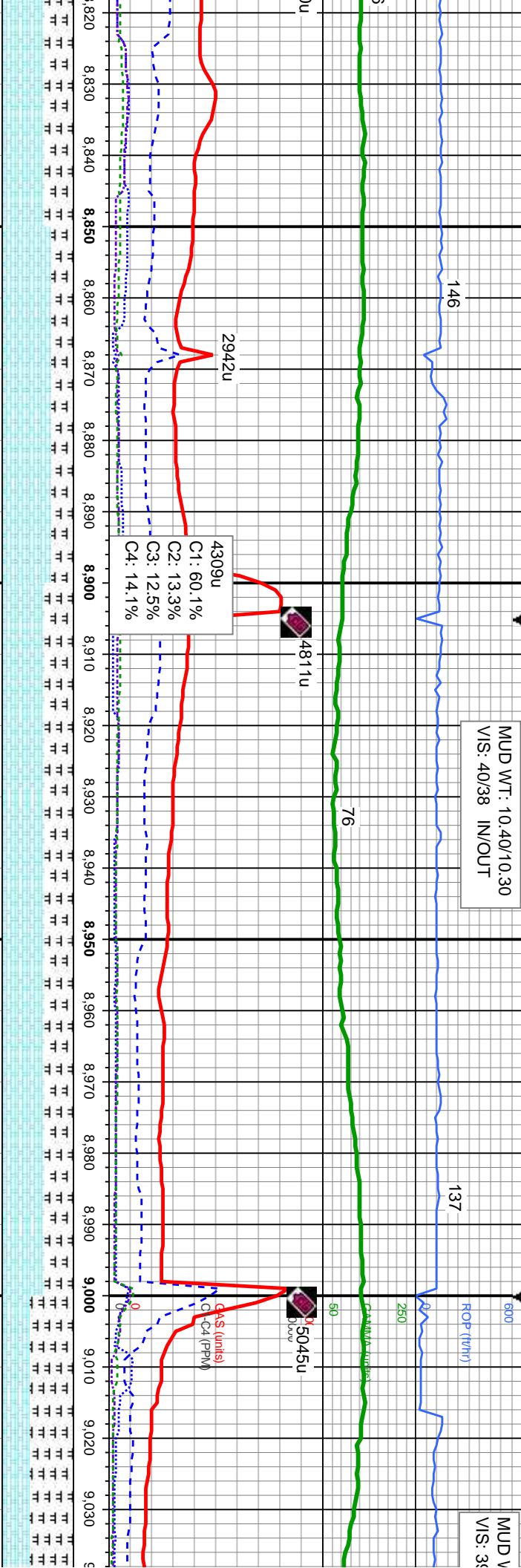




5850	MD: 8.652' TVD: 6,046.84' Inclination: 88.98 ° Azimuth: 269.07 ° VS: 194.72'	5850	MD: 8.747' TVD: 6,048.27' Inclination: 89.29 ° Azimuth: 269.18 ° VS: 193.27'	5850	MD: 8.747' TVD: 6,048.27' Inclination: 89.29 ° Azimuth: 269.18 ° VS: 193.27'
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50% CHK: pred tan w/ wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 50% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	60% CHK: pred tan w/ wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	40% CHK: pred tan w/ wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 60% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	80% CHK: pred tan w/ wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	60% CHK: pred lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty
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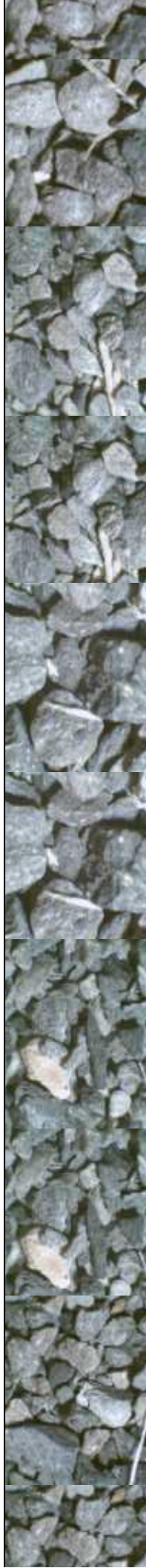


MD: 8.842'
TVD: 6,049.65'
Inclination: 89.04 °
Azimuth: 268.7°
VS: 191.51'

MD: 8.937'
TVD: 6,050.52'
Inclination: 89.91 °
Azimuth: 269.41 °
VS: 189.94'

MD: 9.032'
TVD: 6,051.72'
Inclination: 88.6 °
Azimuth: 270.73°
VS: 190.06'

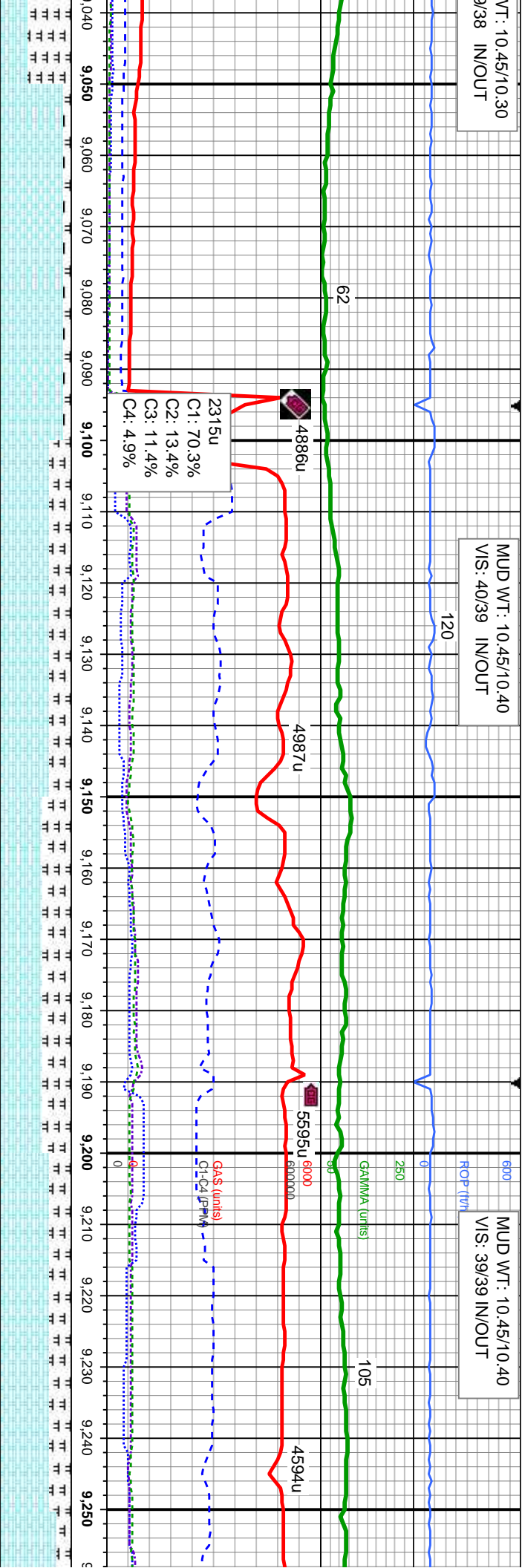
70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	60% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	60% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, tr fos	40% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 60% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent
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WT: 10.45/10.30
9/38 IN/OUT

MUD WT: 10.45/10.40
VIS: 40/39 IN/OUT

MUD WT: 10.45/10.40
VIS: 39/39 IN/OUT



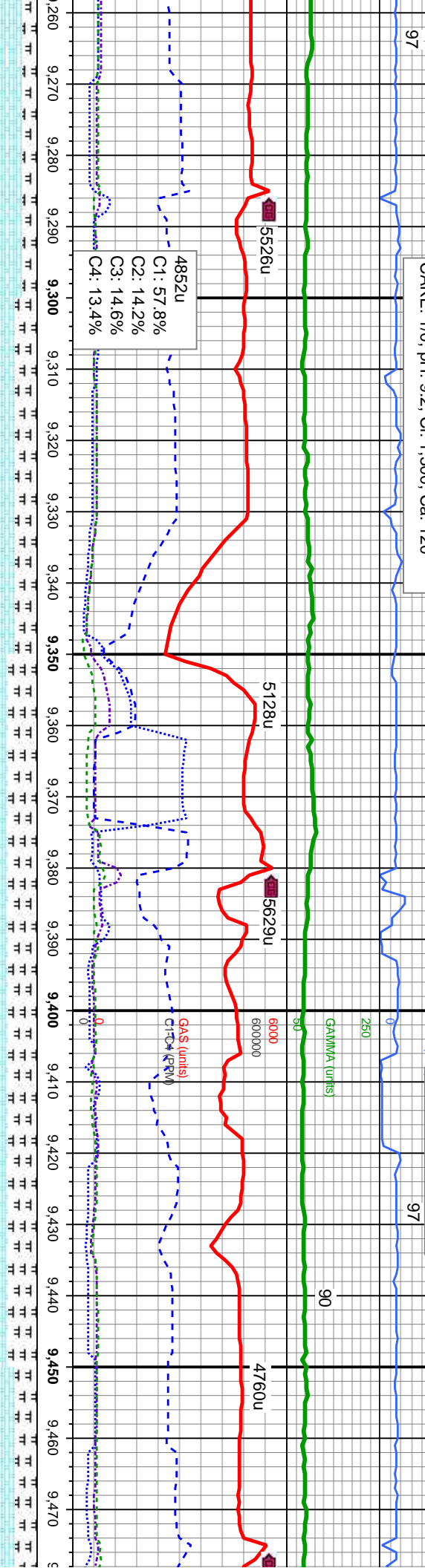
4°	MD: 9.127'	MD: 9.221'
3°	TVD: 6.053.94'	TVD: 6.055.84'
	Inclination: 88.67°	Inclination: 89.01°
	Azimuth: 270.9°	Azimuth: 271.14°
	VS: 191.42'	VS: 3.209.92'

90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, no fos	70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, no fos	60% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, no fos	70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, no fos	80% C
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2/24/2014, Mud Wt: 10.35, FV/s: 39
PVs: 12, YP: 8, GELS: 3/6/13, API Filtr: 8.0
CAKE: 1/0, pH: 9.2, Cl: 1,300, Ca: 120

MUD WT: 10.35/10.35
VIS: 36/38 IN/OUT



MD: 9,316'
TVD: 6,056.15'
Inclination: 90.62 °
Azimuth: 272.35 °
VS: 3,304.91'

MD: 9,411'
TVD: 6,055.71'
Inclination: 89.91 °
Azimuth: 271.28 °
VS: 3,399.91'

70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grly tex, tr bent, tr fos	60% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grly tex, tr bent, tr fos	60% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 40% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grly tex, tr bent, tr fos	70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grly tex, tr bent, tr fos
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MUD WT: 10.35/10.45
VIS: 36/36 IN/OUT

94

ROP (ft/hr)

MUD WT: 10.40/10.40
VIS: 35/36 IN/OUT

94

101

GAMMA (units)

50

94

5327u

6000

4575u

5327u

6000000

4575u

5327u

GA\$ (units)

4575u

5327u

GA\$ (units)

4575u

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MD: 9.506'
TVD: 6.056.61'
Inclination: 89.01°
Azimuth: 269.25°
VS: 3.494.84'

MD: 9.601'
TVD: 6.058.52'
Inclination: 88.67°
Azimuth: 268.91°
VS: 3.589.68'

MD: 9.696'
TVD: 6.060.
Inclination: 88.67°
Azimuth: 268.91°
VS: 3.684.5'

70% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos

70% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos

70% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos

70% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos

90% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb ply - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb ply - ply, silty - grty tex, tr bent, tr fos



2/24/14

2/25/14

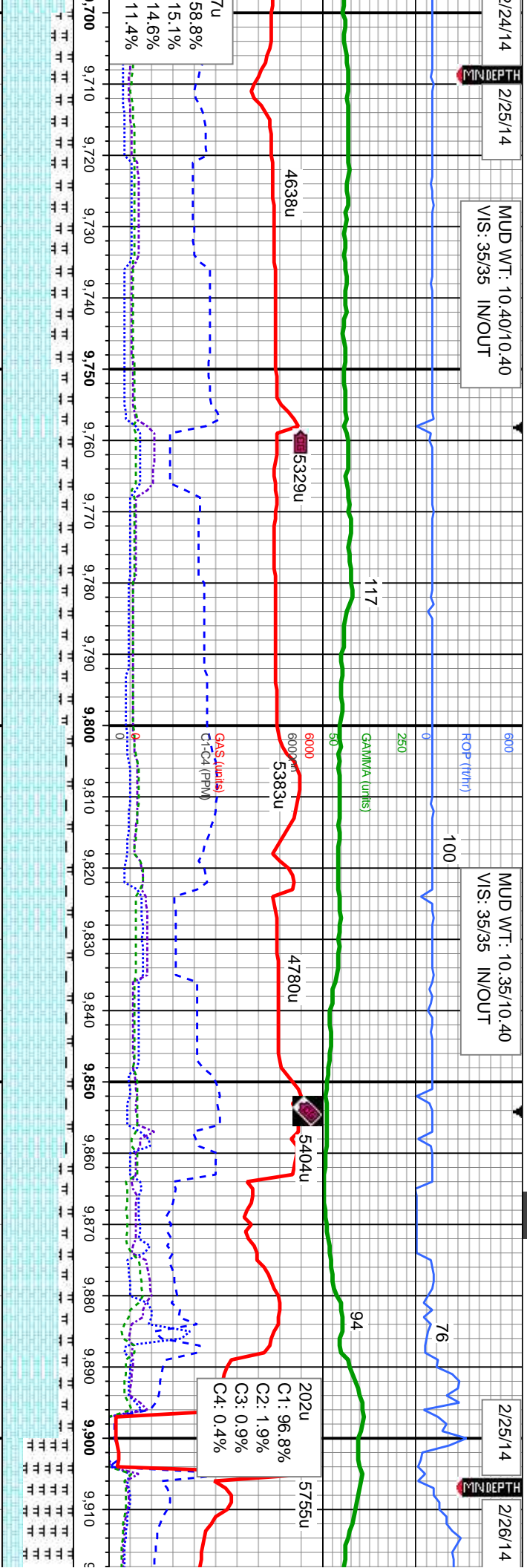
MUD WT: 10.40/10.40
VIS: 35/35 IN/OUT

2/25/14

MUD WT: 10.35/10.40
VIS: 35/35 IN/OUT

2/25/14

2/26/14

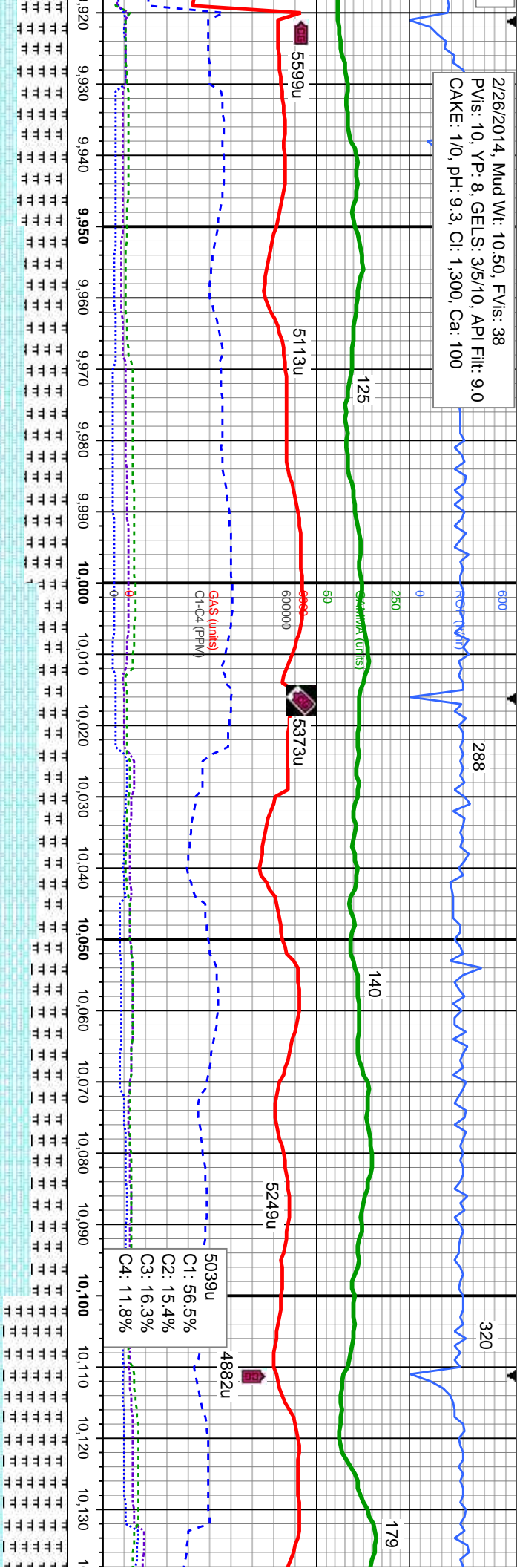


03'	MD: 9,791' TVD: 6,060.85' Inclination: 89.51° Azimuth: 269.78° VS: 3,779.45'	5850	MD: 9,858' TVD: 6,061.46' Inclination: 89.45° Azimuth: 268.69° VS: 195.4'	Bit Data Bit #: 4 Type: Schlumberger/Smith Model: SD513 Size: 6.12" Depth In: 9,883' Jets: 5x13	TOOH TO RE AND AGITAT
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70% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 30% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, tr fos	80% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, tr fos	90% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 10% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, no bent, no fos	80% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 20% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, no fos	30% CHK: pred tan wi wh, sme ltyg, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 70% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, tr bent, no fos
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2/26/2014, Mud Wt: 10.50, FV/s: 38
PV/s: 10, YP: 8, GELS: 3/5/10, API Filtr: 9.0
CAKE: 1/0, pH: 9.3, Cl: 1,300, Ca: 100



PLACE MUD MOTOR
OR 9,905' MD.

MD: 9,953'
TVD: 6,061.36'
Inclination: 90.68°
Azimuth: 268.51°
VS: 193.08'

TVD (ft)

MD: 10,048'
TVD: 6,059.8'
Inclination: 91.2°
Azimuth: 268.89°
VS: 190.93'

MD: '
TVD: '
Inclin
Azim
VS: 1

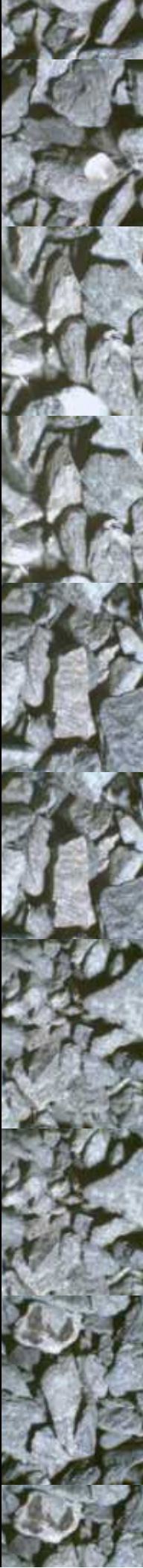
tan wi wh, sme lty, mot,
ply - sb blk, rthy tex, v calc
gy, occ blk, sft - mod hd,
v - grty tex, rr bent, no fos

40% CHK: pred tan wi wh, sme lty, mot,
lam, sft - frm, sb ply - sb blk, rthy tex, v calc
60% MRL: lt - med gy, occ blk, sft - mod hd,
sb ply - ply, silty - grty tex, rr bent, no fos

60% CHK: pred tan wi wh, sme lty, mot,
lam, sft - frm, sb ply - sb blk, rthy tex, v calc
40% MRL: lt - med gy, occ blk, sft - mod hd,
sb ply - ply, silty - grty tex, rr bent, rr fos

50% CHK: pred tan wi wh, sme lty, mot,
lam, sft - frm, sb ply - sb blk, rthy tex, v calc
50% MRL: lt - med gy, occ blk, sft - mod hd,
sb ply - ply, silty - grty tex, rr bent, no fos

10% CHK: pred tan wi wh, sme lty,
lam, sft - frm, sb ply - sb blk, rthy
90% MRL: lt - med gy, occ blk, sft -
sb ply - ply, silty - grty tex, rr bent,

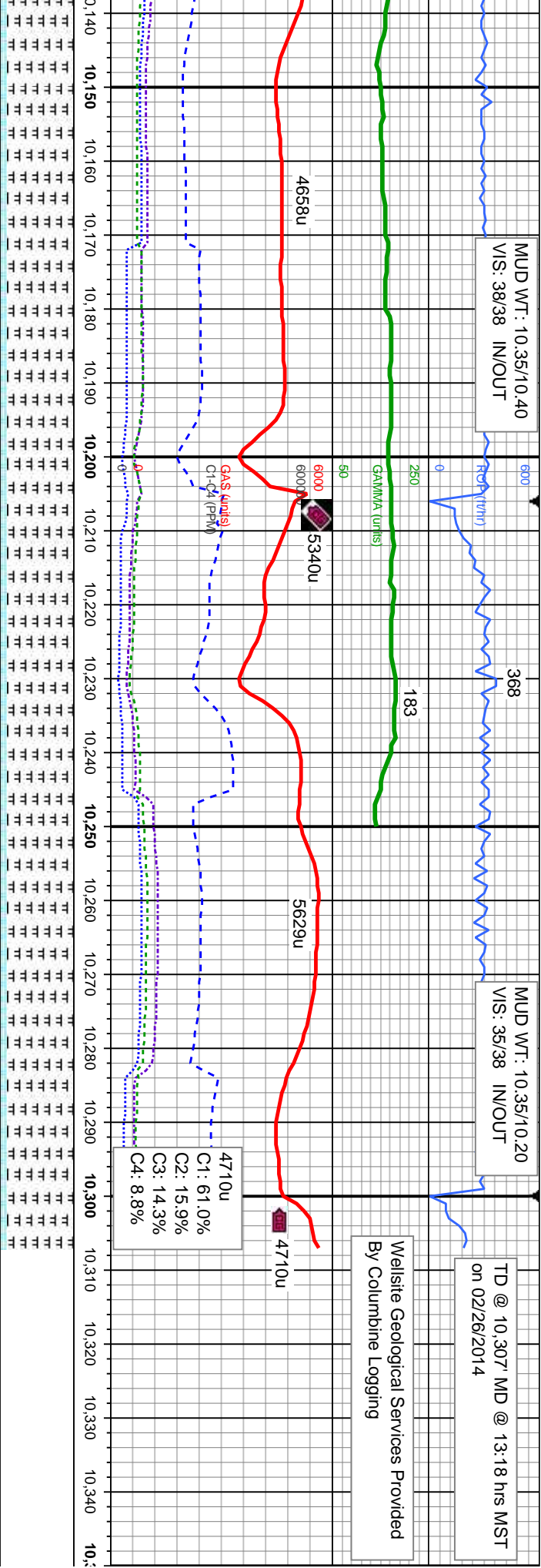


MUD WT: 10.35/10.40
VIS: 38/38 IN/OUT

MUD WT: 10.35/10.20
VIS: 35/38 IN/OUT

TD @ 10,307 MD @ 13:18 hrs MST
on 02/26/2014

Wellsite Geological Services Provided
By Columbine Logging



0.143'	MD: 10,243'	MD: 10,307'
6.057.43'	TVD: 6,054.25'	TVD: 6,052.05'
Inclination: 91.66°	Inclination: 91.97°	Inclination: 91.97°
uth: 269.09°	Azimuth: 269.65°	Azimuth: 269.65°
89.25'	VS: 188.16'	VS: 187.77'

10% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 90% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, rr fos	10% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 90% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, rr fos	10% CHK: pred tan wi wh, sme lty, mot, lam, sft - frm, sb pty - sb blk, rthy tex, v calc 90% MRL: lt - med gy, occ blk, sft - mod hd, sb pty - pty, silty - grty tex, rr bent, rr fos
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