



Scale: 5" / 100'
Measured Depth Log

Well Name Moses State LD11-77-1AHN

Location SESW SEC2, T9N, R58W, 6PM

State COLORADO **County** WELD

Country USA **Rig Number** H&P 326

API Number 05-123-39844 **Field** WILDCAT

Region DJ BASIN **Drilling Completed** 1/12/2015

Spud Date 1/6/2015

Surface Coordinates 465' FSL, 1567' FWL
40.77456/-103.83534

Bottom Hole Coordinates (PROJ)
330' FFSSL, 1540' FFWLL

Ground Elevation 4774' **K.B. Elevation** 4771'

Logged Interval 4962' To 10911' **Total Depth** 10911'

Formation NIOBRARA B-CHALK

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name RENEE CLACKLER

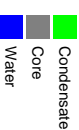
Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

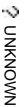


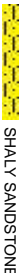



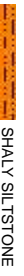



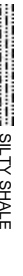

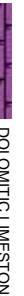








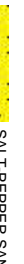





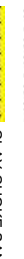





Other

COLUMBINE LOGGING MATT HOPKINS
ANDREW MARTENS


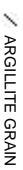
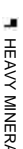

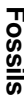
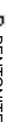

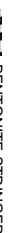


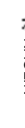

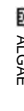

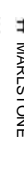
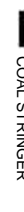
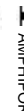
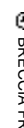

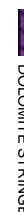
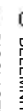

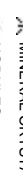
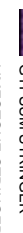
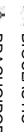


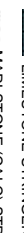




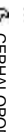
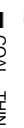
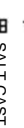
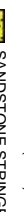





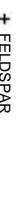



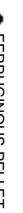





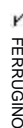


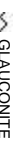

Zone Color Coding



Rock Types

 UNKNOWN	 COAL	 MARLSTONE	 SHALY SANDSTONE
 ANHYDRITE	 CONGLOMERATE	 METAMORPHIC	 SHALY SILTSTONE
 BENTONITE	 DOLOMITE	 NO SAMPLE	 SILTY SHALE
 BRECCIA	 DOLOMITIC LIMESTONE	 SALT	 SILTSTONE
 CHALK	 GRANITE	 SANDSTONE	 TILL
 CEMENT	 GYPSUM	 SALT-PEPPER SANC	 TUFF
 CHERT	 IGNEOUS	 SHALE	 WELDED TUFF
 CLAY CHOKE SANC	 SIDERITE or LIMONITE	 SHALE COLORED	
 CLAYSTONE	 LIMESTONE	 SHALE GRAY	

Accessories


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

Stringer


Oil Show

 P PINPOINT
 V VUGGY

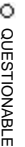
Engineering




D DEAD




EVEN




QUESTIONABLE



BIT



SPOTTED STAINING








































CONNECTION (UP)

Engineering

Porosity

 C CONNECTION (DOW)	 C CONNECTION GAS	 E EARTHY	 C CONNECTION GAS
 F FENESTRAL	 T TRIP GAS	 F FRACTURE	 T TRIP GAS (LEFT)
 I INTERCRYSTALLINE	 D DOWN TIME GAS	 I INTEROOLITIC	 D DOWN TIME GAS
 M MOLDIC	 C CORE - LOST	 O ORGANIC	 C CORE - RECOVERED

Other Symbols

	DST INTERVAL		WIRELINE TESTED - LEFT		E EARTHY
	FAULT		WIRELINE TESTED - RT		FX FINELYXLN
	FORMATION TOP		DRILL STEM TEST		BS GRAINSTONE
	GAS SHOW		MN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MN DEPTH UP	Rounding			
					MX MUDSTONE
	MN DEPTH (DOWN)		A ANGULAR		PS PACKSTONE
	NORMAL FAULT		R ROUNDED		WS WACKESTONE
	OVERTURNED STRATA		B SUBANG		
	REVERSE FAULT		P SUBRND	Sorting	
	CASING				M MODERATE
Textures					
	SIDEWALL CORE (LEFT)				P POOR
	SIDEWALL CORE (RIGHT)		BS BOUNDSTONE		W WELL
	SLIDE		C CHALKY		
	SURVEY		CX CRYPTOXLN		

Slide/Rotate

ROP
ROP

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

COLUMBINE LOGGING INC.
RIGGED UP ON 1/07/2015
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0568

CONTINUED FROM MOSES
STATE LD11-77-1AHN(VERT)

Depth Labels

% Lith

GAMMA
GR

50' Sample Intervals

Well Bore
TVD

Bit Data
Bit #: 1
Type: PDC
Size: 8.75
Depth In: 1,243'
Jets: 7X13
S/N: JJ2603

MD: 4,967'
Inclination: 2.11 °
Azimuth: 1.02 °
TVD: 4,964.58'
VS: -53.39'

SLTY SH: lt-dk gy, mod frm, sb blk-y-sb pty,
gritty, rthy, silky, occ string of shv ss

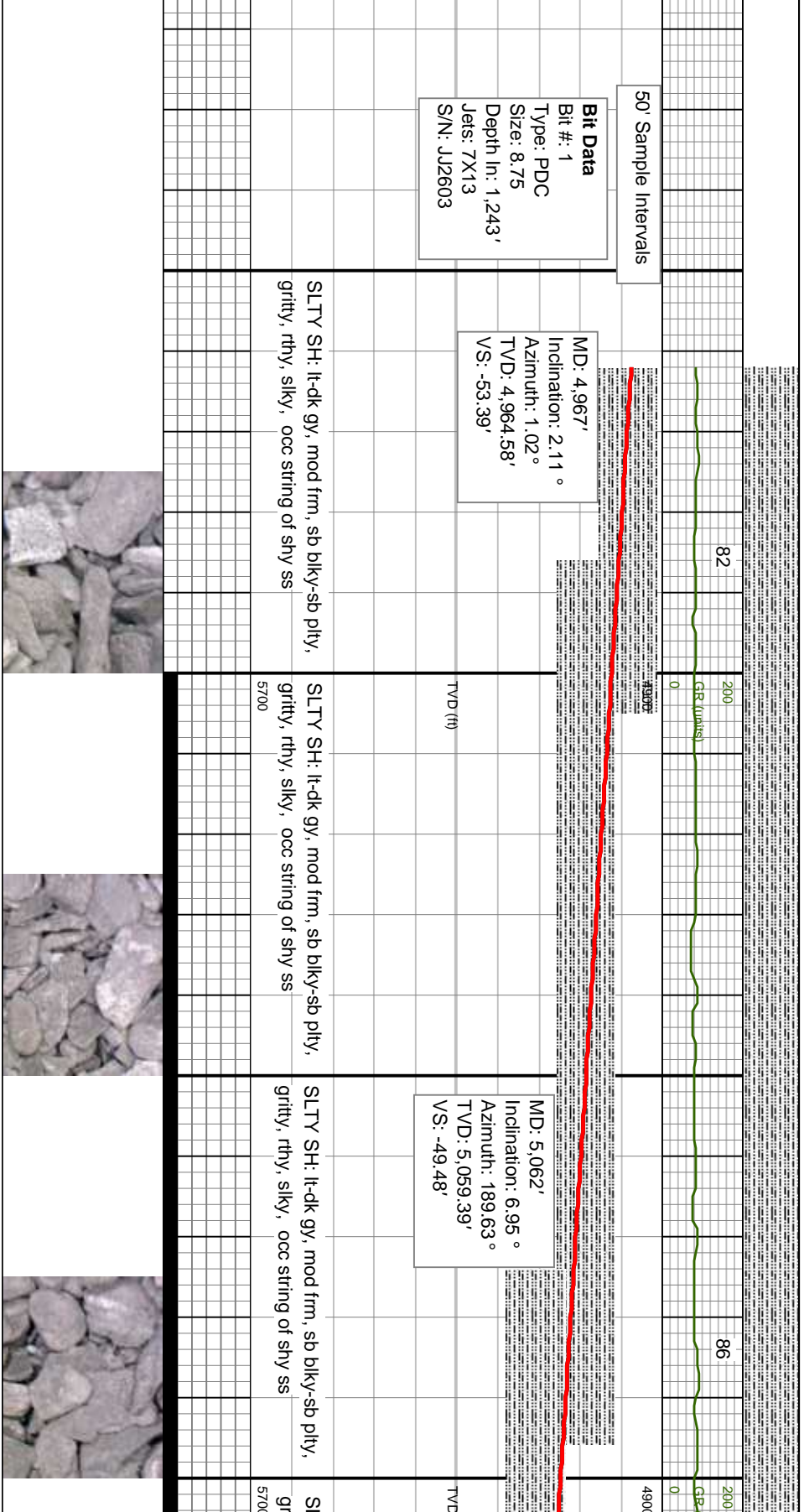
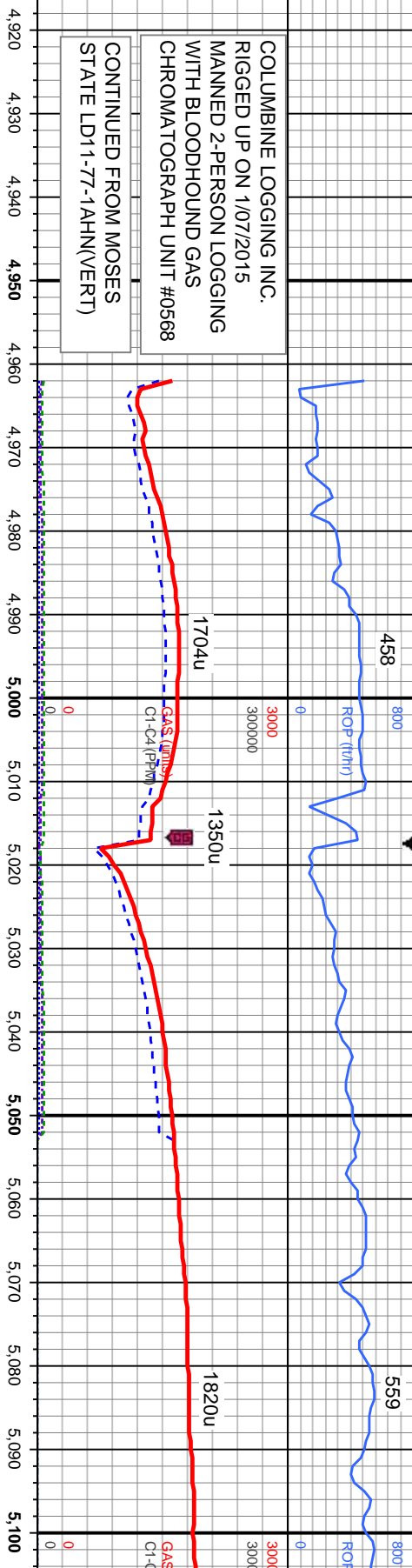
SLTY SH: lt-dk gy, mod frm, sb blk-y-sb pty,
gritty, rthy, silky, occ string of shv ss

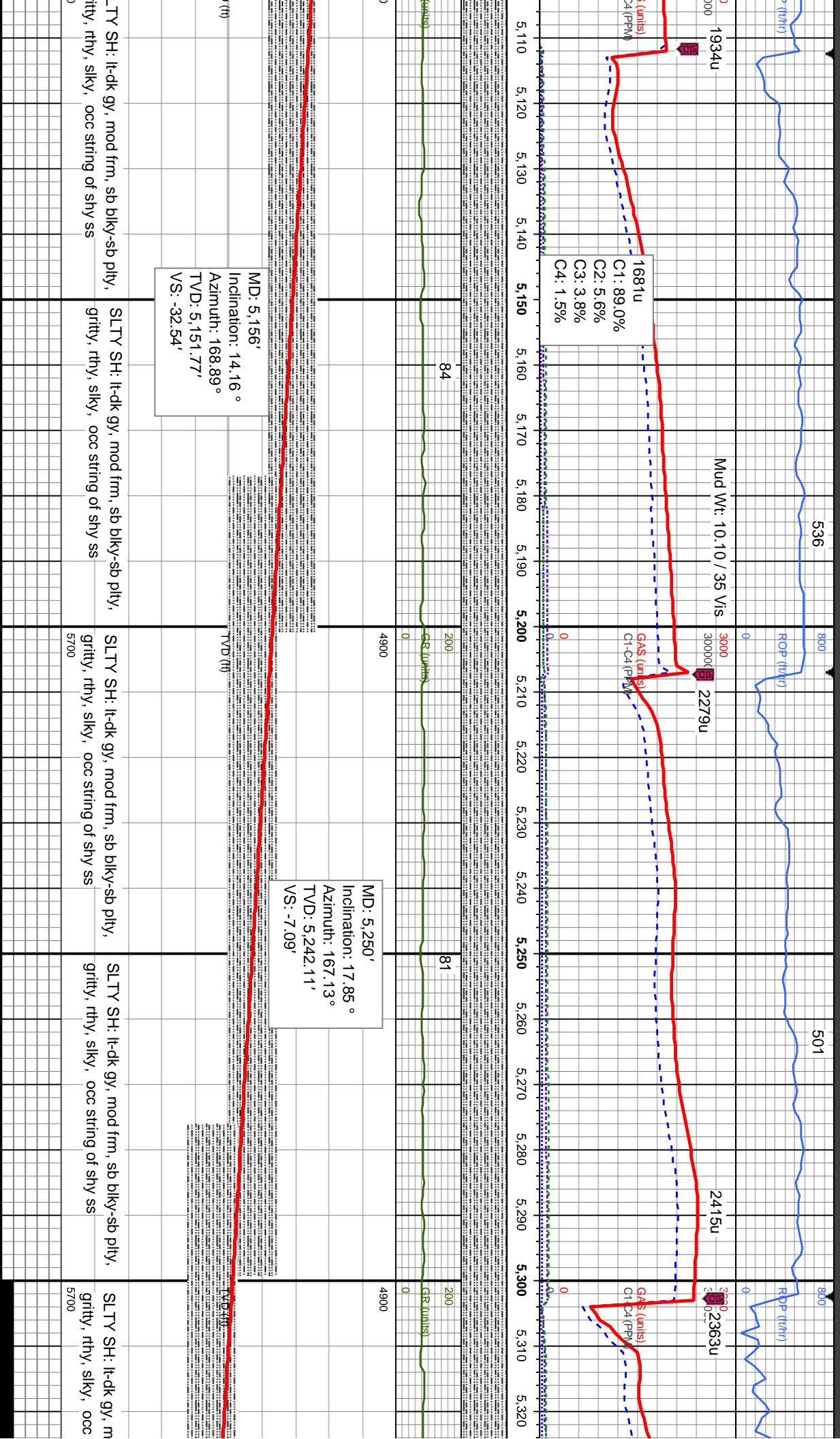
SLTY SH: lt-dk gy, mod frm, sb blk-y-sb pty,
gritty, rthy, silky, occ string of shv ss

Oil Show

E
C
M
F
T
ST

Images

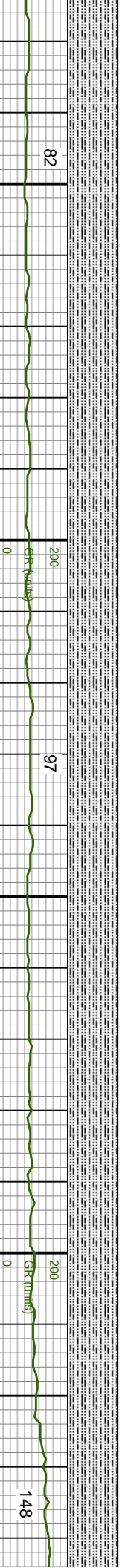
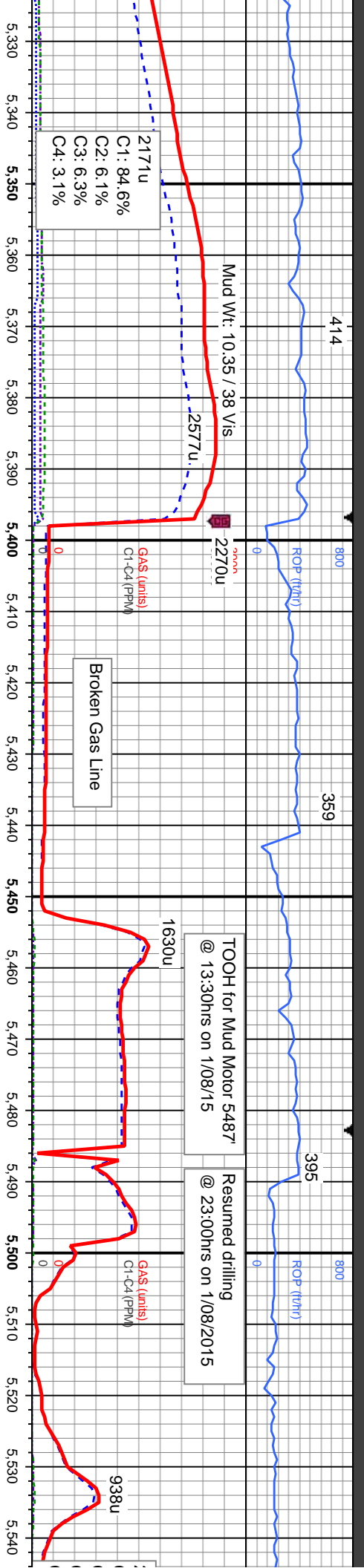




MD: 5,156'
Inclination: 14.16 °
Azimuth: 168.89 °
TVD: 5,151.77'
VS: -32.54'

MD: 5,250'
Inclination: 17.85 °
Azimuth: 167.13 °
TVD: 5,242.11'
VS: -7.09'





MD: 5,345'
Inclination: 20.66 °
Azimuth: 174.34 °
TVD: 5,331.8'
VS: 23.89'

MD: 5,439'
Inclination: 25.76 °
Azimuth: 185.24 °
TVD: 5,418.21'
VS: 60.76'

Bit Data
Bit #: 2
Type: PDC
Size: 8.75
Depth In: 5,487'
Jets: 5x14
S/N: JU2941

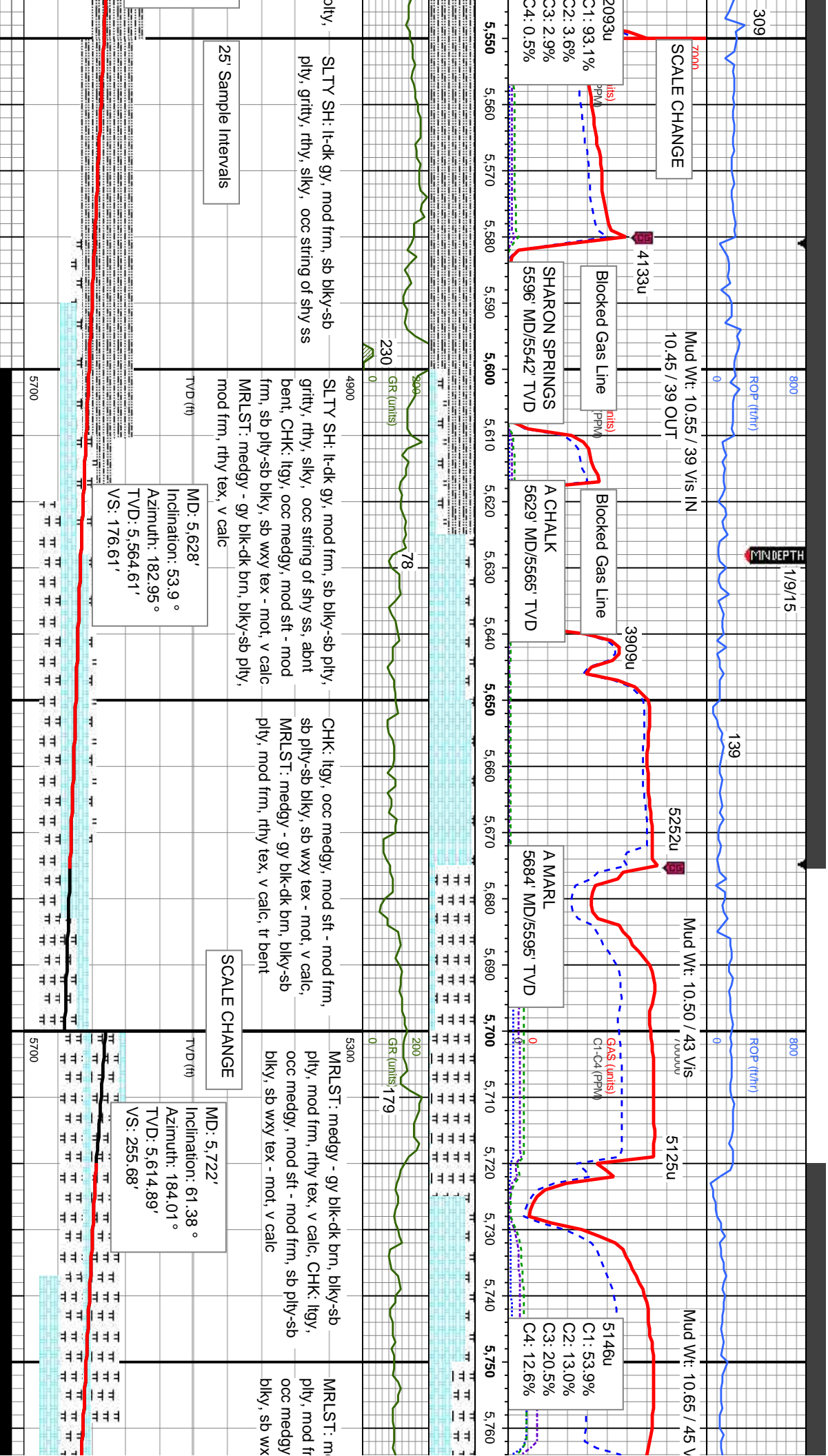
MD: 5,534'
Inclination: 37.28 °
Azimuth: 185.59 °
TVD: 5,499.05'
VS: 110'

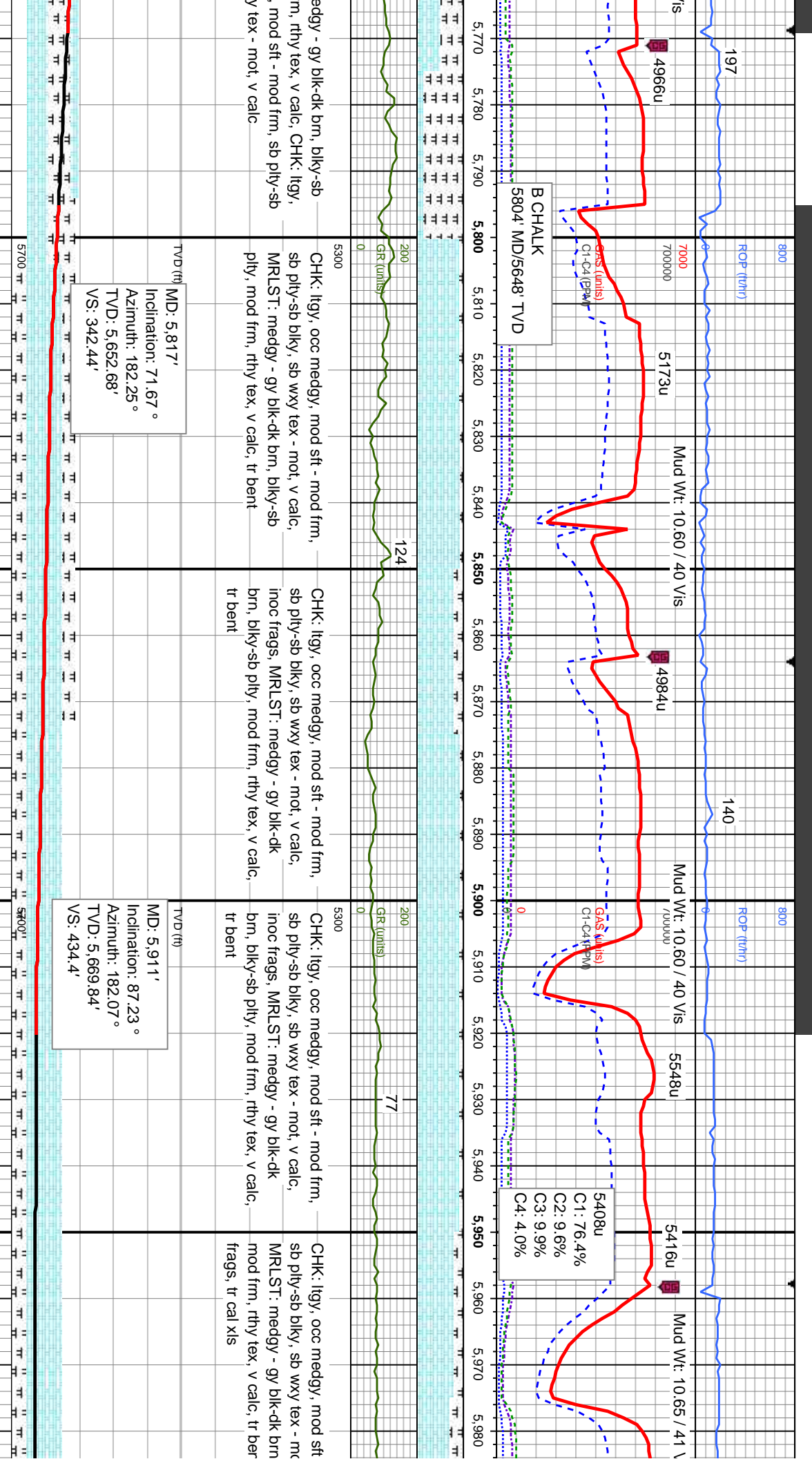
od frm, sb blk-y-sb pty,
string of shy ss

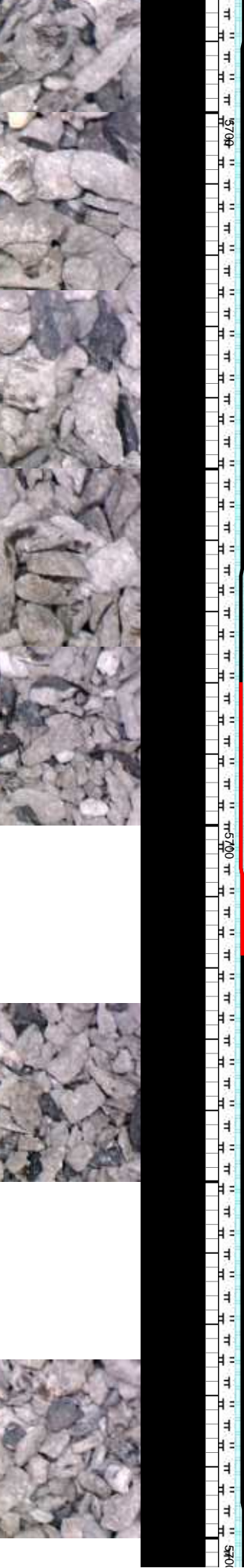
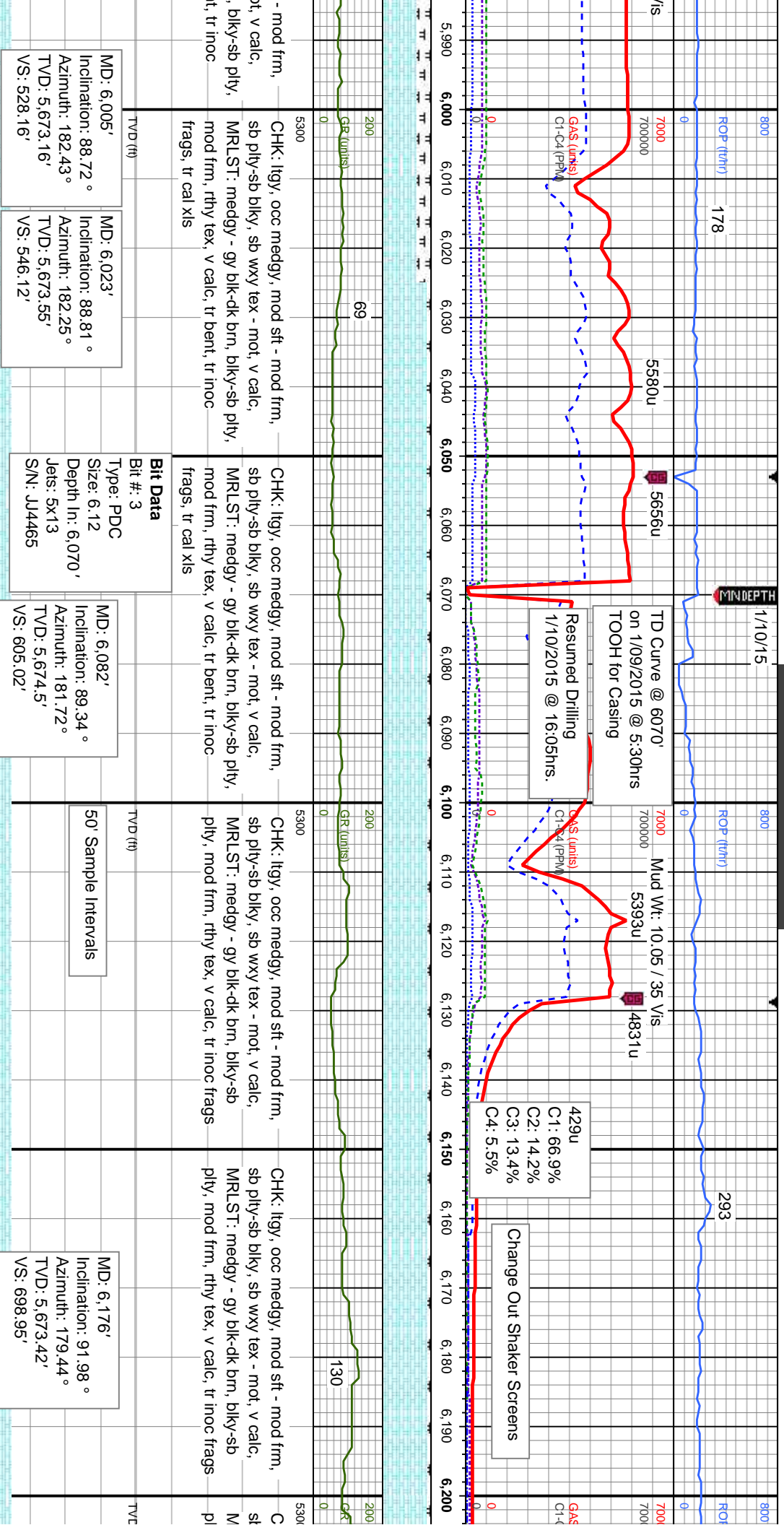
SLTY SH: lt-dk gy, mod frm, sb blk-y-sb pty,
gritty, rthy, silky, occ string of shy ss

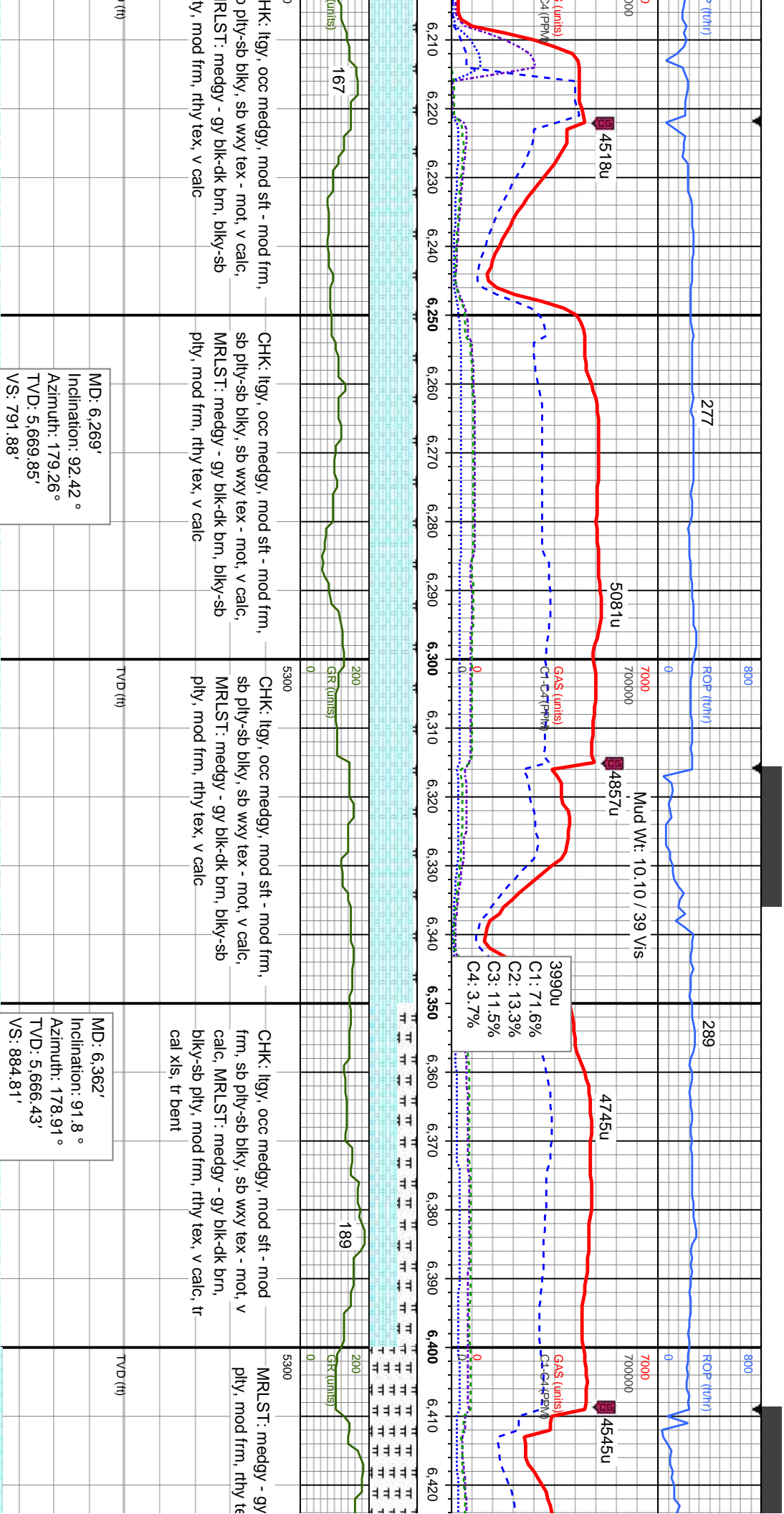
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gritty, rthy, silky, occ string of shy ss

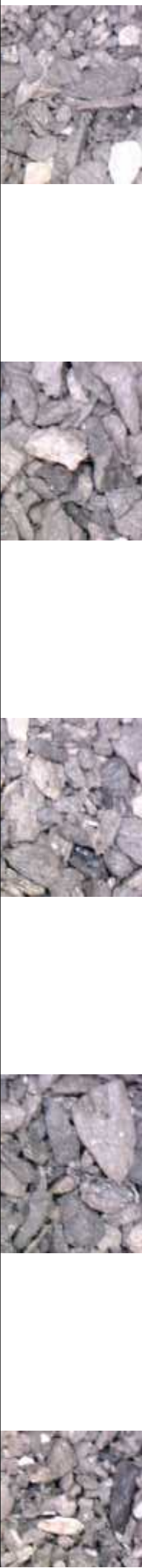
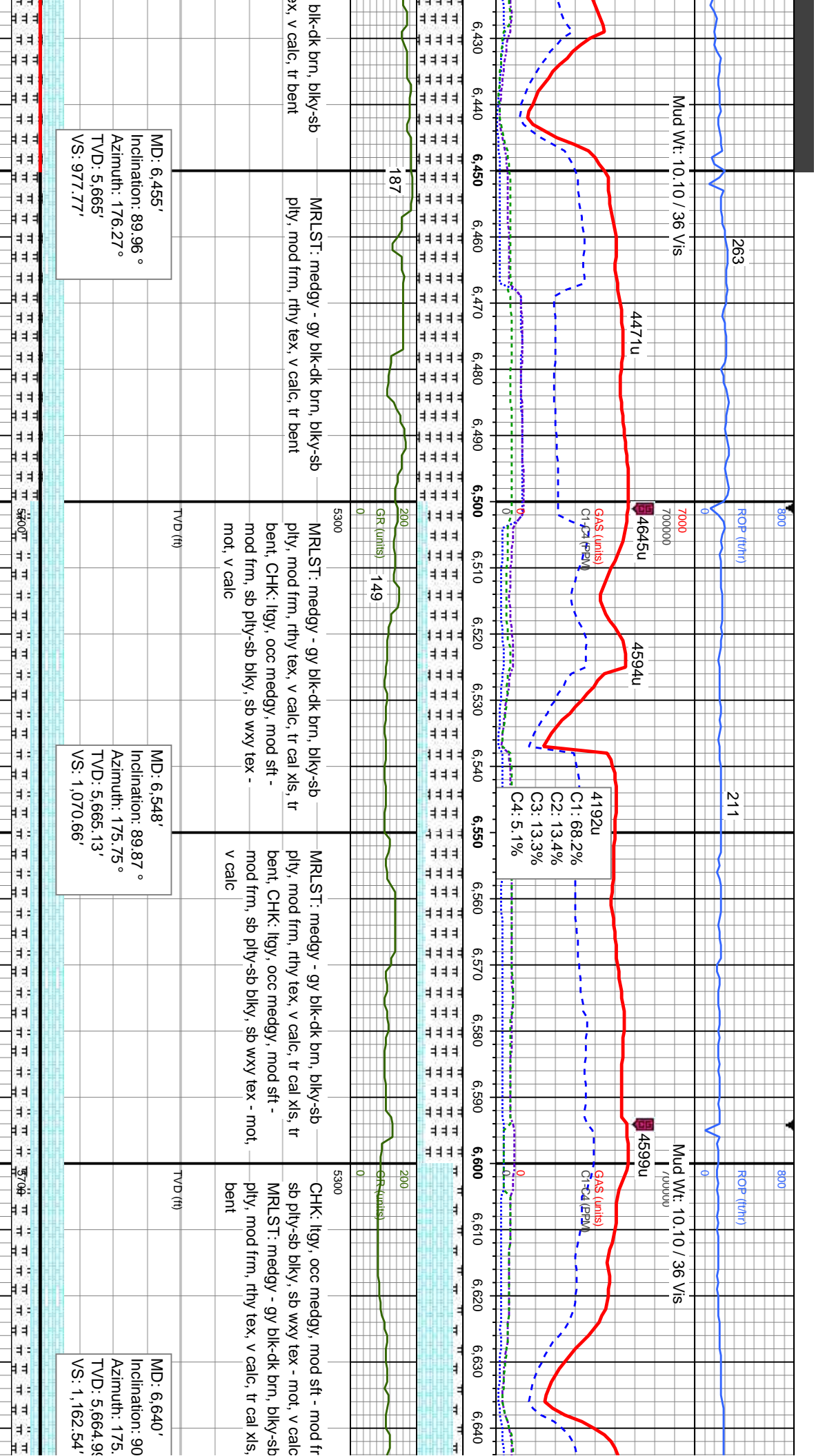


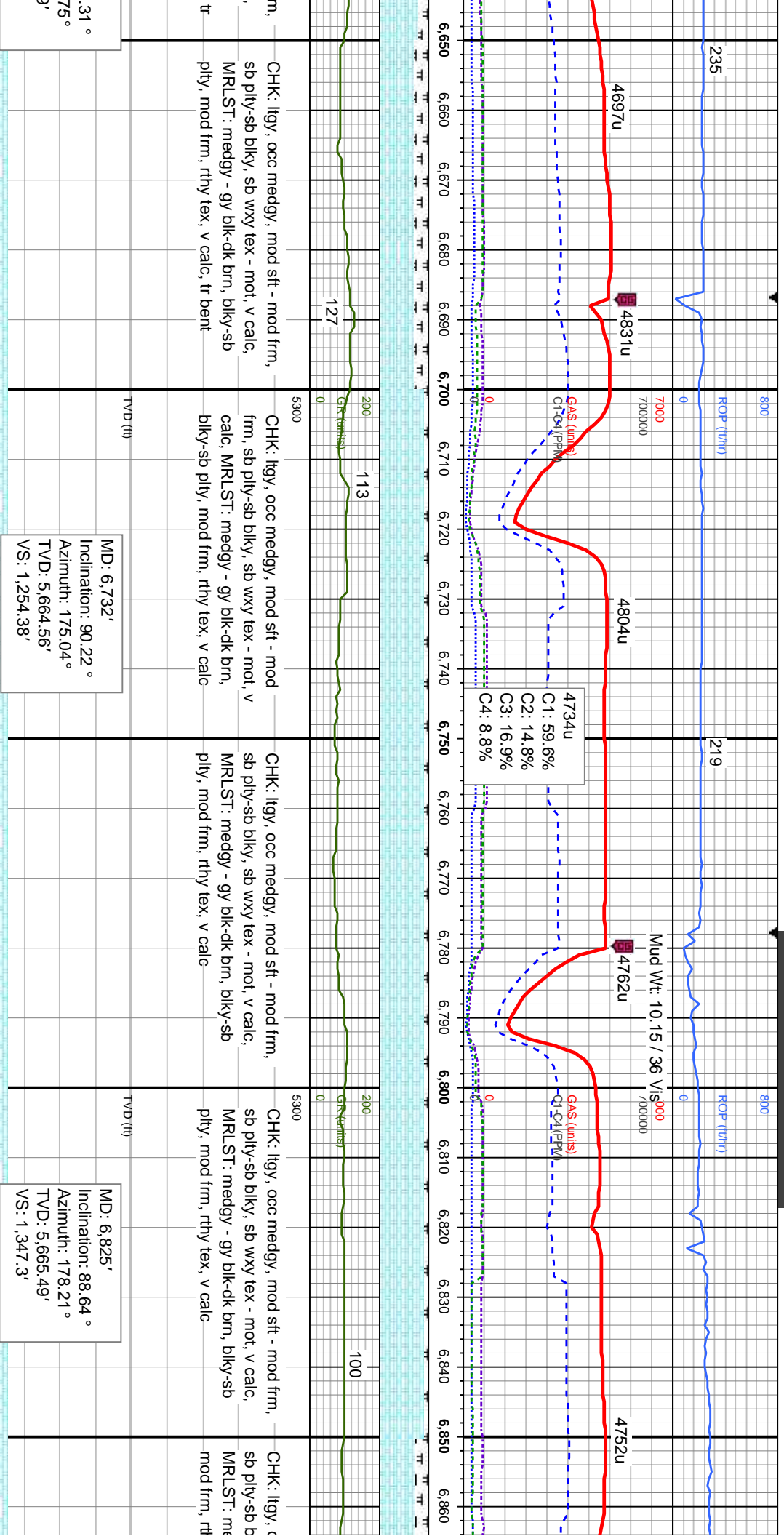








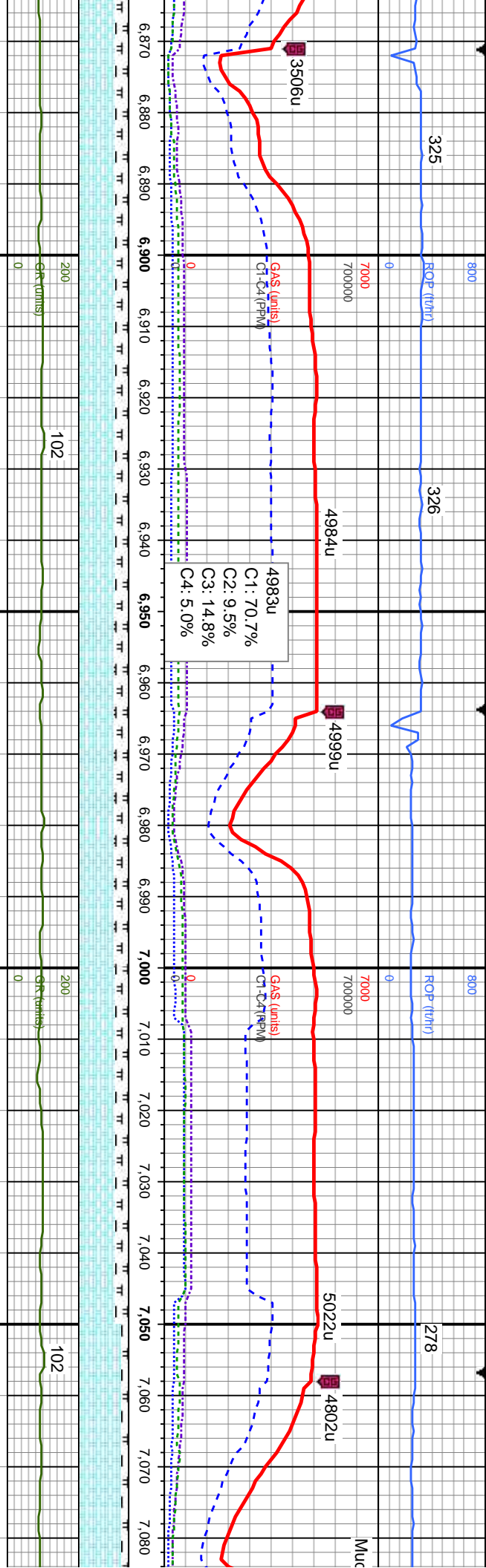




MD: 6,732'
Inclination: 90.22°
Azimuth: 175.04°
TVD: 5,664.56'
VS: 1,254.38'

MD: 6,825'
Inclination: 88.64°
Azimuth: 178.21°
TVD: 5,665.49'
VS: 1,347.3'





occ medgy, mod sft - mod frm, lly, sb wxy tex - mot, v calc, medgy - gy blk-dk brn, bly-sb pty, y tex, v calc

CHK: lly, occ medgy, mod sft - mod frm, sb pty-sb bly, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, bly-sb pty, mod frm, rthy tex, v calc, inoc frags

CHK: lly, occ medgy, mod sft - mod frm, sb pty-sb bly, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, bly-sb pty, mod frm, rthy tex, v calc, inoc frags

CHK: lly, occ medgy, mod sft - mod frm, sb pty-sb bly, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk brn, bly-sb pty, mod frm, rthy tex, v calc, inoc frags

TVD (ft)

MD: 6,918'

Inclination: 89.52 °

Azimuth: 179.26 °

TVD: 5,666.98'

VS: 1,440.29'

TVD (ft)

MD: 7,011'

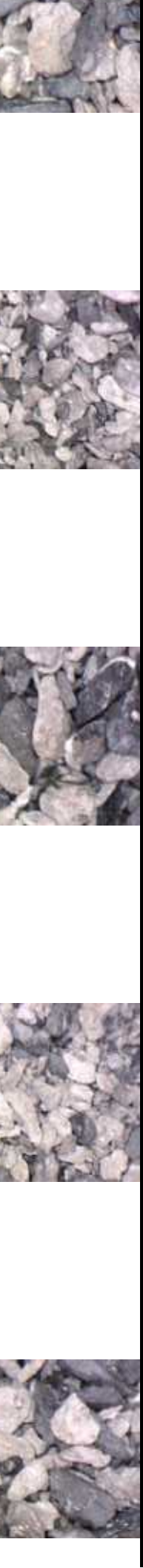
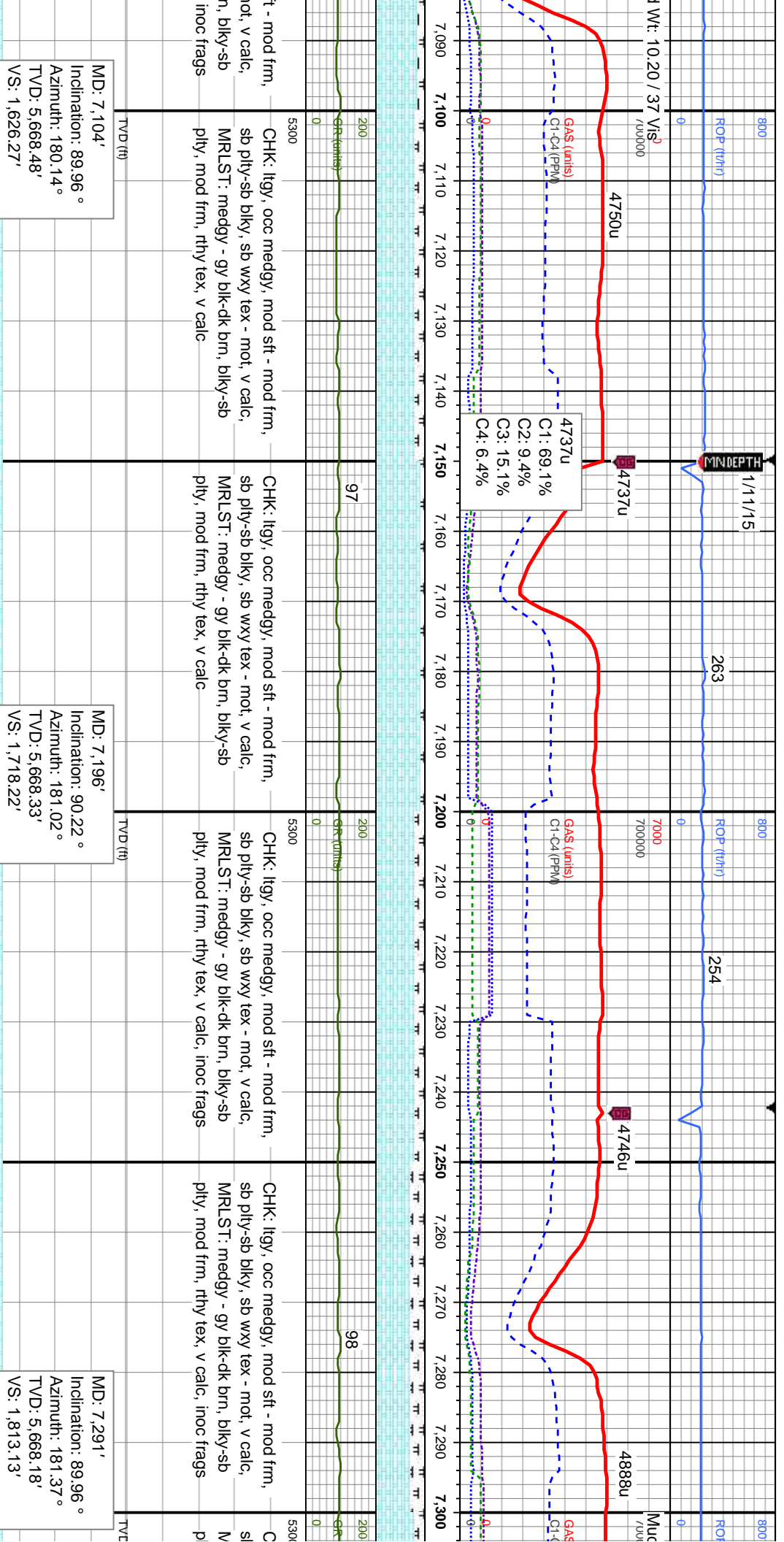
Inclination: 89.34 °

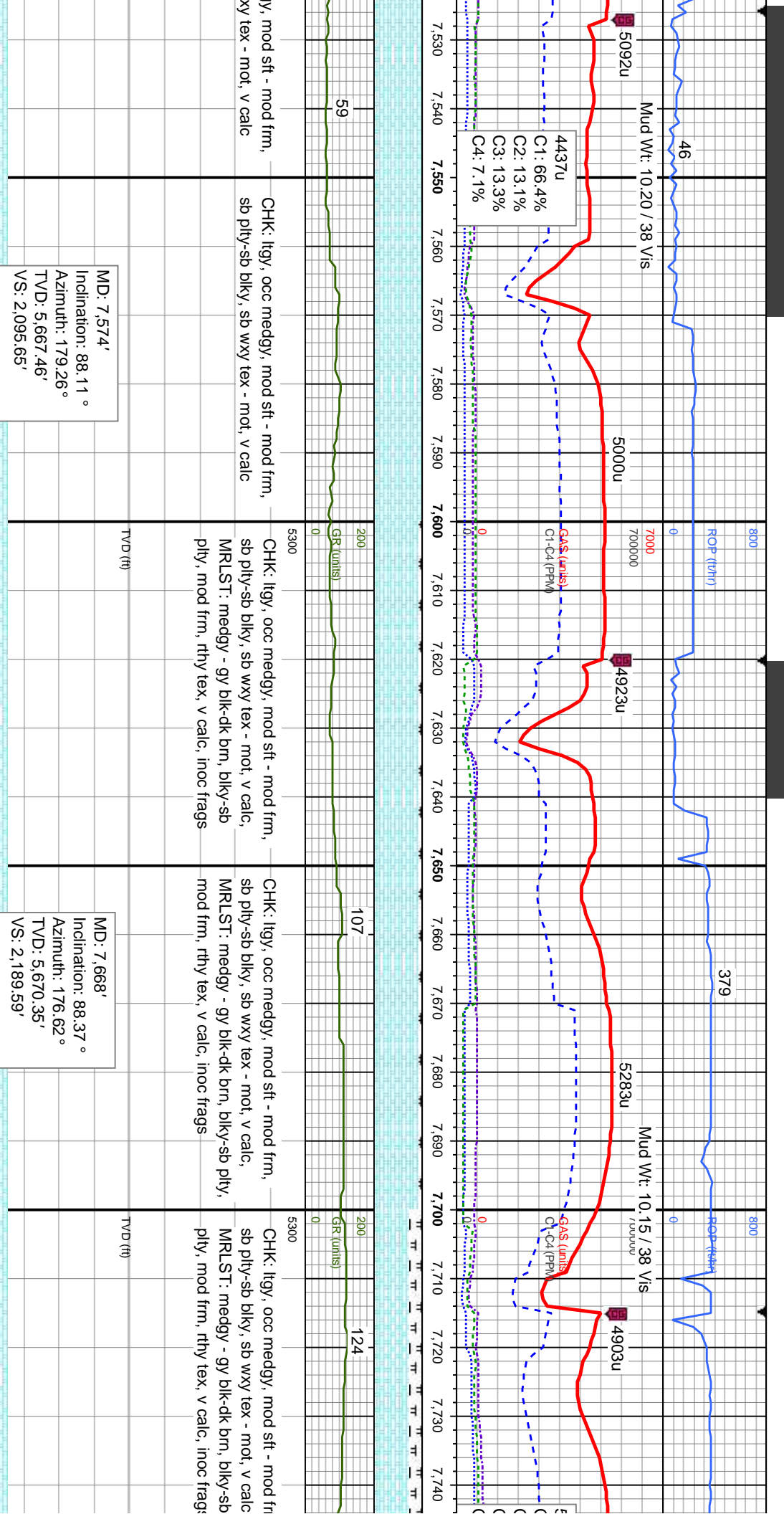
Azimuth: 179.09 °

TVD: 5,667.91'

VS: 1,533.28'



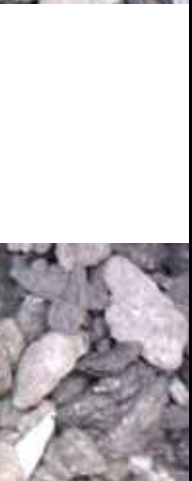
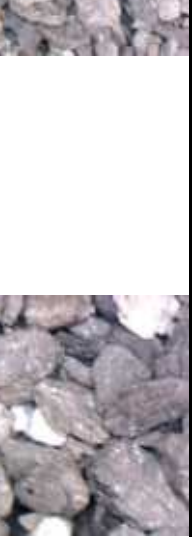
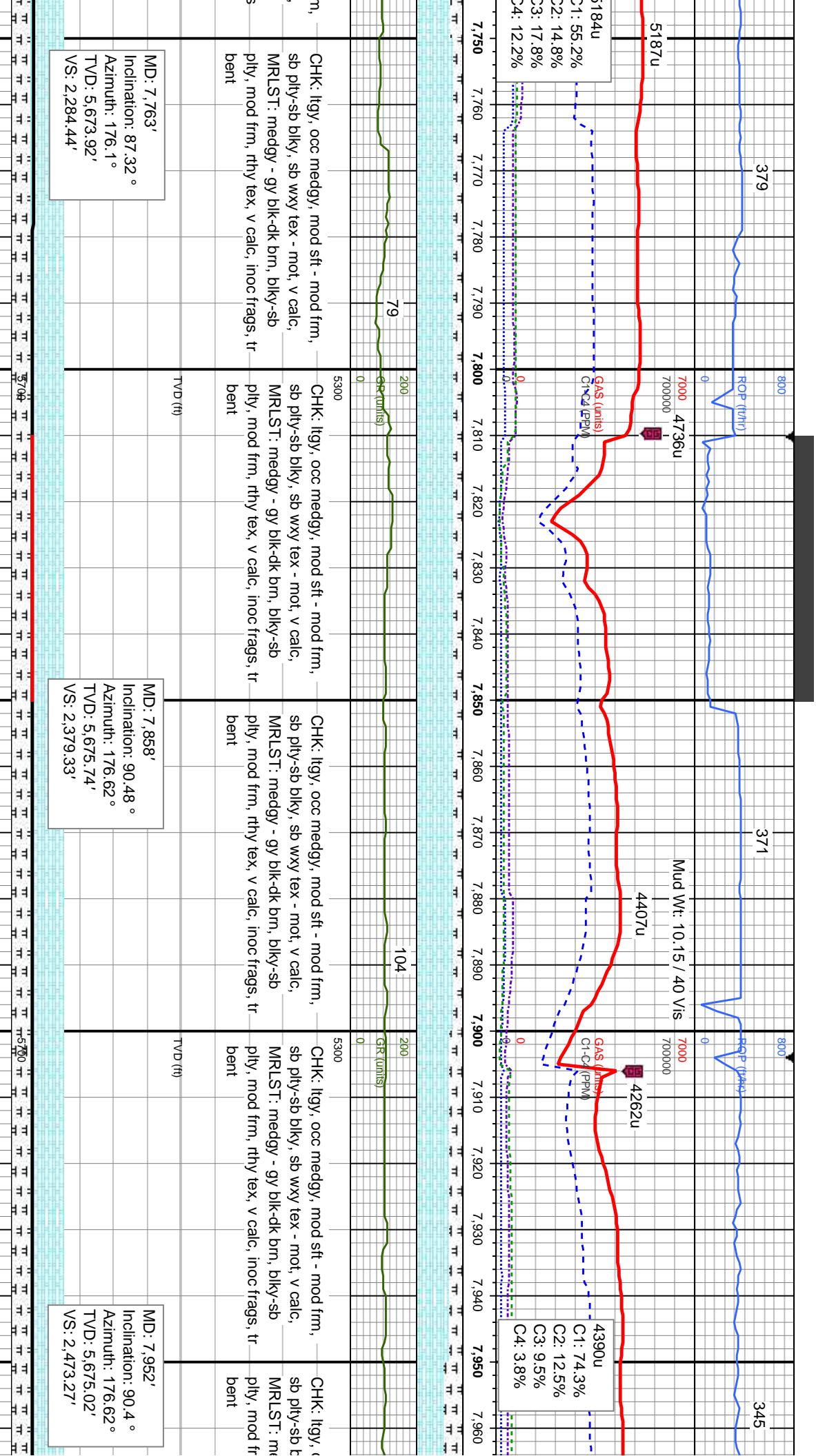


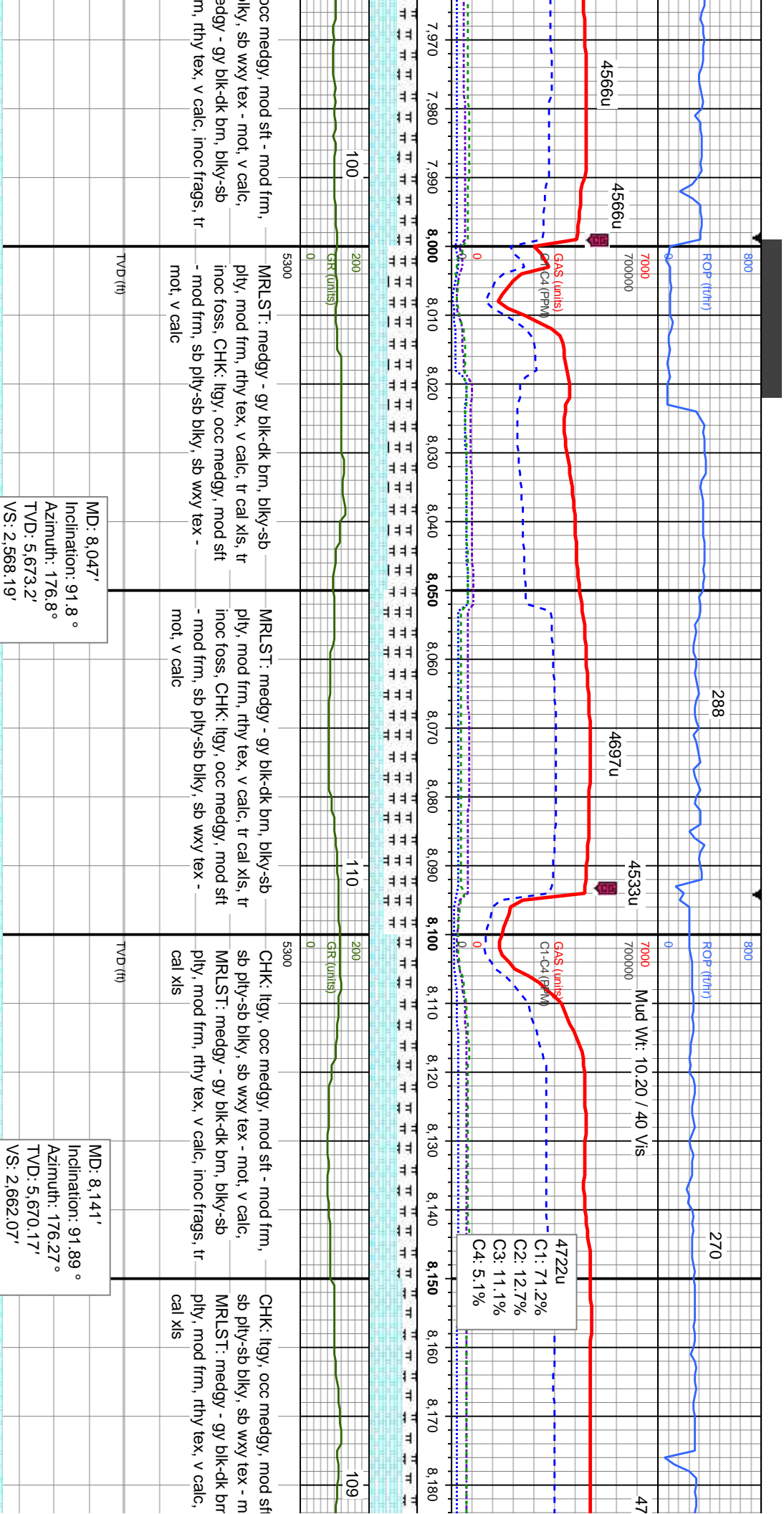


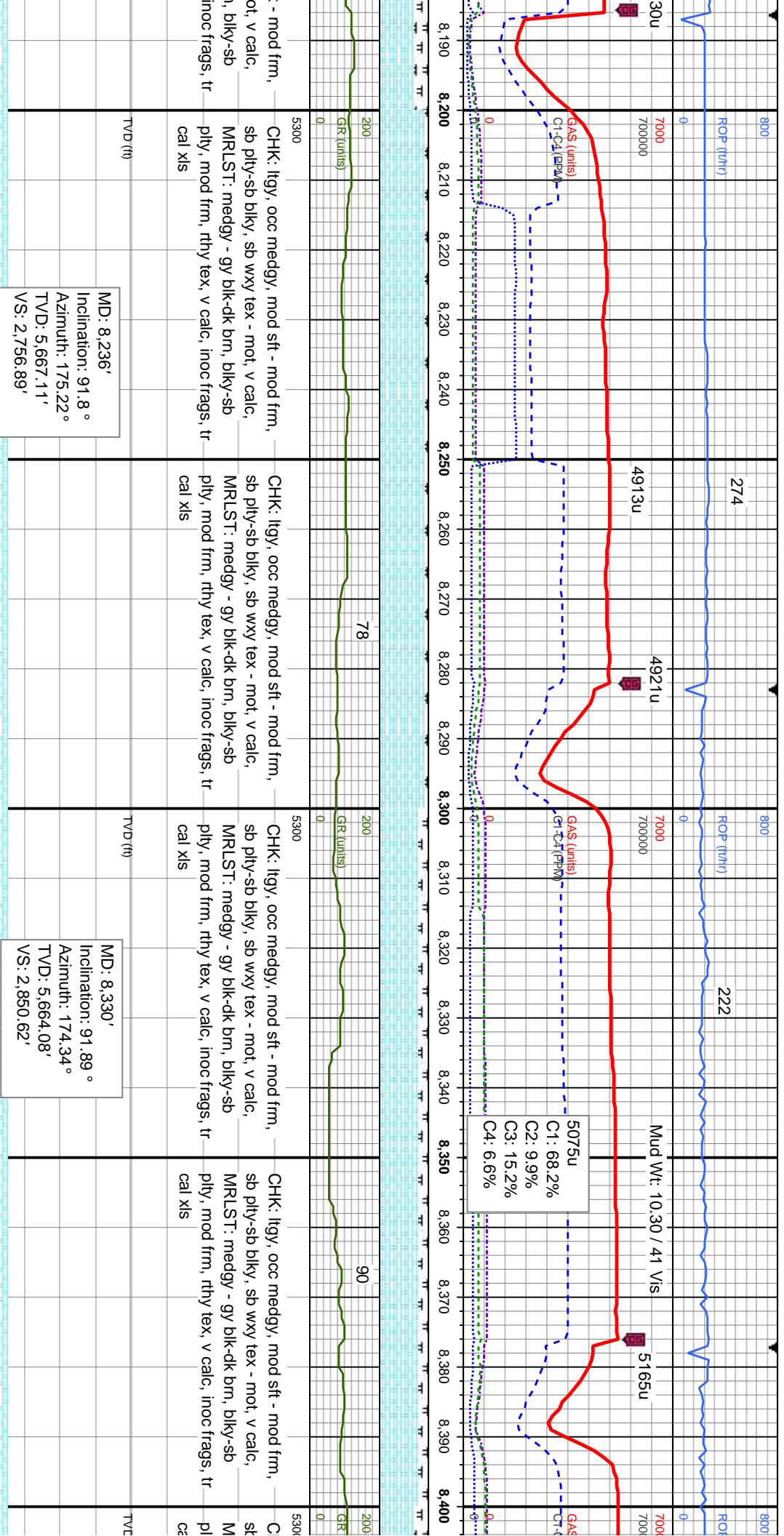
MD: 7,574'
Inclination: 88.11 °
Azimuth: 179.26 °
TVD: 5,667.46'
VS: 2,095.65'

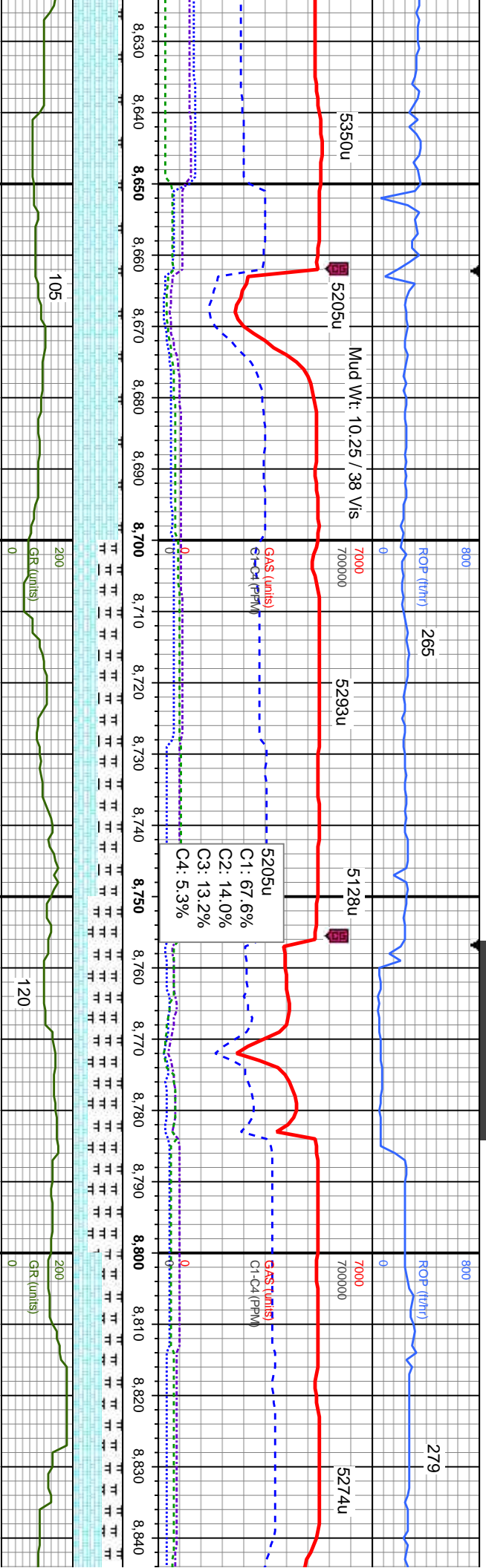
MD: 7,668'
Inclination: 88.37 °
Azimuth: 176.62 °
TVD: 5,670.35'
VS: 2,189.59'









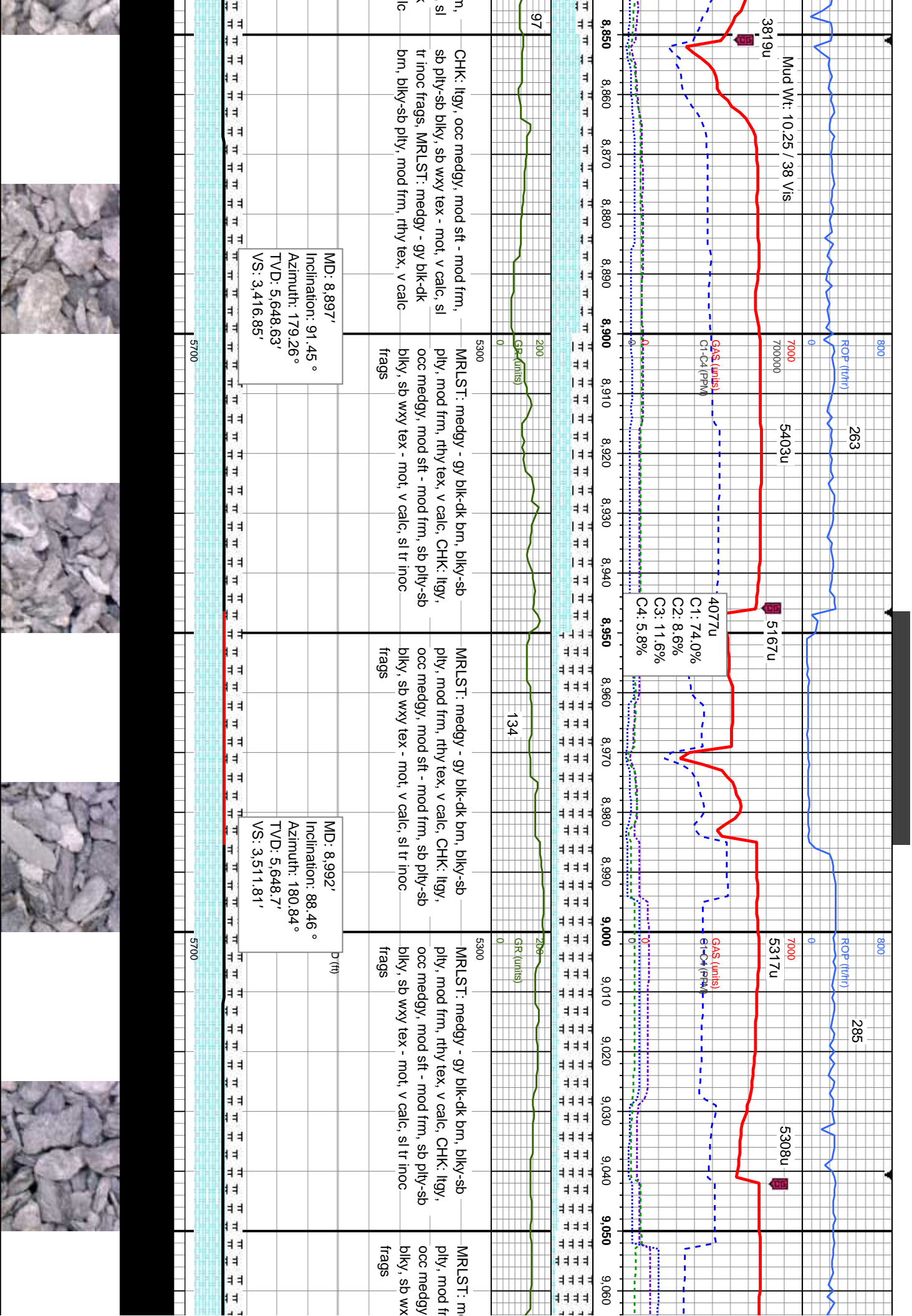


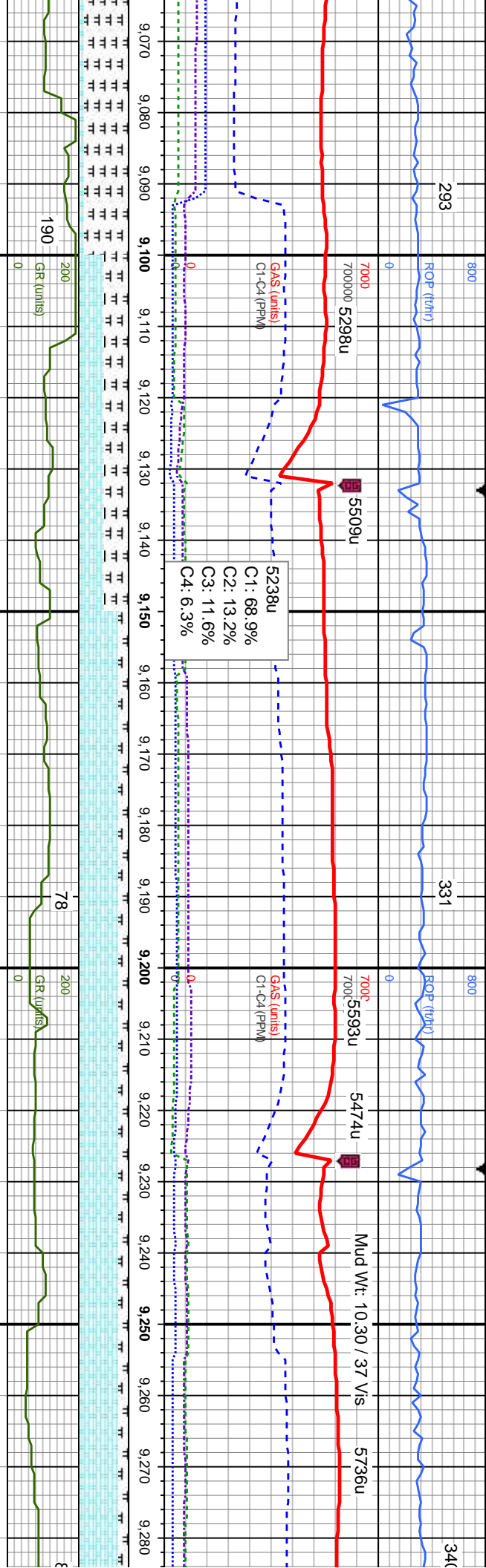
ly, mod sft - mod frm, y tex - mot, v calc, blk-dk bm, blk-y-sb x, v calc, inoc frags, tr	CHK: ltgy, occ medgy, mod sft - mod frm, sb pty-sb blk-y, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk bm, blk-y-sb pty, mod frm, rthy tex, v calc, inoc frags, tr	MRLST: medgy - gy blk-dk bm, blk-y-sb pty, mod frm, rthy tex, v calc, CHK: ltgy, occ medgy, mod sft - mod frm, sb pty-sb blk-y, sb wxy tex - mot, v calc, sl tr inoc frags	MRLST: medgy - gy blk-dk bm, blk-y-sb pty, mod frm, rthy tex, v calc, CHK: ltgy, occ medgy, mod sft - mod frm, sb pty-sb blk-y, sb wxy tex - mot, v calc, sl tr inoc frags	CHK: ltgy, occ medgy, mod sft - mod frm, sb pty-sb blk-y, sb wxy tex - mot, v calc, MRLST: medgy - gy blk-dk bm, blk-y-sb pty, mod frm, rthy tex, v ca
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MD: 8,708'
Inclination: 92.15 °
Azimuth: 178.73 °
TVD: 5,652.99'
VS: 3,227.93'

MD: 8,803'
Inclination: 90.84 °
Azimuth: 180.14 °
TVD: 5,650.51'
VS: 3,322.88'







edgy - gy blk-dk brn, blk-y-sb
m, rthy tex, v calc, CHK: lgy,
mod sft - mod frm, sb pily-sb
y tex - mot, v calc, sl tr inoc

CHK: lgy, occ medgy, mod sft - mod frm,
sb pily-sb blk-y, sb wxy tex - mot, v calc, sl
tr inoc frags, MRLST: medgy - gy blk-dk
brn, blk-y-sb pily, mod frm, rthy tex, v calc

CHK: lgy, occ medgy, mod sft - mod frm,
sb pily-sb blk-y, sb wxy tex - mot, v calc, sl
tr inoc frags, MRLST: medgy - gy blk-dk
brn, blk-y-sb pily, mod frm, rthy tex, v calc

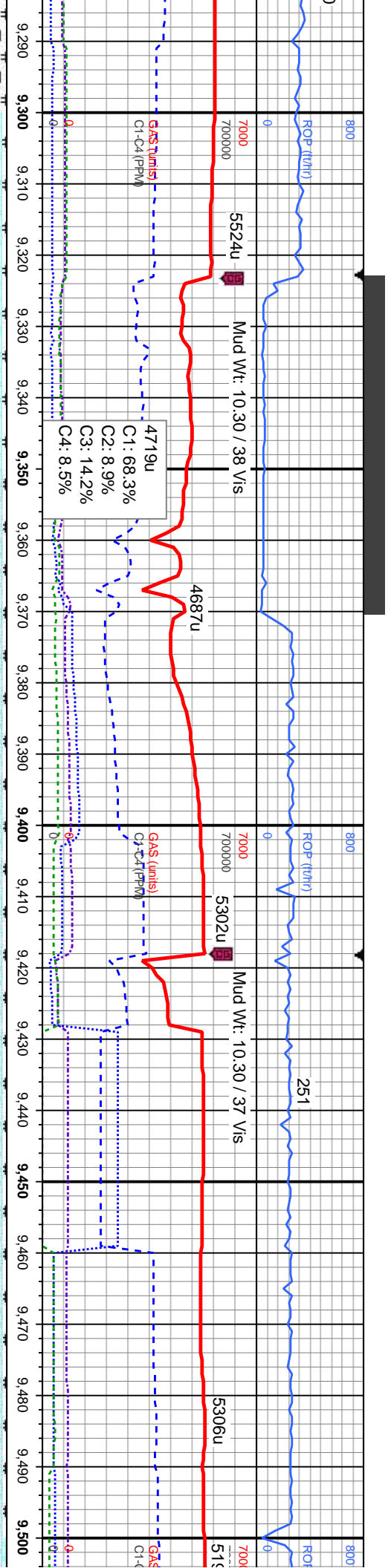
CHK: lgy, occ medgy, mod sft
sb pily-sb blk-y, sb wxy tex - m
tr inoc frags, MRLST: medgy -
brn, blk-y-sb pily, mod frm, rthy
tr bent

MD: 9,087'
Inclination: 88.46 °
Azimuth: 179.44 °
TVD: 5,651.25'
VS: 3,606.74'

MD: 9,181'
Inclination: 88.81 °
Azimuth: 178.21 °
TVD: 5,653.49'
VS: 3,700.71'

MD: 9,276'
Inclination: 89.16 °
Azimuth: 177.68 °
TVD: 5,655.17'
VS: 3,795.69'

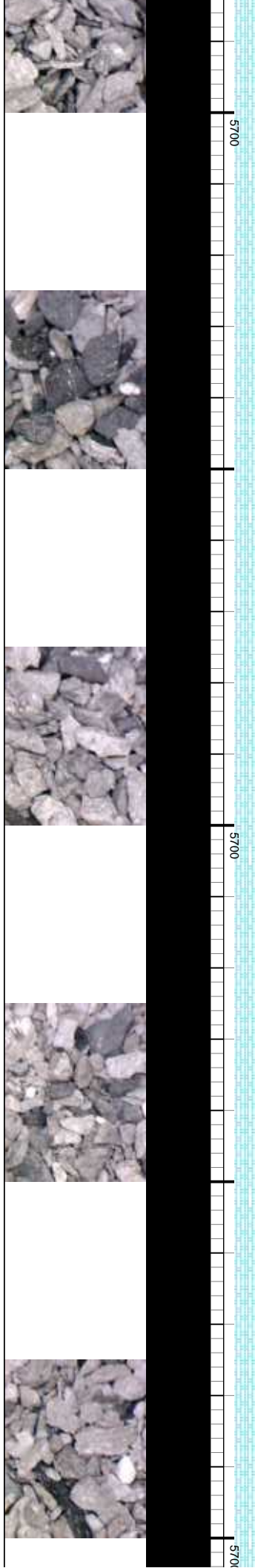


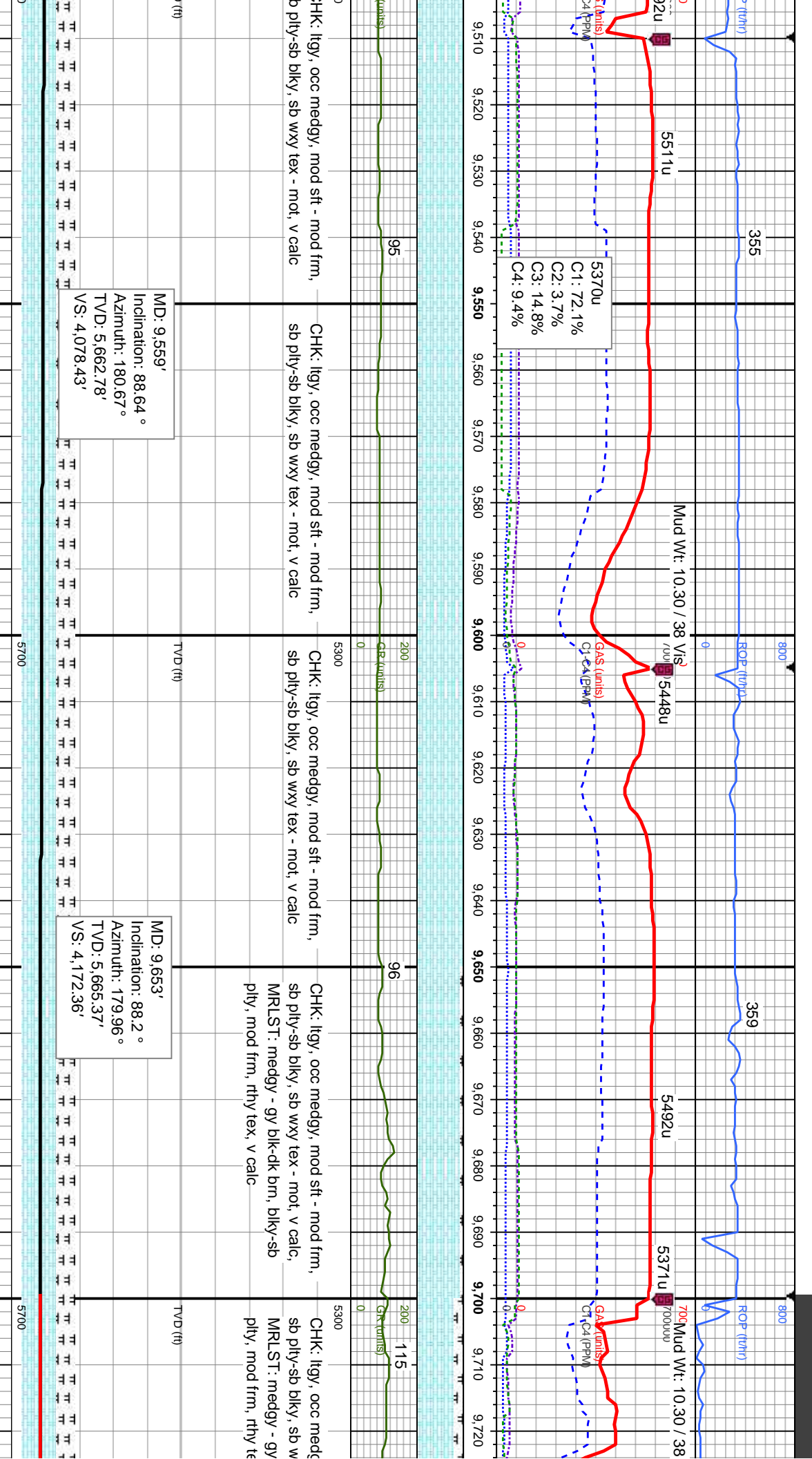


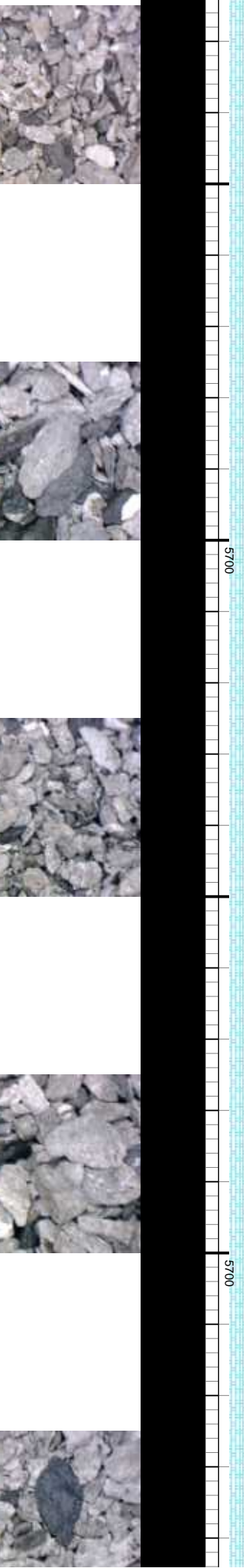
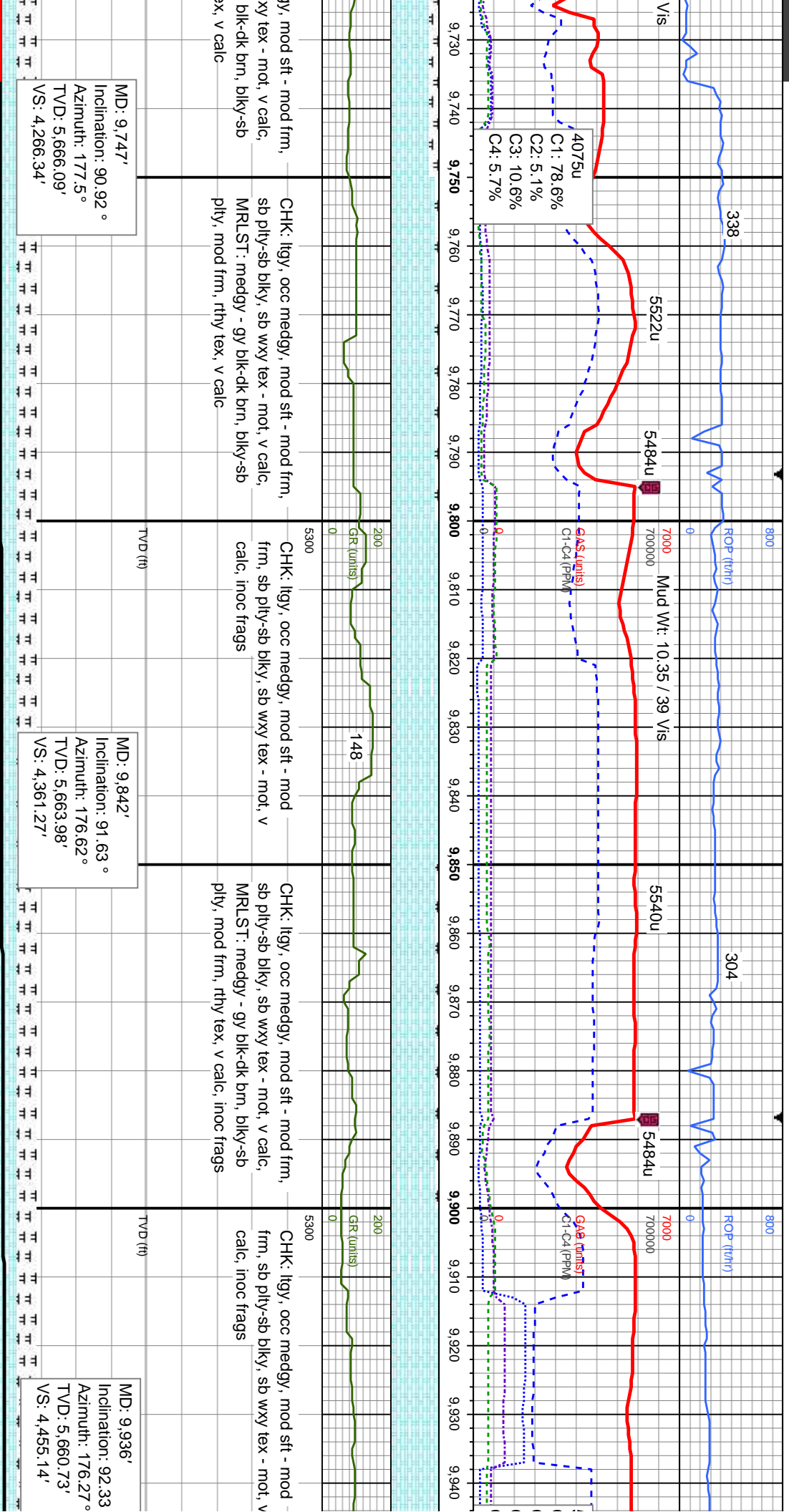
9	GR (units)	200	142	5300	CHK: Itgy, occ medgy, mod sft - mod frm, sb pfty-sb blk, sb wxy tex - mot, v calc, sl tr inoc frags, MRLST: medgy - gy blk-dk brn, blk-sb pty, mod frm, rthy tex, v calc
5300	TVD (ft)				
5300	GR (units)	200	111	5300	CHK: Itgy, occ medgy, mod sft - mod frm, sb pfty-sb blk, sb wxy tex - mot, v calc, sl tr inoc frags, MRLST: medgy - gy blk-dk brn, blk-sb pty, mod frm, rthy tex, v calc
5300	TVD (ft)				

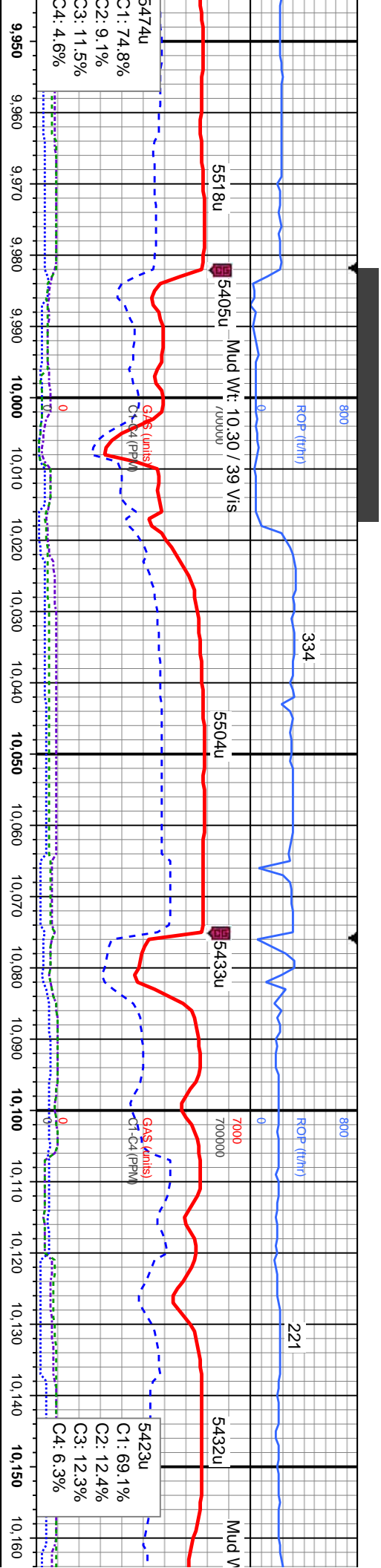
MD: 9,370'
Inclination: 88.02 °
Azimuth: 180.67 °
TVD: 5,657.49'
VS: 3,889.65'

MD: 9,464'
Inclination: 88.46 °
Azimuth: 181.46 °
TVD: 5,660.37'
VS: 3,983.52'









5474u
C1: 74.8%
C2: 9.1%
C3: 11.5%
C4: 4.6%

5518u
5405u
Mud Wt: 10.30 / 39 Vis

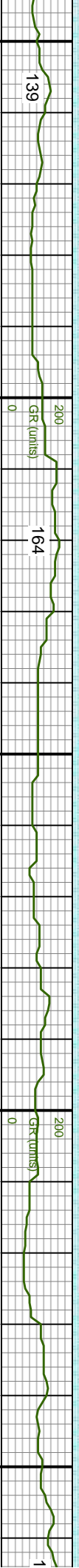
5504u

5433u

5432u

5423u

C1: 69.1%
C2: 12.4%
C3: 12.3%
C4: 6.3%



CHK: lgy, occ medgy, mod sft - mod frm,
sb pty-sb blk, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blk-sb
pty, mod frm, rthy tex, v calc, inoc frags

CHK: lgy, occ medgy, mod sft - mod
frm, sb pty-sb blk, sb wxy tex - mot, v
calc, MRLST: medgy - gy blk-dk brn,
blk-sb pty, mod frm, rthy tex, v calc

CHK: lgy, occ medgy, mod sft - mod
frm, sb pty-sb blk, sb wxy tex - mot, v
calc, MRLST: medgy - gy blk-dk brn,
blk-sb pty, mod frm, rthy tex, v calc, tr
bent

CHK: lgy, occ medgy, mod sft - mod
frm, sb pty-sb blk, sb wxy tex - mot, v
calc, MRLST: medgy - gy blk-dk brn,
blk-sb pty, mod frm, rthy tex, v calc, tr
bent

CHK: lgy,
frm, sb pty
calc, MRLST:
blk-sb pty



MD: 10,031'
Inclination: 91.01 °
Azimuth: 178.38 °
TVD: 5,657.96'
VS: 4,550.07'

MD: 10,125'
Inclination: 91.89 °
Azimuth: 177.5 °
TVD: 5,655.58'
VS: 4,644.03'



1/12/15

MINDEPTH

10.30 / 38 Vis

4746u

10.30 / 39 Vis

Mud Wt: 70000

70000

5274u

5346u

358

ROF (ft/lv)

335

7000

700000

5265u

5254u

C1: 70.4%
C2: 12.5%
C3: 12.1%
C4: 5.0%

10.170 10.180 10.190 10.200 10.210 10.220 10.230 10.240 10.250 10.260 10.270 10.280 10.290 10.300 10.310 10.320 10.330 10.340 10.350 10.360 10.370 10.380

GR (units)

5300

occ medgy, mod sft - mod
-sb blk, sb wxy tex - mot, v
ST: medgy - gy blk-dk brn,
- mod frm, rthy tex, v calc, tr

CHK: ltgy, occ medgy, mod sft - mod frm,
sb pty-sb blk, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blk-sb
pty, mod frm, rthy tex, v calc, tr bent

MRLST: medgy - gy blk-dk brn, blk-sb
pty, mod frm, rthy tex, v calc, tr bent, tr
cal, CHK: ltgy, occ medgy, mod sft - mod
frm, sb pty-sb blk, sb wxy tex - mot, v
calc

CHK: ltgy, occ medgy, mod sft - mod frm,
sb pty-sb blk, sb wxy tex - mot, v calc,
MRLST: medgy - gy blk-dk brn, blk-sb
pty, mod frm, rthy tex, v calc, tr bent

MRLST: medgy - gy blk-dk brn
pty, mod frm, rthy tex, v calc,
occ medgy, mod sft - mod frm
blk, sb wxy tex - mot, v calc

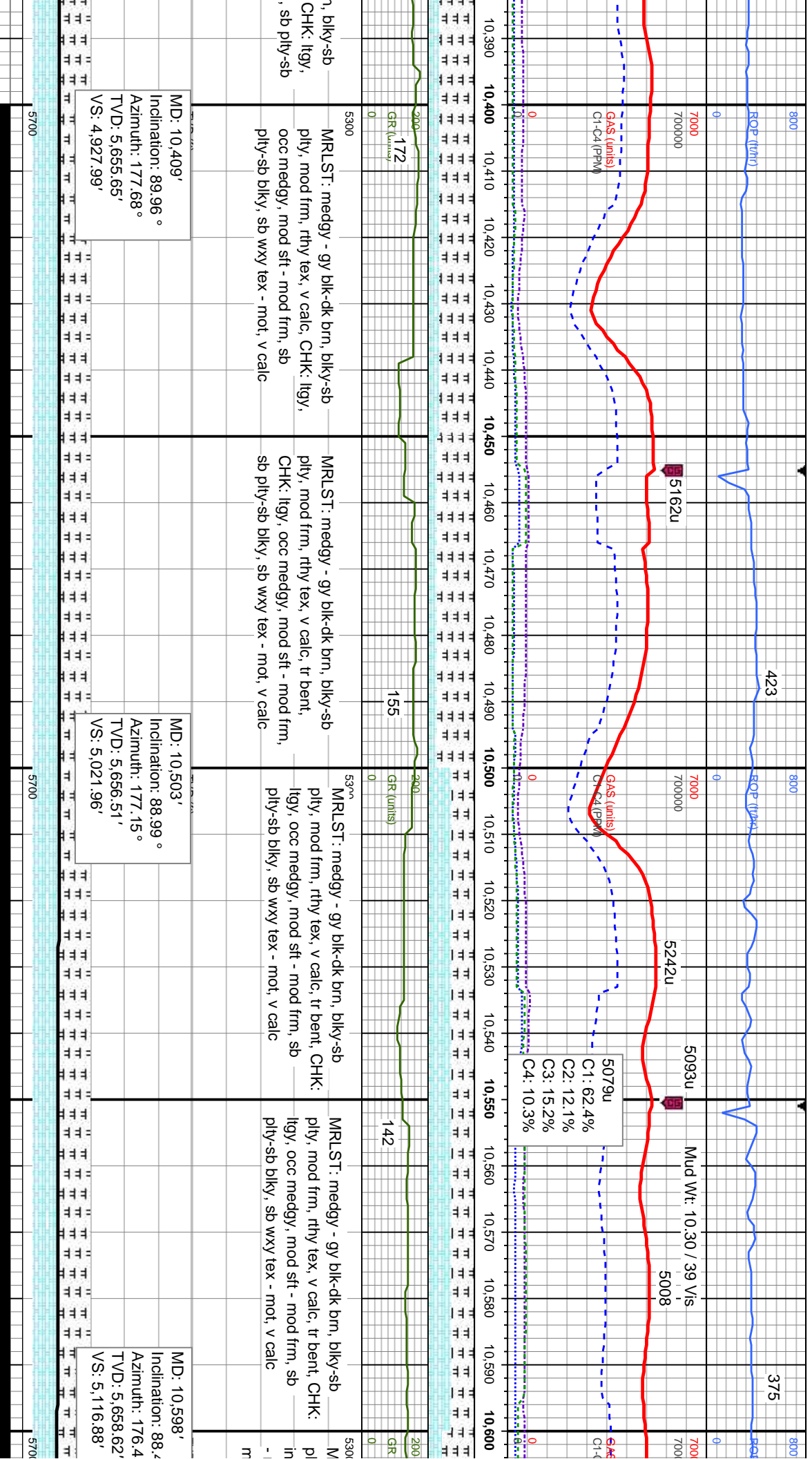
TVD (ft)

MD: 10,220'
Inclination: 89.34 °
Azimuth: 178.73 °
TVD: 5,654.56'
VS: 4,739.01'

5700

5700





MD: 10,409'
Inclination: 89.96 °
Azimuth: 177.68 °
TVD: 5,655.65'
VS: 4,927.99'

MD: 10,503'
Inclination: 88.99 °
Azimuth: 177.15 °
TVD: 5,656.51'
VS: 5,021.96'

MD: 10,598'
Inclination: 88.4 °
Azimuth: 176.4 °
TVD: 5,658.62'
VS: 5,116.88'

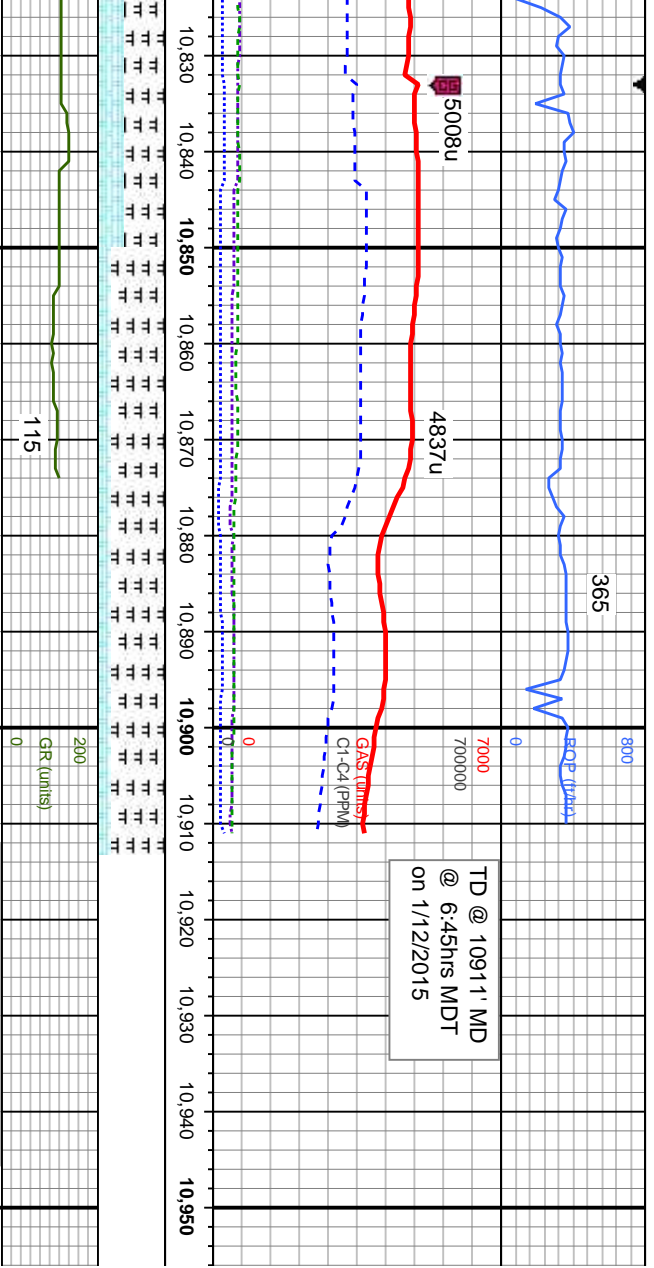
MRLST: medgy - gy blk-dk brn, blk-y-sb
pity, mod frm, rthy tex, v calc, CHK: itgy,
occ medgy, mod sft - mod frm, sb
pity-sb blk-y, sb wxy tex - mot, v calc

MRLST: medgy - gy blk-dk brn, blk-y-sb
pity, mod frm, rthy tex, v calc, tr bent,
CHK: itgy, occ medgy, mod sft - mod frm,
sb pity-sb blk-y, sb wxy tex - mot, v calc

MRLST: medgy - gy blk-dk brn, blk-y-sb
pity, mod frm, rthy tex, v calc, tr bent, CHK:
itgy, occ medgy, mod sft - mod frm, sb
pity-sb blk-y, sb wxy tex - mot, v calc

MRLST: medgy - gy blk-dk brn, blk-y-sb
pity, mod frm, rthy tex, v calc, tr bent, CHK:
itgy, occ medgy, mod sft - mod frm, sb
pity-sb blk-y, sb wxy tex - mot, v calc





TD @ 10911' MD
@ 6:45hrs MDT
on 1/12/2015

blk-dk brn, blk-y-sb
x, v calc, tr bent, tr
, occ medgy, mod sft
blk-y, sb wxy tex -
MRLST: medgy - gy blk-dk brn, blk-y-sb
ply, mod frm, rthy tex, v calc, tr bent, tr
inoc frags, CHK: ltyy, occ medgy, mod sft
- mod frm, sb ply-sb blk-y, sb wxy tex -
mot, v calc

MD: 10,865'
Inclination: 91.63°
Azimuth: 175.92°
TVD: 5,657.76'
VS: 5,383.52'

MD: 10,911'
Inclination: 91.63°
Azimuth: 175.92°
TVD: 5,656.45'
VS: 5,429.45'

Wellsite Geological Services
Provided By Columbine
Logging, Thank You!

PTB

