





















Scale: 5" / 100'
Measured Depth Log

	UNKNOWN		COAL
	ANHYDRITE		CLAY
	BENTONITE		CLAY
	BRECCIA		CLAY
	CHALK		CLAY
	CEMENT		CLAY
	CHELT		CLAY
	CLAY CHOKE SAND		CLAY
	CLAYSTONE		CLAY
	CLAYSTONE		CLAY

Operator

SY INC.

Suite 2200

202

Geologist

SY INC.

Suite 2200
202

Other

SULLIVAN
SILVEY

Rock Types

UNIT	THICKNESS (m)	DESCRIPTION	REMARKS
1	0.5	SHALY SILTSTONE	
2	0.5	SILT SHALE	
3	0.5	SILTSTONE	
4	0.5	TUFF	
5	0.5	WELDED TUFF	
6	0.5	SHALE	
7	0.5	SALT-PEPPER SAND	
8	0.5	SANDSTONE	
9	0.5	SALT	
10	0.5	NO SAMPLE	
11	0.5	METAMORPHIC	
12	0.5	CONGLOMERATE	
13	0.5	DOLOMITE	
14	0.5	GRANITE	
15	0.5	GYPNUM	
16	0.5	IGNEOUS	
17	0.5	SIDERITE or LIMONITE	
18	0.5	SHALE COLORED	
19	0.5	SHALE GRAY	
20	0.5	SHALY SANDSTONE	
21	0.5	MARLSTONE	
22	0.5	LIMESTONE	
23	0.5	SHALE	
24	0.5	SHALE	
25	0.5	SHALE	
26	0.5	SHALE	
27	0.5	SHALE	
28	0.5	SHALE	
29	0.5	SHALE	
30	0.5	SHALE	
31	0.5	SHALE	
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34	0.5	SHALE	
35	0.5	SHALE	
36	0.5	SHALE	
37	0.5	SHALE	
38	0.5	SHALE	
39	0.5	SHALE	
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41	0.5	SHALE	
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88	0.5	SHALE	
89	0.5	SHALE	
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95	0.5	SHALE	
96	0.5	SHALE	
97	0.5	SHALE	
98	0.5	SHALE	
99	0.5	SHALE	
100	0.5	SHALE	

Accessories

Fossils



























[illegible]

Other Symbols

Oil Show

- ☒ MOLDIC
- ☐ ORGANIC
- ☐ PINPOINT
- ☐ DEAD
- ☐ VUGGY
- ☐ EVEN
- ☒ FAULT
- ☒ FORMATION TOP
- ☒ GAS SHOW
- ☒ MN DEPTH
- ☒ MN DEPTH
- ☒ WIRELINE TESTED - LEFT
- ☒ WIRELINE TESTED - RT
- ☒ E EARTHY
- ☒ F FINELYX LN
- ☒ GS GRAINSTONE
- ☒ L LITHOGRAPHIC

Engineering

	QUESTIONABLE		NORMAL FAULT		ANGULAR		M _X MICROXON
	SPOTTED STAINING		OIL SHOW		R ROUNDED		M _S MUDSTONE
Engineering							
	BIT		OVERTURNED STRATA		SUBANG		P _S PACKSTONE
	CONNECTION (LEFT)		REVERSE FAULT		SUBREND		W _S WACKESTONE
	CONNECTION (RIGHT)		SIDEWALL CORE (LEFT)	Textures			
	FENESTRAL		SIDEWALL CORE (RIGHT)		B _S BOUNDSTONE		M _M MODERATE
	FRACTURE		SLIDE		CHALKY		P _P POOR
	INTERCRYSTALLINE		SURVEY		CRYPTOXLON		W _W WELL
	INTEROOLITIC		TRIP GAS	Sorting			

Textures

Sorting

BS BOUNDSTONE **M** MODERATE
C CHALKY **P** POOR
XX CRYPTOXLN **W** WELL

Slide/Rotate

ROP

ROP (ft/min)

Total Gas & Chromatograph

GAS

C1

C2

C3

C4

COLUMBINE LOGGING INC.
RIGGED UP ON 11/12/2013
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0298
COLUMBINE BEGAN LOGGING
AT F/1300' on 11/13/2013

Depth Labels

% Lith

Gamma

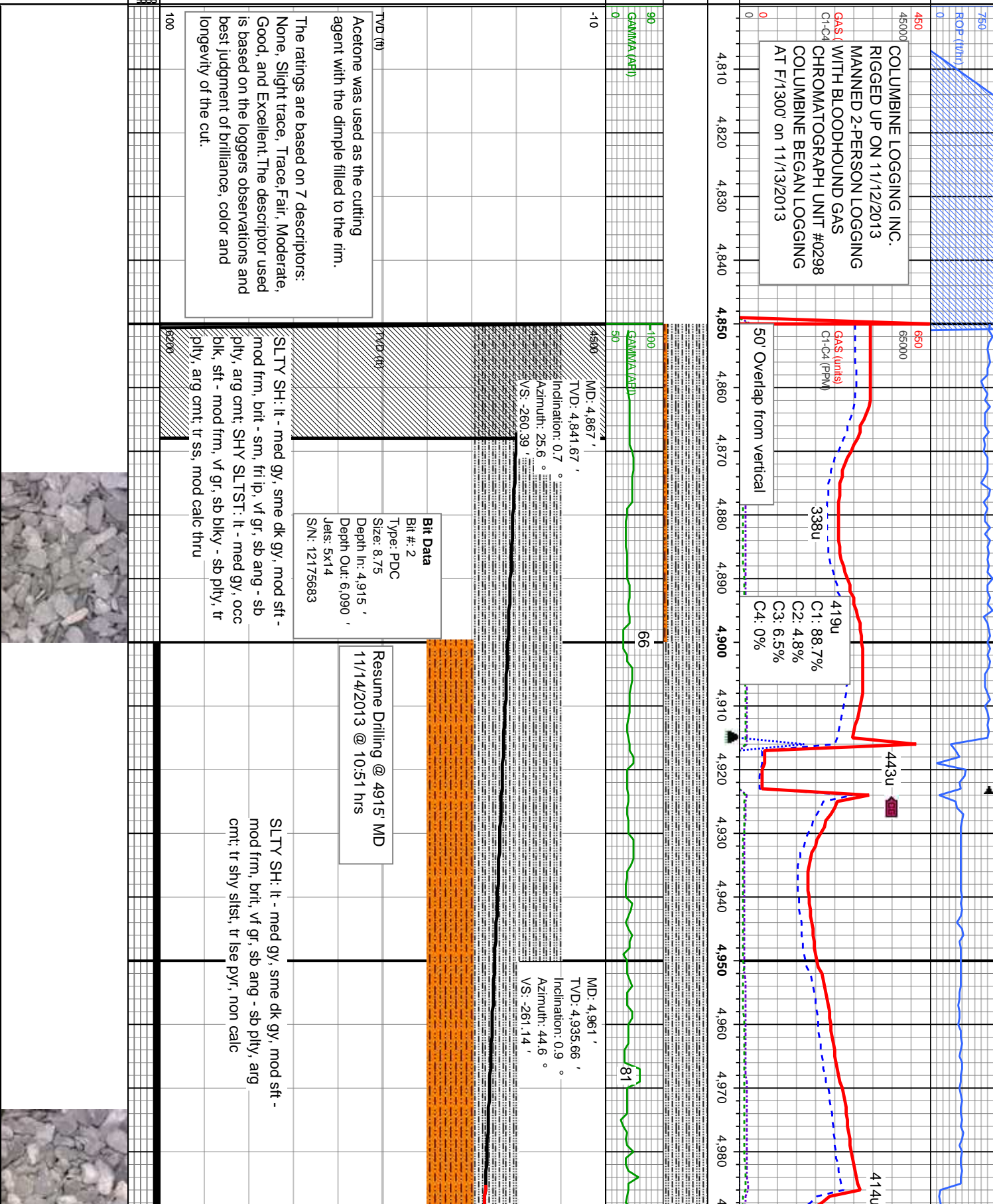
GAMMA (API)

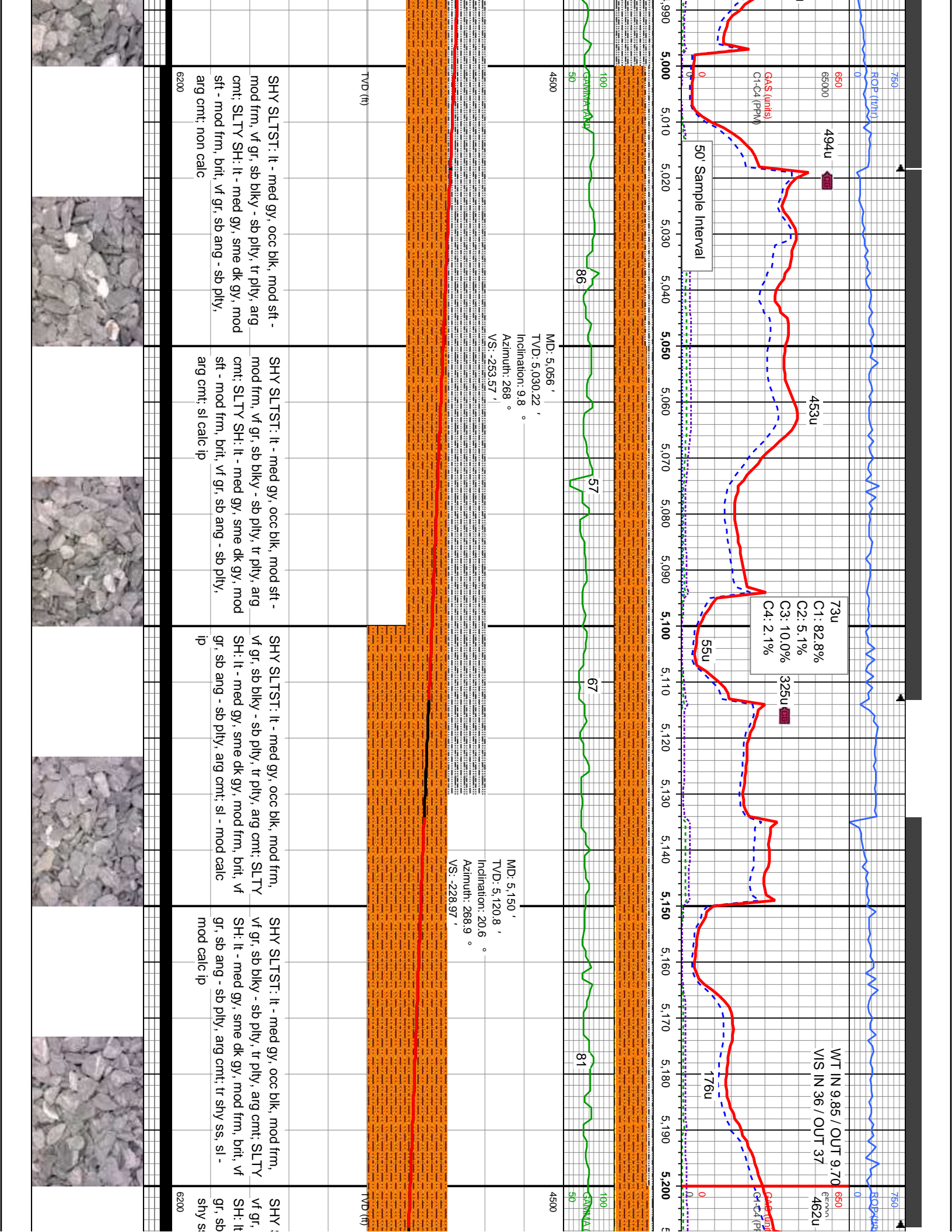
Well Bore

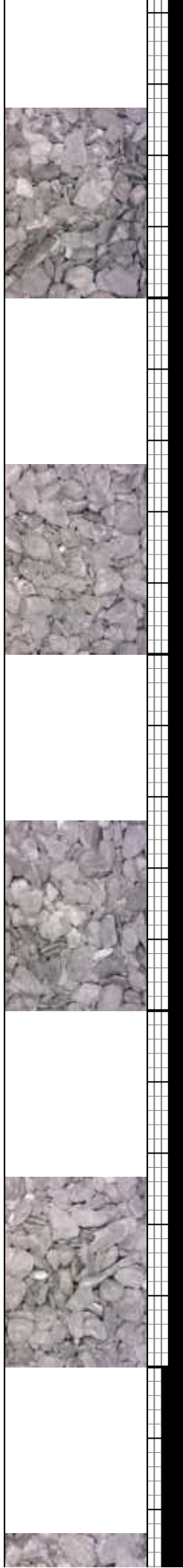
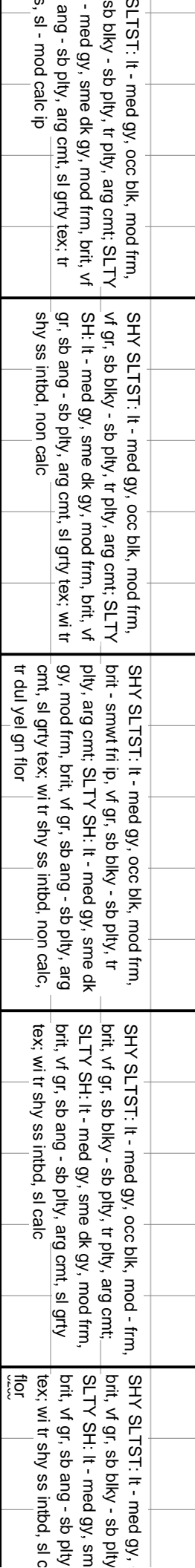
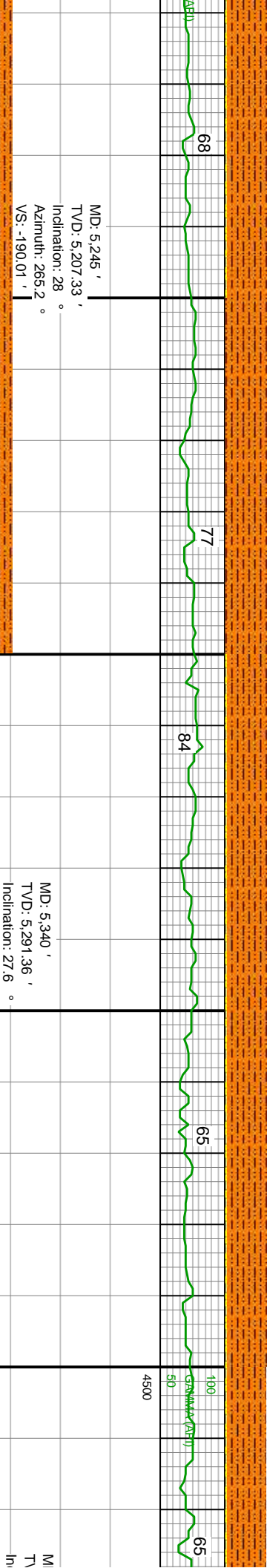
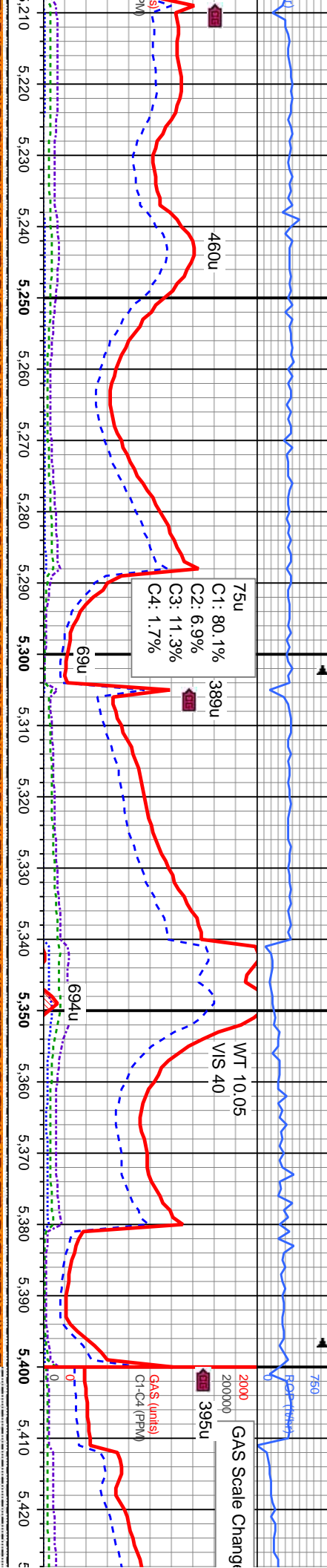
TVD

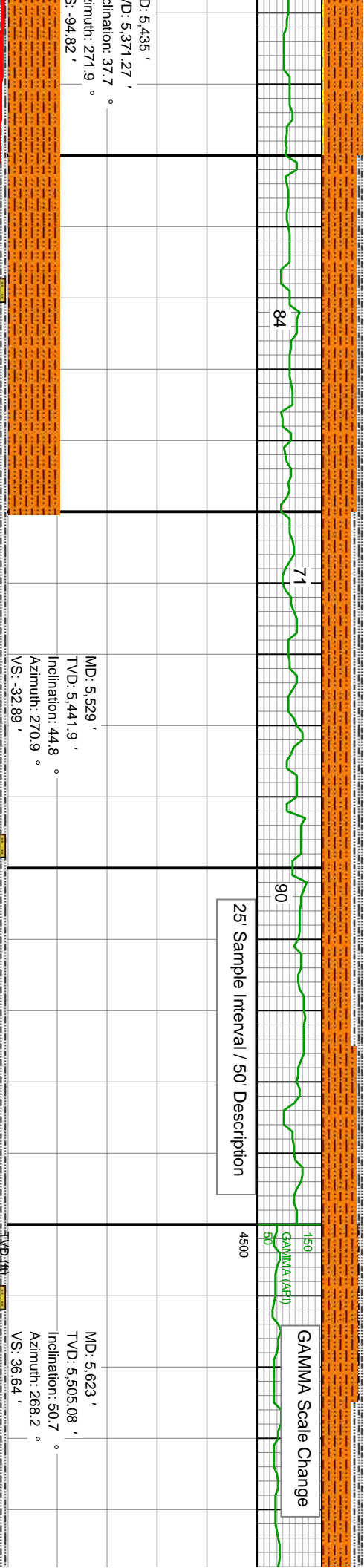
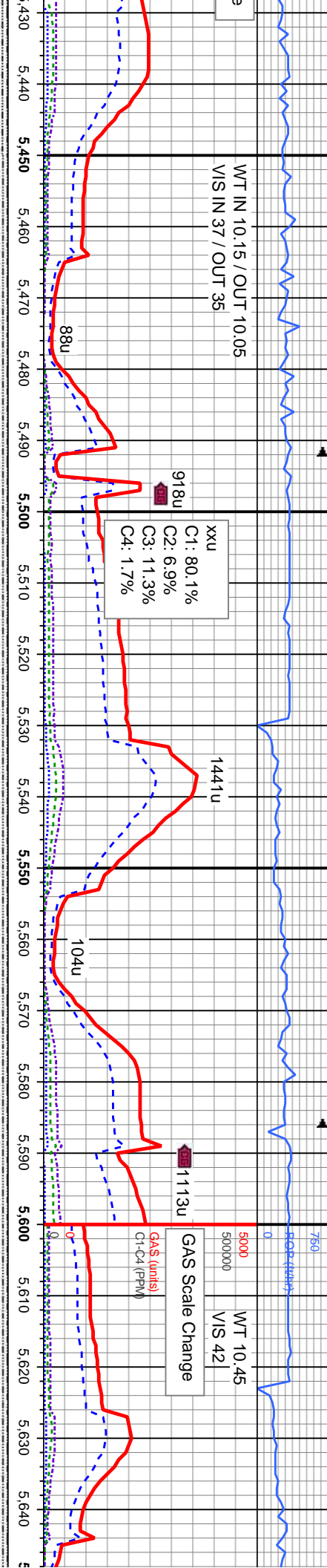
Oil Show

Images

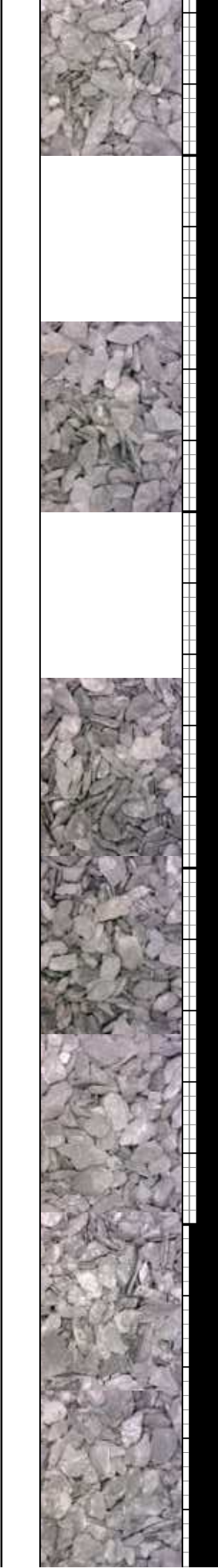


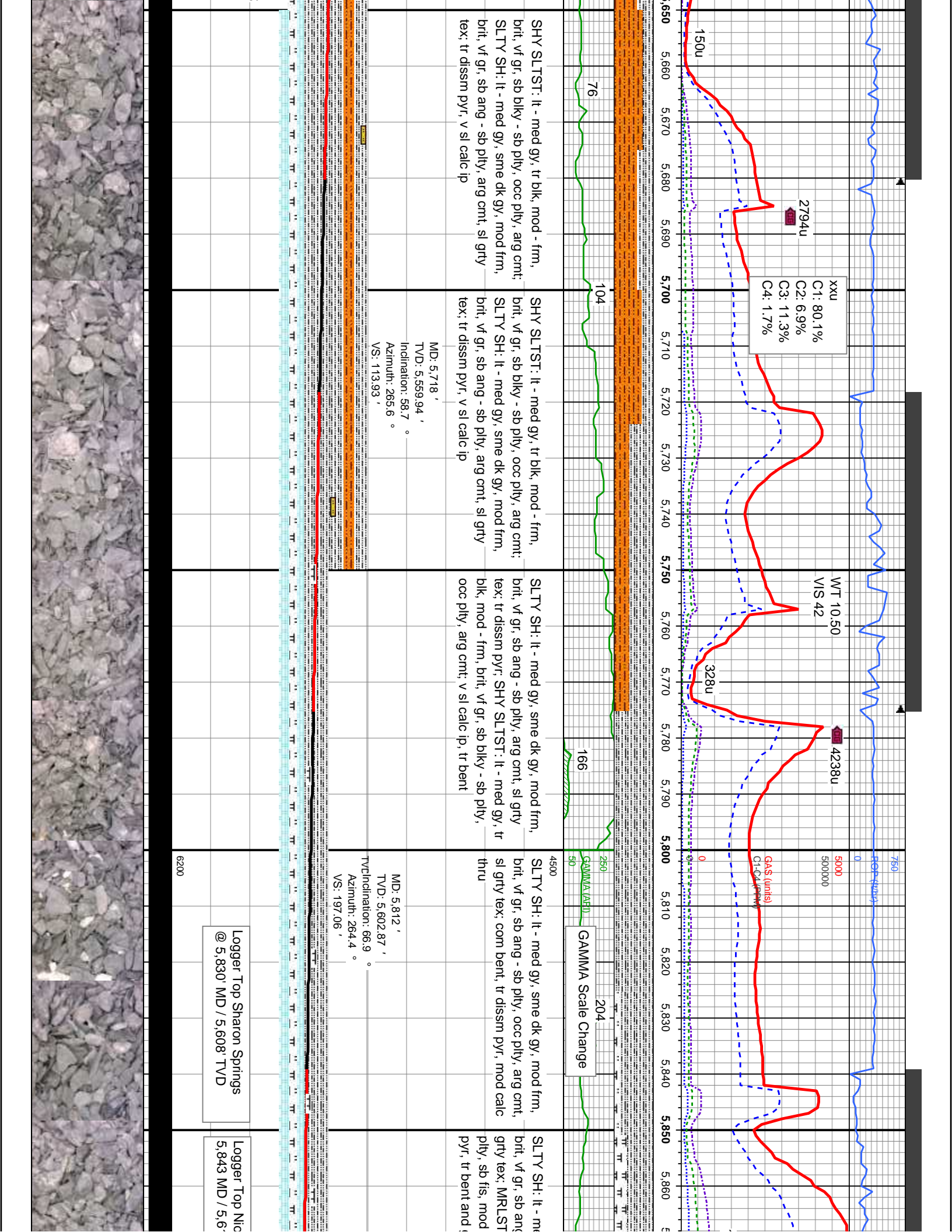


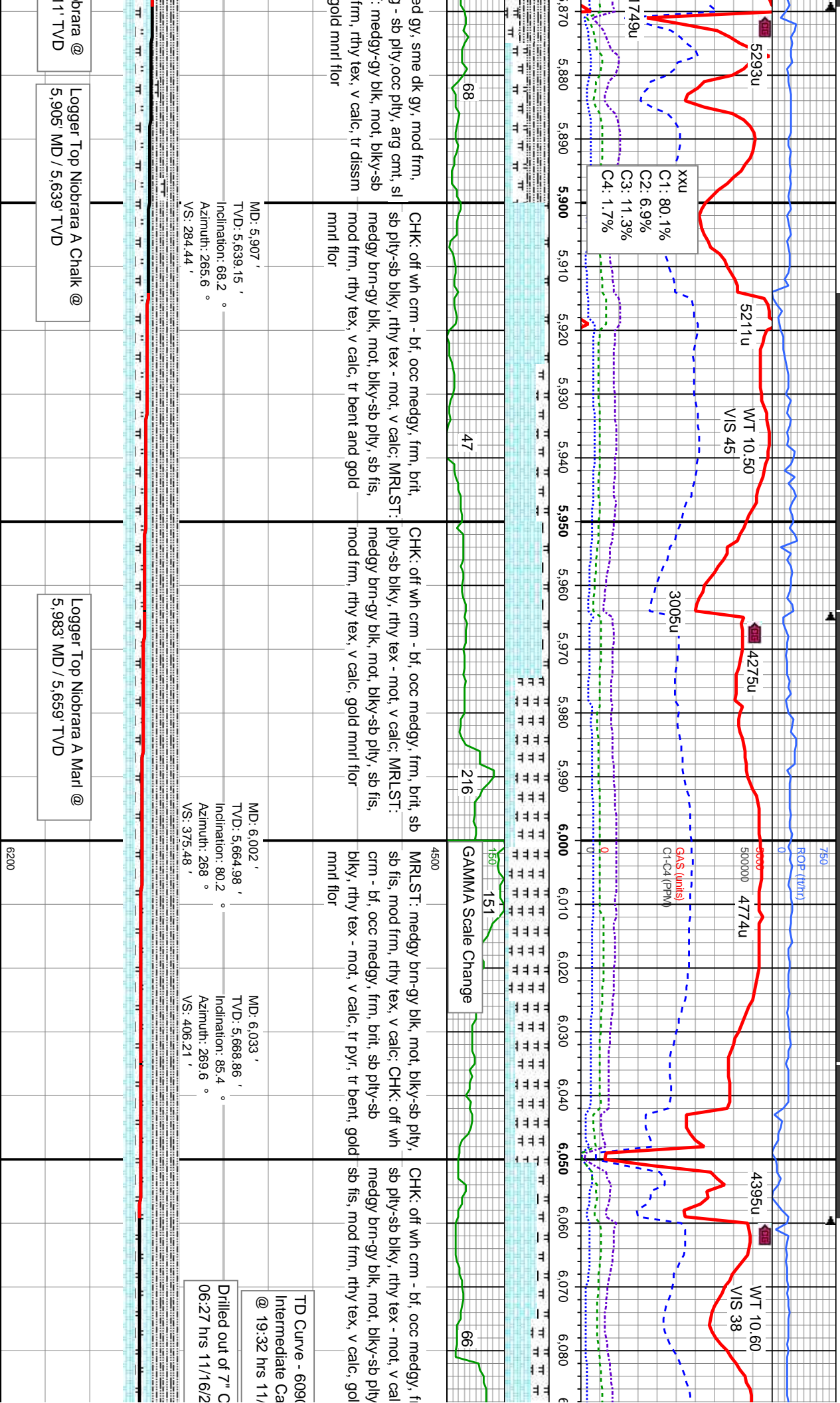




occ blk, mod - frm, , tr pty, arg cnt; e dk gy, mod frm, arg cnt, sl grty alc, sl tr dul ong	SHY SLTST: lt - med gy, occ blk, mod - frm, brit, vf gr, sb blk, tr pty, arg cnt; SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb pty, arg cnt, sl grty tex: tr dissim pyr, v sl calc ip	SHY SLTST: lt - med gy, occ blk, mod - frm, brit, vf gr, sb blk, tr pty, arg cnt; SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb pty, arg cnt, sl grty tex: tr dissim pyr, v sl calc ip	SHY SLTST: lt - med gy, occ blk, mod - frm, brit, vf gr, sb blk, tr pty, arg cnt; SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb pty, arg cnt, sl grty tex: tr dissim pyr, v sl calc ip	SHY SLTST: lt - med gy, tr blk, mod - frm, brit, vf gr, sb blk, tr pty, arg cnt; SLTY SH: lt - med gy, sme dk gy, mod frm, brit, vf gr, sb ang - sb pty, arg cnt, sl grty tex: tr dissim pyr, v sl calc ip
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11/15/2013
11/16/2013

244u
C1: 64.0%
C2: 17.1%
C3: 18.6%
C4: 0.3%

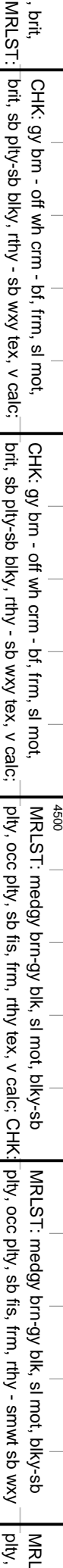
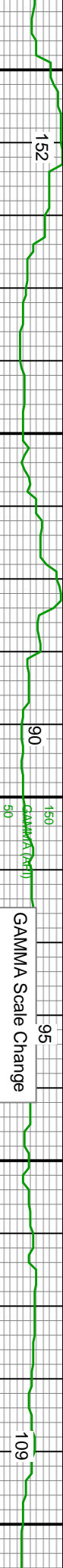
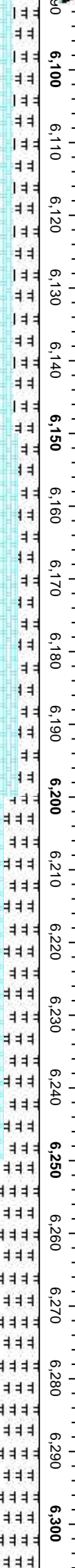
WT 10.00
VIS 33

4330u

WT 10.00
VIS 37

3909u

4271u
C1: 62.0%
C2: 17.2%
C3: 20.3%
C4: 0.5%



CHK: gy brn - off wh crm - bf, frm, sl mot,
brt, sb pty-sb blk, rthy - sb wxy tex, v calc;
MRLST: medgy brn-gy blk, sl mot, blk-sb
pty, occ pty, sb fis, frm, rthy tex, v calc

CHK: gy brn - off wh crm - bf, frm, sl mot,
brt, sb pty-sb blk, rthy - sb wxy tex, v calc;
MRLST: medgy brn-gy blk, sl mot, blk-sb
pty, occ pty, sb fis, frm, rthy tex, v calc

MRLST: medgy brn-gy blk, sl mot, blk-sb
pty, occ pty, sb fis, frm, rthy tex, v calc; CHK:
gy brn - bf, frm, sl mot, brt, sb pty-sb blk,
rthy - sb wxy tex, v calc

MRLST: medgy brn-gy blk, sl mot, blk-sb
pty, occ pty, sb fis, frm, rthy - smwt sb wxy
tex, v calc; CHK: gy brn - bf, frm, sl mot ip,
brt, sb pty-sb blk, rthy - sb wxy tex, v calc

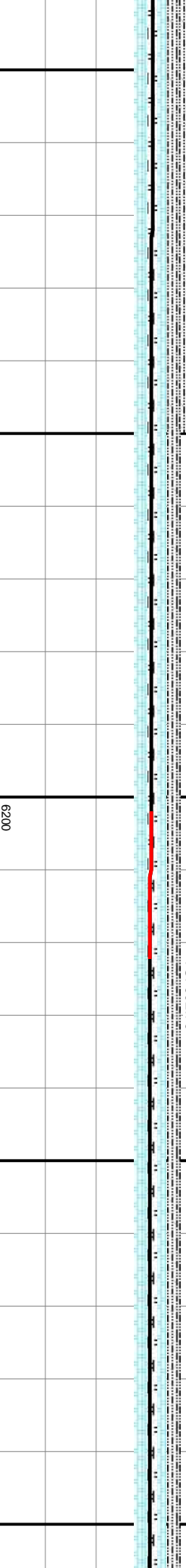
MRLS

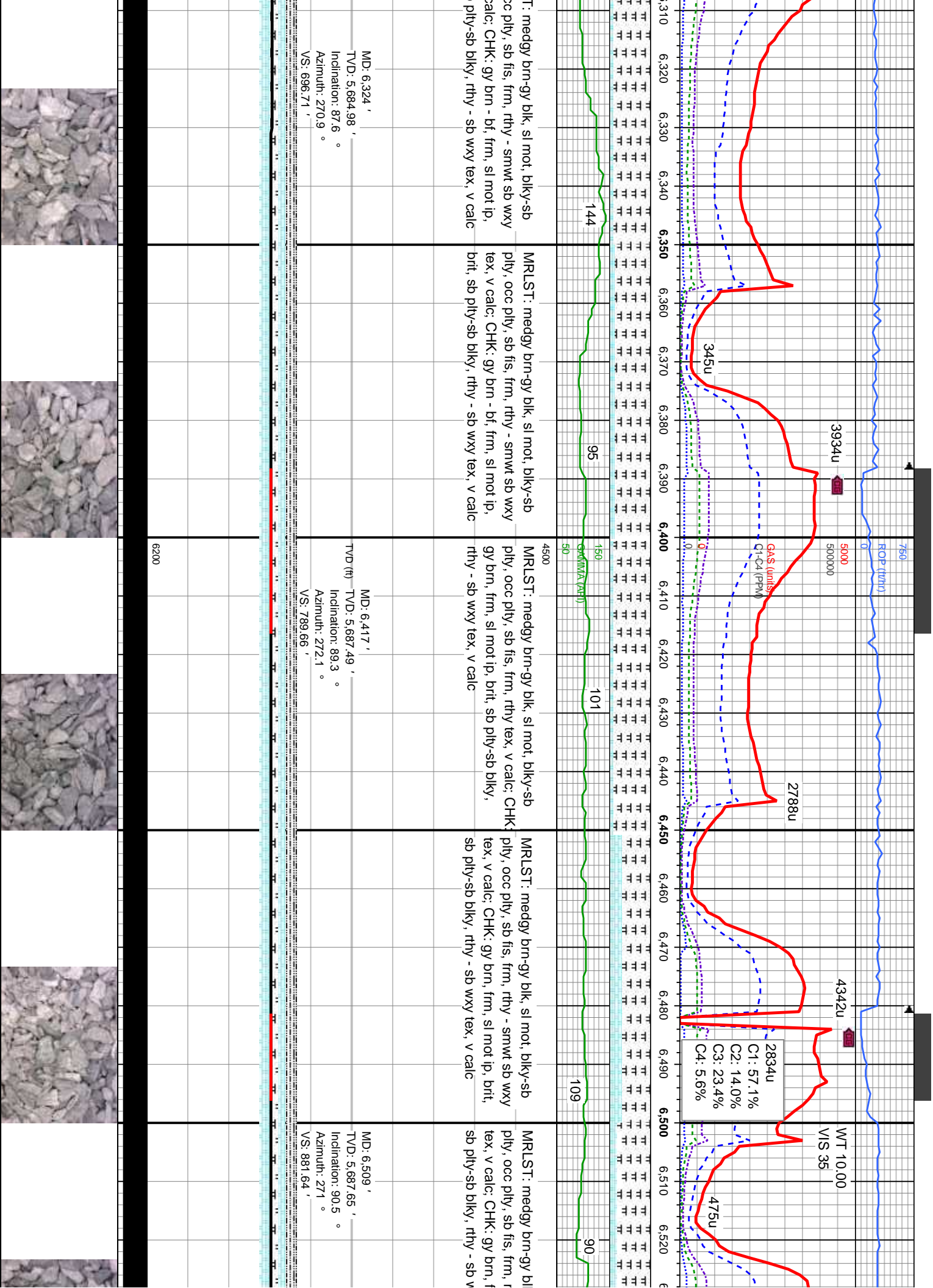
MD
sing
14/2013
asing @
013

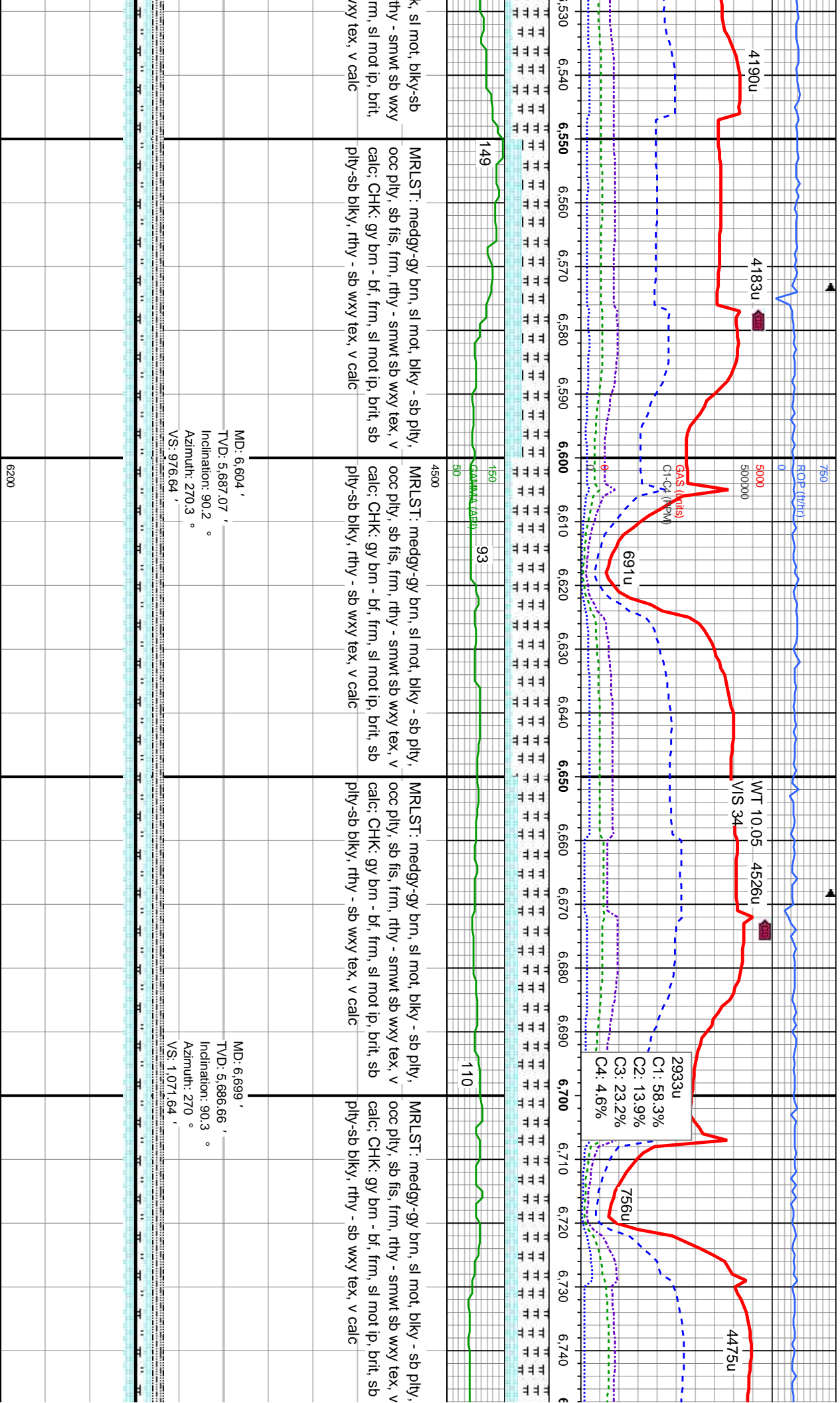
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Depth In: 6,090 '
Jets: 5x11
S/N: JH0817

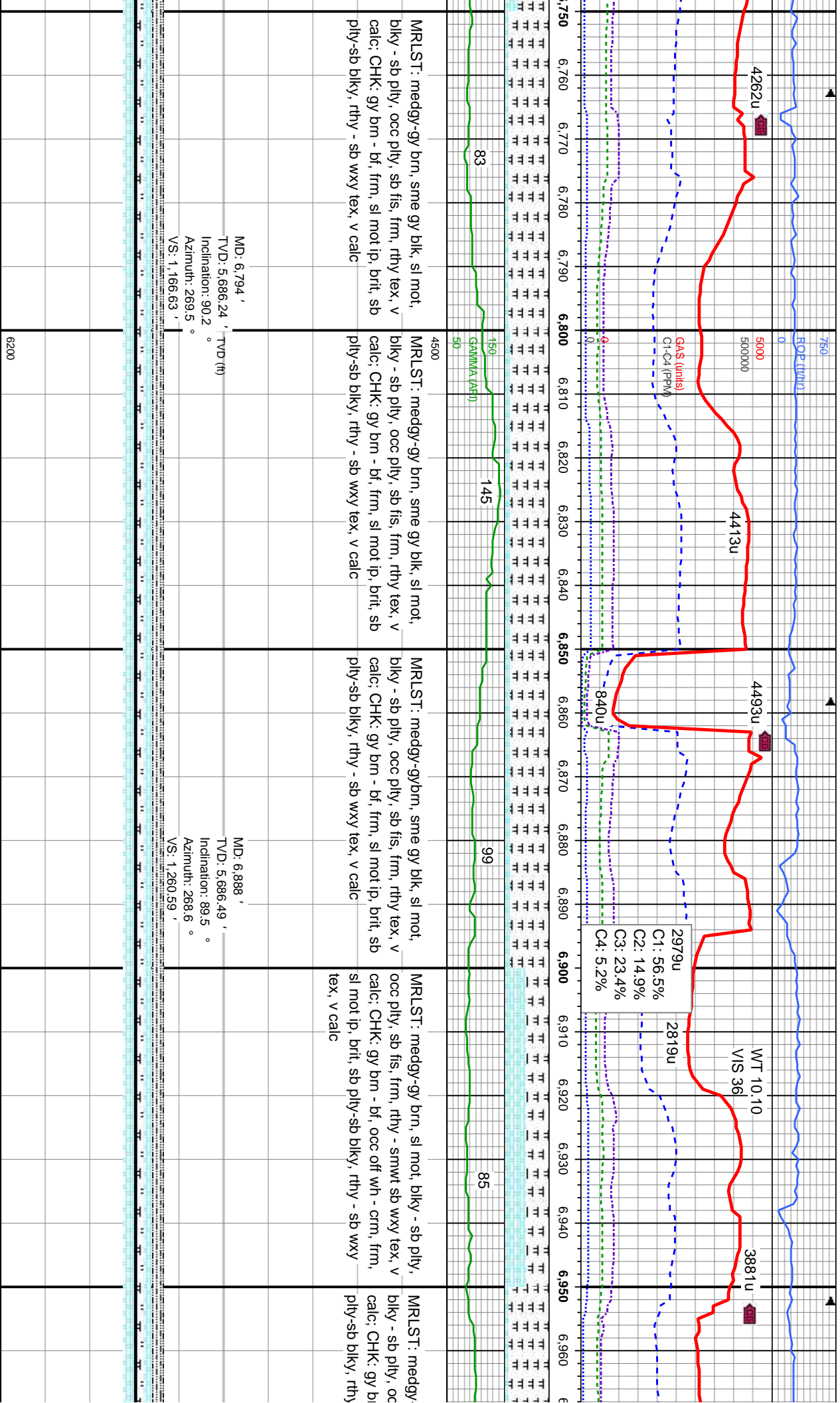
MD: 6,138 '
TVD: 5,676.55 '
Inclination: 86.2 °
Azimuth: 270.7 °
VS: 510.92 '

TVD (ft)
MD: 6,230 '
TVD: 5,681.28 '
Inclination: 87.9 °
Azimuth: 271.6 °
VS: 602.79 '









MD: 6,794 '
TVD: 5,686.24 ' - TVD (ft)
Inclination: 90.2 °
Azimuth: 269.5 °
VS: 1,166.63 '

MRLST: medgy-gy brn, sme gy blk, sl mot,
biky - sb pty, occ pty, sb fis, frm, rthy tex, v
calc; CHK: gy brn - bf, frm, sl mot ip, brit, sb
pty-sb biky, rthy - sb wxy tex, v calc

MRLST: medgy-gy brn, sme gy blk, sl mot,
biky - sb pty, occ pty, sb fis, frm, rthy tex, v
calc; CHK: gy brn - bf, frm, sl mot ip, brit, sb
pty-sb biky, rthy - sb wxy tex, v calc

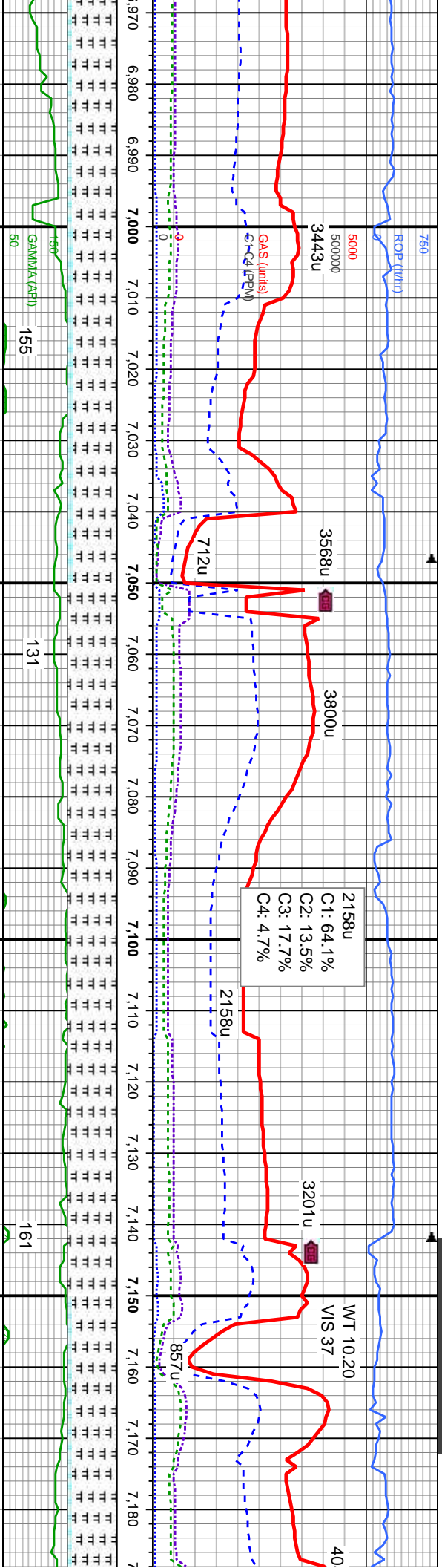
MRLST: medgy-gybrn, sme gy blk, sl mot,
biky - sb pty, occ pty, sb fis, frm, rthy tex, v
calc; CHK: gy brn - bf, frm, sl mot ip, brit, sb
pty-sb biky, rthy - sb wxy tex, v calc

MRLST: medgy-gy brn, sl mot, biky - sb pty,
occ pty, sb fis, frm, rthy - smwt sb wxy tex, v
calc; CHK: gy brn - bf, occ off wh - crm, frm,
sl mot ip, brit, sb pty-sb biky, rthy - sb wxy
tex, v calc

MRLST: medgy-
biky - sb pty, oc
calc; CHK: gy b
pty-sb biky, rthy

MD: 6,888 '
TVD: 5,686.49 ' - TVD (ft)
Inclination: 89.5 °
Azimuth: 268.6 °
VS: 1,260.59 '





gy brn, sme gy blk, sl mot,
cc pily, sb fis, frm, rthy tex, v
n, frm, sl mot ip, brit, sb
- sb wxy tex, v calc

MRLST: medgy-gy brn, sme gy blk, sl mot,
bkly - sb pily, occ pily, sb fis, frm, rthy - smwt
sb wxy tex, v calc; CHK: gy brn, frm, sl mot
ip, brit, sb pily-sb bkly, rthy tex, v calc

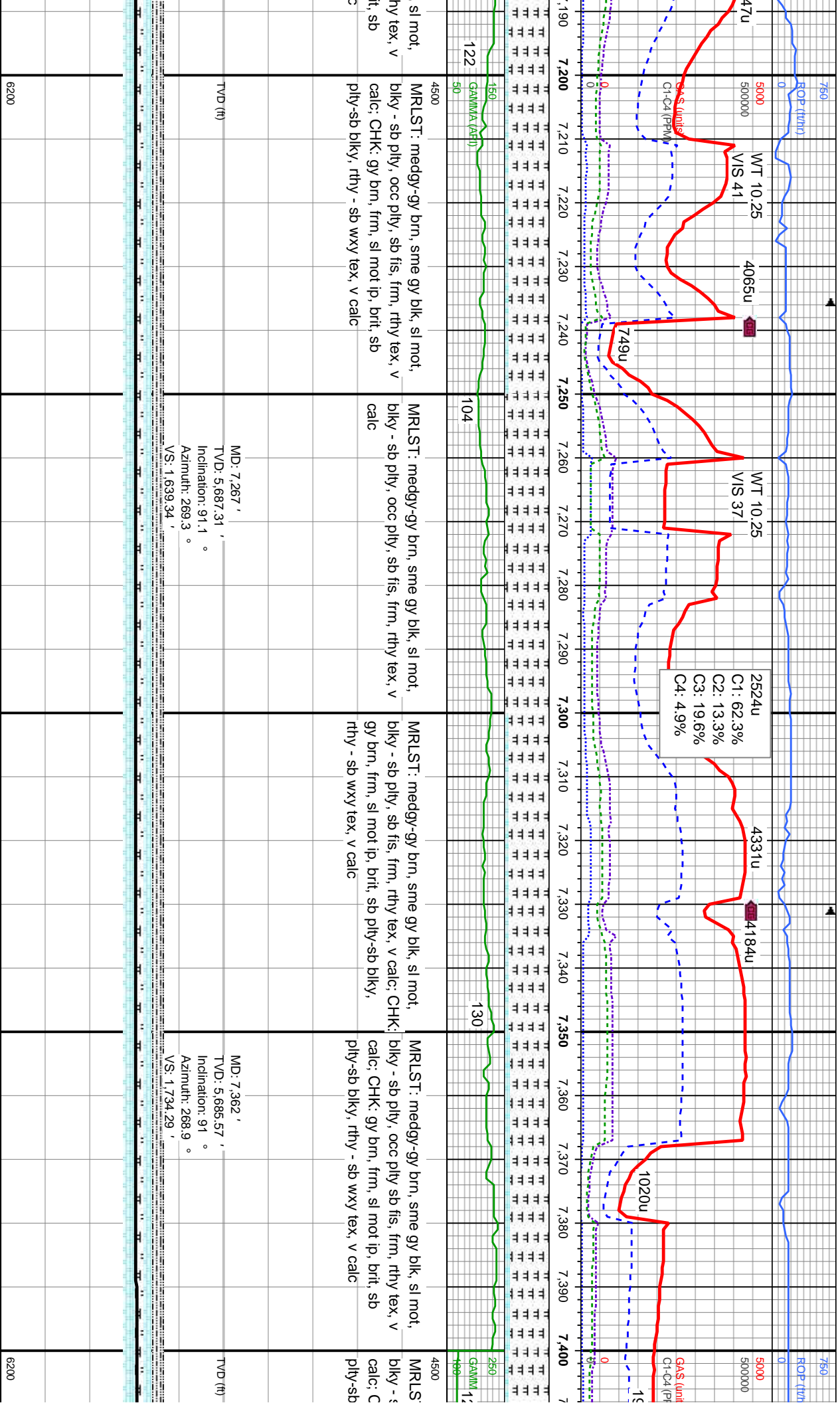
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bkly - sb pily, occ pily, sb fis, frm, rthy tex, v
calc; tr chk

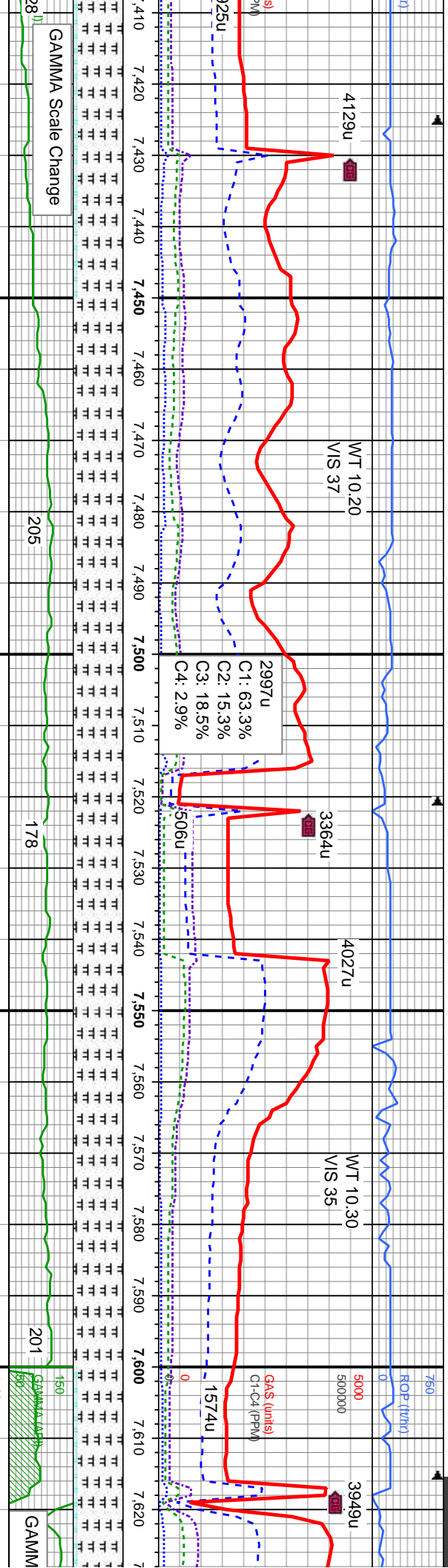
MRLST: medgy-gy brn, sme gy blk, sl mot,
bkly - sb pily, occ pily, sb fis, frm, rthy tex, v
calc; tr chk

MRLST: medgy-gy brn, sme gy blk,
bkly - sb pily, occ pily, sb fis, frm, r
calc; CHK: gy brn, frm, sl mot ip, br
pily-sb bkly, rthy - sb wxy tex, v cal

MD: 6.983 ' TVD: 5,687.32 ' Inclination: 89.5 ° Azimuth: 268.2 ° VS: 1,355.52 '	TVD (ft)	MD: 7.078 ' TVD: 5,688.89 ' Inclination: 88.6 ° Azimuth: 267.9 ° VS: 1,450.41 '	MD: 7.172 ' TVD: 5,689.14 ' Inclination: 91.1 ° Azimuth: 270.5 ° VS: 1,544.37 '
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medgy-gy brn, sme gy blk, sl mot, biky - sb pily, occ pily sb fis, frm, rthy tex, v calc

medgy-gy brn, sme gy blk, sl mot, biky - sb pily, occ pily sb fis, frm, rthy tex, v calc

medgy-gy brn, sme gy blk, sl mot, biky - sb pily, occ pily sb fis, frm, rthy tex, v calc, tr chk

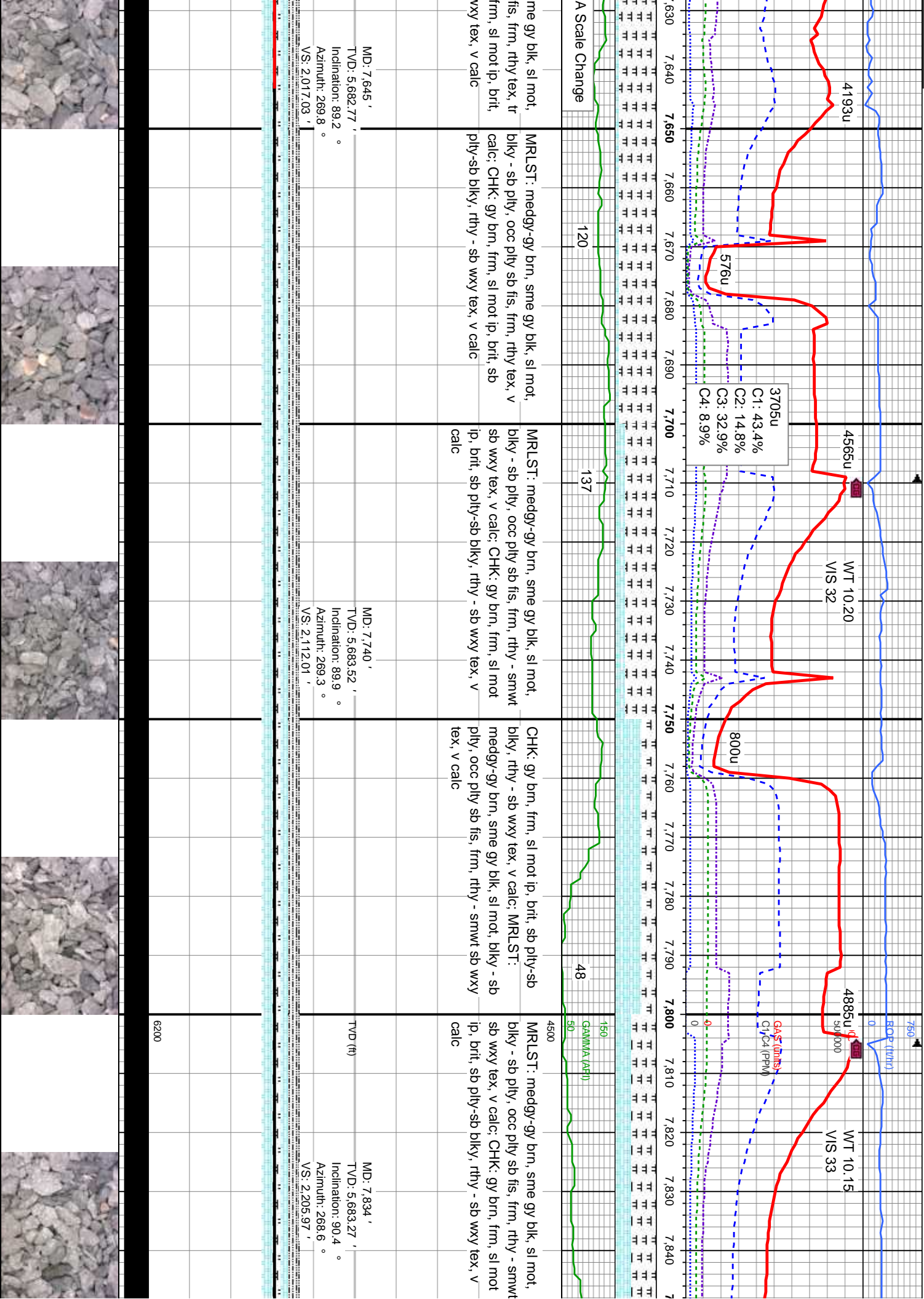
medgy-gy brn, sme gy blk, sl mot, biky - sb pily, occ pily sb fis, frm, rthy tex, v calc; CHK: gy brn, sb pily-sb biky, rthy - sb v

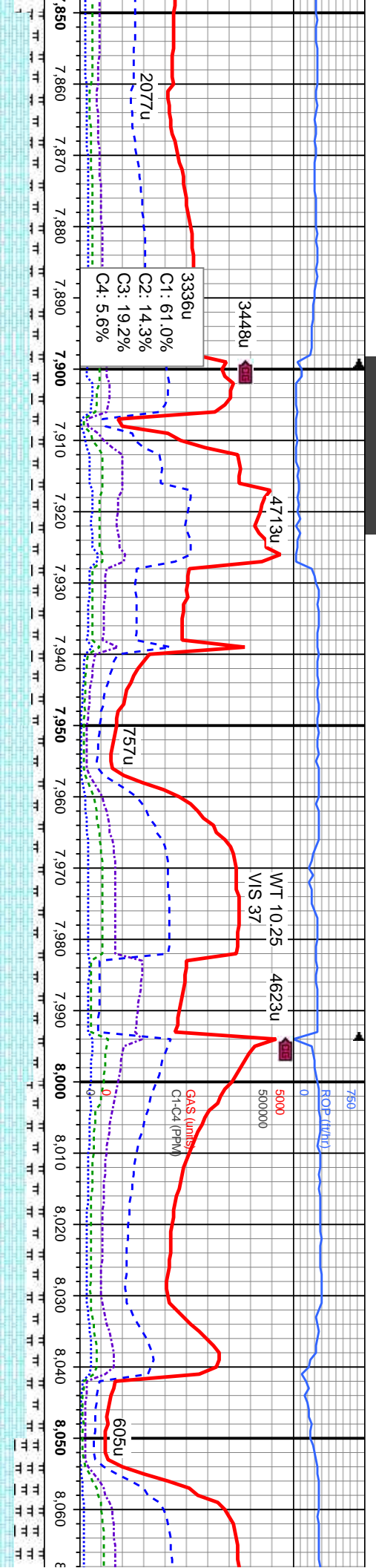
MD: 7.456 '
TVD: 5.684.1 '
Inclination: 90.8 °
Azimuth: 267.9 °
VS: 1.828.21 '

MD: 7.561 '
TVD: 5.682.77 '
Inclination: 90.8 °
Azimuth: 267.7 °
VS: 1.923.09 '

TVD (ft)







CHK: gy brn, frm, sl mot ip, brit, sb pty-sb
blky, rthy - sb wxy tex, v calc; MRLST:
medgy-gy brn, sme gy blk, sl mot, blky - sb
pty, occ pty sb fis, frm, rthy - smwt sb wxy
tex, v calc

CHK: gy brn, frm, sl mot ip, brit, sb pty-sb
blky, rthy - sb wxy tex, v calc; MRLST:
medgy-gy brn, sme gy blk, sl mot, blky - sb
pty, occ pty sb fis, frm, rthy - smwt sb wxy
tex, v calc

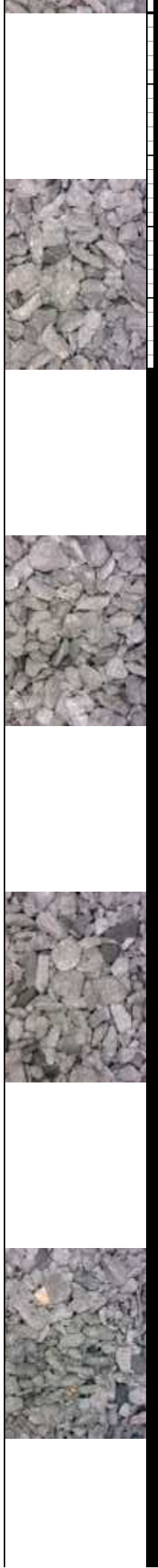
CHK: lt gy-gy brn, frm, sl mot ip, brit, sb
pty-sb blky, rthy - sb wxy tex, v calc; MRLST:
medgy-gy brn, sme gy blk, sl mot, blky - sb
pty, occ pty, sb fis, frm, rthy - smwt sb wxy
tex, v calc

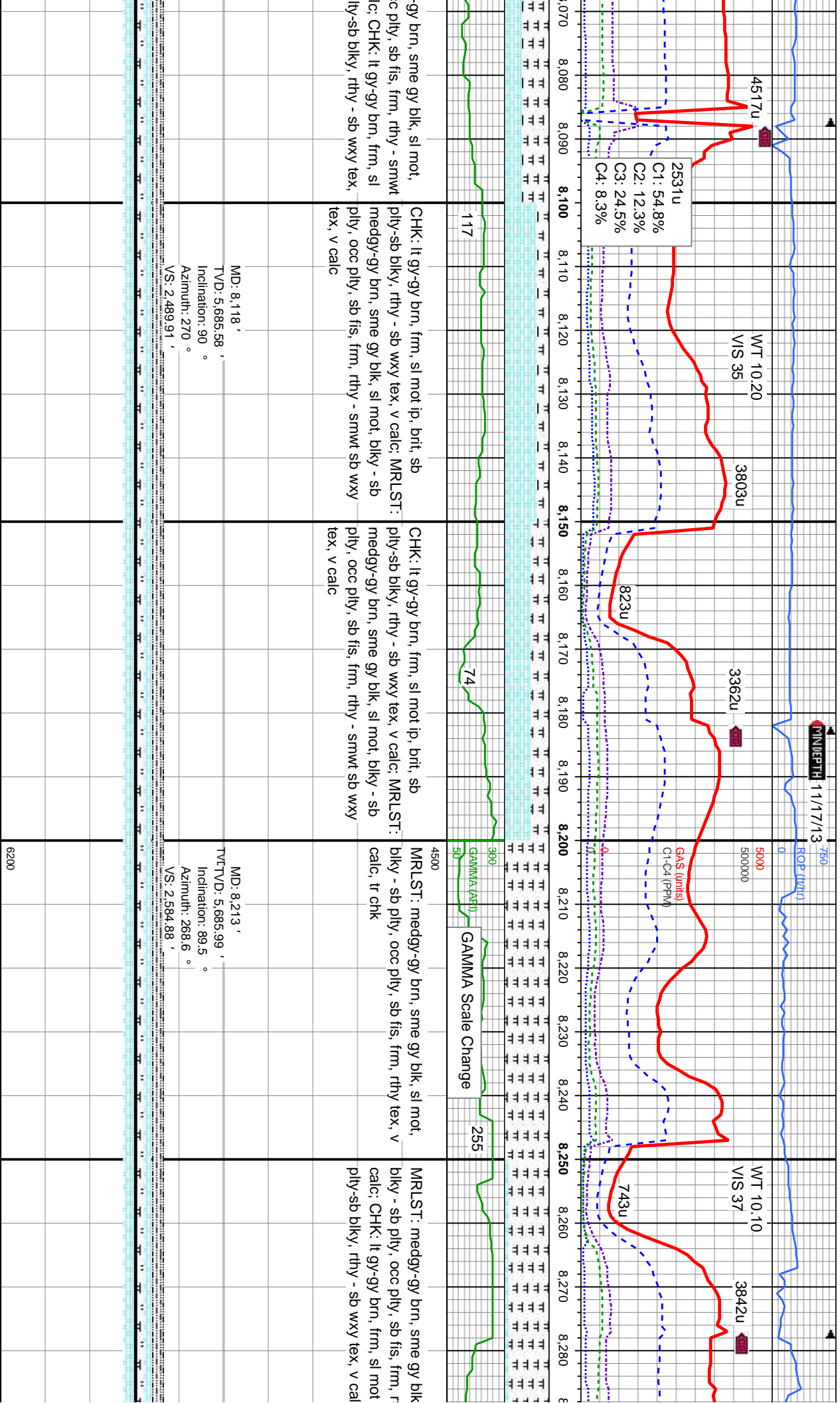
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pty-sb blky, rthy - sb wxy tex, v calc; MRLST:
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pty, occ pty, sb fis, frm, rthy - smwt sb wxy
tex, v calc

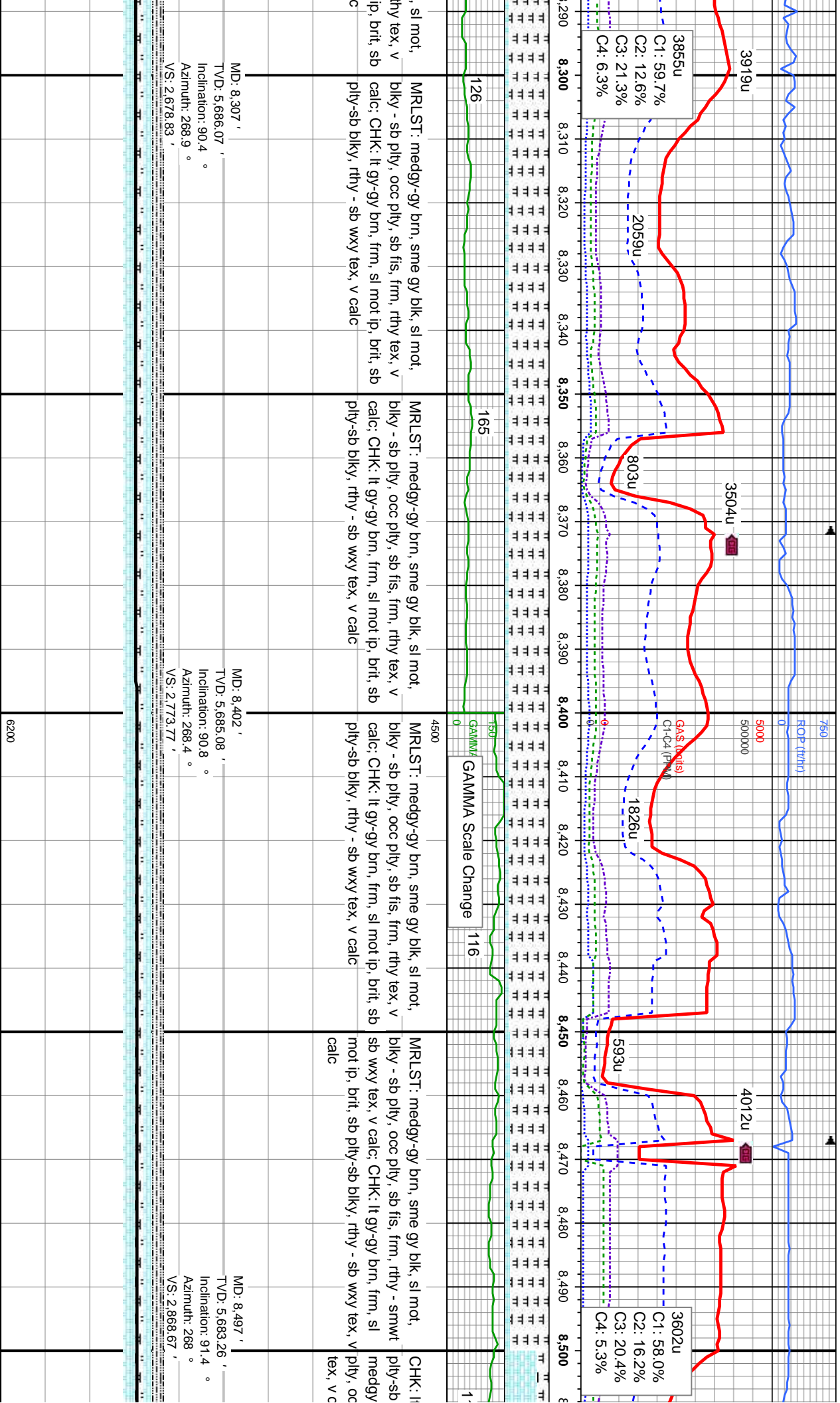
MRLST: medgy
blky - sb pty, oc
sb wxy tex, v ca
mot ip, brit, sb p
v calc

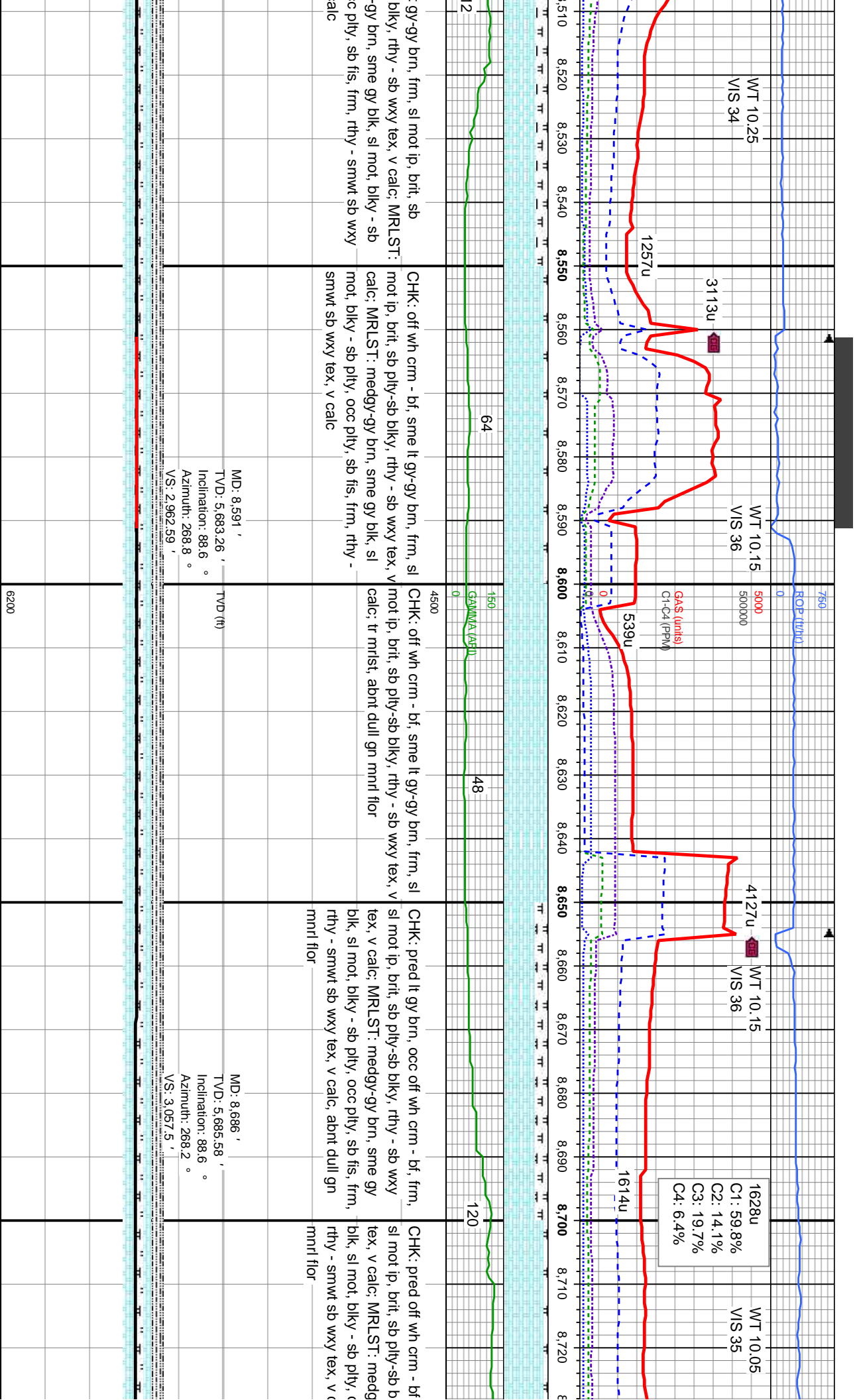
MD: 7.929 '
TVD: 5,684.27 '
Inclination: 88.4 °
Azimuth: 269.5 °
VS: 2,300.93 '

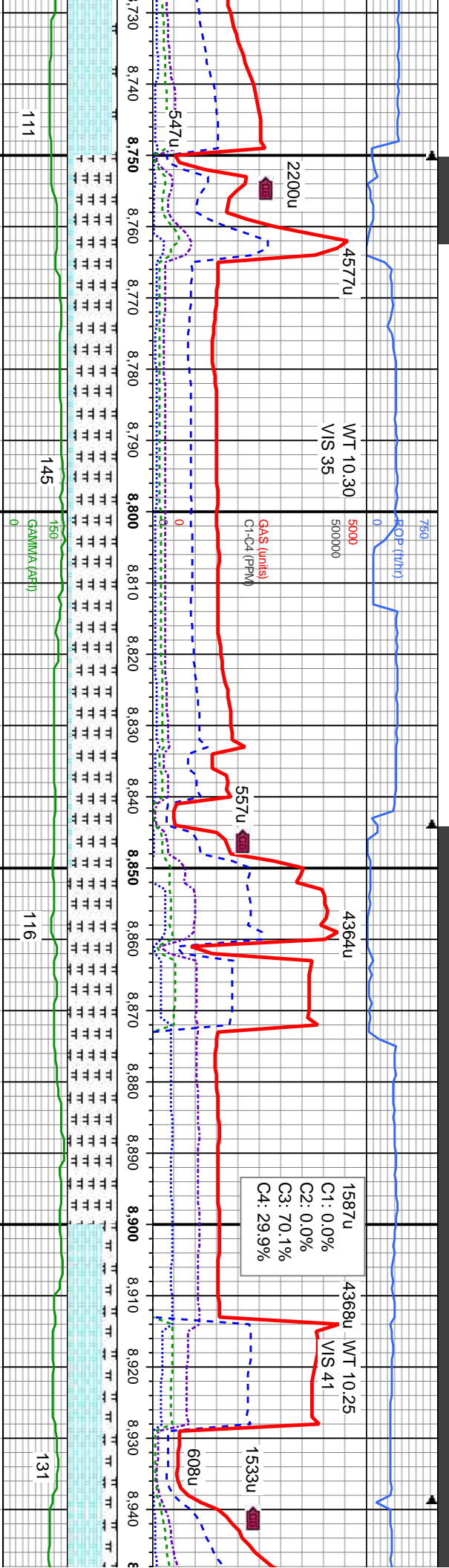
MD: 8.023 '
TVD: 5,685.58 '
Inclination: 90 °
Azimuth: 270.7 °
VS: 2,394.91 '











sne lt gy brn, frm,
rthy - sb wxy
y-gy brn, sme gy
occ pily, sb fis, frm,
calc, abnt dull gn

MRLST: medgy-gy brn, sme gy blk, sl mot,
biky - sb pily, occ pily, sb fis, frm, rthy tex, v
calc; CHK: pred gy brn, frm, sl mot ip, brt, sb
pily-sb biky, rthy - sb wxy tex, v calc

MRLST: medgy-gy brn, sme gy blk, sl mot,
biky - sb pily, occ pily, sb fis, frm, rthy tex, v
calc; CHK: pred gy brn, frm, sl mot ip, brt, sb
pily-sb biky, rthy - sb wxy tex, v calc

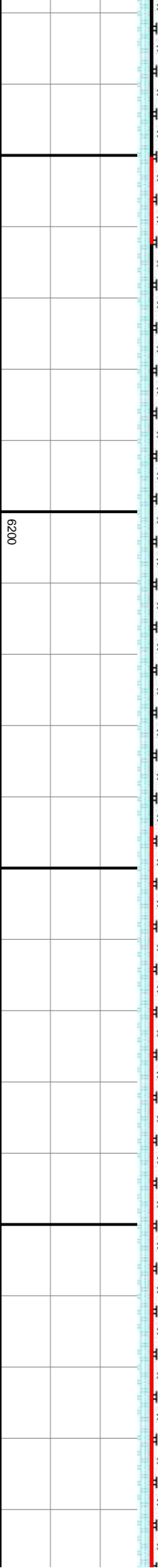
MRLST: medgy-gy brn, sme gy blk, sl mot,
biky - sb pily, occ pily, sb fis, frm, rthy tex, v
calc; tr chk

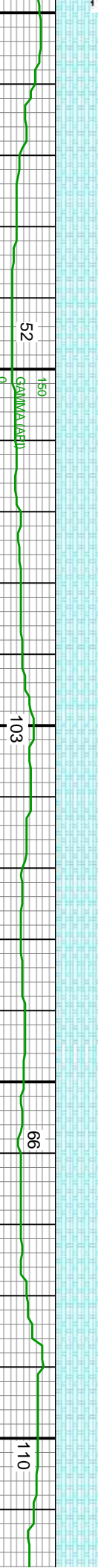
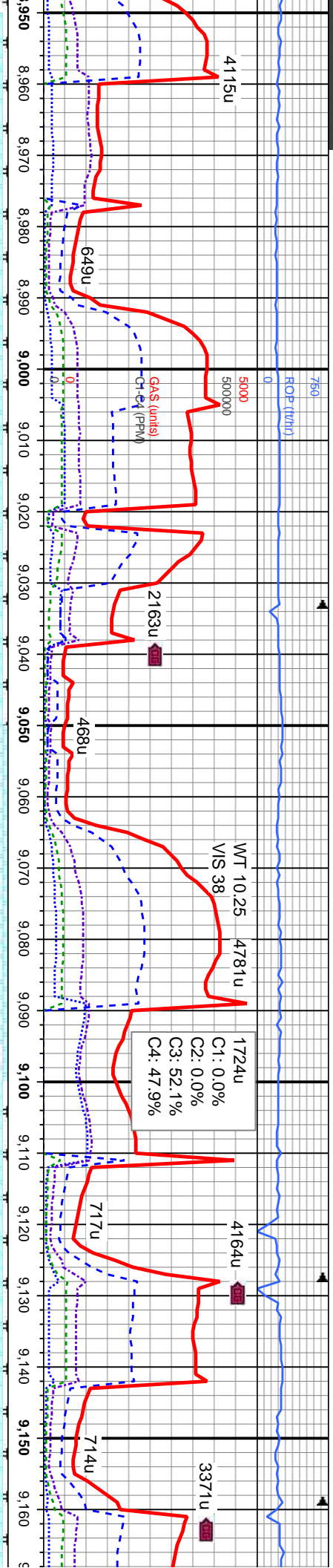
CHK: pred off wh crm - bf, sme lt gy brn,
mod frm, mot ip, brt, sb pily-sb biky, sb wxy
tex, v calc; MRLST: medgy-gy brn, sme gy
blk, sl mot, biky - sb pily, occ pily, sb fis, moc
frm, rthy - smwt sb wxy tex, v calc, abnt dull
gn mnrl flr

MD: 8,780 '
TVD: 5,687.96 '
Inclination: 88.5 °
Azimuth: 269.8 °
VS: 3,151.43 '

TVD (ft)

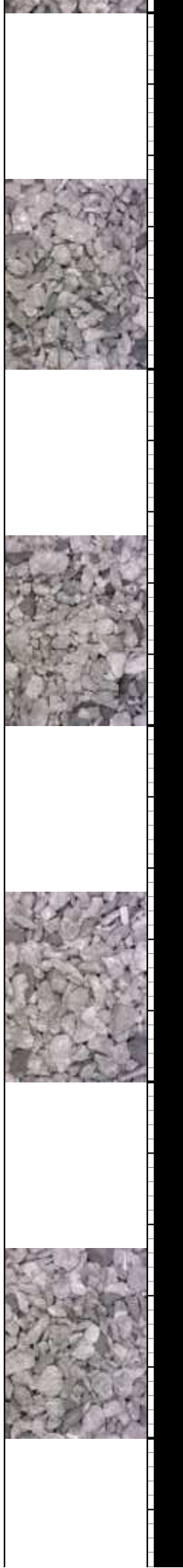
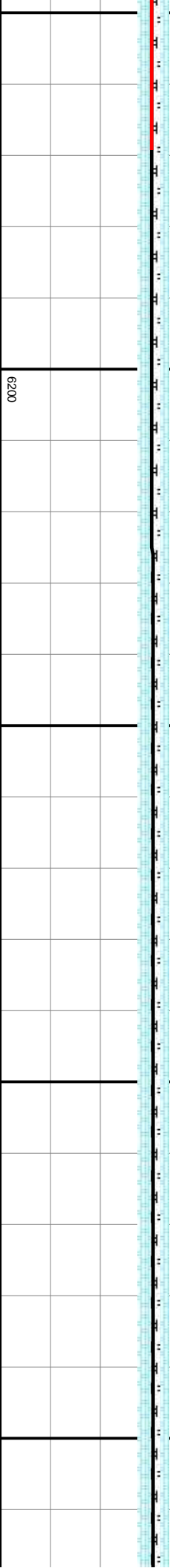
MD: 8,874 '
TVD: 5,688.04 '
Inclination: 91.4 °
Azimuth: 271.7 °
VS: 3,245.42 '

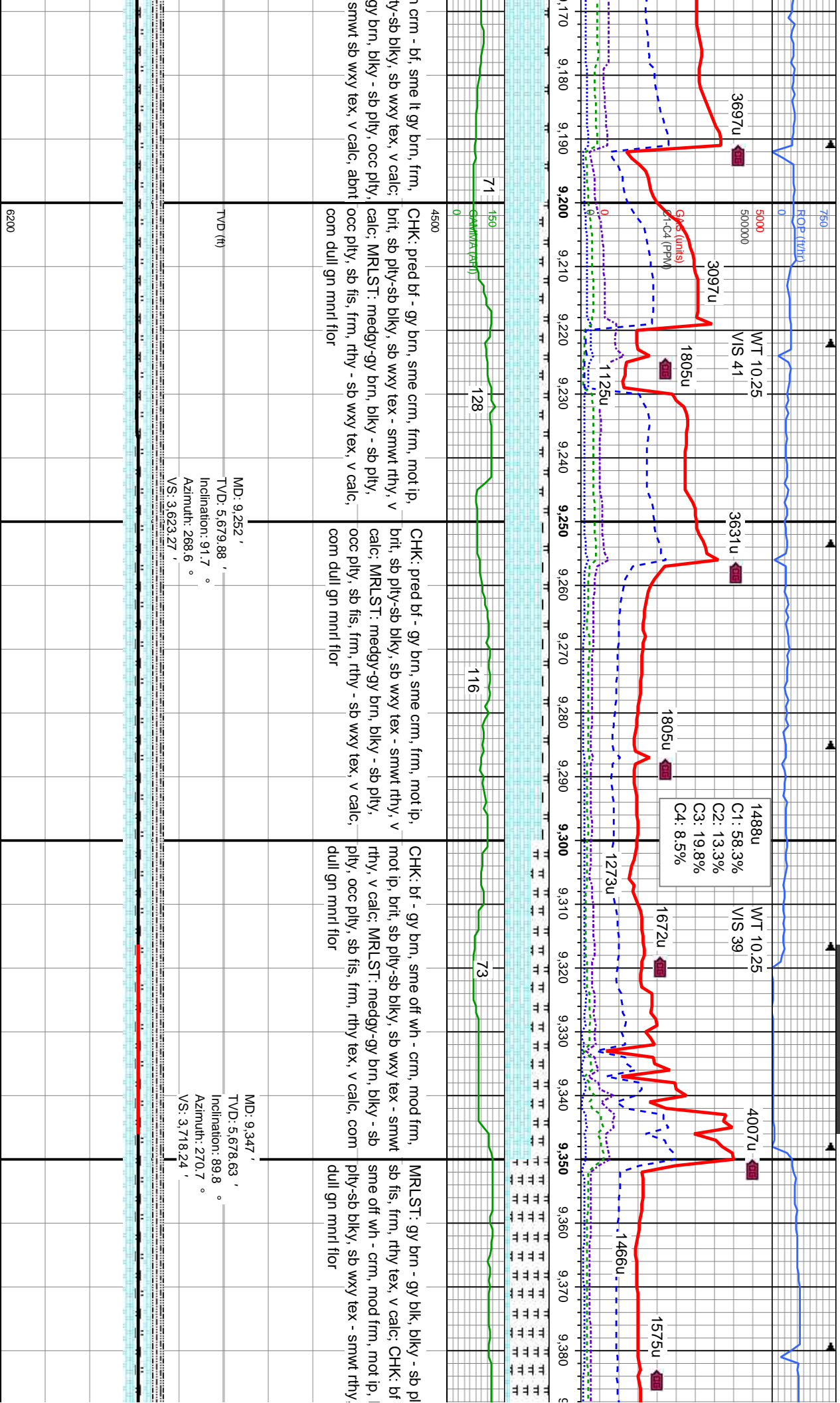




Depth (ft)	Log Description
8,950 - 9,000	CHK: pred off wh crm - bf, sme lt gy brn, mod frm, mot ip, brit, sb pily-sb blk, sb wxy tex, v calc, MRLST: medgy-gy brn, sme gy blk, sl mot, blk - sb pily, occ pily, sb fis, mod frm, rthy - smwt sb wxy tex, v calc, abnt dull gn mnrl flr
9,000 - 9,050	CHK: pred off wh crm - bf, sme lt gy brn, mod frm, mot ip, brit, sb pily-sb blk, sb wxy tex, v calc, MRLST: medgy-gy brn, sme gy blk, sl mot, blk - sb pily, occ pily, sb fis, mod frm, rthy - smwt sb wxy tex, v calc, abnt dull gn mnrl flr
9,050 - 9,100	CHK: pred off wh crm - bf, sme lt gy brn, frm, mot ip, brit, sb pily-sb blk, sb wxy tex, v calc, tr mlst, abnt dull gn mnrl flr
9,100 - 9,150	CHK: pred off wh crm - bf, sme lt gy brn, frm, mot ip, brit, sb pily-sb blk, sb wxy tex, v calc, MRLST: medgy-gy brn, blk - sb pily, occ pily, sb fis, frm, rthy - smwt sb wxy tex, v calc, abnt dull gn mnrl flr
9,150 - 9,160	CHK: pred off wh crm - bf, sme lt gy brn, frm, mot ip, brit, sb pily-sb blk, sb wxy tex, v calc, MRLST: medgy-gy brn, blk - sb pily, occ pily, sb fis, frm, rthy - smwt sb wxy tex, v calc, abnt dull gn mnrl flr

MD: 8,969'	TVD: 5,686.13'	Inclination: 90.9°	Azimuth: 270.7°	VS: 3,340.39'
MD: 9,063'	TVD: 5,684.49'	Inclination: 91.1°	Azimuth: 270°	VS: 3,434.37'
MD: 9,158'	TVD: 5,682.42'	Inclination: 91.4°	Azimuth: 269.5°	VS: 3,529.34'

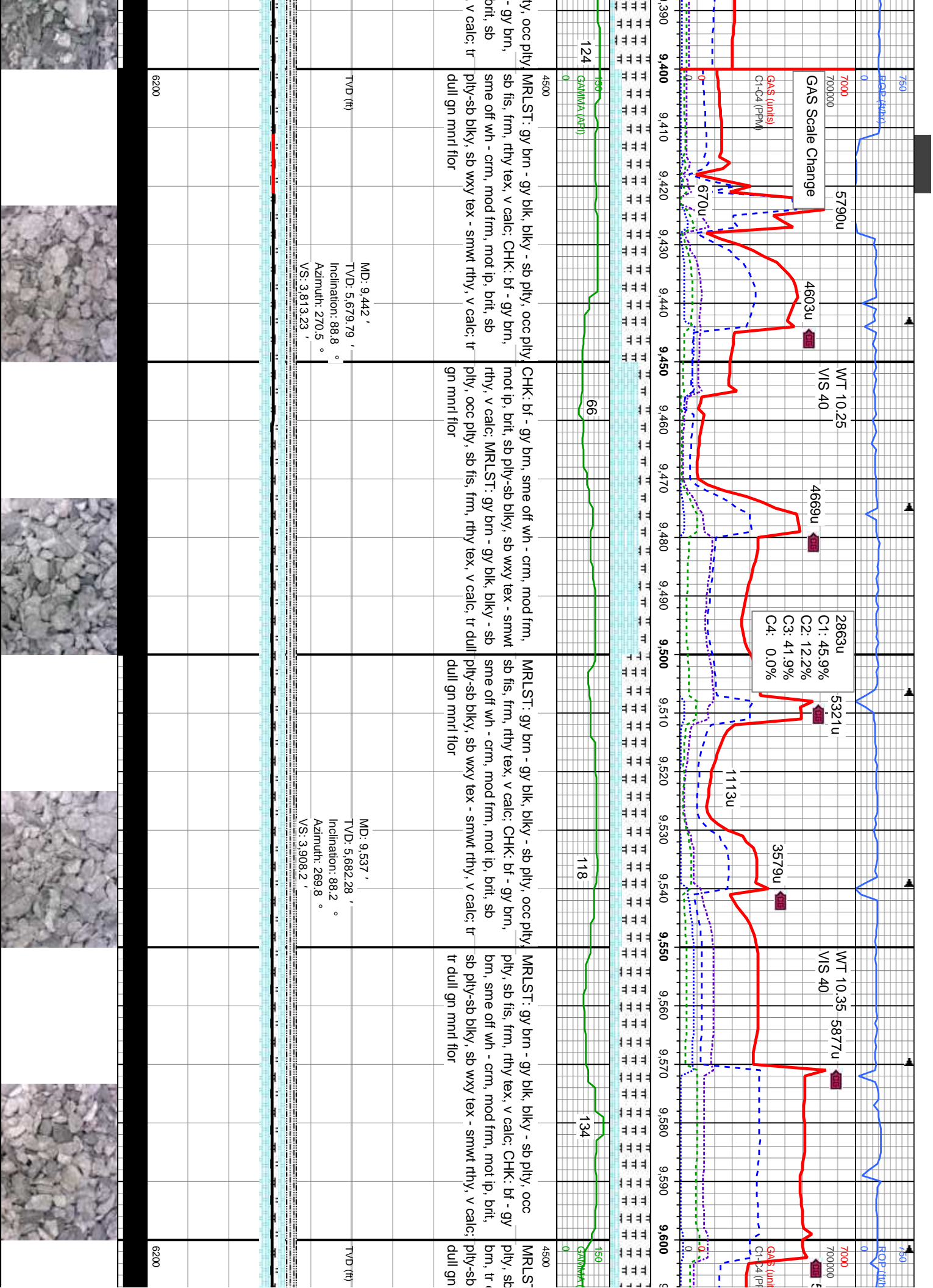


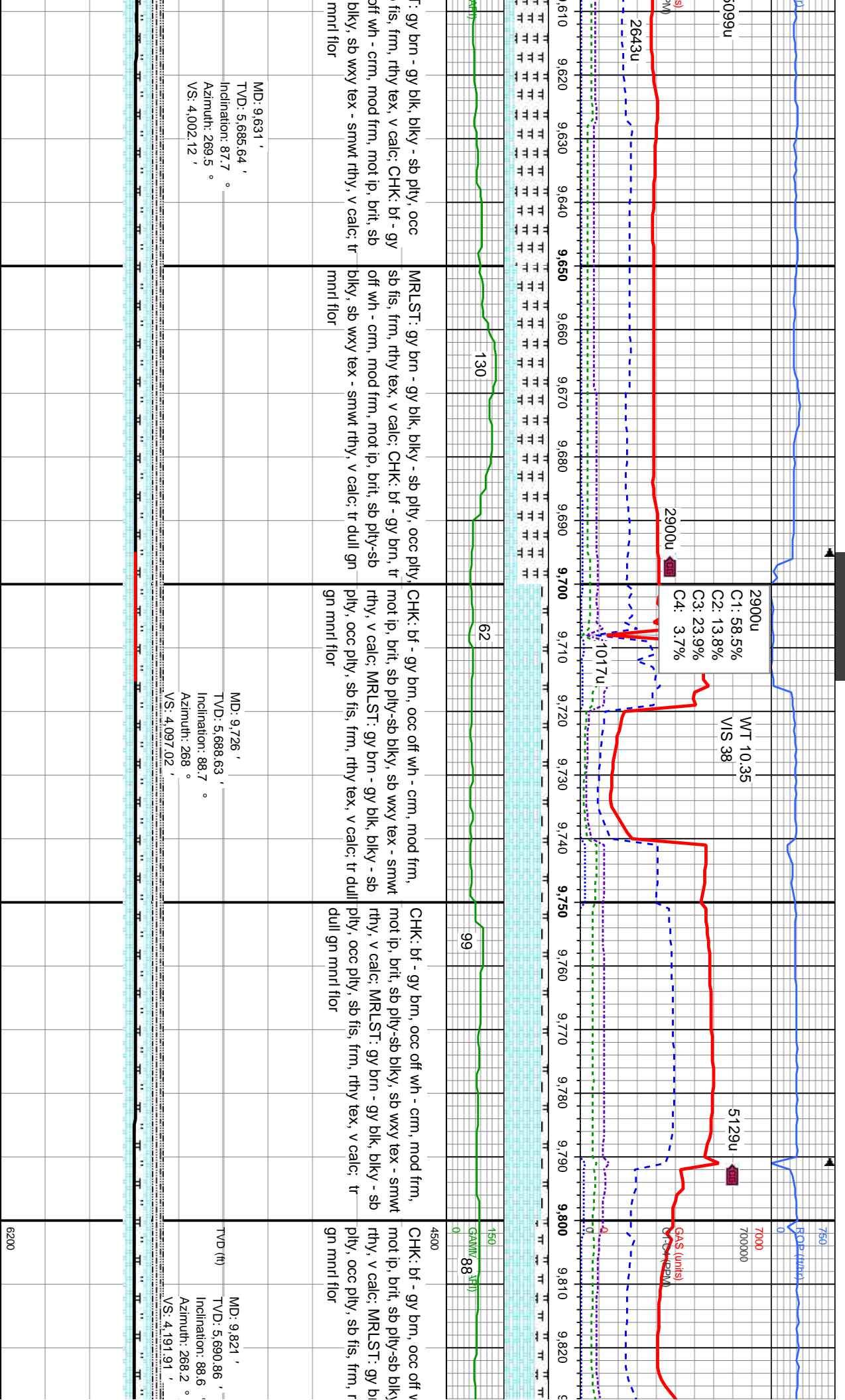


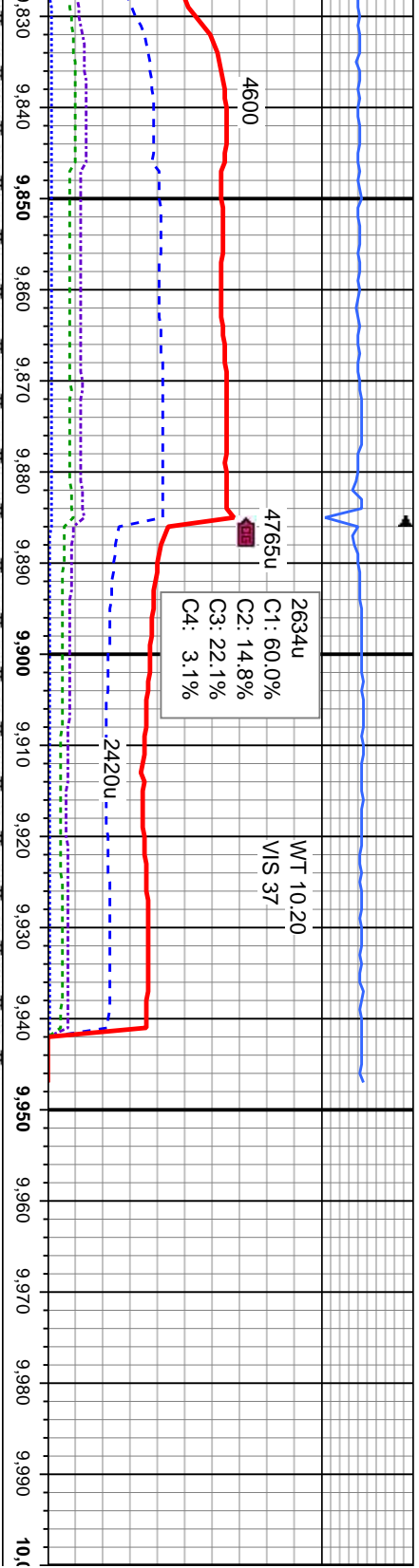
MD: 9,252 '
TVD: 5,679.88 '
Inclination: 91.7 °
Azimuth: 268.6 °
VS: 3,623.27 '

MD: 9,347 '
TVD: 5,678.63 '
Inclination: 89.8 °
Azimuth: 270.7 °
VS: 3,718.24 '









wh - crm, mod frm, /, sb wxy tex - smwt	CHK: bf - gy brn, occ off wh - crm, mod frm, mot ip, brit, sb pily-sb blk, sb wxy tex - smwt rthy, v calc; MRLST: gy brn - gy blk, blkly - sb pily, occ pily, sb fis, frm, rthy tex, v calc, tr dull gn mnrl flr	CHK: bf - gy brn, occ off wh - crm, mod frm, mot ip, brit, sb pily-sb blk, sb wxy tex - smwt rthy, v calc; MRLST: gy brn - gy blk, blkly - sb pily, occ pily, sb fis, frm, rthy tex, v calc, tr dull gn mnrl flr
71		
97		

MD: 9,883 '
TVD: 5,691.84 '
Inclination: 89.6 °
Azimuth: 268.4 °
VS: 4,253.85 '

MD: 9,947 '
TVD: 5,692.28 '
Inclination: 89.6 °
Azimuth: 268.4 °
VS: 4,317.8 '

PTB

Thank you for choosing
Columbine Logging Inc.

NOBLE ENERGY INC
TIMBRO STATE LD 16-67-1HN
TD @ 9,947 MD
11/17/2013 @ 19:46 hrs

