

# COLUMBINE LOGGING

Scale: 5' / 100'  
Measured Depth Log

Well Name Wells Ranch AF05-690 (Horz)

Location SWSW 32 6N 62W

State COLORADO

County WELD

Country WELD

Rig Number H&P #273

API Number 05-123-41786

Field WATTENBERG

Region DJ BASIN

Drilling Completed 9/7/2015

Spud Date 9/1/2015

Surface Coordinates Lat: 40.43764

Long: -104.35449

615' FSL

650' FWL

Bottom Hole Coordinates 1' FSL

535' FEL

Ground Elevation 4,716'

K.B. Elevation 4,740'

Logged Interval 800' To 15,993'

Total Depth 15,993'

Formation NIOBRARA C MARL

Type of Drilling Fluid H2O, LSND

Operator

Company Noble Energy Inc.

Address 1625 BROADWAY  
DENVER, CO 80202  
(303) 228-4000

Geologis

Name MICHAEL ANDERSON, JOHN SABROSKE

Company COLUMBINE LOGGING, INC.

Address 602 S. LIPAN ST  
DENVER, COLORADO 80223  
(303) 289-7764

Zone Color Co

Oil  
Note  
Error

Condensate  
Core  
Water

Rock Type

UNKNOWN  
ANHYDRITE  
BENTONITE  
BRECCIA  
CHALK  
CEMENT  
CHERT  
CLAY CHOKE SA...  
CLAYSTONE  
COAL  
CONGLOMERATE  
DOLOMITE  
DOLOMITIC LIMESTO...  
GRANITE  
GYPSUM  
IGNEOUS  
SIDERITE or LIMONITE  
LIMESTONE



Accessories

Fossils			Stringer
GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	
INOCERAMUS	B BENTONITE	K KAOLIN	
ALGAE	BITUMENOUS SUBSTANCE	M MARCASITE	ANHYDRITE STRINGER
AMPHIPORA	BRECCIA FRAGMENTS	T MARLSTONE	BENTONITE STRINGER
BELEMNITE	CALCAREOUS	U MICACEOUS	COAL STRINGER
BIOCLASTIC	CARBONACEOUS FLAKES	X MINERAL CRYSTALS	DOLOMITE STRINGER
BRACHIOPOD	CHTDL	Y NODULES	GYPSUM STRINGER
BRYOZOA	CHTL	Z PHOSPHATE PELLET	LIMESTONE STRINGER
CERPHALOPOD	COAL - THIN BEDS	P PYRITE	MARLSTONE (CALC) STRG
CORAL	SCAPHOPOD	B SALT CAST	MARLSTONE (DOL) STRG
CRINOID	STROMATOPOROID	S SANDY	SANDSTONE STRINGER
ECHINOID	FERRUGINOUS PELLET	S SIDERITE	SHALE STRINGER
FISH	FERRUGINOUS	U SILICEOUS	SILTSTONE STRINGER
FORAMINIFERA	ANHYDRITIC	V SILTY	
F FOSSIL	ARGILLACEOUS	V TUFFACEOUS	

Other Symbols

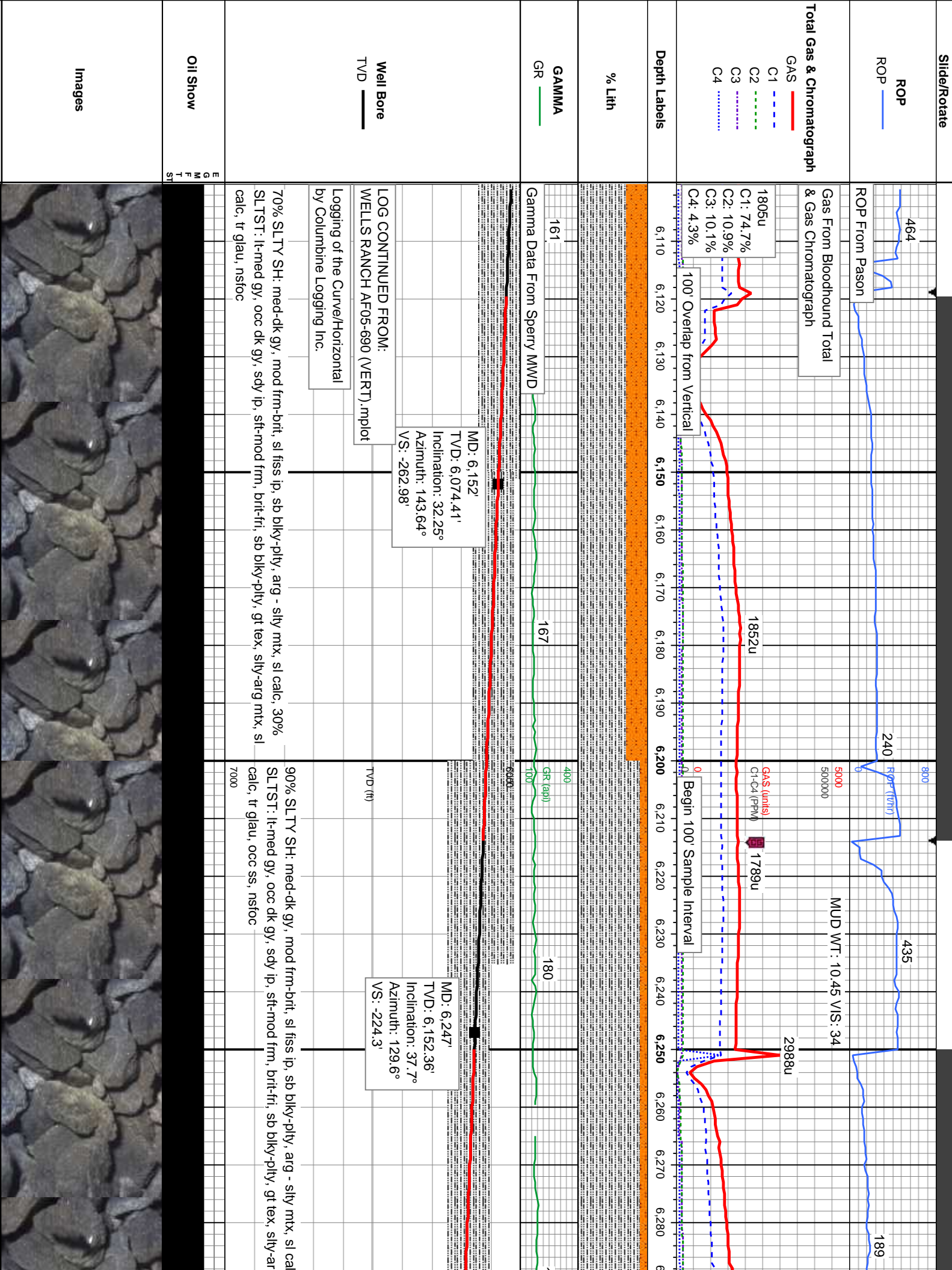
Oil Show			
P PINPOINT	DST INTERVAL	V WIRELINE TESTED - LE...	E EARTHY
V VUGGY	FAULT	V WIRELINE TESTED - RT	FX FINELYXLN
D DEAD	FORMATION TOP	DRILL STEM TEST	GS GRAINSTONE
EVEN	GAS SHOW	MNDEPTH MN DEPTH	L LITHOGRAPHIC
QUESTIONABLE	OIL SHOW		MX MICROXLN
BIT			
SPOTTED STAIN...	CONNECTION (UP)		MS MUDSTONE
Porosity			
CONNECTION (DOWN)	MN DEPTH (DOWN)	A ANGULAR	PS PACKSTONE
E EARTHY	CONNECTION GAS	R ROUNDED	WS WACKESTO...
FENESTRAL	CONNECTION GAS (LEF..	B SUBANG	
	TRIP GAS	N SUBRND	
F FRACTURE	TRIP GAS (LEFT)	CASING	
INTERCRYSTALL...	DOWN TIME GAS	SIDEWALL CORE (LEFT)	
INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGH..	
MOLDIC	CORE - LOST	SLIDE	
ORGANIC	CORE - RECOVERED	SURVEY	
		CX CRYPTOXLN	

oding

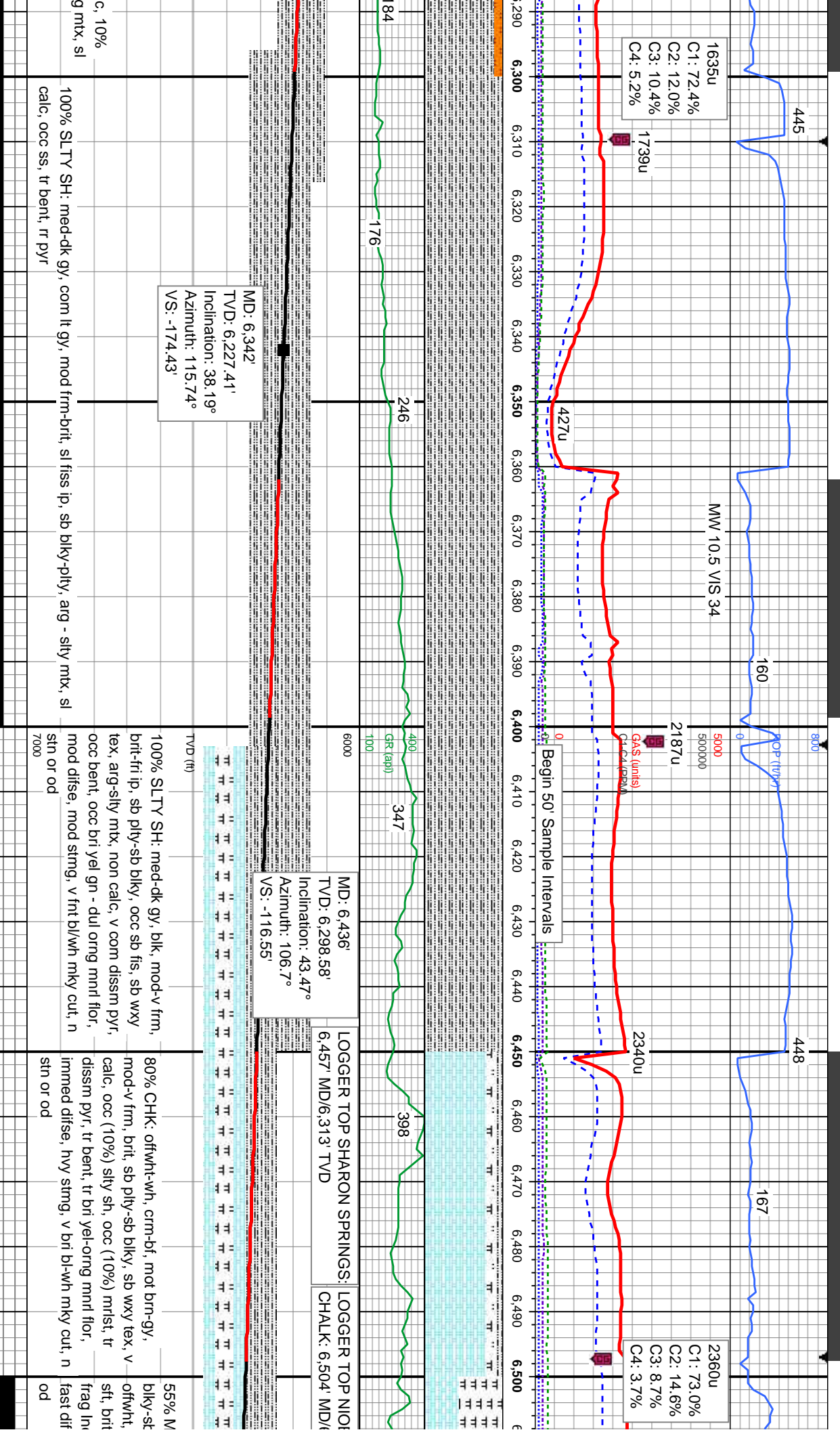


T MARLSTONE	SHALY SANDSTO..
METAMORPHIC	SHALY SILTSTONE
X X NO SAMPLE	SILTY SHALE
SANDSTONE	SILTSTONE
SALT-PEPPER SA..	TUFF
SHALE	WELDED TUFF
SHALE COLORED	
SHALE GRAY	





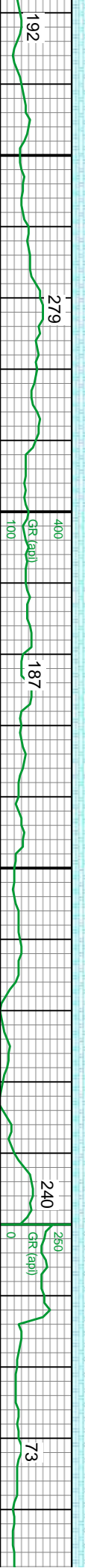
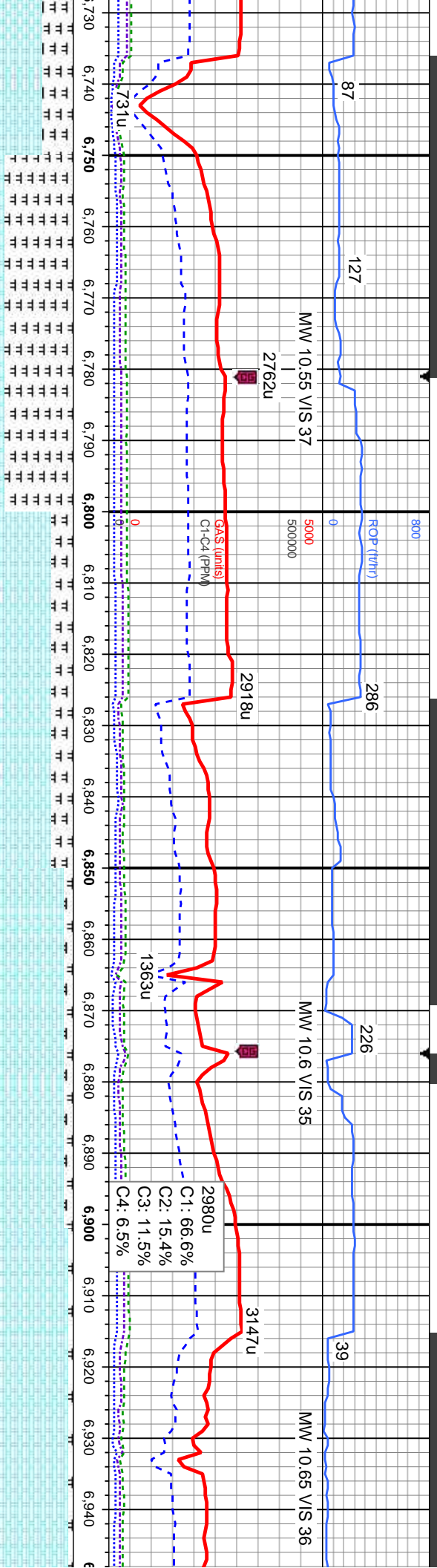












MD: 6,815'  
TVD: 6,496.43'  
Inclination: 73.65°  
Azimuth: 87.51°  
VS: 199.97'

LOGGER TOP NIOBRARA C  
CHALK: 6,866' MD/6,508' TVD

MD: 6,910'  
TVD: 6,518.1'  
Inclination: 79.96°  
Azimuth: 86.67°  
VS: 292.11'

PROJECTION

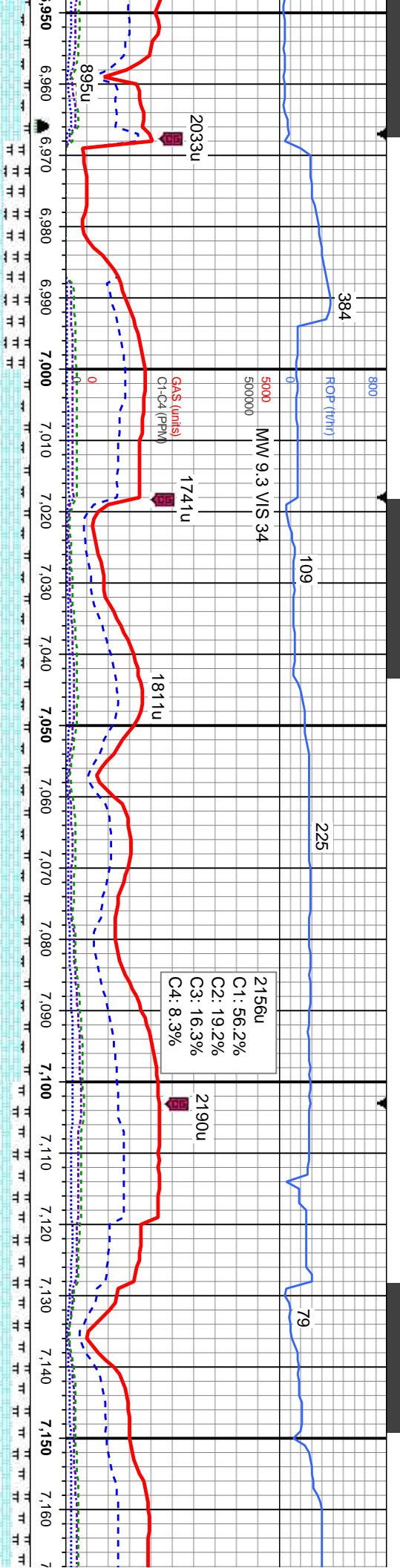
sb ply-sb blkly, frm, brit, gt tex, CHK: crm-bf, mot gy, mod-v frm, tex, v calc, occ fos frag inoc, abnt bent w/ dissn pyr, abnt bri yel j, mod bri bl wh mky cut, n stn or od

CHK: offwht-wh, crm-bf, mot brn-gy, frm, brit, sb ply-sb blkly, v wxy tex, MRLST: med-dk gy, blk, sb ply-sb blkly, frm, brit, gt tex, v calc, tr fos frag inoc, tr dissn pyr, rr bent, rr bri yel-dul orng mnrl flor, immed difse, hvy stmg, v bri bl wh mky cut, n stn or od

CHK: offwht-wh, crm-bf, mot brn-gy, sft-frm, brit-fri, sb ply-sb blkly, v wxy tex, v calc, tr mrlst, occ fos frag inoc, tr dissn pyr, com dul bl gn chk flor, immed difse, hvy stmg, v bri bl wh mky cut, n stn or od







TID Intermediate @ 6968' MD  
@ 10:35 hrs on 09/03/15

Resume Drilling @  
13:49 hrs on 09/04/15

MD: 6,968'  
TVD: 6,524.96'  
Inclination: 86.45°  
Azimuth: 88.15°  
VS: 349.5'

MD: 7,045'  
TVD: 6,532.58'  
Inclination: 87.72°  
Azimuth: 91.95°  
VS: 426.06'

MD: 7,140'  
TVD: 6,534.58'  
Inclination: 89.88°  
Azimuth: 91.49°  
VS: 521.03'

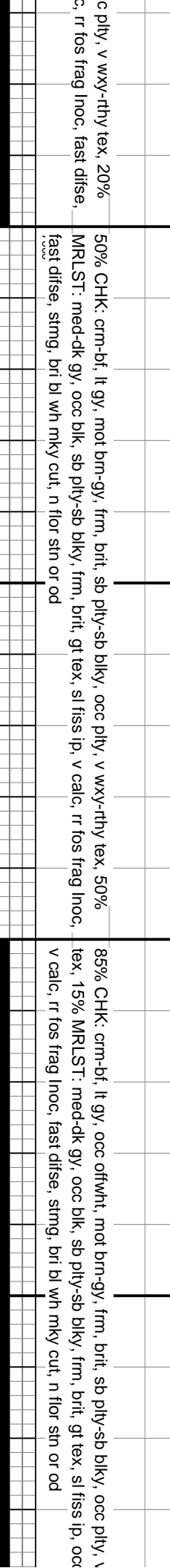
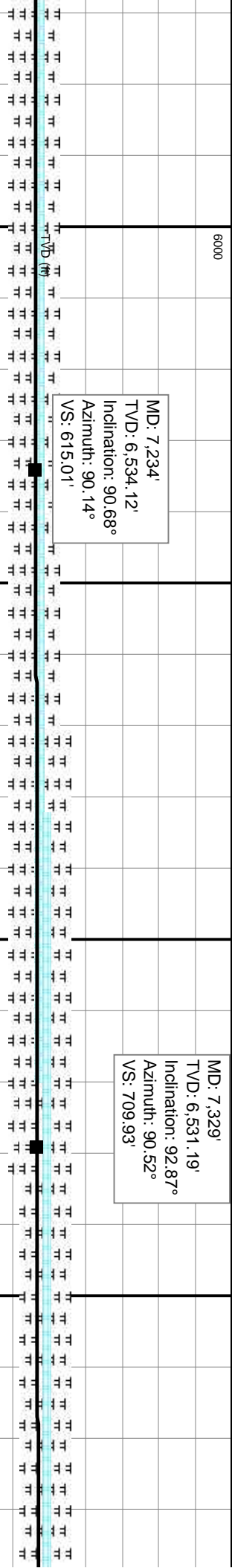
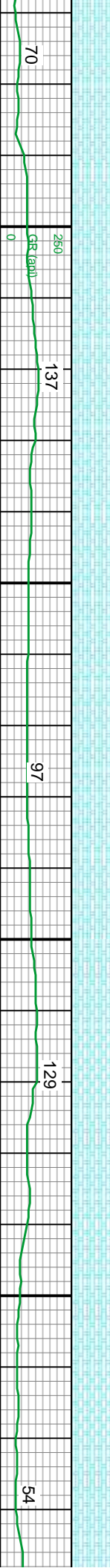
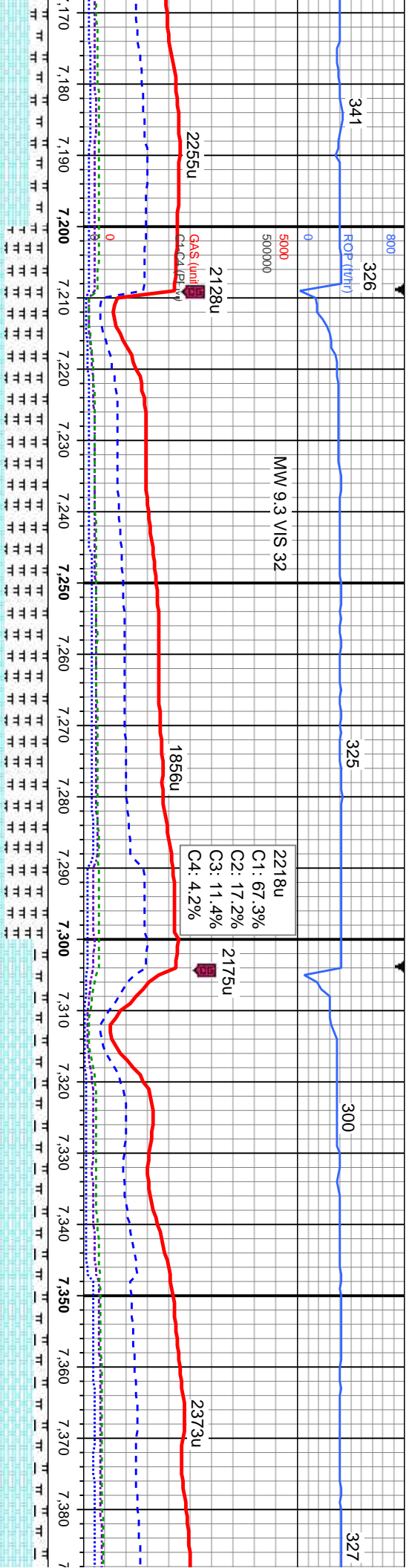
70% CHK: crm-bf, lt gy, mot brn-dk gy, frm, brit, sb blk, v wxy-rthy tex, 30% MRLST: med-dk gy, blk, sb ply-sb blk, frm, brit, gt tex, v calc, occ fos frag inoc, occ orng chk floor, fast disse, stmg, bri bl wh mky cut, n sin or od

90% CHK: crm-bf, lt gy, mot brn-gy, frm, brit, sb ply-sb blk, v wxy-rthy tex, 10% MRLST: med-dk gy, sb ply-sb blk, frm, brit, gt tex, v calc, tr fos frag inoc, fast disse, stmg, bri bl wh mky cut, n floor sin or od

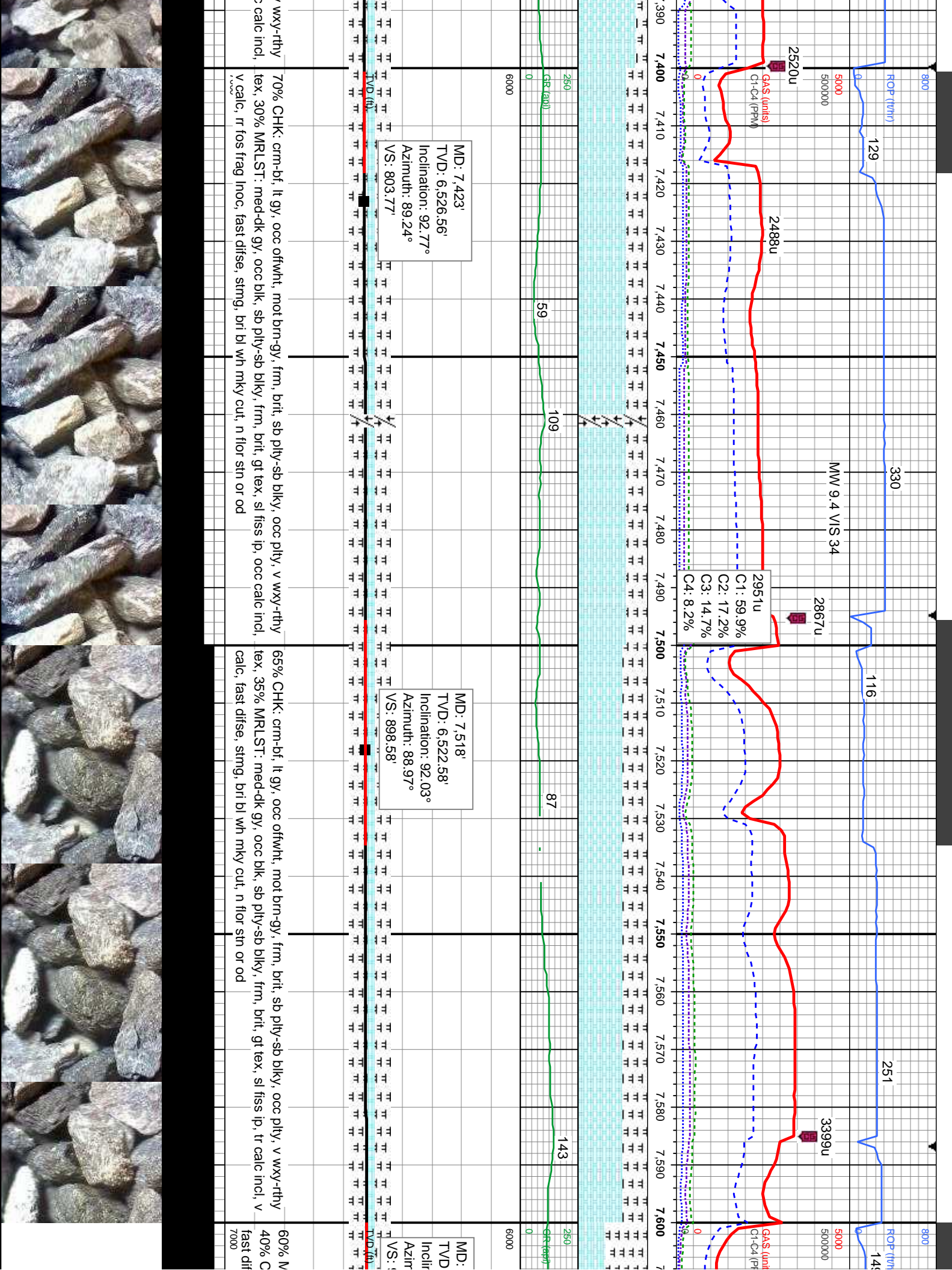
80% CHK: crm-bf, lt gy, mot brn-gy, frm, brit, sb ply-sb blk, oc MRLST: med-dk gy, tr blk, sb ply-sb blk, frm, brit, gt tex, v cal stmg, bri bl wh mky cut, n floor sin or od



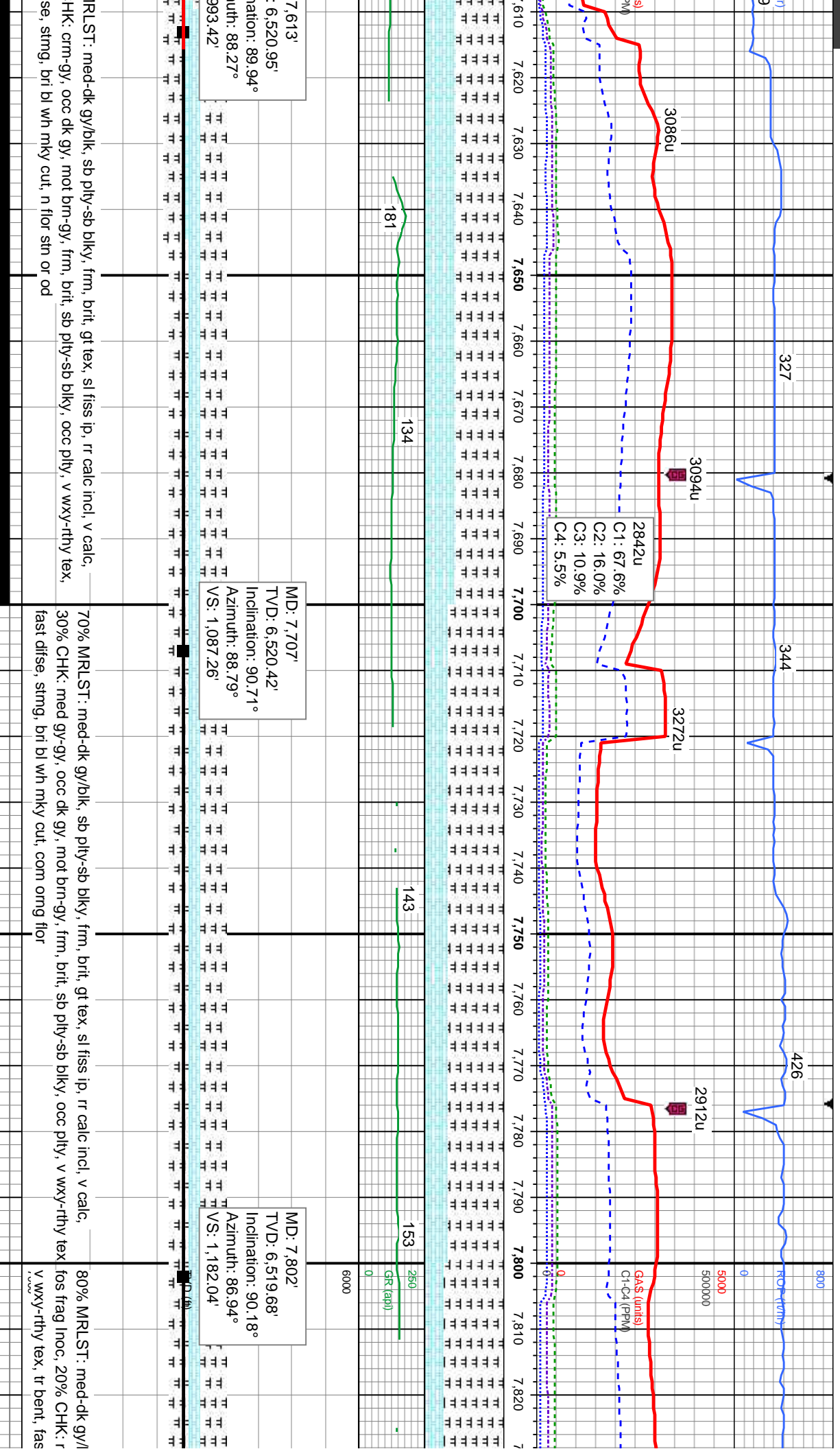




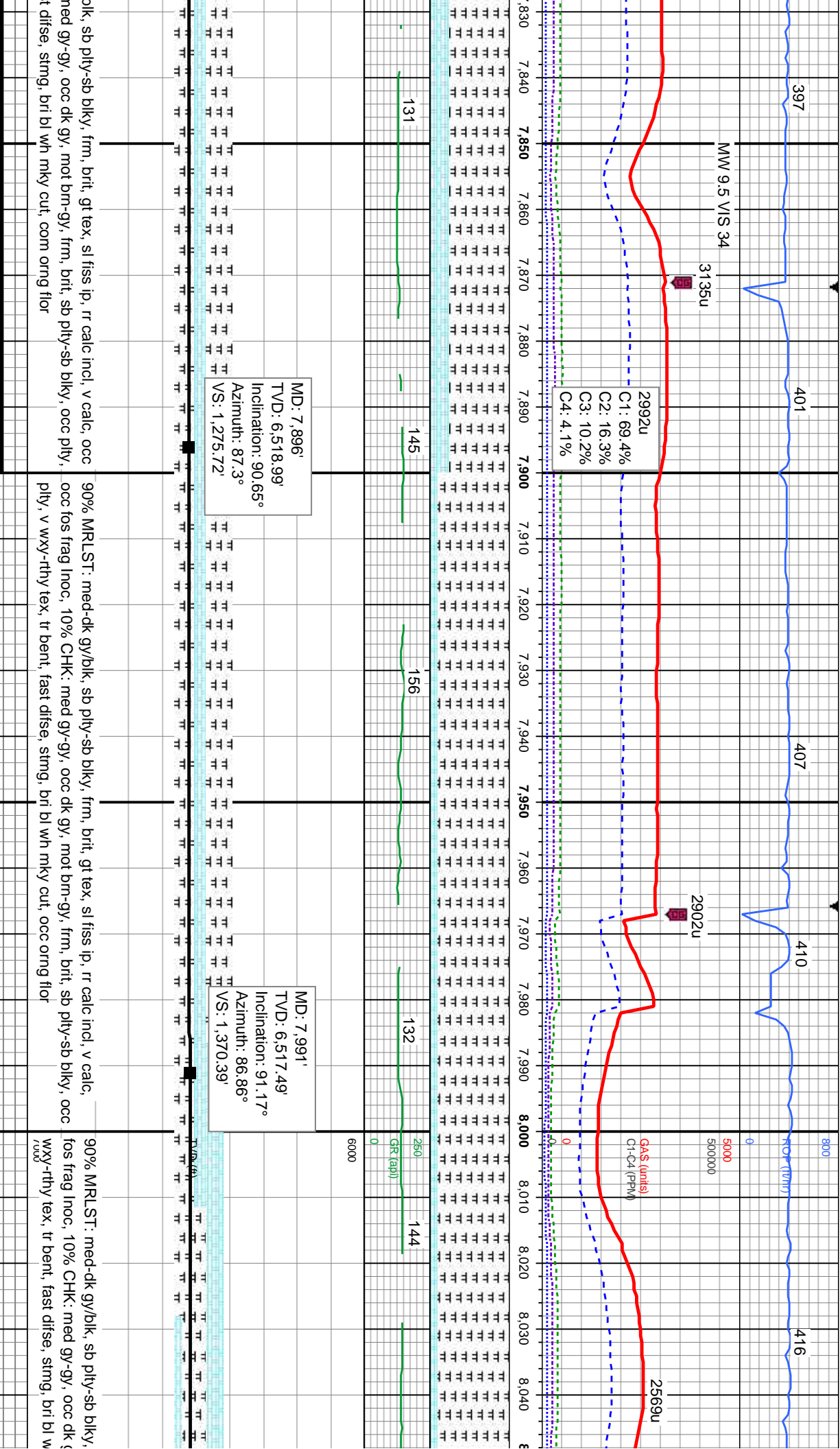








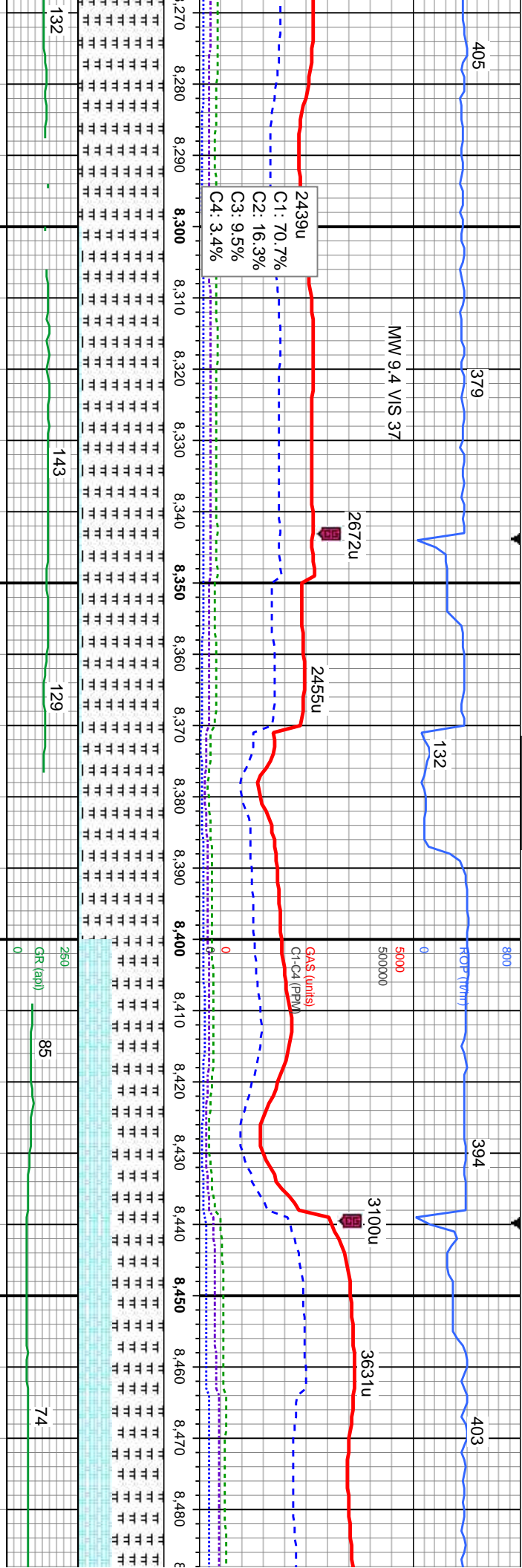












MD: 8,275'  
TVD: 6,511.76'  
Inclination: 91.26°  
Azimuth: 86.75°  
VS: 1,653.21'

MD: 8,370'  
TVD: 6,510.57'  
Inclination: 90.18°  
Azimuth: 85.71°  
VS: 1,747.75'

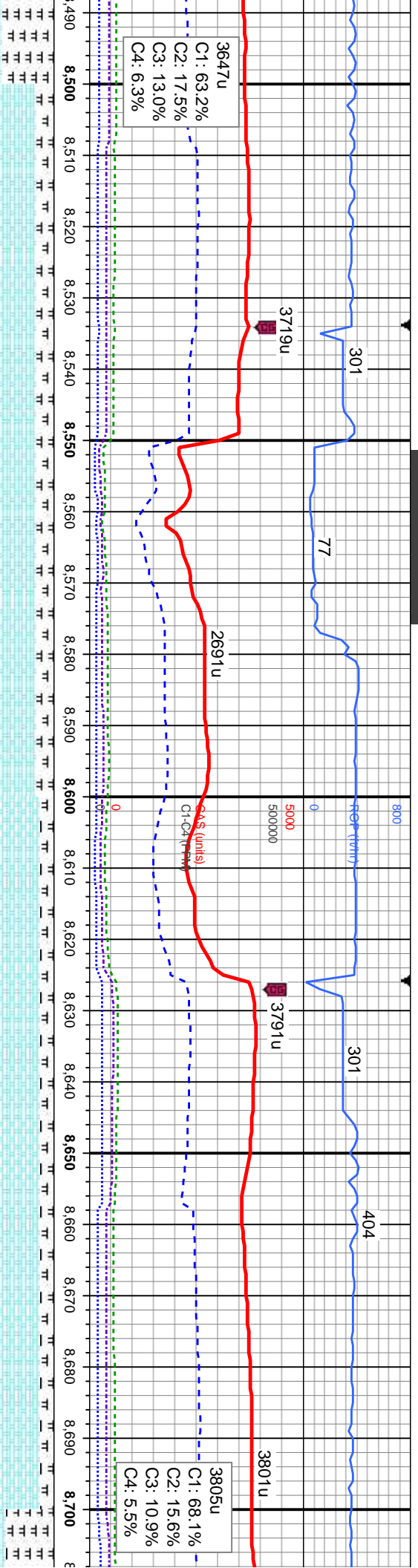
MD: 8,464'  
TVD: 6,509.97'  
Inclination: 90.55°  
Azimuth: 86.06°  
VS: 1,841.26'

95% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brit, gt tex, sl fss ip, rr calc incl, v calc, occ fss frag inoc, 5% CHK: med gy-gy, occ dk gy, mot brn-gy, frm, brit, sb ply-sb blk, v wxy-rthy tex, tr bent, fast dfse, sting, bri bl wh mky cut, occ orn g flr

60% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brit, gt tex, sl fss ip, rr calc incl, v calc, occ 40% CHK: med gy-gy, occ lt gy/lan, mot brn-gy, frm, brit, sb ply-sb blk, occ ply, tex, fast dfse, sting, bri bl wh mky cut, tr orn g flr



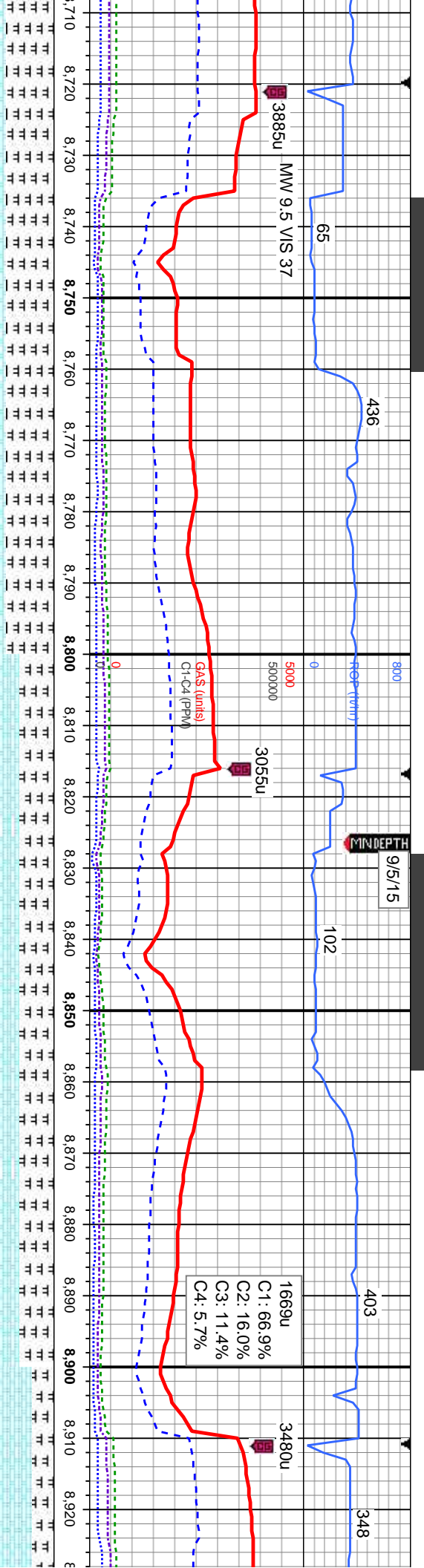




80% CHK: crm-bf, occ lt gy/lan, mot brn-gy, frm, brt, sb ply-sb blk, occ ply, v wxy-rthy tex, tr calc incl, 20% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brt, gt tex, sl fiss ip, tr calc incl, v calc, fast difse, stmg, brl bl wh mky cut, tr orng flr	85% CHK: crm-bf, occ lt gy/lan, mot brn-gy, frm, brt, sb ply-sb blk, occ ply, v wxy-rthy tex, calc incl, 15% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brt, gt tex, sl fiss ip, occ calc incl, v calc, fast difse, stmg, brl bl wh mky cut, tr orng flr
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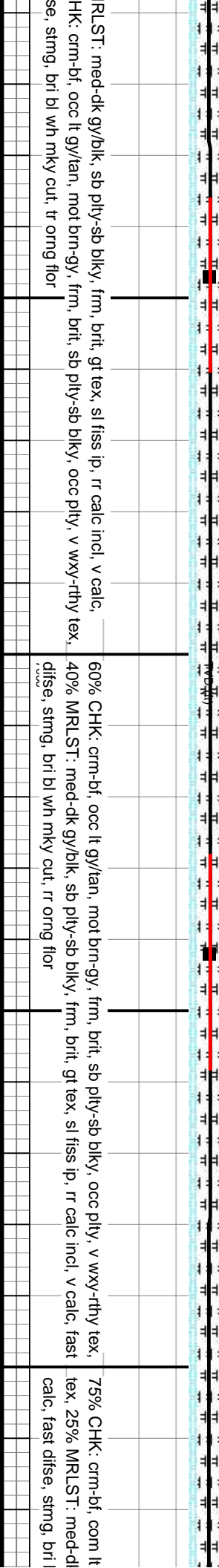






MD: 8,747'  
TVD: 6,505.5'  
Inclination: 91.05°  
Azimuth: 89.18°  
VS: 2,123.54'

MD: 8,842'  
TVD: 6,505.22'  
Inclination: 89.29°  
Azimuth: 89.06°  
VS: 2,218.43'

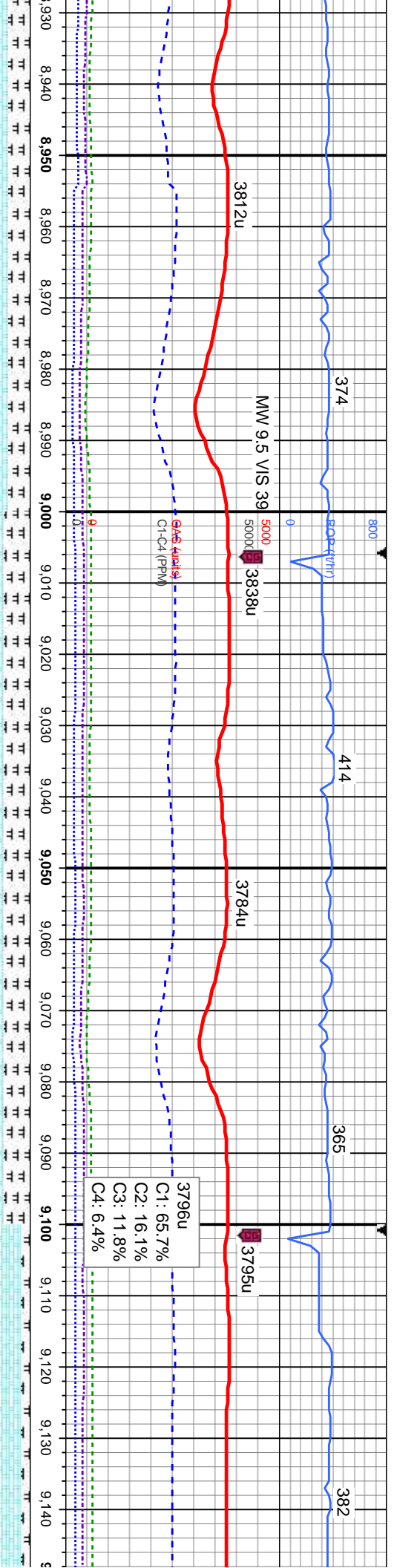


RRLST: med-dk gy/blk, sb pty-sb blk, frm, brit, gt tex, sl fiss ip, rr calc incl, v calc, 60% CHK: crm-bf, occ lt gy/tan, mot brn-gy, frm, brit, sb pty-sb blk, occ pty, v wxy-rthy tex, 40% MRLST: med-dk gy/blk, sb pty-sb blk, frm, brit, gt tex, sl fiss ip, rr calc incl, v calc, fast difse, stmg, bri bl wh mky cut, rr org flr

75% CHK: crm-bf, com lt tex, 25% MRLST: med-dk gy/blk, sb pty-sb blk, frm, brit, gt tex, sl fiss ip, rr calc incl, v calc, fast difse, stmg, bri bl wh mky cut, rr org flr







D: 8,936'  
VD: 6,506.81'  
Inclination: 88.77°  
Azimuth: 89.02°  
S: 2,312.31'

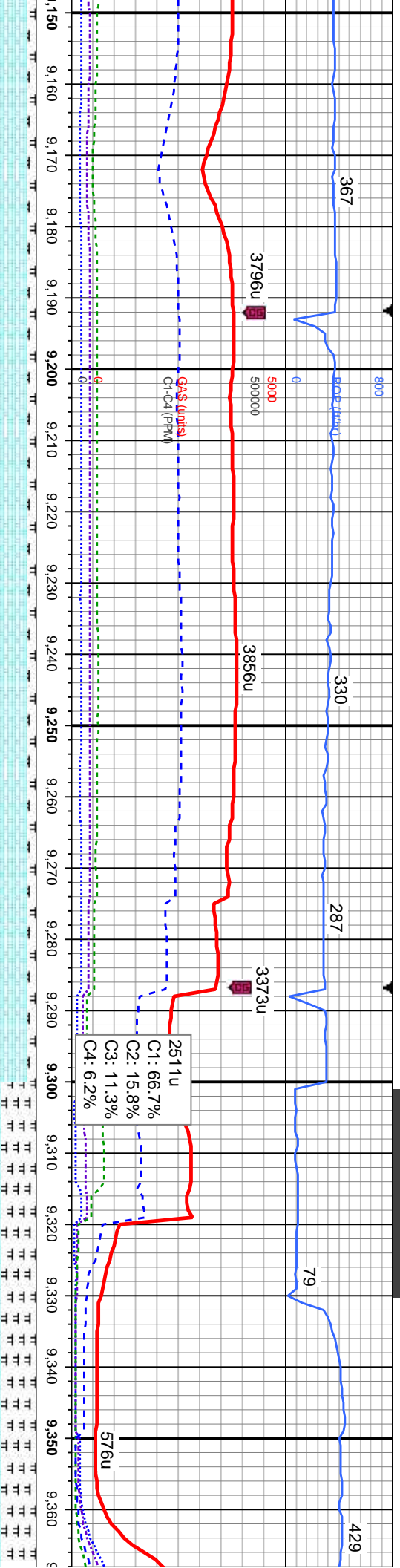
MD: 9,030'  
TVD: 6,508.55'  
Inclination: 89.11°  
Azimuth: 88.66°  
VS: 2,406.17'

MD: 9,125'  
TVD: 6,509.24'  
Inclination: 90.06°  
Azimuth: 88.36°  
VS: 2,501.01'

k gy/blk, sb ply-sb blk, frm, brit, sb ply-sb blk, occ ply, v wxy-rthy d wh mky cut, rr ong flor	70% CHK: crm-bf, com lt gy/oftwht, mot brn-gy, frm, brit, sb ply-sb blk, occ ply, v wxy-rthy tex, 30% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brit, gt tex, sl fss ip, rr calc incl, v fast difse, sting, bri bl wh mky cut, com dul gn flor	90% CHK: crm-bf, com lt gy/oftwht, mot brn-gy, frm, brit, sb ply-sb blk, occ ply, v wxy-rthy tex, 10% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brit, gt tex, sl fss ip, rr calc incl, v calc, fast difse, sting, bri bl wh mky cut, com dul gn flor
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MD: 9,219'  
TVD: 6,508.23'  
Inclination: 91.17°  
Azimuth: 87.94°  
VS: 2,594.82'

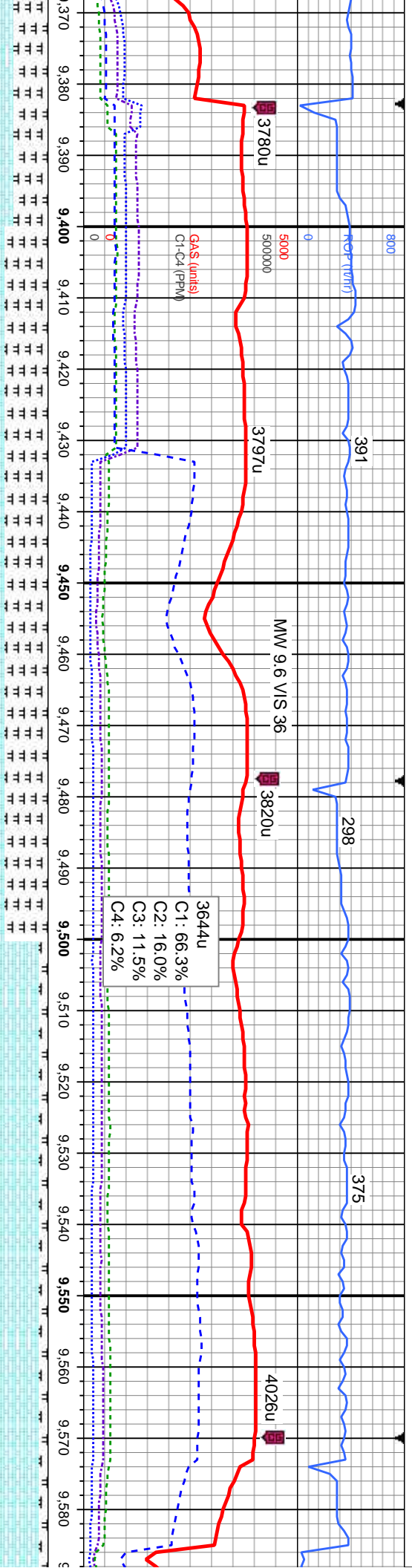
MD: 9,314'  
TVD: 6,508.28'  
Inclination: 88.77°  
Azimuth: 87.2°  
VS: 2,689.56'

gy, frm, brit, sb ply-sb blk, occ ply, v wxy-rthy	90% CHK: crm-bf, com lt gy/oftwht, mot brn-gy, frm, brit, sb ply-sb blk, occ ply, v wxy-rthy
ply, frm, brit, gt tex, sl fiss ip, r calc incl, v calc,	tex, 10% MRLST: med-dk gy/blk, sb ply-sb blk, frm, brit, gt tex, sl fiss ip, r calc incl, v calc,
n flr	fast difse, sting, bri bl wh mky cut, com dul gn flr

60% CHK: crm-bf, com lt gy/oftwht, mot brn-gy, frm, brit, sb ply







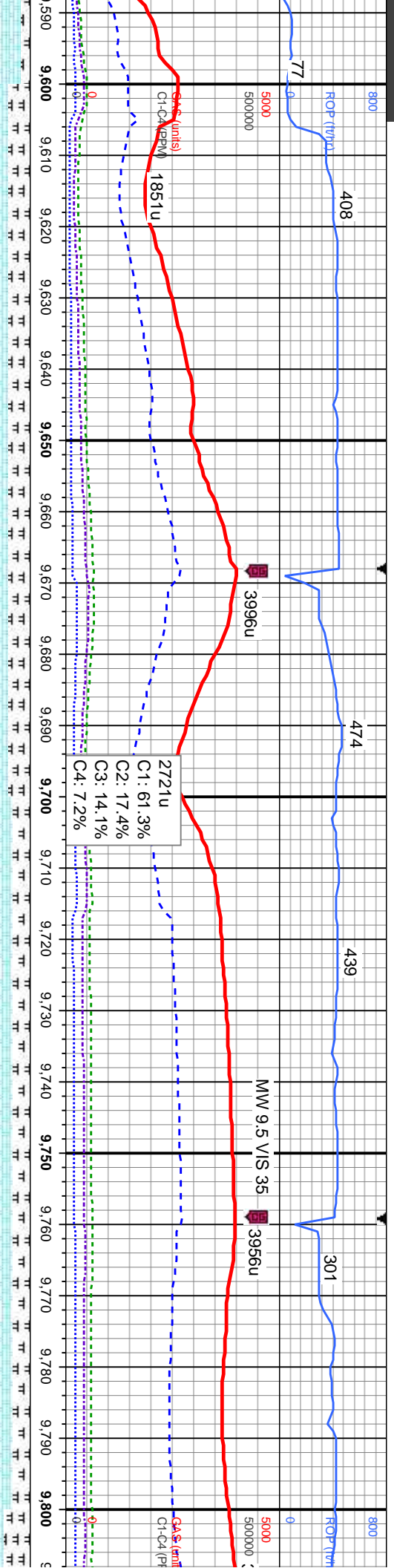
MD: 9,408'  
TVD: 6,510.78'  
Inclination: 88.18°  
Azimuth: 87.47°  
VS: 2,783.24'

MD: 9,502'  
TVD: 6,513.83'  
Inclination: 88.09°  
Azimuth: 87.01°  
VS: 2,876.9'

sb blkly, occ pily, v wxy-rthy	50% CHK: crm-bf-brn, lt gy, offwht, mot brn-gy, v frm, brit, sb pily-sb blkly, v wxy-sl rthy tex,	90% CHK: offwht-crm, bf-brn, mot gy, frm, brit, sb pily-sb blkly, v wxy-sl rthy tex, v
sl fss ip, rr calc incl, v calc.	50% MRLST: med-dk gy, blk ip, sb pily-sb blkly, occ sb fss, frm, brit, gt tex, v calc. tr fos frag	mrst, tr fos frag lroc, rr bent, rr bri orng mnrl flor, fast difse, string, bri bl wh mky cl
	lnoc, occ dul bl chk flor, mod difse, mod string, mod bri bl wh mky cut, no sin or od	or od
	7000	







AD: 9,597'  
VD: 6,515.65'  
Inclination: 89.72°  
Azimuth: 87.25°  
SI: 2,971.57'

MD: 9,692'  
TVD: 6,514.8'  
Inclination: 91.29°  
Azimuth: 87.67°  
VS: 3,066.29'

MD: 9,786'  
TVD: 6,511.32'  
Inclination: 92.96°  
Azimuth: 87.17°  
VS: 3,159.95'

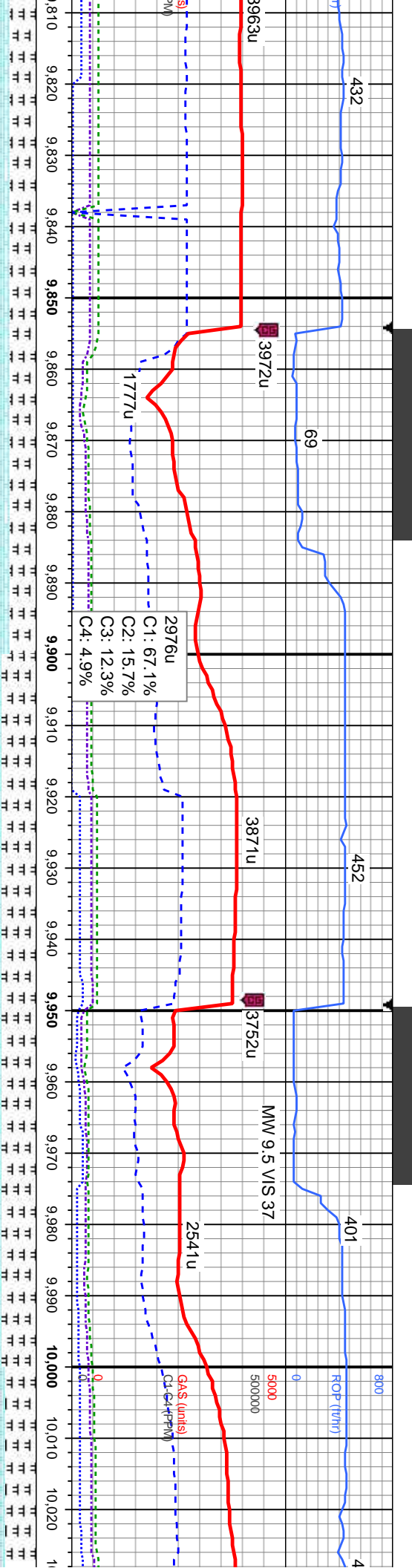
75% CHK: offwht-orm, bf-bm, mot gy, frm, brit, sb pily-sb blk, v wxy-sl rthy tex, 25% MRLST: med-dk gy, blk ip, sb pily-sb blk, occ sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, tr bent, rr bri omg mnrl flor, fast difse, sting, bri bl wh mky cut, no stn or od

80% CHK: crm-bf-bm, mot brn-gy, frm, brit, sb blk, v wxy-sl rthy tex, 20% MRLST: med-dk gy, blk ip, sb pily-sb blk, occ sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, rr bent wi dissm pyr, rr bri omg mnrl flor, fast difse, sting, bri bl wh mky cut, no stn or od

70% C  
gy, blk  
pyr, tr







MD: 9,881'  
TVD: 6,507.34'  
Inclination: 91.85°  
Azimuth: 87.28°  
VS: 3,254.57'

MD: 9,975'  
TVD: 6,505.24'  
Inclination: 90.71°  
Azimuth: 88.14°  
VS: 3,348.31'

HK: crm-bf-brn, mot brn-gy, frm, brit, sb blk, v wxy-sl rthy tex, 30% MRLST: med-dk ip, sb pily-sb blk, occ sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, tr bent wi dissm bri yel-orng mnrl flor, fast difse, string, bri bl wh mky cut, no stn or od

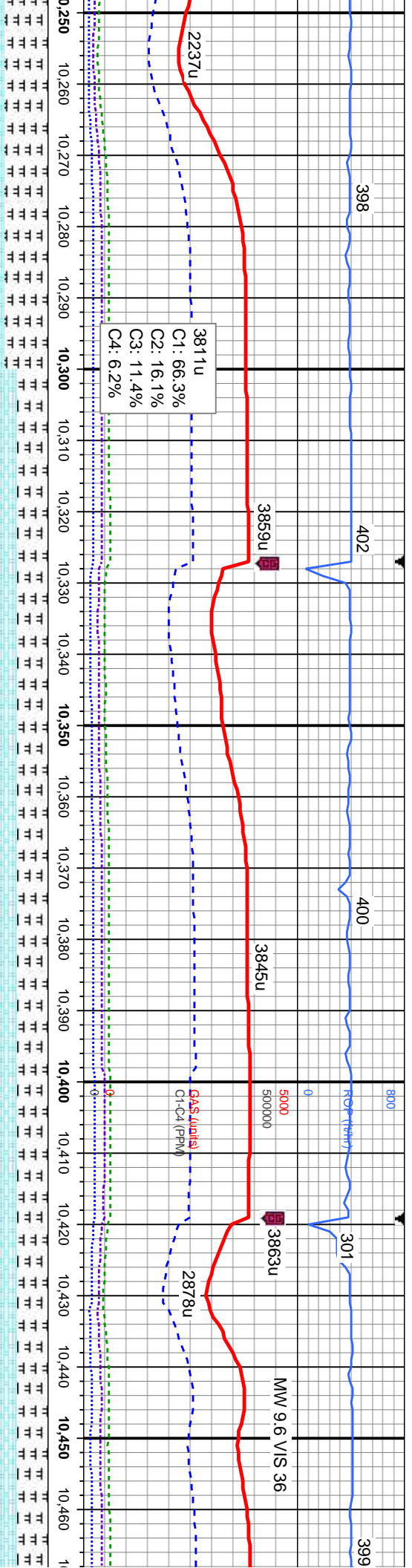
60% CHK: crm-bi-brn, lt-med gy, mot dk gy, frm, brit, sb blk, v wxy-sl rthy tex, 40% MRLST: med-dk gy, blk, sb pily-sb blk, occ sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, mod difse, mod string, mod bri bl wh mky cut, no flor stn or od











C1: 66.3%  
C2: 16.1%  
C3: 11.4%  
C4: 6.2%

D: 10,256'  
VD: 6,505.23'  
Inclination: 90.55°  
Azimuth: 89.15°  
S: 3,628.98'

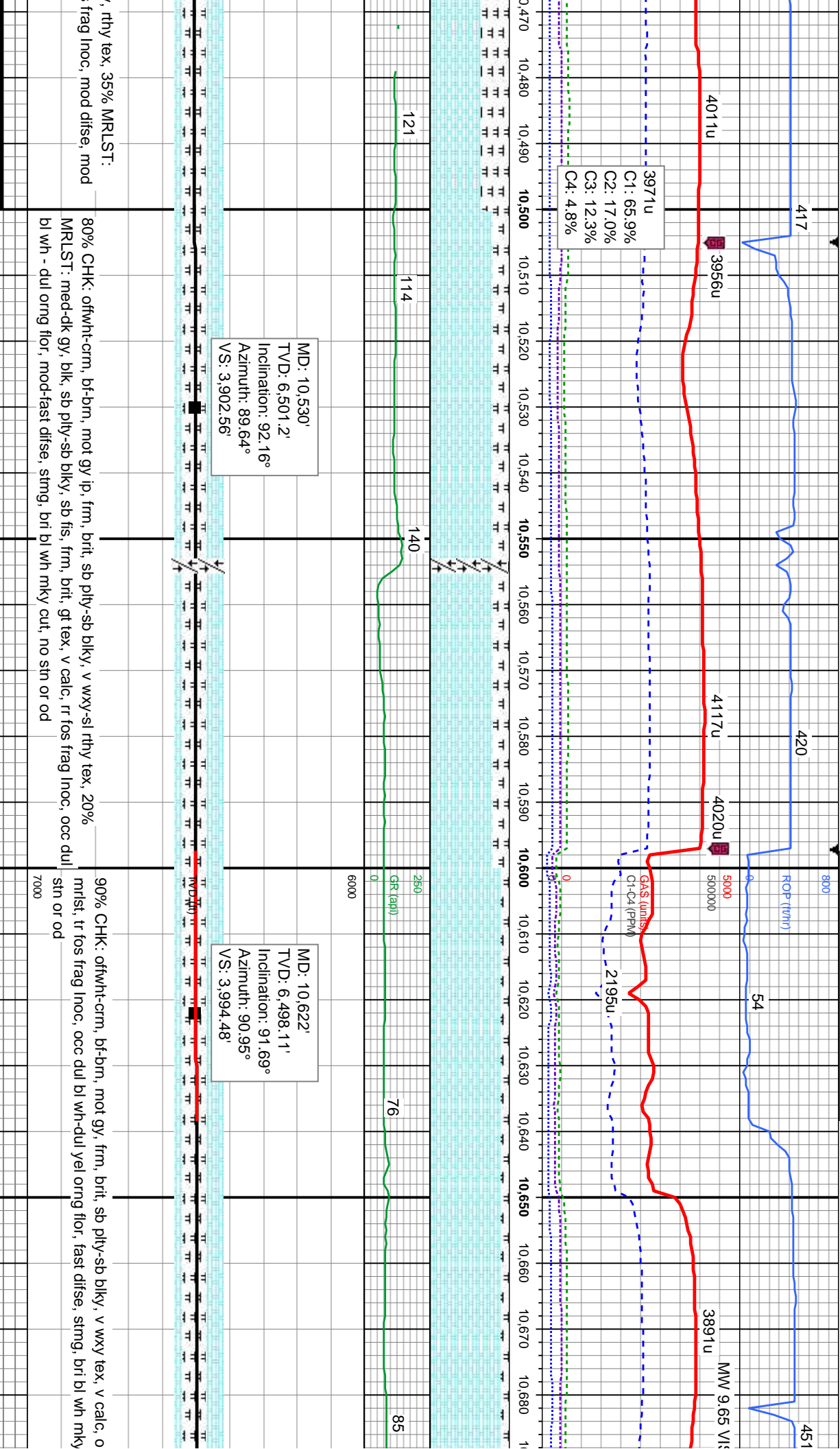
MD: 10,347'  
TVD: 6,504.91'  
Inclination: 89.85°  
Azimuth: 88.46°  
VS: 3,719.86'

MD: 10,439'  
TVD: 6,503.97'  
Inclination: 91.33°  
Azimuth: 88.58°  
VS: 3,811.71'

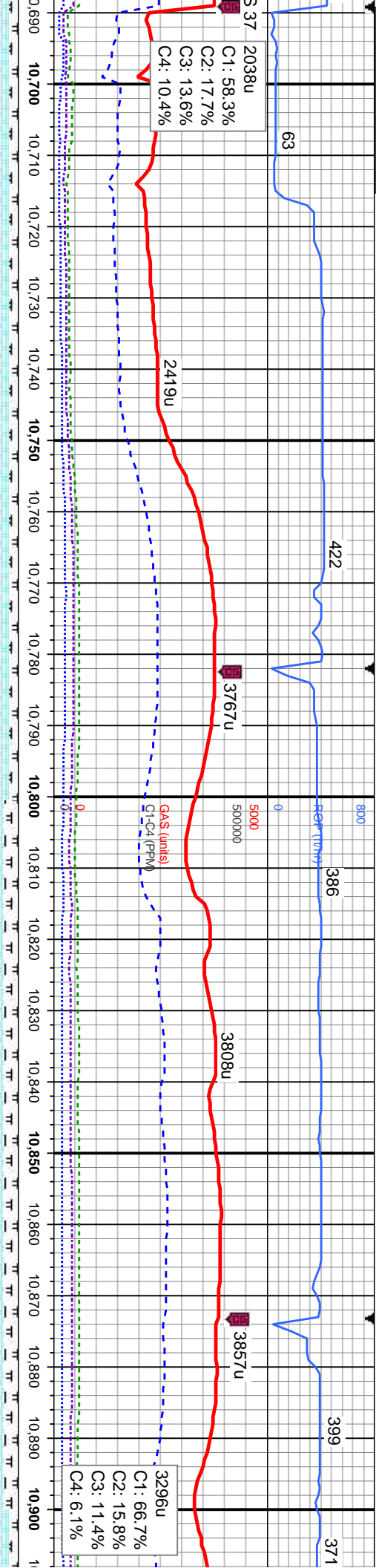
n, brit, sb blk, rthy tex, 50% MRLST: med-dk calc, tr fos frag inoc, r bent w/ dissn pyr, tr bri difse, mod stmg, mod bri bl wh mky cut, no	65% CHK: crm, bf-brn, med gy brn, mot dk gy, frm, brit, sb blk, rthy tex, 35% MRLST: med-dk gy, blk, pty-sb blk, sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, occ dui orng chk flor, mod difse, mod stmg, mod bri bl wh mky cut, no stn or od	65% CHK: crm, bf-brn, med gy brn, mot dk gy, frm, brit, sb blk, rthy tex, 35% MRLST: med-dk gy, blk, pty-sb blk, sb fis, frm, brit, gt tex, v calc, tr fos frag inoc, occ dui orng chk stmg, mod bri bl wh mky cut, no flor stn or od
	7000	











MD: 10,714'  
TVD: 6,497.32'  
Inclination: 89.29°  
Azimuth: 91.07°  
VS: 4,086.46'

MD: 10,804'  
TVD: 6,498.34'  
Inclination: 89.41°  
Azimuth: 90.22°  
VS: 4,176.44'

MD: 10,896'  
TVD: 6,497.77'  
Inclination: 91.29°  
Azimuth: 90.48°  
VS: 4,268.4'

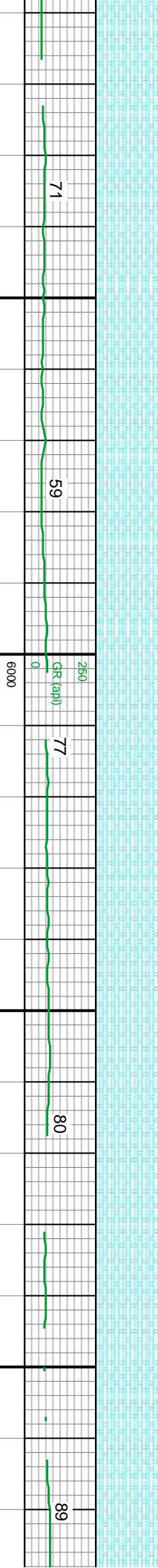
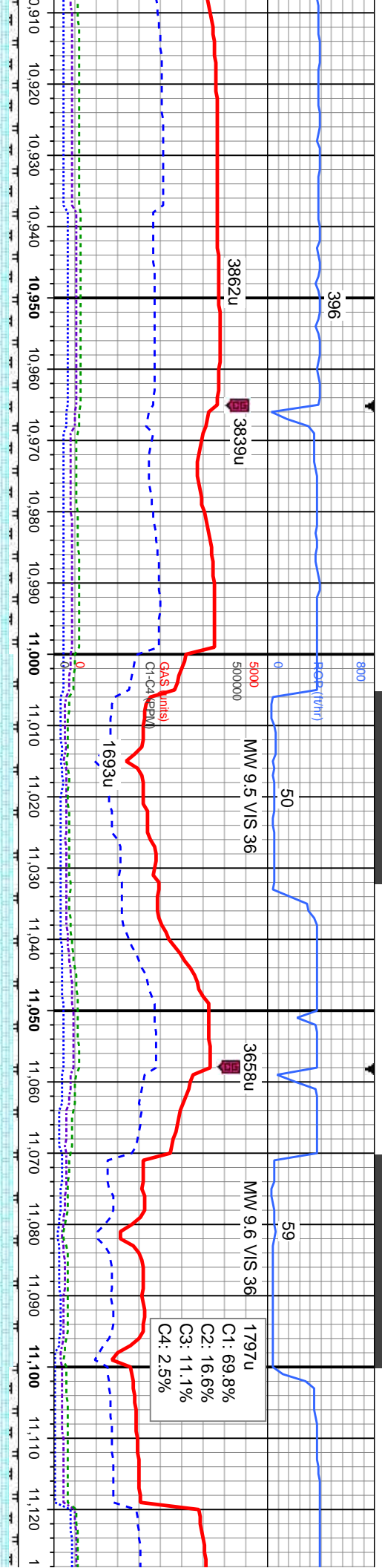
90% CHK: offwht-crm, bf-bm, mot gy, frm, brit, sb pily-sb blk, v wxy tex, v calc, occ (10%)  
mrlst, tr fos frag inoc, rr bent w/ dissim pyr, rr yel-ormg mnl flr, fast difse, stmg, bri bl wh  
mky cut, no stn or od

85% CHK: offwht-crm, bf-brn, lt gy, mot gy, frm, brit, sb pily-sb blk, v wxy tex, 15% MRLST:  
med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, tr fos frag inoc, abnt bl wh chk flr,  
fast difse, stmg, bri bl wh mky cut, no stn or od

90% C  
(10%)  
or od







MD: 10,988'  
TVD: 6,493.77'  
Inclination: 93.7°  
Azimuth: 90.83°  
VS: 4,360.29'

MD: 11,079'  
TVD: 6,491.2'  
Inclination: 89.54°  
Azimuth: 89.49°  
VS: 4,451.2'

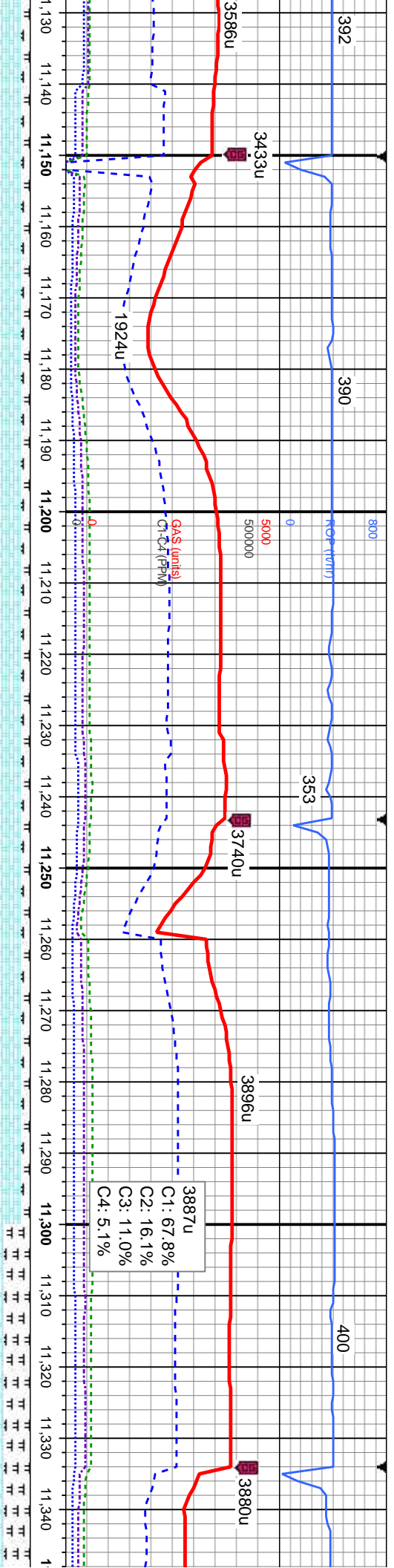
HK: offwht-crm, bf-brn, lt gy, mot gy, frm, brit, sb ply-sb blk, v wxy tex, v calc, occ  
mrst, tr fos frag lnc, abnt bl wh chk flr, fast dfse, stmg, bri bl wh mky cut, no stn

95% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb ply-sb blk, v wxy tex, v calc, tr  
(5%) mrst, tr fos frag lnc, tr bent, tr bri yel-orig mml flr, occ bl wh chk flr, fast dfse,  
stmg, bri bl wh mky cut, no stn or od

90% CHK: offwht-crm, bf-brn, mod-v frm, brit, sb ply-sb blk, v wxy tex, v calc, tr  
(10%) mrst, tr fos frag lnc







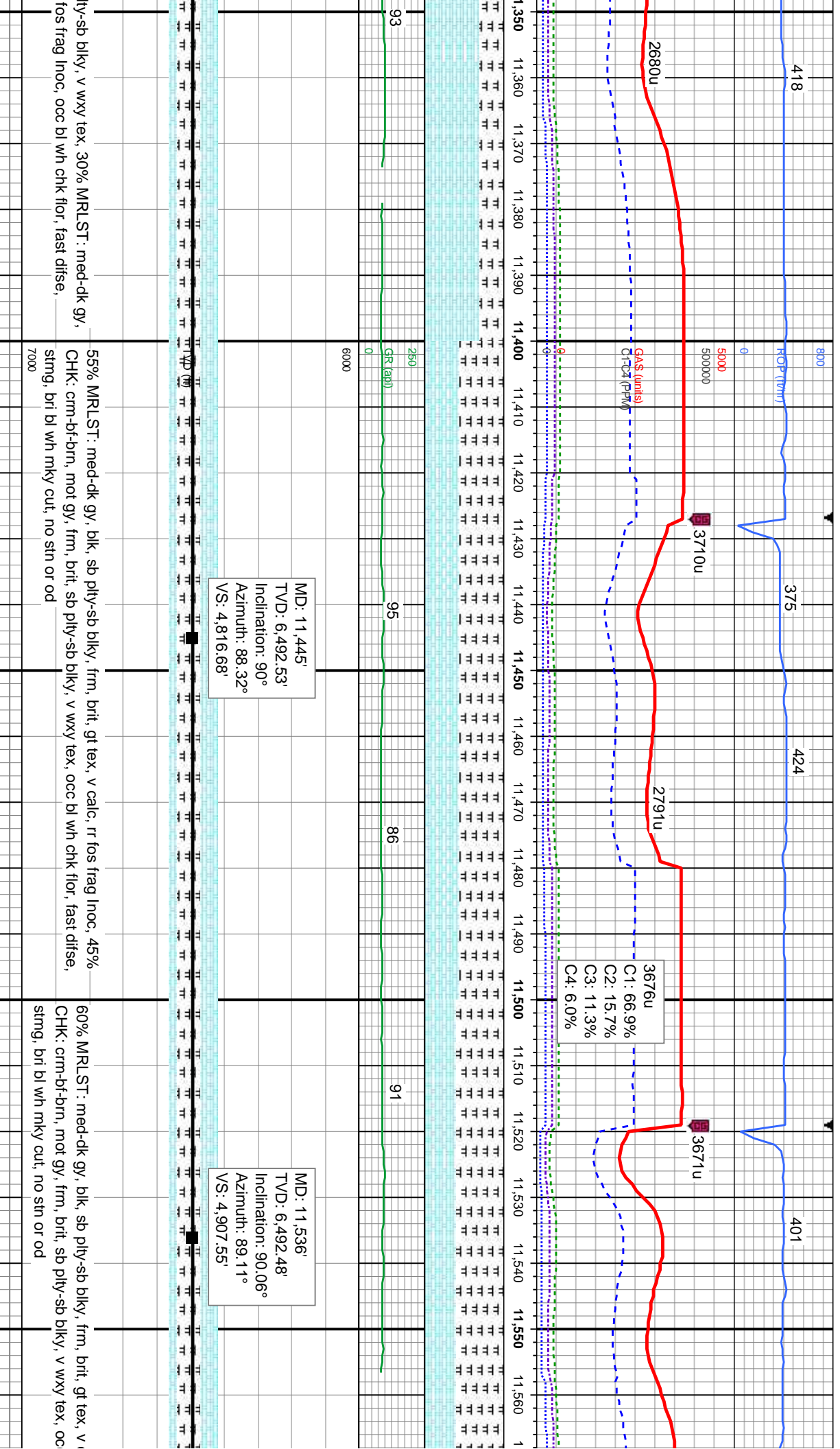
MD: 11,171'  
TVD: 6,492.09'  
Inclination: 89.35°  
Azimuth: 89.08°  
VS: 4,543.11'

MD: 11,262'  
TVD: 6,492.58'  
Inclination: 90.03°  
Azimuth: 88.6°  
VS: 4,633.98'

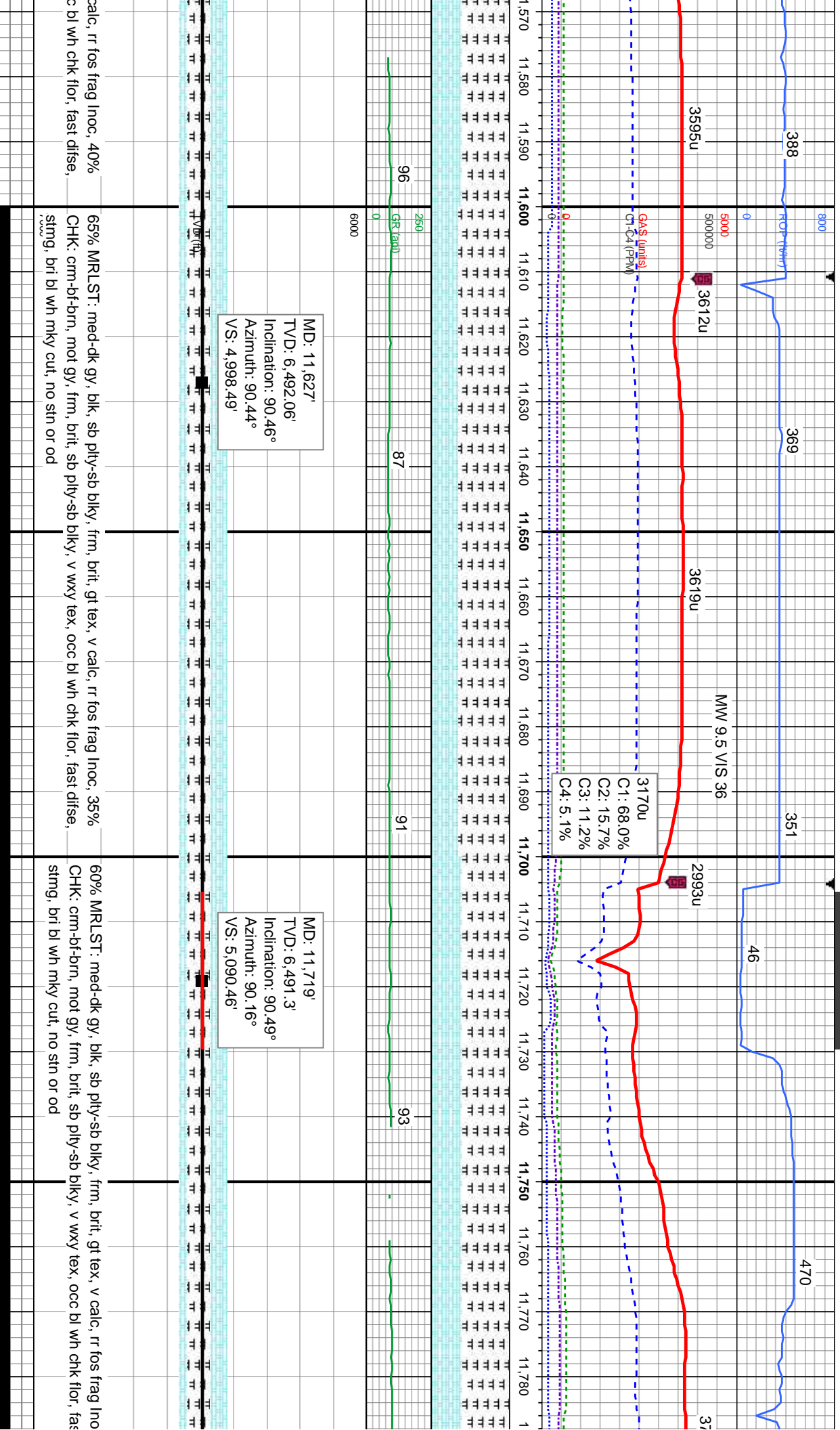
brn, mot gy, mod-v frm, brit, sb ply-sb blk, v wxy tex, v calc, occ	90% CHK: oftwht-crm, bf-brn, mot gy, mod-v frm, brit, sb ply-sb blk, v wxy tex, v calc, occ	70% CHK: crm-bf-brn, mot gy, frm, brit, sb p
c, occ bl wh chk flr, fast difse, string, bri bl wh mky cut, no stn or	(10%) mlst, tr fos frag lroc, fast difse, string, bri bl wh mky cut, no flr stn or od	blk, sb ply-sb blk, frm, brit, gt tex, v calc, r
	7000	string, bri bl wh mky cut, no stn or od



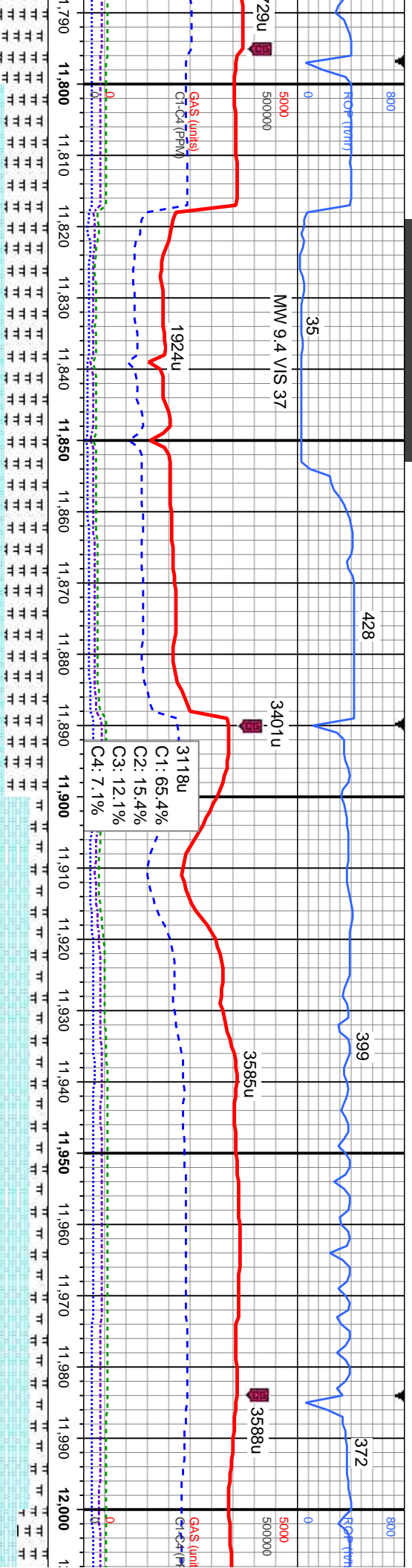












MD: 11,811'  
TVD: 6,491.1'  
Inclination: 89.75°  
Azimuth: 88.28°  
VS: 5,182.36'

MD: 11,906'  
TVD: 6,491.97'  
Inclination: 89.2°  
Azimuth: 86.55°  
VS: 5,277.08'

MD: 12,001'  
TVD: 6,490.69'  
Inclination: 92.3°  
Azimuth: 88.09°  
VS: 5,371.77'

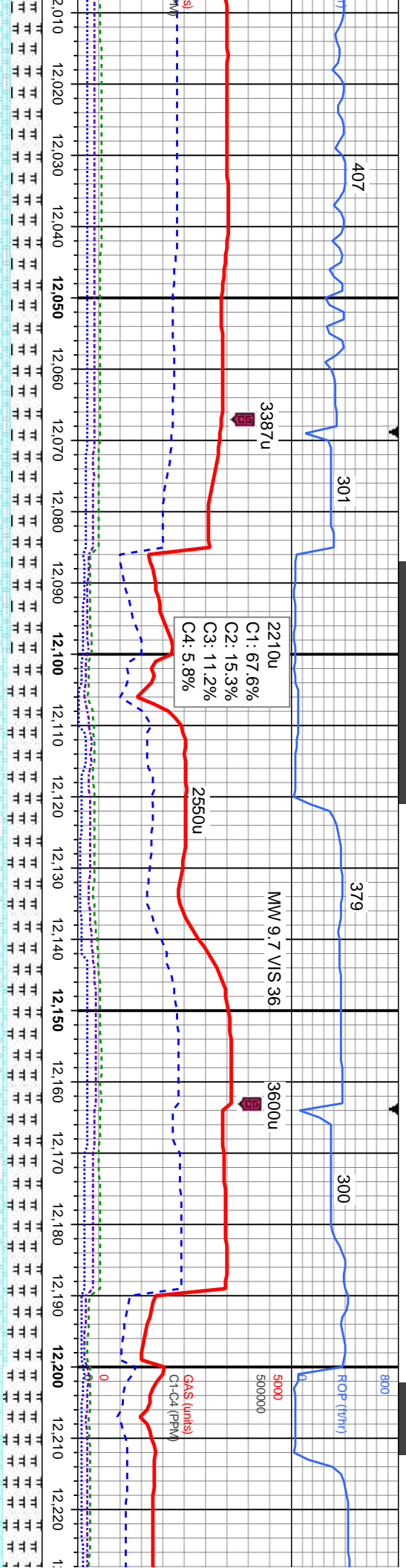
c, 40%  
50% MRLST: med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, rr fos frag inoc, 50%  
CHK: crm-bf-brn, mot gy, frm, brit, sb pily-sb blk, v wxy tex, occ cacl incl, occ bl wh chk  
flor, fast difse, string, bri bl wh mky cut, no sin or od

80% CHK: crm-bf-brn, mot gy, frm, brit, sb pily-sb blk, v wxy tex, occ cacl incl, 20% MRLST:  
med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, rr fos frag inoc, com bl wh chk flor,  
fast difse, string, bri bl wh mky cut, no sin or od

65% C  
MRLS  
chk flo







CHK: crm-bi-brn, mot gy, frm, brit, sb pily-sb blkly, v wxy tex, occ caci incl, 35%  
T: med-dk gy, blk, sb pily-sb blkly, frm, brit, gt tex, v calc, r fos frag Inoc, ocom bl wh  
r, fast difse, stmg, bri bl wh mky cut, no stn or od

60% CHK: crm-bi-brn, mot gy, frm, brit, sb pily-sb blkly, v wxy tex, occ caci incl, 40% MRLST:  
med-dk gy, blk, sb pily-sb blkly, frm, brit, gt tex, v calc, occ fos frag Inoc, occ bl wh chk flor,  
fast difse, stmg, bri bl wh mky cut, no stn or od

55% CHK: crm-bi-brn, mot gy, frm, brit, sb pily-sb blkly, v wxy tex, occ caci incl, 40% MRLST:  
med-dk gy, blk, sb pily-sb blkly, frm, brit, gt tex, v calc, occ fos frag Inoc, occ bl wh chk flor,  
fast difse, stmg, bri bl wh mky cut, no stn or od



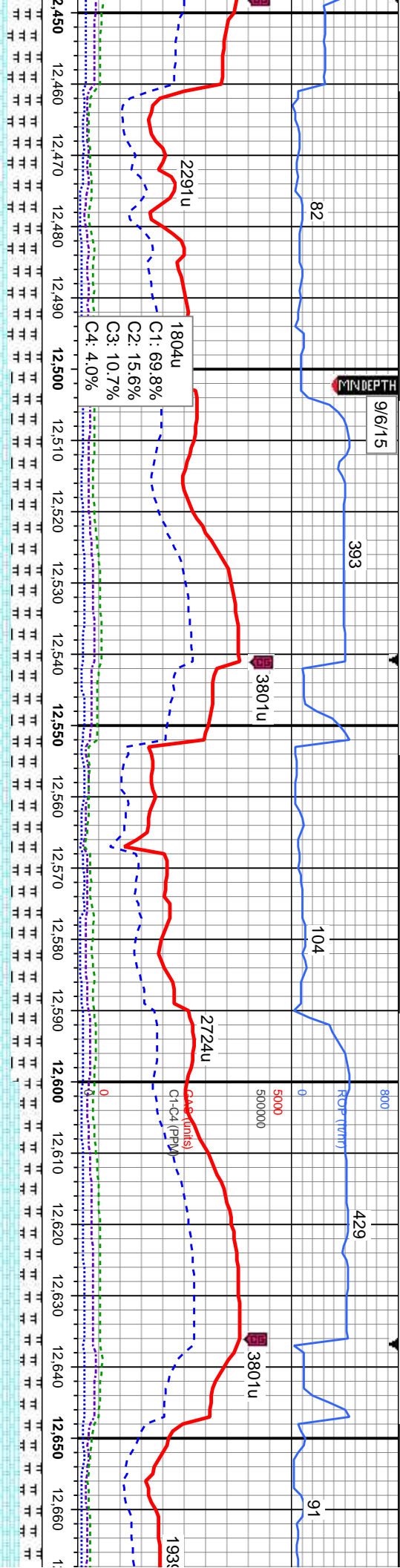






9/6/15

MINDEPTH



MD: 12,474'  
TVD: 6,480.02'  
Inclination: 90.49°  
Azimuth: 81.63°  
VS: 5,841.32'

MD: 12,569'  
TVD: 6,479.44'  
Inclination: 90.22°  
Azimuth: 83.62°  
VS: 5,935.11'

MD: 12,664'  
TVD: 6,478.33'  
Inclination: 90.22°  
Azimuth: 85.62°  
VS: 6,029.36'

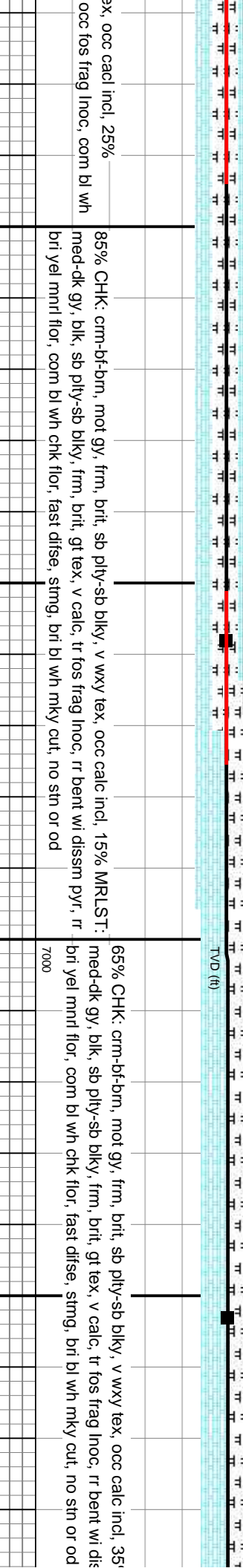
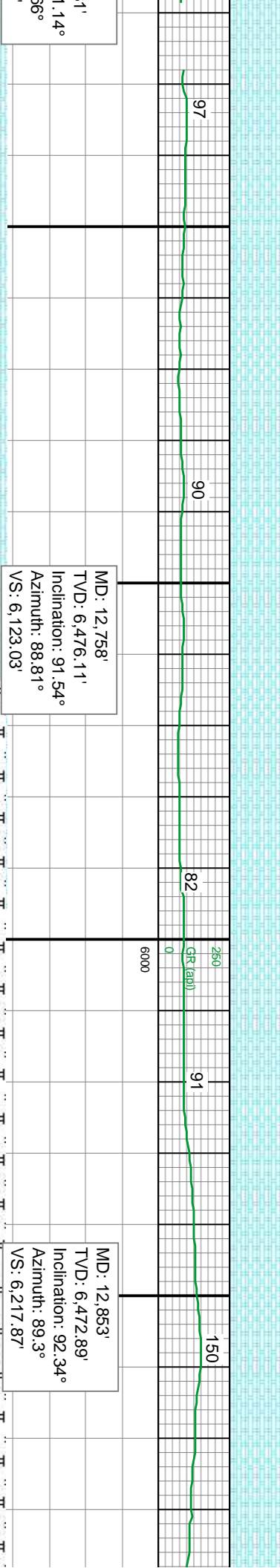
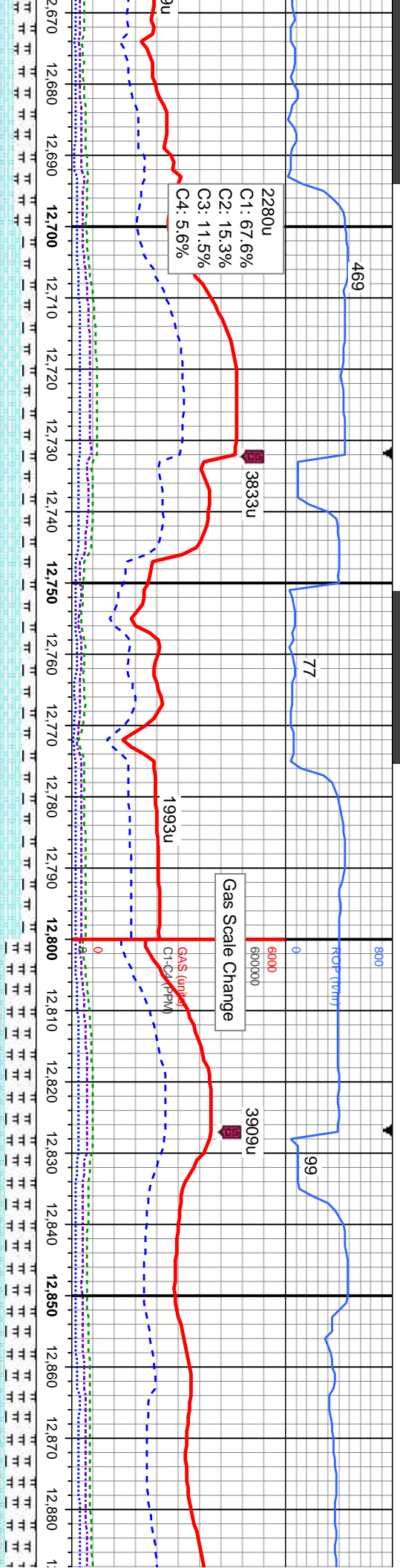
sb blk, v wxy tex, occ caci incl, 40%  
brit, gt tex, v calc, occ fos frag Inoc, com bl wh  
o stn or od

65% CHK: crm-bf-brn, mot gy, frm, brit, sb pily-sb blk, v wxy tex, occ caci incl, 35% MRLST:  
med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, occ fos frag Inoc, com bl wh chk flr,  
fast difse, stimg, bri bl wh mky cut, no stn or od

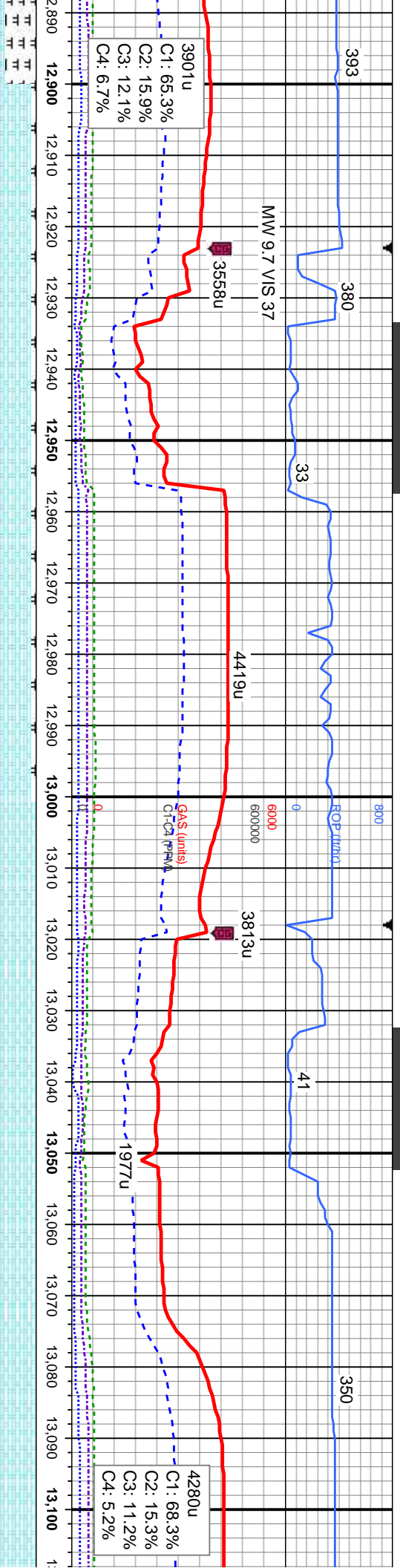
75% CHK: crm-bf-brn, mot gy, frm, brit, sb pily-sb blk, v wxy tex, occ caci incl, 35% MRLST:  
med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, occ fos frag Inoc, com bl wh chk flr,  
fast difse, stimg, bri bl wh mky cut, no stn or od







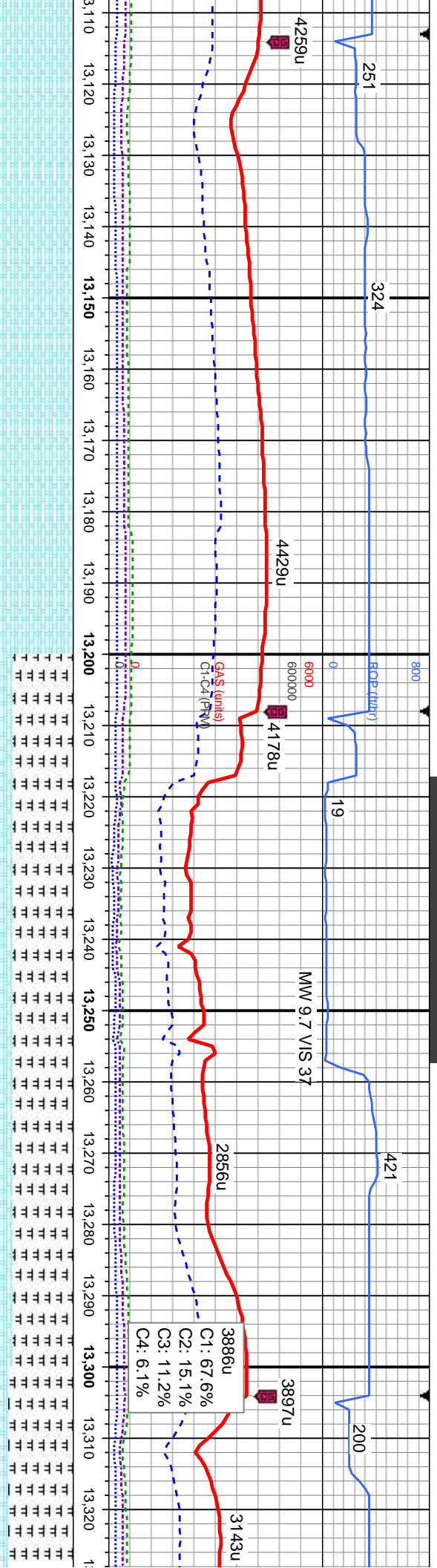




% MRLST:	
sm pyr, r	95% CHK: offwht-crm, bf-brn, mot gy ip, mod-v frm, brit, sb pty-sb blk, v wxy tex, v calc, tr (5%) mlst, r fos frag inoc, r pyr, com bl wh chk flr, fast difse, stmg, bri bl wh mky cut, no stn or od
	100% CHK: offwht-crm, bf-brn, mot gy ip, mod-v frm, brit, sb pty-sb blk, v wxy tex, v calc, tr mlst, r fos frag inoc, r pyr, abnt bl wh chk flr, fast difse, stmg, bri bl wh mky cut, no stn or od
	100% r mlst or od







MD: 13,137'  
TVD: 6,466.66'  
Inclination: 91.88°  
Azimuth: 88.76°  
VS: 6,501.42'

MD: 13,232'  
TVD: 6,463.65'  
Inclination: 91.76°  
Azimuth: 89.26°  
VS: 6,596.26'

MD: 13,326'  
TVD: 6,462'  
Inclination: 88.76°  
Azimuth: 88.76°  
VS: 6,690.1'

CHK: ofwhit-wh, crm-bf, mot brn-gy, mod-v frm, brit, sb pily-sb blk, v wxy tex, v calc, r, r fos frag Inoc, r pyr, abnt bl wh chk flr, fast difse, stmg, bri bl wh mky cut, no stn

70% MRLST: med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex. 30% CHK: crm-bf-brn, mot dk gy, mod-v frm, brit, sb blk, wxy-rthy tex, v calc, occ fos frag Inoc, occ bent wi dissm pyr, occ bri yel mnrl flr, mod difse, mod stmg, mod bri bl wh mky cut, no stn or od

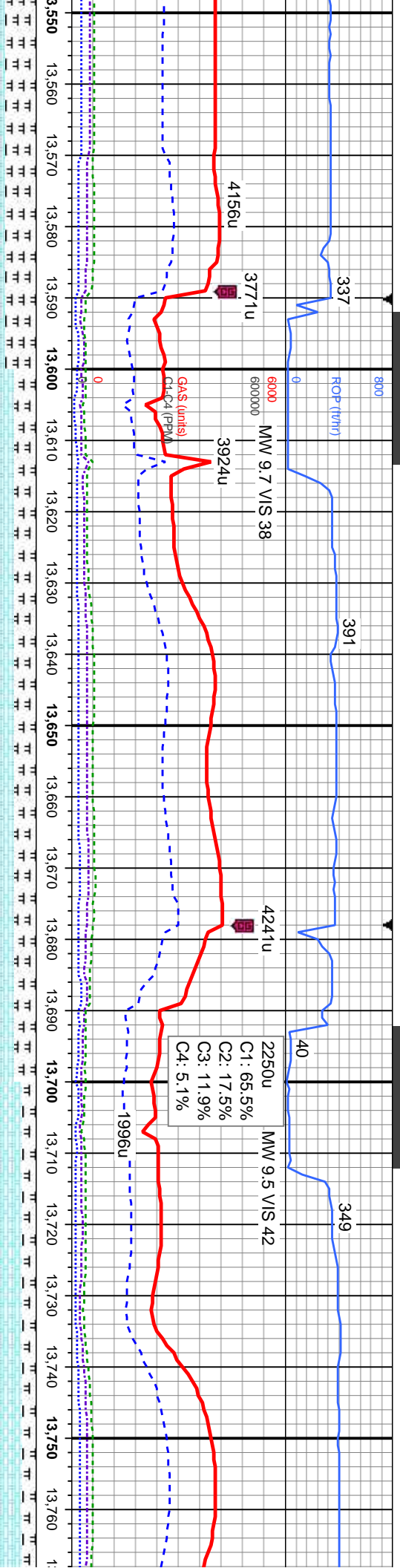
75% MRLST: med-dk gy, mod-v frm, brit, sb blk, bri yel gn mnrl flr, mod d





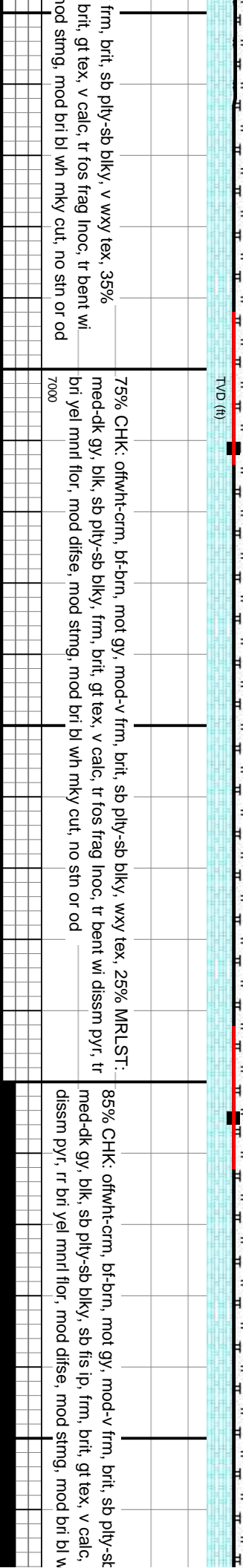






MD: 13,611'  
TVD: 6,472.7'  
Inclination: 88.49°  
Azimuth: 87.85°  
VS: 6,974.5'

MD: 13,705'  
TVD: 6,473.81'  
Inclination: 90.15°  
Azimuth: 88.16°  
VS: 7,068.29'



frm, brit, sb pily-sb blk, v wxy tex, 35%  
brit, gt tex, v calc, tr fos frag lnoc, tr bent wi  
mod stmg, mod bri bl wh mky cut, no sin or od

75% CHK: offwht-crm, bi-brn, mot gy, mod-v frm, brit, sb pily-sb blk, wxy tex, 25% MRLST:  
med-dk gy, blk, sb pily-sb blk, frm, brit, gt tex, v calc, tr fos frag lnoc, tr bent wi diss pyr, tr  
bri yel mnrl flr, mod difse, mod stmg, mod bri bl wh mky cut, no sin or od

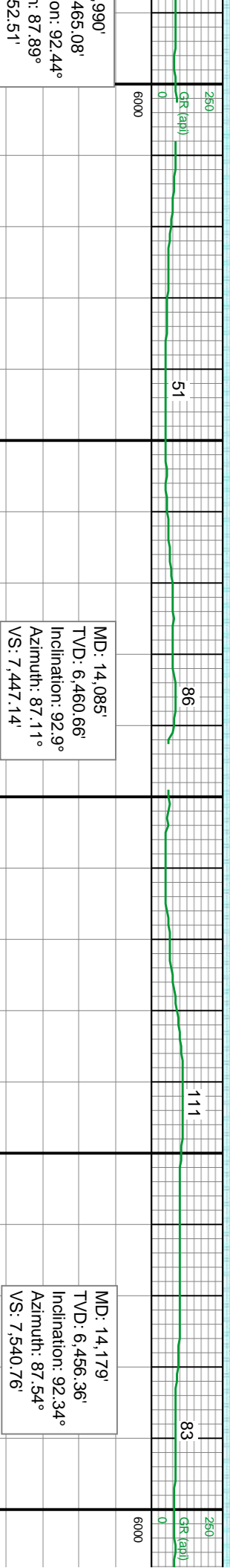
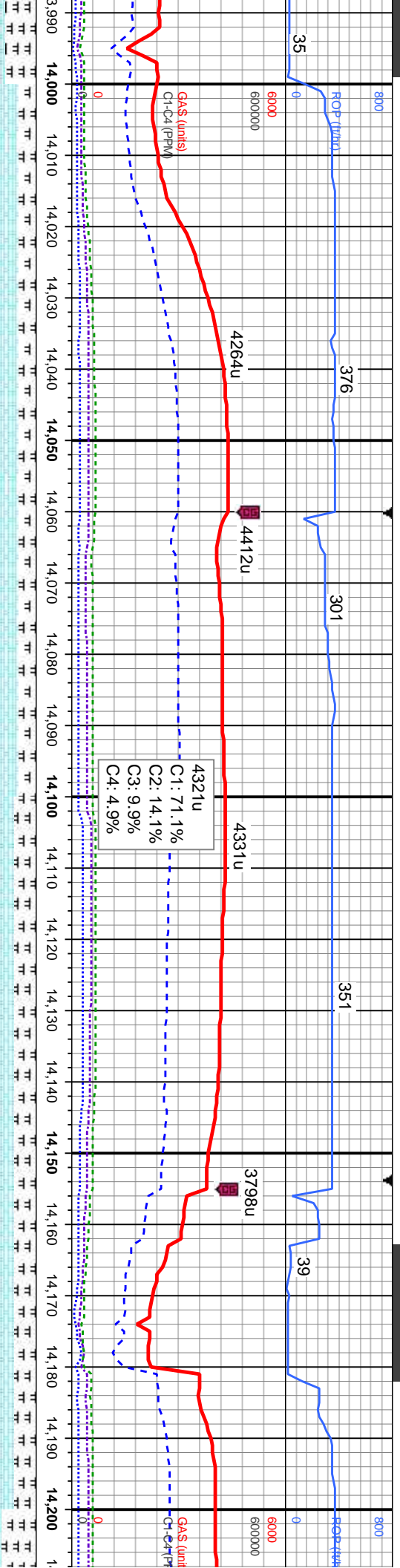
85% CHK: offwht-crm, bi-brn, mot gy, mod-v frm, brit, sb pily-sb  
med-dk gy, blk, sb pily-sb blk, sb fts ip, frm, brit, gt tex, v calc,  
dissm pyr, rr bri yel mnrl flr, mod difse, mod stmg, mod bri bl w







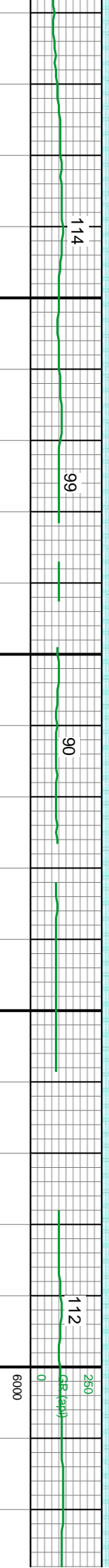
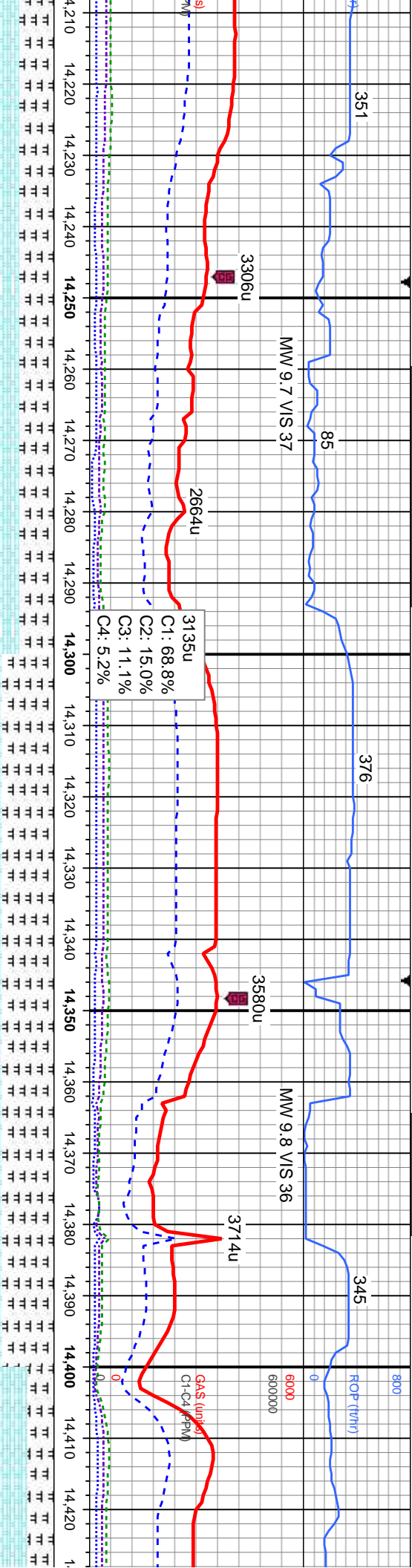




60% MRLST:	80% CHK: offwht-crm, bf-bm, mot gy, mod-v frm, brit, sb pty-sb blk, wxy tex, 20% MRLST:	75% CHK: offwht-crm, bf-bm, mot gy, mod-v frm, brit, sb pty-sb blk, wxy tex, 25% MRLST:	60% C
med-dk gy, blk, sb pty-sb blk, gt tex, v calc, tr fos frag Inoc, occ dul bl	med-dk gy, blk, sb pty-sb blk, gt tex, v calc, tr fos frag Inoc, occ dul bl	med-dk gy, blk, sb pty-sb blk, gt tex, v calc, tr fos frag Inoc, occ dul bl	med-d
chk flr, mod difse, mod strng, mod bri bl wh mky cut, no sin or od	chk flr, mod difse, mod strng, mod bri bl wh mky cut, no sin or od	chk flr, mod difse, mod strng, mod bri bl wh mky cut, no sin or od	chk flo







MD: 14,274'  
TVD: 6,453.42'  
Inclination: 91.2°  
Azimuth: 88.74°  
VS: 7,635.52'

MD: 14,369'  
TVD: 6,452.86'  
Inclination: 89.48°  
Azimuth: 87.86°  
VS: 7,730.34'

HK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, wxy tex, 40% MRLST: 60% MRLST: med-dk gy, blk, sb pily-sb blk, sb fls ip, frm, brit, gt tex, v calc, tr fos frag Inoc, 40% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, wxy tex, occ dul bl chk flor, mod difse, mod sting, mod bri bl wh mky cut, no stn or od

70% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, wxy tex, 40% MRLST: 60% MRLST: med-dk gy, blk, sb pily-sb blk, sb fls ip, frm, brit, gt tex, v calc, tr fos frag Inoc, 40% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, wxy tex, occ dul bl chk flor, mod difse, mod sting, mod bri bl wh mky cut, no stn or od









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MINDEPTH

ROP (ft)

21

312

65

276

MW 9.7 VIS 37

3753u

3939u

3794u

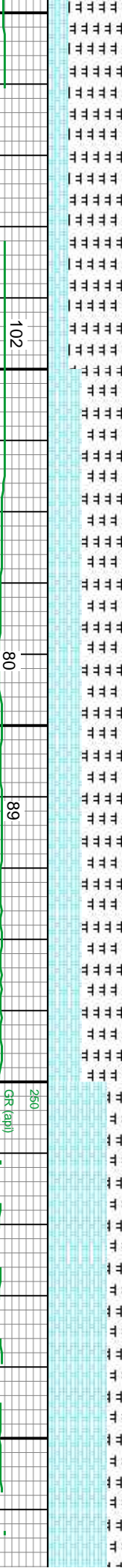
3695u

GAS (units)

0.012PM

3783u  
C1: 69.1%  
C2: 15.3%  
C3: 11.0%  
C4: 4.5%

14,650 14,660 14,670 14,680 14,690 14,700 14,710 14,720 14,730 14,740 14,750 14,760 14,770 14,780 14,790 14,800 14,810 14,820 14,830 14,840 14,850 14,860



GR (api)

0

250

6000

MD: 14,748'  
TVD: 6,451.9'  
Inclination: 91.05°  
Azimuth: 87.74°  
VS: 8,108.44'

14,653'  
6,453.61'  
ation: 91.02°  
uth: 87.58°  
3,013.7'

TVD (ft)

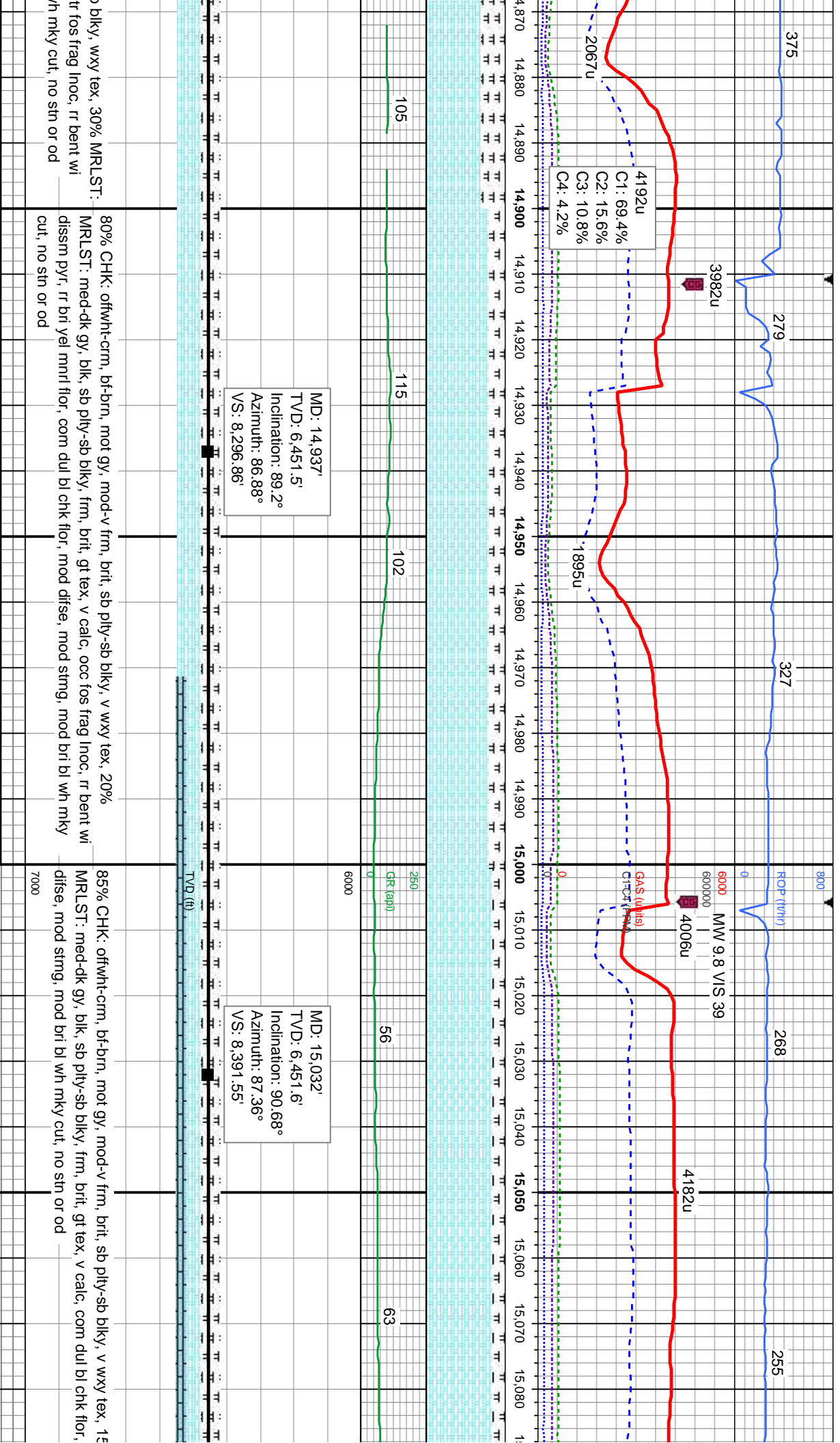
60% MRLST: med-dk gy, blk, sb ply-sb blk, sb fis ip, frm, brit, gt tex, v calc, rr fos frag Inoc, 40% CHK: offwht-crm, bf-brn, mot gy/dt, mod-v frm, brit, sb ply-sb blk, wxy tex, occ dul bl chk flr, mod difse, mod stmg, mod bri bl wh mky cut, no sin or od

70% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb ply-sb blk, med-dk gy, blk, sb ply-sb blk, sb fis ip, frm, brit, gt tex, v calc, dissm pyr, rr bri yel mnrl flr, mod difse, mod stmg, mod bri bl w

sb fis ip, frm, brit, gt tex, v calc, tr fos frag Inoc, frm, brit, sb ply-sb blk, wxy tex, occ dul bl chk cut, no sin or od



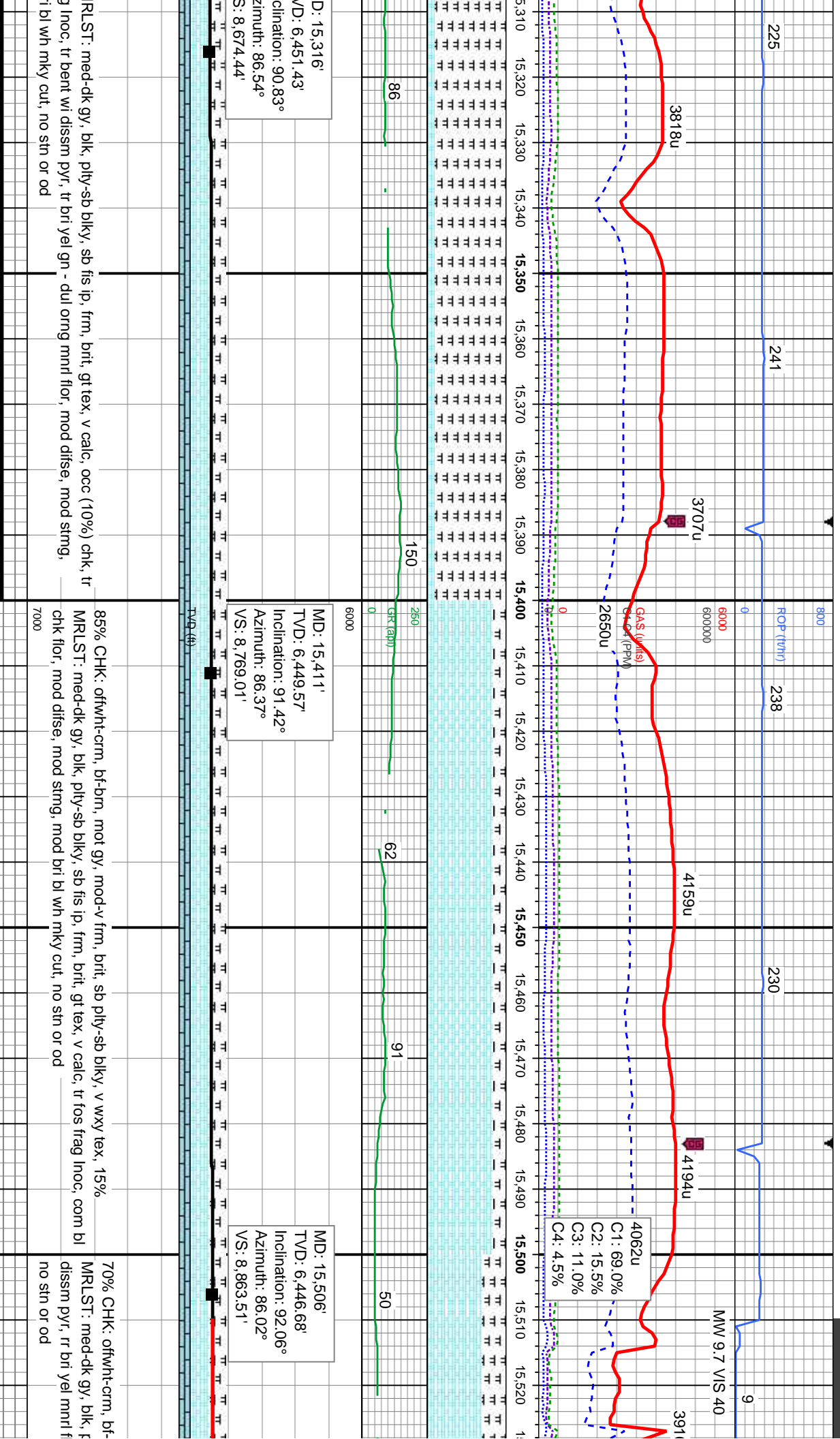




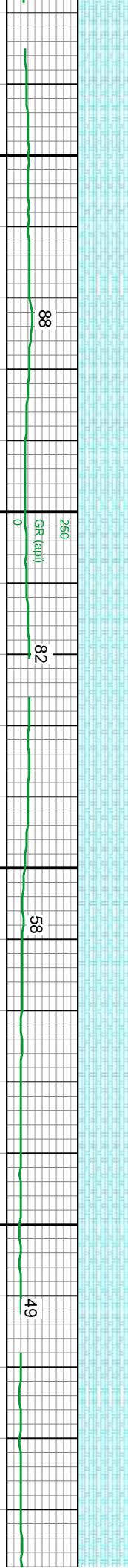
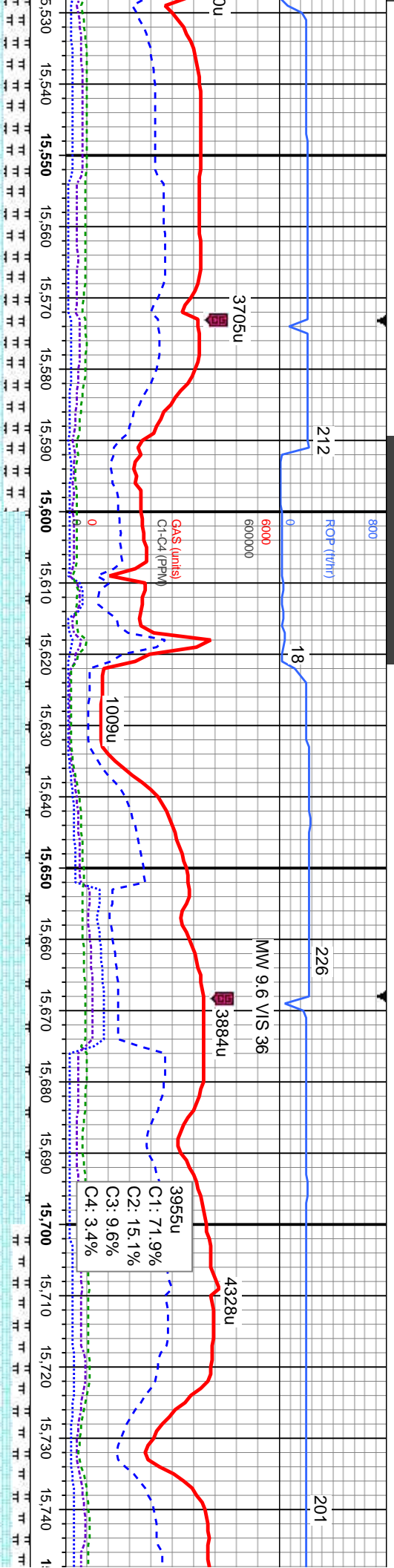












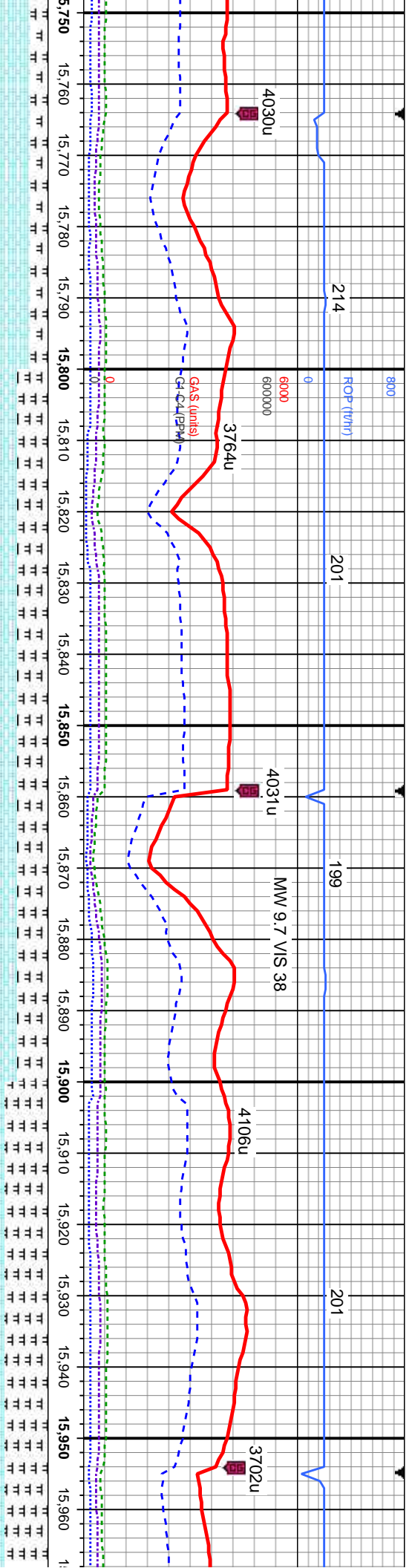
MD: 15,601'  
TVD: 6,444.92'  
Inclination: 90.06°  
Azimuth: 86.27°  
VS: 8,958.04'

MD: 15,695'  
TVD: 6,444.87'  
Inclination: 90°  
Azimuth: 86.35°  
VS: 9,051.61'

brn, mot gy, mod-v frm, brit, sb pily-sb blk, v wxy tex, 30% pily-sb blk, sb fis, frm, brit, gt tex, v calc, tr fos frag lnoc, rr bent w	95% CHK: offwht-frm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, v wxy tex, v calc, tr (5%) mlst, rr fos frag lnoc, occ bl chk flr, mod dfse, mod sting, mod bri bl wh mky cut, no stn or od	7000
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MD: 15,790'  
TVD: 6,443.49'  
Inclination: 91.66°  
Azimuth: 86.74°  
VS: 9,146.2'

MD: 15,925'  
TVD: 6,438.11'  
Inclination: 92.9°  
Azimuth: 85.88°  
VS: 9,280.48'

frm, brit, sb pily-sb blk, v wxy tex, v calc, 20% o, frm, brit, gt tex, v calc, occ fos frag inoc, occ wh mky cut, no sin or od	70% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb blk, v wxy tex, v calc, 30% MRLST: med-dk gy, blk, pily-sb blk, sb fis ip, frm, brit, gt tex, v calc, occ fos frag inoc, occ bl chk flr, mod difse, mod sting, mod bri bl wh mky cut, no sin or od	50% CHK: offwht-crm, bf-brn, mot gy, mod-v frm, brit, sb pily-sb MRLST: med-dk gy, blk, pily-sb blk, sb fis ip, frm, brit, gt tex, v bl chk flr, mod difse, mod sting, mod bri bl wh mky cut, no sin
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