

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

Well Name      Wirkner-Vance 29N-36HZ

Location      SWSW SEC 36, T3N, R67W

State      COLORADO

Country      USA

API Number      05-123-37881-0000

Region      DJ BASIN

Spud Date      12/14/2013

Surface Coordinates      396' FSL & 854' FWL

Bottom Hole Coordinates      460' FSL & 1525' FWL

Ground Elevation      4822'

Logged Interval      6582'      To      11696'

Formation      Niobrara B

Type of Drilling Fluid      H2O, LSND

County      WELD

Rig Number      ENSIGN 138

Field      WATTENBERG

Drilling Completed      12/22/2013

K.B. Elevation      4835'

Total Depth      11696'

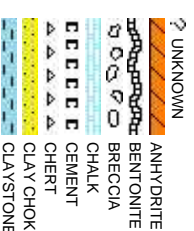
Company      Anadarko

Address      Granite Tower  
1099 18th St, S  
Denver, CO 802

Name      Zach Uber& Ga

Company      Columbine Logg

Address      2385 S. Lipan S  
Denver, CO 802



Operator

uite #1800  
202

Geologist

be Rubio

ging, Inc.

223

Rock Types

CONGLOMERATE	MARLSTONE	SHALY SANDSTONE
DOLOMITE	METAMORPHIC	SHALY SILTSTONE
DOLOMITIC LIMESTONE	NO SAMPLE	SILT SHALE
GRANITE	SALT	SILTSTONE
GYPSUM	SANDSTONE	TILL
IGNEOUS	SALT-PEPPER SAN	TUFF
SIDERITE or LIMONITE	SHALE	WELDED TUFF
LIMESTONE	SHALE COLORED	
	SHALE GRAY	

Accessories

<b>Fossils</b>	GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL
INOCERAMUS	B BENTONITE	K KAOLIN	ANHYDRITE STRINGER
ALGAE	O OOLITE	BITUMENOUS SUBSTANCE	COAL STRINGER
AMPHIPORA	OSTRACOD	BRECCIA FRAGMENTS	DOLOMITE STRINGER
BELEMNITE	PELECYPOD	CALCAREOUS	GYPSUM STRINGER
BIOCLASTIC	PELLET	CARBONACEOUS FLAKES	LIMESTONE STRINGER
BRACHIOPOD	PISOLITE	CHTDK	NODULES
BRYOZOA	PLANT REMAINS	COAL - THIN BEDS	PHOSPHATE PELLETS
CEPHALOPOD	PLANT SPORES	DOLOMITIC	PYRITE
CORAL	SCAPHOPOD	FELDSPAR	SALT CAST
CRINOID	STROMATOPOROID	FERRUGINOUS PELLET	SANDY
ECHINOID		FERRUGINOUS	SILICEOUS
FISH		GLAUCONITE	SILTY
FORAMINIFERA	ANHYDRITIC	TUFACEOUS	
F FOSSIL	ARGILLACEOUS	GYPSIFEROUS	<b>Stringer</b>

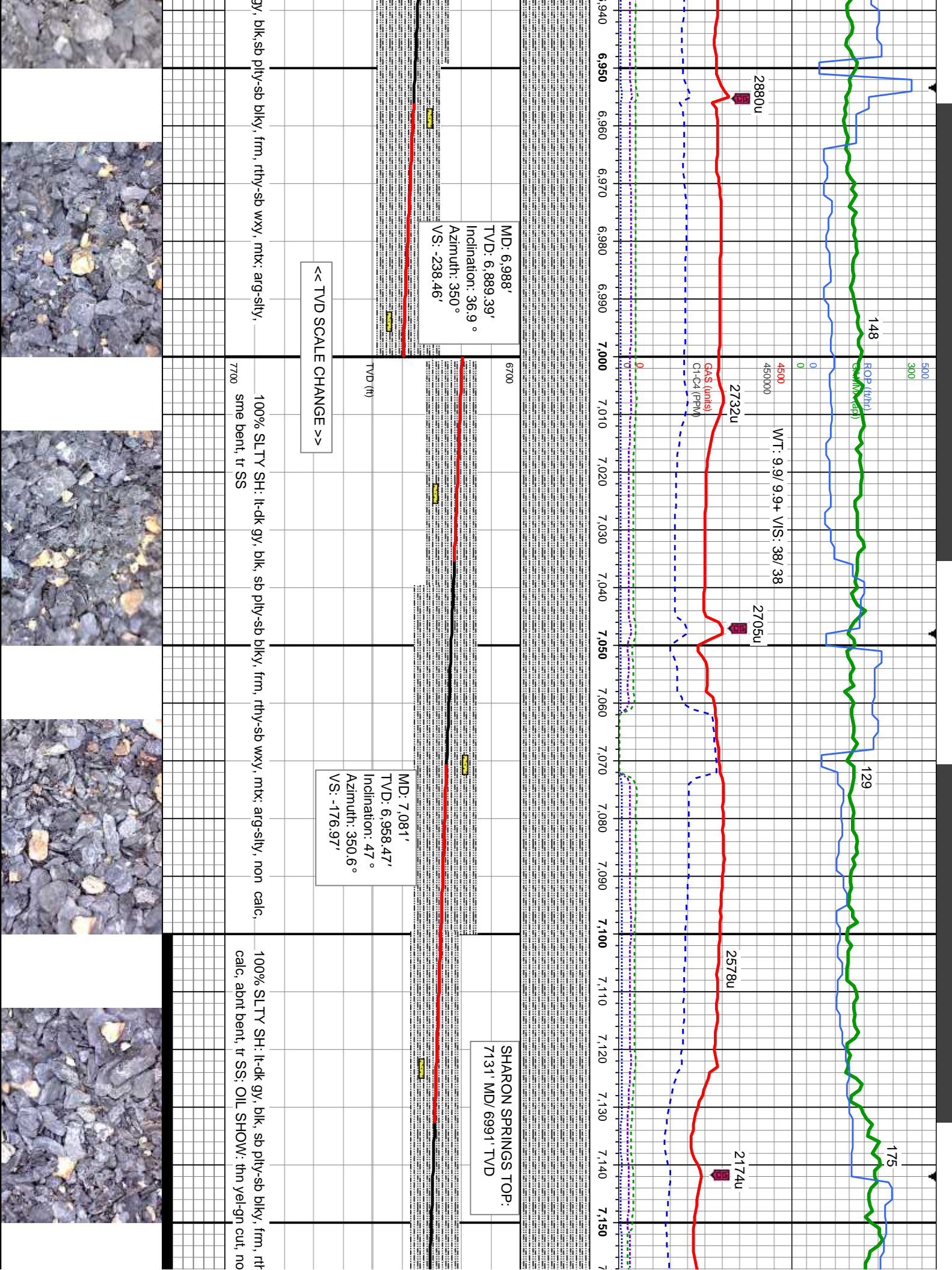
Other Symbols

<b>Oil Show</b>	P PINPOINT	DST INTERVAL	WIRELINE TESTED - LEFT	E EARTHY
V VUGGY	FAULT	WIRELINE TESTED - RT	FX FINELYXLN	
<b>Engineering</b>	FORMATION TOP	DRILL STEM TEST	BS GRAINSTONE	
DEAD	GAS SHOW	MN DEPTH	L LITHOGRAPHIC	
EVEN	OIL SHOW		MX MICROXLN	
QUESTIONABLE	BIT			
SPOTTED STAINING	CONNECTION (UP)	<b>Rounding</b>	MS MUDSTONE	
		MN DEPTH UP		
<b>Porosity</b>	CONNECTION (DOWN)	ANGULAR	PS PACKSTONE	
	CONNECTION GAS	NORMAL FAULT	R ROUNDED	
E EARTHY	CONNECTION GAS (LEFT)	OVERTURNED STRATA	B SUBANG	WS WACKSTONE
F FENESTRAL	TRIP GAS	REVERSE FAULT	R SUBRND	
F FRACTURE	TRIP GAS (LEFT)	CASING		
INTERCRYSTALLINE	DOWN TIME GAS	SIDEWALL CORE (LEFT)	<b>Textures</b>	
INTEROOLITIC	DOWN TIME GAS (LEFT)	SIDEWALL CORE (RIGHT)	BS BOUNDSTONE	P POOR
W MOLDIC	CORE - LOST	SLIDE	CHALKY	W WELL
O ORGANIC	CORE - RECOVERED	SURVEY	CRYPTOXLN	

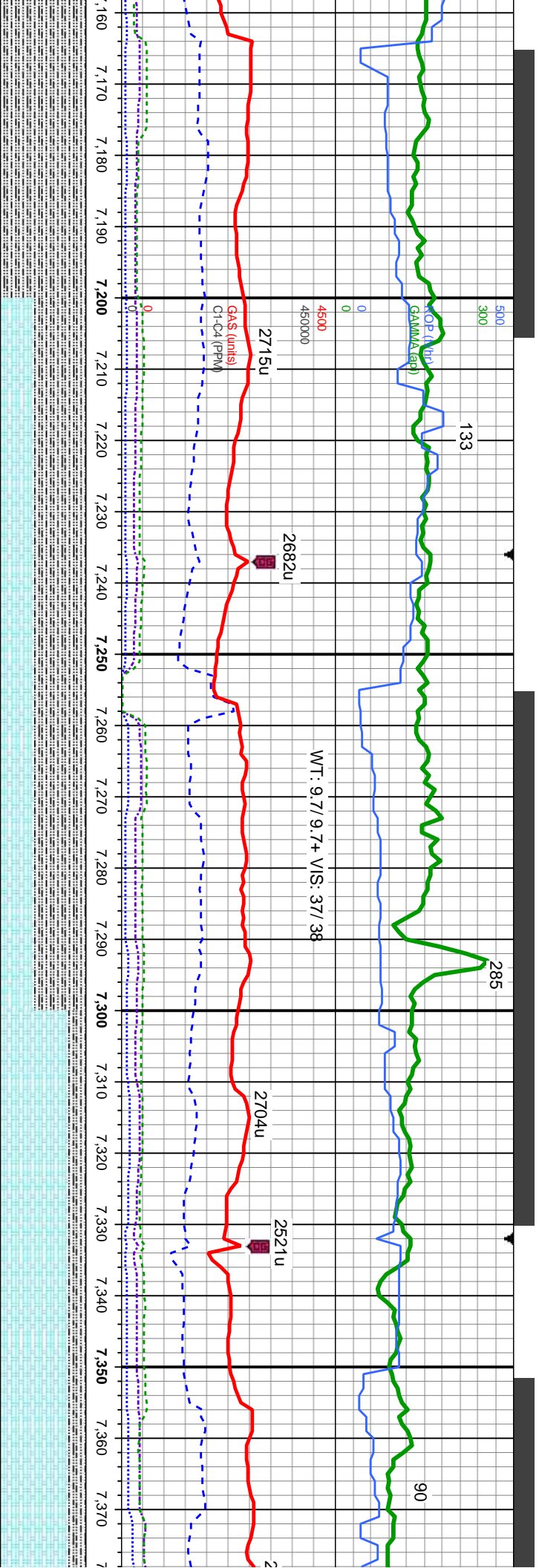












MD: 7,176'  
TVD: 7,019.14'  
Inclination: 53.6 °  
Azimuth: 355.2 °  
VS: -104.26'

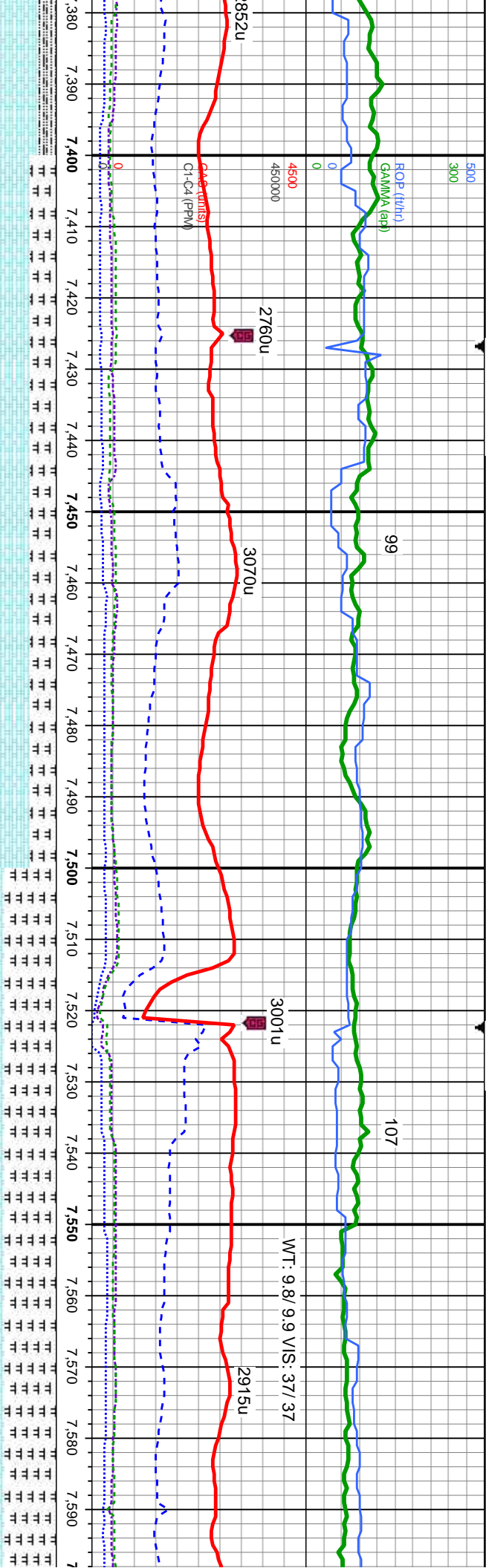
MD: 7,271'  
TVD: 7,069.09'  
Inclination: 62.9 °  
Azimuth: 359.6 °  
VS: -23.6'

MD: 7,366'  
TVD: 7,105.02'  
Inclination: 72.6 °  
Azimuth: 1 °  
VS: 64.16'

60% SLTY SH: lt-dk gy, blk,sb ply-sb blk, frm, rthy-sb wxy, mtx, arg-sily,non-v sl calc;  
40% CHK: lt-med gy, tr wh, sb blk-sb ply, frm-occ brt, rthy tex, tr bent, mtx;calc; OIL  
SHOW: tr yel mnrl flr, fast dfse, mod string, gn cut, sl gn stn, no od

80% CHK: lt-med gy, tr wh, sb blk-sb ply, frm-occ brt, rthy tex,v sl tr  
60% SLTY SH: lt-dk gy, blk,sb ply-sb blk, frm, rthy-sb wxy, mtx, arg  
OIL SHOW: tr yel mnrl flr, fast dfse, mod string, gn cut, sl gn stn, no





NIOBRARA B TOP:  
7408 MD/7116' TVD

MD: 7,460'  
TVD: 7,125.58'  
Inclination: 82.1°  
Azimuth: 0.4°  
VS: 155.69'

MD: 7,543'  
TVD: 7,132.16'  
Inclination: 88.8°  
Azimuth: 358.8°  
VS: 238.35'

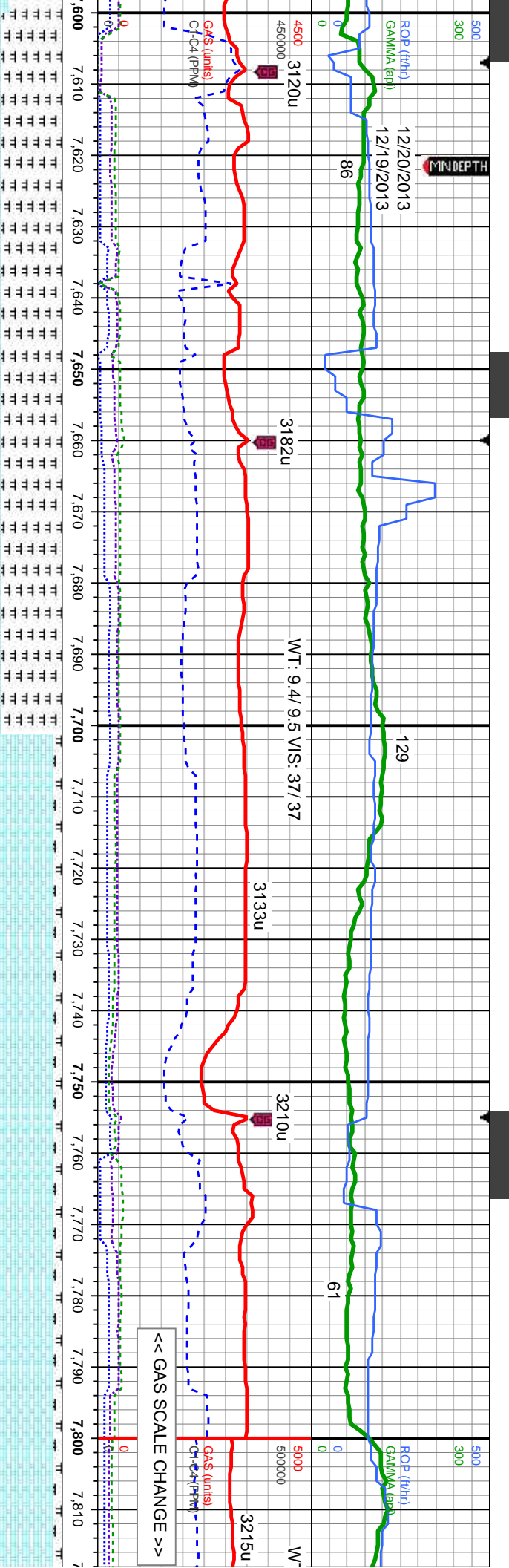
MD: 7,604'  
TVD: 7,131  
Inclination:  
Azimuth: 3°  
VS: 299.35'

TVD (ft)

bent, mtk; calc;	70% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc; 30%	60% MRLST: dk - med gy, gy brn, mod - sl frm, brit - fri lp, gt tex, sb pthy - sb blk, arg -
sity, non-v sl calc;	MLST: dk - med gy, gy brn, mod - sl frm, brit - fri lp, gt tex, sb pthy - sb blk, arg - sily	sily mtk; 40% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc;
od	od	OIL SHOW: bl-gn stng cut, fast difse, tr-mod yel min flr, solid gn resd stn, no od
7700		







TOOH @ 7603' MD FOR INTERMEDIATE  
CASING @ 10:04 HRS MST ON 12/18/2013

RESUMED LATERAL @ 13:36 HRS MST ON 12/20/13

MD: 7,700'  
TVD: 7,128.83'  
Inclination: 91.8°  
Azimuth: 359.4°  
VS: 395.29'

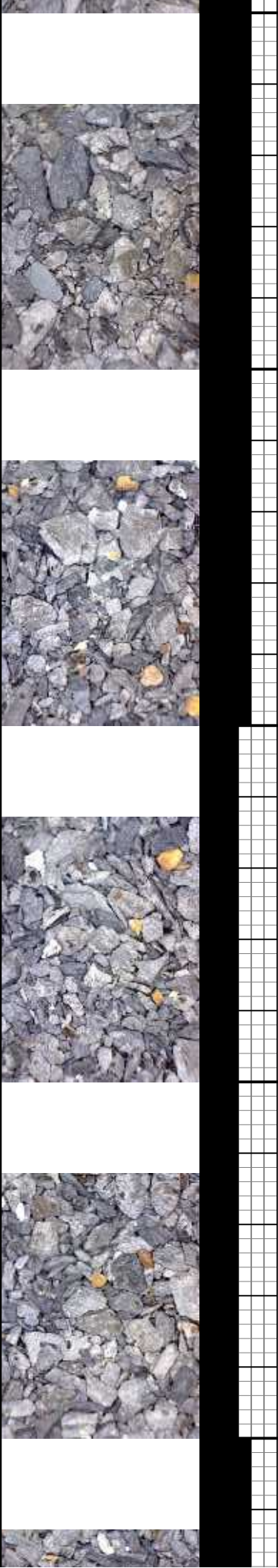
MD: 7,794'  
TVD: 7,126.61'  
Inclination: 90.9°  
Azimuth: 358.5°  
VS: 489.26'

70% MRLST: dk - med gy, gy brn, mod -  
sl frm, brit - fri ip, gt tex, sb ply - sb blk,  
arg - silty mix; 30% CHK: mot gy brn - lt  
gy, v sft - sl frm, fri, sb blk, rthy - sb wxy  
tex, v calc; OIL SHOW: bl-gn stmg cut,  
fast difse, tr-mod yel min flr, solid gn  
resld stn, no od

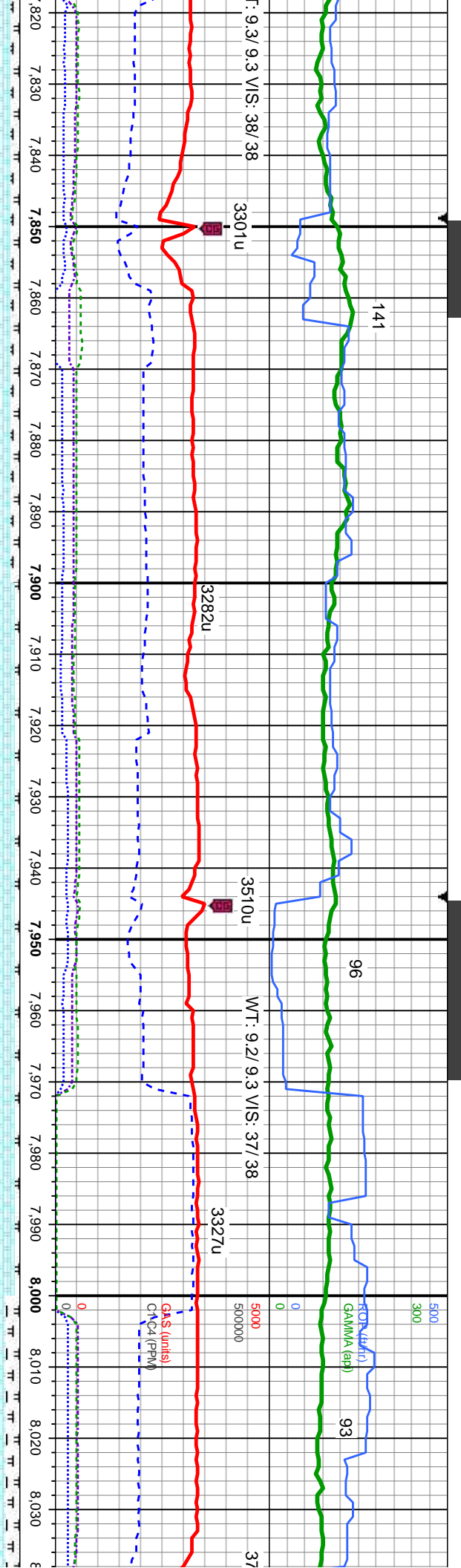
Bit #: 2  
Type: Varrel/ VS513D  
Size: 6.12  
Depth In: 7,603'  
Depth Out: 11,696'  
Jets: 5x16

90% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc  
10% MRLST: med gry-brn, sb ply-sb blk, brit-frm, mot, rthy-chky, mix; calc; tr inoc fos;  
OIL SHOW: tr yel mnrl flr, fast difse, mod stmg, gn cut, sl gn stn, no od

90% CHK:  
10% MRLS  
: OIL SHOW







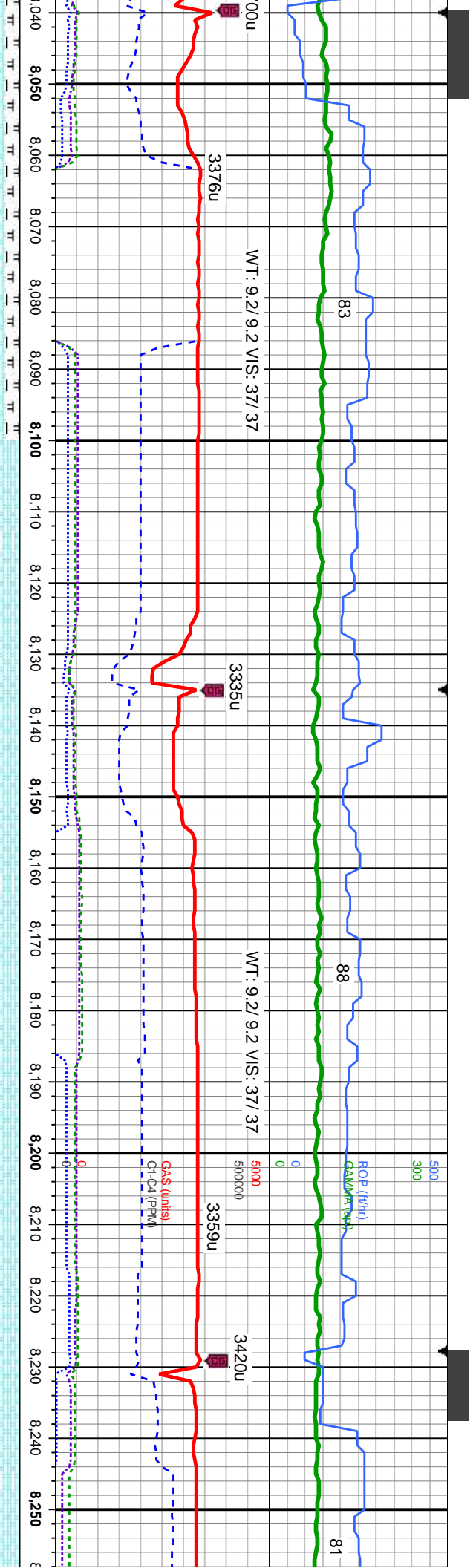
FAULT #1  
MD: 7831'  
TVD: 7126'  
THROW: 11' DOWN

MD: 7,889'  
TVD: 7,126.53'  
Inclination: 89.2 °  
Azimuth: 359.4 °  
VS: 584.25'

MD: 7,984'  
TVD: 7,126.7'  
Inclination: 90.6 °  
Azimuth: 0.1 °  
VS: 679.21'

mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc T: med gry-brn, sb ply-sb blk, brt-frm, mot, rthy-chky, mt; calc; tr inoc fos W: b-gn string cut, fast difse, tr-mod yel min flr, solid gn resd sn, no od	95% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc 5% MRLST: med gry-brn, sb ply-sb blk, brt-frm, mot, rthy-chky, mt; calc; OIL SHOW: bl-gn string cut, fast difse, tr-mod yel min flr, solid gn resd sn, no od	85% CHK: mot gy brn - lt gy, v 15% MRLST: med gry-brn, sb OIL SHOW: mod difse, tr yel r
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MD: 8,079'  
TVD: 7,127.11'  
Inclination: 88.9°  
Azimuth: 0°  
VS: 774.16'

MD: 8,173'  
TVD: 7,128.1'  
Inclination: 89.9°  
Azimuth: 0.5°  
VS: 868.1'

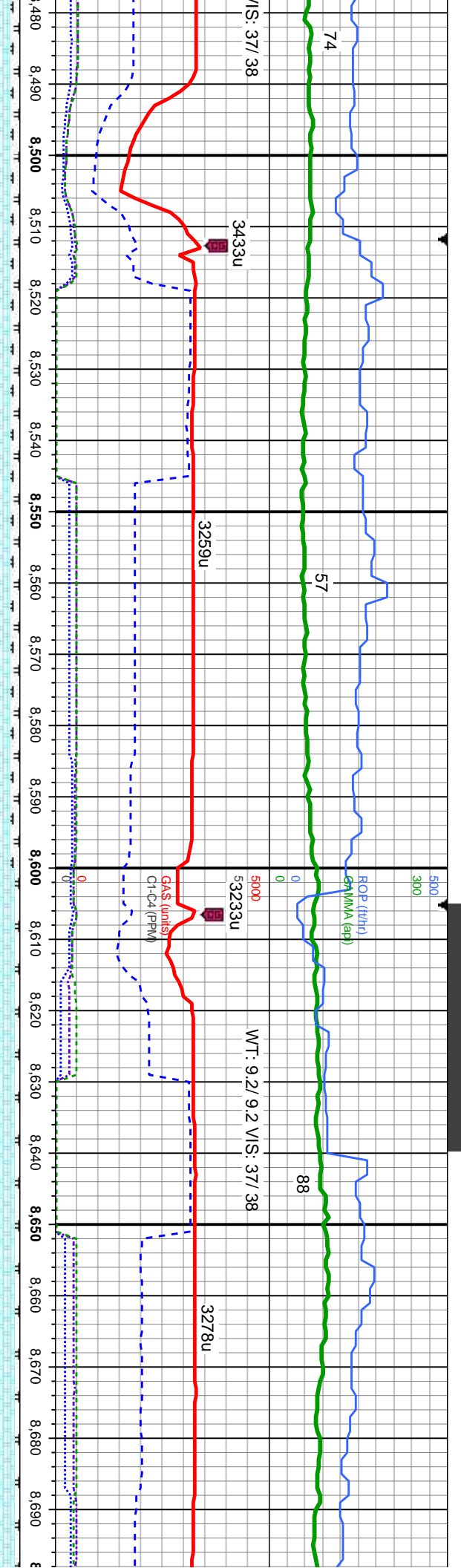
sft - sl frm, fri, sb blkly, rthy - sb wxy tex, v calc  
ply-sb blkly, brt-frm, mot, rthy-ckly, mix; calc; tr inoc fos;  
lin flr, bl-wh stng, bl-wh mky cut, mod gn-bl stn, no od  
100% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blkly, rthy - sb wxy tex, v calc; tr inoc fos;  
OIL SHOW: mod dfse, tr yel min flr, bl-wh stng, bl-wh mky cut, mod gn-bl stn, no od

100% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sl  
fos; OIL SHOW: mod dfse, tr yel min flr, bl-wh  
no od









MD: 8,550'  
TVD: 7,128.92'  
Inclination: 90.8 °  
Azimuth: 358.6 °  
VS: 1,244.99'

FAULT #2  
MD: 8604'  
TVD: 7128'  
THROW: 3' DOWN

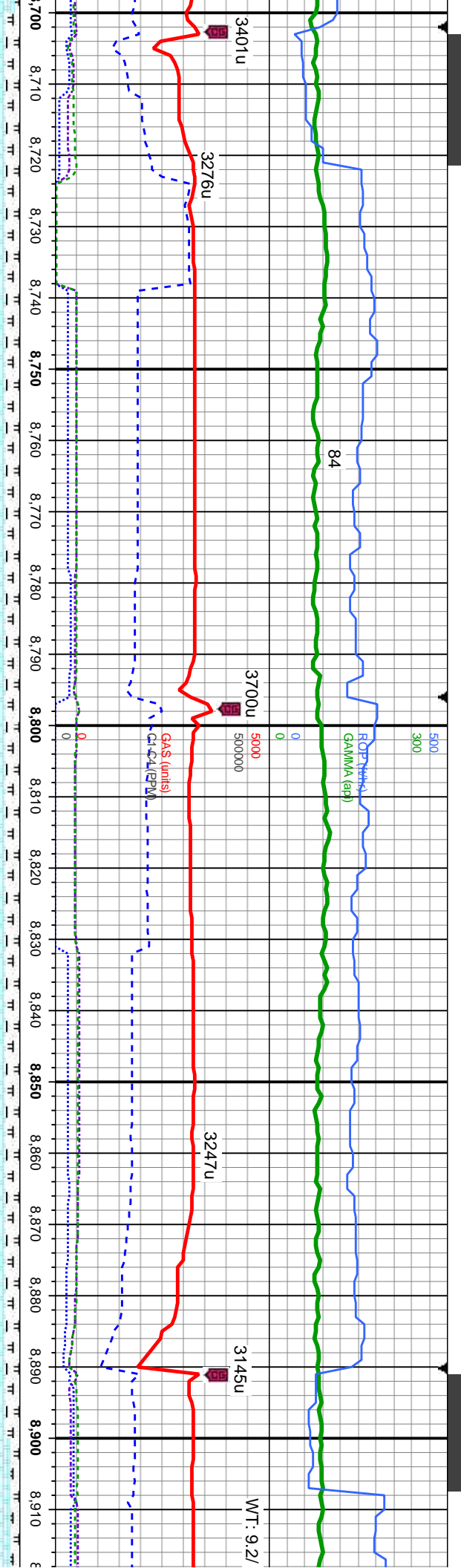
MD: 8,645'  
TVD: 7,127.51'  
Inclination: 90.9 °  
Azimuth: 359.7 °  
VS: 1,339.97'

ex, rthy, v calc  
90% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, rthy, v calc  
10% MRLST: med gry-brn gt-bk, sb ply-sb blk, brit-frm, mot, rthy-chky, mt, calc; tr inoc  
fos: OIL SHOW: bi-gn stmg cut, fast difse, tr-mod yel min flor, solid gn resdl stn, no od

95% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, rthy, v calc  
5% MRLST: med gry-brn gt-bk, sb ply-sb blk, brit-frm, mot, rthy-chky, mt, calc; tr inoc  
fos: OIL SHOW: bi-gn stmg cut, fast difse, tr-mod yel min flor, solid gn resdl stn, no od







MD: 8,740'  
TVD: 7,127.35'  
Inclination: 89.3°  
Azimuth: 358.3°  
VS: 1,434.95'

MD: 8,834'  
TVD: 7,128.17'  
Inclination: 89.7°  
Azimuth: 358.4°  
VS: 1,528.95'

FAULT #3  
MD: 8955'  
TVD: 7128'  
THROW: 26' DOWN

85% CHK: lt-med gy, tr wh, sb blk-y-sb ply, frm-occ brit, rthy tex, mtx;calc, 15% MRLST: med gry-brn, sb ply-sb blk-y,brit-frm, mot, rthy-ckky, mtx; calc; OIL SHOW: bl-gn stmg cut, fast difse, tr-mod yel min flor, solid gn resd sln, no od

85% CHK: lt-med gy, tr wh, sb blk-y-sb ply, frm-occ brit, rthy tex, mtx;calc, 15% MRLST: med gry-brn, sb ply-sb blk-y,brit-frm, mot, rthy-ckky, mtx; calc; OIL SHOW: tr yel mnrl flor, fast difse, mod stmg, gn cut, sl gn stn, no od

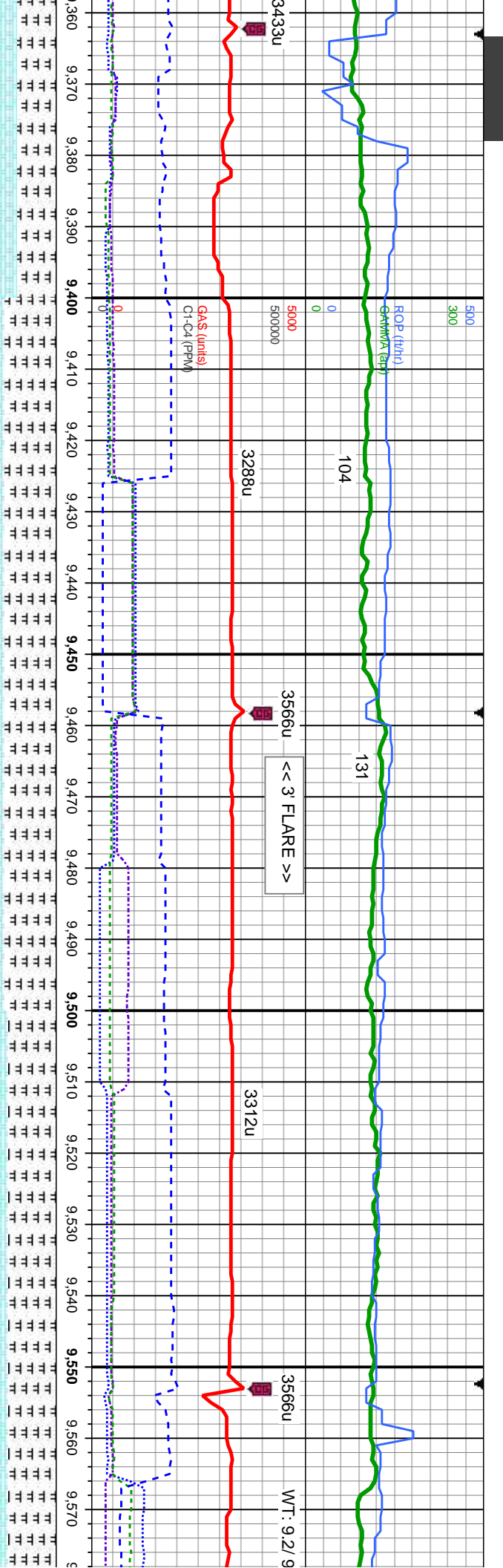
95% CHK: m 5% MRLST: fos; OIL SHC











MD: 9,496'  
TVD: 7,135.35'  
Inclination: 88.5°  
Azimuth: 358.3°  
VS: 2,190.86'

FAULT #6  
MD: 9497'  
TVD: 7135'  
THROW: 29' DOWN

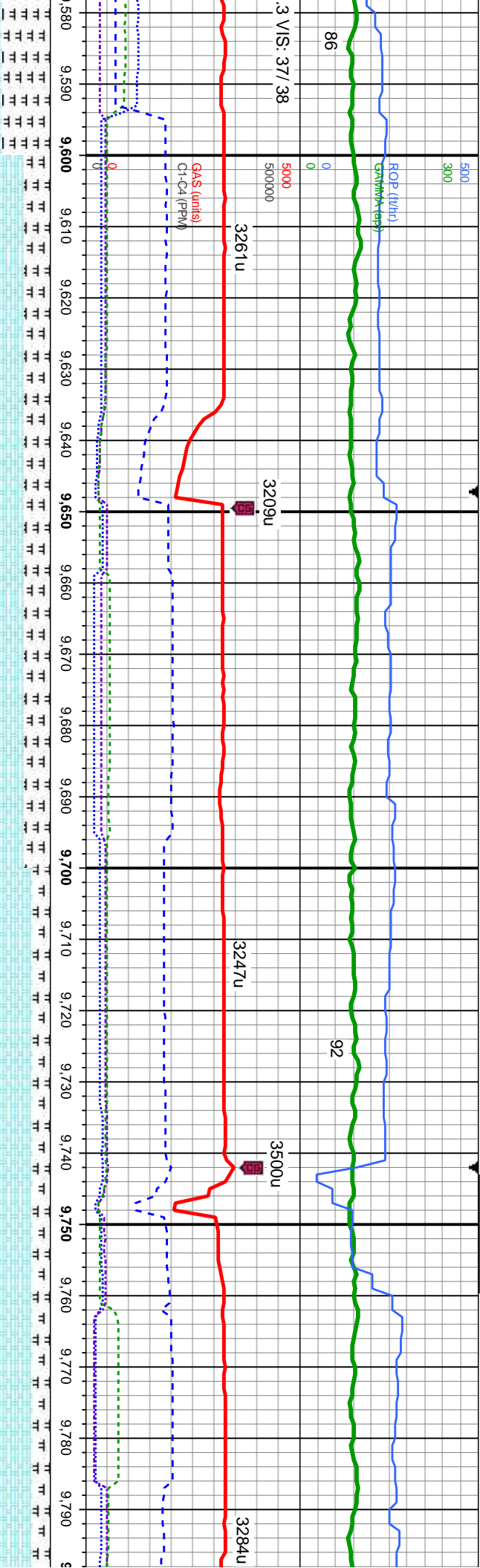
ky, rthy - sb wxy tex, rthy, v calc  
it-frm, mot, rthy-chky, mt; calc;  
n cut, sl gn stn, no od

60% MRLST: dk - med gy, gy brn, mod - sl frm, brit - fri ip, gt tex, sb ply - sb blk, arg -  
sily mt; 40% CHK: mot gy brn - lt gy, occ bf, v sft - sl frm, sb blk, rthy - sb wxy tex, v  
calc; OIL SHOW: tr yel mnrl flr, fast dfse, mod string, gn cut, sl gn stn, no od

55% MRLST: dk - med gy, gy brn, mod - sl frm, brit - fri ip, gt tex, sb ply -  
mt; 45% CHK: mot gy brn - lt gy, occ bf, v sft - sl frm, sb blk, rthy - sb  
SHOW: tr yel mnrl flr, fast dfse, mod string, gn cut, sl gn stn, no od







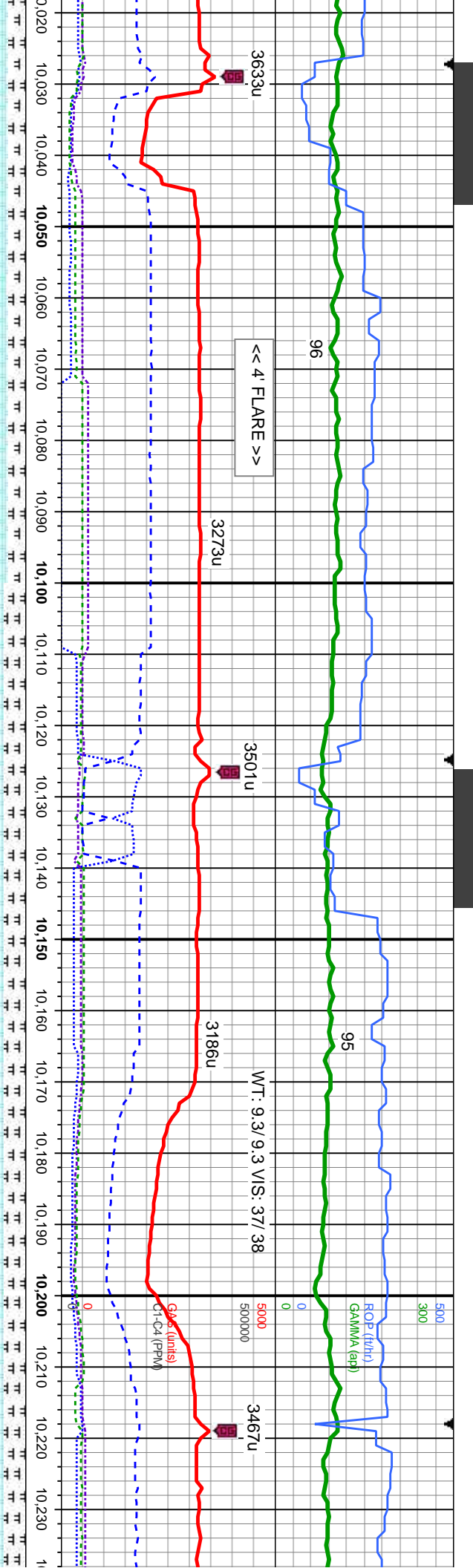
MD: 9,686'  
TVD: 7,140.65'  
Inclination: 88.3°  
Azimuth: 359.7°  
VS: 2,380.77'

7700	70% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc: 30% MRLST: dk - med gy, gy brn, mod - sl frm, brt - fri ip, gt tex, sb pily - sb blk, arg - stly mtx: OIL SHOW: tr yel mnl flor, fast difse, mod stmg, gn cut, sl gn stn, no od	80% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blk, rthy - sb wxy tex, v calc: 20% MRLST: dk - med gy, gy brn, mod - sl frm, brt - fri ip, gt tex, sb pily - sb blk, arg - SHOW: bl-gn stmg cut, fast difse, tr-mod yel min flor, solid gn resd stn, no od
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MD: 10,067'  
TVD: 7,139.81'  
Inclination: 90.6°  
Azimuth: 0.1°  
VS: 2,761.56'

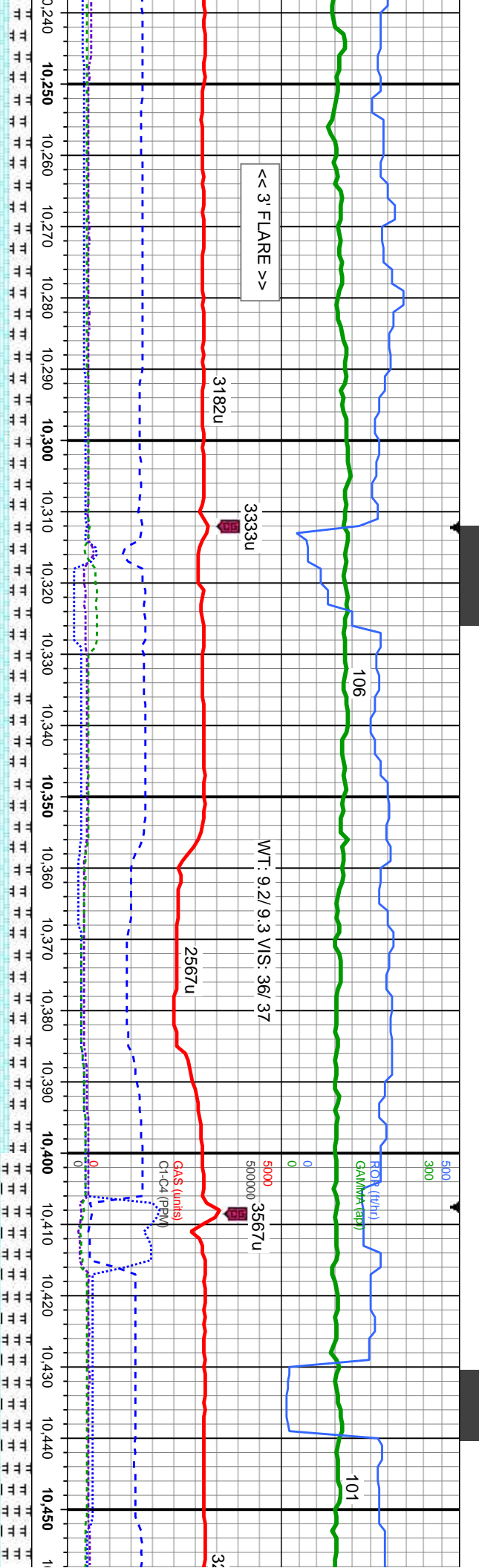
MD: 10,161'  
TVD: 7,139.24'  
Inclination: 90.1°  
Azimuth: 358.1°  
VS: 2,855.54'

It-med gy, tr wh, sb blk-y-sb pty, frm-occ brit, rthy tex, mtx;calc: 20% med gry-brn, sb pty-sb blk-y, brit-frm, mot, rthy-chky, mtx; calc: OIL SHOW: cut, fast difse, tr-mod yel min flor, solid gn resdl stn, no od

75% CHK: It-med gy, tr wh, sb blk-y-sb pty, frm-occ brit, rthy tex, mtx;calc: 25% MRLST: med gry-brn, sb pty-sb blk-y, brit-frm, mot, rthy-chky, mtx; calc: OIL SHOW: bl-gn sting cut, fast difse, tr-mod yel min flor, solid gn resdl stn, no od

75% CHK: It-med gy, tr wh, sb blk-y-sb pty, frm-occ brit, rthy tex, mtx;calc: 25% MRLST: med gry-brn, sb pty-sb blk-y, brit-frm, mot, rthy-chky, mtx; calc: OIL SHOW: bl-gn sting cut, fast difse, tr-mod yel min flor, solid gn resdl stn, no od





MD: 10,256'  
TVD: 7,138.49'  
Inclination: 90.8 °  
Azimuth: 358.5 °  
VS: 2,950.54'

MD: 10,445'  
TVD: 7,138.99'  
Inclination: 88.9 °  
Azimuth: 357.6 °  
VS: 3,139.52'

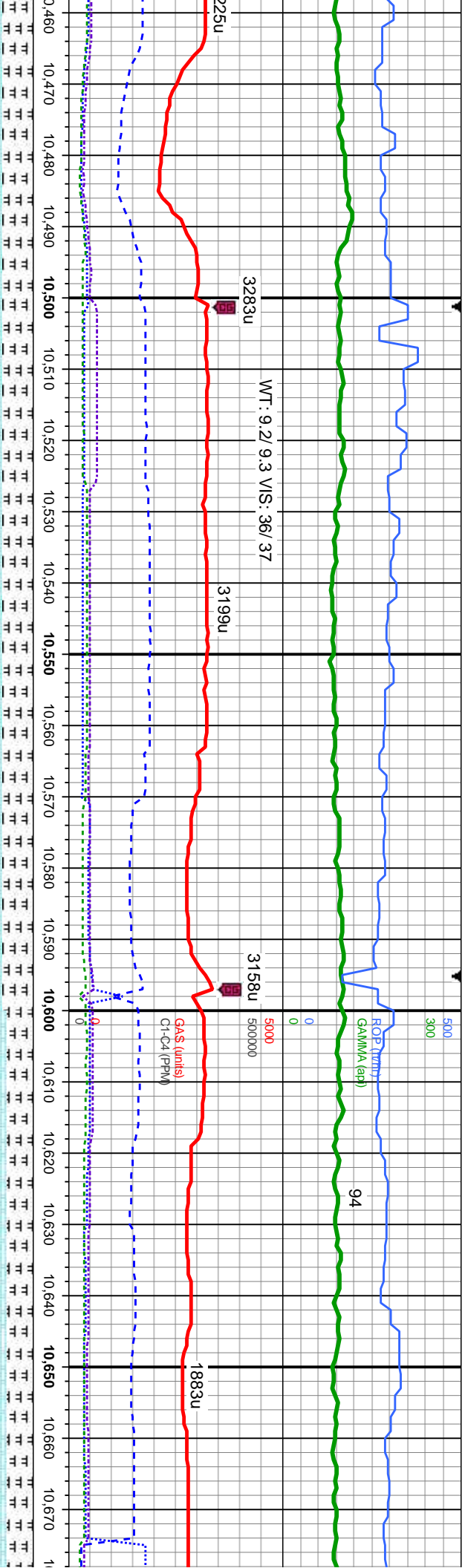
blky-sb pily, frm-occ brit, rthy tex, mtx;calc: 25%  
sb blky,brit-frm, mot, rthy-chky, mtx; calc: OIL SHOW:  
od yel min flor, solid gn resdl stn, no od

75% CHK: lt-med gy, tr wh, sb blky-sb pily, frm-occ brit, rthy tex, mtx;calc: 25% MRLST:  
med gry-brn, sb pily-sb blky,brit-frm, mot, rthy-chky, mtx; calc: OIL SHOW: tr yel mnrl flor,  
fast difse, mod stmg, gn cut, sl gn stn, no od

65% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb b  
35% MRLST: med gry-brn gr-bk, sb pily-sb blky,t  
inoc fos: OIL SHOW: tr yel mnrl flor, fast difse, m



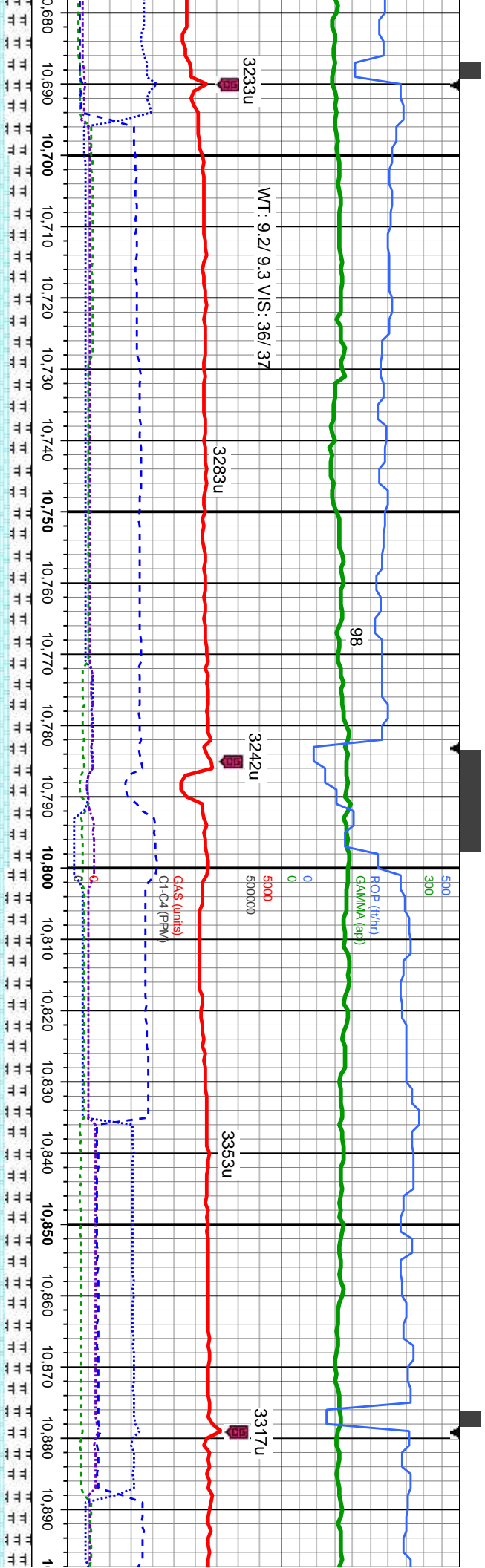




MD: 10,539'  
TVD: 7,140.46'  
Inclination: 89.3°  
Azimuth: 357.7°  
VS: 3,233.51'

blky, rthy - sb wxy tex, rthy, v calc	65% CHK: mot gy brn - lt gy, v sft - sl frm, fri, sb blky, rthy - sb wxy tex, rthy, v calc	70% CHK: lt-med gy, tr wh, sb blky-sb pily, frm-occ brit, rthy tex, mtk
brit-frm, mot, rthy-chky, mtk; calc; tr	35% MRLST: med gry-brn gt-bk, sb pily-sb blky, brit-frm, mot, rthy-chky, mtk; calc; tr	med gry-brn, sb pily-sb blky, brit-frm, mot, rthy-chky, mtk; calc; tr
mod stmg, gn cut, sl gn stn, no od	inoc fos; OIL SHOW: tr yel mnrl flor, fast difse, mod stmg, gn cut, sl gn stn, no od	yel mnrl flor, fast difse, mod stmg, gn cut, sl gn stn, no od





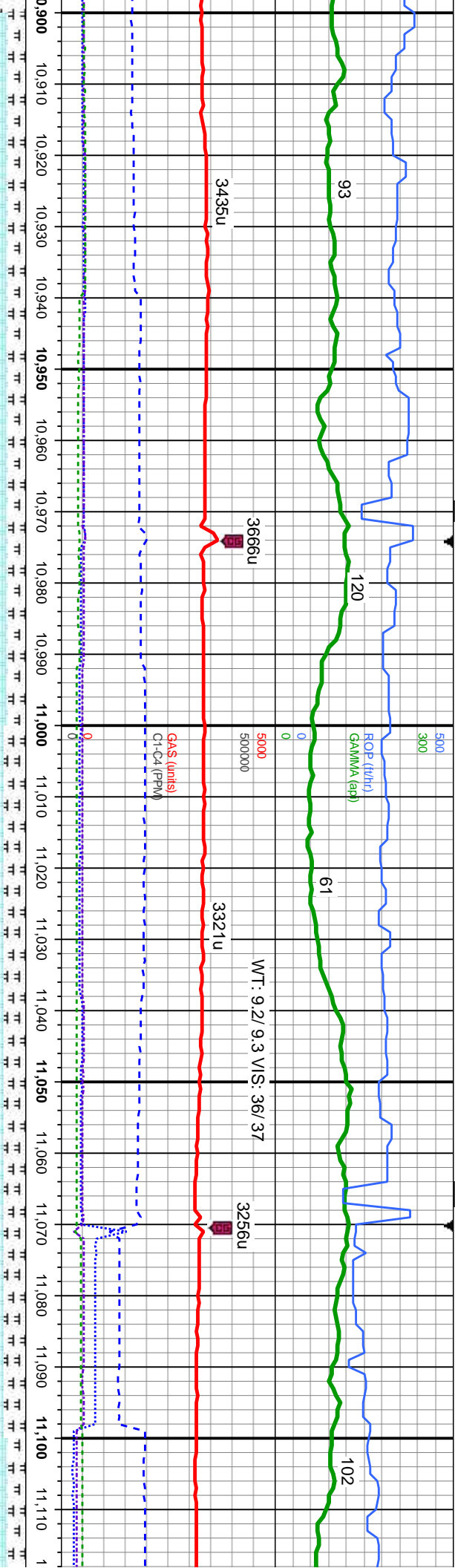
10,680	10,690	10,700	10,710	10,720	10,730	10,740	10,750	10,760	10,770	10,780	10,790	10,800	10,810	10,820	10,830	10,840	10,850	10,860	10,870	10,880	10,890	10,900
TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT

10,680	10,690	10,700	10,710	10,720	10,730	10,740	10,750	10,760	10,770	10,780	10,790	10,800	10,810	10,820	10,830	10,840	10,850	10,860	10,870	10,880	10,890	10,900
TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT

calc; 30% MRLST: 75% CHK: lt-med gy, tr wh, sb blkly-sb pily, frm-occ brit, rthy tex, mix;calc; 25% MRLST: 70% CHK: lt-med gy, tr wh, sb blkly-sb pily, frm-occ brit, rthy tex, mix;calc; 30% MRLST: med gry-brn, sb pily-sb blkly,brit-frm, mot, rthy-chky, mix; calc; tr inoc fos; OIL SHOW: t bl-gn sting cut, fast difse, tr-mod yel min flor, solid gn resdl sin, no od yel mnrl flor, fast difse, mod sting, gn cut, sl gn sin, no od







MD: 10,918'  
TVD: 7,139.47'  
Inclination: 89.9 °  
Azimuth: 357.3 °  
VS: 3,612.48'

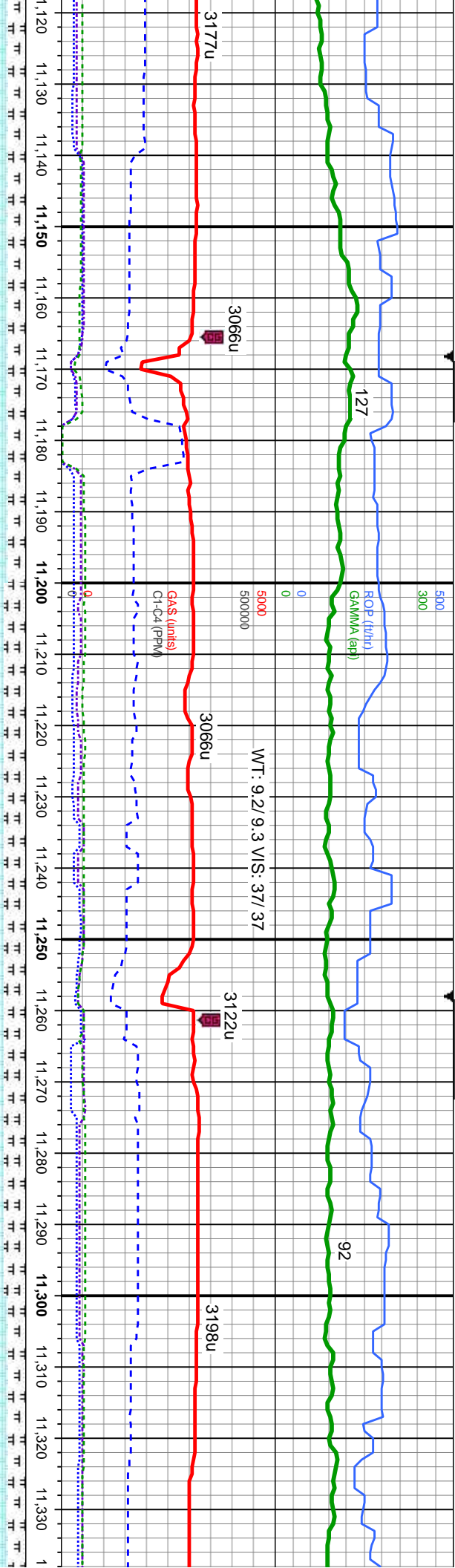
MD: 11,107'  
TVD: 7,137.82'  
Inclination: 91.1 °  
Azimuth: 357.3 °  
VS: 3,801.44'

80% CHK: lt-med gy, tr wh, sb blk-y-sb pily, frm-occ brit, rthy tex, mtx:calc; 20% MRLST: med gry-brn, sb pily-sb blk-y,brit-frm, mot, rthy-chky, mtx: calc; tr inoc fos; OIL SHOW: tr yel mnrl flor, fast difse, mod string, gn cut, sl gn stn, no od

75% CHK: lt-med gy, tr wh, sb blk-y-sb pily, frm-occ brit, rthy tex, mtx:calc; 25% MRLST: med gry-brn, sb pily-sb blk-y,brit-frm, mot, rthy-chky, mtx: calc; tr inoc fos; OIL SHOW: tr yel mnrl flor, fast difse, mod string, gn cut, sl gn stn, no od

80% CHK: lt-m med gry-brn, sl mnrl flor, fast d

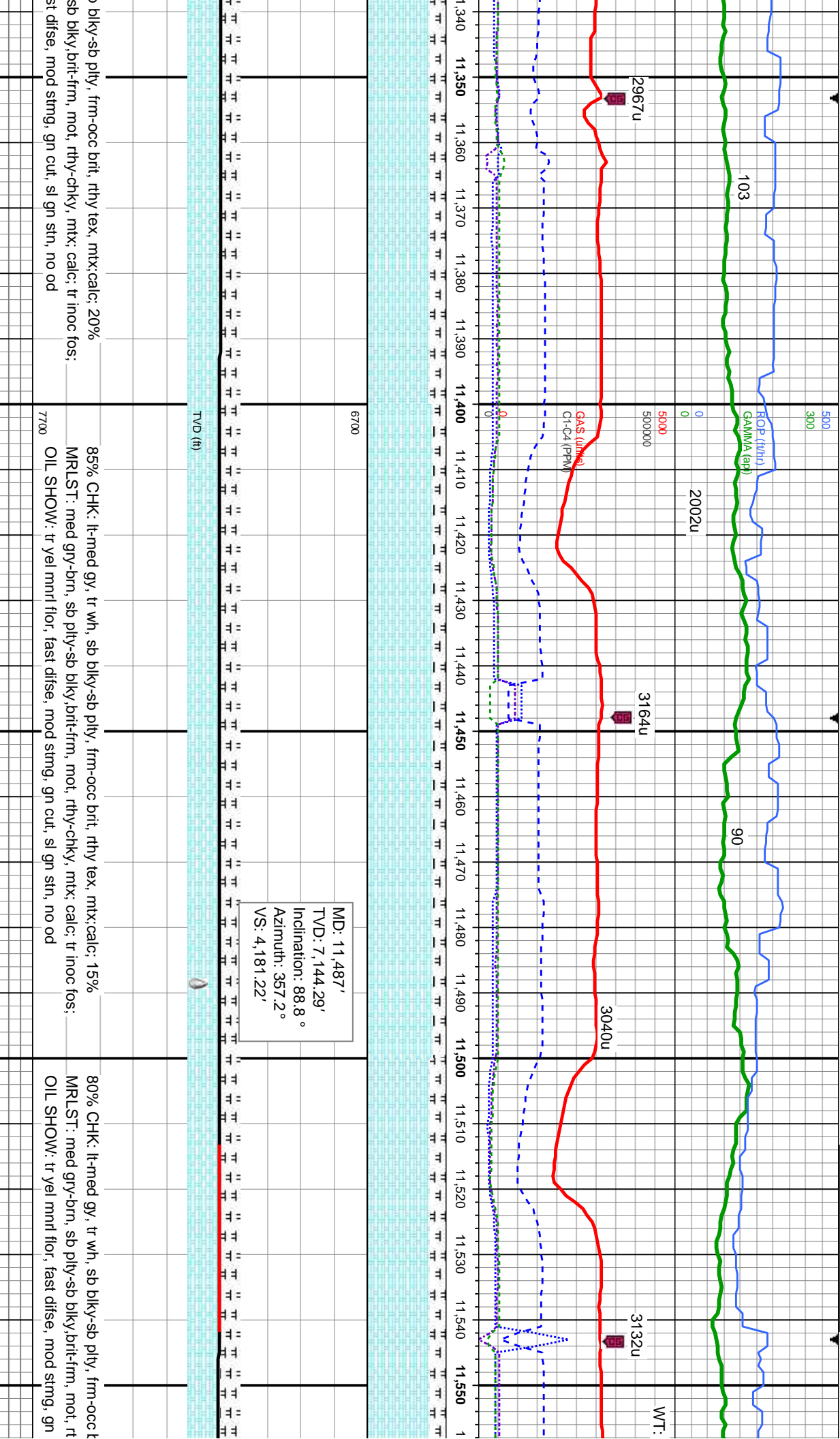




med gy, tr wh, sb blk-y-sb pily, frm-occ brit, rthy tex, mtx;calc: 20% MRLST: 75% CHK: lt-med gy, tr wh, sb blk-y-sb pily, frm-occ brit, rthy tex, mtx;calc: 25%  
p pily-sb blk-y,brit-frm, mot, rthy-chky, mtx; calc; tr inoc fos; OIL SHOW: tr yel MRLST: med gry-brn, sb pily-sb blk-y,brit-frm, mot, rthy-chky, mtx; calc; tr inoc fos;  
fise, mod string, gn cut, sl gn stn, no od OIL SHOW: tr yel mnrl flor, fast difse, mod string, gn cut, sl yel-gn stn, no od







MD: 11,487'  
TVD: 7,144.29'  
Inclination: 88.8 °  
Azimuth: 357.2 °  
VS: 4,181.22'

b blkly-sb pily, frm-occ brti, rthy tex, mtix;calc: 20%  
sb blkly,brti-frm, mot, rthy-chky, mtix; calc: tr inoc fos;  
st difse, mod sting, gn cut, sl gn stn, no od

85% CHK: lt-med gy, tr wh, sb blkly-sb pily, frm-occ brti, rthy tex, mtix;calc: 15%  
MRLST: med gry-brn, sb pily-sb blkly,brti-frm, mot, rthy-chky, mtix; calc: tr inoc fos;  
OIL SHOW: tr yel mnrl flor, fast difse, mod sting, gn cut, sl gn stn, no od

7700

TVD (ft)



