



Scale: 5" / 100'
Measured Depth Log

Well Name Wells Ranch AE19-626 Horz

Location NWSW 20 6N 62W 6 PM

State COLORADO

County WELD

Country UNITED STATES

Rig Number H&P 330

API Number 05-123-39634

Field WATTENBERG

Region DJ BASIN

Drilling Completed 12/16/2014

Spud Date 12/10/2014

Surface Coordinates 1573 FSL 65 FWL

Lat/Long: 40.46928/-104.35587

Bottom Hole Coordinates 1040 FFSL 235 FFELL

Ground Elevation 4,786'

K.B. Elevation 4,816'

Logged Interval 2,000' To 11,842'

Total Depth 11,842'

Formation Niobrara

Type of Drilling Fluid LSND

Operator

Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name Teresa Malesardi

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

tmalesardi@nobleenergyinc.com

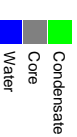
Other

Well Site Logging Company Columbine Logging Inc.



































Well Site Geologist (Days) Brad Wilson

Well Site Geologist (Nights) Terry Acomb

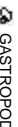
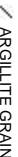









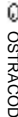





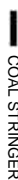
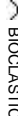


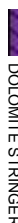



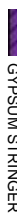

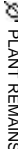
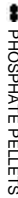
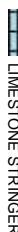
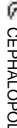
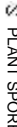
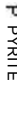
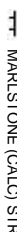


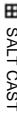




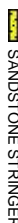











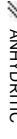

Zone Color Coding



Rock Types

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



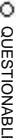



Accessories

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

Oil Show

 P PINPOINT
 V VUGGY






































Engineering

 D DEAD	
 E EVEN	
 Q QUESTIONABLE	 B BIT
 S SPOTTED STAINING	 C CONNECTION (UP)

Porosity

 C CONNECTION (DOWN)	 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		GS GRAINSTONE
	GAS SHOW		MIN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MIN DEPTH UP	Rounding			
					MS MUDSTONE
	MIN DEPTH (DOWN)		ANGULAR		PS PACKSTONE
	NORMAL FAULT		ROUNDED		WS WACKSTONE
	OVERTURNED STRATA		SUBANG		
	REVERSE FAULT		SUBRND	Sorting	
	CASING				M MODERATE
Textures					
	SIDEWALL CORE (LEFT)				P POOR
	(LEFT) SIDEWALL CORE (RIGHT)		BS BOUNDSTONE		W WELL
	SLIDE		CHALKY		
	SURVEY		CX CRYPTOXLN		

Slide/Rotate

COLUMBINE LOGGING RIGGED UP
ON 12/11/14 MANNED 2-PERSON

ROP
ROP —
GAMMA —

MUDLOG CONTINUED FROM "Wells
Ranch AE19-626 Horz.mplot"

ROP Data Imported from Pason EDR

Total Gas & Chromatograph

GAS —
C1 - - -
C2 - - -
C3 - - -
C4 - - -

GAS DATA FROM BLOODHOUND
CHROMATOGRAPH UNIT #273 JOB
158 via IBALL GAS CHART
DATABASE
"WELLS_RANCH_AE19_615.mdb"

Depth Labels

% Lith

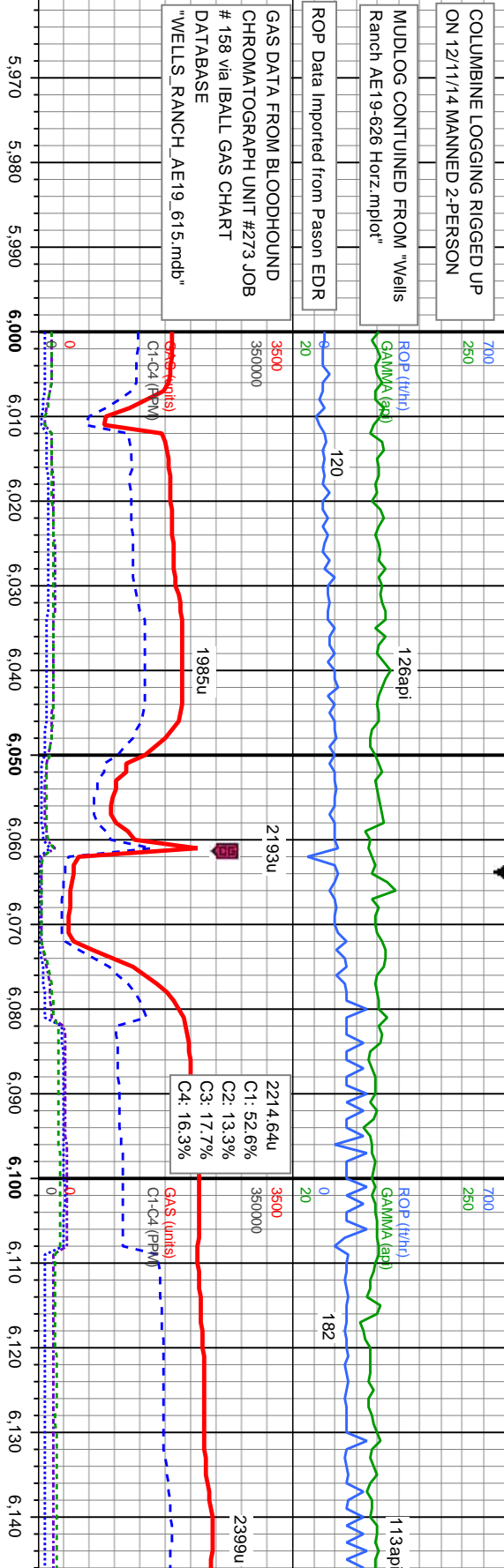
Survey and Gamma Data Provided
PathFinder Energy Services

Well Bore
TVD —

Oil Show

E
G
M
F
T
ST

Images



MD: 6.001'
TVD: 5.950.64'
Inclination: 9.67°
Azimuth: 275.8°
VS: 231.52'

TVD (ft)

SLTY SH: med - dk gy, sb bky-sb ply, sft- sl
frm, silt tex, sl rthy, sl silty ip, non calc, no bent

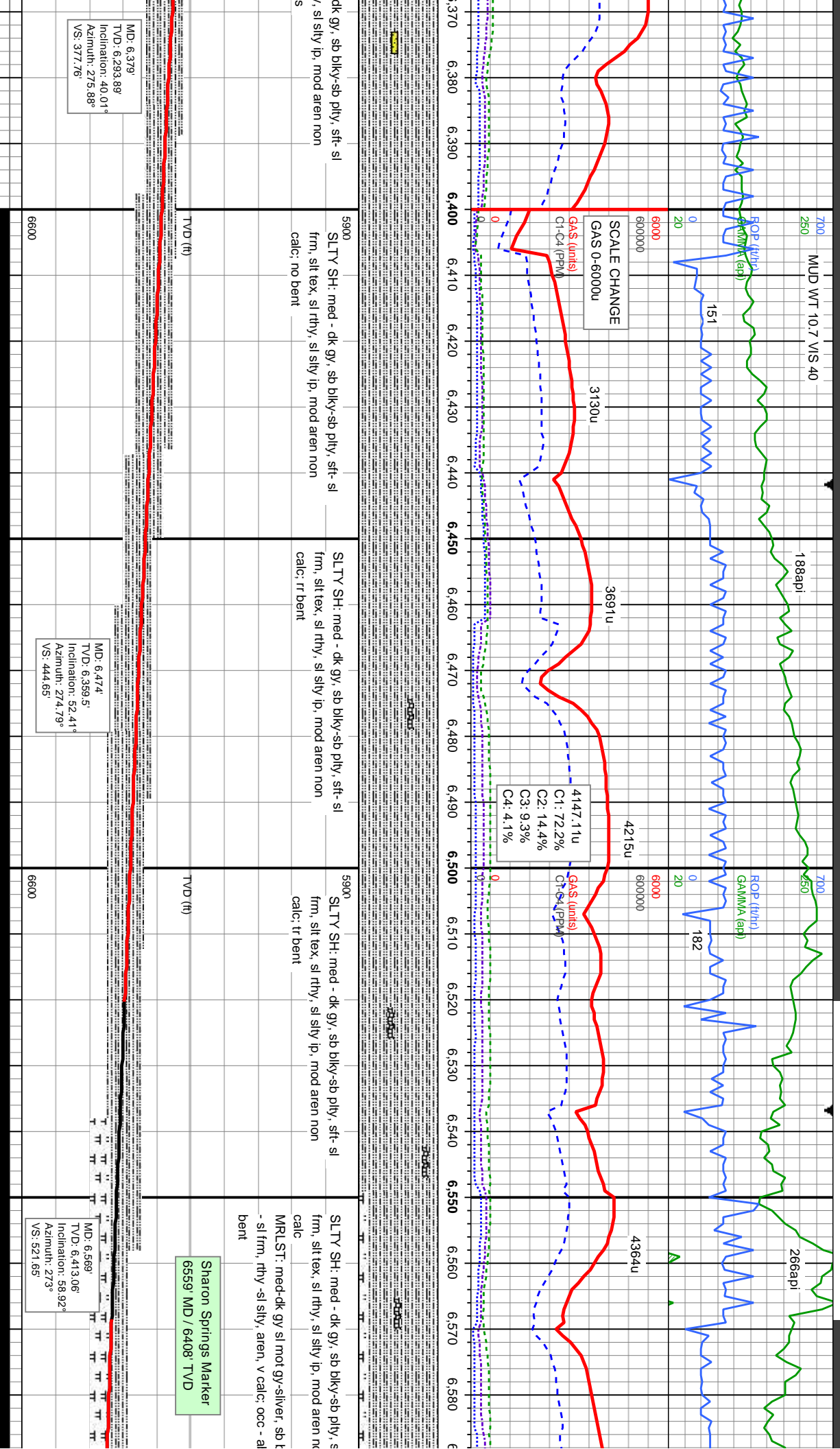
SLTY SH: med - dk gy, sb bky-sb ply, sft- sl
frm, silt tex, sl rthy, sl silty ip, mod aren non
calc, no bent, tr o sind ss w/dim yel flr

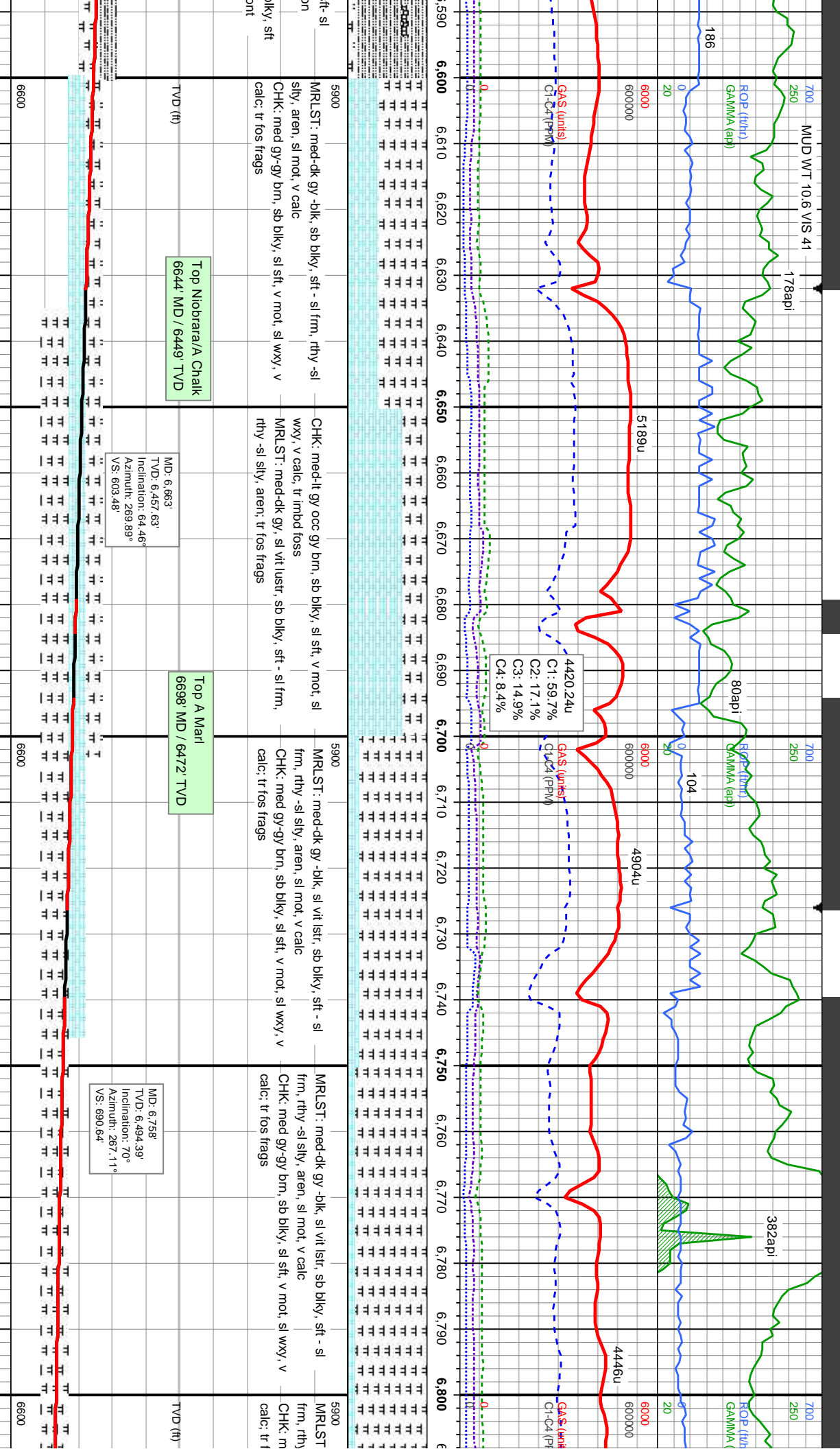
MD: 6.095'
TVD: 6.042.35'
Inclination: 15.48°
Azimuth: 266.51°
VS: 251.76'

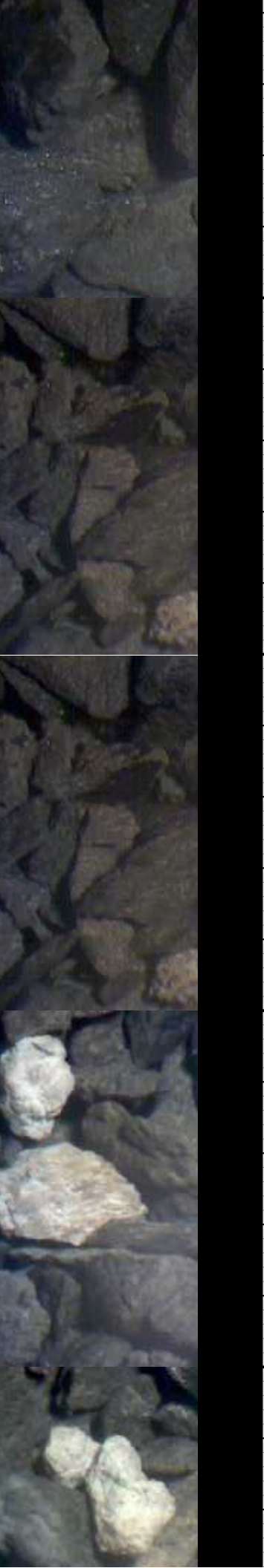
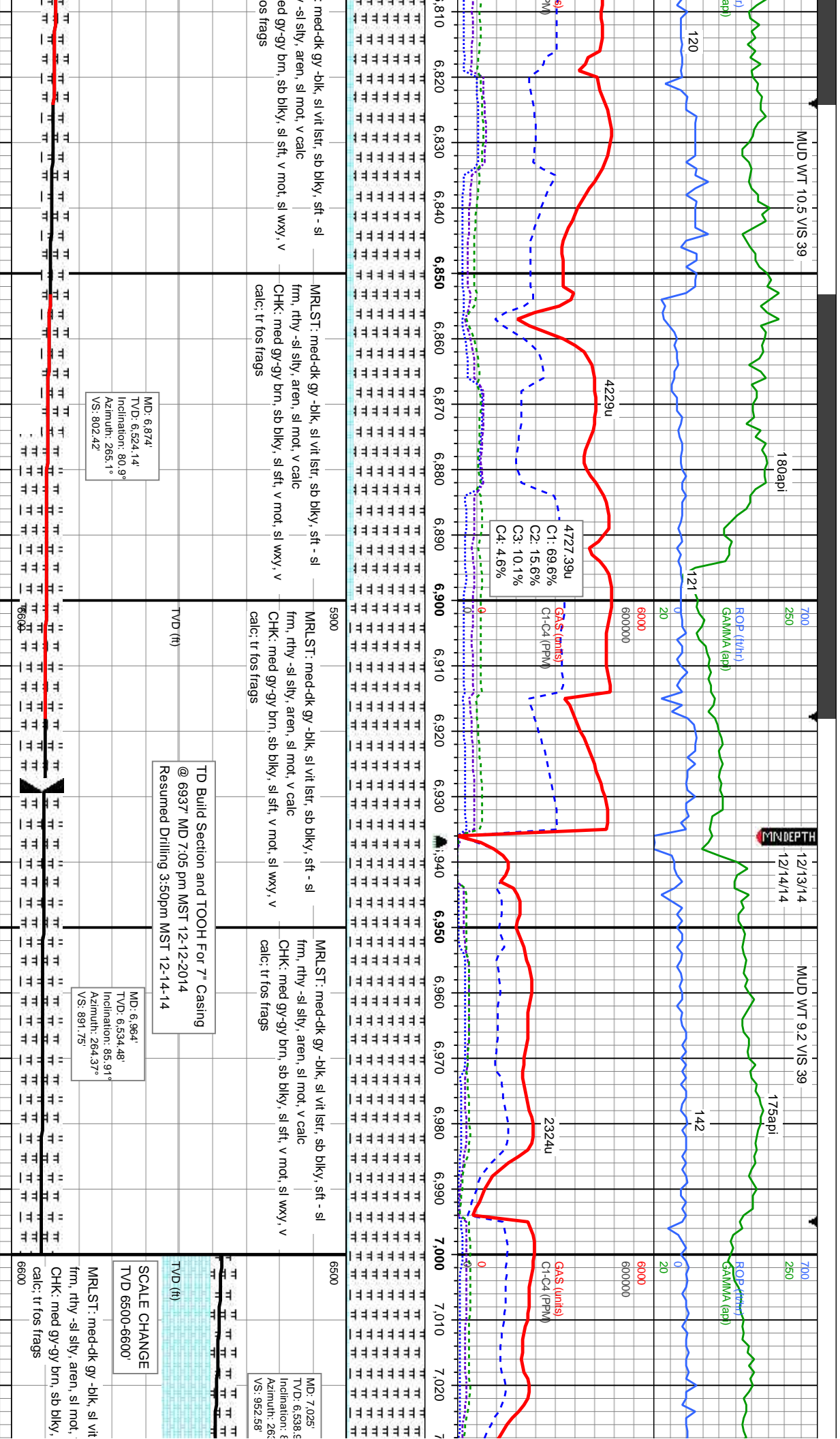
TVD (ft)

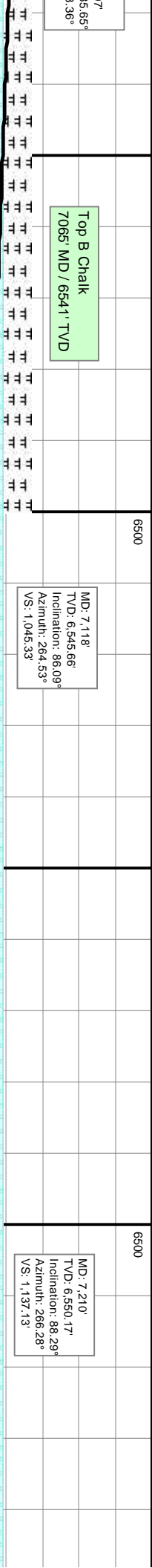
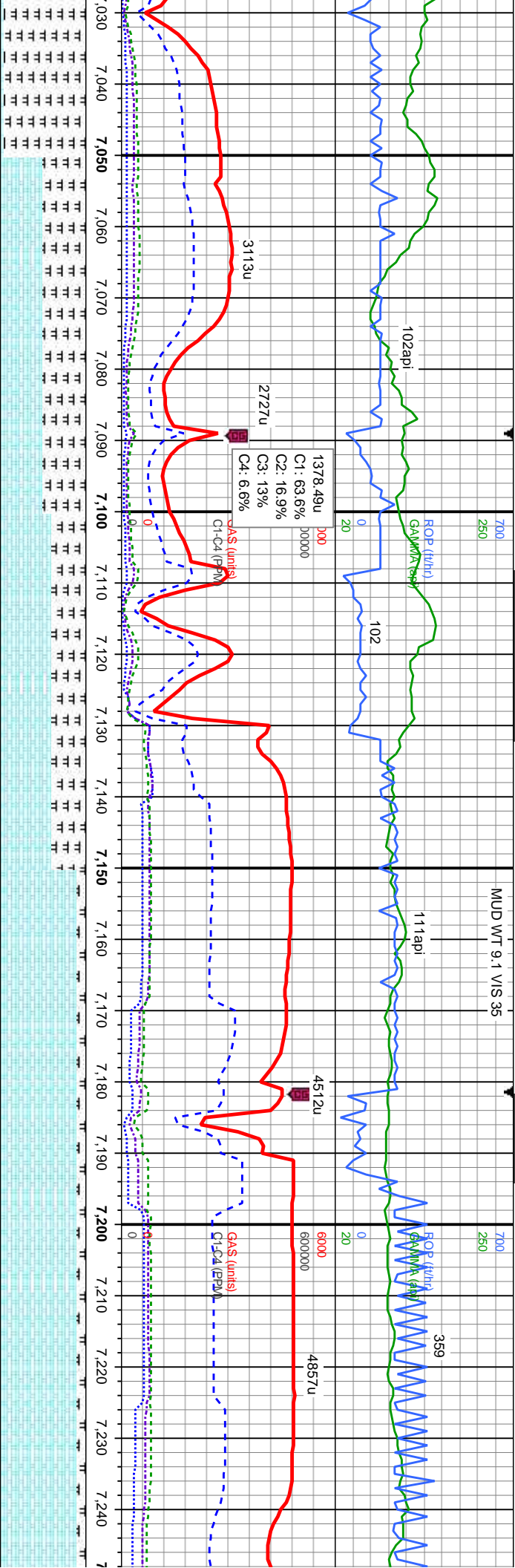
SLTY SH: med - dk gy, sb bky-sb ply, sft- sl
frm, silt tex, sl rthy, sl silty ip, mod aren non
calc, no bent, tr o sind ss w/dim yel flr





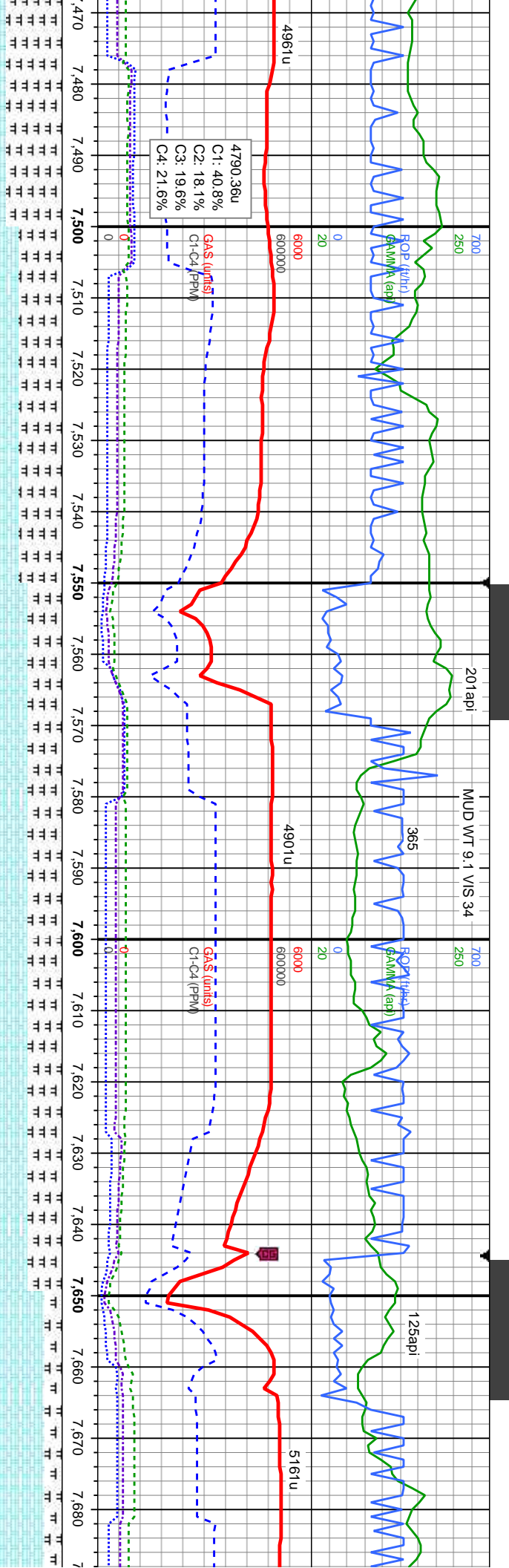






lstr, sb blky, sft - sl	MRLST: med-dk gy -blk, sl vlt lstr, sb blky, sft - sl	CHK: med-lt gy, gy brn, sb blky, sl sft, v mot, sl wxy, v calc, tr fos frags	MRLST: med-dk gy, tr vlt lstr, sb blky, sft - sl frm, rthy -sl sly, aren, sl mot, v calc	CHK: med-lt gy, gy brn, sb blky, sl sft, v mot, sl wxy, v calc, tr fos frags	MRLST: med-dk gy, tr vlt lstr, sb blky, sft - sl frm, rthy -sl sly, aren, tr calc frags	CHK: med-lt gy, gy brn, sb blky, sl sft, v mot, sl wxy, v calc, tr fos frags	MRLST: med-dk gy, tr vlt lstr, sb blky, sft - sl frm, rthy -sl sly, aren, tr calc frags	CHK: med-lt gy, gy brn, sb blky, sl sft, v mot, sl wxy, v calc, tr fos frags	MRLST: med-dk gy, tr vlt lstr, sb blky, sft - sl frm, rthy -sl sly, aren, tr calc frags
sl sft, v mot, sl wxy, v									
6600									





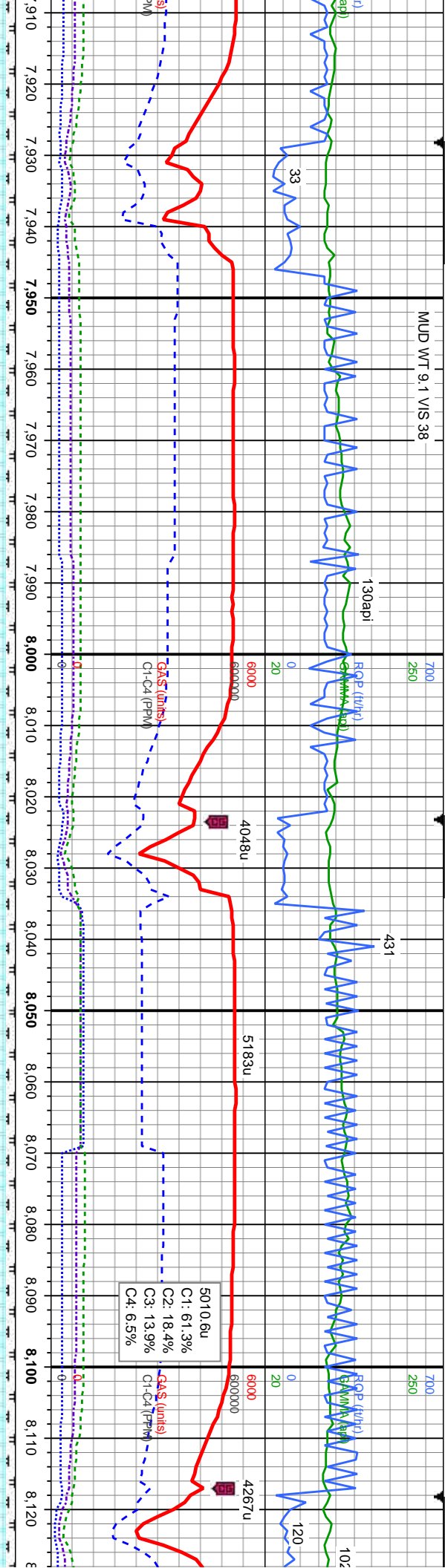
MD: 7.489°
TVD: 6.549.12°
Inclination: 92.68°
Azimuth: 269.36°
VS: 1.414.81°

MD: 7.582°
TVD: 6.545.63°
Inclination: 91.63°
Azimuth: 268.78°
VS: 1.507.23°

MD: 7.677°
TVD: 6.543.29°
Inclination: 91.19°
Azimuth: 268.93°
VS: 1.601.71°

v - blk, sl vlt lstr, sb blkly, sft - sl	CHK: med-lt gy, gy brn, sb blkly, sl sft, v mot, sl	CHK: med-lt gy, gy brn, sb blkly, sl sft, v mot, sl	CHK: med-lt gy, gy brn, sb blkly, sl sft, v mot, sl
en, sl mot, v calc	wxy, v calc, tr fos frags	wxy, v calc, tr fos frags	wxy, v calc, tr fos frags
rn, sb blkly, sl sft, v mot, sl wxy, v	MRLST: med-dk gy, tr vlt lustr, sb blkly, sft - sl frm, rthy -sl slty, aren, tr calc frags	MRLST: med-dk gy, tr vlt lustr, sb blkly, sft - sl frm, rthy -sl slty, aren, tr calc frags	MRLST: med-dk gy, tr gy brn, tr vlt lustr, sb blkly, sft - sl frm, rthy -sl slty, aren, tr calc frags
	6600	6600	6600



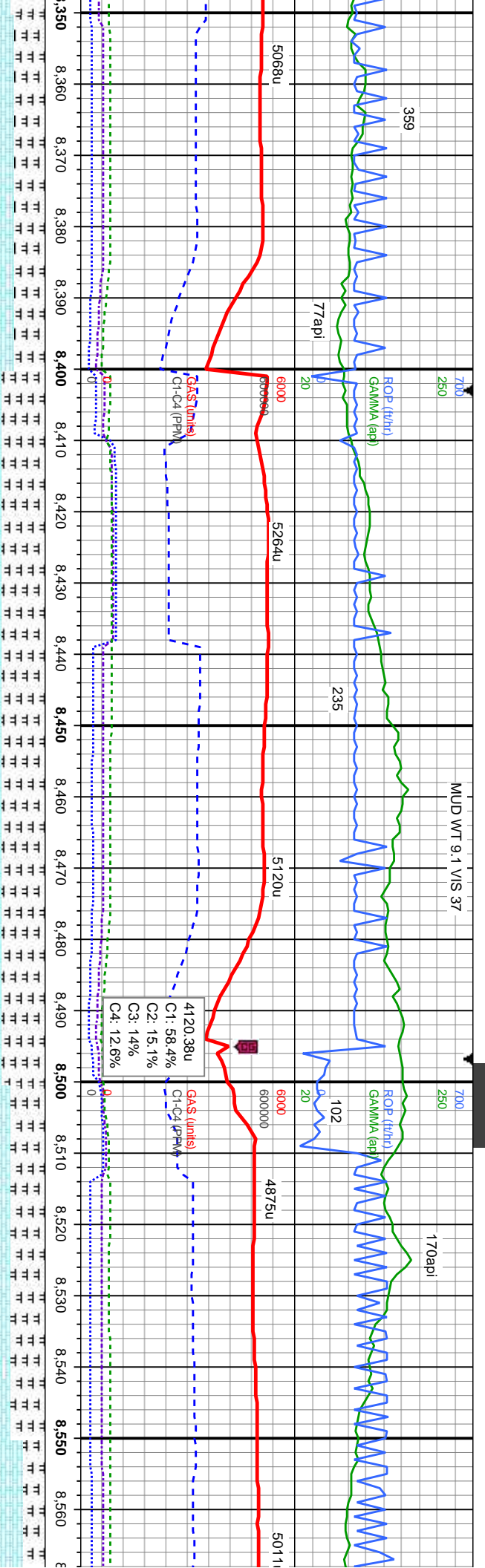


MD: 7,961'
TVD: 6,546.48'
Inclination: 89.34°
Azimuth: 268.56°
VS: 1,884.36'

MD: 8,056'
TVD: 6,547.14'
Inclination: 89.87
Azimuth: 269.38°
VS: 1,978.84'

C1: 61.3%
C2: 18.4%
C3: 13.9%
C4: 6.5%

[illegible]

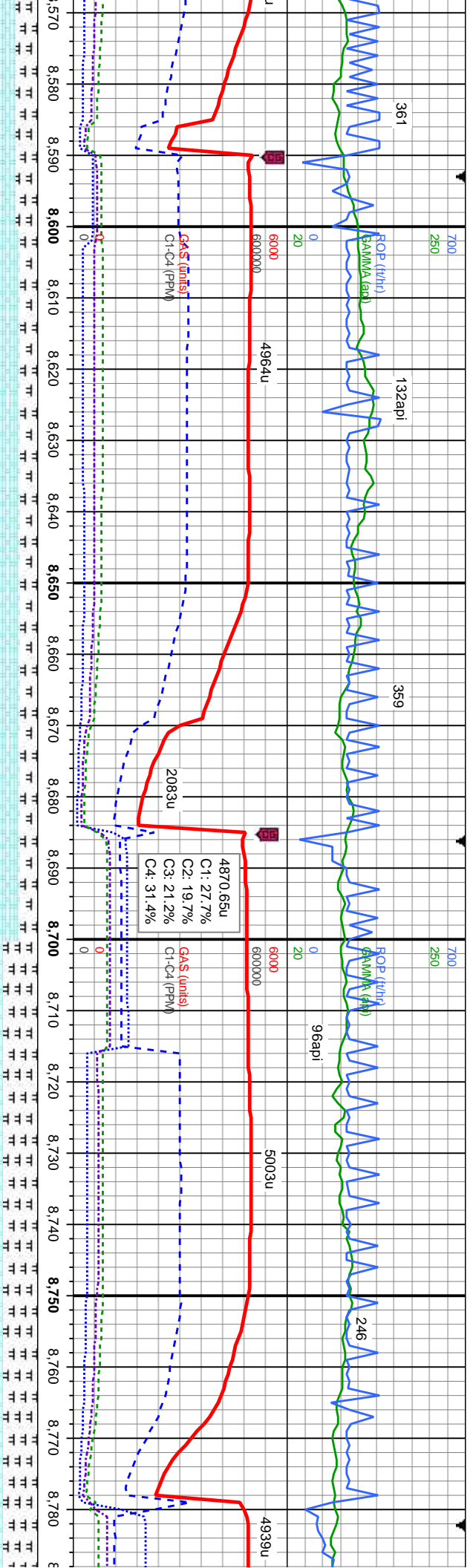


6500	CHK: med gy- gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc, tr bdcg MRLST: med-dk gy, tr gy brn, tr vit lustr, sb blk, sft - sl frm, rthy -sl silty, aren	6600
6500	CHK: med gy- gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc, tr bdcg MRLST: med-dk gy, tr gy brn, sb blk, sft - sl frm, rthy -sl silty, aren	6600
6500	CHK: med gy- gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc, tr bdcg MRLST: med-dk gy, tr gy brn, sb blk, sft - sl frm, rthy -sl silty, aren	6600

MD: 8.434'
TVD: 6.563.52'
Inclination: 88.99°
Azimuth: 268.57°
VS: 2.354.55'

MD: 8.529'
TVD: 6.566.14'
Inclination: 87.85°
Azimuth: 268.78°
VS: 2.449.06'





brn occ grdg - lt gy, sb blkly, sl
sft-sl frm, mod mot, sl wxy, v calc
MRLST: med-dk gy, tr gy brn, sb blkly, sft - sl frm,
rthy -sl sily, aren

6500
CHK: med gy- gy brn occ grdg - lt gy, sb blkly, sl
sft-sl frm, mod mot, sl wxy, v calc
MRLST: med-dk gy, tr gy brn, sb blkly, sft - sl frm,
rthy -sl sily, aren

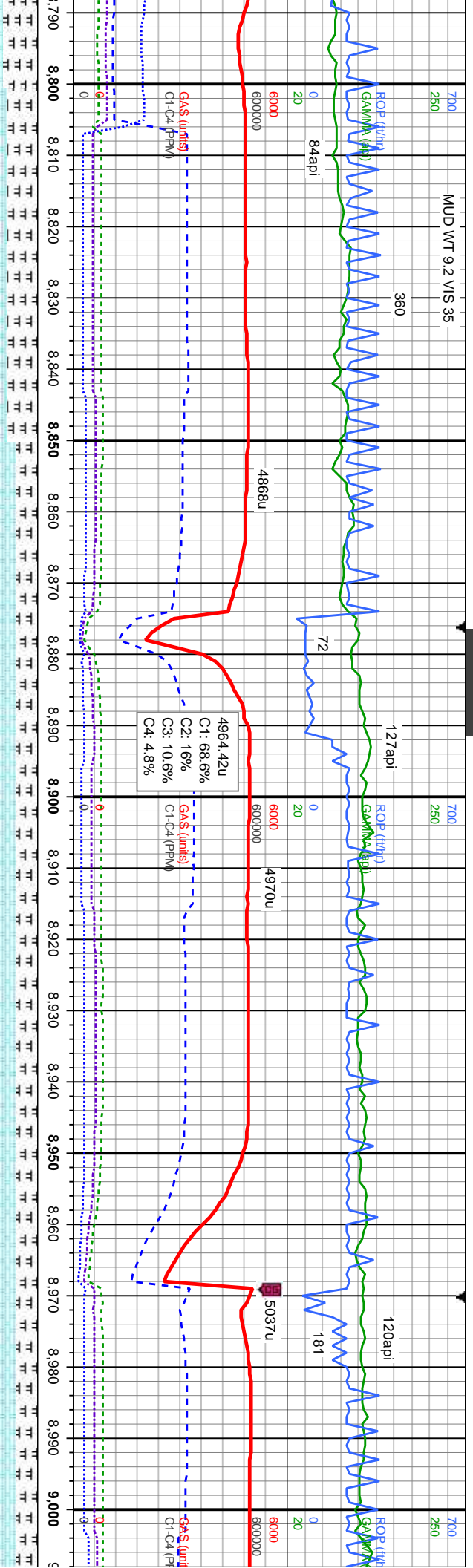
6500
CHK: med gy- gy brn occ grdg - lt gy, sb blkly, sl
sft-sl frm, mod mot, sl wxy, v calc
MRLST: med-dk gy, tr gy brn, sb blkly, sft - sl frm,
rthy -sl sily, aren

6500
CHK: med gy- gy brn, sb blkly, sl sft-sl frm
mod, sl wxy, v calc
MRLST: med-dk gy, tr gy brn, sb blkly, sft
rthy -sl sily, aren, v calc

MD: 8,623'
TVD: 6,559.31'
Inclination: 88.29°
Azimuth: 266.62°
VS: 2,542.54'

MD: 8,718'
TVD: 6,561.56'
Inclination: 88.99°
Azimuth: 267.86°
VS: 2,637.13'



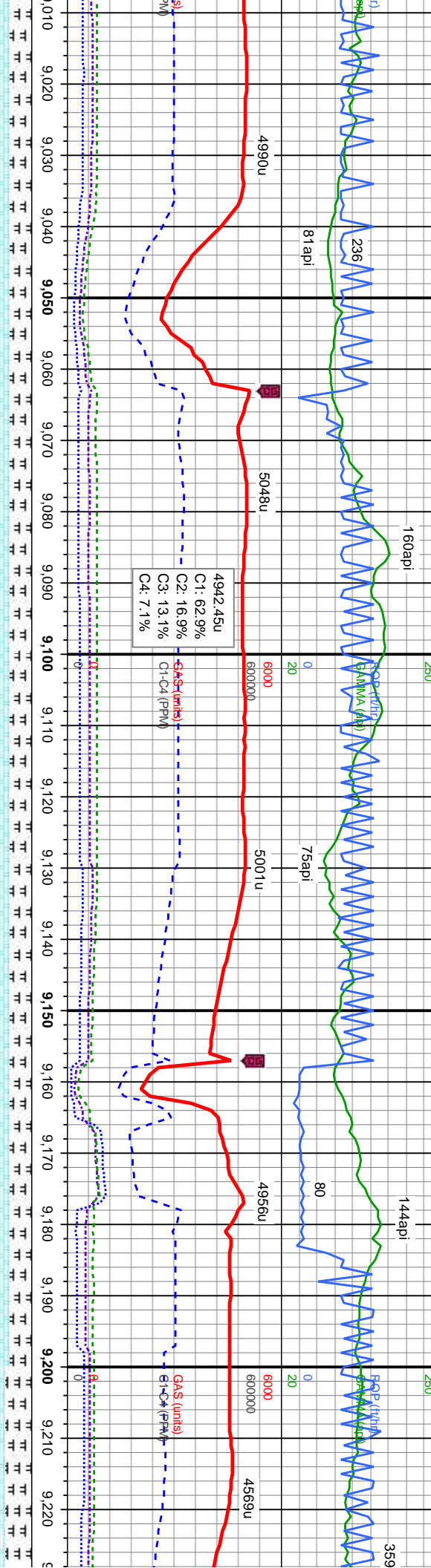


6500	CHK: gy brn-med gy w/ occ lt gy, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc	6500	CHK: brn-lt-gy-med gy, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc	6500	CHK: brn-lt-gy-med gy, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc
- sl frm,	MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy	- sl frm,	MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy	- sl frm,	MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy
- sl sily, aren, v calc; occ lse fos frag		- sl sily, aren, v calc; occ lse fos frag		- sl sily, aren, v calc; occ lse fos frag	

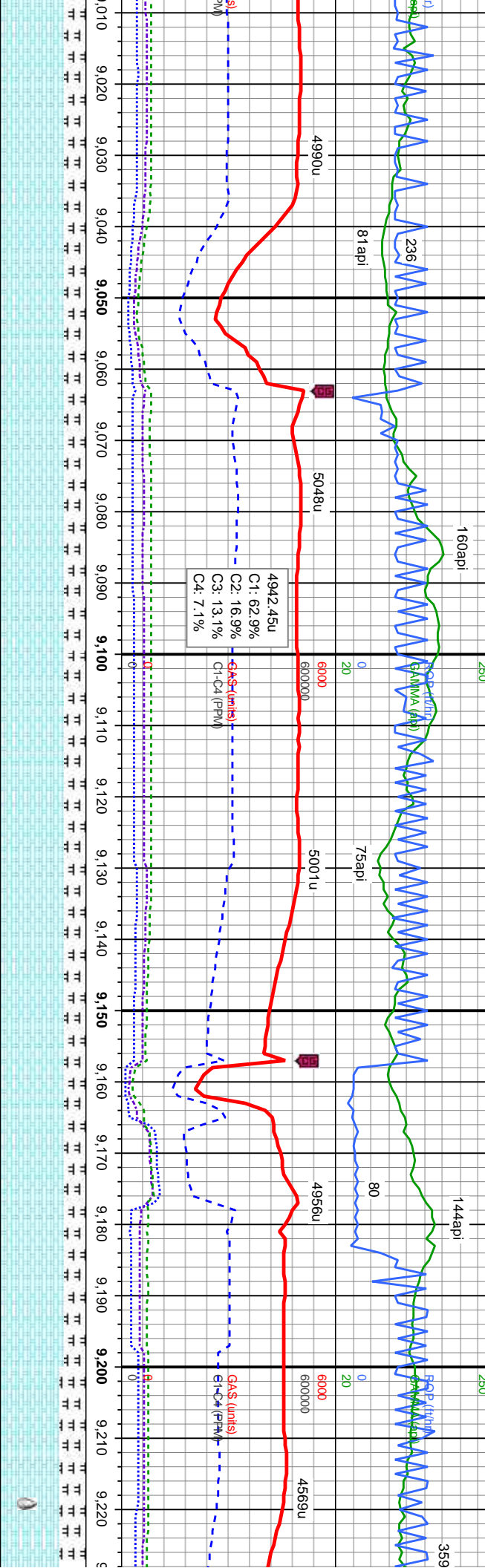
MD: 8.812° TVD: 6.562.57° Inclination: 89.78° Azimuth: 267.69° VS: 2.730.8°	MD: 8.906° TVD: 6.563.66° Inclination: 88.9° Azimuth: 268.09° VS: 2.824.46°	MD: 9.001° TVD: 6.564.68° Inclination: 89.87° Azimuth: 266.75° VS: 2.919.17°
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MUD WT 9.25 VIS 38



MUD WT 9.1 VIS 38

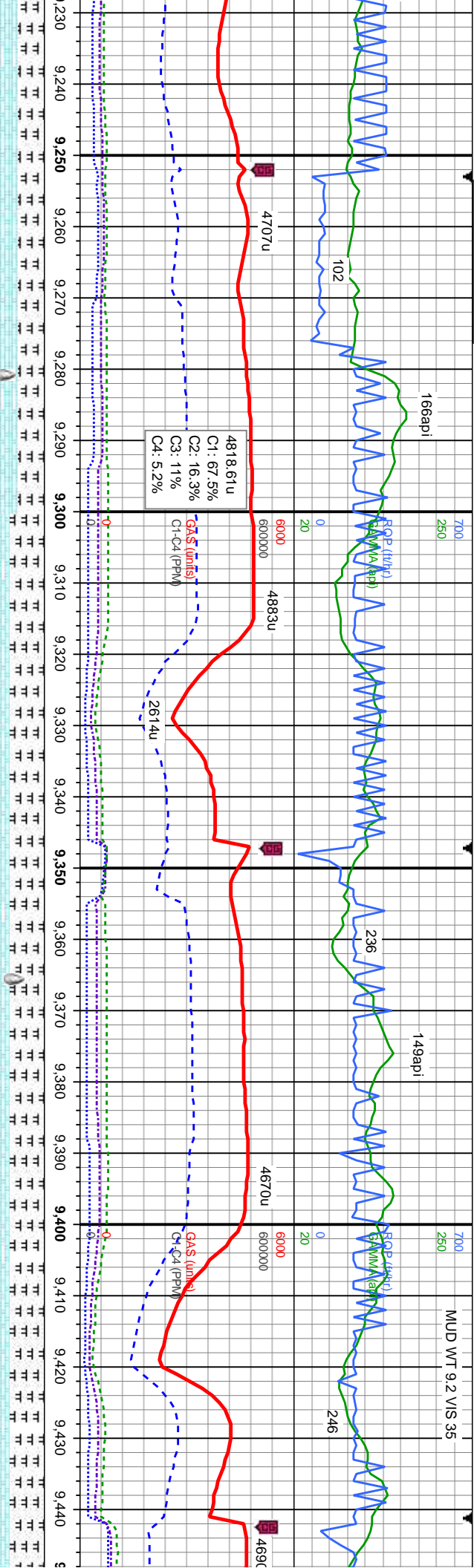


m-lt-gy-med gy, sb blk, sl sft-sl frm, mod wxy, v calc	: med-dk gy, sb blk-sb ply, sft - sl frm, rthy aren, v calc	CHK: lt gy-med gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc MRLST: med-dk gy, sb blk-sb ply, sft - sl frm, rthy -sl sily, aren, v calc	TVD (ft)	9,010	9,020	9,030	9,040	9,050	9,060	9,070	9,080	9,090	9,100	9,110	9,120	9,130	9,140	9,150	9,160	9,170	9,180	9,190	9,200	9,210	9,220	9,230
				9,010	9,020	9,030	9,040	9,050	9,060	9,070	9,080	9,090	9,100	9,110	9,120	9,130	9,140	9,150	9,160	9,170	9,180	9,190	9,200	9,210	9,220	9,230
				9,010	9,020	9,030	9,040	9,050	9,060	9,070	9,080	9,090	9,100	9,110	9,120	9,130	9,140	9,150	9,160	9,170	9,180	9,190	9,200	9,210	9,220	9,230
				9,010	9,020	9,030	9,040	9,050	9,060	9,070	9,080	9,090	9,100	9,110	9,120	9,130	9,140	9,150	9,160	9,170	9,180	9,190	9,200	9,210	9,220	9,230

MD: 9.095'
TVD: 6,564.03'
Inclination: 90.92°
Azimuth: 266.43°
VS: 3.012.98'

MD: 9.190'
TVD: 6,563.23'
Inclination: 90.04°
Azimuth: 268.58°
VS: 3.107.69'

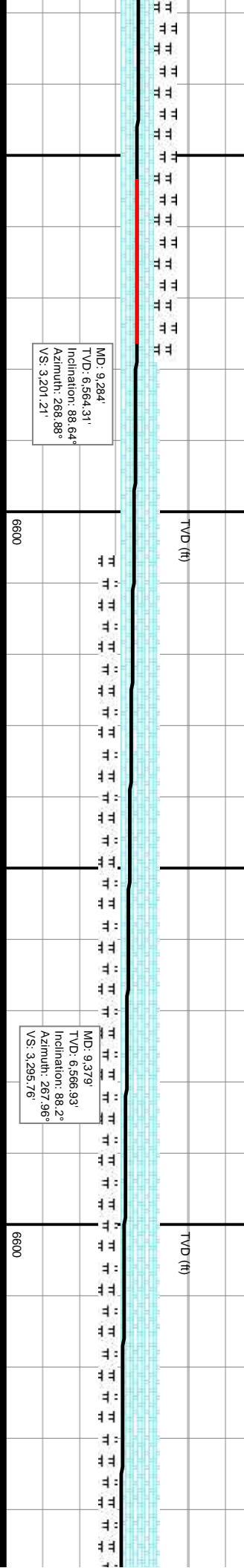


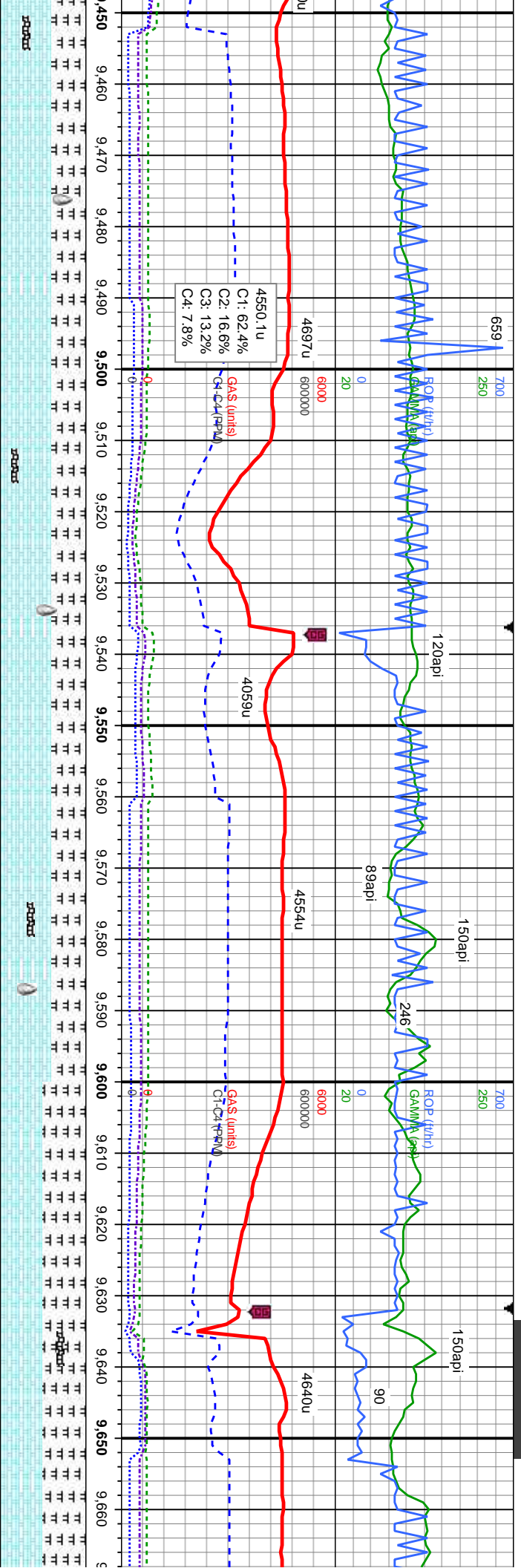


CHK: lt-med gy- lt gy brn, sb blk, sl sft-sl frm, mod
mot, sl wxy, v calc
MRLST: med-dk gy, sb blk-sb ply, sft - sl frm, rthy
-sl silty, aren, v calc; occ inoc fos frag

CHK: lt-med gy- lt gy brn, sb blk, sl sft-sl frm,
mod mot, sl wxy, v calc
MRLST: med-dk gy, sb blk-sb ply, sft - sl frm,
rthy -sl silty, aren, v calc; occ inoc fos frag; occ
bent

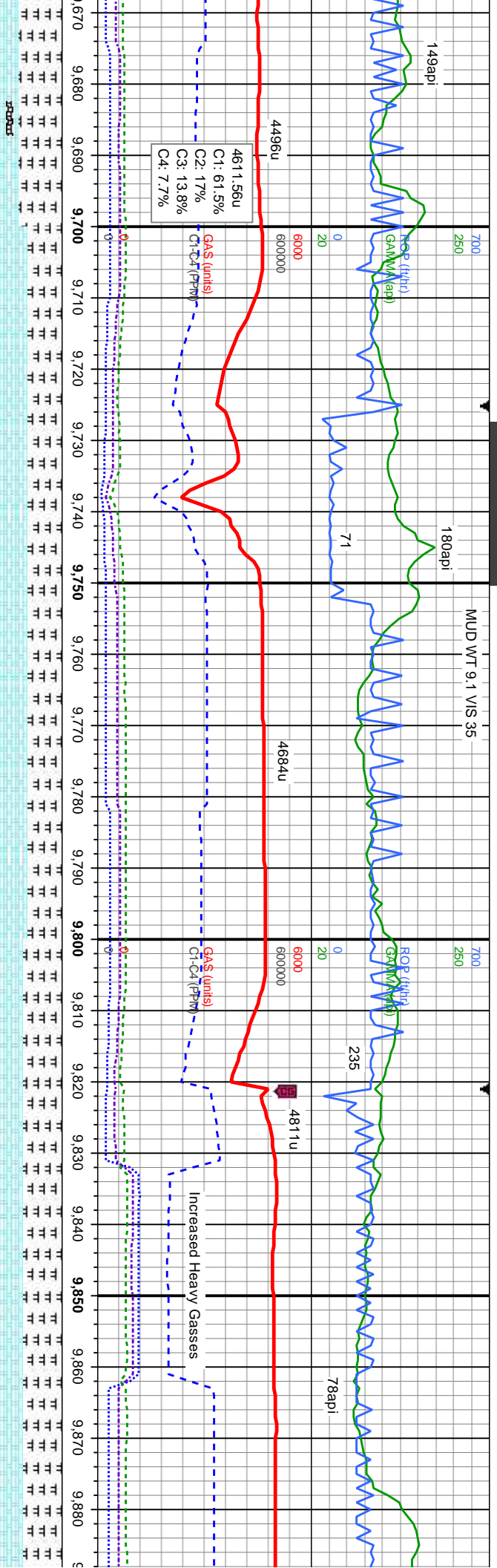
CHK: lt-med gy- lt gy brn, sb blk, sl sft-sl frm,
mod mot, sl wxy, v calc
MRLST: med-dk gy, sb blk-sb ply, sft - sl frm,
rthy -sl silty, aren, v calc; occ inoc fos frag; occ
bent





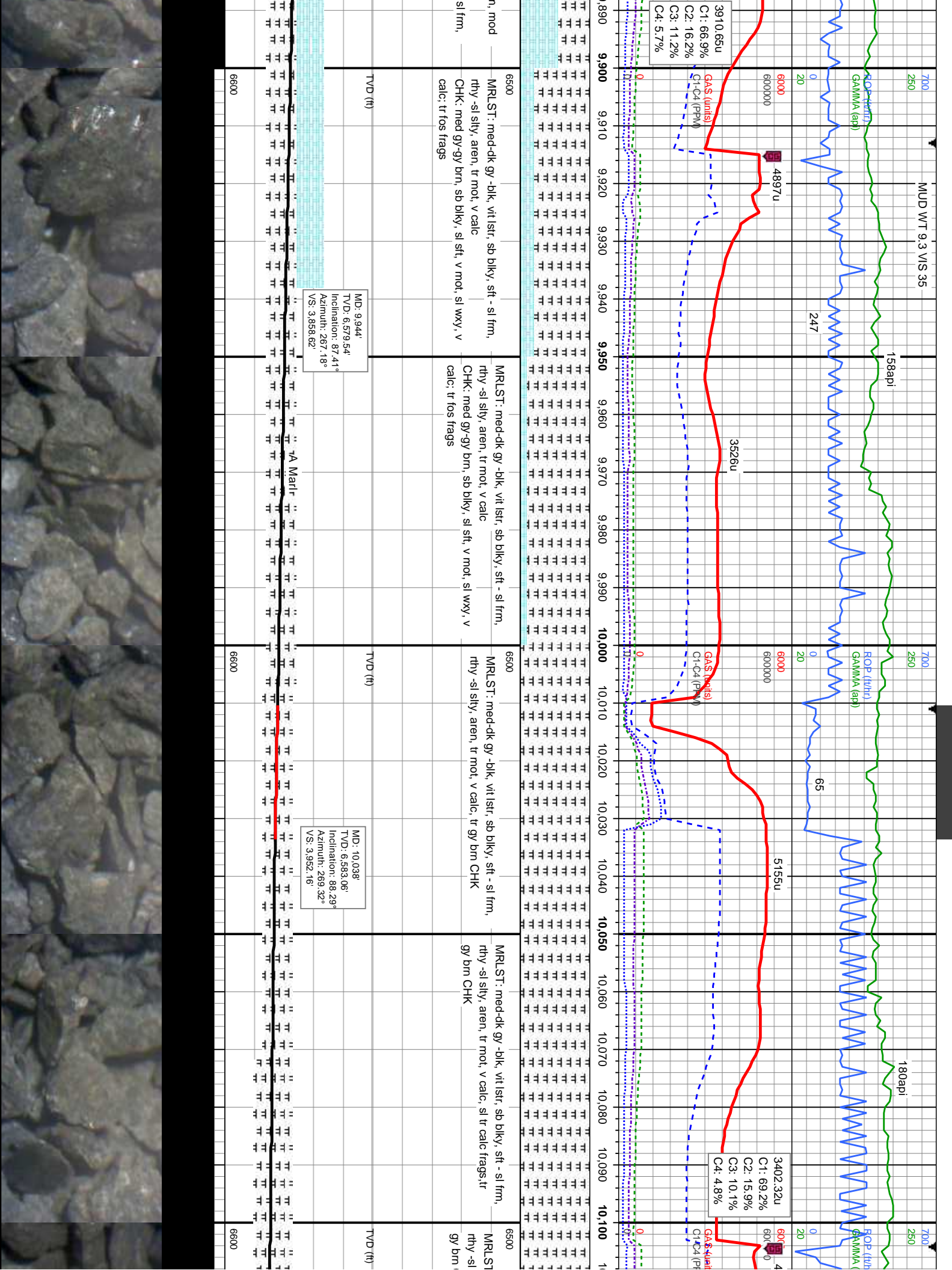
CHK: lt-med gy- lt gy brn, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy -sl silty, aren, v calc, occ inoc fos frag, occ bent	6500	CHK: lt-med gy- lt gy brn, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc, imbd cal nod MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy -sl silty, aren, v calc, imbd cal nod; occ inoc fos frag, occ bent	6500	CHK: lt-med gy- lt gy brn, sb blkly, sl sft-sl frm, mod mot, sl wxy, v calc, tr imbd cal nod MRLST: med-dk gy, sb blkly-sb ply, sft - sl frm, rthy -sl silty, aren, v calc, tr imbd cal nod; tr inoc fos frag, tr bent	6500
	TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)	
Lower B Chalk					
Lower B Chalk					
Fault Zone					
MD: 9.473 TVD: 6,569.03' Inclination: 89.25° Azimuth: 266.97° VS: 3,389.45'					
MD: 9.567 TVD: 6,569.39' Inclination: 90.31° Azimuth: 266.82° VS: 3,483.24'					
MD: 9.662 TVD: 6,569.16' Inclination: 89.96° Azimuth: 268.06° VS: 3,577.96'					

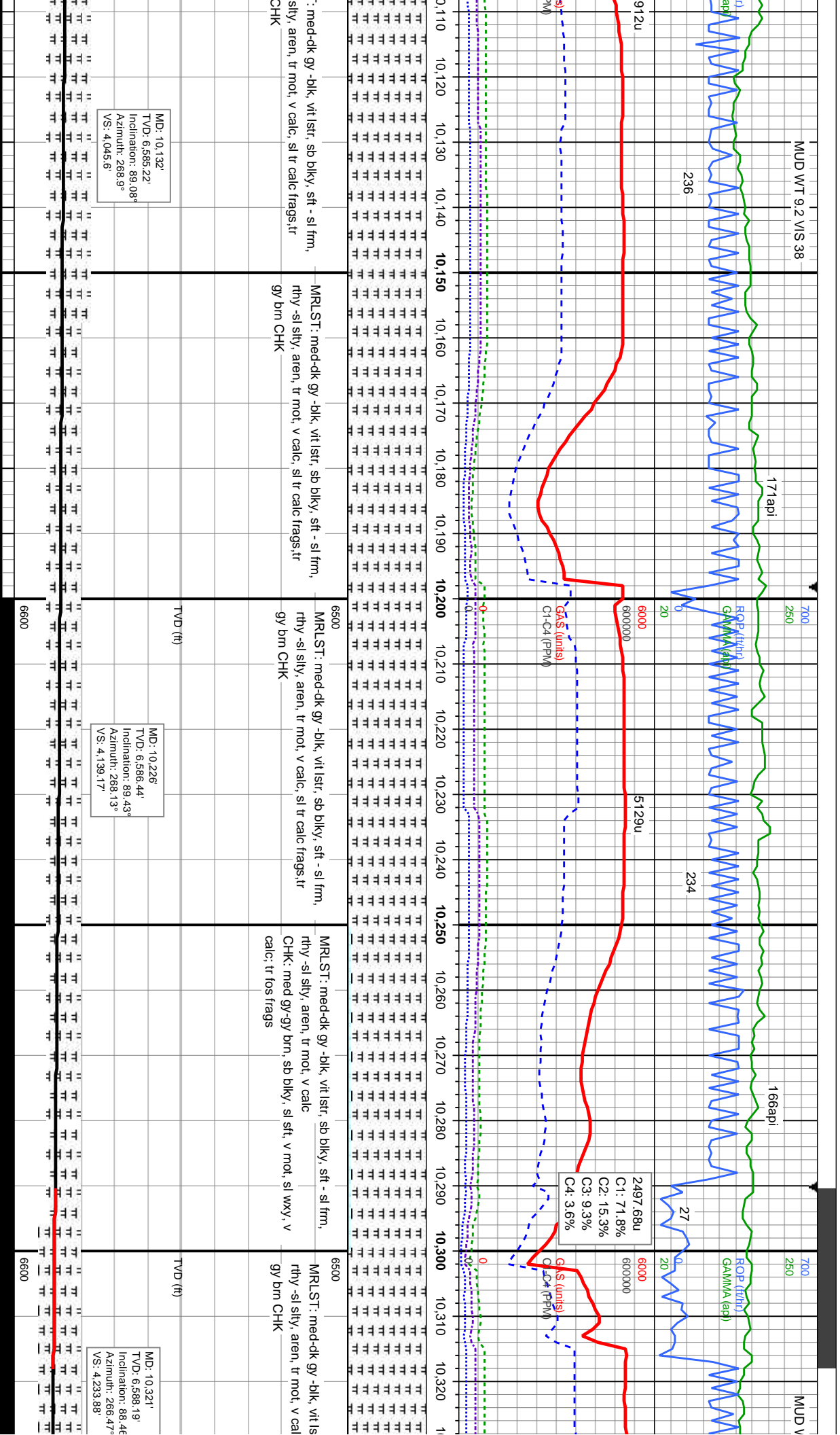


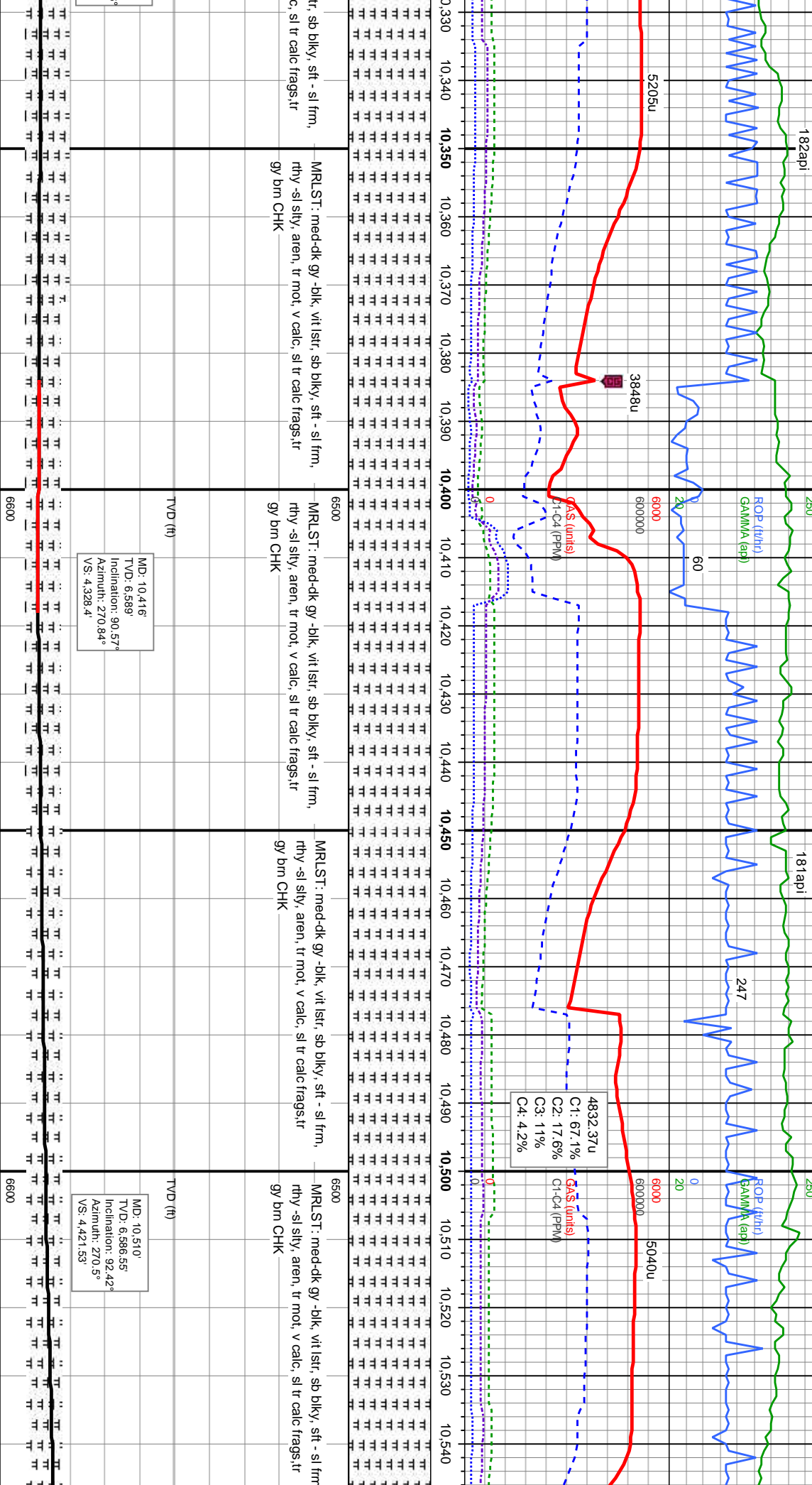


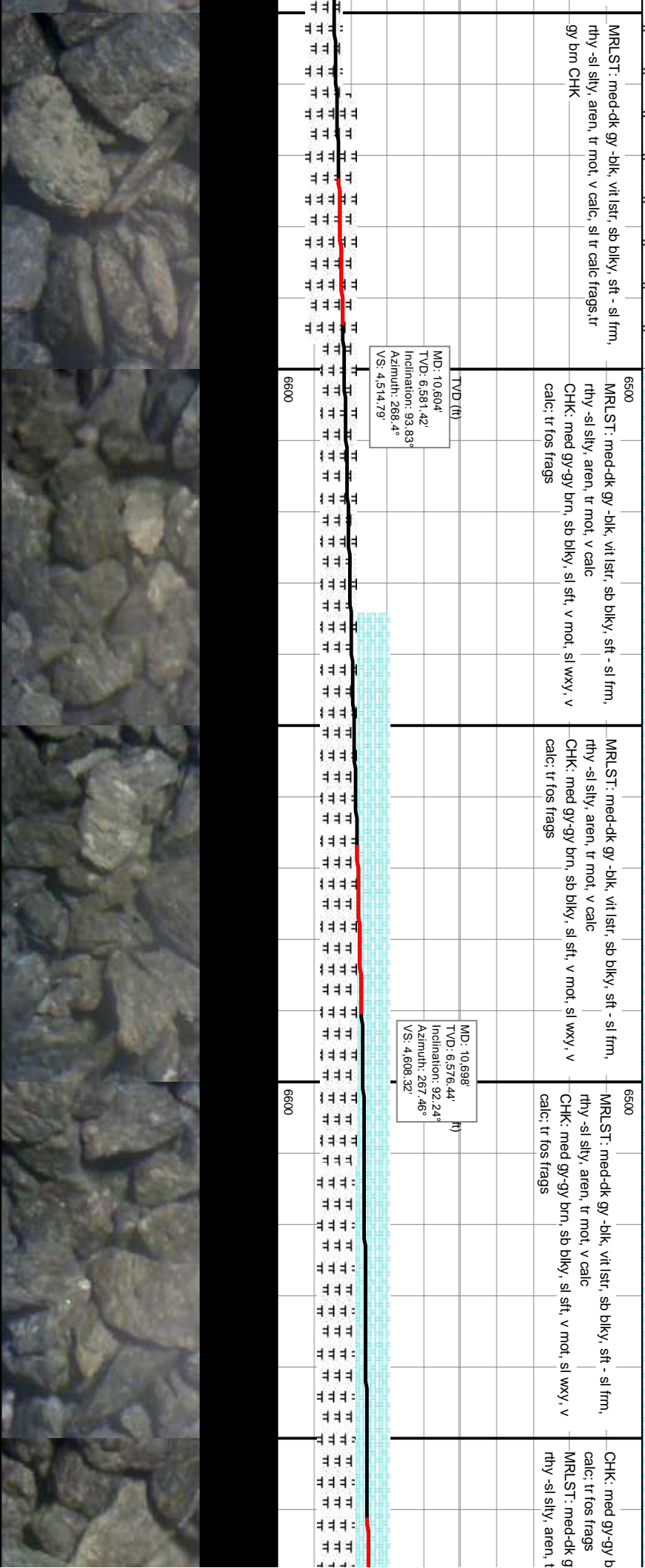
6500	CHK: med gy- gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc, MRLST: med-dk gy, sb blk-sb ply, sft - sl frm, rthy -sl silty, aren, v calc	MD: 9.756 TVD: 6,571.39' Inclination: 87.32° Azimuth: 268.72° VS: 3.671.51'	6600
6500	CHK: med gy- gy brn, sb blk, sl sft-sl frm, mod mot, sl wxy, v calc, MRLST: med-dk gy, sb blk-sb ply, sft - sl frm, rthy -sl silty, aren, v calc	MD: 9.850 TVD: 6,575.5' Inclination: 87.67° Azimuth: 268.11° VS: 3.765.01'	6600

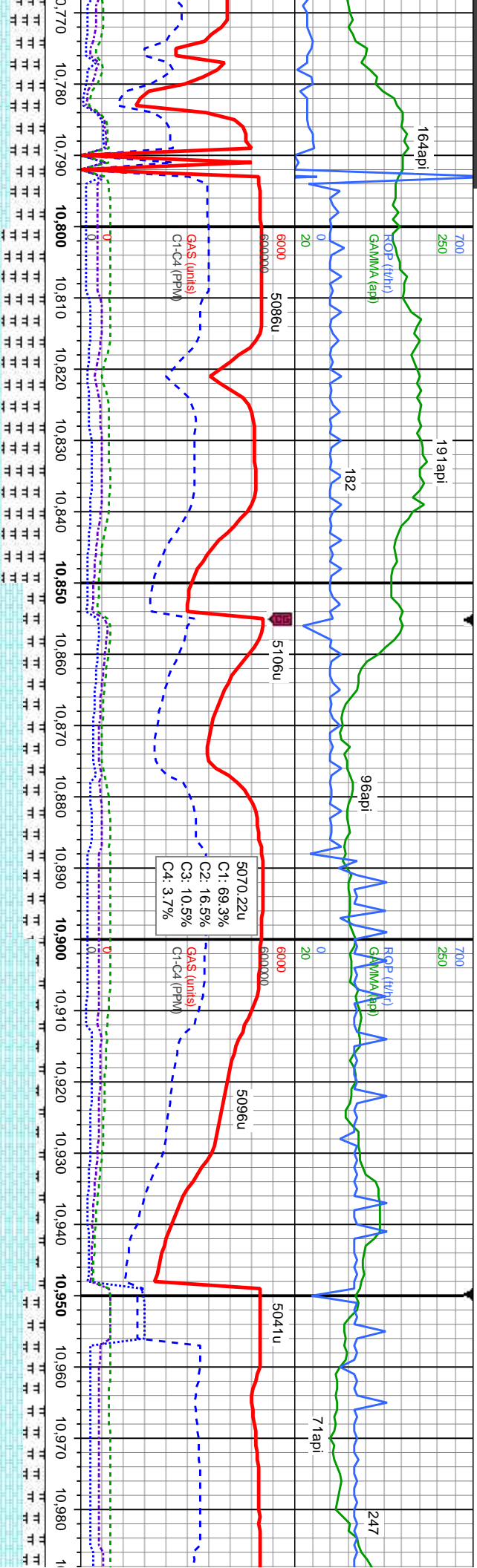












rn, sb blk, sl sft, v mot, sl wxy, v
v - blk, vit lstr, sb blk, sft - sl frm,
mot, v calc

6500 MRLST: med-dk gy -blk, vit lstr, sb blk, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc
CHK: med gy-gy brn, sb blk, sl sft, v mot, sl wxy, v
calc: tr fos frags

6500 CHK: med gy-gy brn, sb blk, sl sft, v mot, sl wxy, v
calc: abnt fos frags
MRLST: med-dk gy -blk, vit lstr, sb blk, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc, occ fos frags

6500 CHK: med gy-gy brn, sb blk, sl sft, v mot, sl wxy, v
calc: abnt fos frags
MRLST: med-dk gy -blk, vit lstr, sb blk, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc, occ fos frags

6500 CHK: med gy-gy brn, sb blk, sl sft, v mot, sl wxy, v
calc: abnt fos frags
MRLST: med-dk gy -blk, vit lstr, sb blk, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc, occ fos frags

MD: 10.793'
TVD: 6,574.62'
Inclination: 89.96°
Azimuth: 268.22°
VS: 4,702.96'

TVD (ft)

MD: 10.867'
TVD: 6,575.7'
Inclination: 88.72°
Azimuth: 267.39°
VS: 4,796.62'

TVD (ft)

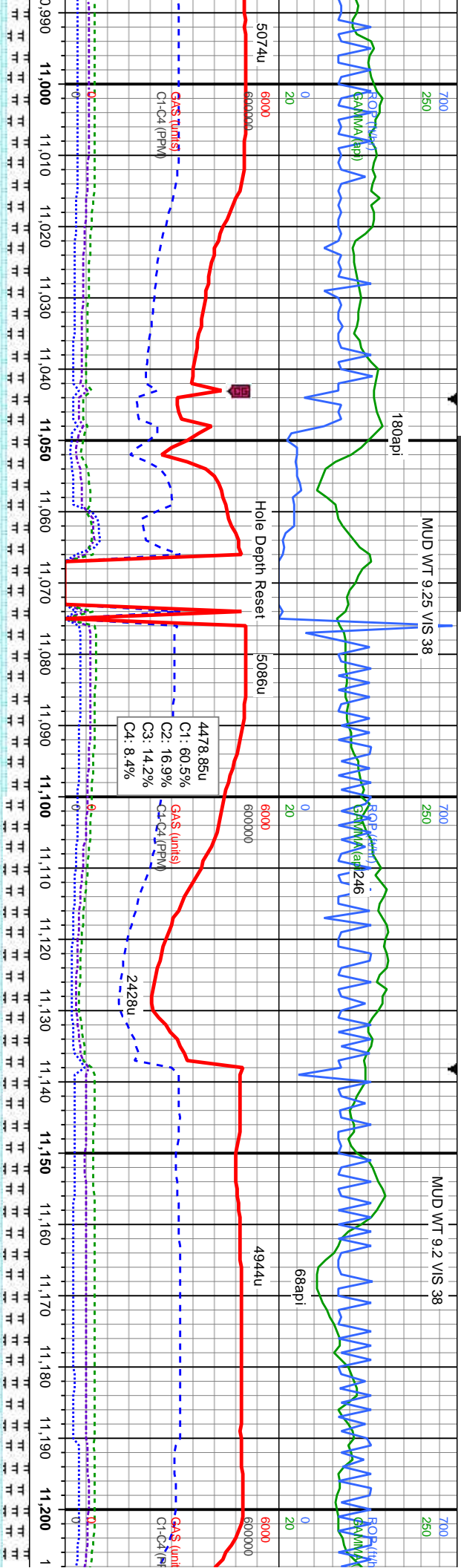
MD: 10.982'
TVD: 6,577.53'
Inclination: 89.06°
Azimuth: 266.45°
VS: 4,891.39'

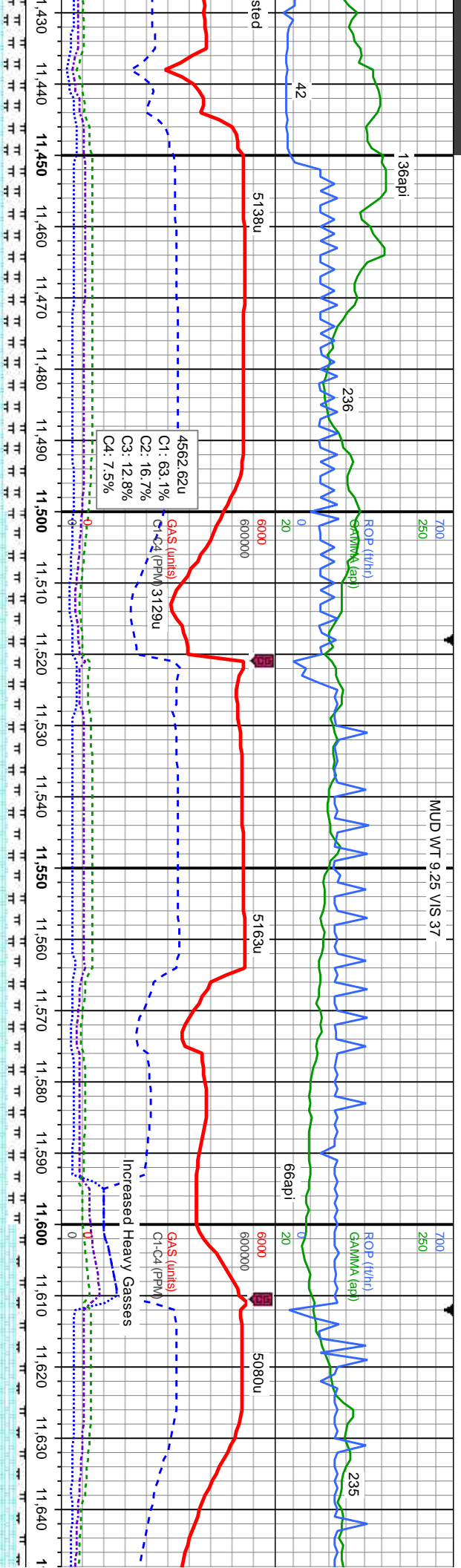
6600

6600

6600



[illegible]



tan-brn, sb blk, sl

CHK: med gy- lt gy brn abnt sp tan-brn, sb blk, sl
sft, mot, sl wxy, v calc

MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc; tr bent

tan-brn, sb blk, sl

CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk,
sl sft, mot, sl wxy, v calc

MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc; tr bent

tan-brn, sb blk, sl

CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk,
sl sft, mot, sl wxy, v calc

MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm,
rthy -sl silty, aren, tr mot, v calc; tr bent

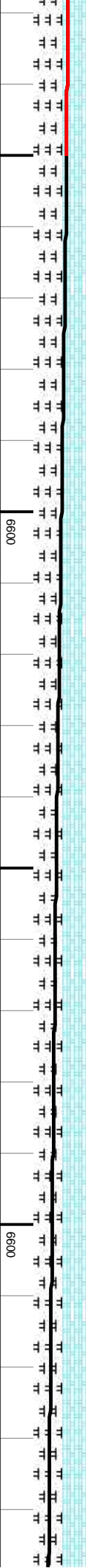
MD: 11.455
TVD: 6,581.65
Inclination: 88.02°
Azimuth: 271.15°
VS: 5,361.95'

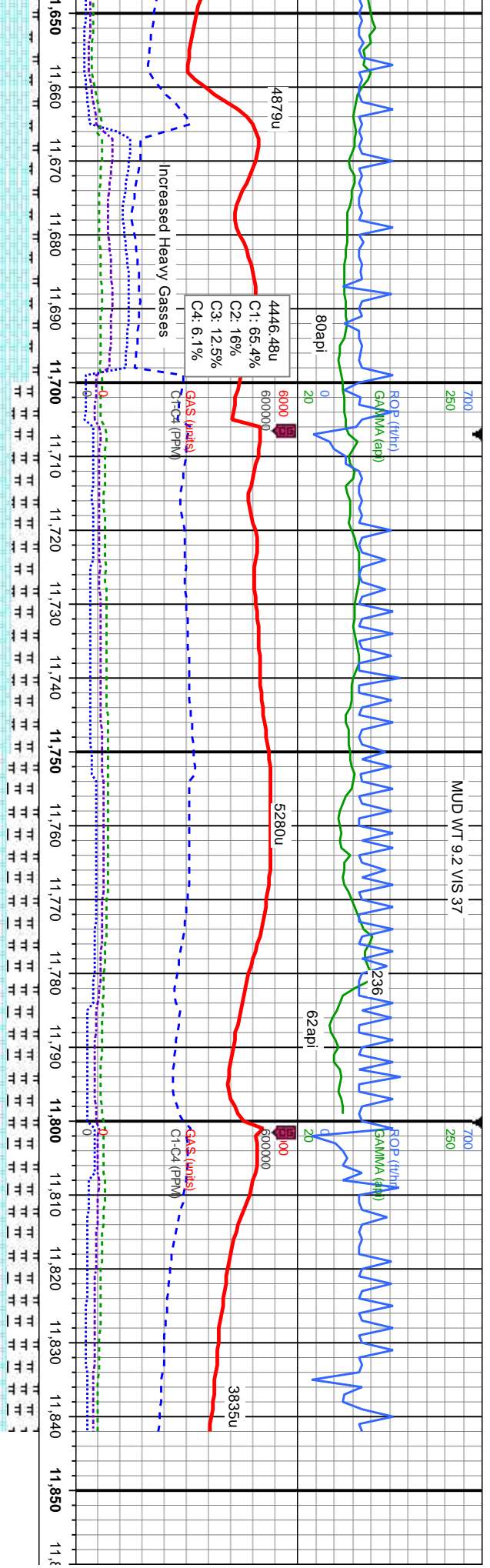
TVD (ft)

MD: 11.549
TVD: 6,584.46
Inclination: 88.55°
Azimuth: 271°
VS: 5,454.98'

TVD (ft)

MD: 11.644
TVD: 6,586.5
Inclination: 88°
Azimuth: 271°
VS: 5,548.99'





CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm, rthy -sl sily, aren, tr mot, v calc; tr bent

CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm, rthy -sl sily, aren, tr mot, v calc; tr bent

CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm, rthy -sl sily, aren, tr mot, v calc; tr bent

CHK: med -lt gy- lt gy brn abnt sp tan-brn, sb blk, sl sft, mot, sl wxy, v calc
MRLST: med-dk gy -blk, sb blk- sb ply, sft - sl frm, rthy -sl sily, aren, tr mot, v calc; tr bent

MD: 11.739
TVD: 6,587.45
Inclination: 89.87°
Azimuth: 271.4°
VS: 5.642.96

MD: 11.779
TVD: 6,587.35
Inclination: 90.4°
Azimuth: 271.48°
VS: 5.682.53

TD 11,842MD
11:50am MST 12/16/2014
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