



Scale: 5" / 100'
Measured Depth Log

Well Name Reliance E23-68-1HN

Location NWNW SEC23, T6N, R65W, 6 PM

State COLORADO **County** WELD

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

API Number 05-123-38142 **Field** GREELEY

Region DG BASIN **Drilling Completed** 2/1/2015

Spud Date 1/26/2015

Surface Coordinates 1280' FNL, 755' FWL
40.47528/-104.63728

Bottom Hole Coordinates (PROJ)
990' FFNLL, 225' FFELL
40.476050/-104.621690

Ground Elevation 4732' **K.B. Elevation** 4762'

Logged Interval 6381' **To** 11,719' **Total Depth** 11,719'

Formation NIOBRARA C-CHALK

Type of Drilling Fluid LSND

Operator

Company Noble Energy Inc

Address 1625 Broadway Suite 2200
Denver, CO 80202

Geologist

Name HOLLY DUNCAN

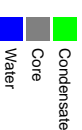
Company NOBLE ENERGY INC.

Address 1625 Broadway Suite 2200
Denver, CO 80202

Other

COLUMBINE LOGGING MATT HOPKINS
IAN CONTRERAS

Zone Color Coding



Rock Types

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

Accessories

GASTROPOD	ARGILLITE GRAIN	HEAVY MINERAL	ANHYDRITE STRINGER
INOCERAMUS	BENTONITE	KAOLIN	BENTONITE STRINGER
ALGAE	BITUMENOUS SUBSTANCE	MARLSTONE	COAL STRINGER
AMPHIPORA	BRECCIA FRAGMENTS	MICACEOUS	DOLOMITE STRINGER
BELEMNITE	PELECYPOD	CALCAREOUS	GYPSUM STRINGER
BIOCLASTIC	PELLET	CARBONACEOUS FLAKES	LIMESTONE STRINGER
BRACHIOPOD	PISOLITE	CHTDK	MARLSTONE (CALC) STRG
BRYOZOA	PLANT REMAINS	CHTLT	MARLSTONE (DOL) STRG
CEPHALOPOD	PLANT SPORES	COAL - THIN BEDS	SANDSTONE STRINGER
CORAL	SCAPHOPOD	DOLOMITIC	SHALE STRINGER
CRINOID	STROMATOPOROID	FELDSPAR	SILTSTONE STRINGER
ECHINOID		FERRUGINOUS PELLET	
FISH		FERRUGINOUS	TUFFACEOUS
FORAMINIFERA	ANHYDRITIC	GLAUCONITE	
FOSSIL	ARGILLACEOUS	GYPSIFEROUS	

Stringer

Oil Show

PINPOINT
VUGGY





































Engineering

● SPOTTED STAINING	● EVEN	○ QUESTIONABLE	● BIT
▲ CONNECTION (UP)			

Porosity

CONNECTION GAS	CONNECTION G	TRIP GAS	TRIP GAS (LEFT)
EARTHY	FENESTRAL	FRACTURE	INTERCRYSTALLINE
INTEROOLITIC	MOLDIC	ORGANIC	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		MNDEPTH MN DEPTH		L LITHOGRAPHIC
	OIL SHOW				MX MICROXLN
	MNDEPTH MN DEPTH UP	Rounding			
	MNDEPTH MN DEPTH (DOWN)		ANGULAR		PS PACKSTONE
	NORMAL FAULT		R ROUNDED		WS WACKESTONE
	OVERTURNED STRATA		B SUBANG		
	REVERSE FAULT		P SUBRND	Sorting	
	CASING				M MODERATE
Textures					
	SIDEWALL CORE (LEFT)				P POOR
	SIDEWALL CORE (RIGHT)		BS BOUNDSTONE		W WELL
	SLIDE		C CHALKY		
	SURVEY		CX CRYPTOXLN		

ROP
ROP (t/h)

Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Depth Labels

% Lith

GAMMA
GR

CONTINUED FROM Reliance
E23-68-1HN(VERT)

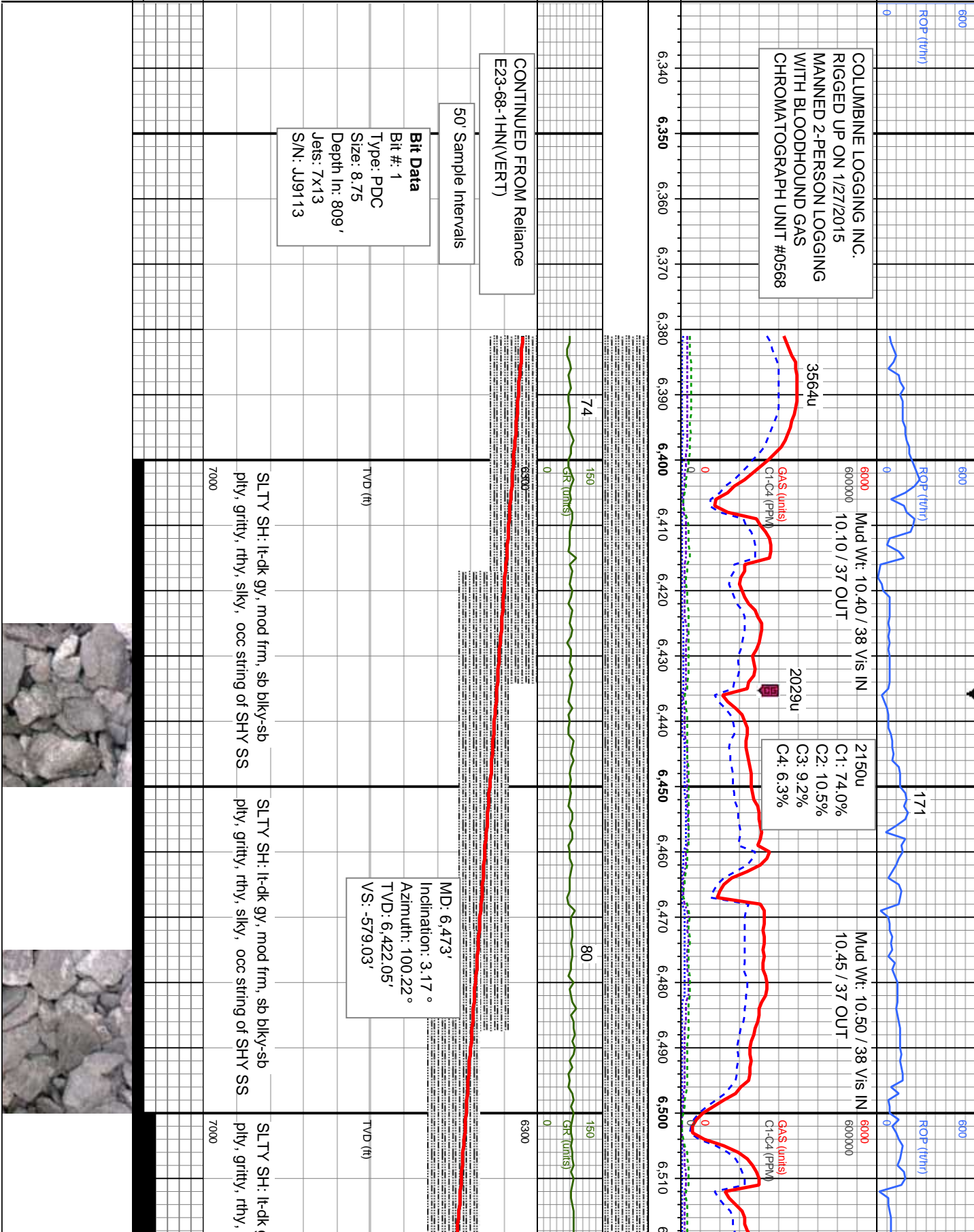
50' Sample Intervals

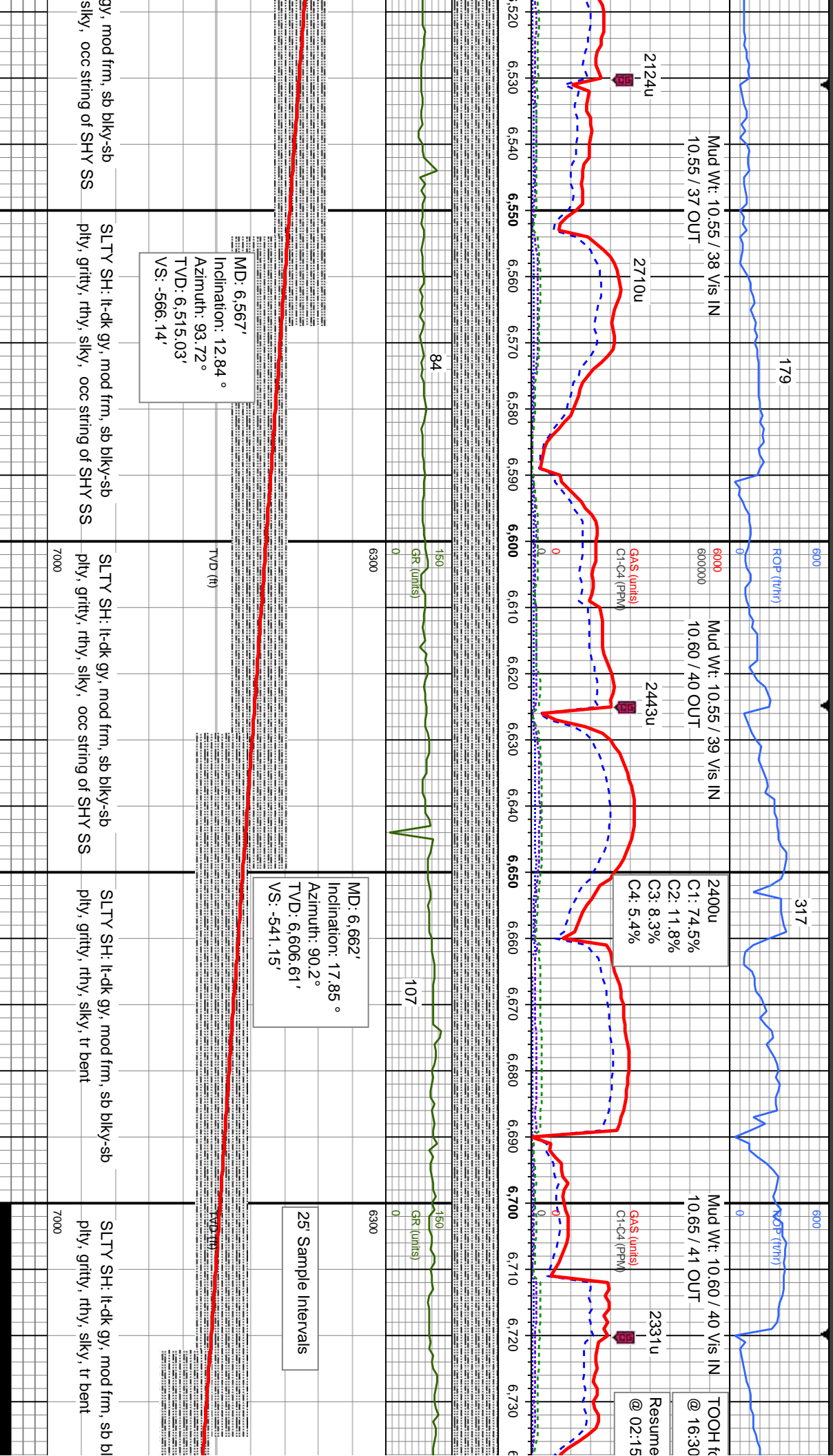
Well Bore
TVD

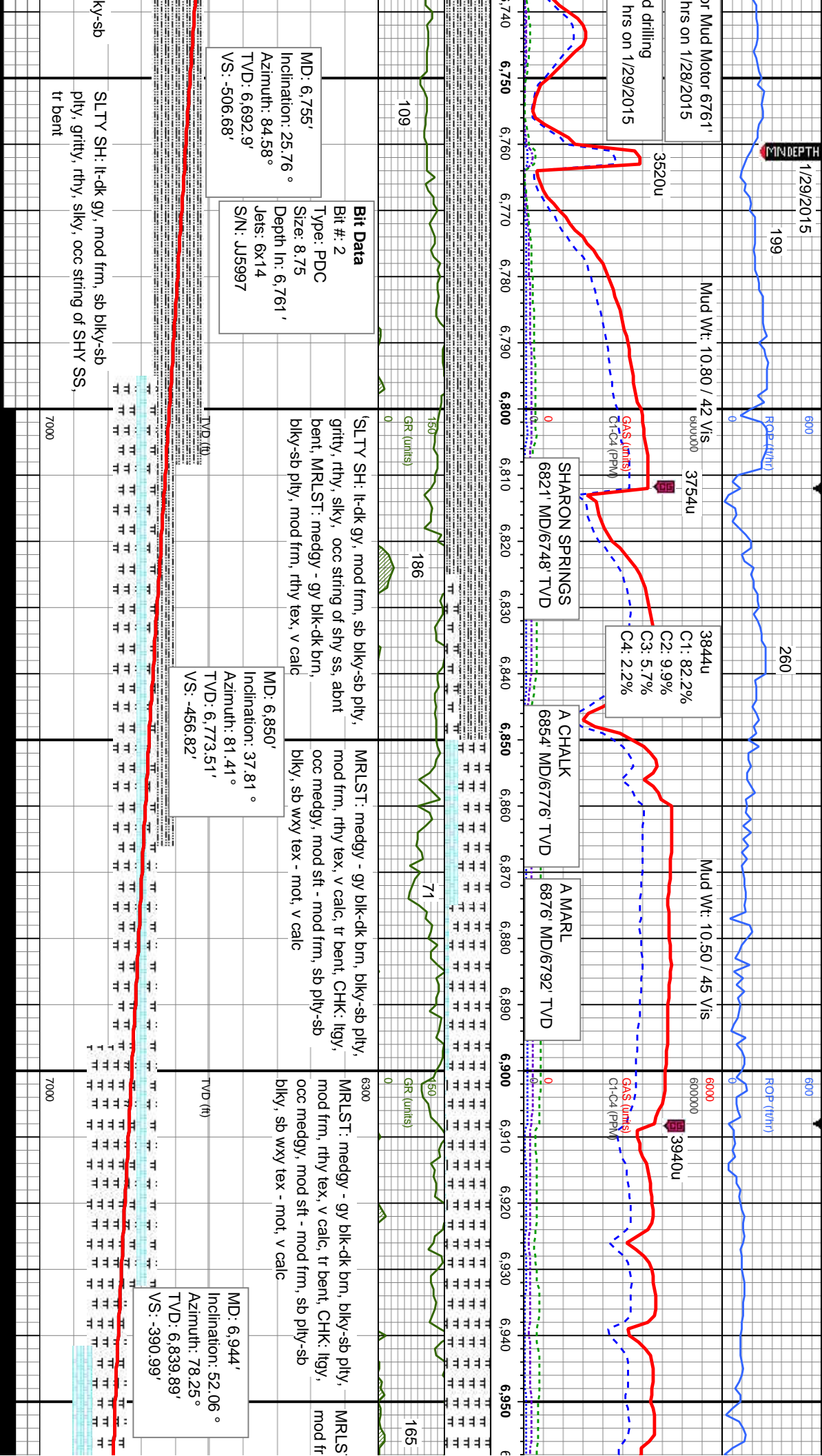
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S/N: JU9113

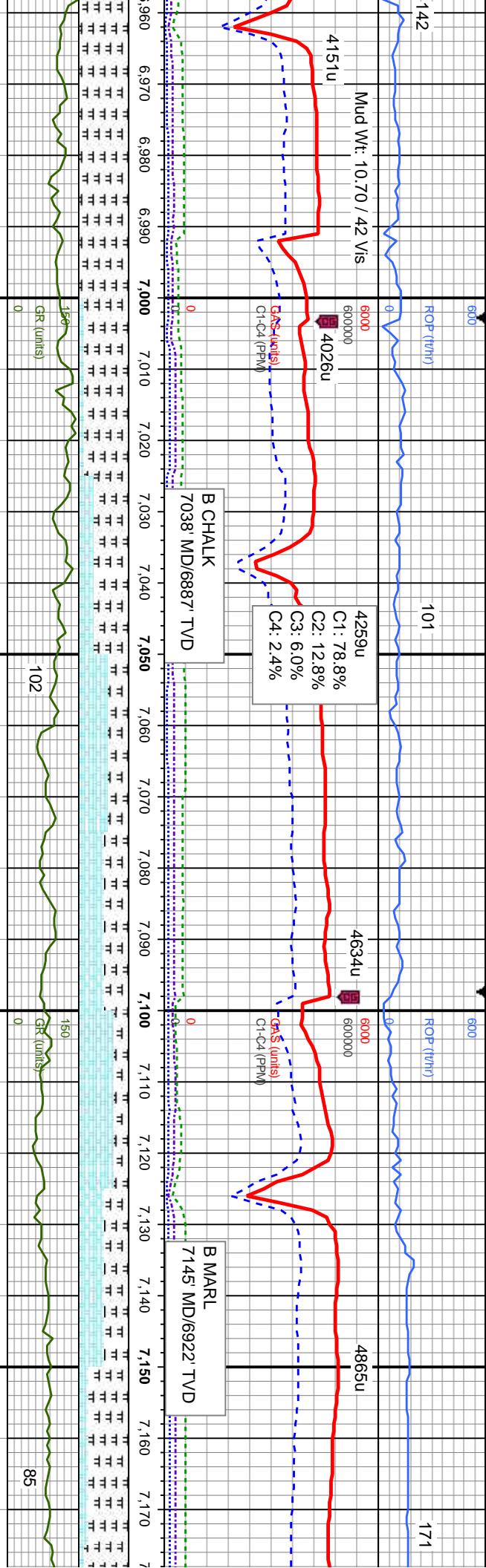
Oil Show

Images









medgy - gy blk-dk brn, blkly-sb plty, m, rthy tex, v calc, tr bent, tr CHK

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

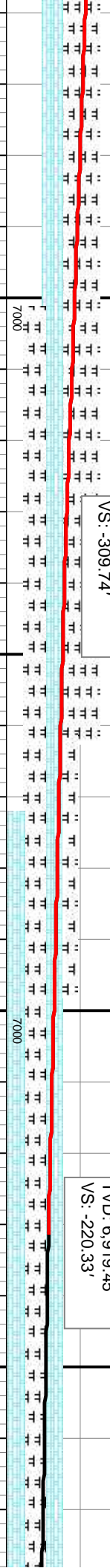
CHK: ltyg, occ medgy, mod sft - mod frm, sb plty-sb blkly, sb wxy tex - mot, v calc, tr cal xls, MRLST: medgy - gy blk-dk brn, blkly-sb plty, mod frm, rthy tex, v calc, tr bent

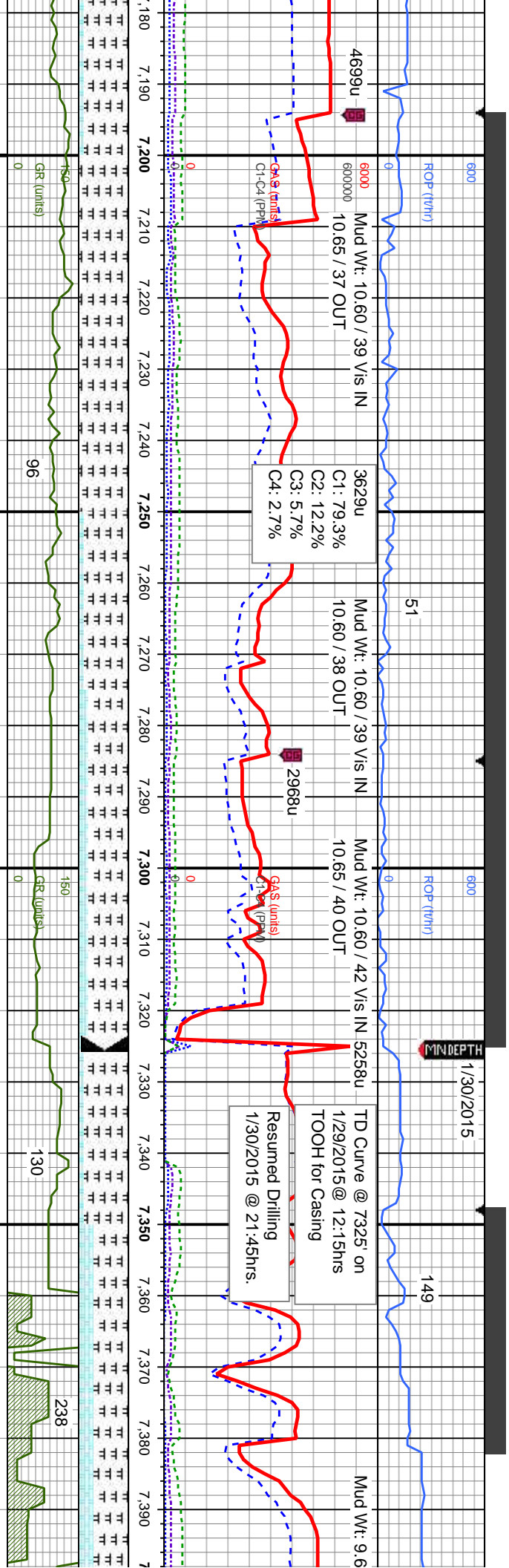
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MRLST: medgy - gy blk-dk brn, blkly-sb plty, mod frm, rthy tex, v calc, tr inoc frags, CHK: ltyg, occ medgy, mod sft - mod frm, sb plty-sb blkly calc

MD: 7,039'
Inclination: 67.01°
Azimuth: 81.76°
TVD: 6,887.93'
VS: -309.74'

MD: 7,134'
Inclination: 74.3°
Azimuth: 91.96°
TVD: 6,919.45'
VS: -220.33'





6700

MRLST: medgy - gy blk-dk brn, blkly-sb ppty, mod frm, rthy tex, v calc, com cal xls, tr bent, tr inoc frags, tr CHK

MRLST: medgy - gy blk-dk brn, blkly-sb ppty, mod frm, rthy tex, v calc, com cal xls, tr bent, tr inoc frags, CHK: ltgy, occ medgy, mod sft - mod frm, sb ppty-sb blkly, sb wxy tex - mot, v calc

MRLST: medgy - gy blk-dk brn, blkly-sb ppty, mod frm, rthy tex, v calc, com cal xls, tr bent, tr inoc frags, CHK: ltgy, occ medgy, mod sft - mod frm, sb ppty-sb blkly, sb wxy tex - mot, v calc

MRLST: medgy - gy blk-dk brn, blkly-sb ppty, mod frm, rthy tex, v calc, com cal xls, tr bent, tr inoc frags, CHK: ltgy, occ medgy, mod sft - mod frm, sb ppty-sb blkly, sb wxy tex - mot, v calc

SCALE CHANGE

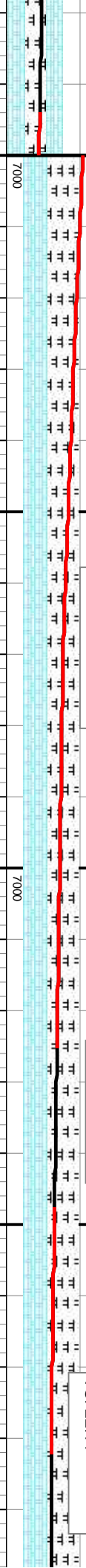
MD: 7,229'
Inclination: 75.53 °
Azimuth: 89.15°
TVD: 6,944.18'
VS: -128.94'

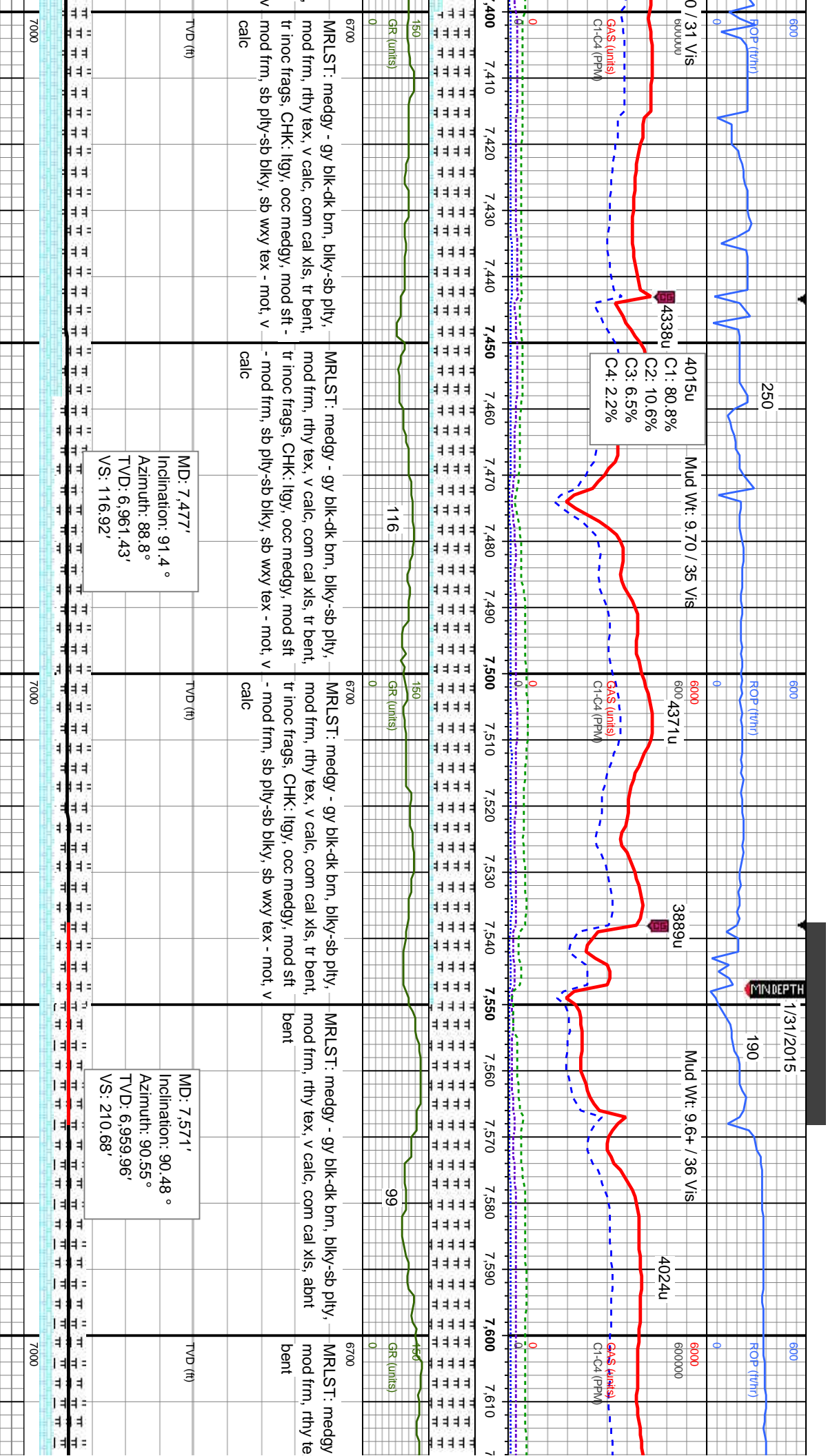
MD: 7,269'
Inclination: 79.14 °
Azimuth: 89.5°
TVD: 6,952.95'
VS: -90'

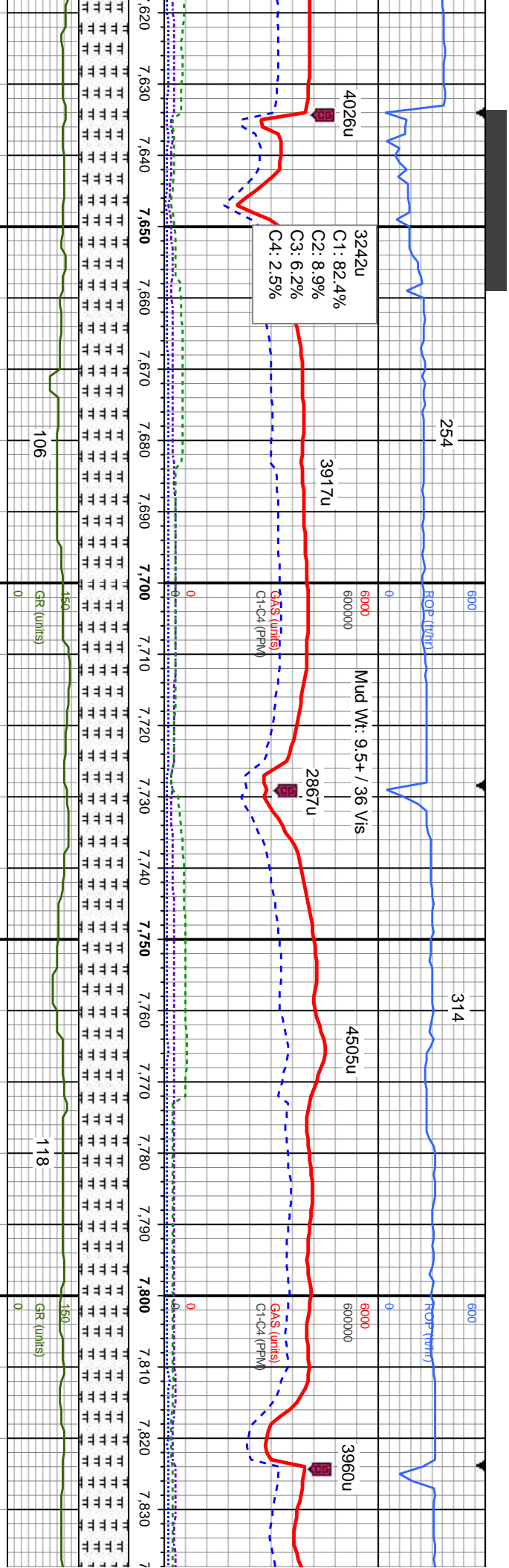
Bit Data
Bit #: 3
Type: PDC
Size: 6.12
Depth In: 7,325'
Jets: 5x13
S/N: JJ7549

50' Sample Intervals

MD: 7,382'
Inclination: 90.57 °
Azimuth: 89.67°
TVD: 6,963.07'
VS: 22.11'







- gy blk-dk brn, blkly-sb plty, x, v calc, com cal xls, abnt

MRLST: medgy - gy blk-dk brn, blkly-sb plty, mod frm, rthy tex, v calc, tr pyr, tr bent

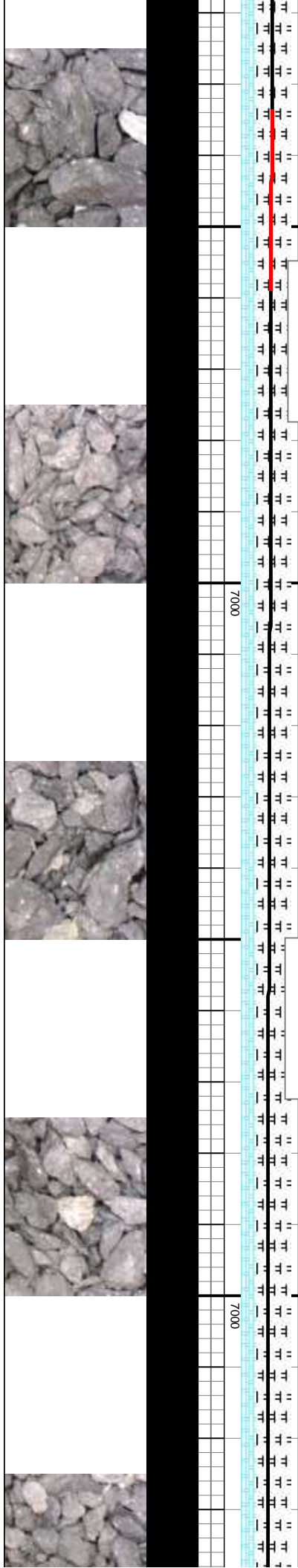
MRLST: medgy - gy blk-dk brn, blkly-sb plty, mod frm, rthy tex, v calc, tr inoc frag, abnt bent

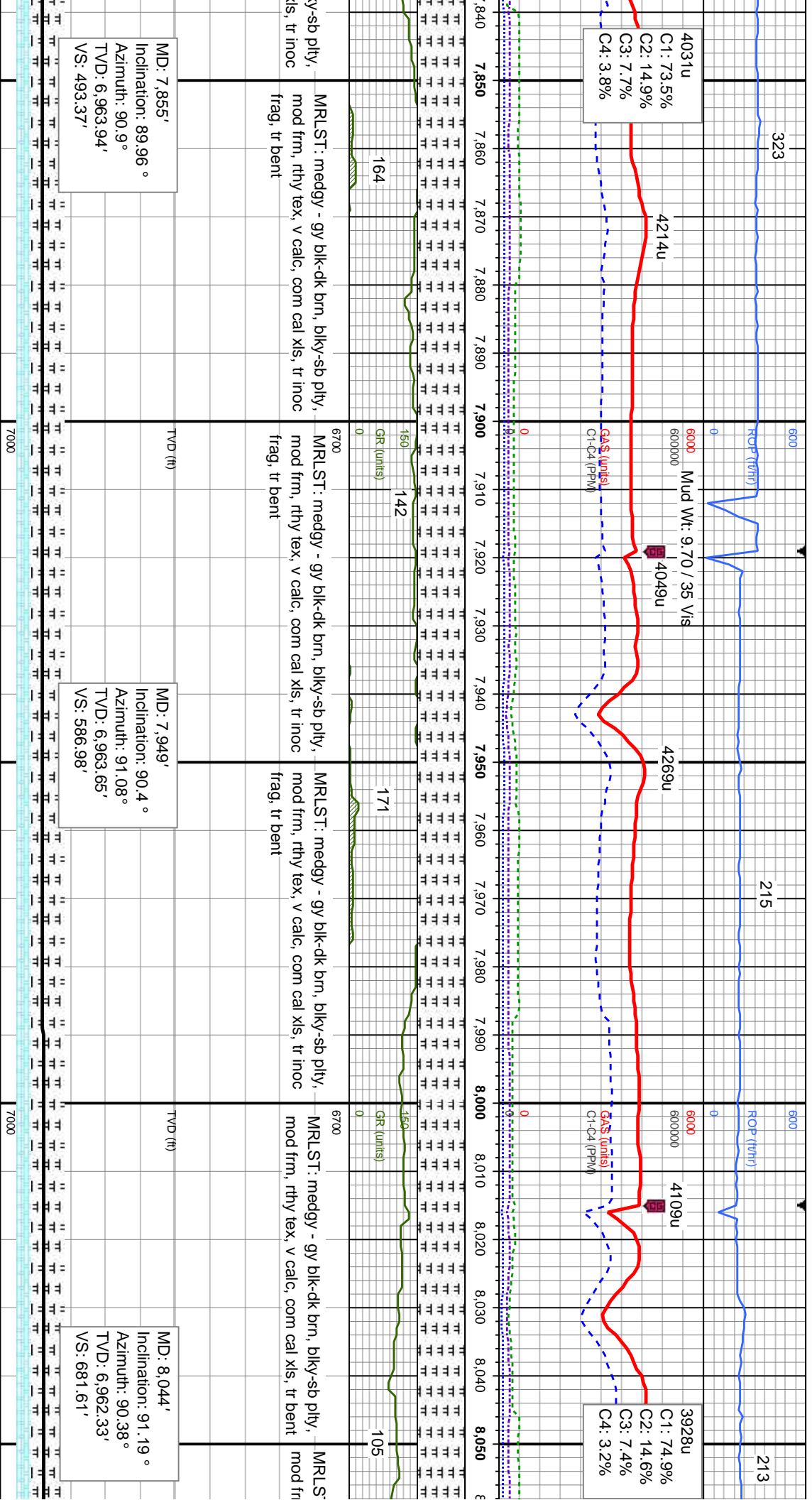
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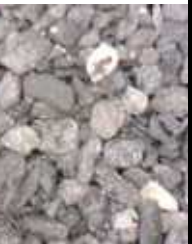
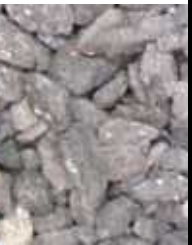
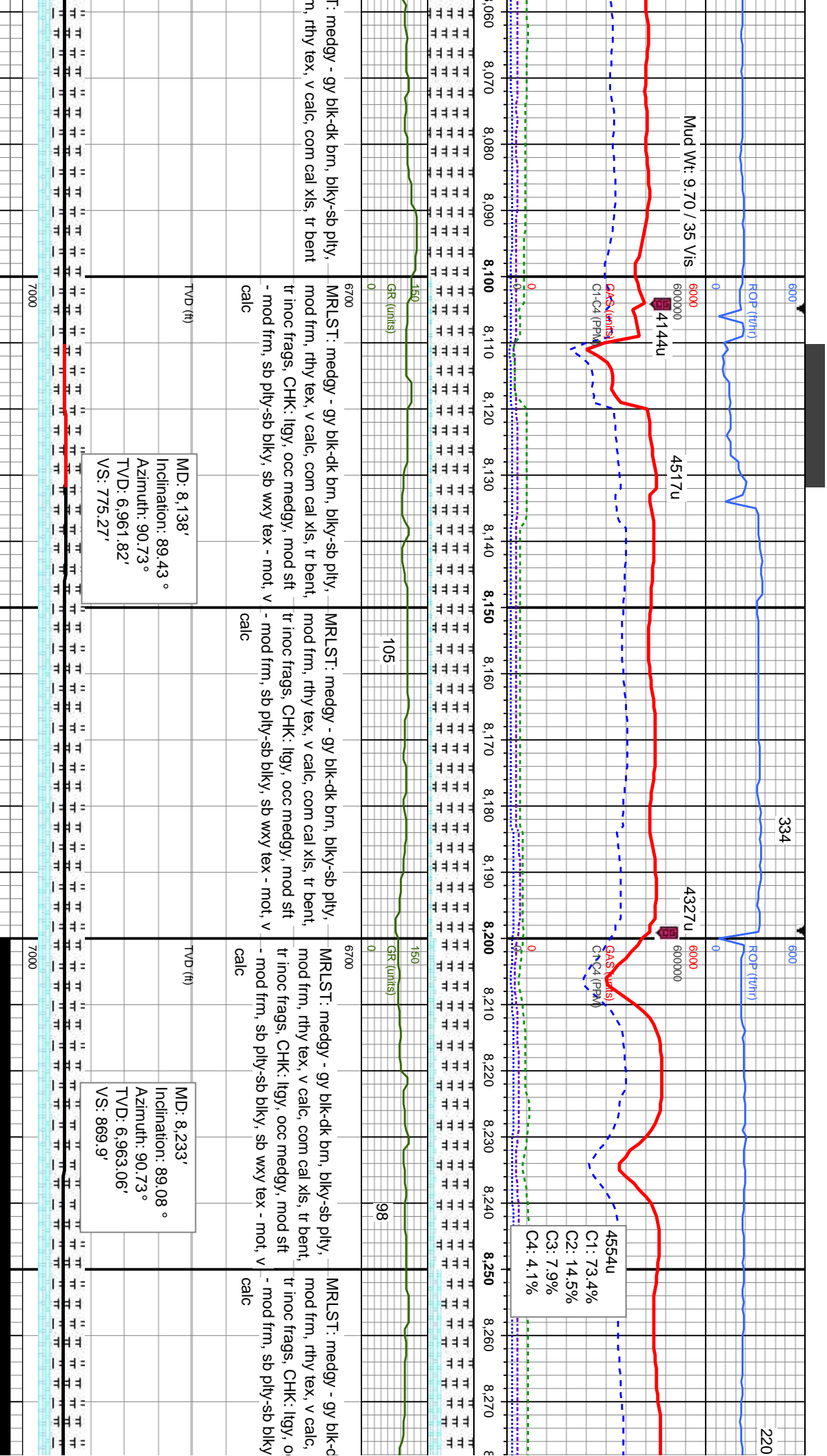
MRLST: medgy - gy blk-dk brn, blkly-sb plty, mod frm, rthy tex, v calc, com cal xls, abnt

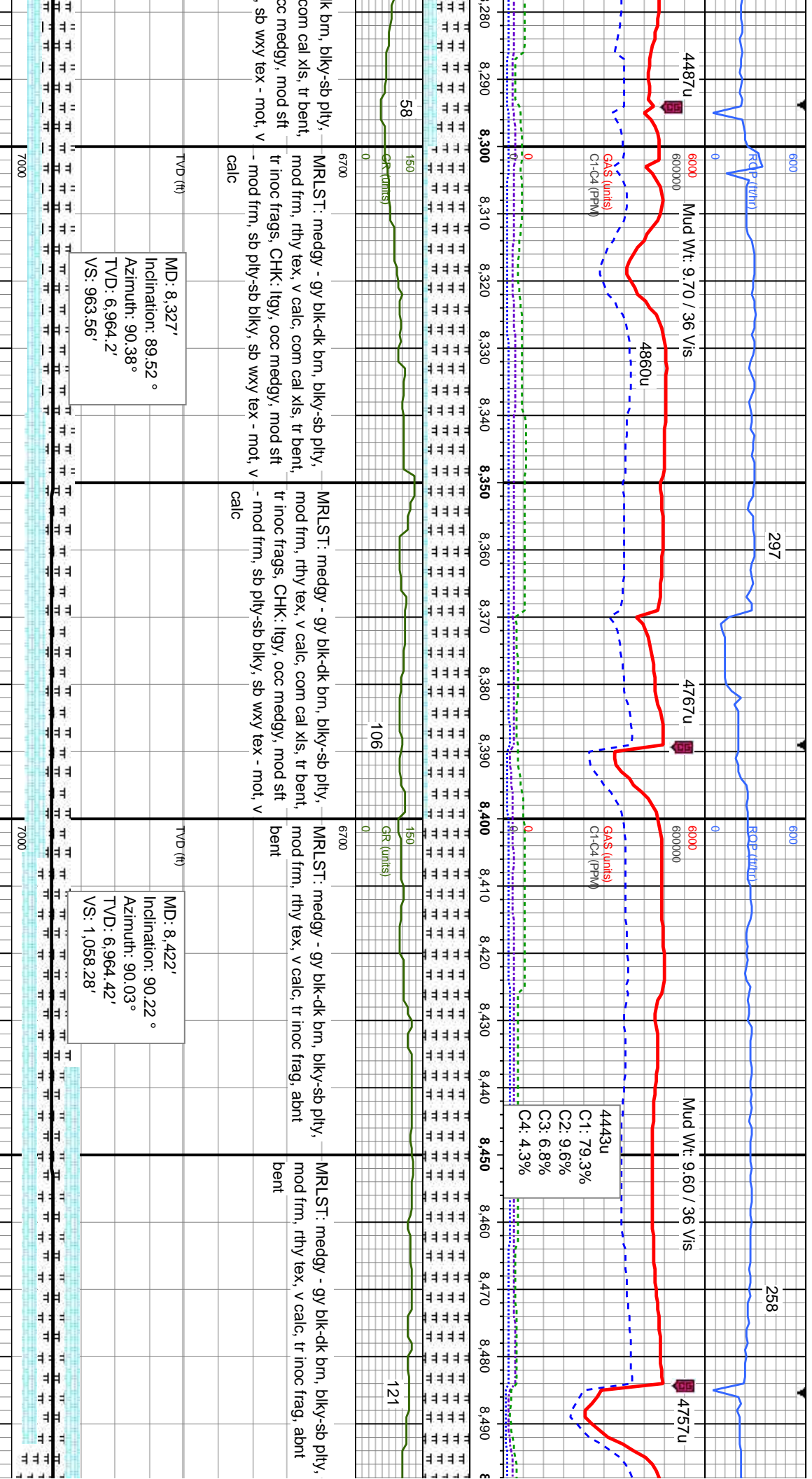
MD: 7,666'
Inclination: 88.29 °
Azimuth: 91.61 °
TVD: 6,960.98'
VS: 305.25'

MD: 7,761'
Inclination: 89.08 °
Azimuth: 91.08 °
TVD: 6,963.16'
VS: 399.77'









6700
150
GR (units)
0

58

MD: 8.327'
Inclination: 89.52 °
Azimuth: 90.38 °
TVD: 6.964.2'
VS: 963.56'

6700

150
GR (units)
0

106

MD: 8.422'
Inclination: 90.22 °
Azimuth: 90.03 °
TVD: 6.964.42'
VS: 1,058.28'

6700

150
GR (units)
0

121

MRLST: medgy - gy blk-dk bm, blkly-sb plty, mod frm, rthy tex, v calc, com cal xls, tr bent, tr inoc frags, CHK: lty, occ medgy, mod sft - mod frm, sb plty-sb blkly, sb wxy tex - mot, v calc

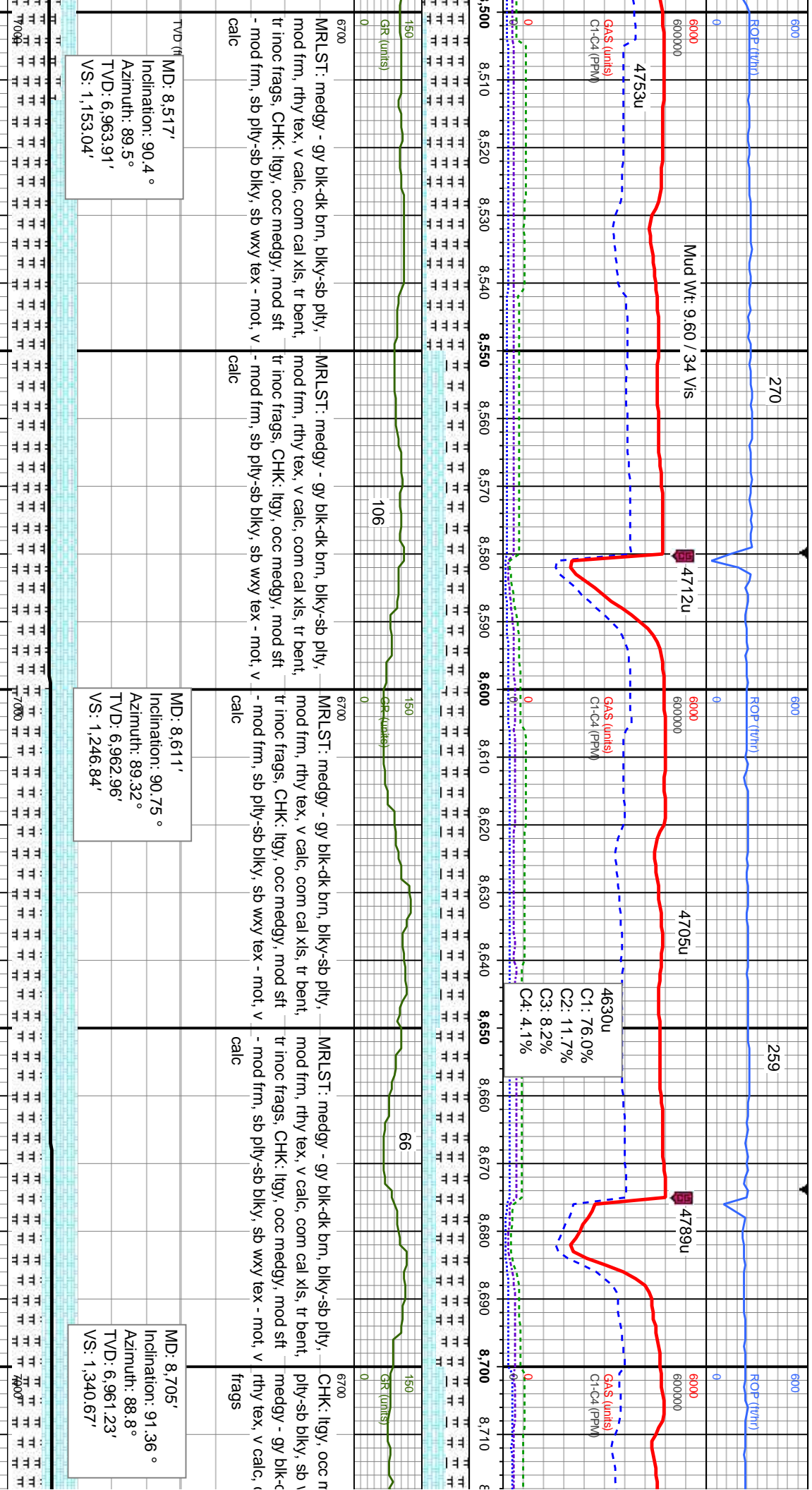
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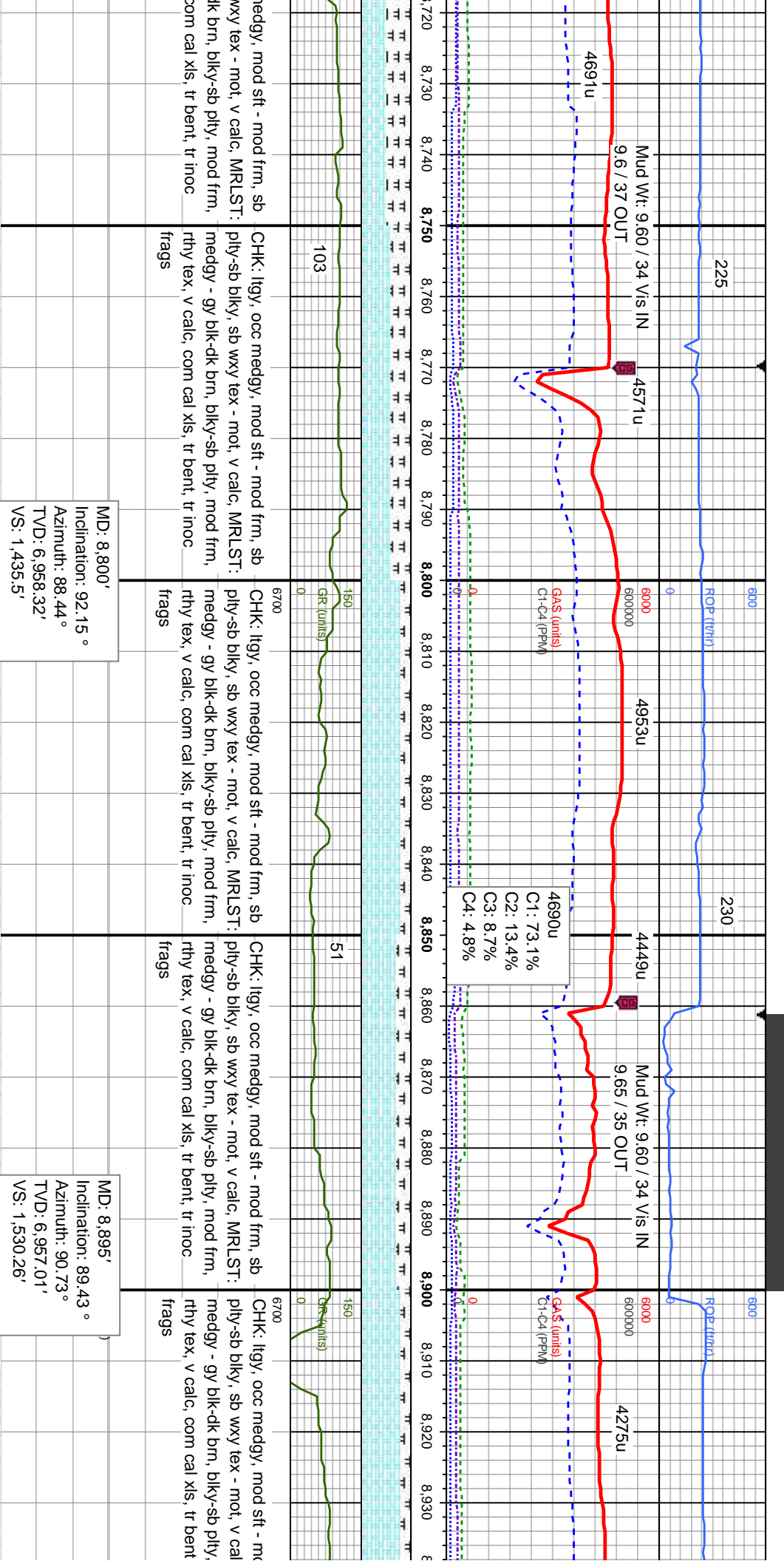
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MRLST: medgy - gy blk-dk bm, blkly-sb plty, mod frm, rthy tex, v calc, tr inoc frag, abnt bent

MRLST: medgy - gy blk-dk bm, blkly-sb plty, mod frm, rthy tex, v calc, tr inoc frag, abnt bent



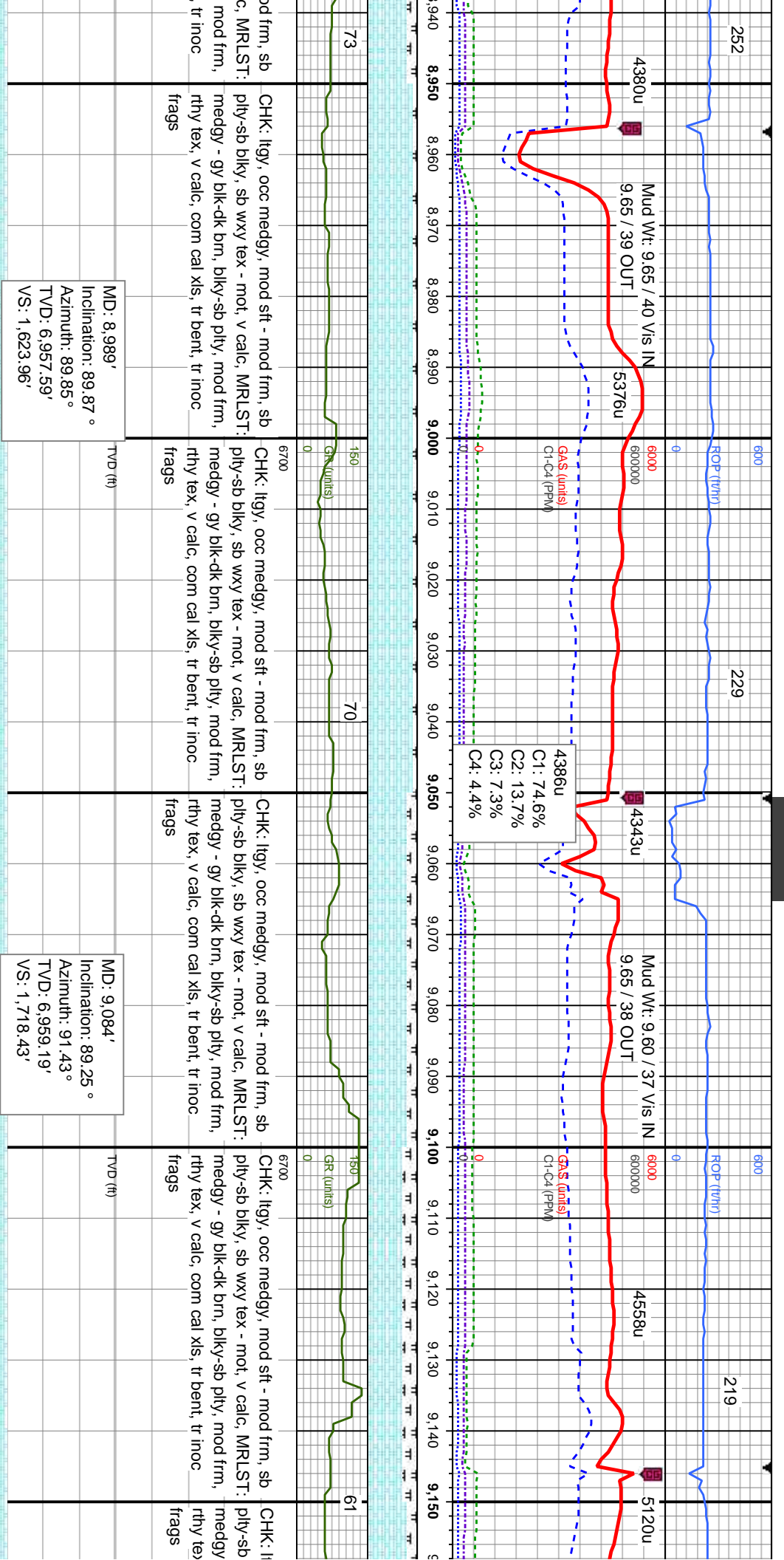




MD: 8,800'
Inclination: 92.15 °
Azimuth: 88.44 °
TVD: 6,958.32'
VS: 1,435.5'

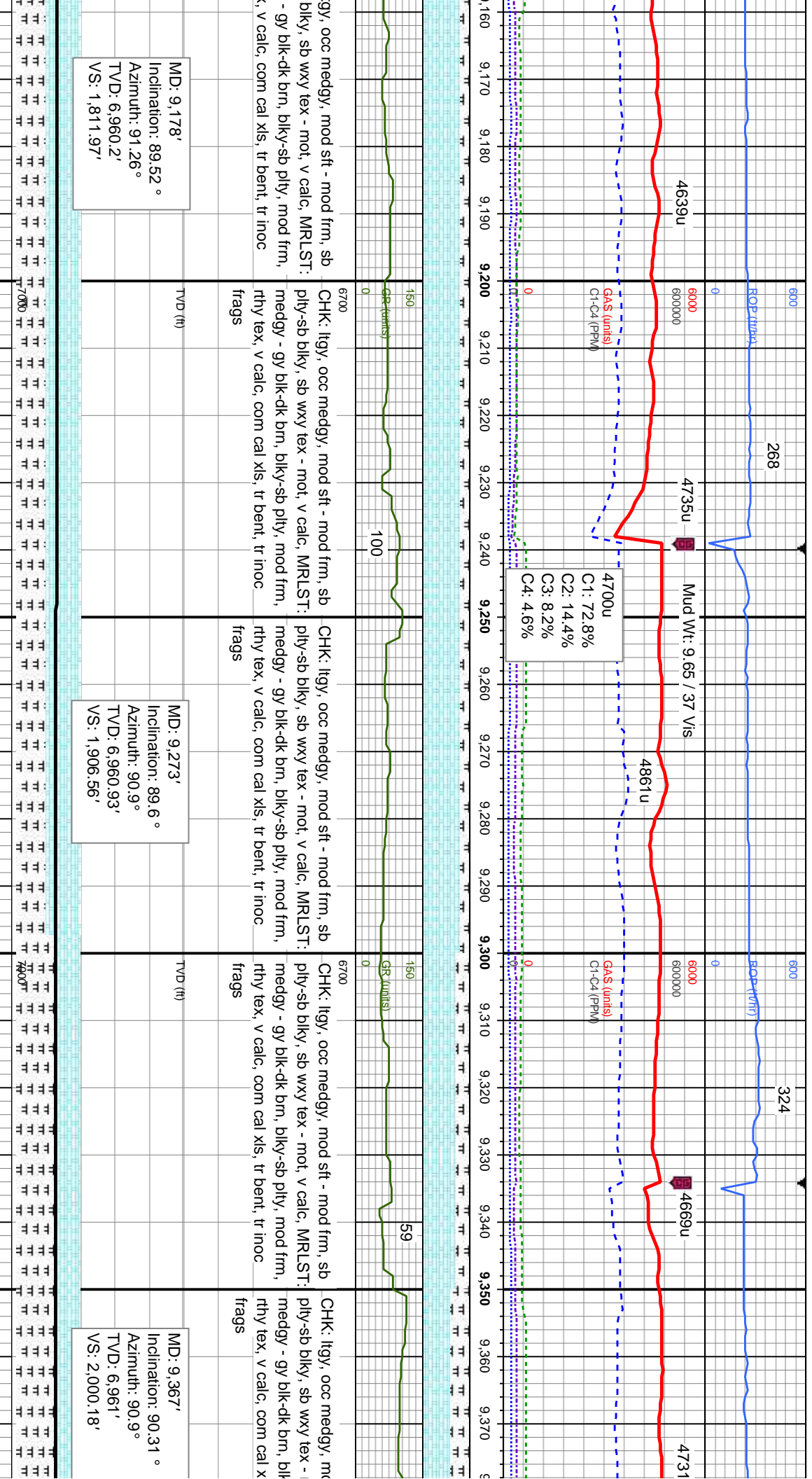
MD: 8,895'
Inclination: 89.43 °
Azimuth: 90.73 °
TVD: 6,957.01'
VS: 1,530.26'

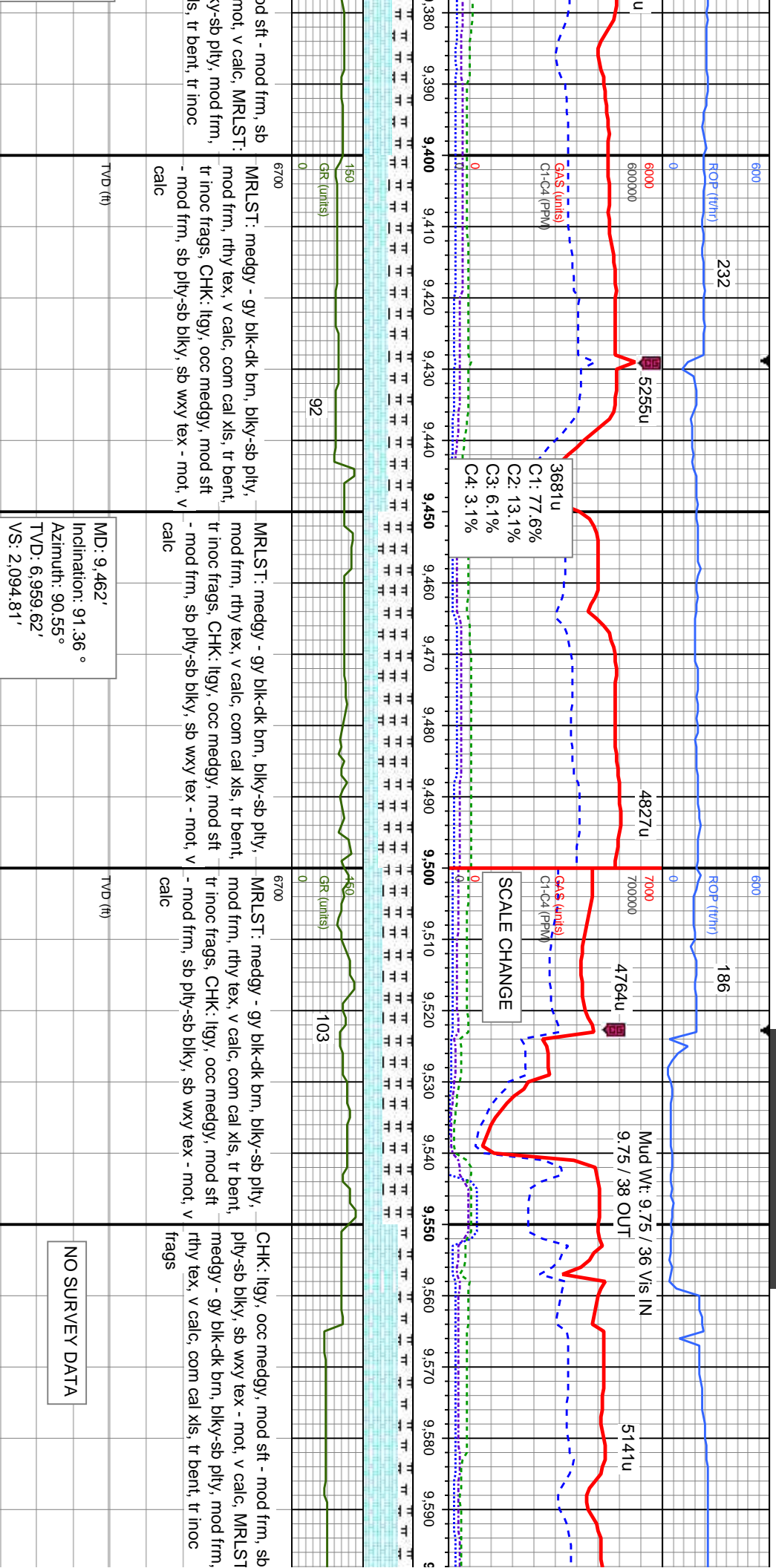


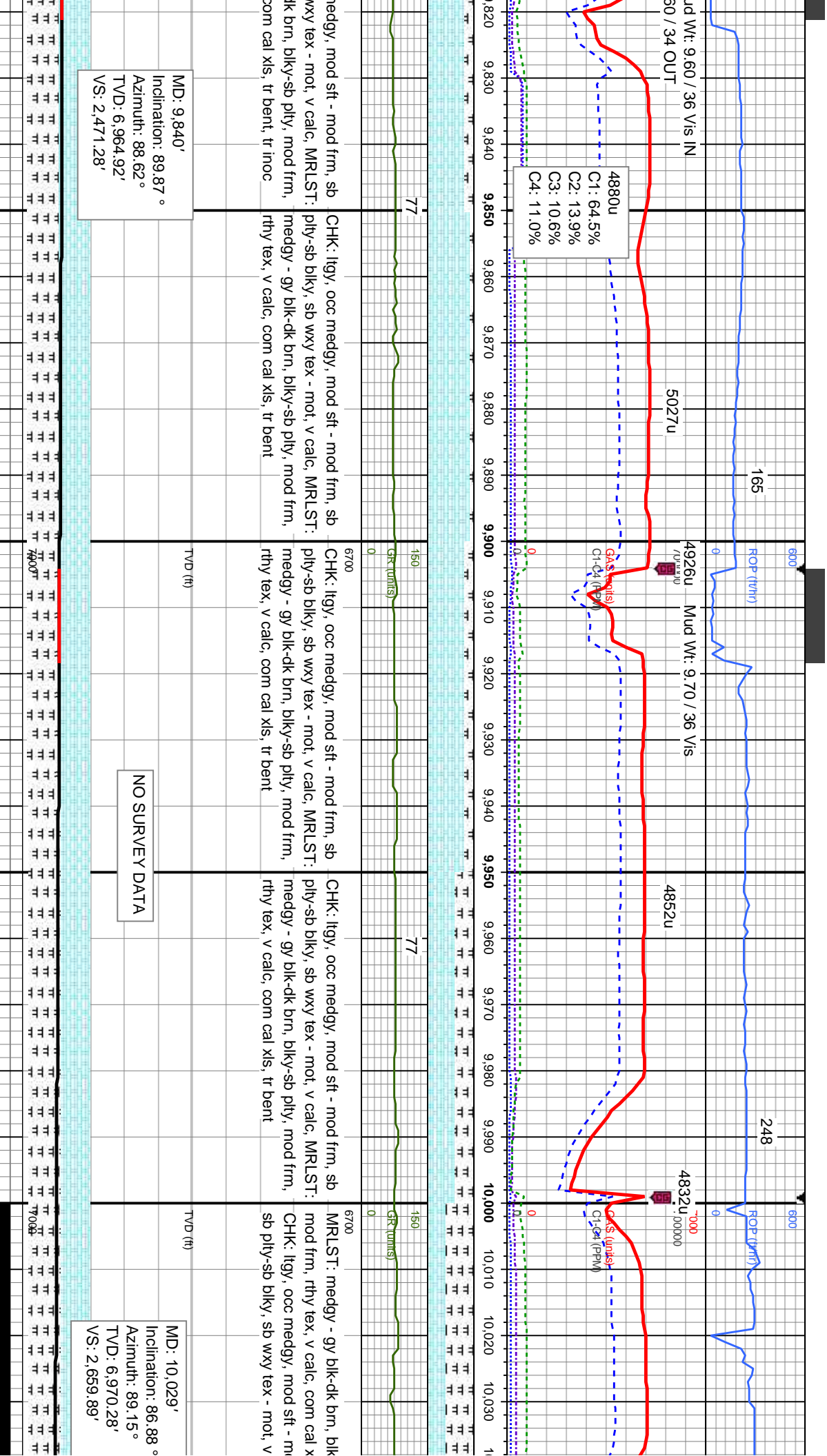


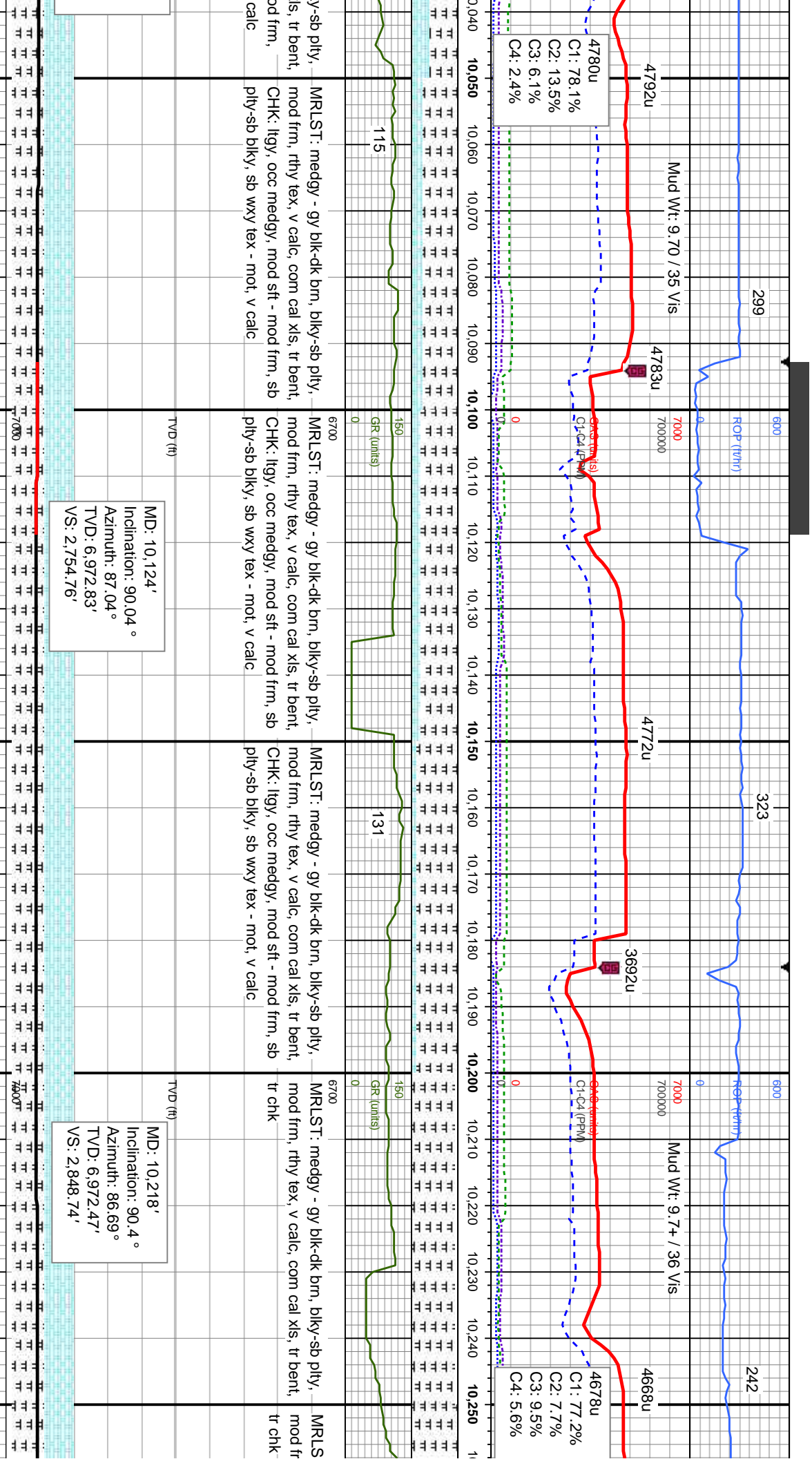
73	CHK: lly, occ medgy, mod sft - mod frm, sb	CHK: lly, occ medgy, mod sft - mod frm, sb	CHK: lly, occ medgy, mod sft - mod frm, sb	CHK: lly, occ medgy, mod sft - mod frm, sb
	ply-sb blk, sb wxy tex - mot, v calc, MRLST:	ply-sb blk, sb wxy tex - mot, v calc, MRLST:	ply-sb blk, sb wxy tex - mot, v calc, MRLST:	ply-sb blk, sb wxy tex - mot, v calc, MRLST:
	medgy - gy blk-dk brn, blk-sb ply, mod frm,	medgy - gy blk-dk brn, blk-sb ply, mod frm,	medgy - gy blk-dk brn, blk-sb ply, mod frm,	medgy - gy blk-dk brn, blk-sb ply, mod frm,
	rthy tex, v calc, com cal xls, tr bent, tr inoc	rthy tex, v calc, com cal xls, tr bent, tr inoc	rthy tex, v calc, com cal xls, tr bent, tr inoc	rthy tex, v calc, com cal xls, tr bent, tr inoc
	frags	frags	frags	frags

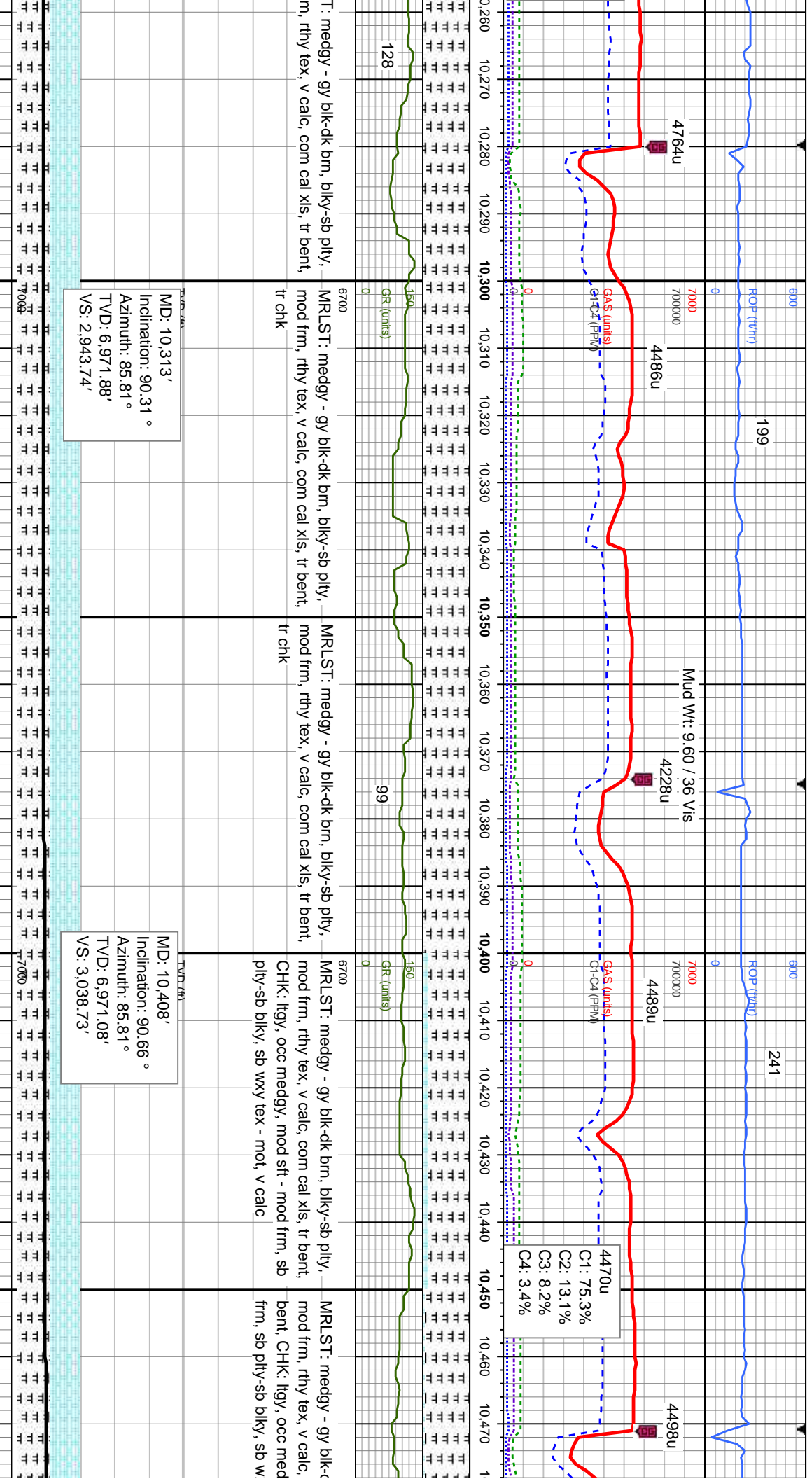


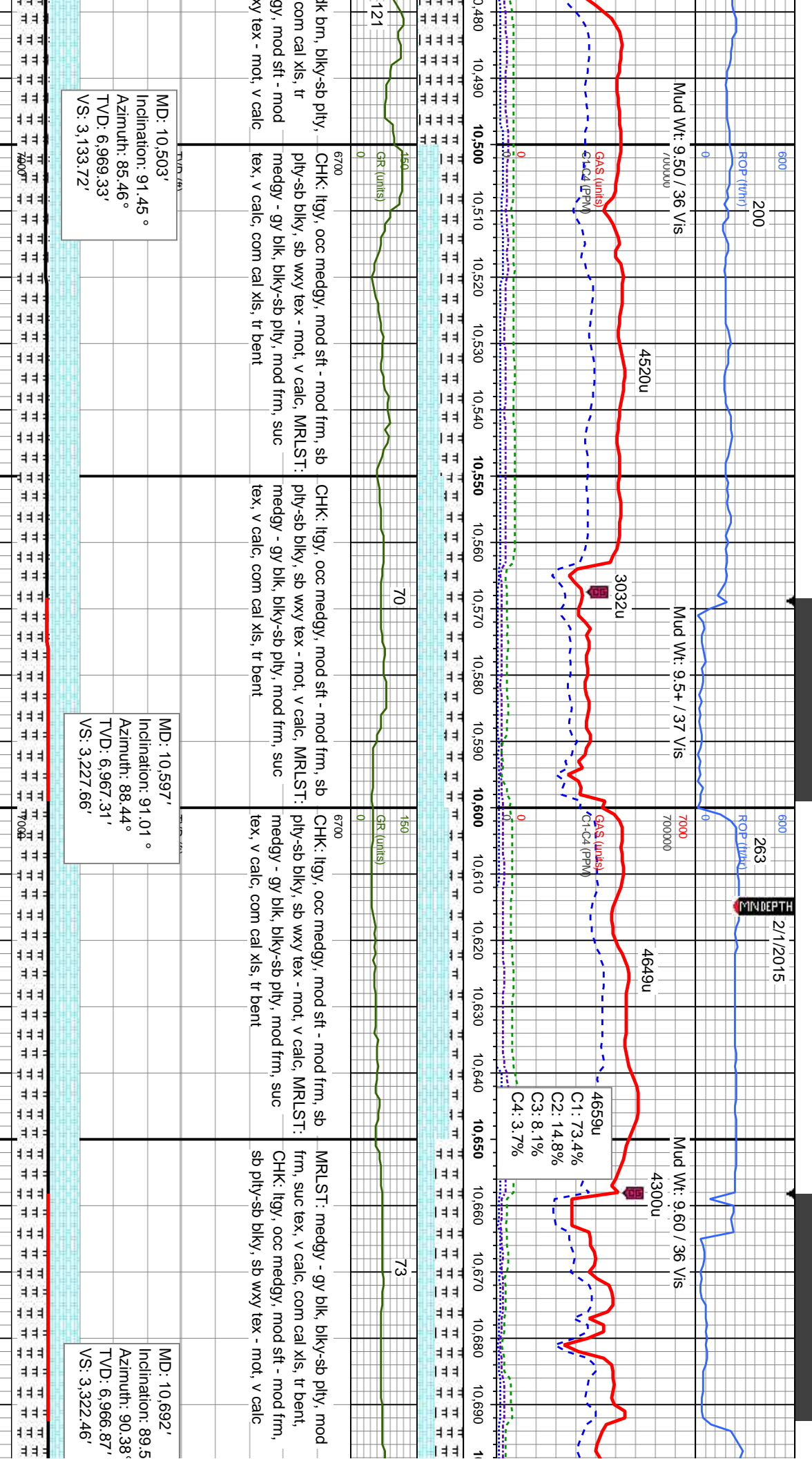


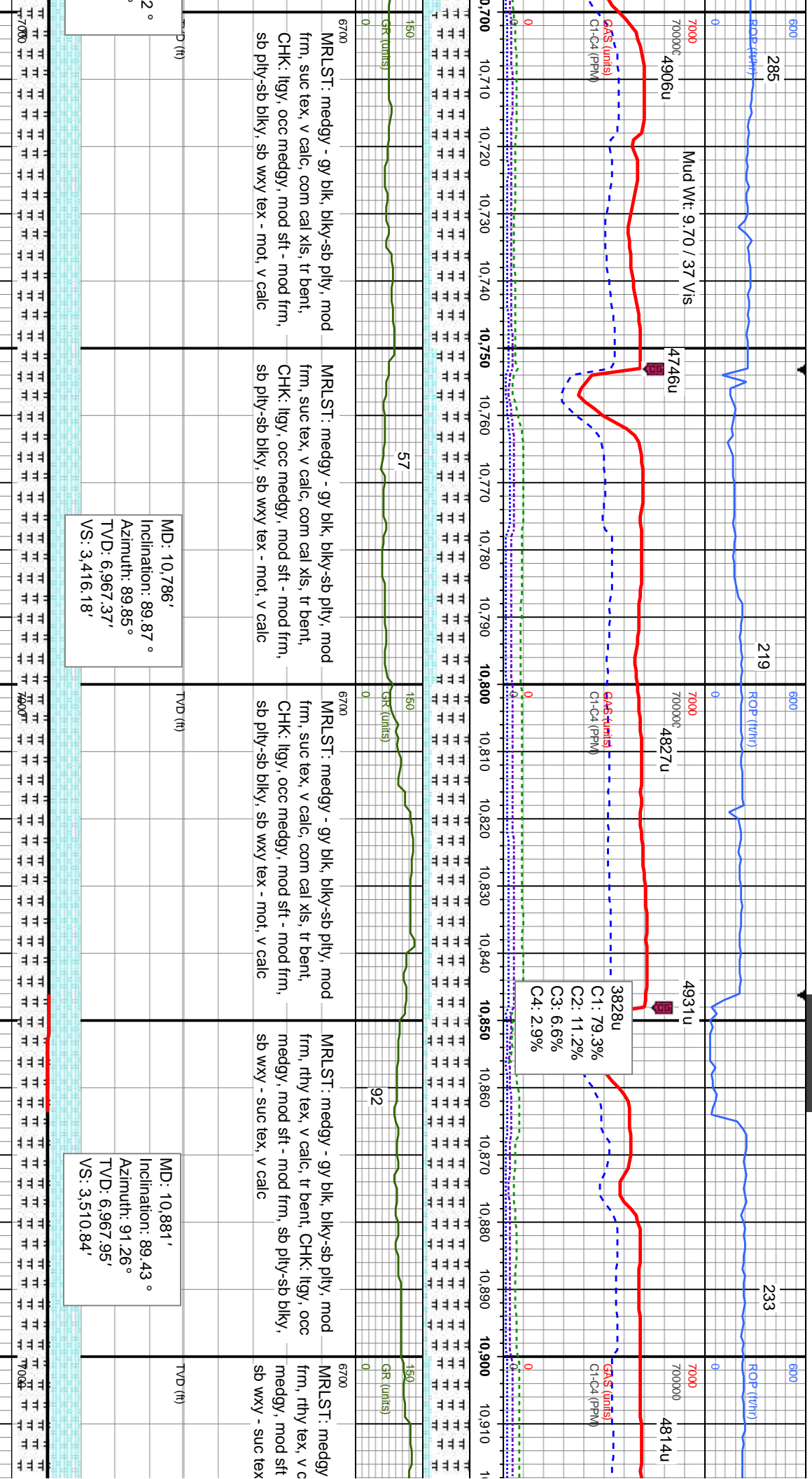












MRLST: medgy - gy blk, blkly-sb pily, mod frm, suc tex, v calc, com cal xls, tr bent, CHK: lity, occ medgy, mod sft - mod frm, sb pily-sb blkly, sb wxy tex - mot, v calc

MRLST: medgy - gy blk, blkly-sb pily, mod frm, suc tex, v calc, com cal xls, tr bent, CHK: lity, occ medgy, mod sft - mod frm, sb pily-sb blkly, sb wxy tex - mot, v calc

MRLST: medgy - gy blk, blkly-sb pily, mod frm, suc tex, v calc, com cal xls, tr bent, CHK: lity, occ medgy, mod sft - mod frm, sb pily-sb blkly, sb wxy tex - mot, v calc

MRLST: medgy - gy blk, blkly-sb pily, mod frm, rthy tex, v calc, tr bent, CHK: lity, occ medgy, mod sft - mod frm, sb pily-sb blkly, sb wxy - suc tex, v calc

MRLST: medgy frm, rthy tex, v c medgy, mod sft sb wxy - suc tex

MD: 10,786'
Inclination: 89.87°
Azimuth: 89.85°
TVD: 6,967.37'
VS: 3,416.18'

MD: 10,881'
Inclination: 89.43°
Azimuth: 91.26°
TVD: 6,967.95'
VS: 3,510.84'



