

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name Pappenheim 6-62-23-0461BH Vert

Location NENW S23-T6N-R62W

State COLORADO

County WELD

Country USA

Rig Number CADE 24

API Number 05-123-37263

AFE # 18310D

Region DJ BASIN

Field WILDCAT

Spud Date 6/24/2013

Drilling Completed 7/4/2013

Surface Coordinates 250' FNL 1954' FWL

Bottom Hole Coordinates SESW S23-T6N-R62W
650' FSL 2300' FWL

Ground Elevation 4698

K.B. Elevation 4715

Logged Interval 4000 To 5650

Total Depth 10664

Formation NIOBRARA B2 CHALK

Type of Drilling Fluid SPUD

Operator

Company BILL BARRETT CORPORATION

Address 1099 18TH STREET, SUITE 2300
DENVER, CO 80202

Geologist

Name JASON BRAND

Company BILL BARRETT CORPORATION

Address 1099 18TH STREET, SUITE 2300
DENVER, CO 80202

Other

Rock Types

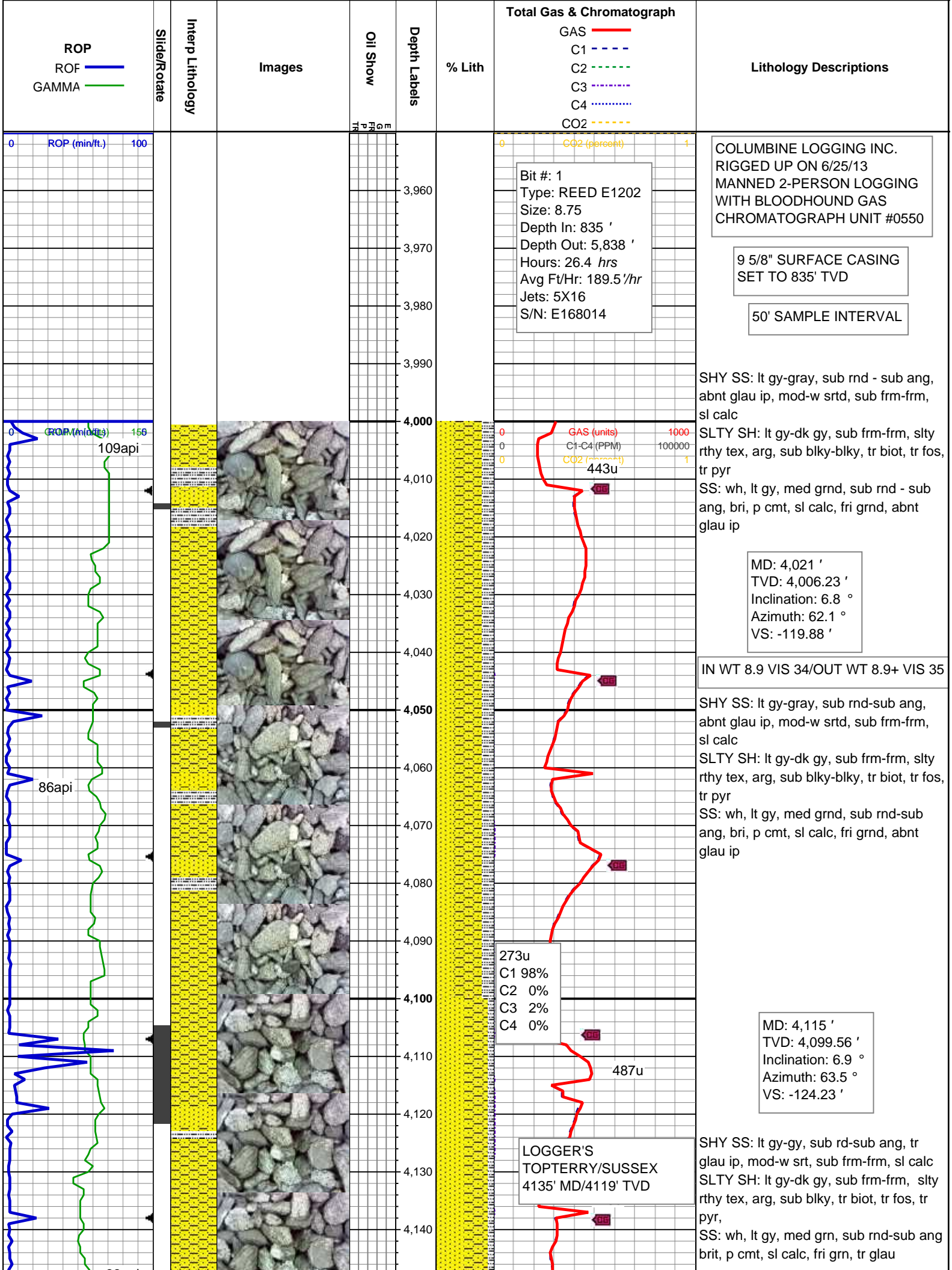
UNKNOWN	COAL	METAMORPHIC	SHALY SILTSTONE
ANHYDRITE	CONGLOMERATE	NO SAMPLE	SILTSTONE
BENTONITE	DOLOMITE	SALT	SILTY SHALE
BRECCIA	GRANITE	SALT- PEPPER SAND	TILL
CEMENT	GYPSUM	SANDSTONE	TUFF
CHALK	IGNEOUS	SHALE	WELDED TUFF
CHERT	LIMESTONE	SHALE COLORED	
CLAY CHOKE SAND	SIDERITE or LIMONITE	SHALE GRAY	
CLAYSTONE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

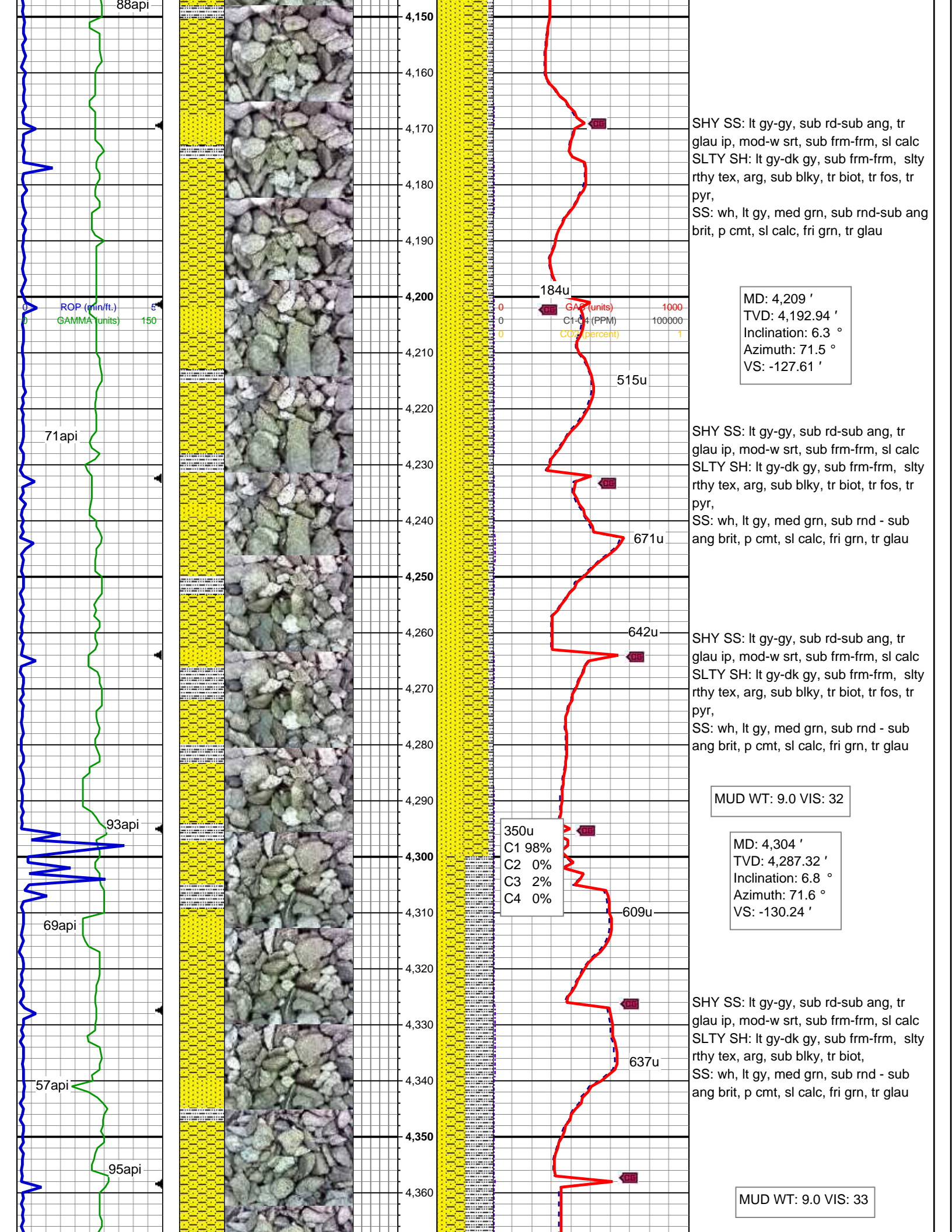
Accessories

Fossils	F FOSSIL	ANHYDRITIC	FERRUGINOUS	TUFFACEOUS
ALGAE	GASTROPOD	ARGILLACEOUS	GLAUCONITE	Stringer
AMPHIPORA	INOCERAMUS	ARGILLITE GRAIN	GYPSIFEROUS	ANHYDRITE STRINGER
BELEMNITE	OOLITE	BENTONITE	HEAVY MINERAL	BENTONITE STRINGER
BIOCLASTIC	OSTRACOD	BITUMENOUS SUBSTANCE	KAOLIN	COAL STRINGER
BRACHIOPOD	PELECYPOD	BRECCIA FRAGMENTS	MARLSTONE	DOLOMITE STRINGER
BRYOZOA	PELLET	CALCAREOUS	MINERAL CRYSTALS	GYPSUM STRINGER
CEPHALOPOD	PISOLITE	CARBONACEOUS FLAKES	NODULES	LIMESTONE STRINGER
CORAL	PLANT REMAINS	CHTDK	PHOSPHATE PELLETS	MARLSTONE (CALC) STRG
CRINOID	PLANT SPORES	CHTLT	PYRITE	MARLSTONE (DOL) STRG
ECHINOID	SCAPHOPOD	COAL - THIN BEDS	SALT CAST	SANDY
FISH	STROMATOPOROID	DOLOMITIC	SILICEOUS	SHALE STRINGER
FORAMINIFERA	Minerals	FELDSPAR	SILTY	SILTSTONE STRINGER
	FERRUGINOUS PELLETT			

Other Symbols

Oil Show	MOLDIC	FAULT	WIRELINE TESTED - LEFT	E EARTHY
DEAD	ORGANIC	FORMATION TOP	WIRELINE TESTED - RT	FX FINELYXLN
EVEN	PINPOINT	GAS SHOW	Rounding	GS GRAINSTONE
QUESTIONABLE	VUGGY	MN DEPTH	A ANGULAR	L LITHOGRAPHIC
SPOTTED STAINING	Engineering	NORMAL FAULT	R ROUNDED	MX MICROXLN
Porosity	BIT	OIL SHOW	S SUBANG	MS MUDSTONE
E EARTHY	CONNECTION (LEFT)	OVERTURNED STRATA	S SUBRND	PS PACKSTONE
F FENESTRAL	CONNECTION (RIGHT)	REVERSE FAULT	Textures	WS WACKESTONE
F FRACTURE	CONNECTION GAS	SIDEWALL CORE (LEFT)	BS BOUNDSTONE	Sorting
X INTERCRYSTALLINE	CORE - LOST	SIDEWALL CORE (RIGHT)	C CHALKY	M MODERATE
I INTEROOLITIC	CORE - RECOVERED	SLIDE	CX CRYPTOXLN	P POOR
	DST INTERVAL	SURVEY		W WELL
		TRIP GAS		





SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot, tr fos, tr pyr,
 SS: wh, lt gy, med grn, sub rnd-sub ang brit, p cmt, sl calc, fri grn, tr glau

MD: 4,209 '
 TVD: 4,192.94 '
 Inclination: 6.3 °
 Azimuth: 71.5 °
 VS: -127.61 '

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot, tr fos, tr pyr,
 SS: wh, lt gy, med grn, sub rnd - sub ang brit, p cmt, sl calc, fri grn, tr glau

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot, tr fos, tr pyr,
 SS: wh, lt gy, med grn, sub rnd - sub ang brit, p cmt, sl calc, fri grn, tr glau

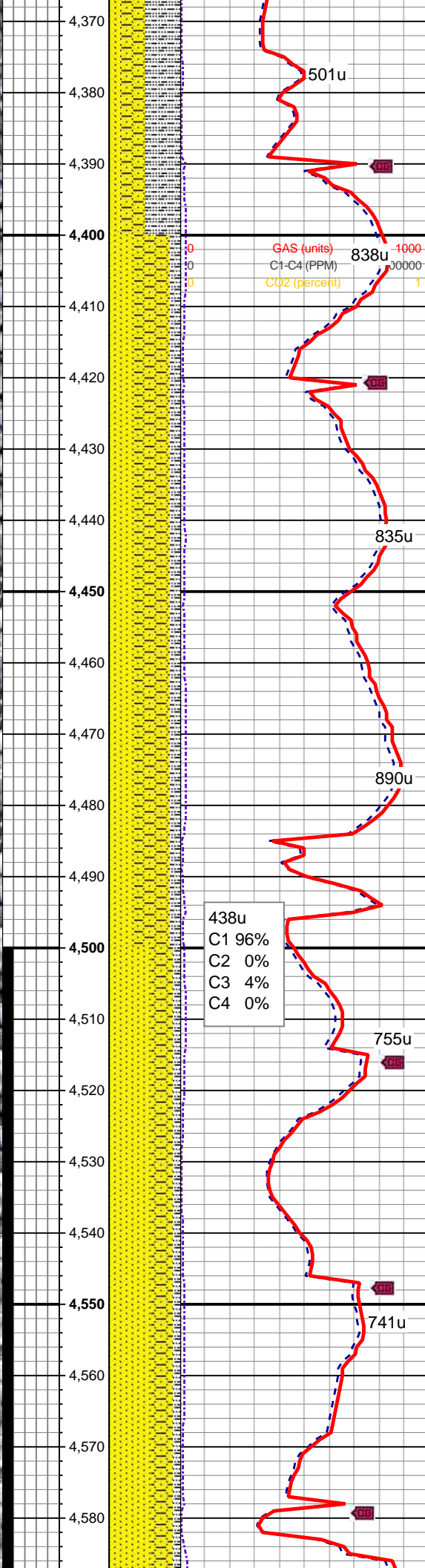
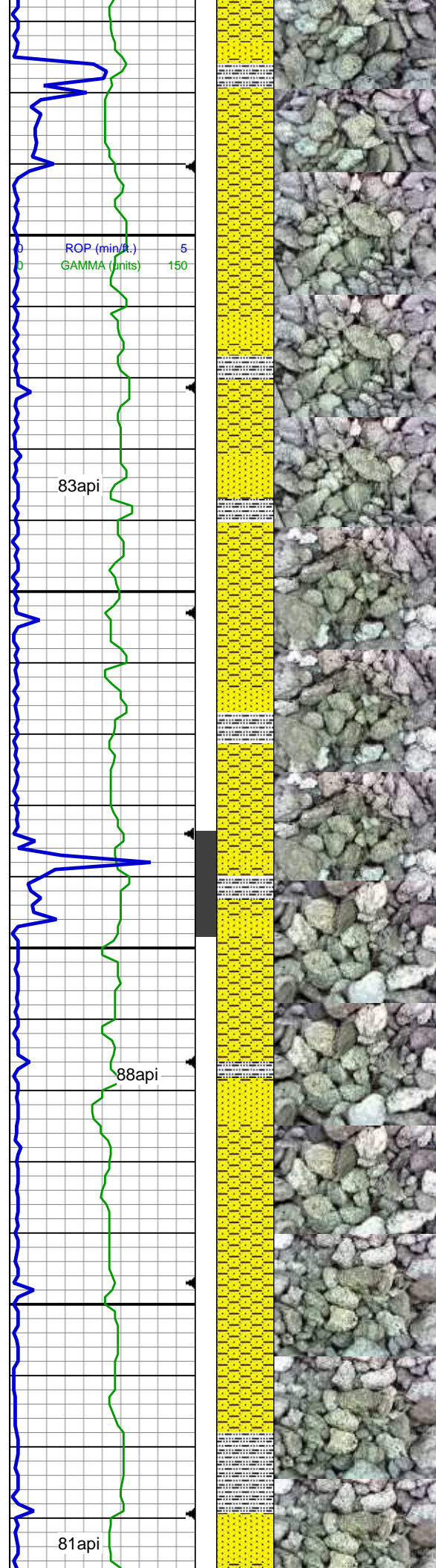
MUD WT: 9.0 VIS: 32

MD: 4,304 '
 TVD: 4,287.32 '
 Inclination: 6.8 °
 Azimuth: 71.6 °
 VS: -130.24 '

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot,
 SS: wh, lt gy, med grn, sub rnd - sub ang brit, p cmt, sl calc, fri grn, tr glau

MUD WT: 9.0 VIS: 33

350u
 C1 98%
 C2 0%
 C3 2%
 C4 0%



SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot,
 SS: wh, lt gy, med grn, sub rnd - sub ang brit, p cmt, sl calc, fri grn, tr glau

MD: 4,398 '
 TVD: 4,380.74 '
 Inclination: 5.9 °
 Azimuth: 61.2 °
 VS: -133.59 '

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot,
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr glau

MUD WT: 9.1 VIS: 34

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot,
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr glau

MD: 4,493 '
 TVD: 4,475.25 '
 Inclination: 5.8 °
 Azimuth: 54.3 °
 VS: -138.1 '

438u
 C1 96%
 C2 0%
 C3 4%
 C4 0%

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly, tr biot,
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, tr glau

SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SLTY SH: lt gy-dk gy, sub frm-frm, slty rthy tex, arg, sub blkly,
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, tr glau

ROP (min/ft.) 5-
 GAMMA (units) 150

83api

88api

81api

501u

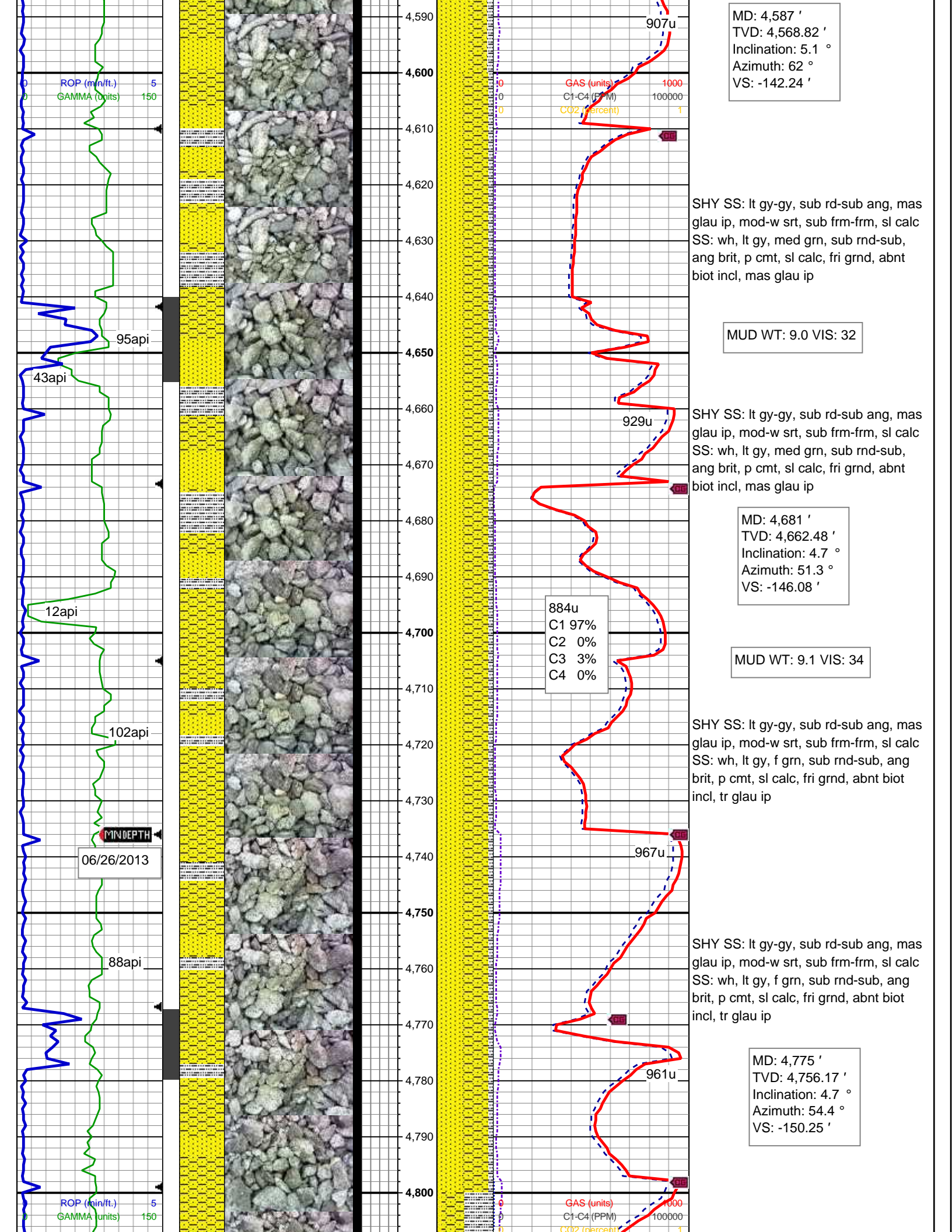
GAS (units) 838u 1000
 C1-C4 (PPM) 00000
 CO2 (percent) 1

835u

890u

755u

741u



MD: 4,587 '
 TVD: 4,568.82 '
 Inclination: 5.1 °
 Azimuth: 62 °
 VS: -142.24 '

SHY SS: lt gy-gy, sub rd-sub ang, mas glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, mas glau ip

MUD WT: 9.0 VIS: 32

SHY SS: lt gy-gy, sub rd-sub ang, mas glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, mas glau ip

MD: 4,681 '
 TVD: 4,662.48 '
 Inclination: 4.7 °
 Azimuth: 51.3 °
 VS: -146.08 '

884u
 C1 97%
 C2 0%
 C3 3%
 C4 0%

MUD WT: 9.1 VIS: 34

SHY SS: lt gy-gy, sub rd-sub ang, mas glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, f grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, tr glau ip

SHY SS: lt gy-gy, sub rd-sub ang, mas glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, f grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, abnt biot incl, tr glau ip

MD: 4,775 '
 TVD: 4,756.17 '
 Inclination: 4.7 °
 Azimuth: 54.4 °
 VS: -150.25 '

ROP (min/ft.) 5
 GAMMA (units) 150

GAS (units) 1000
 C1-C4 (PPM) 100000
 CO2 (percent) 1

MINDEPTH
 06/26/2013

ROP (min/ft.) 5
 GAMMA (units) 150

GAS (units) 1000
 C1-C4 (PPM) 100000
 CO2 (percent) 1

95api

43api

12api

102api

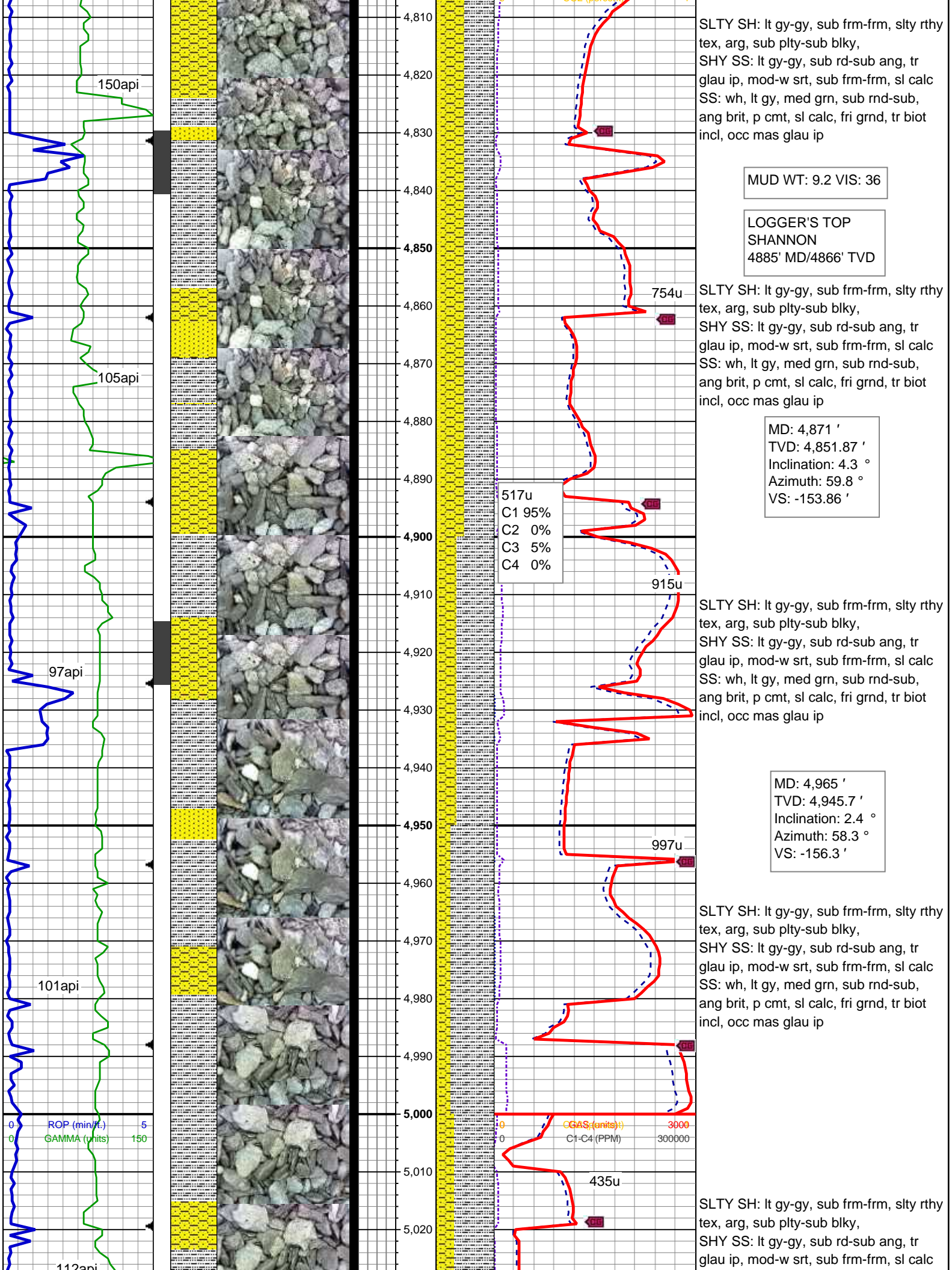
88api

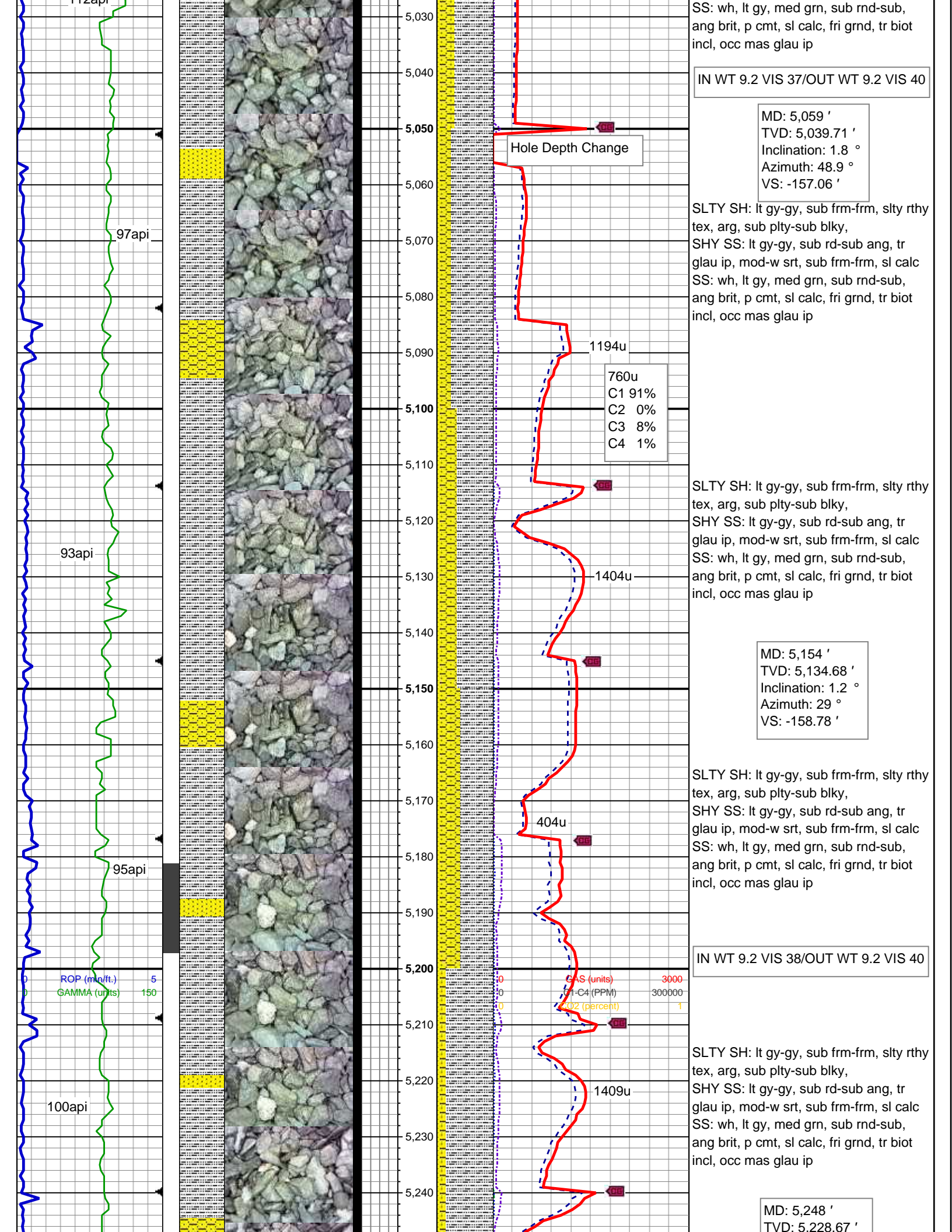
907u

929u

967u

961u





SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grd, tr biot incl, occ mas glau ip

IN WT 9.2 VIS 37/OUT WT 9.2 VIS 40

MD: 5,059 '
 TVD: 5,039.71 '
 Inclination: 1.8 °
 Azimuth: 48.9 °
 VS: -157.06 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grd, tr biot incl, occ mas glau ip

Hole Depth Change

760u
 C1 91%
 C2 0%
 C3 8%
 C4 1%

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grd, tr biot incl, occ mas glau ip

MD: 5,154 '
 TVD: 5,134.68 '
 Inclination: 1.2 °
 Azimuth: 29 °
 VS: -158.78 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grd, tr biot incl, occ mas glau ip

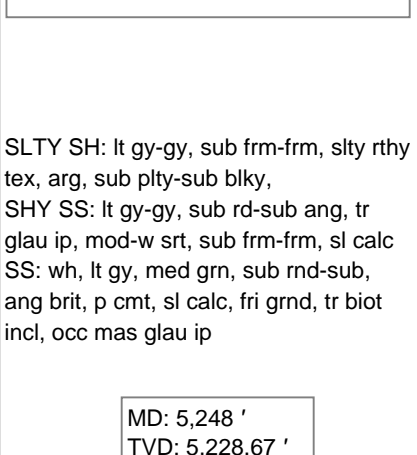
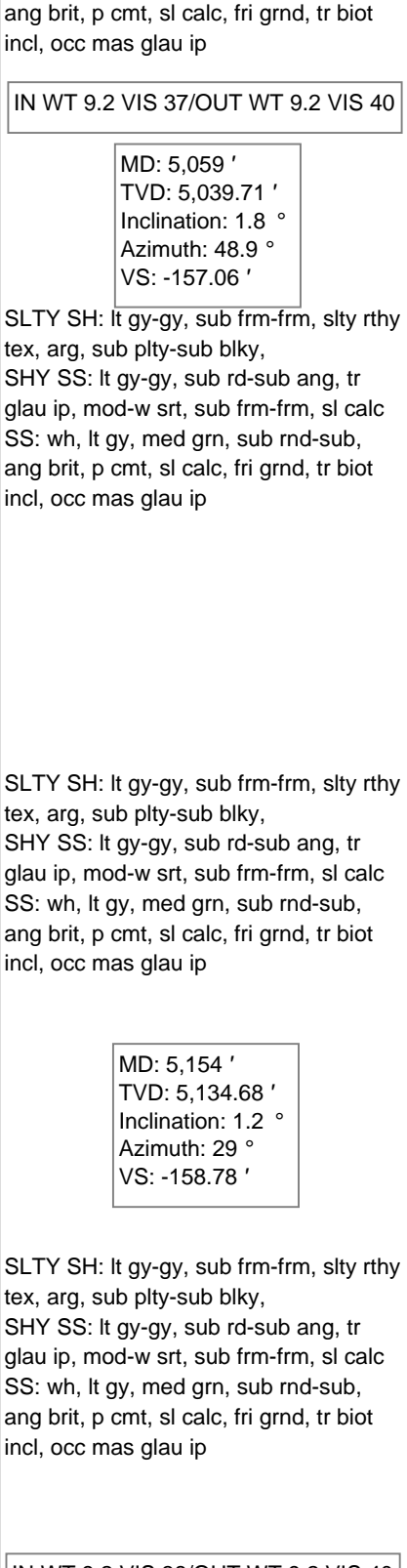
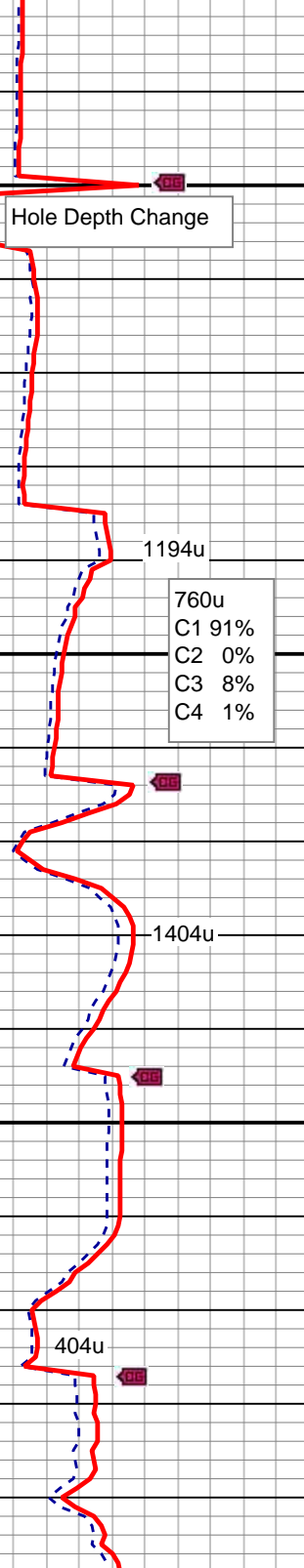
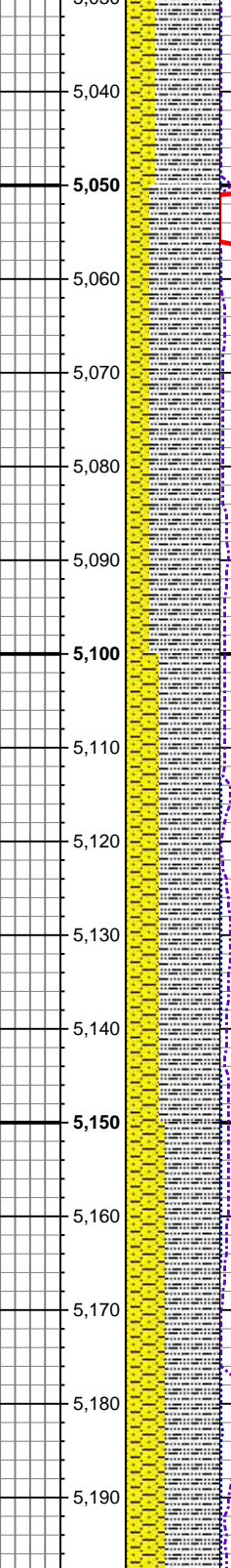
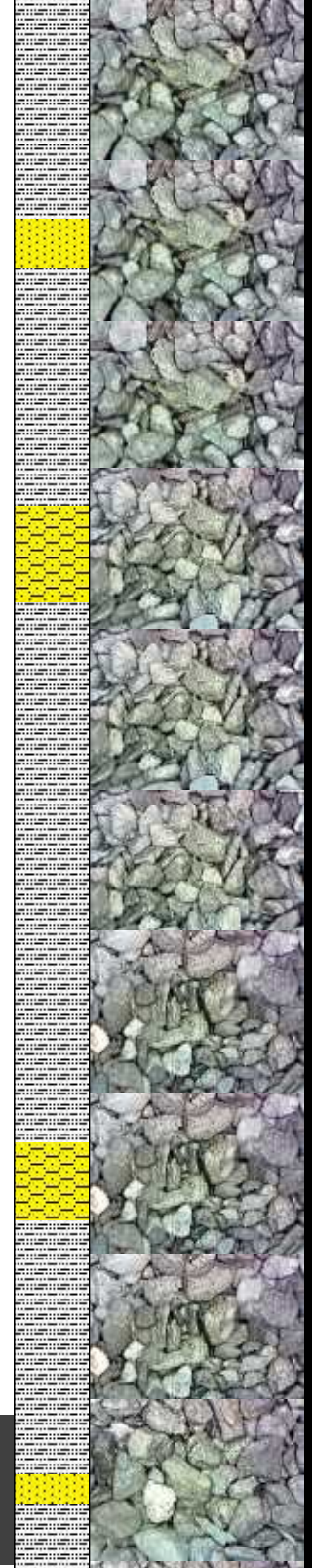
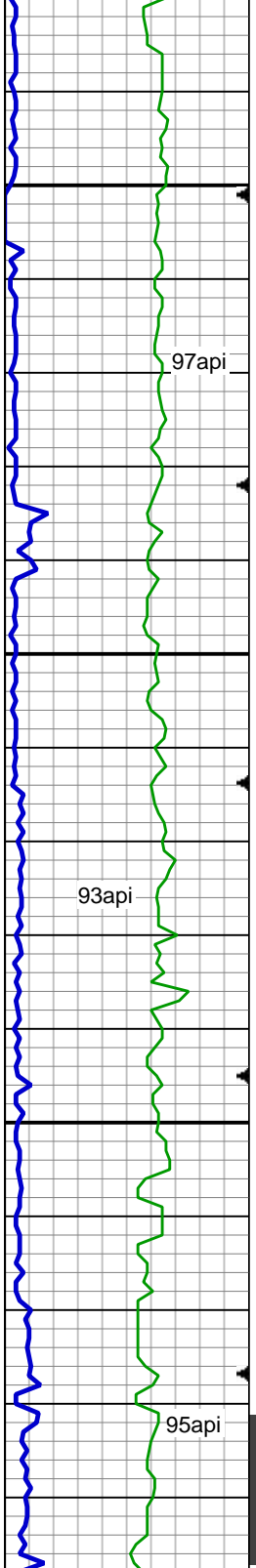
IN WT 9.2 VIS 38/OUT WT 9.2 VIS 40

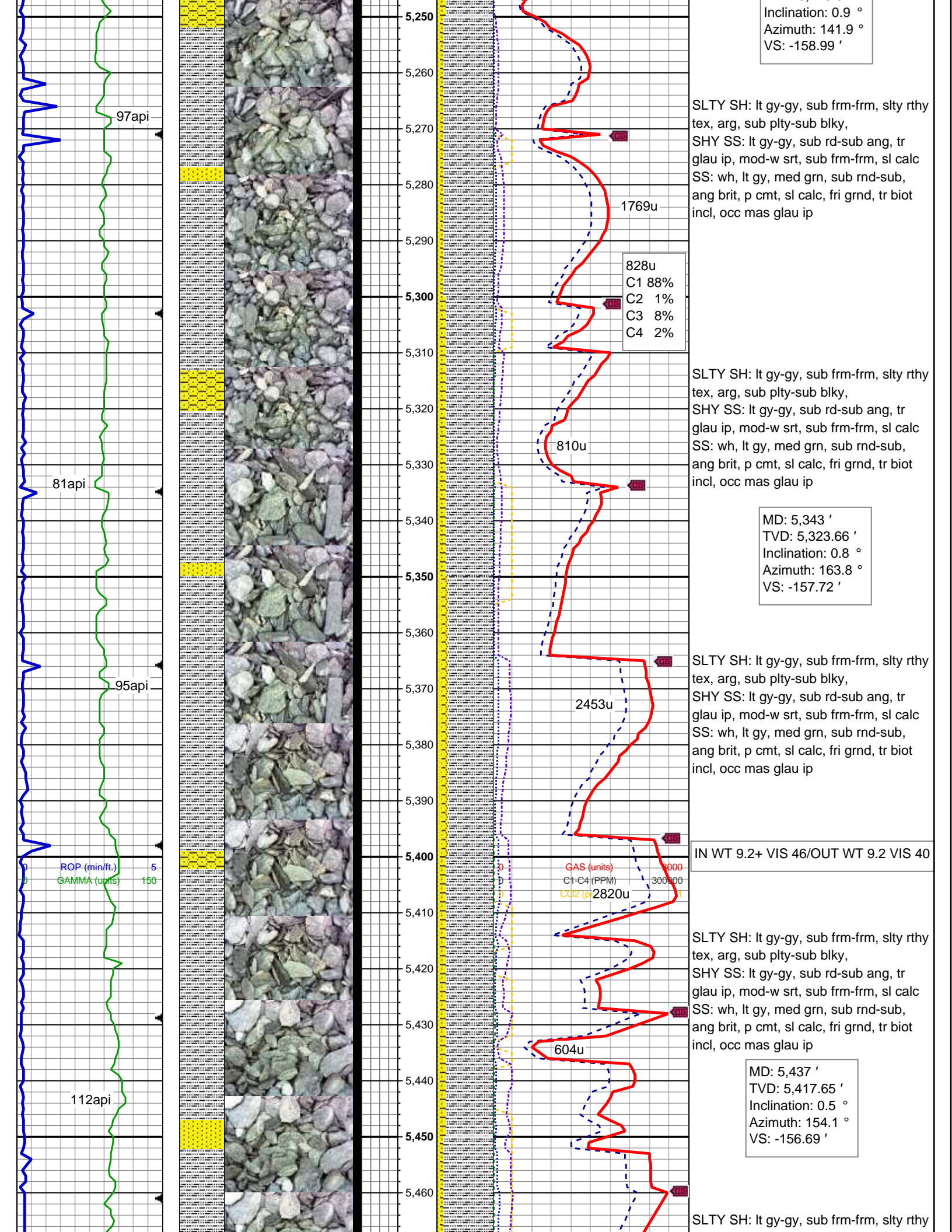
CAS (units) 3000
 C1-C4 (PPM) 300000
 C02 (percent) 1

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grd, tr biot incl, occ mas glau ip

MD: 5,248 '
 TVD: 5,228.67 '

ROP (min/ft.) 5
 GAMMA (units) 150





Inclination: 0.9 °
Azimuth: 141.9 °
VS: -158.99 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr biot incl, occ mas glau ip

828u
C1 88%
C2 1%
C3 8%
C4 2%

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr biot incl, occ mas glau ip

MD: 5,343 '
TVD: 5,323.66 '
Inclination: 0.8 °
Azimuth: 163.8 °
VS: -157.72 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr biot incl, occ mas glau ip

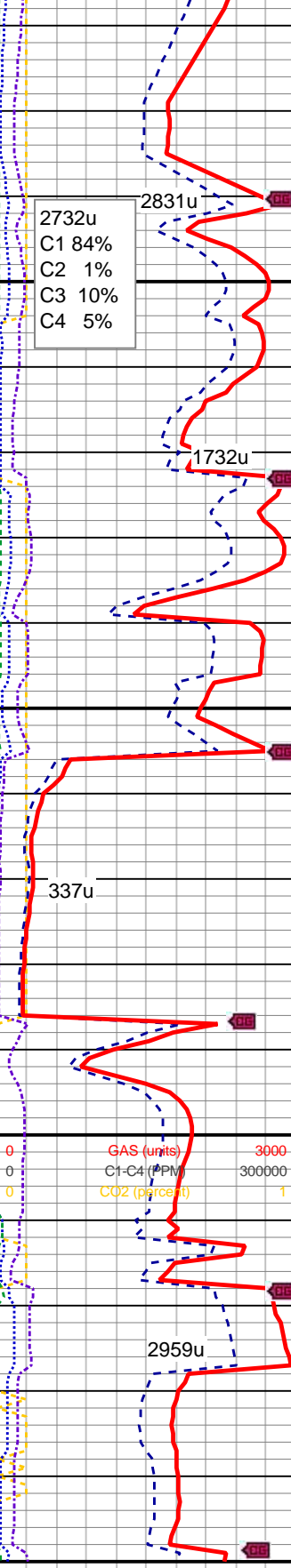
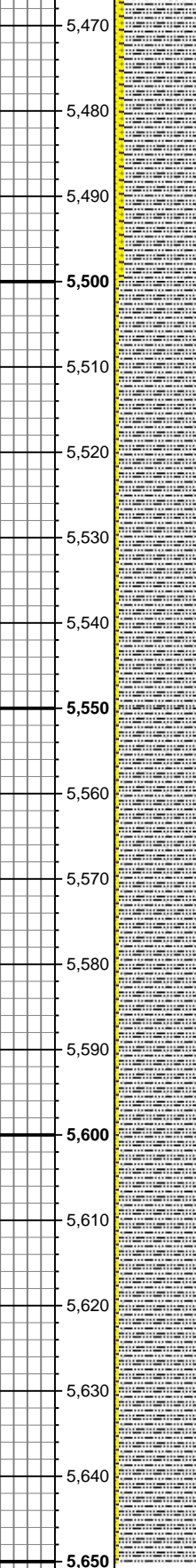
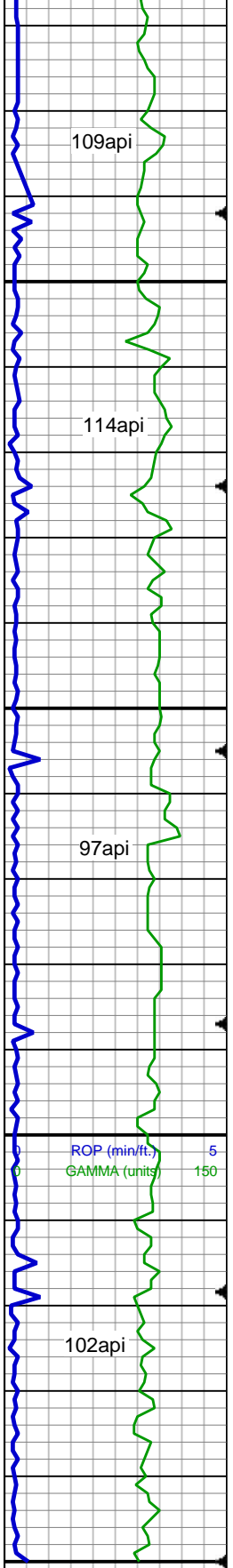
IN WT 9.2+ VIS 46/OUT WT 9.2 VIS 40

GAS (units) 8000
C1-C4 (PPM) 300000
CO2 (ppm) 2820u

SLTY SH: lt gy-gy, sub frm-frm, slty rthy tex, arg, sub plty-sub blkly,
SHY SS: lt gy-gy, sub rd-sub ang, tr glau ip, mod-w srt, sub frm-frm, sl calc
SS: wh, lt gy, med grn, sub rnd-sub, ang brit, p cmt, sl calc, fri grnd, tr biot incl, occ mas glau ip

MD: 5,437 '
TVD: 5,417.65 '
Inclination: 0.5 °
Azimuth: 154.1 °
VS: -156.69 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy



tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr
 glau ip, mod-w srt, sub frm-frm, sl calc
 SS: wh, lt gy, med grn, sub rnd-sub,
 ang brit, p cmt, sl calc, fri grnd, tr biot
 incl, occ mas glau ip

Depth 5491	Gels 10/40	Water 93
MW 9.25	Cake 1	Oil 0
MG 0.481	pH 9.2	Hard 40
FV 39	Fil .1/6	MBT 25
PV 6	Sand TR	Ch 300
YP 9	Solids 7	LCM 0

2732u
 C1 84%
 C2 1%
 C3 10%
 C4 5%

2831u

SLTY SH: lt gy-gy, sub frm-frm, slty rthy
 tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr
 glau ip, mod-w srt, sub frm-frm, sl calc

MD: 5,532 '
 TVD: 5,512.65 '
 Inclination: 0.1 °
 Azimuth: 41.3 °
 VS: -156.37 '

IN WT 9.3 VIS 40/OUT WT 9.3 VIS 42

SLTY SH: lt gy-gy, sub frm-frm, slty rthy
 tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr
 glau ip, mod-w srt, sub frm-frm, sl calc

MD: 5,627 '
 TVD: 5,607.65 '
 Inclination: 0.6 °
 Azimuth: 1.3 °
 VS: -156.92 '

SLTY SH: lt gy-gy, sub frm-frm, slty rthy
 tex, arg, sub plty-sub blkly,
 SHY SS: lt gy-gy, sub rd-sub ang, tr
 glau ip, mod-w srt, sub frm-frm, sl calc

IN WT 9.3 VIS 39/OUT WT 9.3 VIS 42

DATA CONTINUED ON
 HORIZONTAL LOG

THANK YOU FOR USING
 COLUMBINE LOGGING, INC.

109api

114api

97api

ROP (min/ft) 5
 GAMMA (units) 150

102api

0 GAS (units) 3000
 0 C1-C4 (PPM) 300000
 0 CO2 (percent) 1

337u

2959u

