RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name	Kugel 1M-18H-H267		
Location	Sec. 18 T2N R67W		
State	Colorado	**County**	Weld
Country	USA	**Rig Number**	Ensign 153
API Number	05-123-49481	**AFE #**	16192100
Geographic Region	Rockies	**Field**	Wattenberg
Spud Date	7/3/2019	**Drilling Completed**	7/6/2019
Surface Coordinates	Lat/Long (NAD27): 40.139512/-104.925925 Lat/Long (NAD83): 40.139496/-104.926457 SHL: Sec 18 T2N R67W Footage: 2238 FNL 682 FEL		
Bottom Hole Coordinates	Proposed BHL: Sec 17 T2N R67W Footage: 460 FSL 50 FWL		
Ground Elevation	4,953'	**K.B. Elevation**	4,976'
Logged Interval	7,067' **To** 13,665'	**Total Depth**	13,665'
Formation	Niobrara C Chalk		
Type of Drilling Fluid	Synthetic Oil Based Mud (Neoflo Base Oil)		

Operator

Company Crestone Peak Resources

Address 1801 California Street, Suite 2500
Denver, CO 80202

CRESTONE PEAK
RESOURCES

Geologist

Name John Ready

Company Crestone Peak Resources

Address 1801 California Street, Suite 2500
Denver, CO 80202

CRESTONE PEAK
RESOURCES

Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Loggers: Shana Swirin, Thomas Yull

Services Provided: 2-Man Mudlogging, Geosteering

Equipment: ML-558

Contractor: Reservoir Group
6360 West Sam Houston Pkwy N
Houston, Texas, 77041

Service Start Date: 07/04/2019

Service End Date: 07/06/2019

Job # 2307RK1907

Release Date: 07/07/2019

Rock Types

- UNKNOWN
- ANHYDRITE
- GYPSUM
- SALT
- SIDERITE or LIMONITE
- LIMESTONE
- DOLOMITE
- CHERT
- COAL
- MARLSTONE
- CHALK
- SHALE
- SHALE GRAY
- SHALE COLORED
- SILTSTONE
- SANDSTONE
- CONGLOMERATE
- BRECCIA
- TILL
- BENTONITE
- TUFF
- IGNEOUS
- METAMORPHIC
- CEMENT
- No Sample

Accessories

Fossils

- FOSSIL
- GASTROPOD
- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHOIPOD
- BRYOZOA
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS

- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK

- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER

CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA
PLANT SPORES
SCAPHOPOD
STROMATOPOROID

Minerals

ANHYDRITIC
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET
FERRUGINOUS
PYRITE
SALT CAST
SANDY
SILICEOUS
SILTY
TUFFACEOUS
MARLSTONE (CALC) STRG
MARLSTONE (DOL) STRG
SANDSTONE STRINGER
SHALE STRINGER
SILTSTONE STRINGER

Other Symbols

Oil Show

DEAD
EVEN
QUESTIONABLE
SPOTTED STAINING

Porosity

EARTHY
FENESTRAL
FRACTURE
INTERCRYSTALLINE
INTEROOLITIC
MOLDIC
ORGANIC
PINPOINT
VUGGY

Engineering

BIT
CASING
CONNECTION (LEFT)
CONNECTION (RIGHT)
CONNECTION GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL
FAULT

FORMATION TOP
GAS SHOW
MN DEPTH
NORMAL FAULT
OIL SHOW
OVERTURNED STRATA
REVERSE FAULT
SIDEWALL CORE (LEFT)
SIDEWALL CORE (RIGHT)
SLIDE
SURVEY
TRIP GAS
WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

Textures

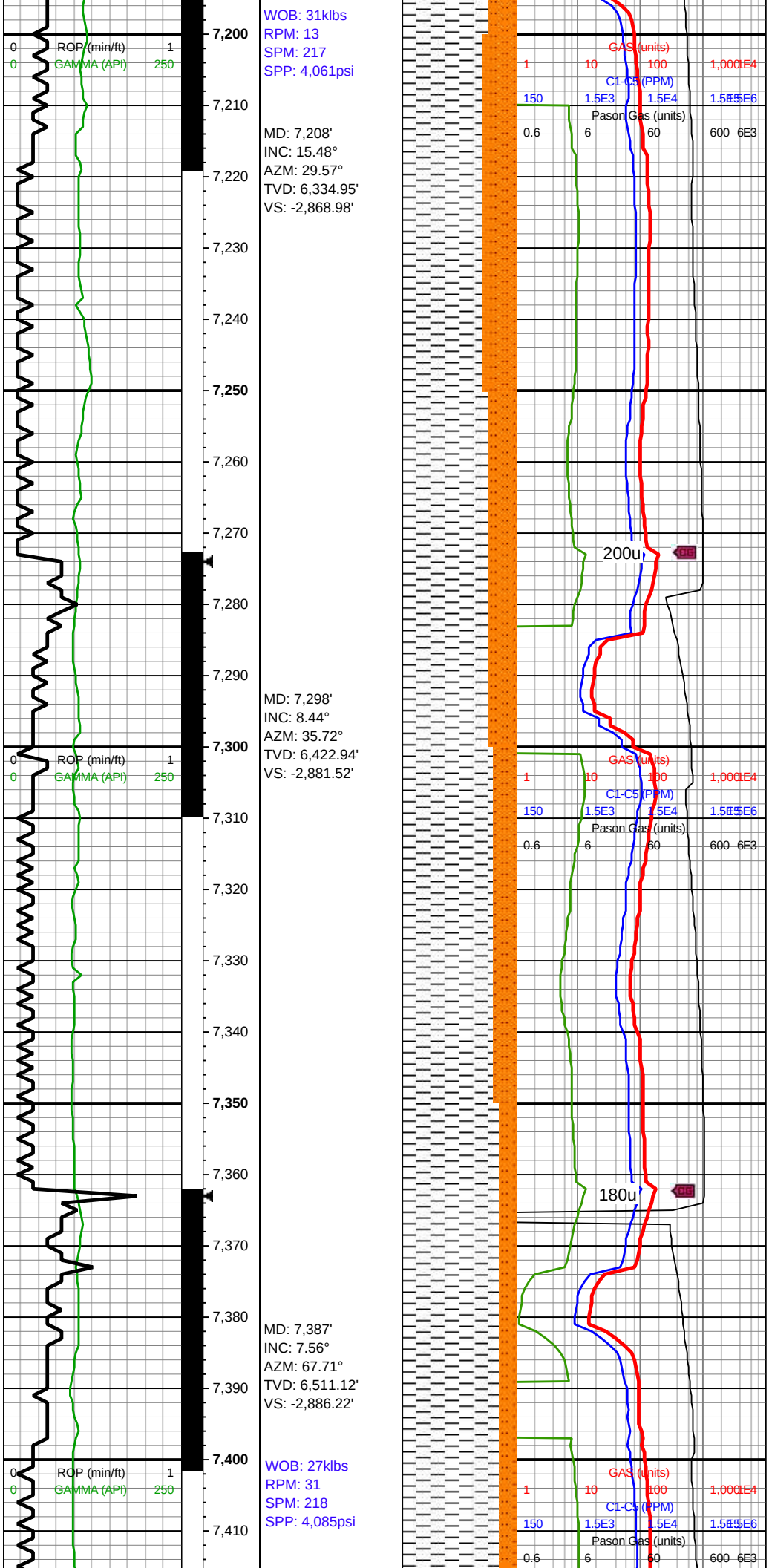
BOUNDSTONE
CHALKY
CRYPTOXLN
EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

Sorting

MODERATE
POOR
WELL

ROP / GAMMA	Slide/Rotate	Depth Labels	Notes	% Lith	Total Gas (GAS, C1, C2, C3, C4, C5, Pason Gas)	Lithology Descriptions	Images
Crestone Peak Resources **Kugel 1M-18H-H267** **9 5/8" Surface Casing @ 2,381'** **Spud Date: 7/3/2019** **2 man Logging Began: 7/3/2019** **All Depths Correspond to Driller's Pipe Tally**		7,010 7,020 7,030 7,040 **7,050** 7,060 7,070 7,080 7,090 **7,100** 7,110 7,120 7,130 7,140 **7,150** 7,160 7,170 7,180 7,190	Bit #: 1 Type: U516M Size: 8 1/2 Depth In: 2,392' Depth Out: 13,665' Hours: 35.1 hrs Avg Ft/Hr: 321.17 '/hr Jets: 6x13 S/N: 46783 **KOP @ 7,067' MD on 07/04/2019 @ 19:04 MST** MD: 7,119' INC: 22.86° AZM: 18.85° TVD: 6,250.92' VS: -2,846.41' **Teepee Buttes** 7174'MD/6302'TVD MW IN: 10 VIS IN: 48 MW OUT: 10 VIS OUT: 46		GAS (units) 1 10 100 1,000 1E4 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6 **SYSTEM CALIBRATED** **1% Methane = 100 Units** **100% Methane = 10000 Units** 140u Pason Gas (units) 0.6 6 60 600 6E3 180u	7067-7100 SLTY SH: (65%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, non calc; SLTST (45%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, r pyr nod, non calc 7100-7150 SLTY SH: (60%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, non calc; SLTST (40%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, tr pyr nod, non calc 7150-7200 SLTY SH: (75%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (25%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc	  

ROP (min/ft) 0 1
GAMMA (API) 0 250



WOB: 31klbs
RPM: 13
SPM: 217
SPP: 4,061psi

MD: 7,208'
INC: 15.48°
AZM: 29.57°
TVD: 6,334.95'
VS: -2,868.98'

7200-7250 SLTY SH:(70%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (30%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc

7250-7300 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc

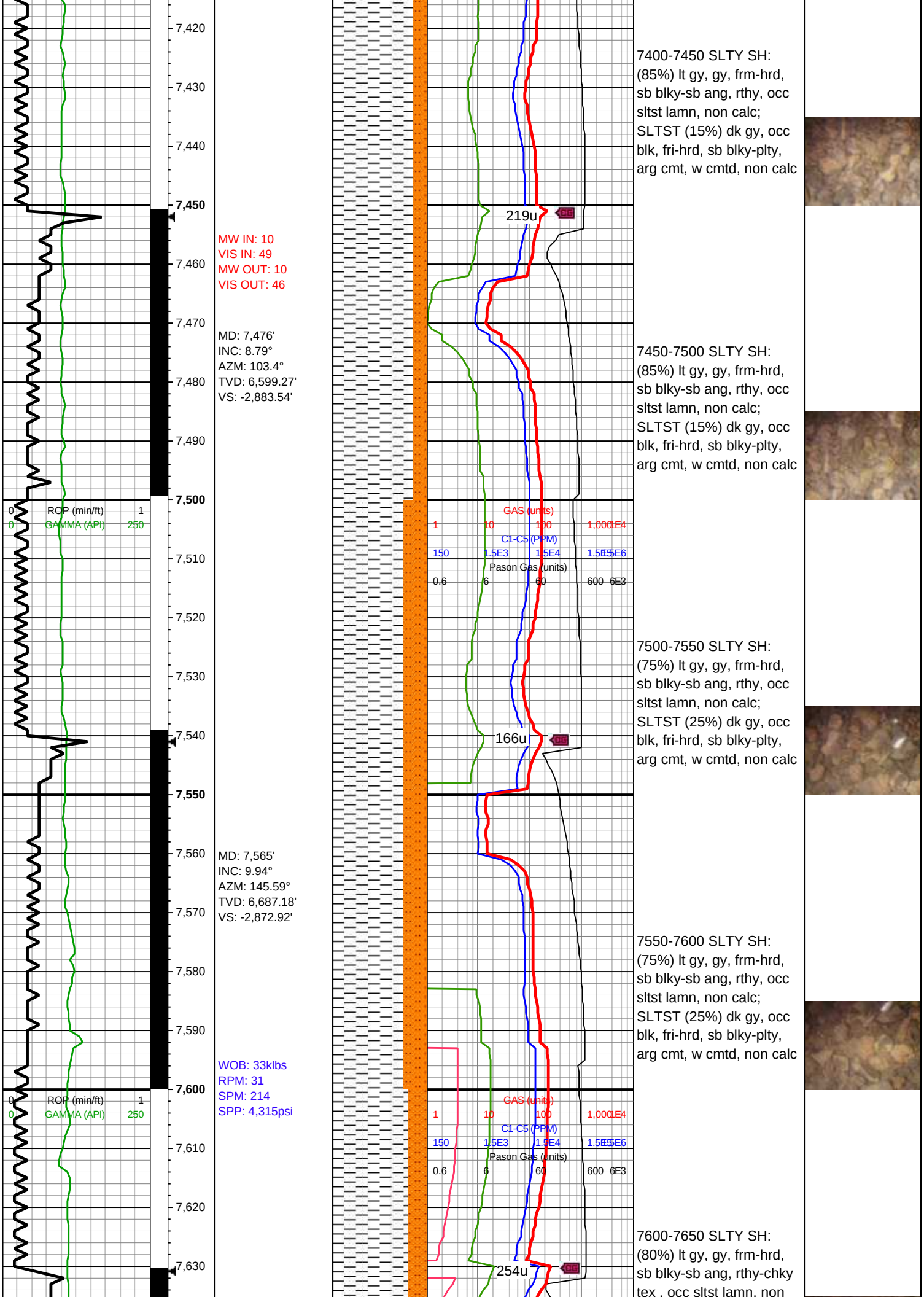
MD: 7,298'
INC: 8.44°
AZM: 35.72°
TVD: 6,422.94'
VS: -2,881.52'

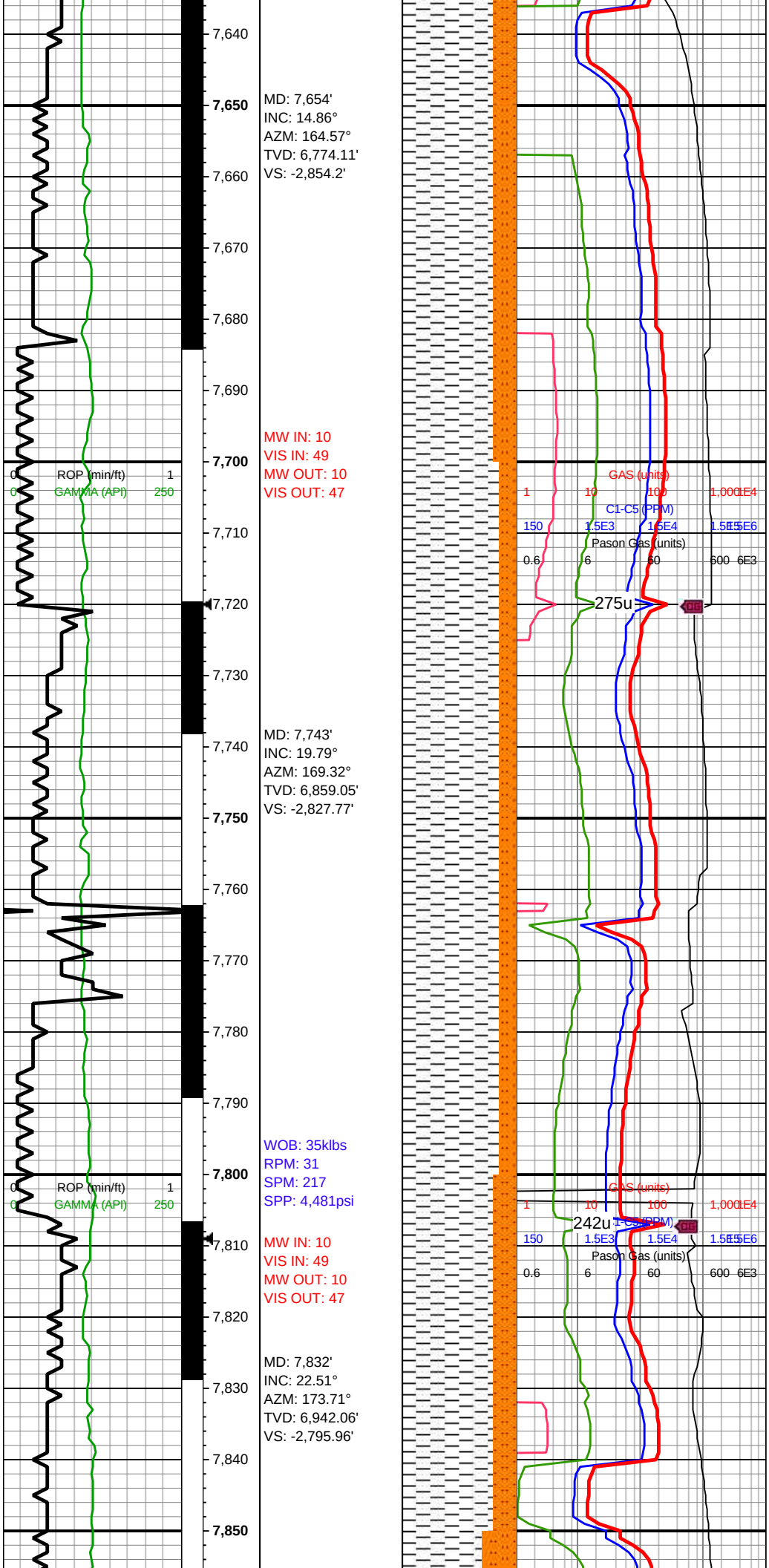
7300-7350 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc

MD: 7,387'
INC: 7.56°
AZM: 67.71°
TVD: 6,511.12'
VS: -2,886.22'

7350-7400 SLTY SH: (85%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (15%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc

WOB: 27klbs
RPM: 31
SPM: 218
SPP: 4,085psi


7,420
7,430
7,440
7,450
7,460
7,470
7,480
7,490
7,500
7,510
7,520
7,530
7,540
7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
MW IN: 10
VIS IN: 49
MW OUT: 10
VIS OUT: 46
MD: 7,476'
INC: 8.79°
AZM: 103.4°
TVD: 6,599.27'
VS: -2,883.54'
MD: 7,565'
INC: 9.94°
AZM: 145.59°
TVD: 6,687.18'
VS: -2,872.92'
WOB: 33klbs
RPM: 31
SPM: 214
SPP: 4,315psi
0 ROP (min/ft) 1
0 GAMMA (API) 250
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3
219u
166u
254u
7400-7450 SLTY SH: (85%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (15%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc
7450-7500 SLTY SH: (85%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (15%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc
7500-7550 SLTY SH: (75%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (25%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc
7550-7600 SLTY SH: (75%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy, occ sltst lamn, non calc; SLTST (25%) dk gy, occ blk, fri-hrd, sb blky-plty, arg cmt, w cmtd, non calc
7600-7650 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex , occ sltst lamn, non



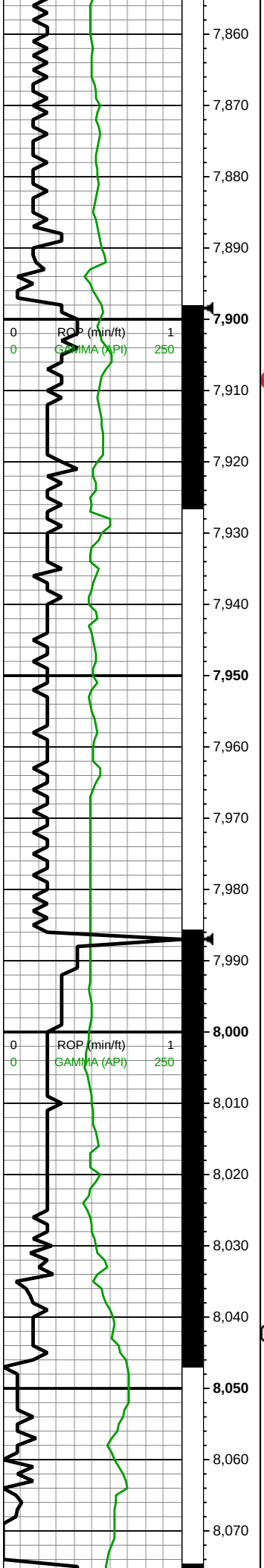
calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

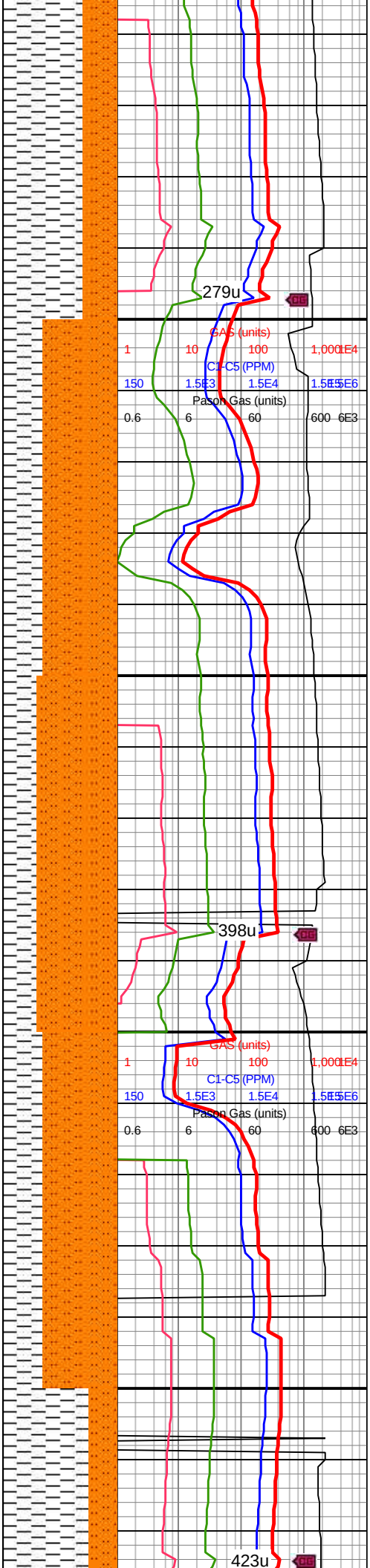
7650-7700 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

7700-7750 SLTY SH: (85%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (15%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

7750-7800 SLTY SH: (85%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (15%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

7800-7850 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc





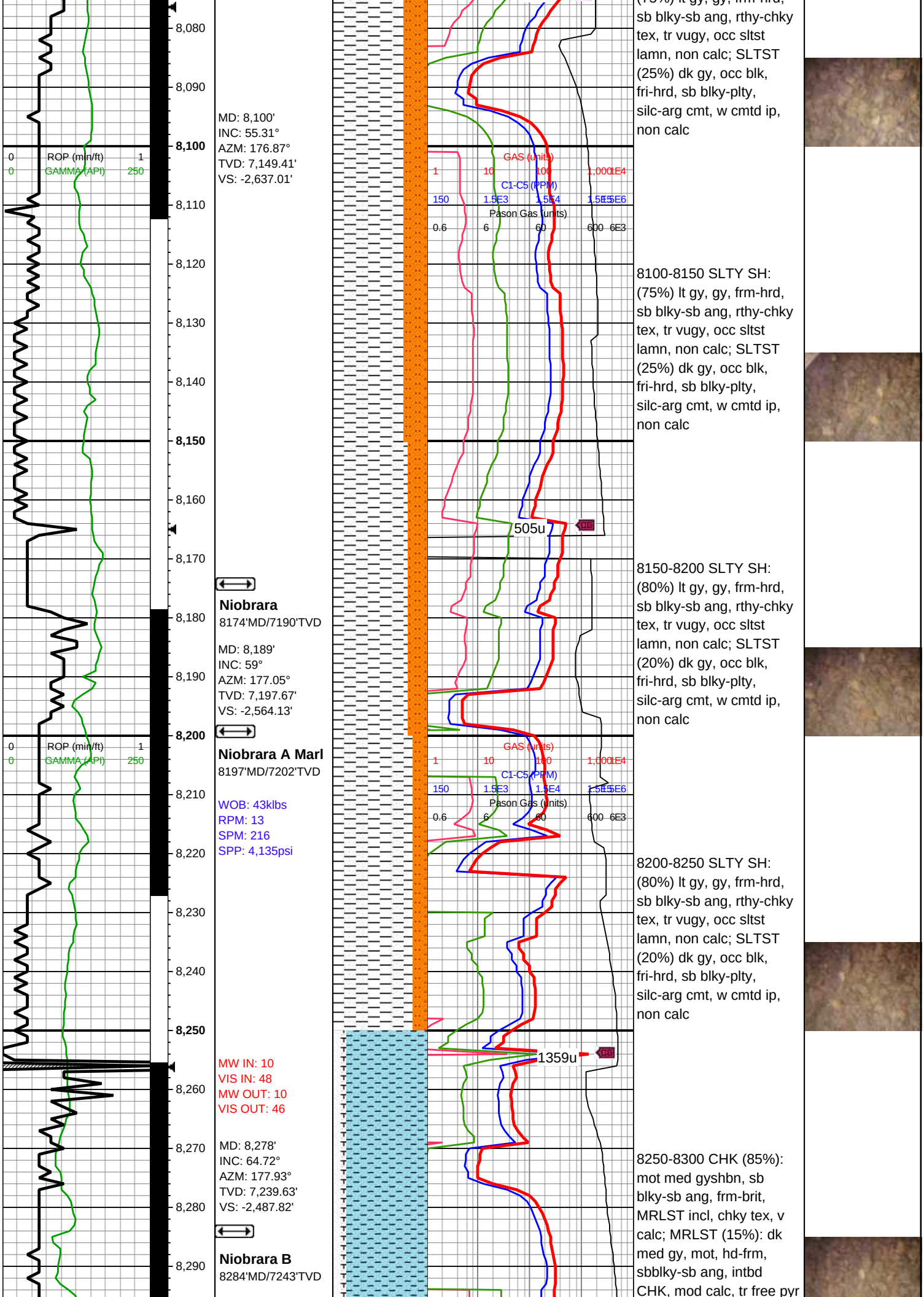
7850-7900 SLTY SH: (70%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (30%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

7900-7950 SLTST (65%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc; SLTY SH: (35%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc

7950-8000 SLTST (70%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc; SLTY SH: (30%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc

8000-8050 SLTST (70%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc; SLTY SH: (30%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc

8050-8100 SLTY SH: (75%) lt gy, gy, frm-hrd



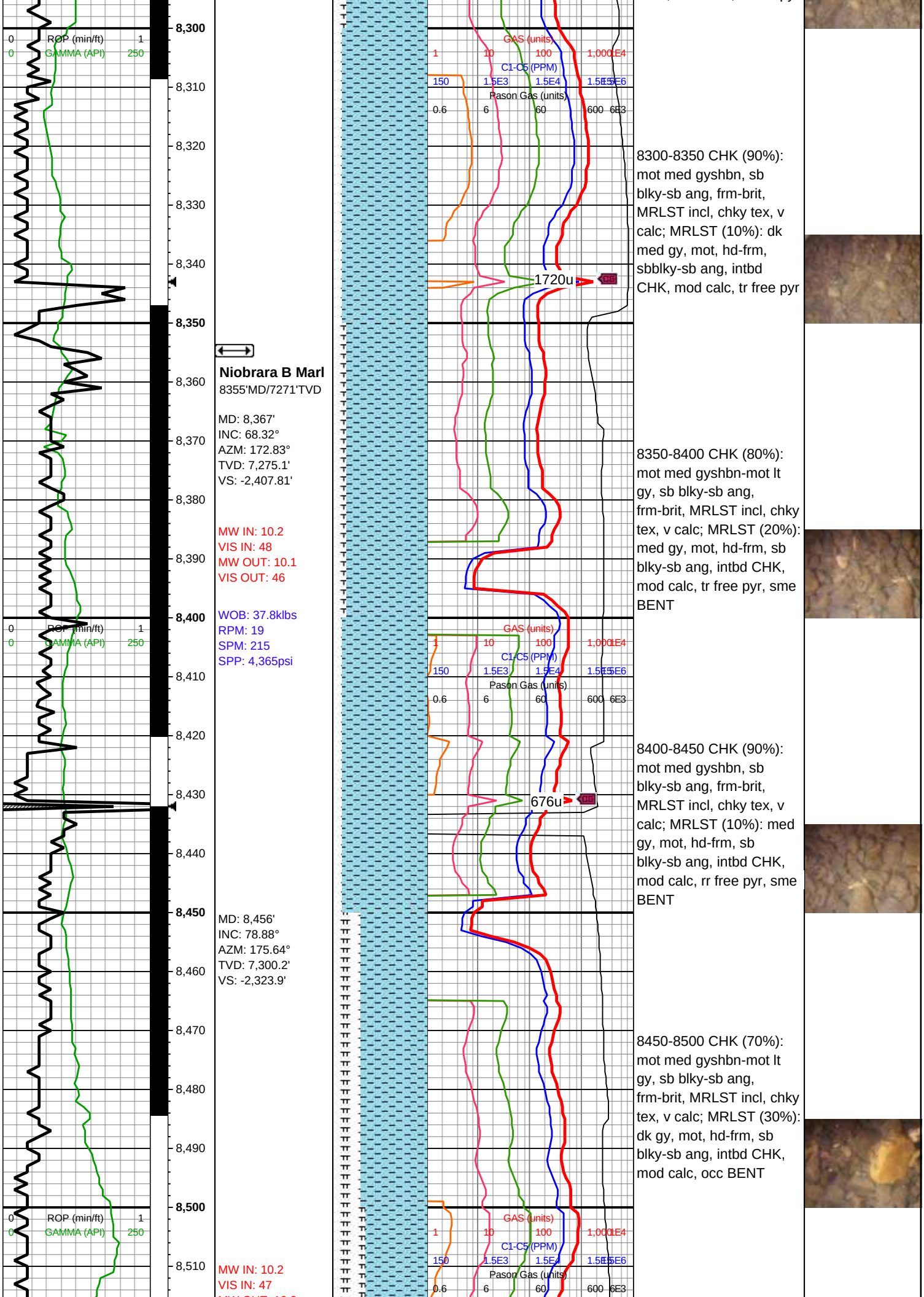
sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (25%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

8100-8150 SLTY SH: (75%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (25%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

8150-8200 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

8200-8250 SLTY SH: (80%) lt gy, gy, frm-hrd, sb blky-sb ang, rthy-chky tex, tr vugy, occ sltst lamn, non calc; SLTST (20%) dk gy, occ blk, fri-hrd, sb blky-plty, silc-arg cmt, w cmtd ip, non calc

8250-8300 CHK (85%): mot med gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (15%): dk med gy, mot, hd-frm, sbblky-sb ang, intbd CHK, mod calc, tr free pyr



Niobrara B Marl
8355'MD/7271'TVD

MD: 8,367'
INC: 68.32°
AZM: 172.83°
TVD: 7,275.1'
VS: -2,407.81'

MW IN: 10.2
VIS IN: 48
MW OUT: 10.1
VIS OUT: 46

WOB: 37.8klbs
RPM: 19
SPM: 215
SPP: 4,365psi

MD: 8,456'
INC: 78.88°
AZM: 175.64°
TVD: 7,300.2'
VS: -2,323.9'

MW IN: 10.2
VIS IN: 47

8300-8350 CHK (90%): mot med gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (10%): dk med gy, mot, hd-frm, sbblky-sb ang, intbd CHK, mod calc, tr free pyr

8350-8400 CHK (80%): mot med gyshbn-mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (20%): med gy, mot, hd-frm, sb blky-sb ang, intbd CHK, mod calc, tr free pyr, sme BENT

8400-8450 CHK (90%): mot med gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (10%): med gy, mot, hd-frm, sb blky-sb ang, intbd CHK, mod calc, rr free pyr, sme BENT

8450-8500 CHK (70%): mot med gyshbn-mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (30%): dk gy, mot, hd-frm, sb blky-sb ang, intbd CHK, mod calc, occ BENT

MW OUT: 10.2
VIS OUT: 45

Niobrara C
8526'MD/7312'TVD

MD: 8,545'
INC: 84.06°
AZM: 176.87°
TVD: 7,313.4'
VS: -2,237.89'

WOB: 43klbs
RPM: 31
SPM: 218
SPP: 4,692psi

Land Curve @ 8,620' MD on 07/05/2019 @ 05:30 MST

MD: 8,634'
INC: 91.1°
AZM: 179.16°
TVD: 7,317.15'
VS: -2,151.65'

MD: 8,723'
INC: 90.75°
AZM: 177.23°
TVD: 7,315.72'
VS: -2,065.35'

8,520 8,530 8,540 **8,550** 8,560 8,570 8,580 8,590 **8,600** 8,610 8,620 8,630 8,640 **8,650** 8,660 8,670 8,680 8,690 **8,700** 8,710 8,720 8,730

0 ROP (min/ft) 1
0 GAMMA (API) 250

724u
1190u
1565u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

8500-8550 CHK (65%): mot med gyshbn-mot dk med gy, sb blky-sb ang, v frm-brit, MRLST incl, chky tex, v calc; MRLST (35%): dk gy, mot, hd-frm, sb blky-sb ang, intbd CHK, mod calc, occ BENT

8550-8600 CHK (70%): mot med gyshbn-mot dk med gy-mot lt gy, sb blky-sb ang, v frm-brit, MRLST incl, chky tex, v calc; MRLST (30%): dk gy, mot, hd-frm, sb blky-sb ang, intbd CHK, mod calc, sme BENT, rr free pyr

8600-8700 CHK (55%): mot dk med gy-mot lt gy, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc; MRLST (45%): v dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc, rr BENT

8,740
8,750
8,760
8,770
8,780
8,790
8,800
8,810
8,820
8,830
8,840
8,850
8,860
8,870
8,880
8,890
8,900
8,910
8,920
8,930
8,940
8,950

MW IN: 10.2
VIS IN: 48
MW OUT: 10.2
VIS OUT: 46

WOB: 58.8klbs
RPM: 14
SPM: 218
SPP: 4,163psi

MD: 8,812'
INC: 90.31°
AZM: 178.63°
TVD: 7,314.89'
VS: -1,978.94'

ON GAS BUSTER

MD: 8,901'
INC: 89.16°
AZM: 179.69°
TVD: 7,315.3'
VS: -1,893'

MW IN: 10.3
VIS IN: 49
MW OUT: 10.2

0 ROP (min/ft) 1
0 GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

2004u

508u

8700-8800 CHK (60%): mot dk med gy-mot med gyshbn, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (40%): v dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc

8800-8900 CHK (70%): mot med gyshbn-mot med gy, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (30%): v dk gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, rr free pyr

VIS OUT: 46

8,960
8,970
8,980
8,990
9,000
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

MD: 8,990'
INC: 89.34°
AZM: 179.16°
TVD: 7,316.47'
VS: -1,807.18'

WOB: 40.3klbs
RPM: 61
SPM: 218
SPP: 4,829psi

MD: 9,079'
INC: 89.6°
AZM: 178.1°
TVD: 7,317.29'
VS: -1,721.03'

MD: 9,169'
INC: 90.31°
AZM: 176.7°
TVD: 7,317.36'
VS: -1,633.45'

0 ROP (min/ft) 1
0 GAMMA (API) 250

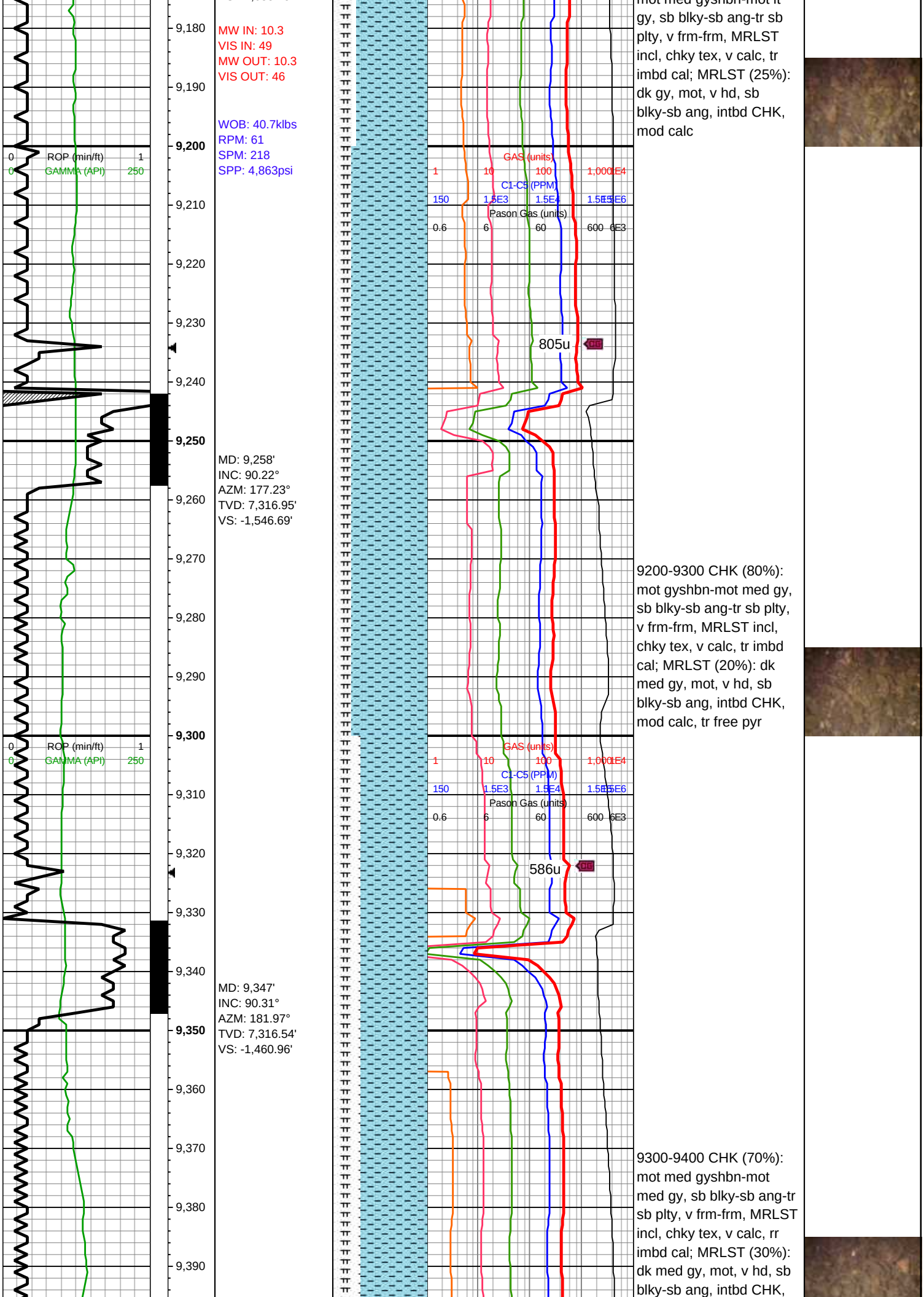
646u
647u
300u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

8900-9000 CHK (60%): mot med gyshbn-mot med lt gy, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc; MRLST (40%): v dk gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc

9000-9100 CHK (55%): mot med gyshbn-mot med lt gy, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc; MRLST (45%): v dk gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc

9100-9200 CHK (75%): mot med gyshbn-mot lt



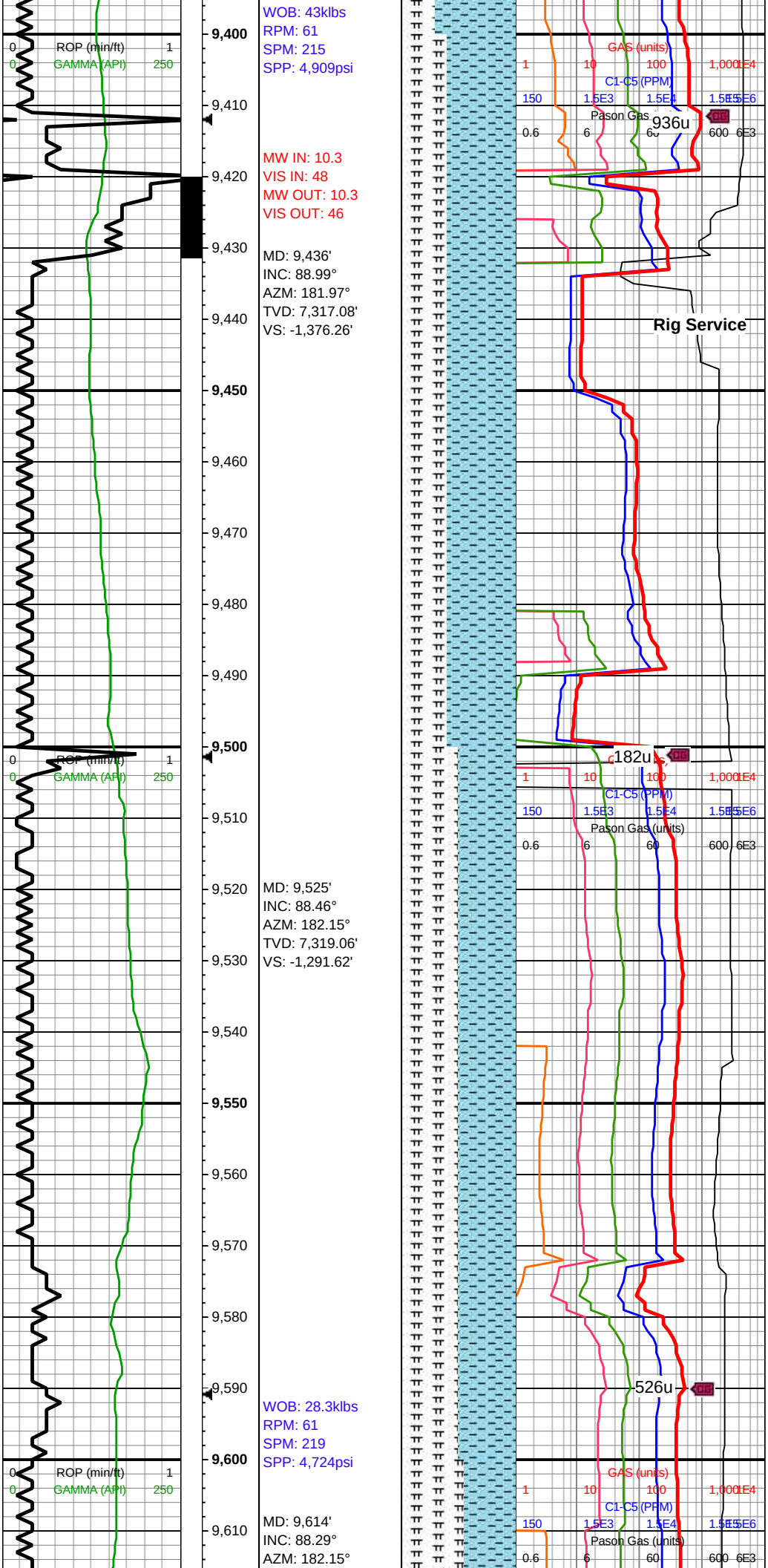
MD: 9,258'
INC: 90.22°
AZM: 177.23°
TVD: 7,316.95'
VS: -1,546.69'

MD: 9,347'
INC: 90.31°
AZM: 181.97°
TVD: 7,316.54'
VS: -1,460.96'

mot med gyshbn-mot lt gy, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (25%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc

9200-9300 CHK (80%): mot gyshbn-mot med gy, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (20%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr free pyr

9300-9400 CHK (70%): mot med gyshbn-mot med gy, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (30%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK,



WOB: 43klbs
RPM: 61
SPM: 215
SPP: 4,909psi

MW IN: 10.3
VIS IN: 48
MW OUT: 10.3
VIS OUT: 46

MD: 9,436'
INC: 88.99°
AZM: 181.97°
TVD: 7,317.08'
VS: -1,376.26'

MD: 9,525'
INC: 88.46°
AZM: 182.15°
TVD: 7,319.06'
VS: -1,291.62'

WOB: 28.3klbs
RPM: 61
SPM: 219
SPP: 4,724psi

MD: 9,614'
INC: 88.29°
AZM: 182.15°

mod calc

9400-9500 CHK (60%): mot med gy-mot med gyshbn-tr mot lt gy, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (40%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, rr fos frags, rr free pyr, sme BENT

9500-9600 CHK (50%): mot med gy, sb blky-sb ang, v frm-brit, MRLST incl, chky tex, v calc, rr imbd cal, rr imbd cal; MRLST (50%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr fos frags, sme BENT

TVD: 7,321.59'
VS: -1,207.04'

9,620
9,630
9,640
9,650
9,660
9,670
9,680
9,690
9,700

0 ROP (min/ft) 1
0 GAMMA (API) 250

MD: 9,703'
INC: 88.9°
AZM: 180.74°
TVD: 7,323.77'
VS: -1,122.12'

9,710
9,720
9,730
9,740
9,750
9,760
9,770
9,780
9,790
9,800

0 ROP (min/ft) 1
0 GAMMA (API) 250

MD: 9,793'
INC: 89.69°
AZM: 180.74°
TVD: 7,324.88'
VS: -1,035.9'

WOB: 42.5klbs
RPM: 61
SPM: 218
SPP: 4,893psi

MW IN: 10.3
VIS IN: 49
MW OUT: 10.3
VIS OUT: 46

9,810
9,820
9,830

700u
GG

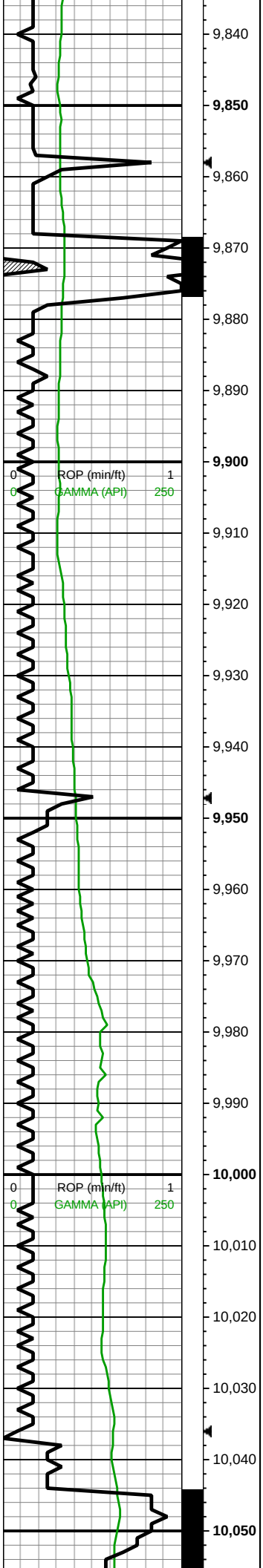
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

1130u
GG

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

9600-9700 MRLST (55%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc; CHK (45%): mot med gy-mot gyshbn, sb blky-sb ang, v frm-brit, MRLST incl, chky tex, v calc, rr imbd cal, rr imbd cal, tr fos frags, sme BENT

9700-9800 CHK (70%): mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (30%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, rr imbd cal, tr BENT, tr free pyr

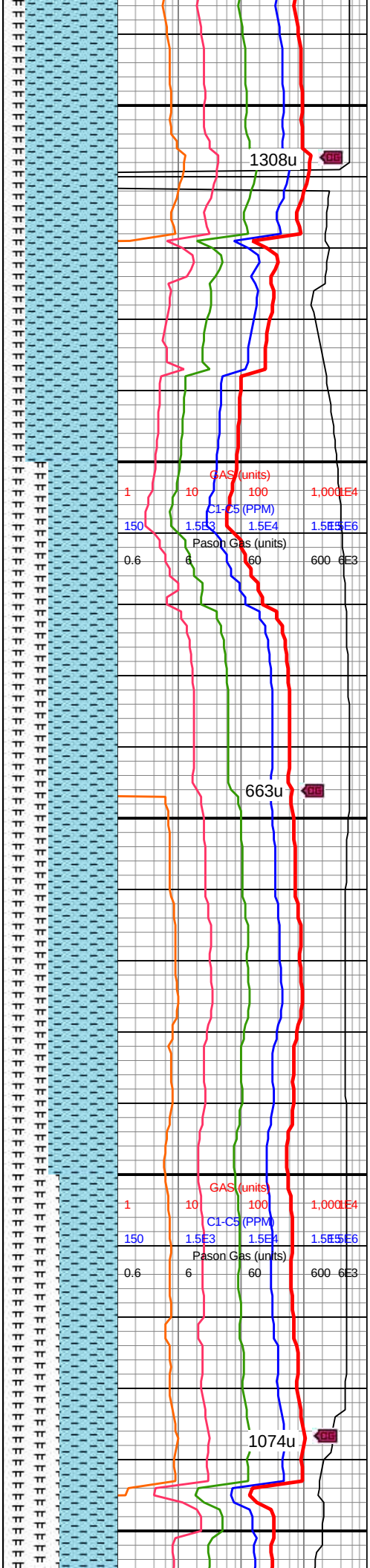


MD: 9,882'
INC: 90.84°
AZM: 178.81°
TVD: 7,324.47'
VS: -950.22'

MD: 9,971'
INC: 91.63°
AZM: 178.63°
TVD: 7,322.55'
VS: -864.13'

WOB: 44klbs
RPM: 61
SPM: 217
SPP: 4,961psi

MW IN: 10.3
VIS IN: 49
MW OUT: 10.3
VIS OUT: 46



9800-9900 CHK (80%): mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (20%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr free pyr

9900-10000 CHK (60%): mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (40%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc

MD: 10,060'
INC: 89.52°
AZM: 180.04°
TVD: 7,321.65'
VS: -778.27'

10,060
10,070
10,080
10,090
10,100
10,110
10,120
10,130
10,140

MD: 10,149'
INC: 89.43°
AZM: 179.69°
TVD: 7,322.47'
VS: -692.63'

10,150
10,160

MW IN: 10.4
VIS IN: 49
MW OUT: 10.3
VIS OUT: 46

10,170
10,180
10,190
10,200
10,210
10,220
10,230

MD: 10,238'
INC: 89.34°
AZM: 178.1°
TVD: 7,323.42'
VS: -606.59'

10,240
10,250
10,260
10,270

0 ROP (min/ft) 1
0 GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

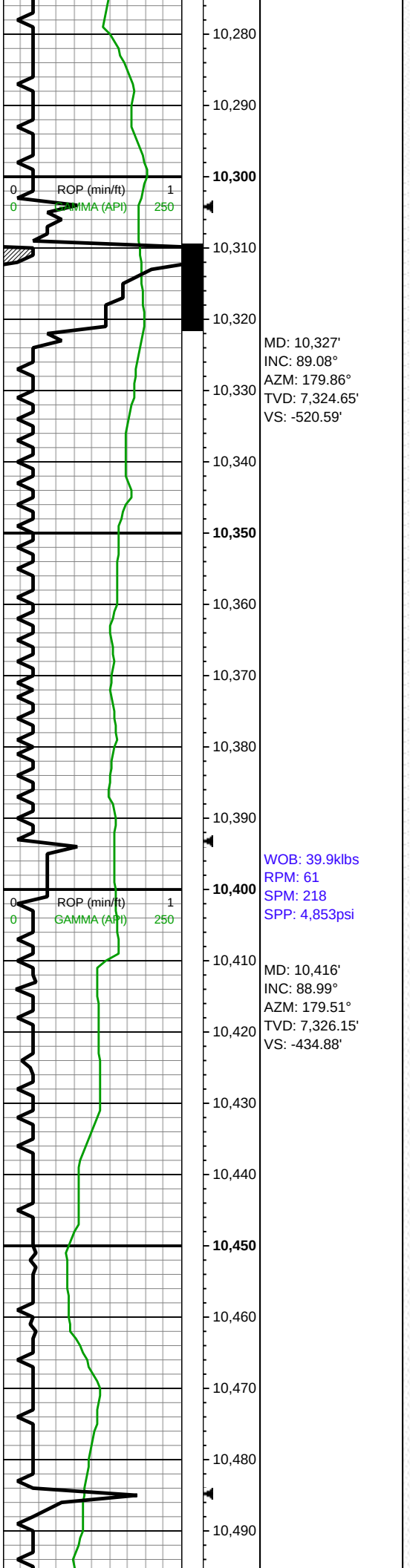
698u

10000-10100 CHK (50%): mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (50%): dk med gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc

671u

10100-10200 MRLST (65%): dk med gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc; CHK (35%): mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, v abnt BENT, tr free pyr

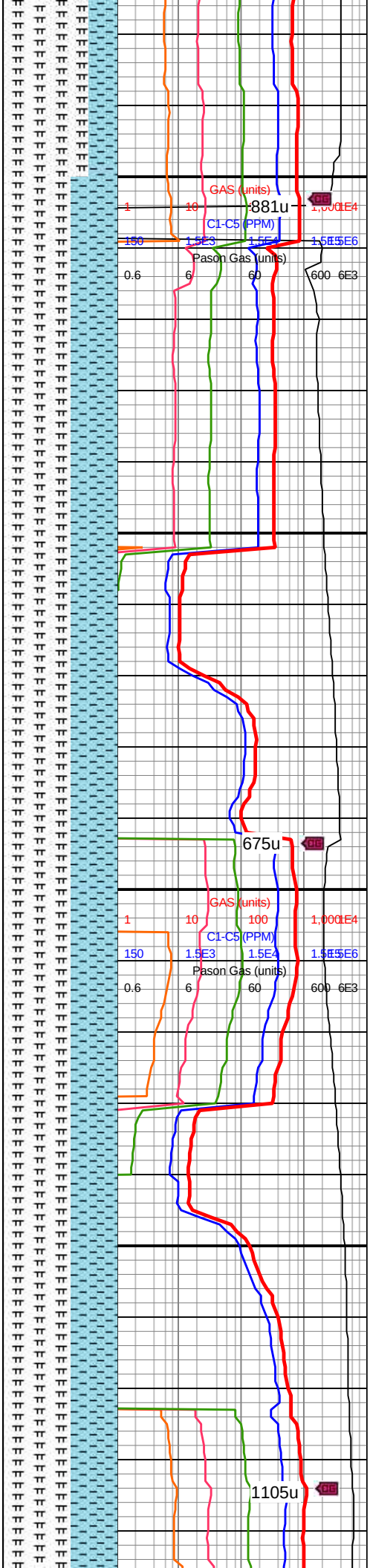
10200-10300 MRLST (75%): dk med gy-dk gy



MD: 10,327'
INC: 89.08°
AZM: 179.86°
TVD: 7,324.65'
VS: -520.59'

WOB: 39.9klbs
RPM: 61
SPM: 218
SPP: 4,853psi

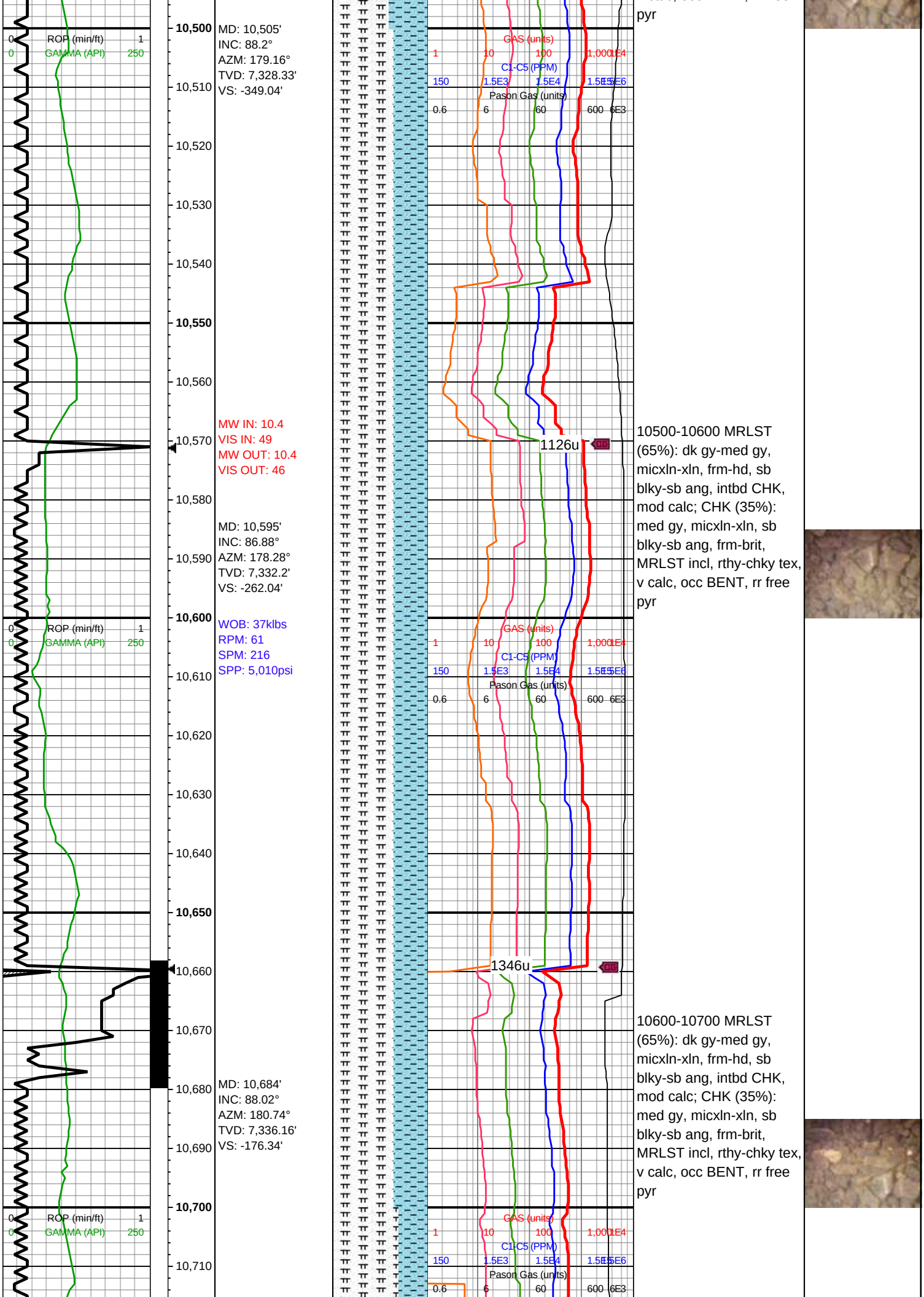
MD: 10,416'
INC: 88.99°
AZM: 179.51°
TVD: 7,326.15'
VS: -434.88'



(75%): dk med gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc; CHK (25%): mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, v abnt BENT

10300-10400 MRLST (60%): dk med gy-dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc; CHK (40%): mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, v abnt BENT, rr free pyr

10400-10500 MRLST (60%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod-v calc; CHK (40%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free



pyr

10500-10600 MRLST (65%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (35%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

10600-10700 MRLST (65%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (35%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

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
10,910
10,920
10,930

MW IN: 10.4
VIS IN: 48
MW OUT: 10.4
VIS OUT: 46

MD: 10,773'
INC: 88.9°
AZM: 180.04°
TVD: 7,338.55'
VS: -90.95'

WOB: 42klbs
RPM: 61
SPM: 215
SPP: 5,140psi

MD: 10,862'
INC: 88.29°
AZM: 179.69°
TVD: 7,340.73'
VS: -5.32'

0 ROP (min/ft) 1
0 GAMMA (API) 250

583u

902u

923u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

10700-10800 MRLST (70%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (30%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

10800-10900 MRLST (75%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (25%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

MW IN: 10.4
VIS IN: 48
MW OUT: 10.4
VIS OUT: 46

MD: 10,951'
INC: 90.13°
AZM: 180.04°
TVD: 7,341.96'
VS: 80.31'

WOB: 41klbs
RPM: 61
SPM: 216
SPP: 4,925psi

MD: 11,040'
INC: 90.22°
AZM: 178.81°
TVD: 7,341.69'
VS: 166.14'

MW IN: 10.4
VIS IN: 48
MW OUT: 10.4
VIS OUT: 46

MD: 11,129'
INC: 89.78°
AZM: 178.98°
TVD: 7,341.69'
VS: 252.19'

10,940
10,950
10,960
10,970
10,980
10,990
11,000
11,010
11,020
11,030
11,040
11,050
11,060
11,070
11,080
11,090
11,100
11,110
11,120
11,130
11,140
11,150

0 ROP (min/ft) 1
0 GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1E6
Pason Gas (units)
0.6 6 60 600 6E3
527u
933u

10900-11000 MRLST (55%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (45%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

11000-11100 MRLST (50%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (50%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

11,160
11,170
11,180
11,190
11,200
11,210
11,220
11,230
11,240
11,250
11,260
11,270
11,280
11,290
11,300
11,310
11,320
11,330
11,340
11,350
11,360
11,370

0 ROP (min/ft) 1
0 GAMMA (API) 250

WOB: 21klbs
RPM: 61
SPM: 216
SPP: 4,395psi

MD: 11,218'
INC: 89.87°
AZM: 180.21°
TVD: 7,341.96'
VS: 337.95'

MD: 11,308'
INC: 90.13°
AZM: 178.98°
TVD: 7,341.96'
VS: 424.67'

MW IN: 10.4+
VIS IN: 49
MW OUT: 10.4
VIS OUT: 47

745u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

467u

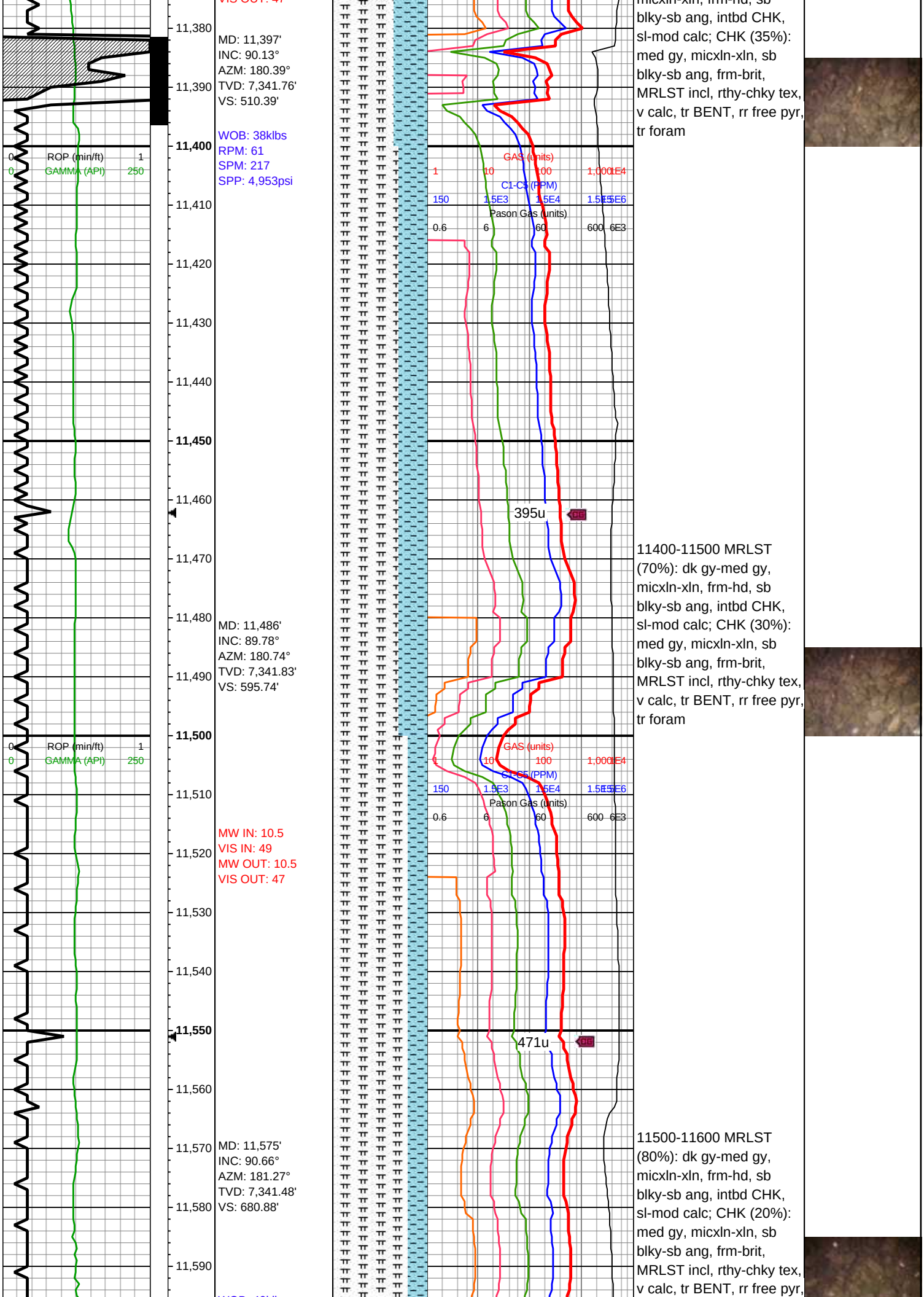
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

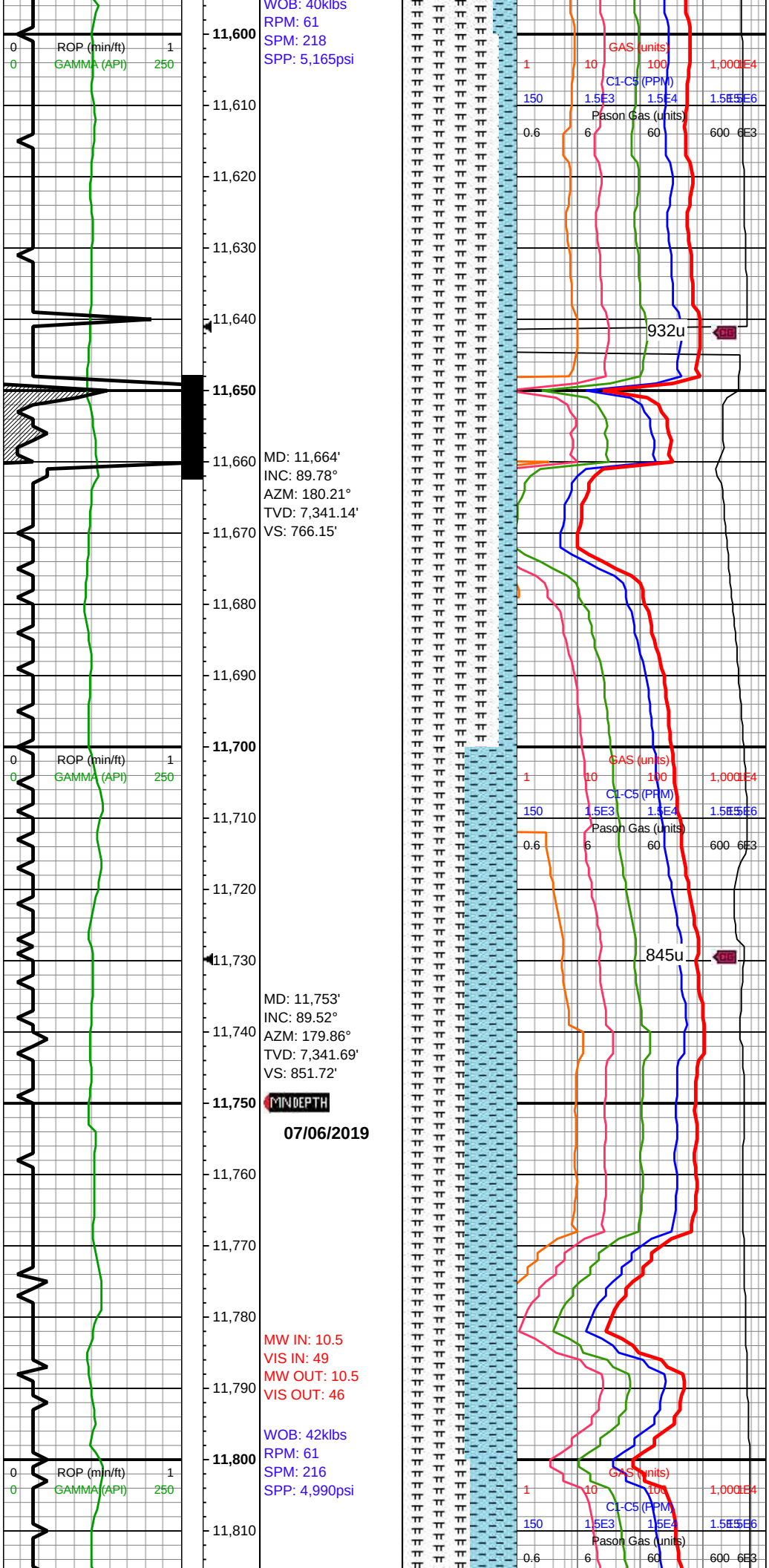
591u

11100-11200 MRLST (60%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (40%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

11200-11300 MRLST (65%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, mod calc; CHK (35%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, occ BENT, rr free pyr

11300-11400 MRLST (65%): dk gy-med gy,

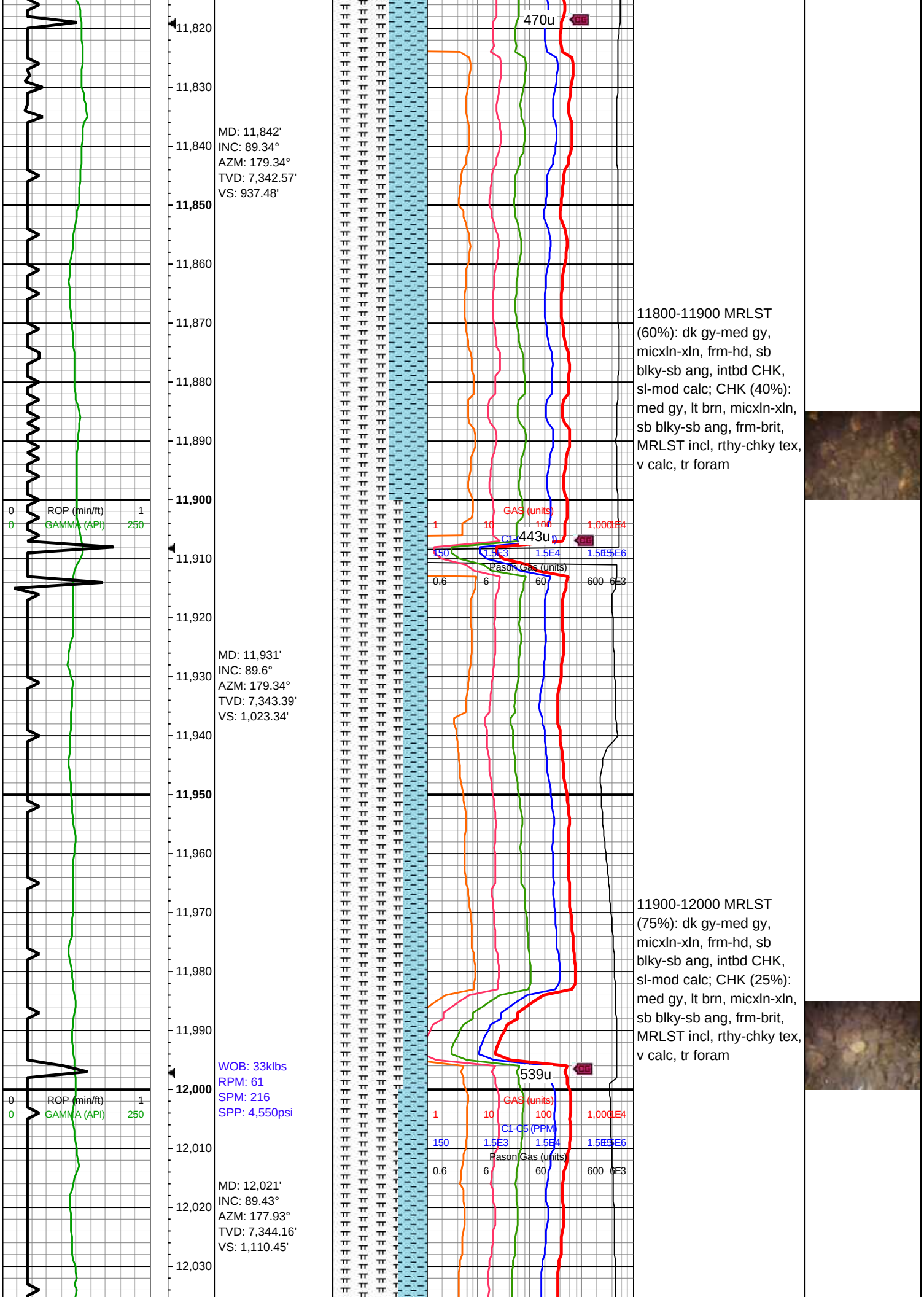

11,380
11,390
11,400
11,410
11,420
11,430
11,440
11,450
11,460
11,470
11,480
11,490
11,500
11,510
11,520
11,530
11,540
11,550
11,560
11,570
11,580
11,590
0 ROP (min/ft) 1
0 GAMMA (API) 250
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3
395u
471u
MD: 11,397'
INC: 90.13°
AZM: 180.39°
TVD: 7,341.76'
VS: 510.39'
WOB: 38klbs
RPM: 61
SPM: 217
SPP: 4,953psi
MD: 11,486'
INC: 89.78°
AZM: 180.74°
TVD: 7,341.83'
VS: 595.74'
MW IN: 10.5
VIS IN: 49
MW OUT: 10.5
VIS OUT: 47
MD: 11,575'
INC: 90.66°
AZM: 181.27°
TVD: 7,341.48'
VS: 680.88'
blky-sb ang, intbd CHK, sl-mod calc; CHK (35%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr BENT, rr free pyr, tr foram
11400-11500 MRLST (70%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (30%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr BENT, rr free pyr, tr foram
11500-11600 MRLST (80%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (20%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr BENT, rr free pyr,



tr foram

11600-11700 MRLST (85%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (15%): med gy, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr BENT, rr free pyr, tr foram

11700-11800 MRLST (55%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (45%): med gy, lt brn, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr foram



11800-11900 MRLST (60%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (40%): med gy, lt brn, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr foram

11900-12000 MRLST (75%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (25%): med gy, lt brn, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr foram

12,040
12,050
12,060
12,070
12,080
12,090
12,100
12,110
12,120
12,130
12,140
12,150
12,160
12,170
12,180
12,190
12,200
12,210
12,220
12,230
12,240
12,250

0 ROP (min/ft) 1
0 GAMMA (API) 250

MW IN: 10.5
VIS IN: 49
MW OUT: 10.5
VIS OUT: 46

MD: 12,110'
INC: 89.78°
AZM: 179.51°
TVD: 7,344.77'
VS: 1,196.56'

MD: 12,199'
INC: 90.04°
AZM: 180.74°
TVD: 7,344.91'
VS: 1,282.09'

WOB: 36klbs
RPM: 61
SPM: 218
SPP: 5,020psi

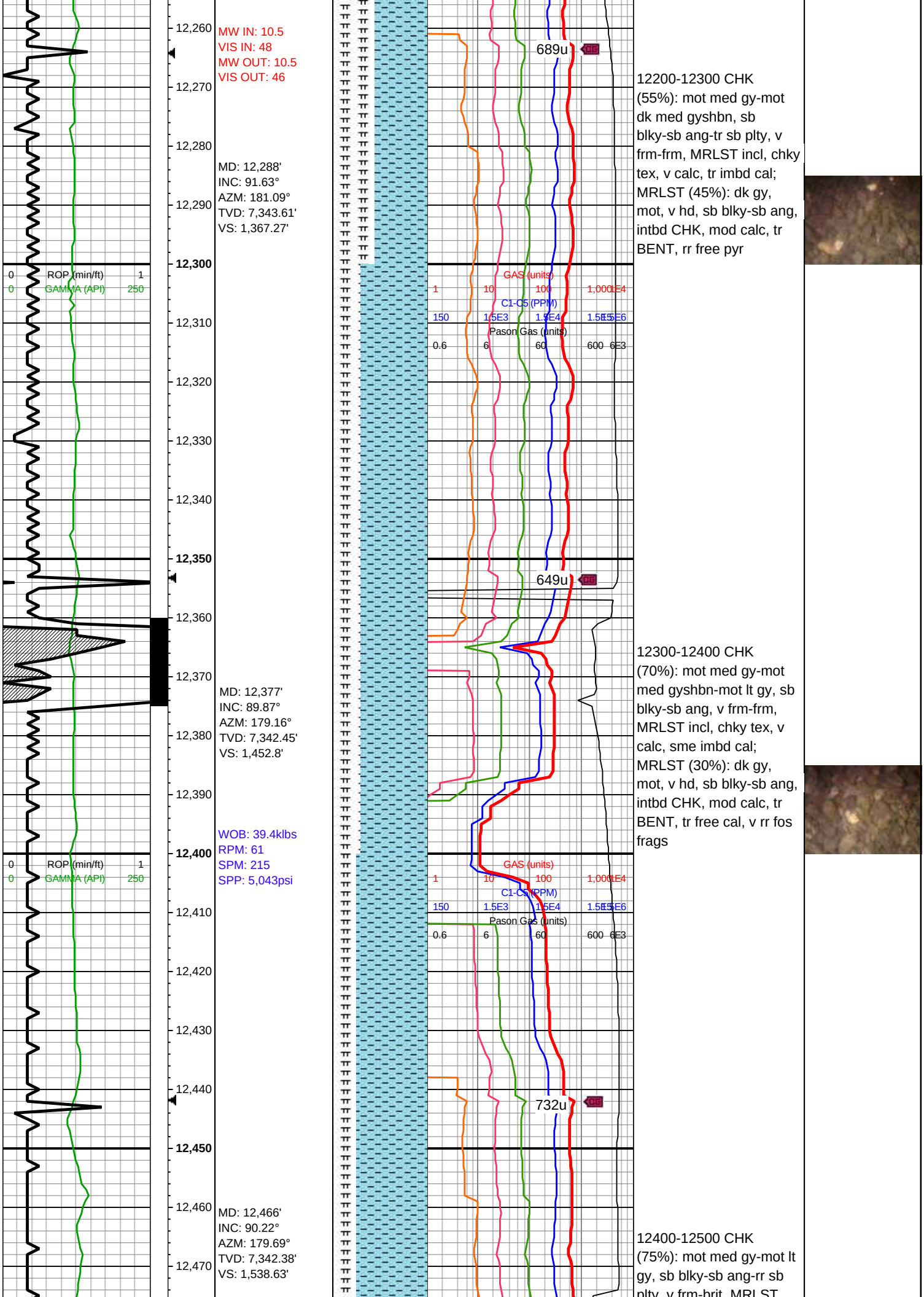
686u

631u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

12000-12100 MRLST (70%): dk gy-med gy, micxln-xln, frm-hd, sb blky-sb ang, intbd CHK, sl-mod calc; CHK (30%): med gy, lt brn, micxln-xln, sb blky-sb ang, frm-brit, MRLST incl, rthy-chky tex, v calc, tr foram

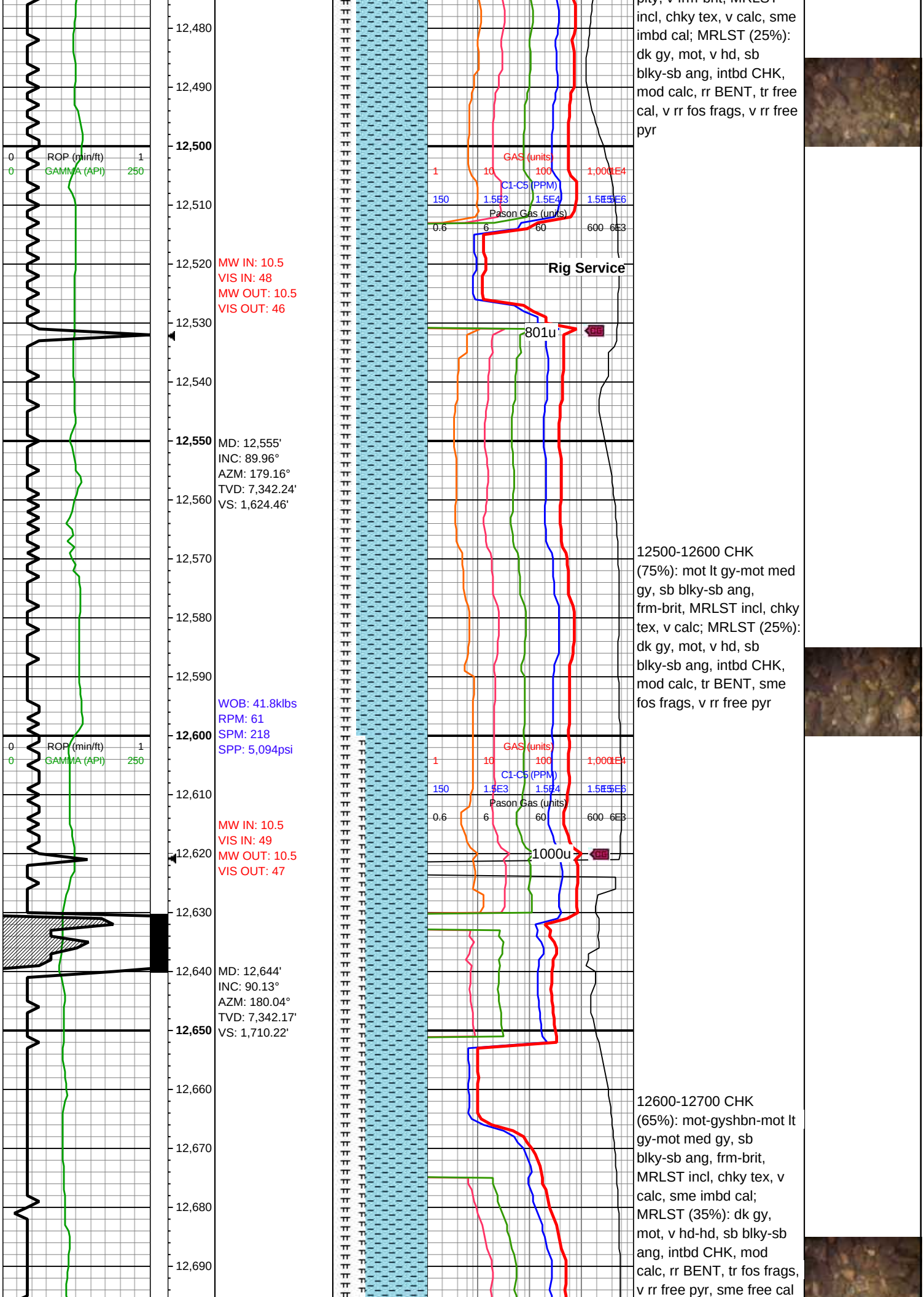
12100-12200 MRLST (60%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc; CHK (40%): mot med gy-mot dk med gy, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc, tr BENT

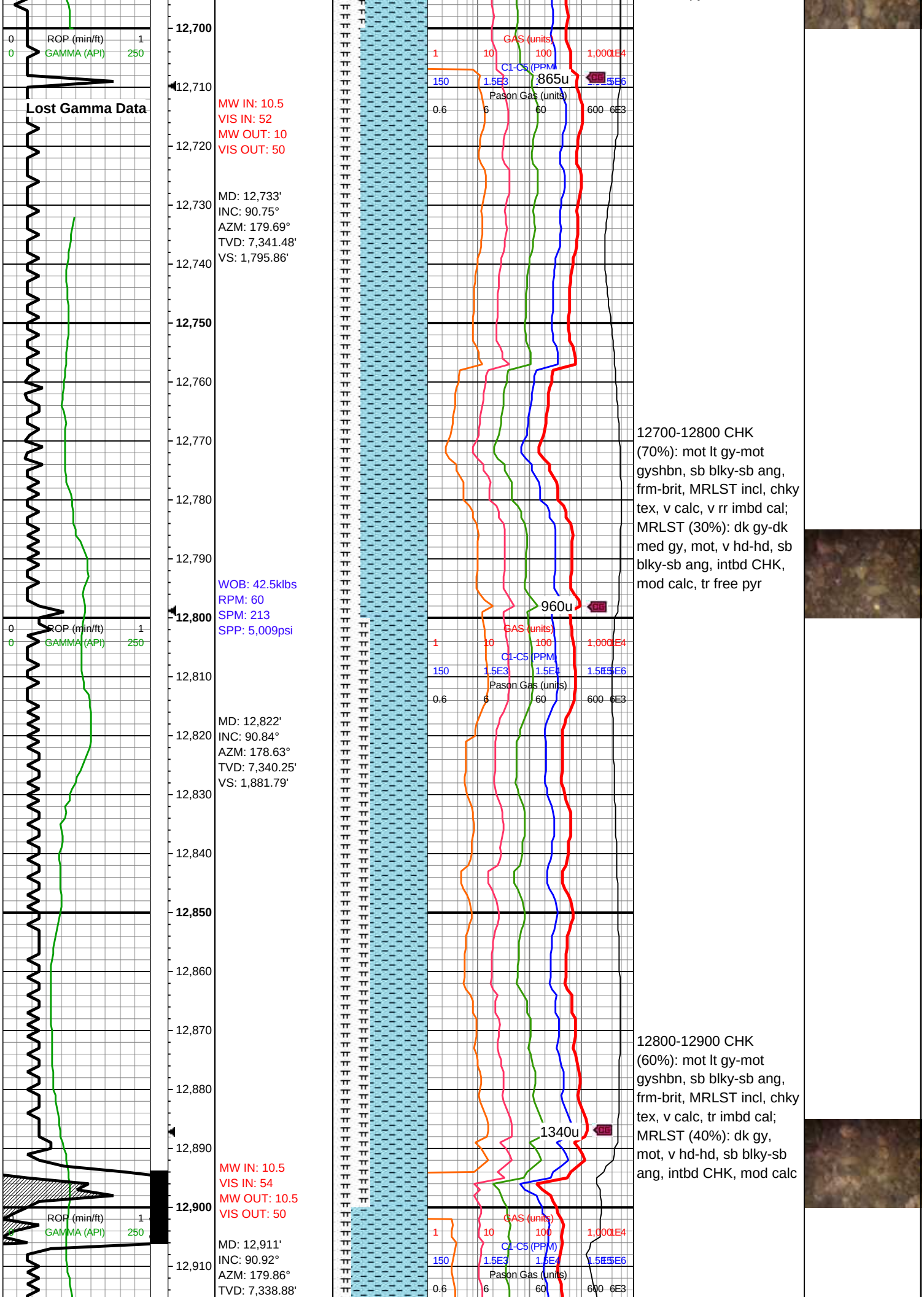


12200-12300 CHK (55%): mot med gy-mot dk med gyshbn, sb blky-sb ang-tr sb plty, v frm-frm, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (45%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr BENT, rr free pyr

12300-12400 CHK (70%): mot med gy-mot med gyshbn-mot lt gy, sb blky-sb ang, v frm-frm, MRLST incl, chky tex, v calc, sme imbd cal; MRLST (30%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr BENT, tr free cal, v rr fos frags

12400-12500 CHK (75%): mot med gy-mot lt gy, sb blky-sb ang-rr sb plty, v frm-brit, MRLST


0
ROP (min/ft)
1
0
GAMMA (API)
250
12,480
12,490
12,500
12,510
12,520
12,530
12,540
12,550
12,560
12,570
12,580
12,590
12,600
12,610
12,620
12,630
12,640
12,650
12,660
12,670
12,680
12,690
MW IN: 10.5
VIS IN: 48
MW OUT: 10.5
VIS OUT: 46
MD: 12,555'
INC: 89.96°
AZM: 179.16°
TVD: 7,342.24'
VS: 1,624.46'
WOB: 41.8klbs
RPM: 61
SPM: 218
SPP: 5,094psi
MW IN: 10.5
VIS IN: 49
MW OUT: 10.5
VIS OUT: 47
MD: 12,644'
INC: 90.13°
AZM: 180.04°
TVD: 7,342.17'
VS: 1,710.22'
GAS (units)
1
10
100
1,000
1E4
C1-C5 (PPM)
150
1.5E3
1.5E4
1.5E5
1.5E6
Pason Gas (units)
0.6
6
60
600
6E3
Rig Service
801u
1000u
incl, chky tex, v calc, sme imbd cal; MRLST (25%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, rr BENT, tr free cal, v rr fos frags, v rr free pyr
12500-12600 CHK (75%): mot lt gy-mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc; MRLST (25%): dk gy, mot, v hd, sb blky-sb ang, intbd CHK, mod calc, tr BENT, sme fos frags, v rr free pyr
12600-12700 CHK (65%): mot-gyshbn-mot lt gy-mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, sme imbd cal; MRLST (35%): dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc, rr BENT, tr fos frags, v rr free pyr, sme free cal



12700-12800 CHK (70%): mot lt gy-mot gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, v rr imbd cal; MRLST (30%): dk gy-dk med gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc, tr free pyr

12800-12900 CHK (60%): mot lt gy-mot gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (40%): dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc

VS: 1,967.68'

12,920
12,930
12,940
12,950
12,960
12,970
12,980
12,990
13,000
13,010
13,020
13,030
13,040
13,050
13,060
13,070
13,080
13,090
13,100
13,110
13,120
13,130

WOB: 43.5klbs
RPM: 61
SPM: 218
SPP: 5,309psi

MD: 13,001'
INC: 91.28°
AZM: 179.51°
TVD: 7,337.15'
VS: 2,054.35'

MD: 13,090'
INC: 89.87°
AZM: 180.39°
TVD: 7,336.26'
VS: 2,139.96'

0 ROP (min/ft) 1
0 GAMMA (API) 250

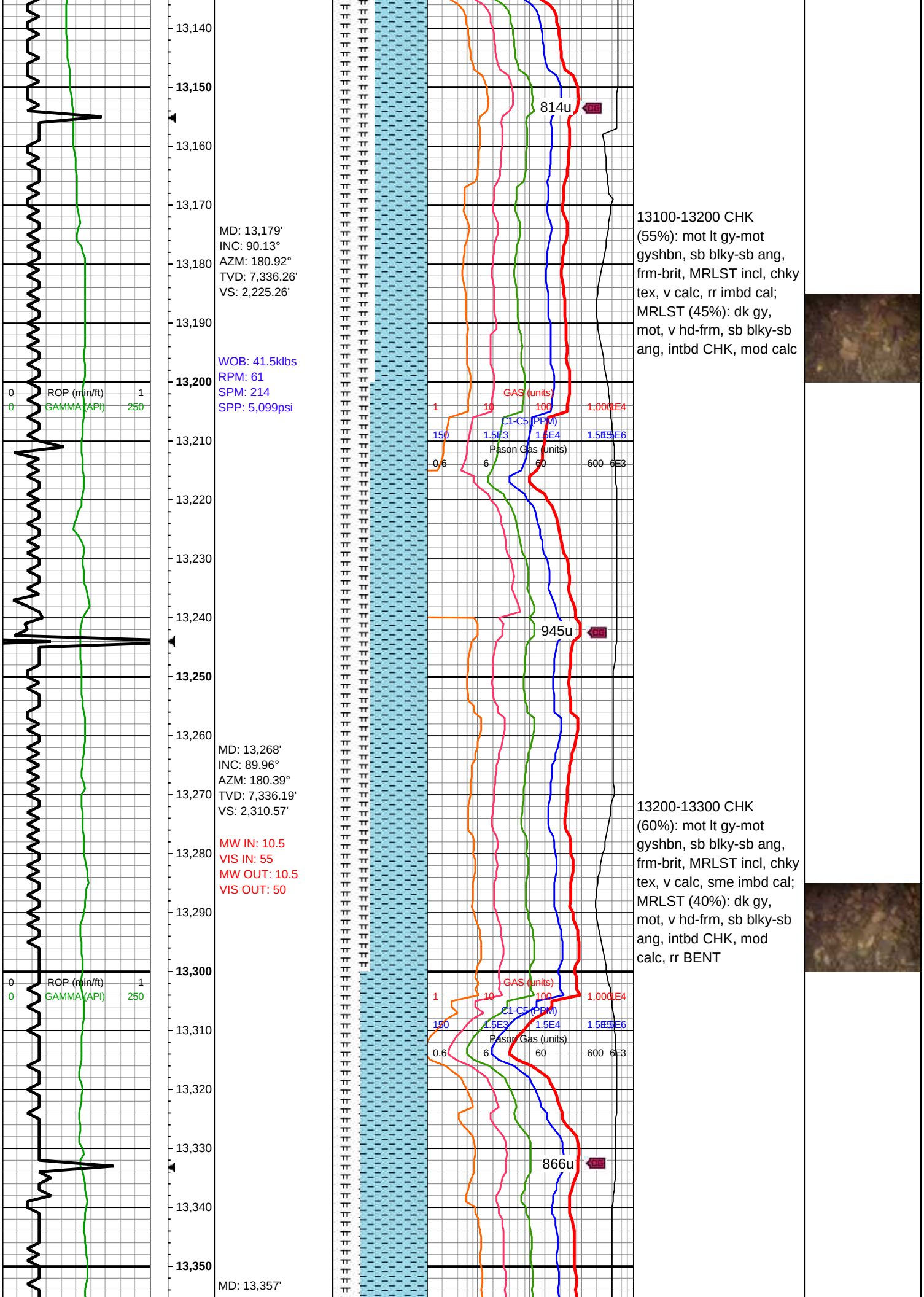
992u

637u

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

12900-13000 CHK (80%): mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (20%): dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc, v rr fos frags, v rr BENT

13000-13100 CHK (70%): mot lt gy-mot gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (30%): dk gy, mot, v hd-hd, sb blky-sb ang, intbd CHK, mod calc, v rr fos frags, v rr BENT, rr free pyr



13100-13200 CHK (55%): mot lt gy-mot gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (45%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc

13200-13300 CHK (60%): mot lt gy-mot gyshbn, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, sme imbd cal; MRLST (40%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc, rr BENT

INC: 89.34°
AZM: 179.69°
TVD: 7,336.74'
VS: 2,396.14'

WOB: 41.3klbs
RPM: 61
SPM: 217
SPP: 5,121psi

MD: 13,446'
INC: 89.16°
AZM: 179.86°
TVD: 7,337.9'
VS: 2,481.82'

MW IN: 10.5
VIS IN: 55
MW OUT: 10.5
VIS OUT: 50

MD: 13,536'
INC: 89.25°
AZM: 179.16°
TVD: 7,339.15'
VS: 2,568.57'

13,360
13,370
13,380
13,390
13,400
13,410
13,420
13,430
13,440
13,450
13,460
13,470
13,480
13,490
13,500
13,510
13,520
13,530
13,540
13,550
13,560
13,570

0 ROP (min/ft) 1
0 GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
Pason Gas (units)
0.6 6 60 600 6E3

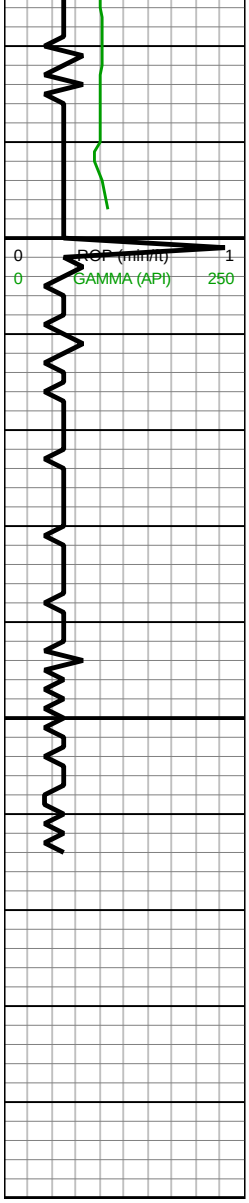
1091u

889u

13300-13400 CHK (70%): mot gyshbn-mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (30%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc, rr BENT, tr free cal

13400-13500 CHK (60%): mot gyshbn-mot med gy-mot lt gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, tr imbd cal; MRLST (40%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc, rr BENT, tr free cal

13500-13600 CHK (90%): mot lt gy-mot med



13,580

WOB: 44.2klbs
RPM: 61
SPM: 218
SPP: 5,223psi

13,590

MD: 13,600'
INC: 89.34°
AZM: 177.93°
TVD: 7,339.94'
VS: 2,630.54'

13,600

13,610

13,620

MW IN: 10.5
VIS IN: 55
MW OUT: 10.5
VIS OUT: 50

13,630

13,640

13,650

Projection to Bit

13,660

MD: 13,665'
INC: 89.34°
AZM: 177.93°
TVD: 7,340.69'
VS: 2,693.65'

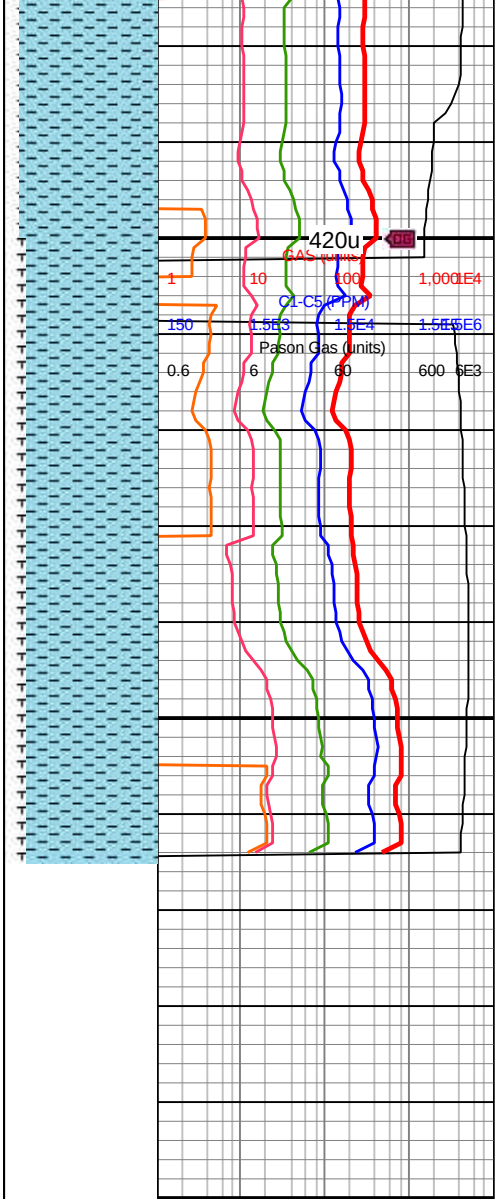
13,670

13,680

Reached a Total Depth of 13,665' MD @ 11:15hrs MST on 07/06/2019

13,690

13,700



gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (10%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc, tr BENT, tr free cal

13600-13665 CHK (85%): mot lt gy-mot med gy, sb blky-sb ang, frm-brit, MRLST incl, chky tex, v calc, rr imbd cal; MRLST (15%): dk gy, mot, v hd-frm, sb blky-sb ang, intbd CHK, mod calc, v rr BENT, v rr free pyr