RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name	Herren 1J-33H-H367		
Location	Sec. 33 T3N R67W		
State	Colorado	**County**	Weld
Country	USA	**Rig Number**	Ensign 153
API Number	05-123-47734	**AFE #**	16191569
Geographic Region	Rockies	**Field**	Wattenberg
Spud Date	1/7/2019	**Drilling Completed**	1/10/2019
Surface Coordinates	Latitude: 40.183145 Longitude: -104.886739 SHL: Sec: 33 Twp: 3N 67W Footage: 2521 FNL 460 FEL		
Bottom Hole Coordinates	Proposed BHL: Sec: 33 Twp: 3N 67W Footages: 2521 FNL 460 FWL		
Ground Elevation	4,849'	**K.B. Elevation**	4,872'
Logged Interval	6,400' **To** 11,875'	**Total Depth**	11,875'
Formation	Niobrara C		
Type of Drilling Fluid	Synthetic Oil Based Mud		

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

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Loggers: Shana Swirin-Miles / Heather Davis

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-515

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

Start Date 01/07/2019

Release Date: 1/11/2019

Job #: 1829RK1812

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

Accessories

Fossils

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

- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS

- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST

Stringer

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPSUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG

CRINOID
ECHINOID
FISH
FORAMINIFERA
STROMATOPOROID

Minerals

ANHYDRITIC
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET
FERRUGINOUS
SANDY
SILICEOUS
SILTY
TUFFACEOUS
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

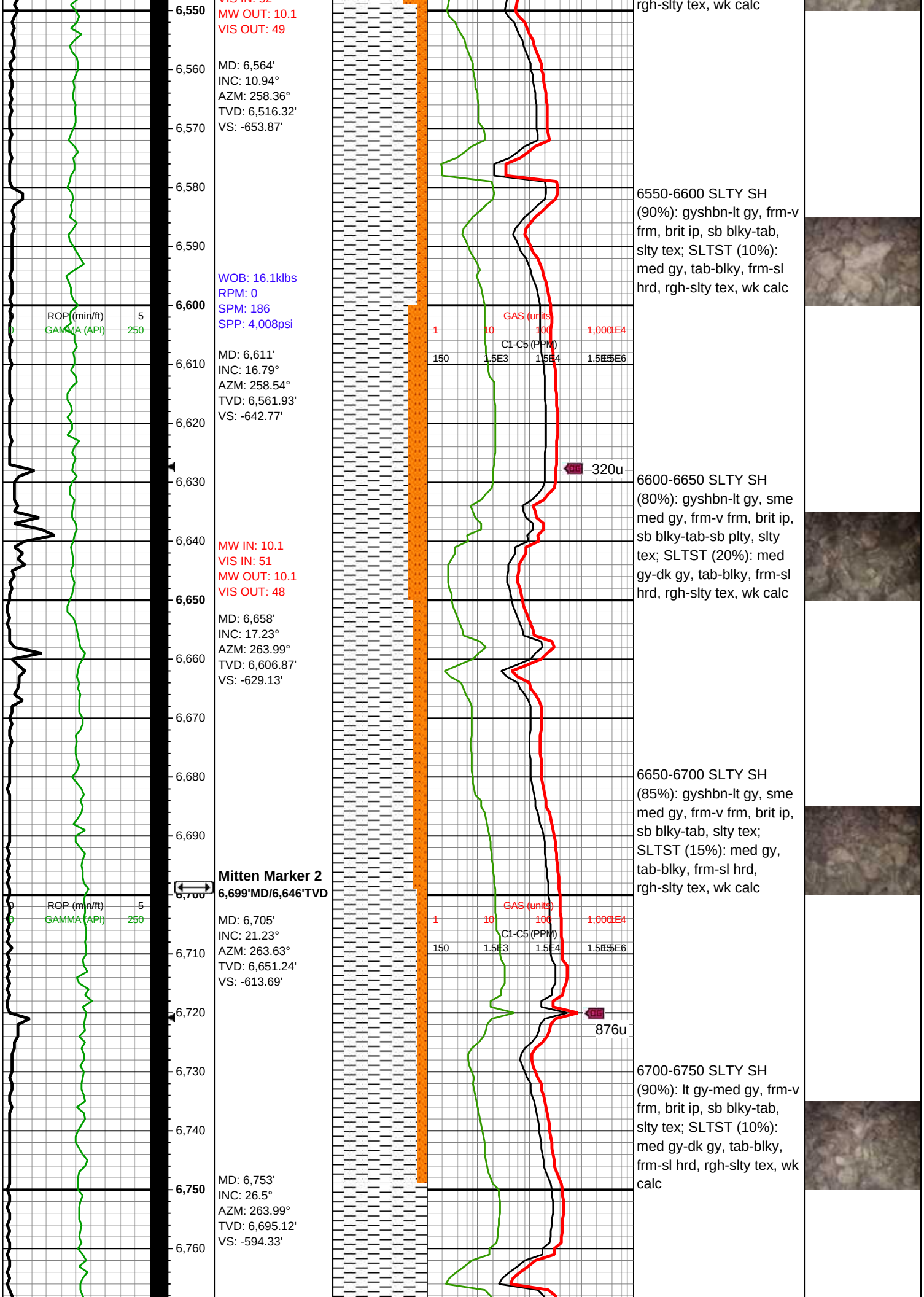
Textures

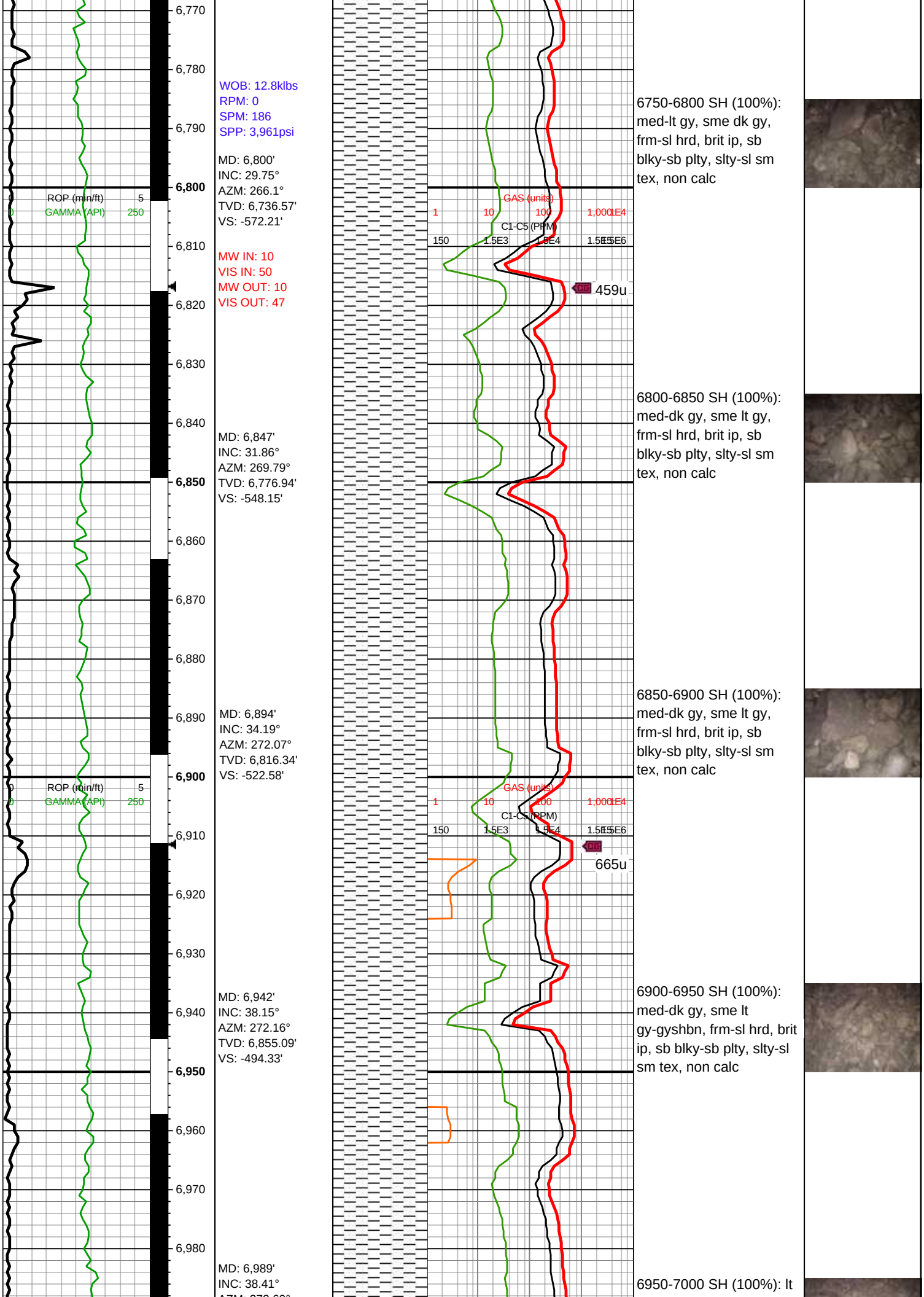
BOUNDSTONE
CHALKY
CRYPTOXLN
EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

Sorting

MODERATE
POOR
WELL

ROP / GAMMA	Slide/Rotate	Depth Labels	Notes	% Lith	Total Gas (GAS, C1, C2, C3, C4, C5)	Lithology Descriptions	Images
Crestone Peak Resources **Herren 1J-33H-H367** **9 5/8" Surface Casing @ 1,975'** **Spud Date: 01/07/2019** **2 man Logging Began: 01/07/2019** **All Depths Correspond to Driller's Pipe Tally**		6,360 6,370 6,380 6,390 **6,400** 6,410 6,420 6,430 6,440 **6,450** 6,460 6,470 6,480 6,490 **6,500** 6,510 6,520 6,530 6,540	Bit #: 1 Type: U516M Size: 8 1/2 Depth In: 1,977' Jets: 6x13 S/N: 44581 **KOP @ 6,398' MD** WOB: 0.9klbs RPM: 0 SPM: 186 SPP: 3,857psi MD: 6,469' INC: 4.09° AZM: 233.66° TVD: 6,422.15' VS: -665.55' MW IN: 10.1 VIS IN: 53 MW OUT: 10.2 VIS OUT: 49 MD: 6,516' INC: 7.16° AZM: 256.34° TVD: 6,468.92' VS: -661.3' MW IN: 10.1 VIS IN: 52		**SYSTEM CALIBRATED** **1% Methane = 100 Units** **100% Methane = 10000 Units** GAS (units) 1 10 100 1,000 1E4 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6 396u 339u	6398-6450 SLTY SH (50%): med-lt gy, frm-v frm, sb blky-tab, slty-sl sm tex; SLTST (50%): dk gy-med gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc 6450-6500 SLTY SH (60%): med-lt gy, frm-v frm, sb blky-tab, slty tex; SLTST (40%): dk gy-med gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc 6500-6550 SLTY SH (75%): lt-med gy, frm-v frm, sb blky-tab, slty tex; SLTST (25%): med gy-dk gy, tab-blky, frm-sl hrd,	  


6,550
MW OUT: 10.1
VIS OUT: 49
6,560
MD: 6,564'
INC: 10.94°
AZM: 258.36°
TVD: 6,516.32'
VS: -653.87'
6,570
6,580
6,590
WOB: 16.1klbs
RPM: 0
SPM: 186
SPP: 4,008psi
6,600
ROP (min/ft) 5
GAMMA (API) 250
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
MD: 6,611'
INC: 16.79°
AZM: 258.54°
TVD: 6,561.93'
VS: -642.77'
6,610
6,620
320u
6,630
6,640
MW IN: 10.1
VIS IN: 51
MW OUT: 10.1
VIS OUT: 48
6,650
MD: 6,658'
INC: 17.23°
AZM: 263.99°
TVD: 6,606.87'
VS: -629.13'
6,660
6,670
6,680
6,690
Mitten Marker 2
6,699'MD/6,646'TVD
6,700
ROP (min/ft) 5
GAMMA (API) 250
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
MD: 6,705'
INC: 21.23°
AZM: 263.63°
TVD: 6,651.24'
VS: -613.69'
6,710
6,720
876u
6,730
6,740
6,750
MD: 6,753'
INC: 26.5°
AZM: 263.99°
TVD: 6,695.12'
VS: -594.33'
6,760
rgh-slty tex, wk calc
6550-6600 SLTY SH (90%): gyshbn-lt gy, frm-v frm, brit ip, sb blky-tab, slty tex; SLTST (10%): med gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc
6600-6650 SLTY SH (80%): gyshbn-lt gy, sme med gy, frm-v frm, brit ip, sb blky-tab-sb plty, slty tex; SLTST (20%): med gy-dk gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc
6650-6700 SLTY SH (85%): gyshbn-lt gy, sme med gy, frm-v frm, brit ip, sb blky-tab, slty tex; SLTST (15%): med gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc
6700-6750 SLTY SH (90%): lt gy-med gy, frm-v frm, brit ip, sb blky-tab, slty tex; SLTST (10%): med gy-dk gy, tab-blky, frm-sl hrd, rgh-slty tex, wk calc



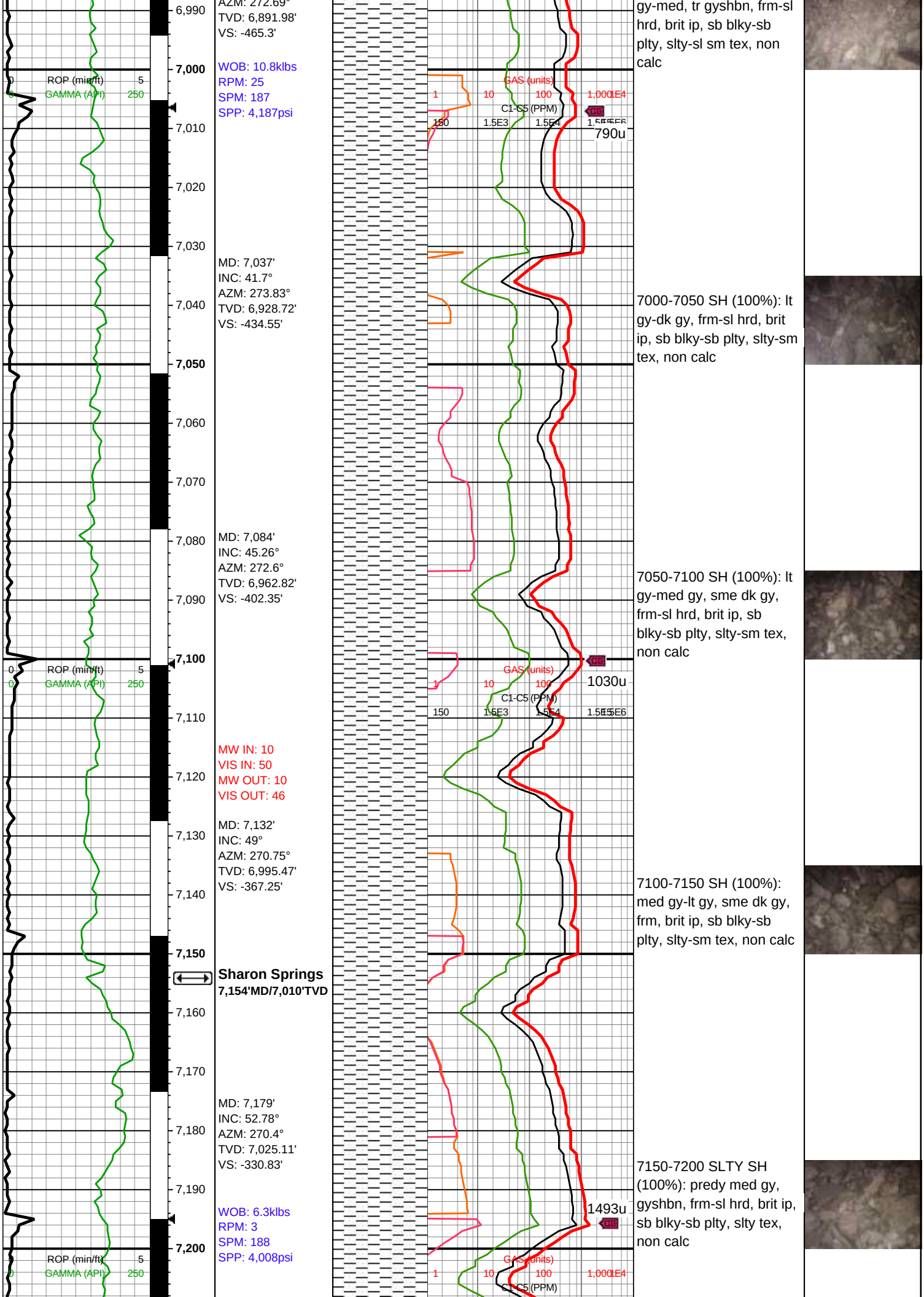
6750-6800 SH (100%): med-lt gy, sme dk gy, frm-sl hrd, brit ip, sb blky-sb plty, slty-sl sm tex, non calc

6800-6850 SH (100%): med-dk gy, sme lt gy, frm-sl hrd, brit ip, sb blky-sb plty, slty-sl sm tex, non calc

6850-6900 SH (100%): med-dk gy, sme lt gy, frm-sl hrd, brit ip, sb blky-sb plty, slty-sl sm tex, non calc

6900-6950 SH (100%): med-dk gy, sme lt gy-gyshbn, frm-sl hrd, brit ip, sb blky-sb plty, slty-sl sm tex, non calc

6950-7000 SH (100%): lt



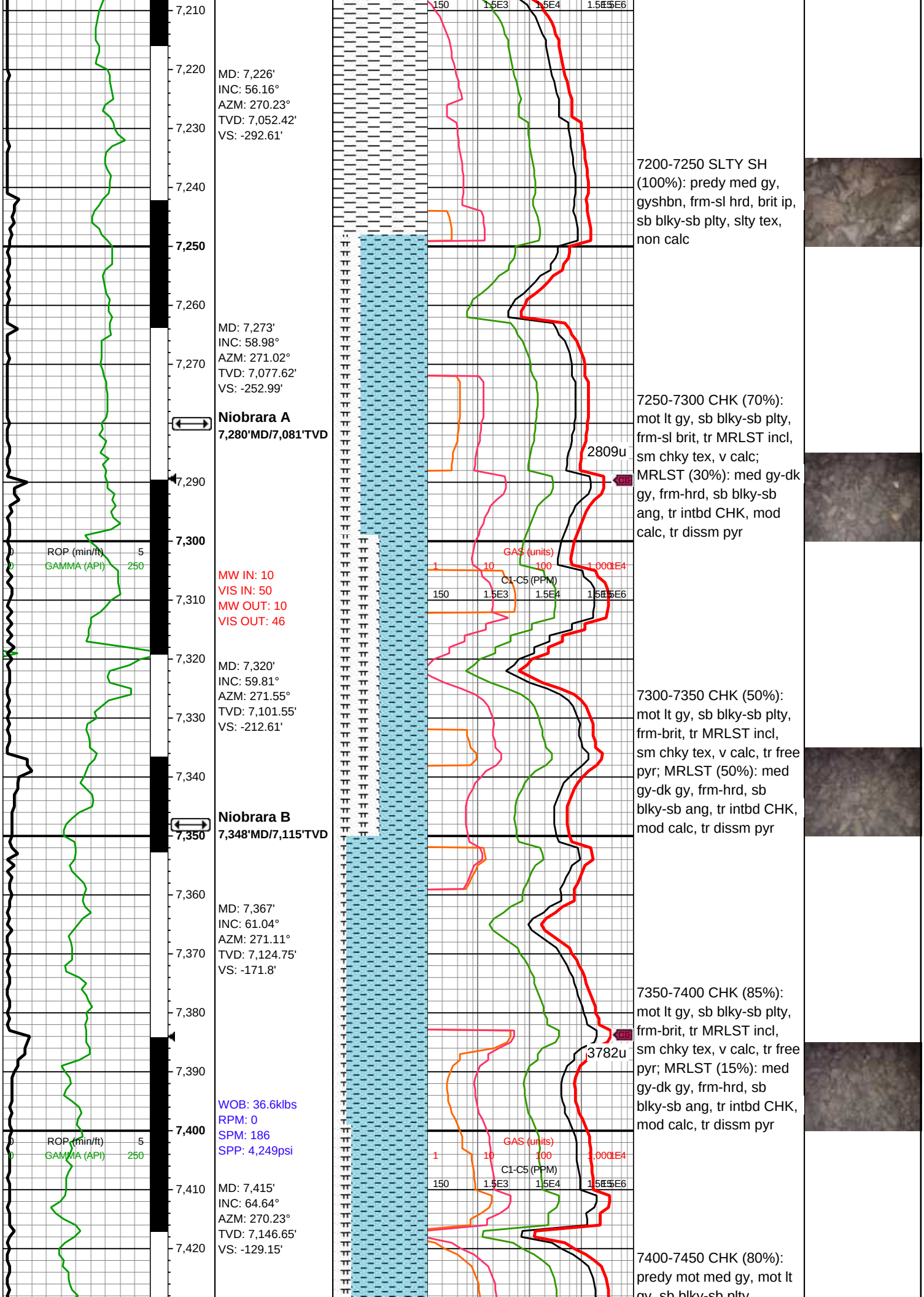
gy-med, tr gyshbn, frm-sl hrd, brit ip, sb blky-sb plty, slty-sl sm tex, non calc

7000-7050 SH (100%): lt gy-dk gy, frm-sl hrd, brit ip, sb blky-sb plty, slty-sm tex, non calc

7050-7100 SH (100%): lt gy-med gy, sme dk gy, frm-sl hrd, brit ip, sb blky-sb plty, slty-sm tex, non calc

7100-7150 SH (100%): med gy-lt gy, sme dk gy, frm, brit ip, sb blky-sb plty, slty-sm tex, non calc

7150-7200 SLTY SH (100%): predy med gy, gyshbn, frm-sl hrd, brit ip, sb blky-sb plty, slty tex, non calc



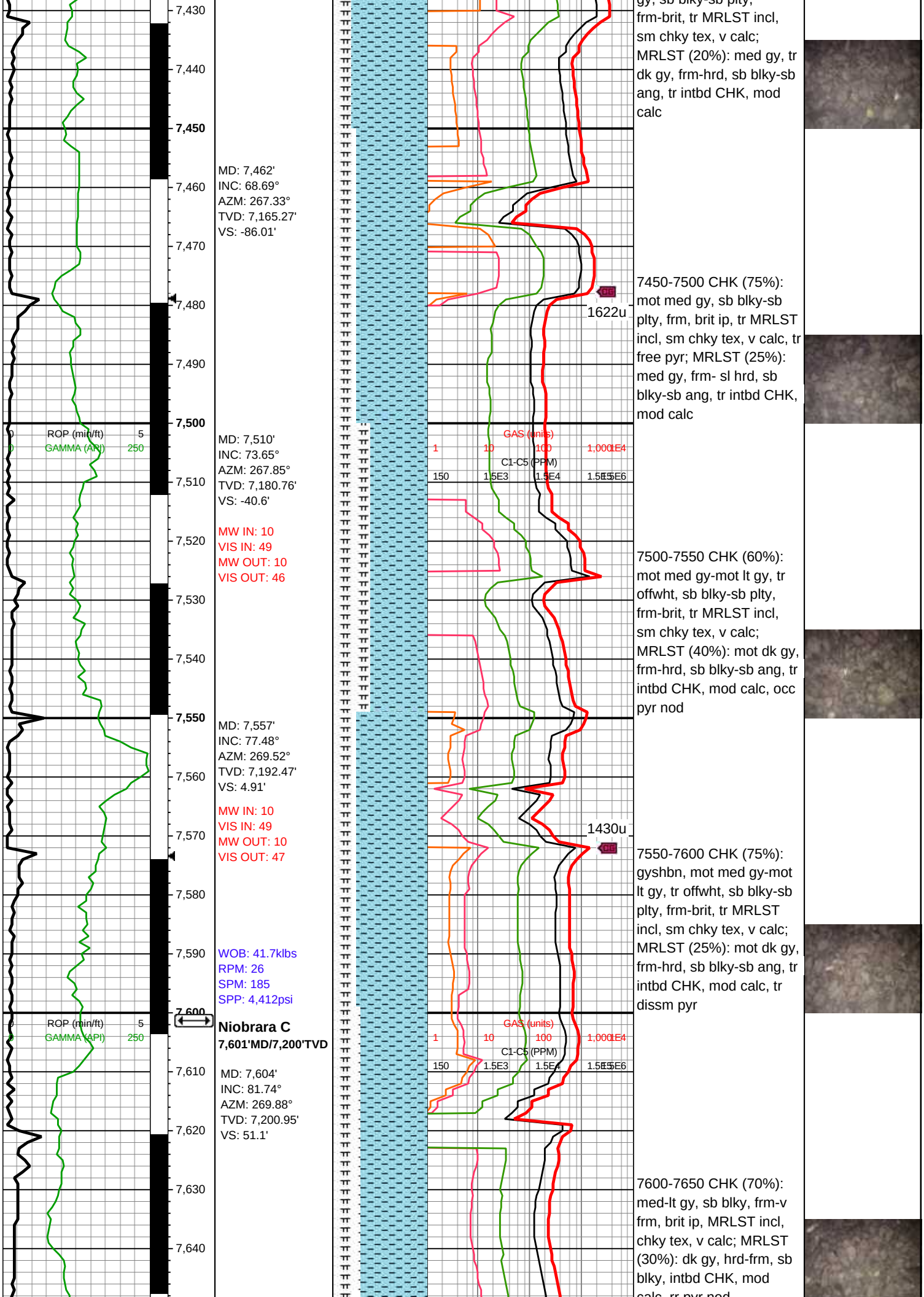
7200-7250 SLTY SH (100%): predy med gy, gyshbn, frm-sl hrd, brit ip, sb blky-sb plty, slty tex, non calc

7250-7300 CHK (70%): mot lt gy, sb blky-sb plty, frm-sl brit, tr MRLST incl, sm chky tex, v calc; MRLST (30%): med gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr

7300-7350 CHK (50%): mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc, tr free pyr; MRLST (50%): med gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr

7350-7400 CHK (85%): mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc, tr free pyr; MRLST (15%): med gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr

7400-7450 CHK (80%): predy mot med gy, mot lt



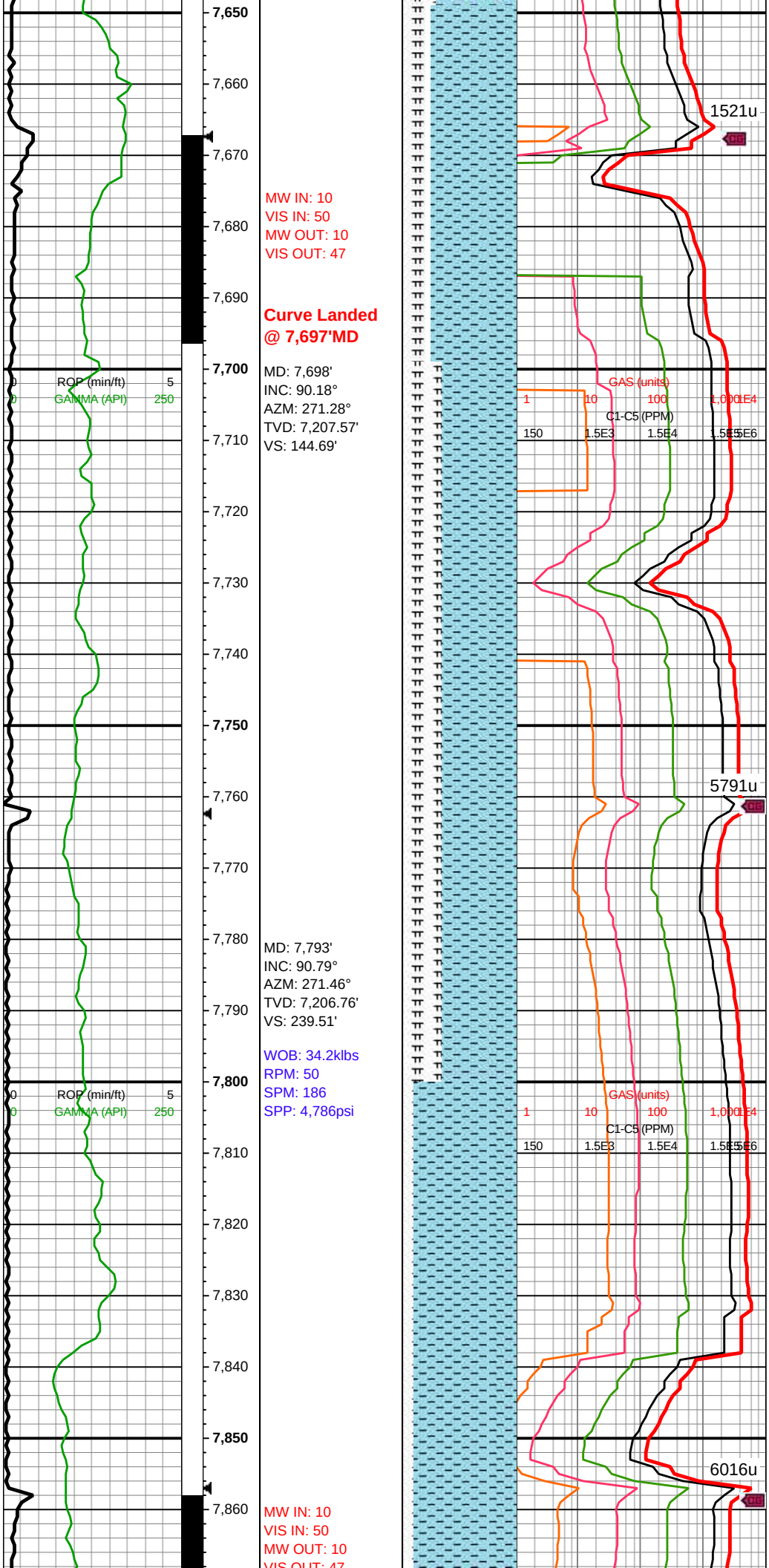
frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (20%): med gy, tr dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

7450-7500 CHK (75%): mot med gy, sb blky-sb plty, frm, brit ip, tr MRLST incl, sm chky tex, v calc, tr free pyr; MRLST (25%): med gy, frm- sl hrd, sb blky-sb ang, tr intbd CHK, mod calc

7500-7550 CHK (60%): mot med gy-mot lt gy, tr offwht, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (40%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, occ pyr nod

7550-7600 CHK (75%): gyshbn, mot med gy-mot lt gy, tr offwht, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (25%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr

7600-7650 CHK (70%): med-lt gy, sb blky, frm-v frm, brit ip, MRLST incl, chky tex, v calc; MRLST (30%): dk gy, hrd-frm, sb blky, intbd CHK, mod



MW IN: 10
VIS IN: 50
MW OUT: 10
VIS OUT: 47

Curve Landed @ 7,697'MD

MD: 7,698'
INC: 90.18°
AZM: 271.28°
TVD: 7,207.57'
VS: 144.69'

MD: 7,793'
INC: 90.79°
AZM: 271.46°
TVD: 7,206.76'
VS: 239.51'

WOB: 34.2klbs
RPM: 50
SPM: 186
SPP: 4,786psi

MW IN: 10
VIS IN: 50
MW OUT: 10
VIS OUT: 47

calc, rr pyr nod

7650-7700 CHK (75%): med gy, sb blky, frm-v frm, brit ip, MRLST incl, chky tex, v calc; MRLST (25%): dk gy, sl hrd-frm, sb blky, intbd CHK, mod calc, occ pyr nod

7700-7800 CHK (65%): med gy, sme lt gy, sb blky, frm-v frm, brit ip, MRLST incl, chky tex, v calc; MRLST (35%): dk gy, sl hrd-frm, sb blky, intbd CHK, mod calc, rr pyr nod

VIS OUT: 47

MD: 7,888'
INC: 89.39°
AZM: 274.01°
TVD: 7,206.61'
VS: 334.18'

7800-7900 CHK (90%): predy med gy, sme mot lt gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (10%): dk gy, frm, sb blky, intbd CHK, mod calc, tr pyr nod

MD: 7,982'
INC: 89.03°
AZM: 273.92°
TVD: 7,207.91'
VS: 427.65'

WOB: 36.5klbs
RPM: 55
SPM: 188
SPP: 4,927psi

7900-8000 CHK (85%): lt-med mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (15%): dk gy, frm, sb blky, intbd CHK, mod calc, tr pp pyr

MW IN: 10
VIS IN: 50
MW OUT: 10
VIS OUT: 47

MD: 8,077'
INC: 89.03°
AZM: 273.13°
TVD: 7,208.58'

01/09/2019

8000-8100 CHK (90%): lt-med mot gy-gyshbn, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc;

TVD: 7,209.52'
VS: 522.19'

MW IN: 10.3
VIS IN: 59
MW OUT: 10.1
VIS OUT: 58

MD: 8,171'
INC: 89.43°
AZM: 272.69°
TVD: 7,210.78'
VS: 615.83'

WOB: 37.7klbs
RPM: 69
SPM: 202
SPP: 5,404psi

MD: 8,266'
INC: 88.9°
AZM: 272.6°
TVD: 7,212.16'
VS: 710.51'

ROP (min/ft) 0 5
GAMMA (API) 0 250

GAS (units) 1 10 100 1,000 1E4
C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6

1384u

1394u

8,090
8,100
8,110
8,120
8,130
8,140
8,150
8,160
8,170
8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300

sme chky tex, v calc; MRLST (10%): dk gy, frm, sb blky, intbd CHK, mod calc, tr pp pyr

8100-8200 CHK (85%): lt-med mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (15%): dk gy-v dk gy, frm, sb blky, intbd CHK, mod calc, tr pp pyr

8200-8300 CHK (80%): lt-med mot gy, tr gyshbn, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (20%): dk gy-v dk gy, frm, sb blky, intbd CHK, mod calc

8,310
8,320
8,330
8,340
8,350
8,360
8,370
8,380
8,390
8,400
8,410
8,420
8,430
8,440
8,450
8,460
8,470
8,480
8,490
8,500
8,510
8,520

MW IN: 10.3
VIS IN: 55
MW OUT: 10.3
VIS OUT: 51

MD: 8,361'
INC: 88.33°
AZM: 274.09°
TVD: 7,214.46'
VS: 805.06'

WOB: 38.3klbs
RPM: 70
SPM: 202
SPP: 5,359psi

MD: 8,455'
INC: 90.66°
AZM: 274.18°
TVD: 7,215.29'
VS: 898.51'

ROP (min/ft) 0 5
GAMMA (API) 0 250

GAS (units) 1 10 100 1,000 1E4
C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6

1663u

1330u

1313u

8300-8400 CHK (60%): lt-med mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (40%): v dk gy, frm, sb blky, intbd CHK, mod calc

8400-8500 CHK (50%): med mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (50%): v dk gy, frm, sb blky, intbd CHK, mod calc

8,530
MW IN: 10.3
VIS IN: 52
MW OUT: 10.3+
VIS OUT: 48

8,540

MD: 8,549'
INC: 90.44°
AZM: 274.53°
TVD: 7,214.39'
VS: 991.92'

8,550

8,560

8,570

8,580

8,590

WOB: 39.4klbs
RPM: 70
SPM: 202
SPP: 5,396psi

8,600

ROP (min/ft) 5
GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

8,610

8,620

1228u

8,630

MD: 8,643'
INC: 89.82°
AZM: 274.36°
TVD: 7,214.17'
VS: 1,085.32'

8,640

8,650

8,660

8,670

8,680

8,690

8,700

ROP (min/ft) 5
GAMMA (API) 250

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

8,710

1156u

8,720

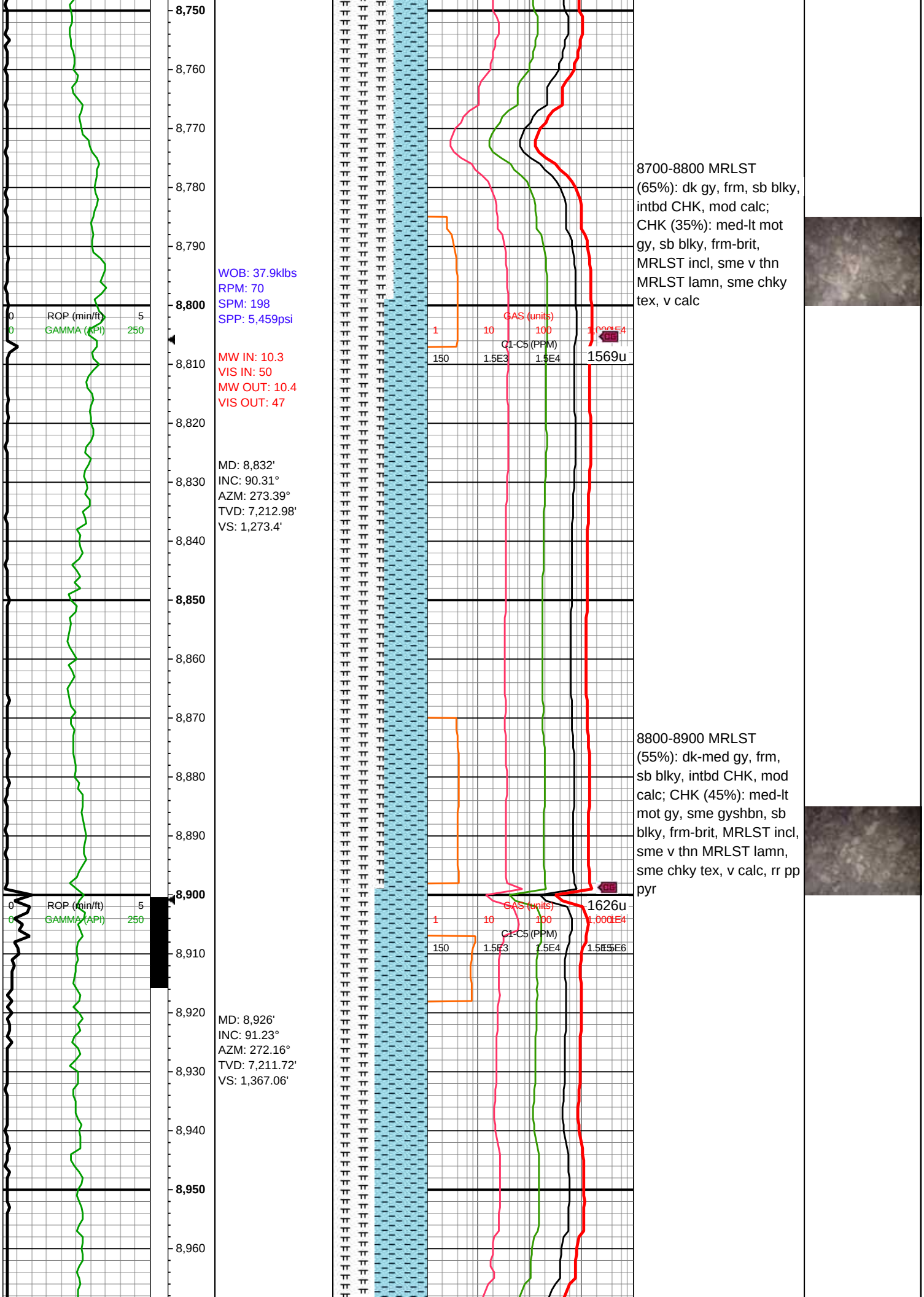
8,730

MD: 8,738'
INC: 90.66°
AZM: 273.3°
TVD: 7,213.77'
VS: 1,179.82'

8,740

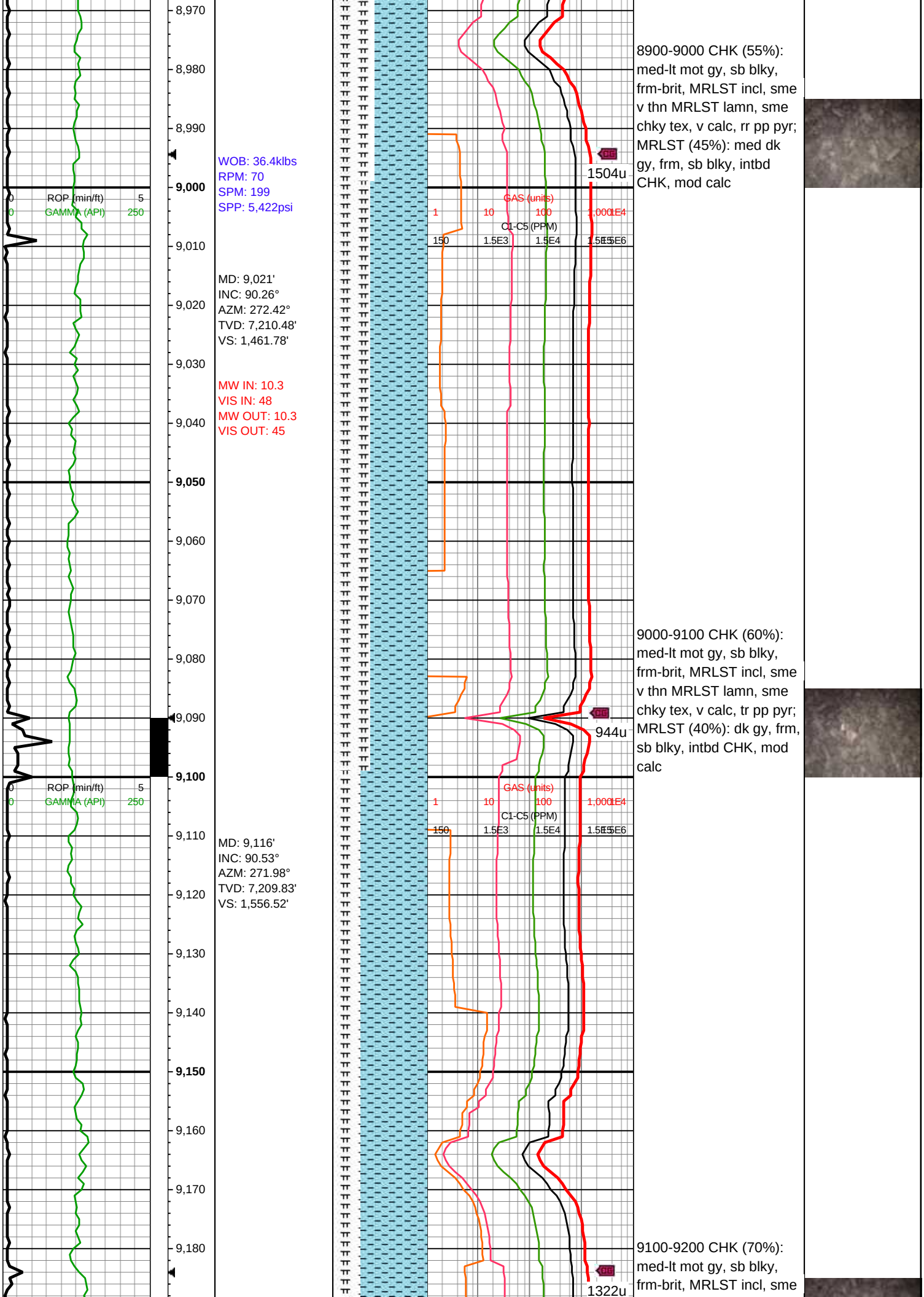
8500-8600 CHK (70%): lt mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (30%): dk gy-v dk gy, frm, sb blky, intbd CHK, mod calc

8600-8700 CHK (50%): med-lt mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (50%): dk gy, frm, sb blky, intbd CHK, mod calc



8700-8800 MRLST (65%): dk gy, frm, sb blky, intbd CHK, mod calc; CHK (35%): med-lt mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc

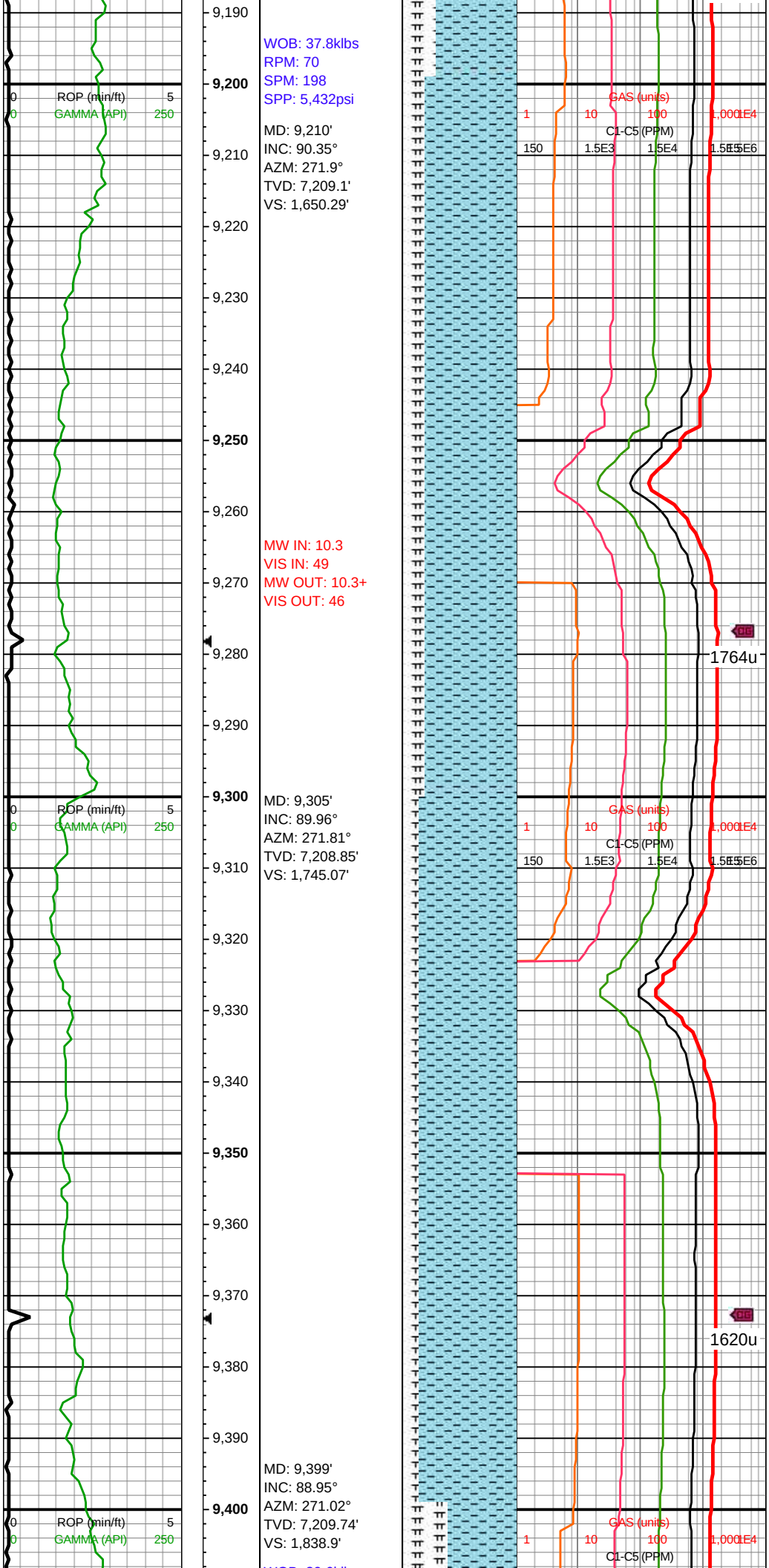
8800-8900 MRLST (55%): dk-med gy, frm, sb blky, intbd CHK, mod calc; CHK (45%): med-lt mot gy, sme gyshbn, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc, rr pp pyr



8900-9000 CHK (55%): med-lt mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc, rr pp pyr; MRLST (45%): med dk gy, frm, sb blky, intbd CHK, mod calc

9000-9100 CHK (60%): med-lt mot gy, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc, tr pp pyr; MRLST (40%): dk gy, frm, sb blky, intbd CHK, mod calc

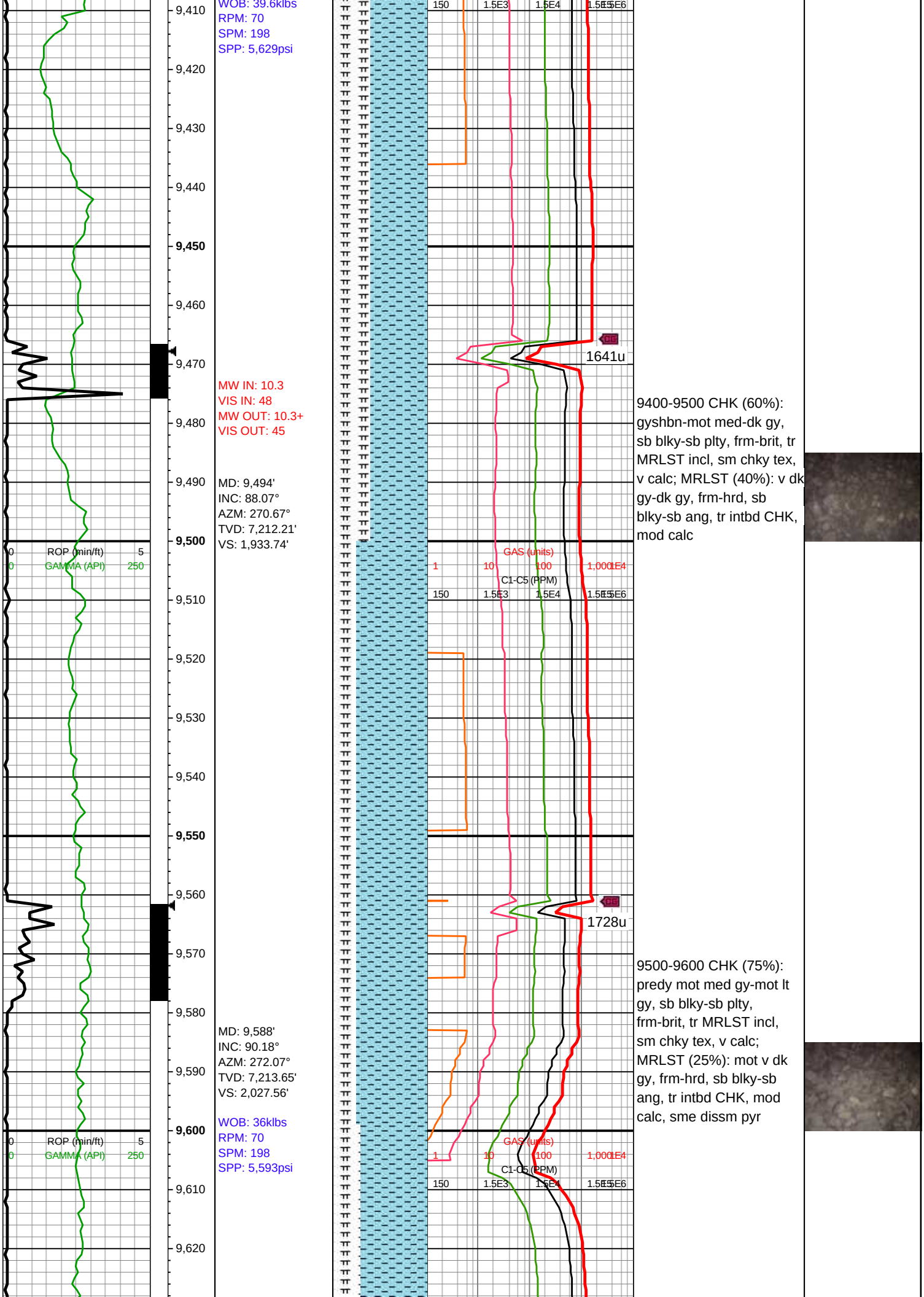
9100-9200 CHK (70%): med-lt mot gy, sb blky, frm-brit, MRLST incl, sme



v thn MRLST lamn, sme chky tex, v calc; MRLST (30%): dk med gy, frm, sb blky, intbd CHK, mod calc

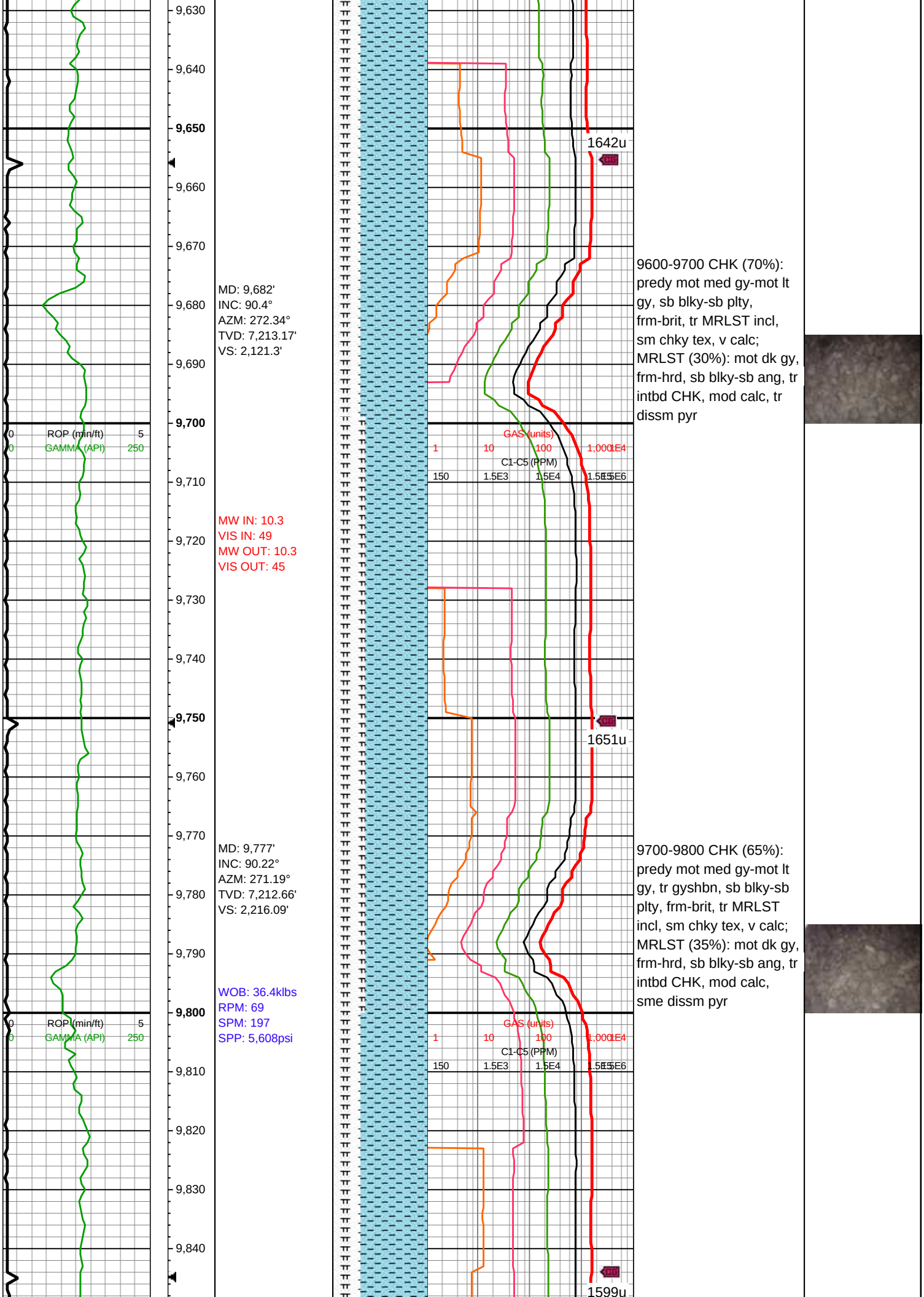
9200-9300 CHK (80%): med-lt mot gy, tr gyshbn, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (20%): dk med gy, frm, sb blky, intbd CHK, mod calc

9300-9400 CHK (85%): lt-med mot gy, tr gyshbn, sb blky, frm-brit, MRLST incl, sme v thn MRLST lamn, sme chky tex, v calc, tr pp pyr; MRLST (15%): dk gy-v dk gy, frm, sb blky, intbd CHK, mod calc



9400-9500 CHK (60%): gyshbn-mot med-dk gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (40%): v dk gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

9500-9600 CHK (75%): predy mot med gy-mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (25%): mot v dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, sme dissm pyr


9,630
9,640
9,650
9,660
9,670
9,680
9,690
9,700
9,710
9,720
9,730
9,740
9,750
9,760
9,770
9,780
9,790
9,800
9,810
9,820
9,830
9,840
0 ROP (min/ft) 5
0 GAMMA (API) 250
MD: 9,682'
INC: 90.4°
AZM: 272.34°
TVD: 7,213.17'
VS: 2,121.3'
MW IN: 10.3
VIS IN: 49
MW OUT: 10.3
VIS OUT: 45
WOB: 36.4klbs
RPM: 69
SPM: 197
SPP: 5,608psi
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
1642u
1651u
1599u
9600-9700 CHK (70%): predy mot med gy-mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (30%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr
9700-9800 CHK (65%): predy mot med gy-mot lt gy, tr gyshbn, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (35%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, sme dissm pyr

0 ROP (min/ft) 5
0 GAMMA (API) 250

9,850
9,860
9,870
9,880
9,890
9,900
9,910
9,920
9,930
9,940
9,950
9,960
9,970
9,980
9,990
10,000
10,010
10,020
10,030
10,040
10,050
10,060

MD: 9,871'
INC: 89.43°
AZM: 271.19°
TVD: 7,212.94'
VS: 2,309.94'

MD: 9,965'
INC: 89.21°
AZM: 271.55°
TVD: 7,214.06'
VS: 2,403.77'

WOB: 39.3klbs
RPM: 70
SPM: 193
SPP: 5,574psi

MD: 10,060'
INC: 88.73°
AZM: 271.81°
TVD: 7,215.77'
VS: 2,498.55'

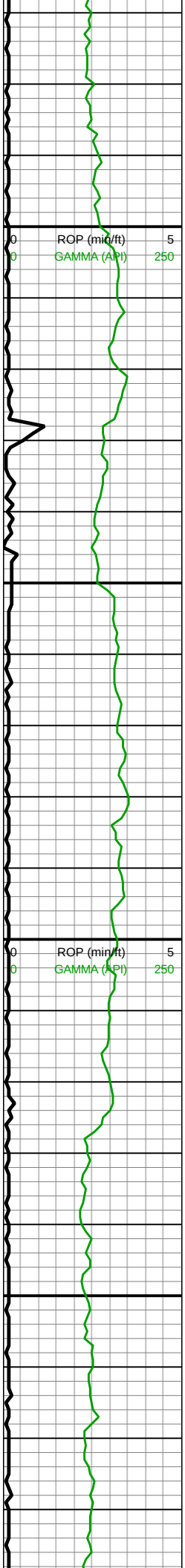
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 5E6

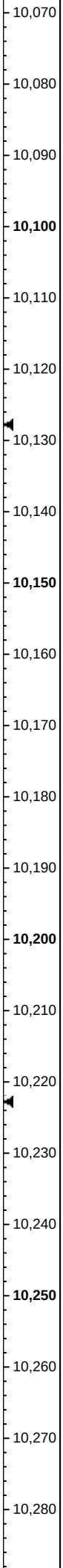
1512u

1617u

9800-9900 CHK (70%): predy mot med gy-mot lt gy, sme gyshbn-offwht, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (30%): mot v dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

9900-10000 CHK (65%): predy mot med gy-mot lt gy, tr gyshbn, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (35%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, sme dissm pyr

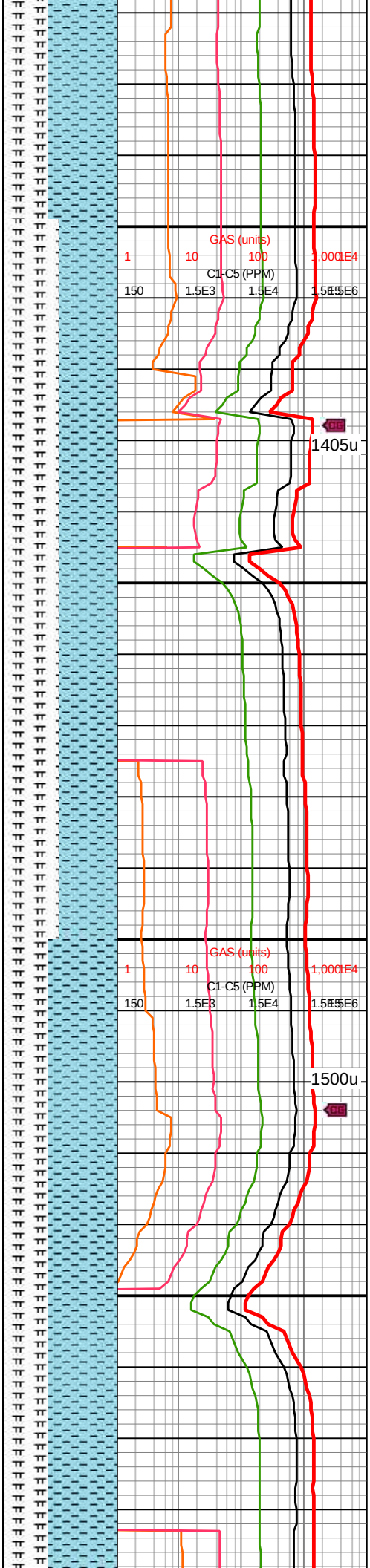




MW IN: 10.4
VIS IN: 49
MW OUT: 10.3+
VIS OUT: 45

MD: 10,154'
INC: 90.97°
AZM: 272.07°
TVD: 7,216.01'
VS: 2,592.32'

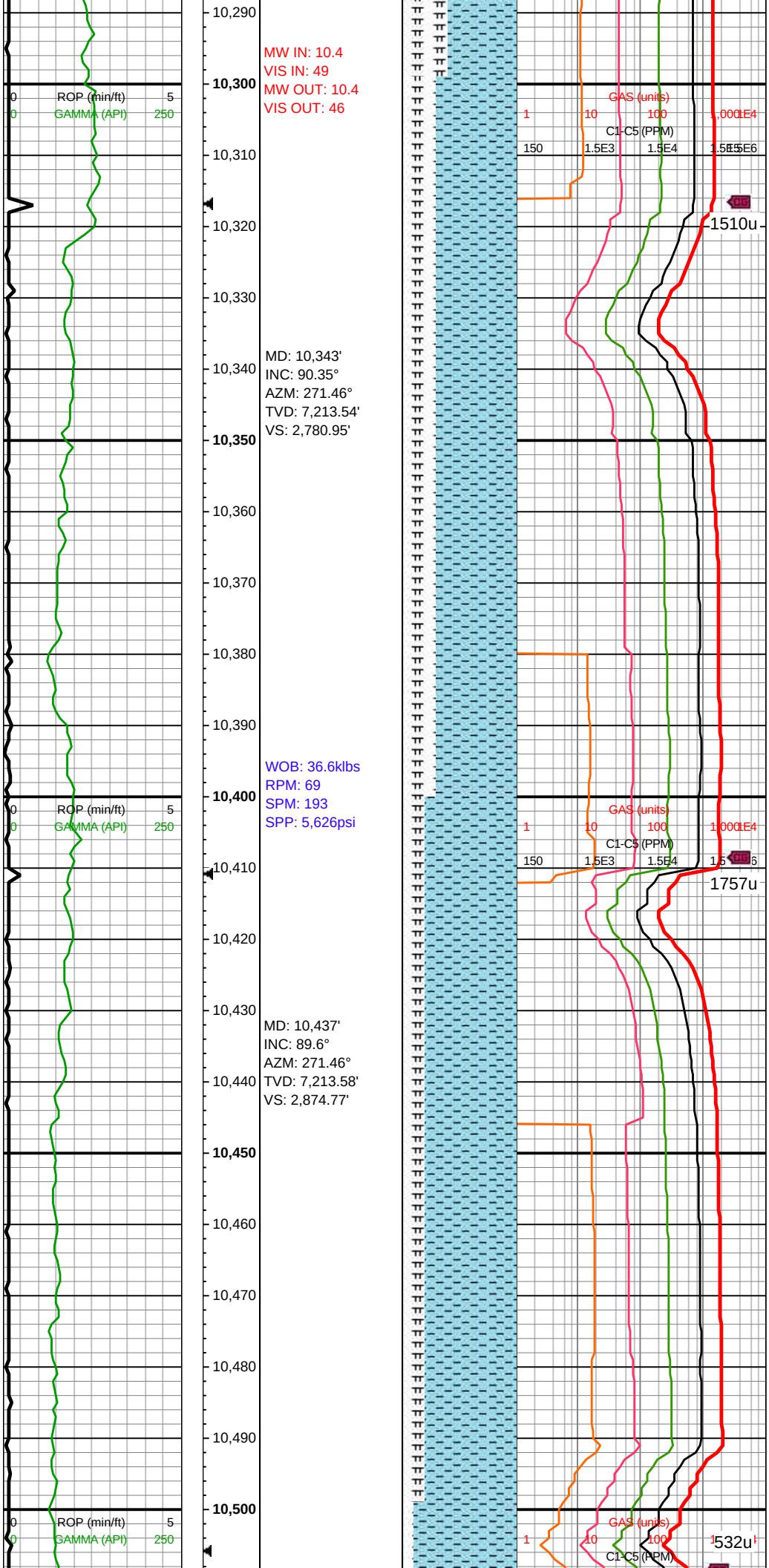
MD: 10,249'
INC: 90.84°
AZM: 271.19°
TVD: 7,214.51'
VS: 2,687.11'



10000-10100 CHK (60%): gyshbn-mot med-dk gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (40%): v dk gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

10100-10200 MRLST (50%): dk gy, frm, sb blky, tr thn CHK lamn, intbd CHK, hi calc; CHK (50%): mot lt gy, sme gyshbn, sb blky, frm-brit, MRLST incl, v thn MRLST lamn, sme chky tex, v calc

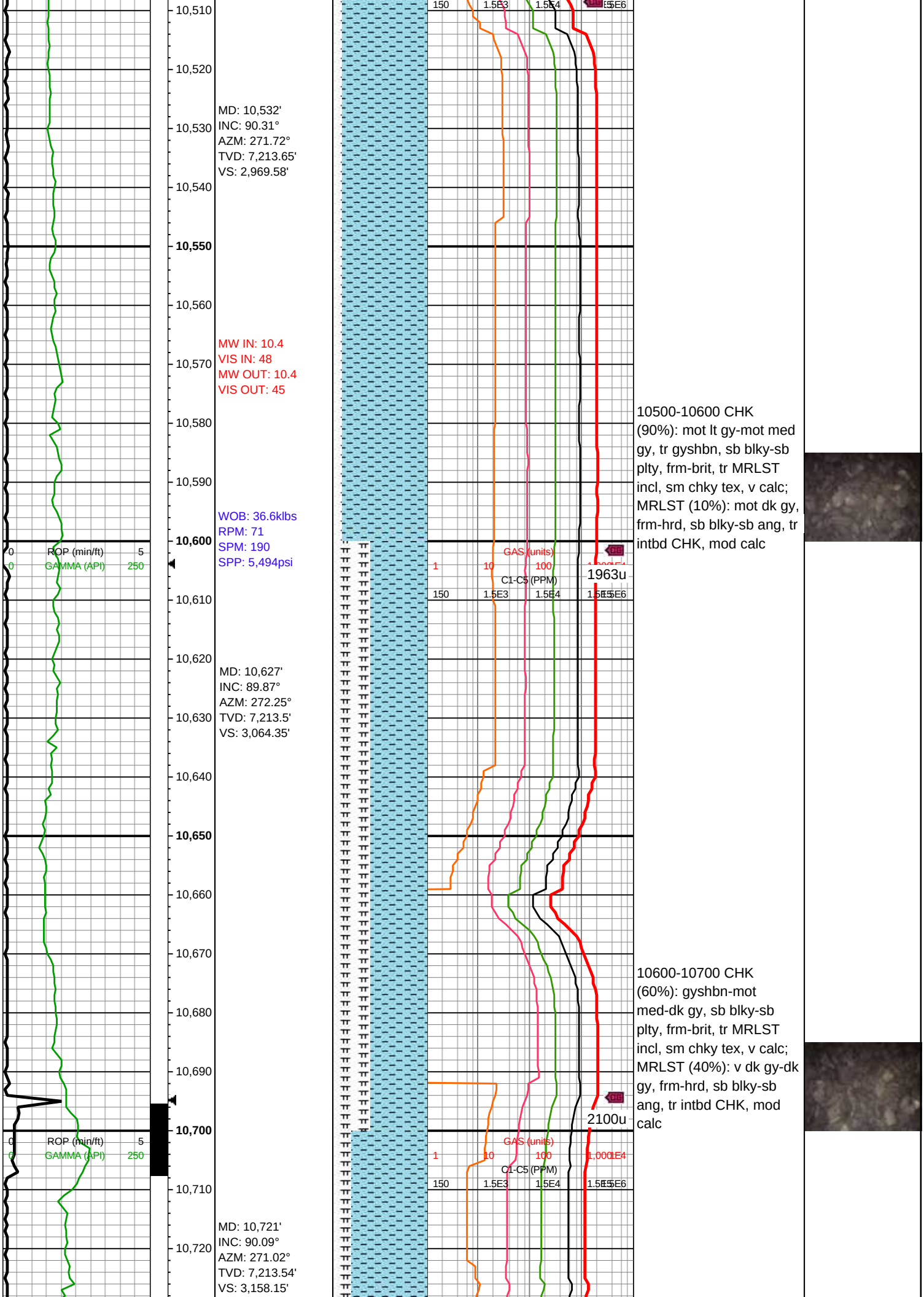
10200-10300 CHK (60%): mot dk med gy, sme lt gy, sb blky, frm-brit, MRLST incl, v thn MRLST lamn, sme chky tex, v calc; MRLST (40%): v dk gy-dk gy, frm-sl hrd

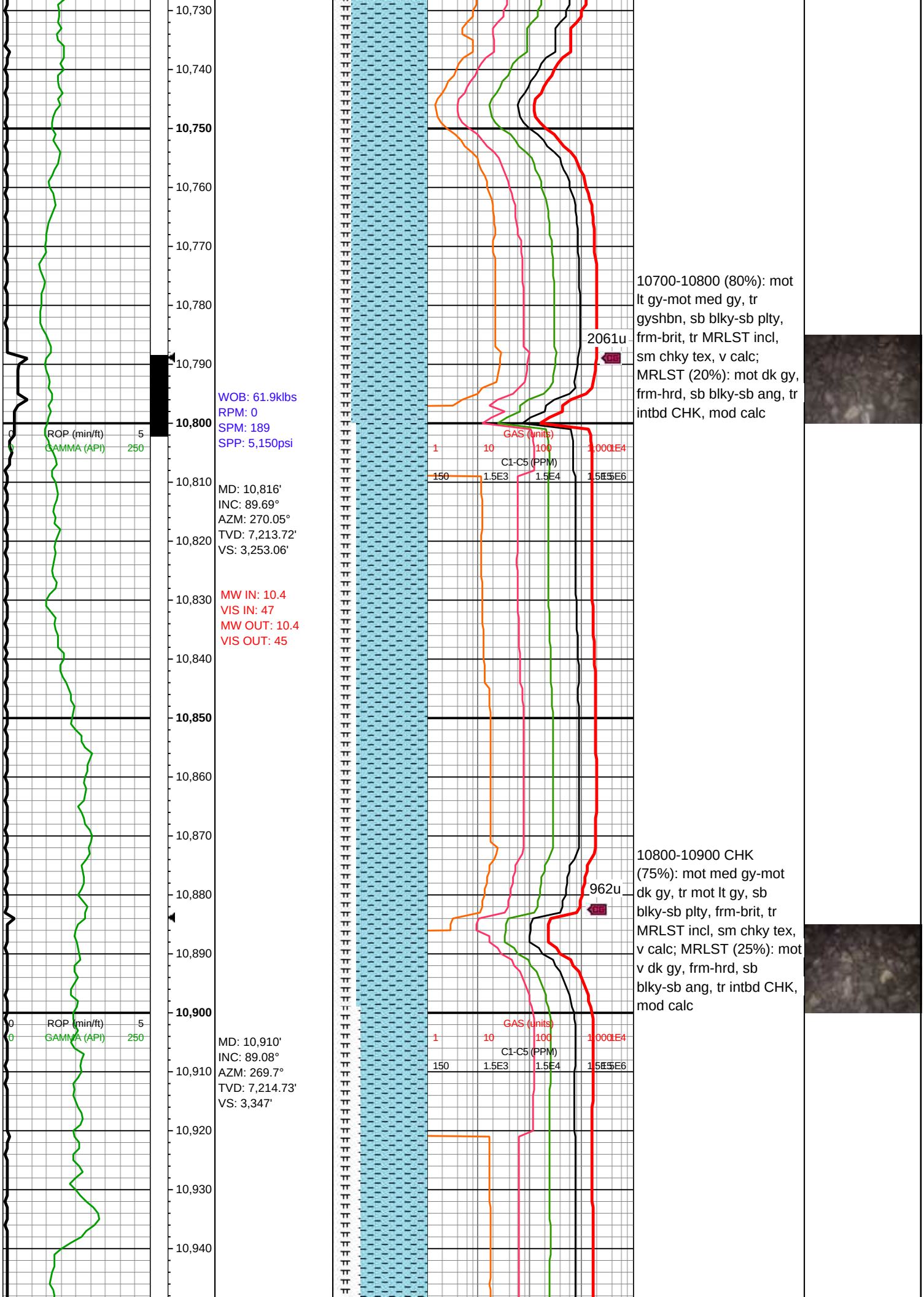


v dk gy-dk gy, frm-sl hrd, sb blky, v thn CHK lamn, intbd CHK, hi calc, tr free pyr

10300-10400 CHK (70%): predy lt gy-mot med gy, blky-sb blky, frm-brit, sme v thn MRLST lamn, chky tex, v calc; MRLST (30%): predy dk gy, hd-frm, sb blky, com CHK intbds, mod-hi cal, tr pp mic pyr

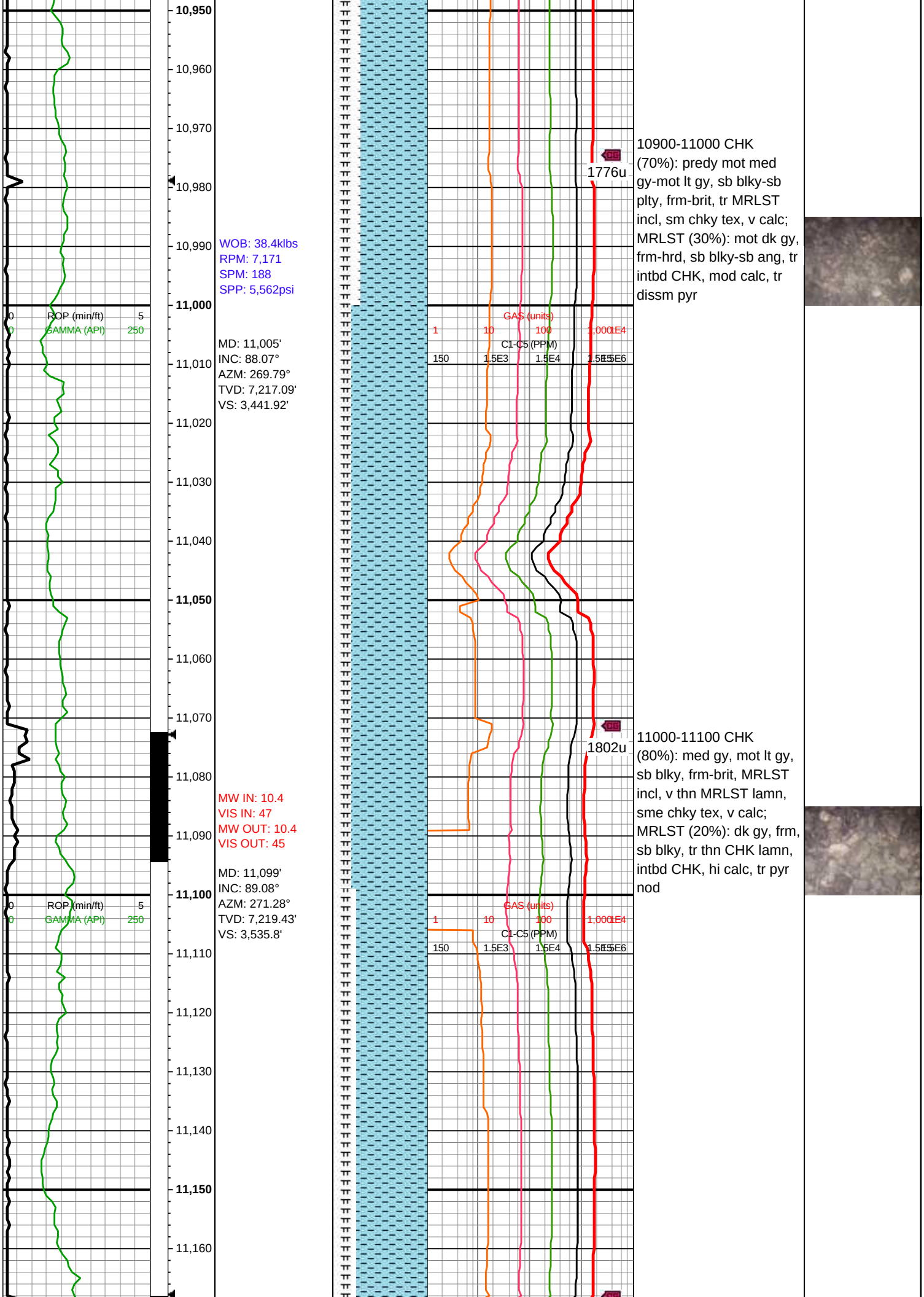
10400-10500 CHK (80%): mot lt gy-mot med gy, tr gyshbn, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (20%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc


10,510
10,520
10,530
10,540
10,550
10,560
10,570
10,580
10,590
10,600
10,610
10,620
10,630
10,640
10,650
10,660
10,670
10,680
10,690
10,700
10,710
10,720
MD: 10,532'
INC: 90.31°
AZM: 271.72°
TVD: 7,213.65'
VS: 2,969.58'
MW IN: 10.4
VIS IN: 48
MW OUT: 10.4
VIS OUT: 45
WOB: 36.6klbs
RPM: 71
SPM: 190
SPP: 5,494psi
MD: 10,627'
INC: 89.87°
AZM: 272.25°
TVD: 7,213.5'
VS: 3,064.35'
MD: 10,721'
INC: 90.09°
AZM: 271.02°
TVD: 7,213.54'
VS: 3,158.15'
0 ROP (min/ft) 5
0 GAMMA (API) 250
150 1.5E3 1.5E4 1.5E5 1.5E6
GAS (units)
1 10 100
C1-C5 (PPM)
1963u
2100u
10500-10600 CHK (90%): mot lt gy-mot med gy, tr gyshbn, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (10%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc
10600-10700 CHK (60%): gyshbn-mot med-dk gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (40%): v dk gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc



10700-10800 (80%): mot lt gy-mot med gy, tr gyshbn, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (20%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

10800-10900 CHK (75%): mot med gy-mot dk gy, tr mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (25%): mot v dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc



10900-11000 CHK (70%): predy mot med gy-mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (30%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr

11000-11100 CHK (80%): med gy, mot lt gy, sb blky, frm-brit, MRLST incl, v thn MRLST lamn, sme chky tex, v calc; MRLST (20%): dk gy, frm, sb blky, tr thn CHK lamn, intbd CHK, hi calc, tr pyr nod

MNDEPT

01/10/2018

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
11,380

0 ROP (min/ft) 5
0 GAMMA (API) 250

MD: 11,194'
INC: 89.39°
AZM: 269.35°
TVD: 7,220.7'
VS: 3,630.7'

WOB: 28.8klbs
RPM: 70
SPM: 188
SPP: 5,464psi

MW IN: 10.4
VIS IN: 47
MW OUT: 10.4
VIS OUT: 44

MD: 11,289'
INC: 90.92°
AZM: 266.8°
TVD: 7,220.44'
VS: 3,725.69'

MD: 11,384'
INC: 90.13°
AZM: 264.6°
TVD: 7,219.57'

GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 5E6

1701u

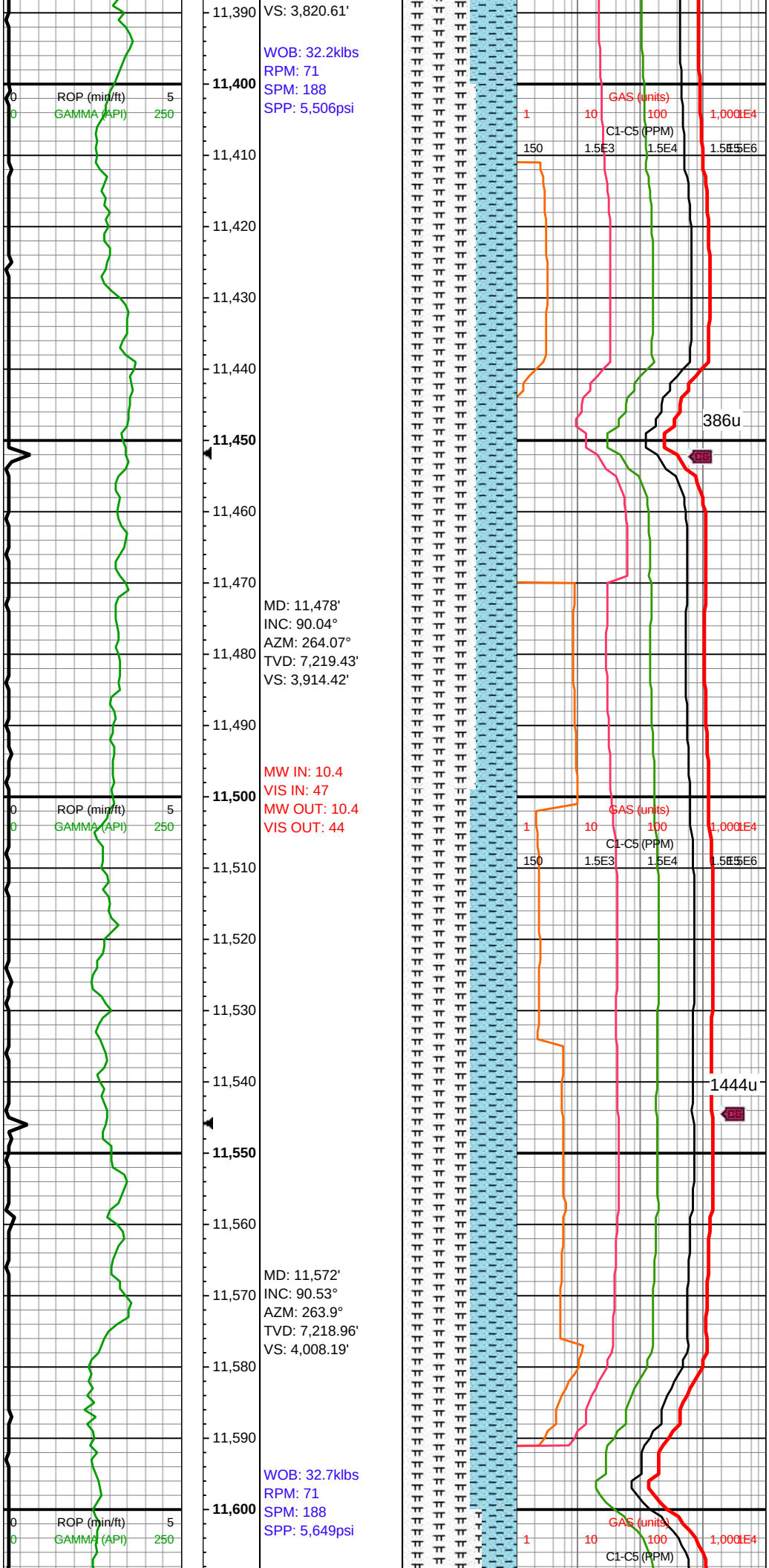
11100-11200 CHK (75%): mot med gy-mot dk gy, tr mot lt gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (25%): mot v dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc

1728u

11200-11300 CHK (50%): med gy, sme lt gy, sb blky, frm-v frm, brit ip, MRLST incl, chky tex, v calc; MRLST (50%): dk gy, sl hrd-frm, sb blky, intbd CHK, mod calc, rr pyr nod

1287u

11300-11400 MRLST (60%): v dk gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc; CHK (40%): gyshbn-mot



med-dk gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc

11400-11500 MRLST (65%): dk gy, frm, sb blky, tr thn CHK lamn, intbd CHK, hi calc; CHK (35%): mot lt gy, sme gyshbn, sb blky, frm-brit, MRLST incl, v thn MRLST lamn, sme chky tex, v calc

11500-11600 MRLST (60%): dk gy, frm, sb blky, tr thn CHK lamn, intbd CHK, hi calc; CHK (40%): mot lt gy, sme gyshbn, sb blky, frm-brit, MRLST incl, v thn MRLST lamn, sme chky tex, v calc

0 ROP (min/ft) 5
0 GAMMA (API) 250

11,610
11,620
11,630
11,640
11,650
11,660
11,670
11,680
11,690
11,700
11,710
11,720
11,730
11,740
11,750
11,760
11,770
11,780
11,790
11,800
11,810
11,820

MD: 11,667'
INC: 89.3°
AZM: 263.46°
TVD: 7,219.1'
VS: 4,102.92'

MW IN: 10.4
VIS IN: 47
MW OUT: 10.4
VIS OUT: 44

MD: 11,761'
INC: 88.46°
AZM: 263.11°
TVD: 7,220.94'
VS: 4,196.59'

WOB: 37.9klbs
RPM: 71
SPM: 188
SPP: 5,668psi

MD: 11,807'
INC: 88.15°
AZM: 262.93°
TVD: 7,222.3'
VS: 4,242.4'

0 ROP (min/ft) 5
0 GAMMA (API) 250

150 1.5E3 1.5E4 1.5E5 1.5E6

1561u

GAS (units)
1 10 100 1,000 1E4

C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

1219u

GAS (units)
1 10 100 1,000 1E4

C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

11600-11700 MRLST (70%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr; CHK (30%): mot med gy-mot lt gy, tr offwht, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc

11700-11800 MRLST (60%): mot dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc, tr dissm pyr; CHK (40%): mot med-lt gy, tr offwht, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc

11,830
11,840
11,850
11,860
11,870
11,880
11,890
11,900

Projection to Bit:

MD: 11,875'
INC: 88.15°
AZM: 262.93°
TVD: 7,224.5'
VS: 4,310.1'

Total Depth of 11,875' MD Reached on 01/10/2019 @03:39 MST

1658u

11800-11875 MRLST (50%): v dk gy-dk gy, frm-hrd, sb blky-sb ang, tr intbd CHK, mod calc; CHK (50%): gyshbn-mot med-dk gy, sb blky-sb plty, frm-brit, tr MRLST incl, sm chky tex, v calc