RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name	Melbon Ranch 4C-17H-M265		
Location	Sec. 17 T2N R65W		
State	Colorado	**County**	Weld
Country	USA	**Rig Number**	Ensign 153
API Number	05-123-47753	**AFE #**	16191468
Geographic Region	Rockies	**Field**	Wattenberg
Spud Date	9/24/2018	**Drilling Completed**	9/27/2018
Surface Coordinates	Lat/Long: 40.134869/-104.696113 SHL: Sec: 17 Twp: 2N 65W Footage: 2500 FSL 460 FWL		
Bottom Hole Coordinates	Proposed BHL: Sec: 17 Twp: 2N 65W Footages: 2500 FSL 460 FEL		
Ground Elevation	4,956'	**K.B. Elevation**	4,979'
Logged Interval	6,500' **To** 12,055'	**Total Depth**	12,055'
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: Heather Davis / Shana Swirin / Degan Barber

Services Provided: 2-Man Mudlogging / Geosteering

Equipment: ML-567

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

Start Date 9/24/2018

Release Date: 09/28/2018

Job #: 1622RK1809

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
- CRINOID
- ECHINOID
- FOSSIL
- GASTROPOD
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS

Stringer

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

FISH
FORAMINIFERA

Minerals

ANHYDRITIC

FERRUGINOUS PELLET
FERRUGINOUS

SILTY
TUFFACEOUS

SILTSTONE STRINGER

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

Other Symbols

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	Lithology Descriptions	Images

Crestone Peak Resources

Melbon Ranch 4C-17H-M265

9 5/8" Surface Casing @ 2,433'

Spud Date: 09/24/2018
2 man Logging Began: 09/24/2018

All Depths Correspond to Driller's Pipe Tally

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

GAS (units) 0.01 – 0.1 – 1 – 10 – 100
C1-C5 (PPM) 0.01 – 0.1 – 1 – 10 – 100

SYSTEM CALIBRATED
1% Methane = 100 Units
100% Methane = 10000 Units

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

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

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
6,550
6,560
6,570
6,580
6,590

Bit #: 1
Type: U516M
Size: 8 1/2
Depth In: 2,439"
Jets: 6x13
S/N: 43551

KOP

MW IN: 9.8
VIS IN: 53
MW OUT: 9.7
VIS OUT: 50

MD: 6,511'
INC: 9.89°
AZM: 351.98°
TVD: 6,396.59'
VS: -157.15'

MD: 6,558'
INC: 12.04°
AZM: 16.15°
TVD: 6,442.76'
VS: -154.09'

WOB: 4.7klbs
RPM: 3
SPM: 156
SPP: 2,926psi

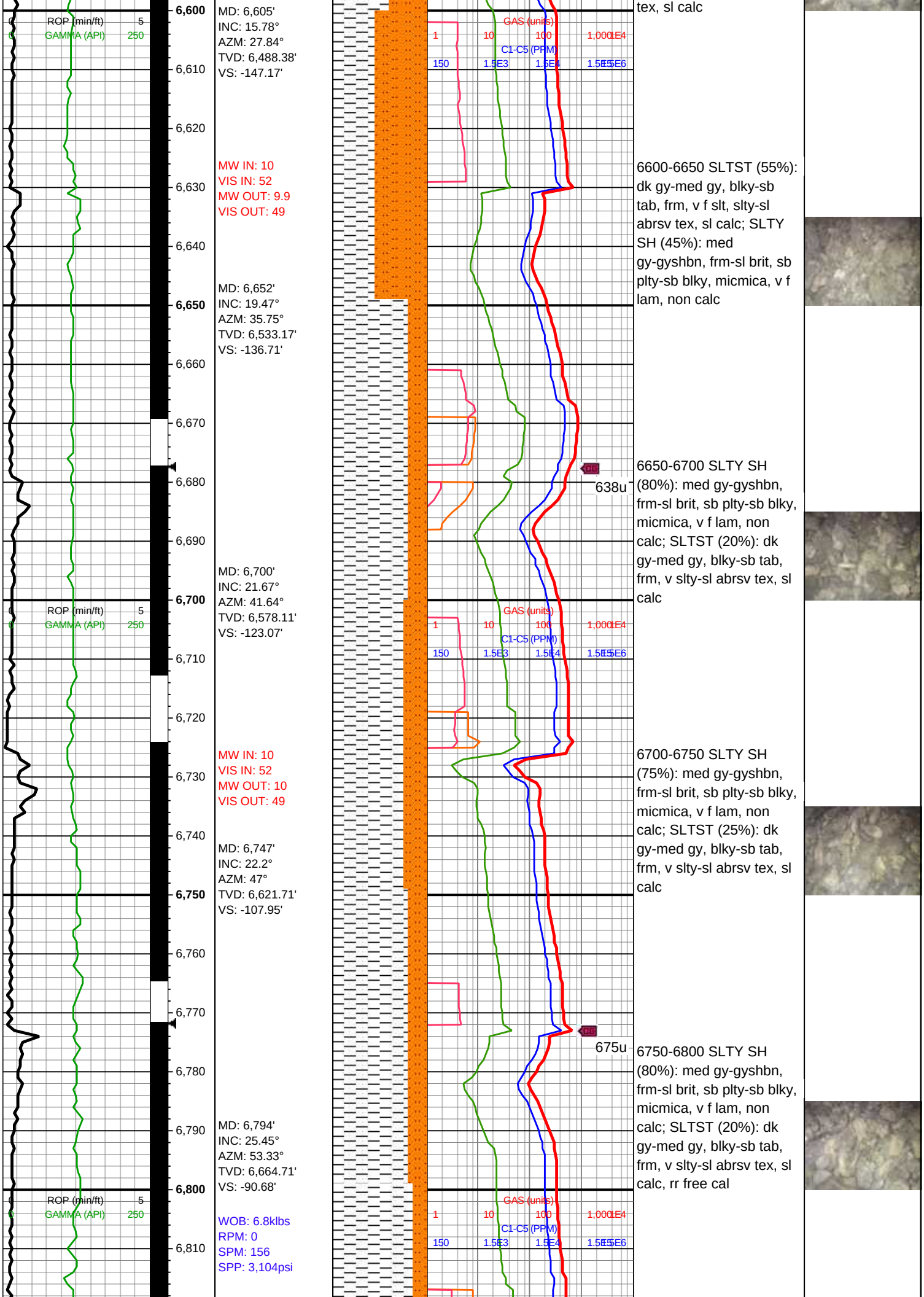
679u

476u

6450-6500 SLTY SH (70%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (30%): dk gy-med gy, blky-sb tab, frm, slty-sl abrsv tex, sl calc

6500-6550 SLTY SH (80%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (20%): dk gy-med gy, blky-sb tab, frm, slty-sl abrsv tex, sl calc

6550-6600 SLTY SH (60%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (40%): dk gy-med gy, blky-sb tab, frm, v f slt, slty-sl abrsv


ROP (min/ft)
GAMMA (API)
GAS (units)
C1-C5 (PPM)
6,600
6,610
6,620
6,630
6,640
6,650
6,660
6,670
6,680
6,690
6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
6,800
6,810
MD: 6,605'
INC: 15.78°
AZM: 27.84°
TVD: 6,488.38'
VS: -147.17'
MW IN: 10
VIS IN: 52
MW OUT: 9.9
VIS OUT: 49
MD: 6,652'
INC: 19.47°
AZM: 35.75°
TVD: 6,533.17'
VS: -136.71'
MD: 6,700'
INC: 21.67°
AZM: 41.64°
TVD: 6,578.11'
VS: -123.07'
MW IN: 10
VIS IN: 52
MW OUT: 10
VIS OUT: 49
MD: 6,747'
INC: 22.2°
AZM: 47°
TVD: 6,621.71'
VS: -107.95'
MD: 6,794'
INC: 25.45°
AZM: 53.33°
TVD: 6,664.71'
VS: -90.68'
WOB: 6.8klbs
RPM: 0
SPM: 156
SPP: 3,104psi
638u
675u
tex, sl calc
6600-6650 SLTST (55%): dk gy-med gy, blky-sb tab, frm, v f slt, slty-sl abrsv tex, sl calc; SLTY SH (45%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc
6650-6700 SLTY SH (80%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (20%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc
6700-6750 SLTY SH (75%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (25%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc
6750-6800 SLTY SH (80%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (20%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc, rr free cal

6,820
6,830
6,840
6,850
6,860
6,870
6,880
6,890
6,900
6,910
6,920
6,930
6,940
6,950
6,960
6,970
6,980
6,990
7,000
7,010
7,020
7,030

MD: 6,841'
INC: 29.19°
AZM: 58.6°
TVD: 6,706.47'
VS: -70.26'

MW IN: 10
VIS IN: 52
MW OUT: 10
VIS OUT: 50

MD: 6,889'
INC: 33.49°
AZM: 63.35°
TVD: 6,747.46'
VS: -46.03'

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

Mitten Marker 2
6916'MD/6770'TVD

MD: 6,936'
INC: 35.74°
AZM: 68.09°
TVD: 6,786.15'
VS: -19.67'

MD: 6,983'
INC: 38.33°
AZM: 70.99°
TVD: 6,823.66'
VS: 8.51'

WOB: 20.3klbs
RPM: 25
SPM: 156
SPP: 3,758psi

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

Sharon Springs
7211'MD/6988'TVD

MD: 7,030'
INC: 40.04°
AZM: 75.74°
TVD: 6,860.1'
VS: 38.18'

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

779u

553u

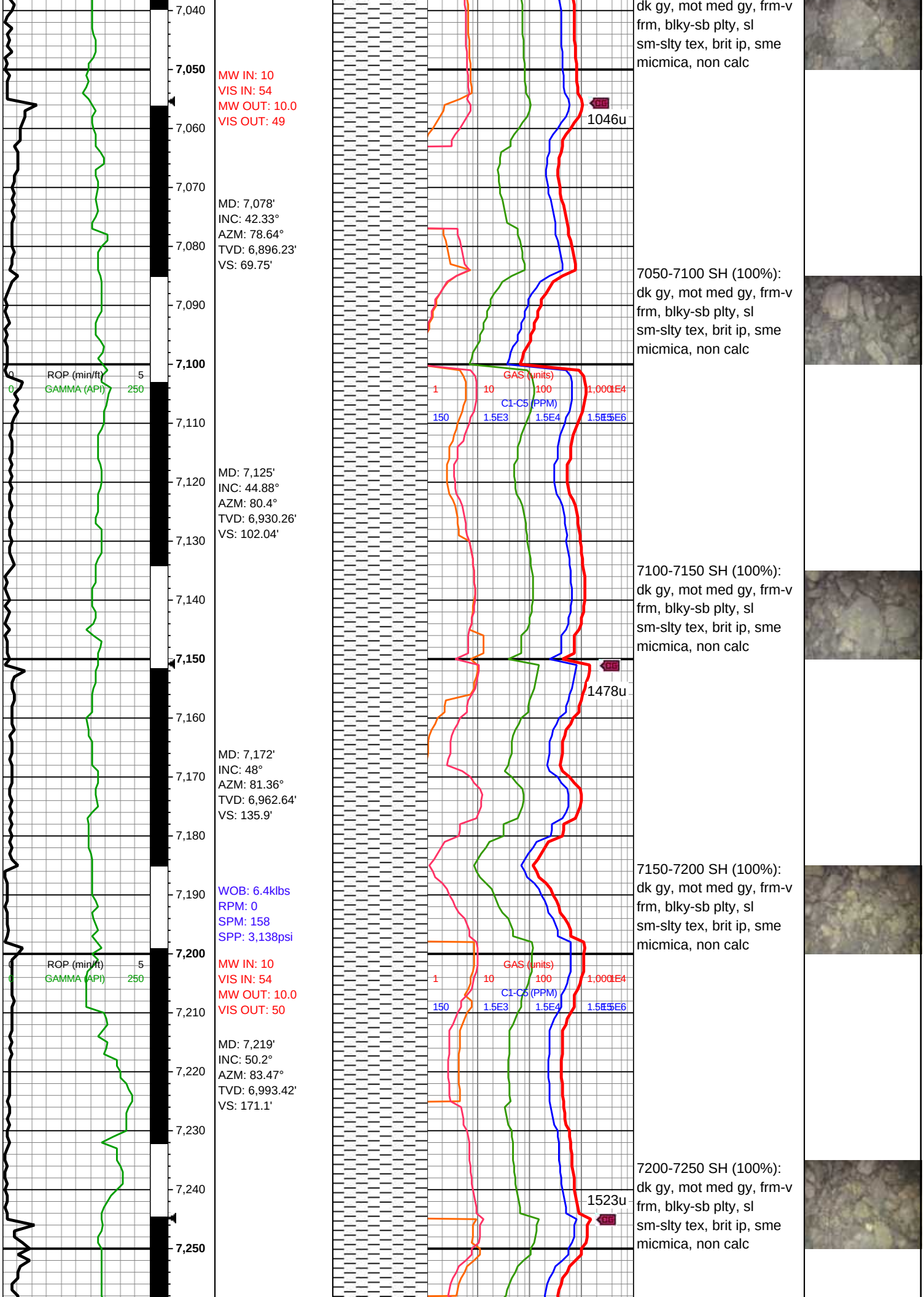
6800-6850 SLTY SH (85%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (15%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc, rr free cal

6850-6900 SLTY SH (80%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (20%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc, rr free cal

6900-6950 SLTY SH (85%): med gy-gyshbn, frm-sl brit, sb plty-sb blky, micmica, v f lam, non calc; SLTST (15%): dk gy-med gy, blky-sb tab, frm, v slty-sl abrsv tex, sl calc, rr free cal

6950-7000 SH (100%): dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc

7000-7050 SH (100%):


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
7,200
7,210
7,220
7,230
7,240
7,250
ROP (min/ft)
GAMMA (API)
GAS (units)
C1-C5 (PPM)
1046u
1478u
1523u
MW IN: 10
VIS IN: 54
MW OUT: 10.0
VIS OUT: 49
MD: 7,078'
INC: 42.33°
AZM: 78.64°
TVD: 6,896.23'
VS: 69.75'
MD: 7,125'
INC: 44.88°
AZM: 80.4°
TVD: 6,930.26'
VS: 102.04'
MD: 7,172'
INC: 48°
AZM: 81.36°
TVD: 6,962.64'
VS: 135.9'
WOB: 6.4klbs
RPM: 0
SPM: 158
SPP: 3,138psi
MW IN: 10
VIS IN: 54
MW OUT: 10.0
VIS OUT: 50
MD: 7,219'
INC: 50.2°
AZM: 83.47°
TVD: 6,993.42'
VS: 171.1'
dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc
7050-7100 SH (100%): dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc
7100-7150 SH (100%): dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc
7150-7200 SH (100%): dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc
7200-7250 SH (100%): dk gy, mot med gy, frm-v frm, blky-sb plty, sl sm-slty tex, brit ip, sme micmica, non calc

7,260
7,270
7,280
7,290
7,300
7,310
7,320
7,330
7,340
7,350
7,360
7,370
7,380
7,390
7,400
7,410
7,420
7,430
7,440
7,450
7,460
7,470

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

MD: 7,267'
INC: 51.96°
AZM: 85.05°
TVD: 7,023.57'
VS: 207.93'

MW IN: 10
VIS IN: 4
MW OUT: 10.0
VIS OUT: 49

Niobrara A
7310'MD/7049'TVD

MD: 7,314'
INC: 54.99°
AZM: 84.35°
TVD: 7,051.54'
VS: 245.13'

MD: 7,361'
INC: 59.65°
AZM: 84.18°
TVD: 7,076.91'
VS: 284.14'

MW IN: 10
VIS IN: 53
MW OUT: 10.0
VIS OUT: 49

WOB: 9.3klbs
RPM: 0
SPM: 155
SPP: 3,192psi

MD: 7,408'
INC: 63.16°
AZM: 85.49°
TVD: 7,099.4'
VS: 324.76'

Niobrara B
7310'MD/7049'TVD

MD: 7,456'
INC: 66.51°
AZM: 85.76°
TVD: 7,119.81'
VS: 367.42'

MW IN: 10.1
VIS IN: 53
MW OUT: 10.0
VIS OUT: 50

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

1602u

1235u

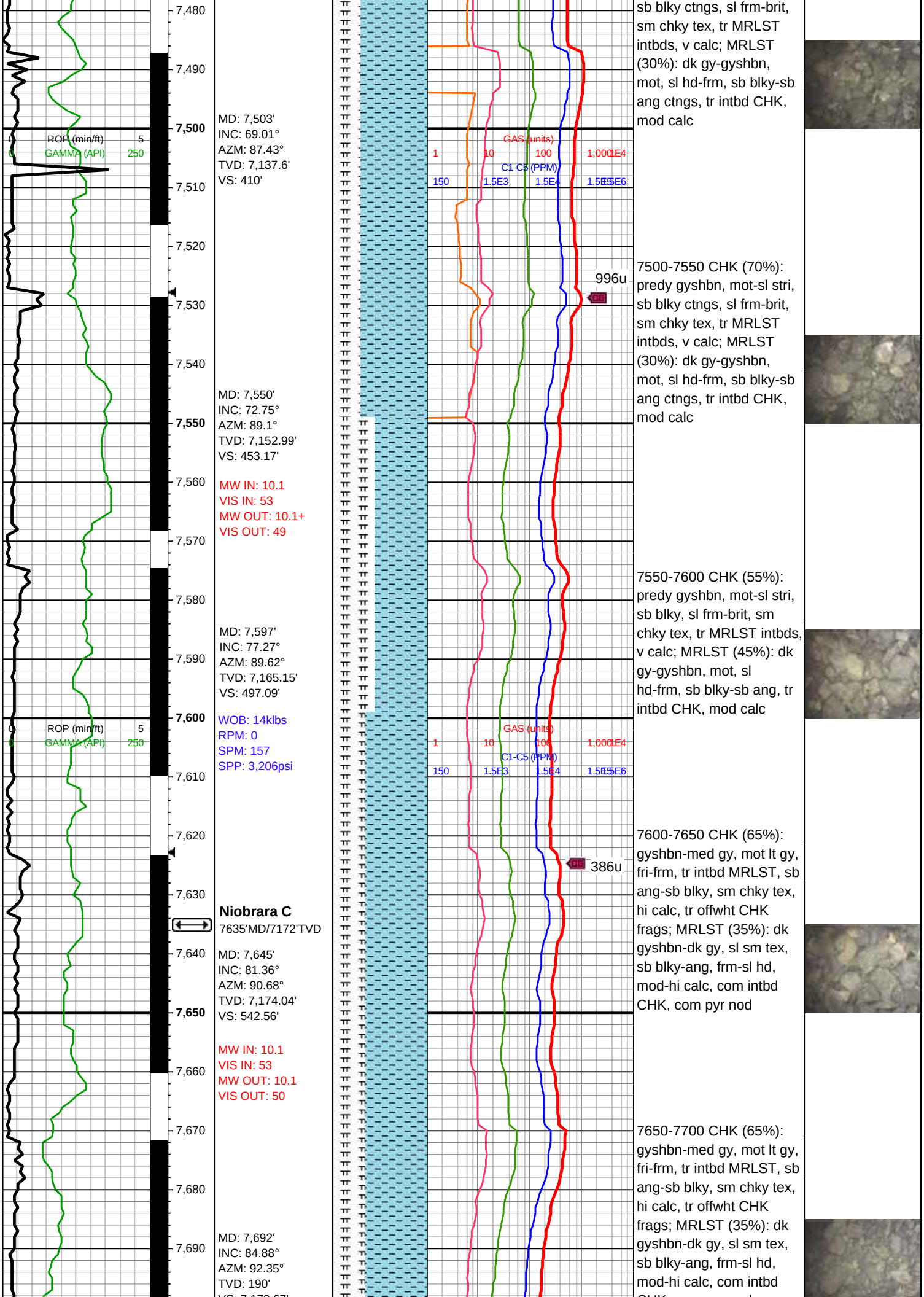
7250-7300 SH (100%): pred dk gy-v dk gy, mot med gy, blky-tab ctngs, sme plty, frm-sl hd, mod brit, sl sm tex, tr micmica, sme v thnly lam, non calc

7300-7350 CHK (65%): predy gyshbn, mot-sl stri, sb blky, sl frm-brit, tr MRLST incl, sm chky tex, v calc; MRLST (35%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang, tr intbd CHK, mod calc, scat pyr nod

7350-7400 CHK (70%): predy gyshbn, mot-sl stri, sb blky, sl frm-brit, sme sft, tr MRLST incl, sm chky tex, v calc; MRLST (30%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang, tr intbd CHK, mod calc, scat pyr nod

7400-7450 CHK (60%): predy gyshbn, mot-sl stri, sb blky, sl frm-brit, sm chky tex, v calc; MRLST (40%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang, tr intbd CHK, mod calc

7450-7500 CHK (70%): predy gyshbn, mot-sl stri,



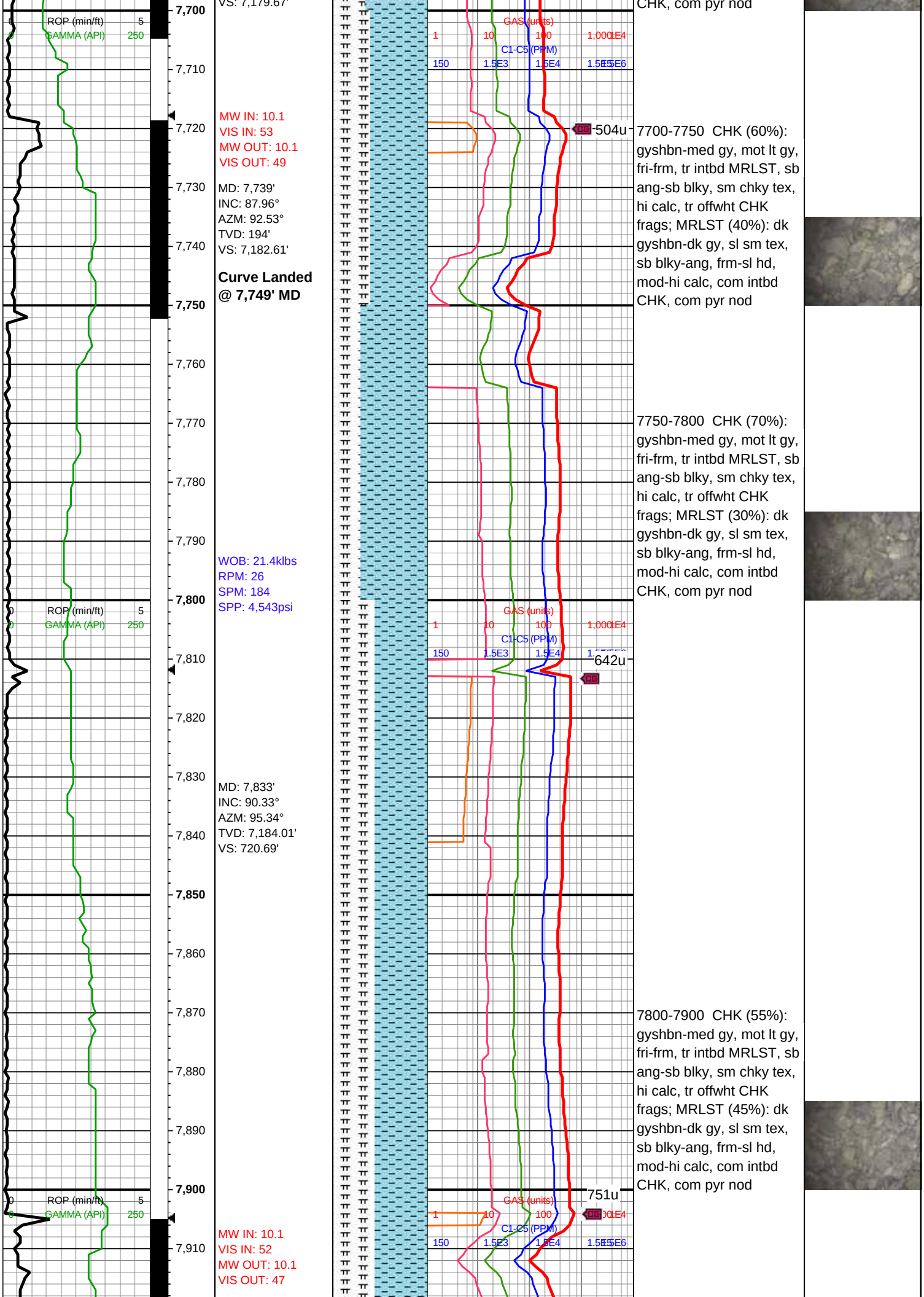
sb blky ctngs, sl frm-brit, sm chky tex, tr MRLST intbds, v calc; MRLST (30%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang ctngs, tr intbd CHK, mod calc

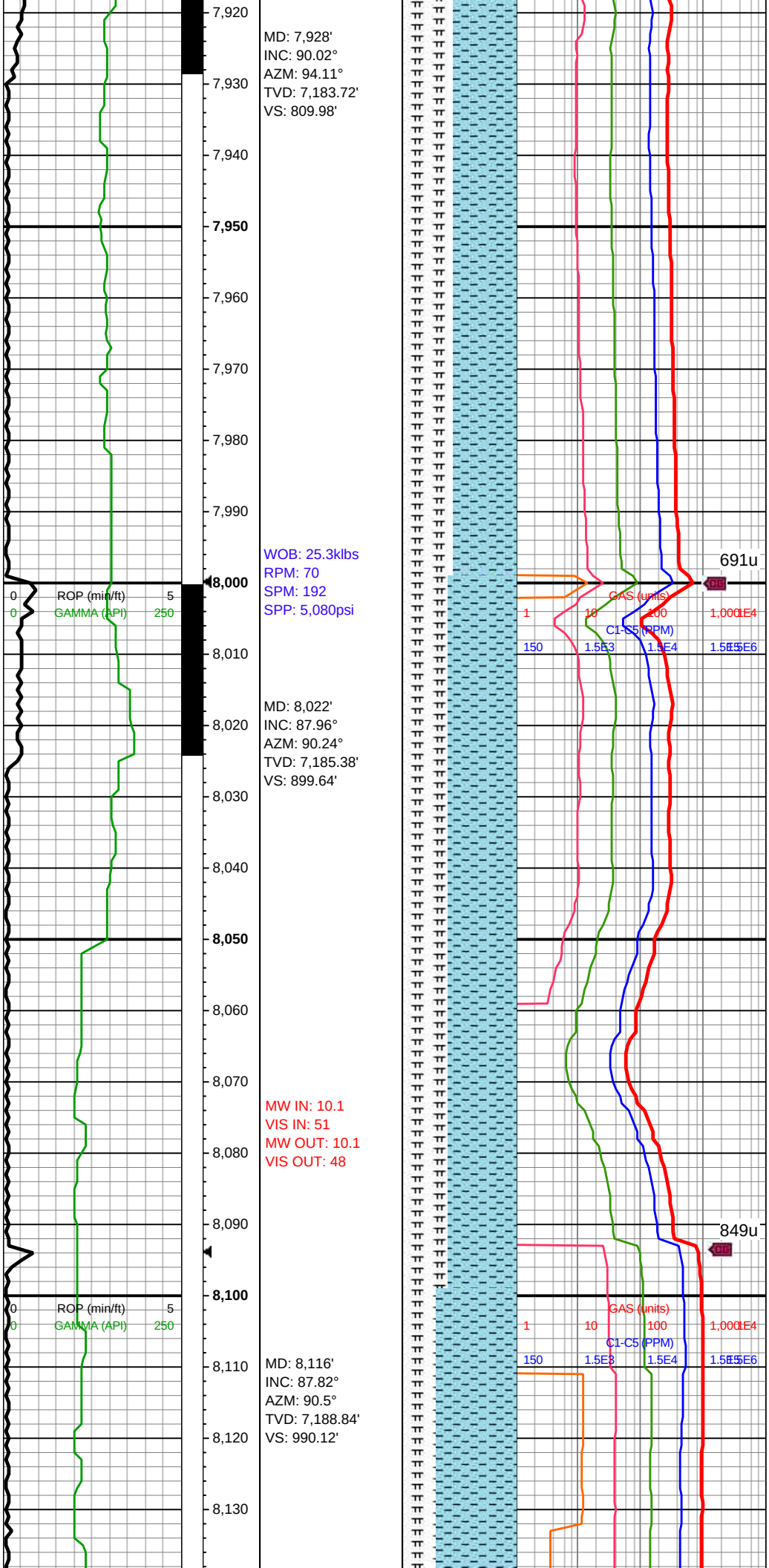
7500-7550 CHK (70%): predy gyshbn, mot-sl stri, sb blky ctngs, sl frm-brit, sm chky tex, tr MRLST intbds, v calc; MRLST (30%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang ctngs, tr intbd CHK, mod calc

7550-7600 CHK (55%): predy gyshbn, mot-sl stri, sb blky, sl frm-brit, sm chky tex, tr MRLST intbds, v calc; MRLST (45%): dk gy-gyshbn, mot, sl hd-frm, sb blky-sb ang, tr intbd CHK, mod calc

7600-7650 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

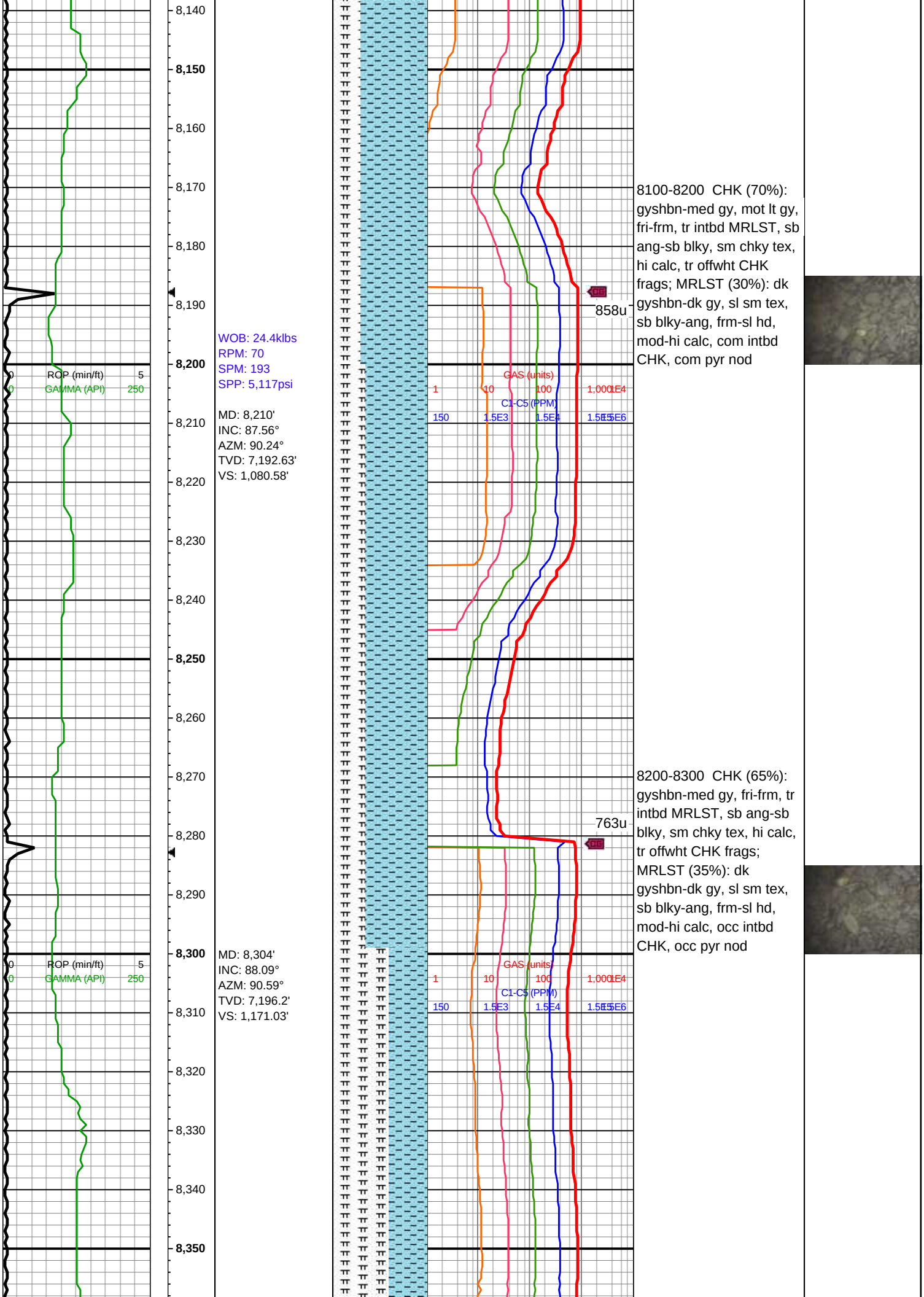
7650-7700 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd


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
7,700
7,710
7,720
7,730
7,740
7,750
7,760
7,770
7,780
7,790
7,800
7,810
7,820
7,830
7,840
7,850
7,860
7,870
7,880
7,890
7,900
7,910
MW IN: 10.1
VIS IN: 53
MW OUT: 10.1
VIS OUT: 49
MD: 7,739'
INC: 87.96°
AZM: 92.53°
TVD: 194'
VS: 7,182.61'
Curve Landed
@ 7,749' MD
WOB: 21.4klbs
RPM: 26
SPM: 184
SPP: 4,543psi
MD: 7,833'
INC: 90.33°
AZM: 95.34°
TVD: 7,184.01'
VS: 720.69'
MW IN: 10.1
VIS IN: 52
MW OUT: 10.1
VIS OUT: 47
504u
642u
751u
7700-7750 CHK (60%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (40%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod
7750-7800 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod
7800-7900 CHK (55%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (45%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod



7900-8000 CHK (55%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (45%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

8000-8100 CHK (60%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (40%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod



8100-8200 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

8200-8300 CHK (65%): gyshbn-med gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, occ intbd CHK, occ pyr nod

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
8,530
8,540
8,550
8,560
8,570

MW IN: 10.1
VIS IN: 52
MW OUT: 10.2
VIS OUT: 49

MD: 8,399'
INC: 88.13°
AZM: 88.39°
TVD: 7,199.33'
VS: 1,262.86'

WOB: 26.8klbs
RPM: 71
SPM: 192
SPP: 5,198psi

MD: 8,493'
INC: 89.1°
AZM: 88.92°
TVD: 7,201.6'
VS: 1,354.09'

MD: 8,588'

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

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

804u

8300-8400 MRLST (60%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod; CHK (40%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags

987u

8400-8500 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

814u

8500-8600 MRLST (50%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc,

MD: 8,588'
INC: 90.24°
AZM: 89.45°
TVD: 7,202.15'
VS: 1,446.09'

WOB: 33klbs
RPM: 71
SPM: 188
SPP: 5,312psi

MW IN: 10.1
VIS IN: 51
MW OUT: 10.2
VIS OUT: 48

MD: 8,682'
INC: 90.9°
AZM: 88.75°
TVD: 7,201.21'
VS: 1,537.16'

MD: 8,777'
INC: 90.59°
AZM: 90.06°
TVD: 7,199.98'
VS: 1,629.07'

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

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

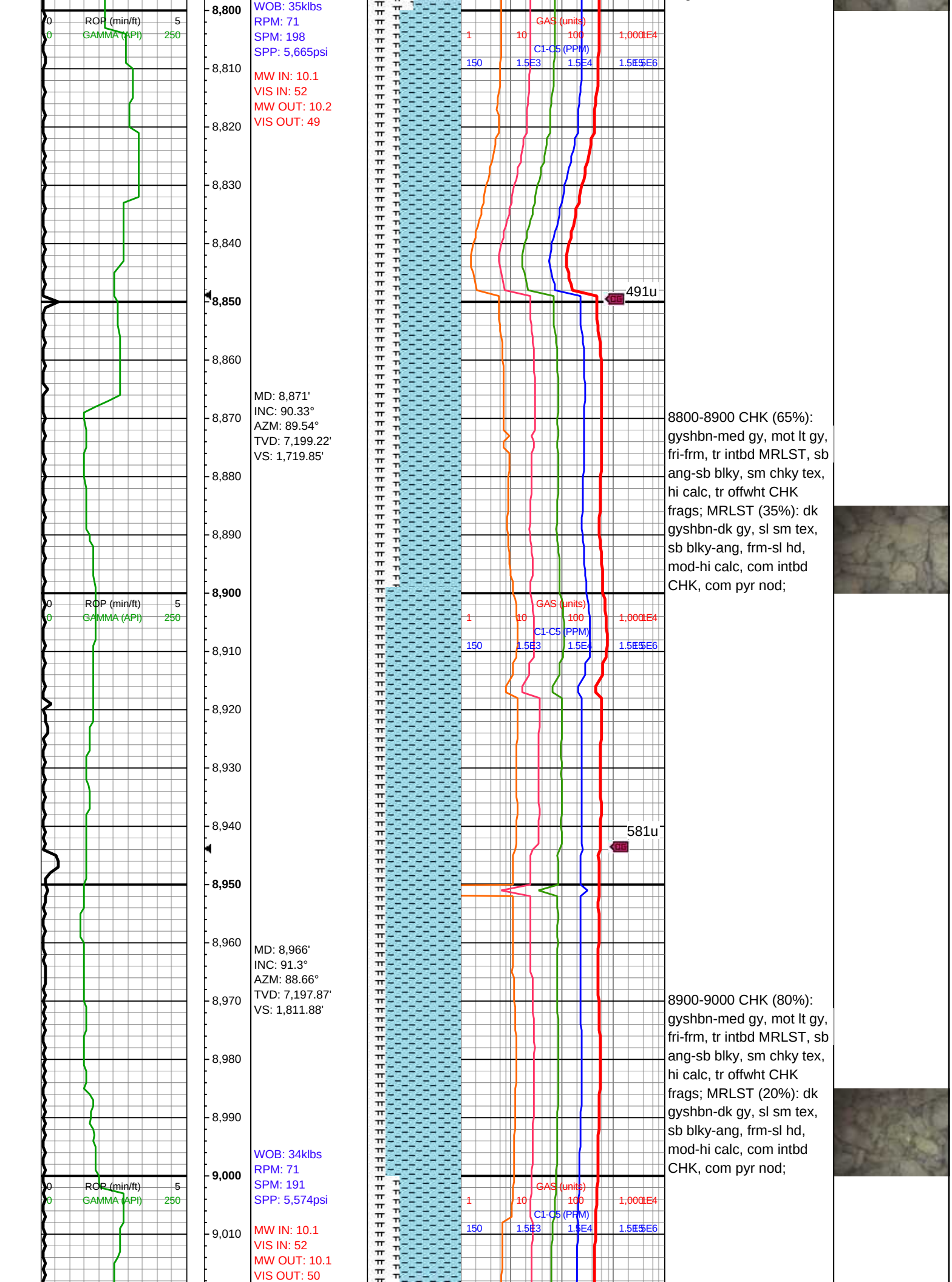
811u

796u

com intbd CHK, com pyr nod; CHK (50%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags

8600-8700 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

8300-8400 MRLST (50%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod; CHK (50%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags



8800-8900 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

8900-9000 CHK (80%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (20%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

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

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

MD: 9,060'
INC: 89.58°
AZM: 89.89°
TVD: 7,197.15'
VS: 1,902.88'

MD: 9,154'
INC: 90.02°
AZM: 90.59°
TVD: 7,197.48'
VS: 1,993.47'

WOB: 34klbs
RPM: 71
SPM: 188
SPP: 5,436psi

MW IN: 10.1
VIS IN: 51
MW OUT: 10.1
VIS OUT: 49

644u

687u

690u

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

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

9000-9100 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

9100-9200 CHK (60%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (40%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

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

9,240
9,250
9,260
9,270
9,280
9,290
9,300
9,310
9,320
9,330
9,340
9,350
9,360
9,370
9,380
9,390
9,400
9,410
9,420
9,430
9,440
9,450

MD: 9,249'
INC: 88.84°
AZM: 89.98°
TVD: 7,198.42'
VS: 2,085'

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

965u

9200-9300 CHK (55%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (45%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

MD: 9,343'
INC: 88.7°
AZM: 89.89°
TVD: 7,200.44'
VS: 2,175.71'

WOB: 34klbs
RPM: 71
SPM: 189
SPP: 5,404psi

MW IN: 10.1
VIS IN: 52
MW OUT: 10.1
VIS OUT: 51

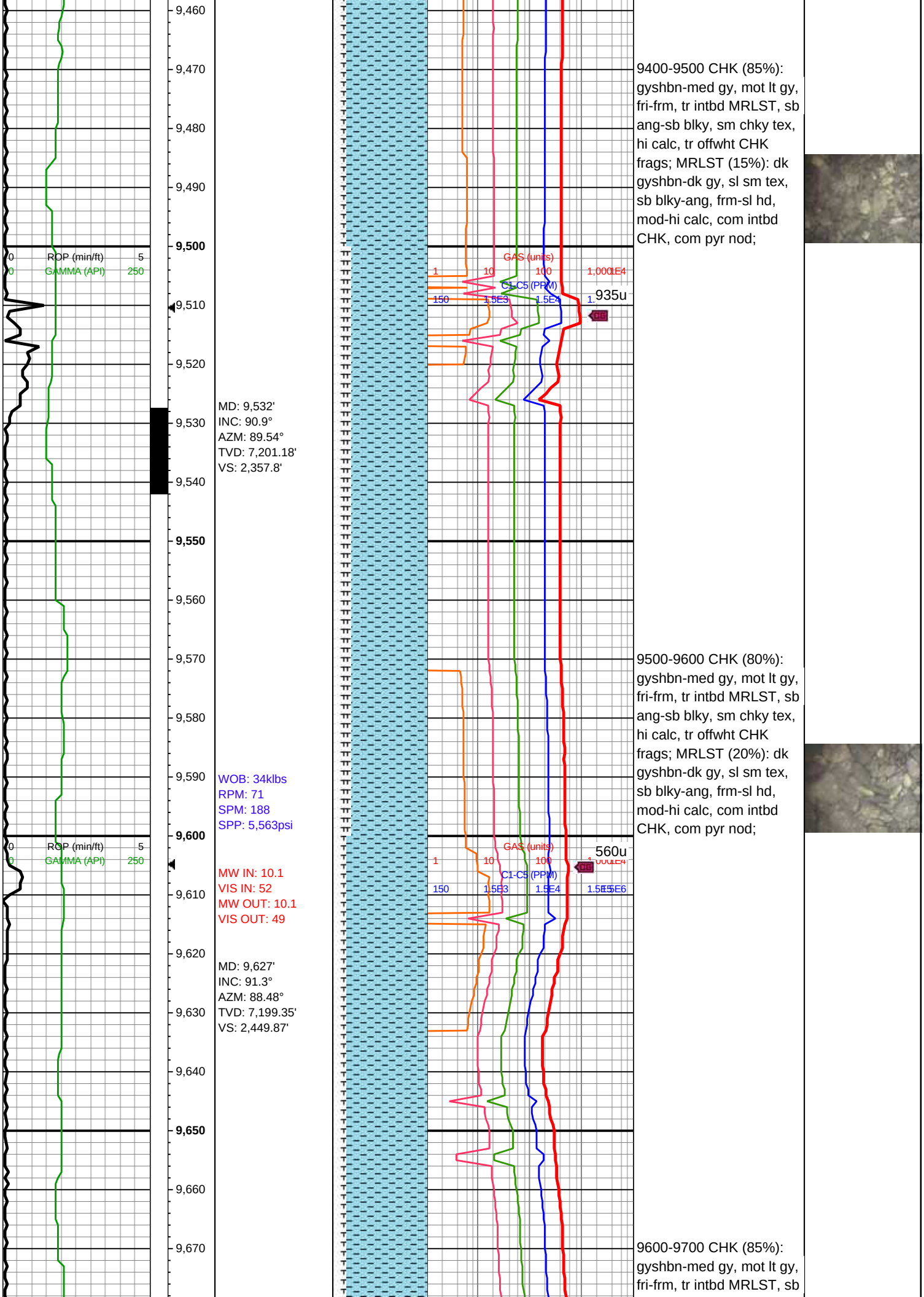
MD: 9,438'
INC: 89.76°
AZM: 90.86°
TVD: 7,201.72'
VS: 2,267.2'

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

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

840u

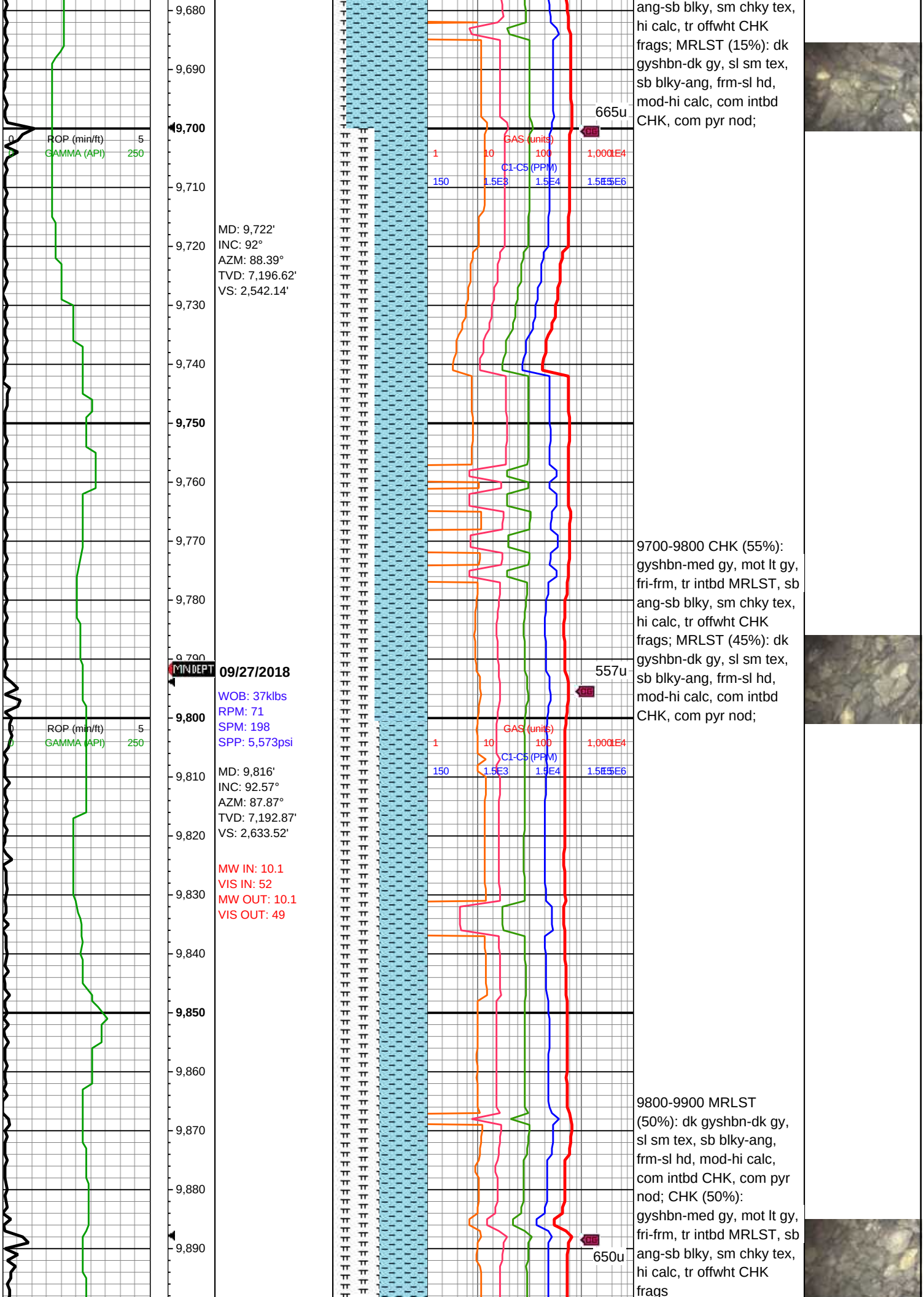
9300-9400 CHK (75%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (25%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;



9400-9500 CHK (85%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (15%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

9500-9600 CHK (80%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (20%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

9600-9700 CHK (85%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb



ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (15%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

9700-9800 CHK (55%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (45%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

9800-9900 MRLST (50%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod; CHK (50%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags

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

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
10,070
10,080
10,090
10,100
10,110

MD: 9,911'
INC: 91.87°
AZM: 88.92°
TVD: 7,189.19'
VS: 2,725.78'

WOB: 35klbs
RPM: 71
SPM: 187
SPP: 4,968psi

MD: 10,005'
INC: 91.52°
AZM: 89.98°
TVD: 7,186.41'
VS: 2,816.67'

MW IN: 10.1
VIS IN: 52
MW OUT: 10.1
VIS OUT: 49

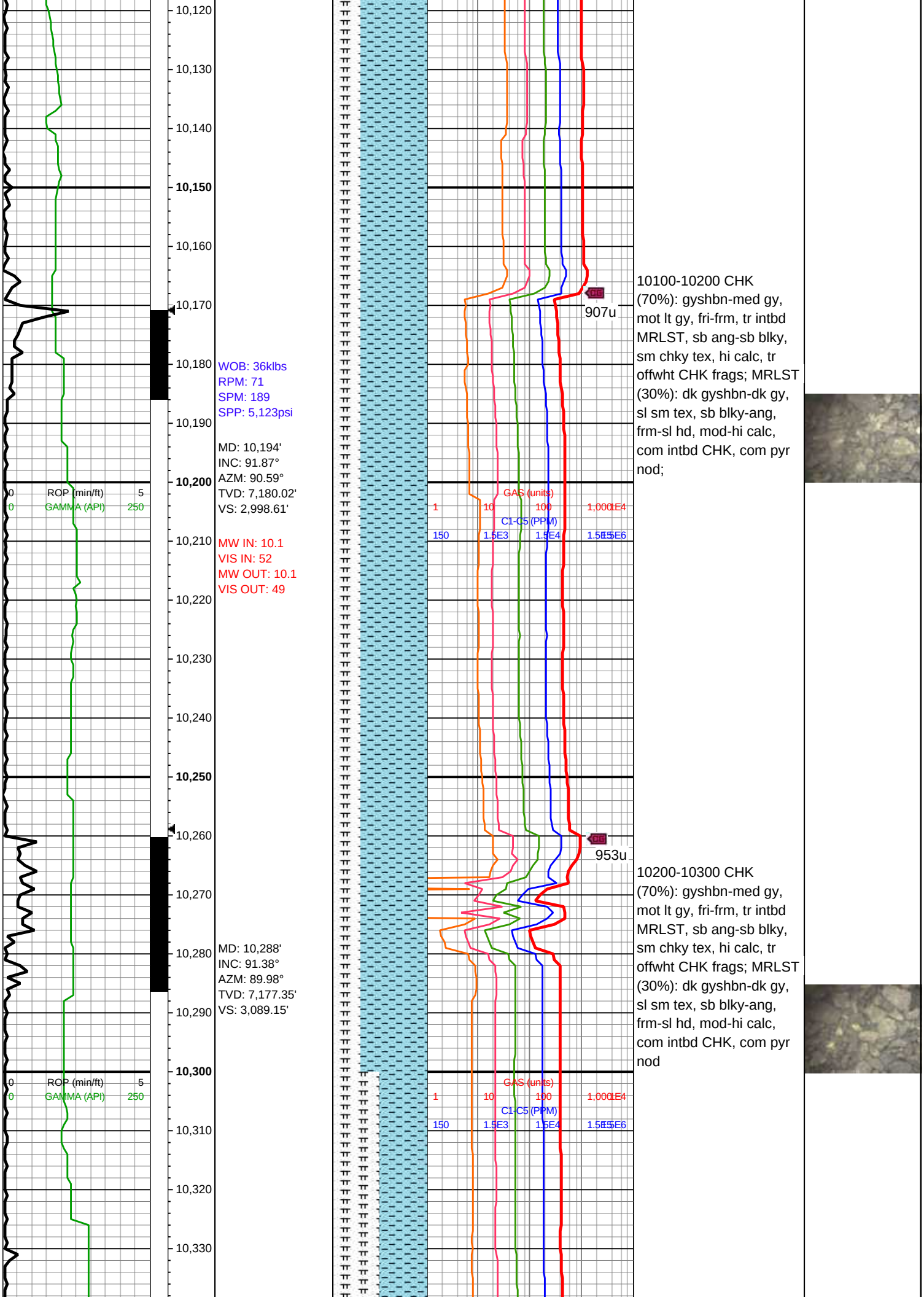
MD: 10,099'
INC: 92.18°
AZM: 90.42°
TVD: 7,183.37'
VS: 2,907.23'

752u

9000-10000 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

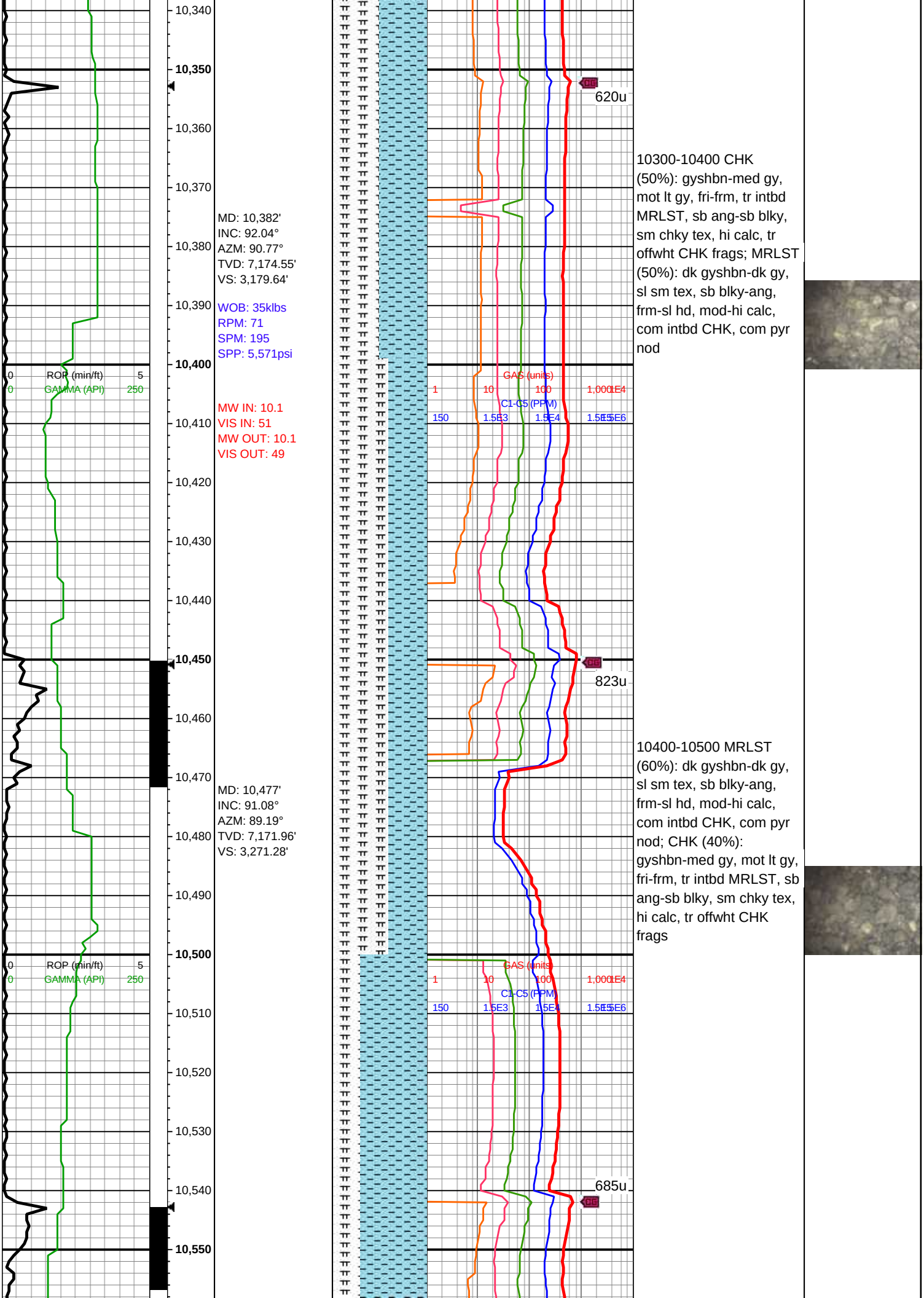
1185u

10000-10100 CHK (80%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (20%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;



10100-10200 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod;

10200-10300 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod



10300-10400 CHK (50%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (50%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

10400-10500 MRLST (60%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod; CHK (40%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags

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
10,730
10,740
10,750
10,760
10,770

MD: 10,571'
INC: 90.77°
AZM: 90.33°
TVD: 7,170.44'
VS: 3,362.07'

WOB: 35klbs
RPM: 71
SPM: 182
SPP: 5,518psi

MW IN: 10.1
VIS IN: 51
MW OUT: 10.1
VIS OUT: 49

MD: 10,665'
INC: 89.63°
AZM: 89.71°
TVD: 7,170.11'
VS: 3,452.75'

MW IN: 10.1
VIS IN: 51
MW OUT: 10.1+
VIS OUT: 48

MD: 10,760'
INC: 89.54°
AZM: 88.83°
TVD: 7,170.8'
VS: 3,544.72'

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

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

1071u

844u

10500-10600 CHK (70%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

10600-10700 CHK (75%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (25%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

10700-10800 CHK (60%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky,

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

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
10,940
10,950
10,960
10,970
10,980
10,990

WOB: 30.7klbs
RPM: 71
SPM: 181
SPP: 5,506psi

MD: 10,854'
INC: 88.97°
AZM: 88.39°
TVD: 7,172.03'
VS: 3,635.99'

MD: 10,949'
INC: 88.44°
AZM: 88.04°
TVD: 7,174.17'
VS: 3,728.36'

MW IN: 10.1
VIS IN: 53
MW OUT: 10.1+
VIS OUT: 51

WOB: 27.7klbs

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

485u

540u

sm chky tex, hi calc, occ offwht CHK frags; MRLST (40%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

10800-10900 CHK (70%): gyshbn-med gy, mot, sl frm, sm chky tex, tab-sb blky ctngs, mnr crm CHK frags, mnr intbd MRLST, hi calc; MRLST (30%): dk gy, med gy, sl sm tex, sb blky-ang ctngs, frm-sl hd, mod calc, mnr intbd CHK

10900-11000 CHK (60%): gyshbn-med gy, mot, sl frm, sm chky tex, tab-sb blky ctngs, mnr crm CHK frags, mnr intbd MRLST, hi calc; MRLST (40%): dk gy, med gy, sl sm tex, sb blky-ang ctngs, frm-sl hd, mod

RPM: 71
SPM: 182
SPP: 5,467psi

MD: 11,043'
INC: 88.22°
AZM: 89.27°
TVD: 7,176.91'
VS: 3,819.57'

MW IN: 10.1
VIS IN: 54
MW OUT: 10.2
VIS OUT: 50

MD: 11,138'
INC: 90.42°
AZM: 89.45°
TVD: 7,178.04'
VS: 3,911.5'

WOB: 29.1klbs
RPM: 71
SPM: 180
SPP: 5,311psi

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

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
11,160
11,170
11,180
11,190
11,200
11,210

430u

555u

464u

calc, mnr intbd CHK

11000-11100 CHK (60%): gyshbn-med gy, mot, sl frm, sm chky tex, tab-sb blky ctngs, mnr crm CHK frags, mnr intbd MRLST, hi calc; MRLST (40%): dk gy, med gy, sl sm tex, sb blky-ang ctngs, frm-sl hd, mod calc, mnr intbd CHK

11100-11200 MRLST (60%): dk gy-med gy, mot v dk gy, sb blky-sb ang ctngs, sl hd-frm, tr intbd CHK, mod calc; CHK (40%): med gy-gyshbn, mot, sm chky tex, sb blky ctngs, sl frm, brit, tr MRLST lamn, hi calc

11,220

MD: 11,232'
INC: 92.09°
AZM: 90.94°
TVD: 7,175.98'
VS: 4,002.08'

11,230

11,240

11,250

11,260

11,270

11,280

11,290

11,300

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

MW IN: 10.1
VIS IN: 54
MW OUT: 10.1+
VIS OUT: 49

11,310

11,320

MD: 11,327'
INC: 91.47°
AZM: 90.42°
TVD: 7,173.03'
VS: 4,093.4'

11,330

11,340

11,350

11,360

11,370

11,380

11,390

WOB: 32.3klbs
RPM: 71
SPM: 178
SPP: 5,311psi

11,400

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

11,410

MD: 11,421'
INC: 92.35°
AZM: 89.98°
TVD: 7,169.9'
VS: 4,183.96'

11,420

11,430

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

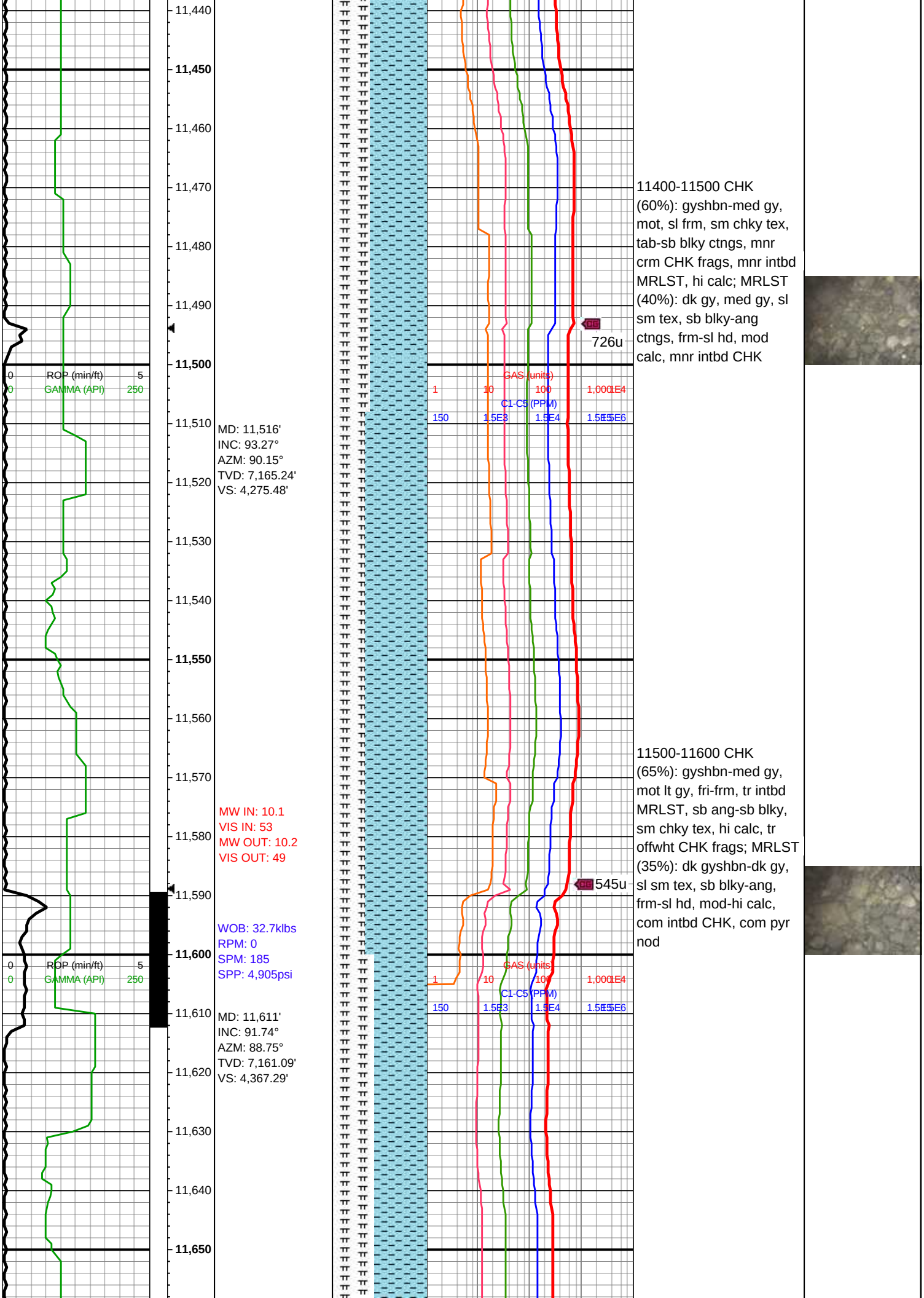
530u

11200-11300 MRLST (60%): dk gy-med gy, mot v dk gy, sb blky-sb ang ctngs, sl hd-frm, tr intbd CHK, mod calc; CHK (40%): med gy-gyshbn, mot, sm chky tex, sb blky ctngs, sl frm, brit, tr MRLST lamn, hi calc

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

675u

11300-11400 MRLST (70%): dk gy-med gy, mot v dk gy, sb blky-sb ang ctngs, sl hd-frm, tr intbd CHK, mod calc; CHK (30%): med gy-gyshbn, mot, sm chky tex, sb blky ctngs, sl frm, brit, tr MRLST lamn, hi calc



MD: 11,516'
INC: 93.27°
AZM: 90.15°
TVD: 7,165.24'
VS: 4,275.48'

MW IN: 10.1
VIS IN: 53
MW OUT: 10.2
VIS OUT: 49

WOB: 32.7klbs
RPM: 0
SPM: 185
SPP: 4,905psi

MD: 11,611'
INC: 91.74°
AZM: 88.75°
TVD: 7,161.09'
VS: 4,367.29'

11400-11500 CHK (60%): gyshbn-med gy, mot, sl frm, sm chky tex, tab-sb blky ctngs, mnr crm CHK frags, mnr intbd MRLST, hi calc; MRLST (40%): dk gy, med gy, sl sm tex, sb blky-ang ctngs, frm-sl hd, mod calc, mnr intbd CHK

11500-11600 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

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
11,830
11,840
11,850
11,860
11,870

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

MD: 11,705'
INC: 90.02°
AZM: 88.13°
TVD: 7,159.64'
VS: 4,458.61'

MW IN: 10.2
VIS IN: 53
MW OUT: 10.2+
VIS OUT: 50

WOB: 30.6klbs
RPM: 71
SPM: 174
SPP: 5,139psi

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

MD: 11,799'
INC: 89.93°
AZM: 87.52°
TVD: 7,159.68'
VS: 4,550.18'

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

405u

11600-11700 CHK (55%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (45%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

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

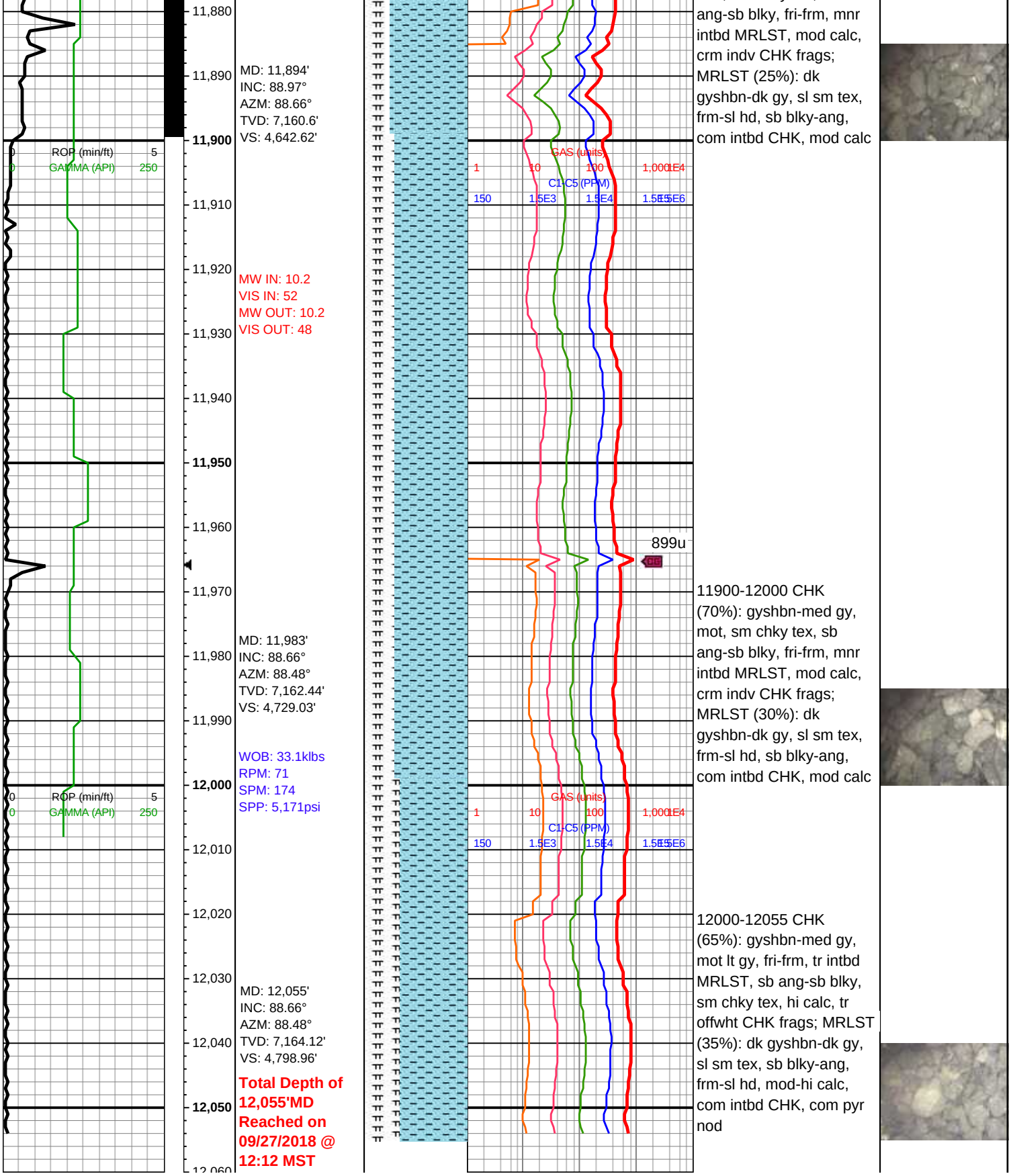
397u

11700-11800 CHK (60%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (40%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod

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

731u

11800-11900 CHK (75%): gyshbn-med gy, mot, sm chky tex, sb


ROP (min/ft) 0 5
GAMMA (API) 0 250
11,880
11,890
11,900
11,910
11,920
11,930
11,940
11,950
11,960
11,970
11,980
11,990
12,000
12,010
12,020
12,030
12,040
12,050
12,060
MD: 11,894'
INC: 88.97°
AZM: 88.66°
TVD: 7,160.6'
VS: 4,642.62'
MW IN: 10.2
VIS IN: 52
MW OUT: 10.2
VIS OUT: 48
MD: 11,983'
INC: 88.66°
AZM: 88.48°
TVD: 7,162.44'
VS: 4,729.03'
WOB: 33.1klbs
RPM: 71
SPM: 174
SPP: 5,171psi
MD: 12,055'
INC: 88.66°
AZM: 88.48°
TVD: 7,164.12'
VS: 4,798.96'
Total Depth of 12,055'MD Reached on 09/27/2018 @ 12:12 MST
GAS (units) 1 10 100 1,000 1E4
C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6
899u
ang-sb blky, fri-frm, mnr intbd MRLST, mod calc, crm indv CHK frags; MRLST (25%): dk gyshbn-dk gy, sl sm tex, frm-sl hd, sb blky-ang, com intbd CHK, mod calc
11900-12000 CHK (70%): gyshbn-med gy, mot, sm chky tex, sb ang-sb blky, fri-frm, mnr intbd MRLST, mod calc, crm indv CHK frags; MRLST (30%): dk gyshbn-dk gy, sl sm tex, frm-sl hd, sb blky-ang, com intbd CHK, mod calc
12000-12055 CHK (65%): gyshbn-med gy, mot lt gy, fri-frm, tr intbd MRLST, sb ang-sb blky, sm chky tex, hi calc, tr offwht CHK frags; MRLST (35%): dk gyshbn-dk gy, sl sm tex, sb blky-ang, frm-sl hd, mod-hi calc, com intbd CHK, com pyr nod