RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name	Lion Creek 23-0164B		
Location	Sec 23 T11N R64W		
State	Colorado	**County**	Weld
Country	U.S.	**Rig Number**	Savanna 802
API Number	05-123-47385	**AFE #**	20240D
Geographic Region	Rockies	**Field**	Hereford
Spud Date	8/1/2018	**Drilling Completed**	TBD
Surface Coordinates	Latitude: 40.912756, Longitude: -104.517319 300 FNL 1320 FWL		
Ground Elevation	5,391.2'	**K.B. Elevation**	5,411.2'
Logged Interval	3,000' **To** 8,237'	**Total Depth**	TBD
Formation	Nio B. Chalk		
Type of Drilling Fluid	Water Based Mud		

Operator

Company HighPoint Resources

Address 1099 18th Street, Suite 2300
Denver, CO 80202

HighPoint
RESOURCES

Geologist

Name Aryn Rowe, Ben Burke

Company HighPoint Resources

Address 1099 18th Street, Suite 2300
Denver, CO 80202

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

Other

Services Provided 2-Man Logging, ISO Tubes/Jars, Mass Spec, AGS

Loggers: Reed Pellicore / Jonathan Saltz

Equipment: ML-597

Address Reservoir Group - Empirica
6360 West Sam Houston Pkwy N
Houston, Texas 77041

Service Start Date: 09/03/2018

Service End Date: TBD

Job #: TBD

Hole Profile

Bore Hole Records

Size	From	To
0.0	0.0	0.0

Casing Records

Size	Wgt	From	To	Test
9.625	-	0	1541	-
7	-	0	8217	-

Rock Types

- UNKNOWN
- ANHYDRITE
- GYPSUM
- SALT
- CHALK
- LIMESTONE
- DOLOMITE
- CHERT
- COAL
- MARLSTONE
- CLAYSTONE
- SHALE
- SHALE GRAY
- SHALE COLORED
- SILTSTONE
- SANDY SILTSTONE
- SANDSTONE
- CONGLOMERATE
- BRECCIA
- TILL
- BENTONITE
- TUFF
- IGNEOUS
- METAMORPHIC
- CEMENT

Accessories

Fossils

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

Minerals

- ANHYDRITIC
- ARGILLACEOUS
- ARGILLITE GRAIN
- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR
- FERRUGINOUS PELLET
- FERRUGINOUS
- GLAUCONITE
- GYPSIFEROUS
- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS
- SILTY
- TUFFACEOUS

Stringer

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

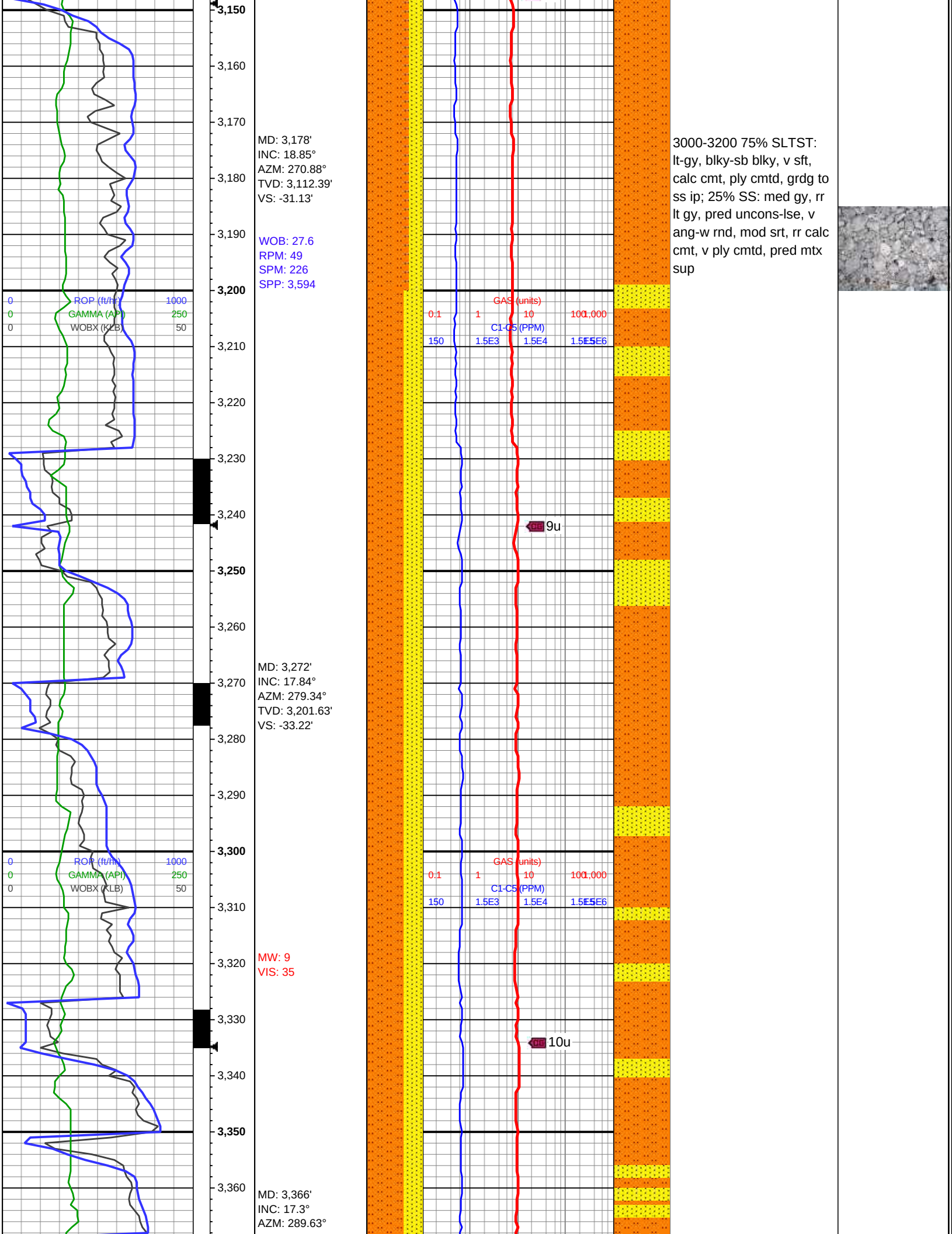
- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- EARTHY
- FINELYXLN
- GRAINSTONE
- LITHOGRAPHIC
- MICROXLN
- MUDSTONE
- PACKSTONE
- WACKESTONE

Sorting

- MODERATE
- POOR
- WELL

ROP / GAMMA / WOBX	Slide/Rotate	Depth Labels	Notes	% Lith	Total Gas (GAS, C1, C2, C3, C4, C5)	Interp Lith	Lithology Descriptions	Images
High Point Resources **Lion Creek 23-0164B** **Weld County, CO** **Spud Date: 09/03/2018** **Surface Casing:** **9.625"** **1,554' MD** **2 Man Logging** **Began on 09/03/2018** **14:46 MST** **All Depths** **Correspond to** **Drillers Pipe Tally** **Loggers Were Rigged Up and Ready on 09/03/2018**		2,960 2,970 2,980 2,990 **3,000** 3,010 3,020 3,030 3,040 **3,050** 3,060 3,070 3,080 3,090 **3,100** 3,110 3,120 3,130 3,140	Bit #: 2 Type: U611S Size: 8 3/4" Depth In: 1,554' Depth Out: 8,237' Hours: 23.2 hrs Avg Ft/Hr: 288.06 '/hr Jets: 6x15 S/N: 23842 MD: 2,991' INC: 20.25° AZM: 266.18° TVD: 2,935.99' VS: -33.33' WOB: 11.2 RPM: 49 SPM: 226 SPP: 3,483 MD: 3,085' INC: 19.2° AZM: 269.4° TVD: 3,024.47' VS: -31.56' MW: 9.1 VIS: 37		**Yellow Box: ML-597 Gas, ROP & WOBX** **SYSTEM CALIBRATED** **1% Methane = 100 units** **100% Methane = 10000 units** GAS (units) 0.1 1 10 100 1,000 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6 7u GAS (units) 0.1 1 10 100 1,000 C1-C5 (PPM) 150 1.5E3 1.5E4 1.5E5 1.5E6 8u			

ROP (ft/hr) 0 – 1000
GAMMA (API) 0 – 250
WOBX (KLB) 0 – 50


3,150
3,160
3,170
3,180
3,190
3,200
3,210
3,220
3,230
3,240
3,250
3,260
3,270
3,280
3,290
3,300
3,310
3,320
3,330
3,340
3,350
3,360
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
MD: 3,178'
INC: 18.85°
AZM: 270.88°
TVD: 3,112.39'
VS: -31.13'
WOB: 27.6
RPM: 49
SPM: 226
SPP: 3,594
9u
MD: 3,272'
INC: 17.84°
AZM: 279.34°
TVD: 3,201.63'
VS: -33.22'
MW: 9
VIS: 35
10u
MD: 3,366'
INC: 17.3°
AZM: 289.63°
3000-3200 75% SLTST: lt-gy, blky-sb blky, v sft, calc cmt, ply cmtd, grdg to ss ip; 25% SS: med gy, rr lt gy, pred uncons-lse, v ang-w rnd, mod srt, rr calc cmt, v ply cmtd, pred mtx sup

TVD: 3,291.27'
VS: -39.8'

WOB: 33.3
RPM: 49
SPM: 226
SPP: 4,000

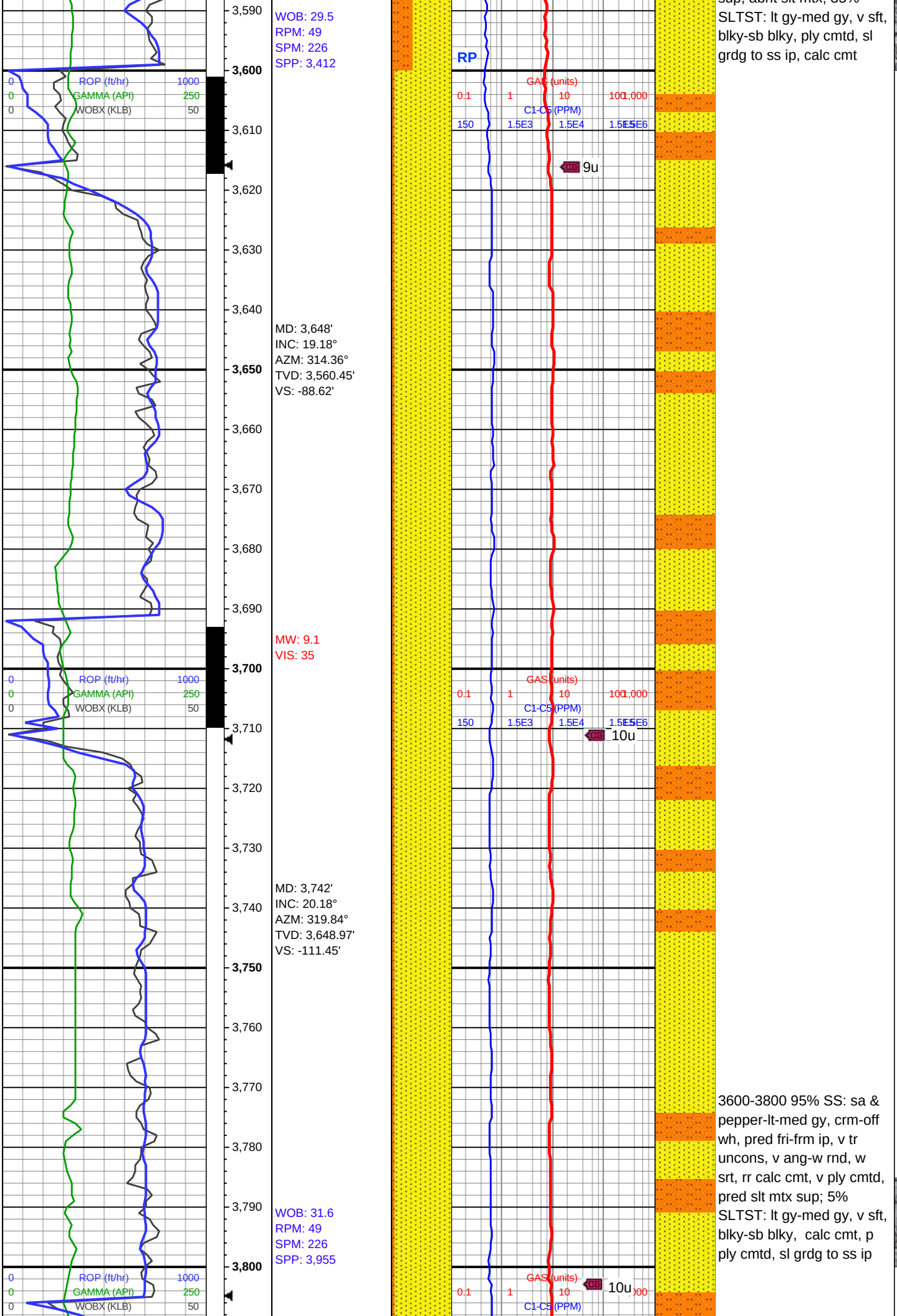
MD: 3,459'
INC: 16.47°
AZM: 305.94°
TVD: 3,380.31'
VS: -51.8'

MW: 9.1
VIS: 35

MD: 3,553'
INC: 17.37°
AZM: 311.78°
TVD: 3,470.25'
VS: -68.62'

3200-3400 65% SLTST: predy lt-gy, v sft, blky-sb blky, calc cmt, ply cmtd, grdg to ss ip; 35% SS: predy med gy, rr lt gy, pred uncons-lse, v tr fri, v ang-w rnd, mod srt, rr calc cmt, v ply cmtd, pred mtx sup, abnt slt mtx

3400-3600 65% SS: lt-med gy, uncons, v ang-w rnd, w srt, rr calc cmt, v ply cmtd, pred mtx sup, abnt slt mtx; 35%


3,590
3,600
3,610
3,620
3,630
3,640
3,650
3,660
3,670
3,680
3,690
3,700
3,710
3,720
3,730
3,740
3,750
3,760
3,770
3,780
3,790
3,800
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
WOB: 29.5
RPM: 49
SPM: 226
SPP: 3,412
MD: 3,648'
INC: 19.18°
AZM: 314.36°
TVD: 3,560.45'
VS: -88.62'
MW: 9.1
VIS: 35
MD: 3,742'
INC: 20.18°
AZM: 319.84°
TVD: 3,648.97'
VS: -111.45'
WOB: 31.6
RPM: 49
SPM: 226
SPP: 3,955
RP
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
9u
10u
10u
SLTST: lt gy-med gy, v sft, blky-sb blky, ply cmtd, sl grdg to ss ip, calc cmt
3600-3800 95% SS: sa & pepper-lt-med gy, crm-off wh, pred fri-frm ip, v tr uncons, v ang-w rnd, w srt, rr calc cmt, v ply cmtd, pred slt mtx sup; 5% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd, sl grdg to ss ip

3,810
3,820
3,830
MD: 3,836'
INC: 20.68°
AZM: 320.3°
TVD: 3,737.05'
VS: -136.26'
3,840
3,850
3,860
3,870
MW: 9.25
VIS: 38
3,880
3,890
3,900
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
3,910
3,920
MD: 3,931'
INC: 21.47°
AZM: 324.39°
TVD: 3,825.7'
VS: -162.96'
3,930
3,940
3,950
3,960
3,970
3,980
WOB: 27
RPM: 50
SPM: 226
SPP: 3,890
3,990
4,000
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
4,010
4,020
MD: 4,025'
INC: 22.31°
AZM: 323.06°
TVD: 3,912.93'
150 1.5E3 1.5E4 1.5E5 1.5E6
9u
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
10u
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
3800-4000 95% SS: sa & pepper-lt-med gy, crm-off wh, pred fri-frm ip, v tr uncons, v ang-w rnd, w srt, rr calc cmt, v ply cmtd, pred slt mtx sup; 5% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd, sl grdg to ss ip


VS: -190.86'

MW: 9.25
VIS: 38

9u

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

MD: 4,119'
INC: 23.33°
AZM: 322.32°
TVD: 3,999.57'
VS: -219.48'

9u

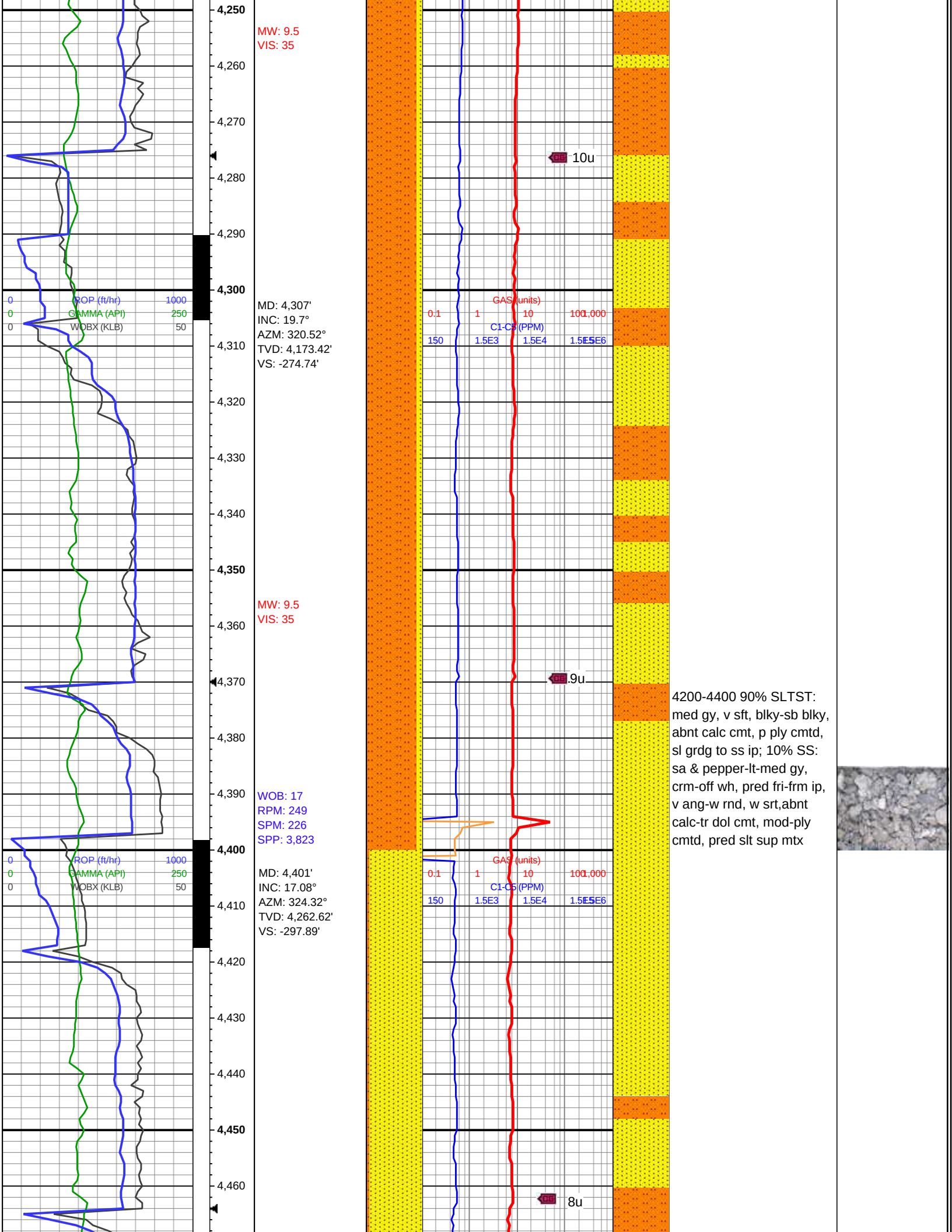
4000-4200 80% SLTST: lt gy-med gy, v sft, blky-sb blky, abnt calc cmt, p ply cmtd, sl grdg to ss ip; 20% SS: sa & pepper-lt-med gy, crm-off wh, pred fri-frm ip, v ang-w rnd, w srt,abnt calc-tr dol cmt, mod-ply cmtd, pred slt sup mtx;

WOB: 37
RPM: 50
SPM: 226
SPP: 4,353

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

MD: 4,213'
INC: 23.16°
AZM: 321.72°
TVD: 4,085.94'
VS: -248.35'


4,250
4,260
4,270
4,280
4,290
4,300
4,310
4,320
4,330
4,340
4,350
4,360
4,370
4,380
4,390
4,400
4,410
4,420
4,430
4,440
4,450
4,460
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
MW: 9.5
VIS: 35
MD: 4,307'
INC: 19.7°
AZM: 320.52°
TVD: 4,173.42'
VS: -274.74'
GAS (units)
0.1 1 10 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
10u
MW: 9.5
VIS: 35
9u
WOB: 17
RPM: 249
SPM: 226
SPP: 3,823
MD: 4,401'
INC: 17.08°
AZM: 324.32°
TVD: 4,262.62'
VS: -297.89'
8u
4200-4400 90% SLTST: med gy, v sft, blky-sb blky, abnt calc cmt, p ply cmtd, sl grdg to ss ip; 10% SS: sa & pepper-lt-med gy, crm-off wh, pred fri-frm ip, v ang-w rnd, w srt,abnt calc-tr dol cmt, mod-ply cmtd, pred slt sup mtx

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

4,470
4,480
4,490
4,500
4,510
4,520
4,530
4,540
4,550
4,560
4,570
4,580
4,590
4,600
4,610
4,620
4,630
4,640
4,650
4,660
4,670
4,680

MD: 4,495'
INC: 15.18°
AZM: 327.75°
TVD: 4,352.92'
VS: -319.27'

MW: 9.45
VIS: 36

Parkman
4,572'MD/4,427'TVD

MD: 4,589'
INC: 14.36°
AZM: 326.11°
TVD: 4,443.81'
VS: -339.14'

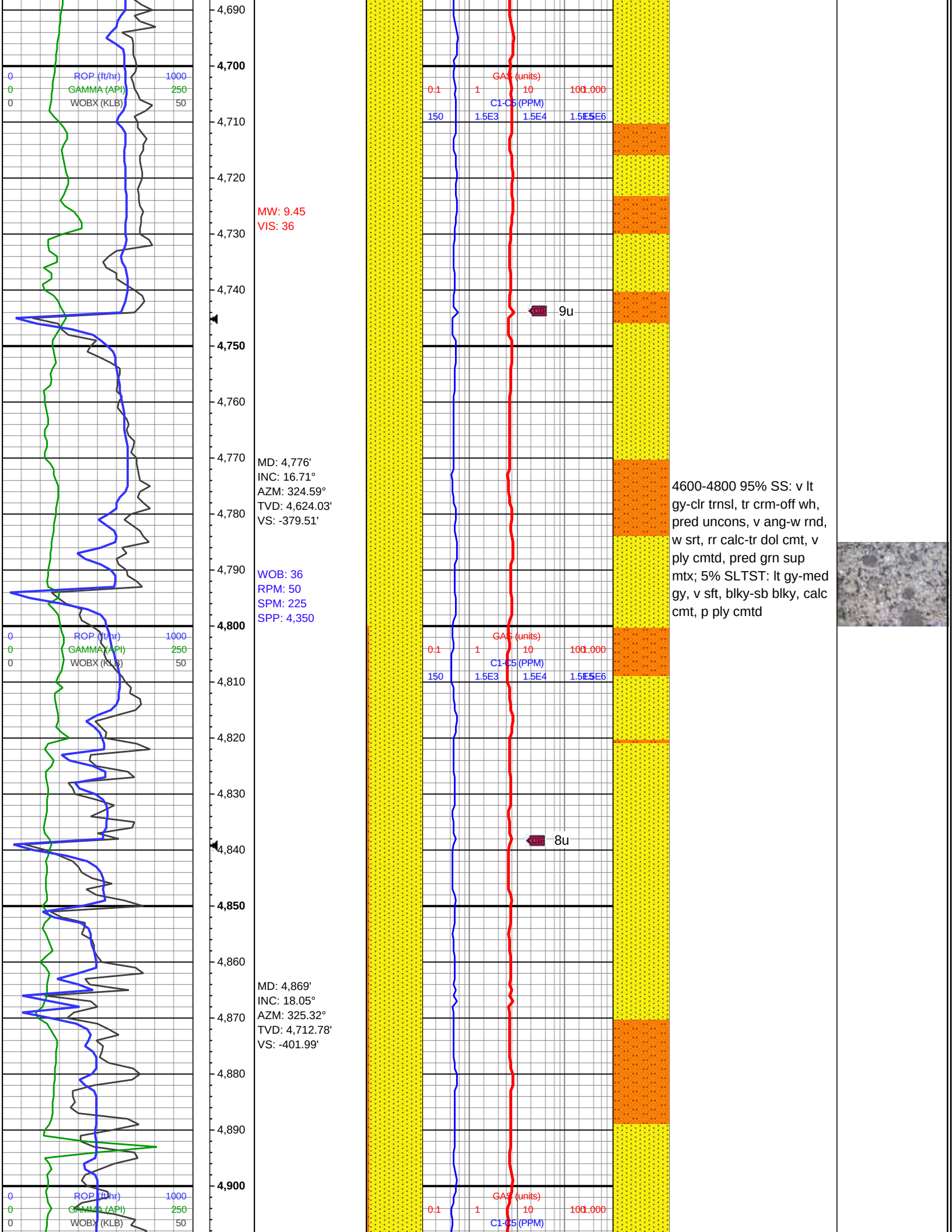
WOB: 30
RPM: 50
SPM: 226
SPP: 4,299

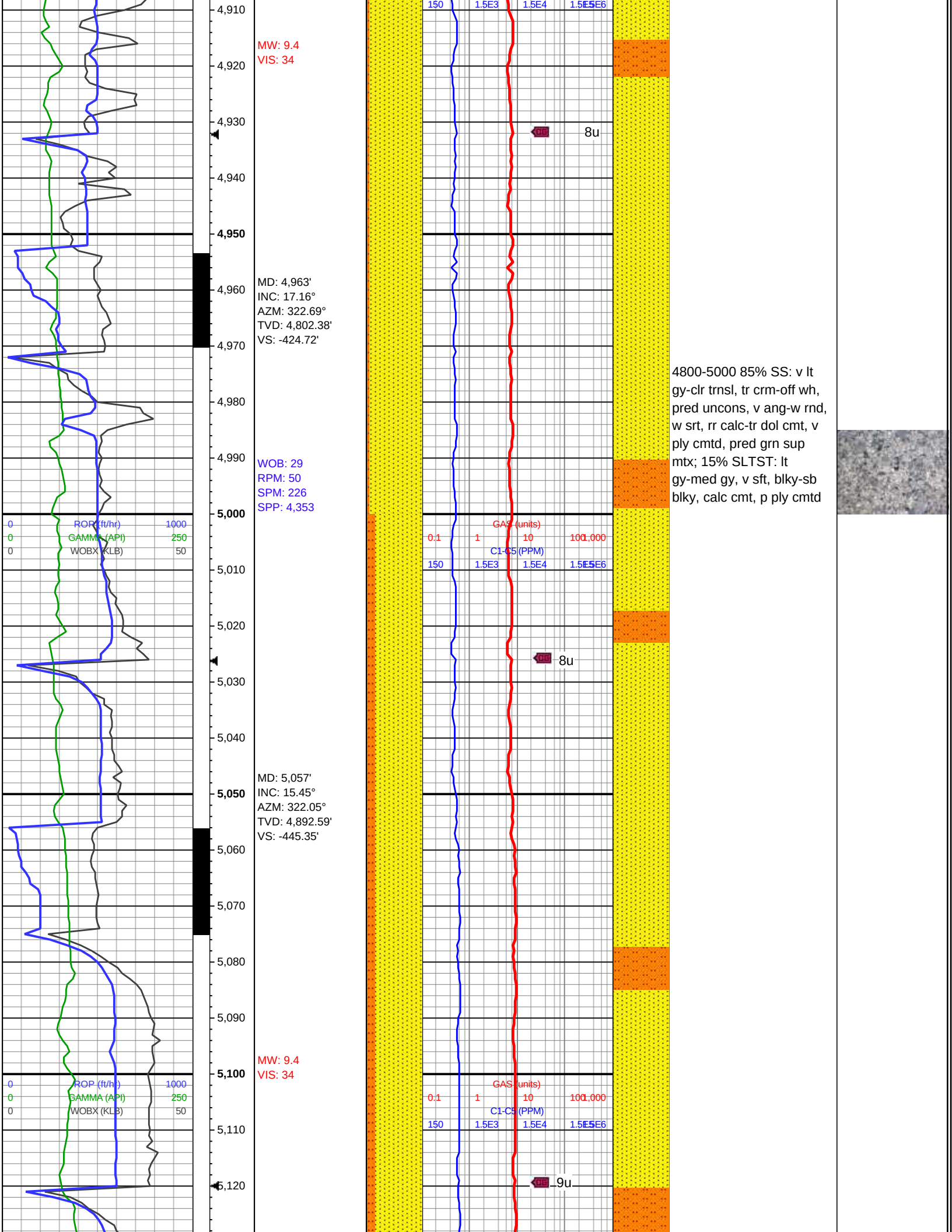
MD: 4,682'
INC: 15.39°
AZM: 324.72°
TVD: 4,533.69'
VS: -358.57'

GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

8u

4400-4600 95% SS: v lt gy-clr trnsl, tr crm-off wh, pred uncons, v ang-w rnd, w srt, rr calc-tr dol cmt, v ply cmtd, pred grn sup mtx; 5% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd


0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
4,690
4,700
4,710
4,720
4,730
4,740
4,750
4,760
4,770
4,780
4,790
4,800
4,810
4,820
4,830
4,840
4,850
4,860
4,870
4,880
4,890
4,900
GAS (units)
0.1 1 10 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
9u
8u
MW: 9.45
VIS: 36
MD: 4,776'
INC: 16.71°
AZM: 324.59°
TVD: 4,624.03'
VS: -379.51'
WOB: 36
RPM: 50
SPM: 225
SPP: 4,350
MD: 4,869'
INC: 18.05°
AZM: 325.32°
TVD: 4,712.78'
VS: -401.99'
4600-4800 95% SS: v lt gy-clr trnsl, tr crm-off wh, pred uncons, v ang-w rnd, w srt, rr calc-tr dol cmt, v ply cmtd, pred grn sup mtx; 5% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd


4,910
4,920
4,930
4,940
4,950
4,960
4,970
4,980
4,990
5,000
5,010
5,020
5,030
5,040
5,050
5,060
5,070
5,080
5,090
5,100
5,110
5,120
MW: 9.4
VIS: 34
MD: 4,963'
INC: 17.16°
AZM: 322.69°
TVD: 4,802.38'
VS: -424.72'
WOB: 29
RPM: 50
SPM: 226
SPP: 4,353
MD: 5,057'
INC: 15.45°
AZM: 322.05°
TVD: 4,892.59'
VS: -445.35'
MW: 9.4
VIS: 34
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
150 1.5E3 1.5E4 1.5E5 1.5E6
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
8u
8u
9u
4800-5000 85% SS: v lt gy-clr trnsl, tr crm-off wh, pred uncons, v ang-w rnd, w srt, rr calc-tr dol cmt, v ply cmtd, pred grn sup mtx; 15% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd

5,130
5,140
5,150
5,160
5,170
5,180
5,190
5,200
5,210
5,220
5,230
5,240
5,250
5,260
5,270
5,280
5,290
5,300
5,310
5,320
5,330
5,340

MD: 5,150'
INC: 14.69°
AZM: 324.07°
TVD: 4,982.39'
VS: -464.43'

WOB: 27
RPM: 49
SPM: 224
SPP: 4,675

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

9u

MD: 5,244'
INC: 15.23°
AZM: 324.2°
TVD: 5,073.21'
VS: -483.86'

MW: 9.4
VIS: 34

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

10u

MD: 5,338'
INC: 14.19°
AZM: 323.28°
TVD: 5,164.13'
VS: -502.87'

5000-5200 85% SS: v lt gy-clr trnsl, tr crm-off wh, pred uncons, v ang-w rnd, w srt, rr calc-tr dol cmt, v ply cmtd, pred grn sup mtx; 15% SLTST: lt gy-med gy, v sft, blky-sb blky, calc cmt, p ply cmtd

5,350

MNDEPT 09/04/2018

5,360

5,370

5,380

5,390

WOB: 37
RPM: 50
SPM: 226
SPP: 4,734

5,400

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

5,410

5,420

MD: 5,431'
INC: 10.97°
AZM: 325.64°
TVD: 5,254.88'
VS: -519.12'

5,430

5,440

5,450

5,460

5,470

MW: 9.4
VIS: 34

5,480

5,490

5,500

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

5,510

5,520

MD: 5,526'
INC: 11.28°
AZM: 325.63°
TVD: 5,348.1'
VS: -534.07'

5,530

5,540

5,550

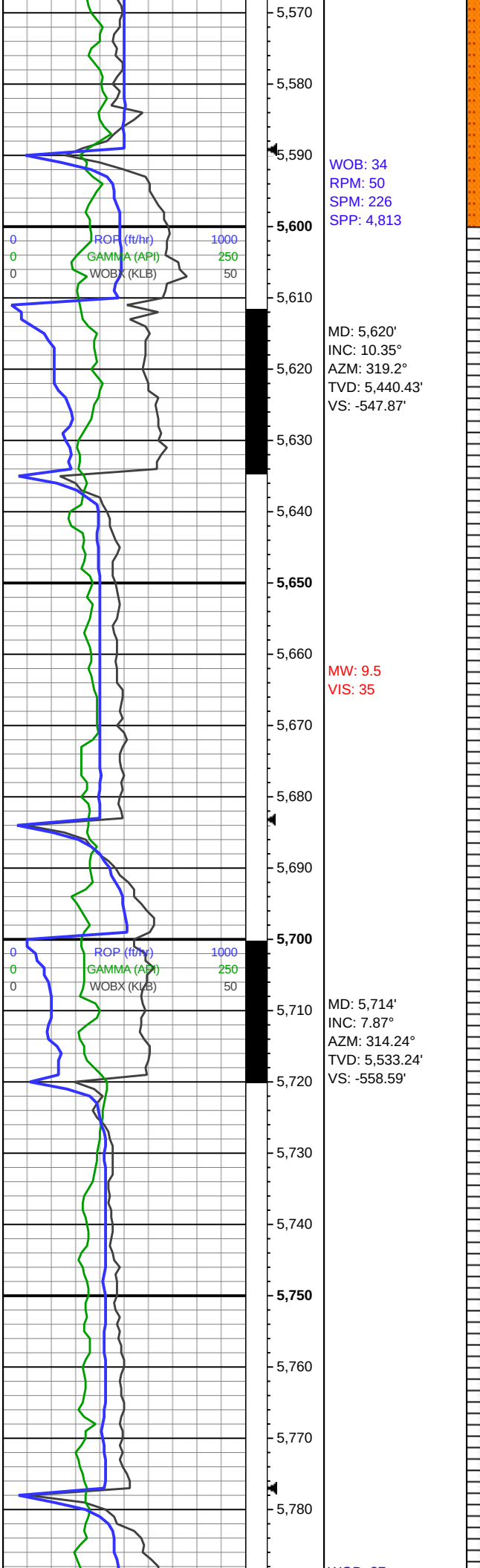
5,560

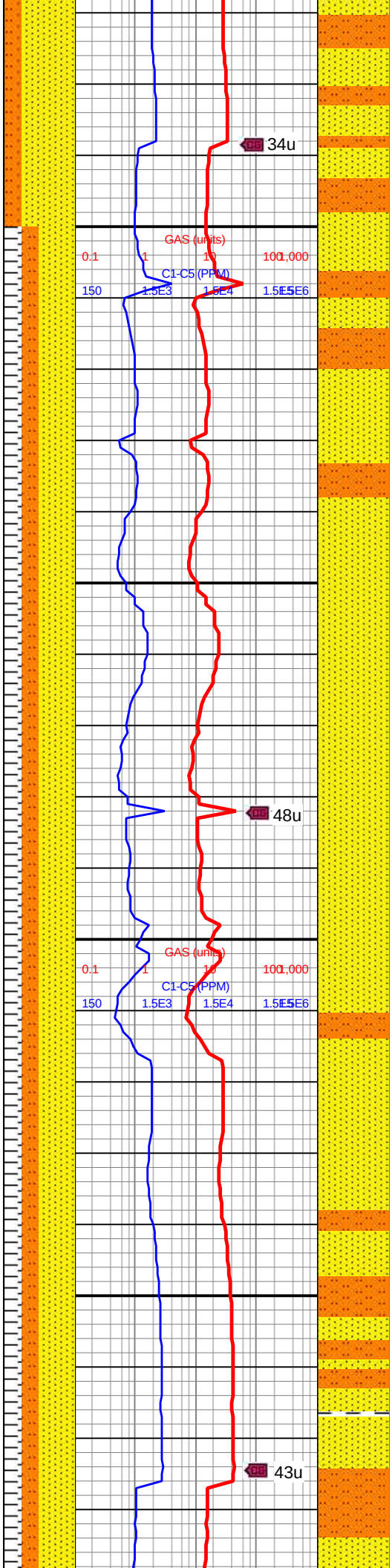
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

9u

10u

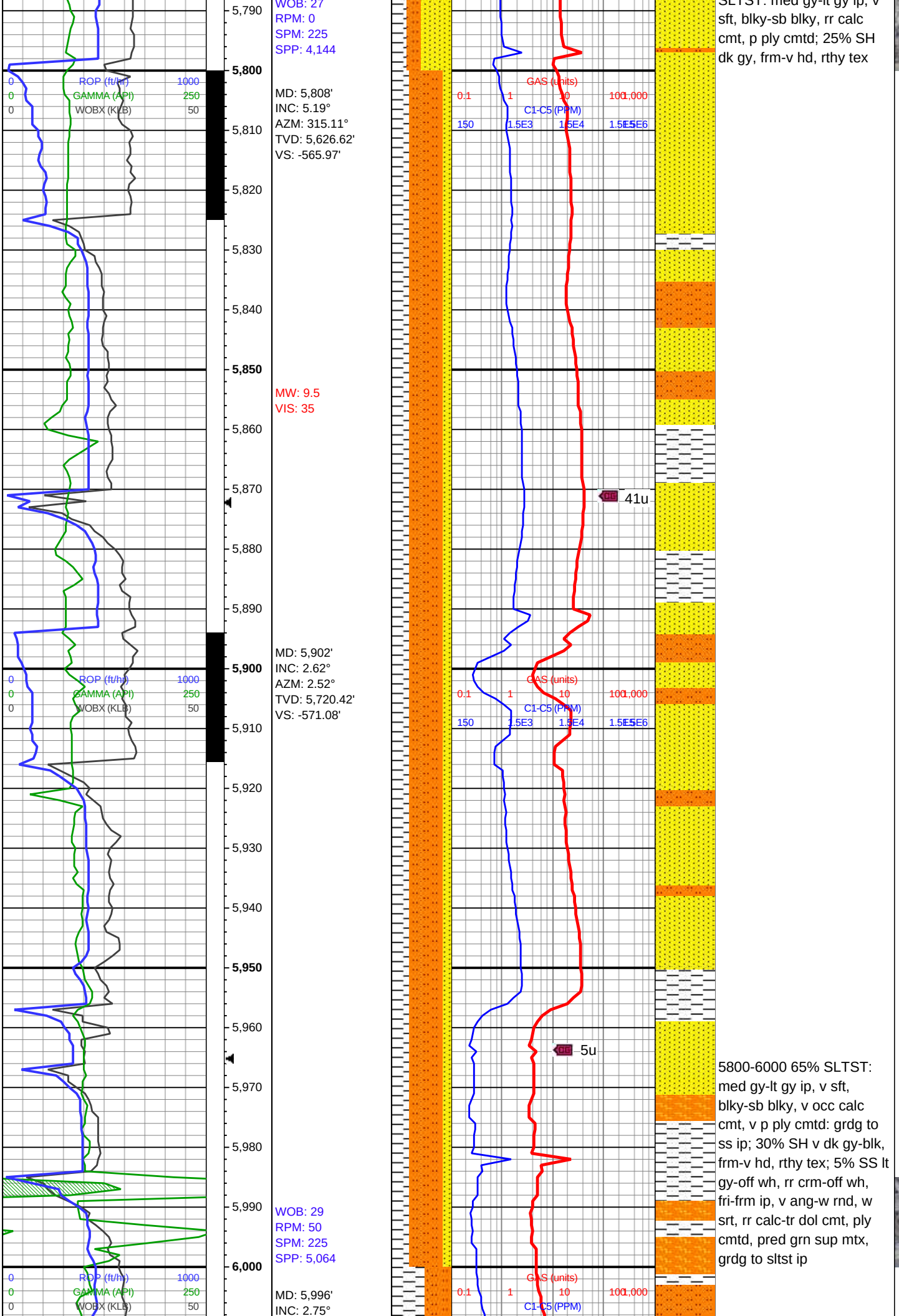
5200-5400 60% SS lt gy-off wh, rr crm-off wh, fri-frm ip, v ang-w rnd, w srt, rr calc-tr dol cmt, ply cmtd, pred mud sup mtx; 40% SLTST: med gy-lt gy ip, v sft, blky-sb blky, calc cmt, p ply cmtd





5400-5600 75% SS lt gy-off wh, rr crm-off wh, fri-frm ip, v ang-w rnd, w srt, rr calc-tr dol cmt, ply cmtd, pred grn sup mtx, grdg to sltst ip; 25% SLTST: med gy-lt gy ip, v sft, blky-sb blky, calc cmt, p ply cmtd

5600-5800 55% SS lt gy-off wh, rr crm-off wh, fri-frm ip, v ang-w rnd, w srt, rr calc-tr dol cmt, ply cmtd, pred grn sup mtx, grdg to sltst ip; 25% SLTST: med gy-lt gy ip, v



SLTST: med gy-lt gy ip, v sft, blky-sb blky, rr calc cmt, p ply cmtd; 25% SH dk gy, frm-v hd, rthy tex

5800-6000 65% SLTST: med gy-lt gy ip, v sft, blky-sb blky, v occ calc cmt, v p ply cmtd: grdg to ss ip; 30% SH v dk gy-blk, frm-v hd, rthy tex; 5% SS lt gy-off wh, rr crm-off wh, fri-frm ip, v ang-w rnd, w srt, rr calc-tr dol cmt, ply cmtd, pred grn sup mtx, grdg to sltst ip

AZM: 37.06°
TVD: 5,814.32'
VS: -575.05'

MW: 9.5
VIS: 35

MD: 6,090'
INC: 2.06°
AZM: 352.8°
TVD: 5,908.24'
VS: -578.55'

MD: 6,184'
INC: 1.99°
AZM: 331.47°
TVD: 6,002.19'
VS: -581.65'

WOB: 21
RPM: 50
SPM: 226
SPP: 4,856

6,010
6,020
6,030
6,040
6,050
6,060
6,070
6,080
6,090
6,100
6,110
6,120
6,130
6,140
6,150
6,160
6,170
6,180
6,190
6,200
6,210
6,220

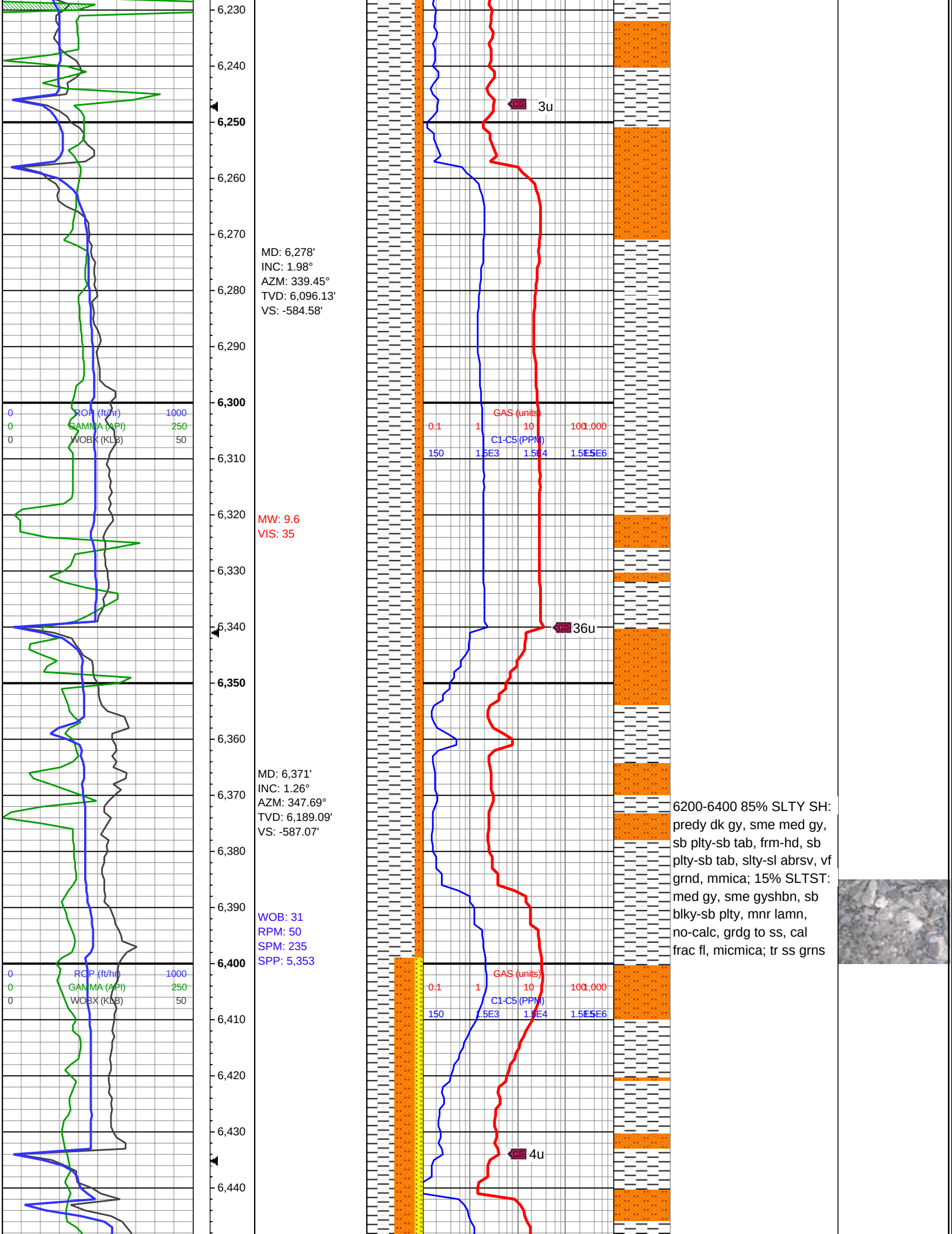
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

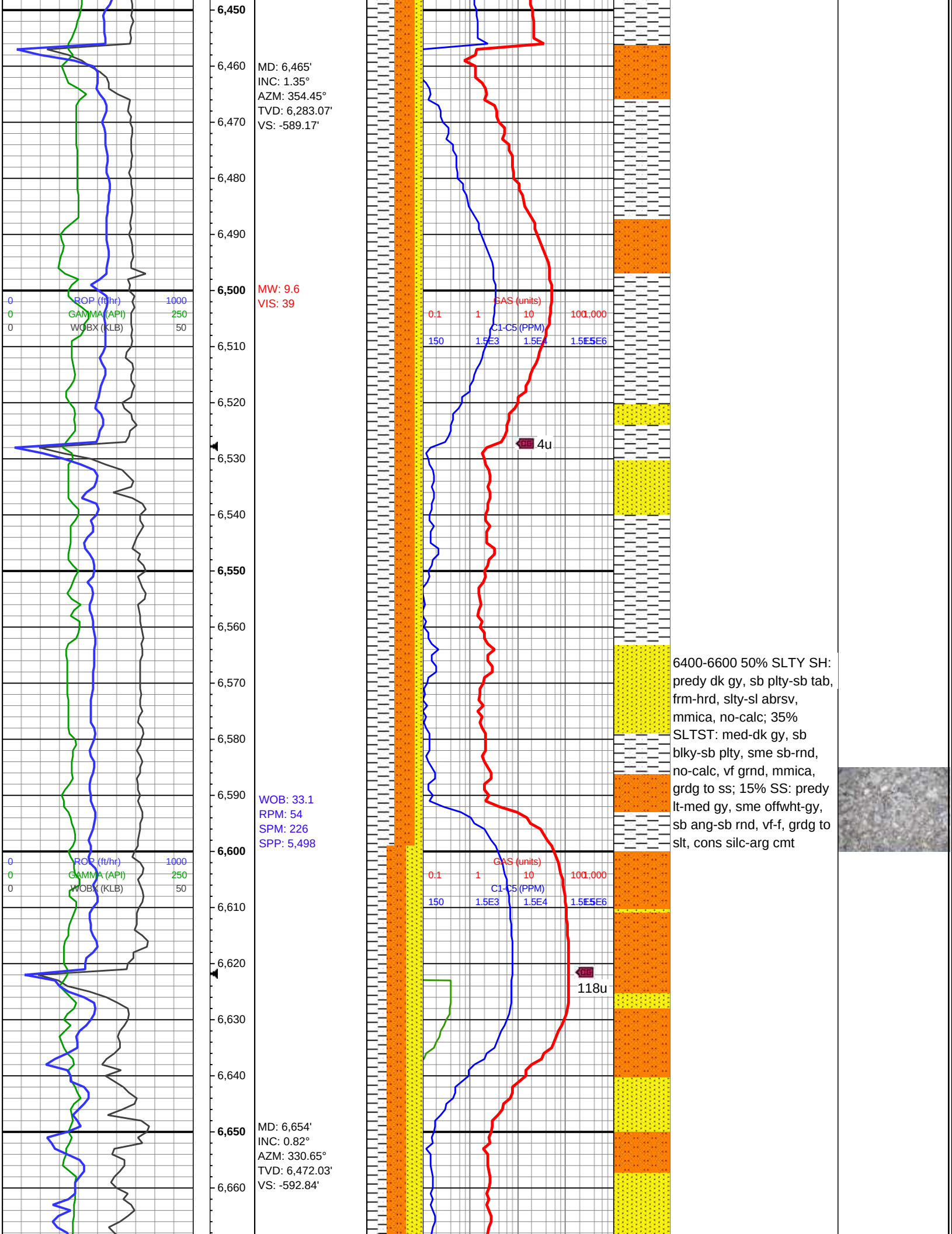
GAS (units)
0.1 1 10 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6

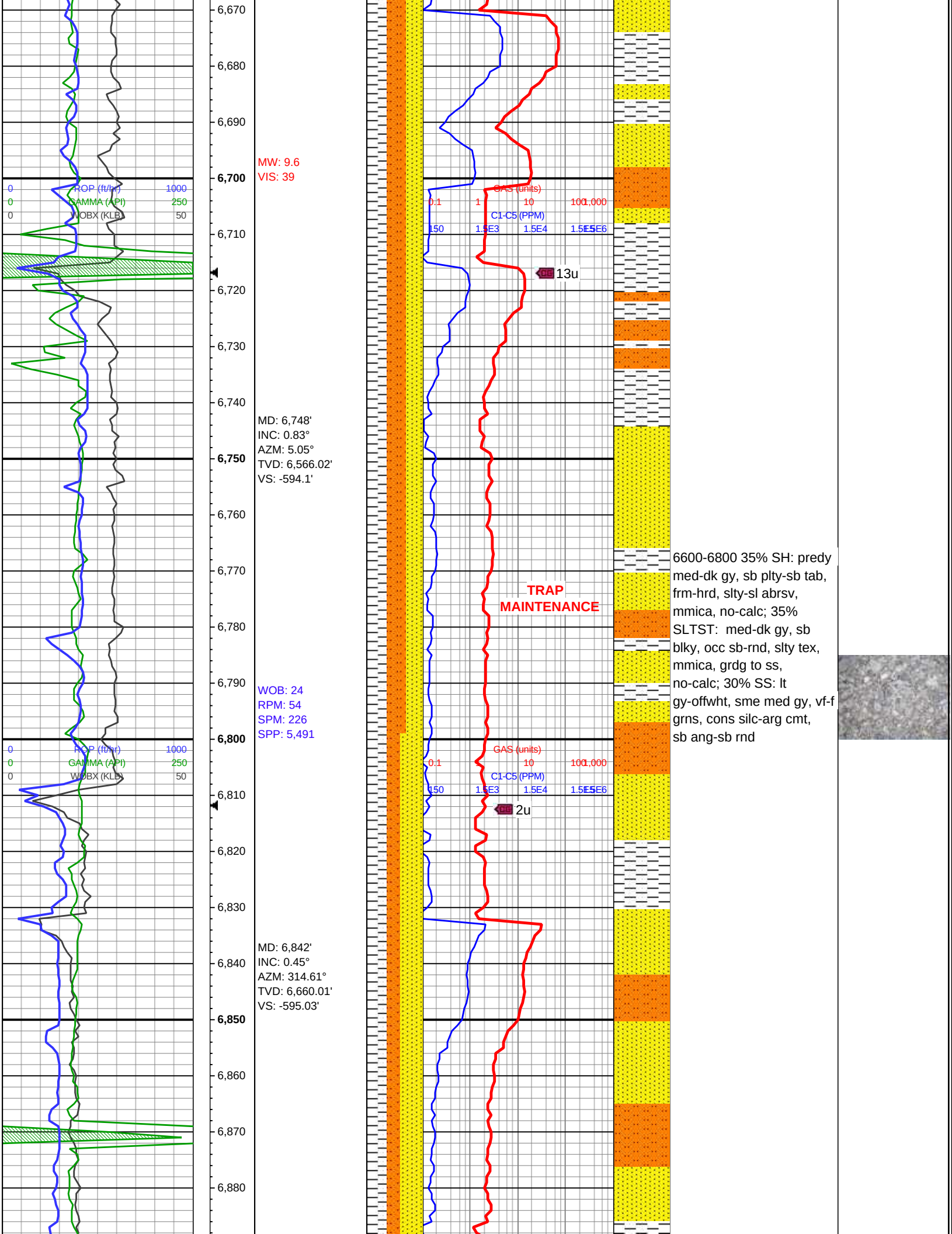
15u

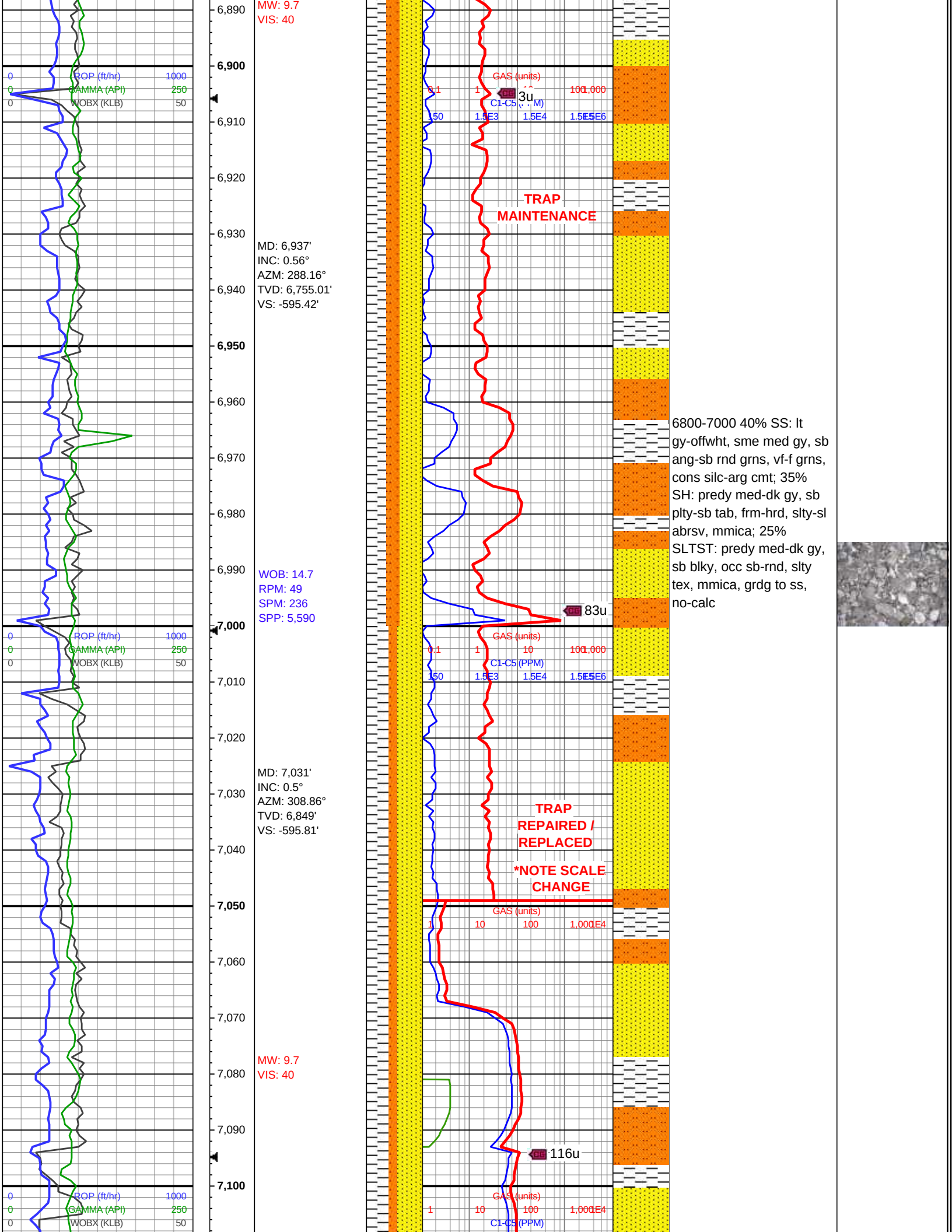
16u

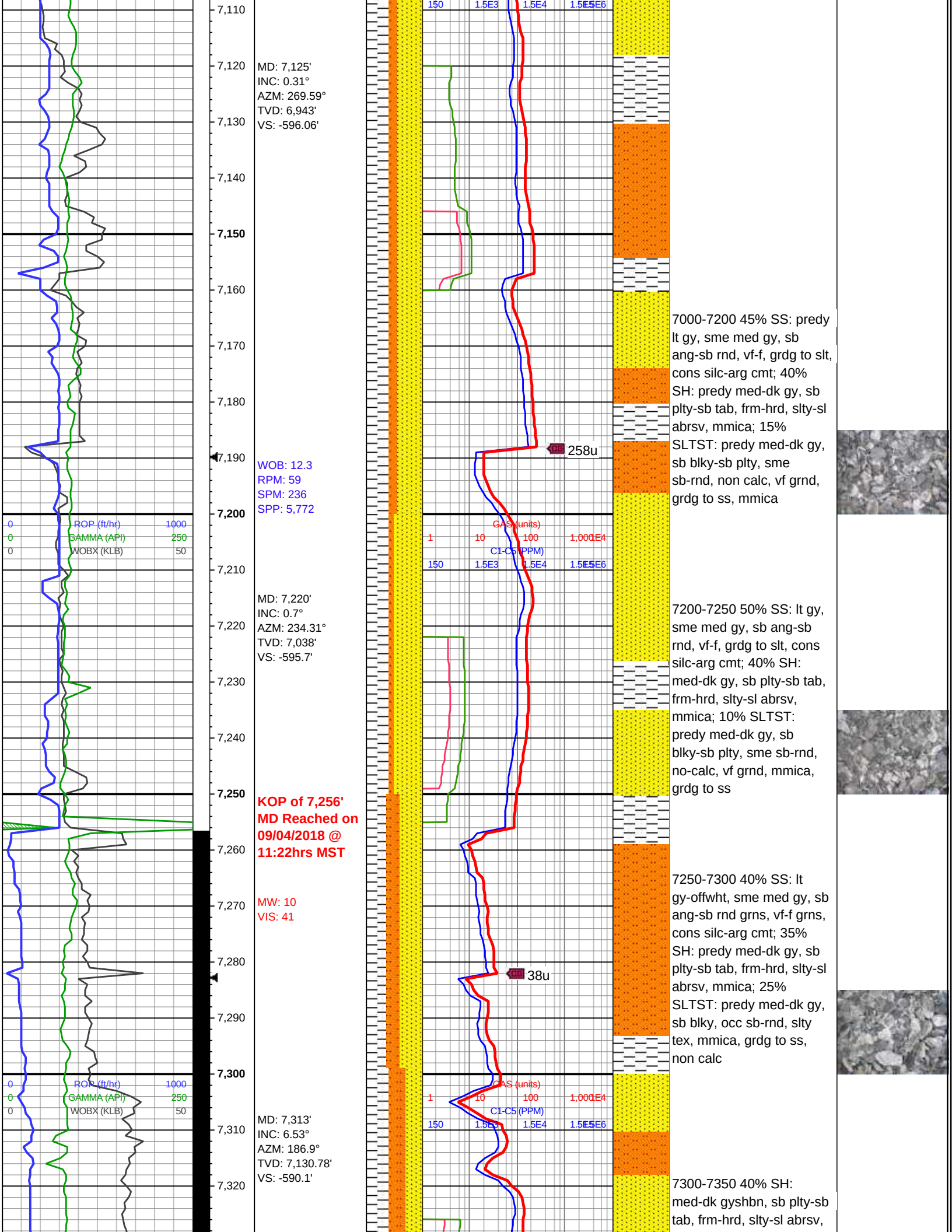
6000-6200 70% SH v dk gy-blk, frm-v hd, rthy tex; 30% SLTST: med gy-lt gy ip, v sft, blky-sb blky, rr calc cmt, v p ply cmtd: grdg to ss ip


6,230
6,240
6,250
6,260
6,270
6,280
6,290
6,300
6,310
6,320
6,330
6,340
6,350
6,360
6,370
6,380
6,390
6,400
6,410
6,420
6,430
6,440
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
3u
36u
4u
MD: 6,278'
INC: 1.98°
AZM: 339.45°
TVD: 6,096.13'
VS: -584.58'
MW: 9.6
VIS: 35
MD: 6,371'
INC: 1.26°
AZM: 347.69°
TVD: 6,189.09'
VS: -587.07'
WOB: 31
RPM: 50
SPM: 235
SPP: 5,353
6200-6400 85% SLTY SH: predy dk gy, sme med gy, sb plty-sb tab, frm-hd, sb plty-sb tab, slty-sl abrsv, vf grnd, mmica; 15% SLTST: med gy, sme gyshbn, sb blky-sb plty, mnr lamn, no-calc, grdg to ss, cal frac fl, micmica; tr ss grns


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
6,600
6,610
6,620
6,630
6,640
6,650
6,660
MD: 6,465'
INC: 1.35°
AZM: 354.45°
TVD: 6,283.07'
VS: -589.17'
MW: 9.6
VIS: 39
WOB: 33.1
RPM: 54
SPM: 226
SPP: 5,498
MD: 6,654'
INC: 0.82°
AZM: 330.65°
TVD: 6,472.03'
VS: -592.84'
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
4u
118u
6400-6600 50% SLTY SH: predy dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica, no-calc; 35% SLTST: med-dk gy, sb blky-sb plty, sme sb-rnd, no-calc, vf grnd, mmica, grdg to ss; 15% SS: predy lt-med gy, sme offwht-gy, sb ang-sb rnd, vf-f, grdg to slt, cons silc-arg cmt


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
6,820
6,830
6,840
6,850
6,860
6,870
6,880
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
MW: 9.6
VIS: 39
MD: 6,748'
INC: 0.83°
AZM: 5.05°
TVD: 6,566.02'
VS: -594.1'
WOB: 24
RPM: 54
SPM: 226
SPP: 5,491
MD: 6,842'
INC: 0.45°
AZM: 314.61°
TVD: 6,660.01'
VS: -595.03'
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
13u
2u
TRAP
MAINTENANCE
6600-6800 35% SH: predy med-dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica, no-calc; 35% SLTST: med-dk gy, sb blky, occ sb-rnd, slty tex, mmica, grdg to ss, no-calc; 30% SS: lt gy-offwht, sme med gy, vf-f grns, cons silc-arg cmt, sb ang-sb rnd


MW: 9.7
VIS: 40
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
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
7,040
7,050
7,060
7,070
7,080
7,090
7,100
GAS (units)
0.1 1 10 100 1,000
C1-C5 (PPM)
150 1.5E3 1.5E4 1.5E5 1.5E6
3u
TRAP MAINTENANCE
MD: 6,937'
INC: 0.56°
AZM: 288.16°
TVD: 6,755.01'
VS: -595.42'
WOB: 14.7
RPM: 49
SPM: 236
SPP: 5,590
83u
MD: 7,031'
INC: 0.5°
AZM: 308.86°
TVD: 6,849'
VS: -595.81'
TRAP REPAIRED / REPLACED
*NOTE SCALE CHANGE
1 10 100 1,000 1E4
MW: 9.7
VIS: 40
116u
6800-7000 40% SS: lt gy-offwht, sme med gy, sb ang-sb rnd grns, vf-f grns, cons silc-arg cmt; 35% SH: predy med-dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 25% SLTST: predy med-dk gy, sb blky, occ sb-rnd, slty tex, mmica, grdg to ss, no-calc


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
7,260
7,270
7,280
7,290
7,300
7,310
7,320
0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50
MD: 7,125'
INC: 0.31°
AZM: 269.59°
TVD: 6,943'
VS: -596.06'
WOB: 12.3
RPM: 59
SPM: 236
SPP: 5,772
MD: 7,220'
INC: 0.7°
AZM: 234.31°
TVD: 7,038'
VS: -595.7'
KOP of 7,256'
MD Reached on
09/04/2018 @
11:22hrs MST
MW: 10
VIS: 41
MD: 7,313'
INC: 6.53°
AZM: 186.9°
TVD: 7,130.78'
VS: -590.1'
150 1.5E3 1.5E4 1.5E5 1.5E6
258u
GAS (units)
1 10 100 1,000 1E4
C1-C5 (PPM)
38u
7000-7200 45% SS: predy lt gy, sme med gy, sb ang-sb rnd, vf-f, grdg to slt, cons silc-arg cmt; 40% SH: predy med-dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 15% SLTST: predy med-dk gy, sb blky-sb plty, sme sb-rnd, non calc, vf grnd, grdg to ss, mmica
7200-7250 50% SS: lt gy, sme med gy, sb ang-sb rnd, vf-f, grdg to slt, cons silc-arg cmt; 40% SH: med-dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 10% SLTST: predy med-dk gy, sb blky-sb plty, sme sb-rnd, no-calc, vf grnd, mmica, grdg to ss
7250-7300 40% SS: lt gy-offwht, sme med gy, sb ang-sb rnd grns, vf-f grns, cons silc-arg cmt; 35% SH: predy med-dk gy, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 25% SLTST: predy med-dk gy, sb blky, occ sb-rnd, slty tex, mmica, grdg to ss, non calc
7300-7350 40% SH: med-dk gyshbn, sb plty-sb tab, frm-hrd, slty-sl abrsv,

mmica; 30% SS: lt gy-offwht, sme med gy, sb ang-sb rnd grns, vf-f grns, cons silc-arg cmt; 30% SLTST: predy med-dk gy, sb blky, occ sb-rnd, tr intbd mmica, slty tex

7350-7400 50% SH: dk-med gyshbn, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 35% SLTST: predy med-dk gy, frm-fri, sb blky, occ sb-rnd, slty tex, tr intbd mmica, grdg to ss; 15% SS: lt gy-offwht, sme med gy, sb ang-sb rnd grns, vf-f grns, cons silc-arg cmt, no-calc

7400-7450 60% SH: predy dk-med gyshbn, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 30% SLTST: med-dk gy, frm-fri, sb blky, tr sb-rnd, slty tex, grdg to ss, no-calc; 10% SS: lt gy, scat offwht-med gy, sb ang, vf-f cons grns in silc-arg cmt mtx

7450-7500 70% SH: dk-med gyshbn, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica, grdg to sltst; 30% SLTST: med-dk gy, frm-fri, sb blky, tr sb-rnd, slty tex, non calc; tr SS

7500-7550 60% SH: dk-med gyshbn, sb plty-sb tab, frm-hrd, slty-sl abrsv, mmica; 30% SLTST: med-dk gy, frm-fri, sb blky, tr sb-rnd, slty tex, grdg to ss, non calc; 10% SS: lt gy, scat offwht-med gy, sb ang, silc-arg cmt mtx, vf-f cons grns

7,330
7,340
7,350
MW: 9.9
VIS: 39
7,360
7,370
7,380
WOB: 29.3
RPM: 0
SPM: 236
SPP: 5,364
7,390
7,400
MD: 7,407'
INC: 14.39°
AZM: 171.83°
TVD: 7,223.16'
VS: -573.22'
7,410
7,420
7,430
7,440
7,450
MW: 9.9
VIS: 37
7,460
7,470
7,480
7,490
MD: 7,501'
INC: 18.19°
AZM: 183.63°
TVD: 7,313.4'
VS: -547.01'
7,500
7,510
7,520
7,530
MD: 7,533'
INC: 21.44°
AZM: 187.12°
TVD: 7,343.5'
VS: -536.21'
7,540

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

68u
175u

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

MW: 9.9
VIS: 37

WOB: 21.7
RPM: 0
SPM: 235
SPP: 5,003

MD: 7,596'
INC: 26.75°
AZM: 191.04°
TVD: 7,400.99'
VS: -510.78'

MW: 10
VIS: 36

MD: 7,691'
INC: 37.14°
AZM: 188.26°
TVD: 7,481.5'
VS: -461.16'

MW: 7.8
VIS: 10

7,550
7,560
7,570
7,580
7,590
7,600
7,610
7,620
7,630
7,640
7,650
7,660
7,670
7,680
7,690
7,700
7,710
7,720
7,730
7,740
7,750
7,760

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

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

114u
331u
702u

7550-7600 75% SH: dk blkgy, frm-hrd, sb plty-tab, rthy tex; 25% SLTST:dk gy, sft-frm ip, blky-sb blky, cal cmt, sl mod cmtd

7600-7650 70% SH: dk blkgy, frm-hrd, sb plty-tab, rthy tex; 30% SLTST:dk gy, sft-frm ip, blky-sb blky, cal cmt, sl mod cmtd

7650-7700 85% SH: dk blkgy, frm-hrd, sb plty-tab, rthy tex; 15% SLTST:dk gy, sft-frm ip, blky-sb blky, v tr cal cmt, sl cmtd

7700-7750 85% SH: dk blkgy, frm-hrd ip, sb plty-tab, rthy tex; 15% SLTST: dk gy, sft-frm, blky-sb blky, cal cmt, sl mod cmtd

7,770

Sharon Springs
7,776'MD/7,544'TVD

7,780

MD: 7,785'
INC: 48.26°
AZM: 186.89°
TVD: 7,550.48'
VS: -397.93'

7,790

7,800

WOB: 36.5
RPM: 0
SPM: 236
SPP: 5,438

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

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

7,810

7,820

7,830

7,840

Nio A Chalk
7,849'MD/7,589'TVD

GIB
1625u

7750-7800 95% SH: dk blkgy, pred frm-hd ip, sb blky-sb plty, rthy tex; 5% SLTST: dk gy, sft-frm, blky-sb blky, cal cmt, sl mod cmtd

7800-7850: 100% SH: dk blkgy, pred frm-hd ip, sb blky-sb plty, rthy tex

Nio A Marl
7,860'MD/7,596'TVD

7,870

MD: 7,879'
INC: 58.71°
AZM: 178.21°
TVD: 7,606.41'
VS: -322.63'

7,880

7,890

MW: 9.9
VIS: 35

7,900

0 ROP (ft/hr) 1000
0 GAMMA (API) 250
0 WOBX (KLB) 50

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

7850-7900 75% MRLST: dk gy bl, frm-hd, sb plty-sb blky, rthy tex-rgh tex, rr intbdd CHK lamn: 25% CHK: off wh-crm, v lt gy-crm-off wh, v sft, blk-sb rnd, rthy tex, tr intbdd MRLST

7,910

7,920

7,930

7,940

GIB
1132u

7900-7950 75% MRLST: dk gy-lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, com intbdd CHK lamn & incl: 35% CHK: off wh-crm, v v sft, blk-sb rnd, rthy tex, tr intbdd MRLST

7,950

Nio B Chalk
7,953'MD/7,640'TVD

7,960

MD: 7,973'
INC: 68.83°
AZM: 173.1°
TVD: 7,647.92'
VS: -238.83'

7,970

7,980

7950-8000 55% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh

WOB: 46`
RPM: 0
SPM: 235
SPP: 5,495

MW: 9.9
VIS: 36

MD: 8,066'
INC: 81.14°
AZM: 176.73°
TVD: 7,671.98'
VS: -149.69'

MD: 8,161'
INC: 89.87°
AZM: 180.38°
TVD: 7,679.42'
VS: -55.17'

09/05/2018

WOB: 25
RPM: 25
SPM: 235
SPP: 5,857

2288u

1881u

tex, tr intbdd CHK lamn & incl: 45% CHK: off wh-crm, v v sft, blk-sb rnd, rthy tex, v tr intbdd MRLST

8000-8050 55% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, tr intbdd CHK lamn & incl: 45% CHK: off wh-crm, v v sft, blk-sb rnd, rthy tex, v tr intbdd MRLST

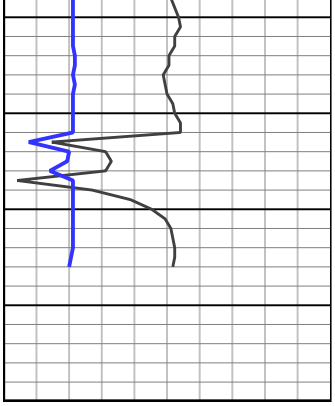
8050-8100 60% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, abnt intbdd CHK lamn & incl: 40% CHK: off wh-crm, v v sft, blk-sb rnd, rthy tex, v tr intbdd MRLST

8100-8150 55% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, abnt intbdd CHK lamn & incl: 45% CHK: off wh-crm, v v sft, blk-sb rnd, rthy tex, v tr intbdd MRLST; tr free CHK

8150-8200 65% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, abnt intbdd CHK lamn & incl: 35% CHK: off wh-crm, v sft, blk-sb rnd, rthy tex, occ intbdd MRLST; rr free CHK







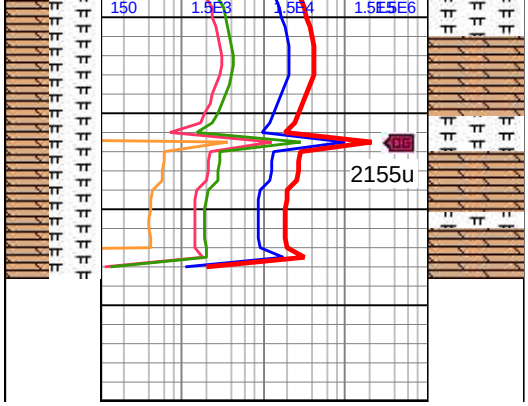
8,210
8,220
8,230
MNDEPT
8,240
8,250

MW: 9.9
VIS: 36

Curve Landed on 09/05/2018 @ 00:48 MST @ 8,237'MD

09/06/2018

Continue on Horizontal Log



Bottoms Up Sample

8200-8237 55% MRLST: lt gy-v lt gy, frm-hd, sb plty-sb blky, rthy tex-rgh tex, abnt intbdd CHK lamn & incl: 45% CHK: off wh-crm, v sft, blk-sb rnd, rthy tex, occ intbdd MRLST; rr free CHK