Scale: 5" / 100'
Measured Depth Log

Well Name	Janssen #5_vertical		
Location	Sec.8-T06N-R65W		
State	Colorado	**County**	Weld
Country	USA	**Rig Number**	Patterson UTI 346
API Number	05-123-42362-00	**AFE #**	NA
Geographic Region	DJ Basin	**Field**	Wattenberg
Spud Date	12/24/2015	**Drilling Completed**	TBD
Surface Coordinates	SHL: 2231' FNL, 2397' FWL Sec. 8 T6N R65W Lat: 40 30' 11.120 N Long: 104 41' 17.776 W		
Bottom Hole Coordinates	PBHL: Lat: 40 30' 26.500 N Long: 104 42' 17.032 W		
Ground Elevation	4,779'	**K.B. Elevation**	4,803.5
Logged Interval	5,000' **To** 6,680'	**Total Depth**	11,652'
Formation	Codell		
Type of Drilling Fluid	Oil Based - invert		

Operator

Company Extaction Oil & Gas

Address 1888 Sherman St., Suite 200
Denver, CO 80203

Geologist

Name Vivian Spiess / Jared Rouse

Zone Color Coding

Oil Condensate Gas

Name Vivian Spiess / Jared Rouse

Company Extraction Oil & Gas

Address 1888 Sherman St., Suite 200
Denver, CO 80203

Note
Core
Pressure
Error
Water
Seal

Other

Equipment ML-113

Comments Start: 12-24-15
TD: 12-25-15

Services Provided 2-man Logging
On Site Geosteering

Logger Names Dominic Pitre / Nicholas Watkiins

Address Empirica, LLC.
6360 W Sam Houston Pkwy N
Suite 100
Houston, TX 77041

Rock Types

- UNKNOWN
- ANHYDRITE
- GYPSUM
- SALT
- SIDERITE or LIMONITE
- LIMESTONE
- DOLOMITE
- CHERT
- COAL
- MARLSTONE
- CLAYSTONE
- 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
- 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
- ORGANIC
- PINPOINT
- VUGGY

Engineering

- BIT
- CASING

- FORMATION TOP
- GAS SHOW
- MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

- LITHOGRAPHIC
- MICROXLN
- MUDSTONE
- PACKSTONE
- WACKESTONE

Sorting

Porosity

- E EARTHY
- FENESTRAL
- F FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

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

- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS
- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT

Textures

- BS BOUNDSTONE
- C CHALKY
- CX CRYPTOXLN
- E EARTHY
- FX FINELYXLN
- GS GRAINSTONE

- M MODERATE
- P POOR
- W WELL

ROP / GAMMA	Depth Labels	% Lith	Total Gas & Chromatograph (GAS, C1, C2, C3, C4)	Lithology Descriptions	Interp Lith	Images

Extraction OG Janssen #5

Weld County, Colorado
Spud Date: 12-24-15
Surface Casing @ 1,576'
2-man Logging / Geosteering
Began: 12-24-15

100 units = 1% methane

Depths Correspond to
Driller's Pipe Tally

NW @ 5,000'

MD: 5,000'
TVD: 4,821.67'
Inclination: 14.06°
Azimuth: 14.91°
VS: -290.73'

MD: 5,095'
TVD: 4,913.96'
Inclination: 13.39°
Azimuth: 13.69°
VS: -295.13'

ROP (ft/hr) 0 3
GAMMA (units) 0 200

GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

Depth Labels: 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 · 5,130 · 5,140 · **5,150**

Bit #: 2
Type: MDi516
Size: 7 7/8
Depth In: 1,590'
Jets: 8X10
S/N: JK9898

5000-5060 SS: off wh-lt gy ss clus, lt brn-brn hue ip, v arg SS, mod srtd vf-f grs, med frm-frm sli fri pred gr sup clus cons wi arg cmt, rr wh dolc strg ip, occ dk gy sltst strg & frags, tr gn glau, sl-l mod calc

5060-5120 SS: off wh-lt gy, med frm-frm mod srtd v arg SS wi vf-f sb ang-sb rd grs, sli fri gr sup cls cons wi arg cmt, rr silc cmt ip, rr mtx sup cls ip, rr dolc strg ip, rr gy-dk gy-gy brn sltst incl, tr gn glau, sl-l mod calc

5120-5180 SS: pred off wh-lt gy, occ gy-dk gy-gy brn sltst strg & incl, v arg, mod srtd vf-f sb ang-sb rd grs, sl sft-med frm-frm sli fri pred mtx sup cls cons wi arg cmt, rr silc cmt ip, rr gr sup cls ip, rr

dolc strg ip, tr gn glau, sl-l mod calc

MD: 5,190'
TVD: 5,006.5'
Inclination: 12.73°
Azimuth: 13.33°
VS: -299.03'
WOB: 33Klbs
Rotary: 0RPM
Strokes: 240SPM
Pump Rate: 688GPM

ROP (ft/hr) 0 3
GAMMA (units) 0 200

GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

5180-5240 SS: off wh-lt gy, med frm-frm mod srtd v arg SS wi vf-f sb ang-sb rd grs, sli fri gr sup cls cons wi arg cmt, rr silc cmt ip, rr mtx sup cls ip, rr dolc strg ip, rr gy-dk gy-gy brn sltst incl, tr gn glau, sl-l mod calc

MW 8.9
VIS 42

5240-5300 SS (90%): off wh-lt gy, gy-gy brn ip, mod srtd arg ss wi vf-f sb ang-sb rd grs, med frm-frm sli fri mtx sup cls cons wi arg cmt, rr silc cmt ip, rr gr sup cls, rr dolc strg ip, tr gn glau, sl-l mod calc, SLTST (10%): dk gy-dk bl gy, med-hi fis ang-sb plty-plty ctgs, non calc wi silc cmt, tr vf pyr

MD: 5,286'
TVD: 5,100.19'
Inclination: 12.49°
Azimuth: 13.39°
VS: -302.78'

ROP (ft/hr) 0 3
GAMMA (units) 0 200

GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

5300-5360 SS (90%): off wh-lt gy, occ gy-dk gy brn, mod srtd vf-f sb ang-sb rd grs, med frm-frm sli fri mtx-gr sup cls cons wi arg cmt, rr silc cmt ip, rr dolc strg ip, tr gn glau, sl-l mod calc, SLTST (10%): dk gy-dk bl gy, med-hi fis ang-sb plty-plty ctgs, non calc wi silc cmt, tr vf pyr

5360-5420 SS (85%): off wh-lt gy, pred vf-f mod

MD: 5,380'
TVD: 5,192.39'
Inclination: 9.92°
Azimuth: 11.13°
VS: -305.74'
WOB: 31Klbs
Rotary: 0RPM
Strokes: 240SPM
Pump Rate: 689GPM

ROP (ft/hr) 0 3
GAMMA (units) 0 200

GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

srtd sb rd grs, med frm-frm sli fri gr-mtx sup cls cons wi arg cmt, rr silc ip, tr vf pyr, sl-l mod calc, rr gn glau, wi 15% SLTST: pred gy-dk gy ang-plty ctgs, wi tr-rr vf pyr strg ip, silc & non calc

5420-5480 SS (85%): off wh-lt gy, pred vf-f gr, sb ang-sb rd mod srtd grs, med frm-frm sli fri mtx sup cls cons wi arg cmt, occ gr sup cls ip, rr silc cmt, rr gn glau, tr vf pyr, sl-l mod calc, wi occ intbdd SLTST (15%): pred gy-dk gy wi bl hue ip, ang-plty ctgs, silc, non calc, wi tr-rr vf pyr strg ip

MD: 5,475'
TVD: 5,285.99'
Inclination: 9.77°
Azimuth: 10.82°
VS: -307.98'

5480-5540 SS (80%): off wh-lt gy, mod srtd vf-f sb ang-sb rd grs, med frm-frm sli fri mtx-gr sup cls cons wi arg cmt, rr silc cmt, tr vf pyr, sl-l mod calc, wi 20% SLTST: pred gy-dk gy ang-plty ctgs, silc, non calc, wi tr-rr vf pyr strg ip

5540-5600 SS (75%): off wh-lt gy, mod srtd vf-f gr sb rd grs, med frm-frm sli fri mtx sup cls cons wi arg cmt, gr sup ip wi occ silc cmt, tr vf pyr, sl-l mod calc, wi 25% SLTST: pred gy-dk gy ang-plty ctgs, wi tr-rr vf pyr strg ip, silc & non calc

MD: 5,571'
TVD: 5,380.98'
Inclination: 6.79°
Azimuth: 9.32°
VS: -309.7'

WOB: 38Klbs

MW 8.9
VIS 41

Rotary: 60RPM
Strokes: 240SPM
Pump Rate: 688GPM

ROP (ft/hr) 0 3
GAMMA (units) 0 200

GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

5,600
5,610
5,620
5,630
5,640
5,650
5,660
5,670
5,680
5,690
5,700
5,710
5,720
5,730
5,740
5,750
5,760
5,770
5,780
5,790
5,800
5,810

MD: 5,666'
TVD: 5,475.37'
Inclination: 6.15°
Azimuth: 13.33°
VS: -311.23'

MD: 5,762'
TVD: 5,570.65'
Inclination: 7.9°
Azimuth: 19.83°
VS: -314.05'

WOB: 35Klbs
Rotary: 61RPM
Strokes: 240SPM
Pump Rate: 690GPM

5600-5660 SS (80%): off wh-lt gy, occ dk gy wi sltst incl & frags, vf-f gr sb ang-sb rd grs, med frm-frm sli fri mod srtd mtx-gr sup cls cons wi arg cmt, rr hd clus wi silc cmt, tr vf pyr, sl-l mod calc, SLTST (20%): pred gy-dk gy ang-plty ctgs, silc, non calc, wi tr-rr vf pyr strg ip

5660-5720 SS (70%): off wh-lt gy, mod srtd vf-f gr sb ang-sb rd grs, med frm-frm sli fri mtx sup cls cons wi arg cmt, occ gr sup cls ip, rr hd clus wi silc cmt, tr vf pyr, sl-l mod calc, SLTST (30%): pred gy-dk gy ang-plty ctgs, silc, non calc, wi tr-rr vf pyr strg ip

5720-5780 SS (75%): off wh-lt gy, occ dk gy sltst frag incl & intbds ip, pred vf-f sb ang-sb rd mod srtd grs, med frm-frm sli fri mtx-gr sup cls cons wi arg cmt, rr hd clus wi silc cmt, tr vf pyr, sl-l mod calc, wi intbdd SLTST (25%): pred gy-dk gy ang-plty ctgs, brit silc ctgs, wi tr-rr vf pyr strg ip, non calc

5780-5840 SS (80%): off wh-lt gy, pred vf-f sb ang-sb rd mod srtd grs, med frm-frm sli fri mtx sup cls cons wi arg cmt, occ gr sup cls ip, rr hd clus wi silc cmt, tr vf pyr, sl-l mod calc, SLTST (20%): pred gy-dk gy

ang-plty ctgs, silc, non calc, wi tr-rr vf pyr strg ip

5840-5960 SLTY SH (60%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 20% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (20%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr

5960-6020 SLTY SH (60%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 20% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (20%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, tr vf pyr, pred non calc, sl calc ip

MD: 5,857'
TVD: 5,664.98'
Inclination: 5.64°
Azimuth: 15.21°
VS: -316.91'

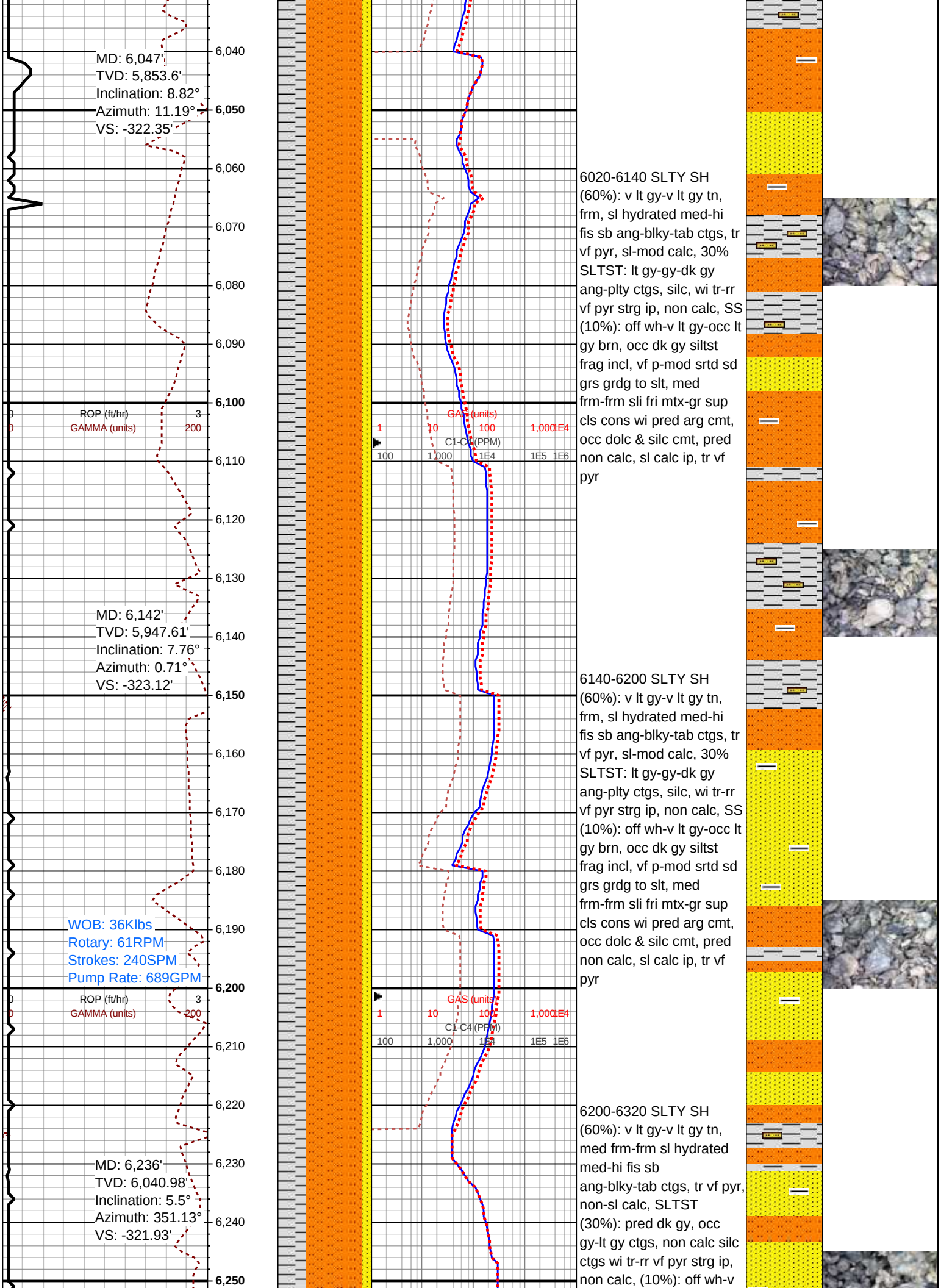
MD: 5,952'
TVD: 5,759.45'
Inclination: 6.52°
Azimuth: 21.52°
VS: -319.61'

WOB: 36Klbs
Rotary: 60RPM
Strokes: 240SPM
Pump Rate: 688GPM

MW 8.9
VIS 42

ROP (ft/hr) 0 3
GAMMA (units) 0 200
GAS (units) 1 10 100 1,000 1E4
C1-C4 (PPM) 100 1,000 1E4 1E5 1E6

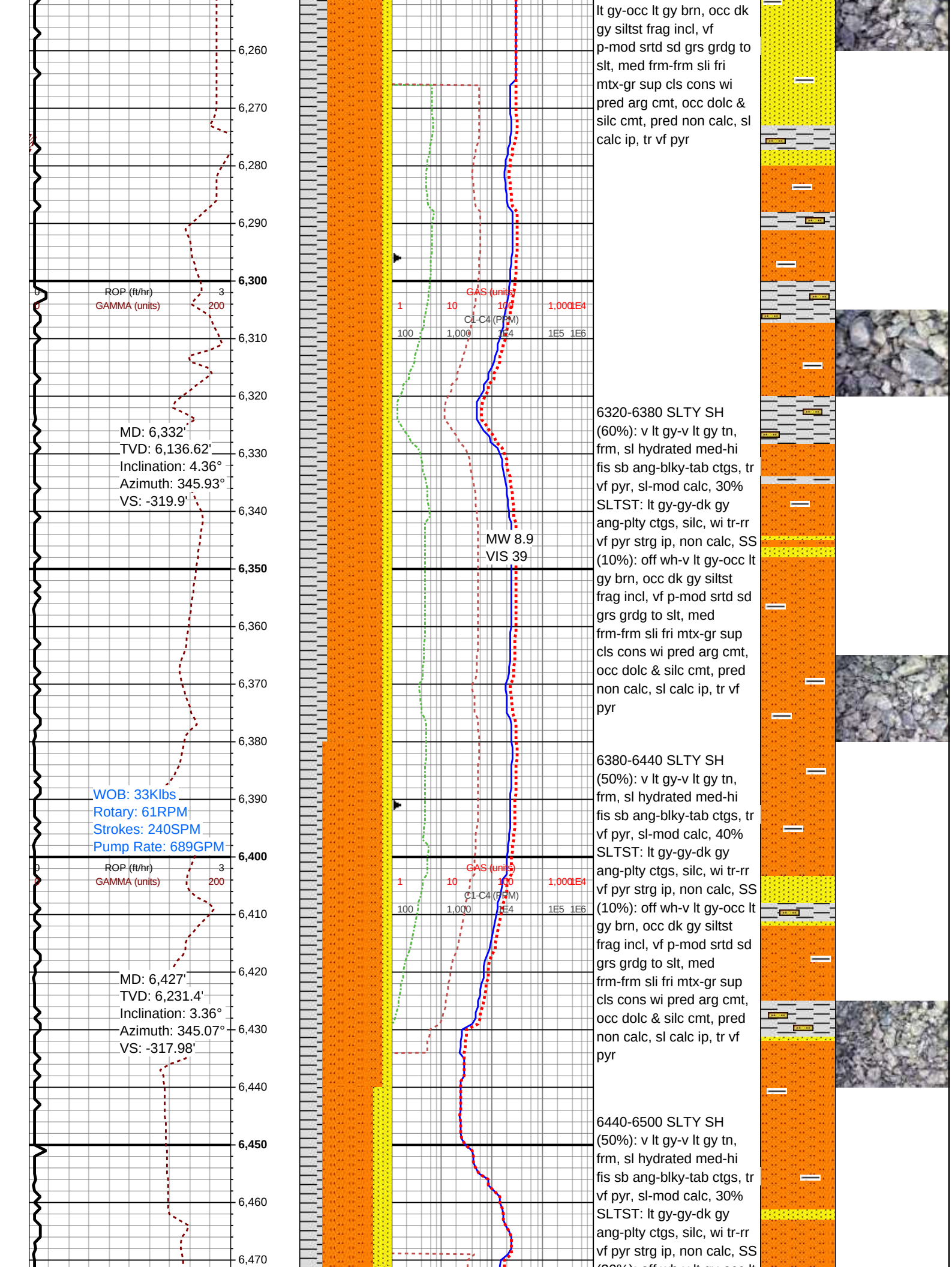
5,820 5,830 5,840 **5,850** 5,860 5,870 5,880 5,890 **5,900** 5,910 5,920 5,930 5,940 **5,950** 5,960 5,970 5,980 5,990 **6,000** 6,010 6,020 6,030

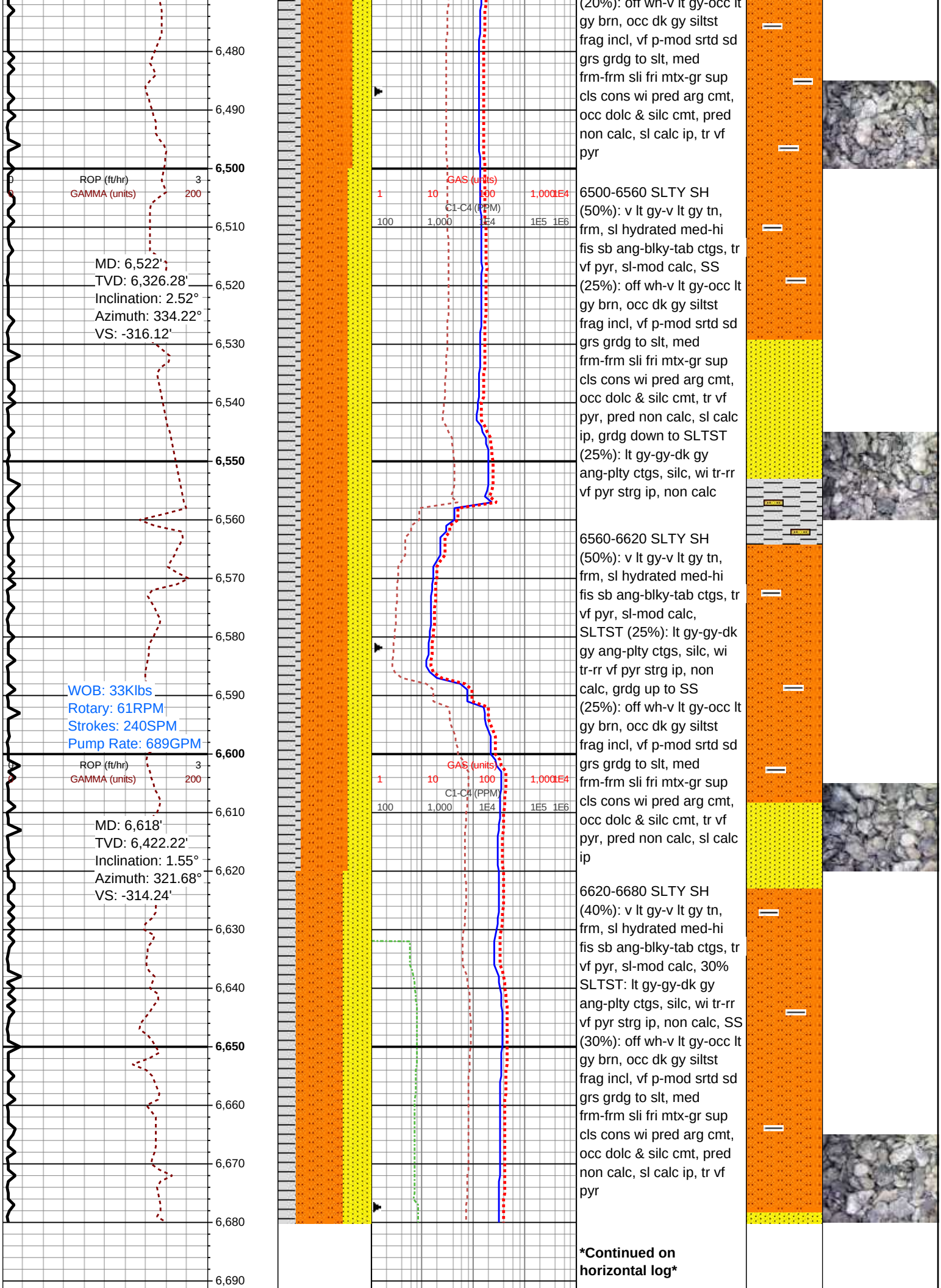


6020-6140 SLTY SH (60%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 30% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr

6140-6200 SLTY SH (60%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 30% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr

6200-6320 SLTY SH (60%): v lt gy-v lt gy tn, med frm-frm sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, non-sl calc, SLTST (30%): pred dk gy, occ gy-lt gy ctgs, non calc silc ctgs wi tr-rr vf pyr strg ip, non calc, (10%): off wh-v


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
6,450
6,460
6,470
ROP (ft/hr)
GAMMA (units)
GAS (units)
C1-C4 (PPM)
MD: 6,332'
TVD: 6,136.62'
Inclination: 4.36°
Azimuth: 345.93°
VS: -319.9'
MW 8.9
VIS 39
WOB: 33Klbs
Rotary: 61RPM
Strokes: 240SPM
Pump Rate: 689GPM
MD: 6,427'
TVD: 6,231.4'
Inclination: 3.36°
Azimuth: 345.07°
VS: -317.98'
lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr
6320-6380 SLTY SH (60%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 30% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr
6380-6440 SLTY SH (50%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 40% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr
6440-6500 SLTY SH (50%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 30% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS



(20%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr

6500-6560 SLTY SH (50%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, SS (25%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, tr vf pyr, pred non calc, sl calc ip, grdg down to SLTST (25%): lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc

6560-6620 SLTY SH (50%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, SLTST (25%): lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, grdg up to SS (25%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, tr vf pyr, pred non calc, sl calc ip

6620-6680 SLTY SH (40%): v lt gy-v lt gy tn, frm, sl hydrated med-hi fis sb ang-blky-tab ctgs, tr vf pyr, sl-mod calc, 30% SLTST: lt gy-gy-dk gy ang-plty ctgs, silc, wi tr-rr vf pyr strg ip, non calc, SS (30%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, vf p-mod srtd sd grs grdg to slt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cmt, occ dolc & silc cmt, pred non calc, sl calc ip, tr vf pyr

Continued on horizontal log

0 ROP (ft/hr) 3
0 GAMMA (units) 200

GAS (units)
1 10 100 1,000 1E4
C1-C4 (PPM)
100 1,000 1E4 1E5 1E6

6,700
6,710
6,720
6,730
6,740
6,750
6,760
6,770
6,780
6,790
6,800
6,810
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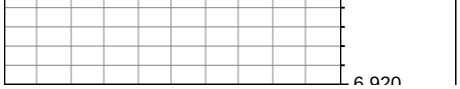
6,860
6,870
6,880
6,890
6,900
6,910





6 920