



Scale: 5" / 100'
Measured Depth Log

Well Name ROY SWD #5

Location NW/NE, SEC 28, T1N, R66W

State COLORADO

Country USA

API Number 056-123-49501-00

Geographic Region DJ BASIN - NORTHEASTERN COLORADO

Spud Date 4/19/2019

Surface Coordinates NAD83, LAT. 40.028650°N., LONG. -104.780150°W

Bottom Hole Coordinates NAD83, LAT. 40.033930°N., LONG. -104.791293°W

Ground Elevation 5,047'

K.B. Elevation 5,072'

Logged Interval 5,000'

To 11,963'

Total Depth 11,963'

Formation FOUNTAIN

Type of Drilling Fluid GYPSUM MUD TO INTERMEDIATE CASING, WATER-BASED MUD TO TD

County WELD

Rig Number PATTERSON 346

Field WATTENBERG

Drilling Completed 5/2/2019

Operator

Company NGL WATER SOLUTIONS PERMIAN, LLC

Address 3773 CHERRY CREEK N DRIVE, SUITE 1000
DENVER, CO 80209

Geologist

Name SHANE NICKLAUS, SORAYA BAROUMAND

Company FIELD GEO SERVICES, INC.

Address 533 BOGART LANE, UNIT A
GRAND JUNCTION CO 81505
O: (970) 424-5163
F: (970) 424-5164

Color Coding

Oil
Note
Error

Condensate
Core
Water

Gas
Pressure
Seal

Rock Types

UNKNOWN
ANHYDRITE
FREE QUARTZ
GYPSUM
SALT
SIDERITE or LIMONITE
LIMESTONE
DOLOMITIC LIMESTONE

LIMESTONE SHALY
DOLOMITE
CHERT
COAL
MARLSTONE
CLAYSTONE
SHALE
SHALE GRAY

SHALE COLORED
SHALE CARB
SHALE CALC
SILTSTONE
SANDSTONE
CONGLOMERATE
BRECCIA
TILL

BENTONITE
TUFF
IGNEOUS
METAMORPHIC
CEMENT
NO SPL NO SAMPLE

Accessories

Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOPOD
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
CALCITE VEIN
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET
FERRUGINOUS
GLAUCONITE
GYPSIFEROUS

HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
QUARTZ
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
TUFF

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
- DOWN TIME GAS
- TRIP GAS
- CORE - LOST
- CORE - RECOVERED
- FAULT
- FORMATION TOP

Other Symbols

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

- 6AMDEPTH
- 6PMDEPTH

Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

Textures

- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- EARTHY
- FINELYXLN

- GRAINSTONE

- LITHOGRAPHIC

- MICROXLN
- MUDSTONE

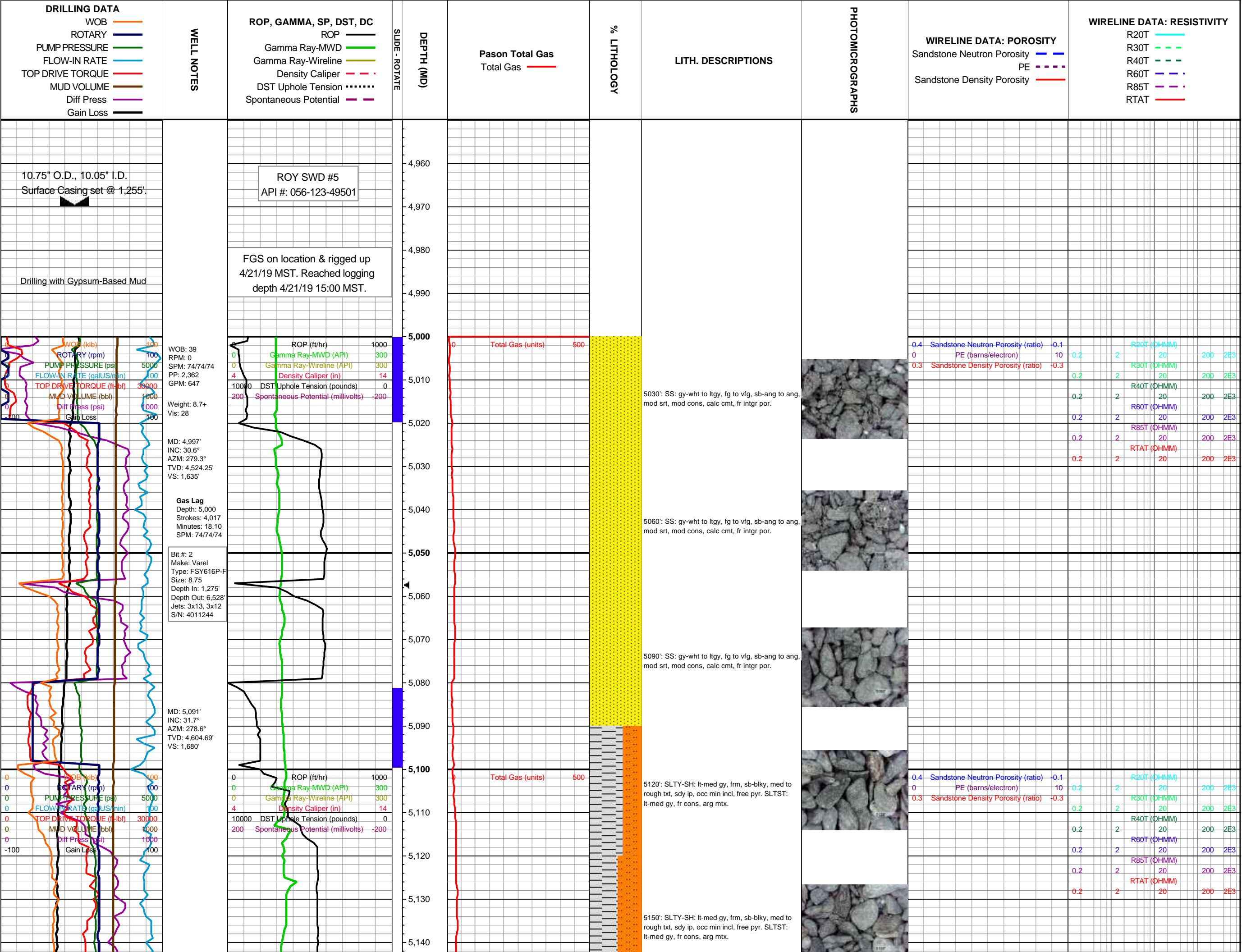
- PACKSTONE
- WACKESTONE

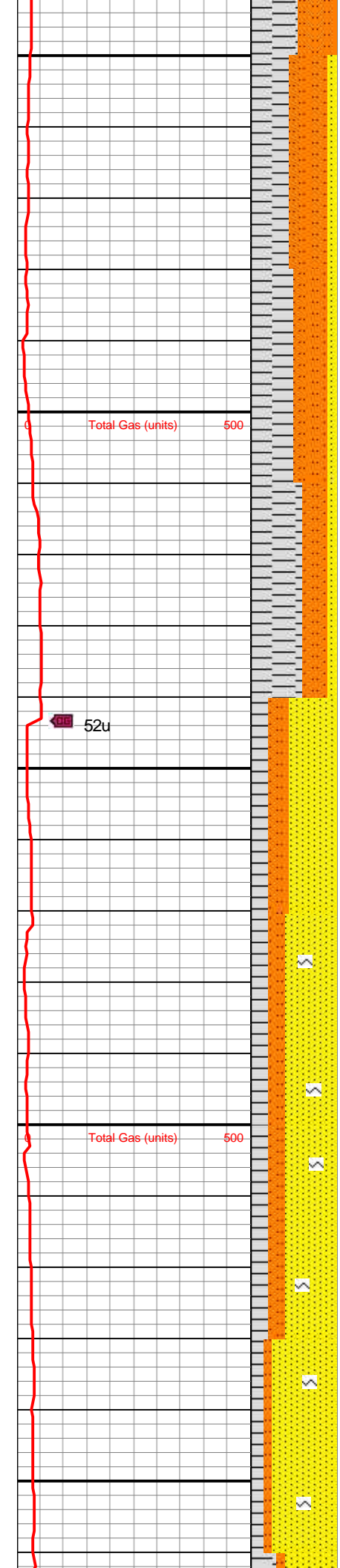
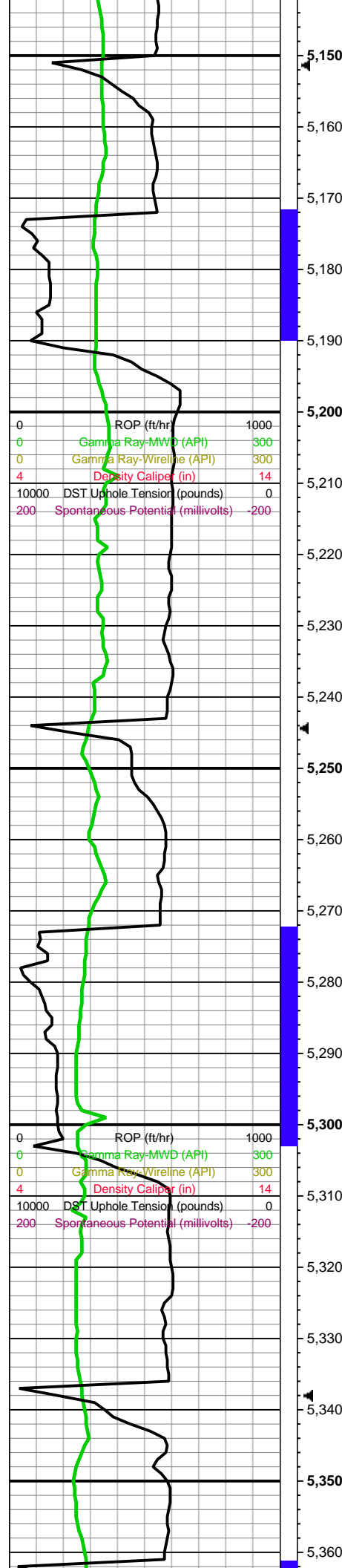
Sorting

- MODERATE
- POOR
- WELL

DEPTH

6PMDEPTH





5180': SLTY-SH: lt-med gy, frm, sb-blky, med to rough txt, sdy ip, occ min incl, free pyr. SLTST: lt-med gy, fr cons, arg mtx. SS: gy-wht to ltgy, fg to vfg, sb-ang to ang, mod srt, mod cons, calc cmt, fr integr por.

5210': SLTY-SH: lt-med gy, frm, sb-blky, med to rough txt, sdy ip, occ min incl, free pyr. SLTST: lt-med gy, fr cons, arg mtx. SS: gy-wht to ltgy, fg to vfg, sb-ang to ang, mod srt, mod cons, calc cmt, fr integr por.

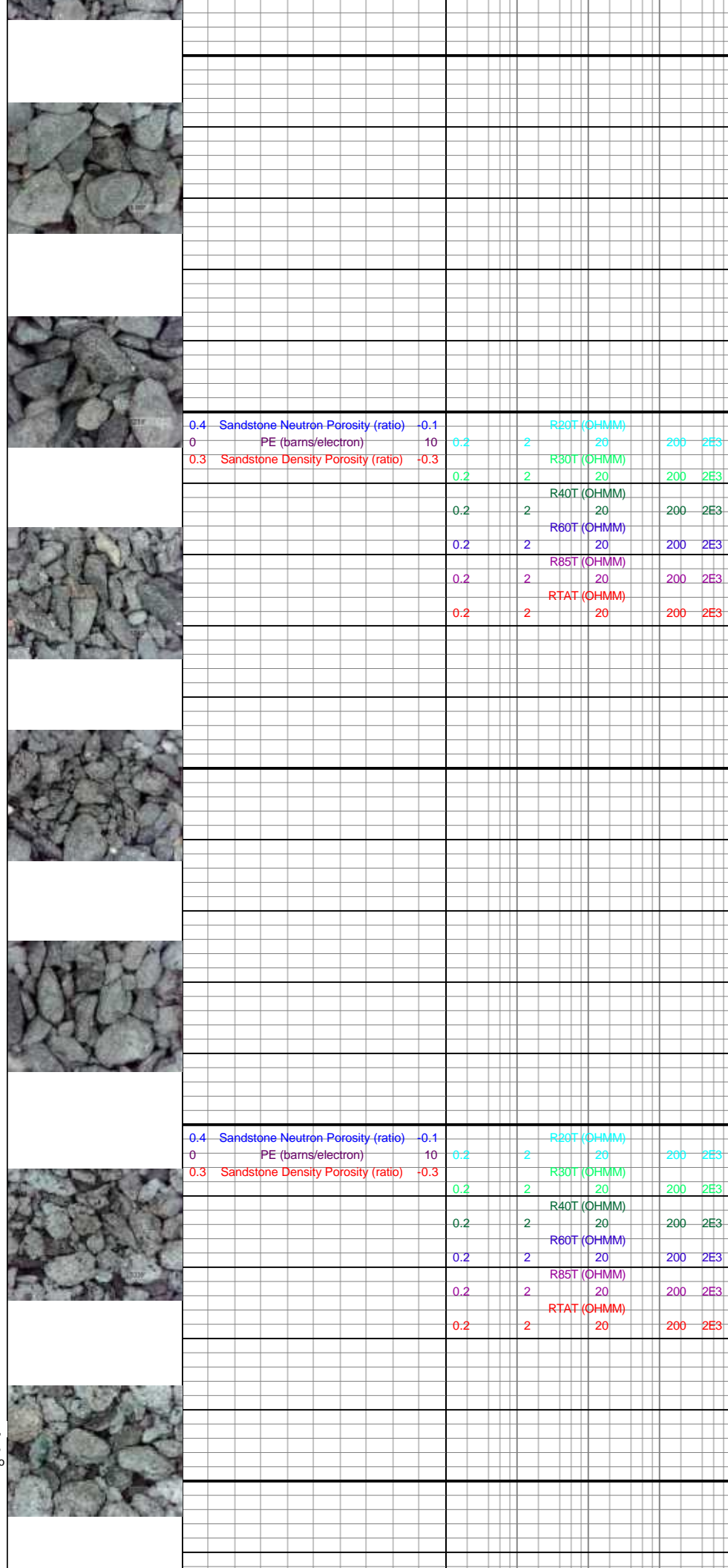
5240': SLTY-SH: lt-med gy, frm, sb-blky, med to rough txt, sdy ip, occ min incl, free pyr. SLTST: lt-med gy, fr cons, arg mtx. SS: gy-wht to ltgy, fg to vfg, sb-ang to ang, mod srt, mod cons, calc cmt, fr integr por.

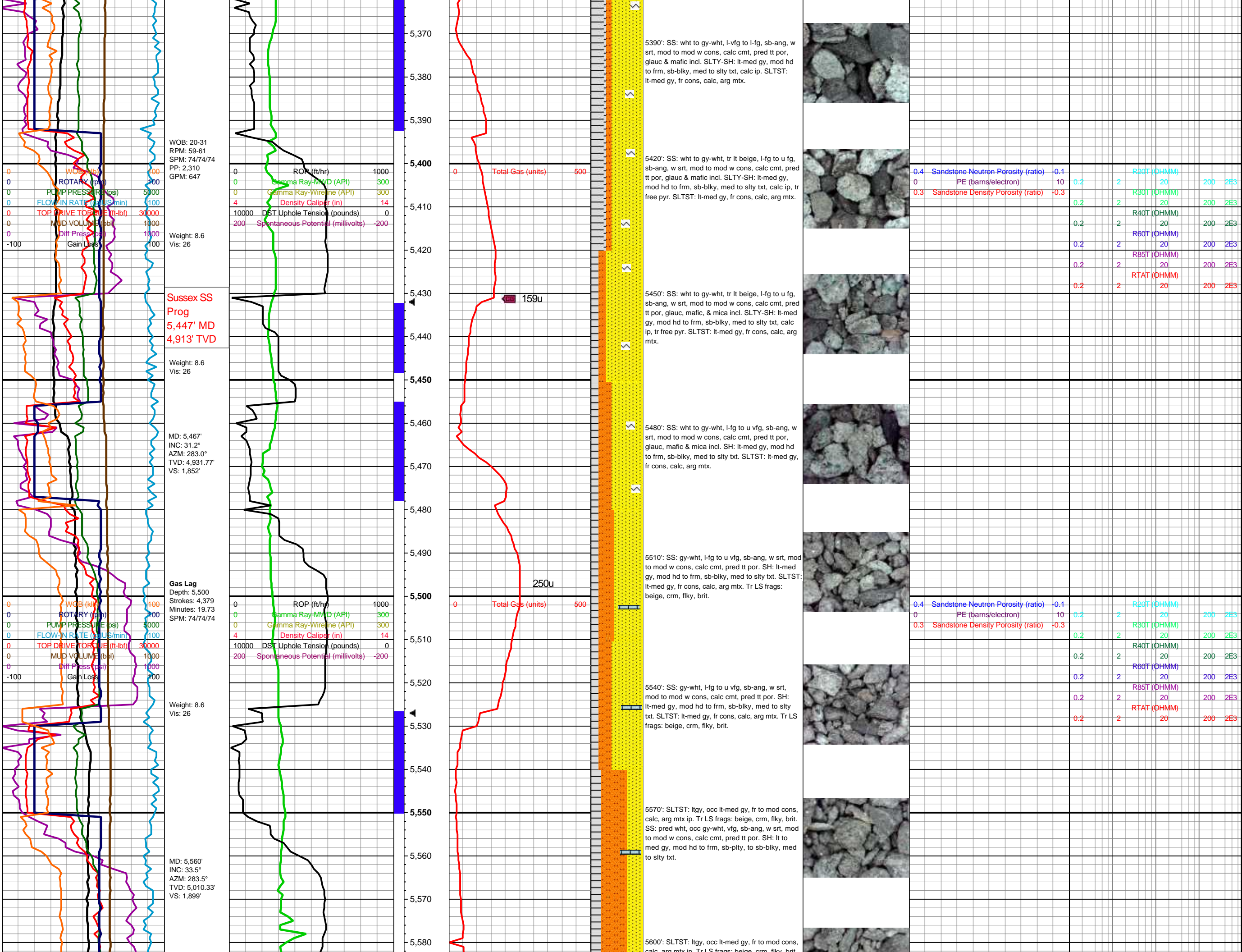
5270': SS: wht w/blk spec to gy-wht, l-fg to u-fg, sb-rd to sb-ang, w srt, fr cons, calc cmt, fr intrgr por. SLTST: lt-med gy, fr cons, calc, arg mtx. SLTY-SH: lt-med gy, frm, sb-blky, med to slty txt.

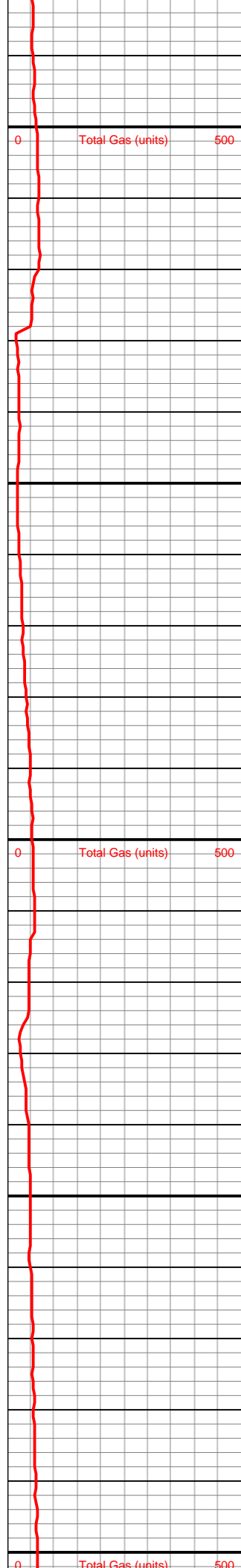
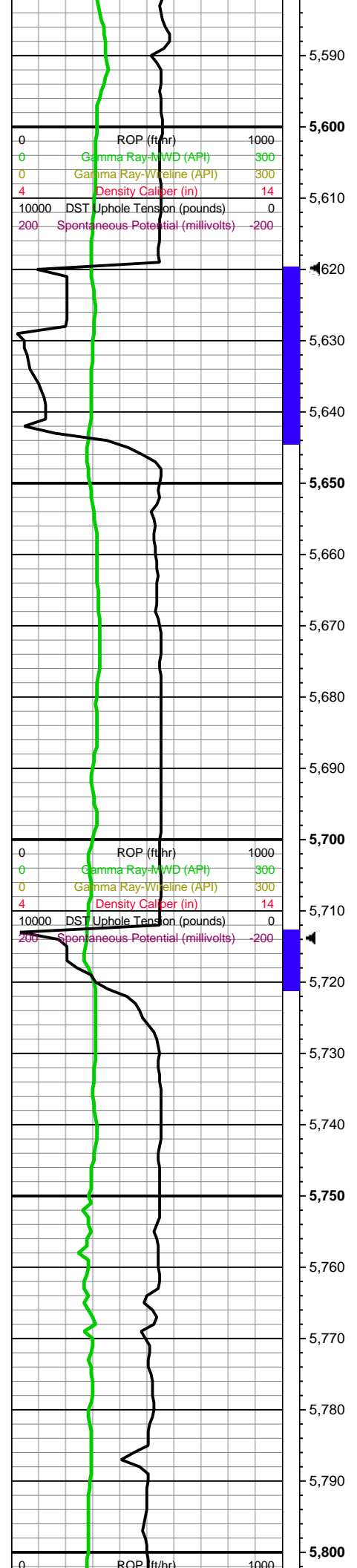
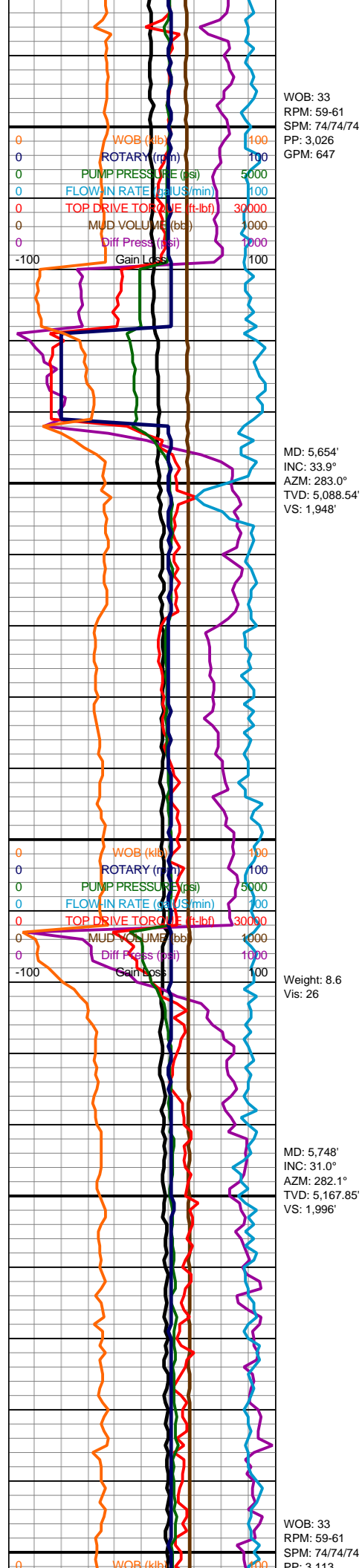
5300': SS: wht w/blk spec to gy-wht, l-fg to u-fg, sb-rd to sb-ang, w srt, fr cons, calc cmt, fr integr por. SLTST: lt-med gy, fr cons, calc, arg mtx. SLTY-SH: lt-med gy, frm, sb-blky, med to slty txt.

5330': SS: wht w/blk spec to gy-wht, l-fg to u-fg, sb-rd to sb-ang, w srt, fr cons, calc cmt, fr intrgr por. SLTST: lt-med gy, fr cons, calc, arg mtx. SLTY-SH: lt-med gy, frm, sb-blky, med to slty txt.

5360': SS: wht to gy-wht, l-fg to u-vfg, sb-ang to sb-rd, w srt, mod to fr cons, calc cmt, fr intgr por, glauc & mafic incl. SLTST: lt-med gy, fr cons, calc, arg mtx. SLTY-SH: lt-med gy, frm, sb-blky, med to slty txt.







SS: prod wht, occ gy-wht, vfg, sb-ang, w srt, mod to mod w cons, caly cmt, prod tt por. SH: lt to med gy, mod hd to frm, sb-plty, to sb-blky, med to slty txt.

5630': SS: med-ltgy, vfg to fg, sb-rd to sb-ang,
mod w srt, mod to fr cons, pred sil cmt, arg ip.
SLTST: ltgy, occ lt-med gy, fr to mod cons, calc,
arg mtx ip. Tr LS frags: beige, crm, flky, brit. SH:
med gy, frm, sb-plty, to sb-blky, f txt. Scat Bent.

5660': SS: med-ltgy, vfg, sb-rd to sb-ang, mod w
srt, fr cons, pred sil cmt, arg ip. SLTST: ltgy, occ
lt-med gy, fr to mod cons, calc, arg mtx ip. Tr LS
frags: beige, crm, flky, brit. SH: med gy, frm,
sb-plty, to sb-blky, f txt. Scat Bent. Scat free pyr.

5690': SS: med-ltgy, vfg, sb-rd to sb-ang, mod w
srt, fr cons, pred sil cmt, arg ip. SLTST: ltgy, occ
lt-med gy, fr to mod cons, calc, arg mtx ip. Tr LS
frags: beige, crm, flky, brit. SH: med gy, frm,
sb-plty, to sb-blky, f txt. Scat Bent. Scat free pyr.

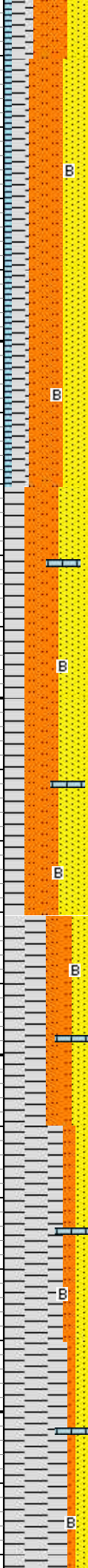
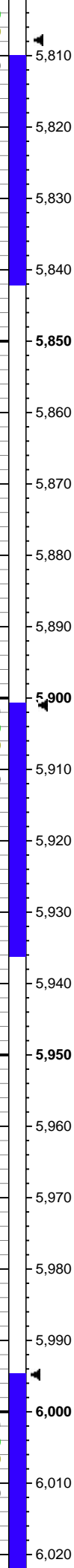
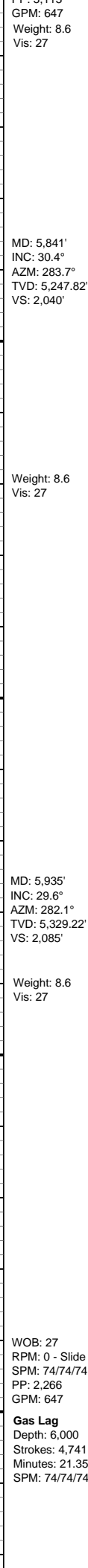
5720': SS: med-ltgy, vfg, sb-rd to sb-ang, mod w
srt, fr cons, pred sil cmt, arg ip. SLTST: ltgy, occ
lt-med gy, fr to mod cons, calc, arg mtx ip. Tr LS
frags: beige, crm, flky, brit. SH: med gy, frm,
sb-plty, to sb-blky, f txt. Scat Bent.

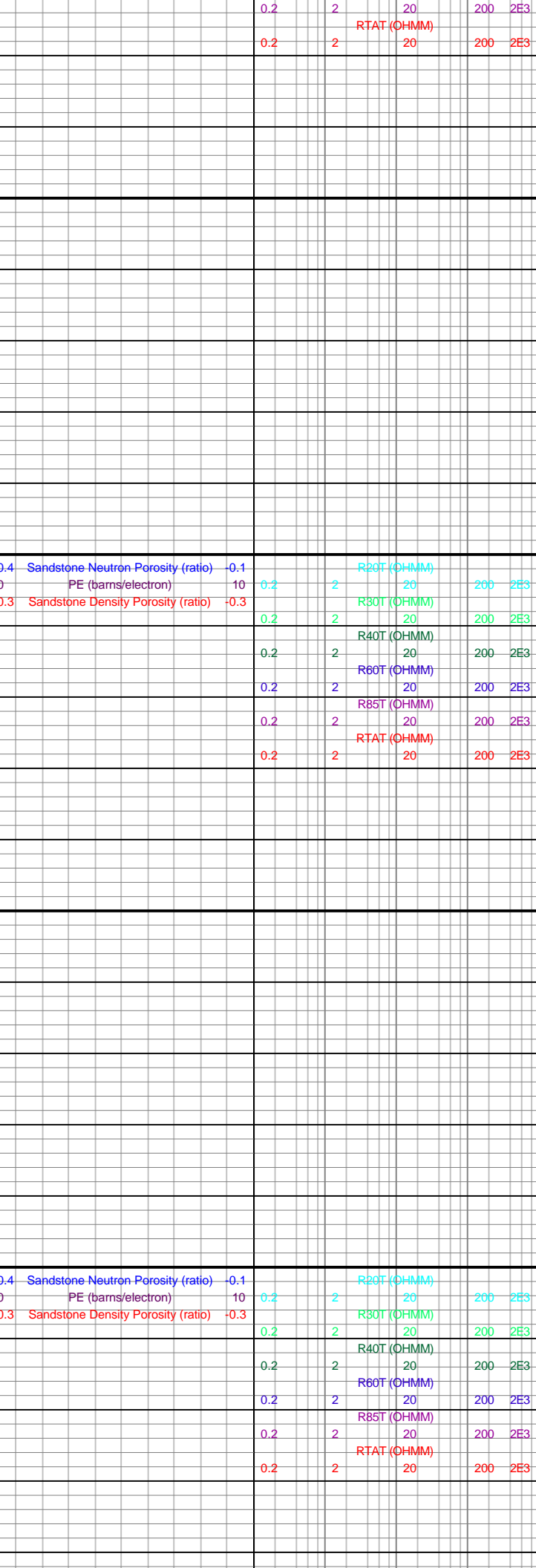
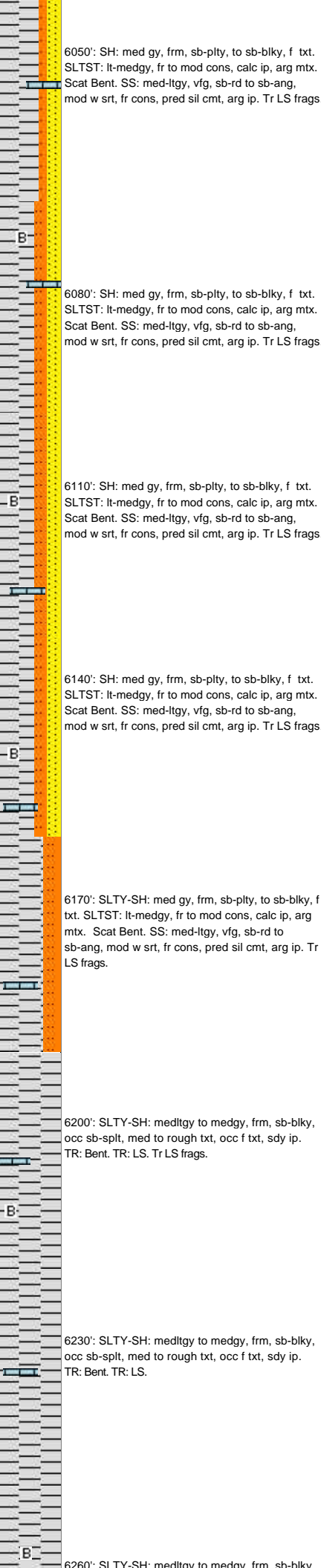
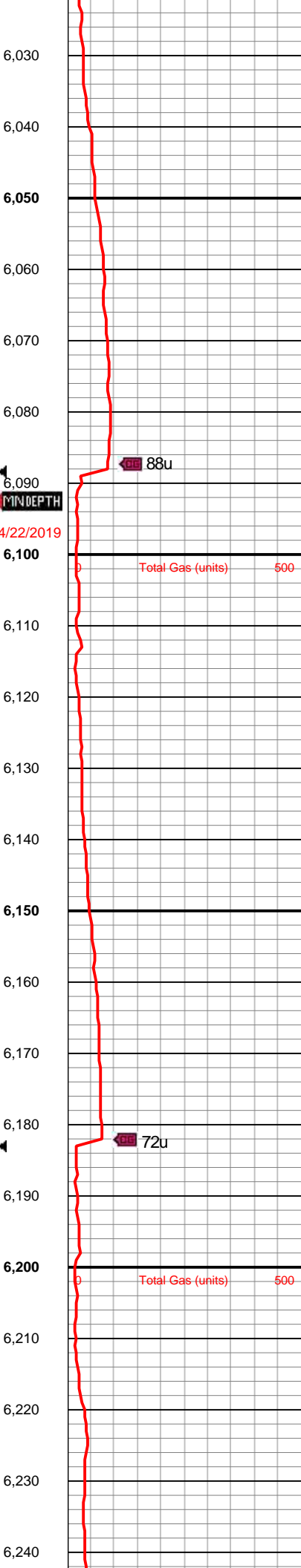
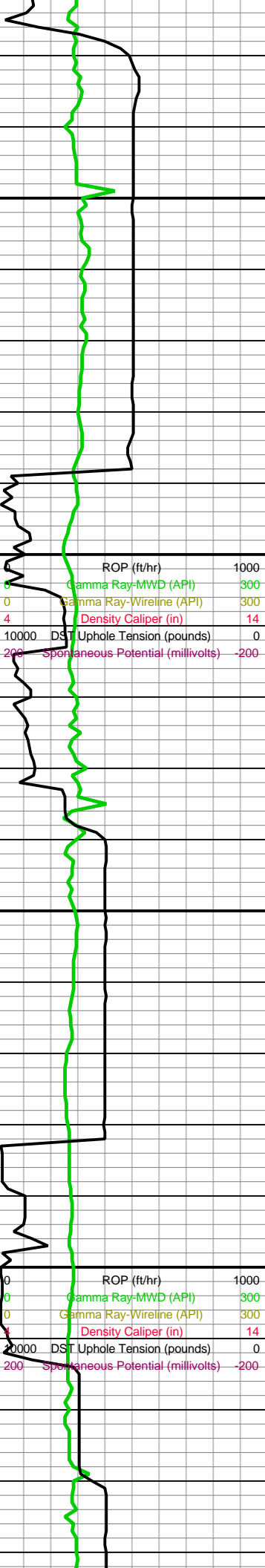
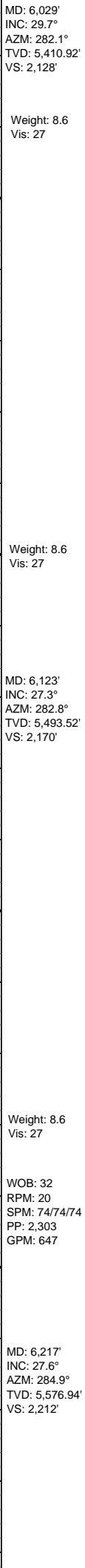
5750': SS: med-ltgy, vfg, sb-rd to sb-ang, mod w
srt, fr cons, pred sil cmt, arg ip. SLTST: ltgy, occ
lt-med gy, fr to mod cons, calc, arg mtx ip. Tr LS
frags: beige, crm, flky, brit. SH: med gy, frm,
sb-plty, to sb-blky, f txt. Scat Bent.

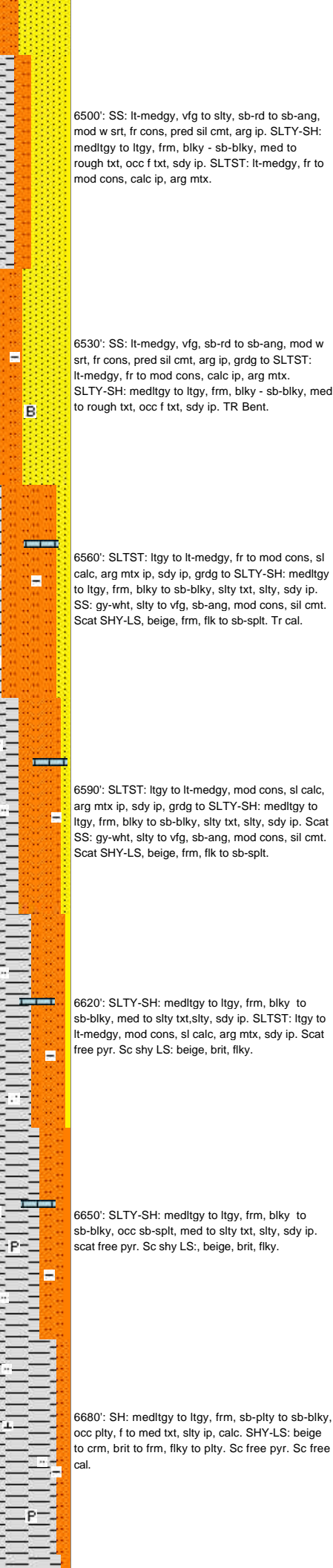
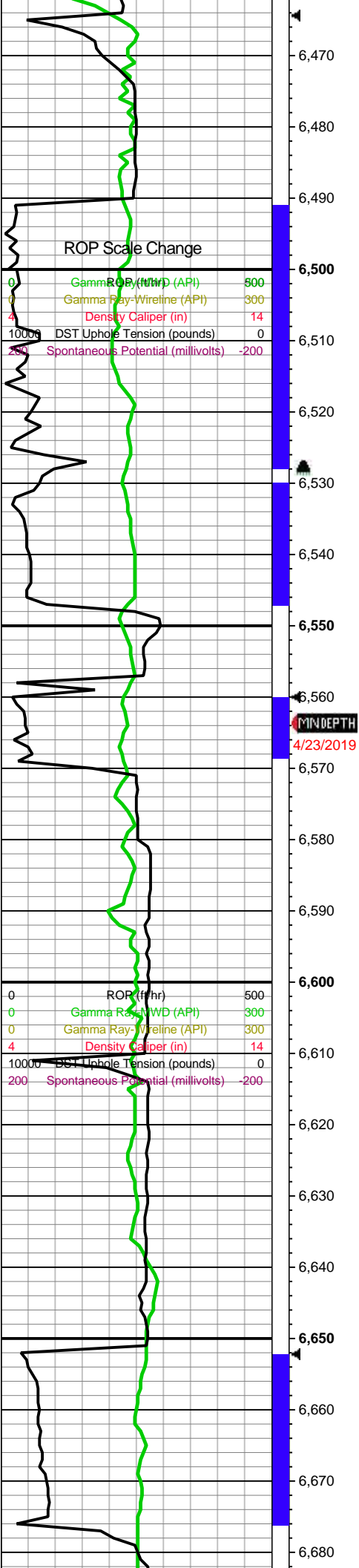
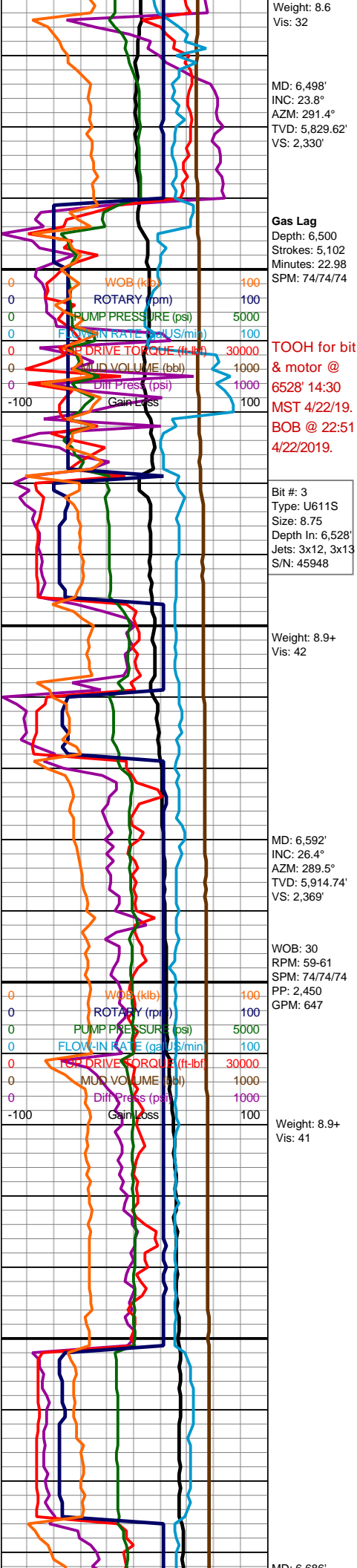
5780': SLTST: lt-medgy, fr to mod cons, calc ip, arg mtX. SS: med-ltgy, vfg, sb-rd to sb-ang, mod w srt, fr cons, pred sil cmt, arg ip. Tr LS frags: beige, crm, flky, brit. SH: med gy, frm, sb-plty, to sb-blky, f txt. Scat Bent.

5810': SLTST: lt-medgy, fr to mod cons, calc ip, ar
mtx. SS: med-ltgy, vfg, sb-rd to sb-ang, mod w
srt, fr cons, pred sil cmt, arg ip. Tr LS frags: beige,
crm, flky, brit. SH: med gy, frm, sb-plty, to
sb-blky, f txt. Scat Bent.

[illegible]

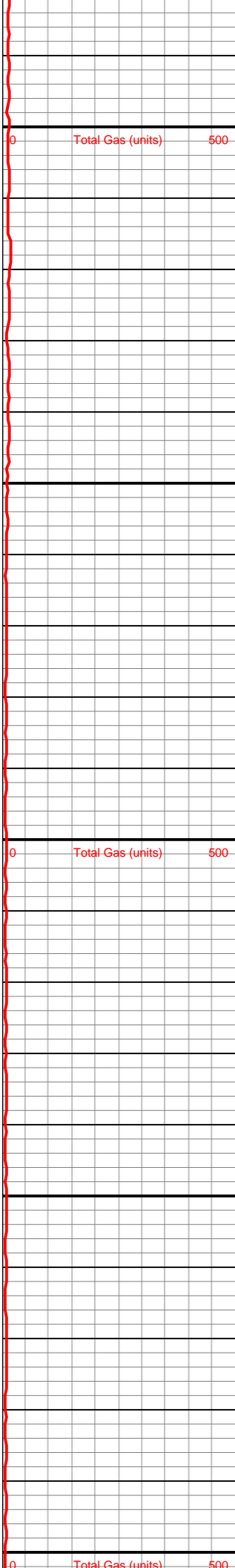
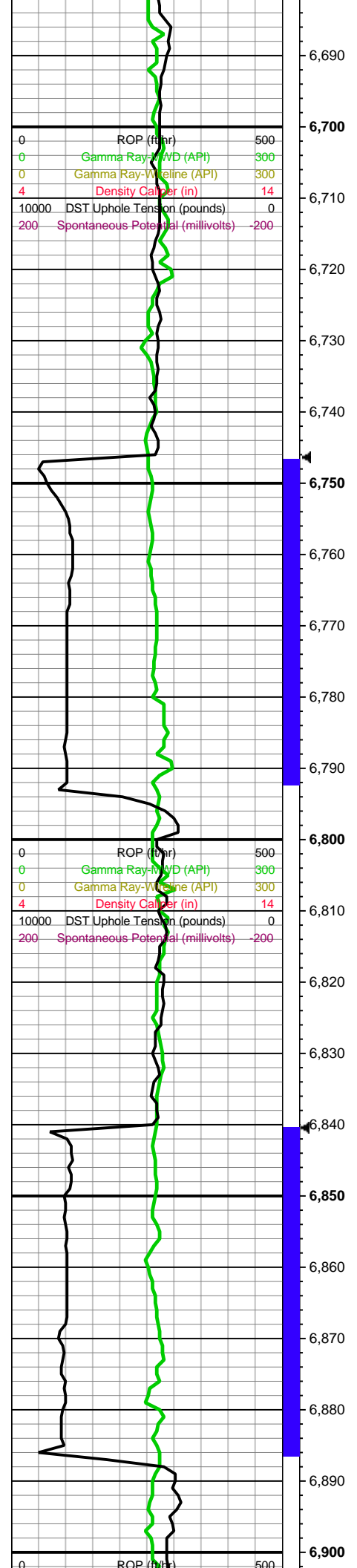
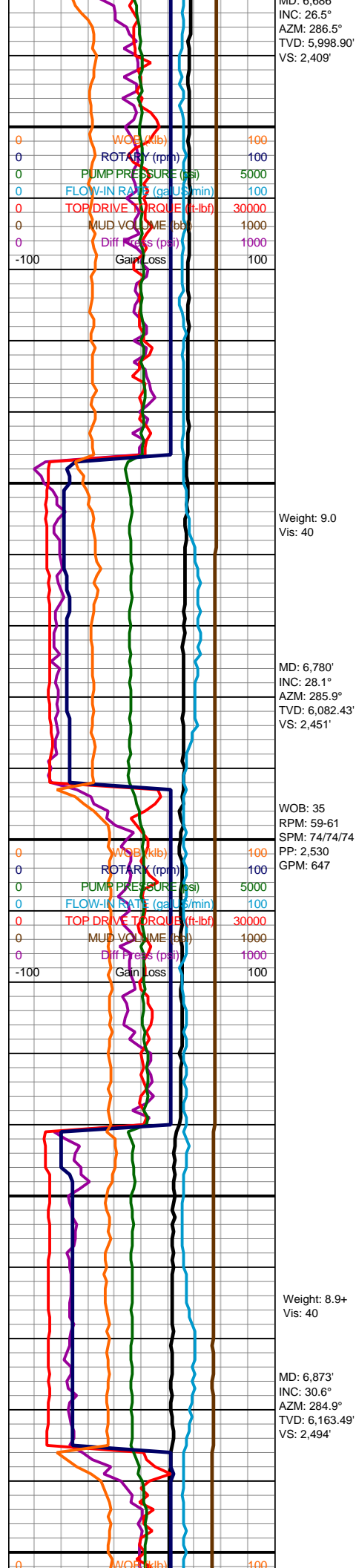
[illegible]





0.4	Sandstone Neutron Porosity (ratio)	-0.1				R20T (OHMM)				
0	PE (barns/electron)	10	0.2	2	20	200	2E3			
0.3	Sandstone Density Porosity (ratio)	-0.3				R30T (OHMM)				
			0.2	2	20	200	2E3			
						R40T (OHMM)				
			0.2	2	20	200	2E3			
						R60T (OHMM)				
			0.2	2	20	200	2E3			
						R85T (OHMM)				
			0.2	2	20	200	2E3			
						RTAT (OHMM)				
			0.2	2	20	200	2E3			

0.4	Sandstone Neutron Porosity (ratio)	-0.1				R20T (OHMM)				
0	PE (barns/electron)	10	0.2	2	20	200	2E3			
0.3	Sandstone Density Porosity (ratio)	-0.3				R30T (OHMM)				
			0.2	2	20	200	2E3			
						R40T (OHMM)				
			0.2	2	20	200	2E3			
						R60T (OHMM)				
			0.2	2	20	200	2E3			
						R85T (OHMM)				
			0.2	2	20	200	2E3			
						RTAT (OHMM)				
			0.2	2	20	200	2E3			



6710': SH: medltgy to v ltgy, frm, sb-plty to plty,
occ sb-blky, f to med txt, slty ip, calc, tr imbd pyr.
SHY-LS: beige to crm, brit to frm, flky to plty.
Scat free cal

6740': SLTY-SH: medltgy to ltgy, frm, sb-blky, occ
sb-plty, med to slty txt, slty, sdy ip, occ pyr incl;
grdg to SHY-SLTST: medltgy to ltgy, fr cons, arg
mtx, sdy ip.

6770': SLTY-SH: medltgy to ltgy, frm, sb-biky, occ sb-plty, med to slty txt, sl calc, slty, sdy ip, occ pyr incl; grdg to SHY-SLTST: medltgy to ltgy, fr cons, arg mtx, sdy ip.

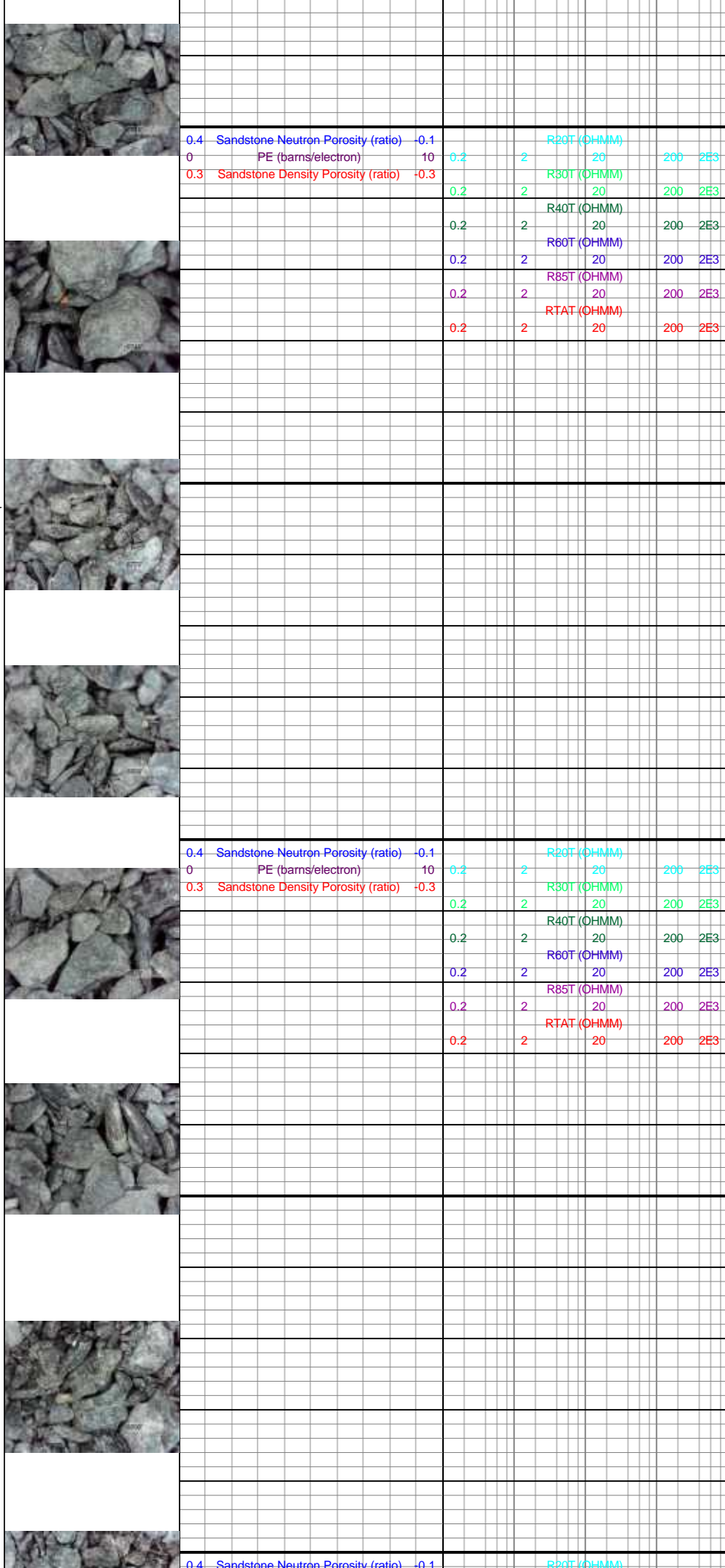
6800': SLTY-SH: medltgy to ltgy, frm, sb-blky, occ sb-plty, med to slty txt, calc, slty, sdy ip, occ pyr incl; grdg to SHY-SLTST: medltgy to ltgy, fr cons, arg mtx, sdy ip. SHY-LS: crm to v lt gy-brn, brit to frm, flky to plty.

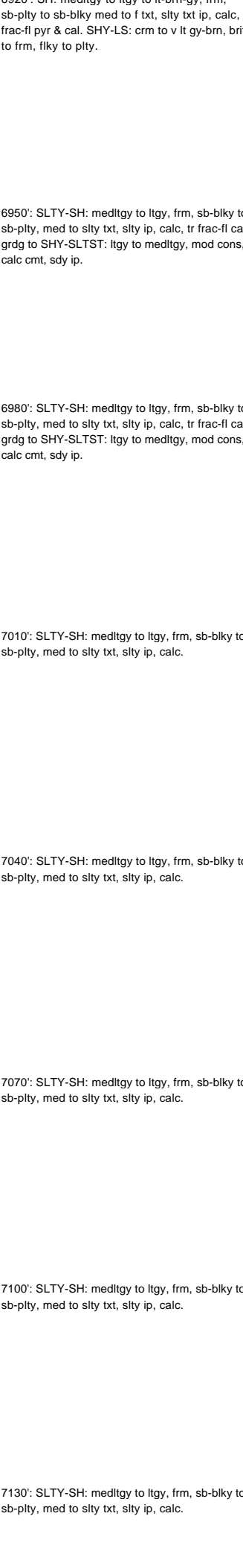
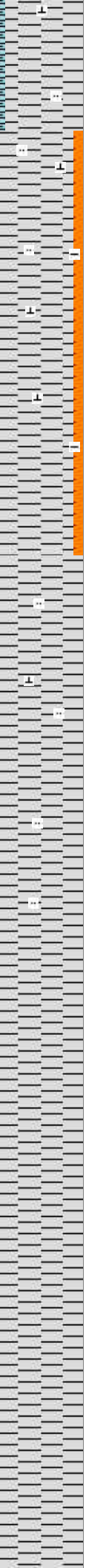
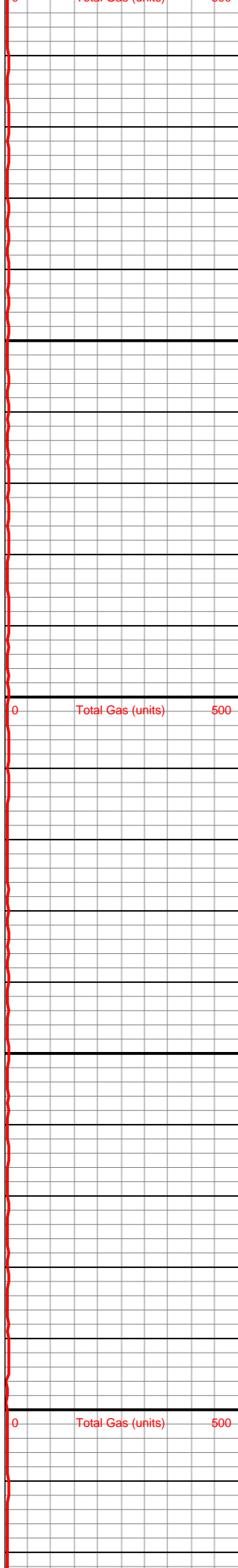
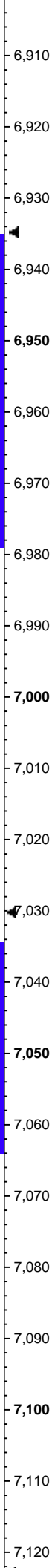
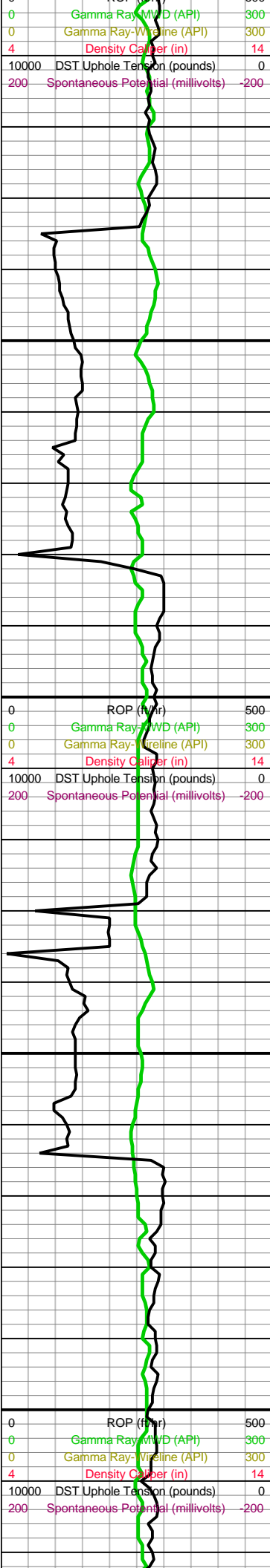
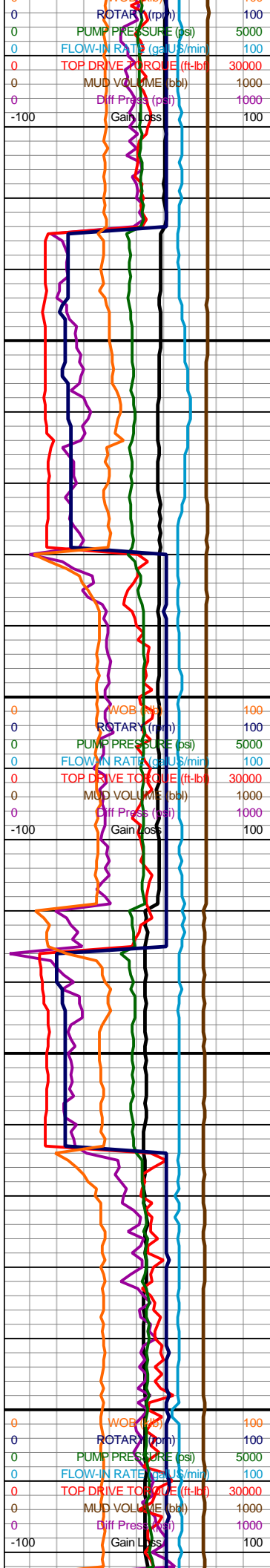
6830': SLTY-SH: medltgy to ltgy to lt-brn-gy, frm, sb-blky, occ sb-plty, med to slty txt, calc, slty, sdy ip, occ pyr incl; grdg to SHY-SLTST: medltgy to ltgy, fr cons, arg mtx, sdy ip. SHY-LS: crm to v lt gy-brn, brit to frm, filky to plty.

6860': SLTY-SH: medltgy to ltgy to lt-brn-gy, frm, sb-blky, occ sb-plty, med to slty txt, calc, slty, sdy ip, occ pyr incl; grdg to SHY-SLTST: medltgy to ltgy, fr cons, arg mtx, sdy ip. SHY-LS: crm to v lt gy-brn, brit to frm, flky to plty.

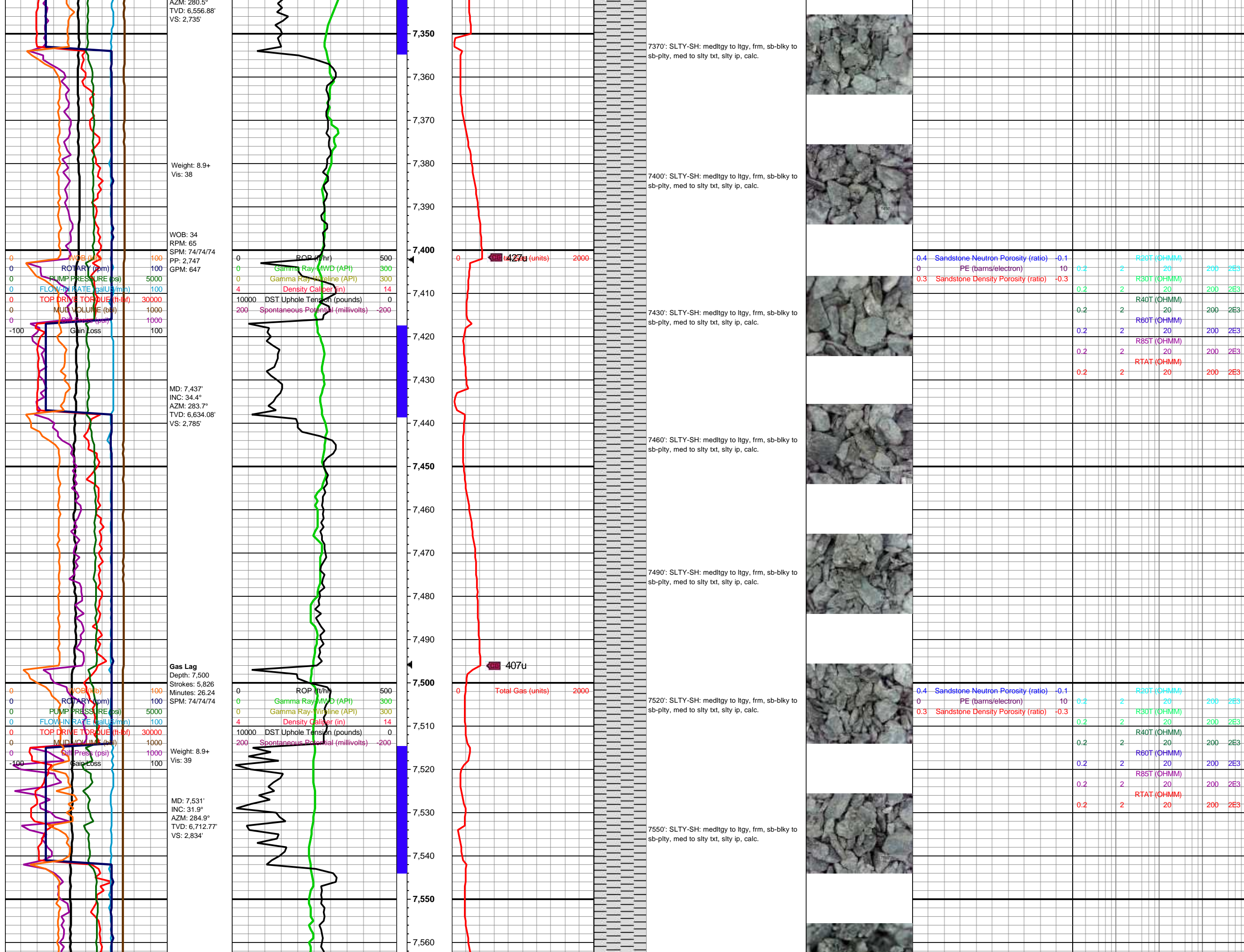
6890: SH: medltgy to ltgy to lt-brn-gy, frm,
sb-plty to sb-blky med to f txt, slty txt ip, calc, tr
frac-fl pyr & cal. SHY-LS: crm to v lt gy-brn, brit
to frm, flky to plty.

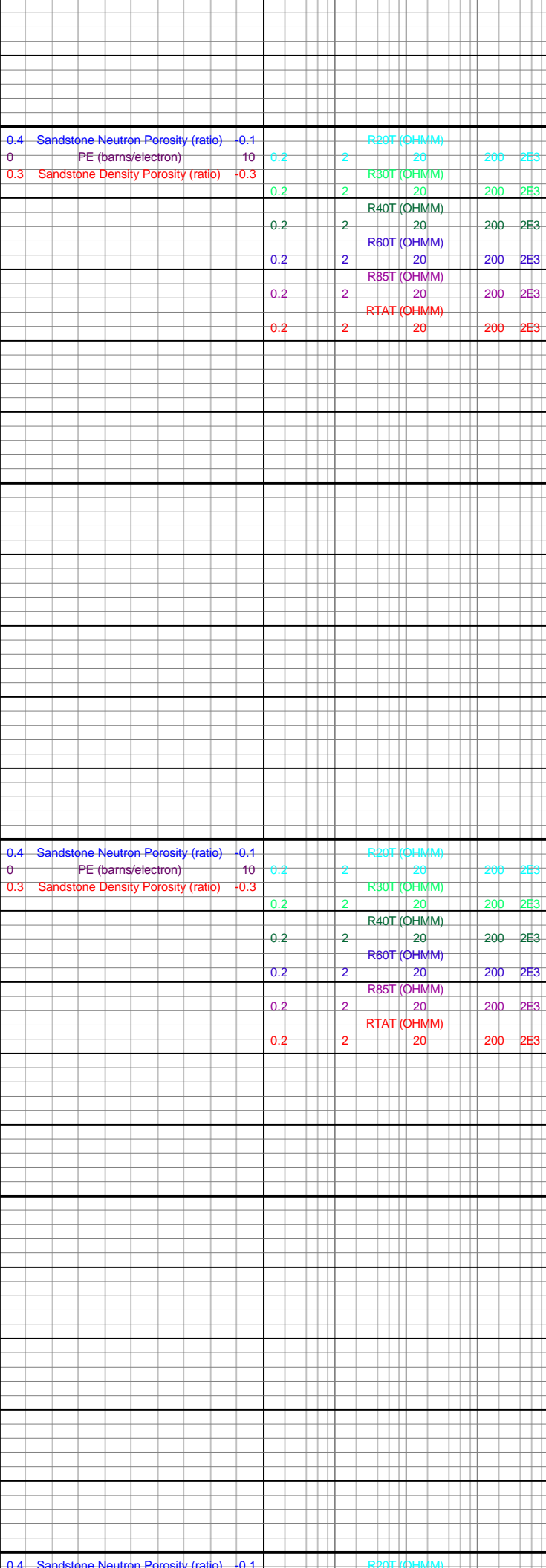
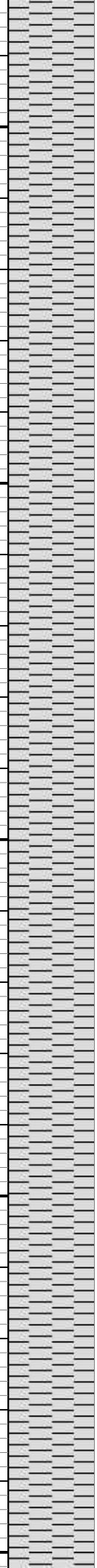
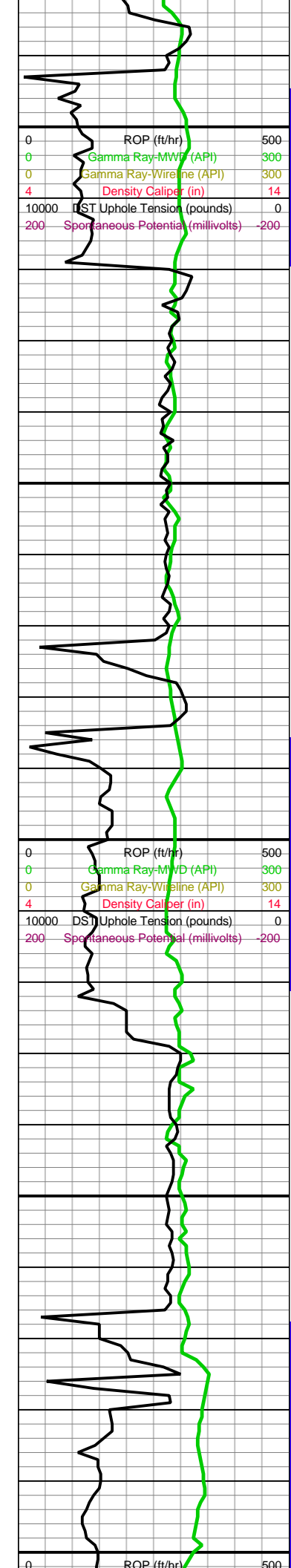
6920': SH: medltay to ltay to lt-brn-ay frm

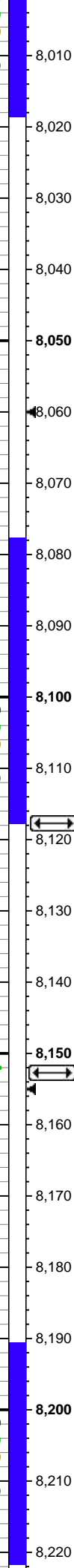
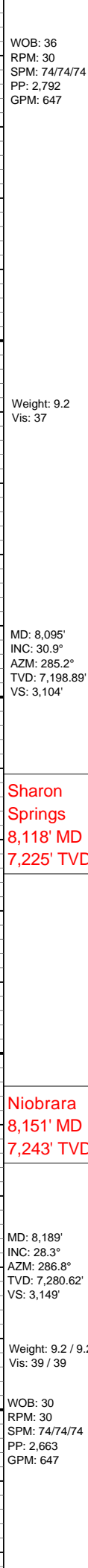




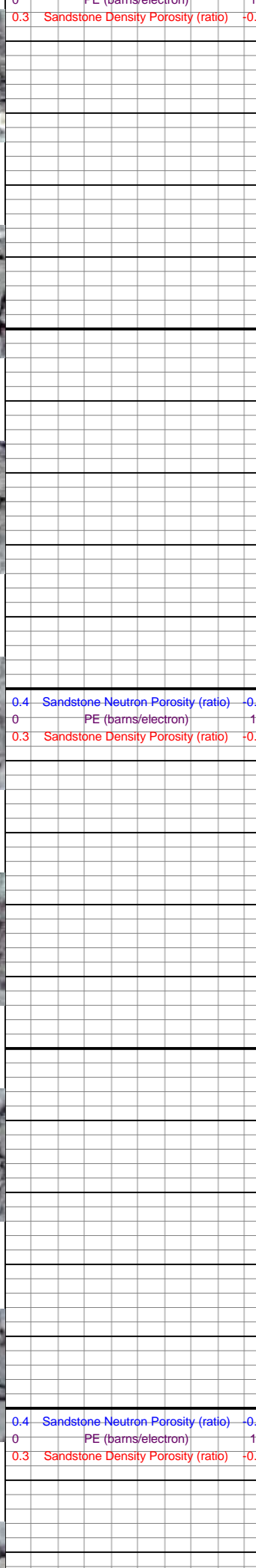
0.1 Sandstone Neutron Porosity (ratio)	-0.2	2	20	200	2E3
0 PE (barns/electron)	10	0.2	2	20	2E3
0.3 Sandstone Density Porosity (ratio)	-0.3	0.2	2	20	2E3
			R30T (OHMM)	200	2E3
			R40T (OHMM)	200	2E3
			R60T (OHMM)	200	2E3
			R85T (OHMM)	200	2E3
			RTAT (OHMM)	200	2E3
0.4 Sandstone Neutron Porosity (ratio)	-0.1		R20T (OHMM)	200	2E3
0 PE (barns/electron)	10	0.2	2	20	2E3
0.3 Sandstone Density Porosity (ratio)	-0.3	0.2	2	20	2E3
			R30T (OHMM)	200	2E3
			R40T (OHMM)	200	2E3
			R60T (OHMM)	200	2E3
			R85T (OHMM)	200	2E3
			RTAT (OHMM)	200	2E3
0.4 Sandstone Neutron Porosity (ratio)	-0.1		R20T (OHMM)	200	2E3
0 PE (barns/electron)	10	0.2	2	20	2E3
0.3 Sandstone Density Porosity (ratio)	-0.3	0.2	2	20	2E3
			R30T (OHMM)	200	2E3
			R40T (OHMM)	200	2E3
			R60T (OHMM)	200	2E3
			R85T (OHMM)	200	2E3

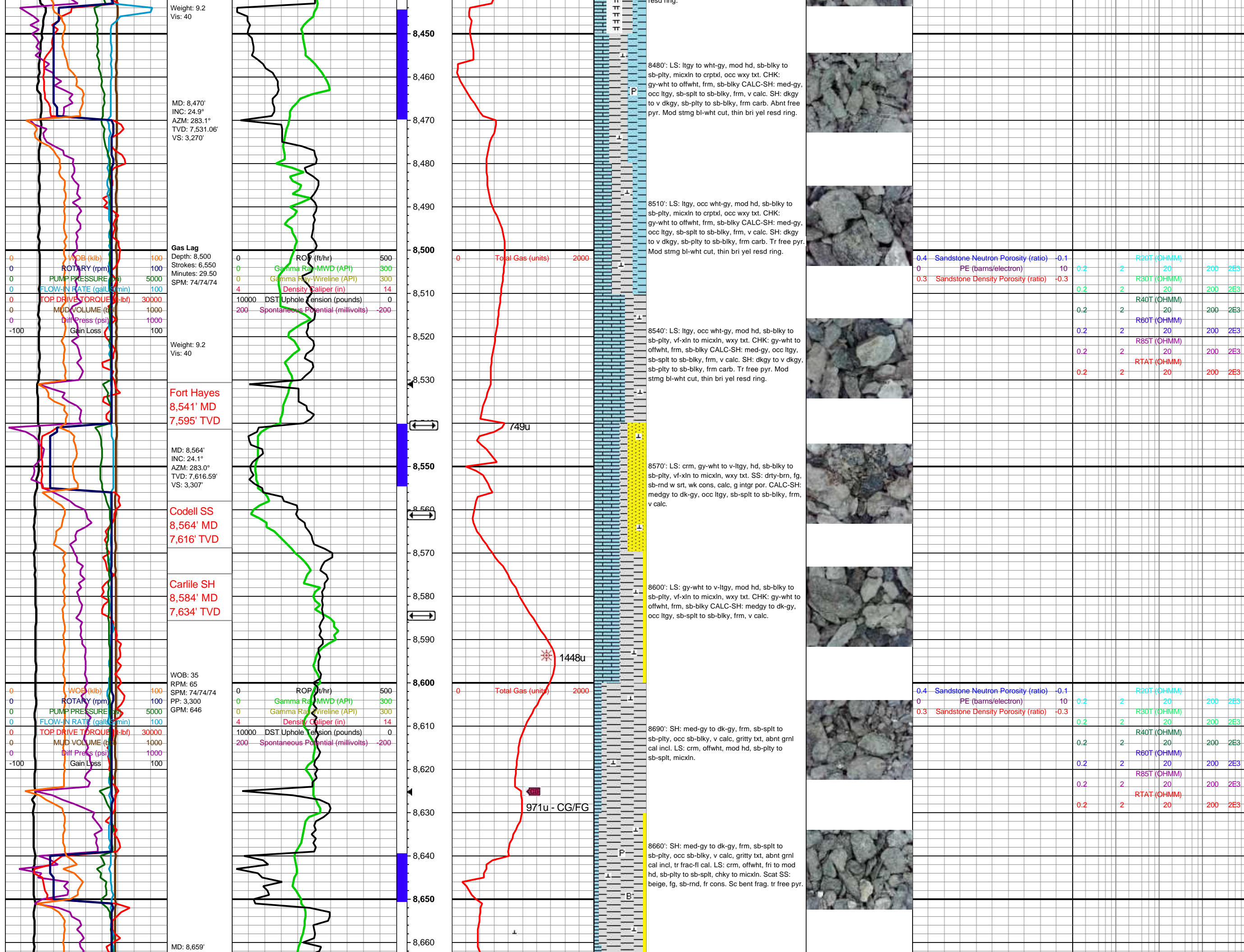


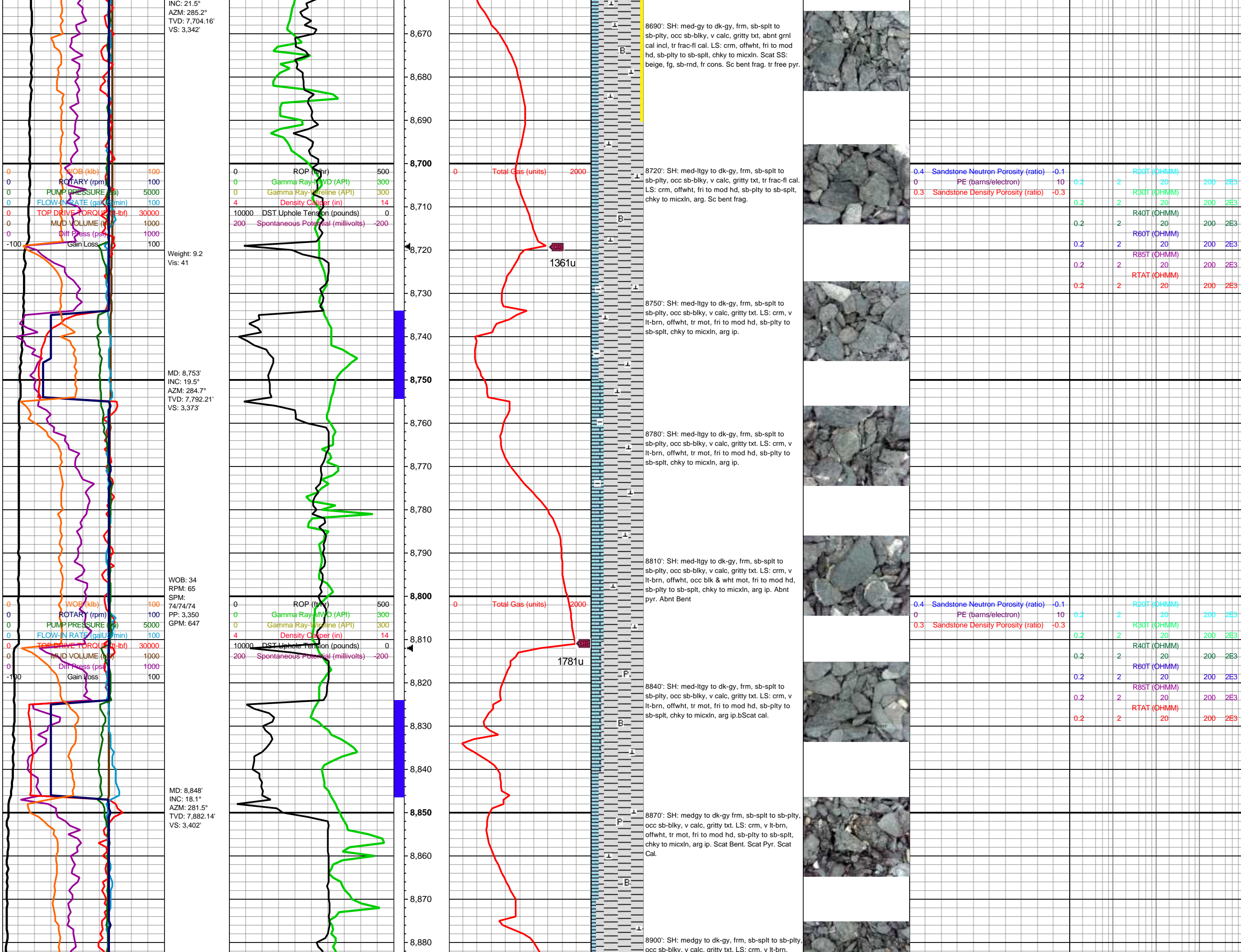


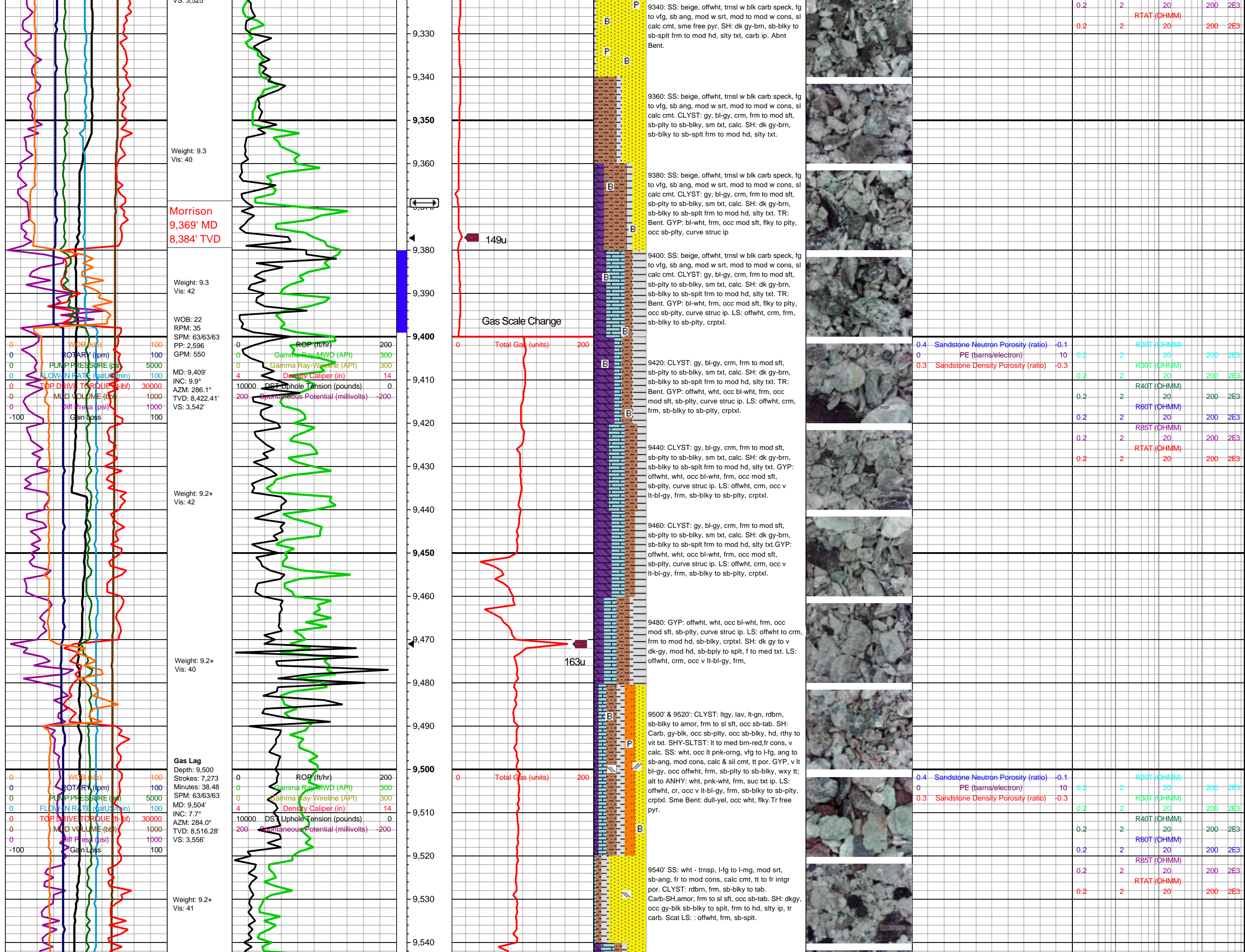


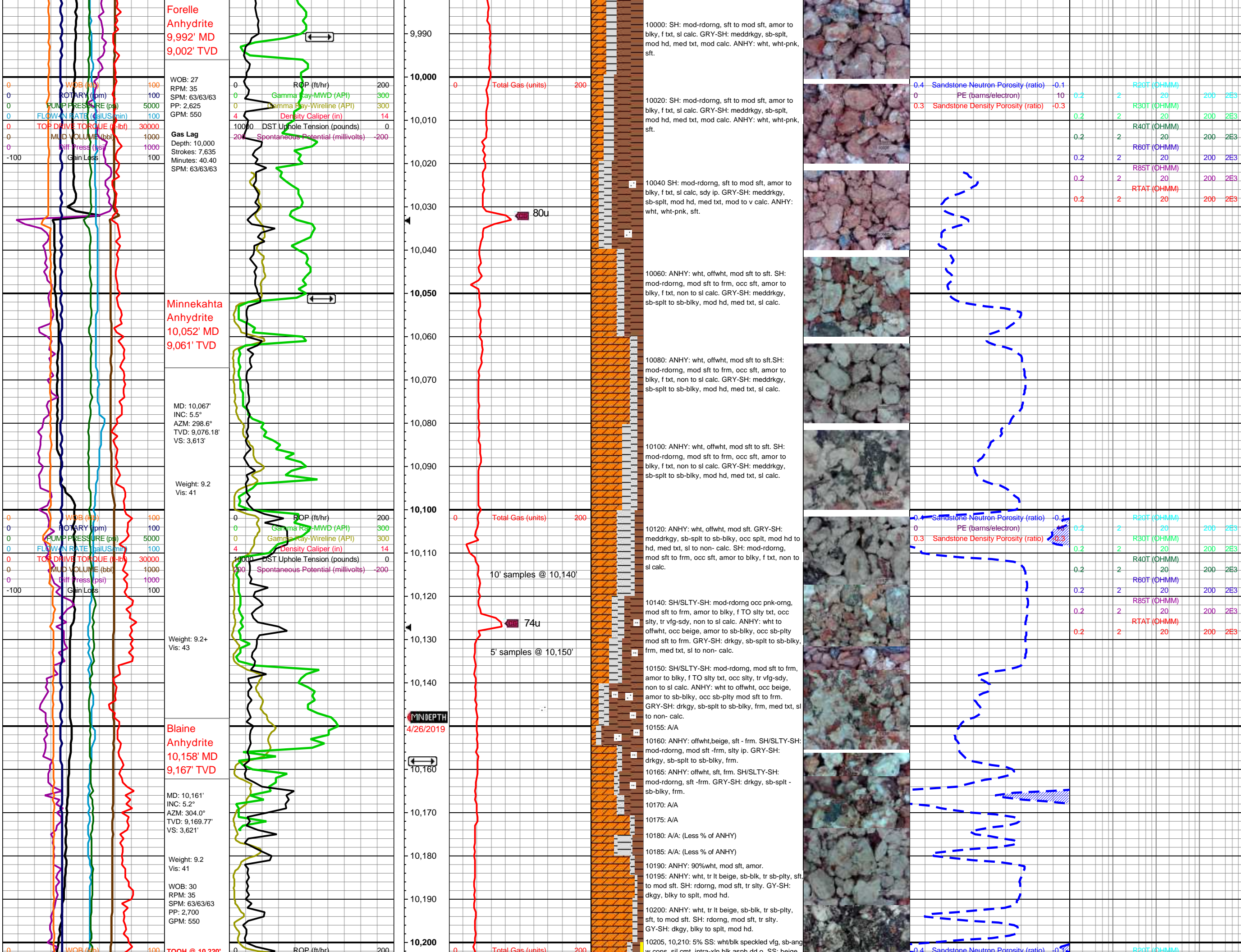
8240': CHK: lt-brn to lt gy, mot, str, sb-splt to sb-flky, fri, v calc. arg. MRLST: med-gy to drkgy

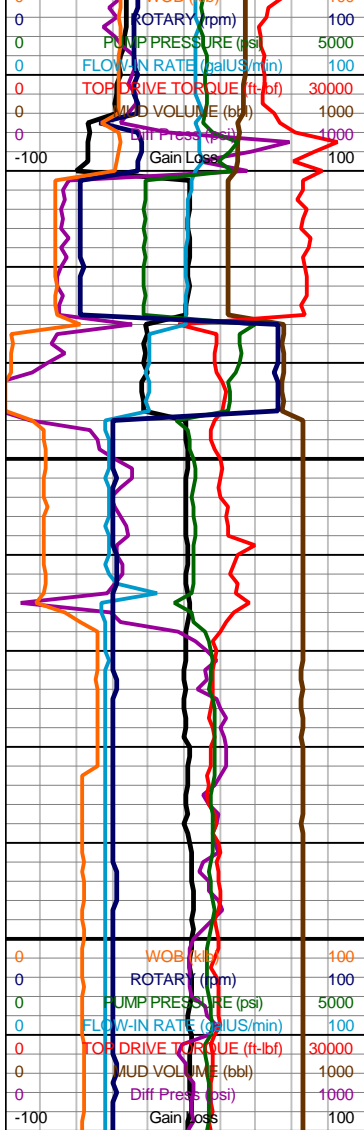
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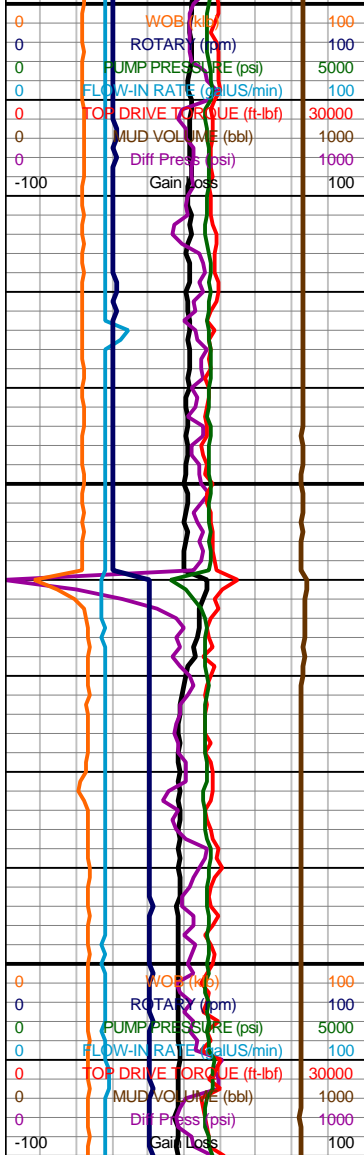
Lyons
10,219' MD
9,228' TVD

TD'd @ 10,235' @ 22:47 on 4/26/19 for intermediate casing. Casing done 4/28/19. Cementing done 4/28/19. BOB @ 15:36 MST 4/29/19.

Weight: 8.8
Vis: 32

Weight: 8.8
Vis: 32

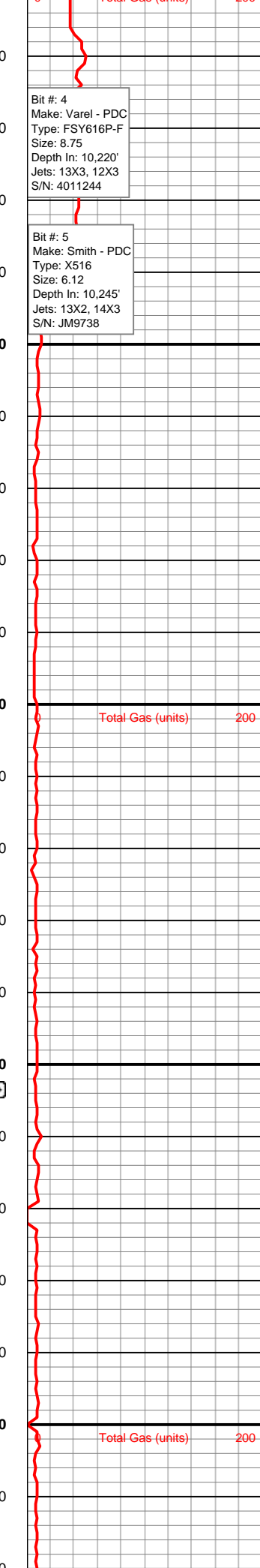
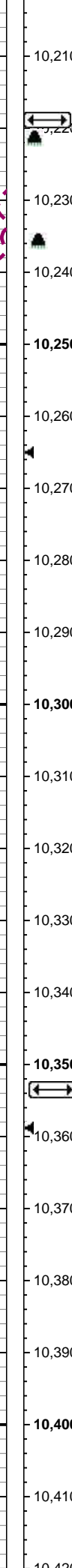
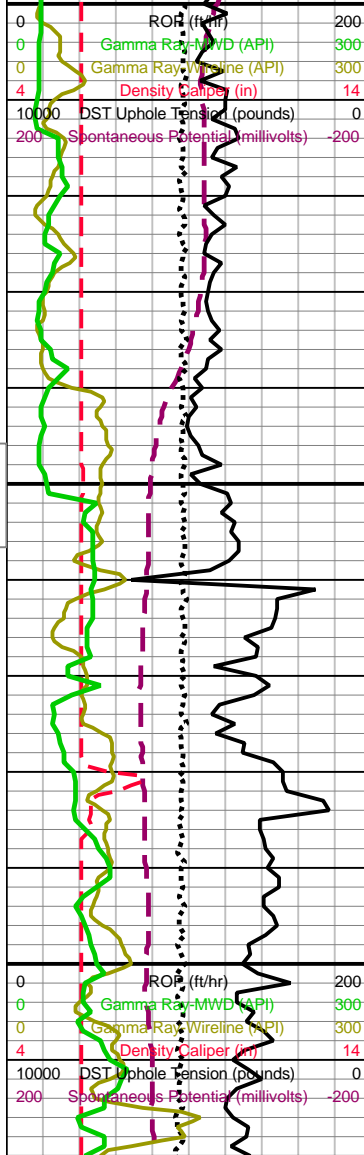
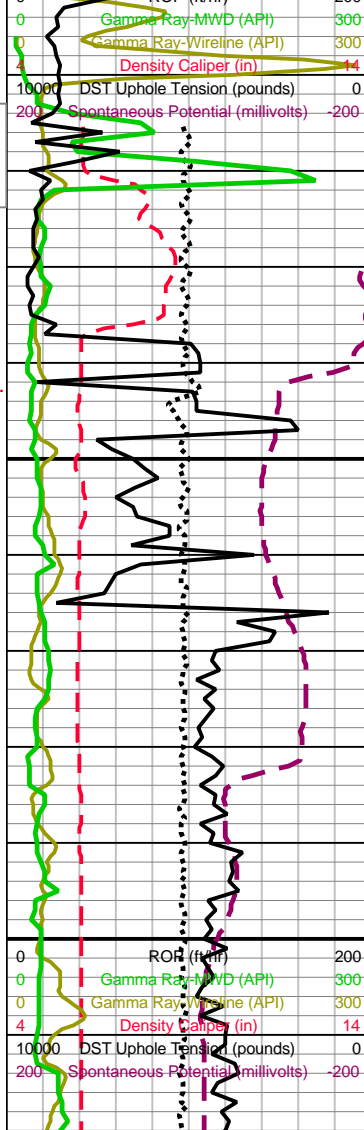
MD: 10,300'
INC: 6.0°
AZM: 317.6°
TVD: 9,308.11'
VS: 3.635°



L. Santanka
10,351' MD
9,359' TVD

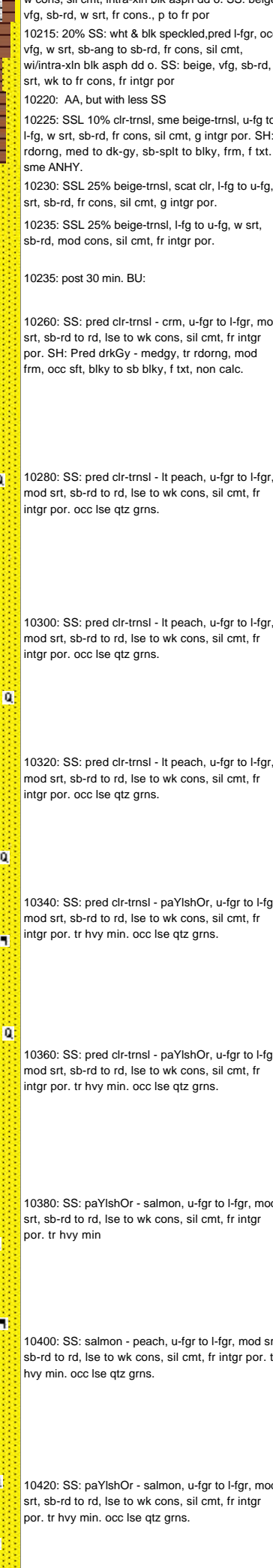
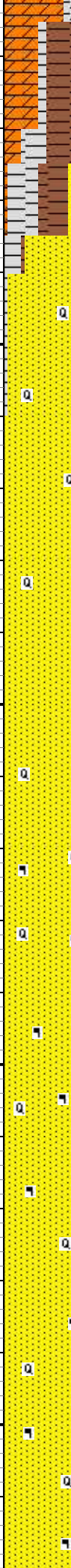
MD: 10,395'
INC: 5.4°
AZM: 323.0°
TVD: 9,402.64'
VS: 3.644°

WOB: 22
RPM: 40
SPM: 51/52
PP: 2,800
GPM: 300



Bit #: 4
Make: Varel - PDC
Type: FSY616P-F
Size: 8.75
Depth In: 10,220'
Jets: 13X3, 12X3
S/N: 4011244

Bit #: 5
Make: Smith - PDC
Type: X516
Size: 6.12
Depth In: 10,245'
Jets: 13X3, 12X3
S/N: JM9738



10215: 20% SS: wht & blk speckled, pred l-fgr, occ vfg, w srt, sb-ang to sb-rd, fr cons, sil cmt, wi/intra-xln blk asph dd o. SS: beige, vfg, sb-rd, w srt, wk to fr cons, fr intgr por

10220: AA, but with less SS

10225: SSL 10% clr-trnsl, sme beige-trnsl, u-fgr to l-fgr, w srt, sb-rd, fr cons, sil cmt, g intgr por. SH: rdorn, med to dk-gy, sb-splt to blk, frm, f txt. sme ANHY.

10230: SSL 25% beige-trnsl, scat clr, l-fgr to u-fgr, w srt, sb-rd, fr cons, sil cmt, g intgr por.

10235: SSL 25% beige-trnsl, l-fgr to u-fgr, w srt, sb-rd, mod cons, sil cmt, fr intgr por.

10235: post 30 min. BU:

10260: SS: pred clr-trnsl - crm, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. SH: Pred drkGy - medgy, tr rdorn, mod frm, occ sft, blkly to sb blkly, f txt, non calc.

10280: SS: pred clr-trnsl - lt peach, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. occ lse qtz grns.

10300: SS: pred clr-trnsl - lt peach, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. occ lse qtz grns.

10320: SS: pred clr-trnsl - lt peach, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. occ lse qtz grns.

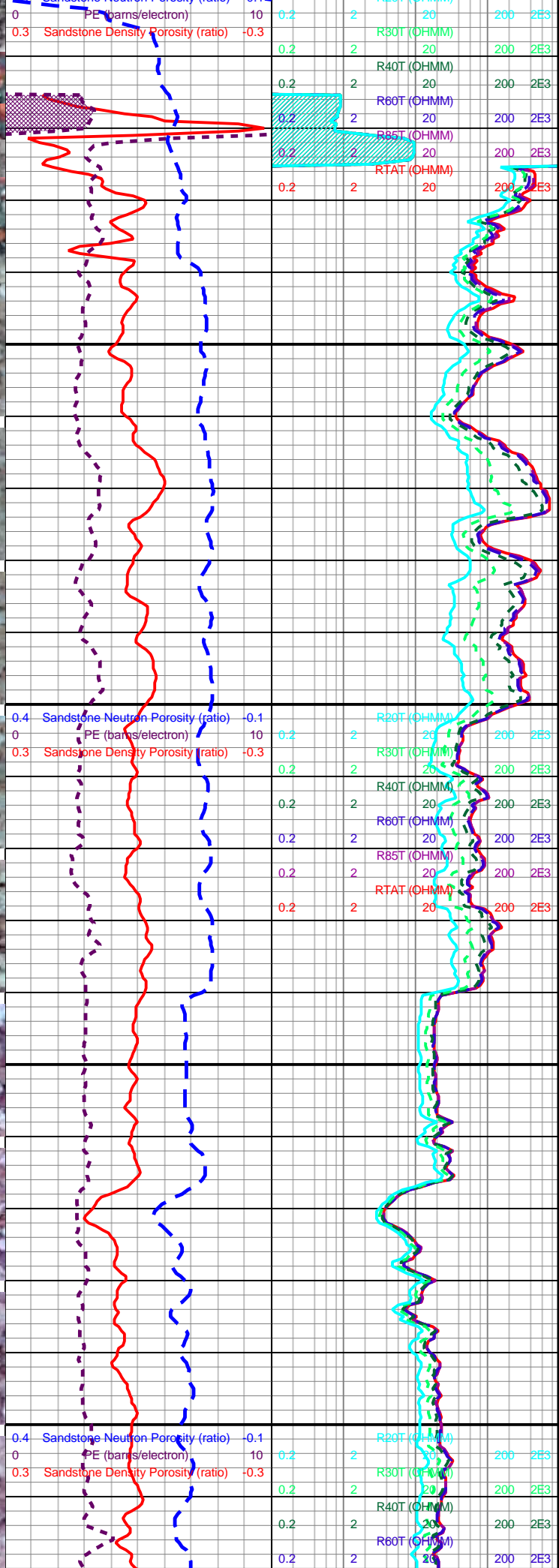
10340: SS: pred clr-trnsl - paYlshOr, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. tr hvy min. occ lse qtz grns.

10360: SS: pred clr-trnsl - paYlshOr, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. tr hvy min. occ lse qtz grns.

10380: SS: paYlshOr - salmon, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. tr hvy min

10400: SS: salmon - peach, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. tr hvy min. occ lse qtz grns.

10420: SS: paYlshOr - salmon, u-fgr to l-fgr, mod srt, sb-rd to rd, lse to wk cons, sil cmt, fr intgr por. tr hvy min. occ lse qtz grns.



0.3 Sandstone Density Porosity (ratio) -0.3

0.2 R30T (OHMM) 200 2E3

0.2 R40T (OHMM) 200 2E3

0.2 R60T (OHMM) 200 2E3

0.2 R85T (OHMM) 200 2E3

0.2 RTAT (OHMM) 200 2E3

0.4 Sandstone Neutron Porosity (ratio) -0.1

0.3 Sandstone Density Porosity (ratio) -0.3

0.2 R20T (OHMM) 200 2E3

0.2 R30T (OHMM) 200 2E3

0.2 R40T (OHMM) 200 2E3

0.2 R60T (OHMM) 200 2E3

0.2 R85T (OHMM) 200 2E3

0.2 RTAT (OHMM) 200 2E3

0.4 Sandstone Neutron Porosity (ratio) -0.1

0.3 Sandstone Density Porosity (ratio) -0.3

0.2 R20T (OHMM) 200 2E3

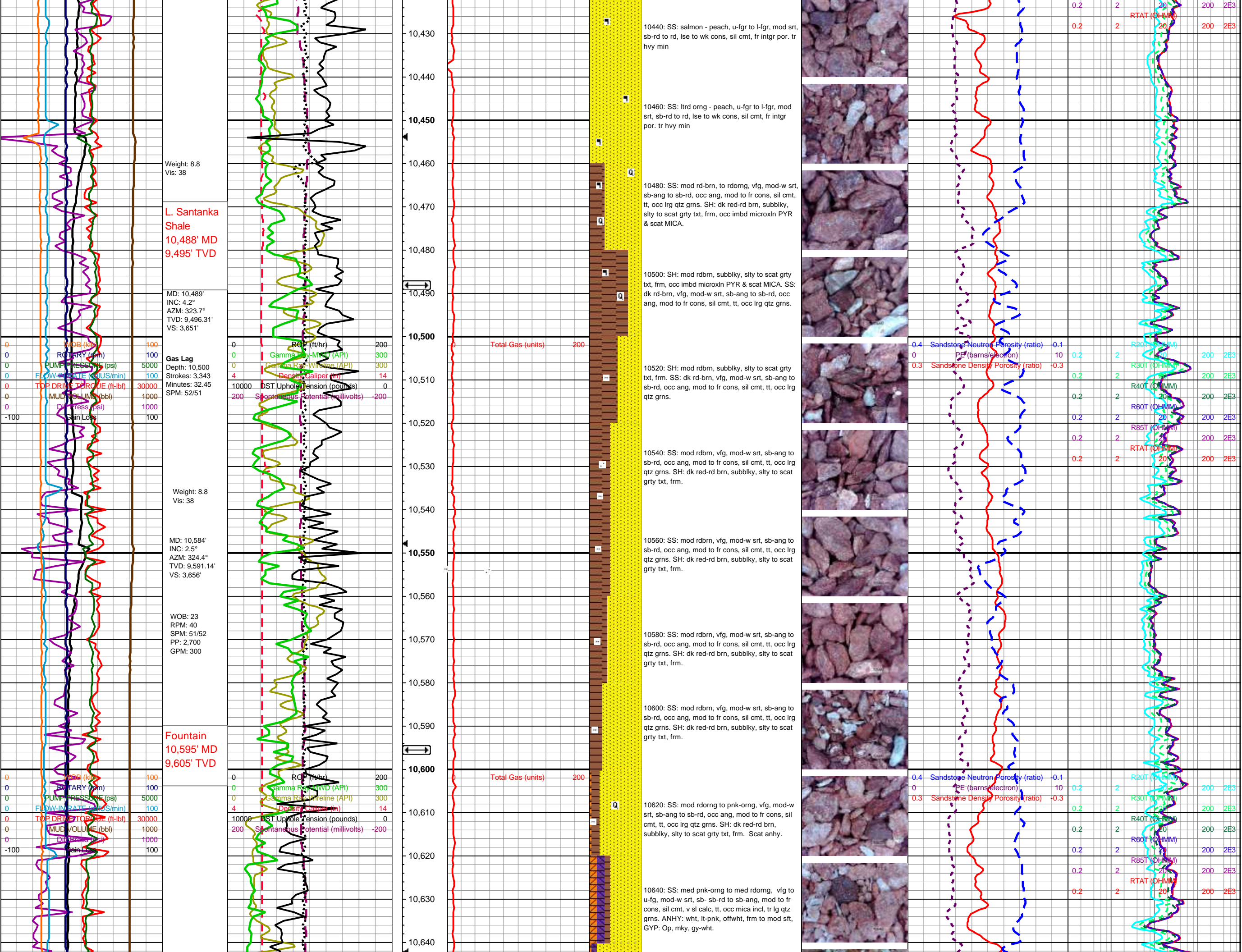
0.2 R30T (OHMM) 200 2E3

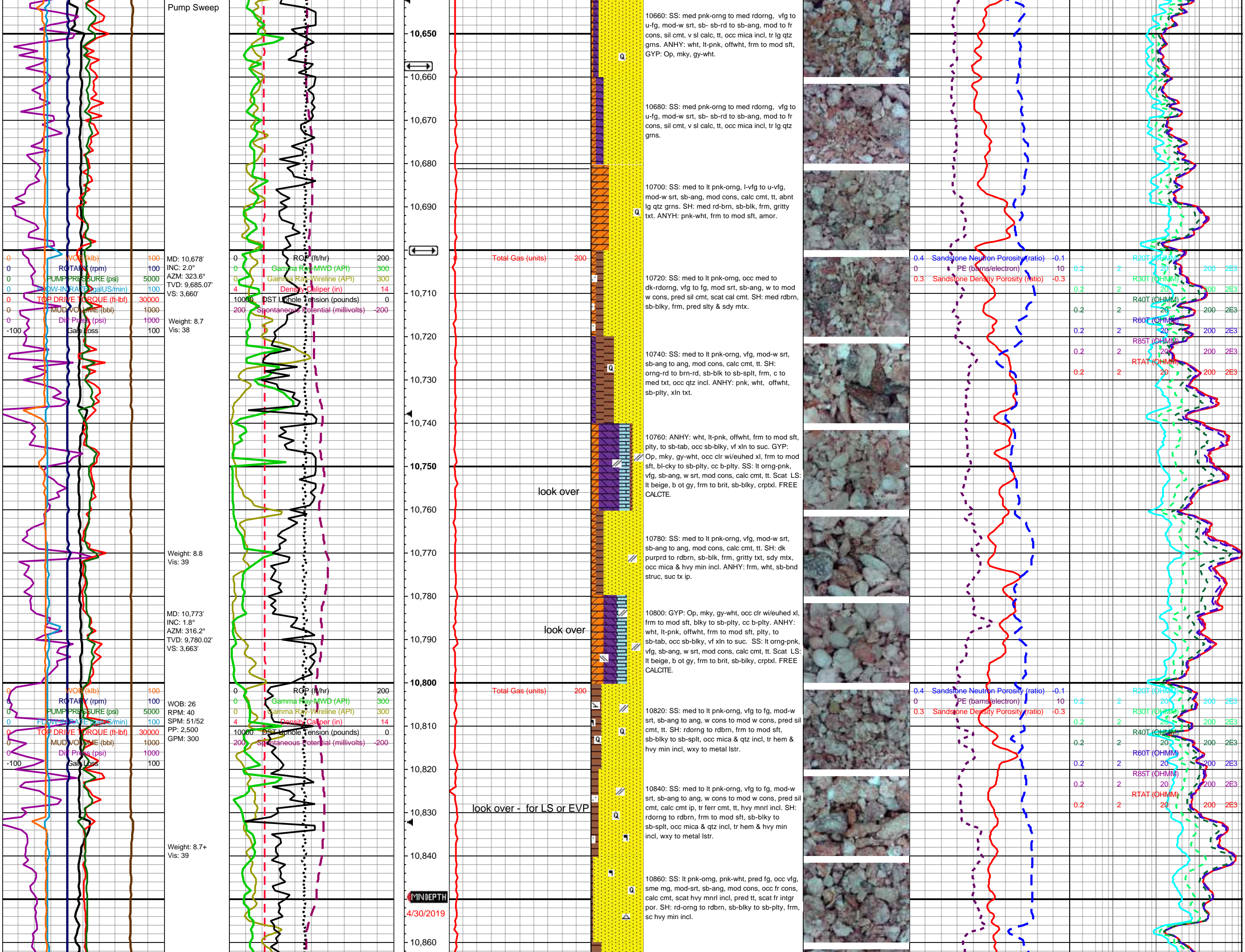
0.2 R40T (OHMM) 200 2E3

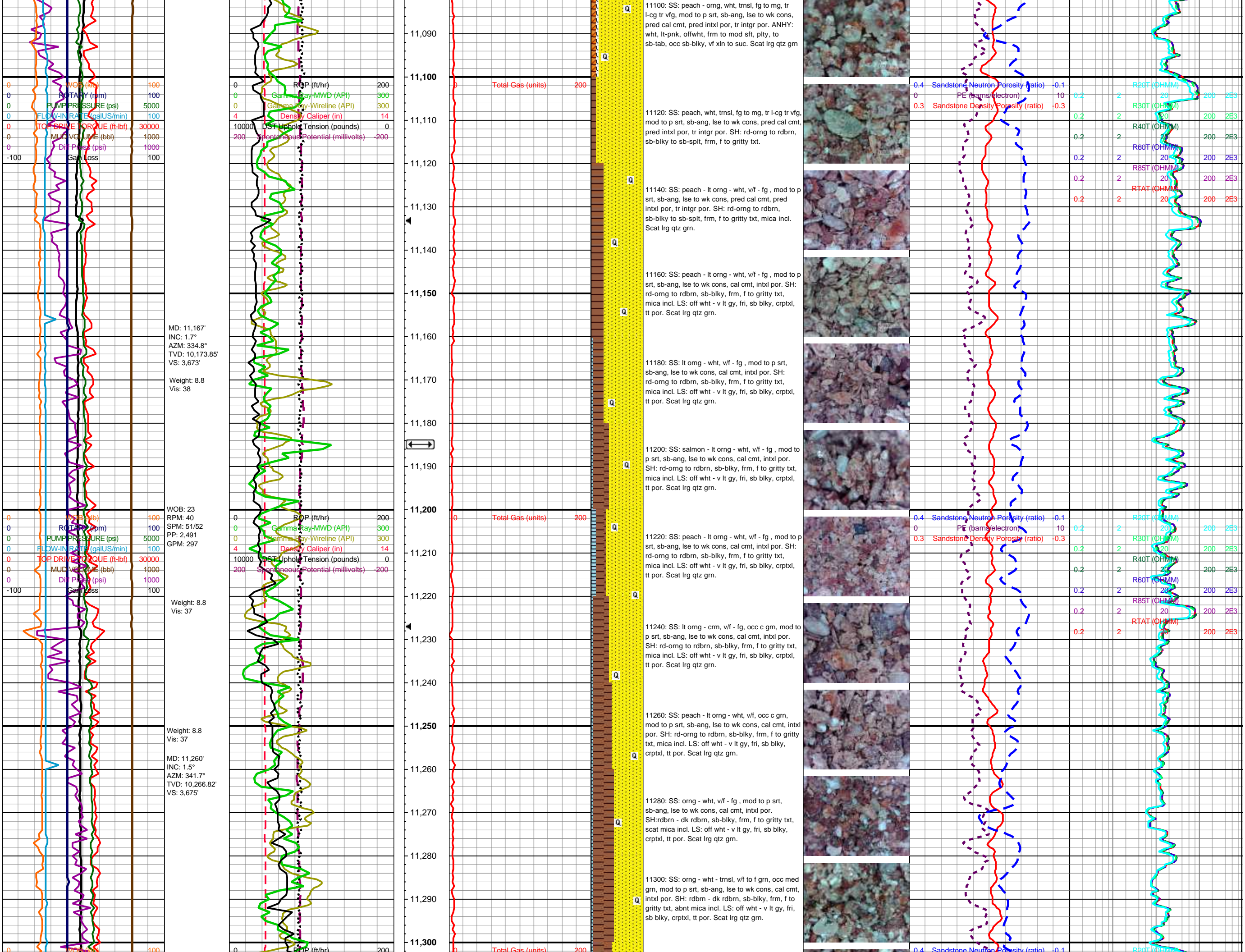
0.2 R60T (OHMM) 200 2E3

0.2 R85T (OHMM) 200 2E3

0.2 RTAT (OHMM) 200 2E3







0.4

Sandstone Neutron Porosity (ratio)

-0.1

0

PE (barns/electron)

10

0.3

Sandstone Density Porosity (ratio)

-0.3

R20T (OHMM)

200

2E3

R30T (OHMM)

200

2E3

R40T (OHMM)

200

2E3

R60T (OHMM)

200

2E3

R85T (OHMM)

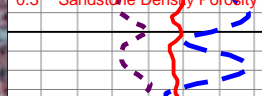
200

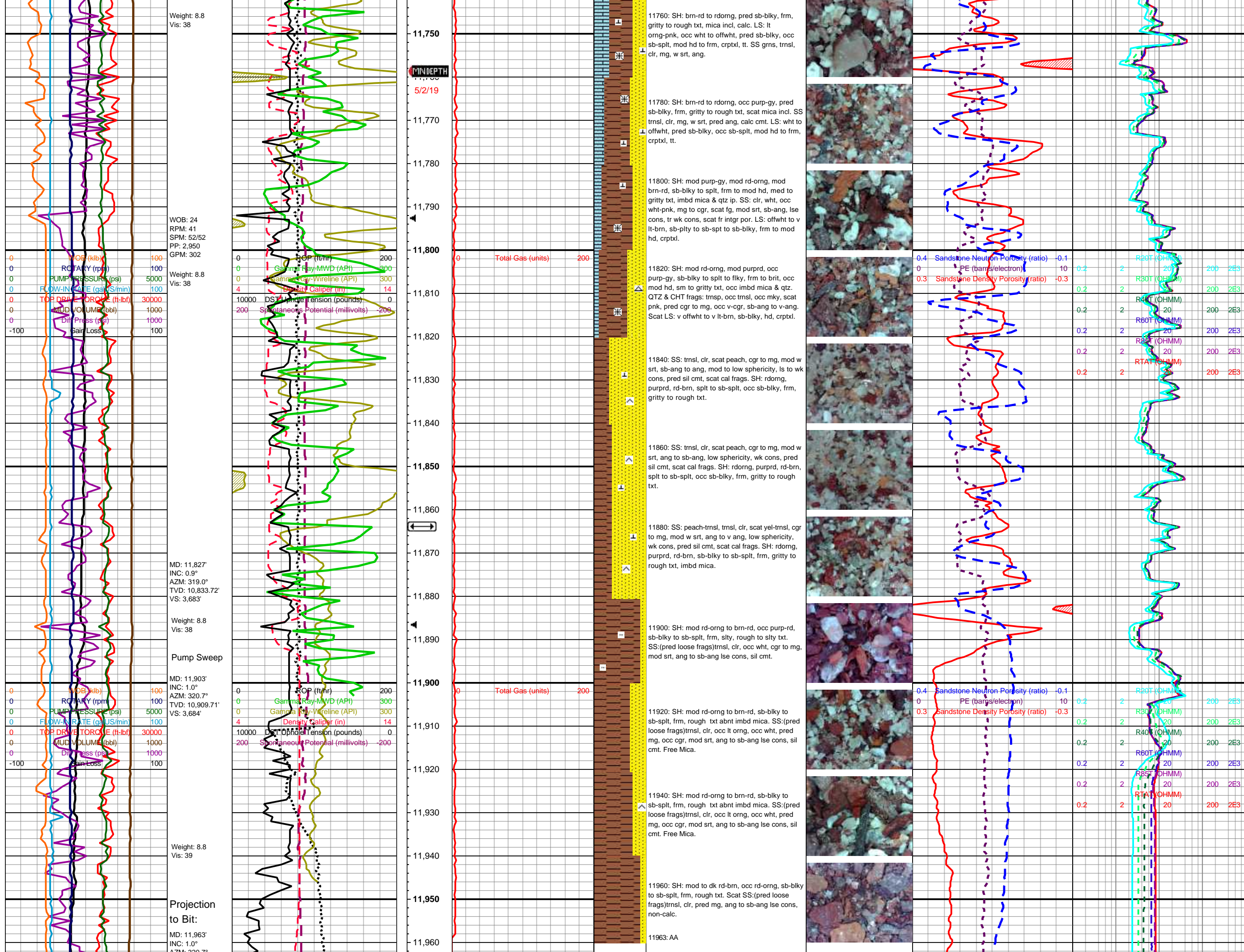
2E3

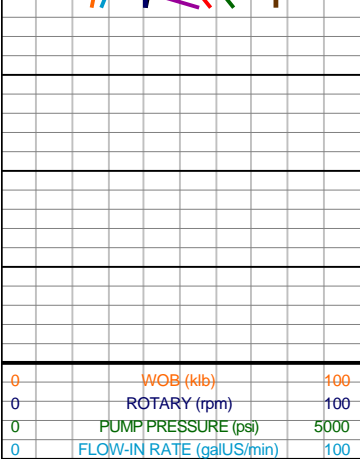
RTAT (OHMM)

200

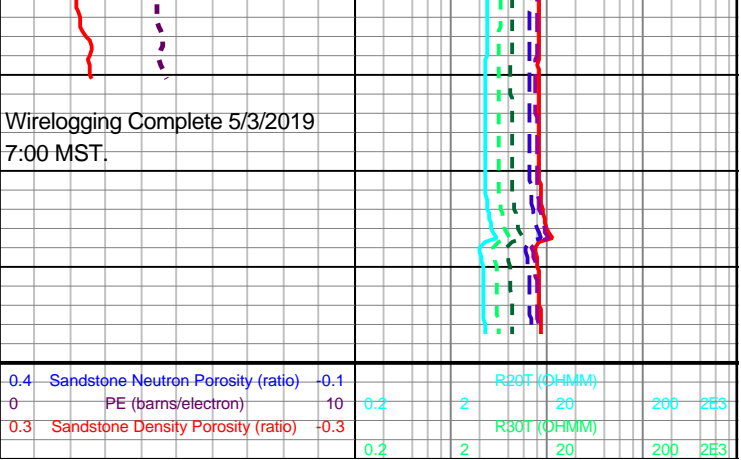
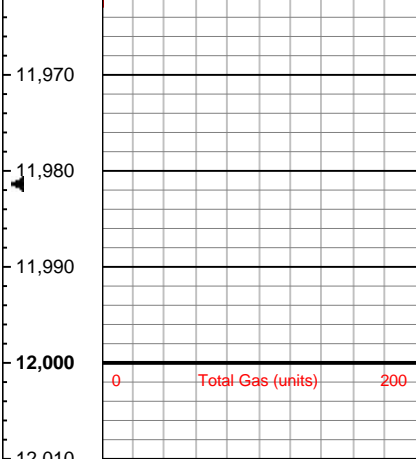
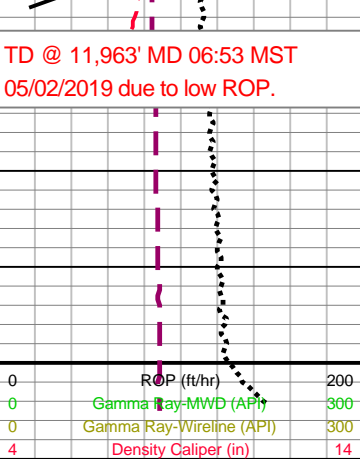
2E3







AZM: 320.7
TVD: 10,969.70'
VS: 3.685'



Wirelogging Complete 5/3/2019
7:00 MST.