



**Well Information**

**Operator:** Northern Cross (Yukon) Limited  
**Well Name:** West Chance H-28  
**Location:** 300/H-28-6610-13730/0  
**UWI:** NCY W Chance H-28  
**Pool / Field:** / Permit 0016  
**Well License #:** 1135  
**Province / State:** Yukon Territory  
**Country:** Canada

**Total Depth**

Measurement Type	MD	TVD
Drillers TD (Tally)	<u>3024.8 m</u>	<u>3024.62 m</u>
Drillers TD (Strap or SLM)	<u>m</u>	<u>m</u>
Loggers TD	<u>m</u>	<u>m</u>

**Well Co - Ordinates**

**Longitude**      **Latitude**      **Well Type:** Vertical

**Surface Co-Ordinates:** 137.340564      66.072982      **NS:**  
**EW:**

**Int. Casing Co-Ordinates:**      **NS:**  
**EW:**

**Bottom Hole Co-Ordinates:** 137.340564      66.072982      **NS:**  
**EW:**

**UTM Surface Co-Ordinates:** **Northing:** 7336214.66      **Easting:** 384033.44

**Elevations**

**Reference:** MSL

**Ground:** 461.8 m

**Cut(-) / Fill(+):** +0.3 m

**K.B. to Ground:** 8.36 m

**Kelly Bushing:** 470.16 m

**Casing Flange:** m

**Well Summary**

**Spud Date:** Jan 11, 2013 @ 18:30hrs

**TD Date:** Mar 29, 2013 @ 00:15hrs

**Rig Release Date:** \_\_\_\_\_

**Contractor:** Patterson-UTI Drilling Canada Ltd.

**Casing Summary**

Type	Hole Size	Casing Size	Landed At
Conductor	762 mm	508 mm	31.7 m
Surface	444.5 mm	339.7 mm	404.4 m
Intermediate	311 mm	244.5 mm	1526 m
Liner	222 mm	177.8 mm	2882.37 m

**Drilling Fluid Summary**

Fluid Type	From	To
Gel/Chem - Polymer	32 m	406 m
KCL/Ultradrill	406 m	1420 m
KCL/Ultradrill	1420 m	2652.8 m

**Work Schedule**

Contractor	Geologist	Log Interval	Dates Logged
Keitech Consultants Ltd	Trevor Wall	32 m - 1734 m	Jan 9, 2013 - Feb 7, 2013
Keitech Consultants Ltd	H. Gluth/ T. Wall	1734 m - 3024.8 m	Feb 7, 2013 - Apr 4, 2013

**Remarks**

\_\_\_\_\_  
 \_\_\_\_\_



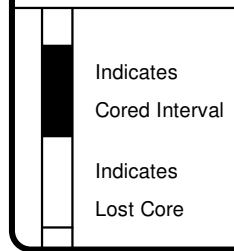
### Trace Fossil Track

An	Anconichnus	Ar	Arenicolites	At	Arthropycus	As	Asterosoma
Au	Aulichnites	Be	Bergaueria	Cg	Camborygma	Cf	Celliforma
Cb	Chabolithes	Ch	Chondrites	Cl	Climactichnites	Co	Conichnus
Cp	Cosmoraphe	C	Cruziana	Cy	Cylindrichnus	Da	Dactyloidites
Dm	Dimorphichnus	D	Diplocraterion	Ea	Eatonichnus	En	Entobia
Et	Entomichnus	Esc	Escape Traces	Ga	Gastrochaenolites	Gl	Glossifungites
G	Gyrolithes	Gy	Gyrophyllites	H	Helminthopsis	K	Kouphichnius
L	Lockeia	Lo	Lorenzina	Mp	Macanopsis	Ma	Macaronichnus
Mo	Monocraterion	Ne	Neonereites	N	Nereites	O	Ophiomorpha
Pa	Palaeophycus	Pd	Paleodictyon	Pc	Paleohelcura	Pl	Paleoscolytus
Pt	Petalichnus	Py	Phycodes	Ph	Phycosiphon	P	Planolites
Pm	Psammichnites	Ps	Psilonichnus	Rh	Rhizocorallium	Rg	Rogerella
Ro	Rosselia	Ru	Rusophycus	Sb	Scalarituba	Sc	Schaubcylindrichnus
Sy	Scovenia	Si	Siphonichnus	S	Skolithos	Sp	Spirophycus
Su	Subphylochora	Syn	Synaeresis Cracks	Te	Teichichnus	Tr	Terebellina
Td	Teredolites	Th	Thalassinoides	Tc	Trichichnus	Tp	Trichophycus
Ty	Trypanites	Z	Zoophycos				

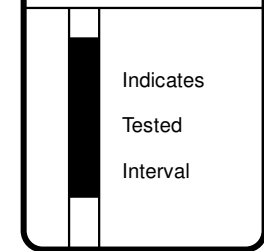
### Porosity Type Track

e	Earthy - low permeability - crystals / grains less than 1 / 16 mm	
☐	Fenestral - voids from gas bubbles - shrinkage cracks - birdseye texture	
X	Intercrystalline - Interfragmental - Intergranular	
F	Fracture	O Organic - Bridged - Intrafossil
⊕	Interoolitic - Interpelletoidal	P Pinpoint - voids less than 1/ 16 mm
~	Moldic	V Vuggy - voids greater than 1 / 16 mm

### Core Track



### Test Track



### Oil Show Track

●	Even staining (75 - 100% of the rock is stained) - fluoresces in solvent
◐	Spotted staining (50 - 75% of the rock is stained) - fluoresces in solvent
◑	Spotted staining (25 - 50% of the rock is stained) - fluoresces in solvent
◒	Spotted staining (1 - 25% of the rock is stained) - fluoresces in solvent
○	Questionable oil staining - No fluorescents in solvent
D	Dead oil staining - asphaltic - bitumen - pyrobitumen etc.
F	Fluoresces - no visible oil staining

### Framework Track

Framework is a ratio between clastic material greater than 1/16 mm and primary void filler less than 1/16 mm.

? indicates questionable interpretation

### Sedimentary Structures Bedding / Cross Bedding

CM	Centimeter bedding	••••	Inverted graded bedding	≠	Massive bedding
DM	Decimeter bedding	••••	Normal graded bedding	≡	Chevron cross-bedding
MM	Millimeter bedding	≡	Herringbone cross-bedding	≡	Sigmoidal cross-bedding
	Hummocky cross-bedding	≡	Swaley cross-bedding	≡	Planar/Tabular x-bedding
	Trough cross-bedding				

### Sedimentary Bedding Contacts

BIO	Bioturbated	BORED	Bored	CAL	Caliche / calcrete	COR	Corrosional	DC	Dessication cracks
EX	Exposure	FS	Flooding surface	GLOSS	Glossifungites	GRAD	Gradational	HG	Hardground
INCL	Inclined - sharp	IRR	Irregular - sharp	MFS	Maximum flooding surface			MC	Mud cracks
NOD	Nodular	PB	Parasequence boundary	RS	Ravinement surface	RSE	Regressive surface of erosion		
ROOT	Rooted	SCOUR	Scour	SB	Sequence boundary	SHARP	Sharp	TRUN	Truncation
TSE	Transgressive surface of erosion			UNCON	Unconformity	WAVY	Wavy		

### Sedimentary Structures Laminations / Cross Laminations

	Climbing ripple cross-lams		Contorted / Slumped lams		Current ripple cross-lams
	Flaser laminations		High angle cross-lamination		High angle parallel lams
	Lenticular laminations		Low angle cross-lamination		Low angle parallel lams
	Parallel laminations		Trough cross-laminations		Varved laminations
	Wave ripple cross-lams		Wavy laminations		

### Canstrat / Amstrat Grain Size Scale

Clastic Rocks	Lower Size Limit (mm)	Upper Size Limit (mm)	Size Grades Phi (Ø)
Silt (Lower)	0.0039062	0.03125	+8 to +7
Silt (Upper)	0.03125	0.0625	+6 to +5
Very Fine Sand (Lower)	0.0625	0.09375	+4.5
Very Fine Sand (Upper)	0.09375	0.125	+4
Fine Sand (Lower)	0.125	0.1875	+3.5
Fine Sand (Upper)	0.1875	0.25	+3
Medium Sand (Lower)	0.25	0.375	+2.5
Medium Sand (Upper)	0.375	0.5	+2
Coarse Sand (Lower)	0.5	0.75	+1.5
Coarse Sand (Upper)	.75	1.0	+1
Very Coarse Sand (Lower)	1.0	1.5	+0.5
Very Coarse Sand (Upper)	1.5	2.0	0

The size measure Phi is equal to the negative logarithm to the base 2 of the size in millimeters.  
Thus 1 mm = 0 Phi and 1/2 mm = +1 Phi and 1/4 mm = +2 Phi etc.

### Wentworth Grain / Crystal Size Scale Chart

Clastic Rocks	Crystalline Rocks	Lower Size Limit (mm)	Upper Size Limit (mm)	Size Grades Phi (Ø)
Clay	Cryptocrystalline	0.0009765	0.0039062	+10 to +9
Very Fine Silt	Very Finely Microcrystalline	0.0039062	0.0078125	+8
Fine Silt	Finely Microcrystalline	0.0078125	0.015625	+7
Medium Silt	Medium Microcrystalline	0.015625	0.03125	+6
Coarse Silt	Coarsely Microcrystalline	0.03125	0.0625	+5
Very Fine Sand	Very Finely Crystalline	0.0625	0.125	+4
Fine Sand	Finely Crystalline	0.125	0.25	+3
Medium Sand	Medium Crystalline	0.25	0.5	+2
Coarse Sand	Coarsely Crystalline	0.5	1.0	+1
Very Coarse Sand	Finely Megacrystalline	1.0	2.0	0
Granules	Coarsely Megacrystalline	2.0	4.0	-1
Fine Pebbles		4.0	8.0	-2
Medium pebbles		8.0	16.0	-3
Coarse Pebbles		16.0	32.0	-4
Very Coarse pebbles		32.0	64.0	-5
Cobbles		64.0	256.0	-6 to -7
Boulders		256.0	infinity	-8 to -9

### Sedimentary Structures

	Ball and pillow	⊕	Bioturb-churned	-0-	Bioturbated-slightly	⊕	Bioturb-moderate
	Bioturb-mod well	-0w	Bioturbated-well	∞∞	Boudinage	∇∇	Burrows
	Clastic Dike		Clastic sill	∇∇	Desiccation crack	~	Dish structure
	Fault-Large scale		Fault-Small scale	∇	Flame structure	∇	Flute mark
	Geopetal		Groove casts	∇	Gutter casts	∇	Load casts
	Inclined heterolithic strata			∇	Mud chips	∇	Mud drapes
	Neptunian dike		Pit marks	↔	Pull-a-part	∇	Rill marks
	Rip up clasts		Roots / root trace	∇	Scour and Fill	∇	Slump structure
	Swash marks		Synersis crack	∇	Teepee structure	∇	Tool marks
	Water Escape						

**Drilling Progress**  
**Total Gas - ROP**  
**Gamma Ray - SP**

SP (Mv)	-90	35	160
Total Gas - Linear (units)	0	250	500
Gamma Ray (gapi)	0	75	150
MWD Gamma (gapi)	0	75	150
Drill Rate (min/m)	0	20	40

**Caliper Logs**  
**Sonic DT**

Hole Size (mm)	200	350	500	450
Y Caliper (mm)	200	350	500	450
X Caliper (mm)	200	350	500	450
Sonic Curve (ms/m)	500	300	100	100

**Density-Neutron**  
**Density Correction**  
**PEFZ**

Density Correction (Kg/m3)	200	2.5	5	7.5	10
PEF (b/e)	200	0.45	0.25	0.05	-0.15
Density Porosity (%)	200	0.45	0.25	0.05	-0.15
Neutron Porosity (%)	200	0.45	0.25	0.05	-0.15

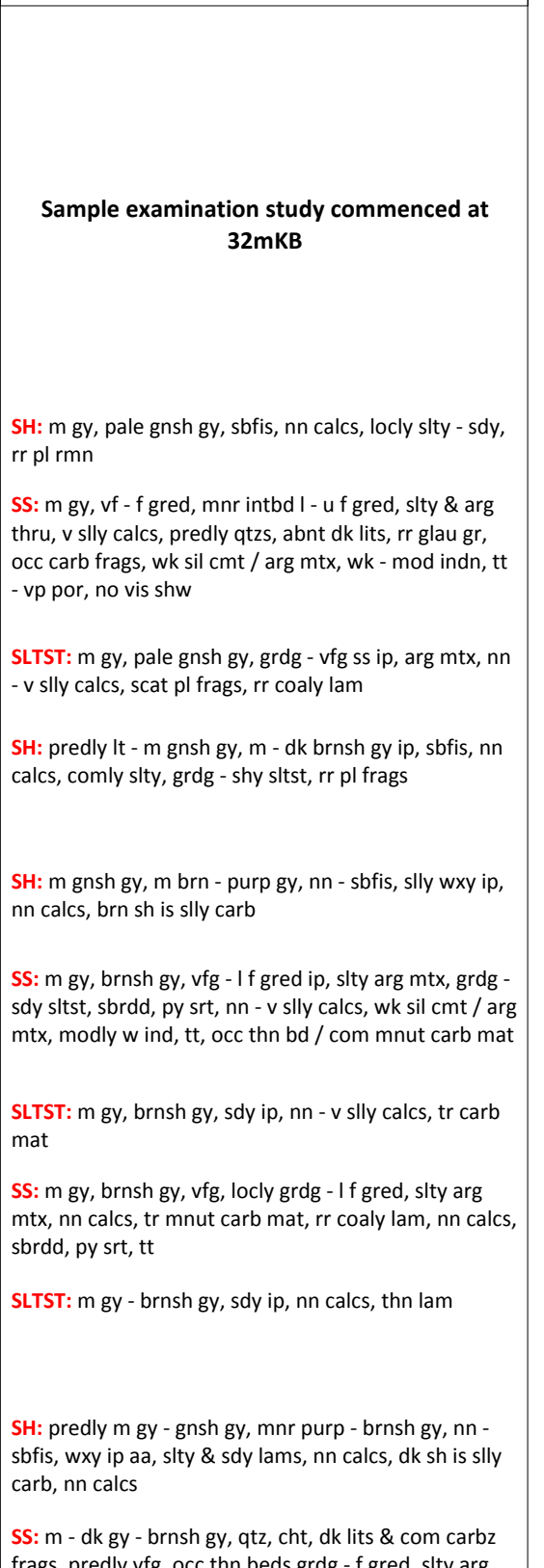
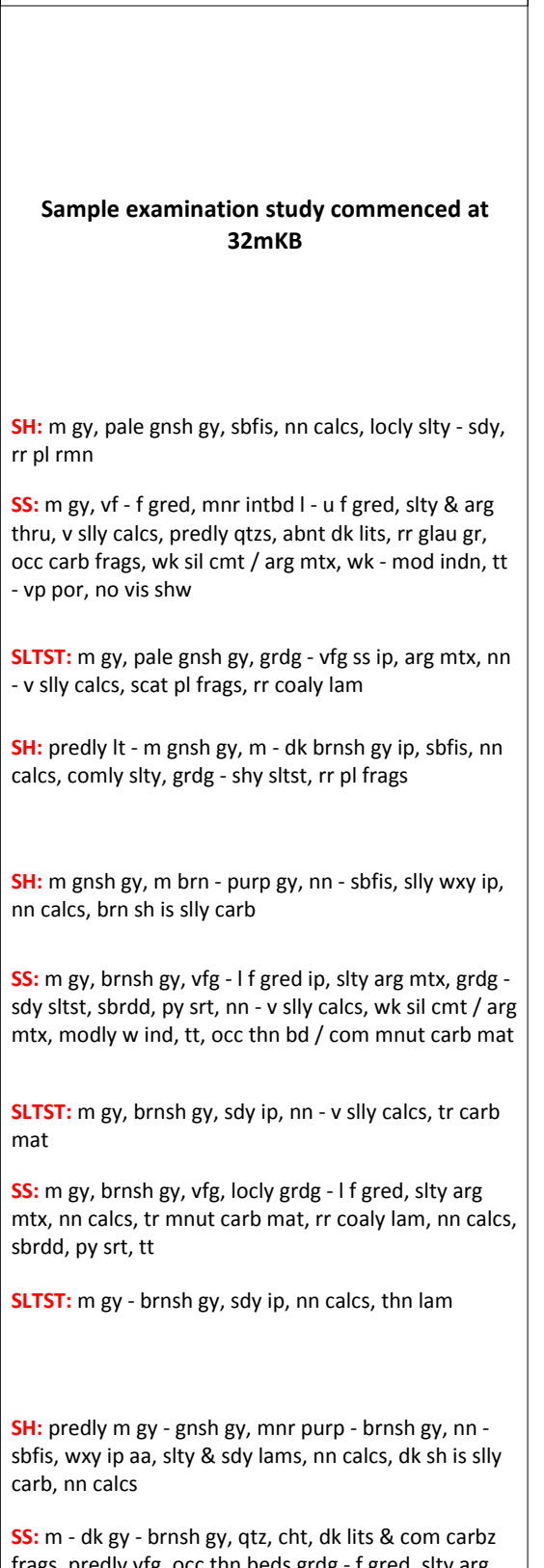
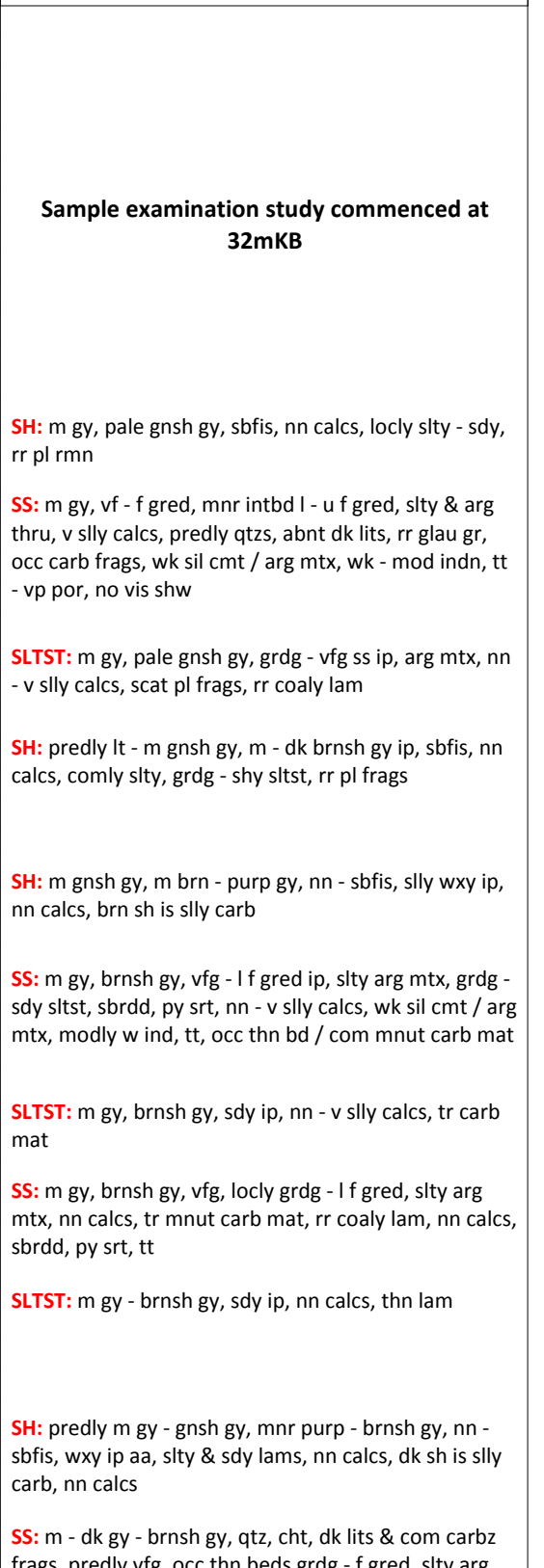
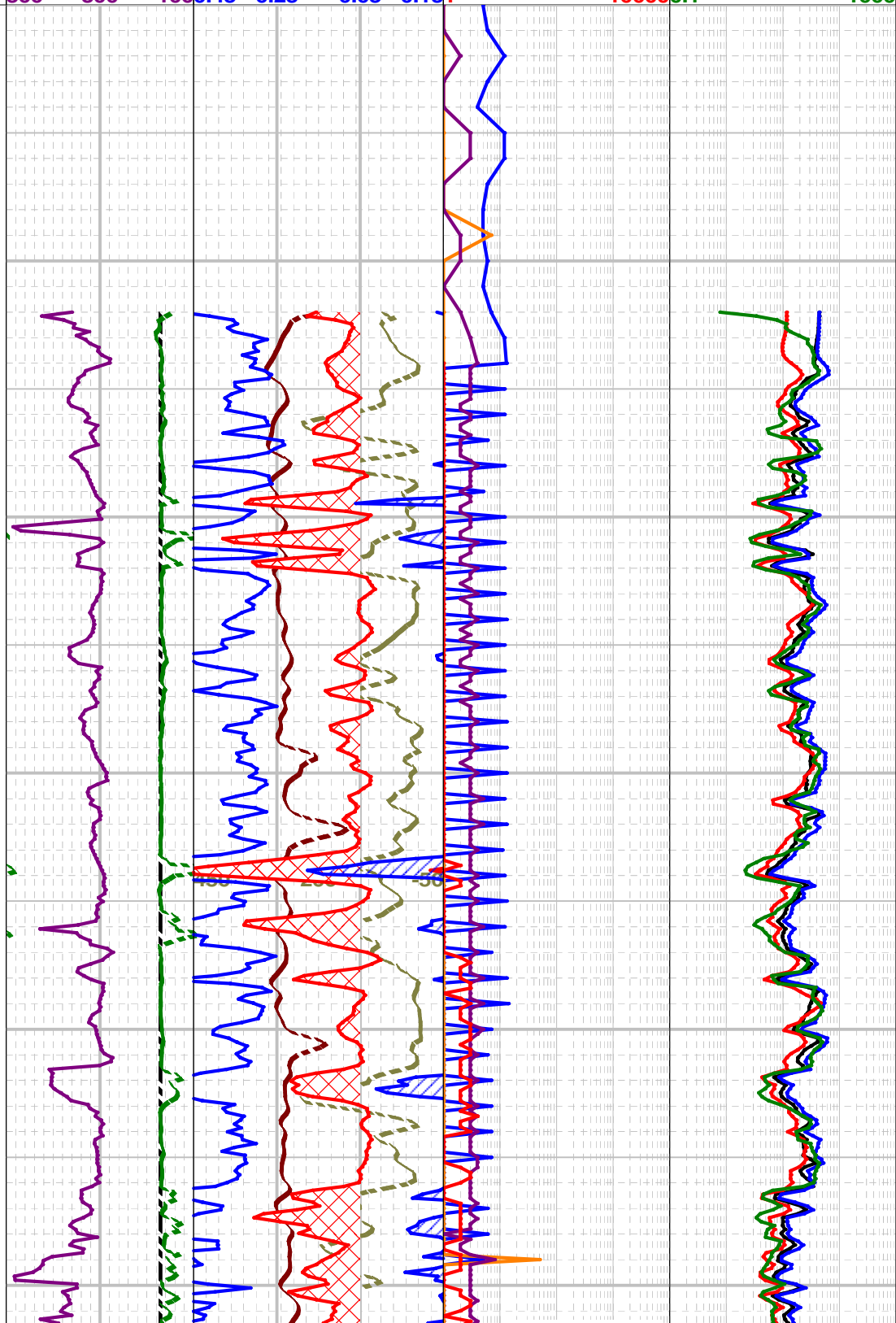
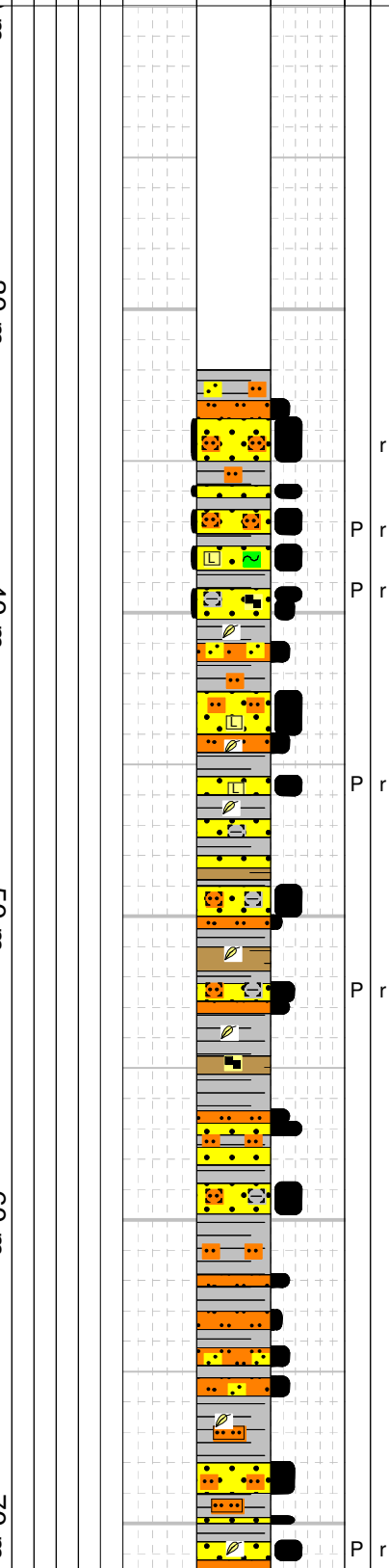
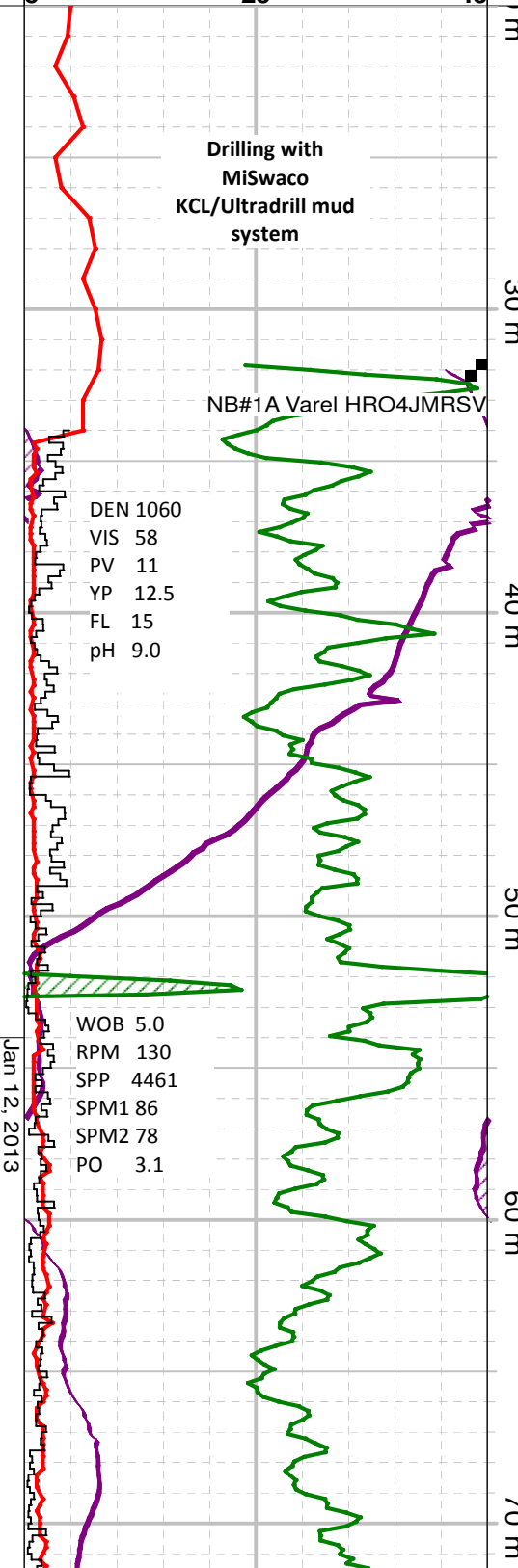
**Mud Gas**  
**Chromotography**

Sum of C4s and C5 (ppm)	10000	10000	10000	10000
C3 (Propane) (ppm)	10000	10000	10000	10000
C2 (Ethane) (ppm)	10000	10000	10000	10000
C1 (Methane) (ppm)	10000	10000	10000	10000

**Array Induction**

Shallow Induction AF20 (ohmm)	0.1	0.1	0.1	0.1
Medium Induction AF30 (ohmm)	0.1	0.1	0.1	0.1
Deep Induction AF60 (ohmm)	0.1	0.1	0.1	0.1
Invaded Fm Resistivity (ohmm)	0.1	0.1	0.1	0.1

**Northern Cross Yukon Ltd**  
**NCY W Chance H-28**  
**300/H-28-6610-13730/0**



**Sample examination study commenced at 32mKB**

**SH:** m gy, pale gnsh gy, sbfis, nn calcs, locly slty - sdy, rr pl rmn

**SS:** m gy, vf - f gred, mnr intbd l - u f gred, slty & arg thru, v sily calcs, predly qtzs, abnt dk lits, rr glau gr, occ carb frags, wk sil cmt / arg mtx, wk - mod indn, tt - vp por, no vis shw

**SLTST:** m gy, pale gnsh gy, grdg - vfg ss ip, arg mtx, nn - v sily calcs, scat pl frags, rr coaly lam

**SH:** predly lt - m gnsh gy, m - dk brnsh gy ip, sbfis, nn calcs, comly slty, grdg - shy sltst, rr pl frags

**SH:** m gnsh gy, m brn - purp gy, nn - sbfis, sily wxy ip, nn calcs, brn sh is sily carb

**SS:** m gy, brnsh gy, vfg - l f gred ip, slty arg mtx, grdg - sdy sltst, sbrdd, py srt, nn - v sily calcs, wk sil cmt / arg mtx, modly w ind, tt, occ thn bd / com mnut carb mat

**SLTST:** m gy, brnsh gy, sdy ip, nn - v sily calcs, tr carb mat

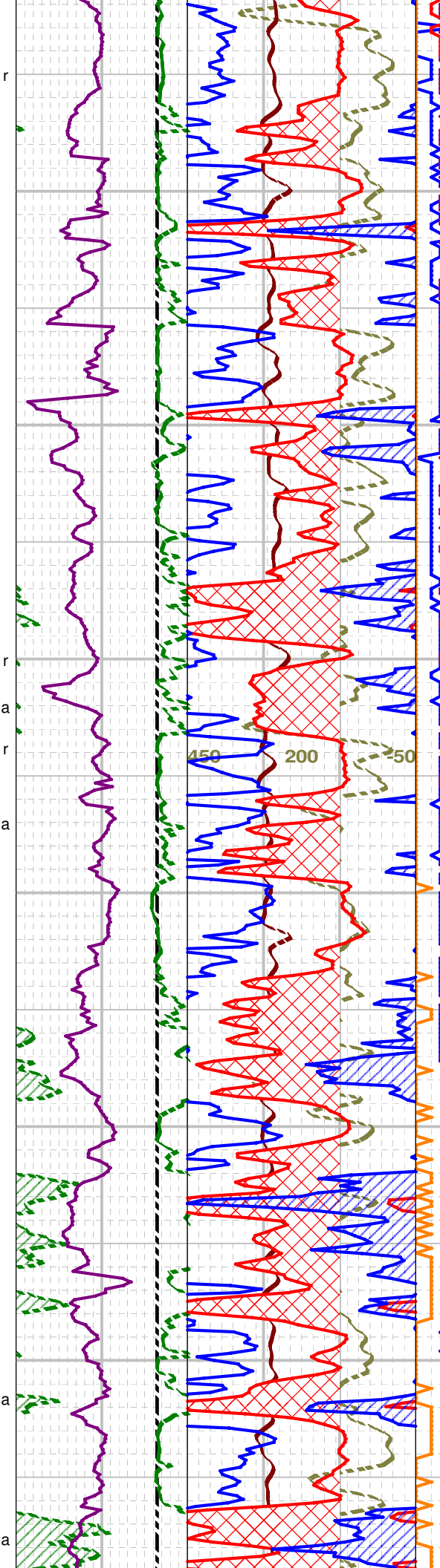
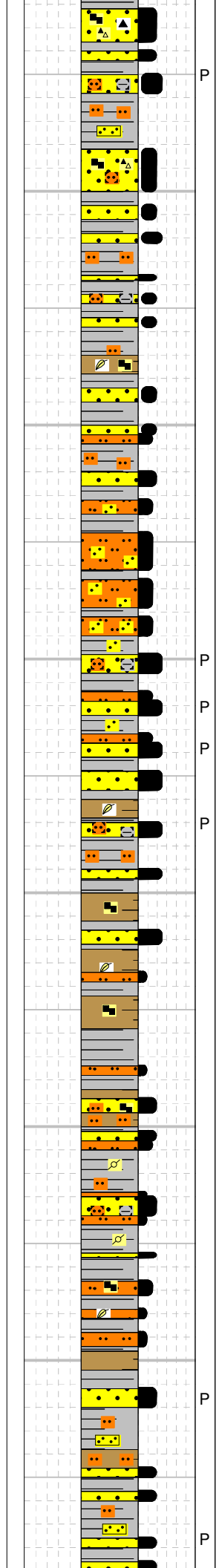
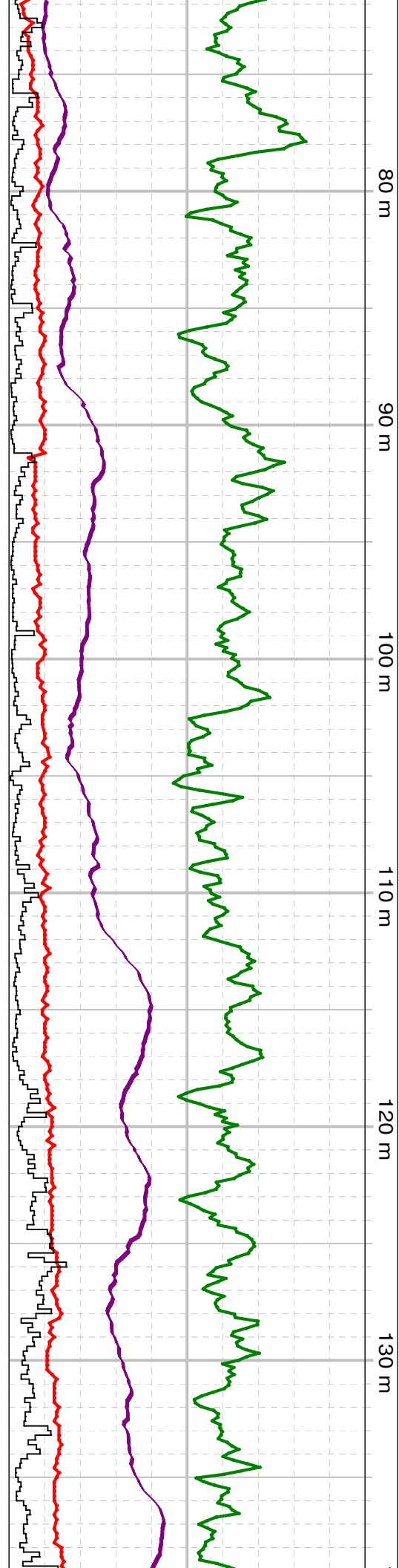
**SS:** m gy, brnsh gy, vfg, locly grdg - l f gred, slty arg mtx, nn calcs, tr mnut carb mat, rr coaly lam, nn calcs, sbrdd, py srt, tt

**SLTST:** m gy - brnsh gy, sdy ip, nn calcs, thn lam

**SH:** predly m gy - gnsh gy, mnr purp - brnsh gy, nn - sbfis, wxy ip aa, slty & sdy lams, nn calcs, dk sh is sily carb, nn calcs

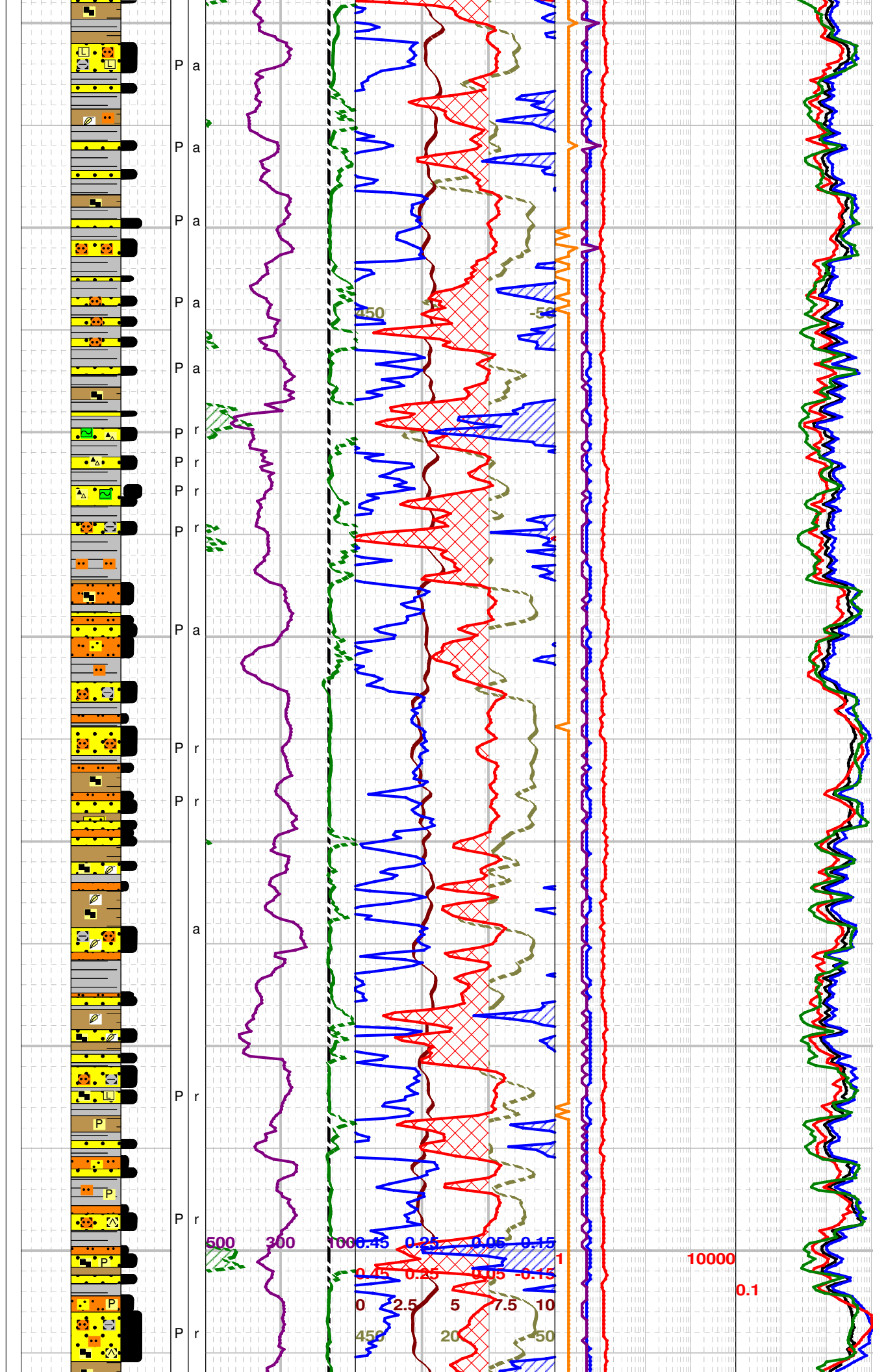
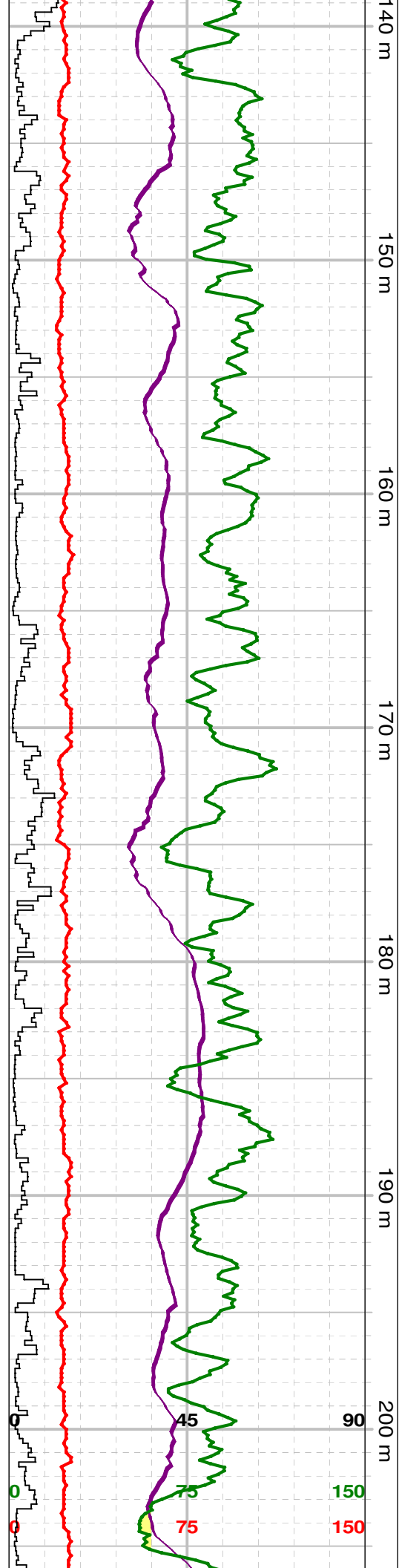
**SS:** m - dk gy - brnsh gy, qtz, cht, dk lits & com carbz frags, predly vfg, occ thn beds grdg - f gred, slty arg

Jan 12, 2013



NB: C4s and C5 gasses are added together and plotted shown as the blue line.

- mtx, nn calcs, mod ind, fri ip, tt - vp por, no vis shw, scat pl frags, rr coaly lam
- SH:** m gnsh gy and brnsh gy, nn - sbfis, sily wxy, nn calcs, comly slty & or sdy, carb ip
- SH:** m - dk brnsh gy, nn - sbfis, slty thru, grdgy shy sltst ip, incrly carb, rr coaly lam, sdy strgs, nn - v sily calcs ip
- SS:** m - dk gysh brn - brnsh gy, predly vfg, 3-5% l f gred, slty and arg mtx, nn - v sily calcs, sbrdd - sbang, py srt, modly ind, tt
- SS:** m gy, vf - locly f gred, slty & arg mtx, sbang - sbrdd, nn calcs, modly w ind, tt, com mnut carbz pl frags thru
- SH:** predly m - dk brnsh gy, lt - m gnsh gy ip, nn calcs, nn - sbfis, slty & sdy ip, occ sdy strgs, carb ip, occ carbz pl frags
- SLTST:** lt flsy brn, qtzs, sdy, nn calcs
- SH:** lt gnsh gy, m gysh brn ip, nn - sbfis, slty & sdy thru, sily wxy, mod - w cpctd, nn calcs
- SLTST:** predly m - dk gy - brnsh gy, lt gy ip, sdy ip, nn calcs, carb ip
- SS:** dk gysh brn, qtz, cht, lits, and com - abnt blk carb mat, vf - f gred, slty & arg mtx, sbrdd - sbang, py srt, mod indn, fri ip, tt - vp por, no vis shw
- SH:** predly lt gy - pale gysh gn, lt - m brn, mnr dk gysh brn aa, sbfis - nn fis, sily wxy, nn calcs, slty thru
- SH:** lt - m gysh brn, pale tan gy, nn fis, lt cold vf - f gred oval pels? in sily dkr mtx, wxy, comly lmic and sidic - fer, nn calcs, slty ip, rr carbz pl rmn
- SS:** m - dk gysh brn, vfg, slty & arg, sbrdd - sbang, py srt, bcmg carb, nn calcs, tt
- SH:** predly lt - m gysh tan - brn, nn fis, slty ip, nn calcs, comly having bioturb appearance / ltr cold pels? in dkr mtx, sdy strgs, bcmg m dk brn and carb
- SLTST:** lt - m gysh brn, sdy ip, nn calcs, tr carb mat
- SH:** m - dk gysh brn, sbfis, slty, carb ip, nn calcs
- SLTST:** dk gysh brn, sdy ip, grdgy - vfg ss, carb, nn calcs, pl rmn, rr pyr, micmica
- SH:** mot & intbd pale gysh gn & gysh brn, brn sh is sily carb, slty, nn calcs, wxy ip, sdy lams
- SS:** lt - m gysh brn, qtz & abnt dk lits, vfg, slty & arg, grdgy - sdy sltst ip, sbang, py srt, thn beds, tt



**SH:** mot & intbd pale gysh gn & m - dk brn aa, sbfis - nn fis, nn calcs, slty ip, w cpctd, frm

**SS:** m - dk gysh brn, vfg, slty & arg, grd - sdy sltst, sbang, py srt, tt, carb ip, nn calcs

**SH:** predly lt - m pale gysh gn, m - dk brnsh gy ip, nn fis, s tr pyr, tr carb mat, nn calcs

**SS:** m gy - gysh brn, qtz, cht & abnt dk lits in brn slty and arg mtx, sbrdd - sbang, py srt, modly w ind, nn calcs, tt, rr glau gr

**SLTST:** m - dk gysh brn, sdy ip, nn calcs, sily carb

**SH:** pale gn, lt - m gysh brn, nn fis, wxy ip, slty ip, nn calcs, breaks readily when immersed in HCl

**SS:** m - dk gysh brn, vfg, dk brn slty & arg mtx, sbang - sbrdd, py srt, modly ind, tt

**SH:** dk brn, sbfis, nn calcs, slty ip, sily carb, sdy strgs thru

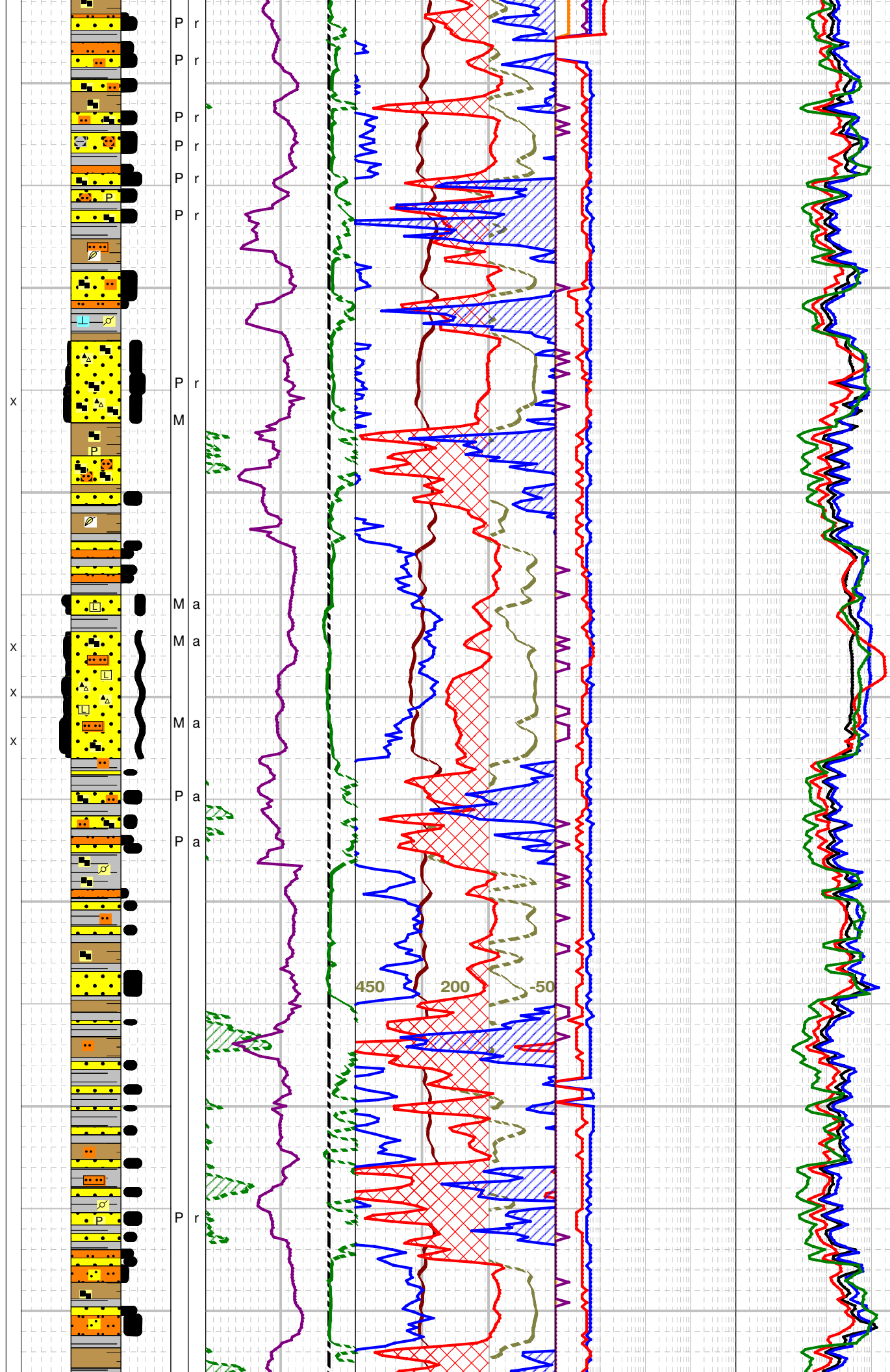
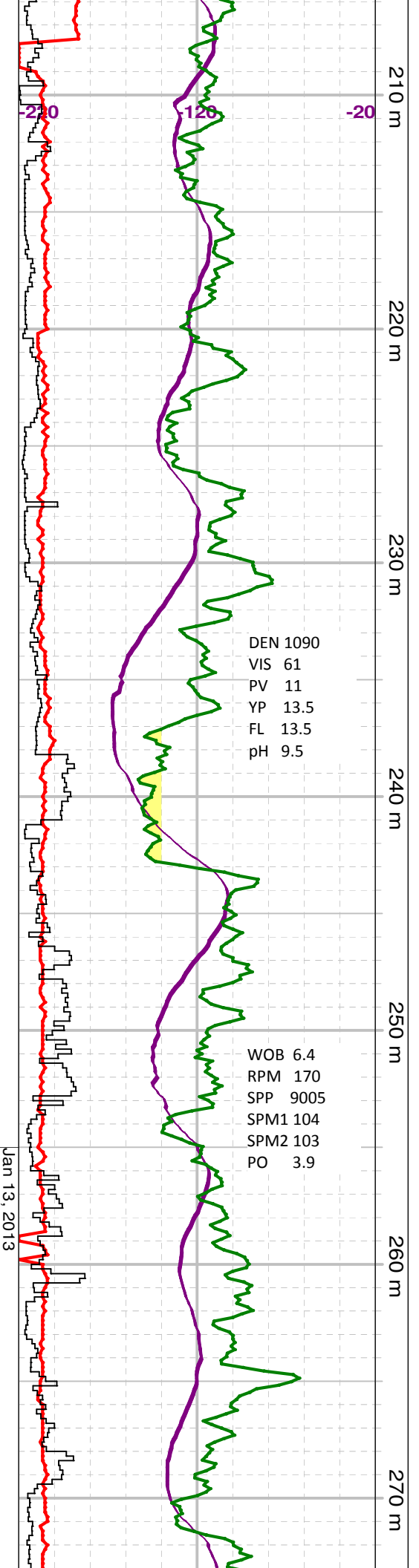
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**SS:** m - dk gy - gysh brn, vf - lf gred, slty & arg mtx, occ carbz pl frags, sbrdd, py srt, nn calcs, modly w ind, fri ip, tt

**SH:** m - dk brnsh gy, sbfis, nn calcs, sily carb, s tr pyr, w cpctd, modly frm

**SLTST:** m - dk gysh brn, carb ip, nn calcs, sdy ip, tr pyr

**SS:** m - dk gysh brn, qtz, dk lits, and carb frags, vf - locly f gred, slty & arg mtx, sbrdd, py srt, sil cmt, nn - v



sily calcs, modly w ind, tt

**SS:** lt - m gysh brn, qtz, cht, lits & com blk carb frags in a dk brn slty & arg mtx, nn - v sily calcs, sil cmt, modly w ind, tt, tr pyr

**SLTST:** m - dk gysh brn, carb ip, nn calcs, sdy ip, tr pyr

**SH:** lt - m gysh brn, ip dk brnsh gy aa, sbfis, lt cold sh appears pell or bioturb, nn - v sily calcs, slty & sdy strgs, slty ip, w cpctd, modly frm

**SS:** m gy - gysh brn, qtz, cht, lits, and abnt blk carb frags, dk brn slty mtx, vf - l f gred, tr u f gred, sbrdd, p - mod srtg, mod indn, modly fri, tt - v wk por

**SH:** m - dk brn, sbfis, slty ip, nn - v sily calcs, s tr pyr, carb ip, bioturb

**SLTST:** m - dk brn - gysh brn, sdy, carb ip, nn - v sily calcs

**SS:** m gy - brnsh gy, s&p, predly f gred, slty - vfg mtx, qtz, cht, lits & abnt dk brn - blk carb frags, sbang, modly srt, sil + mnr calc cmt, p por (3-6%), no vis shw, fri ip

**SH:** lt gy, pale gnsh gy, lt - dk brn ip, sbfis, nn calcs, slty ip, scat yel pels, bioturb ip

**SS:** m gy - brnsh gy, aa, abnt dk brn - blk carb frags, vp por

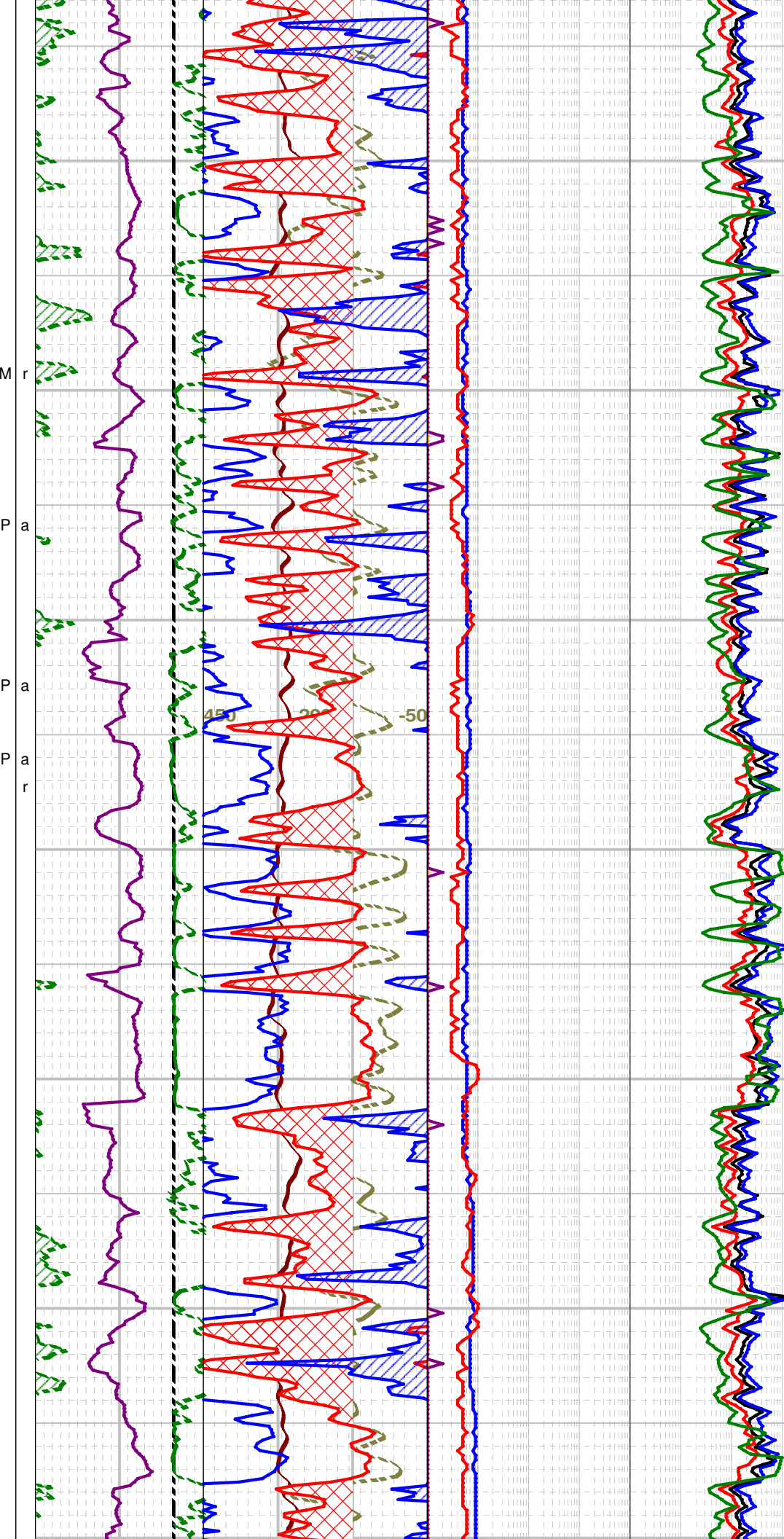
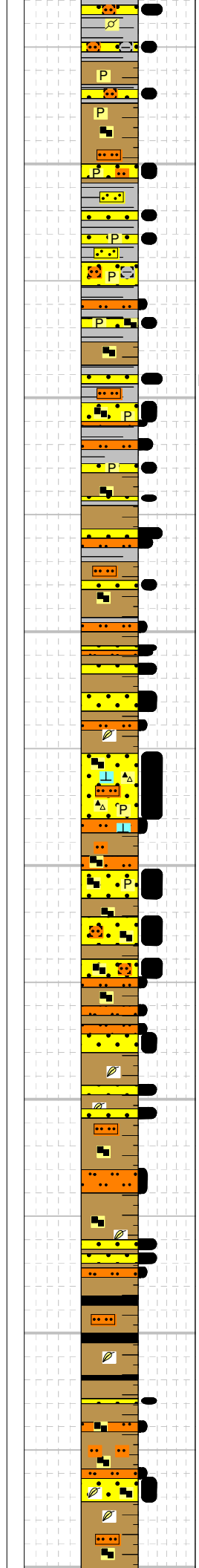
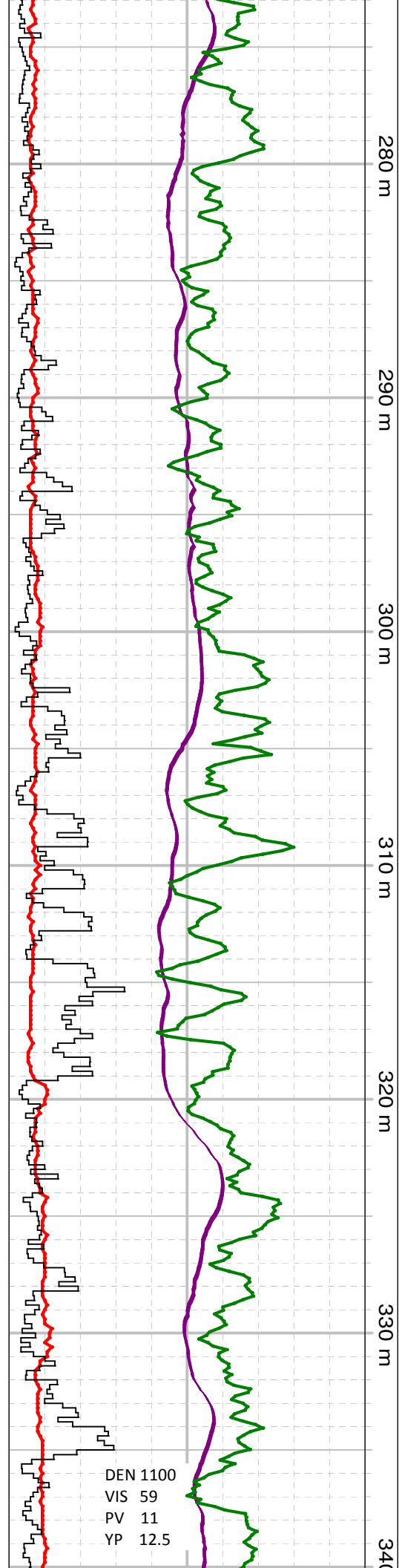
**SH:** dk gysh brn, sbfis, slty, nn calcs, carb ip

**SLTST:** ddk gysh brn, sdy ip, nn calcs, carb

**SH:** predly m - dk gysh brn, sbfis, nn calcs, sily carb, bcmg incrly lt gysh brn - lt gy, bioturb ip, slty, sdy lams

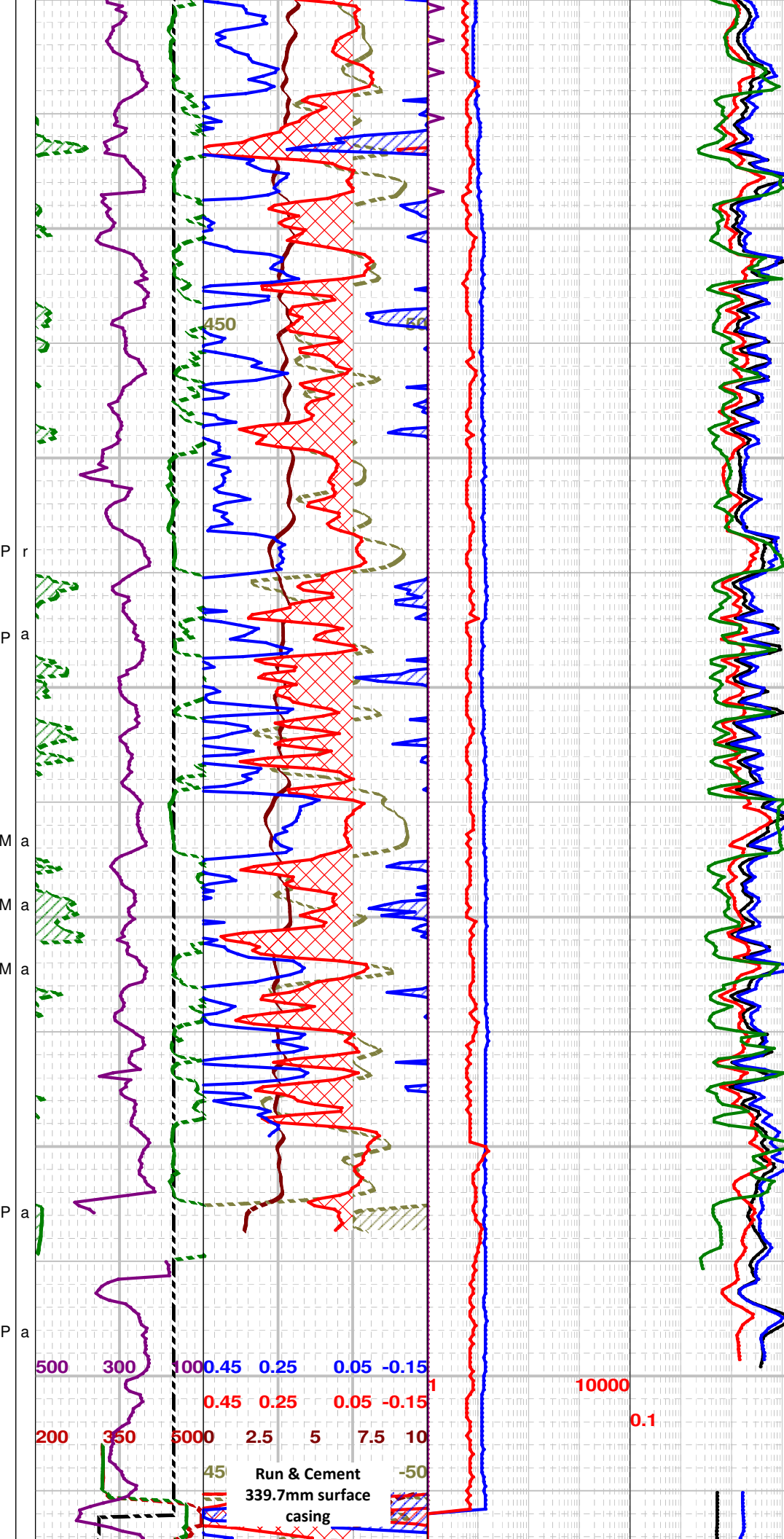
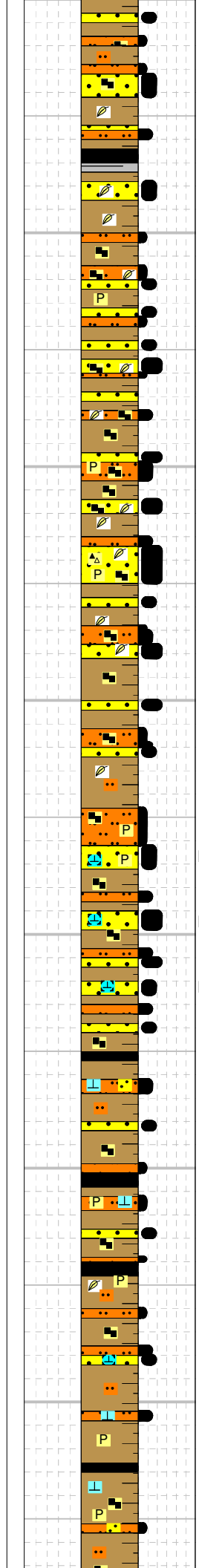
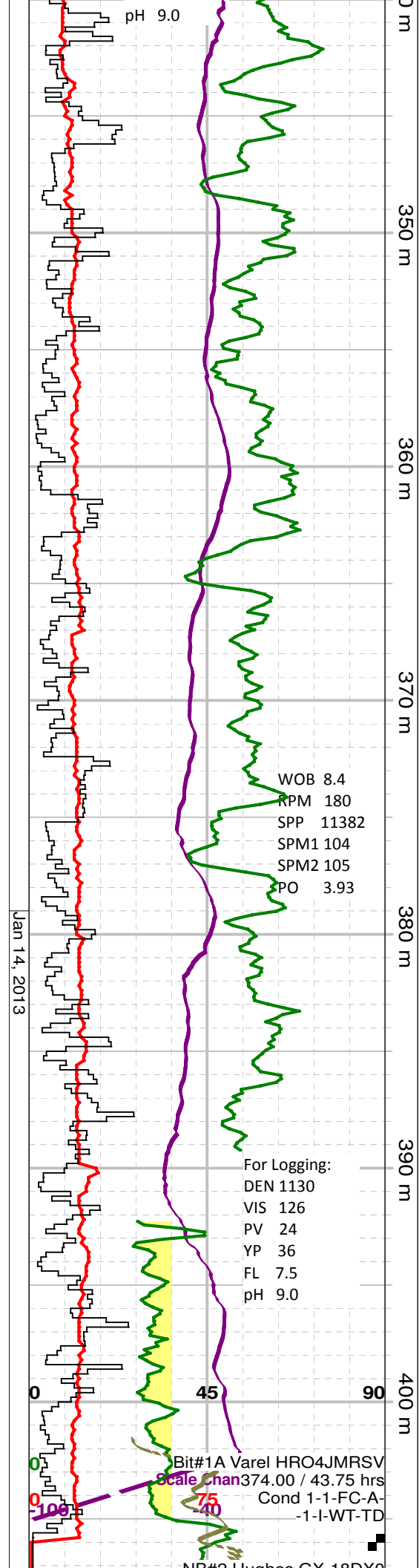
**SS:** m - dk gysh brn, predly vfg, occ l f gred lams, dk brn slty & arg mtx, nn calcs, sbrdd, py srt, modly w ind, tt, carb ip

**SH:** m - dk gysh brn, lt - m gy, sbfis, slty, scat pels, carb ip, nn calcs

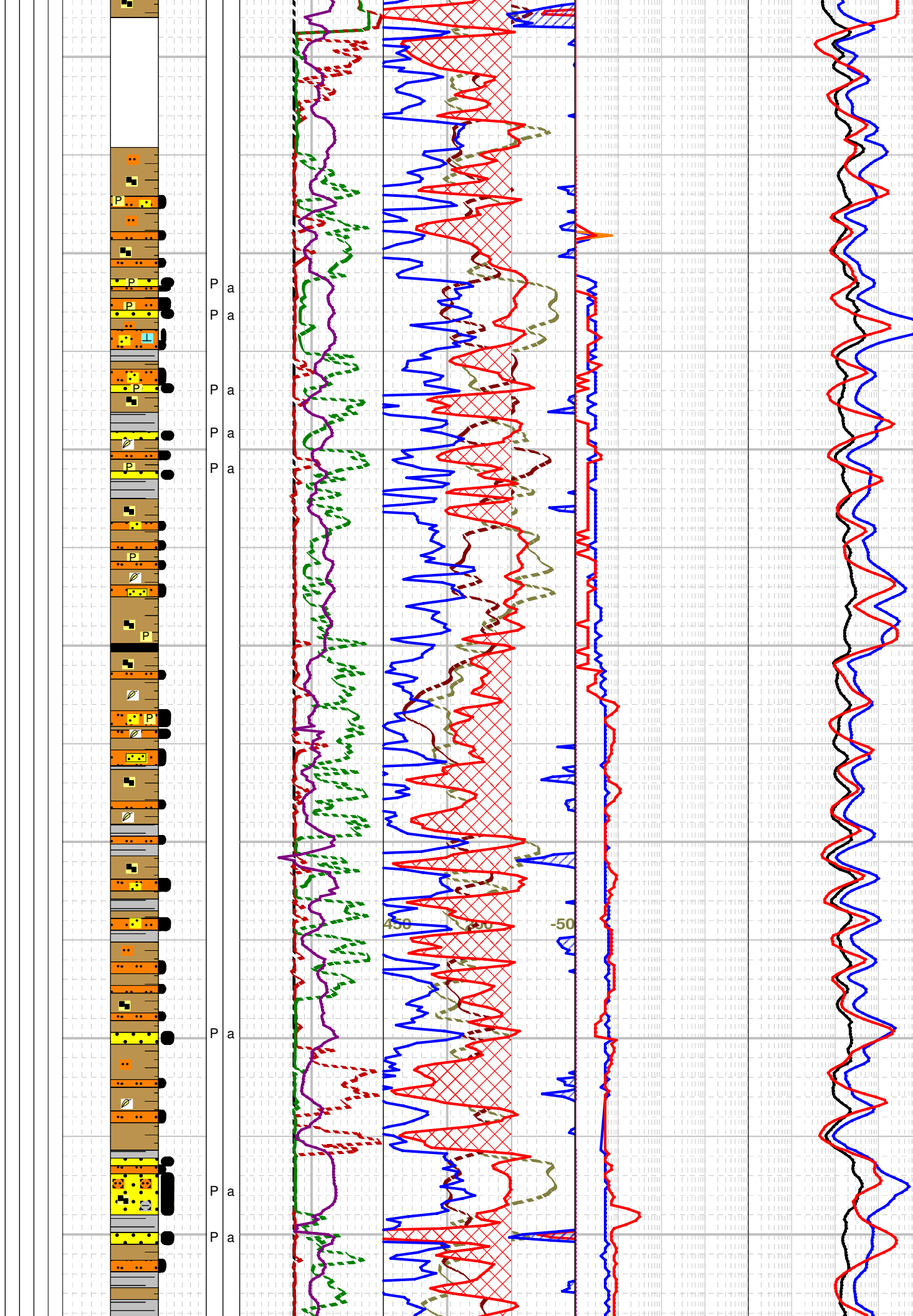
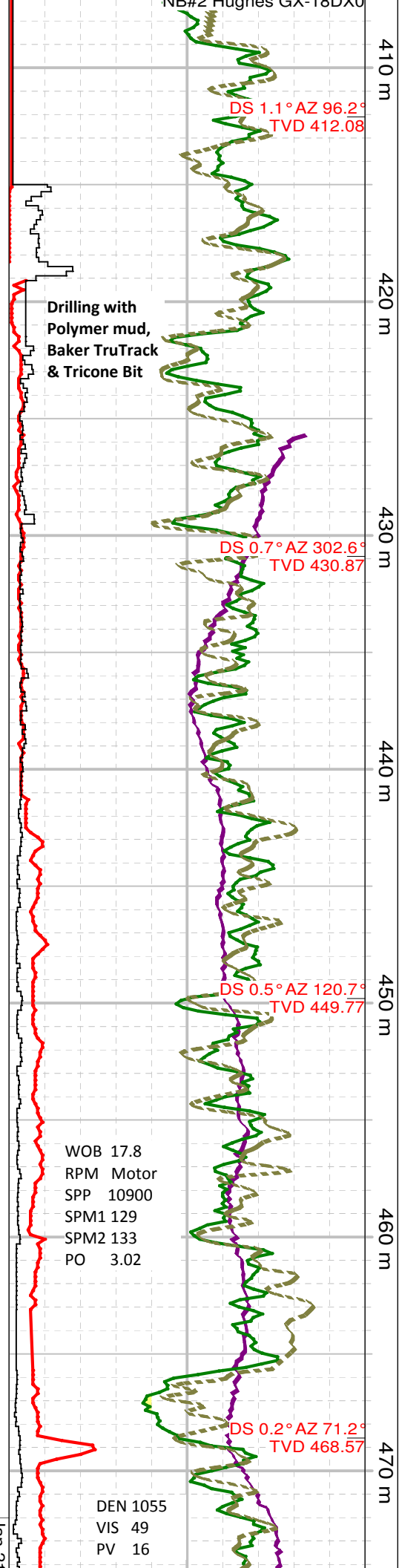


- SS:** m - dk brn, vfg, locly grd - l f gred, dk brn slty arg & carb mtz, tr pyr, sbrdd, py srt, mod indn, tt, thn lams
- SH:** predly m - dk brn, locly lt - m gysh brn, sbfis, locly slty, bioturb ip, occ pels, tr pyr, sdy lams
- SLTST:** dk brn, c, sdy ip, carb ip, sly calcs
- SS:** lt - m gy - gysh brn, vf - l f gred, slty & arg ip, qtz, lt cold cht and com dk lits, tr carb mat, sbrdd, mod - py srt, nn calcs, tr - mnr pyr, mod indn, tt
- SH:** aa, incrg slty & sdy lams, comly lt cold in 295 spl
- SH:** m - dk brn, sbfis, slty lam, carb ip, scat carbz mnut pl frags
- SLTST:** dk gysh brn, nn - sly calcs, carb ip, locly sdy, occ pl frags
- SS:** m - dk gysh brn, vfg, dk brn slty & arg mtz, sbang - sbrdd, py srt, locly sly calcs, carb ip, modly w ind, fri ip, tt
- SS:** m - dk gysh brn, qtz lits and abnt blk carb frags in dk brn slty carb mtz, vf - l f gred, slty arg mtz, sbang - sbrdd, py srt, tr - mnr pyr cmt, nn - spy calcs cont, mod indn, tt
- SH:** m - dk gysh brn, sbfis, slty ip, nn calcs, carb
- SS:** m - dk gysh brn, qtz, lits, cht, and dk carb frags in a m - dk slty carb mtz, sbrdd - sbang, py srt, mod indn, tr pyr, tt
- SLTST:** m - dk gy - gysh brn, sdy ip, carb, nn calcs
- SH:** dk gy - dk gysh brn, sbfis, slty lam, pl rmn, nn calcs, w cpctd, frm, brit, occ coal strgs
- COAL:** dull - modly vit, coaly sh lam thru, arg ip, thn strgs
- SH:** dk gy - dk gysh brn, sbfis, slty lam, pl rmn, nn calcs, w cpctd, frm, brit, occ coal strgs
- SH:** predly m - dk gysh brn, lt brnsh gy ip, sbfis, nn calcs, slty ip, carb ip, nn calcs, bioturb





- SS:** m - dk gysh brn, s&p, vfg, sbang, py srt, pl frags, tt
- SLTST:** m - dk brn, sdy ip, carb, tr py, pl rmn
- COAL:** dull - modly vit, shy or slty lam, occ pyric lam, brit
- SH:** predly m - dk brn - gysh brn, lt gy ip, sbfis, nn calcs, carb, pl rmn, slty lam, occ thn coal strg, tr pyr
- SLTST:** m - dk brn, carb, nn calcs, pl rmn, tr pyr
- SS:** m gysh brn, vfg, slty ip, sbang, py srt, dk slty carb mtx, nn calcs, tt, thn beds
- SLTST:** aa, sdy ip, locky grdg - vfg ss, carb
- SS:** m brn - gysh brn, qtz, lits, & abnt blk carb frags, m - dk brn slty mtx, vf - l f gred, sbrdd - sbang, py srt, nn calcs, modly w ind, tt, pl frags
- SS:** m gy - gysh brn, vfg, slty & arg ip, sbang, py srt, thn lams, tt, carb
- SLTST:** m - dk gysh brn, sdy ip, carb, tr pyr
- SS:** lt - m gysh brn, vf - f gred, sbang, modly srt, sly calcs, sil + mnr calc cmt, modly w ind, tt, occ carb frags
- COAL:** modly vit, pyric, brit, thn strgs
- SH:** m - dk brn - gysh brn, sbfis, slty ip, carb, slty lam, occ sdy strg, tr coal
- SLTST:** dk gysh brn, sdy ip, sly calcs, carb, pl rmn
- COAL:** modly vit, pyric, brit, thn strgs
- SLTST:** dk gysh brn, sdy ip, sly calcs, carb, pl rmn
- SS:** m gysh brn, qtz & abnt dk lits, vf - l f gred, sbang, sil + calc cmt, modly w ind, tt, carb frags
- SH:** m - dk brn - gysh brn, sbfis, slty ip, carb, sly calcs
- SLTST:** dk gysh brn, sdy ip, locky grdg - vfg ss, calcs, carb, tr pyr



NB: PIPE TALLY ERROR - ALL DATA ORIGINALLY PLOTTED FROM 406-1023mMD HAS BEEN SHIFTED LOWER 9.5m

SH: m - dk gysh brn, lt - m gy ip, sbfis, locky slty, sily calcs

SLTST: m - dk gysh brn, sdy ip, sily calcs, tr carb mat, tr pyr

SS: m - dk gysh brn, vfg, slty & arg mtx, sily calcs, carb ip, thn lams, tt

SLTST: m - dk gysh brn, sdy ip, sily calcs, s tr pyr, tr carb mat

SH: m - dk gysh brn, lt - m gy ip, sbfis, locky slty, sily calcs

SS: aa, s tr pyr, tr carb mat, tt

SH: aa, bioturb ip

SLTST: m - dk gysh brn, sdy ip, sily calcs, s tr pyr, tr carb mat

SH: m - dk gysh brn, sbfis, carb, occ coal lam

COAL: brit, jtd, vit, mnr pyr

SLTST: m gy - gysh brn, sdy ip, locky grd g vfg slty ss, carb ip, v sily calcs, tr pyr

SH: m - dk brn - gysh brn, sbfis, nn calcs, carb, tr pyr, pl rmn

SLTST: m - dk gysh brn, sdy, grd g - vfg ss, arg, carb, nn - v sily calcs, s tr pyr

SH: ip m - dk brn aa, lt - m gy, sbfis, slty, nn calcs, bioturb ip

SLTST: m gysh brn, sdy, ip, grd g - vfg slty & arg ss, nn calcs, carb, tr pyr, pl rmn

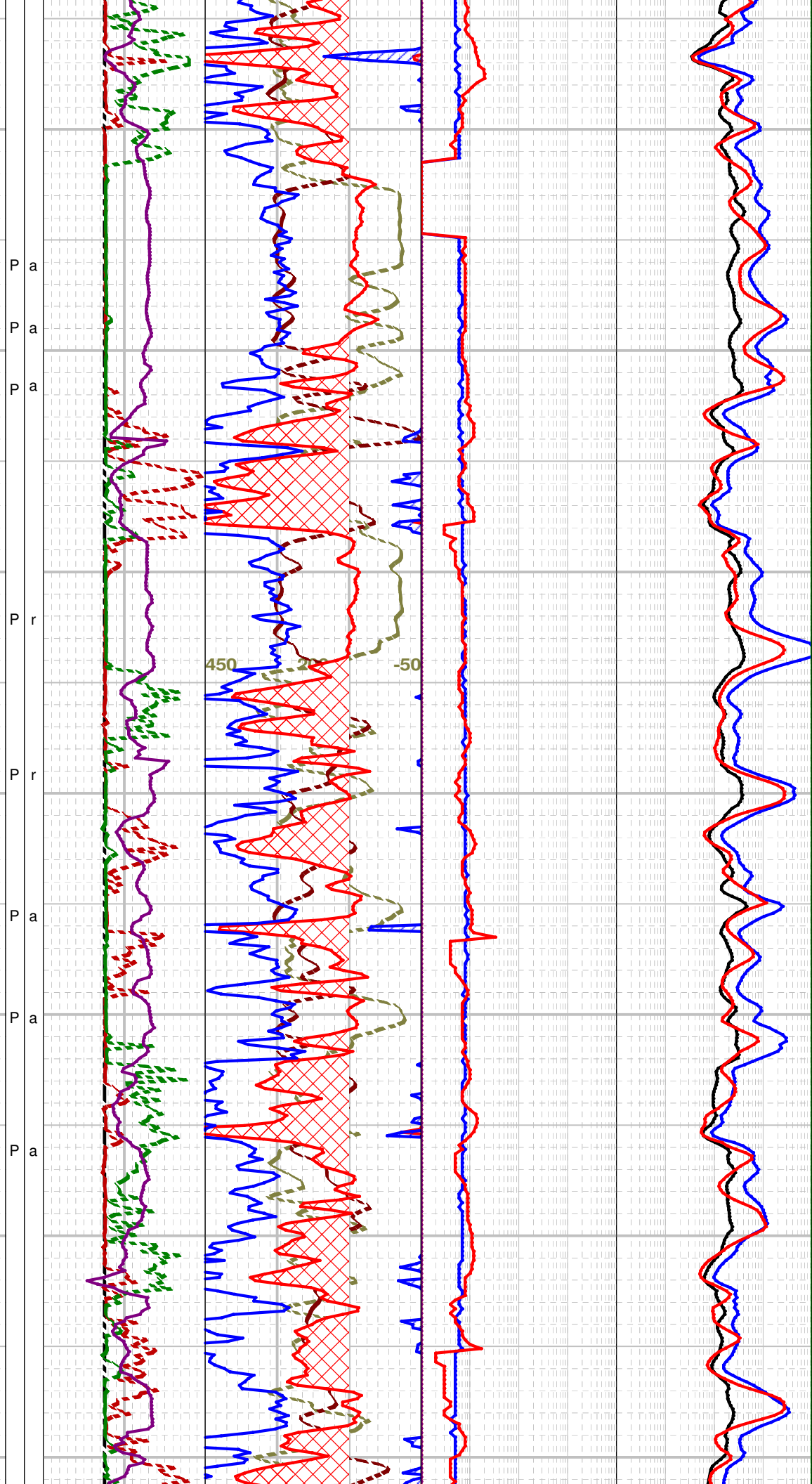
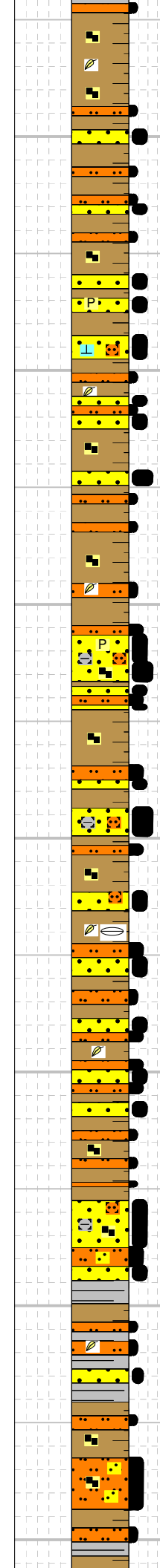
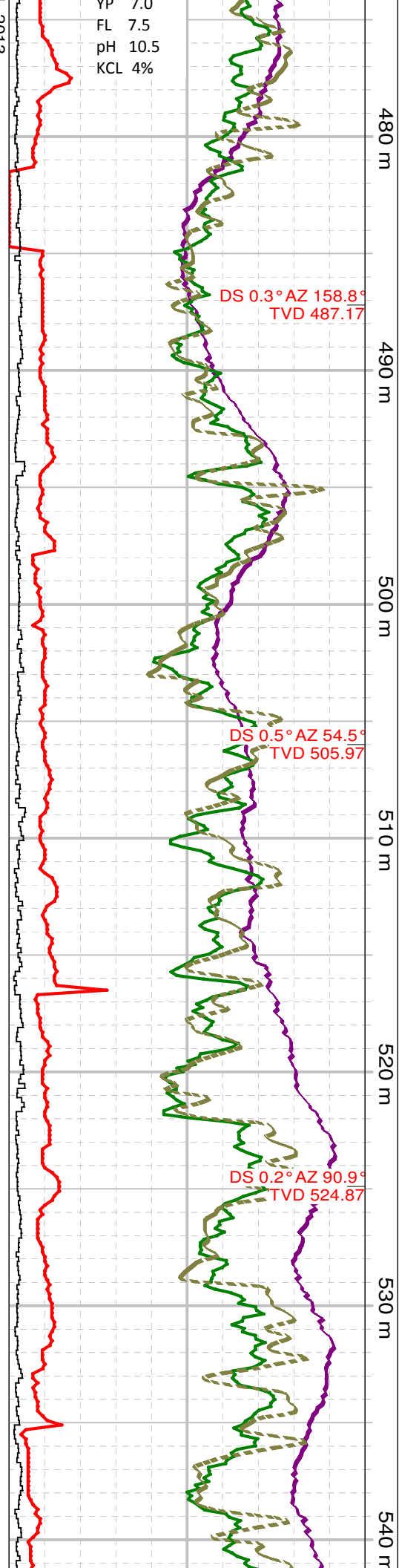
SH: predly m - dk brn - gy brn, lt - m gy ip, sbfis, nn calcs, carb ip, locky slty, rr pyr nods, occ slty strgs

SS: m - dk gysh brn, vfg, dk brn slty & arg mtx, sbang, py srt, nn calcs, carb, tt

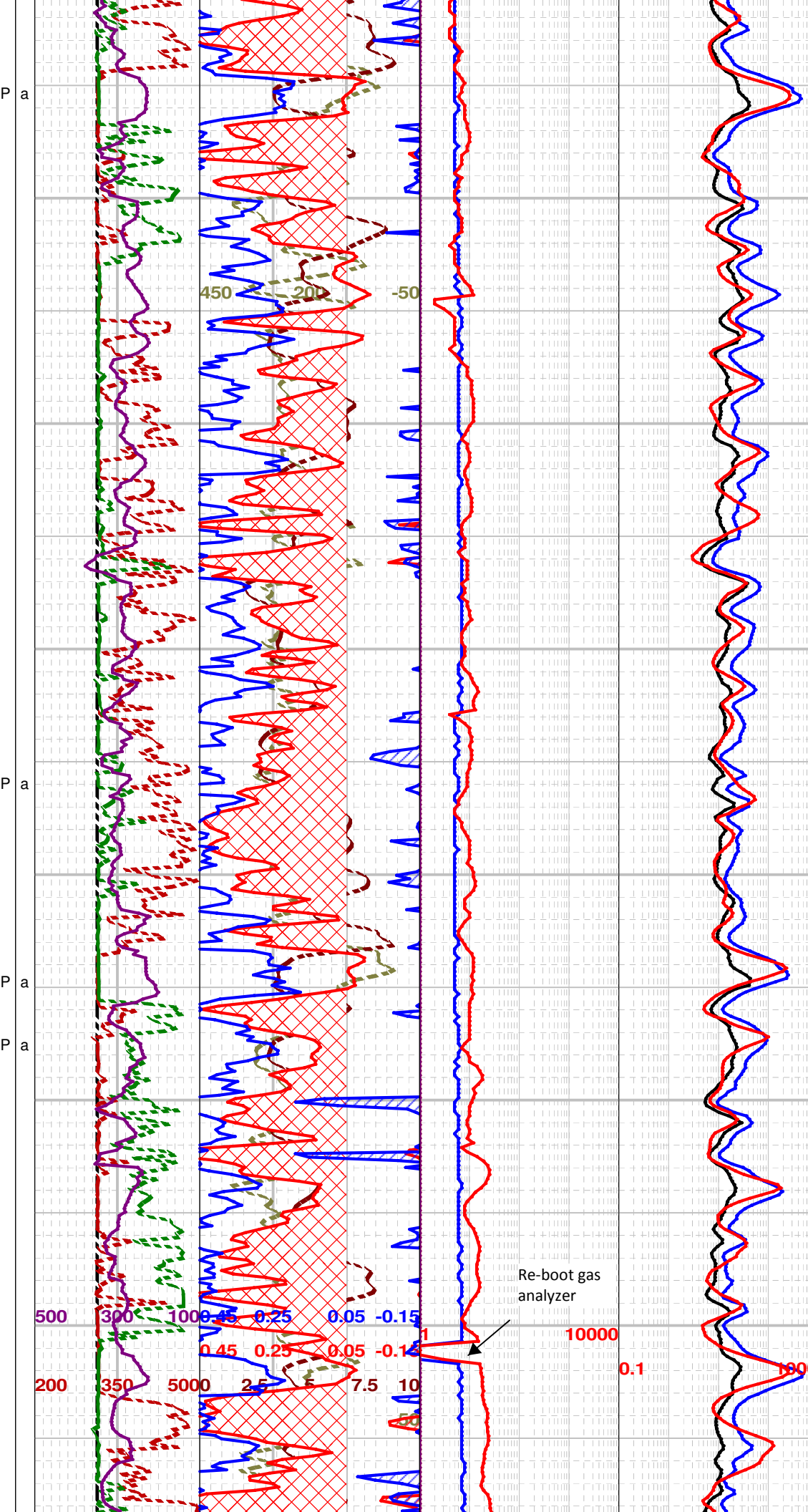
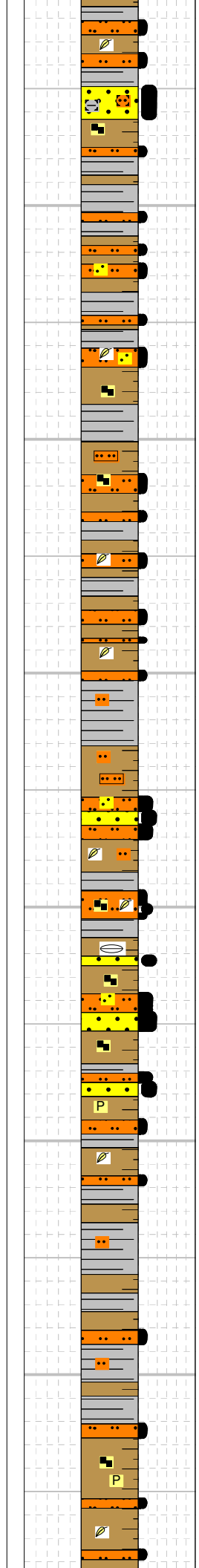
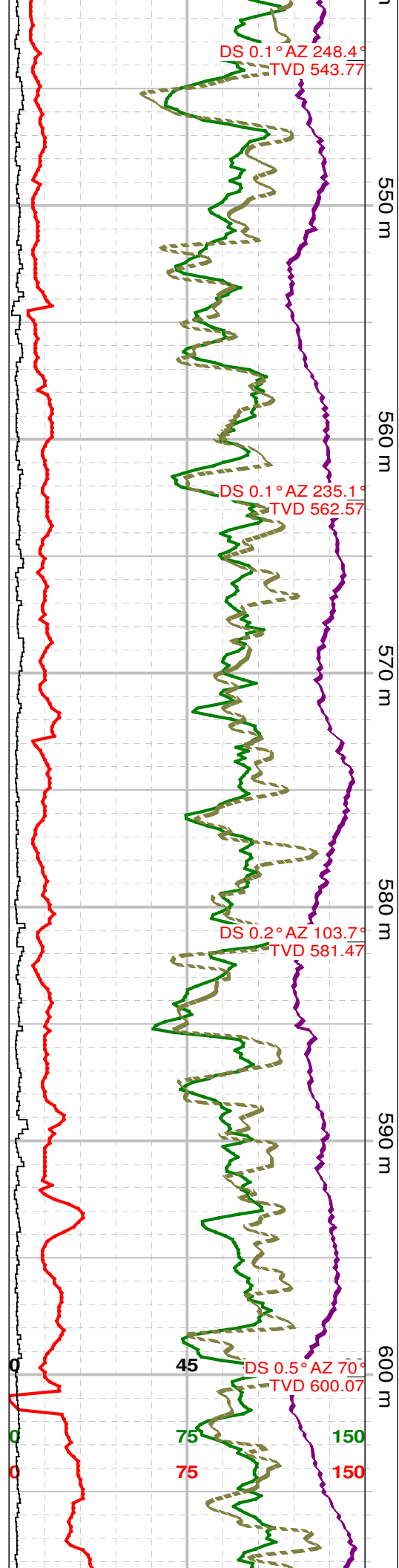
SLTST: aa, locky grd g - vfg ss

2013

YP 7.0  
FL 7.5  
pH 10.5  
KCL 4%



- SH:** m - dk gysh brn, sbfis, nn calcs, locly slty, tr pyr, rr fish sc, pl rmn, slty lam
- SLTST:** dk gysh brn, sdy, nn calcs, carb, s tr pyr, pl rmn
- SS:** m - dk gysh brn, vfg, dk brn slty & arg mtx, sbang, py srt, nn calcs, carb, tt
- SS:** dk gysh brn, qtz, dk lits, mnr cht & carb frags in dk slty & arg mtx, vf - l f gred, sbrdd - sbang, py srt, mod - w ind, tt, silly calcs, s tr pyr
- SH:** m - dk gysh brn, sbfis, slty ip, occ sltst lams, rr shl frags, carb ip, nn calcs, pl rmns
- SLTST:** dk gysh brn, sdy ip, carb ip, pl rmn, thn lam
- SS:** m - dk gysh brn, vf - l f gred, dk brn slty & arg mtx, carb, nn calcs, sbrdd - sbang, py srt, tt, tr pyr
- SLTST:** lt - m gy, m - dk gysh brn ip, sdy ip, tr carb mat, nn calcs
- SS:** lt - m gy, predly vfg, 10-15% l f gred, slty arg mtx, nn calcs, sbrdd - sbang, py srt, mod indn, tt
- SH:** m - dk brn - gysh brn, sbfis, slty ip, nn calcs, carb ip, rr shl frags
- SS:** m gysh brn, vfg, slty & arg, sbang, py srt, carb ip, thn beds, tt
- SLTST:** m - dk gysh brn, sdy ip, carb, nn calcs
- SH:** m gy, m - dk gysh brn, sbfis, nn calcs, carb ip, occ coaly lam, pl rmn, slty lam
- SS:** m - dk gy - bnsh gy, vfg, slty & arg thru, nn calcs, scat carb frags, tt, grdg - sdy sltst
- SLTST:** m - dk gy - brnsh gy, bcmg lt gy, sdy ip, nn calcs, carb ip
- SLTST:** m - dk gysh brn, sdy ip, nn calcs, carb ip



**SH:** lt - m gy, m - dk brn, brn col apr when immersed in mnrl o, sbfis, slty lam, carb ip, nn calcs

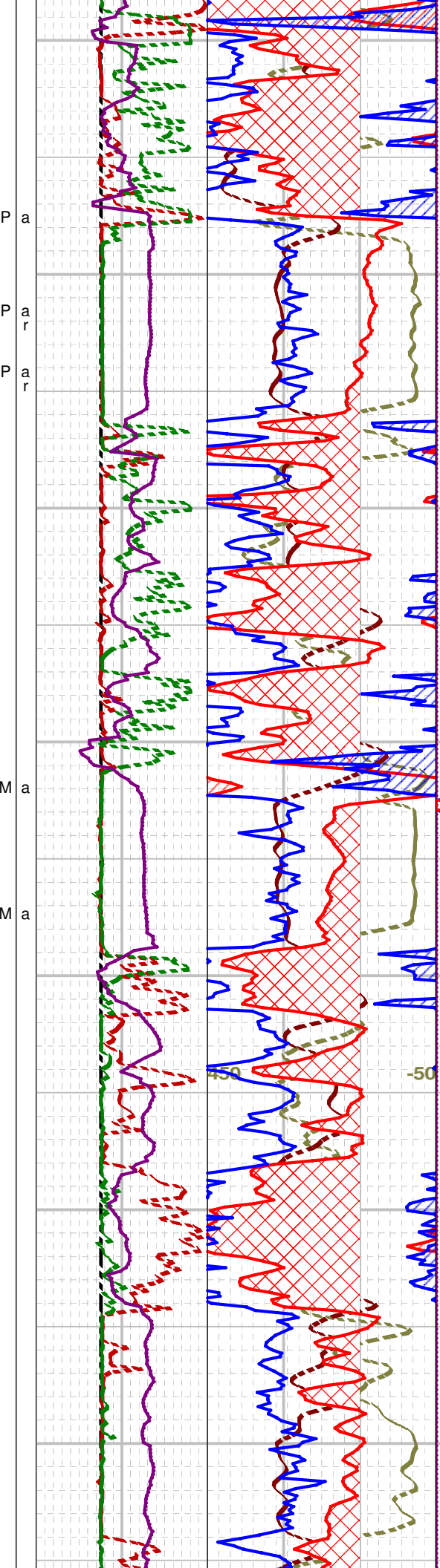
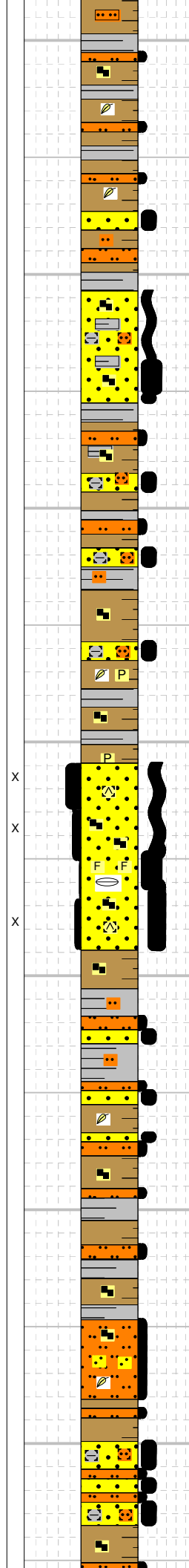
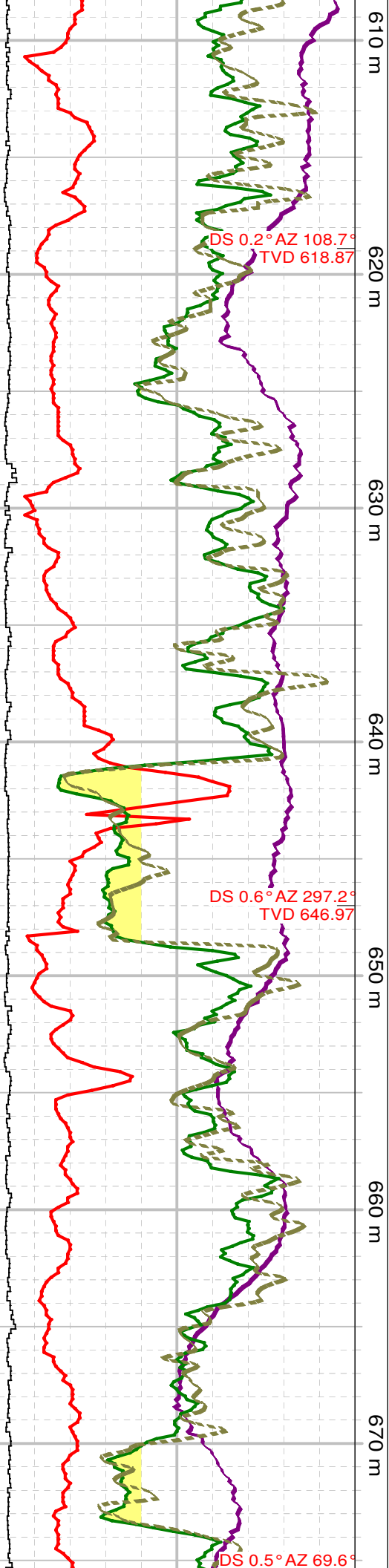
**SLTST:** m - dk gysh brn, sdy ip, occ vfg sdy lam, scat carbz pl frags, nn calcs

**SH:** lt - m gy, m brn, sbfis, slty ip, occ sltst lams, dechr carb cont, nn calcs, bioturb ip, rr shl frags

**SLTST:** m - dk gysh brn, tr - mnr fy dism mnut carb mat, nn calcs, locky sdy

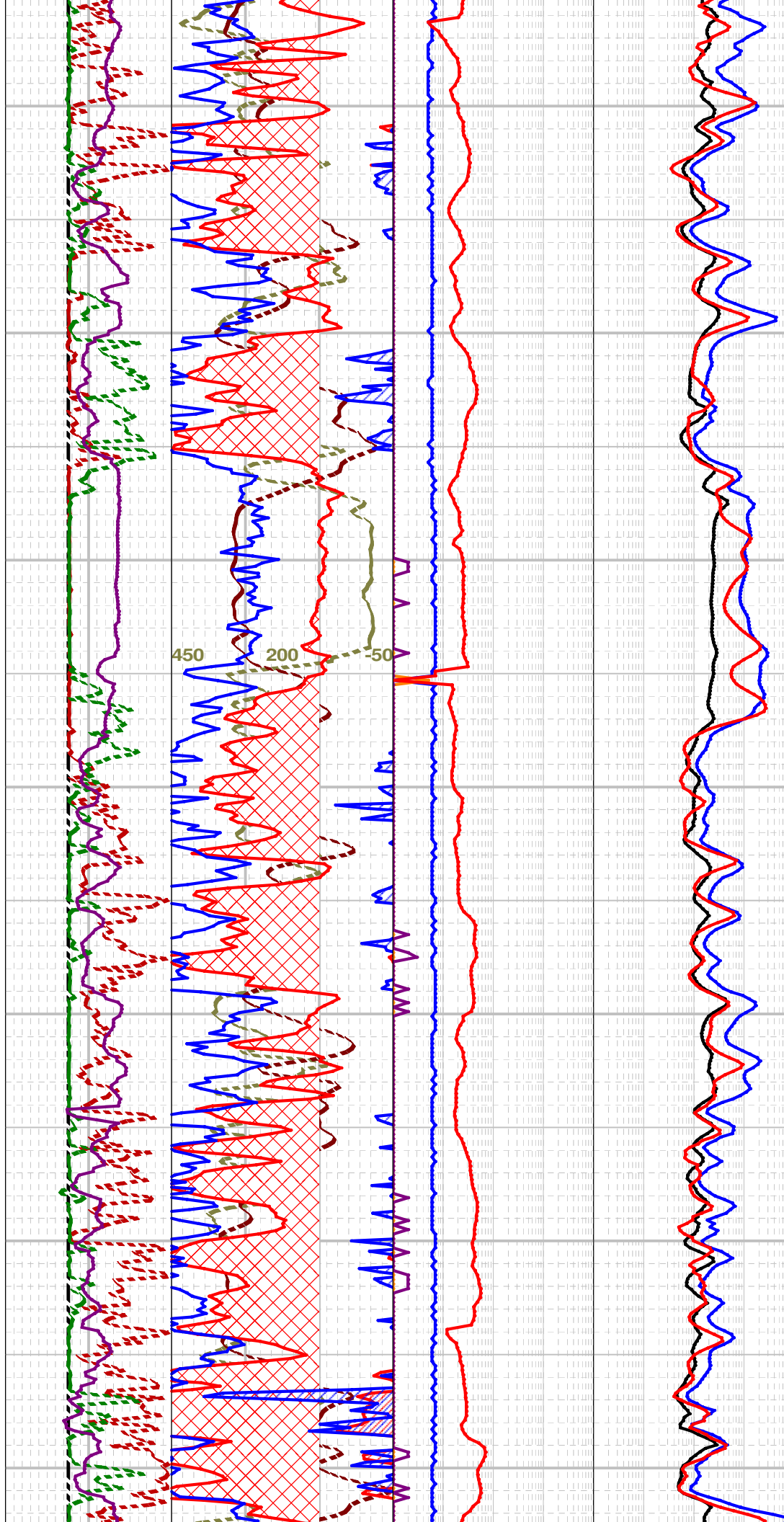
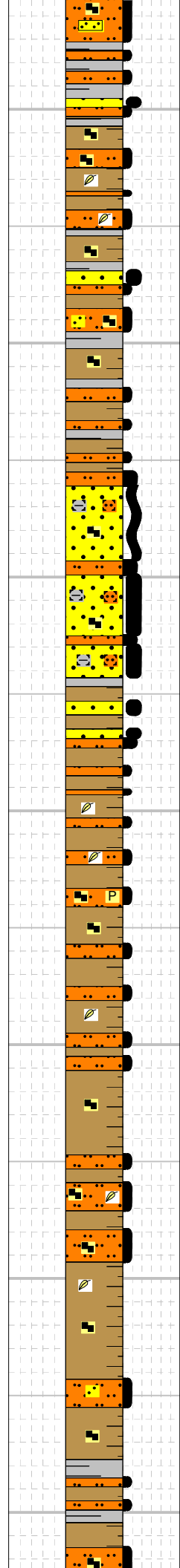
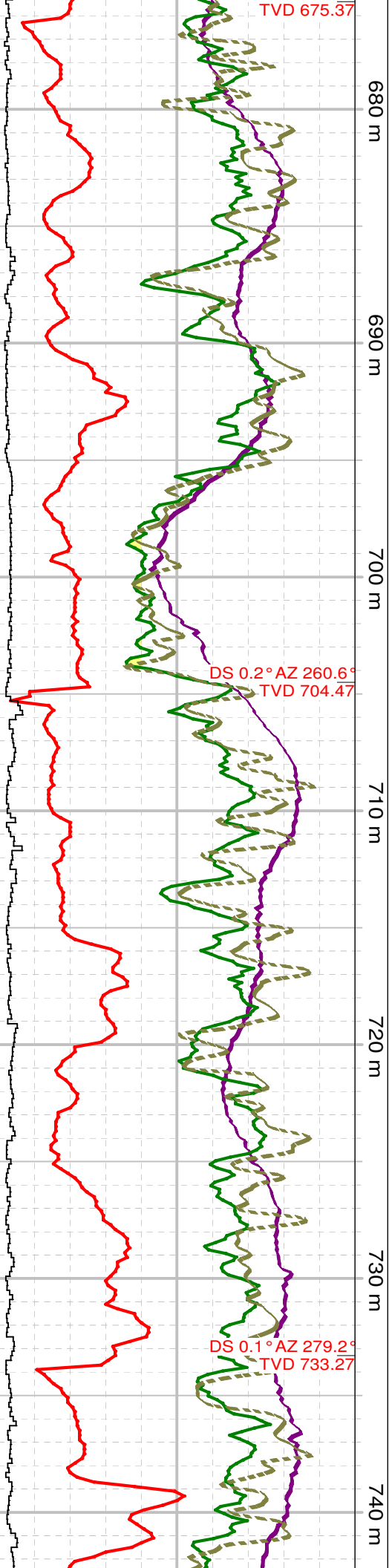
**SH:** m brn, lt - m gy, sbfis, occ slty lam, nn calcs, carb ip, scat pl rmn, bioturb ip

**SH:** m gy dry, m brn immersed in mnrl o, sbfis, incrly carb, tr coal in 585 spl, pl rmn, nn calcs, occ slty lams, s tr pyr

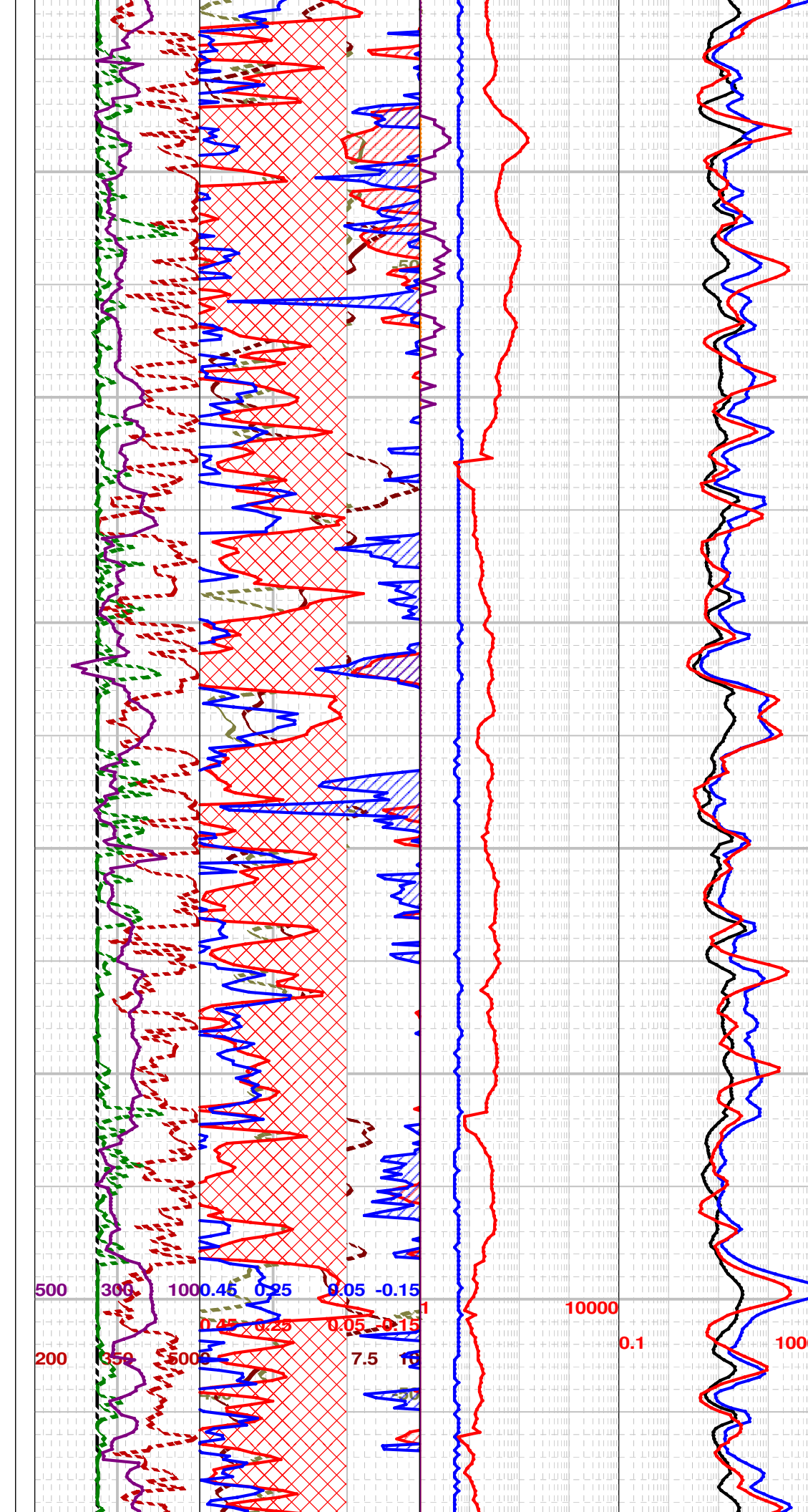
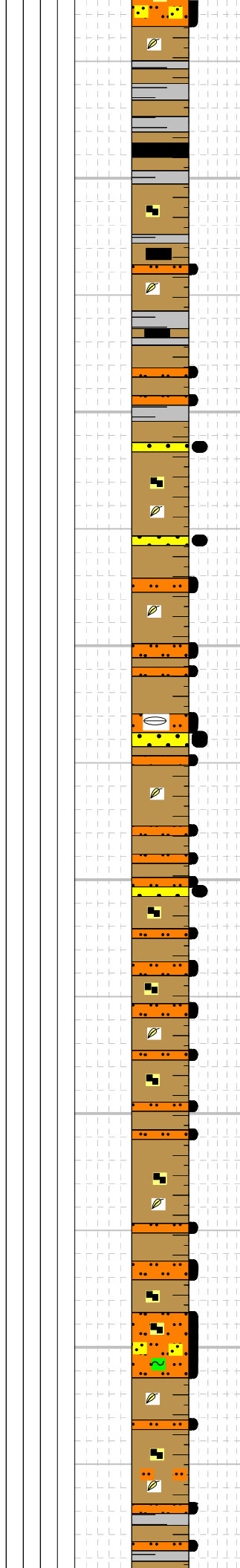
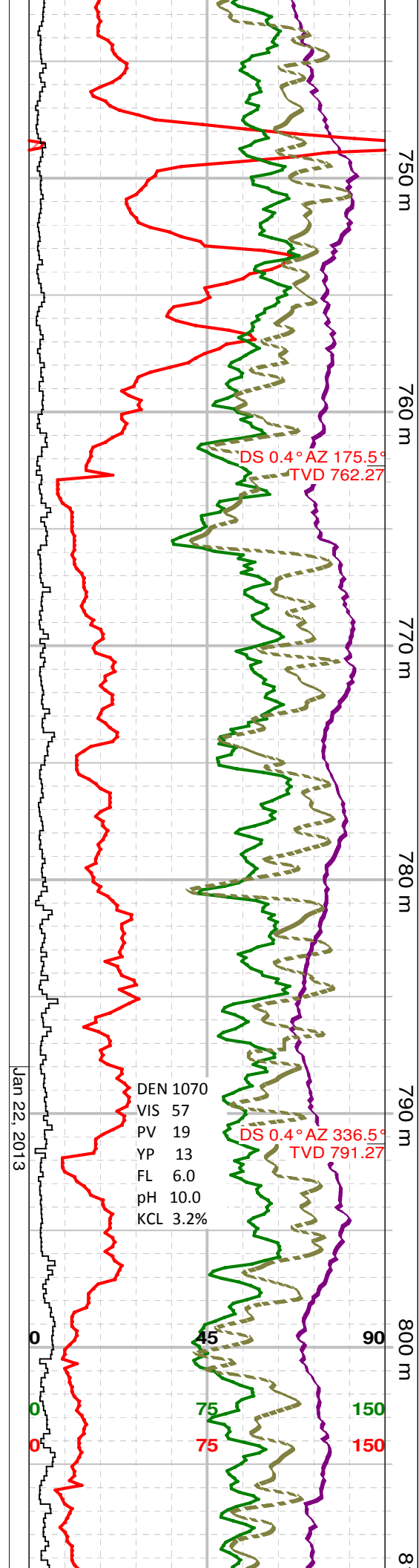


Re-boot gas analyzer in attempts to obtain C2 & C3 analysis

- SLTST:** dk gysh brn, nn calcs, carb, sdy ip
- SH:** m brn, sbfis, locly slty, nn calcs, pl rmn
- CGL:** predly varly gy cht, mnr wh & brn cht pbls grnls & v c gred cls, m brnsh gy slty - u m gred mtx, mnr blk
- SS:** m gy, predly vfg, locly grd - l f gred, dk gysh brn slty & arg mtx, sbrdd - sbang, py srt, nn calcs, mnut carb frags thru, mod indn, tt, sh ptgs
- spy dull yel flor, fr stmg cut, dd o shw**
- SH:** predly m brn, sbfis, carb ip, sdy strgs, pl rmn, ip lt - m gy & lt tan, bioturb, nn calcs
- SLTST:** m brn, nn calcs, carb, locly sdy ip
- SS:** m gy brn, vf - l f gred, 3 - 5% u f gred, dk slty & arg mtx, sbrdd - sbang, py srt, wk sil cmt, mod indn, tt, carb ip, nn calcs
- SH:** m - dk gy dry, m - dk brn in mnrl oil, sbfis, nn calcs, amb foss lam, s tr vit coal, thn bed / org wh specs, carb, s tr pyr, occ slty lam
- SS:** m gy - brnsh gy, qtz, lits & com carb frags, predly u f gred, slty vfg mtx, sbang, mod srtg, sil cmt, amb - lt org slty foss bed, scat calcs shl frags, sil cmt, mod indn, fri ip, wk intgran por (4-7%), no vis shw
- SH:** predly lt - m gy, sbfis, slty ip, bioturb, m - dk brn ip, sbfis, nn calcs, carb
- SS:** m - dk gysh brn, vfg, slty & arg mtx, sbang, py srt, thn beds, tt, pl rmn
- SLTST:** m - dk gysh brn, nn calcs, carb, sdy ip, pl rmn, occ shl frags
- SH:** predly m - dk brn - gysh brn, sbfis, slty strgs, carb ip, nn calcs, lt gy - gysh tan ip, slty, nn calcs, bioturb
- SS:** m - dk gysh brn, vfg, slty & arg mtx, sbang, py srt, thn beds, tt, pl rmn



- SLTST:** m - dk brn - gysh brn, nn calcs, carb ip, sdy lams
- SH:** predly m brn, aa, incrly carb, slty lams thru, nn calcs
- SS:** m - dk gysh brn, vfg, slty & arg thru, nn calcs, carb, tt, thn beds
- SH:** predly m - dk gysh brn - brn, sbfis, nn calcs, carb ip, intbd lt - m tan - gysh tan, sbfis, nn calcs, slty, bioturb sh
- SLTST:** m - dk gysh brn, sdy ip, carb ip, nn calcs
- SS:** dk brn - gysh brn, vfg, slty & arg mtx, sbrdd - sbang, py srt, nn calcs, carb, modly ind, tt,
- SH:** m brn, mnr intbd m gy - gysh brn, sbfis, nn calcs, carb ip, slty slty ptgs, pl rmns, rr coaly lam
- SLTST:** lt - m gysh brn, locly sdy, nn calcs, carb ip, thn beds, s tr pyr, pl rmn
- SH:** m brn - gysh brn ip, sbfis, nn calcs, carb ip, intbd sltst, w cpctd, modly frm & brit
- SLTST:** m gy, qtzs, v slly calcs, tr mnut carb mat thru
- SH:** m - dk brn - gy brn, sbfis, nn calcs, occ slty lams, incrly carb, locly bioturb, scat pl rmn, tr vit coal in 730 spl
- SLTST:** lt - m gysh brn, sdy ip, nn calcs, carb ip, thn



beds & lams

**SH:** lt - m gy, grd - vf sltst ip, qtzs, nn calcs, bioturb ip, intbd m - dk brn, sbfis, slty lam, carb ip

**COAL:** modly vit, pyric, brit, thn strgs

**SH:** m - dk brn - sly gysh brn, sbfis, nn calcs, incrly carb, pl rmn, slty lam, occ thn pyric coal strgs

**SH:** predly m brn, mnr lt gy aa, sbfis, nn calcs, carb ip, mnr intbd sltst, occ arg sdy ptg, pl rmn, w cpctd, modly frm

**SS:** m gysh brn, vfg, slty & arg thru, sbang, py srt, carb ip, tt, thn beds

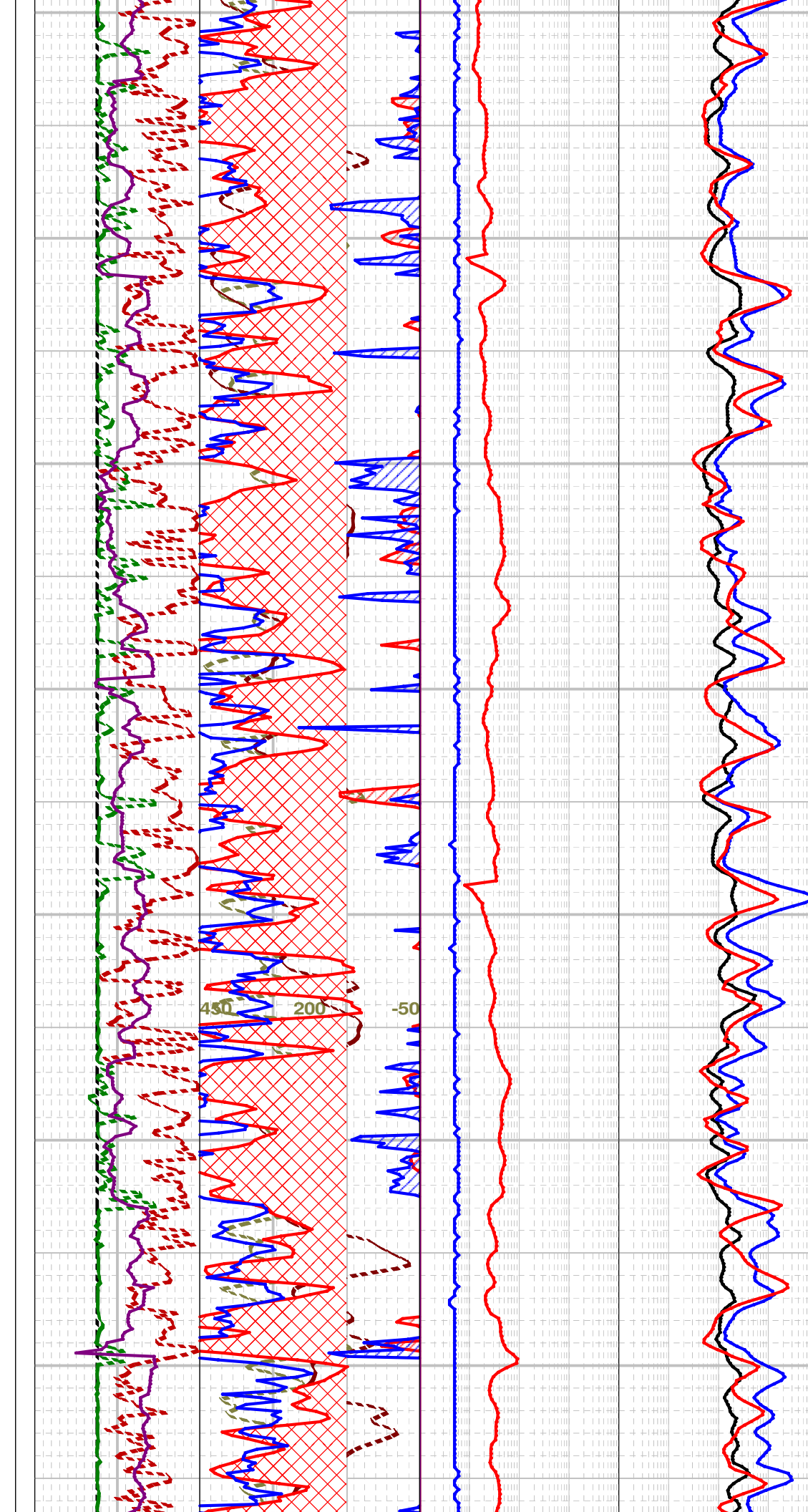
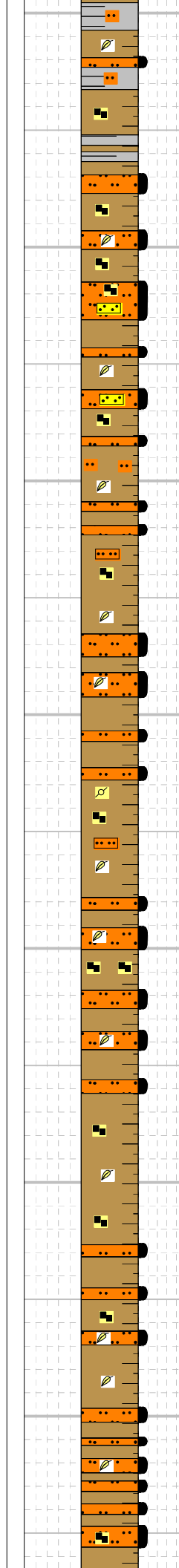
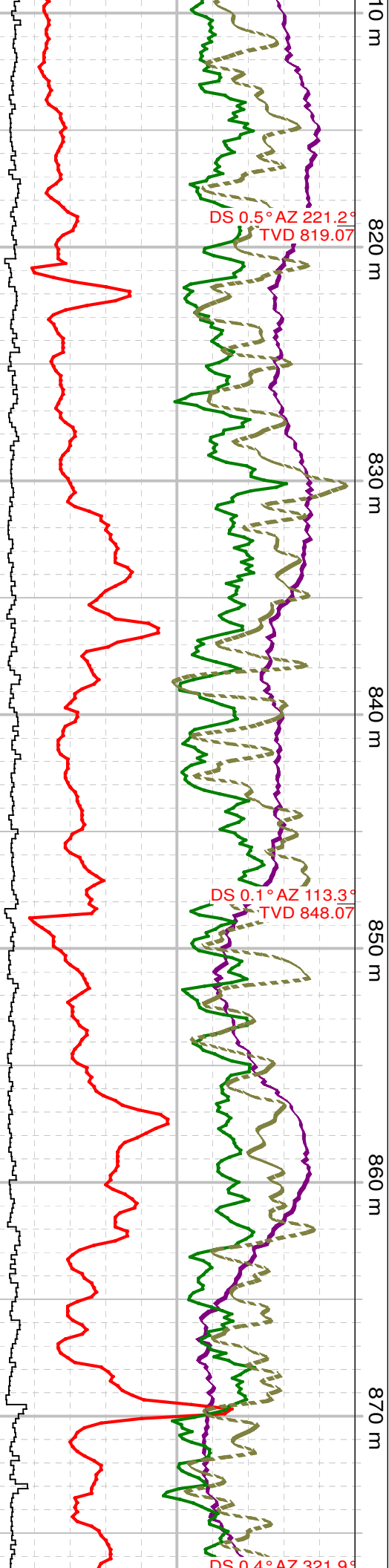
**SLTST:** m gy - brnsh gy, sdy ip, carb ip, nn calcs

**SLTST:** lt yel tan - gy, qtzs, sdy ip, sly arg, scat shl frags

**SH:** m gy, gysh brn, sbfis, nn calcs, intbd sltst

**SH:** m - dk brn, locly dk gysh brn, sbfis, nn calcs, slty strgs, carb, w cpctd, modly frm, scat carbz pl rmn

**SLTST:** m - dk brn, gysh brn ip, sdy ip, rr glau gr, nn calcs, carb



**SH:** m br - gysh brn, sbfis, nn calcs, locly slty, occ lt gy qtzs slty lams, carb ip, sltst ptgs, scat carbz pl rmn

**SLTST:** m gysh brn, nn calcs, mnut carb mat com thru, locly grd - vfg ss, thn strgs

**SH:** m brn - gysh brn, sbfis, nn calcs, locly slty, occ lt gy qtzs slty lams, carb ip, sltst ptgs, scat carbz pl rmn

**SLTST:** m - dk gysh brn, nn calcs, vf slt in brn arg & carb mtx, rrlly sdy,

**SH:** m - dk gy dry, m - dk brn in mnrl o, sbfis, slty lams thru, nn calcs, carb ip, occ pl rmn, rr thn lam / abnt pels, w cpctd, frm, modly brit, softens in H2O

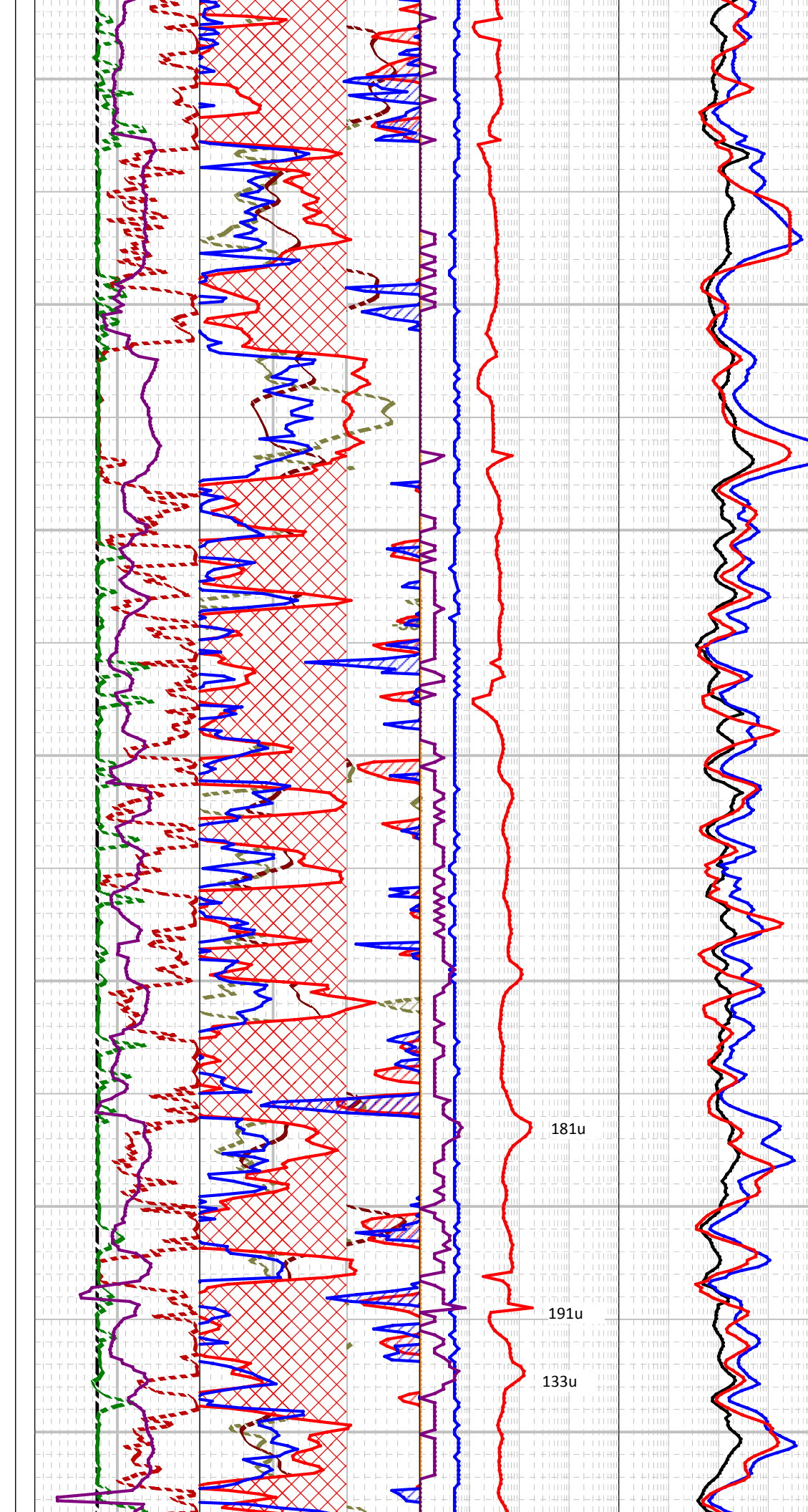
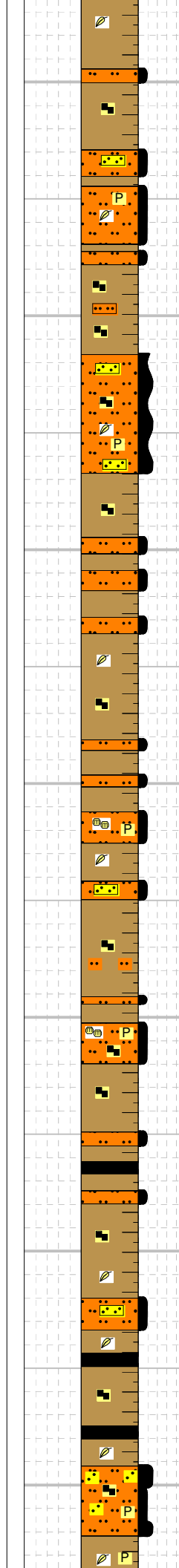
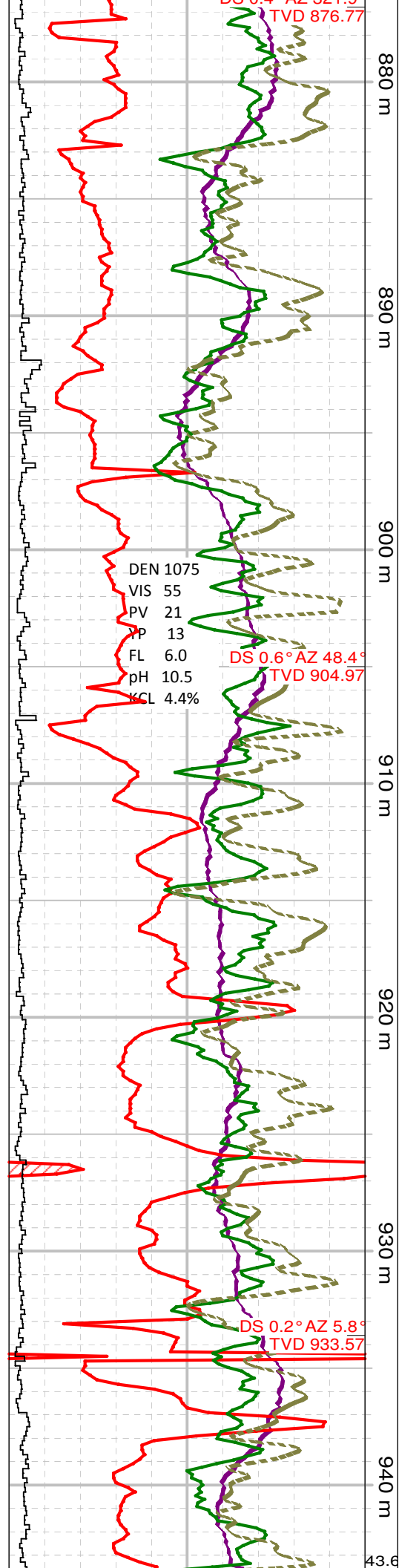
**SH:** aa, bioturb ip, sl incr in carb cont, pl rmn

**SLTST:** aa, comly lt gysh tan, qtzs, tr mnut carb mat thru, nn calcs, scat pl rmn

**SH:** m brn - gysh brn, sbfis, slty ip, carb, nn calcs, intbd carb sltst

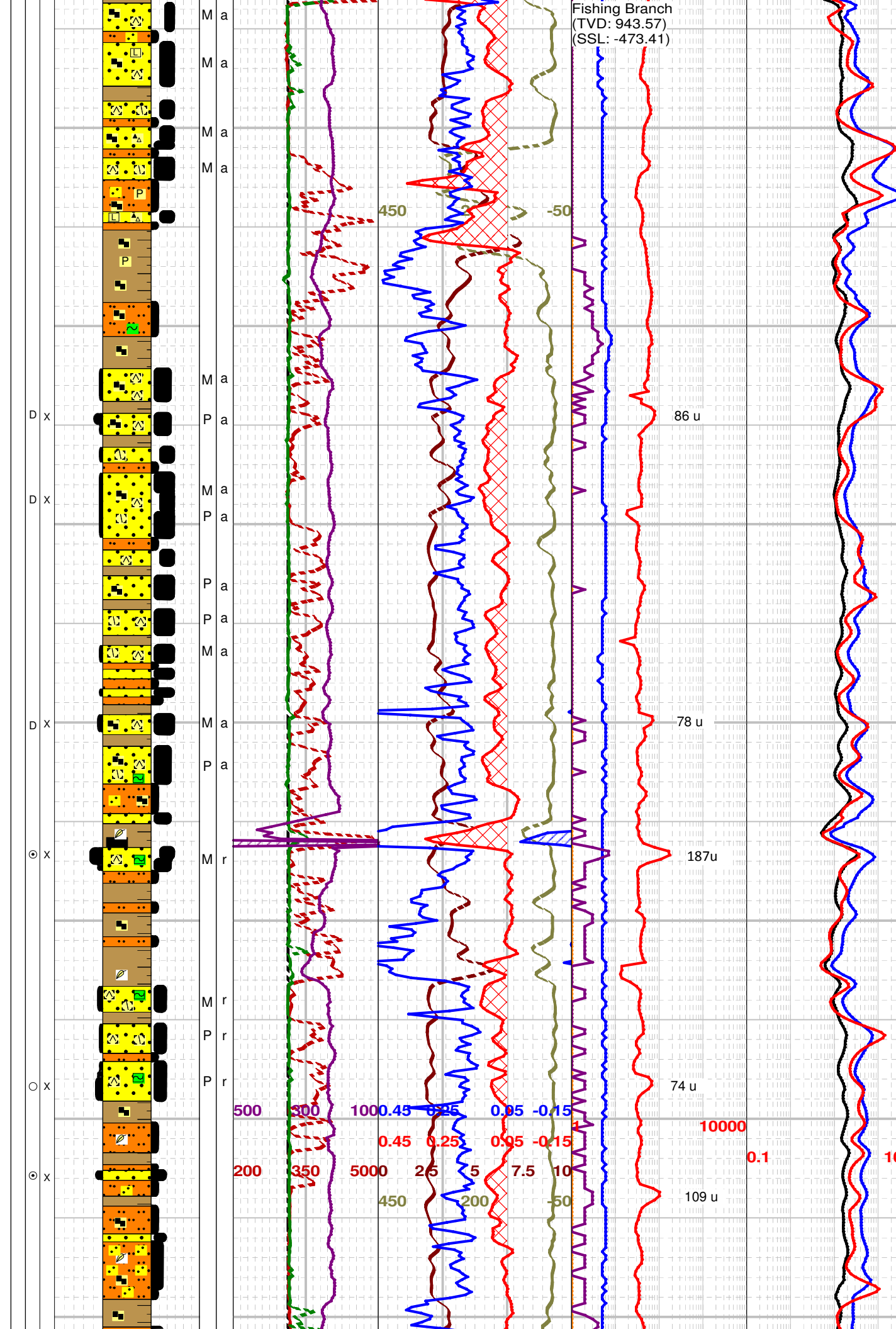
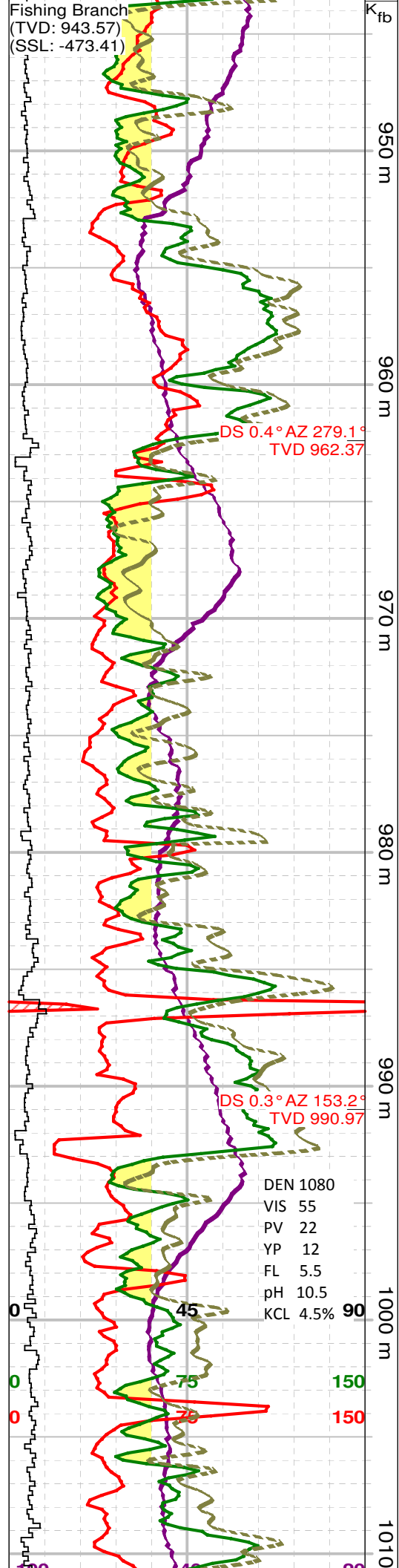
**SLTST:** lt - dk brn, lt gysh wh & qtzs ip, nn calcs, carb ip, rr scat shl frags, carbz pl rmn





**SH:** m - dk brn - gysh brn, sbfis - sbbkly, occ slty lam, carb ip, nn calcs, w cpctd, frm  
**SLTST:** m - dk gysh brn, vf - c slt, locly sdy, locly wh - lt tan & qtzs, carb, nn calcs, s tr pyr  
**SH:** m - dk brn, sbfis, intbd sltst, carb, nn calcs  
**SLTST:** m - dk gysh brn, vf - c slt, locly sdy, locly wh - lt tan & qtzs, carb, nn calcs, s tr pyr  
**SH:** m - dk brn, sbfis, intbd sltst, carb, nn calcs  
**SLTST:** m - dk gysh brn, nn calcs, rr sdy lam, carb, s tr pyr, pl rmn, micmica  
**SH:** m - dk brn, sbfis, nn calcs, carb, occ thn coal lam, scat carbz & pyric pl rmn, intbd carb sltst  
**COAL:** blk, modly vit - vit, pyric, thn seam  
**SLTST:** m - dk brn - gy brn, mnr lt gysh wh qtzs sltst, nn calcs, carb, f - c slt in brn arg & carb mtx, locly sdy, s tr pyr  
**SH:** m brn, sbfis, nn calcs, carb

181u  
191u  
133u



**SS:** m brnsh gy, lf - uf gred, qtz / mnr dk lits and com scat blk carb frags, sbang, sil ovghts, mod srtg, sil cmt, tr sec calc cmt, tt - locky p intgran por (2-5%), **no vis shw**

**SS:** lt - m yel brn - gysh brn, qtzs / mnr lits & gy cht, scat carb frags, tr - mnr dk brn - blk intstl bit cmt, vf - f gred, sbang, mod - py srt, sil + tr sec calc cmt, w ind tt - vp por (<4%), **no vis flor, slow wk dd o cut, yelsh wh calcs lam / shl deb, rr glau**

**SH:** m brn, sbfis - sbbkly, nn calcs, carb ip

**SLTST:** lt - m brn, sdy, grd - vfg slty ss, brn arg mtx, carb, nn calcs, s tr glau

**SLTY SH:** m brn, m gy ip, sbfis - sbbkly, slty, grd to shy sltst, bioturb, carb ip, s tr pyr, nn calcs

**SS:** lt - brn - gysh brn, qtz, lits, mnr cht carb frags, com dk brn - blk pyrbit cmt, vf - lf gred, slty ip, sbang, mod - py srt, sil + tr sec calc cmt, tt - locky v wk por, **no vis flor, slow hazy dd o cut, intbd slty sh**

**SS:** lt - m brn - yelsh brn, vf - lf gred, slty carb mtx, sbang, p - mod srtg, sil cmt, w ind, tt, **tr pyrbit, no vis flor, tr slow fnt cut**

**SLTST:** m brn, sdy ip, nn calcs, carb ip, shy, pl rmn

**SH:** m brn, gysh brn, sbfis, nn calcs, carb ip, locky slty

**SLTST:** m brn, sdy ip, nn calcs, carb

**SS:** lt yelsh brn - yelsh wh, qtzs / mnr dk lits, s tr glau, u vfg, locky grd - lf gred, sbrdd - sbang, sil ovghts, predly tt, locky / 4-7% intgran por, **tr - mnr intstl bit cmt, no vis flor, slow fnt cut, q shw**

**SH:** m brn, sbfis, nn calcs, carb, sdy & slty lam

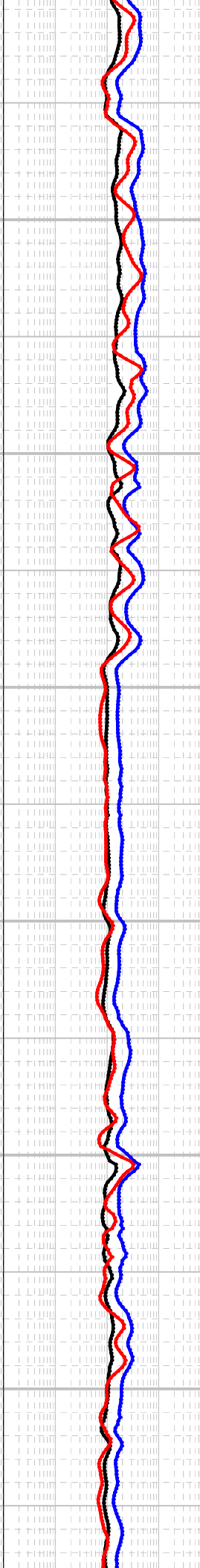
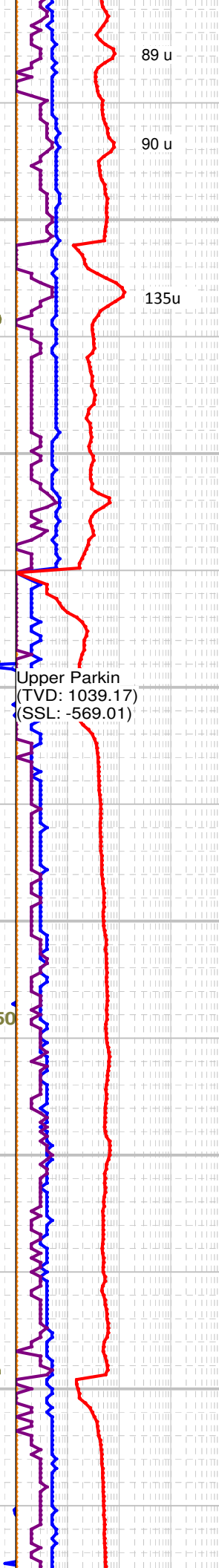
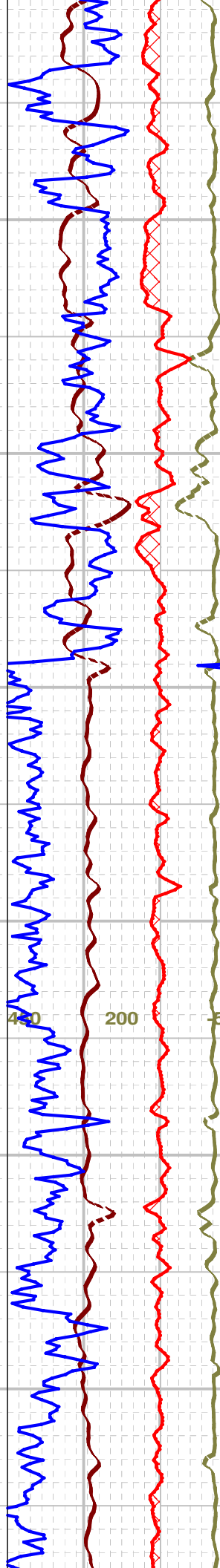
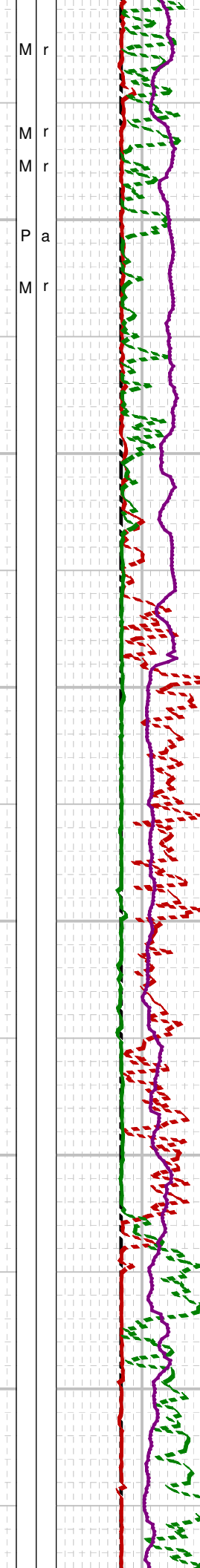
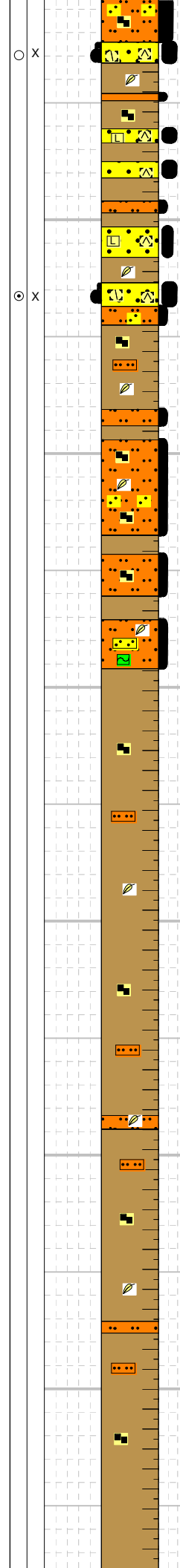
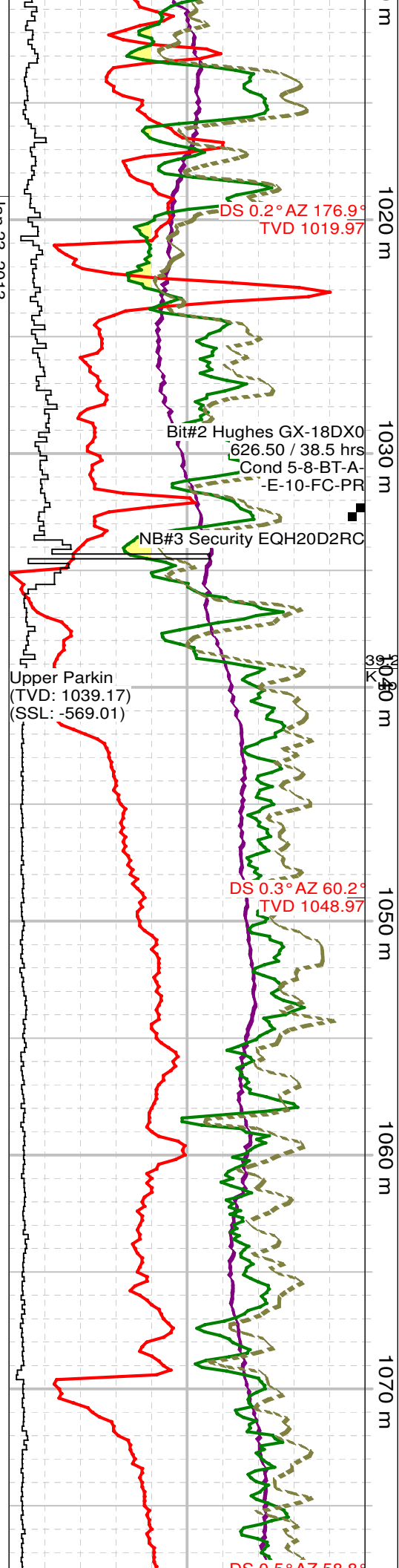
**SS:** lt - m brn, gysh brn, predly vfg, 7-10% lf gred, slty & arg mtx, sbang, py srt, modly w ind, s tr glau, sil cmt, predly tt, locky w/ v wk por (<6%), **tr pyrbit cmt, no vis flor, slow fnt cut**

**SLTST:** lt - m brn, nn calcs, carb ip, lams, pl rmn

**SH:** m brn, sbfis, nn calcs, carb, slty ip

**SDY SLTST:** m brn, sdy thru, grd - vfg ss, arg mtx, nn calcs, w ind, hd, carb

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**SH:** m - dk brn, sbfis, locly slty, carb, nn calcs

89 u

90 u

**SLTY SS:** lt - m brn, vfg, slty, grdg - c sltst, sbang - sbrdd, mod - py srt, sil cmt, w ind, predly tt, locly / wk por, **no vis flor, tr slow fnt cut**

135u

**SLTST:** m brn, sdy ip, carb, nn calcs

**SH:** m - dk brn - gysh brn, slty ip, carb, nn calcs

**SLTST:** m brn, nn calcs, locly sdy, carb, scat carbz pl rmn

**SH:** m brn, gysh brn ip, sbfis, nn calcs, carb

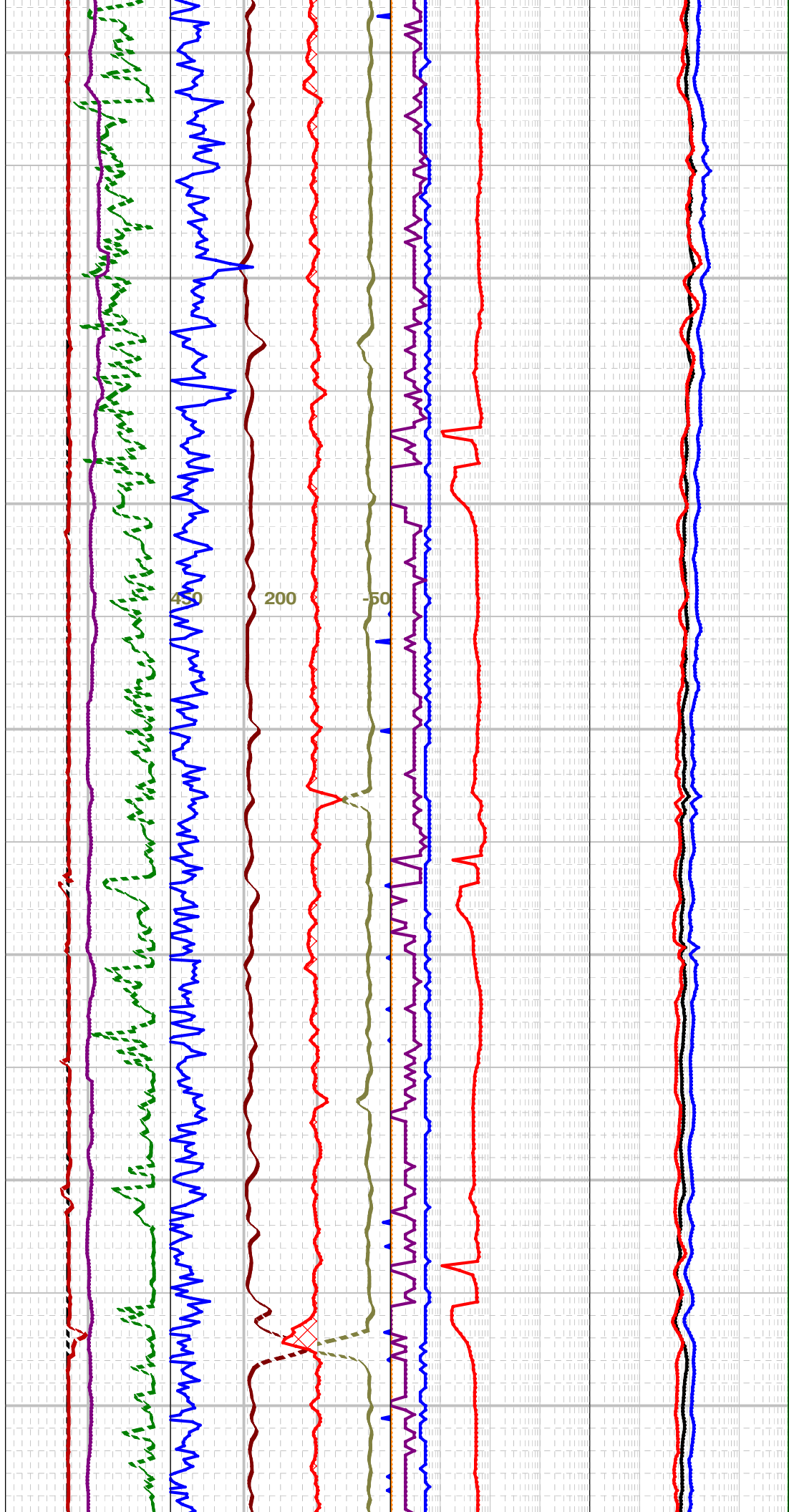
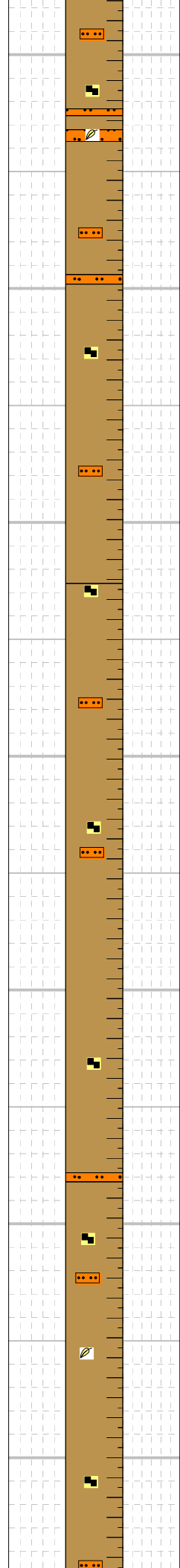
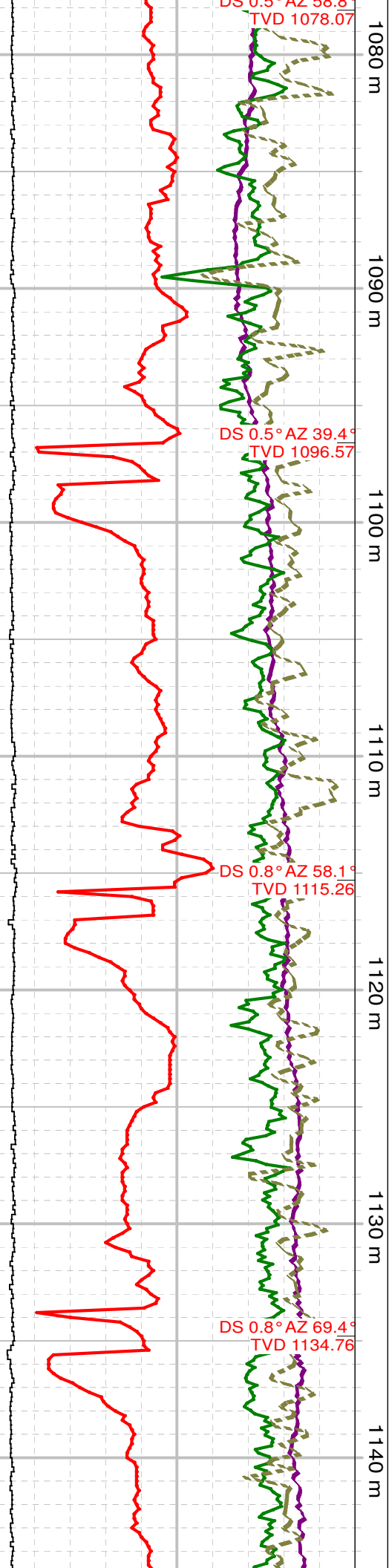
**SLTST:** predly m - dk brn, sly sdy / s tr glau, nn calcs, carb, mnr wh - lt gy of v lt tan & qtzs,

**SH:** m - dk brn - gysh brn, sbfis, slty lam, carb ip, nn - v sly calcs, w cpctd, modly frm

40 200 -50

**SH:** m - dk brn - gysh brn, sbfis, slty lam, carb ip, nn - v sly calcs, w cpctd, modly frm

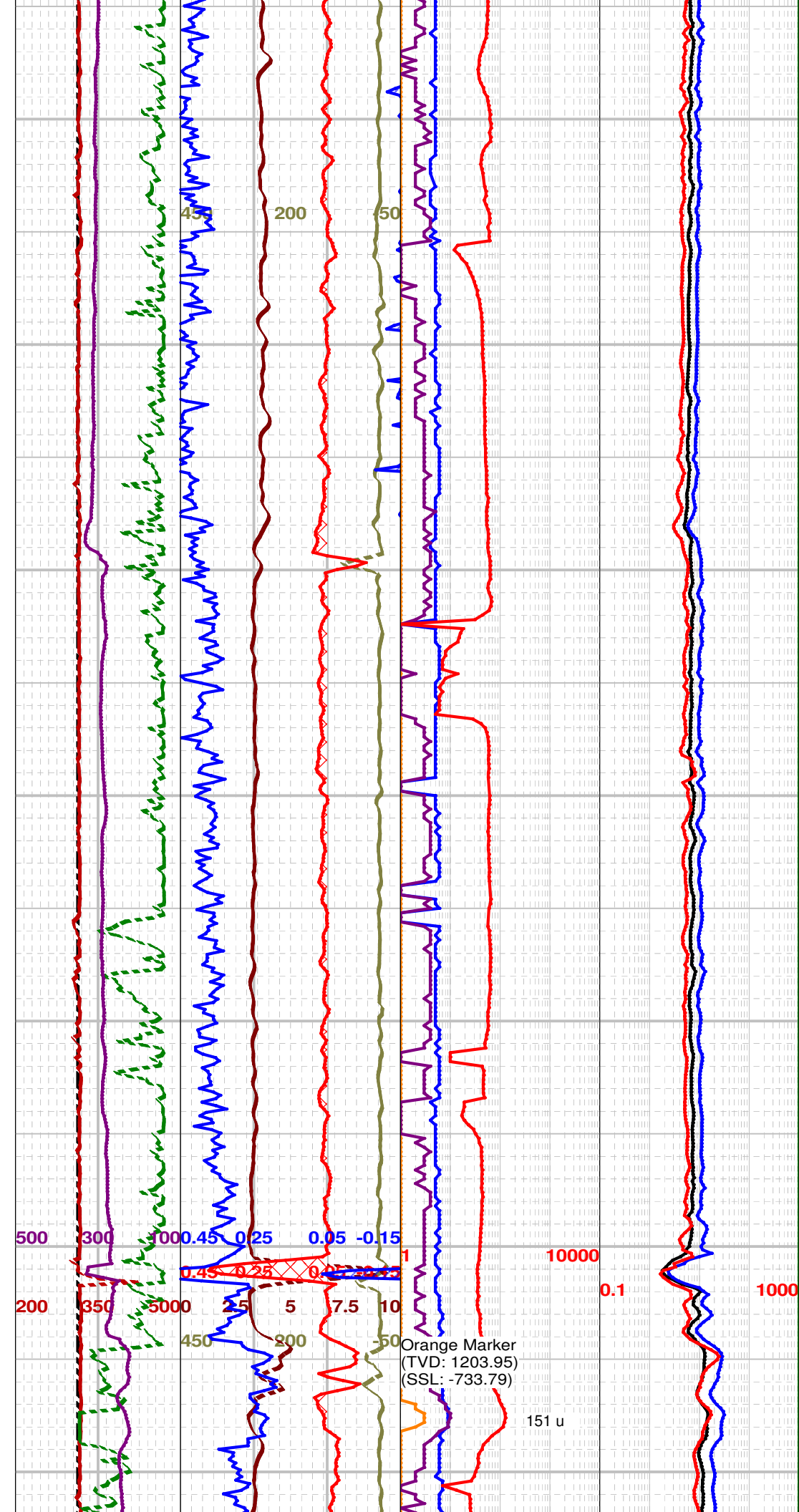
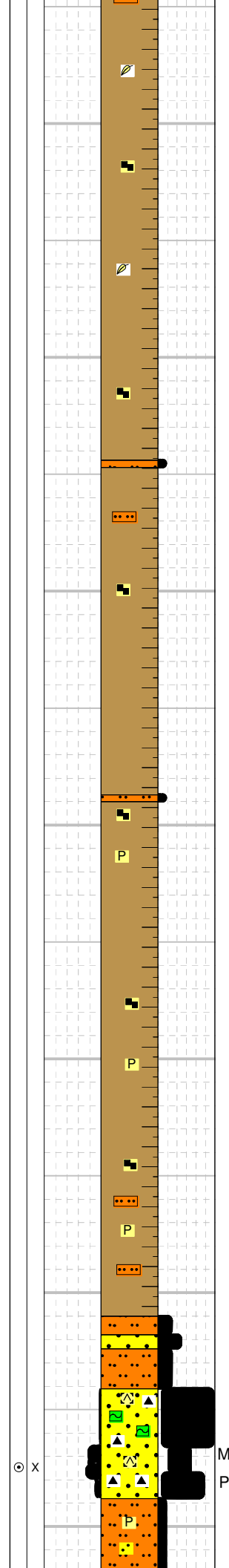
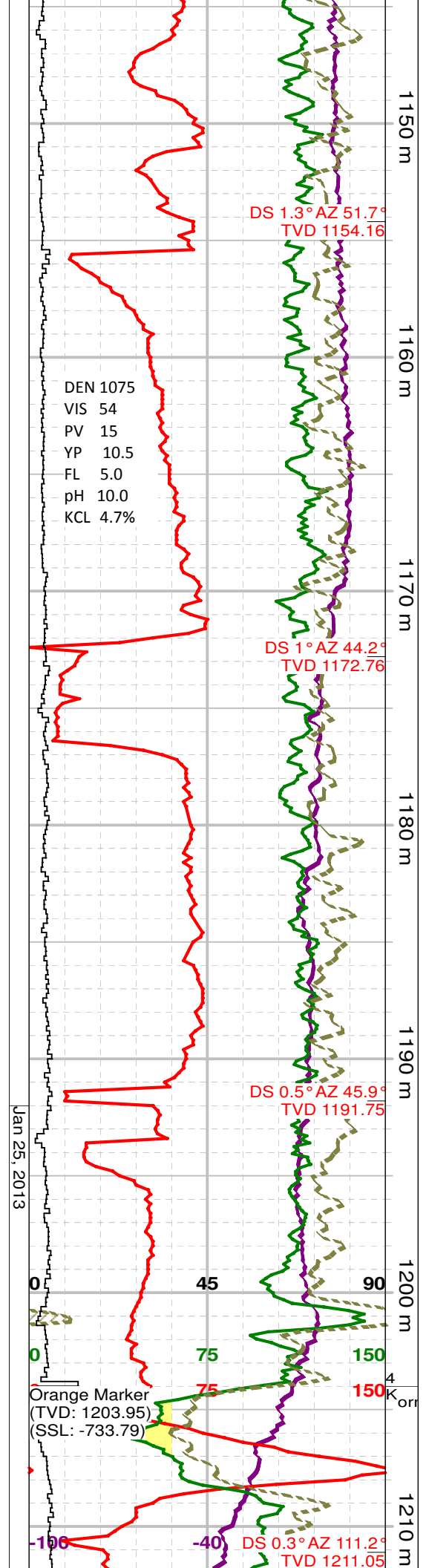
**SH:** dk brn - gysh brn, sbfis, nn calcs, incrlly carb, com slty lam, w cpctd



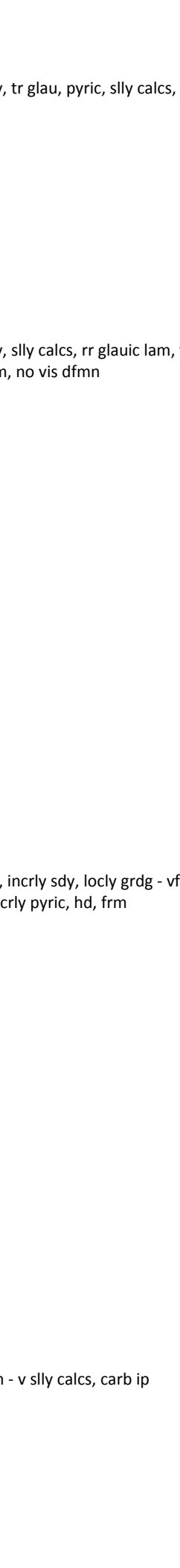
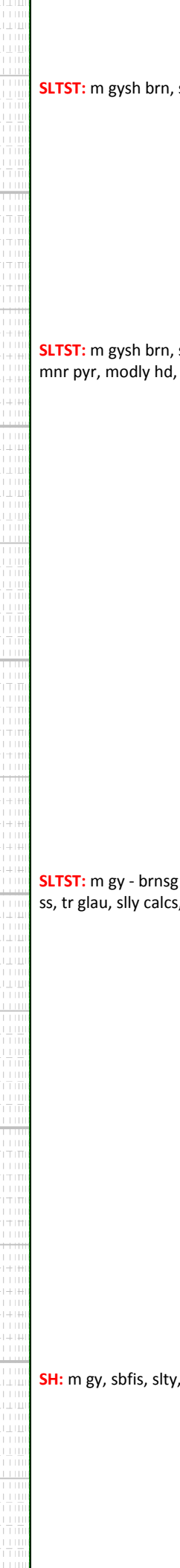
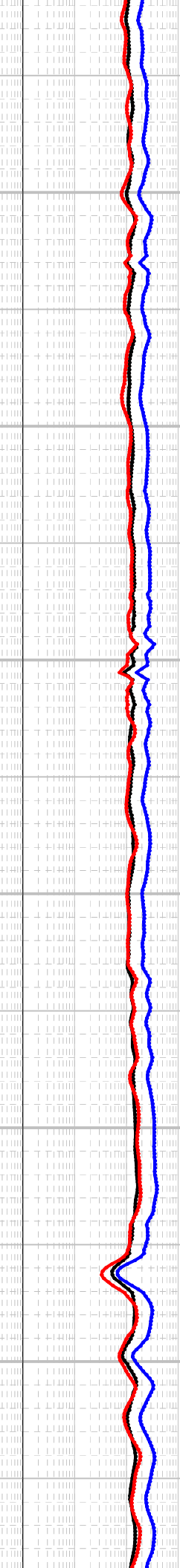
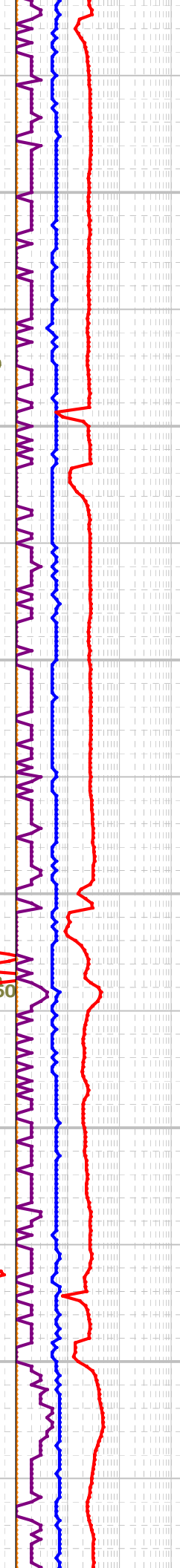
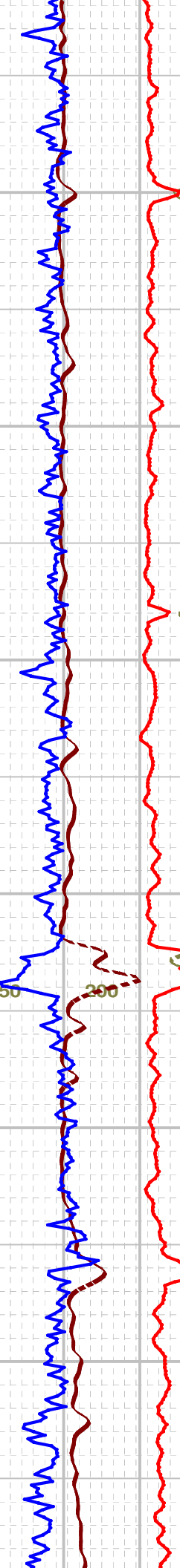
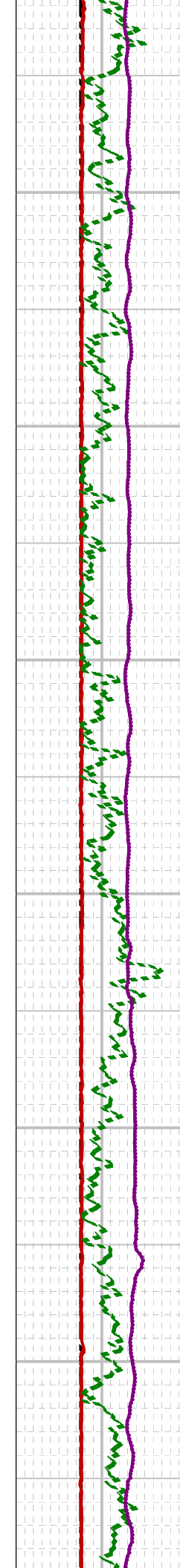
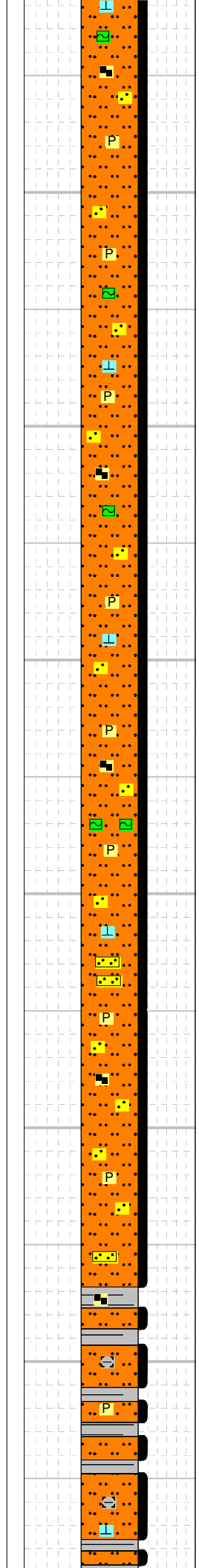
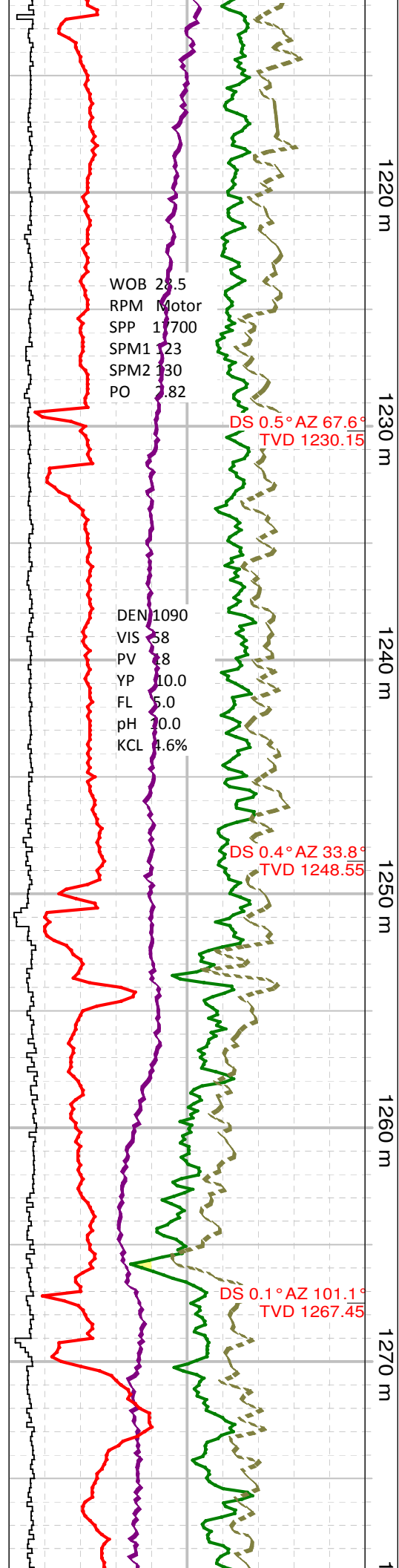
SH: dk brn - gysh brn, sbfis, nn calcs, inclry carb, com slty lam, w cpctd

SH: m - dk gy dry, m - dk brn immersed in mnrl o, sbfis, nn calcs, carb, occ slty lam

SH: m - dk gy dry, m - dk brn immersed in mnrl o, sbfis, nn calcs, carb, occ slty lam



**SH:** m - dk gy dry, m - dk brn immersed in mnrl o, sbfis, nn calcs, carb, occ slty lam, w cpctd, modly frm  
**SH:** m - dk gy dry, m - dk brn immersed in mnrl o, sbfis, nn calcs, carb, occ slty lam, w cpctd, modly frm  
**SH:** m - dk brn in mnrl o. sbfis, nn calcs, tr pyt, slty ip, occ slty lam, carb ip  
**SH:** m brn - gysh brn, sbfis - sbblky, slty, nn calcs  
**SLTST:** lt - m gysh brn, sdy ip, nn - v slly calcs  
**SS:** lt brn, lt - m gy, vf - vc gred, cglic ip, abnt dk gy - blk & brn cht in a predly qtzs mtx / com bri gn glau grs, sbrdd, predy py srt & ttly cmtd / sil + mnr sec calc, thn qtzs bed / wk intgran por (<8%) & lt amb hydc stng, no vis flor, fnt v slow cut, vp shw

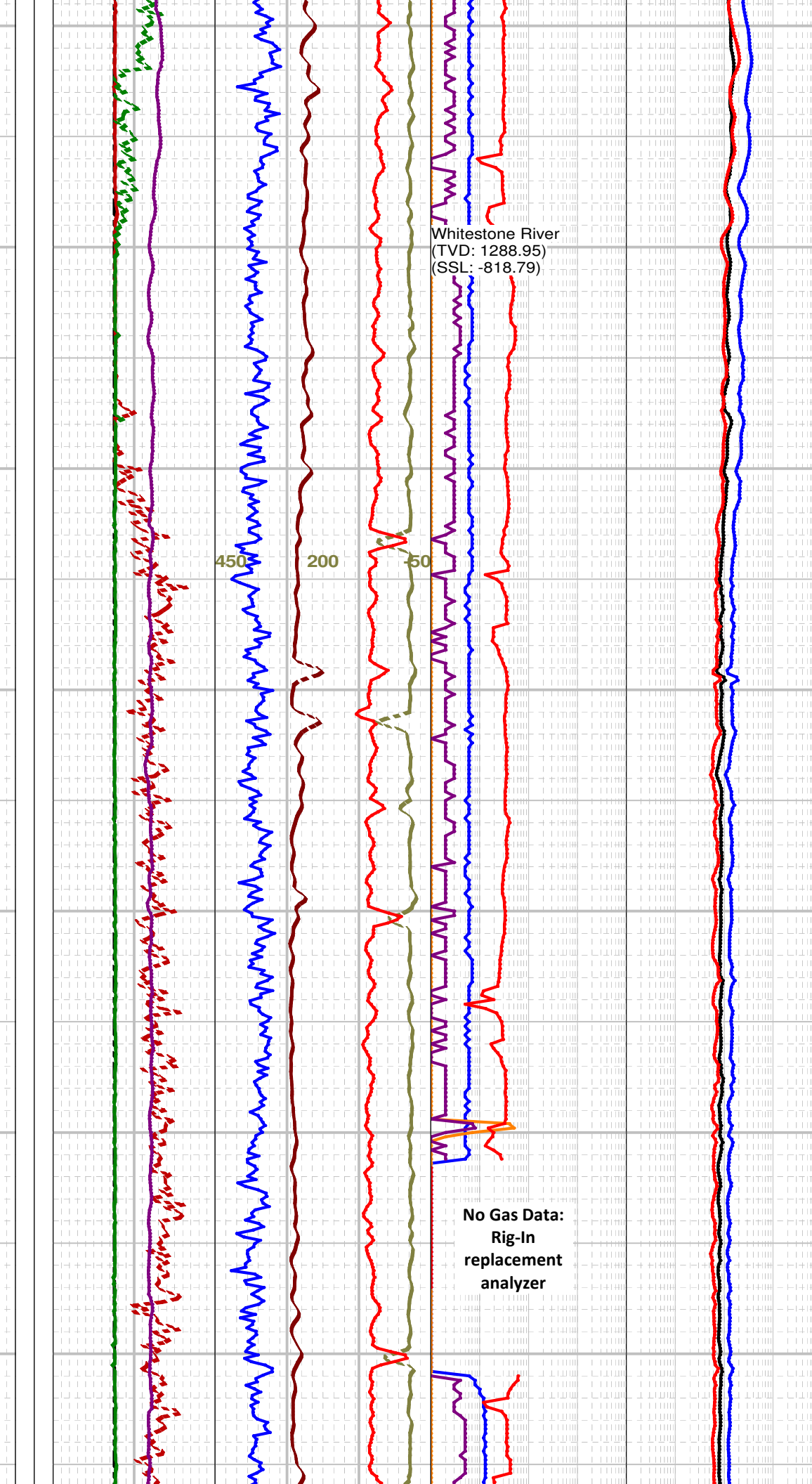
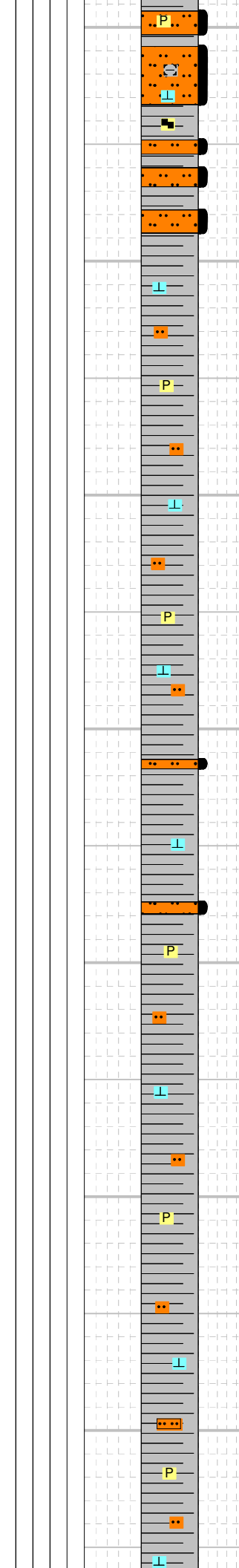
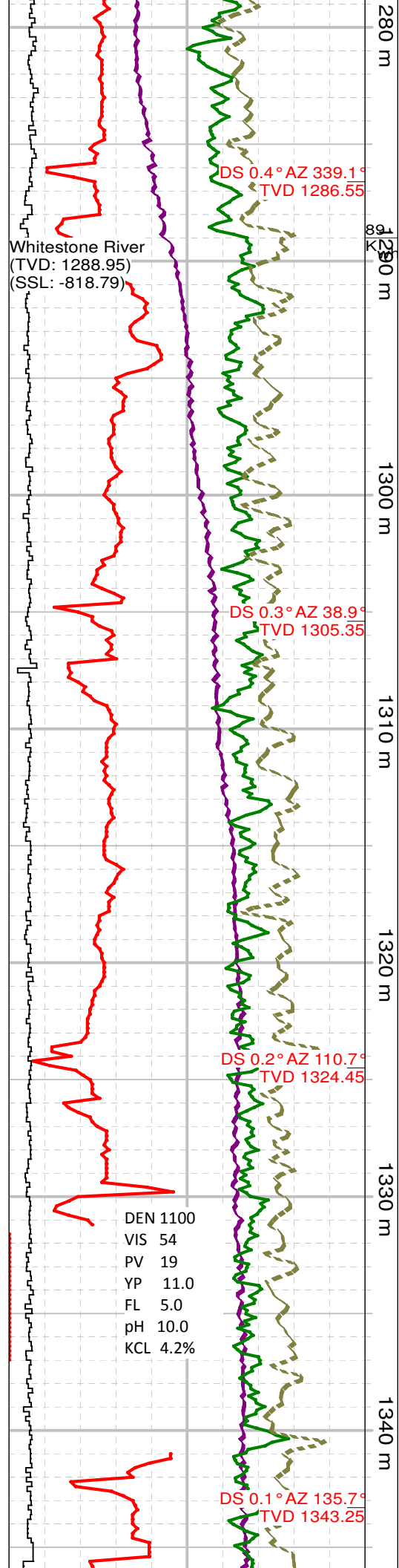


**SLTST:** m gysh brn, sdy, tr glau, pyric, sily calcs, carb ip

**SLTST:** m gysh brn, sdy, sily calcs, rr glauc lam, tr - mnr pyr, modly hd, frm, no vis dfmn

**SLTST:** m gy - brnsg gy, incrlly sdy, locly grd g - vfg slty ss, tr glau, sily calcs, incrlly pyric, hd, frm

**SH:** m gy, sbfis, slty, nn - v sily calcs, carb ip



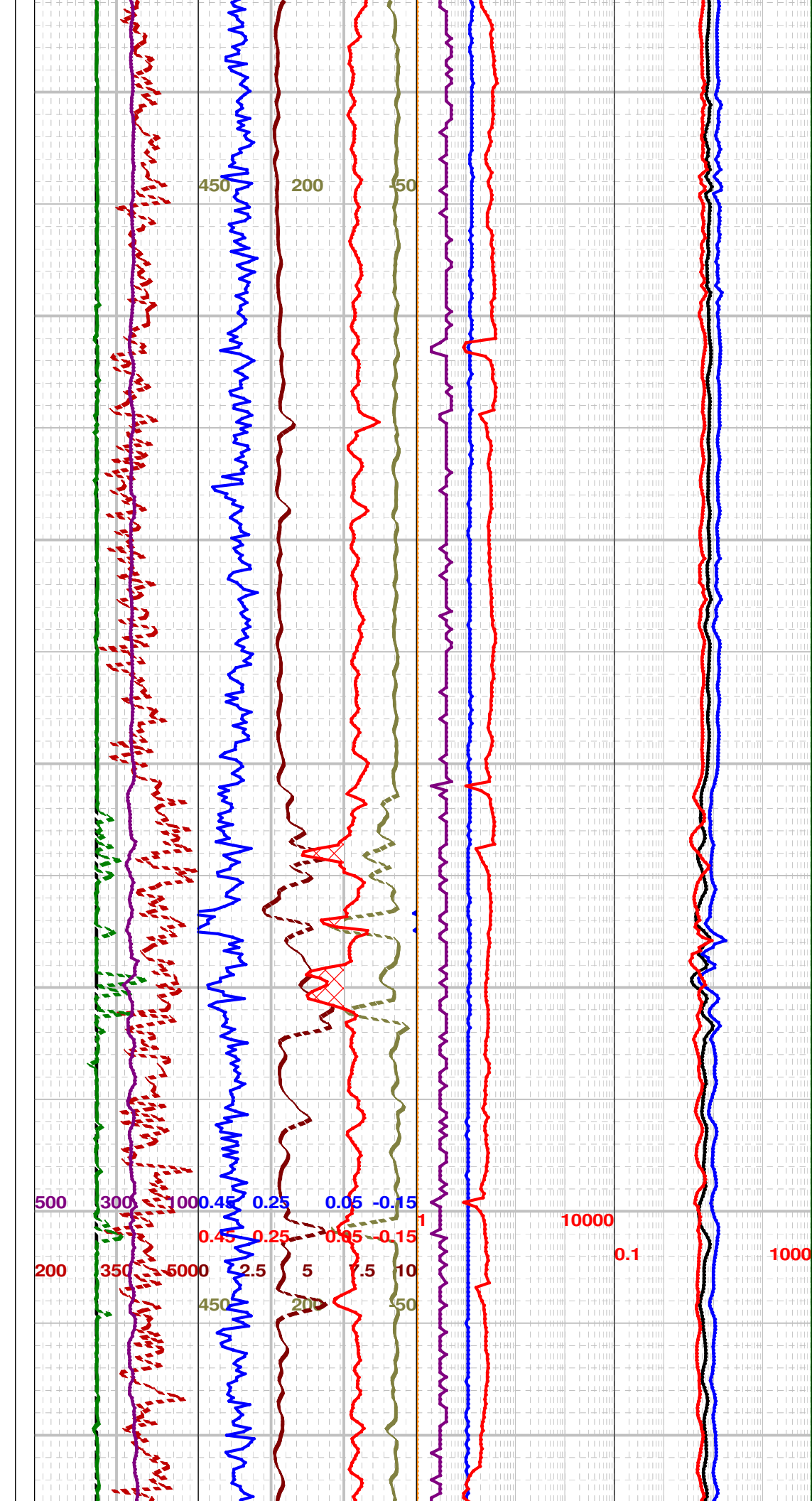
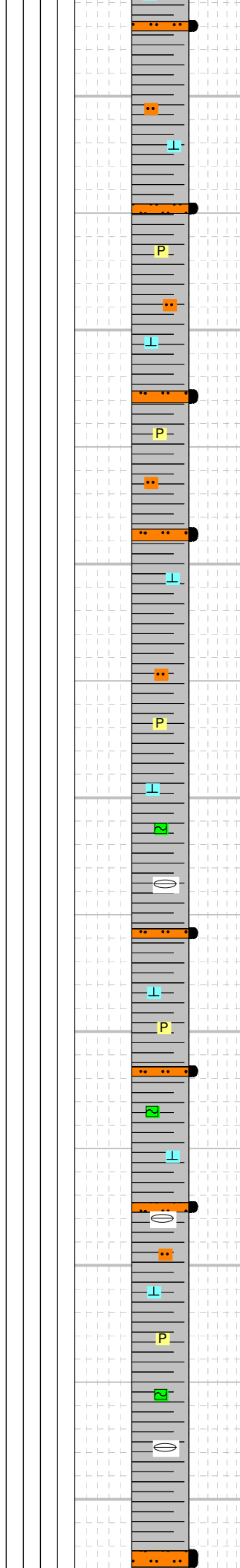
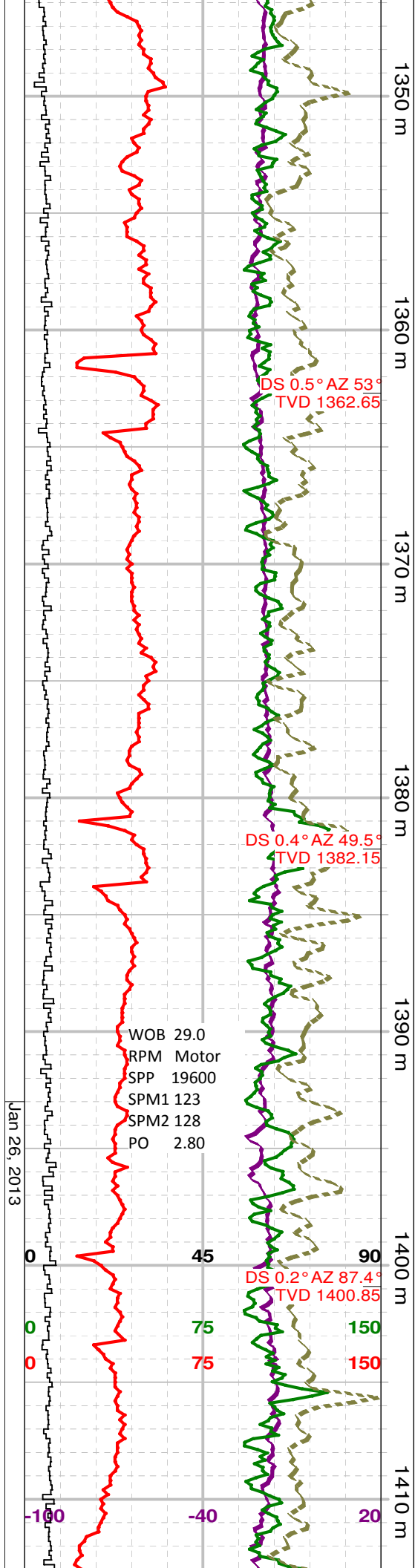
**SLTST:** m gy - brnsh gy, sdy ip, sily calcs, carb ip, tr pyr

**SH:** m gy - brnsh gy, sbfis, nn - v sily calcs, slty ip, slty lam, pl rnm, scat tr pyr

**SH:** m gy, brnsh gy, sbfis, v sily calcs ip, slty ip, sily carb, tr pyr, w cpctd, modly frm, slty lam

DEN 1100  
VIS 54  
PV 19  
YP 11.0  
FL 5.0  
pH 10.0  
KCL 4.2%

450 200 50



SH: m gy - brnsh gy, sbfis, v slly calcs, slty ip, s tr pyr, slly carb, w cpctd, modly frm

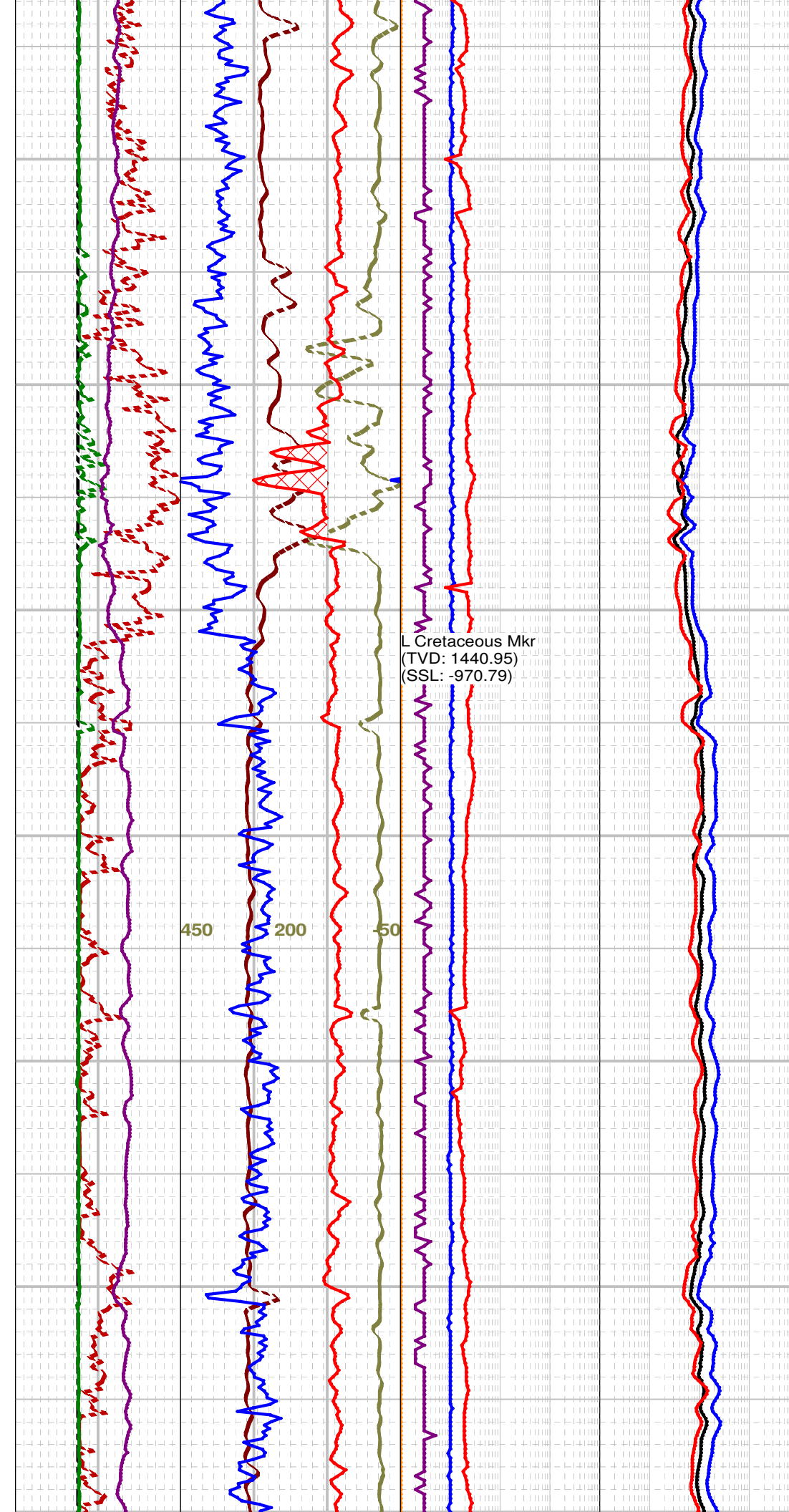
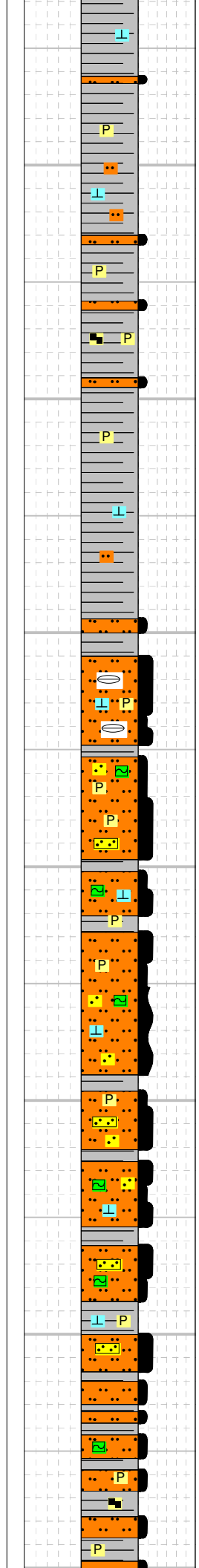
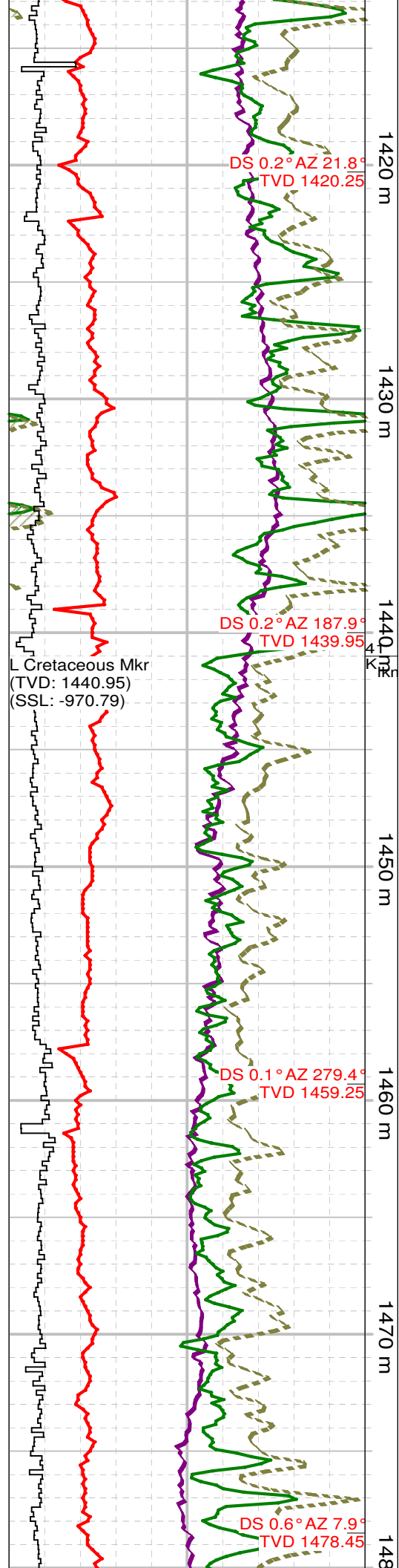
SH: m gy - brnsh gy, sbfis, v slly calcs, slty ip, s tr pyr, slly carb, w cpctd, modly frm

SH: m gy, m gysh brn ip, locly bcmg dk gy, sbfis, v slly calcs, rr shl frags, s tr pyr, slty ip, occ sltst lams / s tr glau

SH: m gy, m gysh brn ip, locly bcmg dk gy, sbfis, v slly calcs, rr shl frags, s tr pyr, slty ip, occ sltst lams / s tr glau

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**SH:** m - dk gy, brnsh gy ip, sbfis, v sily calcs, tr - locly com pyr, slty ip, rr slty lams, sily carb

**SH:** m gy, sbfis, v sily calcs, s tr pyr, sily carb, w cpctd, locly slty

**SLTST:** m gy, sily calcs, s tr glau, ~2% wh - yelsh wh crpxl calc (shl frags?), tr pyr, sdy ip

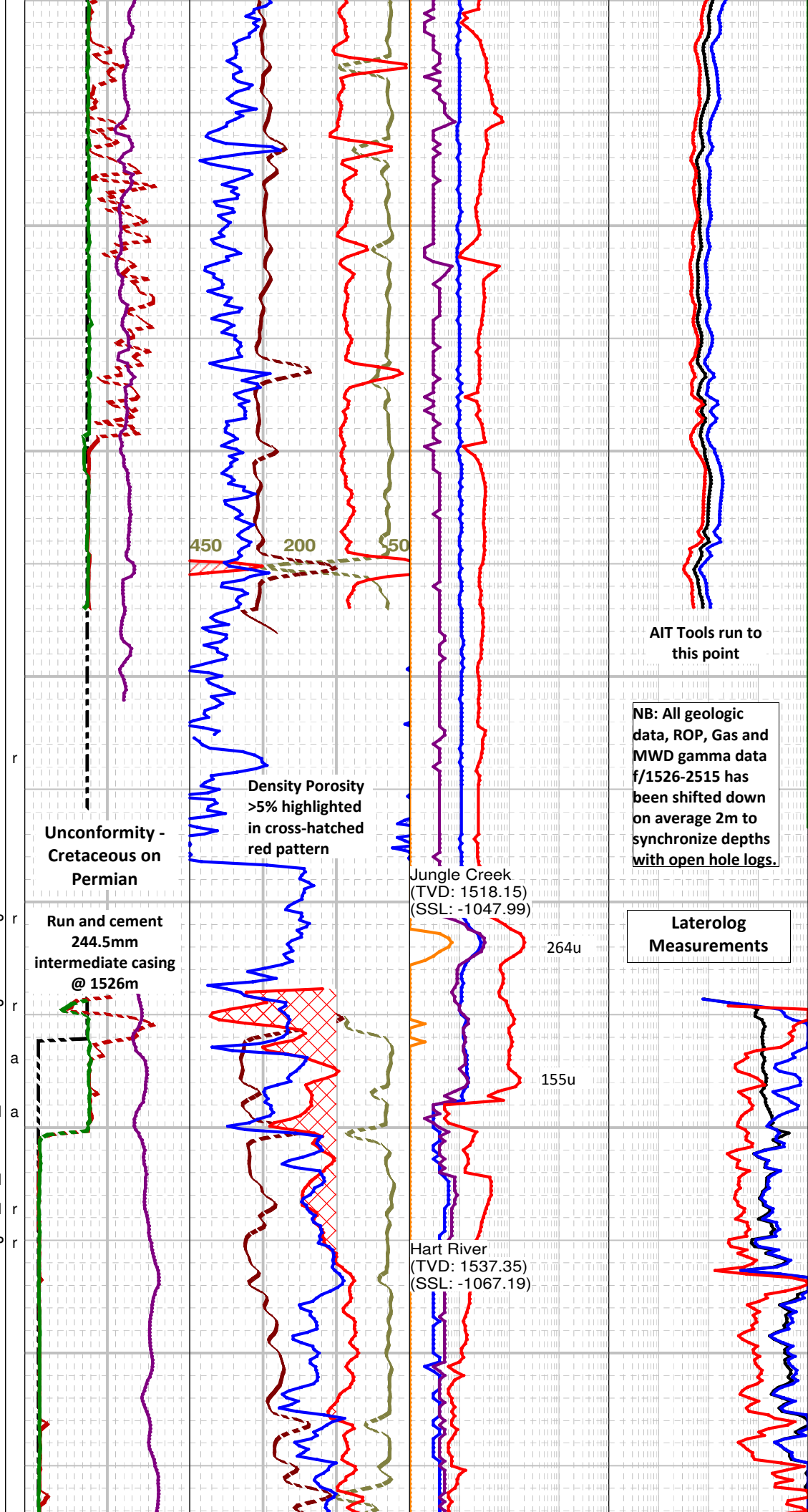
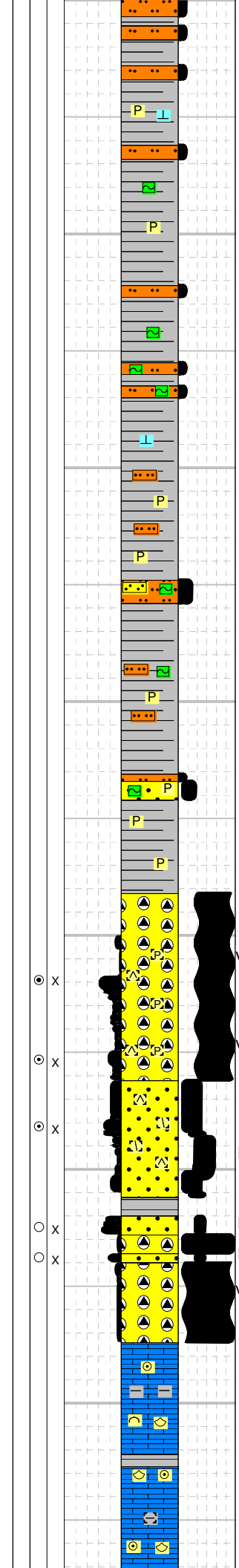
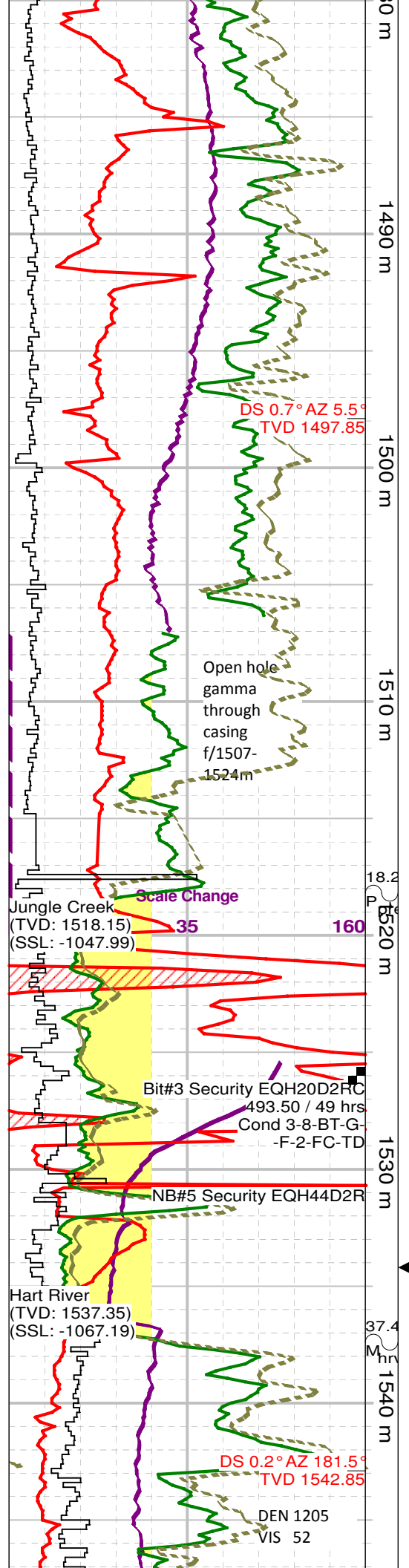
**SLTST:** m gy, sdy, locly grd - vfg slty & arg ss, mnr - com glau, mnr - com pyr, sily calcs, tr carb mat, slty sh lam

**SH:** m gy, sbfis, slty, v sily calcs, tr glau, tr pyr

**SLTST:** m gy, locly sdy, aa

**SH:** m - dk gy, brnsh gy, sbfis, slty, v sily calcs, tr carb mat, tr pyr

**SLTST:** m gy - brnsh gy, sdy ip, locly grd - vfg ss, sily calcs, tr pyr, tr glau



**SLTY SH:** m - dk brnsh gy, sbfis, slty thru / slty lams, occ vfg sdy strg, v sily calcs, tr pyr, tr glau

**SLTST:** m brnsh gy, sdy, occ vfg sdy lams / tr glau, sily calcs, tr pyr, tr glau

**SH:** m gysh brn, sbfis, comly slty, pyric, com - abnt fy dism pyr thru, v sily calcs, calcs lam, pyric slty lam / tr glau

**SS:** lt - m gy, vfg, slty & arg ip, abnt bri gn glau, pyric

**SH:** m gy brn, sbfis - fis, nn calcs, tr fy dism pyr, w cpctd, brit in mnrl o, bcmg sft in wtr, glauc sdy strg

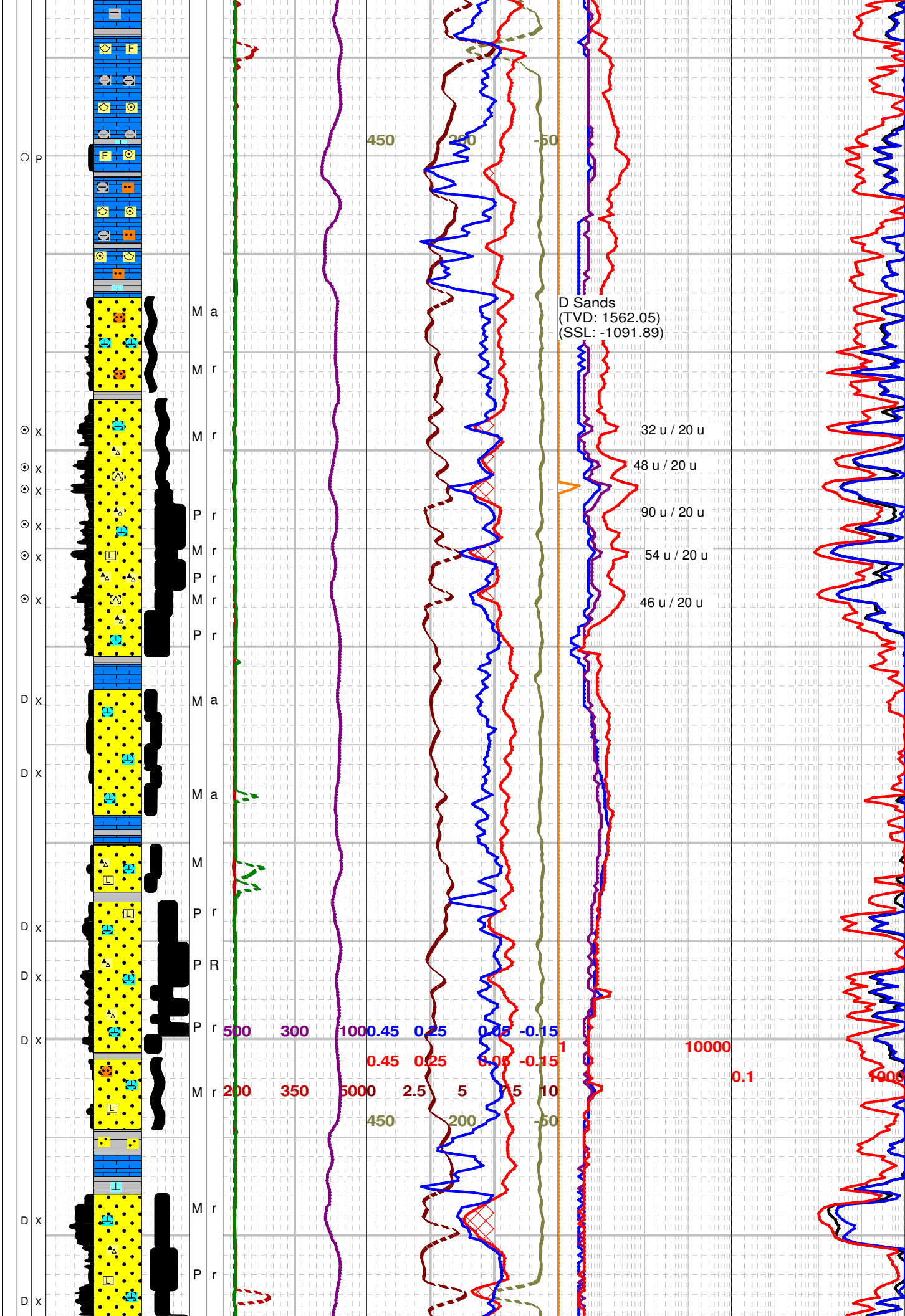
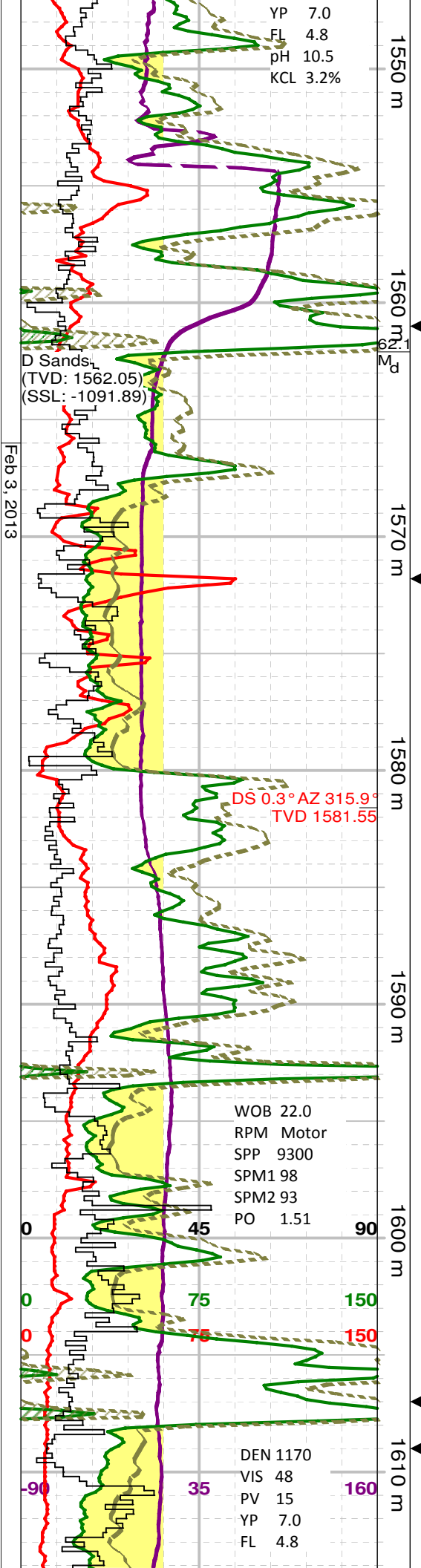
**CHT PBL CGL:** m - dk brn - gysh brn, predly m - dk gysh brn cht pbls, grnls, and vc grs in slty - u f gred mtx, sbrdd - rdd, py srt, sil + pyr + locly mnr pyrbit cmt, q por, cht grs are pulverized to shards, **mtx comly has lt amb o stng, sp dull yel flor, imm blomg cut, mnr stmg cut**

**SS:** m - dk brn, ptch v dk brn pyrbit cmt imparts col, vf - u m gred, sbrdd - sbang, sil ovgths, predly py srt, ip modly w srt f - m gred, sil + abnt v dk brn - blk pyrbit cmt, p - locly fr intgran por (3-10%), **sp yel flor, fr modly fast blomg cut**, abnt rusty red ox discol in slty - vfg ss

**LS:** m - dk gysh brn, crpxl, arg, fragl, wh cy xln calc comly replaces fos frags, tr pyr, tr - mnr cht, scat brac shls, occ crin oss, dns, tt, occ mdst ptg

**NB: All geologic data, ROP, Gas and MWD gamma data f/1526-2515 has been shifted down on average 2m to synchronize depths with open hole logs.**

**Laterolog Measurements**



**LS:** m - dk gysh brn, incrlly foss, crmy wh cy xln calc preserves bracs, crins and fos frags, dk arg wkest mtx, predly tt, locly wk pp por, **spy dull yel flor, fr stmg cut, q shw**

**LS:** m - dk gy - brnsh gy, com crmy wh cy xln fos frags (predly bracs & crins) in a v dk arg & slty crpxl mtx, calc pres abnt micfoss, occ dk gy shy ptg, dns, tt, **no shw**

**SS:** lt - m gy, qtzs, vfg, c slty mtx, sbrdd - sbang, modly srt, calc cmt, tt, **no shw**

**SS:** predly m gy, dk gy ip, predly vfg, 5-7% f gred, slty & arg mtx, sbrdd - sbang, moid - py srt, calc cmt, **no vis shw**

**SS:** lt amb brn, qtzs / mnr cht & com - abnt wh sils lits, u vf - l m gred, 5-7% u m gred, sbrdd, modly srt, sil cmt & abnt calc cmt, scat mnr pyr cmt, var por, predly 3-8%, locly 8-12%, **lt amb hydc stng thru, yel flor thru, slow stmg cut, p o shw**

**SS:** m brnsh gy, qtz & abnt gy cht, com wh sils lits, u f - l vc gred, sbrdd, mod - py srt, prim mnr sil cmt / abnt sec calc cmt oclgd por, **com - abnt yel flor, wk stmg cut, p o shw**

**SH:** v dk gy, blkly, slty & sdy, v calcs

**LS:** m - dk gysh brn, crpxl, slty ip, foss, scat bracs & crins, arg, dns, tt

**SS:** prtely m - dk dk gysh brn, vfg, locly grd - f gred, slty ip, sbang, mod - py srt, calcs cmt, sly bits, tt, occ sdy sh ptgs

**LS:** m - dk gysh brn, ptch lt gy - off wh, crpxl, slty & sdy ip, scat fos frags (bracs, crins), dns, tt

**SH:** v dk gy, blkly, slty & sdy, v calcs

**SS:** lt - m gy, predly lt - m gy cht, wh cht, & brn cht, / mnr clr qtz, u f - l vc gred, sbrdd - rdd, py srt, intbdd m gysh brn vf - f gred ss, abnt sec calc cmt + mnr prim sil cmt, tt - p por (2-7%), **com yel flor, modly fast stmg cut, dd o**

**SS:** dk gysh brn, vfg, slty & arg mtx, sbrdd, py srt, xtrem calcs

**SH:** m - dk gysh brn, sbbkly, slty & sdy ip, calcs, scat brac frags

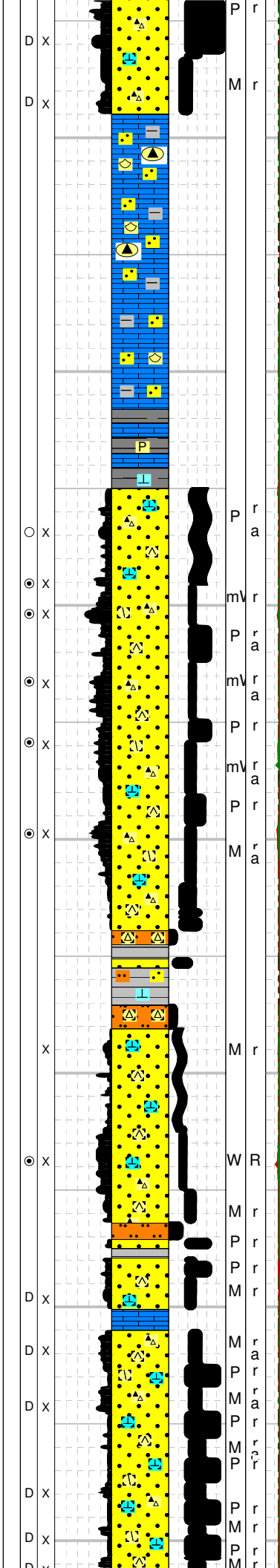
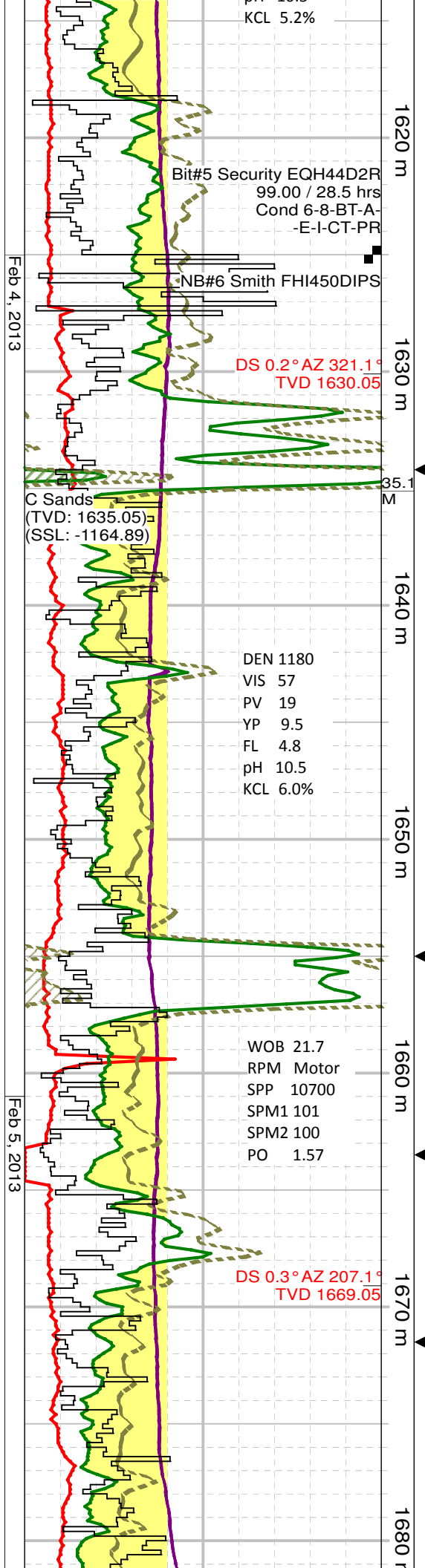
**LS:** m gysh brn, crpxl, slty & arg, sdy ip, foss, (bracs, crins), dns, tt

**SS:** lt gysh brn, qtz, mnr gy cht & com - abnt wh sils cls, predly u vf - u f gred, 5-8% l m gred, sbrdd, modly srt, mnr prim sil cmt / abnt sec calc cmt, tr - mnr blk pyrbit cmt, occ sil ovghts, 6-9% intgran por, **yel flor thru, mod stmg & wk blomg cut, fr dd o shw**

**SS:** lt - m gy - brnsh gy, qtz, com - abnt gy cht, and

Feb 4, 2013

Feb 5, 2013



Sequence Boundary/MFS

450 200 -50

Test Gas

Test Gas

**SS:** lt - m gy brnsh gy, qtz, com - abnt gy cht, and com - abnt wh op sils cls, u vf - u vc gred, sbrdd, py srt, calc + mnr sil cmt, mnr pyrbit cmt, **dull yel flor, modly slow stmg cut, dd o shw**, wh sils cls comly have micfrac cmt / sil

**SS:** wh - lt gy, lt yelsh brn, qtz / com varly gy cht, vf - l f gred, sbrdd, mod srtg, calc cmt thru, tt, **ptch lt amb hydrc stng & dull yel flor, wk stmg dd o cut**

**LS:** m - dk gysh brn, crpxl, sdy, flotg vf - l f gred sd cls thru, tr - mnr cht nods, crpxl, arg ip, dns, tt, hd

**LS:** m - v dk gysh brn, crpxl, sdy, arg ip, scat brac frags, rr brn cht nod, dns, tt, hd

**LS:** m - dk gysh brn, crpxl, arg, sdy ip, occ vfg sdy strgs, dns, tt, scat brac frags

**SH:** dk gysh brn, blk, calcs, slty, carb ip, tr pyr

**SS:** lt - m gy brnsh gy, trnsl & semi op qtz, and com gy & brn cht, f - l c gred, sbrdd, mod - py srt, mnr prim sil cmt, abnt sec calc cmt oclds por, tr spy intstl bit cmt, tt - wk por (0-6%), **ptch yel flor, fr stmg cut, q shw**

**SS:** lt - m gysh brn, trnsl & semi op qtz, mnr gy & brn cht, abnt wh cht, predly f gred, 10-15% m - l c gred, mod srtg, sbrdd - sbang, com sil ovghts, sil cmt, tr sec calc cmt, fr intgran por (8-12%), dk pyrbit oclds por thru, **yel flor, strong pets odor, fr modly fast blomg & stmg cut, fr shw, no gas shw, fng down / incrg calc cmt**

**SS:** lt - m gysh brn, qtz / abnt gy wh, & occ brn cht, predly u vf - u f gred, mnr m - l c gred, sbrdd - sbang, modly w srt, prim sil cmt, abnt sec calc cmt, com - abnt dk brn - blk pyrbit cmt, modly w ind, fri ip, p - locly fr por (3-10%), **yel flor thru, fr blomg and mod stmg cut, fr shw, no gas**

**SS:** lt - m gy, vf - f gred, mnr l m gred, qtz & gy cht, sbrdd, mod - py srt, prim sil + abnt sec calc cmt, predly tt (0-4% por), tr intstl pyrbit, **spy yel flor, slow stmg cut, vp - q shw**

**SH:** dk gysh brn, blk, slty, vf sd thru, calcs, tr pyr, v frm, brit, carb ip

**CHTY SLTST:** wh - off wh, v lt gy, qtz slt cmt / wh cht, slly calcs, hd, brit

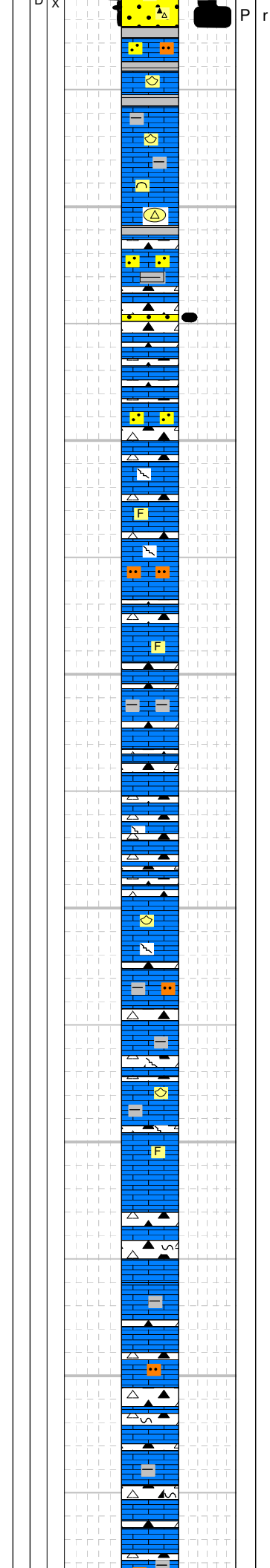
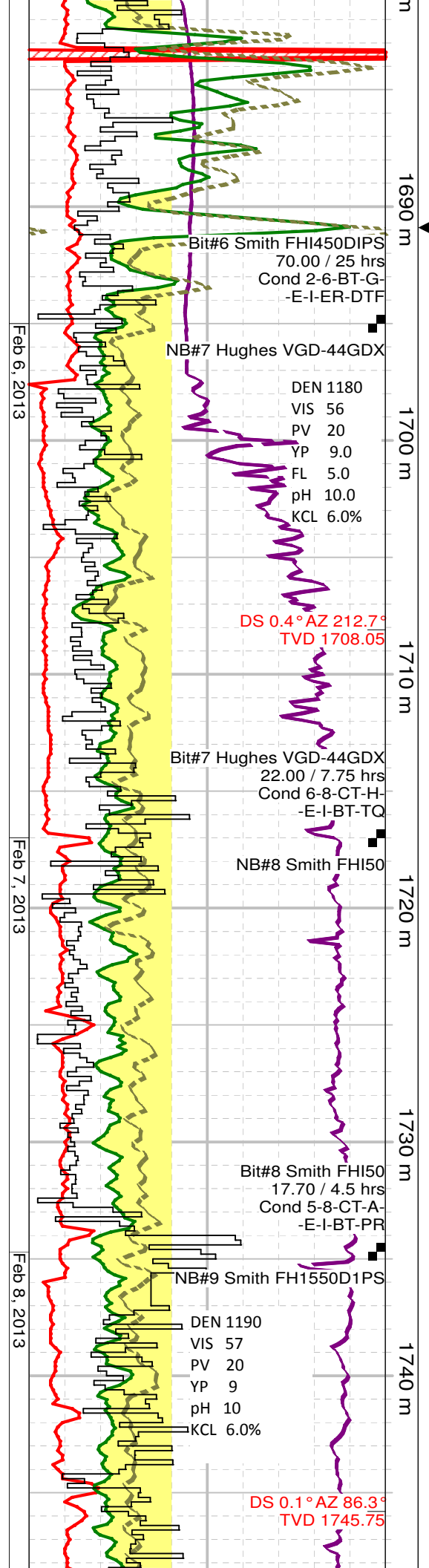
**SS:** wh - v lt tan or yelsh wh, vfg, slty ip, sbrdd, mod srt, sil cmt, extrly calcs, dissolved grs leave a frmwk of qtz & mnr gy cht / mnr intstl pyrbit cmt, **spy dull flor, tr cut, no shw**

**SS:** lt brn, vfg, mnr l f gred, qtzs, sbrdd - rdd, modly w srt, prim sil + sec calc cmt, ptch mnr pyrbit cmt, p por (3-7%), **bri yel flor thru, fr modly fast blomg & stmg cut, resd shw**

**SS:** m gy - gysh brn, predly u vf - u f gred, 3-5% m - l c gred, sbrdd, mod - w srt, prim sil + bit cmt, mnr sec calc cmt, sil ovghts, p intgran por (3-5%), **spy dull yel flor, slow stmg dd o cut**

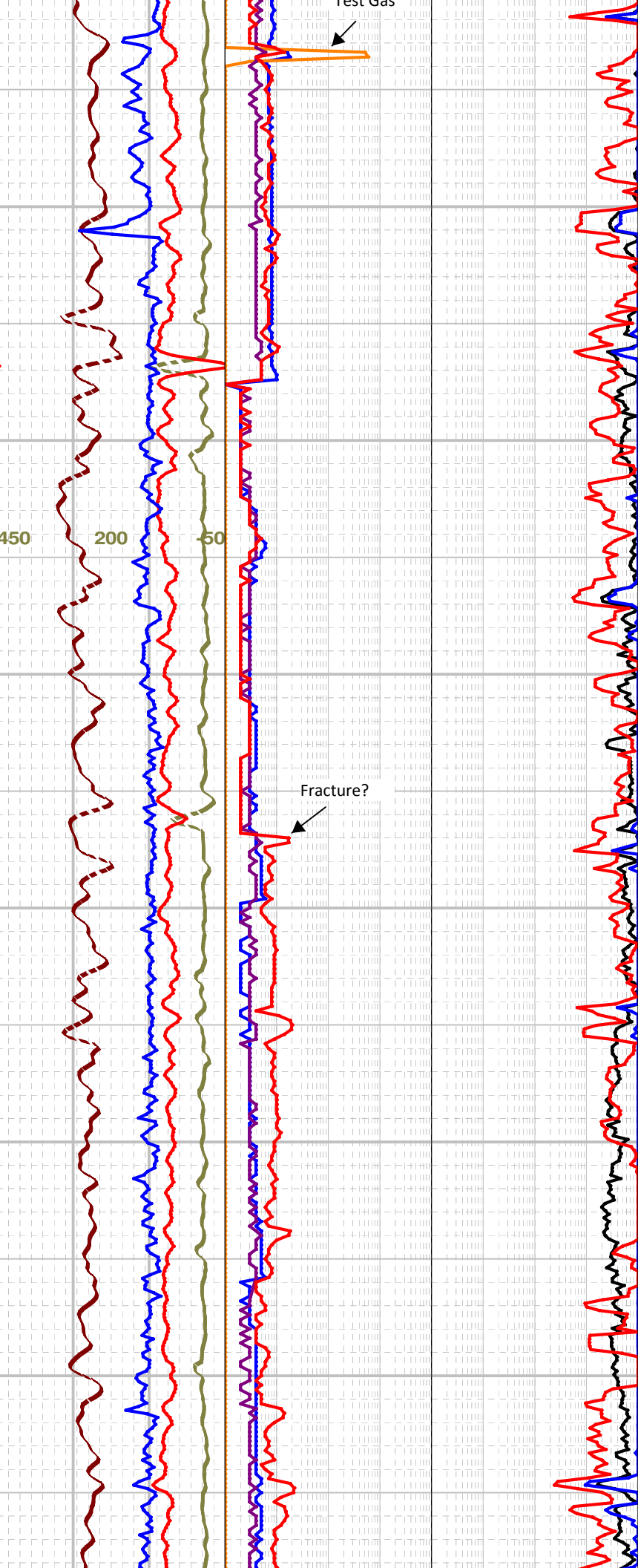
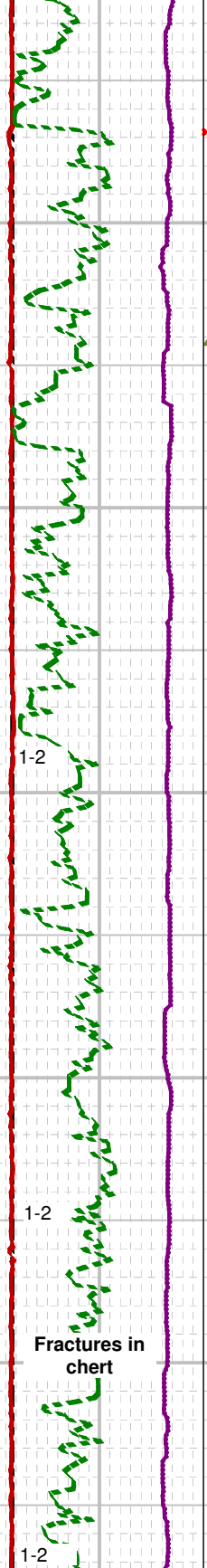
**LS:** m - dk gysh brn, crpxl, chty, sdy ip, dns, tt, thn beds

**SS:** lt - m gysh brn, qtz & abnt gy & ocly brn cht, vf - vc gred, predly py srt, intbd mod - w srt f - l m gred ss, sbrdd - sbang, mod - w ind, prim sil cmt, com pyrbit cmt, abnt sec calc cmt, p intgran por (~2-6%), **ptch yel flor, mod stmg dd o cut**



**CHERT  
CARBONATE  
FACIES**

**FRACTURE/DEFOR-  
MATION INTENSITY:**  
0 ... None  
1 ... Very Low  
5 ... Moderate  
10 ... Very High



**SH:** dk gysh brn, sbblky, slty ip, calcs, carb ip

**LS:** mot or intbd lt tan - lt yelsh brn & m - dk gysh brn, crpxl, arg ip, locky slty - vfg sdy ip, foss, scat bracs, shl frags, 2-3% cht in 1690 spl, dns tt

**CHT:** predly lt - m yelsh brn - gysh tan, occ dk brn, slty inclcs thru, occly seen / pyr along rim ctc / ls, as nods & ireg beds

**SS:** lt tan - lt gysh brn, vfg, c slt ip, sbrdd, mod srtg, calc cmt thru, grdg - sdy ls ip, thn beds, tt

**LS:** wh, off wh, m gysh brn ip, comly sdy, scat fos frags, chty, dns tt

**CHT:** predly lt yelsh brn, mnr m - dk brn, slty & org inclcs, mas, bdd, hd, brit

**LS:** lt - m yelsh brn, crpxl - v fy micxl sbhed, cln, loc sly slty, rr arg strg, rr fos frag, cht strgs, occ calc drs in rr micfrac, dns, tt

**CHT:** predly lt - m yelsh brn - gysh brn, mnr mot dk brn, slty & org inclcs aa, bdd, fracd - jtd ip

**LS:** lt - m yel brn, mnr intbd dk gysh brn, sly arg ip, crpxl - v fy micxl sbhed aa, slty ip, dns, tt, intbd mas cht

**CHT:** mot lt - occly v dk yelsh brn - gysh brn, mas, bdd, v hd, brit, org inclcs, slty ip

**LS:** lt - m yelsh brn, arg ip, occ dk brn arg strg, crpxl - v fy micxl sbhed, scat shl frags, locky slty, dns, tt, intbd mas cht, pos cht nods

**CHT:** mot lt - dk gysh brn, mas, tr calc, slty ip, org inclcs, bdd & pos nods, com fracs

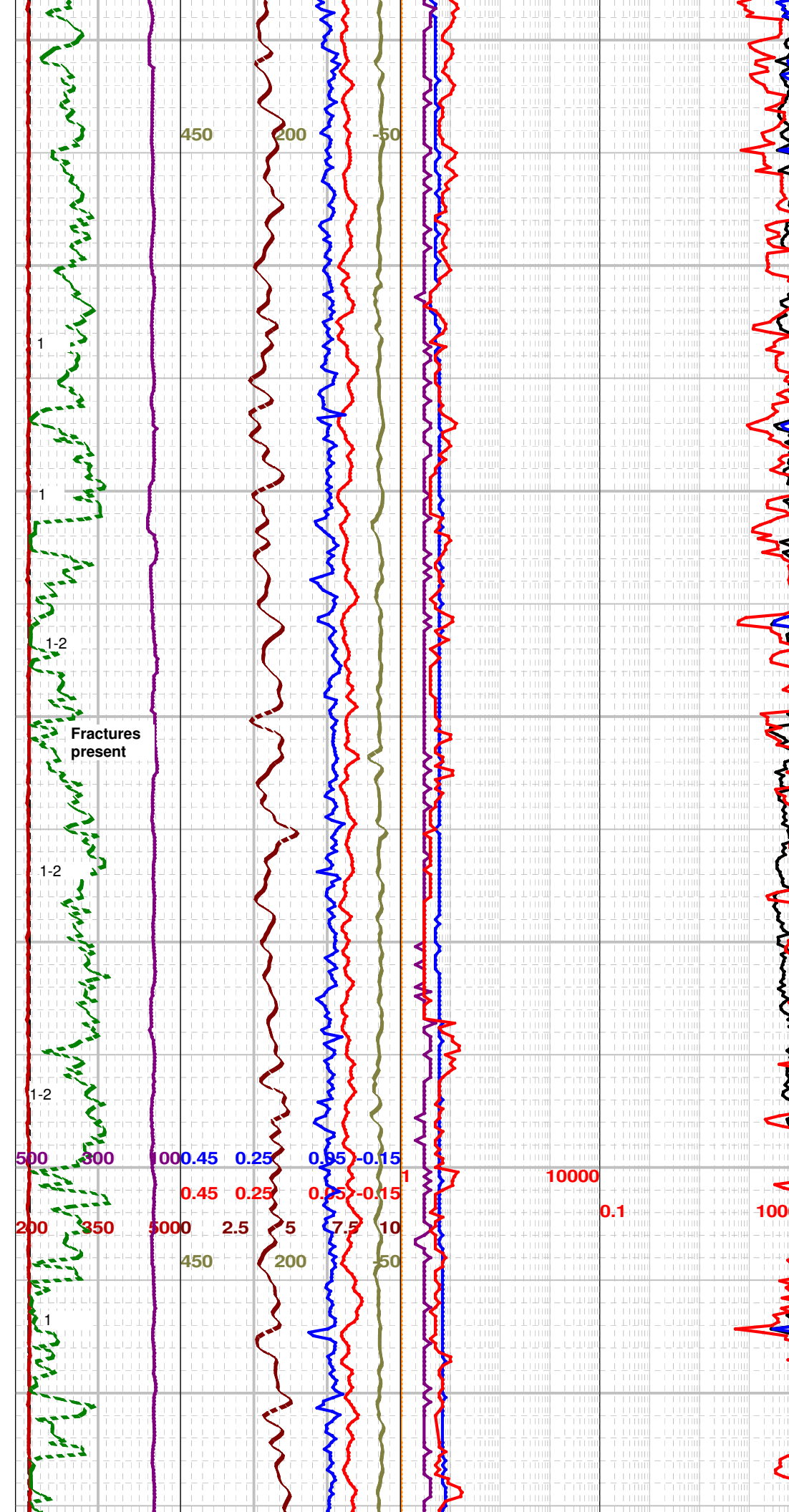
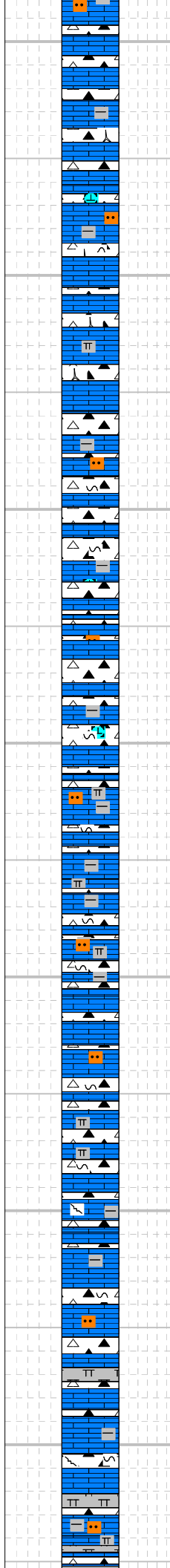
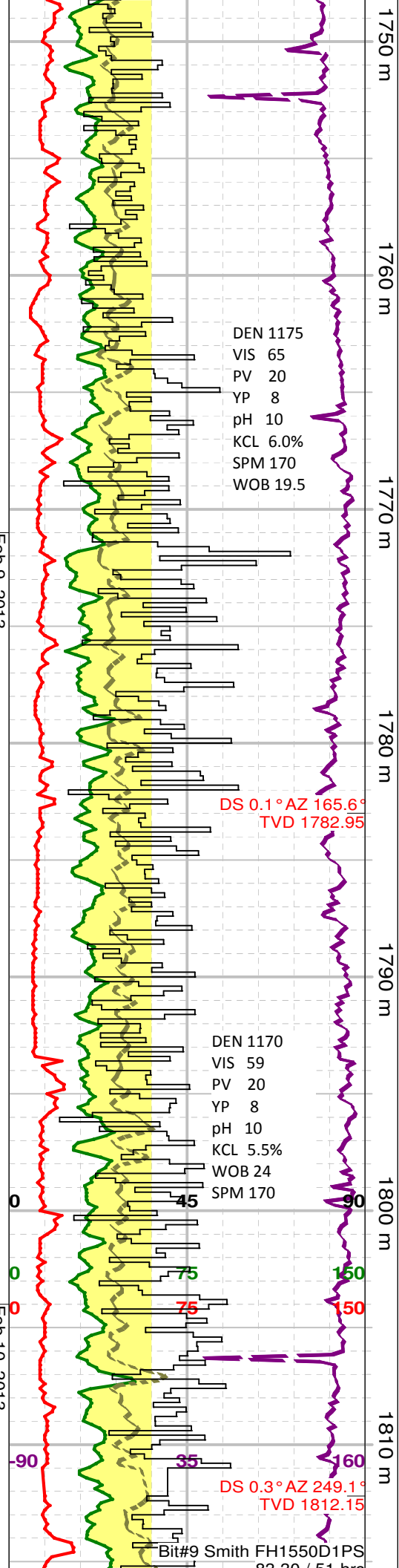
**LS:** lt - m yelsh brn, off wh, chky & arg ip, crpxl - v fy micxl, sbhed, locky slty, dns, tt, intbd mas cht, pos cht nods

**CHT:** mot lt - dk gysh brn, off wh, yel brn, mas, tr calc, slty ip, / org inclcs, cht bdd & as pos nods, com fracs

**LS:** lt - m yelsh brn, off wh, chky & arg ip, crpxl - v fy micxl, sbhed, locky slty, sdy, dns, tt, intbd mas cht, pos cht nods, sly bits.

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**CHT:** off wh, lt yel brn, comly mot, sly calcs, mas, trnsl, occ cly, hydc or spic incls, rr opn and healed fracs, tt,

**LS:** off wh, lt - occlly m brn gy, crpxl - l f xln, rexld, chky, as peloidal mdst - wkest, sly arg & slty, locly chty, rr dk brn sh partings, sly bits.

**CHT:** off wh, lt - m brn, mot, trnsl, comly / org or arg incls, sly calcs, spicr, rr open and healed fracs.

**LS:** off wh, lt - occlly m brn gy, rr dk brn mrlly frags, crpxl - l f xln, rexld, chky, as peloidal mdst - wkest, sly arg & slty, locly chty, rr dk brn sh ptgs, sly bits.

**CHT:** predly yel brn, lt gy, occlly off wh, dk gy or blk, trnsl, occlly / org of arg incls, sly calcs, rr spics, occ frags / healed or opn fracs, tt.

**LS:** off wh, mot yel brn, gy brn, crpxl - v f xln, rexld, chky, fri in pt, as mdst, sly slty, sdy or arg, tt, sly bits.

**CHT:** yel brn, lt gy, occlly off wh, dk gy or dk brn, mot, trnsl, comly / org or arg incls, sly calcs, rr spics, occ frags / healed or opn fracs, tt.

**LS:** off wh, lt gy brn, lt yel brn, mot, crpxl - v f xln, rexld, chky in pt, as mdst, sly slty, sdy, tt, 7-8% m brn, as calcs sh, arg ls or mrlst frags, sly bits.

**LS:** off wh, crm, occlly m - dk brn gy, crpxl - v f xln, rexld, comly chky texd, as mdst, gy brn frags comly arg, locly mrlly, rr dk brn sh lam or partings, rr fracs, rr styls, tt, sly bits.

**LS:** off wh, crm, comly lt gy brn & mot, crpxl - v f xln, rexld & in pt chky, comly arg, sly slty & sdy, rr dk brn mrlly frags, tt, sly bits.

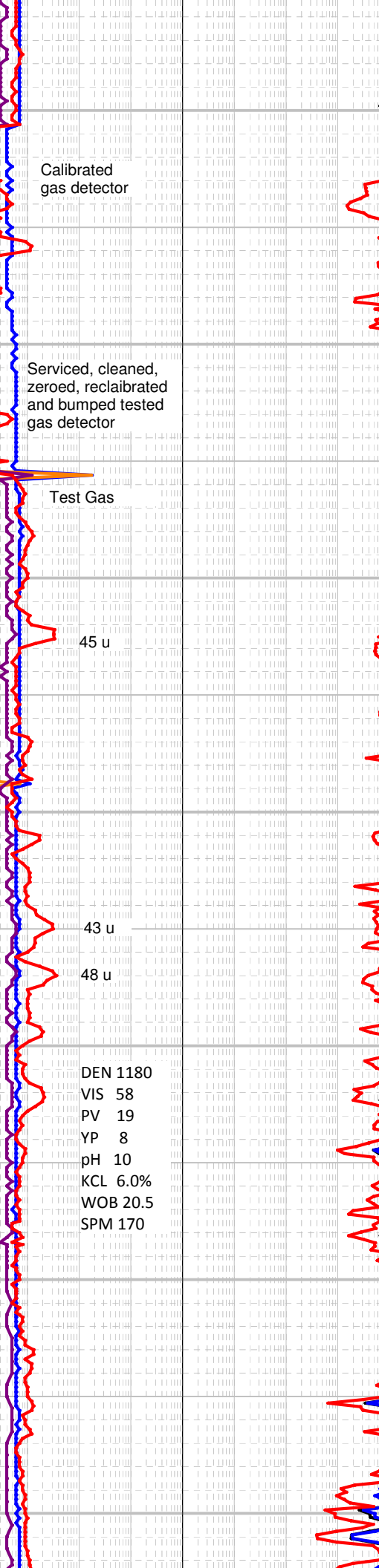
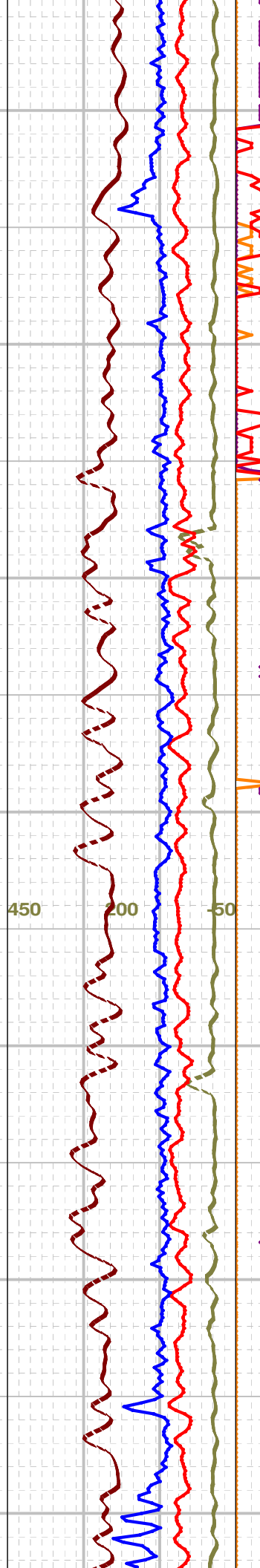
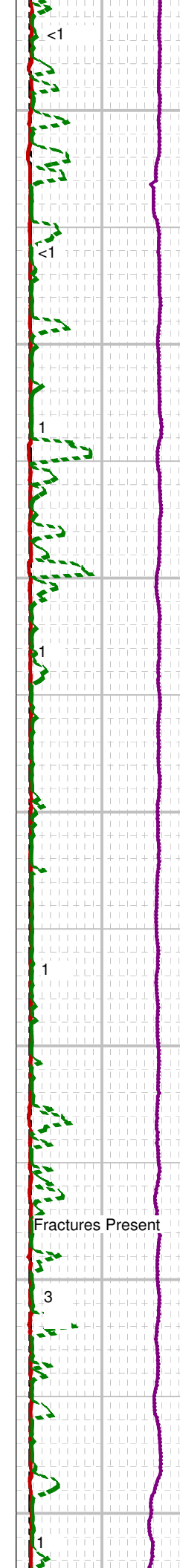
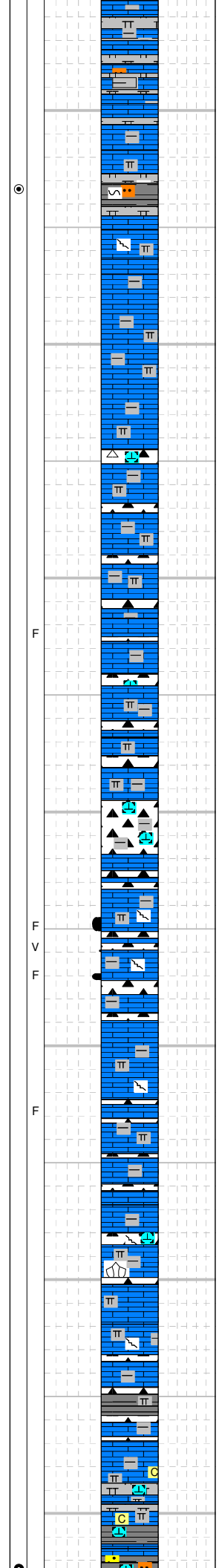
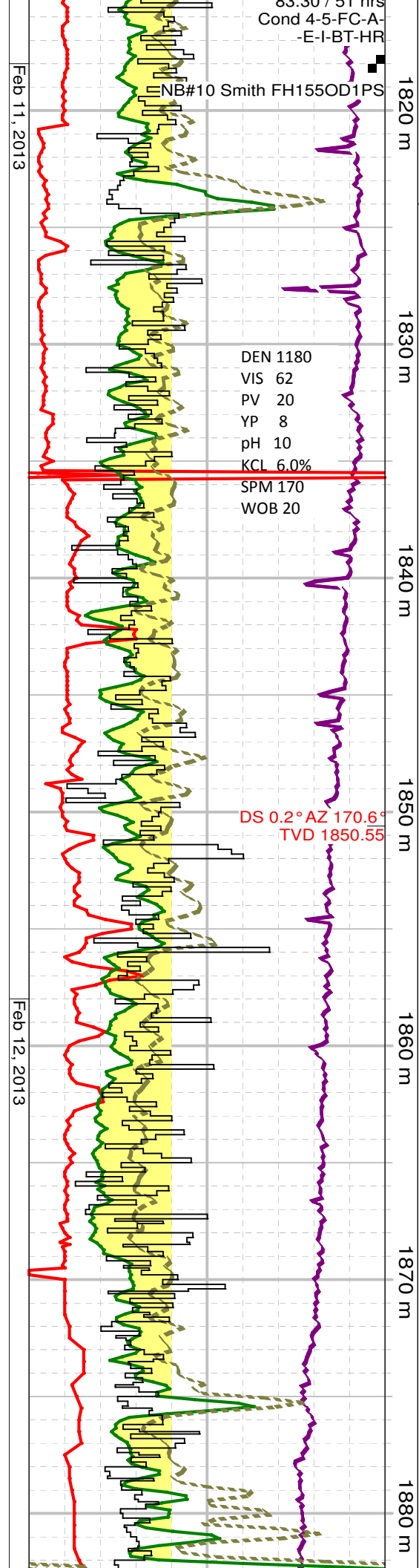
**CHT:** lt - m yel brn, lt - m brn gy, off wh, trnsl, calcs, comly / arg or hydc incls, / occ open & healed fracs, tt.

**LS:** off wh, crm, gy brn, comly mottled, rexld, crpxl - l f xln, as mdst, chky texd ip, 3-4% dk brn, crpxl mrlly ls frags, slty, sdy or arg, tt, sly bits.

**CHT:** lt - m yel brn, occlly dk brn, off wh, lt gy, as plty - occlly blkly frags, trnsl, mot, comly / arg or hydc incls, rr pyr or spics, occ open & healed fracs.

**LS:** off wh, crm, comly lt - m brn gy & more arg, comly mottled, crpxl - v f xln, rexld & in pt chky texd, comly / m brn cly, locly grd - mrlst, sly slty, tt, no vis fracs, tr m brn gy, blkly, micmica, gsy sh frags, bits.

**LS:** lt - m brn gy, comly mot, crpxl - micxl, locly v f xln, chky in pt, comly / m brn arg cmt & grd in pt - calcs mrlst, rr calc filled fracs, 6% off wh, dk brn, trnsl, locly fracc & spicr cht frags, tr dk gy brn, sft sh frags, bits.



**LS:** lt - m brn gy, occlly dk brn, crpxl - occlly l f xln, as mdst, comly / m brn arg cmt & grd to calcs mrlst, sly sly or sdy, rr fracs, tt, 3-4% as trnsl cht frags, tr calcs, dk brn gy calcs sh, bits.

**SH:** dk brn - blk, sb plty, v calcs & v firm, sly sly & sdy, micmica, non fis, **slow wk yel gn blomg cut flor.**

**LS:** off wh, lt - m brn gy, mot, crpxl - v f xln, chky texd ip, 10-15% m brn, dk brn & predly crpxl, as mdst, comly arg & locally mrlly, tt, rr fracs.

**LS:** off wh, lt - m brn gy, mot, crpxl - v f xln, chky texd ip, 10-15% m brn, dk brn & predly crpxl, as mdst, comly arg & locally mrlly, tt, rr fracs.

**CHT:** m brn, op, calcs, calcs, blk, dns & tt, rr pyr.

**LS:** off wh, lt - m brn gy, mot, crpxl - l f xln, chky texd ip, as mdst, comly arg, locally mrlly, rr calc healed fracs, tt.

**LS:** predly off wh - m brn & mot, crpxl - l f xln, comly chky texd & rexd, occlly m brn, crpxl & dns, as mdst, comly sly arg, locally mrlly, rr fracs / calc druse, rr dk brn brn, plty, calcs sh frags.

**CHT:** m - dk brn, tr off wh frags, crpxl, calcs, locly arg, predly op, dns & tt.

**LS:** off wh, lt - m brn gy, comly mot, ip m brn, crpxl - occlly l f xln, rexd or ip cht replaced, as mdst, arg, locally mrlly, rr fracs, rr calc druse as frac fill or pos vug linings, sly bits.

**CHT:** predly m - dk brn, opaque and as replaced ls, occlly arg, rr lt gy or off wh trnsl spic cht frags, tt.

**LS:** off wh, lt - m brn, mot, ip m brn gy, crpxl - occlly l f xln, ip rexd & chky, as mdst, comly arg, locally chty and mrlly, rr calc filled fracs, rr frags / calc druse & pos vug lining, sly bits.

**LS:** off wh, lt - m brn gy, mot, ip m brn gy, m brn, crpxl - occlly l f xln, ip rexd & chky, as mdst, comly arg, locally chty and mrlly, rr calc filled fracs, sly bits.

**CHT:** m - dk brn, opaque, plty - blk, calcs, comly arg & as replaced ls, rr pyr, rr off wh or m brn spicular cht frags, tt.

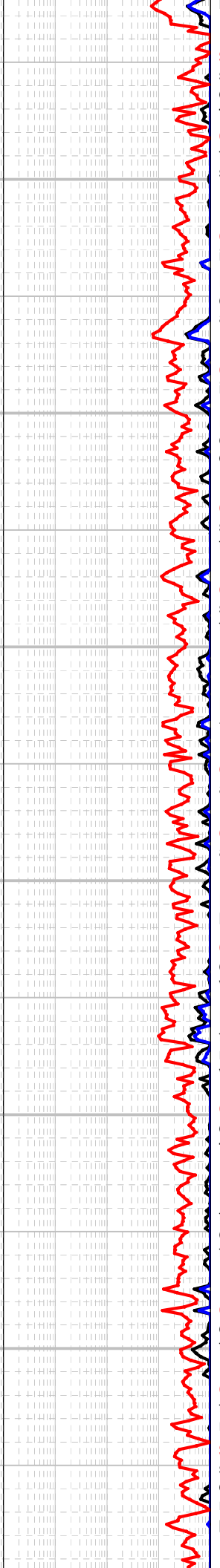
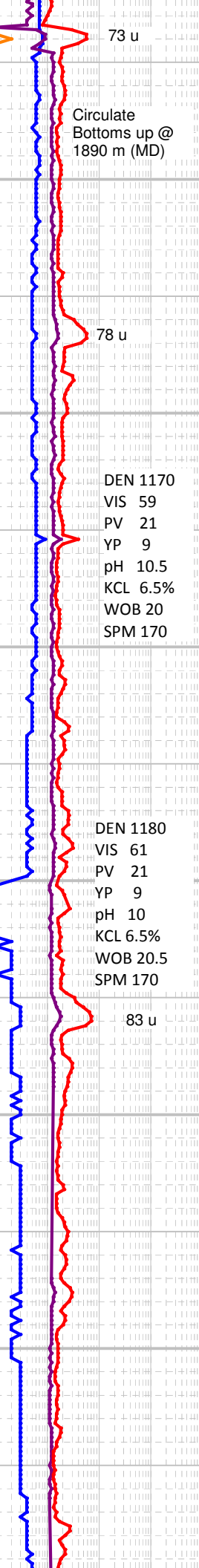
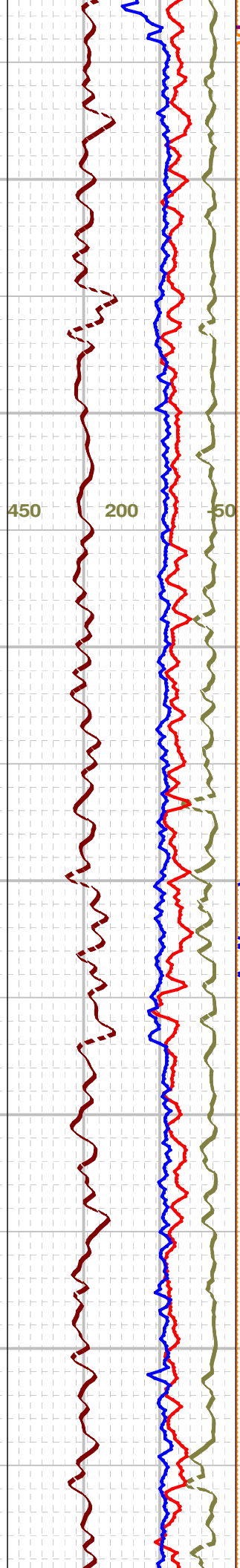
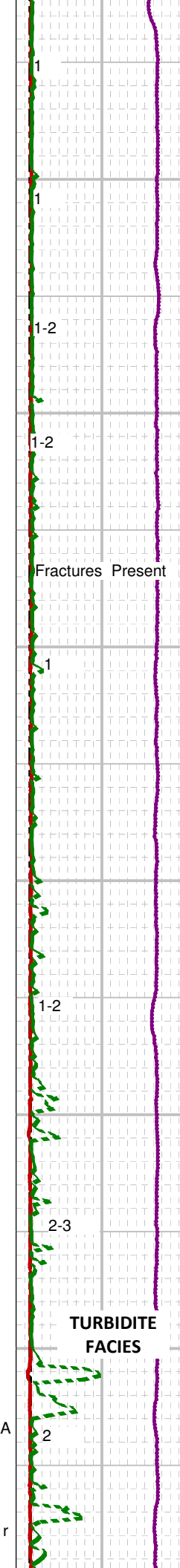
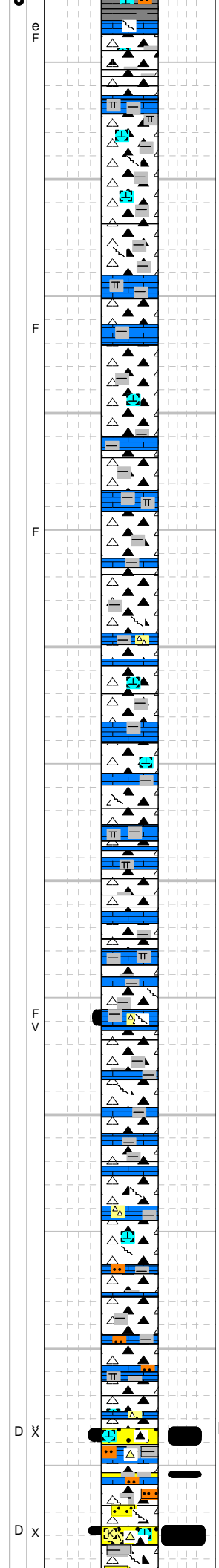
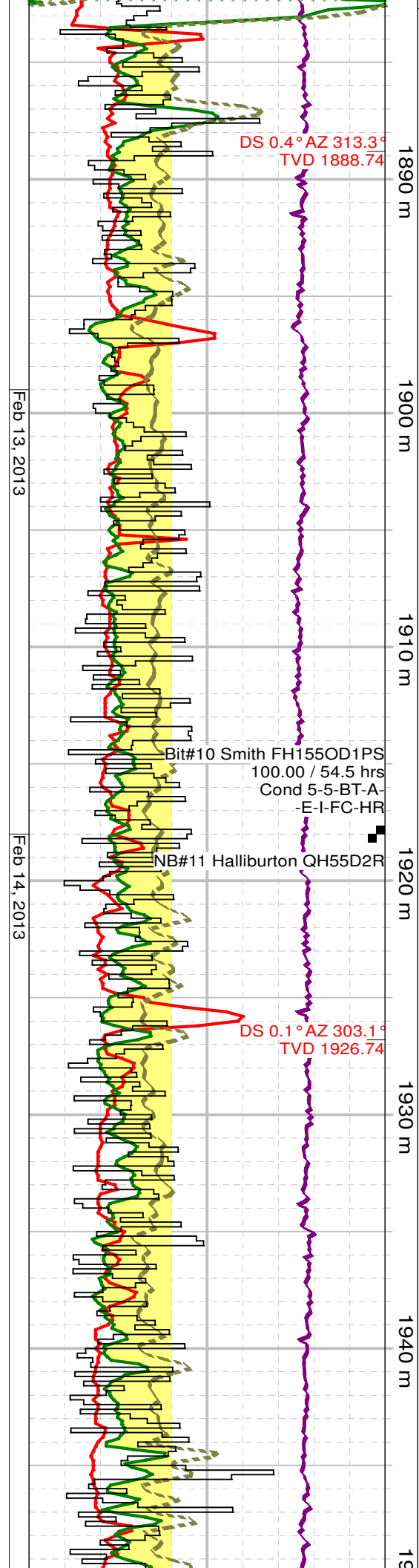
**LS:** predly off wh, speckled m brn gy & mot, occlly m brn, rexd ip, ip chky texd, rr bracs, as mdst, chty, locally arg & mrlly, rr fracs, tt, bits, rr styls, mnr sh.

**LS:** off wh comly / gy brn speckling, mot, occ m brn frags, crpxl - l f xln, rexd & chky ip, as mdst, comly arg & grd ip to calcs mrlst, locally chty, rr wh calc filled fracs, 3% blk, blk, v calcs, non fis, hd, sh frags.

**CHT:** m brn, m - dk gy, blk, opaque, occlly trnsl, calcs, locally arg, rr fracs, ip spicular, predly as replaced ls, tt.

**LS:** off wh comly / gy brn speckling, mot, occ m brn frags, crpxl - l f xln, rexd & chky ip, as mdst, rr bracs, comly arg & grd ip to calcs mrlst, locally chty, rr wh calc filled fracs, **7% m brn, blk, blk, v calcs, non fis,**

Fractures Present



**SH:** m - dk brn, blk, comly / off wh calcs & sd gr speckling, calcs, comly sbbiky - blk, hd, non fis, comly slty & sdy, pyric, / **slow, wk yel gn blomg cut flor, bits.**

**CHT:** m - dk brn, gy, trnsl, ocly op, calcs, locly arg, frags / occ arg incls, rr calc lined fracs, predly tt, no shows.

**CHT:** m - dk brn, ocly gy, op - trnsl, calcs, ocly / arg incls, spic in pt, rr opn and healed fracs, tt.

**LS:** off wh, crm comly speckled lt - m brn gy, mot, ocly m brn, m brn gy, crpxl - ocly l f xln, rexd & chky, as mdst, comly arg, locally mrly, rr cly lined styls, tt.

**CHT:** m - dk brn, comly gy, trnsl, calcs, ocly / arg incls, spic in pt, rr opn and healed fracs, tt.

**LS:** off wh, crm comly speckled lt - m brn gy, mot, ocly lt brn, crpxl - ocly l f xln, rexd & chky, as mdst, comly arg, locally mrly, tt.

**CHT:** gy, m - dk brn, tr blk, trnsl - opaque, comly / spher & arg incls, spic in pt, calcs, occ healed & open fracs / druse, tt.

**CHT:** gy, m - dk brn, tr blk, trnsl - opaque, comly / spher & arg incls, spic in pt, calcs, occ healed & open fracs, tt.

**LS:** off wh, speckled brn & mot, chky textd & rexd, crpxl - l f xln, rr m brn crpxl frags, as mdst, ip arg or mrly, tt.

**CHT:** lt gy, m - dk brn, comly trnsl, calcs, faint lam, sly arg, occ calc & sil lined fracs, rr open fracs, tt.

**CHT:** m - dk brn, ocly lt gy, op - trnsl, comly arg or / arg incls, spic ip, rr fracs, tt, tr dk brn - blk, calcs, sh.

**LS:** off wh, mot lt - m brn gy, comly chky textd & crpxl - l f xln, comly arg or mrly, tt.

**CHT:** m - dk brn, ocly gy or blk, plty - blk, op - trnsl, ocly / open & healed fracs, comly / arg incls, calcs, no vis stng.

**LS:** off wh, mot lt - m brn gy, comly chky textd & crpxl - l f xln, occ m brn, crpxl frags, as mdst, comly arg or mrly, tt, rr druse lined fracs & pos druse lined vugs, no vis stng.

**CHT:** m - dk brn, yel brn, gy, blk, plty - blk, op - trnsl, comly / arg incls, calcs, **ocly / flid calc drs lined fracs / blk pyrbit.**

**LS:** off wh mot lt - m brn gy, comly chky textd & crpxl - l f xln, fri ip, comly arg, bit-ground?, occ m brn, crpxl, ocly chty frags, as mdst, comly arg or mrly, tt, rr fracs, tr dk brn - blk, slty & sdy, calcs sh frags.

**CHT:** m - dk brn, yel brn, gy, blk, plty - blk, op - trnsl, crpxl, comly / arg incls, calcs, occ open & healed fracs, tt.

**CHT:** m - dk brn, gy, rr yel brn or blk, plty - blk, op - trnsl, comly / arg incls, calcs, occ opn & healed fracs, rr frac lined drs / pyrbit, genly tt.

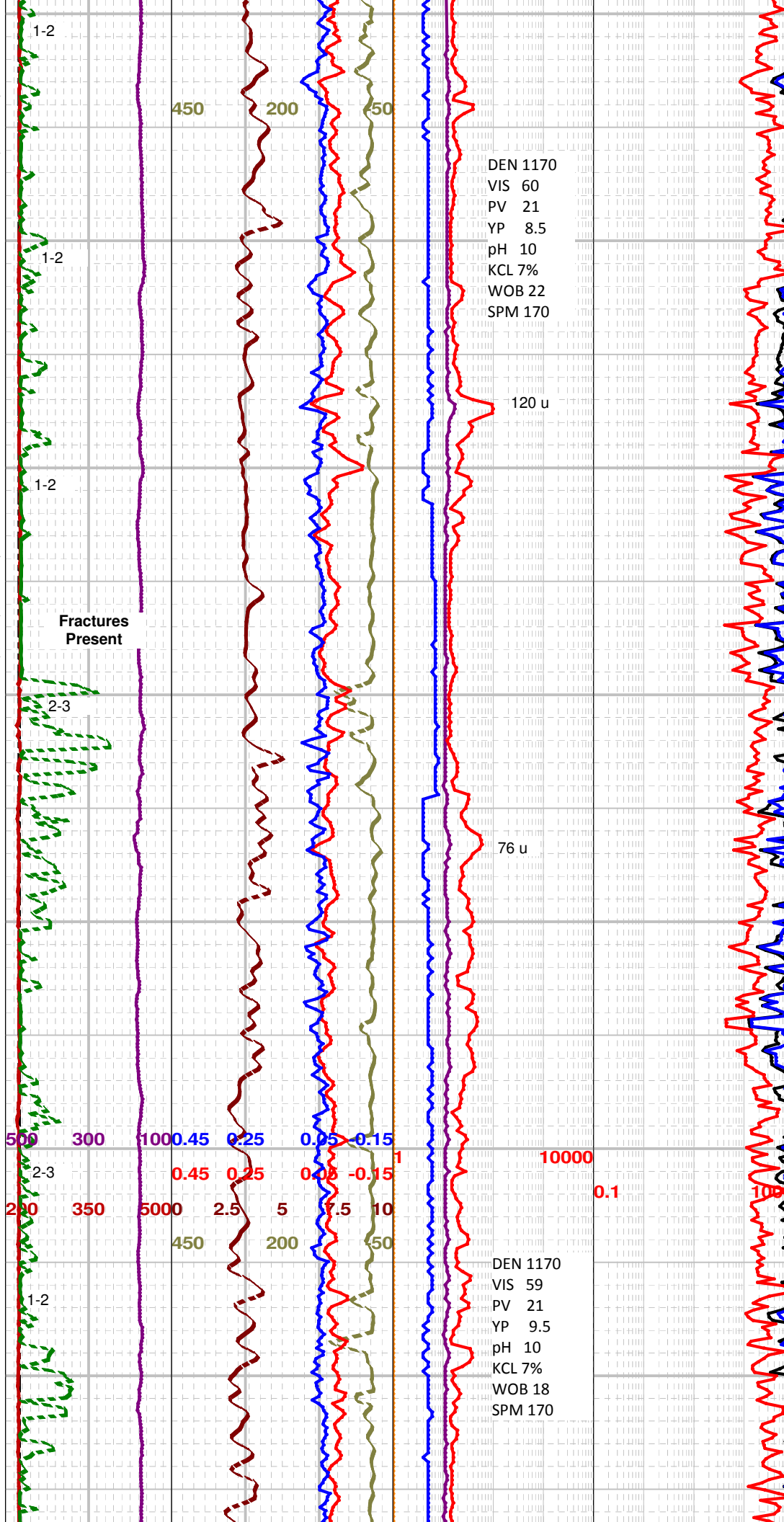
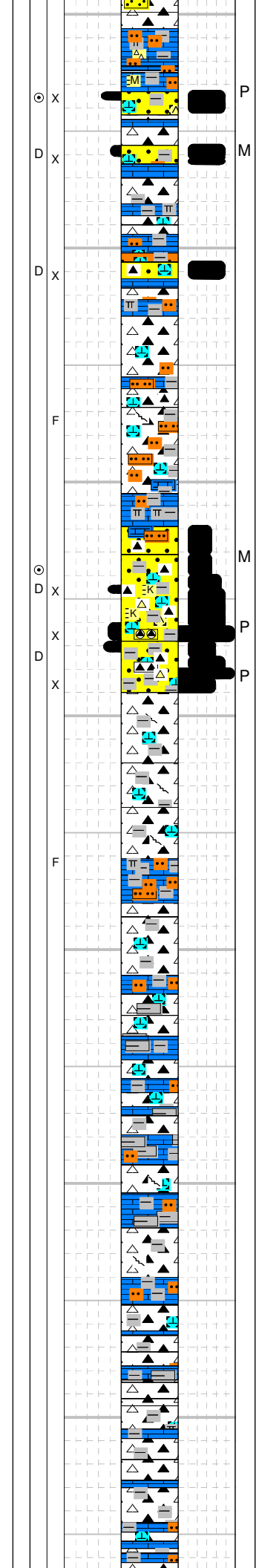
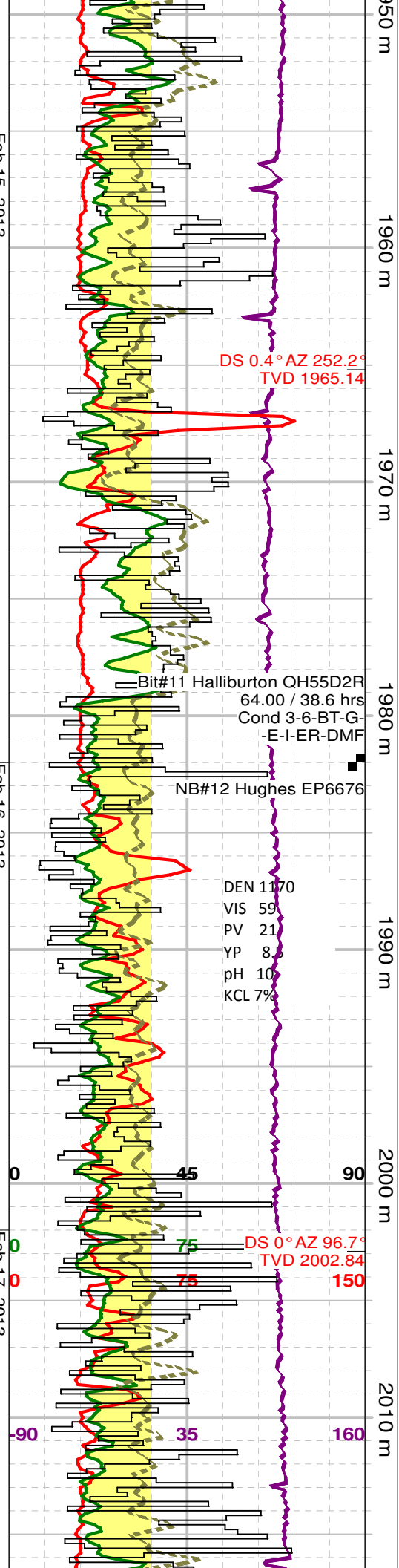
**SS:** wh, lt gy, m brn, cons, s&p, f-c l gred, p - modly srt, ang - sbrdd, / < 40% brn, lt gy, yel brn cht grs, calcs, sils, sly pyric & / patchy m brn arg cmt, p gr relief, tt, **rr frags / 1-6% blk dd bit plugged intgran por, no cut flor,** rr brn gy sh partings.



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**LS:** off wh mot lt - m brn gy, occlly gy brn, m brn, comly chky texd & crpxl - micxl, occlly l f xln, fri ip, comly arg, mrlly, comly slty & sdy, grdg ip to calcs, arg sltst, tt, rr fracs, tr calcs sh frags.

**SS:** wh, lt gy, rr lt brn, cons, s&p, f - c l gred, rr floating v c l cht grs, p - modly srt, ang - sbrdd, / < 40% brn, lt - dk gy, yel brn, gn, cht grs, calcs, sily sils & pyric, / patchy m brn arg cmt, p gr relief, tt, **rr frags / 1-9% blk dd bit plugged intgran por, arg frags / g bri yel gn stmg cut flor.**

**LS:** v lt brn, off wh, comly speckled lt - m brn gy, mot, crpxl - v f l xln, chky texd ip & rexld, comly arg & mrlly, chty ip, tt, tr m - dk brn, rr blk, greasy ip, comly slty, sdy, calcs, sh frags.

**CHT:** m brn, m brn gy, gy, calcs, arg ip, trnsl - op, calcs, rr calc lined fracs.

**CHT:** off wh, crm, lt - dk brn, lt gy, micxl - crpxl, micxl frags slty, calcs, sils, in pt as sild sltst, trnsl frags comly / arg incls, in pt as repl ls & ip spicr, occ fracs, tt.

**LS:** off wh, v lt brn & comly m brn speckling & mot, crpxl - v f l xln, 3% as cons, f - m gred, calcs, s&p ss frags / spy dd blk bit & no cut flor aa, tr dk brn - blk slty, calcs, slty & sdy sh frags.

**CHT PBL SS:** lt gy, off wh, s&p, fri, f - v c u gred, rr dk gy cht grnls, cglic & mtx supd, / 40-80 % lt - dk gy, lt brn, rr lt yel brn cht grs, ang in pt & predly sbang - sbrdd, p - modly srt, occ frags / slty - v f l qtz mtx, calcs, sily sils & pyric, patchy brn & wh (kaolic?) arg mtx, **no vis por, scat 1-7%, rr 9 % blk bit plugged intgran por, v slow, yel gn wk blomg cut flor.**

**CHT:** lt gy, lt brn, crpxl - l f xln, comly / brn or off wh arg incls, spotty calcs cmt, spicr ip, comly trnsl, occ healed and open fracs, tt.

**CHT:** m brn, lt gy, trnsl, calcs, comly / arg incls, sily pyric, occ healed & open fracs, tt, 4% largely unconss aa.

**LS:** off wh, lt gy brn, comly arg, slty & grdg to calcs mrlst & calcs, comly arg sltst, & slty l f gred ss, tt, no shows.

**CHT:** lt gy, lt - m brn, tr blk, trnsl, occlly op, rr pyr, sily calcs, comly / fnt v f l gr ghosts, comly / arg incls, predly crpxl, 3% m - dk brn, slty, sdy, calcs, hd, non fis sh, **v slow yel gn blomg cut flor.**

**LS:** off wh, lt brn speckled, mot, chky ip, arg, occlly slty & sdy, locally grdg to calcs mrlst & calcs, comly arg sltst, tt.

**SH:** (20%) m - dk brn, blk, non fis, occlly / calcs specs, locally fracd, mrlly ip, comly slty & sdy, **wk, slow blomg cut flor.**

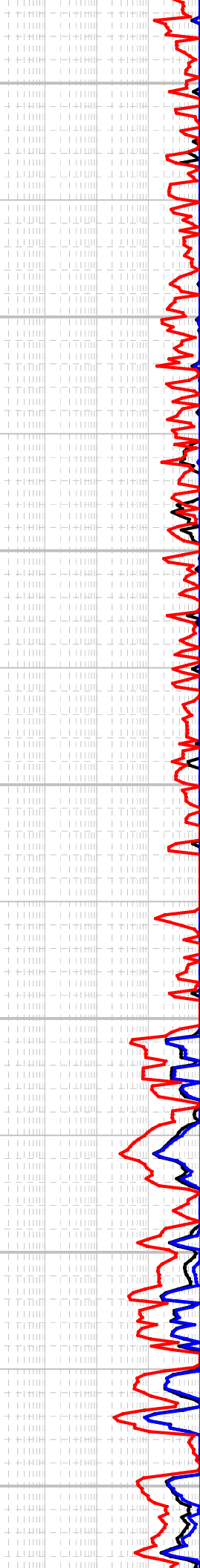
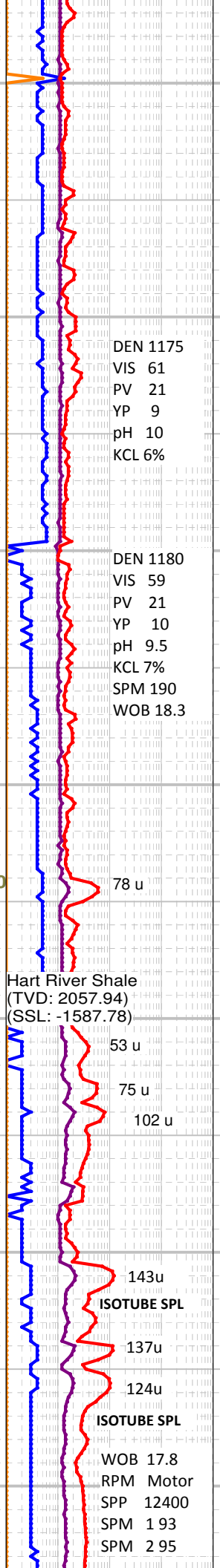
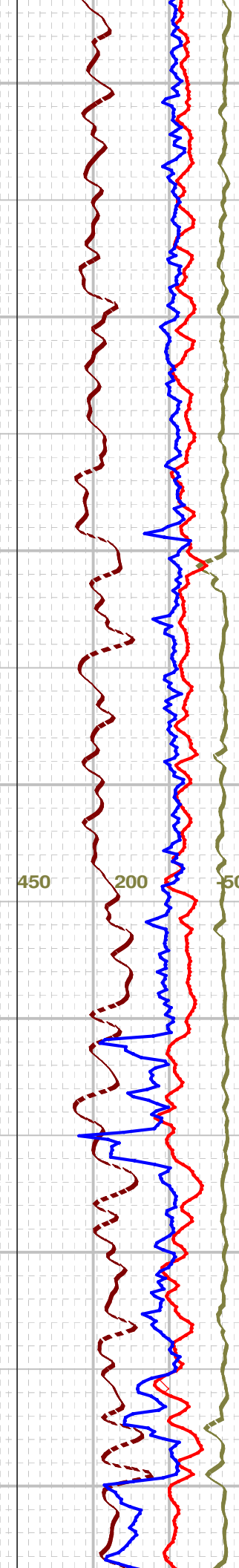
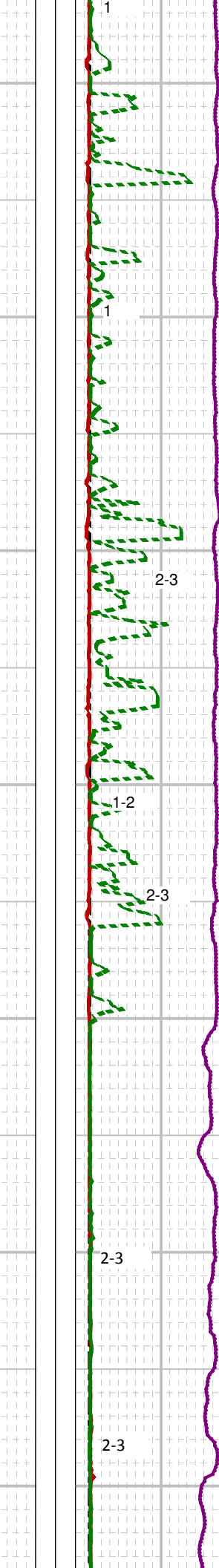
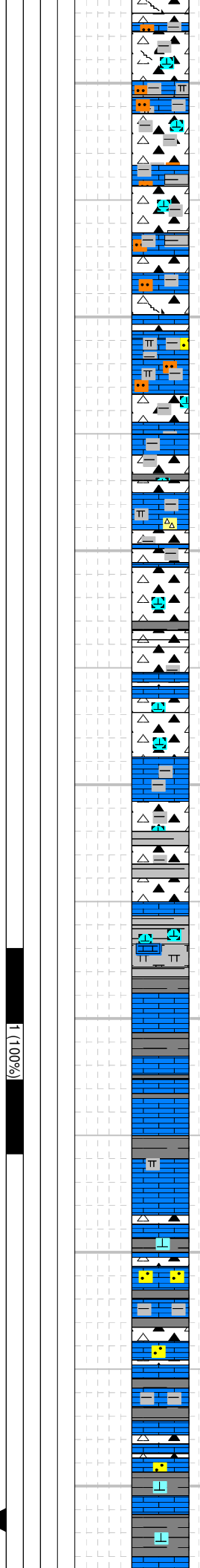
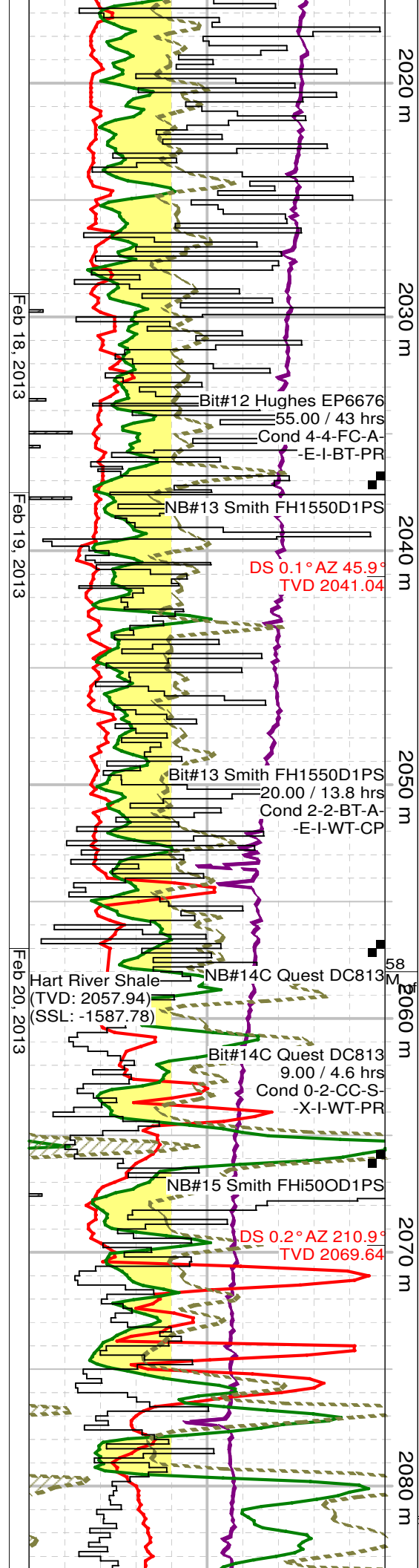
**SH:** (20%) m - dk brn, ip blk, comly / wh or lt brn calc specs, v firm & non fis, calcs, mrlly ip, comly slty & / occ f qtz grs, sily chty, **g v slow (5 mins) bri yel gn blomg cut flor.**

**LS:** off wh, lt brn, comly speckled or mottled yel brn or lt - m gy brn, crpxl - micxl, occlly l f xln, rexld, chky ip, comly arg, slty or sdy, comly grdg to calcs mrlst, tr dk brn, blk, calcs, occlly slty & sdy, mrlly ip, sh frags.

**CHT:** m brn, lt gy, gy gn, trnsl, calcs, crpxl, occlly fracd, comly / arg incls, no shows.

**LS:** off wh, lt brn, comly speckled or mottled yel brn or lt - m gy brn, crpxl - micxl, occlly l f xln, rexld, chky ip, comly arg, slty or sdy, comly grdg to calcs mrlst, tr dk brn, blk, calcs, occlly slty & sdy, mrlly ip, sh frags.

**CHT:** m - dk brn, occlly lt gy or yel brn, op - trnsl, calcs, comly / arg incls, sily pyric, spicr ip, occ opn & healed fracs, sily pyric, tt.



LS: off wh / dk brn mottling, occlly dk brn, crpxl - f l xln, arg, mrly, sily chty, slty or sdy, tt.

LS: off wh - dk brn gy, comly mot, loclly off wh & brn interlaminated, / off wh or m brn arg cmt, comly slty & sdy, locally chty, comly grdg to silty calcs mrlst or rarely to arg calcs sdy sltst, rr sdy sh frags.

CHT: lt gy, m yel brn, m - dk brn, occlly orgn brn, calcs, ip as replaced ls, crpxl - occlly micxl, occ opn & calcs or sil healed fracs, sily pyric, locally arg, tt.

LS: off wh - m brn gy, comly specd & mot, crpxl - f xln, comly arg or mrly, slty & sdy, loclly in pt cht repl, grdg to mrlst, rr calcs sh, tt.

LS: off wh / lt - m brn mottling and grdg to dk brn / wh mottling, crpxl - l f xln, comly sily slty & occlly sdy, comly arg & grdg to mrlst, ip cht replaced, tt.

CHT: dk brn, blk, occlly lt gy or yel brn, op - trnsl, occ arg frags, crpxl - occlly micxl, rr frags / sils druse frac fill, sily pyric, tt.

LS: off wh or crm - m brn gy & mot, crpxl - l f xln, rexl & chky in pt, comly / off wh or m brn arg cmt & in pt mrly, chty, slty & sdy in pt, tt.

CHT: m - dk brn, occlly lt yel brn, lt gy, crpxl - rr micxl, trnsl, calcs, comly / m brn arg incls, sily pyric, rr fracs, tt.

LS: off wh, crm - dk brn gy, mot, crpxl - micxl, occlly l f xln, comly / off wh or m brn arg cmt & ip mrly, sily slty & sdy, tt, **rr dk brn gy, blk, calcs, slty, firm, sh frags.**

LS: off wh, crm grdt to m brn gy, mot, crpxl, ip micxl or v l xln, comly / off - m brn arg mtz & comly grdg to mrlst, locally chty, , sily slty or sdy, rr calc filled fracs, rr lt - m gy brn, tr blk, sily pyric, ip non calcs sh frags.

CHT: lt - dk brn, occlly yel brn or lt gy, trnsl, spicr ip, comly / abnt rdd l f grs, micfoss?, calcs, sily pyric, comly / v f arg incls, occlly fracd, tt.

SH: m - dk brn gy, sb pty - sbbly, dull, tr pyr, sft - firm, sb fis, calcs, occ calc lined fracs, sily mrly, slty & sdy, **wk, slow (10 mins) yel gn blomg cut flor.**

SH: dk brn gy, grdg - blk, hd, nn fis, q sks, calcs, sily sils, sily slty & sdy, pyric, wk slow yel gn blomg cut

SH: dk brnsh gy - blk, sbbly, calcs, slty ip, sily bits, **no vis flor, v slow fnt cut**

CHT: m - dk amb brn, op - semi op, spicr ip. slty & org incls, hd, brit, occ calc filld micfrac

LS: predly m - dk brnsh gy, lt - m gysh brn ip, crpxl, slty & arg, comly chty / m brn spicr cht, cht lenses & beds, occ dk sh ptgs, occ drsy calc lng fracs, **no vis shw**

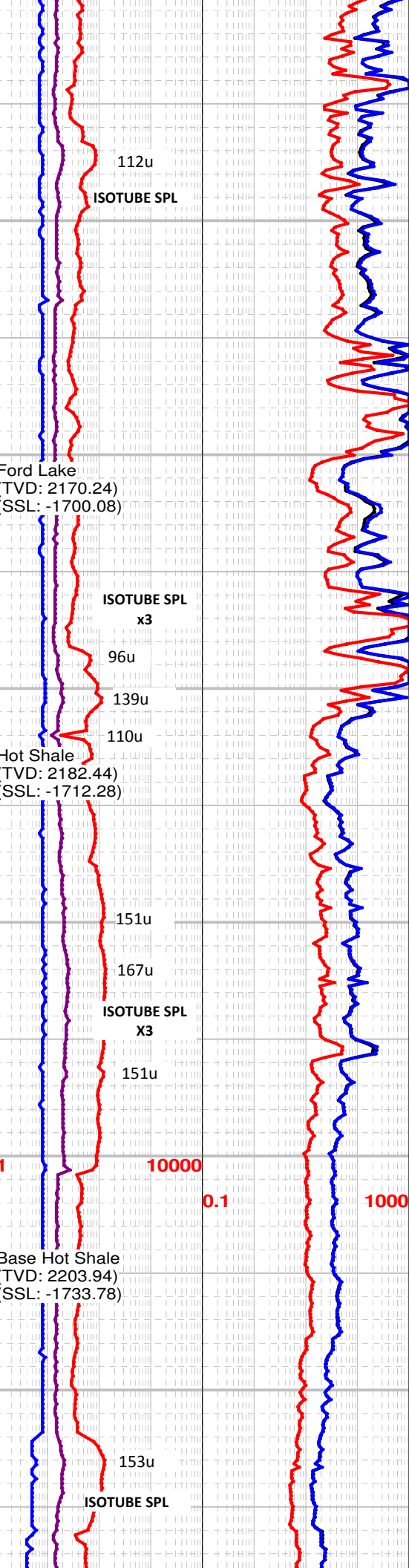
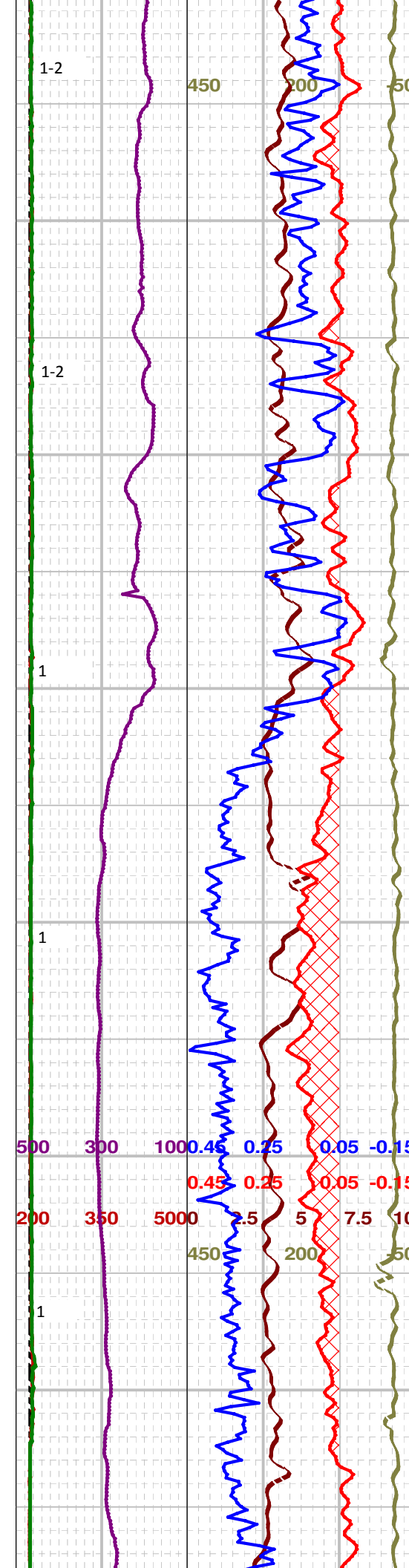
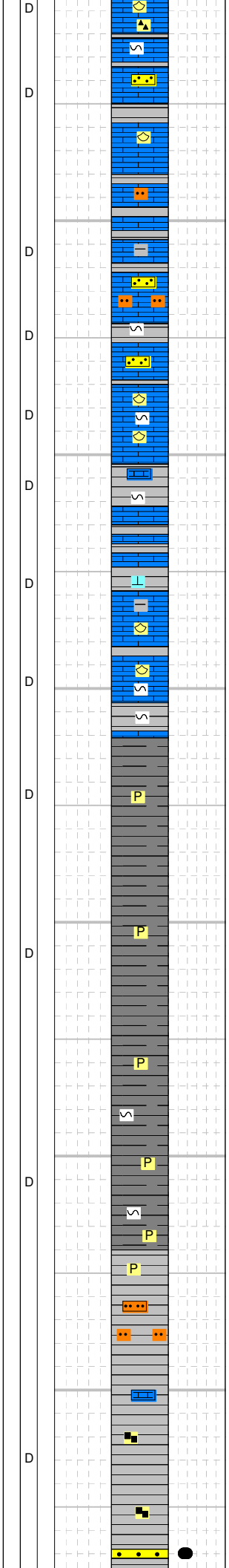
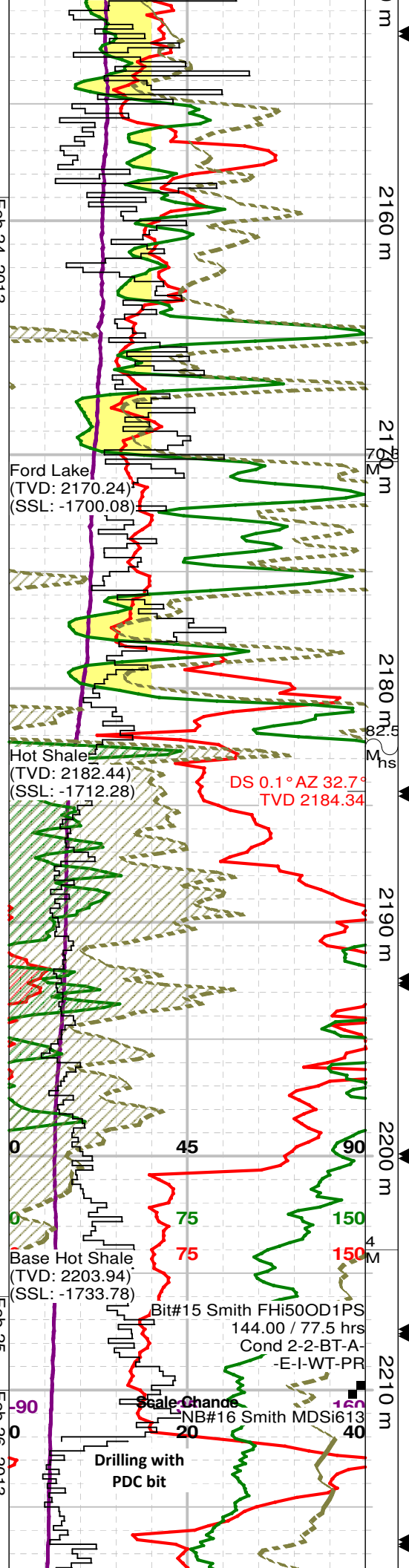
SH: dk gysh brn - blk, sbfis - nn fis, v calcs, slty ip, sily



Feb 24, 2013

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Feb 26, 2013



LS: m - dk gy - gysh brn, crpxl, arg, slty ip, occ sdy strg, scat bracs, occ biocl thn bed, **silly bits, wk blomg cut**, 2-3% scat cht, dns, tt, rr calc cmtd micfrac

LS: lt - dk gysh brn, crpxl, slty & arg, occ sltst and ss strgs, ss strgs grade to vc gred & are py srt / abnt dk gy cht & are ttly cmtd / calc, scat bracs, occ biocl beds, intbd dk carb sh, locly chty / 2-4% dk brn cht, **silly bits, slow blomg cut**, rr calc fld frac

SH: dk gysh brn - blk, sbfis, blk sh is incry bits / gsy lstr & decreasingly calcs, dk gysh brn sh is slty & py fis & extrly calcs aa, **slow dd o cut**

LS: lt - dk gysh brn, crpxl, slty & arg ip, biocl deb, rr brac spn, 2-3% scat brn cht, **silly bits, wk slow cut**, dns, tt

SH: dk gysh brn - blk, sbfis, calcs, bits, slty, vfg gred sdy ip, modly frm & brit, **no vis flor, bits ip, wk slow hazy cut**, tr pyr

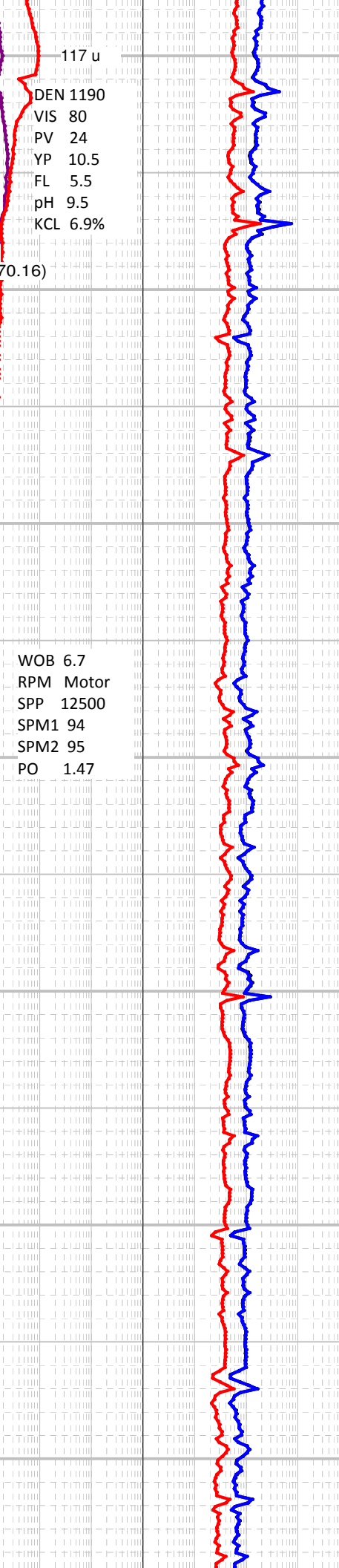
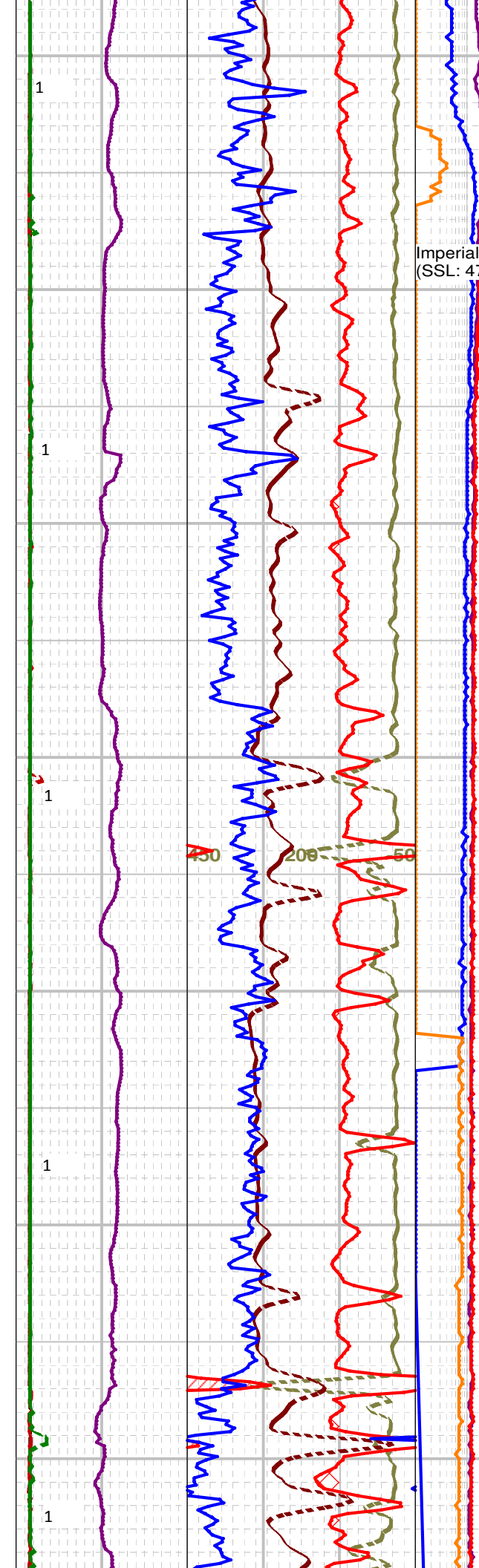
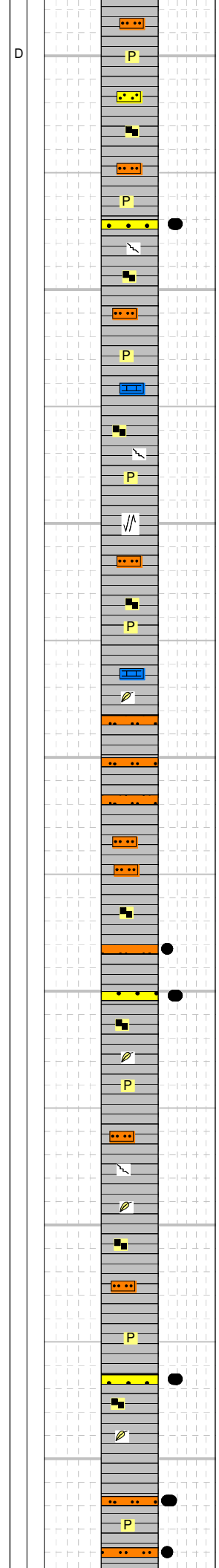
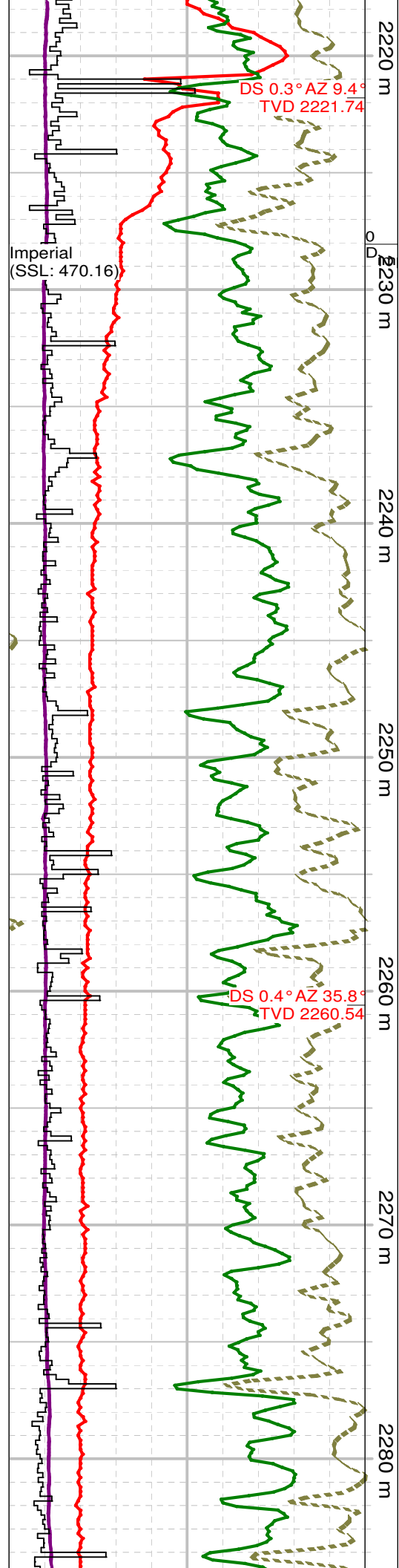
SH: incry dk gysh brn - blk, incry bits, slty - vfg sdy thru, tr pyr, sbfis, modly frm, modly brit, calcs

SH: v dk brn - blk, sbfis, slty ip, w cpctd, modly sft, modly ductile, gsy, v silly - nn calcs, **bits, no vis flor, slow hazy cut**, tr pyr

SH: aa

SH: v dk gy - gysh brn, sbfis, modly sft, rr wispy calc vnt, nn calcs / occ limy arg strgs, slty ip, sltst - vfg arg & calcs ss strgs, pyric, **degrg bits cont, slow wk cut**

SH: dk gy - dk brnsh gy, sbfis, nn calcs, occ slty and sdy

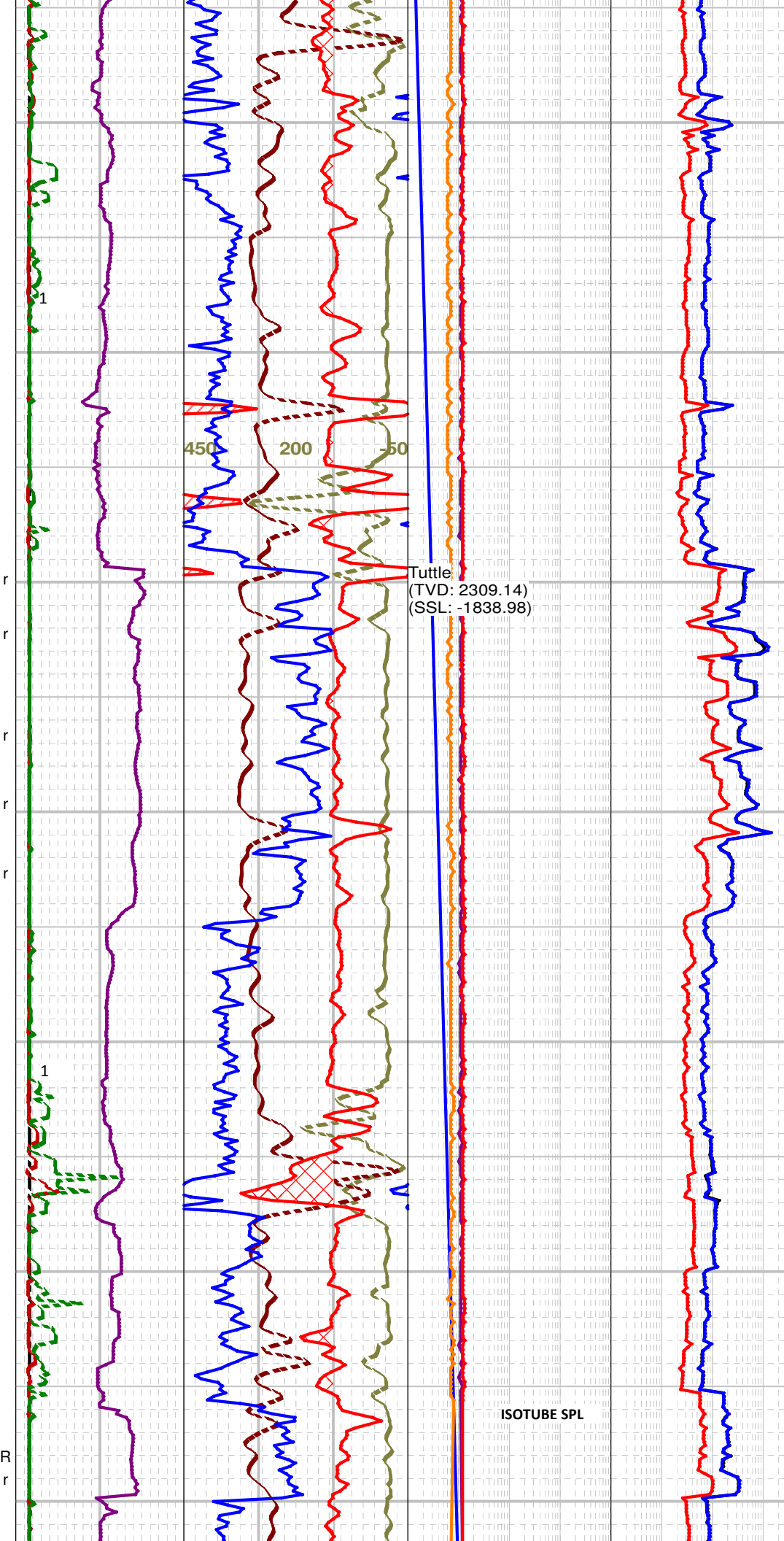
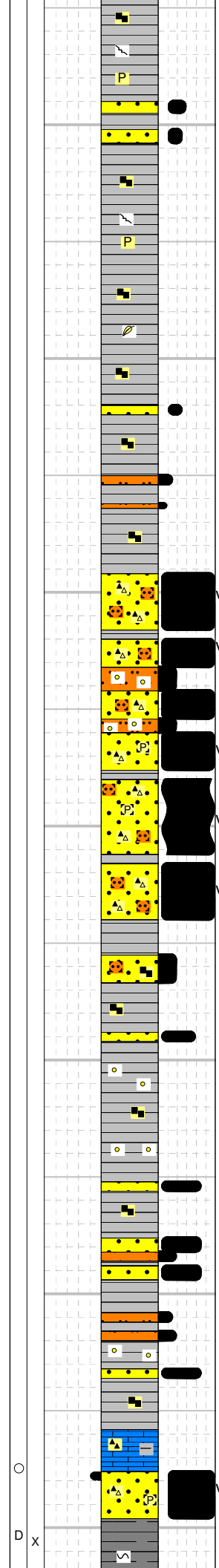
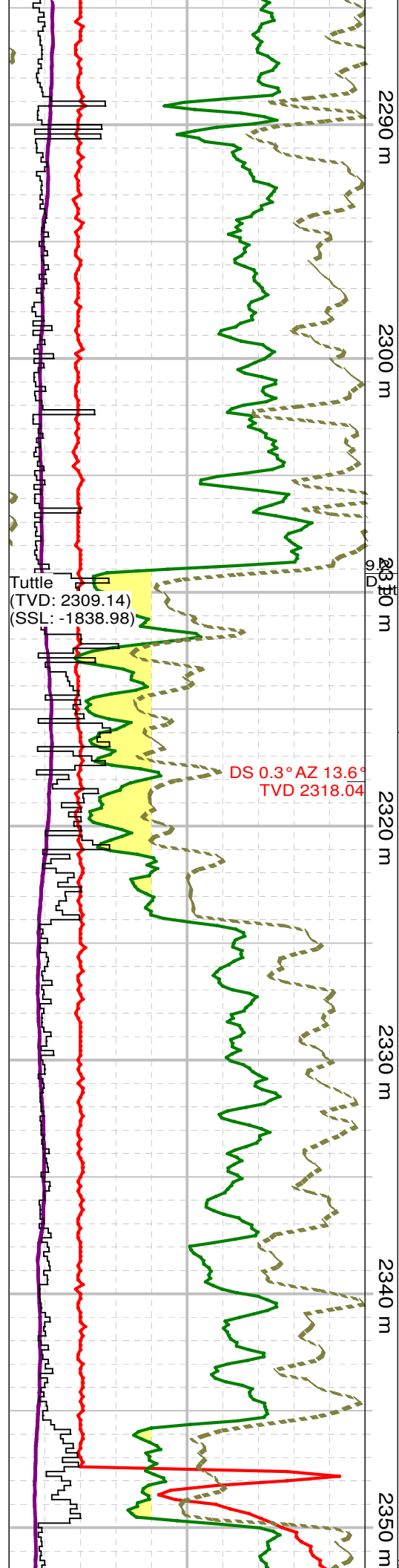


SH: dk gy - dk brnsh gy, sbfis, nn calcs, occ slty and sdy strgs, carb ip, v slly bits ip, slow fnt cut

SH: dk gy - dk brnsh gy, sbfis, nn calcs, occ slty stgs, carb ip, rr limy strgs, pyric, rr sks, occ calc flld frac

SH: m brnsh gy, locly dk gy, sbfis, nn calcs, s tr pyr, carb ip, com carbz pl rmn, incrly slty, slty & sdy lam, occ f gred flotg qtzs grs, w cpctd, frm, no vis fracs, mnr hi angle jtg

SH: dk brnsh gy, sbfis, nn calcs. locly slty, occ sltst and vfg qtzs ss lams, mic lam comly hilghted / carb mat, scat mnr - com pyr, wk jtg, w cpctd, modly frm, bcmg sft when immersed in wtr



**SH:** dk gy - dk brnsh gy, fis - sbfis, nn calcs, carb, vf carb mic lam, slty & occ sdy lams, rr calc fld mic vnlit, wk hi angle jtg, modly w cpctd, modly frm, does not swell but softens in wtr

**GRNLR SS:** m gysh brn, off wh, lt brn & gy cht and occ qtz grnls & pos pbls in a py srt arg, slty & sdy mtz / sd cls to l m, sbrdd, vp srtg, tt, no vis shw, intbd arg sltst & slty sh, scat mas pyr

**SLTST:** lt - m brn, qtzs, sdy, ang - sbang flotg sd cls to u f gred, tr mnut carb mat, nn calcs

**SH:** m - dk gy - brnsh gy, fis - sbfis, nn calcs, slty ip, carb, tr pyr

**GRNLR SS:** aa, sdy and arg mtz, tt, no vis shw

**SS:** m gysh brn, predly vfg / flotg f gred cls, slty arg mtz, sbrdd, py srt, nn calcs, com mnut carb mat thru, mod indn, tt, no vis shw

**SH:** dk gysh brn - dk gy, sbfis, slty ip, tr pyr, nn calcs, flotg f - m gred sd cls, wk jtg

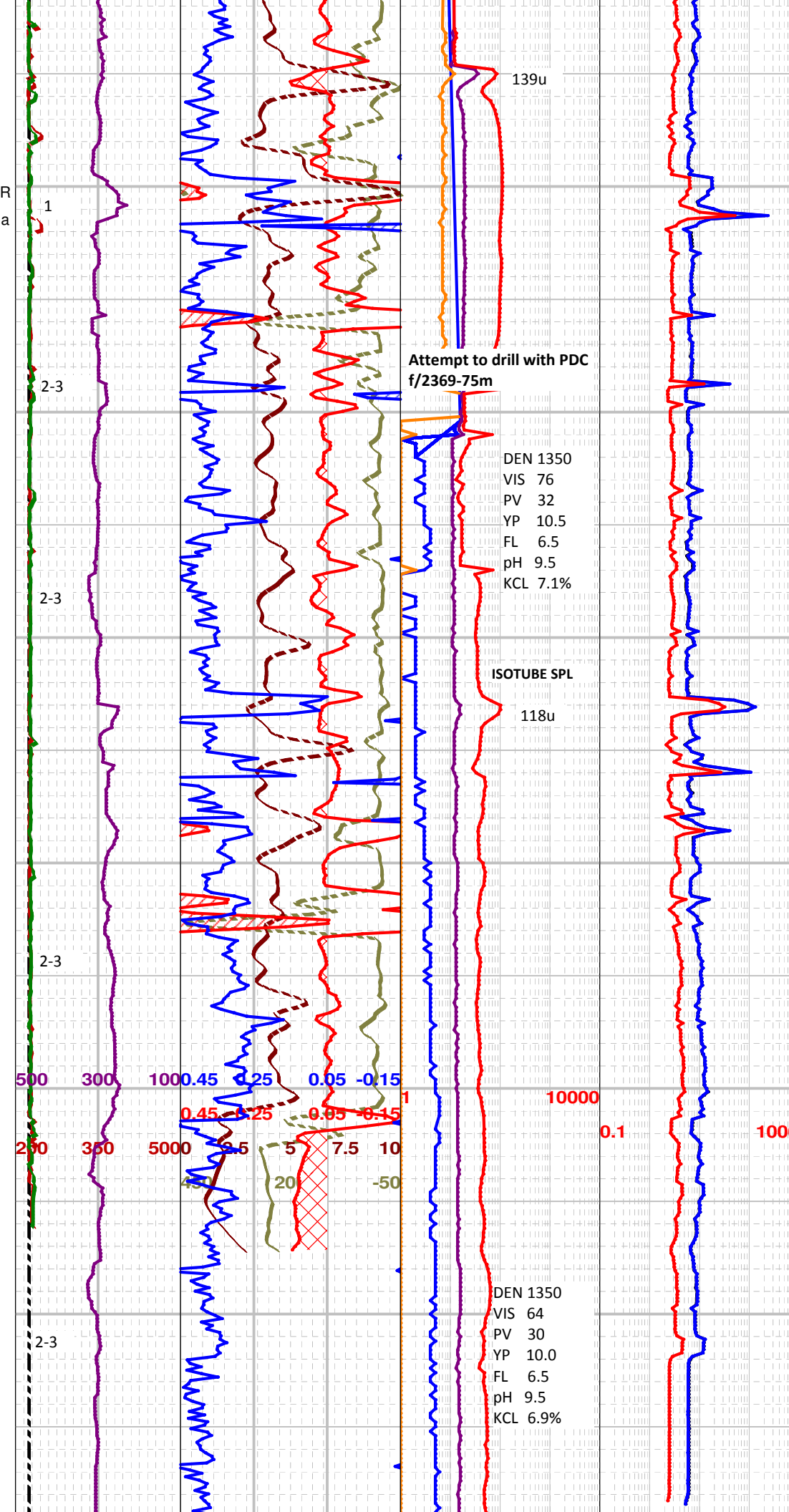
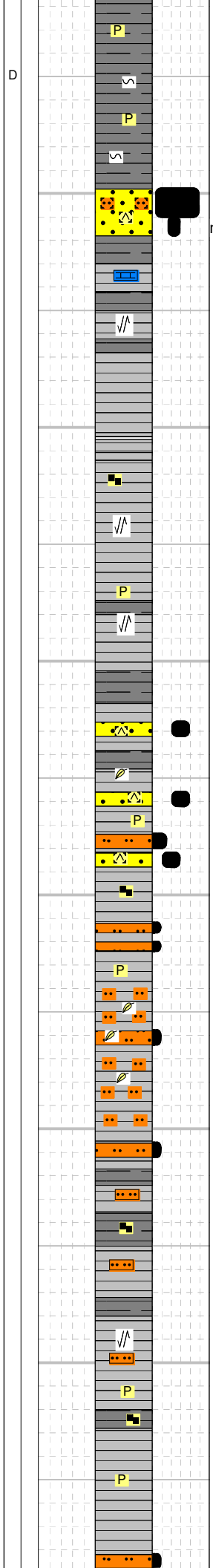
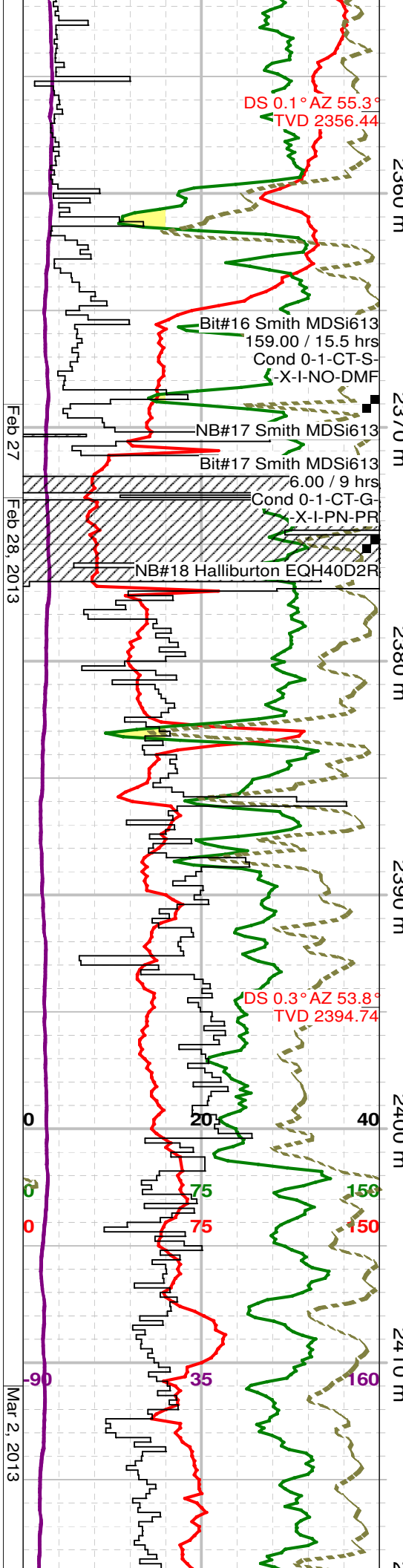
**SH:** m - dk gysh brn, sbfis, nn - slty calcs, slty ip, occ sltst lams, carb ip, tr scat pyr, occ c gred py srt ss ptgs, modly sft, fragile

**SS:** m gy - brnsh gy, m - l c gred gy & brn cht & qtz grs in m brn slty arg mtz, nn calcs, sbrdd, py srt, tt, thn beds & strgs

**SH:** dk gy - brnsh gy, bcmg v dk gy - blk, incrly carb, bits ip, sbfis, nn calcs, slty strgs

**LS:** dk gy - gysh brn, crpxl, arg, chty, dns, tt

ISOTUBE SPL



SS: m gy - brnsh gy, u c u vc gred rdd cht cls in vfg slty & arg mtz, nn calcs, predly tt, contact gas shw?, tr lt brn hydrc stng on occ gr, wk cut, locky / abnt pyr cmt

SH: v dk brnsh gy - blk, sbfis, rthy - slly gsy lstr, nn calcs, bits, no vis flwr, slow hazy dd o cut, tr pyr

SH: dk gysh brn - blk, fis - sbfis, nn calcs, bits ip, no vis flwr, slow hazy dd o cut, modly sft & fragile, occ py srt c gred ss strgs, rr dk arg ls strgs, pyric

SH: dk gy - dk brnsh gy, sbfis, nn calcs, carb ip, relatively sft, sheared in pt, tr qtzs ss aa, tr pyr, occ pyric slty lams tt, no vis shw

SH: dk brnsh gy - blk ip, sbfis, nn calcs, tr pyr, scat pyr nod, sft, bcmg v sft when immersed in wtr, jtd, occ sks

SS: off wh, lt - m gysh brn, wh & trnsl qtz & com lt lits, lf - l m gred, mnr u m gred, sbRDD, mod srtg, w ind, sil cmt, tr sec calc cmt, tt

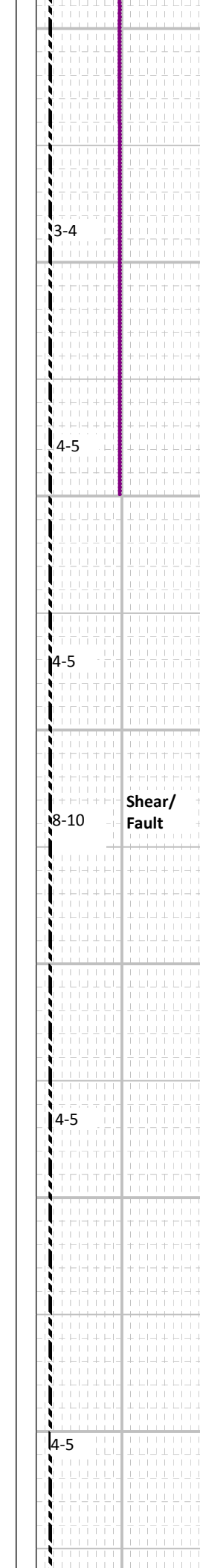
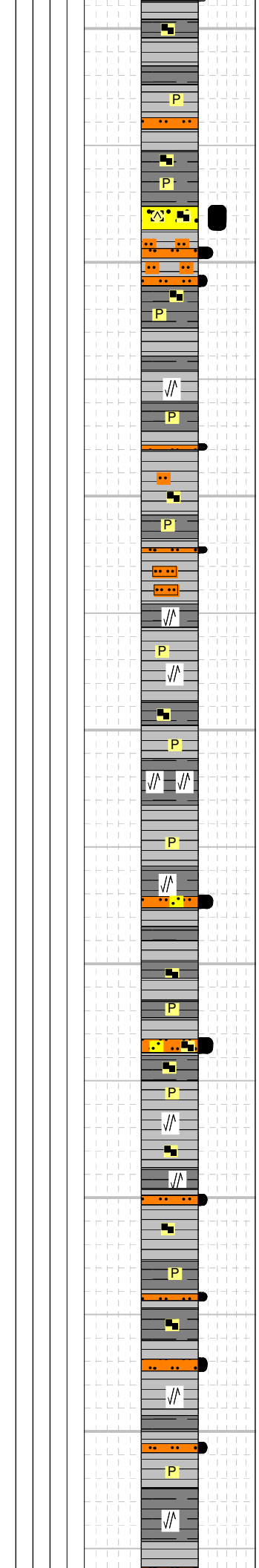
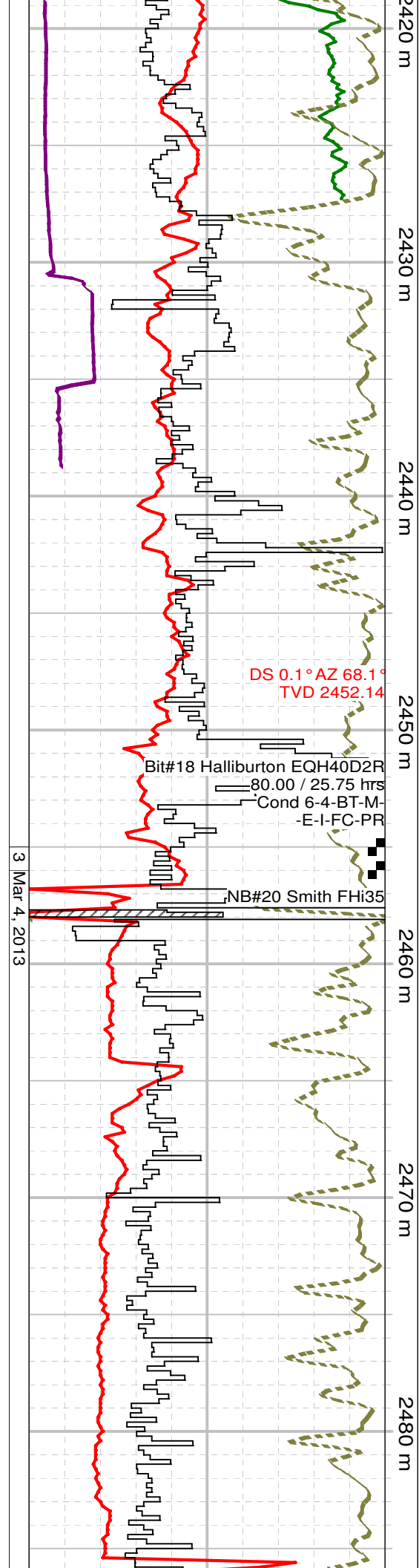
SS: m gy, vf - u m gred, occ flotg c - vc gred cls, sbRDD, py srt, sil cmt, tr - calc cmt, w ind, tt

SH: dk brnsh gy - blk, sbfis, nn calcs, tr - mnr scat pyr, sft rdd grs, bcmg v sft in wtr, occ sks, slty strgs, occ thn hd ss strg

SLTST: m - dk gy, relatively sft & fragile, rdd grs, nn calcs, arg mtz, grdg - slty sh, com carb pl rmn, tr pyr

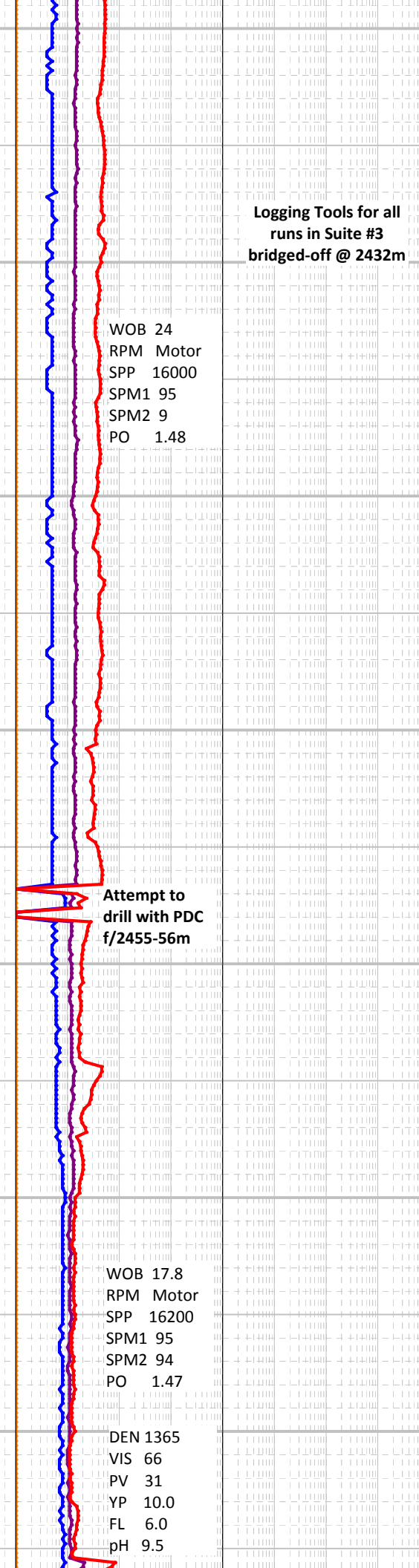
SLTY SH: m - dk gy, sbfis - nn fis, slty thru, nn calcs, tr pyr, sft, rdd sh grs, com carb pl rmn

SH: v dk brnsh gy, incrlly blk, sbfis, nn calcs, tr - mnr pyr, com sks, occ sdy strg, sft, fragile, bcmg incrlly sft in wtr



Severe bridging on most trips with the drill string.

Shear/  
Fault



**SH:** aa, scat mnr pyr, occ pyric lam, occ slty strg

**SH:** dk gy - blk, sbfis, nn calcs, carb, com sks, sft

**SS:** m gy, vf - u f gred, tr m gred, slty & arg mtx, sbrdd, py srt, sil + tr sec calc cmt, ptch pyr cmt, mod - w ind, com carb mat thru, tt

**SLTY SH:** m - dk gy, sbfis - nn fis, nn calcs, slty thru, vfg sdy ip, carb

**SH:** dk brnsh gy - blk ip, sbfis, nn calcs, tr - mnr scat pyr, carb, w cpctd, relatively sft, bcmg v sft & fragile in wtr, mod shear, occ sksd gr

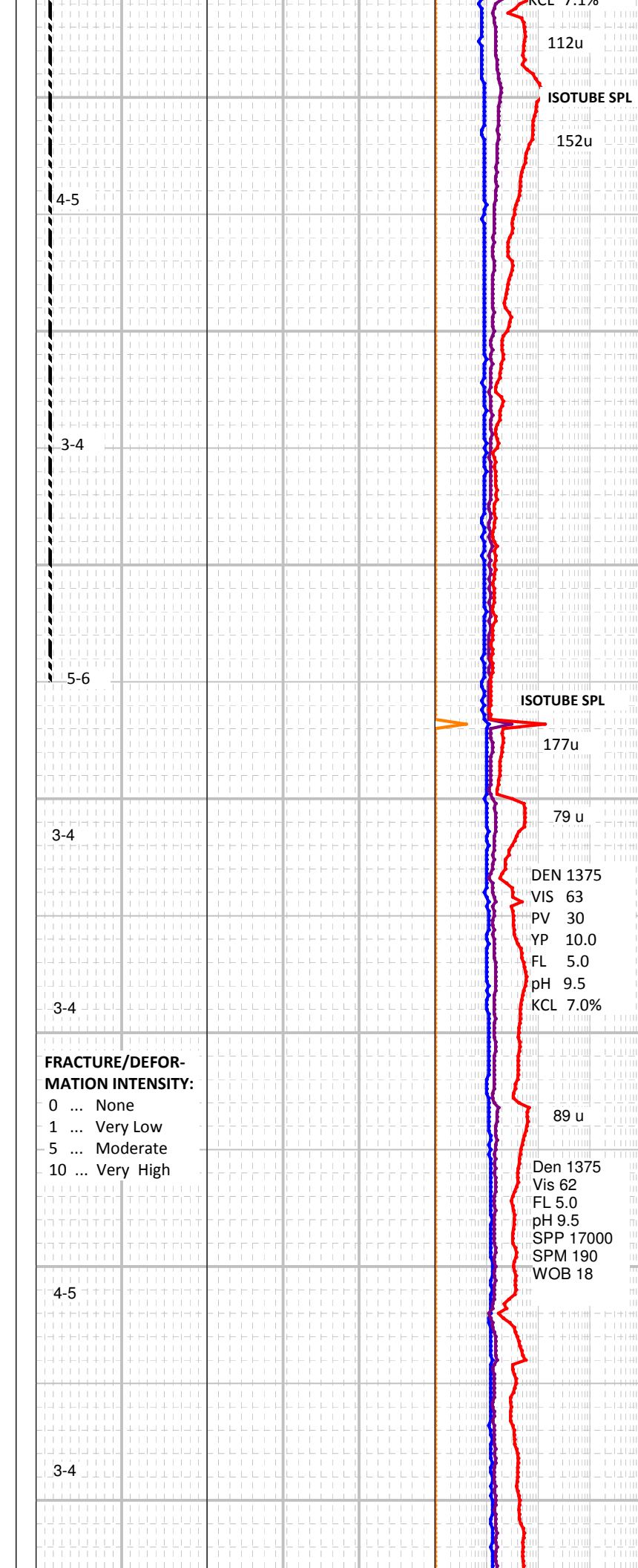
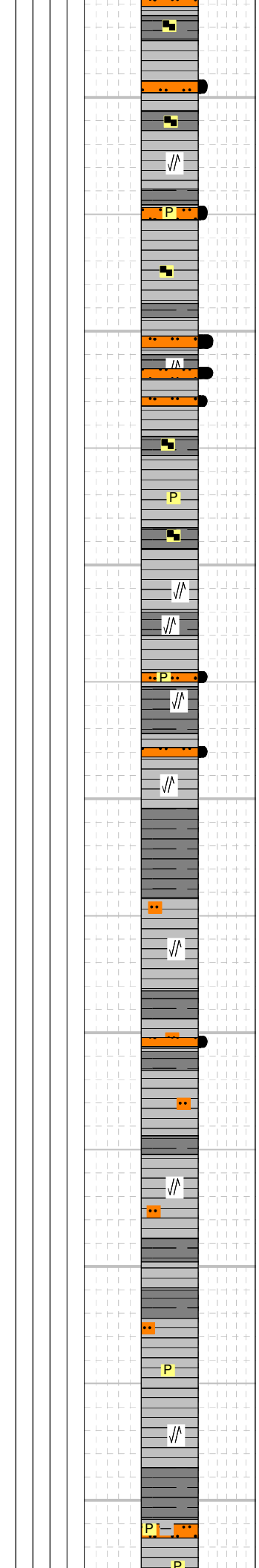
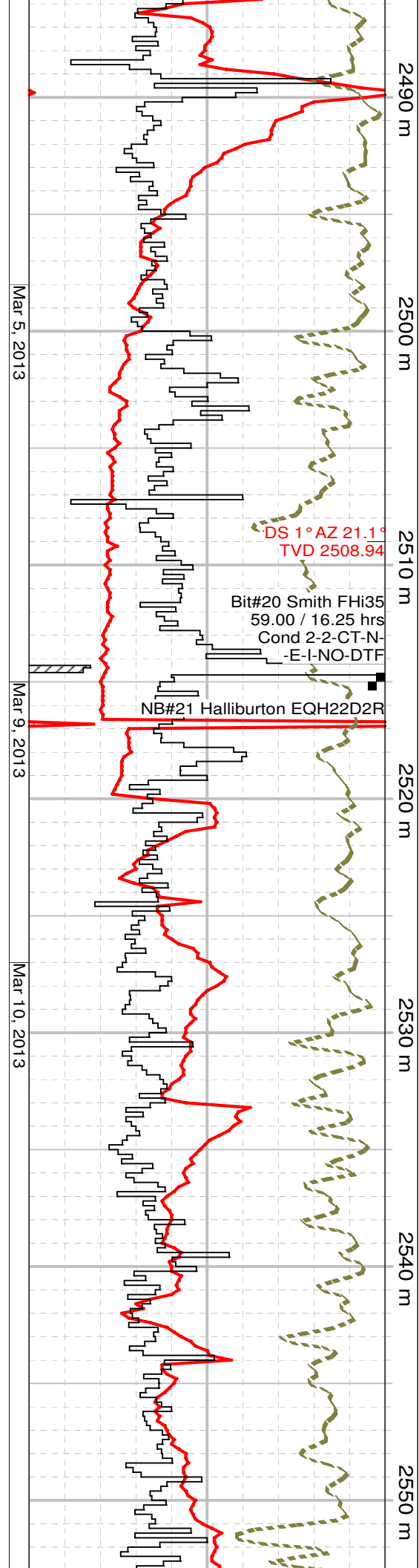
**SH:** inclry dk brnsh gy - blk ip, sbfis, nn calcs, carb, occ slty lam, abnt sheared grs, pos shear or flt zone (2448-2451m?), wk micfrac, sft, fragile

**SLTST:** m brnsh gy, sdy ip, grdg - vfg slty & arg ss, nn calcs, pyric, carb ip, mod indn

**SH:** dk brnsh gy - blk ip, fis - sbfis, nn calcs, carb ip, occ slty strgs, com sheared grs

**SH:** v dk brnsh gy - blk ip, sbis, locly fis, occ slty lam, carb, pyric lam, tr - mnr scat pyr, mod cpctn, sft, bcmg v sft & fragile in wtr, com sks and/or sheared gr





**NB: All geologic data, ROP, Gas and MWD gamma data f/1526-2515 has been shifted down on average 2m to synchronize depths with open hole logs.**

**SH: dk brnsh gy, grdg - blk, sbfis - fis, nn calcs, carb, com sks ~pll to bdg, mod shear, tr scat pyr, occ pyric slty lams**

**SH: dk brnsh gy - blk, sbfis, nn calcs, carb, occ pyric lam, tr dism pyr, rr pyr nods, occ slty - vfg sdy lams, occ - com sheared grs, sft, relatively fragile**

**SH: dk gy, dk gy brn, sft - frm, sb fis, micmica, gsy, as cly sh, slty pyr, rr v f pyr lam, comly sheared & / abnt slickensides, post-trip spl, nn calcs.**

**SH: dk brn, grdg to blk, dk brn gy, sb blkly - blkly, comly firm, brit, micmica, occly greasy or dull, pyric, occ pyr lams, non calcs, occ slickenside surfaces.**

**SH: dk gy, grdg to blk, dk brn, dk brn gy, plty - blkly, comly hd, sb - non fis, greasy, dull, micmica, slty pyric, predly as cly sh, rr slt or sd grs, rr frags bcmg sft in wtr, occ slickenside surfaces.**

**SH: dk gy, grdg to blk, dk brn, dk brn gy, plty - blkly, comly hd, sb - non fis, greasy, dull, micmica, slty pyric, predly as cly sh, occ slty or sdy frags, rr frags bcmg sft or splitting in wtr, occ slickenside surfaces.**

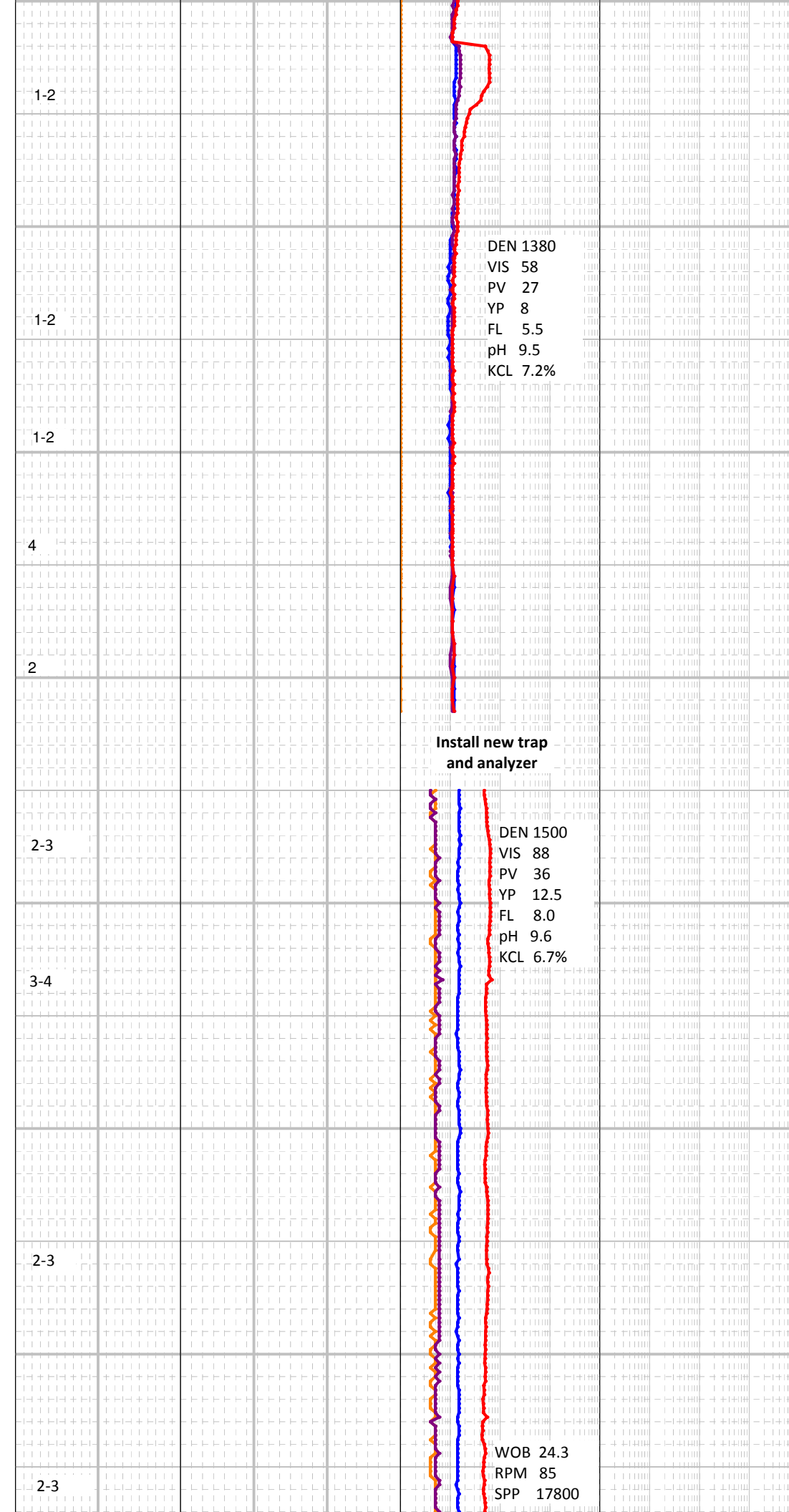
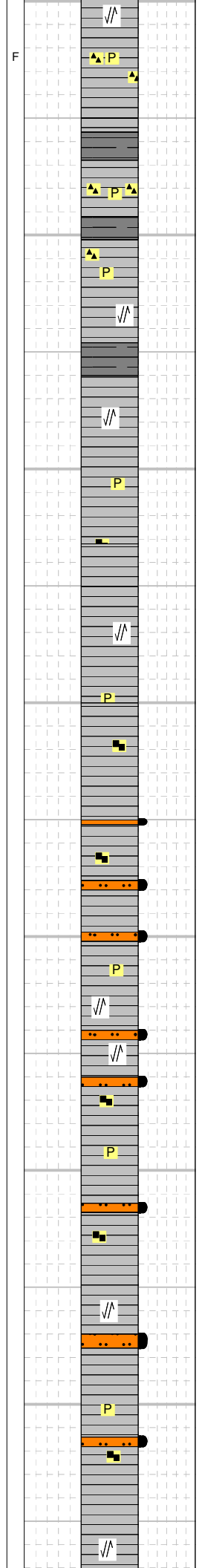
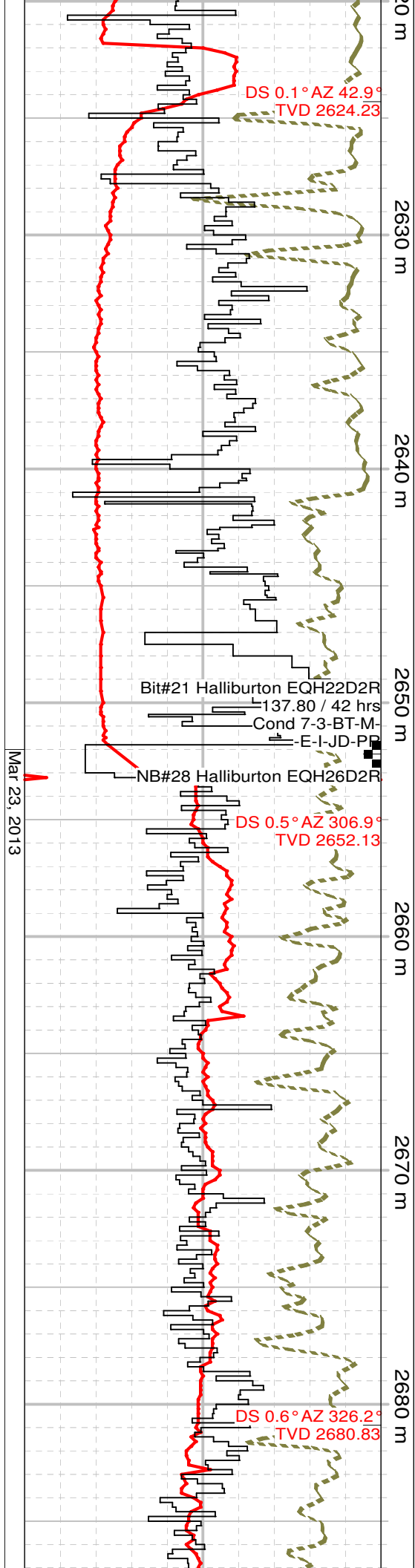
**SH: dk gy, dk brn, dk brn gy, grdg to blk, plty - blkly, comly hd, sb - non fis, greasy, dull, micmica, slty pyric, predly as cly sh, occ slty & sdy frags, 30% of frags m brn gy, sft, splitting in water, occ slickenside surfaces.**

**SH: dk gy, dk brn, dk brn gy, grdg to blk, plty - blkly, comly hd, sb - non fis, rr sft frags, greasy, dull, micmica, slty pyric, predly as cly sh, occ slty & sdy frags, occ frags bcmg sft or cracking in water, occ slickenside surfaces.**

**SH: dk gy, dk brn, dk brn gy, grdg to blk, 25% lt - m brn gy, plty - blkly, comly hd, sb - non fis, occ sft frags, greasy, dull, micmica, slty pyric, predly as cly sh, occ slty & sdy frags, occ frags bcmg sft or cracking in water, occ slickenside surfaces.**

**SH: dk gy, dk gy brn, dk brn, 35% m brn gy, sb plty - sbblkly, occly blkly, sft - hd, fis - brit, micmica, dull, occly greasy, occ slickenside surfces, pyric, occ frags**





**SH:** m - dk gy, dk brn, dk brn gy, plty - blk, predly sft, sbfis - fis, occ hd & brit frags, micmica, dull, occlly wxy, predly as cly sh, rr dism or mas pyr, rr v f pyr lam, rr slty or sdy frags, occ sks sfcs, tr m - dk brn, chty, arg, sltst - v fl ged ss frags.

**SH:** m - dk gy, sb plty - blk, micmica, dull, comly sft, sbfis - fis, / occ crks when placed in wtr, sly pyric, as cly sh, 40& m - dk brn, frm, brit, / occ slickensides, locky sils or chty, rr m brn arg, comly pyric, locky slty or sdy cht frags / euhed sil qtz drs frac linings.

**SH:** m - dk gy, sb plty - blk, micmica, dull, comly sft, sbfis - fis, / occ crks when placed in wtr, sly pyric, as cly sh, 20& m - dk brn, frm, brit, / occ slickensides, rr pyr lam, rr m - dk brn, rr blk, arg, comly pyric, locky slty or sdy, tt cht frags.

**SH:** m - dk gy, sb plty - blk, micmica, dull, comly sft, sbfis - fis, / occ crks when placed in wtr, sly pyric, as cly sh, 35% m - dk brn, frm, brit, / occ slickensides, rr m - dk brn, crpxl - micxl, arg, slty in pt, comly pyric, cht frags / rr euhed sil drs.

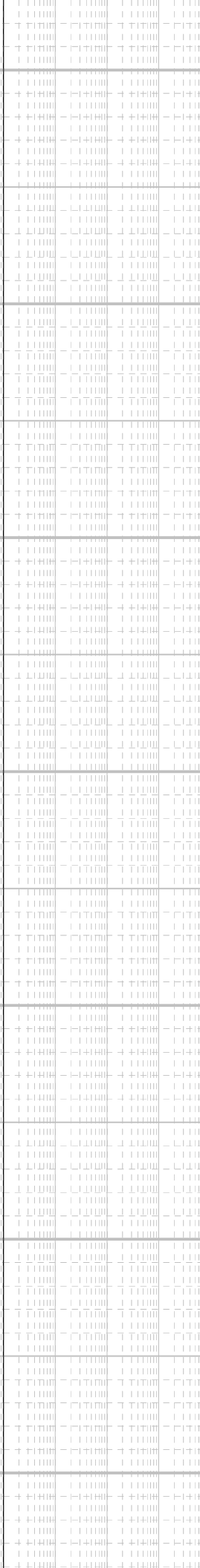
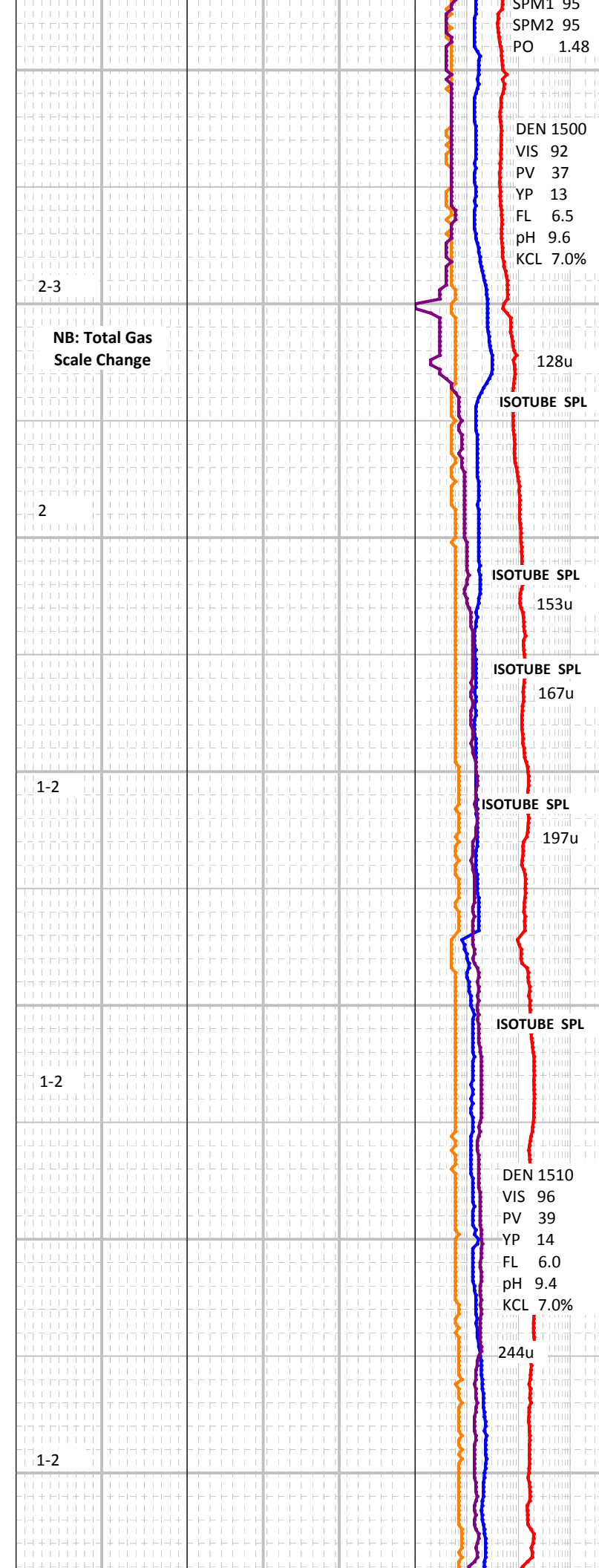
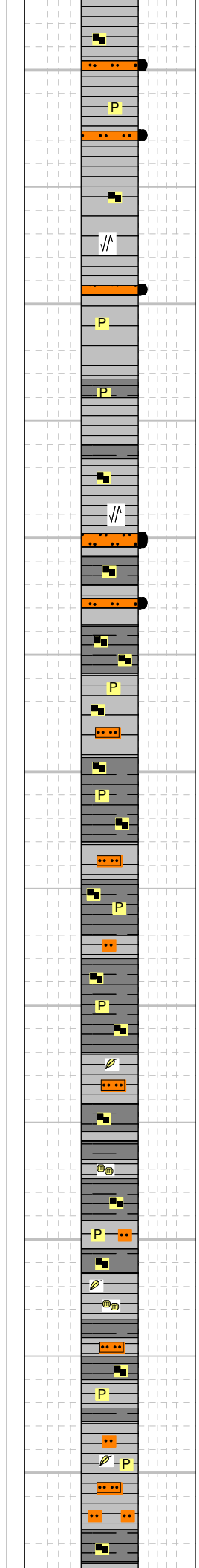
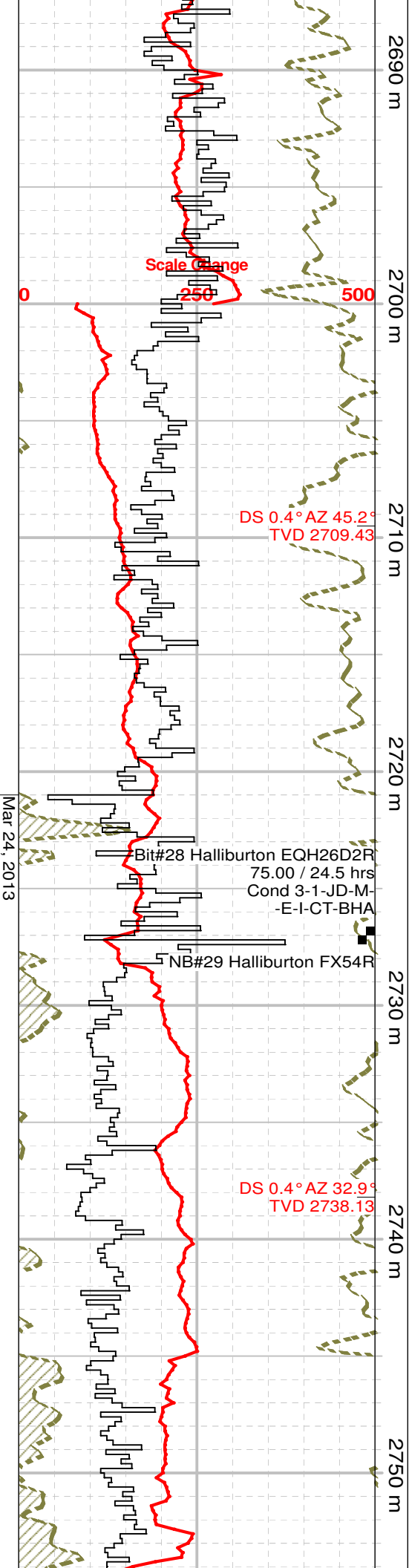
**SH:** m - dk gy, sb plty - blk, micmica, dull, comly sft, sbfis - fis, rr hd & non fis frags, / occ crks when placed in wtr, sly pyric, as cly sh, 15% m - dk brn, frm, brit, / rr slickensides, tr m - dk brn, crpxl - micxl, arg, slty in pt, tt cht frags.

**SH:** m - dk gy, sb plty - blk, micmica, dull, comly sft, sbfis - fis, rr hd & nn fis frags, / fewer crks when placed in wtr than abv, sly pyric, as cly sh, < 15% m - dk brn, frm, brit, / rr slickensides, tr m - dk brn, crpxl - micxl, arg, slty in pt, tt cht frags.

**SH:** v dk gy - brnsh gy, sbfis, nn calcs, sft, fragile, delaminates in wtr, mnr scat pyr, carb ip, occ slty strg, com sks

**SLTST:** lt - m gy, yelsh brn ip, arg, comly qtzs, com mnut carbz pl mat thru, rr sks, occ hi angle jt, sils, tr calc, hd, brit, thn strgs

**SH:** v dk gy, dk gysh brn ip, sbfis, nn calcs, slty strgs, tr fy dism pyr, occ pyr lams, scat s pyr nods, occ sks, hi angle jtg, modly sft, fragile, carb ip



**SH:** dk gy, dk brnsh gy ip, sbfis, nn calcs, modly sft, fragile, delaminates and breaks apart in wtr, occ slty strg, tr pyr, carb ip, occ sheared gr, occ hi angle jt

**SH:** v dk gy - blk, dk gysh brn ip, sbfis, nn calcs, incrl pyric, com - abnt v fy dism pyr thru, pyric lam, incrl carb, mod sft, fragile, aa, decrg sheared grs, occ hi angle jt, occ sltst lams

**SH:** dk gysh brn, blk, sbfis, nn - v slly calcs, carb, com fy dism pyr thru, sft, fragile, occ sheared gr, occ slty lam

**SH:** predly dk gy - blk, sbfis, nn - v slly calcs, carb, occ sks, 20-30% intbd & intlam m brnsh gy, sbfis, slty micmica sh, com mnut blk carbz pl rmns, tr - mnr pyr, occ pyric lam

**SH:** predly m brnsh gy, sbfis, slty, pyric, nn - v slly calcs, frm, modly hd & brit, carb ip, 20-30% intlam & intbd dk brnsh gy - blk, sbfis, nn - v slly calcs sft carb sh, also / tr - mnr pyr, occ sks, occ sltst lams

DS 0.5° AZ 35.5°  
TVD 2757.13

DS 0.6° AZ 24.5°  
TVD 2776.33

DS 1.4° AZ 44.7°  
TVD 2795.63

DS 1.2° AZ 47.2°  
TVD 2814.92

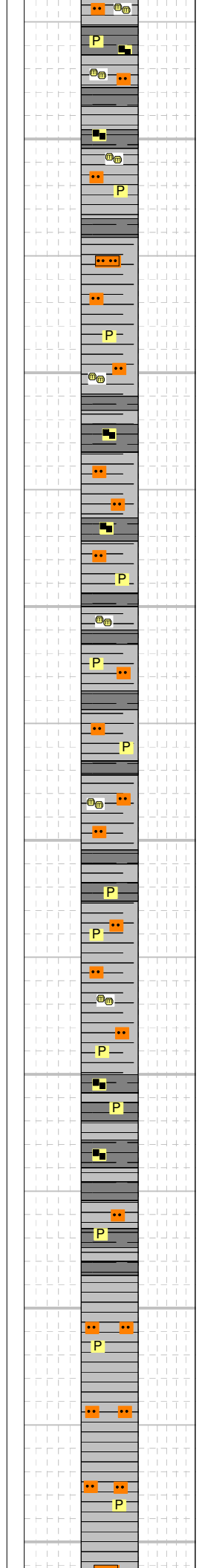
Pason down due to  
electrical problem on  
the rig - No data

250 500

0 20 40  
2800 m

2810 m

2820 m



1-2

1-2

1-2

1-2

Gas Analyzer not  
recording data

ISOTUBE SPL  
255u

WOB 10.6  
RPM 20 + motor  
SPP 19800  
SPM1 100  
SPM2 100  
PO 1.57

246u

10000

ISOTUBE SPL

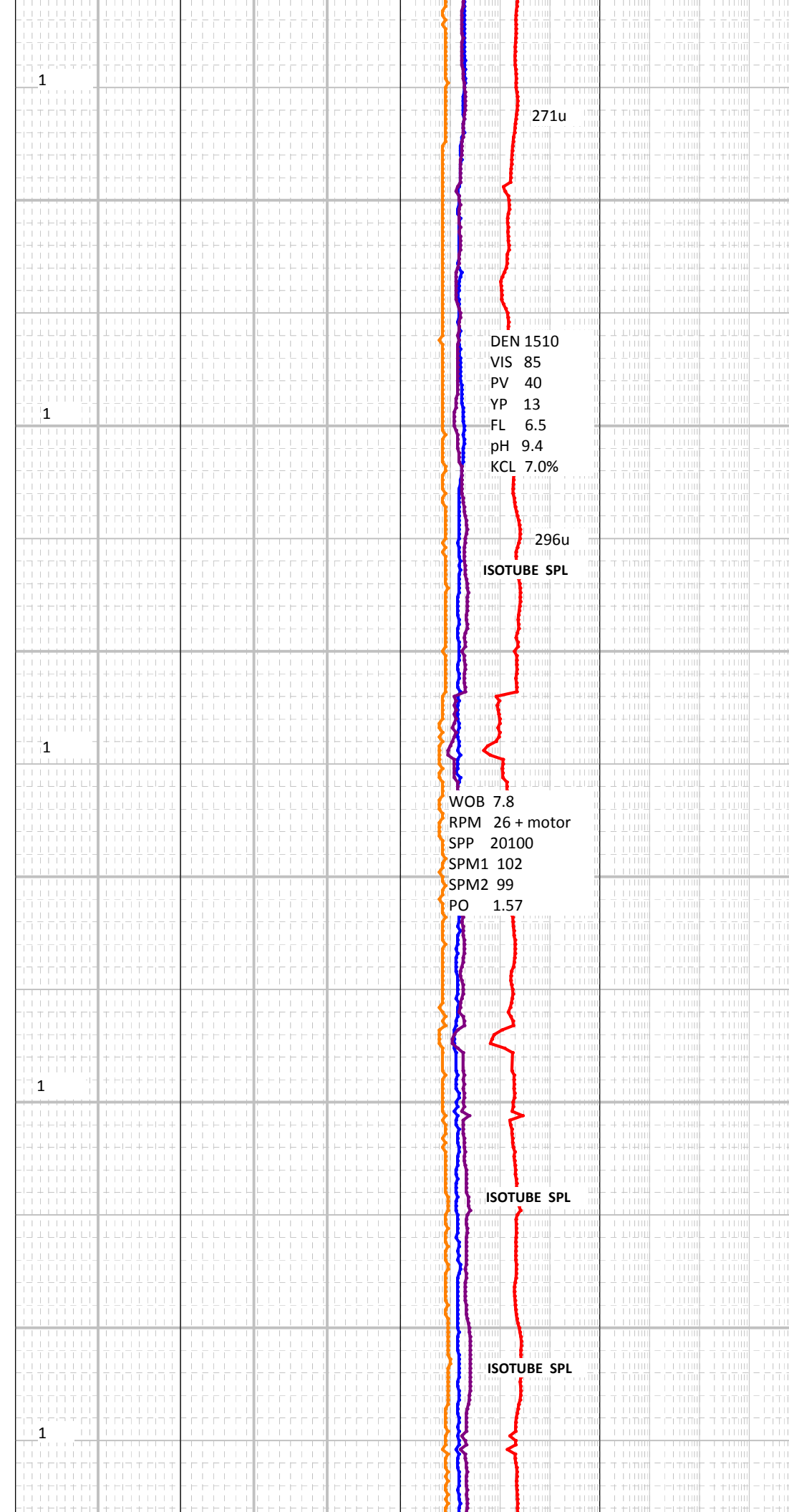
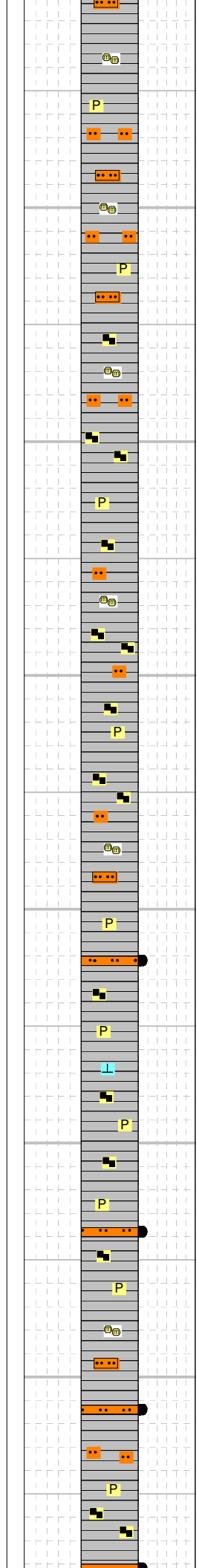
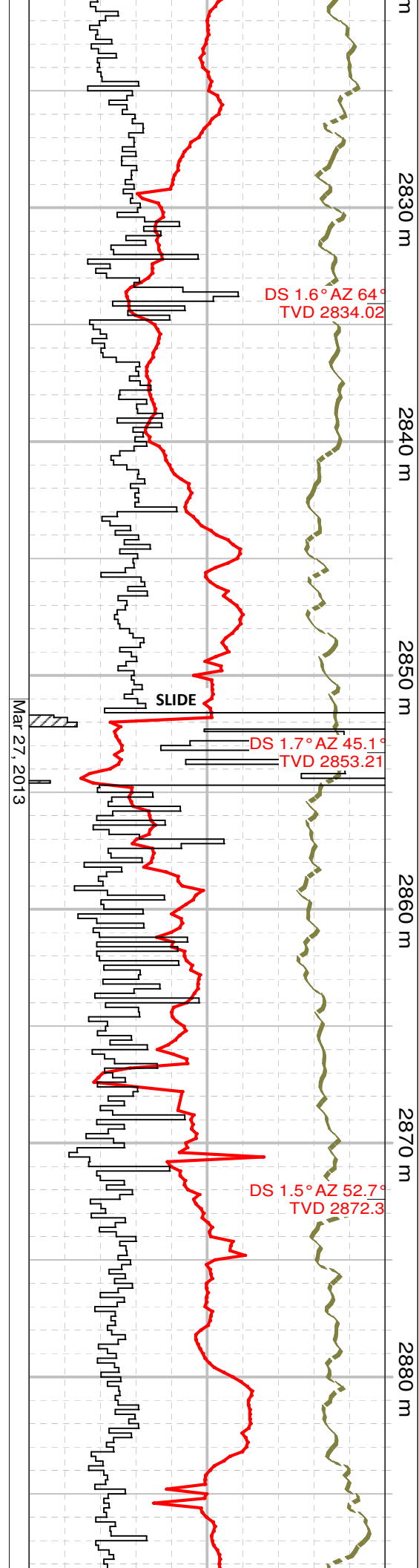
By-pass  
shaker for  
repairs

**SH:** m brnsh gy, 10-15% dk gy - blk aa, sbfis, slty, pyric, mnr - com fy dism pyr thru, micmica ip, nn - v slly calcs, rock chips are stable in oil and wtr, but break down immediately in acid, com mnut blk carbz mat thru, slty strgs, occ hi angle jt

**SH:** predly m gy - m brnsh gy, sbfis, nn calcs, mnr - com fy dism pyr thru, modly frm, brit, tr carb mat, mnr intbd dk brnsh gy - blk carb sh, no apparent shear, occ hi angle jt

**SH:** m brnsh gy silty pyric sh / mnr intbdd dk gy - blk carb sh aa, com fy dism pyr thru, modly frm, occ hi angle jt, tr calcs mat

**SH:** sbeg m gysh brn & intbd dk brn - blk, occ lt gy slty lam, sbfis - sbblky, nn calcs, mnr fy dism pyr, decrg slt cont, incrly carb, modly frm, brit, occ hi angle jt



**SH:** sbeq m & intbd dk gysh brn - brnsh gy, sbfis, nn calcs, micmica ip, m gy sh is slty & modly frm, dk sh is softer & carb, tr - mnr fy dism pyr, no shear evident, occ hi angle jt, slty lam

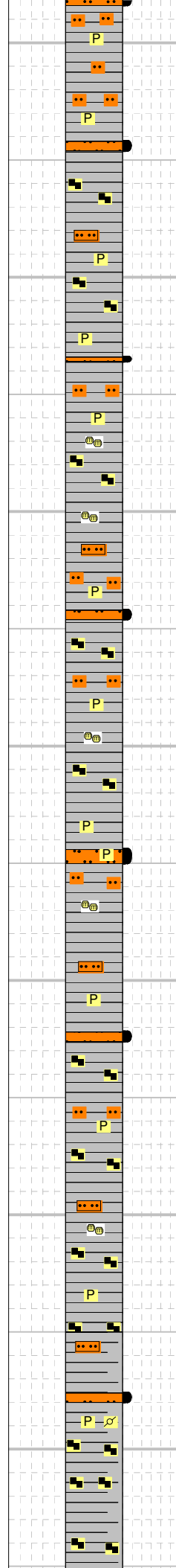
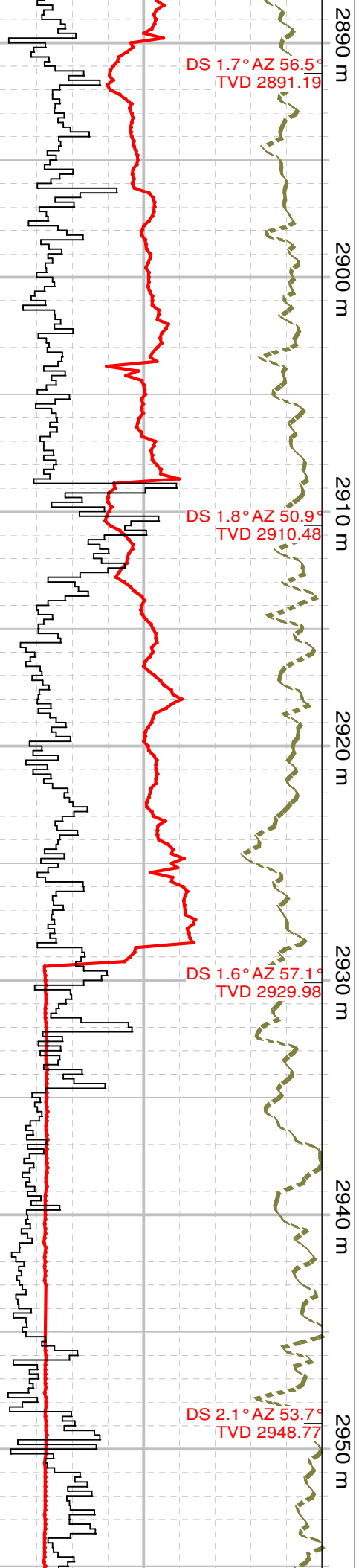
**SH:** predly dk brnsh gy - gysh brn, mnr m brnsh gy, sbfis, decreasingly slty, slty mic lam, nn calcs, incrly carb, modly sft, fragile, tr pyr, rr calc fld micfrac

**SH:** dk gy - dk brnsh gy, sbfis, nn calcs, carb, modly sft, fragile, bcmg v fragile in wtr, tr - locly mnr pyr, occ slty lam

**SH:** dk brnsh gy, sbfis - sbbly, nn - v slly calcs, modly frm, slty ip, tr fy dism pyr, micmica ip, occ slty lam, carb, occ jtg

**SH:** dk brnsh gy / 20-30% intbd m gy, sbfis, nn calcs, mnr dism pyr, carb ip, slty ip, modly frm, brit, v fy mod lamd, wk jtg, no vis shear

Mar 28, 2013



1

1

1

1

DECREASING TOC

DEN 1505  
 VIS 78  
 PV 40  
 FL 6.5  
 pH 9.4  
 KCL 7.0%

ISOTUBE SPL

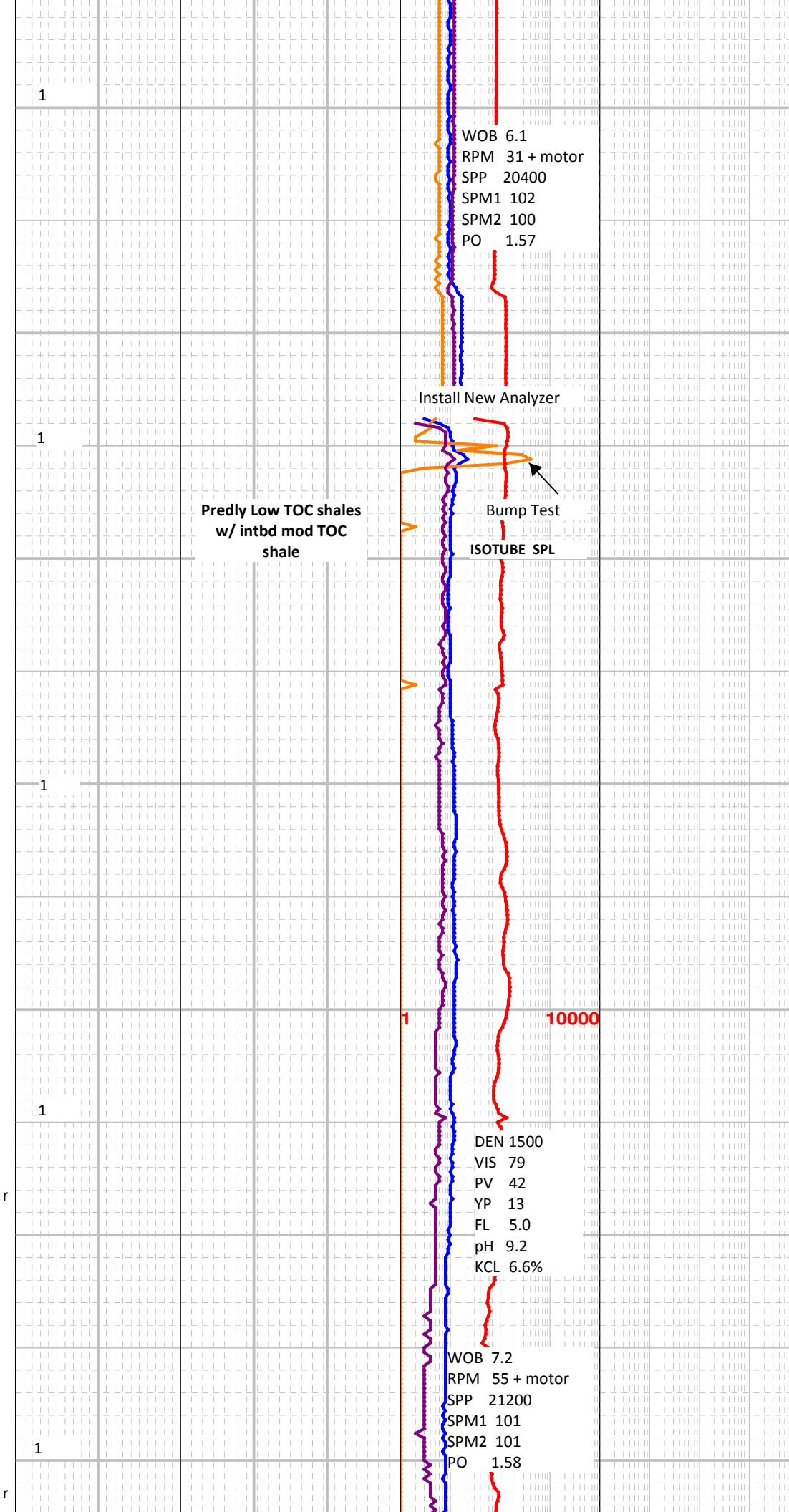
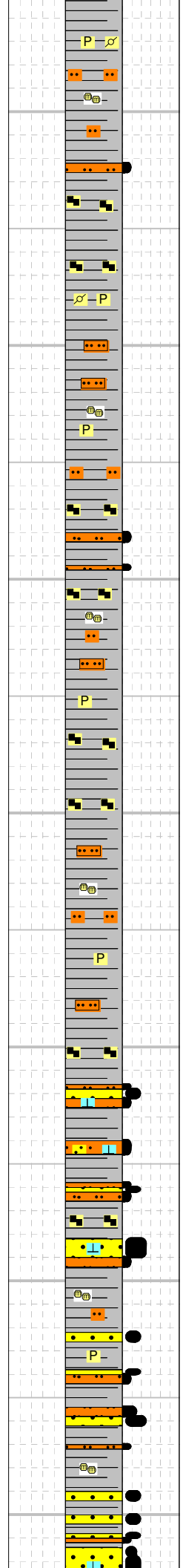
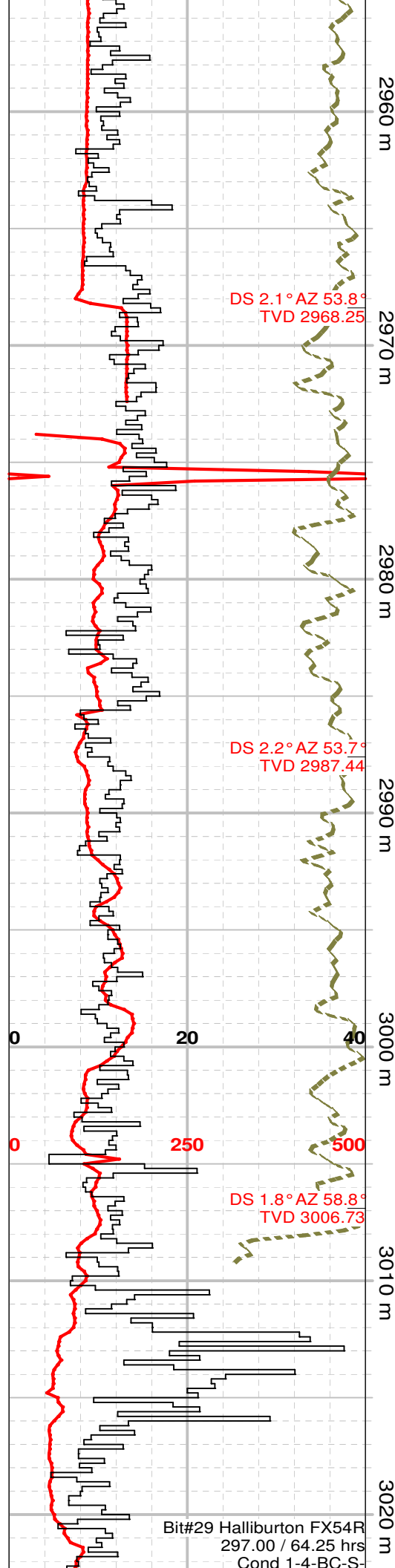
PASON GAS ANALYZER  
 MALFUNCTION - Gas  
 Data f/2928-2974m is  
 unreliable.

**SLTY SH:** lt - m brnsh gy, sbfis, slty thru, vf qtzs slt, nn calcs, tr - locky mnr dism pyr, modly sft, fragile, bcmg v sft in wtr, wk jtg

**SH:** intbd & intlam lt - m brnsh gy slty sh, & m - dk brnsh gy carb sh, sbfis, nn calcs, tr - mnr fy dism pyr, micmica ip, modly frm, modly brit, fragile, softens in wtr, wk jtg, no shear

**SH:** 30-35% m brnsh gy slty sh / 65-70% intbd & intlam v dk gysh brn carb sh, sbfis - sbbly, nn - v slty calcs ip, mnr - locky com dism pyr, occ slty pyric lams, modly sft, modly fragile, no vis shear, occ hi angle jt

**SH:** predly lt - m brnsh gy, sbfis - sbbly, slty ip, mnr v fy dism pyr, rr pyr mic sph (pyrd pels?), w cpctd, modly brit, 20-25% intbd & intlam dk carb sh, tr - mnr dism pyr, modly sft, bcmg v sft and fragile in wtr, occ modly hd slty lams



**SH:** predly m brnsh gy, ~30-35% dk gysh brn, sbfis, nn calcs, decrg slt cont, rr slty lam, mnr fy dism pyr, rr pyrd pels (sph) aa, carb ip, modly sft & fragile, bcmg v sft in wtr, slty lam are modly hd & brit

**SH:** predly lt - m brnsh gy low toc sh, 10-15% dk gysh brn carb sh, nn calcs, locly slty, tr fy dism pyr, micmica ip, modly sft, fragile aa, no vis shear, occ hi angle jt

**SH:** predly m brnsh gy, 20-25% dk brnsh gy, sbfis, nn calcs, mod - low toc, tr - mnr dism pyr, micmica ip, slty ip, occ sltst strgs, w cpctd, modly sft, fragile

**SH:** lt - m gy - brnsh gy / low toc, ~10% dk brnsh gy & carb ip, sbfis, nn calcs, tr pyr, slty lams, modly sft & fragile aa

**SLTST:** lt - m gy, sily calcs, sdy ip, locly grd - vfg ss, mnr - com blk mnut carbz pl mat thru, thn beds, tr pyr, micmica ip

**SH:** predly m gy, locly dk gysh brn / incrg toc cont, sbfis, nn calcs, tr dism pyr, locly slty, micmica ip, modly sft & fragile

**SS:** lt - m gy, vfg, slty & arg ip, 3-5% l f gred cls, sbrdd - sbang, py srt, v sily calcs, cly mtx, tr pyr, tr mica, mod indn, modly brit, tt, tr - mnr carb mat

**SLTST:** m gy, sdy ip, v sily calcs, tr carb mat, tr pyr

**SH:** m gy, sbfis, nn calcs, slty ip, intlam vfg ss, and sdy sltst, low toc, tr pyr, tr mica, modly sft, fragile aa



Mar 29, 2013

-X-I-PN-TD

Total Depth  
(TVD: 3024.62)  
(SSL: -2554.46)

24.8

303

0	20	40
MWD Gamma (gapi)		
0	75	150
Gamma Ray (gapi)		
0	75	150
Total Gas - Linear (units)		
0	250	500
SP (Mv)		
-90	35	160

Measured Depth

Sidewall Core

Core

Test

Porosity Type

Oil Show

Porosity (%)

Interpreted Lithology

Grain Size (mm)

Rounding

Sorting

Drilling Progress  
Total Gas - ROP  
Gamma Ray - SP

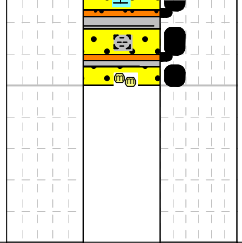
Caliper Logs  
Sonic DT

Density-Neutron  
Density Correction  
PEFZ

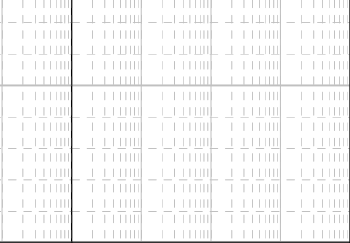
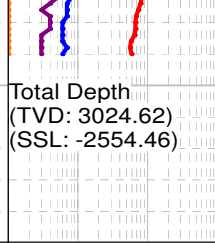
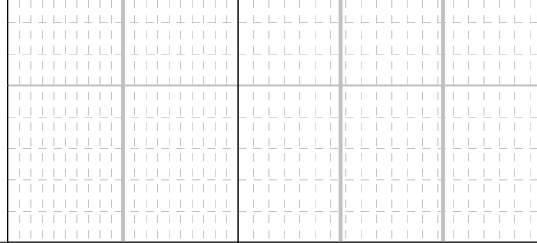
Mud Gas  
Chromotography

Array Induction

Northern Cross Yukon Ltd  
NCY W Chance H-28  
300/H-28-6610-13730/0



P r



SS: lt - m gy, vfg, slty & arg mtx, occ strg grdg - l f  
gred, sbrdd - sbang, mod indn, fri - brit ip, slly calcs, tr  
carb mat, tr mica, tt, slty and shy lams

**Expanded Core Log (1:48) Feb 20, 2013**  
**Core #1 Interval: 2057.00m to 2065.80m Cut: 8.8m Recovered: 8.8m (100%)**

