Well Information

Operator:	NORTHERN CROSS (YUKON) LIMITED
Well Name:	NCY McParlon A-25
Location:	300A256610137150
UWI:	NCY McParlon A-25
Pool / Field:	N/A / UNDEFINED
Well License #:	1130
Province / State:	Yukon Territory
Country:	Canada

Total Depth

Measurement Type	MD	TVD
Drillers TD (Tally)	3132 m	3089.01 m
Drillers TD (Strap or SLM)	3132 m	3089.01 m
Loggers TD	m	m

Well Co - Ordinates

	Longitude	Latitude	
Surface Co-Ordinates:	137.185758	66.040930	**NS:** 158.5 meters West of the East Boundary of Unit A. **EW:** 296.3 meters North of the South Boundary of Unit A.
Int. Casing Co-Ordinates:			**NS:** 339.89 meters West of the East Boundary of Unit A. **EW:** 378.44 meters North of the South Boundary of Unit A.
Bottom Hole Co-Ordinates:			**NS:** @ 3079.48m stn: 138.42m north of well centre **EW:** @ 3079.48m stn: 191.90m west of well centre
UTM Surface Co-Ordinates:	**Northing:** 7329565.45		**Easting:** 395189.91

Well Type: Deviated

Elevations

Reference:	MSL
Ground:	616.8 m
Cut(-) / Fill(+):	-0 m
K.B. to Ground:	8.35 m
Kelly Bushing:	625.15 m
Casing Flange:	m

Well Summary

Spud Date:	Jul 2, 2012 @ 20:30hrs
TD Date:	Sep 19, 2012 @ 22:15hrs
Rig Release Date:	
Contractor:	Patterson Drilling Rig #3.

Casing Summary

Type	Hole Size	Casing Size	Landed At
Conductor	mm	508 mm	28.2 m
Surface	444.5 mm	339.7 mm	374.6 m
Intermediate	311 mm	244.5 mm	1193.82 m

Drilling Fluid Summary

Fluid Type	From	To
Gel Chemical	0 m	377 m
Polymer PHPA	377 m	3132 m

Work Schedule

Contractor	Geologist	Log Interval	Dates Logged
Keitech Consultants Ltd	H. Gluth, P. Geo / T. Wall BSc Geol	28 m - 3132 m	Jun 28, 2012 - Sep 20, 2012

Remarks

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

SP (Mv) -300 -150 0
Drill Rate (min/m) 0 20 40
Gamma Ray (gapi) 0 75 150
MWD Gamma (gapi) 0 75 150
Total Gas - Linear (units) 0 125 250

Caliper Logs
Sonic DT

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

Density-Neutron
Density Correction
PEFZ

Density Porosity (%) 0.45 0.3 0.15 0-0.15
Neutron Porosity (%) 0.45 0.3 0.15 0-0.15
Density Correction (Kg/m3) 450 200 -50
PEF (b/e) 0 2.5 5 7.5 10

Mud Gas
Chromotography

C5 (Total Pentanes) (ppm) 1 10000
C4 (Total Butanes) (ppm) 1 10000
C3 (Propane) (ppm) 1 10000
C2 (Ethane) (ppm) 1 10000
C1 (Methane) (ppm) 1 10000

Array Induction

Shallow Induction AF20 (ohmm) 0.1 1000
Medium Induction AF30 (ohmm) 0.1 1000
Deep Induction AF60 (ohmm) 0.1 1000
Invaded Fm Resistivity (ohmm) 0.1 1000

Northern Cross Yukon
NCY McParlon A-25
300/A25 66-10 137-15/0

Date
Measured Depth
Slide - Rotate
MDT Data
Sidewall Core
Core
Test
Oil Show
Porosity Type
Porosity (%) 15 15 20
Interpreted Lithology
Grain Size (mm) c sand m sand f sand v f sand c silt
Sorting
Rounding

NB#1A Security KIS 11 TGP
Jul 3, 2012
28.8 m
Burnthill Creek (TVD: 28.80) (SSL: 596.35)
30 m
Losing mud to formation
40 m
50 m
Bit#1A Security KIS 11 TGP
34.80 / 12.25 hrs
Cond 1-1-NO-A-E-I-WT-BHA
NB#2A Smith 15JSC
60 m
Jul 4, 2012
70 m
Den 1030
Vis 95
WL 9
SPM 133
PP 7200
RPM 180
WOB 6
80 m
90 m
100 m

Burnthill Creek (TVD: 28.80) (SSL: 596.35)

450 200 -50

Commence Sample Examination Study @ 28mMD.

SS: lt gy, cons, s&p, slty - f u gred, sbang - sbrdd, ang ip, modly srt, / 40-50 % cht grs, calcs, carb, slly micas, arg, tr p vis intgran por, no cut flor.

SH: m gy, m brn gy, sbblky, micmica, slly montic, slly slty, carb or calcs.

SS: 10-15% of frags as uncons, sbang - sbrdd, f u - occly l m qtz grs, cons frags, lt gy, s&p ,v f l - v f u, , occly f l - f u gred, sbang - sbrdd, modly - w srt, arg, slly calcs, comly carb, slly micas or sidic, cons frags tt, tr p vis intgran por, predly tt, uncons gr por?, tr blk vit COAL.

SS: cons, s&p, lt gy, predly slty - v f u gred, occ f u - l m, or f l gred frags, sbang - sbrdd, modly - occly w srt, calcs, arg, locally / limonite or goethite, sid or rr hemic cmt, micas, tt, tr p vis intgran por, tr COAL.

SS: lt gy, rr frags / yel - orng limonite? arg cmt. s&p, predly slty - v f l gred, locally v f u gred, sbang - sbrdd, slly calcs & dolic, arg, micas, carb, tt, rr frags / abnt v f carb or coaly lam, tr COAL.

SS: cons, s&p, predly slty - v f u gred, < 20% of frags f l or rarely f u gred, modly srt, sbang - sbrdd, ang in pt, dolic, tr calc, comly arg, carb, micas,occ carb partings, tt, **no shows**

SS: cons, lt gy, s&p, slty - v f u gred, locally fl or v f l gred, sbang - sbrdd, modly srt, dolic, slly calcs, comly / gy arg cmt, micas, carb, no vis intgran por, **no cut flor**, locally fer cmt.

SS: cons, lt gy, s&p, predly slty - v f u gred, occly f l gred, rrr f u gred frags, predly modly srt, slty, arg, dolic, comly brit & fri, carb, micas, tt, no cut flor, tr COAL.

SS: cons, s&p, sbang - sbrdd, ang ip, slty - v f l gred, grdg ip to sdy sltst, occ fl gred frags, predly modly srt, arg, dolic, carb, micas, tt, **no shows**

SH: lt brn, lt - m brn gy, sb plty - blky, montic, occly slty & sdy, micmica, rr carb flks.

SH: lt gy, m brn, comly m - dk gy, sb plty - blky, micmica, occly slty & sdy, 5% as fracd ironstone or sid nods, / < 10% as lt gy, cons, s&p, dolic, arg, tt, sdy sltst & slty - v f l gred s&p ss frags.

SLTST: lt gy, sdy, s&p, dolic, slly carb, micas, sft, grdg ip to slty sh, tt **no shows**

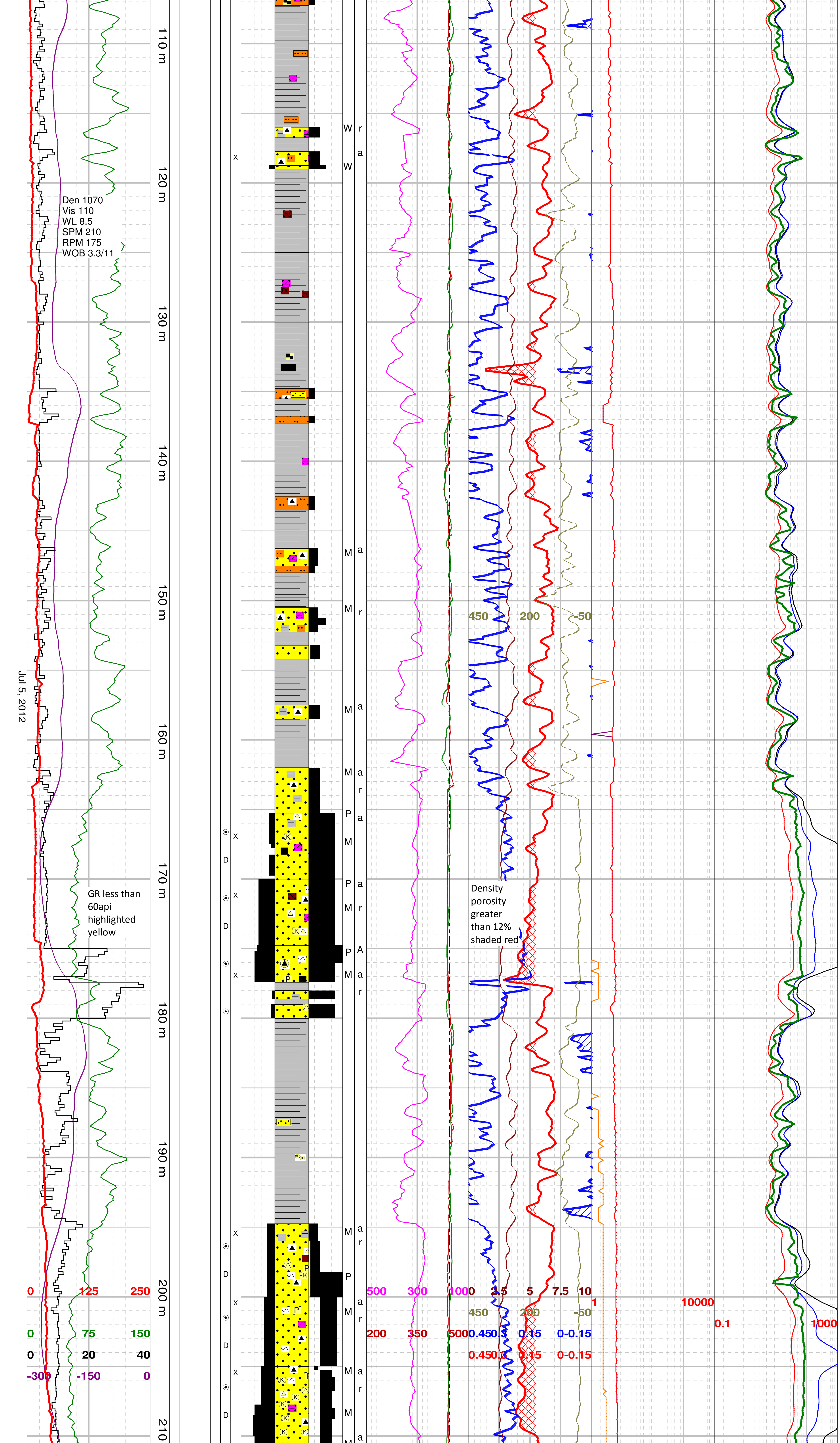
SS: lt gy, cons, s&p, slty - v f l, locally v f u gred or / floating v f u qtz & cht grs, modly srt, dolic, slly calcs, arg, carb, micas, tt.

SLTST: cons, s&p, sdy & ip grdg to slty - v f l gred, dolic, tt ss, / < 10% as slty - v f l, occly v f u gred, cons, s&p, arg, dolic, carb, micas, tt, ss frags.

SS: cons, s&p, slty - v f l, occly v f u gred, sbang - sbrdd, ang ip, modly srt, arg, dolic, carb, mica, tt, no show, 3% COAL, grdg ip to sdy sltst.

SS: cons, s&p, slty - v f l, occly v f u gred, grdg ip to sdy sltst, sbang - sbrdd, ang ip, modly srt, arg, dolic, micas, carb, tt, no shows, 3% COAL.

SLTST: lt gy, s&p, arg, dolic, comly sdy & locally grdg to slty - v f l gred, tt, ss, slly carb & micas.



grdg to slty - v f l gred, tt, ss, slly carb & micas.

SH: lt gy, comly m gy, m gy brn, sb plty - blky, micmica, comly slty, 3% as fracd sid or ironstone nods, 10% of frags v slty & grdg to arg sltst, rr, cons, s&p, slty - v f u, rr v f u gred, modly srt, arg, tt, s&p ss frags.

SH: m gy, m brn gy, sb plty - sbblky, micmica, comly slty, slly carb, / abnt fracd sid & ironstone nods.

SS: cons, s&p, lt gy, off wh, lt gy brn, predly slty - v f u gred, / < 5% of frags f l - f u gred, sbang - sbrdd, ang ip, modly srt, / < 35% cht grs, dolic, comly fri, micas, arg, carb, f u frags / traces of p intgran por, **no cut flor**, mtx por?

SH: m gy (dry), m brn gy, m brn (wet), sb plty - occly blky, micmica, comly slty, locally carb, rr montic frags, 6% as lt brn, fracd ironstone nods, tr lt gy, v f l - f l gred, modly srt, predly sbang - sbrdd, micas, tt, carb ss frags.

SH: 10% off wh, montic, predly m gy (dry) or m brn gy (wet), comly slty, sb plty - sbblky, micmica, dolic.

SH: m brn gy (wet), m gy dry, micmica, slly slty & slly montic, occ coal partings, / 15-20% as blk, vit, locally pyric COAL.

SLTST: lt gy, cons, s&p, arg, sdy, grdg ip to v f l gred, ss, dolic, arg, micas, tr v f l - v f u gred, sbang - sbrdd, modly - w srt, tt ss frags, abnt LCM in spl.

SH: lt - m gy, sb plty - sbblky, mcimca, lt gy frags comly montic, slly carb, & slty, m gy or m gy frags comly slty, tr fracd sid nods.

SLTST: cons, lt gy, m gy, sdy ip & grdg to v arg, v slty, v f l gred, ss, dolic, carb, micas, tt.

SS: cons, lt gy, s&p, predly slty - v f l gred, locally v f u - rr f l gred, modly - rr w srt, sbang - sbrdd, dolic, comly slty, arg, carb, tt, grdg ip to sdy sltst, **no shows**

SS: cons, s&p, lt gy, lt gy brn, v f l - v f u gred, rr f l - f u gred frags, sbang - sbrdd, comly slty, w - predly modly srt, dolic, arg, carb, micas, tt, **no shows**

SS: cons, s&p, lt gy, lt gy brn, sbang - sbrdd, slty - v f u gred, modly srt, carb, dolic, arg, micas, tt, **no shows,** post-trip spl.

SS: lt brn, cons, s&p, slty - v f u gred, modly srt, sbang - sbrdd, dolic, comly / gy, gy brn arg cmt, / lt & dk mica flks, slly carb & sidic, tt, **no shows**

SS: predly as uncons f l - u m, rr c l, sbang qtz & wh, blk, gy, rr gn cht grs, cons frags s&p, lt gy, v f u & grdg to u m gred, p - modly srt, fri, dolic, slly sils, locally / lt brn arg cmt, tr glau, rr COAL grs, slly kaoic & sidic, tr 1-4% intgran por, kao mtx por?, uncons gr por? **v slow gn flash cut flor**

SS: predly as uncons, ang - sbrdd, f l - u m, rr c l qtz & blk, wh, occly yel or brn cht grs, cons frags s&p, lt gy, lt gy brn, p - modly srt, / 50% or more cht grs, slly dolic, slly sils, fri - firm, patchy off wh or lt brn intgran kao, tr intgran bit, occ frags / 1- rr 10% vis intgran por, slly sidic, kao mtx por?, **v slow g gn flash cut flor**

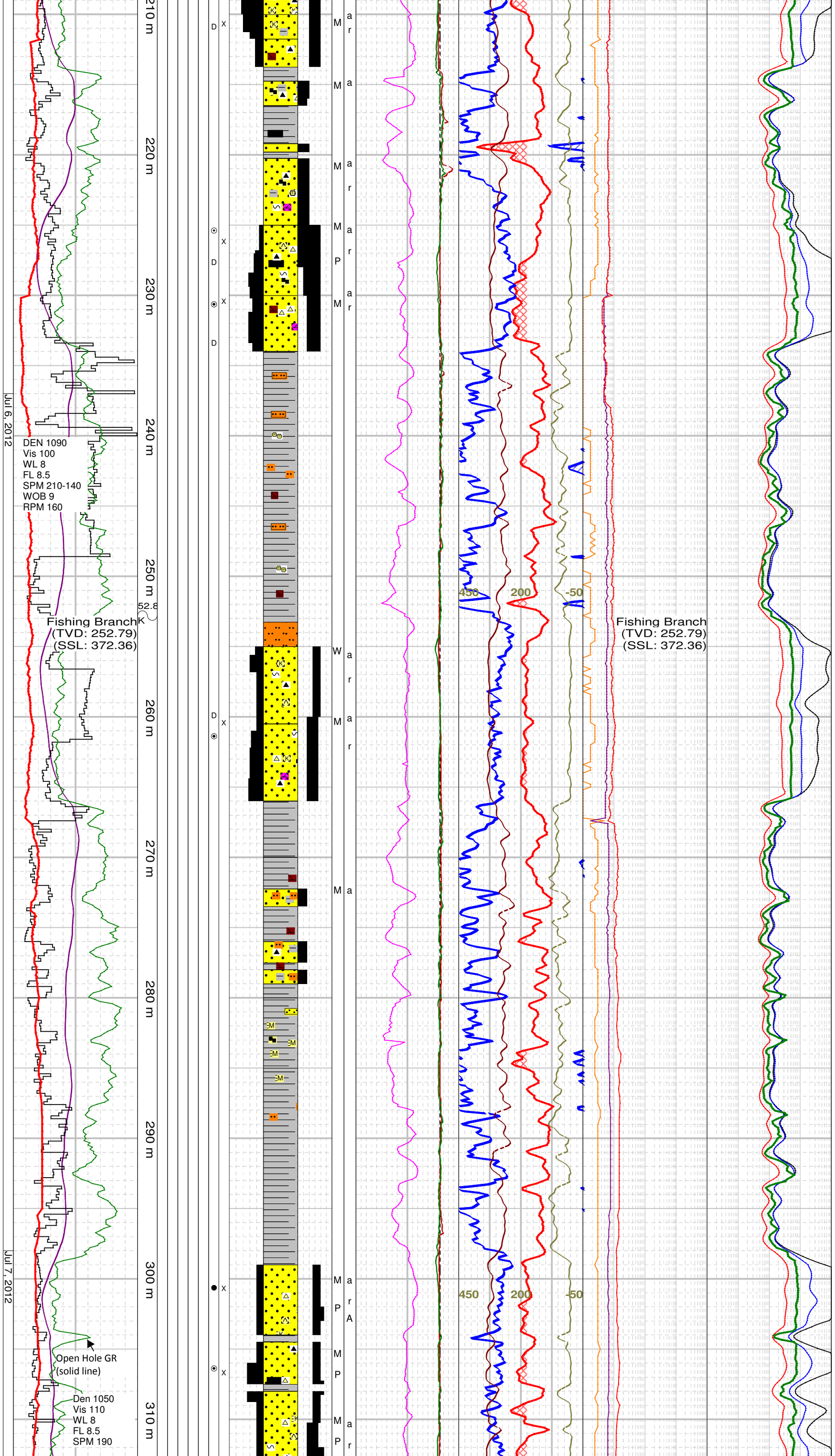
SS: predly as uncons f l - u m, occly c l qtz & cht grs & rr brn cht granules, cglic ip & mtx supported, cons frags s&p, lt gy, lt gy brn, f l - u m gred, ang - sbrdd, / 20-45% cht grs, modly - locally w srt, rr pyric worm burrows, rr coal grs, rr pyr, comly fri, slly sils, dolic, f gred frags / lt gy predly m brn arg cmt, rr kao, m gred frags / rr 1-12% blk bit plugged intgran por, slly sidic, occ 10-12% vis intgran por, 12-20% coal plugged intgran & kao plugged mtx por?, uncons gr por?, **v slow g gn flash cut flor**

SH: m gy dry, lt - m brn , m brn gy wet, montic, micmica, tr lt brn, lt gy, sdy sltst & slty ss frags.

SS: 10% as lt - m brn, cons, s&p, slty - v f l, grdg to v f l - f u gred, locally / flotg m qtz & cht grs, p - modly srt, dolic, micas, fri ss comly / lt gy brn arg cmt, / tr p vis intgran por, loclly / wh intgran kao, predly as uncons f l - u m, tr v c u qtz & vcol cht grs, sbang - sbrdd, rr wh kao rims, slly sidic, rr blk bit or carb rims, tr mas pyr, 6% kao plugged por, uncons gr por?, **slow gn flash cut flor**

SS: predly as uncons, f l - c u, sbang - sbrdd, qtz & wh, blk, brn, rr gn cht grs, cons frags slly dolic, slly sidic, slly sils, locally pyric, kaoic, scat 6, occ 9-12% vis & kao plugged intgran por, **v slow gn flash cut flor**

SS: as uncons, sbang - sbrdd, f l - m, tr c l qtz & vcol cht grs, gr comly / v f druse, cons frags, lt gy, s&p, / abnt cht grs, dolic, fri, slly sils, slly kaoic, sidic, occ 6-10 % intgran por, kao & blk bit plugged intgran por?, occ frags / 25 % kao plugged intgran por? uncons gr por?, **slow yel gn flash cut flor**, tr COAL.



por? uncons gr por?, **slow yel gn flash cut flor**, tr COAL.

SS: predly as uncons, sbang - sbrdd, f l - c l qtz & vcol cht grs, cons frags s&p, lt gy, lt gy brn, predly f l - f u, locly l m gred or / flotg c l cht grs, slly dolic, fri, carb, comly slty or / lt gy brn arg cmt, slly sils, p - modly srt, slly kaoic, scat 1-9% vis intgran por, **v slow gn flash cut flor**

SS: cons, s&p, lt gy, lt brn, sbang - sbrdd, slty - v f l gred, locly - v f u gred, w - modly srt, comly / lt brn arg cmt, slly micas, dolic, carb, tt. 10% blk COAL.

SS: lt gy, lt gy brn, cons, s&p, / <25% cht & carb grs, slty - v f u gred, occly f l gred, sbang - sbrdd, modly srt, slly dolic, slty, carb, micas, **bits or tarry &** / **slow gn flash cut flor,** occ frags / v f coaly lam, slly kaoic, no vis por, 35% as uncons, sbang - sbrdd, f u - l m qtz & cht grs, uncons gr por? q spl quality

SS: predly as uncons, sbang - sbrdd, occly ang, f u - u m qtz & vcol cht grs, cons frags s&p, lt gy, lt gy brn , / 20-40% cht grs, slty - u m gred, p - modly srt, slly dolic, sils, fri, slly micas, slly kaoic, carb, slly bits or tarry, abnt kao plugged, coal & mnr bit plugged por, occ 10% vis intgran por, **slow wk gn flsh cut flor**

SS: 50-60% of spl as uncons, sbang - sbrdd, f u - u m, rr c l, fri ip qtz & vcol cht grs, cons frags lt gy, lt gy brn, s&p, slly dolic & sidic, v f u - m gred, p - modly srt, kaoic, carb, sils, rr mas pyr, fldic?, locly / coal grs or / rr faint coaly laminations, occ 1-9% vis intgran por, kao mtx por?, / mnr blk bit or tar plugged intgran por, **slow yel gn flash cut flor,** 15% log por? (spl interval 230-235 m (md).

SH: 20% v lt gy - wh, sb plty, montic, slty, micmica, predly m brn, sb plty - occly blky, micmica, montic carb, 10% as fracd sid nods, slly dolic.

SH: predly m brn (wet), sb plty - sbblky, micmica, slty, rr montic frags, 25% v lt gy, more montic, micmica, slly slty, 3% fracd sid nods, tr lt brn gy, arg, cons, s&p, sdy sltst frags.

SH: 40% off wh gy, comly / abnt rdd f u - l m sid nods, montic, slly slty, predly m brn, sidic, slty, 7% lt gy, off wh, slty - v f l gred, comly fri ss & slty ss frags.

SS: predly as uncons, f u - u m, occly v f l - f l , rr c l, sbang - sbrdd, qtz & vcol cht grs, cons frags lt gy, slly dolic, / 40% dk cht grs & carb grs & flks, fri, slly sils, kaoic, fldic? illite?, grs crush to a fine powder, occ frags / 12% blk bit filled intgran por, occ 9% vis intgran por, kao mtx por?, **slow, g gn flash cut flor**

SS: predly as uncons, v f u - l m, rr u m, sbang - sbrdd, qtz & vcol cht grs, cons frags off wh, lt gy, / up to 50% cht grs, , predly v f u - l m gred, / rr floating u m cht grs, modly srt, frags crush to a f powder, fldic?, comly kaoic, slly sils, slly dolic, comly carb, or bits, rr mica flks, scat 1-9% vis & kao plugged intgran por, bit plugged intgran por?, **slow mod gn flash cut flor**

SH: m brn (wet), sb plty - sbblky, montic, micmica, tr fracd sid nods.

SS: lt - m gy, slty - v f l gred, modly srt, arg, micas, carb, v p gr relief, tt, no shows.

SID: as predly l m, rdd nods eroded from sh, occ frags of larger concretions., arg, locally carb.

SS: cons, lt gy, gy brn, slty - v f l gred, s&p & / <15% cht grs, sbang - sbrdd, slly carb, sidic, comly / lt gy arg cmt, micas, grdg to slty sdy sh, tt, no shows.

SH: m brn, lt - m brn gy, v montic, micmica, predly as cly minerals, slty ip, tr carb flks, occ coal lam, tr COAL, locally / l m rdd sid nods, 7% as gy brn, v arg, micas, slty - v f l gred, tt ss frags.

SH: 10-15% v lt brn, v montic, micmica, tr slt, predly m brn, sb plty - blky, comly slty, 25% as fracd sid nods, slly carb, rr m gy, v arg, slty - v f l gred, qtzs - s&p, micas, tt ss & sdy sltst frags.

SH: 7% v lt brn, sb plty, slly montic, slty or carb, predly m brn gy, sb plty - sbblky, micmica, occly slty or sdy, occ f rdd, clustered sid grs or more mas fracd sid nods

SS: predly as uncons, f l - u m, tr c l, sb ang - sbrdd, occly ang qtz & vcol cht grs, cons frags s&p, / comly 40-50% cht grs, comly off wh, lt gy, lt brn, p - modly srt, dolic, sidic, slly sils, **comly** / **m brn o? stnd arg cmt, slly bits,** 6-9% vis intgran por, kao mtx por?, **rapid mky yel gn flash cut flor**

SS: predly as uncons sbang - sbrdd, occly ang, f l - u m, occ c l, tr c u qtz & vcol cht grs, cons frags lt gy, occly lt brn & v kaoic, p - modly srt, / 40-50% cht grs, dolic, sils, sidic, slly carb, fri - occly firm, tr of 3-5% vis intgran por, spotty lt brn o stnd kaoic cly mtx, kao mtx plugged por?, **spy bri rapid yel gn flash cut flor**

SS: predly as uncons sbang - sbrdd, occly ang, f l - u m, occ c l qtz & vcol cht grs, cons frags lt gy, occly lt brn & v kaoic, p - modly srt, / 40-50% cht grs, dolic, sidic, carb, occ COAL grs, COAL ptgs or lam, sils, fri - occly firm, rr 12-15% vis intgran por, spy lt brn bit stnd kaoic cly mtx, kao mtx pltugged

SPM 190
PP 11500
RPM 180
WOB 14 dN

320 m
330 m
340 m
350 m
360 m
370 m
380 m
390 m
400 m
410 m

23.6
Kprk

Upper Parkin
(TVD: 323.59)
(SSL: 301.56)

131 u
113 u
107 u
146u

Scale Change
0
Bit#2A Smith 15JSC
314.00 / 52 hrs
Cond 2-2-SS-A-
-E-1-FC-TD
NB#1 Varel HE14JMRSV

Jun 14, 2012

MWD
Gamma
(Dotted
line)

DS 0.79° AZ 184.5°
TVD 391.98

DS 1.19° AZ 215.87°
TVD 401.48

DS 1.01° AZ 235.87°
TVD 410.77

0 125 250
0 75 150
0 20 40
0 75 150

X
D
X
D

P r A
A
M a P r A
M r
M r

P a
P a
P r

Upper Parkin
(TVD: 323.59)
(SSL: 301.56)

450 200 -50

NB: MWD gamma data and all gas, rop and lithology data f/377-1197mMD has been shifted to match to open hole log data.

Bit Size
Run 339.7mm SCsg

500 300 1000 0 2.5 5 7.5 10
450 200 -50
200 350 500 0.45 0.3 0.15 0-0.15
0.45 0.3 0.15 0-0.15

Badly washed-out hole. Poor open hole Density Porosity response.

Open hole logging data shown is corrected for the presence of barite in the drilling mud.

0 0.1 1000

lam, sils, fri - occly firm, rr 12-15% vis intgran por, spy lt brn bit stnd kaoic cly mtx, kao mtx pltugged por?, **slow bri mky yel gn flash cut flor,.**

SS: predly as uncons sbang - sbrdd, occly ang, f l - u m, occ c l, qtz & vcol cht grs, cons frags lt gy, off wh / comly <35% cht grs, v f u - l m gred, / occly u m - c l flotg qtz & cht grs, occ f u - l m gred frags, predly p - modly srt, dolic, sils, slly sidic, carb & / occ carb grs, fri - occly firm, m gred frags / traces of 6-9% vis intgran por, **spy lt brn o stnd kaoic cly mtx,** kao mtx pltugged por?, **spotty bri rapid yel gn flash cut flor**, 10% as fracd sid nods.

SS: predly as uncons sbang - sbrdd, occly ang, f l - u m, occ c l, qtz & vcol cht grs,tr dk cht grnls, locly as mtx supported cglic ss, cons frags lt gy, off wh, p - modly srt / 30-50% cht grs, dolic, sils, sidic, slly carb, fri, occ coaly ptg or coaly grs, scat 3-6, rr 12% vis intgran por, occ carb or coaly frags, slly bits, kao mtx plugged por?, **slow bri gn flash cut flor**.

SS: predly as uncons sbang - sbrdd, occly ang, f l - u m, occ - rr c l, qtz & vcol cht grs, cons frags lt gy ,off wh, comly lt brn & / abnt bit stnd kaoic mtx, comly v f u - f u gred, / fltg m - c l qtz & cht grs, rr f u - m gred frags, p - modly srt, 20-50% cht grs, dolic, sils, sidic, slly carb, fri, occ coaly ptgs or coal grs, cons frags comly tt, occ 6-12 %vis intgran por, slly bits, kao mtx plugged por?, **slow mod gn flash cut flor**

SH: 20% off wh, predly m brn, montic, micmica, tr slt & sd grs, 3% fracd sid nods.

SH: 10-15% lt gy, off wh, predly m brn, sb plty - sbblky, micmica, montic, tr slt & sd grs, occ carb flks, tr COAL.

SH: m brn, 15% lt gy, montic, sb plty - blky, micmica, comly slly, dism v f carb flks, 8% as fracd sid nods, tr COAL, 8% as uncons f u - u m qtz & vcol cht grs

SH: m brn, sb plty - blky, rr lt gy, montic, occly slty & sdy, 3% fracd sid nods, 3% COAL

SH: m brn, sb plty - blky, micmica, occ v f dism carb flks, slly montic, occ frags / abnt coaly lam, 7% off wh, lt gy, sb plty - blky, slty, sdy, 3% as fracd sid nods, 4% blk, locally pyric COAL.

SH: m brn gy, sb plty - blky, micmica, slly montic, comly slty & sdy, locally / carb flks, comly lt brn, sb plty - blky, comly slty & sdy, grdg ip to lt - m brn, v arg, predly qtzs ss & sltst, slly sidic, tr COAL.

SH: m brn, sb plty - sbblky, micmica, carb, slly montic, occ slty frags, 15% off wh, wh gy, sb plty - sbblky, montic, sft, slly slty, micmica, tr fracd sid nods, 7% m brn, qtzs, - s&p, slty - v f l gred, tt, v sidic ss frags, 10-15% as blk, dk gy, locly arg COAL

SLTST: m brn, w cons, grdg to vslty - v f l gred ss, slly dolic, sidic, v micas, carb, minor dk cht, rr blk or dk gray & v carb frags, dns & tt, 5% as fracd sid nods, 5% m - dk brn sh, 4% COAL.

COAL: bri vit lstr, cln, thn strgs & lam

SH: incrly dk gy, grdg - blk, incrly carb, coal lam, sbfis, nn calcs, occ pl rmn, slty lams, frm, w cpctd

SS: lt - m gy, predly qtz / com lits, fld & carb rk frags, tr glau, l - vfg, slty & arg ip, sbang - sbrdd, py srt, sil cmt, nn calcs, w ind, tt, no vis shw

SS: m gy, yelsh gy, vfg, slty ip, sbrdd, py srt, sil cmt, tt, arg ip, carb, nn - locly slly calcs, tr glau

SH: m gy, brnsh gy, sbfis - sbblky, nn - v slly calcs, occ slty lams, carb ip, scat pl rmn

SH: m - dk gy - brnsh gy, sbfis, nn - v slly calcs, slty lam, rr sdy lams, carb ip

SS: m - dk gy, vfg, slty & arg, tr calcs mat, tr glau, sbang, py srt, sil cmt, w ind, tt, carb

SLTST: m - dk gy, sdy ip, v slly calcs, carb, pl rmn

SS: lt - m gy - yelsh gy, qtzs, vfg, grdg - c sltst, occ l f gred arg lams, sbrdd, modly srt, sil cmt, s tr sec calc, s tr glau, w ind, tt

SH: dk gy, sbfis, carb, blk carbz pl rmn com thru, nn

DS 1.49° AZ 259.6°
TVD 420.1

420 m

DS 1.89° AZ 278.89°
TVD 429.56

430 m

DS 2.68° AZ 286.89°
TVD 438.99

440 m

DS 3.6° AZ 294.27°
TVD 448.44

450 m

DS 4.7° AZ 299.5°
TVD 457.73

460 m

DS 5.71° AZ 305.56°
TVD 467.04

470 m

DS 6.9° AZ 304.86°
TVD 476.32

480 m

DS 8.31° AZ 308.38°
TVD 485.54

490 m

DS 9.32° AZ 310.09°
TVD 494.74

500 m

DS 10.11° AZ 308.2°
TVD 503.72

510 m

DS 11.6° AZ 310.57°
TVD 513.2

Jul 15, 2012

P r

P a

P r

P r

P r

Den 1030
Vis 40
FL 8.5
pH 9

WOB 11.0
RPM 50+
PP 7100
PO 2.81

450 200 450

WOB 21.0
RPM 30+
PP 8900
PO 2.83

150 200 -50

SH: dk gy, sbfis, carb, blk carbz pl rmn com thru, nn calcs

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

SH: m - dk gy, sbfis, slty, carb, nn calcs

SS: lt - m yelsh gy, yelsh brn, vfg, qtz / com lits & com - abnt carb mat, sbrdd - sbang, py srt, w ind, tt, tr glau

SH: m - dk gy, gysh brn ip, sbfis, nn calcs, com pl rmns, rr slty lam

SH: m - dk gy - brnsh gy, sbfis, nn calcs, carb ip, rr slty lam, pl rmn, jtg com

COAL: vit - dull lstr, arg ip, thn strgs

SH: m - dk gy, dk brnsh gy ip, sbfis, nn calcs, carb, com carbz pl rmn, sdy & slty strgs

SS: lt - m yelsh gy - yelsh brn, qtz / com cht & abnt lt - dk lits, tr glau, predly vf - l f gred, locly grdg - u f gred, sbang - sbrdd, py srt, sil cmt, s tr sec calc cmt, w ind, tt, carb frags

COAL: modly vit lstr, arg ip, brit, occ flotg sd & slt grs, scat pyr bleb

SLTST: m - dk gy, m yelsh brn - yelsh gy ip, sdy ip, nn calcs, locly carb

SLTST: m - dk gy - brnsh gy, sdy ip, nn calcs, carb, tr glau

SH: predly dk gy, locly m - dk gysh brn, fis - sbfis, nn calcs, carb, pl rmn, slty strgs

SS: lt - m brnsh gy, lt yelsh brn ip, vfg, slty & arg ip, qtz / mnr cht & com - abnt lits, com carb frags, sbrdd, py srt, sil cmt, w ind, tt

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

SS: lt - m yelsh brn - yelsh gy, vfg, qtz / com lits, tr - mnr cht, tr glau, com carbz pl rmn, vf - l f gred, slty ip, sbrdd, py srt, sil cmt, w ind, tt, **no vis shw**

SLTST: m - dk gy, yelsh brn, sdy ip, occ sdy lams, nn calcs, carb, pl rmn

SH: dk gy, sbfis, mnr m - dk gysh brn blky sh, nn calcs, occ slty strgs, tr coal, carb, pl rmn

SH: dk gy, occ blk coaly strgs, sbfis, nn calcs, carb, slty & sdy strgs, tr pyric coal

SS: lt - m gy, brnsh gy, qtz / com lits & carb frags, vfg, slty ip, sbrdd, py srt, sil + mnr calc cmt, w ind, tt, carb

SLTST: m - dk gy, brnsh gy, sdy ip, carb, slly calcs

SH: dk gy, occ blk coaly strgs, sbfis, nn calcs, carb, slty & sdy strgs, tr pyric coal

SLTST: m - dk gysh brn, c, sdy ip, carb, tr pyr, slly calcs, occ sdy lams

SH: dk gy, dk brnsh gy, sbfis, carb, nn calcs

DS 12.61° AZ 309.78°
TVD 522.46

DS 14.19° AZ 309.96°
TVD 531.35

DS 15.29° AZ 307.37°
TVD 540.46

DS 16.3° AZ 306.4°
TVD 549.6

DS 16.7° AZ 305.78°
TVD 558.85

DS 17.09° AZ 305.7°
TVD 568.13

DS 17.49° AZ 306.8°
TVD 577.4

DS 17.71° AZ 304.29°
TVD 586.76

DS 17.89° AZ 302.18°
TVD 595.85

DS 18.02° AZ 301.7°
TVD 605.01

DS 18.41° AZ 302.58°

520 m 530 m 540 m 550 m 560 m 570 m 580 m 590 m 600 m 610 m

S

D x M r M a P a M r D x D x M a M r D x M r D x M r D x M r D x M r D x M r D x M r D x M r D x M r

0 75 150 0 20 40 132u 0 75 150

500 300 1000 2.5 5 7.5 10 1 10000 0.1 1000

450 200 -50

200 350 500 0.45 0.3 0.15 0-0.15

0.45 0.3 0.15 0-0.15

WOB 15.0
RPM 30+
PP 9200
PO 2.80

Den 1060
Vis 45
FL 7.5
pH 9.5

WOB 12.0
RPM 50+
PP 9600
PO 2.83

WOB 10.0
RPM 70+
PP 9600
PO 2.83

SH: dk gy, dk brnsh gy, sbfis, carb, nn calcs

SLTST: m - dk gysh brn, f - c occ vfg sdy lam, carb, slly calcs, pl rmn

SH: incrly dk gy & carb, sbfis, nn calcs, com pl rmn, tr pyric coal, slty strgs

SS: lt - m yelsh brn, m - dk gy ip, vfg, grdg - c sltst, sbrdd, modly srt, sil + tr sec calc cmt, w ind, tt - v wk por (0-3%), **tr lt amb resdl o stng, v wk slow hazy dd o cut**

SS: lt - m gy, brnsh gy, s&p, qtz, mnr cht & abnt dk lits, predly vf - l f gred, 3-5% u f gred, sbang - sbrdd, mod - py srt, cng down, sil + mnr sec calc cmt, p por (3-6%), com ptch lt amb resdl o stng, ptch blk bit cmt, **no vis flor, slow wk hazy dd o cut,** s tr glau

SLTST: m gy - yelsh gy, sdy ip, slly calcs, slly bits, tt, slow wk hazy dd o cut

SS: lt - m brnsh gy, s&p, vf - u f gred, 2-3% l m gred, qtz, cht & abnt dk lits, sbang - sbrdd, mod - py srt, sil + mnr sec calc cmt, ptch blk bit cmt, 4-8% por, **com lt amb resdl o stng, no vis flor, wk slow hazy dd o cut**, rr bri gr glau gr

SH: m - dk gy, dk brnsh gy ip, sbfis, slty ip, carb, nn calcs

SLTST: m - dk gysh brn, yelsh brn, f - c, slly calcs, slly bits, locly grdg - vfg ss

SH: predly dk gy, m gysh brn ip, sbfis, locly slty, carb, nn calcs

SS: lt - m yelsh gy - yelsh brn, qtzs / mnr lits, carb frags, s t glau, vfg, grdg - c sltst, sbrdd - sbang, modly srt, sil + tr - mnr sec calc cmt, w ind, tt, **no vis flor, wk hazy dd o cut**

SS: lt - m yelsh brn, qtzs / mnr lits, s tr glau, vfg, c slt ip, sbrdd, modly w srt, sil + mnr sec calc cmt, modly w ind, fri ip, tt - p por (0-5%), **lt amb resdl o stg com thru, slow wk blomg dd o cut**

SLTST: m - dk gysh brn - brnsh gy, sdy ip, slly bits, slly calcs, carb ip

SH: dk gy, sbfis, nn calcs, locly slty, carb

SLTST: m - dk yelsh brn, sdy ip, slly bits, slly calcs

SS: lt yelsh brn, qtzs, vfg, rr l f gred lams, tr - mnr lits, s tr glau, sbrdd, modly srt, sil + tr sec calc cmt, **wk resdl o stng, wk dd o cut**, tt

SH: dk gy, locly v dk gy & incrly carb, occ coaly lam, pl rmn, slty strgs

SS: lt yelsh brn, qtzs / mnr lits, tr glau, com carb frags, vf - l f gred, slty ip, sbrdd, mod srt, sil cmt, w ind, tt - vp por (0-4%), **ptch lt brn resdl o stng, no vis flor, v slow wk dd o cut**

SLTST: m - dk yelsh brn, sdy ip, carb, nn calcs

DS 18.41° AZ 302.58°
TVD 613.97

620 m

DS 18.5° AZ 302.58°
TVD 622.99

630 m

Bad MWD gamma

DS 18.28° AZ 302.58°
TVD 631.62

640 m

DS 18.3° AZ 300.3°
TVD 639.91

650 m

DS 18.7° AZ 299.9°
TVD 648.25

660 m

DS 18.98° AZ 298.97°
TVD 657.58

670 m

DS 18.41° AZ 298.67°
TVD 666.38

680 m

DS 18.11° AZ 298.58°
TVD 675.45

690 m

DS 17.8° AZ 300.29°
TVD 684.37

700 m

DS 17.4° AZ 297.87°
TVD 693.55

710 m

DS 17.18° AZ 294.97°
TVD 702.71

720 m

Jul 16, 2012

PO 2.83

450 200 -50

WOB 10.0
RPM 60+
PP 9780
PO 2.83

450 200 -50

SLTST: m - dk yelsh brn, sdy ip, carb, nn calcs

SH: dk gy, sbfis, slty ip, carb, nn calcs

SH: dk gy, fis - sbfis, locly slty, carb

SS: lt - m yelsh gy, qtzs / com lits & blk carb frags, vfg, c slt ip, sbrdd, modly srt, w ind, tt - locly p por, tr bit cmt, **ptch fnt resdl hydc stng, no vis flor, slow wk hazy dd o cut,** s tr glau

SH: dk gy, fis - sbfis, locly slty, carb

SLTST: m - dk gy, gysh brn, sdy ip, v slly calcs, slly bits

SS: lt - m yelsh gy, occly yelsh wh, qtzs / mnr - com lits & carb frags, s tr glau aa, vfg - c slt, sbrdd, modly srt, sil + tr sec calc cmt, tr ptch bit cmt, w ind, tt - v p por (0-3%), **no vis flor, wk slow hazy dd o cut**

SLTST: m gy - gysh brn, sdy, arg, slly bits, slly calcs, carb ip

SH: dk gy - dk brnsh gy, sbfis, locly slty, carb, nn calcs

SS: lt yelsh brn - yelsh gy, qtzs, mnr lits & tr glau aa, vfg, sbrdd, modly srt, sil + tr calc cmt, tt, **tr lt amb o stng aa, wk hazy dd o cut**

SH: dk gy - v dk gy, sbfis, locly slty / tr glau, carb, locly pyric, nn calcs, w cpctd, frm, jtg com

SH: dk gy, dk brnsh gy, sbfis, nn calcs, occ slty strgs, carb

SS: lt yelsh brn, qtzs / tr - mnr lits, occ carb frags, tr - mnr ptch blk bit cmt, p - vp por (2-5%), **dull yel flor, slow blomg cut, p - q shw**

SH: dk gy, sbfis, carb, locly slty

SS: lt - m yelsh brn, qtzs / mnr lits, tr glau, tr carb mat, sil + tr bit cmt, w ind, tt, **wk dd o cut**

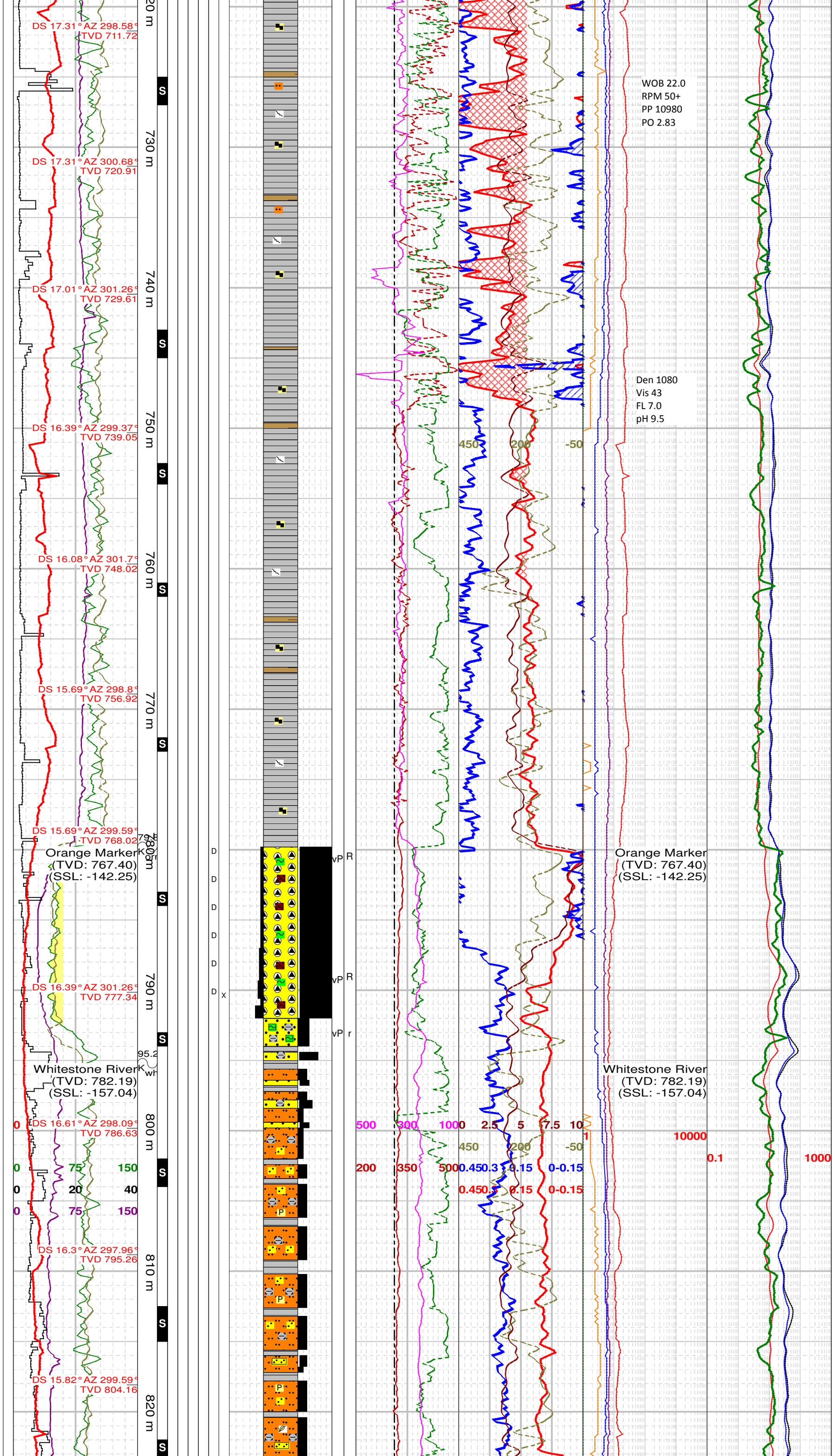
SLTST: m - dk gysh brn, sdy ip, nn calcs

SH: dk gy - v dk gy, sbfis, occ slty & sdy lams, carb, nn calcs

SH: dk - v dk gy, bcmg blk, sbfis - fis, locly slty ip, nn calcs, occ slty lams, com jtg

SH: dk - v dk gy, bcmg blk, sbfis - fis, locly slty ip, nn calcs, occ slty lams

SH: predly dk - v dk gy, bcmg blk, fis - sbfis, occ thn m - dk gysh brn blky strgs, nn calcs, carb ip, com jtg



SH: predly dk - v dk gy, bcmg blk, fis - sbfis, occ thn m - dk gysh brn blky strgs, nn calcs, carb ip

SH: predly dk - v dk gy, bcmg blk, fis - sbfis, occ thn m - dk gysh brn blky strgs, nn calcs, carb ip, com jtg

SH: predly dk - v dk gy, bcmg blk, fis - sbfis, occ thn m - dk gysh brn blky strgs, nn calcs, carb ip

SH: v dk gy - blk, sbfis - fis, nn calcs, carb

CHT PBL CGL: m - dk gy, ptch gnsh yel & gn mtx, predly blk, gy & brn cht / mnr qtz & sils cls in a py srt dk sils glauic & sidic mtx, c grnls - pbls, w rdd & pold cls, tt - q por, **no vis flor, tr resdl hydc, wk hazy cut, vp - q dd o shw**

SS: dk gy - blk, vfg, slty arg mtx, com - abnt glau thru, sils, slly calcs, w ind, tt, **no vis shw**

SH: dk gy, sbfis - sbblky, nn calcs, carb

SLTST: dk gy - blk, sdy ip, grdg - vfg slty arg ss, dk gy arg mtx, locly pyric, calcs, slly bits, no vis flor, wk cut, occ f gred arg sdy lams, 5 - 10% cglic deb

SH: dk gy - blk, sbfis - sbblky, nn calcs, carb, frm

SLTST: dk gy - blk, sdy ip, grdg - vfg slty arg ss, dk gy arg mtx, locly pyric, calcs, slly bits, no vis flor, wk cut, occ f gred arg sdy lams, 5 - 10% cglic deb

DS 14.81° AZ 297.48°
TVD 813.91

830 m

DS 14.81° AZ 297.57°
TVD 822.22

840 m

DS 15.51° AZ 298.49°
TVD 831.68

850 m

DS 15.91° AZ 297.48°
TVD 839.58

860 m

Jul 17, 2012

DS 16.08° AZ 294.27°
TVD 850.25

870 m

DS 15.91° AZ 294.44°
TVD 856.26

Bit#1 Varel HE14JMRSV
504.00 / 56 hrs
Cond 2-2-WT-A-
-F-4-NO-TQ

NB#2 Smith GFi23BODVC

880 m

Jul 18, 2012

DS 15.82° AZ 292.5°
TVD 866.66

890 m

DS 16° AZ 291.01°
TVD 875.01

135R

900 m

DS 16.44° AZ 288.2°
TVD 884.17

135R

910 m

DS 16.79° AZ 285.65°
TVD 893.43

135R

920 m

DS 16.96° AZ 282.57°
TVD 902.53

vP a

vP a

vP a

450 200 -50

WOB 22.5
RPM 30+
PP 11650
PO 2.83

Den 1130
Vis 44
FL 7.5
pH 9.0

Trip for bit

WOB 24.0
RPM 20+
PP 13000
PO 2.80

450 200 -50

Den 1160
Vis 42
FL 7.0
pH 8.5

SLTST: dk gy - blk, sdy ip, nn - slly calcs, dk arg mtx, pl frags, sdy lams

SH: dk gy - blk, sbblky, slty, nn calcs, carb

SLTST: dk gy - blk, sdy ip, nn - slly calcs, dk arg mtx, pl frags, sdy lams

SH: dk gy - dk brnsh gy, sbblky, nn calcs, carb, slty ip

SLTST: dk gy - dk brnsh gy, sdy ip, carb, slly calcs, tr pyr, tr glau

SH: dk gy, sbfis, slty, nn calcs, carb

SLTST: dk gy, sdy, v slly calcs, scat m dk yelsh brn plcy frags

SS: m - dk gy, dk gnsh gy, vfg, slty & arg mtx, sbang - sbrdd, py srt, pyric, w ind, hd, sil + pyr cmt, tt, com - abnt glauic + pyr cmt, ptch mas pyr

SH: dk gy - dk brnsh gy, blky, nn calcs, slty ip, w cpctd, frm

SLTST: dk gy - dk brnsh gy, sdy, slly calcs, carb, glauic, scat plcy frags

SS: m - dk gy, dk gnsh gy, vfg, slty & arg mtx, sbang - sbrdd, py srt, pyric, w ind, hd, sil + pyr cmt, tt, com - abnt glauic + pyr cmt, ptch mas pyr

SLTST: dk gy - dk brnsh gy, sdy, slly calcs, carb, glauic, scat plcy frags

SLTST: dk gy, nn - slly calcs, carb ip, dk gy mtx, thn lams

SH: dk gy, fis - sbfis, nn calcs, slty ip, slly carb, loc toc, comly / jtg @ hi angle to bdg

SLTST: dk gy, nn - slly calcs, tr glau, carb ip, dk gy mtx, thn lams

SH: incrly dk gy, fis - sbfis, predly nn calcs, occ lam are slly calcs, slty ip, occ slty lams, occ pl rmn, incrg toc, tr scat pyr nods, jtg com

SH: dk gy, fis - sbfis, nn calcs, slty ip, carb ip, jtg com, scat plcy frags, occ lt - m yelsh brn slly calcs blky lams, rr pyr

135R
DS 16.61° AZ 282.48°
TVD 911.95
930 m

135R
DS 16.61° AZ 282.31°
TVD 921.27
940 m

WOB 14.0
RPM 30+
PP 12800
PO 2.81

135R
DS 16.52° AZ 281.78°
TVD 930.64
950 m

450 200 -50

SH: dk gy, fis - sbfis, slty ip, nn calcs, rr slty glauic strg, occ plcy frags, occ lt - m yelsh brn slly calcs blky strgs, slly dolic

180R
DS 16° AZ 281.78°
TVD 938.7
960 m

135R
DS 15.47° AZ 282.04°
TVD 947.56
970 m

WOB 18.0
RPM 30+
PP 13150
PO 2.83

SH: dk gy, sbfis, nn calcs, carb ip, tr pyr, occ slty lams, scat plcy frags, occ lt - m yelsh brn slly calcs blky lams aa

100R
DS 15.47° AZ 282.04°
TVD 956.91
980 m

SH: dk gy, sbfis, nn calcs, occ slty lam, rr plcy frags, com jtg, s tr pyr, carb

Jul 19, 2012

DS 15.91° AZ 282.66°
TVD 965.96
90R
990 m

SH: dk gy, fis - sbfis, slly calcs, occ slty lams / tr glau, s tr pyr, carb, pl rmn

DS 16.44° AZ 283.1°
TVD 975.17
90R
1000 m

0 125 250
500 300 100
0 2.5 5 7.5 10
1 10000
450 200 -50
0 75 150
200 350 500
0.45 0.3 0.15 0-0.15
0.1 1000
0 20 40
0.45 0.3 0.15 0-0.15

SH: dk gy, fis - sbfis, slty ip, carb, pl rmn, tr pyr, jtg com, occ lt - m yelsh brn blky calcs lams

0
DS 16.88° AZ 281.96°
TVD 984.61
110R
1010 m

PreCretaceous Unc
(TVD: 989.91)
(SSL: -364.76)

SH: dk gy, sbfis, slly calcs, slty ip, carb ip

DS 17.31° AZ 282.84°
TVD 993.46
110R
1020 m

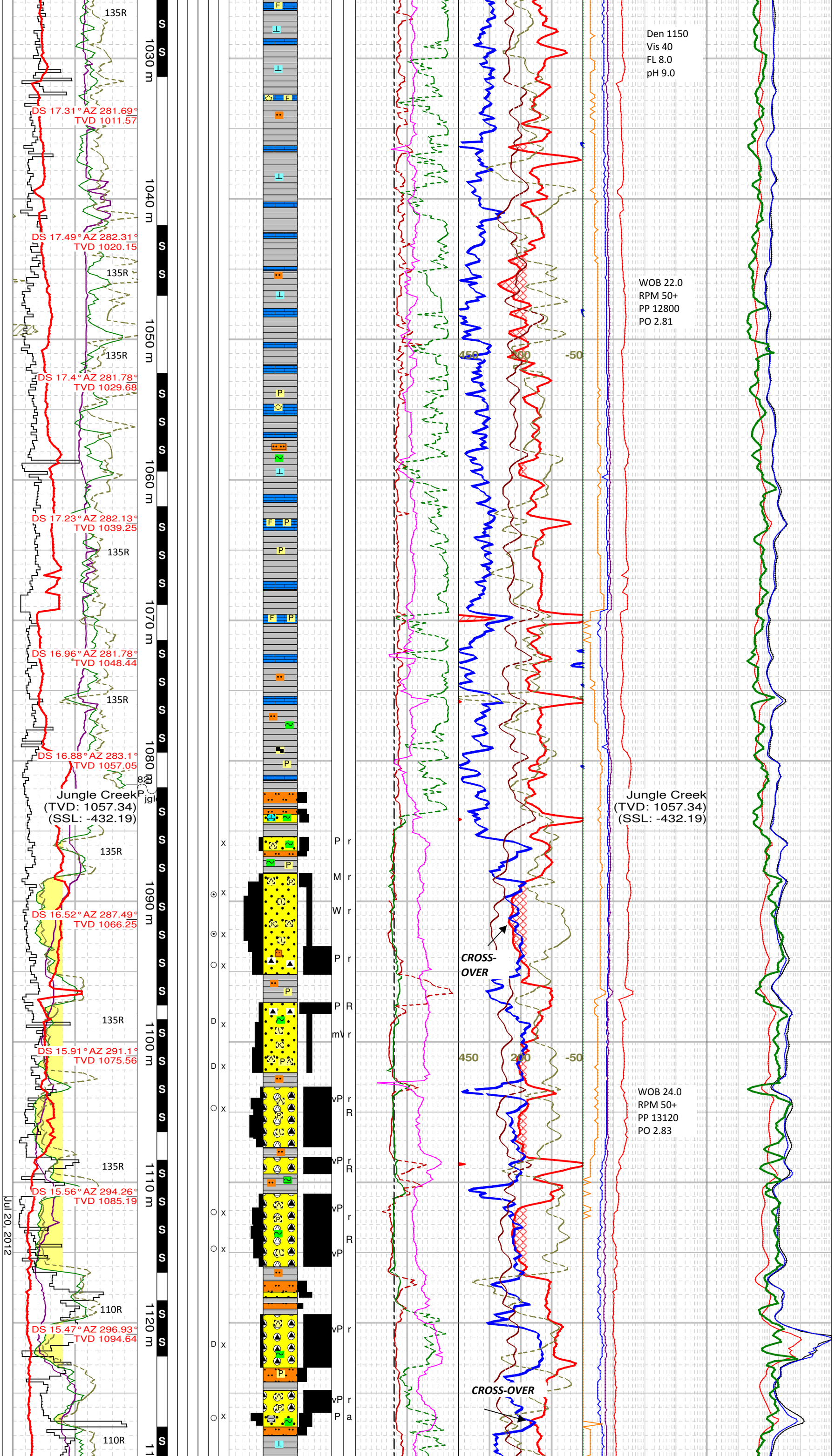
PreCretaceous Unc
(TVD: 989.91)
(SSL: -364.76)

LS: lt - m yelsh brn, m gy, blky, arg, crpxl, pyric, rr shl frags

LS: m - dk brnsh gy, lt yelsh brn ip, arg, dns, tt, com yelsh amb gly fos frags, thn bdd, tr pyr, tr c gred dk cht in dk gy arg slly calc mtx

DS 17.31° AZ 283.36°
TVD 1002.42
135R

SH: dk gy, dk gnsh gy ip, sbfis, slly calcs, slty, tr pyr



LS: lt - m yelsh brn, m gy, blky, arg, crpxl, pyric, rr shl frags

SH: dk gy, sbfis, slly calcs, slty ip, occ thn limy strgs

LS: m - dk gy - dk brnsh gy, crpxl, arg, dns, tt, rr fos frags, thn beds

SH: dk gy, sbfis, slly calcs, occ ls strgs, locly slty, tr pyr

LS: m - dk yelsh brn - brnsh gy, blky, crpxl, arg, dns, tt, locly pyric, chty, tr - mnr gy cht frags

SH: dk gy, sbfis, slly calcs, locly slty / tr glau, tr pyr, carb ip

LS: m - dk gy - gysh brn, occ lt yelsh brn fos frags (crins), locly pyric, tt

LS: m - dk gy - gysh brn, occ lt yelsh brn fos frags, locly pyric, tt

LS: m - dk gysh brn, com lt - m amb cold gly fos frags, arg, tt

SH: dk gy, sbfis, slly calcs, locly slty / tr glau, tr pyr, carb ip

SS: lt - m yelsh brn, vfg, slty ip, sbrdd, py srt, sil + tr - mnr calc cmt, mnr glau, w ind, hd, tt

SH: dk gy, sbfis, slly calcs, locly slty / tr glau, tr pyr, carb ip

SS: wh - lt yelsh brn, lt gy ip, qtzs / com wh intstl kaoic cmt, predly u vf - l f gred, sbrdd, mod - w srt, sil + kao + 2-4% bit cmt, sil ovgths, p - locly fr intgran por (6-12%), mnr vf - slty grs, 2-3% c dk cht grnls / sil + pyr cmt, **spy fnt lt amb resdl o stng, spy dull yel flor, modly fast stmg cut**

SH: dk gy, sbfis, nn calcs, slty, pyric, carb ip

PBL SS: lt - m gy - slly brnsh gy, qtz / com - abnt gy & brn cht cls, occ flotg grnls - s pbls, tr glau, tr pyr, sbrdd, mod - py srt, sil cmt, ptch wh kaoic cmt, **mnr - locly com intstl bit cmt, p por (3-6%), spy dull flor, wk cut**

CHT PBL CGL: m - dk gy, s&p ip, predly dk gy, dk brn & gysh brn cht, mnr lt yelsh brn sils cls & qtz, slty - l m gred sdy mtx, sil + pyr + tr bit cmt, sil ovgths, pyr fills chaotic micfracs, ptch wk - locly fr por (3-9%), **tr fnt yelsh gn flor, modly fast blomg & stmg cut**

CHT PBL CGL: m brn - gysh brn, predly lt brn, yelsh brn & lt - m gysh brn cht, com dk gy cht, vf - m gred sdy mtx, sbrdd - rdd, py srt, sil + tr - mnr pyr cmt, tt - p por (0-6%), occ euhed qtz xls, tr glau, **tr bit, spy v dull yelsh gn flor, wk hazy cut**

SH: m - dk gy, blky - sbfis, nn calcs, slty ip

SLTST: m gysh brn, sdy, pyric, nn calcs, locly grdg - vfg arg ss

CHT PBL CGL: off wh, lt brn & dk gy cht pbls in a m gy s&p l f - u m gred sdy mtx, sbrdd, py srt, sil cmt, w ind, p - locly fr intgran por (4-10%), t**r intstl bit, tr fnt dull yelsh gn flor, wk hazy cut,** tr glau

CHT PBL CGL: dk gy, abnt dk gy - blk cht thru, m gy arg slty - u f gred sdy mtx, sil + mnr pyr cmt, s tr bit, tt - p por, **no vis shw**

110R
DS 15.29° AZ 299.1°
TVD 1103.68
1130 m
DS 15.21° AZ 299.27°
TVD 1112.88
1140 m
DS 15.38° AZ 298.04°
TVD 1122.37
1150 m
DS 15.29° AZ 297.6°
TVD 1131.51
1160 m
135R
DS 14.77° AZ 296.28°
TVD 1140.39
1170 m
DS 14.5° AZ 296.37°
TVD 1149.84
Ettrain
(TVD: 1151.20)
(SSL: -526.05)
1180 m
DS 14.24° AZ 295.23°
TVD 1153.23
90R
1190 m
Bit#2 Smith GFi23BODVC
316.00 / 48.5 hrs
Cond 2-3-BT-S-
-E-1-FC-TD
80R
NB#3RR Smith FH121B OD1
Aug 3, 2012
DS 13.71° AZ 298.84°
TVD 1173.41
1200 m
Blackie
(TVD: 1180.15)
(SSL: -555.00)
DS 13.71° AZ 299.19°
TVD 1182.48
1210 m
DS 13.54° AZ 298.67°
TVD 1192.37
1220 m
100 u
DS 13.36° AZ 301.13°
TVD 1200.66
1230 m

P r
vP r
x
450 200 -50
Den 1150
Vis 43
FL 8.0
pH 8.5
WOB 26.0
RPM 50+
PP 14000
PO 2.83
Ettrain
(TVD: 1151.20)
(SSL: -526.05)
Run 244.5mm Csg
500 300 1000 0 2.5 5 7.5 10
450 200 -50
200 350 500 0.45 0.3 0.15 0 -0.15
0.45 0.3 0.15 0 -0.15
10000
0.1 1000
Blackie
(TVD: 1180.15)
(SSL: -555.00)
Den 1125
Vis 45
pH 10
WOB 4/12
SPM 102
SPP 3415 KPa
Work Tight Hole
Den 1130
Vis 45
pH 9.5

tt - p por, **no vis shw**

SH: dk gy, sbbly - sbfis, slly calcs, slty ip

SLTST: lt - m gysh brn, sdy ip, nn calcs, tr pyr, occ inoc frag pres / arag

SS: m gy - gysh brn, qtz / com gy cht & mnr - com bri gn glau, pyric, vf - u f gred, slty & arg, sbrdd, py srt, sil cmt, tt, **no vis shw**

SS: m gysh brn, vfg, slty & arg, com bri gn glau, sbang - sbrdd, py srt, calc cmt, tt, **no vis shw**

SH: m - dk gy, fis - sbfis, slly calcs, slty, pyric

SLTST: m - dk gy - gysh brn, sdy ip, calcs, pyric, occ inoc frags pres / arag

SH: dk gy - brnsh gy, fis - sbfis, slty ip, calcs, occ inoc frags

SS: m yelsh brn - brnsh gy, vfg, slty & arg, sbrdd, py srt, calc cmt, tt, com arag fos frags (inoc), tr glau, locly / mas pyr cmt

CHT PBL CGL: dk gy, abnt dk gy & brn cht & mnr qtz, grnls - pbls, f - l m gred sdy mtx, sbrdd, py srt, sil + mnr pyr cmt, tr glau, p - locly fr por, **no vis shw**

SS: lt - m gysh brn, vf - f gred, slty & arg ip, sbrdd, py srt, calcs cmt, w ind, com - abnt bri gn glau, tt, **no - q shw**

SLTST: lt - m brnsh gy, sdy, calcs

SS: lt - m gysh brn, vf - f gred, slty & arg ip, sbrdd, py srt, calcs cmt, w ind, com - abnt bri gn glau, tt, **no vis shw**

CHT PBL CGL: dk gy, abnt dk gy & brn cht & mnr qtz, grnls - pbls, f - l m gred sdy mtx, sbrdd, py srt, sil + mnr pyr cmt, tr glau, p - locly fr por, **no vis shw**

SLTST: m - dk brnsh gy, sdy, calcs, tr glau

PBL SS: lt - m yelsh brn, s&p, u f - m gred, com - abnt dk gy cht grnls - pbls, sbrdd, py srt, sil + calc cmt + pyr cmt, **no vis shw**

SH: dk gysh brn, sbfis - sbblky, slty, tr glau, tr pyr, calcs

LS: ip lt yelsh brn - yelsh wh & relatively cln, ip dk gysh brn & arg thru, crpxl, foss (brac shl frags & spns, occ crin deb), dns, tt, Brac Wkest

SH: dk gy - brnsh gy, sbblky, calcs, intbd arg ls

LS: predly dk gysh brn - brnsh gy, 10% lt - m yelsh brn, foss, scat bracs, rr crin frags, chty, com spics, dns, tt, Brac Wkest

LS: lt brn, off wh, comly mottled, comly / m brn arg mtx or / sh or mrly partings, ip cht replaced, arg, crin, brac wkest - pkst rr mdst, occ glau grs, locally fri or chky, rr sd grs, tt, no shows, abnt cmt in spl.

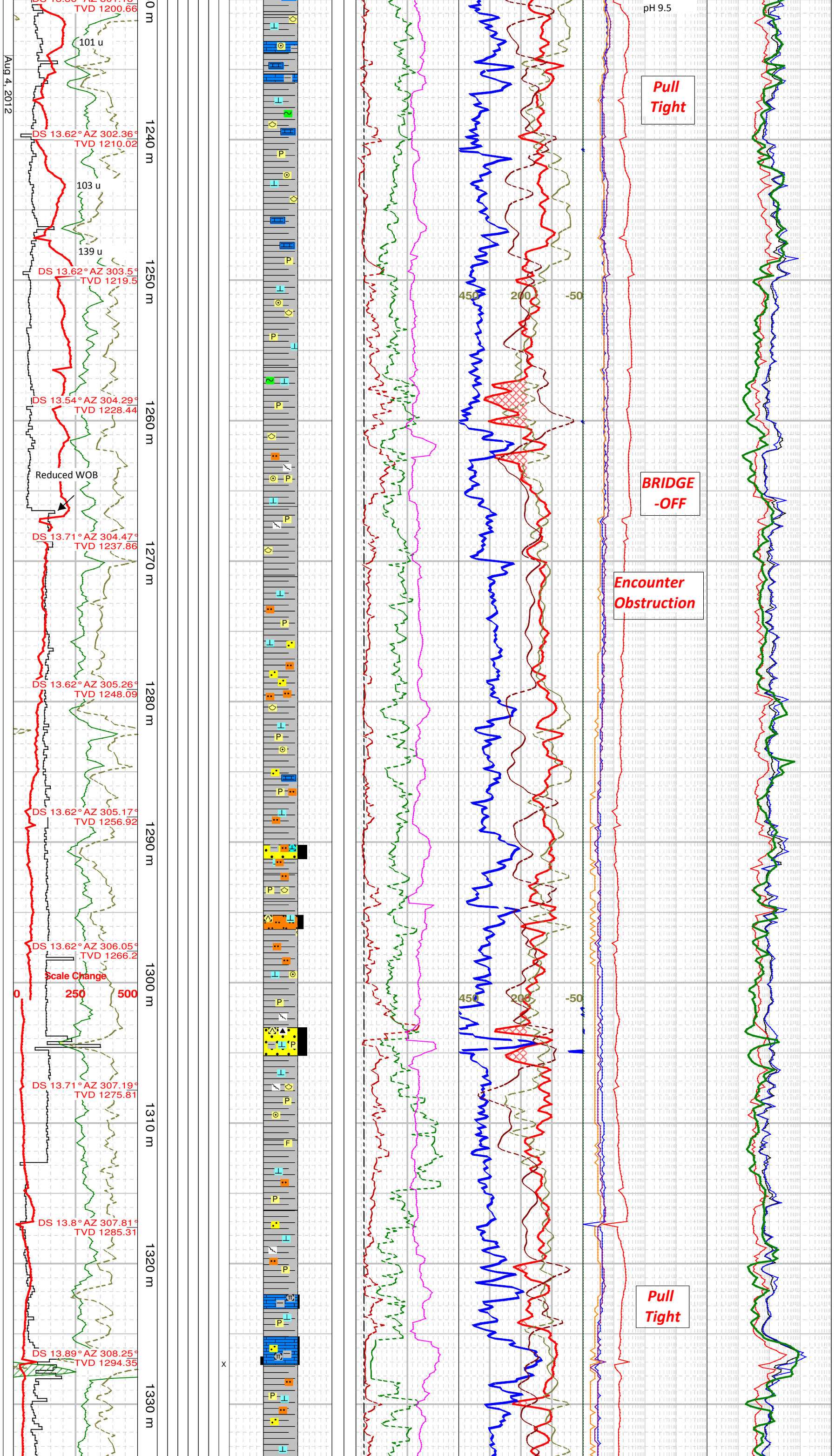
SH: m brn, sb plty - blky, calcs, slly dolic, comly slty, sdy, tr glau grs & carb flks, pyric, occ frags / brac or crin frags, abnt cmt in spl

LS: off wh, lt brn, comly mottled / m brn arg mtx, comly chky & fri, as crin, brac mdst - pkst, rr
CHT: brn, occly gy, foss ip, org incls, bedded grs, tt, no cut flor.

SH: m brn, plty - occly blky, micmica, calcs, tr dism & mas pyr, fracs?, rr botryoidal pyr, occ crin & brac frags, slly carb, sft - firm, fis ip, 7& as off wh, lt brn, occly orng brn, crin, brac, mdst - wkest, rr pkst ls, frags comly / m brn arg mtx, tt, no shows, slly glauic.

SH: m brn, sb plty - occly blky, micmica, tr dism or pyr occurs in thin line bands, fracs?, occly slty & sdy, rr glau grs, calcs, slow yel gn flash cut flor, 8% as off wh, lt - m brn, ip chky wh crin, brac wkest, rr pkst frags, slow mky yel gn flash cut flor, addiing Soltex asphaltene mud additive.

SH: m brn, occ dk brn frags, plty - occly blky, sft - firm, occ frags / glau grs, calcs, occ carb grs, flks, crins or brac frags, rr off wh, lt - m brn, mottled, arg, crin brac mdst - wkest frags, rr sh frags / v f coaly lam, occ mrly frags, slow mky yel gn flash cut flor, addied Soltex asphaltene mud additive, pyr



LS: off wh, lt - m brn, mottled, as crin, brac mdst - wkest, rr pkst, slly chty, chky, rr frags / p moldic bit plugged intgran por, bri yel gn flash cut flor, Soltex mud additive?

SH: m brn, occly dk brn, plty - occly blky, pyric, calcs, occ brac & crin cls, rr carb grs or glau, slow yel gn flash cut flor (Soltex mud additive?).

SH: m brn, occly dk brn, plty - occly blky, pyric, calcs, occ brac & crin cls, rr carb grs or glau, slow yel gn flash cut flor (Soltex Mud additive?).

SH: m brn, sb plty - blky, calcs, occly v pyric, / pyric lam (facs?), & comly / dism v f pyric specs, calcs, slly carb, slly slty & sdy, occ brac or crin fossils, rr glau, slow yel gn mky flash cut flor (Soltex mud additive?)

SH: m brn, plty - occly blky, pyric, micas, calcs, locally slly slty or sdy, rr carb flks, rr crin & brac fossils, slow yel gn flash cut flor (Soltex mud additive?)

SH: m brn, sb plty - occly blky, pyric, calcs, less slty & sdy than above, rr brac & crin fossils, mky yel gn slash cut flor, (Soltex mud additive?)

SH: lt - m brn, rr dk brn frags, sb plty - blky, calcs, pyric, comly slty & sdy, occ frags grdg to v arg, lt - m brn, ang - sbrdd, calcs, slty - v f l gred, tt, qtzs ss.

SH: m brn, sb plty - blky, micmica, pyric, rr pyr frac fills, calcs, comly slty & sdy, occ brac & crin fossils, , slly carb, slow yel gn, mky flash cut flor, (Soltex mud additive?)

SH: m brn, rr dk brn frags, sb plty - occly blky, micmica, calcs, slly pyric, 25% of frags slty & sdy, slow yel gn mky flash cut flor (Soltex mud additive?)

SH: m - dk brn, sb plty - blky, calcs, tr carb flks, rr mas pyr frags as pos frac fills, rr crin & brac fos frags, slow yel gn flash cut flor (Soltex mud additive?), rr lt gy, off wh, sa and pepper,sbang - sbrdd, sils, calcs, slty - v f l gred, tt ss frags / 10-15% cht grs.

SH: m - dk brn, sb plty - blky, calcs, slly carb, occ brac or crin fossils, locly / v f pyr lam & as prob frac fl, slly mrly, slly slty & sdy, slow yel gn flash cut flor, (Soltex mud additive?) slly slty & sdy, 3-5% lt gy, off wh, sa and pepper, cons, slty - v f l gred, sbang - sbrdd, calcs, sils, locly arg or pyric, tt, modly - w srt, ss frags.

SH: m - dk brn, plty - occly blky, micmica, 7% as pyr frags, frac fill?, tr dism v f carb flks, calcs, 15-20% of frags slly slty & sdy, slow yel gn flash cut flor, (Soltex mud additive?)

SH: m brn, sb plty - blky, calcs, occ pyr flld fracs, 15-20% of frags slty & sdy, rr v f dism carb flks, rr crin or brac fossils, slow yel gn flash cut flor (Soltex mud additive?)

LS: wh, lt - m brn, mottled, sdy, mrly, arg, glauic, as crin, brac mdst - wkest, chky ip, grdg to calcs, foss, arg, slty - f l gred, glauic, tt ss & sdy, foss mrlst.

SH: m brn, 6% lt gy, sb plty - occly blky, calcs, pyric, rr pyr filled fracs, 30% of frags slty & sdy, grdg to

DS 13.8° AZ 308.51°
TVD 1303.5

DS 13.54° AZ 309.3°
TVD 1312.44

DS 13.71° AZ 309.65°
TVD 1321.81

DS 13.97° AZ 310°
TVD 1331.11

397 u

DS 14.24° AZ 309.83°
TVD 1339.86

DS 14.5° AZ 310.27°
TVD 1349.94

DS 15.21° AZ 310.17°
TVD 1358.54

DS 15.29° AZ 310.43°
TVD 1367.98

Bit#3RR Smith FH121B OD1
208.00 / 39 hrs
Cond 8-4-BT-A-
-E-I-WT-BHA

NB#4 Smith FH135

150 R

DS 15.29° AZ 314.56°
TVD 1377.37

151 R

DS 14.77° AZ 317.64°
TVD 1386.96

187 R

DS 13.97° AZ 318.96°
TVD 1396.15

1340 m
1350 m
1360 m
1370 m
1380 m
1390 m
1400 m
1410 m
1420 m
1430 m

Aug 5, 2012
Aug 6, 2012

M r

450 200 -50

Pull Tight

Den 1110
Vis 48
WL 9
pH 10
SPM 140
WOB 22
RPM 70

500 300 1000 0 2.5 5 7.5 10
450 200 -50
200 350 500 0.45 0.3 0.15 0-0.15
0.45 0.3 0.15 0-0.15

1 10000
3050 u 0.1
000

Den 1150
Vis 45
FL 6.5
pH 9.5
SPM 140

Den 1150
Vis 45
FL 6.5
pH 9.5

LS: lt - m brn, off wh occly mot, chky in pt, comly / m brn arg cmt & mrly, occly sdy & grdg - slty - v f l gred, tt, calcs, qtzs, arg, ang - sbrdd ss, ls as crin, brac mdst - wkest.

SH: m brn, sb plty - occly blky, calcs, pyric, < 25% of frags slty & sdy, occ crin & brac fossils, slly mrly, mky yel gn flash cut flor (Soltex mud additive?) , 7% lt gy, lt - m brn, arg, locally slty or sdy, mrly, crin, brac wkest, mdst frags.

LS: lt - m brn, occly lt gy, off wh, arg & grdg to calcs mrlst, as mrly, locally sdy, slty, arg, brac, crin mdst, rr wkest, tt, chky ip. Tr lt gy, lt brn, cons, s&p, sbang - sbrdd, ang ip, calcs, qtzs - s&p, arg, f gred, modly - w srt, tt ss frags.

LS: lt - m brn, occly off wh & chky ip, crpxl - micxl, arg & grdg to calcs mrlst, as mdst, tt, slly pyric, locally slty or sdy, rr glau grs, tt, no shows, 20% of frags sdy, grdg to arg, v calcs, tt, predly qtzs, arg, tt ss.

LS: lt - m brn, crpxl - occly micxl, as crin, brac mdst, comly arg & mrly, grdg ip to mrlst, occ frags / 9% vis vug por / bri rapid yel gn flash cut flor (Soltex mud addiitve?)

LS: lt - m brn, crpxl, as mdst, rr brac & crin fossil frags, rr pyr, comly arg & mrly, dns & tt.

LS: lt - predly m brn, 10-15% off wh & chky, crpxl, as rr crin, brac mdst, comly / lt - m brn arg cmt & grdg to calcs, tt mrlst, tt, no shows, rr pyr.

LS: 30% off frags off wh, crpxl - micxl, chky & fri ip, comly / off wh arg mtx & mrly, predly m brn, crpxl, comly / m brn arg cmt, ls mrly & grdg to calcs mrlst, as arg, crin, brac mdst, tt, no shows.

LS: 20% off frags off wh, predly m brn, crpxl - micxl, chky & fri ip, comly / off wh or m brn arg mtx & mrly, grdg to calcs mrlst, as arg, crin, brac mdst, tt, no shows.

LS: off wh, lt - m brn, mottled, crpxl - occly micxl, chky ip, tr pyr, chty, comly / brn arg mtx & grdg to calcs mrlst, as rr crin, brac mdst, slly sdy, slty, dns & tt.

LS: 25% off wh, predly m brn, crpxl - micxl, comly / off wh or m brn arg cmt & locally grdg to mrlst, comly cht replaced, as rr crin, brac mdst, slly pyric, tt.

LS: 30% of frags off wh, chty, comly / off wh arg cmt, grdg ip to chty, calcs mrlst, tt, 30% m brn, comly cht replaced, / m brn arg cmt, tr pyr, 25% lt gy, predly cht replaced, 15% off wh, mottled, as mdst, rr brac & crin frags, tt.

LS: 30% off wh, predly m brn, mottled ip, as crin, brac mdst, comly cht replaced, locally arg, rr fracs, 1-2% of frags as clear or amber colored calc spar, locally euhedral and as vug or frac fill, rr calc lined fracs, most frags give a bri yel gn flash cut flor, petroleum odor (Soltex mud additive?)

LS: off wh & brn, mottled, comly arg, slly slty & sdy, occly hd & chty or occly mrly, crpxl - micxl, as arg mdst, 50% of frags m brn, crpxl, w indurated, / more cht than above, locally / m brn arg cmt, as mdst, rr brac & crin fossils,

LS: off wh, predly lt - m brn, crpxl - occly micxl, v chty, locally / lt brn arg cmt, cht comly lt - m brn, rr gy, as mdst, rr crin & brac fossil frags, tt.

LS: 25% off wh, chky, crpxl - micxl, predly m brn, crpxl, as mdst, rr brac & crin fossil frags, v chty, locally arg, rr cht frags / 9 % blk bit filled moldic por, predly tt, spls contaminated with Soltex mud additive.

LS: 20% off wh, chky ip, slly arg or chty, predly lt - m brn, crpxl, rr pyr, comly cht replaced, as mdst, rr m brn sh partings, tt.

LS: off wh, lt brn, mottled. predly m - dk brn, crpxl - occly micxl, comly arg, mrly, chty, tr dism pyr, grdg ip to calcs chty mrlst, tt.

LS: 40% off wh, lt brn, mottled, predly m brn, comly arg, chty, slly pyric, occly frags v arg & grdg to calcs mrlst, comly chty, as mdst, tt.

Aug 7, 2012

172 R
DS 13.18° AZ 320.8°
TVD 1405.99

Bit#4 Smith FH135
42.00 / 13 hrs
Cond 8-5-BT-A-
-E-I-JD-PR

NB#5 Hughes GX-45CDX2

151 L
DS 12.48° AZ 319.66°
TVD 1415.66

137 L
DS 11.69° AZ 320.45°
TVD 1424.91

135 L
DS 11.07° AZ 321.33°
TVD 1433.34

88 L
DS 10.63° AZ
TVD 1442.76

Aug 8, 2012

85 L
DS 10.02° AZ 321.86°
TVD 1451.59

104 u

78 L
DS 9.49° AZ 322.91°
TVD 1460.93

90 L
DS 9.14° AZ 319.05°
TVD 1470.1

70 L
DS 8.53° AZ 320.36°
TVD 1479.82

120 L
DS 7.82° AZ 316.67°
TVD 1489.74

297 u

130 L
DS 7.47° AZ 316.59°
TVD 1498.76

1440 m
1450 m
1460 m
1470 m
1480 m
1490 m
1500 m
1510 m
1520 m
1530 m

F

450 200 -50

pH 9.5
WOB 17
RPM 50
SPM 140

Den 1150
Vis 45
FL 5
pH 9
SPM 140
WOB 17
RPM 20

Work Tight Hole

Den 1100
Vis 42
FL 9
pH 8.5
WOB 18
RPM 18

104 u

Pull Tight

Den 1100
Vis 42
FL 6
pH 9.5
SPM 140
WOB 20
RPM 20

297 u

LS: 30% lt brn, chky ip, predly m brn, crpxl, as mdst, comly arg, chty & grdg to calcs mrlst, tt, no shows.

LS: 25% off wh, brn, mottled, chky ip, predly m brn, crpxl, dns, w indurated, comly chty, arg, as mdst ls, grdg to calcs mrlst, slly pyric, tt.

MRLST: lt gy brn, predly m- dk brn, crpxl, v calcs, comly slty, rr crin or brac fossil frags, comly slty & sdy, slly carb, frags ip grdg to arg mdst ls, rr pyr & cht, dns & tt.

LS: 40% lt brn,, off wh, mottled, slly pyric, as crin, brac mdst, comly arg, occly slty & sdy, predly m - dk brn, crpxl, arg, slty, sdy, slly chty, grdg to calcs mrlst, dns & tt.

LS: lt brn, lt gy brn, off wh, comly mottled, arg, as crin, brac mdst, slty, sdy, chky ip, grdg to mrlst, dns & tt.

MRLST: m - dk brn, sb plty - blky, slly pyric, grdg ip to arg, mdst ls, comly slly slty or sdy, dns & tt.

LS: lt gy brn, loff wh, brn, mottled, comly arg, grdg ip to calcs, mrlst, as arg mdst ls, slly pyric, chky ip, slly carb, sdy or chty, dns & tt.

LS: off wh, lt gy brn, lt brn, mottled, comly / lt brn or off wh cly, mrly, as mdst, slly pyric, tt.

MRLST: m - dk brn, blky, firm, v calcs, slly pyric, slty, sdy or chty, dns & tt.

LS: lt gy brn, crpxl, comly / lt gy, lt brn arg cmt, rr crins, spics, bracs, slty & sdy ip, as mdst, grdg to mrlst., dns & tt.

LS: lt brn gy, comly m - dk brn, crpxl, arg & comly grdg to calcs mrlst, ip cht replaced, slly carb & slty, rr calc lined fracs, as arg, mrly mdst, rr pyr, dns & tt.

LS: lt gy brn, m - dk brn, crpxl, rr micxl frags, slly chky, as mdst, comly arg & grdg to mrlst, slly slty & carb, rr cht in acid residue, dns & tt.

LS: 40% lt brn, off wh, chky ip, predly m - dk brn, crpxl, comly arg, slly slty or pyric, spicular, predly as mdst, rr clr calc spar & euhedral spar lined frac fills & rr micxl calc healed fracs, yel gn flash cut flor (Soltex mud additive)

LS: 50% lt gy brn, chtky ip, 50% m - dk brn, crpxl - rr micxl, as mdst, arg, grdg ip to mrlst, occ spicules, slly carb, tt.

LS: lt gy brn, lt brn, chky ip, mottled, arg, as crin mdst, grdg to mrlst, slly slty & sdy, tt, 40% m - dk brn, blky, crpxl, v arg, rr crins, comly grdg to mrlst, slly slty & sdy, rr pyr lined fracs.

LS: lt brn, chky & mottled in, comly arg, / lt brn arg cmt, arg, grdg to calcs mrlst, slly slty, rr pyr, as arg, mrly ls, tt, no shows

LS: lt gy brn, lt gy, off wh, mottled, crpxl, comly / lt gy, lt brn arg acid residue, mrly, grdg to mrlst, as mdst, dns & tt.

LS: lt gy brn, lt brn, off wh, mottled ip & chky, crpxl, as arg, mrly ls, slly slty, tr pyr, rr clear calc spar & rr euhral spar / blk, dd bit as prb frac fill, slow yel gn flash cut flor,(Soltex mud additive?).

LS: 60% off wh, lt brn, mottled, chky, chty, arg, as arg mdst, 40% m brn & predly as arg cht or calcs, mrlst, dns & tt.

LS: off wh, v lt brn, mottled, chky, chty & arg, grdg ip to mrlst, occ spar lined fracs / abnt blk, bit lined clear c spar calc xls as frac fills / abnt blk tarry - vit & dd & hd bit, slow yel gn flash cut flor, Soltex still contaminating spls, 40% of frag as dk gy mrlst & trnsl, spicular cht.

LS: 50% off wh, lt brn, mottled, arg, slly pyric, mrly, crpxl - occly v f l xln, as mdst, grdg to mrlst, dns & tt, 40% as m - dk brn, crpxl, as calcs, locally chty, slly slty, slly carb, mrlst, dns & tt.

TVD 1498.76

DS 7.12° AZ 318.17°
TVD 1509.37

150 L

DS 6.77° AZ 321.6°
TVD 1518.01

100 L

DS 6.42° AZ 323°
TVD 1527.65

100 L

DS 5.98° AZ 320.98°
TVD 1537.73

399 u

100L

DS 5.54° AZ 318.96°
TVD 1547.36

100L

DS 5.54° AZ 321.77°
TVD 1556.81

Bit#5 Hughes GX-45CDX2
159.00 / 43.5 hrs
Cond 2-3-WT-A-
-E-1-CT-TQ

0 250 500

0 75 50

7530u

DS 5.27° AZ 319.66°
TVD 1566.53

Aug 9, 2012

NB#6 Security EQH-34D2R

DS 5.36° AZ 321.07°
TVD 1576.01

DS 5.27° AZ 322.91°
TVD 1585.47

160L

DS 4.92° AZ 323.35°
TVD 1594.73

180

1540 m 1550 m 1560 m 1570 m 1580 m 1590 m 1600 m 1610 m 1620 m 1630 m 164

450 200 -50

Den 1110
Vis 43
FL 8.5
pH 9
SPM 140
WOB 23

399 u

500 300 1000 0 2.5 5 7.5 10

450 200 -50

200 350 500 0.45 0.3 0.15 0 -0.15

Divert flow through manifold. 1.5m flare.

DEN 1105
Vis 41
FL 7.0
pH 9.5

1 10000 0.1 1000

7530 u

FRACTURE

DEN 1125
Vis 42
FL 7.0
pH 9.5

WOB 23.0
RPM 20+65
PP 7920
PO 1.6

sily slty, slly carb, mrlst, dns & tt.

LS: off wh, lt brn, mottled, arg, crpxl - micxl, chky ip, comly arg & grdg to calcs mrlst, as arg, mrly mdst ls, tt, no shows.

LS: off wh, lt brn, lt gy brn, mottled, chky texd ip, comly arg, slly slty, sdy, spicular, as arg, mrly mdst ls, grdg to calcs, mrlst, dns & tt.

MRLST: m - predly dk brn, sb plty - blky, crpxl, slly slty, carb, dns & tt.

LS: lt brn, lt gy brn, off wh, chky ip, arg & mrly, slly slty & carb, tr pyr, dns & tt, grdg ip to mrlst.

MRLST: m - dk brn, crpxl - micxl, slty, grdg to calcs sh.

MRLST: lt gy brn, m brn, ckhy, mottled ip, calcs, slly slty, sdy, pyric or carb, dns & tt.

MRLST: lt gy brn, off wh, chky texd, calcs, slly slty & sdy, fri ip.

SH: m - dk brn, calcs, slly slty, locally grdg to mrlst.

SH: m brn, calcs, firm, non fis, locally chty or grdg to calcs mrlst.

MRLST: m - dk brn, plty - blky, calcs, grdg to calcs sh, slly slty, dns & tt.

LS: off wh, lt gy, lt - m brn, chky texd, mottled, arg & comly grdg to calcs mrlst, tr slt, rr bit lined spar frac fill frags.

MRLST: lt gy brn, lt - m brn, off wh, mottled, chky texd, calcs, occly grdg to arg mdst ls, tr slt, rr pyr, tt.

MRLST: off wh, lt brn, lt brn gy, mottled, chky texd ip, calcs, slly slty, chty, grdg ip to arg mdst ls.

MRLST: 50% of frags off wh, lt gy brn, lt brn, mottled, comly chky texd, calcs, < 30% of frags grdg to arg mdst ls, slly slty, spicular, / lt brn arg mtx, 40% of frags m - dk brn, as calcs cht, locally as mrlst or sh, dns & tt.

SH: dk gy, blky, calcs, tr mnut carb mat thru, mnr fy dism pyr, thn lams

LS: dk gysh brn - yelsh brn, crpxl, slly arg ip, occ calcs sh ptgs, scat - locly com brac frags, chty sils frmwk, tt muddy mtx, occ calc filled frac / tr - mnr pyrbit, loc frac por, sy calc + bit cmt has yel flor & gives a slow blomg cut.

SH: dk gy - blk, sbfis - blky, calcs, carb ip

LS: dk gysh brn chty mtx / com lt - m yelsh brn - yelsh gy foss ls, skel ip, scat bracs, occ crins, crpxl, arg ip, dns, tt, tr pyr, rr calc filled frac, no vis shw

SH: dk gy - blk, sbfis - sbblky, calcs, thn lams

LS: predly m yelsh brn - yelsh gy, dk gysh brn & chty ip, crpxl, slly arg, scat bracs, skel ip, dns, tt, occ calc cmtd frac

LS: aa, occ calc cmtd frac / tr pyrbit, dk chty mtx, scat bracs, dns, tt

SH: dk gy - blk, blky, calcs, carb ip

180

DS 4.92° AZ 325.2°
TVD 1604.59

1640 m

143

DS 4.48° AZ 327.84°
TVD 1614.29

1650 m

Bit#6 Security EQH-34D2R
53.00 / 9.25 hrs
Cond 6-8-BT-A-
-E-I-LT-PR

145

NB#7 Smith FHi40

Aug 11, 2012

DS 4.22° AZ 328.89°
TVD 1623.55

1660 m

DS 4.13° AZ 334.25°
TVD 1633.01

1670 m

DS 3.69° AZ 341.9°
TVD 1642.09

1680 m

88.2
M

Hart River
(TVD: 1650.04)
(SSL: -1024.89)

DS 3.34° AZ 355.43°
TVD 1653.17

1690 m

DS 3.16° AZ 3.87°
TVD 1661.55

1700 m

Test Gas

Aug 12, 2012

DS 2.99° AZ 6.77°
TVD 1670.97

1710 m

DS 2.99° AZ 9.41°
TVD 1680.44

1720 m

DS 3.08° AZ 23.29°
TVD 1689.81

1730 m

DS 3.34° AZ 38.06°
TVD 1699.3

1740 m

P r

450 200 -50

DEN 1135
Vis 43
FL 6.5
pH 9.5

WOB 23.0
RPM 25+65
PP 7000
PO 1.5

DEN 1145
Vis 42
FL 7.0
pH 9.5

WOB 23.0
RPM 20+65
PP 6970
PO 1.5

Hart River
(TVD: 1650.04)
(SSL: -1024.89)

DEN 1135
Vis 43
FL 6.5
pH 10.5

Test Gas

WOB 23.0
RPM 20+65
PP 7100
PO 1.48

LS: predly lt - m yelsh brn - yelsh gy, dk gysh brn ip, crpcxl, slly arg, 5-8% dk brn cht, nodr, scat bracs, dns, tt, occ calc cmtd frac, tr calc drs, occ calcs sh lams, no vis shw

SH: dk gy - blk, sbblky - blky, calcs, thn beds

LS: lt - m yelsh brn, - gysh brn nods in dk gysh brn mdy mtx, crpxl, arg ip, com calcs sh ptgs, chty, 3-5% dk gysh brn cht nods, scat bracs, dns, tt, Chty Nodr Brac Wkest

LS: lt - m gysh brn, crpxl, chty, 15-20% chty frmwk & occ dk cht nods, fragl, locly sdy, sdy strgs, dns, tt, occ calc cmtd micfrac, tr pyr

LS: m - dk gysh brn, crpxl, incrly arg, chty frmwk, locly sdy, fragl ip, com brac frags, dns, tt, occ calc cmtd micfrac

SH: dk gy, dk brnsh gy, blky, slly carb, calcs

LS: m brnsh gy nods in dk gysh brn mdy mtx, com bracs, arg, occ dk gy - blk arg ptg, dns, tt, mnr fy dism pyr, slty ip, Nodr Brac Wkest

LS: m - dk gysh brn - brnsh gy, crpxl, arg, rr fos frags, dns, tt

SH: dk gy - blk, sbblky - sbfis, phosic, com wh specs, carb ip, no vis shw

SH: dk gy - blk, sbfis - sbblky, extrly calcs, occ calc rods, abnt wh specs thru, phosic, locly slty, carb ip, no vis shw

SS: m gy, lt, m & dk gy cht, com - abnt gysh brn cht, mnr qtz, f - vcl gred, sbrdd, py srt, calc cmt, w ind, brit, tt, no vis shw

LS: m - dk yelsh brn - gysh brn, crpxl, arg, scat shl frags, dns, tt, locly sdy, brit, Sdy Wkest

LS: m - dk gy - gysh brn, crpxl, arg, locly sdy, scat bracs, hd, brit, dns, tt, dk mdy mtx, Brac Wkest

SH: dk gy - blk, sbfis, calcs, carb ip, slly phosic

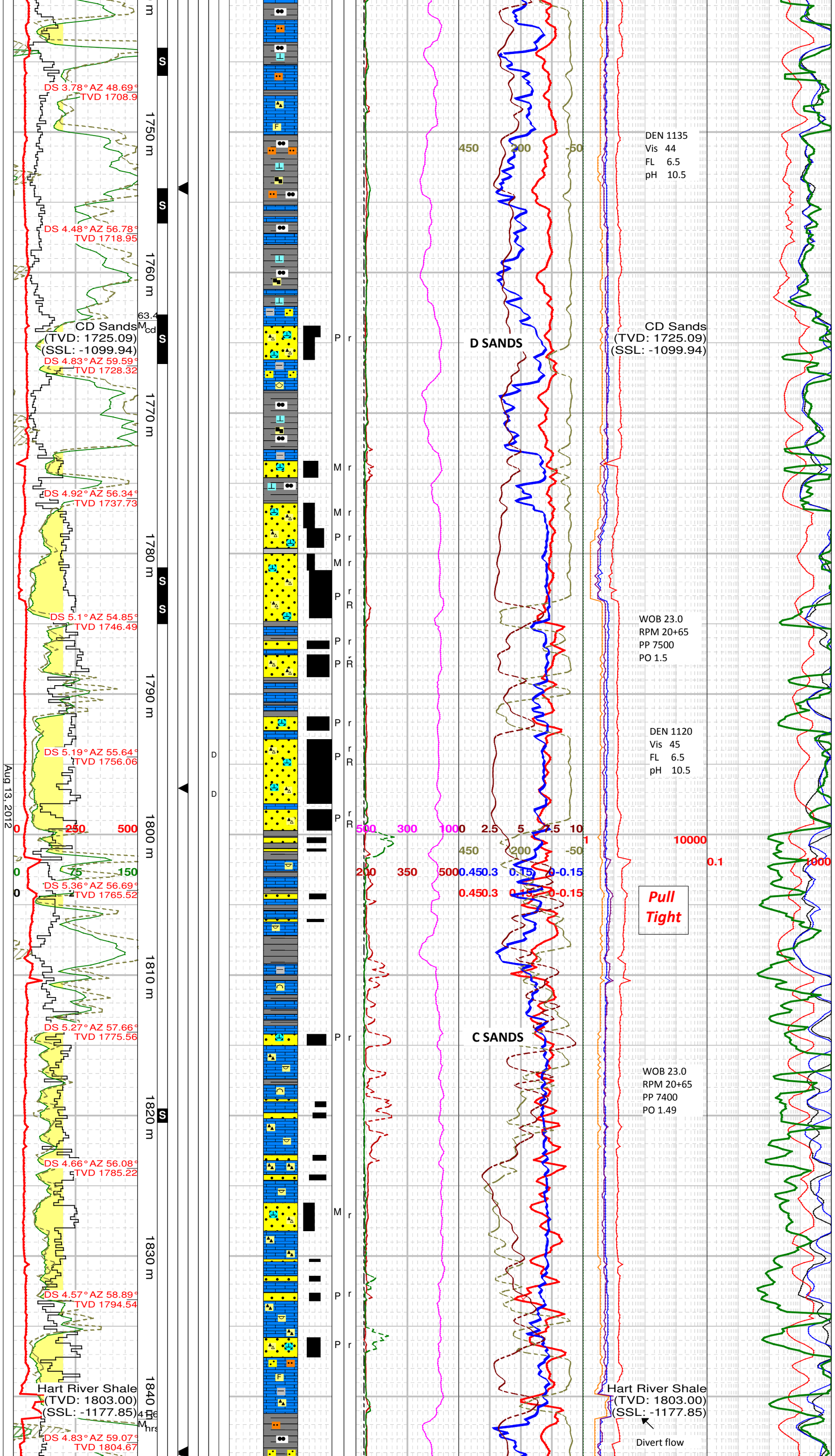
LS: m - dk gy - brnsh gy, crpxl, arg, scat fos frags, dns, tt

SH: dk gy - blk, sbfis - sbblky, extrly calcs, phosic, carb ip, slty - vfg sdy, abnt wh specs thru, no vis flor

SH: dk gy - blk, sbblky, slty - sdy, calcs, carb ip, phosic, abnt wh phosic specs thru

LS: dk gysh brn, crpxl, arg, phosic, tr - mnr cht, scat nods, dns, tt

LS: m - dk gysh brn, crpxl - v fy micxl sbhed, locly slty, phosic ip, scat dk brn cht nods, occ fos frags, dns, tt



SH: dk gy - blk, sbblky, slty ip, phosic, calcs, carb

LS: m - dk gysh brn, crpxl - v fy micxl sbhed, locly slty, phosic ip, scat dk brn cht nods, occ fos frags, dns, tt

SH: dk gysh brn - blk, sbfis - sbblky, calcs, carb, slty - sdy, phosic, locly / wh xln rods, occ dk gysh brn ls strgs

LS: m - dk gysh brn, crpxl, sdy, vf - u f gred qtz & cht cls com thru, arg, dns, tt, Sdy Ls

SS: m yelsh brn, vf - f gred, locly grdg - m gred, sbrdd, py srt, calc cmt, grdg - sdy ls ip, w ind, tt, sbeq qtz & gy cht

SH: dk brnsh gy - blk, sbblky, calcs, carb, phosic ip, slty - sdy

LS: dk gysh brn, crpxl, arg, locly sdy, rr fos frags, dns, tt

SS: lt - m yelsh brn, predly qtz / com lt cht, vf - f gred, mnr m gred, sbrdd, modly srt, calc cmt, tt, no vis shw

SS: lt yelsh wh - gysh wh, lt - m yelsh brn, predly vf - f gred, locly m - l c gred, sbrdd, mod - py srt, calc cmt, w ind, tt, no vis shw

SS: lt gy, lt yelsh gy, vf - f gred, 7-10% m - l c gred chty ss, 40-50% cht, sbrdd, py srt, calc cmt, w ind, tt, no shw, mnr sh & ls aa

SS: m gy, s&p, f - v c u gred, predly variously gy cht / mnr qtz, sbrdd - rdd, py srt, calc cmt, w ind, tt

SH: dk brnsh gy - blk, sbblky, calcs, phosic ip, carb, slty

SS: lt - m gy, brnsh gy ip, 70-80% variously gy & occly brn cht, 20-30% qtz, vf - l c gred, sbrdd - rdd, py srt, brit, hd, w ind, calc cmt, tt, no vis shw

LS: lt - dk yelsh brn, crpxl, arg ip, slty, locly sdy, gly, w ind, hd, brit, rr shl frags

LS: lt yelsh brn, crpxl, arg, plty, foss, com shl frags, tt

SS: lt - m gy, 85-90% cht, 10-15% qtz, u f - u vc gred, sbrdd - rdd, py srt, calc cmt, w ind, tt, occ grs shw tr - mnr intstl pyrbit cmt, tr wk dull yel flor, slow stmg dd o cut

SH: dk gysh brn - blk, sbfis - sbblky, calcs, carb, slty, phosic

LS: predly lt - m yelsh brn, locly dk gysh brn, crpxl, arg ip, gly, brit, scat shl frags, occ calc cmtd micfrac, tt

SH: dk gysh brn - blk, sbfis - sbblky, calcs, carb, slty, phosic

LS: lt - dk yelsh brn - gysh brn, crpxl, arg, gly ip, dns, tt, incrg shl frags, occ calc cmtd micfracs

SS: m yelsh gy, vf - c gred cht & tr - mnr qtz, calc cmt, sbrdd, py srt, w ind, tt, no vis shw

LS: predly lt - m yelsh brn & foss, com - abnt dk gysh brn & gly, crpxl, arg ip, slty ip, rr micfracs / calc cmt, tr cht, tt

SS: lt yelsh brn, m - c gred cht in f gred qtz rich mtx, calc cmt, sbrdd, py srt, w ind, tt, thn strgs

LS: aa, incrly chty, 5-7% dk brn cht, dns, tt, occ micfrac

SS: 15%: lt - m yelsh brn, predly cht / mnr qtz, vf - u f gred, lt yelsh brn ls mtx, grdg - sdy ls; 10%: lt - m gy, predly variously gy cht / com qtz, f - u m gred, sbrdd, py srt, calc cmt, w ind, tt

LS: lt - m yelsh brn, locly dk gysh brn, crpxl, locly sdy, sdy ptgs, foss (shl frags), chty, com m - dk brn cht nods or strgs, v sdy f/1825-1830mMD

SS: lt - m gy - yelsh gy, 60-70% gy & brn cht, 30-40% qtz, predly u vf - u m gred, 5-7% c - vc gred, sbrdd - rdd, py srt, calc cmt, tt

LS: sbeq lt - m yelsh brn foss & fragl ls (shl frags) & dk gysh brn gly ls, crpxl, arg, slty & sdy ip, f - c gred sdy strgs, chty, ~5% dk brn cht (nods or strgs), dns, tt

SH: m - dk gysh brn, blk, sbfis - sbblky, slty - sdy ip,

DS 4.83° AZ 59.07°
TVD 1804.67

1850 m

DS 4.83° AZ 57.13°
TVD 1814.1

1860 m

DS 4.92° AZ 56.25°
TVD 1823.67

62.8
Mab

AB Sands
(TVD: 1824.13)
(SSL: -1198.98)

Test Gas

1870 m

DS 4.83° AZ 54.23°
TVD 1833.43

Aug 14, 2012

DS 4.92° AZ 55.64°
TVD 1843.09

1880 m

DS 5.01° AZ 54.06°
TVD 1852.46

1890 m

DS 5.19° AZ 55.46°
TVD 1861.27

1900 m

DS 5.36° AZ 58.89°
TVD 1870.5

1910 m

DS 5.36° AZ 59.68°
TVD 1879.83

1920 m

1564u

DS 5.36° AZ 61.18°
TVD 1889.24

1930 m

DS 5.36° AZ 60.74°
TVD 1898.22

1940 m

Divert flow
through
manifold

450 200 -50

B SANDS

AB Sands
(TVD: 1824.13)
(SSL: -1198.98)

DEN 1120
Vis 43
FL 6.5
pH 10.5

86 u / 35 u

Pull
Tight

99 u / 50 u

97 u / 50 u

151 u / 50 u

104 u / 50 u

WOB 23.0
RPM 20+65
PP 6640
PO 1.50

450 200 -50

A SANDS

DEN 1120
Vis 43
FL 6.5
pH 10.5

138 u / 50 u

1564 u / 50 u

171 u / 50 u

142 u / 50 u

WOB 23.0
RPM 20+65
PP 7600

SH: m - dk gysh brn, blk, sbfis - sbblky, slty - sdy ip, rr calc cmtd ireg micfrac, phosic, mnr ls & chty c gred ss aa

SH: incrly dk gysh brn - blk, sbfis - sbblky, slty ip, occ dk gysh brn ls strg, calcs, phosic, rr micfrac, no vis flor

SH: dk gysh brn - blk, incrly slty, calcs, phosic, tr dk chty ls, occ ss strgs

SH: dk gysh brn - blk, sbfis - sbblky, slty, calcs, carb ip, hd, brit, phosic

SS: lt - m gy, yelsh gy ip, qtz & abnt lt - m gy cht in wh calc cmt, com wh sbang brit cls (fld?), l f - u m gred, sbrdd - sbang, mod - py srt, sil + calc + blk intstl bit cmt, p intgran por (6-8%), **no vis flor, slow stmg dd o cut**

SH: m - dk brnsh gy, calcs, slty, carb ip

SS: lt - m gy, 20-25% gy cht, 10-15% wh ang frags, 60-70% qtz, predly u f - u m gred, 5-7% c gred, sbrdd - ang, sil + calc + tr - mnr pyrbit cmt, 6-8% por, **no vis flor, wk stmg dd o cut**

SS: lt gy, lt yelsh brn, qtz, cht & abnt wh brit cls, f - u m gred, sbrdd, sil ovgths, sil + calc + tr - mnr ptch pyrbit cmt, var por (6-12%), com yel flor, **wk slow blomg cut, q shw**

SS: aa

SH: dk gysh brn - blk, sbblky - sbfis, slty, calcs, carb ip, gsy, frm, brit

SS: lt gy, qtz & abnt lt - m gy cht, vf - m gred, sbrdd - rdd, py srt, predly ttly cmtd / calc, occ gr has **mnr intstl pybit / p por, no vis flor**

SH: aa, incrly slty - vfg sdy, phosic

LS: lt - m yelsh brn, crpxl, slly arg, slty, foss (shl frags), phosic ip

LS: predly lt - m yelsh brn, dk gysh brn ip, crpxl, arg, scat shl frags, scat dk brn cht, dns, tt

SS: lt - m gy, brnsh gy, 30-40% gy & occly brn cht, vf - u m gred, 4-5% l c gred, sbrdd - sbang, py srt, calc + sil cmt, predly tt, locly / wk intgran por & **tr blk pyrbit cmt, no vis flor**

SH: dk gysh brn - blk, sbblky, slty, calcs, carb ip, phosic ip

SS: m gy, s&p, vf - l c gred, predly variously gy cht, 20-30% qtz, sbrdd, py srt, sil + calc + 5-7% pyrbit cmt, w ind, p - locly fr por (7-12%), **no vis flor, slow stmg dd o cut**

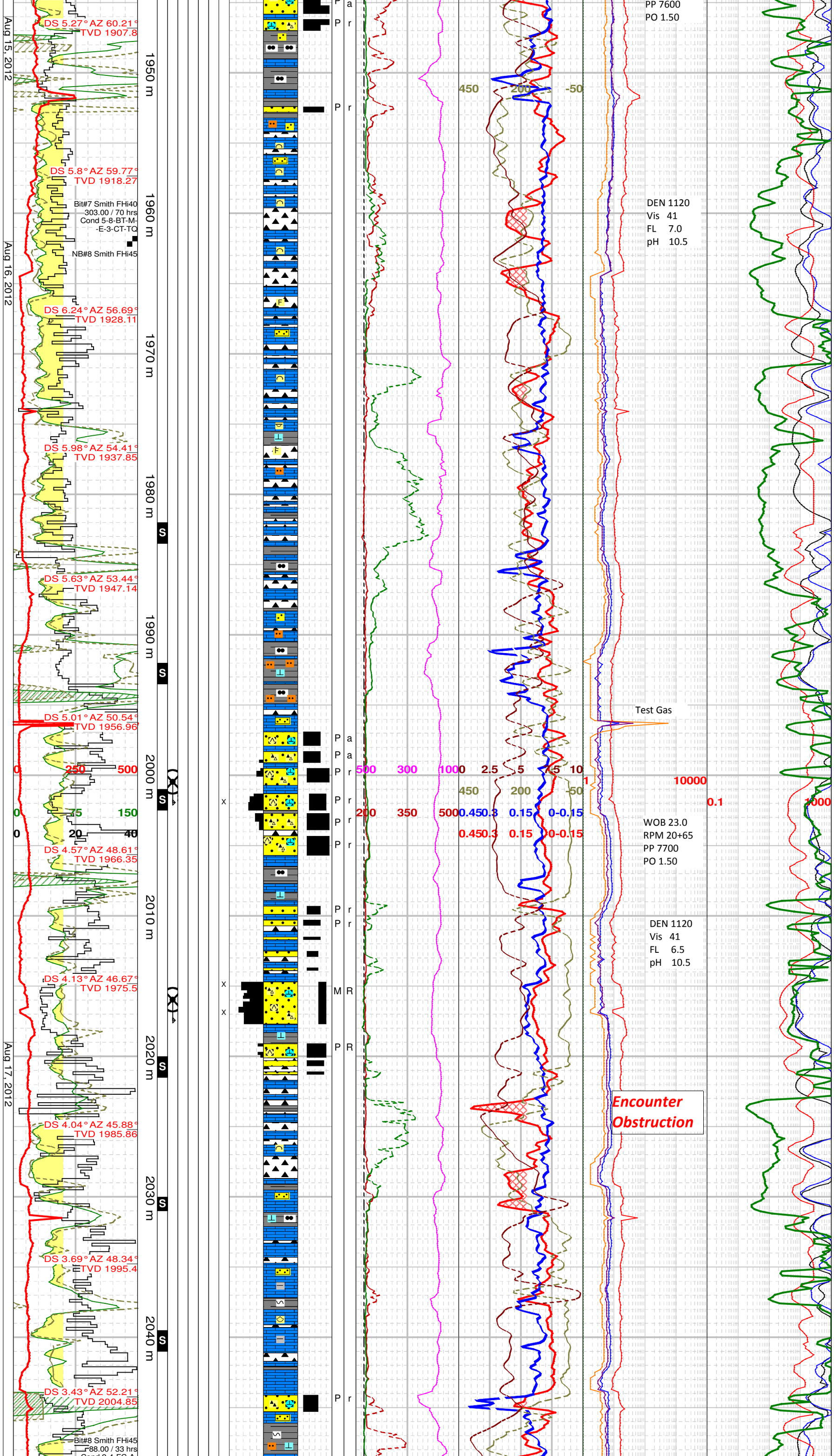
SS: aa, incrg calc cmt, 8-10% por, abnt pyrbit cmt, **spy dull yel flor, slow stmg dd o cut**

SS: lt gy - lt yelsh gy, 35-40% variously gy & occ brn cht, com wh brit fld cls, sil ovgths, vf - l m gred, 3-5% l c gred, sbrdd, py srt, mod - w ind, fri ip, p - locly fr por (3-10%), tr instl pyrbit, **no vis shw**, occ yelsh wh foss ls strgs (coq)

SH: dk brn - blk, sbfis, slty - sdy ip, gsy, calcs, phosic, carb ip

LS: predly dk gysh brn, crpxl, gly, chty, lt - m yelsh brn ip, crpxl, slly arg, foss, shl frags, slty ip, tt

SS: lt - m gy, qtz & 35-40% var gy cht, predly vf - u



SS: lt - m gy, qtz & 35-40% var gy cht, predly vf - u m gred, occ l - u vc gred, rdd - sbang, py srt, w ind, sil + calc + locly tr pyrbit cmt, 0-4% por, **no vis flor**

SH: m - dk gysh brn - blk, sbfis - sbblky, calcs, hd, brit, phosic, carb ip, slty

LS: m - dk yelsh brn - gysh brn, crpxl, arg ip, slty - sdy, chty, fragl, dns, tt

LS: lt yelsh wh, lt - m yelsh gy, crpxl - v fy micxl, fragl, intbd mas cht, occ sdy ptgs, dns, tt

CHT: lt - m yelsh brn, m - dk gysh brn, mnut foss mat & brn org mat as incls thru, bdd

CHT: m - dk brn, lt - m gysh brn, mic foss & brn org incls, bdd, incrly abnt dk brn cht in 1972.5m spl

LS: lt - m yelsh brn - yelsh gy, crpxl - v fy micxl, sdy ip, fragl, shl deb, occ f gred ss lams, dns, tt, intbd cht

SH: dk brnsh gy - blk, sbfis, calcs, carb, slty ip, **slly bits, no vis flor, v wk slow stmg cut**

CHT: predly dk brn, brn org incls thru

LS: lt yelsh wh, lt - m yelsh gy, locly dk gysh brn, crpxl - v fy micxl, arg ip, com shl frags, slty & sdy ip

SH: dk gy - blk, sbfis, slty, calcs, carb, gsy

CHT: m - v dk brn, micfoss & org incls, bdd

LS: lt - m yelsh brn, yelsh gy, comly m - dk gysh brn, crpxl - v fy micxl, slty & sdy ip, dns, tt

SH: dk gy - blk, m - dk gysh brn ip, sbfis - sbblky, calcs, slty ip, phosic, **slly bits, v wk fnt hazy cut**

LS: aa, incrly m - dk gysh brn, occ sdy strg, rr brac frags, dns, tt, occ cht beds

SS: lt - m gy, yelsh gy, vf - m gred, qtz / abnt gy & brn cht thru, sbrdd - sbang, py srt, sil + sec calc cmt, w ind, predly tt, spy v wk ingran por / **tr - mnr intstl pyrbit, no vis flor**

SS: lt - m gy, brnsh gy, sbeq qtz & gy - blsh gy cht, vf - vc l gred, sbrdd, py srt, sil + lt yelsh brn calc cmt, tr intstl pyrbit cmt, fri ip, p - fr por (8-12%), **no vis flor, spy slow stmg dd o cut, no shw**

LS: m - dk brn - gysh brn, crpxl, gly, occ shl frags

SH: dk gysh brn - blk, sbfis, calcs, slty, phosic, gsy

SS: lt - m gy, cht & qtz, vf - m gred, w ind, sil + sec calc cmt, tt, **no vis shw**

SS: lt - m brnsh gy, qtz & abnt gy cht, predly u m - u c gred, vf - f gred mtx, rdd - w rdd, modly srt, sil + yelsh brn calc cmt, fri, predly lse, fr - g intgran por (12-18%), **no vis flor, rr gr / wk hazy cut, no shw**

SH: dk gysh brn - blk, sbfis, calcs, slty, phosic, gsy

LS: lt - m yelsh brn, m - dk brn, crpxl, arg ip, sdy, com sdy strgs, intbd cht, fragl ip

CHT: lt - dk brn, gysh brn ip, micfoss & org incls, mas, bdd

LS: predly lt yelsh wh, m - dk brnsh gy, crpxl - v fy micxl, fragl, intbd cht, locly sdy, tt

SH: dk brnsh gy - blk, sbfis, calcs, gsy, slty ip

LS: predly m - dk gysh brn, mnr lt yelsh gy, crpxl, incrly arg, f gred sdy lams, occ bracs, occ calc cmtd micfracs, dns, tt

SH: dk gysh brn - blk, sbfis - sbblky, calcs, slty, slly bits, slow wk hazy cut

CHT: dk brn, micfoss & org incls, thn bds & lenses

LS: m - dk gysh brn, crpxl, arg ip, dns, tt, locly sdy

SH: v dk brn - blk, sbfis, calcs, gsy, bits ip, slty, no vis flor, slow blomg cut, dk orng brn resd ring

Bit#8 Smith FHi45
88.00 / 33 hrs
Cond 2-4-FC-A-
-E-I-CT-CP

2050 m

NB#9 Hughes VGD-44GDX

Aug 19, 2012

DS 3.16° AZ 54.58°
TVD 2014.24

2060 m

DS 2.99° AZ 54.23°
TVD 2025.42

Bit#9 Hughes VGD-44GDX
18.50 / 5.25 hrs
Cond 8-8-LC-A-
1-F-5-JD-TQ

2070 m

NB#10 Smith FHi55

Aug 21, 2012

DS 2.99° AZ 53.35°
TVD 2034.7

Ford Lake
(TVD: 2039.36)
(SSL: -1414.21)

2080 m

DS 3.16° AZ 54.14°
TVD 2044.15

2090 m

DS 2.99° AZ 54.93°
TVD 2053.79

Aug 22, 2012

Peak 1234u

2100 m

DS 2.72° AZ 59.33°
TVD 2063.91

2110 m

DS 2.2° AZ 64.87°
TVD 2072.22

Imperial
(TVD: 2073.51)
(SSL: -1448.36)

2120 m

DS 2.29° AZ 69°
TVD 2083.13

2130 m

DS 1.57° AZ 80.86°
TVD 2092.67

2140 m

DS 0.97° AZ 135.53°
TVD 2102.24

2150

Core #1:
2050.0-2051.5mMD

450 200 -50

FISH
FOR 3
CONES

WOB 23.0
RPM 20+65
PP 10200
PO 1.51

DEN 1130
Vis 40
FL 7.0
pH 10.0

DEN 1140
Vis 40
FL 6.5
pH 9.5

Ford Lake
(TVD: 2039.36)
(SSL: -1414.21)

WOB 22.0
RPM 20+65
PP 10200
PO 1.61

450 200 50

CG
f/1604m

WOB 23.0
RPM 40+65
PP 10200
PO 1.61

Imperial
(TVD: 2073.51)
(SSL: -1448.36)

Shales become
noncalcareous

CG
f/1604m

Increase
RPM

CG f/1604m

DEN 1120
Vis 43
FL 6.2
pH 10.0

WOB 25.0
RPM 40+72
PP 10200
PO 1.50

vis flor, slow blomg cut, dk orng brn resd ring

CHT: lt - m dk brn, gysh brn ip, micfoss & org incls, thn beds

CHTY LS: m - dk gy, dk brnsh gy, crpxl, arg, chty, v hd, dns, tt, no vis shw, 2-3cm dk brn cht beds, intbd py srt vf -m gred ss

SS: lt - m gy, qtz & cht, vf - l m gred, sbrdd, py srt, w ind, sil + tr pyrbit + calc cmt, tt, hd, no vis shw

CHT: lt - v dk brn - gysh brn, mas, micfoss & org incls, bdd

LS: predly lt yelsh wh, m yelsh brn, dk gysh brn ip, crpxl - micxl, intbd ss, shl frags, dns, tt

LS: lt m yelsh brn, yelsh wh, locly v dk gysh brn, crpxl, slly arg, sdy ip, shl frags (bracs, occ crins), dns, tt, tr pyr

CHT: m - dk gysh brn, mas, micfoss

CHT: lt - m brn, gysh brn f gred sd cls, micfoss & org incls, bdd, occ hi angle frac

LS: yelsh wh - lt yelsh brn, crpxl - v fy micxl, occ shl frags, loc sdy, dns, tt

SH: dk brnsh gy - blk, sbfis, calcs, slty ip, comly gsy, slly bits, **slow stmg dd o cut**

LS: lt yelsh brn, m - dk brnsh gy, crpxl, slty & sdy ip, occ sdy strgs, shl frags, tt, thn beds

SH: dk gysh brn - blk, sbfis - sbblky, calcs, slty, frm, modly brit, slly bits, no vis flor, slow stmg cut, fr brn resd, occ ls & ss ptgs

SH: dk gysh brn - blk, sbfis, slty, occ vf - f gred sdy lam, tr pyr, calcs, slly bits, **slow wk stmg dd o cut,** occ dk gy arg ls strg

SH: dk gysh brn - blk, sbfis, incrly bits, gsy lstr thru, slty ip, occ cht & ls strg, occ sdy ptg, **no vis flor, slow wk strmg cut**

SS: m - dk gy, qtz & com gy cht, vf - u f gred, occly l m gred, sbrdd - sbang, py srt, sil + calc cmt, tr pyrbit, w ind, tt, **no vis shw**

SS: aa, incrly u f - l m gred, py srt, w ind, ttly cmtd, **no vis shw**

SH: v dk gysh brn - blk, sbfis, slty, locly sdy, calcs, slly bits, pyric (2-5% pyr), comly gsy, slow wk stmg cut, fr dk amb brn resd

LS: predly lt - m gysh brn - yelsh brn, dk gysh brn ip, crpxl, arg ip, locly sdy, scat fos frags, dns, tt

CHT: m - dk brn - gysh brn, thn beds, incls

SH: v dk gysh brn - blk, nn - slly calcs, sbfis, slty, pyric, gsy - rthy lstr, slly bits, wk stmg cut

SH: blk, v dk brn, fis - sbfis, slty ip, nn calcs, occ slt - f gred sdy ptg, tr cht, tr pyr, modly frm, modly brit

SS: m - dk gy, vfg, slty ip, sbrdd, py srt, calc cmt, mnr bit cmt, w ind, tt

SH: dk gy - blk, sbfis, nn calcs, gsy, slly bits, slow wk stmg cut, tr pyr, slty lams

CHT: m - dk gy, gysh brn, thn beds, incls

LS: lt - m yelsh brn, crpxl - v fy micxl, thn beds, intbd ss, scat pyr, tt

SS: m - dk gy, vf - f gred, rr m - c gred cls, sbrdd, py srt, sil + calc cmt, locly / abnt pyr cmt, w ind, tt

LS: lt - m yelsh brn, dk gysh brn ip, crpxl - v fy micxl, locly sdy, occ fos frags, tr pyr

SH: dk gysh brn - blk, sbfis, locly slty, occ pyric sdy strgs, gsy, slly bits, v wk slow stmg cut

CHT: lt - m gysh brn, occly v dk brn, incls, thn beds

DS 1.76° AZ 191.17°
TVD 2111.93

DS 2.9° AZ 199.78°
TVD 2121.56

DS 3.69° AZ 206.19°
TVD 2130.48

20 R

DS 4.39° AZ 203.91°
TVD 2141.1

Tuttle Member
(TVD: 2140.45)
(SSL: -1515.30)

DS 4.66° AZ 204.09°
TVD 2150.05

10 R

DS 4.57° AZ 207.69°
TVD 2159.13

20 R

Bit#10 Smith FHi55
131.00 / 37 hrs
Cond 4-2-BT-M-
-E-I-WT-DST

NB#11 Smith MDS1613UBP

DS 4.66° AZ 214.63°
TVD 2169.36

DS 4.83° AZ 214.9°
TVD 2177.74

127 u

DS 4.92° AZ 214.98°
TVD 2188.26

DS 4.82° AZ 219.91°
TVD 2198.07

DS 5.19° AZ 221.49°
TVD 2207.55

Aug 23, 2012

Aug 25, 2012

2150 m
2160 m
2170 m
2180 m
2190 m
2200 m
2210 m
2220 m
2230 m
2240 m
2250 m

PO 1.50

DEN 1130
Vis 45
FL 4.5
pH 10.5

Tuttle Member
(TVD: 2140.45)
(SSL: -1515.30)

DEN 1130
Vis 45
FL 10.5
pH 10.5
PP 8000
SPM 129

BRIDGE-OFF

Logging Tools
Bridged-off at
2218mMD

127 u

0-1

CHT: lt - m gysh brn, occly v dk brn, incls, thn beds

SH: v dk gy - blk, sbfis, nn calcs, gsy, slly bits, k stmg cut aa

LS: m - dk yelsh brn, crpxl, arg ip, dns, tt, rr brac frags

SS: lt - m gy, vf - f gred, qtzs / tr cht, sbang - sbrdd, mod - py srt, calc cmt, w ind, tt, locly abnt pyr cmt

SH: v dk gy - blk, sbfis - sbblky, slty, nn calcs, gsy, slly bits, sdy lams, rr osts

SS: m - dk gy, vf - f gred, slty & arg ip, sbrdd - sbang, py srt, calc cmt, locly / abnt pyr cmt, tt

CHT PBL SS: off wh, lt gy, occly m brn, cons, s&p, f - m gred, occly c gred or cglic & mtx supported, / 30-70% lt cht grs, sbang - rdd, modly - w srt, comly / sil overgrowths, comly firm & grs cut, calcs, slly dolic, locally pyric, traces of 6-8% dd bit plugged por, p effective por, no cut flor, / < 10% m brn, blky, slty, pyric, m brn sh frags.

SS: comly as uncons, sbang - sbrdd, f l - f u, occly l m qtz & cht grs, cons frags lt gy, off wh, sbang - sbrdd, modly - w srt, calcs, sils, slly dolic, locally u m gred, tt, no shows.

SH: m brn, m gy, < 10% dk brn or dk brn gy, sb plty - blky, micmica, pyric, sft, slly carb or slty, bits.

SH: post-trip spl, comly m gy, plty, micmica, pyric, slly carb & slty, sft - hd, 40% m - dk brn, occly pyric, slty, **bits,** tr lt - m brn crpxl ls & frac sid nods, 6% off wh, lt gy, sils, s&p, f - occly l m gred, calcs, slly dolic, ss frags / occ 1-8% dd blk bit plugged intgran por, no cut flor, p effective por.

SH: m gy, 30% dk gy - blk, micmica, slly carb, locally sidic, bits, **slow yel gn flash cut flor,** bioturbated, dull - greasy, 3-4% as crpxl - micxl, locally slty, sdy fracd sid nods & sidic ls, 3% as lt gy, f gred, qtzs - s&p, calcs, tt, sbang - sbrdd, slly dolic, tt ss frags, rr mas pyr frags.

SH: m gy, 30% dk gy - blk, micmica, slly carb, locally sidic, bits, 3-4% as crpxl - micxl, locally slty, sdy fracd sid nods & sidic ls, 3% as lt gy, f gred, qtzs - s&p, calcs, tt, sbang - sbrdd, slly dolic, tt ss frags, rr mas pyr frags.

SH: m gy, 25% dk gy, blk, plty - occly sbblky, micmica, pyric, slly calcs, bits, **slow gn flash cut flor,** 3% m brn, fracd sid frags.

CHT PBL SS: cons, off wh, lt brn, ang - sbrdd, v f u - u m, occly c gred, rr cht granules & locally cglic, p - modly srt, abnt wh, gy, brn, dk gy cht grs, calcs, dolic, sils, pyric, locally / m brn arg cmt, spotty 1-9% blk dd bit plugged intgran por, no cut flor.

CHT PBL SS: cons, off wh, lt brn, ang - sbrdd, v f l - c l, occly c u - v c u gred, rr cht granules & locally cglic, p - modly srt, abnt wh, gy, brn, dk gy cht grs, calcs, dolic, sils, pyric, occ frags / brn arg cmt, grs comly pitted, spotty 1-10, tr 13 % blk dd bit plugged intgran por, no cut flor.

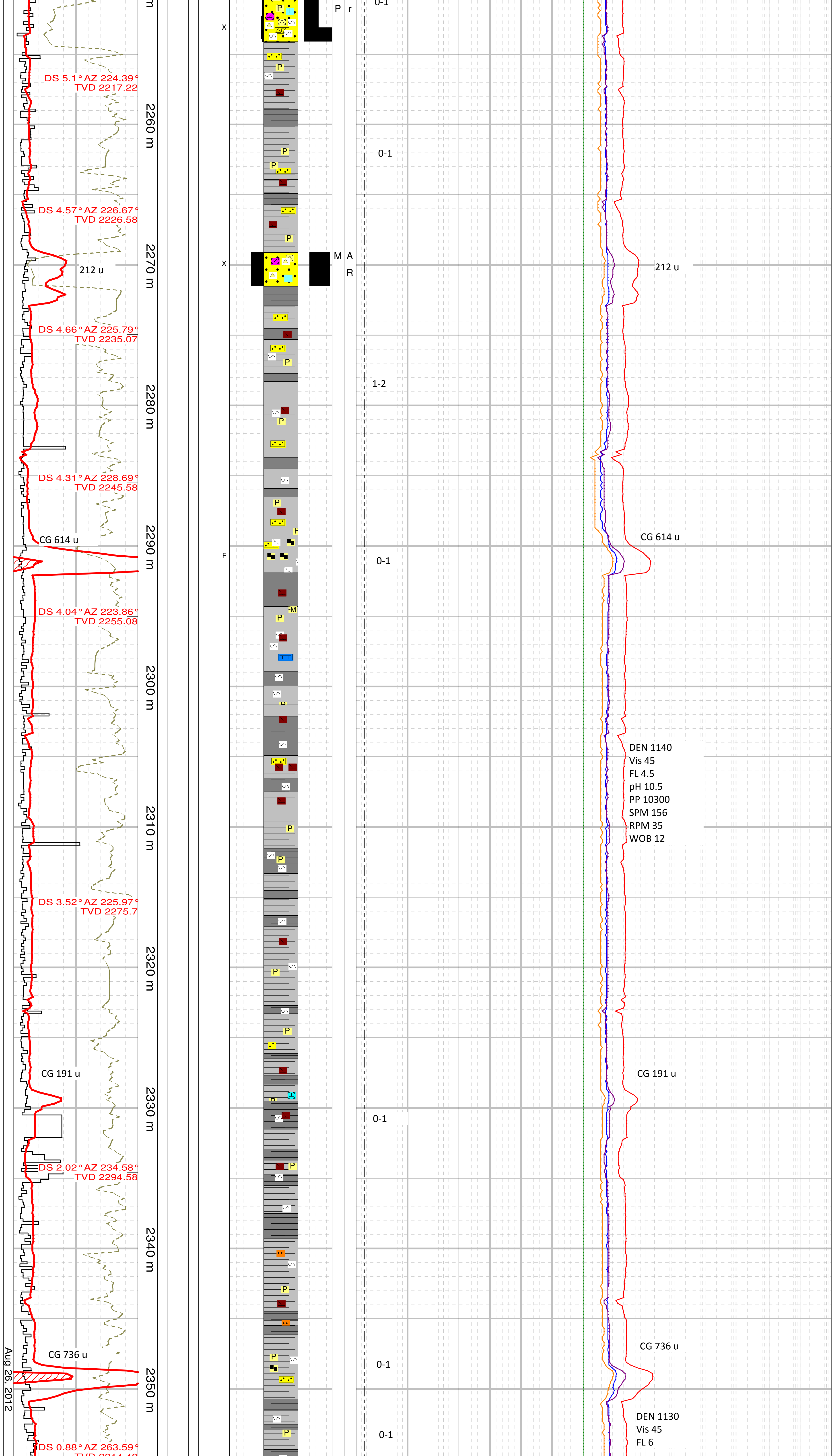
SH: lt - m brn, sb plty, micmica, pyric, bits, **v slow gn flash cut flor.**

SS: cons, s&p, off wh, lt brn, comly blk & bit stnd, f - l m gred, occly / floating c qtz & cht grs, abnt wh, occly gy, cht grs, p - modly srt, sils, calcs, dolic, pyric, / 10-18% blk ip dd bit plugged intgran por & rr bit frac fill, tr 9% vis intgran por, **wk mky wh flash cut flor.**

CHT PBL SS: cons, lt brn, f l - v c u, rr granules, sbang - sbrdd, ang ip, p - modly srt, cglic & as a mtx supported cglic ss, calcs, dolic, sils, comly / wh, brn, gy cht grs, pyric, spotty 6-9% blk dd bit plugged intgran por, no cut flor.

CHT PBL SS: predly as uncons, sbang - sbrdd, locally rdd, f u - v c u cht & qtz grs & rr granules,

Drill Stem Tested
1604 m Interval,
August 24th



locally rdd, f u - v c u cht & qtz grs & rr granules, cons frags f - l m gred, ang - sbrdd, / lt brn, off wh, gy cht grs, sils, calcs, locally / m brn arg cmt, slly dolic, & pyric, predly tt, rr blk dd intgran bit, no cut flor.

SH: m - occly dk brn, sb plty - sbblky, micmica, pyric, tr calc, **bits & / slow yel gn flash cut flor,** 3% f - m gred, s&p ss aa as carry over.

SH: m brn, sb plty - sbblky, micmica, slly pyric, predly as cly sh, **bits & / slow yel gn flash cut flor,** occ fracd m brn sid nods, 7% f - l m, rr u m, sbang - sbrdd, p - modly srt, sils, calcs, dolic, slly pyric, tt, s&p ss frags / abnt lt brn, occly wh cht grs.

SS: cons, s&p, / abnt wh, occly lt - dk gy, tr blk cht grs, v f u - c l gred, occly c u v c u gred, ang - sbrdd, modly srt, sils, calcs, dolic, slly pyric, / sil overgrowths, slly bits, grs pitted, occ 6-9% vis intgran por, no cut flor.

SH: m brn, 20% dk brn, sb plty - sbblky, micmica, pyric, slly carb, rr slt, predly as cly sh, **slow mky yel gn flash cut flor.**

SH: m brn, sb plty - sbblky, micmica, rr slt, predly as cly sh, slly carb, pyric, **slow mky yel gn flash cut flor.**

SH: m - dk brn, sb plty - sbblky, pyric, micmica, 3% arg, fracd sid nods, rr pyr lined fracs, tr f - m gred, s&p, sils, calcs, dolic, tt ss frags as prob carry over, **slow yel gn flash cut flor.**

SH: m - dk brn gy, greasy, sb plty - sbblky, micmica, pyric, rr fracs, 7% as arg, locally slty, sdy, calcs, fracd sid nods, rr mas pyr frags, rr coaly partings, slly carb, rr fracs, **mky yel gn flash cut flor.**

SH: m - occly dk brn, sb plty - sbblky, micmica, pyric, slly carb, predly as cly sh, slly carb, slly montic, rr fracd sid nods or calcs frags, **slow yel gn flash cut flor.**

SH: m gy, 40% dk gy, sb plty - blky, micmica, occly pyric, 10-15% as crpxl - micxl, sidic, arg, tt ls frags, **bulk spl / mky yel gn flash cut flor.**

SH: m - predly dk gy, plty, micmica, slly pyric, greasy - dul lustre, sb plty - occly blky, brit - sbfis, no vis fracs 1-2% of frags as mas pyr, fracs?, 6-7% as m brn, occly slty or sdy, calcs, fracd sid frags, tr f - m gred, cons, s&p, ang - sbrdd, sils, calcs, dolic, tt, ss frags, **slow yel gn flash cut flor.**

SH: m - dk gy, sb plty - sbblky, micmica, ip blky, greasy, slly carb, as cly sh, firm, brit, sbfis, 1-2% of frags as mas pyr, 6-7% of frags as m brn fracd sid nods, or arg, sidic, tt ls frags, **sh / mky yel gn flash cut flor.**

SH: m - dk gy, dk brn, sb plty, micmicca, slly pyric & carb, dull - greasy ip, slly pyric, as cly sh, comly firm, sbfis, 6% of frags as fracd sid nods or arg, sidic, calcs, mdst ls frags, **mky yel gn flash cut flor.**

SH: m - dk gy, dk brn, micmica, dull - greasy ip, slly pyric, bits, predly as cly sh, rr pyr lam as prob frac fills, slly montic, 6-7% of frags as fracd sid nods or as sidic, tt, mdst ls frags, slly carb, rr slt & sd grs, **sh / mky yel gn flash cut flor.**

SH: m - dk gy, dk brn, plty - sbblky, micmica, rr slly montic frags, predly as cly sh, rr slt & sd grs, pyric, q pyr lined fracs, 3% of frags as mas pyr, 4% as m brn, fracd, locally calcs sid nods, sh / **slow yel gn flash cut flor.**

SH: m - dk gy, dk brn, sb plty - sbblky, micmica, dull - greasy, slly carb, rr slly montic frags & rr carb partings, predly as cly sh, rr slt & sd grs, 3% as mas pyr, sh pyric, tr fracd sid nods, fracs?, rr f - m gred s&p ss frags as prob carry over, spl quality good, sh / **mky yel gn flash cut flor.**

SH: m - dk gy, dk brn, plty - occly sbblky, slly carb, pyric, micmica,dull - greasy, predly as cly sh, slly slty & sdy, tr mas pyr frags, brit, subfis, 5% of frags calcs, grdg to calcs mrlst, rr ls, sh / **mky yel gn flash cut flor.**

SH: m - dk gy, plty - occly sbblky, micmica, dull, greasy, firm, brit, subfis, bits, comly pyric, 3% of frags as mas pyr, frac fill?, tr slt & sd grs, slly carb, tr lt gy, m brn, f - l m gred, calcs, sils, tt, s&p ss frags, sh / **mky yel gn flash cut flor.**

SH: m gy, 20% of frags dk gy, plty - occly sbblky, micmica,greasy - dull, bits, pyric, slly montic, 6% of frags as mas pyr, frac fill?, tr fracd sid nods, 4% of frags calcs & grdg to calcs mrlst or rr arg, mdst ls, sh / **slow wk, yel gn flash cut flor.**

SH: m brn, m brn gy, plty - occly sbblky, sft, slly montic, fis - sbfis, micmica, greasy, dull, slly carb, occ pyric frags, bits, rr slty or sdy frags & locally grdg to slty - v f l gred, tt, s&p ss or sdy sltst, tr fracd sid nods, 6% of fags calcs or mrly, **sh / mky yel gn flash cut flor.**

SH: m brn, m brn gy, plty - occly sbblky, sft, slly montic, fis - sbfis, greasy, dull, micmica, slly carb, occ pyric frags, rr slty or sdy frags & locally grdg to slty - v f l gred, tt, s&p

DS 0.88° AZ 263.59°
TVD 2314.48

2360 m

2370 m

2380 m

DS 1.14° AZ 6.24°
TVD 2342.45

2390 m

2400 m

0 250 500
DS 2.64° AZ 21.36°
TVD 2360.58

0 20 40

2410 m

DS 3.6° AZ 26.55°
TVD 2380.04

2420 m

2430 m

Bit#11 Smith MDS1613UBP
234.00 / 26.5 hrs
Cond 2-1-NO-M-
-X-I-CT-BHA
DS 4.48° AZ 24.09°
TVD 2396.43
NB#12 Smith MDS1613UBP

Aug 27, 2012

Bit#12 Smith MDS1613UBP
7.00 / 3.5 hrs
Cond 4-2-BT-M-
-E-I-CT-PP
NB#13 Security EQH34D2R

Aug 28, 2012

2440 m

2450 m

140 L
DS 4.31° AZ 53.53°
TVD 2415.79

S

0-1

0-1

0-1

0-1

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

0-1

0- 1

0- <1

Abundant Shale Cavings Post Trip @ 2435 m (MD)

2-3

2

FL 6
pH 10.5

1 10000

DEN 1140
Vis 45
FL 5.5
pH 10.5
PP 11500
SPM 155
RPM 35
WOB 12

Work Tight Hole

Torq 15-18000

TG 145 u

DEN 1150
Vis 50
FL 6
pH 10.5
WOB 17
RPM 35
PP 1100
Torq 10000

rr slty or sdy frags & locally grdg to slty - v f l gred, tt, s&p ss or sdy sltst, tr fracd sid nods, 6% of fags calcs or mrly, sh / **mky yel gn flash cut flor.**

SH:m gy, 25% of frags dk gy or dk gy brn, plty - occly sbblky, micmica, greasy - dull, firm, brit - sbfis**, bits, / slow yel gn flash cut flor,** predly as cly sh, rr slt & sd grs, slly montic, rr fracd sid nods, rr calcs or mrly frags.
SH:lt - m gy, 40% dk gy, dk gy brn, plty - occly sbblky, predly as cly sh, micmica, gsy - dull, no vis fracs, frm, brit - sbfis, **bits, / slow yel gn flash cut flor**, rr mas pyr, rr mrly or calcs frags, tr fracd sid nods.

SH: m gy, 20% dk gy or dk gy brn, plty - sbblky, micmica, greasy, dull, 7-8% of sh frags / mas pyr, slly carb, rr montic frags or slty or sdy frags, bits, as cly sh, no vis fracs, firm, brit - sbfis, **slow yel gn flash cut flor**.

SH: m gy, 35% of frags dk gy, dk gy brn, plty - sbblky, micmica, dull, greasy, 7% of frags / mas pyr, predly as cly sh, rr slty & sdy frags, bits, **slow yel gn flash cut flor**, 5% of frags calcs, mrly.

SH: m gy, 30% of frags dk gy or dk gy brn, plty - sbblky, micmica, slly carb, predly as cly sh, rr slty & sdy frags, rr montic frags, rr frags /floating m or c cht grs, 7% of frags / mas pyr, rr predly f gred, arg, ang - sbrdd, calcs, sidic, tt, s&p ss frags, tr fracd sid nods, rr carb flks, 4% of frags calcs, mrly, **mky yel gn flash cut flor.**

SH: m gy, m brn, plty - sbblky, greasy, dull, bits, 6% of frags / mas pyr, predly as cly sh, rr slty & sdy frags, occ frags / coaly grs,**bits & / slow yel gn flash cut flor,** tr lt gy, lt brn, qtzs - s&p, f - rr l m gred, sils, calcs, arg, tt ss frags.

SH:m - dk brn, sb plty - occly sbblky, predly as cly sh, 5 % of frags / mas pyr, as cly sh, tr fracd sid nods, dull, greasy, micmica, **bits, / slow yel gn flash cut flor**, tr arg, m brn gy, slty - predly v f l gred, tt, sils, slly calcs ss frags.

SH:lt gy brn, 25% m - occly dk brn, plty - occly sbblky, micmica, greasy, dull, micmica, slly carb, rr slty frags, predly as cly sh, tr mas pyr frags & rr fracd sid nods, firm - occly hd, brit - sbfis**, bits, / slow yel gn flash cut flor**, tr slty - v f u gred, tt, arg, sils, slly calcs, s&p ss frags.

SH: 40% lt gy, 60% m - occly dk brn, plty - occly sbblky, micmica, greasy, dull, predly as cly sh, rr slty & sdy frags, **bits, / slow yel gn flash cut flor**, 3% as lt gy, slty - v f l gred, predly qtzs, non calcs, slly sils, arg, occly pyric, ss & sdy sltst frags.

SH: lt - m gy, 20% dk gy, dk brn, plty - occly sbblky, micmica, greasy, dull, pyric, tr calc lined fracs, 3% as fracd sid nods, predly as cly sh,20% of frags slty **,** sdy, **wk mky yel gn flash cut flor.**

SS: off wh, lt gy, v lt brn, cons, qtzs, slty - v f l gred, non calcs, fri, comly / m brn arg cmt, rr cht grs, micas, no cut flor
SH: m gy, 30% dk brn, dk gy, plty - occly sbblky, pyric, as cly sh**,** micmica, greasy, dull, slly montic, firm, brit - sbfis, rr curved shale foliation or partings & calc lined fracs, **mod slow mky yel gn flash cut flor.**
SS: cons, qtzs, slty - f gred, rr floating l m qtz grs, sbang - sbrdd, modly - w srt, sils, / sil overgrowths, comly / m brn arg cmt, slly sidic, rr pyr, tt, no cut flor.

SH: lt brn, 60% dk brn, plty - occly sbblky, micmica, 3-4% as mas pyr, predly as cly sh, 2% as fracd, occly slty or sdy sid nods, **slow mky yel gn flash cut flor**, rr wh calc lined fracs, curved sh & q slickeslide.

SH: lt gy, 50% dk gy or blk, more organic than above, plty - occly sbblky, greasy - dull, micmica, carb, as cly sh, firm, brit - sbfis, rr slty & sdy frags, **bits, slow yel gn flash cut flor**, shales / curved foliation or partings, 6% as fracd, occly slty or sdy sid nods, rr montic frags, 4% of frags / abnt mas pyr, 3% as cons, s&p, slty - f, occly l m gred, sils, arg, sbang - sbrdd, ss frags / rr traces of intgran bit.

SH:dk gy, dk brn, blky, plty - occly sbblky, micmica, greasy, dull, 7-8% as fracd sid nods, **bits & / slow yel gn flash cut flor,** 4% of frags as mas pyr, rr f gred, p - modly srt, sils, arg, tt s&p & qtzs ss frags,, many frags / curved foliation or partings.

SH: Post-trip spl, m gy brn, 35% dk gy, dk brn, plty, sft - occly firm, sbfis, micmica, dull - greasy, 3% of frags as mas pyr, as cly sh, rr slt & sd**, bits, / yel gn slow flash cut flor,** sh frags occly curved, tr fracd sid nods, tr slty - v f l gred, arg, tt ss frags / rr m, gred, predly sils slly bit ss frags as prob carryover.

SH: post-trip spl, 25% m gy, 75% dk gy - blk, plty - occly sbblky, micmica, greasy, dull, splintery ip, sft - firm, sbfis, slly pyric, carb, bits, **yel gn slow flash cut flor**, rr sdy frags / lt gy, slty - v f l gred, tt, predly qtzs, slty ss & sdy sltst frags., rr pyr or calc lined fracs.

SH: 40% m gy, 60% dk gy, blk, plty - sbblky, micmica, dull, greasy, pyric, occ carb flks or rr v thin carb partings, predly as cly sh, non calcs, rr calc lined fracs, comly sft, slly brit, **bits, / slow yel gn flash cut flor**, 10-15% of frags slty or sdy, locally grdg to arg, lt brn gy, slty - v f l gred, tt qtzs, v py srt tt ss & sdy sltst, 7% of frags / mas pyr.
SH: 40% m gy, 60% dk gy, blk, plty - sbblky, micmica, greasy, dull, occ curved sh frags, pyric, occ carb flks or rr v thin carb partings, predly as cly sh, sft - m hd, sbfis, bits**, / slow yel gn flash cut flor,** 10-15% of frags slty or sdy, locally grdg to arg, lt brn gy, slty - v f l gred, tt qtzs, v py srt tt ss & sdy sltst, 7% of frags / mas pyr.

DS 4.31° AZ 53.53°
TVD 2415.79

2460 m

2470 m

140 L

DS 5.1° AZ 78.75°
TVD 2435.01

2480 m

238 u

2490 m

DS 4.92° AZ 91.5°
TVD 2454.32

2500 m

2510 m

DS 6.33° AZ 110.57°
TVD 2472.49

2520 m

Aug 29, 2012

178 R

2530 m

DS 6.94° AZ 111.1°
TVD 2491.26

2540 m

222 u

145 L

DS 7.12° AZ 99.85°
TVD 2509.43

166 u

2550 m

P a

F

M a

M a

1-2

1-2

2

238 u

2-3

Com-Abnt v hd brit sils sh, mnr mas pyr

3-4

scat cht nods com sheared sh grs

3-4

1-2

2-3

Work Tight Hole

DEN 1200
Vis 55
FL 5.5
pH 10
SPM 154
PP 13500
RPM 40
WOB 23

DEN 1200
Vis 55
FL 6
pH 10.5PP
13500
SPM 154

2-3

sheared sh

3-4

222 u

166 u

3-4

locally grdg to arg, lt brn gy, slty - v f l gred, tt qtzs, v py srt tt ss & sdy sltst, 7% of frags / mas pyr.

SH: m gy, m brn, 25% dk gy - blk, splintery, sb plty - sbblky, micmica, greasy ip, dull, predly as cly sh, firm - hd, brit - sbfis, occ curved sh frags, **bits, / yel gn flash cut flor,** 3% of frags / mas pyr, comly / tr dism pyr, 4-5% of frags as sdy fracd sid nods, rr slty - v f l gred, qtzs, locally sidic or arg, p - w srt, tt, as slty ss or sdy sltst frags.

SH: m gy, 20% dk brn or dk gy, plty - sbblky, micmica, gtreasy, dull, firm - hd, brit - sbfis, **bits, / yel gn flash cut flor,** occly slly slty & sdy, slly carb, / mas pyr, rr slly montic frags, 20% or calcarb mud additive.

SH: m brn gy, m gy, m brn, splintery, plty - sbblky, micmica, greasy, dull, predly as cly sh, occ slty or sdy frags, firm - brit, occly sbfis, occ frags / curved foliation or rr calc lined fracs, bits, / **slow yel gn flash cut flor**, 3-5% as fracd sid nods.

SH: m - dk gy brn, plty - blky, micmica, dull, greasy, predly as cly sh, greasy ip,firm, brit, occly sbfis, bits, / **slow yel gn flash cut flor,** 4% as fracd sid nods, pyric, rr lt gy, slty - v f u gred, sils, arg, locally calcs, tt, qtzs ss & sdy sltst frags.

SH: m gy, 40% dk brn, blk, plty - occly blky, micmica, greasy, dull, firm, occly sils & v hard, occ sh frags / curved foliation, rr calc lined fracs**, bits, / slow yel gn flash cut flor,** pyric, 6% as fracd sid nods, 3% lt gy, off wh, predly qtzs, slty - v f l gred, arg, calcs, sils, p - w srt, tt, ss frags, 3% c xln calc frags as mud additive, scat mas pyr frags.

SH: m - dk gy, plty, splintery - blky, greasy, dull, micmica, slly pyric, as cly sh, 10-15% as fracd sid nods, abnt ls mud additive, rr v carb frags, occly sils hd & brit frags occ frags / curved foliation, rr calc lined fracs / euhedral calc xls as frac fills, bits, **mky yel gn flash cut flor**, tr dk cht.

SH: m gy, 40% dk gy, blky, plty, occly sbblky, micmica, pyric, rr slty or sdy frags, predly as cly sh, 5% as fracd sid nods, rr sidic, crpxl frags cht or hd sils sh frags.

SH: m gy, 50% dk gy, plty - occly sbblky, occly slly slty, predly as cly sh, sils, rr slickenslide, hd, brit, non fis, micmica, greasy, bits, pyric, 3% as fracd, occly sils sid nods & sils sh frags, **mky yel gn flash cut flor.**

SH: m gy, 40% dk gy, blky, plty, occly sbblky, micmica,greasy, dull, pyric, rr slty or sdy frags, occly sils, brit, frm, chty, predly as cly sh, 5% as fracd sid, comly sils nods, rr sidic, crpxl frags of cht or hd sil sh frags, bits, **slow yel gn flash cut flor**, rr slickenslides, curved sh frags or q calc lined fracs

SH:m gy, 50% dk gy, dk gy brn, plty - occly sbblky, micmica, gsy ip, dull, rr waxy frags, pyric, comly brit, hd, ip sils, as cly sh, rr slty & sdy frags, 2% as fracd sid nods, 2% off wh, lt gy brn, slty - v f l, rr f l gred, qtzs, slly carb, arg, sils, slty ss & sdy sltst frags, sh bits & / **yel gn flash cut flor** & locally / curved foliation, rr fracs.

SH:m gy, 50% dk gy, dk gy brn, plty - occly sbblky, micmica, gsy in pt, dull, rr waxy frags, firm, brit - sbfis, pyric, as cly sh, rr slty & sdy frags, 2% as fracd sid nods, 2% off wh, lt gy brn, slty - v f l, rr v f u gred, qtzs, slly carb, arg, sils, slty ss & sdy sltst frags, sh **bits & / yel gn fllash cut flor**, rr fracs, occ v sils frags.

SH: m gy, 70% dk gy, plty, occly sbblky, as cly sh, micmica, greasy, dull, rr waxy frags, rr slty or sdy frags, pyric**, bits, / yel gn slow flash cut flor,** rr fracs & curved sh frags, 3% as fracd sid nods.

SH: m gy, 30% dk gy, sb plty - sbblky, micmica, dull, greasy, bits, predly as cly sh, **/ mky yel gn flash cut flor,** rr curved sh frags & / q pyr lined fracs, 4% as off wh, lt gy, gy brn, slty - occ v f l gred, arg, calcs, sils, slly carb, tt, qtzs ss & sdy sltst.

SH: m gy, 70% dk gy, blk, dk brn, plty - sbblky, micmica, greasy, pyric, predly as cly sh, slly bits & / **mky yel gn flash cut flor**, sils, comly brit - v hd.

SS: cons, off wh, qtzs - s&p, / < 20% cht grs, slty - f u gred, sbang - sbrdd, calcs, arg, sils, pyric, slly carb, modly srt, tt, no shows.

SH: m gy, 70% dk gy, plty - sbblky, micmica,greasy, dull, as cly sh, pyric, comly hd, sils, rr curved frags,bits, rr slty & sdy frags, **yel gn mky flash cut flor.**

SS: cons, off wh, gy brn, lt brn, qtzs - s&p, / < 20% cht grs, slty - f u gred, rr l m gred frags or frags / floating m qtz & cht grs, sbang - sbrdd, ang ip, slly calcs, arg, sils, pyric, slly carb, modly srt, tt, no shows.

SH: m gy, 70% dk gy, plty, occly sbblky, micmica, greasy,dull, waxy ip, pyric, predly as cly sh, firm, sils, occly subfis, bits, **/ yel gn fllash cut flor,** rr curved sh frags, sils, rr q fracs.

SLTST: off wh, lt gy, lt gy brn, qtzs, sdy, comly grdg to slty - v f l gred, ss, sils, arg, slly calcs & pyric, slly carb, tt, no shows, rr f l - l m gred, tt s&p ss frags.

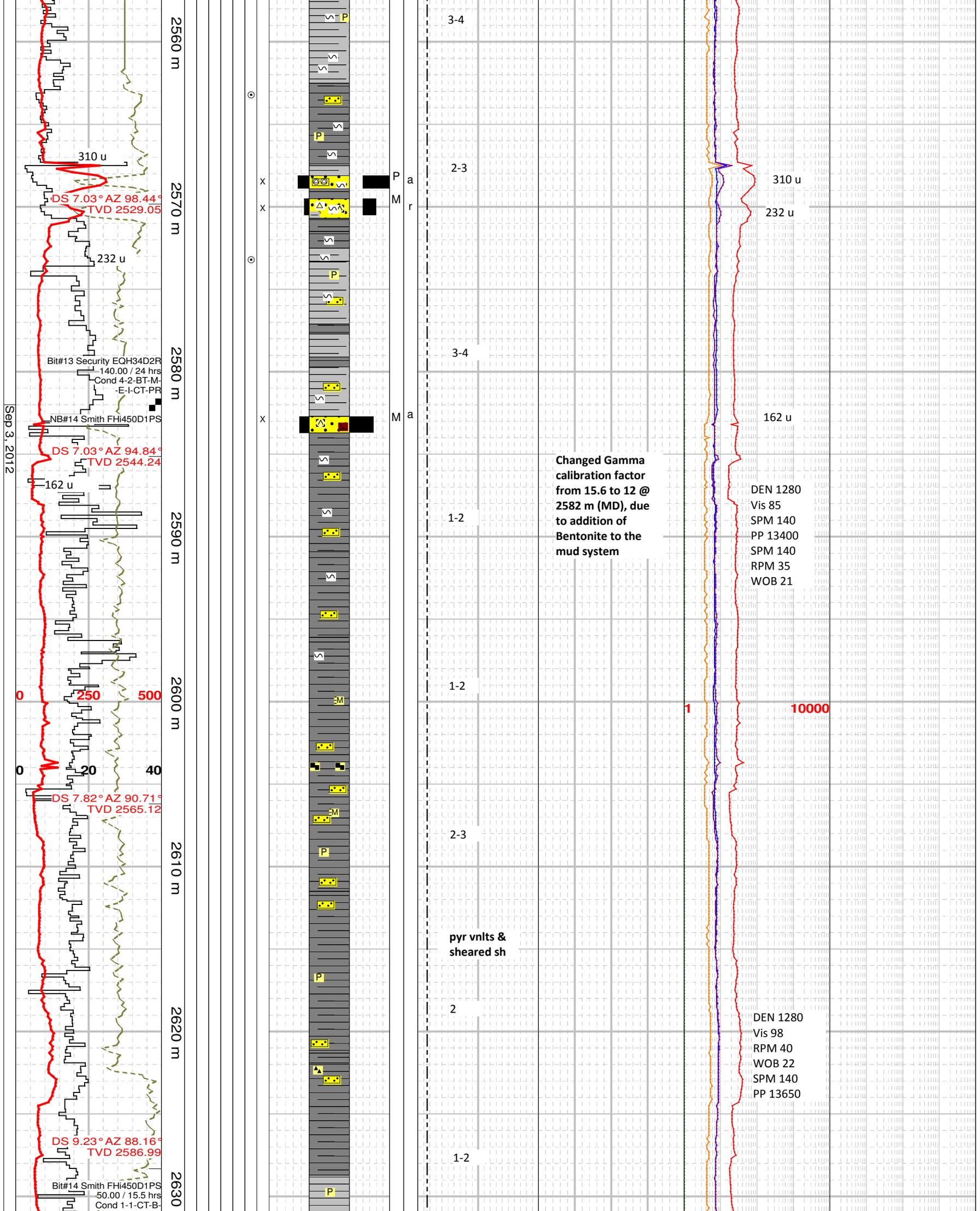
SH: m gy, predly dk gy or dk brn, sb plty - sbblky, micmica, gsy in pt, rr waxy frags, pyric, locly slty & sdy, predly as cly sh, bits, locly slis & hd & grdg - arg cht, **mky yel gn flash cut flor.**

SS: lt gy, off wh, lt gy brn, qtzs - s&p, / < 20% cht grs , slty - v f l gred, locally / floating v f u - f u qtz grs, sbang - sbrdd, ang ip, arg, sils, slly carb & pyric, locally micas, tt, no shows.

SS: cons, lt brn, lt gy, off wh, qtzs - s&p, slty - f, rr l m - c l gred, sbang - sbrdd, occly ang, / < 30% lt cht grs, v sils & comly / sil overgrowths, sidic, or / m brn arg cmt, slly calcs, pyric, slly carb, rr frags / 6% dd blk intgran bit, **wk yel gn flash cut flor**, p reservoir.

SS: cons, qtzs - s&p, / < 25% lt cht grs, lt brn, sidic brn, lt gy, off wh, slty - f gred, sbang - sbrdd, ang ip, p - modly srt, qtzs - s&p, slly calcs, dolic, sidic, comly sils or / m brn arg cmt, carb, pyric, tt, slly bits, no cut flor.

SH: m gy, 20% dk gy, blky, micmica, greasy, plty - occly sbblky, pyric, 15% as fracd sid nods.bits, no cut flor.



occly sbblky, pyric, 15% as fracd sid nods.bits, no cut flor.

SH: m - dk brn, occly m gy, plty - sbblky, micmica, greasy, pyric, slly montic, slly carb, locally slty, predly as cly sh, **mky yel gn flash cut flor**, rr fracs & occ curved sh frags.

CHT PBL SS: cons, s&p, v hd, lt gy, lt - m brn, f - u m gred, rr c gred frags or cht granules & ip as mtx supported cglic ss, ang - sbrdd, p - modly srt, sils & comly / sil overwths, patchy m brn arg cmt, slly calcs, dolic or sidic, / 30-50% cht grs, slly pyric, rr frags / 6-8% blk dd intgran bit, predly tt, v p reservoir, no cut flor.

SH: m gy, 80% dk gy or blk, plty, occly blky, micmica, dull, greasy, occly wxy, pyric, slly carb, firm - hd, occ sh frags / curved foliation, locally sils, **bits, mky yel gn flash cut**

SH: lt gy, predly m brn, plty, occly splintery or sbblky, micmica, dull - greasy, < 15% of frags waxy, pyric, slly carb, bits, mky yel gn flash cut flor, rr curved sh frags.

SH: Post-trip spl, m - dk gy, plty, occly sbblky, micmica, greasy, occly waxy, sft - m dd, predly as cly sh, rr slty & sdy frags, 2% lt gy, lt brn, slty - v f l, rr v f u - l m gred, slty, ip, modly srt, sbang - sbrdd, comly v sils, slly carb, locally sidic, qtzs - s&p ss, rr 6-8% blk dd bit plugged intgran por, / p effective por, no cut flor.

SH: m - dk gy, plty - occly blky, sft - frm, micmica, gsy, dulll, occly wxy, as cly sh, rr slty or sdy frags, brit in pt, in pt sbfis, pyric, nn calcs, rr brn, crpxl, sidic, slly sils & hd sh frags, rr slickenslides, tr lt gy, lt gy brn, slty - v f l gred, arg, sils, tt ss frags.

SH: m - dk gy, plty occly blky, as cly sh, < 10% of frags slly slty or sdy, pyric, frm, sbfis, tr dk brn crpxl cht frags / abnt euhed qtz drs, tr lt brn, lt gy, slty - v f u gred, v sils, w ind, sils, slly arg, tt, slly carb, ss frags.

SH: m - dk gy, sbblky, micmica, comly firm & semi fis, occly slty, slly montic, occ v sfty & brit sh frags, tr lt gy, qtzs, slly carb, arg, slly sils, tt slty - v f l gred, ss & sdy tt sltst frags, tr dk brn cht frags.

SH: m - dk gy, 10% blk & v carb, occly plty, predly sbblky, comly sft, sbfis, occly fis, locally slly montic, v brit, pyric, micmica, greasy ip, 5% lt gy, lt brn, qtzs - s&p, slty - v f u gred, arg, slly carb, locally / sil overgrowths, slly carb, fri - w indurated,tt ss frags, no cut flor.

SH: m - dk gy, sb plty - blky, micmica, greasy ip, slly montic, pyric, predly as cly sh, rr slty or sdy frags, tr lt gy, arg, sils, qtzs, slly pyric, slly carb, / rr dk cht grs, p - modly srt, tt, slty - u m gred, tt, ss & sdy sltst frags, no cut flor.

SH: m - dk gy, plty - blky, micmica, pyric, predly as cly sh, < 10% of frags slty, sdy, tr fracd sid nods, tr m brn cht, tr m brn, gy brn, chty sid frags, tr lt gy, cons, blky, slty - v f l gred, tt, arg, sils, tt ss & sdy sltst frags, no cut flor.

SS: cons, lt brn, lt gy, qtzs - s&p, locally / 20-30% cht grs, slty - f gred, rr m - c grs or cht granules, p - modly srt, sils & comly / sil overgrowths, comly / gy or m brn arg cmt, occly calcs, slly pyric, / 6-10% blk dd bit plugged intgran por, no cut flor.

SH: m - dk gy, plty - blky, micmica, greasy ip, rr slty & sdy frags, predly as cly sh, pyric, brit - sbfis, 4% lt gy, arg, sils, blky, slly carb, pyric, non calcs tt, sltst frags ip grdg to slty - v f l gred, tt,qtzs ss., **sh / wk, slow yel gn flash cut flor.**

SH: Post-trip spl, m - dk gy, plty - occly blky, micmica, firm, ip sb fis, as cly sh, carb, rr slt & sd grs, bits. 1% as mas pyr frags, tr lm brn, slly calcs fracd sid nods, tr lt gy, v f, sils, tt, s&p, sltst frags, **bulk spl / wk, v slow gn flash cut flor.**

SH: m - dk gy, plty - blky, micmica, greasy ip, predly as cly sh, rr slty or sdy frags, pyric, m hd, slly fis, bits, / **v slow gn flash cut flor**, 7% lt gy, cons, s&p, lt gy, lt brn, lt gy brn, slty - v f l, occly v f u gred, sbang - sbrdd, sils, & occly / sil overgrowths comly arg & / lt gy arg mtx, slly calcs, / < 10-20% cht grs & as sdy sltst & slty tt ss, no shows.

SH: m - dk gy, plty - blky, micmica, greasy ip, pyric, m hd, sbfis ip, 2-3% as fracd, locally slty or sdy sid nods, tr m brn cht, , 1% cons, qtzs - s&p, predly slty - v f u gred, sbang - sbrdd, sils, arg, slly pyric tt ss frags, tr m gred, sils, s&p ss frags / 6-8% dd blk bit plugged por, as cvgs?, bulk spl / no cut flor.

SH: m - dk gy, plty - blky, micmica, pyric, m hd, sb fis in pt, as cly sh, rr slty & sdy frags, 1-2% as lt gy, slty - v f u gred, sbang - sbrdd, qtzs - sa and pepper, modly srt, sils, slly pyric, tt ss frags grdg in pt - sdy, sltst, tt, tr lt gy, sa and pepper, v f l - f u gred frags / flotg c l qtz & cht grs, sils, / 1-12% blk dd, bit plugged intgran por, as thins strgs,?, cvgs?, no cut flor.

SH: dk gy - blk, fis - sbfis, nn calcs, pyric, occ slty slly calcs & pyric lams, occ chty pyric strgs, w cpctd,

DS 9.4° AZ 93.17°
TVD 2623.01

DS 9.4° AZ 94.75°
TVD 2632.98

DS 9.23° AZ 96.68°
TVD 2642.93

DS 9.14° AZ 98.88°
TVD 2652.05

DS 8.7° AZ 102.84°
TVD 2662.38

Bit#16 Smith FHi45OD1PS
82.00 / 34.5 hrs
Cond 1-2-WT-A-
-E-I-BT-PR

NB#17 Smith FHi40

221u
DS 6.68° AZ 125.25°
TVD 2689.7

231u

250u

307u

297u
DS 4.57° AZ 136.5°
TVD 2708.75

Sep 8, 2012

Sep 9, 2012

Sep 10, 2012

2660 m
2670 m
2680 m
2690 m
2700 m
2710 m
2720 m
2730 m
2740 m
2750 m
2760 m

P
D
X

1
2
4-5
3-4

Den 1280
Vis 62
FL 6.5
pH 10.5

WOB 23
RPM 85
PP 11,400
PO 1.60

Den 1270
Vis 75
FL 4.2
pH 10.5

WOB 21.7
RPM 20+M
PP 13,600
PO 1.59

Den 1300
Vis 88
FL 6.0
pH 10.5

slly calcs & pyric lams, occ chty pyric strgs, w cpctd, hd, sils ip, brit, occ calc cmtd micfrac, occ pyrd pl stems or burs?

SH: v dk gy - blk, fis - sbfis, nn calcs, pyric, pyr nods & mic lam, carb, occ slty - vfg sdy lams, w cpctd, brit, tr brn cht

SH: dk gy - blk, fis - sbfis, nn calcs, carb, pyric, slty strgs, w cpctd, frm, brit, tr brn cht

SLTST: m - dk yelsh brn - yelsh gy, qtzs, calcs, pyric, locly grdg - vfg ss

SH: v dk gy - blk, fis - sbfis, nn calcs, pyric, occ chty ls strgs, w cpctd, frm, carb

CHT: m - dk yelsh brn - yelsh gy, thn strgs, org incls

LS: m - dk gysh brn, crpxl, slly arg, chty ip, blky, dns, tt, hd

SS: lt - m yelsh brn - yelsh gy, vf - u m gred, rr u c gred cls, qtz / mnr cht & wh flds, sbrdd - rdd, ply srt, predly tt, locly / 8-10% intgran por, **locly / com intstl blk pyrbit cmt, wk slow dd stmg cut**

LS: aa, occ fos frags (crins, bracs), thn strgs, tr brn cht

SH: blk, fis - sbfis, nn calcs, occ sltst & ls strgs, carb, w cpctd, frm

SLTST: dk gy - dk brnsh gy, calcs, locly sdy, pyric, thn strgs

SH: v dk gy - blk, fis - sbfis, nn calcs, carb, locly pyric

SS: lt - m gy, yelsh gy, vf - f gred, qtzs / tr cht, sbrdd - sbang, mod - py srt, sil + abnt sec calc cmt, com pyr cmt, **locly / mnr - com blk pyrbit cmt, fnt slow stmg dd o cut**, w ind, tt

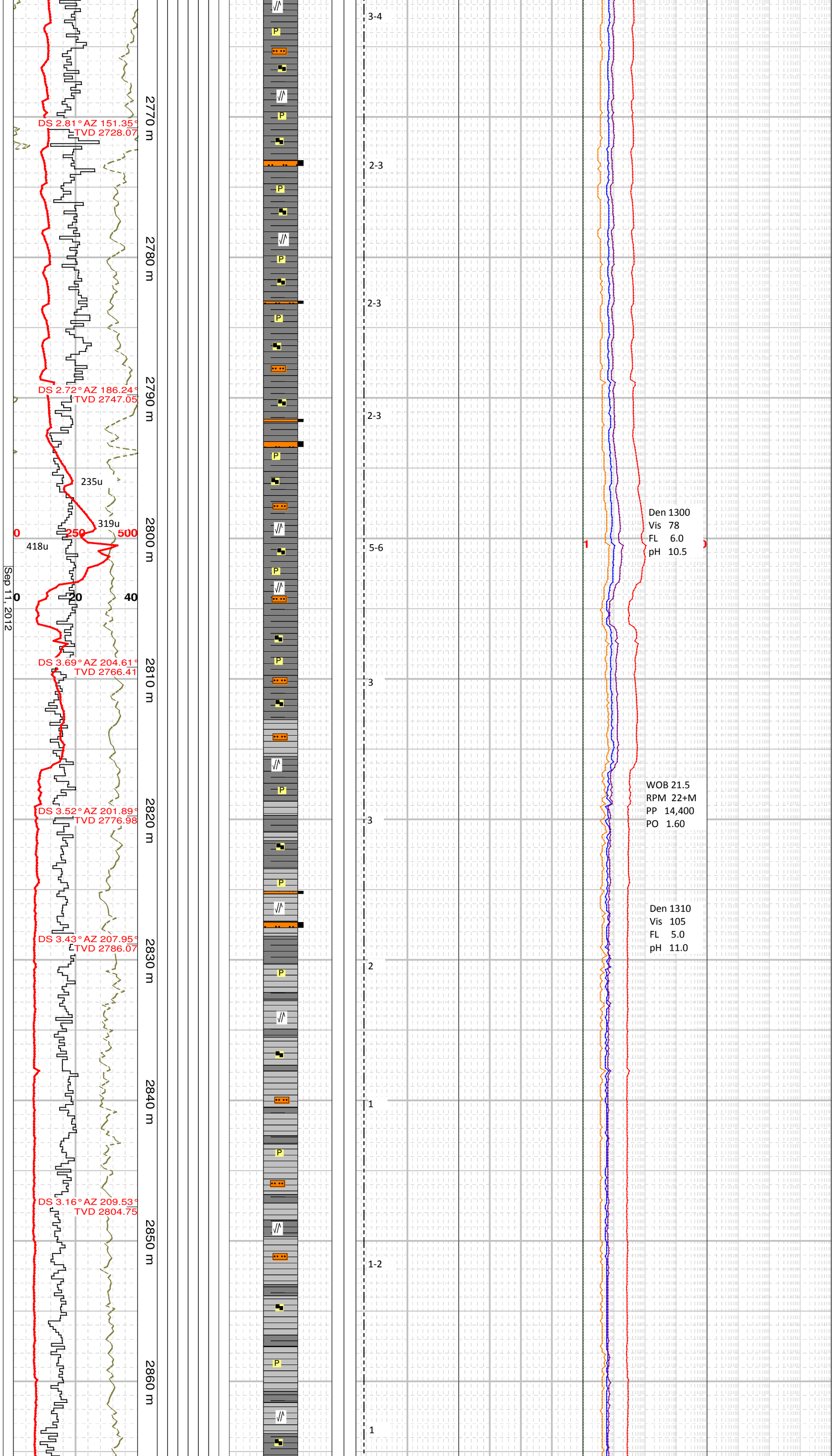
LS: lt - dk yelsh brn, crpxl, blky, gly, slly arg ip, dns, tt, rr fos frags, tr brn cht

SLTST: m - dk gysh brn, qtzs, calcs, micmica, sdy ip, tr pyr

SH: blk, sbfis - fis, nn calcs, pyric, scat mas pyr, occ pyr cmtd fracs, carb, occ sks, w cpctd, frm

SH: v dk gysh brn - blk, sbfis - fis, pyric, w cpctd, frm, modly brit, com sks, slly gsy lstr, incrly carb, **no vis flor, rr cut / cut flor,** occ slty lams

SH: v dk gy - blk, fis - sbfis, occ dk gysh brn blky lam, pyric, occ aragic fos frags, slly gsy lstr, com sks, occ slty lams, occ calc cmtd micfrac, w cpctd, modly frm, **no vis flor, slow wk hazy dd o cut**



SH: aa, **v slow wk hazy cut**, incrly com slty lam

SLTST: dk gysh brn, vf slt / arg mtx, carb ip, tr pyr, slly calcs, thn lam

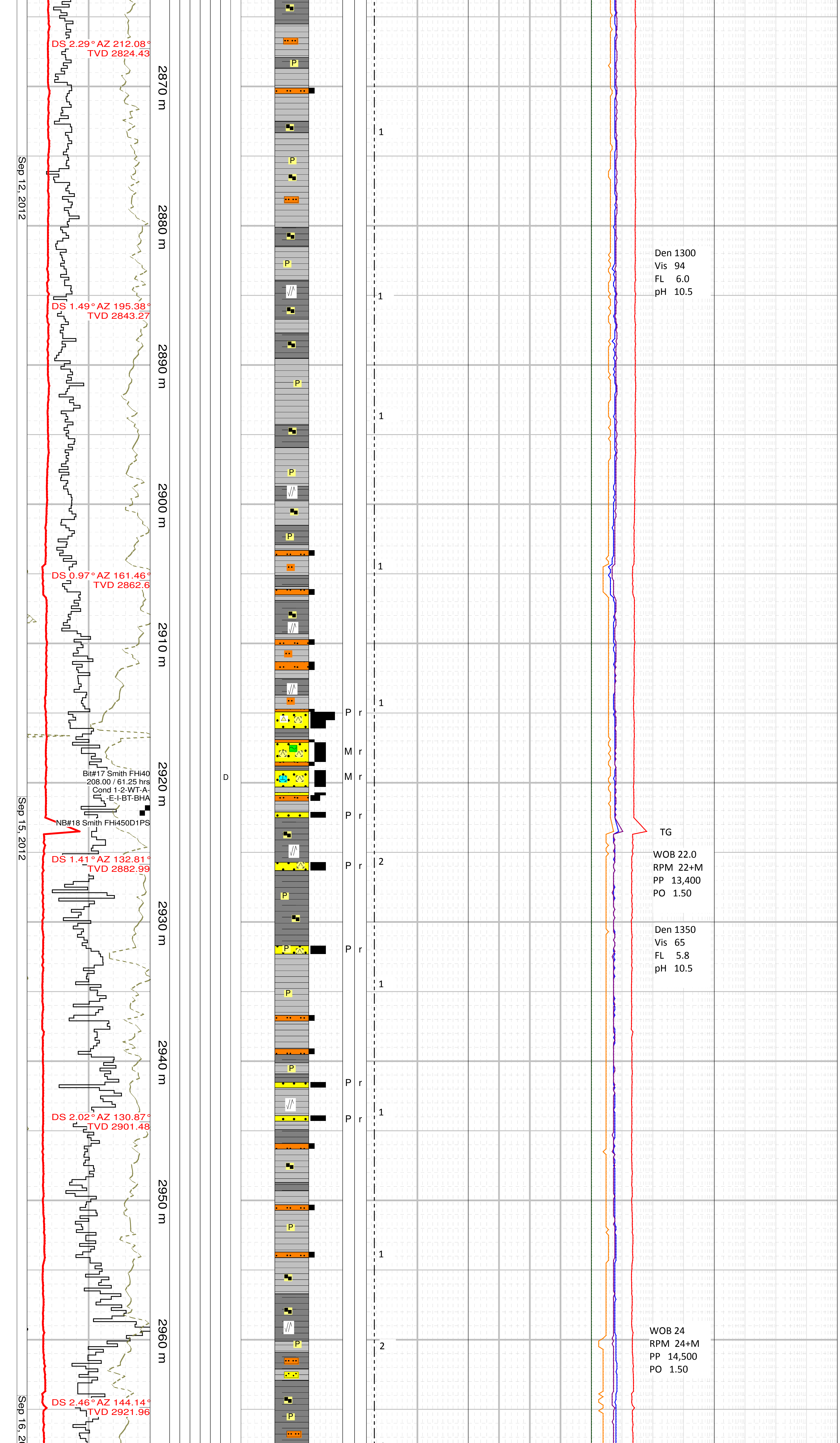
SH: v dk gy - blk, fis - sbfis, nn calcs, incrly carb, slly gsy lstr ip, pyric, com sks, occ slty lam, **no vis flor, slow wk hazy cut**

SH: dk gy - blk, sbfis - fis, occ dk gysh brn blky lam, pyric, carb, occ dk gysh brn slty lams, com sks / gsy lstr, **no flor, v slow fnt cut**

SH: predly dk gy, locly blk, sbfis - fis, carb, decrg toc, nn calcs, w cpctd, modly frm, pyric, com fy dism pyr, tr mas pyr, occ sks, occ slty lam, **no vis flor**

SH: predly dk gy - dk brnsh gy, locly blk, sbfis - fis, nn calcs, carb, modly w cpctd, modly sft, decrg pyr cont, tr scat mas pyr, occ sks, **no vis shw**

SH: predly dk gy - dk brnsh gy, locly blk, occ dk



SH: predly dk gy - dk brnsh gy, locly blk, occ dk gysh brn calcs slty lams, sbfis - fis, nn calcs, carb, modly w cpctd, modly sft, decrg pyr cont, tr scat mas pyr, rr sks, **no vis shw**

SH: predly dk gy - dk brnsh gy, locly blk, sbfis, nn calcs, carb, slty ip, occ slty lams, tr mas pyr, tr dism pyr, micmica, **no vis shw,** occ sks

SLTST: m - dk gysh brn, f - c slt, arg mtx, slly calcs ip, slly carb, pyric, micmica

SH: predly dk gy - dk brnsh gy, locly blk, sbfis, nn calcs, carb ip, incrly slty, tr pyr, micmica, rr sks, **no vis flor**

SS: m gysh brn, qtz & com cht, vf - l c gred, slty mtx, sbrdd, py srt, sil + mnr calc cmt, w ind tt, v hd, **no vis shw**

SS: lt - m gysh brn, predly qtz / tr cht, vf - u f gred, locly / slty mtx, sbrdd, modly srt, sil + tr calc cmt, tr bri gn glau gr, w ind, tt, **tr brn hydc resd, no vis flor, v slow & v fnt wk hazy cut, no shw**

SLTST: lt - m gysh brn, qtzs, sdy ip, slly calcs, w ind, hd

SH: predly dk gy - blk, sbfis - fis, nn calcs, carb, w cpctd, modly frm, brit ip, occ dk brn sils lam, locly pyric, mnr mas pyr, occ sks, cvgs ip

SS: m gy, qtz, cht & com dk lits, vf - u f gred, rr m gred cls, slty arg mtx, sil + tr dolic cmt, w ind, hd, mnr dism pyr cmt, tt

SLTST: m gy, sdy ip, slly calcs - dolic, pyric, w ind

SH: dk gy - brnsh gy, locly blk, sbfis, nn calcs, decrg carb cont, pyric, frm, brit, com - abnt mas, dis & ptch pyr thru, occ slty strg, occ py srt ss lams, rr - occ sks

SLTST: m - dk gy, dk brnsh gy, slly dolic ip, rr brac frag, sdy ip, w ind, hd, tr pyr

SH: dk gy, dk gysh brn, mnr bk, sbfis - sbblky, nn calcs, carb ip, w cpctd, frm, brit, pyric, slty lams

SH: dk gy - blk, sbfis, incrly carb, nn calcs, pyric, occ slty lams, occ sks

SH: predly blk, dk gy - dk gysh brn ip, sbfis, nn

6, 2012

2970 m

2980 m

DS 2.99° AZ 155.66°
TVD 2940.41

2990 m

0 250 500

DS 3.16° AZ 174.91°
TVD 2958.48

3000 m

0 20 40

3010 m

Sep 17, 2012

DS 2.72° AZ 199.34°
TVD 2977.35

3020 m

3030 m

DS 2.02° AZ 223.25°
TVD 2996.38

3040 m

3050 m

Sep 18, 2012

DS 0.7° AZ 213.31°
TVD 3015.61

3060 m

P r

4

3

6

Den 1360
Vis 79
FL 6.0
pH 10.5

Test Gas

WOB 24.2
RPM 40+M
PP 15,400
PO 1.60

4

3

WOB 25.2
RPM 30+M
PP 14,300
PO 1.50

1

3

Den 1350
Vis 64
FL 6.2
pH 10.5

3-4

2

2

2-3

4-5

3-4

Den 1365
Vis 77
FL 6.0
pH 10.5

WOB 26.2
RPM 32+M
PP 14,400
PO 1.49

3-4

SH: predly blk, dk gy - dk gysh brn ip, sbfis, nn calcs, carb, modly hi toc, locly pyric, occ slty lams, rr py srt ss strg, w cpctd, frm, com sks

SLTST: m gy, sdy, slly calcs, thn lams, mnr pyr

SH: dk gy - blk, dk gysh brn ip, sbfis - fis, nn calcs, carb, pyric, ptch mas pyr, mod - w cpctd, com sks, occ ss & sltst strgs, cvgs ip

SS: lt - m gy, brnsh gy, vf - f gred, slty arg mtx, sbrdd, py srt, sil + mnr dolic - calcs cmt, ptch mnr pyr cmt, w ind tt, thn strgs

SS: aa, qtz & com dk lits, tr carb mat, w ind, tt, thn strgs, mnr pyr

SH: predly blk, dk gysh brn ip, sbfis - fis, nn calcs, carb, occ slty lam, locly pyric, occ sks

SH: predly blk, dk gysh brn ip, fis - sbfis, nn calcs, carb, mod - w cpctd, modly frm, com sks, brit ip, mnr pyr, occ sdy strg, **no vis flor, v fnt & v slow cut flor**

SS: lt - m gy, brnsh gy, qtz & mnr dk lits, vf - f gred, occ m - l c gred strg, slty & arg, sbrdd, py srt, sil + calc cmt, tr pyr, w ind, tt

SLTST: m - dk gy, m brn, qtzs, arg ip, sdy, thn lams, slly calcs

SH: dk gy - blk, dk gysh brn ip, sbfis, nn calcs, carb ip, mnr ptch & dism pyr, mod - w cpctd, occ sks

LS: m - dk hgy - brn, crpxl, arg, blky, dns, tt, thn strg

SS: lt - m gy - brnsh gy, qtzs / mnr dk lits, vf - u f gred, rr m gred cls, rdd - sbrdd, mod - py srt, sil + mnr calc cmt, w ind, tt

SH: predly dk gy, blk ip, sbfis, calcs, slty & sdy lams, mod - w cpctd, decrg carb cont, frm, occ sks

SS: lt - m gy - brnsh gy, qtzs / mnr dk lits, vf - f gred, slty ip, sbrdd, mod srtg, sil + mnr calc cmt, w ind, tt, **ptch blk bit cmt, no vis shw**

SH: sbeq dk gy - gysh brn & blk, sbfis - fis, nn calcs, carb, mnr dism & ptch pyr, sdy lams aa, occ - com sks, occ slty lams

SH: predly blk, dk brnsh gy ip, sbfis - fis, incrly carb, nn calcs, mnr ptch pyr, pyr lam, vfg sdy - slty lams, com sks

SH: aa, occ slty lams, occ - com sks

SH: predly blk, v dk gysh brn ip, sbfis - fis, nn calcs, carb, mnr ptch pyr, modly w cpctd, frm, com sks, occ slty lam, rr micfos frags, rr aragic fos rmn

SS: lt - m gy - brnsh gy, vf - u f gred, occ l - u m gred cls, slty mtx, sbang, py srt, sil + mnr calc cmt, rr gr /

3070 m

3080 m

3090 m

3100 m

3110 m

3120 m

3130 m

3140

DS 0.62° AZ 118.66°
TVD 3036.49

Bit#18 Smith FHi450D1PS
210.00 / 80.5 hrs
Cond 3-2-WT-A-
-E-I-BT-HR

Sep 19, 2012

Sep 20, 2012

P a

P a

P a

P a

P a

P r

P r

P r

P r

P r

P R

2-3

2-3

2-3

2-3

2-3

1

Den 1360
Vis 68
FL 5.6
pH 10.5

WOB 26.1
RPM 32+M
PP 14,000
PO 1.47

SS: lt - m gy - brnsh gy, vf - u f gred, occ l - u m gred cls, slty mtx, sbang, py srt, sil + mnr calc cmt, rr gr / tr - mnr pyr bit cmt, w ind, tt

SH: sbeq dk gy - dk brnsh gy & blk, sbfis - fis, nn calcs, decrg carb, occ slty lam, tr - mnr scat pyr, modly w cpctd, frm, sdy strgs, occ sks

SS: lt - m gy - brnsh gy, vf - u f gred, occ l - u m gred cls, slty mtx, sbang, py srt, sil + mnr calc cmt, rr gr / tr - mnr pyr bit cmt, w ind, tt

SH: aa, rr calc flld micfrac, occ sks

SS: aa, predly vf - f gred, slty ip, modly srt, w ind, tt, no vis flor, tr fnt v slow cut, no shw, tr pyr, thn strgs

SLTST: m - dk gy, sdy ip, slly calcs, carb ip, thn lams

SH: sbeq v dk gy - gysh brn & blk, fis - sbfis, nn calcs, carb, w cpctd, frm, mnr pyr, sdy strgs, slty lam, rr sks

SH: predly dk gy - brnsh gy, comly blk, sbfis, pyric, carb ip, modly w cpctd, modly frm, occ sks, sdy strgs

SS: aa, com flotg l m gred cls, py srt, w ind, tt, thn strgs

SS: m brnsh gy, vf - f gred, occ m gred flotg cls, slty mtx, sbrdd, py srt, sil + calc cmt, w ind, tt

SH: predly dk gy - gysh brn, sbfis - sbblky, w cpctd, frm, nn calcs, decrg carb cont, w cpctd, frm, pyric, occ sks

SH: predly dk gy - gysh brn, blk ip, sbfis - sbblky, w cpctd, frm, slty ip, decrg carb cont, rr sks

SLTST: m - dk gysh brn, sdy ip, slly calcs, carb ip, tr - mnr dism pyr

SS: m brnsh gy, vf - f gred, occ m - c gred qtz & lt gy cht w rdd lse cls, slty mtx, sbrdd, py srt, sil + calc cmt, w ind, tt, mnr pyr cmt

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

Measured Depth

Slide - Rotate
MDT Data
Sidewall Core
Core
Test
Oil Show
Porosity Type
Porosity (%)
5 10 20

Interpreted Lithology

c slt vf snd f snd m snd c snd
Grain Size (mm)

Sorting
Rounding

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

PEF (b/e)
0 2.5 5 7.5 10
Density Correction (Kg/m3)
450 200 -50
Neutron Porosity (%)
0.45 0.3 0.15 0-0.15
Density Porosity (%)
0.45 0.3 0.15 0-0.15

C1 (Methane) (ppm)
1 10000
C2 (Ethane) (ppm)
1 10000
C3 (Propane) (ppm)
1 10000
C4 (Total Butanes) (ppm)
1 10000
C5 (Total Pentanes) (ppm)
1 10000

Invaded Fm Resistivity (ohmm)
0.1 1000
Deep Induction AF60 (ohmm)
0.1 1000
Medium Induction AF30 (ohmm)
0.1 1000
Shallow Induction AF20 (ohmm)
0.1 1000

Date

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
NCY McParlon A-25
300/A25 66-10 137-15/0