Well Information

Operator:	**NORTHERN CROSS YUKON LIMITED**
Well Name:	**NCY Ehnjuu Choo B-73**
Surface Location:	**300/H-60-6620-13645/0**
Bottom Hole Location:	**66:12:10.35N/136:59:01.56W**
UWI:	300H60662013645
Pool / Field:	Wildcat / Wildcat
Well License #:	1128
Well Licensee:	NORTHERN CROSS YUKON LIMITED
Province / State:	Yukon
Country:	Canada

Elevations

Reference:	Sea Level
Ground:	673.2 m
Kelly Bushing:	681.7 m
Casing Flange:	m
K.B. to Ground:	8.5 m
Cut(-) / Fill(+):	-0 m

Total Depth

Measurement Type	MD	TVD
Drillers TD (Tally)	3350 m	2946.87 m
Drillers TD (Strap or SLM)	m	m
Loggers TD	3353 m	2949.81 m

Well Co - Ordinates

	Longitude	Latitude	
Surface Co-Ordinates:	136.590156	66.121035	**Well Type:** Deviated
			NS:
			EW:
Int. Casing Co-Ordinates:			**NS:**
			EW:
Bottom Hole Co-Ordinates:			**NS:**
			EW:
UTM Surface Co-Ordinates:	**Northing:** 7343938.1		**Easting:** 410691.44

Well Summary

Spud Date:	Apr 16, 2013 @ 02:00hrs
TD Date:	Jun 22, 2013 @ 13:45hrs
Rig Release Date:	Jun 26, 2013 @ 23:59hrs
Contractor	Patterson-UTI Drilling Company

Logging Tool Summary

Job #	Run #	On Bottom Date	BH Temp	Tool Type
1	1	Apr 24, 2013 @ 19:45hrs	39.1 °C	DSI, PPC, GPIT from 366 to surface.
1	2	Apr 24, 2013 @ 22:10hrs	32 °C	AIT, PEX, HNGS to surface.
2	1	May 11, 2013 @ 05:55hrs	43.8 °C	
2	2	May 11, 2013 @ 12:00hrs	43.8 °C	
2	3	May 12, 2013 @ 00:15hrs	43.8 °C	ART-ECS-SMR-DT-GR-SP w/HNGS, GPIT, PPC-2 EMI-GPIT-Sonic Scanner-PPC2 (x2), GPIT, PPC-2

Drilling Fluid Summary

Fluid Type	From	To
Gel Chemical	0 m	366 m
KCL Ultradrill	366 m	1252 m
KCL Ultradrill	1252 m	3350 m

Work Schedule

Contractor	Geologist	Log Interval	Dates Logged
Keitech Consultants	Trevor Wall/Harry Gluth	20 m - 3350 m	Apr 15, 2013 - Jun 27, 2013

Casing Summary

Type	Hole Size	Casing Size	Landed
Surface	444.5 mm	339.7 mm	366 m
Intermediate	311 mm	244.5 mm	1249 m
Intermediate	222 mm	177.8 mm	2853 m
Liner	156 mm	114.3 mm	3349 m

Remarks

Legend

Rock Types and Thin Beds

Whole Bed	Stringer	Nodule	Breccia	Clast	Pebble	Grain	Rock Type
							Anhydrite - primary
							Anhydrite - secondary
							Argillite
							Barite
							Bentonite
							Breccia
							Cement
							Conglomerate - mixed
							Conglomerate - dark chert
							Conglomerate - light chert
							Conglomerate - varicolored chert
							Chert - dark
							Chert - fossiliferous
							Chert - light
							Chert - tripolitic
							Chert - varicolored
							Claystone - colored
							Claystone - gray
							Coal
							Dolomite
							Ferruginous
							Feldspar
							Gypsum
							Igneous - acidic
							Igneous - basic

Whole Bed	Stringer	Nodule	Breccia	Clast	Pebble	Grain	Rock Type
							Igneous - metamorphic
							Limestone - grain supported
							Limestone - mud supported
Muddy IHS burrowed							Muddy Inclined Heterolithic Strata
							Marlstone - calcareous
							Marlstone - dolomitic
							Mud breccia
							Mudstone
							Paleosol
							Phosphate
							Quartz
							Salt
							Shale - black
							Shale - dark gray
							Shale - medium gray
							Shale - light gray
							Shale - brown
							Shale - green
							Shale - red
							Siderite
							Sandstone
							Siltstone
Sandy IHS burrowed							Sandy Inclined Heterolithic Strata
							Till - glacial
							Volcanic (Tuff)
							Welded Volcanic (Tuff)

Fossils (Rock Builders)

	Aggregate grains		Foraminifera
	Algae - laminations	F	Fossil
	Algae - non descript		Fragmental
	Algae - ootoid		Gastropod
	Algae - skeletal		Graptolite
	Amphipora	H	Hydrozoa
	Belemnite		Intraclast
	Bioclastic		Mollusc
	Brachiopod		Oncolite
	Bryozoa		Oolite
	Calciphaera		Ostracod
	Cephalopod		Pelecypod
	Chaetetes		Pellet
	Coated grain		Pisolite
	Conodont		Plant Remains
	Coral	S	Plant Spores
	Coral - branching		Scaphopod
	Coral - head		Spicule
	Coral - colonial		Sponge
	Coral - solitary		Stromatoporoid
	Crinoid	B	Stromatoporoid-bulbous
	Diatom	M	Stromatoporoid-massive
	Echnoid		Stromatoporoid-tabular
	Echnoid - spine		Tentaculites
	Fish Remains		Trilobite
	Euryamphipora		

Sorting Track

vP	Very poorly sorted - > 10 phi size grade classes
P	Poorly sorted - 6-10 phi size grade classes
M	Moderately sorted - 3-6 phi size grade classes
mW	Moderately well sorted - 2-3 phi size grade classes
W	Well sorted - < 2 phi size grade classes

Accessories

	Anhydritic		Cherty - tripolitic	I	Illitic		Salt casts
	Argillaceous		Cherty - varicolored	K	Kaolinitic		Sandy
	Baritic	C	Chloritic	L	Lithic Fragment		Sideritic
	Bentonitic		Clayey	TT	Marly - calcareous		Siliceous
	Bituminous		Dolomitic		Marly - dolomitic		Silty
	Calcareous	Fe	Ferruginous staining	m m	Micromicaceous		Slickenside
	Carbonaceous		Fractures	ML	Mixed layer clayey		Stylolitic
	Cherty - dark		Glauconitic	M	Montmorillonitic		Tuffaceous
F	Cherty - fossiliferous		Gypsiferous		Phosphate pellets	Z	Zeolitic
	Cherty - light	G	Gibbsitic	P	Pyritic		

Textures

C	Chalky	e	Earthy	mx	Microcrystalline
CX	Cryptocrystalline	L	Lithographic		Slickenside
MS	Mudstone	GS	Grainstone	BFS	Bafflestone
WS	Wackestone	FLS	Floatstone	BS	Bindstone
PS	Packstone	RS	Rudstone	FS	Framestone

Matrix

	Argillaceous	TT	Marl - calcareous
BFS	Bafflestone		Marl - dolomitic
B	Bentonite	L	Micrite
BS	Bindstone	ML	Mixed Clay
	Bituminous	M	Montmorillonite
	Clay	MS	Mudstone
C	Chlorite	PS	Packstone
FLS	Floatstone	RS	Rudstone
FS	Framestone		Sand
G	Gibbsite		Silt
GS	Grainstone		Sparry Calcite
I	Illite	WS	Wackestone
K	Kaolinite	Z	Zeolite

Rounding Track

vA	Very Angular
A	Angular
a	Subangular
r	Subrounded
R	Rounded
wR	Well Rounded

Cement

	Anhydritic		Gypsiferous
	Baritic		Hematitic
	Bituminous		Limonitic
	Calcareous	P	Pyritic
	Chert - dark		Salt
	Chert - light		Sideritic
	Dolomitic		Siliceous
Fe	Ferruginous		

Miscellaneous Grains

B	Biotite		Mineral crystal		Orthoclase
	Glauconite		Mineral - dark		Plagioclase
m	Mica flakes	M	Muscovite		Sand grain

Trace Fossil Track

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

Sedimentary Structures Bedding / Cross Bedding

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

Sedimentary Structures Laminations / Cross Laminations

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

Sedimentary Structures

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

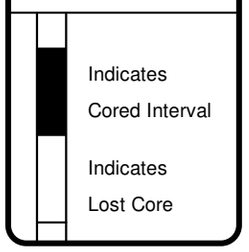
Porosity Type Track

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

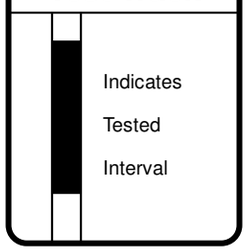
Oil Show Track

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

Core Track



Test Track



Framework Track

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

? indicates questionable interpretation

Sedimentary Bedding Contacts

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

Canstrat / Amstrat Grain Size Scale

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

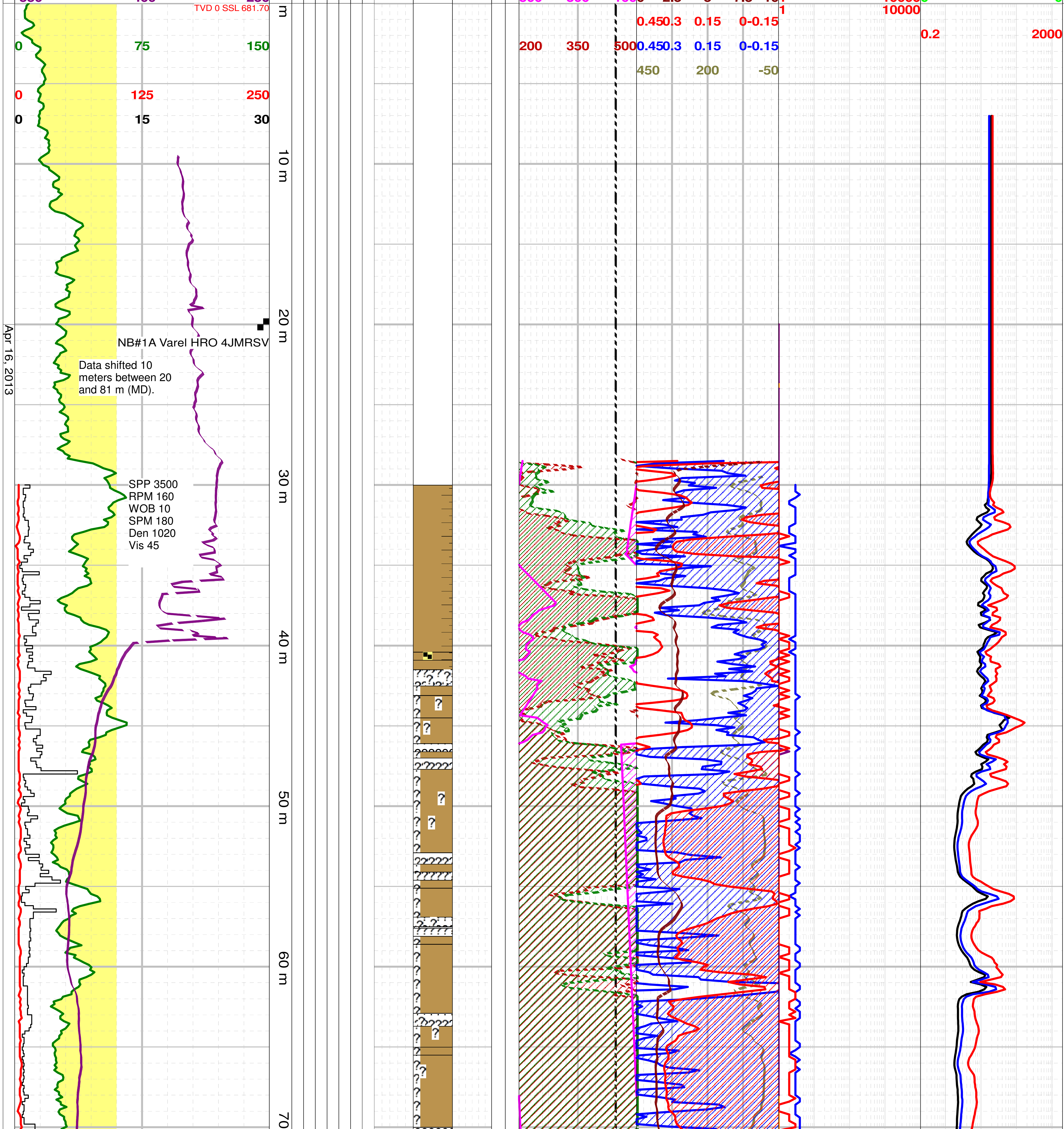
The size measure Phi is equal to the negative logarithm to the base 2 of the size in millimeters.
Thus 1 mm = 0 Phi and 1/2 mm = +1 Phi and 1/4 mm = +2 Phi etc.

Wentworth Grain / Crystal Size Scale Chart

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

Drilling Progress Total Gas - ROP Gamma Ray - SP	Caliper Logs Sonic DT	Density-Neutron Density Corr. PEFZ	Mud Gas Chromotography	Array Induction	Northern Cross Yukon NCY Ehnjuu Choo B-73 300/H-60-6620-13645/0
Drill Rate (min/m) 0 30 60	Hole Size (mm) 125 250 375	Density Correction (kg/m3) 450 200 -50	Total C4s C5s (units) 1 10000	Shallow Induction AF20 (ohm) 0.2 2000	
Total Gas - Linear (units) 0 125 250	Y Caliper (mm) 125 250 375	Neutron Porosity (%) 0.45 0.3 0.15 0 -0.15	C3 (Propane) (units) 1 10000	Medium Induction AF30 (ohm) 0.2 2000	
Core Rate (min/0.2m) 0 15 30	X Caliper (mm) 125 250 375	Density Porosity (%) 0.45 0.3 0.15 0 -0.15	C2 (Ethane) (units) 1 10000	Deep Induction AF60 (ohm) 0.2 2000	
Gamma Ray (gapi) 0 75 150	Sonic Curve (ms/m) 500 300 100	PEF (b/e) 0 2.5 5 7.5 10	C1 (Methane) (units) 1 10000	Graded Fm Resistivity (ohm) 0	
MWD Gamma (units) 0 75 150					
SP (Mv) -550 -400 -250					

Date | Measured Depth | Slide - Rotate | MDT Data | Sidewall Core | Core | Test | Oil Show | Porosity Type | Porosity (%) | Interpreted Lithology | Grain Size (mm) | Sorting | Rounding



SS: qtzs, f l - c l gred, sbang - occly rdd, ip cglic / rr qtz granules, sils, / 15 - 30% vis intgran por, no cut, p spl quality.

SH: lt gy brn, sb plty - blky, comly cracking in wtr. micmica, occ slty or sdy frags, non calcs, sft, sb fis.

SLTST: lt yel brn, arg, micmica, slly carb, grdg ip to sltty sh, tt, no shows.

SH: lt - m brn gy, lt - m gy, sb plty - occly blky, comly swelling or cracking in wtr, occly slty or sdy, <10% as lt brn, arg, micmica, slly carb, tt, nn calcs sltst frags.

SLTST: lt yel brn, arg, micmica, slly carb, grdg ip to sltty sh, tt, no shows.

SH: lt - m brn, lt - m brn gy, sb plty - comly blky, micmica, occly slly slty or carb, sft - m hd, sb fis - occly fis, non calcs.

SH: m brn, m brn gy, sb plty - blky, micmica, occly slty, slly carb, occ frags crk in wtr, sft, sb fis, nn calcs.

SH: m brn, m brn gy, sb plty - blky, comly montic, comly sft, fis, occly slty or carb, / < 10% lt yel brn, frm, micmica, slly carb, tt sltst frags.

SLTST: lt yel brn, arg, micmica, carb, qtzs, firm, tt, no shows.

SH: m brn, m brn gy, sb plty - blky, montic, comly cracking in wtr, sft - occly hd, predly as cly sh, rr slty frags.

Ten meter depth correction at 81 m (MD).

DS 1.5° AZ 59.8°
TVD 90.68 SSL 591.02

Loss of Circulation @ 97-99 m (MD)

Den 1010
Vis 65

Ran seven cement plugs at 99, 102, 104 and 116 m (MD)

Apr 18, 2013

DS 2.2° AZ 50.5°
TVD 118.54 SSL 563.16

Apr 21, 2013

DS 2.6° AZ 48.2°
TVD 145.25 SSL 536.45

80 m
90 m
97.5 Korr
100 m
110 m
120 m
130 m
38.6 Korr
140 m
150 m

M
M

Orange Marker
(TVD: 97.49)
(SSL: 584.21)

0450.3 0.15 0-0.15

Drilled blind between 97 and 116 m (MD), LOC, set cement plugs between 99 and 116 m (MD).

Whitetone River
(TVD: 109.38)
(SSL: 572.32)

Zeroed and calibrated gas detector

Den 1010
Vis 32
SPM 160
WOB 6
SPP 5240

P a
P
P a
M a

Lower Cretaceous M
(TVD: 138.56)
(SSL: 543.14)

Sample taken for Fission Track Analysis

Den 1170
Vis 42
SPM 160
PP 5200
WOB 6-7.5
RPM 162

SH: m brn gy, sb plty - blky, micmica, occly cracking in wtr, micmica, sft - occly hd, fis -sb fis, predly as cly sh, / < 10% lt yel brn, carb, arg, micmica, tt qtzs sltst frags.

SH: m brn gy, sb plty -blky, micmica, sft, sbfis - fis, montic, micmica, occ frags / sidic or slly chty m brn lam, as cly sh.

SH: m brn, m brn gy, sb plty - blky, micmica, sft - hd, sb fis, occ slty frags, predly as cly sh, nn calcs, / < 10% lt yel brn, arg, micmica, slly carb, qtzs, tt sltst frags.

SH: m brn, m gy, m brn gy, sb plty - blky, micmica, sft - occly hd, sb fis, non calcs, rr slty frags, tr gy qtzs, arg, slty - v f u gred, tt, sils, glauic ss frags.

SH: lt - m brn, lt - m brn gy, comly swelling in wtr, predly as cly sh, rr carb grs, locally / l f, sbang - sbrdd, v arg, locally micas, slly glauic, qtzs - s&p, tt ss stringers.

No Sample: Drillied blind between 97 and 116 meters (MD), no samples coming across the shakers.

SLTST: lt - m brn, slty - occly v f l gred, cons, s&p, locally slly calcs, slly carb, comly arg, tt, no shows.

SH: lt - m gy, sb plty - sbblky, micmica, comly slly slty, carb, sft - hd, sb fis, 7-8% m brn, crpxl fest frags, 10-15% cmt cvgs.

SH: m gy, sb plty - blky, micmica, slly slty, sdy,carb, predly non calcs, rr pyr, sft - hd, sb fis, 8% crpxl fest frags.

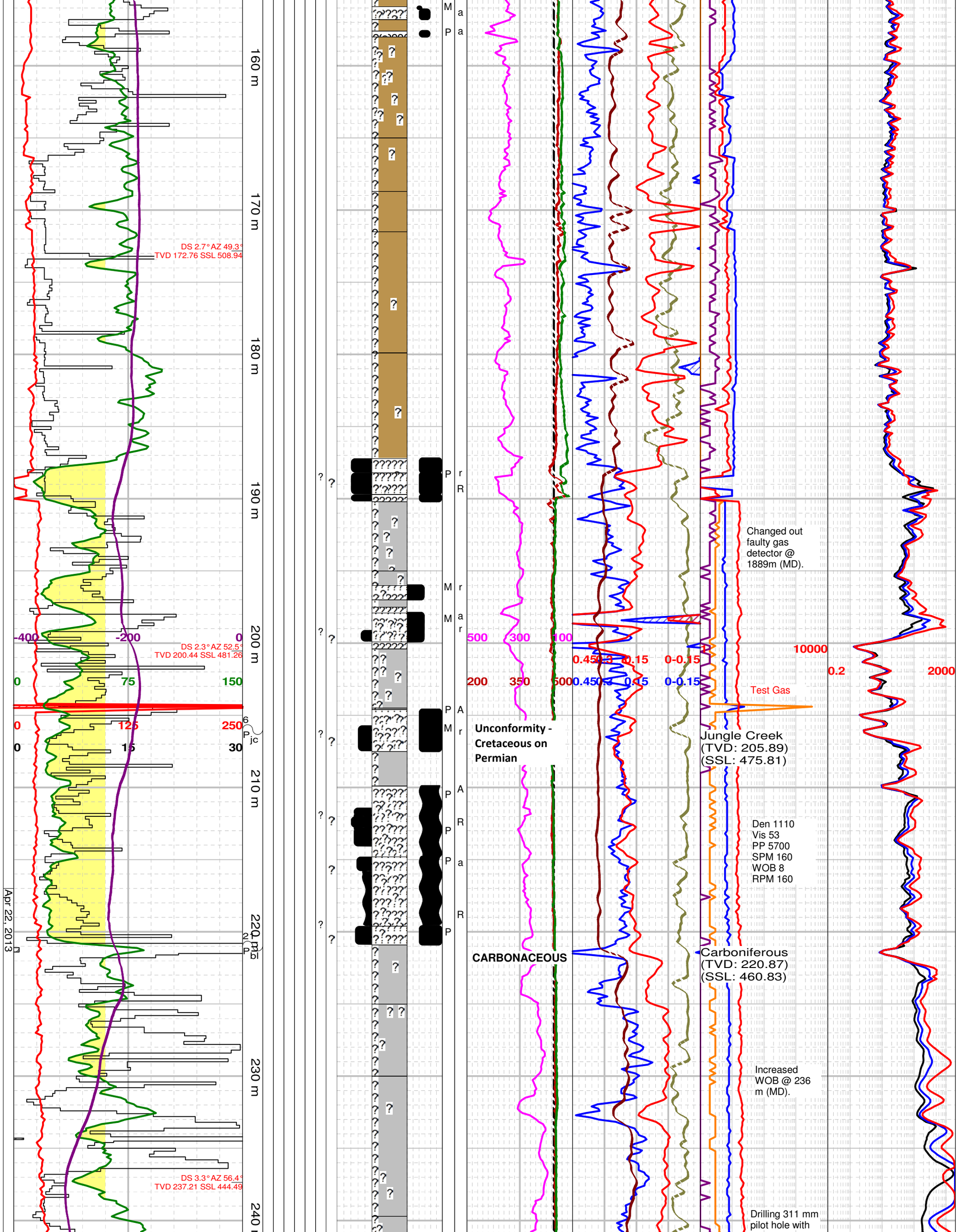
SH: m gy, m brn gy, sb plty - blky, micmica, locally slly slty, sdy or slly carb, frags crack in wtr, predly as cly sh, sft - occly hd, fis ip, slly calcs, 3% lt brn, m brn fest frags.

SS: cons,lt - m brn gy, s&p, v arg & ip not clast supported, f - occly l m gred, v glauic, micmica, / rr dk cht grs, v py srt, ang - sbrdd, predly / a lt - m brn gy arg mtx occ calcs frags, tt, no shows.

SH: m gy, m brn gy, rr m brn sh frags, sb plty - blky, micmica, comly slty, sdy, locally glauic, sft - hd, occly fis, rr pyr, rr calcs frags, 3% m brn fest frags.

SS: lt gy, lt gy brn, slty - f l gred, ip as stringers in sdy sh, modly srt, qtzs - s&p, / < 15% dk cht & carb flks & grs, comly / lt - m gy brn arg mtx, slly pyric, glauic, / spotty calcs cmt, tt, no shows.

SS: cons, lt gy, lt gy brn, slty - l m gred, sbang, s&p, / , 10-20% dk cht & carb grs & flks, pyric, micas, py srt, comly / m brn gy, m gy arg cmt, grdg to slty, sdy sh ip, no shows.



SS: cons, m brn, lt gy, f - m gred, sbang - sbrdd, p - modly srt, comly / abnt glau grs, qtzs, locally / dk cht grs, comly / brn, m brn gy arg cmt, predly py srt & v arg & ip grdg to glauic, sdy sh, slly pyric, rr frags / 1-8% dd bit plugged intgran por, p reservoir, no shows.

SH: m brn, m brn gy, sb plty - blky, micmica, micas, slly pyric, slty, sdy, locally glauic, sft, predly non fis.

SH: lt - m gy, m brn, m brn gy, sb plty - blky, occ frags crack in wtr, micmica, pyric, comly slty & sdy, sft, sb fis, tr m brn, crpxl fest frags.

SH: m brn, m brn gy, occly lt gy, lt gy brn, sb plty - blky, rr frags crk in wtr, comly slly slty, sdy, pyric, occ glau grs, sft - hd, fis ip, tr m brn fest frags, non calcs.

SS: m brn gy, slty - f l gred, occ frags / u f - l m floating qtz grs, py srt, / abnt m brn arg cmt, slly pyric, occ glau grs, p gr relief, no shows.

SH: m brn, m brn gy, sb plty - blky, micmica, slly pyric, predly as cly sh, occ slly slty & sdy frags, slly carb, occ frags crack in wtr, slly carb, non calcs.

SH: m brn, occly lt - m brn gy, plty - predly sbblky, micmica, occ carb flks, predly as cly sh, occ slty or sdy frags, rr v pyric frags, nn calcs.

DK CHT CGL: predly as uncons & fracd m - dk gy, dk brn, m brn, rr bk, rr off wh or lt gy c - gran sbrdd - rdd cht grs, cht grs / pr sln pits or / occ sils drs rims, rr euthdral qtz xls, as clst supd cgl, mtx rims rr & as f u - c l gred, s&p, modly srt, sils, ang - sbrdd, nn calcs, comly flld / ligiud m brn o, **10-18% intgran por, rapid mky gn blomg cut flor, o over shakers.**

SS: lt brn, lt gy brn, s&p, f gred, comly silty, v f l - v f u gred, rr floating u m qtz & cht grs, sbang - sbrdd, / < 20% dk brn, blk, gy, cht grs, sils, comly / lt - m brn arg mtx, carb, brit, slly kaoic, p - modly srt, p - g gr relief, rr frags / faint v f coal lam, ip tt**, spotty 1-10% vis intgran por, wk slow gn blomg cut flor.**

SS: 10-15% s fracd, uncons, off wh, lt gy, lt brn, m brn, rr orng, gy brn m - c cht grs & cht grnls & rr sb hedral qtz grs, in pt as mtx supd cglic ss, mtx ss lt yel brn, orng brn, f - m gred, ang - sbrdd, p - modly srt, comly / patchy orng brn arg mtx, rr patchy mas pyr, sils, locally / sil overgrowths, carb, **spotty o stng, spotty 1-12% vis intgan por, rapid, gd mky lt gn blomg cut flor.**

SS: predly as ip fracd, uncons, off wh, gy, brn, m - c sbrdd - rdd cht grs & cht grnls & f - rr grnls & rr sb hedral qtz grs, in pt as mtx supd cglic ss, mtx ss lt yel brn, orng brn, f - m, rr c l gred, ang - sbrdd, p - modly srt, comly / patchy orng brn arg mtx, rr patchy mas pyr, sils, locally / sil overgrowths, carb, **rr faint coaly lam, spotty o stng, spotty 1-16% vis intgran por, rapid, gd mky lt gn blomg cut flor.**

215 - 220m LT CHT PBL CGL: predly as fracd wh, lt gy, lt- dk bn, cht grnls, cl supd, ss mtx lt - m brn, f - occly l m gred, sbang - sbrdd, s&p, comly / m brn, orng brn in pt fer arg mtx, locally / coaly lam, sils, **locally / abnt dd carb mtx, r o filled por, spotty 1-8, rr 12% vis intgran por, wk rapid yel gn blomg cut flor.**

SH: p spl quality, abnt LCM in spl, m brn, occly lt gy, sb plty, micmica, v calcs, micmica, tr dism v f pyr, predly as cly sh, firm, non fis.

SH: 35% lt - m brn, lt gy brn, comly dk brn, sb plty - blky, micmica, slly carb & micmica, v calcs, hd, non fis.

SH: lt - dk brn, sb plty - blky, micmica, v calcs, tr pyr, rr carb flks, mrly.

SH: m brn, m brn gy, sb plty - blky, calcs, comly

Bit#1A Varel HRO 4JMRSV
226.00 / 27 hrs
Cond 1-1-NO-A-
-E-I-NO-BHA

NBNB#2A Smith GFI30BODVC

46.2 bh

DS 2.9° AZ 51.4°
TVD 246.44 SSL 435.26

DS 2.2° AZ 41.4°
TVD 256.56 SSL 425.14

DS 1.1° AZ 19.7°
TVD 266.01 SSL 415.69

DS 0.7° AZ 293.1°
TVD 275.31 SSL 406.39

DS 1.4° AZ 261.9°
TVD 284.55 SSL 397.15

DS 1.6° AZ 260.4°
TVD 293.92 SSL 387.78

DS 1.5° AZ 256.5°
TVD 303.27 SSL 378.43

DS 1.5° AZ 261.3°
TVD 312.63 SSL 369.07

DS 1.6° AZ 262.2°
TVD 322.12 SSL 359.58

Apr 23, 2013

250 m
260 m
270 m
280 m
290 m
300 m
310 m
320 m

BLACKIE HST

directional tools
@ 246 m (MD)

Blackie HST
(TVD: 246.04)
(SSL: 435.66)

DEN 1100
VIS 50
PV 13
YP 15
FL 15
pH 9

Den 1110
Vis 50
SPM 160
PP 7100
RPM 30
WOB 17

0.45 0.3 0.15 0-0.15

SH: m brn, m brn gy, sb plty - blky., calcs, comly grdg to mrlst, rr arg, tt mdst ls frags, slly carb, tt, no shows.

SS: wh, wh gy, cons, s&p, f gred, occly / floating m - rr c l qtz & cht grs, rr cht granules, cglic & mtx supported, s&p, / < 10-25% dk cht grs, calcs, sbang - sbrdd, locally / wh arg cmt, modlly - w srt, tt, no shows.

SS: wh, lt gy, cons, cglic & mtx supported, s&p, 25% as uncons c off wh, m - dk brn, lt gy comly rdd cht grs & fracd granules, ss mtx f gred, locally l m gred or / floating m - rr c l cht grs, sbang - sbrdd, mtx modly - w srt, v calcs, patchy wh, occly orng brn arg mtx, tt, no shows.

LS: off wh, v lt yel brn, crpxl, comly slty & sdy, locally cht replaced, as mdst, locally arg, tt, grdg ip to calcs cht, 7% lt gy, off wh, predly f gred, s&p ss as above, no shows.

SS: orng brn, yel brn, s&p, / 10-20% dk cht grs, cons, predly v f l - v f u , occly f l - f u gred, / < 25% cht grs, sbang, arg, v calcs, tt, no shows.

LS: lt yel brn, crpxl, as mdst, occly slty, sdy, locally chty or arg, tt, locally mrly & grdg to calcs mrlst, no shows.

LS: lt brn, off wh, lt gy, m brn, crpxl, comly arg & mrly ip, chty, comly slty & sdy, tt, rr frags / 6% organic por, rr druse lined vugs or fracs, rr styls.

MRLST: ong brn, crpxl, calcs, tt, / 25% lt gy, l gy brn, mas, calcs, crpxl - occ;u l f xln or sdy slty, cht, grdg ip to cht sh, 10-15% as off wh, occly orng brn, f gred, v calcs, arg, tt s&p ss frags.

SS: orng brn, lt brn, off wh, slty - v f l gred, s&p, sbang, calcs, comly / off wh, orng brn arg mtx, tt, no shows, mnr cht, calcs sh.

SS: off wh, orng brn, brn gy, cons, s&p, v f l - v f u, locally / floating f l qtz & cht grs, sbang - sbrdd, comly / patchy ferric arg mtx, locally / sil spicules. modly srt, v calcs, tt, no shows, 30-40% lt gy, lt gy gn mas calcs cht, mnr lt yel brn, comly chty, locally arg, tt ls, rr m - dk brn, mrly, locally chty, carb, v calcs tt sh.

SS: off wh, orng brn, mottled ip, s&p, v calcs & / p gr relief, v f l - v f u gred, sbang - sbrdd, / patchy wh arg cmt, 15% dk cht, sbang - sbrdd, tt, no shows.

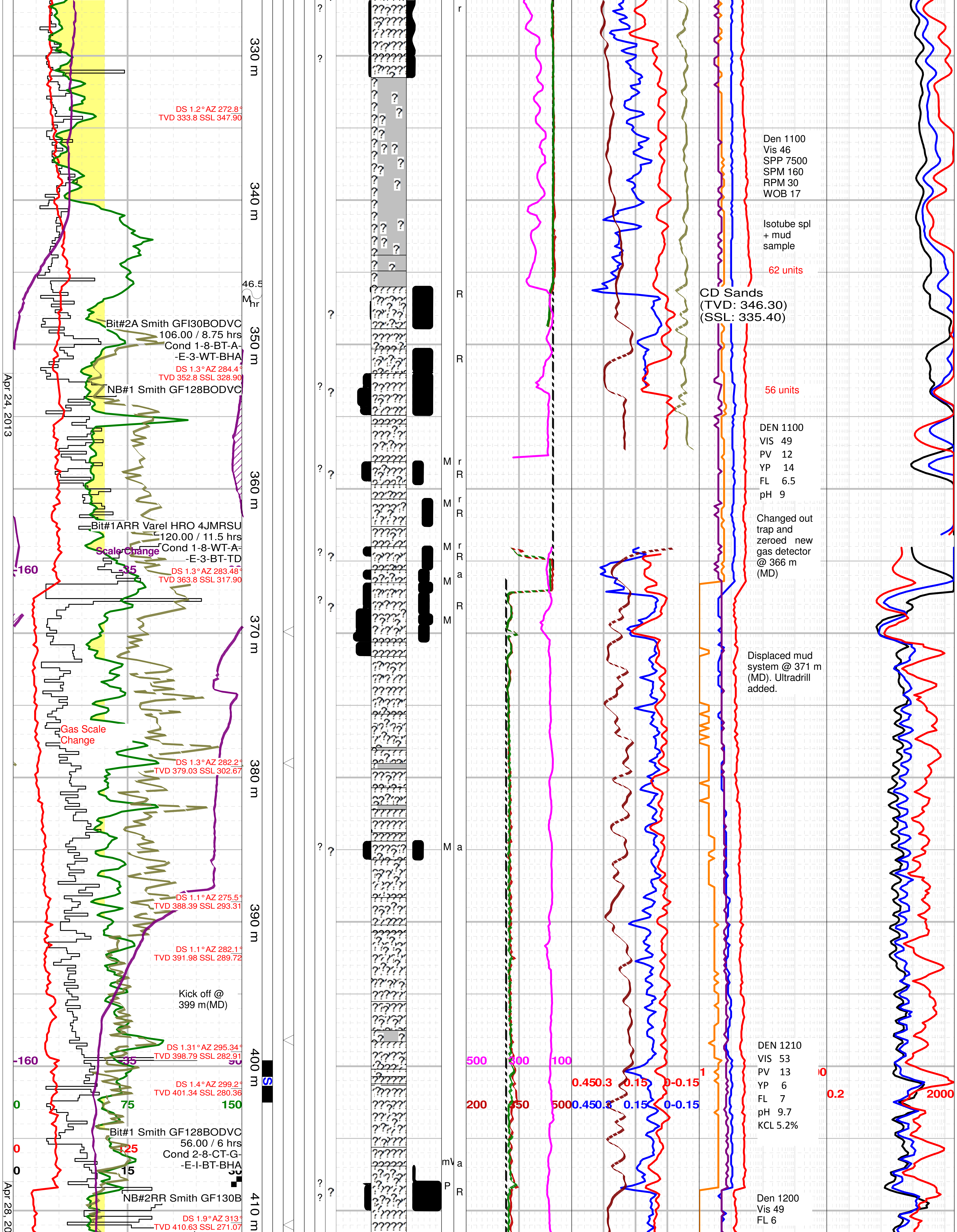
SS: off wh, lt gy, orng brn, occly yel brn, cons, v calcs & / v p gr relief, qtzs - s&p, v f l - v f u gred, rr f l - l m gred frags, sbang - sbrdd, patchy wh, orng brn arg mtx, / < 20% cht grs, locally / sponge spicules, tt, no shows,, locally grdg to sdy, arg, chty dns, arg ls,

SS: lt gy, lt brn, lt orng brn, cons, s&p - qtzs, predly v f l - v f u gred, slty ip as porous f u - m gred frags, / < 25% cht grs, sbang - sbrdd, calcs, patchy wh, orng brn arg mtx, modly srt, < 10% of frags porous, / g gr relief, / o bleeds, less calcs, / wh patchy arg mtx, kao?, **1-6, occ 8 - rr 10l% o plugged intgran por, rapid yel gn blomg cut flor, kao mtx por?,** < 20% as calcs sh & mrlst / bracs & Syringopopora, mnr calcs cht.

SH: m - dk brn, sb plty - blky, v calcs, mrly ip, locally chty, slty, sdy, slly carb, / occ brac & tr Syringopora frags, 25% as intbd / lt - m brn, comly arg, brac, crin mdst - wkest, occ Syringopora bafflestone & floatstone, tt, 10% m brn, lt gy, slty - v f u gred, locally f l - rr l m gred, cons, s&p, sbang - sbrdd arg, calcs, ss / **rr 1-5% o filled por, yel gn blmg cut flor, p reservoir.**

SS: cons, s&p, lt - m brn, slty - predly v f l gred, locally / floating u f qtz & cht grs, sbang - sbrdd, / < 30% dk cht grs, modly - w srt, calcs, comly / m brn, spotty o stnd arg mtx, locally bits or o stnd, micas, / **p gr relief, o stnd, tr 1-4% bit or o filled intgran por, mky yel gn rapid blomg cut flor, p reservoir.**

SS: cons, s&p, lt - m brn, lt gy, slty - predly v f l gred, locally / floating v f u - u f qtz & cht grs, sbang - sbrdd, / < 30% dk cht grs, modly - w srt, calcs, comly / m brn spotty o or bit stnd arg mtx, micas, / p gr relief, o stnd, **tr p intgran por, mky yel gn rapid**



blomg cut flor, p reservoir, mnr intebedded sh.

SH: dk brn, blky, calcs, comly slty & sdy, micmica, locally / brn mica flks, v firm, slly pyric.

SH: m - dk brn, sb plty - blky, micmica, pyric, v calcs, frm, brit, rr bracs & crins, rr calc lined fracs, spicr, slly slty, slly bits.

SH: m - dk brn, sb plty - blky, micmica, pyric, v calcs, mrly, frm, brit, slly slty, bits, occ crins.

SS: cons, s&p, lt brn, occly off wh, f - c u, rr v c u grs or granules, as mtx supported cglic ss, ang - rdd, / vcol cht grs, v calcs, sils, frags occly / off wh trnsl cht cmt, p - modly srt, **spotty 6-8 %, rr 10% intgran bit plugged por, g yel gn blomg cut flor.**

LS: lt - m brn, crpxl, as brac mdst, comly chty & iip grdg to calcs cht, occly arg, mrly, dns & tt, no shows.

SS: cons, s&p, lt brn, occly off wh, f - c u, rr v c u or as granules, as mtx supported cglic ss, ang - rdd, / vcol cht grs, v calcs, sils, frags occly / off wh trnsl cht cmt, p - modly srt, spotty 6-8% sft intgran bit plugged por, g yel gn blomg cut flor.

SS: predly as uncons, f u - c l, sbrdd - rdd, rr ang wh, lt gy, lt - dk bn, blk cht & qtz grs, cons frags s&p, off wh, orng brn, calcs, / spy orng brn or occly off wh arg mtx, slly sils, modly srt, **comly tt & / p gr relief, rr frags / 1-8% blk bit plugged intgran por, wk fnt yel gn blmg cut flor from bits frags, carryover?**

SS: cons, off wh, lt orng brn, gy brn, sbrdd - rdd, occ ang frags, f - u m gred, locally / floating c l qtz & cht grs, s&p, / < 35% cht grs, v calcs, cons frags crush to a f powder & diagenetically altered, slly sils, abnt sb hedral - euhedral qtz grs, comly fri below 366 meters (MD), patchy off wh , orng brn & q bit stnd arg cmt, **predly tt, rr frags / 1-6% blk dd bit plugged intgran por, bcmg 1-10, tr 15% below 366m(MD), spotty wh intgran kao, spotty intgran ip dd bit, spotty sticky tar plugged intgran por, kao mtx por? wk, p, rapid yel gn blomg cut flor, trip@366m(MD).**

LS: 15% off wh, chky, fri, comly slly slty & sdy, occly arg, predly lt - m yel brn, as mdst, comly chty, locally arg or mrly, grdg ip to calcs trnsl cht, 15% off wh, cons, s&p, arg, predly v f l - v f u gred, tt ss / v p gr relief, no shows, 4% m - dk brn, hd, calcs sh.

LS: 40% off wh, chky ip, comly arg, slty & sdy, comly lt yel brn, crpxl, as mdst, rr bracs.

SS: cons, s&p, predly v f l - v f u gred, arg, v calcs, & tt & / p gr relief, rr f - l m gred frags / floating c cht grs, sbang -sbrdd, locally rdd, slly sils. **& / 1-6% blk bit plugged intgran por, no cut flor.**

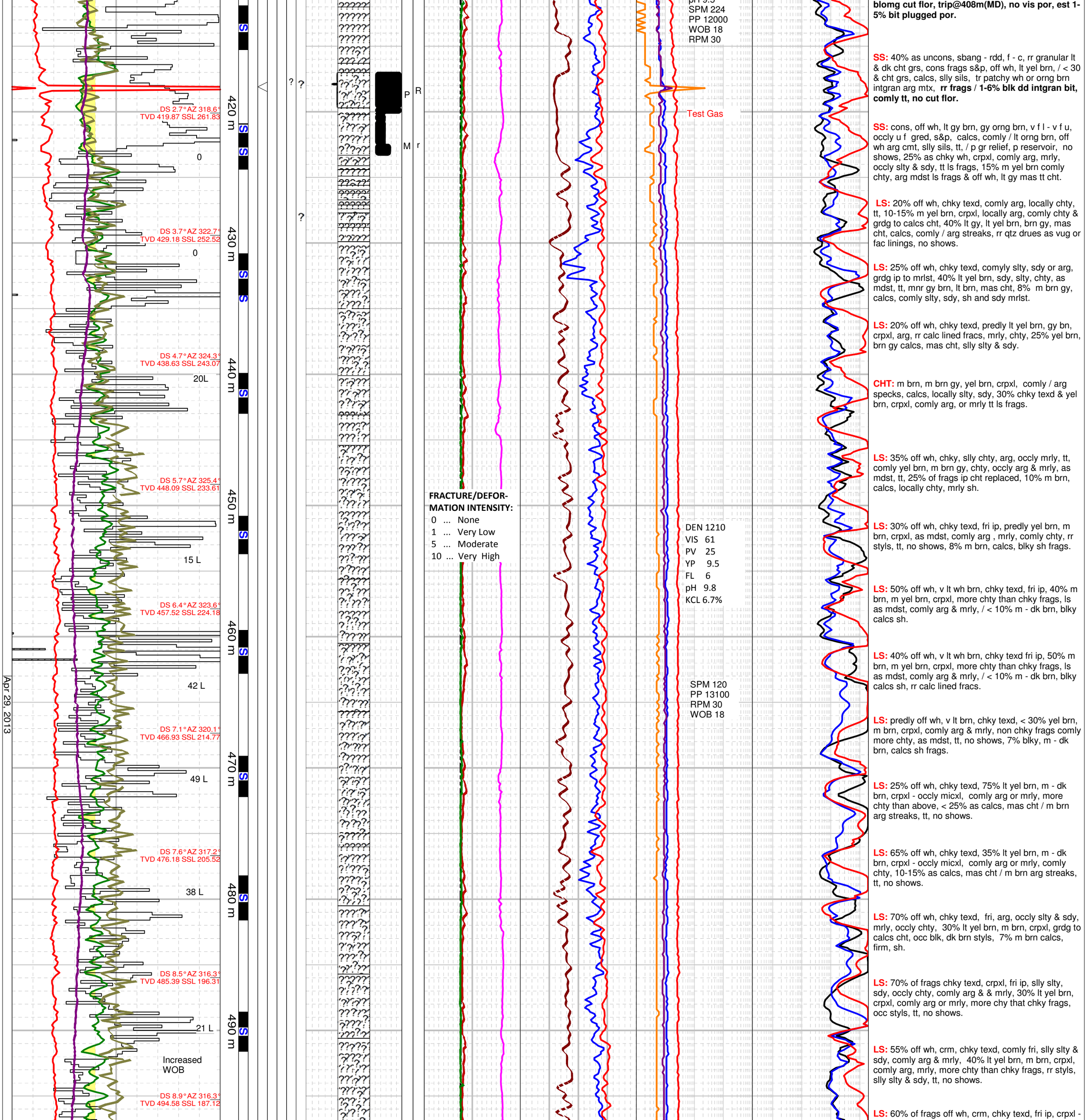
CHT: lt gy, lt - m brn, calcs, mas, rr spicular frags, tt, 30% as chky, comly arg, slty, sdy ls or m brn, yel brn, chky crin mdst - wkest, / < 10% off wh, lt gy, v f l - v f u gred, tt s&p ss frags.

LS: 25% off wh, chky, predly m brn, m yel brn, crpxl, as brac, coral mdst, chty, arg, locally mrly, tt, no shows.

LS: 25% off wh, v lt brn, chky, fri ip, as chky arg mdst, locally mrly, predly m brn, m brn gy, m yel brn, rr bracs, crins, crpxl, chty, mrly, dns & tt, no shows.

CHT: yel brn, gy brn, calcs, comly / m brn arg or bit bands, calcs, rr spicular cht frags, grdg ip to chty, locally mrly ls, 20% off wh, chky, tt, occly arg, mrly, locally chty ls frags, tt no shows.

SS: predly off wh, v f l - occly v f u gred, v calcs, arg, tt above 408m(MD), bcmg f - c gred & slly granular below 408m(MD), Below 408m(MD) as predly uncons blk, occly gy, off wh, lt - m brn rdd cht grs, / off wh, lt - m brn, cons, s&p, calcs, p - modly srt, sbang - sbrdd, slly sils, **ss mtx / amber brn intgran bit, fr gr relief & rapd mod yel gn**



blomg cut flor, trip@408m(MD), no vis por, est 1-5% bit plugged por.

SS: 40% as uncons, sbang - rdd, f - c, rr granular lt & dk cht grs, cons frags s&p, off wh, lt yel brn, / < 30 & cht grs, calcs, slly sils, tr patchy wh or orng brn intgran arg mtx, **rr frags / 1-6% blk dd intgran bit, comly tt, no cut flor.**

SS: cons, off wh, lt gy brn, gy orng brn, v f l - v f u, occly u f gred, s&p, calcs, comly / lt orng brn, off wh arg cmt, slly sils, tt, / p gr relief, p reservoir, no shows, 25% as chky wh, crpxl, comly arg, mrly, occly slty & sdy, tt ls frags, 15% m yel brn comly chty, arg mdst ls frags & off wh, lt gy mas tt cht.

LS: 20% off wh, chky texd, comly arg, locally chty, tt, 10-15% m yel brn, crpxl, locally arg, comly chty & grdg to calcs cht, 40% lt gy, lt yel brn, brn gy, mas cht, calcs, comly / arg streaks, rr qtz drues as vug or fac linings, no shows.

LS: 25% off wh, chky texd, comyly slty, sdy or arg, grdg ip to mrlst, 40% lt yel brn, sdy, slty, chty, as mdst, tt, mnr gy brn, lt brn, mas cht, 8% m brn gy, calcs, comly slty, sdy, sh and sdy mrlst.

LS: 20% off wh, chky texd, predly lt yel brn, gy bn, crpxl, arg, rr calc lined fracs, mrly, chty, 25% yel brn, brn gy calcs, mas cht, slly slty & sdy.

CHT: m brn, m brn gy, yel brn, crpxl, comly / arg specks, calcs, locally slty, sdy, 30% chky texd & yel brn, crpxl, comly arg, or mrly tt ls frags.

LS: 35% off wh, chky, slly chty, arg, occly mrly, tt, comly yel brn, m brn gy, chty, occly arg & mrly, as mdst, tt, 25% of frags ip cht replaced, 10% m brn, calcs, locally chty, mrly sh.

LS: 30% off wh, chky texd, fri ip, predly yel brn, m brn, crpxl, as mdst, comly arg , mrly, comly chty, rr styls, tt, no shows, 8% m brn, calcs, blky sh frags.

LS: 50% off wh, v lt wh brn, chky texd, fri ip, 40% m brn, m yel brn, crpxl, more chty than chky frags, ls as mdst, comly arg & mrly, / < 10% m - dk brn, blky calcs sh.

LS: 40% off wh, v lt wh brn, chky texd fri ip, 50% m brn, m yel brn, crpxl, more chty than chky frags, ls as mdst, comly arg & mrly, / < 10% m - dk brn, blky calcs sh, rr calc lined fracs.

LS: predly off wh, v lt brn, chky texd, < 30% yel brn, m brn, crpxl, comly arg & mrly, non chky frags comly more chty, as mdst, tt, no shows, 7% blky, m - dk brn, calcs sh frags.

LS: 25% off wh, chky texd, 75% lt yel brn, m - dk brn, crpxl - occly micxl, comly arg or mrly, more chty than above, < 25% as calcs, mas cht / m brn arg streaks, tt, no shows.

LS: 65% off wh, chky texd, 35% lt yel brn, m - dk brn, crpxl - occly micxl, comly arg or mrly, comly chty, 10-15% as calcs, mas cht / m brn arg streaks, tt, no shows.

LS: 70% off wh, chky texd, fri, arg, occly slty & sdy, mrly, occly chty, 30% lt yel brn, m brn, crpxl, grdg to calcs cht, occ blk, dk brn styls, 7% m brn calcs, firm, sh.

LS: 70% of frags chky texd, crpxl, fri ip, slly slty, sdy, occly chty, comly arg & & mrly, 30% lt yel brn, crpxl, comly arg or mrly, more chy that chky frags, occ styls, tt, no shows.

LS: 55% off wh, crm, chky texd, comly fri, slly slty & sdy, comly arg & mrly, 40% lt yel brn, m brn, crpxl, comly arg, mrly, more chty than chky frags, rr styls, slly slty & sdy, tt, no shows.

LS: 60% of frags off wh, crm, chky texd, fri ip, crpxl -

micxl, comly slly slty & sdy, comly arg, mrly, occly chty, 5% of frags grdg to v f l - v f u gred, arg, calcs, tt s&p ss, 40% m yel brn, m brn, crpxl, comly arg & more chty than chky frags, as mdst, rr calc druse lined vugs or fracs, 7% dk brn, blky, calcs, sh.

LS: 65% of frags off wh, occly mot brn, crm,chky texd, fri in pt, comly arg, mrly, slly slty, sdy or chty, 35% m yel brn, m brn, crpxl, comly chty, arg, locally mrly, 3% m brn calcs, blky sh, 20% of frags cht replaced, no shows, rr blk styls, rr off wh, v f l - v f u gred, tt, arg, calcs, s&p ss frags.

LS: off wh - yelsh wh, crpxl, com org resd on digestion in HCl, occ brac frag, dns, tt, mot or intbd chty Ls

CHTY LS: predly lt brnsh gy, ~ 5% m gysh brn, crpxl, chty, v hd, sils altn thru, dns, tt, fy lamd

LS: off wh - yelsh wh, crpxl, org resd aa, scat fos frags, occ bracs, plty, mot or intbd chty ls, rrly sdy, s tr calc drs, dns, tt

CHTY LS: lt yelsh brn - yelsh gy, crpxl, chty sils altn thru, dns, tt, v hd, brit, intbd foss ls

LS: off wh, lt - m yelsh brn, crpxl, scat fos frags, com org resd on digestion, dns, tt, rrly sdy, mot or intbd chty sils ls

CHTY LS: lt - m yelsh brn, crpxl, chty, sils altn thru, rock is 90-95% sil, grdg - 100% cht, wkly lamd, tr org incls, v hd & brit, dns, tt

CHTY LS: lt - m yelsh brn, crpxl, sils chty altn thru, dns, tt, hd, brit, aa

LS: off wh, lt yelsh brn, locly m - dk gysh brn, crpxl, occ styl or mic styl, locly / mnr calc drs, intbd or mot chty Ls, dns, tt, scat brac, com - abnt org resd

CHTY LS: lt - m yelsh brn, crpxl, sils chty altn thru, 90-95% sils altn, dns, tt, hd

LS: lt - m yelsh brn - yelsh gy, crpxl, sdy ip, occ brac frags,

CHTY LS: lt - m yelsh brn, crpxl, sils chty altn thru, 90-95% sils altn, dns, tt, hd, mot or intbd / sdy foss Ls

Apr 30, 2013

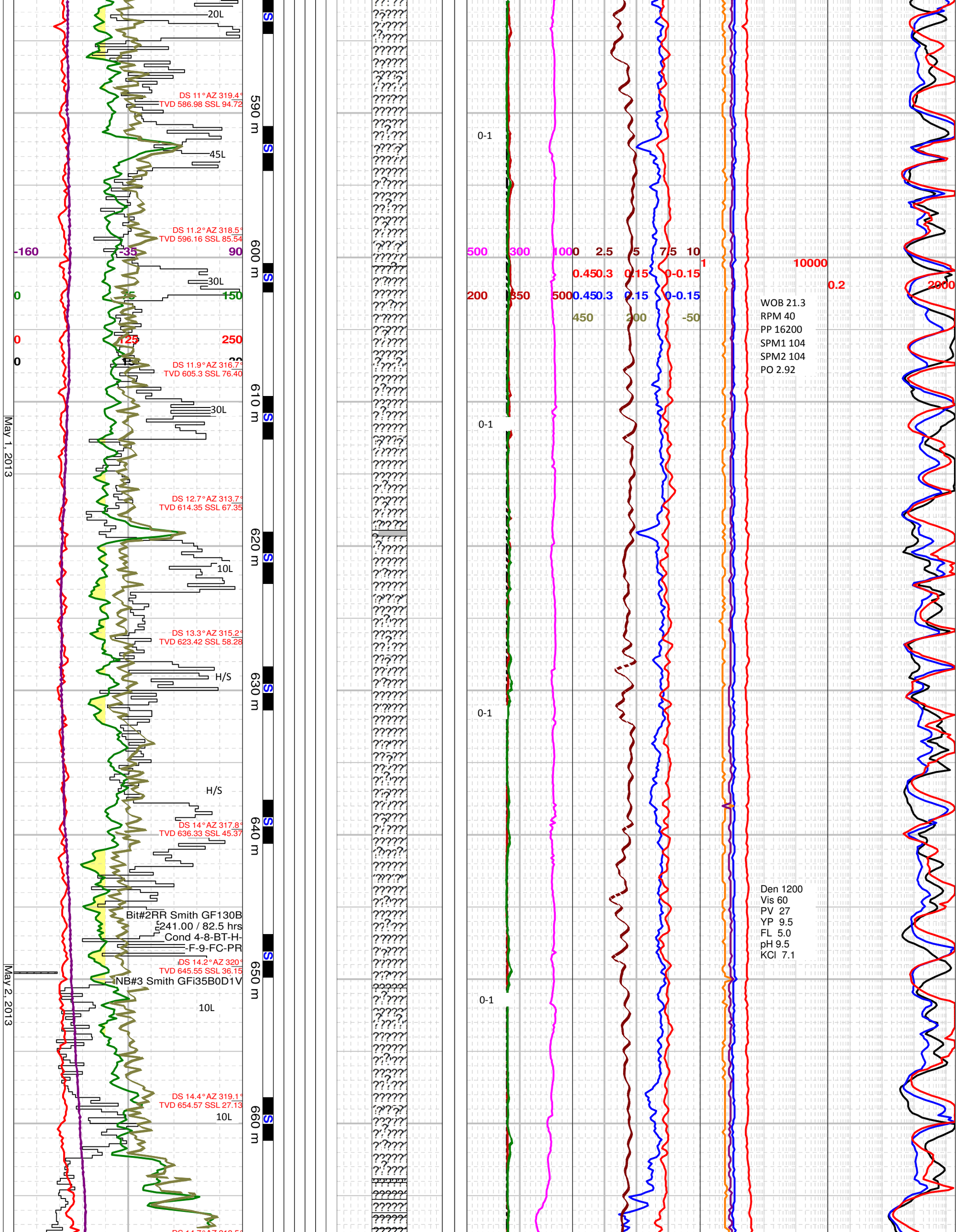
500 m
510 m
520 m
530 m
540 m
550 m
560 m
570 m
580 m

DS 9.1°AZ 316.2°
TVD 503.69 SSL 178.01
4 L
DS 9.5°AZ 317.5°
TVD 512.88 SSL 168.82
DS 9.6°AZ 318.6°
TVD 522.21 SSL 159.49
H/S
DS 9.8°AZ 319.3°
TVD 531.52 SSL 150.18
DS 10°AZ 320°
TVD 540.82 SSL 140.88
30L
DS 10°AZ 319.9°
TVD 549.92 SSL 131.78
DS 10.3°AZ 319.9°
TVD 559.22 SSL 122.48
30L
DS 10.4°AZ 320.1°
TVD 568.57 SSL 113.13
DS 10.4°AZ 319.6°
TVD 577.87 SSL 103.83

0.45 0.3 0.15 0 -0.15

0
0
0
0-1

Den 1200
Vis 60
PV 26
YP 10
FL 5.5
pH 9.5
KCl 7.2



LS: m yelsh brn - yelsh gy, crpxl, slly arg, incrly sdy, rr brac frags, org resd aa, intbd or mot chty Ls aa, rr styl, dns, tt

LS: predly lt - m yelsh brn - yelsh gy, mnr intbd m - dk yelsh brn, arg ip, crpxl, scat bracs, dns, tt, sils ip, org resd

LS: predly lt - m yelsh brn - yelsh gy, m - dk yelsh brn ip, crpxl, slly arg, occ bracs, locly slly sdy, mnr chty Ls aa, dns, tt, rr drsy calc flld frac / tr pyrbit, chty & sils ip, slty ip

LS: predly m yelsh brn - yelsh gy, mnr lt yelsh brn and intbd dk yelsh brn, arg ip, occ sdy bed, locly slty, rr styl, rr calc flld frac, locly chty / ptch or mot siln, dns, tt

LS: incrly dk yelsh brn - gysh brn, crpxl, arg ip, incrly chty, 5-10% scat cht, com siln (10-20% sild grs), locly sdy & slty ip, scat bracs, dns, tt, hd

LS: predly m yelsh brn - gysh brn, mnr lt yelsh mnr & dk brn, crpxl, slly arg ip, locly slty - vfg sdy ip, rr brac frags, tr cht, dns, tt, Mdst

LS: predly m - dk brn - gysh brn, mnr lt yelsh brn, crpxl, arg, scat brac frag, occ sh ptg, dns, tt

SH: dk gysh brn - blk, blky, calcs, locly slty

SH: dk gysh brn, nn fis, blky, slty ip, tr pyr, calcs,

DS 14.7° AZ 318.5°
TVD 663.7 SSL 18.00
30L
DS 14.9° AZ 318.2°
TVD 672.7 SSL 9.00
20L
DS 15.5° AZ 318.5°
TVD 682.12 SSL -0.42
H/S
DS 16.4° AZ 319.8°
TVD 690.59 SSL -8.89
H/S
DS 17.3° AZ 321.6°
TVD 699.71 SSL -18.01
H/S
DS 18° AZ 322.2°
TVD 708.5 SSL -26.80
20L
DS 18.5° AZ 323.5°
TVD 717.81 SSL -36.11
20L
DS 18.9° AZ 323.3°
TVD 726.84 SSL -45.14
20L
DS 19.6° AZ 323.9°
TVD 736.12 SSL -54.42
20L

670 m
680 m
690 m
700 m
710 m
720 m
730 m
740 m
750 m

S

P r
P R

0-1
0-1
2-3
0-1
0-1

0.45 0.3 0-15 0-0.15

Den 1200
Vis 58
PV 26
YP 10.0
FL 5.0
pH 9.5
KCl 6.7

WOB 17.2
RPM 32
PP 16300
SPM1 119
SPM2 120
PO 2.79

AB MFS Shale
(TVD: 704.50)
(SSL: -22.80)
226u
ISOTUBE
SPLS X2
151u
179u
180u
ISOTUBE
SPL
126u
134u

grdg to calcs Mdst

LS: dk gysh brn, mnr lt - m yelsh brn, crpxl, arg, locly slty, scat fos frags, dns, tt, Mdst - Wkest

SS: m gy, predly variously gy - blk cht and mnr qtz, u f - u c gred, sbrdd - rdd, py srt, calc cmt, tt

SH: m - dk brn, blk, blky, slty ip, slly bits, calcs, pets odor, **modly slow dd o blomg cut**

LS: m - dk brn, crpxl, slty & arg ip, blky, bits ip, pets odor, dns, tt, **modly slow blomg dd o cut**

SH: dk gysh brn, sbblky, calcs, slty ip, thn strgs

LS: m - dk brn, lt yelsh brn ip, crpxl, arg ip, locly sdy, slty ip, scat brac frags, rr calc lined frac, rr styl, s tr cht, dns, tt, slly bits

LS: predly m yelsh brn, mnr lt yelsh brn & dk brn, crpxl, arg ip, commly slty, tr calc drs, scat fos, dns, tt

LS: m - dk brn - gysh brn, crpxl, arg ip, slty, chty (5-10% cht), scat fos, rr calc flld micfrac, slly bits

SH: dk brn - blk, blky, calcs, slty, grdg - sltst, bits ip, **mod blomg cut**, s tr pyr

LS: m - dk brn, gysh brn, crpxl, arg & slty, occ brac, dns, tt, slly bits, **mod blomg dd o cut**

SH: v dk brn - blk, slty thru, sbblky, slly - nn calcs, bits, Ls strgs, **mod blomg dd o cut,** hi angle jtg

LS: m - dk gysh brn, crpxl, slty, sdy ip, fragl, occ brac spn, slly bits, rr calc cmtd micfrac, tt

SH: dk brn, grdg - blk, sbblky, slty, sdy ip, slly calcs, bits, **pets odor, mod blomg cut, dd o**

LS: dk brn, crpxl, arg & slty ip, bits ip, dns, tt, thn beds

SH: v dk brn - blk, sbblky, slty thru, sdy ip, calcs ip, bits, s tr pyr, **pets odor, mod blomg dd o cut**, Ls strgs

LS: m - dk brn, crpxl, slly arg, rr fos brac, thn beds, slly bits, dns, tt, **slow blomg cut**

SH: 30% m gy - gnsh gy, sbfis, slly calcs, slty ip, v low toc, 60% mot & intbd high toc dk brn - blk sh, sbblky, slly calcs, bits, slty, vfg sdy ip, **mod slow blomg dd o cut**

LS: m - dk yelsh brn, ptch lt yelsh brn, crpxl, slty ip, slly bits, dns, tt

SH: 10% m gy, sbfis - sbblky, slly calcs, tr fy dism pyr, micmica ip, v low toc, aa; 30% dk brn - blk, sbblky, slty - sdy, **bits, pets odor, slow blomg cut**

May 3, 2013

DS 20.3° AZ 323.5°
TVD 745.26 SSL -63.56
20L
760 m
DS 20.8° AZ 322.2°
TVD 754.02 SSL -72.32
30L
770 m
DS 21° AZ 320.5°
TVD 763.24 SSL -81.54
30L
780 m
DS 21.4° AZ 320.2°
TVD 772.36 SSL -90.66
30L
790 m
DS 21.9° AZ 320.3°
TVD 781.43 SSL -99.73
20L
-160 -35 90
DS 22.6° AZ 319.8°
TVD 790.36 SSL -108.66
0 75 150
0 125 250
10L
0 15 30
800 m
DS 23.3° AZ 320°
TVD 799.44 SSL -117.74
10L
810 m
DS 24.2° AZ 321.4°
TVD 808.3 SSL -126.60
10L
820 m
DS 25.4° AZ 322.3°
TVD 816.97 SSL -135.27
10L
830 m

128u
0-1
ISOTUBE SPL
171u
195u
176u
ISOTUBE SPL
0
AB Sands
(TVD: 781.01)
(SSL: -99.31)
Den 1210
Vis 52
PV 26
YP 9.5
FL 5.5
pH 9.5
KCl 6.6
500 300 100
200 350 500
0.45 0.3 0.15 0-0.15
1
0.2
2000
WOB 22.3
SLIDE
PP 16500
SPM1 121
SPM2 121
PO 2.84
187u
ISOTUBE SPL
Low Build Rates - Slide All
ISOTUBE SPLS x2
200u

SH: predly dk brn, 3-5% m gy, nn fis, slty thru, slly calcs, **bits ip, mod slow blomg dd o cut, strong "swampy" odor (mercaptan)**

SS: m - dk gy, brnsh gy, vc - c gred, sbrdd - rdd, py srt, calc cmt, tt

LS: dk gysh brn, crpxl, arg & slty thru, rthy, plty, slly bits, dns, tt

SS: m gy, predly various gy & lt brn cht, mnr qtz, u f - c gred, sbrdd, ply srt, calc cmt, tt

LS: dk gysh brn, crpxl, rthy, slty & arg, scat bracs, dns, tt, **bits, slow blomg cut**

SS: lt - m gy, brnsh gy, qtz & gy & brn cht, l f - u m gred, sbrdd, mod - py srt, calc cmt, tt

SLTY LS: m - dk gysh brn, crpxl, rthy, slty thru, sdy ip, occ ss ptgs, scat bracs, arg, slly bits, dns, tt, no flor, **wk slow dd cut**

SH: dk brn - blk, sbfis - sbblky, slty thru, slly calcs, bits, **nn vis flor, mod blomg dd o cut, hvy resd**, occ sdy ptg, occ Ls strg

SLTST: m brn - gysh brn, sdy, calcs, bits ip, tt, **slow dd o cut**

SS: m brnsh gy, qtz & cht, vf - l m gred, sbrdd, mod srtg, calc cmt, slly bit, v wk ptch intgran por (2-3%), **slow stmg dd o cut**

SH: dk brn - blk, sbblky, slty, slly calcs, **bits, slow dd o cut**

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

SH: m - dk brn, locly v dk brn - blk, sbblky, slty, slly calcs, bits ip

SS: lt - m gy - brnsh gy, qtz & subordinate gy cht, predly u vf - u f gred, 3-5% l m gred, sbrdd, mod srtg, calc cmt, ptch hydc stg, modly w ind, tt - vp ptch wk por (<5%), **tr wk stmg dd o cut**

LS: m - dk gysh brn, mnr lt - m yelsh brn, crpxl, slty & arg, rthy, slly bits, dns, tt

SH: dk brn - blk, sbfis - sbblky, slty, calcs, bits thru, hi toc, no vis flor, **mod slow blomg dd o cut**, sdy strgs, slty Ls ptgs, tr pyr

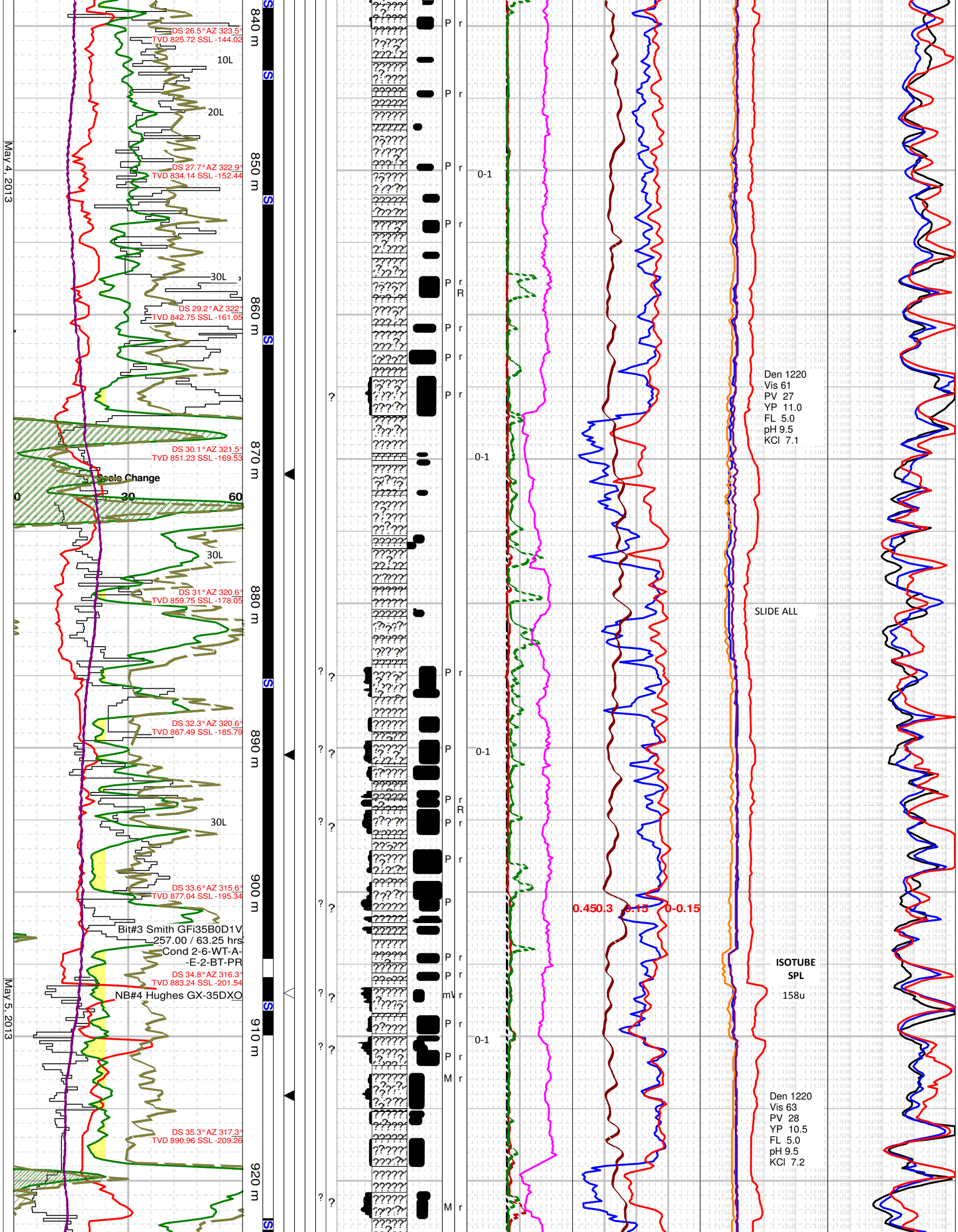
SS: lt - m gy, brnsh gy, predly qtz / com gy cht, vf - f gred, sbrdd, modly srt, calc cmt, w ind, tt, tr bit, thn strgs

SH: dk brn - blk, sbblky, slty, bits, hi toc, slly calcs, slow mod blomg dd o cut, occ sdy strg, occ thn Ls ptg

LS: m - dk gysh brn, mnr lt - m yelsh brn, crpxl, slty & arg, rthy, slly bits, dns, tt, tr cht, rr brac frag

SH: dk brn - blk, sbblky, slty, calcs, bits, aa

SS: m gy, predly m - dk gy & mnr lt brn cht, mnr qtz, predly u f - u m gred, 3 - 5 % l c gred, sbrdd, mod srtg, calc cmt, predly tt, locly / 10-12% intgran por, **tr - mnr brn intstl hydc stng, tr spy dull yel flor, slow stmg cut, p - q shw**



SLTY LS: m gysh brn, crpxl, comly slty, grdg - calcs sltst, flotg sd cls - l c gred, dns, tt, hd, **tr hydc stng**

SS: m brnsh gy, gy cht, mnr lt brn cht & qtz, vf - l c gred, sbrdd, py srt, calc cmt, mod - w ind, hd, **mnr intstl m - dk brn hydc stng**, tt - p por (0-5%), **spy dull flor, wk stmg cut, q shw**

SH: dk gysh brn - blk, sbblky, slty, bits, s tr pyr

SS: lt - m brnsh gy, predly vfg, c gred strg in 855 spl, sbrdd, modly srt, calc cmt, tt, thn strgs

LS: m - dk gysh brn, crpxl, comly slty, occ sdy lam, dns, tt, hd, tr fy dism pyr

SS: lt - m gy - brnsh gy, abnt gy cht thru, com qtz, mnr brn cht, u f - l vc gred cls in vf - f gred slty calcs mtx, sbrdd - rdd, py srt, calc cmt, **spy brn intstl hydc stng in wk intgran por,** predly tt (0-5%), **tr wk cut, no shw**

SLTY LS: m - dk gysh brn, crpxl, incrly slty & arg, grdg - calcs sltst, sdy, vf - m gred cls com, dns, tt, hd, sdy ptgs, occ slty sh lams

SH: dk brn - blk, sbblky, slty, slly bits, thn lams, slly calcs

SS: m yelsh brn, ptch lt gy, 10-12% m - c gred cls flotg in vf - f gred calcs slty & arg mtx, mtx grds - sdy arg Ls, calc cmt, w ind, tt, slly bits

SH: dk brn - blk, sbfis - nn fis, slty ip, bits, slly calcs

SH: m - dk brn, blk, sbfis - nn fis, slty - vfg sdy thru, com sdy lams, occ flotg c gred cht cls, mod blomg dd o cut

SS: m brn, lt gysh brn ip, vf - u f gred, slty ip, predly qtz / mnr gy cht, sbang - sbrdd, mod - p strg, calc cmt, **bits, spy dull flor, wk blomg dd o cut**, s tr fy dism pyr

SH: dk brn - blk, sbfis, slty, bits, slly calcs

LS: m - dk brnsh gy, lt yelsh brn ip, crpxl, slty & arg ip, scat shl frags, dns, tt

SS: m gy - brnsh gy, predly gy & mnr brn cht, mnr qtz, vc gred, grdg - grnls or s pbls, locly / calc cmt, locly / vf - f gred calcs mtx, sbrdd, py srt, predly tt, tr amb brn hydc stng / v wk por (<6%), **sp dull flor, wk stmg cut, no shw**

LS: m - dk brn, locly lt yelsh brn, crpxl, slty & arg, sdy ip, dns, tt, hd

SS: m gy, gysh brn, predly variously gy and brn cht, mnr op qtz, m - c gred, occ pbls or grnls, vf - f gred mtx, sbrdd, occ w rdd pold cls, py srt, calc cmt, tt - locly fr intgran por (0-8%), com m amb hydc stng, **spy flor, wk - mod stmg cut, q shw,** occ sdy Ls ptgs

SH: dk brn - dk gysh brn, sbfis - sbblky, calcs, bits

LS: lt - m yelsh brn, gysh brn ip, crpxl, arg, slty, locly sdy, rr shl frags

SS: m gy - brnsh gy, predly variously gy cht, com qtz, mnr brn cht, u f - v c gred, calc cmt, locly / vf - f gred mtx, sbrdd, py srt, predly tt, **ptch wk por (6-8%) / lt amb hydc stng, spy dull yel flor, fr blomg & stmg cut, wk shw**

SS: 30% lt - m gy, abnt gy - blk cht, mnr brn cht, com qtz, l f - l vc gred, sbrdd, py srt, calc cmt, tt - locly wk por / mnr bit cmt; 30% lt - m brn, qtz & com gy - blk cht, u vf - u f gred, sbrdd, modly w srt, calc cmt, **mnr bit cmt, lt amb hydc stng thru, p - fr intgran por (6-10%), spy yel flor, fr blomg & stmg cut**; 20% m gy - brnsh gy, vf - f gred, slty ip, sbrdd, py srt, calc cmt, tt - v wk por, **tr bit, spy hydc stng, wk stmg cut**

SS: lt - m brnsh gy, qtz & com gy cht, vf - u m gred, sbrdd, mod - py srt, calc cmt, vp intgran por (2-

May 6, 2013

DS 36.1° AZ 318°
TVD 898.9 SSL -217.20

930 m

DS 36.3° AZ 318.8°
TVD 906.75 SSL -225.05

Bit#4 Hughes GX-35DXO
36.00 / 6.75 hrs
Cond 1-5-CT-G-
-1-1-BT-CP-BHA

940 m

NB#5C Quest DC-813

DS 36.4° AZ 319.5°
TVD 914.3 SSL -232.60

950 m

Bit#5C Quest DC-813
14.00 / 2.33 hrs
Cond 0-0-NO-N-
-X-I-NO-BHA

DS 36.4° AZ 319.4°
TVD 922.42 SSL -240.72

NB#4RR Hughes GX-35DXO

960 m

DS 36.3° AZ 319.1°
TVD 929.76 SSL -248.06

970 m

DS 36.3° AZ 319.2°
TVD 937.09 SSL -255.39

980 m

DS 35.7° AZ 319.5°
TVD 944.59 SSL -262.89

990 m

DS 35.4° AZ 320.6°
TVD 952.62 SSL -270.92

1000 m

DS 35.1° AZ 321°
TVD 960.42 SSL -278.72

Ford Lake MFS
(TVD: 906.40)
(SSL: -224.70)

ISOTUBE
SPLS X2

Den 1210
Vis 62
PV 29
YP 9.0
FL 5.0
pH 9.5
KCl 7.0

ISOTUBE
SPLS X2

328u

315u

268u

Den 1220
Vis 58
PV 26
YP 9.5
FL 5.0
pH 9.5
KCl 7.1

232u

238u

7%), tr - locly mnr bit cmt, **ptch dull yel flor, fr blomg & stmg cut, p - q shw**

CHTY LS: yelsh wh, lt - m yelsh brn, m brnsh gy ip, crpxl, chty, 5-7% lt yelsh brn cht thru, locly slty - vfg sdy ip, rr brac frag, dns, tt

SH: dk gysh brn - blk, blky - sbblky, calcs, slty, **bits, fr slow blomg dd o cut**, tr fy dism pyr

LS: lt yelsh brn, m - dk gysh brn, crpxl, incrly arg & slty, rthy lstr, dns, tt, occ sdy strgs, occ brac frags, tr pyr

LS: lt - dk brn, lt - m gy ip, crpxl, comly slty & arg / rthy lstr & brac rmn aa, locly gly & cln / occ cht nod, occ sdy strg

SH: blk, dk brn, sbfis - sbblky, incrly bits, calcs, modly frm, modly brit, strong odor, **v hi toc**, no flor, **slow hazy dd o cut**, rr calc cmtd micfrac

Cut Core #1: 942.0-955.9mMD

SH: v dk brn - blk, sbblky, slty ip, bits, v slly - nn calcs, tr pyr, com pyric silvers, **wk blomg dd o cut,** occ sks, hi angle jtg

LS: m - dk brn - gysh brn, crpxl, rthy, slty ip, thn beds, tt, **bits, slow blomg cut**, rr fos frags

SH: predly blk, v dk brn ip, sbblky, nn - slly calcs, **bits, strong odor, slow blomg dd o cut**, frm, modly brit, occ - locly com sks, hi angle jts

SH: blk, v dk brn, sbfis - sbblky, nn calcs, slty ip, **bits, slow blomg dd o cut**, occ calcs strg, com sks, frm, modly brit

SH: blk, v dk brn, sbfis, nn calcs, occ calcs strg, occ calcs mic incls, tr fy dism pyr, rr s pyr nods,**b its, slow blomg dd o cut**, occ sks, modly brit

1010 m
1020 m
1030 m
1040 m
1050 m
1060 m
1070 m
1080 m
1090 m

DS 35.2° AZ 320.1°
TVD 968.42 SSL -286.72

50L

DS 35.4° AZ 320.3°
TVD 976.22 SSL -294.52

60L

DS 35.3° AZ 319.9°
TVD 983.85 SSL -302.15

H/S

DS 35.2° AZ 320.1°
TVD 991.59 SSL -309.89

40L

DS 35.4° AZ 320.4°
TVD 999.26 SSL -317.56

H/S

DS 35.7° AZ 321.2°
TVD 1007.15 SSL -325.45

20L

DS 36.1° AZ 321.9°
TVD 1014.88 SSL -333.18

20L

DS 36.4° AZ 322.1°
TVD 1022.75 SSL -341.05

30L

DS 36.9° AZ 322.1°
TVD 1030.14 SSL -348.44

May 8, 2013

2
259u
ISOTUBE
SPL
216u
2
232u
1-2
225u
ISOTUBE
SPL
208u
1-2
1-2
169u
1-2
WOB 18.1
RPM 37-39
PP 18850
SPM1 117
SPM2 122
PO 2.79
1-2
1-2

SH: v dk gy - blk, dk gysh brn ip, sbfis - sbblky, predly nn calcs, occ calcs strgs, rr dk gysh brn Ls strgs, **bits, slow blomg dd o cut**, occ sks, wk hi angle jtg

SH: v dk gy - blk, dk gysh brn ip, sbfis - sbblky, predly nn calcs, occ calcs strgs, rr dk gysh brn Ls strgs, **bits, slow blomg dd o cut**, occ sks, wk hi angle jtg

SH: v dk gysh brn, decrg blk, sbfis, nn calcs, occ dk calcs or Ls strgs, decrg bits cont, **slow wk dd o cut**, rr sks, wk hi angle jtg, mnr fy dism pyr, occ pyric lam

SH: v dk brnsh gy, locly grdg - blk, sbfis, occ dk gysh brn arg Ls strg, com fy dism micxl pyr, occ pyric lam, nn calcs, modly hi toc, no vis sks, wk hi angle jtg, modly frm

45L
DS 37.1° AZ 322°
TVD 1037.68 SSL -355.98
1100 m
50L
DS 37.1° AZ 322.1°
TVD 1045.42 SSL -363.72
1110 m
80L
DS 37.1° AZ 322.2°
TVD 1052.86 SSL -371.16
1120 m
80L
DS 36.7° AZ 321.6°
TVD 1060.71 SSL -379.01
1130 m
80L
DS 36.5° AZ 321.4°
TVD 1068.49 SSL -386.79
1140 m
70L
DS 36.7° AZ 321.5°
TVD 1076.12 SSL -394.42
48.5
D
1150 m
60L
DS 36.7° AZ 320.7°
TVD 1083.71 SSL -402.01
1160 m
60L
DS 36.7° AZ 320.6°
TVD 1091.34 SSL -409.64
1170 m
60L
DS 36.7° AZ 320.1°
TVD 1099.12 SSL -417.42
1-2
0.45 0.3 0.15 0-0.15
Den 1220
Vis 58
PV 27
YP 9.0
FL 5.0
pH 9.5
KCl 7.2
WOB 18.1
RPM 35-36
PP 20950
SPM1 120
SPM2 119
PO 2.80
Reduce PO
to 2.65
Imperial
(TVD: 1078.08)
(SSL: -396.38)
WOB 18.1
RPM 37-39
PP 18640

SH: v dk brnsh gy, grdg - blk, sbfis, nn calcs, pyric, com fy dism micxl pyr thru, occ dk gysh brn Ls strg, rr slty strg, modly frm, bcmg modly fragile in wtr, carb, modly hi toc

SH: v dk gy, locly grdg - blk, sbfis, nn calcs, pyric, occ yelsh brn hd brit sils lams or concs, rr pyr nods, modly frm, no vis sks, wk hi angle jtg, modly frm, bcmg somewhat fragile in wtr

SH: v dk gy, grdg - blk, nn calcs, occ m - dk yelsh brn hd sils strgs, rr pyr nod, modly frm, carb, mod toc

SH: v dk gy, grdg - blk, dk brnsh gy ip, sbfis, nn calcs, occ lt yelsh wh Ls strg, rr m brn sils strg, occ py srt sdy strgs, vf - l m gred, Qtz / mnr - com gy cht, calc cmt, tr pyr cmt, tt

SH: v dk gy - blk, dk brnsh gy, sbfis, nn calcs, pyric, com fy dism micxl pyr thru, occ vfg calc cmtd ss lams, occ slty lam, occ sks, wk hi angle jtg, modly sft, bcmg incrly fragile, softens in wtr

May 9, 2013

DS 36.6° AZ 319.6°
TVD 1106.7 SSL -425.00

DS 36.3° AZ 319.6°
TVD 1114.55 SSL -432.85

DS 36.5° AZ 319.3°
TVD 1122.43 SSL -440.73

DS 36.7° AZ 318.8°
TVD 1130.16 SSL -448.46

DS 37.1° AZ 318.5°
TVD 1137.76 SSL -456.06

DS 37.4° AZ 318.1°
TVD 1141.84 SSL -460.14

Scale Change

Bit#4RR Hughes GX-35DXO
296.00 / 62.5 hrs
Cond 2-6-BT-A-
-E-5-WT-TD

DS 38.1° AZ 319.8°
TVD 1160.82 SSL -479.12

NB#5 Smith XRPS

May 15, 2013

1180 m 1190 m 1200 m 1210 m 1220 m 1230 m 1240 m 1250 m 1260 m

TD

SPM2 114
PO 2.65

Reduce PO
to 2.57

Den 1220
Vis 64
PV 26
YP 9.5
FL 5.5
pH 9.5
KCl 7.0

Turbidite
Facies

Tuttle
(TVD: 1128.34)
(SSL: -446.64)

NB: Data acquired while drilling has been shifted down to correlate with open hole logging data f/ ICP to 2889mMD

137 u

WOB 18.1
RPM 36-38
PP 19230
SPM1 108
SPM2 108
PO 2.53

WOB 18
RPM 40
PP 13200
SPM1 115
SPM2 115
Den 1200
Vis 48
YP 7

SH: v dk gy, locly blk, sbfis, nn calcs, carb, mod toc, mnr fy dism pyr thru, modly frm, softening in wtr, rr sheared gr, wk hi angle jtg

SH: aa, occ sdy ptg

SS: lt gy, lt brnsh gy, qtzs / mnr gy cht, vf - f gred, c slt ip, sbrdd, modly srt, sil +/- pyr + tr - mnr sec calc cmt, tt, **no vis shw**

SS: lt - m brnsh gy, qtz / com gy cht & occ dk lits, com - abnt wh - off wh sils cls, predly vf - f gred, 2-3% l - u m gred cls, sbrdd, modly srt, sil + mnr ptch pyr cmt, tr - mnr sec calc cmt, predly tt, ptch wk por (4-7%) / **lt amb hydc stng, dull yel flor, wk slow blomg cut, p - q shw**, 1220 spl has decrg sd cont & incrg arg cont & pyr

SH: dk gy - grdg - blk, sbfis, nn calcs, carb, mod toc aa, rr sks, occ hi angle jt, modly frm, pyric aa, intbdd vf - f gred ss

SS: lt - m gy, lt yelsh brn ip, qtzs / mnr gy cht, predly vf - l f gred, locly slty & arg ip, sbrdd - sbang, mod srtg, sil cmt, tr pyr cmt, tr - mnr sec calc cmt, predly tt, occ thn bed / 5-8% intgran por & **lt brn hydc stng / dull yel flor & wk blomg cut, q shw**

SS: sbeq lt gy & lt amb brn, qtzs / mnr gy cht, & occ k lit gr, scat wh sils grs, vf - f gred, sbang - sbrdd, sil ovgths, modly w srt, sil cmt, tr sec calc cmt, brn ss is o stnd thru & has p - locly fr por (6-10%), **com dull yel flor, mod slow blomg cut**, gy ss is ttly cmtd

SS: aa, incrly gy, slty & arg ip, predly tt, locly cmtd / abnt pyr, **comly / amb brn o stng & mod blomg cut aa**

SH: dk gy - blk, sbfis - fis, nn calcs, carb, locly slty, pyric, modly frm

SS: lt - m gy, lt yelsh brn, qtzs / mnr gy cht, vf - f gred, locly slty & arg, sbang - sbrdd, mod - locly py srt, sil cmt, ptch pyr cmt, predly tt, comly / wk por (2-6%) & **lt brn hydc stng, spy dull yel flor, wk slow stmg cut, vp shw**

SH: dk gy, dk brnsh gy, grdg - blk, sbfis, nn calcs, pyric, carb, modly frm, occ hi angle jt

ICP = 1252mMD; 1160.9mTVD; -479.2mSS
Reached May 9, 2013 @ 23:00hrs.

SH: m brn gy, sb plty - blky, micmica, slly pyric, predly as cly sh, m hd, rr f - m gred, cons, s&p, sbng - sbrdd, sils, v pyric, tt ss frags, cuttings sticking to shaker, q spl quality.

SH: dk gy brn - blk, comly m hd, sb fis - fis, predly as cly sh, slly pyric, occ frags / pyr lam, predly lt brn, bit-ground, slly montic & cracking in wtr, sh sticking to shaker screens, micmica, slly pyric, rr m brn, hd

1270 m
1280 m
1290 m
1300 m
1310 m
1320 m
1330 m
1340 m
1350

DS 38.9° AZ 321.5°
TVD 1180.05 SSL -498.35

Bit#5 Smith XRPS
31.50 / 9 hrs
Cond 7-7-WT-A-
-E-I-FC-PR

NB#6 Security FX54R
DS 39° AZ 321.3°
TVD 1187.16 SSL -505.46

DS 38.9° AZ 321.4°
TVD 1194.76 SSL -513.06

DS 38.8° AZ 321.3°
TVD 1201.82 SSL -520.12

DS 38.8° AZ 320.7°
TVD 1209.34 SSL -527.64

DS 38.6° AZ 320.1°
TVD 1216.77 SSL -535.07

DS 38.3° AZ 320.°
TVD 1224.33 SSL -542.63

DS 38.2° AZ 320.1°
TVD 1231.71 SSL -550.01

100 R

S

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

FL 4.5
pH 9.5
KCL 7.1

Transferring mud into system

Den 1320
Vis 57
FL 5
pH 10
PP 1340
RPM 40
WOB 9

0.45 0.3 0.15 0-0.15

186 u

Den 1500

M a
M a
P a
M r
M a

SH: m - dk brn gy, sb plty - sbblky, micmica, pyric, predly as cly sh, rr slty & sdy frags, m hd - firm, sb fis, 5% as off wh, lt gy, occly lt brn, f - l m gred, modly srt, sbang - sbrdd, comly sils, locally arg or pyric, tt, firm s&p ss frags, 3% m brn ironstone frags.

SH: m - dk gy, m - dk gy brn, sb plty - sbblky, micmica, m hd - hd, sb fis - fis, as cly sh, comly / dism & mas pyr, rr carb flks, as cly sh, tr f - l m gred, sbang - sbrdd, sils, arg, pyric, tt ss stringers.

SH: m - dk gy, m - dk brn gy, sb plty - sbblky, micmica, comly sft, sb fis - fis, as cly sh, pyric, locally / mas pyr specs, rr strecthed pyr, tr frags / high angled joints, occ frags crack in wtr.

SH: m - dk gy brn, sb plty - sbblky, micmica, pyric, as cly sh, rr shear features, tr m brn ironstone frags, non calcs.

SH: m - dk gy, m - dk brn, sb plty - sbblky, micmica, occly / dism v f or mas pyr, rr greasy frags, as cly sh, 5% as lt gy, off wh, lt brn, cons, f - m gred, sbang - sbrdd, sils, pyric, arg, tt ss stingers.

SH: m - dk gy, m - dk gy brn, plty - sbblky, micmica, m hd, fis, as cly sh, tr lt gy, f - l m gred, modly srt, sils, arg, pyric, tt s&p ss stringers.

SH: m - dk gy, m - dk gy brn, plty - sbblky, micmica, m hd, sb fis - fis, micmica, as cly sh, 3% lt gy, lt gy brn, predly f gred, tt, sbang - sbrdd, sils, pyric, locally arg, w cons tt, s&p ss frags.

SH: m - dk gy, m - dk gy brn, sb plty - sbblky, micmica, comly slty & sdy. slly carb, tr dism & mas pyr, rr shear features, non calcs.

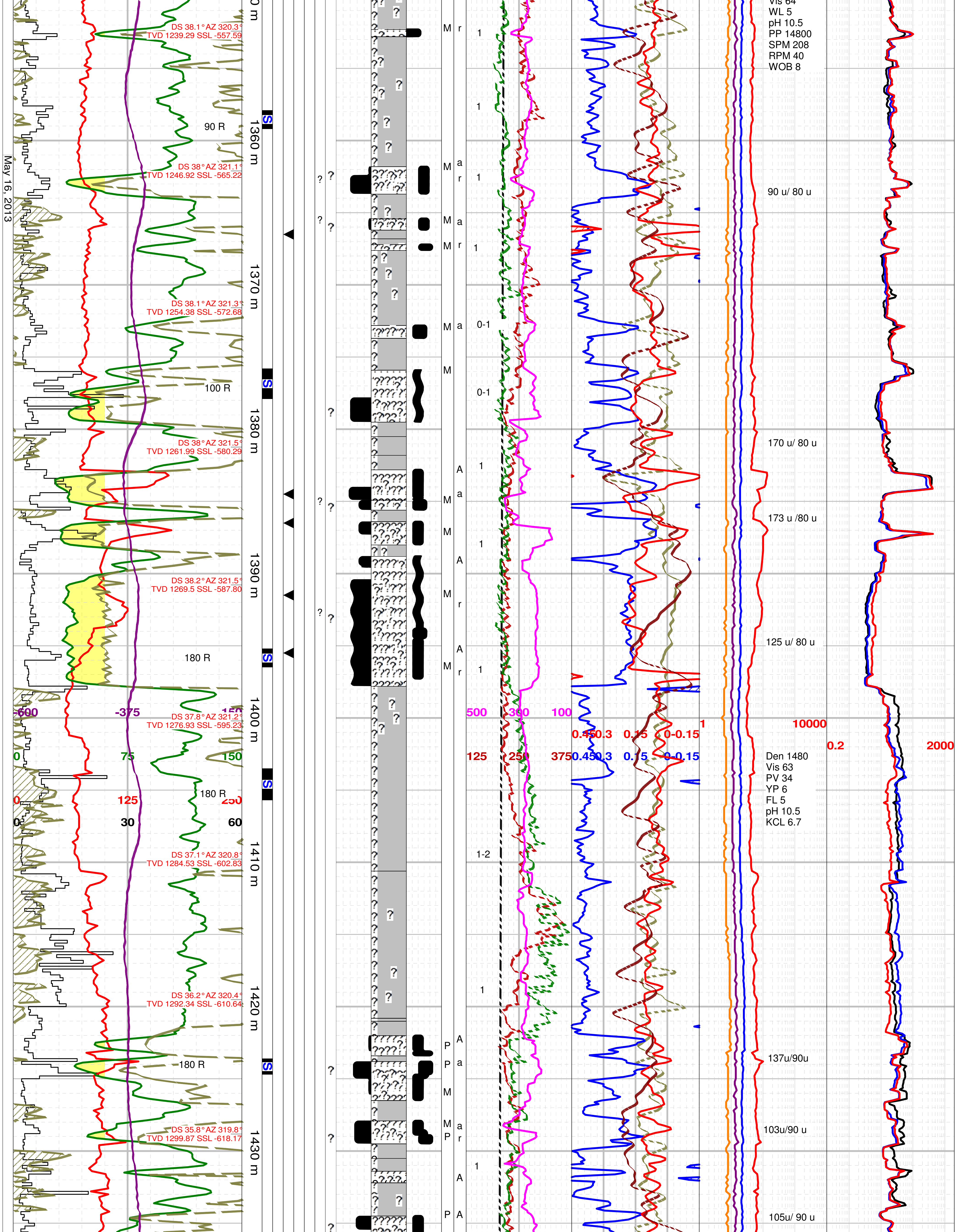
SS: cons, s&p, off wh, lt gy, slty - v f u gred, rr f u gred frags, p - modly srt, arg, locally sils or pyric, tt, no shows.

SH: m brn, m - dk gy, sb plty - sbblky micmica, slly carb, micmica, rr frags cracking in wtr, occly slly slty or sdy, m hd, sb fis - occly fis, 6% as m brn non calcs ironstone frags, 4% off wh, lt gy, p - modly srt, slty - u m gred, arg, sils, locally pyric, tt s&p ss frags.

SH: m - dk brn, sb plty sbblky, micmica, locly / carb grs or flks, m hd, locly v hd, sb fis, occ frags crk or swell n wtr, difficult - wash, 5% lt gy, off wh, slty - f u gred, sbang - sbrdd, modly srt, comly arg, sils, slly pyric, firm, tt s&p ss frags, 3% m brn ironstone frags.

SH: m - dk gy, m - dk gy brn, sb plty - blky, micmica, predly as cly sh, locally slty & sdy, occ frags cracking or swelling in wtr, sft - m hd, comly fis, tr dism or mas pyr, rr slickensides, rr shear structures, 6% m brn, locally pyric, non calcs ironstone frags, 3% lt gy, off wh, slty - f u, locally l m gred, sbang - sbrdd, p - modly srt, sils, arg, pyric, tt s&p ss frags.

SH: m - dk gy brn, sb plty - sbblky, micmica, pyric, as cly sh, rr shear features, tr f - l m gred, sils, tt, s&p ss frags.



SS: predly as uncons, sbrdd, f u - u m qtz & cht grs, cons frags lt gy, off wh, s&p / 10-20% dk cht grs, modly srt, sbang - sbrdd, sils & comly / sil overgrowths, patchy wh or lt gy arg mtx, **occ frags / 15% wh kao plugged mtx por, slly pyric, / p gr relief, tt, rr frags / 1-5% blk, dd plugged intgran por, p reservoir, no shows.**

SS: cons, off wh, lt gy, lt - m brn, f - rr l m gred, sbang - sbrdd, / < 20% dk & wh cht grs, modly srt, comly / patchy wh or gy brn arg mtx, sils, slly pyric, firm - fri, / **p gr relief, 15-18% kao plugged mtx por, p gr relief, pyric, tr p dd bit plugged intgran por, no shows, p reservoir.**

SS: off wh, lt gy brn, lt gy, cons, qtzs - s&p, / < 25% wh & dk cht grs, f - occly l m gred, sbang - sbrdd, ang ip, slly calcs, sils, fri - firm. sils / sil overgrowths, abnt wh intgran kao, slly pyric, or / m brn arg cmt, / **p - rr g gr relief, modly srt, rr frags / 1-6% vis intgran por, 9-21% kao mtx por, v p, slow wk yel gn blomg cut flor.**

SH: m - dk brn, sft - m hd, plty - blky, micmica, predly as cly sh, occ v f pyr lam, occ frags swelling or cracking in wtr, rr slickensides.

SH: m - dk brn, sb plty - blky, micmica, pyric, occ pyr lam, occ slickensides ip q bit-generated, 5% of frags swelling or cracking in wtr.

SH: m - dk gy, m - dk brn, sb plty - occly blky, micmica, as cly sh, spl difficult to wash, slly carb, pyric, occ frags split or crack in wtr, tr dism & mas pyr.

SH: m - dk gy, m - dk brn, sb plty - occly blky, micmica, as cly sh, pyric, occ frags split or crack in wtr, tr dism & mas pyr., occ slickensides.

SS: lt gy, off wh, lt gy brn, f gred, rr frags / m - c l floating qtz grs, sbang - sbrdd, s&p - qtzs, / 25% wh & lt & dk cht grs, slly calcs, sils & comly / sil overgrowth, comly / lt gy brn, locally off wh & / kaoic arg mtx, rr pyr, occ sh partings, / **p gr relief, no vis intgran por, 12-15% kao mtx por, v p, v slow yel gn blomg cut flor.**

DS 35.9° AZ 319.8°
TVD 1307.24 SSL -625.54

DS 35.8° AZ 319.6°
TVD 1315 SSL -633.30

DS 35.8° AZ 318.9°
TVD 1322.58 SSL -640.88

DS 35.5° AZ 318.5°
TVD 1330.4 SSL -648.70

DS 35.5° AZ 318.1°
TVD 1338.38 SSL -656.68

DS 35.3° AZ 318.8°
TVD 1345.85 SSL -664.15

90 R

DS 35° AZ 321.1°
TVD 1353.52 SSL -671.82

90 R

DS 34.4° AZ 323.4°
TVD 1361.13 SSL -679.43

DS 34.2° AZ 324.3°
TVD 1368.88 SSL -687.18

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

May 17, 2013

M a
P A
M a

M

109u/90 u

187 u

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

0-450.3 0-15 0-0.15

Den 1500
Vis 72
FL 5
pH 10
PP 18200
SPM 204
RPM 40
WOB 8

SS: off wh, lt gy, cons, s&p, f gred, locally / floating m grs, p - modly srt, sbang - sbrdd, ang ip, comly / off wh kao arg mtx, sils, pyric, slly calcs, / < 20% cht grs, **tr 1-3% vis intgran por, 15% kao plugged mtx por, no cut flor.**

SH: m - dk brn, plty - sbblky, micmica, as cly sh, comly swelling or cracking in wtr, rr pyr, rr shear structures, m hd, comly fis.

SH: m - dk brn, plty - occly blky, micmica, as cly sh, occ frags which crack or swell in wtr, tr dism pyr, locally / v f pyr lam, rr shear structures.

SH: m brn, m brn gy, sb plty - sbblky, micmica, m hd comly fis, as cly sh, occ frags swelling or cracking in wtr, rr slickensides, slly pyric.

SH: m - dk gy, m - dk brn, plty - blky, micmica, as cly sh, sft - m hd, comly fis, rr shear features, occ frags swelling in wtr, tr ironstone, non calcs.

SH: m - dk brn gy, m - dk gy, plty - occly sbblky, micmica, as cly sh, comly fis, sft - hd, rr pyr lam, occ swelling frags, tr ironstone, tr off wh, f gred, cons, s&p ss frags, rr shear features.

SH: m - dk gy, m - dk gy brn, sb plty - sbblky, micmica, sft, fis, occ frags swell in wtr, tr dism & mas pyr, rr ironstone frags, rr shear structures.

SH: m - dk gy, m - dk gy brn, sb plty - sbblky, micmica, sft, fis, occ frags swell in wtr, tr dism & mas pyr, rr ironstone frags, occ slickenside surfaces, rr carb frags.

SS: off wh, v lt brn, slty - v f l gred, arg, slly sils, carb, tt.

SH: lt - m brn, m gy brn, sb plty - sbblky, micmica, sft, fis, occ swelling frags, non calcs, rr shear structures.

SH: m gy, m - dk gy bn, plty, micmica, as cly sh, sft, fis, occ frags crack in wtr, slly pyric, rr shear structures.

SH: m - dk brn gy, m gy, plty - sbblky, micmica, tr dism & mas pyr, as cly sh, comly sft & fis, slly carb, tr ironstone, rr slickensides.

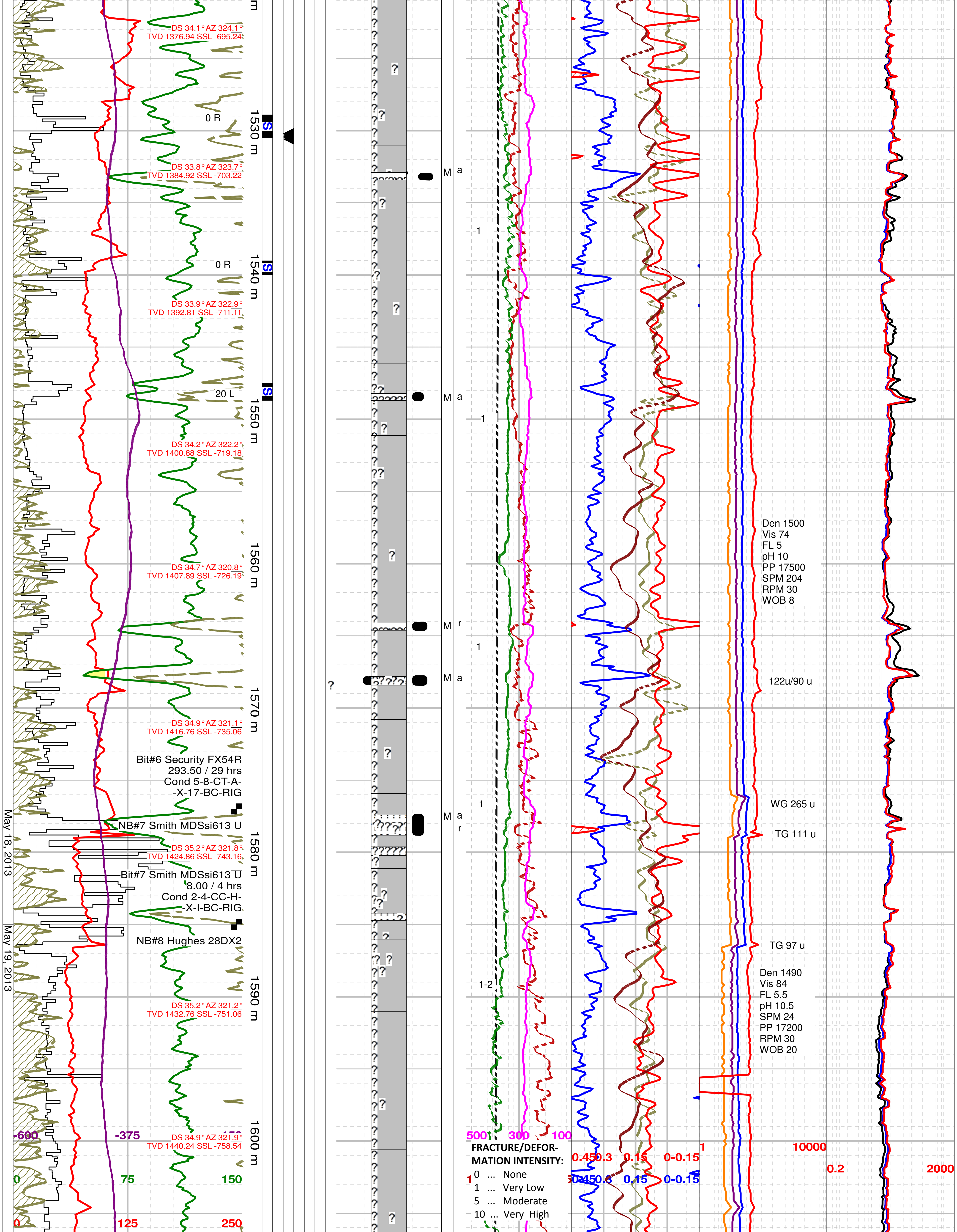
SH: m gy, m - dk gy brn, plty - sbblky, micmica, as cly sh, sft - m hd, comly fis, occ frags / v f pyr lam, tr ironstone, rr shear features, occ frags crack in wtr.

SH: m gy, m - dk brn gy, sb plty, micmica, as cly sh, sft - m hd, comly fis, occ frags swell or crack in wtr, occ pyr lam,. rr slickensides.

SH: m - dk gy, m - dk gy brn, sb plty - occly blky, micmica, occ frags / pyr lam, as cly sh, occ frags crack or swell in wtr, sft - m hd, comly fis, rr shear structures, tr ironstone.

SH: m - dk brn gy, m gy, plty - sbblky, micmica, as cly sh, occ pyr lam, frags occly crack or swell in wtr, difficult to wash, rr slickenside surfaces.

SH: m - dk gy brn, m - dk gy, plty - sbblky, micmica, predly as cly sh, occ frags swell or crack in wtr, sft - occly m hd, comly fis, occ irregular pyr lam, occ mas pyr, no really obvious shear features.



SH: m - dk gy, m - dk gy brn, plty - sb plty, occly blky, as cly sh, sft - m hd, comly fis, slly pyric, occ frags swell or crack in wtr, non calcs, slly pyric.

SH: m - dk gy, m - dk gy brn, plty - sbblky, micmica, as cly sh, occ frags swell or crack in wtr, slly pyric, sft - m hd, comly fis, rr slickensides, tr off wh, f gred, arg, qtzs - s&p ss frags.

SH: m - dk gy, m - dk gy brn, plty - sbblky, occly blky, micmica, predly as cly sh, occ sdy or slty frags or frags which swell or crack in wtr, slly pyric, sft - m hd, comly fis, rr slickensides, 3% off wh, lt gy, f gred, locally l m gred, p - modly srt, arg, qtzs - s&p, tt ss frags.

SH: m - dk gy, m - dk gy brn, blk, plty - sbblky, micmica, predly as cly sh, occ sdy or slty frags or frags which swell or crack in wtr, slly pyric, sft - m hd, comly fis, tr off wh, lt gy, f gred, locally l m gred, p - modly srt, arg, qtzs - s&p, tt ss frags.

SH: m - dk brn, m - dk gy, plty - blky, micmica, as cly sh, occ frags swell or crack in wtr, slly carb, tr dism v f pyr, pyr lam or mas pyr, sft - hd, comly fis, rr shear structures.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, 5% of frags slty & sdy, tr dism & mas pyr, occ frags swell or crack in wtr, tr ironstone frags, rr v f pyr lam, tr lt gy, wh, cons, slty - v f u gred, tt ss frags as stringers.

SH: m - dk brn gy, m - dk gy, sb plty - sbblky, micmica, as cly sh, occ frags crack or swell in wtr, sft - m hd, comly fis, rr shear structures.

SS: off wh, lt gy, lt gy brn, lt brn, cons, s&p, / < 10-15% dk cht grs, f gred, slty ip, p - modly srt, sbang - sbrdd, sils,tr calc, arg, patchy lt brn, occ wh kao mtx, pyric, **no vis intgran por, 6% kao mtx por, no cut flor.**

SH: m - dk brn comly sft - m hd, sb fis - fis, comly m - dk gy or blk, plty - blky, micmica, carb, comly firm, brit, sils ip, slly pyric, 3% f gred, lt gy, sils, sbang - sbrdd, modly - w srt, sils, tt, s&p ss frags.

SS: lt gy, off wh, lt brn, f gred, occ frags / floating m - v c l qtz & cht grs, rr granules, cglic ip, p - modly srt, sbang - sbrdd, sils & / sil overgrowths, slly pyric, spotty wh or m brn arg cmt, / < 20-30% cht grs, p gr relief, slly calcs or dolic, tt, no shows.

SH: m - dk brn, sb plty - comly blky, comly firm, brit, occly sb fis - fis, micmica, as cly sh, rr slty & sdy frags, pyric, occ frags / lense shaped pyr, tr ironstone, 3-7% off wh, lt gy, f gred, locally / floating m - c qtz or cht grs, sils, pyric, occly arg, tt, s&p ss frags.

SH: m - dk gy, occly blky, sb plty - comly blky, sft - firm, fis ip, predly as cly sh, occ frags slty & sdy, occ frags crack or swell in wtr, micmica, greasy, 2% f gred, sils, hd, cons, tt, ss frags.

DS 34.4° AZ 322.6°
TVD 1447.85 SSL -766.15

DS 34.2° AZ 323.4°
TVD 1455.93 SSL -774.23

DS 33.8° AZ 324.8°
TVD 1463.88 SSL -782.18

60 L

DS 33.6° AZ 324.6°
TVD 1471.96 SSL -790.26

DS 33.1° AZ 325.4°
TVD 1479.82 SSL -798.12

DS 32.5° AZ 326.8°
TVD 1487.77 SSL -806.07

DS 32.9° AZ 327.7°
TVD 1495.47 SSL -813.77

30-50 L

DS 33.4° AZ 328.2°
TVD 1503.57 SSL -821.87

40 L

DS 33.9° AZ 328.1°
TVD 1511.62 SSL -829.92

50 L

1610 m
1620 m
1630 m
1640 m
1650 m
1660 m
1670 m
1680 m
1690 m

May 20

M a

P A r

2-3

2-3

2

1

1

Den 1470
Vis 74
PV 40
YP 10
pH 10.2
KCL 7.3

Tracers in @ 1632 m (MD), ;lagtime 21 minutes,

Change sample Pail

118 u

SH: m - dk gy, blk, micmica, sb plty - blky, comly cracking or swelling in wtr, pyric, as cly sh, occ slt or sdy frags, slly carb, comly sft & fis in wtr.

SH: m brn gy, m gy, dk brn gy, comly v sft & fis in wtr, comly cracks & swell in wtr, as cly sh, rr slickenside surfaces, micmica, greasy ip, tr m brn ironstone frags & lt gy, predly f gred, s&p, sils, ss frags.

SH: dk gy - blky, plty - blky, micmica, comly hd & brit, 60% of frags lt brn gy, comly bit-ground or swelled, fri, v sft, fis ip, pyric, non clacs.

SH: m - dk gy, blk, plty - blky, micmica, occly gresy, as cly sh, comly sft & sb fis - fis, occly hd & brit, comly cracking or swelling in wtr, pyric, scat slickensides.

SH: m - dk gy, blk, plty - blky, micmica, occly greasy, as cly sh, comly sft & sb fis - fis, occly hd & brit, comly cracking or swelling in wtr, pyric, tr f gred, sils, tt ss stringers.

SH: m - dk gy, micmica, occly greasy, as cly sh, occ pyr lam, occ slickensides, rr deformed pyr inclusions, tr m brn ironstone frags, sft - hd, sb fis - brit.

SH: m - dk brn gy, m - dk gy, blk, micmica, rr greasy frags, occ frags swell or crack in wtr, occ slickenside surfaces, tr m brn crpxl ironstone frags, comly sft - occly firm in wtr, sb fis - fis, occly brit.

SH: m - dk gy, blk, plty - sbblky, occly blky, micmica, occ greasy frags, as cly sh, comly swelling or cracking in wtr, rr pyr, occ slickensides.

SS: off wh, v lt brn, f gred, rr frags / floating l m grs, qtzs, sbang - sbrdd, sils, / < 15% cht grs, comly / lt gy or off wh arg cmt, rr carb grs, tt, v p gr relief, no shows.

SH: m - dk gy, grdg to blk, micmica, rags crack or swell in wtr, tr dism & mas pyr, 7% off wh, f gred, tt, sils, predly qtzs, arg, slly pyric. tt ss frags.

SH: m - dk gy, grdg to blk, m - dk brn, plty - blky, micmica, frags comly swelling or cracking in wtr, tr dism & mas pyr, rr slickensides.

SH: dk gy - blk, plty - sb plty, rrblky frags, micmica, slly pyric, carb, comly firm & brit, rr slickesides, rr lt gy, slty - f u gred, cons, tt, sils, ss stringers or partings.

SH: m - dk gy, grdg to blk, dk gy brn, plty - sbblky, micmica, as cly sh, sft - occly hd & fis in wtr, slly swelling or cracking in wtr, pyric, rr shear structures.

SH: m - dk gy, occly blky, plty - sbblky, micmica, as cly sh, comly sft, fis, comly cracking or swelling in wtr, rr hd & brit frags, tr pyr, rr shear structures.

SH: m - dk gy, blk, plty - blky, micmica, rr greasy frags, comly sft & fis, occ hd & brit frags, as cly sh, frags comly cracking or welling in wtr, rr slickenside surfaces, tr m brn ironstone frags & rr qtzs, lt gy, v f sils sltst frags.

SH: m - dk gy, grdg to blk, micmica, rr greasy frags, sb plty - sbblky, micmica, sft - hd, fis - brit, abnt bit-ground lt m brn cly in spl.

SH: m - dk gy, blk, sb plty - blky, micmica, slly pyr, sft - hd, fis - brit, comly cracking or swelling in wtr, rr slickensides.

SS: cons, qtzs - s&p, lt gy, lt gy brn, m brn, f - occly u m gred, rr frags / floating c lt & dk cht grs, ang -

Bit#8 Hughes 28DX2
112.00 / 19.5 hrs
Cond 6-8-BT-A-
-E-2-NO-PR
DS 34.9° AZ 327.3°
TVD 1519.64 SSL -837.94
NB#9 Smith SD1513MHSB

1700 m

6 R

DS 35.8° AZ 326.3°
TVD 1527.6 SSL -845.90

1710 m

70 L

DS 36.2° AZ 325°
TVD 1535.23 SSL -853.53

1720 m

70L

DS 36.4° AZ 323.6°
TVD 1542.77 SSL -861.07

1730 m

90 L

DS 36.2° AZ 322.9°
TVD 1550.47 SSL -868.77

1740 m

90 L

DS 36.3° AZ 322.1°
TVD 1558.1 SSL -876.40

1750 m

DS 36.3° AZ 322.4°
TVD 1565.65 SSL -883.95

1760 m

DS 36° AZ 322.1°
TVD 1573.24 SSL -891.54

1770 m

DS 35.8° AZ 321.6°
TVD 1581.09 SSL -899.39

May 21, 2013

Den 1510
Vis 78
WL 4.5
pH 10
PP 18000
SPM 216
RPM 40
WOB 20

TG 205 u

0.45 0.3 0.15 0 -0.15

MFS
(TVD: 1525.79)
(SSL: -844.09)

IMPERIAL MFS

Den 1510
Vis 84
PV 38
YP 11
FL 5
pH 10
KCL 6.8

Den 1510
Vis 85
FL 5.1
pH 10
PP 19600
SPM 216
RPM 40
WOB 7

sbrdd, predly / < 25% cht grs, m gred frags / < 30% cht grs, spotty calcs cmt, comly sils & / sil overgrowths, / off wh, gy brn arg mtx, **rr frags / 1-9% blk dd bit plugged intgran por, p - g gr relief, traces of 1-5% vis intgran por, slow, p, faint yel gn stmg cut flor.**

SH: m - dl gy, m - dk gy brn, plty - blky, micmica, as cly sh, as cly sh, rr slty or sdy frags, frags comly crack or swell in wtr, carb, sft - hd, fis - brit, tr dism & mas pyr, rr slickensides, tr gy, wh, f gred, sbang - sbrdd, sils, arg, tt qtzs - s&p ss frags.

SH: m - dk gy, occly blk, plty - sbblky, micmica, as cly sh, tr dism & mas pyr, occ frags crack in wtr, rr slickensides, comly sft & sb fis - fis. tr m brn ironstone frags.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, comly sft, fis, sb fis, slly carb, tr dism & mas pyr, no shear structures.

SH: m - dk gy, m - dk brn gy, plty - occly sbblky, micmica, as cly sh, rr greasy frags, comly sft, fis - semi fis, occ frags swell or crack in wtr, rr pyric frags.

SH: m - dk gy, plty - occly sbblky, micmica, as cly sh, rr pyr, sft, sb fis - fis, no shear structures, occ frags crack or swell in wtr.

SH: m - dk gy, 15% lt gy brn, micmica, carb, slly pry, predly as cly sh, comly sft, fis - sbfis, occ frags slly slty or sdy, rr sltst & ironstone frags.

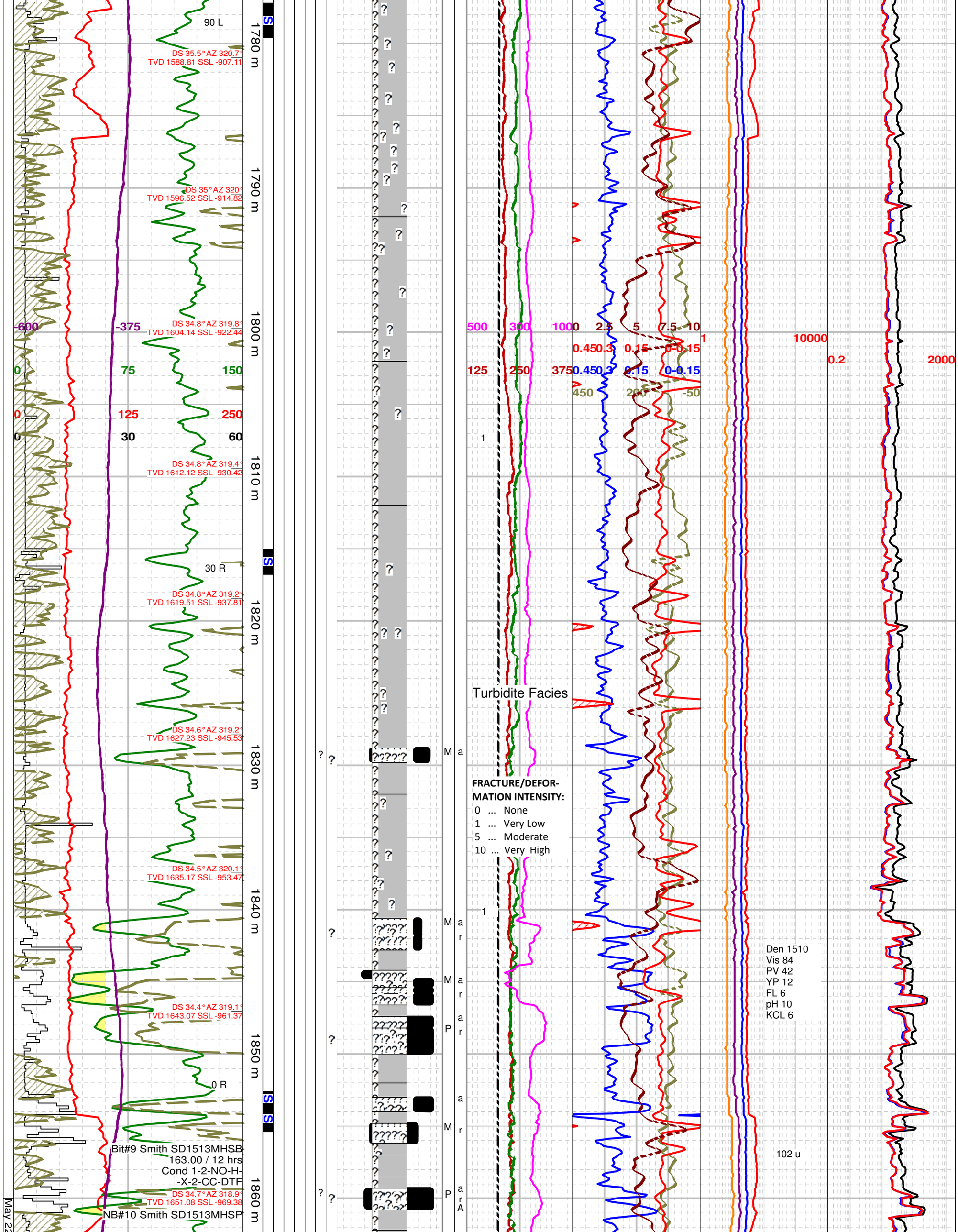
SH: m - dk gy, sb plty - occly sbblky, micmica, as cly sh, tr dism & mas pyr, occ frags crack or swell in wtr, sft, sb fis - fis, 3-4% ironstone & rr off wh, lt gy, sils sltst & slty - v f l gred, tt, qtzs ss frags.

SH: lt - dk gy, plty - occly sbblky, micmica, as cly sh, occ slty frags, slly carb, slly swelling or crackng in wtr, rr lt gy sltst & m brn ironstone frags.

SH: m - dk gy, plty - occly sbblky, micmica, 20% of frags slty or sdy, comly sft, sb fis- - fis, tr off wh, slty - v f u gred, sils, v f ss stringers,.

SH: m - dk gy, plty, sb plty, rr blky frags, sft, comly fis, semi fis, frags swell or crack in wtr, slly carb, no shear structures, non calcs.

SH: m - dk gy,15-25% lt gy brn, sb plty - sbblky, micmica, as cly sh, comly sft, sb fis - fis, tr dism & mas pyr, tr ironstone or lt gy, slty - v f l gred slty ss frags, slly carb, non calcs.



SH: m - dk gy, plty - sbblky, micmica, sft, fis - sb fis, tr dism & occ mas pyr, 3% fracd ironstone frags & rr lt gy, off wh sltst frags.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, occ slly slty, sdy, locally chky & slly calcs, or carb frags, 10-15% lt gy, arg, comly sft sltst frags & rr m brn ironstone frags, no shear structures, rr pyr.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, occ slly slty, sdy, locally chky & slly calcs, or carb frags, 10-15% lt gy, arg, comly sft sltst frags & rr m brn ironstone frags, no shear structures, rr pyr.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, tr v f dism carb flks, sft, fis, occ frags swell or crack in wtr, tr lt gy, comly sft, arg, sltst frags, slly chky & calcs.

SH: m - dk gy, plty - occly sbblky, micmica, carb, slly slty or sdy, tr lt gy, off wh, comly arg, tt, sft sltst frags, rr ironstone.

SH: m - dk gy, plty - sbblky, micmica, as cly sh, rr slty or sdy frags, sft fis, tr pyr, occ frags crack or swell in wtr, tr ironstone, sltst & rr v f l gred, tt ss frags.

SH: lt - dk gy, sb plty - sbblky, micmica, as cly sh, slly swelling in wtr, sft, sb fis - fis, 5% as off wh, sdy, arg, tt sltst.

SH: lt - dk gy, plty - blky, micmica, as cly sh, tr dism v f carb flks, sft, sb fis - fis, tr mas & dism pyr, slly calcs, 4% as lt gy, lt gy brn, off wh, slty - v f u gred, ss & sdy sltst frags, tr ironstone.

SH: lt - dk gy, plty - blky, micmica, as cly sh, tr dism v f carb flks, sft, sb fis - fis, tr mas & dism pyr, slly calcs, 5% as lt gy, lt gy brn, off wh, slty - f u gred, ss & sdy sltst frags, tr ironstone.

SS: m brn, qtzs, f - m gred, sbang - sbrdd, sils, / overgrowths, modly srt, **comly / brn arg, bit stnd mtx, slly pyric, no vis por, mtx por?, wk yel gn rapid flash cut flor.**

SS: cons, s&p, sidic brn, off wh, lt gy, gy brn, f - c l gred, sbang - sbrdd, ang ip, rr lt gy cht granules, p - modly srt,. / 20 - rr 80% wh, gy, brn cht grs, slly calcs, sidic, comly sils, slly pyric, comly / gy brn, lt brn, **occly off wh kaoic arg mtx, spotty dism m brn dd bit stng, rr frags / blk intgran dd bit, 1-12% blk bit plugged & kao plugged intgran por, no vis intgran por & / p gr relief, no cut flor.**

SS: cons, s&p, off wh, lt brn, lt gy brn, f - c l gred, sbang - sbrdd, ang ip, rr cht granules & ip as mtx supported cglic ss, p - modly srt, sils, slly calcs, predly / lt gy, lt gy brn,m brn, **occly wh & kaoic arg mtx, p reservoir, occ frags / 1-9% blk bit plugged intgran por, kao mtx por? v p, wk yel gn blomg cut flor.**

SS: cons, lt gy brn, s&p, predly slty - f l gred, comly / floating m - c l qtz or cht grs, p - modly srt, sbang - sbrdd, ang ip, slly calcs, sils, comly / off wh, lt gy, **lt**

DS 34.7° AZ 318.9°
TVD 1658.5 SSL -976.80

20 R

DS 34.7° AZ 317.4°
TVD 1666.5 SSL -984.80

50 R

DS 34.8° AZ 318.5°
TVD 1674.4 SSL -992.70

DS 34.7° AZ 318°
TVD 1682.12 SSL -1000.42

DS 34.9° AZ 319.3°
TVD 1690.1 SSL -1008.40

1870 m

1880 m

1890 m

1900 m

Desorbed Sidewall

Den 1490
Vis 76
FL 6
pH 10
PP 19200
SPM 216
RPM 40
WOB 7.5

0.450.3 0.15 0-0.15

SH: 10-15% dk gy, plty - occly blky, micmica, predly m brn, plty - blky, micmica, locally pyric, comly slty, sdy, carb, sft, grdg ip to py srt, v arg, slty - f l gred, carb, predly sft ss, rr lt - m brn, f - m gred, v firm, cons, s&p, sbang - sbrdd, ang ip, tt, arg, pyric, slly calcs,, sils, ss frags.

SH: m brn, 7% dk brn or m - dk gy, comly slty & sdy, slly carb, non swelling, 10% as lt - m gy brn, slty - predly f l gred, arg, tt, comly sft ss frags.

SH: m brn, 7% dk brn or m - dk gy, comly slty & sdy, slly carb, non swelling, 10% as lt - m gy brn, slty - predly f l gred, arg, tt, comly sft ss frags, rr ironstone frags.

SH: m brn, plty - blky, micmica, sb plty, slly pyric, sft - comly m hd, brit - sb fis, slly pyric, comly slly slty, sdy or carb, 7% lt gy, slty - v f u gred, arg, tt, qtzs ss frags, rr slickensides (PDC generated?).

SS: lt gy, lt - m brn, slty - c l gred, sbang - sbrdd, ang ip, p - modly srt, qtzs - s&p, occ frags / 40% lt & dk cht grs, calcs, sils, slly pyric, comly / lt gy, gy brn, **lt - m brn ip dd bit stnd arg mtx, no vis intgran por, no cut flor.**

SS: cons, s&p, lt gy brn, m brn, lt gy, slty - f u gred, occ m gred frags, occ frags / floating c cht grs, tr granules, sbang - sbrdd, ang ip, / < 35% off wh, m brn, gy cht grs, comly / lt gy, off wh (kao?), arg mtx, slly calcs, sils, pyric, **spotty 1-6% blk intgran blk dd bit, no vis por, wk, rapid yel gn, blomg cut flor, v p reservoir, kao mtx por?**

DS 35.2° AZ 318.4°
TVD 1698.13 SSL -1016.43

0 R

DS 35.7° AZ 318.5°
TVD 1705.99 SSL -1024.29

DS 35.8° AZ 317°
TVD 1713.83 SSL -1032.13

DS 35.8° AZ 317°
TVD 1721.85 SSL -1040.15

1910 m

1920 m

1930 m

1940 m

Den 1480
Vis 79
PV 35
YP 12
FL 7.0
pH 10
KCL 7.3

139 u

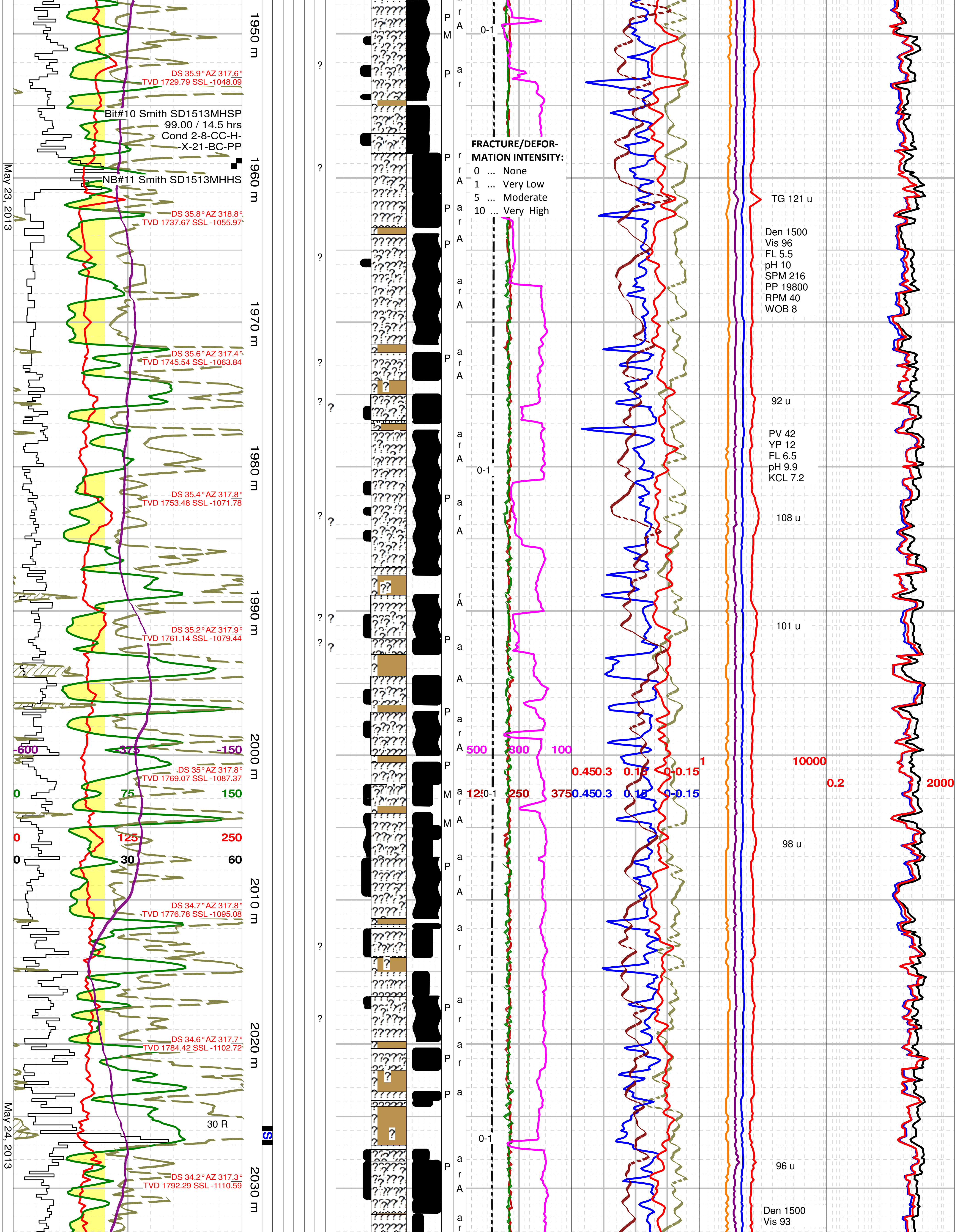
SS: cons, s&p, lt gy, lt gy brn, f - m gred, occ frags / floating c qtz & cht grs, rr granules, cglic ip, sbang - sbrdd, ang ip, sils, firm, non calcs, **comly / lt gy, lt brn, off wh arg mtx, kao mtx por?, slly pyric, frags comly / 1-7% blk, dd, bit plugged intgran por, no vis por, slow p, yel gn blomg cut flor.**

SS: cons, off wh, v lt brn, qtzs - s&p, f - u m gred, occ frags / floating c cht grs, sbang - sbrdd, ang ip, slly calcs, sils, slly pyric, comly / off wh, v lt gy brn arg mtx, fri - firm, / sil overgrowths, **p gr relief, 9-12% kao mtx por, no vis intgran por, v slow p yel gn blomg cut flor.**

SS: off wh, lt brn, cons, s&p, f - m gred, occ frags / floating c qtz & cht grs, rr cht granules, cglic & ip mtx supported, sbang - sbrdd, ang ip, p - modly srt, slly calcs, sft - firm, sils, slly pyric, comly / off wh, lt gy brn, occly swelling arg mtx, kaoic, slly carb, **no vis intgran por, predly / p gr relief, v wk p yel gn blomg cut flor, 9-12% kao mtx por.**

SS: off wh, lt brn, cons, s&p, frags comly swell & fall apart in wtr, f - m gred, rr c gred frags, rr granules, cglic ip & mtx supported, sbang - sbrdd, ang ip, p - modly srt, slly calcs, sils, sft & fri - firm, sils, pyric, slly carb, **comly / off wh swelling or lt gy arg mtx, / p gr relief, p reservoir, 1-12% kao mtx por, no vis intgran por, no cut flor.**

SS: off wh, lt brn, cons, s&p, slty - l m gred, occ frags / floating u m - c qtz & cht grs, tr fracd cht granules, cglic ip & mtx supported, sbang - sbrdd, ang ip, p - modly srt, slly calcs, sils, sft & fri - firm, sils, pyric, slly carb, comly / off wh or lt gy, lt gy brn



relief, rr frags / sil druse, p reservoir, spotty 9% kao mtx por, no vis intgran por,v wk, p rapid, yel gn blomg cut flor.

LT CHT CGL: 25% as fracd off wh, lt gy, rr yel, c cht grs & cht granules, cglic, cl supported ip, ss mtx off wh, lt gy brn, f - occly m gred, rr frags / floating c cht grs, sbang - sbrdd, ang ip, slly calcs, sils, rr pyr, comly / off wh, lt gy brn, lt gy arg mtx, fri - occly firm, occly / carb grs, **no vis intgran por, rr frags / 6-9% kao mtx por, v wk, v p yel gn blomg cut flor.**

LT CHT CGL: 25% as fracd off wh, lt gy, c cht & cht granules, cglic, cl supported ip, ss mtx off wh, lt gy brn, f - occly m gred, rr frags / floating c cht grs, sbang - sbrdd, ang ip, slly calcs, sils, rr pyr, comly / off wh, lt gy brn, lt gy arg mtx, fri - occly firm, occly / carb grs or flks, **predly / no vis intgran por, rr sil druse xls, tr 6-9% kao intgran por, v wk, v p yel gn blomg cut flor.**

CGL: 25% as fracd off wh, lt gy, occly m brn, rr blk, c cht & cht granules, cglic, cl supported ip, ss mtx off wh, lt gy brn, f - occly m gred, rr frags / floating c cht grs, sbang - sbrdd, ang ip, slly calcs, sils, rr pyr, comly / off wh, lt gy brn, lt gy arg mtx, fri - occly firm, occly / carb grs or flks, predly / **no vis intgran por, rr sil druse xls, 6-9% intgan & kao plugged mtx por, v wk, v p yel gn blomg cut flor.**

CGL: 20-25% as uncons sbrdd - rdd, wh, occly lt gy, yel, rr blk c cht grs & granules, cglic, mtx - cl supported, ss mtx off wh, lt brn gy, s&p, f - occly m - c l gred, sbang - sbrdd, ang ip, slly calcs, locally sils & / sil overgrowths, comly / off wh, lt - occly m brn arg mtx, rr pyr, p gr relief, rr sils druse, frags comly / **no vis intgran por, 6-9% intgran & kao mtx por, v wk, slow yel gn blomg cut flor, predly as p reservoir, 20% m brn, rr dk brn gy, plty - blky, sh frags.**

SS: cons, off wh, lt gy brn, s&p, f - occly m gred, occ frags / floating c or rr granules,tr c gred frags, ip cglic & mtx supported, sbang - sbrdd, ang ip, slly calcs, comly sils, fri - firm, grs occly sutured, sils & / sil overgrowths, comly / off wh, occly lt gy brn arg mtx, cly swelling in acid, rr pyr, **3-7% kao mtx por, comly tt, / < 60% lt - m gy, lt brn, off wh cht grs, no vis intgran por, wk slow yel gn blomg cut flor,** 15% m brn, plty - blky, slty, sdy, carb sh frags.

CGL: predly as fracd wh, lt gy, c cht grs & cht granules, cl - mtx supported, ss mtx off wh, predly lt gy brn, f - m, rr c l gred, sbang - sbrdd, ang ip, s&p, slly calcs, sils, slly pyric, / off wh, lt gy brn arg mtx, tr blk carb grs, flks, kaoic, **no vis intgran por, p reservoir, 3-9% kao mtx por, v wk, p yel gn blomg cut flor.**

CGL: predly as fracd wh, lt gy, c cht grs & cht granules, cl - mtx supported, ss mtx off wh, predly lt gy brn, f - m, rr c l gred, sbang - sbrdd, ang ip, s&p, slly calcs, sils, slly pyric, / off wh, lt gy brn arg mtx, kaoic, tr blk carb grs, flks, **no vis intgran por, 3-9% kao mtx por, p reservoir, v wk, p yel gn**

May 25, 2013

30 R

DS 34° AZ 316.7°
TVD 1800.36 SSL -1118.66

2040 m

DS 33.8° AZ 316.2°
TVD 1806.01 SSL -1124.31

2050 m

20 R

DS 33.8° AZ 316.7°
TVD 1813.88 SSL -1132.18

Bit#11 Smith SD1513MHHS
102.00 / 15.5 hrs
Cond 8-8-CC-A-
-X-23-BC-PR

NB#12 Hughes DP605X

2060 m

DS 34° AZ 316.8°
TVD 1821.95 SSL -1140.25

20 R

2070 m

DS 35° AZ 318.2°
TVD 1829.95 SSL -1148.25

20 R

2080 m

DS 35.1° AZ 318.5°
TVD 1837.89 SSL -1156.19

2090 m

DS 35.8° AZ 320°
TVD 1845.59 SSL -1163.89

20 R

2100 m

DS 36.1° AZ 321.7°
TVD 1853.3 SSL -1171.60

2110 m

DS 35.8° AZ 321.2°
TVD 1860.96 SSL -1179.26

W a

a

M a A

M a r

P a r A

P a r A

P a r A

P a r A

M M a r

M a r A

P a r A

FL 6
pH 10
SPM 218
PP 19300
RPM 40
WOB 8

104 u

125 u

Den 1500
Vis 105
PV 55
YP 13
FL 5
pH 9.8
KCL 7

Den 1500
Vis 110
FL 5
pH 10
SPM 192
PP 15300
RPM 40
WOB 6-7

Test Gas

0.45 0.3 0.15 0-0.15

Den 1485
Vis 91
PV 42
YP 11
FL 5
pH 9.9
KCL 6.9

blomg cut flor.

SH: m brn, plty - blky, micmica, comly sft & fis, tr v f dism pyr, comly cracking or swelling in wtr, carb, slly slty & sdy, 8% lt gy brn, slty - v f u gred, carb, arg, sft, tt, qtzs - s&p ss frags, tr cglic ss carryover.

SH: m brn, plty - blky, micmica, comly sft & fis, tr v f dism pyr, comly cracking or swelling in wtr, carb, slly slty & sdy.

SS: cons, s&p, / < 20% cht grs, off wh, lt gy, slty - f u gred, sbang - sbrdd, slly calcs, sils, slly pyric, / lt gy, off wh kao arg mtx, 6% kao mtx por, no vis por, p gr relief, no shows.

SS: cons, s&p, / < 20% cht grs, off wh, lt gy, slty - f u gred, sbang - sbrdd, slly calcs, sils, slly pyric, / lt gy, off wh arg mtx, tt, p gr relief, no shows, rr off wh, s&p, m - c l gred, modly srt, sikls, sllu calcs, **slly arg ss frags / 1-5% vis intgran por & rr sil druse, wk, p, slow yel gn blomg cut flor.**

SS: cons, s&p, / < 20% cht grs, off wh, lt gy, slty - f u gred, sbang - sbrdd, slly calcs, sils, slly pyric, / lt gy, off wh arg mtx, tt, p gr relief, no shows.

SS: lt gy, f gred, sbang - sbrdd, s&p, / v p gr relief, arg, slly sils, rr calc cmt, / rr floating c wh cht grs, tt, no shows.

SS: cons, s&p, lt gy, lt gy brn, slty - f l, occly f u gred, rr frags / floating m - c cht grs, / < 15% cht grs, sbang - sbrdd, sils, predly / lt gy arg cmt, rr pyr, tt, p gr relief, no shows.

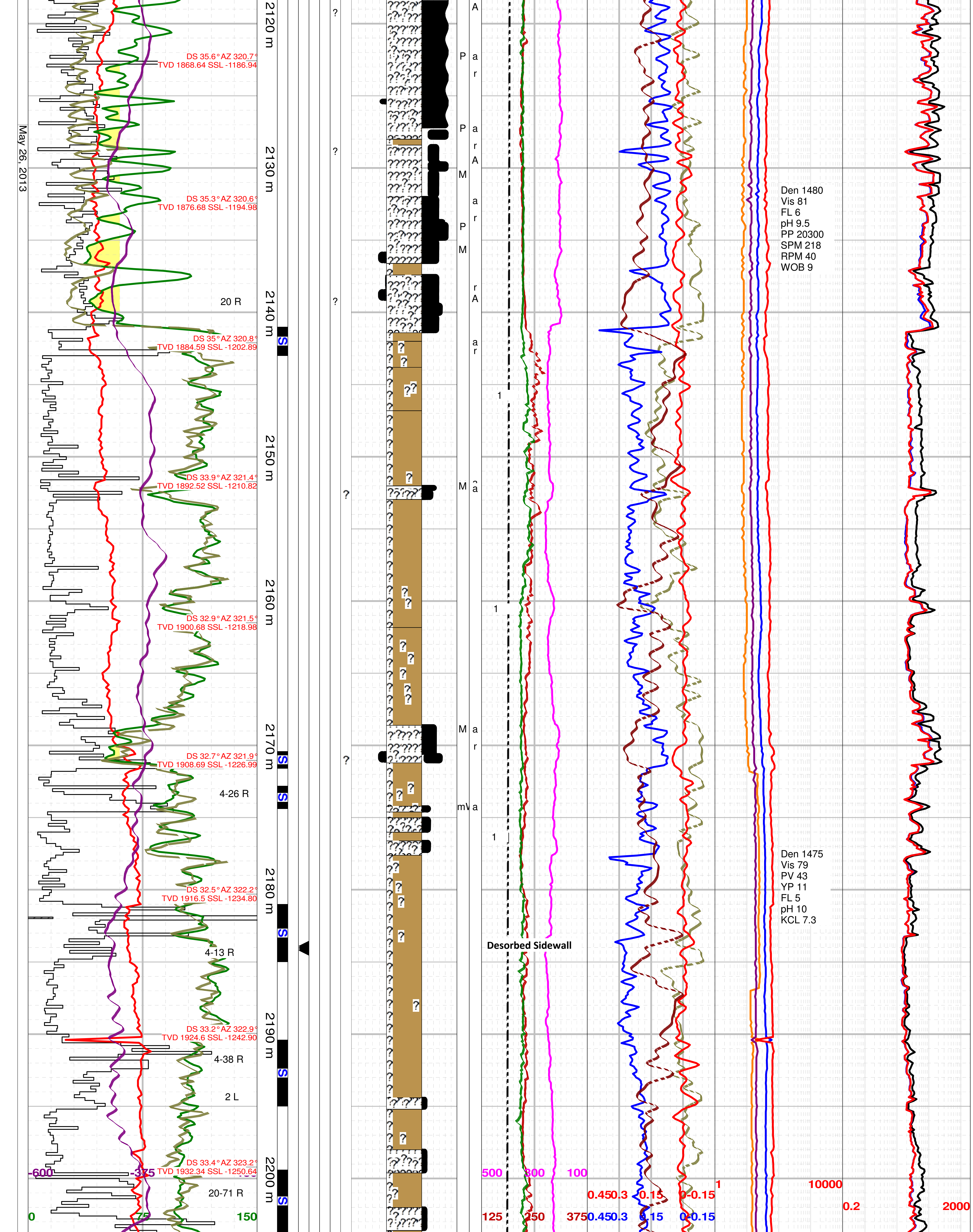
SS: lt gy, cons, s&p, slty - f gred, rr m gred frags, arg, kaoic, sils, sbang - sbrdd, modly srt, carb, slly pyric, / **p gr relief, dns & tt, rr m - c l gred, sbang - ang, tt ss frags, tr euhedral qtz grs, 3-6% intgran & kaoic mtx por, no cut flor.**

CGL: predly as fracd wh, lt gy, f u - c cht grs & cht grs & cht granules, mtx - cl supported, ss mtx off wh, lt gy, lt gy brn, f - m gred, sbang - sbrdd, ang ip, sils, spotty wh, lt gy arg mtx, slly pyric, kaoic ip, calcs, / **p - fr gr relief, no vis intgran por,6-9% kao mtx por, v wk, p yel gn blomg cut flor**, 5-20% plty - sbblky, m brn sh frags, p reservoir.

CGL: predly as fracd wh, lt gy, m - c cht grs & cht granules, mtx - cl supported, ss mtx off wh, lt gy, lt gy brn, fri - firm, f - m gred, occly / floating c cht grs, sbang - sbrdd, ang ip, sils, spotty wh, lt gy, lt brn comly swelling arg mtx, slly pyric, calcs, / **p - fr gr relief, no vis intgran por, v wk, p yel gn blomg cut flor,** 15% plty - sbblky, m brn or dk gy sh frags, p reservoir.

CGL: predly as fracd wh, lt gy, rr blk, m - c cht grs & cht granules, mtx - cl supported, ss mtx off wh, lt gy, lt gy brn, f - m gred, occly / floating c cht grs, sbang - sbrdd, angip, sils, spotty wh, lt gy, lt brn, ip swelling or v sft in wtr arg mtx, slly pyric, calcs, kaoic ip, / **p - fr gr relief, tr druse druse, 6-9% kao mtx por & rr vis intgran por, v wk, p yel gn blomg cut flor,** 15% plty - sbblky, m brn or dk gy sh frags, p reservoir.

SS: 45% as uncons, fracd ip, off wh, v lt gy, f u - c



SS: 45% as uncons, fracd ip, off wh, v lt gy, f u - c cht & rr cht granules, ip as mtx supported cglic ss, ss mtx off wh, lt gy, lt gy brn, fri, s&p, slty - f, occly m - c l gred, p - modly srt, sbang - sbrdd, ang ip, sils, carb, slly pyric, slly calcs, comly / off wh, lt gy arg mtx, **kaoic, / p gr relief, no vis intgran por, 3-6% kao mtx por, v wk, p, yel gn blomg cut flor,** 15-20% m - occly dk brn, plty - blky sh frags, p reservoir.

SS: predly as uncons, fracd ip, off wh, v lt gy, tr lt gn, f u - c cht & rr cht granules, ip as mtx supported cglic ss, ss mtx off wh, lt gy, lt gy brn, fri, s&p, f, occly m - c gred, p - modly srt, sbang - sbrdd, ang ip, sils, carb, slly pyric, slly calcs, comly / off wh, lt gy arg mtx, **kaoic ip, / p gr relief, no vis intgran por, 3-7% kao mtx por?, v wk, p, yel gn blomg cut flor,** < 10% m - occly dk brn, plty - blky, comly slty or sdy, carb sh frags, p reservoir.

SH: m brn, 6% dk brn, plty - blky, occly slty, sdy, carb, occ frags crack or swell in wtr, pyric, comly sft, sb fis - fis.

SS: cons, s&p, off wh, lt gy, slty - f l gred, rr f u gred frags, sbang - sbrdd, modly w srt, / < 15-20% dk cht carb grs & carb flks, spotty calcs cmt, sils, comly / off wh, lt gy arg mtx, predly tt, no shows, rr frags / sil druse.

SH: m brn, plty - occly blky, micmica, comly sft & fis, comly cracking or swelling in wtr, predly as cly sh, rr slty or sdy frags, rr slickensides.

SS: lt gy, off wh, lt gy brn, predly slty - v f l gred, grdg ip to sdy sltst, occly f u gred, tr m - c l gred frags, sbang - sbrdd, rr ang grs, modly srt, comly / off wh, lt gy arg mtx, slly carb, micas, comly sils, tr pyr, non calcs, tt, no shows, 15% as lt - m brn, ply - sb plty sh frags, rr slickesides.

SS: lt gy, off wh, lt gy brn,50% of frags slty - v f l gred, grdg ip to sdy sltst, comly slty - f l, occly f u tr m gred frags or frags / floating m - c l qtz & cht grs, sbang - sbrdd, rr ang grs, modly srt, comly / off wh, lt gy arg mtx, slly carb, micas, comly sils, tr pyr, non calcs, tt, no shows, 15% as lt - m brn, plty - sb plty sh frags.

SH: m brn, 5% dk brn, plty - blky, as cly sh, frags comly cracking or swelling in wtr, as cly sh, 10-15% lt gy, cons, sils, s&p, slty - v f l gred, arg, tt ss frags.

SH: m brn, m brn gy, plty - sbblky, micmica, tr dism v f pyr, comly swelling or cracking in wtr, comly sft, fis, 15-20% of frags slty, slly sdy, grdg to off wh, lt gy, carb, qtzs sltst & rr v f l gred, slty tt ss.

SLTST: lt gy, lt gy brn, v arg, fri - hd, comly sdy & v f l gred, sbng - sbrdd, comly / v f dism pyr & carb flks, sils, tt, no shows, grdg ip to slty v f l gred qtzs ss.

SLTST: lt gy, lt gy brn, arg, qtzs, locally / v f l qtz grs

May 27, 2013

DS 33.7° AZ 323.9°
TVD 1940.34 SSL -1258.64

30-60 L

2 L

DS 34.5° AZ 322.3°
TVD 1948.26 SSL -1266.56

2-20 L

DS 35.2° AZ 322°
TVD 1956.12 SSL -1274.42

20 R - 40 L

Difficult to hold tool face

DS 35.8° AZ 321.8°
TVD 1963.93 SSL -1282.23

24 L

DS 35.6° AZ 321.8°
TVD 1971.8 SSL -1290.10

DS 34.7° AZ 322.1°
TVD 1979.63 SSL -1297.93

DS 34.2° AZ 322°
TVD 1987.62 SSL -1305.92

H/S

DS 33.9° AZ 322.1°
TVD 1995.18 SSL -1313.48

H/S

DS 34.7° AZ 321.8°
TVD 2002.98 SSL -1321.28

2210 m
2220 m
2230 m
2240 m
2250 m
2260 m
2270 m
2280 m

S

Den 1500
Vis 78
FL 5.5
pH 9.5
SPM 218
PP 19500
RPM 40
WOB 9

130 u

Den 1500
Vis 84
PV 49
YP 12
FL 5
pH 9.6
KCL 6.7

Desorbed Sidewall

179u

ISOTUBE
SPL x2

WOB 8.4
RPM 45
PP 19350
SPM1 108
SPM2 105
PO 1.66

& sdy, carb, micmica, pyric, slly calcs, comly sft, grdg to slty, sdy sh.

SH: lt - m brn, 7% of frags dk brn - blk, plty - sbblky, micmica, pyric, comly slty & sdy., occ slickensides.

SH: lt - m gy brn, sb plty - blky, micmica, tr dism v f pyr, occly slty, rr frags crack in wtr, scat q bit generated slickensides.

SLTST: lt gy, lt gy brn, arg, qtzs, locally / v f l qtz grs & sdy, carb, micmica, pyric, slly calcs, comly sft, grdg to slty, sdy sh.

SH: 40% lt gy, lt gy brn, plty - sbblky, micmica, tr dism v f pyr, sft, fis, 60% m - dk brn, slly pyric, predly as cly sh, frags comly swelling & cracking in wtr, rr lt gy, arg, sltst frags.

SH: 45 % lt gy, plty - blky, micmica, pyric, predly as cly sh, rr slty & sdy frags, comly swelling in wtr, 55 % m - dk brn, pyric, predly as cly sh, occly / intlam lt gy sh, scat slickenside surfaces ip bit-generated?

SH: lt gy, lt gy brn, 10-15% m - dk brn, plty - blky, micmica, comly sft & fis, frags comly cracking or swelling in wtr, tr dism & mas pyr, rr slly slty & sdy frags, tr lt gy arg sltst frags, occ slickensides, ip bit-generated?

SH: lt gy brn, 20% dk brn - blk, sb plty - occly blky, micmica, sft - m hd, fis, brit ip, tr dism v f carb flks & pyr, 20% of frags slty, grdg to arg, tt, v f sltst., frags comly crack or swell in wtr, occ slickensides, 4% lt gy, sdy, arg, tt, sltst frags.

SH: lt gy brn, 20% m brn, plty - blky, micmica, comly sft & fis in wtr, predly as cly sh, occly slly slty. tr dism & mas pyr, tr lt gy, arg, sdy, tt sltst frags, scat slickensides.

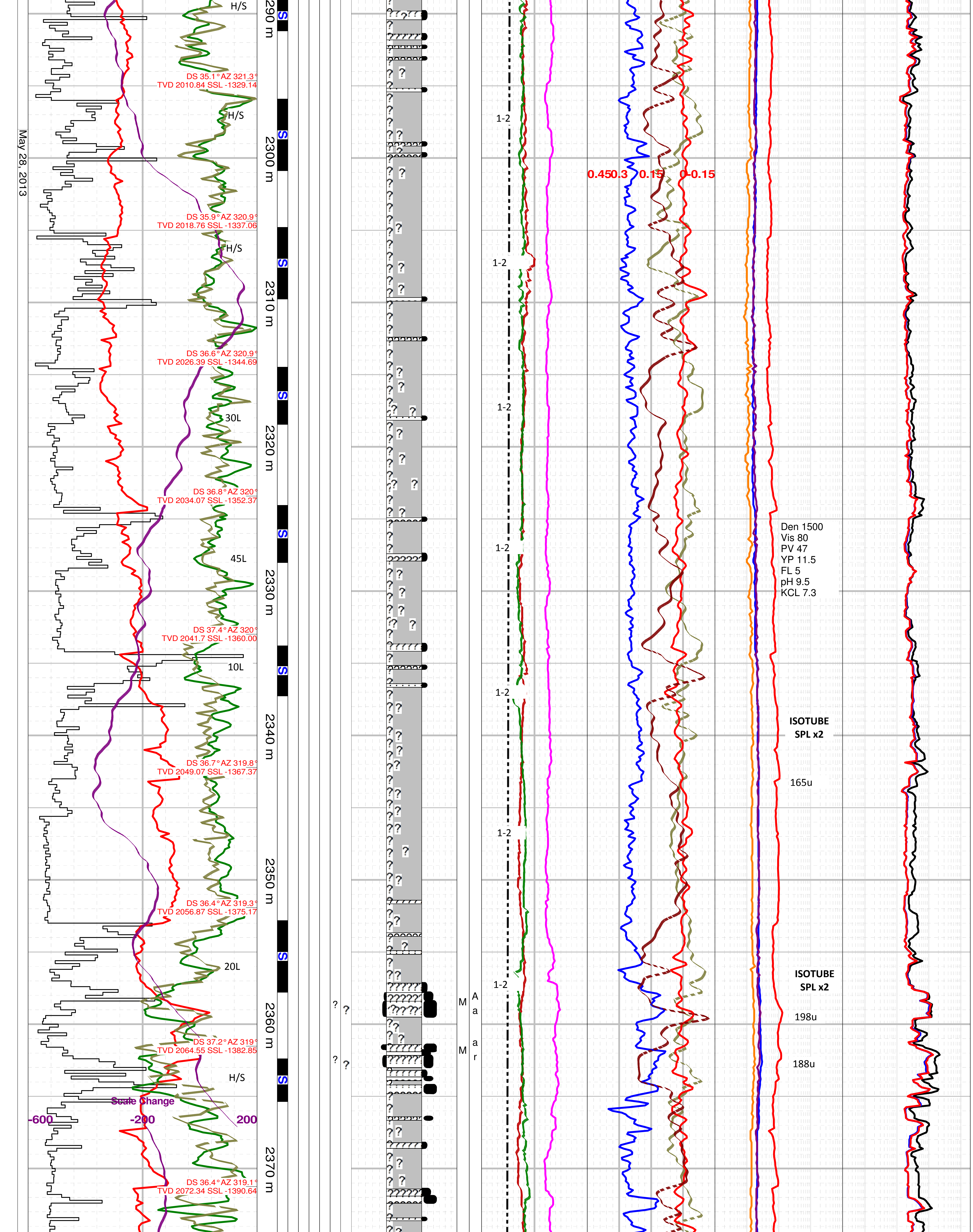
SH: predly lt - m gy, 30-35% dk gy carb sh, fis - sbfis, nn - slly calcs, occ slty lams, micmica, tr pyr, modly sft

SH: predly v dk gy - dk brnsh gy, sbfis, incrly carb, mod toc, occ pyric lam, 15-20% lt - m gy sh aa, modly sft, bcmg incrly sft in wtr, rr mic fltd gr

SH: sbeq lt - m gy & dk gy carb sh, fis - sbfis, nn calcs, decrg toc, occ slty lams, rr sdy strg, tr fy dism pyr, micmica, modly sft

SLTST: lt - m gy, qtzs & com lits, v slly calcs, tr pyr, micmica ip

SH: 30-35% m - dk gy - dk brnsh gy, fis - sbfis, nn calcs, carb ip, 65-70% lt - m gy, low toc, fis - sbfis, nn calcs, slty ip, modly sft, micmica



SLTST: lt - m gy, predly qtz, locly grdg - vfg ss, s tr pyr

SH: lt - m gy, fis, nn calcs, s tr scat pyr, occ dk carb beds, locly slty, micmica, modly sft

SH: predly lt - m gy, locly dk brnsh gy & carb ip, fis - sbfis, nn calcs, locly slty, sltst lams, tr pyr, tr micmica, sft

SLTST: lt - m gy, predly qtz, locly grdg - vfg ss, s tr pyr

SH: sbeq lt - m gy micas sh & dk brnsh gy carb sh, fis - sbfis, nn - v slly calcs, rr slty strgs, locly pyric, rr calc cmtd mic frac, rr gr showing folding, modly frm

SH: predly dk brnsh gy, 10-15% lt - m gy micas sh aa, sbfis, incrly carb, occ slty strgs, tr pyr, occ mic pyr slivers, rr coloform pyr, slly calcs, sft

SH: 70% m - dk brnsh gy, sbfis, nn - slly calcs, carb ip, 30% intlam & intbd lt gy, slly calcs, slty ip, occ slty lams, scat tr pyr, micmica ip, sft, fragile

SH: 60% m - dk brnsh gy, sbfis, nn - slly calcs, carb ip, 40% intlam & intbd lt gy, slly calcs, incrly slty, occ slty lams, scat tr pyr, micmica ip, sft, fragile, rr sdy lam

SS: lt - m brnsh gy, qtz / abnt dk lits, vf - l f gred, slty ip, ang - sbang, py srt, v wk por

SLTST: lt - m gy, nn - v slly calc, micmica, thn lam, tr pyr

SS: lt - m gysh brn, qtz / com - abnt dk lits, predly vfg & slty, 5-7% l f gred, sbrdd - sbang, modly srt, sil cmt, tr sec calc cmt, modly ind, tt - v wk por (0-4%), **lt amb brn hydc stng thru, no vis flor, v slow wk hazy cut, wk resdl shw**

SH: predly m brnsh gy, 10-15% dk gy - blk, sbfis - fis, nn - v slly calcs, occ sdy & slty lam, locly carb, modly sft, micmica, tr fy dism pyr

May 29, 2013

May 30, 2013

2380 m
2390 m
2400 m
2410 m
2420 m
2430 m
2440 m
2450 m

DS 35.6° AZ 318.5°
TVD 2079.94 SSL -1398.24
H/S
DS 34.4° AZ 318.7°
TVD 2087.89 SSL -1406.19
-600 -200 200
DS 33.5° AZ 318.9°
TVD 2098.13 SSL -1416.43
0 125 250
0 30 60
H/S
DS 33.4° AZ 318.8°
TVD 2106.13 SSL -1424.43
Bit#12 Hughes DP605X
356.00 / 77.25 hrs
Cond 3-5-CC-N-
-X-5-CC-PR
NB#13 Smith FHI35ODIVP
H/S
DS 34.8° AZ 318.5°
TVD 2113.99 SSL -1432.29
H/S
DS 36.7° AZ 320°
TVD 2121.85 SSL -1440.15
H/S
DS 37.8° AZ 320.5°
TVD 2129.47 SSL -1447.77
DS 37.5° AZ 321.9°
TVD 2137.22 SSL -1455.52

P a
P a
1-2
WOB 8.6
RPM 42-46
PP 20050
SPM1 109
SPM2 105
PO 1.67
1-2
500 800 1000 2.5 5 7.5 10
0.45 0.3 0.15 0 0.15
125 250 375 0.45 0.3 0.15 0 0.15
450 200 -50
1 10000
0.2 2000
P a r
P a r
WOB 9.7
RPM 40-43
PP 19150
SPM1 109
SPM2 106
PO 1.68
2-3
Den 1480
Vis 71
PV 44
YP 11.0
FL 4.5
pH 9.5
KCL 7.0
P a r
P a r
P a
2-3
Den 1500
Vis 72
PV 38
YP 9.0
FL 5.0
pH 9.5
KCL 7.2
P r
P r
152u
Isotube
Spl
P r
2-3
WOB 24.4
RPM 37-45
PP 21700
SPM1 107
SPM2 109
PO 1.69

SS: m gy - brnsh gy, vfg, slty ip, qtz, dk lits & occ carb frags, sbang, py srt, sil + tr sec calc cmt, tt, **tr spy amb hydc stng, no vis flor, no shw**, thn beds

SH: m brnsh gy, fis - sbfis, nn calcs, tr micmica, tr fy dism pyr, occ slty lams, modly frm, bcmg sft in wtr, carb ip

SH: m - dk gy - brnsh gy, fis - sbfis, v slly calcs, occ calcs slty lams, carb ip, low toc, tr mica, tr fy dism pyr aa, modly sft

SH: m - dk gy - brnsh gy, com lt gy lam, sbfis - fis, v slly calcs, tr mic mica, occ slty lams, sft

SLTST: lt - m gy, sdy ip, micmica, slly calcs, thn strgs, wk - modly ind

SH: predly m gy - brnsh gy, ~10% dk gy & carb, sbfis - fis, v slly calcs, s tr pyr, modly sft, sdy & slty lam, micmica

SS: lt - m gy - slly brnsh gy, vf - l f gred, locly grdg - u f gred, slty mtx, ang - sbang, qtz, lits & com carb frags, slly calcs, tt - locly v wk por, no vis shw, modly w ind, fri ip

SLTST: lt - m gy, slly calcs, locly sdy, s tr pyr, micmica, scat carb frags, modly sft

SH: m - dk gy, locly grdg - blk, sbfis - sbblky, nn calcs, locly pyric, carb ip, mod toc, frm - hd, brit

SS: lt - m gy, qtz & com - abnt gy cht, vf - u f gred, slty ip, sbrdd - sbang, py srt, sil + mnr sec calc cmt, tr pyr cmt, tt, modly w ind, hd, brit

SLTST: m gy, sdy ip, tr pyr, v slly calcs, micmica ip

SH: predly m brnsh gy, fis - sbfis, micmicas, nn - slly calcs, sft, com - abnt dk gy - blk sh, nn calcs, modly hd, brit, carb ip, occ sheared gr

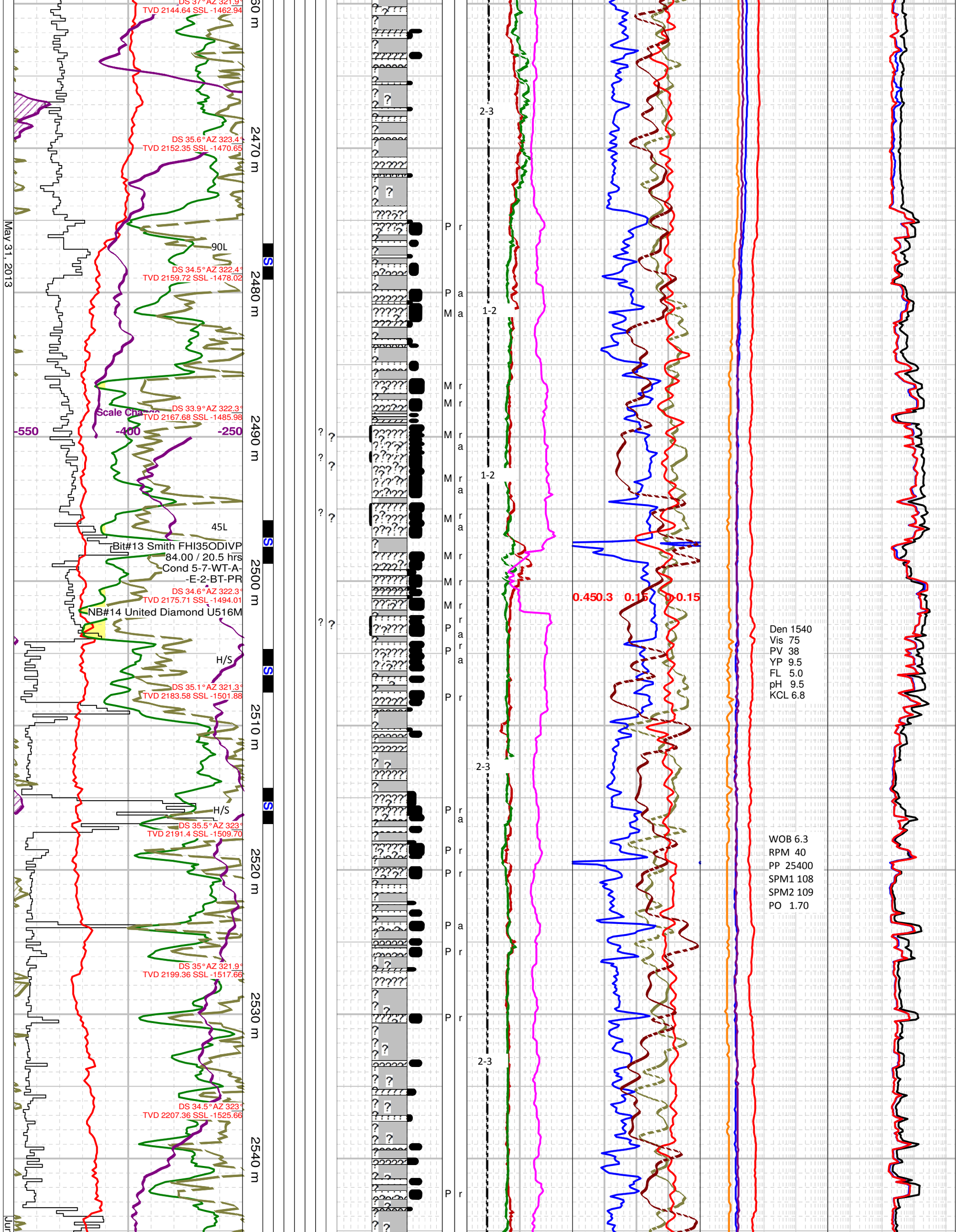
SS: lt - m brnsh gy, slty - vf gred, locly grdg - f gred, slty arg mtx, sil + mnr calc cmt, tr pyr, modly w ind, tt, thn beds

SS: m gy - slly brnsh gy, vf - l f gred, locly grdg - u f gred, slty mtx, sbrdd - sbang, py srt, sil + tr - mnr calc cmt, tr pyr cmt, tt

SH: predly m - dk bnrsh gy, locly blk, sbfis - sbblky, nn calcs, frm, brit, carb ip

SLTST: lt - m gy, sdy ip, calcs, wkly ind, fragile rdd cls

SH: predly m brnsh gy, sbfis - fis, micmica, comly



SS: lt - m gy, predly qtz / mnr cht & lits, vf - l f gred, slty, sbrdd, py srt, w ind, sil + calc cmt, tt, thn beds

SH: predly lt - m brnsh gy, fis - sbfis, micmica, nn calcs, modly sft, comly dk gy - blk, sbblky, nn calcs, carb ip, frm, hd, brit, tr pyr

SH: predly m gy, fis - sbfis, nn calcs, ~10% dk gy - blk & carb ip

SS: m gy, vfg, slty & arg ip, sbang, mod - py srt, sil + tr - mnr calc cmt, modly w ind, tt

SLTST: m gy, locly sdy, micmica ip, v slly calcs

SH: predly m gy, fis - sbfis, nn calcs, ~10% dk gy - blk & carb ip aa

SS: lt - m brnsh gy, vf - f gred, slty ip, occ slty lams, qtz, mnr - com cht, occ lits & mnr carb frags, sbrdd - sbang, modly srt, sil + tr sec calc cmt, mod - w ind, tt - v wk por (0-4%), **sl tr hydc stng, no vis flor, v slow fnt cut, no shw**

SS: m gy - slly brnsh gy, vf - f gred, slty ip, sbrdd - sbang, py srt, sil + tr calc cmt, **tr hydc stng, v slow fnt cut aa,** tt - v wk por, mod - w ind

SH: m gy - brnsh gy, sbfis, nn calcs, frm, brit, micmica ip, tr pyr

SLTST: m gy, slly calcs, thn lam, micmica

SS: lt - m gy, slly brnsh gy, qtz, cht & com dk carb frags, slty ip, sbrdd - sbang, py srt, sil + calc cmt, mod - w ind, tt, occ sh ptg

SH: m gy - brnsh gy, fis - sbfis, nn clcs, micmica ip, tr pyr, slty lams

SS: lt - m gy, slly brnsh gy, qtz, cht & com dk carb frags, slty ip, sbrdd - sbang, py srt, sil + calc cmt, mod - w ind, tt, thn beds

SH: m - dk gy, fis - sbfis, nn calcs, slty & sdy strgs thru, slly carb, low toc, s tr pyr, tr micmica, modly sft

SLTST: m gy, sdy ip, slly calcs, thn lams, micmica ip, tr carb mat, s tr pyr

SS: lt - m gy - brnsh gy, qtz, mnr cht, occ lit gr, occ carb frag, predly vf - l f gred, locly u f gred, slty ip, sbrdd, py srt, sil + mnr sec calc cmt, tr pyr, thn beds, w ind, **tr hydc stng,** tt

2550 m
2560 m
2570 m
2580 m
2590 m
2600 m
2610 m
2620 m
2630

30L
DS 35.2°AZ 320°
TVD 2223.11 SSL -1541.41

30L
DS 35.6°AZ 320.2°
TVD 2230.62 SSL -1548.92

DS 35.2°AZ 318.9°
TVD 2238.4 SSL -1556.70

H/S
DS 35.1°AZ 320.2°
TVD 2246.25 SSL -1564.55

DS 34.4°AZ 319.2°
TVD 2254.13 SSL -1572.43

40R
DS 34.2°AZ 320.5°
TVD 2262.06 SSL -1580.36

H/S
DS 34.5°AZ 320.4°
TVD 2269.94 SSL -1588.24

H/S
DS 34.9°AZ 321.7°
TVD 2277.93 SSL -1596.23

H/S

2-3

Den 1500
Vis 66
PV 38
YP 10.0
FL 5.0
pH 9.5
KCL 7.3

Isotube Spl
147u

Isotube Spl
199u

-550 -400 -250
0 75 150
0 125 250
0 30 60
500 300 100
125 250 375
0.45 0.3 0.15 0-0.15 1
0.45 0.3 0.15 0-0.15
10000
0.2
2000

SLTST: m gy, sdy ip, slly calcs, thn lams, micmica ip, tr carb mat, s tr pyr

SH: predly m gy / occ dk gy - blk carb beds, fis - sbfis, nn calcs, occ slty lam, tr pyr, wkly - modly micmica, modly sft, rr calc flld micfrac, occ hi angle jt

SLTST: m gy, sdy ip, grdg - vfg ss, slly calcs, tr pyr, micmica ip, tr carb mat

SH: predly m gy / occ dk gy - blk carb beds, fis - sbfis, nn calcs, occ slty lam, tr pyr, wkly - modly micmica, modly sft, rr calc flld micfrac, occ hi angle jt

SLTST: m gy, slly calcs, tr carb mat, tr pyr, micmica

SS: lt - m gy, qtz com - abnt cht occ lits & carb frags, predly vfg, 5-7% l f gred, slty mtx, prim sil & tr - mnr sec calc cmt, tr ptch pyr cmt, mod indn, tt, thn beds

SH: m - dk gy, occly blk, fis - sbfis, nn calcs, carb ip, tr py, com vfg sdy strgs, slty lams, modly sft

SS: lt - m gy, qtz com - abnt cht occ lits & carb frags, predly vfg, 5-7% l f gred, slty mtx, prim sil & tr - mnr sec calc cmt, mod indn, tt - locly v wk por, pos frac por, rr wh micxl calc flld micfrac, rr drsy euhed qtzs xls, **tr spy brn hydc stng, no vis flor, tr v fnt slow wk cut,** incrg pyr cmt

SH: m - dk gy, locly blk, fis - sbfis, carb ip, nn calcs, s tr pyr, micmica ip, slty lam

SLTST: m gy, slly calcs, sdy ip, micmica, tr carb mat, thn strgs

SH: m - dk gy, locly dk gysh brn - blk, fis - sbfis, nn calcs, wkly micmica, carb ip, s tr pyr, modly sft - sft, slty & sdy strgs, rr sheared gr

SS: m gy, slty - l f gred, sbrdd, py srt, sil + tr calc cmt, tt, thn strgs

SS: m gy, vf - l f gred, 3-5% u f gred, c slt thru, qtz, cht, lits & carb frags aa, sbrdd, py srt, sil + mnr calc cmt, mod indn, thn beds, tt

SLTST: m gy, locly sdy, slly calcs, micmioca ip

SH: m - dk gy,locly blk, sbfis, nn calcs, slty lam, occ sdy ptgs, carb ip, micmica ip, modly sft - sft, tr pyr

SLTST: m gy, f - c slt, locly grdg - vfg ss, slly calcs, s

Jun 3, 2013

2640 m
2650 m
2660 m
2670 m
2680 m
2690 m
2700 m
2710 m

DS 34.9° AZ 322.1°
TVD 2285.74 SSL -1604.04
DS 34.3° AZ 320.9°
TVD 2293.63 SSL -1611.93
DS 34.4° AZ 321.2°
TVD 2301.66 SSL -1619.96
H/S
DS 34.2° AZ 320.3°
TVD 2309.58 SSL -1627.88
H/S
DS 34.6° AZ 321.3°
TVD 2317.61 SSL -1635.91
H/S
DS 34.9° AZ 322.1°
TVD 2325.46 SSL -1643.76
H/S
DS 35.2° AZ 321.8°
TVD 2333.32 SSL -1651.62
H/S
DS 35.3° AZ 322.2°
TVD 2341.16 SSL -1659.46
DS 35.1° AZ 322.5°
TVD 2349.11 SSL -1667.41

Ma
Ma
Ma
Mar
Pa
Pa
Mr
Mr
Mr

WOB 5.6
RPM 43
PP 24850
SPM1 108
SPM2 109
PO 1.70

Den 1490
Vis 74
PV 35
YP 11.5
FL 6.0
pH 9.5
KCL 7.0

0.45 0.3 0.15 0 -0.15

Isotube
Spl
187u

SS: m brnsh gy, predly c slt - vfg, locly grdg to f gred, sbang - sbrdd, mod srtg, sil + calc cmt, tr pyr, modly ind, modly fri, tt - v wk por, **tr light brn hydc stng, v fnt slow hazy cut, v p shw**

SH: m - dk brnsh gy, fis - sbfis, nn calcs, micmica ip, slly carb, slty lam, s tr pyr, sft

SS: m gy - slly brnsh gy, qtz, cht, lits & carb frgas, predly slty - vfg, 7-10% l f gred, tr u f gred, sbrdd, modly srt, sil + tr sec calc cmt, tr pyr, mod indn, tt

SLTST: m gy, sdy ip, slly calcs, tr carb mat, lams

SH: m - dk gy, brnsh gy, fis - sbfis, nn calcs, occ sdy strg, slty lam, wkly micmica, low toc, modly sft

SS: m gy - brnsh gy, vfg, locly grdg - f gred, slty, sbrdd, mod - py srt, sil + tr calc cmt, locly micmica, tr carb mat, tr pyr, tt

SH: m brnsh gy, fis - sbfis, nn calcs, slty & sdy lams, tr - mnr micmica mat, slly carb, low toc, modly sft

SS: m gy - brnsh gy, vfg, locly grdg - f gred, slty, sbrdd, mod - py srt, sil + tr calc cmt, locly micmica, tr carb mat, s tr pyr, modly w ind, tt, thn strgs

SLTST: m gy, sdy ip, slly calcs, tr carb mat, lams

SH: m - dk brnsh gy, fis - sbfis, nn calcs, occ slty & sdy lams, rr pyr, carb ip, modly sft

SS: m gy - brnsh gy, vfg, locly grdg - f gred, slty, sbrdd, mod - py srt, sil + tr calc cmt, locly micmica, tr carb mat, s tr pyr, modly w ind, tt, thn strgs

SLTST: m gy, sdy ip, slly calcs, tr carb mat, lams

SH: m - dk brnsh gy, fis - sbfis, nn calcs, occ slty & sdy lams, rr pyr, carb ip, modly sft

SH: m brnsh gy, fis - sbfis, nn calcs, wkly micmica, tr carb mat, scat carbz pl rmn, modly sft

SLTST: m gy, sdy, nn calcs, micmica ip, carb ip

SS: m brnsh gy, predly vfg - c slt, locly grdg - l f gred, sbrdd, mod srtg, sil cmt, tr calc cmt, qtz, cht & com carb frags, modly w ind, predly tt, ptch wk por (0-5%), **tr lt brn hydc stng, no vis flor, fnt slow hazy cut, q shw**, s tr pyr

SLTST: lt - m brnsh gy, sdy ip, v slly calcs, slly carb, micmica

SH: m - dk brnsh gy, fis - sbfis, nn calcs, occ slty &

DS 34.5° AZ 322.6°
TVD 2356.78 SSL -1675.08

DS 34.1° AZ 321.7°
TVD 2364.64 SSL -1682.94

H/S

DS 34° AZ 322.5°
TVD 2372.39 SSL -1690.69

DS 33.6° AZ 322.8°
TVD 2379.96 SSL -1698.26

DS 33.1° AZ 321.8°
TVD 2387.94 SSL -1706.24

Jun 4, 2013

2720 m
2730 m
2740 m
2750 m
2760 m

DS 32.6° AZ 321.4°
TVD 2395.91 SSL -1714.21

H/S

DS 32.1° AZ 321.5°
TVD 2403.96 SSL -1722.26

DS 31.5° AZ 322.2°
TVD 2412.08 SSL -1730.38

DS 30.8° AZ 321.9°
TVD 2420.26 SSL -1738.56

Jun 5, 2013

2770 m
2780 m
2790 m
2800 m

-550 -400 -250

S

P r
P r
P r
P r
P r
P a
P r

WOB 3-6
RPM 44
PP 24850
SPM1 109
SPM2 109
PO 1.70

158u

Isotube Spl

WOB 4-6
RPM 45
PP 17400
SPM1 0
SPM2 123
PO 1.44

Isotube Spls X2

Den 1500
Vis 71
PV 34
YP 11.5
FL 5.0
pH 9.5
KCL 6.7

WOB 4.5
RPM 49
PP 17700
SPM1 0
SPM2 121
PO 1.42

Desorbed Sidewall

500 300 100

Den 1500
Vis 72

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

SS: m gysh brn, qtz, cht, lits & occ carb frags, vf - f gred, slty mtx, sbrdd, py srt, sil cmt, tr sec calc cmt, mod indn, predly tt, scat wk por (0-4%), **tr brn hydc stng, no vis flor, v slow fnt cut, v p shw**

SH: m - dk brnsh gy, fis - sbfis, nn calcs, slty lams, sdy ptgs, carb ip, low toc

SH: v dk brnsh gy - blk, sbblky, nn calcs, carb, tr pyr, frm, modly brit, occ jt, occ sdy strg, **no vis flor, extrly slow fnt dd o cut**, slty lam

SS: m brnsh gy, vf - f gred ip, slty mtx, sbang, py srt, s tr glau, sil cmt, slly calcs, modly ind, tt - vp por, **tr lt brn hydc stng, no flor, slow wk hazy cut**

SS: m gysh brn, qtz, mnr lt cht & dk lits, occ carb gr, s tr glau, predly vf - f gred, rr l m gred cls, sbrdd - sbang, py srt, sil + tr calc cmt, **wk ptch amb hydc stng, v wk slow hazy cut, resdl shw**

SH: predly dk gy - blk, sbblky - sbfis, m - dk brnsh gy, frm, carb ip, nn calcs, slly carb, modly sft

SH: m - dk brnsh gy, fis - sbfis, nn calcs, slty lam, occ sdy strgs, wkly micmica, modly sft, occ sheared gr

SS: m brnsh gy, vfg, slty & arg mtx, sbang - sbrdd, py srt, sil cmt, s tr sec calc cmt, carb ip, tt

SLTST: m gy, sdy ip, v slly calcs, carb ip, micmica

SH: m - dk brnsh gy, fis - sbfis, nn calcs, slty lams, occ sdy strg, wkly micmica, tr scat pyr, carb ip, modly sft

SH: predly m - dk brnsh gy aa, 5-10% dk gy - blk, sbfis, nn calcs, locly pyric, frm, incrly carb, slty lams, occ vfg sdy strgs

SS: m brnsh gy, vfg, slty & arg mtx, sbang - sbrdd, py srt, sil cmt, s tr sec calc cmt, carb ip, tt

SH: m - dk gy, fis - sbfis, nn calcs, carb ip, occ pyric lam, locly slty, modly frm, micmica ip

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

DS 30.1° AZ 322.2°
TVD 2428.51 SSL -1746.81

DS 29.6° AZ 322.5°
TVD 2436.79 SSL -1755.09

DS 29.3° AZ 323.2°
TVD 2445.11 SSL -1763.41

DS 29° AZ 322.1°
TVD 2453.48 SSL -1771.78

2810 m

2820 m

2830 m

2840 m

Jun 6, 2013

Bit#14 United Diamond U516M
354.00 / 72.64 hrs
Cond 2-4-CC-H-
-X-4-BC-TD

DS 28.1° AZ 322.8°
TVD 2471.41 SSL -1789.71

NB#15 Ulterra U613M

DS 27.6° AZ 323.3°
TVD 2482.67 SSL -1800.97

Increased
WOB

DS 26.9° AZ 324°
TVD 2491.34 SSL -1809.64

DS 26.5° AZ 324.4°
TVD 2496.26 SSL -1814.56

2850 m

2860 m

2870 m

2880 m

Jun 14, 2013

? ? P r

? ? P r

? ? P a

? ? P r

? ? P r

? ? P r

? ? P r

? ? P a

P a

P a

P a

P a

P a

YP 12.0
FL 5.0
pH 9.5
KCL 6.8

NB: Logger's depth 4m deeper than Driller's depth. Data acquired while drilling has been shifted down to correlate with open hole logging data f/ 1248 to 2889mMD

Den 1310
Vis 57
FL 6.4
pH 9.5
PP 13000
SPM 109
RPM 20
WOB 5-7

Leak off Test
produced gas

0-1

0-1

1

1

SS: m brnsh gy, predly vfg, 7-10% f gred ang - sbang flotg cls, slty arg mtx, sbrdd, py srt,sil cmt, mod indn, tt, **no vis flor, tr v fnt slow hazy cut, resdl shw**, s tr glau

SH: m - dk gy - brnsh gy, fis - sbfis, nn calcs, carb ip, occ pyric lam, locly slty, modly frm, intbd ss

SS: m gy, vfg, slty arg mtx, sbrdd, py srt, qtz, cht, lits & occ carb frags, 7-10% f gred ang - sbang cls, sil cmt, mod indn, tt, no vis shw

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

SH: m - dk gy, dk brnsh gy, locly grdg - blk, fis - sbfis, nn calcs, incrly carb, tr scat pyr, modly frm & brit

SH: m - dk gy, locly grdg - blk, fis - sbfis, nn calcs, carb ip, frm

SS: m gy - brnsh gy, qtz & com lt cold cht, occ dk lits, vfg, 7-10% f gred, rr flotg m gred sbang cls, sbrdd, py srt, sil cmt, tr calc, **tr hydc stng, slow wk cut, redl dd o shw**, tt - v wk por (0-3%), modly ind, fri ip

SH: m - dk brnsh gy, fis - sbfis, nn calcs, micmica ip, carb ip, slty & sdy lams, modly sft

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

SH: m - dk brnsh gy, fis - sbfis, nn calcs, micmica ip, carb ip, intbd vfg ss, slty lams, modly frm

SS: m - dk gy - brnsh gy, vfg, slty & arg mtx, nn calcs, tt, thn beds

SS: cons, lt - m brn, slty - f gred, s&p, comly / m brn arg cmt, grdg ip to sdy, slty sh, py srt, sbang - sbrdd, ang ip, pyric, carb, locally v sils, occ frags / floating m qts grs, tt, no shows.

SH: m brn, 4% dk brn, plty - sb plty, rr blky frags, micmica, sft - m hd, sb fis - fis, predly as cly sh, 20% of frags slty & sdy, grdg ip to v arg sdy sltst or slty - f l gred, v arg, pyric, m brn gy, carb, slly sils ss, tr dism & mas pyr, rr swelling frags, tr slickensides, non calcs.

SH: m brn, 4% dk brn, plty - sb plty, rr blky frags, micmica, sft - m hd, sb fis - fis, predly as cly sh, 20% of frags slty & sdy, grdg ip to v arg sdy sltst or slty - f l gred, v arg, pyric, m brn gy, carb, slly sils ss, tr dism & mas pyr, rr swelling frags, tr slickensides, non calcs.

SH: m brn, sb plty - occly sbblky, micmica, sft - m hd, fis, occly brit, tr v f dism pyr, occ frags crack or swell in wtr, rr slickenside surfaces, 7% dk brn, blky, slly swelling, carb sh frags, 7% m brn, arg, slty ironstone frags, rr mas pyr frags, rr mas pyr, tr calc.

SS: cons, predly m brn, rr wh & m brn frags, fri - comly firm, slty - v f l gred, locally v f u - tr f l gred, ang - sbrdd, rr floating f u - l m ang qtz grs, slly calcs or sidic, slly sils, rr pyr, comly / m brn arg mtx, tt, no shows, comly grdg to sdy arg, tt sltst.

SS: cons, m brn, occly wh & m brn, cons, / v p gr relief, fri - predly firm, sbang - sbrdd, ang ip, predly

Jun 16, 2013
Jun 17, 2013
Jun 18, 2013
Jun 19, 2013

2890 m
2900 m
2910 m
2920 m
2930 m
2940 m
2950 m
2960 m
2970 m

Bit balling up

DS 25.2° AZ 325.3°
TVD 2508.88 SSL -1827.18

DS 24.3° AZ 326.2°
TVD 2516.13 SSL -1834.43

Increased WOB

Bit#15 Ulterra U613M
53.00 / 18.25 hrs
Cond 1-1-NO-N-
-X-I-NO-CP

NB#16C Corepro DC 813LS

Bit#16C Corepro DC 813LS
4.00 / 6.25 hrs
Cond 0-0-NO-
-X-I--BHA

NB#17RR Ulterra U613M

DS 23.8° AZ 326.7°
TVD 2526.54 SSL -1844.84

DS 22.7° AZ 327°
TVD 2535.47 SSL -1853.77

Bit#17RR Ulterra U613M
18.00 / 30.75 hrs
Cond 1-1-WT-N-
-X-1--CP

NB#18C Corepro RS-713

DS 22.2° AZ 327.2°
TVD 2544.46 SSL -1862.76

DS 22.9° AZ 327.7°
TVD 2553.46 SSL -1871.76

Bit#18C Corepro RS-713
18.00 / 17.75 hrs
Cond 0-0-NO-A-
-X-I--BHA

Control drilling @ 7 m/hr

DS 22.5° AZ 327.7°
TVD 2562.45 SSL -1880.75

DS 21.6° AZ 326.8°
TVD 2571.51 SSL -1889.81

2 (100%)
3 (100%)

0-1
2-3
1
Core Jammed @ 2912 m (MD)
0
Desorbtion tests a 2938.36, 2946.64 and at 2943.64 m (MD)
0-1
0-1
0-1

0.45 0.3 0.15 0-0.15

Den 1310
Vis 65
PV 22
YP 9.5
FL 7
pH 9.8
KCL 5.2

123 u
Isotube Spl

128 u
Isotube spl
Den 1320
Vis 71
PV 23
YP 9
FL 6
pH 9.9
KCL 5.8

Den 1305
Vis 73
PV 26
YP 26
pH 9.8
FL 4.3
KCL 5.0
SPM 105
WOB 9
PP 20500

101 u
Isotube and mud gas samples taken every 2.5 meters

Vis 1290
Vis 80
PV 27
YP 9.5
FL 4
pH 9.9
KCL 5.6

Den 1280
Reducing mud weight

micas, pyric, slly sidic, comly / m brn arg mtx, slly sils, grdg ip to sdy tt sltst or sdy slty sh, tt, no shows.

SH: m brn, 7-8% dk brn - blk, plty - sb plty, occly blky, micmica, tr dism pyr, predly as cly sh, occ frags swell or crack in wtr, < 5% of frags slty & sdy & grdg to v arg, tt, sltst & slty ss, dk brn frags greasy, scat slickensides, bit-balling.

SH: 60% m brn, sb plty - blky, comly swelling in wtr, micmica, tr dism v f pyr, predly as cly sh, slow yel gn blomg cut flor, tr sltst & arg, slty - v f l gred, sbang - sbrdd, arg, py srt ss frags, 40% of frags dk gy, v dk gy brn, blky, chty, v hd & non fis, comly grdg to hd cht, rr frags / sil healed fracs, **wk yel gn blomg cut flor.**

CHT & SH MNR SS: 40% blk, dk gy, comly rdd, irregular, occly blky, crpxl, comly arg, hd, brit, CHT, 50% as m - dk brn, sb plty - blky, locally splintery, slly pyric firm sh, **wk p yel gn blomg cut flor,** rr lt brn swelling sh frags, 10% m brn, slty - f l gred, ang - srdd, pyr srt slty ss & sdy sltst frags.

SH: m - dk brn, firm, as cly sh, micmica, occ v f nearly vertical sil lined fracs, slly carb, **v wk, slow yel gn blomg cut flor.**

CHTY SH: predly dk gy - blk, hd, blky, brit, dull, chty, occly sdy, carb, frags irregular in shape, micmica, ip as fis sh, rr slty & sdy frags, 25% as lt - m brn swelling sh frags, **v wk p, slow yel gn blomg cut flor.**

CHTY SH: predly dk gy - blk, hd, blky, brit, dull, carb, chty, frags irregular or blky in shape, micmica, ip as fis sft sh, rr slty & sdy frags, 25% as lt - m brn swelling sh frags, **v wk p, slow yel gn blomg cut flor.**

CHTY SH: blk, v dk gy, sb plty - blky, sft - hd, fis - brit, comly chty & grdg to arg cht, ip fracd, carb, 30% of frags lt - m brn, m - rr dk brn, bit-ground, swelling, rr m brn, slty - v f l gred, arg, tt slty ss frags, wk slow yel gn blomg cut flor.

SS: m brn, slty - v f l gred, sbang - sbrdd, v py srt & / m brn arg mtx, grdg to slty, sdy sh, micmica, carb, micas, tt, v v p gr relief, v firm, carb, v wk, v p yel gn blomg cut flor.

SH: m brn, sft, sb fis, slly slty & sdy, sb fis, slly pyric, non calcs. scat carb flks,

SH: m brn, sft, sb fis, comly slly slty & sdy, micmica, micas, comly / scat carb flks, wk p, slow yel gmn blomg cut flor.

SH: m - dk brn, sft, sb fis, micmica, slly pyric, as cly sh, scat carb flks.

SH: m brn, m brn gy, dk brn, sb plty - blky, micmica, slly pyric, occly carb, slly swelling in wtr, comly sft & fis in wtr, wk, v p, slow, yel gn blomg cut flor.

SS: lt gy, m brn gy, cons, s&p, frags occly swell in wtr, slty - v f l gred, sbang - sbrdd, grdg to slty, sdy sh, comly / a lt gy, m brn gy arg mtx, slly kaoic, rr spotty wh arg mtx, slly kaoic?, v wk, slow, v p yel gn blomg cut flor.

SS: lt gy, predly m - dk brn gy, cons, s&p, slty - v f u gred, sbang - sbrdd, ang ip, py srt, grdg to slty, sdy sh, comly fri, comly / a lt gy, m brn gy arg mtx, pyric, occly micas, slly sils, rr spotty wh arg mtx, slly kaoic?, no cut flor.

SS: lt gy, predly m - dk brn gy, cons, s&p, slty - v f l gred, sbang - sbrdd, ang ip, py srt, grdg to slty, sdy sh, comly fri, comly / a lt gy, m brn gy arg mtx, carb, pyric, occly micas, slly sils, v p reservoir, no cut flor, occ frags / wh lined sil fracs, non calcs.

DS 20.6° AZ 326.4°
TVD 2580.62 SSL -1898.92

2980 m

DS 19.6° AZ 326.1°
TVD 2589.77 SSL -1908.07

2990 m

DS 18.7° AZ 326.1°
TVD 2598.94 SSL -1917.24

3000 m

DS 17.8° AZ 325.7°
TVD 2608.19 SSL -1926.49

75

125

30

Jun 20, 2013

3010 m

DS 17.1° AZ 324.7°
TVD 2617.5 SSL -1935.80

Control
Drilling

3020 m

DS 16.4° AZ 324.8°
TVD 2626.84 SSL -1945.14

3030 m

DS 15.7° AZ 324.1°
TVD 2636.21 SSL -1954.51

3040 m

DS 14.8° AZ 323.9°
TVD 2645.57 SSL -1963.87

44.4
D

3050 m

DS 13.7° AZ 326.3°
TVD 2655.01 SSL -1973.31

56.6
D

Desorbed
sample

0-1

500 300 1000 2.5 5 7.5 10

0.45 0.3 0.15 0 0.15

125 250 375 0.45 0.3 0.15 0 0.15

450 200 -50

10000

0.2 2000

Den 1030
Vis 75
FL 5.50
pH 9.5
PP 15880
SPM 102
RPM 40
WOB 3.5

Canol
(TVD: 2648.83)
(SSL: -1967.13)

Scale Change

300 200 100

SS: lt - m brn gy, sft - firm & brit, cons, s&p, slty - v f l gred, ang - sbrdd, comly / lt gy, m brn arg mtx, slly pyric, sils, rr frags swell in water, v p reservoir, p gr relief, no vis por, no cut flor.

SH: m brn, lt - m brn gy, sb plty - occly sbblky, micmica, tr dism v f pyr, predly as cly sh, rr slty & sdy frags, sft - m hd, sb fis, occly brit, occly carb, rr sil lined fracs**, v wk slow yel gn blomg cut flor.**

SS: cons, s&p, lt - m brn gy, occly gy & v carb, slty - v f l gred, sbang - sbrdd, ang ip, py srt, comly v arg, carb, slly pyric, sils, no vis por, no cut flor.

SH: m brn, m brn gy, rr dk gy - blk frags, slly pyric, sb plty - blky, micmica, sft - m hd, sb fis, rr slty & sdy frags.

SS: cons, s&p, slty - v f l gred, lt - m gy brn, dk brn, gy, py srt, arg, carb, slly sils, / lt gy brn, off wh, arg mtx, tt, no shows.

SS: off wh, lt - m brn gy, cons, s&p, slty - v f l gred, py srt, sbang - sbrdd, ang ip, / of whlt gy, m brn arg mtx, carb, slly sils, fri, carb, slly dolic, tt, no shows.

SS: off wh,rr lt - m brn gy frags, cons, s&p, slty - v f l gred, py srt, grdg to sdy sltst, sbang - sbrdd, ang ip, / off wh, lt gy, m brn arg mtx, carb, slly sils, fri, carb, slly dolic, tt, no shows.

SH: m brn, m brn gy, plty - sbblky, micmica, slly pyric, sft - m hd, tr pyr, as cly sh, rr frags crack in wtr. / < 10% off wh, lt gy, v lt gy brn, locally dk gy & carb, slty - v f gred, arg, tt, s&p sdy sltst & slty ss frags.

SS: lt gy, off wh, locally dk gy & carb, slty - v f l gred, sbang - sbrdd, / < 25% dk cht grs, carb, slly sils, slly calcs or dolic, py srt, grdg to sdy sltst, tt, p gr relief, firm, occly v fri, / off wh, lt gy arg mtx, tt, no shows.

SH: m brn gy, m brn, rr dk brn - blk frags, as cly sh, sft - m hd, fis - brit, rr carb flks, slly swelling in wtr, slly pyric, slow, p yel gn blomg cut flor, contamination by mud additive?

SH: m brn gy, m brn, rr dk brn - blk frags, as cly sh, sft - m hd, fis - brit, rr carb flks, slly swelling in wtr, slly pyric, slow, p yel gn blomg cut flor, contamination by mud additive?

SH: m - dk brn, sb plty - blky, micmica, dul, occly greasy, carb, sft - occly firm, comly fis, dolic, tr dism v f pyr, predly as cly sh, occ slly slty & sdy frags,10% of frags dk gy, v slty, sdy, carb, comly brit, grdg to py srt, slty - v f l gred, v arg, py srt ss, wk, p, slow yel gn blomg cut flor.

SH: m - dk brn, sb plty - blky, micmica, sft - occly m hd, comly fis, dolic, predly as cly sh, rr carb or sdy & slty frags, wk p, slow yel gn blomg cut flor.

SH: dk brn, dk brn gy, sb plty - blky, dull, greasy, comly sft, sb fis, pyric, slly swelling in wtr, carb, occly slly slty & sdy, slow, p, yel gn blomg cut flor.

SH: m - predly dk brn, 15-20% of frags blk, predly sft, sbfis, pyric, v carb, slly dolic, rr brit frags, occ frags swell or crack in wtr, predly as cly sh, rr slty & sdy frags or rr brit frags, slow, p yel gn blomg cut flor.

SH: m - predly dk brn, 20% of frags blk or dk gy, predly sft, sbfis, pyric, v carb, slly dolic, tr dk brn cht frags, rr brit frags, occ frags swell or crack in wtr, predly as cly sh, rr slty & sdy frags or rr brit frags, slow, p yel gn blomg cut flor.

DS 13.4° AZ 326.6°
TVD 2664.46 SSL -1982.76

Control
Drilling

DS 13.3° AZ 326.6°
TVD 2673.92 SSL -1992.22

DS 13.3° AZ 326.1°
TVD 2683.41 SSL -2001.71

DS 13.4° AZ 326.7°
TVD 2692.87 SSL -2011.17

DS 13.3° AZ 325.9°
TVD 2702.37 SSL -2020.67

DS 13.3° AZ 325.8°
TVD 2711.83 SSL -2030.13

DS 13.4° AZ 325.1°
TVD 2721.3 SSL -2039.60

Control
Drilling

DS 13.4° AZ 325.1°
TVD 2730.77 SSL -2049.07

DS 13.4° AZ 325.2°
TVD 2740.24 SSL -2058.54

3060 m
3070 m
3080 m
3090 m
3100 m
3110 m
3120 m
3130 m
3140 m

Jun 21, 2013

FORESLOPE

MID TO
LOWER
FORESLOPE

Ogilvie
(TVD: 2660.67)
(SSL: -1978.97)

Den 1230
Vis 61
FL 5
PV 20
YP 7
pH 9.5
KCL 5.2

0.45 0.3 0.15 0 -0.15

Den 1220
Vis 61
FL 5.4
pH 9.5
PP 15800
SPM 102
RPM 40
WOB 5

LS: off wh, lt gy brn, rr m brn frags, crpxl, rexld, mottled, comly chky, bit-ground ip, arg, locally mrly, as chky mdst,no vis por, no cut flor.

LS: off wh, mottled blk, chky, rexld, bit-ground, as crpxl mdst, comly / blk arg bits cly lined styls, tt, no shows, slow yel gn mky blomg cut flor.

LS: off wh, lt gy brn, mottled, tr m brn frags, rexld, comly chky texd, crpxl - occly l f xln, 25% of frags / blk ip dd bit & dk brn partings, styl fils, & locally as inter allochem fillings, predly as mdst, rr bracs, q corals & stroms, predly tt, 6-7% bit plugged intpar plugged por?, no cut flor.

LS: predly lt brn, lt yel brn, occly off wh, occly mottled, ip rexld & chky, predly as mdst, rr tabulatan cora & strom frags, rr off wh cac spar, 10-15% of frags / blk arg & slly bits lined styls, rr pyr, **no vis por, wk slow, p yel gn blomg cut flor.**

LS: off wh, lt - m yel brn, mottled, 30% of frags / blk arg & bits styls & incls, chky texd, rexld, predly crpxl, q brac, crin & rugisan coral ghosts, non dolic, **arg & bit frag / slow yel gn blomg cut flor, earthy por?, no vis por.**

LS: off wh, lt brn, mottled, chky texd, rexld, crpxl, scat blk bit & arg lined styls, fri ip, earthy por?, 15% of frags arg, no vis por, **stylic frags / slow yel gn blomg cut flor.**

LS: off wh, lt brn, rr wh opalescent frags, mottled, chky texd, rexld, crpxl, scat blk bit & arg lined styls, occ ghosts of crins, rugosan corals, bracs, non dolic, fri ip, earthy por?, 15-20% of frags arg, stylic, as q organic por infill, no vis por, stylic frags / slow yel gn blomg cut flor, frags ip bit-ground

LS: off wh, lt brn, rr wh opalescent frags, mottled, chky texd, rexld, crpxl, scat blk bit & arg lined styls & blk mrlst partings, occ ghosts of crins, rugosan corals, non dolic, fri ip, earthy por?, 15-20% of frags arg, stylic, bits, **no vis por, blk frags / slow yel gn blomg cut flor,** frags ip bit-ground, rr calc healed micfracs.

LS: off wh, lt yel brn, mottled, 25% of frags / dism blk, slly bits arg incls, or as intpar fill between rexld allochems, chky texd, crpxl - locally l f xln, ip as rexld biocl grst, pkst, occ crin ghosts, tr wh & lt brn cht in acid residue, earthy por?, **arg frags / slow yel gn p blomg cut flor.**

LS: off wh, v lt yel brn, lt brn gy, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 35% of frags / blk, m brn arg, ip dd bit incls or partings, occ dk brn q dd bit lined org por, earthy por, scat tabulatan coral bafflestones, tr cht in acid residue, **arg or bits frags / slow yel gn blomg cut flor, bit plugged org por?** tr cht in acid residue, rr frags / rhombohedral dol xls.

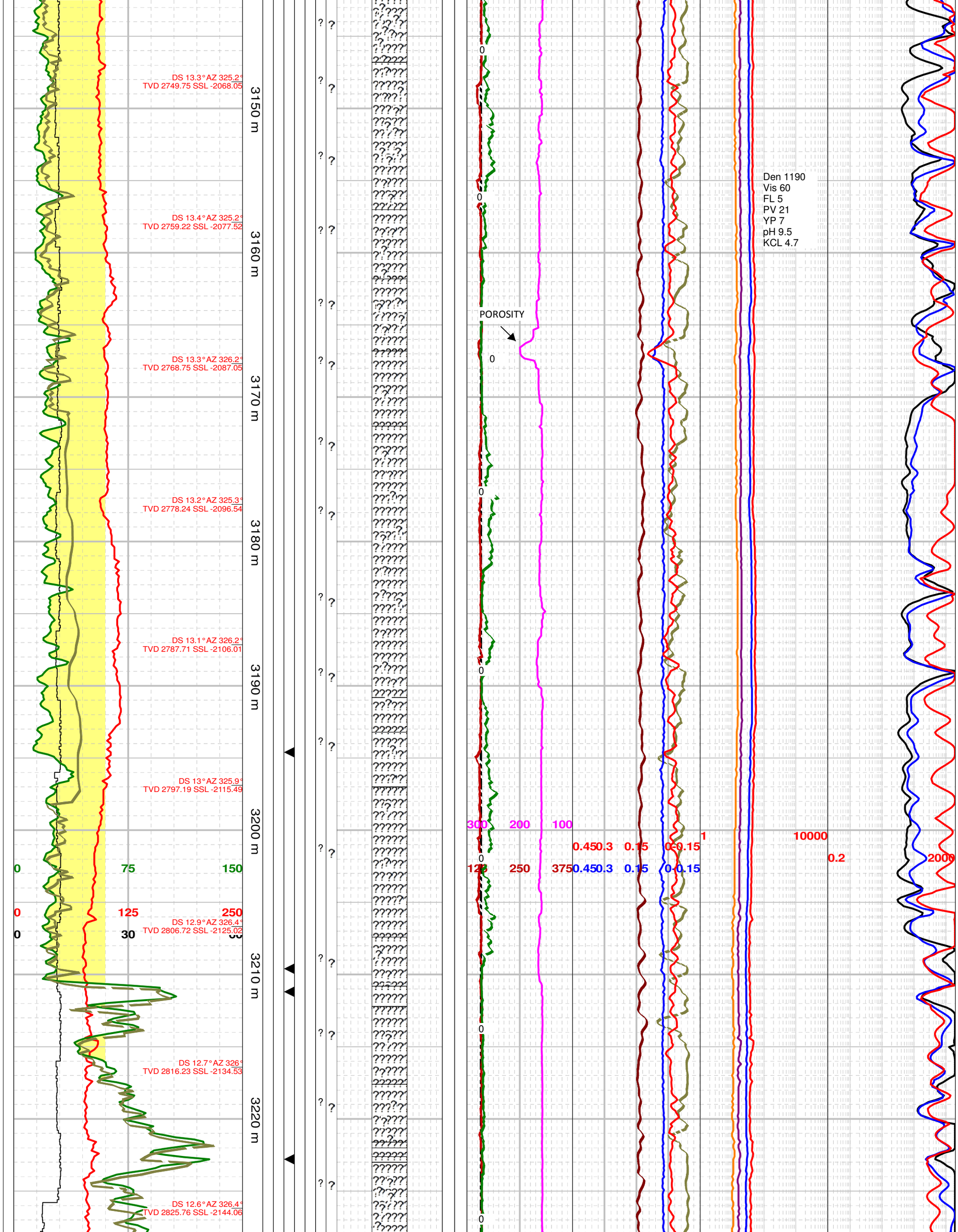
LS: off wh, v lt yel brn, lt gy brn, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 15-20% of frags / blk ip dd bit, m brn arg incls or partings, 3% as mrly frags earthy por?, tr cht , predly as tabulatan bafflestone & mdst, wkest, **rr org por, arg frags / slow yel gn blomg cut flor, tr cht in acid residue.**

LS: off wh, v lt yel brn, lt brn gy, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 35% of frags / blk (ip dd bit) , arg incls, lined styls, partings or as interallochem fill, earthy por?, rr bracs, crins, tabulatan coral bafflestone, predly as rexld biocl mdst - wkest, occ frags / 1-8% blk dd bit lfilled org por? tr cht, arg frags / slow yel gn blomg cut flor.

LS: off wh, v lt yel brn, rr dk brn frags, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 20% of frags / blk ip dd bit, lt - m brn gy arg incls, as rr lined styls or partings or as mrly frags, occ crin, brac or coral ghosts, earthy por?, **spotty 1-12% org & rr intpar bit plugged por?,** tr cht, **arg frags / wk, slow yel gn blomg cut flor.**

LS: off wh, v lt yel brn, gy brn, rr dk brn frags, comly mottled, crpxl - l f xln, rexld & comly chky texd, 50% of frags / blk, lt - m brn gy arg incls, rr lined styls, as partings or as interallochem infill, occ crin, brac or coral ghosts, rr coral bafflestone frags, earthy por?, **dd bit lined organic por?** tr cht, **arg frags / wk, slow yel gn blomg cut flor.**

LS: off wh, v lt yel brn, gy brn, rr dk brn frags, comly mottled, crpxl - l f xln, rexld & comly chky texd,



LS: off wh, lt yel brn, lt gy brn, comly mottled, predly rexld, chky texd & crpxl, comly sft, brit, rr non rexld crin, peloid grst frags, 25% of frags / mottled blk dk brn, slly bits arg incls, styls, & occly as inter allochem infill, rr frags / calc spar, occ crin ghosts, rr stroms & tabulatan corals, bindstone, bafflestone, rr pyr, no vis intpar por, no vis druse, **10% blk bit plugged intpar & org por?, v p faint yel gn blomg cut flor, tr cht.**

LS: off wh, lt gy brn, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 35% of frags / blk, arg . slly bits (dd) incls, lined styls, partings or as interallochem fill, earthy por?, occ stroms, rr bracs & crins, ip as bindstone tr cht, arg frags / slow yel gn blomg cut flor.

LS: off wh, occly v lt yel brn, lt brn, comly mottled, crpxl - occly l f xln, rexld & comly chky texd, 25% of frags / blk, ip bit (predly dd) arg incls, lined styls, partings or as interallochem fill, scat rexld stroms, earthy por?, rr bracs, crins, tabulatan coral bafflestone, tr cht, non dolic, **arg & bits frags / slow, p yel gn blomg cut flor, 10-15% org, intpar dd bit plugged por?**

LS: predly lt brn, lt yel brn, occly off wh, occly mottled, ip rexld & chky, predly as mdst, rr tabulatan coral & strom frags, rr off wh calc spar, 10-15% of frags / blk arg & slly bits lined styls, rr pyr, **no vis por, wk slow, p yel gn blomg cut flor.**

LS: off wh, lt brn gy, comly mottled, rexld ip & chky texd, crpxl, rr l f xln frags, predly as mdst ls, occ blk bit or arg lined styls, occ calc spar, rr pyr, tt, no shows.

LS: off wh, lt brn gy, lt yel brn, comly mottled, rexld ip & chky texd, crpxl, rr l f xln frags, predly as mdst ls, occ blk bit or arg lined styls, occ calc spar, rr pyr, tt, tr cht, no shows.

LS: off wh, lt brn, comly chky texd & rexld, predly as mdst, rr stroms, 40% of frags / blk comly dism dd bit & cly , ip as blk mrly frags, rr wh calc spar, non dolic**, v wk yel gn blomg cut flor, 10% blk bit plugged por?**

LS: off wh, lt brn, 5% m brn, comly chky texd & rexld, predly as mdst, rr stroms, 40% of frags / blk comly dism dd bit & cly ,10-15% blk mrly sh, rr wh calc spar, non dolic, **v wk yel gn blomg cut flor, blk dd bit plugged por?**

LS: off wh, lt brn, rexld & chky texd ip, mottled, as Amphipora mdst - floatstone, comly rexld & chky, scat blk bit & arg lined styls, 10-15% blk, dk brn mrly frags, predly tt**, v wk, p yel gn blomg cut flor.**

LS: off wh, lt brn, rexld & chky texd ip, mottled, as Amphipora mdst - floatstone, scat blk bit & arg lined styls, 10-15% blk, dk brn mrly frags, predly tt, v wk, p yel gn blomg cut flor, scat micfracs, occ wh spar, no vis por.

LS: off wh, v lt brn, chky texd, rexld, 10-15% dk brn, blk, mrly, rr wh calc spar, as Amphipora mdst - floatstone, com;ly / blk arg or bit lined styls, no vis por, no cut flor.

LS: off wh, lt gy brn, chky texd, rexld, predly crpxl, occ Amphipora & Stachyoides ghosts, mdst - floatstone, occ blk bit or arg lines styls, rr micfracs, 5-6%dk brn, mrly ls frags, **no vis por, wk, slow, p yel gn blomg cut flor.**

LS: off wh, lt gy brn, chky texd, rexld, predly crpxl, occ Amphipor & Stachyodes ghosts, mdst - floatstone, occ blk bit or arg lines styls, rr micfracs, 5-6%dk brn, mrly lls frags, **no vis por, wk, slow, p yel gn blomg cut flor.**

Jun 22, 2013

3230 m

3240 m

3250 m

3260 m

3270 m

3280 m

3290 m

3300 m

3310 m

DS 12.5° AZ 326.2°
TVD 2835.28 SSL -2153.58

DS 12.4° AZ 325.6°
TVD 2844.8 SSL -2163.10

DS 12.3° AZ 325.3°
TVD 2854.31 SSL -2172.61

DS 12.2° AZ 325°
TVD 2863.82 SSL -2182.12

DS 12.2° AZ 325.3°
TVD 2873.33 SSL -2191.63

DS 12.1° AZ 325.4°
TVD 2882.87 SSL -2201.17

DS 12.1° AZ 325.3°
TVD 2892.38 SSL -2210.68

DS 11.8° AZ 324.6°
TVD 2901.91 SSL -2220.21

0

0

0

0

Den 1165
Vi 71
PV 23
YP 8
FL 6
pH 9.5
KCL 4

0.45 0.3 0.15 0 -0.15

LS: off wh, mottled lt brn, chky texd, rexld, as mdst, occ Stachyoides, scat blk, arg & dd bit lined styls, rr dk brn mrly ls frags, scat wh calc spar, **no vis por, v p, wk, slow yel gn blomg cut** flor.

LS: off wh, mottled lt yel brn, lt brn, chky texd, rexld, predly crpxl, predly as mdst, occ tabulatan coral bafflestone, q floatstone, rudstone, scat blk bit & blk cly lined styls, tr m brn mrly frags, slow, p wk yel gn blomg cut flor.

LS: off wh, mottled lt brn, chky texd, rexld, crpxl, as rexld Stachyoides, Amphipora rudstone - floatstone, ip as mdst, scat blk lined styls, **no vis por, earthy por?, v wk, p yel gn blomg cut flor.**

LS: off wh, mottled lt brn, chky texd, rexld, crpxl, as rexld Stachyoides, Amphipora rudstone - floatstone, ip as mdst, scat blk lined styls, no vis por, earthy por?, v wk, p yel gn blomg cut flor.

LS: off wh, mottled lt brn, chky texd, rexld, crpxl, as rexld Stachyodes, Amphipora rudstone - floatstone, ip as mdst, scat blk lined styls, no vis por, earthy por?, v wk, p yel gn blomg cut flor.

LS: off wh, mottled lt brn, chky texd, rexld, crpxl, as rexld Stachyoides, Amphipora rudstone - floatstone, ip as mdst, scat blk lined styls, **no vis por, earthy por?, v wk, p yel gn blomg cut flor.**

LS: off wh, mottled lt brn, chky texd, rexld, crpxl, as rexld Stachyoides, Amphipora rudstone - floatstone, ip as mdst, scat blk lined styls, **no vis por, earthy por?, v wk, p yel gn blomg cut flor.**

LS: off wh, lt brn mottled, chky texd, rexld, predly crpxl, as Stachyoides floatstone, rudstone,. occ blk arg, slly bits lined styls**, tr blk org plugged dd bit, no vis por, v p, wk, yel gn** blomg cut flor.

LS: off wh, lt brn or lt yel brn mottled, chky texd, rexld, predly crpxl, scat Stachyoides, as rudst, floatstone, rr frags / blk org plugged por, occ arg or bits lined styls, no cut flor.

LS: off wh, lt brn mottled, chky texd, rexld, predly crpxl, scat Stachyodes, as rudst, floatstone, rr frags / blk org plugged por, occ arg or bits lined styls, no cut flor, rr Amphipora.

LS: off wh, lt brn mottled, chky texd, rexld, crpxl, as Amphipora, Stachyoides floatstone, rudstone, scat blk arg & dd bit lined styls, no vis por, no cut flor, mnr dd bit plugged org por.

LS: off wh, comly lt brn mottled, predly rexd & / chak tex, frags comly fri, crpxl, as Amphipora, Stachyoides rudst, fltst, / dism blk org bit plugged por, no cut flor, occ blk styls.

LS: off wh, lt brn mottled, chky texd, rexld, predly predly crpxl, 15% m brn, lt gy, no rexld, / abnt Amphipora, Stacyiodes, ip as mdst, no vis por, occ bit fillied org por, no cut flor.

DS 11.7°AZ 324.6°
TVD 2911.43 SSL -2229.73

DS 11.6°AZ 325.1°
TVD 2920.41 SSL -2238.71

Bit#19RR Ulterra U613M
420.00 / 66.25 hrs
Cond 1-1-WT-H-
-x-I-CT-TD

DS 11.3°AZ 326.6°
TVD 2946.87 SSL -2265.17

3320 m
3330 m
3340 m
3350 m
3360 m

53

LS: predly off wh, lt brn mottled, chky texd, rexld, comly sft & fri & / q eathy por, 15% m brn, dk brn & non rexld, as pelodal, mdst - wkest, Amphipora & Stachyodes (Idiostroma) rudstone - floatstone, spotty blk arg styls + orgnaic lined blk dd bit, rr druse, predly / no vis por, no cut flor.

LS: predly off wh, mottlede yel brn, lt brn, chky texd, rexld, crpxl, comly fri, predly as Stachyoides, Amphipora floatstone, 15-20% as m brn, non rexld mdt / floating calcipheres, osts & rr Amphipora,, tr peloidal grst, no vis por, no cut flor.

LS: predly off wh, lt brn mottled, chky texd, rexld, crpxl, comly fri, as mdst, Stacyoides, Amphipora floatstone, 20% of frags m brn, no rexld, / frags of Stachyoides, Amphippoera, calcisperes, ip as mdst, no vis por, no cut flor, 3% calcs, blk mrst.

LS: less rexld than above, 20% lt gy, comly arg, mrly, crpxl, dns & tt, tr lt gn calcs sh, 40% lt yel brn, m brn, as mdst, Amphipora rudstone & floatstone, as ost wkest, dns & tt, 50% of frags chky texd, rexld, off wh, mottled lt brn, predly fri, as mdst, rr stachyoides, tt, no shows.

LS: 25% of frags lt gy, v lt gy brn, crpxl, comly arg, mrly, dns & tt, 40% of frags m brn, crpxl, non rexld, as mdst, Amphipora floatstone, calcisphere wkest, 25% of frags chky, rexld, fri, chky texd, tr dk gy slly arg tt frags, no cut flor.

LS: 10-15% of frags lt gy, v lt gy brn, crpxl, comly arg, mrly, dns & tt, 50% of frags m brn, crpxl, non rexld, as mdst, Amphipora floatstone, calcisphere wkest, mdst, 25% of frags chky, rexld, fri, chky texd, tr dk gy slly arg tt frags, no cut flor, 10% blk, dk gy, calcs, sh & mrlst.

LS: off wh, m brn, as mdst, wkest, rr Amphipora floatstone, rexld & chky texd ip, scat calc druse, 1-6% intpar, vug & mic vug por, no cut flor, rr lt gy arg ls frags, rr mic fracs, no cut flor.

118 u

NB: Logger's depth 3m deeper than Driller's depth. Data acquired while drilling has been shifted down to correlate with open hole logging data f/ 2855 to 3350mMD

Total Depth
(TVD: 2949.81)
(SSL: -2268.11)

Date

SP (Mv) -550 -400 -250
MWD Gamma (units)
Gamma Ray (gapi) 0 75 150
Core Rate (min/0.2m) 0 75 150
Total Gas - Linear (units) 0 10 20 30
Drill Rate (min/m) 0 125 250
0 30 60

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

Measured Depth

Slide - Rotate
MDT Data
Sidewall Core
Core
Test
Oil Show
Porosity Type

Porosity (%) 5 10 15 20

Interpreted Lithology

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

Sorting

Rounding

Sonic Curve (ms/m) 300 200 100
X Caliper (mm) 125 250 375
Y Caliper (mm) 125 250 375
Hole Size (mm) 125 250 375

Caliper Logs
Sonic DT

PEF (b/e) 0 2.5 5 7.5 10
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

Density-Neutron
Density Corr.
PEFZ

C1 (Methane) (units) 1 10000
C2 (Ethane) (units) 1 10000
C3 (Propane) (units) 1 10000
Total C4s C5s (units) 1 10000

Mud Gas
Chromotography

aded Fm Resistivity (ohm/
eep Induction AF60 (ohmn 0.2 2000
dium Induction AF30 (ohm 0.2 2000
allow Induction AF20 (ohm 0.2 2000

Array Induction

Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

Expanded Core Log (1:48) May 6, 2013

Core #1 Interval: 940.60m to 954.52m Cut: 13.92m Recovered: 13.92m (100%)

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

Drill Rate (min/m) 0 30 60
Total Gas - Linear (units) 0 125 250
Core Rate (min/0.2m) 0 10 20 30
Gamma Ray (gapi) 0 75 150
MWD Gamma (units) 0 75 150
SP (Mv) -550 -400 -250

Date | Measured Depth | Slide - Rotate | MDT Data | Sidewall Core | Core | Test | Oil Show | Porosity Type | Porosity (%) 15 5 20 | Interpreted Lithology | Grain Size (mm) s snd m snd f snd vf snd c slt | Sorting | Rounding

Caliper Logs
Sonic DT

Hole Size (mm) 125 250 375
Y Caliper (mm) 125 250 375
X Caliper (mm) 125 250 375
Sonic Curve (ms/m) 300 200 100

Density-Neutron
Density Corr.
PEFZ

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
PEF (b/e) 0 2.5 5 7.5 10

Mud Gas
Chromotography

Total C4s C5s (units) 1 10000
C3 (Propane) (units) 1 10000
C2 (Ethane) (units) 1 10000
C1 (Methane) (units) 1 10000

Array Induction

allow Induction AF20 (ohm 0.2 2000
dium Induction AF30 (ohm 0.2 2000
eep Induction AF60 (ohm 0.2 2000
aded Fm Resistivity (ohm/ 0 0

Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

Bit#4 Hughes GX-35DXO
36.00 / 6.75 hrs
Cond 1-5-CT-G-
-1-1-BT-CP-BHA

NB#5C Quest DC-813

DS 36.4° AZ 319.5°
TVD 914.3 SSL -232.60

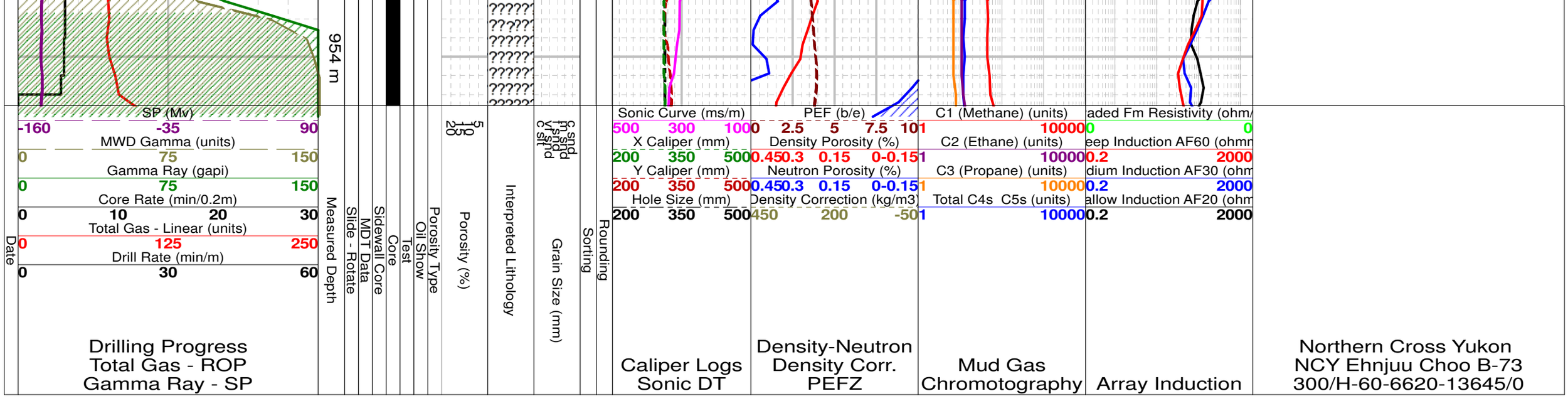
942 m
944 m
946 m
948 m
950 m
952 m

1 (100%)

ISOTUBE
SPLS X2

Den 1210
Vis 62
PV 29
YP 9.0
FL 5.0
pH 9.5
KCl 7.0

Cut Core #1: 942.0-955.9mMD


954 m
SP (Mv)
-160
-35
90
MWD Gamma (units)
0
75
150
Gamma Ray (gapi)
0
75
150
Core Rate (min/0.2m)
0
10
20
30
Total Gas - Linear (units)
0
125
250
Drill Rate (min/m)
0
30
60
Date
Measured Depth
Slide - Rotate
MDT Data
Sidewall Core
Core
Test
Oil Show
Porosity Type
5
10
15
20
Porosity (%)
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 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
C1 (Methane) (units)
1
10000
C2 (Ethane) (units)
1
10000
C3 (Propane) (units)
1
10000
Total C4s C5s (units)
1
10000
aded Fm Resistivity (ohm/
0
0
eep Induction AF60 (ohm
0.2
2000
dium Induction AF30 (ohm
0.2
2000
allow Induction AF20 (ohm
0.2
2000
Drilling Progress
Total Gas - ROP
Gamma Ray - SP
Caliper Logs
Sonic DT
Density-Neutron
Density Corr.
PEFZ
Mud Gas
Chromotography
Array Induction
Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

Expanded Core Log (1:48)

Core #2 Interval: 2908.59m to 2912.59m Cut: 4m Recovered: 4m (100%)

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

Drill Rate (min/m) 0 30 60
Total Gas - Linear (units) 0 125 250
Core Rate (min/0.2m) 0 10 20 30
Gamma Ray (gapi) 0 75 150
MWD Gamma (units) 0 75 150
SP (Mv) -160 -35 90

Date: Jun 16, 2013

Measured Depth: 2910 m – 2912 m

Slide - Rotate | MDT Data | Sidewall Core | Core | Test | Oil Show | Porosity Type

Porosity (%) 15 20 5

Interpreted Lithology

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

Sorting | Rounding

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 Corr.
PEFZ

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
PEF (b/e) 0 2.5 5 7.5 10

Mud Gas
Chromotography

Total C4s C5s (units) 1 10000
C3 (Propane) (units) 1 10000
C2 (Ethane) (units) 1 10000
C1 (Methane) (units) 1 10000

Array Induction

allow Induction AF20 (ohm 0.2 2000
dium Induction AF30 (ohm 0.2 2000
eep Induction AF60 (ohm 0.2 2000
aded Fm Resistivity (ohm/ 0 0

Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

Core Jammed
@ 2912 m (MD)

Den 1320
Vis 71
PV 23
YP 9
FL 6
pH 9.9
KCL 5.8

SH: m - dk brn, firm, as cly sh, micmica, occ v f nearly vertical sil lined fracs, slly carb, **v wk, slow yel gn blomg cut flor.**

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

SP (Mv) -550 -400 -250
MWD Gamma (units) 0 75 150
Gamma Ray (gapi) 0 75 150
Core Rate (min/0.2m) 0 75 150
Total Gas - Linear (units) 0 10 20 30
Drill Rate (min/m) 0 125 250
0 30 60

Caliper Logs
Sonic DT

Sonic Curve (ms/m) 500 300 100
X Caliper (mm) 125 250 375
Y Caliper (mm) 125 250 375
Hole Size (mm) 125 250 375

Density-Neutron
Density Corr.
PEFZ

PEF (b/e) 0 2.5 5 7.5 10
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

Mud Gas
Chromotography

C1 (Methane) (units) 1 10000
C2 (Ethane) (units) 1 10000
C3 (Propane) (units) 1 10000
Total C4s C5s (units) 1 10000

Array Induction

aded Fm Resistivity (ohm/ 0 0
eep Induction AF60 (ohm 0.2 2000
dium Induction AF30 (ohm 0.2 2000
allow Induction AF20 (ohm 0.2 2000

Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

Expanded Core Log (1:48) Jun 18, 2013

Core #3 Interval: 2931.40m to 2949.40m Cut: 18m Recovered: 18m (100%)

Drilling Progress
Total Gas - ROP
Gamma Ray - SP

Drill Rate (min/m) 0 30 60
Total Gas - Linear (units) 0 125 250
Core Rate (min/0.2m) 0 10 20 30
Gamma Ray (gapi) 0 75 150
MWD Gamma (units) 0 75 150
SP (Mv) -550 -400 -250

Date | Measured Depth | Slide - Rotate | MDT Data | Sidewall Core | Core | Test | Oil Show | Porosity Type | Porosity (%) 15 5 20 | Interpreted Lithology | Grain Size (mm) s sand g sand vf sand c silt | Sorting | Rounding

Caliper Logs
Sonic DT
Hole Size (mm) 125 250 375
Y Caliper (mm) 125 250 375
X Caliper (mm) 125 250 375
Sonic Curve (ms/m) 500 300 100

Density-Neutron
Density Corr.
PEFZ
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
PEF (b/e) 0 2.5 5 7.5 10

Mud Gas
Chromotography
Total C4s C5s (units) 1 10000
C3 (Propane) (units) 1 10000
C2 (Ethane) (units) 1 10000
C1 (Methane) (units) 1 10000

Array Induction
allow Induction AF20 (ohm 0.2 2000
dium Induction AF30 (ohm 0.2 2000
eep Induction AF60 (ohm 0.2 2000
aded Fm Resistivity (ohm/ 0 0

Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0

2932 m
2934 m
2936 m
2938 m
2940 m
2942 m
2944 m

DS 22.2° AZ 327.2°
TVD 2544.46 SSL -1862.76

DS 22.9° AZ 327.7°
TVD 2553.46 SSL -1871.76

3 (100%)

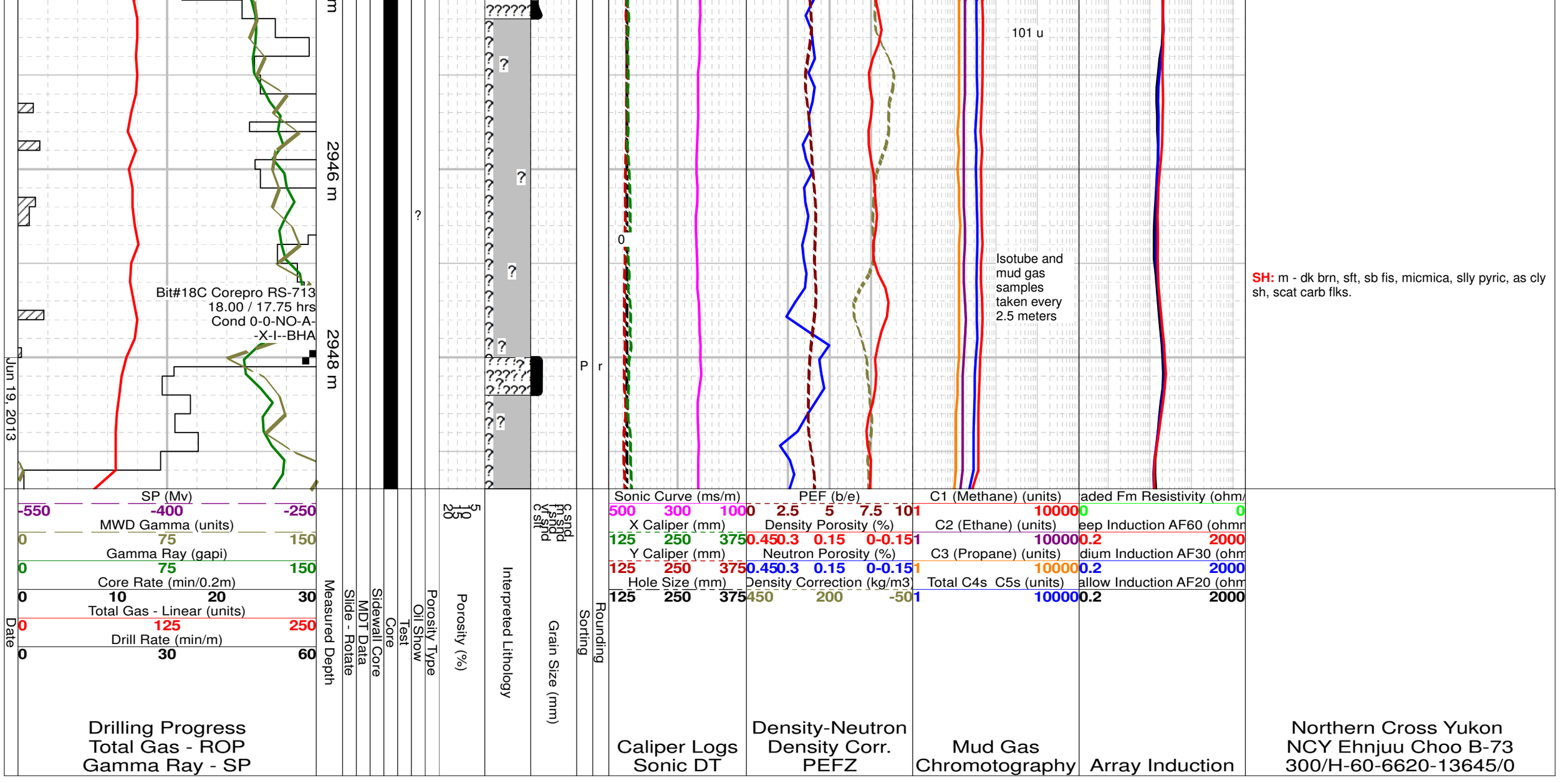
Den 1305
Vis 73
PV 26
YP 26
pH 9.8
FL 4.3
KCL 5.0
SPM 105
WOB 9
PP 20500

Desorbtion tests a
2938.36, 2946.64
and at 2943.64 m
(MD)

SS: m brn, slty - v f l gred, sbang - sbrdd, v py srt & / m brn arg mtx, grdg to slty, sdy sh, micmica, carb, micas, tt, v v p gr relief, v firm, carb, v wk, v p yel gn blomg cut flor.

SH: m brn, sft, sb fis, slly slty & sdy, sb fis, slly pyric, non calcs. scat carb flks,

SH: m brn, sft, sb fis, comly slly slty & sdy, micmica, micas, comly / scat carb flks, wk p, slow yel gmn blomg cut flor.


2946 m
2948 m
Jun 19, 2013
Bit#18C Corepro RS-713
18.00 / 17.75 hrs
Cond 0-0-NO-A-
-X-I--BHA
101 u
Isotube and
mud gas
samples
taken every
2.5 meters
SH: m - dk brn, sft, sb fis, micmica, slly pyric, as cly sh, scat carb flks.
SP (Mv)
-550 -400 -250
MWD Gamma (units)
0 75 150
Gamma Ray (gapi)
0 75 150
Core Rate (min/0.2m)
0 10 20 30
Total Gas - Linear (units)
0 125 250
Drill Rate (min/m)
0 30 60
Date
Measured Depth
Slide - Rotate
MDT Data
Sidewall Core
Core
Test
Oil Show
Porosity Type
Porosity (%)
Interpreted Lithology
Grain Size (mm)
Sorting
Rounding
Sonic Curve (ms/m)
500 300 100
X Caliper (mm)
125 250 375
Y Caliper (mm)
125 250 375
Hole Size (mm)
125 250 375
PEF (b/e)
0 2.5 5 7.5 10
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
C1 (Methane) (units)
1 10000
C2 (Ethane) (units)
1 10000
C3 (Propane) (units)
1 10000
Total C4s C5s (units)
1 10000
aded Fm Resistivity (ohm/
0 0
eep Induction AF60 (ohm
0.2 2000
dium Induction AF30 (ohm
0.2 2000
allow Induction AF20 (ohm
0.2 2000
Drilling Progress
Total Gas - ROP
Gamma Ray - SP
Caliper Logs
Sonic DT
Density-Neutron
Density Corr.
PEFZ
Mud Gas
Chromotography
Array Induction
Northern Cross Yukon
NCY Ehnjuu Choo B-73
300/H-60-6620-13645/0