



WATERS PETROLEUM ADVISORS

Scale 1:1200 (1"=100') Imperial
Measured Depth Log

Well Name: OCS-Y-2321 Burger J 001
Location: Posey 6912
License Number:
Spud Date: 7/30/2015
Surface Coordinates: LAT: N 71° 10' 24.029"
LONG: W 163° 28' 18.522"
Bottom Hole Coordinates: LAT: N 71° 10' 24.029"
LONG: W 163° 28' 18.522"
Ground Elevation (ft): 0 K.B. Elevation (ft): 76
Logged Interval (ft): 222 To: 6800 Total Depth (ft): 6800
Formation: Kuparuk C / Kuparuk A / Kuparuk D
Type of Drilling Fluid: Surface: Sea Water; Intermediate and Main Objective: KlaShield WBM
Region: Chukchi Sea, Alaska
Drilling Completed: 9/21/2015
Printed by STRIP.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

Company: Shell Gulf of Mexico, Inc
Address: 200 North Dairy Ashford Rd
Houston, TX 77079

GEOLOGIST

Name: J. McBeth, R. Massey
Company: Waters Petroleum Advisors
Address: 4824 Potter Crest Circle
Anchorage, AK 99516
Office: (907) 350-8289

Comments

Exploration
Rig: Polar Pioneer
API #: 55-352-00004-00
AFE #: 30230984

This log displays the LWD data in Real Time Mode

Casing/LOT

KB to Mudline: 222'

Mudline Cellar Floor: 255'

Water Depth: 146'

Surface:

8.5" Pilot hole to 1,512' MD

42" Pilot hole opener: 36" x 2" X65 set at 393' MD

22" 129.5 # X80, H90 casing @ 1475' MD / 1475' TVD; FIT to 210 psi w/ 10.0 ppg MW @ 1522' TVD=12.6 ppg EMW

Intermediate 1: 14" 114# L80 Vam Top KB casing @ 2,933' MD / 2,933' TVD; FIT to 451 psi w/ 14.0 ppg MW @ 2,973' TVD=14.0 ppg EMW

Intermediate 2: 9 5/8" 53.5# L80 Vam SLIJ-II casing @ 5,408' MD / 5,406' TVD; FIT to 907 psi w/ 12.07 ppg MW @ 5,408' TVD=15.28 ppg EMW

LWD

Pilot Hole (8.5" hole size):

BHA #1 Sensor Distances: DGR=6.67', PWD=9.49', PCDC=16.8', XBAT=32.85', ADR=59.89', ALD=79.17', CTN=92.13', MRIL=109.6'

Pilot Hole (26" hole size):

BHA #4 Sensor Distances: PCDC=123.78', PWD=133.7'

Intermediate 1 Hole (17-1/2" hole size):

BHA #5 Sensor distances: DIR=79.96', PWD=89.88'





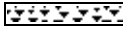
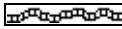




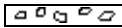

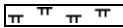


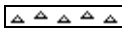



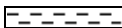

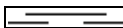

Intermediate 2 Hole (12-1/4" hole size)

BHA #6 Sensor distances: GR=37.22', EWR=45.42', DIR=56.82', PWD=70.67', ALD=87.77', CTN=106.44', XBAT=130.62'

Main Objective (8.5" hole size):

BHA #7 Sensor Distances: DGR=38.4', PWD=41.27', DIR=48.8', XBAT=64.79', ADR=95.88', ALD=113.16', CTN=126.09', MRIL=143.06'

ROCK TYPES

	Anhy		Coal		Lmst		Shcol		Tuff
	Bent		Congl		Meta		Shgy		Siderite
	Brec		Dol		Mrlst		Sltst		Cement
	Cht		Gyp		Salt		Ss		
	Clyst		Igne		Shale		Till		

PROPRIETARY

ACCESSORIES

MINERAL

- veins
- Vertfrac
- Slickens
- ovgth
- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel

- Ferr
- Glau
- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff

FOSSIL

- Algae
- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Pelec

- Pellet
- Pisolite
- Plant
- Strom
- Inoceram

STRINGER

- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst
- Sltstrg
- Ssstrg
- thincoal

- Fault
- sidstrg
- Pebbly
- Clyst-strg
- Cong

TEXTURE

- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackst

OTHER SYMBOLS

POROSITY

- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint

Vuggy

SORTING

- Well
- Moderate
- Poor

ROUNDING

- Rounded
- Subrnd
- Subang
- Angular

OIL SHOW

- Even

Spotted

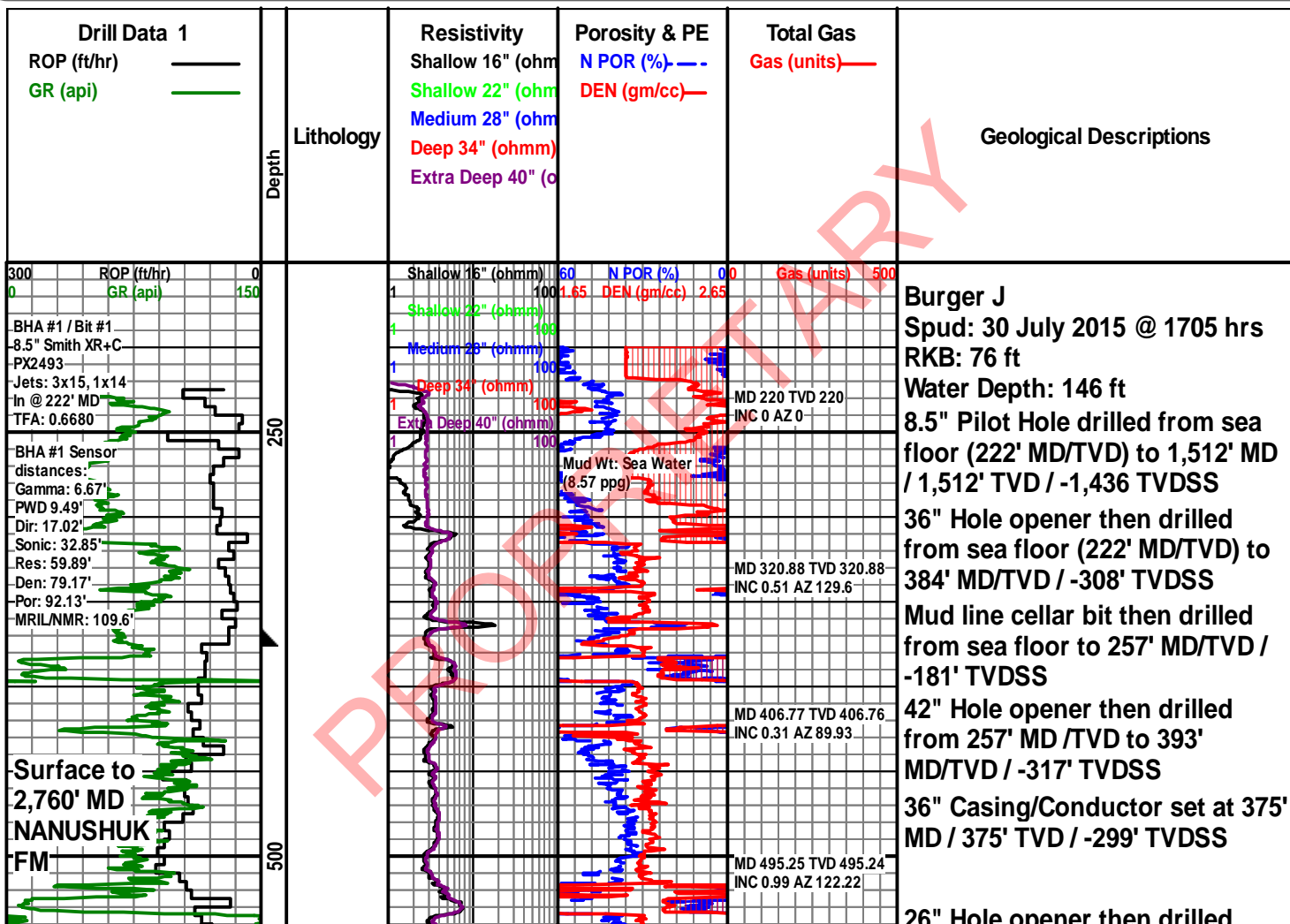
- Ques
- Dead

INTERVAL

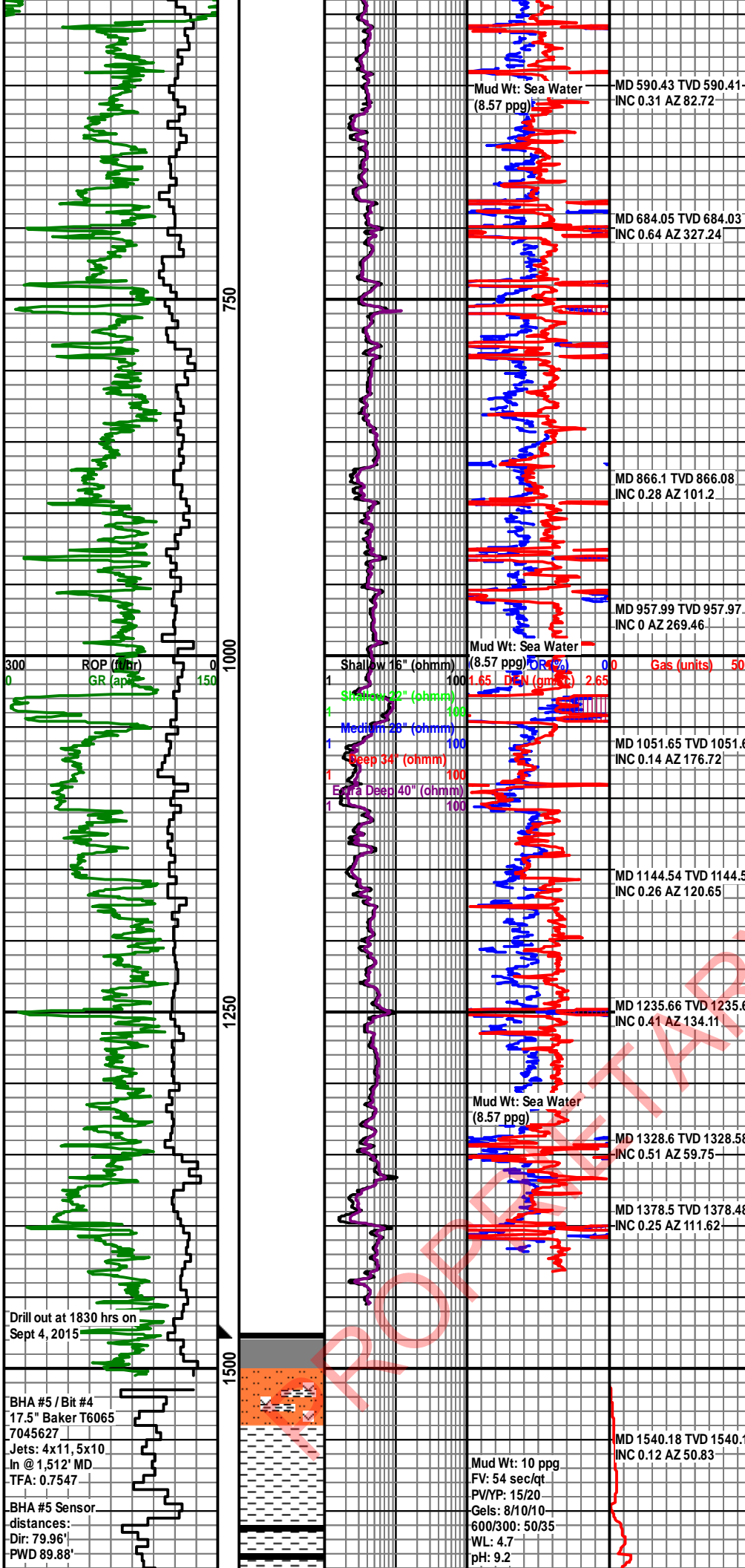
- Core
- Dst

EVENT

- casngr
- Rft
- Sidewall
- Bit
- New symbol
- Pipe conn



20' Hole Opened then drilled
from 375' MD/TVD to 1,512' MD /
1,512' TVD / -1,436 TVDSS



Mud Wt: Sea Water (8.57 ppg) MD 590.43 TVD 590.41
INC 0.31 AZ 82.72

MD 684.05 TVD 684.03
INC 0.64 AZ 327.24

MD 866.1 TVD 866.08
INC 0.28 AZ 101.2

MD 957.99 TVD 957.97
INC 0 AZ 269.46

Mud Wt: Sea Water (8.57 ppg) OR (%) 0.0 Gas (units) 500
1.65 DFN (gm/cc) 2.65

MD 1051.65 TVD 1051.6
INC 0.14 AZ 176.72

MD 1144.54 TVD 1144.52
INC 0.26 AZ 120.65

MD 1235.66 TVD 1235.6
INC 0.41 AZ 134.11

Mud Wt: Sea Water (8.57 ppg)

MD 1328.6 TVD 1328.58
INC 0.51 AZ 59.75

MD 1378.5 TVD 1378.48
INC 0.25 AZ 111.62

300 ROP (ft/hr)
0 GR (api) 150

750

1000

1250

1500

Drill out at 1830 hrs on
Sept 4, 2015

BHA #5 / Bit #4
17.5" Baker T6065
7045627
Jets: 4x11, 5x10
In @ 1,512' MD
TFA: 0.7547

BHA #5 Sensor
distances:
Dir: 79.96'
PWD 89.88'

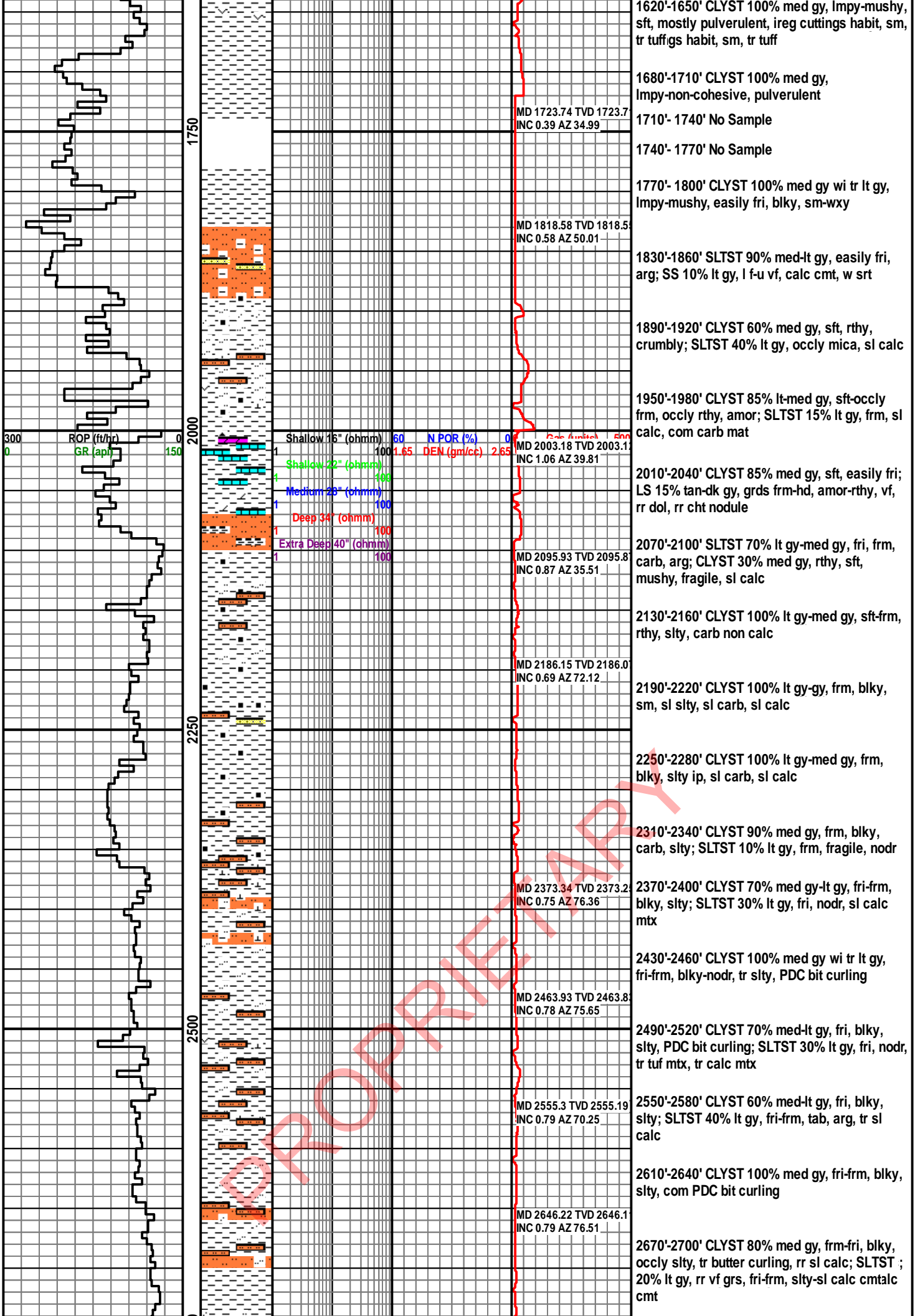
Mud Wt: 10 ppg
FV: 54 sec/qt
PV/YP: 15/20
Gels: 8/10/10
600/300: 50/35
WL: 4.7
pH: 9.2

MD 1540.18 TVD 1540.1
INC 0.12 AZ 50.83

22" Surface Casing set at 1,475'
MD / 1,475' TVD / -1,399' TVDSS

1500'-1530' SLTST 70% lt-med gy wi com wh-lt
gy tuf mtx, arg, sft, easily fri; CLYST 30% med
gy, sft, fri,ft, fri

1560'- 1590' CLYST 100% med gy,
Impy-mushy, sft, ireg cuttings habit, sm-sltly



1620'-1650' CLYST 100% med gy, Impy-mushy, sft, mostly pulverulent, irreg cuttings habit, sm, tr tuffigs habit, sm, tr tuff

1680'-1710' CLYST 100% med gy, Impy-non-cohesive, pulverulent

MD 1723.74 TVD 1723.7
INC 0.39 AZ 34.99

1710'- 1740' No Sample

1740'- 1770' No Sample

1770'- 1800' CLYST 100% med gy wi tr lt gy, Impy-mushy, easily fri, blk, sm-wxy

MD 1818.58 TVD 1818.5
INC 0.58 AZ 50.01

1830'-1860' SLTST 90% med-lt gy, easily fri, arg; SS 10% lt gy, l f-u vf, calc cmt, w srt

1890'-1920' CLYST 60% med gy, sft, rthy, crumbly; SLTST 40% lt gy, occlly mica, sl calc

1950'-1980' CLYST 85% lt-med gy, sft-occlly frm, occlly rthy, amor; SLTST 15% lt gy, frm, sl calc, com carb mat

Shallow 16" (ohmm) 60 N POR (%) 0 Calc (gm/cc) 500
1 100 1.65 DEN (gm/cc) 2.65 MD 2003.18 TVD 2003.1
INC 1.06 AZ 39.81

2010'-2040' CLYST 85% med gy, sft, easily fri; LS 15% tan-dk gy, grds frm-hd, amor-rthy, vf, rr dol, rr cht nodule

Shallow 22" (ohmm) 100

Medium 28" (ohmm) 100

Deep 34" (ohmm) 100

Extra Deep 40" (ohmm) 100

MD 2095.93 TVD 2095.8
INC 0.87 AZ 35.51

2070'-2100' SLTST 70% lt gy-med gy, fri, frm, carb, arg; CLYST 30% med gy, rthy, sft, mushy, fragile, sl calc

2130'-2160' CLYST 100% lt gy-med gy, sft-frm, rthy, slty, carb non calc

MD 2186.15 TVD 2186.0
INC 0.69 AZ 72.12

2190'-2220' CLYST 100% lt gy-gy, frm, blk, sm, sl slty, sl carb, sl calc

2250'-2280' CLYST 100% lt gy-med gy, frm, blk, slty ip, sl carb, sl calc

2310'-2340' CLYST 90% med gy, frm, blk, carb, slty; SLTST 10% lt gy, frm, fragile, nodr

MD 2373.34 TVD 2373.2
INC 0.75 AZ 76.36

2370'-2400' CLYST 70% med gy-lt gy, fri-frm, blk, slty; SLTST 30% lt gy, fri, nodr, sl calc mtx

2430'-2460' CLYST 100% med gy wi tr lt gy, fri-frm, blk, nodr, tr slty, PDC bit curling

MD 2463.93 TVD 2463.8
INC 0.78 AZ 75.65

2490'-2520' CLYST 70% med-lt gy, fri, blk, slty, PDC bit curling; SLTST 30% lt gy, fri, nodr, tr tuf mtx, tr calc mtx

MD 2555.3 TVD 2555.19
INC 0.79 AZ 70.25

2550'-2580' CLYST 60% med-lt gy, fri, blk, slty; SLTST 40% lt gy, fri-frm, tab, arg, tr sl calc

2610'-2640' CLYST 100% med gy, fri-frm, blk, slty, com PDC bit curling

MD 2646.22 TVD 2646.1
INC 0.79 AZ 76.51

2670'-2700' CLYST 80% med gy, frm-fri, blk, occlly slty, tr butter curling, rr sl calc; SLTST ; 20% lt gy, rr vf grs, fri-frm, slty-sl calc cmtalc cmt

2,760' MD
TOROK FM

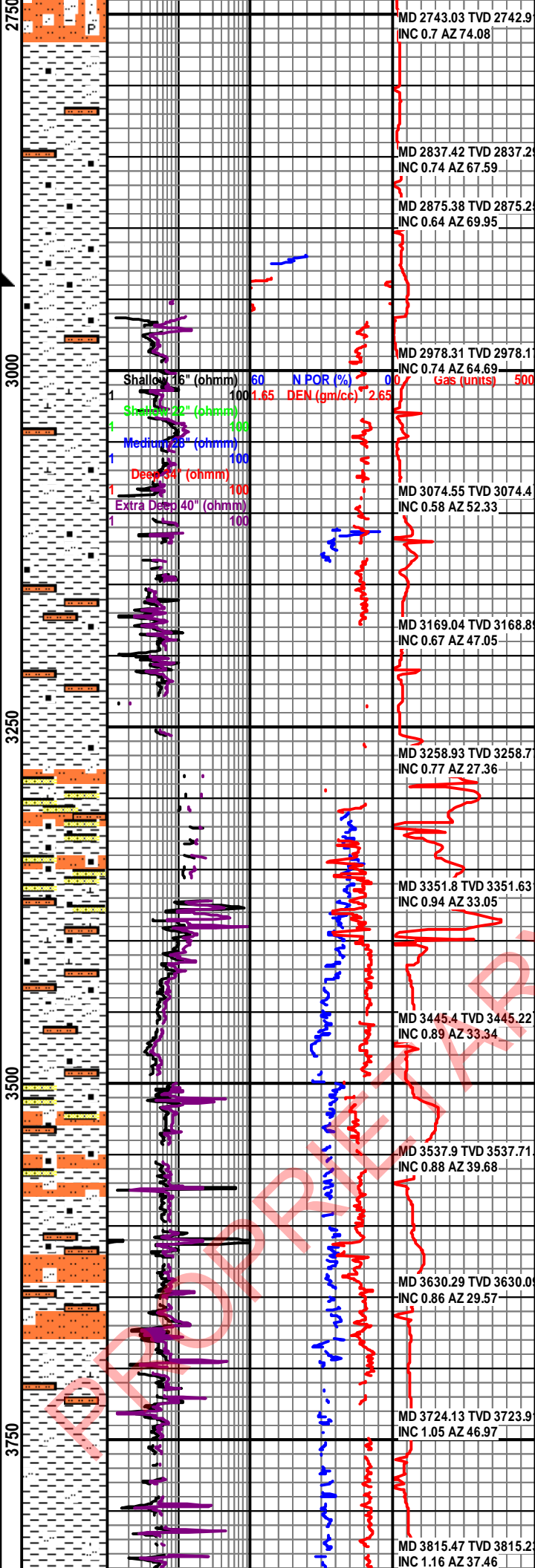
TD 17.5" Intermediate 1 -
2,963' MD / 2,963' TVD - @
0608 hrs on Sept 06, 2015

Bit #4 out @ 2,963' MD
Made 1,451' in 20.58 HOB
Avg ROP 70 fph

ROP (#/hr)
GR (api)

BHA #6 / Bit #5
12.25" HDBS SF66H
12642177
Jets: 9x12
In @ 2,963' MD
TFA: 0.9940

BHA #6 Sensor
distances:
GR: 37.22'
RES: 45.42'
Dir: 56.82'
PWD 70.67'
DEN: 87.77'
NEU: 106.44'
SON: 130.62'



2760'-2790' CLYST 100% med gy, frm-easily fri, blkly-nodr, occlly slty, tr carb flecks/b flecks

2820'-2850' CLYST 90% med-dk gy, frm-fri, blkly-nodr, slty, tr carb flecks; SLTST 10% lt gy, slty-vf, calc cmt, mod hd

2880'- 2910' CLYST 100% med-dk gy, sft-easily fri, mushy-tacky

2940'-2963' CLYST 100% med-dk gy, sft-fri, slty ip, scat carb mat

3000'-3030' CLYST 100% gy, sft-mod hd, tr grd-g-mudst, calc, com diss m clays

3060'-3090' CLYST 95% gy, sft-easily fri, tr slty, sl calc; SLTST 5% gy, sft-l vf, calc, carb

3120'-3150' CLYST 85% lt gy-gy, sft-occlly frm, rthy-blky, incrg slt; SLTST 15% gy, carb laminations, non calc

3180'-3210' CLYST 85% gy, sft-occlly frm, rthy-blky, slty ip, non calc; SLTST 15% gy, carb ip, rarely calc

3240'-3270' CLYST 75% gy-med gy, sft-frm, fragile, blkly, slty ip; SLTST 25% gy, occlly vf l sd, carb, non calc

3295'-3315' CLYST 55% gy-med gy, sft, mushy, fragile, rthy, slty/sdy ip, SLTST 35%; SS 10% v lt gy, vf-vf l, sb rd, sb elg, mod cmt, slty, calc, slty, calc

3360'-3390' CLYST 40% med gy-dk gy, sft-occlly frm, mushy, fragile; SLTST 40% lt gy-gy; SS 20% lt gy, vfg, sb rd, sb elg, mod cmt, slty, increasingly carb, sl calc

3420'-3450' CLYST 60% gy-med gy, sft-occlly frm, mushy, fragile, SLTST 40% gy, carb, rr vf grn sd

3480'-3510' CLYST 80% lt gy-gy, sft, fragile, mushy, occlly frm, non calc; SS 20% v lt gy-lt gy, vf grn, sb ang, v wrt, calc cmt, carb

3540'- 3570' CLYST 75% med lt gy-med gy, sft-frm, fragile, blkly ip, calc, SLTST 25% lt gy-gy, frm, fragile, carb

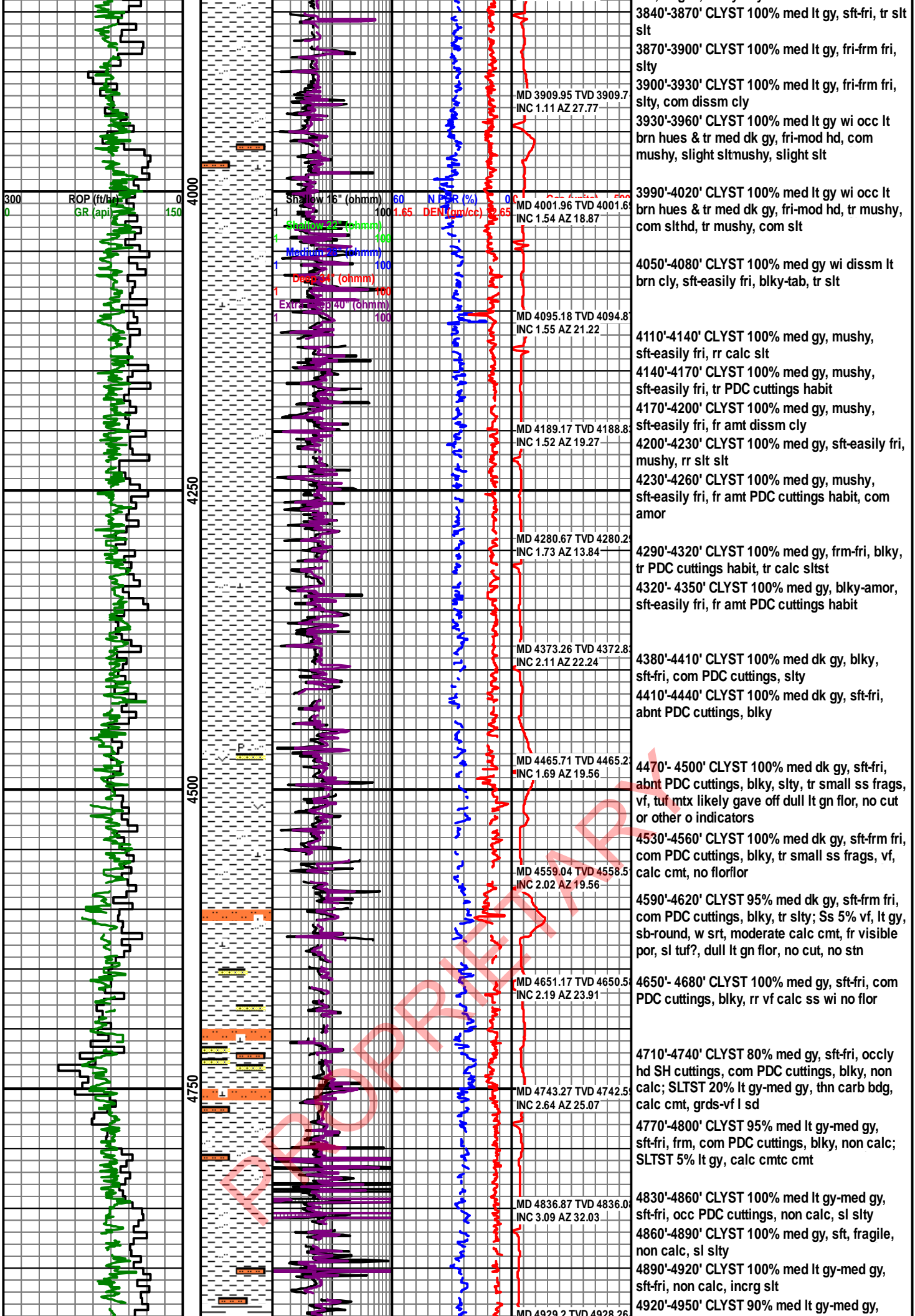
3600'-3630' SLTST 40% lt gy-med gy, sft, fragile, carb laminations, occ f grn sd, sl calc; CLYST 60% med lt gy-med gy, blkly, sl calc

3660'-3690' SLTST 35% lt gy-med gy, sft, fragile, decrng carb mat; CLYST 65% lt gy-med gy, sft, frm, fragile

3720'- 3750' CLYST 100% med lt gy-med gy, frm, fragile, calc, sl slty

3780'-3810' CLYST 100% med lt gy-med, sft-occlly frm, fragile

3810'-3840' CLYST 100% med lt gy, sft-occlly frm, fragile, occlly slty



300 ROP (ft/hr)
0 GR (api) 150

4000
4250
4500
4750

Shallow 16" (ohmm) 60
Medium 30" (ohmm) 100
Deep 60" (ohmm) 100
Extra Deep 40" (ohmm) 100

NGR (%) 0
DEN (gm/cc) 65

MD 3909.95 TVD 3909.7
INC 1.11 AZ 27.77

MD 4001.96 TVD 4001.6
INC 1.54 AZ 18.87

MD 4095.18 TVD 4094.8
INC 1.55 AZ 21.22

MD 4189.17 TVD 4188.8
INC 1.52 AZ 19.27

MD 4280.67 TVD 4280.2
INC 1.73 AZ 13.84

MD 4373.26 TVD 4372.8
INC 2.11 AZ 22.24

MD 4465.71 TVD 4465.2
INC 1.69 AZ 19.56

MD 4559.04 TVD 4558.5
INC 2.02 AZ 19.56

MD 4651.17 TVD 4650.5
INC 2.19 AZ 23.91

MD 4743.27 TVD 4742.5
INC 2.64 AZ 25.07

MD 4836.87 TVD 4836.0
INC 3.09 AZ 32.03

MD 4929.2 TVD 4928.26

3840'-3870' CLYST 100% med lt gy, sft-fri, tr slit

3870'-3900' CLYST 100% med lt gy, fri-frm fri, slty

3900'-3930' CLYST 100% med lt gy, fri-frm fri, slty, com dissm cly

3930'-3960' CLYST 100% med lt gy wi occ lt brn hues & tr med dk gy, fri-mod hd, com mushy, slight sltmushy, slight slit

3990'-4020' CLYST 100% med lt gy wi occ lt brn hues & tr med dk gy, fri-mod hd, tr mushy, com slthd, tr mushy, com slit

4050'-4080' CLYST 100% med gy wi dissm lt brn cly, sft-easily fri, blkly-tab, tr slit

4110'-4140' CLYST 100% med gy, mushy, sft-easily fri, rr calc slit

4140'-4170' CLYST 100% med gy, mushy, sft-easily fri, tr PDC cuttings habit

4170'-4200' CLYST 100% med gy, mushy, sft-easily fri, fr amt dissm cly

4200'-4230' CLYST 100% med gy, sft-easily fri, mushy, rr slit slit

4230'-4260' CLYST 100% med gy, mushy, sft-easily fri, fr amt PDC cuttings habit, com amor

4290'-4320' CLYST 100% med gy, frm-fri, blkly, tr PDC cuttings habit, tr calc sltst

4320'- 4350' CLYST 100% med gy, blkly-amor, sft-easily fri, fr amt PDC cuttings habit

4380'-4410' CLYST 100% med dk gy, blkly, sft-fri, com PDC cuttings, slty

4410'-4440' CLYST 100% med dk gy, sft-fri, abnt PDC cuttings, blkly

4470'- 4500' CLYST 100% med dk gy, sft-fri, abnt PDC cuttings, blkly, slty, tr small ss frags, vf, tuf mtx likely gave off dull lt gn flor, no cut or other o indicators

4530'-4560' CLYST 100% med dk gy, sft-frm fri, com PDC cuttings, blkly, tr small ss frags, vf, calc cmt, no florflo

4590'-4620' CLYST 95% med dk gy, sft-frm fri, com PDC cuttings, blkly, tr slty; Ss 5% vf, lt gy, sb-round, w srt, moderate calc cmt, fr visible por, sl tuf?, dull lt gn flor, no cut, no stn

4650'- 4680' CLYST 100% med gy, sft-fri, com PDC cuttings, blkly, rr vf calc ss wi no flor

4710'-4740' CLYST 80% med gy, sft-fri, occlly hd SH cuttings, com PDC cuttings, blkly, non calc; SLTST 20% lt gy-med gy, thn carb bdg, calc cmt, grds-vf l sd

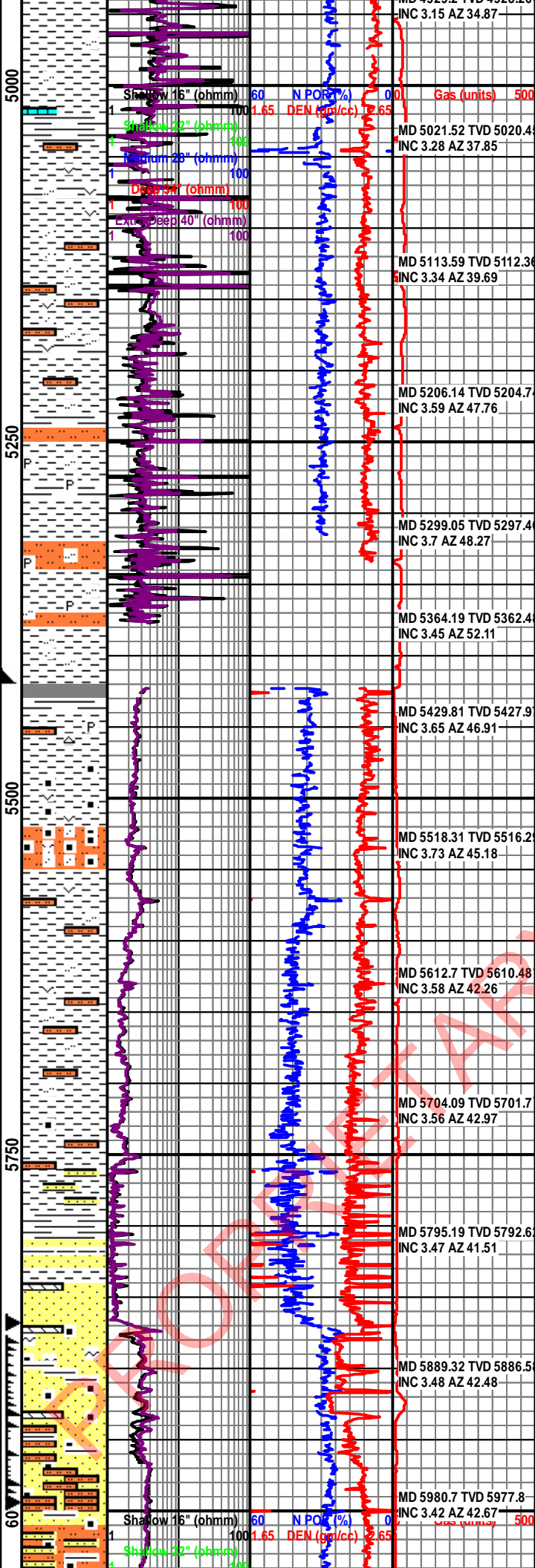
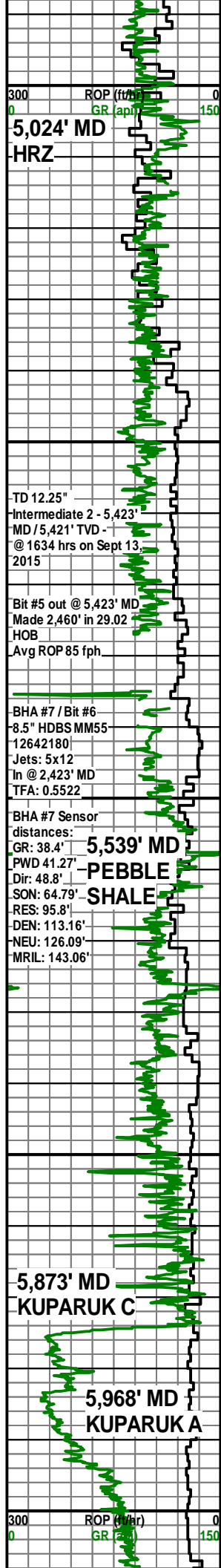
4770'-4800' CLYST 95% med lt gy-med gy, sft-fri, frm, com PDC cuttings, blkly, non calc; SLTST 5% lt gy, calc cmtc cmt

4830'-4860' CLYST 100% med lt gy-med gy, sft-fri, occ PDC cuttings, non calc, sl slty

4860'-4890' CLYST 100% med gy, sft, fragile, non calc, sl slty

4890'-4920' CLYST 100% med lt gy-med gy, sft-fri, non calc, incrg slit

4920'-4950' CLYST 90% med lt gy-med gy,



sft-fri, non calc, slty ip; SH 10% dk gy, frm-hd, occlly brit, rthy-fis ip, non calc on calc

4980'-5010' CLYST 100% lt gy-med lt gy, sft, fragile, non calc

5010'- 5040' CLYST 85% med dk gy, frm, fragile, crumbly, pyr, slightly calc, slty ip, rr sd grs, med, sb ang; SH 10% med dk gy, frm, ply fis; LS 5%

5070'-5100' CLYST 85% med dk gy, frm, fragile, crumbly, non calc, slty ip; SH 10% med dk gy, ply fis, non calc; TUFF 5%

5130'-5160' CLYST 90% med dk gy-dk gy, frm, fragile, crumbly, tr tuff; SLTST 10% med gy, tr sd

5190'-5220' CLYST 80% med gy-med dk gy, sft-frm, mushy, rr pyr, slty ip, rr tan ls; SH 20% dk gy-blk, hd, brit, fis

5250'-5280' CLYST 90% med gy-med dk gy wi brn hue, sft-frm, fragile, rr pyr, slty ip, rr sd grs; SH 10% dk gy, hd, brit, sb fis

5310'-5340' CLYST 90% med gy wi brn hue, sft-frm, fragile, blk, incrg slt, rr sd grs; SH 10% med gy, hd, brit, sb fis-fis

5370'-5400' CLYST 100% med lt gy wi brn hue, sft, fragile, slty, diss m pyr, com ls, slty ip lty ip

5430'-5460' CLYST 60% med lt gy-med gy, sft, fragile; SH 25% med dk gy, hd-brit, rthy, sl slty; SILSTONE 15% lt gy, occlly grds-vf ss, rr pyr

5490'-5520' CLYST 95% med lt gy-med gy, sft, fragile, rr cht, slty ip, rr pyr, occ calc tuff; Sh 5% med gy, hd, brit, sl carb ip

5580'-5610' SLTST 60% med gy wi brownish hue, com pyr, com crbnt, tr tuff, grdg-vf gy sd; SH 20% med dk gy, frm-mod hd; CLYST 20% med gy, sft-frm

5640'-5670' CLYST 95% med gy-med dk gy wi com brownish hues, frm-hd, moderate-w ind, blk, elongated, occlly slty, tr pyr; SS 5% lt gy wi trnsl-trnsp qtz, vf wi tr fitg med grs, sb round-sb ang, p srtg, calc cmt

5730'- 5750' SLTST 50% med gy wi brownish hue, fri-frm, grdg-vf sd, arg mtx; CLYST 40% med dk gy wi brownish hues, frm-fri, occlly grdg-slty; SS 10% trnsl-trnsp-lt gy hues, uncons, disaggregated, vf-u med, ply srt, sb round-round

5850'- 5880' SS 80% gy-med gy wi abnt trnsl-trnsp & com wh qtz grs, vf-f wi scat med, w-moderate srt, sb round, abnt carb, tr glau, tr sid cmt; CLYST 20% med gy-dk gy, sft-frm

5950'- 5970' SS 90% lt gy-med gy wi abnt trnsp-trnsl qtz grs, vf-f grs, occ m grs, w srt, sr-subangular, abnt carb mat, tr sid cmt, com lithics; SH 10% dk gy,

5990'-6010' SS 50% lt gy-med lt gy wi abnt trnsp-trnsl qtz grs, f l-vf u, w srt, subangular-sr, carb mat; SLTST 50% med lt gy wi slight brownish hue, sft-fri, arg mtx, sl clayey, amor

INC 3.15 AZ 34.87

MD 5021.52 TVD 5020.4
INC 3.28 AZ 37.85

MD 5113.59 TVD 5112.36
INC 3.34 AZ 39.69

MD 5206.14 TVD 5204.7
INC 3.59 AZ 47.76

MD 5299.05 TVD 5297.4
INC 3.7 AZ 48.27

MD 5364.19 TVD 5362.4
INC 3.45 AZ 52.11

MD 5429.81 TVD 5427.9
INC 3.65 AZ 46.91

MD 5518.31 TVD 5516.2
INC 3.73 AZ 45.18

MD 5612.7 TVD 5610.48
INC 3.58 AZ 42.26

MD 5704.09 TVD 5701.7
INC 3.56 AZ 42.97

MD 5795.19 TVD 5792.6
INC 3.47 AZ 41.51

MD 5889.32 TVD 5886.5
INC 3.48 AZ 42.48

MD 5980.7 TVD 5977.8
INC 3.42 AZ 42.67

