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:		Region:	Chukchi Sea, Alaska
Spud Date:	7/30/2015	Drilling Completed:	9/21/2015
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		

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 Recorded 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'

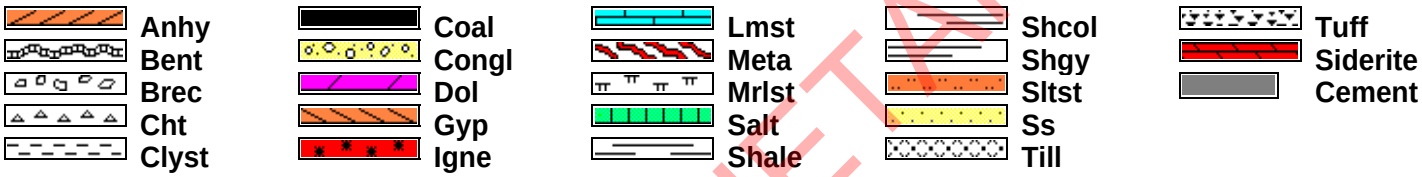
Pilot Hole (26" hole size):
BHA #4 Sensor Distances: PCDC=123.78', PWD=133.7'

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



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

TEXTURE
- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

Fault
- sidstrg
- Pebbly
- Clyst-strg
- Cong

OTHER SYMBOLS

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

SORTING
- Well
- Moderate
- Poor

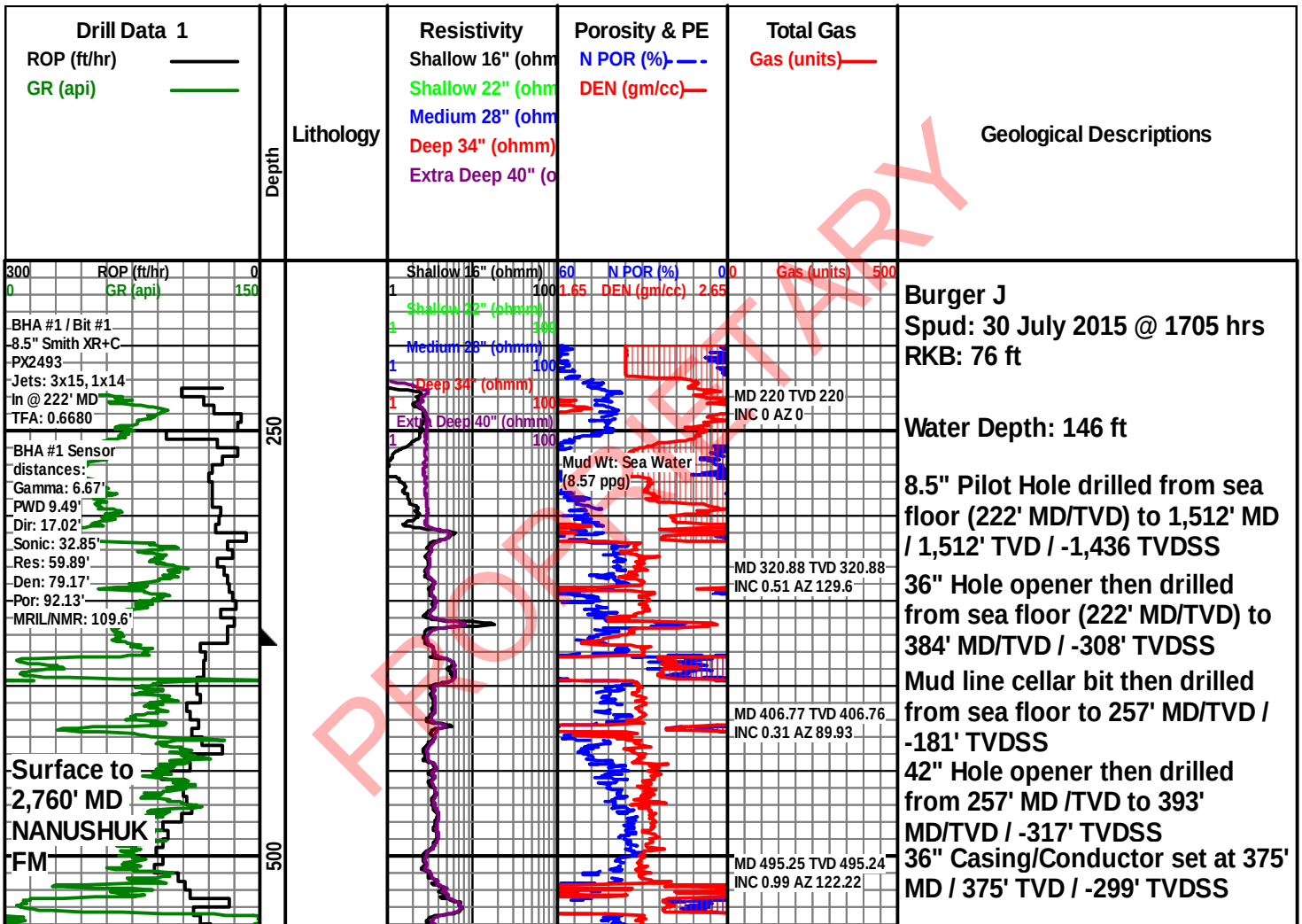
ROUNDING
- Rounded
- Subrnd
- Subang
- Angular

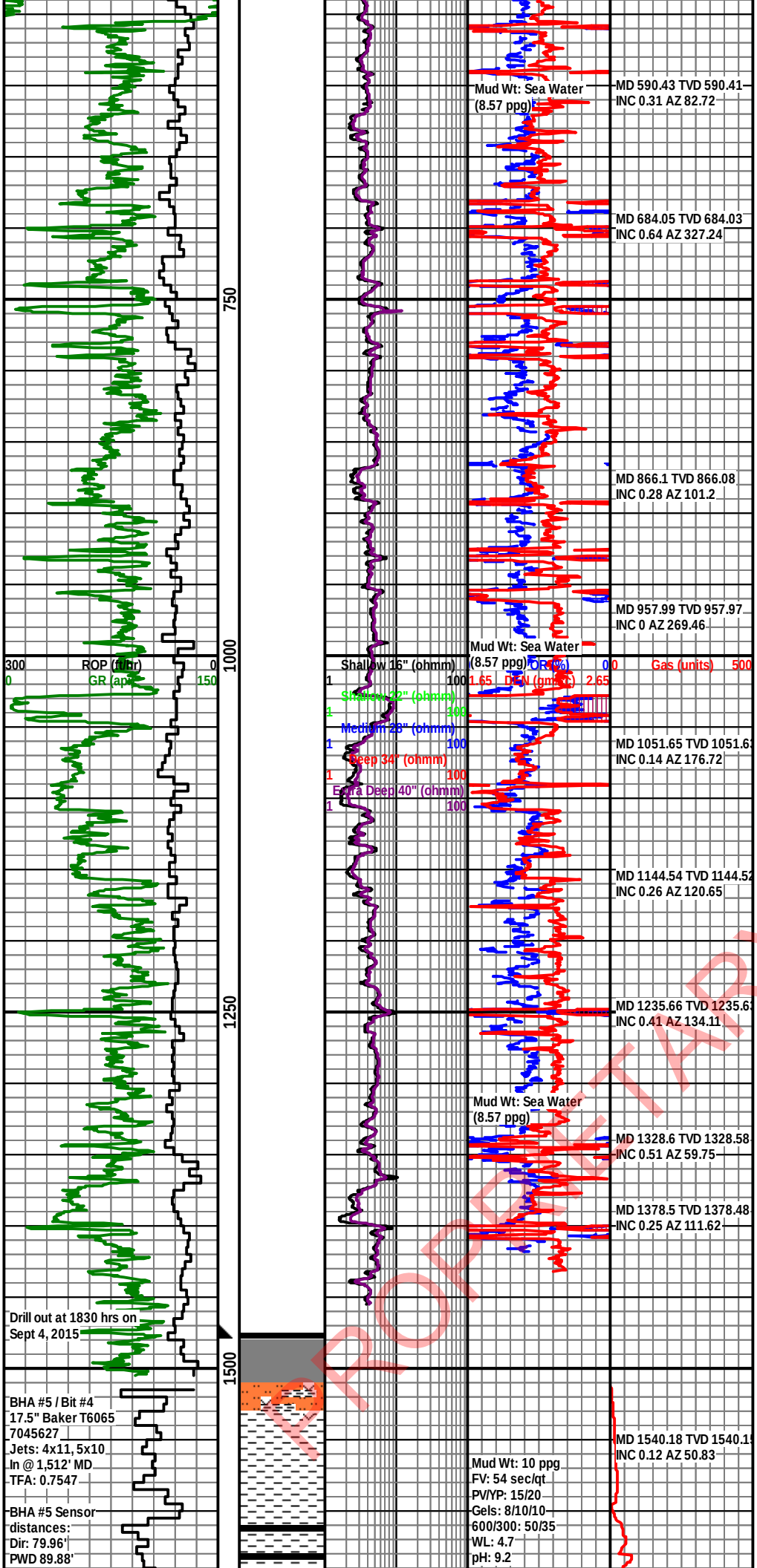
OIL SHOW
- Even

- Spotted
- Ques
- Dead

INTERVAL
- Core
- Dst

EVENT
- casingr
- Rft
- Sidewall
- Bit
- New symbol
- Pipe conn



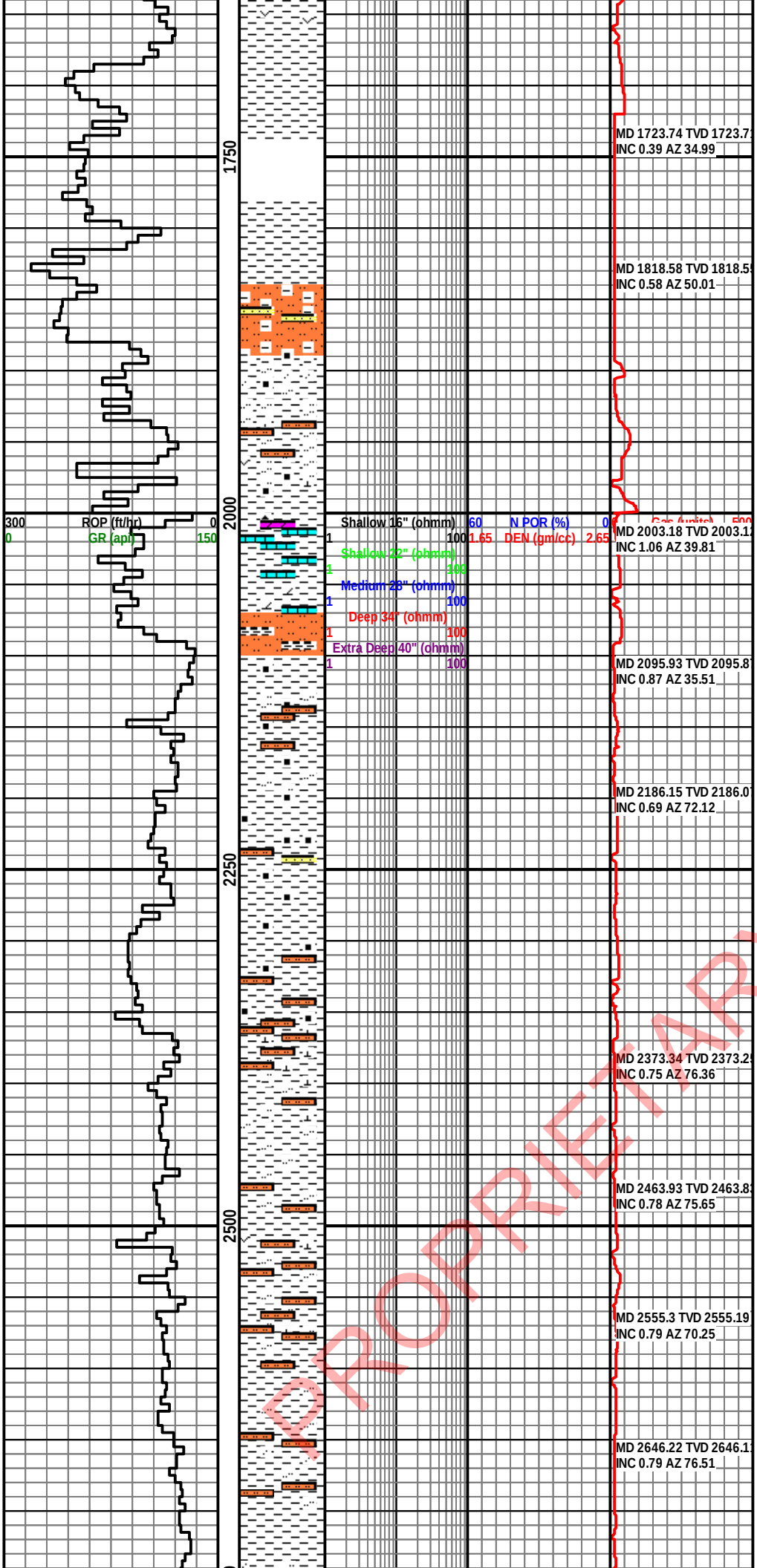


26" Hole opener then drilled from 375' MD/TVD to 1,512' MD / 1,512' TVD / -1,436 TVDSS

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, lmpy-mushy, sft, ireg cuttings habit, sm-slty habit, sm-slty



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

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

1710'- 1740' No Sample

1740'- 1770' No Sample

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

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, occly mica, sl calc

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

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

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

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

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

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

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

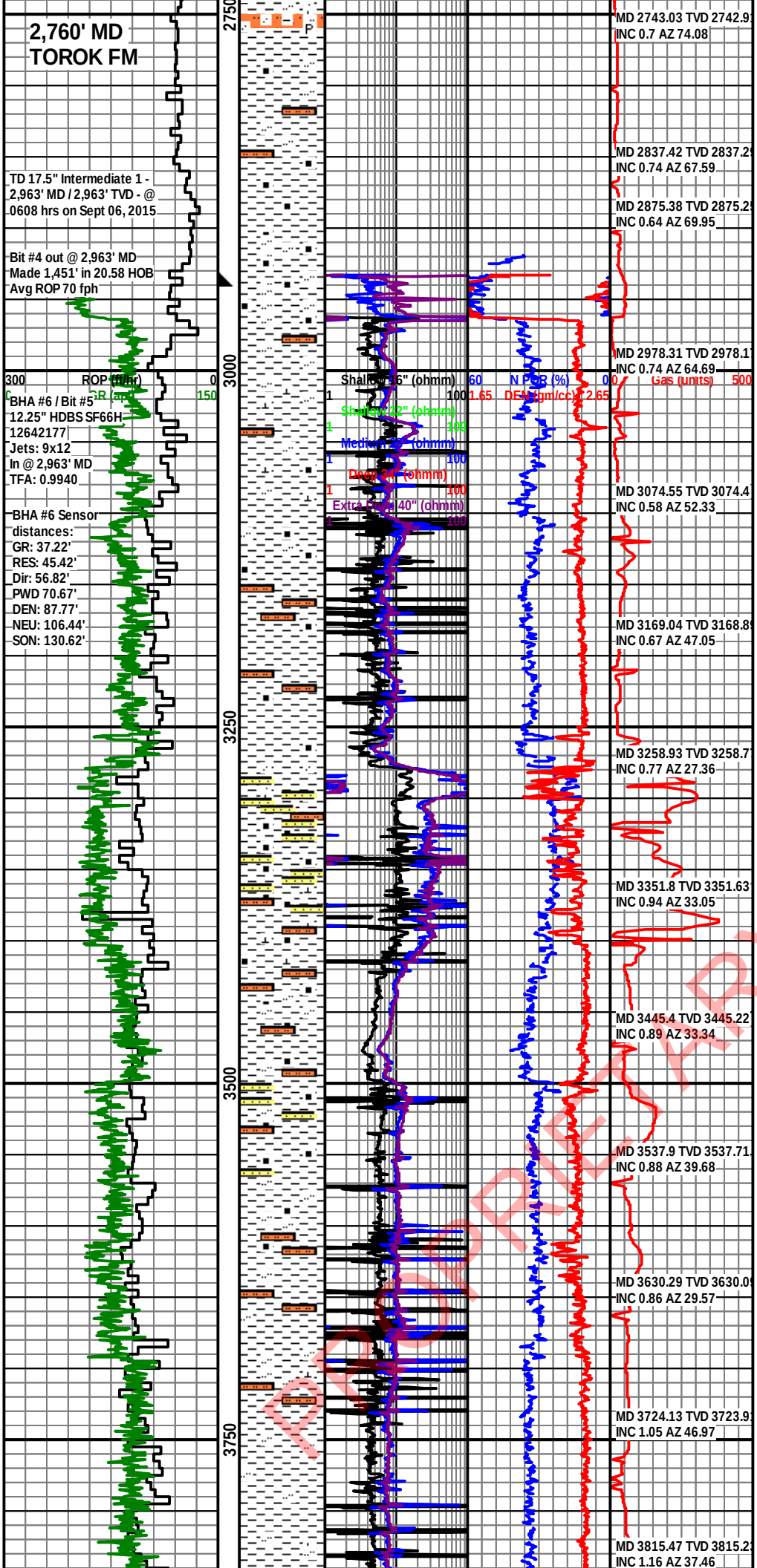
2430'-2460' CLYST 100% med gy wi tr lt gy, fri-frm, blky-nodr, tr slty, PDC bit curling

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

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

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

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



2730'-2760' SLTST 70% lt gy, slty-vf, frm-fri, arg-calc cmt, tr pyr; CLYST 30% med gy, frm, blky, sm, tr sl calc

2790'-2820' CLYST 90% med gy, frm-moderate hd, blky-nodr, occly slty, tr carb flecks; SLTST 10% lt gy, vf-slty, calc cmt, mod hdc cmt, mod hd

2850'- 2880' CLYST 100% med-dk gy, easily fri, mushy-tacky, pulverulent, tr carb flecks

2910'-2940' CLYST 100% med-dk gy, sft-fri, frm ip, sl slty, carb flecks, sl calc calc

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

2973'-3000' CLYST 100% gy wi tr med dk gy, sft-easily fri, abnt hydrophilic dissm cly particles, rarely slty

3030'-3060' CLYST 95% gy, sft-easily fri, mushy, tr slty, sl calc; SLTST 5% gy, slt-l vf, calc

3090'- 3120' CLYST 90% gy, sft, rthy, slty ip; SLTST 10% gy, rarely carb, sl calc

3150'-3180' CLYST 80% lt gy-gy, sft-occly frm, rthy-blky, slty ip; SLTST 20% gy, carb ip, non calc

3210'-3240' CLYST 70% gy-med gy, sft, mushy, rthy, incrg slt; SLTST 30% gy, carb, non calc non calc

3270'-3295' CLYST 60% gy-med gy, sft-frm, fragile, rthy, slty/sdy ip; SLTST 35% gy, carb, SS 5% ip

3315'-3330' SLTST 40%; SS 20% v lt gy, vfg, sb rd, sb elg, mod cmtd, slty, sl calc CLYST 40% med gy, sft, mushy, fragile, rthy, slty/sdy ip,

3390'-3420' CLYST 40% med gy, sft-occly frm, fragile; SLTST 30% gy, carb; SS 30% lt gy-gy, vfg, sb rd-sb ang, sb elg, mod-g calc cmt

3450'-3480' CLYST 85% gy, sft, fragile, sl fis,

3450'- 3480' CLYST 85% gy, sft, fragile, sl fis, non calc, slty; SLTST 15% gy, frm, fragile, carb, sl calc

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

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

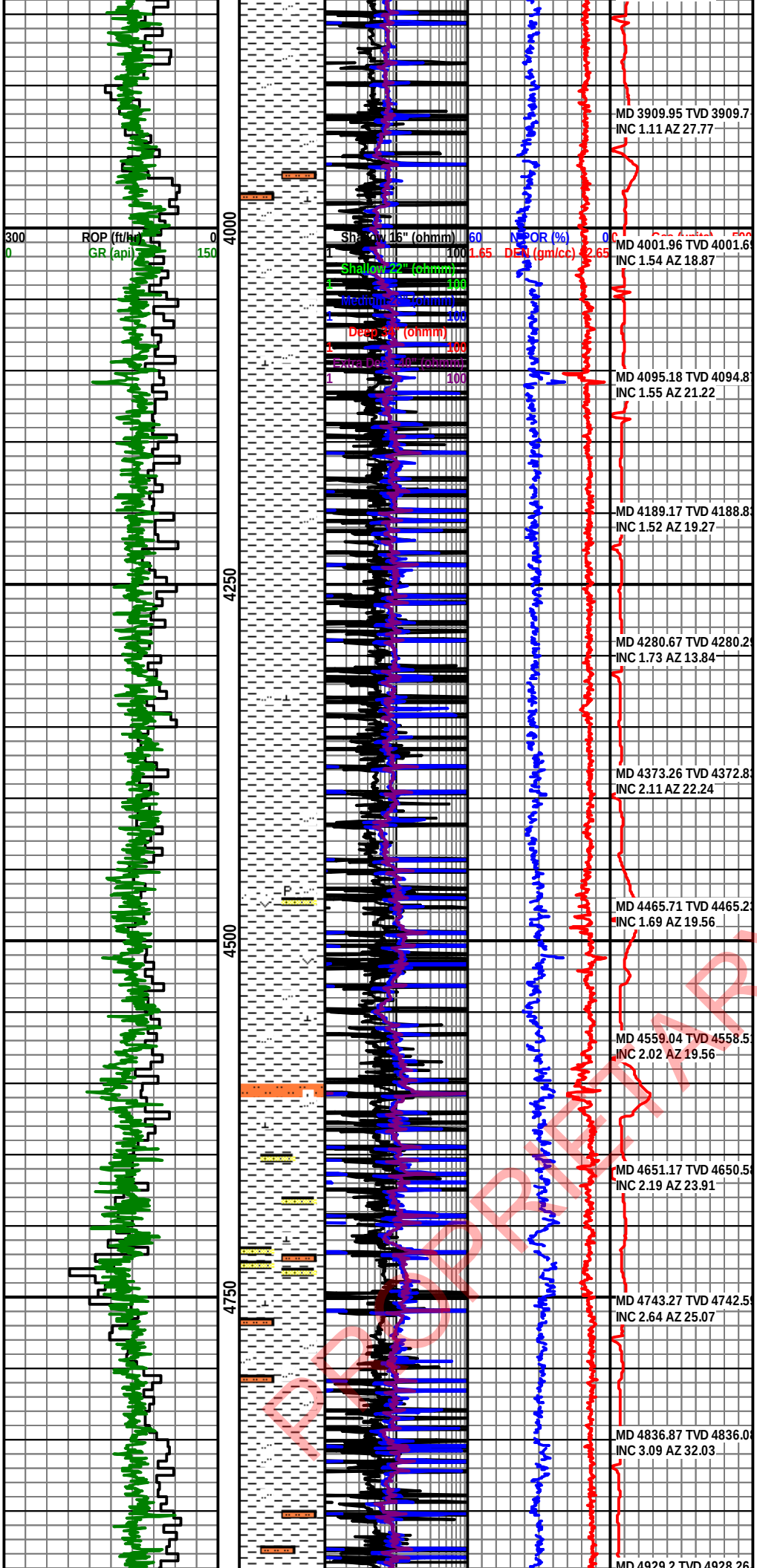
3600'-3630' SLTST 40% lt gy-med gy, sft, fragile, carb laminations, occ f grn sd, sl calc; CLYST 60% med lt gy-med gy, blky, sl calc

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-occly frm, fragile

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



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

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 slt

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 slt

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

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

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 slt slt

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, blky, tr PDC cuttings habit, tr calc sltst

4350'-4380' CLYST 100% med dk gy wi tr mod hd dk gy clyst, blky, sft-fri, com PDC cuttings

4440'- 4470' CLYST 100% med dk gy, sft-fri, abnt PDC cuttings, blky, slty, tr pyr, tr small ss frags, vf, weakly cmtd, tuf mtx likely gave off dull lt gn flor, no cut or other o indicators

4470'- 4500' CLYST 100% med dk gy, sft-fri, abnt PDC cuttings, blky, 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, blky, tr small ss frags, vf, calc cmt, no florflor

4590'-4620' CLYST 95% med dk gy, sft-frm fri, com PDC cuttings, blky, 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

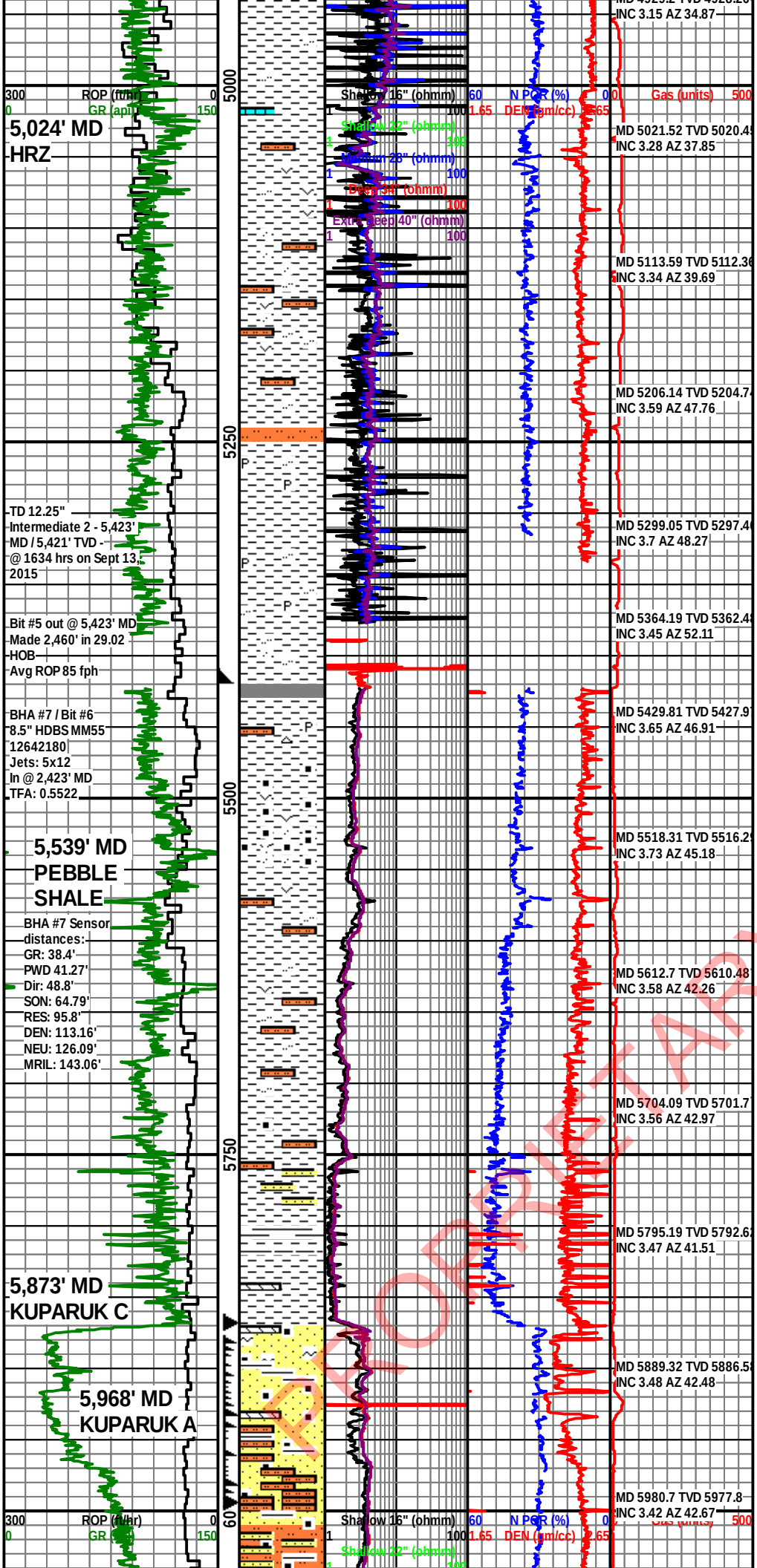
4650'-4680' CLYST 100% med gy, sft-fri, com PDC cuttings, blky, rr vf calc ss wi no flor

4710'-4740' CLYST 80% med gy, sft-fri, occly hd SH cuttings, com PDC cuttings, blky, 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, blky, 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

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



4950'-4980' CLYST 100% med lt gy, sft-fri, non calc, rarely slty

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

5010'- 5040' CLYST 85% med dk gy, frm, fragile, crumbly, pyr, slighltly 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, blky, 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, dissm pyr, com ls, slty iplty 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, occly 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

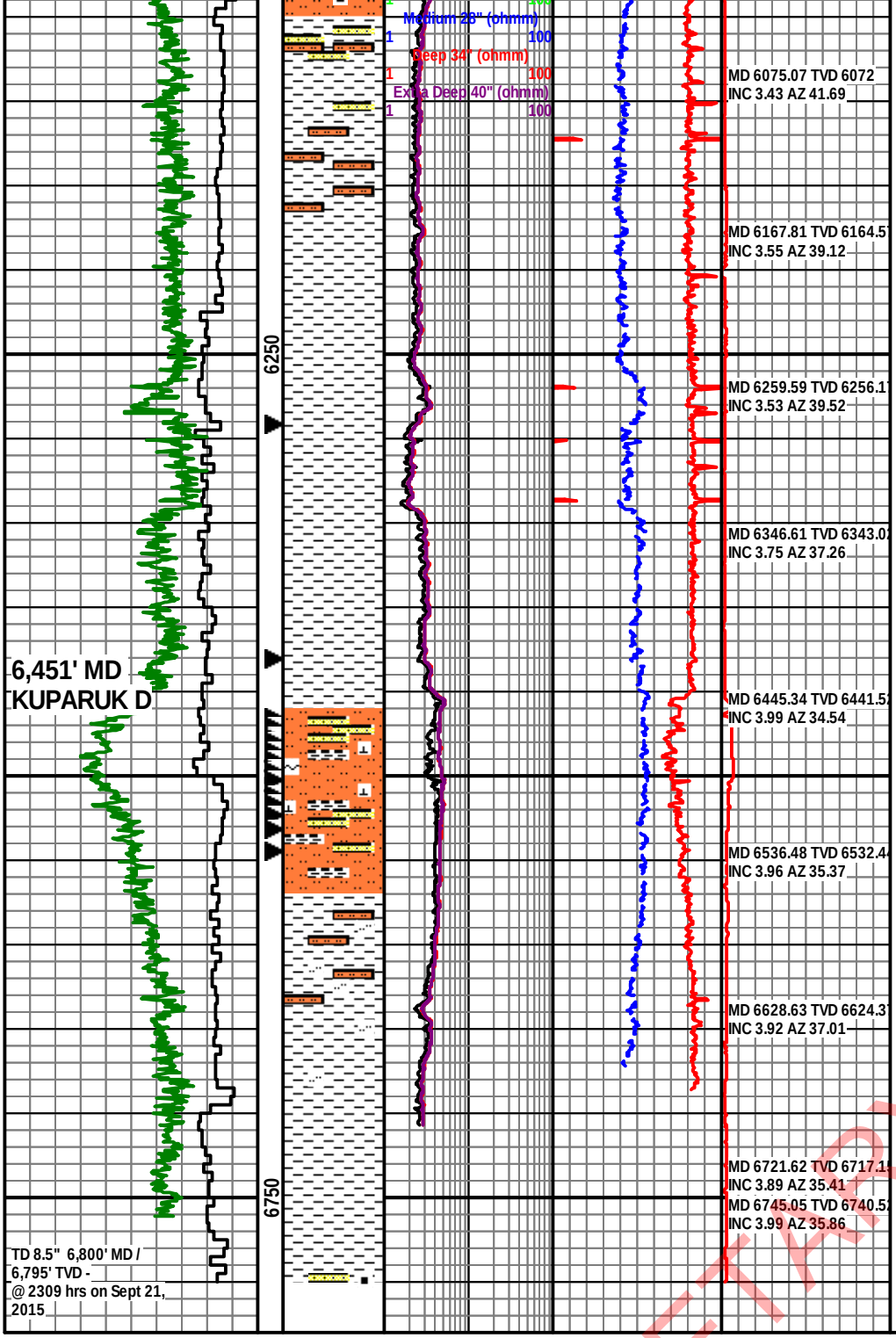
5700'-5730' SLTST 60% med gy wi brownish hue, frm-fri, occly grdg-l vf, arg mtx, tr pyr; CLYST 40% med gy-med dk gy wi com brownish hues, frm-fri, mod ind, commonly slty, tr pyr, tr SH

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, occly 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

5880'-5950' SS 80% lt gy-med gy wi abnt trnsp-trnsl qtz grs, vf-f grs, occ c grs, w srt, sr-subangular, abnt carb mat, com lithics, tr sid cmt; SH 10% dk gy, mod hd, splt-flky; CLYST 10% med gy, mushy-frm, amor-nodr

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, com lithics; SH 10% dk gy, mod hd, splt-flky



MD 6075.07 TVD 6072
INC 3.43 AZ 41.69

MD 6167.81 TVD 6164.5
INC 3.55 AZ 39.12

MD 6259.59 TVD 6256.1
INC 3.53 AZ 39.52

MD 6346.61 TVD 6343.0
INC 3.75 AZ 37.26

MD 6445.34 TVD 6441.5
INC 3.99 AZ 34.54

MD 6536.48 TVD 6532.4
INC 3.96 AZ 35.37

MD 6628.63 TVD 6624.3
INC 3.92 AZ 37.01

MD 6721.62 TVD 6717.1
INC 3.89 AZ 35.41

MD 6745.05 TVD 6740.5
INC 3.99 AZ 35.86

6010'- 6080' SLTST 55% med lt-med gy wi slight brownish hue, sft-fri, arg mtx, incrg cly content, amor; SS 45% lt gy-med lt gy wi abnt trnsp-trnsl qtz grs, f l-vf u, w srt, subangular-sr, carb mat scat

6110'-6140' CLYST 90% med gy-med dk gy wi brownish hue, sft-occly frm, rthy, increasingly slty; SH 10% med dk gy-dk gy, hd, brit, elongated cuttings

6170'-6200' CLYST 95% med gy-med dk gy wi brownish hue, sft-frm, occly hd, rthy, slty ip, carb, rr calc tuff; SH 5% med dk gy-dk gy, hd, brit, elongated cuttings

6230'-6260' CLYST 90% med gy-med dk gy wi brownish hue, sft-frm, occly hd, rthy, carb, rr calc tuff; SH 10% med dk gy-dk gy, hd, brit, elongated cuttings

6290'-6320' CLYST 80% med gy-med dk gy wi brownish hue, sft-frm, occly hd, rthy, slty ip, carb, rr calc tuff, sid; SH 20% med dk gy-dk gy, hd, brit, elongated cuttings

6380'-6410' CLYST 90% med gy-med dk gy wi brownish hue, sft-frm, occly hd, rthy, incrg slt, carb, rr calc tuff, rr glauc cly; SH 10% med dk gy-dk gy, hd, brit, elongated cuttings

6490'- 6500' SS 50% lt gy-med gy wi abnt trnsp-trnsl qtz grs, vf-f, sr-subangular, uncons-cons wi wk calc cmt, dull yel flor over 40% spl, slow dull yel crush cut flor, dull yel resdl flor; SLTST 30% lt gy-med gy, sft-mod hd, fri; CLYST 20% lt gy-med gy, sft-mod hd, moderate induration, slty, sl calc

6560'- 6570' SS 50% lt gy-med gy wi abnt trnsp-trnsl, vf-f, subangular-rd, lse uncons qtz grs & lithics wi tr glau, tr f-med calc frags; SLTST 30% lt gy-med gy, easily fri-fri, arg-calc mtx, dull yel flor over 30% of spl, fnt slow bri yel crush flor, dull yel resdl flor; CLYST 20% med gy, sft-easily fri, amor-plty, slty

6690'-6720' CLYST 100% med dk gy wi brownish hues, frm fri-sft, blky-amor, abnt hydrated clays, com grdg-slt, tr flky-splt blk-dk gy SH

6750'-6780' CLYST 100% med dk gy wi brownish hues, frm fri-sft, blky-amor, tr hydrated clays, com grdg-slt, tr splt blk-dk gy SH