



WATERS PETROLEUM ADVISORS

Scale 1:240 (5"=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
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Anchorage, AK 99516
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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'


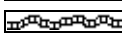
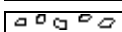
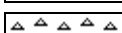
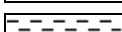
Intermediate 2 Hole (12-1/4" hole size)



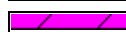


BHA #6 Sensor distances: GR=37.22', EWR=45.42', DIR=56.82', PWD=70.67', ALD=87.77', CTN=106.44', XBAT=130.62'



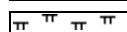

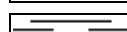
Main Objective (8.5" hole size):





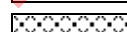
BHA #7 Sensor Distances: DGR=38.4', PWD=41.27', DIR=48.8', XBAT=64.79', ADR=95.88', ALD=113.16', CTN=126.09', MRIL=143.06'




ROCK TYPES

	Anhy
	Bent
	Brec
	Cht
	Clyst

	Coal
	Congl
	Dol
	Gyp
	Igne

	Lmst
	Meta
	Mrlst
	Salt
	Shale

	Shcol
	Shgy
	Sltst
	Ss
	Till

	Tuff
	Siderite
	Cement

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
 - Slststrg
 - Ssstgr
 - 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

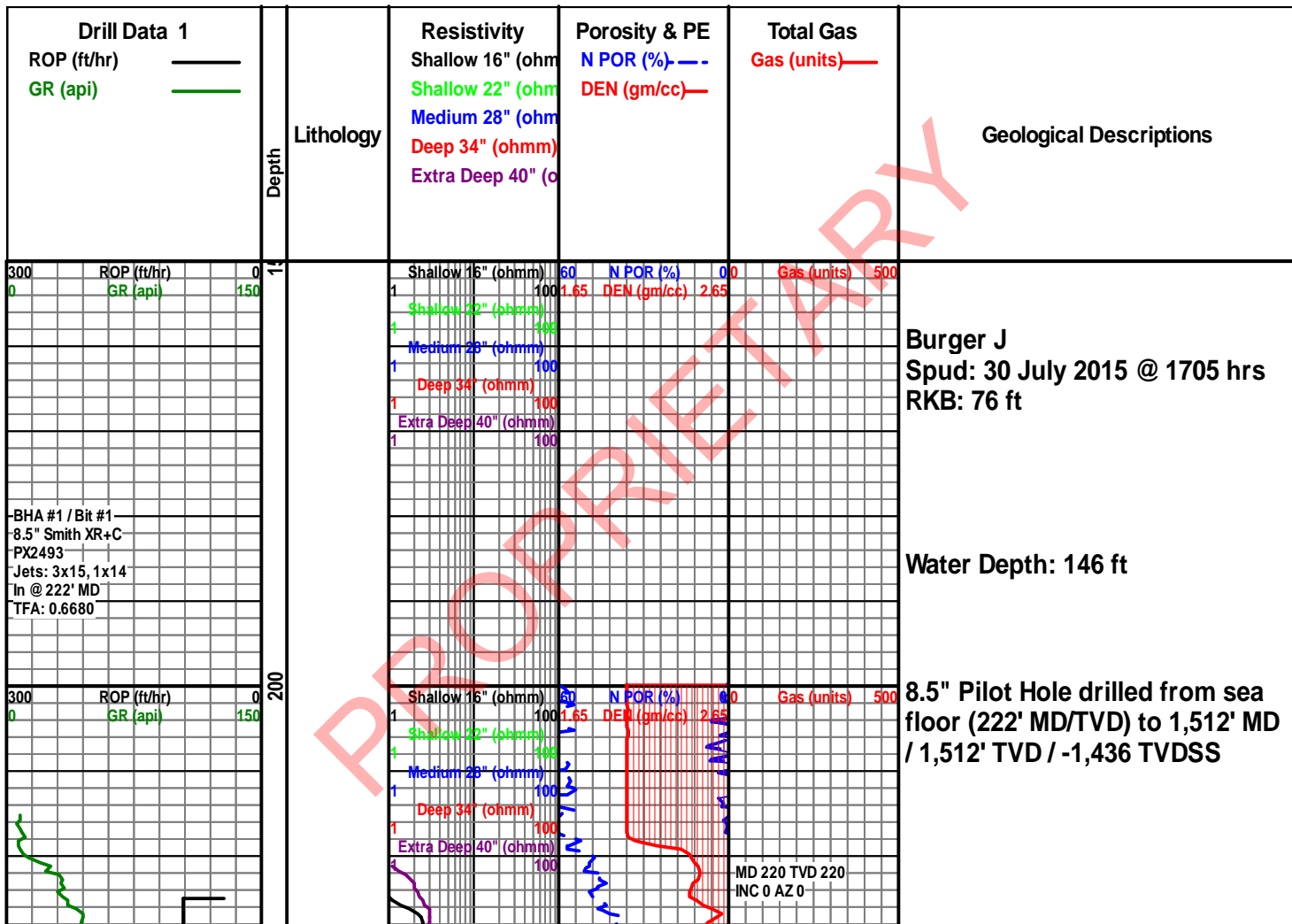
- ROUNDING**
- Rounded
 - Subrnd
 - Subang
 - Angular

- OIL SHOW**
- Even

- Spotted
- Ques
- Dead

- INTERVAL**
- Core
 - Dst

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



BHA #1 Sensor
 distances:
 Gamma: 6.67'
 PWD 9.49'
 Dir: 17.02'
 Sonic: 32.85'
 Res: 59.89'
 Den: 79.17'
 Por: 92.13'
 MRIL/NMR: 109.6'

250

300

350

400

ROP (ft/hr)
 GR (gpm)

Surface to
 2,760' MD
 NANUSHUK

Mud Wt: Sea Water
 (8.57 ppg)

36" Hole opener then drilled
 from sea floor (222' MD/TVD) to
 384' MD/TVD / -308' TVDSS

Mud line cellar bit then drilled
 from sea floor to 257' MD/TVD /
 -181' TVDSS

42" Hole opener then drilled
 from 257' MD /TVD to 393'
 MD/TVD / -317' TVDSS

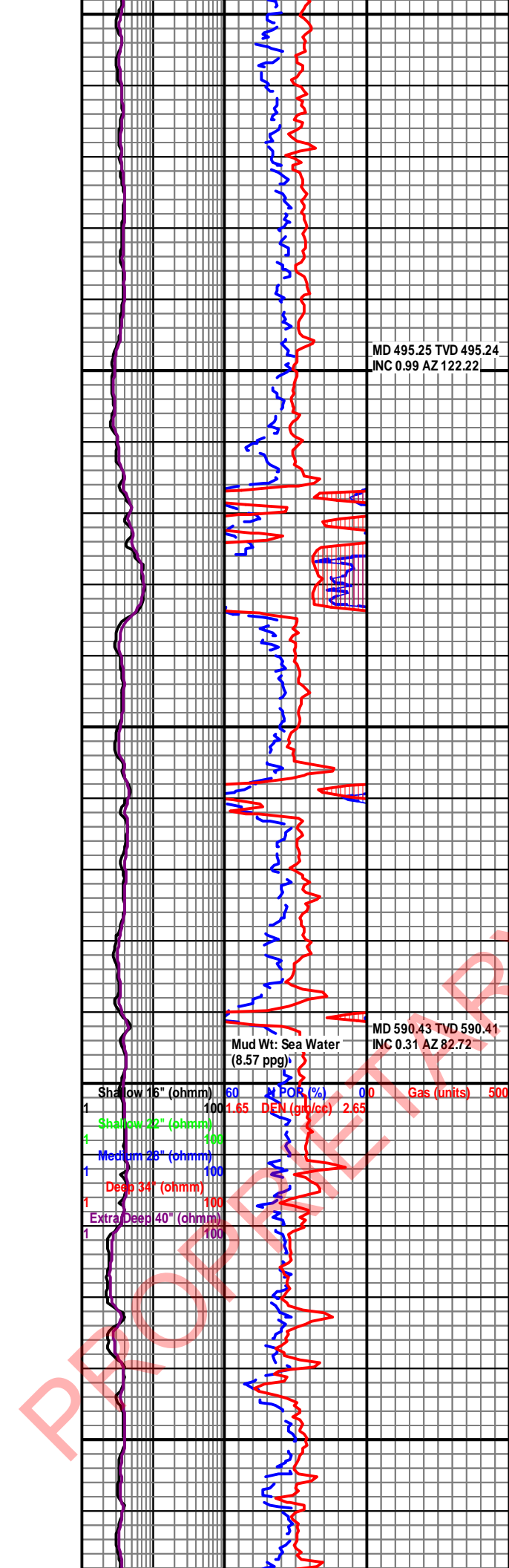
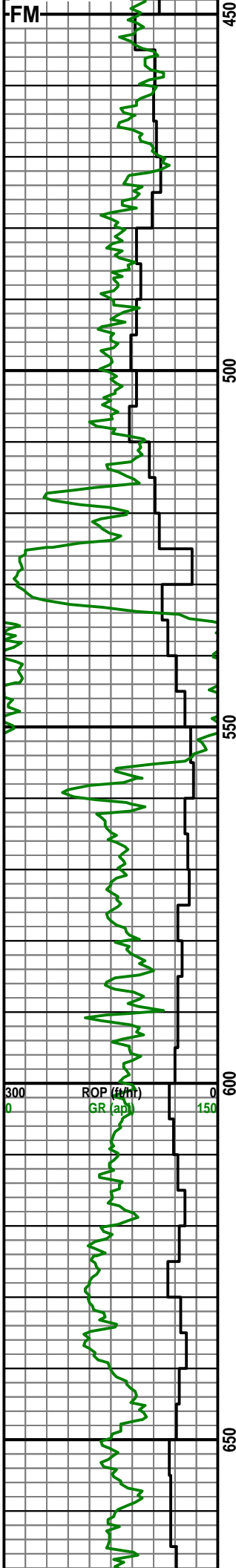
MD 320.88 TVD 320.88
 INC 0.51 AZ 129.6

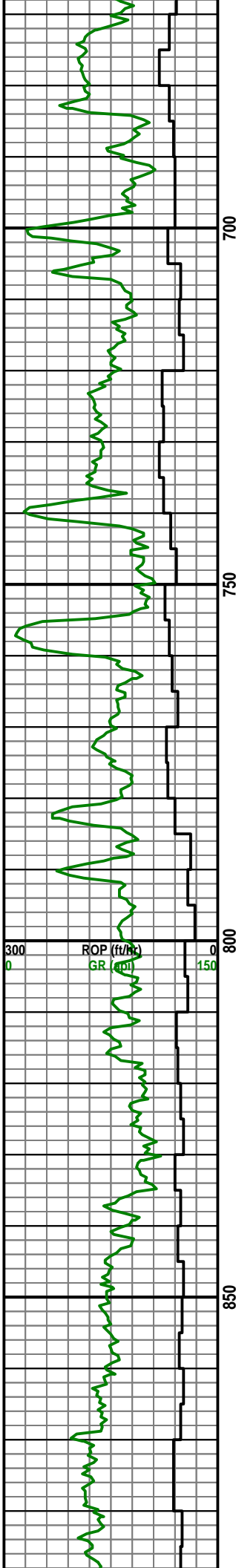
36" Casing/Conductor set at 375'
 MD / 375' TVD / -299' TVDSS

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

Shallow 16" (ohmm)	60	POR (%)	0.0	Gas (units)	500
Shallow 22" (ohmm)	100	WEN (gm/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

MD 406.77 TVD 406.76
 INC 0.31 AZ 89.93



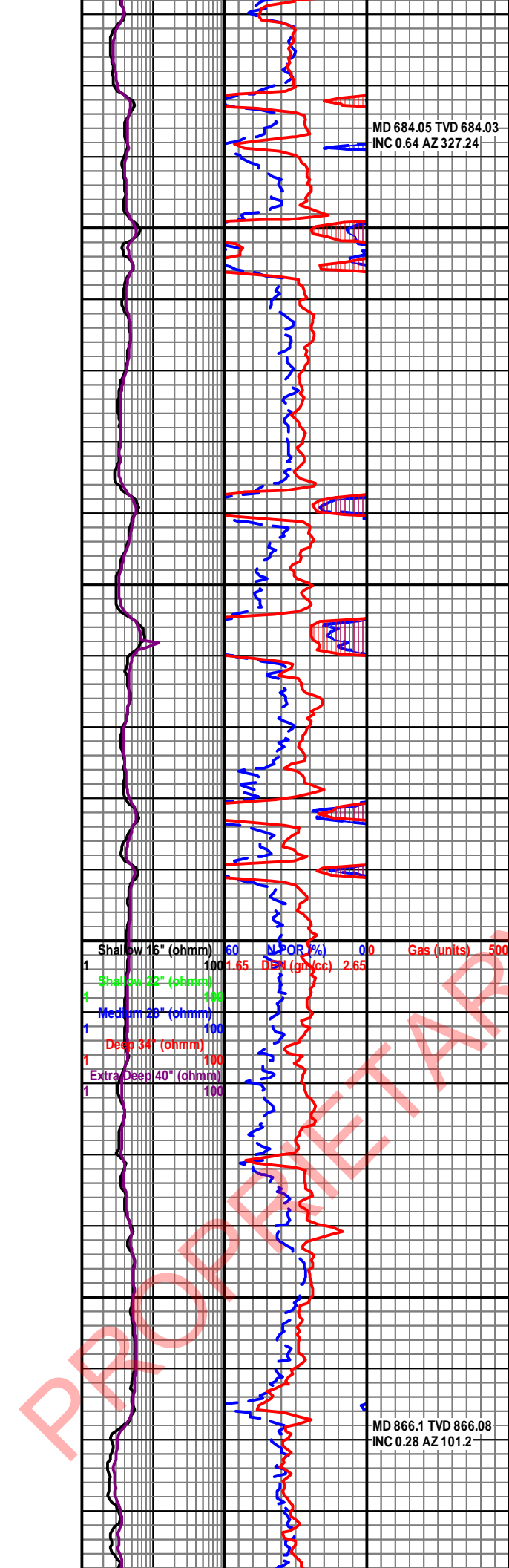


700

750

800

850

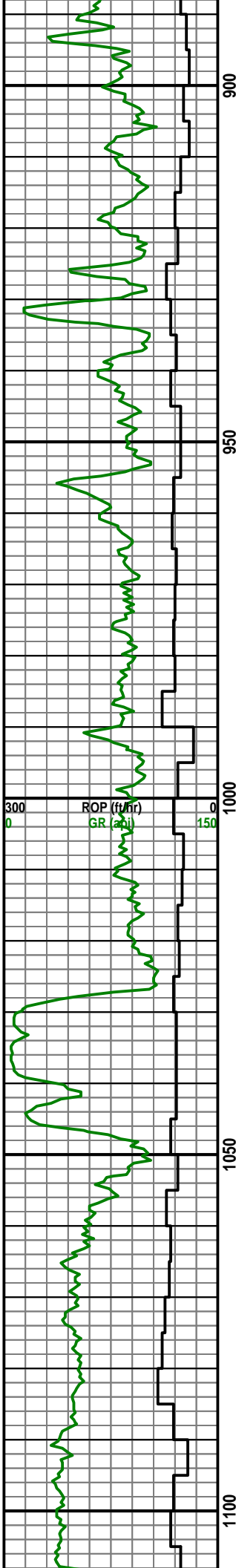


MD 684.05 TVD 684.03
INC 0.64 AZ 327.24

Shallow 16" (ohmm)	60	N POR %	0.0	Gas (units)	500
1	100	1.65	DEW (gm/cc)	2.65	
Shallow 22" (ohmm)	100				
4	100				
Medium 28" (ohmm)	100				
1	100				
Deep 34" (ohmm)	100				
1	100				
Extra Deep 40" (ohmm)	100				
1	100				

MD 866.1 TVD 866.08
INC 0.28 AZ 101.2

PROPERTY



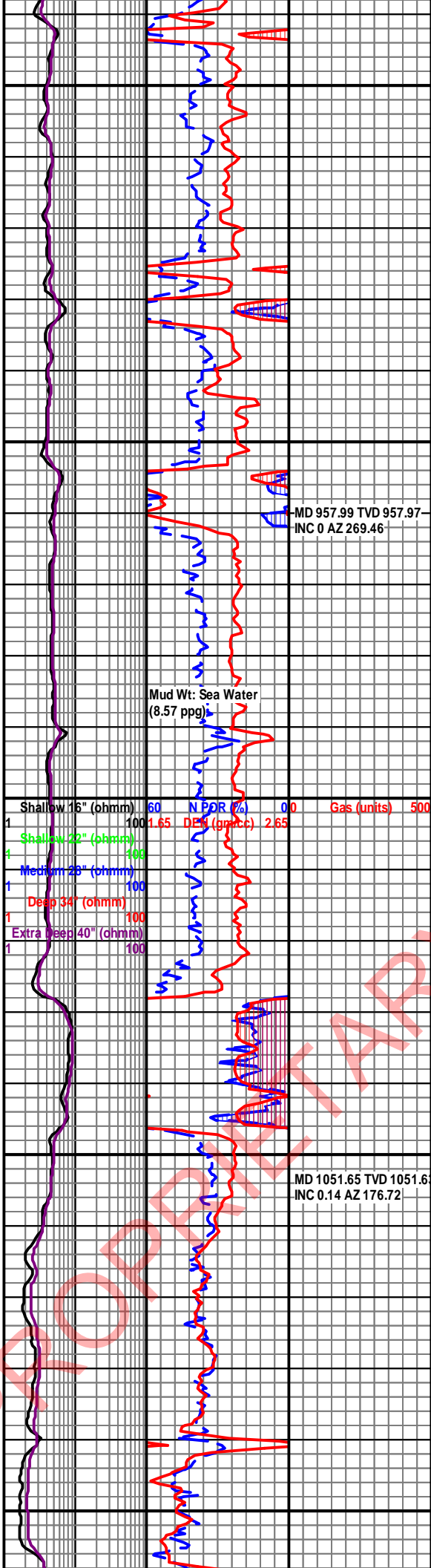
900

950

1000

1050

1100



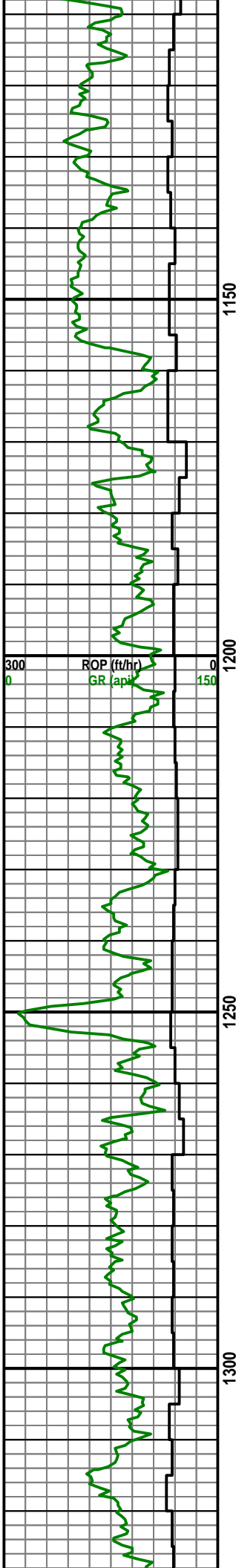
MD 957.99 TVD 957.97
INC 0 AZ 269.46

Mud Wt: Sea Water
(8.57 ppg)

Curve Name	Scale	Value	Curve Name	Scale	Value
Shallow 16" (ohmm)	60	100	N POR (%)	0.0	0.0
Shallow 22" (ohmm)	100	1.65	DEW (ppm-c)	2.65	2.65
Medium 28" (ohmm)	100	100			
Deep 34" (ohmm)	100	100			
Extra Deep 40" (ohmm)	100	100			
			Gas (units)	500	

MD 1051.65 TVD 1051.6
INC 0.14 AZ 176.72

PROPRITARY



1150

1200

1250

1300

MD 1144.54 TVD 1144.54
INC 0.26 AZ 120.65

Shallow 16" (ohmm)	60	ROR (%)	0.0	Gas (units)	500
Shallow 22" (ohmm)	100	DEM (ppm-c)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

MD 1235.66 TVD 1235.66
INC 0.41 AZ 134.11

Mud Wt: Sea Water
(8.57 ppg)

PROPERTY

MD 1328.6 TVD 1328.58
INC 0.51 AZ 59.75

MD 1378.5 TVD 1378.48
INC 0.25 AZ 111.62

MD 1540.18 TVD 1540.1
INC 0.12 AZ 50.83

1350

1400

1450

1500

ROP (ft/hr)
GR (api)

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

Shallow 16" (ohmm)	60	N POR (%)	0	Gas (units)	500
Shallow 22" (ohmm)	100	GR DEN (pp/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

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, fri

1530'-1560' CLYST 100% med gy, stiff-mushy,
cohesive, sft, sm

PROPRIETARY

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

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

1590'-1620' CLYST 100% med gy, Impy-mushy, sl adhesive, ireg cuttings habit, sm, tr coalit, sm, tr coal

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

1650'-1680' CLYST 100% med gy, Impy-mushy, sft, mostly pulverulent, ireg cuttings habit, sm cuttings habit, sm

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

1710'- 1740' No Sample

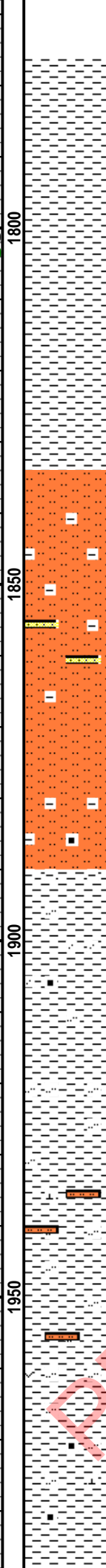
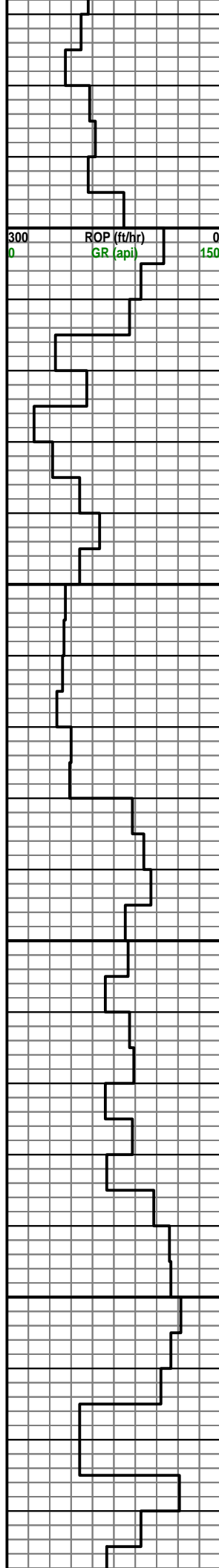
1740'- 1770' No Sample

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

Shallow 16" (ohmm)	60	N POR (%)	0	Gas (units)	500
1	100	1.65	DEN (gm/cc)	2.65	
Shallow 22" (ohmm)	100				
4	100				
Medium 28" (ohmm)	1				
1	100				
Deep 34" (ohmm)	1				
1	100				
Extra Deep 40" (ohmm)	1				
1	100				

MD 1723.74 TVD 1723.7
 INC 0.39 AZ 34.99

PROPRIETARY



Shallow 16" (ohmm)	60	N POR (%)	0	Gas (units)	500
Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

MD 1818.58 TVD 1818.5
INC 0.58 AZ 50.01

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

1800'-1830' CLYST 100% med gy, mushy-malleable, slty, easily fri, com blk

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

1860'-1890' SLTST 95% med gy, easily fri, arg, occlly carb; SS 5% lt gy, l f-u vf, sl calc, w srt

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

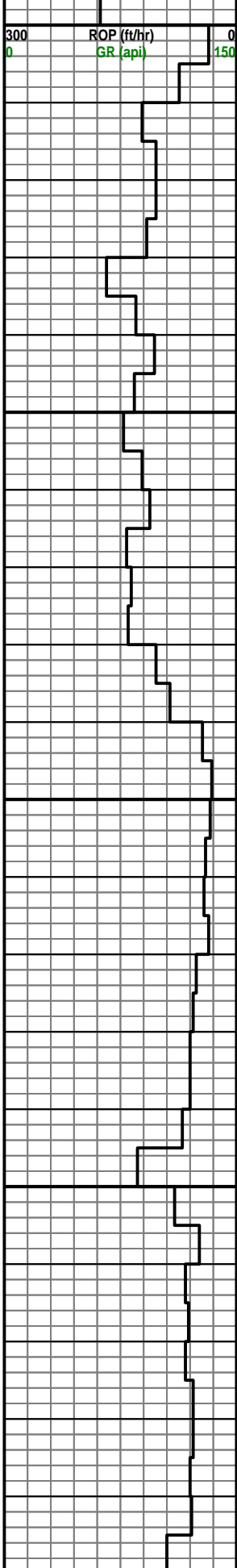
1920'-1950' CLYST 80% lt-med gy, sft frm, blk, sm, non calc; SLTST 20% lt gy, frm, non calc, tr tuff

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

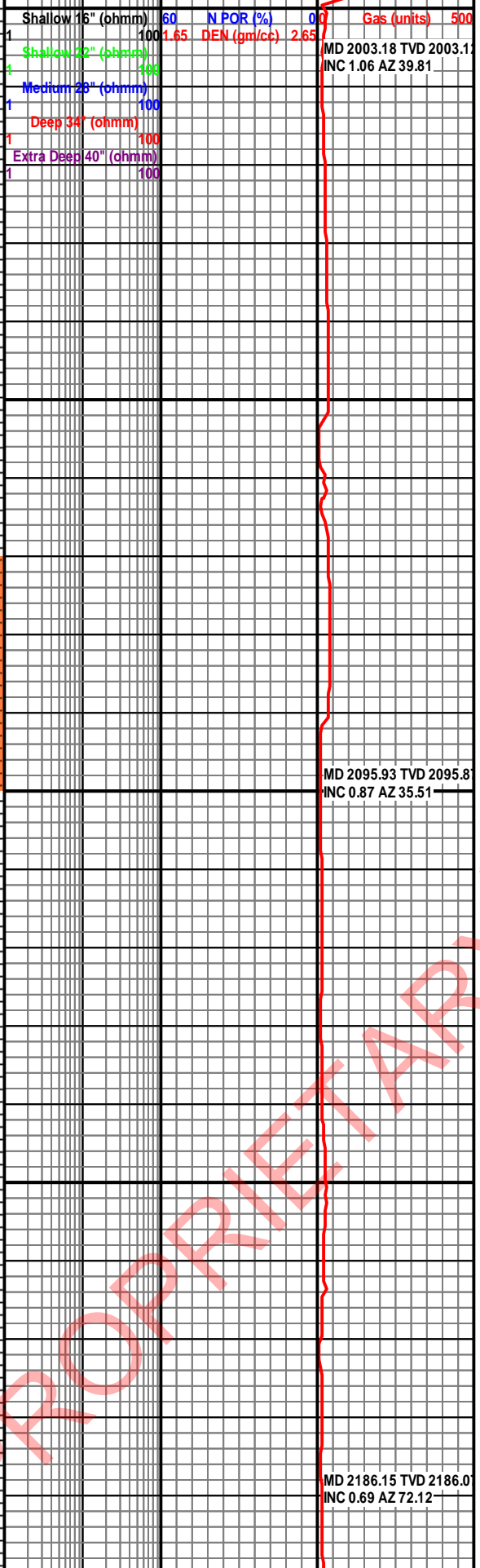
1980'-2010' CLYST 80% med gy, Impy-mushy, sft, easily fri; LS 20% crm-tan-dk gy, grds

PROPRIETARY

sft, easily fri, LS 20% tan-lt dk gy, grds frm-hd, amor-rthy, vf, rr dol, rr cht nodule



2000
2050
2100
2150
2200



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

2040'-2070' CLYST 95% med gy, fri, sft-frm, rthy, carb; LS 5% tan-lt gy, frm-hd, rthy, mudst, vf, rr dol

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

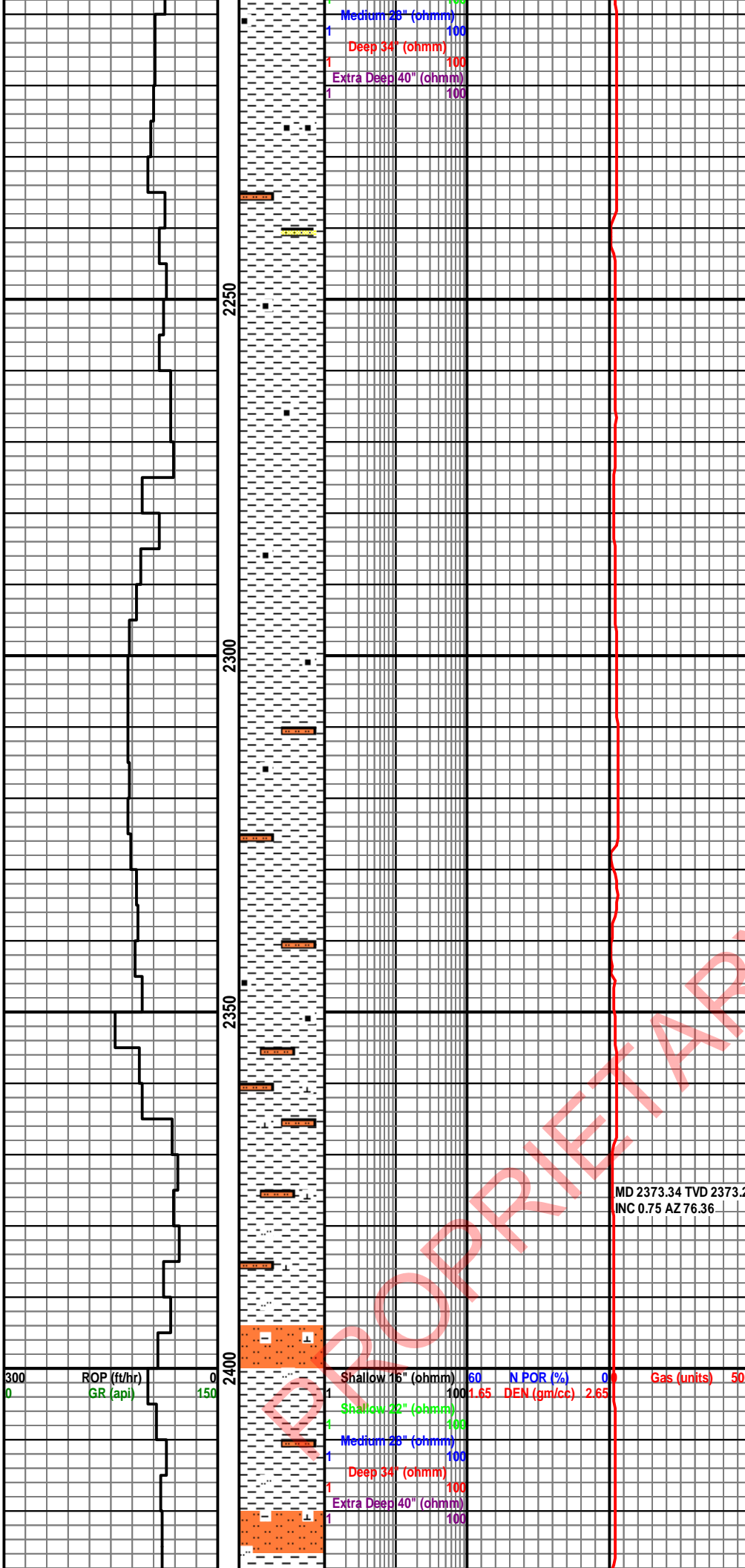
2100'-2130' CLYST 90% lt gy, frm-sft, rthy, slty, rr vf l sd grs, non calc; SLTST 10% lt gy, frm, non calc calc

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

2160'-2190' CLYST 100% lt gy-gy, frm, fragile, blk, sm, sl slty

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

PROPRIETARY



2220'-2250' CLYST 100% lt gy-med gy, frm, blky, slty ip, carb, sl calc, tr vf grn sd

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

2280'-2310' CLYST 100% med gy, frm, blky-plty, sm, incrg slt, carb, non calc

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

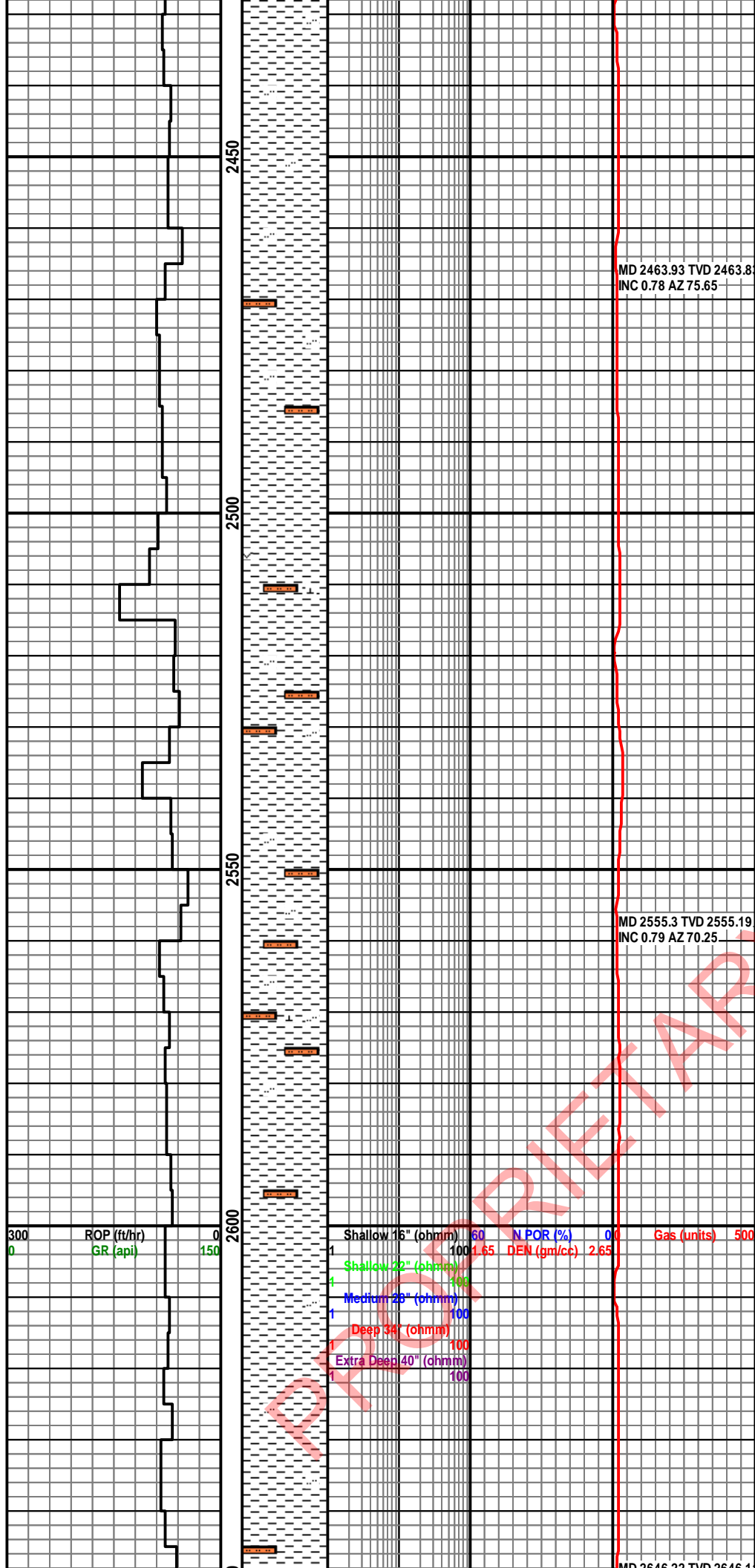
2340'-2370' CLYST 85% med gy, frm, blky, slty, carb, slty; SLTST 15% lt gy, frm, fragile, nodr, tr lsr, tr ls

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

2400'-2430' CLYST 60% med gy-lt gy, fri-frm, blky, slty; SLTST 40% med gy wi tr lt brn, fri, nodr, sl calc mtx

MD 2373.34 TVD 2373.2
INC 0.75 AZ 76.36

300	ROP (ft/hr)	0	Shallow 16" (ohmm)	60	N POR (%)	0	Gas (units)	500
0	GR (api)	150	Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
			Medium 28" (ohmm)	100				
			Deep 34" (ohmm)	100				
			Extra Deep 40" (ohmm)	100				



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

2460'-2490' CLYST 80% med-lt gy, fri-frm, blk-ynodr, PDC bit curling; SLTST 20% lt gy, fri, nodr

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

2520'-2550' CLYST 70% med-lt gy, fri, blk-ynodr, PDC bit curling; SLTST 30% lt gy, fri, nodr, tr sl calc

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

2580'-2610' CLYST 90% med-lt gy, fri, blk-ynodr, occl-ynodr; SLTST 10% lt gy, fri-frm, arg, rr, calc mtx/calc

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

2640'-2670' CLYST 60% med gy, frm-fri, blk-ynodr, occl-ynodr, tr butter curling, rr calc; SLTST ; 40% lt-med gy, slt-ynodr, fri-frm, moderate arg-slty

MD 2463.93 TVD 2463.8
INC 0.78 AZ 75.65

MD 2555.3 TVD 2555.19
INC 0.79 AZ 70.25

MD 2646.22 TVD 2646.1

2450

2500

2550

2600

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

Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
1	100	DEN (gm/cc)	2.65		
Shallow 22" (ohmm)	100				
4	100				
Medium 28" (ohmm)	100				
1	100				
Deep 34" (ohmm)	100				
1	100				
Extra Deep 40" (ohmm)	100				
1	100				

MD 2646.22 TVD 2646.1
INC 0.79 AZ 76.51

40% lt-med gy, slt-vf, fr-fri, moderate arg-sly
cmtsly cmt

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

2700'-2730' CLYST 100% med-lt gy, fri, pulverulent-blky, occlly slty wi vf qtz grs imbd grs imbd

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

MD 2743.03 TVD 2742.9
INC 0.7 AZ 74.08

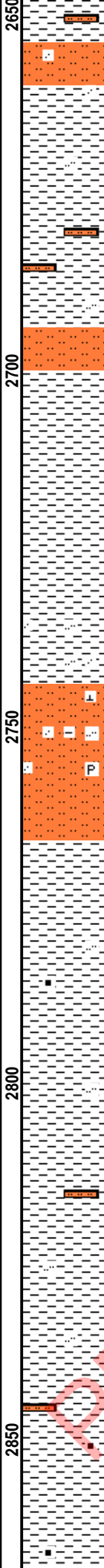
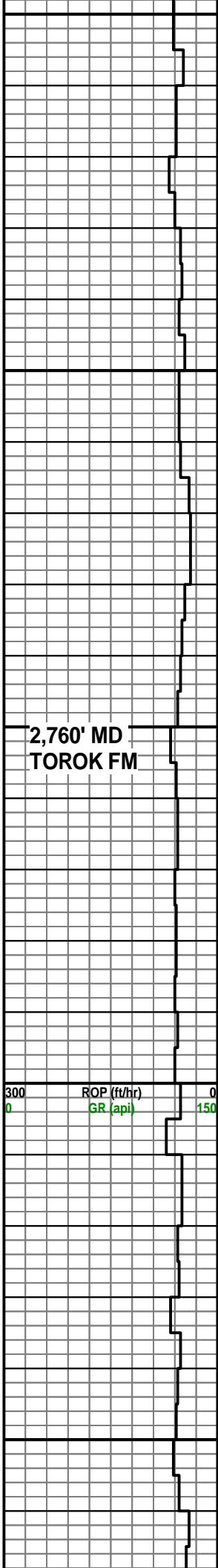
2760'-2790' CLYST 100% med gy, frm-easily fri, blk, nodr, occlly slty, tr carb flecks;rb flecks

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

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

MD 2837.42 TVD 2837.2
INC 0.74 AZ 67.59

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



Depth (ft)	Shallow 16" (ohmm)	N POR (%)	DEN (gm/cc)	Gas (units)
2650	60	0%	2.65	500
2670	100	1.65	2.65	
2690	100			
2710	100			
2730	100			
2750	100			
2770	100			
2790	100			
2810	100			
2830	100			
2850	100			

2,760' MD
TOROK FM

PROPERTY

MD 2875.38 TVD 2875.2
INC 0.64 AZ 69.95

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

2900

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

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

2950

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

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

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

MD 2978.31 TVD 2978.1
INC 0.74 AZ 64.69

3000

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

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

Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

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

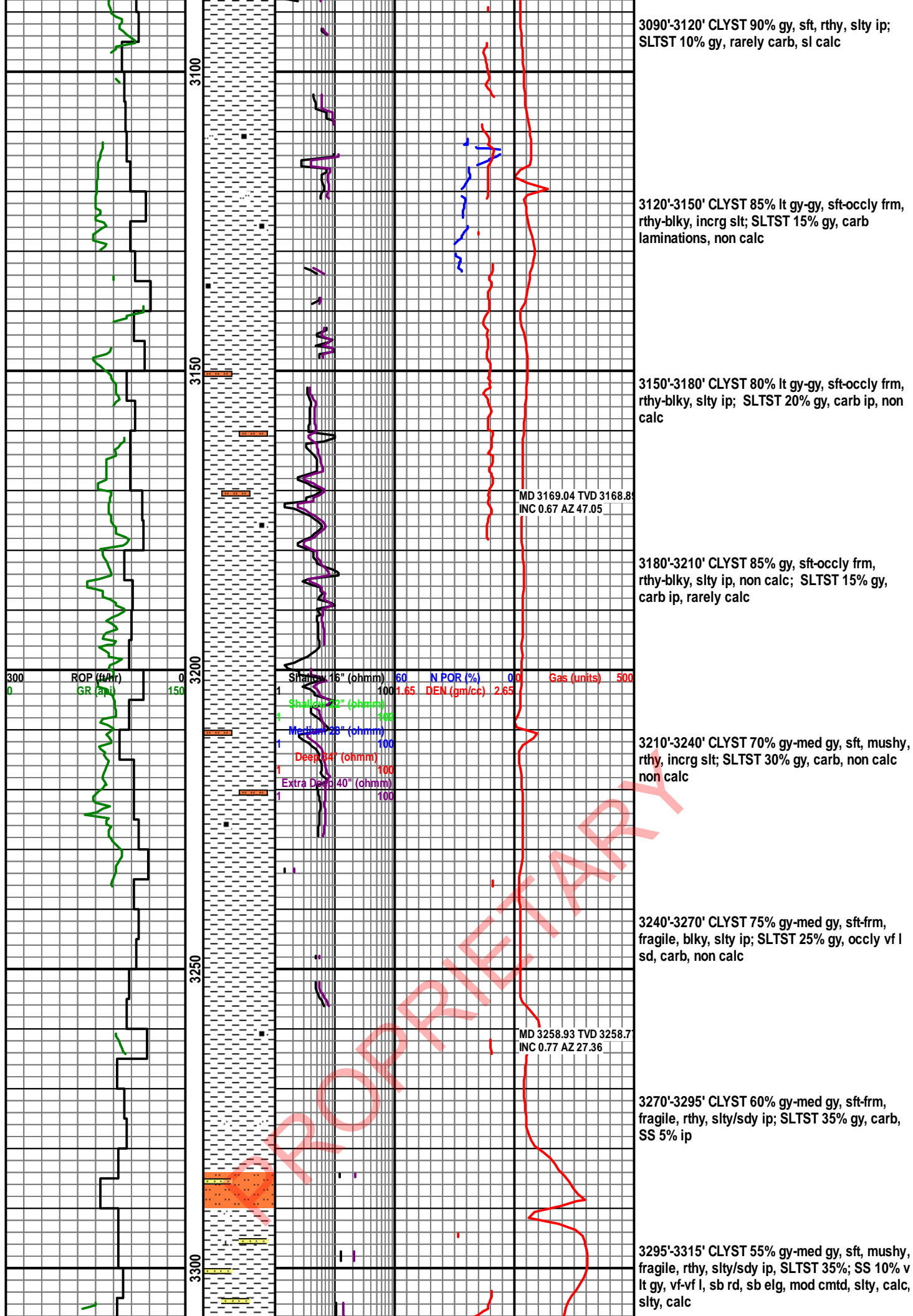
3030'-3060' CLYST 95% gy, sft-easily fri, mushy, tr slty, sl calc; SLTST 5% gy, slt-l vf, calc

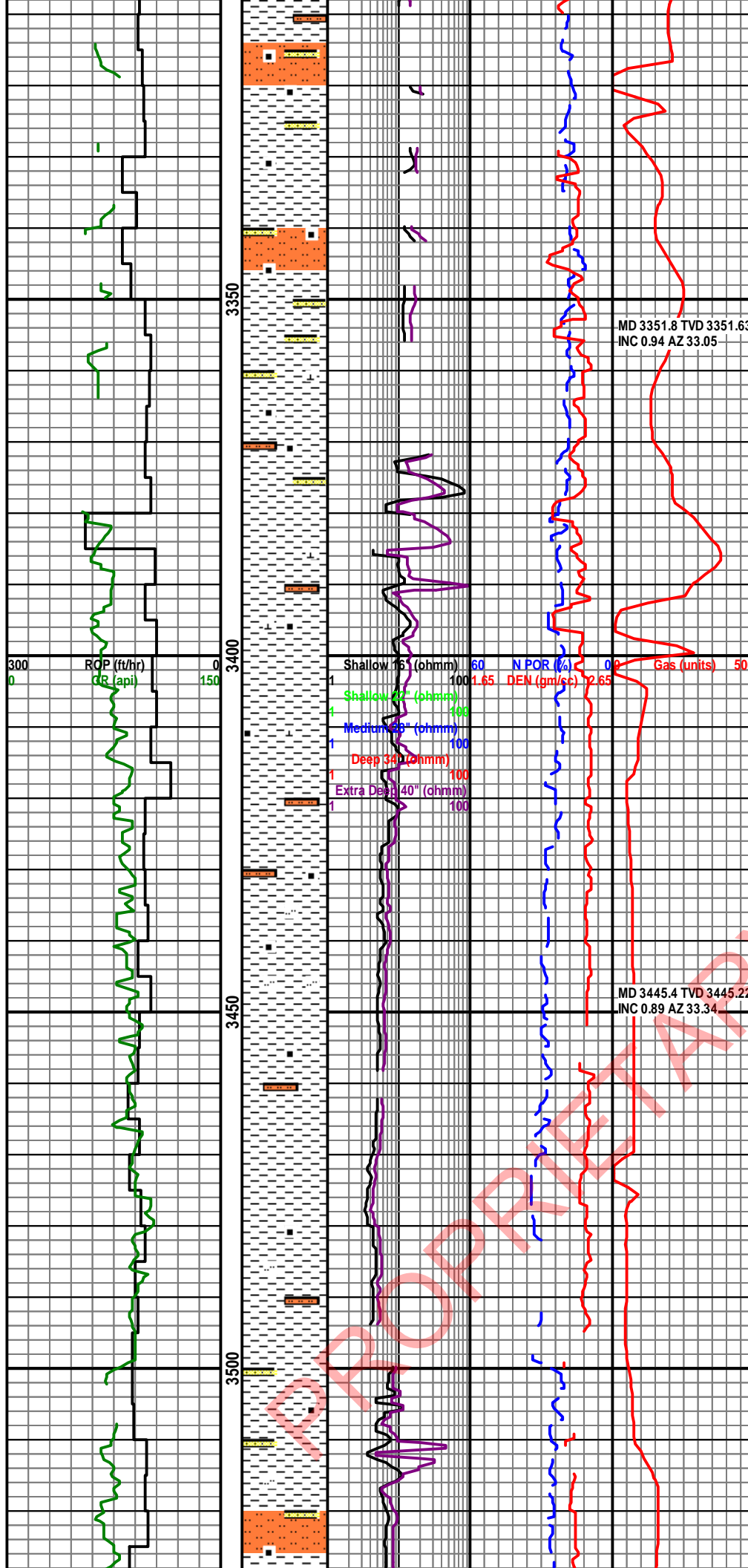
3050

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

MD 3074.55 TVD 3074.4
INC 0.58 AZ 52.33

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'





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

3330'-3360' CLYST 35% gy-med gy, sft, fragile; SLTST 40% lt gy-gy; SS 25% v lt gy, vfg, sb rd-sb ang, sb elg, mod cmt, slty, sl calc sl 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

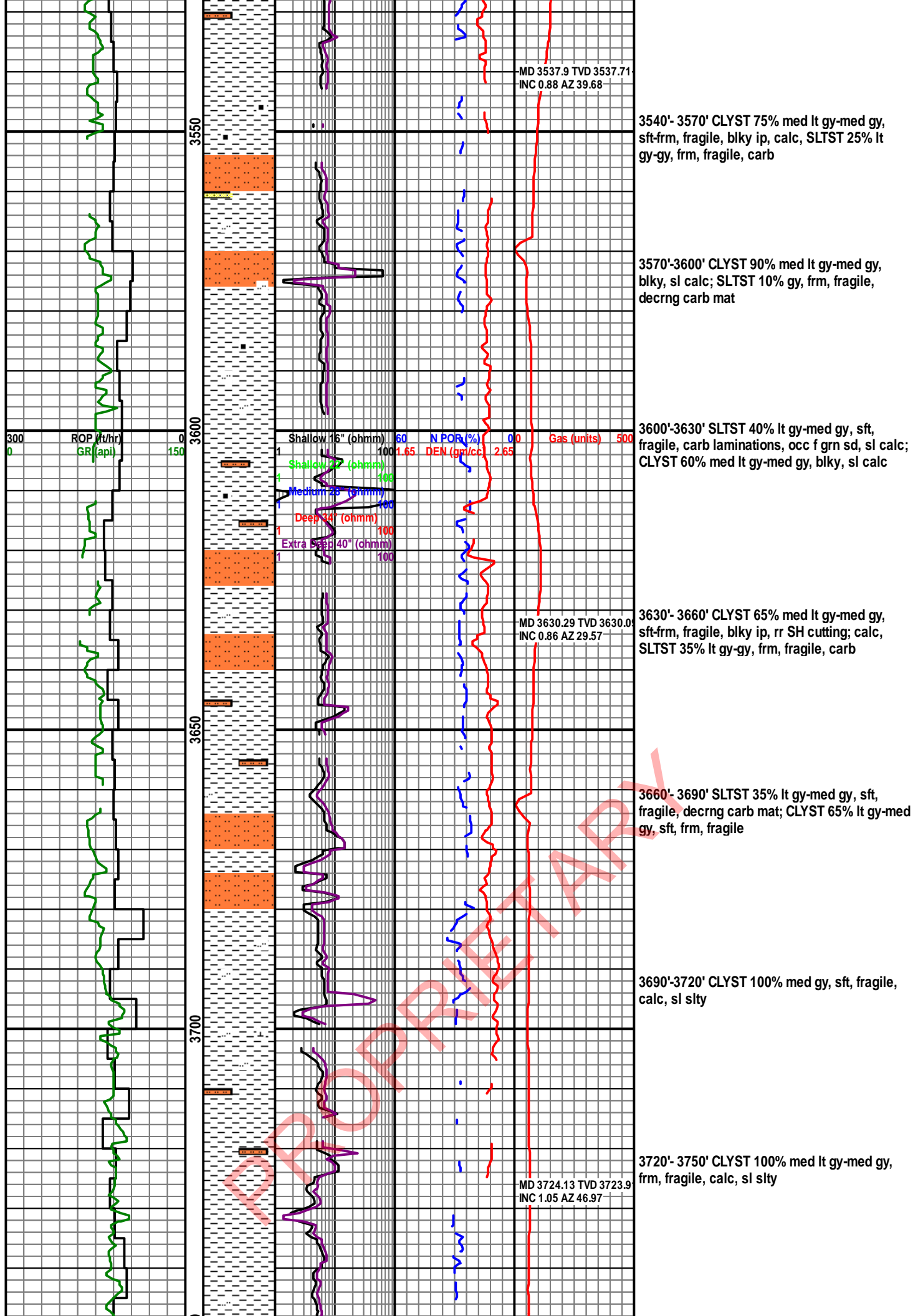
3390'-3420' CLYST 40% med gy, sft-occlly frm, fragile; SLTST 30% gy, carb; SS 30% lt gy-gy, vfg, sb rd-sb ang, sb elg, mod-g calc cmt

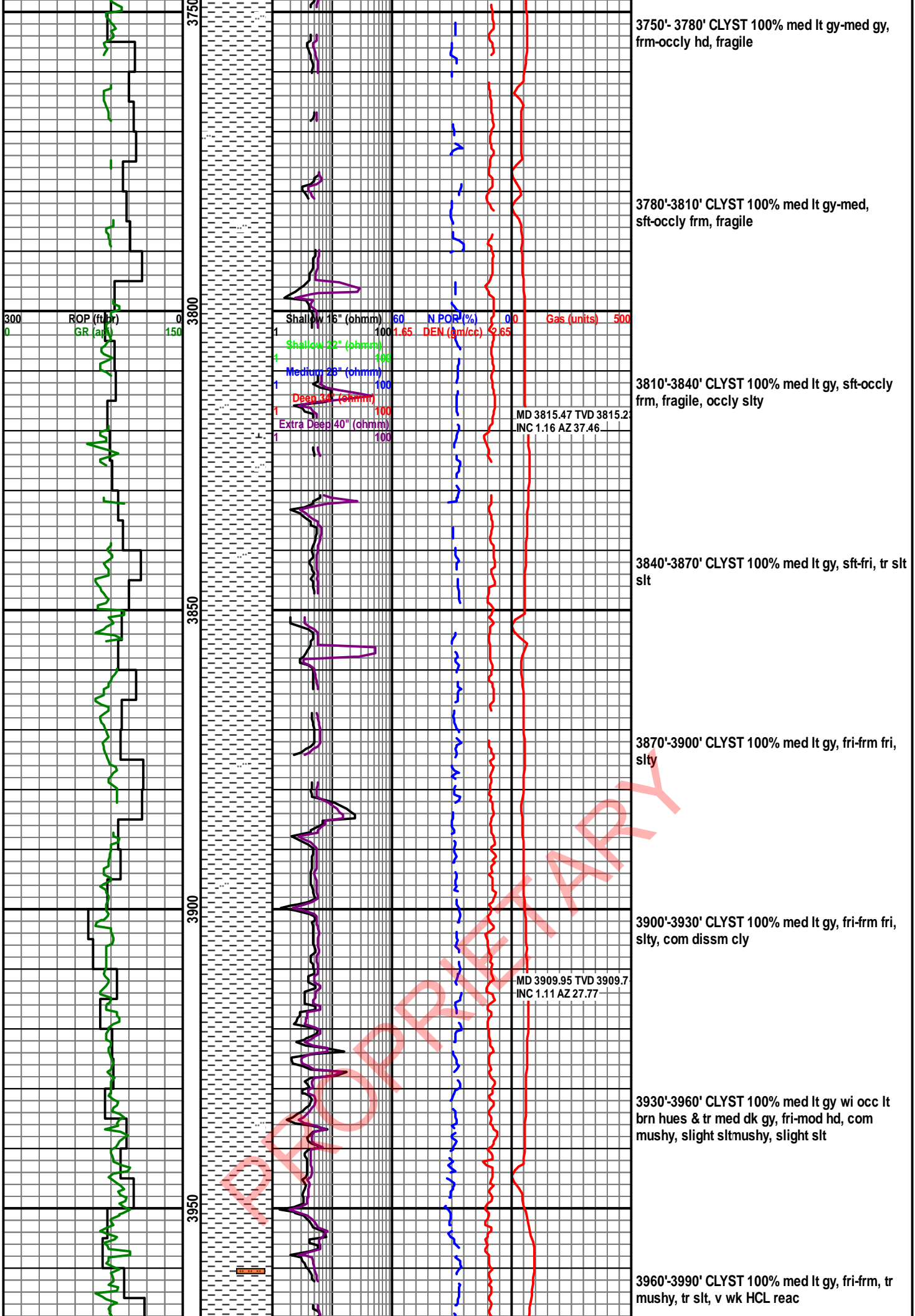
3420'-3450' CLYST 60% gy-med gy, sft-occlly frm, mushy, fragile, SLTST 40% gy, carb, rr vf grn sd

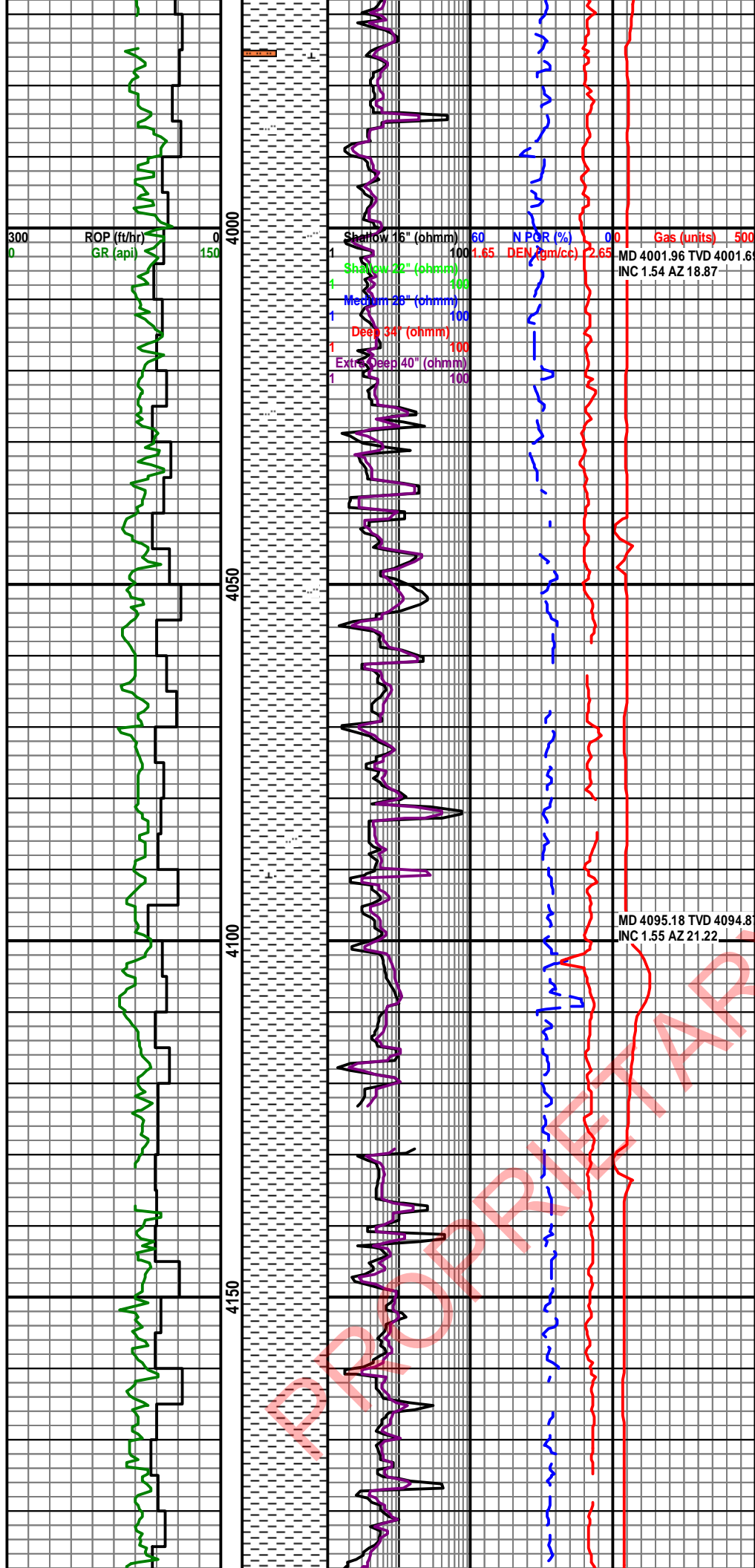
3450'-3480' CLYST 85% gy, sft, fragile, sl fis, non calc, slty; SLTST 15% gy, frm, fragile, carb, sl calc

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

3510'-3540' CLYST 80% med lt gy-med gy, sft, fragile, mushy, occlly frm, non calc; SLTST 10% gy, frm, fragile, carb, sl calc; SS 10% v lt gy-lt gy, vf grn, sb ang, w srt, calc cmt, carb







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

4020'-4050' CLYST 100% med lt gy wi com lt brn hues & tr hd med dk gy frags, sft-fri wi tr mod hd sltst, tr mushy-dissm

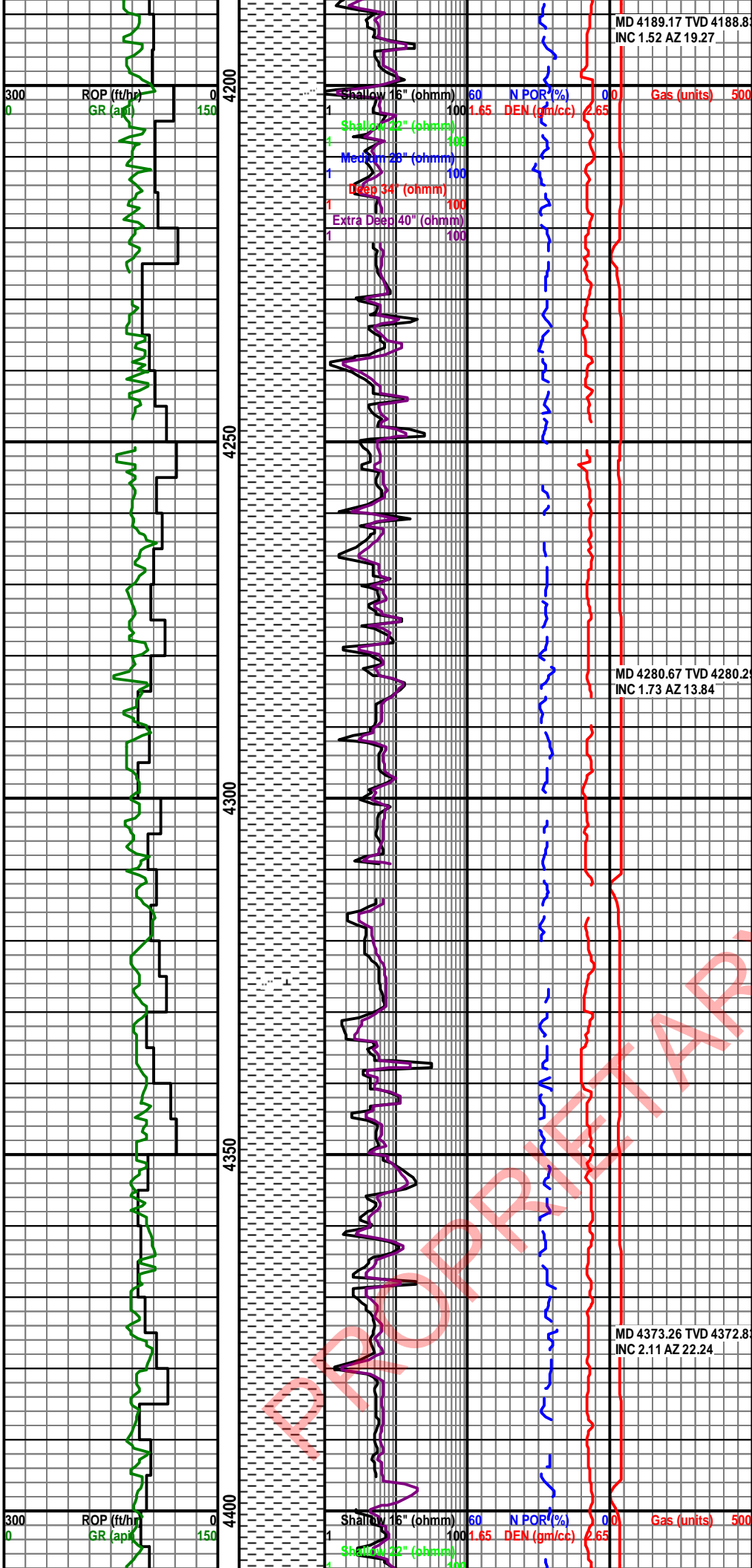
4050'-4080' CLYST 100% med gy wi dissmt brn cly, sft-easily fri, blk-y-tab, tr slt

4080'-4110' CLYST 100% med gy, mushy, sft-easily fri, tr PDC cuttings habit, rr calc 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 dissmt 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

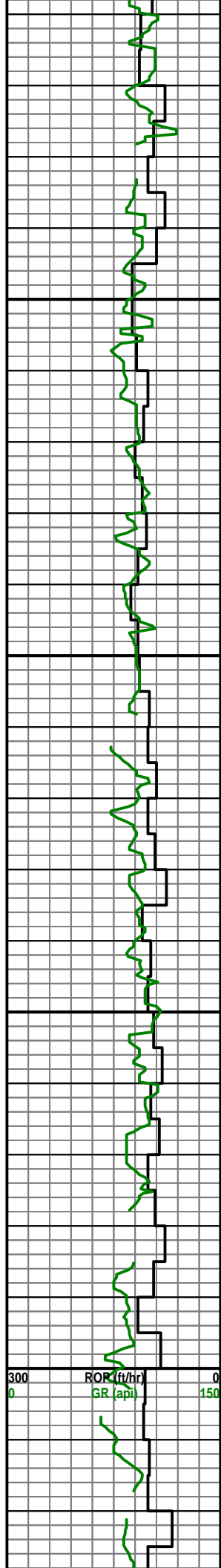
4260'-4290' CLYST 100% med gy, sft-frm fri, blk, tr PDC cuttings habit, sl slty

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

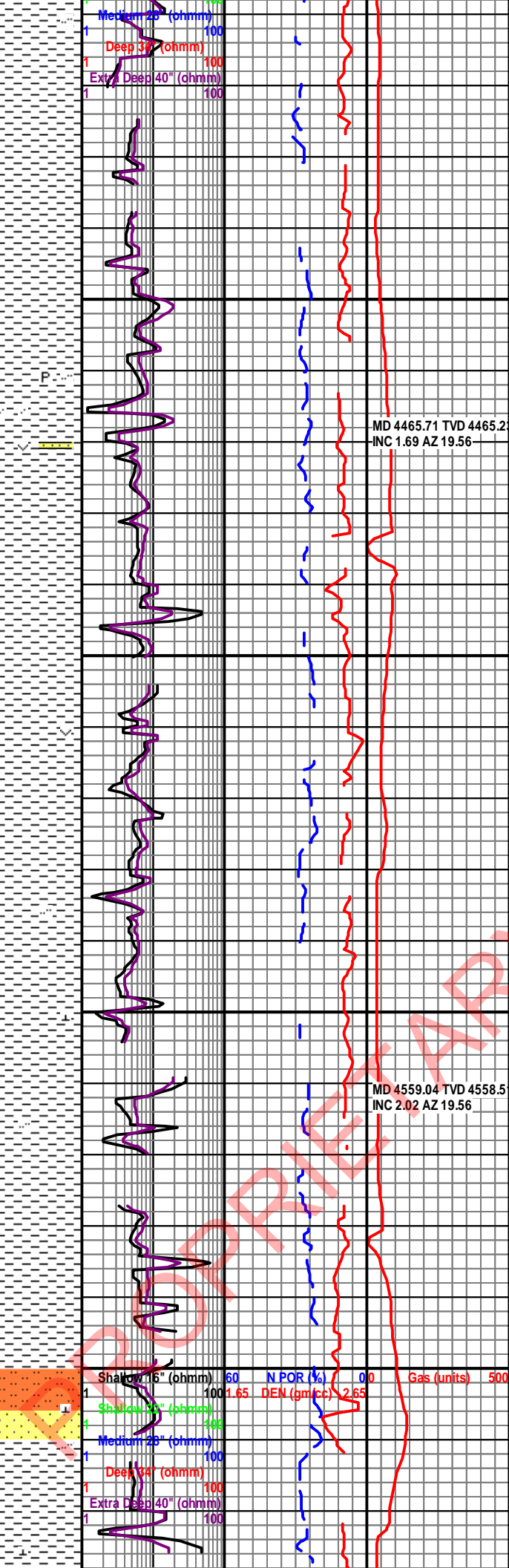
4320'-4350' CLYST 100% med gy, blk-amor, sft-easily fri, fr amt PDC cuttings habit

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

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



4450
4500
4550
4600



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

4440'- 4470' CLYST 100% med dk gy, sft-fri, abnt PDC cuttings, blk, 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

MD 4465.71 TVD 4465.2
INC 1.69 AZ 19.56

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

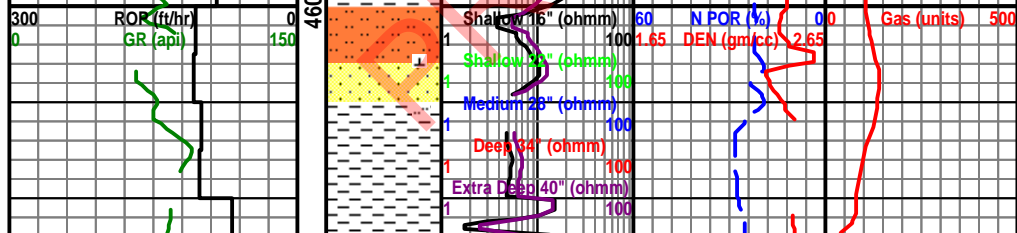
4500'- 4530' CLYST 100% med dk gy, sft-fri, com PDC cuttings, blk, tr small ss frags, vf, calc cmt, no flor

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

MD 4559.04 TVD 4558.5
INC 2.02 AZ 19.56

4560'-4590' CLYST 100% med dk gy, sft-fri, com PDC cuttings, blk, tr sltst wi wk wk reac-HCL

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



4620'- 4650' CLYST 100% med gy, sft-fri, com

PDC cuttings, blk, tr vf calc ss wi no flor

4650

MD 4651.17 TVD 4650.5
INC 2.19 AZ 23.91

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

4700

4680'-4710' CLYST 100% med gy, sft-fri, com
PDC cuttings, blk, rr vf calc ss wi no flor

4750

MD 4743.27 TVD 4742.5
INC 2.64 AZ 25.07

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

4740'-4770' CLYST 95% med lt gy-med gy,
sft-fri, occlly frm, com PDC cuttings, blk, non
calc; SLTST 5% lt gy-med gy, carb mat scat,
calc cmt

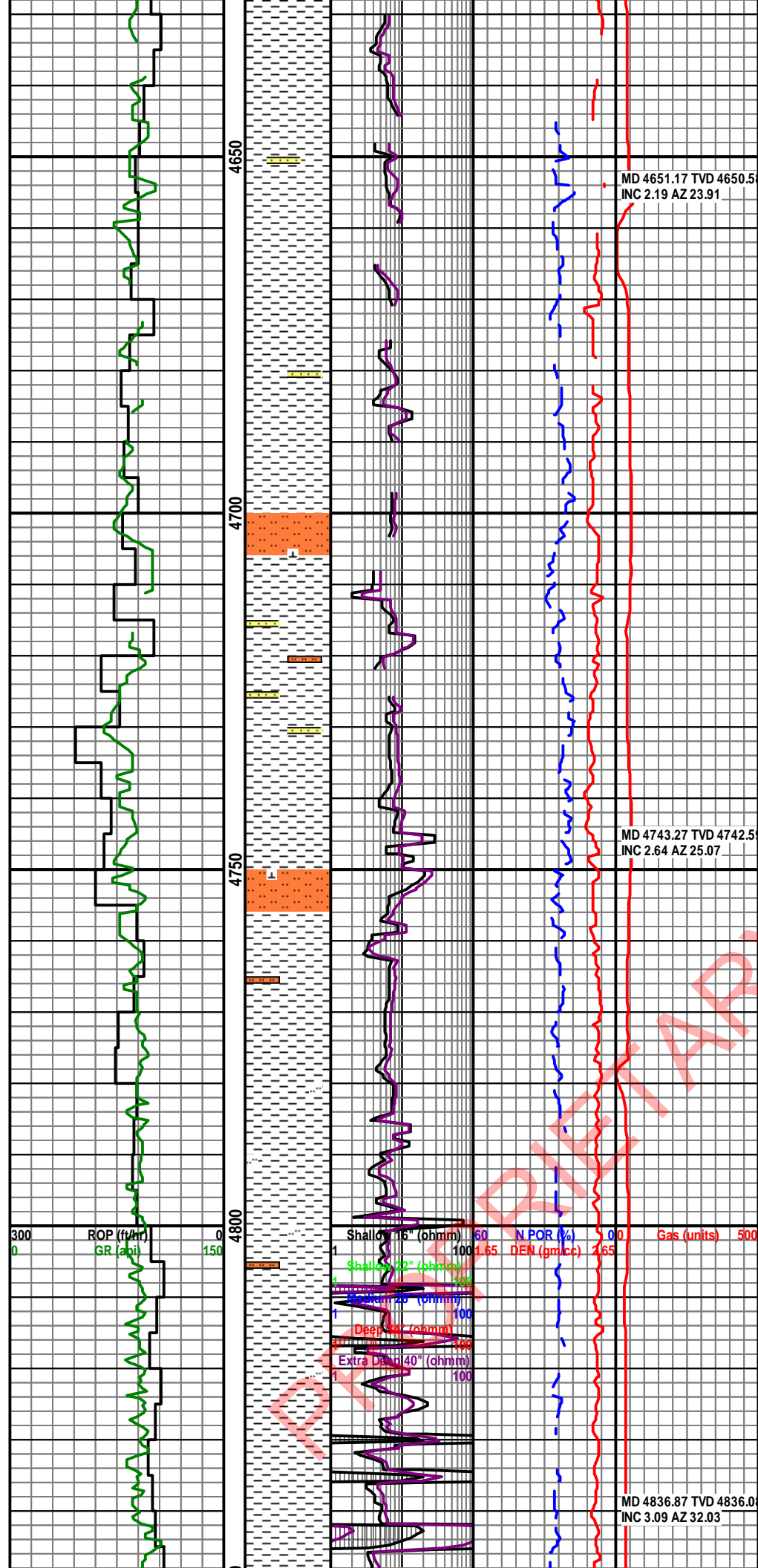
4800

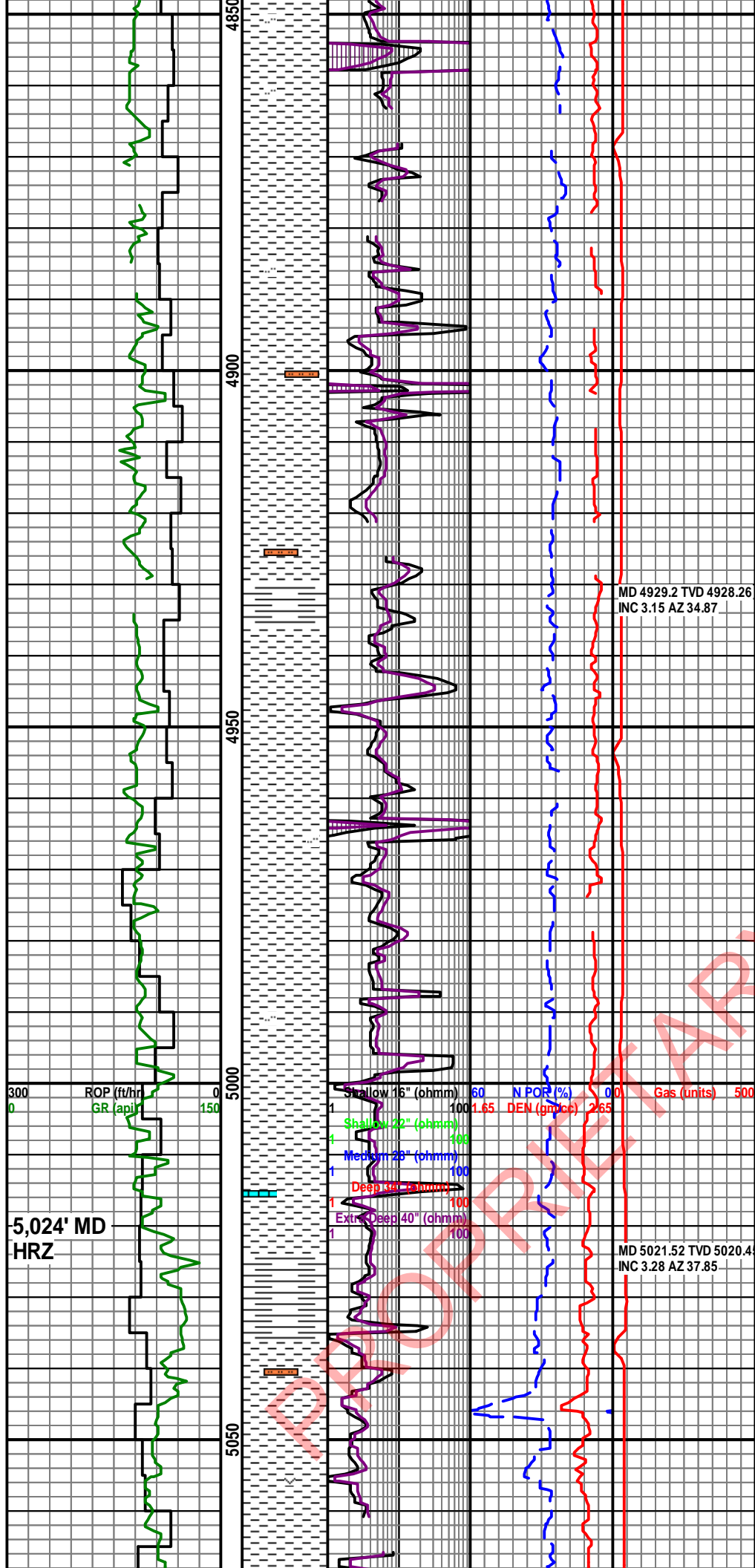
MD 4836.87 TVD 4836.0
INC 3.09 AZ 32.03

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

4800'-4830' CLYST 100% med gy, sft-fri, frm,
blk-rthy, non calc, sl slty

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 slt

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

MD 4929.2 TVD 4928.26
INC 3.15 AZ 34.87

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

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

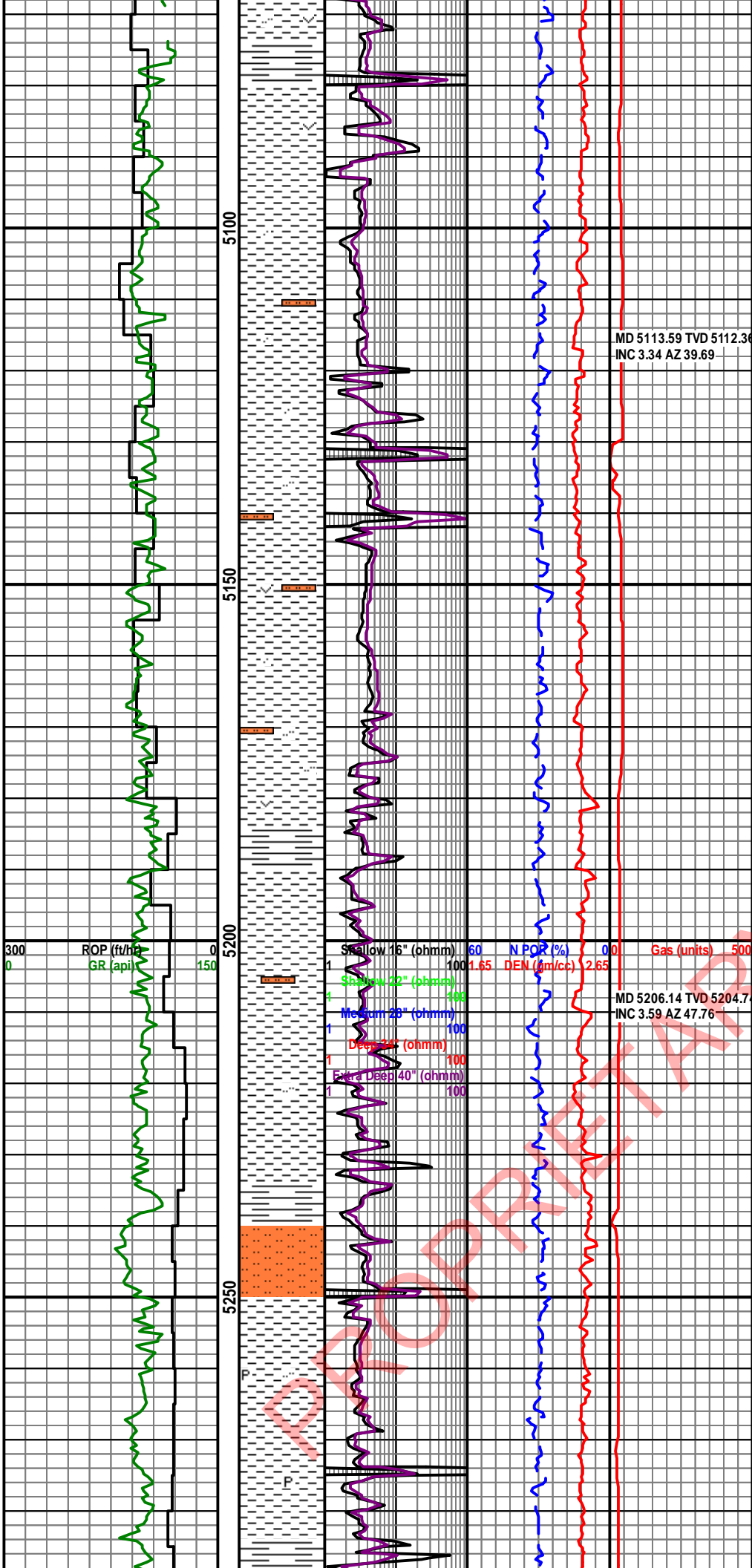
Shallow 16" (ohmm) 60 N POR (%) 0.0 Gas (units) 500
1 100 1.65 DEN (gm/cc) 2.65
Shallow 22" (ohmm) 100
4 100
Medium 28" (ohmm) 100
1 100
Deep 34" (ohmm) 100
1 100
Extra Deep 40" (ohmm) 100
1 100

5,024' MD
HRZ

MD 5021.52 TVD 5020.4
INC 3.28 AZ 37.85

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%

5040'-5070' CLYST 75% med lt gy-med dk gy, frm, fragile, crumbly, non calc, slty ip; SH 20% med dk gy, ply fis, non calc; TUFF 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%

5100'- 5130' CLYST 90% med dk gy-dk gy, sft-frm, fragile, crumbly, tr tuff; SLTST 10% med gy, tr sd

MD 5113.59 TVD 5112.36
INC 3.34 AZ 39.69

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

5160'-5190' CLYST 100% med dk gy-dk gy, sft-frm, mushy, brit in places, slty ip

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

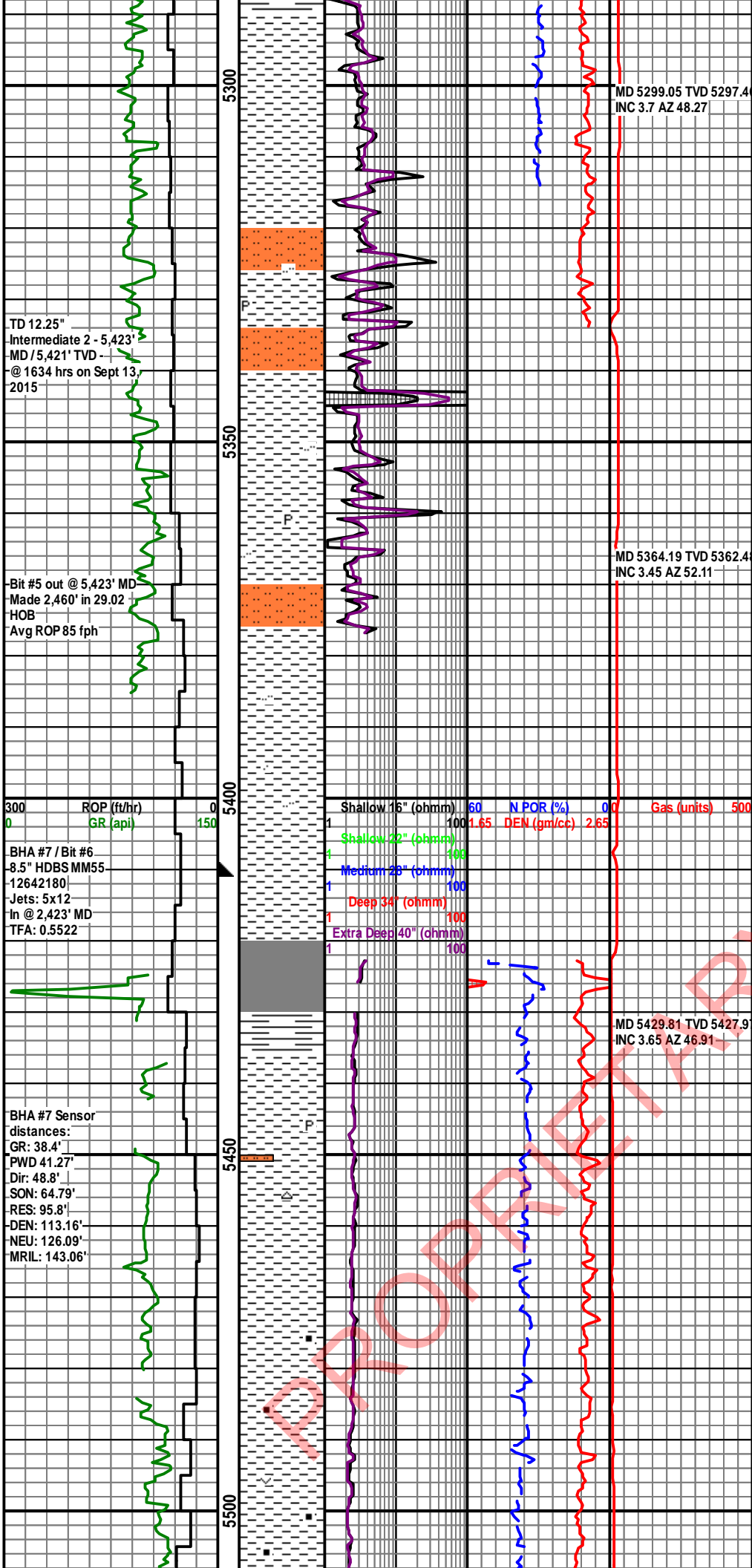
MD 5206.14 TVD 5204.7
INC 3.59 AZ 47.76

5220'-5250' CLYST 80% med gy-med dk gy wi brn hue, sft-frm, slty ip, rr sd, med l gr; SH 20% dk gy-blk, hd, brit, sb fis 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

5280'-5310' CLYST 80% med gy wi brn hue, sft-frm, fragile, rr pyr, incrg slt, rr sd grs; SH 20% dk gy, hd, brit, sb fis-fis

Log Type	Value	Log Type	Value	Log Type	Value
Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				



TD 12.25"
 Intermediate 2 - 5,423'
 MD / 5,421' TVD -
 @ 1634 hrs on Sept 13,
 2015

Bit #5 out @ 5,423' MD
 Made 2,460' in 29.02
 HOB
 Avg ROP 85 fph

ROP (ft/hr)
 GR (api)

BHA #7 / Bit #6
 8.5" HDBS MM55
 12642180
 Jets: 5x12
 In @ 2,423' MD
 TFA: 0.5522

BHA #7 Sensor
 distances:
 GR: 38.4'
 PWD 41.27'
 Dir: 48.8'
 SON: 64.79'
 RES: 95.8'
 DEN: 113.16'
 NEU: 126.09'
 MRIL: 143.06'

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

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

5340'-5370' CLYST 100% med gy wi brn hue, sft, fragile, mushy, slty ip, ls present

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

Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
1	100	1.65	DEN (gm/cc)	2.65	
Shallow 22" (ohmm)	100				
4	100				
Medium 28" (ohmm)	100				
1	100				
Deep 34" (ohmm)	100				
1	100				
Extra Deep 40" (ohmm)	100				
1	100				

5400'-5423' CLYST 100% med lt gy wi brn hue, sft, fragile, slty ip, pyr, tr ls, rr f l sd grnd grn

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

5460'-5490' CLYST 85% med lt gy-med gy, sft, fragile, rr cht, slty ip, occ calc tuff; SH 15% med gy-med dk gy, hd, brit, rthy, 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

**5,539' MD
PEBBLE
SHALE**

MD 5518.31 TVD 5516.2
INC 3.73 AZ 45.18

5520'-5550' SLTST 60% med gy wi brownish hue, occ pyr, incrg thn carb laminations, tr tuff ip, v lt gy sd, grds from slt-vf-med l grn sz, sb rd, p-moderate srtg; CLYST 30% med gy, sft, fragile; SH 10% med gy-med dk gy

5550

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

5600

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

Shallow 16" (ohmm)	60	POR (%)	0.4	Gas (units)	500
Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
Shallow 28" (ohmm)	100				
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

MD 5612.7 TVD 5610.48
INC 3.58 AZ 42.26

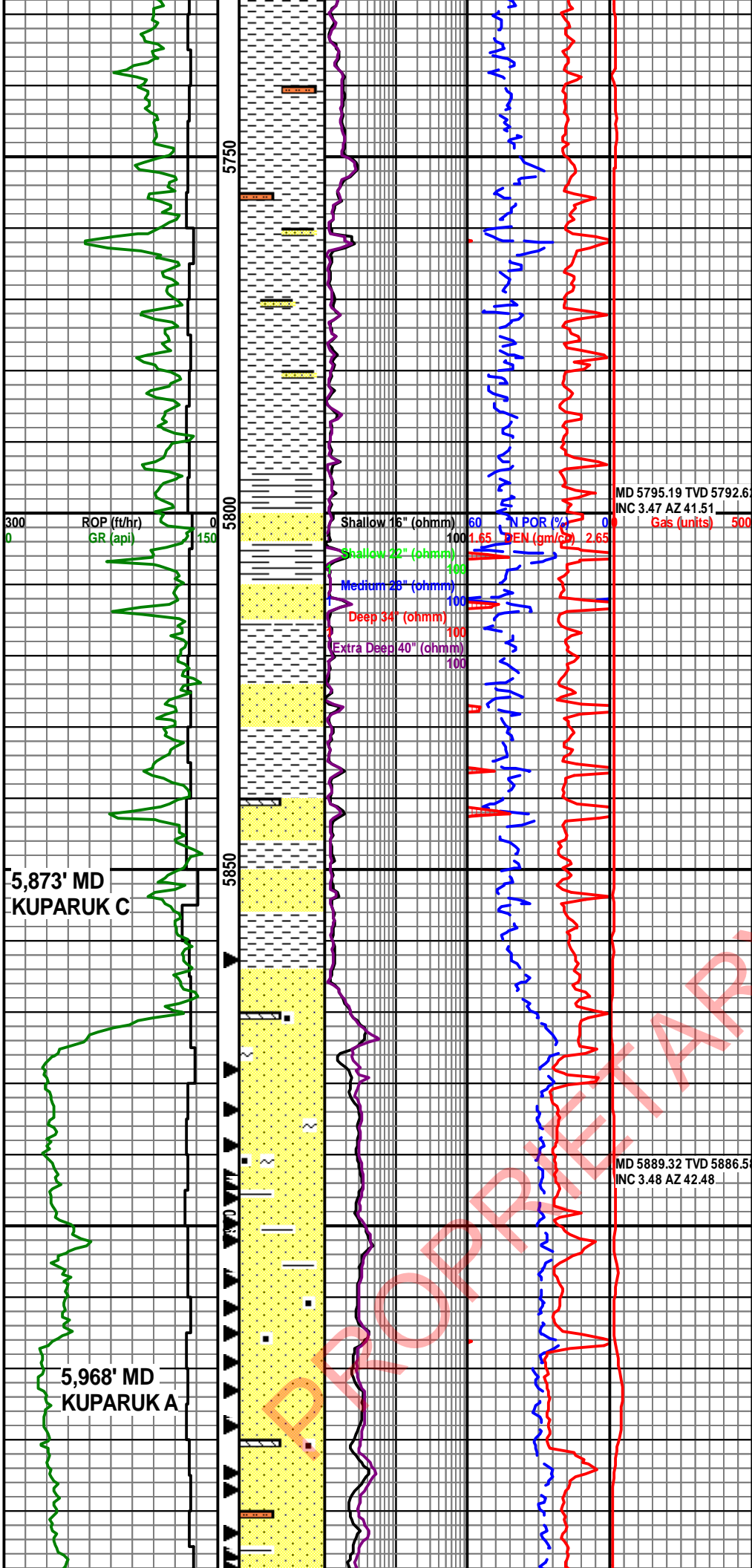
5640'-5670' CLYST 95% med gy-med dk gy wi com brownish hues, frm-hd, moderate-w ind, blk-elongated, occlly slty, tr pyr; SS 5% lt gy wi trns-tnsp, vf wi tr fltg med grs, sb round-sb ang, p srtg, calc cmt

5650

5700

MD 5704.09 TVD 5701.7
INC 3.56 AZ 42.97

5700'-5730' SLTST 60% med gy wi brownish hue, frm-fri, occlly 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, grd-g-vf sd, arg mtx; CLYST 40% med dk gy wi brownish hues, frm-fri, occlly grd-g-slty; SS 10% trnsl-trnsp-lt gy hues, uncons, disaggregated, vf-u med, ply srt, sb round-round

5790'-5820' SH 70% dk gy, fri-mod hd, flky-splt; CLYST 20% med gy, sft-fri, hydrated, rd-amor, occlly mushy; SLTST 10% lt gy, fri, tr lse sd

MD 5795.19 TVD 5792.6
INC 3.47 AZ 41.51
Gas (units) 500

5820'-5850' SS 60% lt-med gy, lse uncons u vf-l f qtz, rd-sr, w srt; CLYST 40% med gy-dk gy, amor-blky, shaley, flky-splt

5,873' MD
KUPARUK C

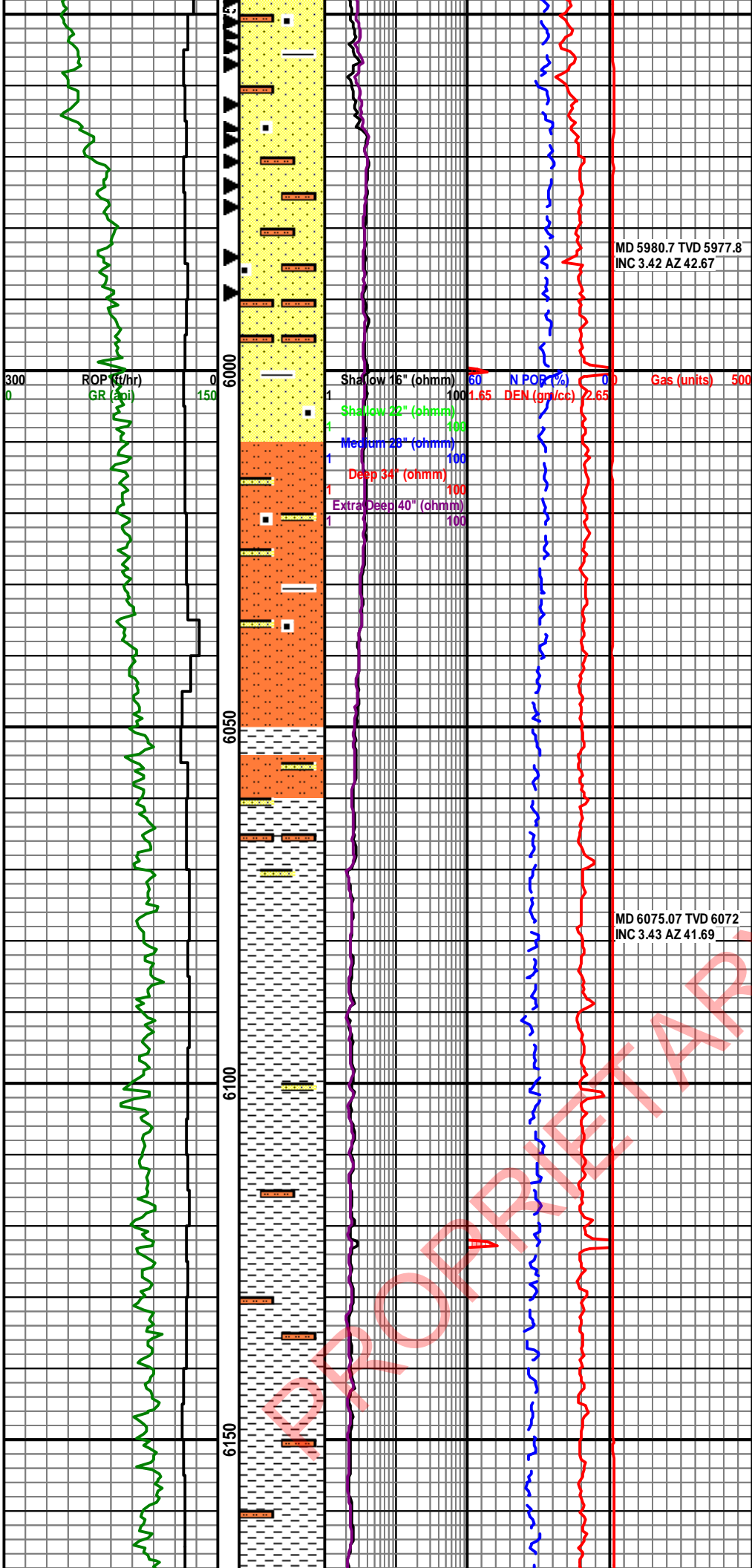
5850'- 5880' SS 80% gy-med gy wi abnt trnsl-trnsp & com wh qtz grs, vf-f wi scat med, w-moderate srt, sb round, abnt carb, tr glau, tr sid cmt; CLYST 20% med gy-dk gy, sft-frm

5,968' MD
KUPARUK A

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

MD 5889.32 TVD 5886.5
INC 3.48 AZ 42.48

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,



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

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

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

6080'- 6110' CLYST 80% med gy-med dk gy wi brownish hue, sft-occly frm, rthy, occly slty; SH 20% med dk gy-dk gy, hd, brit, elongated cuttings

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

6140'- 6170' CLYST 80% med gy-med dk gy wi brownish hue, sft-frm, rthy, slty ip, carb, rr calc tuff; SH 20% med dk gy-dk gy, hd, brit, elongated cuttings

PROSPECTARY

MD 6167.81 TVD 6164.5
INC 3.55 AZ 39.12

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

ROP (ft/hr)
GR (api)

6200

Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
Shallow 22" (ohmm)	100	DEN (gm/cc)	2.65		
Medium 28" (ohmm)	100				
Deep 34" (ohmm)	100				
Extra Deep 40" (ohmm)	100				

6200'-6230' CLYST 95% med gy-med dk gy wi brownish hue, sft frm, occlly hd, rthy, 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, occlly hd, rthy, carb, rr calc tuff; SH 10% med dk gy-dk gy, hd, brit, elongated cuttings

6250

MD 6259.59 TVD 6256.1
INC 3.53 AZ 39.52

6260'-6290' CLYST 80% med gy-med dk gy wi brownish hue, sft frm, occlly hd, rthy, slty ip, carb, rr calc tuff, sid; SH 20% med dk gy-dk gy, hd, brit, elongated cuttings

6300

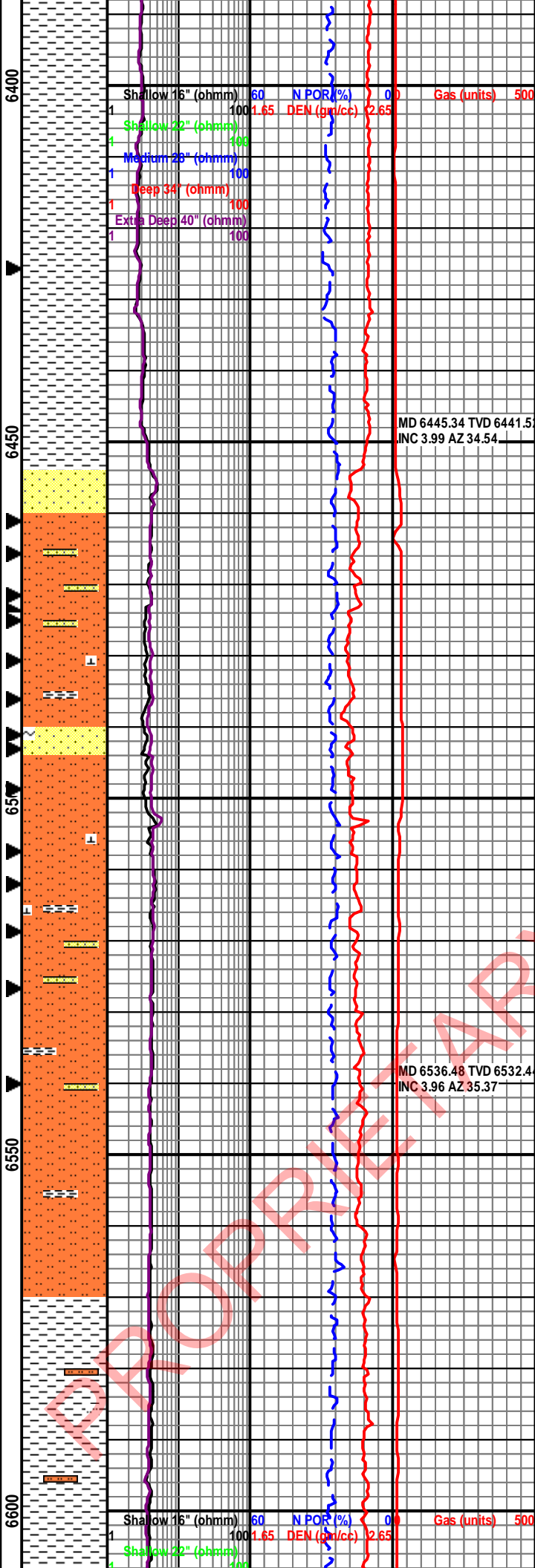
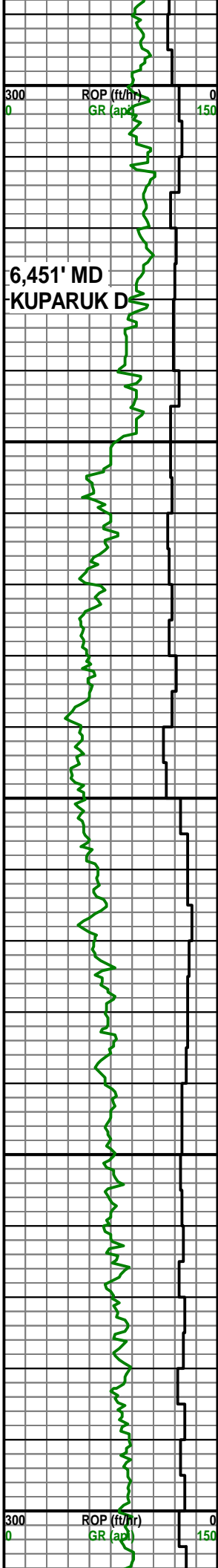
6290'-6320' CLYST 80% med gy-med dk gy wi brownish hue, sft frm, occlly hd, rthy, slty ip, carb, rr calc tuff, sid; SH 20% med dk gy-dk gy, hd, brit, elongated cuttings

6350

MD 6346.61 TVD 6343.0
INC 3.75 AZ 37.26

6350'-6380' CLYST 80% med gy-med dk gy wi brownish hue, sft frm, occlly hd, rthy, slty ip, carb, rr calc tuff, sid; SH 10% med dk gy-dk gy, hd, brit, elongated cuttings

PROFITABLE



6,451' MD
KUPARUK D

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

6460'-6470' SS 65% lt gy-med gy wi abnt trnsp-trnsl qtz grs, fl grs-slty, mod srt, sr-subangular, wk calc cmt ip, tuf cly mtx, abnt carb mat, com lithics, rr pyr, glau, N/S visible o, Fluorescence: mod abnt, sp, orng, Cut: slow, dull, yel; CLYST 25%; SH 10%

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-pty, slty

6600'-6630' CLYST 70% med dk gy-med gy wi brownish hues, mod hd-fri-sft, scat hydrated amor clays, grdg-slty in parts; SLTST 30% TST

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 6600.00 TVD 6595.0
INC 3.96 AZ 35.37

PRELIMINARY

amor clays, grdg-slt in parts, SLTST 30% med gy wi brownish hues, fri-frm, arg mtx, com lse vf sd grs in spln spl

MD 6628.63 TVD 6624.3
INC 3.92 AZ 37.01

6660'-6690' CLYST 80% med dk gy wi brownish hues, frm fri-mod hd wi tr sft, blk-ymodr wi tr hydrated amor cly, tr grdg-slt; SLTST 20% med gy wi brownish hues, frm fri, com carb flecks, tr dk flky-splt SH

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

MD 6721.62 TVD 6717.1
INC 3.89 AZ 35.41

6720'-6750' CLYST 100% med dk gy wi brownish hues, frm fri-sft, blk-ymodr, tr hydrated clays, com grdg-slt, tr spl blk-dk gy SH

MD 6745.05 TVD 6740.5
INC 3.99 AZ 35.86

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

6780'-6800' CLYST 60% med dk gy wi brownish hues, frm fri-sft, blk-ymodr, com grdg-slt; SS 40% lt gy wi abnt trnspl, vf-l f, w srt, lse unconsl qtz grs wi abnt carb flecks, com lithicss

-TD 8.5" 6,800' MD /
-6,795' TVD -
@ 2309 hrs on Sept 21,
2015

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

Shallow 16" (ohmm)	60	N POR (%)	0.0	Gas (units)	500
1	100	1.65	DEN (gm/cc)	2.65	
Shallow 22" (ohmm)	100				
4	100				
Medium 28" (ohmm)	100				
1	100				
Deep 34" (ohmm)	100				
1	100				
Extra Deep 40" (ohmm)	100				
1	100				

PROPRIETARY