

Scale: 5" / 100'
Measured Depth Log

Well Name Toews 24-9-4-1H

Location NW NW Sec4 T25S R9W

State Kansas

Country USA

API Number 15-155-21592

K.B. Elevation 1710

Logged Interval 3200 To 9346

Total Depth 9346

Formation Osage

County Reno

Rig Duke

Accessories

- | | | | |
|---------------|----------------------|-------------------|-------|
| F FOSSIL | ARGILLACEOUS | GLAUCONITE | STRIP |
| GASTROPOD | ARGILLITE GRAN | GYPSIFEROUS | A |
| OOLITE | BENTONITE | HEAVY MINERAL | B |
| OSTRACOD | BITUMENOUS SUBSTANCE | KAOLIN | C |
| PELECYPOD | BRECCIA FRAGMENTS | MARLSTONE | D |
| PELLET | CALCAREOUS | MINERAL CRYSTALS | E |
| PISOLITE | CARBONACEOUS FLAKES | NODULES | G |
| PLANT REMAINS | CHTKD | PHOSPHATE PELLETS | L |
| PLANT SPORES | CHTLT | PYRITE | M |
| CORAL | COAL - THIN BEDS | SALT CAST | MA |
| CRINOID | DOLOMITIC | SANDY | MA |
| ECHINOID | FELDSPAR | SILICEOUS | SA |
| FISH | FERRUGINOUS PELLET | SILTY | SH |
| FORAMINIFERA | FERRUGINOUS | TUFFACEOUS | SIL |
| ANHYDRITIC | | | |

Rock Types

- | | | | |
|----------------------|-----------|---------------|-------------|
| UNKNOWN | DOLOMITE | SHALE GRAY | TILL |
| ANHYDRITE | CHERT | SHALE COLORED | BENTONITE |
| GYPSUM | COAL | SILTSTONE | TUFF |
| SALT | MARLSTONE | SANDSTONE | IGNEOUS |
| SIDERITE or LIMONITE | CLAYSTONE | CONGLOMERATE | METAMORPHIC |
| LIMESTONE | SHALE | BRECCIA | |

Other Symbols

- | | | | |
|------------------|--------------------|-----------------------|------------------------|
| Oil Show | MOLDIC | FAULT | WIRELINE TESTED - LEFT |
| DEAD | ORGANIC | FORMATION TOP | WIRELINE TESTED - RT |
| EVEN | PINPOINT | GAS SHOW | |
| QUESTIONABLE | VUGGY | MINDEPTH | MAN DEPTH |
| SPOTTED STAINING | | | |
| Porosity | Engineering | | |
| E EARTHY | BIT | NORMAL FAULT | ANGULAR |
| FENESTRAL | CONNECTION (LEFT) | OIL SHOW | ROUNDED |
| FRACTURE | CONNECTION (RIGHT) | OVERTURNED STRATA | SUBANG |
| INTERCRYSTALLINE | CONNECTION GAS | REVERSE FAULT | SUBRND |
| INTEROOLITIC | CORE - LOST | SIDEWALL CORE (LEFT) | |
| | CORE - RECOVERED | SIDEWALL CORE (RIGHT) | Textures |
| | DST INTERVAL | SLIDE | BOUNDSTONE |
| | | SURVEY | CHALKY |
| | | TRIP GAS | CRYPTOXLN |

ger

ANHYDRITE STRINGER
ANTONITE STRINGER
DAL STRINGER
DOLOMITE STRINGER
GYPSUM STRINGER
MESTONE STRINGER
MILSTONE (CALC) STRG
MILSTONE (DOL) STRG
MUDSTONE STRINGER
SANDSTONE STRINGER
SANDSTONE STRINGER
SANDSTONE STRINGER

T E EARTHY

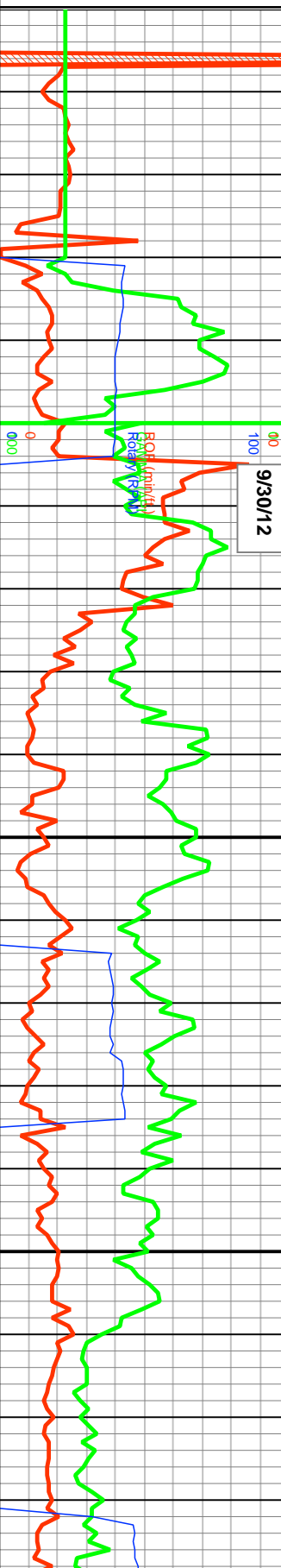
FX FINELYXLN
GS GRAINSTONE
L LITHOGRAPHIC
MX MICROXLN
MS MUDSTONE
PS PACKSTONE
WS WACKSTONE

Sorting

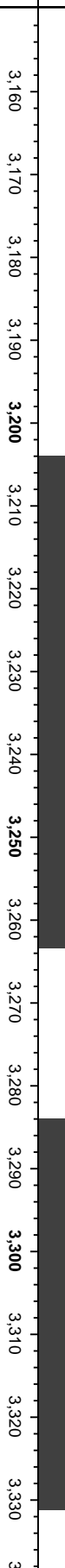
M MODERATE
P POOR
W WELL

ROP

- ROF
- GAMMA
- Rotary



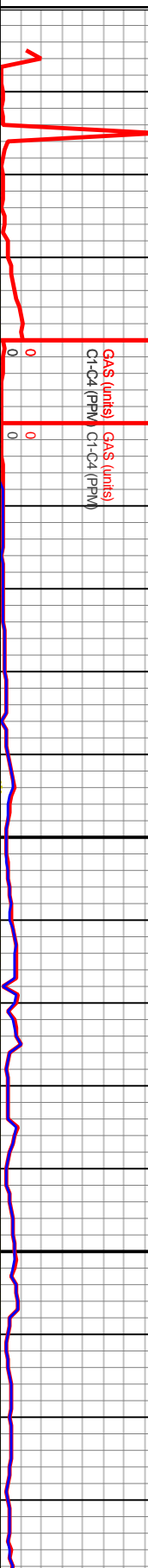
Slide/Rotate



Total Gas & Chromatograph

GAS

- C1
- C2
- C3
- C4



Well Bore

TVD

MD: 3,161'
TVD: 3,160.91'
Inclination: 0.2°
Azimuth: 87.2°

Bit #: 6
Type: Halliburton EQH 24R
Size: 8.75"
Depth In: 3,200'
Depth Out: 3,399'
S/N: 11980374

SS: gy-tan-opa, lf-g-ufg, sb ang-sb rd, w srt, w cons, qtz-plag-fields grs, mtz sup, calc-arg mtz, v calc, nscof

SH: gy, frm, plty-ftly, fis, sm txt, wxy lstr, c cuttings at surface, plas, v adhesive/cohes

Conn 3000
3213'

Conn 3244'

Conn 3275'

Conn 3306'

Conn 3337'

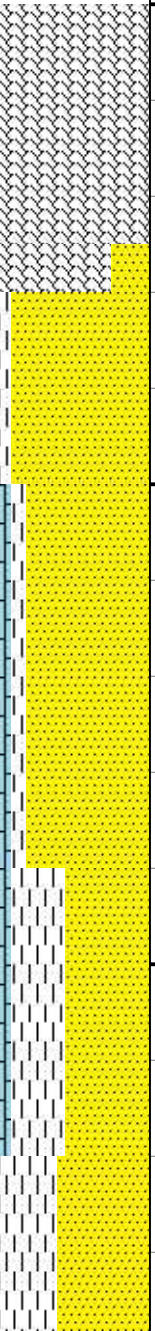
MD: 3,192'
TVD: 3,191.9'
Inclination: 0.9°
Azimuth: 141.8°

MD: 3,254'
TVD: 3,253.73'
Inclination: 6.9°
Azimuth: 155.7°

MD: 3,285'
TVD: 3,284.42'
Inclination: 9.3°
Azimuth: 156.1°

MD: 3,316'
TVD: 3,314.87'
Inclination: 12.3°
Azimuth: 153.2°

% Lith



Images

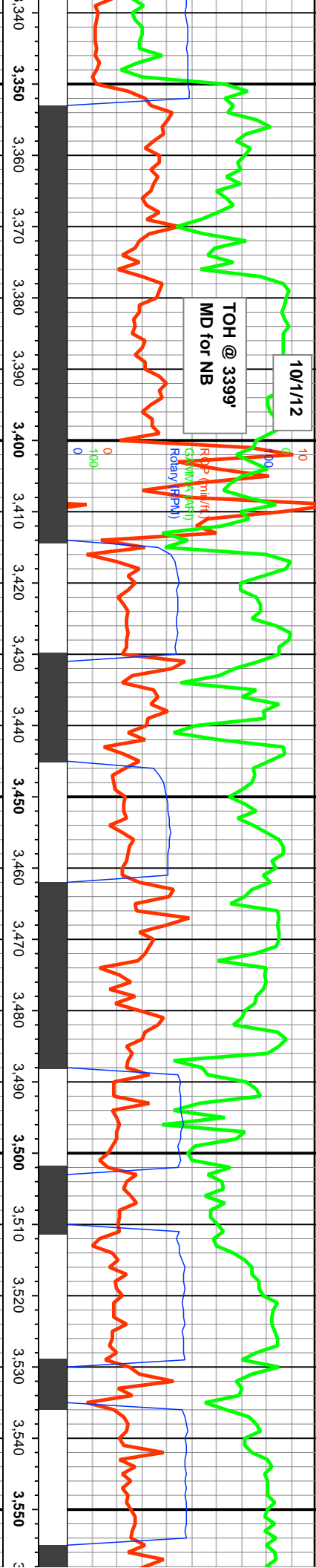


% Porosity

Depth (ft)	% Porosity
3,160	
3,170	
3,180	
3,190	
3,200	
3,210	
3,220	
3,230	
3,240	
3,250	
3,260	
3,270	
3,280	
3,290	
3,300	
3,310	
3,320	
3,330	

Oil Show

Depth (ft)	Oil Show
3,160	
3,170	
3,180	
3,190	
3,200	
3,210	
3,220	
3,230	
3,240	
3,250	
3,260	
3,270	
3,280	
3,290	
3,300	
3,310	
3,320	
3,330	



Lansing-Kansas City
3378' MD
3375' TVD

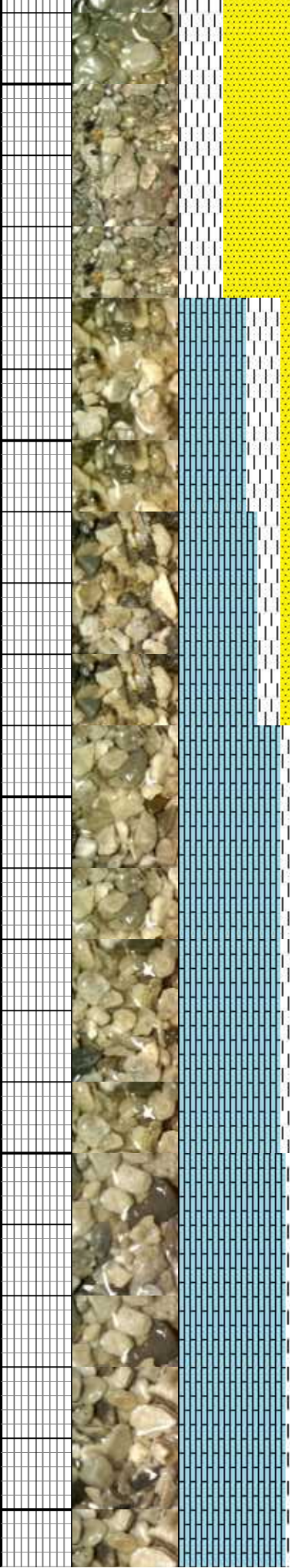
C1 - 100%

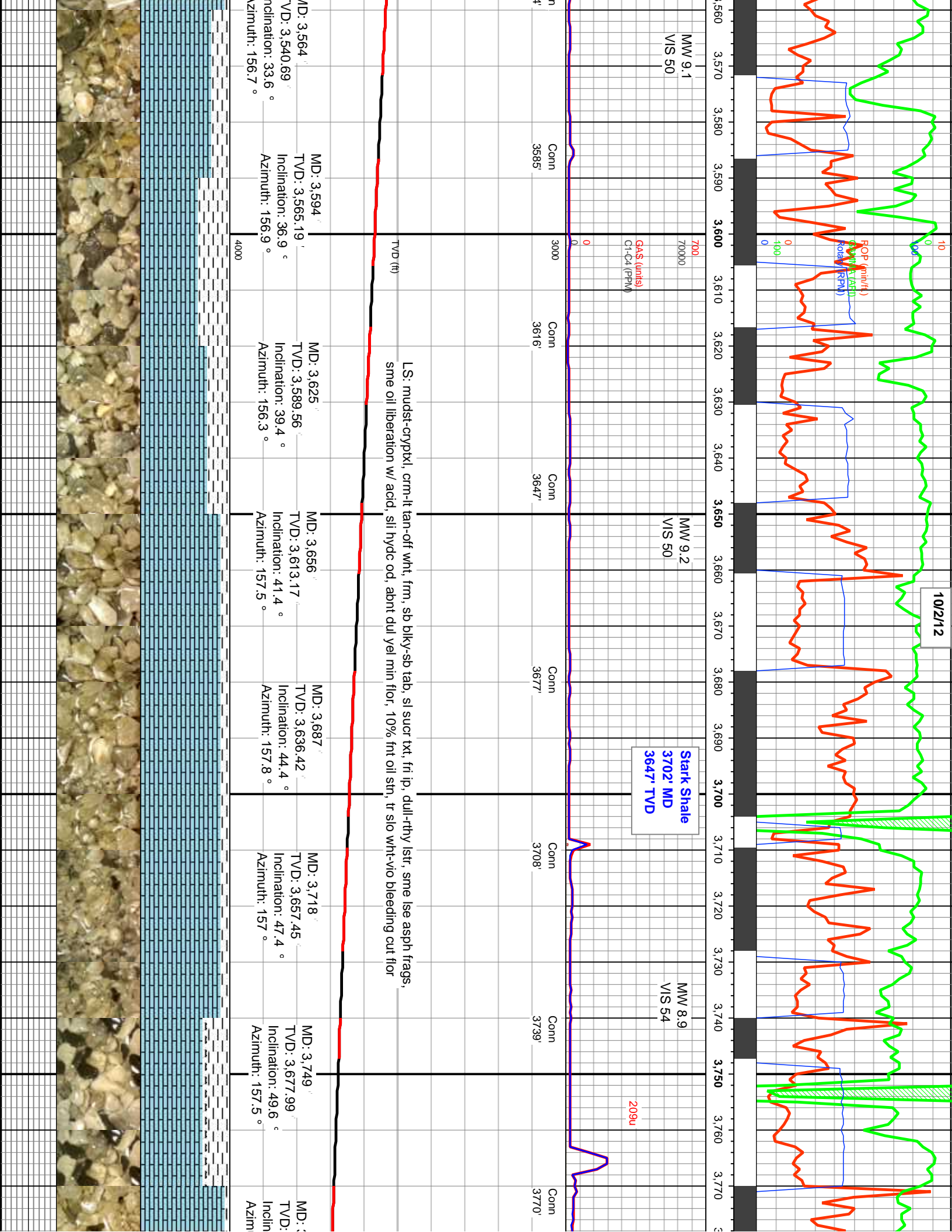
GAS (units)
C1-C4 (PPM)

Conn	MD	TVD	Inclination	Azimuth	Notes
3368'	3,347'	3,345'	14.9°	153.3°	alc, easily hydrated to amorphous, wtr soluble, v calc, nscof
3399'	3,378'	3,374.69'	18.5°	155.4°	
3430'	3,409'	3,403.83'	21.3°	156.2°	LS: mudst-crptxl, sme wckstn, lt gy-tan-crm, hd, sb blkly-sb tab, rgh txt, dull-rthy lst, sdy, abnt dul yel min flor, nscof
3461'	3,471'	3,460.44'	27°	157°	
3492'	3,502'	3,487.76'	29.4°	156.3°	
3523'	3,533'	3,514.52'	31.2°	156.7°	

Bit #: 7
Type: Halliburton FXD 64M
Size: 8.75"
Depth In: 3,399'
Depth Out: 4,234'
Jets: 6-14
S/N: 11985122

TVD (ft)





MW 9.1
VIS 50

MW 9.2
VIS 50

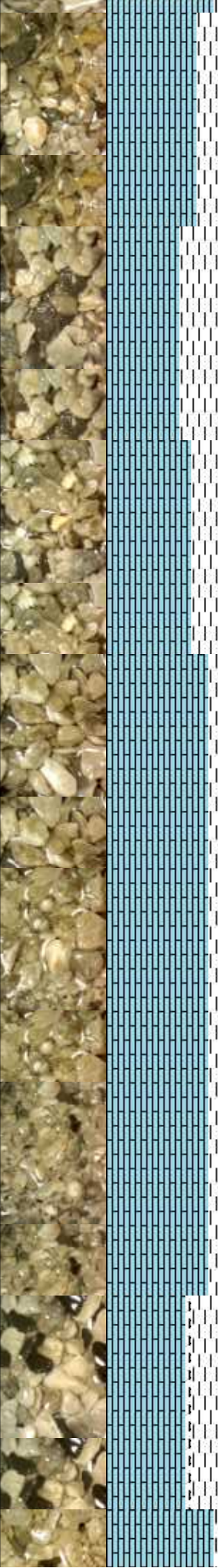
MW 8.9
VIS 54

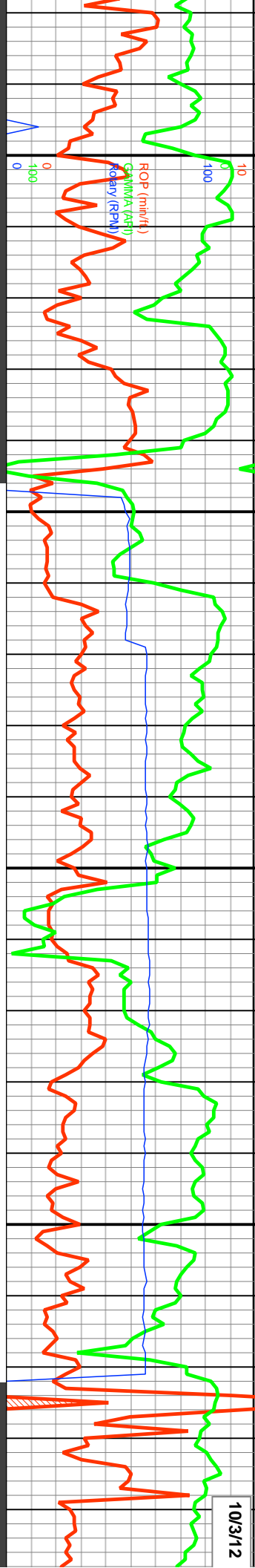
Stark Shale
3702' MD
3647' TVD

209u

MD (ft)	TVD (ft)	Inclination (°)	Azimuth (°)
3564	3540.69	33.6	156.7
3594	3565.19	36.9	156.9
3625	3589.56	39.4	156.3
3656	3613.17	41.4	157.5
3687	3636.42	44.4	157.8
3718	3657.45	47.4	157
3749	3677.99	49.6	157.5
3770			

L.S: mudst-cryptxl, crm-lt tan-off wht, frm, sb blk-y-sb tab, sl sucr txt, fri ip, dull-rthy lstr, sme lse asph frags, sme oil liberation w/ acid, sli hydc od, abprt dul yel min flor, 10% fnt oil str, tr slo wht-vio bleeding cut flor

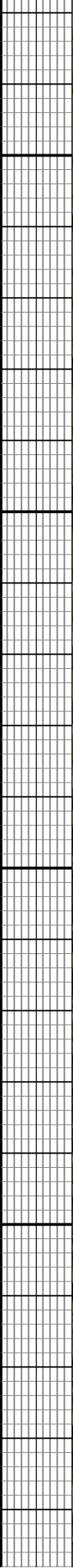
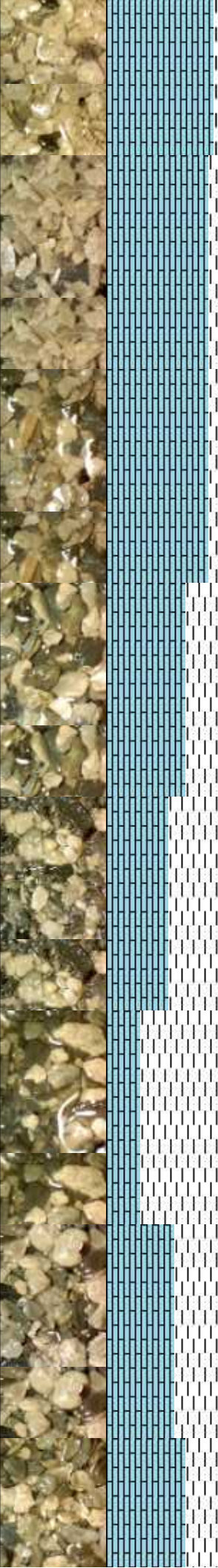


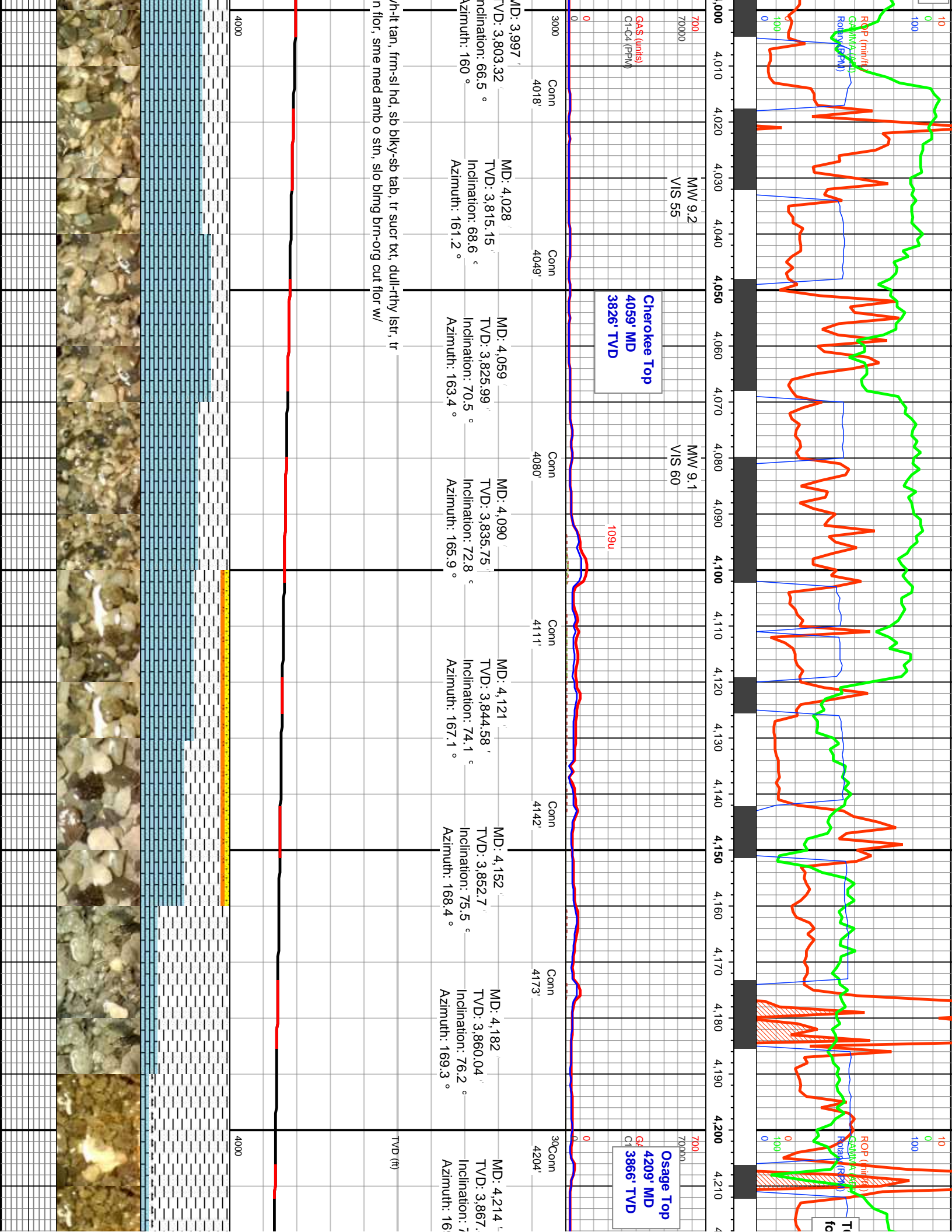


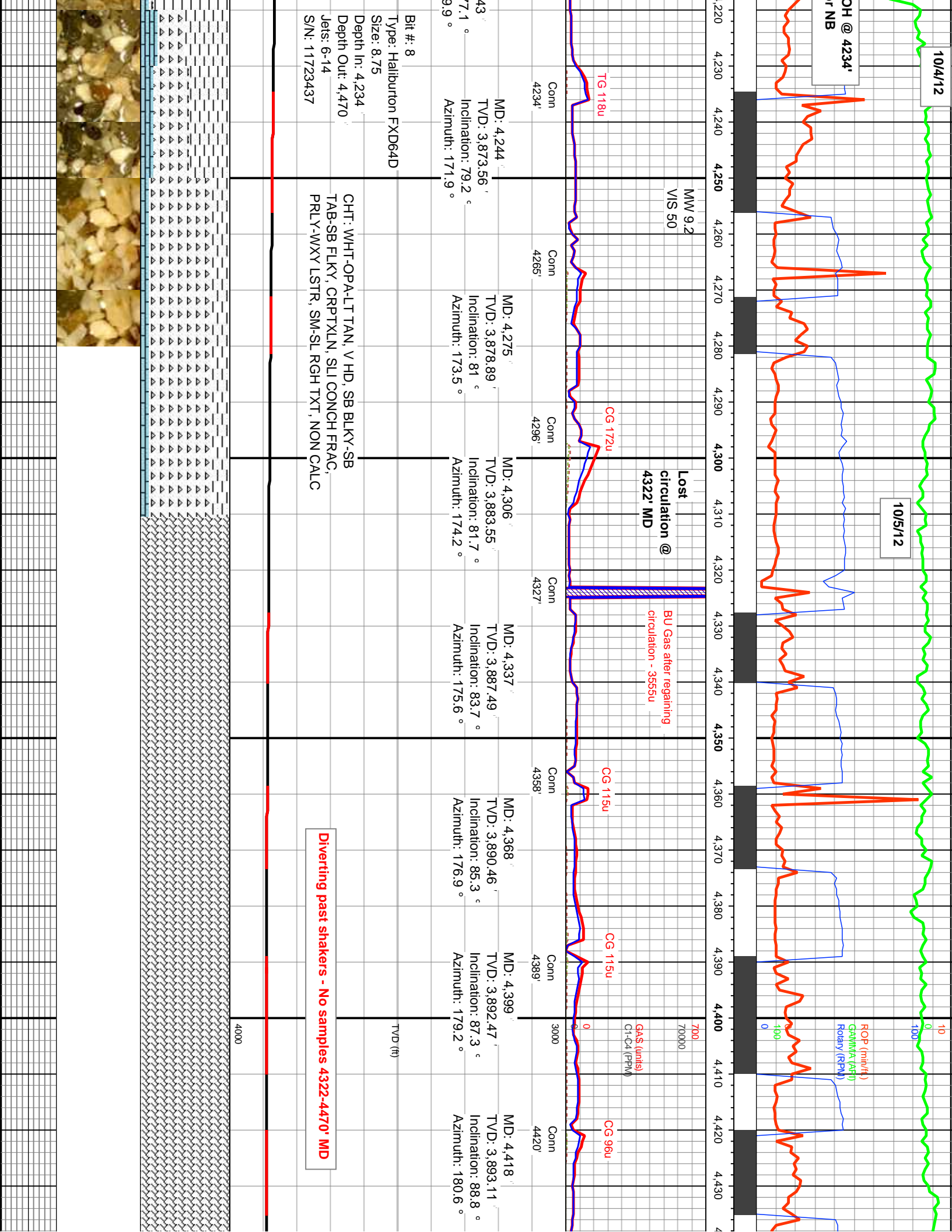
MD (ft)	TVD (ft)	Inclination (°)	Azimuth (°)	Conn
3,780	3,697.47	52.5	157.4	4000
3,811	3,715.58	56.9	157.9	3801
3,842	3,731.53	60.3	158.2	3832
3,873	3,746.75	60.9	158.6	3863
3,904	3,761.66	61.6	157.9	3894
3,935	3,776.19	62.5	158.1	3925
3,966	3,790.24	63.6	158.5	3956
3,987				3987

SH: lt gy-dk gy, frm - sl hd, sb blk-ss tab, sl-mod fis, rthy-dull lstr, calc

LS: mudst-wackst, lt gy-ff v intrxn poro, abnt dul yel m 10% slo wht-vio bleeding









Pump #1 on hole
Pump #2 circulating pits

C1 - 58.6%
 C2 - 14.0%
 C3 - 13.6%
 C4 - 13.8%

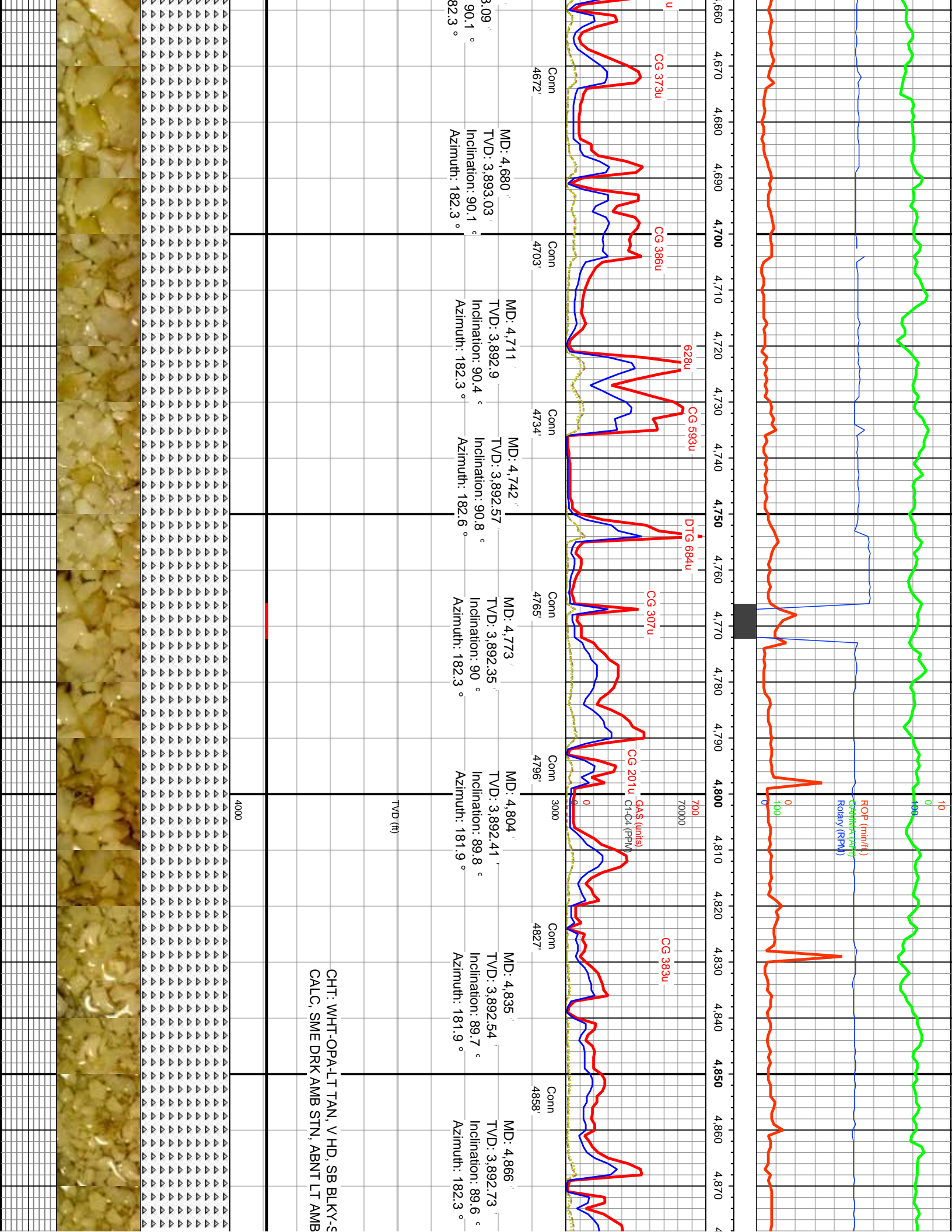
GAS (units)
 C1-C4 (PPM)

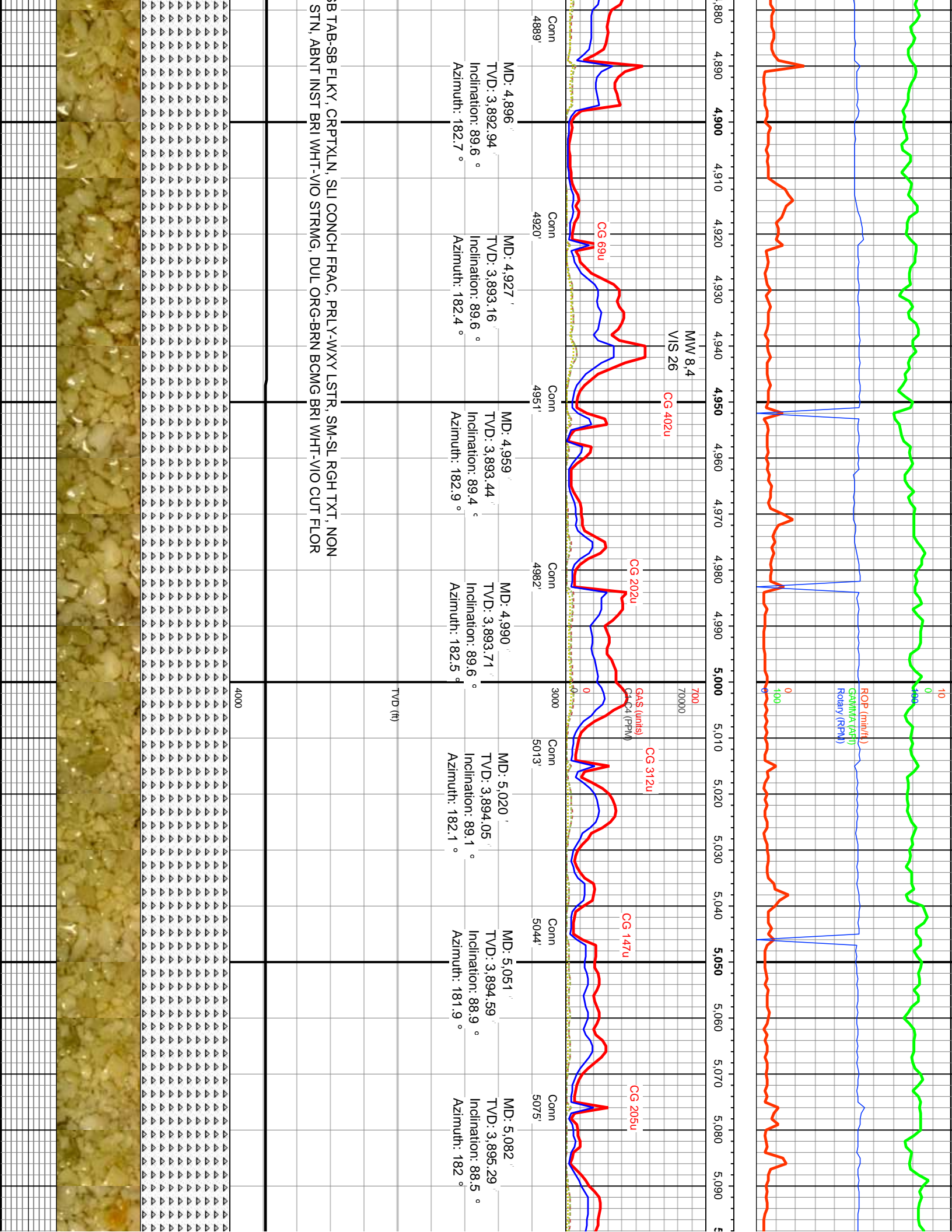
Bit #: 9
 Type: Halliburton PDC
 Size: 6.125"
 Depth In: 4,470'
 Depth Out: 8,539'
 Jets: 6-14
 S/N: 11617749

CHT: WHT-OPAL-TAN, V HD, SB BLKY-SB TAB-SB FLKY, CRPTXLN, SLI CONCH FRAC, PRLY-WXY LSTR, SM-SL RGH TXT, NQN
 CALC, SME DRK AMB STN, ABNT LT AMB STN, ABNT INST BRI WHT-VIO STRMG, DUL ORG-BRN BCMG BRI WHT-VIO CUT FLOR

Conn	MD	TVD	Inclination	Azimuth
4451'	4,493'	3,893.77'	90.2°	181.5°
4485'	4,524'	3,893.66'	90.2°	182.6°
4516'	4,555'	3,893.5'	90.4°	182.7°
4547'	4,586'	3,893.31'	90.3°	182.6°
4578'	4,618'	3,893.17'	90.2°	182.4°
4609'	4,649'	3,893.17'	90.2°	182.4°
4640'				







4880 4890 4900 4910 4920 4930 4940 4950 4960 4970 4980 4990 5000 5010 5020 5030 5040 5050 5060 5070 5080 5090

MW 8.4
VIS 26

CG 69u

CG 402u

CG 202u

CG 312u

CG 147u

CG 205u

ROP (m/min/ft)
GAMMA (API)
Rotary (RPM)

GAS (units)
C4-C4 (PPM)

TVD (ft)

4000

Conn 4889' MD: 4,896' TVD: 3,892.94' Inclination: 89.6° Azimuth: 182.7°

Conn 4920' MD: 4,927' TVD: 3,893.16' Inclination: 89.6° Azimuth: 182.4°

Conn 4951' MD: 4,959' TVD: 3,893.44' Inclination: 89.4° Azimuth: 182.9°

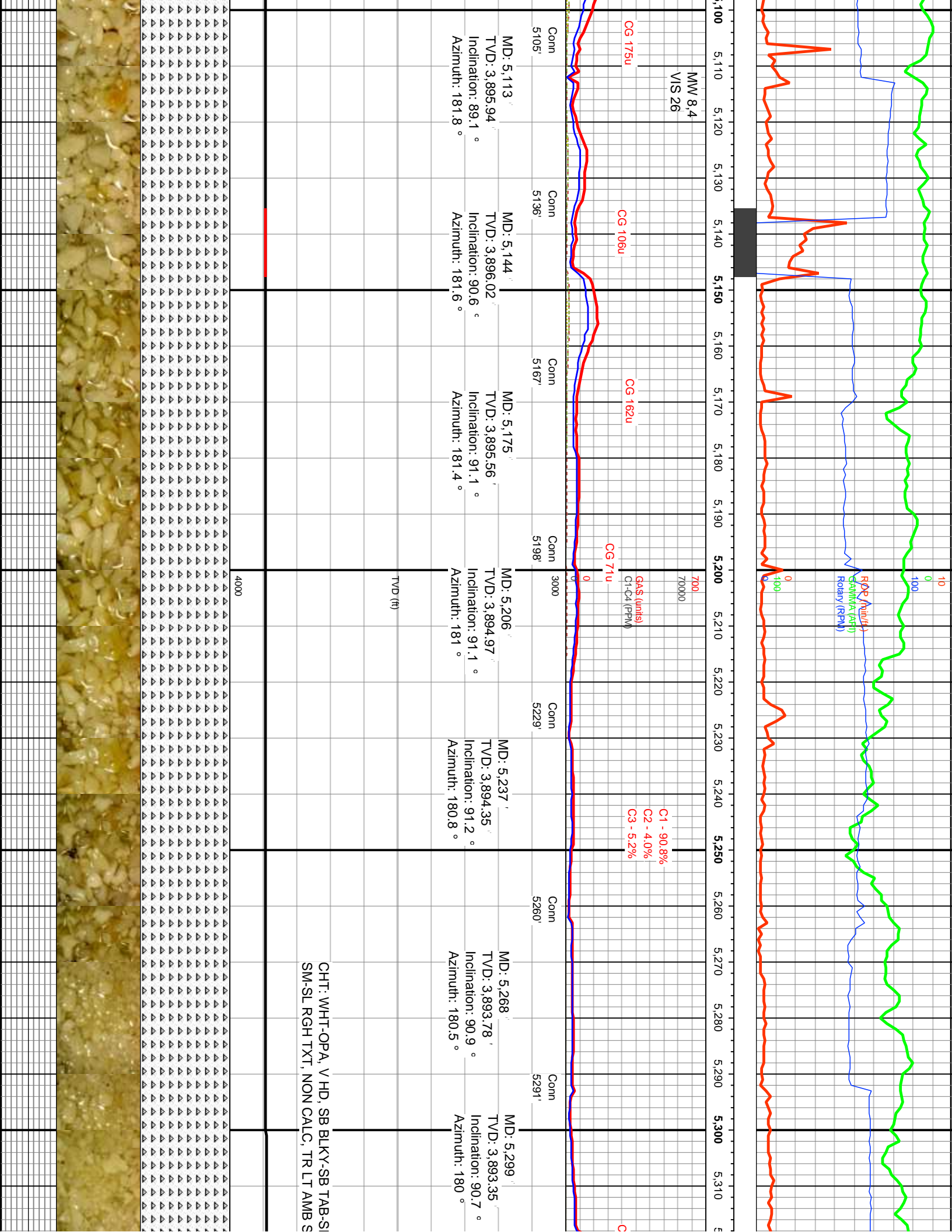
Conn 4982' MD: 4,990' TVD: 3,893.71' Inclination: 89.6° Azimuth: 182.5°

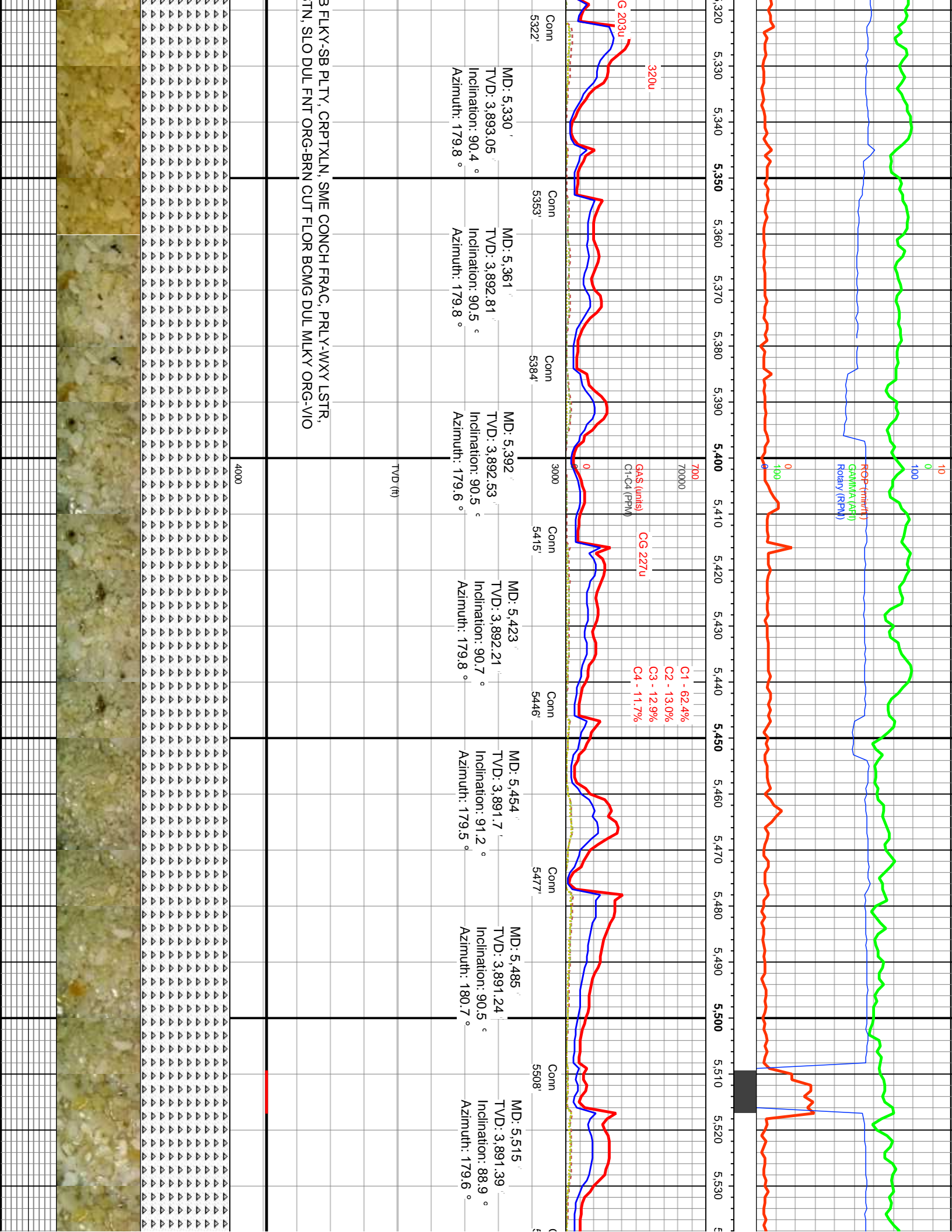
Conn 5013' MD: 5,020' TVD: 3,894.05' Inclination: 89.1° Azimuth: 182.1°

Conn 5044' MD: 5,051' TVD: 3,894.59' Inclination: 88.9° Azimuth: 181.9°

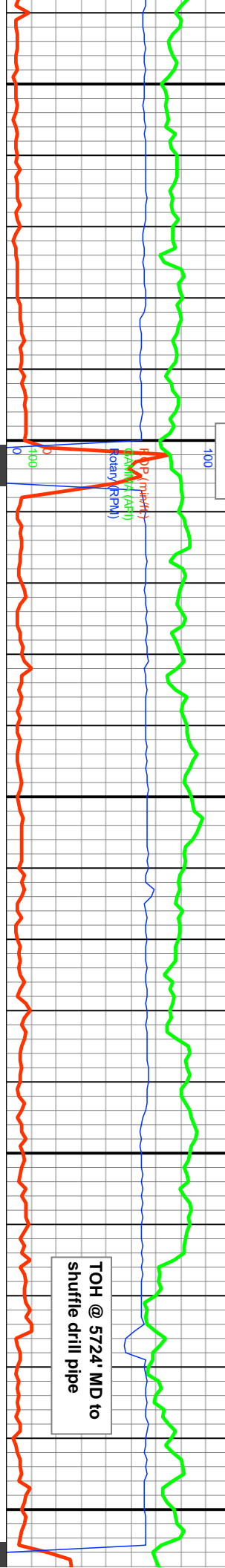
Conn 5075' MD: 5,082' TVD: 3,895.29' Inclination: 88.5° Azimuth: 182°

B TAB-SB FLKY CRPTXLN, SLI CONCH FRAC, PRLY-WXY LSTR, SM-SL RGH TXT, NON
STN, ABNT INST BRI WHT-VIO STRMG, DUL ORG-BRN BCMG BRI WHT-VIO CUT FLOR





10/8/12



CG 232u

Gas (units)
C1-C4 (PPM)

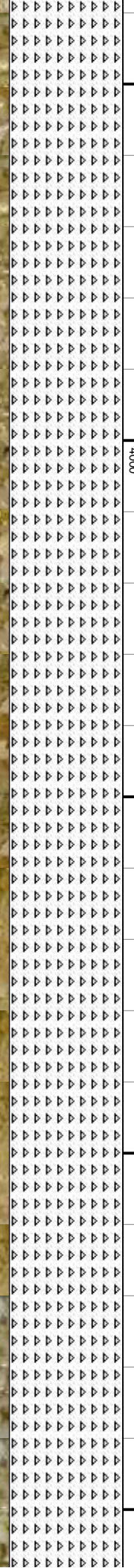
CG 218u

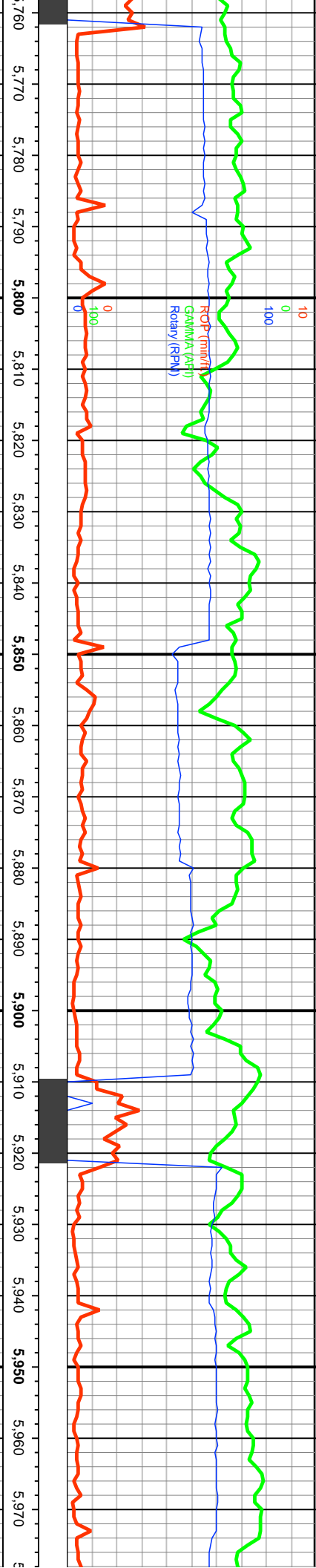
TOH @ 5724' MD to
shuffle drill pipe

MW 8
VIS 28

Conn 5539'	MD: 5,546' TVD: 3,892.1' Inclination: 88.5 ° Azimuth: 179.5 °	Conn 5570'	MD: 5,577' TVD: 3,892.94' Inclination: 88.4 ° Azimuth: 180.2 °	Conn 5601'	MD: 5,609' TVD: 3,893.58' Inclination: 89.3 ° Azimuth: 179.7 °	Conn 5632'	MD: 5,639' TVD: 3,893.94' Inclination: 89.3 ° Azimuth: 180 °	Conn 5663'	MD: 5,670' TVD: 3,894.24' Inclination: 89.6 ° Azimuth: 179.7 °	Conn 5694'	MD: 5,701' TVD: 3,894.51' Inclination: 89.4 ° Azimuth: 179.7 °	Conn 5724'	MD: 5,732' TVD: 3,894.54' Inclination: 89 ° Azimuth: 179.6 °	Conn 5755'	
---------------	--	---------------	---	---------------	---	---------------	---	---------------	---	---------------	---	---------------	---	---------------	--

CHT: WHT-OPA, VHD, SB BLKY-SB TAB-SB FLKY-SB PLTY, CRPTXLN, SME CONCH FRAC, PRLV-WXY LSTR, SM-SL
 RGH TXT, NON CALC, INCRG LT AMB STN, SLO DUL ORG-BRN CUT FLOR BCMG BRI VIO, OCC SLO BLEEDING WHT



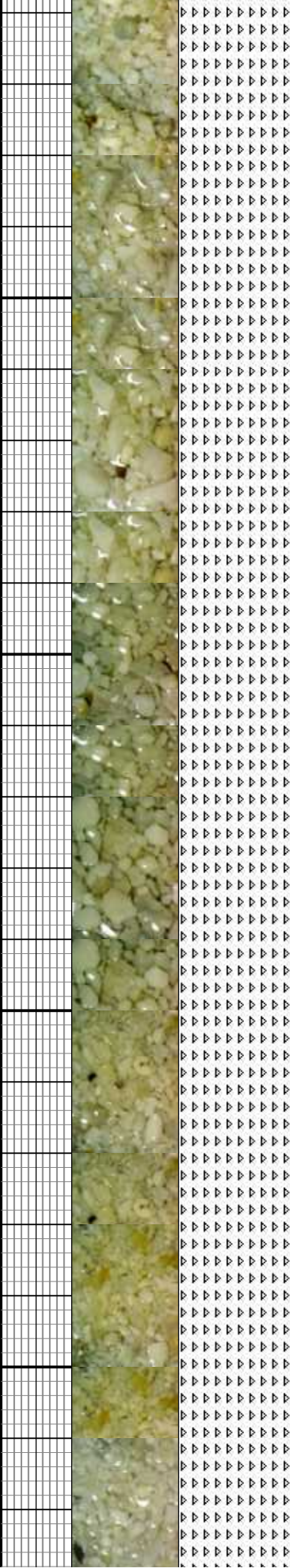


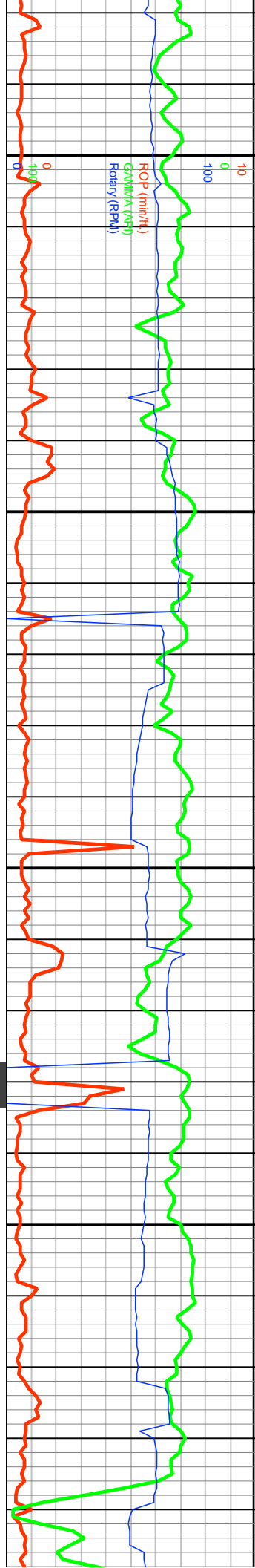
MD	TVD	Inclination	Azimuth	Conn
MD: 5,763	TVD: 3,895.35	Inclination: 89.5 °	Azimuth: 179.1 °	Conn 5786'
MD: 5,794	TVD: 3,895.59	Inclination: 89.6 °	Azimuth: 179.2 °	Conn 5817'
MD: 5,825	TVD: 3,895.78	Inclination: 89.4 °	Azimuth: 178.9 °	Conn 5848'
MD: 5,856	TVD: 3,896.03	Inclination: 89.4 °	Azimuth: 178.9 °	Conn 5879'
MD: 5,887	TVD: 3,896.38	Inclination: 89.3 °	Azimuth: 179.3 °	Conn 5910'
MD: 5,918	TVD: 3,896.41	Inclination: 90.6 °	Azimuth: 178.9 °	Conn 5941'
MD: 5,949	TVD: 3,896.03	Inclination: 90.8 °	Azimuth: 178.8 °	Conn 5972'

CHT: WHT-OPO, V HD, SB BLKY-SB TAB-SB PLTY, CRPTXLN, SCTD CONCH FRAC, PRD PRLY LSTR,
 SM-SL RGH TXT, NON CALC, TR LT AMB STN, WK SLO DUL ORG-BRN CUT FLOR, TR WHT STRMRS

4000

TVD (ft)





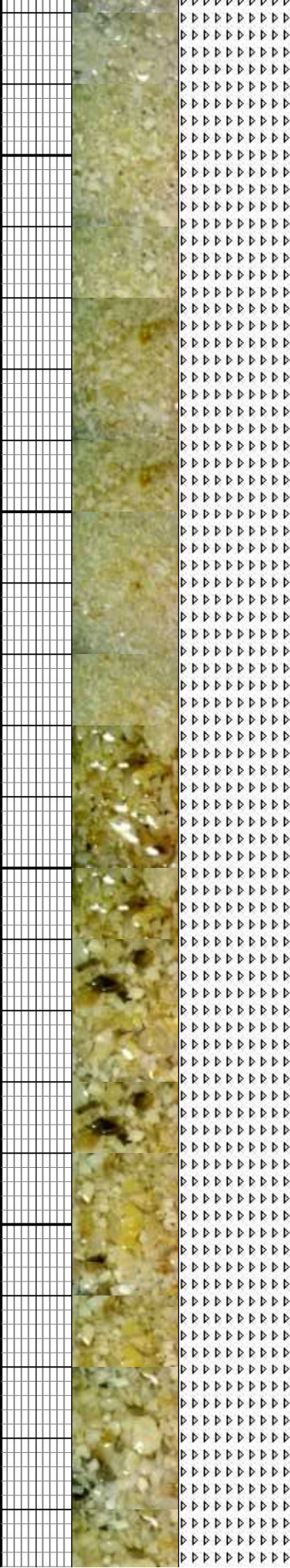
700
70000
CG 261u
GAS (units)
C1-C4 (PPM)

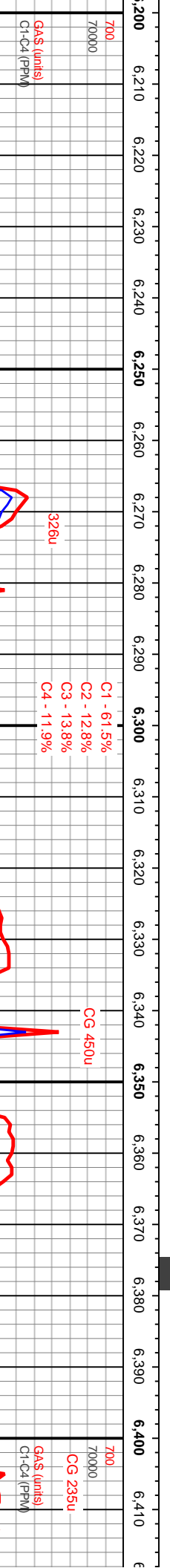
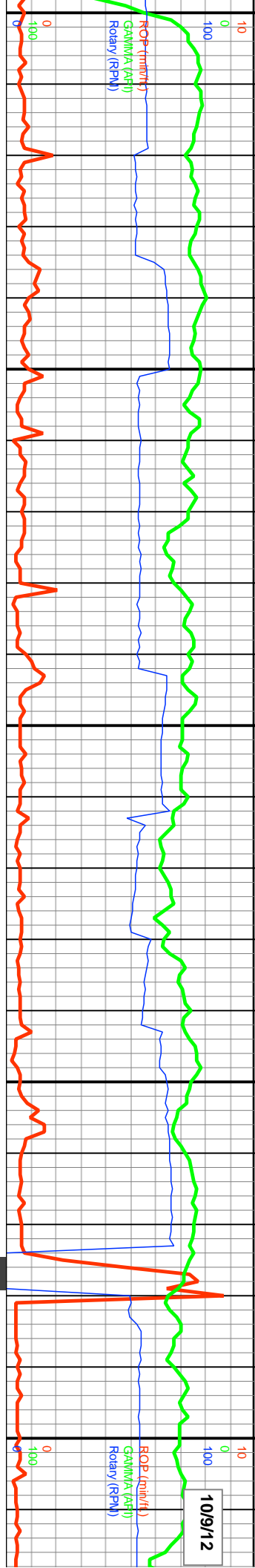
MD (m)	TVD (m)	Inclination (°)	Azimuth (°)
6,011	3,895.22	90.8	179
6,042	3,894.76	90.9	178.7
6,073	3,894.24	91	178.9
6,104	3,893.57	91.5	178.9
6,135	3,893.02	90.5	179.8
6,165	3,892.81	90.3	179.8
6,196	3,89		

Conn 6003
Conn 6034
Conn 6065
Conn 6096
Conn 6127
Conn 6158
Conn 6189

CHT: WHT-OPA-LT CRM, V HD, SB BLKY-SB TAB-SB PLTY, CRPTXLN, SME CONCH
FRAC, PRLY LSTR, SM-SL SUC TXT, NON CALC, OCC GRY CHT, SUC TXT, RTHY
LSTR, SME LT AMB STN, WK SLO DUL ORG-BRN CUT FLOR, TR WHT STFMRS

4000





MD (ft)	TVD (ft)	Inclination (°)	Azimuth (°)
6227	3,892.84	90	179.6
6258	3,892.79	90.2	179.2
6289	3,892.71	90.1	178.8
6320	3,892.6	90.3	179
6351	3,892.35	90.5	179.1
6382	3,892.22	89.9	178.6

Conn 6219'

Conn 6250'

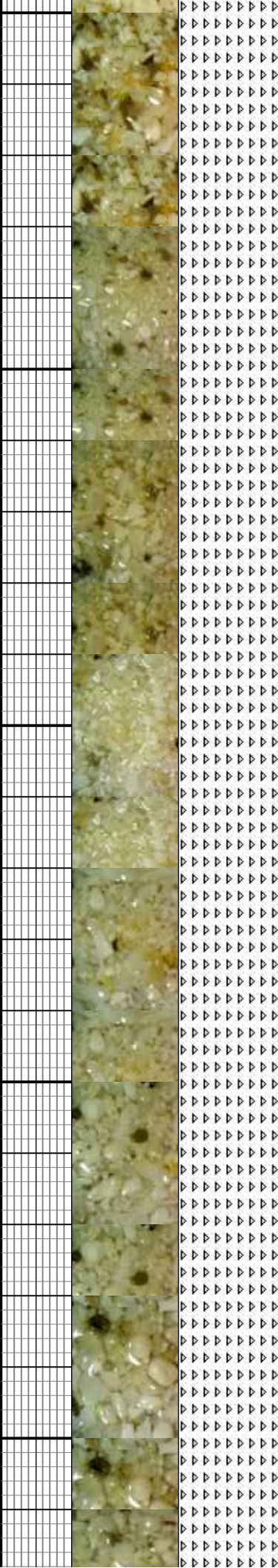
Conn 6281'

Conn 6312'

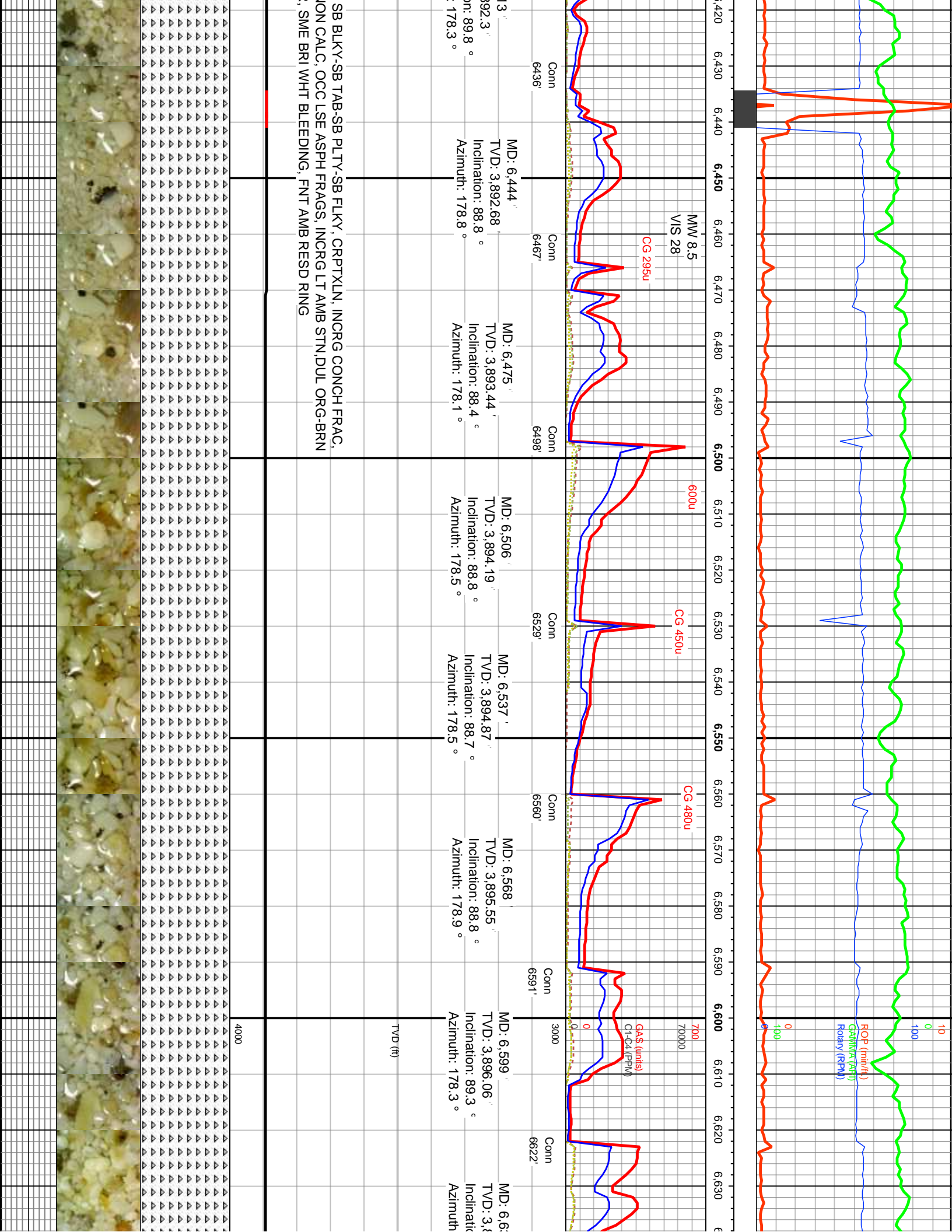
Conn 6343'

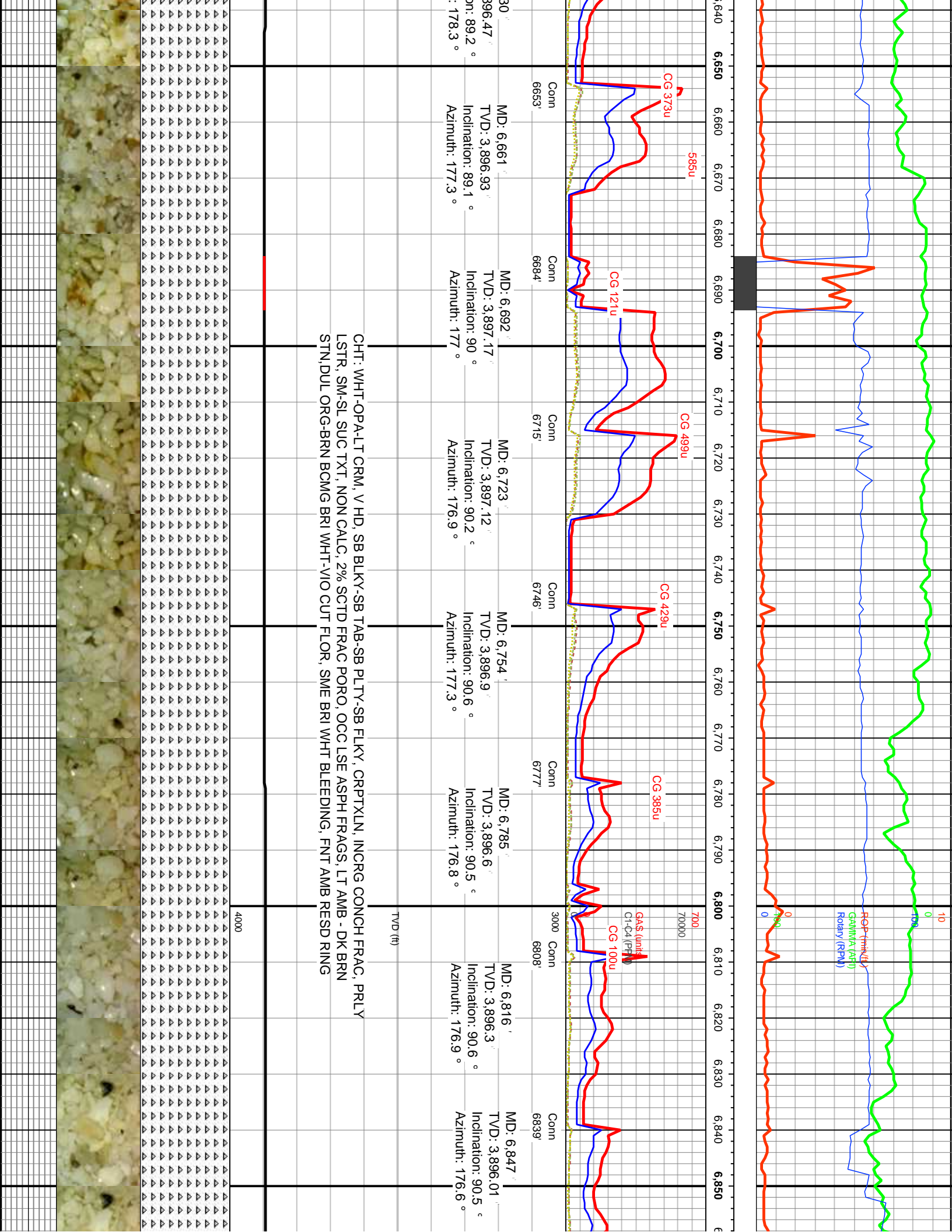
Conn 6374'

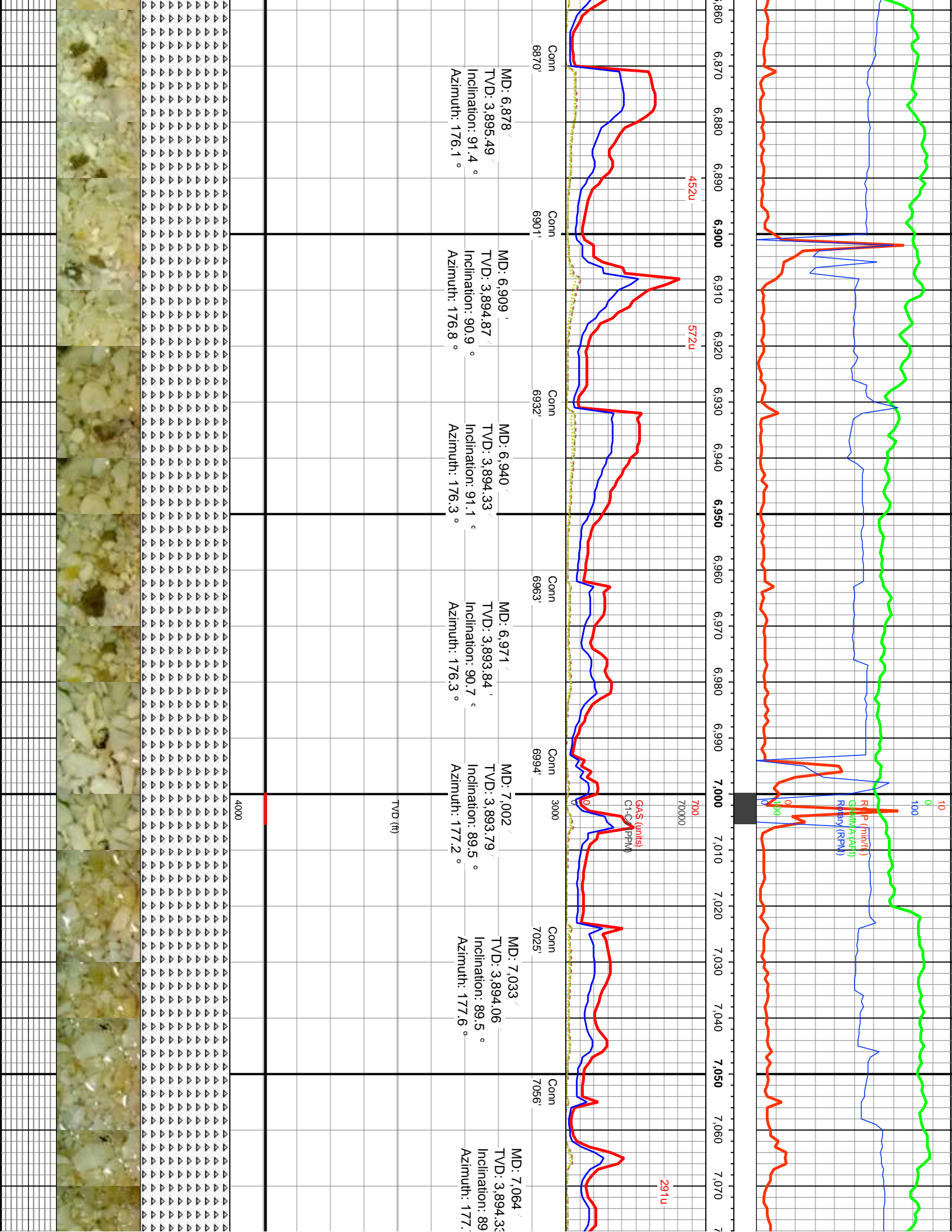
Conn 6405'

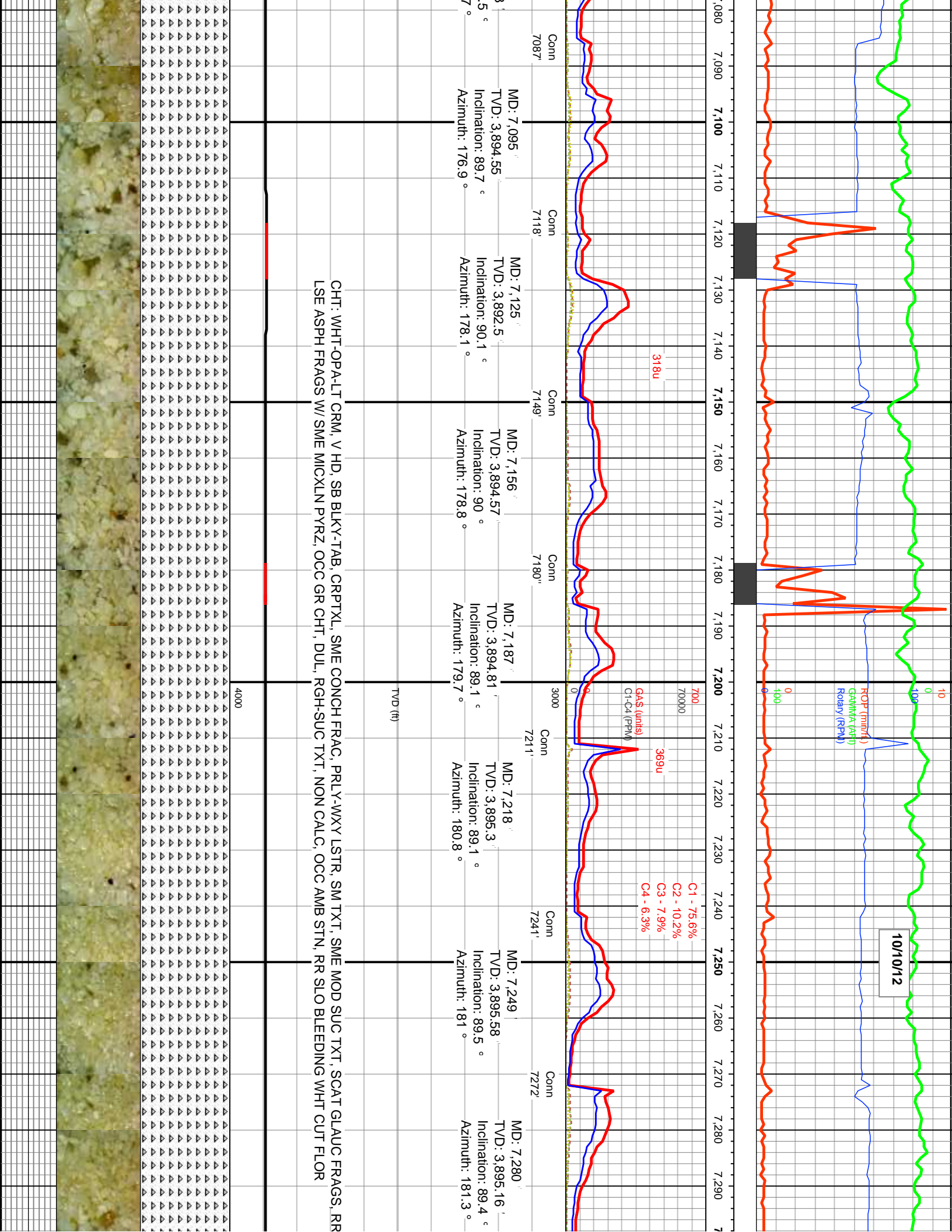


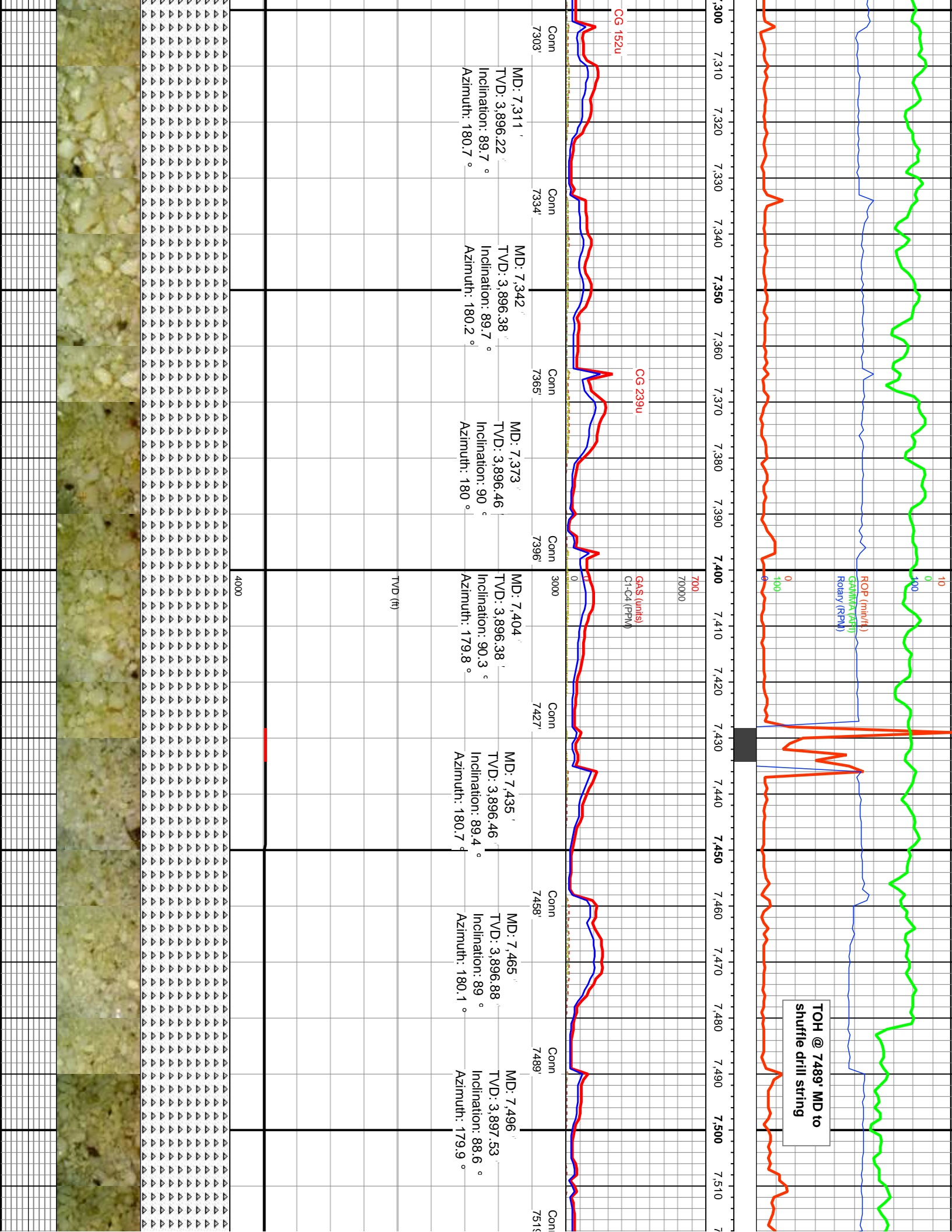
CHT: WHT-OPA-LT CRM, V HD,
 PRL Y LSTR, SM-SL SUC TXT, N
 BCMG BRI WHT-VIO CUT FLOR



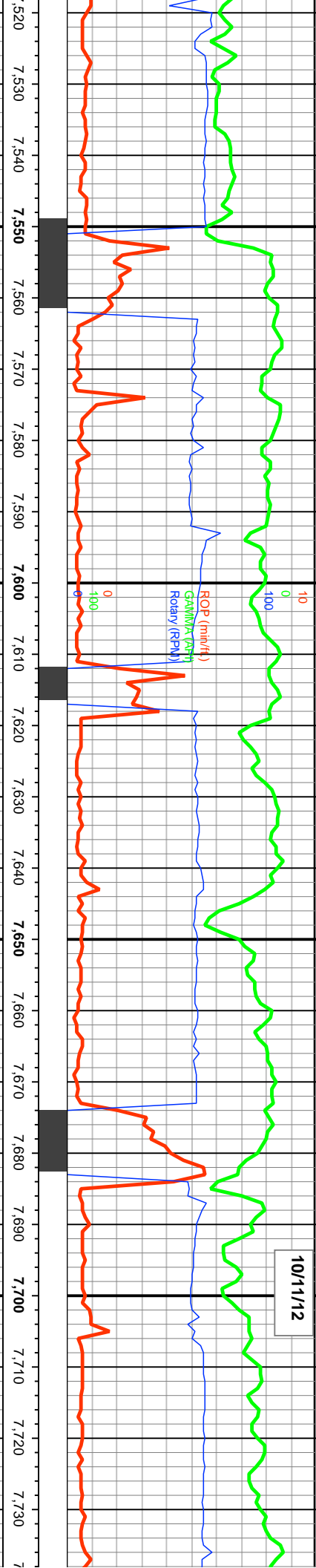








10/11/12



**Pump #1 repaired
Displacement recalibrated
Lag recalculated**

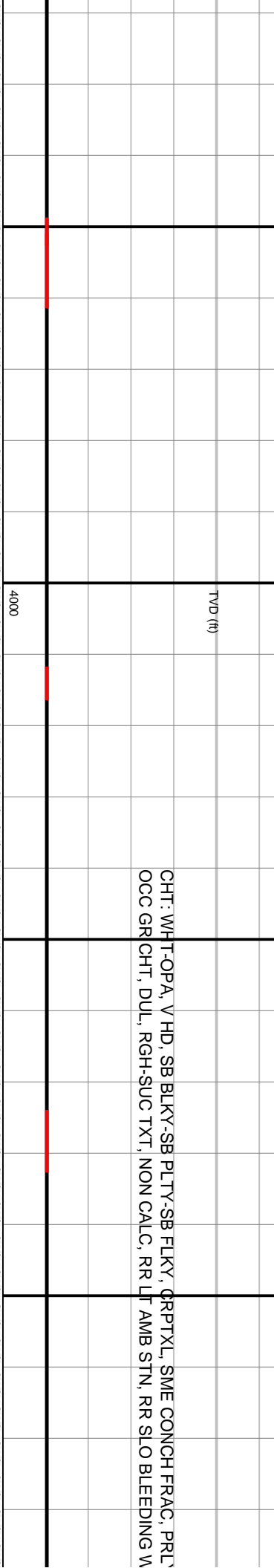
C1 - 74.5%
C2 - 12.1%
C3 - 9.4%
C4 - 4.0%

214u

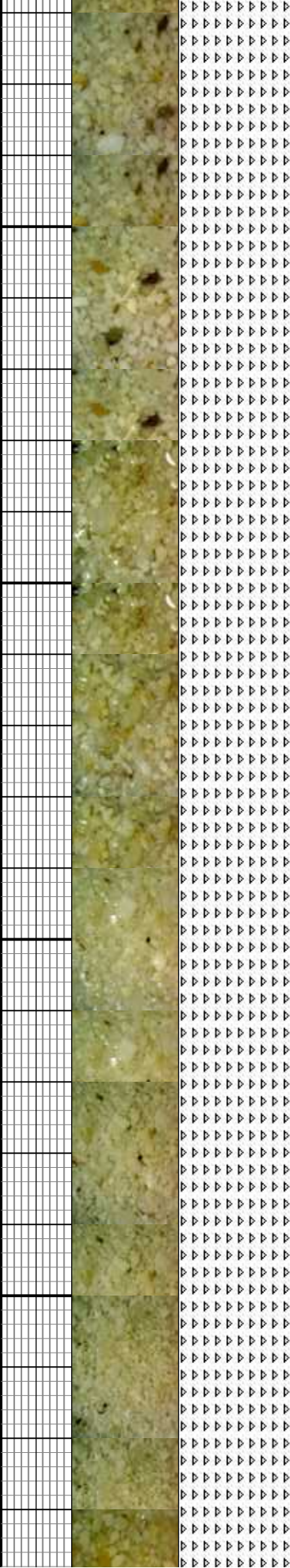
290u

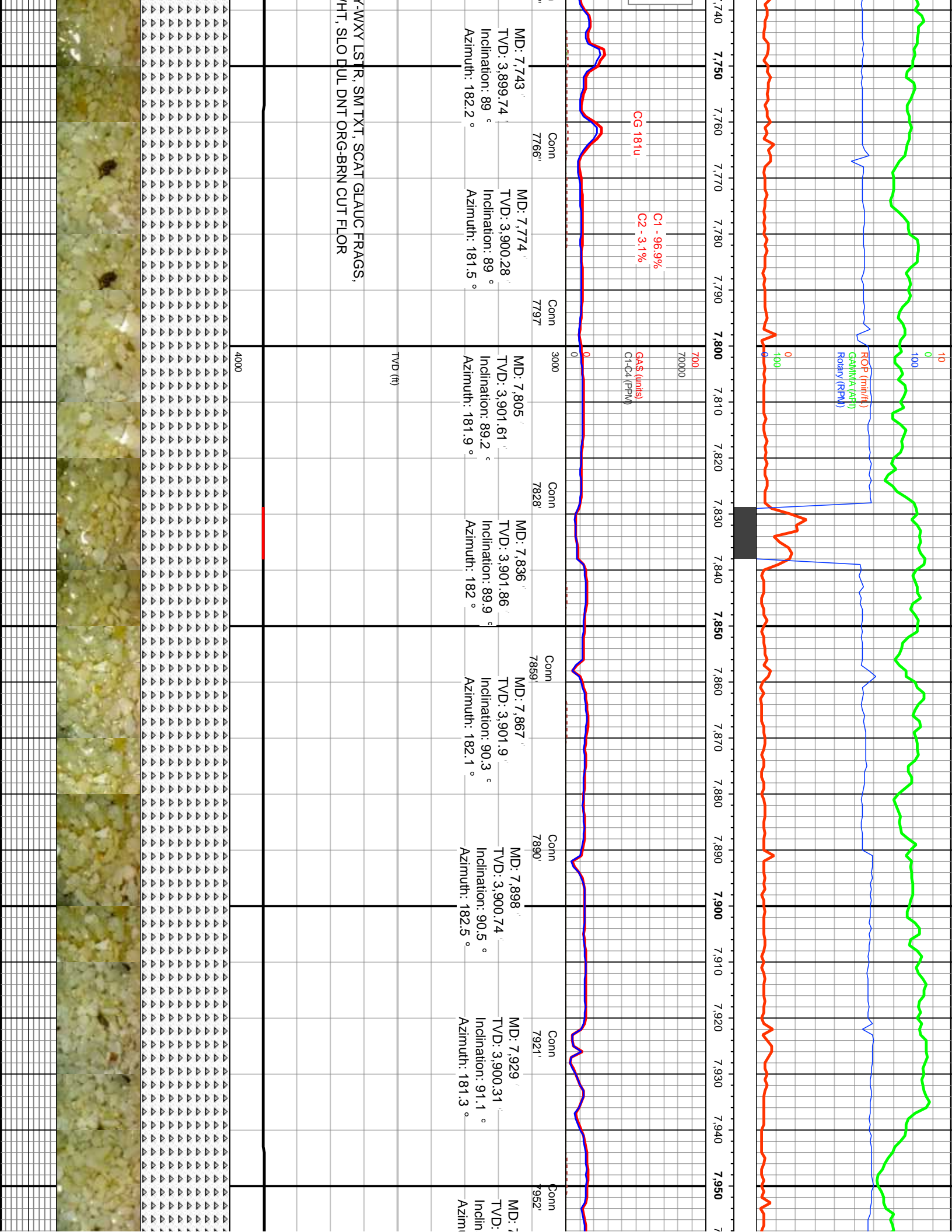
GAS (units)
C1-C4 (PPM)

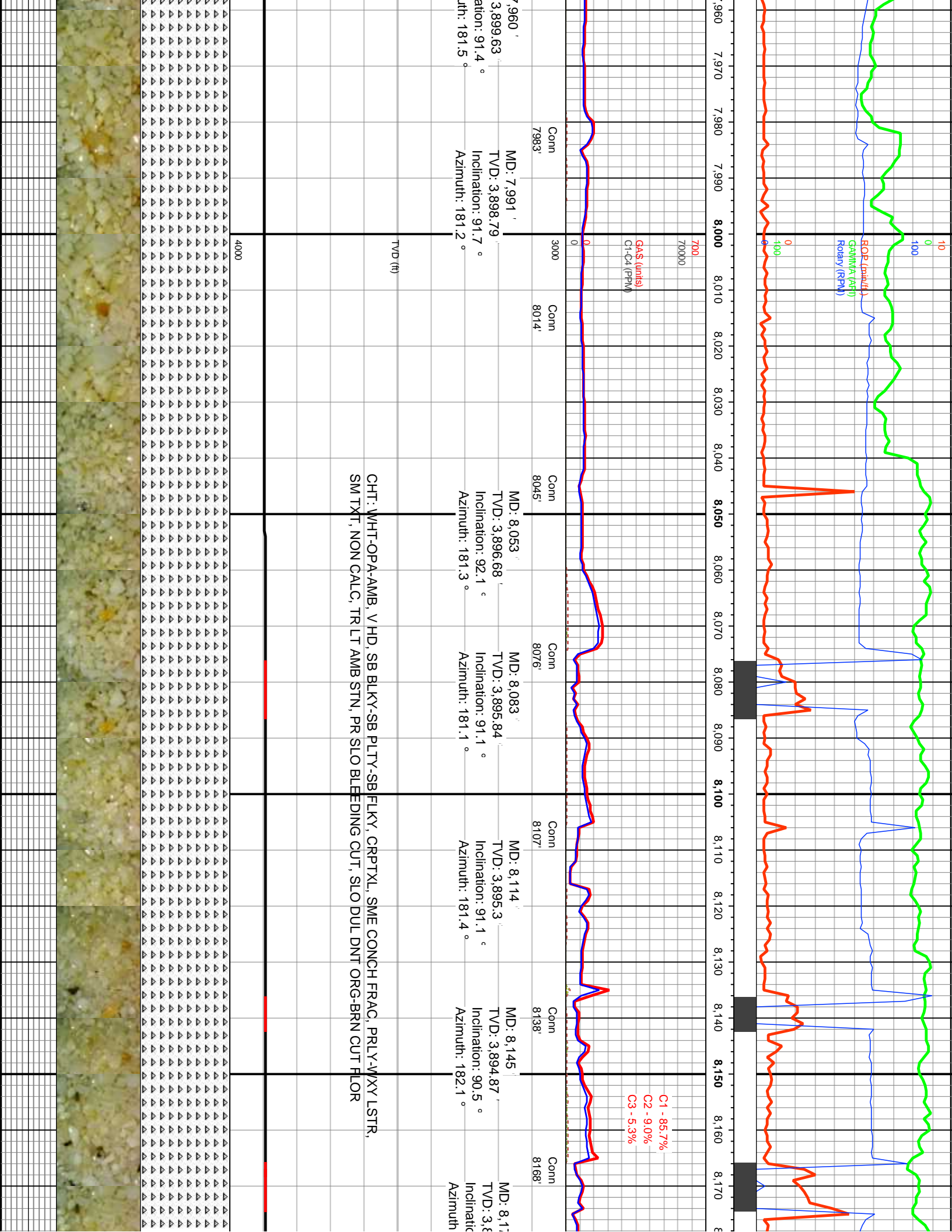
MD: 7,527'	MD: 7,557'	MD: 7,588'	MD: 7,619'	MD: 7,650'	MD: 7,682'	MD: 7,712'
TVD: 3,898.18'	TVD: 3,898.44'	TVD: 3,898.31'	TVD: 3,898.31'	TVD: 3,898.36'	TVD: 3,898.73'	TVD: 3,899.22'
Inclination: 89.0°	Inclination: 90.0°	Inclination: 90.1°	Inclination: 90.1°	Inclination: 89.7°	Inclination: 89.0°	Inclination: 89.1°
Azimuth: 179.9°	Azimuth: 180.3°	Azimuth: 180.6°	Azimuth: 180.6°	Azimuth: 180.9°	Azimuth: 181.4°	Azimuth: 181.8°



CHT: WH-T-OPA_V HD, SB BLKY-SB PLY-SB FLKY, GRPTXL, SME CONCH FRAC, PRLT
OCC GR CHT, DUL, RGH-SUC TXT, NON CALC, RR LT AMB STN, RR SLO BLEEDING W







ROP (pink)
 GAMMA (ART)
 Rotary (RPM)

GAS (units)
 C1-C4 (P/M)

C1 - 85.7%
 C2 - 9.0%
 C3 - 5.3%

MD: 7,960'
 TVD: 3,899.63'
 Inclination: 91.4°
 Azimuth: 181.5°

MD: 7,991'
 TVD: 3,898.79'
 Inclination: 91.7°
 Azimuth: 181.2°

MD: 8,053'
 TVD: 3,896.68'
 Inclination: 92.1°
 Azimuth: 181.3°

MD: 8,083'
 TVD: 3,895.84'
 Inclination: 91.1°
 Azimuth: 181.1°

MD: 8,114'
 TVD: 3,895.3'
 Inclination: 91.1°
 Azimuth: 181.4°

MD: 8,145'
 TVD: 3,894.87'
 Inclination: 90.5°
 Azimuth: 182.1°

MD: 8,170'
 TVD: 3,894.3'
 Inclination: 90.5°
 Azimuth: 182.1°

CHT: WHT-OPA-AMB, VHD, SB BLKY-SB PLTY-SB FLKY, CRPTXL, SME CONCH FRAC, PRLY-WYXY LSTR,
 SM TXT, NON CALC, TR LT AMB STN, PR SLO BLEEDING CUT, SLO DUL DNT ORG-BRN CUT FLOOR

TVD (ft)

4000

Conn
7983'

Conn
8014'

Conn
8045'

Conn
8076'

Conn
8107'

Conn
8138'

Conn
8168'





8,180
8,190
8,200
8,210
8,220
8,230
8,240
8,250
8,260
8,270
8,280
8,290
8,300
8,310
8,320
8,330
8,340
8,350
8,360
8,370
8,380
8,390
8

700
70000
GAS (units)
C1-C4 (PPM)

Conn
8199'

Conn
8230'

Conn
8261'

Conn
8292'

Conn
8323'

Conn
8354'

Conn
8385'

MD: 8,207'
TVD: 3,895.52'
Inclination: 88.9°
Azimuth: 181°

MD: 8,238'
TVD: 3,896.25'
Inclination: 88.4°
Azimuth: 181.5°

MD: 8,269'
TVD: 3,897.11'
Inclination: 88.4°
Azimuth: 181.6°

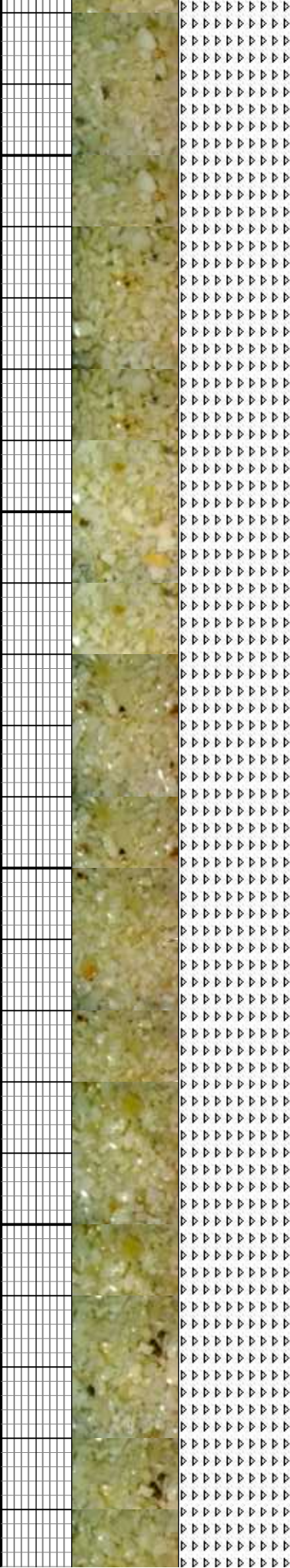
MD: 8,300'
TVD: 3,897.95'
Inclination: 88.5°
Azimuth: 181.5°

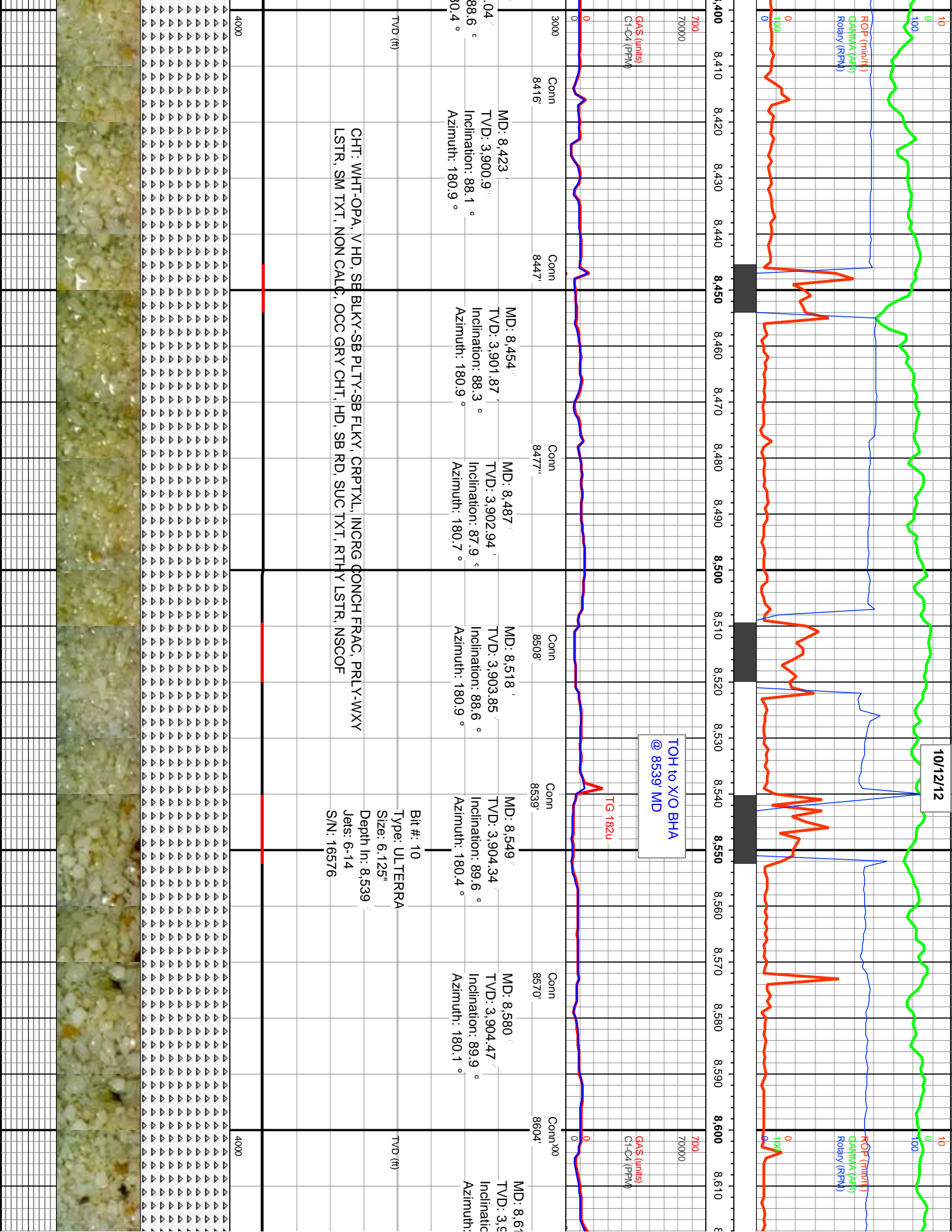
MD: 8,331'
TVD: 3,898.74'
Inclination: 88.6°
Azimuth: 181.7°

MD: 8,362'
TVD: 3,899.39'
Inclination: 89°
Azimuth: 181°

MD: 8,393'
TVD: 3,900'
Inclination:
Azimuth: 181°

4000





10/12/12

TOH to X/O BHA
@ 8539' MD

TG 182u

ROP (min/h)
GAMMA (API)
Rotary (RPH)

ROP (min/h)
GAMMA (API)
Rotary (RPH)

Gas (units)
C1-C4 (PPM)

Gas (units)
C1-C4 (PPM)

MD: 8,423'
TVD: 3,900.9'
Inclination: 88.1°
Azimuth: 180.9°

MD: 8,454'
TVD: 3,901.87'
Inclination: 88.3°
Azimuth: 180.9°

MD: 8,487'
TVD: 3,902.94'
Inclination: 87.9°
Azimuth: 180.7°

MD: 8,518'
TVD: 3,903.85'
Inclination: 88.6°
Azimuth: 180.9°

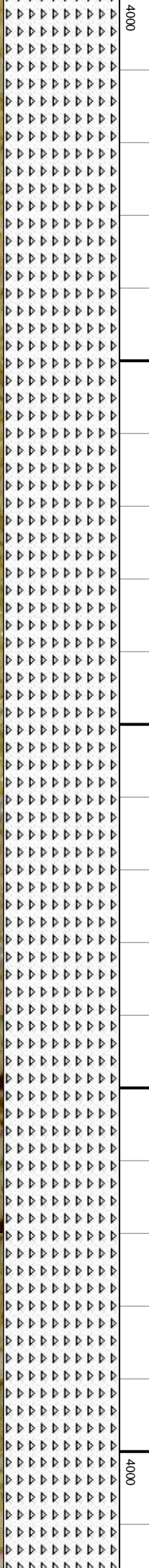
MD: 8,549'
TVD: 3,904.34'
Inclination: 89.6°
Azimuth: 180.4°

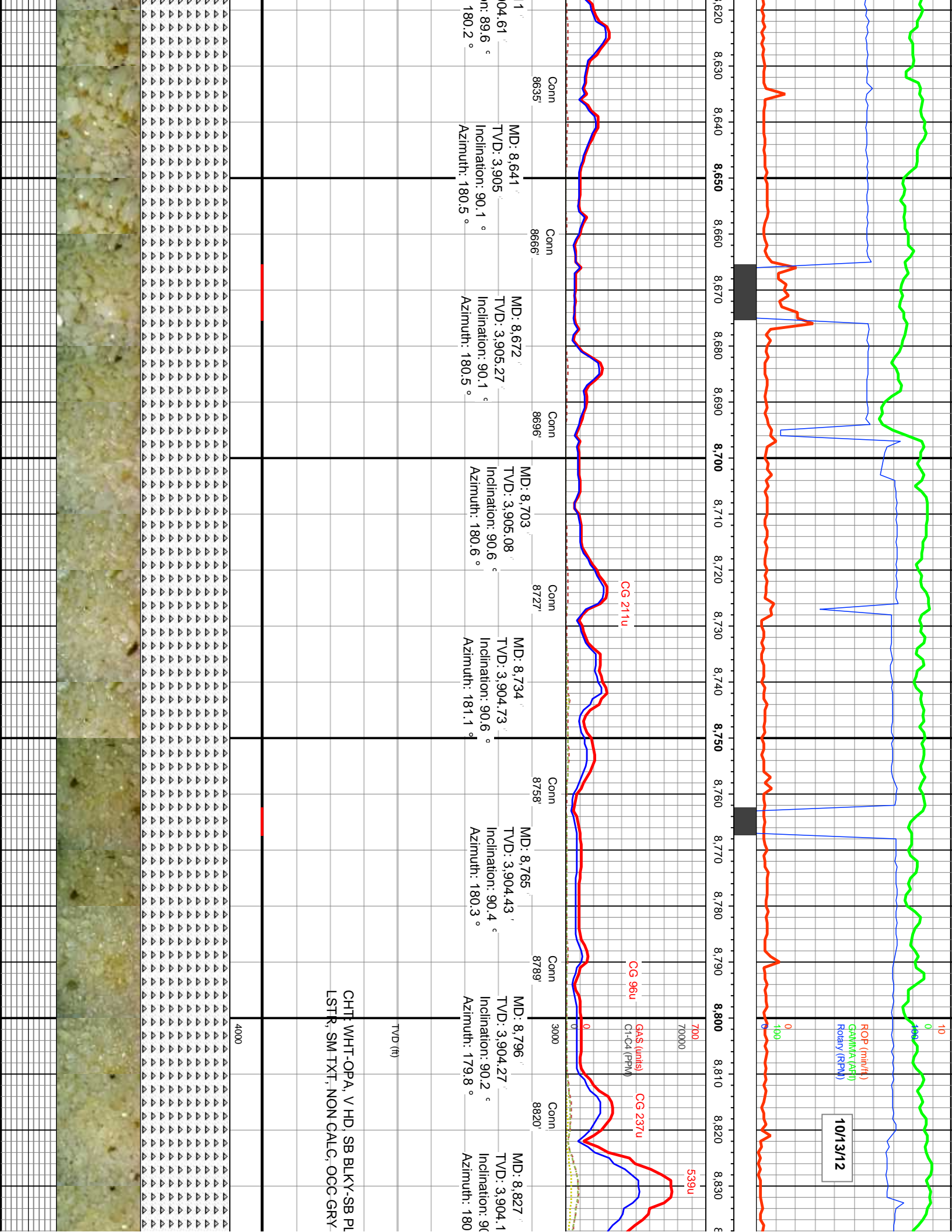
MD: 8,580'
TVD: 3,904.47'
Inclination: 89.9°
Azimuth: 180.1°

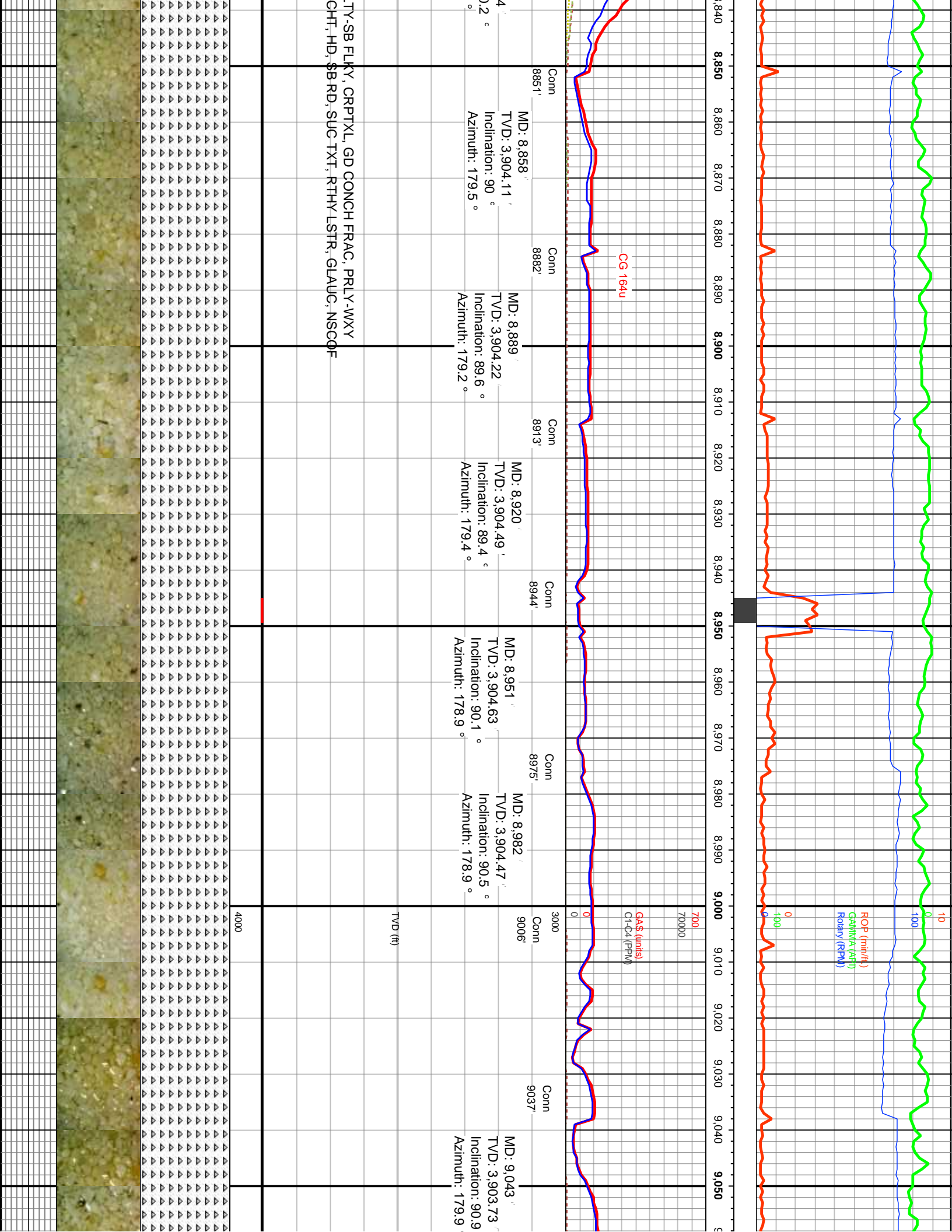
MD: 8,611'
TVD: 3,904.59'
Inclination: 89.9°
Azimuth: 180.1°

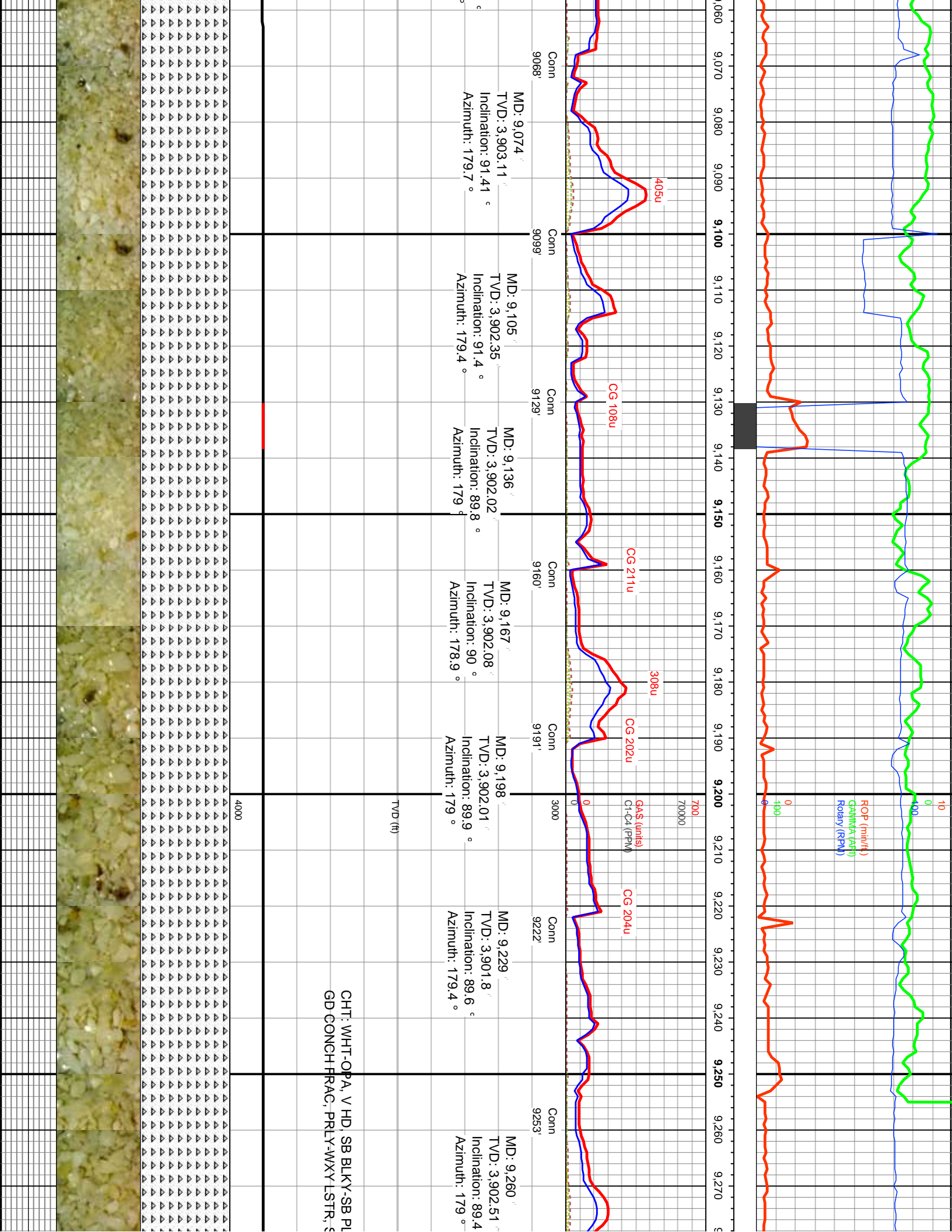
CHT: WHT-OPA, VHD, SB BLKY-SB PLY-SB FLKY, CRPTXL, INCRG CONCH FRAC, PRLY-WXY
LSTR, SM TXT, NON CALD, OCC GRV CHT, HD, SB RD, SUC TXT, RTH Y LSTR, NSCOF

Bit #: 10
Type: ULTERRA
Size: 6.125"
Depth In: 8,539'
Jets: 6-14
S/N: 16576

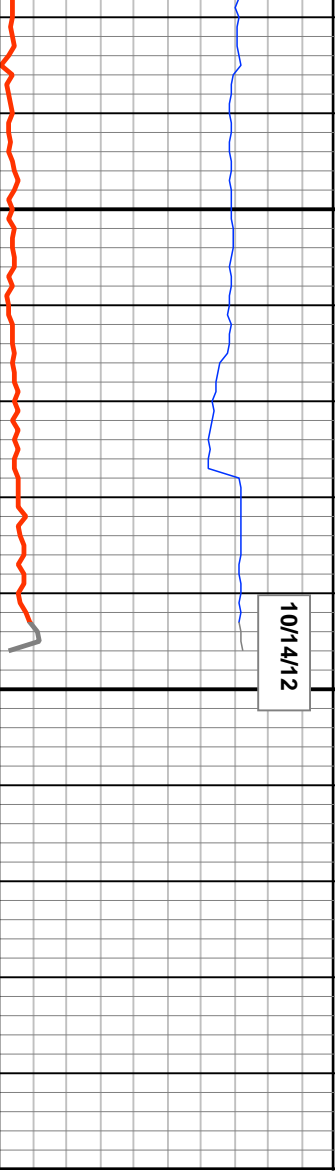








10/14/12



9.280 9.290 9.300 9.310 9.320 9.330 9.340 9.350 9.360 9.370 9.380 9.390 9.4

CG 406u

249u

CG 171u

Conn
9284'

Conn
9315'

Conn
9346'

MD: 9.291'

TV/D: 3,902.92'

Inclination: 89.1°

Azimuth: 179.3°

TY-SB FLKY, SB TAB, CRPTXL,
SMTXT, NON CALG, NSCOF

Thank you for using Hemeros Hydrocarbons
for your well log analysis needs!
Chris Spencer
Kyle Welty

