



Empirica

Scale: 5" / 100'
Measured Depth Log

Well Name Bybee 1_hz

Location Sec. 14-T2N-R68W

State Colorado

Country USA

API Number 05-123-41800-00

Geographic Region DJ Basin

Spud Date 2/23/2016

Surface Coordinates SHL: 2267' FSL, 1080' FEL

Lat: 40° 8' 15.5796"

Long: -104° 57' 53.5386"

County Weld

Rig Number Patterson UTI 346

Field Wattenberg

Drilling Completed 2/27/2016

Ground Elevation 4,889'

K.B. Elevation 4,913.5'

Logged Interval 5,000' To 12,661'

Total Depth 12,661

Formation Niobrara B Chalk

Type of Drilling Fluid Oil Based - invert

Operator

Company Extraction Oil & Gas

Address 1888 Sherman St., Suite 200
Denver, CO 80203

Geologist

Name Vivian Spiess / Jared Rouse

Company Extraction Oil & Gas

Address 1888 Sherman St., Suite 200
Denver, CO 80203



Other

Equipment ML-113










Comments Start: 2-24-16
Standby: N/A
TD: 2-27-16

Services Provided 2-man Logging
On Site Geosteering

























Logger Names Nicholas Watkins / Brian Ferw

Address Empirica, LLC.
6360 W Sam Houston Pkwy N
Suite 100
Houston, TX 77041












































Zone Color Coding

	Oil		Condensate		Gas
	Note		Core		Pressure
	Error		Water		Seal

Rock Types

	UNKNOWN		DOLOMITE		SHALE GRAY		TILL
	ANHYDRITE		CHERT		SHALE COLORED		BENTONITE
	GYPSUM		COAL		SILTSTONE		TUFF
	SALT		MARLSTONE		SANDSTONE		IGNEOUS
	CHALK		CLAYSTONE		CONGLOMERATE		METAMORPHIC
	LIMESTONE		SHALE		BRECCIA		CEMENT




Accessories



	F FOSSIL		ARGILLACEOUS		GLAUCONITE
	GASTROPOD		ARGILLITE GRAIN		GYPSIFEROUS
	OOLITE		BENTONITE		HEAVY MINERAL
	OSTRACOD		BITUMINOUS SUBSTANCE		KAOLIN
	PELECYPOD		BRECCIA FRAGMENTS		MARLSTONE
	PELLET		CALCAREOUS		MINERAL CRYSTALS
	PISOLITE		CARBONEOUS FLAKES		NODULES
	PLANT REMAINS		CHERT		PHOSPHATE PELLET
	PLANT SPORES		CHERT-LT		PYRITE
	SCAPHOPOD		COAL - THIN BEDS		SALT CAST
	STROMATOPOROID		DOLOMITIC		SANDY
	ECHINOID		FELDSPAR		SILICEOUS
	FISH		FERRUGINOUS PELLET		SILTY
	FORAMINIFERA		FERRUGINOUS		TUFFACEOUS
					SILTSTONE STRINGER


Stringer

	ANHYDRITE STRINGER
	BENTONITE STRINGER
	COAL STRINGER
	DOLOMITE STRINGER
	GYPSUM STRINGER
	LIMESTONE STRINGER
	MARLSTONE (CALC) STRG
	MARLSTONE (DOL) STRG
	SANDSTONE STRINGER
	SHALE STRINGER

Other Symbols

	ORGANIC		FORMATION
	PINPOINT		GAS SHOW

	DEAD		VUGGY		MIN DEPTH
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	EVEN		NORMAL FAULT
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Engineering

	QUESTIONABLE		OIL SHOW
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	SPOTTED STAINING		BIT		OVERTURNED STR
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Porosity

	CASING		REVERSE FAULT
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	CONNECTION (LEFT)		SIDEWALL CORE
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	EARTHY		CONNECTION (RIGHT)		SIDEWALL CORE
---	--------	---	--------------------	---	---------------

	FENESTRAL		CONNECTION GAS		SLIDE
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	FRACTURE		CORE - LOST		SURVEY
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	INTERCRYSTALLINE		CORE - RECOVERED		TRIP GAS
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	INTERCOLLITIC		DST INTERVAL		WIRELINE TESTER
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	MOLDIC		FAULT		WIRELINE TESTER
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ols


TOP

L LITHOGRAPHIC

Rounding

 MICROXLN

 ANGULAR  MUDSTONE

 ROUNDED  PACKSTONE

 SUBANG  WACKESTONE

RATA

 SUBBRND

Sorting

Textures

 MODERATE

(LEFT)

(RIGHT)  BOUNDSTONE  POOR

 CHALKY  WELL


 CRYPTOXLN

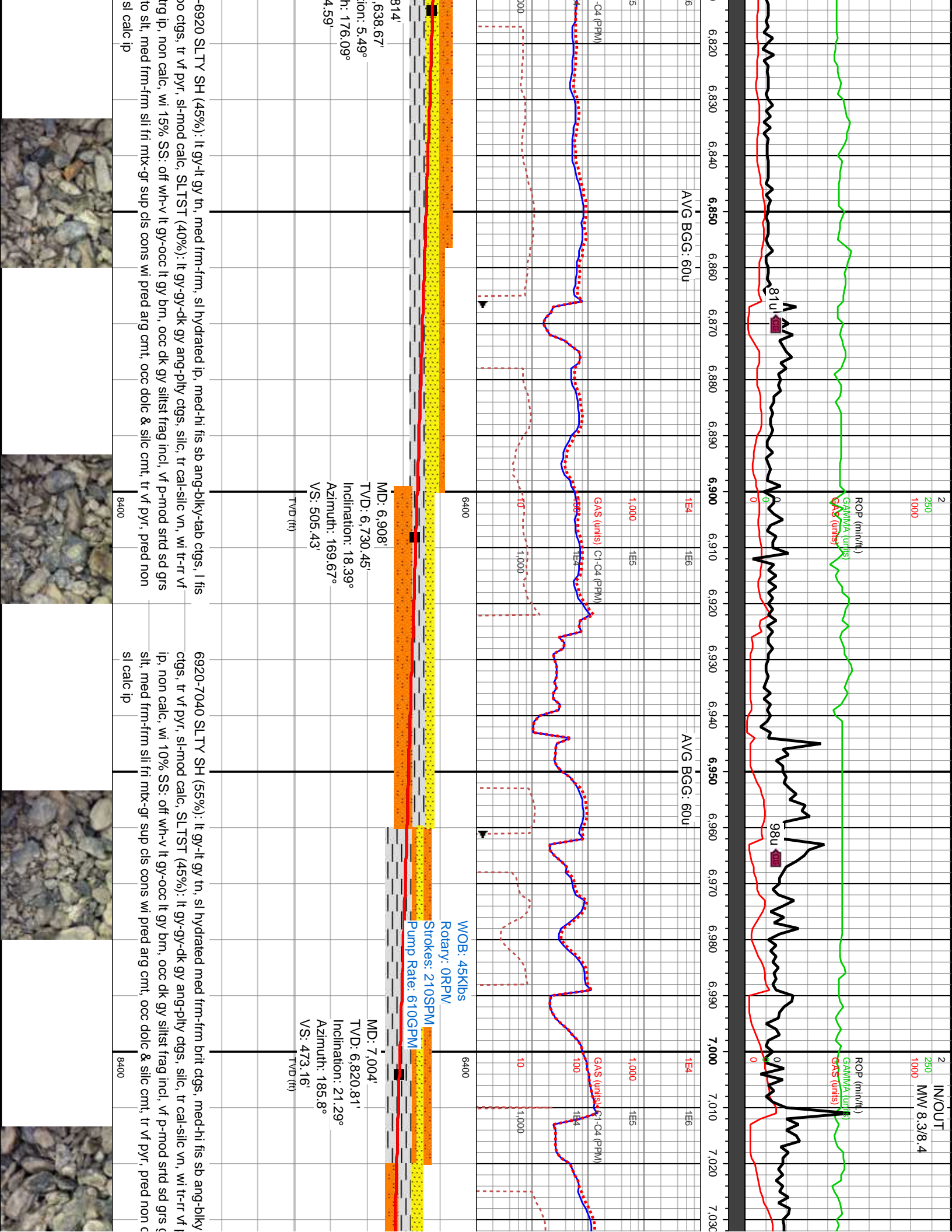
 EARTHY

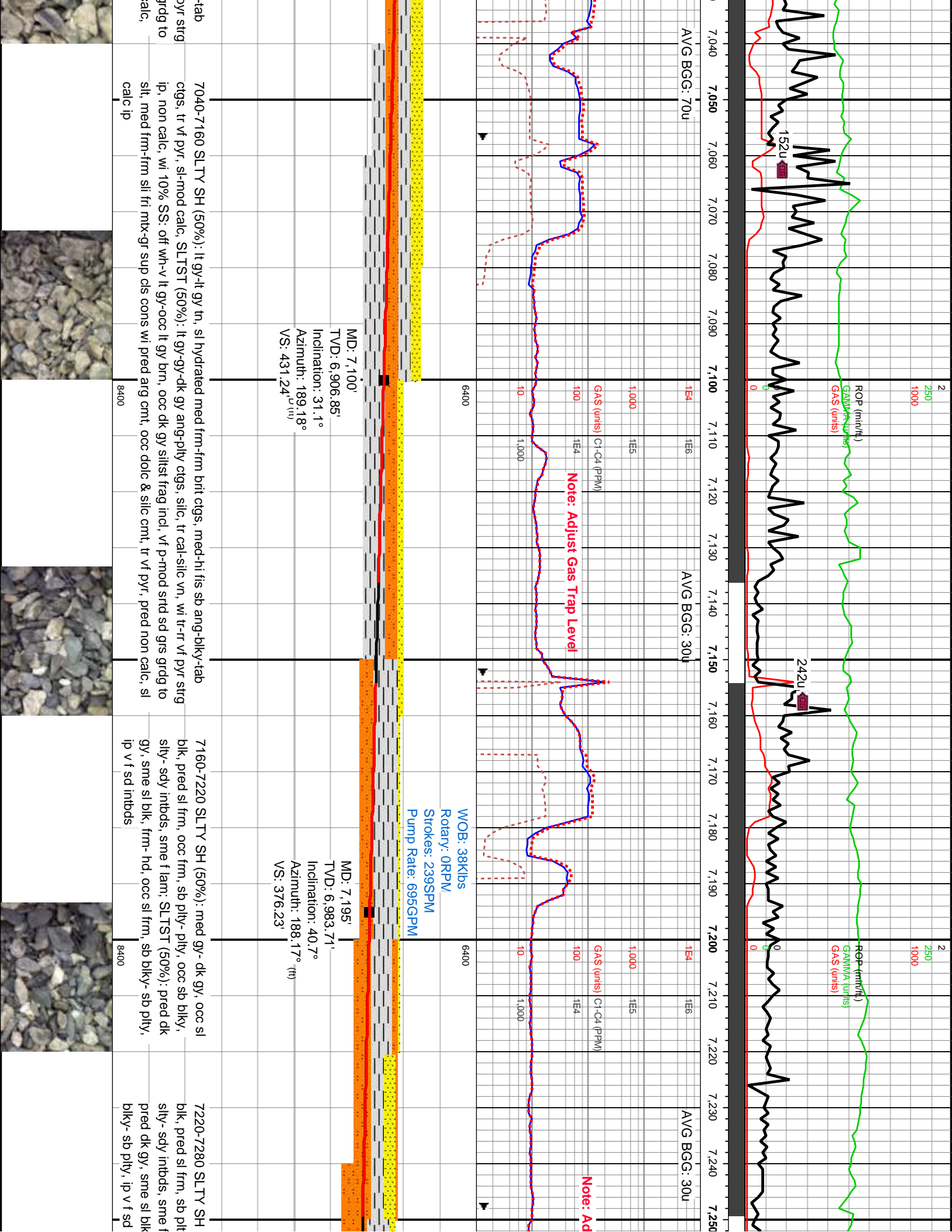
D - LEFT

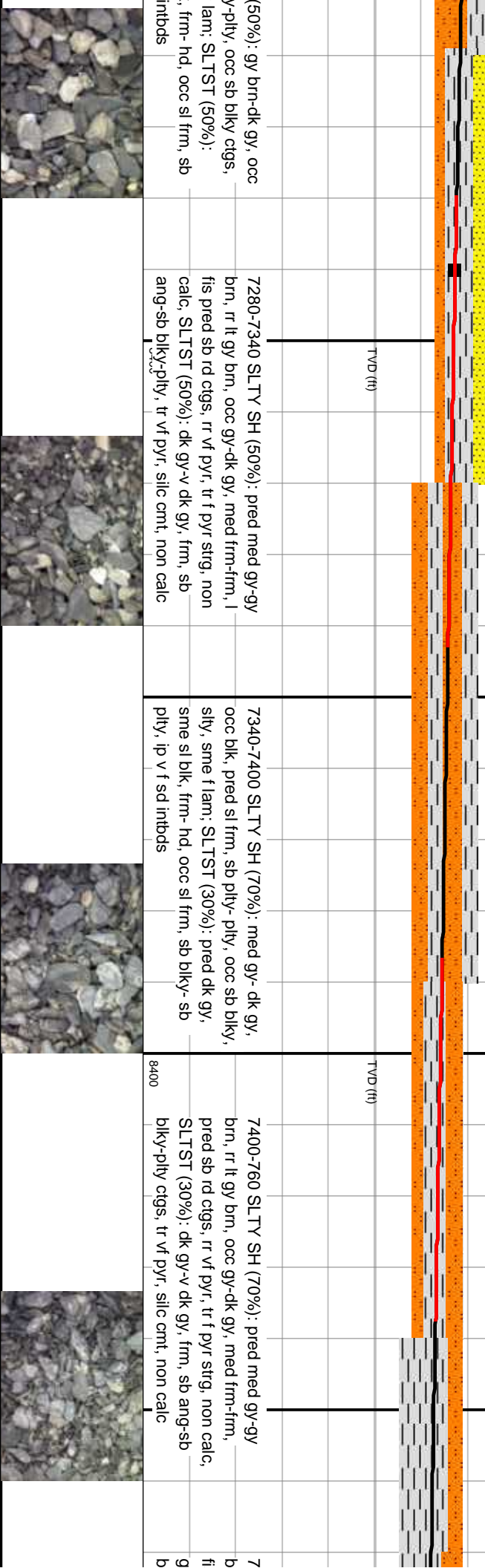
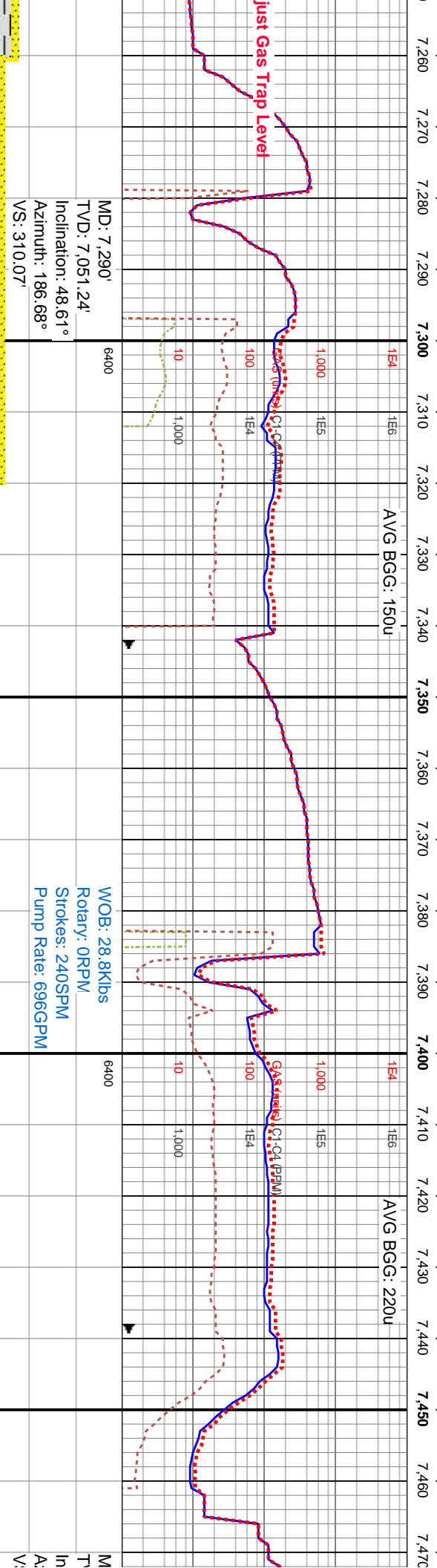
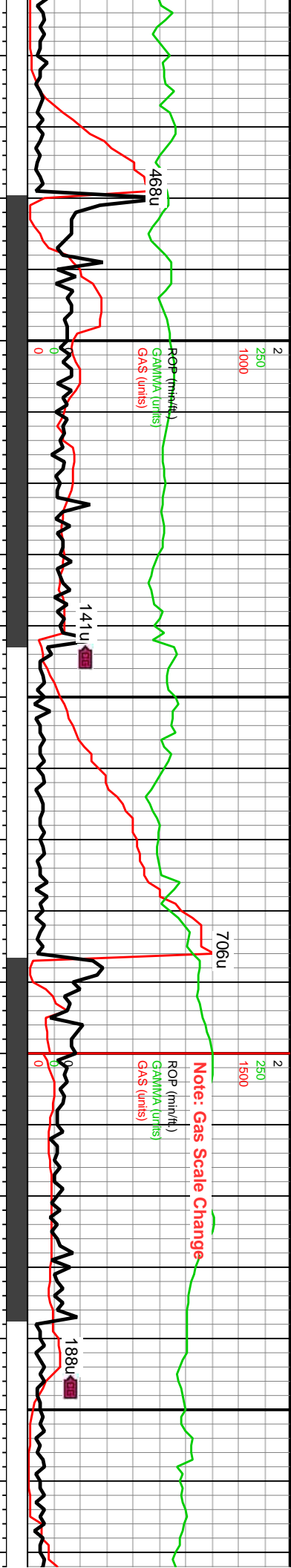
 FINELYXLN

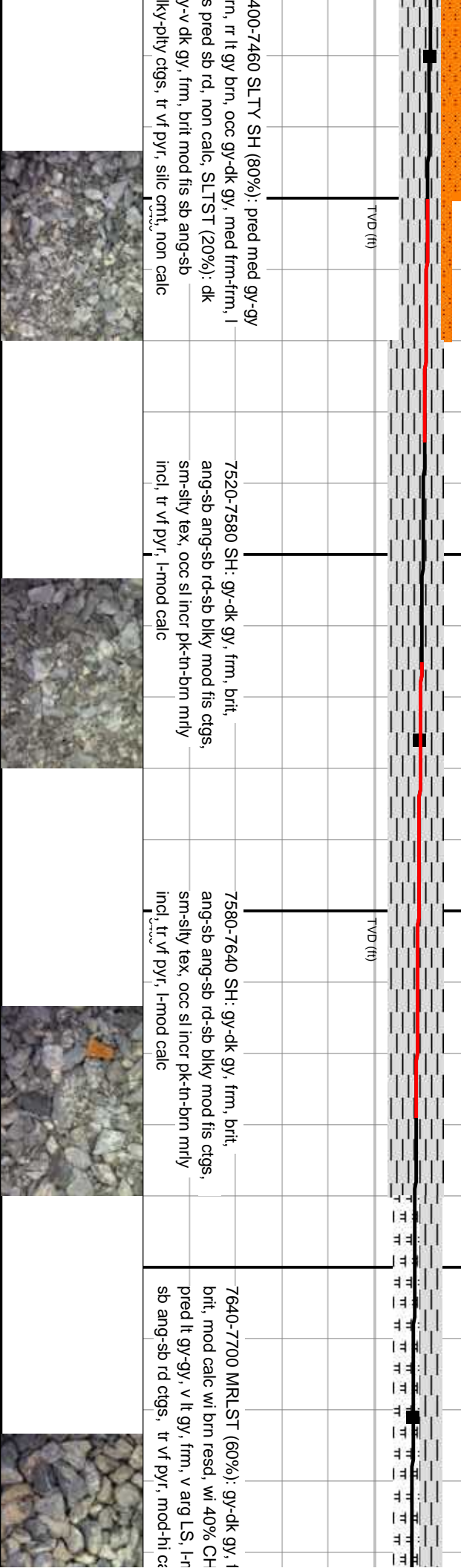
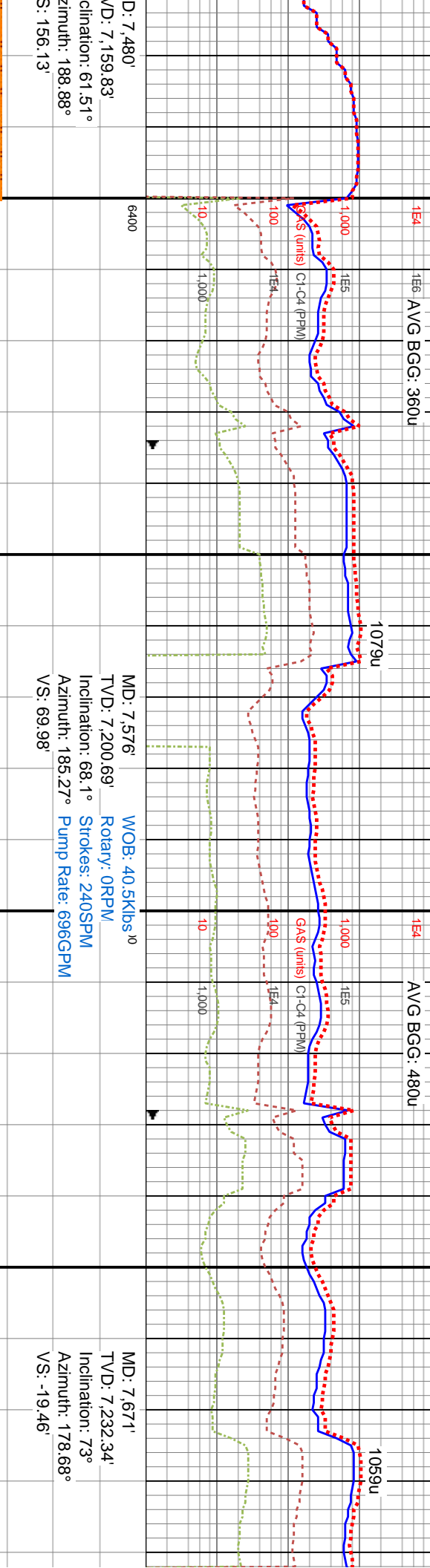
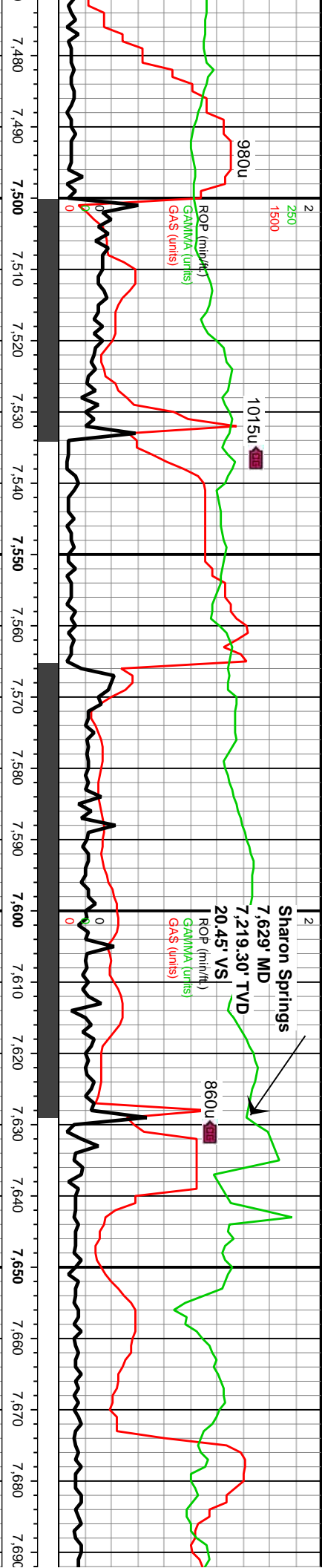
D - RT

 GRAINSTONE

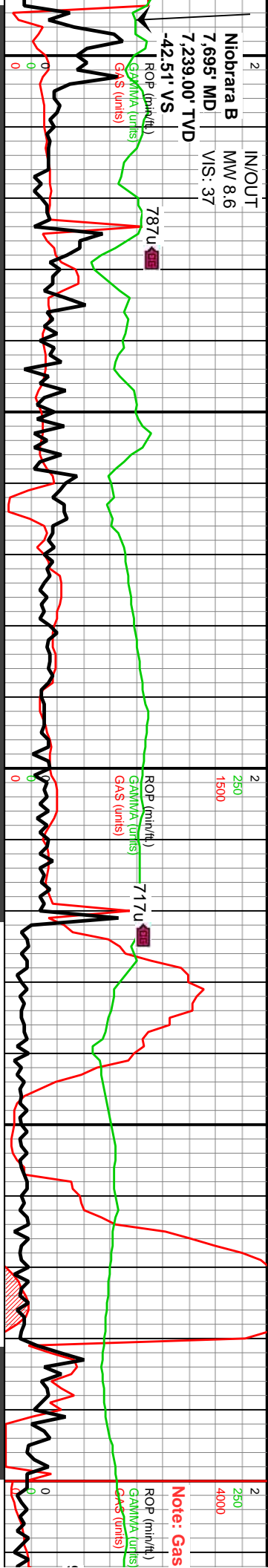








IN/OUT
Niobrara B MW 8.6
7,695' MD
7,239.00' TVD
-42.51° VS



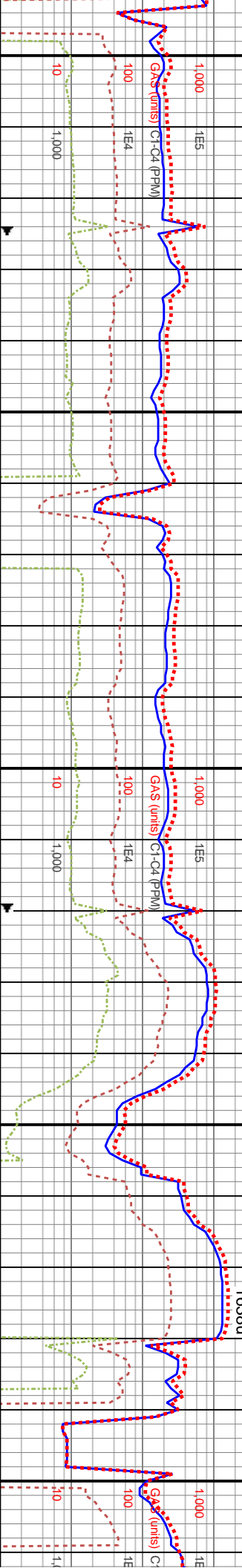
2
250
1500

2
250
4000
Note: Gas

1E4 AVG BGG: 460u

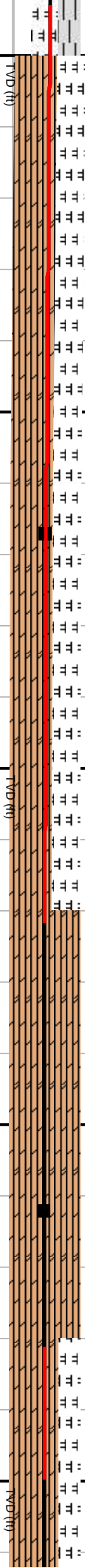
AVG BGG: 250u

AVG BGG: 50u



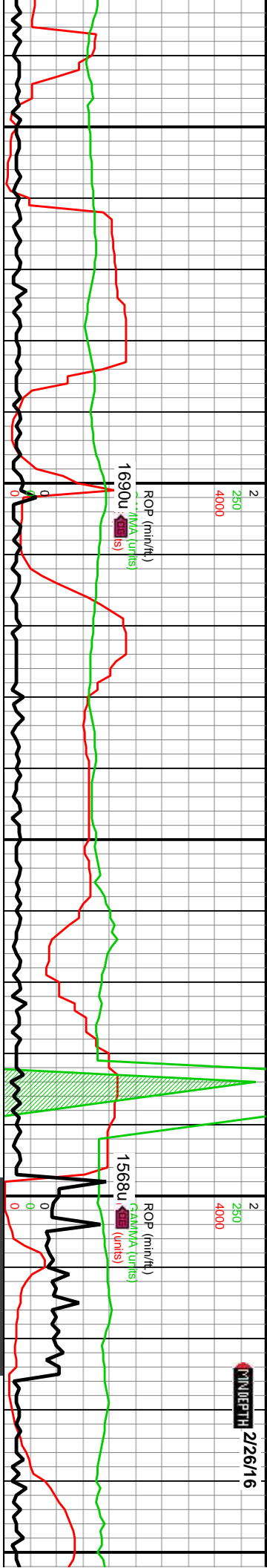
MD: 7,767'
TVD: 7,254.5'
Rotary: 0RPM
Inclination: 80.3°
Strokes: 240SPM
Azimuth: 175.78°
Pump Rate: 696GPM
VS: -112.68°

MD: 7,862'
TVD: 7,263.61'
Inclination: 88.69°
Azimuth: 173.98°
VS: -206.78°



7700-7760 CHK (60%): pred lt gy-gy, v lt gy wi com
thn wh chky lamn & com vf incl, frm, v arg LS, sb
ang-sb rd ctgs, tr vf pyr, mod-hi calc; MRLST (40%):
gy-dk gy, frm, sb rd-rd occ sb ang, com mot wi
gy-dk
7760-7820 CHK (60%): lt gy-gy, occ dk gy-brn gy
wi o sin, frm, l-mod fis sb ang-sb rd ctgs, v arg
LS wi com thn wh chky lamn & com vf-f wh chky
incl, tr vf pyr, MRLST (40%): gy-dk gy, frm, brit, l
fis sb rd-rd occ sb ang ctgs, com mot, tr vf pyr,
sl silty-sm tex, mod calc wi brn resd
7820-7880 CHK: pred med gy, ip dk gy, abnt
br- lt gy mot, sme gy- offwht, pred hd- v frm, ip
sl frm, pred blk- sb blk, tr split- sb ply, rthy-
chky txt, pred sl- mod ang thru, sme ch chk, tr
dk gy- blk sb ply mrlly intbds, tr pyr, sme calc
incl, tr calc
7880-7940 CHK (70%): lt gy
frm, brit, l-mod fis sb ang-sb
thn wh chky lamn & v chky i
mod-hi calc, MRLST (30%):
rd-rd occ sb ang ctgs, com r
vf pyr, mod calc wi brn resd

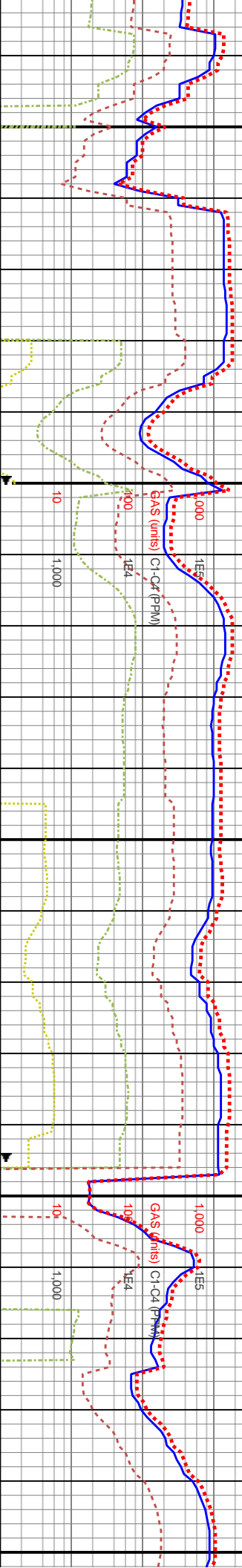




8,140 8,150 8,160 8,170 8,180 8,190 8,200 8,210 8,220 8,230 8,240 8,250 8,260 8,270 8,280 8,290 8,300 8,310 8,320 8,330 8,340 8,350

AVG BGC: 760U

AVG BGC: 1200U

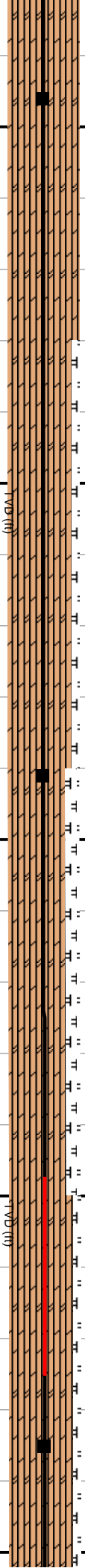


MD: 8,146'
TVD: 7,262.71'
Inclination: 91.59°
Azimuth: 179.78°
VS: -490.07'

WOB: 41.6Klbs
Rotary: 60RPM
Strokes: 240SPM
Pump Rate: 696GPM

MD: 8,241'
TVD: 7,259.48'
Inclination: 92.3°
Azimuth: 178.2°
VS: -584.99'

MD: 8,335'
TVD: 7,256.61'
Inclination: 91.2°
Azimuth: 180.48°
VS: -678.94'



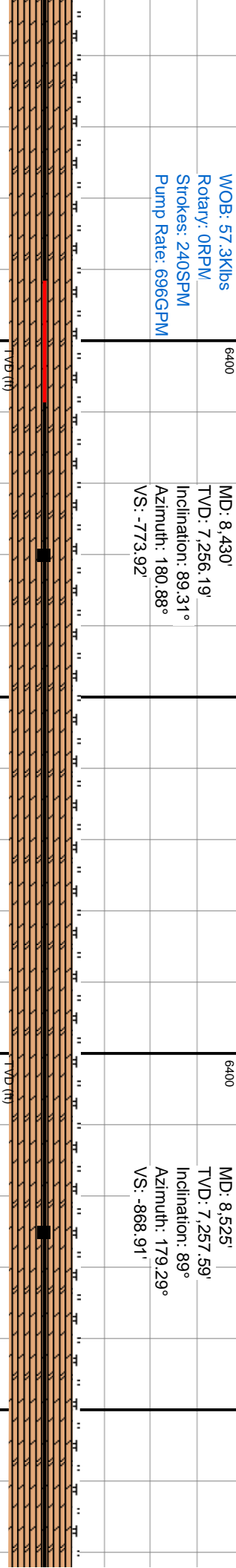
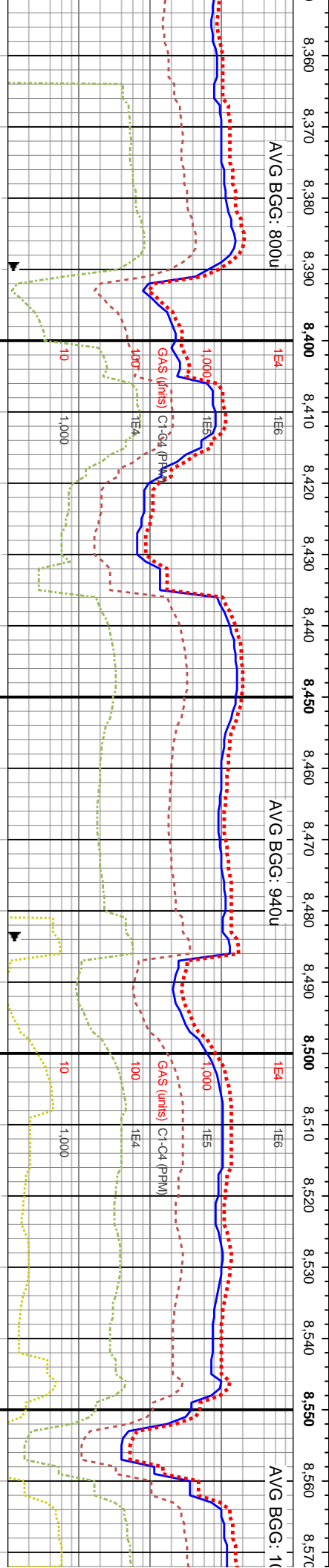
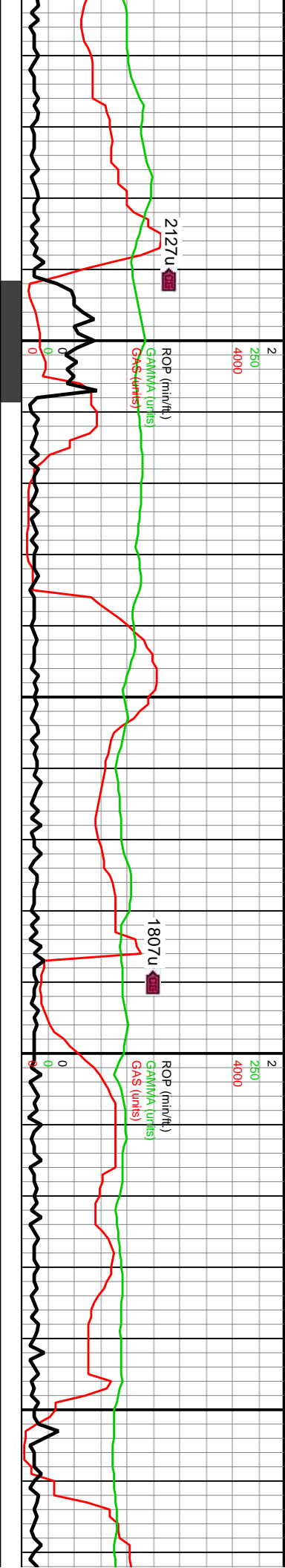
8120-8180 CHK: offwht, pred hd- v frm, sme sl frm, pred blkly- sb blkly, tr split, rthy- chky txt, pred sl arg thru, ip mod arg, tr dk gy- blk sb pily mrlly inbds, tr pyr, sme calc incl, sme lse- euhed cal

8180-8240 CHK (90%): lt gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd, com thn wh chky lamm & com vf incl, sm-sl sily tex, tr c free chk, tr vf pyr, mod-hi, MRLST (10%): gy-dk gy, sb rd-rd occ sb ang, mot wi brn-tr mrlly incl, tr vf pyr, sl sily-sm tex, mod calc

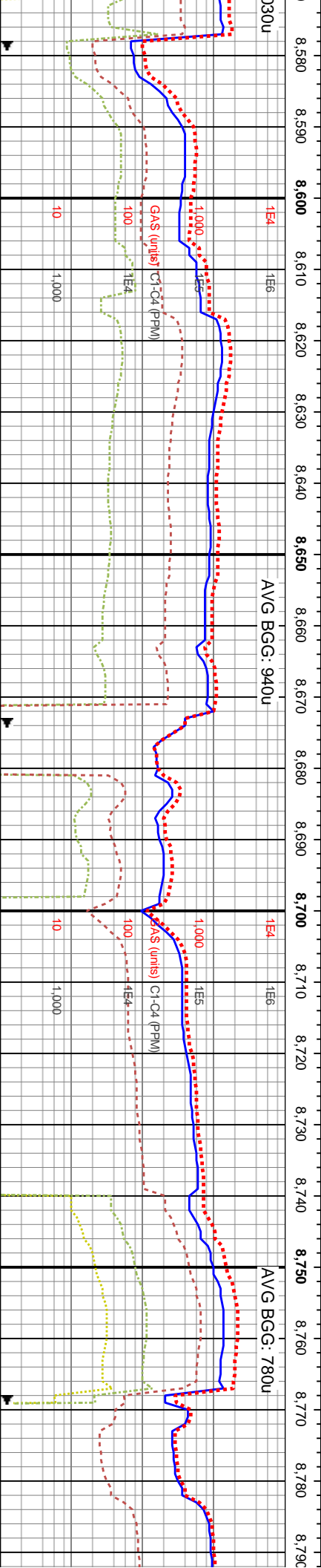
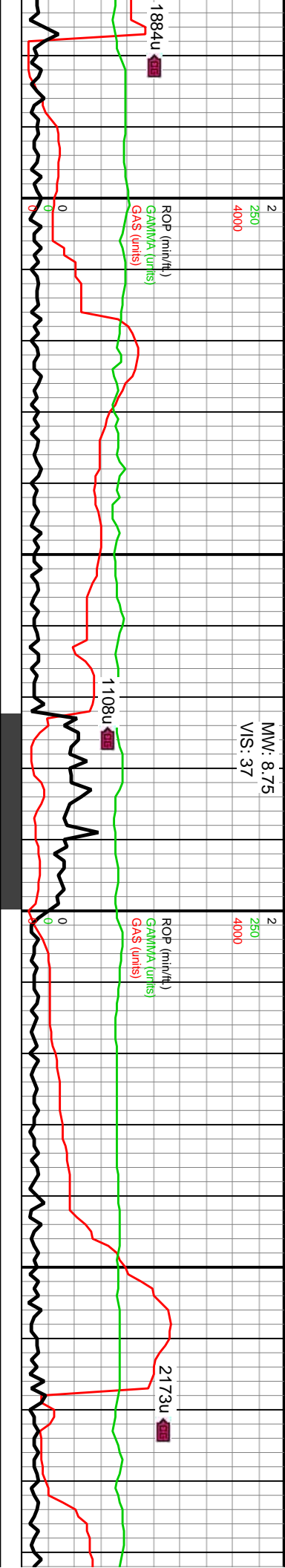
8240-8300 CHK (80%): lt gy-gy, occ-com gy, frm, brit, l-mod fis sb ang-sb rd ctgs, v arg LS wi com thn wh chky lamm & v chky incl, tr vf pyr, mod-hi calc, MRLST (20%): gy-dk gy mot wi brn-tr mrlly incl, sb rd-rd occ sb ang ctgs, tr vf pyr, mod calc

8300-8420 CHK (90%): wh chky lamm & com vf incl, HCL rxn, MRLST (10%) incl, tr vf pyr, sl sily-sm





It gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd ctgs, com thn ncl, sm-sl silty tex, tr c free chk, tr vf pyr, mod-hi calc wi chn gy-dk, frm-brit l fis sb rd-rd occ sb ang ctgs mot wi brn-tn mrlly tex, mod calc wi brn resdl	8420-8480 CHK (90%): It gy-gy, occ-com gy brn, frm, brit, l-mod fis sb ang-sb rd ctgs, v arg LS wi com thn wh chky lamn & v chky incl, tr c free chk, tr vf pyr, mod-hi calc, MRLST (10%): gy-dk gy mot wi brn-tn mrlly incl, frm-brit l fis sb rd-rd occ sb ang ctgs, tr vf pyr, mod calc wi brn resdl	8480-8540 CHK (90%): It gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd ctgs, com thn wh chky lamn & com vf incl, sm-sl silty tex, tr c free chk, tr vf pyr, mod-hi calc, MRLST (10%): gy-dk, frm-brit l fis sb rd-rd occ sb ang ctgs mot wi brn-tn mrlly incl, tr vf pyr, sl silty-sm tex, mod calc	8540-8600 CHK (90%): fis sb ang-sb rd ctgs, v chky lamn & com vf incl, tr vf pyr, mod-hi calc, MRLST (10%): gy-dk, frm-brit l fis sb ang ctgs, tr vf pyr, sl silty

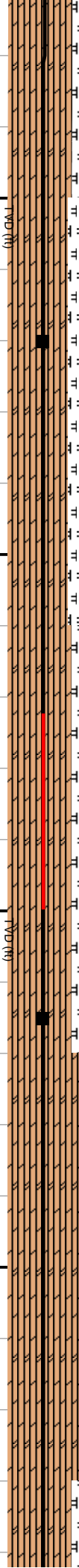


WOB: 46.3Klbs
Rotary: 50RPM
Strokes: 240SPM
Pump Rate: 696GPM

MD: 8,620'
TVD: 7,259.08'
Inclination: 89.2°
Azimuth: 177.67°
VS: -963.86'

MD: 8,715'
TVD: 7,260.41'
Inclination: 89.2°
Azimuth: 181.1°
VS: -1,058.83'

WOB: 45.3Klbs
Rotary: 65RPM
Strokes: 240SPM
Pump Rate: 696



: lt gy-gy, frm-brit, l-mod
arg LS w/ com thn wh
l, sm-sil silty tex, tr c free
allic; MRLST (10%): gy-dk
ci, frm, sb rd-rd occ sb
y-sm tex, mod calc

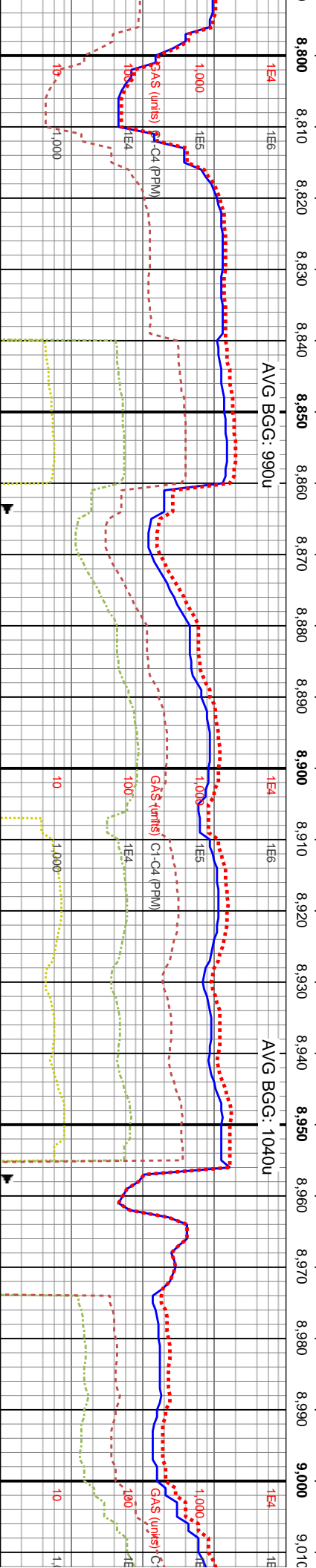
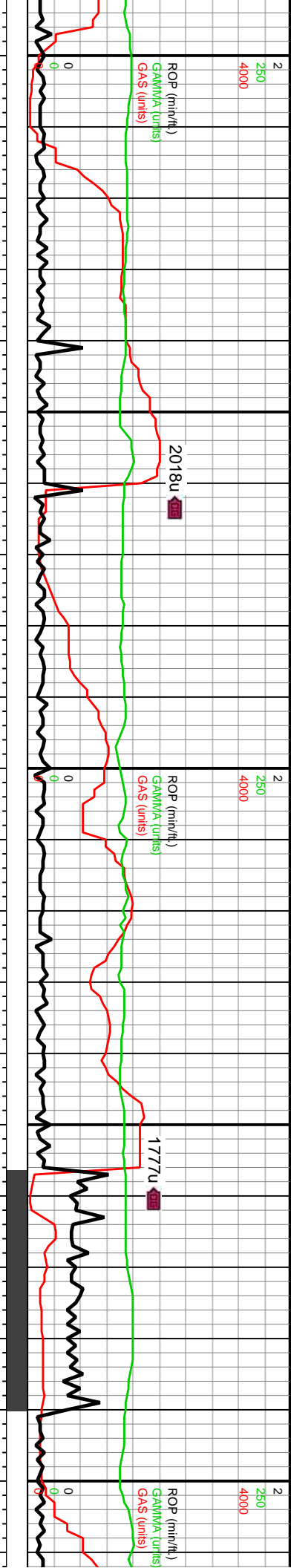
8600-8660 CHK (85%): lt gy-gy v arg LS, frm-brit
l-mod fis sb ang-sb rd cigs, com thn wh chky lamn
& com vf incl sm-sil silty tex, tr fos frags, tr c free chk, tr
vf pyr, tr pyr nod, mod-hi calc, MRLST (15%): gy-dk
gy mot w/ brn-tn mrlly incl, frm, brit, l fis sb rd-rd occ
sb ang cigs, tr vf pyr, sl silty-sm tex, mod calc

8660-8720 CHK (90%): lt gy-gy v arg LS, frm-brit
l-mod fis sb ang-sb rd cigs, com thn wh chky lamn
& com vf incl sm-sil silty tex, tr c free chk, tr vf pyr, tr
pyr nod, mod-hi calc, MRLST (10%): gy-dk gy mot w/
brn-tn mrlly incl, frm, sb rd-rd occ sb ang cigs, tr vf
pyr, sl silty-sm tex, mod calc

8720-8780 CHK: pred med gy- gy, abnt
bf- lt gy mot, sme dk gy- offwh, pred hd- v
frm, sme sl frm, pred blkly- sb blkly, tr spl,
rthy- chky txt, pred sl ang thru, sme cin chk,
tr dk gy- blk sb plty mrlly intbds, tr pyr, sme
calc incl, sme lse cal

8780
l-mod
com
mod-
ang, r
tex, r





MD: 8.809'
TVD: 7,261.63'
Inclination: 89.31°
GPM Azimuth: 178.28°
VS: -1,152.81'

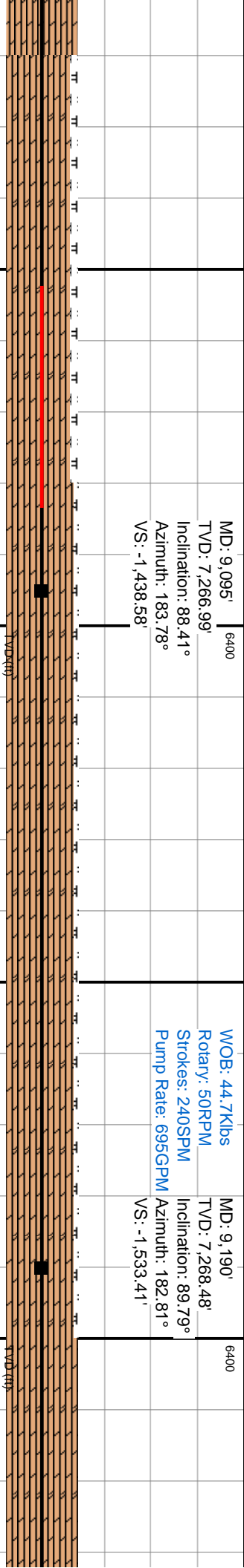
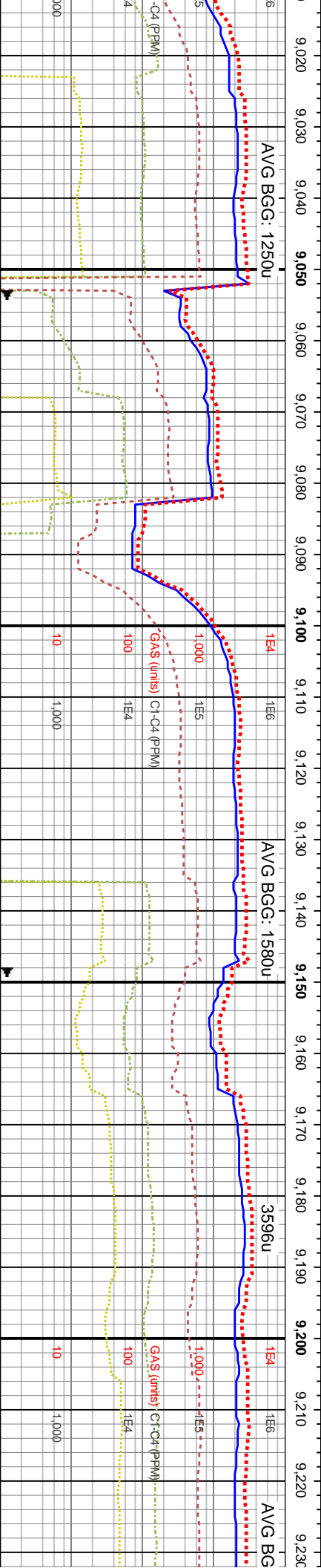
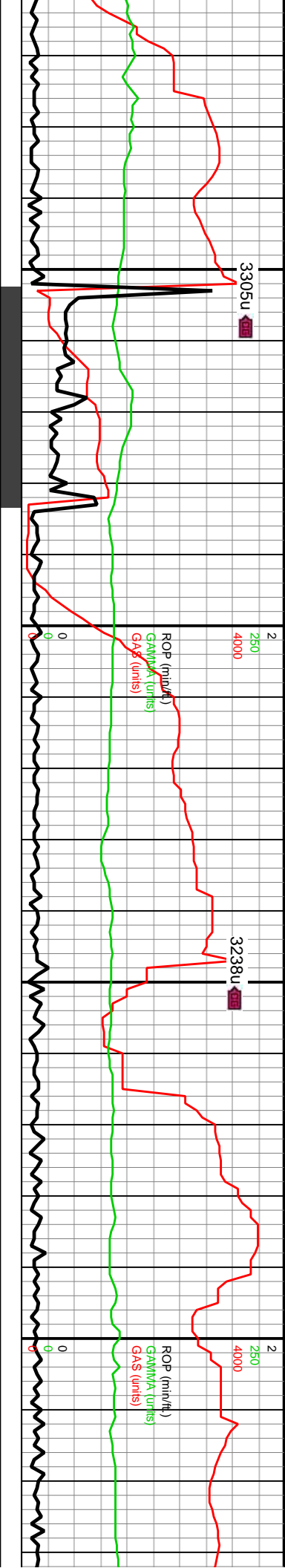
MD: 8.904'
TVD: 7,262.61'
Inclination: 89.51°
Azimuth: 177.49°
VS: -1,247.74'

WOB: 43.6Klbs
Rotary: 50RPM
Strokes: 240SPM
Pump Rate: 696GPM

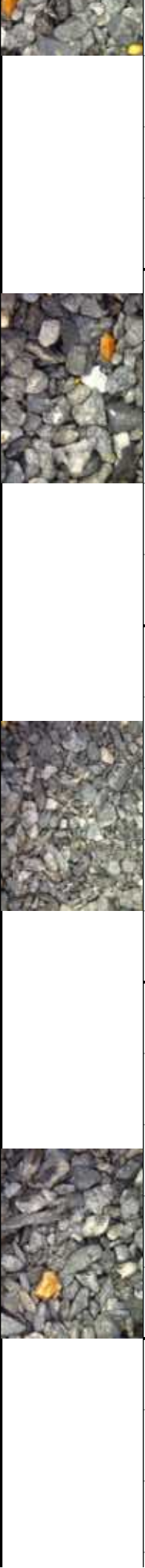
MD: 9,000.400'
TVD: 7,264.35'
Inclination: 88.41°
Azimuth: 180.7°
VS: -1,343.7'

8840-8840 CHK (90%): lt gy-gy v arg LS, frm-brit d fis sb ang-sb rd, com thn wh chky lamn & vf incl, sm-sl silty tex, tr c free chk, tr vf pyr, hi; MRLST (10%): gy-dk gy, sb rd-rd occ sb mot wi brn-th mrlly incl, tr vf pyr, sl silty-sm mod calc ₃₄₀₀	8840-8900 CHK (90%): lt gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd, com thn wh chky lamn & com vf incl, sm-sl silty tex, tr c free chk, tr vf pyr, mod-hi; MRLST (10%): gy-dk gy, sb rd-rd occ sb ang, mot wi brn-th mrlly incl, tr vf pyr, sl silty-sm tex, mod calc ₈₄₀₀	8900-8960 CHK (90%): lt gy-gy-gy brn, com thn chky lamn & com vf-f incl, frm, v arg LS, l-mod fis sb ang-sb rd ctgs, sl silty tex, tr c free chk, tr vf pyr, mod-hi calc, MRLST (10%): gy-dk gy, frm, brit, l fis sb rd-rd occ sb ang ctgs, com mot wi brn-th mrlly incl, sl silty-sm tex, tr vf pyr ₈₄₀₀	8960-9020 CHK: pred med gy- gy, ab lt gy mot, sme dk gy- offwht, pred nd- sme sl frm, pred blk- sb blk- ly, tr spl, chky txt, pred sl arg thru, sme cln chk gy- blk sb pily mrlly intbds, tr pyr, sme incl, sme lse cal ₈₄₀₀
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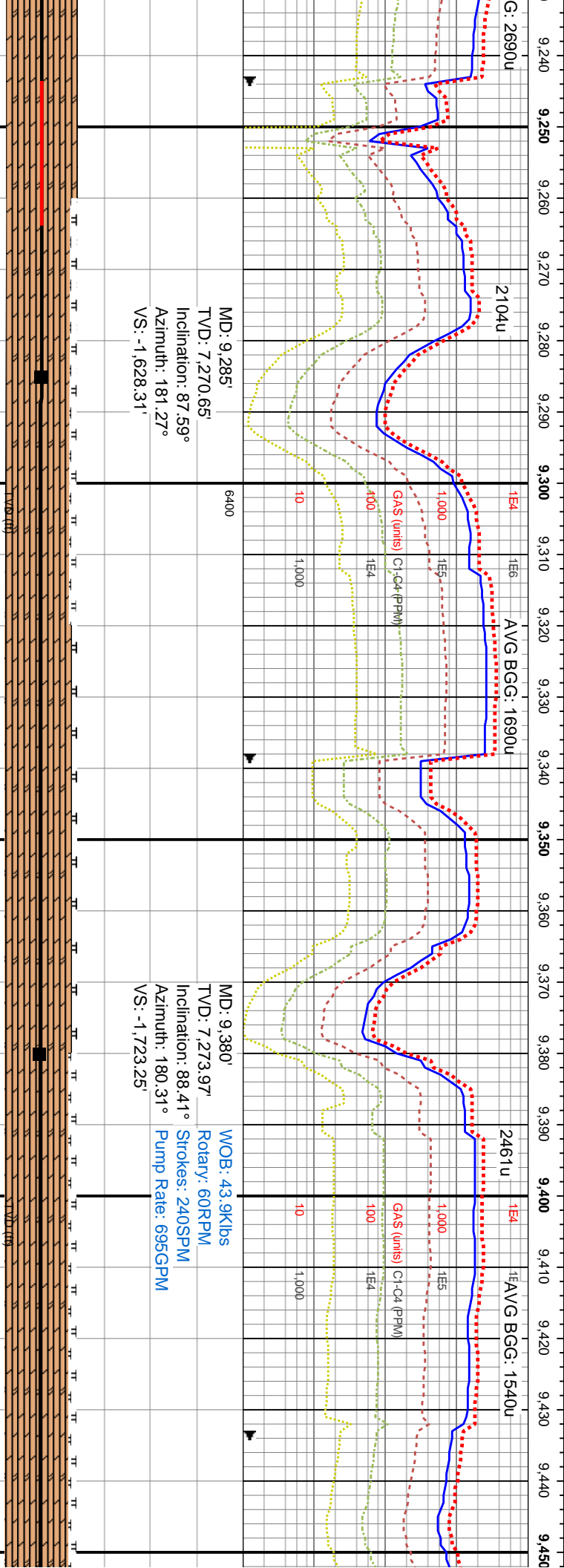
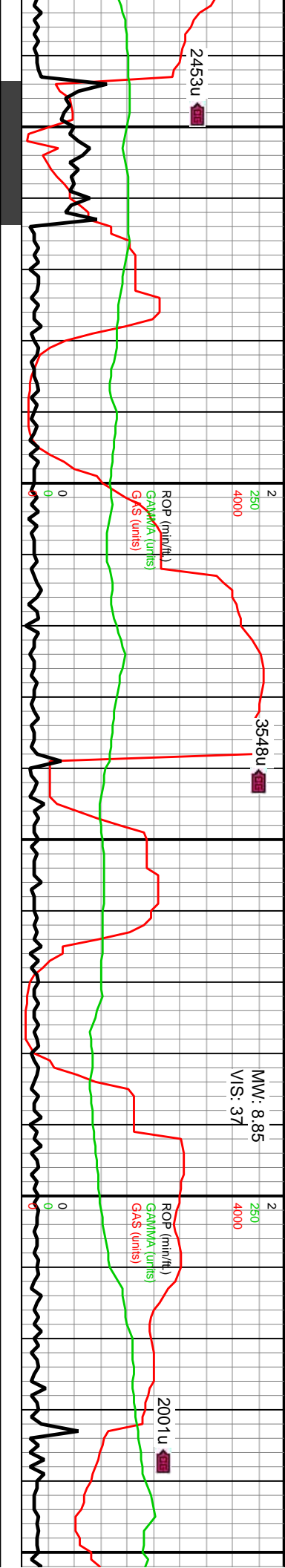


9020-9080 CHK (90%): lt gy-gy, frm-brit, l-mod fis sb ang-sb rd ctgs, v arg LS wi com thn wh chky lamm & com vf incl, sm-sil silty tex, tr c free chk, tr vf pyr, mod-hi calc; MRLST (10%): gy-dk gy mot wi brn-tn mrly incl, frm, sb rd-rd occ sb ang ctgs, tr vf pyr, silty-sm tex, mod calc	9080-9140 CHK (95%): lt gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd ctgs, com thn wh chky lamm & com vf indsn-sil silty tex, tr fos frags, tr c free chk, tr vf pyr, tr pyr nod, mod-hi calc, MRLST (5%): gy-dk gy mot wi brn-tn mrly incl, frm, brit, l fis sb rd-rd occ sb ang ctgs, tr vf pyr, silty-sm tex, mod calc	9140-9200 CHK (95%): lt gy-gy, occ-com gy, frm, brit, l-mod fis sb ang-sb rd ctgs, v arg LS wi com thn wh chky lamm & v chky incl, tr vf pyr, mod-hi calc, MRLST (5%): gy-dk gy mot wi brn-tn mrly incl, sb rd-rd occ sb ang ctgs, tr vf pyr, mod calc	9200-9260 CHK: p lt gy mot, sme dk g sme sil frm, pred bl chky txt, pred sil ar gy- blk sb pily mrly incl, sme lse cal
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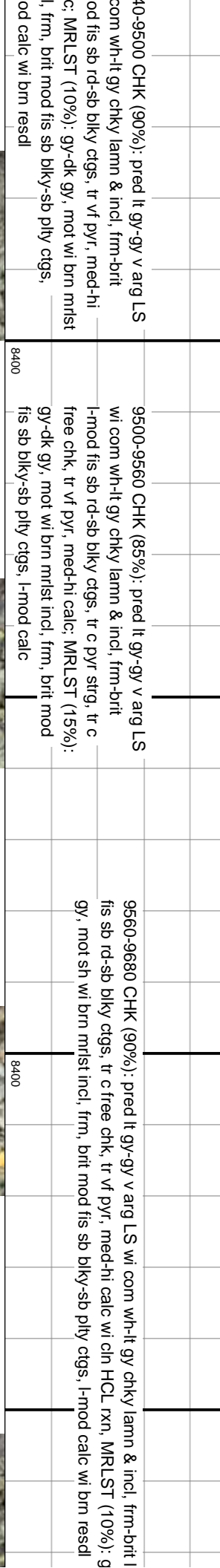
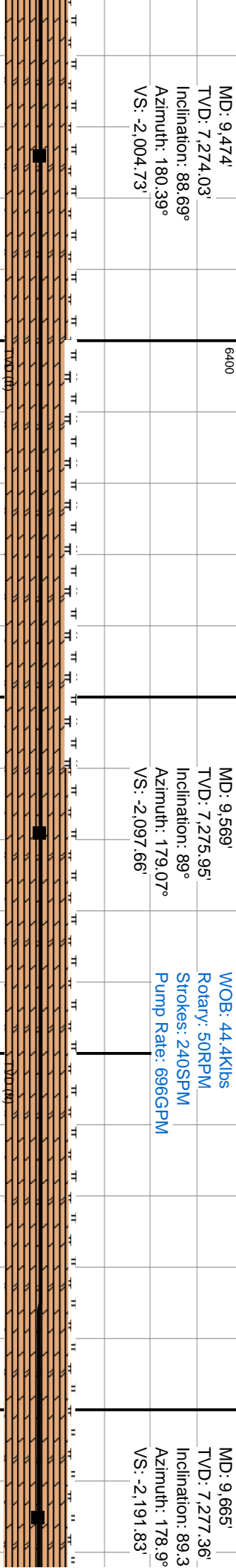
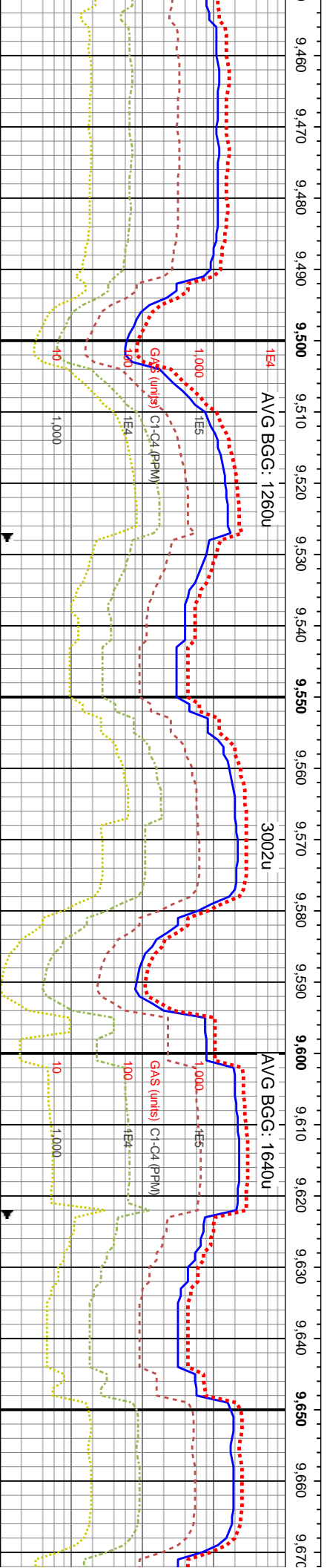
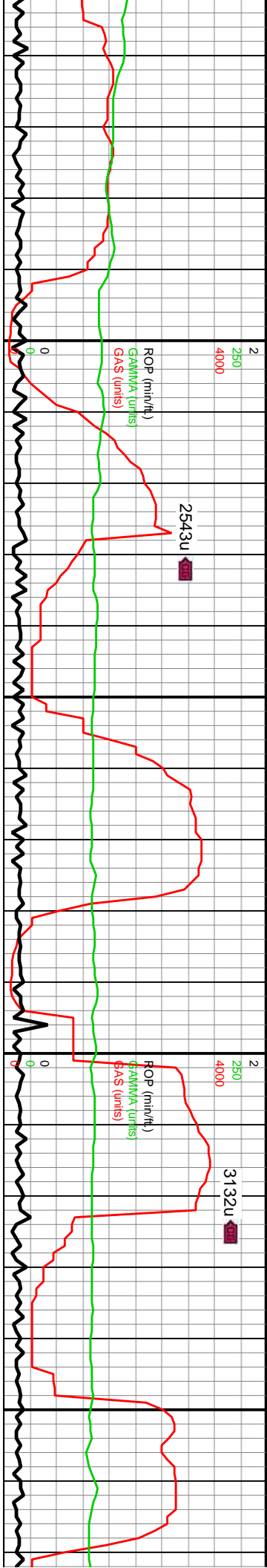


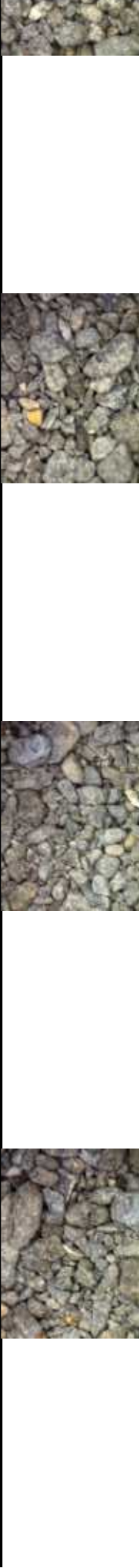
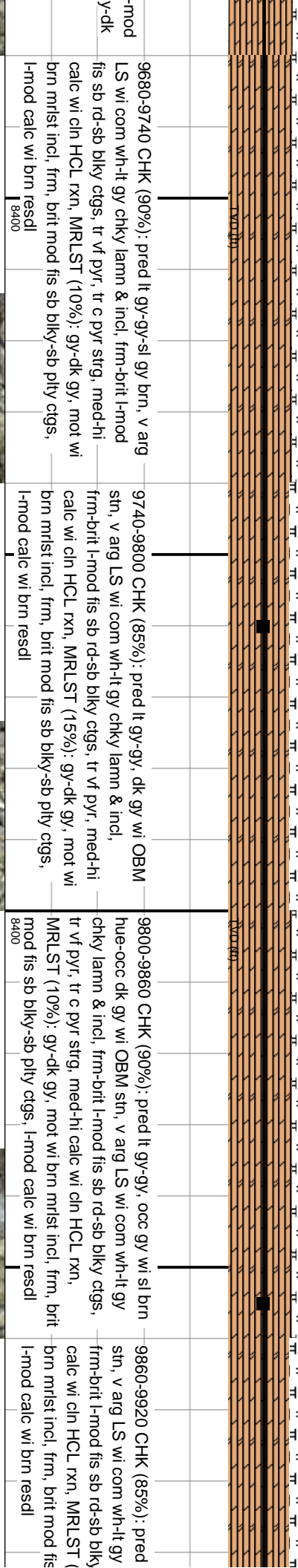
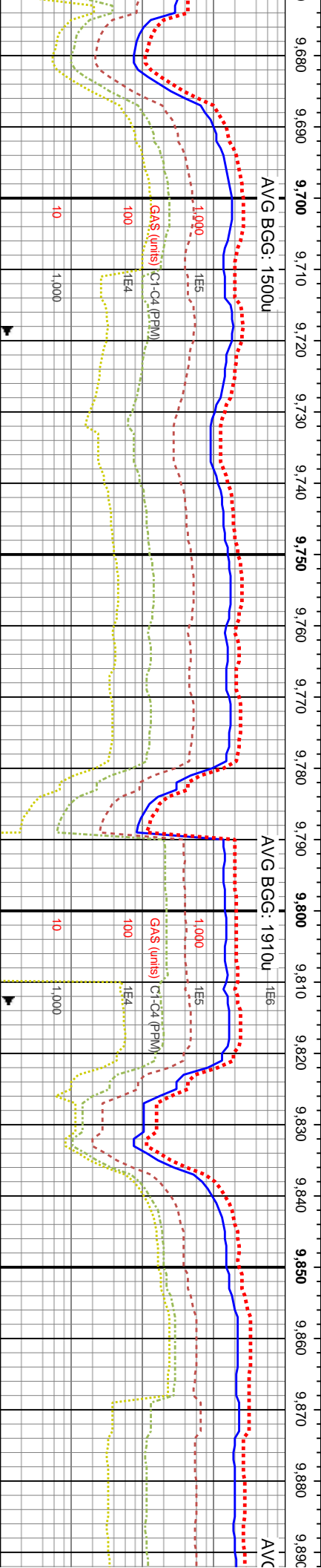
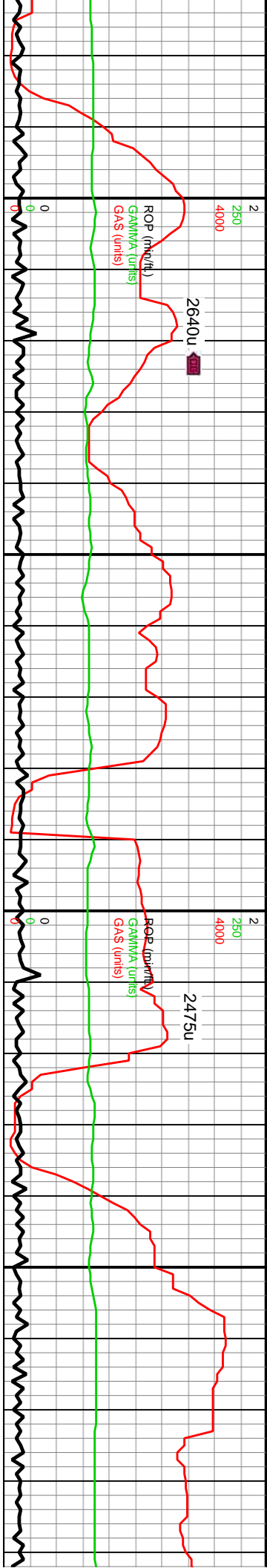
MD: 9,095'
TVD: 7,266.99'
Inclination: 88.41°
Azimuth: 183.78°
VS: -1,438.58'

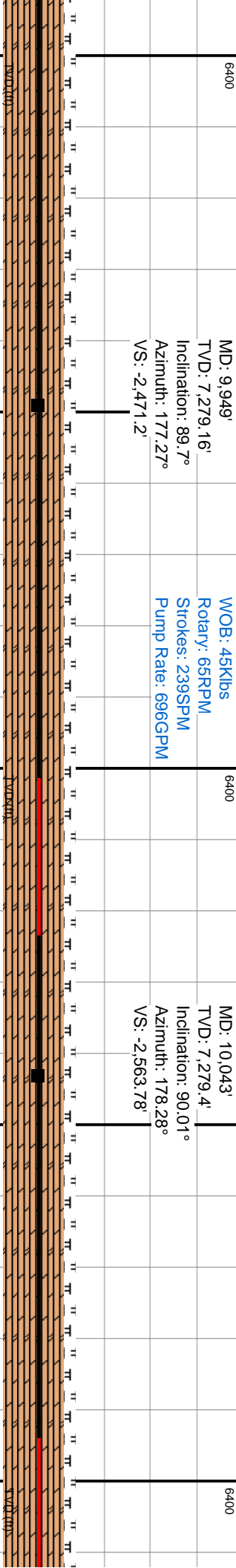
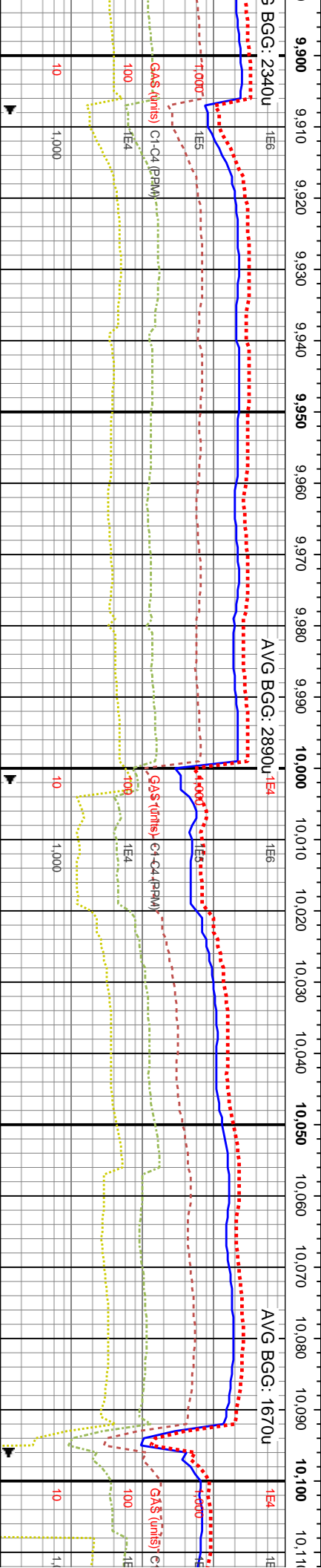
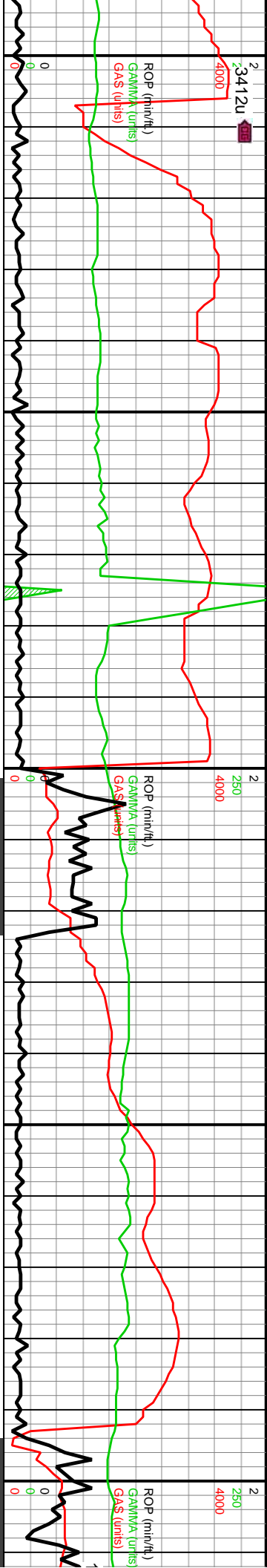
WOB: 44.7Klbs
Rotary: 50RPM
Strokes: 240SPM
Pump Rate: 695GPM
MD: 9,190'
TVD: 7,268.48'
Inclination: 89.79°
Azimuth: 182.81°
VS: -1,533.41'



red med gy- gy, abnt bf- y- offwhit, pred hd- v frm, ky- sb blk, tr spl, rthy- g thru, sme cin chk, tr dk intbds, tr pyr, sme calc	9260-9320 CHK (90%): lt gy-gy v arg LS, frm-brit l-mod fis sb ang-sb rd, com thin wh chky lamn & com vf incl, sm-sl silty tex, tr c free chk, tr vf pyr, mod-hi; MRLST (10%): gy-dk gy, sb rd-rd occ sb ang, mot wi brn-tn mrly incl, tr vf pyr, sl silty-sm tex, mod calc	9320-9380 CHK (95%): lt gy-gy v arg LS wi com thin wh chky lamn & com vf incl, frm-brit, l-mod fis sb ang-sb rd cigs, sm-sl silty tex, tr c free chk, tr vf pyr, mod-hi calc, MRLST (5%): gy-dk gy, frm, brit, l fis sb rd-rd occ sb ang cigs mot wi brn-tn mrly incl tr vf pyr, sl silty-sm tex, mod calc	9380-9440 CHK (90%): lt gy-gy, frm-brit l-mod fis sb rd-sb blk cigs, v arg LS wi com wh-lt gy chky lamn & f elong incl, tr vf pyr, med-hi calc, MRLST (10%): gy-dk gy, mot sh wi brn mrlst incl, frm, brit mod fis sb blk-sb pty cigs, l-mod calc wi brn resd	9440-9500 CHK (90%): lt gy-gy, frm-brit l-mod fis sb rd-sb blk cigs, v arg LS wi com wh-lt gy chky lamn & f elong incl, tr vf pyr, med-hi calc, MRLST (10%): gy-dk gy, mot sh wi brn mrlst incl, frm, brit mod fis sb blk-sb pty cigs, l-mod calc wi brn resd

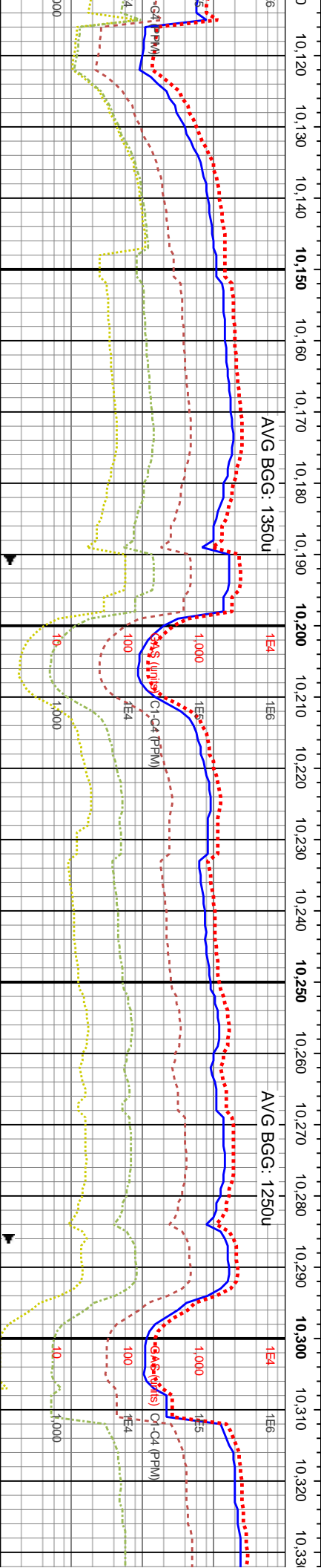
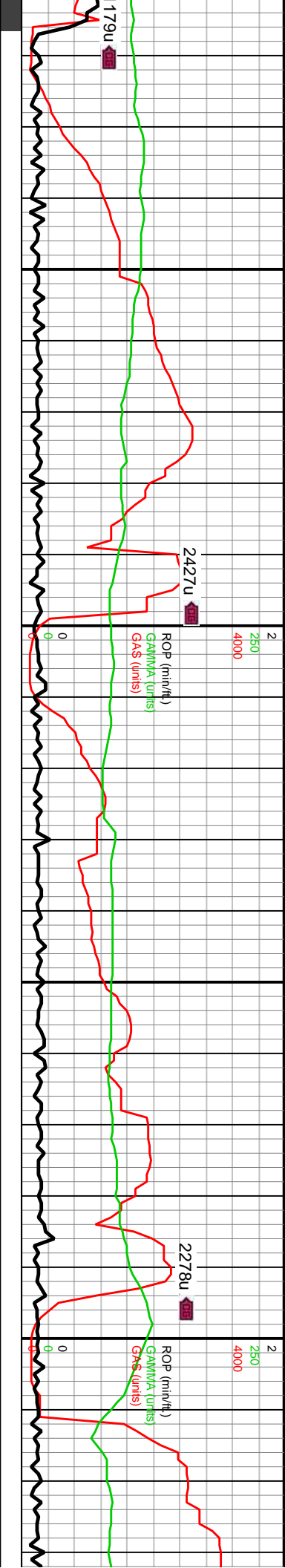






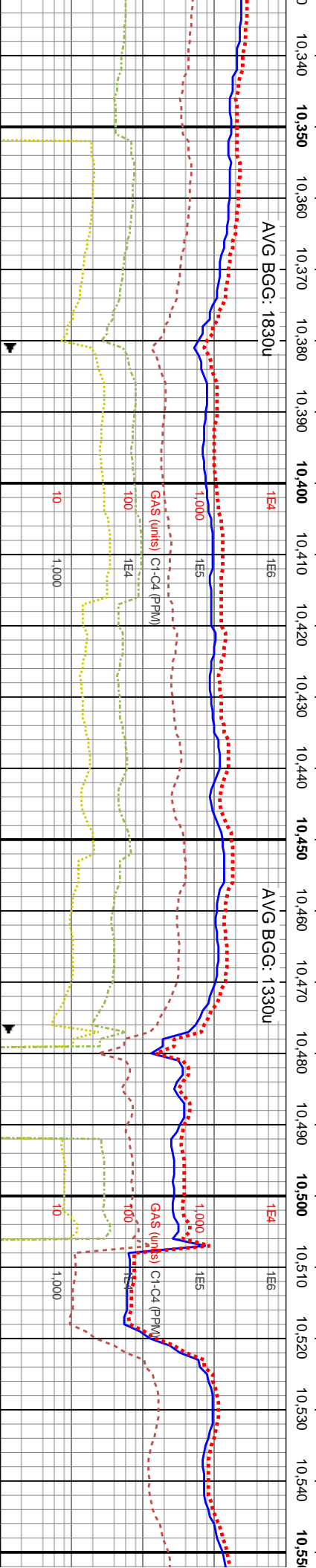
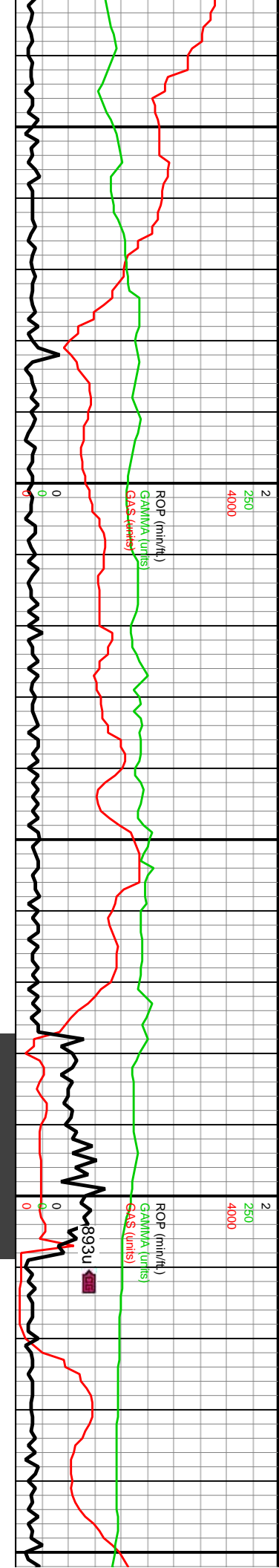
9920-9980	CHK (85%): pred lt gy-gy, occ gy wi sl brn hue-occ dk gy wi OBM sin, v arg LS wi com wh-it gy chky lamn & incl, rr-occ c free chk, frm-brit l-mod fis sb rd-sb blkly ctgs, tr vf pyr, tr c pyr strg, med-hi calc wi cin HCL rxn, MRLST (15%): gy-dk gy, mot wi brn mrst incl, frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn resdl	9980-10100	CHK (85%): lt gy-gy, dk gy wi OBM sin ip, frm-brit l-mod fis sb rd-sb blkly v arg LS wi com wh-it gy chky lamn & incl, rr-occ c free chk, rr-tr bent, tr vf pyr, med-hi calc wi cin HCL rxn, MRLST (15%): gy-dk gy, mot wi brn mrst incl, frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn resdl
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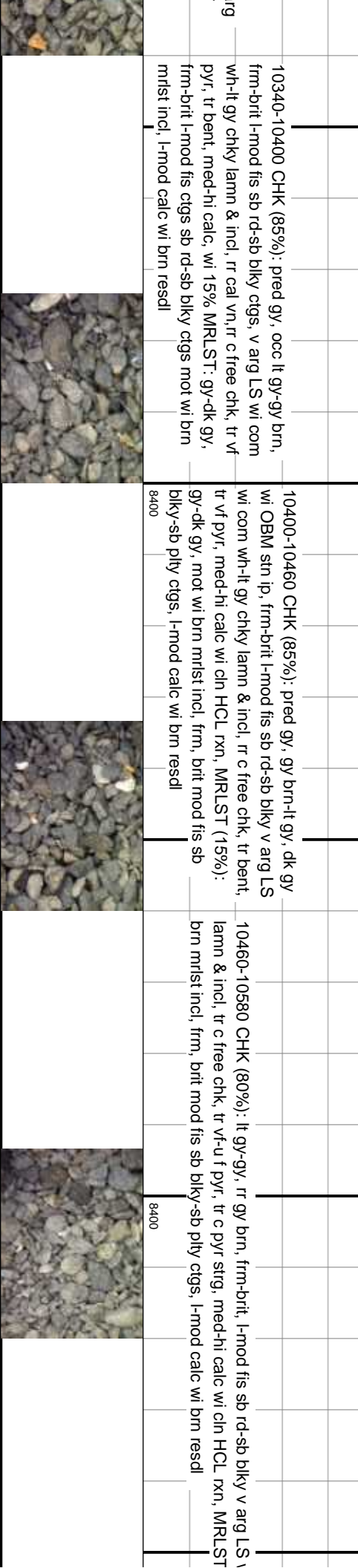


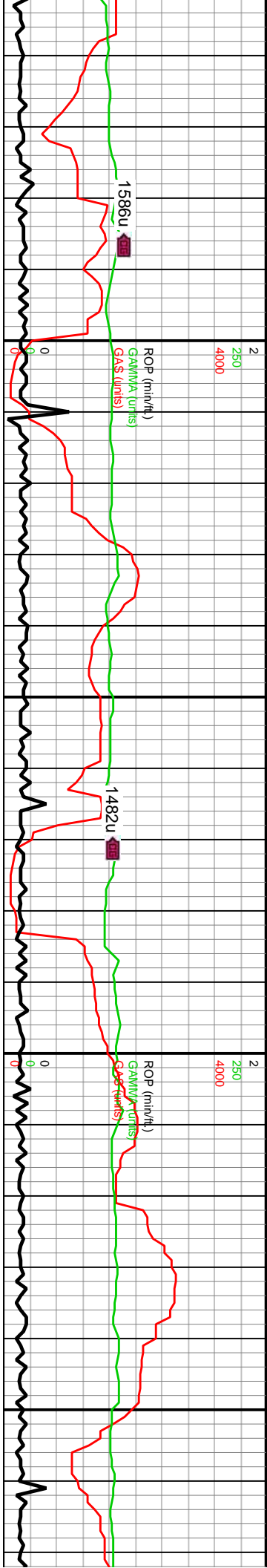
MD: 10,137' TVD: 7,280.95' Inclination: 88.1° Azimuth: 181.27° VS: -2,655.71'	WOB: 43Klbs Rotary: 65RPM Strokes: 239SPM Pump Rate: 695GPM	6400	MD: 10,232' TVD: 7,283.78' Inclination: 88.49° Azimuth: 179.69° VS: -2,748.35'	6400	MD: 10,327' TVD: 7,285.96' Inclination: 88° Azimuth: 179° VS: -2,841.34'						
						60 CHK (85%): pred lt gy-gy, occ gy wi sl					
						c dk gy wi OBM stn, frm-brit l-mod fis sb					
						ctigs, v arg LS wi com wh-lt gy chky lamn &					
						c free chk, tr vf pyr, tr c pyr strg, tr bent,					
						c, wi 15% MRLST: gy-dk gy, mot wi brn					
						frm, brit mod fis sb blkysb plyt cigs, l-mod					
						resdl					
						10160-10220 CHK (85%): pred gy, occ lt gy-gy brn,					
						frm-brit l-mod fis sb rd-sb blkys cigs, v arg LS wi com					
						wh-lt gy chky lamn & incl, rr cal vn, rr c free chk, tr vf					
						pyr, tr bent, med-hi calc, wi 15% MRLST: gy-dk gy,					
						frm-brit l-mod fis cigs sb rd-sb blkys cigs mot wi brn					
						mrst incl, l-mod calc wi brn resdl					





10340-10400 CHK (85%): pred gy, ooc lt gy-gy brn, frm-brit l-mod fis sb rd-sb blk-y ctgs, v arg LS wi com wh-lt gy chky lamn & incl, rr cal vn,rr c free chk, tr vf pyr, tr bent, med-hi calc, wi 15% MRLST: gy-dk gy, frm-brit l-mod fis ctgs sb rd-sb blk-y ctgs mot wi brn mlst incl, l-mod calc wi brn resdl	10400-10460 CHK (85%): pred gy, gy brn-lt gy, dk gy wi OBM strn ip, frm-brit l-mod fis sb rd-sb blk-y v arg LS wi com wh-lt gy chky lamn & incl, rr c free chk, tr bent, tr vf pyr, med-hi calc wi cln HCL rxn, MRLST (15%): gy-dk gy, mot wi brn mlst incl, frm, brit mod fis sb blk-y-sb ply ctgs, l-mod calc wi brn resdl	10460-10580 CHK (80%): lt gy-gy, rr gy brn, frm-brit, l-mod fis sb rd-sb blk-y v arg LS v lamn & incl, tr c free chk, tr vf-u f pyr, tr c pyr strg, med-hi calc wi cln HCL rxn, MRLST brn mlst incl, frm, brit mod fis sb blk-y-sb ply ctgs, l-mod calc wi brn resdl
WOB: 41Klbs Rotary: 65RPM Strokes: 239SPM Pump Rate: 695GPM	MD: 10,423' TVD: 7,287.88' Inclination: 88.8° Azimuth: 177.89° VS: -2,935.6'	MD: 10,518' TVD: 7,289.28' Inclination: 89.51° Azimuth: 183.69° VS: -3,028.12'



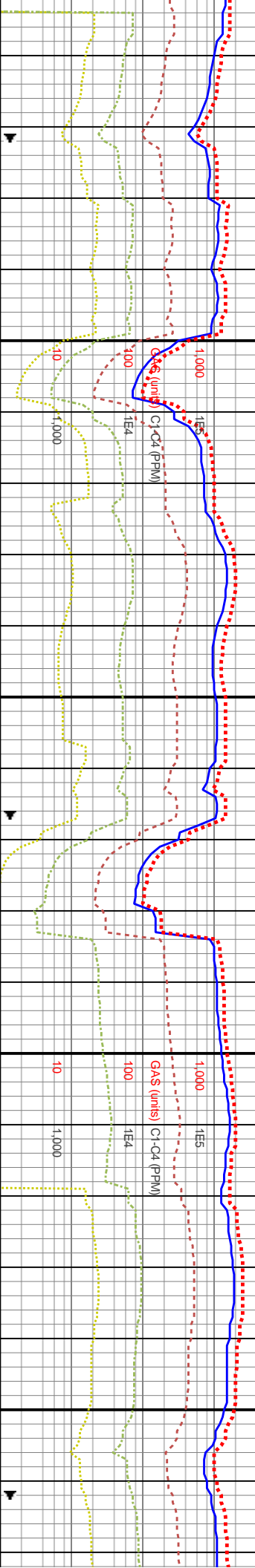


10,560 10,570 10,580 10,590 10,600 10,610 10,620 10,630 10,640 10,650 10,660 10,670 10,680 10,690 10,700 10,710 10,720 10,730 10,740 10,750 10,760 10,770

AVG BGG: 740u

AVG BGG: 1220u

AVG BGG: 1550u



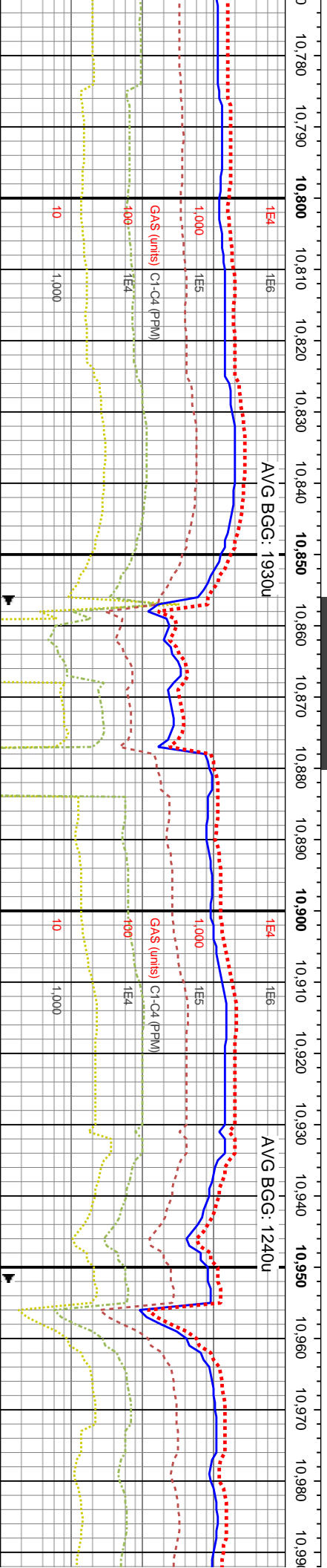
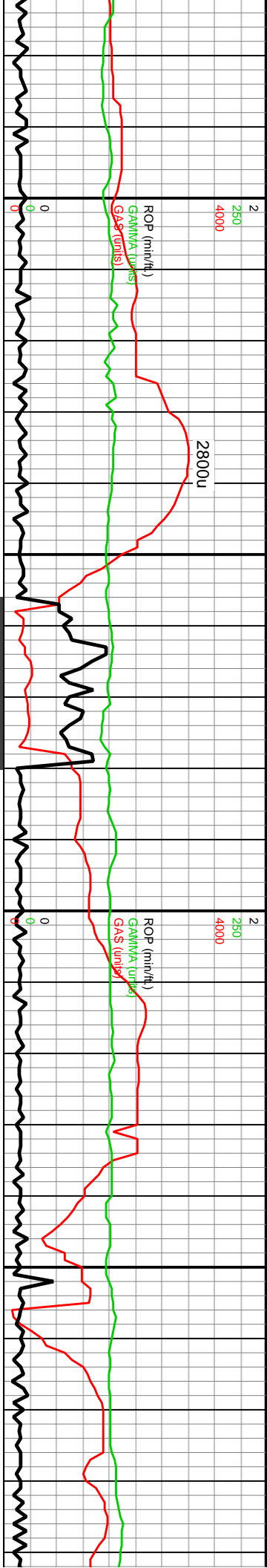
WOB: 40Klbs
Rotary: 60RPM
Strokes: 240SPM
Pump Rate: 696GPM

64MD: 10,613'
TVD: 7,289.87'
Inclination: 89.79°
Azimuth: 181.71°
V/S: -3,119.92'

MD: 10,708'
TVD: 7,290.21'
Inclination: 89.79°
Azimuth: 180.17°
V/S: -3,212.43'

10580-10640 CHK (85%): pred gy, occ lt gy-gy brn, frm-brit l-mod fis sb rd-sb blk cy cigs, v arg LS wi com wh-it gy chky lamn & incl, tr c pyr, lamn & incl, tr c pyr strg, med-hi calc, wi 15% MRLST: gy-dk gy, frm-brit l-mod fis cigs sb rd-sb blk cy cigs mot wi brn mlst incl, l-mod calc wi brn resd	10640-10700 CHK (85%): lt gy-gy, rr gy brn, frm-brit, l-mod fis sb rd-sb blk cy v arg LS wi com wh-it gy chky lamn & incl, tr c pyr, lamn & incl, tr c pyr strg, med-hi calc wi cin HCL rxn, MRLST (15%): gy-dk gy, mot wi brn mlst incl, frm, brit mod fis sb blk cy-sb ply cigs, l-mod calc wi brn resd	10700-10760 CHK (85%): pred gy, occ lt gy-gy brn, frm-brit l-mod fis sb rd-sb blk cy cigs, v arg LS wi com wh-it gy chky lamn & incl, tr c pyr, lamn & incl, tr c pyr strg, med-hi calc, wi 15% MRLST: gy-dk gy-gy brn, frm-brit l-mod fis cigs sb rd-sb blk cy cigs mot wi brn mlst incl, l-mod calc wi brn resd	10760-10800 CHK (85%): pred gy, occ lt gy-gy brn, frm-brit l-mod fis sb rd-sb blk cy cigs, v arg LS wi com wh-it gy chky lamn & incl, tr c pyr, lamn & incl, tr c pyr strg, med-hi calc, wi 15% MRLST: gy-dk gy-gy brn, frm-brit l-mod fis cigs sb rd-sb blk cy cigs mot wi brn mlst incl, l-mod calc wi brn resd
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WOB: 45Klbs
Rotary: 60RPM
Strokes: 239SPM
Pump Rate: 695GPM

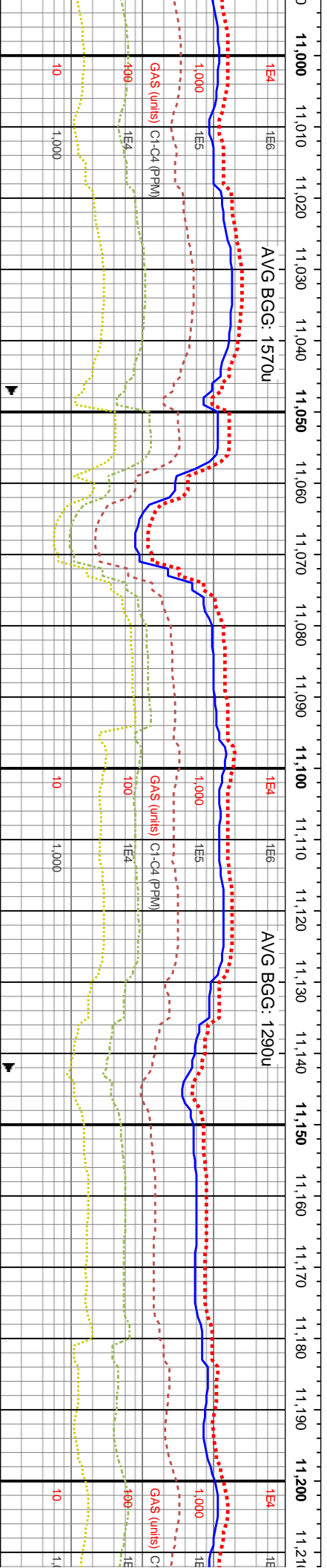
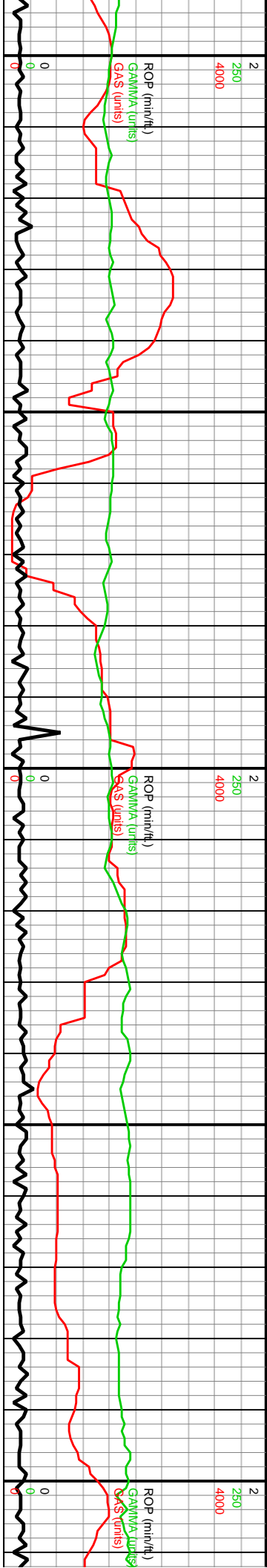
MD: 10,803'
TVD: 7,290.47'
Inclination: 89.9°
Azimuth: 178.99°
VS: -3,305.43'

MD: 10,898-9400
TVD: 7,291.81'
Inclination: 88.49°
Azimuth: 181.49°
VS: -3,398.18'

MD: 10,99
TVD: 7,29
Inclination:
Azimuth: 1
VS: -3,490

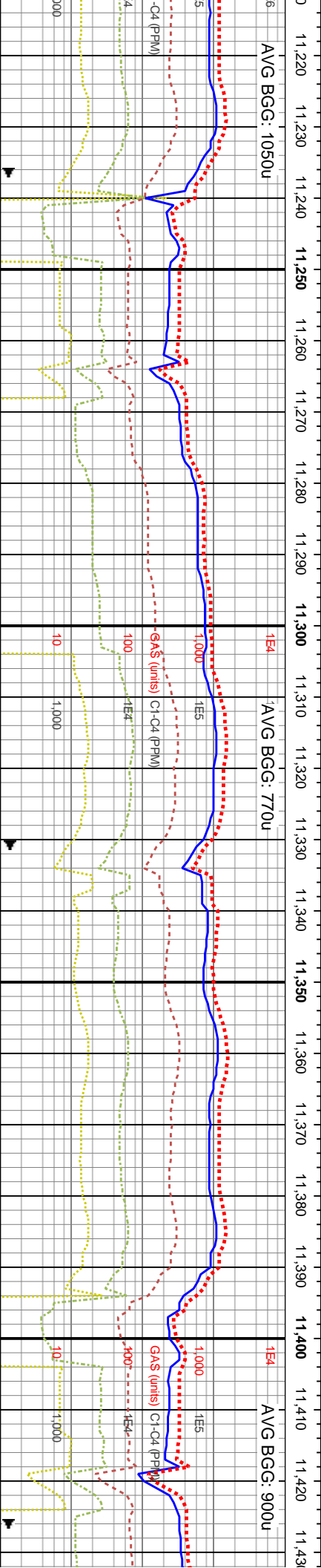
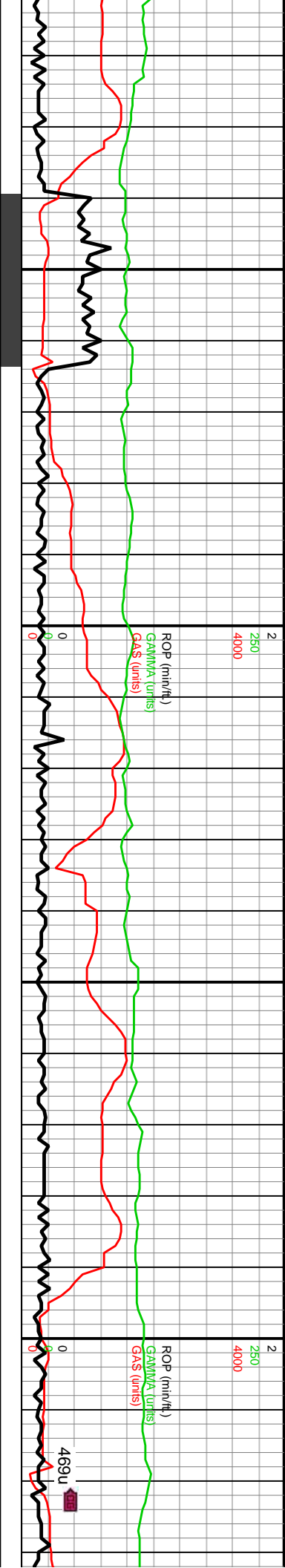
220 CHK (80%): lt gy-gy, frm-brit, l-mod fis ky v arg LS wi com wh-it gy chky lamn & e chk, tr c pyr strg, med-hi calc wi cin HCL T (20%): gy-dk gy, mot wi brn mist incl, frm, sb blk-y-sb ply ctgs, l-mod calc wi brn	10820-10880 CHK (80%): pred gy, occ lt gy-gy brn, frm-brit l-mod fis sb rd-sb blk-y ctgs, v arg LS wi com wh-it gy chky lamn & incl, rr cal vn, rr c free chk, tr c pyr strg, med-hi calc, wi 20% MRLST: gy-dk gy-gy brn, frm-brit l-mod fis ctgs sb rd-sb blk-y ctgs mot wi brn mist incl, l-mod calc wi brn resd	10880-10940 CHK (80%): lt gy-gy, frm-brit, l-mod fis sb rd-sb blk-y v arg LS wi com wh-it gy chky lamn & incl, tr c free chk, tr c pyr strg, med-hi calc wi cin HCL rxn, MRLST (20%): gy-dk gy, mot wi brn mist incl, frm, brit mod fis sb blk-y-sb ply ctgs, l-mod calc wi brn resd	10940-11000 CHK (85%): pred gy, occ lt gy-gy t frm-brit l-mod fis sb rd-sb blk-y ctgs, v arg LS wi c wh-it gy chky lamn & incl, rr cal vn, rr c free chk, strg, med-hi calc, MRLST (15%): gy-dk gy-gy brn mist incl, l-mod calc wi brn resd
8400	8400	8400	





WOB: 47Klbs		MD: 11,088'	
Rotary: 60RPM		TVD: 7,297.28'	
Strokes: 238SPM		Inclination: 88.3°	
Pump Rate: 695GPM		Azimuth: 179.07°	
		VS: -3,583.45'	
11000-11060 CHK (80%): lt gy-gy, frm-brit, l-mod fis		11060-11100 CHK (85%): lt gy-gy, rr gy brn, frm-brit,	
sb rd-sb blkly v arg LS wi com wh-it gy chky lamm &		l-mod fis sb rd-sb blkly v arg LS wi com wh-it gy chky	
incl, tr c free chk & pyr strg, med-hi calc wi cin HCL		lamm & incl, tr c free chk, tr vfr-u f pyr, med-hi calc wi	
rxn, MRLST (20%): gy-dk gy, mot wi brn mst incl,		cin HCL rxn, MRLST (15%): gy-dk gy, mot wi brn mst	
frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn		incl, frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc	
resdl		wi brn resdl	
8400		8400	
11100-11160 CHK (85%): lt gy-gy, frm-brit, l-mod fis		11160-11220 CHK (85%): lt	
sb rd-sb blkly v arg LS wi com wh-it gy chky		l-mod fis sb rd-sb blkly v arg	
incl, tr c free chk & pyr strg, med-hi calc wi cin HCL		lamm & incl, tr c free chk, tr v	
rxn, MRLST (20%): gy-dk gy, mot wi brn mst incl,		cin HCL rxn, MRLST (15%):	
frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn		incl, frm, brit mod fis sb blkly-	
resdl		wi brn resdl	
8400		8400	





4
GPM

MD: 11,277'
TVD: 7,302.57'
Inclination: 90.1°
Azimuth: 182.59°
VS: -3,768.23'

6400

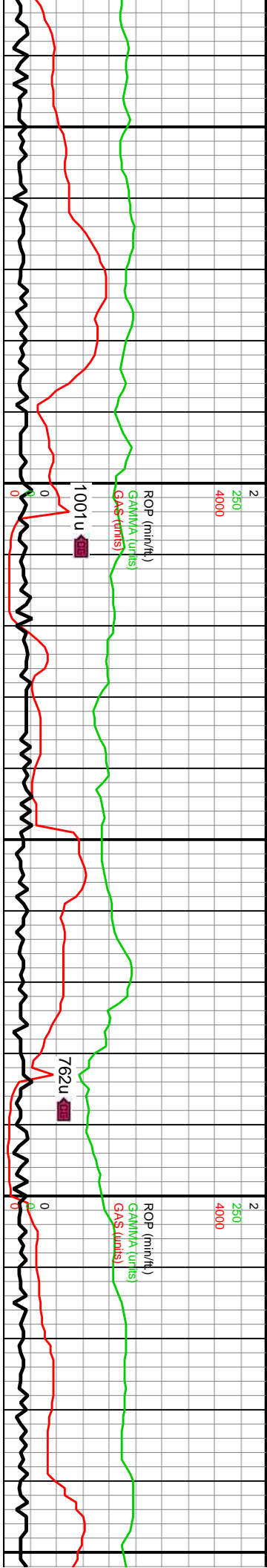
MD: 11,372'
TVD: 7,302.4'
Inclination: 90.1°
Azimuth: 181.8°
VS: -3,860.24'

WOB: 49Klbs⁹⁰
Rotary: 60RPM
Strokes: 239SPM
Pump Rate: 695GPM

8400

gy-gy, tr gy brn, frm-brit, l-mod fis	11240-11300 CHK (85%): lt gy-gy, frm-brit, l-mod fis	11300-11360 CHK (85%): lt gy-gy v arg LS wi com	11360-11420 CHK (80%): lt gy-gy v arg LS wi com	11420-11430 CHK (80%): lt gy-gy v arg LS wi com
LS wi com wh-it gy chky	sb rd-sb biky ctgs, v arg LS wi com wh-it gy chky	wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb	wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb	chky lamn
f-u f pyr, med-hi calc wi	lamn & incl tr c free chk, med-hi calc wi cin HCL rxn,	biky ctgs, tr c free chk, med-hi calc wi cin HCL rxn,	biky ctgs, med-hi calc wi cin HCL rxn, wi 20%: dk gy	arg LS ci
gy-dk gy, mot wi brn mlst	MRLST (85%): pred dk gy, occ gy, frm, brit mod fis	MRLST (85%): pred dk gy, occ gy, frm, brit mod fis	mot wi brn mrvly incl, frm, brit, mod fis sb biky-sb ply	calc wi ci
sb ply ctgs, l-mod calc	sb biky-sb ply ctgs mot wi brn mlst incl, l-mod calc	sb biky-sb ply ctgs mot wi brn mlst incl, l-mod calc	ctgs, l-mod calc wi brn resd	incl, frm,
wi brn resd				wi brn re

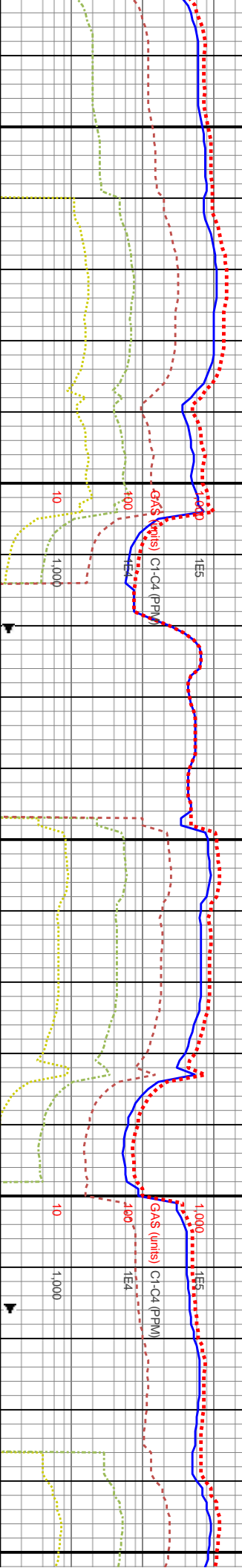




11,440 11,450 11,460 11,470 11,480 11,490 11,500 11,510 11,520 11,530 11,540 11,550 11,560 11,570 11,580 11,590 11,600 11,610 11,620 11,630 11,640 11,650

AVG BGG: 800u

AVG BGG: 580u

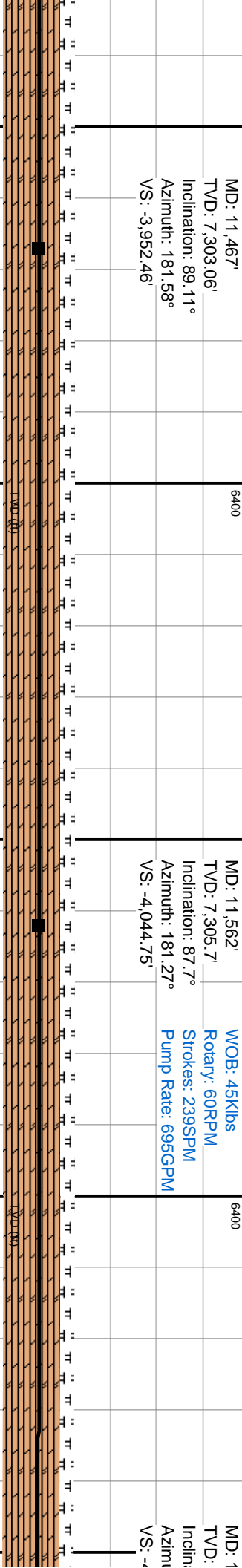


MD: 11,467'
TVD: 7,303.06'
Inclination: 89.11°
Azimuth: 181.58°
VS: -3,952.46'

MD: 11,562'
TVD: 7,305.7'
Inclination: 87.7°
Azimuth: 181.27°
VS: -4,044.75'

WOB: 45Klbs
Rotary: 60RPM
Strokes: 239SPM
Pump Rate: 695GPM

MD: 11,562'
TVD: 7,305.7'
Inclination: 87.7°
Azimuth: 181.27°
VS: -4,044.75'



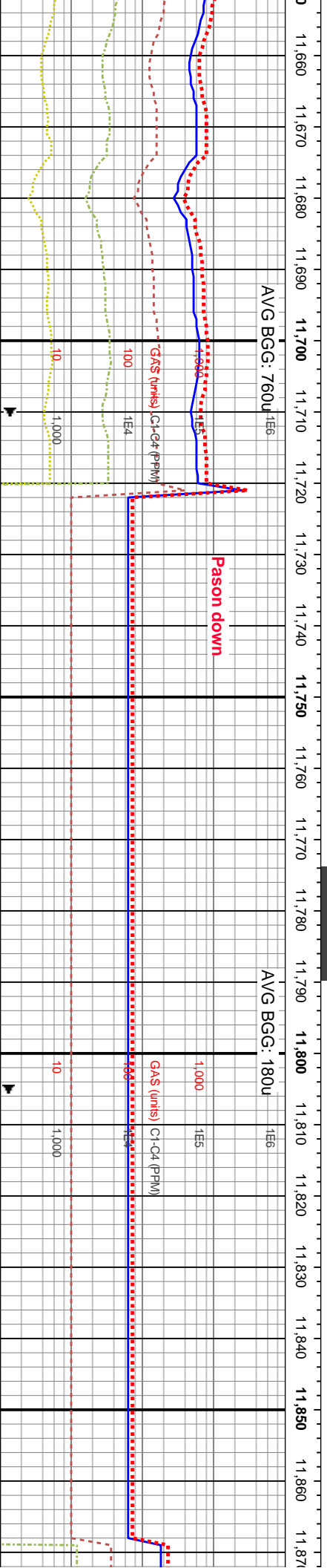
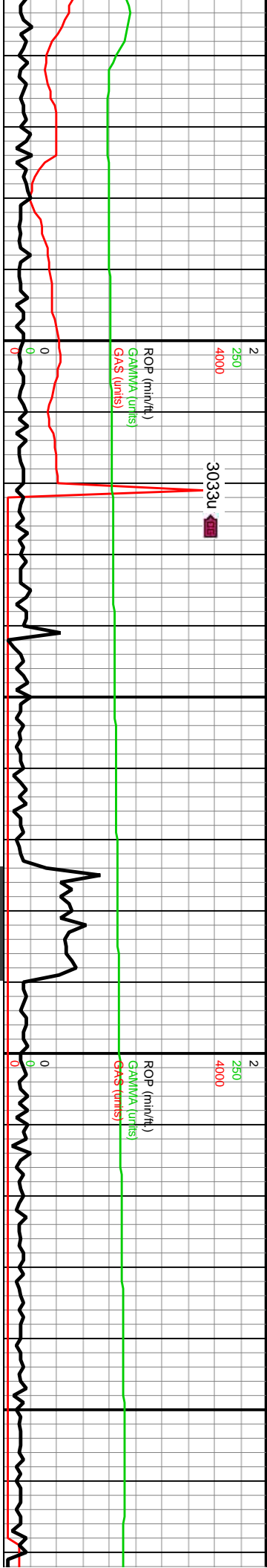
11480-11540 CHK (80%): It gy-gy wi com wh-it gy n & incl, frm-brit, l-mod fis sb rd-sb blkly v ggs, tr fos frags, tr bent, tr c pyr strg, med-hi in HCL rxn, wi 20%: dk gy mot wi brn mrlly brit, mod fis sb blkly-sb plty ctgs, l-mod calc resd

11540-11600 CHK (80%): It gy-gy, frm-brit v arg LS wi com f wh-it gy chky incl, l-mod fis sb rd-sb blkly ctgs, rr fos frags, tr bent, tr vf-c pyr strg, med-hi calc, MRLST (20%): dk gy, frm, brit, mod fis sb blkly-sb plty ctgs, mot wi brn mrlly incl, l-mod calc wi brn resd

11600-11660 CHK (80%): It gy-gy wi com wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb blkly v arg LS ctgs, rr fos frags, tr bent, tr vf-c pyr strg, med-hi calc wi cln HCL rxn, wi 20%: dk gy mot wi brn mrlly incl, frm, brit, mod fis sb blkly-sb plty ctgs, l-mod calc wi brn resd

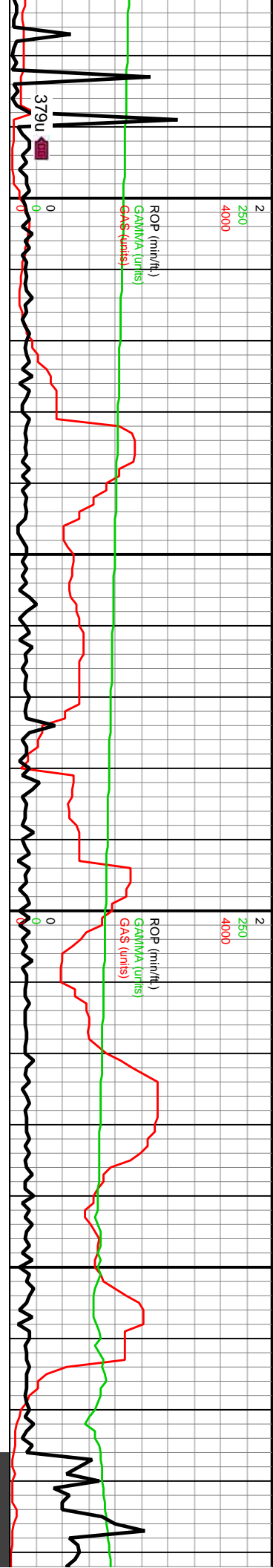
11660-11720 CHK (80%): It gy-gy wi com wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb blkly v arg LS ctgs, rr fos frags, tr bent, tr vf-c pyr strg, med-hi calc wi cln HCL rxn, wi 20%: dk gy mot wi brn mrlly incl, frm, brit, mod fis sb blkly-sb plty ctgs, l-mod calc wi brn resd



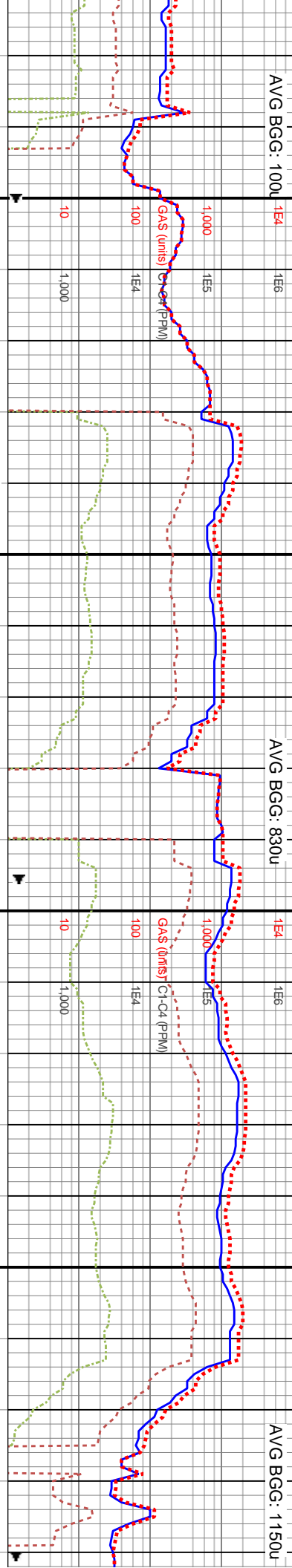


1.656'	6400	MD: 11.751'	WOB: 46Klbs	6400	MD: 11.847'
7.308.32'		TVD: 7.310.89'	Rotary: 60RPM		TVD: 7.312.56'
ation: 89.11°		Inclination: 87.79°	Strokes: 239SPM		Inclination: 90.21°
uth: 180.79°		Azimuth: 179.78°	Pump Rate: 695GPM		Azimuth: 181.01°
4,136.22'		VS: -4,228.93'			VS: -4,322.6'
11660-11720 CHK (85%): lt gy-gy v arg LS wi com					
gy	11660-11720 CHK (85%): lt gy-gy v arg LS wi com	11720-11780 CHK (80%): lt gy-gy v arg LS wi com	11780-11840 CHK (85%): lt gy-gy, frm-brit, l-mod fis,	11840-11900 CHK (80%):	
v arg	wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb	wh-it gy chky lamn & incl, frm-brit, l-mod fis sb rd-sb	sb blk, com wh-it gy chky lamn & incl, tr c free chk, tr	l-mod fis sb ang-sb rd ct	
-hi	blky ctgs, tr fos frags, tr c free chk, med-hi calc wi cin	blky ctgs, tr c free chk, med-hi calc wi cin HCL rxn,	mic pyr strg, med-hi calc wi cin HCL rxn, MRLST	chky lamn, sme chky inc	
calc	HCL rxn, MRLST (15%): pred dk gy, occ gy, frm, brit	MRLST (20%): pred dk gy, occ gy, frm, brit mod fis sb	(15%): gy-dk gy, mot wi brn mlst incl, frm, brit mod fis	calc, MRLST (20%): gy-	
	mod fis sb blk, sb ply ctgs mot wi brn mlst incl,	blk, sb ply ctgs mot wi brn mlst incl, l-mod calc wi	sb blk, sb ply ctgs, l-mod calc wi brn resd	incl, sb rd-rd occ sb ang	
	l-mod calc wi brn resd	brn resd			
	8400				





11,880 11,890 11,900 11,910 11,920 11,930 11,940 11,950 11,960 11,970 11,980 11,990 12,000 12,010 12,020 12,030 12,040 12,050 12,060 12,070 12,080 12,090

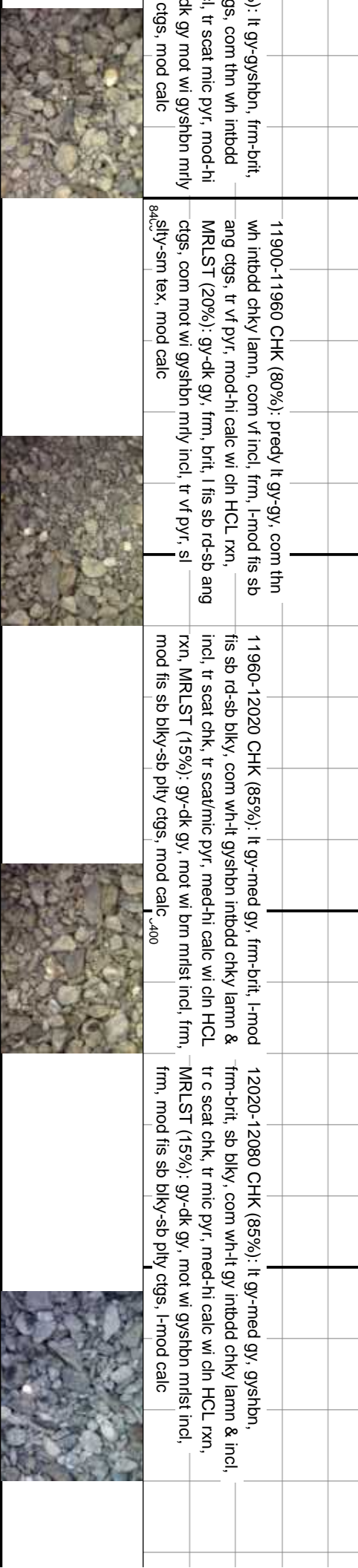
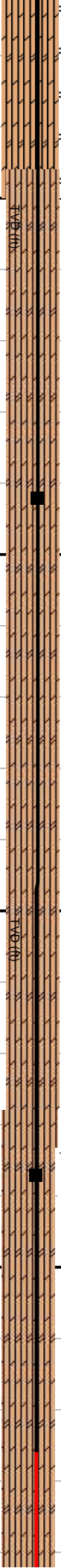


6400

MD: 11,942'
TVD: 7,312.8'
Inclination: 89.51°
Azimuth: 178.59°
VS: -4,415.52'

6400

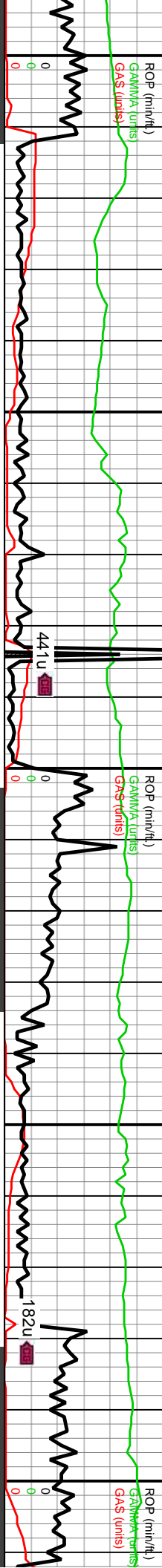
MD: 12,037'
TVD: 7,314.61'
Inclination: 88.3°
Azimuth: 177.49°
VS: 4,508.98'



MW 9.0+
VIS 39

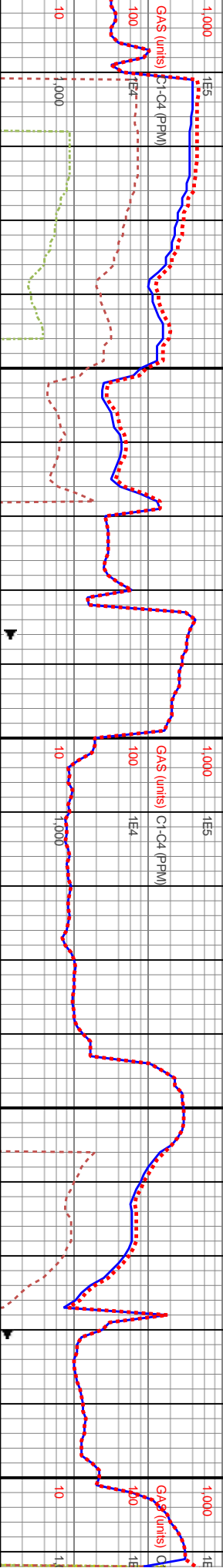
2
250
4000

Note: Sample not circulated up before trip



12,100 12,110 12,120 12,130 12,140 12,150 12,160 12,170 12,180 12,190 12,200 12,210 12,220 12,230 12,240 12,250 12,260 12,270 12,280 12,290 12,300 12,310

Note: Sample not circulated up before trip



AVG BGG: 170u

2
250
4000

Note: Sample not circulated up before trip

MD: 12,132'
TVD: 7,321'
Inclination: 83.99°
Azimuth: 175.47°
VS: 4,602.65'

WOB: 19Klbs
Rotary: 65RPM
Strokes: 210SPM
Pump Rate: 610GPM

MD: 12,227'
TVD: 7,328.04'
Inclination: 87.51°
Azimuth: 178.9°
VS: 4,696.09'

AVG BGG: 90u

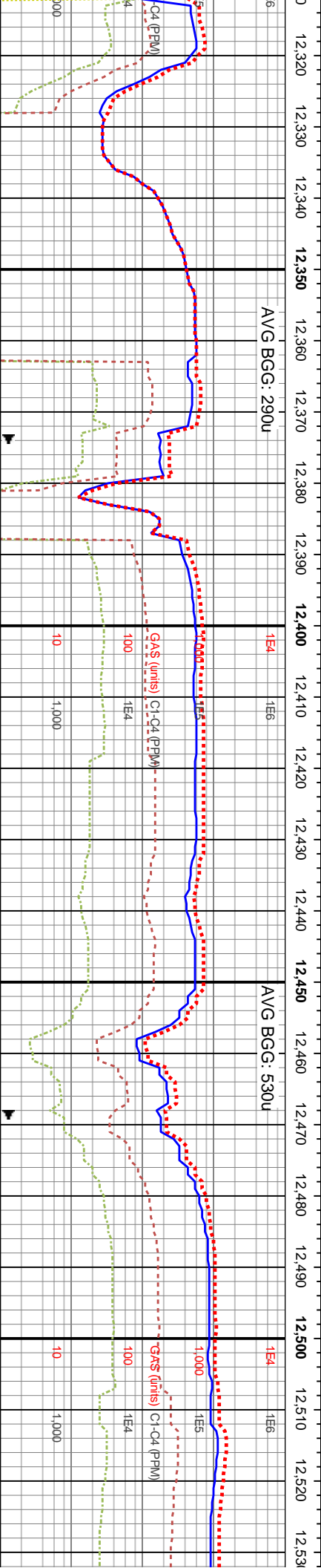
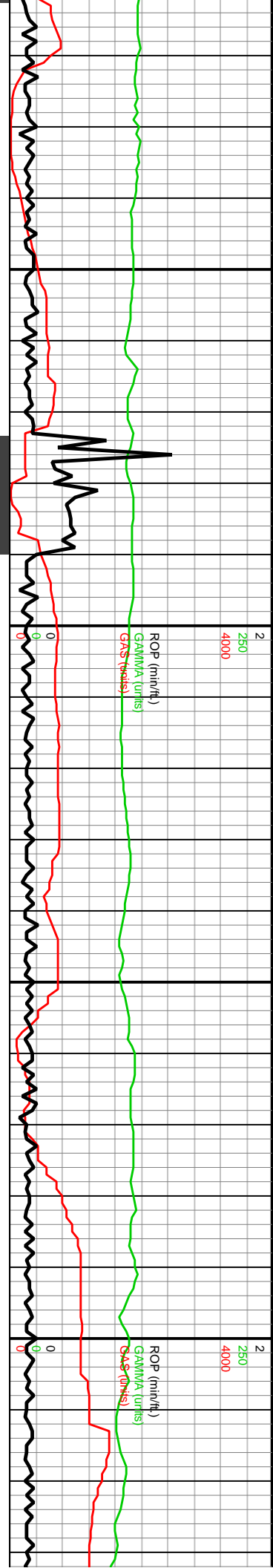
8400

8400

8400

12260-12320 CHK (60%): lt gy-gy-lt gy brn, v ar
wi com wh-lt gy chky larnn & incl, frm-brit, l-mod
sb rd-sb blkly cigs, rr-tr c free chk, med-hi calc v
HCL rxn, MRLST (40%): dk gy, frm, brit mod fis
blkly-sb ply cigs mot wi brn mrst incl, l-mod calc
brn resd





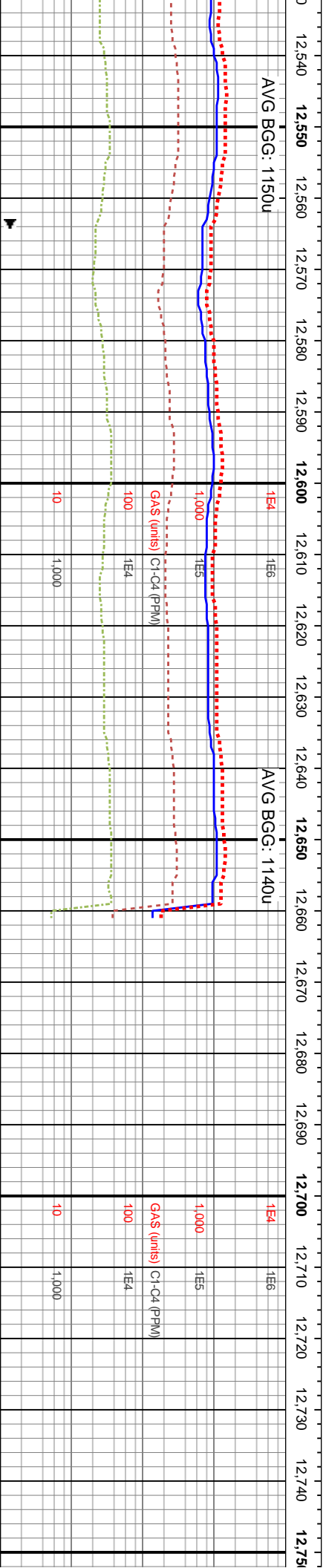
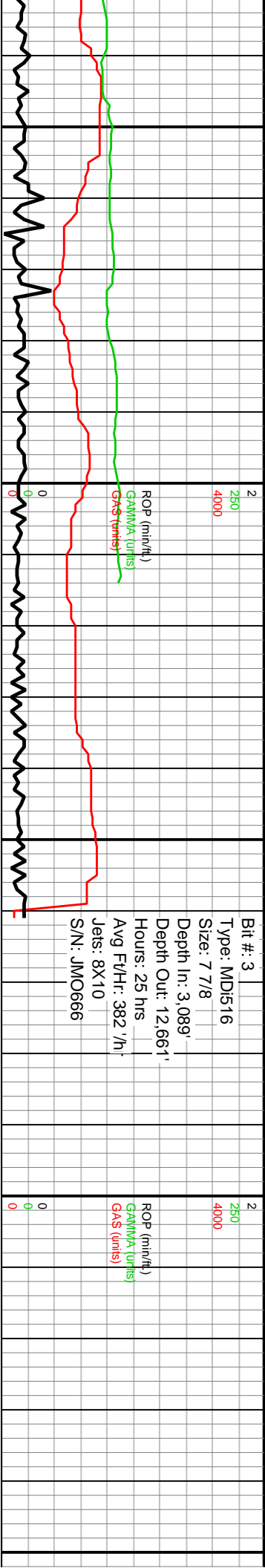
MD: 12,322
TVD: 7,329.37'
Inclination: 90.89°
Azimuth: 181.4°
VS: 4,788.87'

WOB: 43Klbs
Rotary: 50RPM
Strokes: 210SPM
Pump Rate: 609GPM

MD: 12,417
TVD: 7,326.96'
Inclination: 92.01°
Azimuth: 182.59°
VS: 4,880.93'

g LS	12320-12380 CHK (65%): pred lt gy-gy, occ lt gy brn, frm-brit, l-mod fis sb rd-sb blkly ctgs, v arg LS wi com	12380-12440 CHK (70%): pred lt gy-gy v arg LS wi com wh-it gy f chky incl, occ brnsh hue, frm-brit l-mod fis sb rd-sb blkly ctgs, rr chky lann, rr-tr c free chk, tr vt pyr, med-hi calc wi cin HCL rxn, MRLST (30%): dk gy mot wi brn mlst incl, occ wh chky incl ip, frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn resd	12440-12500 CHK (70%): lt gy-gy v arg LS wi com wh chky incl, frm-brit l-mod fis sb rd-sb blkly ctgs, rr chky lann, rr-occ c free chk wi occ f pyr ip, tr cal vn ip, med-hi calc wi cin HCL rxn, MRLST (30%): dk gy mot wi brn mlst incl, occ wh chky incl ip, frm, brit mod fis sb blkly-sb ply ctgs, l-mod calc wi brn resd	12500-12560 CHK (70%): lt sb rd-sb blkly ctgs, v arg LS v thn chky lann, occ c free ch med-hi calc wi cin HCL rxn, l brn, mot wi brn mlst incl & o brit mod fis sb blkly-sb ply ct
	sb blkly-sb ply ctgs, l-mod calc wi brn resd			





WOB: 46Klbs
Rotary: 50RPM
Strokes: 210SPM
Pump Rate: 609GPM

MD: 12,608'		MD: 12,661'
TVD: 7,321.94'		TVD: 7,319.98'
Inclination: 91.4°		Inclination: 91.4°
Azimuth: 182.59°		Azimuth: 182.59°
VS: 5,065.74'		

Reached TD on 2/27/2016 @ 08:15AM



gy-gy, frm-brit l-mod fis
vi com wh chky incl, π
pyr ip, tr c pyr strg,
MR LST (30%): dk gy-gy
wh chky incl ip, frm,
l-mod calc wi brn

12560-1-12661 CHK (70%): lt gy-gy, frm-brit l-mod fis sb rd-sb blk-y ctgs, v arg LS wi com
wh chky incl, rr chky lamm, occ c free chk wi occ f pyr ip, med-hi calc wi cin HCL rxn,
MRLST (30%): dk gy mot wi brn mlist incl, occ wh chky incl ip, frm, brit mod fis sb blk-y-sb
ply ctgs, l-mod calc wi brn resd



