



Empirica

Scale: 5" / 100'
Measured Depth Log

Well Name Waag 25

Location Sec. 19 T7N R65W

State CO

Country USA

API Number 05-123-40347

Region DJ Basin

Spud Date 9/20/2015

County Weld

Rig Number Savannah 802

Field Wattenberg

Drilling Completed 9/22/2015

Surface Coordinates Lat: 40°N 33' 15.940"

Lon: 104°W 42' 27.288"

Bottom Hole Coordinates Lat: 40°N 33' 15.941"

Lon: 104°W 41' 29.437"

Ground Elevation 4,868'

K.B. Elevation 4,883'

Logged Interval 5,000' **To** 12,011' MD

Total Depth 12,011' MD

Formation Codell

Type of Drilling Fluid Invert

Operator

Company Extraction Oil & Gas

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

Geologist

Name Jared Rouse

Company Extraction Oil & Gas

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



Other

Equipment ML-197

Comments Start: 9-20-15
TD: 9-22-15

Services Provided 2-man Logging

Logger Names Brian Ferwerda / Mar

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

Zone Color Coding

Oil

Note

Error

Condensate

Core

Water

Gas

Pressure

Seal

Rock Types

UNKNOWN

ANHYDRITE

GYPSUM

SALT

CHALK

LIMESTONE

DOLOMITE

CHERT

COAL

MARLSTONE

CLAYSTONE

SHALE

SHALE GRAY

SHALE COLORED

SILTSTONE

SANDSTONE

CONGLOMERATE

BRECCIA

TILL

BENTONITE

TUFF

IGNEOUS

METAMORPHIC

CEMENT

Accessories

F FOSSIL

GASTROPOD

OOLITE

OSTRACOD

PELECYPOD

PELLET

PISOLUTE

BRACHIOPOD

BRYOZOA

CEPHALOPOD

CORAL

CRINOID

ECHINOID

FISH

FORAMINIFERA

ARGILLACEOUS

ARGILLITE GRAIN

B BENTONITE

BITUMENOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHTDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

FELDSPAR

FERRUGINOUS PELLET

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

K KAOLIN

MARLSTONE

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLET

PYRITE

SALT CAST

SANDY

SILICEOUS

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

SILTSTONE STRINGER

Other S

ORGANIC

PINPOINT

DEAD

VUGGY

EVEN

QUESTIONABLE

SPOTTED STAINING

BIT

CASING

REVE

OVER

OIL 1

NOR

MUD PIE

GAS

Engineering

CONNECTION (LEFT)

CONNECTION (RIGHT)

SIDE

FENESTRAL

CONNECTION GAS

SLIDE

FRACTURE

CORE - LOST

SUI

INTERCRYSTALLINE

CORE - RECOVERED

TRI

INTEROOLTIC

DST INTERVAL

WIRE

MOLDIC

FAULT

WIRE

Porosity

E EARTHY

SIDE

FENESTRAL

CONNECTION GAS

SLIDE

FRACTURE

CORE - LOST

SUI

INTERCRYSTALLINE

CORE - RECOVERED

TRI

INTEROOLTIC

DST INTERVAL

WIRE

MOLDIC

FAULT

WIRE

Oil Show

ORGANIC

PINPOINT

DEAD

VUGGY

EVEN

QUESTIONABLE

SPOTTED STAINING

BIT

CASING

REVE

OVER

OIL 1

NOR

MUD PIE

GAS

Symbols

FORMATION TOP L LITHOGRAPHIC

Rounding

SHOW M~~X~~ MICROXLN

TH MN DEPTH A~~.~~ ANGULAR M~~S~~ MUDSTONE

WAL FAULT R~~.~~ ROUNDED P~~S~~ PACKSTONE

SHOW B~~.~~ SUBANG W~~S~~ WACKESTONE

RTURNED STRATA P~~.~~ SUBRND

Sorting

ERSE FAULT

Textures

WALL CORE (LEFT) M~~.~~ MODERATE

WALL CORE (RIGHT) B~~S~~ BOUNDSTONE P~~.~~ POOR

C~~.~~ CHALKY W~~.~~ WELL

RVEY C~~X~~ CRYPTOXLN

P GAS E~~.~~ EARTHY

LINE TESTED - LEFT F~~X~~ FINELYXLN

LINE TESTED - RT G~~S~~ GRAINSTONE

ROP
GAMMA
GAS

Extraction OG
Weld County, CO
Spud Date: 9-20-15
Surface Casing @ 894'
2-man logging began: 9-21-15
100 units = 1% methane
Depths correspond to Driller's Pipe Tally

Waag 25



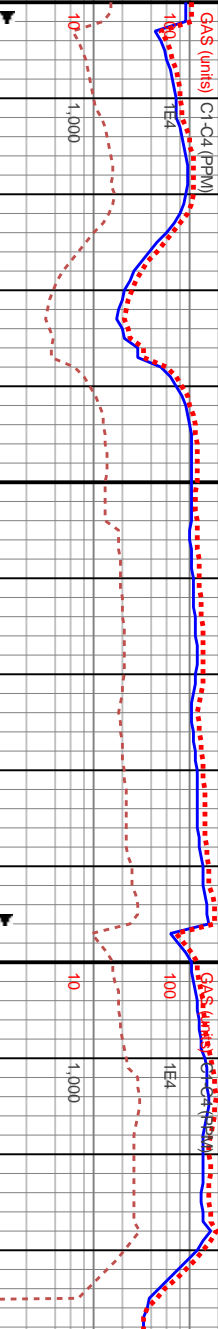
Slide/Rotate

Depth Labels

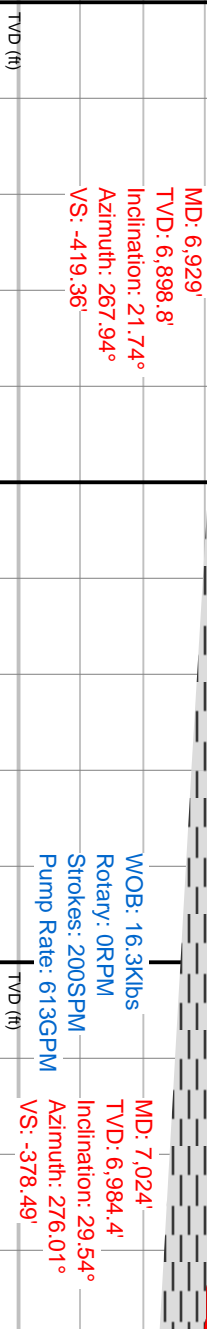
Total Gas & Chromatograph

GAS
C1
C2
C3
C4

Logarithmic Scale



Well Bore
TVD



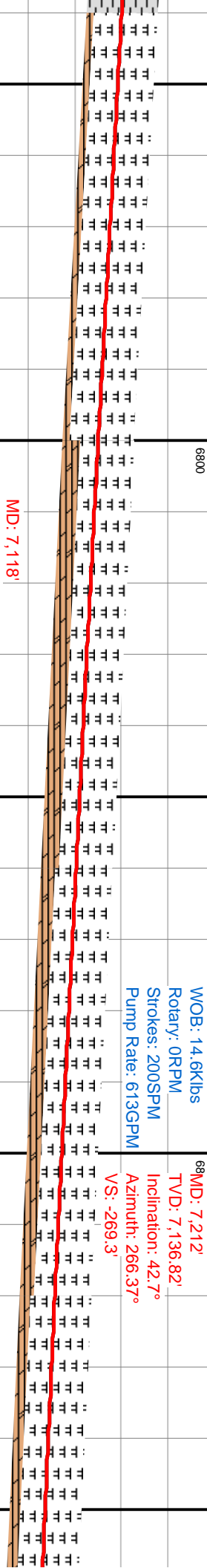
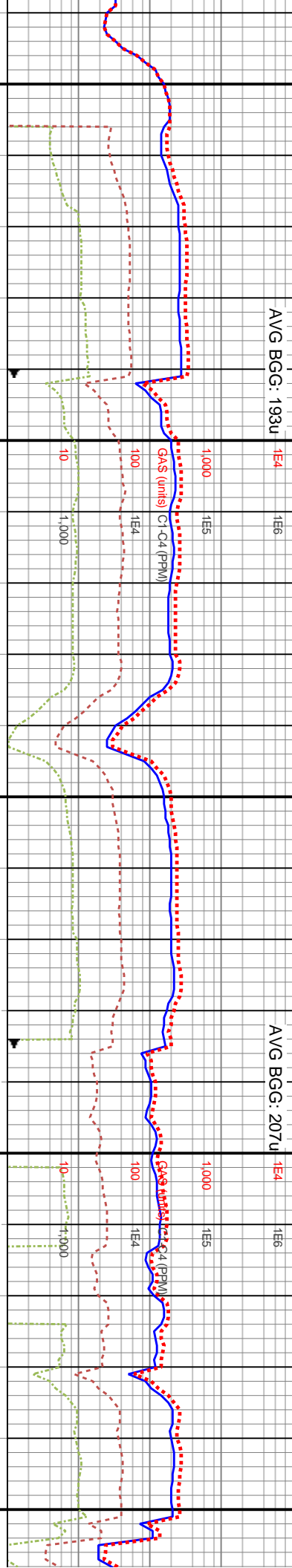
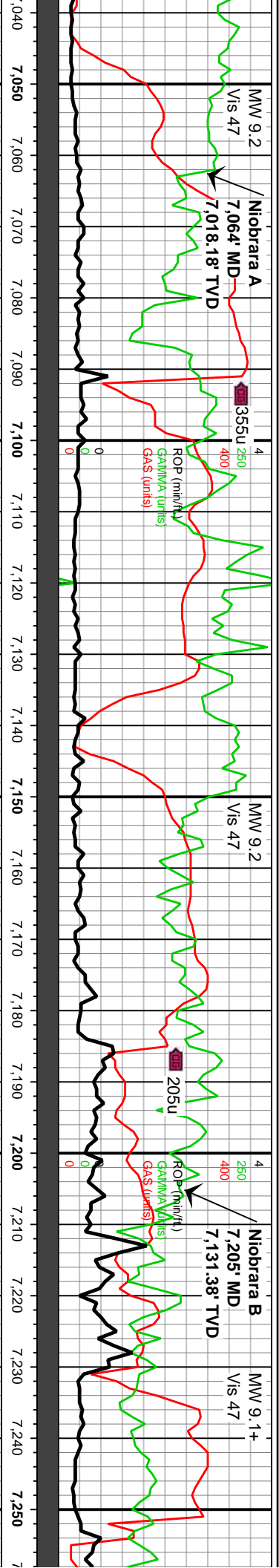
6860-6920 SLTST (60%) med gy-ht gy, frm-sl hrd, silty tex, micnica, non calc, grdg to med gy sh; SH (40%): dk gy-med gy, sb ply-tab, frm-sl hrd, sl silty-rgh tex, non calc

6920-6980 SH (70%): med gy-sl dk gy, occ v dk gy, frm-sl hrd, ply-sb blk, sl micnica, non-sl calc; SLTST (30%): med gy-dk gy, gysbhn ip, frm, sme fis, sb blk, sl rgh tex, tr f lamn, sl calc

6980-7040 SH: med gy-dk gy, gysbhn, sl frm-hrd, sme fis, sb blk-elig, sm-sl silty tex, mnr lamn, calc-v calc, tr micnica;

Oil Show

Images



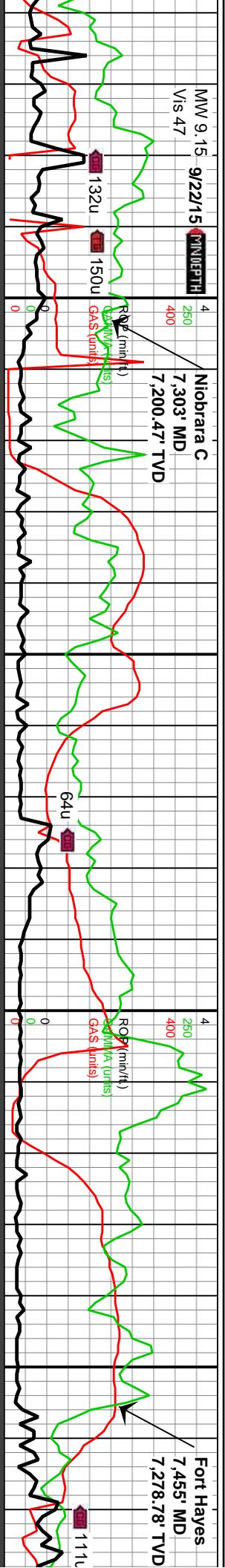
7040-7100 MRLST (95%): dk gy-v dk gy, frm-sl hrd, pty-tab, sl stly tex, v calc, tr chk lamm, tr pp mic pyr; CHK (5%): crm-lt gy, gysbhn, vf lamm, intbdd wi mntst, sft, calc, chky tex	7100-7160 MRLST (75%): mot dk gy-dk gysbhn, pty-biky, frm, v calc, tr frac fil cal, scat pyrc nod-vf imbd pyr; CHK (25%): mot lt gy-oftwht, v sft, chky tex, sb pty-sb biky, bri gn flr	7160-7220 MRLST (80%): pred mot lt gy-med gy, v dk gy ip, occ sme brn, sb biky-pty, sm-sl rgh tex, fy lam, v arg, calc; CHK (20%): gy-dk gy, lam, pty, stly, tr-scat pyr frags, occ pp pyr, scat frac fl cal	7220-7280 MRLST (85%): pred pty-sb biky, frm-sl hrc pyr; CHK (15%): crm-lt gys biky-tab, chky tex, vf lamm, yeign flr
7800	7800	7800	



MW 9.15 9/22/15 MINDEPTH
Vis 47

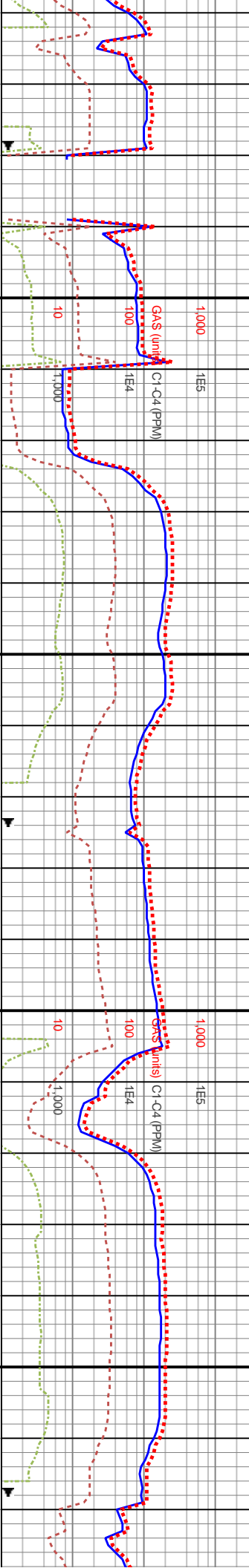
Niobrara C
7,303' MD
7,200.47' TVD

Fort Hayes
7,455' MD
7,278.78' TVD



AVG BGG: 130u

AVG BGG: 139u

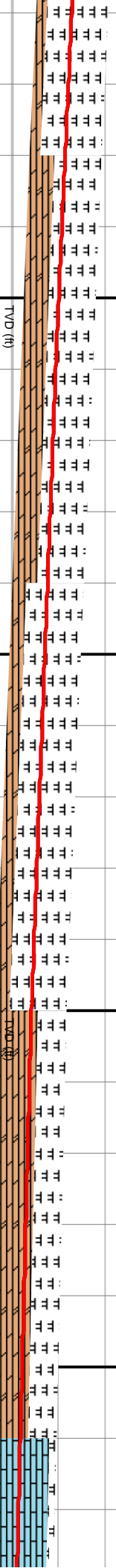


Note: TOO H for motor MD: 7,307'

TVD: 7,203.27'
Inclination: 48.48°
Azimuth: 265.77°
VS: -201.51'

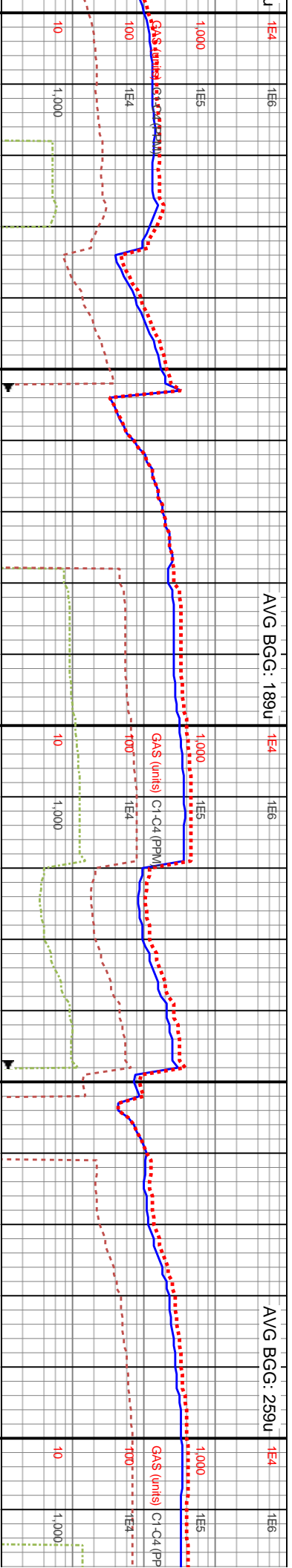
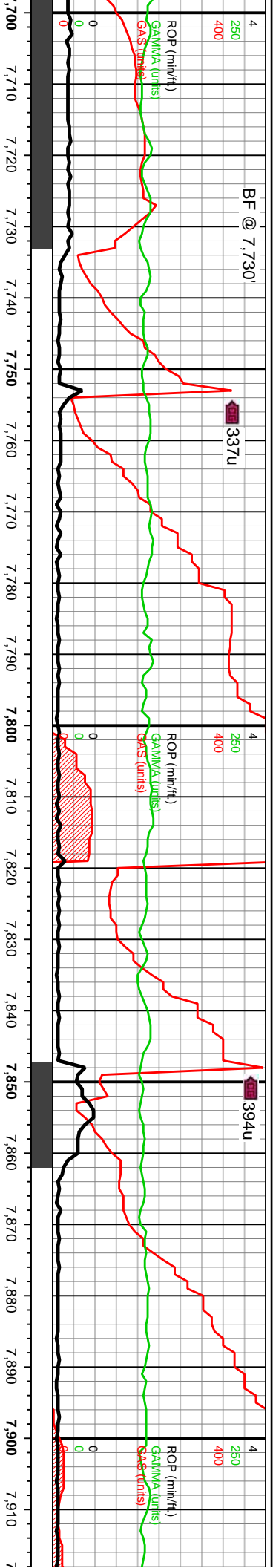
WOB: 24.4Klbs
Rotary: 0RPM
Strokes: 2005SPM
Pump Rate: 613GPM

MD: 7,401'
TVD: 7,257.79'
Inclination: 60.47°
Azimuth: 265.62°
VS: -125.22'



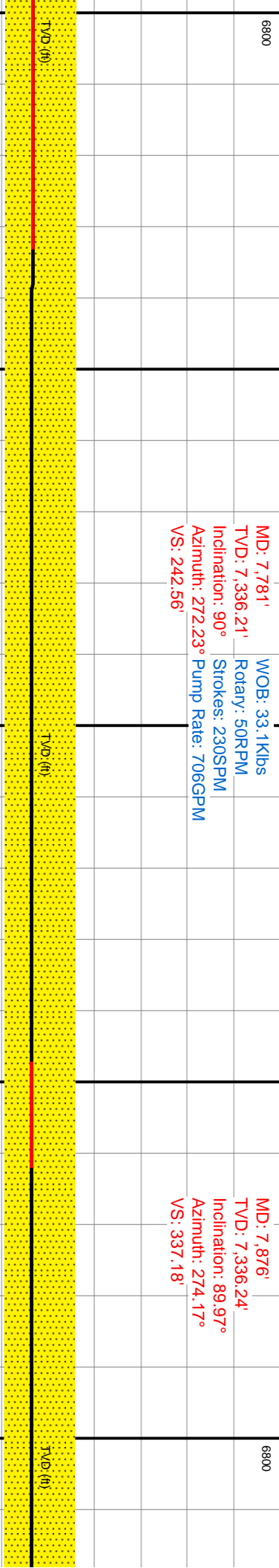
mot med gy-dk gy, , fri, v calc, tr scat hbn, lt gy, sft, sb intbd wi mrlst, dul	7280-7340 MRLST (65%): mot med gy-dk gy, blky-sl splt, frm-sl hrd, v calc, tr mic fos, tr scat pyr; CHK (35%): crm-lt gysbhn, lt gy, sft, chky tex, ply-sb tab, vf lamm, intbd wi mrlst, dul yelgn flr	7340-7400 MRLST (80%): mot med gy-dk gy, sb blky-splt, ply, frm-sl hrd, v calc, vf chk lamm, tr scat pyr; CHK (20%): crm-lt gysbhn, tn, chky tex, sft, vf lamm, blky-sb splt, intbd wi mrlst, dul yelgn flr	7400-7460 CHK (60%): crm-lt gysbhn, tn, sft, chky tex, blky-sb tab, vf lamm, intbd wi mrlst, dul yelgn flr; MRLST (40%): mot med gy-dk gy, sb elg-ply, frm-sl hrd, v calc, vf intbd chk lamm, tr micfos	7460-7500 ofwht-tr pp mic f lamm, in gy-med
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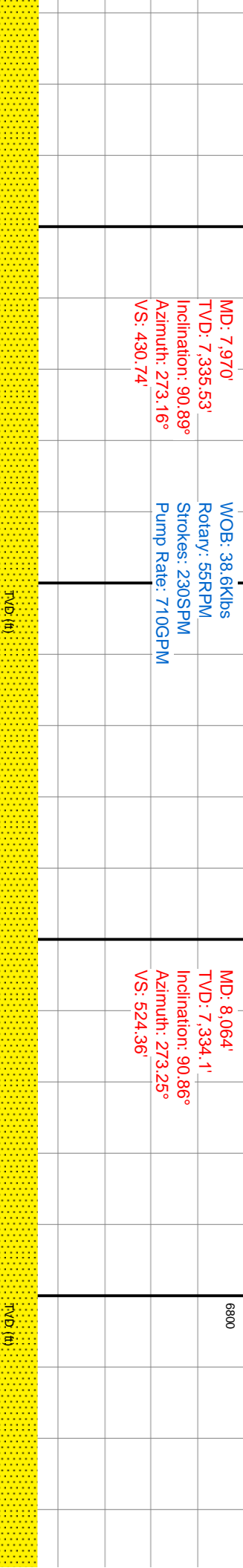
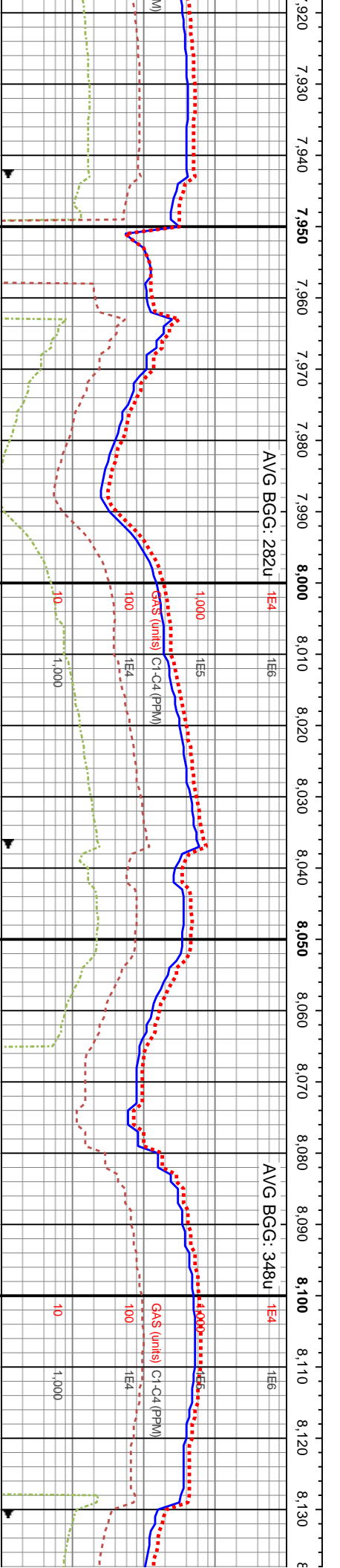
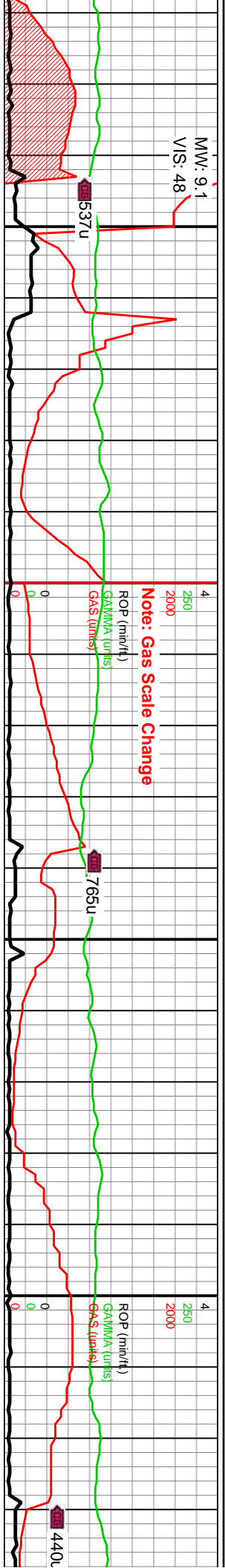
MD: 7,781'
TVD: 7,336.21'
Rotary: 50RPM
Inclination: 90°
Strokes: 230SPM
Azimuth: 272.23°
Pump Rate: 706GPM
VS: 242.56'

MD: 7,876'
TVD: 7,336.24'
Inclination: 89.97°
Azimuth: 274.17°
VS: 337.18'

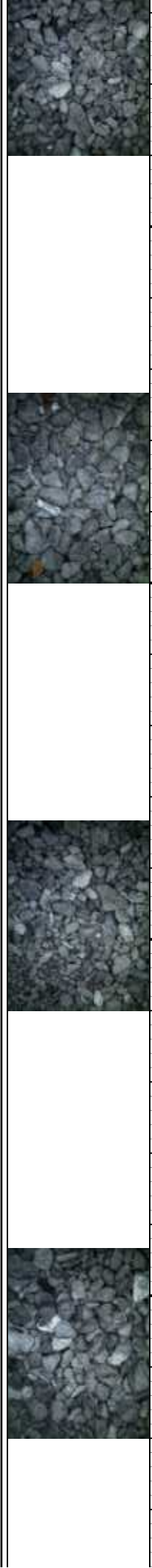


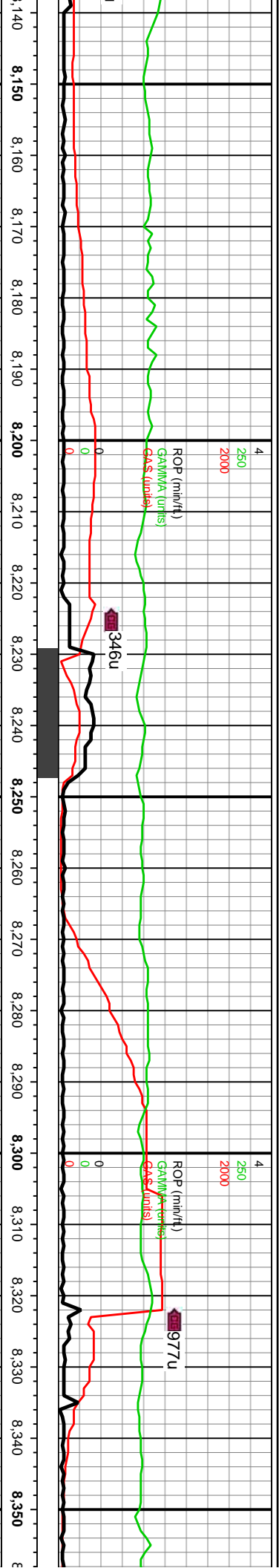
TVD: (ft)		TVD: (ft)		TVD: (ft)	
7700-7760 SS: dk gy-dk gy brn cls, occ clr uncons sd, p-mod strd, pred sb ang-sb rd vf-f gr SS, sft-med frm-frm sft-sl fr gr sup cls cons wi arg-slic cnt, com uncons, tr pyr, pred non-sl calc, rr dul yelgn flor, mod mky-sling cut, mod lt bishwh resdl ring		7760-7820 SS: gyshbn-med gy, lt brn-offwht clus, occ clr uncons sd, mod strd, sb ang-sb rd, vf-f gr, frm-sl fr, gr sup cls, cons wi arg-slic cnt, com uncons, pred non-sl calc, tr dul yelgn flor, mod stmg-nky cut, bishwh resdl ring		7820-7880 SS: med gy-gyshbn, lt brn cls, occ clr uncons sd, mod strd, pred sb ang-sb rd, vf-f gr SS, med frm-sl fr gr sup cls, cons wi arg-slic cnt, pred non-sl calc, tr-rr dul yelgn flor, stmg-nky cut, lt bishwh resdl ring	
7800		7800			





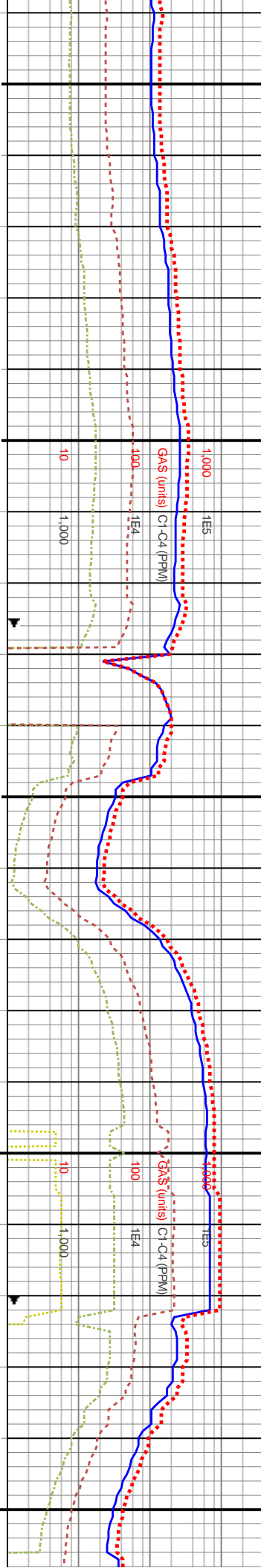
7940-8000 SS: pred gyshbn-med gy, sme dk gy brn, trnsl grs thru, mod strt, pred sb ang-sb rd, vf-f gr, sb ang-sb rnd qtz grs, fri gr sup cls, cons wi arg/silic cnt, tr du yelgn flr, mod stmng-nky cut, bishwh resdl ring	8000-8060 SS: pred med gy-gyshbn, lt gy, trnsl grs thru, mod strt, pred sb ang-sb rd, vf-f grs, fri gr sup cls, cons wi arg-silic cnt, uncons grs, sme sl calc, tr du yelgn flr, mod stmng-nky cut, bishwh resdl ring	8060-8120 SS: dk gy-dk gy brn-off wh-lt tn-lt brn-clr uncons sd, p-mod strt, pred sb ang-sb rd vf-f gr SS, sft-med frm-firm sft-sl fri gr sup cls cons wi arg-silic cnt, com-abnt uncons, tr pyr, pred non-sl calc, tr-r du yelgn flr, mod stmng-nky cut, bishwh resdl ring	8120-8 vf-f grs, grs, fri gr yelgn flr ring
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AVG BGC: 322U

AVG BGC: 375U

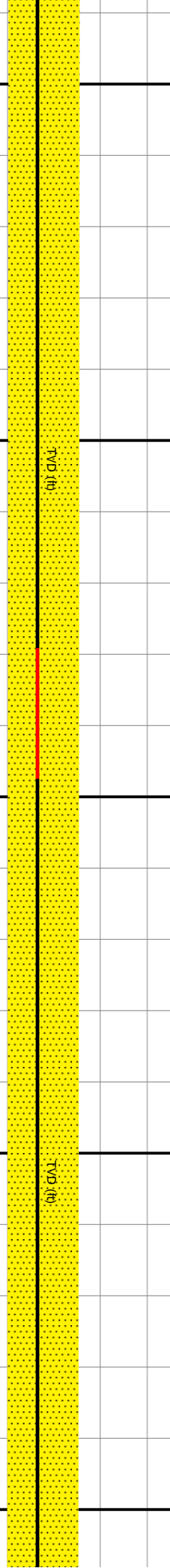


MD: 8,159'
TVD: 7,334.02'
Inclination: 89.23°
Azimuth: 273.45°
VS: 618.96'

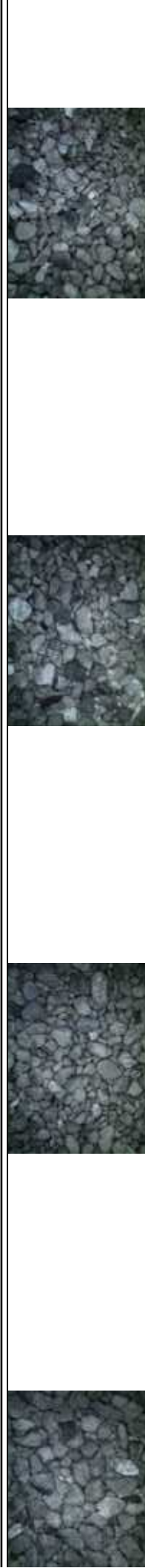
WOB: 38.6klbs
Rotary: 60RPM
Strokes: 232SPM
Pump Rate: 710GPM

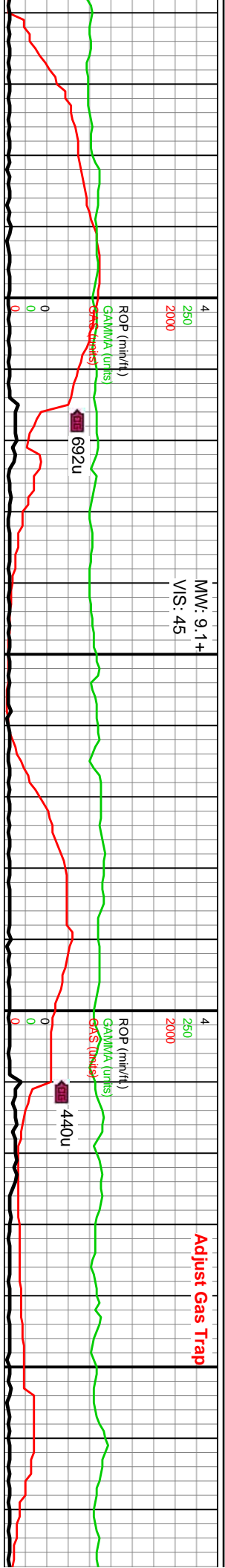
MD: 8,254'
TVD: 7,334.81'
Inclination: 89.82°
Azimuth: 270.68°
VS: 713.73'

MD: 8,348'
TVD: 7,335.38'
Inclination: 89.48°
Azimuth: 270.87°
VS: 807.62'

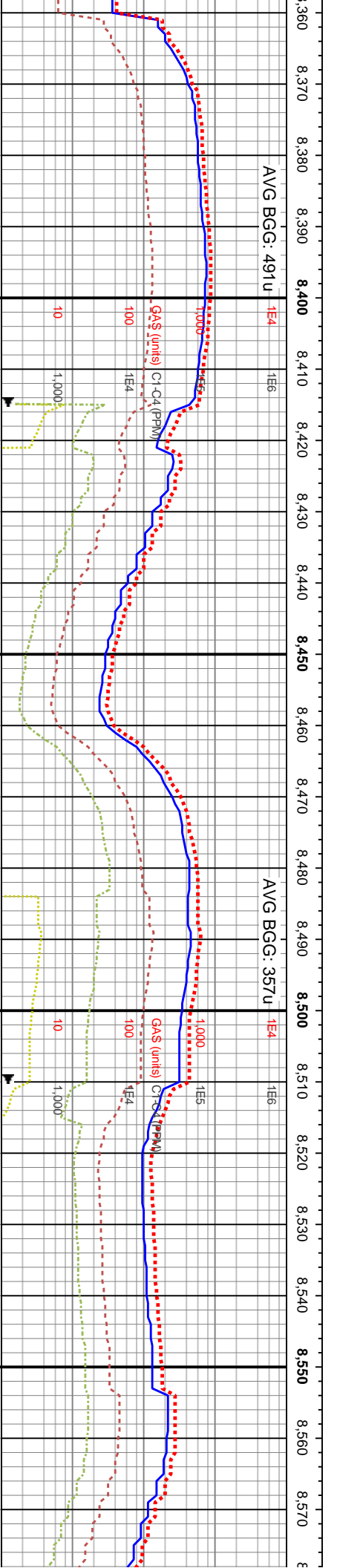


80 SS: pred med gy-dk gy brn, sl op, mod strd, pred sb ang-sb rd, uncongs gr sup cls, cons wi arg/silic cnt, tr-rr dul	8180-8240 SS: dk gy-dk gy brn, lt gy-lt brn, op uncongs sd, mod strd, pred sb ang-sb rd, vt-f grs, frm-sl fri, pred gr sup cls, cons wi arg/silic cnt, abnt uncongs, non-sl calc, tr-rr dul yeign flor, mod stmg-nlky cut, bishwh resd ring	8240-8300 SS: pred med gy-gyshbn, lt brn, clr grs thru, mod strd, pred sb ang-sb rd, vt-uf grs, ang-sb rd qtz grs, uncongs qtz grs, fri gr sup cls, cons wi arg/silic cnt, tr-rr dul yeign flor, mod stmg-nlky cut, bishwh resd ring	8300-8360 SS: pred med gy, occ tn-lt brn, offwht-trnsl grs thru, p-mod strd, pred sb ang-sb rd f-u f gr sd, sme med-l med ang-sb ang qtz grs, uncongs qtz grs-fri gr sup cls cons wi arg-silic cnt, sme sl calc, tr-rr dul yeign flor, mod stmg-nlky cut, bishwh resd ring
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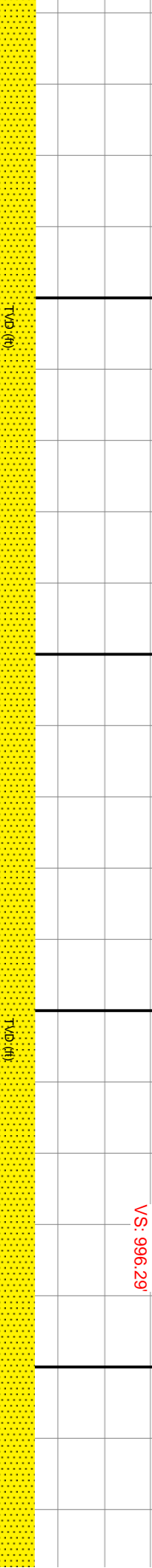


MW: 9.1+
V/S: 45



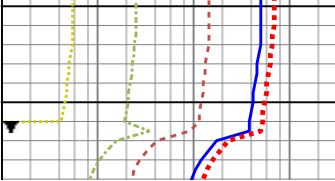
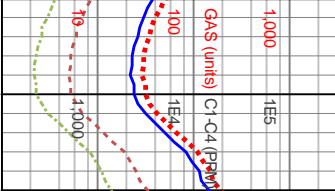
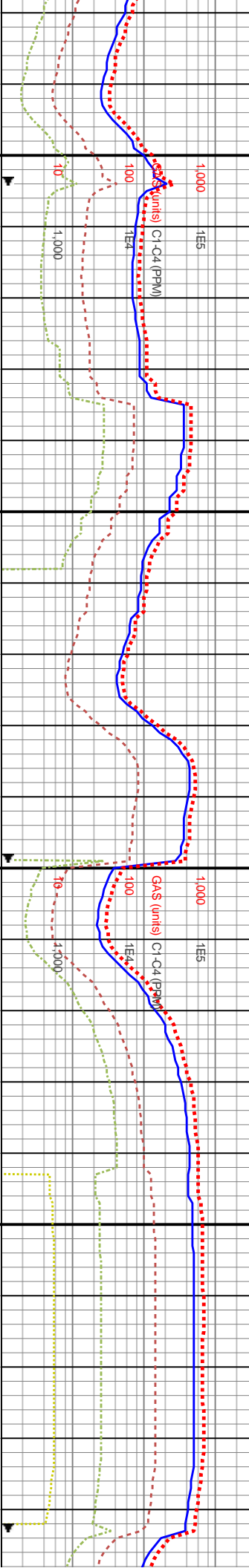
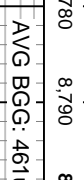
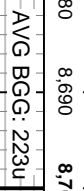
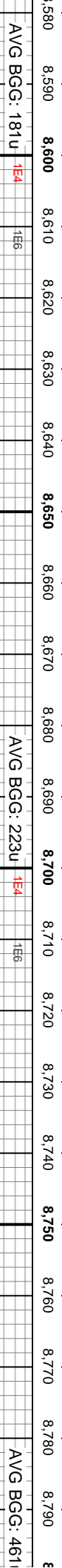
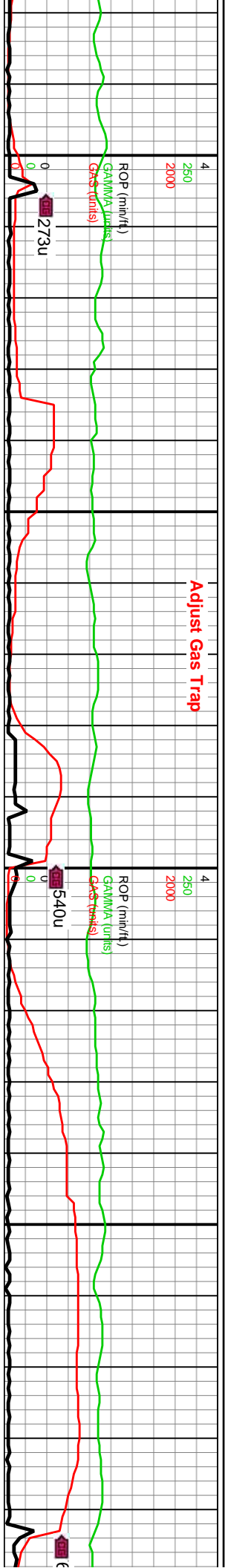
WOB: 40.5Klbs
Rotary: 50RPM
Strokes: 232SPM
Pump Rate: 710GPM

MD: 8,537'
TVD: 7,336.6'
Inclination: 89.78°
Azimuth: 272.11°
VS: 996.29'



8360-8420 SS: pred med gy-gyshbn, occly lt gy, offwht-trnsl grs thru, p-mod strd, pred sb ang-sb rd f-u f gr sd, sme med ang-sb ang qtz grs, fri gr sup cls cons wi arg-silic cnt-uncons grs, sme sl calc, tr-r du yelgn flor, mod sting-mky cut, bishwh resdl ring	8420-8480 SS: pred med gy, occly gyshbn, offwht-trnsl grs thru, ply-mod w strd, sb ang-sb rd f-u f gr sd, sme med ang-sb ang qtz grs, fri gr sup cls cons wi arg-silic cnt-uncons grs, sl calc, tr-r du yelgn flor, mod sting-mky cut, bishwh resdl ring	8480-8540 SS: pred med gy-dk gy, dk gyshbn-lt brn, clt uncons grs, mod w strd, sb ang-sb rd, v-fuf grs, sb ang-sb rd grs, fri gr sup cls, cons wi arg/silic cnt, sme sl calc, tr dl yelgn flor, mod sting-mky cut, bishwh resdl ring	8540-8600 SS: pred med gy, rr offwht-trnsl grs, p-moc rd f-u f gr sd, rr med ang-sb uncons grs-fri gr sup cls coi sl calc lp, rr pyr, tr dl yelgn fl cut, bishwh resdl ring
7800	7800	7800	





WOB: 41Klbs
Rotary: 50RPM
Strokes: 230SPM
Pump Rate: 707GPM

MD: 8,632'
TVD: 7,336.5'
Inclination: 90.34°
Azimuth: 272.61°
VS: 1,091.03'

MD: 8,726'
TVD: 7,336.1'
Inclination: 90.15°
Azimuth: 272.2°
VS: 1,184.77'

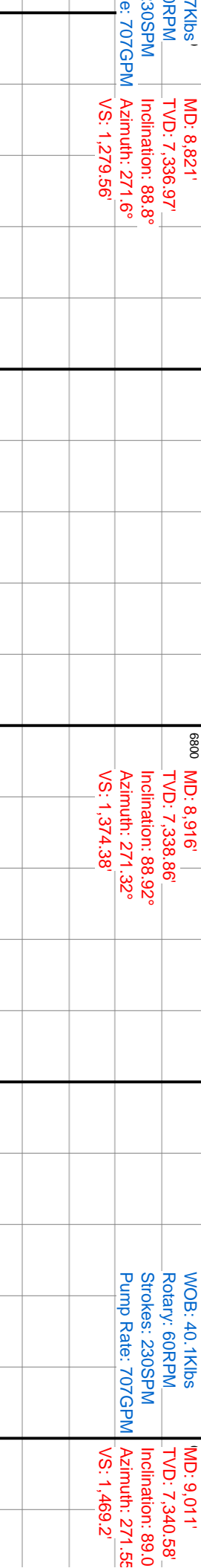
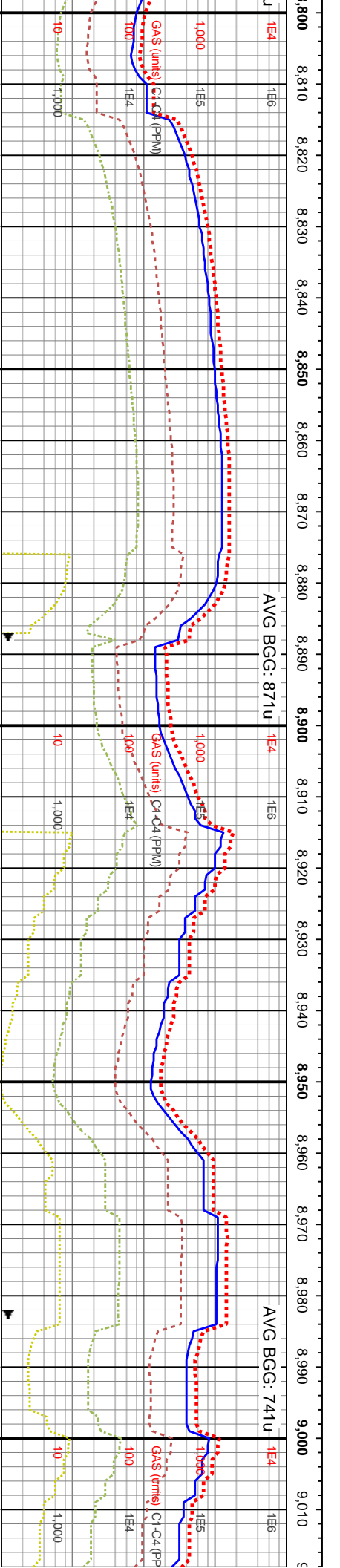
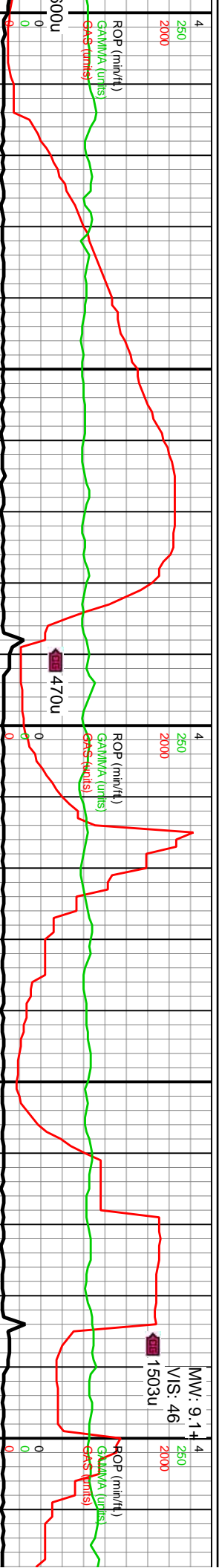
WOB: 29
Rotary: 70
Strokes: 2
Pump Rate:

TVD: (ft)

TVD: (ft)

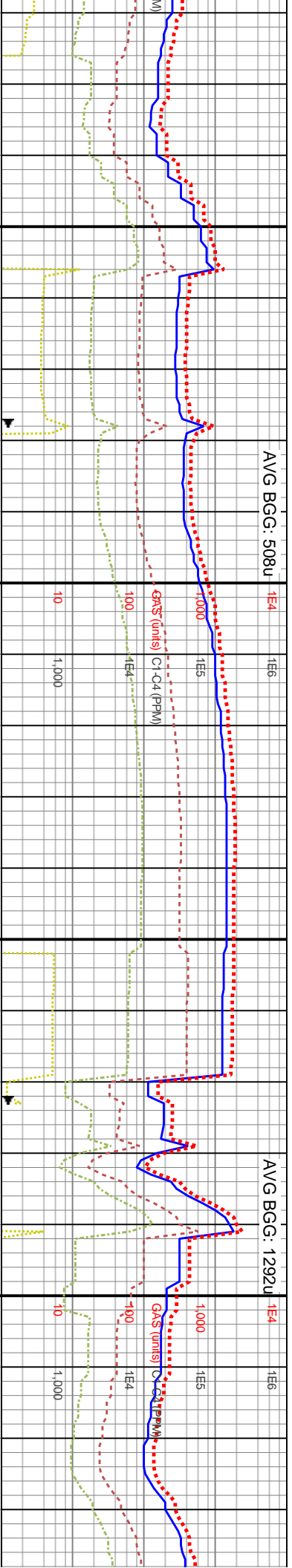
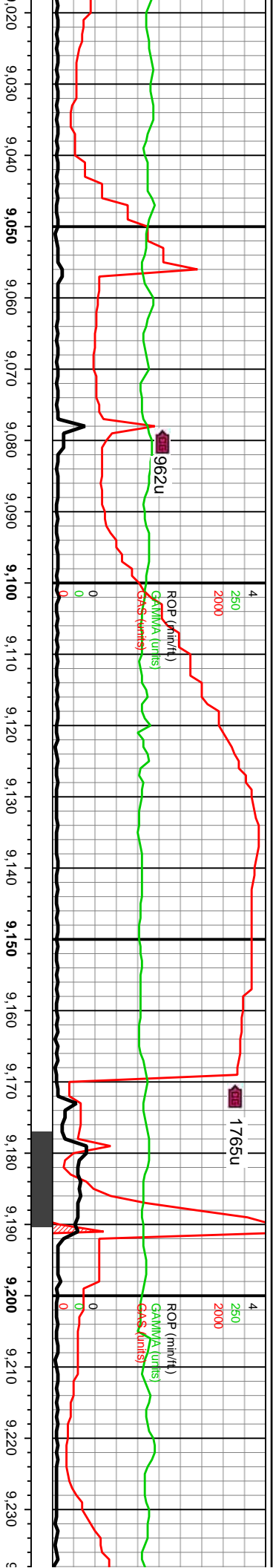
8600-8660 SS: pred med gy-gyshbn, occlly lt gy, ofwht-trnsl grs thru, p-mod strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncongs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr dl yeign flor, mod stmng-rnky cut, bishwh resdl ring	8660-8720 SS: pred med gy-gyshbn, lt gy, clr grs, mod w strd, sb ang-sb rd, vf-uf grs, ang-sb rd grs, uncongs grs, fri gr sup cls, cons wi arg-silic cnt, sl calc ip, rr-tr dl yeign flor, mod stmng-rnky cut, bishwh resdl ring	8720-8780 SS: pred med gy-gyshbn-lt gy, ofwht-trnsl grs thru, p-mod strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncongs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr dl yeign flor, mod stmng-rnky cut, bishwh resdl ring	8780-8840 SS: pred med gy-gyshbn-lt gy, ofwht-trnsl grs thru, p-mod strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncongs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr dl yeign flor, mod stmng-rnky cut, bishwh resdl ring
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MD: 8,821' TVD: 7,336.97' Inclination: 88.8° Azimuth: 271.6° VS: 1,279.56'		MD: 8,916' TVD: 7,338.86' Inclination: 88.92° Azimuth: 271.32° VS: 1,374.38'		MD: 9,011' TVD: 7,340.58' Inclination: 89.0° Azimuth: 271.55° VS: 1,469.2'	
7Klbs' RPM: 30SPM e: 707GPM VS: 1,279.56'		6800 MD: 8,916' TVD: 7,338.86' Inclination: 88.92° Azimuth: 271.32° VS: 1,374.38'		WOB: 40.1Klbs Rotary: 60RPM Strokes: 230SPM Pump Rate: 707GPM	
TVD (ft)		TVD (ft)		TVD (ft)	
8840-8900 SS: pred med gy-gyshbn-lt gy, occ offwht-trnsd grs, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncons grs-fri gr sup cls cons wi arg-silic cnt, sl calc lp, rr pyr incl, tr dl yelgn flor, mod stmg-mky cut, bishwh resdl ring		8900-8960 SS: dk gy-med gyshbn, offwht-lt brn, cfr abnt uncons sd, vf-f grs, mod strd, pred sb ang-sb rd, sl fri-hrd, gr sup cls, cons wi arg/silic cnt, tr dl yelgn flor, mod string-mky cut, bishwh resdl ring		8960-9020 SS: pred med gy-gyshbn, lt gy-offwht, op abnt uncons sd, p-mod strd, pred sb ang-sb rd, vf-f grs, sl hrd-firm, sl fri, gr sup cls, cons wi arg/silic cnt, tr dl yelgn flor, mod stmg-mky cut, bishwh resdl ring	
7800		7800		7800	



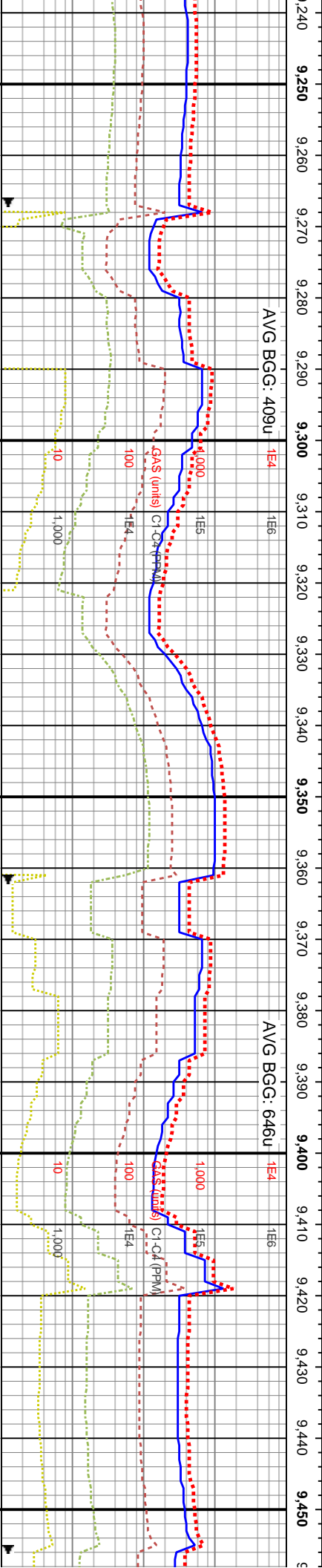
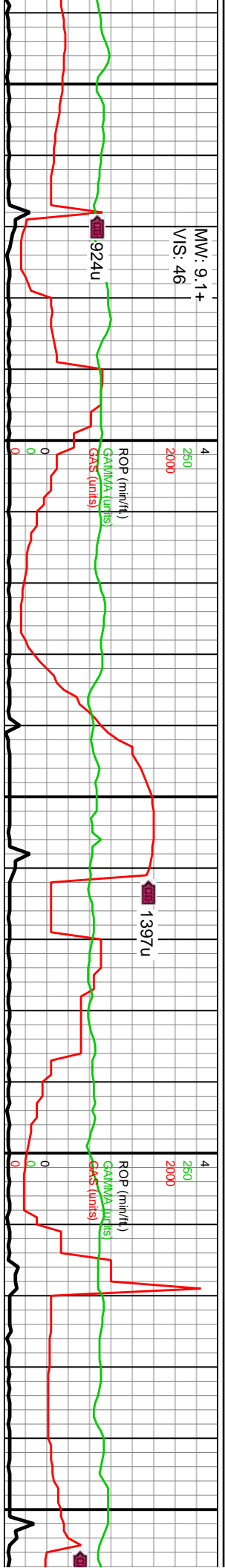


MD: 9,106'
TVD: 7,341.28'
Inclination: 90.15°
Azimuth: 271.85°
VS: 1,564.02'

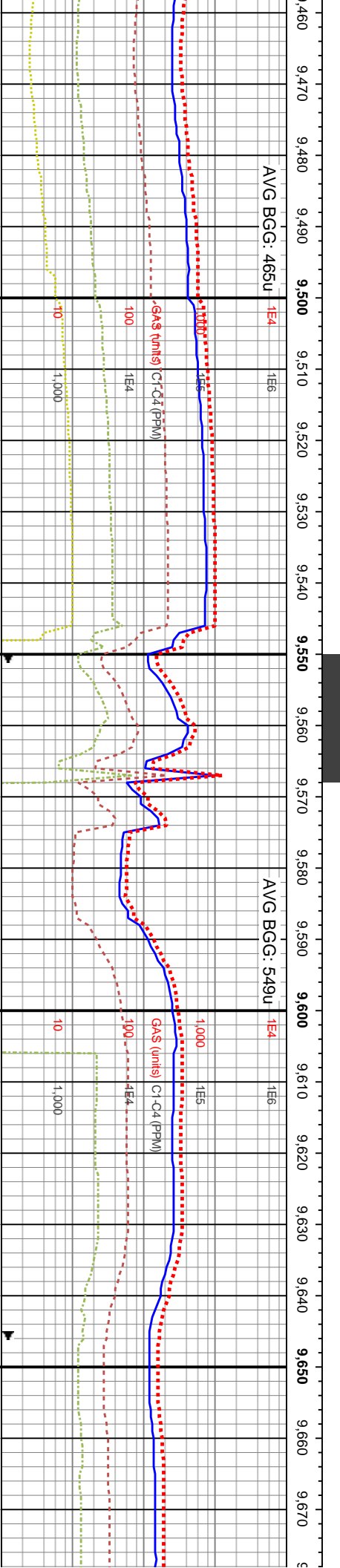
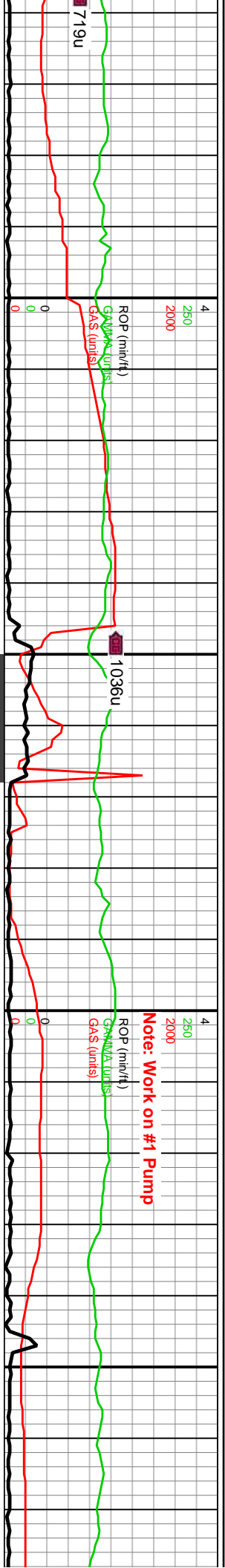
MD: 9,200' 800
TVD: 7,343.47'
Inclination: 87.17°
Azimuth: 270.57°
VS: 1,657.84'

TVD (ft)	
9020-9080 SS: med gy-ilt gy-gyshbn, occily lt tn, occ offwhit-trnsi grs, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncongs grs-frt gr sup cls cons wi arg-silic cnt, sl calc ip, rr pyrc spec, tr dl yelgn flor, mod sting-mky cut, bishwh resdl ring	
9080-9140 SS: predy med gy-ilt gy-gyshbn, occily lt tn, offwhit-trnsi grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncongs grs-frt gr sup cls cons wi arg-silic cnt, tr dl yelgn flor, mod sting-mky cut, bishwh resdl ring	
9140-9200 SS: dk gy-med gysbhn, lt btm, clr uncongs sd, mod strd, pried sb ang-sb rd, vf-f grs, gr sup cls, cons wi arg/silic cnt, abnt lse grs, tr pyr, non-sl calc, tr dul yelgn flor, mod sting-mky cut, bishwh resdl ring	
TVD (ft)	
9200-9260 SS: pried med op grs thru, vf-uf grs, pried strd, gr sup cls, cons wi ar calc, tr dul yelgn flor, mod bishwh resdl ring	



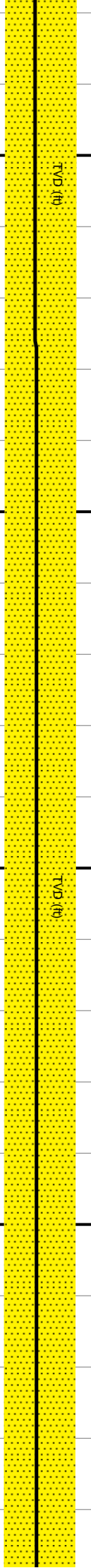
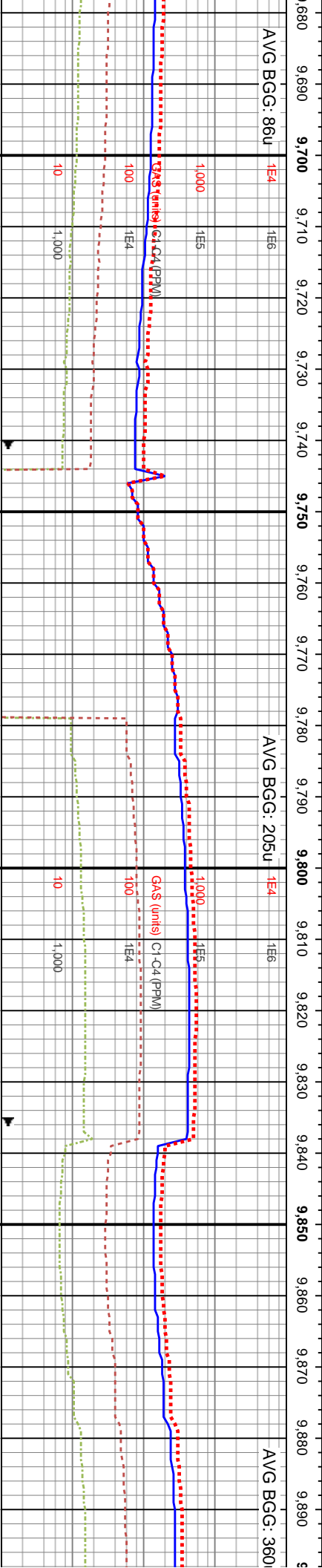
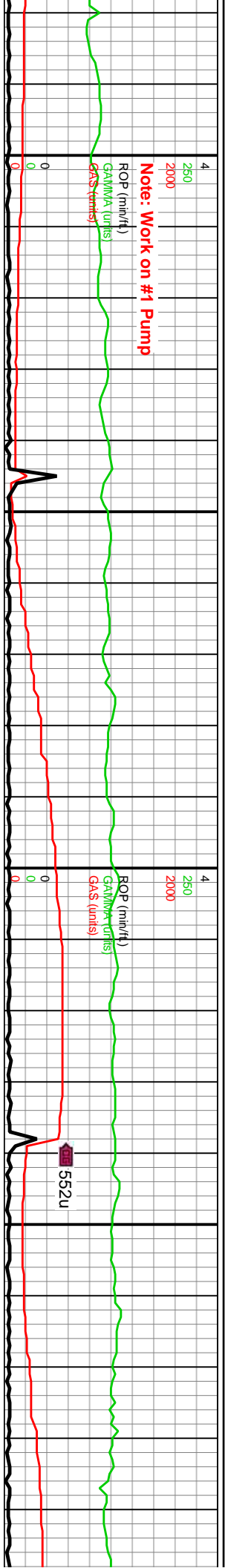


9260-9320 SS: dk gy-gyshbn-offwhlt-lt tn, occ clr unconcs sd grs, p-mod strd, pred sb ang-sb rd vf-f gr, sft-med frm-frm sft-sl fir gr sup cls cons wi arg/silic cnt, pred non calc, sl calc ip, tr du yelgn flor, mod stmng-nlky cut, bishwh resdl ring		9320-9380 SS: predy med gy-lt gy-gyshbn, occly lt tn, offwhlt-trnsf grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, unconcs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr du yelgn flor, mod stmng-nlky cut, bishwh resdl ring	9380-9440 SS: pred med gy-gyshbn-lt gy, occ offwhlt-trnsf grs, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, unconcs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr du yelgn flor, mod stmng-nlky cut, bishwh resdl ring, rr pyr incl	9440-9500 SS: pred med gy-gyshbn-lt gy, occ offwhlt-trnsf grs, p-mod w strd, sb ang-sb ang qtz grs thru, unconcs grs-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr du yelgn flor, mod stmng-nlky cut, bishwh resdl ring
TVD: (ft)		TVD: (ft)	TVD: (ft)	TVD: (ft)
7800				



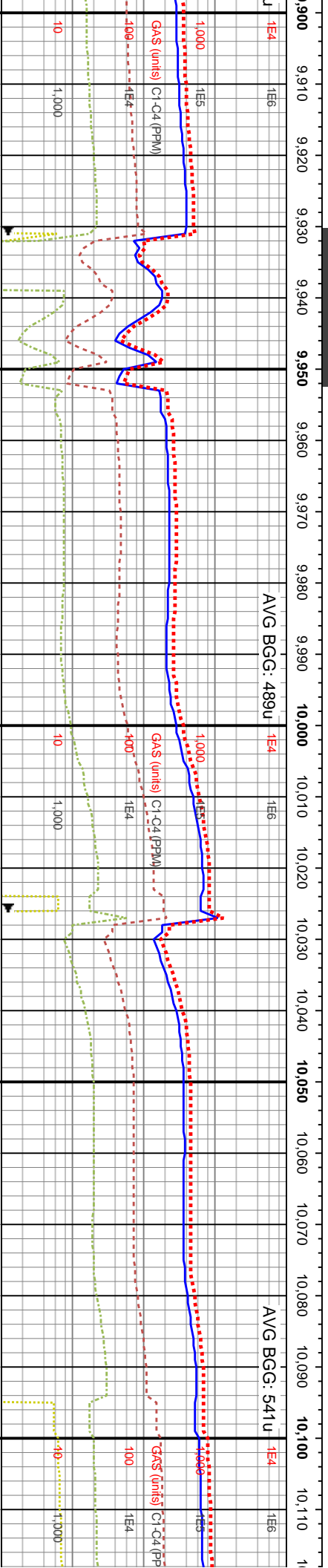
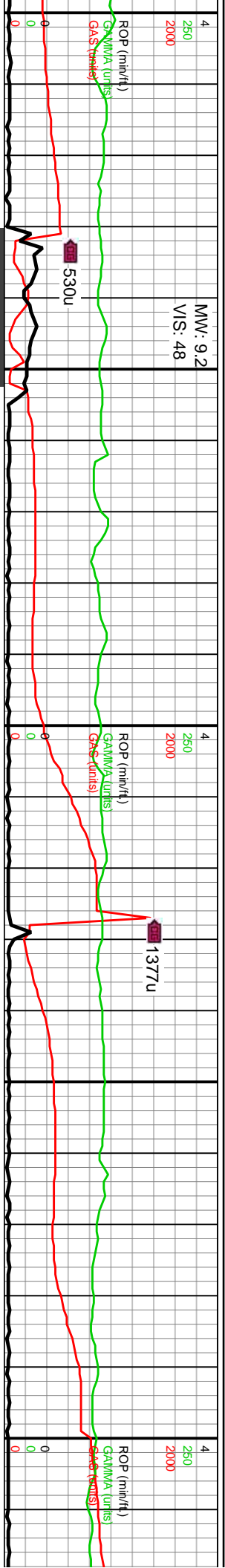
9460-9500 SS: dk gy-dk gyshbn, sme lt brn, mod strd, pred sb ang-sb rd, com lse	9500-9560 SS: med gy-dk gyshbn, lt brn, abnt clt-op lse grs, mod strd, pred sb ang-sb rd, vf-f grs, gr sup cls, cons wi arg/silic cnt, tr pyr, pred non-si calc, tr dul yeign flor, mky cut, bishwh resd ring	9560-9620 SS: dk gy-dk gyshbn, med gy-lt brn cls, mod strd, pred sb ang-sb rd, vf-f grs, gr sup cls cons wi arg/silic cnt, abnt lse grs, tr pyr, tr dul yeign flor, mod sting-mky cut, bishwh resd ring	9620-9680 SS: pred med gy-gyshbn-lt gy, occ oftwht-trnsi grs, p-mod w strd, sb ang-sb rd f gr sd, med ang-sb ang qtz grs thru, fit gr sup cls cons wi arg-silic cnt, si calc lp, tr dul yeign flor, mod sting-mky cut, bishwh resd ring
7800	7800	7800	





9680-9740 SS: pred med gy-gy/shbn-it gy, trnsl grs thru, mod strd, sb ang-sb rd, v-f uf grs, fri gr sup cls, cons wi arg-silic cmt, sl calc ip, tr dul yelgn flor, mod sting-mky cut, bishwh resd ring	9740-9800 SS: pred med gy-gy/shbn-it gy, occ offwht-trnsl grs, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncons grs-fri gr sup cls cons wi arg-silic cmt, sl calc ip, tr dul yelgn flor, mod sting-mky cut, bishwh resd ring	9800-9860 SS: pred med gy-gy/shbn-it gy, offwht-trnsl grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, uncons grs-fri gr sup cls cons wi arg-silic cmt, sl calc ip, tr dul yelgn flor, mod sting-mky cut, bishwh resd ring	9860-9920 SS: med gy-dk (gy, mod strd, pred sb ang-s sup cls, cons wi arg/silic cm pyr, pred sl calc, tr dul yelgr sting-mky cut, bishwh resd
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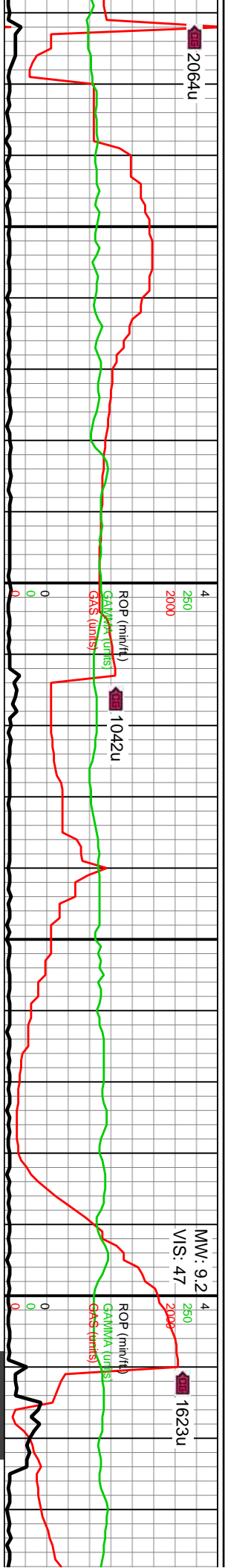
MD: 9,959'
TVD: 7,349.4'
Inclination: 90°
Azimuth: 269.02°
VS: 2,415.05'

WOB: 40.3Klbs
Rotary: 65RPM
Strokes: 224SPM
Pump Rate: 684GPM

MD: 10,054'
TVD: 7,349.47'
Inclination: 89.91°
Azimuth: 269.22°
VS: 2,510.04'

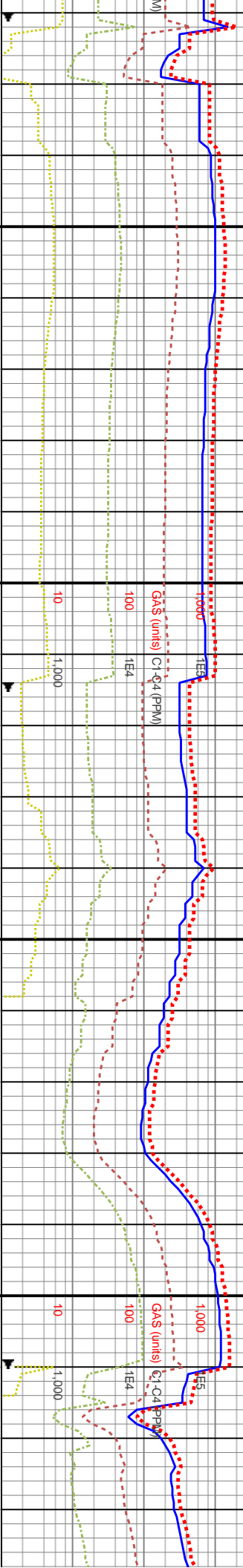
9920-9980 SS: dk gy-gyshbn clus, occ clr uncons sd, vf-f grs, mod strd, sb ang-sb rd, sl hrd-frm, cons wi arg/silic cmt, com uncons, tr pyr, non-sl calc, tr dul yeign flor, mod stmng-mky cut, bishwh resdl ring	9980-10040 SS: dk gy-med gyshbn, oftwht-lt brn, vf-f grs, clr abnt uncons sd, sl fri-hrd, mod strd, pred sb ang-sb rd, gr sup cls, cons wi arg/silic cmt, tr dul yeign flor, mod stmng-mky cut, bishwh resdl ring	10040-10100 SS: predy med gy-gyshbn, lt gy, vf-uf grs, sb ang-sb rd, op grs thru, mod strd, fri gr sup cls, cons wi arg/silic cmt, com lse grs, sl calc ip, tr dul yeign flor, mod stmng-mky cut, bishwh resdl ring	10100-10160 SS: predy med gy-gyshbn, lt gy, vf-uf grs, sb ang-sb rd, op grs thru, mod strd, fri gr sup cls, cons wi arg/silic cmt, com lse grs, sl calc ip, tr dul yeign flor, mod stmng-mky cut, bishwh resdl ring
TVD: (ft)	TVD: (ft)	TVD: (ft)	TVD: (ft)





AVG BGC: 816u

AVG BGC: 555u



MD: 10,148'
TVD: 7,350.02'
Inclination: 89.42°
Azimuth: 268.85°
VS: 2,604.03'

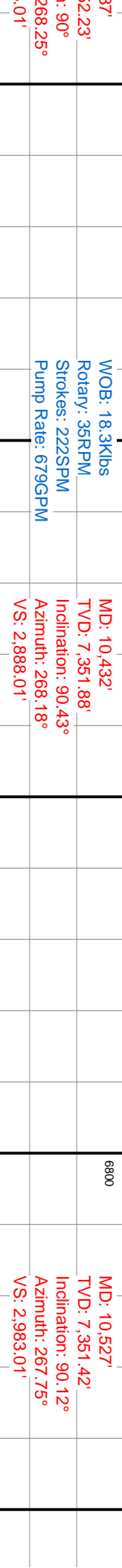
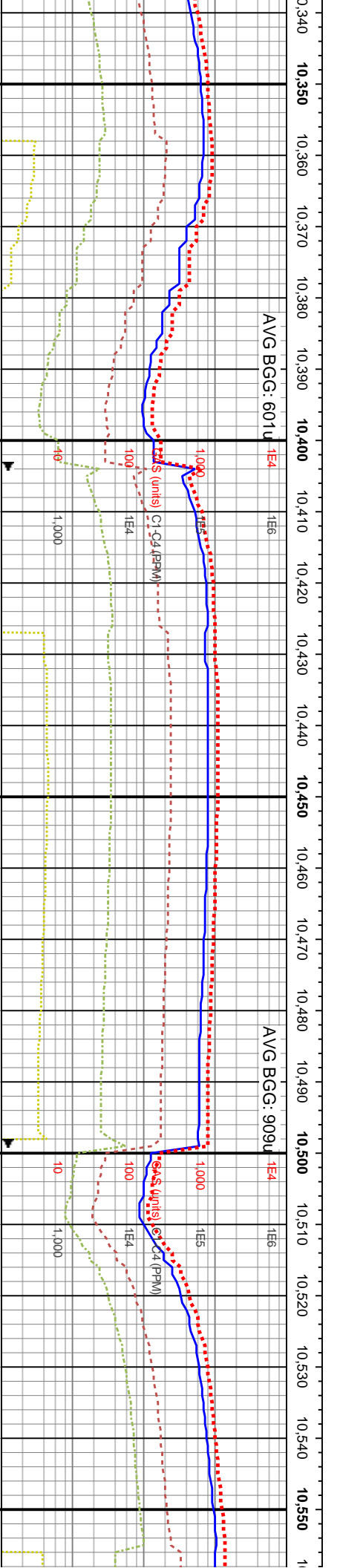
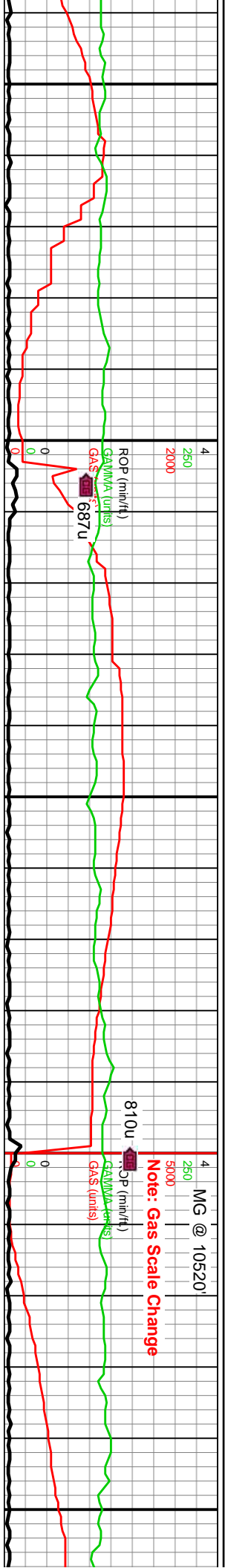
WOB: 37.1Klbs
Rotary: 60RPM
Strokes: 222SPM
Pump Rate: 679GPM

MD: 10,243'
TVD: 7,351.37'
Inclination: 88.95°
Azimuth: 267.77°
VS: 2,699.01'

MD: 10,348'
TVD: 7,351.37'
Inclination: 88.95°
Azimuth: 267.77°
VS: 2,793.01'

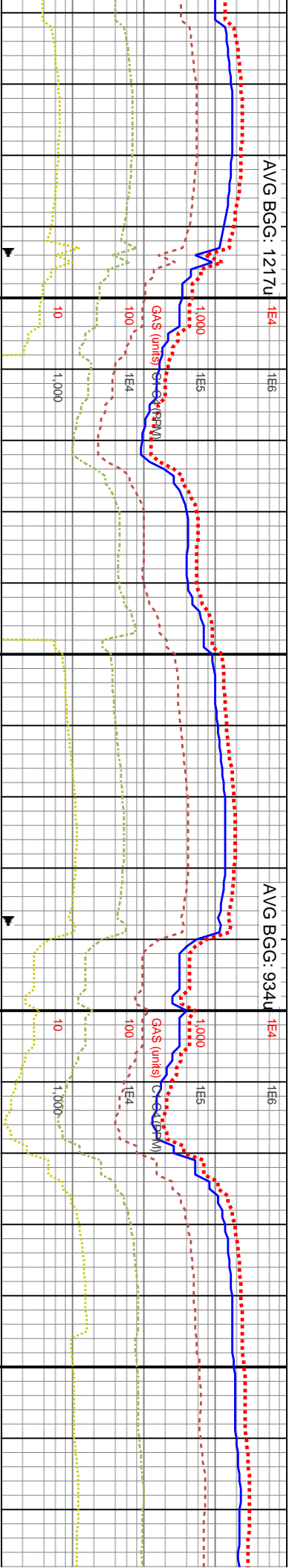
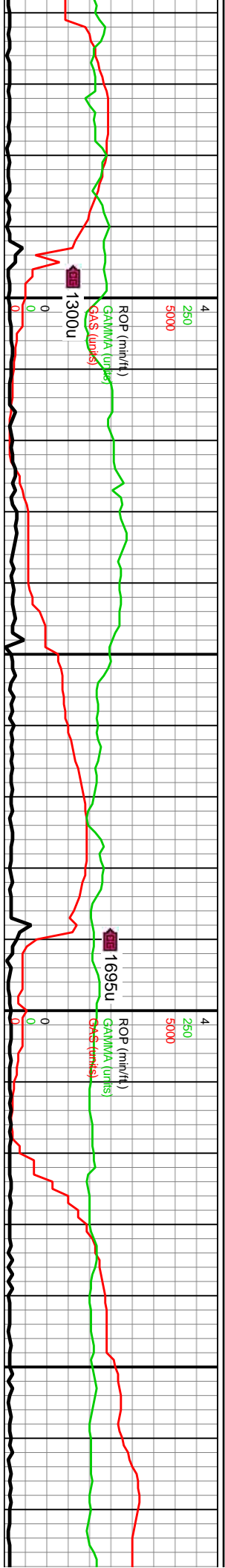
10160-10220 SS: pred med gy-gyshbn-lt gy, offwht-trnsl grs, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, mod w cons-fri gr sup cls cons wi arg-silic cnt, sl calc ip, tr du yelgn flor, mod stmng-rnky cut, bishwh resdl ring	10220-10280 SS: med gy, occl gyshbn-lt gy, offwht-trnsl grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, med ang-sb ang qtz grs thru, predy fri gr sup cls ply cons wi arg-silic cnt, occl mod w cons, sl calc ip, tr du yelgn flor, mod stmng-rnky cut, bishwh resdl ring	10280-10340 SS: pred gy-med gy, sme dk gy brn, op grs thru, pred sb ang-sb rd, vf-uf grs, mod strd, uncons grs-fri gr sup cls cons wi arg/silic cnt, sl calc, tr du yelgn flor, mod stmng-rnky cut, bishwh resdl ring
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10380-10400 SS: pred med gy-gyshn-lt gy, trnsl grs thru, mod strd, sb ang-sb rd, v-f-uf grs, fri gr sup cls, cons wi arg-silic cnt, sl calc ip, tr dul yeign flor, mod sting-nky cut, bishwh resd ring	10400-10460 SS: predy med gy-gyshn, abnt ofwht-trnsl grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, abnt med ang-sb ang qtz grs thru, fri gr sup cls ply cons wi arg-silic cnt, occly mod w cons, sl calc ip	10460-10520 SS: pred gy-med gy, sme dk gy brn, op grs thru, pred sb ang-sb rd, v-f-uf grs, mod strd, uncon grs-fri gr sup cls cons wi arg/silic cnt, sl calc, dul yeign flor, mod mky cut, mod yeign resd ring	10520-10580 SS: med gy-gyshn, mod strd, pred sb ar cll-op, mod strd, pred sb ar gr sup cls, cons wi arg/silic yeign flor, mod mky cut, mod
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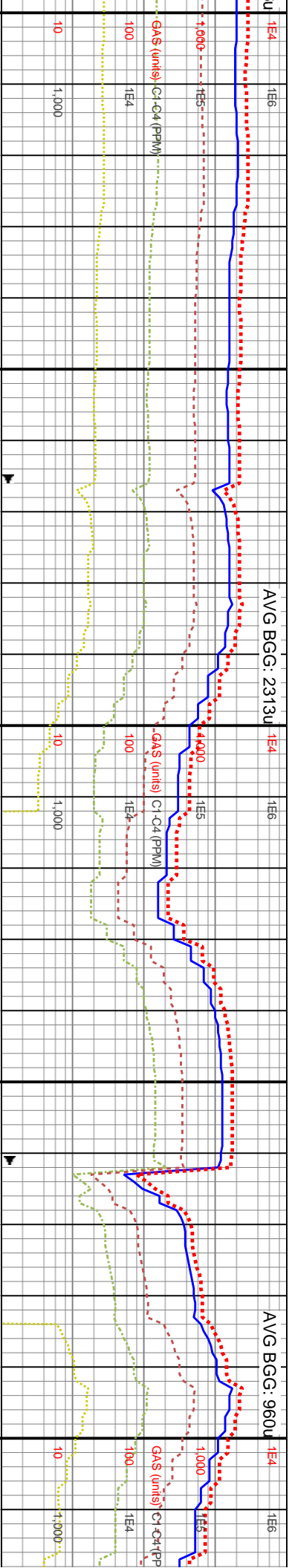
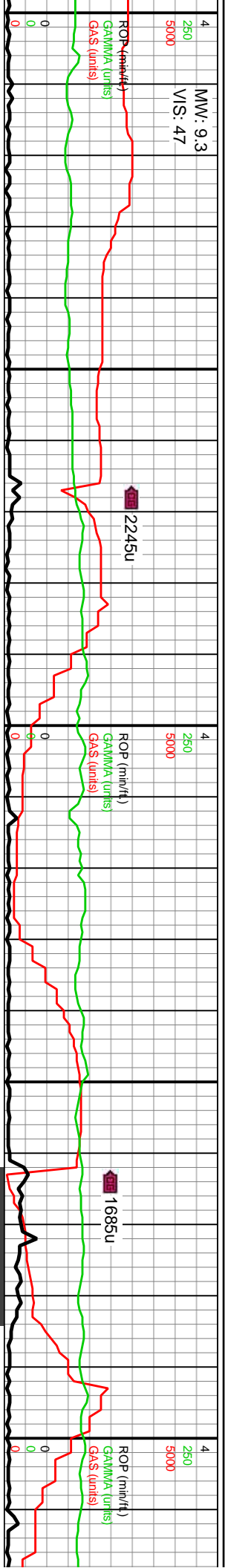
WOB: 46.3Klbs^x
Rotary: 50RPM
Strokes: 220SPM
Pump Rate: 673GPM

MD: 10,621'
TVD: 7,350.33'
Inclination: 91.2°
Azimuth: 268.59°
VS: 3077.68'

MD: 10,716'
TVD: 7,348.21'
Inclination: 91.38°
Azimuth: 268.26°
VS: 3171.97'

TVD: (ft)	
10580-10640 SS: pred gysbhn-med gy, occ	10640-10700 SS: predy med gy-gysbhn, lt gy,
clt grs, mod strd, sb ang-sb rd, vf-uf grs, sb	vf-uf grs, sb ang-sb rd, op grs thru, mod strd,
ang qtz grs thru, p-mod cmt, fri gr sup cls,	fri gr sup cls, cons wi arg/silic cmt, com lse
cons wi arg-silic cmt, sl calc ip, dul yelgn flor,	grs, sl calc ip, dul yelgn flor, mod mky cut,
mod mky cut, mod yelgn resd ring	mod yelgn resd ring
TVD: (ft)	
10700-10760 SS: pred med gy-gysbhn-lt gy,	10760-1
offwhl-trnsf grs thru, p-mod w strd, sb ang-sb	gysbhn-l-
rd f-u f gr sd, med ang-sb ang qtz grs thru,	srtd, sb
predy fri gr sup cls ply cons wi arg-silic cmt,	qtz grs t
occly mod w cons, sl calc ip	arg-silic

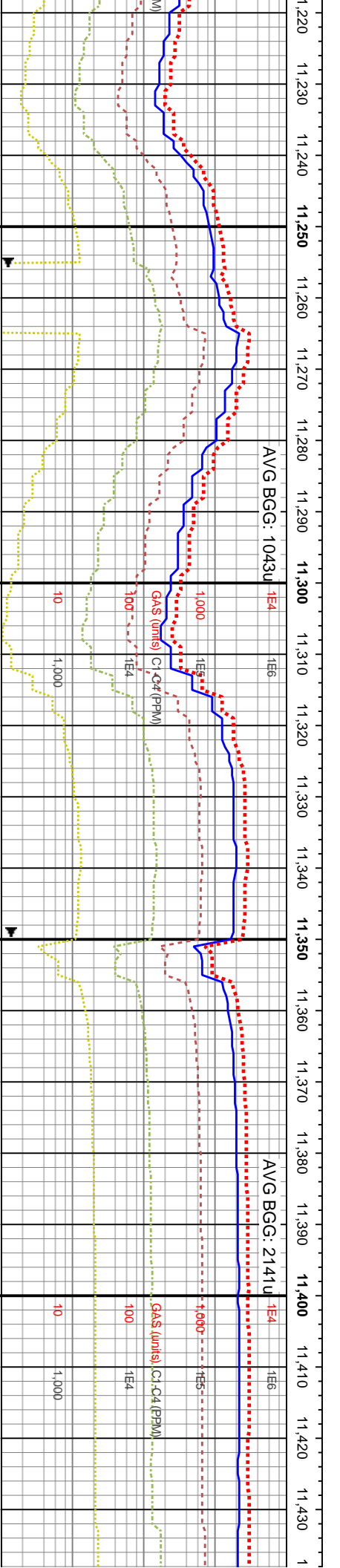
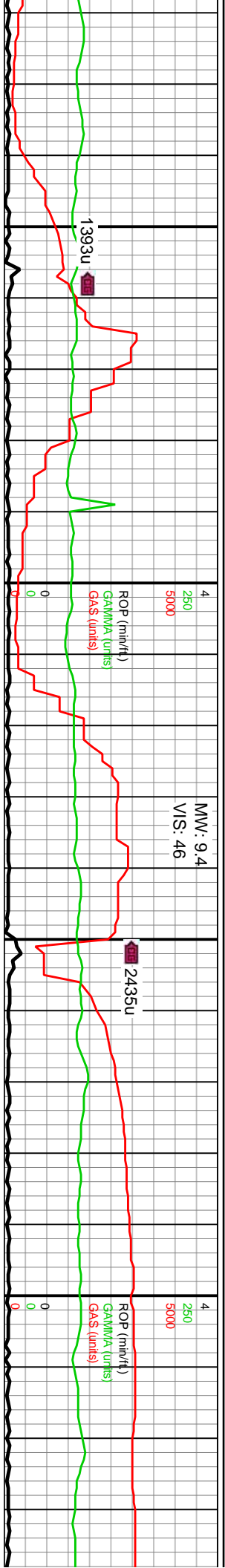




MD: 11,000' TVD: 7,347.49' Inclination: 90.52° Azimuth: 268.06° VS: 3,455.96'	MD: 11,095' TVD: 7,347.93' Inclination: 88.95° Azimuth: 266.84° VS: 3,550.94'	MD: 11,189' TVD: 7,349.42' Inclination: 89.23° Azimuth: 271.59° VS: 3,644.89'
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TVD (ft)	TVD (ft)	TVD (ft)
11000-11060 SS: predy med gy-gyshbn, occly lt gy-ofwht, ofwht-trnsl grs thru, p-mod strd, sb ang-sb rd f-uf gr sd, med ang-sb ang qtz grs thru, fri gr sup cls, ply cons wi arg-silic cnt, occly mod w cons, sl calc ip	11060-11120 SS: med gy-gyshbn-lt gy-ofwht, ofwht-trnsl grs thru, p-mod strd, sb ang-sb rd f-uf gr sd, med ang-sb ang qtz grs thru, predy fri gr sup cls ply cons wi arg-silic cnt, occly mod w cons, sl calc ip, occ inbnd pyr	11120-11180 SS: pred med gy-gyshbn, ofwht-lt gy, pred sb ang-sb rd, mod strd, vf-f grs, cons wi arg-silic cnt, com lse grs, sme sl calc, dul yelgn flor, mod mky cut, mod yelgn resd ring
7800		11180-11240 SS: predy me vf-uf grs, sb ang-sb rd, op c fri gr sup cls, cons wi arg/si grs, sl calc ip, dul yelgn flor mod yelgn resd ring



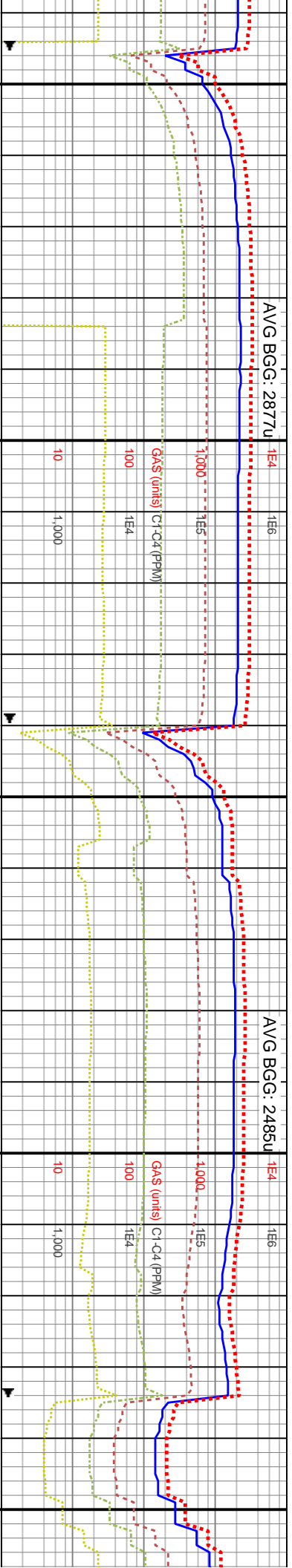
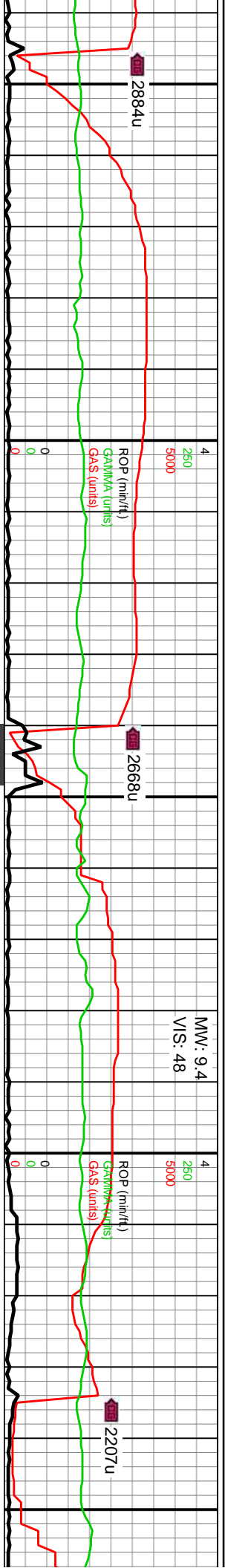


MD: 11,283'
TVD: 7,350.43'
Inclination: 89.54°
Azimuth: 272.25°
VS: 3,738.78'

MD: 11,378'
TVD: 7,351.33'
Inclination: 89.38°
Azimuth: 271.72°
VS: 3,833.46'

TVD (ft)		TVD (ft)	
11240-11300 SS: dk gy-med gysbhn, oftwht-lt brn, vf-f grs, clr abnt unconcs sd, sl fr-hrd, mod strd, pred sb ang-sb rd, gr sup cls, cons wi arg/silt cnt, dul yelgn flor, mod mky cut, yelgn resdl ring		11300-11360 SS: dk gy-gysbhn clus, occ clr unconcs sd, vf-f grs, mod strd, sb ang-sb rd, sl hrd-frn, cons wi arg/silt cnt, com unconcs, tr pyr, non-sl calc, dul yelgn flor, mod mky cut, mod yelgn resdl ring	
7800		7800	
11360-11420 SS: pred med gy-gysbhn-lt gy, tmsl grs thru, mod strd, sb ang-sb rd, vf-uf grs, fir gr sup cls, cons wi arg-silt cnt, sl calc ip, dul yelgn flor, mod mky cut, mod yelgn resdl ring		11420-11440 gy-offwr-ang-sb r thru, pre cnt, occ	
7800		7800	



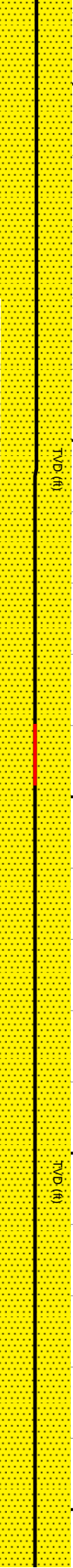


MD: 11,473'
TVD: 7,351.87'
Inclination: 89.97°
Azimuth: 272.16°
VS: 3,928.25'

MD: 11,567'
TVD: 7,353.18'
Inclination: 88.43°
Azimuth: 272.18°
VS: 4,022'

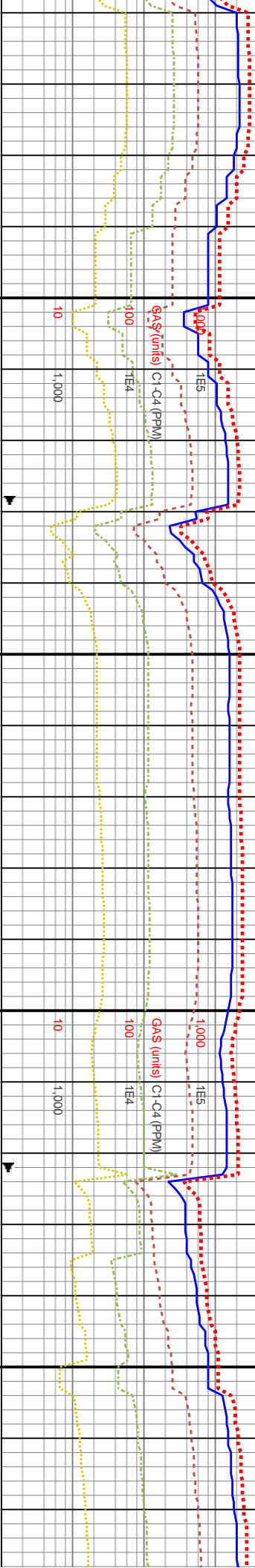
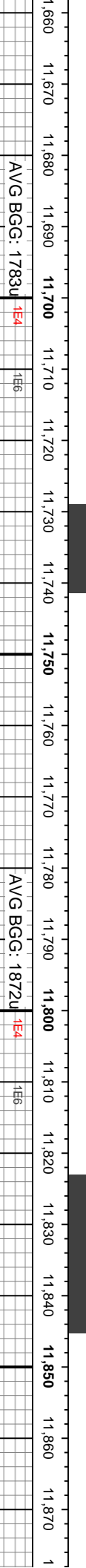
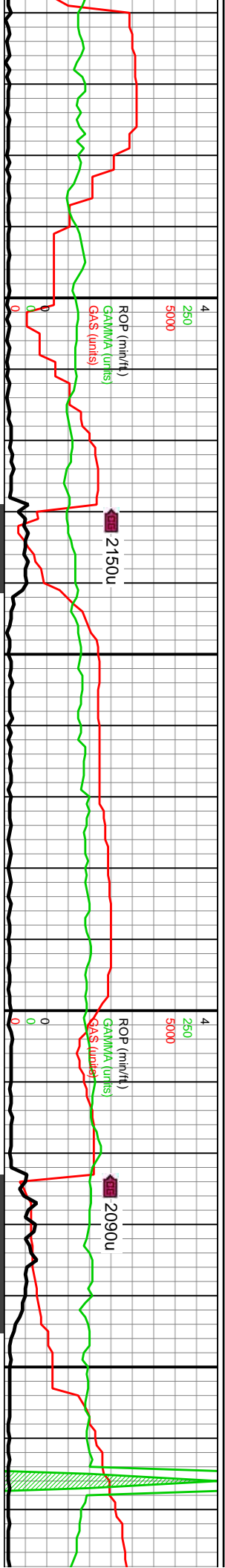
WOB: 42.9Klbs
Rotary: 70RPM
Strokes: 216SPM
Pump Rate: 660GPM

MD: 11,650'
TVD: 7,353.18'
Inclination: 88.43°
Azimuth: 272.18°
VS: 4,022'



11480 SS: predy med gy-gyshbn, lt tr offwht-trnsl grs thru, mod strd, sb d f-u f gr sd, med ang-sb ang qtz grs	11480-11540 SS: med gy-gyshbn-lt gy-offwht, tr offwht-trnsl grs, p-mod strd, sb ang-sb rd f-u f gr sd, tr med ang-sb ang qtz grs, predy fri gr sup cls ply cons wi arg-silic cnt, oocly mod w cons, sl calc ip	11540-11600 SS: med gy, oocly gyshbn, sme lt gy, abnt offwht-trnsl grs thru, p-mod w strd, sb ang-sb rd f-u f gr sd, abnt med ang-sb ang qtz grs thru, fri gr sup cls ply cons wi arg-silic cnt, oocly mod w cons, sl calc ip	11600-11660 SS: dk gy-med gyshbn, offwht-lt brn, v-f grs, clt abnt unconcs sd, sl fri-hrd, mod strd, pred sb ang-sb rd, gr sup cls, cons wi arg/silic cnt, dul yelgn flor, mod mky cut, mod yelgn resd ring
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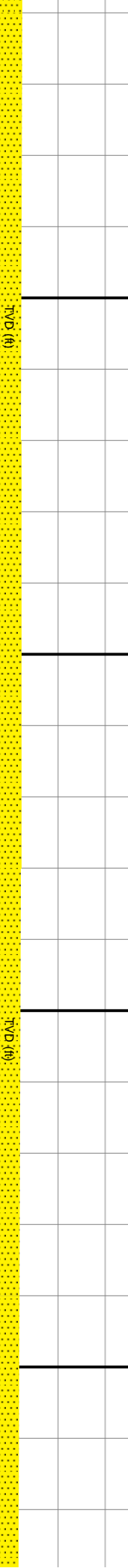


1,662'
7,354.43'
ation: 90.06°
rth: 273.6°
116.66'

MD: 11,756'
TVD: 7,357.24'
Inclination: 86.52°
Azimuth: 272.41°
VS: 4,210.26'

WOB: 48.1Klbs
Rotary: 60RPM
Strokes: 210SPM
Pump Rate: 645GPM

MD: 11,851'
TVD: 7,361.07'
Inclination: 88.86°
Azimuth: 270.68°
VS: 4,305'



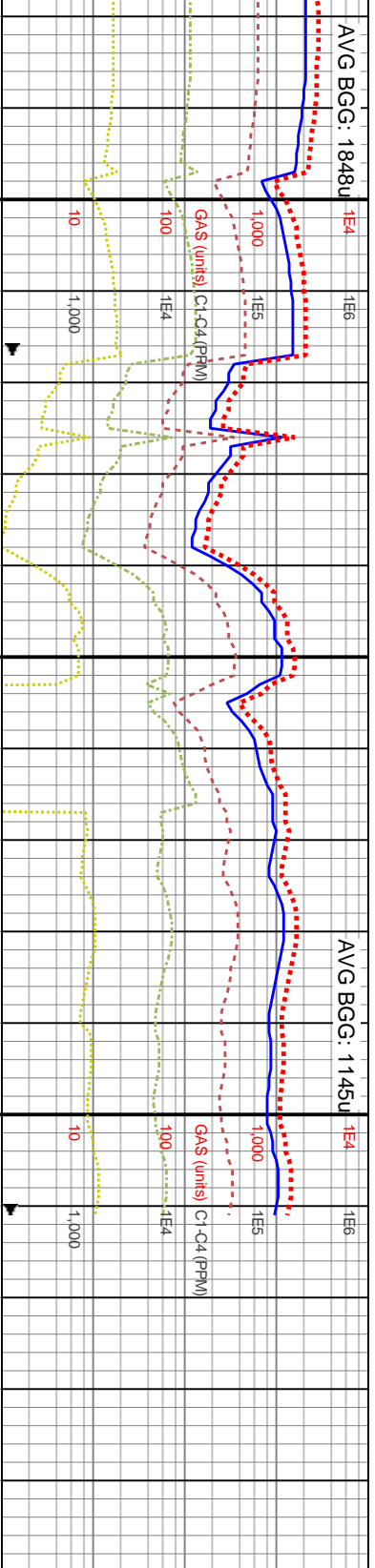
11660-11720 SS: pred gy-med gy, sme dk gy
brn, op grs thru, pred sb ang-sb rd, vf-uf grs,
mod strd, uncongs grs-fri gr sup cls cons wi
arg/silic cnt, sl calc, dul yeign flor, mod mky
cut, mod yeign resd ring

11720-11780 SS: med gy-gyshbn-lt gy-oftwht,
ofwtwh-trnsf grs thru, p-mod strd, sb ang-sb rd
f-u f gr sd, abnt med ang-sb ang qtz grs thru,
predy fri gr sup cls ply cons wi arg-silic cnt,
occl mod w cons, sl calc ip

11780-11840 SS: predy med gy-gyshbn, sme
lt gy-oftwht, ofwtwh-trnsf grs thru, p-mod strd,
sb ang-sb rd f-uf gr sd, med ang-sb ang qtz
grs thru, fri gr sup cls ply cons wi arg-silic cnt,
occl mod w cons, sl calc ip

11840-11900 SS: pred mec
trnsf grs thru, mod strd, sb
grs, fri gr sup cls, cons wi a
ip, dul yeign flor, mod mky
resd ring





	1700 (th)	1700 (th)
d gy-gyshbn-it gy, ang-sb rd, v-f-uf g-silic cnt, sl calc cut, mod yelgn	11900-11960 SS: med gy-gyshbn, dk gysbhn, clr-op, mod strd, pred sb ang-sb rd, v-f-1 grs, fri gr sup cls, cons wi arg/silic cnt, sl calc, dul yelgn fltor, mod mky cut, mod yelgn resdl ring	11960-12011 SS: pred gysbhn-med gy, occ clr grs, mod strd, sb ang-sb rd, v-f-uf grs, sb ang qtz grs thru, p-mod cntd, fri gr sup cls, cons wi arg-silic cnt, sl calc ip, dul yelgn fltor, mod mky cut, mod yelgn resdl ring
7800	7800	7800