



Empirica

Scale: 5" / 100'
Measured Depth Log

Well Name Janssen #5

Location Sec.8-T06N-R65W

State Colorado

Country USA

API Number 05-123-42362-00

AFE # NA

Rig Number Patterson UTI 346

County Weld

Geographic Region DJ Basin

Field Wattenberg

Spud Date 12/14/2015

Drilling Completed TBD

Surface Coordinates SHL: 2231' FNL, 2397' FWL Sec. 8 T6N R65W

Lat: 40 30' 11.120 N

Long: 104 41' 17.776 W

Bottom Hole Coordinates PBHL:

Lat: 40 30' 26.500 N

Long: 104 42' 17.032 W

Ground Elevation 4,778'

K.B. Elevation 4,802.5'

Logged Interval 6,800' To 11,652'

Total Depth 11,652'

Formation Codell

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

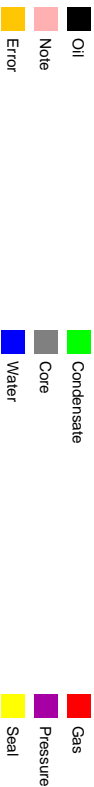
Comments Start: 12-24-15
TD: 12-25-15

Services Provided 2-man Logging
On Site Geosteering

Logger Names Dominic Pitre / Nicholas V

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

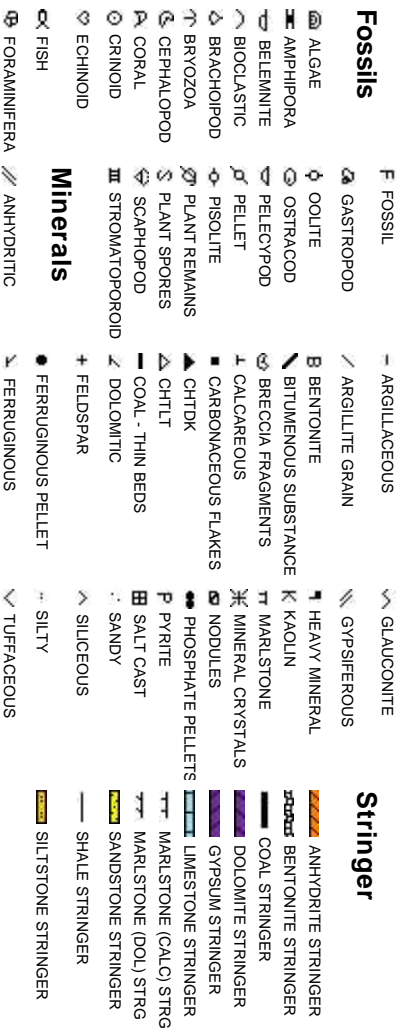
Zone Color Coding



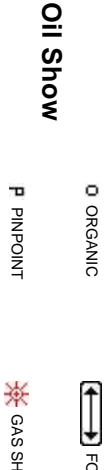
Rock Types



Accessories



Other Sy



Engineering



Porosity



Symbols

FORMATION TOP L LITHOGRAPHIC

Rounding

LOW MX MICROXLN

MIN DEPTH AN ANGULAR MS MUDSTONE

FL FAULT R ROUNDED PS PACKSTONE

DW SB SUBANG WS WACKESTONE

TURNED STRATA SN SUBRND

Sorting

SE FAULT

Textures

LL CORE (LEFT) M MODERATE

LL CORE (RIGHT) BS BOUNDSTONE P POOR

C CHALKY W WELL

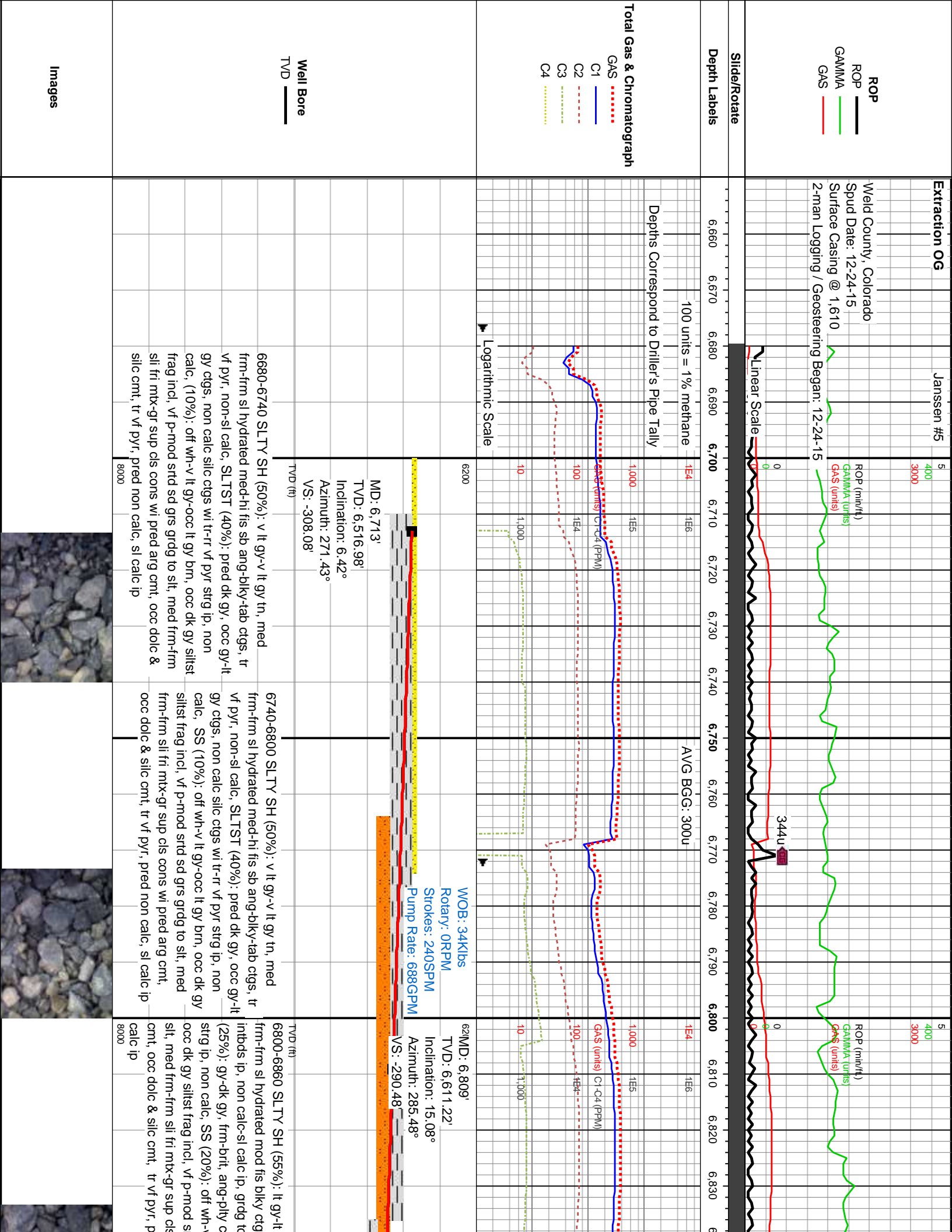
CRY CRYPTOXLN

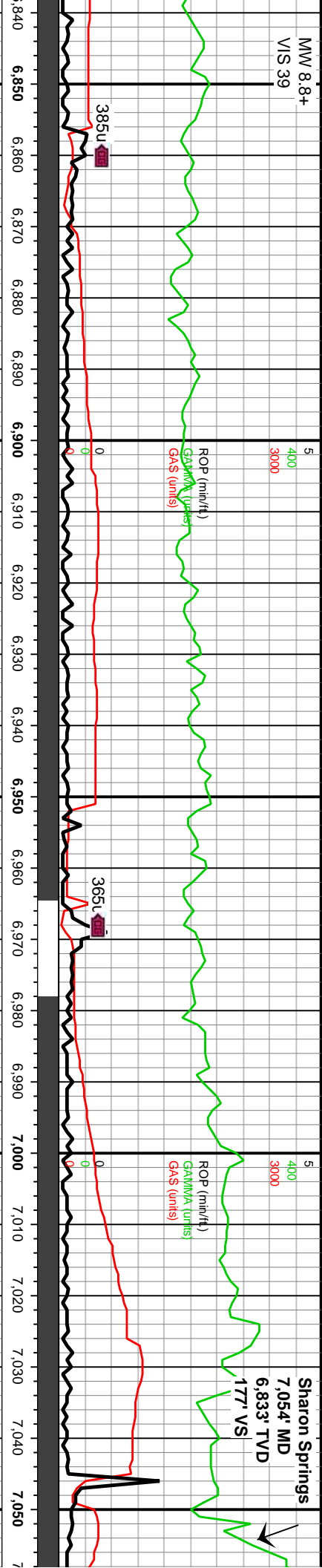
E EARTHY

SAS

IE TESTED - LEFT FX FINELYXLN

IE TESTED - RT GS GRAINSTONE

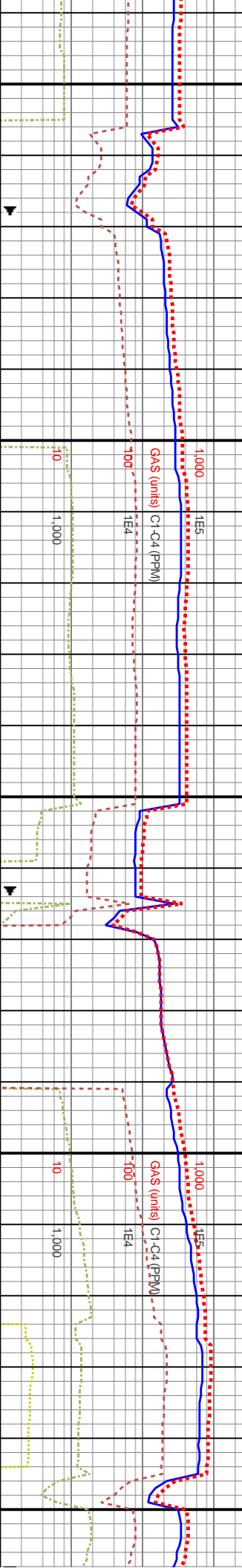




AVG BGG: 280u

AVG BGG: 330u

AVG BGG: 480u



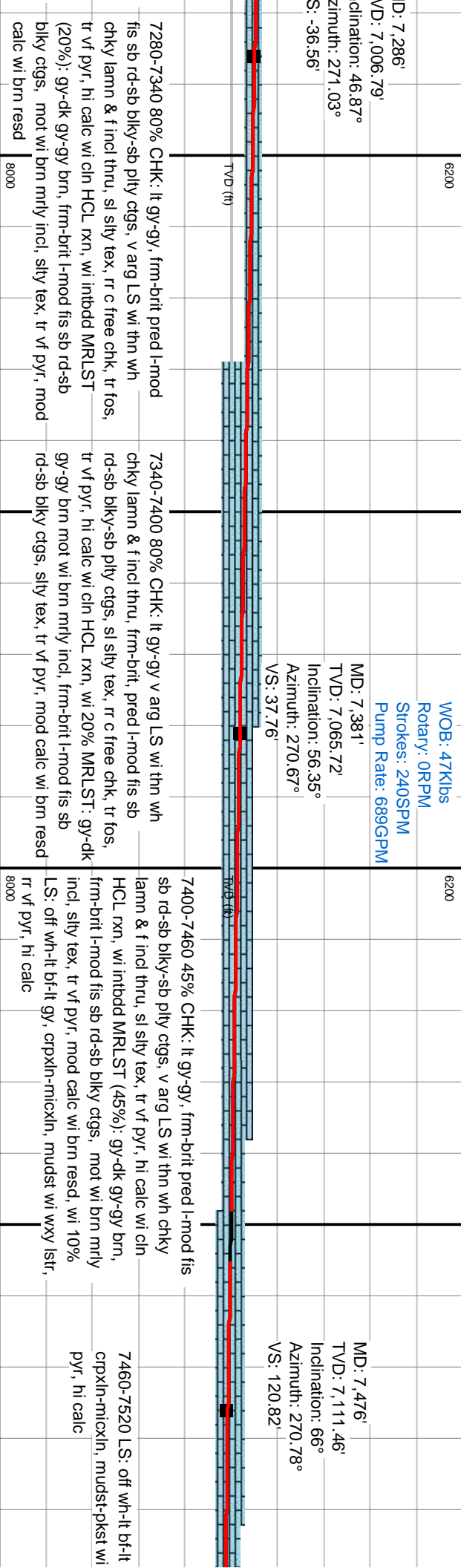
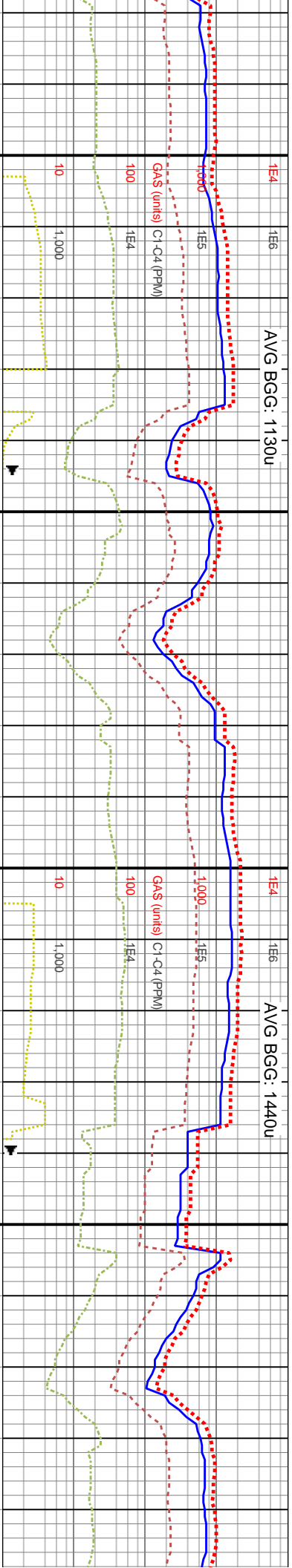
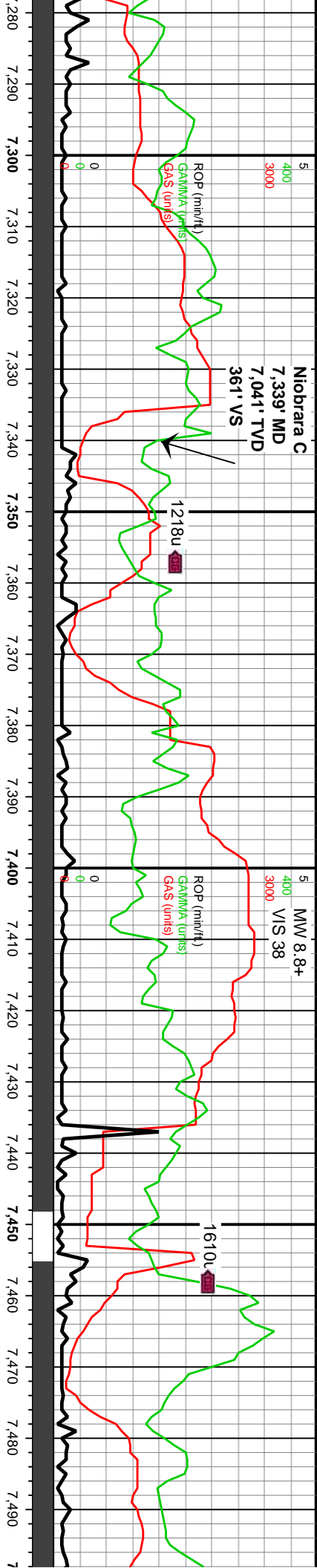
MD: 6,904'
TVD: 6,700.93'
Inclination: 23.13°
Azimuth: 276.69°
VS: -259.74'

WOB: 33Klbs
Rotary: 0RPM
Strokes: 240SPM
Pump Rate: 689GPM

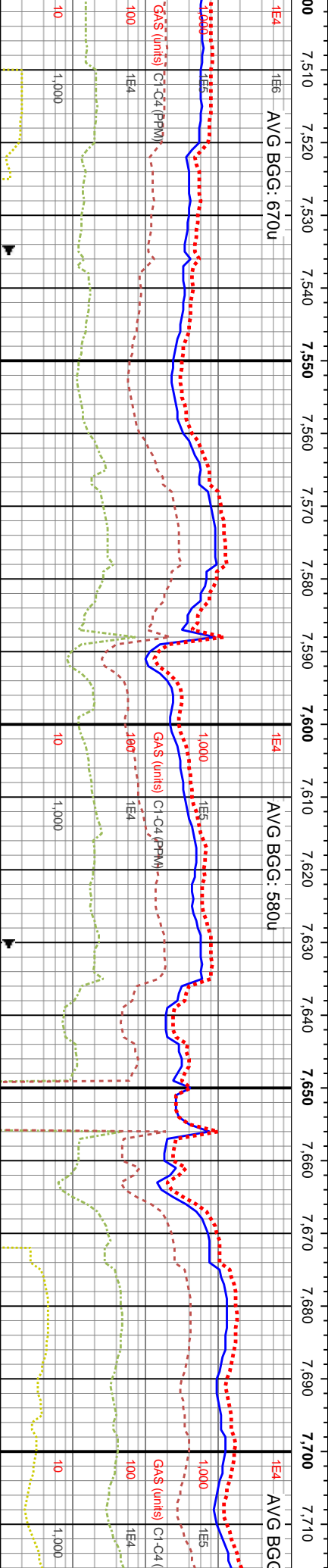
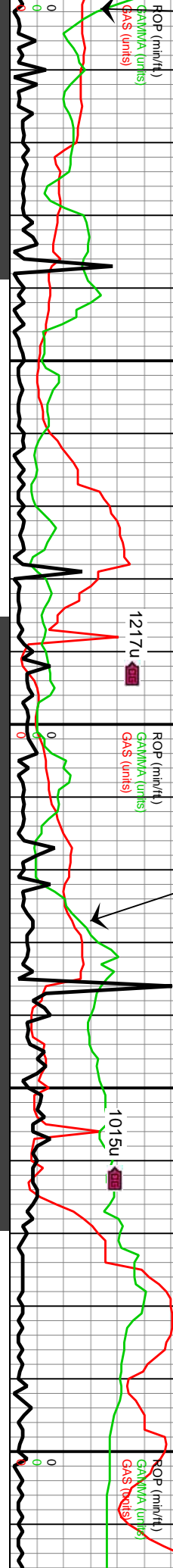
MD: 7,000'
TVD: 6,787.12'
Inclination: 29.09°
Azimuth: 269.24°
VS: -217.59'

gy brn, med s, grdg to sdy SS s silc SLTST s, silc, tr-r v f pyr v f pyr, non-sl calc, SLTST (40%): pred dk gy, occ gy-it gy cigs, non calc silc cigs wi tr-r v f pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, v f p-mod strd sd grs grdg to silt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cnt, occ dolc & silc cnt, tr v f pyr, pred non calc, sl calc ip	6860-6920 SLTY SH (50%): v lt gy-v lt gy tn, med frm-frm sl hydrated med-hi fis sb ang-biky-tab cigs, tr v f pyr, non-sl calc, SLTST (40%): pred dk gy, occ gy-it gy cigs, non calc silc cigs wi tr-r v f pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, v f p-mod strd sd grs grdg to silt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cnt, occ dolc & silc cnt, tr v f pyr, pred non calc, sl calc ip	6920-6980 SLTY SH (55%): lt gy-it gy brn, med frm-frm sl hydrated mod fis biky cigs, grdg to sdy SS intbds ip, non calc-sl calc ip, grdg to silc SLTST (25%): gy-dk gy, frm-bit, ang-ply cigs, silc, tr-r v f pyr strg ip, non calc, SS (20%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, v f p-mod strd sd grs grdg to silt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cnt, occ dolc & silc cnt, tr v f pyr, pred non calc, sl calc ip	6980-7040 SLTY SH (50%): v lt gy-v lt gy tn, med frm-frm sl hydrated med-hi fis sb ang-biky-tab cigs, tr v f pyr, non-sl calc, SLTST (40%): pred dk gy, occ gy-it gy cigs, non calc silc cigs wi tr-r v f pyr strg ip, non calc, SS (10%): off wh-v lt gy-occ lt gy brn, occ dk gy siltst frag incl, v f p-mod strd sd grs grdg to silt, med frm-frm sli fri mtx-gr sup cls cons wi pred arg cnt, occ dolc & silc cnt, tr v f pyr, pred non calc, sl calc ip	7040-7100 SLTY frm-frm sl hydrat intbds ip, non ca (40%): gy-dk gy, strg ip, non calc
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5	Fort Hays	5	Codell	5
400	7,502' MD	400	7,626' MD	400
3000	7,122' TVD	3000	7,160' TVD	3000
	495' VS		607' VS	
			MW 8.8+	
			VIS 41	

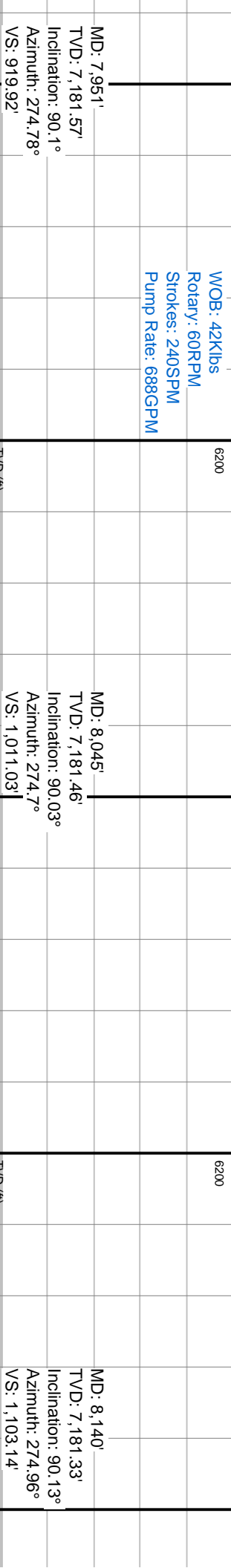
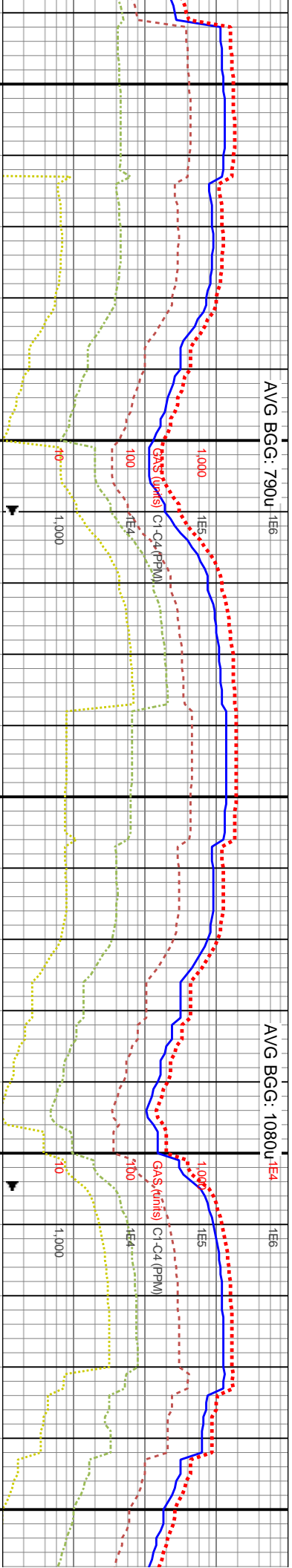
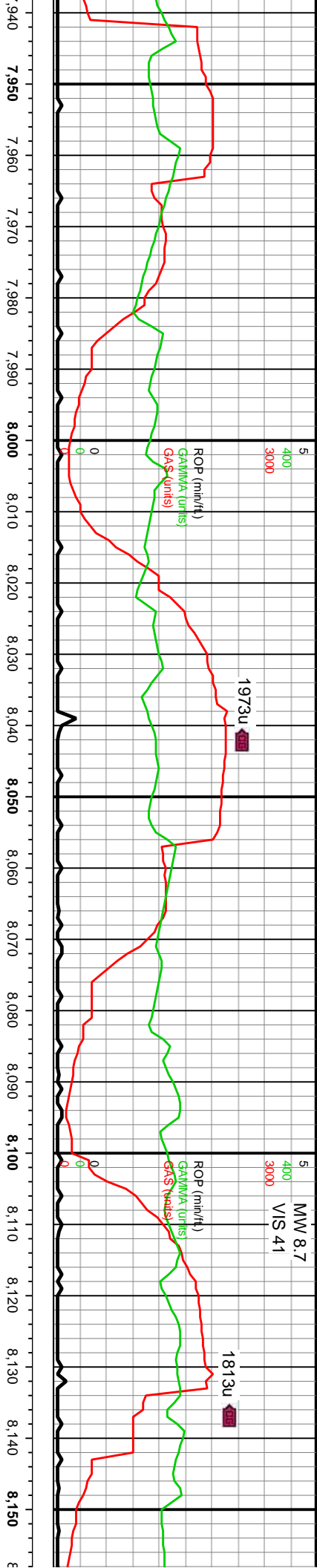


WOB: 58Klbs
Rotary: 0RPM
Strokes: 240SPM
Pump Rate: 688GPM

MD: 7,571'
TVD: 7,145.36'
Inclination: 72.18°
Azimuth: 270.45°
VS: 209.44'

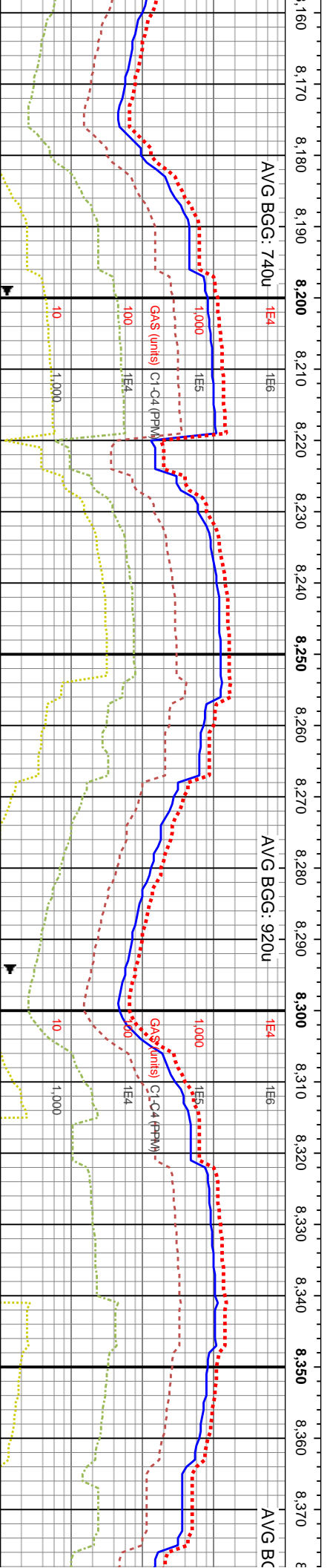
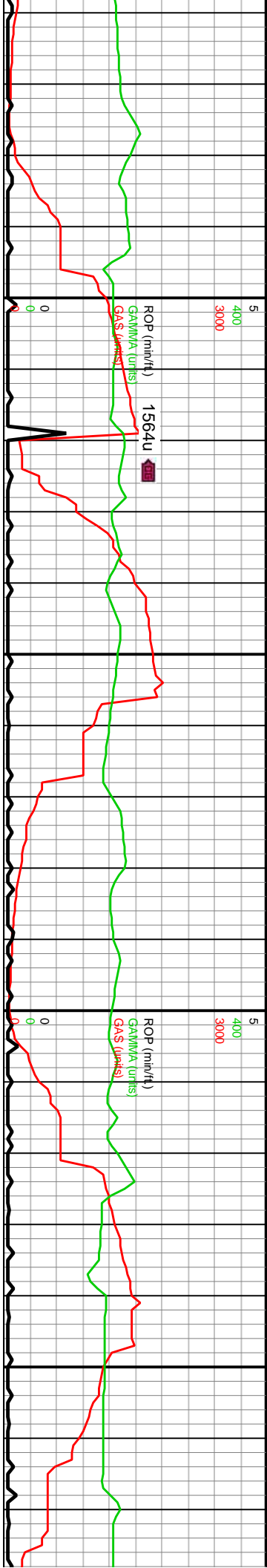
7520-7580 LS: off wh-it bf-lt gy, cpxln-micxln, mudst-pkst wi wxy lstr, rr vf pyr, hi calc	7580-7640 SS (90%): off wh-v lt gy-gy, mod w srtf f sb rd-rd sd grs, v frm-sil fri sb trnsi gr sup cls cons wi silc cnt, dolc ip, sl arg strg ip, tr vf pyr, tr gn glau, mod calc, wi occ SLTST: v dk gy, v frm, silc, sb rd-sb blk cy ctgs, rr vf-f pyr, tr cal strg, pried non calc	7640-7700 SS: pried off wh-it gy, occ gy, rr lt brn-tn-bf hue ip, occ gy brn lamm, vf-f mod w srtf sb rd-rd grs, med frm-frm sl fri pried gr sup cls cons wi silc & sl arg cnt, occ mix sup cls ip, dolc lamm & intbds ip, occ vf-f pyr strg, rr-tr gn glau, mod calc	7700-7760 SS: lamm, vf-f mod v pried gr sup cls occ vf-f pyr strg
8000	8000	8000	8000





7940-8000 SS (90%): off wh-v lt gy-gy grdg to dk gy slst ip, mod w srld f sb rd-rd sd grs, v frm-sli fri sb trnsi gr sup cls cons wi silc cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc, wi occ SLTST: v dk gy, v frm, silc, sb rd-sb blkly ctgs, rr vf-f pyr, tr cal strg, pred non calc	8000-8060 SS (90%): off wh-v lt gy-gy, occ dk gy, mod w srld f sb rd-rd sd grs, v frm-sli fri sb trnsi gr sup cls cons wi silc cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc, grdg to dk gy SLTST: v dk gy, v frm, silc, sb rd-sb blkly ctgs, rr vf-f pyr, tr cal strg, pred non calc	8060-8120 SS (90%): off wh-v lt gy-gy grdg to dk gy slst ip, mod w srld f sb rd-rd sd grs, v frm-sli fri sb trnsi gr sup cls cons wi silc cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc, wi occ SLTST: v dk gy, v frm, silc, sb rd-sb blkly ctgs, rr vf-f pyr, tr cal strg, pred non calc	8120-8180 SS: off wh-v lt gy-gy, oc srld f sb rd-rd sd grs, v frm-sli fri sb cons wi silc cnt, dolc ip, sl arg strg calc
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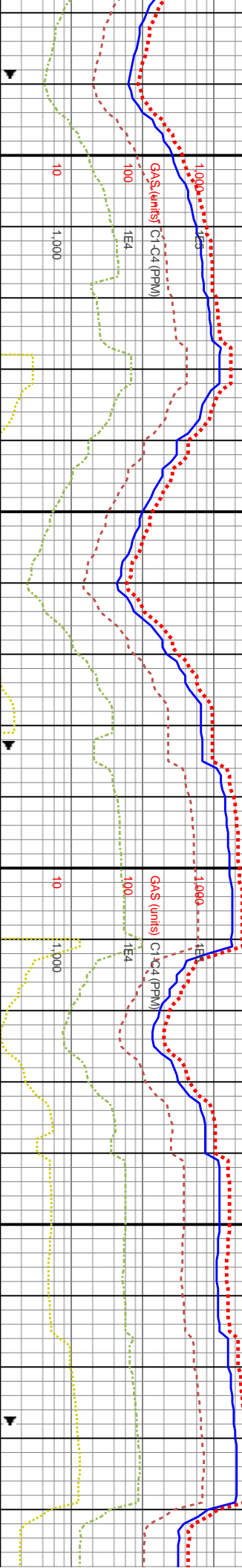
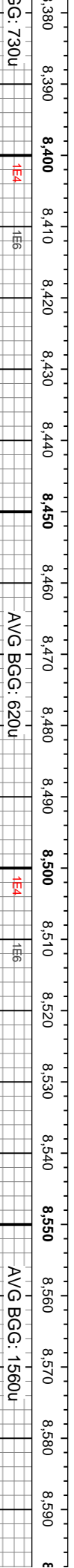
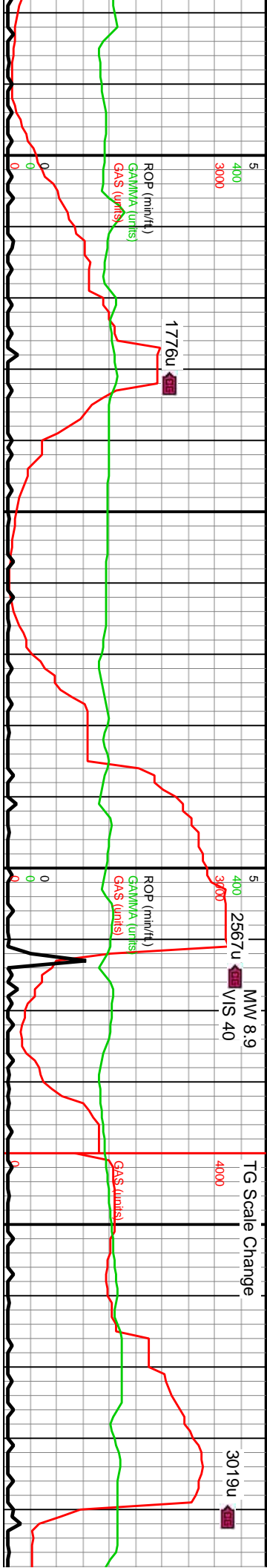


WOB: 27Klbs
Rotary: 60RPM
Strokes: 240SPM
Pump Rate: 689GPM

MD: 8,235'
TVD: 7,181.16'
Inclination: 90.07°
Azimuth: 274.99°
VS: 1,195.3'

8180-8240 SS: off wh-it gy-gy-dk gy, mod w strd, trnsi gr sup cls v-f sb rd-rd sd grs, v frm-sil fri gr sup cls cons wi silic cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc	8000
8240-8300 SS (90%): off wh-v lt gy-gy grdg to dk gy silst ip, mod w strd f sb rd-rd sd grs, v frm-sil fri sb trnsi gr sup cls cons wi silic cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc, wi occ SLTST: v dk gy, v frm, silic, sb rd-sb blkly clgs, rr vf-f pyr, tr cal strg, pred non calc	8000
8300-8360 SS: off wh-v lt gy-gy, occ dk gy, mod w strd f sb rd-rd sd grs, v frm-sil fri sb trnsi gr sup cls cons wi silic cnt, dolc ip, sl arg strg ip, tr vf pyr, mod calc	8000
8360-8420 S:	





WOB: 39Klbs
Rotary: 60RPM
Strokes: 239SPM
Pump Rate: 688GPM

MD: 8,424'
TVD: 7,180.88'
Inclination: 90.27°
Azimuth: 274.67°
VS: 1,378.3'

8420-8480 SS: off wh-lt gy-gy, lt brn-tr-bf hue ip, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cnt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc

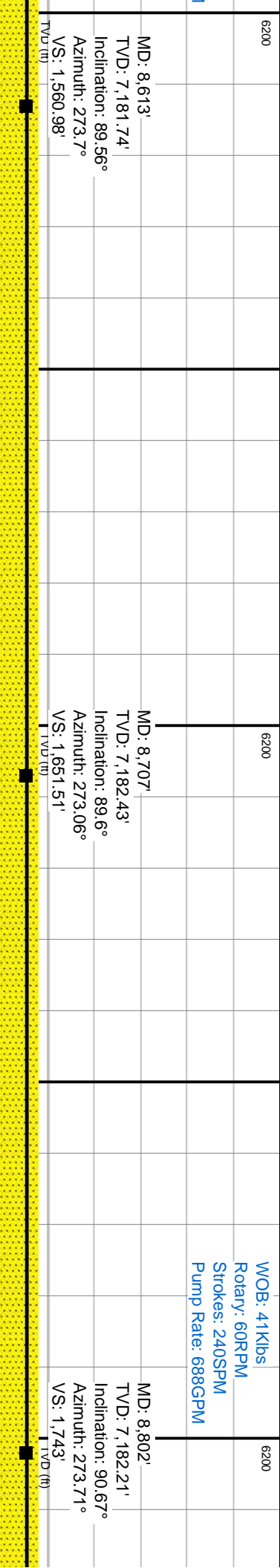
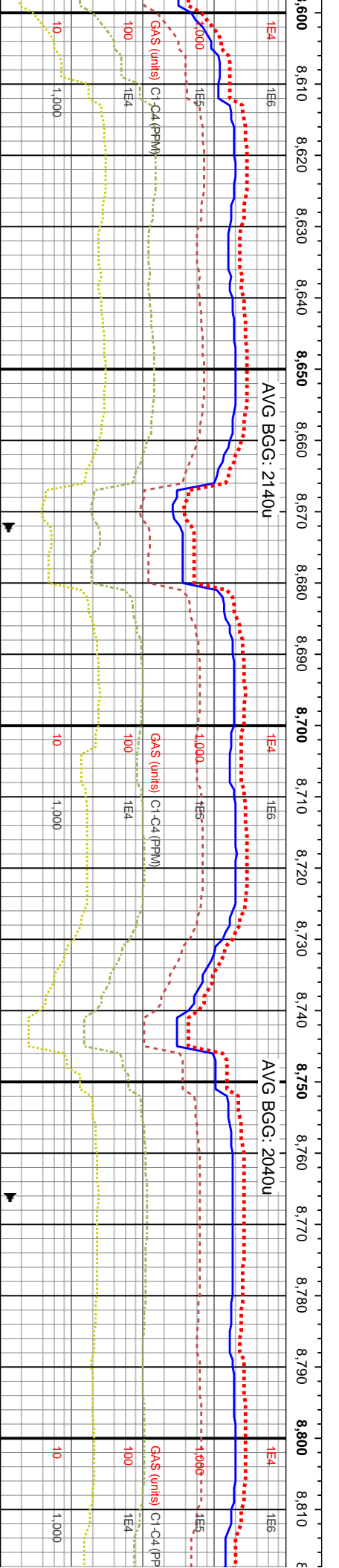
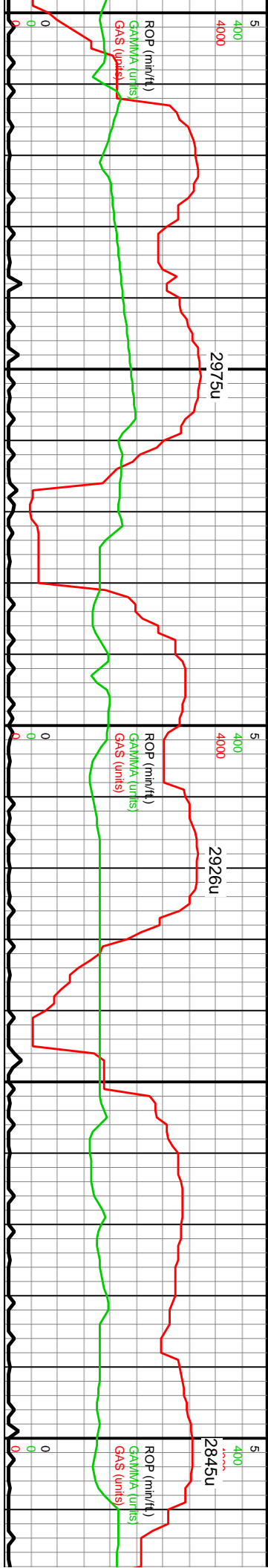
8480-8540 SS: off wh-lt gy-gy, lt brn-tr-bf hue ip, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cnt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc

WOB: 43Klbs
Rotary: 61RPM
Strokes: 240SPM
Pump Rate: 688GPM

MD: 8,519'
TVD: 7,181.02'
Inclination: 89.56°
Azimuth: 274.11°
VS: 1,470.23'

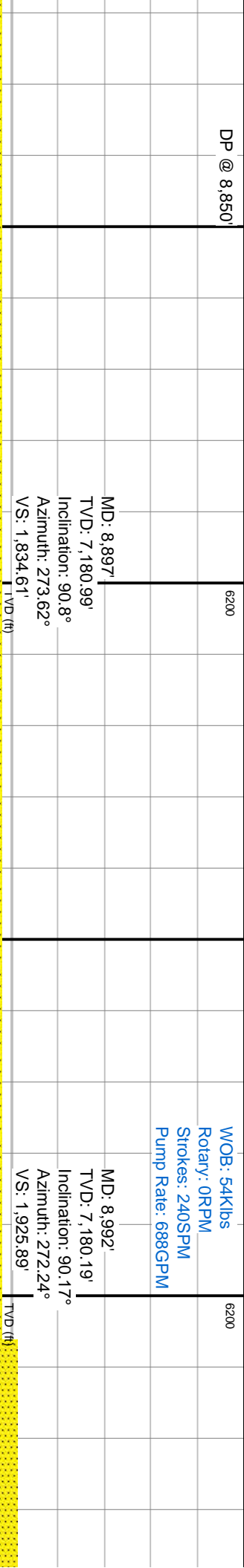
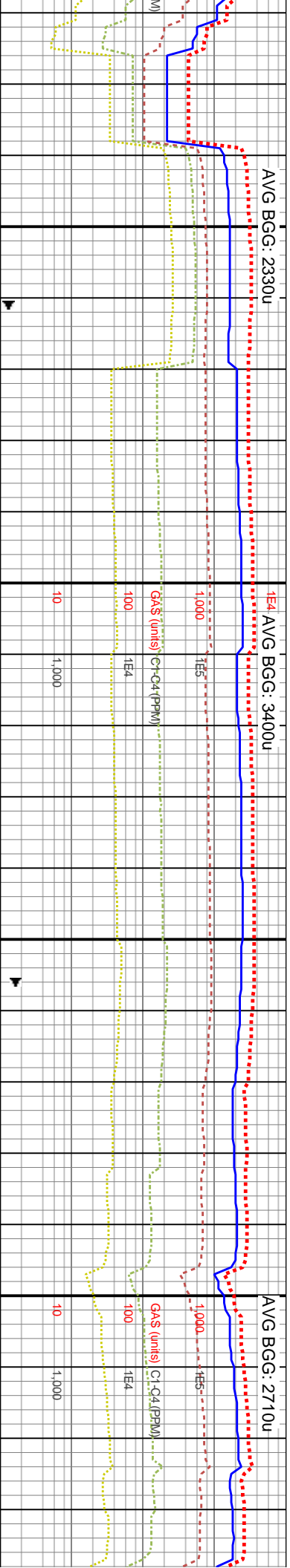
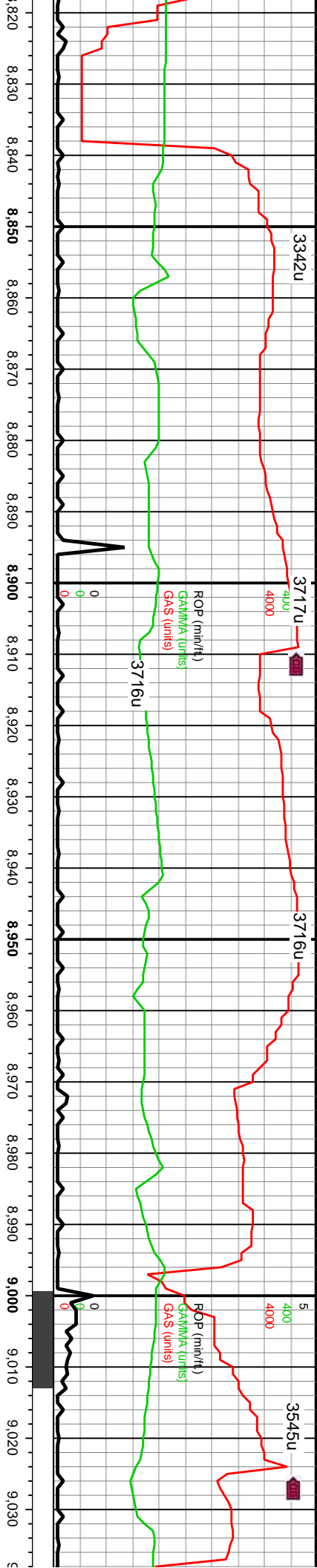
8540-8600 SS: off wh-lt gy-gy, lt brn-tr-bf hue ip, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cnt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc

8600-8660 SS: off wh-lt gy-gy, lt brn-tr-bf hue ip, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cnt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc



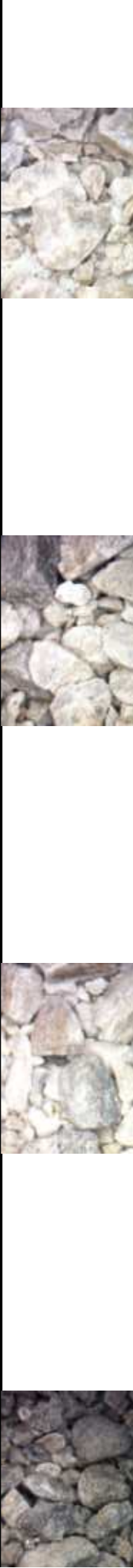
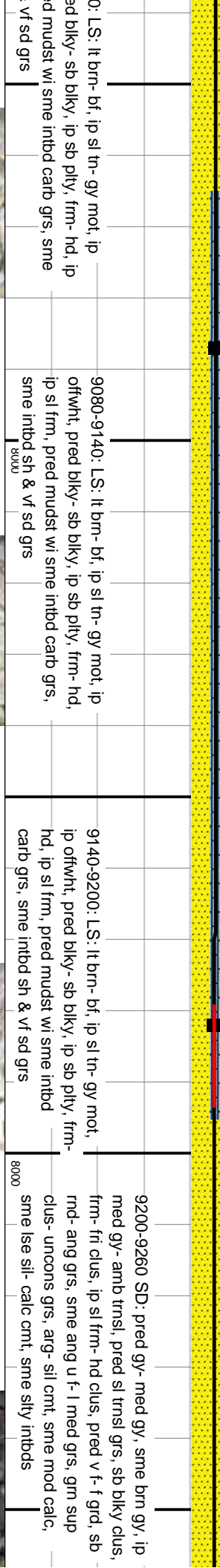
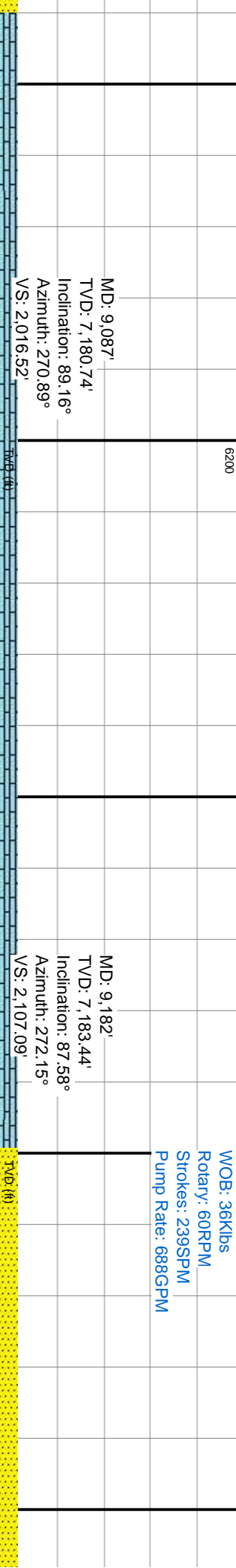
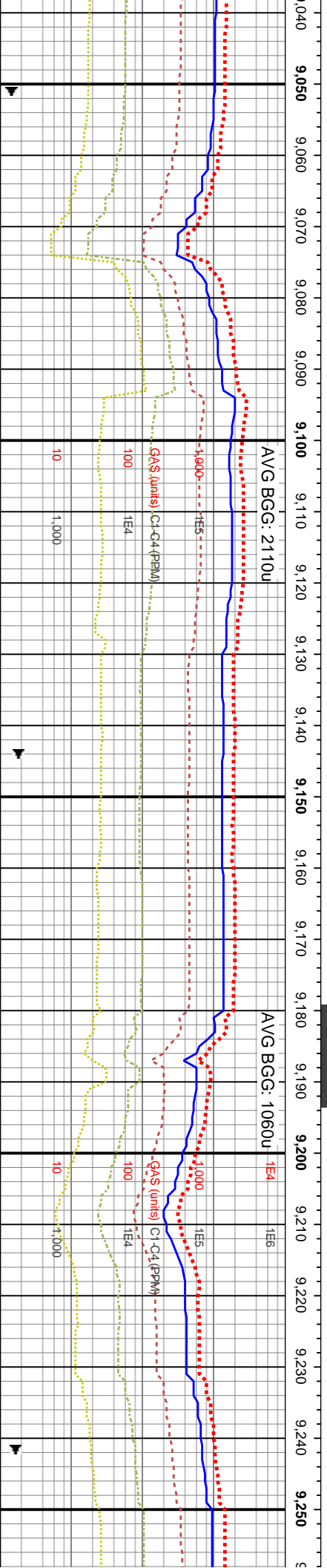
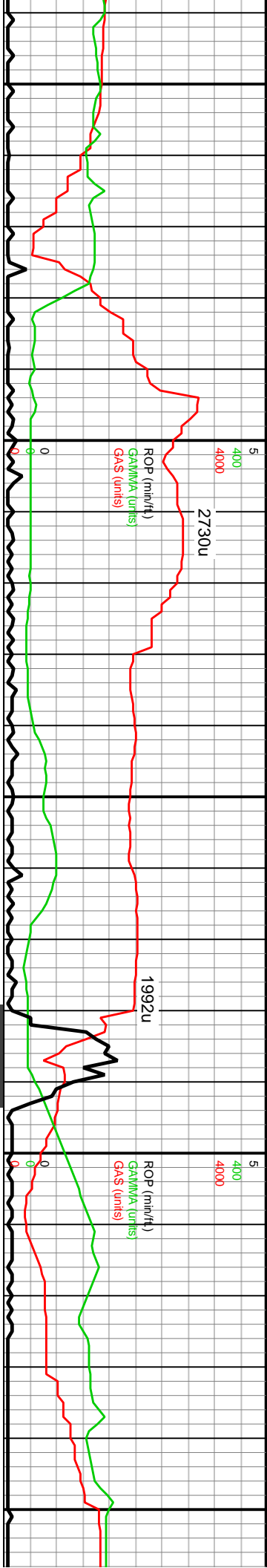
8600-8660 SS: off wh-lt gy-gy, occ dk gy wi OBM stn, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cmt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc	8660-8720 SS: off wh-lt gy-gy, occ dk gy wi OBM stn, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cmt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc	8720-8780 SS: off wh-lt gy-gy, occ dk gy wi OBM stn, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cmt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc	8780-8840 SS: off wh-lt gy-gy, occ dk gy wi OBM stn, mod w strd vf-f sb rd-rd grs, med frm-frm sl fri gr sup cls cons wi silc & sl arg cmt, occ dolc strg, occ mtx sup cls ip, tr pyr, mod calc
8000	8000	8000	8000

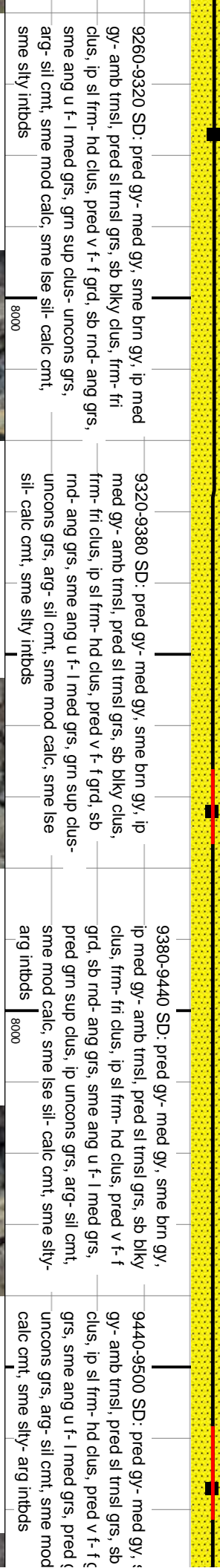
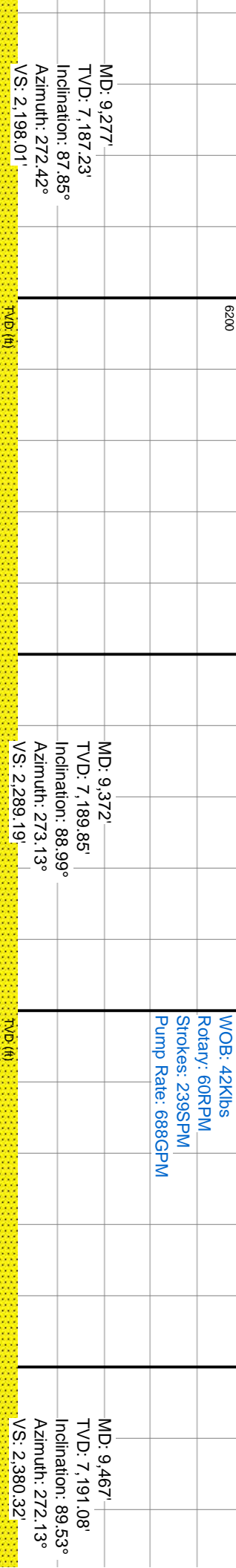
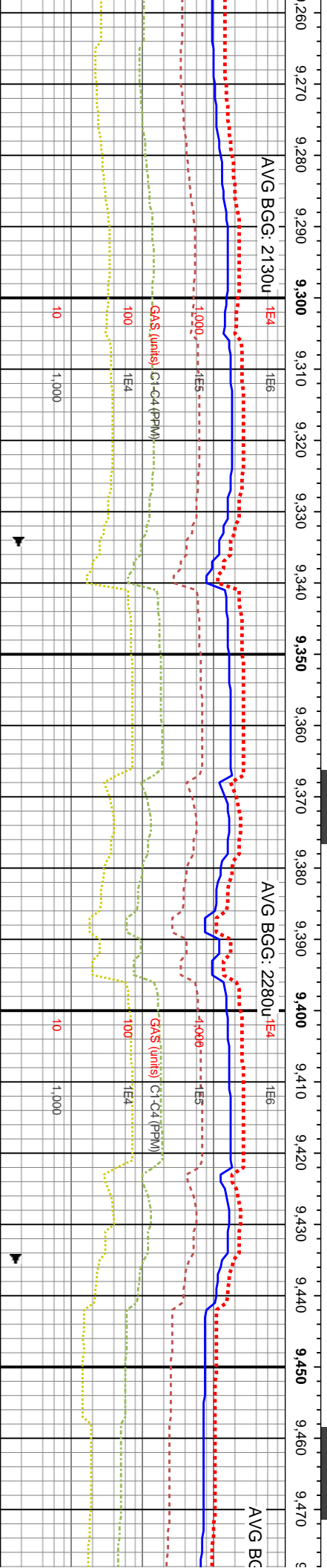
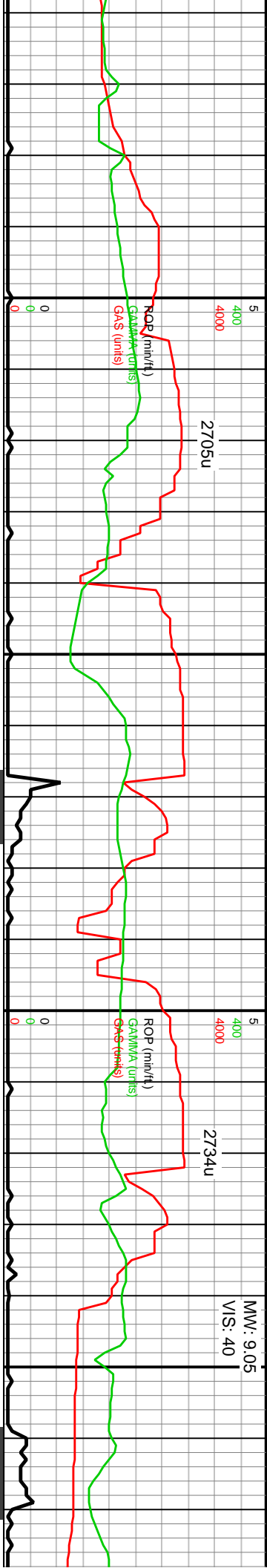


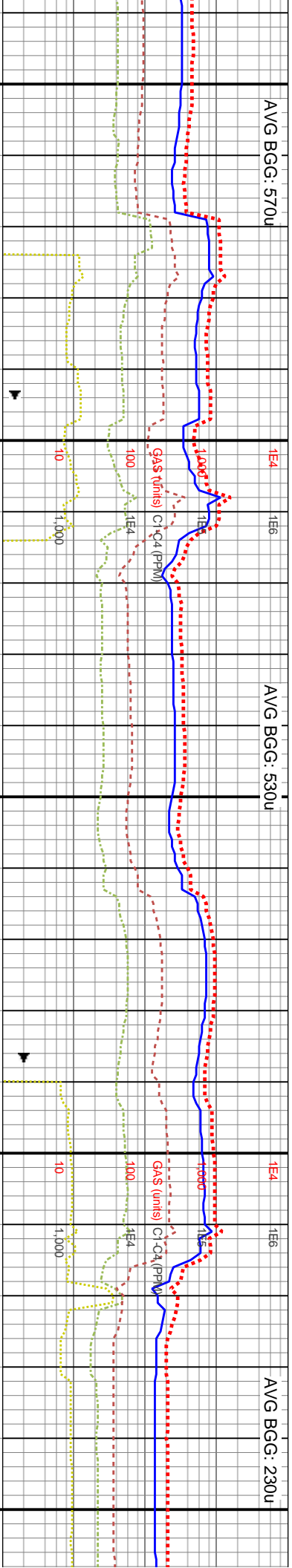
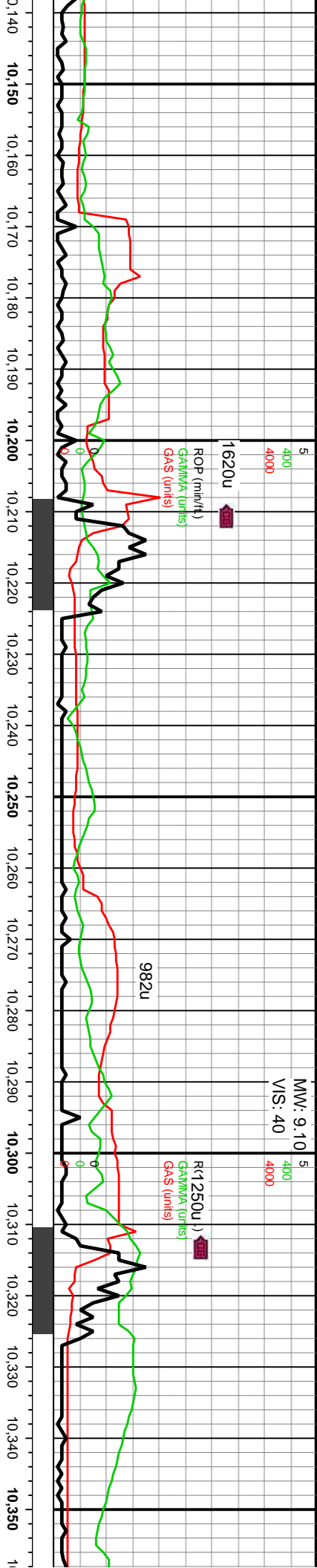


DP @ 8,850'		6200	WOB: 54Klbs Rotary: 0RPM Strokes: 240SPM Pump Rate: 688GPM		6200
MD: 8,897' TVD: 7,180.99' Inclination: 90.8° Azimuth: 273.62° VS: 1,834.61'			MD: 8,992' TVD: 7,180.19' Inclination: 90.17° Azimuth: 272.24° VS: 1,925.89'		
8840-8900 SD: pred gy- med gy, sme brn gy, ip med gy- amb trnsi, pred sl trnsi grs, sb blkly clus, frm- fri clus, ip sl frm- hd clus, pred v f- f grd, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus- uncons grs, arg- sil cmt, sme mod calc, sme lse sil- calc cmt, tr glau, sme pyr			8900-8960 SD: pred gy- med gy, sme brn gy, ip med gy- amb trnsi, pred sl trnsi grs, sb blkly clus, frm- fri clus, ip sl frm- hd clus, pred v f- f grd, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus- uncons grs, arg- sil cmt, sme mod calc, sme lse sil- calc cmt, tr glau, sme pyr		
8960-9020 SD: pred gy- med gy, sme brn gy, ip med gy- amb trnsi, pred sl trnsi grs, sb blkly clus, frm- fri clus, ip sl frm- hd clus, pred v f- f grd, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus- uncons grs, arg- sil cmt, sme mod calc, sme lse sil- calc cmt, tr glau, sme pyr			9020-9080 SD: pred gy- med gy, sme brn gy, ip med gy- amb trnsi, pred sl trnsi grs, sb blkly clus, frm- fri clus, ip sl frm- hd clus, pred v f- f grd, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus- uncons grs, arg- sil cmt, sme mod calc, sme lse sil- calc cmt, tr glau, sme pyr		



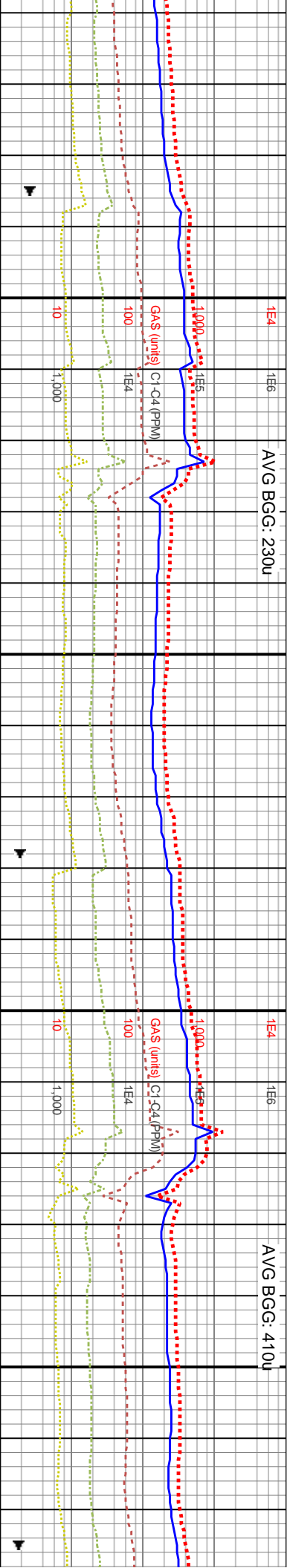
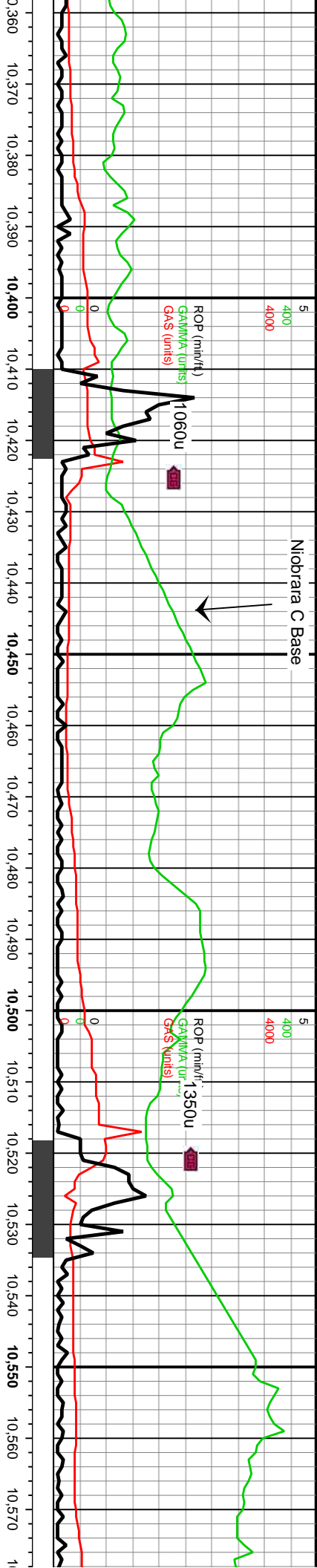




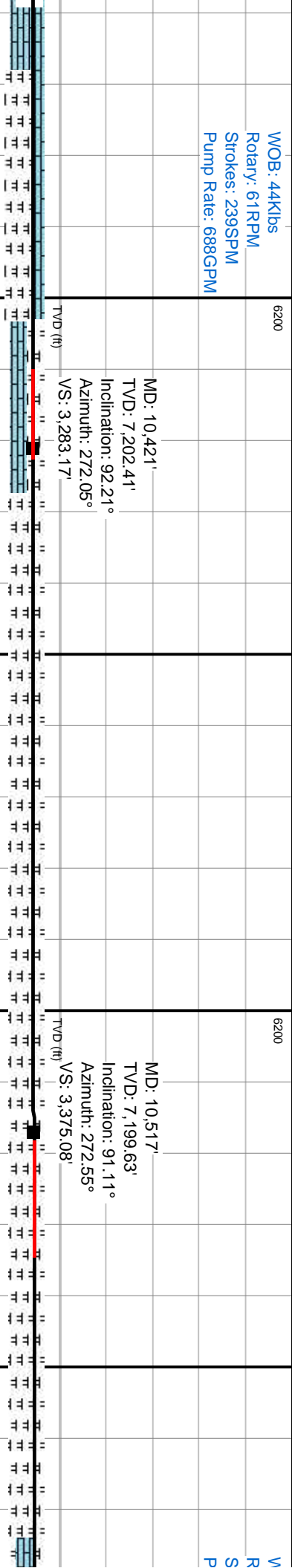


WOB: 43Klbs Rotary: 60RPM Strokes: 240SPM Pump Rate: 688GPM		6200	MD: 10,230' TVD: 7,208.58' Inclination: 90.44° Azimuth: 271.43° VS: 3,100.26'	10160-10220: LS: lt brn- bf, ip sl tn- gy mot, ip offwht, pred blkly- sb blkly, ip sb pty, frm- hd, ip sl frm, pred mudst wi sme intbd carb grs, sme intbd sh & vf sd	10220-10280: LS: lt brn- bf, ip sl tn- gy mot, ip offwht, pred blkly- sb blkly, ip sb pty, frm- hd, ip sl frm, pred mudst wi sme intbd carb grs, sme intbd gy slst	10280-10340: 50% LS: offwht- bf, ip sl tn- gy mot, ip offwht, pred blkly- sb blkly, ip sb pty, frm- hd, ip sl frm, pred mudst wi sme intbd carb grs, 50% MRLST: med gy- gy, sme offwht- bf mot, sl frm- frm, pred blkly- spl, calc incl, tr frac fl cal, sl silty thru	10340-10350: offwht- l incl, tr fr bf, ip sl blkly, ip
TVD (ft)		6200	MD: 10,326' TVD: 7,206.22' Inclination: 92.38° Azimuth: 273.03° VS: 3,192.14'				





WOB: 44Klbs
Rotary: 61RPM
Strokes: 239SPM
Pump Rate: 688GPM



0400-70% MRLST: med gy- gy, sme
of mot, sl frm- frm, pred blkly- spl, calc
ac fl cal, sl silty thru; 30% LS: offwht-
th- gy mot, ip offwht, pred blkly- sb
sb ply, frm- hd, ip sl frm, pred mudst
intbd carb grs

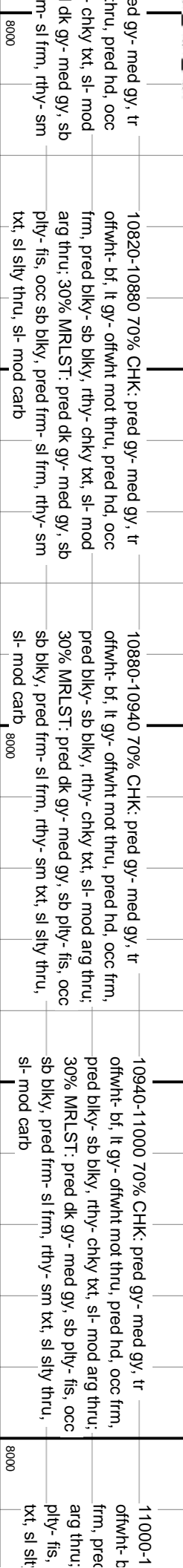
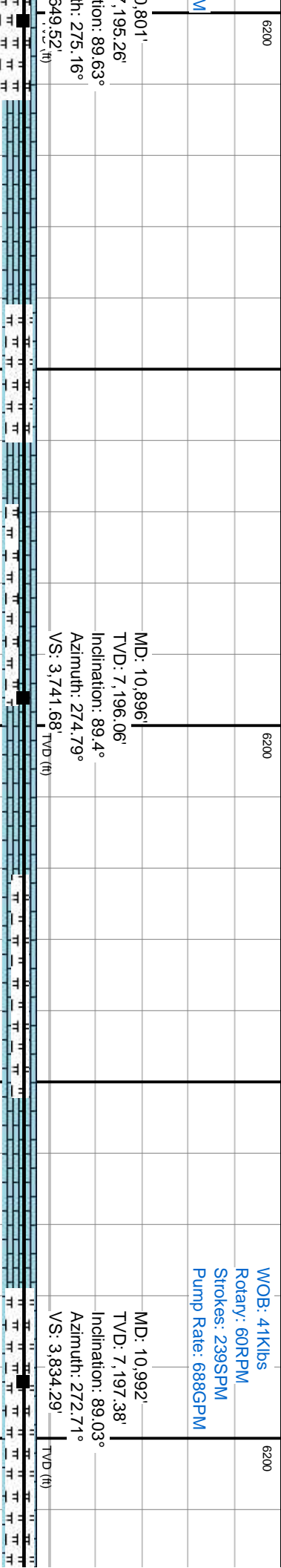
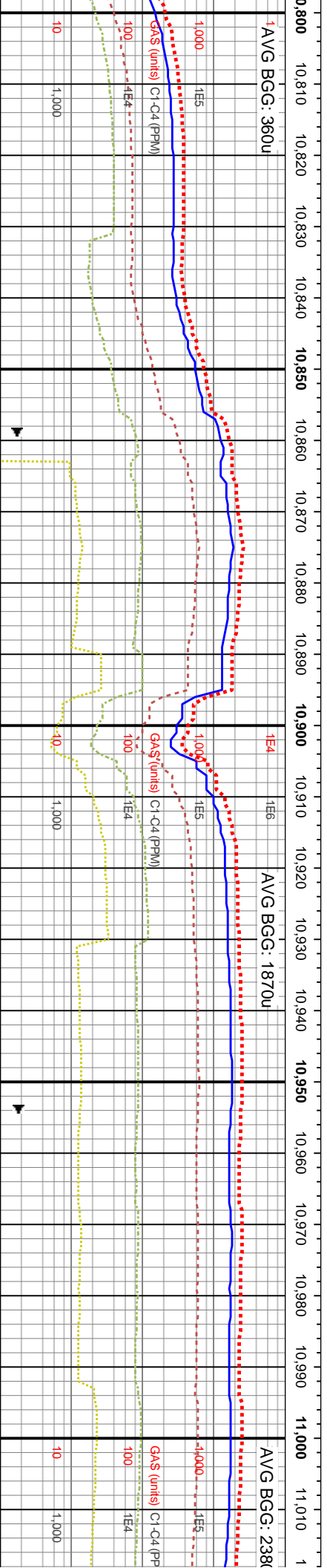
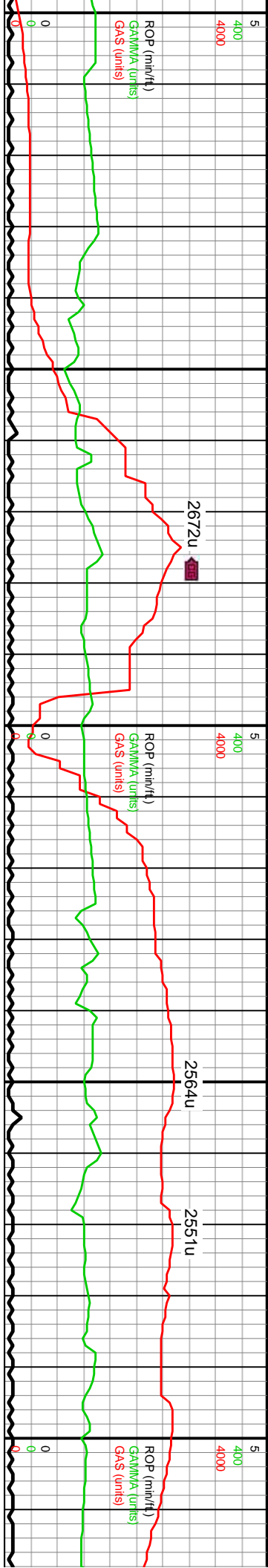
10400-10460: MRLST: med gy- gy, ip dk gy- blk,
occ offwht- bf mot, sl frm- frm, ip hd, pred sb blkly-
spl, occ calc incl, tr frac fl cal, tr cal, sme chky
intbds, sl silty thru

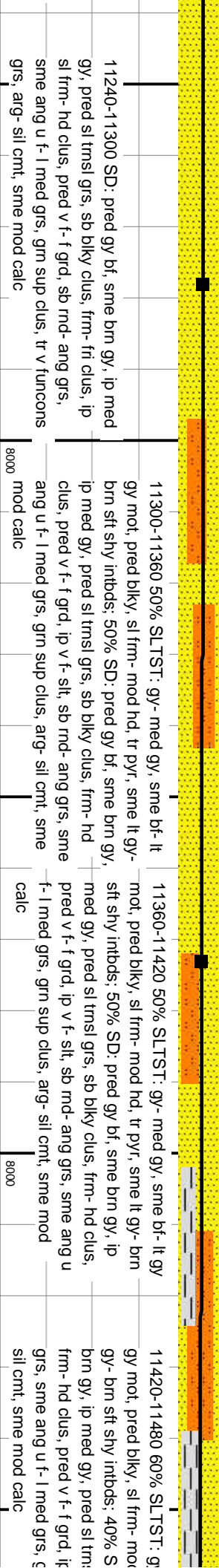
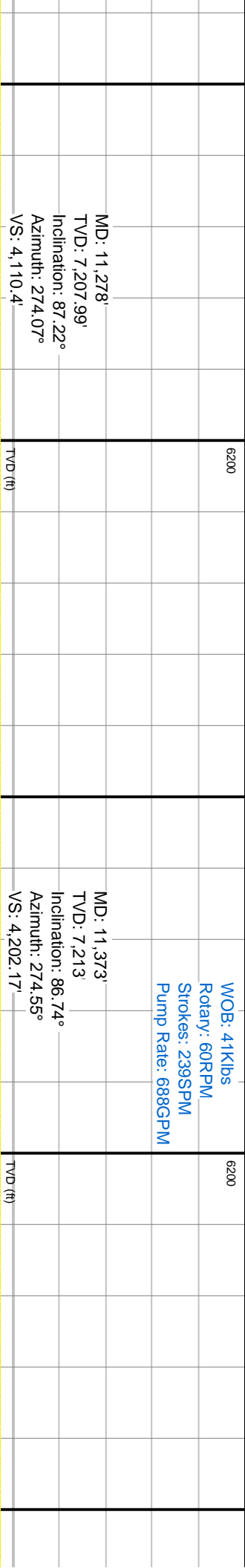
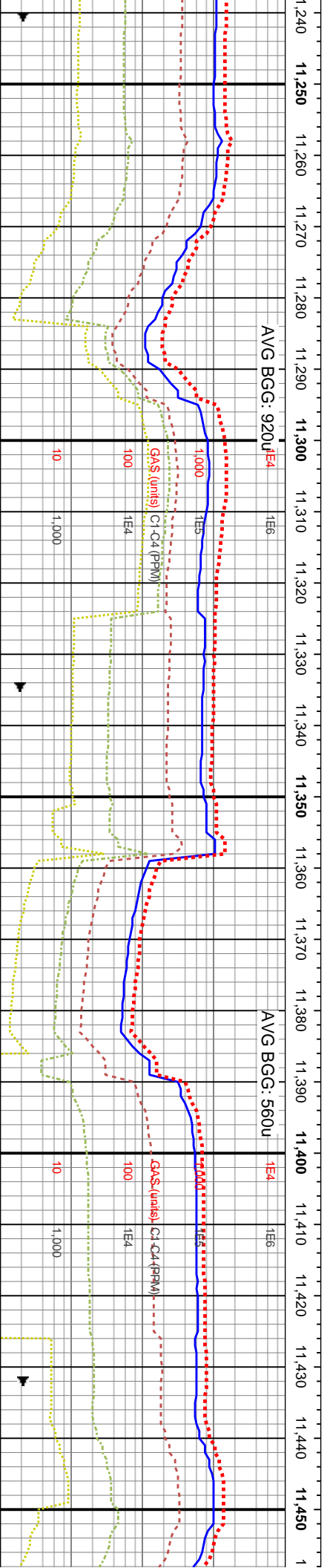
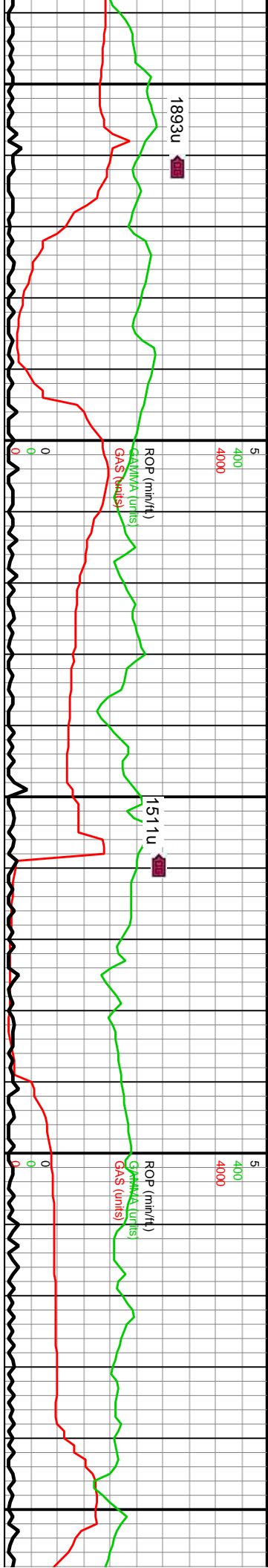
10460-10520: MRLST: med gy- gy, ip dk gy- blk,
occ offwht- bf mot, sl frm- frm, ip hd, pred sb
blkly- spl, occ calc incl, tr frac fl cal, tr cal, sme
chky intbds, sl silty thru

10520-10580: MRLST: med gy- gy, ip dk gy-
blk, occ offwht- bf mot, sl frm- frm, ip hd, pred
sb blkly- spl, occ calc incl, tr frac fl cal, tr cal,
sme chky intbds, sl silty thru



W
R
S
P





MD: 11,278'
TVD: 7,207.99'
Inclination: 87.22°
Azimuth: 274.07°
VS: 4,110.4'

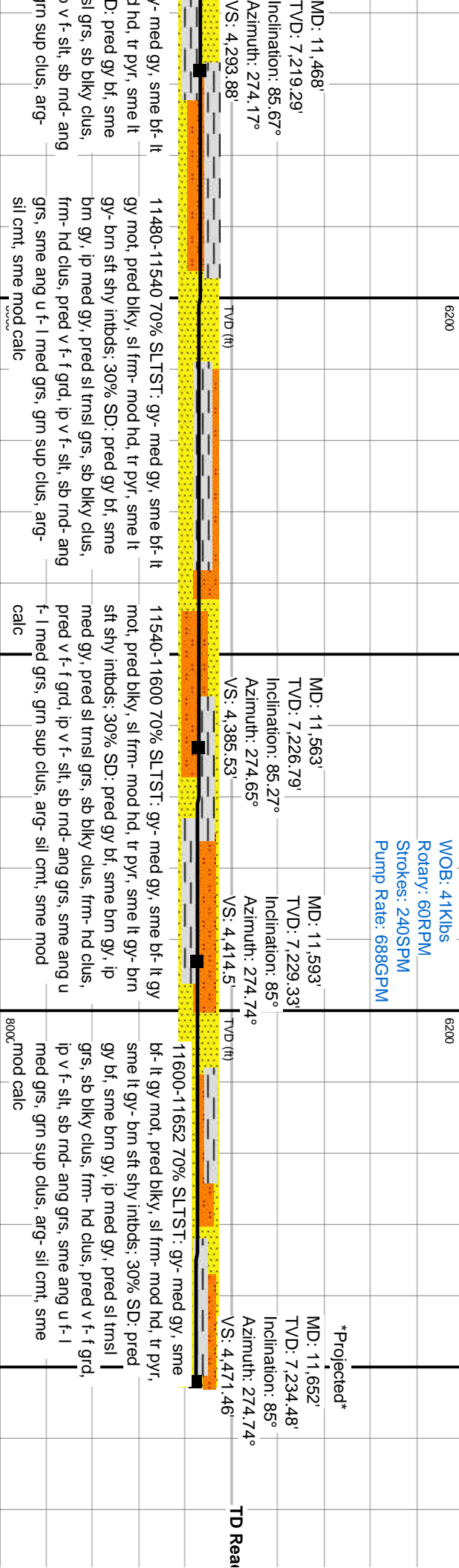
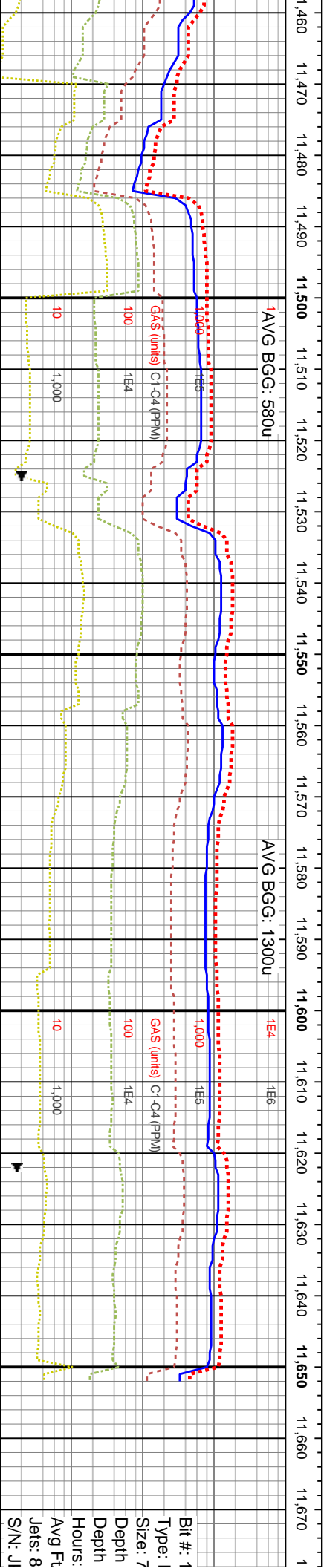
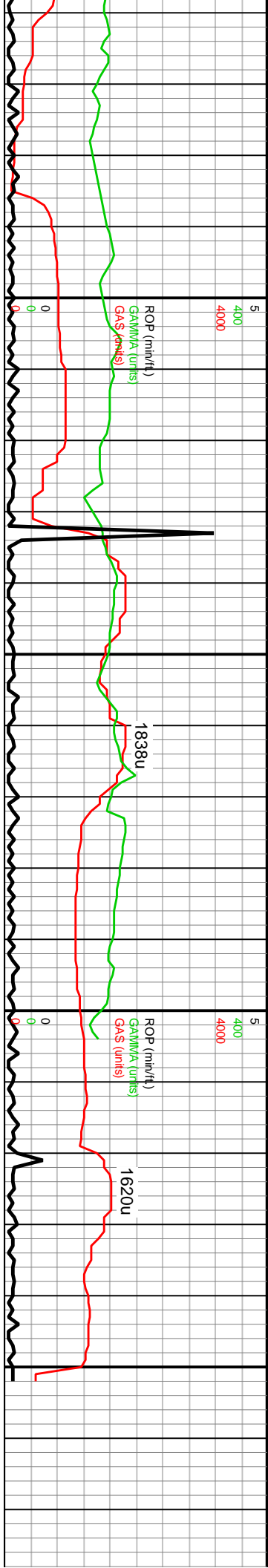
11300-11360 50% SLTST: gy- med gy, sme bf- lt gy mot, pred blkly, sl frm- mod hd, tr pyr, sme lt gy- brn sft shy intbds: 50% SD: pred gy bf, sme brn gy, ip med gy, pred sl tmsl grs, sb blkly clus, frm- hd clus, pred v f- f grd, ip v f- slt, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus, arg- sil cnt, sme mod calc

MD: 11,373'
TVD: 7,213'
Inclination: 86.74°
Azimuth: 274.55°
VS: 4,202.17'

WOB: 41Klbs
Rotary: 60RPM
Strokes: 239SPM
Pump Rate: 688GPM

11360-11420 50% SLTST: gy- med gy, sme bf- lt gy mot, pred blkly, sl frm- mod hd, tr pyr, sme lt gy- brn sft shy intbds: 50% SD: pred gy bf, sme brn gy, ip med gy, pred sl tmsl grs, sb blkly clus, frm- hd clus, pred v f- f grd, ip v f- slt, sb rnd- ang grs, sme ang u f- l med grs, grn sup clus, arg- sil cnt, sme mod calc

11420-11480 60% SLTST: gy mot, pred blkly, sl frm- mod gy- brn sft shy intbds: 40% S brn gy, ip med gy, pred sl tmsl frm- hd clus, pred v f- f grd, ip grs, sme ang u f- l med grs, sil cnt, sme mod calc



MD: 11,468'
TVD: 7,219.29'
Inclination: 85.67°
Azimuth: 274.17°
VS: 4,293.88'

MD: 11,563'
TVD: 7,226.79'
Inclination: 85.27°
Azimuth: 274.65°
VS: 4,386.53'

MD: 11,593'
TVD: 7,229.33'
Inclination: 85°
Azimuth: 274.74°
VS: 4,414.5'

Projected
MD: 11,652'
TVD: 7,234.48'
Inclination: 85°
Azimuth: 274.74°
VS: 4,471.46'

11480-11540 70% SLTST: gy- med gy, sme bf- lt
gy mot, pred blkly, sl frm- mod hd, tr pyr, sme lt
gy- brn sft shy intbds; 30% SD: pred gy bf, sme
brn gy, ip med gy, pred sl trnsi grs, sb blkly clus,
frm- hd clus, pred v f- f grd, ip v f- silt, sb rnd- ang
grs, sme ang u f- l med grs, grn sup clus, arg-
sil cmt, sme mod calc

11540-11600 70% SLTST: gy- med gy, sme bf- lt gy
mot, pred blkly, sl frm- mod hd, tr pyr, sme lt gy- brn
sft shy intbds; 30% SD: pred gy bf, sme brn gy, ip
med gy, pred sl trnsi grs, sb blkly clus, frm- hd clus,
pred v f- f grd, ip v f- silt, sb rnd- ang grs, sme ang u
f- l med grs, grn sup clus, arg- sil cmt, sme mod
calc

11600-11652 70% SLTST: gy- med gy, sme
bf- lt gy mot, pred blkly, sl frm- mod hd, tr pyr,
sme lt gy- brn sft shy intbds; 30% SD: pred
gy bf, sme brn gy, ip med gy, pred sl trnsi
grs, sb blkly clus, frm- hd clus, pred v f- f grd,
ip v f- silt, sb rnd- ang grs, sme ang u f- l
med grs, grn sup clus, arg- sil cmt, sme
mod calc



