



Empirica

Scale: 5" / 100'
Measured Depth Log

Well Name Winder South 5 ST2

Location Sec. 9-T6N-R67W

State Colorado

Country USA

County Weld

Rig Number Patterson 346

API Number 05-123-43407-00

Field Wattenberg

Geographic Region DJ Basin

Drilling Completed 9/19/2016

Spud Date 9/17/2016

Surface Coordinates SHL: 2306'FNL, 448' FEL, Sec. 9 T6N R67W

Lat: 40.502674

Long: -104.890483

Bottom Hole Coordinates BHL: 1870'FFSLL, 460' FFWLL, Sec. 8 T6N R67W

Ground Elevation 4,855'

K.B. Elevation 4,879.5'

Logged Interval 15,545' To 17,145'

Total Depth 17,145'

Formation Codell

Type of Drilling Fluid Oil Based Mud

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-589

Comments Start: 9-9-16
TD: 9-19-16

Services Provided 2-man Logging
On Site Geosteering

Logger Names Dominic Pitre/ Nicholas

Address ALS Empirica
6510 Guhn Road
Houston, Texas 77040

Zone Color Coding

Oil

Note

Error

Condensate

Core

Water

Gas

Pressure

Seal

Other Sy

ORGANIC

PINPOINT

GAS SHC

DEAD

VUGGY

EVEN

NORMAL

QUESTIONABLE

Engineering

OIL SHO

SPOTTED STAINING

BIT

OVERTUR

CASING

REVERSE

Porosity

CONNECTION (LEFT)

SIDEWAL

E EARTHY

CONNECTION (RIGHT)

SIDEWAL

FENESTRAL

CONNECTION GAS

SLIDE

F FRACTURE

CORE - LOST

SURVE

INTERCRYSTALLINE

CORE - RECOVERED

TRIP GA

INTEROOLITIC

DST INTERVAL

WIRELIN

MOLDIC

FAULT

WIRELIN

Oil Show

ORGANIC

PINPOINT

GAS SHC

DEAD

VUGGY

EVEN

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F FRACTURE

CORE - LOST

SURVE

INTERCRYSTALLINE

CORE - RECOVERED

TRIP GA

INTEROOLITIC

DST INTERVAL

WIRELIN

MOLDIC

FAULT

WIRELIN

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

BITUMINOUS SUBSTANCE

BRECCIA FRAGMENTS

CALCAREOUS

CARBONACEOUS FLAKES

CHTDK

CHTLT

COAL - THIN BEDS

DOLOMITIC

FELDSPAR

FERRUGINOUS PELLET

FERRUGINOUS

GLAUCONITE

GYPSIFEROUS

HEAVY MINERAL

KAOLIN

MARLSTONE

MINERAL CRYSTALS

NODULES

PHOSPHATE PELLETS

PYRITE

SALT CAST

SANDY

SILICEOUS

SILTY

TUFFACEOUS

ANHYDRITE STRINGER

BENTONITE STRINGER

COAL STRINGER

DOLOMITE STRINGER

GYPSUM STRINGER

LIMESTONE STRINGER

MARLSTONE (CALC) STRG

MARLSTONE (DOL) STRG

SANDSTONE STRINGER

SHALE STRINGER

SILTSTONE STRINGER

Watkins

Symbols

FORMATION TOP L LITHOGRAPHIC

Rounding

WV MX MICROXLN

MIN DEPTH A ANGULAR MS MUDSTONE

FAULT R ROUNDED PS PACKSTONE

W B SUBANG WS WACKSTONE

UNNED STRATA P SUBRND

Sorting

F FAULT

Textures

L CORE (LEFT) M MODERATE

L CORE (RIGHT) BS BOUNDSTONE P POOR

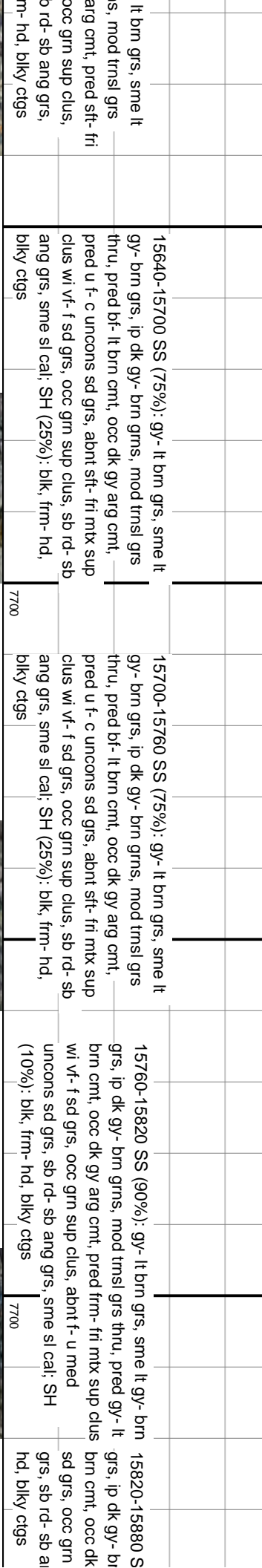
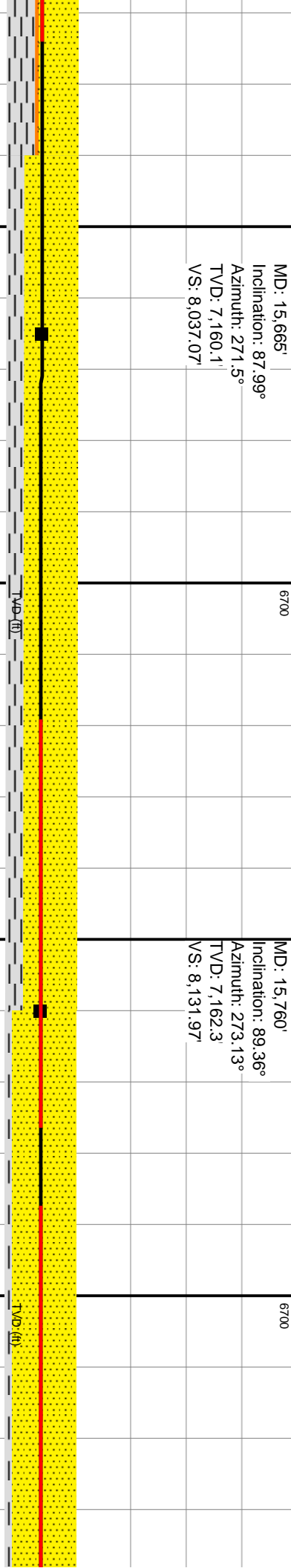
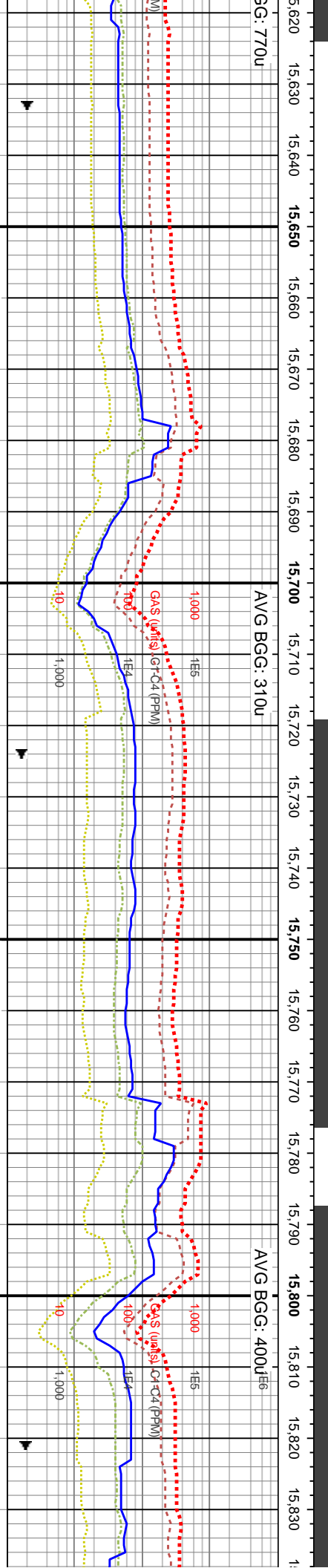
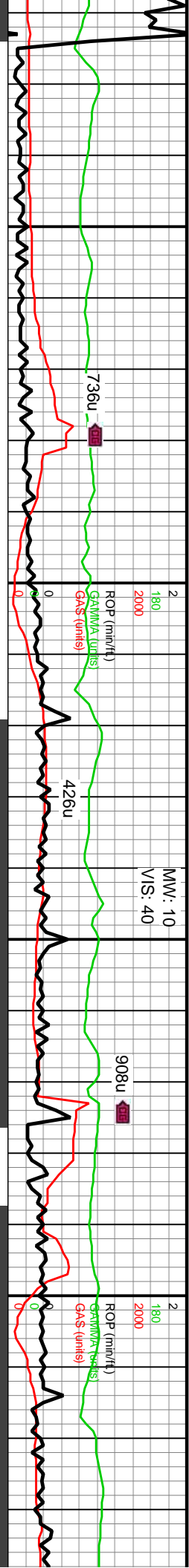
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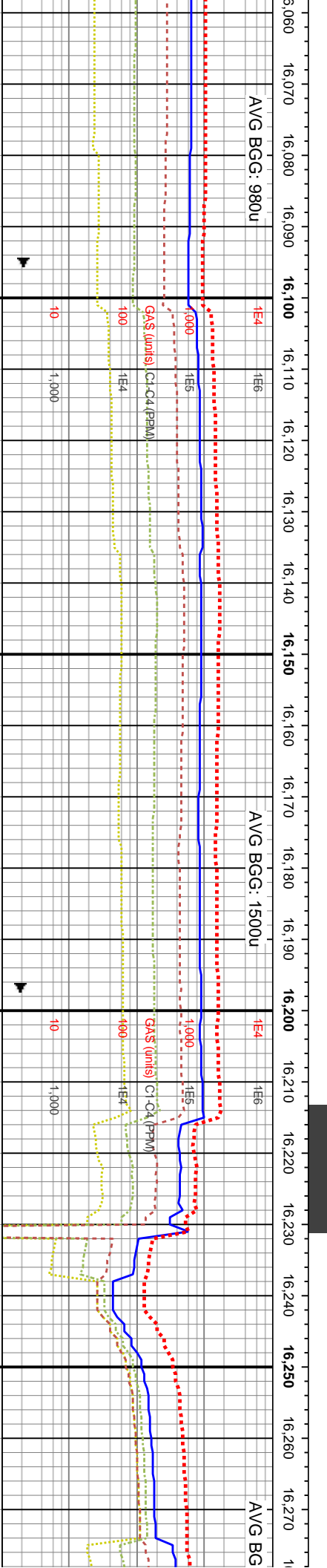
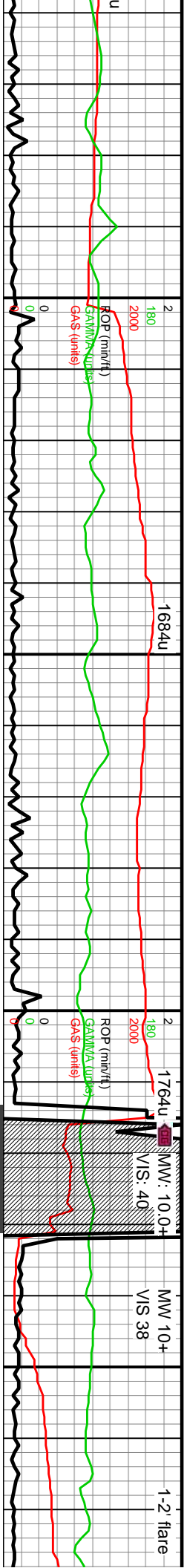
Y CX CRYPTOXLN

AS E EARTHY

TESTED - LEFT FX FINELYXLN

TESTED - RT GS GRAINSTONE





6700

6700

NW

MD: 16,138'
Inclination: 92.48°
Azimuth: 274.07°
TVD: 7,154.71'
VS: 8,509.2

MD: 16,232'
Inclination: 91.68°
Azimuth: 272.42°
TVD: 7,151.25'
VS: 8,602.99'

TVD (ft)

TVD (ft)

16060-16120 SS: lt gy- lt brn grs, sme gy- brn grs, ip dk gy- brn grms, mod- v trnsi grs thru, pred bf- lt brn cnt, ip dk gy arg cnt, frm- fri grm sup clus wi pred f sd grs, occ mtix sup clus, abnt f- u med unconcs sd grs, sb rd- ang grs, sme sl cal, tr dk gy sh

16120-16180 SS: lt gy- lt brn grs, sme gy- brn grs, ip dk gy- brn grms, mod- v trnsi grs thru, pred bf- lt brn cnt, ip dk gy arg cnt, frm- fri grm sup clus wi pred f sd grs, occ mtix sup clus, abnt f- u med unconcs sd grs, sb rd- ang grs, sme sl cal

16180-16220 SS: pred off wh- v lt gy med frm v fri pred mtix sup ss clus cons wi arg cnt, rr gr sup clus ip, com gy brn-dk gy brn frm-hd sli fri gr sup ss clus cons wi silic cnt, mod srtf vf-u f sb ang-sb rd sd grs thru, non calc

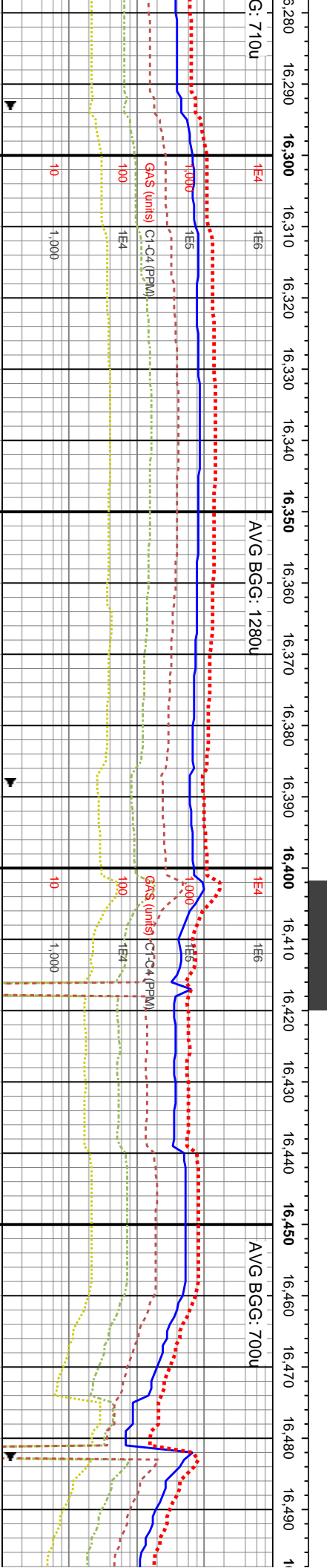
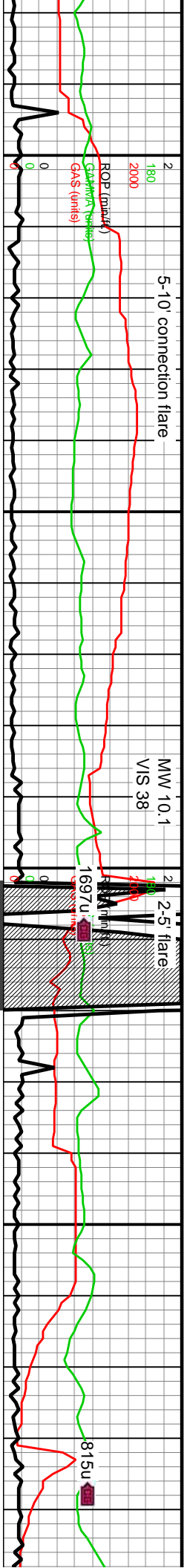
16220-16280 SS: off wh- lt gy-gy brn, mod srtf vf-u f sb ang-sb rd sd grs, pred v lt gy med frm v fri mtix sup ss clus cons wi arg cnt, rr gr sup clus ip, com gy brn-dk gy brn frm-hd sli fri gr sup ss clus cons wi silic cnt, non calc

7700

7700

calc





MD: 16,327'
Inclination: 92.58°
Azimuth: 272.3°
TVD: 7,147.71'
VS: 8,697.86'

MD: 16,422'
Inclination: 91.61°
Azimuth: 270.75°
TVD: 7,144.24'
VS: 8,792.76'

WOB: 23Klb
Rotary: 66Rt
Strokes: 210
Pump Rate:

TVD (ft)

TVD (ft)

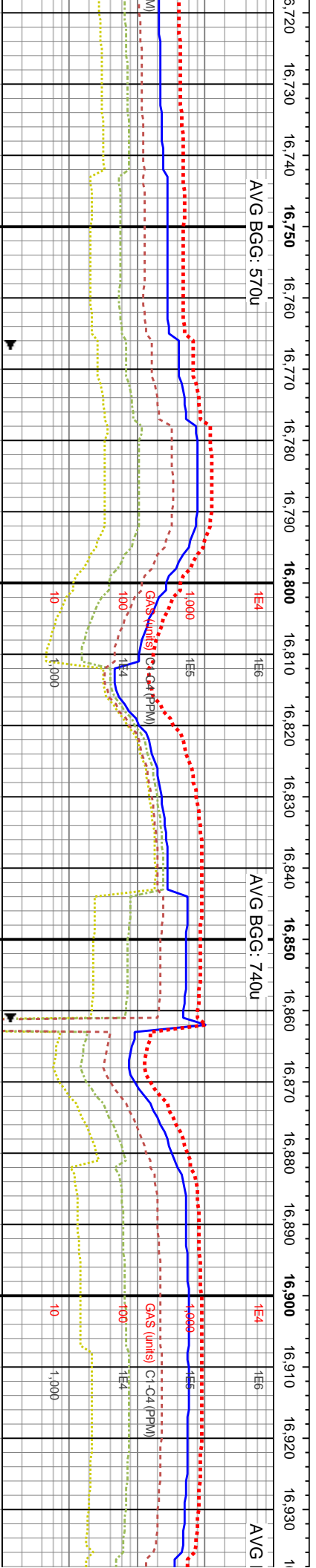
16280-16340 SS: pred off wh-v lt gy med frm v fri
pred mtix sup ss clus cons wi ang cnt & rr dolc ip, rr
gr sup clus ip, com gy brn-dk gy brn frm-hd sil fri gr
sup ss clus cons wi silc cnt, p-mod strd vf-u f sb
ang-sb rd sd grs, pred non calc, sl calc ip

16340-16400 SS: off wh-lt gy-gy brn, mod strd vf-u f
sb ang-sb rd sd grs, pred v lt gy med frm v fri mtix
sup ss clus cons wi ang & sl dolc cnt, rr gr sup
clus ip, com gy brn-dk gy brn frm-hd sil fri gr sup ss
clus cons wi silc cnt, pred non calc, sl calc ip

16400-16460 SS: gy brn frm-hd sil fri gr sup
ss clus cons wi silc cnt, occ-com off wh-v lt
gy med frm v fri mtix sup ss clus cons wi ang
cnt, rr wh gr sup clus ip, mod strd vf-u f sb
ang-sb rd sd grs thru, non calc

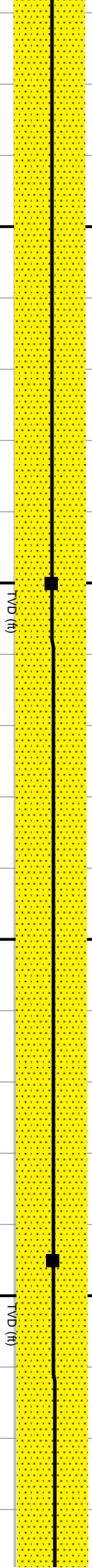
16460-16520 SS: off wh-lt gy-gy br
sb ang-sb rd sd grs, pred gy brn-dk
fri gr sup ss clus cons wi silc cnt, o
med frm v fri mtix sup ss clus cons v
gr sup clus ip, non calc





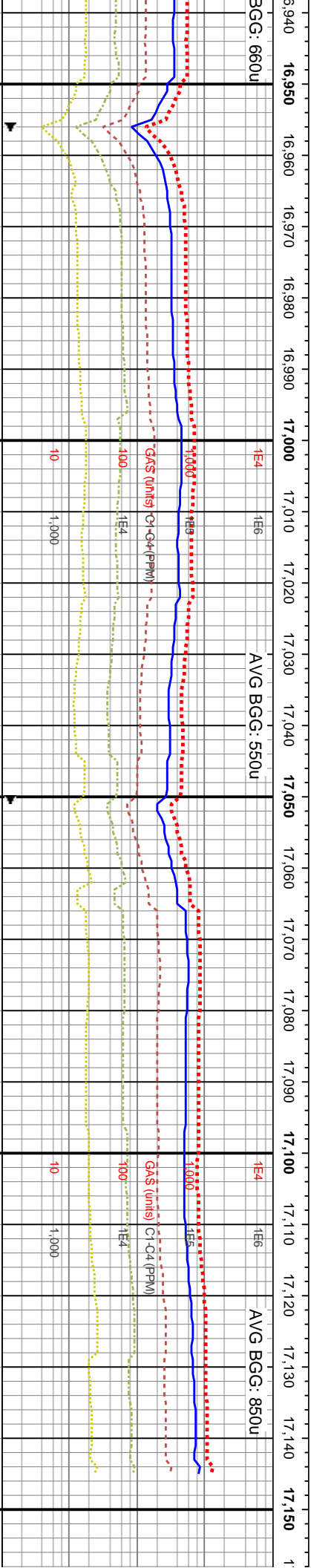
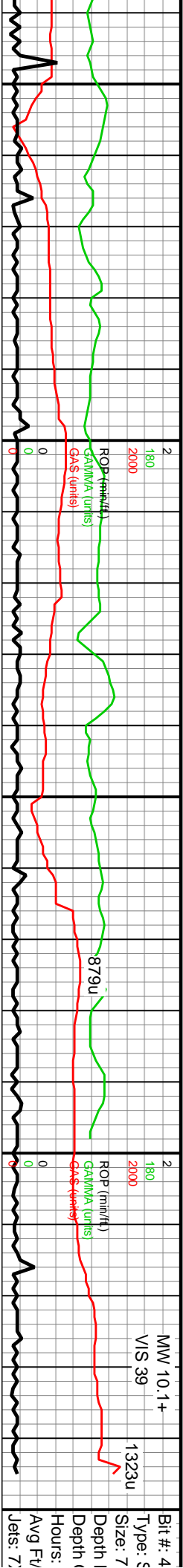
MD: 16,800'
Inclination: 91.48°
Azimuth: 268.88°
TVD: 7,132.27'
VS: 9,170.54'

MD: 16,895'
Inclination: 91.48°
Azimuth: 268.96°
TVD: 7,129.83'
VS: 9,265.49'



S: off wh-lt gy-gy, mod w strd vf-f sd med ang-sb rd sd grs, v lt gy med frm v clus cons wi sft arg cnt, rr gr sup clus d sil fri gr sup ss clus cons wi silic calc	16760-16720 SS: off wh-lt gy-gy, p-mod w strd vf-u f sd grs, l med grs ip, v lt gy med frm v fri mtx sup ss clus cons wi sft arg cnt, rr gr sup clus ip, occ gy frm-hd sil fri gr sup ss clus cons wi silic cnt, rr u f-l med ang-sb ang unconss sd, non calc	16820-16880 SS: off wh-lt gy-gy, mod w strd vf-f sd grs, p strd vf-l med ang-sb rd sd grs, v lt gy med frm v fri mtx sup ss clus cons wi sft arg cnt, rr gr sup clus ip, occ gy frm-hd sil fri gr sup ss clus cons wi silic cnt, pred non calc	16880-16940 SS: pred off wh-v lt gy med frm v fri pred mtx sup ss clus cons wi arg cnt & occ silic cnt ip, rr gr sup clus ip, com gy frm-hd sil fri gr sup ss clus cons wi silic cnt, p-mod strd vf-u f sb ang-sb rd sd grs, pred non calc
	7700	7700	7700





MD: 16,989'
Inclination: 90.87°
Azimuth: 267.9°
TVD: 7,127.9'
VS: 9,359.42'

