



Scale: 5" / 100'
Measured Depth Log

Well Name Winder South 4

Location Sec. 9-T6N-R67W

State Colorado

County Weld

Country USA

Rig Number Patterson 346

API Number 05-123-43400-00

Field Wattenberg

Geographic Region DJ Basin

Drilling Completed 9/7/2016

Spud Date 9/4/2016

Surface Coordinates SHL: 2306'FNL, 468' FEL, Sec. 9 T6N R67W

Lat: 40° 30' 9.6258"
Long: -104° 53' 25.998"

Bottom Hole Coordinates BHL: 2035'FFSLL, 460' FFWLL, Sec. 8 T6N R67W

Ground Elevation 4,855'

K.B. Elevation 4,879.5'

Logged Interval 5,000' MD To 6,680'

Total Depth 16,870'

Formation Niobrara A Chalk

Type of Drilling Fluid Oil Based Mud

Operator

Company Extaction Oil & Gas

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

Geologist

Name Jared Rouse

Company Extraction Oil & Gas

Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

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

Other

Equipment ML-589

Comments Start: 9-4-16
TD: 9-7-16

Services Provided 2-man Logging
On Site Geosteering

Logger Names Dominic Pitre/ Nicholas Watkins

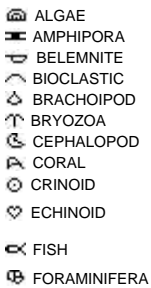
Address ALS Empirica
6510 Guhn Road
Houston, Texas 77040

Rock Types



Accessories

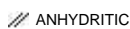
Fossils



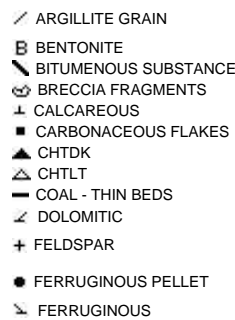
Fossil



Minerals



ARGILLACEOUS



GLAUCONITE

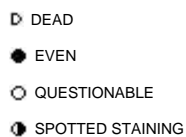


Stringer

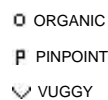
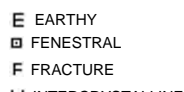


Other Symbols

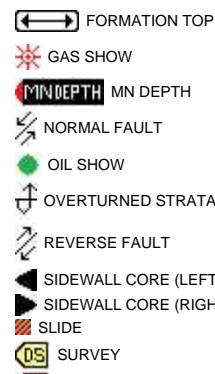
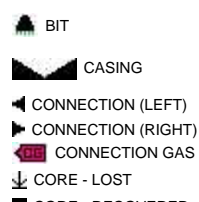
Oil Show



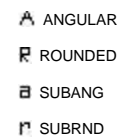
Porosity



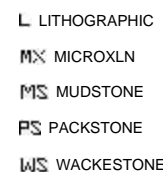
Engineering



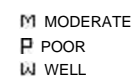
Rounding



Textures



Sorting



✕ INTERCRYSTALLINE

⊕ INTEROOLITIC

↗ MOLDIC

■ CORE - RECOVERED

⋮ DST INTERVAL

↗ FAULT

🔴 TRIP GAS

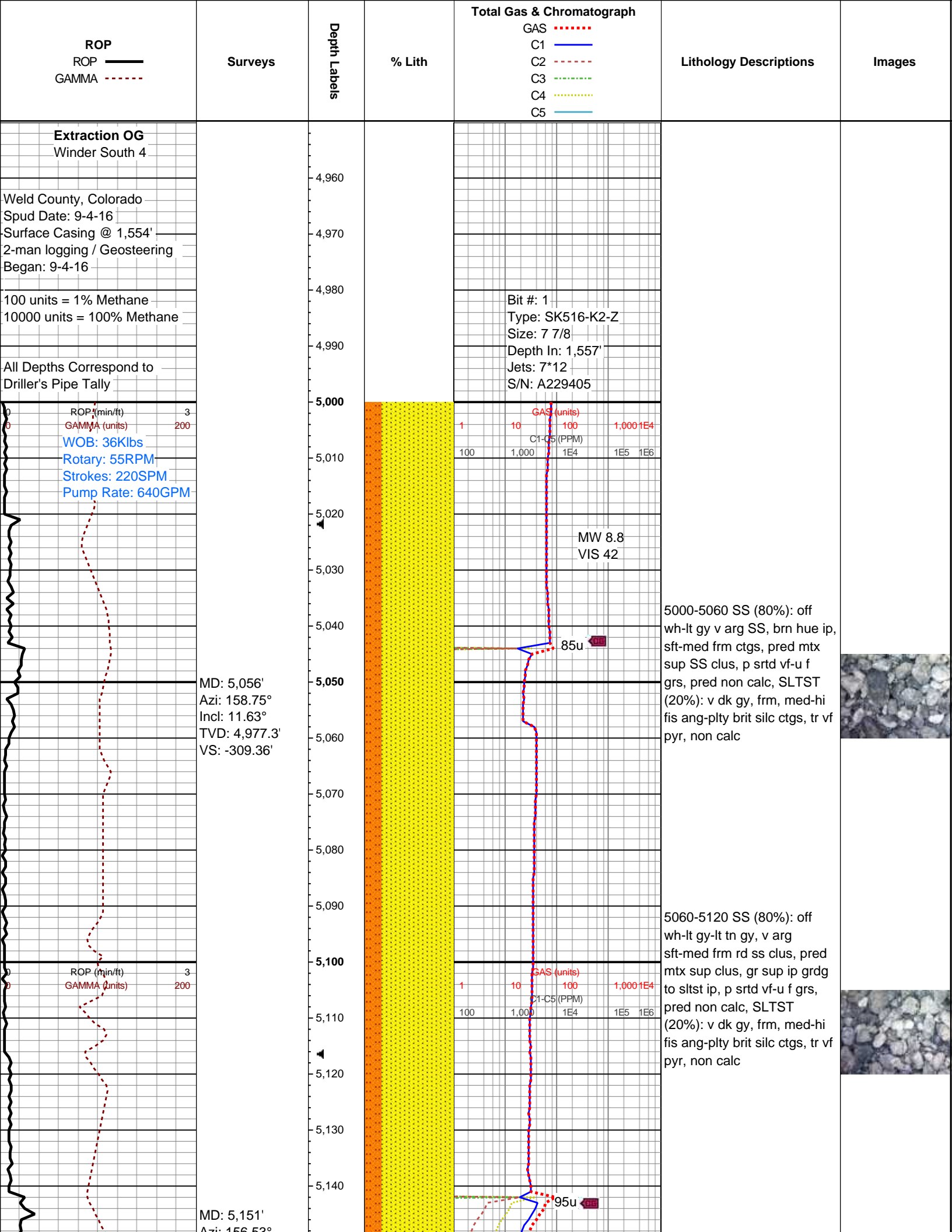
◀ WIRELINE TESTED - LEFT

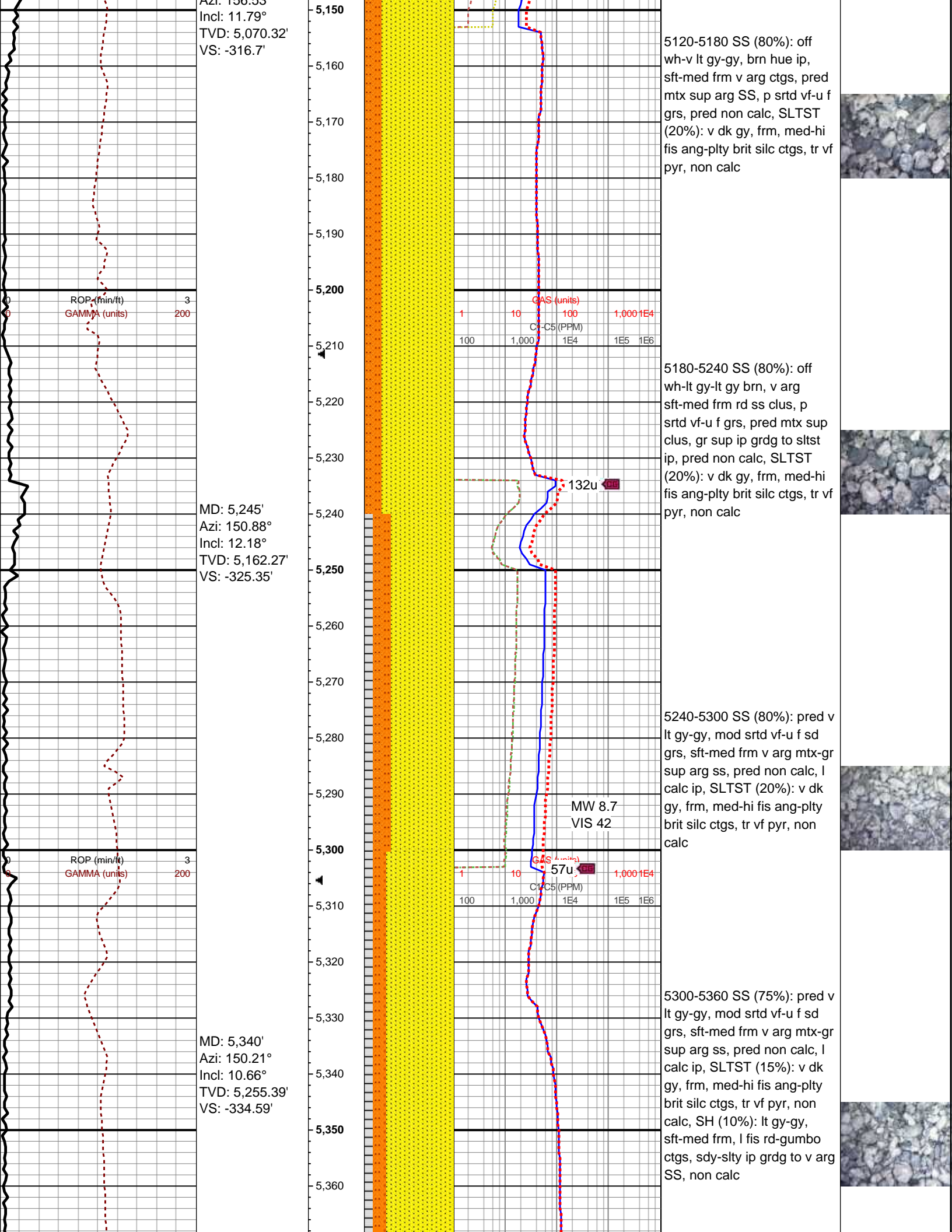
▶ WIRELINE TESTED - RT

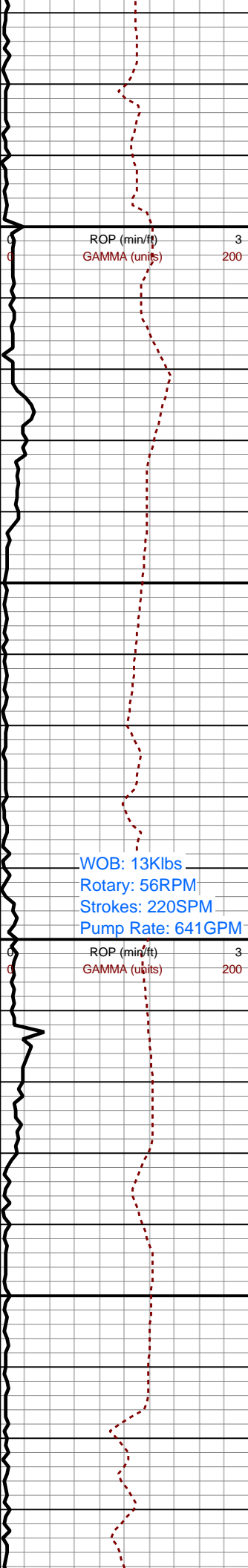
⊞ EARTHY

FX FINELYXLN

SS GRAINSTONE

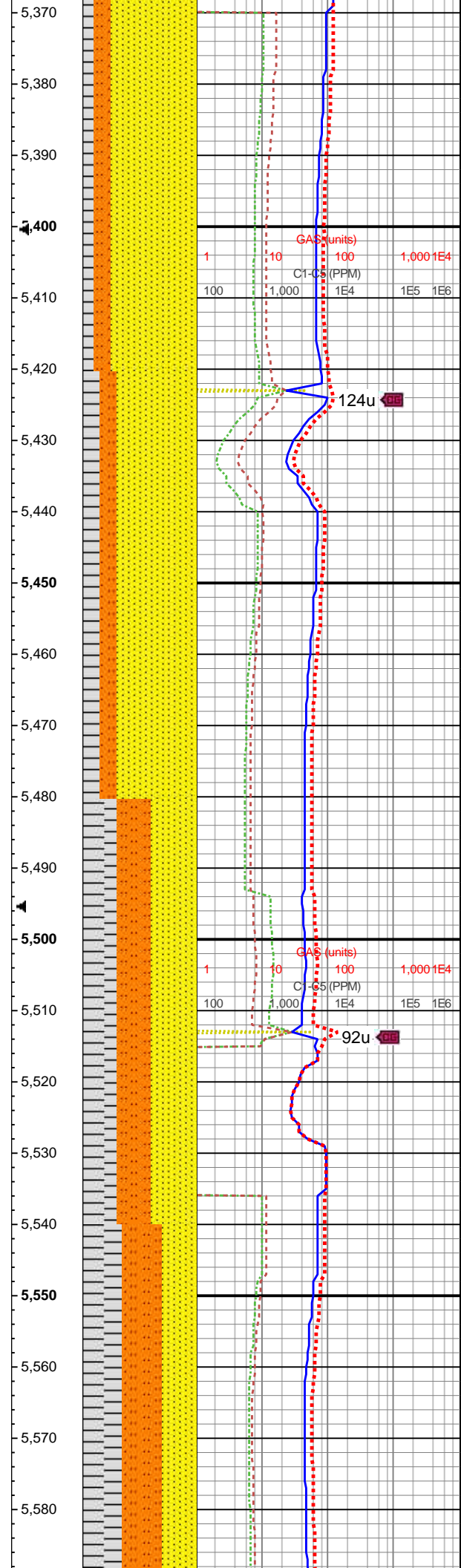






MD: 5,435'
Azi: 153.06°
Incl: 10.7°
TVD: 5,348.74'
VS: -342.95'

WOB: 13Klbs
Rotary: 56RPM
Strokes: 220SPM
Pump Rate: 641GPM



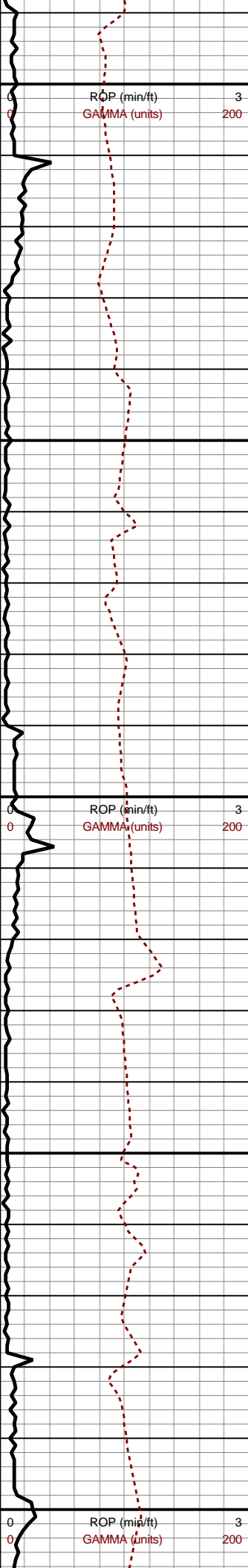
5360-5420 SS (75%): pred v
lt gy-gy, mod srtd vf-u f sd
grs, sft-med frm v arg mtx-gr
sup arg ss, pred non calc, l
calc ip, SLTST (15%): v dk
gy, frm, med-hi fis ang-pty
brit silc ctgs, tr vf pyr, non
calc, SH (10%): lt gy-gy,
sft-med frm, l fis rd-gumbo
ctgs, sdy-sltly ip grdg to v arg
SS, non calc

5420-5480 SS (70%): pred v
lt gy-gy, mod srtd vf-u f sd
grs, sft-med frm v arg mtx-gr
sup arg ss, pred non calc, l
calc ip, wi decr sd grdg to
SH/SDY SH (15%): lt gy-gy,
sft-med frm, l fis rd-gumbo
ctgs, sdy-sltly ip grdg to v arg
SS, non calc, SLTST (15%):
v dk gy, frm, med-hi fis
ang-pty brit silc ctgs, tr vf
pyr, non calc

5480-5540 SS (40%): pred v
lt gy-gy, mod srtd vf-u f sd
grs, sft-med frm v arg mtx-gr
sup arg ss, pred non calc, l
calc ip, wi decr sd grdg to
SH/SDY SH (30%): lt gy-gy,
sft-med frm, l fis rd-gumbo
ctgs, sdy-sltly ip grdg to v arg
SS, non calc, SLTST (30%):
v dk gy, frm, med-hi fis
ang-pty brit silc ctgs, silc vn
ip, tr vf pyr, non calc

5540-5600 SH/SDY SH
(35%): lt gy-gy, sft-med frm,
l-mod fis rd-sb blkty ctgs,
sdy-sltly ip grdg to v arg SS,
non calc, SLTST (35%): v dk
gy, frm, med-hi fis ang-pty
brit silc ctgs, silc vn ip, tr vf
pyr, non calc, SS (30%):
pred v lt gy-gy, mod srtd vf-u f sd
grs, sft-med frm v arg mtx-gr
sup arg ss, pred non calc, l
calc ip, SLTST (15%): v dk
gy, frm, med-hi fis ang-pty
brit silc ctgs, tr vf pyr, non
calc, SH (10%): lt gy-gy,
sft-med frm, l fis rd-gumbo
ctgs, sdy-sltly ip grdg to v arg
SS, non calc

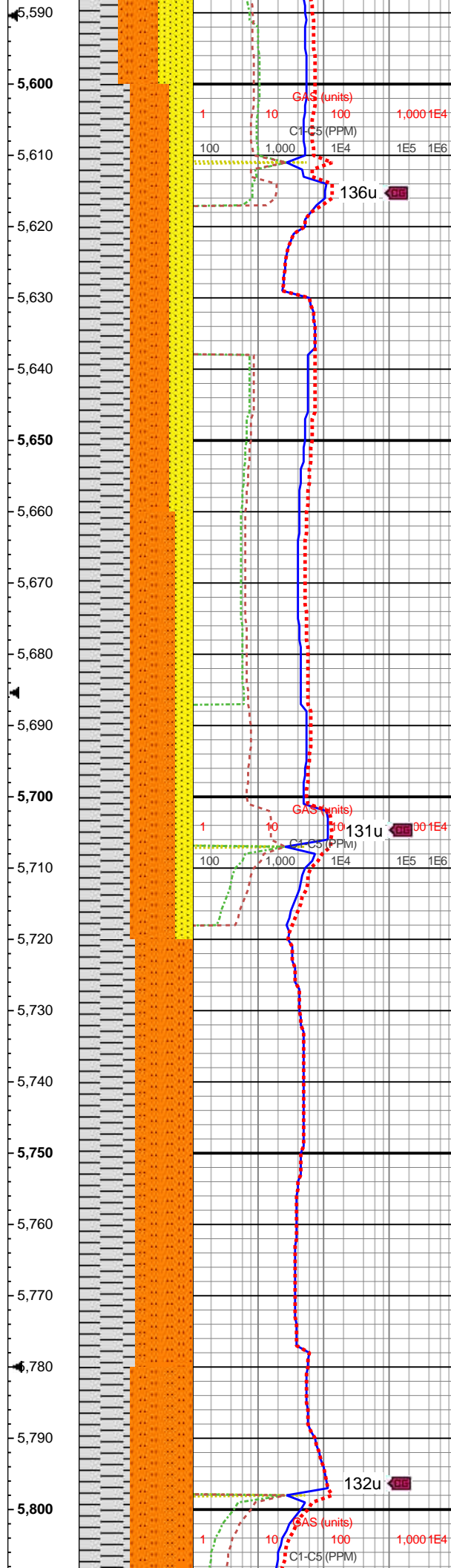




MD: 5,625'
Azi: 162.06°
Incl: 11.99°
TVD: 5,534.89'
VS: -357.63'

MD: 5,719'
Azi: 158.41°
Incl: 12.1°
TVD: 5,626.82'
VS: -364.26'

MD: 5,814'



pred v lt gy-gy, mod srted vf-u
f sd grs, sft-med frm v arg
mtx-gr sup arg ss, non-l
calc

5600-5660 SH/SDY SH
(45%): lt gy-gy, sft-med frm,
l-mod fis rd-sb blkly ctgs,
sdy-sltly ip grdg to v arg SS,
non calc, SLTST (35%): v dk
gy, frm, med-hi fis ang-pty
brit silc ctgs, silc vn ip, tr vf
pyr, non calc, SS (20%):
pred v lt gy-gy, mod srted vf-u
f sd grs, sft-med frm v arg
mtx-gr sup arg ss, non-l
calc

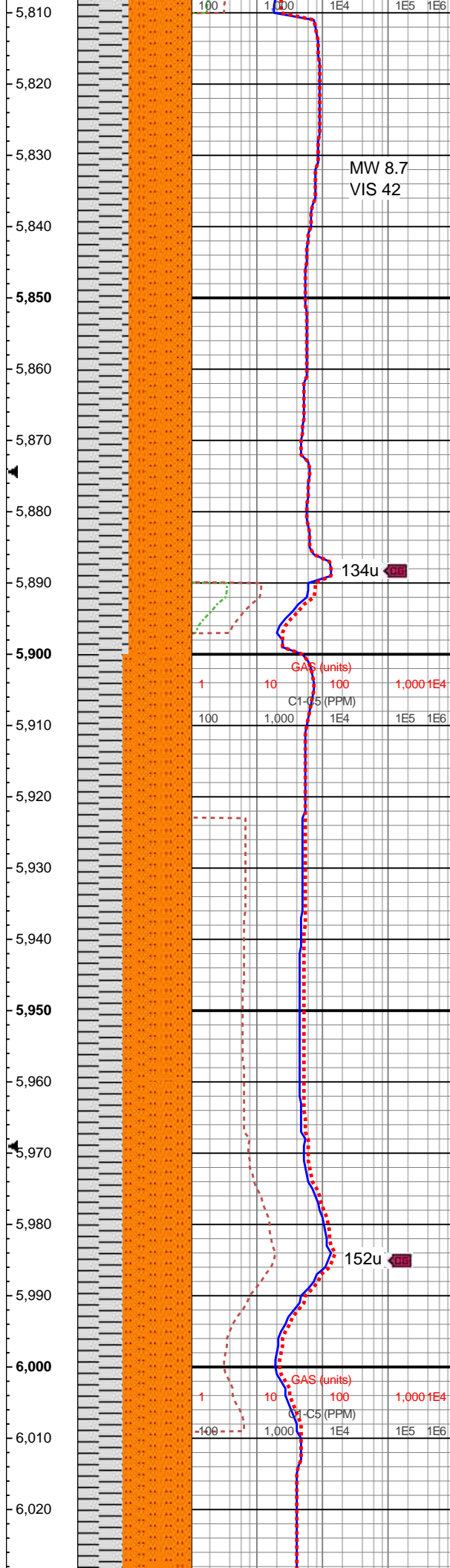
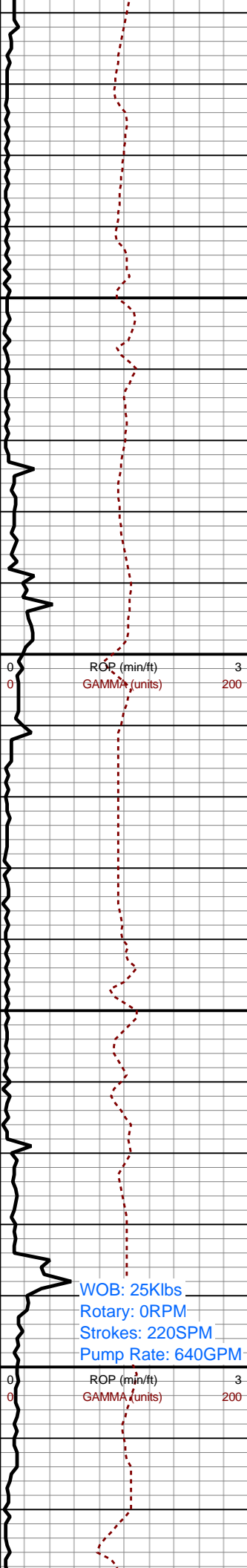
5660-5720 SH/SDY SH
(45%): lt gy-gy, sft-med frm,
l-mod fis rd-sb blkly ctgs,
sdy-sltly ip grdg to v arg SS,
non calc, SLTST (40%): v dk
gy, frm, med-hi fis ang-pty
brit silc ctgs, silc vn ip, tr vf
pyr, non calc, SS (15%): v lt
gy-lt gy-gy, mod srted vf-u f sd
grs, sft-med frm v arg mtx-gr
sup arg ss, non-l calc

5720-5780 SH (50%): lt
gy-gy, sft-med frm, l-mod fis
rd-sb blkly ctgs, thn lamn,
sdy-sltly ip, non calc, SLTST
(50%): v dk gy-blk, frm-brit
med-hi fis sb blkly-pty ctgs,
silc vn ip, tr vf pyr, non calc



MD: 5,909'
Azi: 155.29°
Incl: 11.36°
TVD: 5,812.92'
VS: -378.86'

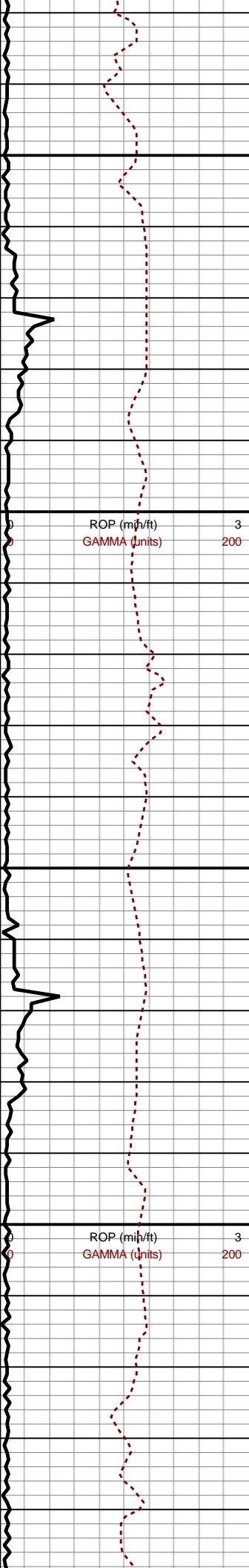
MD: 6,003'
Azi: 160.9°
Incl: 12.49°
TVD: 5,904.9'
VS: -386.06'



5840-5900 SLTST (55%): v
dk gy-blk, frm-brit med-hi fis
sb blk-y-pty ctgs, slty tex, silc
vn ip, tr vf pyr, non calc, SH
(45%): lt gy-gy, sft-med frm,
l-mod fis rd-sb blk-y ctgs, thn
lamn, sdy-slty ip, non calc, tr
calc ip

5900-5960 SLTST (60%): v
dk gy-blk, frm-brit med-hi fis
sb blk-y-pty ctgs, slty tex, silc
vn ip, tr vf pyr, non calc, SH
(40%): lt gy-gy, sft-med frm,
l-mod fis rd-sb blk-y ctgs, thn
lamn, sdy-slty ip, non calc, tr
calc ip

5960-6020 SLTST (60%): v
dk gy-blk, frm-brit med-hi fis
sb blk-y-plty ctgs, slty tex, rr
silc vn ip, tr vf pyr, non calc,
SH (40%): lt gy-gy, sft-med
frm, l-mod fis rd-sb blk-y
ctgs, thn lamn, mod slty
thru, non calc

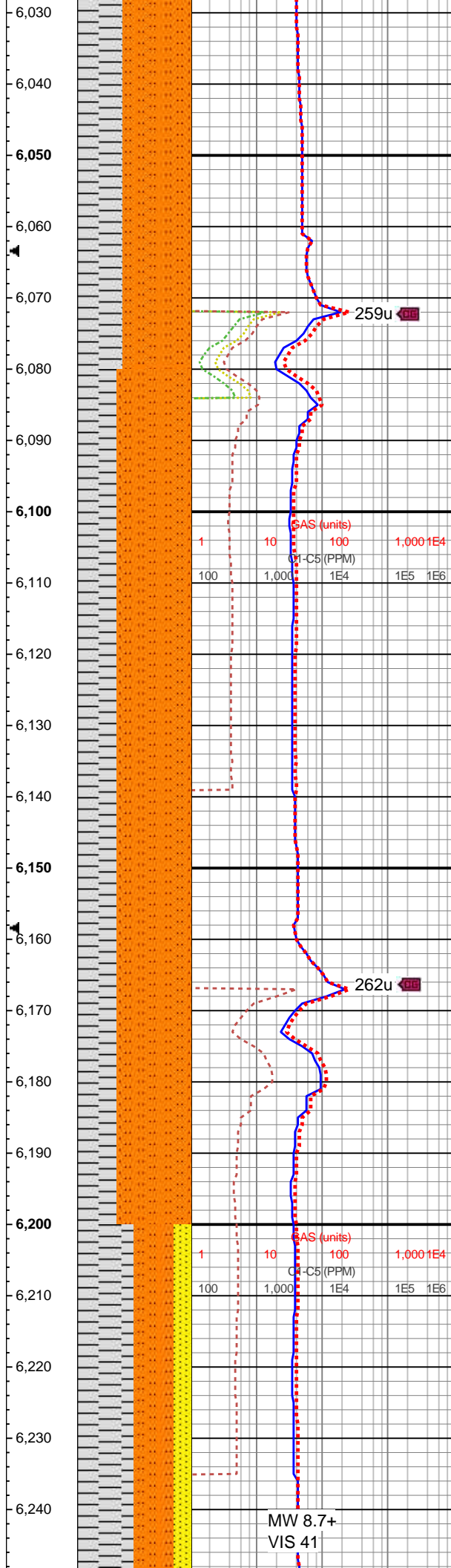


MD: 6,098'
Azi: 155.99°
Incl: 13.81°
TVD: 5,997.41'
VS: -394.03'

ROP (min/ft) 3
GAMMA (units) 200

ROP (min/ft) 3
GAMMA (units) 200

MD: 6,192'
Azi: 152.44°
Incl: 11.94°
TVD: 6,089.04'
VS: -403.1'



259u

262u

MW 8.7+
VIS 41

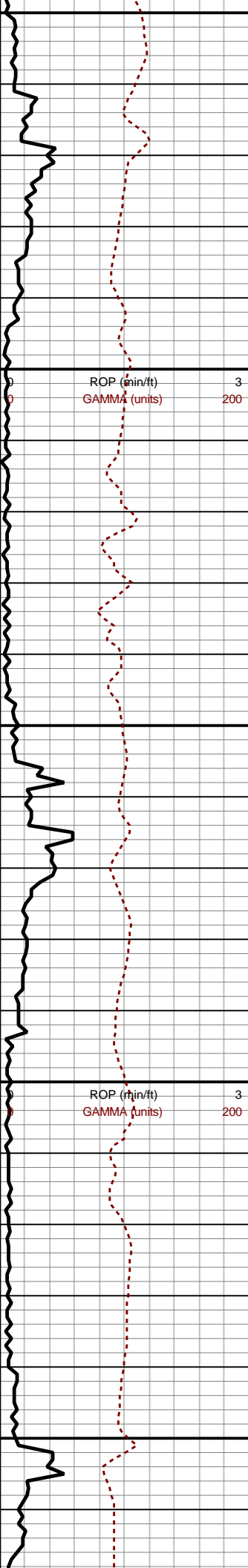
6020-6080 SLTST (60%): v
dk gy-blk, frm-brit med-hi fis
sb blk-pty ctgs, slty tex, rr
silc vn ip, tr vf pyr, non calc,
SH (40%): lt gy-gy, sft-med
frm, l-mod fis rd-sb blk-
ctgs, thn lamn, mod slty
thru, non calc

6080-6140 SLTST (65%): v
dk gy-blk, frm-brit med-hi fis
sb blk-pty ctgs, slty tex, rr
silc vn ip, tr vf pyr, non calc,
SH (35%): lt gy-gy, sft-med
frm, l-mod fis rd-sb blk-
ctgs, thn lamn, mod slty
thru, non calc

6140-6200 SLTST (65%): v
dk gy-blk, frm-brit med-hi fis
sb blk-pty ctgs, slty tex, rr
silc vn ip, tr vf pyr, non calc,
SH (35%): lt gy-gy, sft-med
frm, l-mod fis rd-sb blk-
ctgs, thn lamn, mod slty
thru, non calc

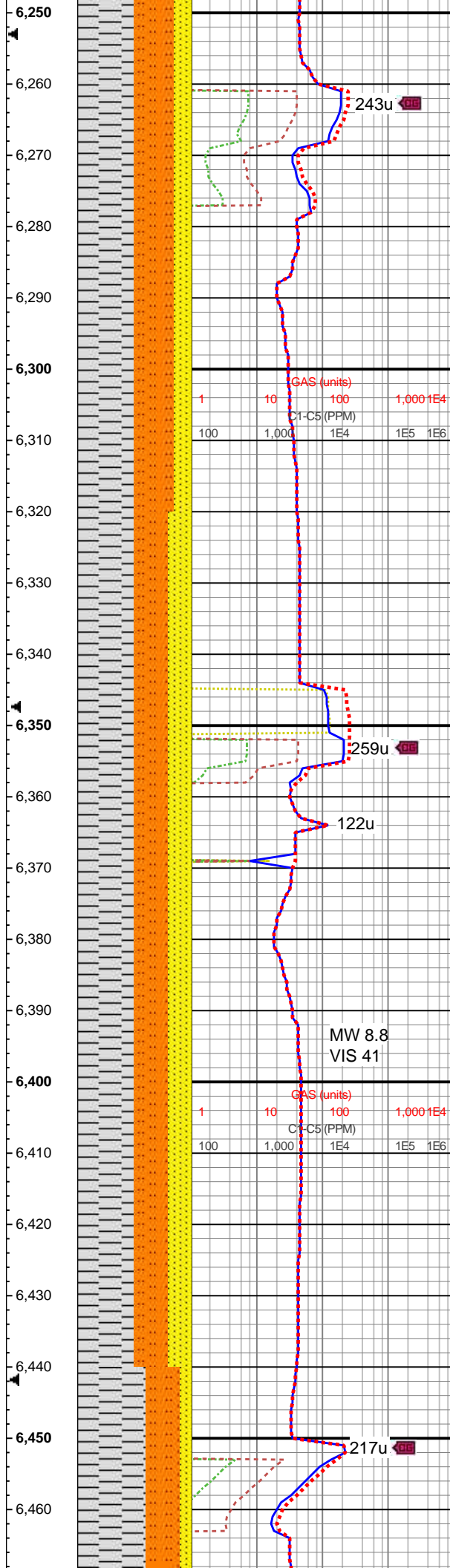
6200-6260 SH (50%): lt
gy-gy, med frm-frm, l-mod
fis rd-sb blk-pty ctgs, sdy-slty
ip grdg to v arg SS, non calc,
SLTST (35%): v dk gy, frm,
med-hi fis ang-pty brit silc
ctgs, silc vn ip, occ vf-f sd
grs, tr vf pyr, non calc, SS





MD: 6,287'
Azi: 156.21°
Incl: 11.16°
TVD: 6,182.12'
VS: -411.35'

MD: 6,381'
Azi: 156.37°
Incl: 11.59°
TVD: 6,274.27'
VS: -418.81'



(15%): v lt gy-lt gy-gy, mod
srted vf-u f sd grs, sft-med
frm v arg mtz-gr sup arg ss,
non-l calc

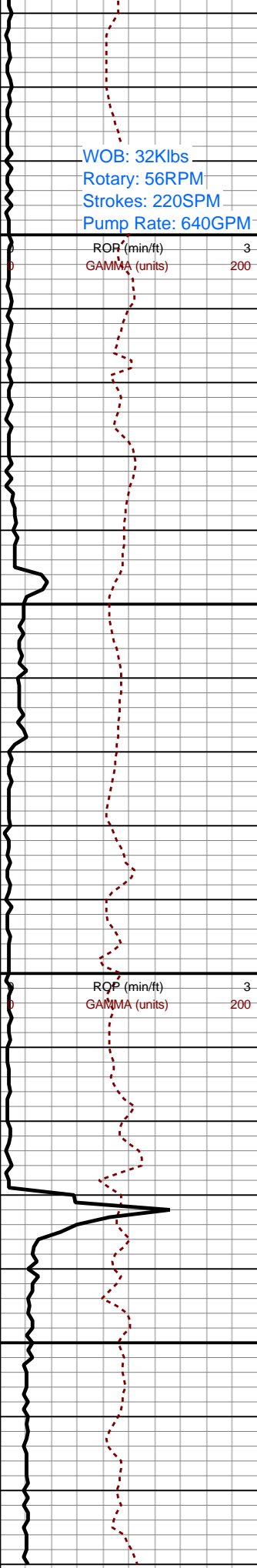
6260-6320 SH (50%): lt
gy-gy, med frm-frm, l-mod
fis rd-sb blkty ctgs, sdy-sltly
ip grdg to v arg SS, non calc,
SLTST (35%): v dk gy, frm,
med-hi fis ang-plty brit silc
ctgs, silc vn ip, occ vf-f sd
grs, tr vf pyr, non calc, SS
(15%): off wh-lt gy, mod srted
vf-u f sd grs, sli fri gr-mtx
sup ss clus cons wi arg
cmt, non-l calc

6320-6380 SH (50%): lt
gy-gy, med frm-frm, l-mod
fis rd-sb blkty ctgs, sdy-sltly
ip grdg to v arg SS, non calc,
SLTST (30%): v dk gy, frm,
med-hi fis ang-plty brit silc
ctgs, silc vn ip, occ vf-f sd
grs, tr vf pyr, non calc, SS
(20%): off wh-lt gy, mod srted
vf-u f sd grs, sli fri gr-mtx
sup ss clus cons wi arg
cmt, pred non calc, rr calc
grs ip

6380-6440 SH (50%): lt
gy-gy, med frm-frm, l-mod
fis rd-sb blkty ctgs, sdy-sltly
ip grdg to v arg SS, non calc,
SLTST (30%): v dk gy, frm,
med-hi fis ang-plty brit silc
ctgs, silc vn ip, occ vf-f sd
grs, tr vf pyr, non calc, SS
(20%): off wh-lt gy, mod srted
vf-u f sd grs, sli fri gr-mtx
sup ss clus cons wi arg
cmt, non-l calc

6440-6500 SH (60%): lt
gy-gy, med frm-frm, l-mod
fis sb rd-sb blkty tab ctgs.

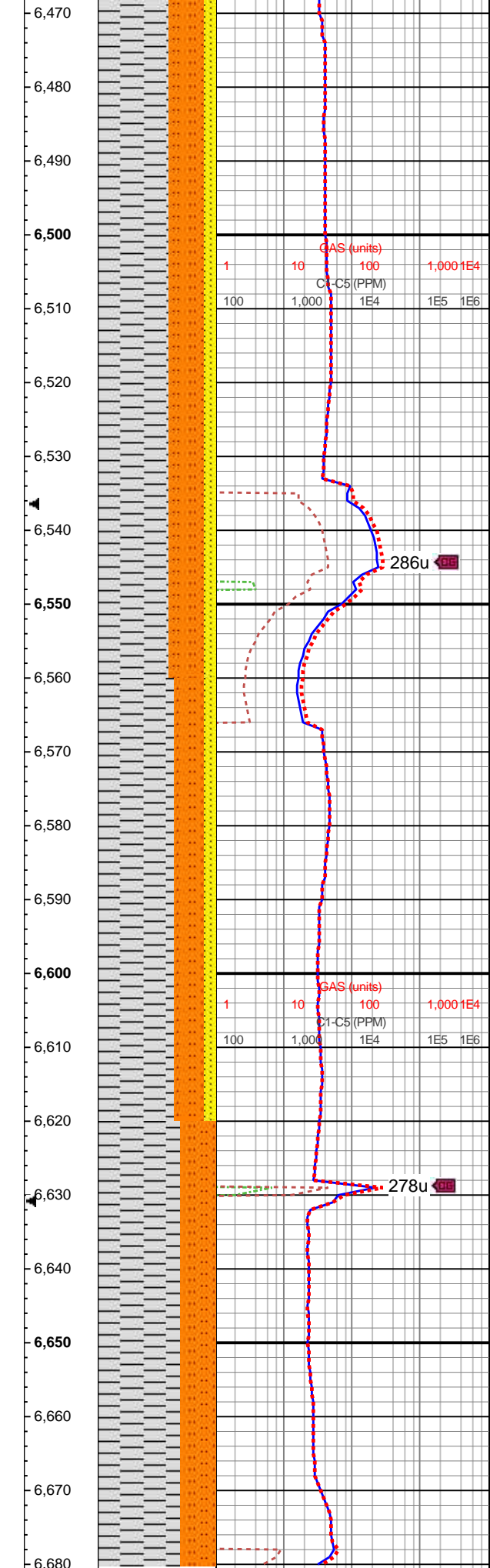




MD: 6,476'
Azi: 154.78°
Incl: 12.95°
TVD: 6,367.1'
VS: -427.17'

MD: 6,570'
Azi: 155.57°
Incl: 12.26°
TVD: 6,458.83'
VS: -435.78'

MD: 6,665'
Azi: 185.43°
Incl: 9.85°
TVD: 6,552.14'
VS: -439.19'



sdv-sltv ip, non calc, SLTST (30%): v dk gy, frm, med-hi fis ang-pty brit silc ctgs, occ vf-f sd grs & sdv lamn, tr vf pyr, non calc, SS (10%): off wh-lt gy, mod srted vf-u f sd grs, med frm-sli fri pred mtx sup ss clus cons wi arg cmt grdng to sh ip, gr sup ip, non-l calc

6500-6560 SH (60%): lt gy-gy, med frm-frm mod fis sb blk-blk ctgs, sdv-sltv ip grdg to arg SS & SLTST ip, non calc, SLTST (30%): v dk gy, frm, med-hi fis ang-pty brit silc ctgs, occ vf-f sd grs & sdv lamn, tr vf pyr, non calc, SS (10%): off wh-lt gy, mod srted vf-u f sd grs, med frm-sli fri pred mtx sup ss clus cons wi arg cmt grdng to sh ip, gr sup ip, non-l calc

6560-6620 SH (65%): lt gy-gy, med frm-frm, l-mod fis sb rd-sb blk tab ctgs, sdv-sltv ip, non calc, SLTST (25%): v dk gy, frm, med-hi fis ang-pty brit silc ctgs, occ vf-f sd grs & sdv lamn, tr vf pyr, non calc, wi rr SS (10%): off wh-lt gy, mod srted vf-u f sd grs, med frm-sli fri pred mtx sup ss clus cons wi arg cmt grdng to sh ip, gr sup ip, non-l calc

6620-6680 SH (70%): lt gy-gy, med frm-frm, l-mod fis sb rd-sb blk tab ctgs, sdv-sltv ip, non calc, SLTST (30%): v dk gy, frm, med-hi fis ang-pty brit silc ctgs, occ vf-f sd grs & sdv lamn, tr vf pyr, non calc



Continued on horizontal log

