



RESERVOIR GROUP

Scale: 5" / 100'
Measured Depth Log

Well Name Lion Creek 23-0362B

Location Sec 23 T11N R64W

State Colorado

Country U.S.

API Number 05-123-47399

County Weld

Rig Number Savanna 802

AFE #

Geographic Region Rockies

Field Hereford

Spud Date 7/28/2018

Drilling Completed 8/18/2018

Surface Coordinates Latitude: 40.912754, Longitude: -104.51721

Ground Elevation 5391.2'

K.B. Elevation 5411.2'

Logged Interval 7,750' To 18,096'

Total Depth 18,096'

Formation Nio B

Type of Drilling Fluid Fresh Water

Operator

Company HighPoint Resources

Address 1099 18th Street, Suite 2300
Denver, CO 80202



HighPoint
RESOURCES

Geologist

Name Aryn Rowe, Ben Burke

Company HighPoint Resources

Address 1099 18th Street, Suite 2300
Denver, CO 80202

HighPoint
RESOURCES

Other

Services Provided 2-Man Logging, ISO Tubes/Jars, Mass Spec, AGS

Loggers: Byron Pitulski / Reed Pellicore / Jonathan Saltz

Equipment: ML-597

Address Reservoir Group - Empirica
6360 West Sam Houston Pkwy N
Houston, Texas 77041

Service Start Date: 08/09/2018

Service End Date: 08/18/2018

Job #: 1492RK1808

Hole Profile

Casing Records

Size	Wgt	From	To	Test
9.625	-	0	1538	-
7	-	0	8064	-

Zone Color Coding

- Oil
- Condensate
- Gas
- Note
- Core
- Pressure
- Error
- Water
- Seal

Rock

- ?












 UNKNOWN
- ANHYDRITE
- COAL
- CHERT
- GYPSUM
- MARLSTONE
- SALT
- CLAYSTONE
- CHALK
- SHALE
- LIMESTONE
- SHALE GRAY
- DOLOMITE
- SHALE COLORADO

Acc


























- F

 FOSSIL
- ARGILLACEOUS
- GASTROPOD
- ARGILLITE GRA
- ALGAE
- B BENTONITE
- AMPHIPODA
- BITUMENOUS
- BELEMNITE
- BRECCIA FRA
- BIOCLASTIC
- CALCAREOUS
- PELLET
- CARBONACE
- PISOLITE
- CHTDK
- BRACHIOPOD
- PLANT REMAINS
- BRYOZOA
- CHTLT
- CEPHALOPOD
- PLANT SPORES
- CORAL
- COAL - THIN B
- CRINOID
- STROMATOPOROID
- DOLOMITIC
- ECHINOID
- FELDSPAR
- FISH
- FERRUGINOUS
- FORAMINIFERA
- ANHYDRITIC
- FERRUGINOUS
































Rock Types

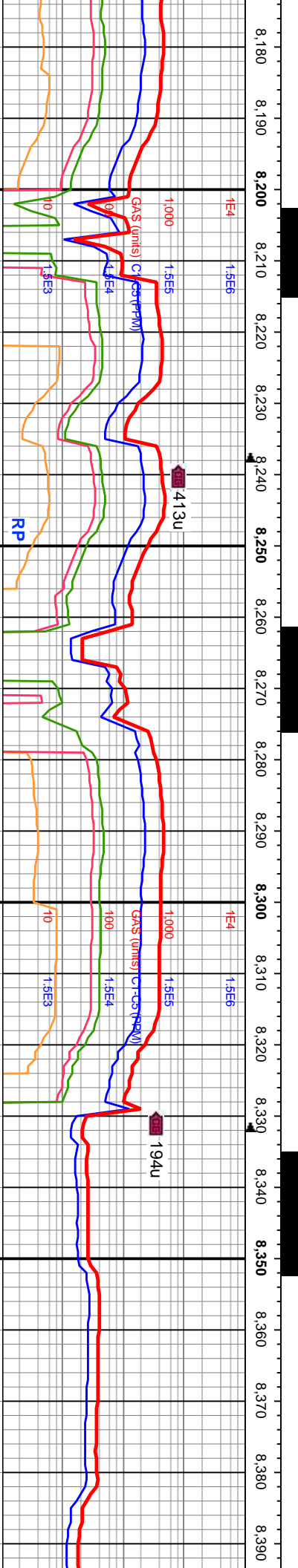
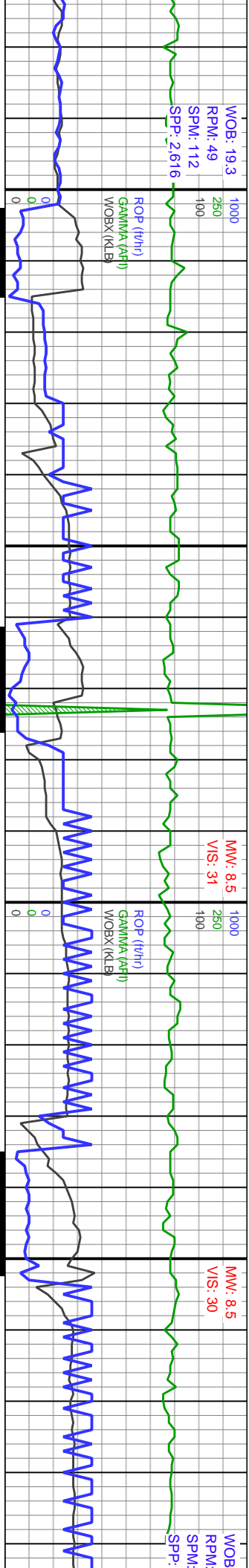
	SILTSTONE		TUFF
	SANDY SILTSTONE		IGNEOUS
	SANDSTONE		METAMORPHIC
	CONGLOMERATE		CEMENT
	BRECCIA		
	TILL		
	BENTONITE		

Accessories

	GLAUCONITE		
	GYPSIFEROUS		
	HEAVY MINERAL		ANHYDRITE STRINGER
	KAOLIN		BENTONITE STRINGER
	MARLSTONE		COAL STRINGER
	MINERAL CRYSTALS		DOLOMITE STRINGER
	NODULES		GYPSUM STRINGER
	PHOSPHATE PELLET		LIMESTONE STRINGER
	PYRITE		MARLSTONE (CALC) STRG
	SALT CAST		MARLSTONE (DOL) STRG
	SANDY		SANDSTONE STRINGER
	SILICEOUS		SHALE STRINGER
	SILTY		SILTSTONE STRINGER
	TUFFACEOUS		

Other Symbols

	ORGANIC		FORMATION TOP		LITHOGRAPHIC
	PINPOINT		GAS SHOW		MICROXLN
	DEAD		MINDEPTH MN DEPTH		ANGULAR
	VUGGY		NORMAL FAULT		ROUNDED
	EVEN		OIL SHOW		SUBANG
	QUESTIONABLE		ENGINEERING		SUBANG
	SPOTTED STAINING		BIT		SUBANG
	CASING		REVERSE FAULT		SUBANG
	CONNECTION (LEFT)		SIDEWALL CORE (LEFT)		SUBANG
	EARTHY		CONNECTION (RIGHT)		SIDEWALL CORE (RIGHT)
	FENESTRAL		SLIDE		BOUNDSTONE
	FRACTURE		CORE - LOST		POOR
	INTERCRYSTALLINE		SURVEY		CHALKY
	INTEROOLITIC		TRIP GAS		WELL
	MOLDIC		WIRELINE TESTED - LEFT		CRYPTOXLN
	FAULT		WIRELINE TESTED - RT		FINELYXLN
	WIRELINE TESTED - RT		GRAINSTONE		



MD: 8,193'
INC: 89.19°
AZM: 177.54°
TVD: 7,688.23'
VS: 93.96'

MD: 8,287'
INC: 90.33°
AZM: 178.16°
TVD: 7,688.62'
VS: 187.82'

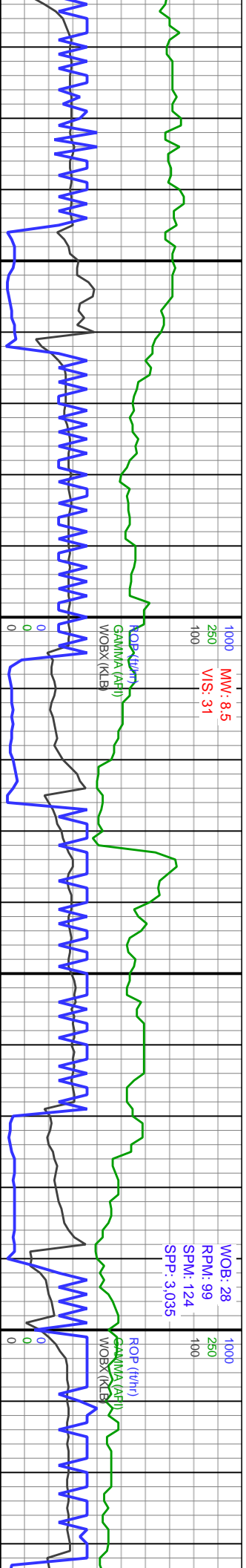
MD: 8,381'
INC: 90.24°
AZM: 177.19°
TVD: 7,688.16'
VS: 281.66'

ST: dk gy-gyshbn, sb
calc, cal frac fl, intbd
med-dk gy, sb blk-y-sb
intbd MRLST, tr glauc

8200-8300 70% MRLST: med-dk gysbhn,
ply-sb ang, frm-hrd, cal frac fl, intbd chk
lamm, mnr calc: 30% CHK: predy med-dk
gy-gyshbn, occ offwnt frag, sb blk-y-sb-ang,
fri frm, v calc, cal frac fl, intbd mrlst lamm

8300-8400 75% MRLST: med-dk gysb
ply-sb ang, frm-hrd, cal frac fl, intbd chk
lamm, mnr calc: 25% CHK: predy med-d
gy-gyshbn, occ offwnt frag, sb blk-y-sb-a
fri frm, cal frac fl, intbd mrlst lamm, v calc

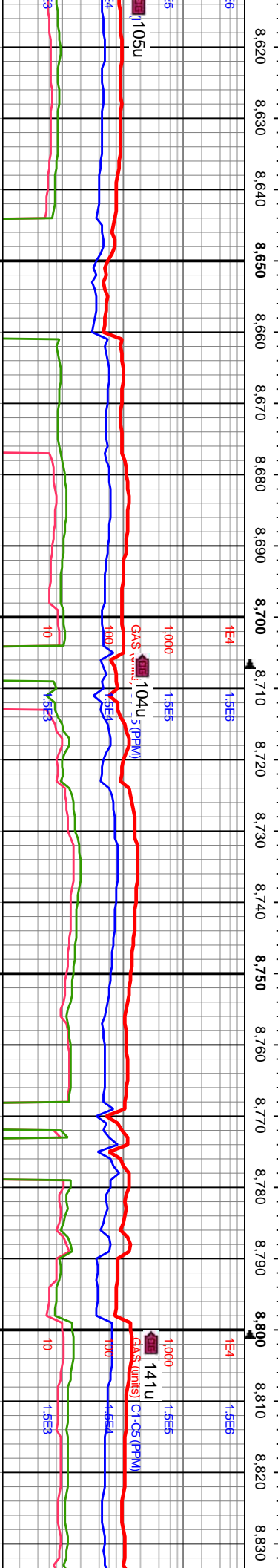




1000 MW: 8.5
250 VIS: 31
100

WOB: 28
RPM: 99
SPM: 124
SPP: 3.035

1000
250
100



1E4 1.5E5
1000 1.5E5
100 1.5E4

1E4 1.5E5
1000 1.5E5
100 1.5E4

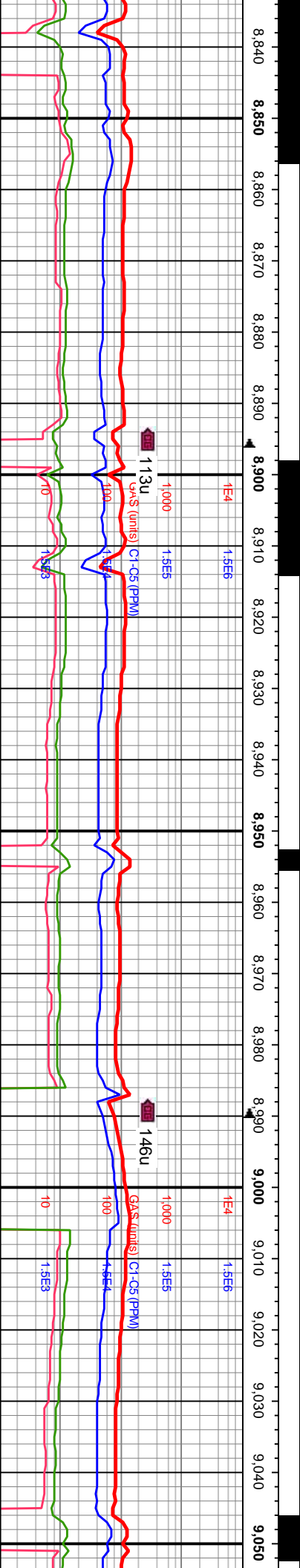
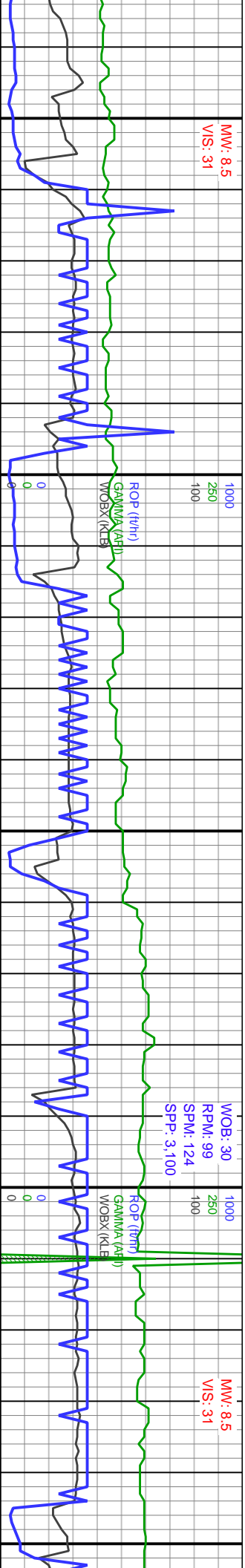
MD: 8.662'
INC: 91.96°
AZM: 179.91°
TVD: 7.682.06'
VS: 562.38'

MD: 8.757'
INC: 93.36°
AZM: 180.71°
TVD: 7.677.65'
VS: 657.27'

8600-8700 65% MRLST: predy dk gy-med
gy, sb ang-pty, frm-hrd, cal frac fl, incrg intbd
chk lamm, calc: 35% CHK: med gy, sme dk
gy, occ offwht frags, sb blk-ang, fri-frm,
cal frac fl, rthy tex, decmg intbd mrlst lamm, v
calc

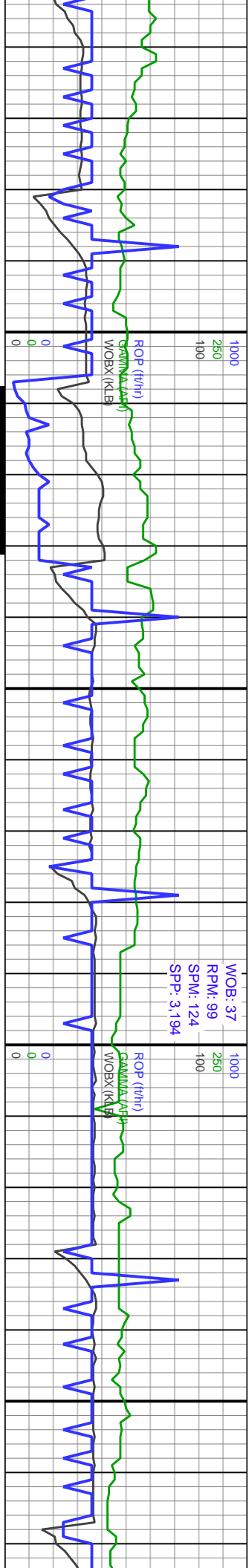
8700-8800 55% CHK: med gy, sme dk gy,
occ offwht frags, sb blk-sb-ang, fri-frm, cal
frac fl, rthy tex, decmg intbd mrlst lamm, v
calc: 45% MRLST: predy dk gy-med gy, sb
ang-pty, frm-hrd, cal frac fl, incrg intbd chk
lamm, calc





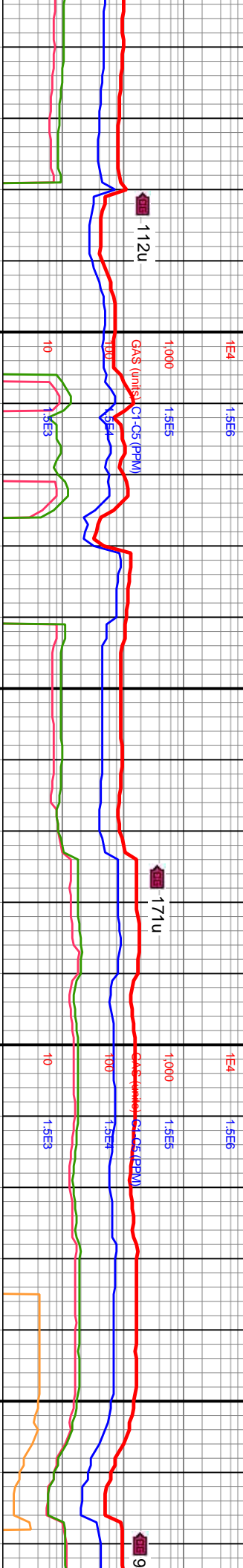
MD: 8.851'	INC: 92°	AZM: 182.02°	TVD: 7,673.26'	VS: 751.16'																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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WOB: 37
RPM: 99
SPM: 124
SP: 3.194

9,060 9,070 9,080 9,090 9,100 9,110 9,120 9,130 9,140 9,150 9,160 9,170 9,180 9,190 9,200 9,210 9,220 9,230 9,240 9,250 9,260 9,270



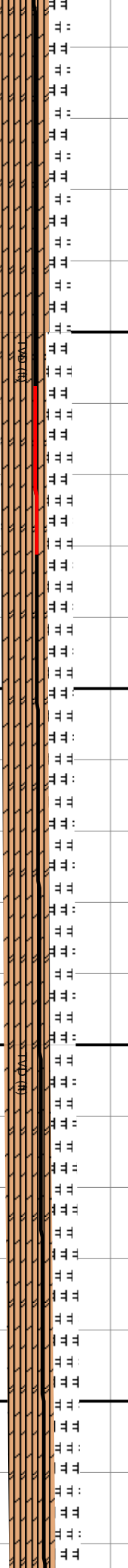
171u

112u

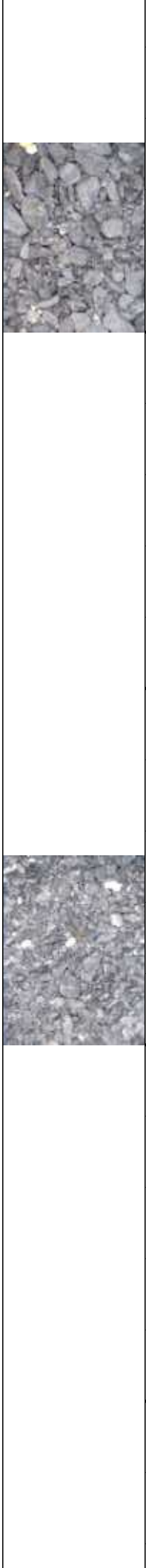
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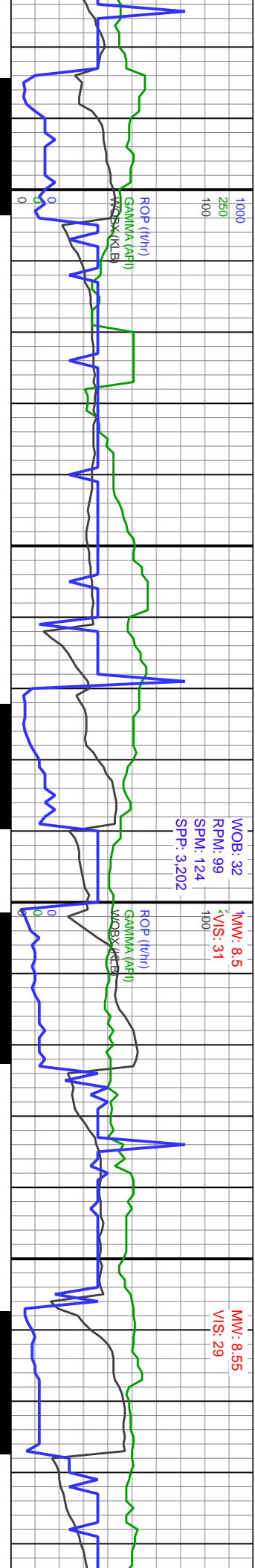
MD: 9,132
INC: 91.91°
AZM: 181.67°
TVD: 7,668.63'
VS: 1,032.06'

MD: 9,226'
INC: 92°
AZM: 179.83°
TVD: 7,665.43'
VS: 1,126'



000-9100 70% CHK: predy med gy, dk gy , occ offwht frags, sb blk-y-sb-ang, fri-frn, al frac lam, rthy tex, decrng intbd mlst mn, v calc: 30% MRLST: predy dk gy-med y, sb ang-pty, frm-hrd, scat cal, sme silky x, com chk intbds, calc	7800	9100-9200 65% CHK: predy med gy, dk gy ip, sb blk-y-sb-ang, fri-frn, cal frac lam, rthy tex, decrng intbd mlst lamm, v calc: 35% MRLST: predy dk gy-med gy, sb ang-sb pty, frm-hrd, sme silky tex, com chk intbds, calc, scat cal frags	7800	9200-9300 65% CHK ip, sb blk-y-sb-ang, fri-frn, tex, decrng intbd mlst MRLST: predy dk gy- frm-hrd, sme silky tex, scat cal frags
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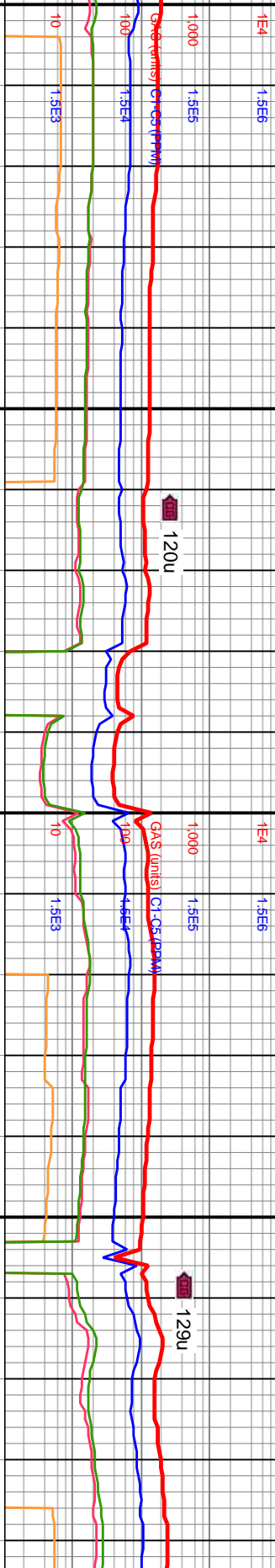


WOB: 32
RPM: 99
SPM: 124
SPP: 3.202

MW: 8.5
VIS: 31

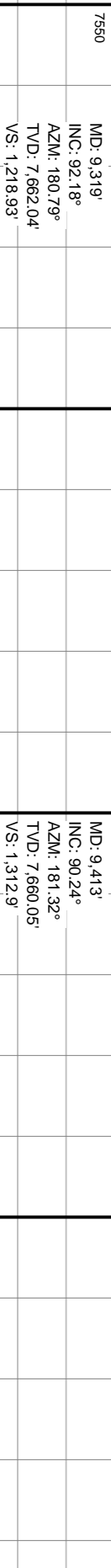
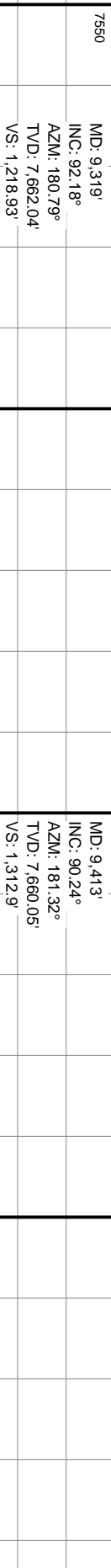
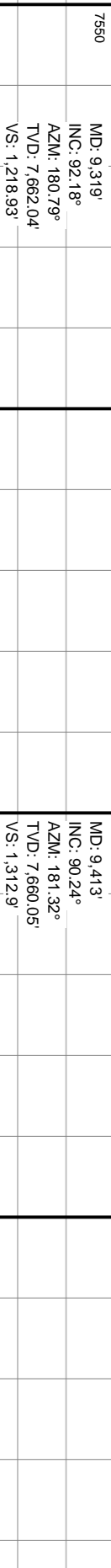
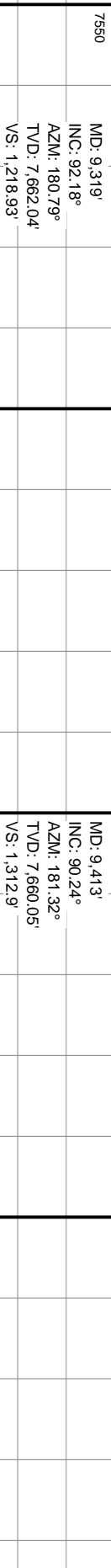
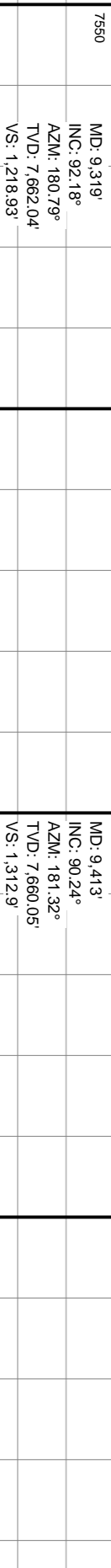
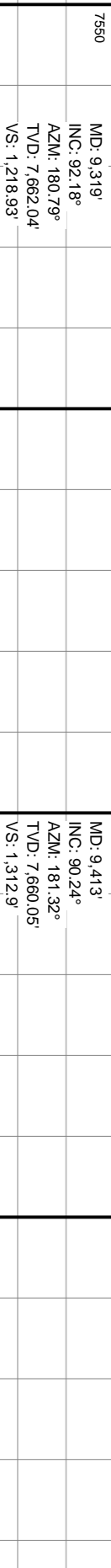
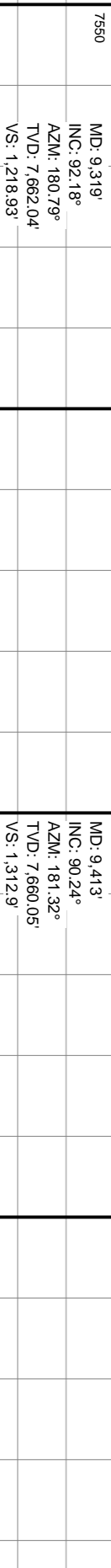
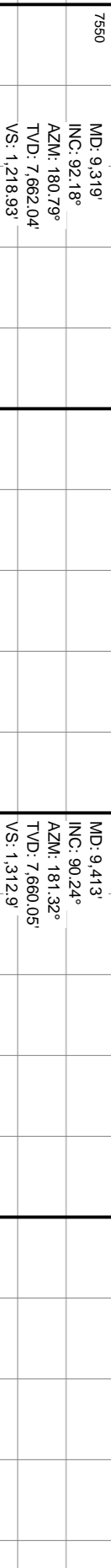
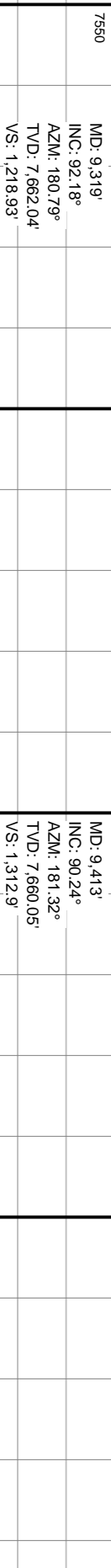
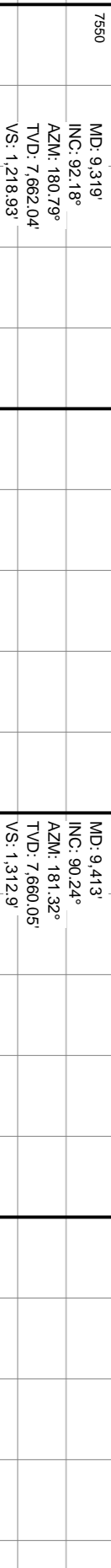
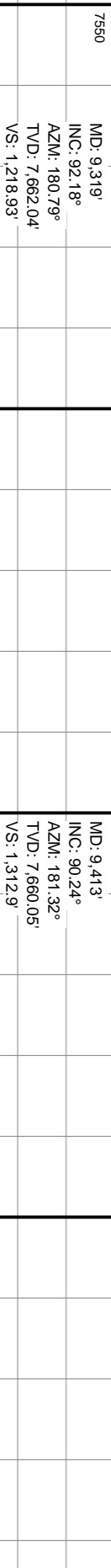
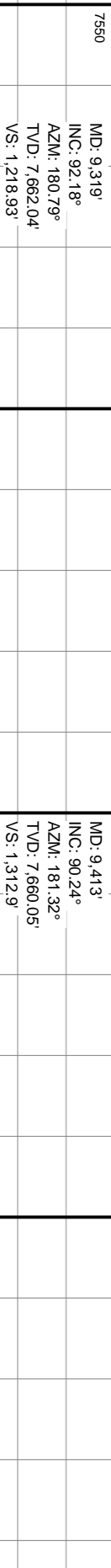
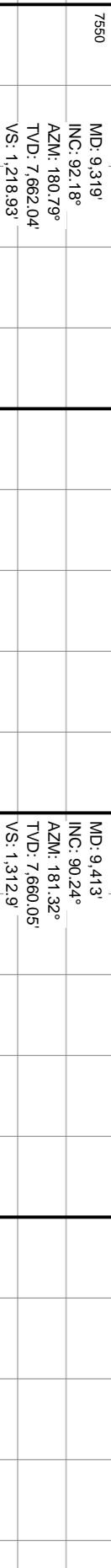
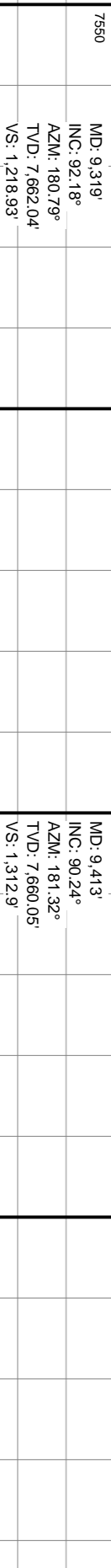
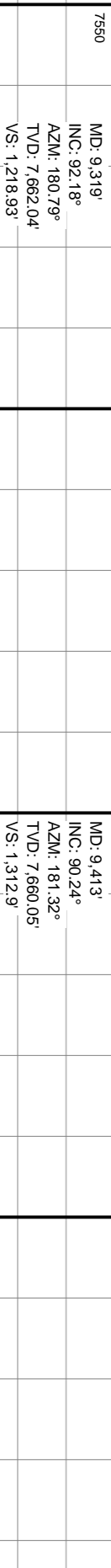
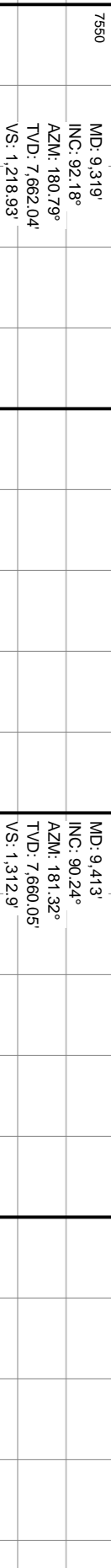
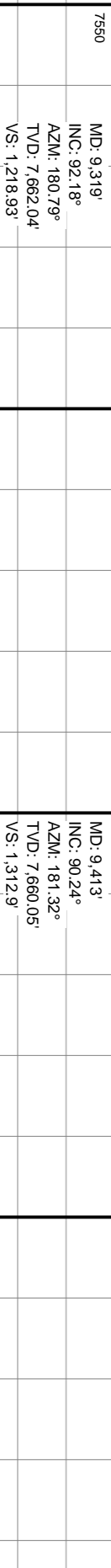
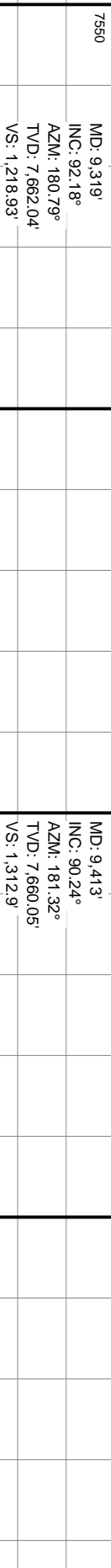
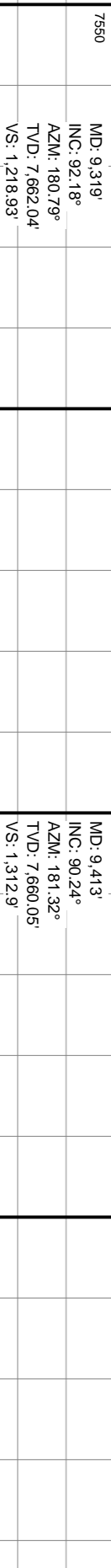
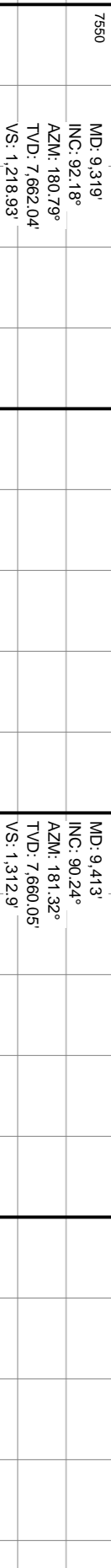
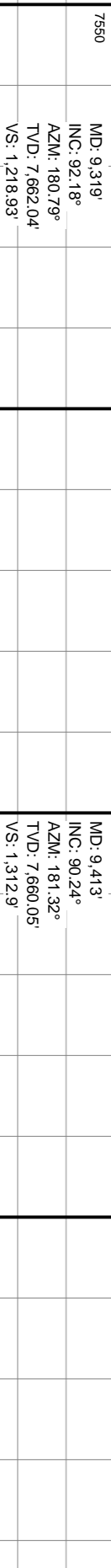
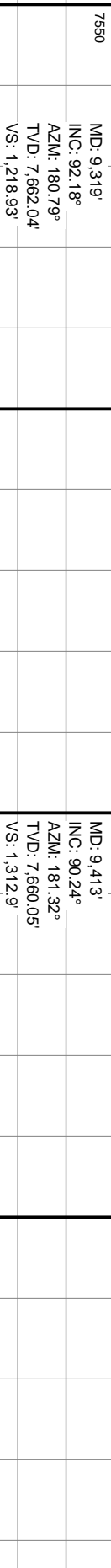
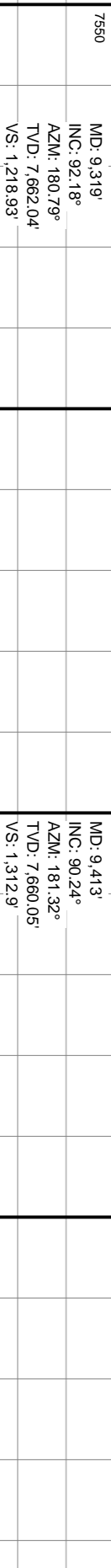
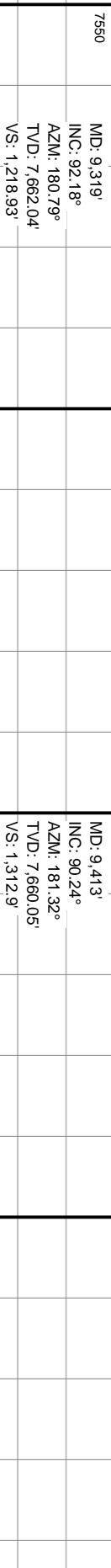
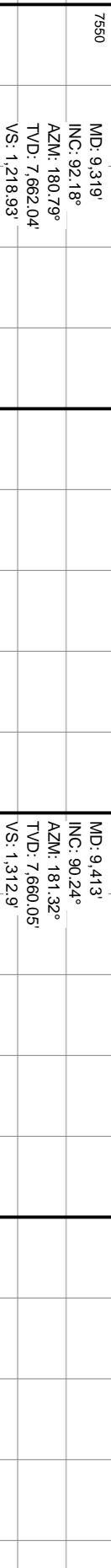
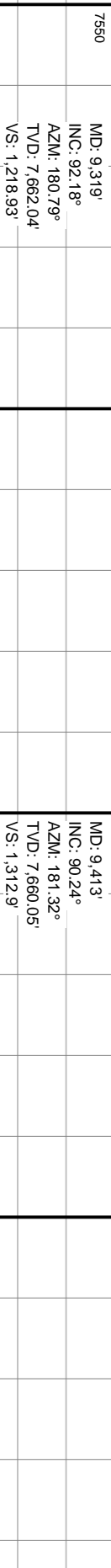
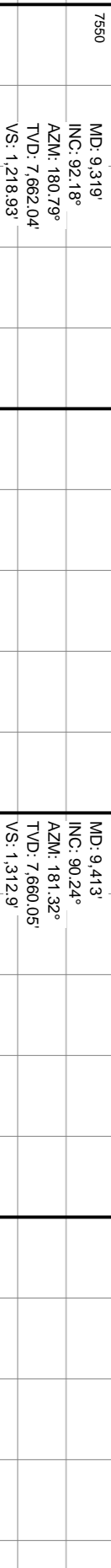
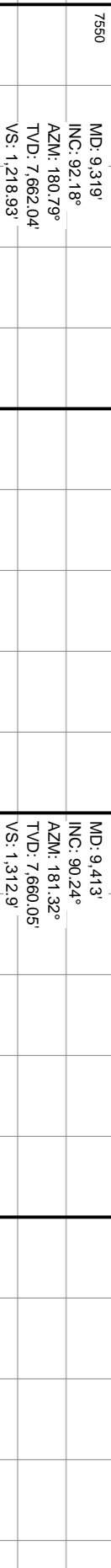
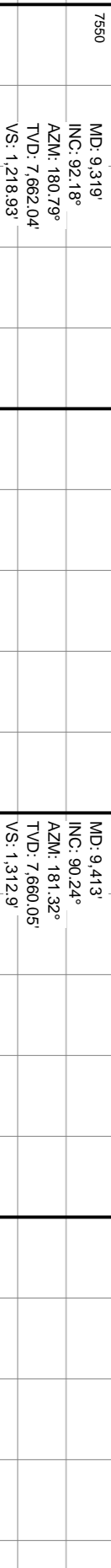
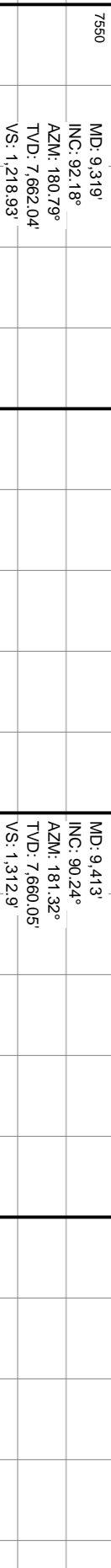
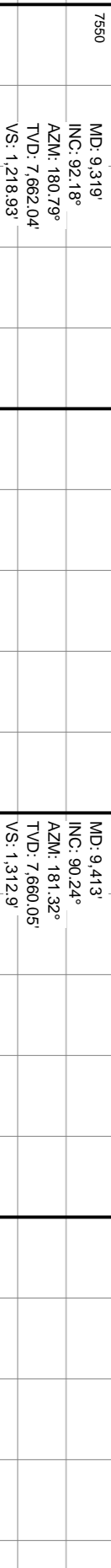
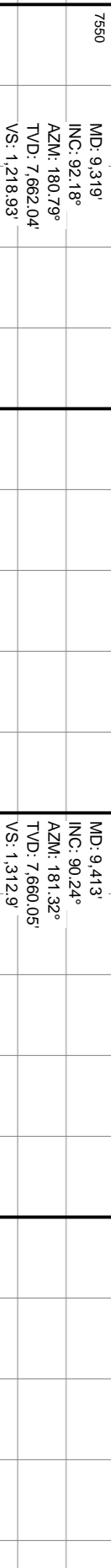
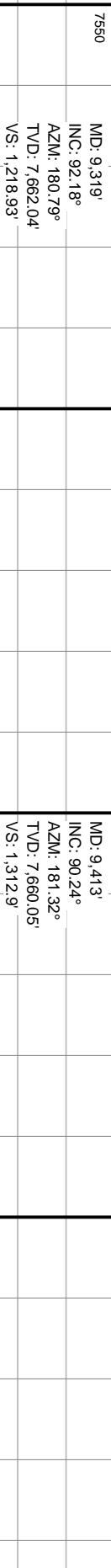
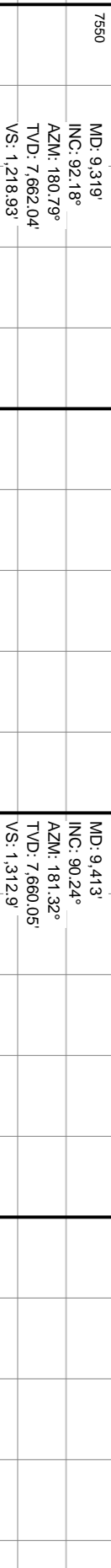
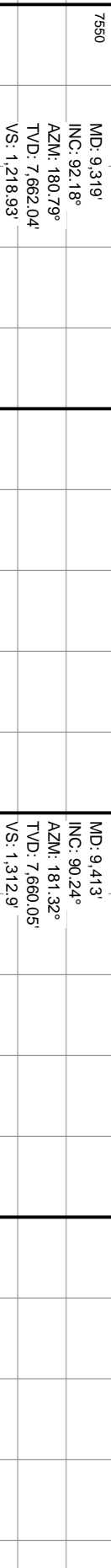
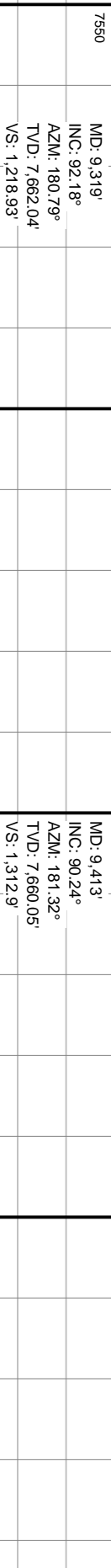
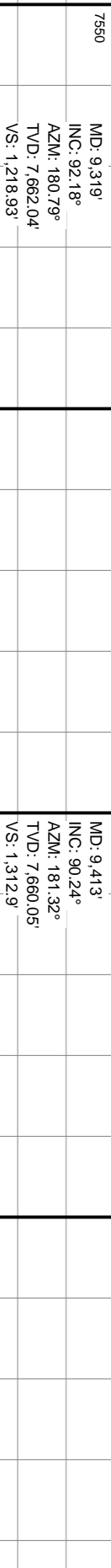
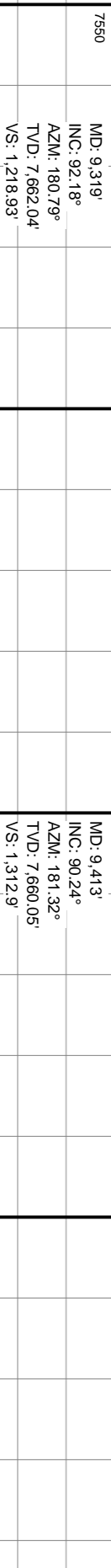
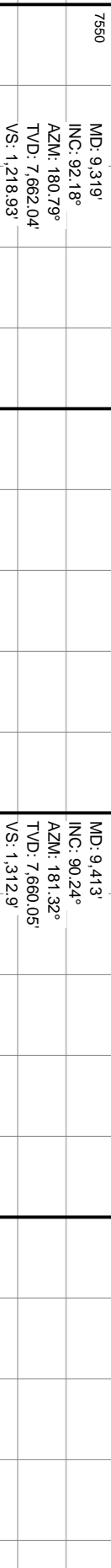
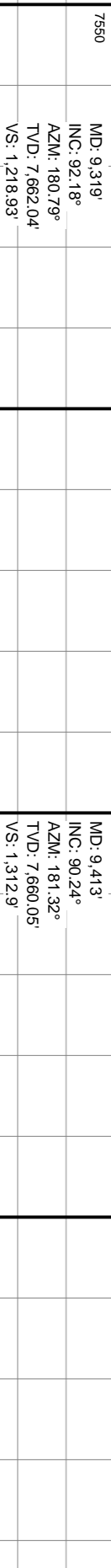
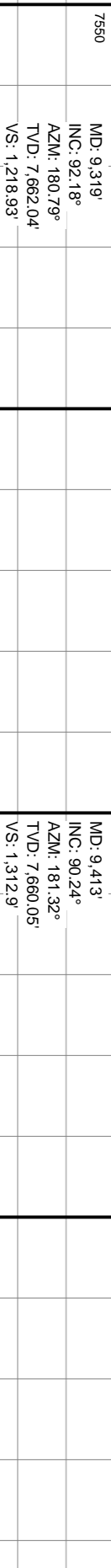
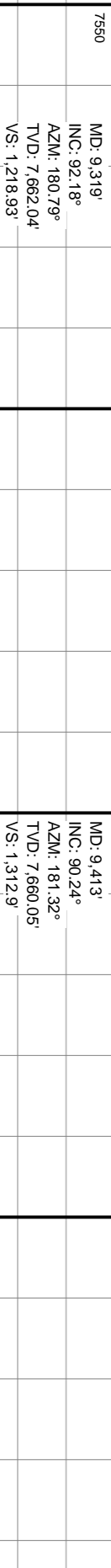
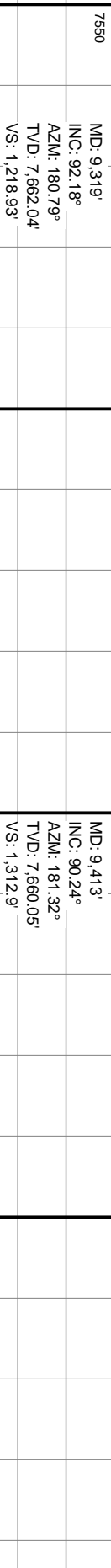
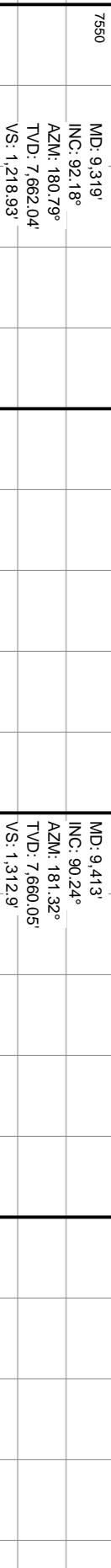
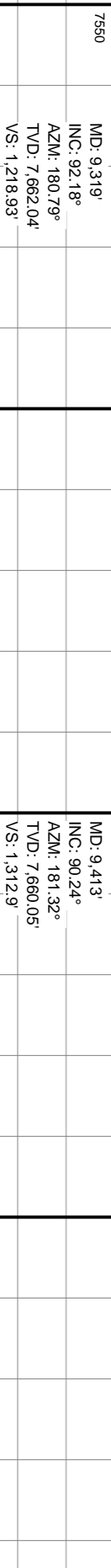
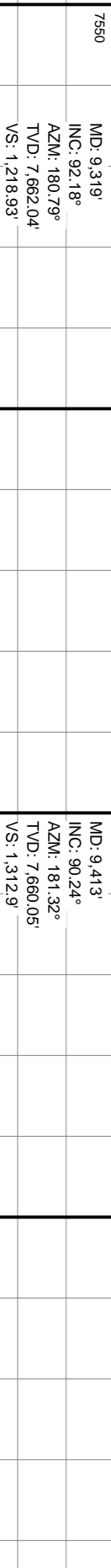
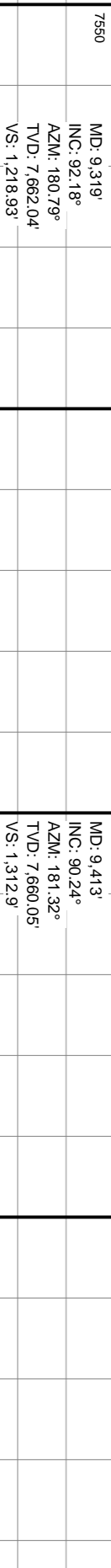
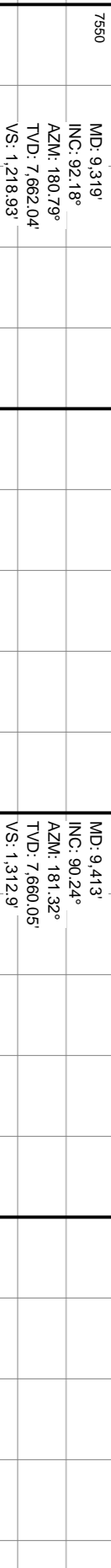
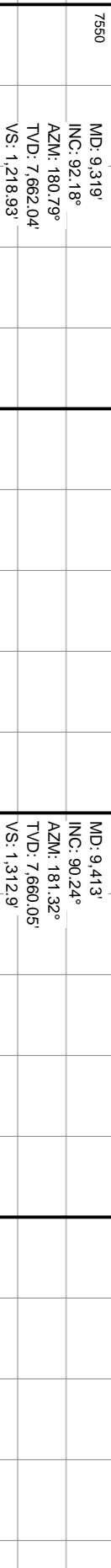
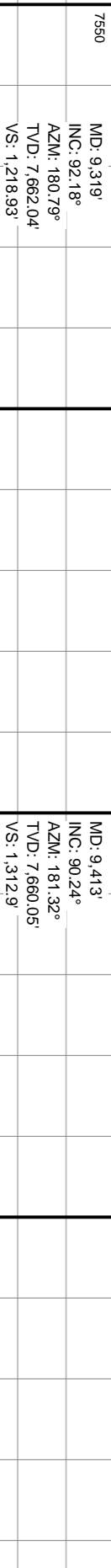
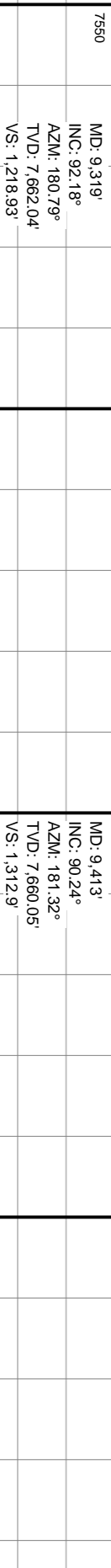
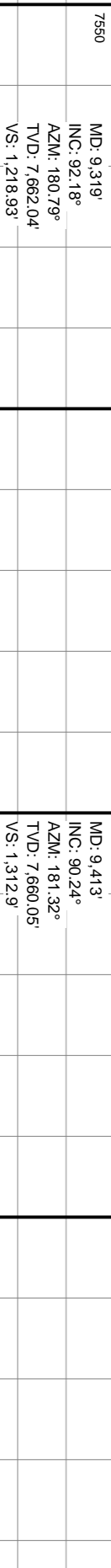
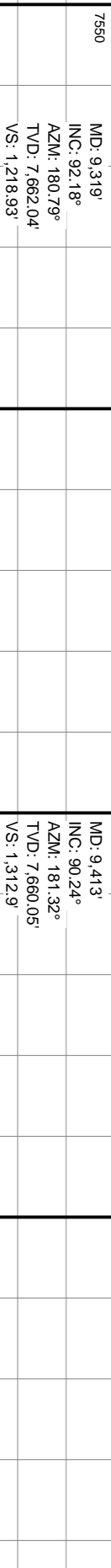
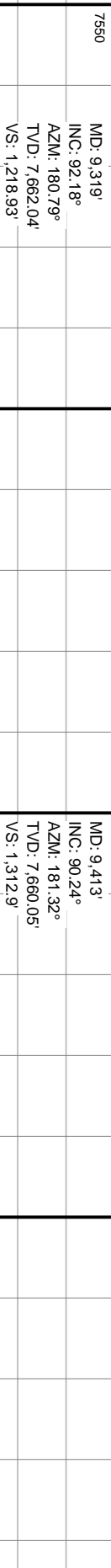
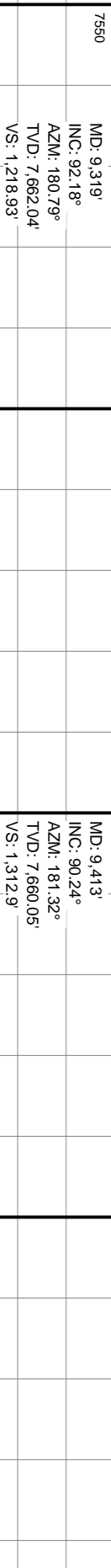
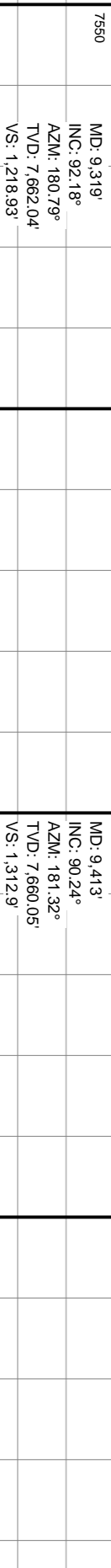
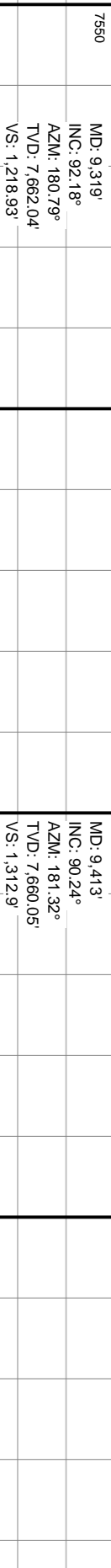
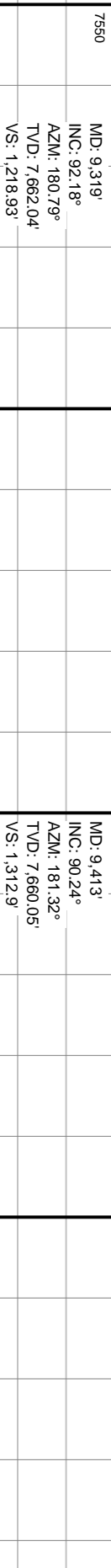
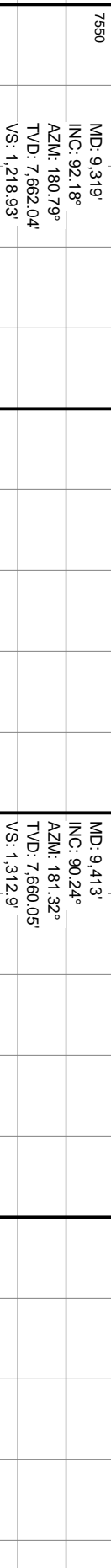
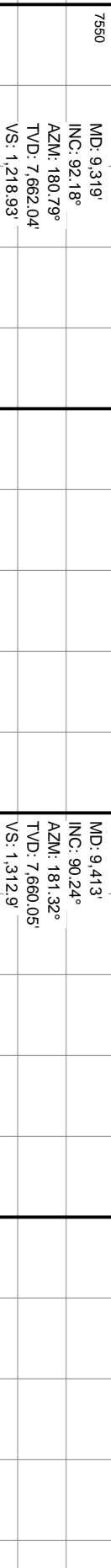
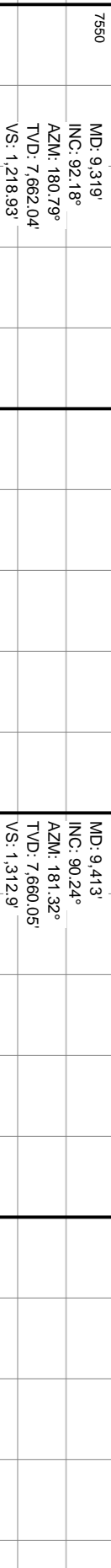
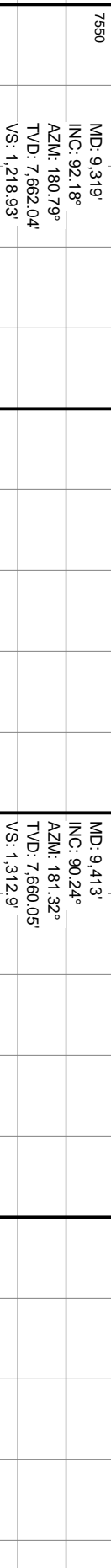
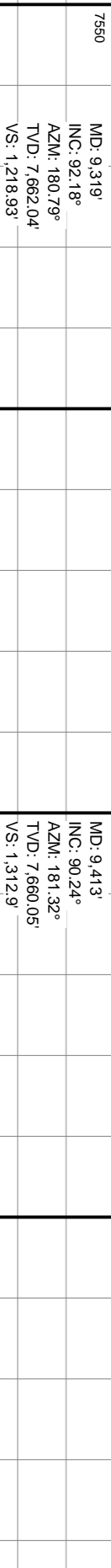
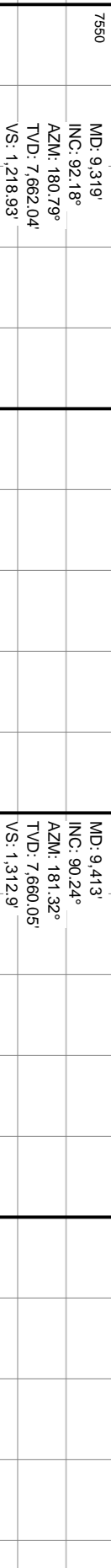
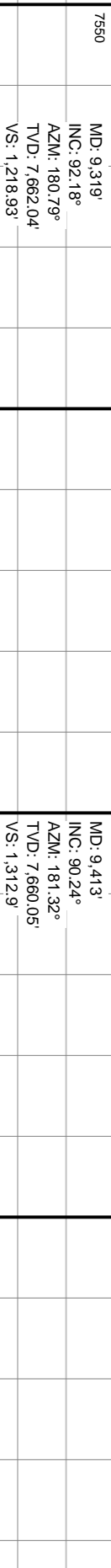
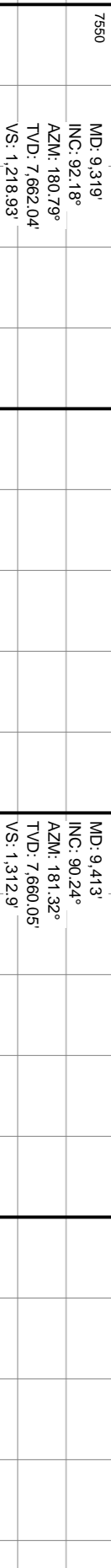
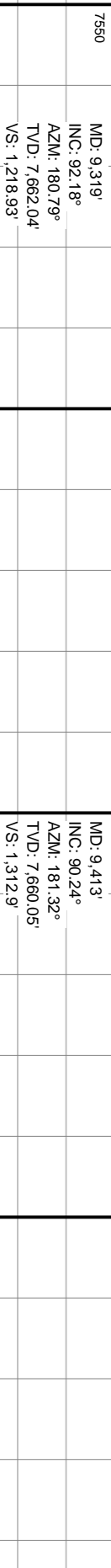
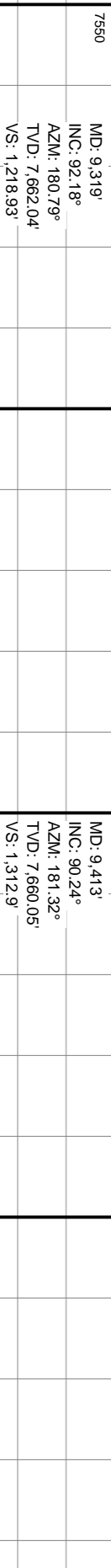
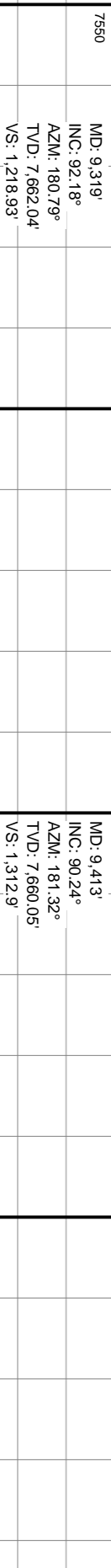
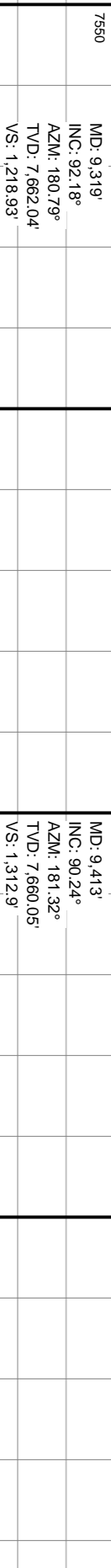
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VIS: 29

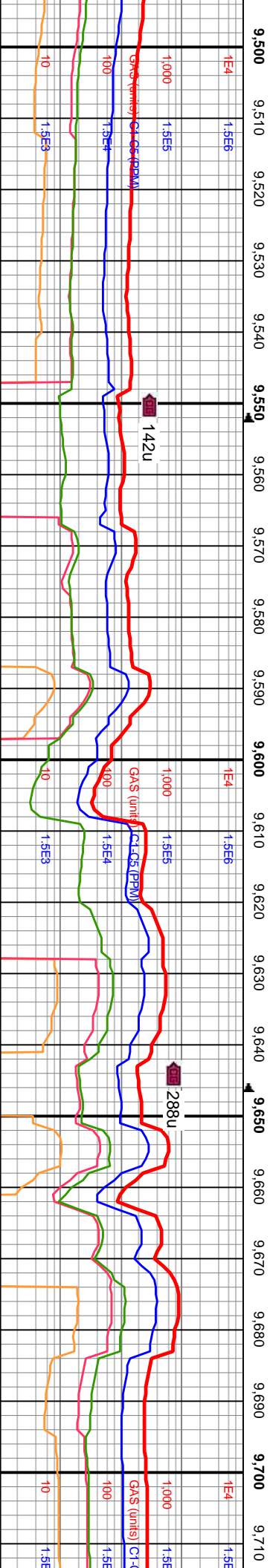
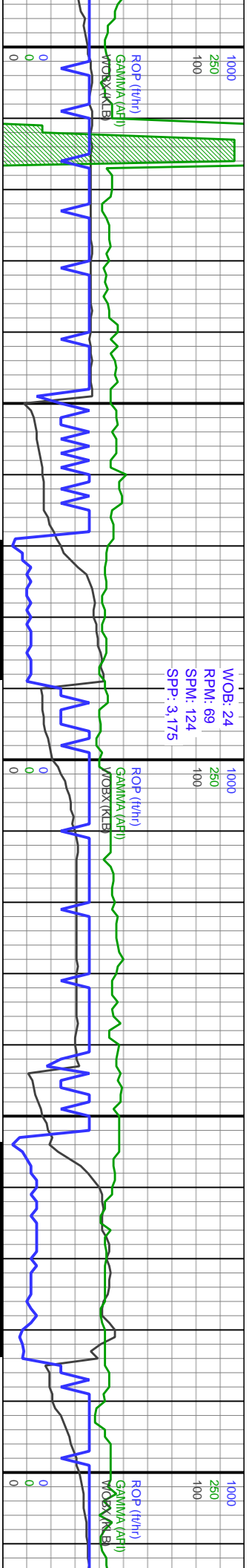
9,280 9,290 9,300 9,310 9,320 9,330 9,340 9,350 9,360 9,370 9,380 9,390 9,400 9,410 9,420 9,430 9,440 9,450 9,460 9,470 9,480 9,490

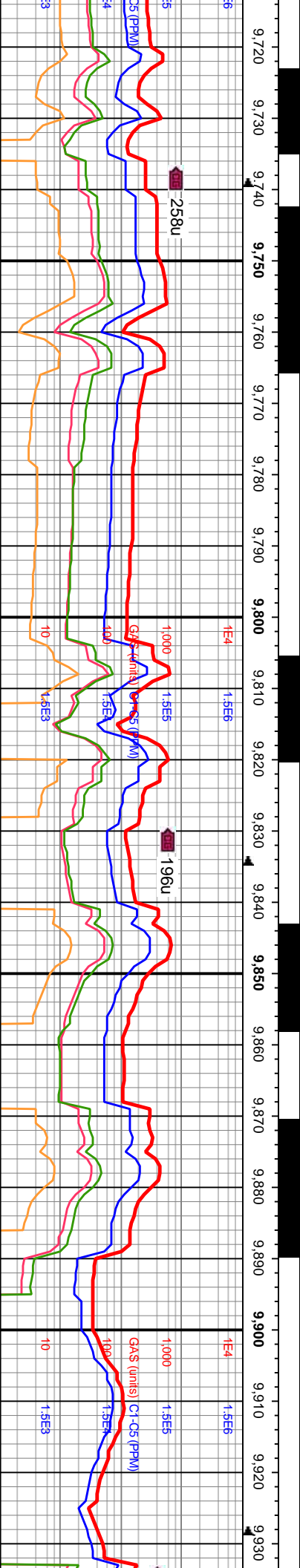
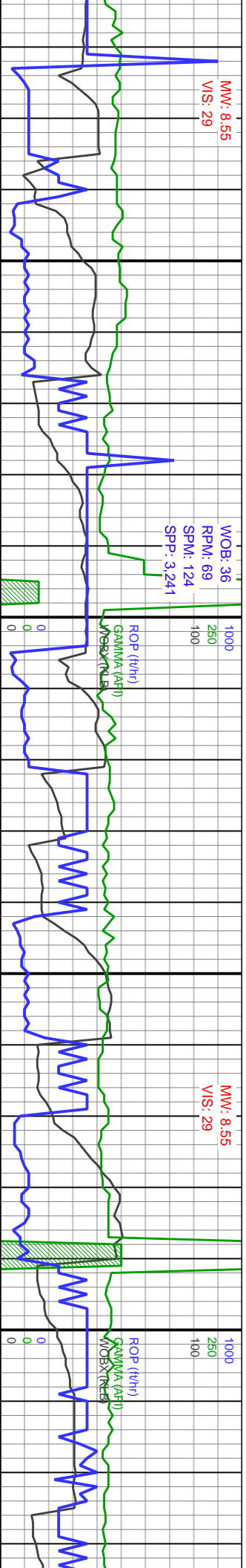


120u

129u



[illegible]



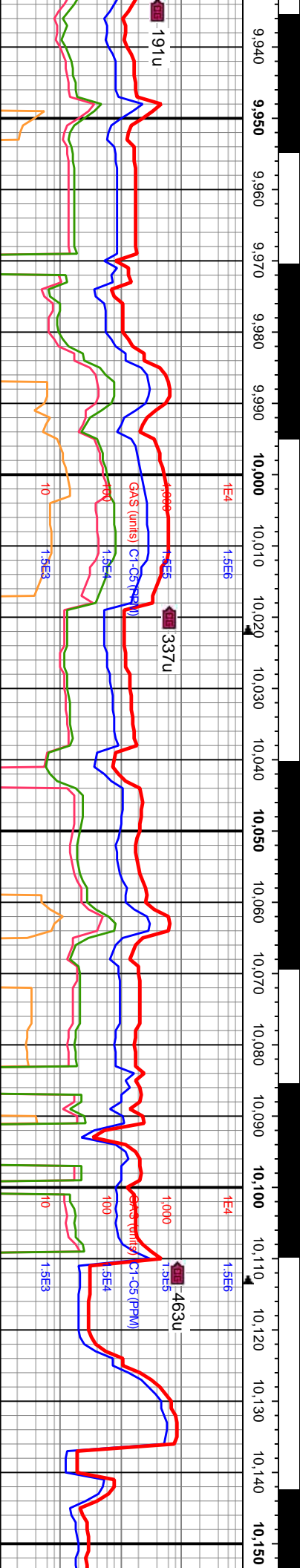
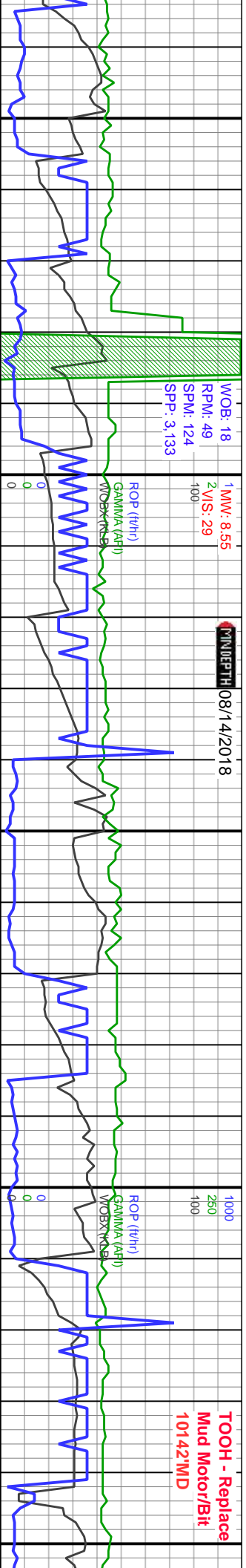
MD: 9.789'
INC: 90.37°
AZM: 181.76°
TVD: 7,658.86'
VS: 1,688.87'

MD: 9.883'
INC: 90.02°
AZM: 181.23°
TVD: 7,658.54'
VS: 1,782.86'

9700-9800 80% CHK: predy med gy, com
offwht intbds, blkly-sb-ang, smewh fri,
rthy/chky tex, com mist intbds, calc; 20%
MRLST: predy dk gy, med gy ip, sb ang-sb
ply, frm-hrd, silky tex, chk intbds, com scat
cal frags, calc; tr glauc

9800-9900 75% CHK: predy med gy,
blkly-sb-ang, smewh fri, rthy/chky tex, com
mist intbds, calc, tr intbd pp mic pyr; 25%
MRLST: predy dk gy, med gy ip, sb ang-sb
ply, frm-hrd, silky tex, chk intbds, com scat
cal frags, calc; tr glauc





MD: 9.977'
INC: 90.37°
AZM: 179.83°
TVD: 7.658.22'
VS: 1.876.85

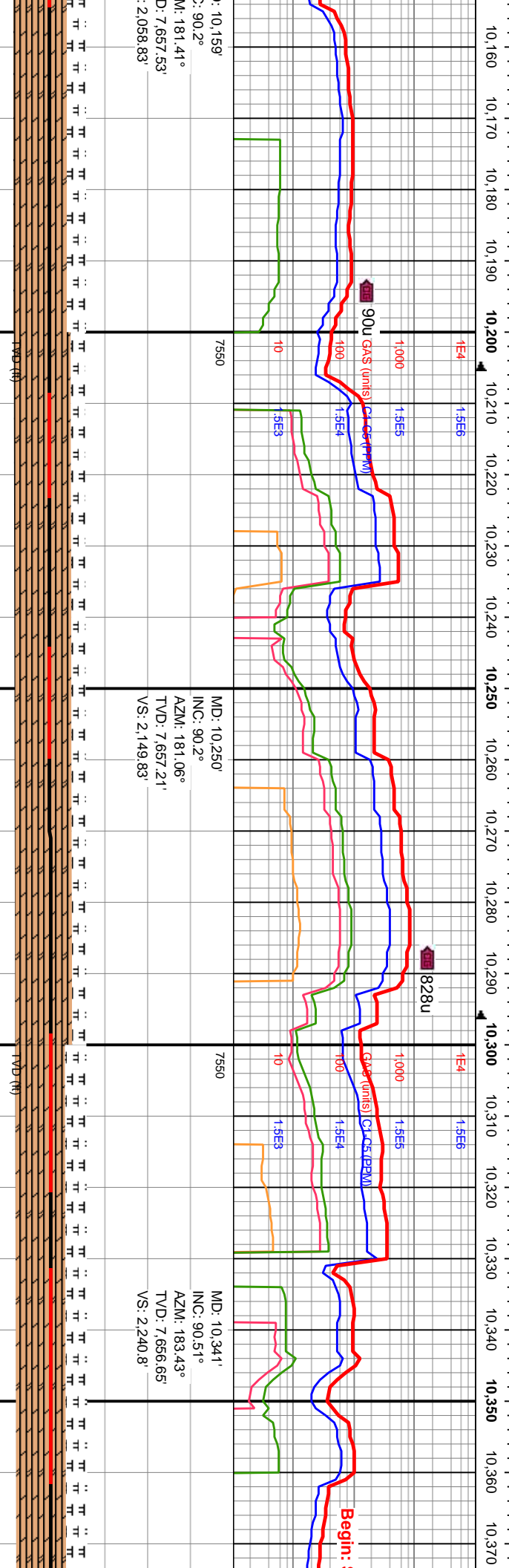
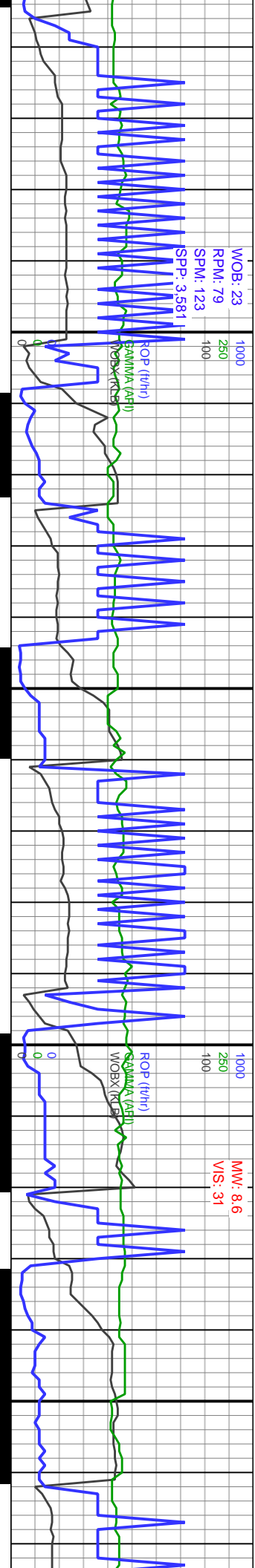
MD: 10.068'
INC: 90.15°
AZM: 179.91°
TVD: 7.657.81'
VS: 1.967.84

Bit #: 4
Type: PDC
Size: 6 1/8
Depth In: 10.142'
Jets: 5x16
S/N: A211337

9900-10000 80% CHK: predy med gy, about
offwht intbds, blkly-sb-ang, smewh fri,
rthy/chky tex, com mlst intbds, calc, tr intbd
pp mic pyr. 20% MRLST: predy dk gy, med
gy ip, sb ang-sb ply, frm-hrd, silky tex, abrsv
tex ip, chk intbds, abnt scat cal frags, calc

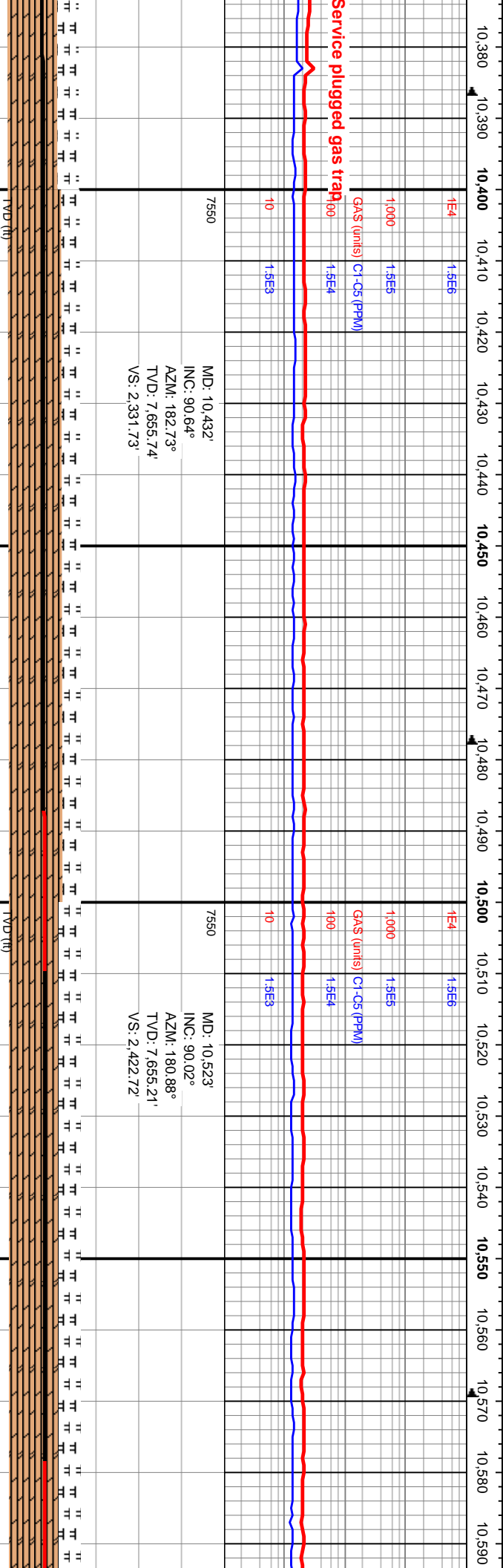
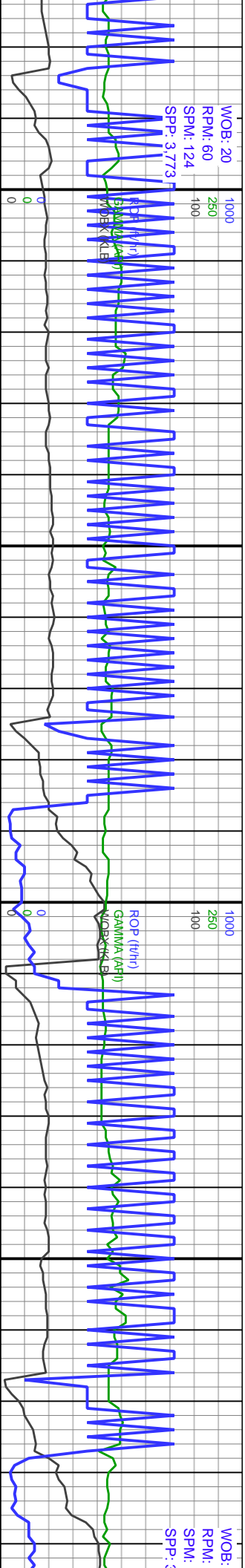
10000-10100 65% CHK: predy med gy, com
offwht intbds, blkly-sb-ang, smewh fri, cal
frac fill, rthy/chky tex, com mlst intbds, calc;
35% MRLST: predy dk gy, med gy ip, sb
ang-sb ply, frm-hrd, silky tex, chk intbds,
calc, com scat cal frags



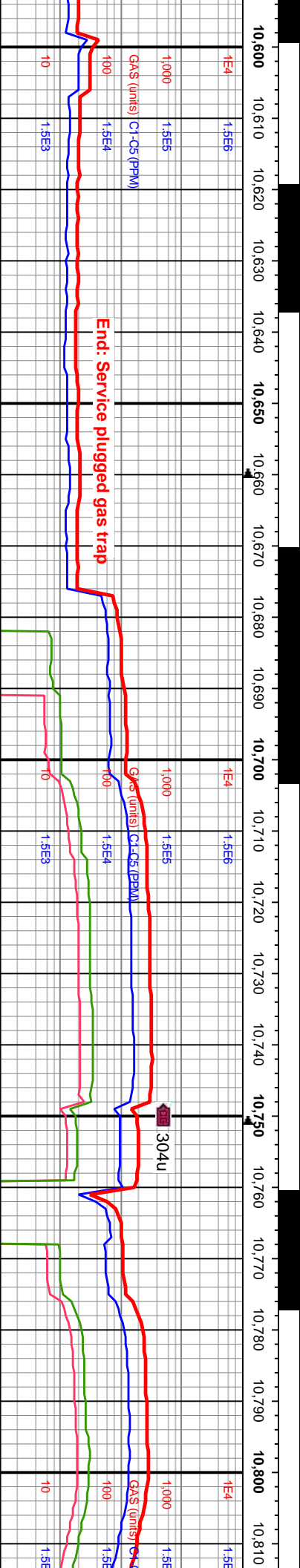
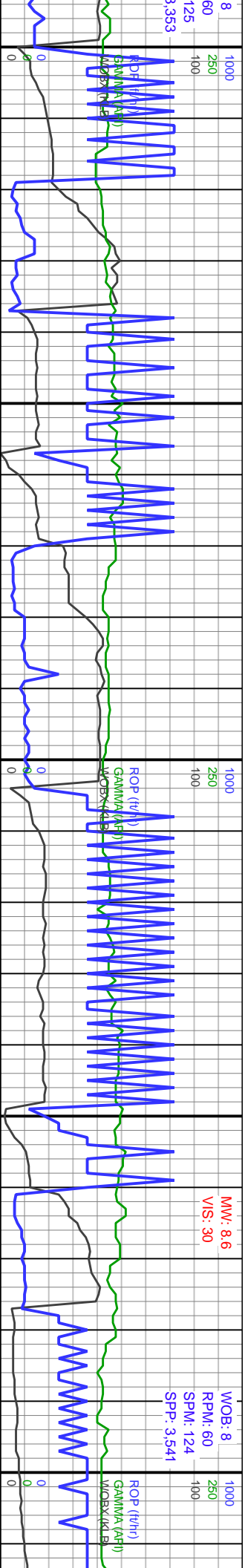


100-10200 75% CHK. lt-med gy, com mwt intbdd, blk-y-sb ang, smewh fri, cal ac fill, rthy/chky tex, com mlst intbdd, calc; % MRLST: predy dk gy, med gy ip, sb g-sb ply, frm-hrd, predy silky tex, f grnd, m chk intbds, calc, abnt scat cal frags	7550	MD: 10,159' INC: 90.2° AZM: 181.41° TVD: 7,657.53' VS: 2,058.83'	10200-10300 80% CHK. lt-med gy, com offwht intbdd, blk-y-sb ang, smewh fri, cal frac fill, rthy/chky tex, com mlst intbdd, calc; 20% MRLST: predy dk gy, med gy ip, sb ang-sb ply, frm-hrd, predy silky tex, f grnd, com chk intbds, abnt scat cal frags, calc	7550	MD: 10,250' INC: 90.2° AZM: 181.06° TVD: 7,657.21' VS: 2,149.83'	10300-10400 70% CHK. lt-med gy, com sme lt gy, com offwht fill, rthy/chky tex, com MRLST: dk gy-med g frm-hrd, predy silky tex, abnt scat cal frags, calc	7800
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HK: predy med gy, inbds, blkly, fri, cal frac mrlst lam, calc: 30% gy ip, sb ang-sb ply, x, f grnd, com chk lam, alc	7800	10400-10500 75% CHK: predy med gy, sme lt gy, com offwht inbds, blkly-sb ang, fri, cal frac fill, rthy/chky tex, com mrlst lam, calc: 25% MRLST: dk gy-med gy ip, sb ang-sb ply, frm-hrd, predy silky tex, f grnd, com chk lam, abnt scat cal frags, calc	7800	10500-10600 70% CHK: med gy-lt gy, s offwht inbds, blkly-sb ang, fri, rthy tex, c frac fill, sme mrlst lam, calc: 30% MRLS dk gy-med gy ip, sb ang-sb ply, frm-hrd predy silky tex, f grnd, com chk lam, abn scat cal frags, calc, tr inbtd pp mic pyr	
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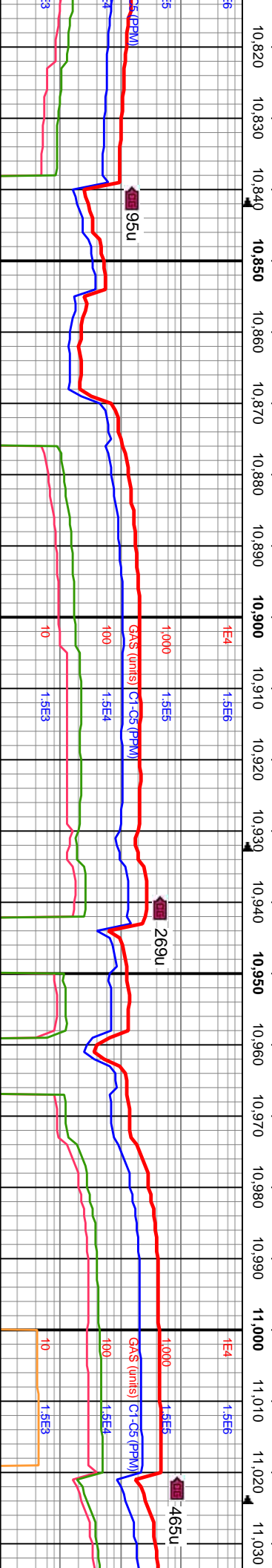
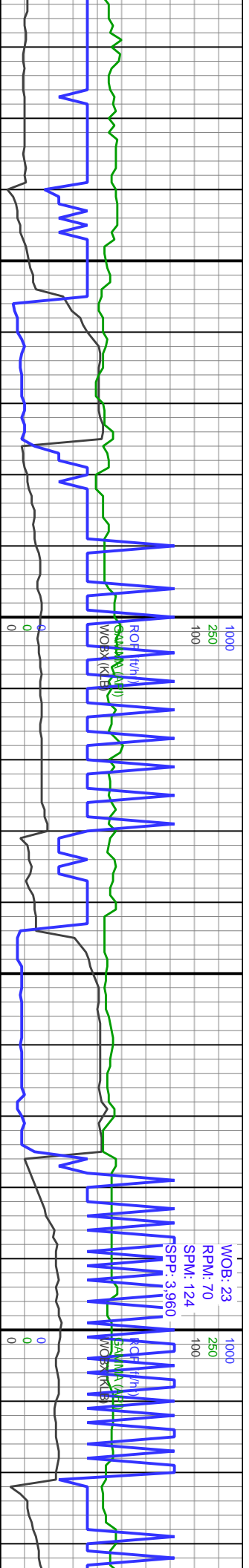
7550 MD: 10,614'
INC: 90.33°
AZM: 181.67°
TVD: 7,654.93'
VS: 2,513.71'

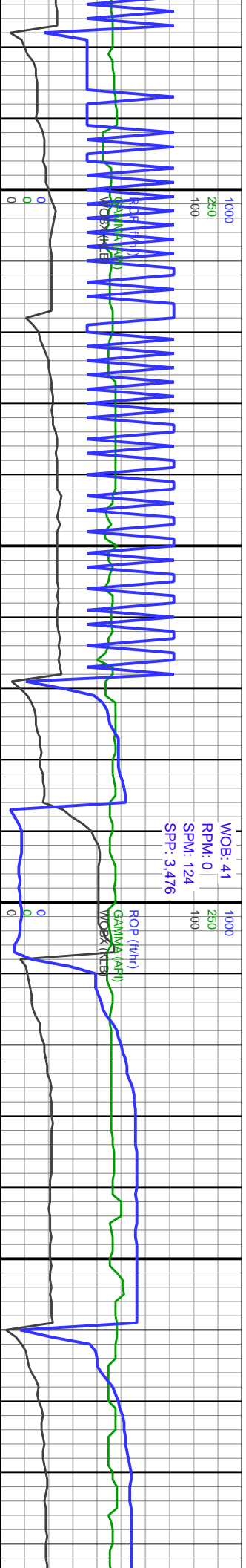
MD: 10,705'
INC: 90.15°
AZM: 183.25°
TVD: 7,654.55'
VS: 2,604.68'

7550 MD: 10,796'
INC: 90.11°
AZM: 182.9°
TVD: 7,654.35'
VS: 2,695.62'

TVD (ft)	TVD (ft)	TVD (ft)
10600-10700 80% CHK: med gy-lt gy, com offwnt inbds, blyk-sb ang, fri, rthy tex, cal frac fill, com mlst lam, calc: 20% MRLST: dk gy-med gy ip, sb ang-sb plty, frm-hrd, predy silky tex, f grnd, com chk lam, about scat cal frags, calc	10700-10800 85% CHK: med gy-lt gy, com crm lam, blyk-sb ang, fri, rthy tex, cal frac fill, com mlst lam, calc: 15% MRLST: dk gy-med gy ip, sb ang-sb plty, frm-hrd, predy silky tex, f grnd, com chk lam, about scat cal frags, calc	

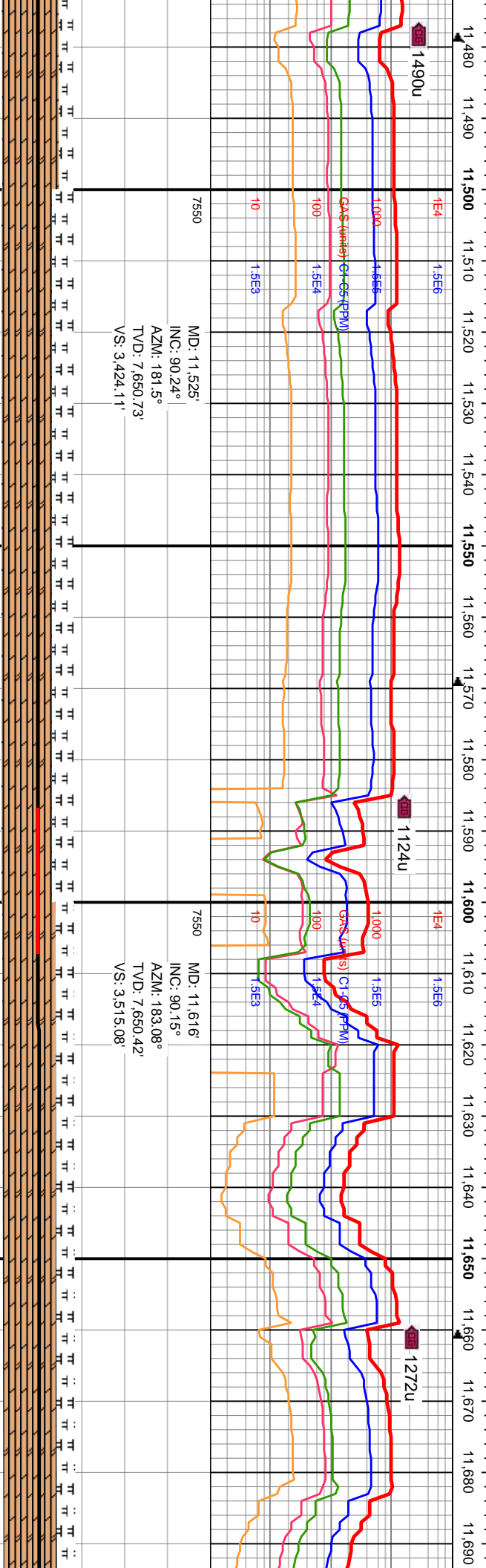


[illegible]



WOB: 41
RPM: 0
SPM: 124
SP: 3.476

ROP (ft/hr)
GAMMA (API)
MOIST (%)



MD: 11,525'
INC: 90.24°
AZM: 181.5°
TVD: 7,650.73'
VS: 3,424.11'

MD: 11,616'
INC: 90.15°
AZM: 183.08°
TVD: 7,650.42'
VS: 3,515.08'

TVD (ft)

TVD (ft)

CHK: med gy-lt gy, sb ang, fri, rthy tex, com mic pyr, calc: 20% med gy, gysbhn, sb sm silky tex, vf f grnd, fill, cal frags, calc

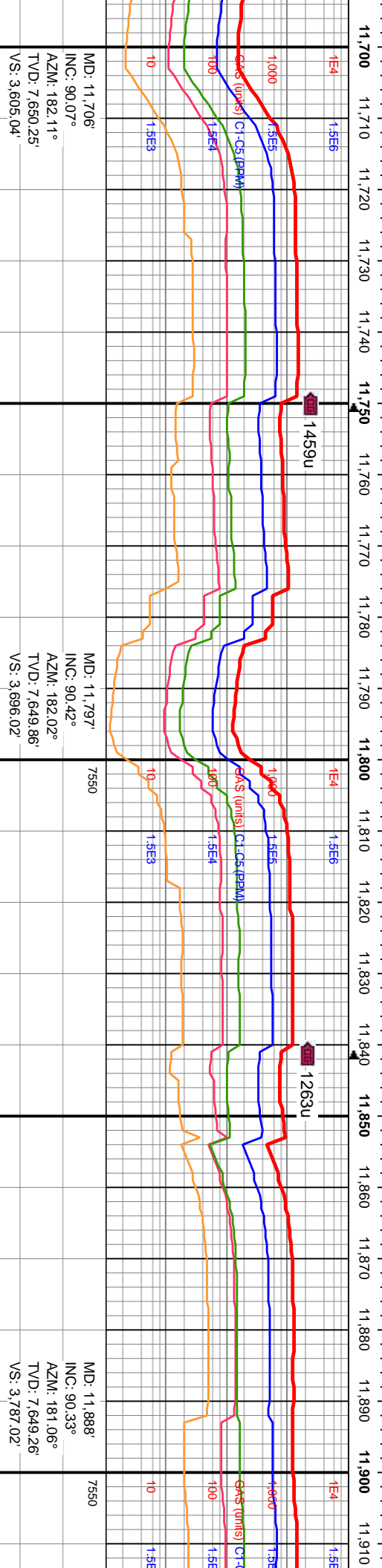
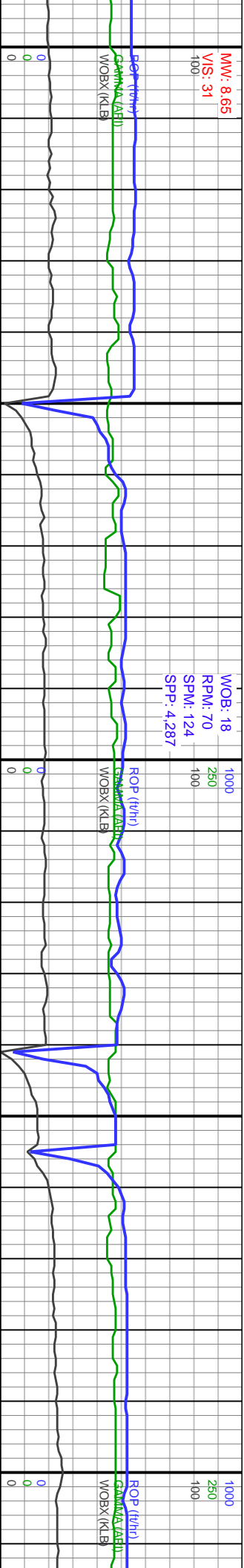
11500-11600 70% CHK: med gy-lt gy, com crm-offwht lam, blk-y-sb ang, fri, chky/rthy tex, com mlst lam, tr intbdd pp mic pyr, calc: 30% MRLST: predy dk gy-med gy, gysbhn, sb ang-sb plty, frm-hrd, sm silky tex, vf f grnd, com chk lam, cal frac fill, calc

11600-11700 75% CHK: med gy-lt gy, c crm-offwht lam, blk-y-sb ang, fri, chky/rth com mlst lam, tr intbdd pp mic pyr, calc 25% MRLST: predy dk gy-med gy, gysbhn, sb ang-sb plty, frm-hrd, sm silky tex, vf f com chk lam, cal frac fill, calc, tr glauc

7800

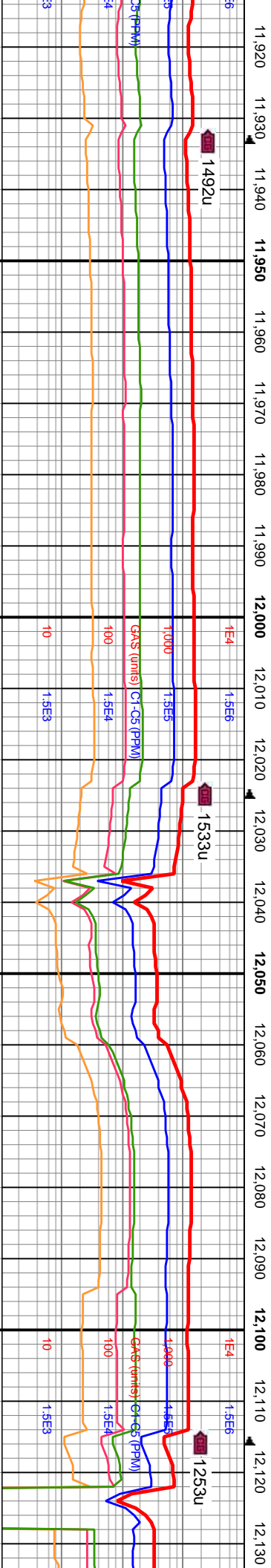
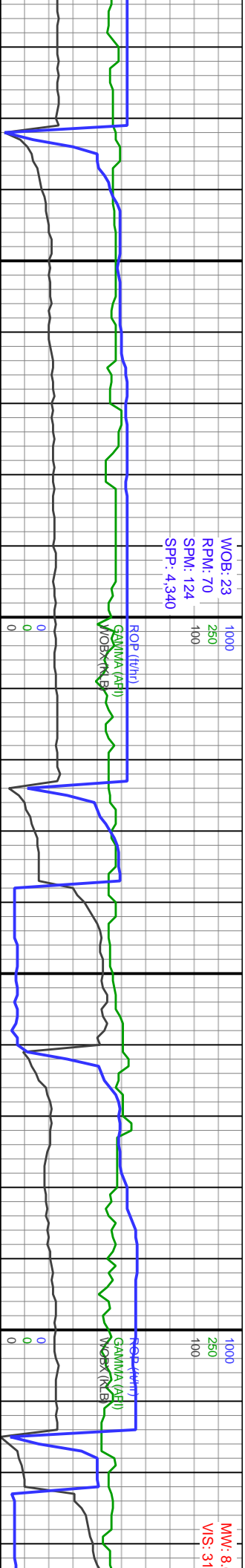
7800

7800



TVD (ft)	TVD (ft)	TVD (ft)	TVD (ft)
11700-11800 85% CHK: med gy-lt gy, crm-offwht lam, blk-y-sb ang, fri, chky/rthy tex, com mist lam, calc: 15% MRLST: predy dk gy-med gy, gysbhn, sb ang-sb ply, frm-hrd, silky tex, vf f gmd, com chk lam, cal frac fill, calc	11800-11900 70% CHK: med gy-lt gy, com crm-offwht intbdd, sme free offwht chk, blk-y-sb ang, fri, chky/rthy tex, com mist lam, calc: 30% MRLST: predy dk gy-med gy, gysbhn, sb ang-sb ply, frm-hrd, silky tex, vf f gmd, com chk lam, cal frac fill, calc		
7800	7800	7800	7800



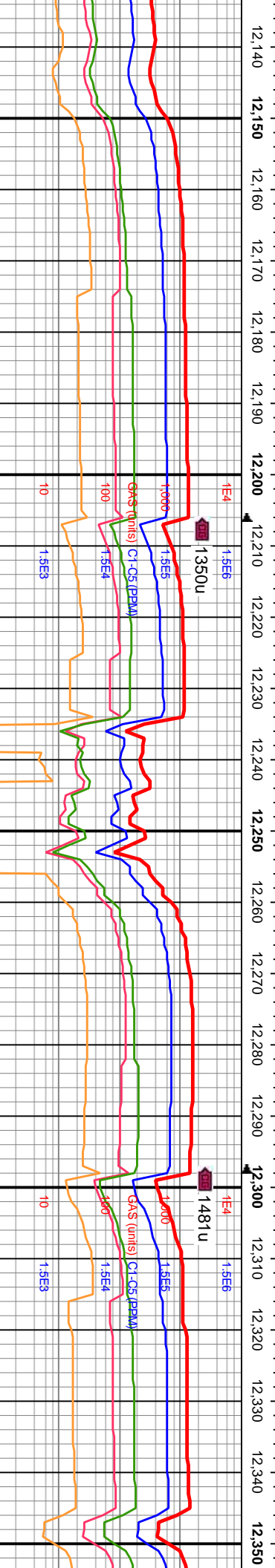
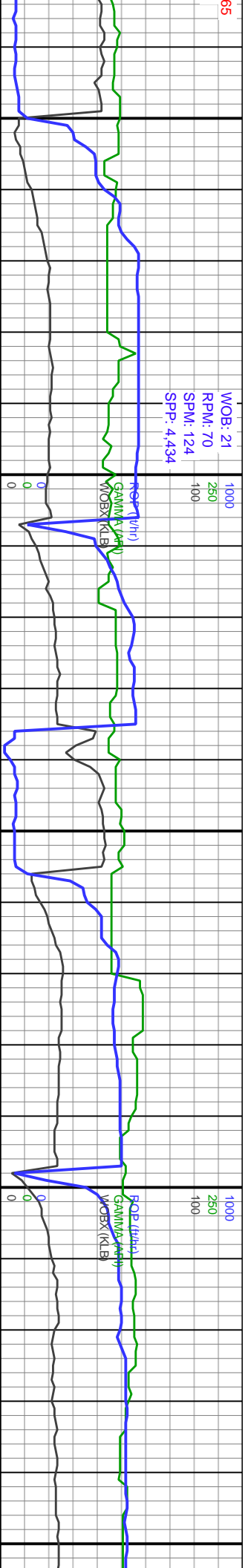


MD: 11,979'
INC: 90.24°
AZM: 180.09°
TVD: 7,648.81'
VS: 3,878.01'

MD: 12,070'
INC: 89.67°
AZM: 179.83°
TVD: 7,648.88'
VS: 3,969'

11900-12000 70% CHK: med gy-lt gy, sme free offwht chk, blk-y-sb ang, fri, chky/rthy tex, com mlst lam, calc: 30% MRLST: predy dk gy-med gy, gyshbn, sb ang-sb ply, frm-hrd, silky tex, v f gmd, cal frac fill, chk lam, calc	TVD (ft)	7800
12000-12100 65% CHK: predy med gy-lt gy, blk-y-sb ang, fri, chky/rthy tex, com mlst lam, sme free offwht chk, calc: 35% MRLST: dk gy-med gy, gyshbn, sb ang-sb ply, frm-hrd, silky tex, v f gmd, cal frac fill, chk lam, calc	TVD (ft)	7800





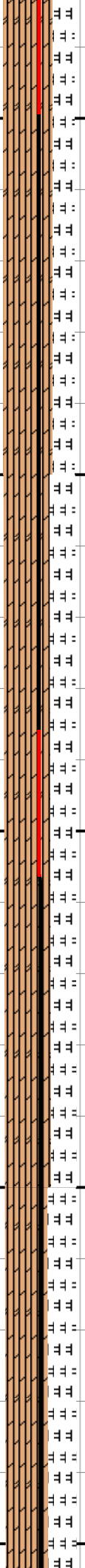
MD: 12,162
INC: 89.8°
AZM: 181.41°
TVD: 7,649.31'
VS: 4,060.99'

7550

MD: 12,253
INC: 90.86°
AZM: 181.5°
TVD: 7,648.78'
VS: 4,151.99'

7550

MD: 12,344
INC: 90.2°
AZM: 180.53°
TVD: 7,647.94'
VS: 4,242.98'



TVD (ft)

TVD (ft)

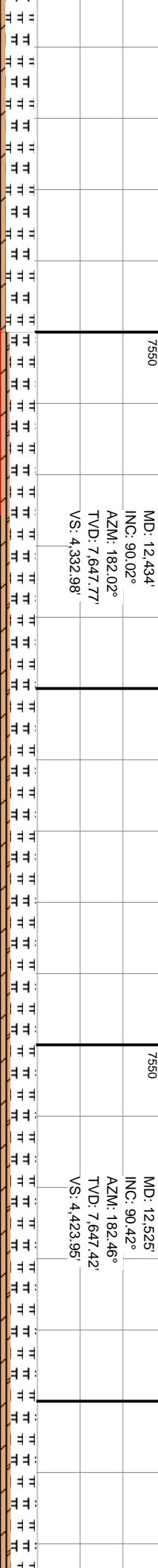
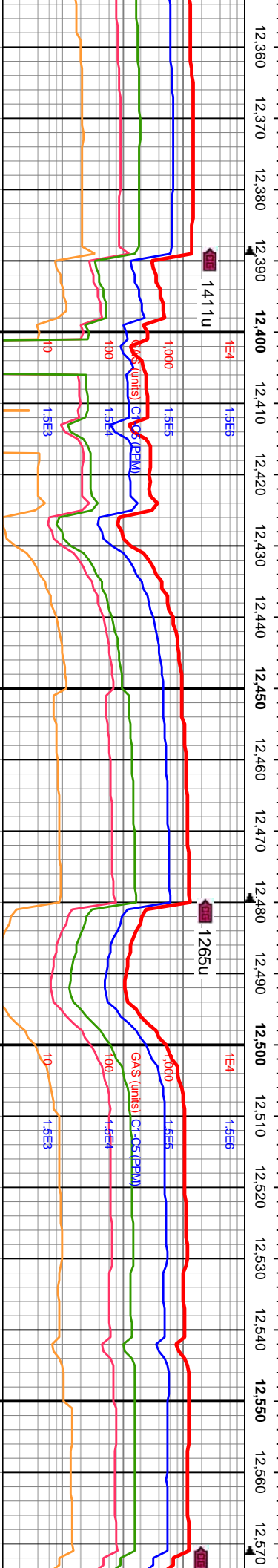
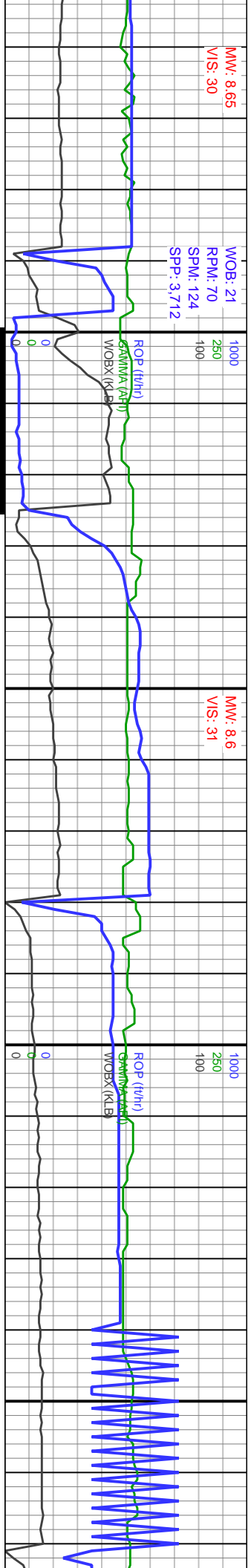
12100-12200 70% CHK: med gy-lt gy, com offwht-crm lam, blk-y-sb ang, fri, rthy tex, cal frac fill, com mlst intbds, calc: 30% MRLST: predy dk gy-med gy, occ gysbhn, sb ang-sb ply, frm-hrd, predy silky tex, vf grnd, com chk lam, rr scat cal frags, calc, tr pp mic pyr incl

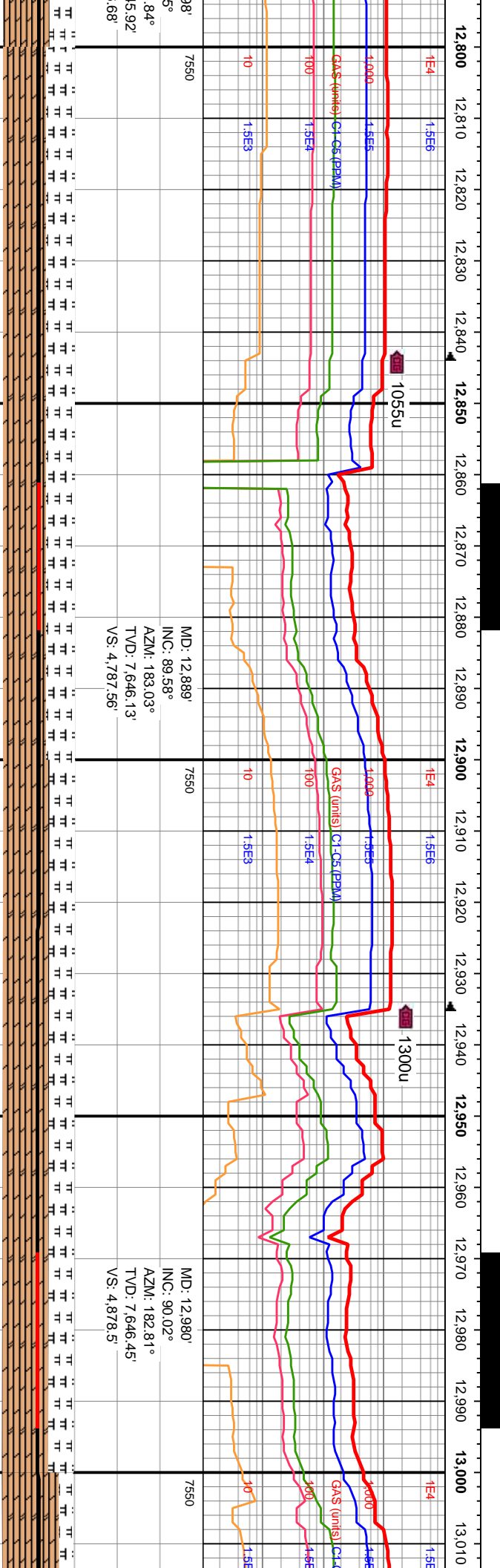
7800

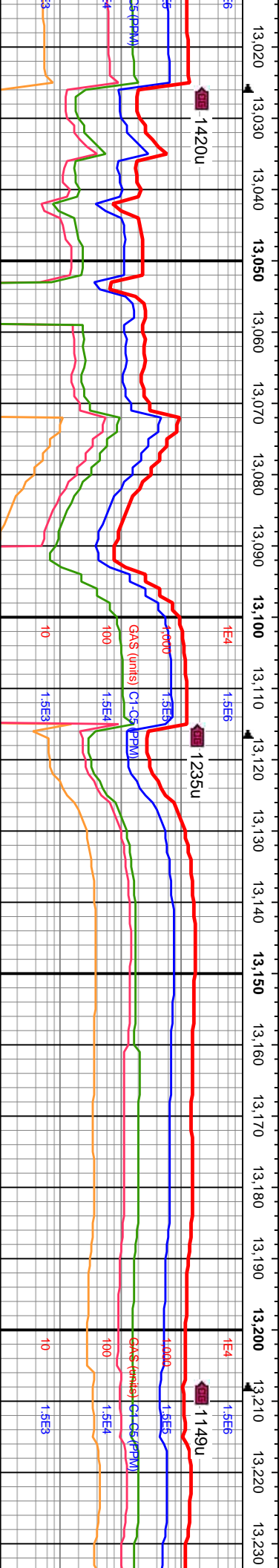
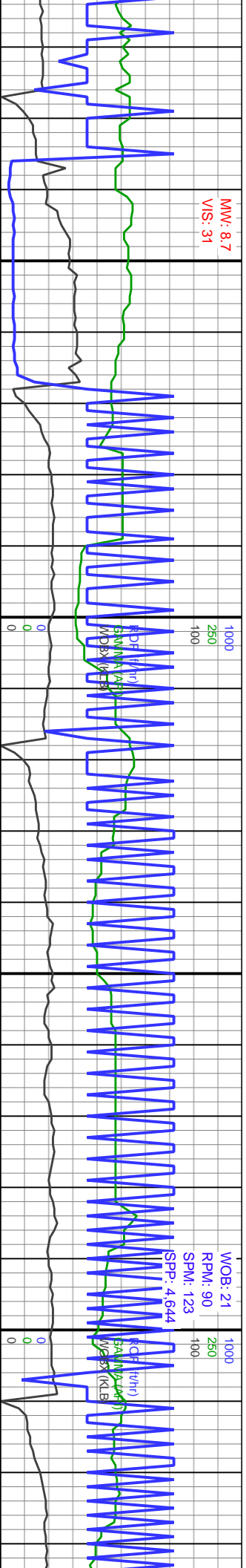
12200-12300 65% CHK: med gy-lt gy, offwht-crm intbds, blk-y-sb ang, fri, rthy tex, cal frac fill, mlst intbds, calc: 35% MRLST: predy dk gy-med gy, occ gysbhn, sb ang-sb ply, frm-hrd, predy silky tex, vf grnd, com chk lam, scat cal frags, calc

7800



[illegible]





MD: 13,071'
INC: 91.12°
AZM: 180.35°
TVD: 7,645.55'
VS: 4,969.49'

7550

MD: 13,162'
INC: 92.35°
AZM: 180°
TVD: 7,642.79'
VS: 5,060.43'

7550

13000-13100 80% CHK: gy-lt gy, crm lam, blkly-sb ang, frm, fri ip, rthy tex, cal frac fill, intbdd mlst, calc; 20% MRLST: dk gy-med gy, gysbhn ip, sb ang-sb plty, frm-hrd, predy silky tex, vf grnd, incrg chk incl, tr free cal ang frags, calc

TVD (ft)

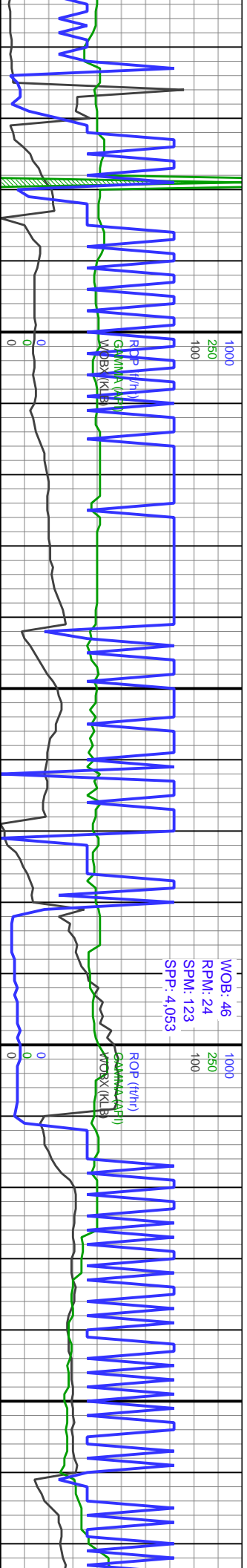
7800

13100-13200 75% CHK: lt gy-gy, crm intbds, predy blkly, sb ang ip, frm, sme fri, rthy/chky tex, cal frac fill, intbdd mlst, calc; 25% MRLST: dk gy-med gy, gysbhn ip, sb ang-sb plty, frm-hrd, predy silky tex, vf grnd, tr free cal, incrg chk incl, calc

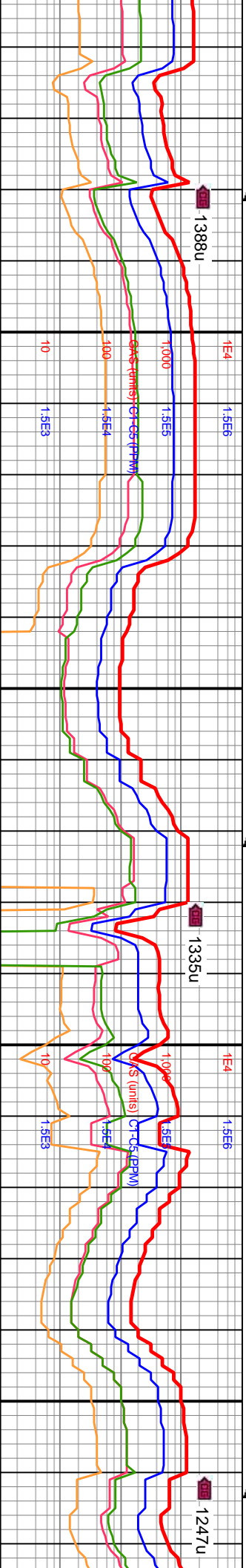
TVD (ft)

7800



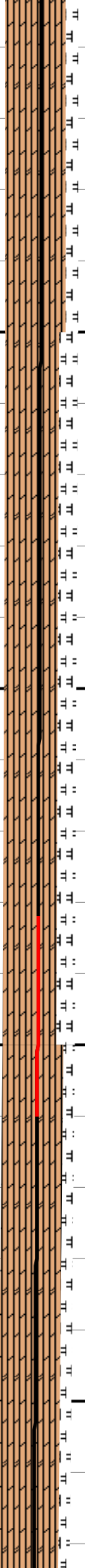


13,460 13,470 13,480 13,490 13,500 13,510 13,520 13,530 13,540 13,550 13,560 13,570 13,580 13,590 13,600 13,610 13,620 13,630 13,640 13,650 13,660 13,670



MD: 13,527'
INC: 89.93°
AZM: 180.97°
TVD: 7,634.81'
VS: 5,425.2'

MD: 13,618'
INC: 87.82°
AZM: 180.79°
TVD: 7,636.6'
VS: 5,516.18'



TVD (ft)

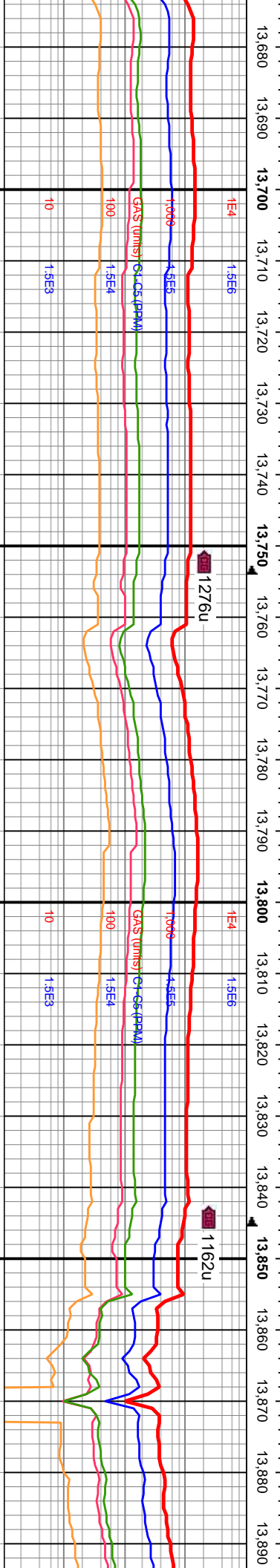
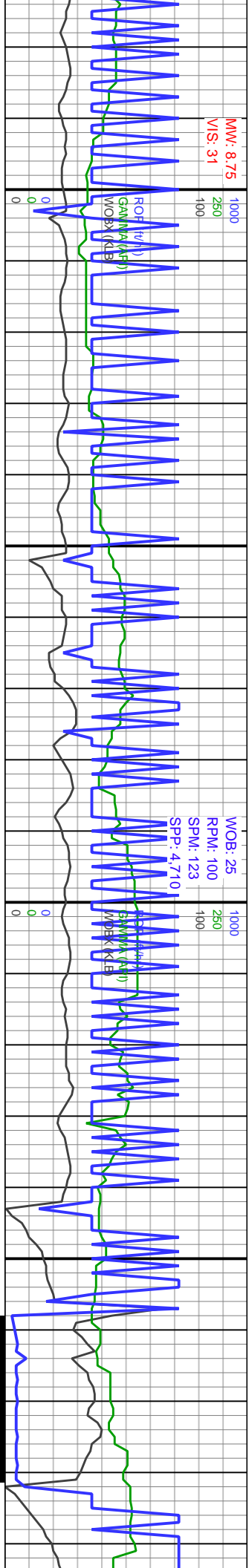
TVD (ft)

400-13500 85% CHK: gy-lt gy, crm intbds, y-sb ang, frm, fri ip, rthy tex, cal frac fill, odd mrlst, calc: 15% MRLST: dk gy-med gysbhn ip, sb ang-sb plty, frm-hrd, predy y tex, vf grnd, pred chk incl, tr free cal ang gs, calc

13500-13600 75% CHK: gy-lt gy, offwht intbds, blk-y-sb ang, frm-fri ip, rthy tex, cal frac fill, intbds mrlst, calc: 25% MRLST: dk gy-med gy, gysbhn ip, sb ang-sb plty, frm-hrd, predy silky app, vf grnd, pred chk incl, sme free ang cal frags, calc

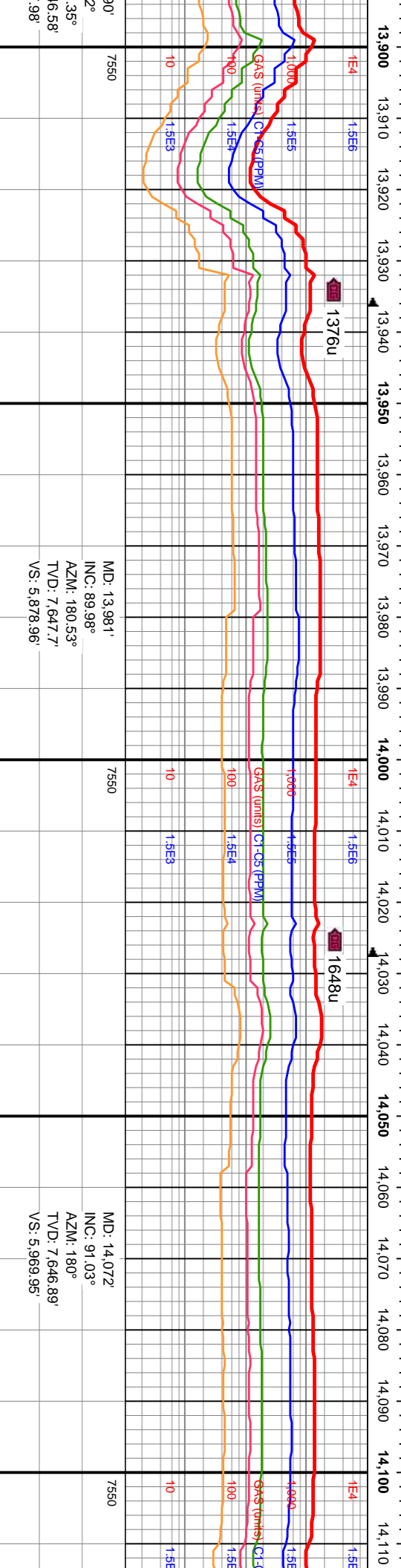
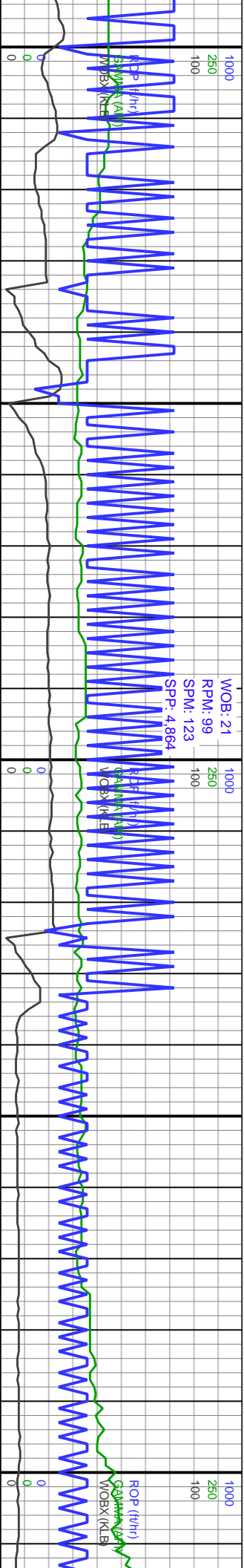
13600-13700 85% CHK: gy-lt gy, crm intbds, blk-y-sb ang, frm, fri ip, rthy tex, cal frac fill, mrlst, calc: 15% MRLST: dk gy-med gysbhn ip, sb ang-sb plty, frm-hrd, predy y tex, vf grnd, pred chk incl, tr free cal ang gs, calc



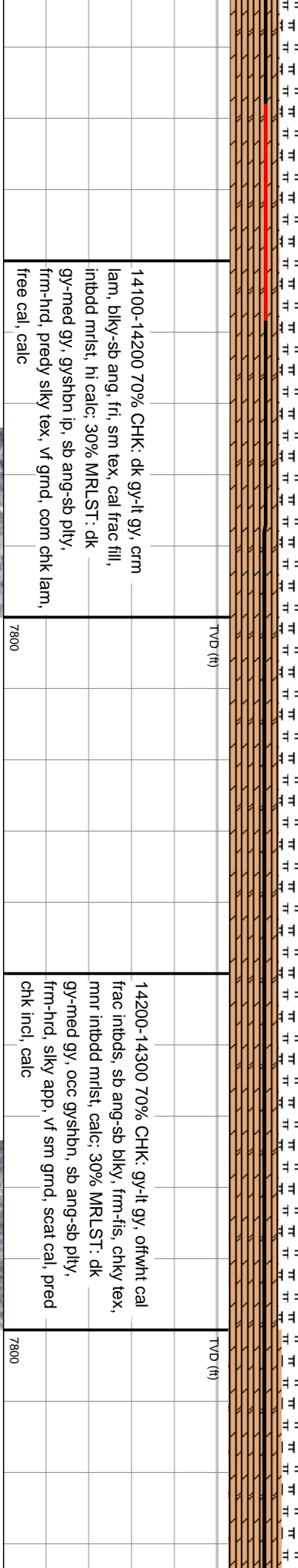
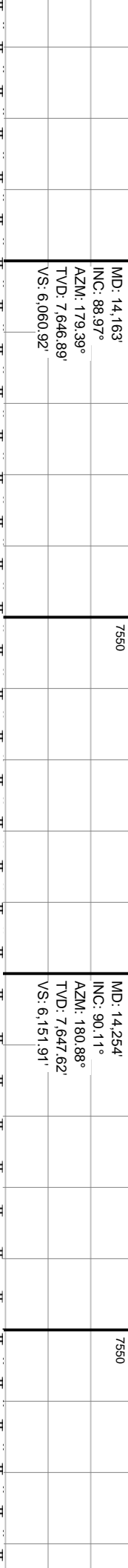
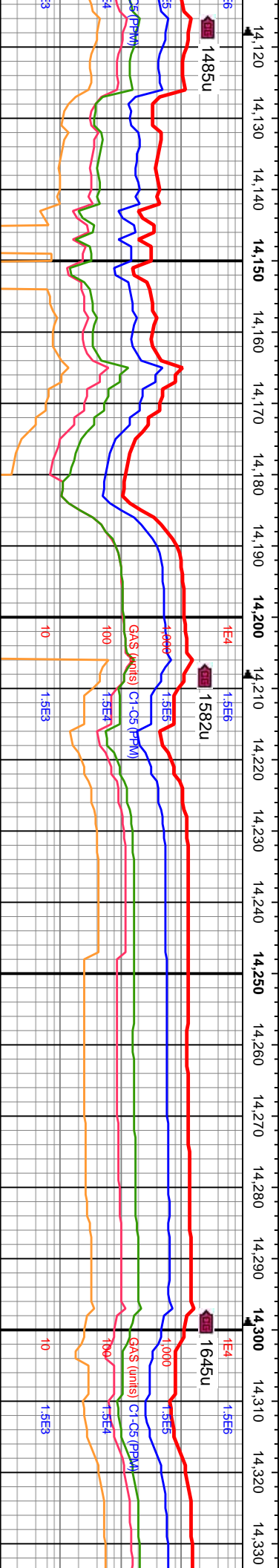
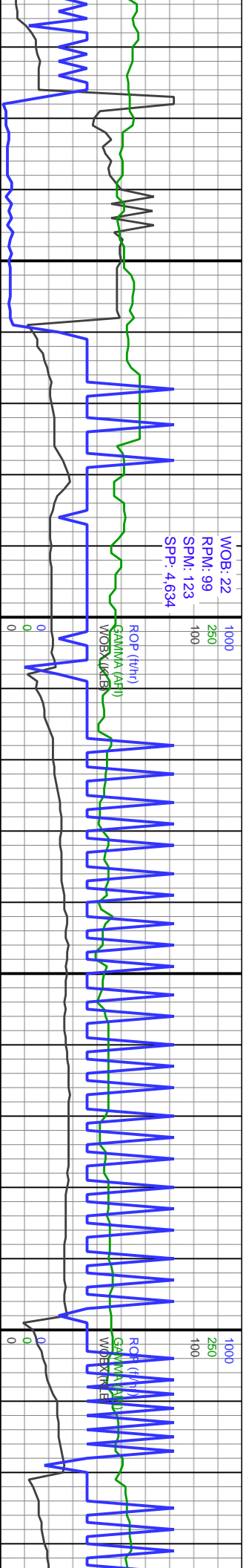


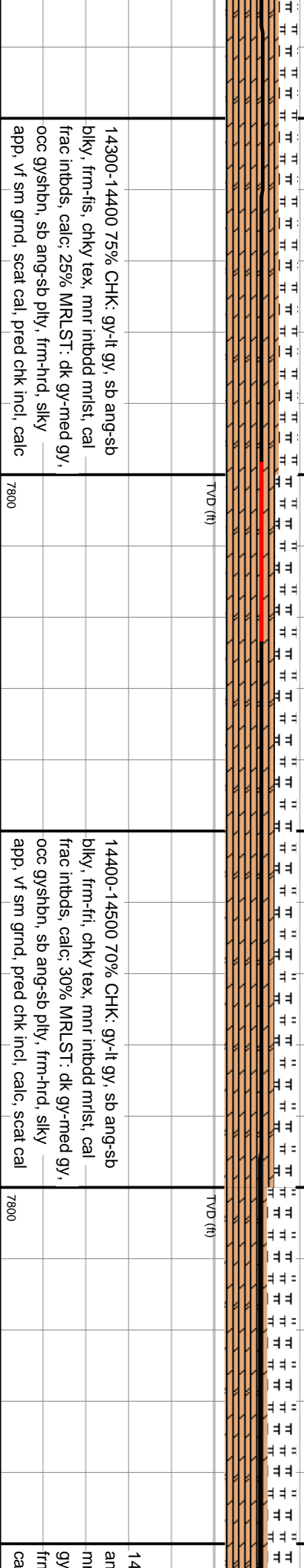
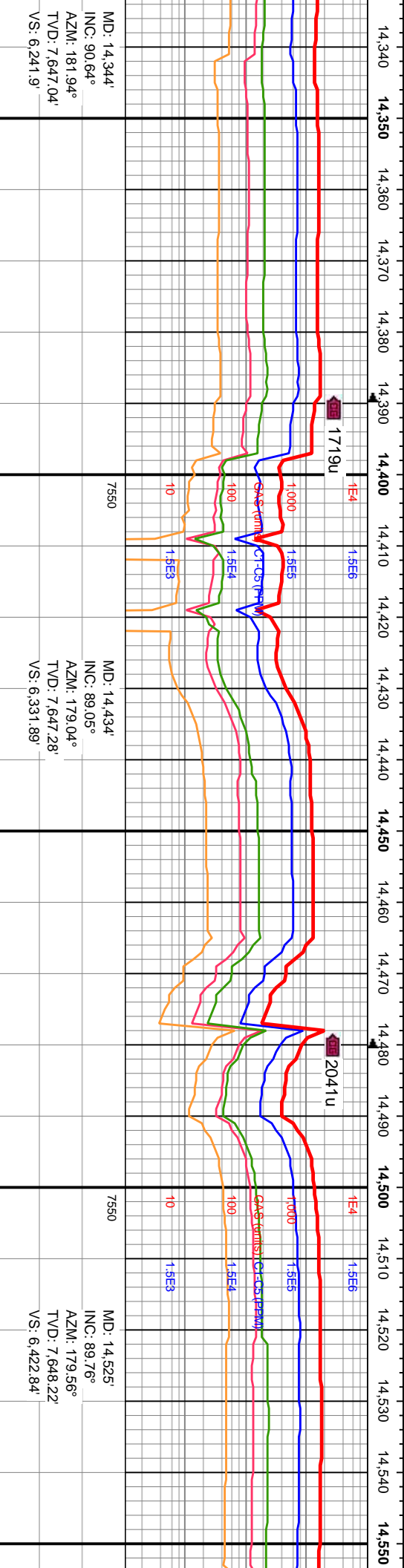
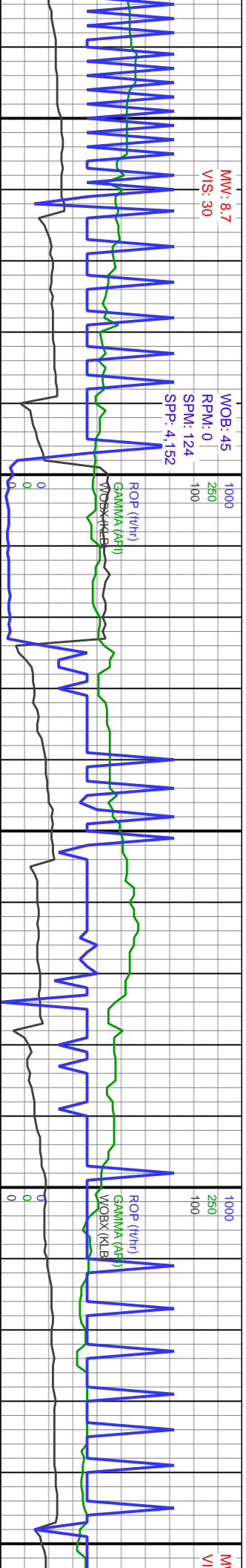
13700-13800 90% CHK: lt gy-gy, offwht intbds, predy sb ang, blkly ip, frm-fls ip, chky/rthy tex, cal frac fill, mnr intbdd mlst, calc: 10% MRLST: dk gy-med gy, gysbhn ip, sb ang-sb ply, frm-hrd, silky app, vf grnd, abnt chk incl, sme free ang cal, calc	7800
13800-13900 90% CHK: lt gy-gy, crm int predy sb ang, blkly ip, frm-fls ip, chky/rthy cal frac fill, mnr intbdd mlst, calc: 10% MRLST: dk gy-med gy, sme gysbhn, sb ang-sb ply, frm-hrd, silky app, vf grnd, abnt chk incl, sme scat cal, calc	7800





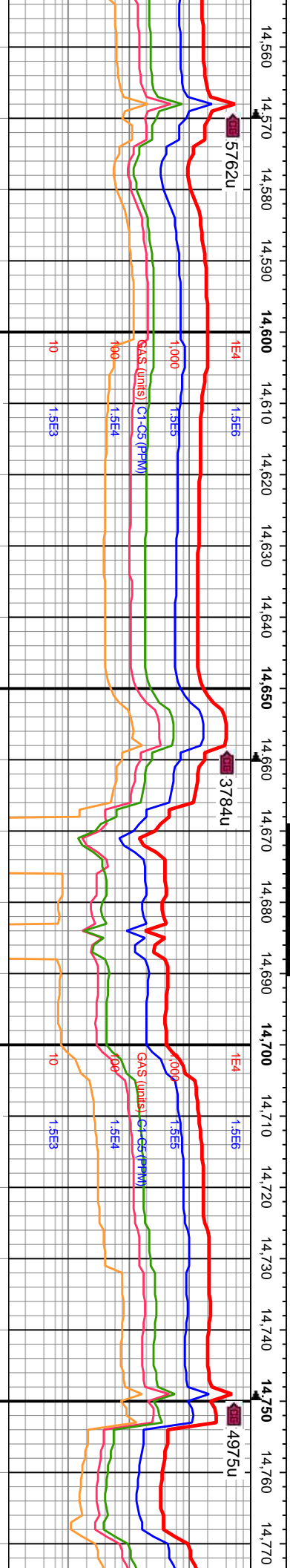
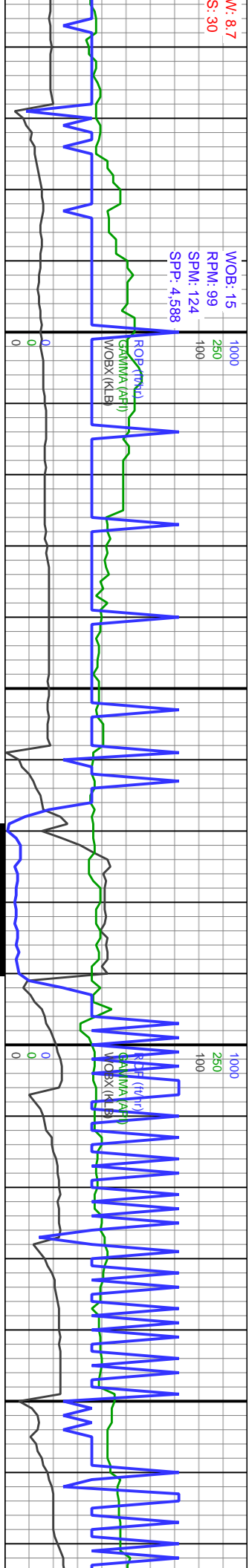
13900-14000 85% CHK: gy-lt gy, crm cal frac intbds, predy sb ang, blkly ip, frm-fis ip, chky tex, tr intbdd mrlst, calc: 15% MRLST: dk gy-med gy, occ gysbhn, sb ang-sb ply, frm-hrd, silky app, vf grnd, pred chk incl, scat cal, calc	TVD (ft)	7800
14000-14100 90% CHK: gy-lt gy, offwht cal frac intbds, predy sb ang, blkly ip, frm-fis ip, chky tex, mnr intbdd mrlst, calc: 10% MRLST: dk gy-med gy, occ gysbhn, sb ang-sb ply, frm-hrd, silky app, vf grnd, scat cal, pred chk incl, calc	TVD (ft)	7800





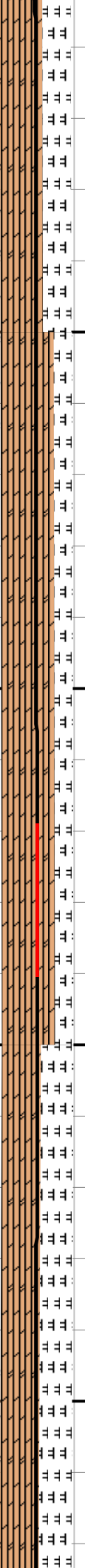
W: 8.7
S: 30

WOB: 15
RPM: 99
SPM: 124
SP: 4.588



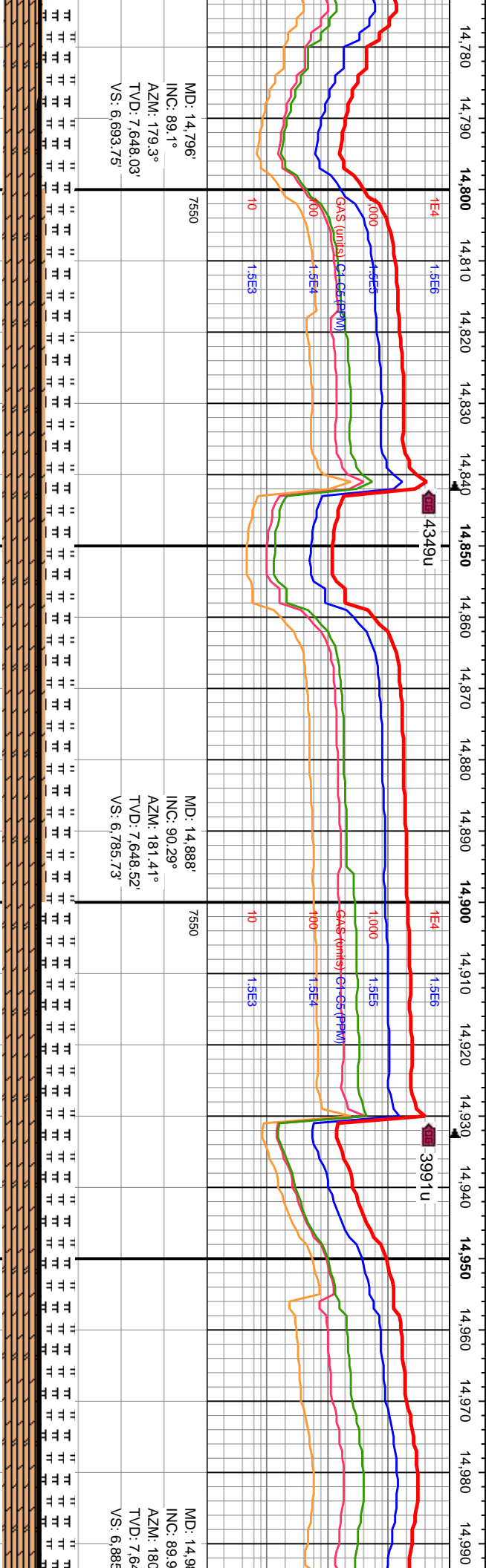
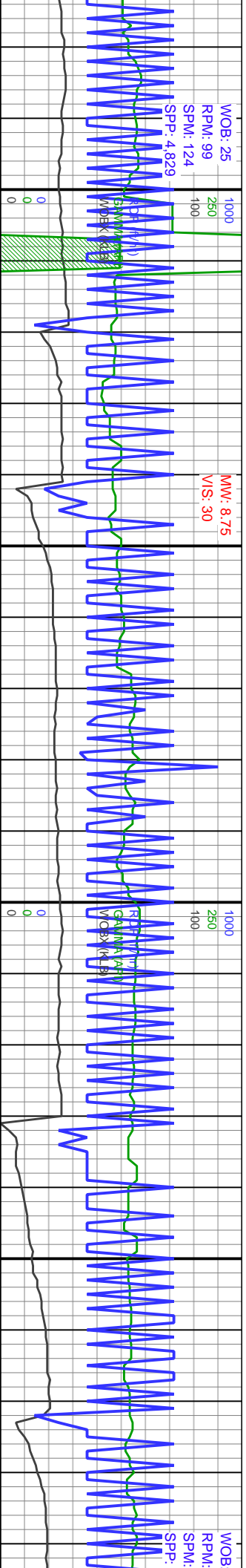
7550 MD: 14.615
INC: 91.38°
AZM: 180.35°
TVD: 7,647.33'
VS: 6,512.82'

MD: 14,705
INC: 89.32°
AZM: 179.3°
TVD: 7,646.78'
VS: 6,602.79'

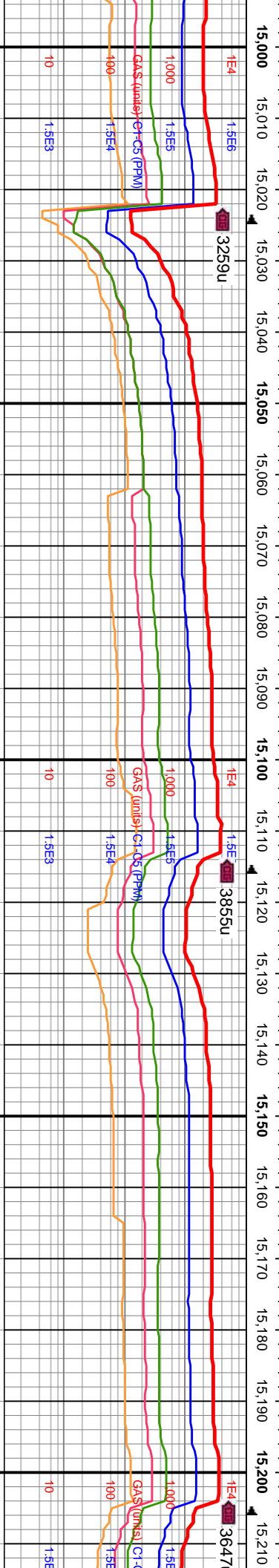
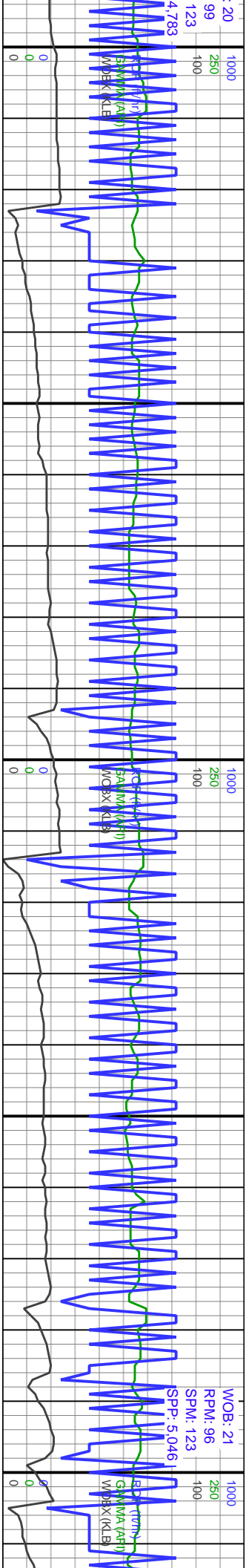


TVD (ft)		TVD (ft)		TVD (ft)	
500-14600 60% CHK: predy gy-lt gy, sb		14600-14700 75% CHK: predy gy-lt gy, sb		14700-14800 55% C	
g-sb blkly, frm-fri, chky tex, mnr intbdd		ang-sb blkly, frm-fri, chky tex, mnr intbdd		predy sb blkly, sb ang	
lst, cal frac intbds, calc: 40% MRLST: dk		mrlst, cal frac intbds, calc, tr pp mic pyr:		incrg intbdd mrlst, ca	
-med gy, occ gysbhn, sb ang-sb ply,		25% MRLST: dk gy-med gy, occ gysbhn, sb		pyr: 45% MRLST: pro	
n-hrd, silky app, vf sm grnd, pred chk incl,		ang-sb ply, frm-hrd, silky app, vf sm grnd,		occ gysbhn, sb ang-s	
ic, scat cal, tr pp mic pyr		pred chk incl, calc		app, vf sm grnd, mnr	
7800		7800			

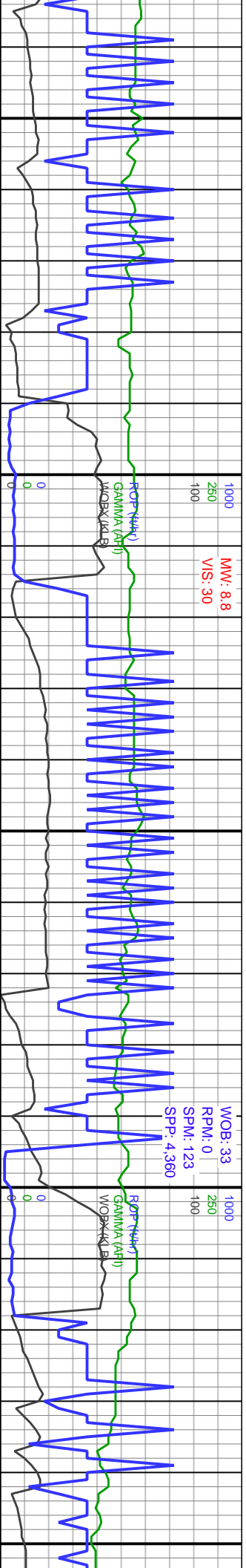




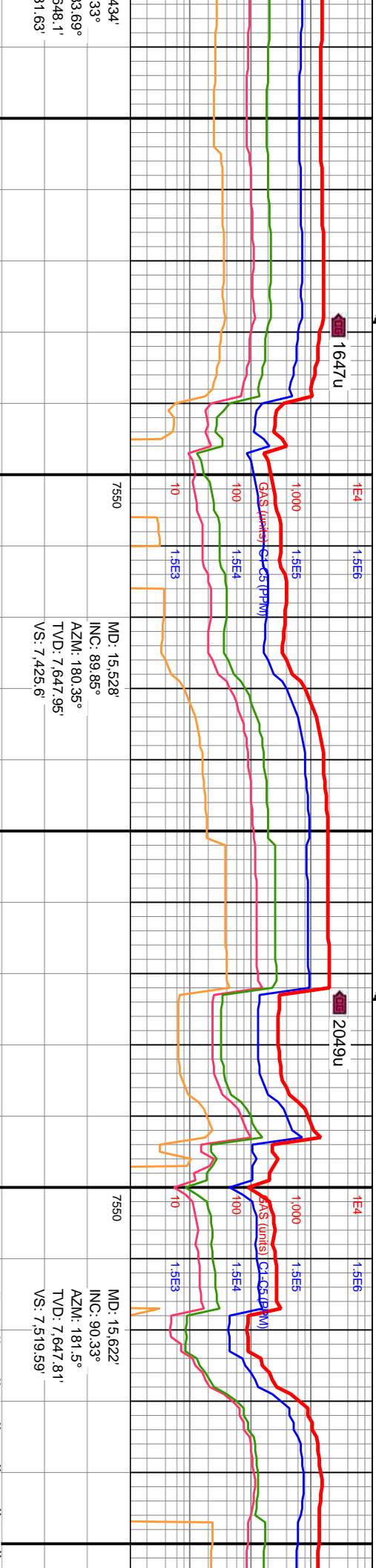
HK: med gy-lt gy, g ip, frm-fri, chky tex, l frac fill, calc, tr pp mic edy dk gy, med gy ip, sb ply, frm-hrd, silky chk incl, calc	7800	TVD (ft)	14800-14900 60% CHK: med gy-lt gy, predy sb blkly, sb ang ip, frm-fri, chky tex, incrg intbdd mlst, cal frac fill, calc, tr pp mic pyr: 40% MRLST: predy dk gy, med gy ip, occ gysbhn, sb ang-sb ply, frm-hrd, silky app, vf grnd, chk incl, calc	7800	TVD (ft)	14900-15000 55% CHK: predy med gy, ip, predy sb blkly, sb ang ip, frm-fri, chky incrg lam mlst, cal frac fill, calc, tr pp m pyr: 45% MRLST: predy dk gy, med gy occ gysbhn, sb ang-sb ply, frm-hrd, vf g silky app, mnr chk incl, calc	7800	TVD (ft)
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7550	38' 8° 53' 18.29' 5.73'	MD: 15.070' INC: 90.02° AZM: 179.91° TVD: 7,648.29' VS: 6.967.73'	15000-15100 60% CHK: predy med gy, lt gy ip, predy sb blkly, sb ang ip, frm-fri, chky tex, incrg lam mrlst, cal frac fill, calc, tr pp mic pyr; 40% MRLST: predy dk gy, med gy ip, occ gysbhn stri, sb ang-sb pily, frm-hrd, vf gmd, silky app, chk lam, calc	7800
7550	15' 161' 90.07° 179.91° 7,648.22' 7.058.71'	MD: 15.161' INC: 90.07° AZM: 179.91° TVD: 7,648.22' VS: 7.058.71'	15100-15200 60% CHK: predy med gy, lt gy ip, predy sb blkly, sb ang ip, frm-fri, chky tex, mrlst intbodd, cal frac fill, calc; 40% MRLST: predy dk gy, med gy ip, occ gysbhn stri, sb ang-sb pily, frm-hrd, vf gmd, silky app, incrg chk lam, calc	7800



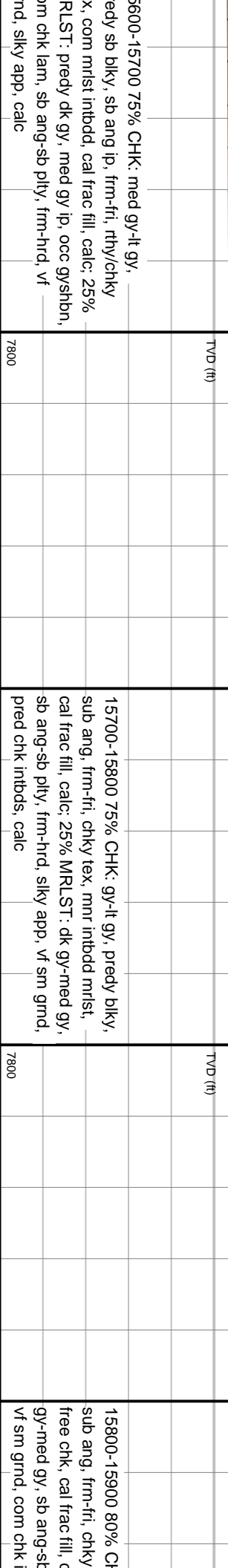
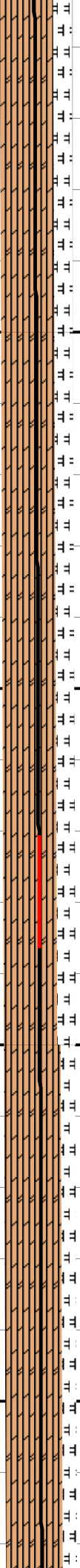
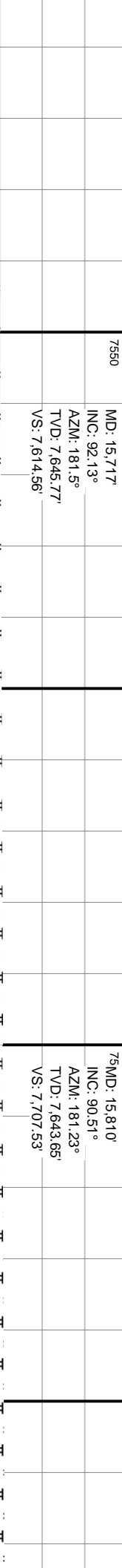
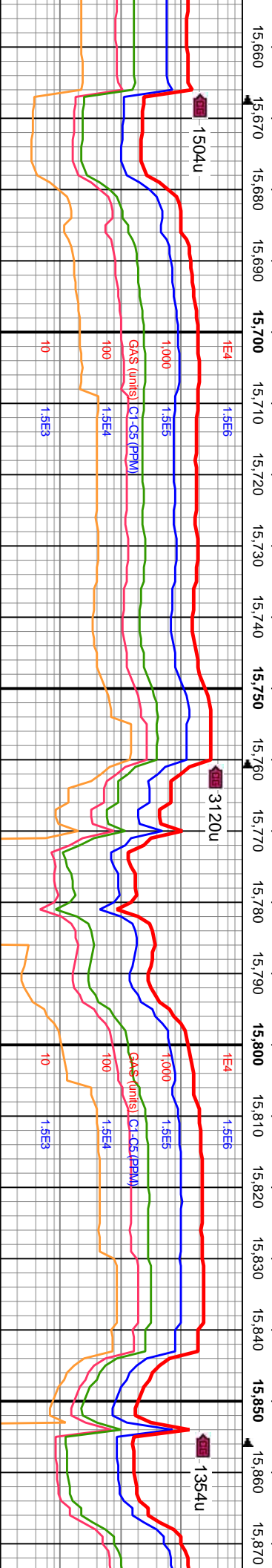
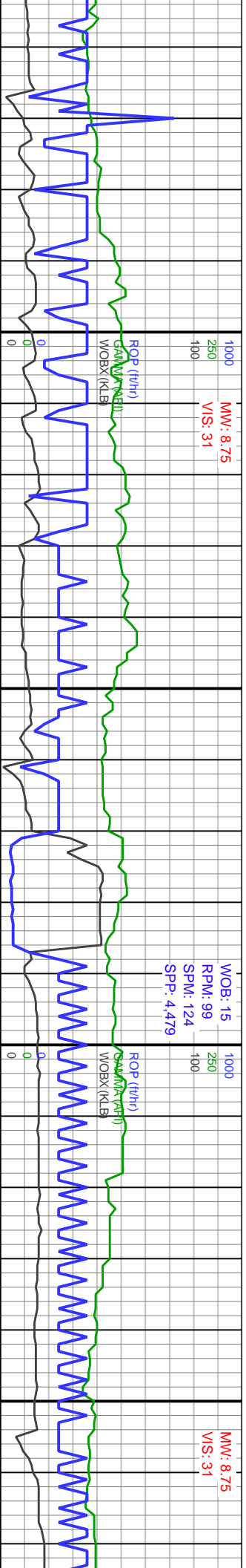
15,440 15,450 15,460 15,470 15,480 15,490 15,500 15,510 15,520 15,530 15,540 15,550 15,560 15,570 15,580 15,590 15,600 15,610 15,620 15,630 15,640 15,650

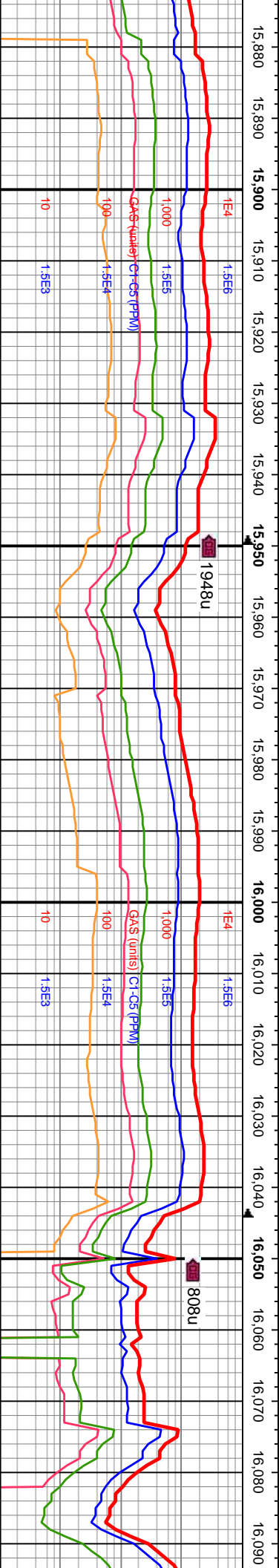
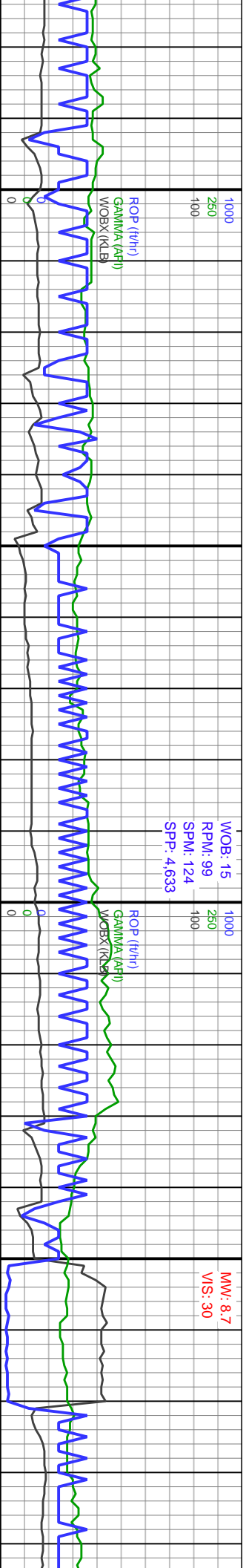


15,440 15,450 15,460 15,470 15,480 15,490 15,500 15,510 15,520 15,530 15,540 15,550 15,560 15,570 15,580 15,590 15,600 15,610 15,620 15,630 15,640 15,650

434°	33°	33.69°	348.1'	11.63	15400-15500 60% CHK: med gy-lt gy, predy sb blk, sb ang ip, frm-fri, rhy/chny tex, mlst intbdd, cal frac fill, calc: 40% MRLST: predy dk gy, med gy ip, occ gysbhn stri, sb ang-sb ply, frm-hrd, vf grnd, silky app, v calc, com chk lam	7800	TVD (ft)
434°	33°	33.69°	348.1'	11.63	15500-15600 65% CHK: med gy-lt gy, predy sb blk, sb ang ip, frm-fri, rhy/chny tex, mlst intbdd, cal frac fill, calc: 35% MRLST: predy dk gy, med gy ip, occ gysbhn, sb ang-sb ply, frm-hrd, vf grnd, silky app, v calc, chk lam	7800	TVD (ft)



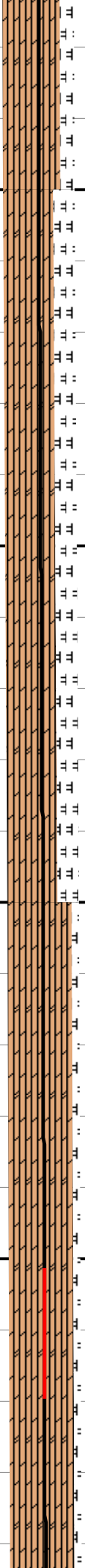




MD: 15,905'
INC: 90.95°
AZM: 180.88°
TVD: 7,642.44'
VS: 7,802.52'

MD: 15,998'
INC: 91.87°
AZM: 180.62°
TVD: 7,640.15'
VS: 7,895.49'

MD: 16,000'
INC: 89.9°
AZM: 181°
TVD: 7,640.15'
VS: 7,988.49'



TVD (ft)

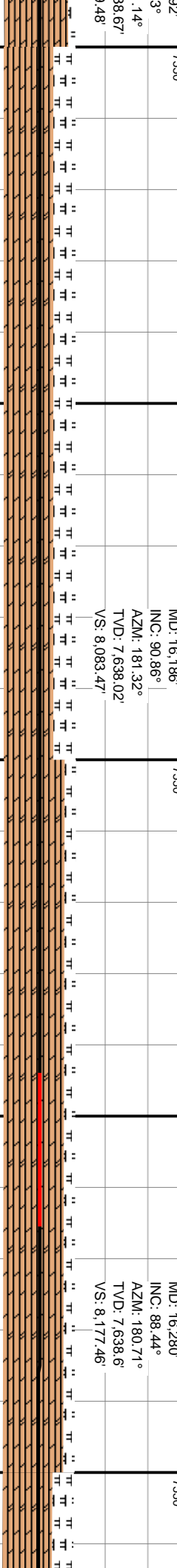
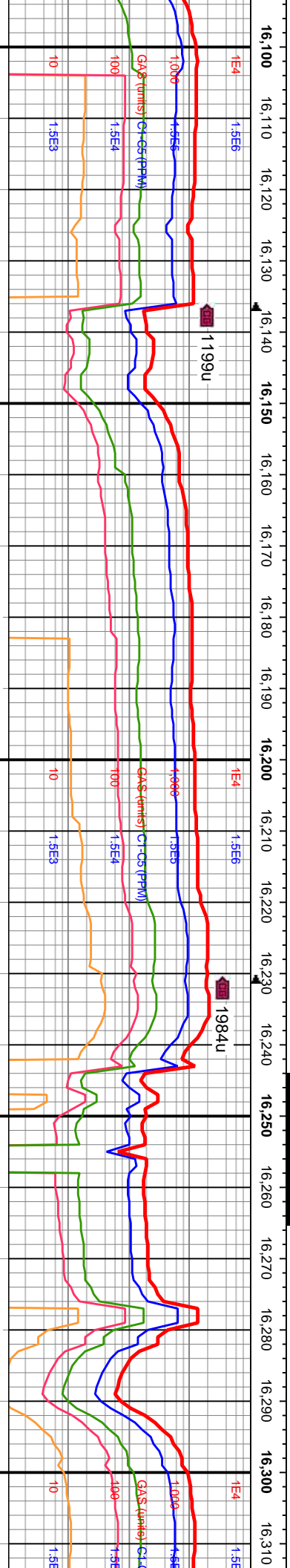
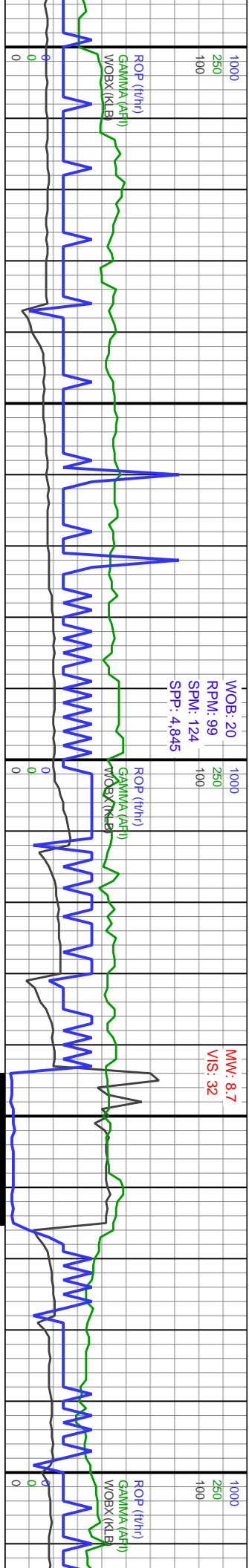
TVD (ft)

HLK: gy-lt gy, predy blk, tex, mnr intbdd mrlst, tr calc; 20% MRLST: dk ply, frm-hrd, silky app, ntbd, hi calc

15900-16000 70% CHK: gy-lt gy, predy blk, sub ang, frm-fri, chky tex, mnr intbdd mrlst, tr free chk, cal frac fill, calc; 30% MRLST: dk gy-med gy, sb ang-sb ply, frm-hrd, silky app, vf sm grnd, com chk intbds, calc

16000-16100 90% CHK: lt gy, predy blk, sub ang, frm-fri, chky tex, mnr intbdd mrlst, tr free chk, cal frac fill, calc; 10% MRLST: gy-med gy, sb ang-sb ply, frm-hrd, silky app, vf sm grnd, abnt chk intbds, hi calc



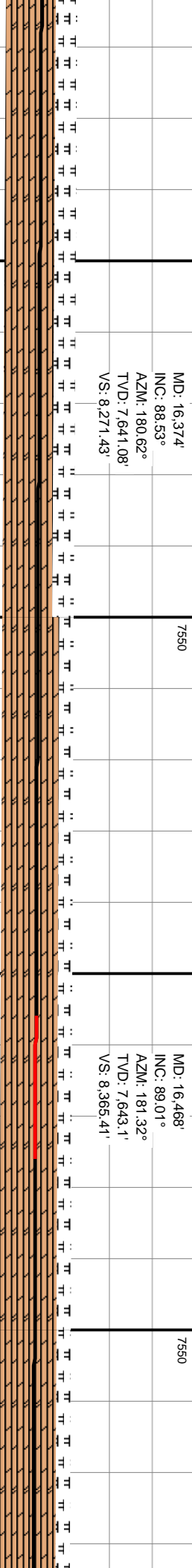
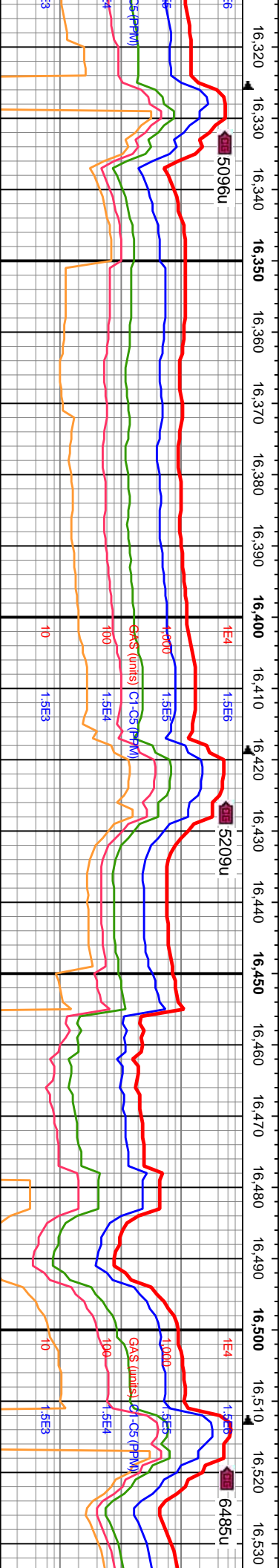
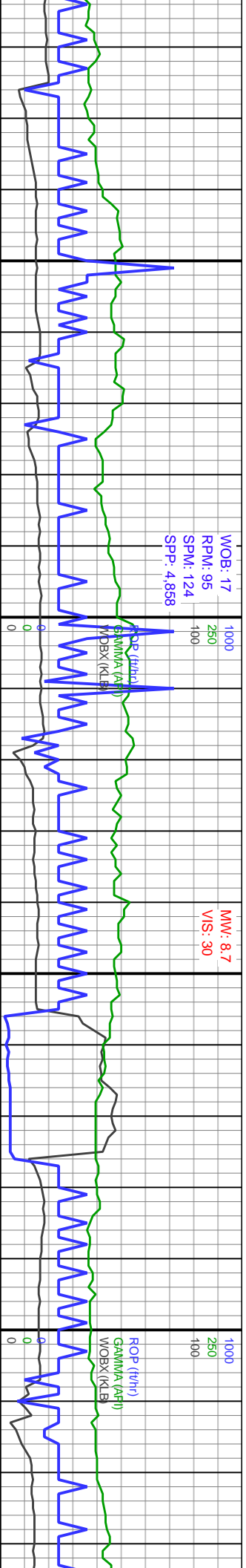


16,100	16,110	16,120	16,130	16,140	16,150	16,160	16,170	16,180	16,190	16,200	16,210	16,220	16,230	16,240	16,250	16,260	16,270	16,280	16,290	16,300	16,310
1E4	1.5E6			1199u						1E4	1.5E6		1984u							1E4	1.5E6
GAS (mm/s) CI-GS (PPM)										GAS (mm/s) CI-GS (PPM)										GAS (mm/s) CI-GS (PPM)	
100	1.5E4									100	1.5E4									100	1.5E4
10	1.5E3									10	1.5E3									10	1.5E3
7550										7550										7550	
MD: 16,186'										MD: 16,280'											
INC: 90.86°										INC: 88.44°											
AZM: 181.32°										AZM: 180.71°											
TVD: 7,638.02'										TVD: 7,638.6'											
VS: 8,083.47'										VS: 8,177.46'											

TVD (ft)										TVD (ft)										TVD (ft)	
7800										7800										7800	

16100-16200 70% CHK: lt gy-dk gy, predy blkly, sub ang, frm-fri, chky tex, mnr intbdd mrlst, tr free chk, cal frac fill, calc: 30% MRLST: dk gy-med gy, sb ang-sb ply, frm-hrd, silky app, vf sm grnd, chk incl, calc

16200-16300 85% CHK: lt gy, predy blkly, sub ang, frm-fri, chky tex, mnr intbdd mrlst, tr free chk, cal frac fill, calc: 15% MRLST: dk gy-med gy, sb ang-sb ply, frm-hrd, silky app, vf sm grnd, abnt chk incl, calc



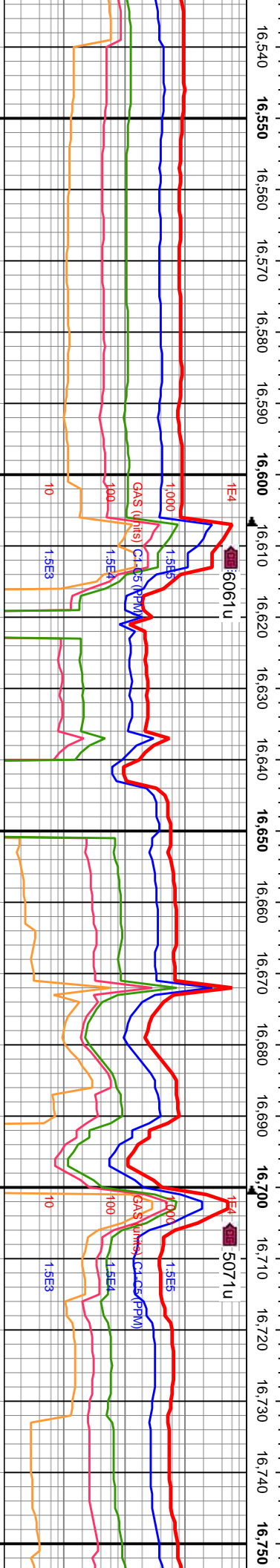
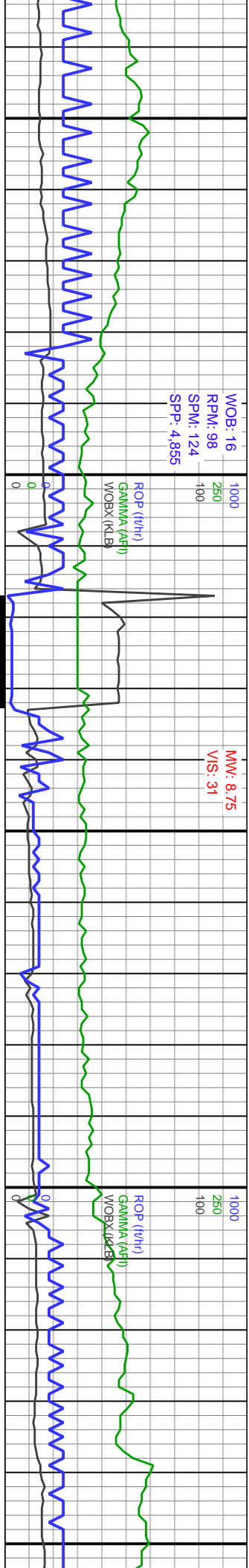
MD: 16,374'
INC: 88.53°
AZM: 180.62°
TVD: 7,641.08'
VS: 8,271.43'

MD: 16,468'
INC: 89.01°
AZM: 181.32°
TVD: 7,643.1'
VS: 8,365.41'

16300-16400 70% CHK: lt gy-dk gy, predy
biky, sub ang, frm-fri, chky tex, tr free chk, cal
frac fill, calc, mnr intbdd mrlst: 30% MRLST:
dk gy-med gy, sb ang-sb ply, frm-hrd, silky
app, vf sm grnd, chk incl, calc

16400-16500 80% CHK: lt gy, predy biky,
sub ang, frm-fri, chky/rthy tex, tr free chk, cal
frac fill, calc, mnr intbdd mrlst: 20% MRLST:
dk gy-med gy, sb ang-sb ply, frm-hrd, silky
app, vf sm grnd, calc, abnt chk incl

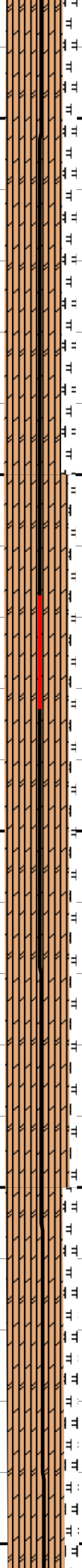




MD: 16,562'
INC: 88.97°
AZM: 181.06°
TVD: 7,644.76'
VS: 8,459.39'

MD: 16,656'
INC: 90.86°
AZM: 182.2°
TVD: 7,644.9'
VS: 8,563.38'

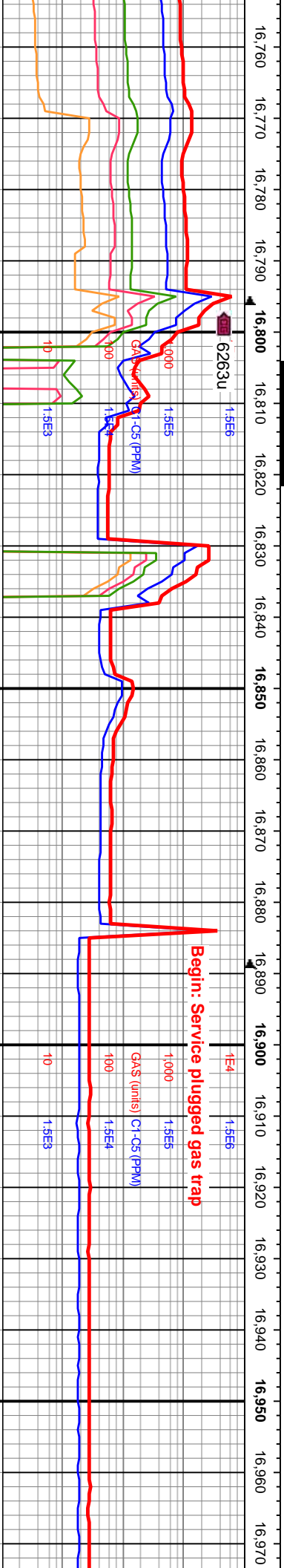
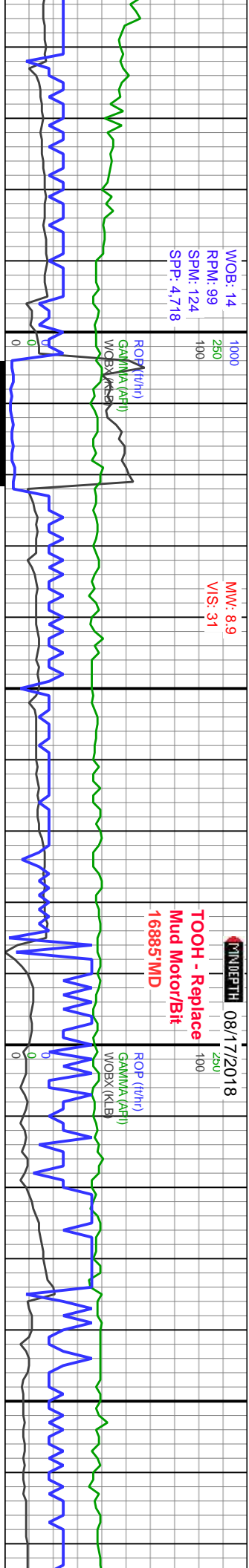
MD: 16,749'
INC: 91.82°
AZM: 182.2°
TVD: 7,642.72'
VS: 8,646.33'



16500-16600 80% CHK: lt gy, predy blkly,
sub ang, frm-fri, chky tex, tr free chk, cal frac
fill, calc, mnv intbdd mst: 20% MRLST: dk
gy-med gy, sb ang-sb pily, frm-hrd, silky app,
vf sm grnd, calc, abnt chk incl

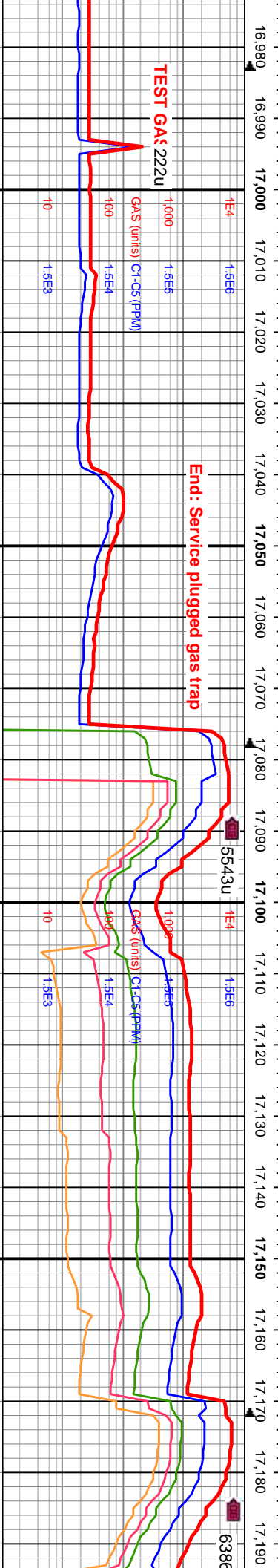
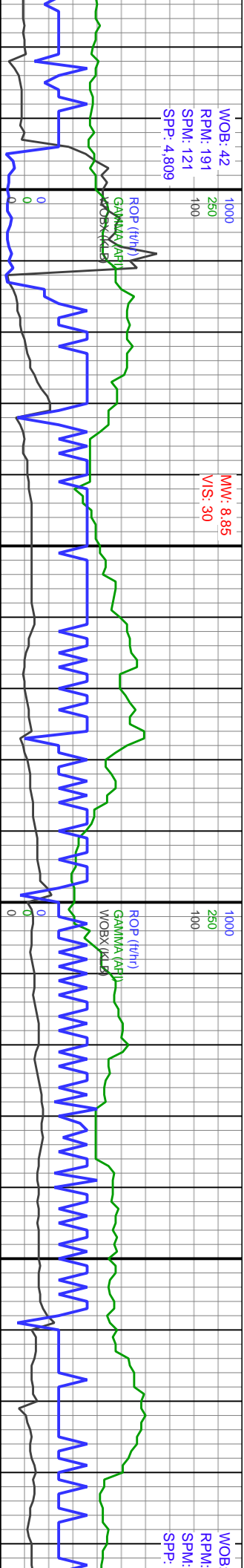
16600-16700 90% CHK: lt gy, predy blkly,
sub ang, frm-fri, chky tex, tr free chk, cal frac
fill, calc, mnv intbdd mst: 10% MRLST: dk
gy-med gy, sb ang-sb pily, frm-hrd, silky app,
vf sm grnd, hi calc, abnt chk incl



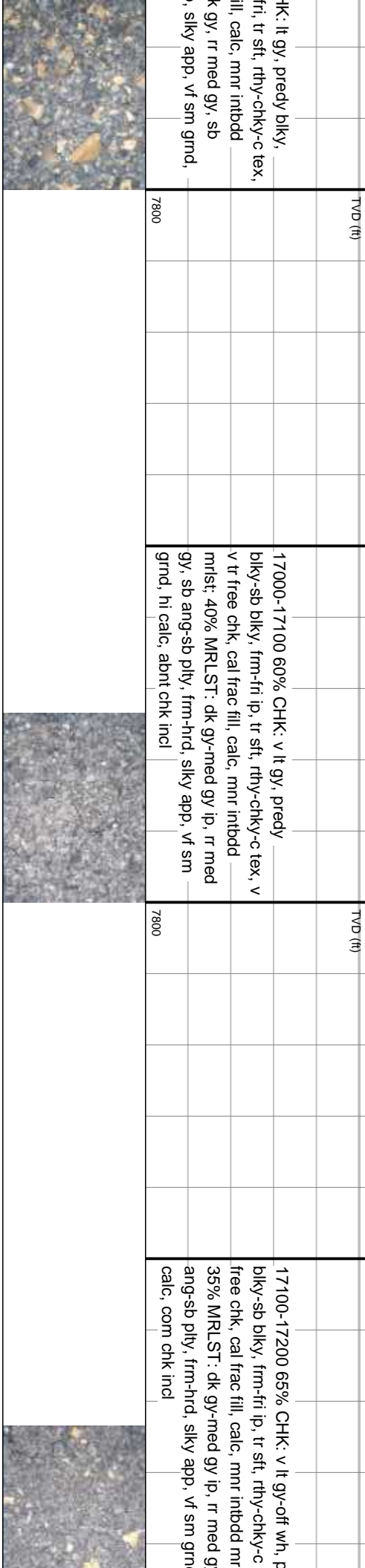


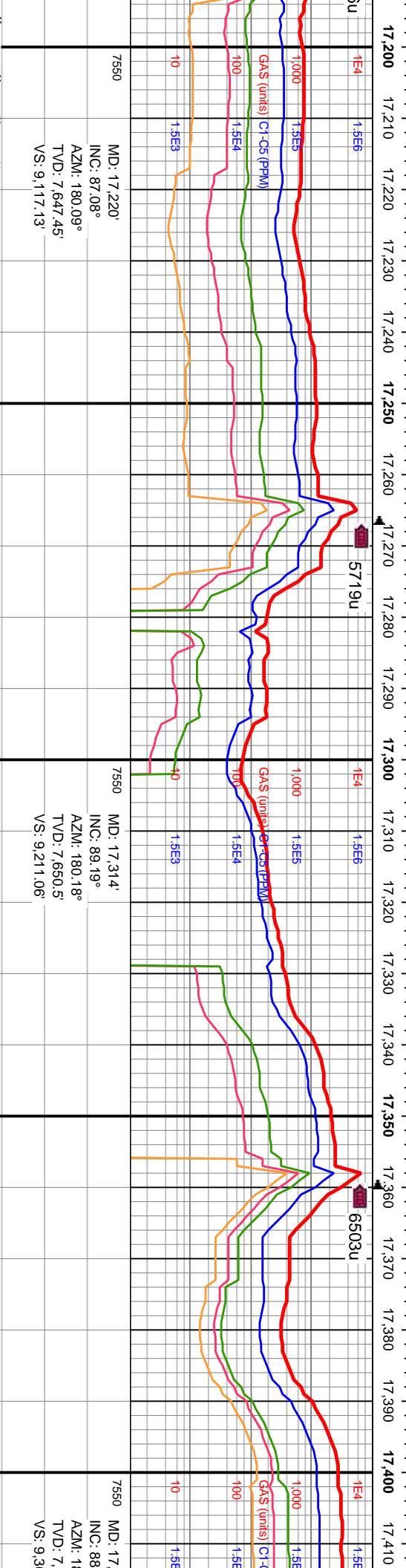
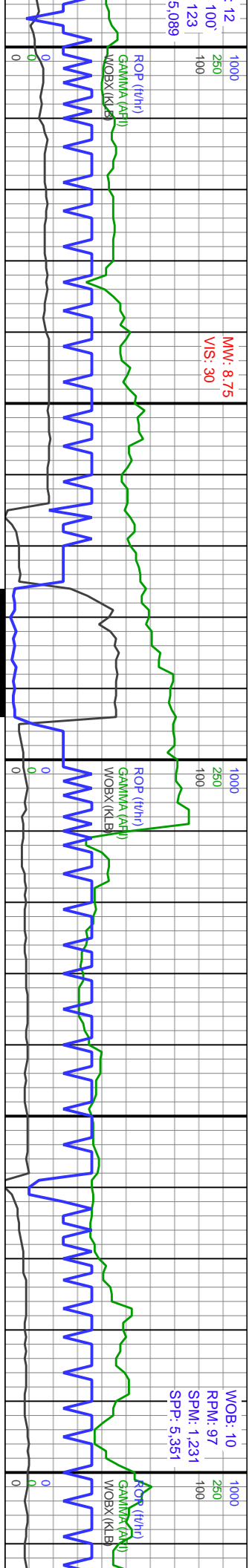
6700-16800 80% CHK: lt gy, predy blkly, sub ang, frm-fri, chky-c tex, tr free chk, cal frac fill, calc, mntr intbdd mlst; 20% MRLST: dk gy-med gy, sb ang-sb ply, mn-htd, silky app, vf sm grnd, hi calc, abnt chl incl	7550	MD: 16,844' INC: 90.42° AZM: 180.53° TVD: 7,640.82' VS: 8,741.3'	7550	MD: 16,938' INC: 91.03° AZM: 180.79° TVD: 7,639.63' VS: 8,835.29'	16900-17000 70% CH sub ang-sub md, frm-v tr free chk, cal frac f mlst; 30% MRLST: d ang-sb ply, frm-htd hi calc, abnt chl incl
TVD (ft)			TVD (ft)		





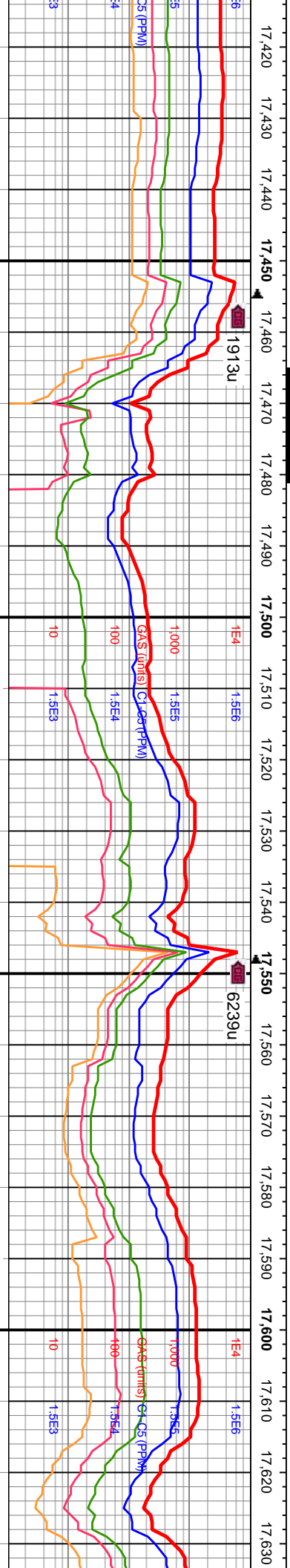
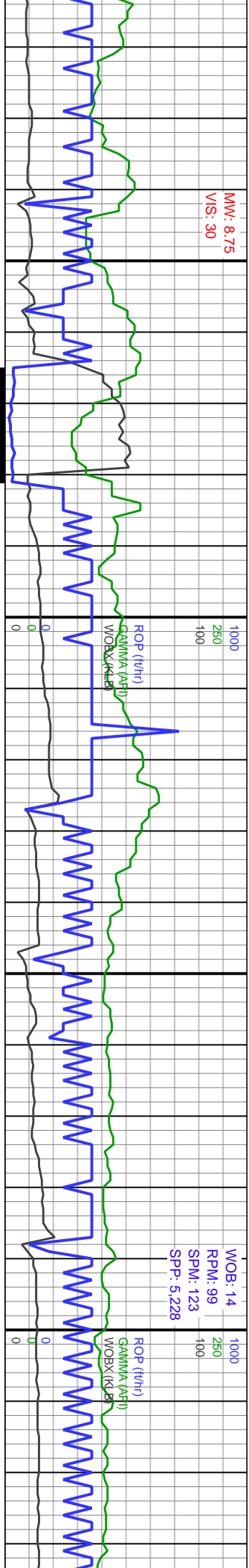
7550	MD: 17.032 INC: 88.4° AZM: 180.62° TVD: 7.640.1' VS: 8.929.28'	17000-17100 60% CHK: v lt gy, predy biky-sb biky, frm-fri ip, tr sft, rthy-chky-c tex, v v tr free chk, cal frac fill, calc, mnr intbdd mrlst: 40% MRLST: dk gy-med gy ip, r med gy, sb ang-sb ply, frm-hrd, silky app, vf sm grnd, hi calc, abnt chk incl
7550	MD: 17.126' INC: 87.78° AZM: 180.62° TVD: 7.643.23' VS: 9.023.23'	17100-17200 65% CHK: v lt gy-off wh, p biky-sb biky, frm-fri ip, tr sft, rthy-chky-c free chk, cal frac fill, calc, mnr intbdd mrl 35% MRLST: dk gy-med gy ip, r med g ang-sb ply, frm-hrd, silky app, vf sm grm calc, com chk incl





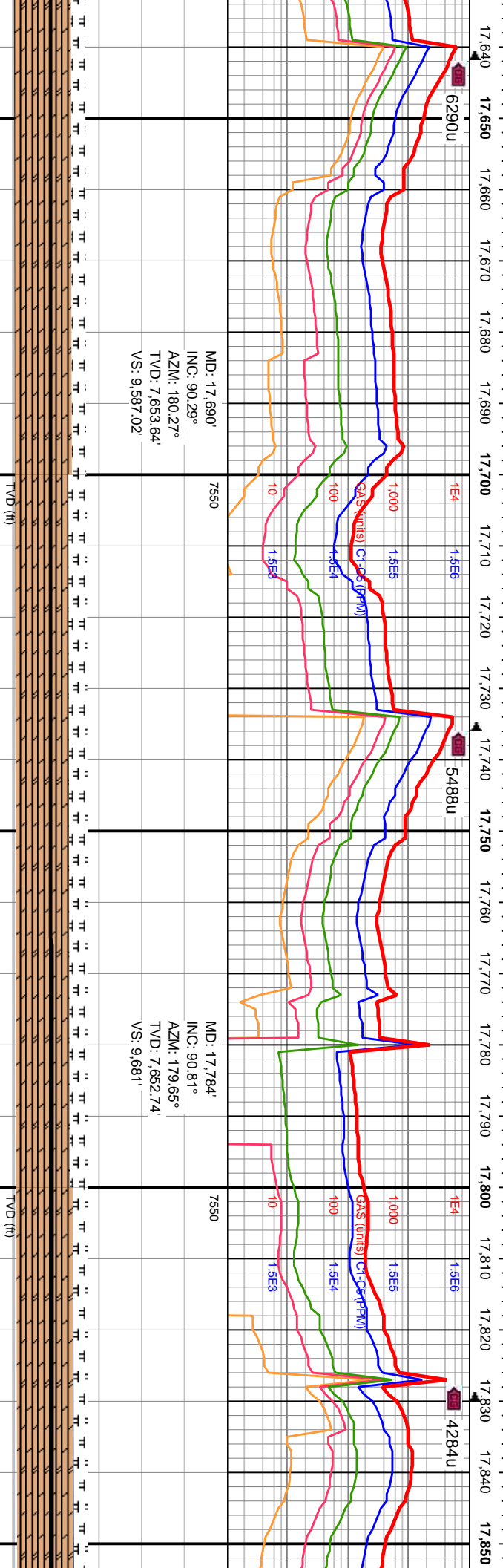
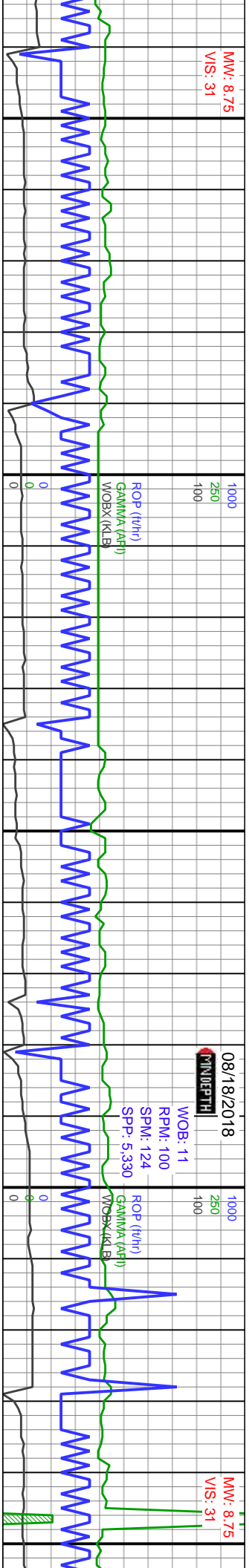
17,200	17,210	17,220	17,230	17,240	17,250	17,260	17,270	17,280	17,290	17,300	17,310	17,320	17,330	17,340	17,350	17,360	17,370	17,380	17,390	17,400	17,410
1E4	1.5E6	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5	1.5E5
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)	GAS (units)
C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)	C1-C5 (PPM)
10	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3	1.5E3
7550	MD: 17,220' INC: 87.08° AZM: 180.09° TVD: 7,647.45' VS: 9,117.13'										7550	MD: 17,314' INC: 89.19° AZM: 180.18° TVD: 7,650.5' VS: 9,211.06'									
TVD (ft)	TVD (ft)										TVD (ft)	TVD (ft)									
predy tex, tr st; y, sb d, hi	17200-17300 55% CHK: v v lt gy-off wh, predy blk-y-sb blk-y, frm-fri, rthy-chky-c tex, v tr free chk, cal frac fill, calc, mod intbdd mrst; 45% MRLST: dk gy-med gy, rr dk gy blk, sb ang-sb ply, pred frm-hrd ip, silky app, vf sm grnd, hi calc, occ chk incl										7800	17300-17400 85% CHK: lt gy-off wh, predy blk-y-sb blk-y, frm-fri ip, rthy-chky tex, v tr free chk, cal frac fill, calc, sl intbdd mrst; 15% MRLST: dk gy-med gy, rr dk gy blk, sb ang-sb ply, pred frm-hrd ip, silky app, vf sm grnd, hi calc, abnt chk incl									
7800	7800										7800	7800									

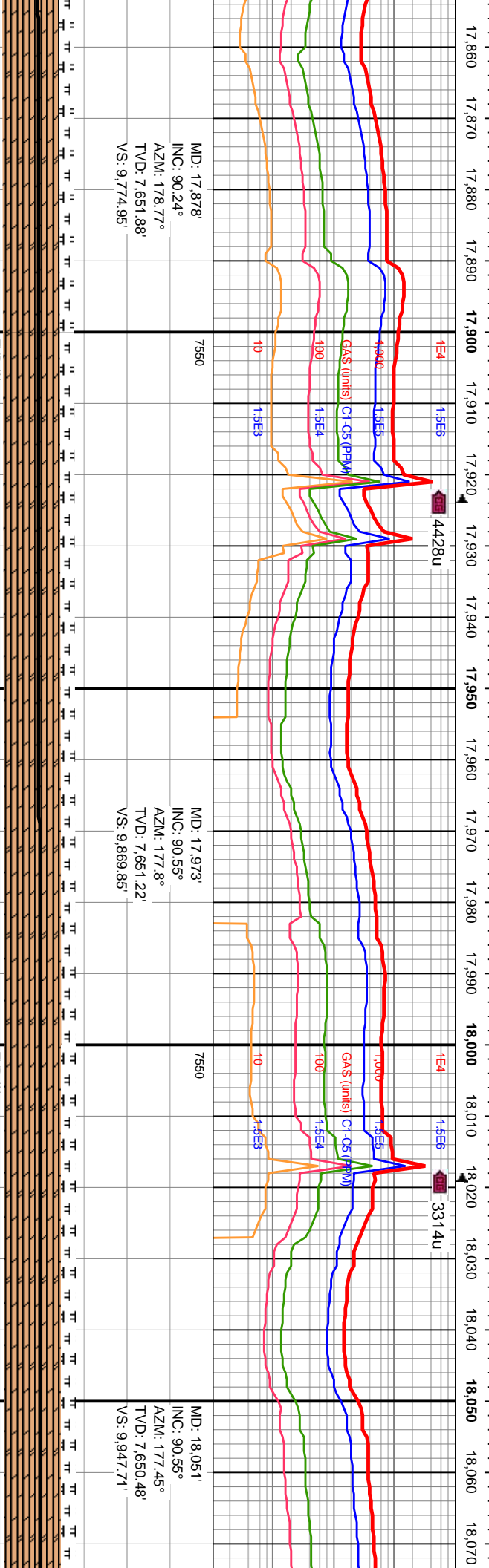
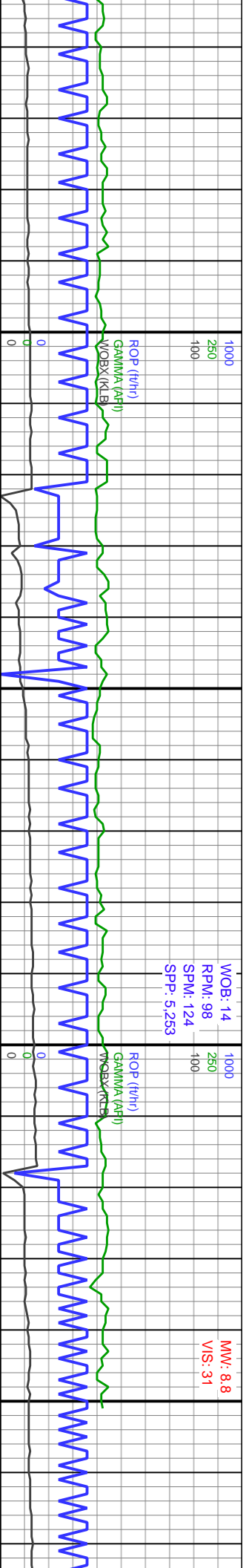




409'	7550	MD: 17,502 INC: 89.76° AZM: 181.32° TVD: 7,653.57' VS: 9,399.03'	7550	MD: 17,596' INC: 89.93° AZM: 180.71° TVD: 7,653.82' VS: 9,493.03'
66°				
30.35°				
652.29'				
06.04'				
17400-17500 75% CHK: v lt gy-off wh, predy biky-sb blk, frm-fri, rthy-chky tex, v v tr free chk, cal frac fill, calc, sl intbdd mlst; 25% MRLST: dk gy-med gy, tr dk gy blk, sb ang-sb ply, pred frm-hrd ip, silky app, vf sm grnd, hi calc, abnt chk incl	17500-17600 80% CHK: v lt gy-off wh, predy biky-sb blk, frm-fri, rthy-chky tex, tr free chk, cal frac fill, calc, sl intbdd mlst; 20% MRLST: dk gy-med gy, sb ang-sb ply, pred frm-hrd, silky app, vf sm grnd, hi calc, abnt chk incl			





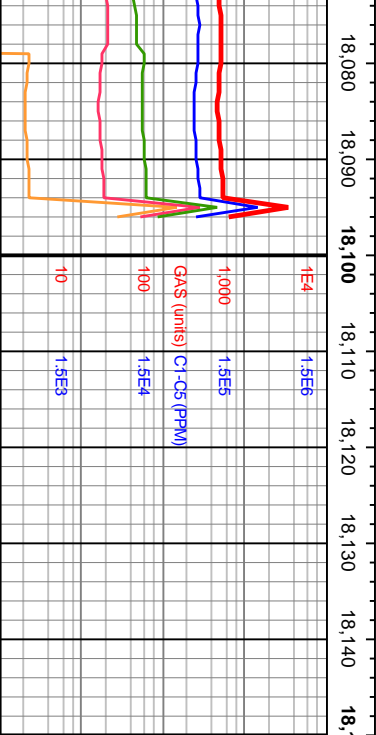
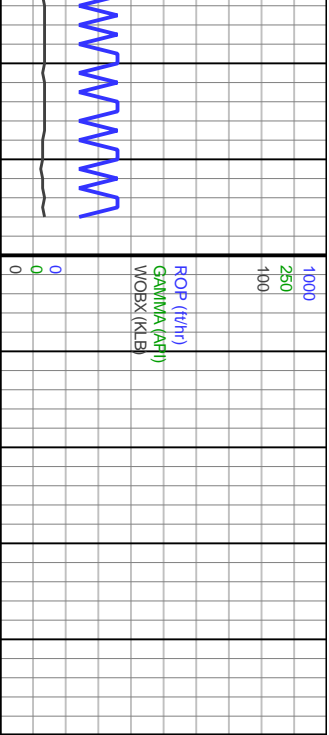


MD: 17,878'
INC: 90.24°
AZM: 178.77°
TVD: 7,651.88'
VS: 9,774.95'

MD: 17,973'
INC: 90.55°
AZM: 177.8°
TVD: 7,651.22'
VS: 9,869.85'

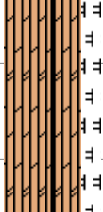
MD: 18,051'
INC: 90.55°
AZM: 177.45°
TVD: 7,650.48'
VS: 9,947.71'

800-17900 80% CHK: lt gy-off wh, blk-y-sb gy, frm-fri, rthy-chky tex, v tr free chk, cal c fill, calc, mod intbdd mlst; 20% MRLST: gy-med gy, sb ang-sb ply, pred frm-hrd silky app, vf sm grnd, hi calc, abnt chk incl	TVD (ft)	17900-18000 80% CHK: v lt gy-off wh, predy blk-y-sb blk-y, frm-fri ip, rthy-chky tex, v tr free chk, cal frac fill, calc, mod intbdd mlst; 20% MRLST: dk gy-med gy, sb ang-sb ply, pred frm-hrd, silky app, vf sm grnd, hi calc, abnt chk incl	TVD (ft)	18000-18096 80% C blk-y-sb blk-y, frm-fri, r chk, cal frac fill, calc, MRLST: dk gy-med g frm-hrd, silky app, vf s chk incl
7800		7800		



Projection to Bit

MD: 18,096'
INC: 90.55°
AZM: 177.5°
TVD: 7,651'
VS: 9,993'



TD of 18,096 MD reached @
01:40 MST on 08/18/2018

TVD (ft)

HK: lt gy-off wh, predy
thy-chky tex. v tr free
mod intbdd mrlst; 20%
yy, sb ang-sb pty. pred
sm grmd, hi calc, abnt

7800

