



Scale: 5" / 100'  
Measured Depth Log

**Well Name** Herren 1B-33H-H367

**Location** Sec. 33 T3N R67W

**State** Colorado

**County** Weld

**Country** USA

**Rig Number** Ensign 153

**API Number** 05-123-47728

**AFE #** 16191561

**Geographic Region** Rockies

**Field** Wattenberg

**Spud Date** 12/3/2018

**Drilling Completed** 12/6/2018

**Surface Coordinates** Latitude: 40.183282  
Longitude: -104.887065

SHL: Sec: 33 Twp: 3N 67W  
Footage: 2257 FNL 368 FEL

**Bottom Hole Coordinates** Proposed BHL: Sec: 33 Twp: 3N 67W  
Footages: 105 FNL 460 FWL

**Ground Elevation** 4,847'

**K.B. Elevation** 4,870'

**Logged Interval** 6,500' **To** 12,135'

**Total Depth** 12,135'

**Formation** Niobrara C

**Type of Drilling Fluid** Synthetic Oil Based Mud

## Operator

**Company** Crestone Peak Resources

**Address** 1801 California Street  
Suite 2500  
Denver, CO 80202



**CRESTONE PEAK**  
RESOURCES

## Geologist

**Name** John Ready

**Company** Crestone Peak Resources

**Address** 1801 California Street  
Suite 2500  
Denver, CO 80202



## Zone Color Coding

Oil	Condensate	Gas
Note	Core	Pressure
Error	Water	Seal

## Other

**Loggers:** Byron Pitulski / Heather Davis / Shana Swirin-Miles

**Services Provided:** 2-Man Mudlogging / Geosteering

**Equipment:** ML-567

**Contractor:** Reservoir Group  
6360 West Sam Houston Pkwy N  
Houston, Texas, 77041

**Start Date** 12/03/2018

**Release Date:** 12/07/2018

**Job #:** 1810RK1812

## Rock Types

UNKNOWN	DOLOMITE	SHALE GRAY	TILL
ANHYDRITE	CHERT	SHALE COLORED	BENTONITE
GYPSUM	COAL	SILTSTONE	TUFF
SALT	MARLSTONE	SANDSTONE	IGNEOUS
SIDERITE or LIMONITE	CHALK	CONGLOMERATE	METAMORPHIC
LIMESTONE	SHALE	BRECCIA	CEMENT

## Accessories

### Fossils

ALGAE  
 AMPHIPORA  
 BELEMNITE  
 BRYOZOA  
 CEPHALOPOD  
 CORAL  
 CRINOID

### F FOSSIL

GASTROPOD  
 OOLITE  
 OSTRACOD  
 PELECYPOD  
 PELLET  
 PISOLITE  
 PLANT REMAINS  
 PLANT SPORES  
 SCAPHOPOD  
 STROMATOLITE

### ARGILLACEOUS

ARGILLITE GRAIN  
 BENTONITE  
 BITUMENOUS SUBSTANCE  
 BRECCIA FRAGMENTS  
 CALCAREOUS  
 CARBONACEOUS FLAKES  
 CHTDK  
 CHTLT  
 COAL - THIN BEDS  
 DOLOMITE

### GLAUCONITE

GYPSIFEROUS  
 HEAVY MINERAL  
 KAOLIN  
 MARLSTONE  
 MINERAL CRYSTALS  
 NODULES  
 PHOSPHATE PELLETS  
 PYRITE  
 SALT CAST  
 SANDY

### Stringer

ANHYDRITE STRINGER  
 BENTONITE STRINGER  
 COAL STRINGER  
 DOLOMITE STRINGER  
 GYPSUM STRINGER  
 LIMESTONE STRINGER  
 MARLSTONE (CALC) STRG  
 MARLSTONE (DOL) STRG  
 SANDSTONE STRINGER

CRINOID  
ECHINOID  
FISH  
FORAMINIFERA

STROMATOPOROID  
**Minerals**  
ANHYDRITIC

DOLOMITIC  
FELDSPAR  
FERRUGINOUS PELLET  
FERRUGINOUS

SANDY  
SILICEOUS  
SILTY  
TUFFACEOUS

SANDSTONE STRINGER  
SHALE STRINGER  
SILTSTONE STRINGER

## Oil Show

DEAD  
EVEN  
QUESTIONABLE  
SPOTTED STAINING

## Porosity

EARTHY  
FENESTRAL  
FRACTURE  
INTERCRYSTALLINE  
INTEROOLITIC  
MOLDIC

ORGANIC  
PINPOINT  
VUGGY

## Engineering

BIT  
CASING  
CONNECTION (LEFT)  
CONNECTION (RIGHT)  
CONNECTION GAS  
CORE - LOST  
CORE - RECOVERED  
DST INTERVAL  
FAULT

## Other Symbols

FORMATION TOP  
GAS SHOW  
MN DEPTH  
NORMAL FAULT  
OIL SHOW  
OVERTURNED STRATA  
REVERSE FAULT  
SIDEWALL CORE (LEFT)  
SIDEWALL CORE (RIGHT)  
SLIDE  
SURVEY  
TRIP GAS  
WIRELINE TESTED - LEFT  
WIRELINE TESTED - RT

## Rounding

ANGULAR  
ROUNDED  
SUBANG  
SUBRND

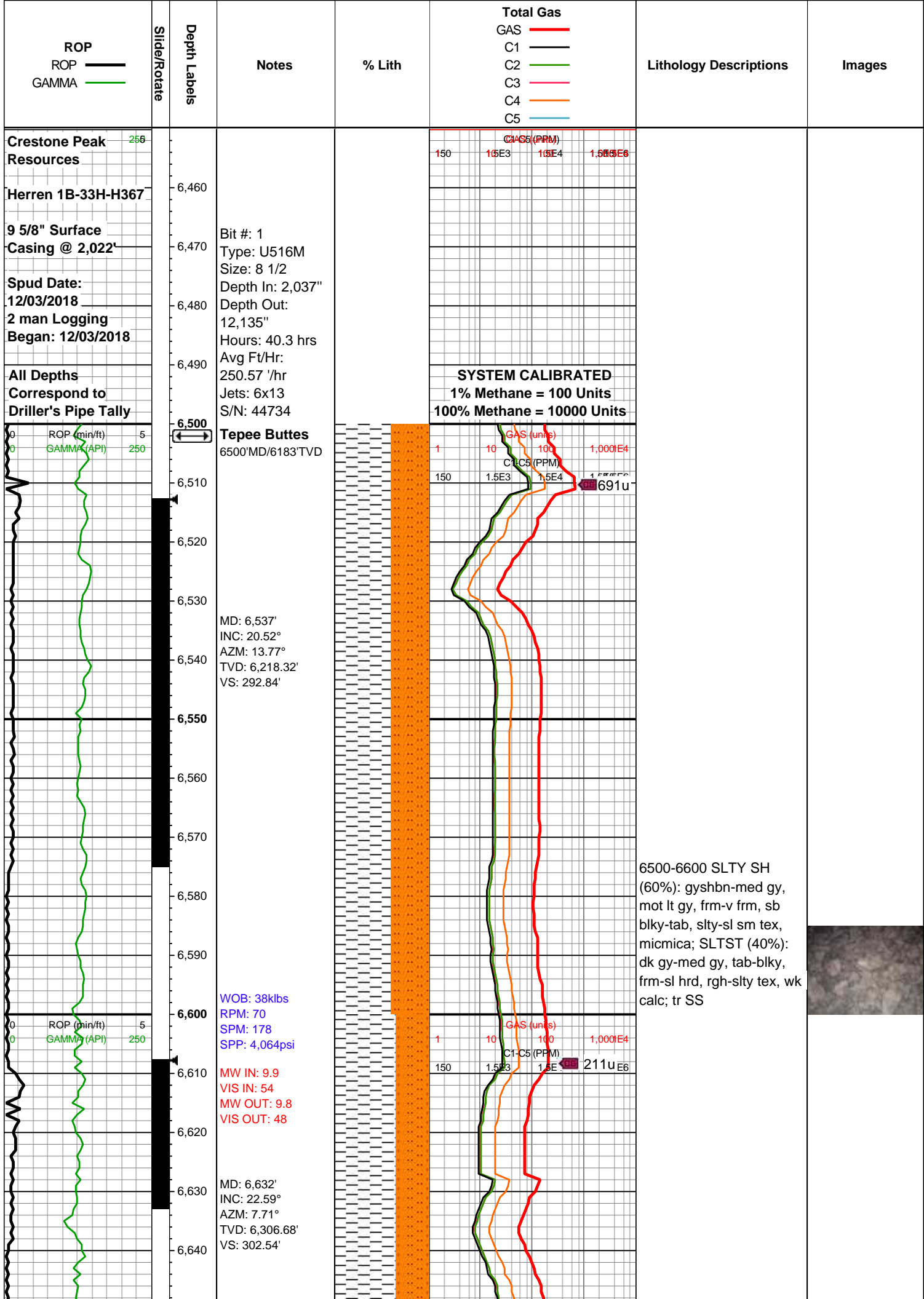
## Textures

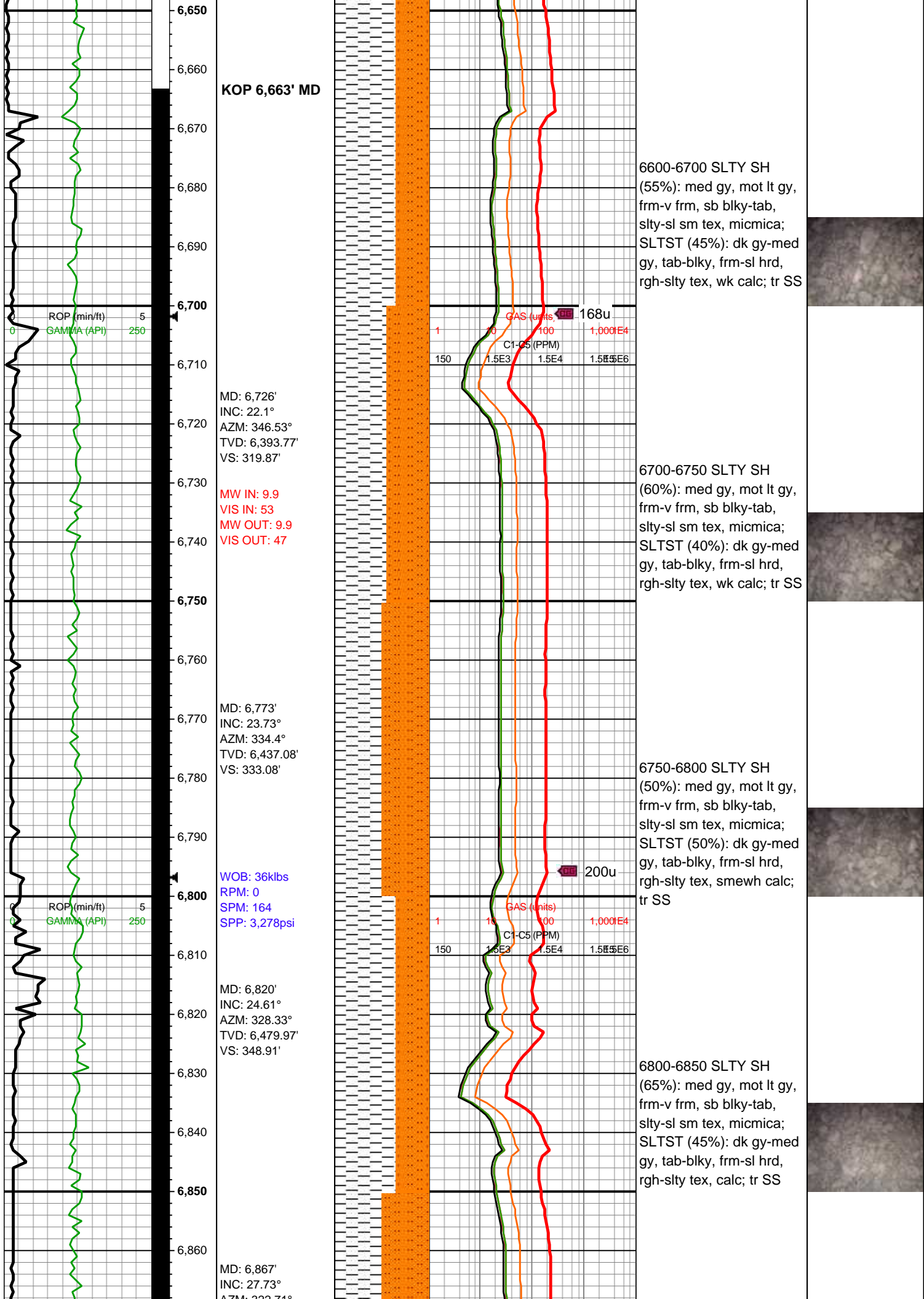
BOUNDSTONE  
CHALKY  
CRYPTOXLN  
EARTHY  
FINELYXLN  
GRAINSTONE

LITHOGRAPHIC  
MICROXLN  
MUDSTONE  
PACKSTONE  
WACKESTONE

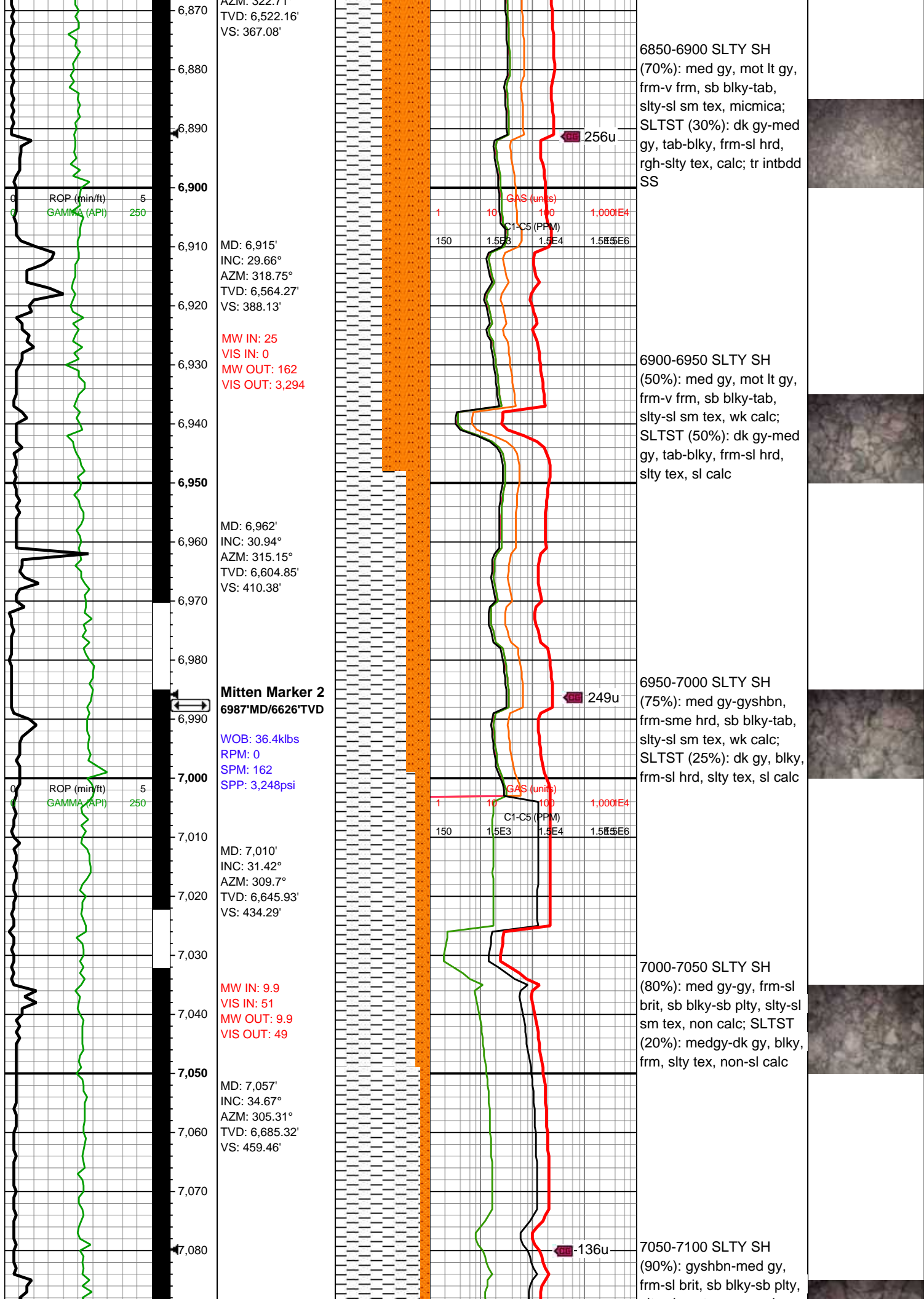
## Sorting

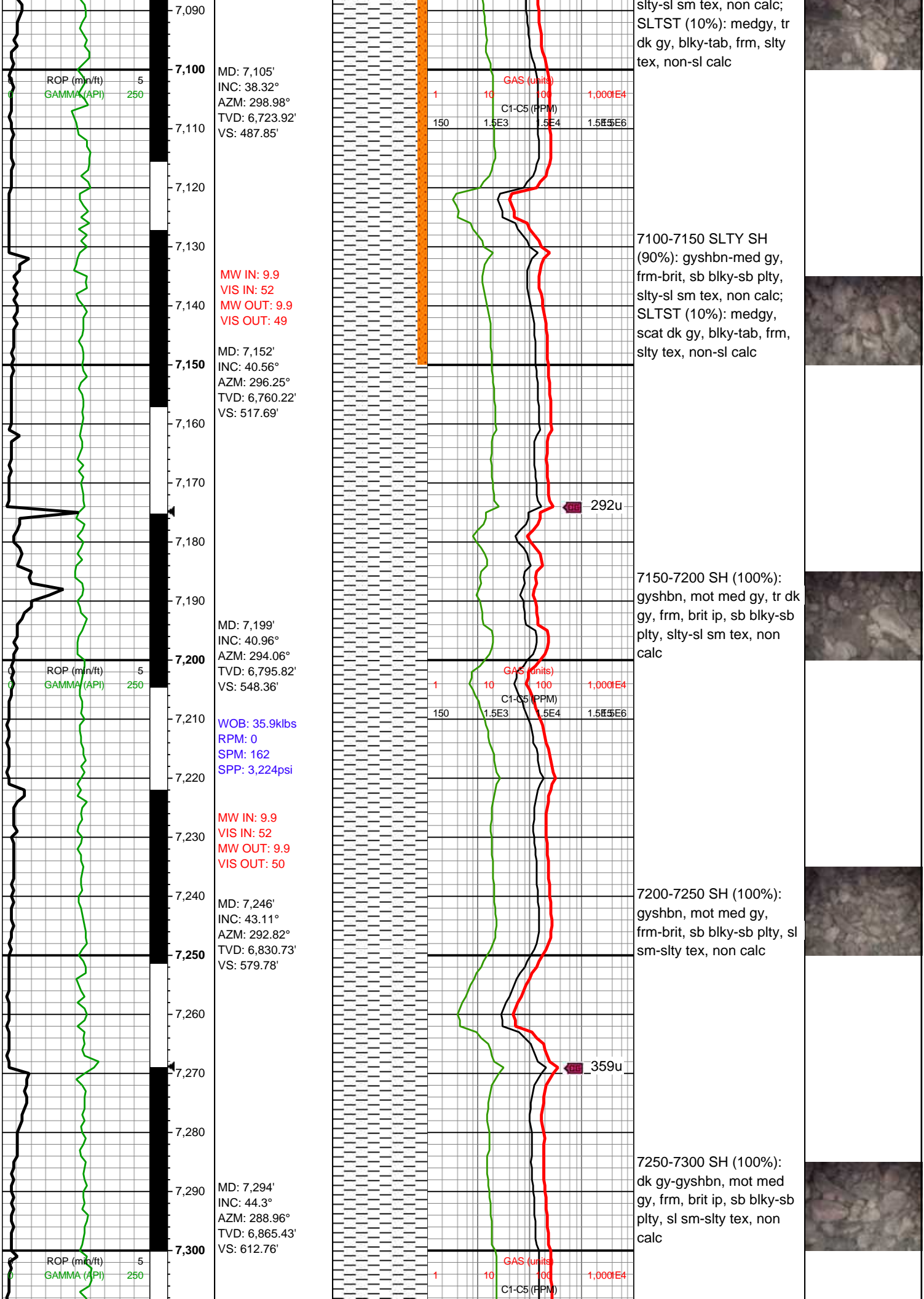
MODERATE  
POOR  
WELL











MD: 7,105'  
INC: 38.32°  
AZM: 298.98°  
TVD: 6,723.92'  
VS: 487.85'

MW IN: 9.9  
VIS IN: 52  
MW OUT: 9.9  
VIS OUT: 49

MD: 7,152'  
INC: 40.56°  
AZM: 296.25°  
TVD: 6,760.22'  
VS: 517.69'

MD: 7,199'  
INC: 40.96°  
AZM: 294.06°  
TVD: 6,795.82'  
VS: 548.36'

WOB: 35.9klbs  
RPM: 0  
SPM: 162  
SPP: 3,224psi

MW IN: 9.9  
VIS IN: 52  
MW OUT: 9.9  
VIS OUT: 50

MD: 7,246'  
INC: 43.11°  
AZM: 292.82°  
TVD: 6,830.73'  
VS: 579.78'

MD: 7,294'  
INC: 44.3°  
AZM: 288.96°  
TVD: 6,865.43'  
VS: 612.76'

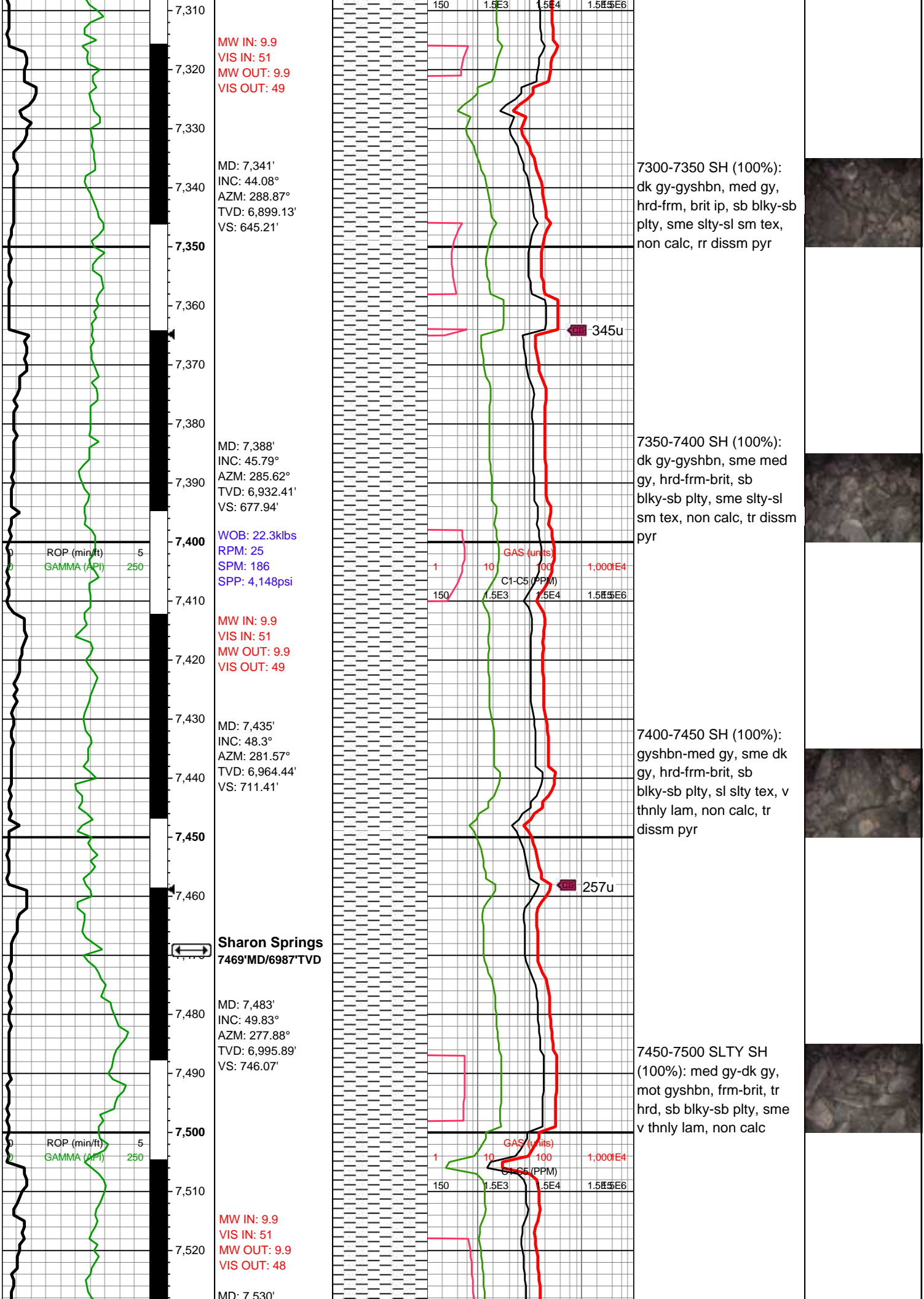
slty-sl sm tex, non calc;  
SLTST (10%): medgy, tr  
dk gy, blkgy-tab, frm, slty  
tex, non-sl calc

7100-7150 SLTY SH  
(90%): gyshbn-med gy,  
frm-brit, sb blkgy-sb plty,  
slty-sl sm tex, non calc;  
SLTST (10%): medgy,  
scat dk gy, blkgy-tab, frm,  
slty tex, non-sl calc

7150-7200 SH (100%):  
gyshbn, mot med gy, tr dk  
gy, frm, brit ip, sb blkgy-sb  
plty, slty-sl sm tex, non  
calc

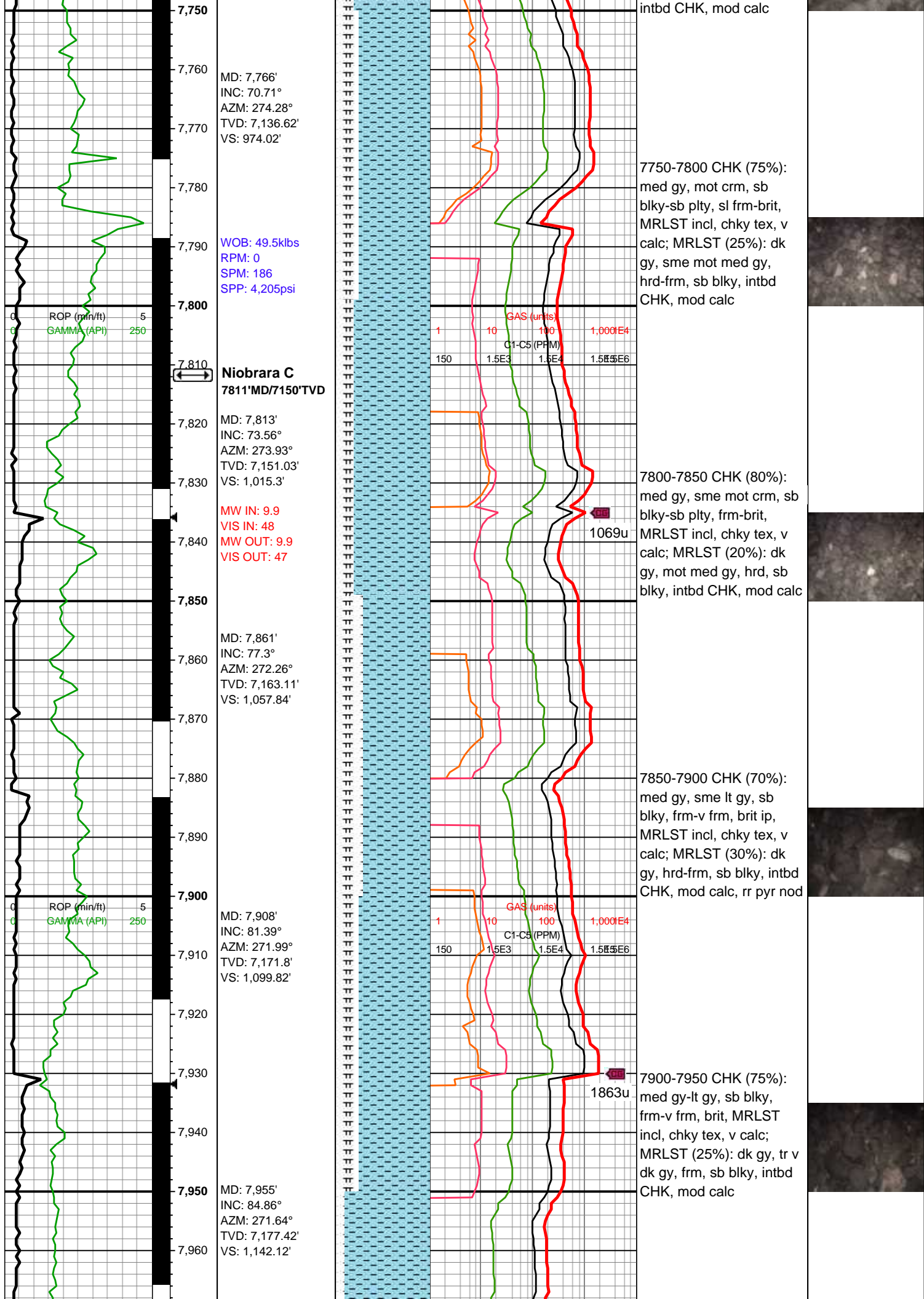
7200-7250 SH (100%):  
gyshbn, mot med gy,  
frm-brit, sb blkgy-sb plty, sl  
sm-slty tex, non calc

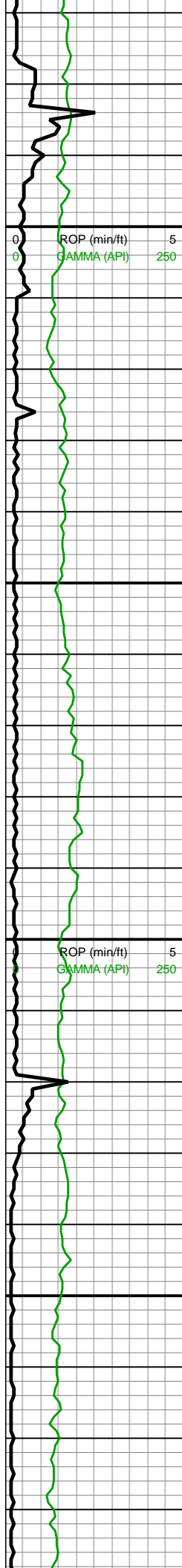
7250-7300 SH (100%):  
dk gy-gyshbn, mot med  
gy, frm, brit ip, sb blkgy-sb  
plty, sl sm-slty tex, non  
calc











WOB: 41.9klbs  
RPM: 9  
SPM: 187  
SPP: 4,284psi

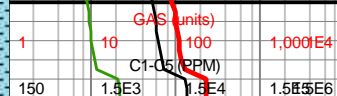
### Land Curve 8,009' MD

MW IN: 9.9+  
VIS IN: 49  
MW OUT: 9.9+  
VIS OUT: 47

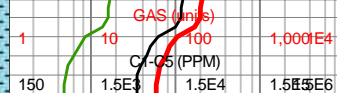
MD: 8,050'  
INC: 88.11°  
AZM: 270.32°  
TVD: 7,183.25'  
VS: 1,227.5'

MW IN: 9.9+  
VIS IN: 48  
MW OUT: 9.9+  
VIS OUT: 47

MD: 8,144'  
INC: 88.95°  
AZM: 269.97°  
TVD: 7,185.66'  
VS: 1,311.52'



219u



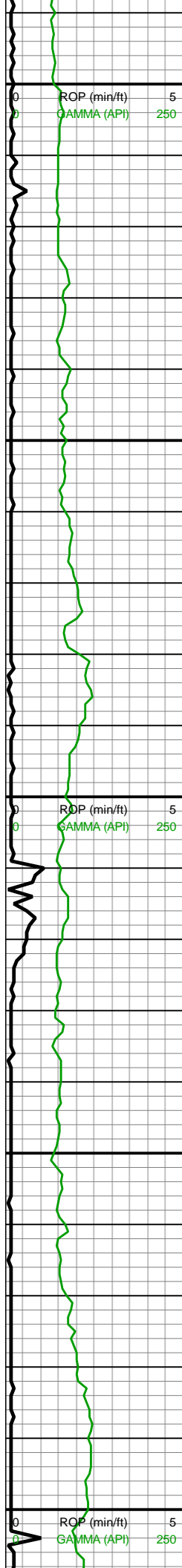
Start: Troubleshoot frozen  
gas line

7950-8000 CHK (90%):  
predy lt gy, sme mot med  
gy, sb blk, frm-brit,  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (10%):  
dk gy, frm, sb blk, intbd  
CHK, mod calc, rr pyr nod

8000-8100 CHK (90%):  
med gy, mot lt gy, sb blk,  
frm-brit, MRLST incl, v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (10%):  
dk gy, frm, sb blk, tr thn  
CHK lamn, intbd CHK,  
mod calc

8100-8200 CHK (90%):  
predy lt gy, sme mot med  
gy, sb blk, frm-brit,  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (10%):  
dk gy, frm, sb blk, intbd  
CHK, mod calc, rr pyr nod





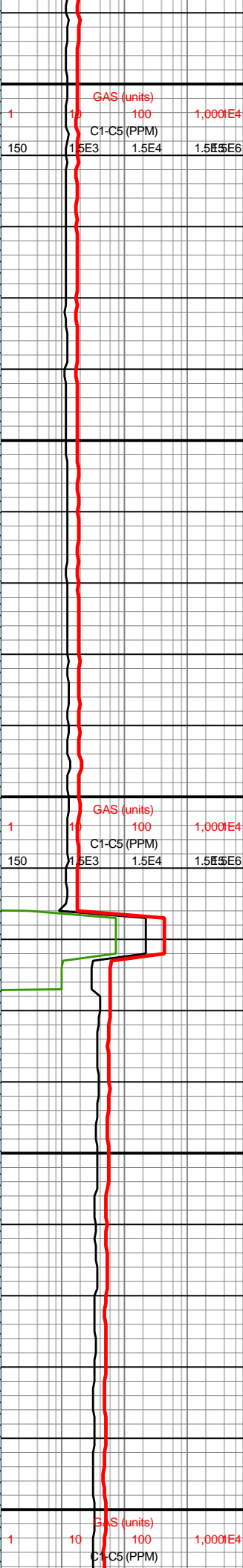
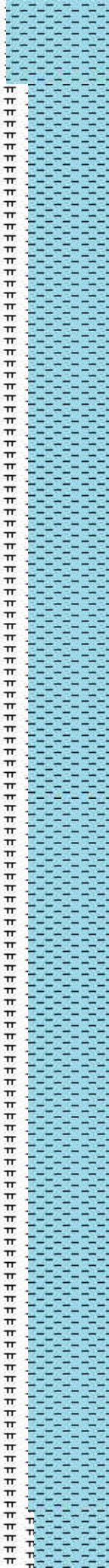
WOB: 36.9klbs  
RPM: 70  
SPM: 202  
SPP: 5,140psi

MD: 8,239'  
INC: 88.99°  
AZM: 270.24°  
TVD: 7,187.35'  
VS: 1,396.42'

MW IN: 9.9+  
VIS IN: 48  
MW OUT: 9.9+  
VIS OUT: 47

MD: 8,333'  
INC: 89.78°  
AZM: 269.36°  
TVD: 7,188.36'  
VS: 1,480.21'

WOB: 35klbs  
RPM: 70  
SPM: 202  
SPP: 5,222psi

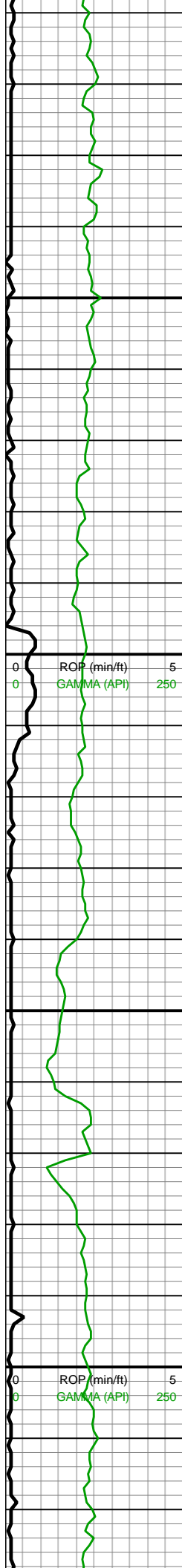


MRLST lamn, sme chky  
tex, v calc; MRLST (10%):  
dk gy, frm, sb blk, intbd  
CHK, mod calc, rr pyr nod

8200-8300 CHK (70%):  
predy lt gy, sme mot med  
gy, sb blk, frm-brit,  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (30%):  
med-dk gy, frm, sb blk,  
com intbd CHK, mod calc

8300-8400 CHK (70%):  
predy lt gy, sme mot med  
gy, sb blk, frm-brit,  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (30%):  
med-dk gy, frm, sb blk,  
com intbdd CHK, mod  
calc





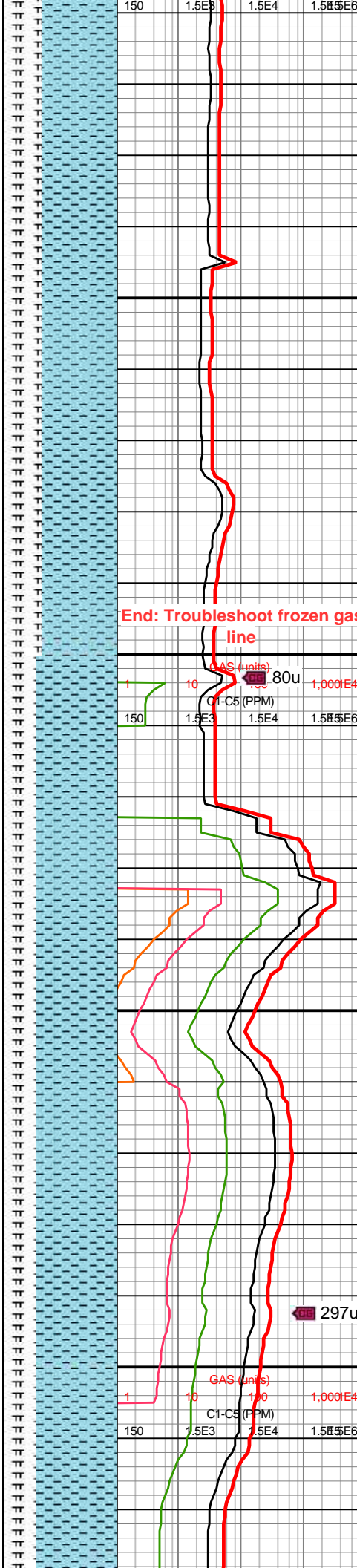
MD: 8,428'  
INC: 89.3°  
AZM: 268.65°  
TVD: 7,189.12'  
VS: 1,564.28'

MW IN: 9.9+  
VIS IN: 48  
MW OUT: 10  
VIS OUT: 47

MD: 8,523'  
INC: 90.57°  
AZM: 269.09°  
TVD: 7,189.23'  
VS: 1,648.25'

WOB: 38klbs  
RPM: 70  
SPM: 200  
SPP: 5,162psi

MD: 8,617'  
INC: 90.26°  
AZM: 268.65°  
TVD: 7,188.55'  
VS: 1,731.34'

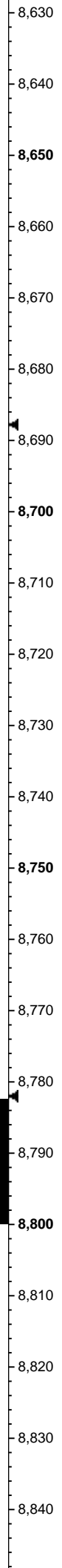
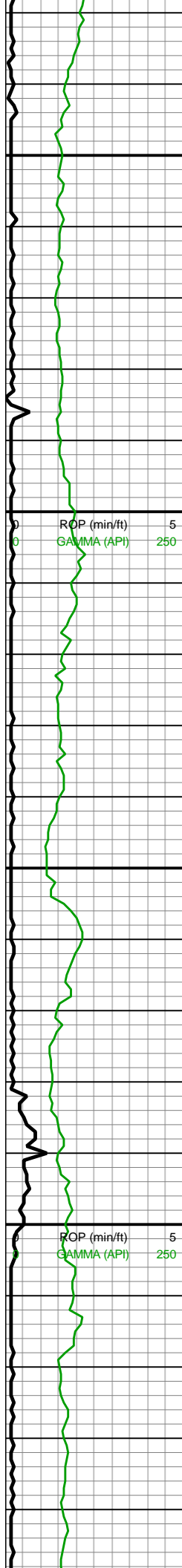


End: Troubleshoot frozen gas line

8300-8400 CHK (65%):  
predy lt gy, sme mot med  
gy, offwht, sb blk, y,  
frm-brit, MRLST incl, sme  
v thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(35%): med-dk gy, frm,  
sb blk, y, com intbdd CHK,  
mod calc

8500-8600 CHK (70%):  
predy lt gy, sme mot med  
gy, offwht, sb blk, y,  
frm-brit, MRLST incl, sme  
v thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(30%): med-dk gy, frm,  
sb blk, y, com CHK lam,  
calc



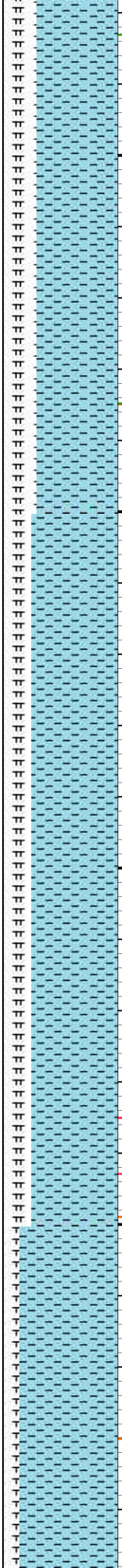


MW IN: 9.9+  
VIS IN: 47  
MW OUT: 9.9+  
VIS OUT: 46

MD: 8,711'  
INC: 89.87°  
AZM: 268.04°  
TVD: 7,188.44'  
VS: 1,814.02'

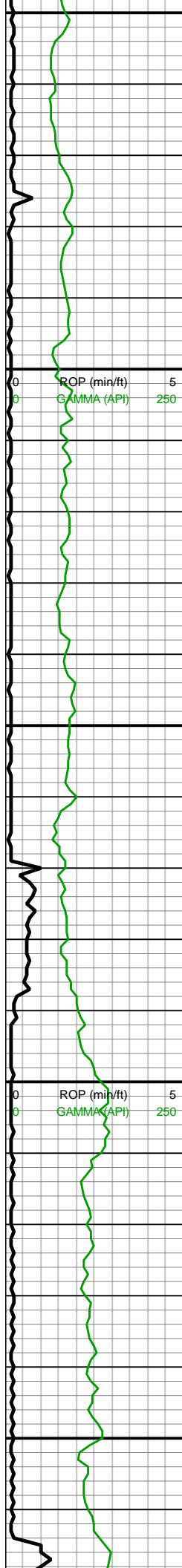
WOB: 31klbs  
RPM: 70  
SPM: 202  
SPP: 5,084psi

MD: 8,805'  
INC: 91.32°  
AZM: 268.22°  
TVD: 7,187.47'  
VS: 1,896.53'



8600-8700 CHK (70%):  
predy lt gy, offwht-sme  
mot med gy, sb blk,  
frm-brit, MRLST incl, sme  
v thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(30%): med-dk gy, frm,  
sb blk, com CHK lam, hi  
calc

8700-8800 CHK (75%): lt  
gy-offwht-sme mot med  
gy, sb blk, frm-brit,  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (25%):  
med-dk gy, frm, sb blk,  
com CHK lam, hi calc

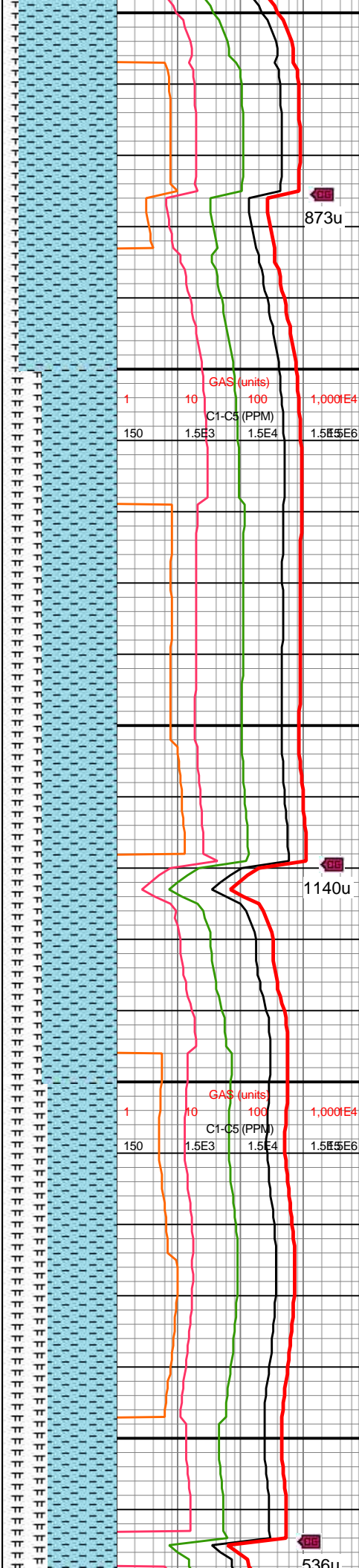


MW IN: 9.9  
VIS IN: 46  
MW OUT: 9.9  
VIS OUT: 45

MD: 8,900'  
INC: 91.71°  
AZM: 267.34°  
TVD: 7,184.96'  
VS: 1,979.61'

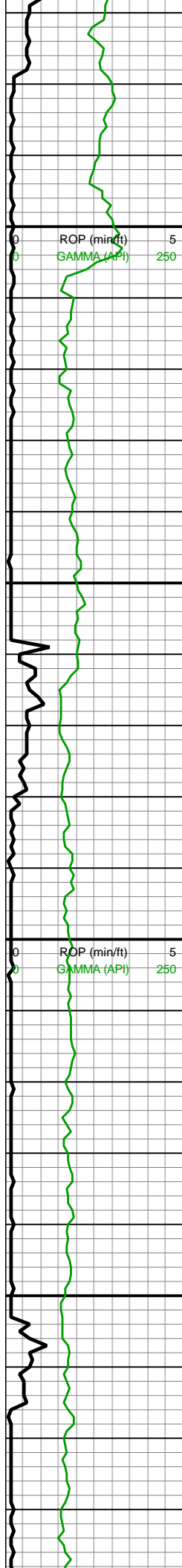
MD: 8,994'  
INC: 92.37°  
AZM: 269.36°  
TVD: 7,181.61'  
VS: 2,062.24'

WOB: 40klbs  
RPM: 70  
SPM: 200  
SPP: 5,238psi



8800-8900 CHK (85%): lt  
gy-offwht-sme mot med  
gy, sb blk, frm-brit, occ  
MRLST incl, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (15%):  
med-dk gy, frm, sb blk,  
com CHK lam, hi calc

8900-9000 CHK (65%): lt  
gy-offwht-sme mot med  
gy, blk-sb blk, frm-brit,  
occ MRLST incl, sme v  
thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(35%): med-dk gy, frm,  
sb blk, com CHK lam, hi  
calc



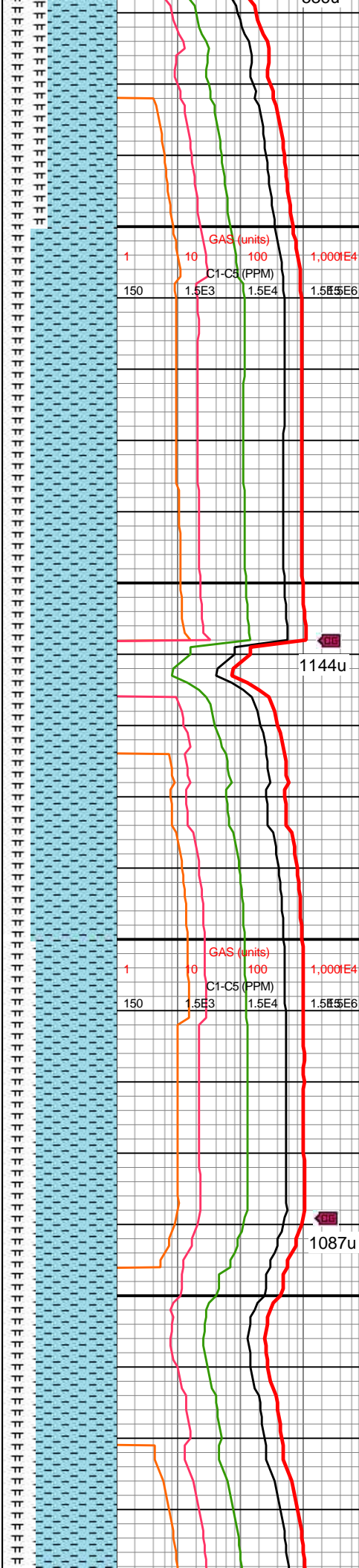
MD: 9,089'  
INC: 91.63°  
AZM: 269.71°  
TVD: 7,178.3'  
VS: 2,146.67'

MD: 9,184'  
INC: 90.35°  
AZM: 271.64°  
TVD: 7,176.65'  
VS: 2,231.99'

WOB: 38klbs  
RPM: 70  
SPM: 202  
SPP: 5,290psi

MW IN: 9.9+  
VIS IN: 46  
MW OUT: 9.9+  
VIS OUT: 45

MD: 9,278'  
INC: 88.99°  
AZM: 270.76°  
TVD: 7,177.19'  
VS: 2,316.79'

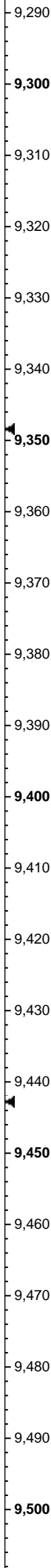
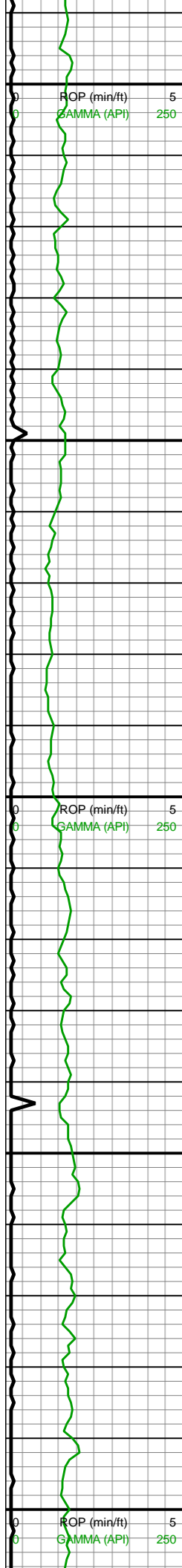


9000-9100 CHK (60%): lt  
gy-offwht-sme mot med  
gy, blk-y-sb blk-y, frm-brit,  
occ MRLST incl, sme v  
thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(40%): med-dk gy, frm,  
sb blk-y, com CHK intbds,  
mod calc

9100-9200 CHK (75%): lt  
gy-offwht-sme mot med  
gy, blk-y-sb blk-y, frm-brit,  
sme v thn MRLST lamn,  
sme chky tex, v calc;  
MRLST (25%): med-dk  
gy, frm, sb blk-y, com CHK  
intbds, mod calc

9200-9300 CHK (70%): lt  
gy-offwht-sme mot med  
gy, blk-y-sb blk-y, frm-brit,  
sme v thn MRLST lamn,

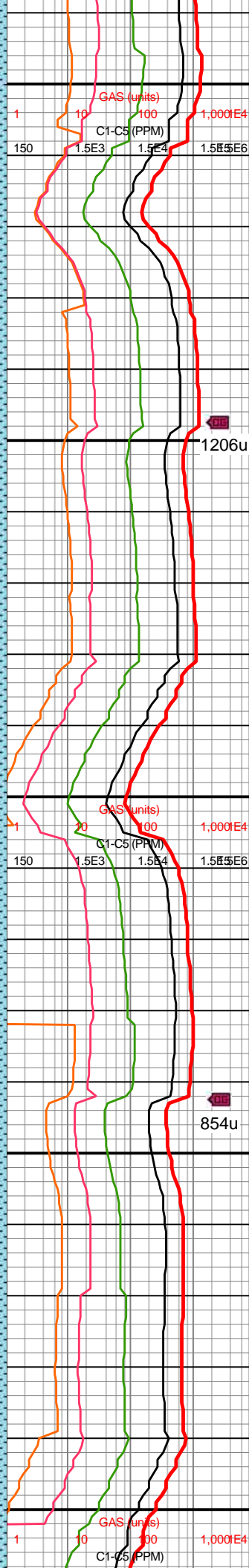
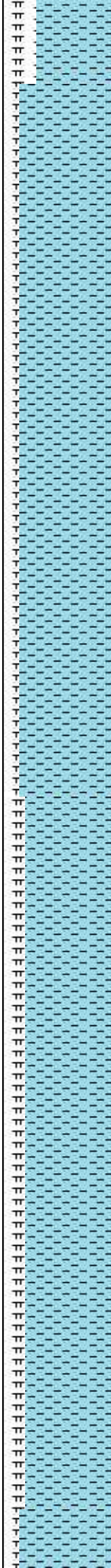




MD: 9,373'  
INC: 88.46°  
AZM: 270.59°  
TVD: 7,179.31'  
VS: 2,402.1'

WOB: 37klbs  
RPM: 70  
SPM: 199  
SPP: 5,226psi

MD: 9,467'  
INC: 88.77°  
AZM: 270.32°  
TVD: 7,181.58'  
VS: 2,486.35'



sme chky tex, v calc;  
MRLST (30%): med-dk  
gy, frm, sb blk, com CHK  
intbds, mod calc

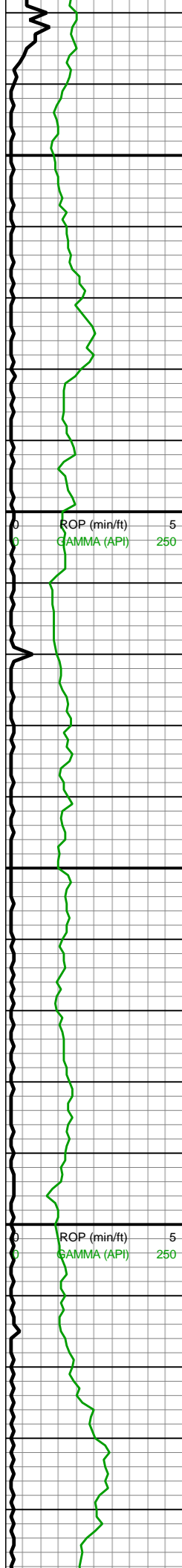
9300-9400 CHK (85%): lt  
gy-offwht-sme mot med  
gy, blk-sb blk, frm-brit,  
sme v thn MRLST lamn,  
sme chky tex, v calc;  
MRLST (15%): med-dk  
gy, frm, sb blk, com CHK  
intbds, mod-hi calc

9400-9500 CHK (80%): lt  
gy-offwht-sme mot med  
gy, blk-sb blk, frm-brit,  
sme v thn MRLST lamn,  
sme chky tex, v calc;  
MRLST (20%): med-dk  
gy, frm, sb blk, com CHK  
intbds, mod-hi calc, tr pp  
pyr incl









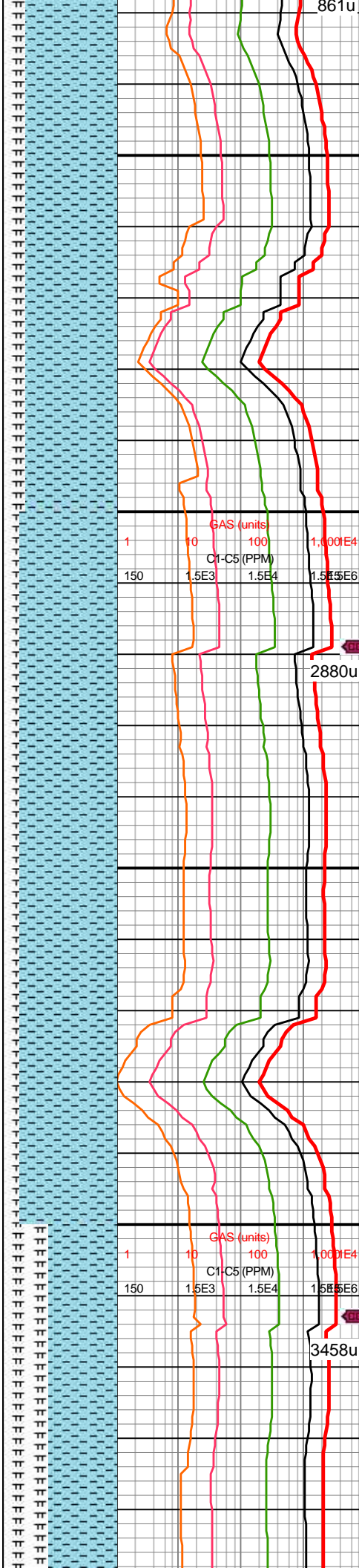
MD: 9,750'  
INC: 90.04°  
AZM: 268.83°  
TVD: 7,186.1'  
VS: 2,739.38'

WOB: 38klbs  
RPM: 70  
SPM: 202  
SPP: 5,412psi

MD: 9,844'  
INC: 90.7°  
AZM: 268.65°  
TVD: 7,185.5'  
VS: 2,822.37'

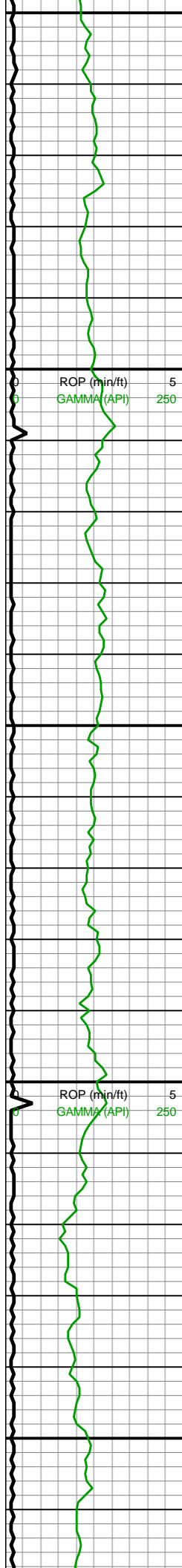
MW IN: 9.9+  
VIS IN: 47  
MW OUT: 9.9+  
VIS OUT: 46

MD: 9,939'  
INC: 90.97°  
AZM: 267.6°  
TVD: 7,184.11'  
VS: 2,905.75'



9700-9800 CHK (80%): lt gy-offwht-sme mot med gy, blk-y-sb blk-y, frm-brit, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (20%): predy dk gy, hd-frm, sb blk-y, sme CHK intbds, mod-hi cal

9800-9900 CHK (85%): predy lt gy-offwht-sme mot med gy, blk-y-sb blk-y, frm-brit, sme v thn MRLST lamn, sme chky tex, v calc; MRLST (15%): predy dk gy, hd-frm, sb blk-y, abnt CHK intbds, mod-hi cal



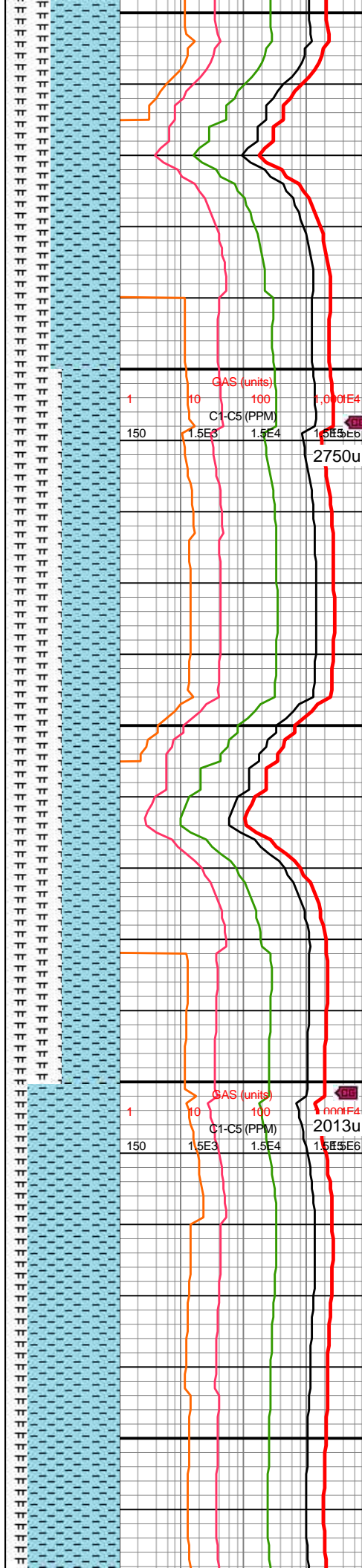
9,950  
9,960  
9,970  
9,980  
9,990  
10,000  
10,010  
10,020  
10,030  
10,040  
10,050  
10,060  
10,070  
10,080  
10,090  
10,100  
10,110  
10,120  
10,130  
10,140  
10,150  
10,160

WOB: 38klbs  
RPM: 70  
SPM: 200  
SPP: 5,378psi

MD: 10,033'  
INC: 91.32°  
AZM: 267.6°  
TVD: 7,182.23'  
VS: 2,987.82'

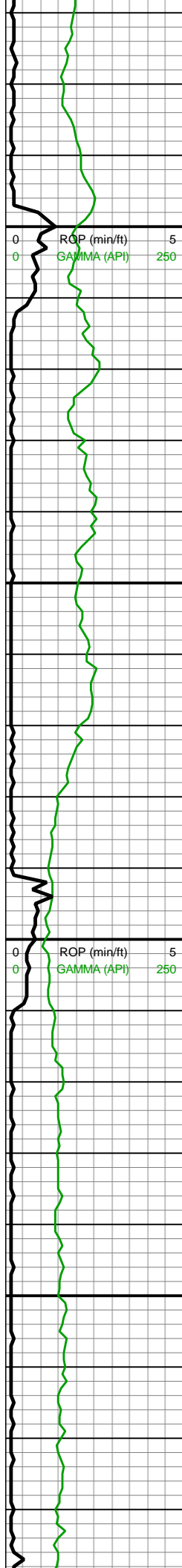
MW IN: 9.9+  
VIS IN: 46  
MW OUT: 9.9+  
VIS OUT: 44

MD: 10,127'  
INC: 91.19°  
AZM: 266.98°  
TVD: 7,180.17'  
VS: 3,069.65'



9900-10000 CHK (60%):  
predy lt gy-offwht-sme  
mot med gy, blkysb blkys,  
frm-brit, sme v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (40%):  
predy dk gy, hd-frm, sb  
blkys, abnt CHK intbds,  
mod-hi cal

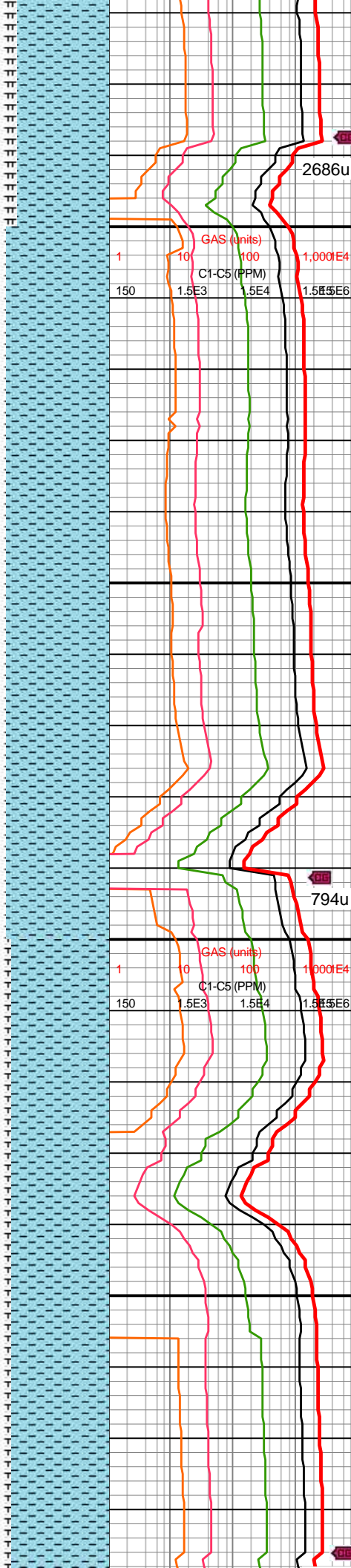
10000-10100 CHK  
(50%): predy lt  
gy-offwht-sme mot med  
gy, blkysb blkys, frm-brit,  
sme v thn MRLST lamn,  
sme chky tex, v calc;  
MRLST (50%): predy dk  
gy, hd-frm, sb blkys, abnt  
CHK intbds, mod-hi cal,  
tr pp mic pyr



WOB: 39klbs  
RPM: 0  
SPM: 201  
SPP: 5,104psi

MD: 10,222'  
INC: 91.36°  
AZM: 268.04°  
TVD: 7,178.06'  
VS: 3,152.52'

MD: 10,316'  
INC: 89.52°  
AZM: 269.01°  
TVD: 7,177.34'  
VS: 3,235.34'

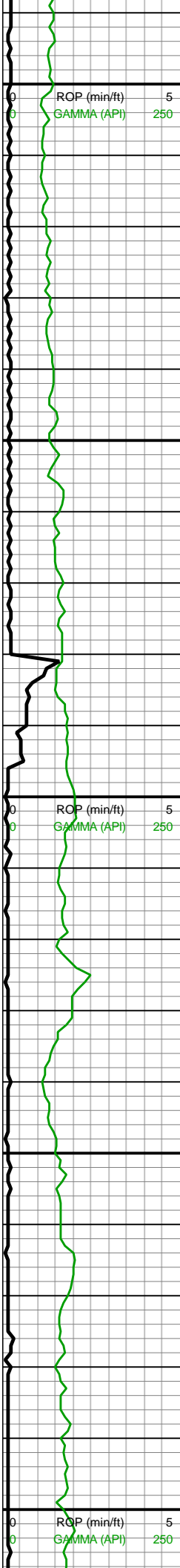


10100-10200 CHK  
(80%): predy lt gy,  
offwht-sme mot med gy,  
blky-sb blky, frm-brit, sme  
v thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(20%): dk gy, hd-frm, sb  
blky, abnt CHK intbds,  
mod-hi cal, tr pp mic pyr

10200-10300 CHK  
(90%): predy lt gy,  
offwht-sme mot med gy,  
blky-sb blky, frm-brit, sme  
v thn MRLST lamn, sme  
chky tex, v calc; MRLST  
(10%): dk gy, hd-frm, sb  
blky, abnt CHK intbds,  
mod-hi cal, tr pp mic pyr

10300-10400 CHK  
(85%): predy lt gy, offwht,  
blky-sb blky, frm-brit, v thn





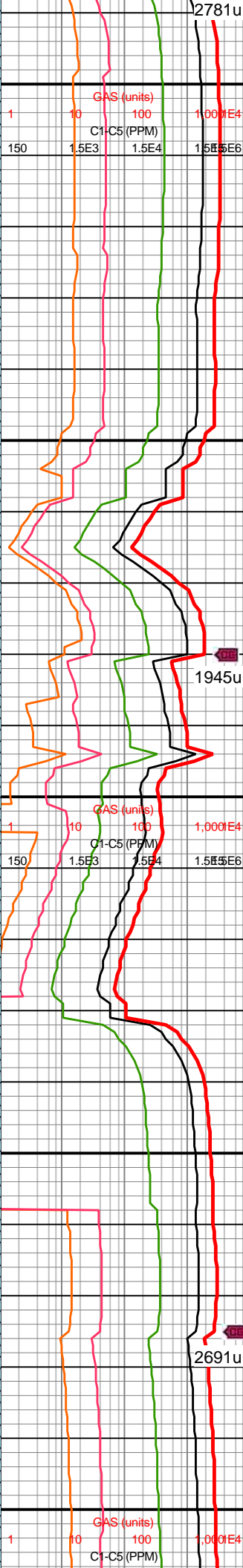
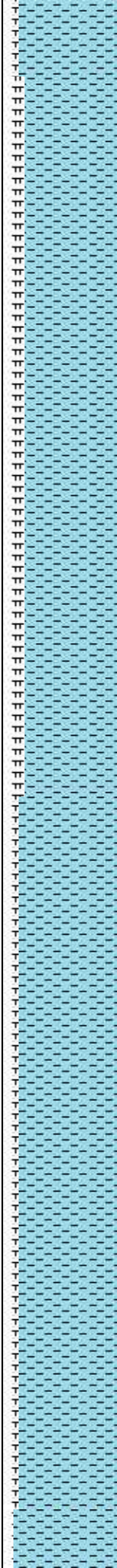
WOB: 38klbs  
RPM: 70  
SPM: 202  
SPP: 5,538psi

MD: 10,411'  
INC: 88.55°  
AZM: 268.65°  
TVD: 7,178.95'  
VS: 3,319.26'

MW IN: 9.9+  
VIS IN: 46  
MW OUT: 9.9+  
VIS OUT: 45

MD: 10,505'  
INC: 90.53°  
AZM: 270.32°  
TVD: 7,179.7'  
VS: 3,402.81'

MD: 10,600'  
INC: 91.19°  
AZM: 269.97°  
TVD: 7,178.28'  
VS: 3,487.74'

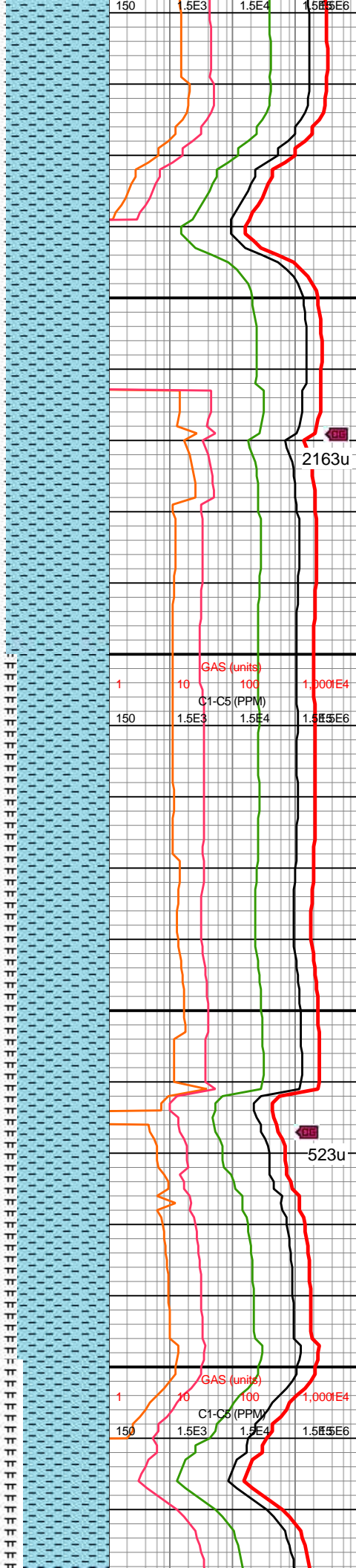
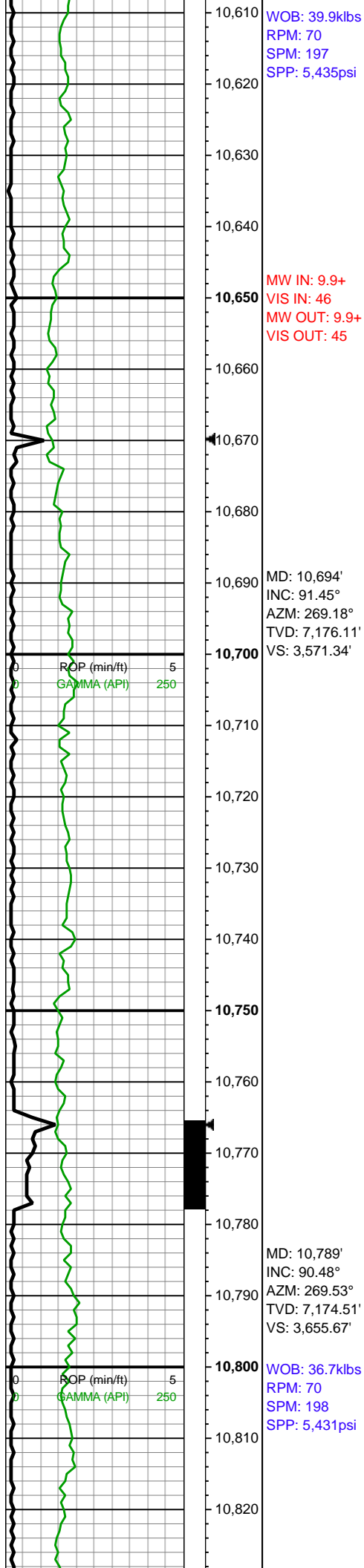


MRLST lamn, sme chky  
tex, v calc; MRLST (15%):  
dk gy, hd-frm, sb blkly,  
CHK intbds, mod-hi cal

10400-10500 CHK  
(80%): lt gy, sme mot  
med gy, blkly-sb blkly, frm,  
brit ip, sme v thn MRLST  
lamn, chky tex, v calc;  
MRLST (20%): dk gy,  
hd-frm, sb blkly, CHK  
intbds, mod cal

10500-10600 CHK  
(85%): predy lt gy, mot  
med gy, tr offwht, blkly-sb  
blkly, frm-brit, tr v thn  
MRLST lamn, sme chky  
tex, v calc; MRLST (15%):  
dk gy, hd-frm, sb blkly,  
CHK intbds, mod-hi cal

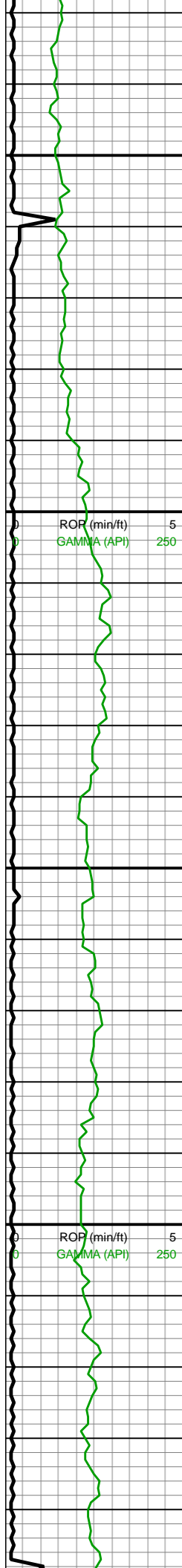




10600-10700 CHK  
(90%): predy mot med gy,  
lt gy-tr offwht, blkysb blkys,  
frm-brit, v thn MRLST  
lamn, chky tex, v calc;  
MRLST (10%): dk gy, hd,  
sb blkys, intbd CHK, mod  
cal, sme pyr nod

10700-10800 CHK  
(80%): predy mot med gy,  
lt gy-offwht, sb blkys, frm,  
brit ip, v thn MRLST lamn,  
chky tex, v calc; MRLST  
(20%): dk gy, tr v dk gy,  
hd, sb blkys, intbd CHK,  
mod cal, tr pyr nod





10,830  
10,840  
10,850  
10,860  
10,870  
10,880  
10,890  
10,900  
10,910  
10,920  
10,930  
10,940  
10,950  
10,960  
10,970  
10,980  
10,990  
11,000  
11,010  
11,020  
11,030  
11,040

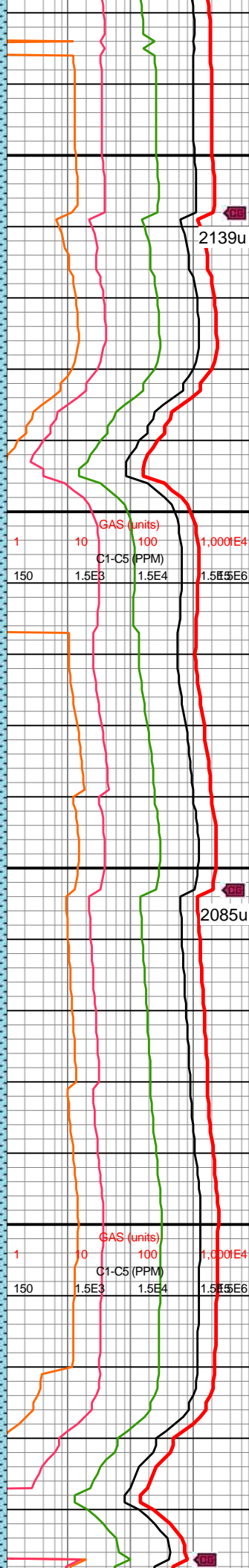
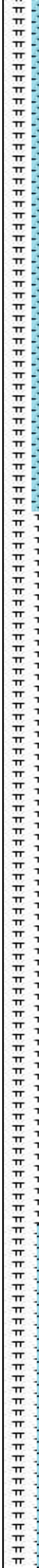
MD: 10,883'  
INC: 90.53°  
AZM: 269.09°  
TVD: 7,173.68'  
VS: 3,739.1'

MW IN: 10  
VIS IN: 46  
MW OUT: 10  
VIS OUT: 45

MD: 10,978'  
INC: 91.1°  
AZM: 269.09°  
TVD: 7,172.33'  
VS: 3,823.23'

WOB: 34.5klbs  
RPM: 70  
SPM: 198  
SPP: 5,484psi

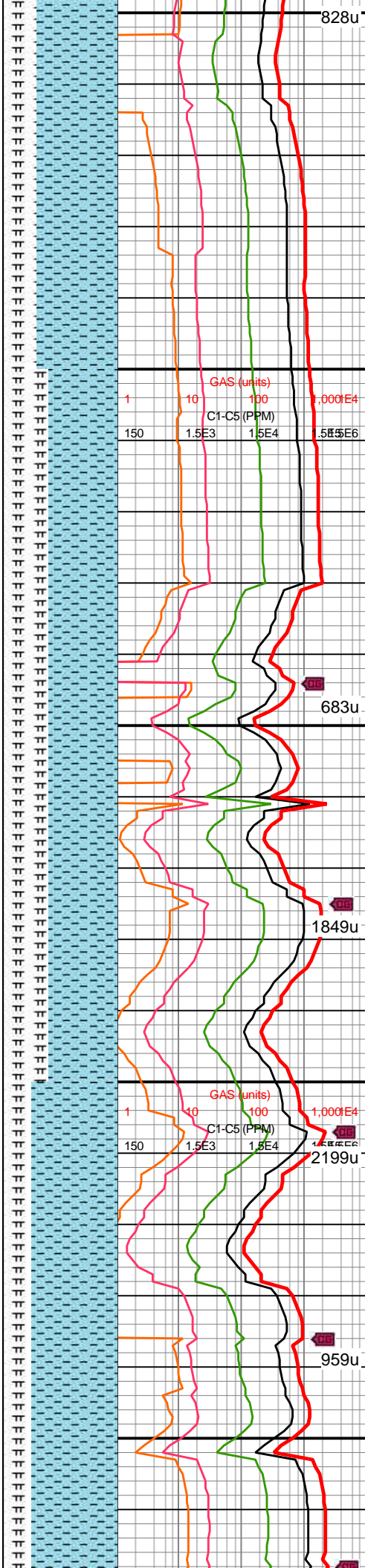
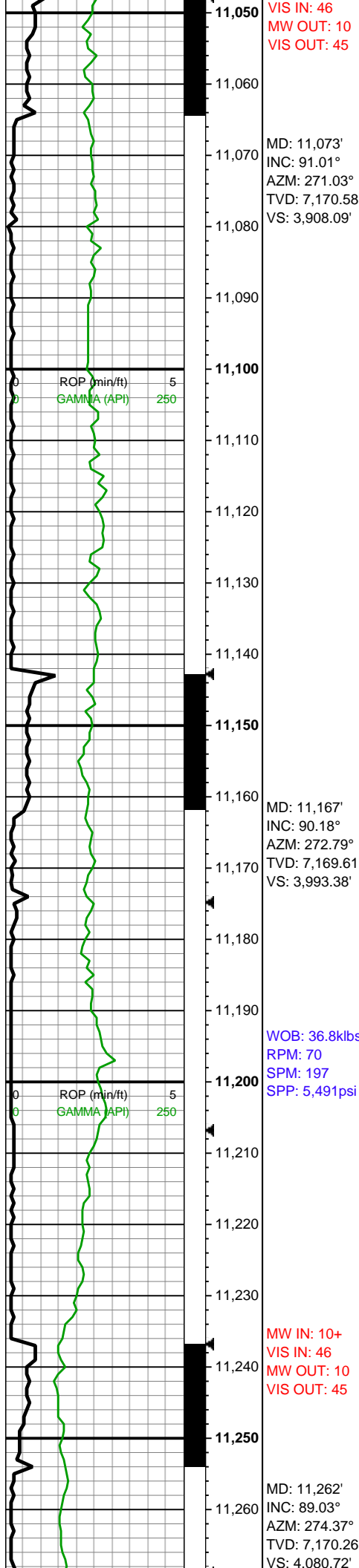
MW IN: 10



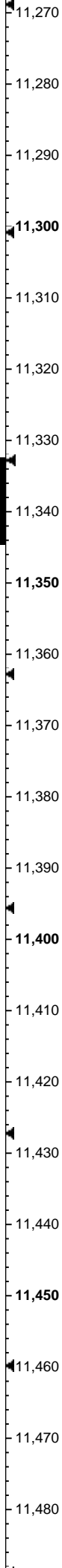
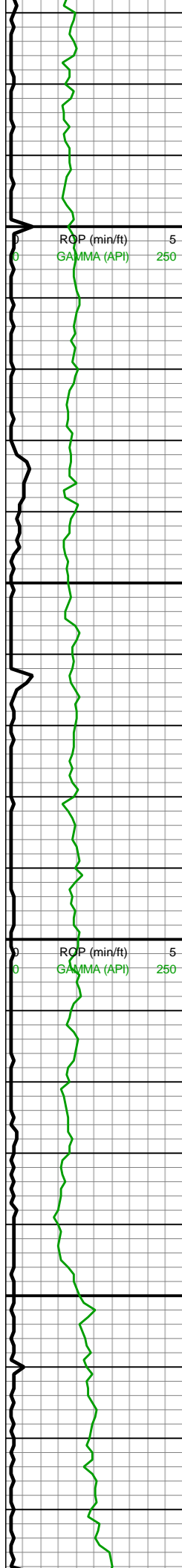
10800-10900 CHK  
(75%): mot med gy, lt gy-  
sme offwht, sb blk, frm,  
brit ip, v thn MRLST lamn,  
chky tex, v calc; MRLST  
(25%): dk gy, tr v dk gy,  
hd, sb blk, intbd CHK,  
mod cal

10900-11000 CHK  
(65%): mot med gy, sme  
dk gy, sb blk, frm-brit,  
sme v thn MRLST lamn,  
chky tex, v calc; MRLST  
(35%): dk gy-v dk gy, hd,  
sb blk, intbd CHK, mod  
cal





11100-11200 CHK  
(60%): med gy-lt gy, sb  
blk-sb plty, frm-brit, sme  
v thn MRLST lamn, chky  
tex, v calc; MRLST (40%):  
v dk gy-dk gy, hd-v hrd, sb  
blk, intbd CHK, mod cal

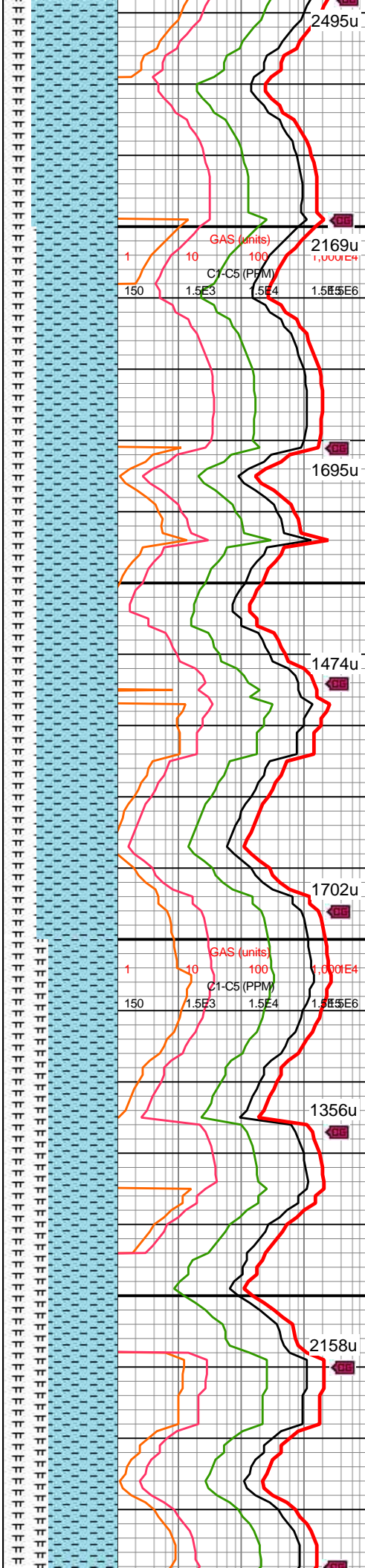


MW IN: 10.1  
VIS IN: 46  
MW OUT: 10  
VIS OUT: 45

MD: 11,356'  
INC: 88.64°  
AZM: 276.74°  
TVD: 7,172.17'  
VS: 4,168.33'

WOB: 30.9klbs  
RPM: 70  
SPM: 196  
SPP: 5,293psi

MD: 11,451'  
INC: 89.03°  
AZM: 276.56°  
TVD: 7,174.11'  
VS: 4,257.53'

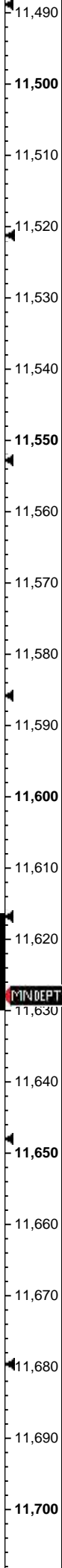
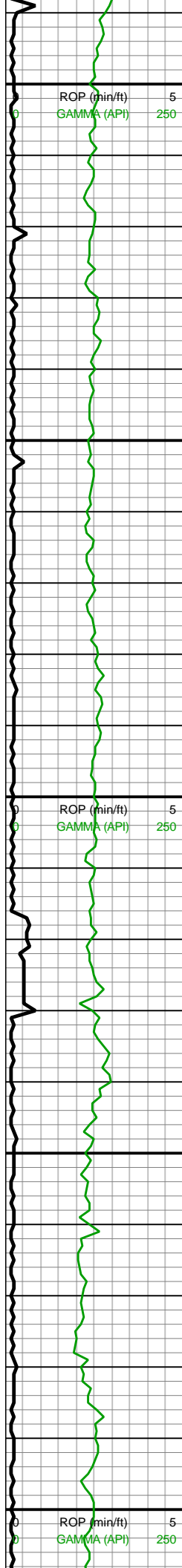


11200-11300 CHK  
(75%): predy med gy-lt  
gy, sb blkgy-sb plty,  
frm-brit, tr v thn MRLST  
lamn, chky tex, v calc;  
MRLST (25%): v dk gy-dk  
gy, hd, sb blkgy, intbd  
CHK, mod cal

11300-11400 CHK  
(70%): predy med gy-lt  
gy, tr dk gy, sb blkgy-sb  
plty, frm-brit, tr v thn  
MRLST lamn, chky tex, v  
calc; MRLST (30%): dk  
gy, hd, sb blkgy, intbd  
CHK, mod cal

11400-11500 CHK  
(60%): predy med gy-dk  
gy, sme lt gy, sb blkgy,  
frm-brit, chky tex, v calc;  
MRLST (40%): dk gy, hd,  
sme lt gy, sb blkgy, intbd  
CHK, mod cal





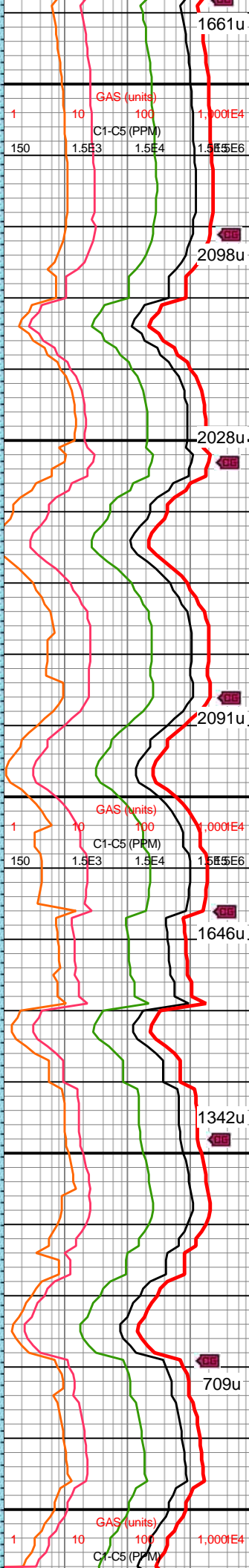
MD: 11,546'  
INC: 89.52°  
AZM: 276.83°  
TVD: 7,175.31'  
VS: 4,346.76'

WOB: 34.7klbs  
RPM: 70  
SPM: 196  
SPP: 5,456psi

MW IN: 10.1  
VIS IN: 46  
MW OUT: 10.1  
VIS OUT: 45

MINDEPTH 12/06/2018

MD: 11,640'  
INC: 88.02°  
AZM: 277.27°  
TVD: 7,177.33'  
VS: 4,435.23'



MRLST (40%): dk gy-v dk  
gy, hd, sb blk, intbd  
CHK, mod cal, sme mic  
pyr

1661u

2098u

2028u

2091u

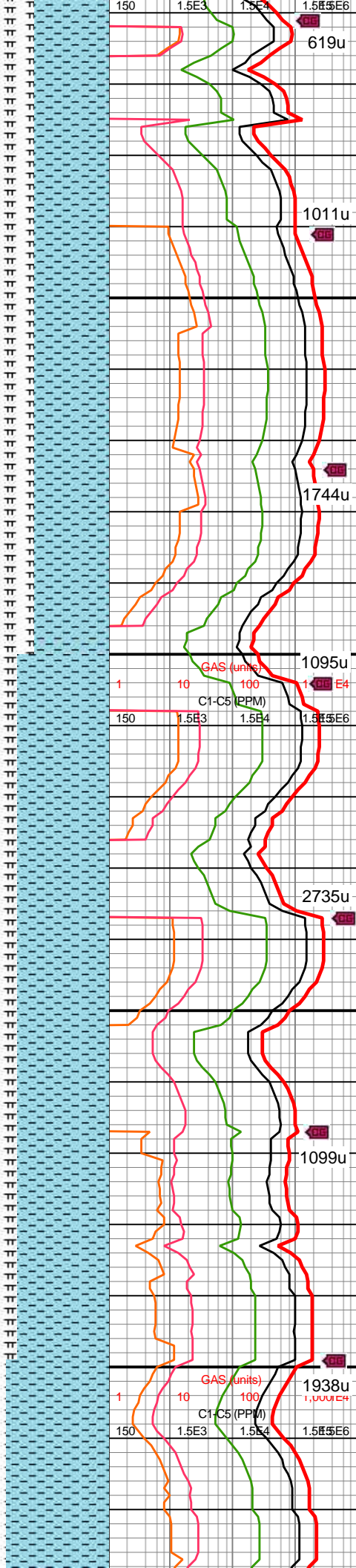
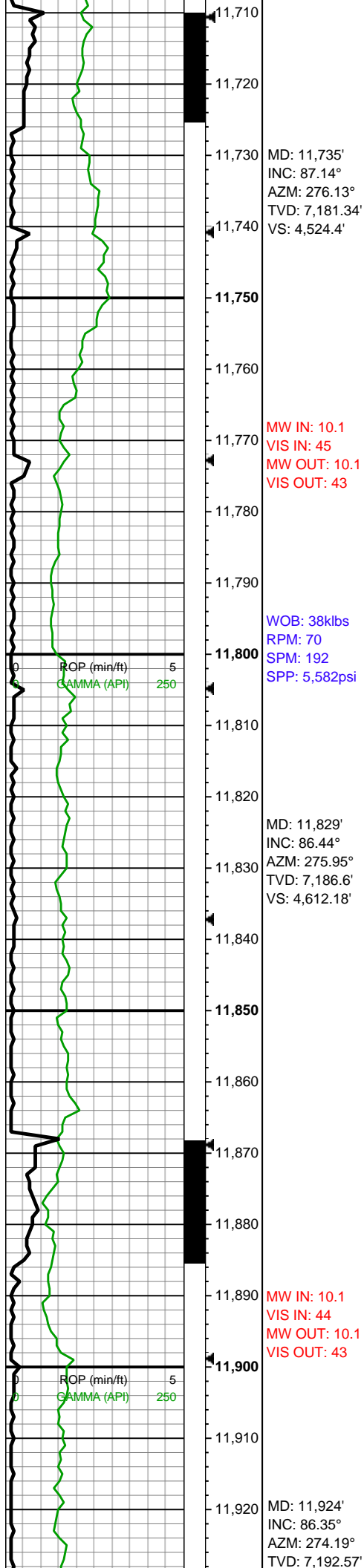
1646u

1342u

709u

11500-11600 CHK  
(65%): predy dk gy-med  
gy, mot lt gy, sb blk,  
frm-brit, chky tex, v calc;  
MRLST (35%): dk gy-v dk  
gy, hd, sb blk, intbd  
CHK, mod cal, tr mic pyr

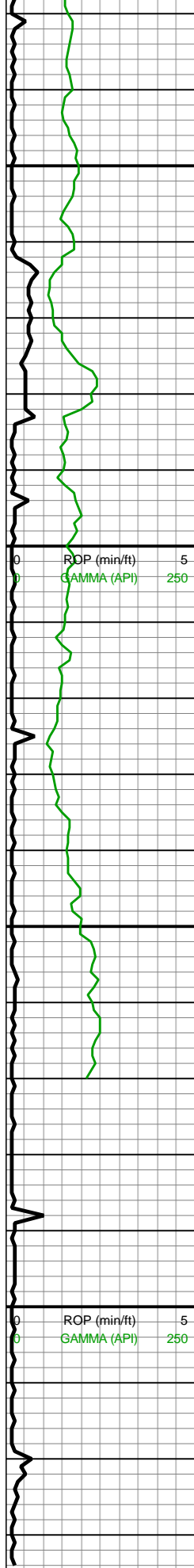
11600-11700 CHK  
(50%): predy dk gy-med  
gy, sb blk, frm-brit, sme  
hrd, chky tex, v calc;  
MRLST (50%): v dk gy,  
hd, sb blk, intbd CHK,  
mod cal



11700-11800 CHK  
(65%): dk gy-med gy, sb  
blky, frm-brit, chky tex,  
intbd MRLST, v calc;  
MRLST (35%): v dk gy-dk  
gy, hd, sb blky, intbd  
CHK, mod cal

11800-11900 CHK  
(80%): dk gy-med gy,  
sme mot lt gy, sb blky,  
frm-brit, chky tex, intbd  
MRLST, v calc; MRLST  
(20%): dk gy, hd, sb blky,  
intbd CHK, mod cal





11,930  
11,940  
11,950  
11,960  
11,970  
11,980  
11,990  
12,000  
12,010  
12,020  
12,030  
12,040  
12,050  
12,060  
12,070  
12,080  
12,090  
12,100  
12,110  
12,120  
12,130  
12,140

VS: 4,700.28'

WOB: 28.1klbs  
RPM: 70  
SPM: 195  
SPP: 5.393psi

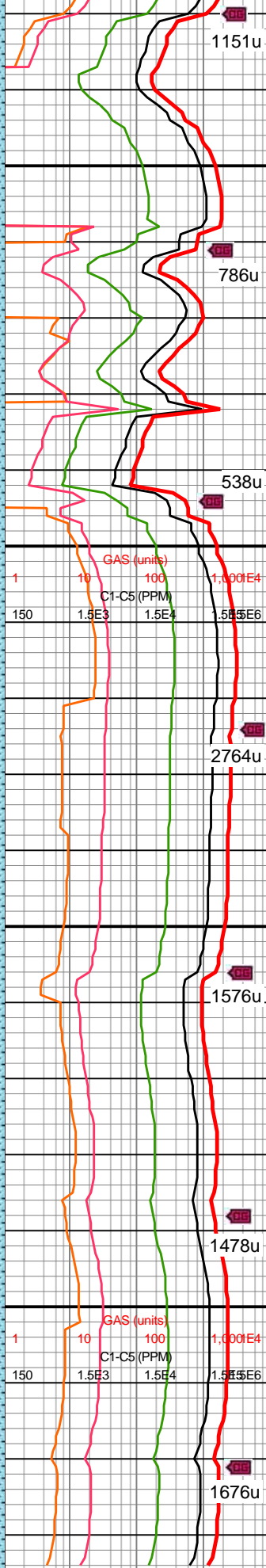
MD: 12,018'  
INC: 88.11°  
AZM: 274.98°  
TVD: 7,197.12'  
VS: 4,787.23'

MW IN: 10.1  
VIS IN: 44  
MW OUT: 10.1  
VIS OUT: 43

MD: 12,065'  
INC: 87.89°  
AZM: 274.63°  
TVD: 7,198.76'  
VS: 4,830.8'

Projection to Bit  
MD: 12,135'  
INC: 87.89°  
AZM: 274.63°  
TVD: 7,201.33'  
VS: 4,895.6'

**Total Depth of 12,135' MD Reached on 12/06/2018 @ 03:52 MST**



11900-12000 CHK  
(90%): predy offwht, mot med-lt gy, sb blk, frm-brit, chky tex, intbd MRLST, v calc; MRLST (10%): dk gy, hd-frm, sb blk, intbd CHK, mod cal

12000-12100 CHK  
(85%): predy offwht, mot med gy, sb blk, frm, brit ip, chky tex, intbd MRLST, v calc; MRLST (15%): dk gy, hd, sb blk, intbd CHK, mod cal

12100-12135 CHK  
(90%): offwht, mot med gy, sb blk, frm-brit, chky tex, intbd MRLST, v calc; MRLST (10%): dk gy, hd-sme frm, sb blk, intbd CHK, mod cal

[illegible]

L 12 150

03.52 MS1

[illegible]