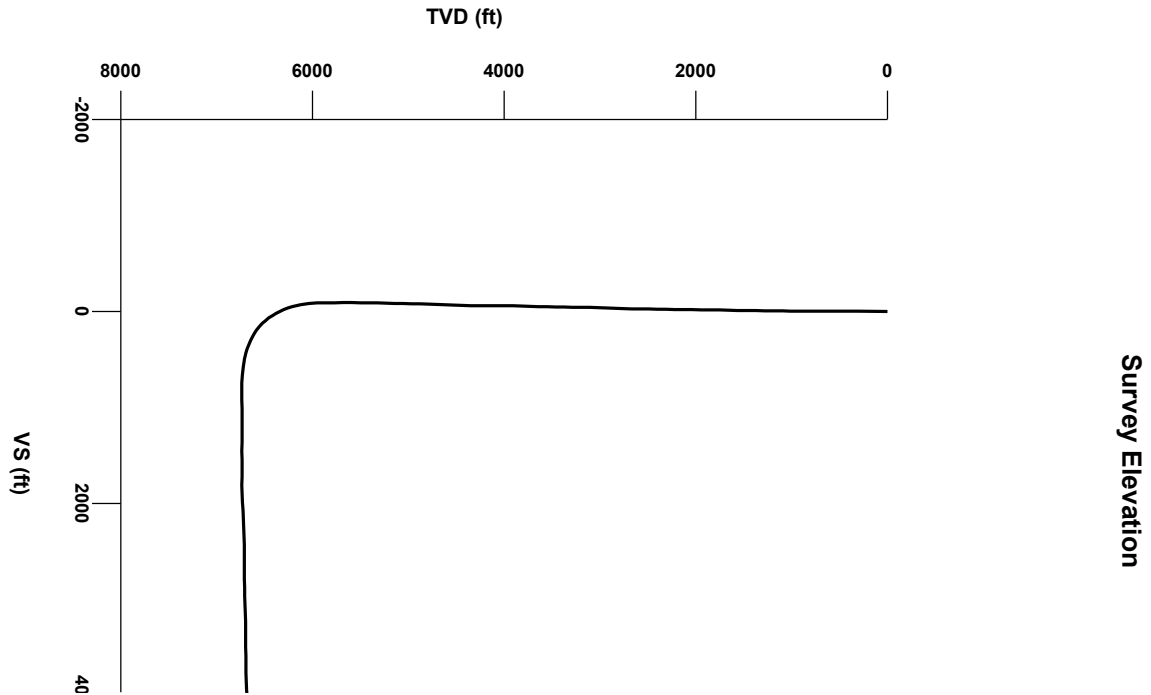
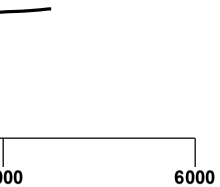
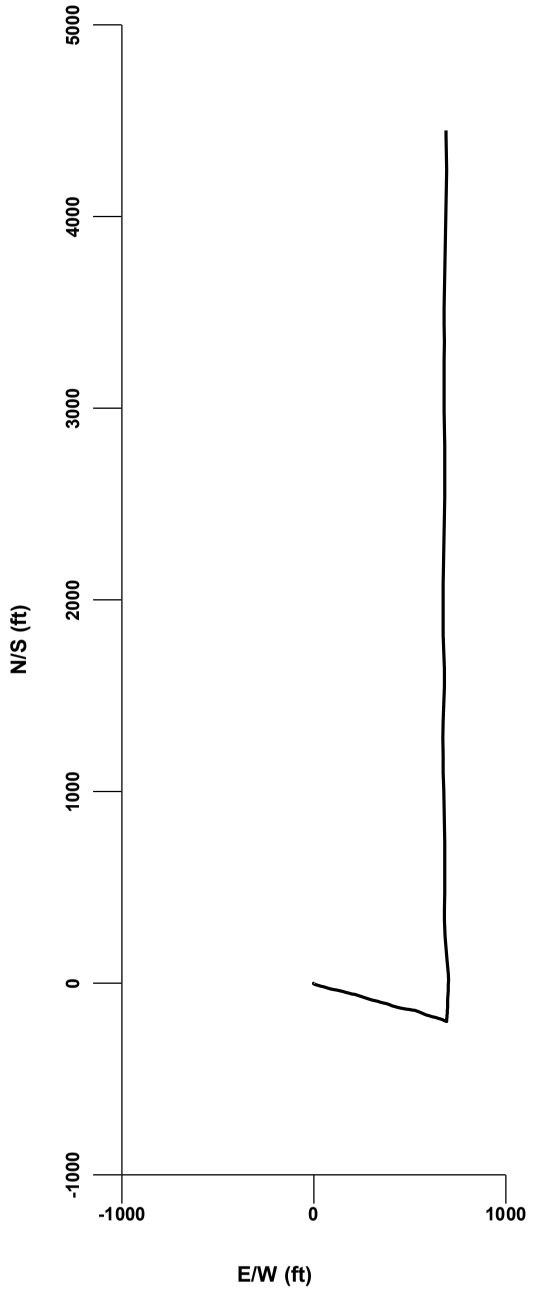
OPERATOR:	**NOBLE ENERGY INC.**
WELL:	**CROW CREEK STATE AC36-78-1HN**
LOCATION:	**SWSW SEC36 T7N R63W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**270' FSL 300' FWL**
ELEVATION:	**4,775' GL, 4,791' KB**
FIELD:	**WATTENBERG**
SPUD DATE:	**9/23/13**
TD DATE:	**10/4/13**
DATES LOGGED:	**9/25/13 - 10/4/13**
DEPTHS LOGGED:	**604' - 11182'**
GEOLOGISTS:	**GARY MYERS, JESSICA SILVEY**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**PRECISION 828**
API:	**05-123-37274**
LOG TYPE:	**HORIZONTAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.**

LOG CONTINUES FROM FILE: Crow Creek State AC36-78-1HN Vert.lplot





Survey Plan



LITHOLOGIES

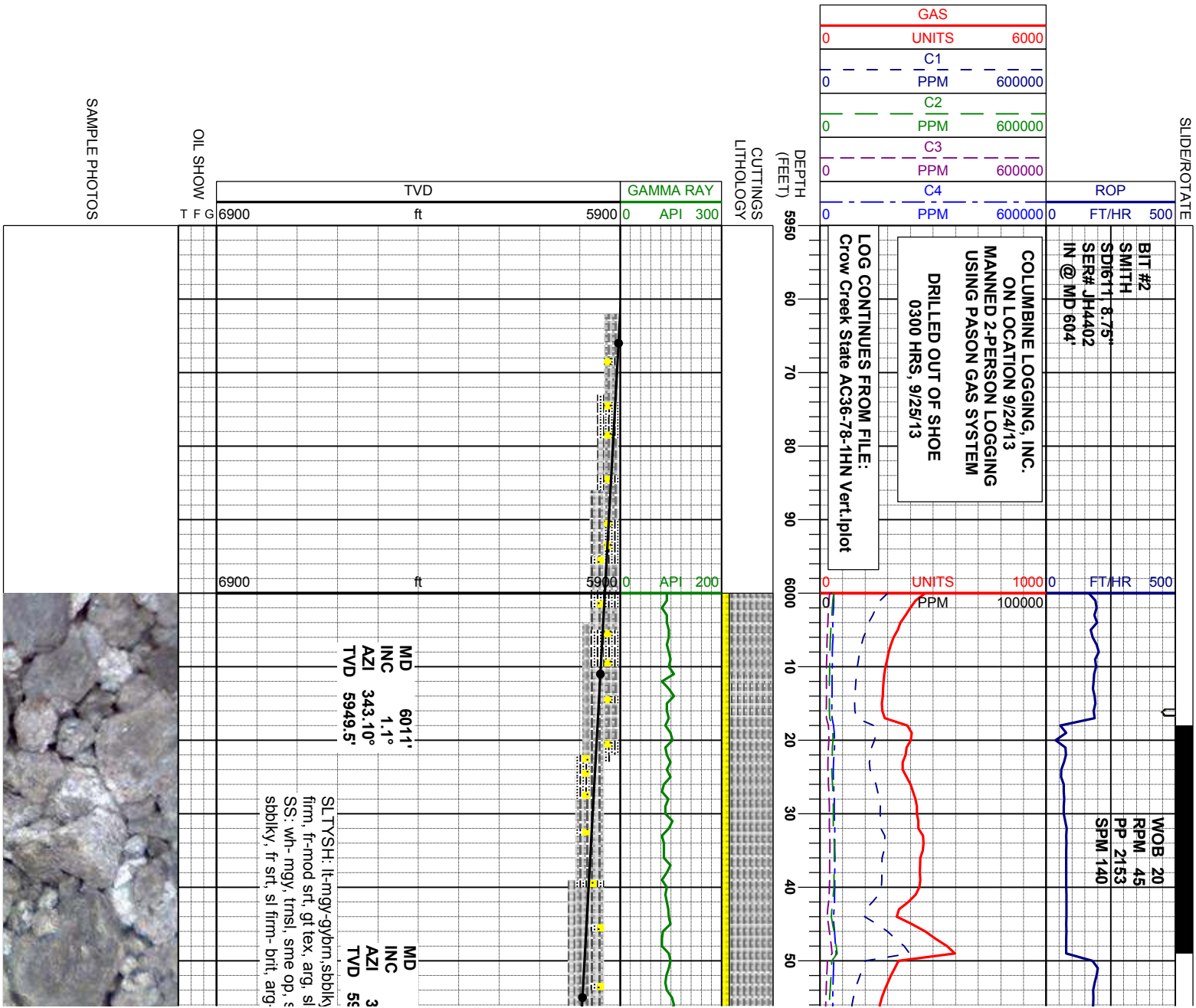
Chalk	Limestone	Marl
Sandstone	Shaly Sandstone	Silty Shale

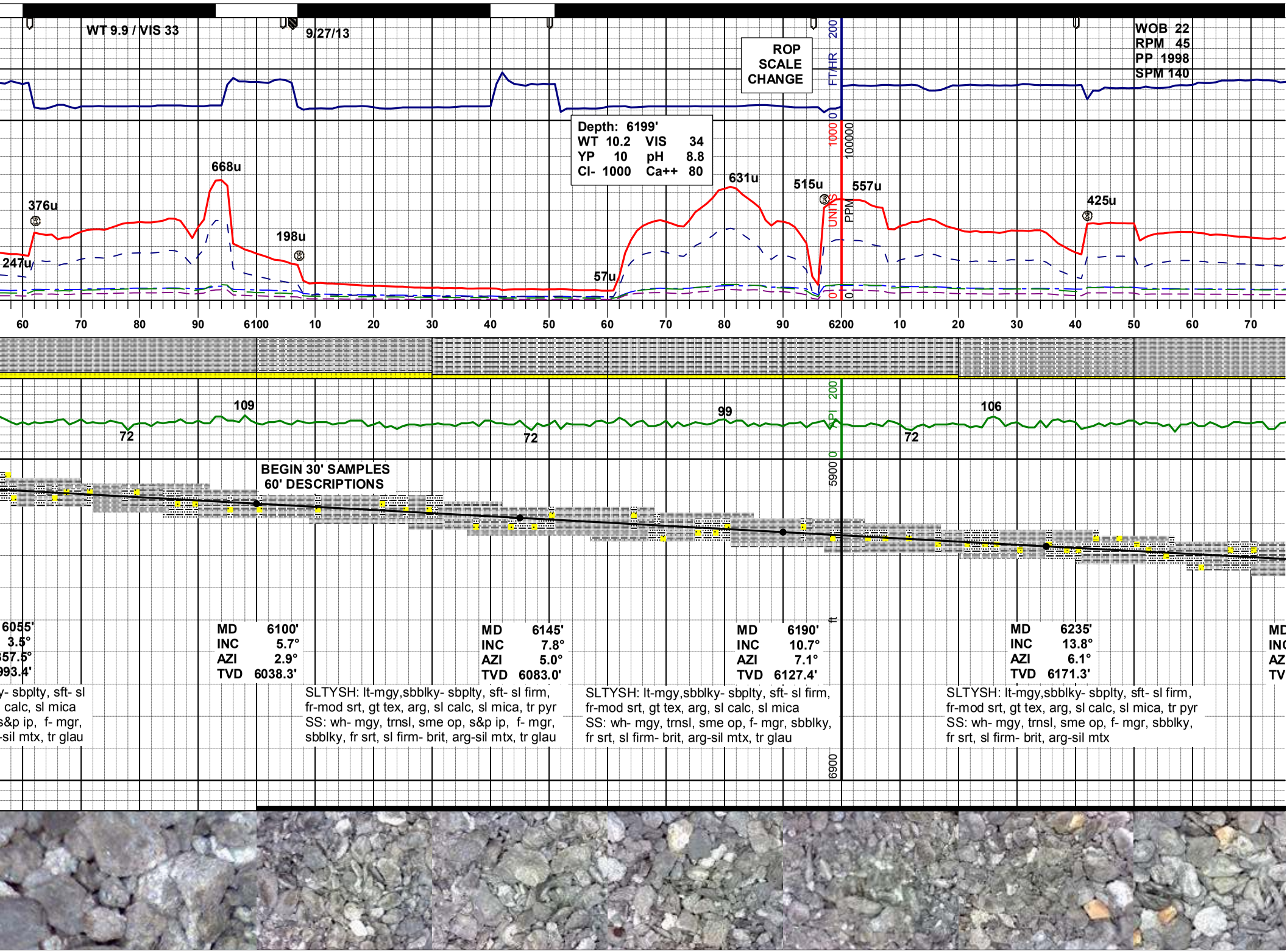
MODIFIERS

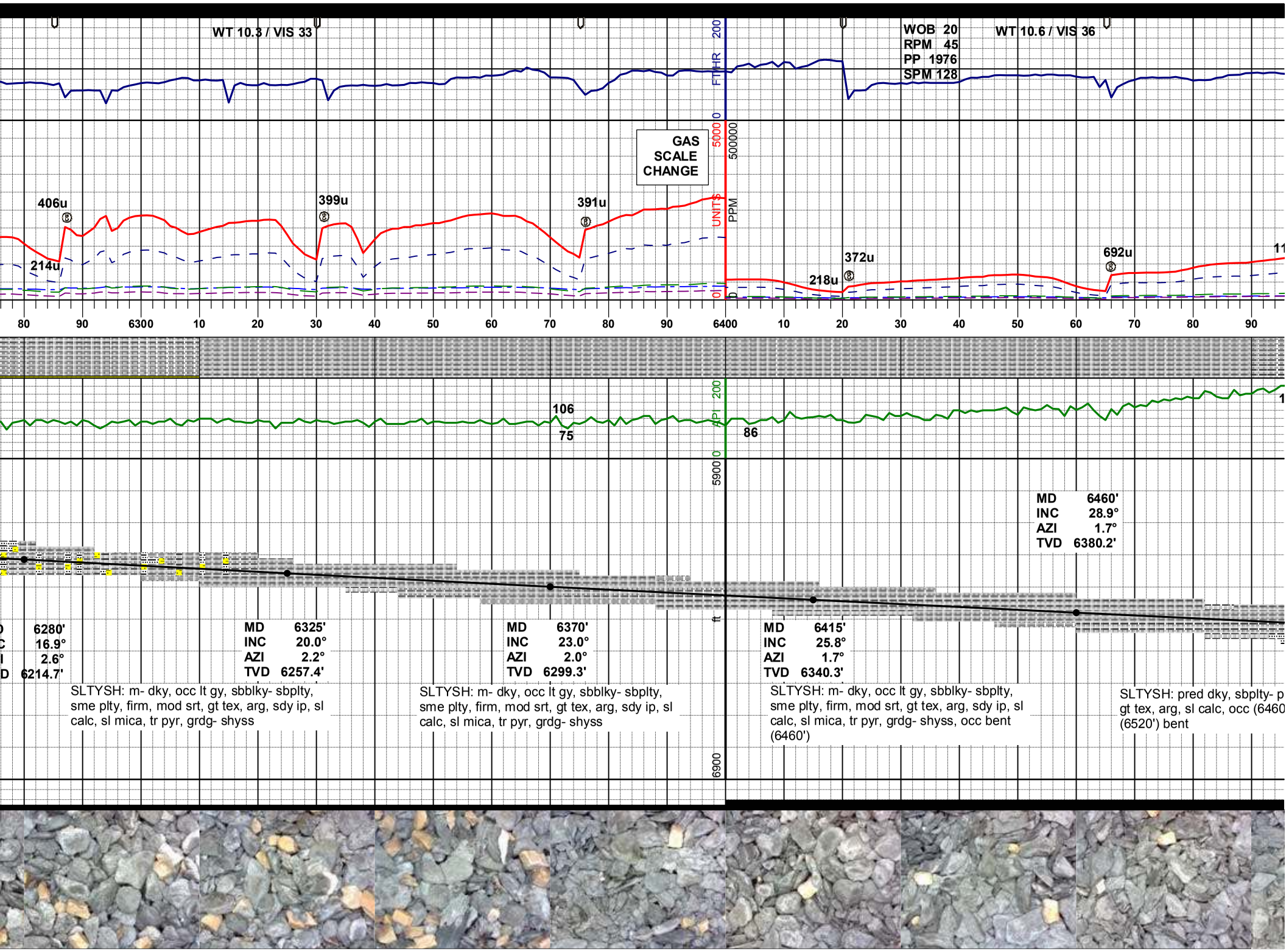
B	Bentonite

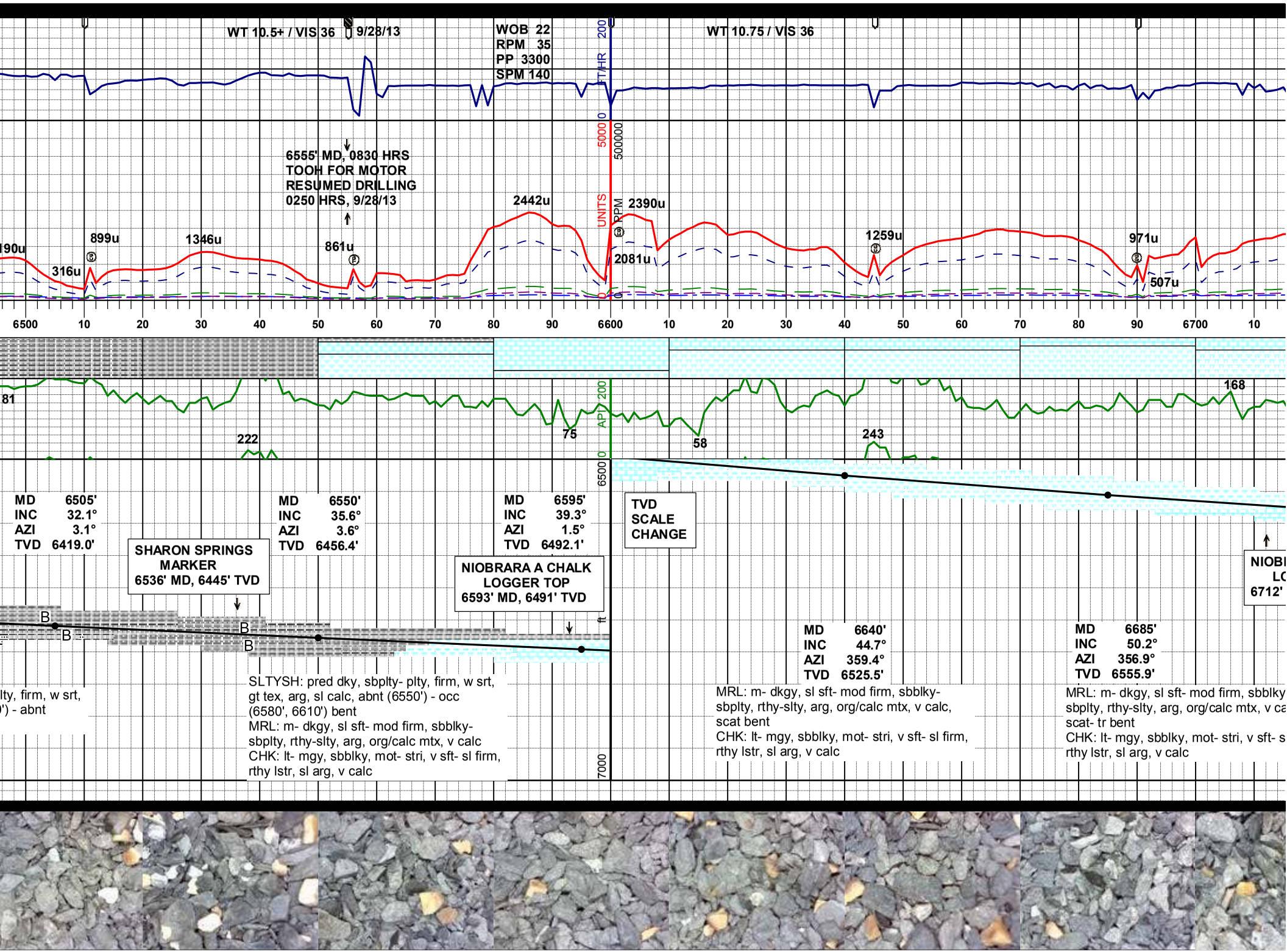
ENGINEERING SYMBOLS

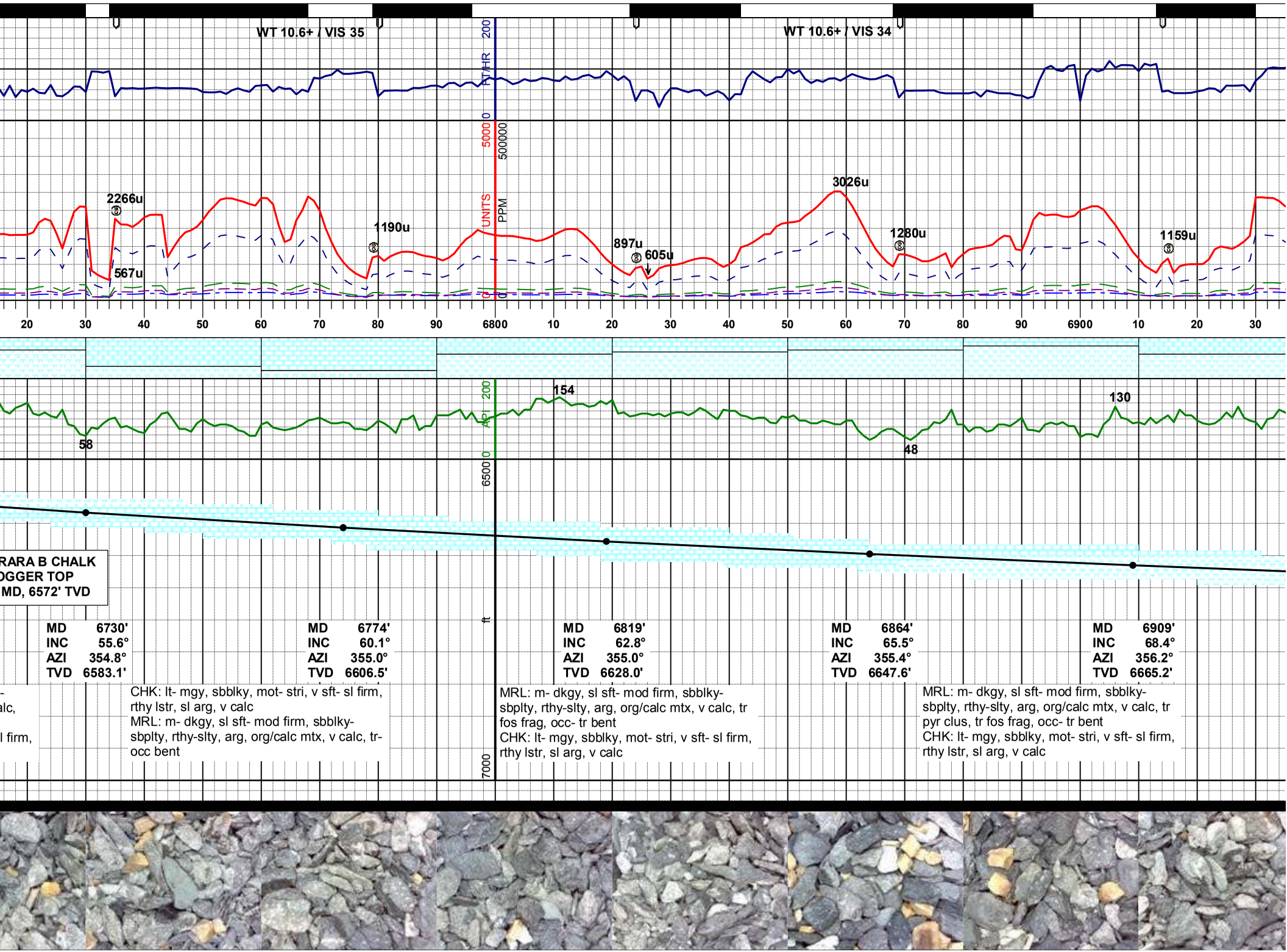
Bit Change	Casing	Casing
Connection	Connection Gas	Arrow
Midnight Depth	Arrow	Trip Gas

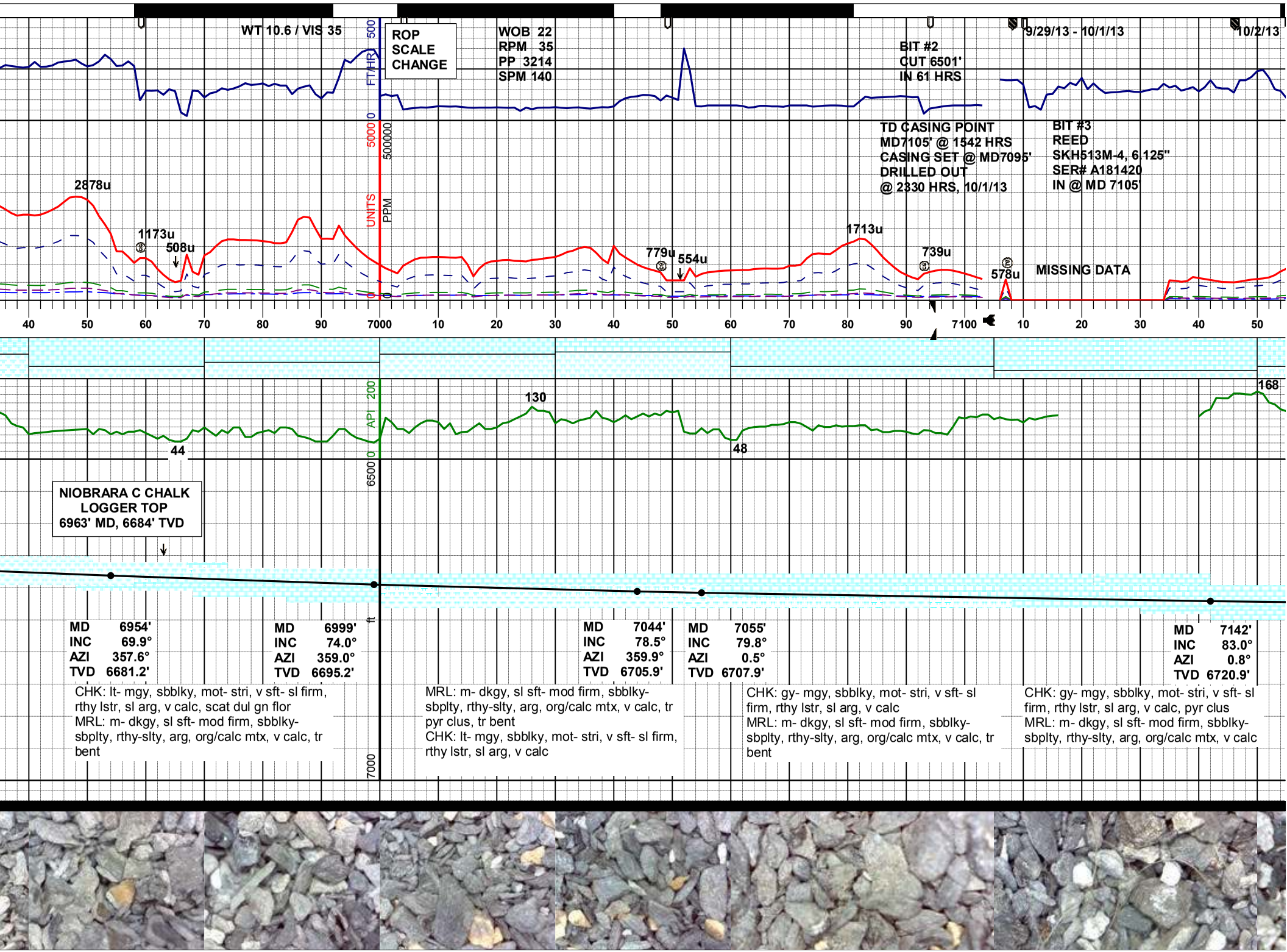


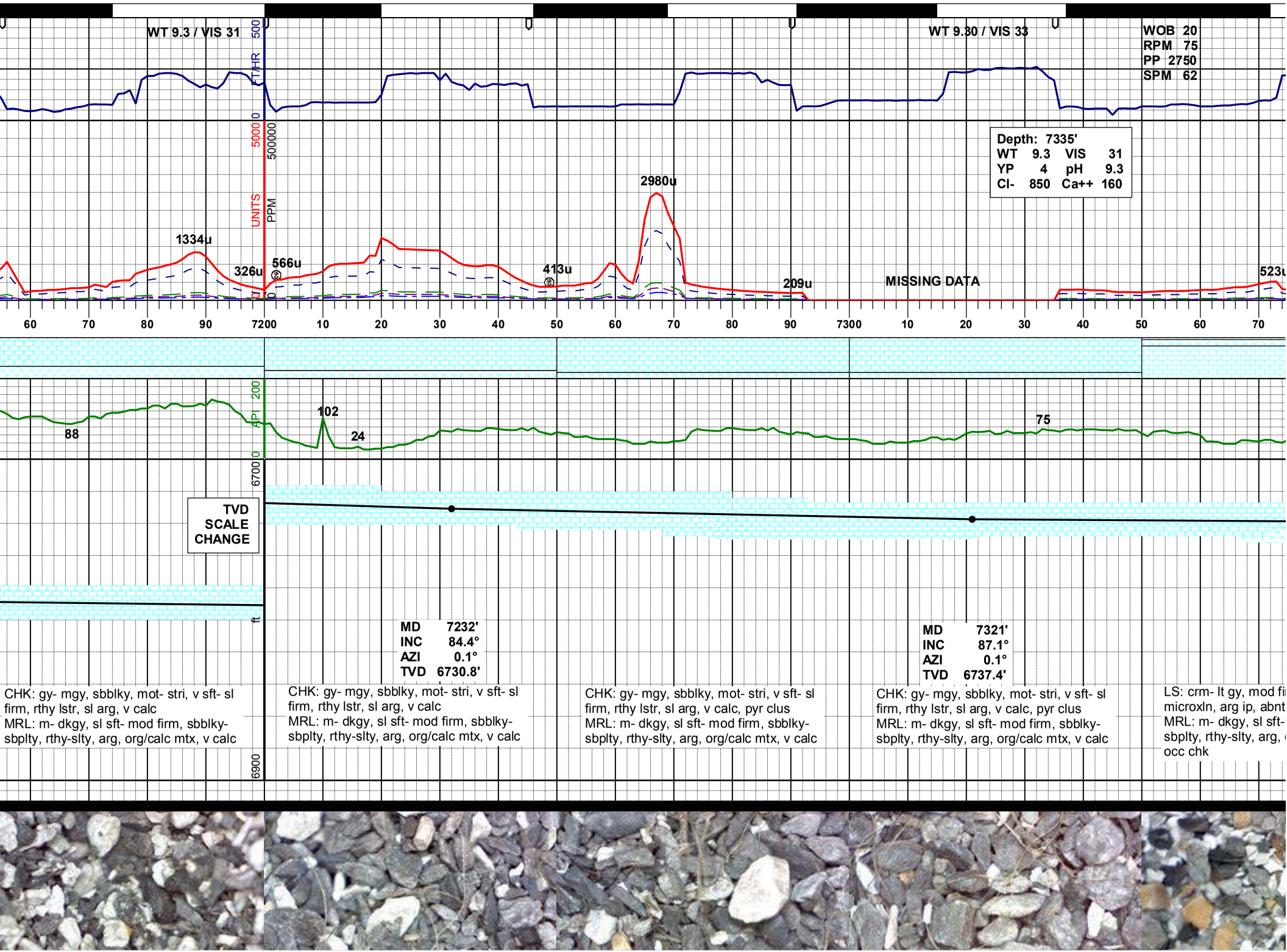

WT 9.9 / VIS 33
9/27/13
ROP SCALE CHANGE
WOB 22
RPM 45
PP 1998
SPM 140
FT/HR
200
0
Depth: 6199'
WT 10.2 VIS 34
YP 10 pH 8.8
Cl- 1000 Ca++ 80
1000
0
100000
0
UNITS
PPM
376u
668u
247u
198u
57u
631u
515u
557u
425u
60 70 80 90 6100 10 20 30 40 50 60 70 80 90 6200 10 20 30 40 50 60 70
GPI
200
0
109
72
72
99
72
106
5900
6900
ft
BEGIN 30' SAMPLES
60' DESCRIPTIONS
6055'
3.5°
57.5°
993.4'
y- sbplty, sft- sl
calc, sl mica
s&p ip, f- mgr,
-sil mtx, tr glau
MD 6100'
INC 5.7°
AZI 2.9°
TVD 6038.3'
SLTYSH: lt-mgy,sbblky- sbplty, sft- sl firm,
fr-mod srt, gt tex, arg, sl calc, sl mica, tr pyr
SS: wh- mgy, trnsl, sme op, s&p ip, f- mgr,
sbblky, fr srt, sl firm- brit, arg-sil mtx, tr glau
MD 6145'
INC 7.8°
AZI 5.0°
TVD 6083.0'
SLTYSH: lt-mgy,sbblky- sbplty, sft- sl firm,
fr-mod srt, gt tex, arg, sl calc, sl mica
SS: wh- mgy, trnsl, sme op, f- mgr, sbblky,
fr srt, sl firm- brit, arg-sil mtx, tr glau
MD 6190'
INC 10.7°
AZI 7.1°
TVD 6127.4'
MD 6235'
INC 13.8°
AZI 6.1°
TVD 6171.3'
SLTYSH: lt-mgy,sbblky- sbplty, sft- sl firm,
fr-mod srt, gt tex, arg, sl calc, sl mica, tr pyr
SS: wh- mgy, trnsl, sme op, f- mgr, sbblky,
fr srt, sl firm- brit, arg-sil mtx

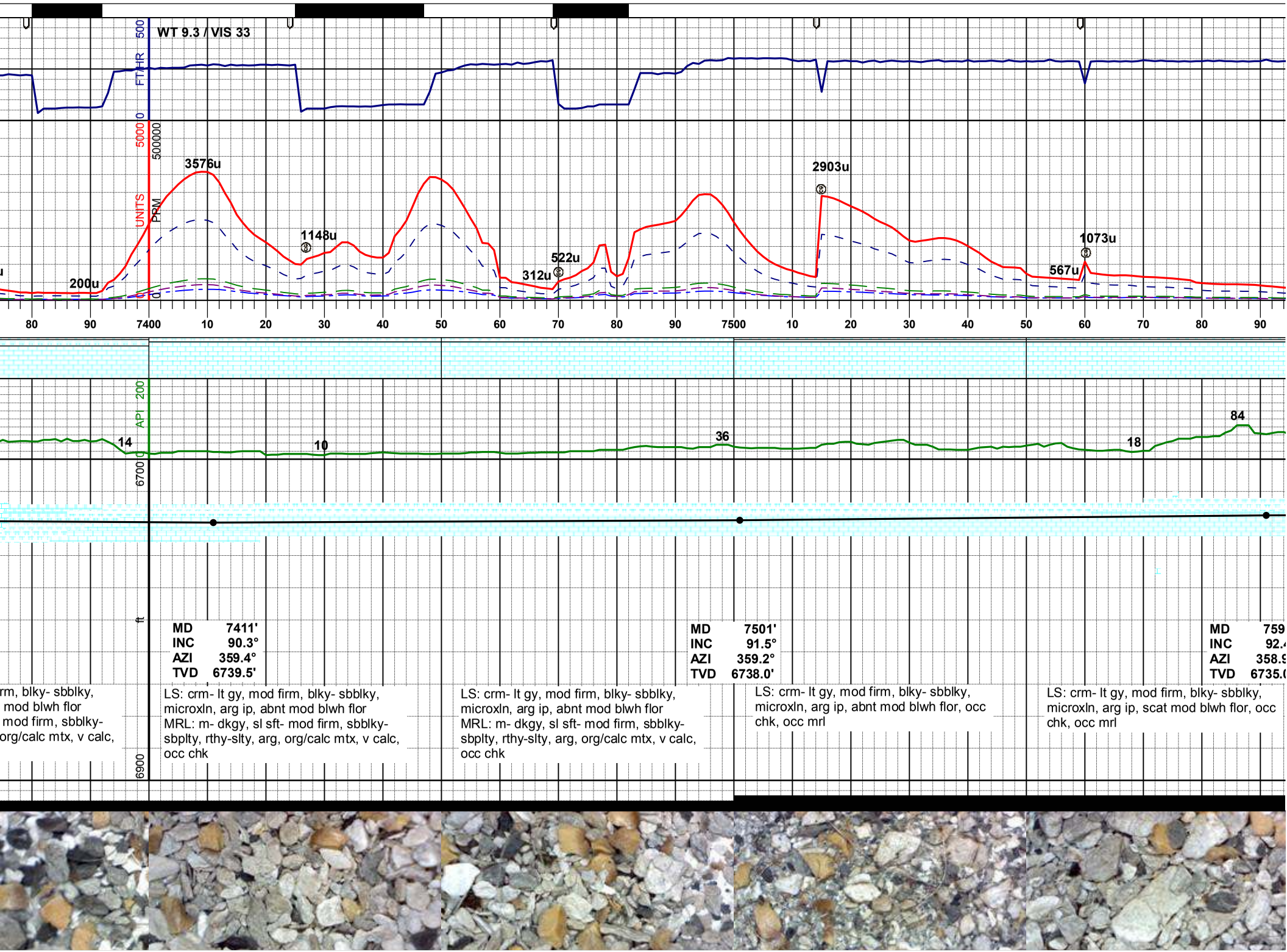

WT 10.3 / VIS 33
WOB 20
RPM 45
PP 1976
SPM 128
WT 10.6 / VIS 36
FT/HR
200
0
GAS
SCALE
CHANGE
5000
0
500000
UNITS
PPM
406u
399u
391u
214u
372u
218u
692u
80
90
6300
10
20
30
40
50
60
70
80
90
6400
10
20
30
40
50
60
70
80
90
106
75
86
API
200
0
5900
6900
ft
MD 6460'
INC 28.9°
AZI 1.7°
TVD 6380.2'
MD 6325'
INC 20.0°
AZI 2.2°
TVD 6257.4'
MD 6370'
INC 23.0°
AZI 2.0°
TVD 6299.3'
MD 6415'
INC 25.8°
AZI 1.7°
TVD 6340.3'
SLTYSH: m- dky, occ lt gy, sbblky- sbplty, sme plty, firm, mod srt, gt tex, arg, sdy ip, sl calc, sl mica, tr pyr, grdg- shyss
SLTYSH: m- dky, occ lt gy, sbblky- sbplty, sme plty, firm, mod srt, gt tex, arg, sdy ip, sl calc, sl mica, tr pyr, grdg- shyss
SLTYSH: m- dky, occ lt gy, sbblky- sbplty, sme plty, firm, mod srt, gt tex, arg, sdy ip, sl calc, sl mica, tr pyr, grdg- shyss, occ bent (6460')
SLTYSH: pred dky, sbplty- p
gt tex, arg, sl calc, occ (6460
(6520') bent

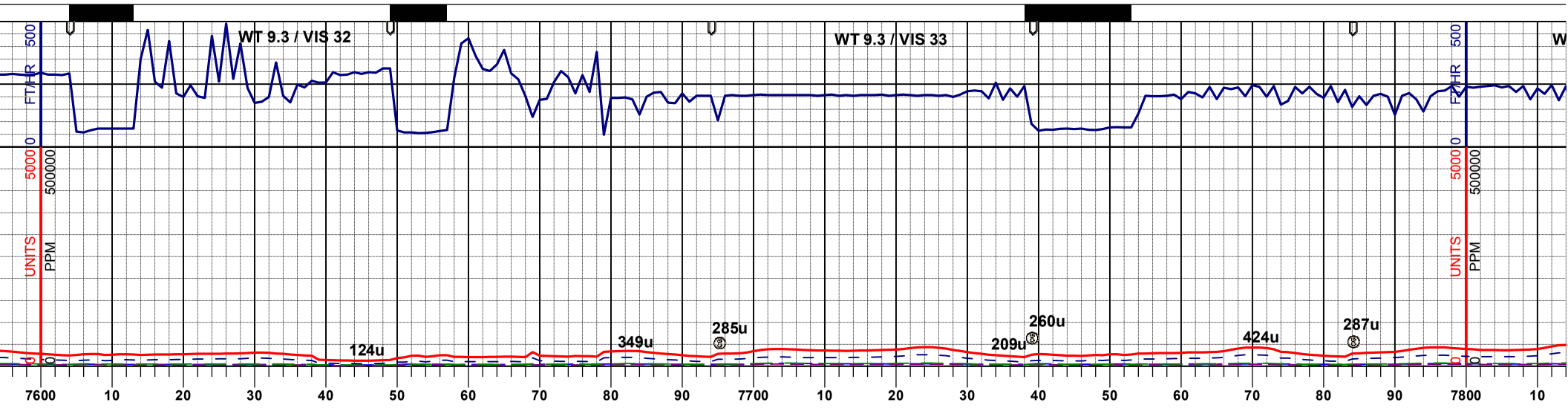

WT 10.5+ / VIS 36
9/28/13
WOB 22
RPM 35
PP 3300
SPM 140
FT/HR
200
0
WT 10.75 / VIS 36
6555' MD, 0830 HRS
TOOH FOR MOTOR
RESUMED DRILLING
0250 HRS, 9/28/13
5000
0
500000
UNITS
RPM
2442u
2390u
2081u
1259u
971u
899u
1346u
861u
316u
507u
6500
10
20
30
40
50
60
70
80
90
6600
10
20
30
40
50
60
70
80
90
6700
10
API
200
0
222
75
58
243
168
6500
7000
MD 6505'
INC 32.1°
AZI 3.1°
TVD 6419.0'
MD 6550'
INC 35.6°
AZI 3.6°
TVD 6456.4'
MD 6595'
INC 39.3°
AZI 1.5°
TVD 6492.1'
TVD SCALE CHANGE
SHARON SPRINGS MARKER
6536' MD, 6445' TVD
NIOBRARA A CHALK LOGGER TOP
6593' MD, 6491' TVD
ft
B
B
B
B
SLTYSH: pred dky, sbplty- plty, firm, w srt, gt tex, arg, sl calc, abnt (6550') - occ (6580', 6610') bent
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MD 6640'
INC 44.7°
AZI 359.4°
TVD 6525.5'
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, scat bent
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MD 6685'
INC 50.2°
AZI 356.9°
TVD 6555.9'
MRL: m- dkgy, sl sft- mod firm, sbblky
sbplty, rthy-slty, arg, org/calc mtx, v ca
scat- tr bent
CHK: lt- mgy, sbblky, mot- stri, v sft- s
rthy lstr, sl arg, v calc

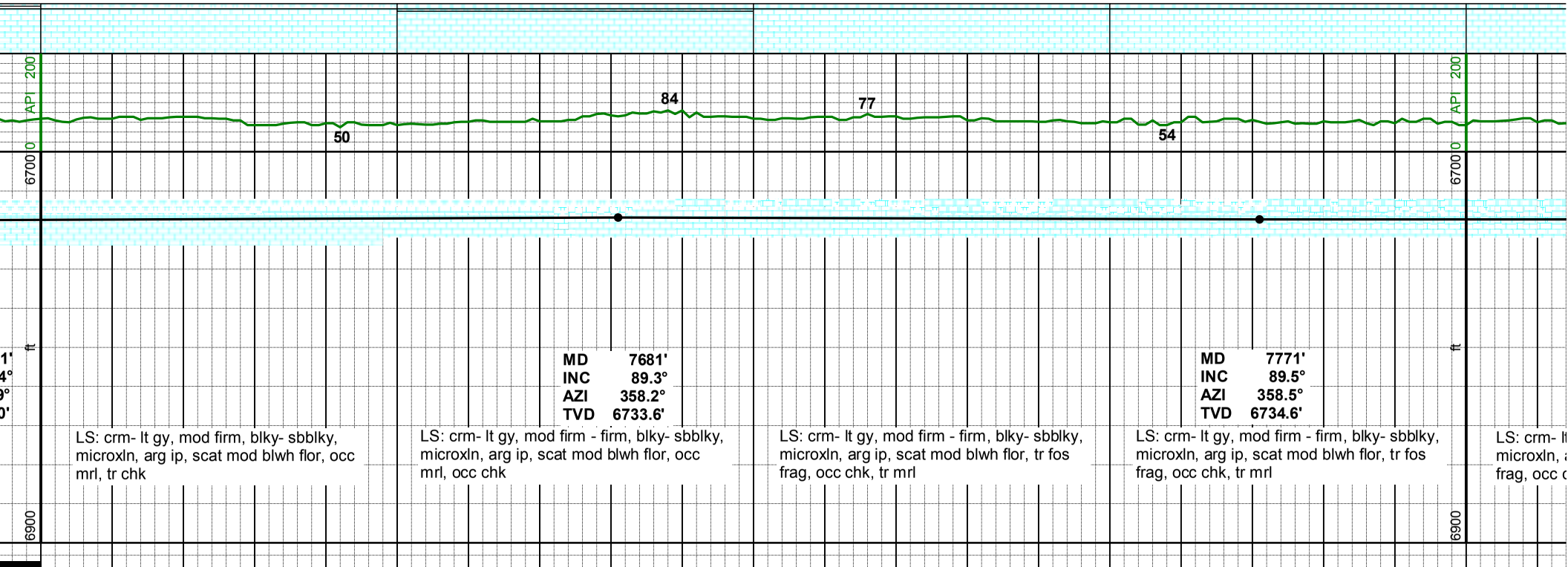

WT 10.6+ / VIS 35
WT 10.6+ / VIS 34
FT/HR
200
0
5000
0
500000
UNITS
PPM
2266u
567u
1190u
897u
605u
3026u
1280u
1159u
20
30
40
50
60
70
80
90
6800
10
20
30
40
50
60
70
80
90
6900
10
20
30
API
200
0
154
58
48
130
6500
7000
ft
RARA B CHALK
OGGER TOP
MD, 6572' TVD
MD 6730'
INC 55.6°
AZI 354.8°
TVD 6583.1'
MD 6774'
INC 60.1°
AZI 355.0°
TVD 6606.5'
MD 6819'
INC 62.8°
AZI 355.0°
TVD 6628.0'
MD 6864'
INC 65.5°
AZI 355.4°
TVD 6647.6'
MD 6909'
INC 68.4°
AZI 356.2°
TVD 6665.2'
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr-occ bent
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, occ- tr bent
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr pyr clus, tr fos frag, occ- tr bent
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc

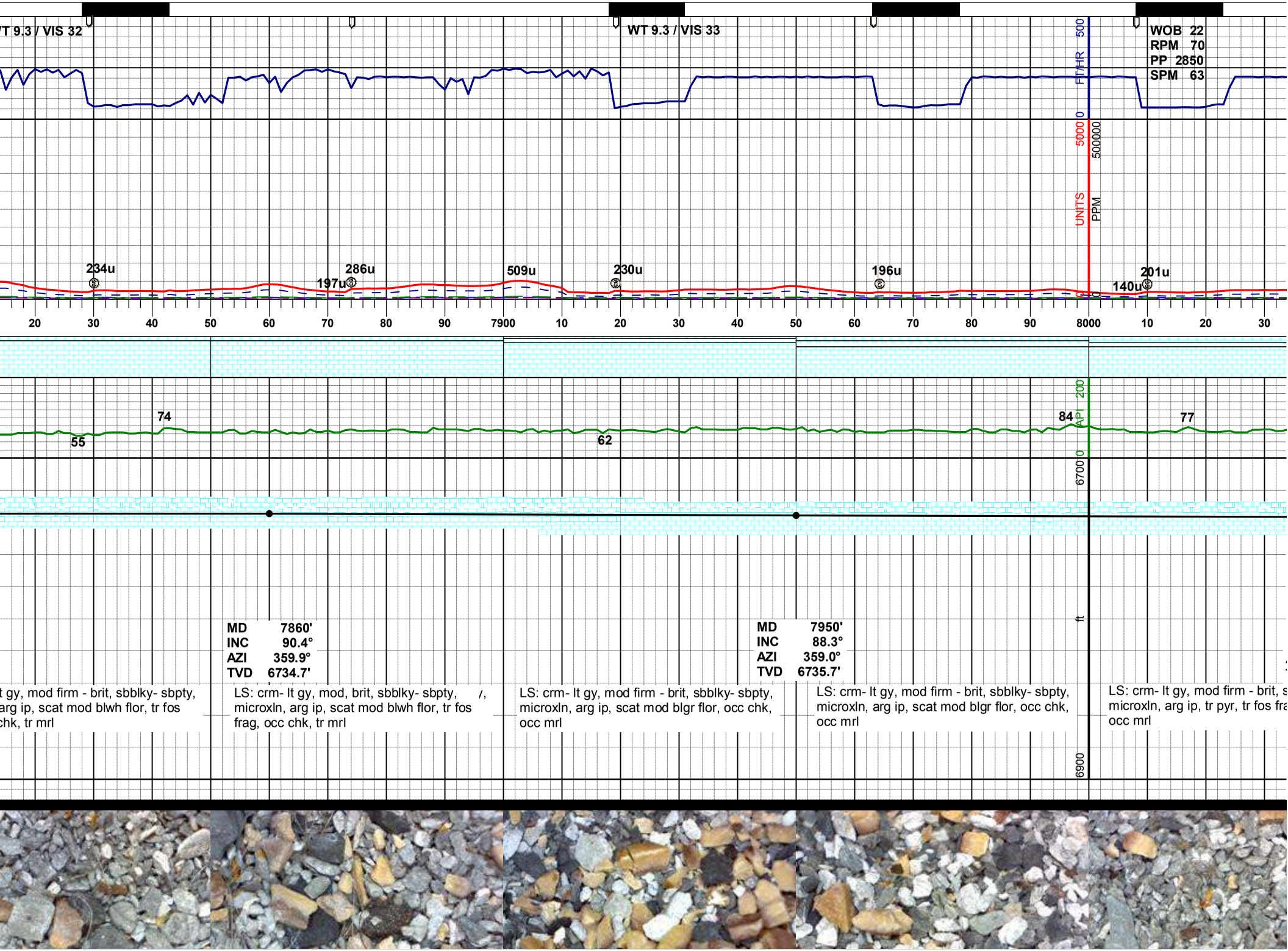

WT 10.6 / VIS 35
ROP SCALE CHANGE
WOB 22
RPM 35
PP 3214
SPM 140
BIT #2
CUT 6501'
IN 61 HRS
9/29/13 - 10/1/13
10/2/13
TD CASING POINT
MD7105' @ 1542 HRS
CASING SET @ MD7095'
DRILLED OUT
@ 2330 HRS, 10/1/13
BIT #3
REED
SKH513M-4, 6.125"
SER# A181420
IN @ MD 7105'
FT/HR
UNITS
PPM
2878u
1173u
508u
779u
554u
1713u
739u
578u
MISSING DATA
API
130
44
48
168
NIOBRARA C CHALK
LOGGER TOP
6963' MD, 6684' TVD
ft
MD 6954'
INC 69.9°
AZI 357.6°
TVD 6681.2'
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc, scat dul gn flor
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, tr bent
MD 6999'
INC 74.0°
AZI 359.0°
TVD 6695.2'
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, tr pyr clus, tr bent
CHK: lt- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MD 7044'
INC 78.5°
AZI 359.9°
TVD 6705.9'
MD 7055'
INC 79.8°
AZI 0.5°
TVD 6707.9'
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, tr bent
MD 7142'
INC 83.0°
AZI 0.8°
TVD 6720.9'
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc, pyr clus
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc

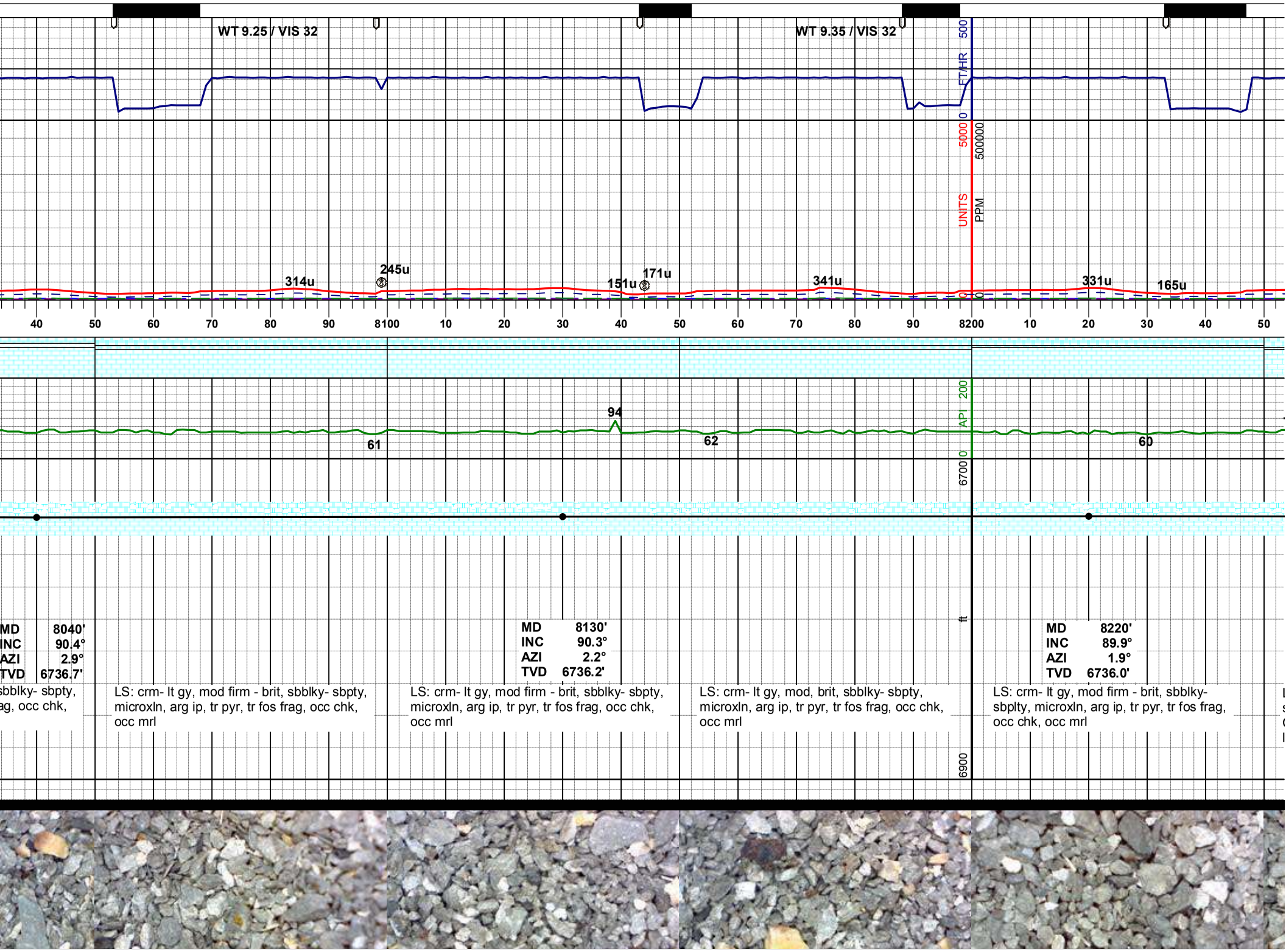

WT 9.3 / VIS 31
WT 9.30 / VIS 33
WOB 20
RPM 75
PP 2750
SPM 62
FT/HR
500
0
5000
0
500000
UNITS
PPM
Depth: 7335'
WT 9.3 VIS 31
YP 4 pH 9.3
Cl- 850 Ca++ 160
1334u
326u
566u
413u
2980u
209u
MISSING DATA
523u
60
70
80
90
7200
10
20
30
40
50
60
70
80
90
7300
10
20
30
40
50
60
70
API
200
0
88
102
24
75
6700
6900
ft
TVD
SCALE
CHANGE
MD 7232'
INC 84.4°
AZI 0.1°
TVD 6730.8'
MD 7321'
INC 87.1°
AZI 0.1°
TVD 6737.4'
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc, pyr clus
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, v sft- sl firm, rthy lstr, sl arg, v calc, pyr clus
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc
LS: crm- lt gy, mod fi
microxln, arg ip, abnt
MRL: m- dkgy, sl sft-
sbplty, rthy-slty, arg,
occ chk

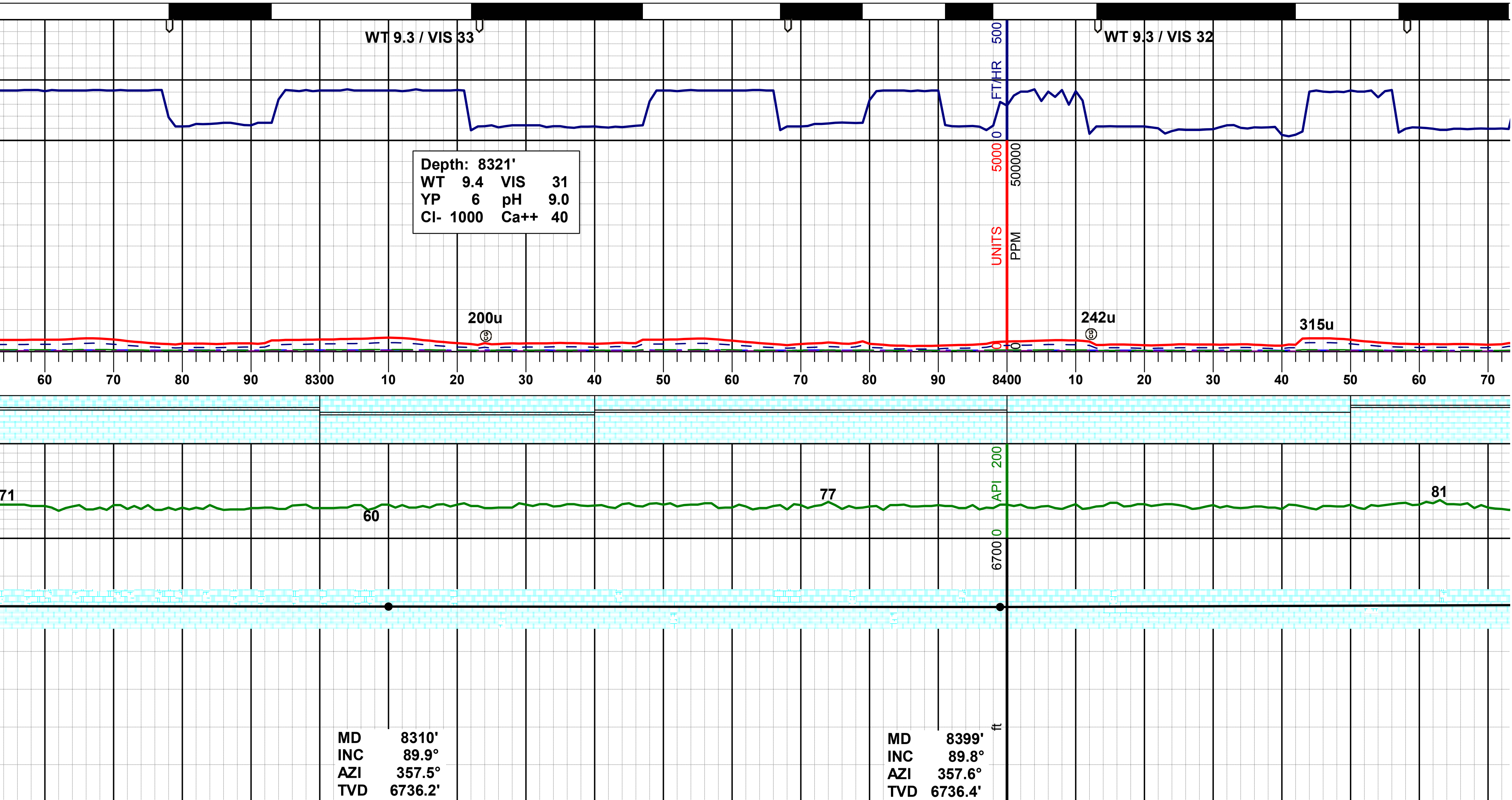

WT 9.3 / VIS 33
FT/HR
500
0
5000
0
500000
UNITS
PRM
3576u
1148u
200u
522u
312u
2903u
1073u
567u
80
90
7400
10
20
30
40
50
60
70
80
90
7500
10
20
30
40
50
60
70
80
90
API
200
0
14
10
36
84
18
6700
6900
ft
MD 7411'
INC 90.3°
AZI 359.4°
TVD 6739.5'
MD 7501'
INC 91.5°
AZI 359.2°
TVD 6738.0'
MD 759
INC 92.
AZI 358.9
TVD 6735.0
rm, blky- sbblky,
mod blwh flor
mod firm, sbblky-
org/calc mtx, v calc,
LS: crm- lt gy, mod firm, blky- sbblky, microxln, arg ip, abnt mod blwh flor
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, occ chk
LS: crm- lt gy, mod firm, blky- sbblky, microxln, arg ip, abnt mod blwh flor
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, occ chk
LS: crm- lt gy, mod firm, blky- sbblky, microxln, arg ip, abnt mod blwh flor, occ chk, occ mrl
LS: crm- lt gy, mod firm, blky- sbblky, microxln, arg ip, scat mod blwh flor, occ chk, occ mrl


WT 9.3 / VIS 32
WT 9.3 / VIS 33
FT/HR
500
0
UNITS
PPM
5000
500000
124u
349u
285u
209u
260u
424u
287u
7600
10
20
30
40
50
60
70
80
90
7700
7800


API
200
0
50
84
77
54
6700
6900
ft
MD 7681'
INC 89.3°
AZI 358.2°
TVD 6733.6'
MD 7771'
INC 89.5°
AZI 358.5°
TVD 6734.6'
LS: crm- lt gy, mod firm, blky- sbblky, microxln, arg ip, scat mod blwh flor, occ mrl, tr chk
LS: crm- lt gy, mod firm - firm, blky- sbblky, microxln, arg ip, scat mod blwh flor, occ mrl, occ chk
LS: crm- lt gy, mod firm - firm, blky- sbblky, microxln, arg ip, scat mod blwh flor, tr fos frag, occ chk, tr mrl
LS: crm- lt gy, mod firm - firm, blky- sbblky, microxln, arg ip, scat mod blwh flor, tr fos frag, occ chk, tr mrl


WT 9.3 / VIS 32
WT 9.3 / VIS 33
WOB 22
RPM 70
PP 2850
SPM 63
FT/HR
500
0
UNITS
5000
0
PPM
500000
0
234u
197u
286u
509u
230u
196u
140u
201u
20
30
40
50
60
70
80
90
7900
10
20
30
40
50
60
70
80
90
8000
10
20
30
55
74
62
84
77
API
200
0
6700
ft
6900
MD 7860'
INC 90.4°
AZI 359.9°
TVD 6734.7'
MD 7950'
INC 88.3°
AZI 359.0°
TVD 6735.7'
t gy, mod firm - brit, sbblky- sbpty,
arg ip, scat mod blwh flor, tr fos
chk, tr mrl
LS: crm- lt gy, mod, brit, sbblky- sbpty,
microxln, arg ip, scat mod blwh flor, tr fos
frag, occ chk, tr mrl
LS: crm- lt gy, mod firm - brit, sbblky- sbpty,
microxln, arg ip, scat mod blgr flor, occ chk,
occ mrl
LS: crm- lt gy, mod firm - brit, sbblky- sbpty,
microxln, arg ip, scat mod blgr flor, occ chk,
occ mrl
LS: crm- lt gy, mod firm - brit, s
microxln, arg ip, tr pyr, tr fos fra
occ mrl


WT 9.25 / VIS 32
WT 9.35 / VIS 32
FT/HR
500
0
UNITS
5000
0
PPM
500000
0
314u
245u
151u
171u
341u
331u
165u
40
50
60
70
80
90
8100
10
20
30
40
50
60
70
80
90
8200
10
20
30
40
50
API
200
0
94
61
62
60
6700
ft
6900
MD 8040'
INC 90.4°
AZI 2.9°
TVD 6736.7'
sbblky- sbpty,
ag, occ chk,
LS: crm- lt gy, mod firm - brit, sbblky- sbpty, microxln, arg ip, tr pyr, tr fos frag, occ chk, occ mrl
MD 8130'
INC 90.3°
AZI 2.2°
TVD 6736.2'
LS: crm- lt gy, mod firm - brit, sbblky- sbpty, microxln, arg ip, tr pyr, tr fos frag, occ chk, occ mrl
LS: crm- lt gy, mod, brit, sbblky- sbpty, microxln, arg ip, tr pyr, tr fos frag, occ chk, occ mrl
MD 8220'
INC 89.9°
AZI 1.9°
TVD 6736.0'
LS: crm- lt gy, mod firm - brit, sbblky- sbplty, microxln, arg ip, tr pyr, tr fos frag, occ chk, occ mrl



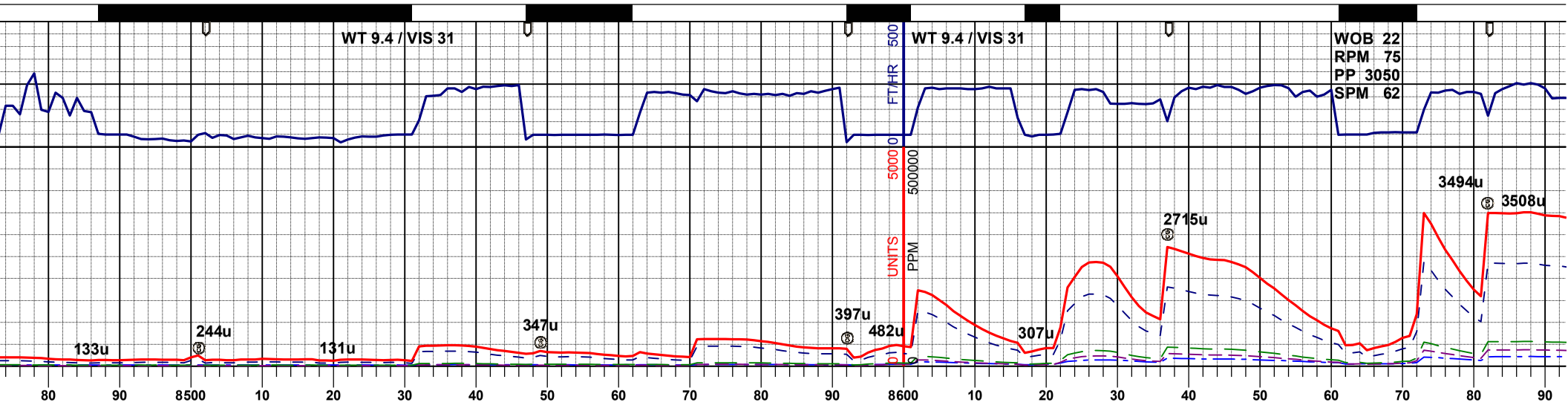
LS: crm- lt gy, mod firm - brit, sbblky-
sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy
lstr, sl arg, v calc, occ mrl

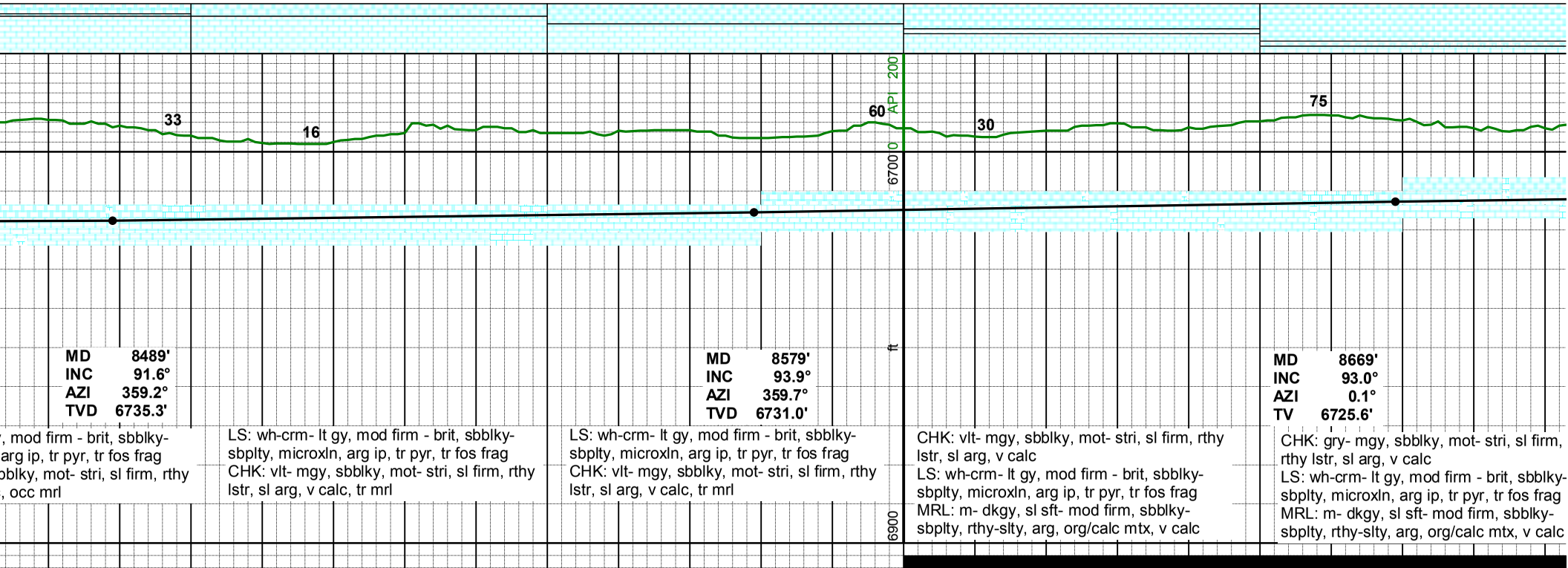
LS: crm- lt gy, mod firm - brit, sbblky-
sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy
lstr, sl arg, v calc, occ mrl

LS: crm- lt gy, mod firm - brit, sbblky-
sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy
lstr, sl arg, v calc, occ mrl

LS: crm- lt gy, mod firm - brit, sbblky-
sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy
lstr, sl arg, v calc, tr mrl

LS: wh-crm- lt gy
sbplty, microxln,
CHK: vlt- mgy, sl
lstr, sl arg, v calc





MD 8489'
INC 91.6°
AZI 359.2°
TVD 6735.3'

, mod firm - brit, sbblky-
arg ip, tr pyr, tr fos frag
bblky, mot- stri, sl firm, rthy
, occ mrl

LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc, tr mrl

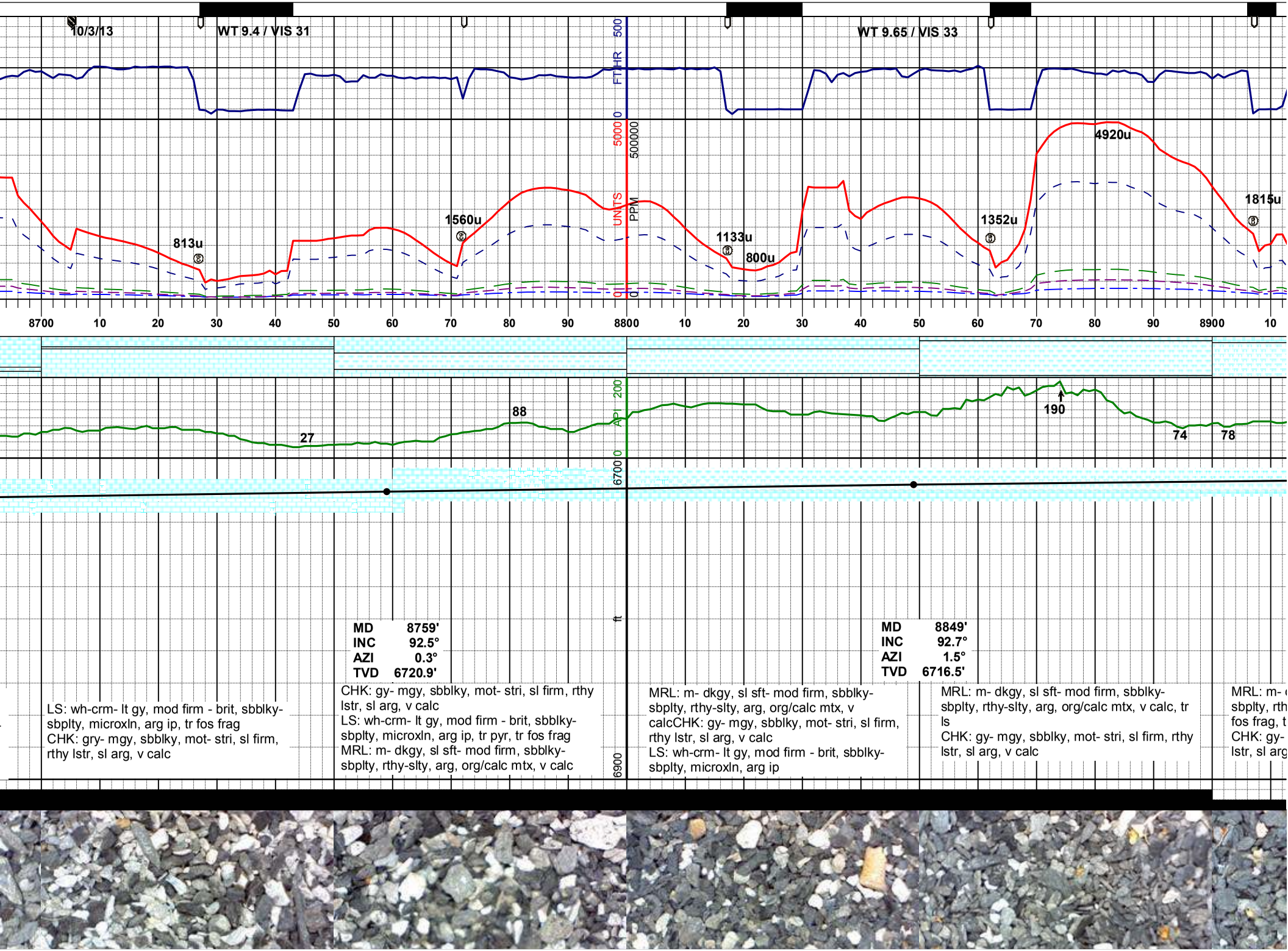
MD 8579'
INC 93.9°
AZI 359.7°
TVD 6731.0'

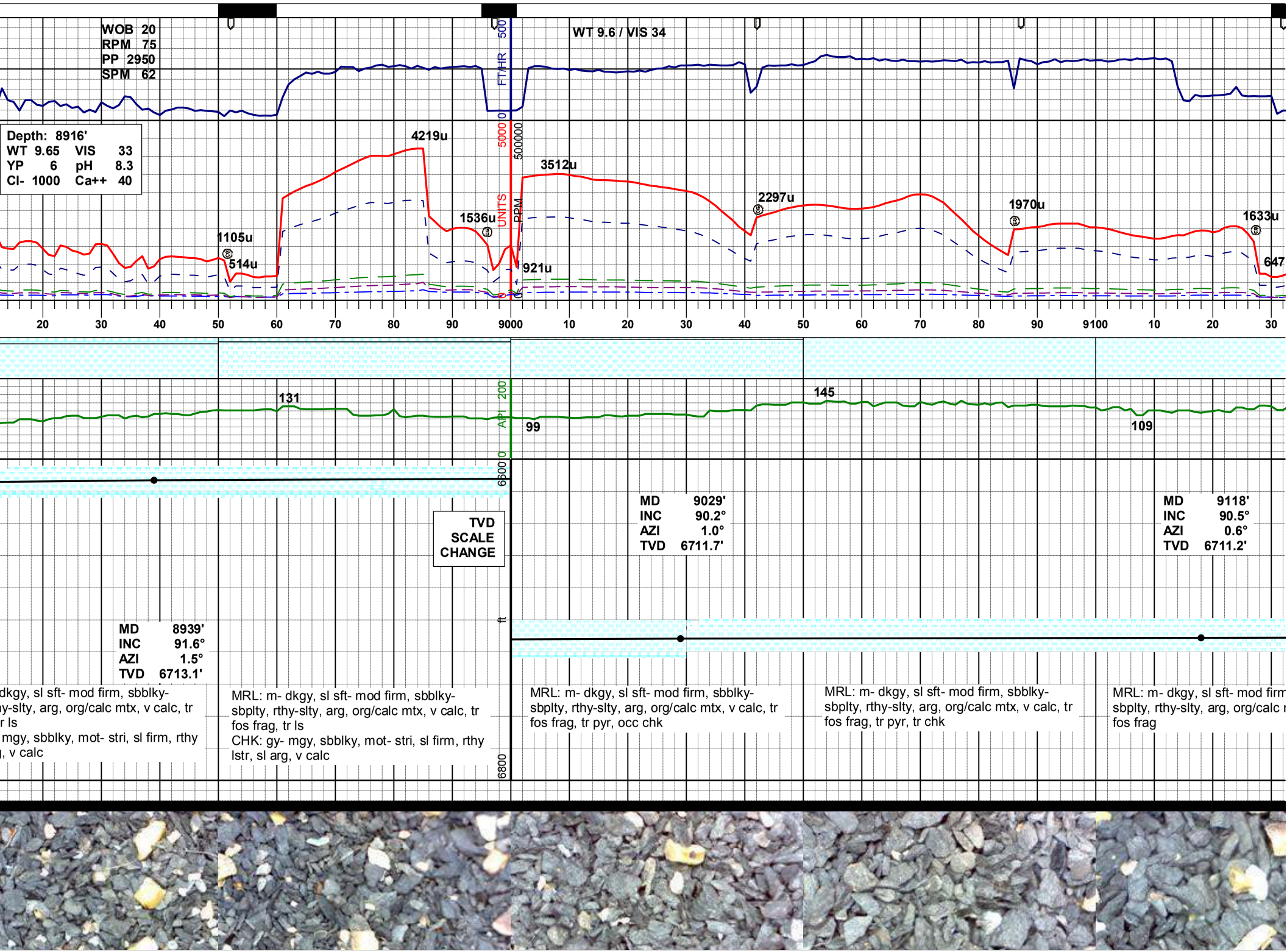
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr pyr, tr fos frag
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc, tr mrl

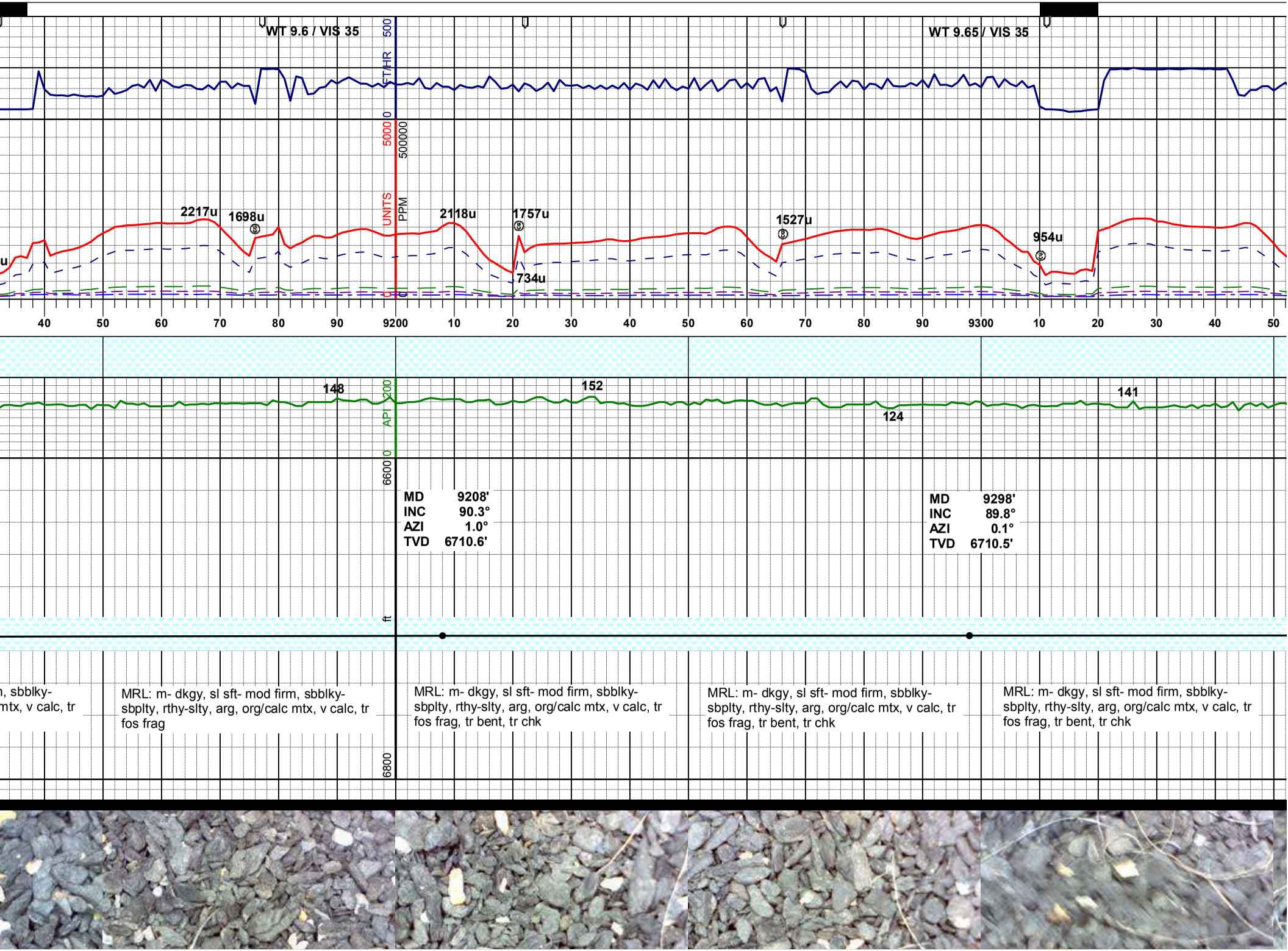
CHK: vlt- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr pyr, tr fos frag
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc

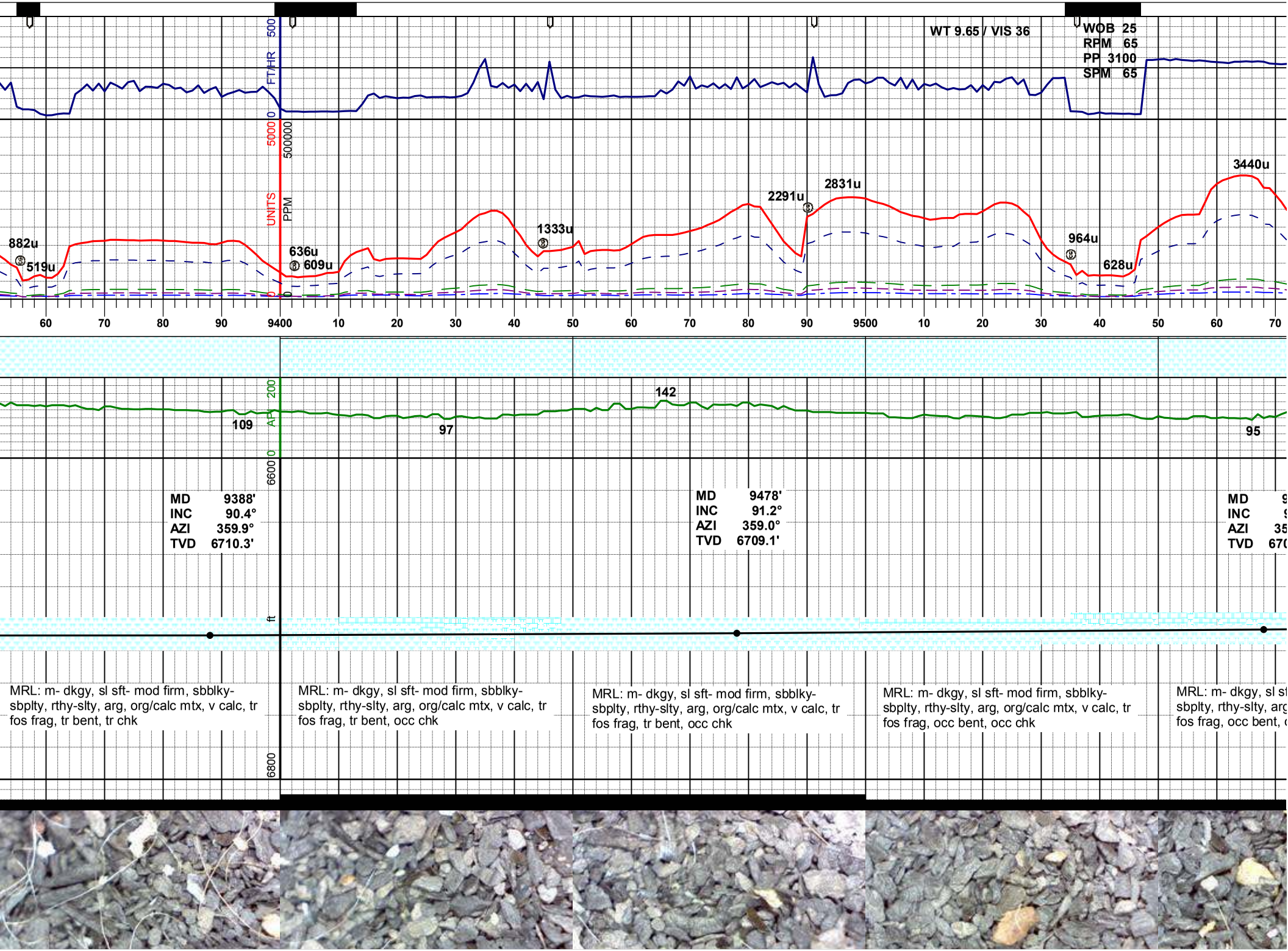
MD 8669'
INC 93.0°
AZI 0.1°
TV 6725.6'

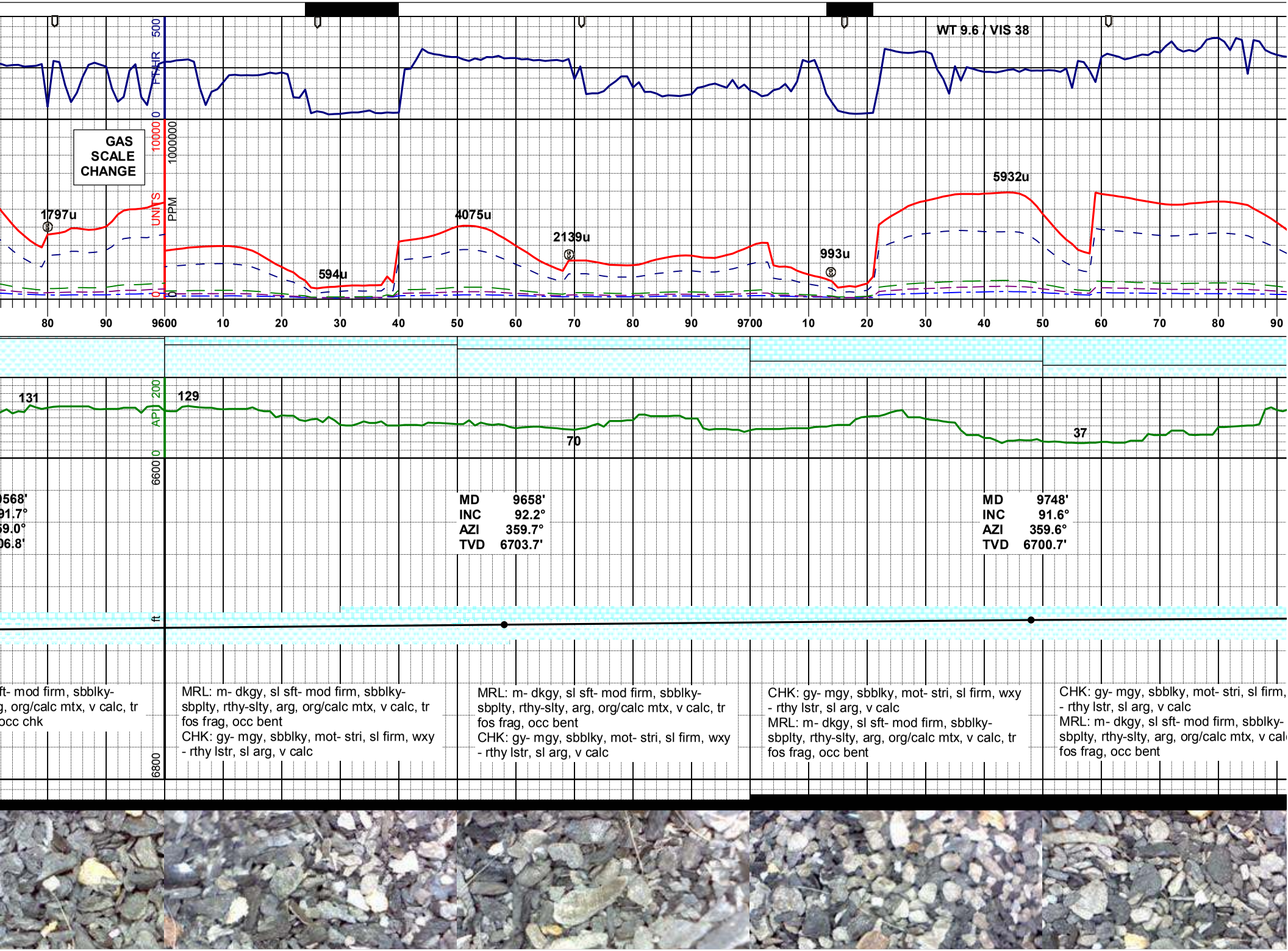
CHK: gry- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr pyr, tr fos frag
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc

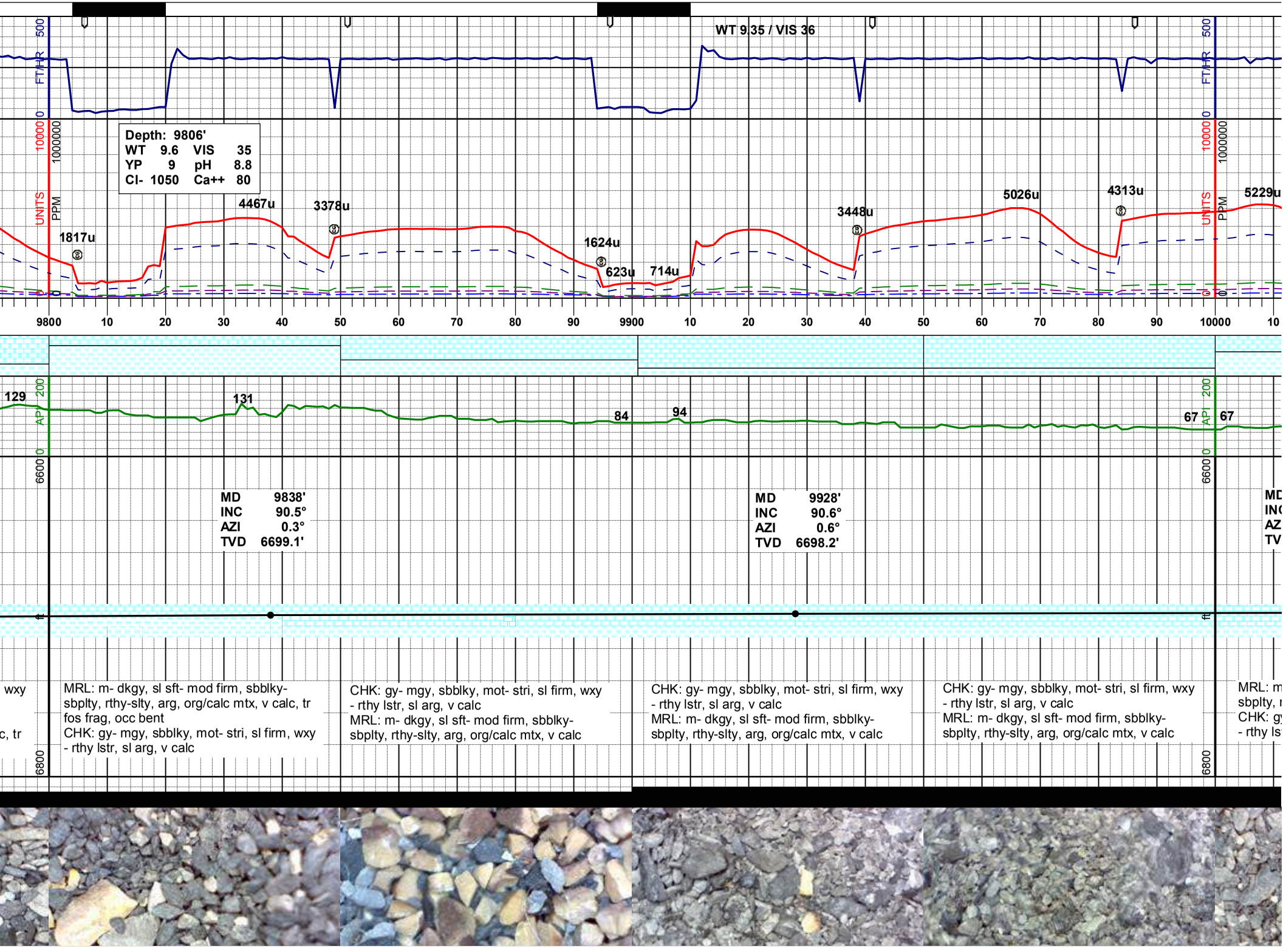

10/3/13
WT 9.4 / VIS 31
WT 9.65 / VIS 33
FT/HR
500
0
5000
0
500000
UNITS
PPM
0
813u
1560u
1133u
800u
1352u
4920u
1815u
8700
10
20
30
40
50
60
70
80
90
8800
10
20
30
40
50
60
70
80
90
8900
10
API
200
0
27
88
190
74
78
6700
6900
ft
MD 8759'
INC 92.5°
AZI 0.3°
TVD 6720.9'
MD 8849'
INC 92.7°
AZI 1.5°
TVD 6716.5'
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr fos frag
CHK: gry- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip, tr pyr, tr fos frag
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calcCHK: gy- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc
LS: wh-crm- lt gy, mod firm - brit, sbblky-sbplty, microxln, arg ip
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr ls
CHK: gy- mgy, sbblky, mot- stri, sl firm, rthy lstr, sl arg, v calc

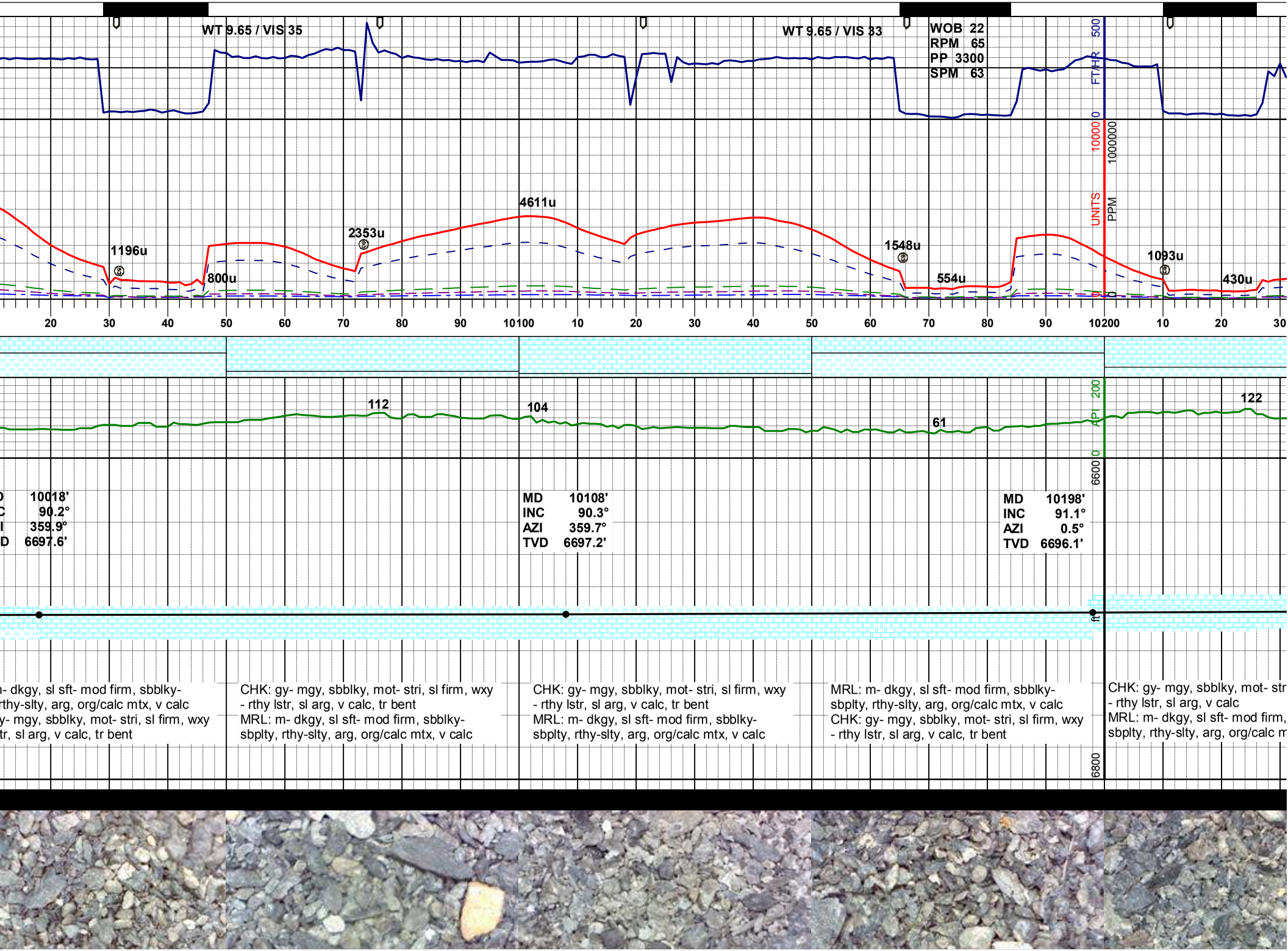

WOB 20
RPM 75
PP 2950
SPM 62
WT 9.6 / VIS 34
FT/HR
500
0
Depth: 8916'
WT 9.65 VIS 33
YP 6 pH 8.3
Cl- 1000 Ca++ 40
4219u
3512u
2297u
1970u
1633u
1536u
1105u
514u
921u
647
UNITS
PPM
5000
0
500000
0
20 30 40 50 60 70 80 90 9000 10 20 30 40 50 60 70 80 90 9100 10 20 30
131
145
99
109
API
200
0
6600
6800
ft
TVD
SCALE
CHANGE
MD 9029'
INC 90.2°
AZI 1.0°
TVD 6711.7'
MD 9118'
INC 90.5°
AZI 0.6°
TVD 6711.2'
MD 8939'
INC 91.6°
AZI 1.5°
TVD 6713.1'
dkgy, sl sft- mod firm, sbblky-
y-slty, arg, org/calc mtx, v calc, tr
r ls
mgy, sbblky, mot- stri, sl firm, rthy
, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, tr ls
CHK: gy- mgy, sbblky, mot- stri, sl firm, rthy
lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, tr pyr, occ chk
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, tr pyr, tr chk
MRL: m- dkgy, sl sft- mod firm
sbplty, rthy-slty, arg, org/calc
fos frag

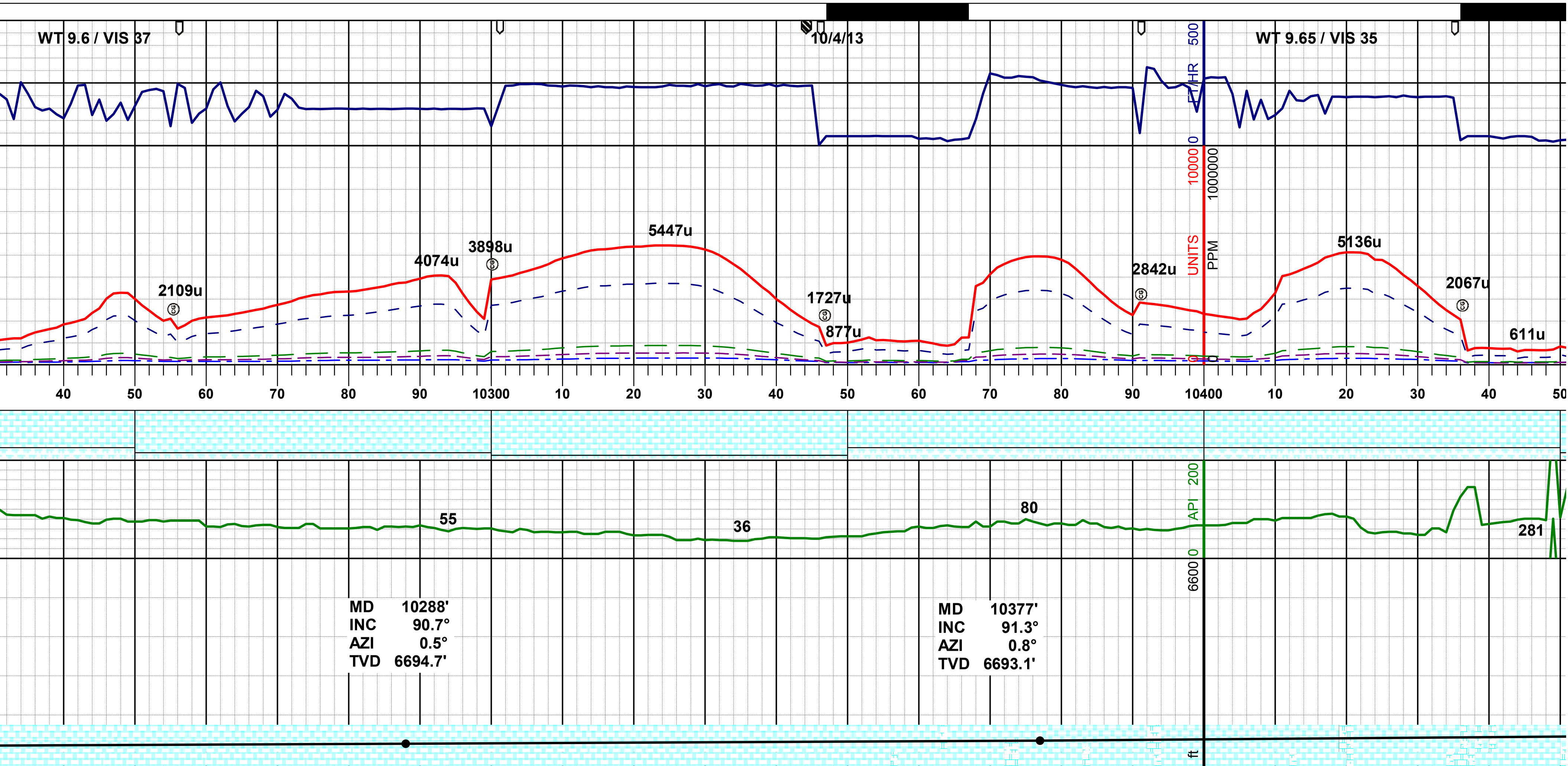

WT 9.6 / VIS 35
WT 9.65 / VIS 35
FT/HR
500
0
5000
0
500000
UNITS
PPM
2217u
1698u
2118u
1757u
734u
1527u
954u
40
50
60
70
80
90
9200
10
20
30
40
50
60
70
80
90
9300
10
20
30
40
50
148
152
124
141
API
200
0
6600
6800
ft
MD 9208'
INC 90.3°
AZI 1.0°
TVD 6710.6'
MD 9298'
INC 89.8°
AZI 0.1°
TVD 6710.5'
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, tr chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, tr chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, tr chk


WT 9.65 / VIS 36
WOB 25
RPM 65
PP 3100
SPM 65
FT/HR
500
0
UNITS
5000
0
PPM
500000
0
882u
519u
636u
609u
1333u
2291u
2831u
3440u
964u
628u
60
70
80
90
9400
10
20
30
40
50
60
70
80
90
9500
10
20
30
40
50
60
70
API
200
0
109
97
142
95
6600
ft
6800
MD 9388'
INC 90.4°
AZI 359.9°
TVD 6710.3'
MD 9478'
INC 91.2°
AZI 359.0°
TVD 6709.1'
MD 9
INC 9
AZI 35
TVD 670
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, tr chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, occ chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, tr bent, occ chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, occ bent, occ chk
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg
fos frag, occ bent,


WT 9.6 / VIS 38
ROP
500
0
GAS
SCALE
CHANGE
10000
0
1000000
UNITS
PPM
1797u
4075u
2139u
594u
993u
5932u
80
90
9600
10
20
30
40
50
60
70
80
90
9700
10
20
30
40
50
60
70
80
90
131
129
70
37
API
200
0
6600
6800
ft
MD 9658'
INC 92.2°
AZI 359.7°
TVD 6703.7'
MD 9748'
INC 91.6°
AZI 359.6°
TVD 6700.7'
ft- mod firm, sbblky-
g, org/calc mtx, v calc, tr
occ chk
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
fos frag, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm,
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc
fos frag, occ bent


WT 9.35 / VIS 36
FT/HR
500
0
Depth: 9806'
WT 9.6 VIS 35
YP 9 pH 8.8
Cl- 1050 Ca++ 80
UNITS
PPM
10000
1000000
1817u
4467u
3378u
1624u
623u
714u
3448u
5026u
4313u
5229u
9800
10
20
30
40
50
60
70
80
90
9900
10000
API
200
129
131
84
94
67
67
6600
6800
MD 9838'
INC 90.5°
AZI 0.3°
TVD 6699.1'
MD 9928'
INC 90.6°
AZI 0.6°
TVD 6698.2'
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr fos frag, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc


WT 9.65 / VIS 35
WT 9.65 / VIS 33
WOB 22
RPM 65
PP 3300
SPM 63
FT/HR
500
0
UNITS
PPM
10000
1000000
0
1196u
800u
2353u
4611u
1548u
554u
1093u
430u
20
30
40
50
60
70
80
90
10100
10
20
30
40
50
60
70
80
90
10200
10
20
30
112
104
61
122
API
200
0
6600
6800
ft
MD 10018'
INC 90.2°
AZI 359.9°
TVD 6697.6'
MD 10108'
INC 90.3°
AZI 359.7°
TVD 6697.2'
MD 10198'
INC 91.1°
AZI 0.5°
TVD 6696.1'
n- dkgy, sl sft- mod firm, sbblky-
rthy-slty, arg, org/calc mtx, v calc
y- mgy, sbblky, mot- stri, sl firm, wxy
tr, sl arg, v calc, tr bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc, tr bent
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc, tr bent
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc, tr bent
CHK: gy- mgy, sbblky, mot- str
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm,
sbplty, rthy-slty, arg, org/calc m



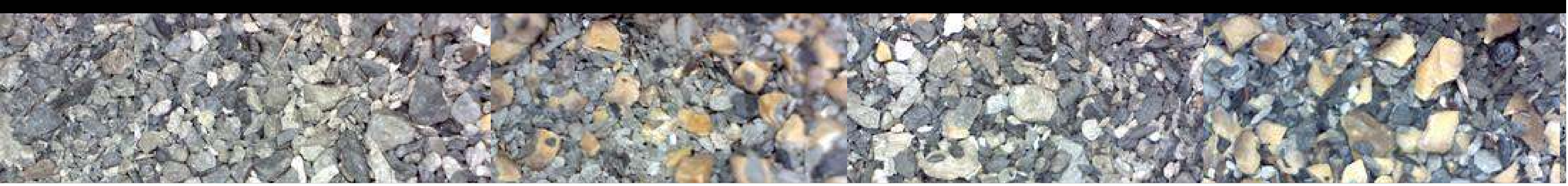
i, sl firm, wxy
sbblky-
tx, v calc

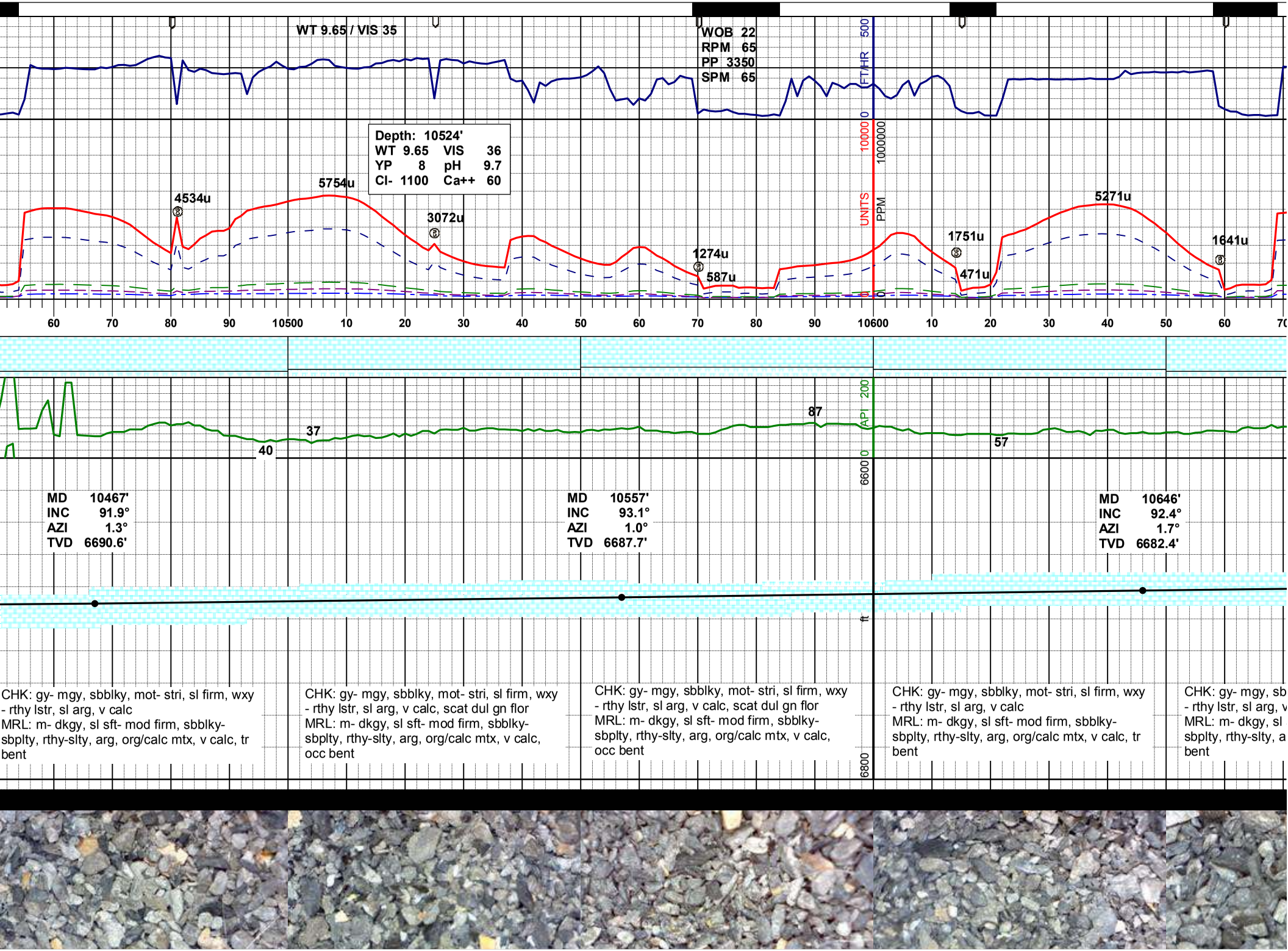
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc

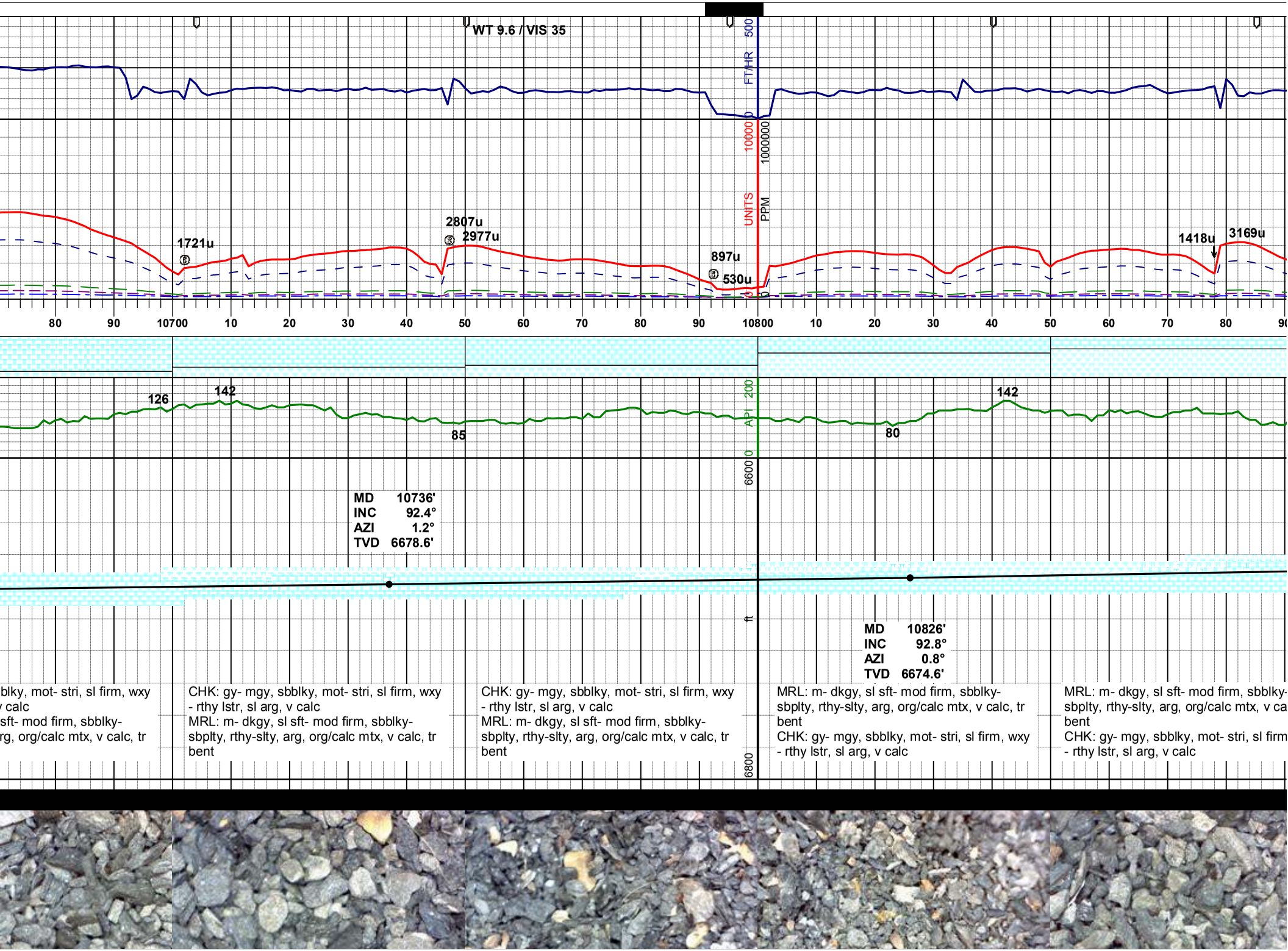
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc

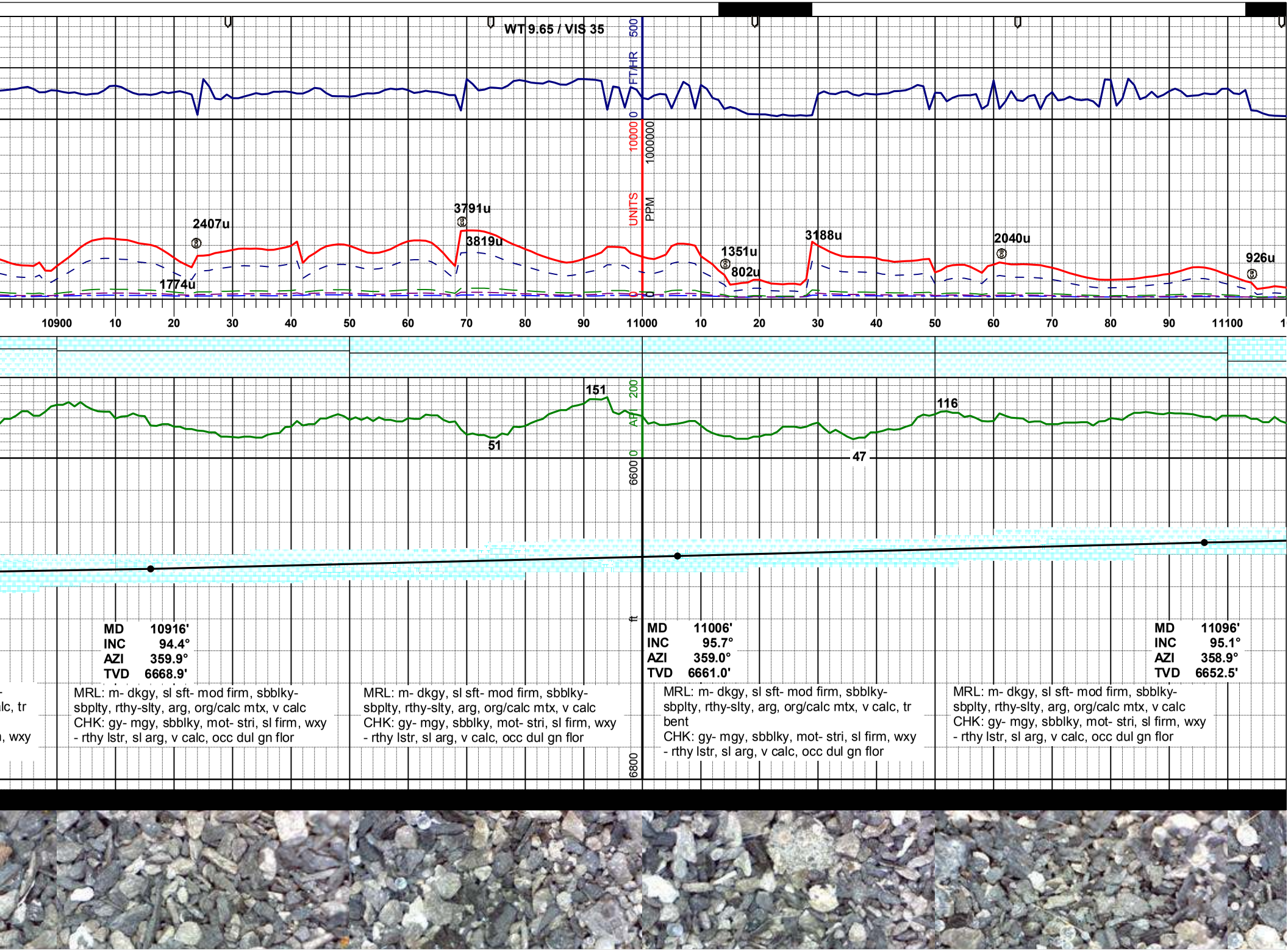
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc

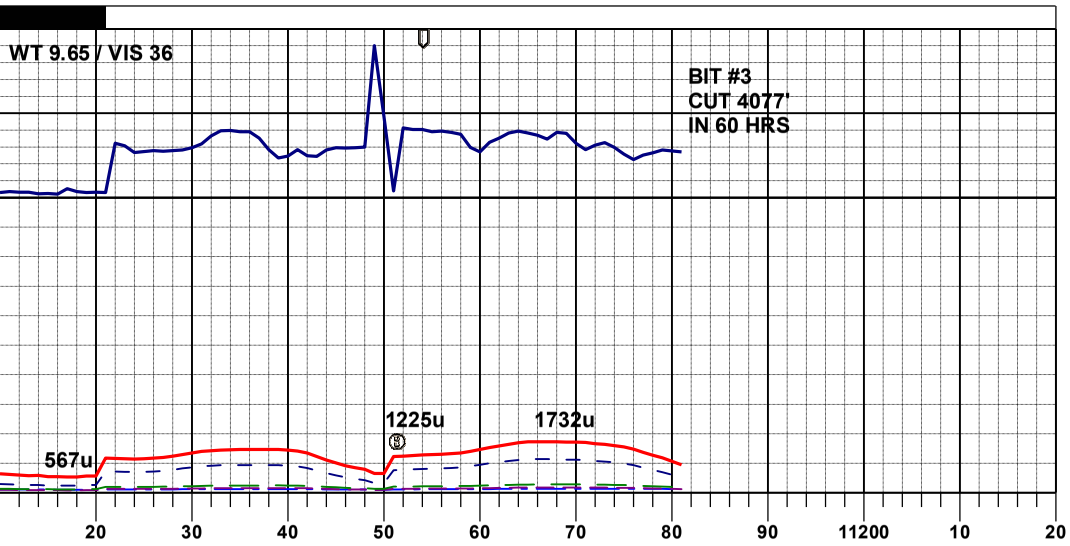
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc




WT 9.65 / VIS 35
WOB 22
RPM 65
PP 3350
SPM 65
FT/HR
500
0
Depth: 10524'
WT 9.65 VIS 36
YP 8 pH 9.7
Cl- 1100 Ca++ 60
5754u
4534u
3072u
1274u
587u
1751u
471u
5271u
1641u
UNITS
PPM
10000
1000000
60 70 80 90 10500 10 20 30 40 50 60 70 80 90 10600 10 20 30 40 50 60 70
API
200
0
87
37
40
57
6600
6800
ft
MD 10467'
INC 91.9°
AZI 1.3°
TVD 6690.6'
MD 10557'
INC 93.1°
AZI 1.0°
TVD 6687.7'
MD 10646'
INC 92.4°
AZI 1.7°
TVD 6682.4'
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, tr bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, scat dul gn flor
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, scat dul gn flor
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, occ bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, tr bent
CHK: gy- mgy, sb
- rthy lstr, sl arg, v
MRL: m- dkgy, sl
sbplty, rthy-slty, a
bent


WT 9.6 / VIS 35
FT/HR
500
0
10000
1000000
UNITS
PPM
1721u
2807u
2977u
897u
530u
1418u
3169u
80
90
10700
10
20
30
40
50
60
70
80
90
10800
10
20
30
40
50
60
70
80
90
126
142
85
142
80
API
200
0
6600
6800
ft
MD 10736'
INC 92.4°
AZI 1.2°
TVD 6678.6'
MD 10826'
INC 92.8°
AZI 0.8°
TVD 6674.6'
blky, mot- stri, sl firm, wxy
v calc
sft- mod firm, sbblky-
rg, org/calc mtx, v calc, tr
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
bent
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v calc, tr
bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy
- rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky-
sbplty, rthy-slty, arg, org/calc mtx, v ca
bent
CHK: gy- mgy, sbblky, mot- stri, sl firm
- rthy lstr, sl arg, v calc


WT 9.65 / VIS 35
FT/HR
500
0
10000
1000000
UNITS
PPM
2407u
1774u
3791u
3819u
1351u
802u
3188u
2040u
926u
10900
10
20
30
40
50
60
70
80
90
11000
10
20
30
40
50
60
70
80
90
11100
API
200
0
151
51
116
47
6600
6800
ft
MD 10916'
INC 94.4°
AZI 359.9°
TVD 6668.9'
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, occ dul gn flor
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, occ dul gn flor
MD 11006'
INC 95.7°
AZI 359.0°
TVD 6661.0'
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc, tr bent
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, occ dul gn flor
MD 11096'
INC 95.1°
AZI 358.9°
TVD 6652.5'
MRL: m- dkgy, sl sft- mod firm, sbblky-sbplty, rthy-slty, arg, org/calc mtx, v calc
CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc, occ dul gn flor



THANK YOU FOR CHOOSING
COLUMBINE LOGGING, INC.

TD: 11182' MD
@ 1426 HRS, 10/4/13

PROJECTION TO BIT

MD	11124'
INC	94.3°
AZI	359.0°
TVD	6650.3'

MD	11182'
INC	94.3°
AZI	359.0°
TVD	6645.9'

CHK: gy- mgy, sbblky, mot- stri, sl firm, wxy - rthy lstr, sl arg, v calc
MRL: m- dkgy, sl sft- mod firm, sbblky- sbplty, rthy-slty, arg, org/calc mtx, v calc, occ fos frag, scat bent.