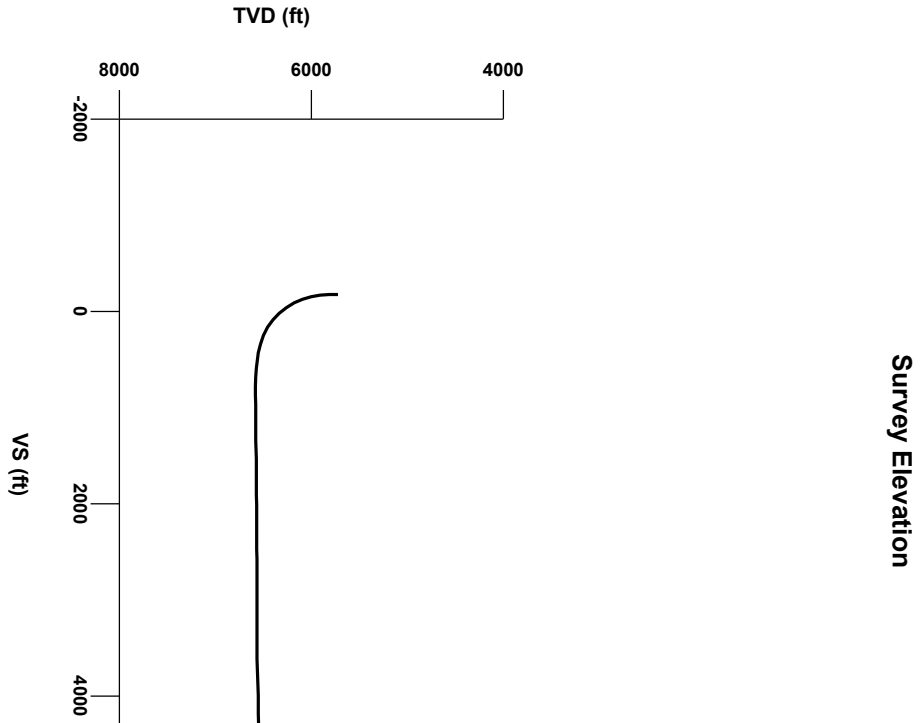
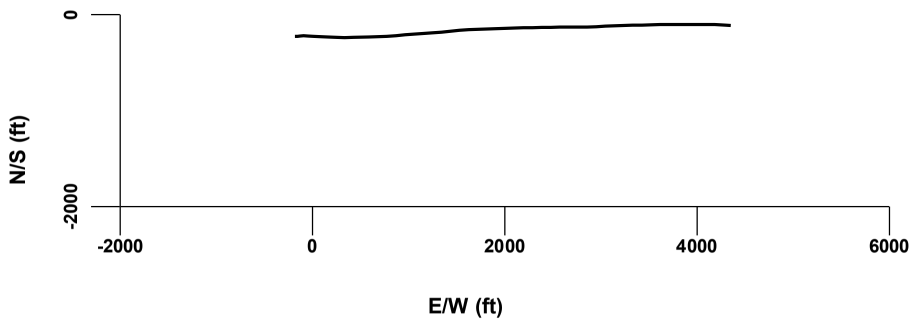
OPERATOR:	**NOBLE ENERGY INC**
WELL:	**KUMMER PC LE 23-64HN**
LOCATION:	**SEC 23 T8N R61W**
COUNTY:	**WELD**
STATE:	**COLORADO**
SPOT:	**2197' FSL; 255' FWL**
ELEVATION:	**4982' GL; 5006' KB**
FIELD:	**WILDCAT**
SPUD DATE:	**04/21/2013**
TD DATE:	**04/27/2013**
DATES LOGGED:	**04/23/2013 - 04/27/2013**
DEPTHS LOGGED:	**5788' - 10804'MD**
LOGGERS:	**LAURA KELLOGG; CONOR PESICKA**
DRILLING FLUID:	**LSND**
DRILLING RIG:	**H&P 273**
API:	**05-123-36679**
LOG TYPE:	**HORIZONTAL**
SCALE:	**1:240 (5 inches per 100 feet)**
REMARKS:	**WELLSITE GEOLOGICAL SERVICES PROVIDED BY COLUMBINE LOGGING INC.**

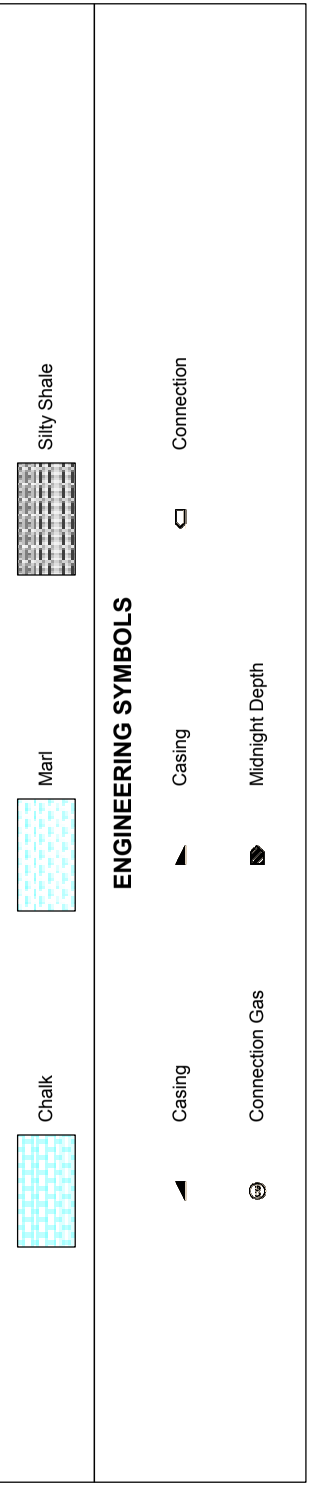


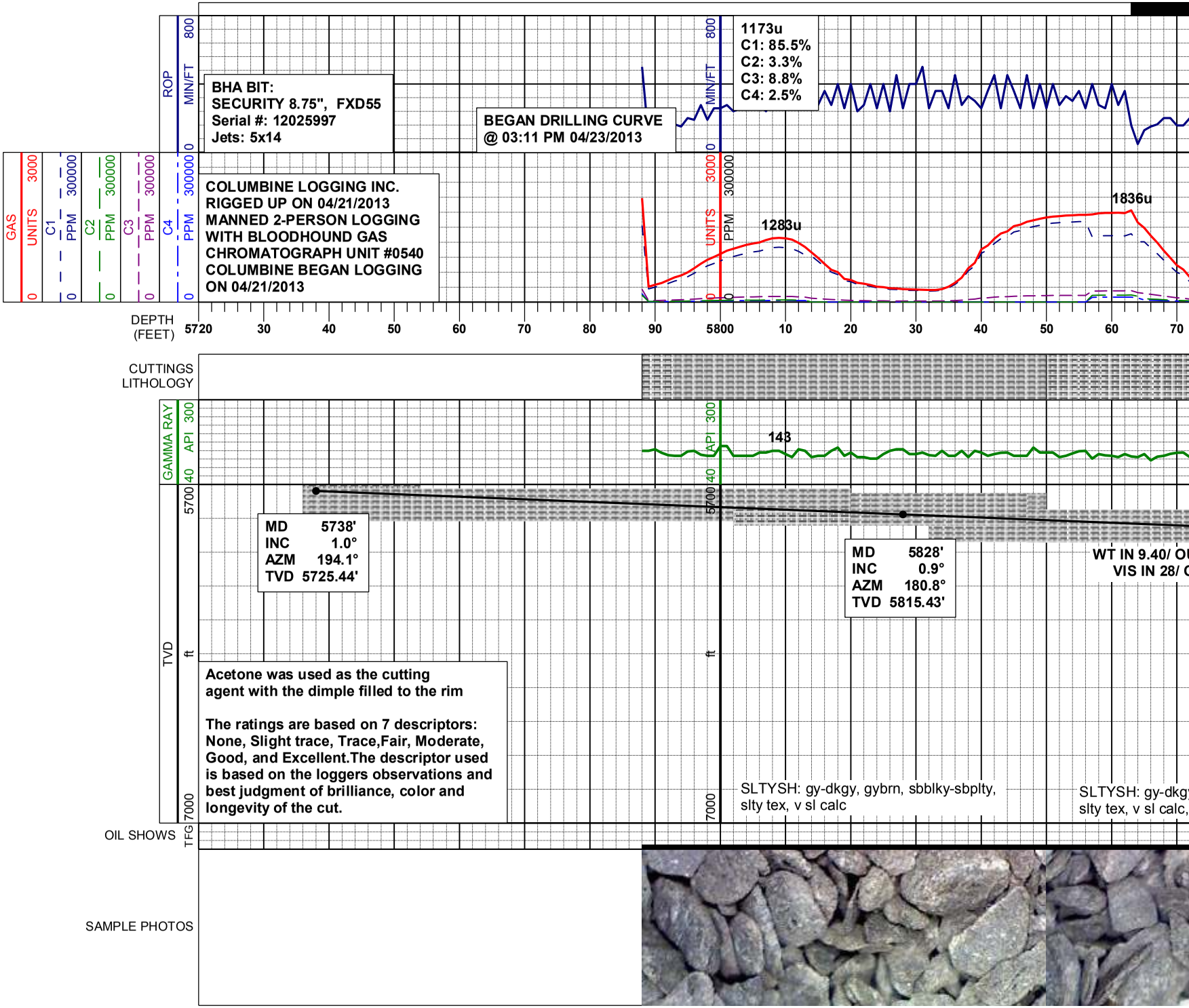
6000

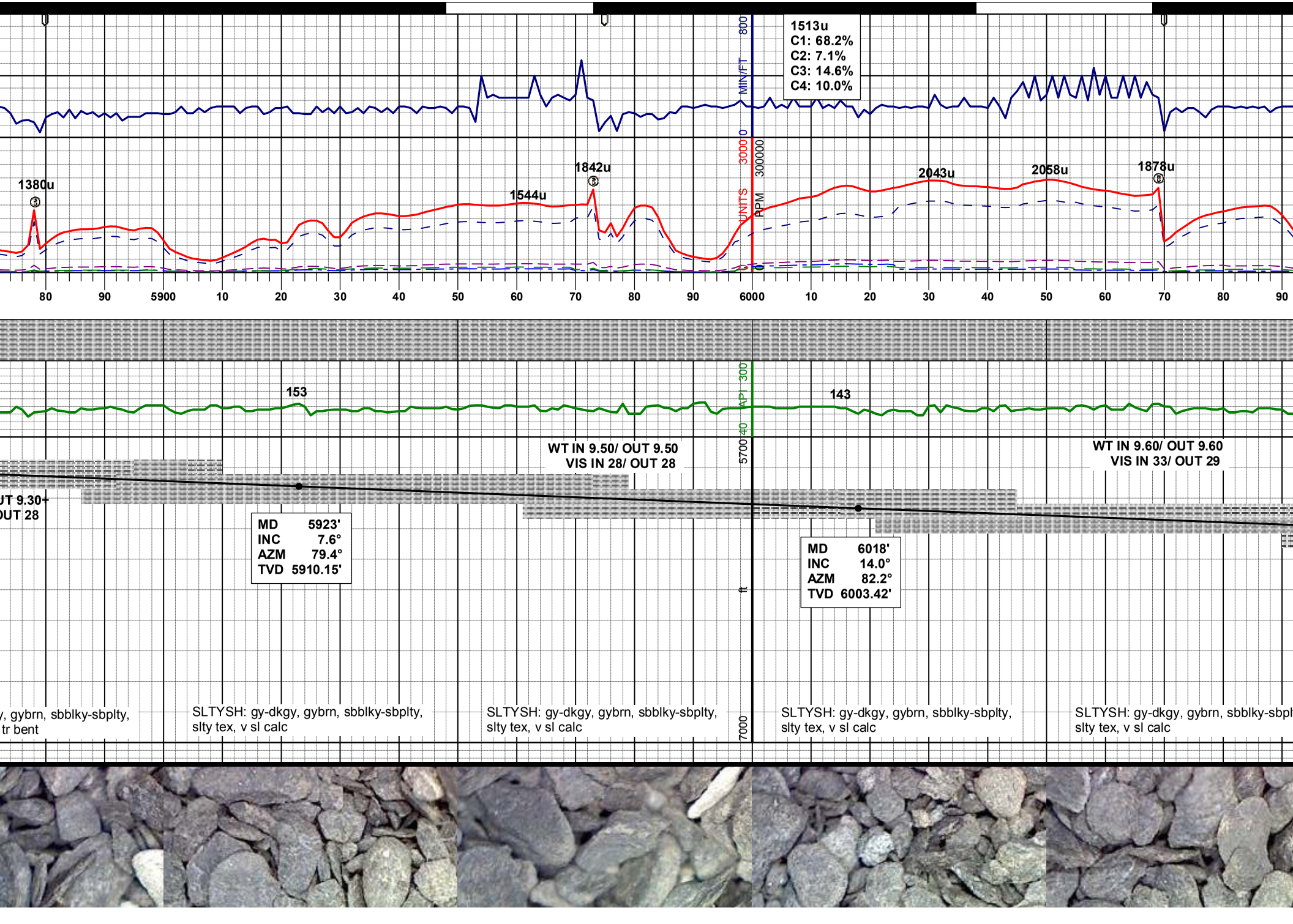
Survey Plan

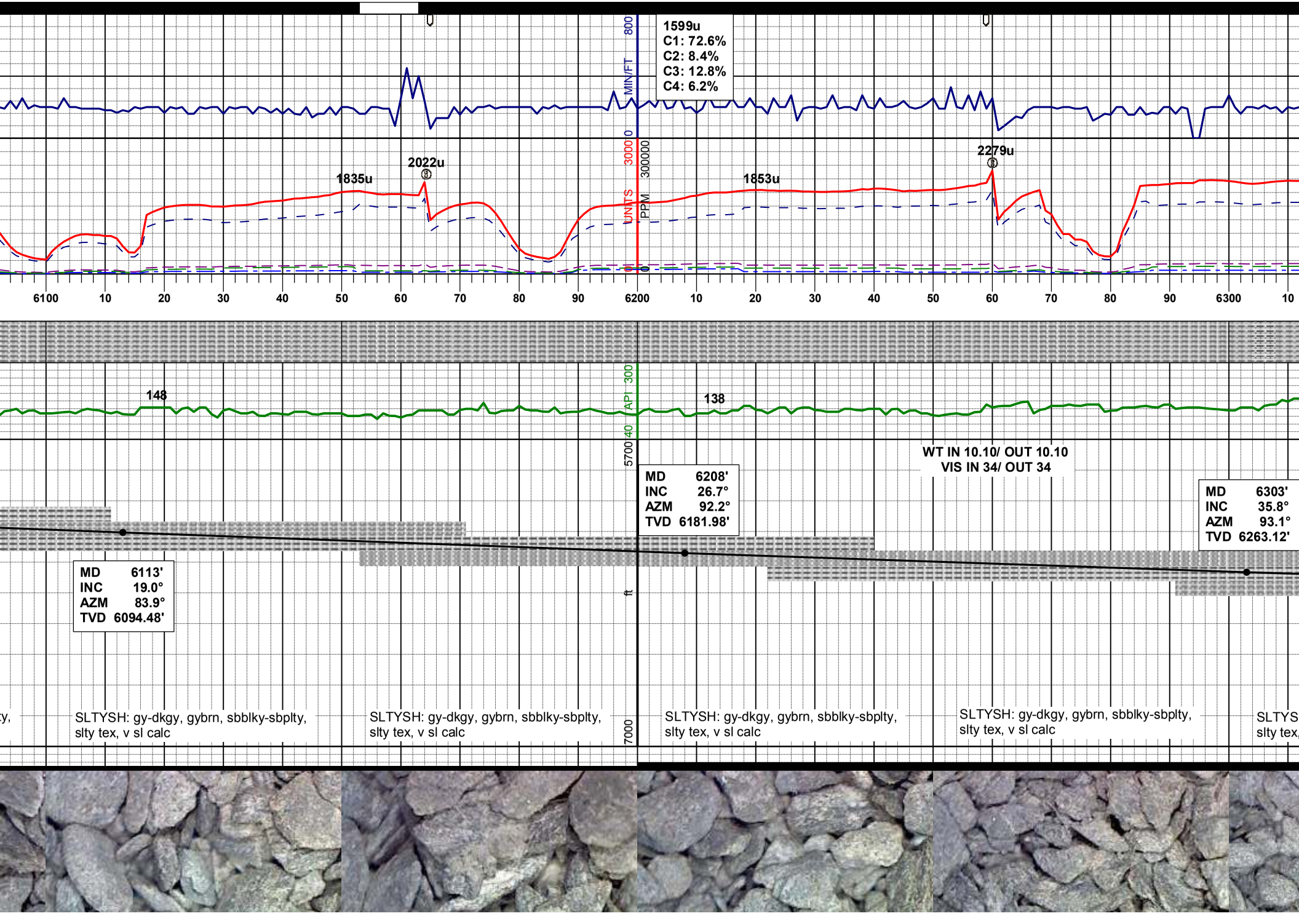


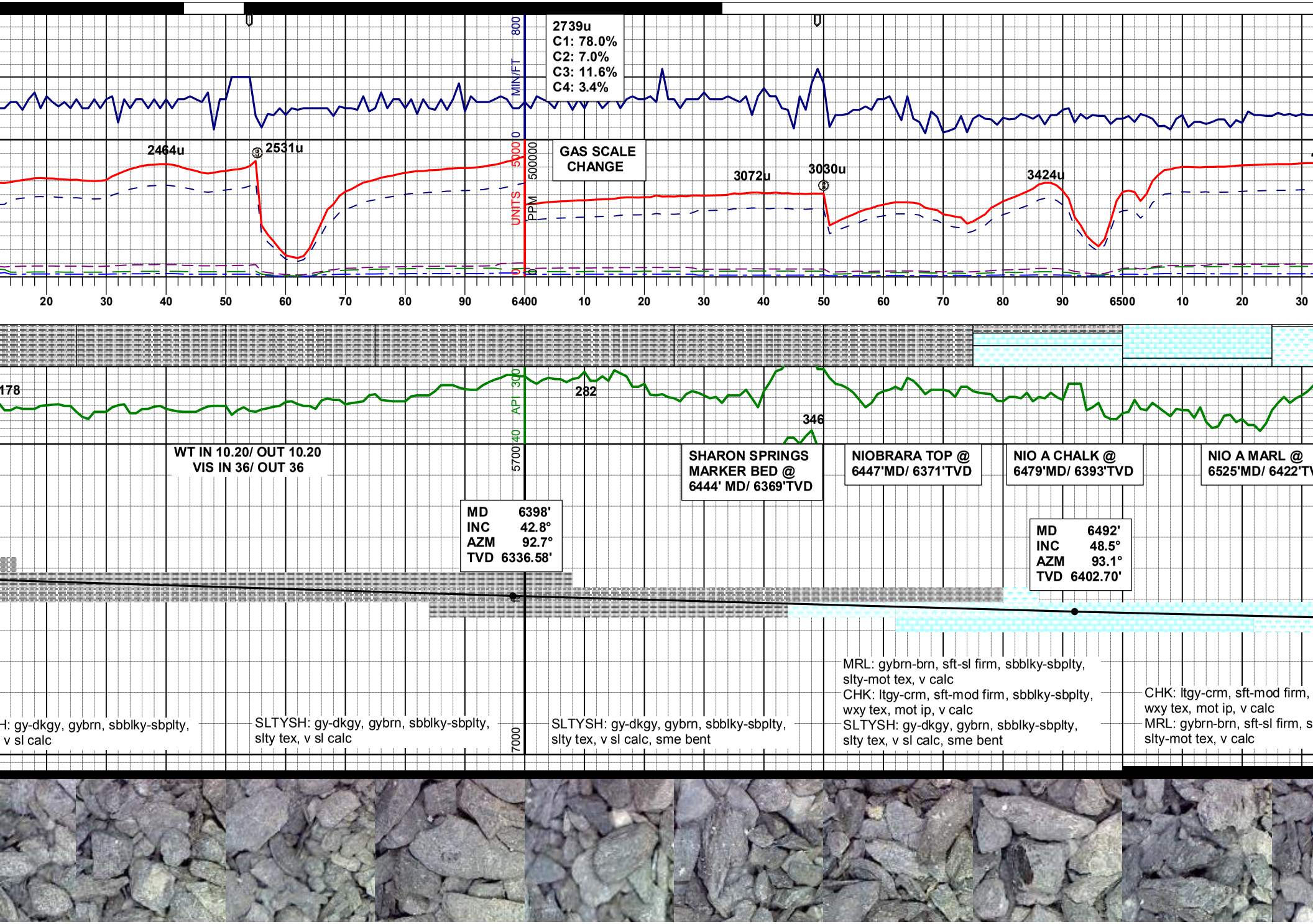
LITHOLOGIES

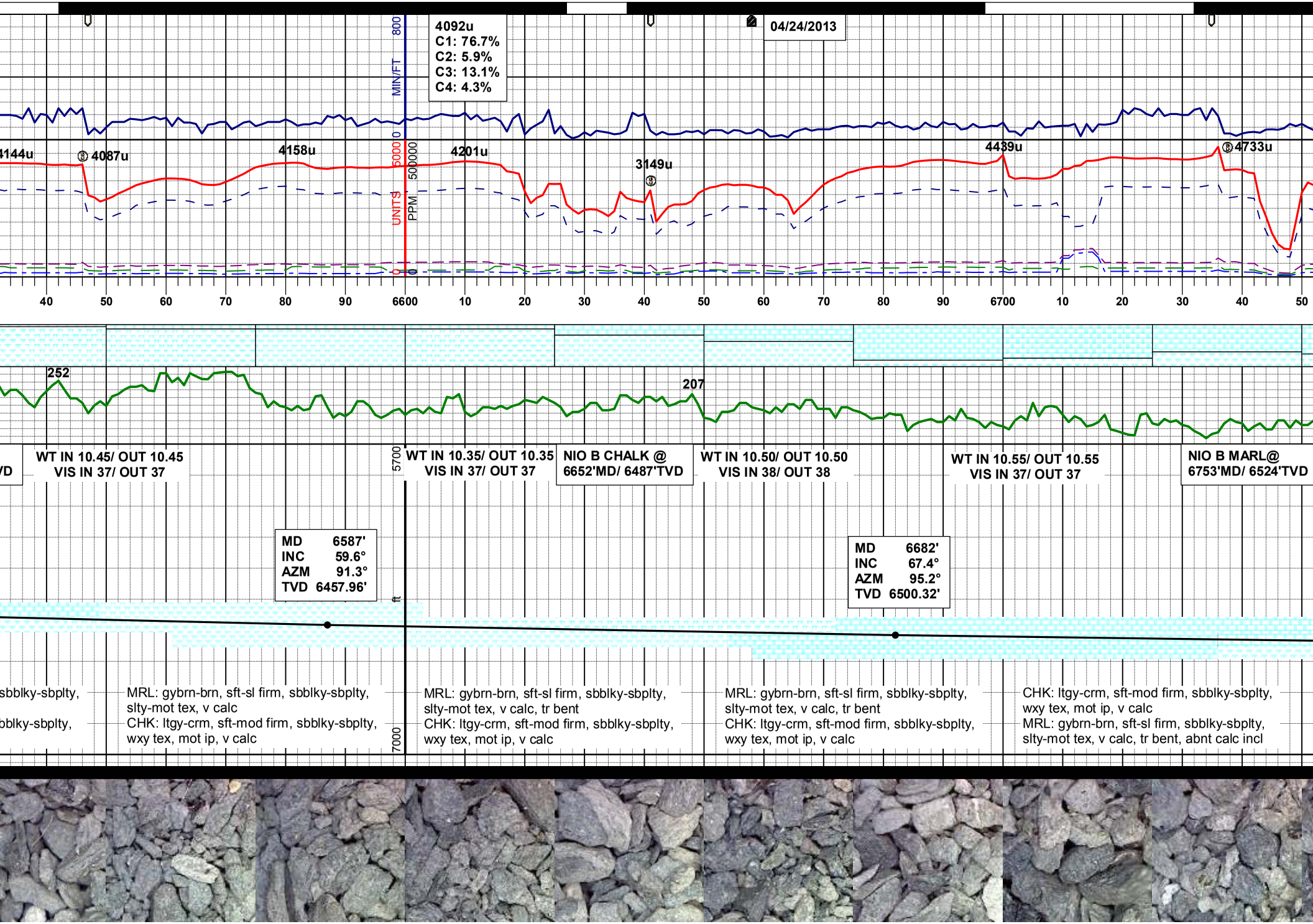

ENGINEERING SYMBOLS
Silty Shale
Marl
Chalk
Connection
Casing
Casing
Midnight Depth
Connection Gas

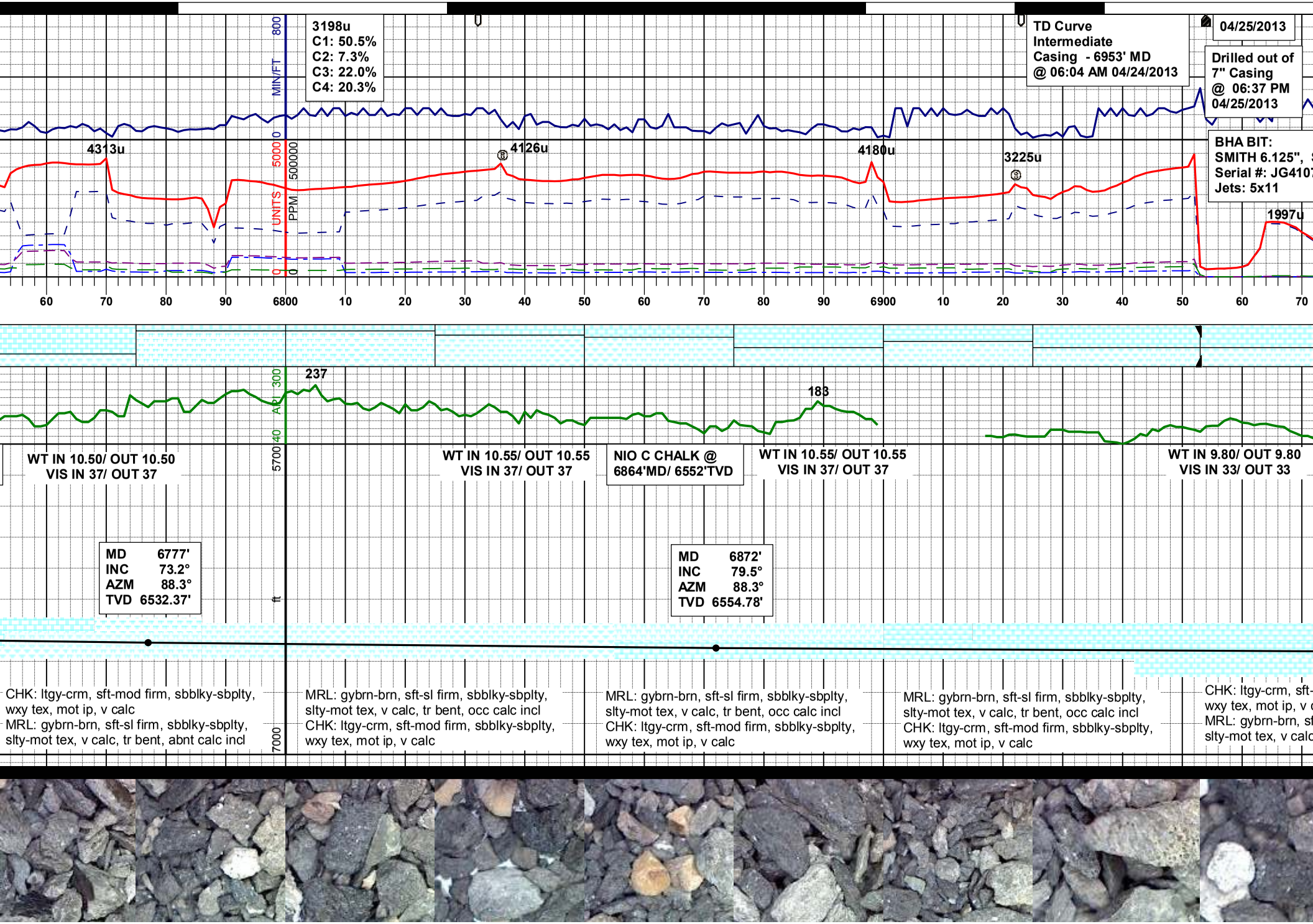

ROP
MIN/FT
800
0
BHA BIT:
SECURITY 8.75", FXD55
Serial #: 12025997
Jets: 5x14
BEGAN DRILLING CURVE
@ 03:11 PM 04/23/2013
1173u
C1: 85.5%
C2: 3.3%
C3: 8.8%
C4: 2.5%
GAS
UNITS
3000
C1
PPM
300000
C2
C3
C4
COLUMBINE LOGGING INC.
RIGGED UP ON 04/21/2013
MANNED 2-PERSON LOGGING
WITH BLOODHOUND GAS
CHROMATOGRAPH UNIT #0540
COLUMBINE BEGAN LOGGING
ON 04/21/2013
1283u
1836u
DEPTH
(FEET)
5720
30
40
50
60
70
80
90
5800
10
20
30
40
50
60
70
CUTTINGS
LITHOLOGY
GAMMA RAY
API
300
40
143
TVD
ft
5700
7000
MD 5738'
INC 1.0°
AZM 194.1°
TVD 5725.44'
MD 5828'
INC 0.9°
AZM 180.8°
TVD 5815.43'
WT IN 9.40/ O
VIS IN 28/ C
Acetone was used as the cutting
agent with the dimple filled to the rim
The ratings are based on 7 descriptors:
None, Slight trace, Trace,Fair, Moderate,
Good, and Excellent.The descriptor used
is based on the loggers observations and
best judgment of brilliance, color and
longevity of the cut.
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty,
slty tex, v sl calc
SLTYSH: gy-dkg
slty tex, v sl calc,
OIL SHOWS
TFG
SAMPLE PHOTOS

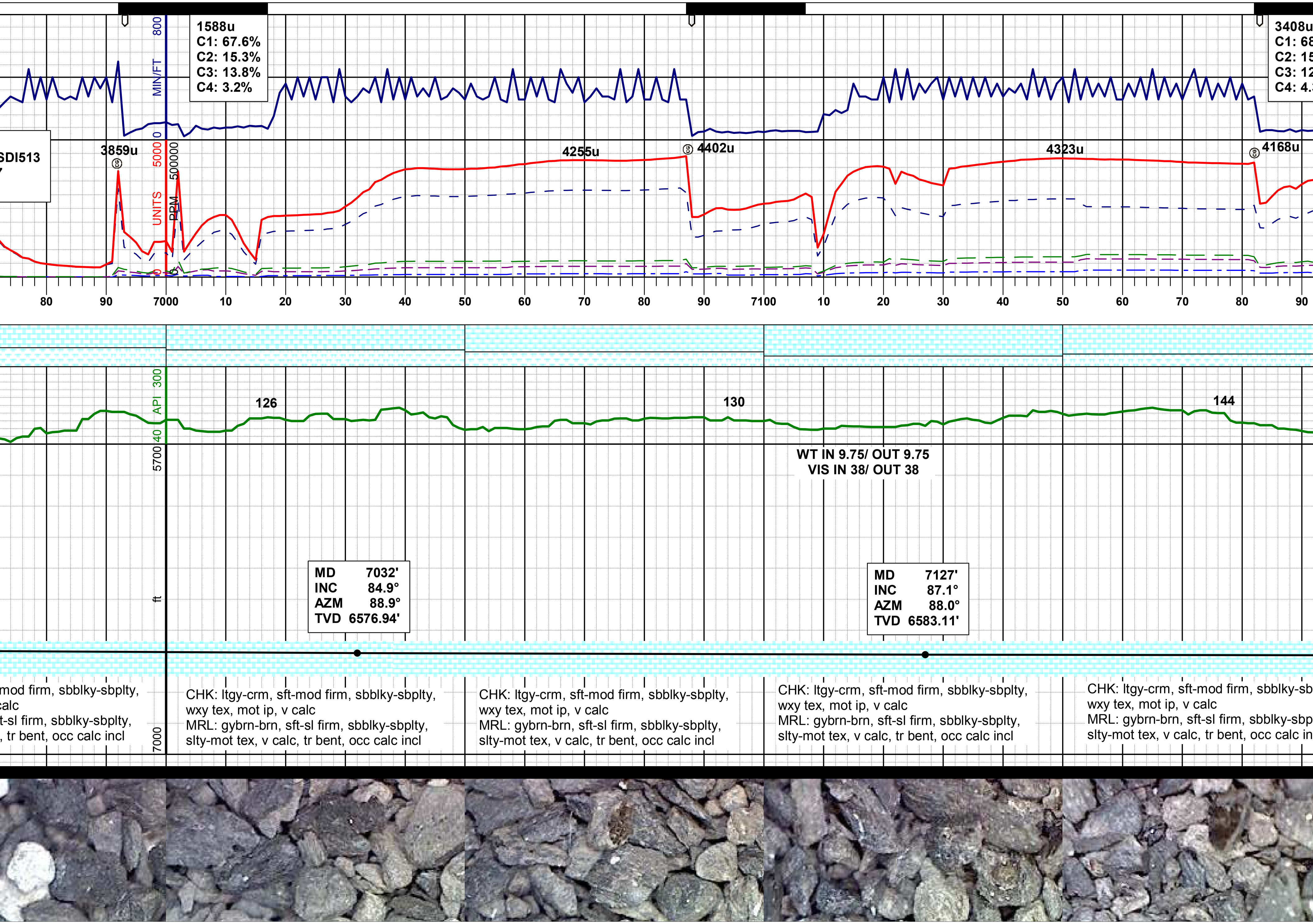

1513u
C1: 68.2%
C2: 7.1%
C3: 14.6%
C4: 10.0%
MIN/FT
800
0
UNITS
3000
0
PPM
300000
0
1380u
1544u
1842u
2043u
2058u
1878u
80
90
5900
10
20
30
40
50
60
70
80
90
6000
10
20
30
40
50
60
70
80
90
153
143
API
300
40
5700
7000
ft
WT IN 9.50/ OUT 9.50
VIS IN 28/ OUT 28
WT IN 9.60/ OUT 9.60
VIS IN 33/ OUT 29
UT 9.30+
OUT 28
MD 5923'
INC 7.6°
AZM 79.4°
TVD 5910.15'
MD 6018'
INC 14.0°
AZM 82.2°
TVD 6003.42'
y, gybrn, sbblky-sbplty,
tr bent
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty,
slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty,
slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty,
slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbpl
slty tex, v sl calc

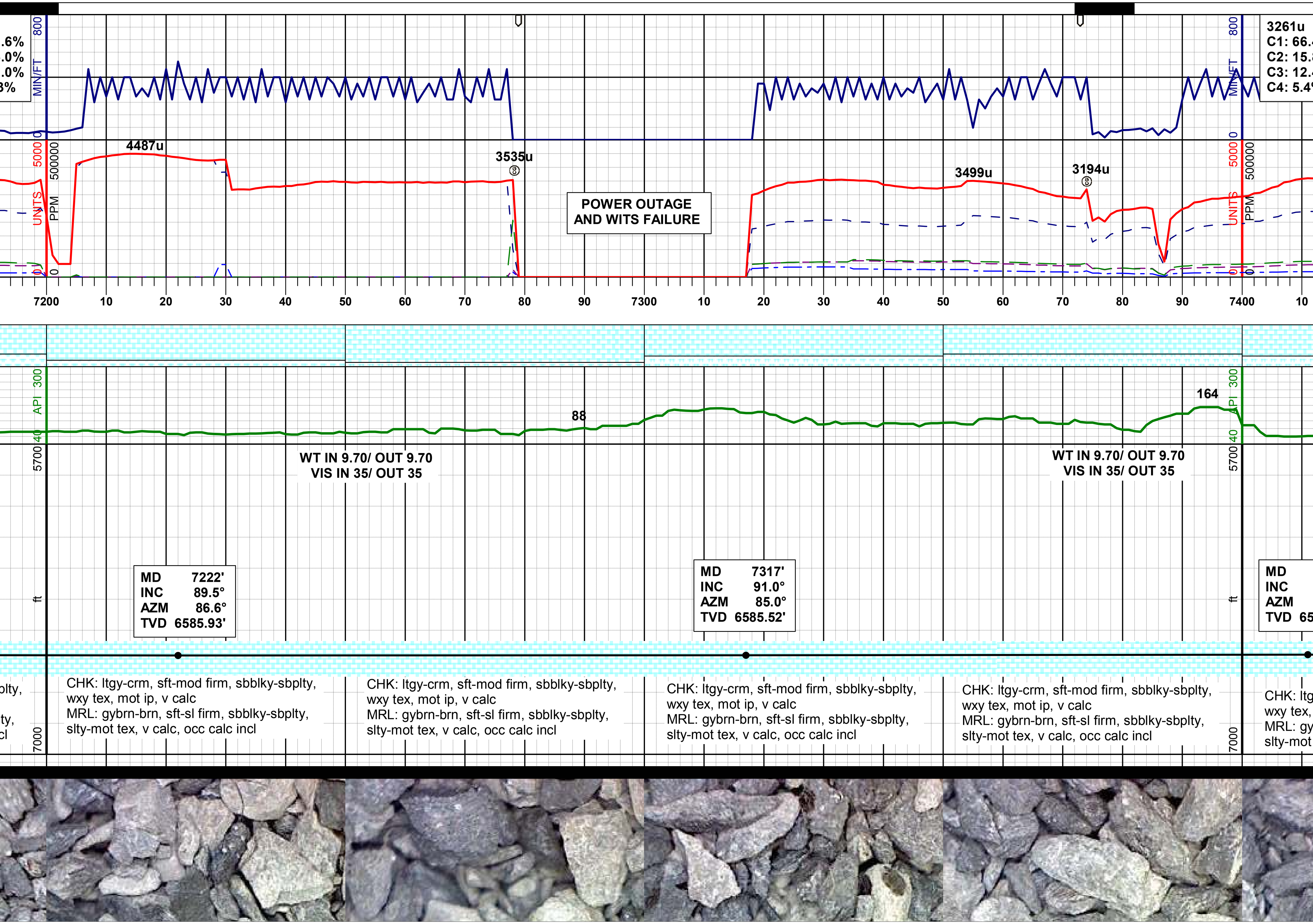

1599u
C1: 72.6%
C2: 8.4%
C3: 12.8%
C4: 6.2%
1835u
2022u
1853u
2279u
MIN/FT
UNITS
PPM
800
0
3000
0
300000
0
6100
10
20
30
40
50
60
70
80
90
6200
10
20
30
40
50
60
70
80
90
6300
10
148
138
API
300
40
5700
7000
ft
WT IN 10.10/ OUT 10.10
VIS IN 34/ OUT 34
MD 6208'
INC 26.7°
AZM 92.2°
TVD 6181.98'
MD 6113'
INC 19.0°
AZM 83.9°
TVD 6094.48'
MD 6303'
INC 35.8°
AZM 93.1°
TVD 6263.12'
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc


2739u
C1: 78.0%
C2: 7.0%
C3: 11.6%
C4: 3.4%
MIN/FT
800
0
GAS SCALE CHANGE
2464u
2531u
3072u
3030u
3424u
UNITS
5000
0
PPM
500000
0
20
30
40
50
60
70
80
90
6400
10
20
30
40
50
60
70
80
90
6500
10
20
30
178
API
300
40
282
346
WT IN 10.20/ OUT 10.20
VIS IN 36/ OUT 36
SHARON SPRINGS MARKER BED @ 6444' MD/ 6369'TVD
NIOBRARA TOP @ 6447'MD/ 6371'TVD
NIO A CHALK @ 6479'MD/ 6393'TVD
NIO A MARL @ 6525'MD/ 6422'TV
5700
MD 6398'
INC 42.8°
AZM 92.7°
TVD 6336.58'
MD 6492'
INC 48.5°
AZM 93.1°
TVD 6402.70'
7000
H: gy-dkgy, gybrn, sbblky-sbplty, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc, sme bent
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
SLTYSH: gy-dkgy, gybrn, sbblky-sbplty, slty tex, v sl calc, sme bent
CHK: ltgy-crm, sft-mod firm, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, s
slty-mot tex, v calc

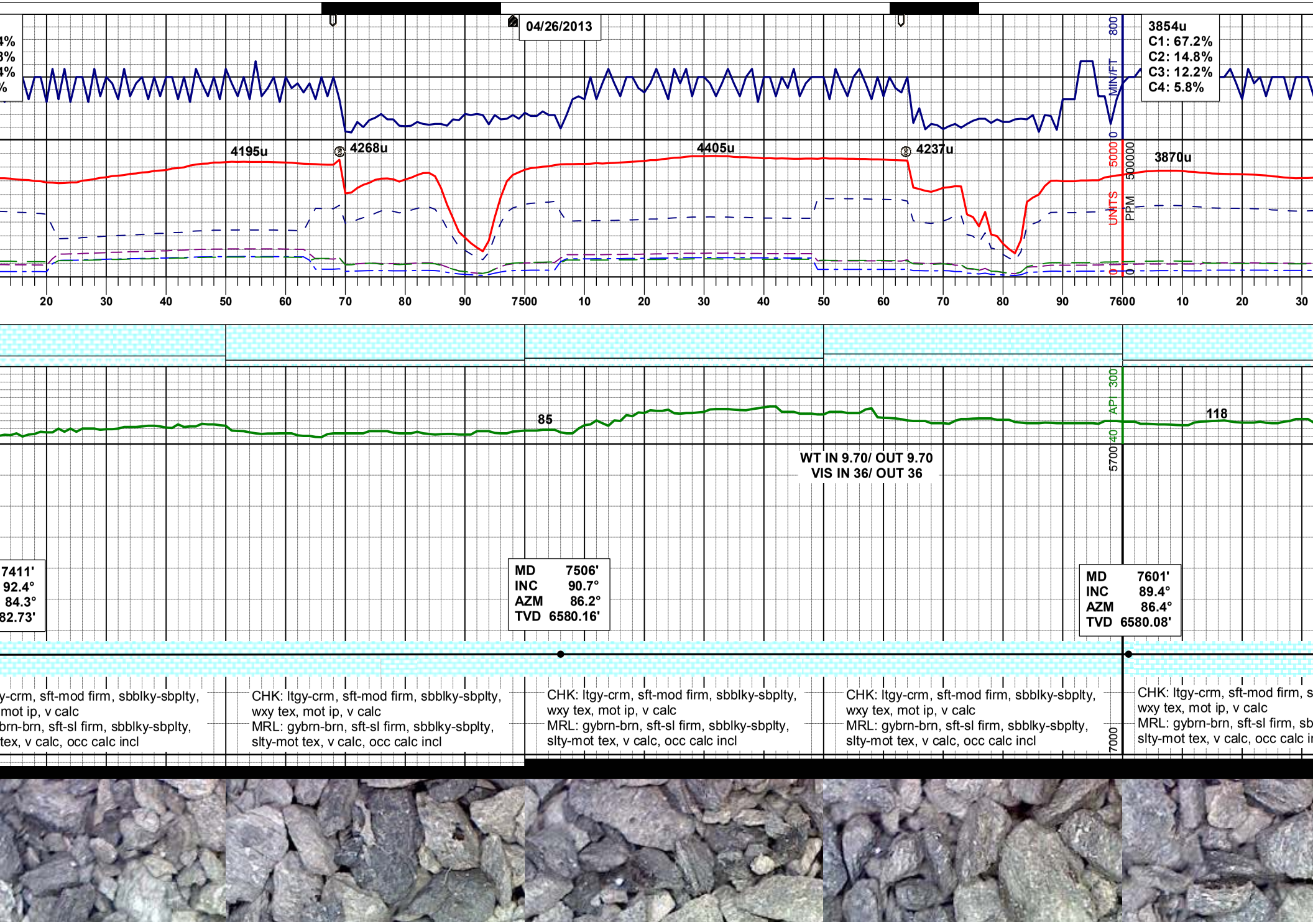

4092u
C1: 76.7%
C2: 5.9%
C3: 13.1%
C4: 4.3%
04/24/2013
MIN/FT
800
0
UNITS
6000
0
PPM
500000
0
4144u
4087u
4158u
4201u
3149u
4439u
4733u
40
50
60
70
80
90
6600
10
20
30
40
50
60
70
80
90
6700
10
20
30
40
50
252
207
WT IN 10.45/ OUT 10.45
VIS IN 37/ OUT 37
WT IN 10.35/ OUT 10.35
VIS IN 37/ OUT 37
NIO B CHALK @
6652'MD/ 6487'TVD
WT IN 10.50/ OUT 10.50
VIS IN 38/ OUT 38
WT IN 10.55/ OUT 10.55
VIS IN 37/ OUT 37
NIO B MARL@
6753'MD/ 6524'TVD
MD 6587'
INC 59.6°
AZM 91.3°
TVD 6457.96'
MD 6682'
INC 67.4°
AZM 95.2°
TVD 6500.32'
5700
ft
7000
sbblky-sbplty,
bblky-sbplty,
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent, abnt calc incl

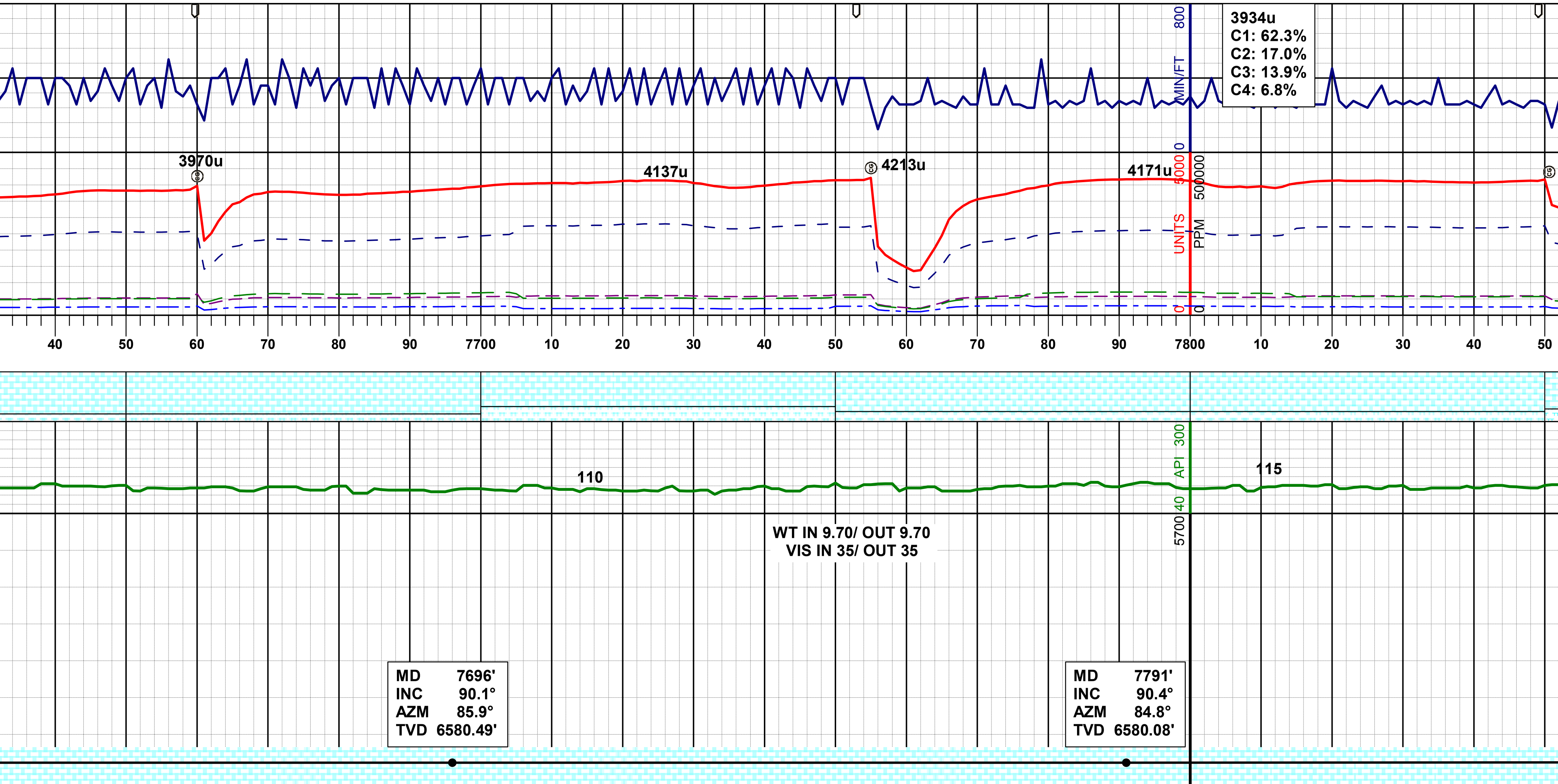

3198u
C1: 50.5%
C2: 7.3%
C3: 22.0%
C4: 20.3%
TD Curve
Intermediate
Casing - 6953' MD
@ 06:04 AM 04/24/2013
04/25/2013
Drilled out of
7" Casing
@ 06:37 PM
04/25/2013
BHA BIT:
SMITH 6.125",
Serial #: JG410
Jets: 5x11
4313u
4126u
4180u
3225u
1997u
MIN/FT
UNITS
PPM
237
183
API
WT IN 10.50/ OUT 10.50
VIS IN 37/ OUT 37
WT IN 10.55/ OUT 10.55
VIS IN 37/ OUT 37
NIO C CHALK @
6864'MD/ 6552'TVD
WT IN 10.55/ OUT 10.55
VIS IN 37/ OUT 37
WT IN 9.80/ OUT 9.80
VIS IN 33/ OUT 33
MD 6777'
INC 73.2°
AZM 88.3°
TVD 6532.37'
MD 6872'
INC 79.5°
AZM 88.3°
TVD 6554.78'
ft
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, tr bent, abnt calc incl
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
CHK: ltgy-crm, sft-
wxy tex, mot ip, v
MRL: gybrn-brn, sf
slty-mot tex, v calc


1588u
C1: 67.6%
C2: 15.3%
C3: 13.8%
C4: 3.2%
3408u
C1: 68
C2: 15
C3: 12
C4: 4.
SDI513
MIN/FT 0 800
UNITS 0 5000
PPM 0 500000
3859u
4255u
4402u
4323u
4168u
80 90 7000 10 20 30 40 50 60 70 80 90 7100 10 20 30 40 50 60 70 80 90
API 40 300
126
130
144
5700 ft 7000
WT IN 9.75/ OUT 9.75
VIS IN 38/ OUT 38
MD 7032'
INC 84.9°
AZM 88.9°
TVD 6576.94'
MD 7127'
INC 87.1°
AZM 88.0°
TVD 6583.11'
mod firm, sbblky-sbplty,
calc
t-sl firm, sbblky-sbplty,
, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, tr bent, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sb
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbp
slty-mot tex, v calc, tr bent, occ calc in



MIN/FT 0 800
UNITS 0 5000
PPM 0 500000
4487u
3535u
POWER OUTAGE AND WITS FAILURE
3499u
3194u
3261u
7200 10 20 30 40 50 60 70 80 90 7300 10 20 30 40 50 60 70 80 90 7400 10
API 40 300
88
164
5700 ft 7000
WT IN 9.70/ OUT 9.70
VIS IN 35/ OUT 35
MD 7222'
INC 89.5°
AZM 86.6°
TVD 6585.93'
MD 7317'
INC 91.0°
AZM 85.0°
TVD 6585.52'
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl


04/26/2013
3854u
C1: 67.2%
C2: 14.8%
C3: 12.2%
C4: 5.8%
MIN/FT
800
0
4195u
4268u
4405u
4237u
3870u
UNITS
5000
0
PPM
500000
0
20
30
40
50
60
70
80
90
7500
10
20
30
40
50
60
70
80
90
7600
10
20
30
API
300
40
5700
85
118
WT IN 9.70/ OUT 9.70
VIS IN 36/ OUT 36
7411'
92.4°
84.3°
82.73'
MD 7506'
INC 90.7°
AZM 86.2°
TVD 6580.16'
MD 7601'
INC 89.4°
AZM 86.4°
TVD 6580.08'
7000
y-crm, sft-mod firm, sbblky-sbplty,
mot ip, v calc
brn-brn, sft-sl firm, sbblky-sbplty,
tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, s
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sb
slty-mot tex, v calc, occ calc i



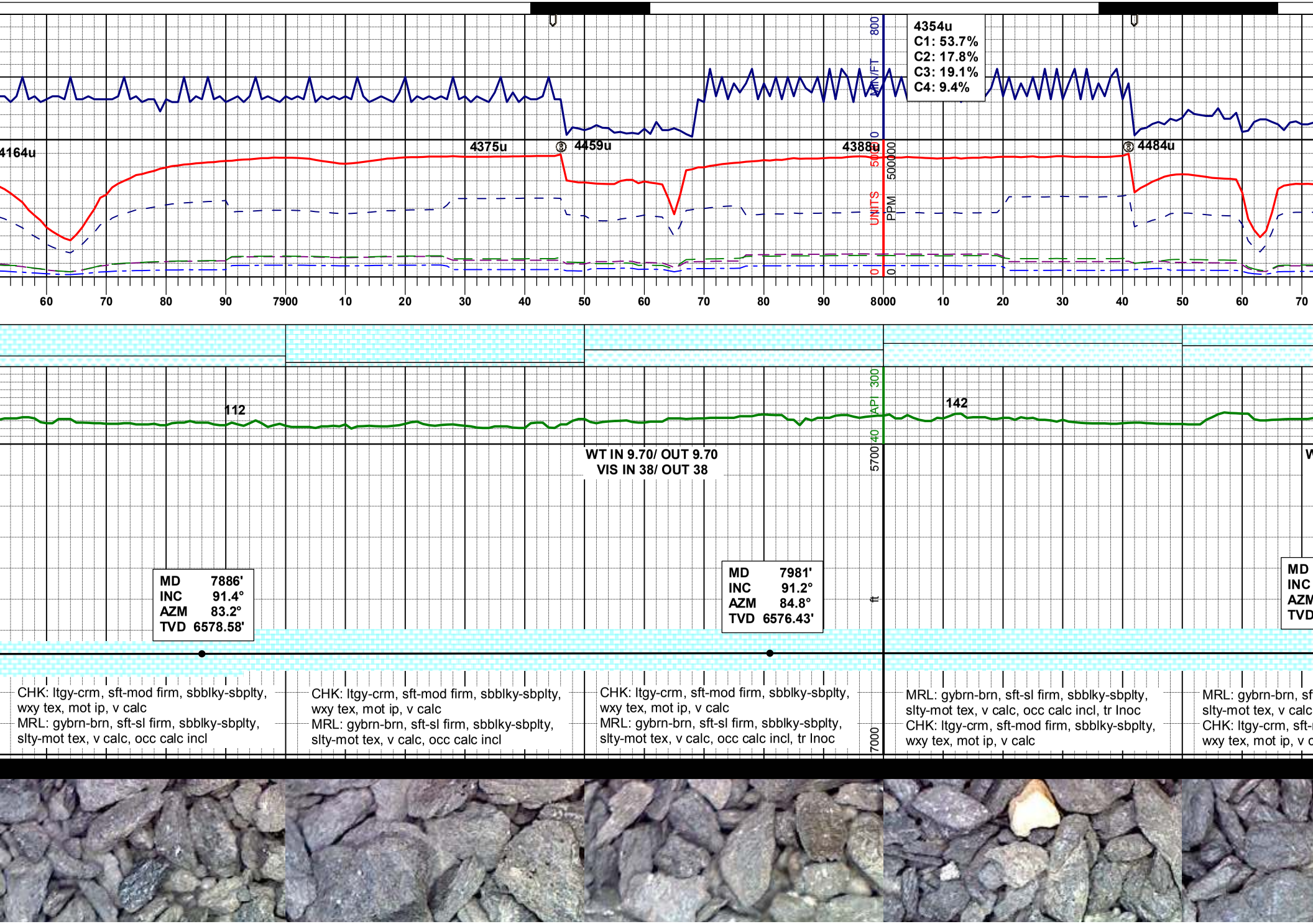
bblky-sbplty,
blky-sbplty,
ncl

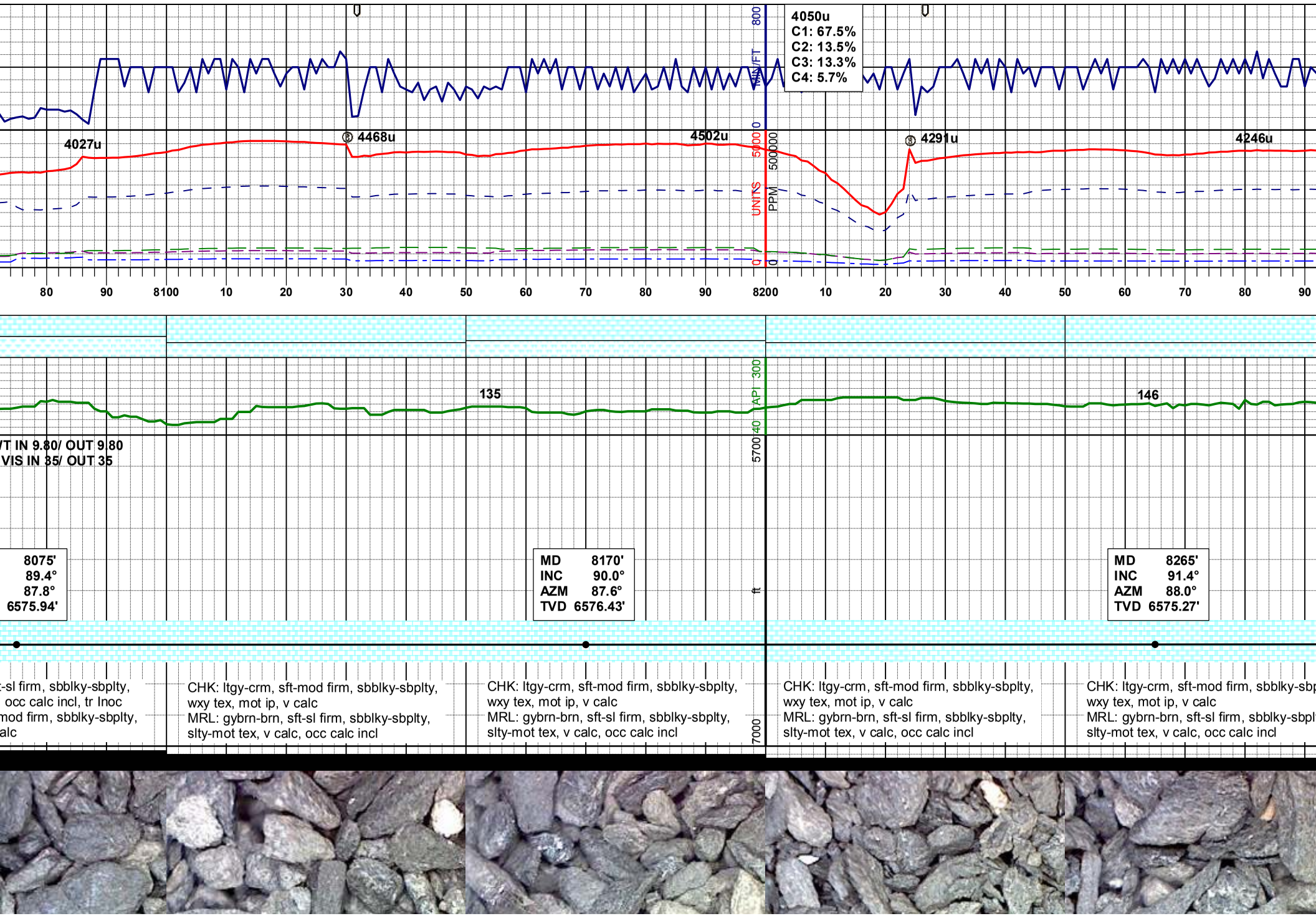
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

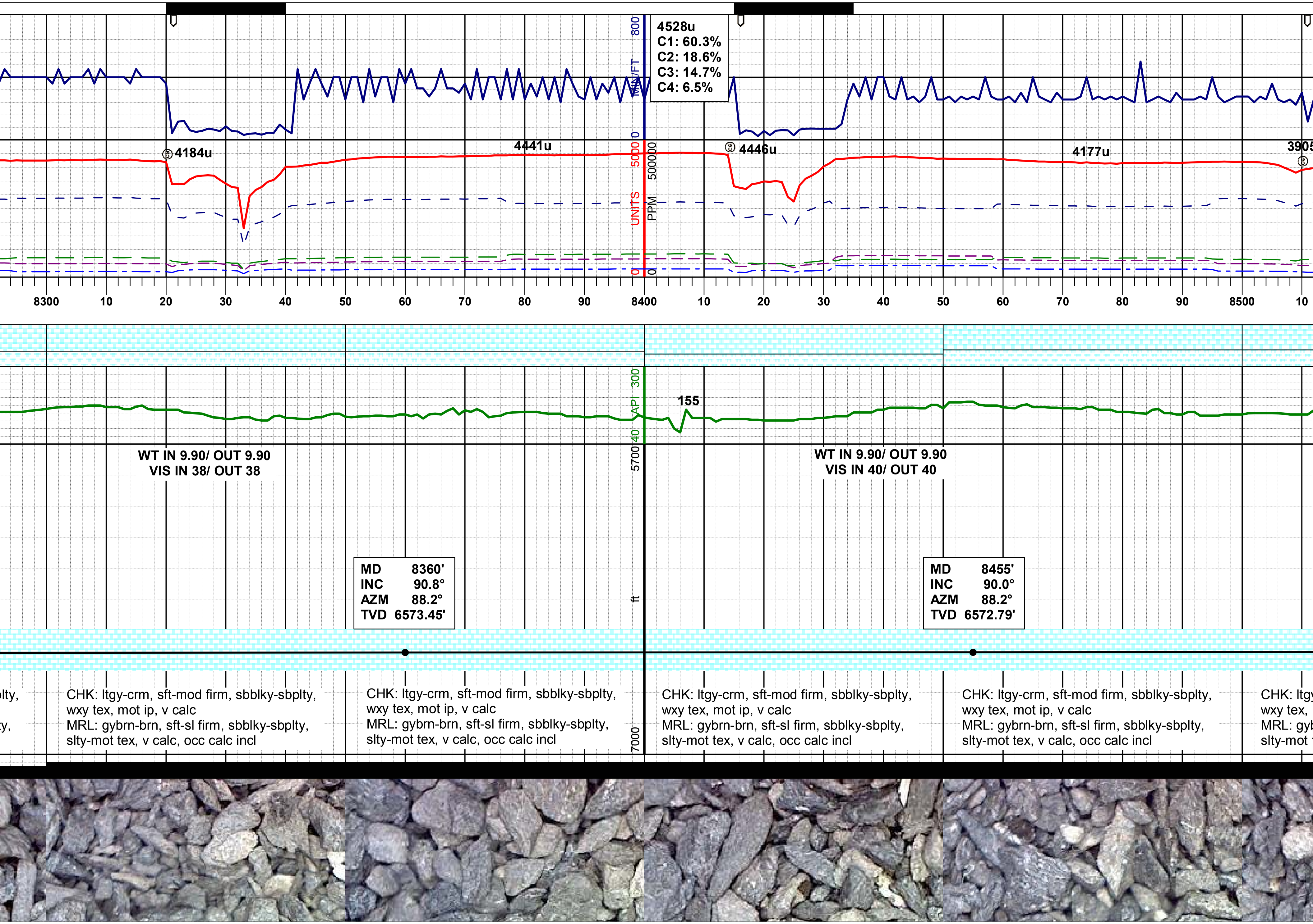
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

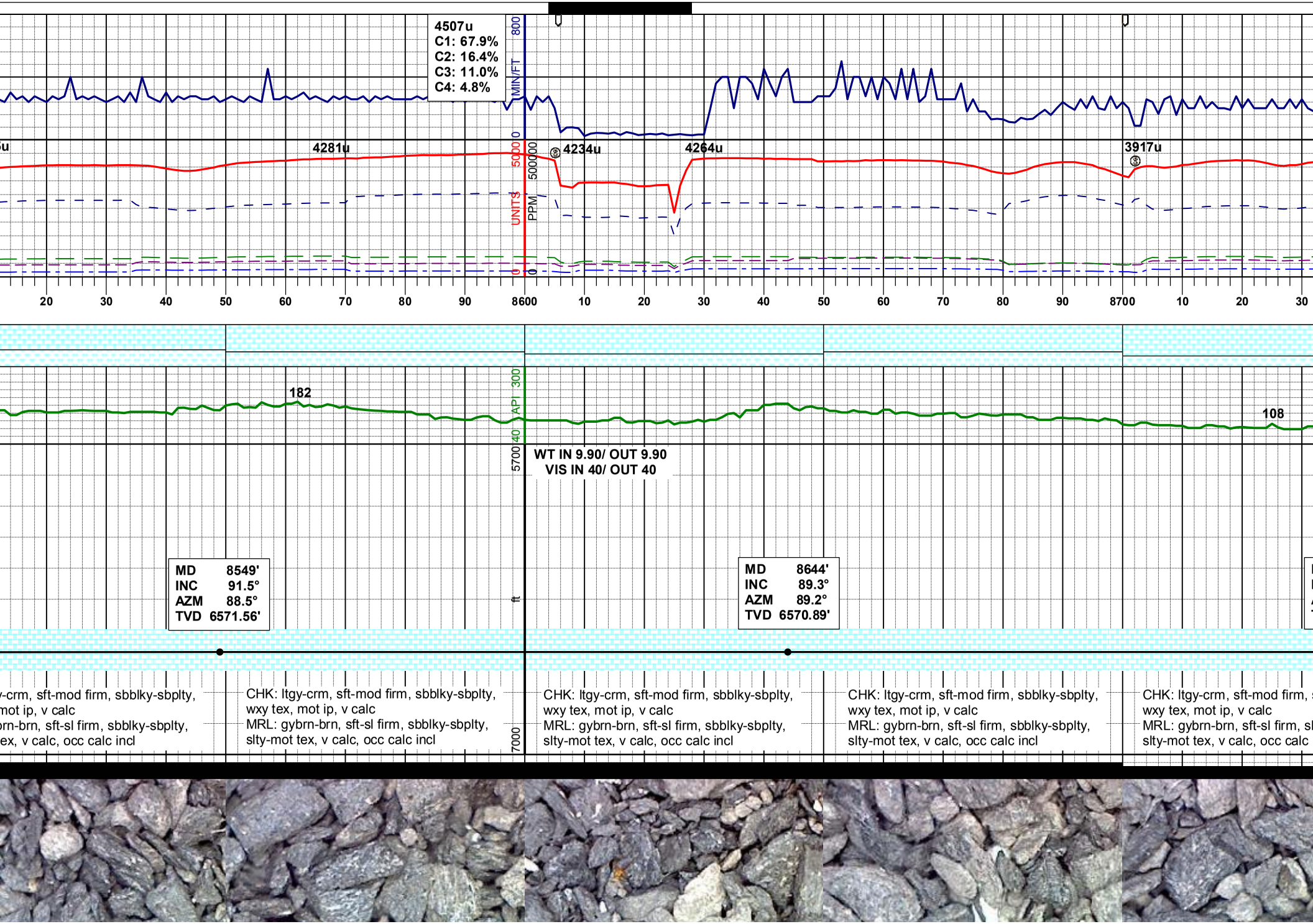
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

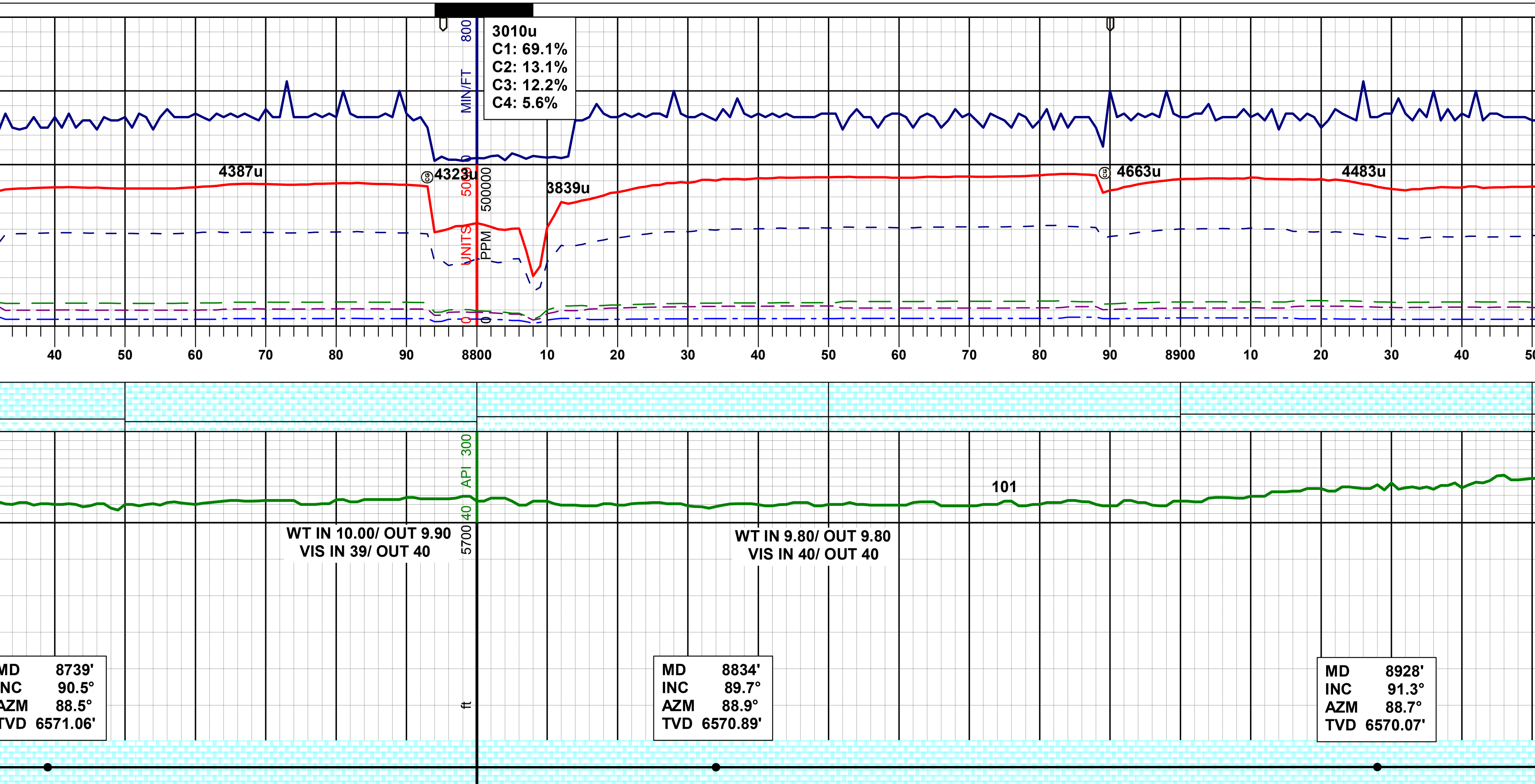

4354u
C1: 53.7%
C2: 17.8%
C3: 19.1%
C4: 9.4%
4164u
4375u
4459u
4388u
4484u
800
0
UNITS
50
0
500000
PPM
0
60
70
80
90
7900
10
20
30
40
50
60
70
80
90
8000
10
20
30
40
50
60
70
API
300
40
112
142
WT IN 9.70/ OUT 9.70
VIS IN 38/ OUT 38
5700
ft
MD 7886'
INC 91.4°
AZM 83.2°
TVD 6578.58'
MD 7981'
INC 91.2°
AZM 84.8°
TVD 6576.43'
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl, tr Inoc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl, tr Inoc
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
7000


4050u
C1: 67.5%
C2: 13.5%
C3: 13.3%
C4: 5.7%
4027u
4468u
4502u
4291u
4246u
800
0
GAS/FT
5000
0
UNITS
500000
0
PPM
80
90
8100
10
20
30
40
50
60
70
80
90
8200
10
20
30
40
50
60
70
80
90
135
146
300
40
API
5700
7000
ft
T IN 9.80/ OUT 9.80
VIS IN 35/ OUT 35
8075'
89.4°
87.8°
6575.94'
MD 8170'
INC 90.0°
AZM 87.6°
TVD 6576.43'
MD 8265'
INC 91.4°
AZM 88.0°
TVD 6575.27'
-sl firm, sbblky-sbplty,
occ calc incl, tr Inoc
mod firm, sbblky-sbplty,
alc
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbp
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbbl
slty-mot tex, v calc, occ calc incl



4528u
C1: 60.3%
C2: 18.6%
C3: 14.7%
C4: 6.5%
0 MIN/FT 800
0 UNITS 5000
0 PPM 500000
4184u
4441u
4446u
4177u
3905
8300
10
20
30
40
50
60
70
80
90
8400
10
20
30
40
50
60
70
80
90
8500
10
40 API 300
155
5700 ft 7000
WT IN 9.90/ OUT 9.90
VIS IN 38/ OUT 38
WT IN 9.90/ OUT 9.90
VIS IN 40/ OUT 40
MD 8360'
INC 90.8°
AZM 88.2°
TVD 6573.45'
MD 8455'
INC 90.0°
AZM 88.2°
TVD 6572.79'
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl


4507u
C1: 67.9%
C2: 16.4%
C3: 11.0%
C4: 4.8%
MIN/FT
800
0
4281u
4234u
4264u
3917u
UNITS
5000
0
PPM
500000
0
20
30
40
50
60
70
80
90
8600
10
20
30
40
50
60
70
80
90
8700
10
20
30
182
API
300
40
108
5700
WT IN 9.90/ OUT 9.90
VIS IN 40/ OUT 40
MD 8549'
INC 91.5°
AZM 88.5°
TVD 6571.56'
MD 8644'
INC 89.3°
AZM 89.2°
TVD 6570.89'
ft
7000
-crm, sft-mod firm, sbblky-sbplty,
mot ip, v calc
rn-brn, sft-sl firm, sbblky-sbplty,
ex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm,
slty-mot tex, v calc, occ calc



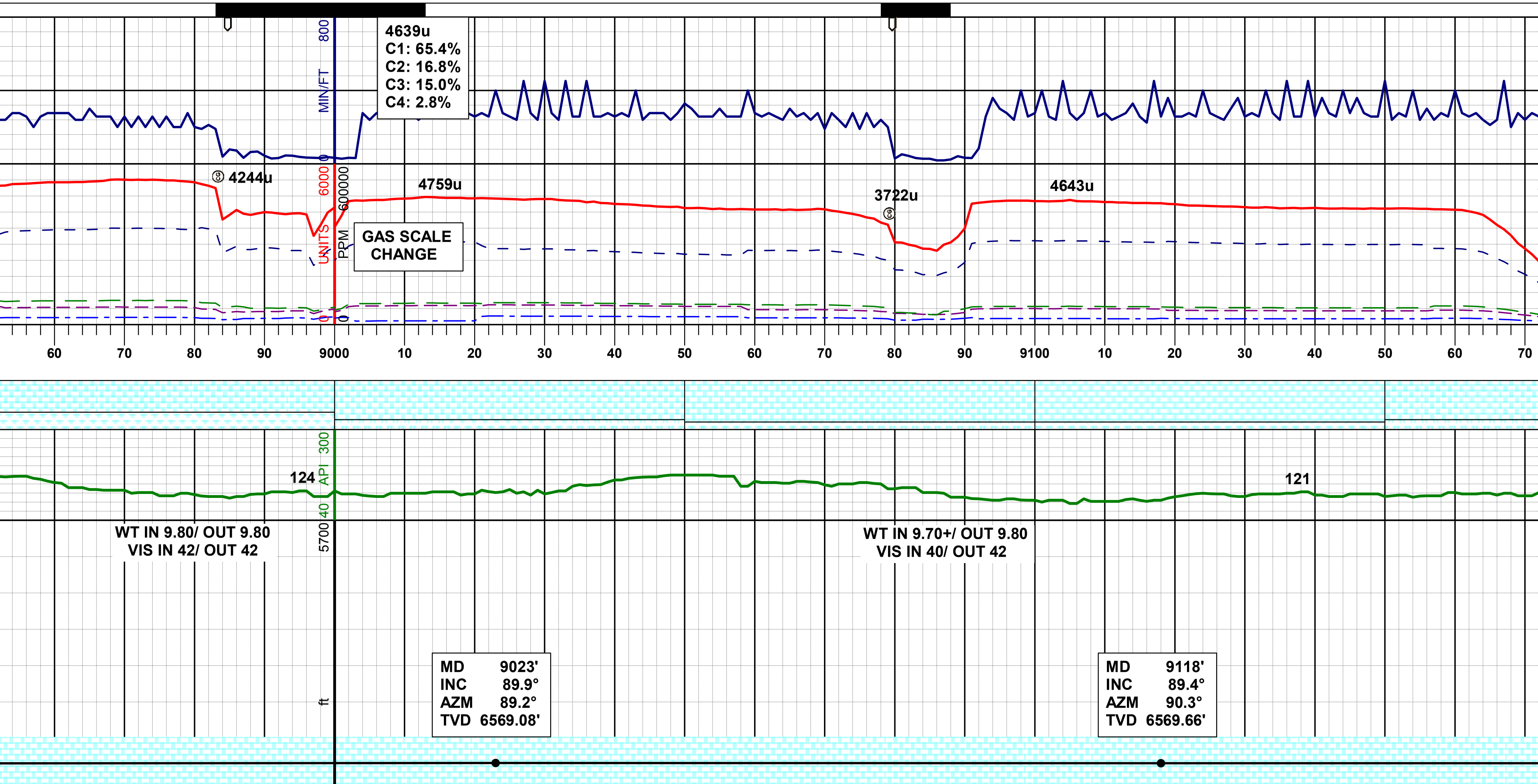
sbblky-sbplty,
bblky-sbplty,
ncl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl



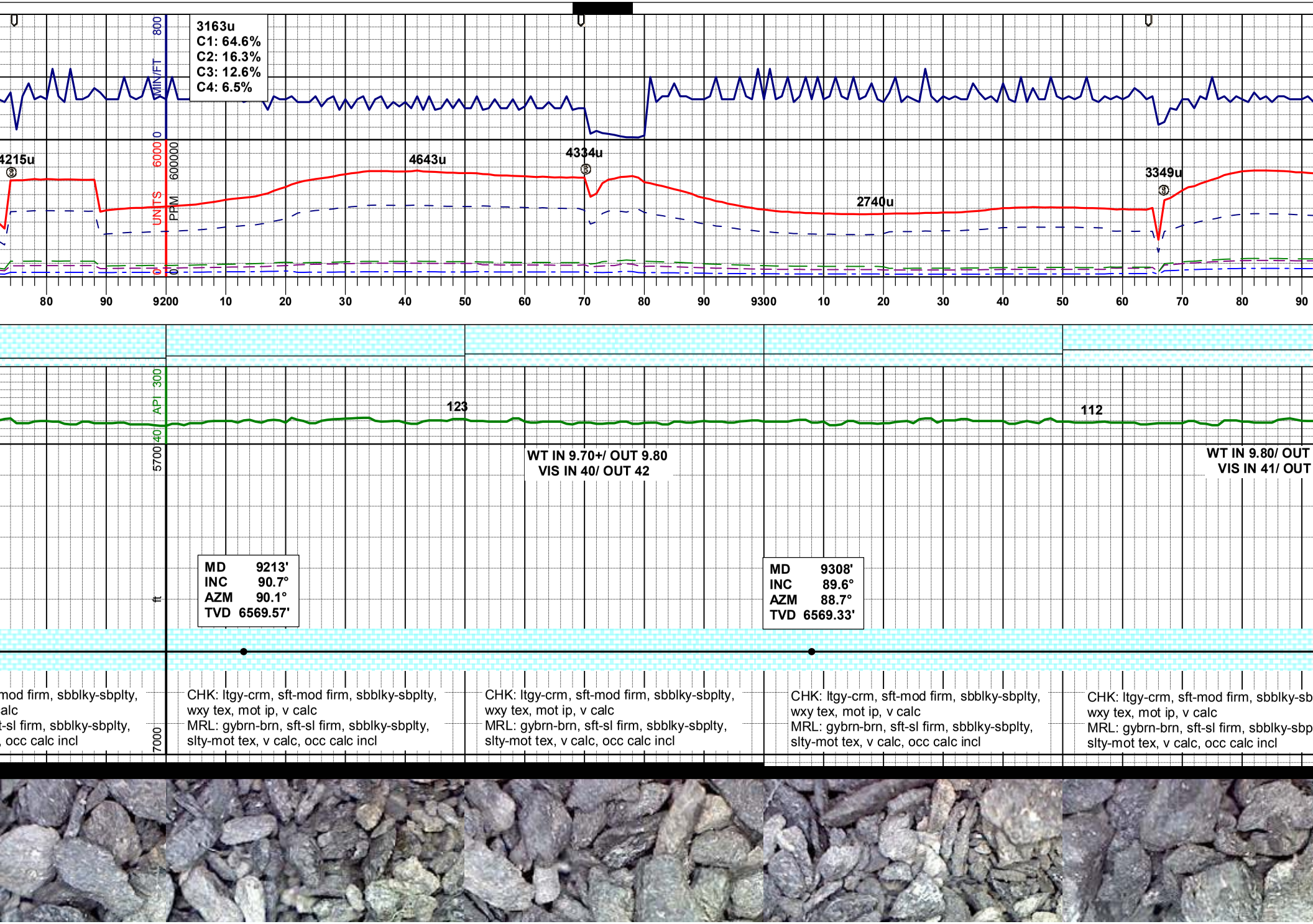
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-
wxy tex, mot ip, v c
MRL: gybrn-brn, sf
slty-mot tex, v calc


3163u
C1: 64.6%
C2: 16.3%
C3: 12.6%
C4: 6.5%
MIN/FT
800
0
UNITS
6000
0
PPM
600000
0
4215u
4643u
4334u
3349u
2740u
80
90
9200
10
20
30
40
50
60
70
80
90
9300
10
20
30
40
50
60
70
80
90
API
300
40
123
112
5700
ft
7000
WT IN 9.70+/ OUT 9.80
VIS IN 40/ OUT 42
WT IN 9.80/ OUT
VIS IN 41/ OUT
MD 9213'
INC 90.7°
AZM 90.1°
TVD 6569.57'
MD 9308'
INC 89.6°
AZM 88.7°
TVD 6569.33'
mod firm, sbblky-sbplty,
alc
t-sl firm, sbblky-sbplty,
, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sb
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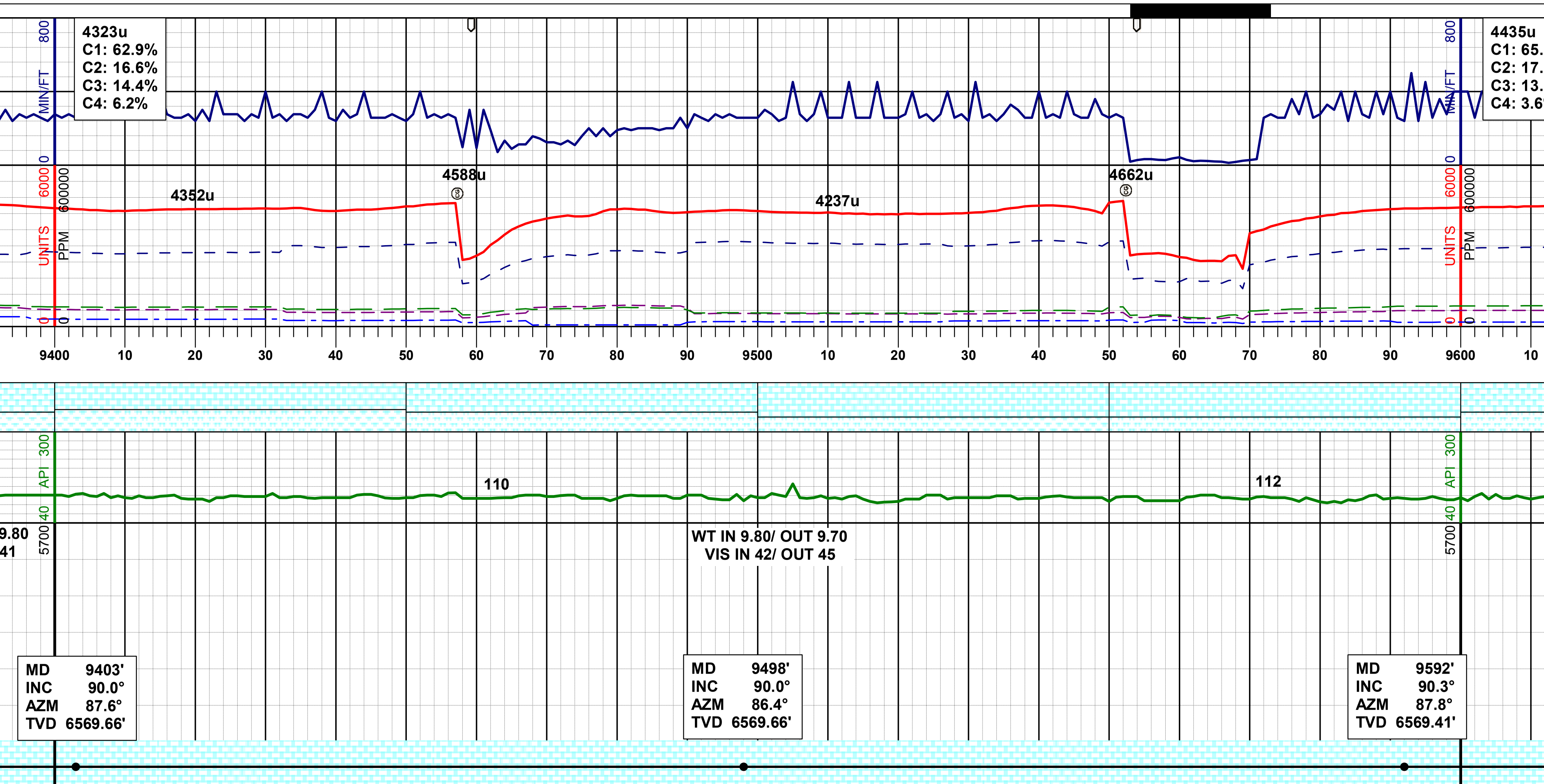
MRL: gybrn-brn, sft-sl firm, sbblky-sbp
slty-mot tex, v calc, occ calc incl



CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
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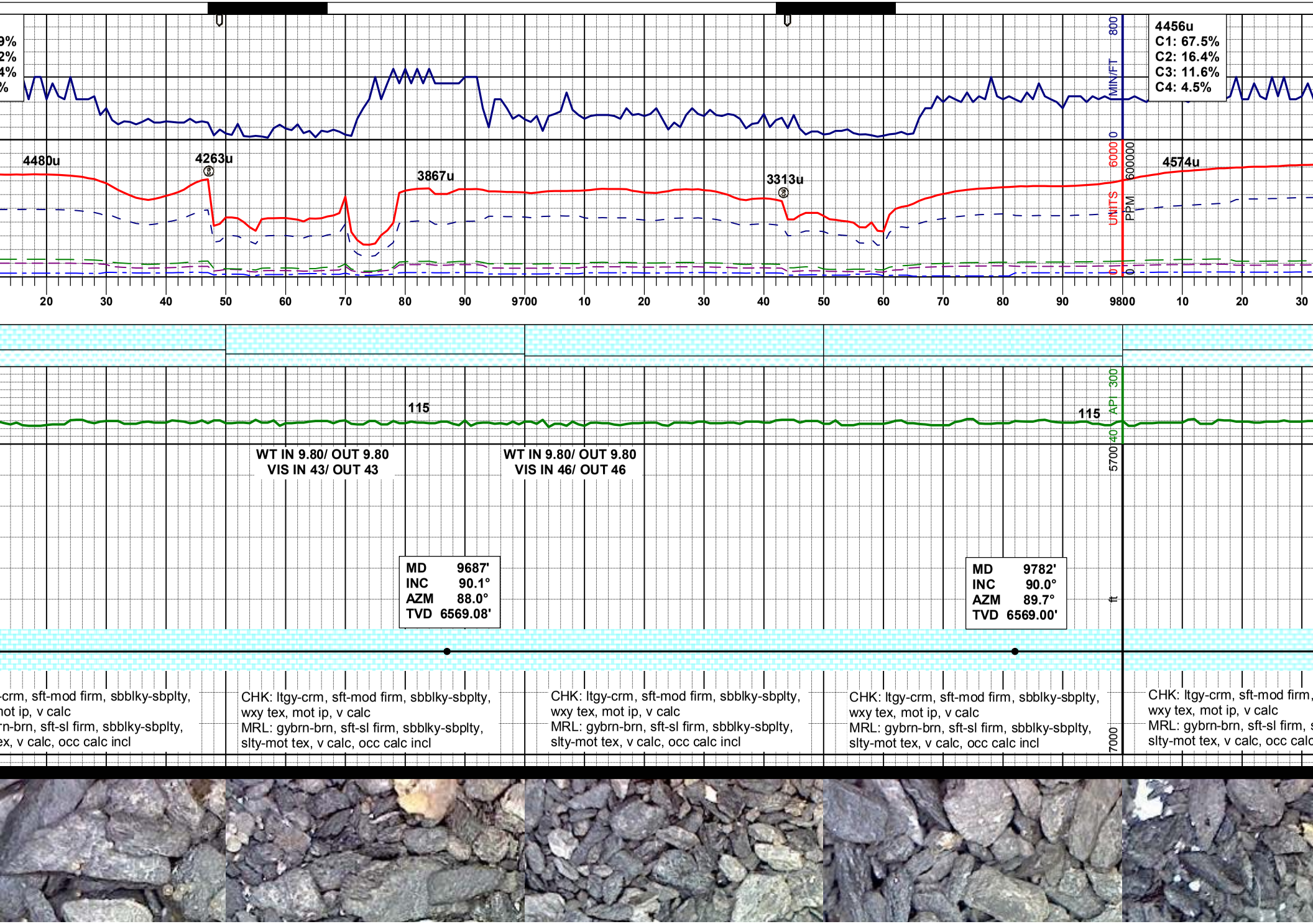
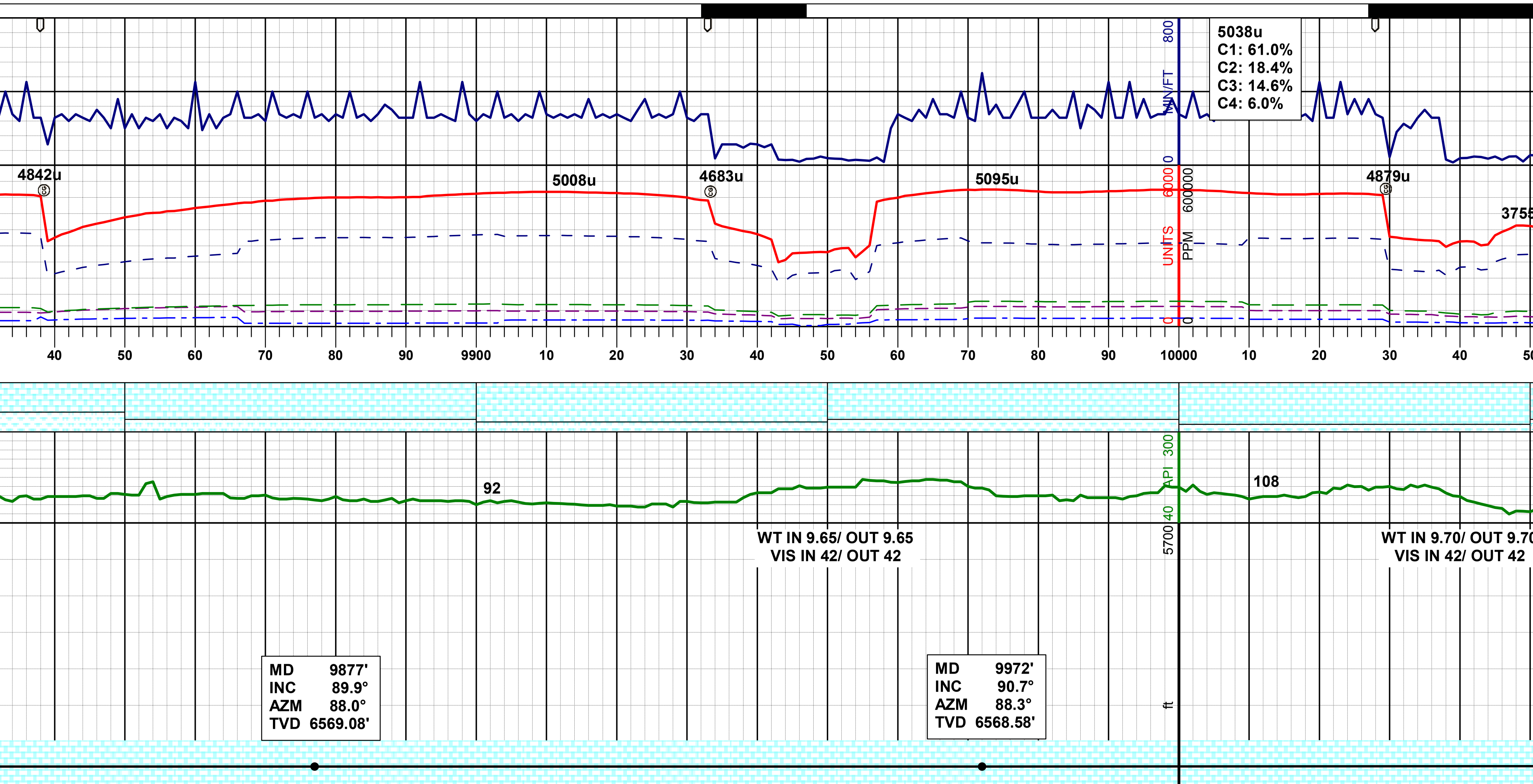
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl


4456u
C1: 67.5%
C2: 16.4%
C3: 11.6%
C4: 4.5%
4480u
4263u
3867u
3313u
4574u
MIN/FT
UNITS
PPM
20
30
40
50
60
70
80
90
9700
10
20
30
40
50
60
70
80
90
9800
10
20
30
115
115
API
WT IN 9.80/ OUT 9.80
VIS IN 43/ OUT 43
WT IN 9.80/ OUT 9.80
VIS IN 46/ OUT 46
MD 9687'
INC 90.1°
AZM 88.0°
TVD 6569.08'
MD 9782'
INC 90.0°
AZM 89.7°
TVD 6569.00'
ft
-crm, sft-mod firm, sbblky-sbplty,
ot ip, v calc
n-brn, sft-sl firm, sbblky-sbplty,
x, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl
CHK: ltgy-crm, sft-mod firm,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm,
slty-mot tex, v calc, occ calc
800
0
6000
600000
0
0
300
40
5700
7000



sbblky-sbplty,
sbblky-sbplty,
incl

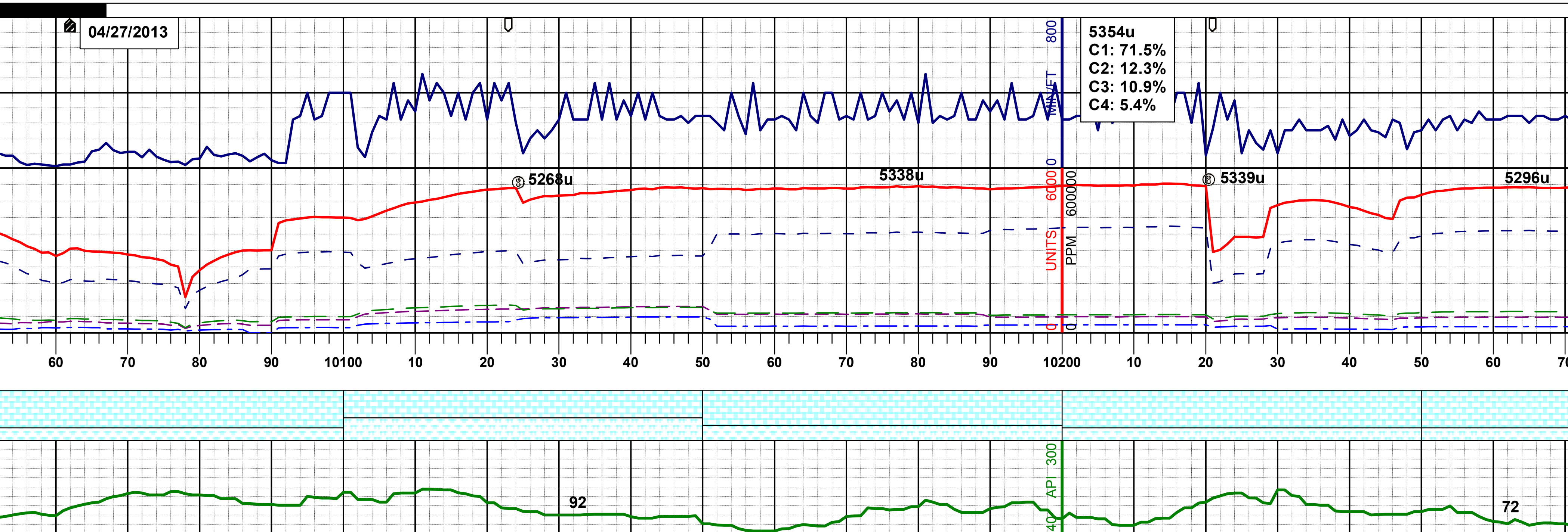
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

04/27/2013



WT IN 9.70/ OUT 9.70
VIS IN 38/ OUT 38

MD	10066'
INC	91.1°
AZM	89.7°
TVD	6567.11'

MD	10161'
INC	91.4°
AZM	89.0°
TVD	6565.03'

MD	10256'
INC	92.7°
AZM	89.9°
TVD	6561.64'

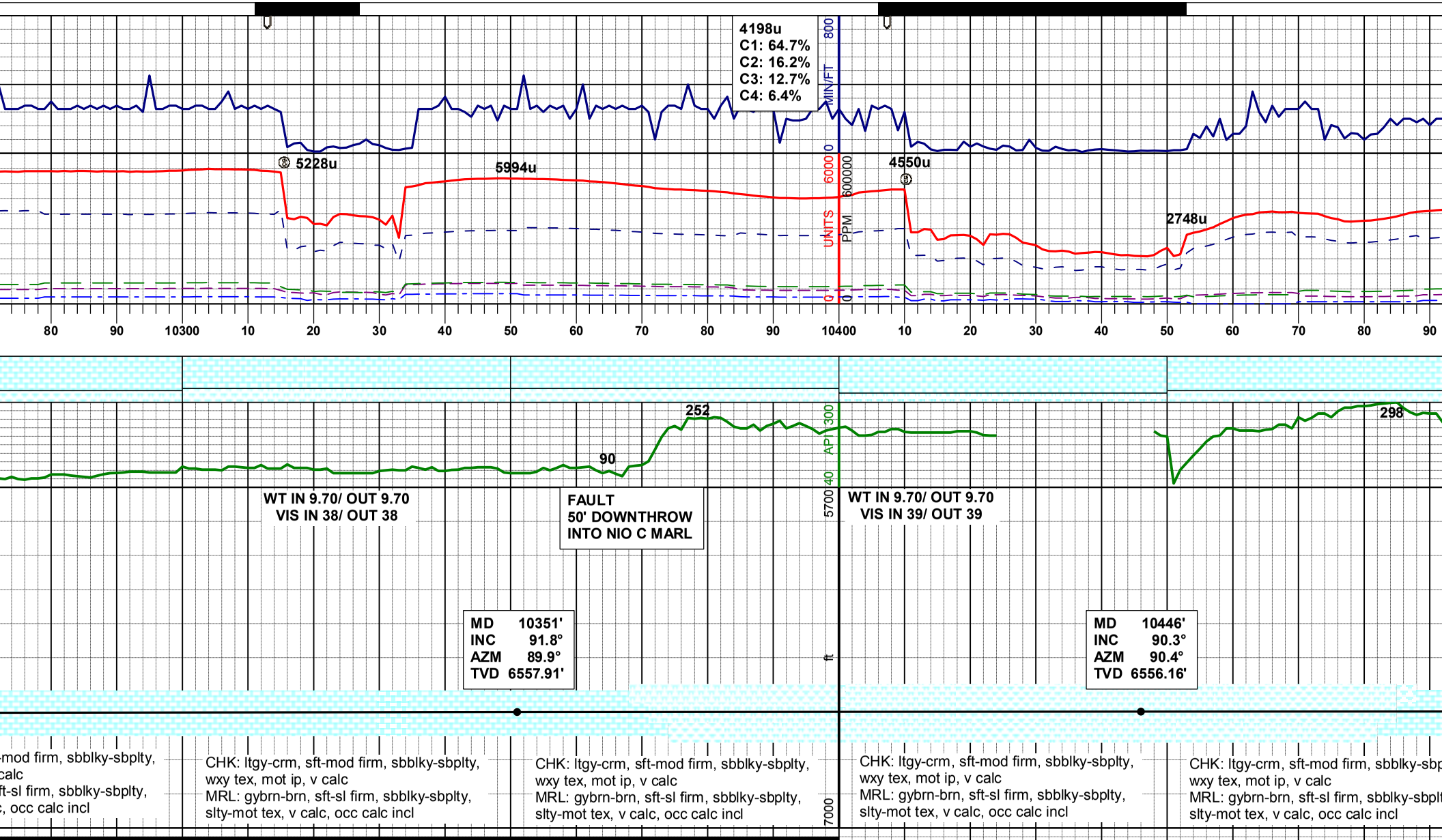
CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft
wxy tex, mot ip, v
MRL: gybrn-brn, s
slty-mot tex, v calc



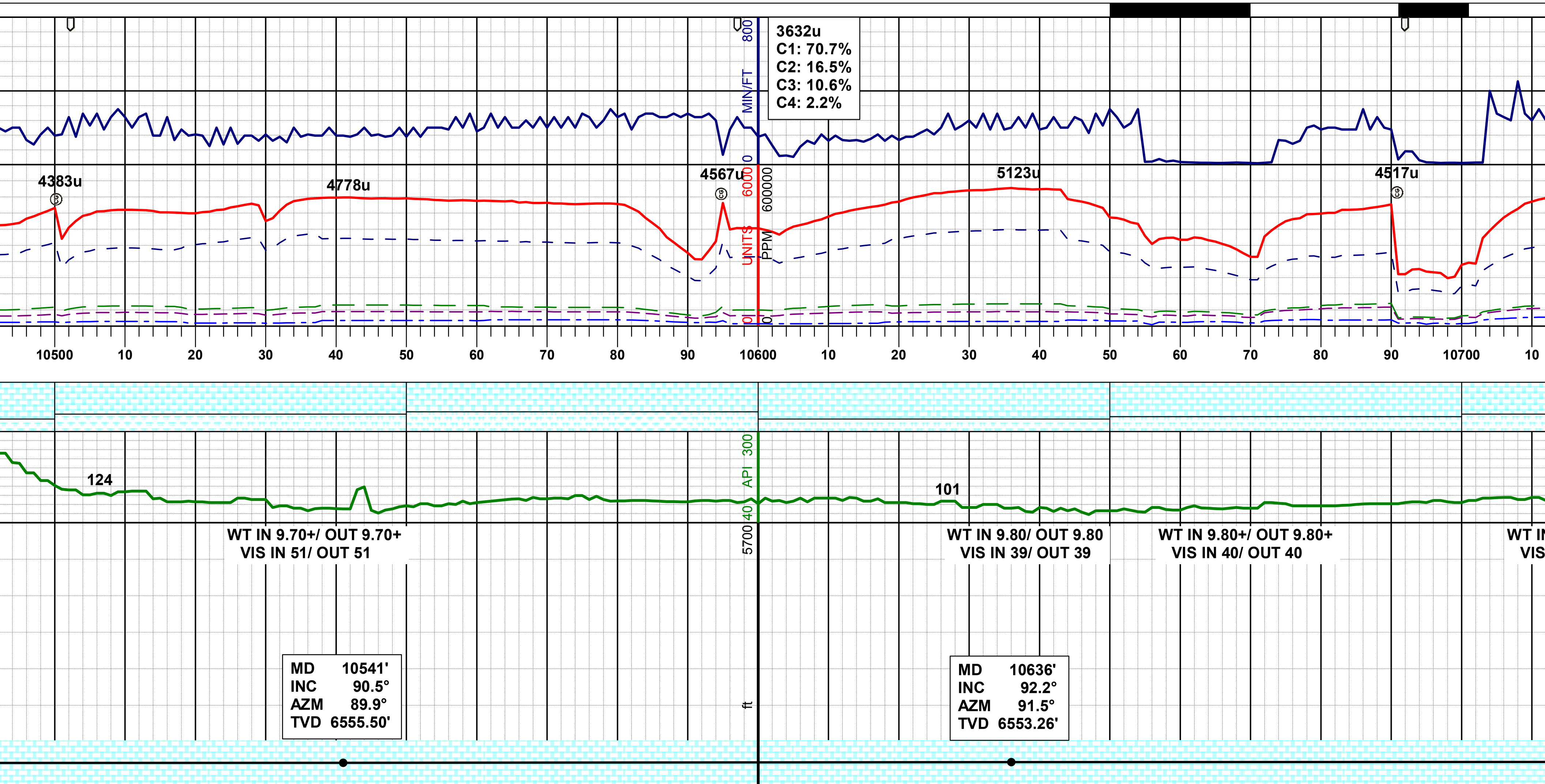
-mod firm, sbblky-sbplty,
calc
ft-sl firm, sbblky-sbplty,
, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbp
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbpl
slty-mot tex, v calc, occ calc incl



CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl, tr fos frag

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty, slty-mot tex, v calc, occ calc incl, tr fos frag

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty, wxy tex, mot ip, v calc
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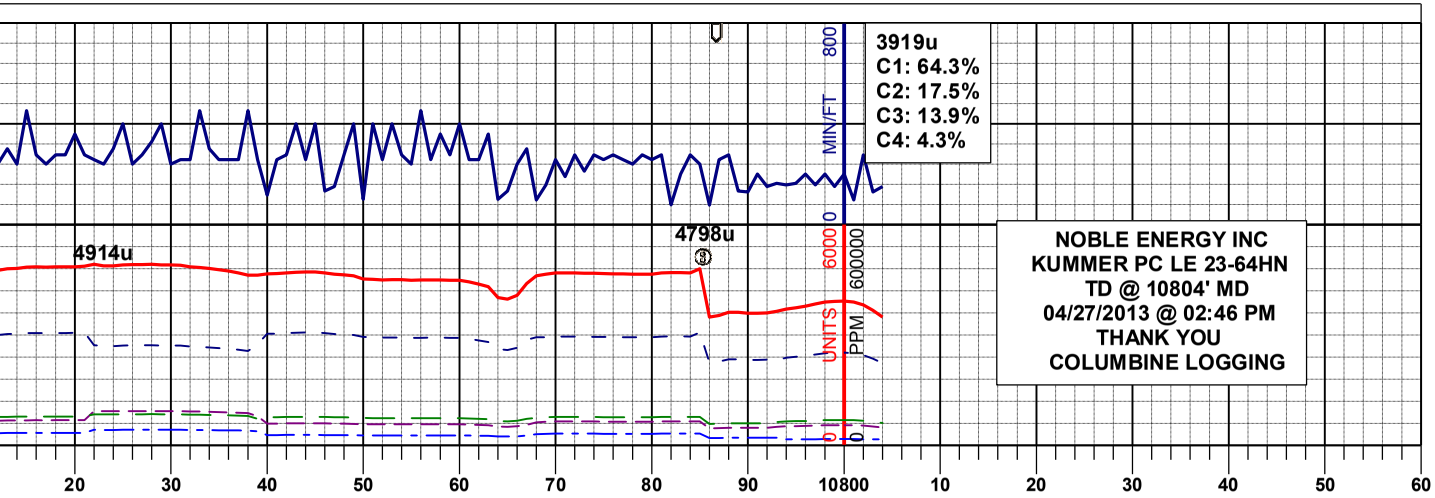
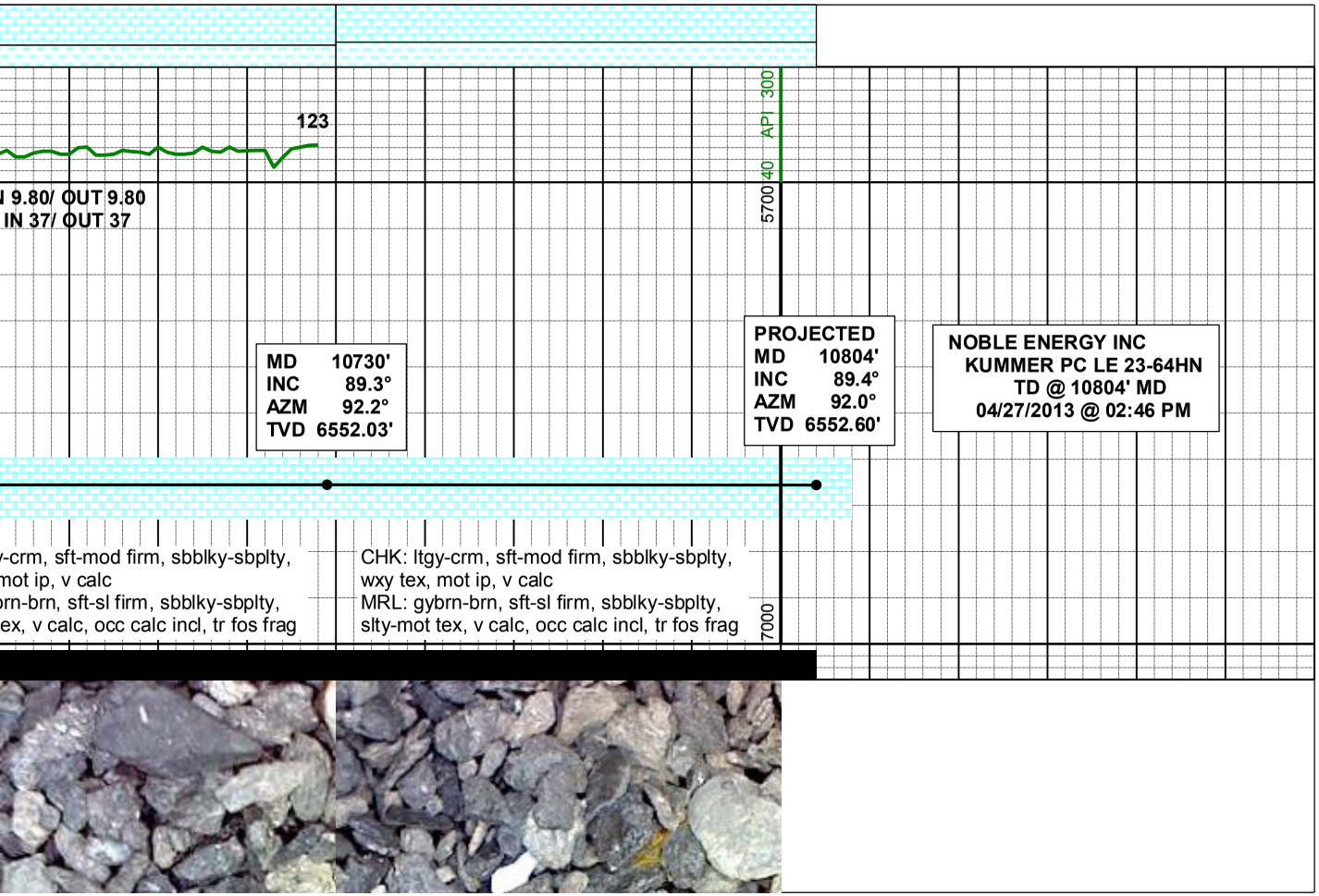


NOBLE ENERGY INC
KUMMER PC LE 23-64HN
TD @ 10804' MD
04/27/2013 @ 02:46 PM
THANK YOU
COLUMBINE LOGGING



MD 10730'
INC 89.3°
AZM 92.2°
TVD 6552.03'

PROJECTED
MD 10804'
INC 89.4°
AZM 92.0°
TVD 6552.60'

NOBLE ENERGY INC
KUMMER PC LE 23-64HN
TD @ 10804' MD
04/27/2013 @ 02:46 PM

y-crm, sft-mod firm, sbblky-sbplty,
mot ip, v calc
rn-brn, sft-sl firm, sbblky-sbplty,
ex, v calc, occ calc incl, tr fos frag

CHK: ltgy-crm, sft-mod firm, sbblky-sbplty,
wxy tex, mot ip, v calc
MRL: gybrn-brn, sft-sl firm, sbblky-sbplty,
slty-mot tex, v calc, occ calc incl, tr fos frag