



**Scale 1:240 (5"=100') Imperial  
Measured Depth Log**

**Well Name:** Razor 11E-0202B  
**Location:** SWNW 11-T10N-R58W  
**License Number:** 05-123-38531  
**Spud Date:** 2/21/2014  
**Surface Coordinates:** Lat.: 40.854189 Long.: -103.839389  
**Bottom Hole Coordinates:** Lat.: 40.874883 Long.: -103.840786  
**Ground Elevation (ft):** 5002 **K.B. Elevation (ft):** 5019  
**Logged Interval (ft):** 5473 **To:** **Total Depth (ft):**  
**Formation:** Pierre, Sharon Springs, Niobrara B  
**Type of Drilling Fluid:** Water Based Mud

**Region:** Redtail Field  
**Drilling Completed:**

Printed by HORIZONTAL.LOG from WellSight Systems 1-800-447-1534 [www.WellSight.com](http://www.WellSight.com)

**OPERATOR**

**Company:** Whiting Oil & Gas Corp.  
**Address:** 1700 Broadway Suite 2300  
Denver, CO 80290

**GEOLOGIST**

**Name:** Todd Nakata, Lauren Roddy, Brian Reddick  
**Company:** Acme Geologic Consulting  
**Address:** 108 Berry Street  
Little Rock, AR 72205

## Drilling Company

Cade Drilling, LLC  
Rig #23

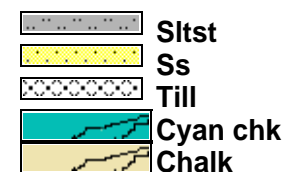
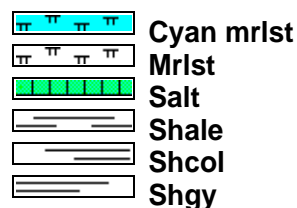
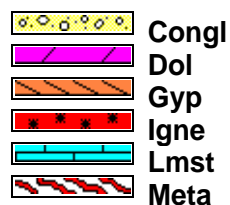
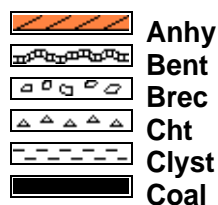
## Gas Detection

Mudlogging Systems, Inc., M Logger, Model TGC, Total Gas and Chromatograph, #149

## Comments

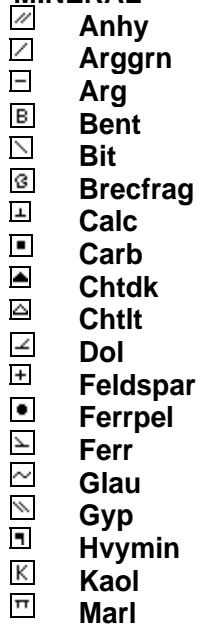
Lithologies and tops at drilled depths, not corrected to elogs. Where the well bore gas is 100% methane, the C1 line is moved to 85% for graphical purposes only.

## ROCK TYPES

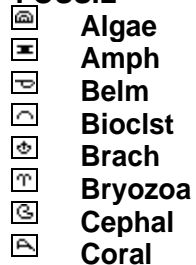


## ACCESSORIES

### MINERAL



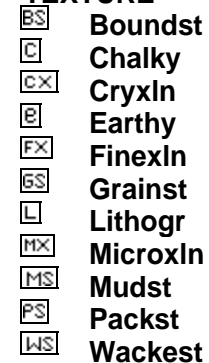
### FOSSIL



### STRINGER











### TEXTURE



OTHER SYMBOLS




POROSITY

-  Earthy
-  Fenest
-  Fracture
-  Inter
-  Moldic
-  Organic
-  Pinpoint
-  Vuggy

SORTING





-  Well
-  Moderate
-  Poor

ROUNDING



-  Rounded
-  Subrnd
-  Subang

-  Angular

OIL SHOW

-  Even
-  Spotted
-  Ques
-  Dead

INTERVAL

-  Core
-  Dst

EVENT

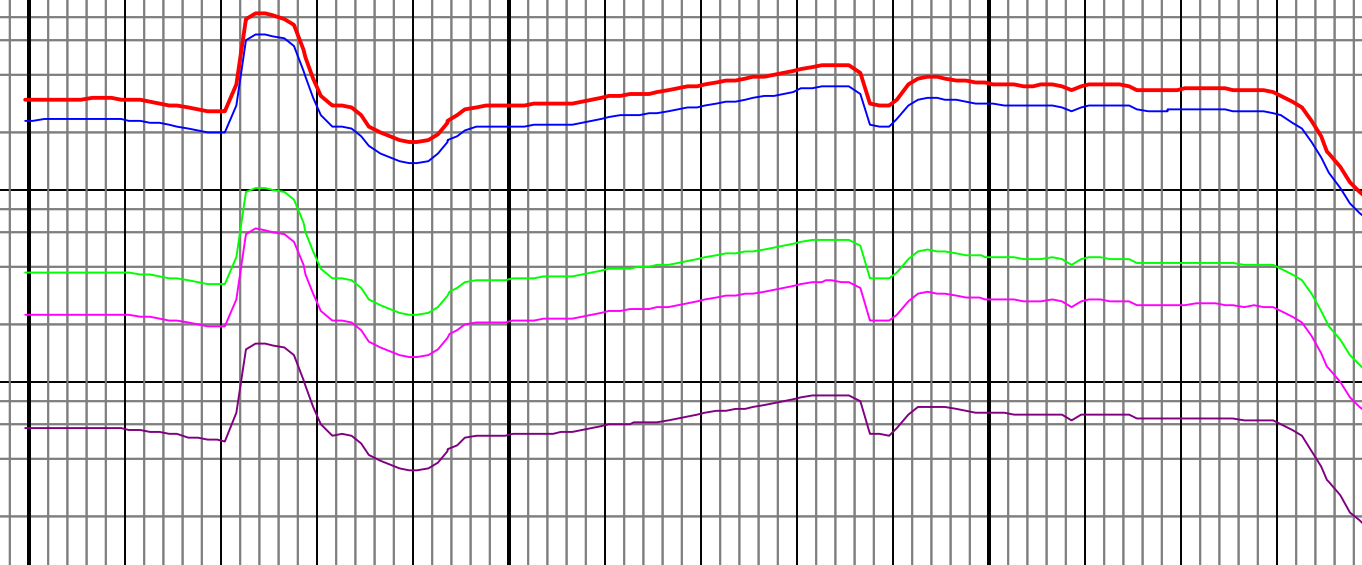
-  Rft
-  Sidewall

TG, C1-C4  
TG (Units)  
C1 (units)  
C2 (units)  
C3 (units)  
C4 (units)

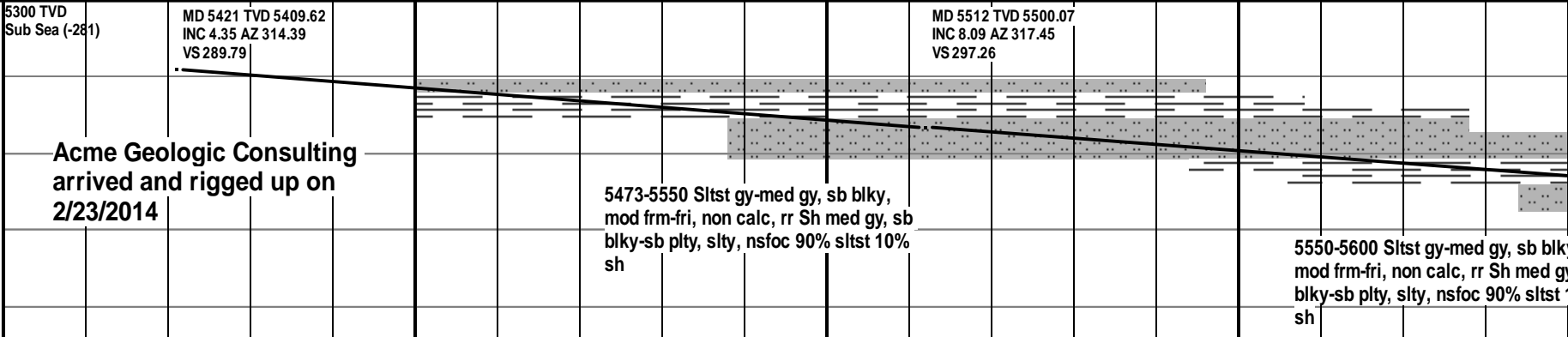
10e4  
10e6  
10e6  
10e6  
10e6  
1000  
10e5  
10e5  
10e5  
10e5  
10  
1000  
1000  
1000  
1000  
1  
100  
100  
100  
100

MSI Model TGC Total Gas and Chromatograph  
Total Gas Calibrated to  
1% Methane = 100 units,  
99.0% Methane = 9900 units.  
Gas Chromatograph Calibrated  
to 1% C1-C4 = 10000 ppm.

TG (Units)  
C1 (units)  
C2 (units)  
C3 (units)  
C4 (units)



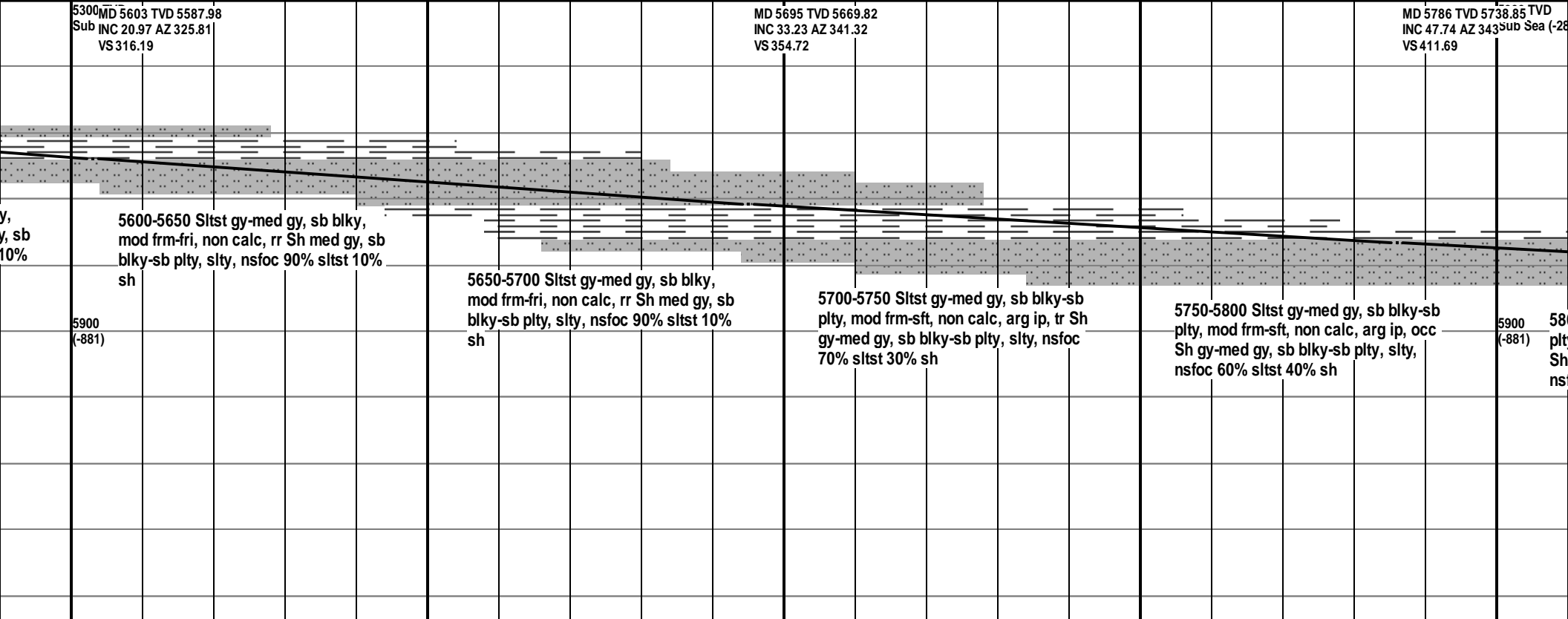
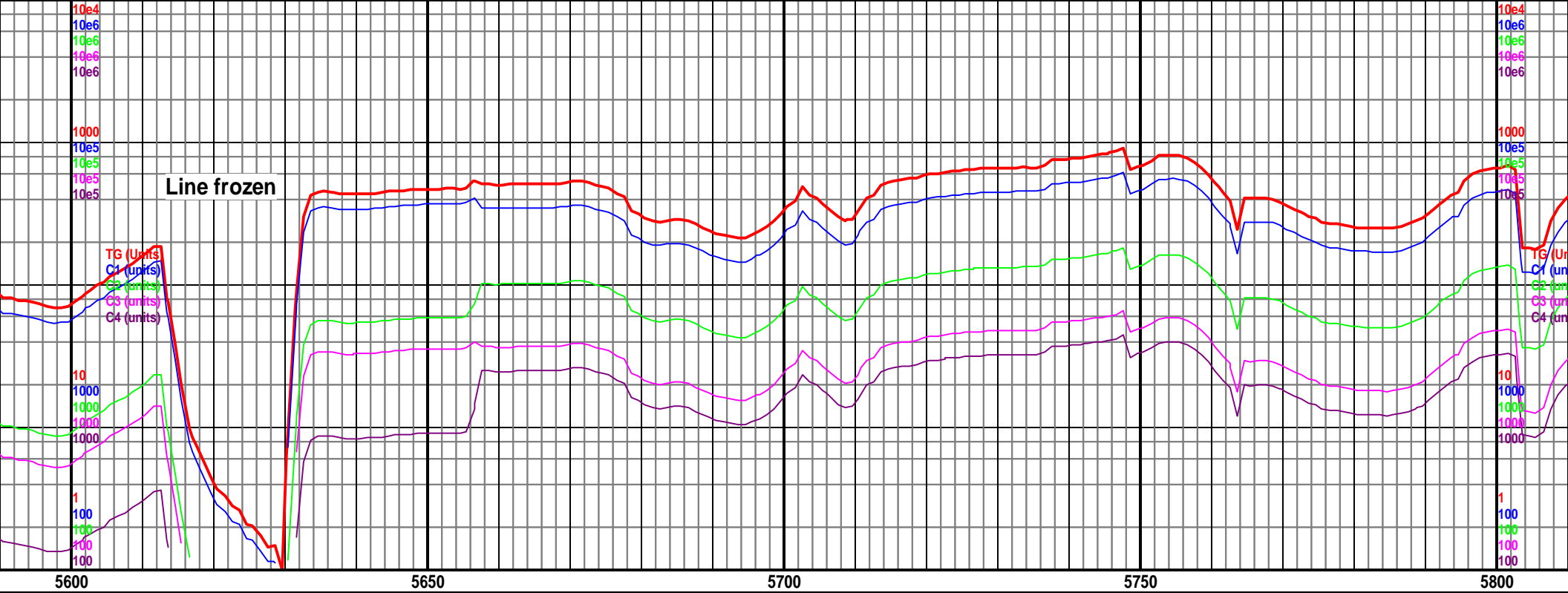
Depth 00 5450 5500 5550

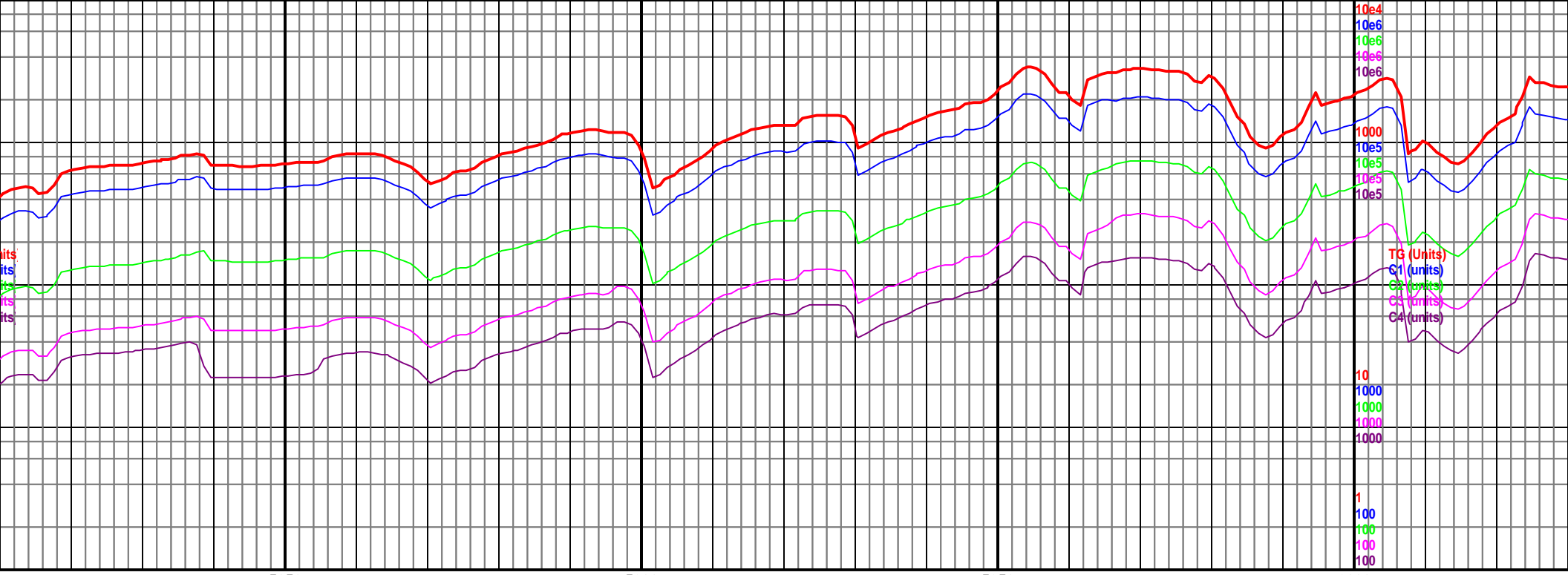


Well Bore Cross Section

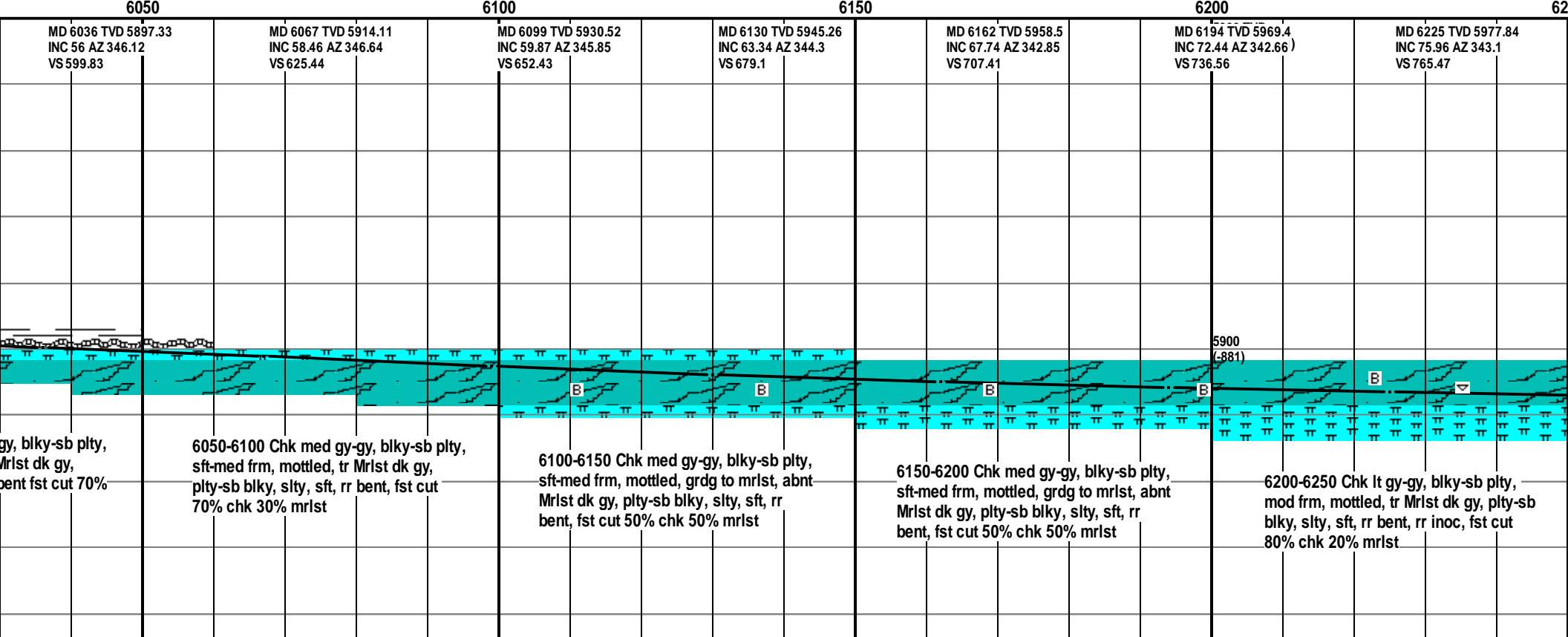
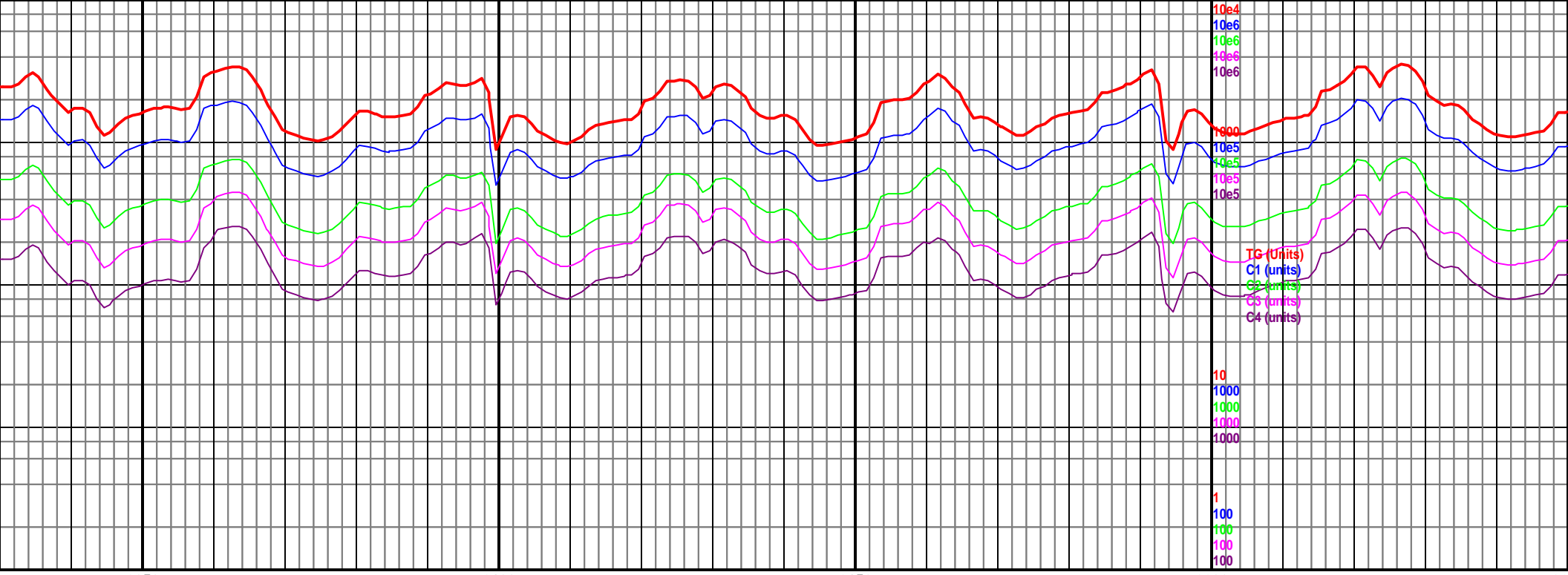
5900  
(-881)

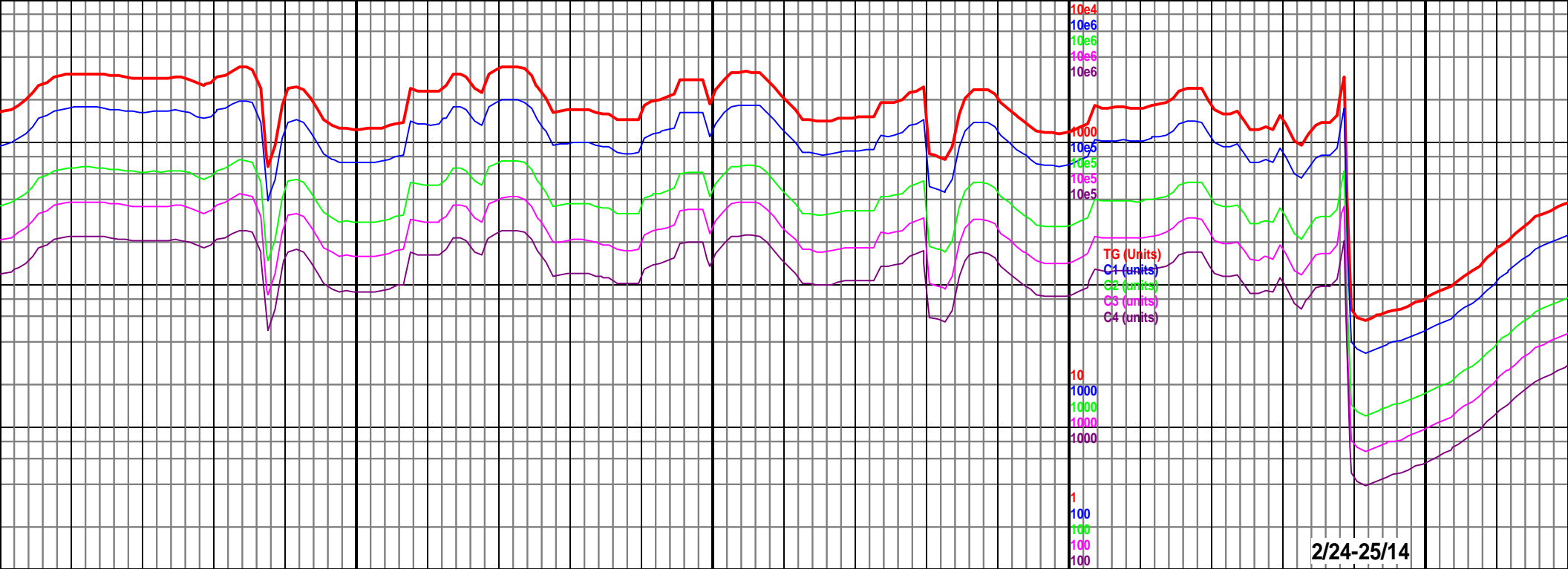
KOP 5473' reached at 02:45  
on 2/24/2014





5850	5900	5950	5950	5950	5950	6000	6000
MD 5817 TVD 5759.16 INC 50.42 AZ 344.08 VS 434.46	MD 5847 TVD 5778.3 INC 50.29 AZ 344.05 VS 456.97	MD 5877 TVD 5797.53 INC 49.98 AZ 343.28 VS 479.37	MD 5909 TVD 5818.18 INC 49.63 AZ 343.14 VS 503.1	MD 5941 TVD 5838.9 INC 49.67 AZ 342.62 VS 526.74	MD 5972 TVD 5858.77 INC 50.59 AZ 344.28 VS 549.86	MD 6004 TVD 5878.66 INC 52.57 AZ 345.32 VS 574.36	MD 5300 TVD 5807.88 INC 50.59 AZ 344.28 VS 549.86
00-5850 Sltst gy-med gy, sb blkly-sb y, mod frm-sft, non calc, arg ip, occ gy-med gy, sb blkly-sb plty, slty, foc 60% sltst 40% sh	5850-5900 Sh gy-med gy, sb blkly-sb plty, slty, tr Sltst gy-med gy, sb blkly, mod frm-fri, non calc, rr nsfoc 70% sh 30% sltst	5900-5950 Sh gy-med gy, sb blkly-sb plty, slty, tr Sltst gy-med gy, sb blkly, mod frm-fri, non calc, rr nsfoc, rr bent 70% sh 30% sltst	5950-6000 Mrlst dk gy, plty-sb blkly, slty, sft, rr Chk dk gy, mottled, grdg to mrlist, rr Sh med gy, plty, non calc, tr Bent, fst cut 80% mrlist 10% chk 10% sh			6000-6050 Chk med gy-s sft-med frm, mottled, tr M plty-sb blkly, slty, sft, tr k chk 30% mrlist	





2/24-25/14

50 6300 6350 6400 6450

MD 6257 TVD 5985.36  
INC 76.84 AZ 343  
VS 795.65

MD 6288 TVD 5991.97  
INC 78.55 AZ 342.88  
VS 825.02

MD 6320 TVD 5997.78  
INC 80.53 AZ 344.83  
VS 855.65

MD 6351 TVD 6002.81  
INC 80.79 AZ 347.1  
VS 885.67

MD 6388 TVD 6008.35'D  
INC 81.98 AZ 350.29ea (-281)  
VS 921.85

MD 6454 TVD 6013.3  
INC 89.1 AZ 353.66  
VS 987.34

Intermediate casing 6440'  
at 15:45 on 2/24/2014.  
Resumed drilling at 04:51  
on 2/26/2014.

5900  
(-881)

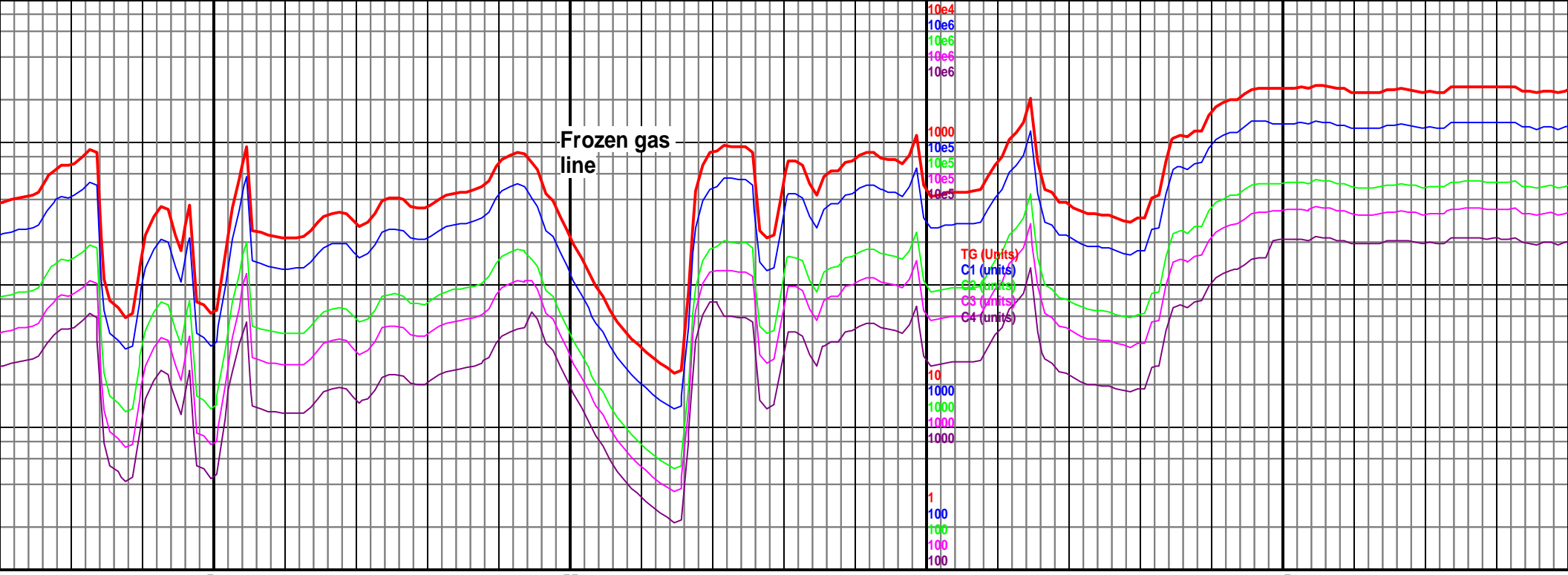
6250-6300 Chk med gy-dk gy, blk-ly-sb  
ply, mod frm, mottled, abnt Mrlst dk gy,  
ply-sb blk, slty, sft, rr bent, rr inoc, fst  
cut 50% chk 50% mrlst

6300-6350 Chk lt gy-gy, blk-ly-ply, mod  
frm, mottled, dk lam, tr Mrlst dk gy,  
ply-sb blk, slty, sft, rr bent, rr inoc, fst  
cut 80% chk 20% mrlst

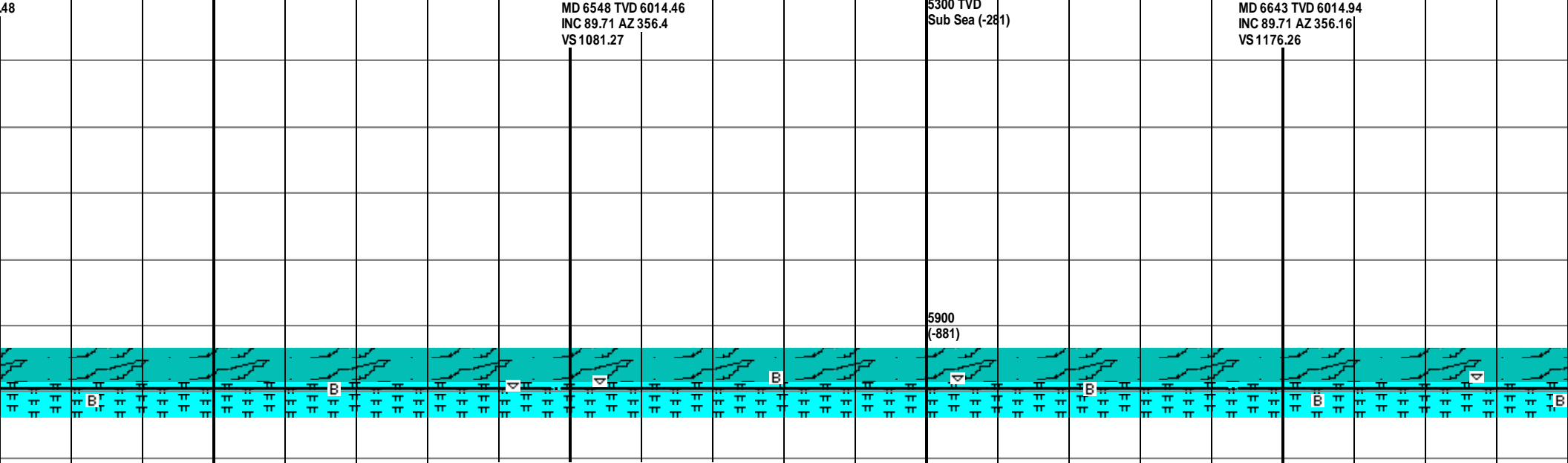
6350-6400 Chk lt gy-gy, blk-ly-ply, mod  
frm, dk lam, tr Mrlst dk gy, ply-sb blk,  
slty, sft, rr bent, rr inoc, fst cut 80% chk  
20% mrlst

6400-6500 Chk lt gy-gy, blk-ly-ply, mod  
frm, dk lam, tr Mrlst dk gy, ply-sb blk,  
slty, sft, rr bent, rr inoc, sl cut 80% chk  
20% mrlst



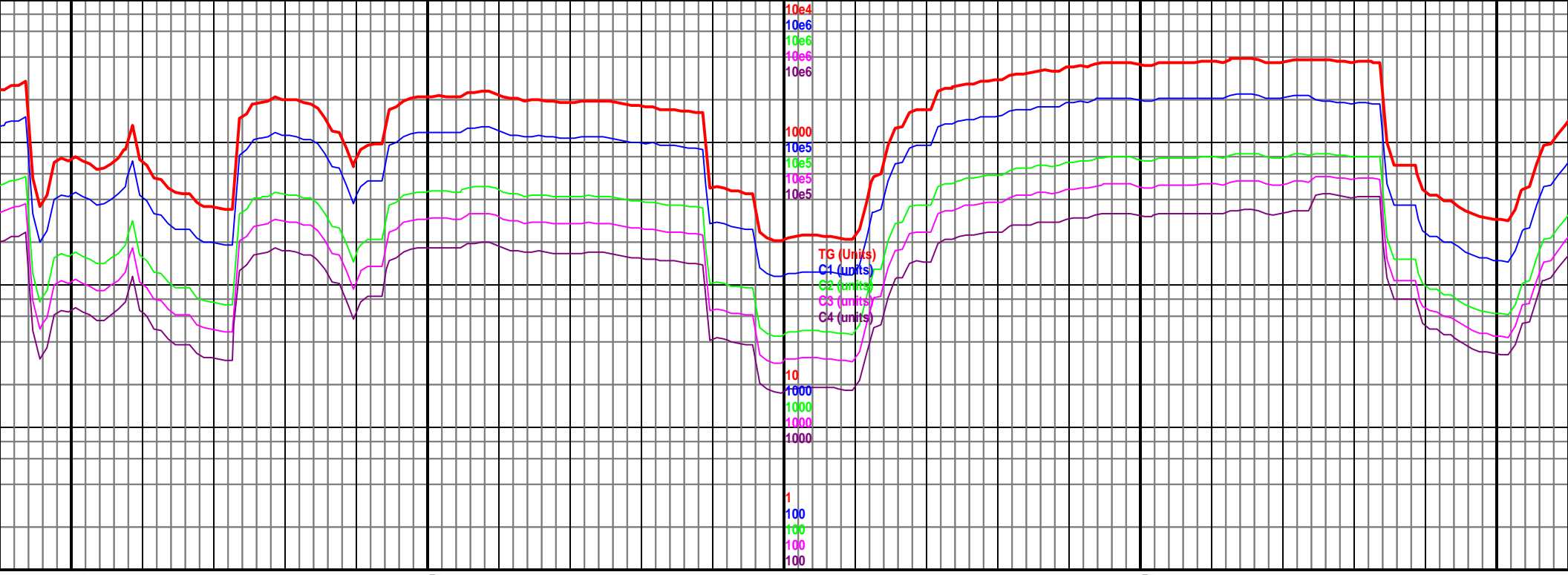


6500 6550 6600 6650



6500-6600 Chk lt gy-gy, blkly-pty, mod  
frm, dk lam, tr Mrlst dk gy, pty-sb blkly,  
silty, sft, rr bent, rr inoc, fst cut 80% chk  
20% mrlst

6600-6700 Chk lt gy-gy, blkly-pty, mod  
frm, dk lam, tr Mrlst dk gy, pty-sb blkly,  
silty, sft, rr bent, rr inoc, fst cut 80% chk  
20% mrlst



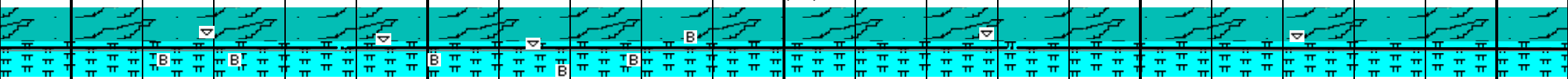
6700 6750 6800 6850 6900

MD 6738 TVD 6015.02  
INC 90.2 AZ 353.95  
VS 1271.19

5300 TVD  
Sub Sea (-281)

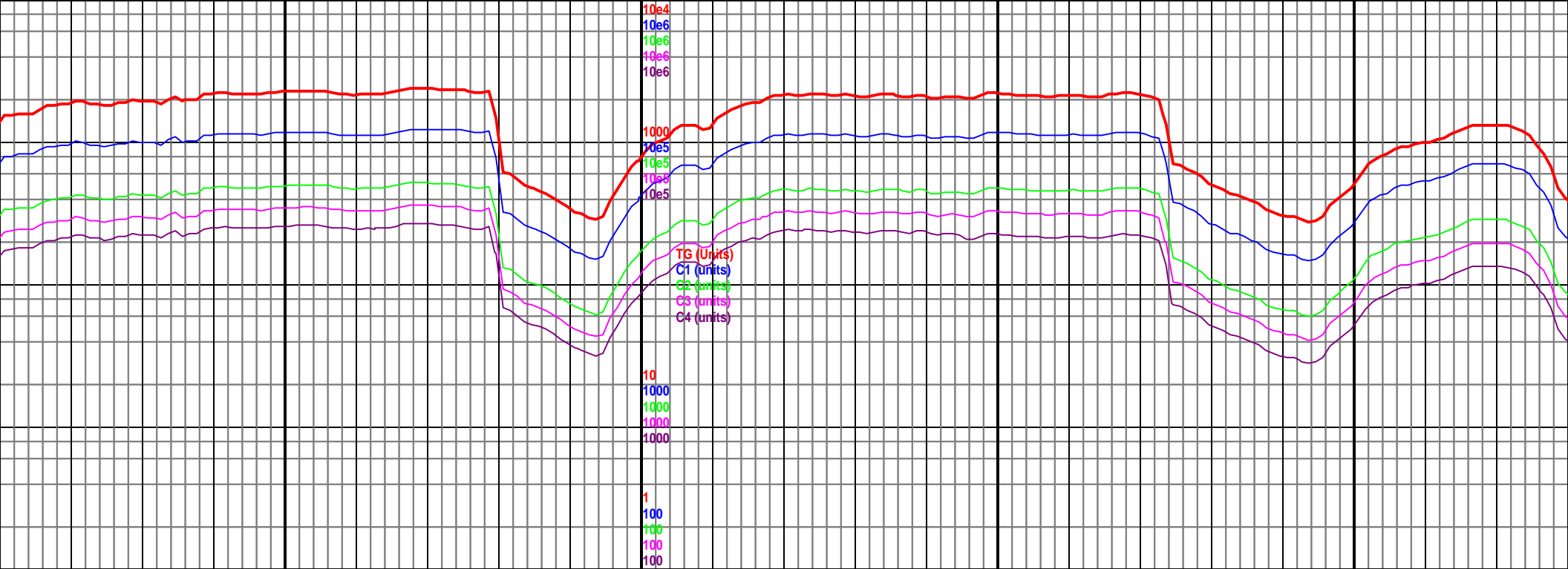
MD 6832 TVD 6015.05  
INC 89.76 AZ 354.05  
VS 1365.06

5900  
(-881)



6700-6800 Chk lt gy-gy, blk-pty, frm,  
dk lam, mottled, tr Mrst dk gy, sb blk,  
sly, sft, tr bent, rr inoc, fst cut 80% chk  
20% mrst

6800-6900 Chk lt gy-gy, pty-blky, frm,  
dk lam, mottled, rr Mrst dk gy, sb pty,  
sly, sft, rr inoc, fst cut 90% chk 10%  
mrst



6950

7000

7050

7100

MD 6927 TVD 6015.45  
INC 89.76 AZ 353.96  
VS 1459.92

5300 TVD  
Sub Sea (-281)

MD 7021 TVD 6016.02  
INC 89.54 AZ 353.89  
VS 1553.78

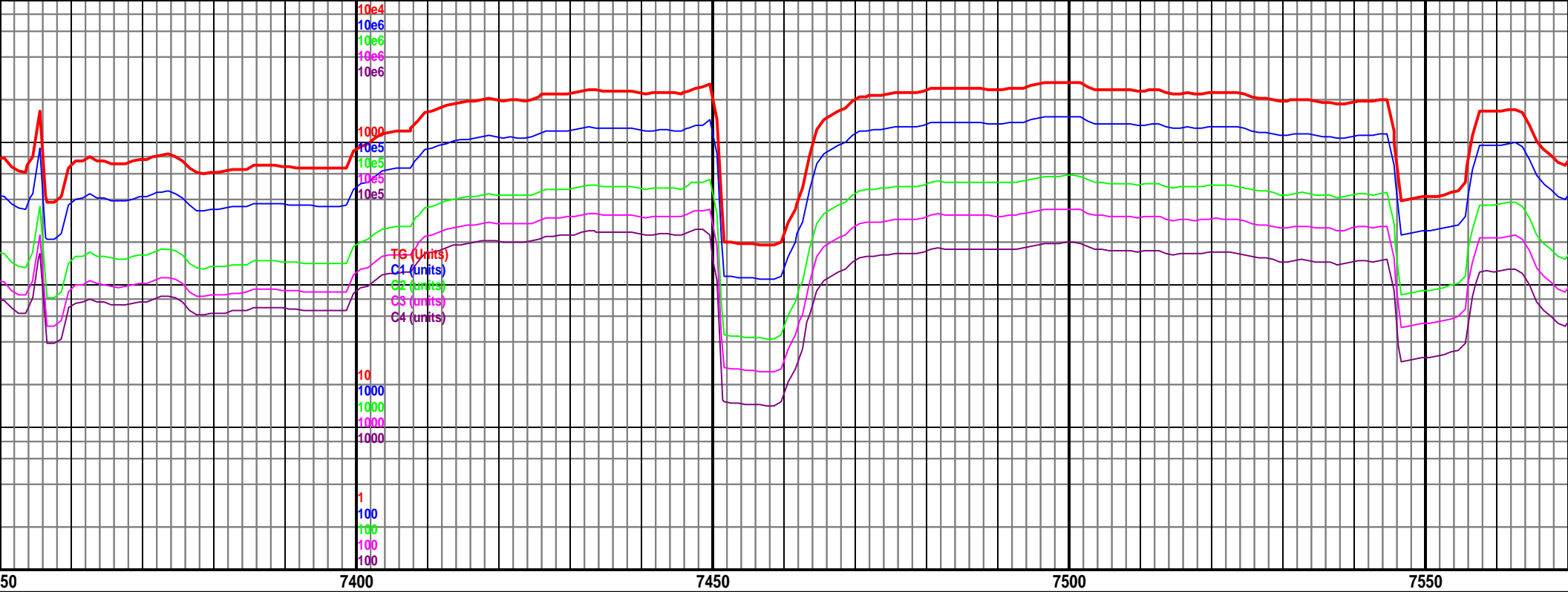
MD 7115 TVD 6016.02  
INC 89.01 AZ 353.89  
VS 1647.61

5900  
(-881)

6900-7000 Chk lt gy-gy, plty-sb blk, frn, mottled, rr Mrlst dk gy, sb plty, slty, sft, tr inoc, fst cut 90% chk 10% mrlist

7000-7100 Chk lt gy-gy, plty-blky, frn, mottled, dk lam, rr Mrlst dk gy, sb plty, slty, sft, rr inoc, fst cut 90% chk 10% mrlist





MD 7399 TVD 6017.91  
INC 91.12 AZ 359.64  
VS 1931.46

MD 7494 TVD 6015.98  
INC 91.21 AZ 359.21  
VS 2026.36

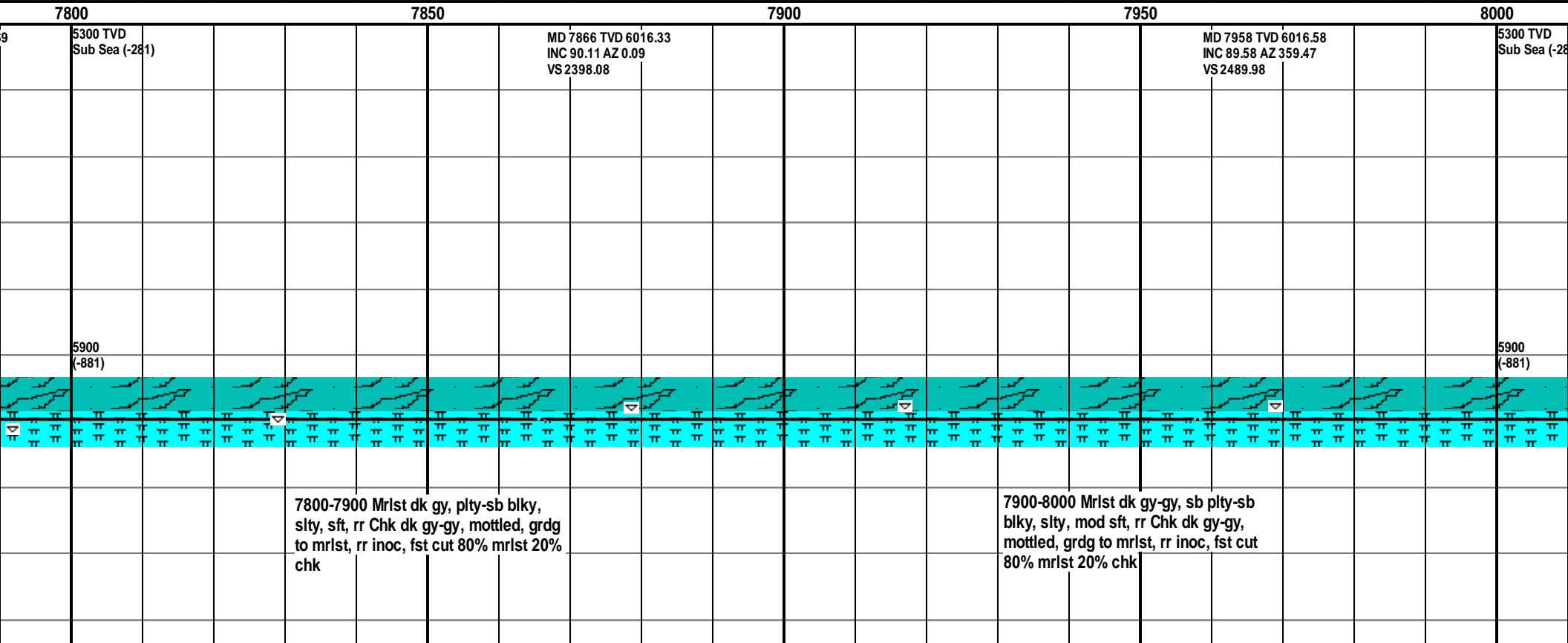
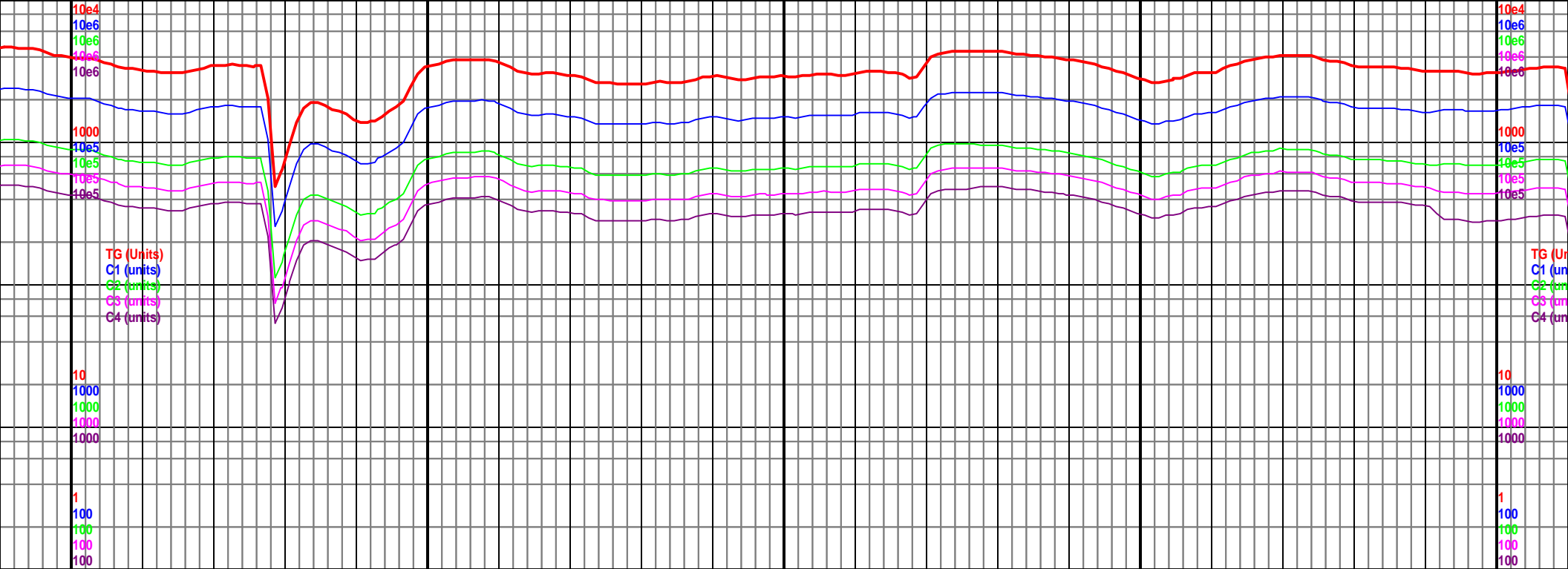
5900  
(-881)

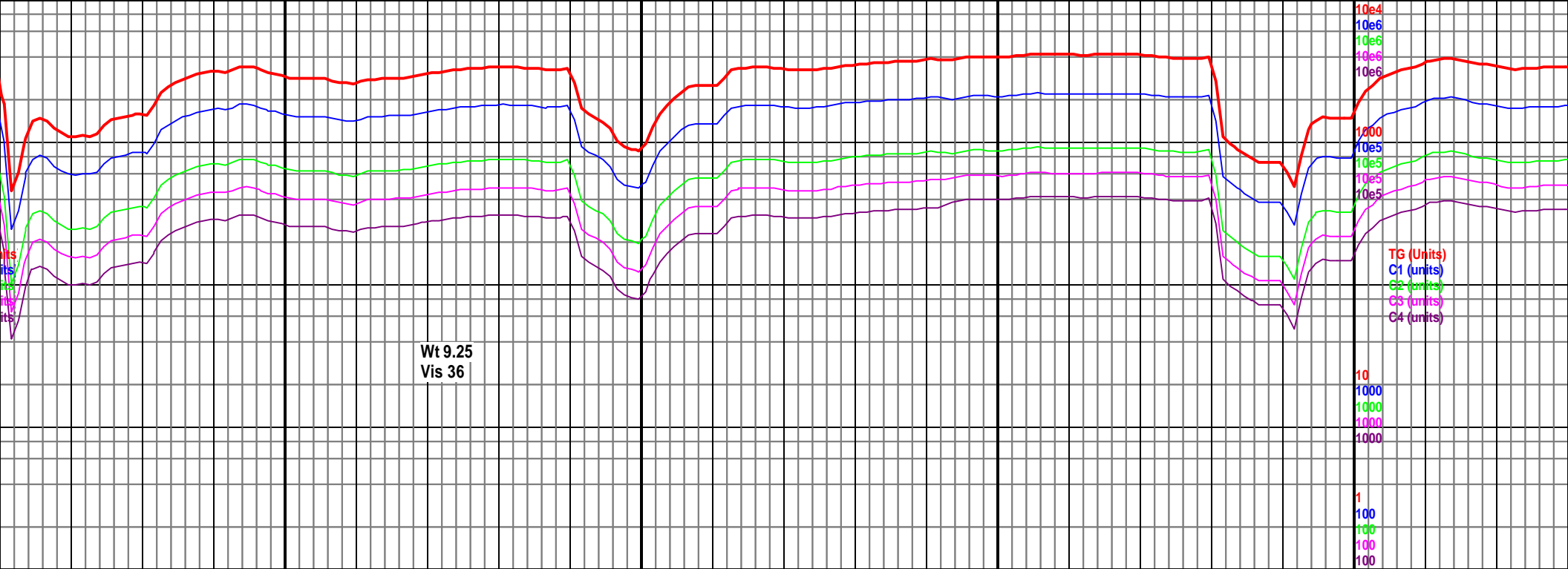
med gy, plty-blky,  
mrlst, abnt Mrlst  
sft, rr inoc, rr bent,  
% mrlst

7400-7500 Chk gy-med gy, plty-blky,  
frm, mottled, grdg to mrlst ip, occ Mrlst  
dk gy, sb plty, slty, sft, rr inoc, fst cut  
70% chk 30% mrlst

7500-7600 Chk gy-med gy, plty-blky,  
frm, mottled, grdg to mrlst ip, occ Mrlst  
dk gy, sb plty, slty, sft, rr inoc, fst cut  
70% chk 30% mrlst







8050

8100

8150

8200

MD 8049 TVD 6015.95  
INC 91.21 AZ 0.75  
VS 2580.85

MD 8142 TVD 6013.96  
INC 91.25 AZ 0.62  
VS 2673.64

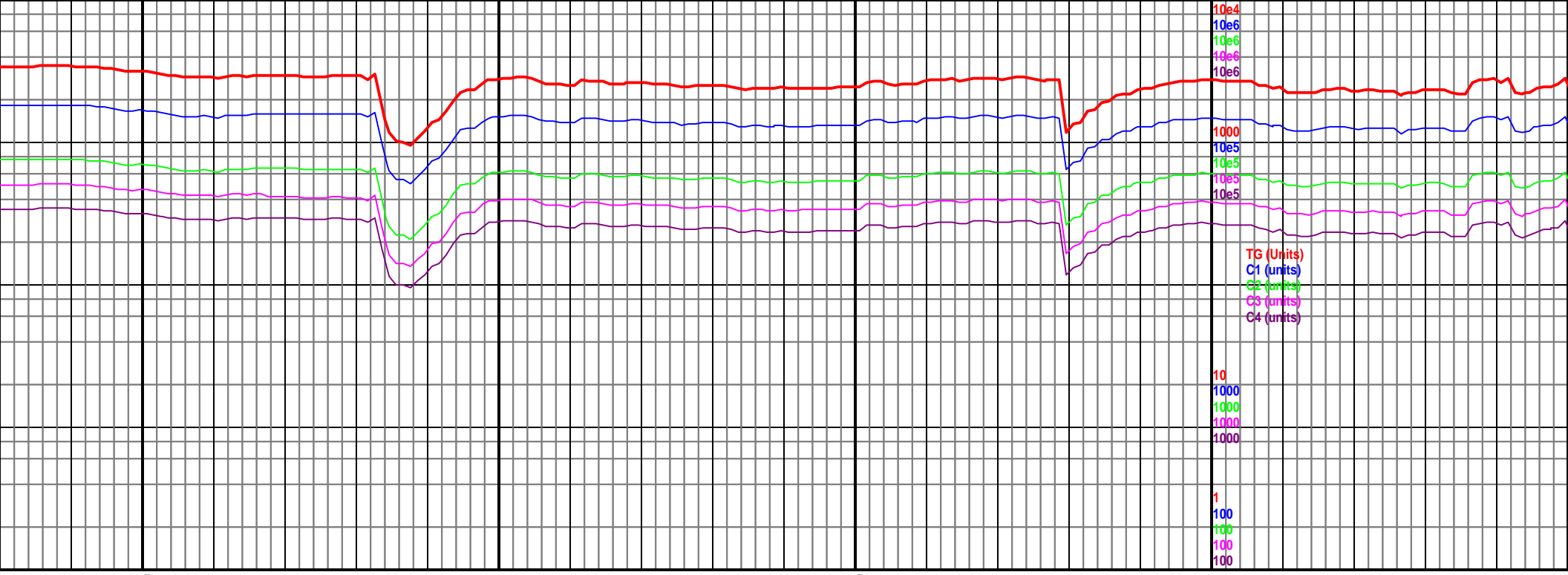
5300 TVD  
Sub Sea (-281)

5900  
(-881)

8000-8100 Chk lt gy-gy, plty-blky, frm,  
mottled, dk lam ip, rr Mrlst dk gy, sb  
plty, slty, sft, rr inoc, fst cut 90% chk  
10% mrlst

8100-8200 Chk lt gy-gy, plty-blky, frm,  
mottled, dk lam ip, rr Mrlst dk gy, sb  
plty, slty, sft, rr inoc, fst cut 90% chk  
10% mrlst





TG (Units)  
C1 (units)  
C2 (units)  
C3 (units)  
C4 (units)

10  
1000  
1000  
1000  
1000  
1000  
  
1  
100  
100  
100  
100  
100

8250

8300

8350

8400

84

MD 8235 TVD 6011.71  
INC 91.52 AZ 0.34  
VS 2766.45

MD 8326 TVD 6009.19  
INC 91.65 AZ 0.17  
VS 2857.27

5300 TVD  
Sub Sea (-281)

MD 8418 TVD 6006.54  
INC 91.65 AZ 360  
VS 2949.11

5900  
(-881)

B

B

B

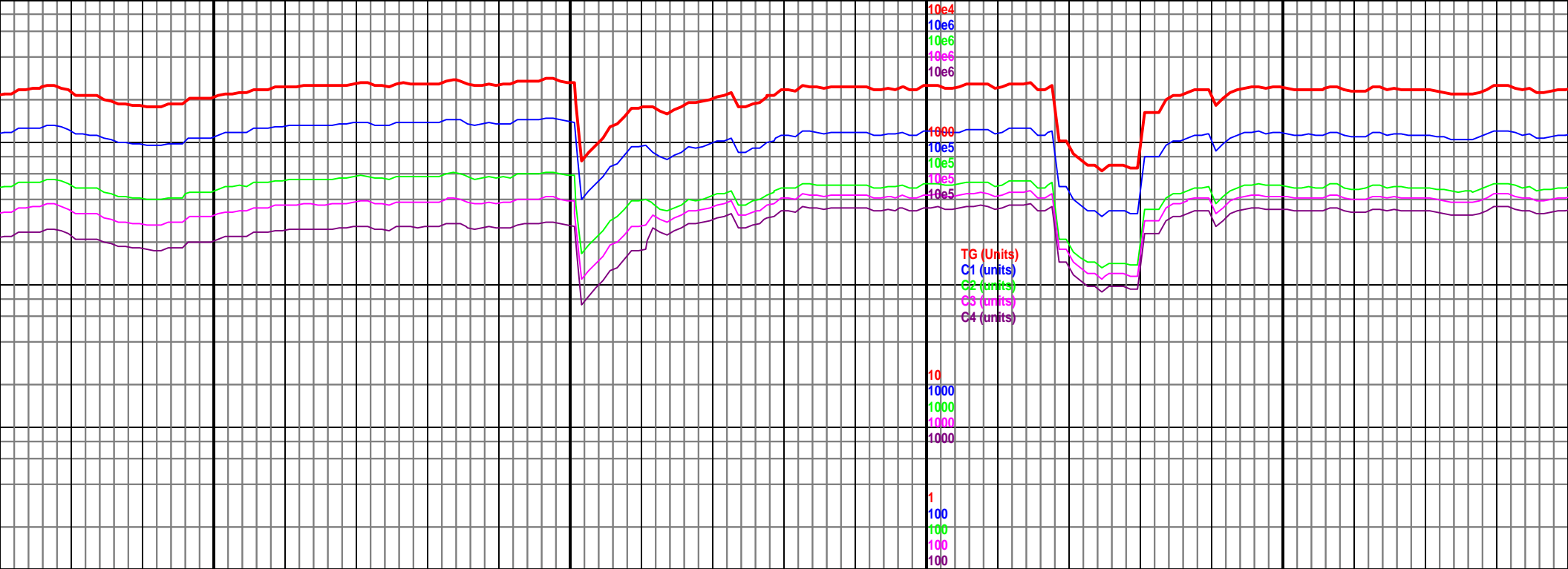
B

8200-8300 Chk lt gy-gy, plty-blky, frm,  
mottled, dk lam, rr Mrlst dk gy, sb  
blky-rd, slty, sft, fst cut 90% chk 10%  
mrlst

8300-8400 Chk med gy-gy, plty-blky,  
frm, slty, rr Mrlst dk gy, blky, slty, sft,  
fst cut 80% chk 20% mrlst

8400-8500 Chk gy-m  
frm, mottled, slty, gr  
Mrlst dk gy, sb blky-  
80% chk 20% mrlst





8700

8750

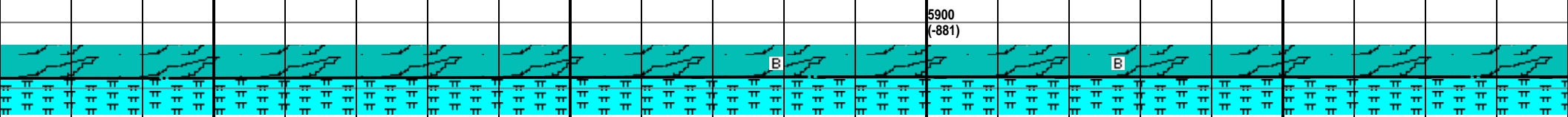
8800

8850

MD 8693 TVD 6000.07  
INC 90.9 AZ 359.67  
VS 3223.71

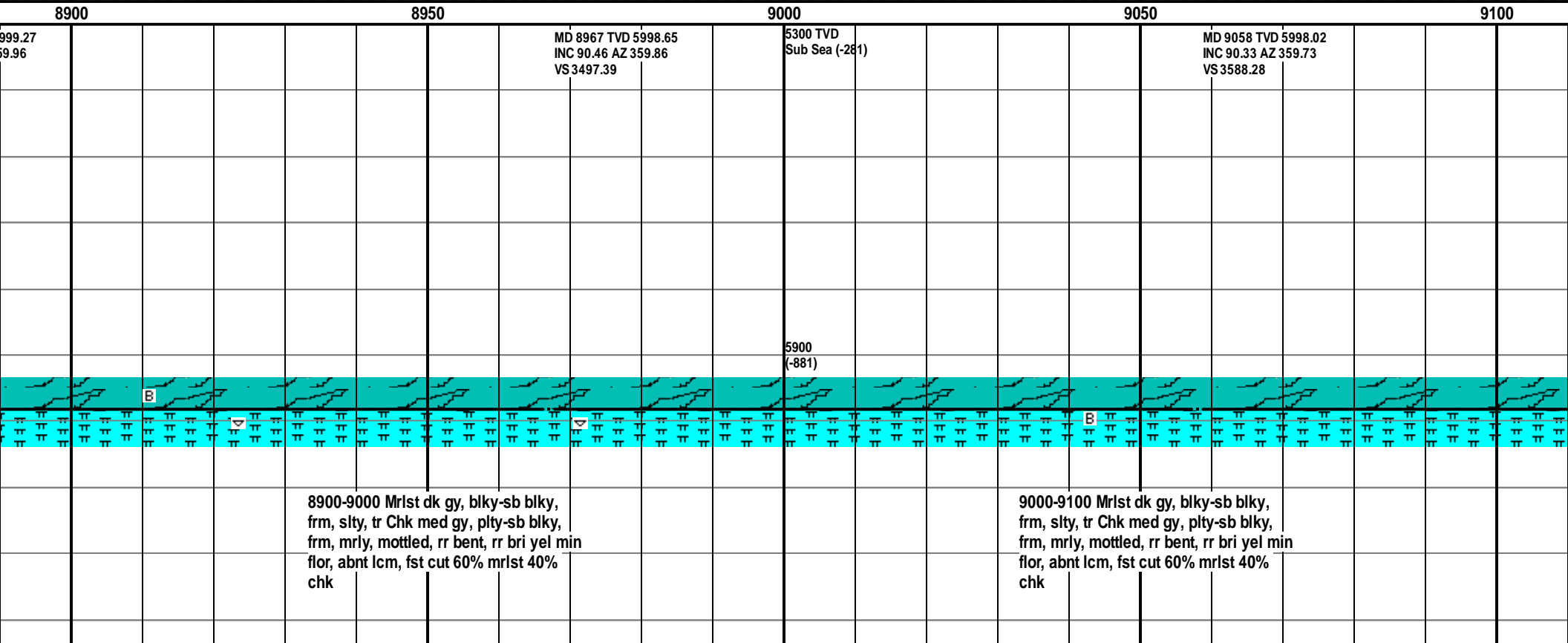
MD 8784 TVD 5999.44 TVD  
INC 89.89 AZ 359.73 Sub Sea (-281)  
VS 3314.61

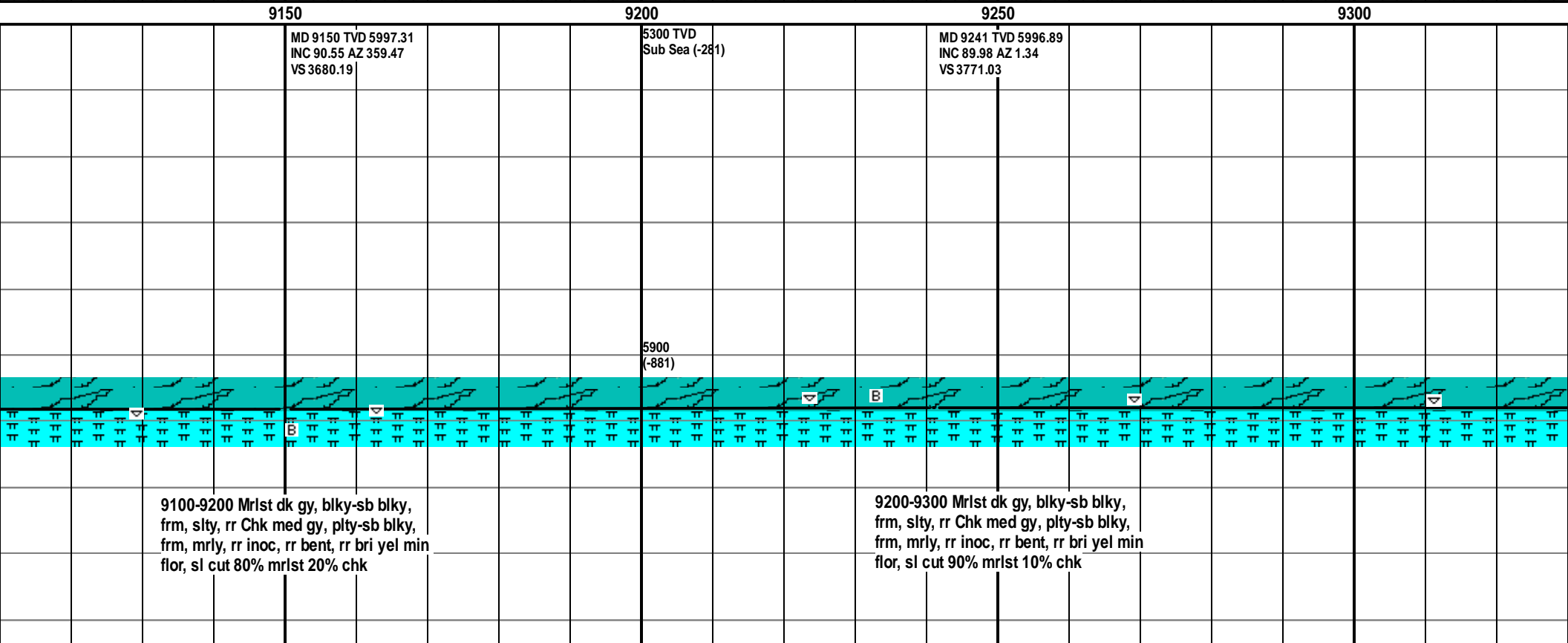
MD 8877 TVD 5999.44 TVD  
INC 90.33 AZ 359.73  
VS 3407.5

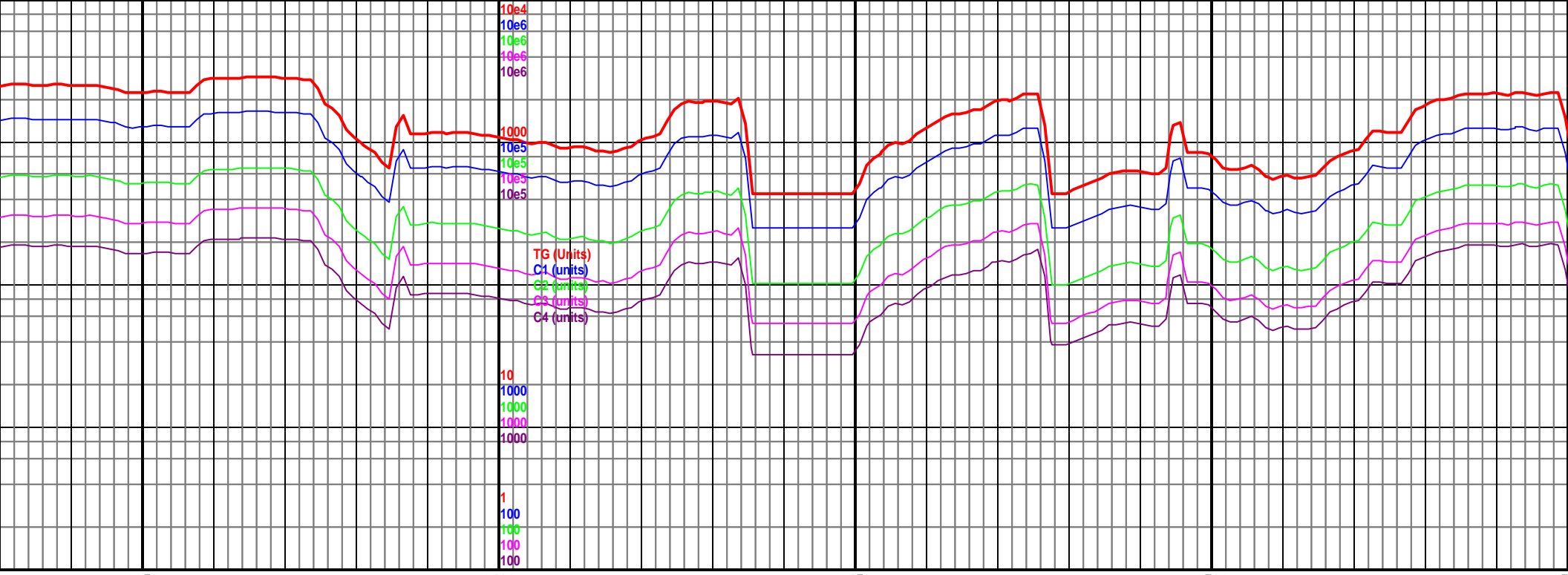


8700-8800 Chk gy-med gy, plty-blky,  
frm, mottled, slty, grdg to mrlst ip, rr  
Mrlst dk gy, sb blky-rd, slty, sft, rr bri yl  
min flor, fst cut 80% chk 20% mrlst

8800-8900 Chk gy-med gy, plty-blky,  
frm, mottled, slty, grdg to mrlst ip, rr  
Mrlst dk gy, sb blky-rd, slty, sft, rr bri yl  
min flor, fst cut 80% chk 20% mrlst







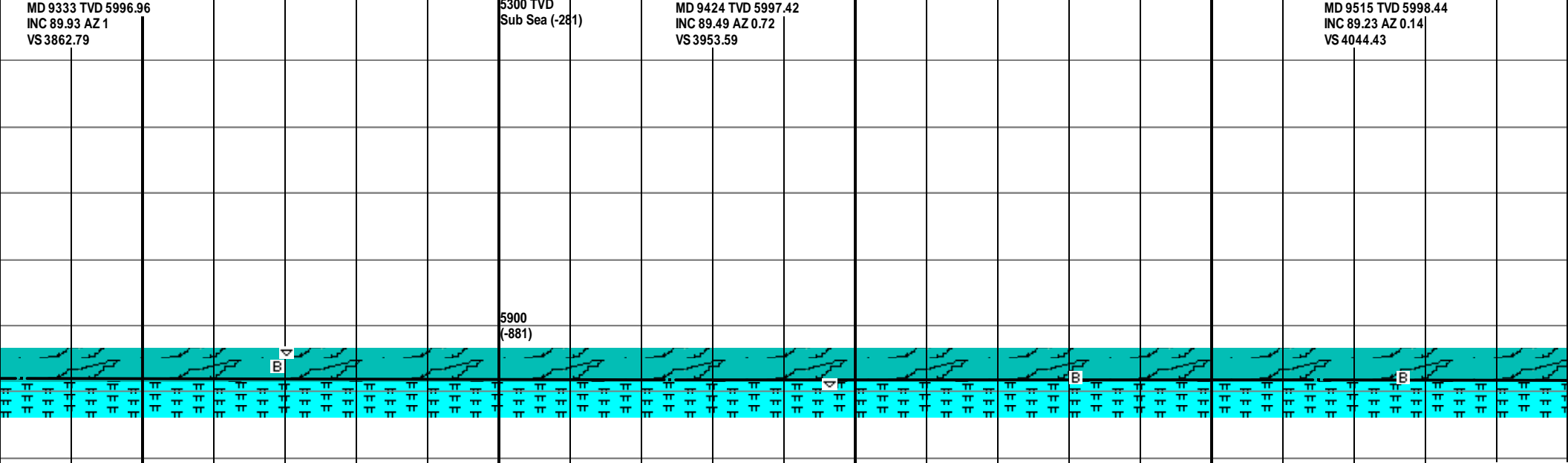
9350 9400 9450 9500 9550

MD 9333 TVD 5996.96  
INC 89.93 AZ 1  
VS 3862.79

5300 TVD  
Sub Sea (-281)

MD 9424 TVD 5997.42  
INC 89.49 AZ 0.72  
VS 3953.59

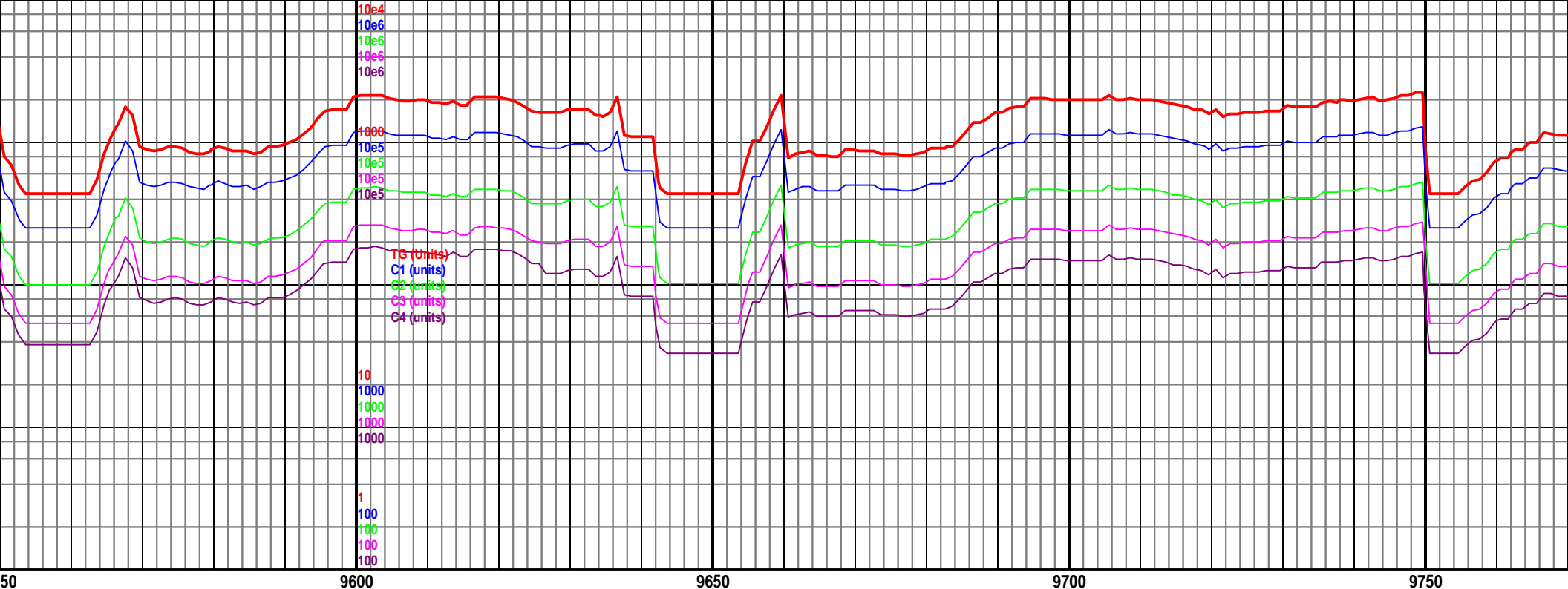
MD 9515 TVD 5998.44  
INC 89.23 AZ 0.14  
VS 4044.43



9300-9400 Mrlst dk gy, blk-y-sb blk-y,  
frm, slty, rr Chk med gy, plty-sb blk-y,  
frm, mrlly, rr inoc, rr bent, rr bri yel min  
flor, sl cut 90% mrlst 10% chk

9400-9500 Mrlst dk gy, blk-y-sb blk-y,  
frm, slty, rr Chk med gy, plty-sb blk-y,  
frm, mrlly, rr inoc, rr bent, sl cut 90%  
mrlst 10% chk

9500-9600 Mrlst dk gy, blk-y-sb blk-y,  
frm, slty, rr Chk med gy, plty-sb blk-y,  
frm, mrlly, rr inoc, rr bent, sl cut 90%  
mrlst 10% chk



5300 TVD MD 9607 TVD 5999.78  
Sub Sea (INC 89.1 AZ 359.97  
VS 4136.3

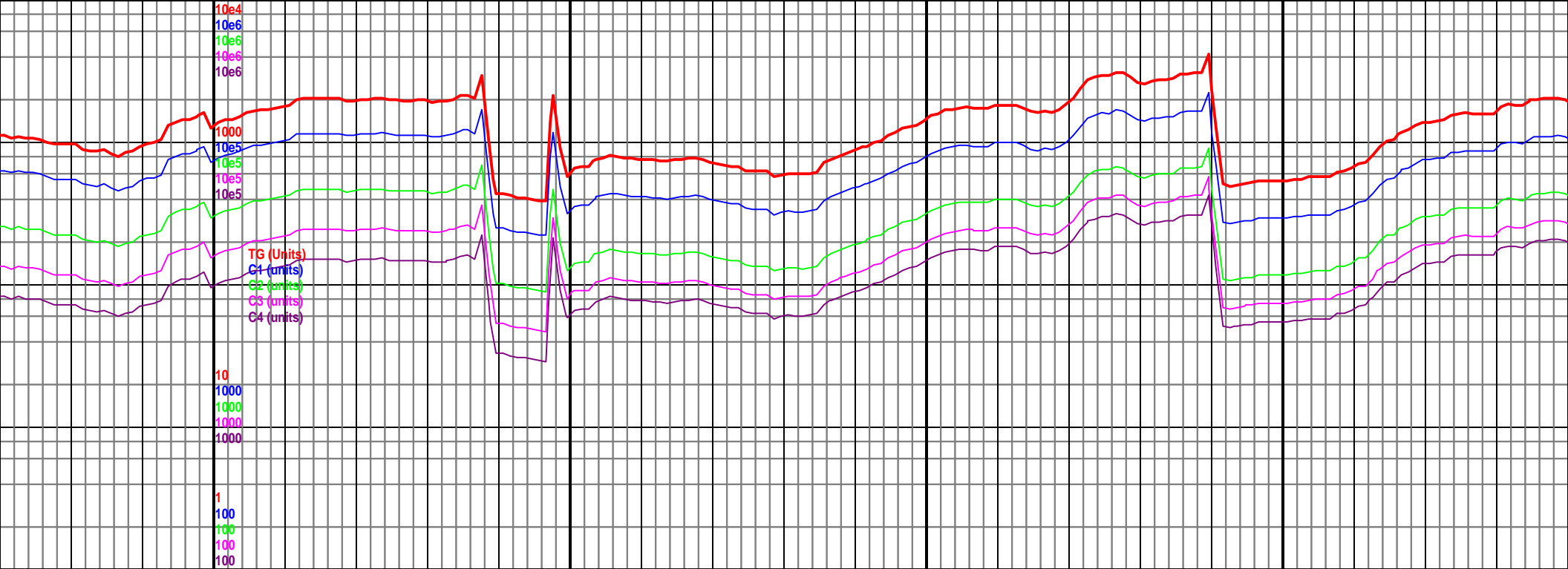
MD 9699 TVD 6001.61  
INC 88.62 AZ 359.81  
VS 4228.17

5900  
(-881)

lk gy, blk-y-sb blk-y,  
med gy, plty-sb blk-y,  
rr bent, sl cut 90%

9600-9700 Mrlst dk gy, blk-y-sb blk-y,  
frm, slty, rr Chk med gy, plty-sb blk-y,  
frm, mrlly, rr inoc, rr bent, sl cut 90%  
mrlst 10% chk

9700-9800 Mrlst dk gy, blk-y-sb blk-y,  
frm, slty, rr Chk med gy, plty-sb blk-y,  
frm, mrlly, rr inoc, rr bent, sl cut 90%  
mrlst 10% chk



1980

1985

1990

1995

MD 9790 TVD 6002.65  
INC 90.07 AZ 0.44<sup>ea</sup> (-281)  
VS 4319.03

MD 9882 TVD 6002.65  
INC 89.93 AZ 0.33  
VS 4410.87

MD 9974 TVD 6002.65  
INC 89.85 AZ 359.9  
VS 4502.74

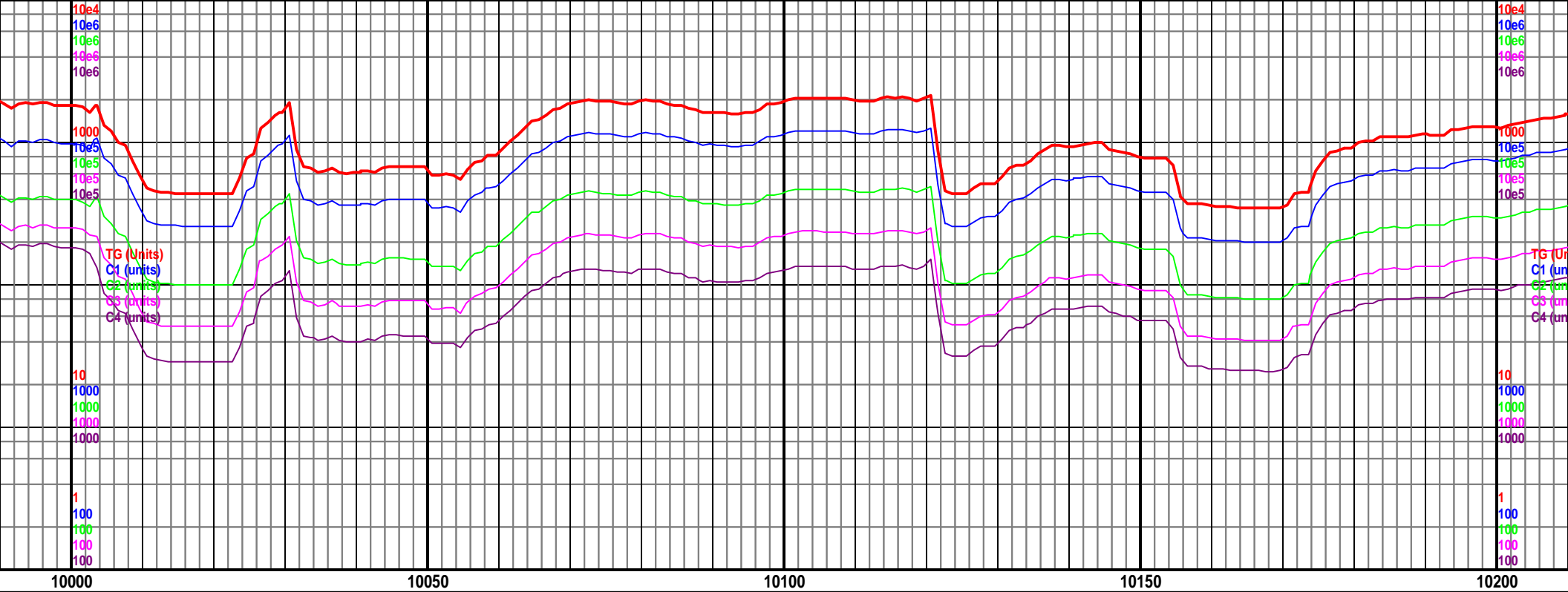
5900  
(-881)



9800-9900 Mrlst dk gy, blkly-sb blkly,  
frm, slty, rr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent, rr bri yel min  
flor, sl cut 80% mrlst 20% chk

9900-10000 Mrlst dk gy, blkly-sb blkly,  
frm, slty, rr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent sl cut 80%  
mrlst 20% chk



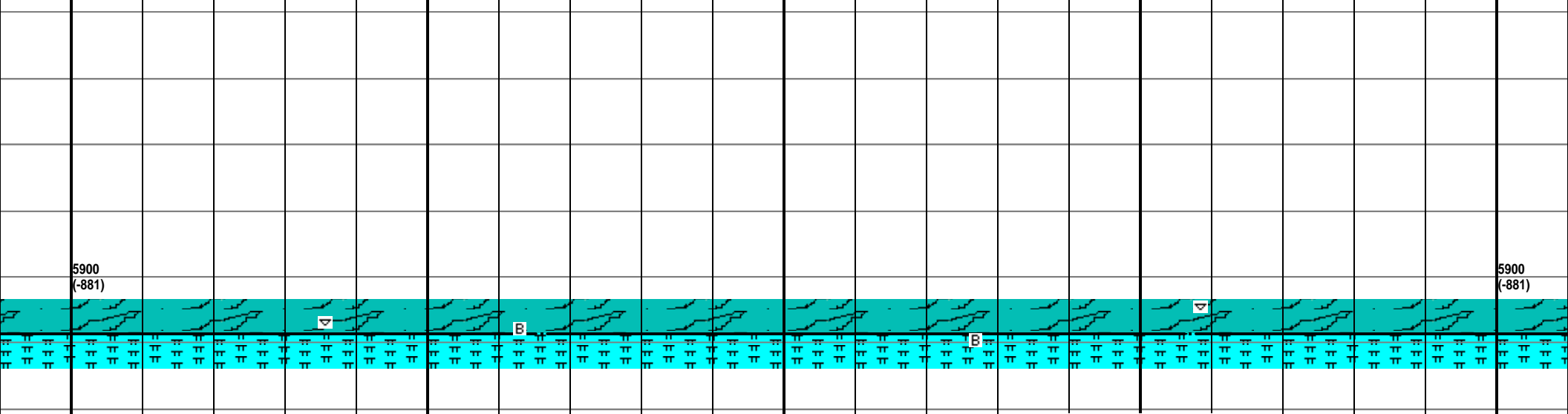


5300 TVD  
Sub Sea (-281)

MD 10066 TVD 6002.79  
INC 90.2 AZ 359.93  
VS 4594.63

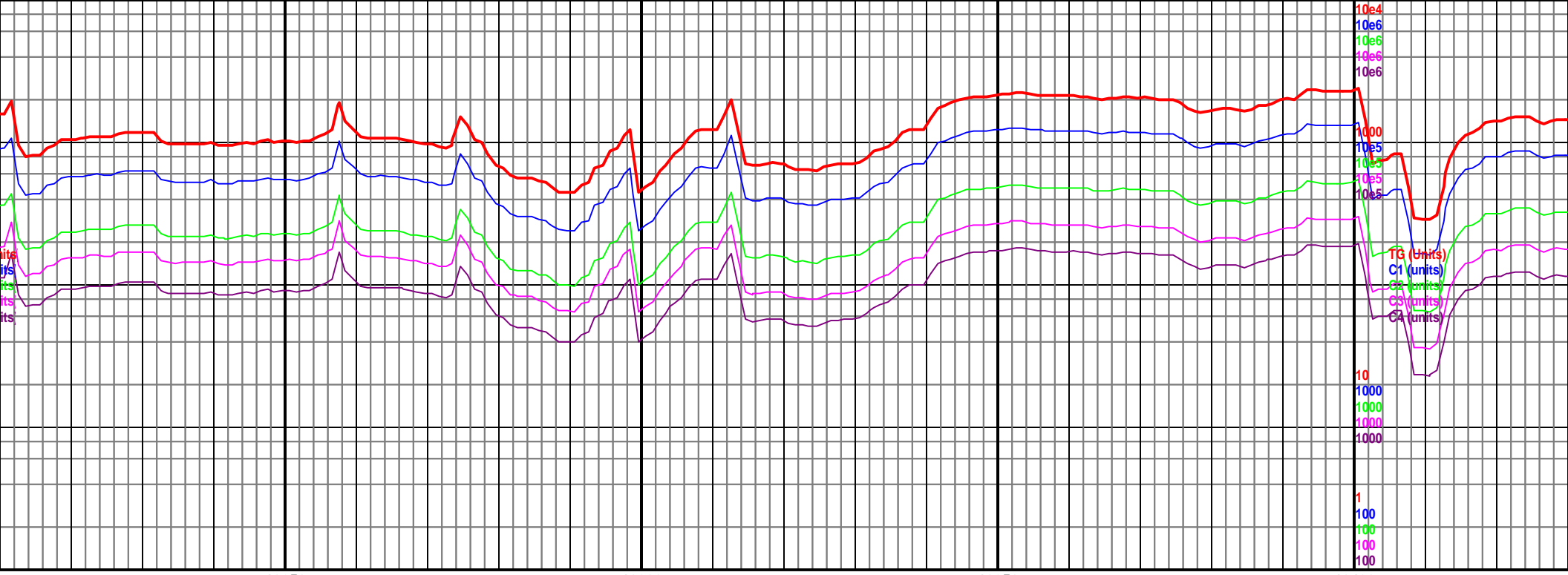
MD 10157 TVD 6003.24  
INC 89.23 AZ 0.39  
VS 4685.5

5300 TVD  
Sub Sea (-281)



10000-10100 Mrlst dk gy, blkly-sb blkly,  
frm, slty, rr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent sl cut 80%  
mrlst 20% chk

10100-10200 Mrlst dk gy, blkly-sb blkly,  
frm, slty, rr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent sl cut 80%  
mrlst 20% chk



10250

10300

10350

10400

MD 10248 TVD 6004.39  
INC 89.32 AZ 359.73  
VS 4776.36

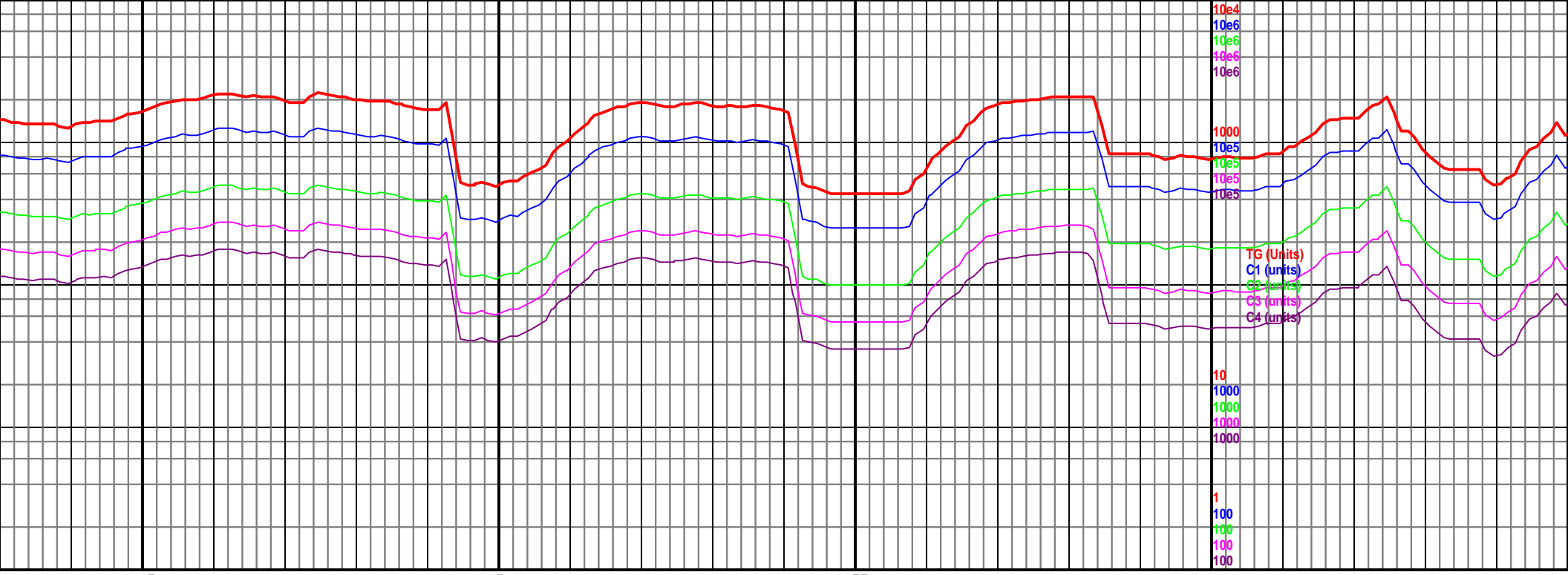
MD 10339 TVD 6005.19  
INC 89.67 AZ 359.25  
VS 4867.28

5300 TVD  
Sub Sea (-281)

5900  
(-881)

10200-10300 Mrlst dk gy, blkly-sb blkly,  
frm, slty, rr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent sl cut 80%  
mrlst 20% chk

10300-10400 Mrlst dk gy, blkly-sb blkly,  
frm, slty, tr Chk med gy, plty-sb blkly,  
frm, mrlly, rr inoc, rr bent sl cut 70%  
mrlst 30% chk



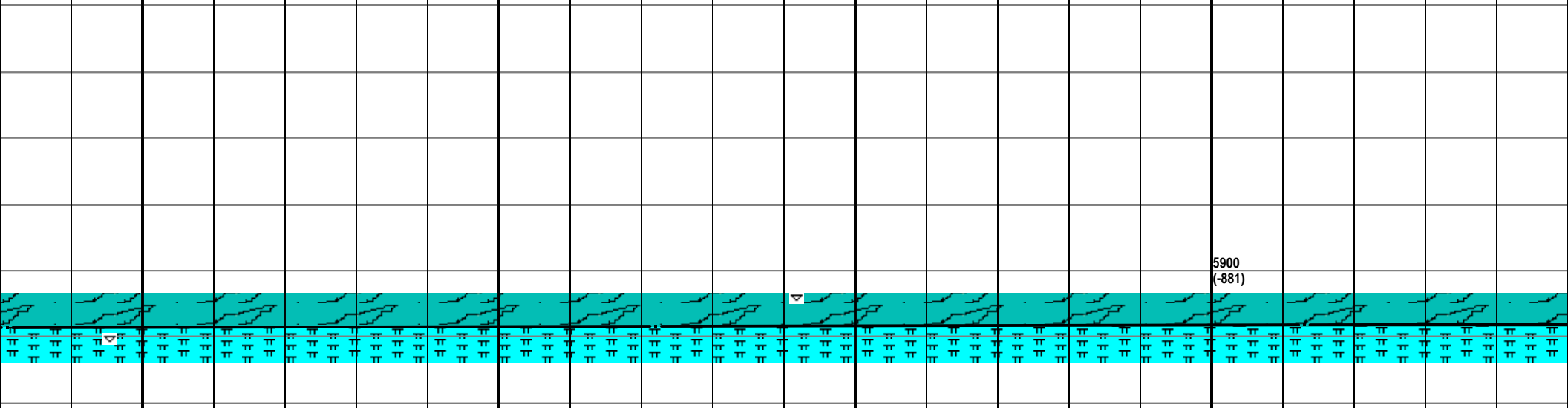
10450 10500 10550 10600 10650

MD 10431 TVD 6004.24  
INC 91.52 AZ 0.65  
VS 4959.15

MD 10522 TVD 6001.82  
INC 91.52 AZ 0.55  
VS 5049.95

5300 TVD  
Sub Sea (-281)

MD 10613 TVD 5999.45  
INC 91.47 AZ 0.21  
VS 5140.76

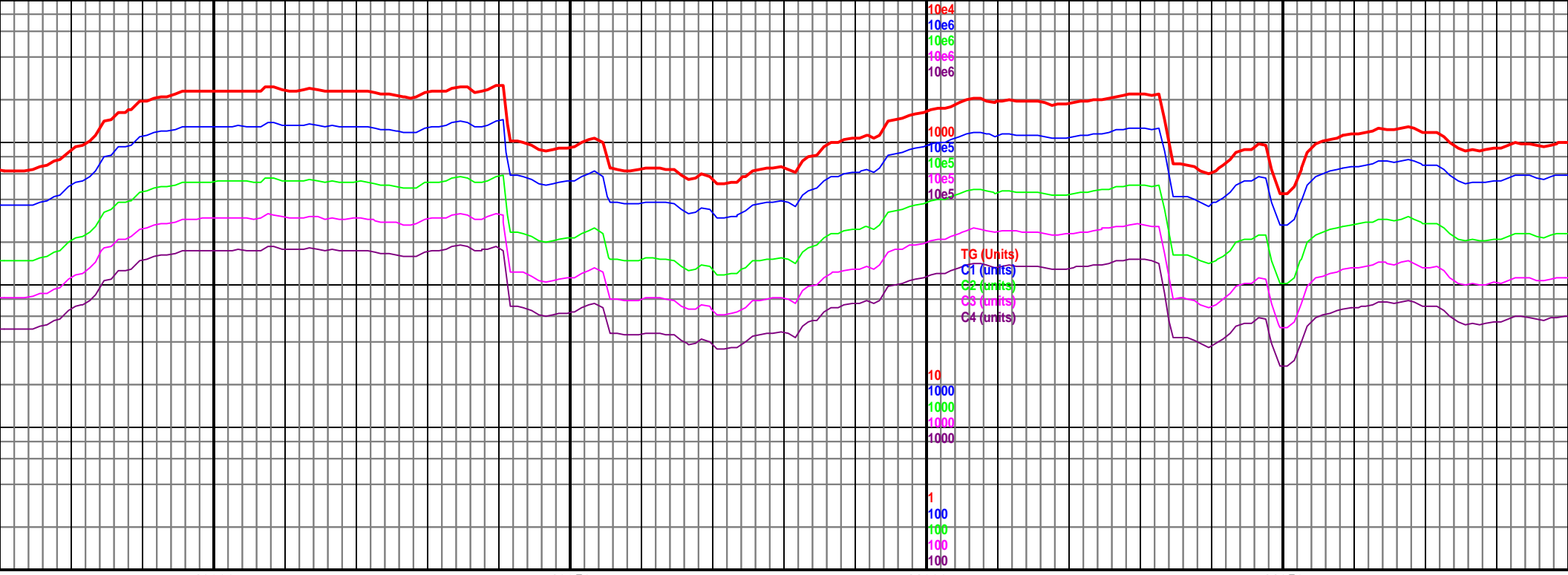


10400-10500 Mrlst dk gy, blk-sb blk,  
frm, slty, abnt Chk med gy, plty-sb blk,  
frm, grdg to mrlst ip, rr inoc, sl cut 50%  
mrlst 50% chk

10500-10600 Mrlst dk gy, blk-sb blk,  
frm-sft, slty, rr Chk dk gy, plty-sb blk,  
frm, grdg to mrlst, rr inoc, sl cut 80%  
mrlst 20% chk

10600-10700 M  
frm-sft, slty, rr C  
frm, grdg to mrl  
mrlst 20% chk





10900

10950

11000

11050

MD 10888 TVD 5989.61  
INC 92.66 AZ 359.91  
VS 5415.22

MD 10980 TVD 5986.51  
INC 91.21 AZ 359.96  
VS 5507.05

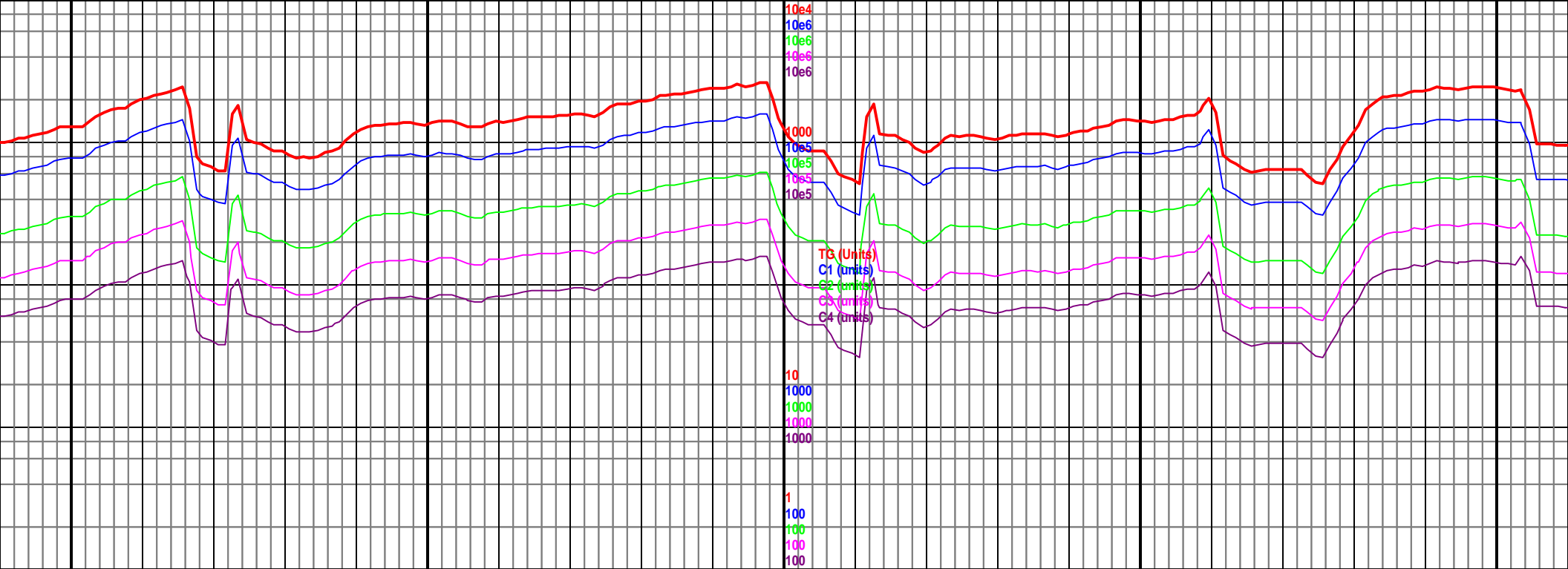
5300 TVD  
Sub Sea (-281)

MD 11070 TVD 5984.53  
INC 91.3 AZ 359.51  
VS 5596.93

5900  
(-881)

10900-11000 Mrlst dk gy, blkly-sb blkly,  
frm-sft, slty, tr Chk dk gy, plty-sb blkly,  
frm, rr inoc, rr bent, sl cut 80% mrlst  
20% chk

11000-11100 Mrlst dk gy, blkly-sb blkly,  
frm-sft, sb wxy-slty, occ Chk dk gy,  
plty-sb blkly, frm sl cut 60% mrlst 40%  
chk



1100

1110

1120

1130

1140

MD 11162 TVD 5983.48  
INC 90.02 AZ 0.12  
VS 5688.82

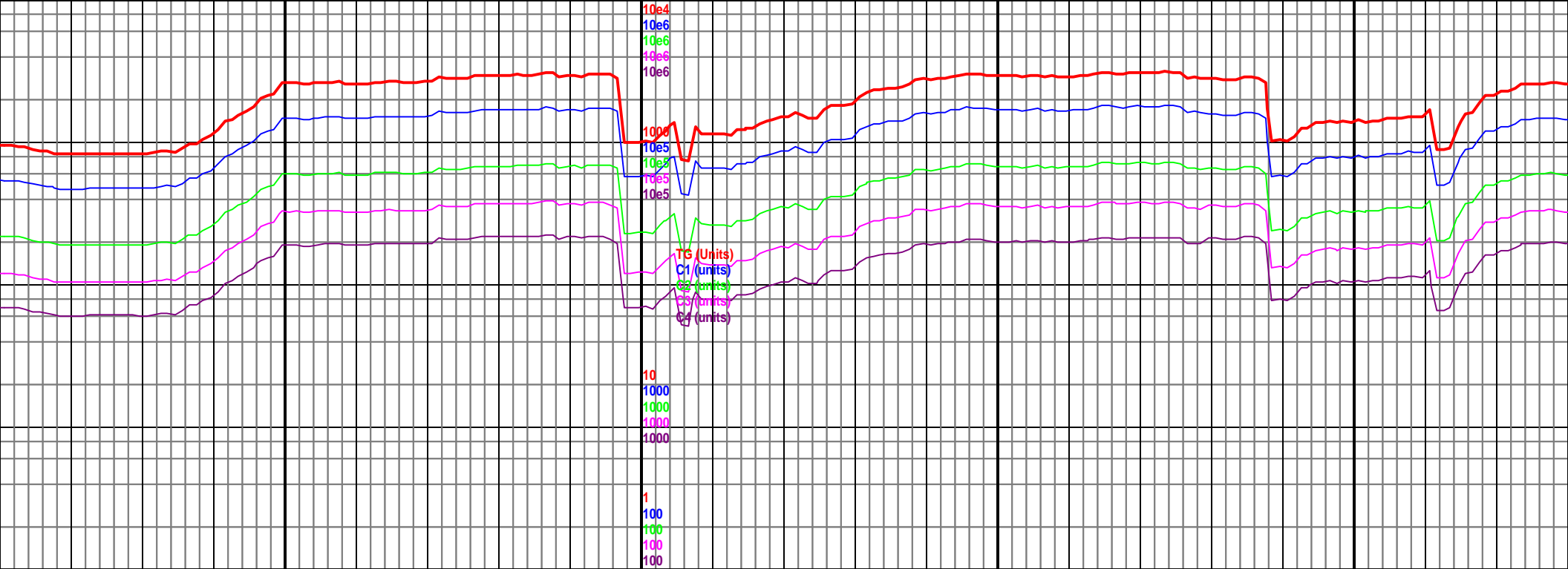
5300 TVD  
Sub Sea (-281)

MD 11253 TVD 5983.69  
INC 89.71 AZ 1.29  
VS 5779.63

5900  
(-881)

11100-11200 Mrlst dk gy, blkly-sb blkly,  
frm-sft, slty, occ Chk dk gy, plty-sb  
blkly, frm sl cut 60% mrlst 40% chk

11200-11300 Mrlst dk gy, blkly-sb blkly,  
frm-sft, slty, grdg to a chk ip, occ Chk  
dk gy, plty-sb blkly, frm rr inoc, sl cut  
60% mrlst 40% chk



11350

11400

11450

11500

MD 11345 TVD 5984.08  
INC 89.8 AZ 0.94  
VS 5871.4

5300 TVD  
Sub Sea (-281)

MD 11436 TVD 5983.88  
INC 90.46 AZ 1.7  
VS 5962.15

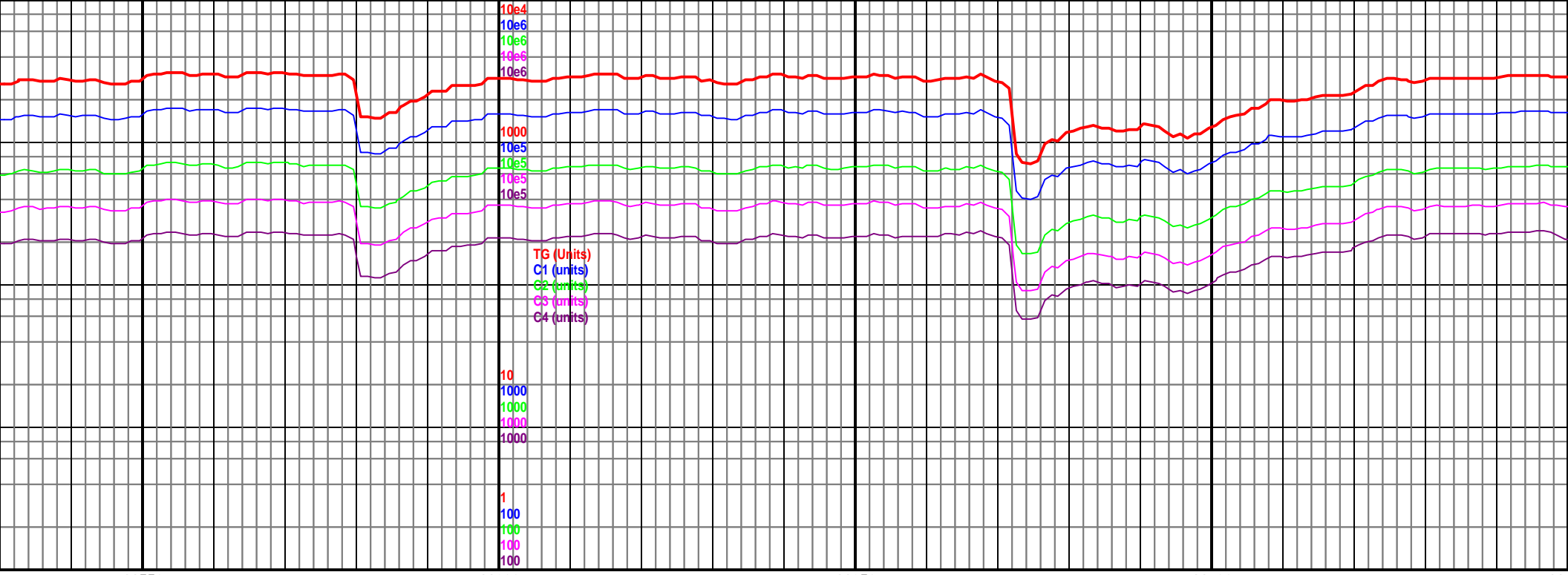
M  
IN  
V

5900  
(-881)



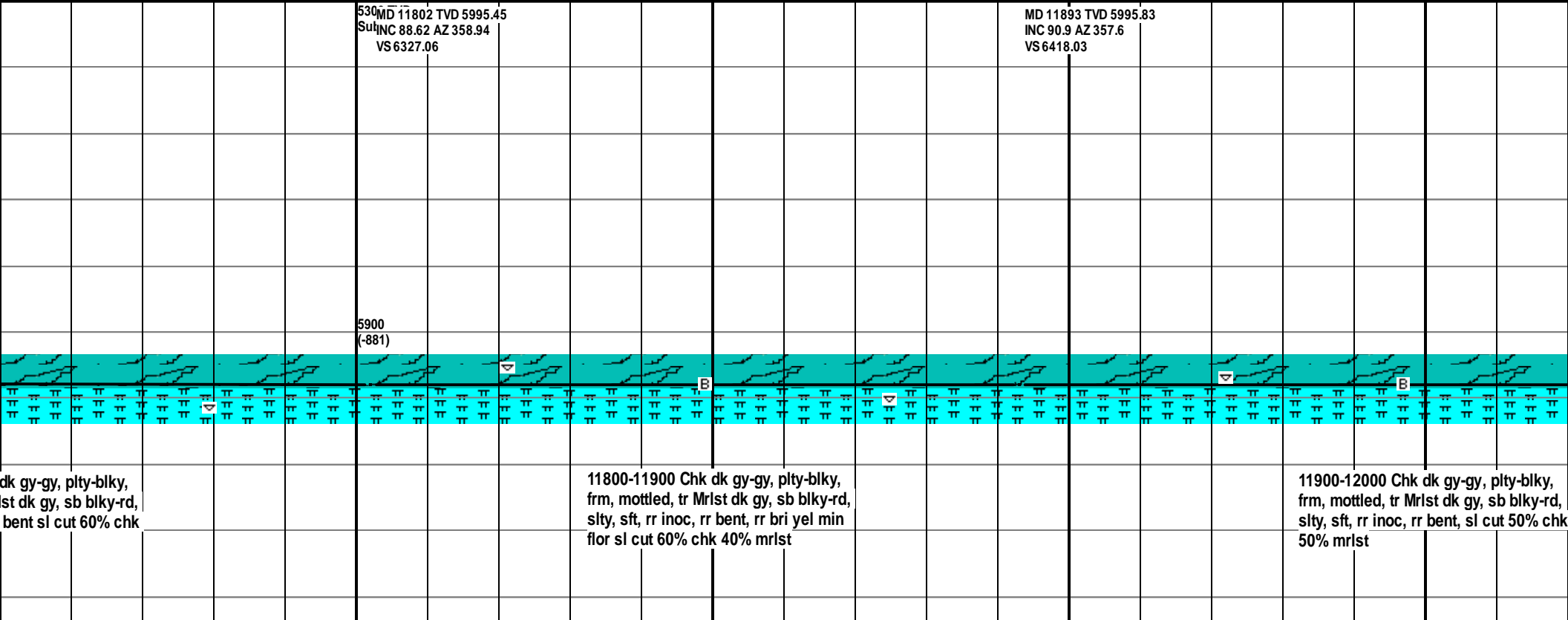
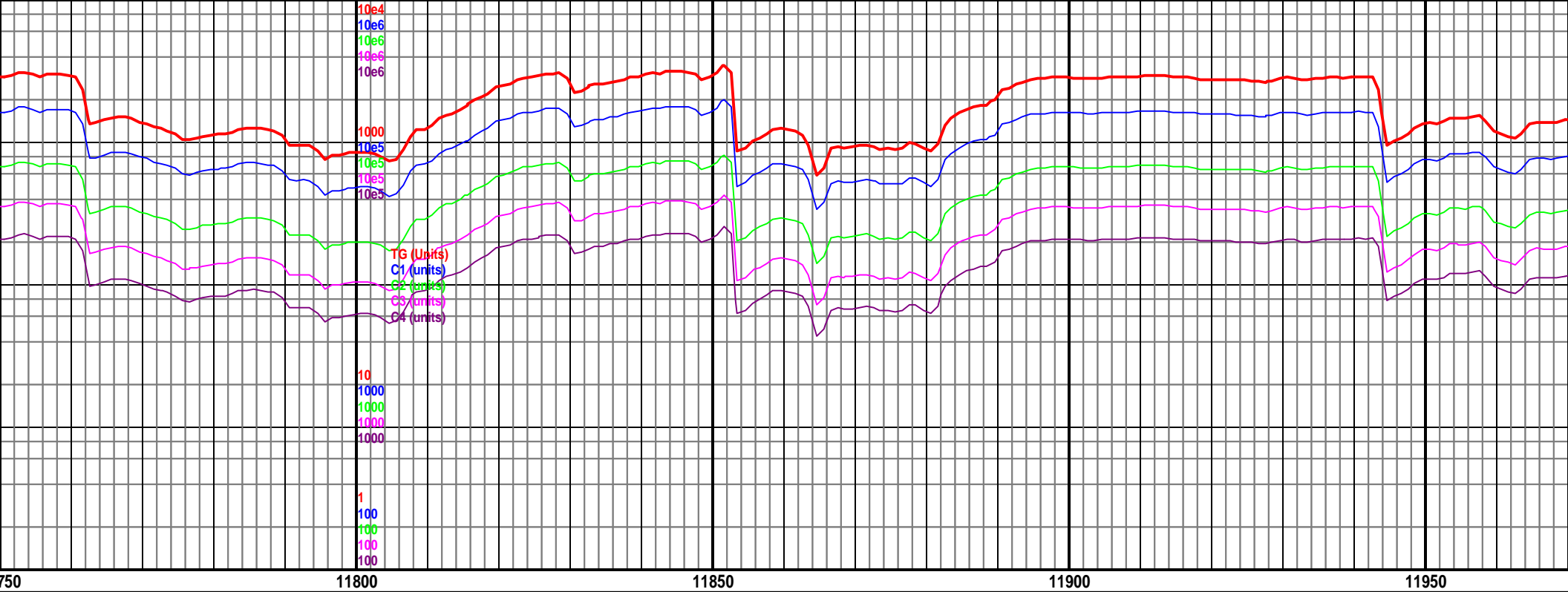
11300-11400 Mrlst dk gy, blkly-sb blkly,  
frm-sft, slty, grdg to a chk ip, occ Chk  
dk gy, plty-sb blkly, frm rr inoc, sl cut  
60% mrlst 40% chk

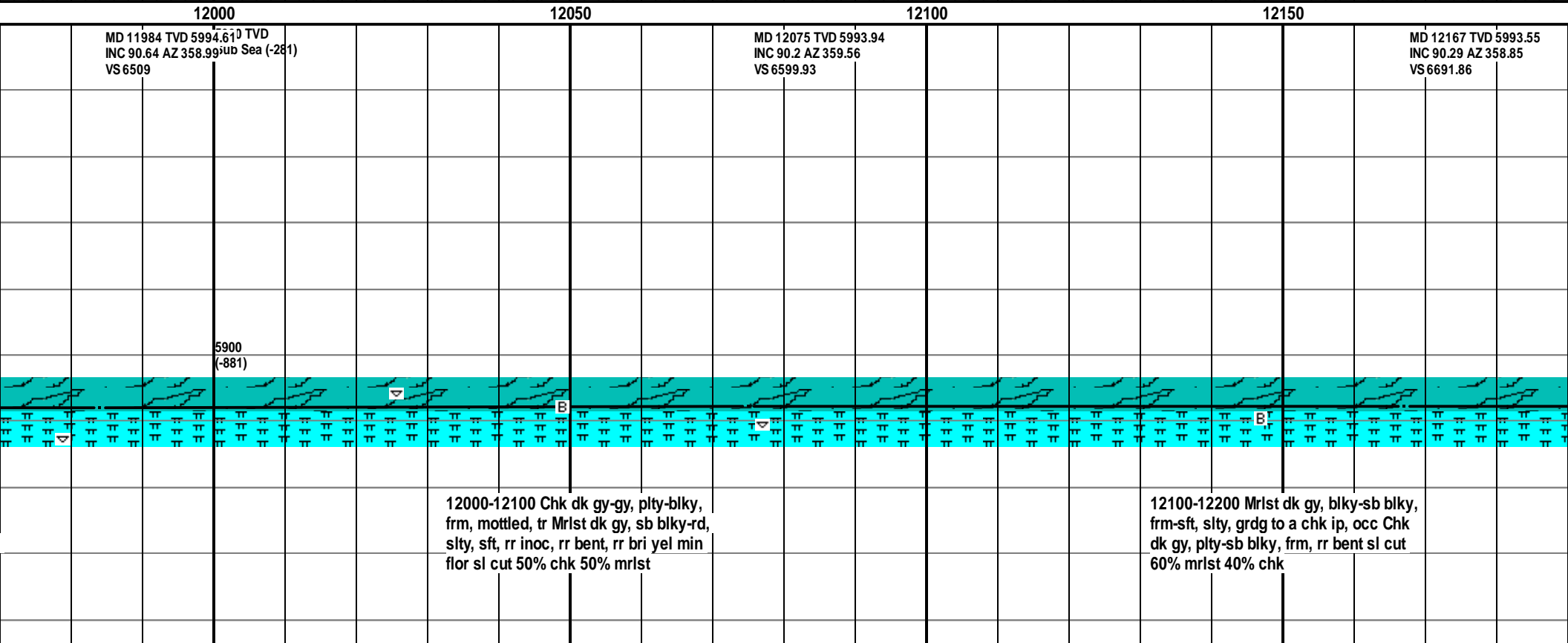
11400-11500 Mrlst dk gy, blkly-sb blkly,  
frm-sft, slty, grdg to a chk, abnt Chk dk  
gy-gy, plty-sb blkly, frm, sl cut 50%  
mrlst 50% chk

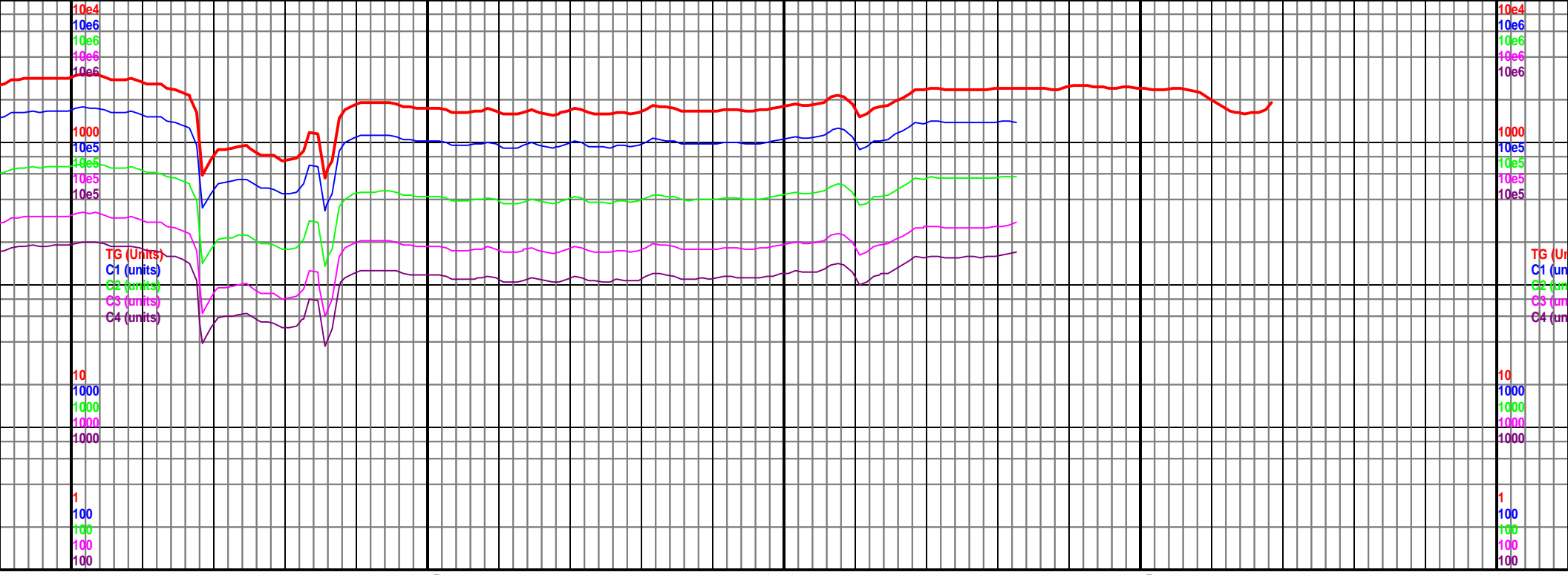


ID 11528 TVD 5985.32 IC 87.74 AZ 1.57 S6053.84	5300 TVD Sub Sea (-281)	MD 11620 TVD 5989.34 INC 87.25 AZ 1.3 VS 6145.48		MD 11711 TVD 5992.94 INC 88.22 AZ 0.68 VS 6236.2	11750
	5900 (-881)				
11500-11600 Chk gy-med gy, plty-blky, frm, mottled, dk lam ip, tr Mrlst dk gy, sb blky-rd, slty, sft, sl cut 70% chk 30% mrlst		11600-11700 Chk dk gy-gy, plty-blky, frm, mottled, tr Mrlst dk gy, sb blky-rd, slty, sft, rr inoc sl cut 60% chk 40% mrlst			11700-11800 Chk frm, mottled, tr Mrlst dk gy, sb blky-rd, slty, sft, rr inoc, rr 40% mrlst









12200

12250

12300

12350

12400

5300 TVD  
Sub Sea (-281)

MD 12258 TVD 5993.2  
INC 90.15 AZ 1.26  
VS 6782.73

MD 12349 TVD 5993.41  
INC 89.58 AZ 1.31  
VS 6873.48

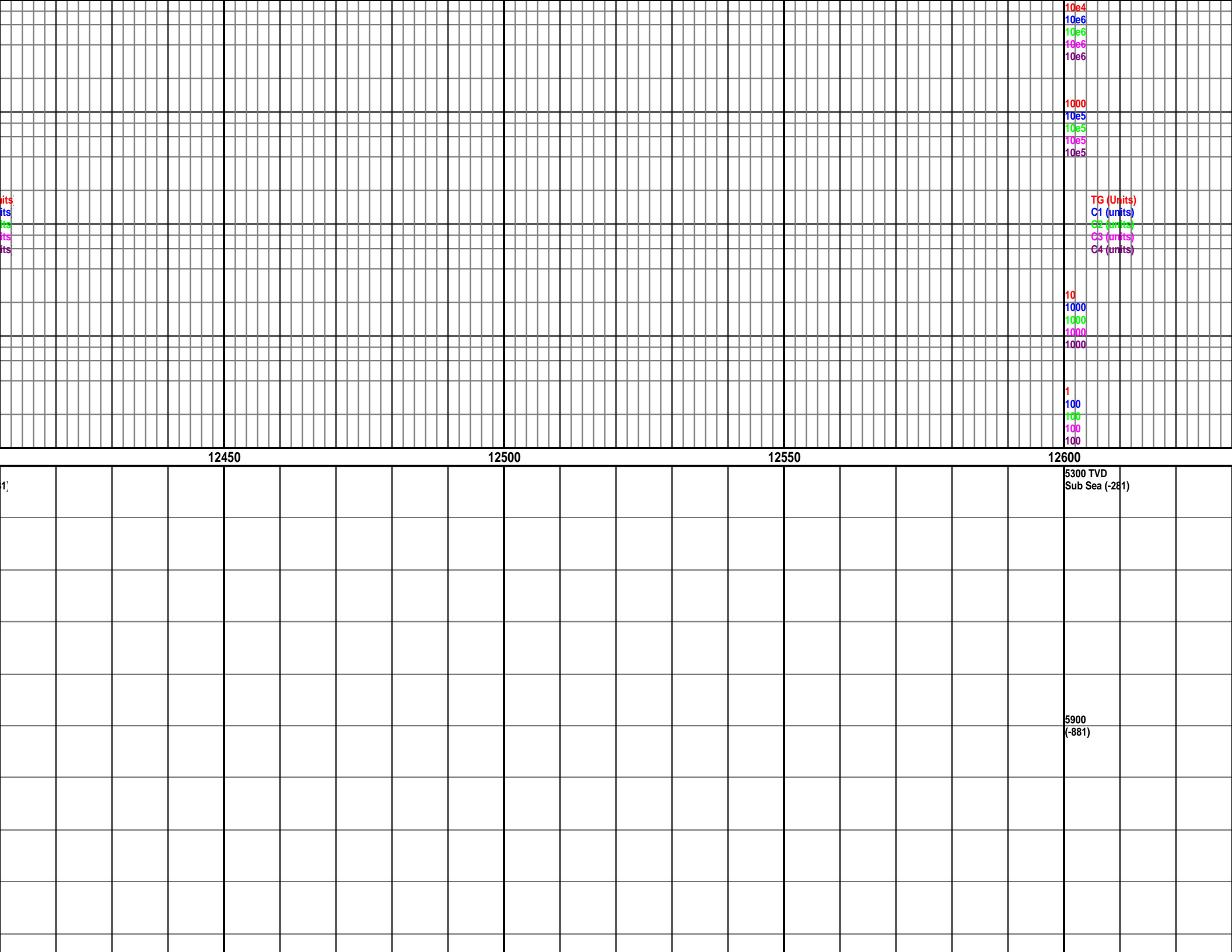
5300 TVD  
Sub Sea (-281)

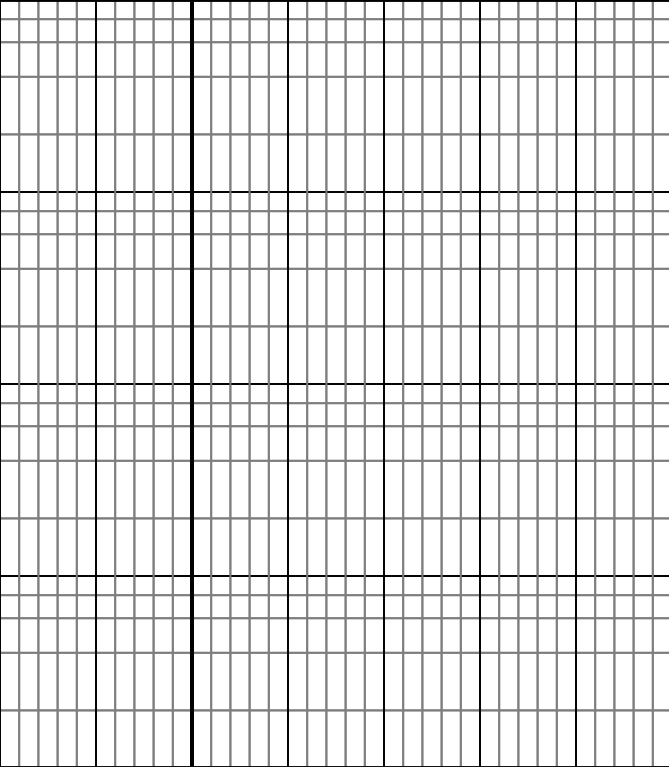
5900  
(-881)

5900  
(-881)

12200-12300 Mrlst dk gy, blk-sb blk,  
frm-sft, slty, grdg to a chk ip, occ Chk  
dk gy, plty-sb blk, frm, rr bent sl cut  
60% mrlst 40% chk

12300-12400 Mrlst dk gy, blk-sb blk,  
frm-sft, slty, grdg to a chk ip, occ Chk  
dk gy, plty-sb blk, frm, rr bent, rr  
inocs sl cut 60% mrlst 40% chk





12650

127

[illegible]