



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

Well Name: Razor 27L 3404B  
Location: NWSW 27-T10N-R58W Weld County, Colorado  
License Number: 05-123-37744  
Spud Date: 8/12/2013  
Surface Coordinates: Lat.: 40.818894 Long.: -103.857628

Region: Redtail Field  
Drilling Completed: 8/21/2013

Bottom Hole Coordinates: Lat.: 40.787975 Long.: -103.855764

Ground Elevation (ft): 4772  
Logged Interval (ft): 5100 To: 12490  
Formation: Pierre, Sharon Springs, Niobrara  
Type of Drilling Fluid: Water Based Mud

K.B. Elevation (ft): 4755  
Total Depth (ft): 12490

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: Brian Reddick, Craig Dreiling  
Company: Acme Geologic Consulting  
Address: 108 Berry Street  
Little Rock, AR 72205

## Drilling Company

Cade Drilling, LLC  
Rig 21


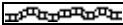
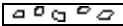


## Gas Detection






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




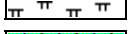

## Comments

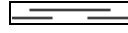
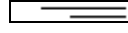

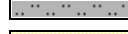
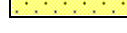
Lithologies and tops at drilled depths, not corrected to elogs. Where the well bore gas is 100% methane, the C1 line is moved to 85% for graphical purposes only.




## ROCK TYPES

 Anhy  
 Bent  
 Brec  
 Cht  
 Clyst
















 Coal  
 Congl  
 Dol  
 Gyp  
 Igne












 Lmst  
 Meta  
 Cyan mrlst  
 Mrlst  
 Salt
















 Shale  
 Shcol  
 Shgy  
 Sltst  
 Ss







 Till  
 Cyan chk  
 Chalk

## ACCESSORIES

**MINERAL**  
 Anhy  
 Arggrn  
 Arg  
 Bent  
 Bit  
 Brecfrag  
 Calc  
 Carb  
 Chtdk  
 Chtlt  
 Dol  
 Feldspar  
 Ferrpel  
 Ferr  
 Glau












 Gyp  
 Hvymin  
 Kaol  
 Marl  
 Minxl  
 Nodule  
 Phos  
 Pyr  
 Salt  
 Sandy  
 Silt  
 Sil  
 Sulphur  
 Tuff

**FOSSIL**  
 Algae  
 Amph  
 Belm  
 Bioclst  
 Brach  
 Bryozoa  
 Cephal  
 Coral  
 Crin  
 Echin  
 Fish  
 Foram  
 Fossil  
 Gastro  
 Oolite








 Ostra  
 Pelec  
 Pellet  
 Pisolite  
 Plant  
 Strom

**STRINGER**  
 Anhy  
 Arg  
 Bent  
 Coal  
 Dol  
 Gyp  
 Ls  
 Mrst

 Sltstrg  
 Ssstrg

**TEXTURE**  
 Boundst  
 Chalky  
 Cryxln  
 Earthy  
 Finexln  
 Grainst  
 Lithogr  
 Microxln  
 Mudst  
 Packst  
 Wackest

**POROSITY**

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







**Vuggy**

**SORTING**

-  Well
-  Moderate
-  Poor

**OTHER SYMBOLS**

**ROUNDING**

-  Rounded
-  Subrnd
-  Subang
-  Angular

**OIL SHOW**

-  Even



**Spotted**



**Ques**



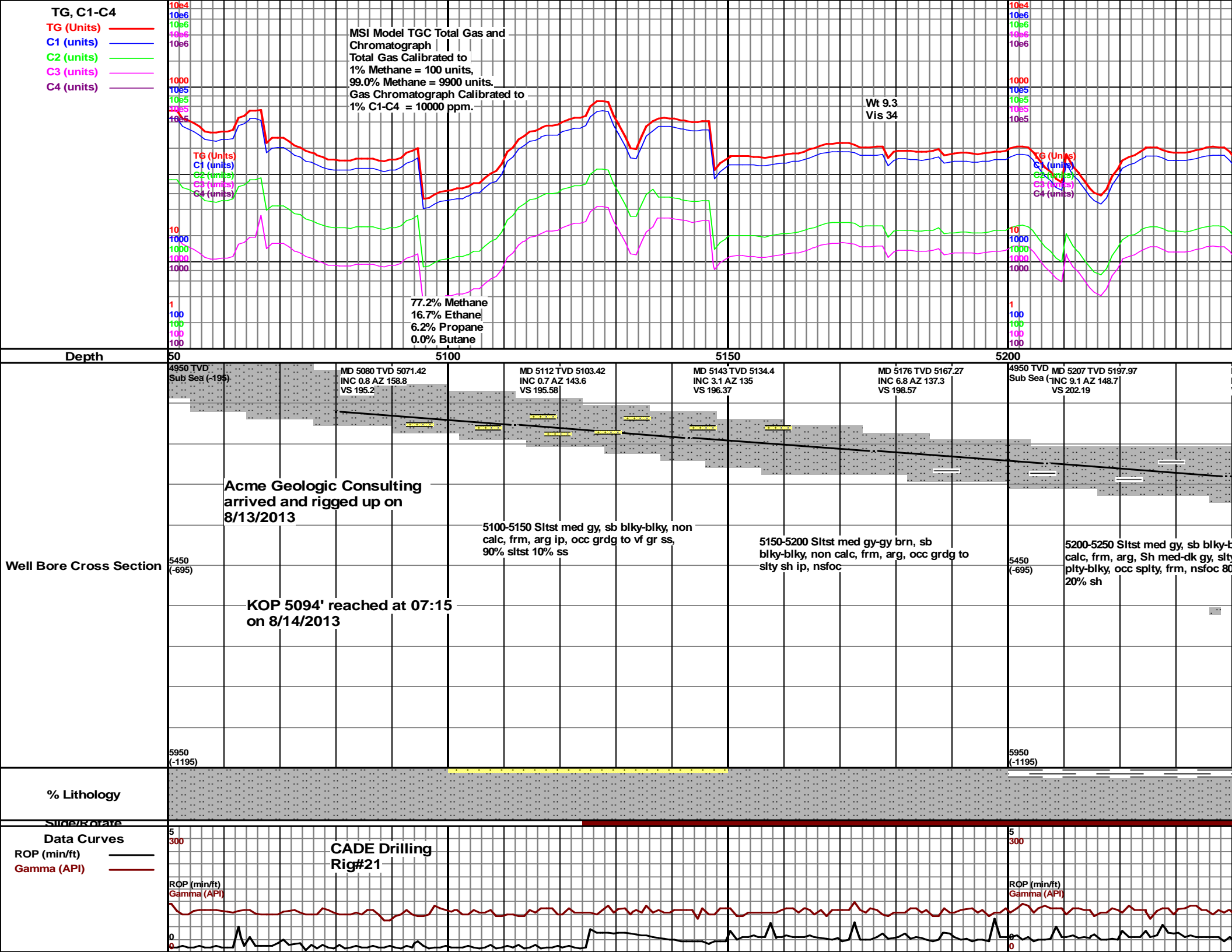
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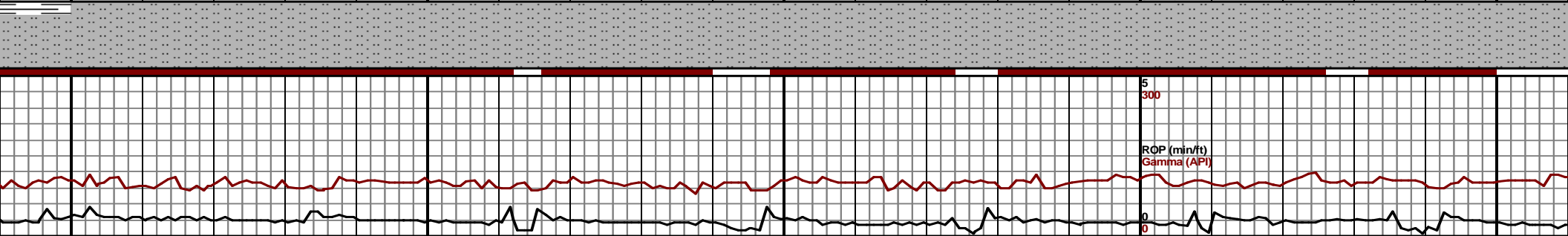
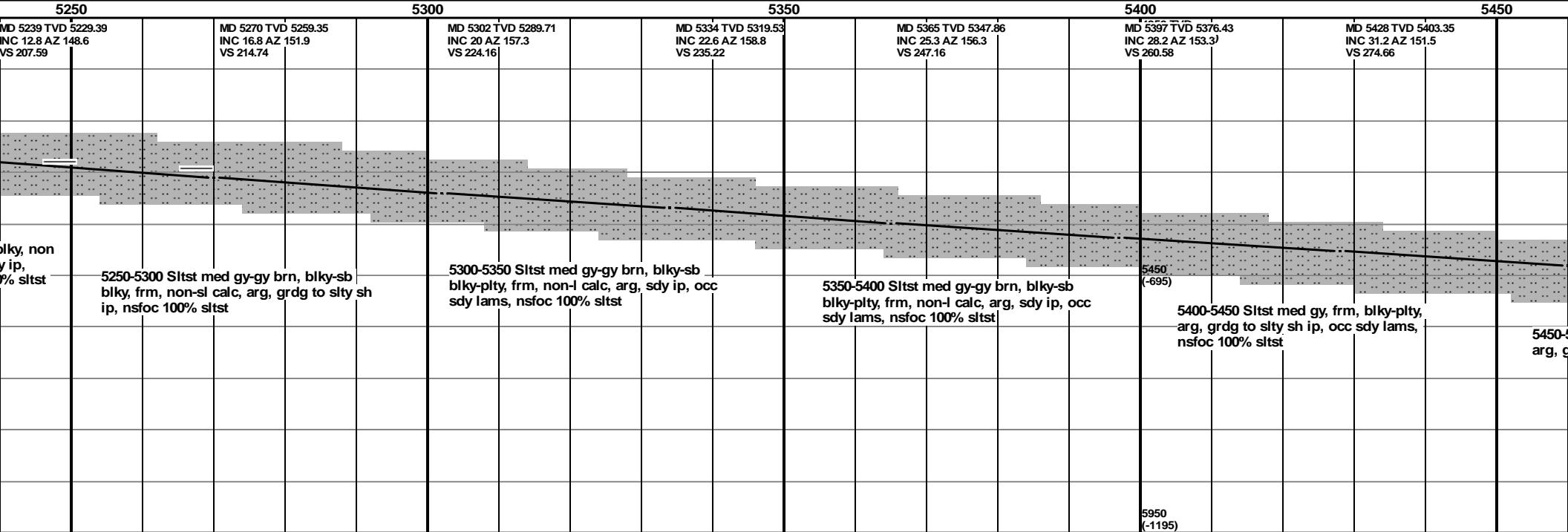
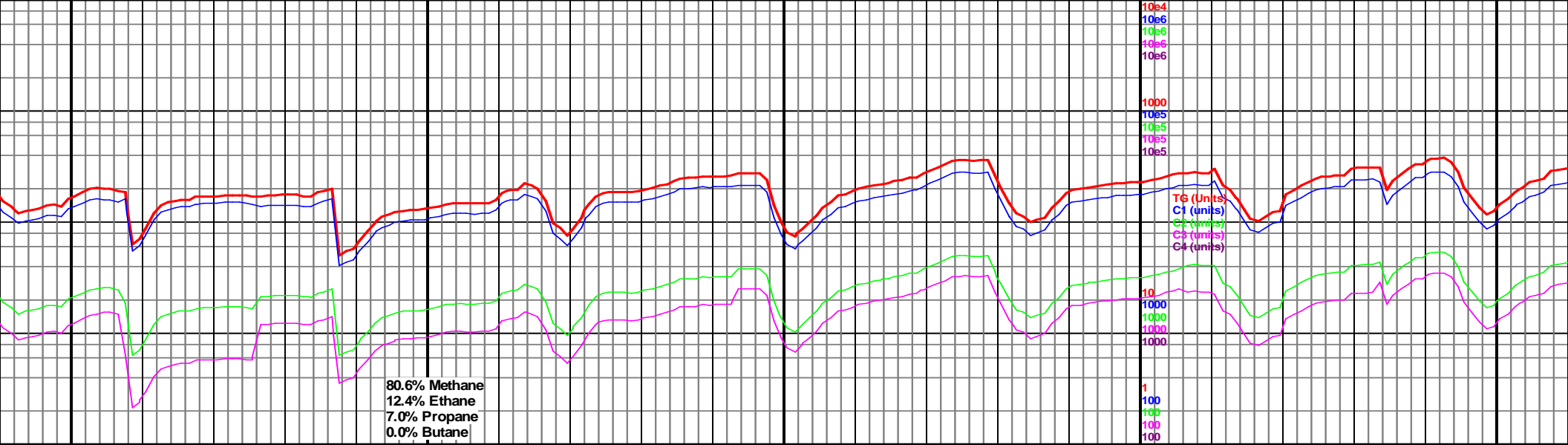
**INTERVAL**

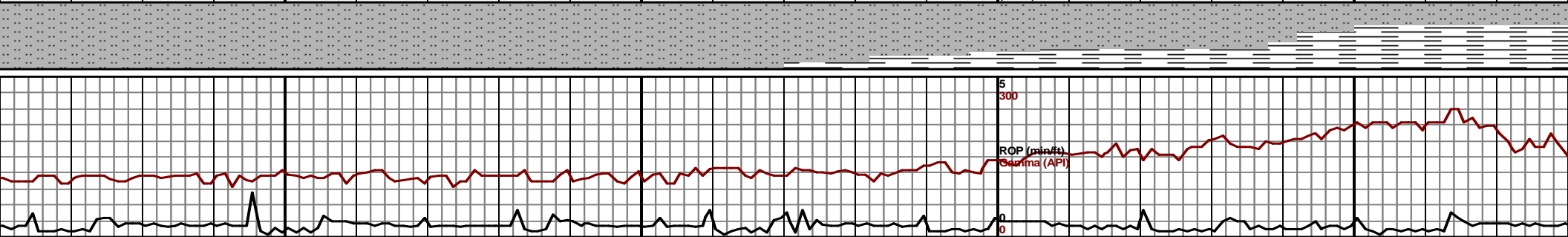
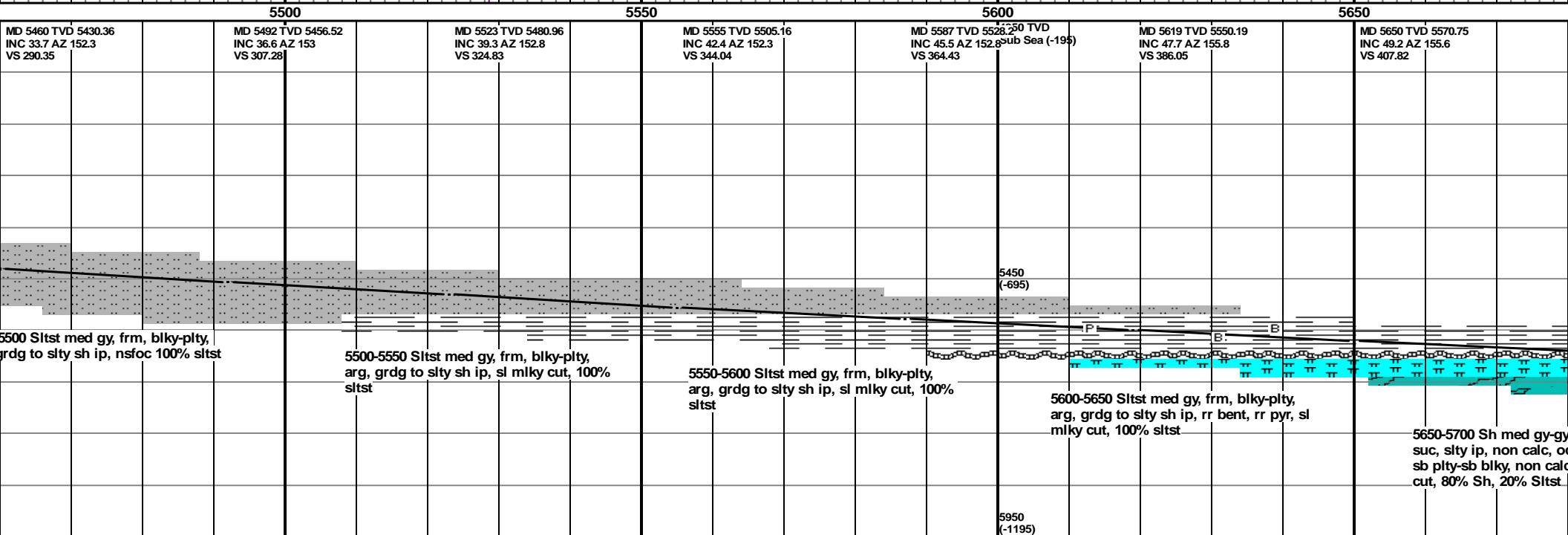
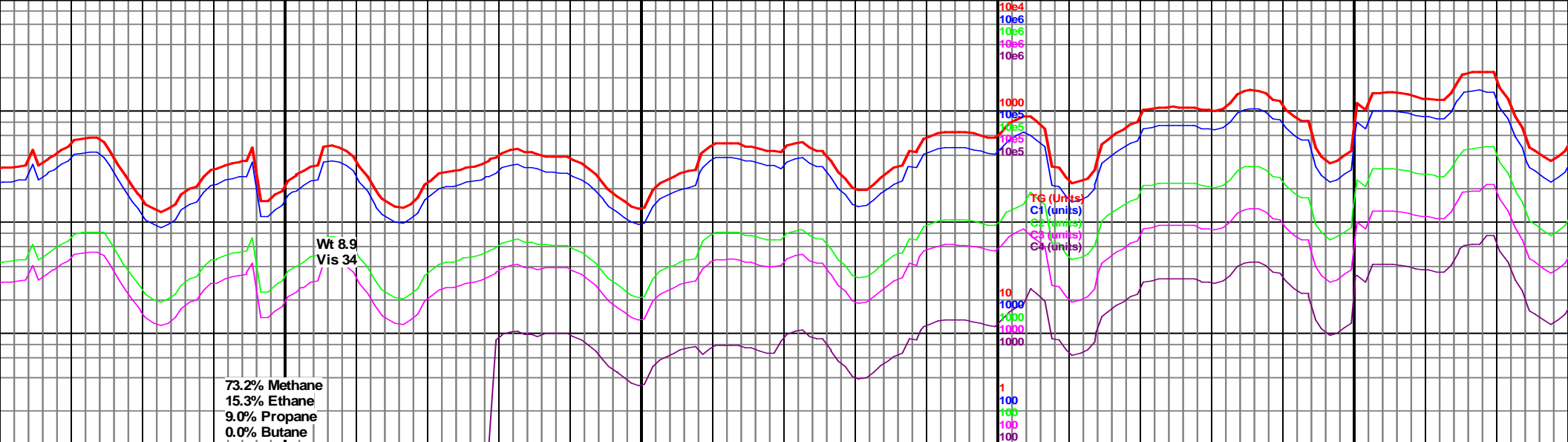
-  Core
-  Dst

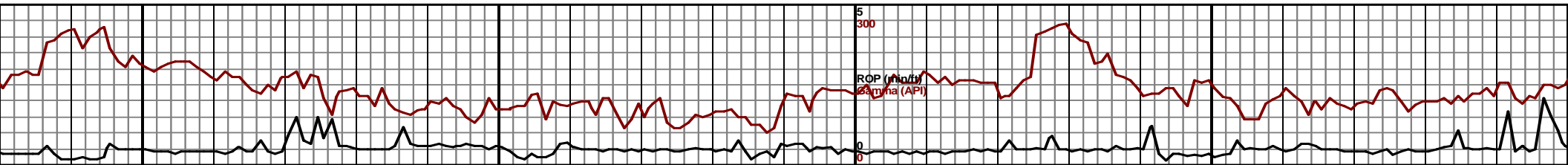
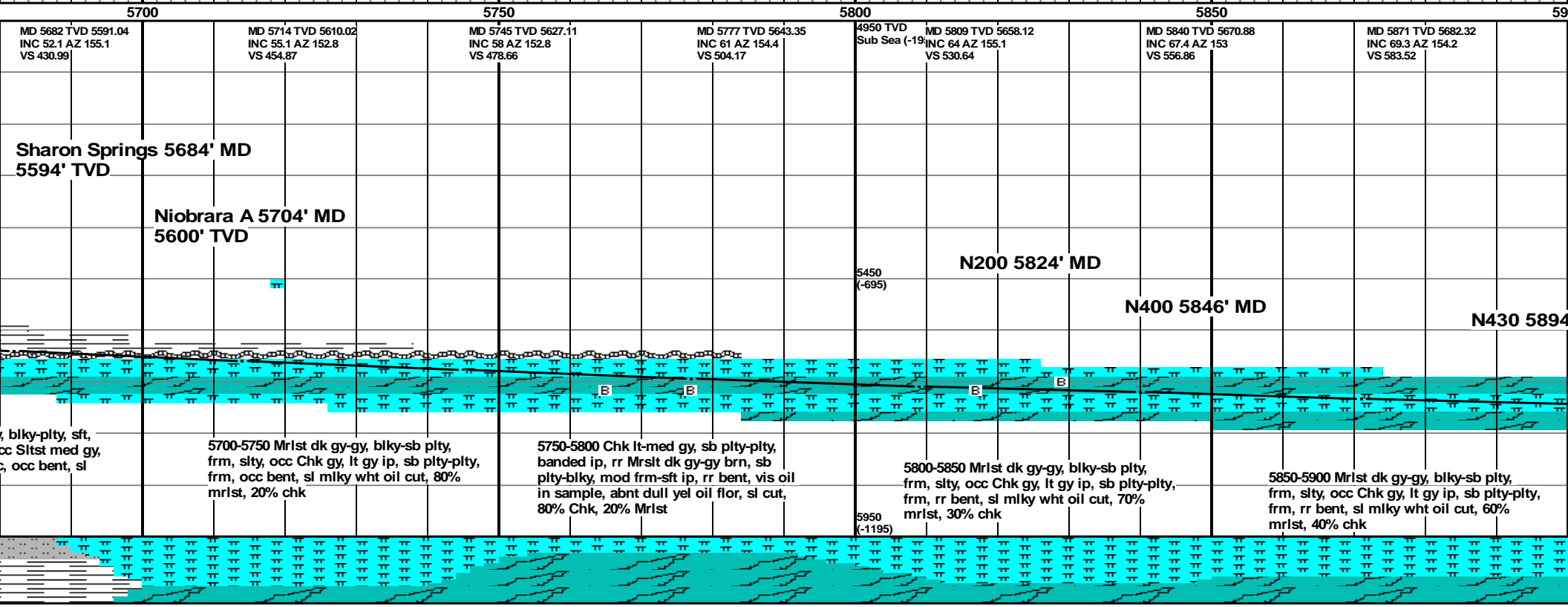
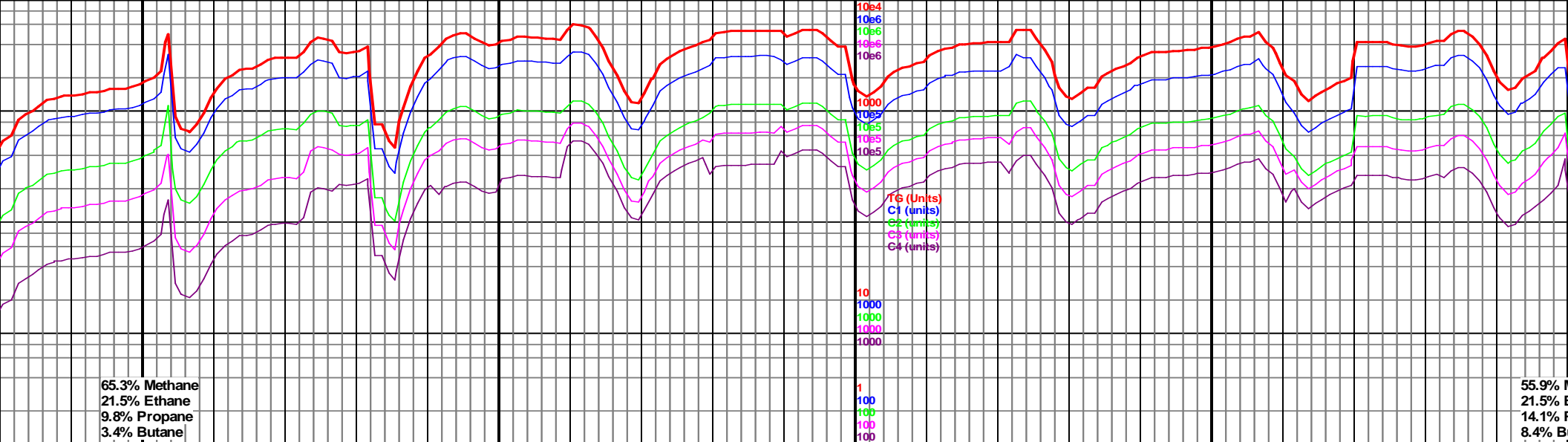
**EVENT**

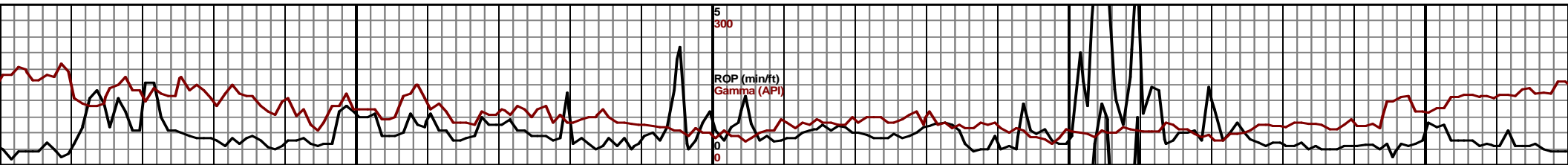
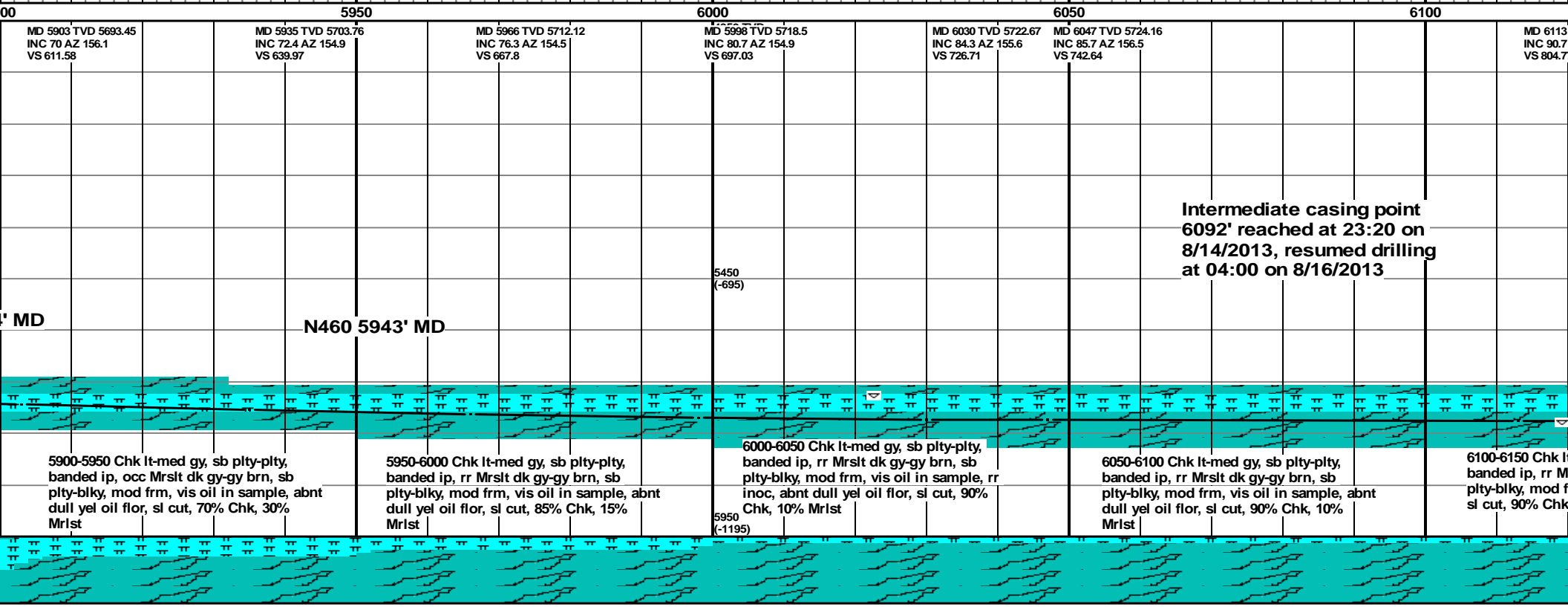
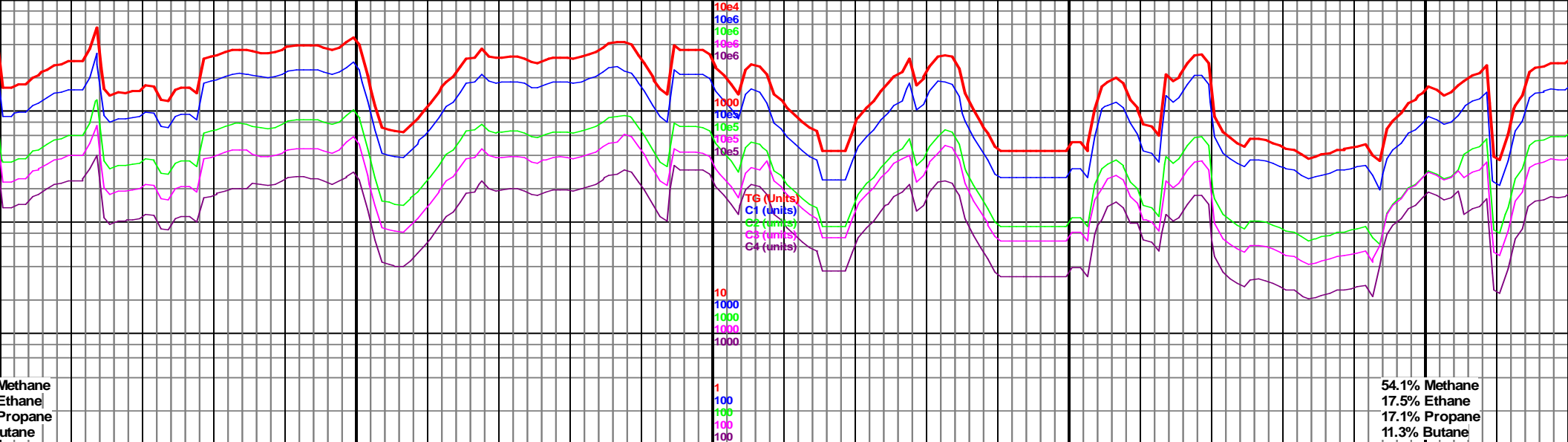
-  Rft
-  Sidewall



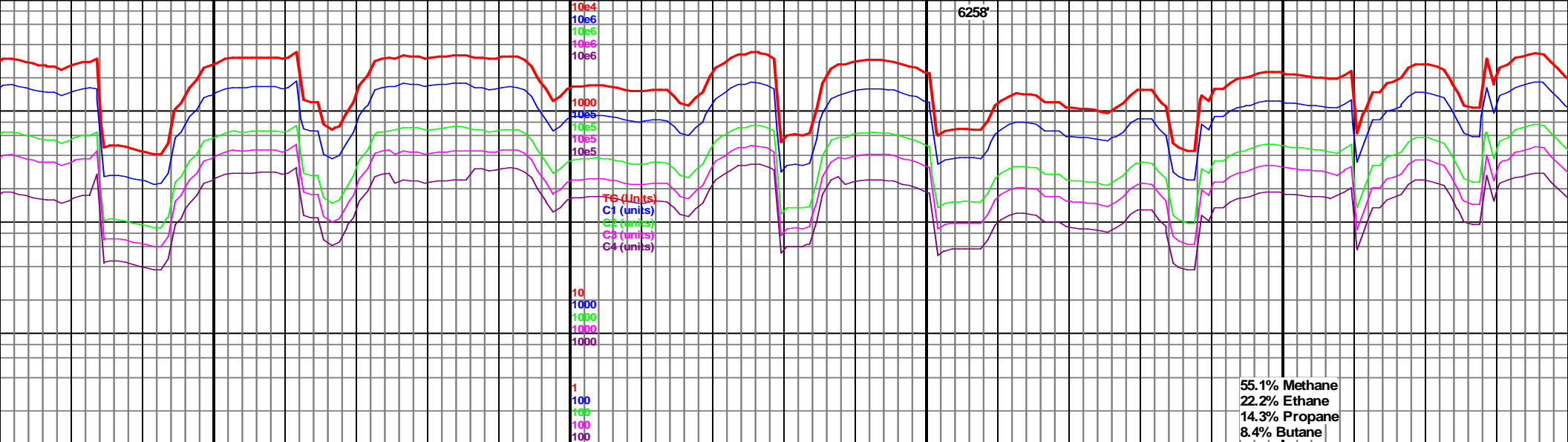




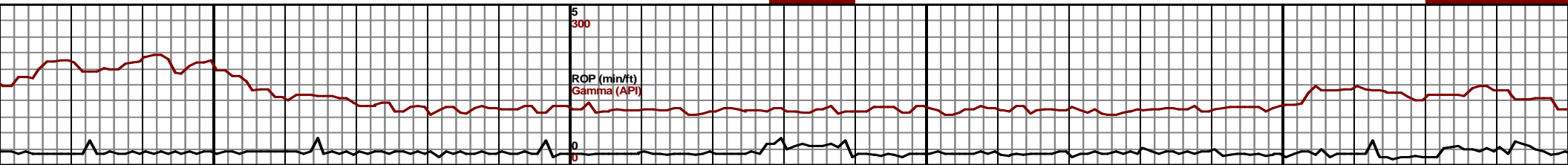




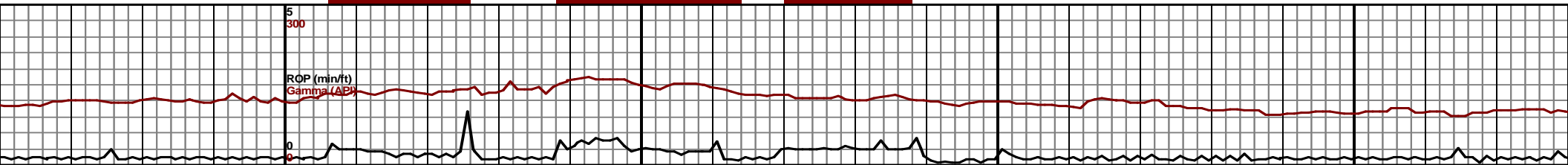
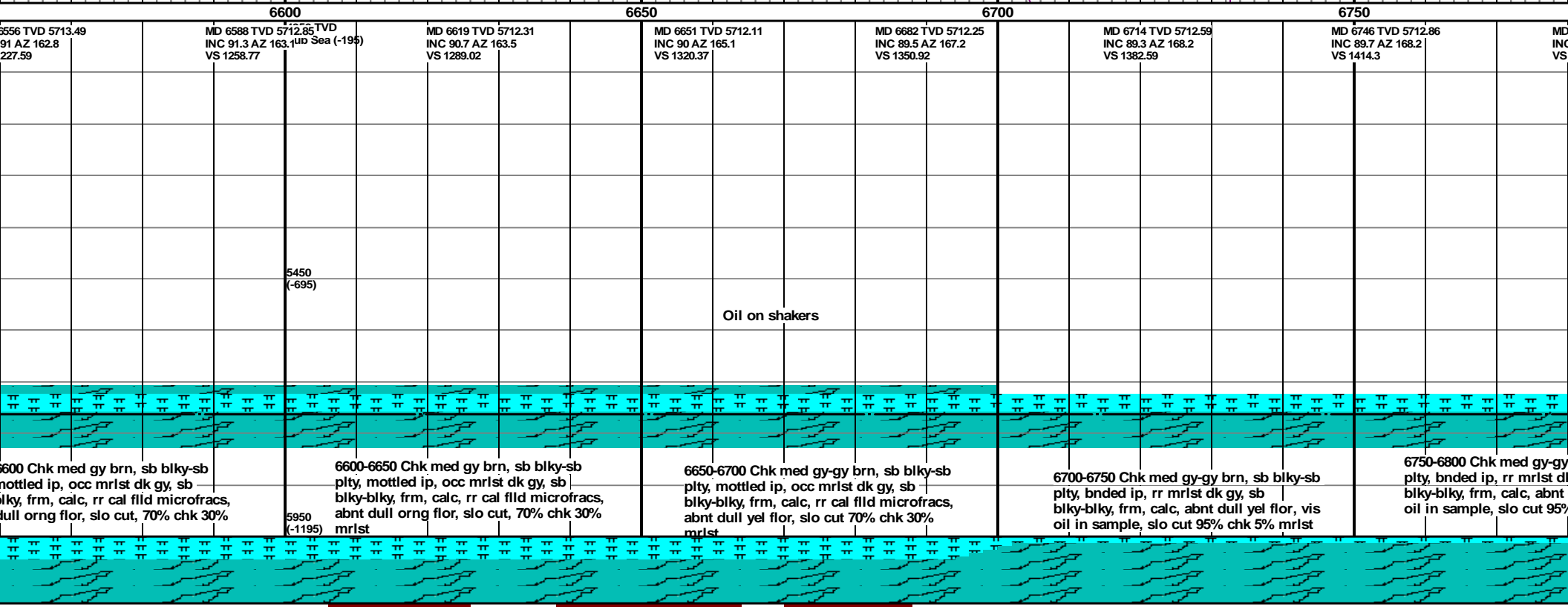
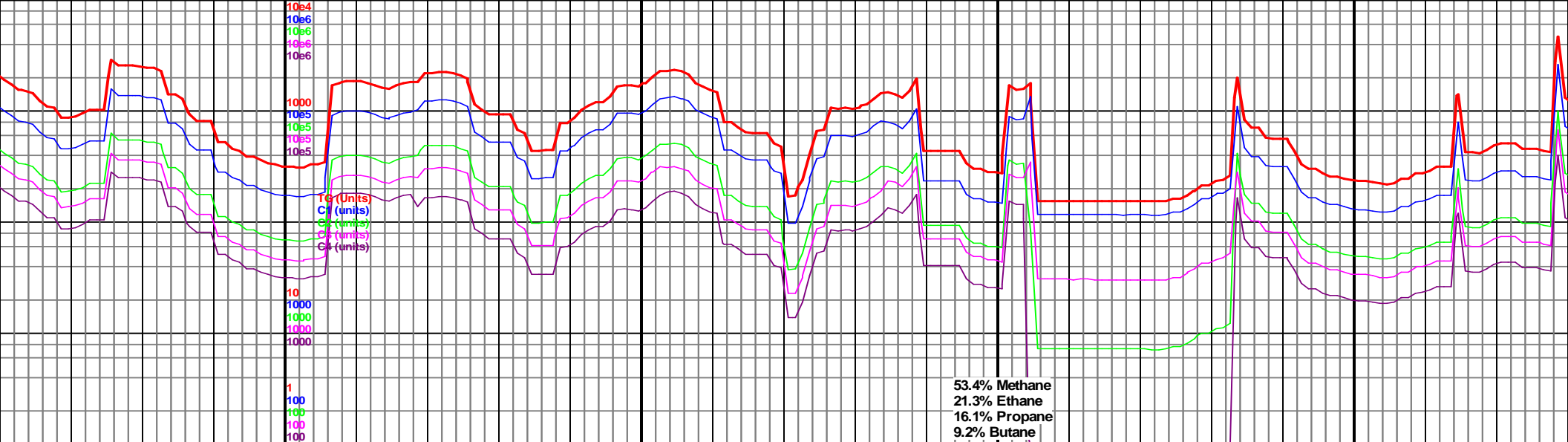


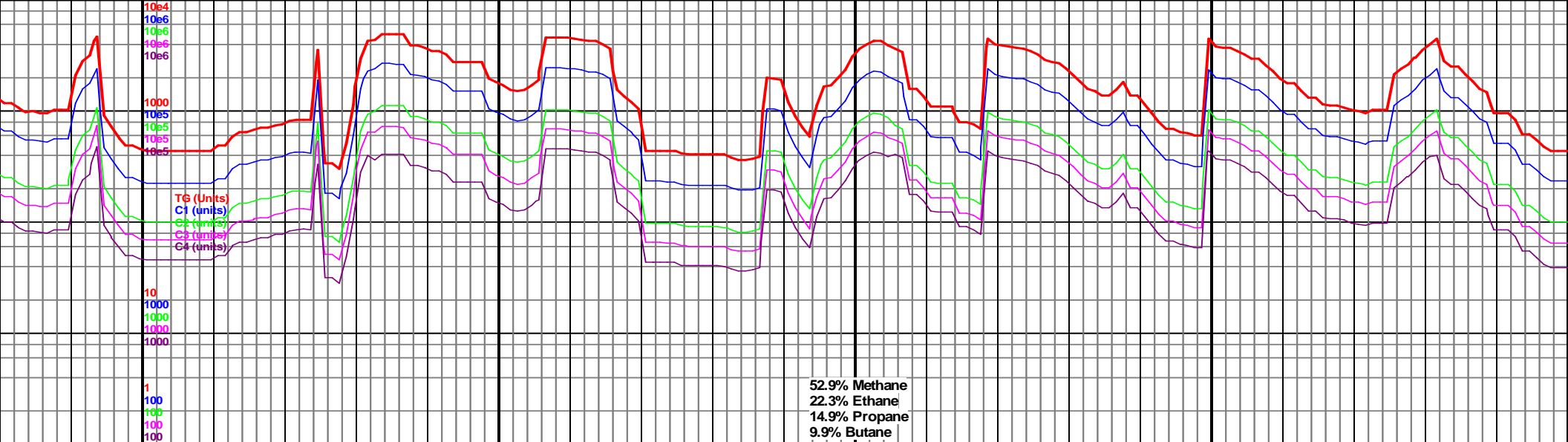


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TVD 5726.23 AZ 156.1 7	MD 6144 TVD 5725.69 INC 91.3 AZ 156.5 VS 833.97	MD 6176 TVD 5724.88 INC 91.6 AZ 156.5 VS 864.15	4950 TVD Sub Sea (-1) MD 6208 TVD 5723.87 INC 92 AZ 156.5 VS 894.32	MD 6240 TVD 5722.87 INC 91.6 AZ 157 VS 924.53	MD 6271 TVD 5722 INC 91.6 AZ 157.7 VS 953.91	MD 6303 TVD 5720.97 INC 92.1 AZ 157.9 VS 984.31	MD 6333 TVD 5719.97 INC 92.1 AZ 157.9 VS 1014.31
It-med gy, sb plty-plty, rslt dk gy-gy brn, sb frm, abnt dull yel oil flor, 10% Mrlst		6150-6200 Chk It-med gy, sb plty-plty, banded ip, rr Mrslt dk gy-gy brn, sb plty-blky, mod frm, abnt dull yel oil flor, sl cut, 80% Chk, 20% Mrlst		6200-6250 Chk It-med gy, sb plty-plty, banded ip, rr Mrslt dk gy-gy brn, sb plty-blky, mod frm, vis oil in sample, abnt dull yel oil flor, sl cut, 90% Chk, 10% Mrlst		6250-6300 Chk It-med gy, sb plty-plty, banded ip, rr Mrslt dk gy-gy brn, sb plty-blky, mod frm, vis oil in sample, abnt dull yel oil flor, sl cut, 90% Chk, 10% Mrlst	
						6300-6350 Chk It-med gy, sb plty-plty, banded ip, rr Mrslt dk gy-gy brn, sb plty-blky, mod frm, abnt dull yel oil flor, sl cut, 85% Chk, 15% Mrlst	

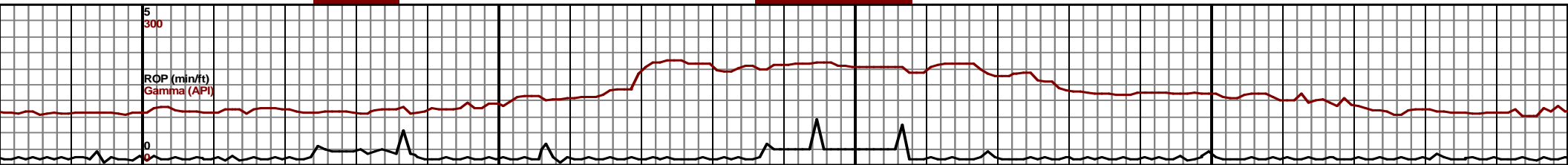


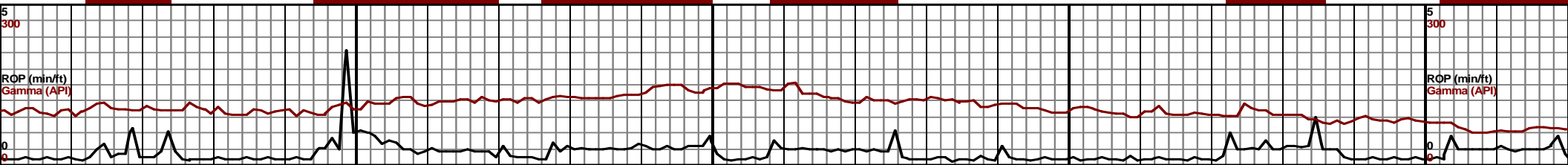
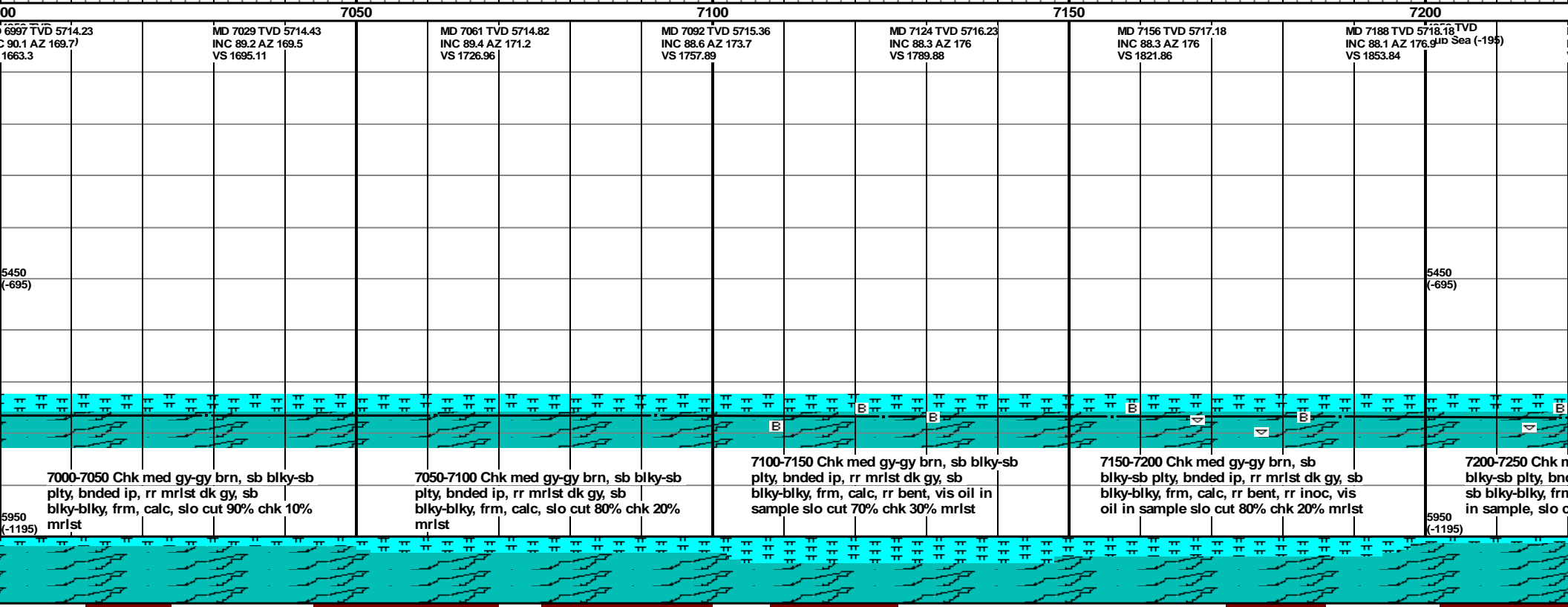
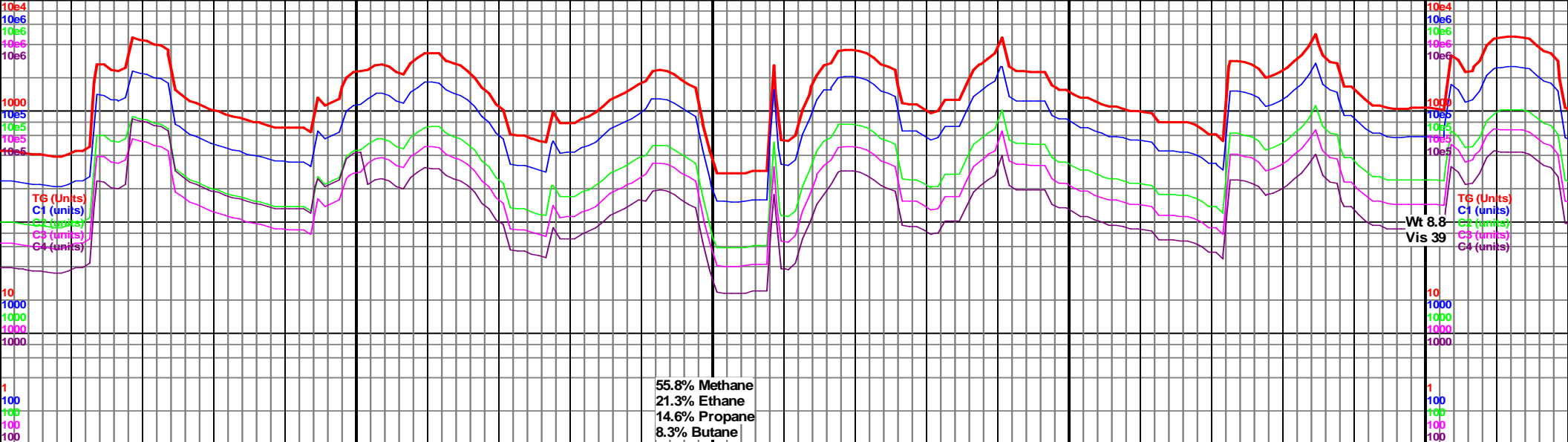


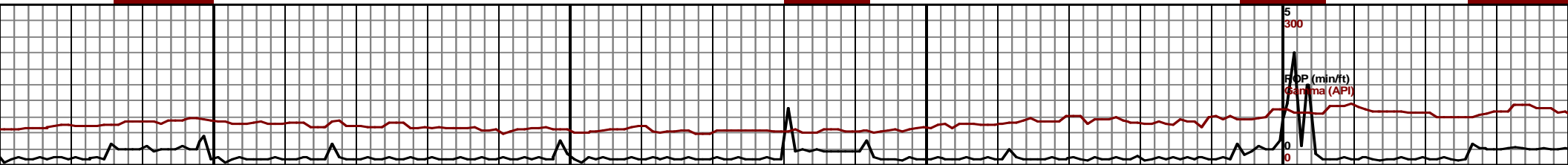
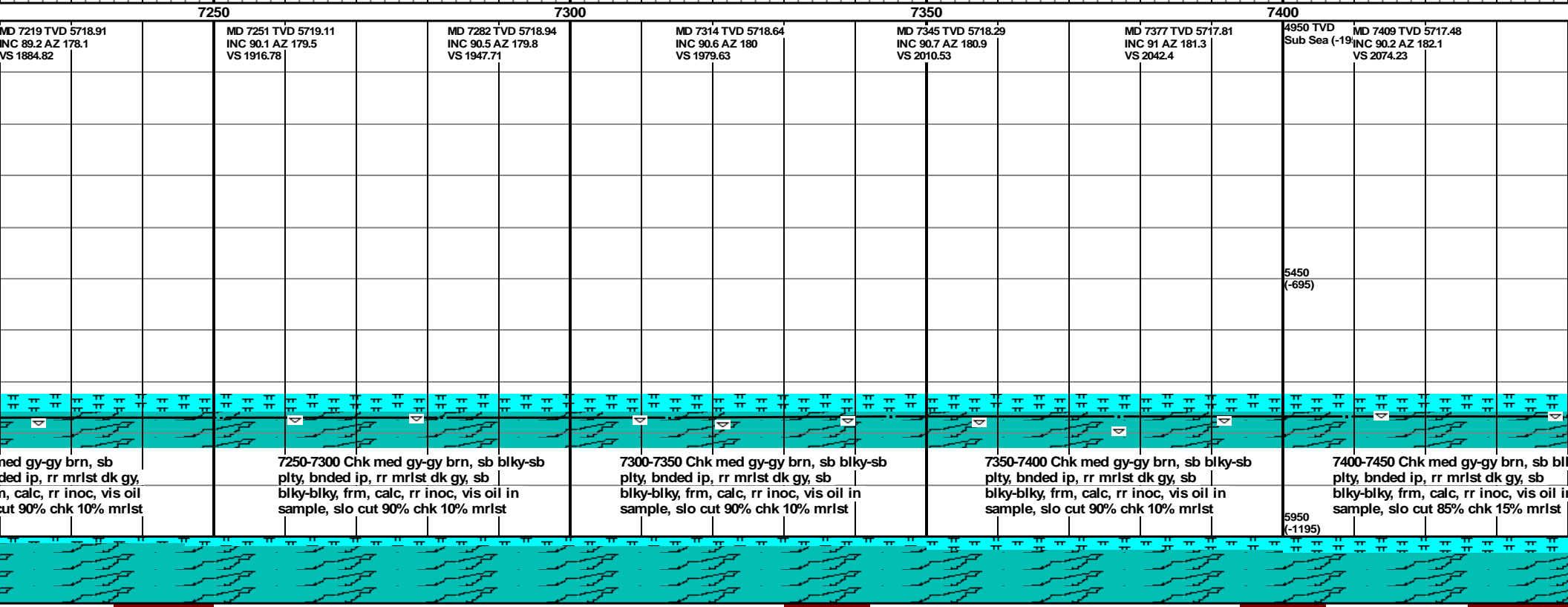
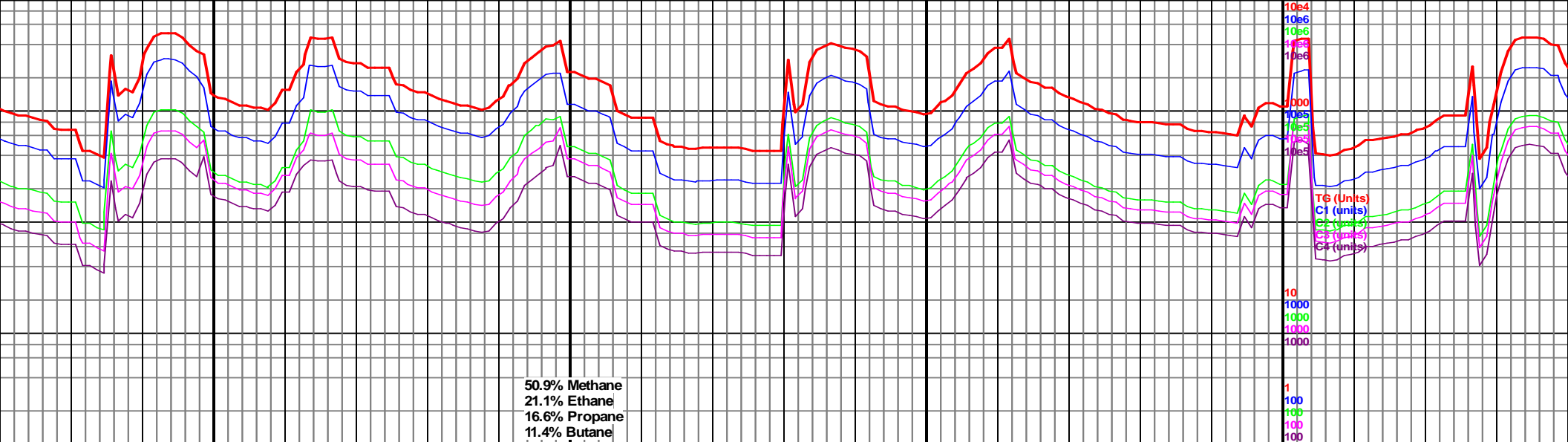


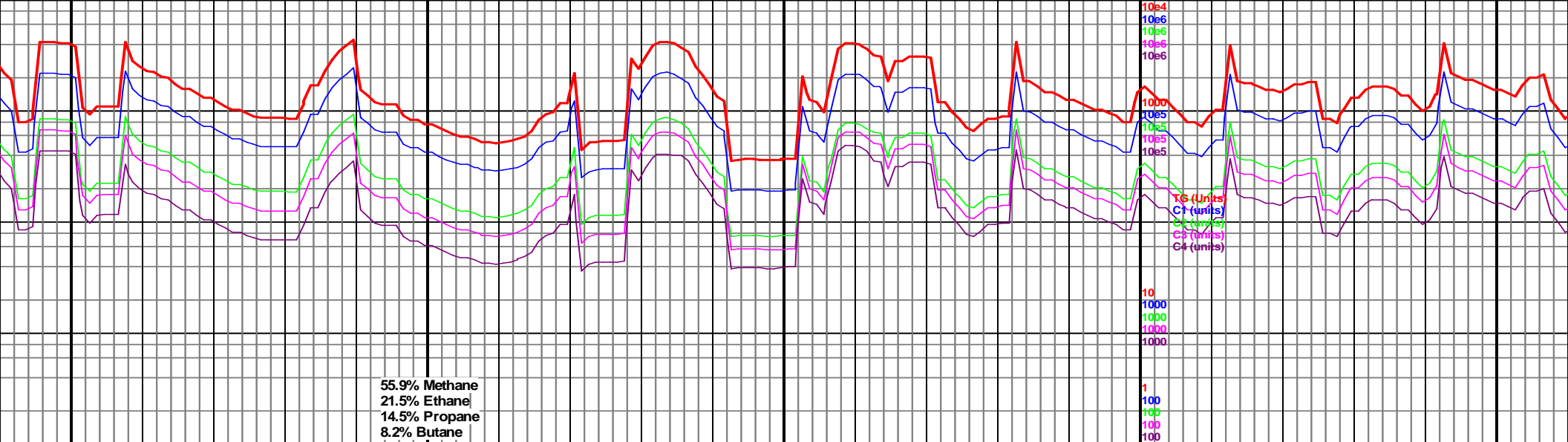


6800		6850		6900		6950		7000	
6777 TVD 5712.92 INC 90.1 AZ 167.9 VS 1445.01	MD 6809 TVD 5712.72 Sub Sea (-19) INC 90.6 AZ 167.9 VS 1476.7	MD 6840 TVD 5712.75 INC 89.3 AZ 168.1 VS 1507.41	MD 6872 TVD 5713.2 INC 89.1 AZ 167.9 VS 1539.1	MD 6903 TVD 5713.6 INC 89.4 AZ 168.9 VS 1569.83	MD 6934 TVD 5713.93 INC 89.4 AZ 170.4 VS 1600.65	MD 6966 TVD 5714.18 INC 89.7 AZ 169.8 VS 1632.48	MD 6998 TVD 5714.43 INC 89.9 AZ 170.1 VS 1664.31	MD 7030 TVD 5714.68 INC 90.1 AZ 170.4 VS 1696.14	MD 7062 TVD 5714.93 INC 90.3 AZ 170.7 VS 1727.97
5450 (-695)									
brn, sb blkly-sb k gy, sb dull yel flor, vis % chk 5% mrlst		6800-6850 Chk med gy-gy brn, sb blkly-sb plty, bnded ip, occ mrlst dk gy, sb blkly-blky, frm, calc, slo cut 80% chk 20% mrlst		6850-6900 Chk med gy-gy brn, sb blkly-sb plty, bnded ip, occ mrlst dk gy, sb blkly-blky, frm, calc, slo cut 70% chk 30% mrlst		6900-6950 Chk med gy-gy brn, sb blkly-sb plty, bnded ip, rr mrlst dk gy, sb blkly-blky, frm, calc, abnt dull yel flor, vis oil in sample, slo cut 90% chk 10% mrlst		6950-7000 Chk med gy-gy brn, sb blkly-sb plty, bnded ip, rr mrlst dk gy, sb blkly-blky, frm, calc, slo cut 90% chk 10% mrlst	
5950 (-1195)									

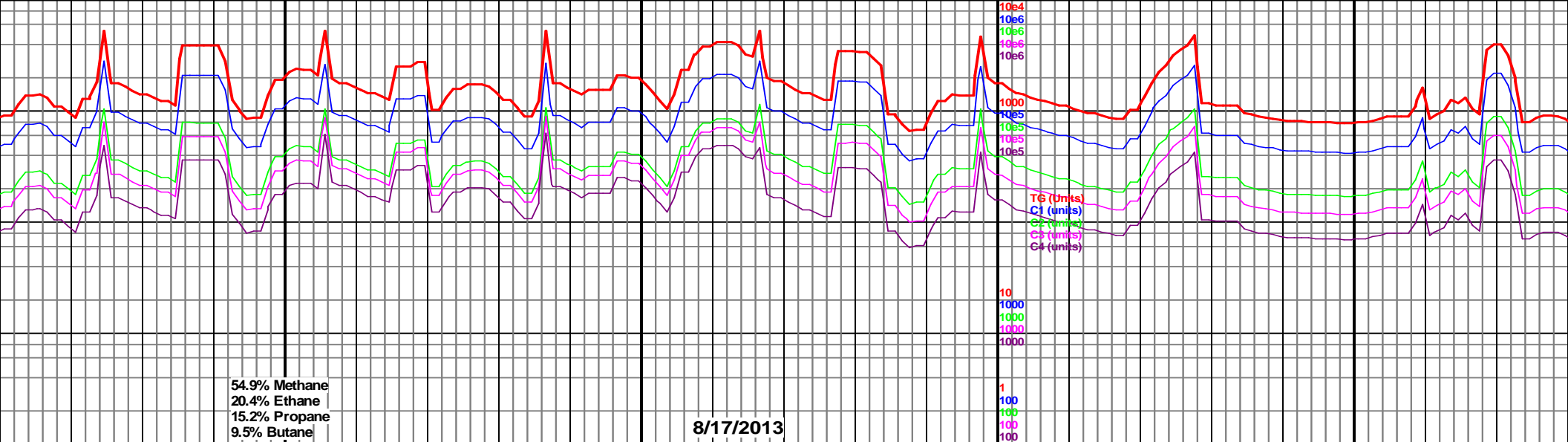








7450		7500		7550		7600		7650	
MD 7440 TVD 5717.69 INC 89 AZ 183.2 VS 2105.01		MD 7472 TVD 5718.22 INC 89.1 AZ 182.8 VS 2136.76		MD 7503 TVD 5718.6 INC 89.5 AZ 182.5 VS 2167.54		MD 7534 TVD 5718.79 INC 89.8 AZ 183.5 VS 2198.3		MD 7565 TVD 5718.84 INC 90 AZ 184.8 VS 2228.98	



54.9% Methane  
20.4% Ethane  
15.2% Propane  
9.5% Butane

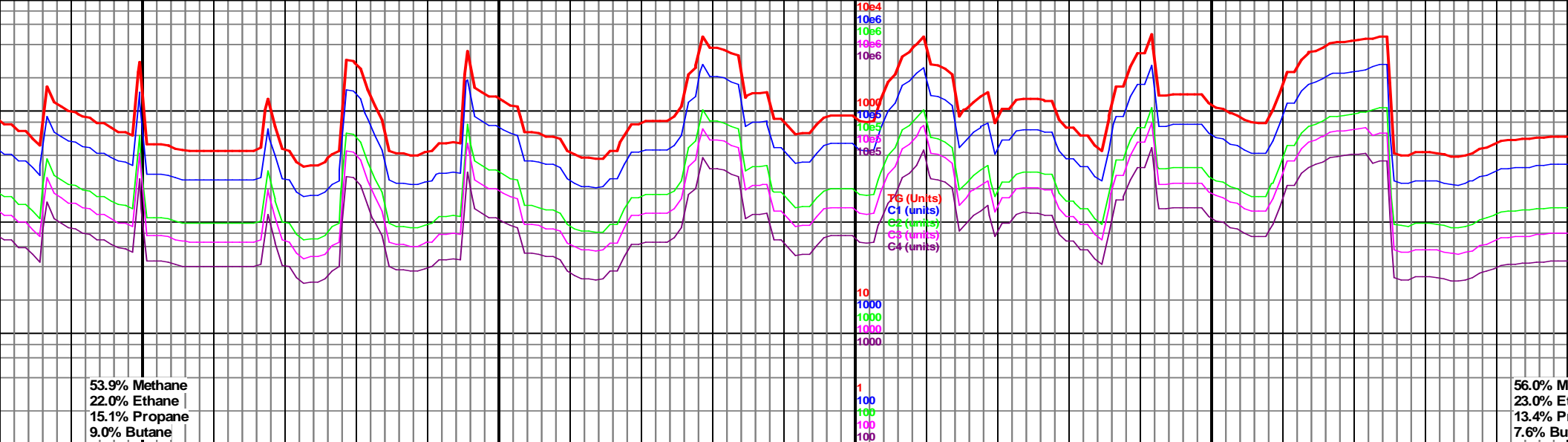
8/17/2013

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

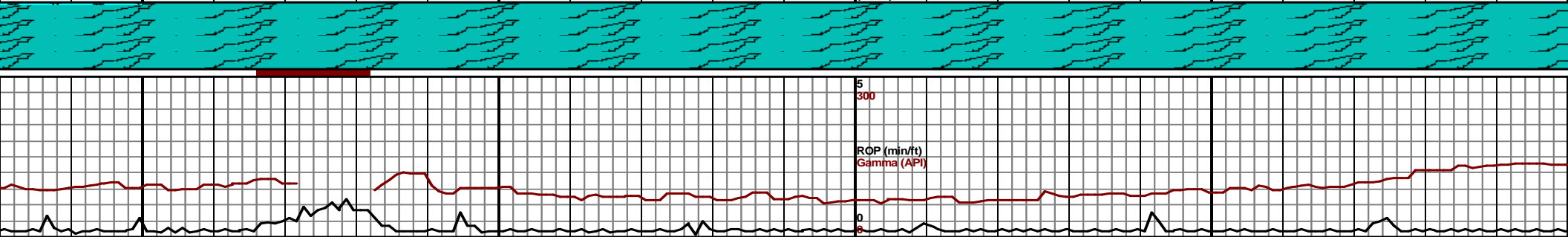
10  
1000  
10000  
100000  
1000000  
10000000  
100000000  
1000000000

7700			7750			7800			7850			7871														
7657 TVD 5719 INC 90.2 AZ 185.3 VS 2319.79			MD 7688 TVD 5718.76 INC 90.7 AZ 185.5 VS 2350.36			MD 7718 TVD 5718.39 INC 90.7 AZ 184.8 VS 2379.97			MD 7749 TVD 5718.01 INC 90.7 AZ 184.2 VS 2410.62			MD 7780 TVD 5717.58 INC 90.9 AZ 184.2 VS 2441.29			4950 TVD Sub Sea (-195)			MD 7810 TVD 5717.03 INC 91.2 AZ 184.2 VS 2470.97			MD 7841 TVD 5716.3 INC 91.5 AZ 184.4 VS 2501.63			MD 7871 TVD 5715.9 INC 90.7 AZ 184.2 VS 2531.32		
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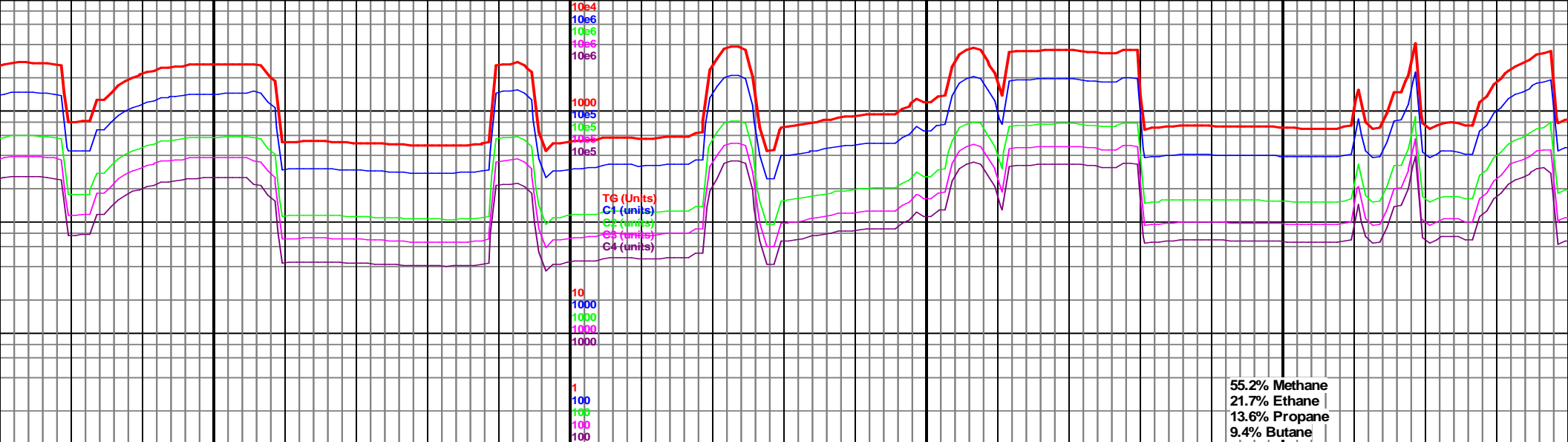




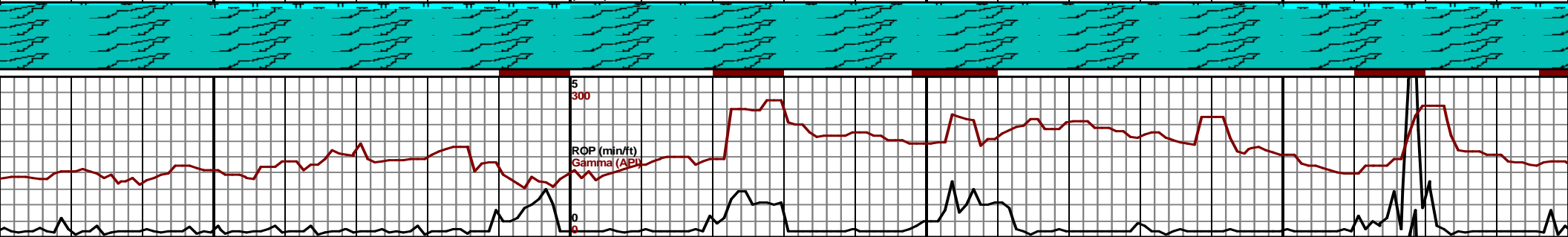
7900		7950		8000		8050		8100	
MD 5715.73 AZ 183.7	MD 7902 TVD 5715.48 INC 90.2 AZ 183.7 VS 2562.03	MD 7933 TVD 5715.51 INC 89.7 AZ 184.1 VS 2592.73	MD 7964 TVD 5715.78 INC 89.3 AZ 184.8 VS 2623.38	MD 7995 TVD 5716.1 INC 89.5 AZ 184.6 VS 2654.01	MD 8026 TVD 5716.29 INC 89.8 AZ 184.2 VS 2684.67	MD 8057 TVD 5716.35 INC 90 AZ 184.2 VS 2715.35	MD 8088 TVD 5716.4 INC 90 AZ 183.9 VS 2746.03	MD 8119 TVD 5716.45 INC 90 AZ 183.5 VS 2776.73	MD 8150 TVD 5716.5 INC 90 AZ 183.1 VS 2807.41
b blkly-plty, sft, tr vis oil, rr dk g yel cut, 95%		7900-7950 Chk lt gy brn, sb blkly-plty, sft, banded-mottled, occ inoc, tr vis oil, rr dk gy mrlst, abnt bri yel flor, g yel cut, 100% chk		7950-8000 Chk lt gy brn, sb blkly-plty, sft, banded-mottled, occ inoc, rr dk gy mrlst, abnt bri yel flor, g yel cut, 100% chk		8000-8050 Chk lt gy brn, sb blkly-plty, sft, banded-mottled, occ inoc, rr dk gy mrlst, abnt bri yel flor, g yel cut, 100% chk		8050-8100 Chk lt gy brn, sb blkly-plty, sft, banded-mottled, occ inoc, rr dk gy mrlst, abnt bri yel flor, g yel cut, 100% chk	

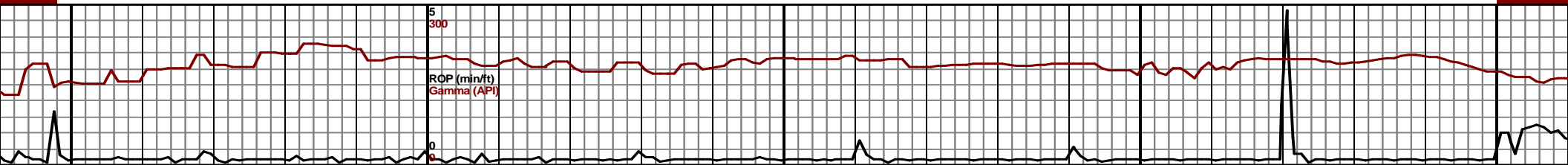
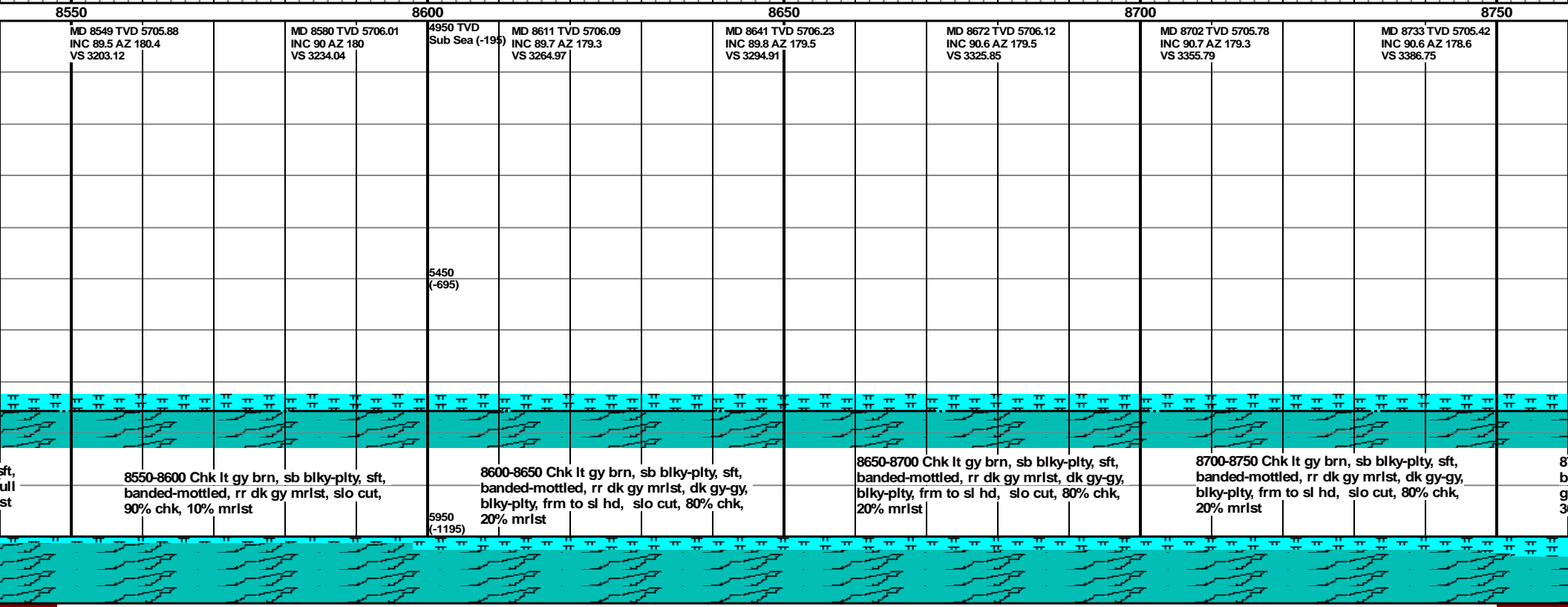
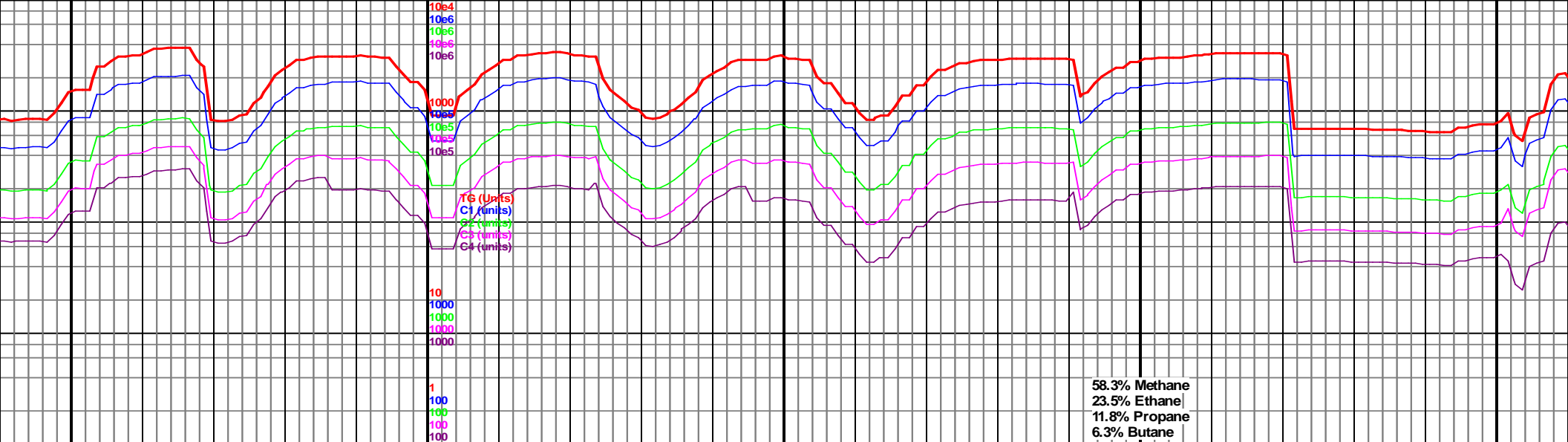


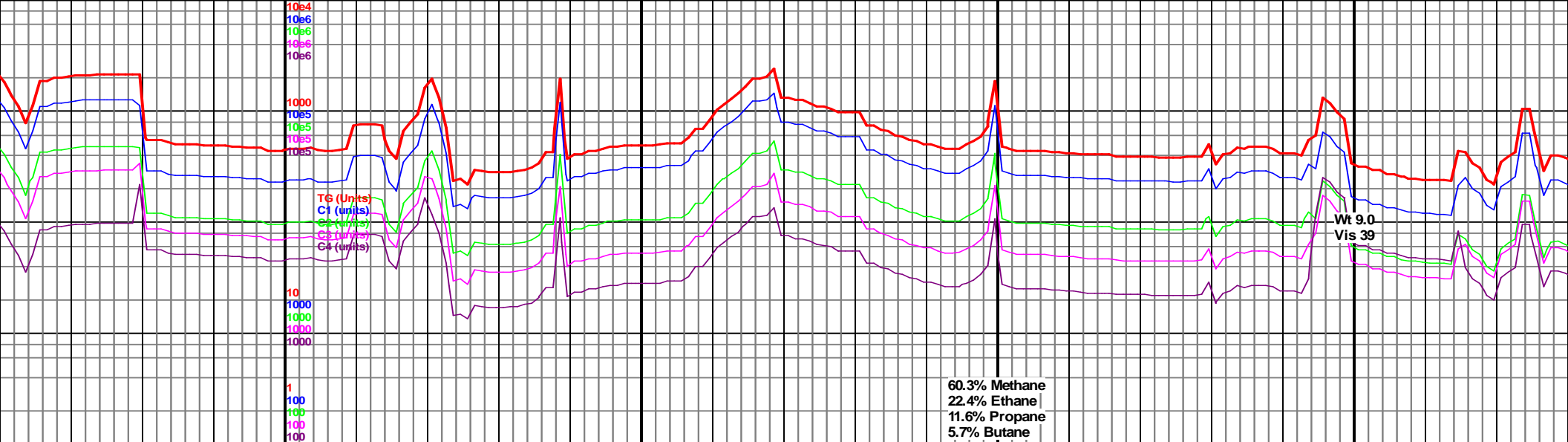




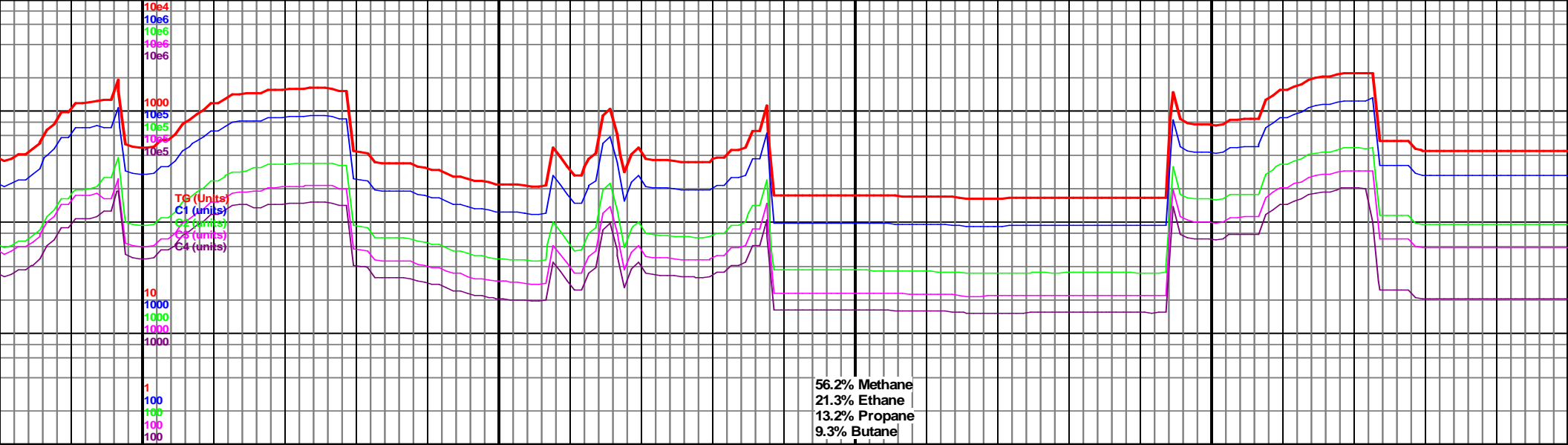
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MD 8334 TVD 5712.01 INC 93 AZ 184.4 VS 2989.79		MD 8364 TVD 5710.41 INC 93.1 AZ 184.6 VS 3019.41		MD 8395 TVD 5708.87 INC 92.6 AZ 184.1 VS 3050.03		MD 8426 TVD 5707.57 INC 92.2 AZ 183.4 VS 3080.72	
						MD 8457 TVD 5706.65 INC 91.2 AZ 181.8 VS 3111.49	
						MD 8488 TVD 5706.06 INC 91 AZ 181.4 VS 3142.33	
						MD 8518 TVD 5705.77 INC 90.1 AZ 180.2 VS 3172.22	



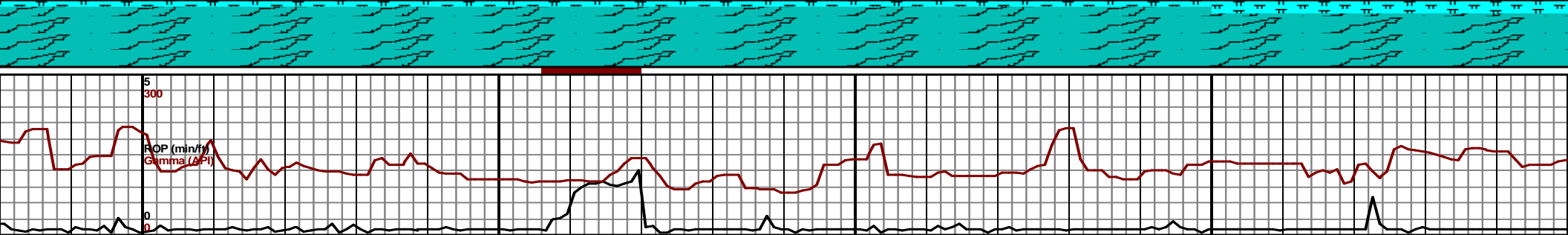


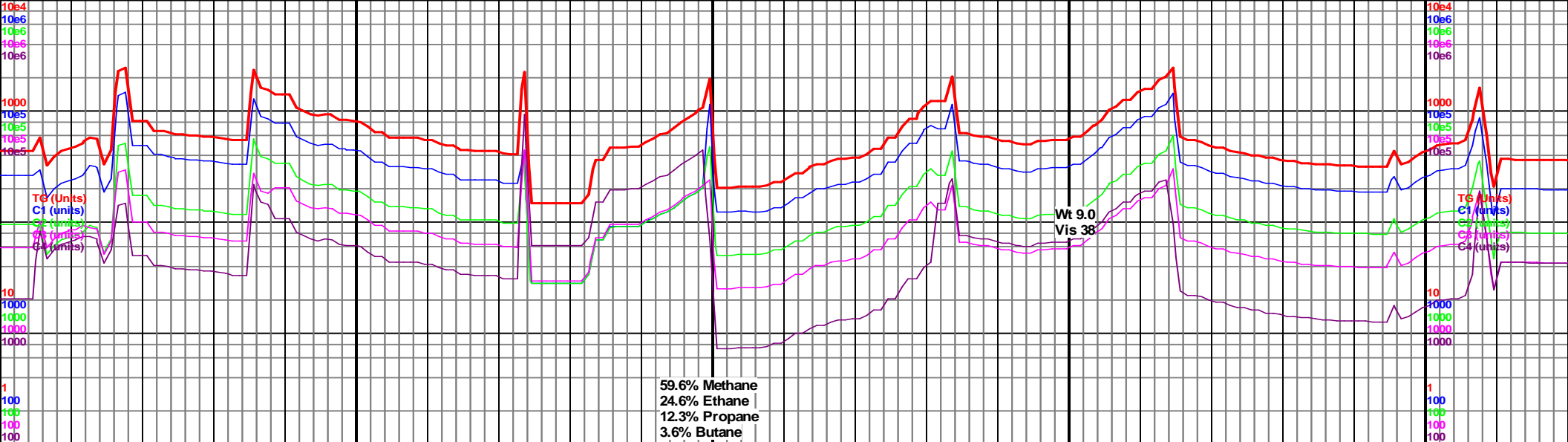


8800				8850				8900				8950																			
MD 8763 TVD 5705.4 INC 89.5 AZ 179 VS 3416.71				MD 8794 TVD 5705.83 INC 88.9 AZ 179.5 <sup>199</sup> VS 3447.65				MD 8825 TVD 5706.37 INC 89.1 AZ 180 VS 3478.58				MD 8855 TVD 5707 INC 88.5 AZ 180.4 VS 3508.48				MD 8886 TVD 5707.73 INC 88.8 AZ 180.7 VS 3539.37				MD 8917 TVD 5708.33 INC 89 AZ 180 VS 3570.27				MD 8948 TVD 5708.89 INC 88.9 AZ 181.4 VS 3601.16				MD 8979 TVD 5709.4 INC 89.5 AZ 182.5 VS 3632.21			

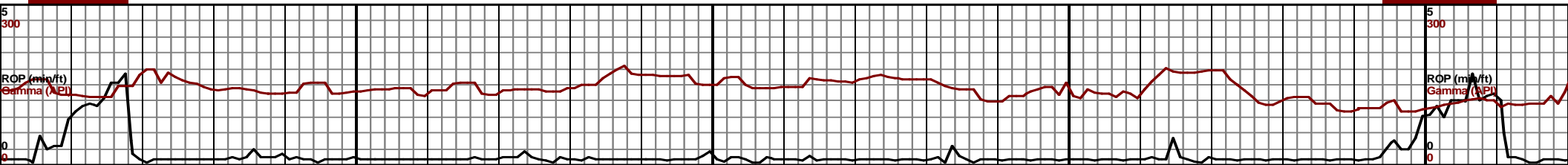


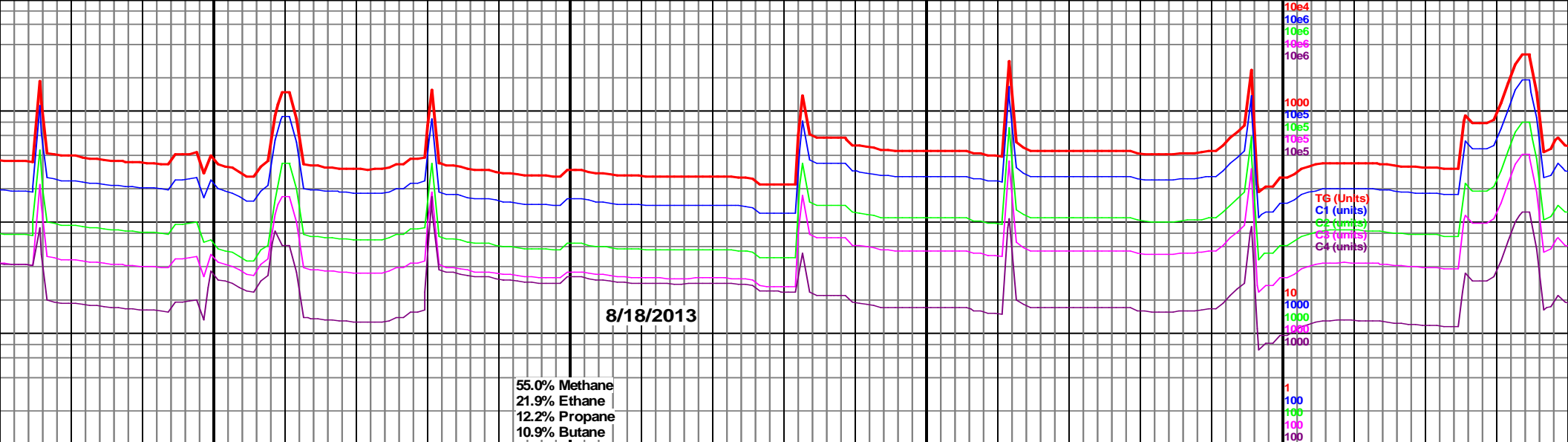
9000		9050		9100		9150		9200	
D 8978 TVD 5709.5 INC 88.8 AZ 182.5 S 3630.98	MD 9009 TVD 5710.2 Sub Sea (-19) INC 88.6 AZ 183 VS 3661.75	MD 9040 TVD 5710.9 INC 88.8 AZ 183.5 VS 3692.49	MD 9071 TVD 5711.23 INC 90 AZ 183.7 VS 3723.21	MD 9101 TVD 5711.04 INC 90.7 AZ 183.5 VS 3752.94	MD 9132 TVD 5710.61 INC 90.9 AZ 183.5 VS 3783.66	MD 9163 TVD 5710.02 INC 91.3 AZ 183.7 VS 3814.37	MD 9193 TVD 5710.02 INC 91.3 AZ 183.7 VS 3844.37		
5450 (-695)									
9000-9050 Chk It gy brn, sb blk-plty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-plty, frm, rr bent, rr inoc, vis oil in sample, slo cut, 95% chk, 5% mrlst		9050-9100 Chk It gy brn, sb blk-plty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-plty, frm, vis oil in sample, slo cut, 95% chk, 5% mrlst		9100-9150 Chk It gy brn, sb blk-plty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-plty, frm, rr inoc, vis oil in sample, slo cut, 95% chk, 5% mrlst		9150-9200 Chk It gy brn, sb blk-plty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-plty, frm, rr bent, rr inoc, slo cut, 90% chk, 10% mrlst			
5950 (-1195)									





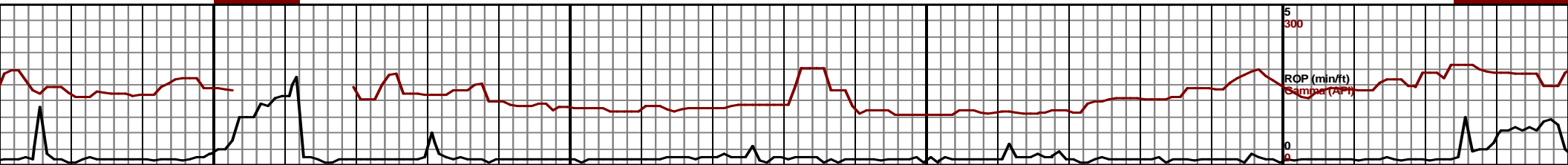
TVD 5708.34 AZ 183.9 (-139)		MD 9224 TVD 5708.79 INC 90.7 AZ 182.7 VS 3874.82		MD 9254 TVD 5708.59 INC 90.1 AZ 182.1 VS 3904.62		MD 9285 TVD 5708.48 INC 90.3 AZ 182.3 VS 3935.43		MD 9315 TVD 5708.22 INC 90.7 AZ 182.1 VS 3965.25		MD 9346 TVD 5707.73 INC 91.1 AZ 181.8 VS 3996.07		MD 9377 TVD 5707.03 INC 91.5 AZ 181.6 VS 4026.91		4950 TVD Sub Sea (-1195)		MD 9408 TVD 5707.5 INC 90.8 AZ 181.8 VS 4057.75	
5450 (-695)														5450 (-695)			
9200-9250 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr bent, rr inoc, slo cut, 85% chk, 15% mrlst		9250-9300 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr inoc, slo cut, 80% chk, 20% mrlst		9300-9350 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr inoc, slo cut, 90% chk, 10% mrlst		9350-9400 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr inoc, slo cut, 90% chk, 10% mrlst		9400-9450 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr inoc, slo cut, 90% chk, 10% mrlst						5950 (-1195)			



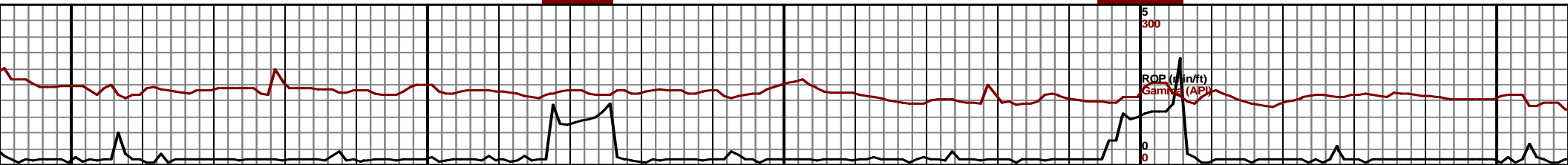
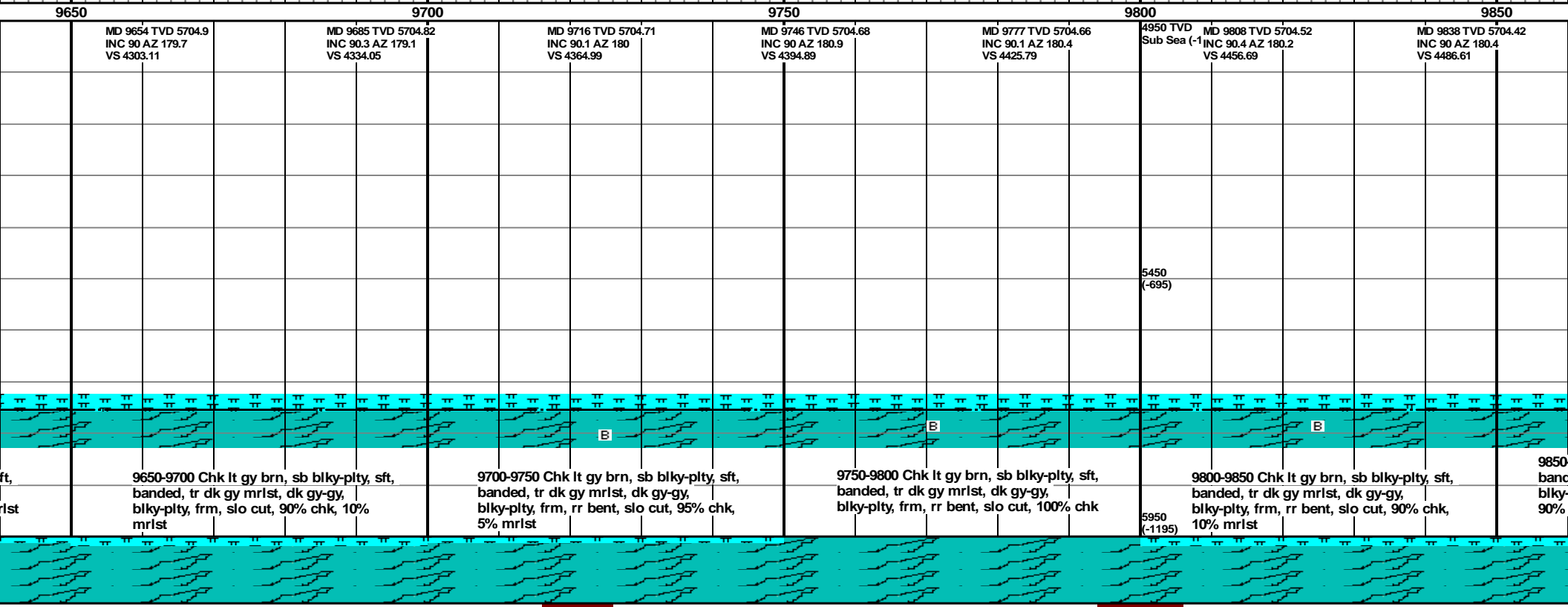
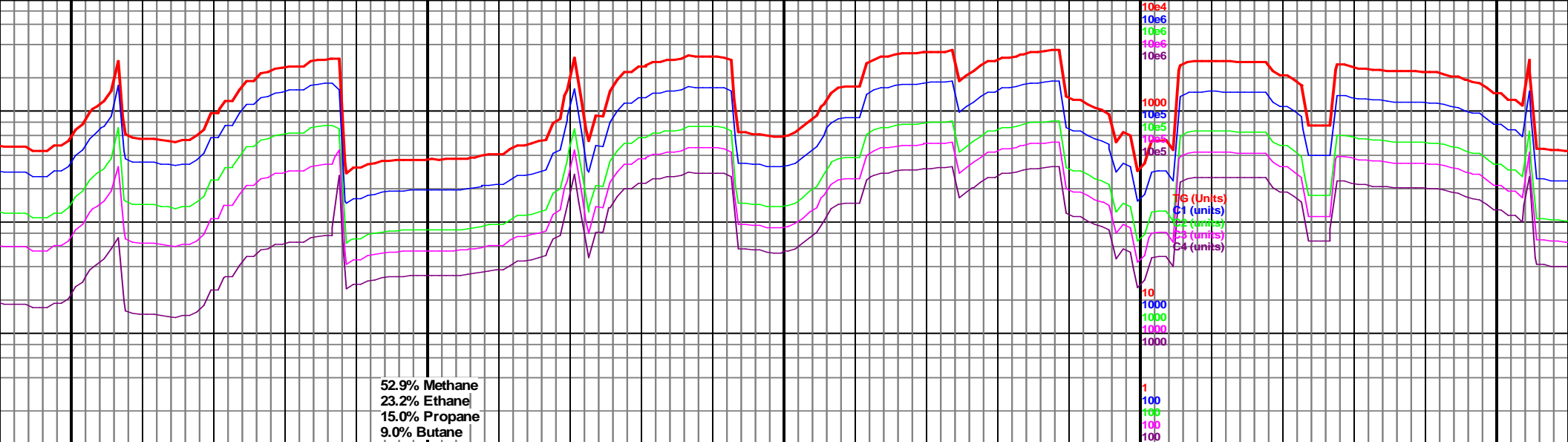


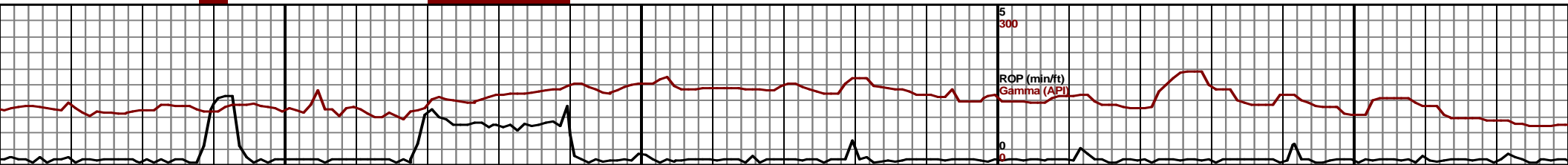
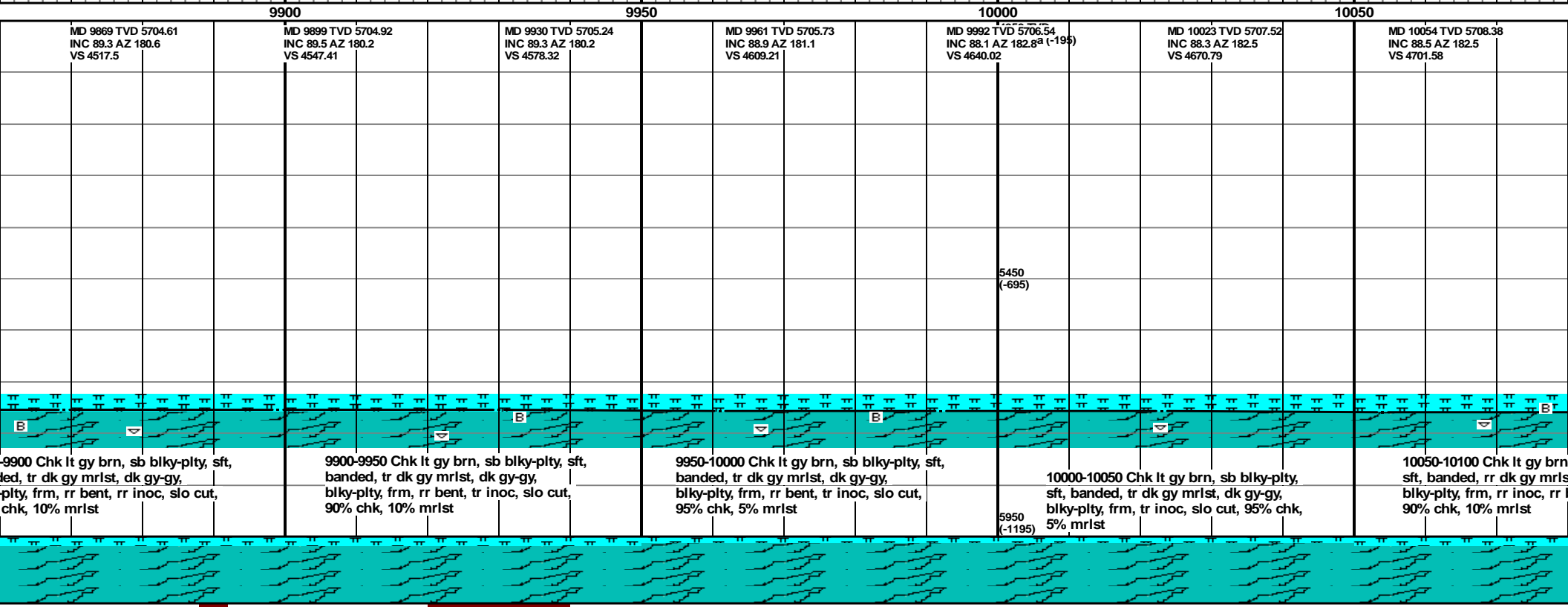
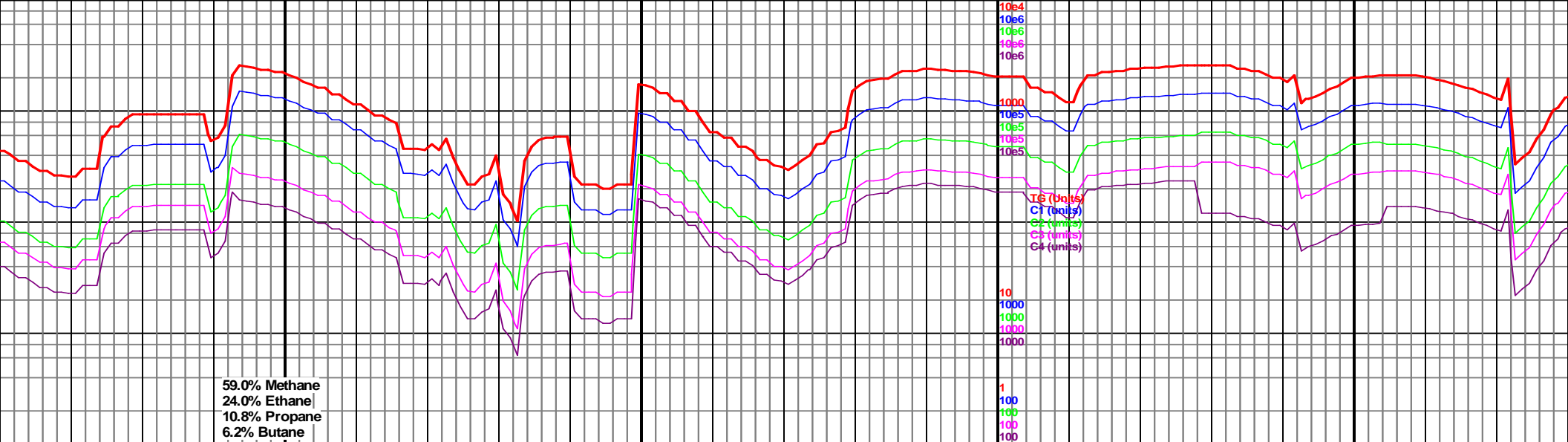
55.0% Methane  
 21.9% Ethane  
 12.2% Propane  
 10.9% Butane

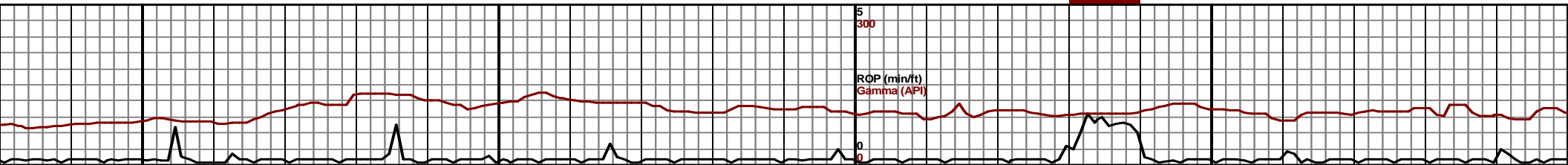
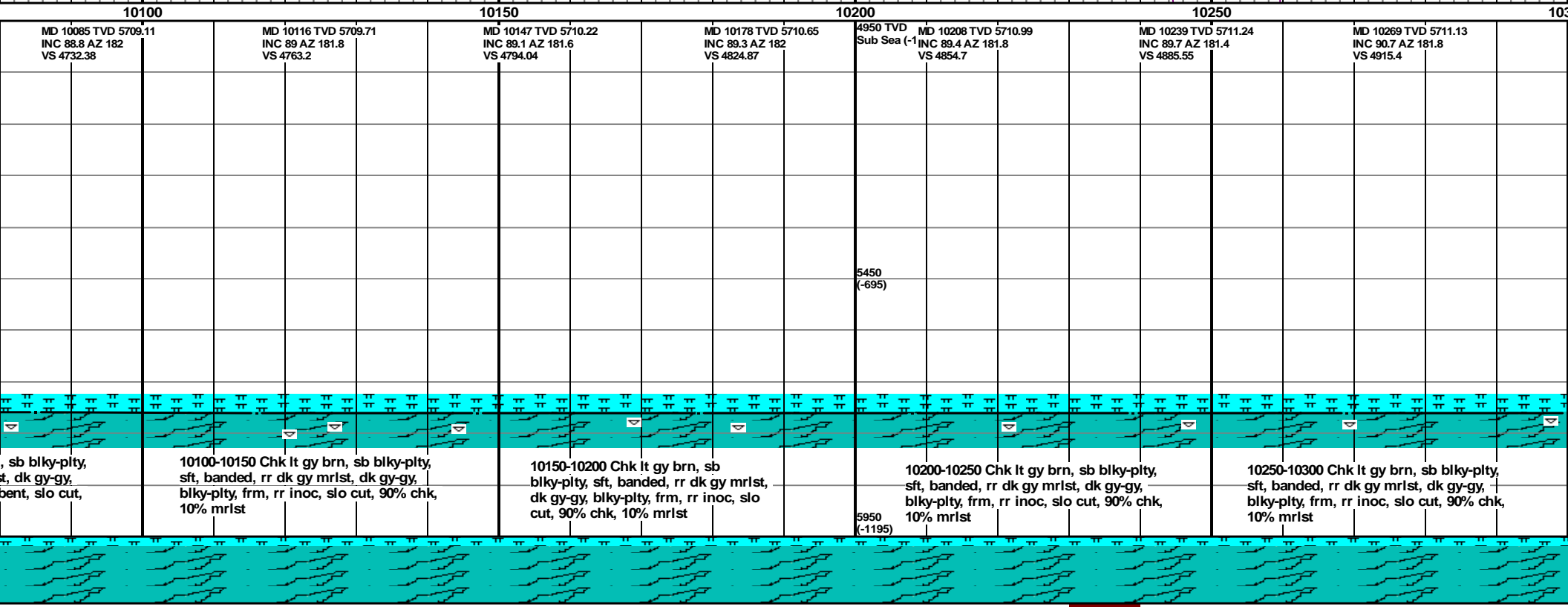
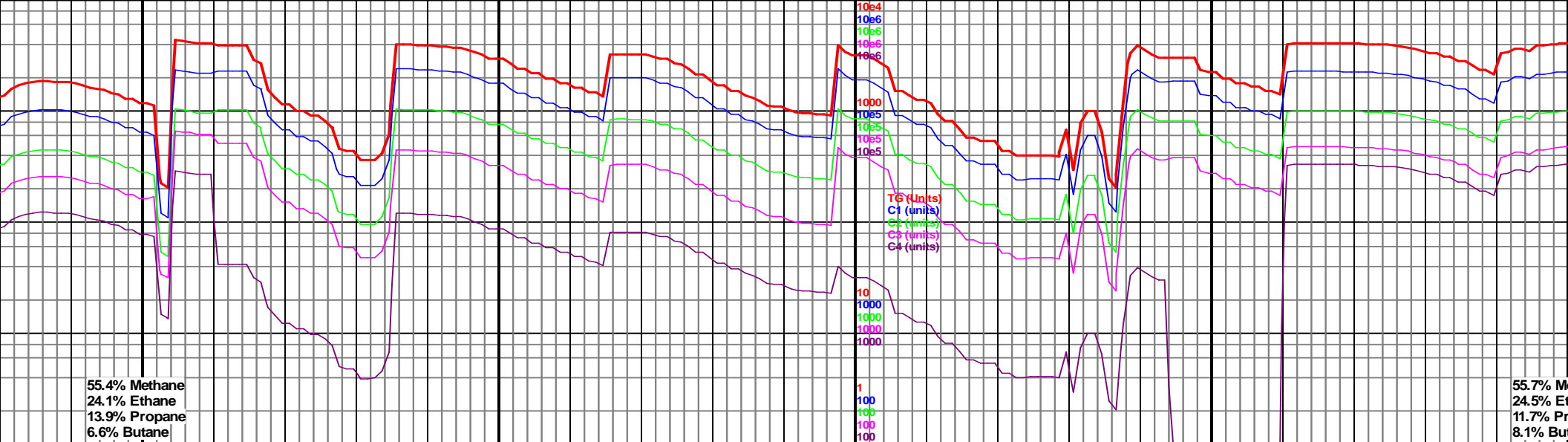
9450		9500		9550		9600	
MD 9438 TVD 5706.06 INC 90.5 AZ 181.1 VS 4087.62	MD 9469 TVD 5705.98 INC 89.8 AZ 179.8 VS 4118.52	MD 9500 TVD 5706.12 INC 89.7 AZ 179.7 VS 4149.45	MD 9530 TVD 5706.14 INC 90.2 AZ 179.8 VS 4179.38	MD 9561 TVD 5705.9 INC 90.7 AZ 179.7 VS 4210.31	MD 9592 TVD 5705.41 INC 91.1 AZ 179.3 <sup>a</sup> (-195) VS 4241.24	MD 9623 TVD 5705.01 INC 90.4 AZ 179.7 VS 4272.18	
		9519', wiper trip 10 stands				5450 (-695)	
9450-9500 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, slo cut, 90% chk, 10% mrlst Poor sample abnt walnut shells		9500-9550 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, slo cut, 95% chk, 5% mrlst		9550-9600 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, slo cut, 95% chk, 5% mrlst		9600-9650 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, slo cut, 95% chk, 5% mrlst	

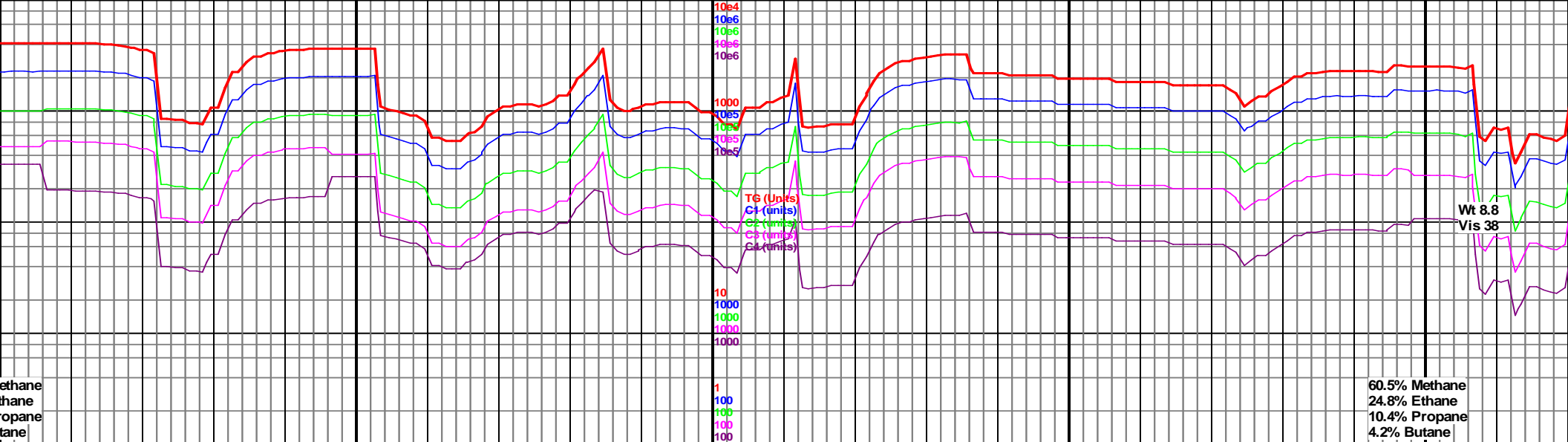




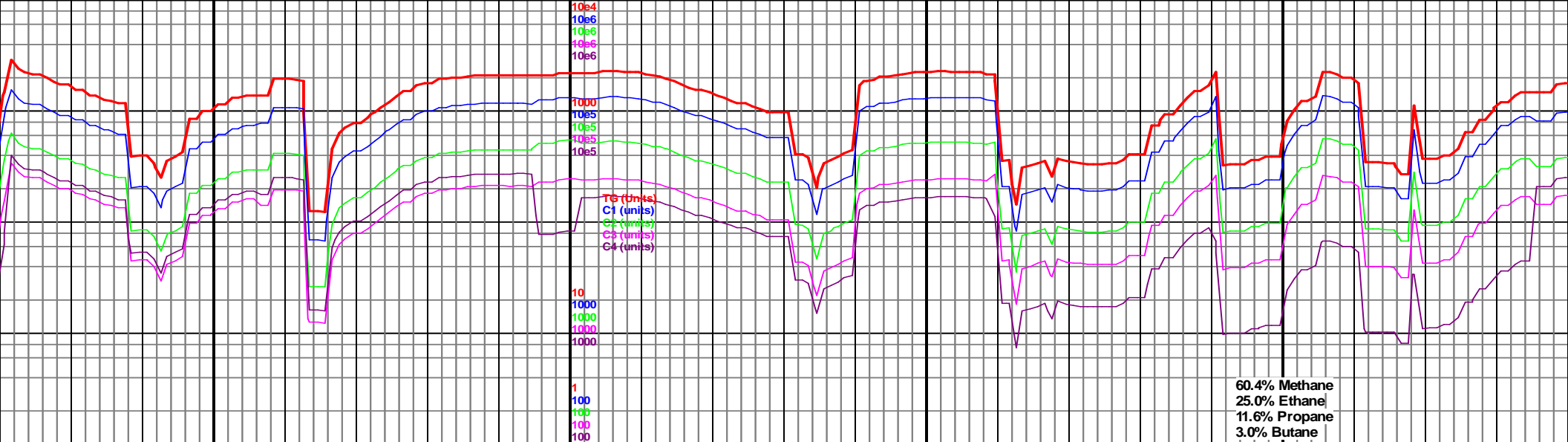




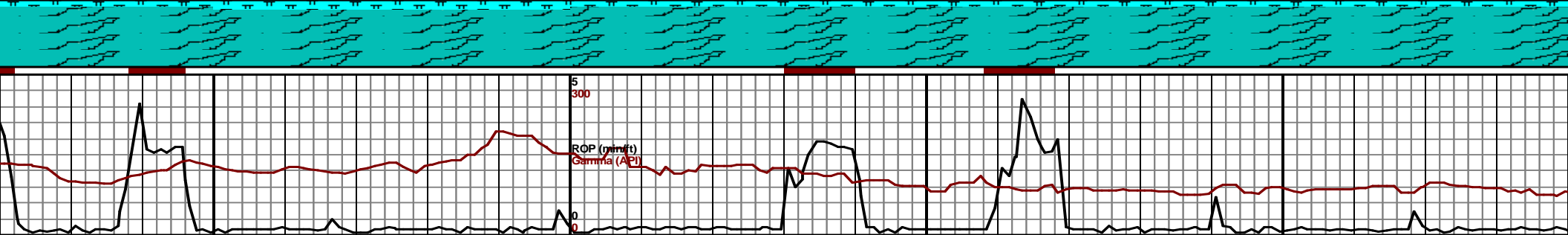


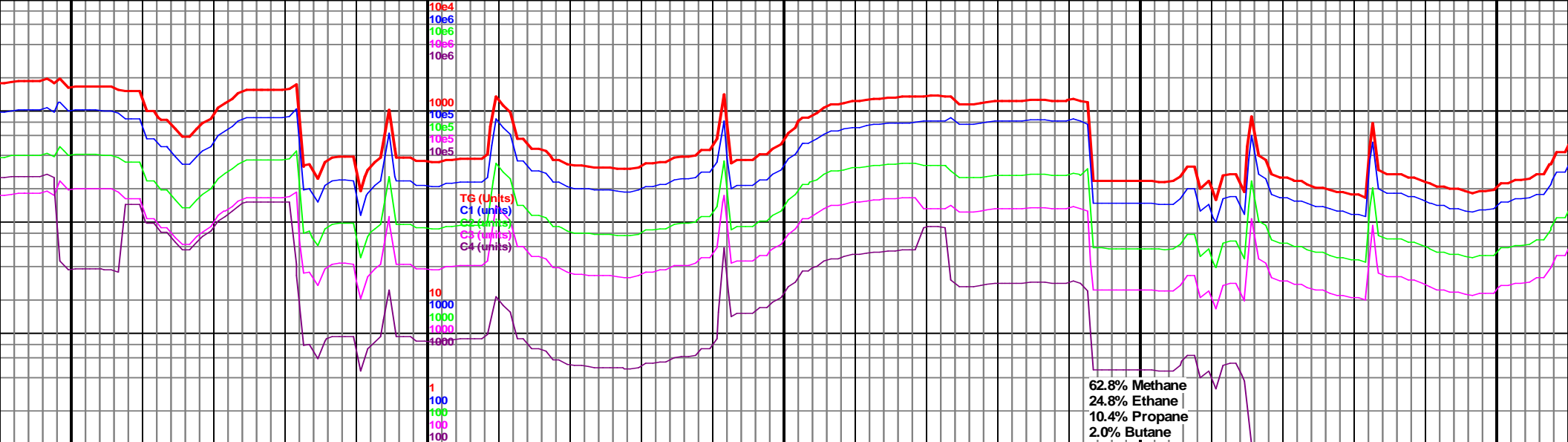


10300				10350				10400				10450				10500													
MD 10300 TVD 5710.59 INC 91.3 AZ 182 VS 4946.22				MD 10330 TVD 5709.83 INC 91.6 AZ 181.8 VS 4976.05				MD 10361 TVD 5708.86 INC 92 AZ 181.8 VS 5006.87				MD 10391 TVD 5707.71 INC 92.4 AZ 181.3 <sup>ea</sup> (-195) VS 5036.7				MD 10422 TVD 5706.36 INC 92.6 AZ 181.3 VS 5067.53				MD 10453 TVD 5704.87 INC 92.9 AZ 181.3 VS 5098.36				MD 10484 TVD 5703.14 INC 93.5 AZ 181.6 VS 5129.16				MD 10515 TVD 5701.81 INC 94.1 AZ 181.7 VS 5160.12	
																				</									

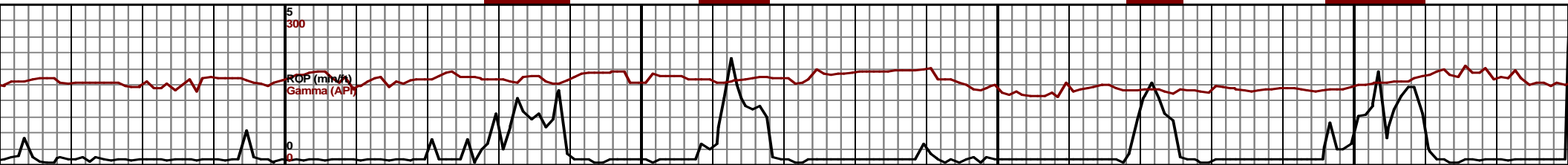
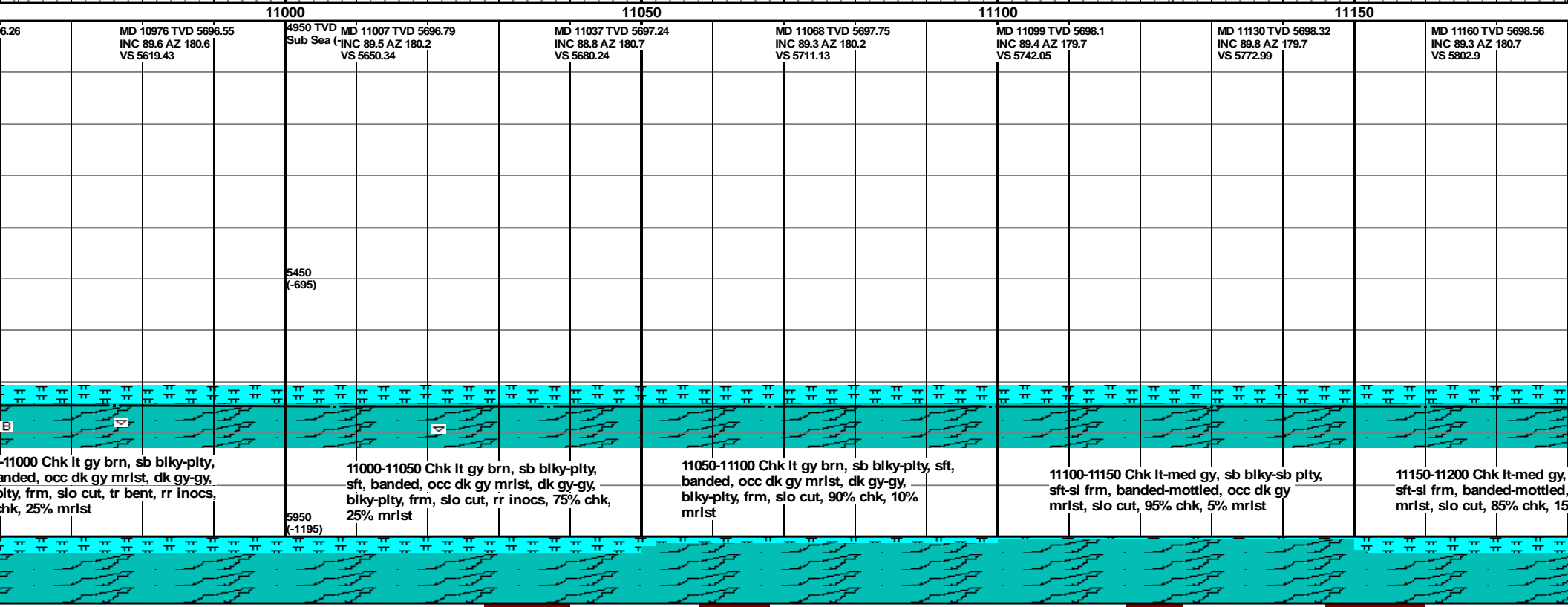
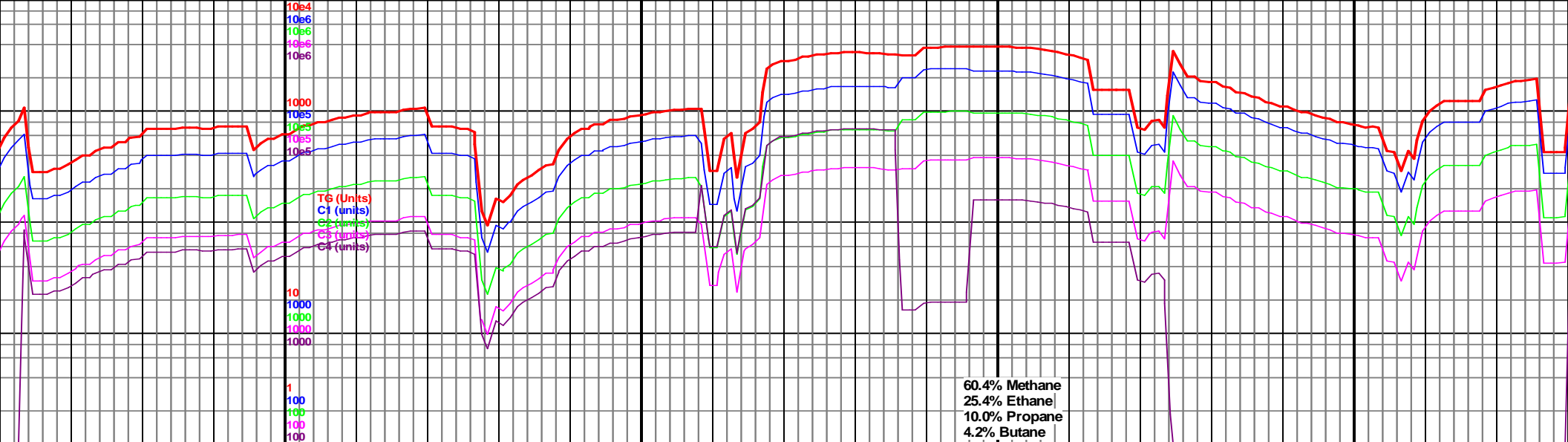


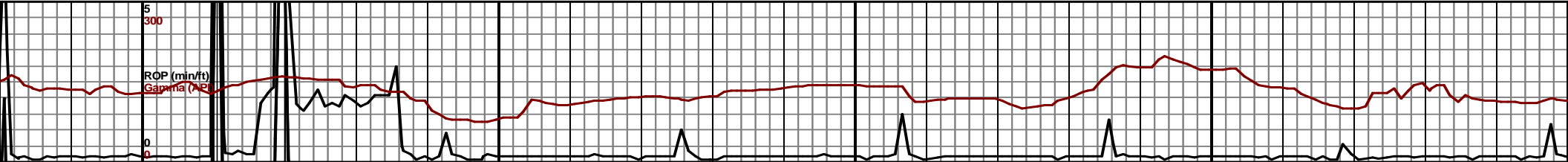
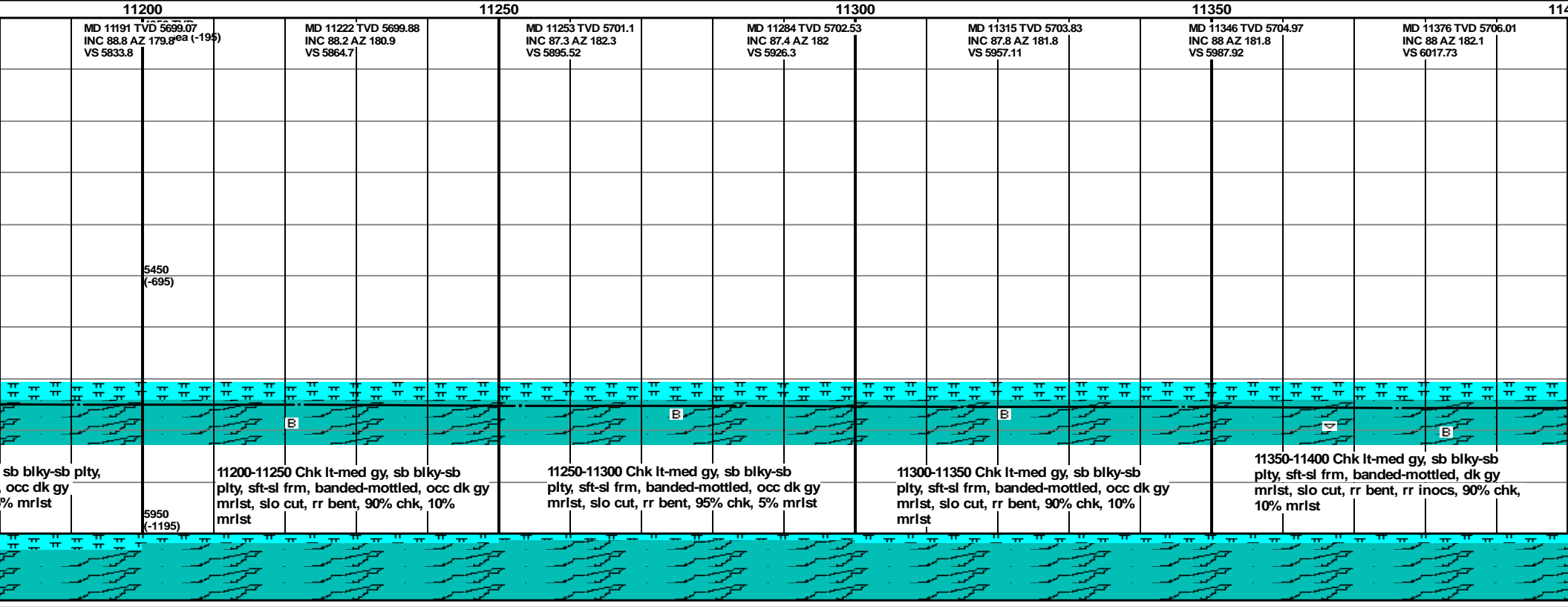
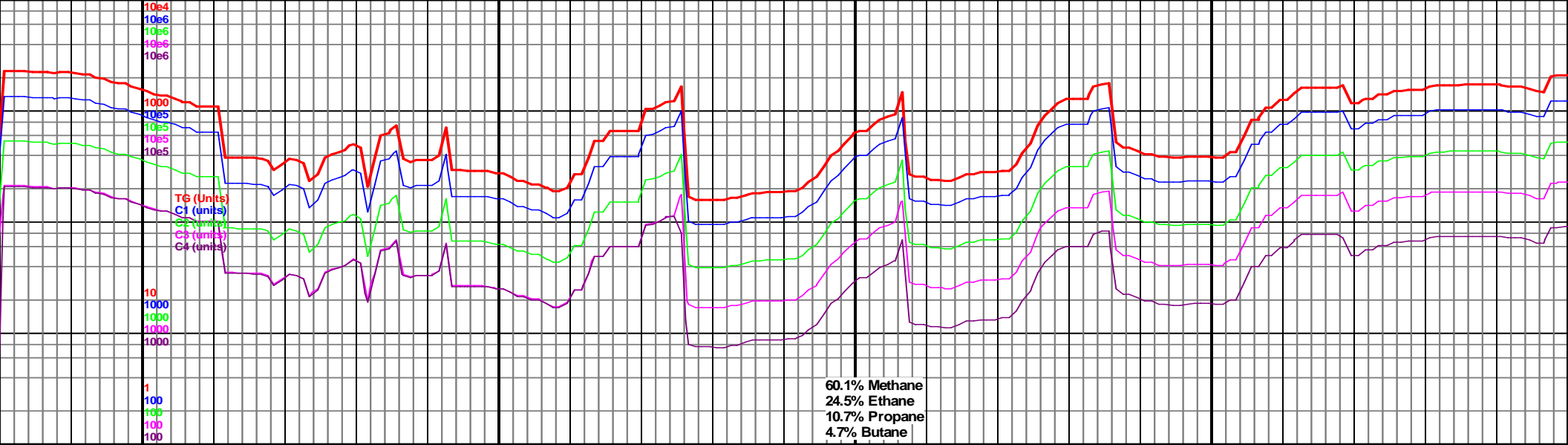
10550		10600		10650		10700	
MD 10515 TVD 5701.3 INC 33.3 AZ 181.6 VS 59.96	MD 10546 TVD 5699.95 INC 91.7 AZ 180.4 VS 5190.8	MD 10579 TVD 5699 INC 91.6 AZ 180.4 VS 5223.69	MD 10607 TVD 5698.12 INC 92 AZ 180.4 VS 5251.58	MD 10638 TVD 5697.25 INC 91.2 AZ 180 VS 5282.48	MD 10668 TVD 5696.96 INC 89.9 AZ 180 VS 5312.41	MD 10699 TVD 5696.99 INC 90 AZ 180 VS 5343.33	MD 10730 TVD 5696.99 INC 90.3 AZ 180 VS 5374.25
10550-10600 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, rr inoc, slo cut, 95% chk, 10% mrlst		10600-10650 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, vis oil in sample, slo cut, 95% chk, 5% mrlst		10650-10700 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, vis oil in sample, slo cut, 95% chk, 5% mrlst		10700-10750 Chk lt gy brn, sb blk-pty, sft, banded, rr dk gy mrlst, dk gy-gy, blk-pty, frm, vis oil in sample, slo cut, 95% chk, 5% mrlst	



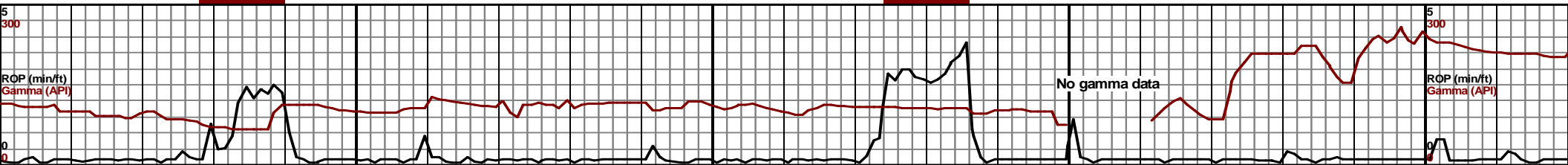
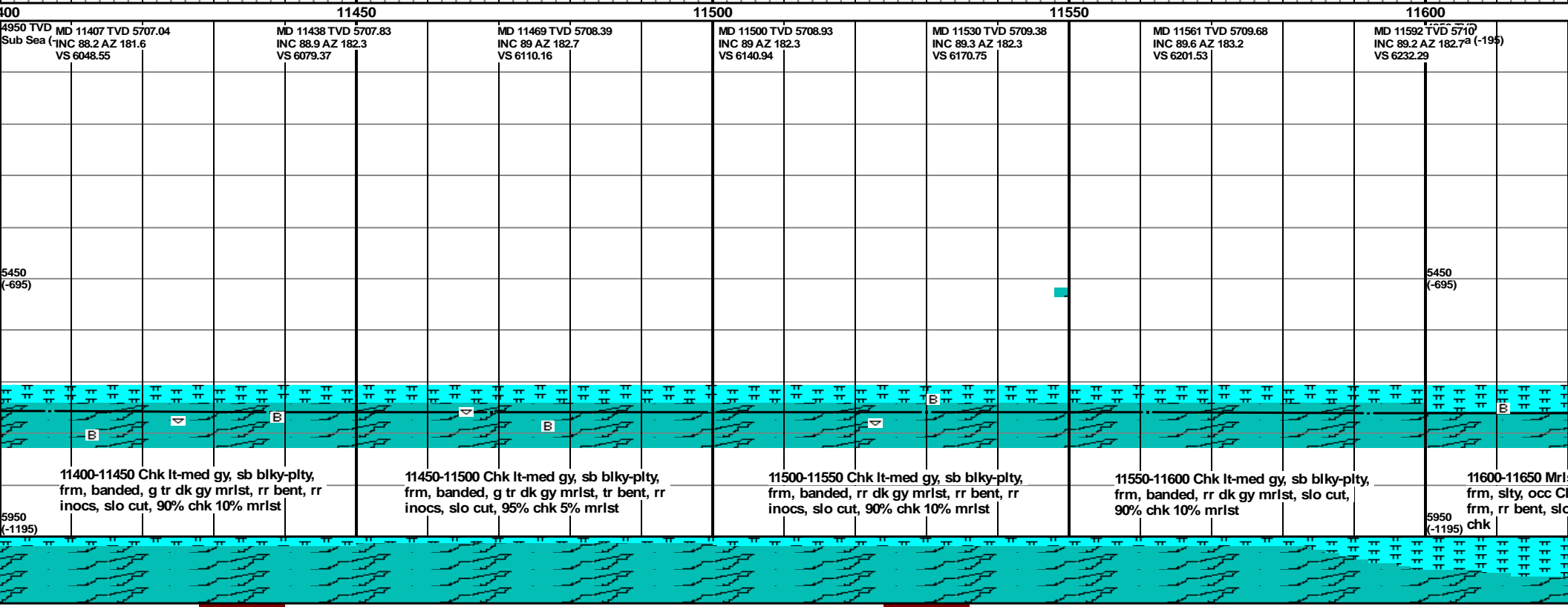
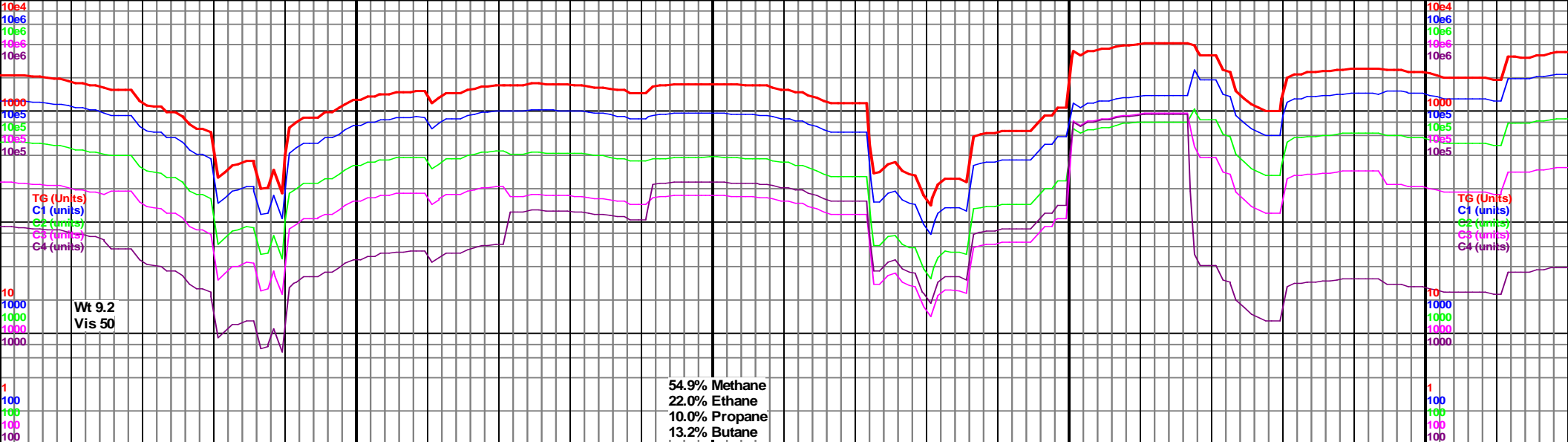


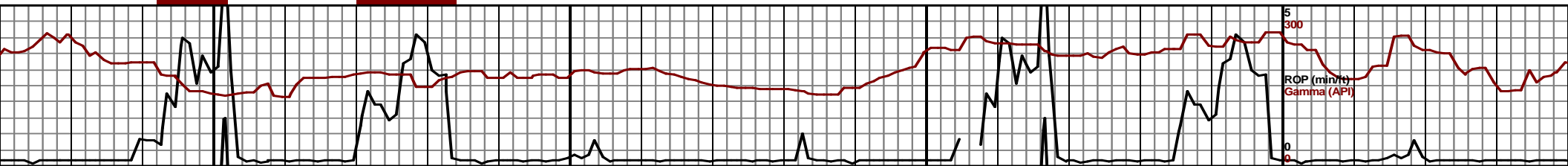
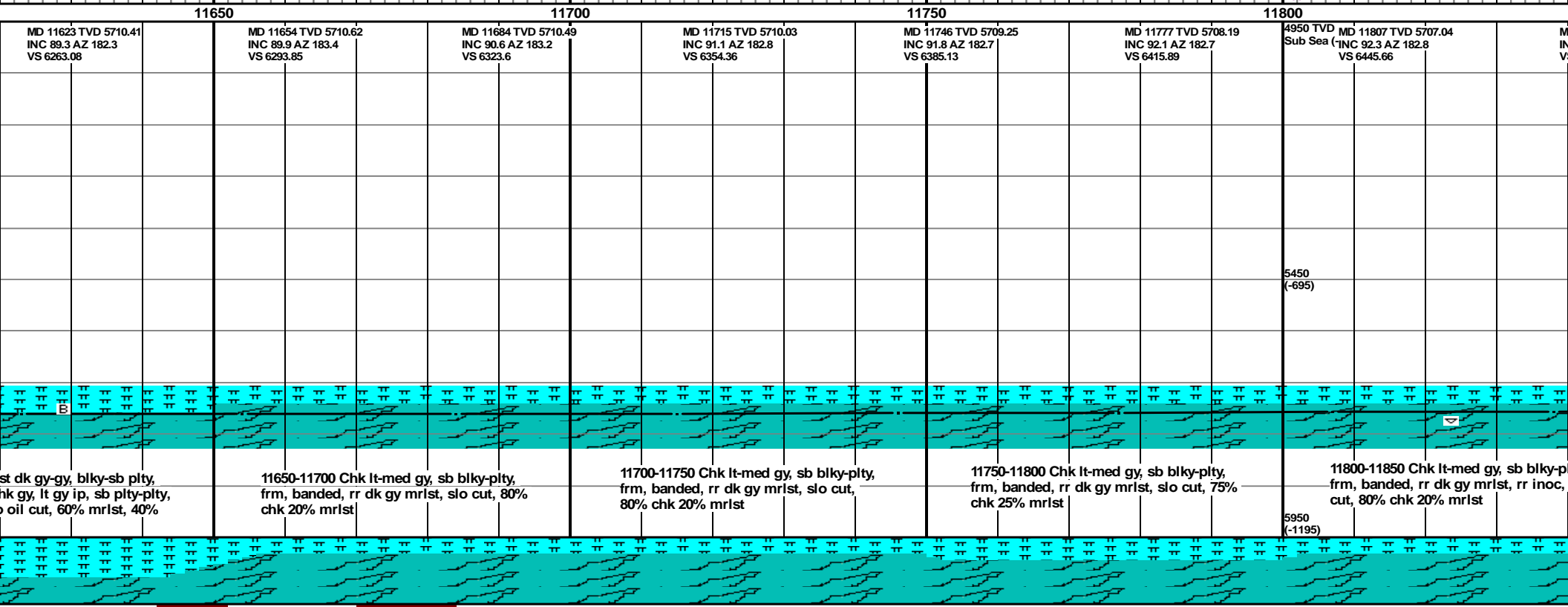
10750		10800		10850		10900		10950	
D 5696.91 179.8		MD 10761 TVD 5696.64 INC 90.7 AZ 179.5 VS 5405.18		MD 10792 TVD 5696.42 INC 90.1 AZ 180.6 VS 5436.11		MD 10853 TVD 5696.37 INC 90.3 AZ 180.9 VS 5496.91		MD 10884 TVD 5696.1 INC 90.7 AZ 181.3 VS 5527.78	
								MD 10915 TVD 5695.99 INC 89.7 AZ 180.7 VS 5558.66	

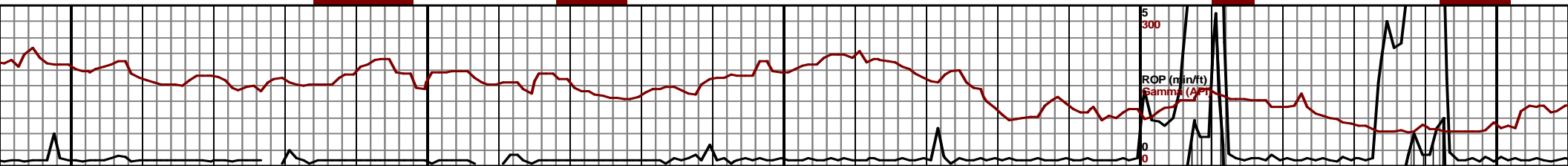
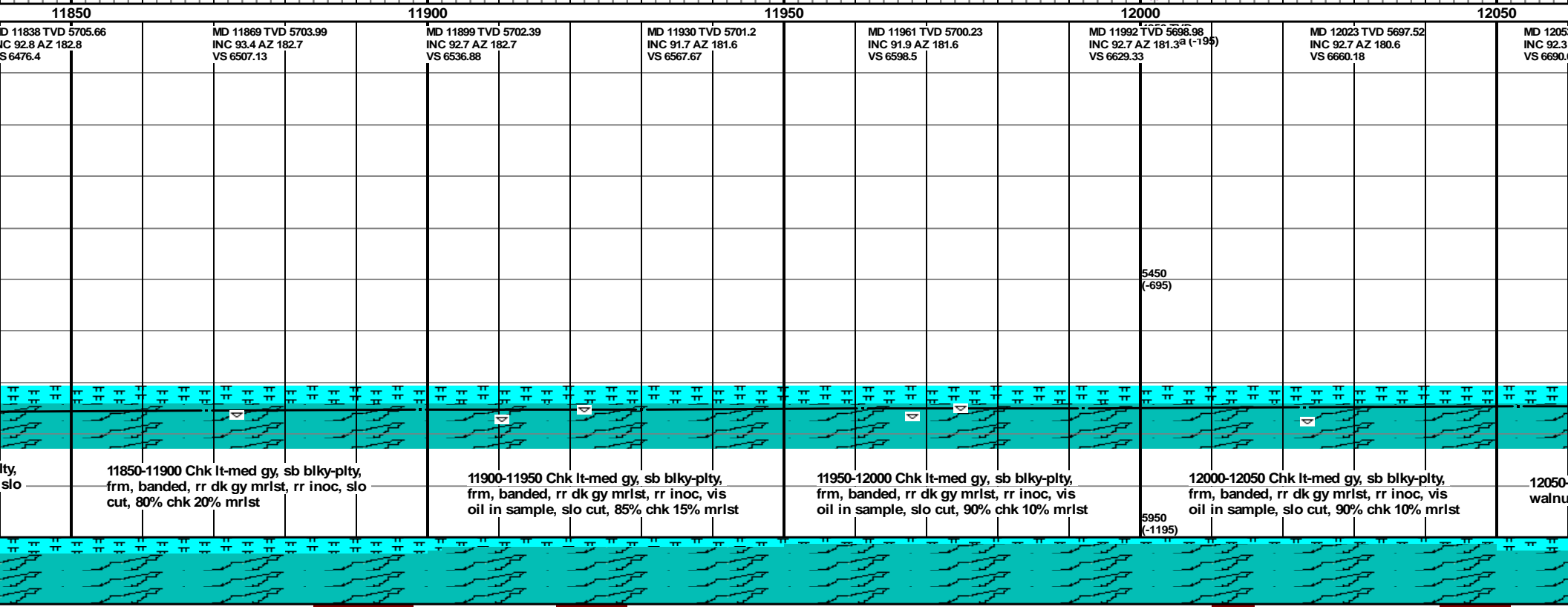


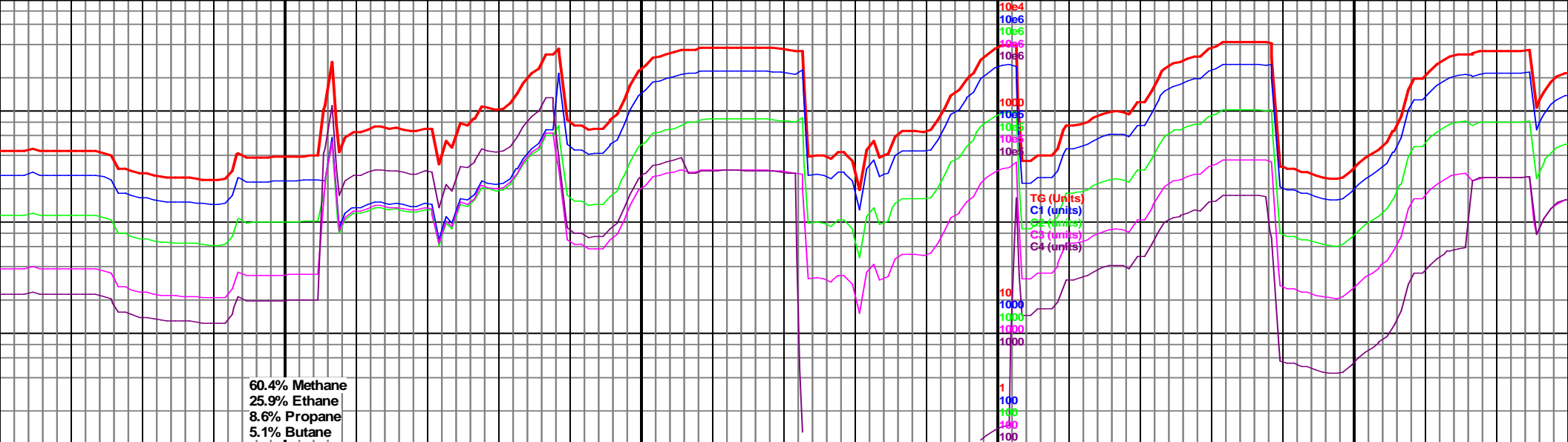


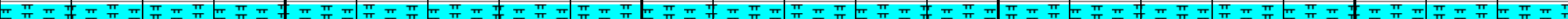











12100			12150			12200			12250				
MD 12087 TVD 5694.67 INC 92.9 AZ 178.4 VS 6723.99	MD 12117 TVD 5693.15 INC 92.9 AZ 178.1 VS 6753.93	MD 12148 TVD 5691.96 INC 91.5 AZ 178.3 VS 6784.88	MD 12179 TVD 5691.26 INC 91.1 AZ 177.9 VS 6815.85	MD 12209 TVD 5690.92 INC 90.2 AZ 178.3 VS 6845.82	MD 12240 TVD 5690.78 INC 90.3 AZ 177.6 VS 6876.8	MD 12271 TVD 5690.79 INC 90.7 AZ 177.6 VS 6907.79							
12103', can't get back to bottom, TOH, replace mud motor & kelly bushing, resume drilling on 8/21/2013							4950 TVD Sub Sea (-19) 5450 (-695)						
													
12100 Very poor sample 100% at hull LCM and poly-beads			12100-12150 Chk lt-gy to dk-gy, sb blk-pty, frm, banded, tr dk gy mrlst, vis oil in sample, slo cut, 85% chk, 15% mrlst			12150-12200 Chk lt-gy to dk-gy, sb blk-pty, frm, banded, tr dk gy mrlst, vis oil in sample, slo cut, 90% chk, 10% mrlst			12200-12250 Chk lt-gy to dk-gy, sb blk-pty, frm, banded, tr dk gy mrlst, vis oil in sample, slo cut, rr bent, rr inocs, 90% chk, 10% mrlst			12250-12300 Poor sample, walnut shells, small amount mrlst	
