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## MUDLOG MD

<b>COMPANY</b>	EXXONMOBIL
<b>WELL</b>	PCU 296-5A07
<b>FIELD</b>	PICEANCE CREEK
<b>REGION</b>	ROCKIES
<b>COORDINATES</b>	LAT: 39.912003 LONG: -108.198668
<b>ELEVATION</b>	G.L.: 7294' R.K.B: 30.2'
<b>COUNTY, STATE</b>	RIO BLANCE, CO
<b>API INDEX</b>	051031124300
<b>SPUD DATE</b>	11/24/2010
<b>CONTRACTOR</b>	HELMERICH_PAYNE
<b>CO. REP.</b>	M. HUDON
<b>RIG/TYPE</b>	HP 321 / FLEX 4S
<b>LOGGING UNIT</b>	ML031
<b>GEOLOGISTS</b>	C. RECORD, B. SMELSER
<b>ADD. PERSONS</b>	M. GROSS
<b>CO. GEOLOGIST</b>	C. ALBA

### LOG INTERVAL

**DEPTHS:** 4681' **TO** 13785'

**DATES:** 02/17/2011 **TO** 04/02/2011

**SCALE:** 5" = 100'

### CASING DATA

10.75" **AT** 4652'

7.0" **AT** 9878'

4.5" **AT**

**AT**

### MUD TYPES

SPUD MUD **TO** 4681'

LSND **TO** 13785'

**TO**

**TO**

### HOLE SIZE

14.75" **TO** 4681'

9.875" **TO** 9894'

6.125" **TO** 13785'

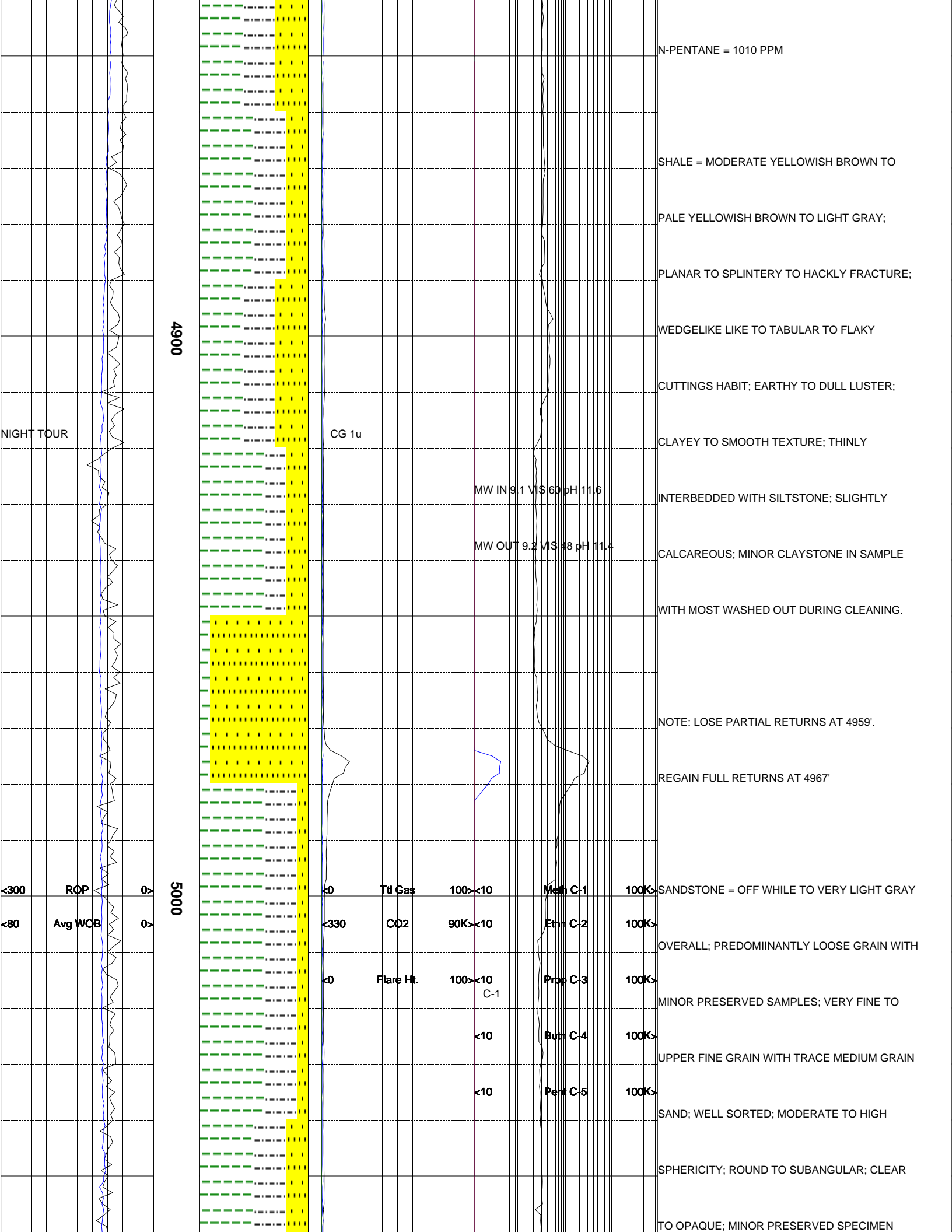
**TO**

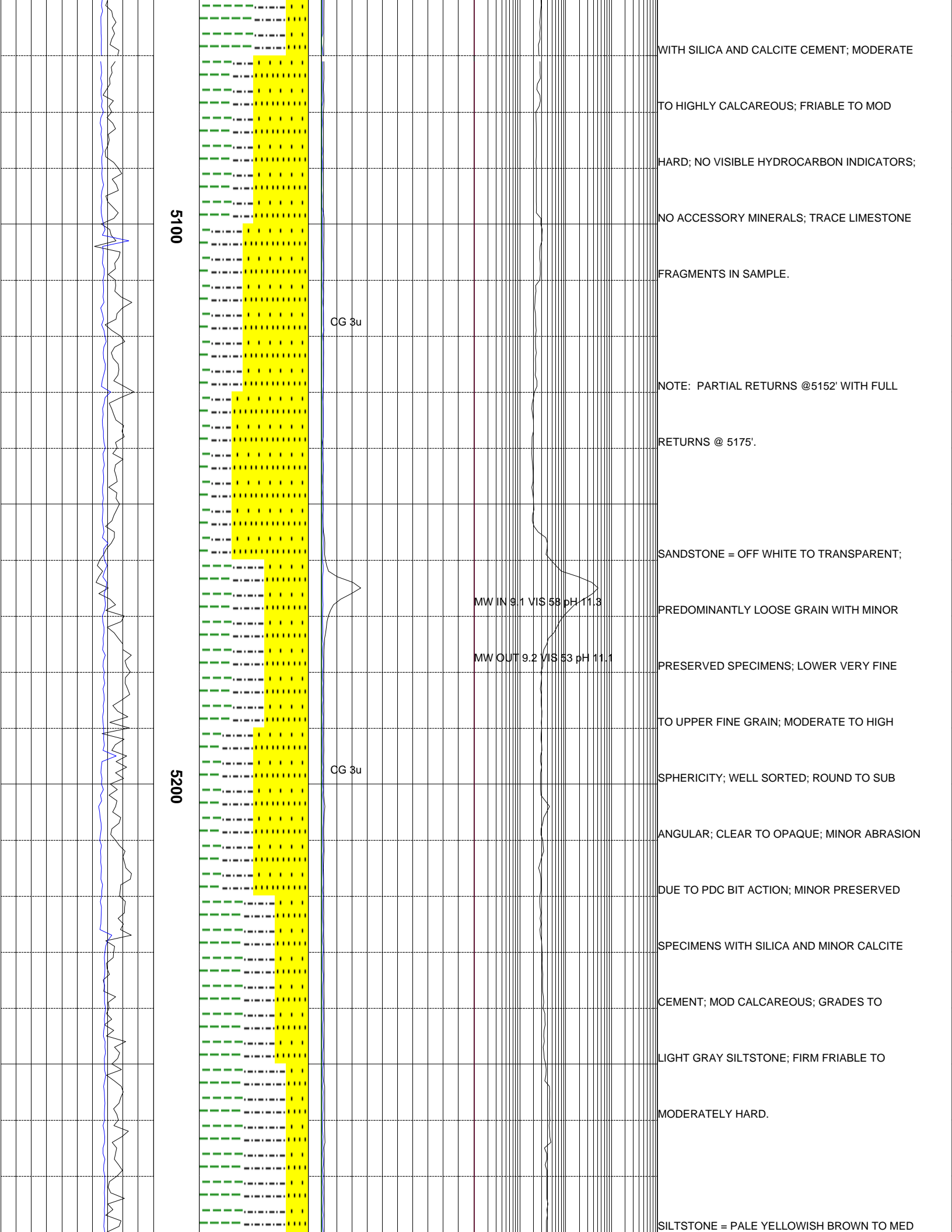
### ABBREVIATIONS

<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</i> MUD RESISTIVITY	<i>SG</i> SURVEY GAS
<i>PP</i> PUMP PRESSURE	<i>Rmf</i> FILTRATE RESISTIVITY	<i>WG</i> WIPER GAS
<i>SPM</i> STROKES/MIN	<i>PR</i> POOR RETURNS	<i>CG</i> CONNECTION GAS
<i>MW</i> MUD WEIGHT	<i>LAT</i> LOGGED AFTER TRIP	
<i>VIS</i> FUNNEL VISCOSITY	<i>LAS</i> LOGGED AFTER SURVEY	



EXXONMOBIL			PCU 296-5A07			8/31/2011					
<div>&lt;100ROP0&gt;</div> <div>ft/hr</div> <div>&lt;80Avg WOB0&gt;</div> <div>klbs</div>			<div>Depth</div> <div>Lithology</div> <div>MGS</div> <div>&lt;0Ttl Gas1.5K&gt;</div> <div>units</div> <div>&lt;330CO290K&gt;</div> <div>ppm</div> <div>&lt;0Flare Ht.100&gt;</div> <div>ft</div>			<div>&lt;10Meth C-1100K&gt;</div> <div>ppm</div> <div>&lt;10Ethn C-2100K&gt;</div> <div>&lt;10Prop C-3100K&gt;</div> <div>&lt;10Butn C-4100K&gt;</div> <div>&lt;10Pent C-5100K&gt;</div>			<div>Remarks</div> <div>Survey Data, Mud Reports, Other Info.</div>		
						CANRIG DRILLING TECHNOLOGY DML COMMENCED					
						LOGGING THE PCU 296-5A07 WELL ON					
2/17/2011						02/17/2011 @ 4681' MD.					
DAY TOUR											
NB # 3 9 875" HC5042XPDC			4700			ROCK CHARACTERISTICS AND CONSTITUENTS					
JETS 2 X 12, 4 X 13 IN @ 468						ARE LISTED FROM MOST ABUNDANT TO LEAST					
						ABUNDANT PERCENTAGE OF SAMPLE.					
						MW IN 9.1 VIS 52 PH 11.2					
						GAS CALIBRATED TO S.P.L.W.A.					
						MW OUT 9.1 VIS 42 PH 11.6					
						STANDARDS (2% ME = 100 UNITS).					
						MUD DATA @ 4768'					
						GAS CHROMATOGRAPHY EQUIPMENT CALIBRATED					
						MW 9.1 VIS 52 PV 14 YP 28					
						TO A TEST GAS COMPOSED OF THE FOLLOWING:					
						API FL 7.8 GF S 8/14/17 pH 11.2					
						CL- 900 Ca + 40 MBT 15 O SOL 4.1					
						METHANE = 10,130 PPM					
						24 HR MUD LOSS 0 BBLS					
						ETHANE = 1010 PPM					
						PROPANE = 1,000 PPM					
						I-BUTANE = 1,000 PPM					
						N-BUTANE = 1,000 PPM					
						I-PENTANE = 1,000 PPM					





5100

5200

CG 3u

MW IN 9.1 VIS 58 pH 11.3

MW OUT 9.2 VIS 53 pH 11.1

CG 3u

WITH SILICA AND CALCITE CEMENT; MODERATE

TO HIGHLY CALCAREOUS; FRIABLE TO MOD

HARD; NO VISIBLE HYDROCARBON INDICATORS;

NO ACCESSORY MINERALS; TRACE Limestone

FRAGMENTS IN SAMPLE.

NOTE: PARTIAL RETURNS @5152' WITH FULL

RETURNS @ 5175'.

SANDSTONE = OFF WHITE TO TRANSPARENT;

PREDOMINANTLY LOOSE GRAIN WITH MINOR

PRESERVED SPECIMENS; LOWER VERY FINE

TO UPPER FINE GRAIN; MODERATE TO HIGH

SPHERICITY; WELL SORTED; ROUND TO SUB

ANGULAR; CLEAR TO OPAQUE; MINOR ABRASION

DUE TO PDC BIT ACTION; MINOR PRESERVED

SPECIMENS WITH SILICA AND MINOR CALCITE

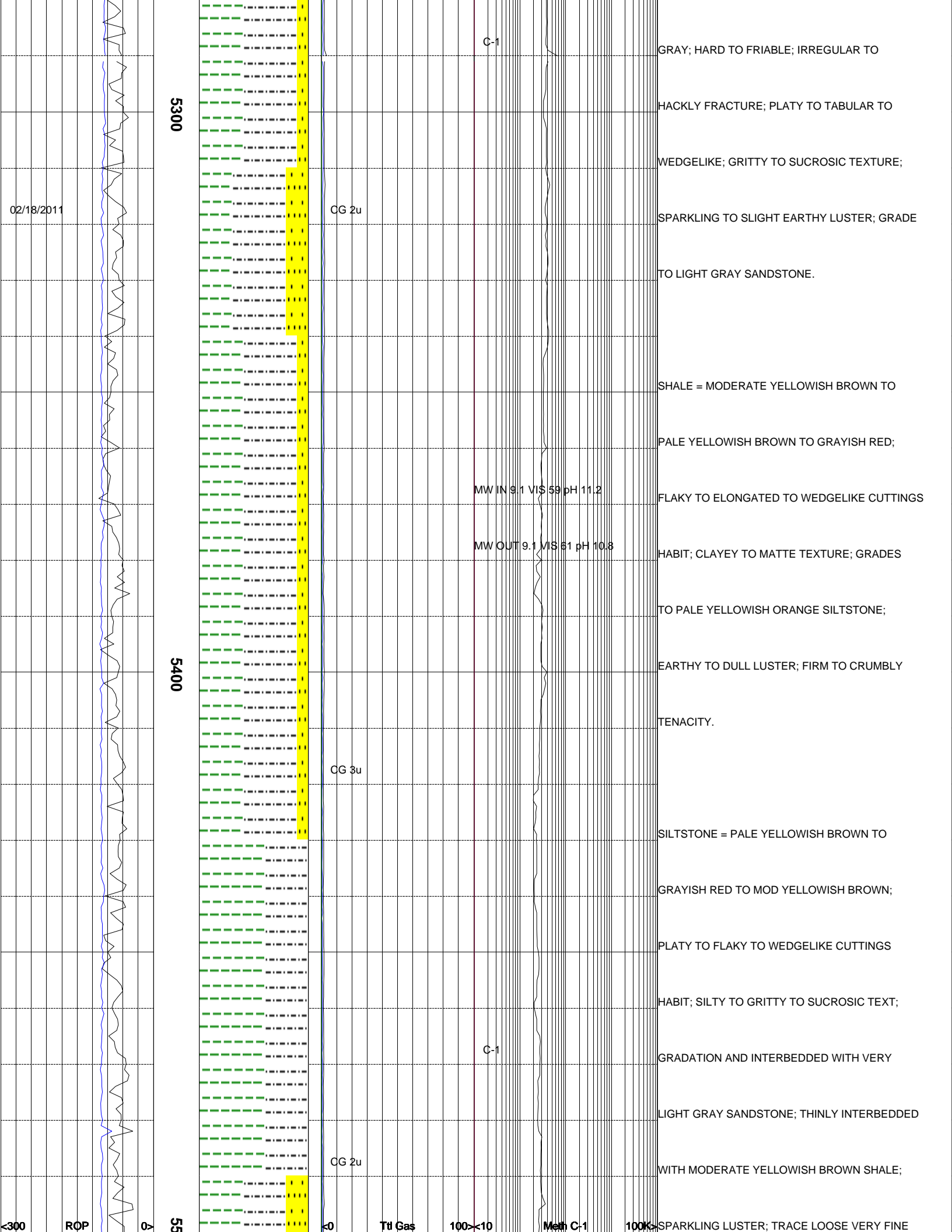
CEMENT; MOD CALCAREOUS; GRADES TO

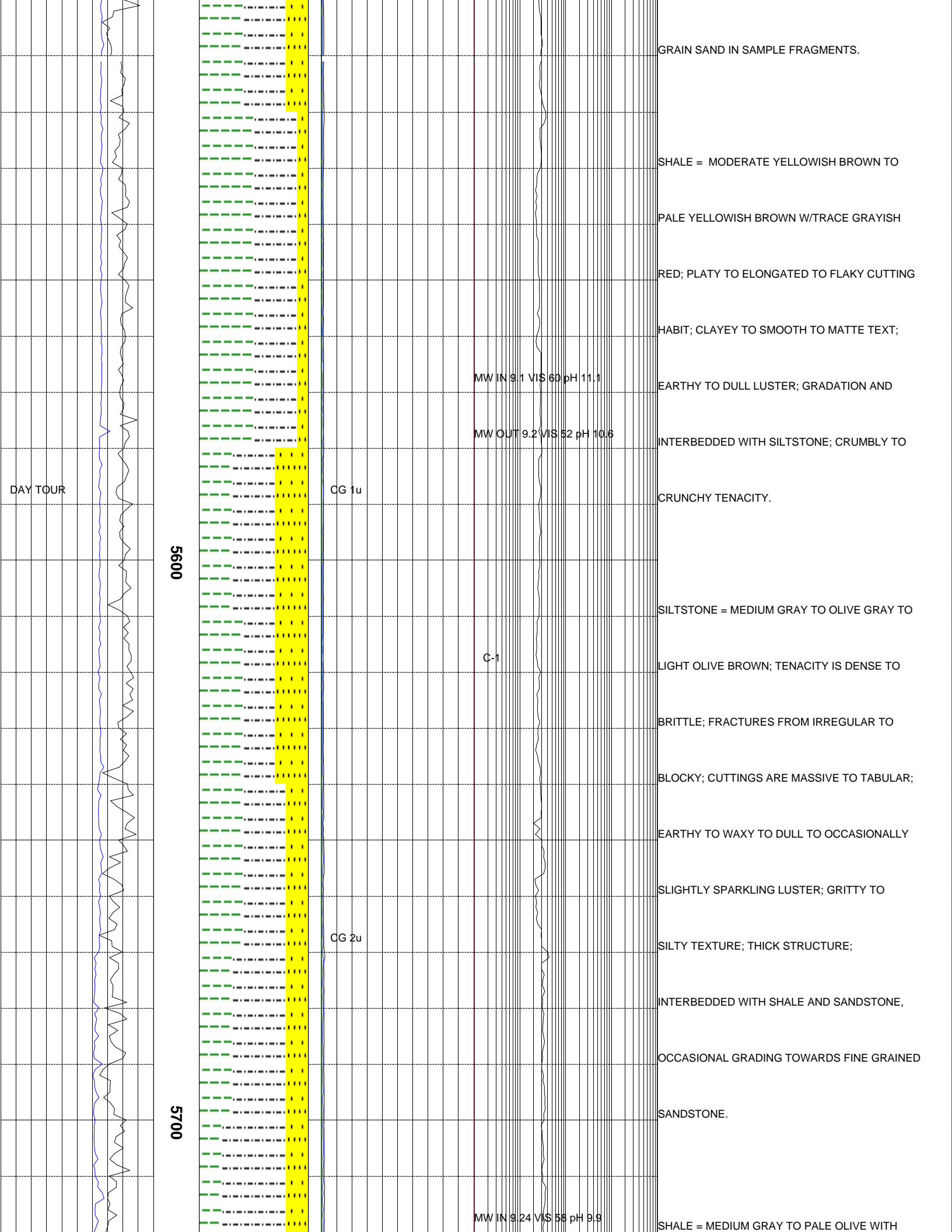
LIGHT GRAY SILTSTONE; FIRM FRIABLE TO

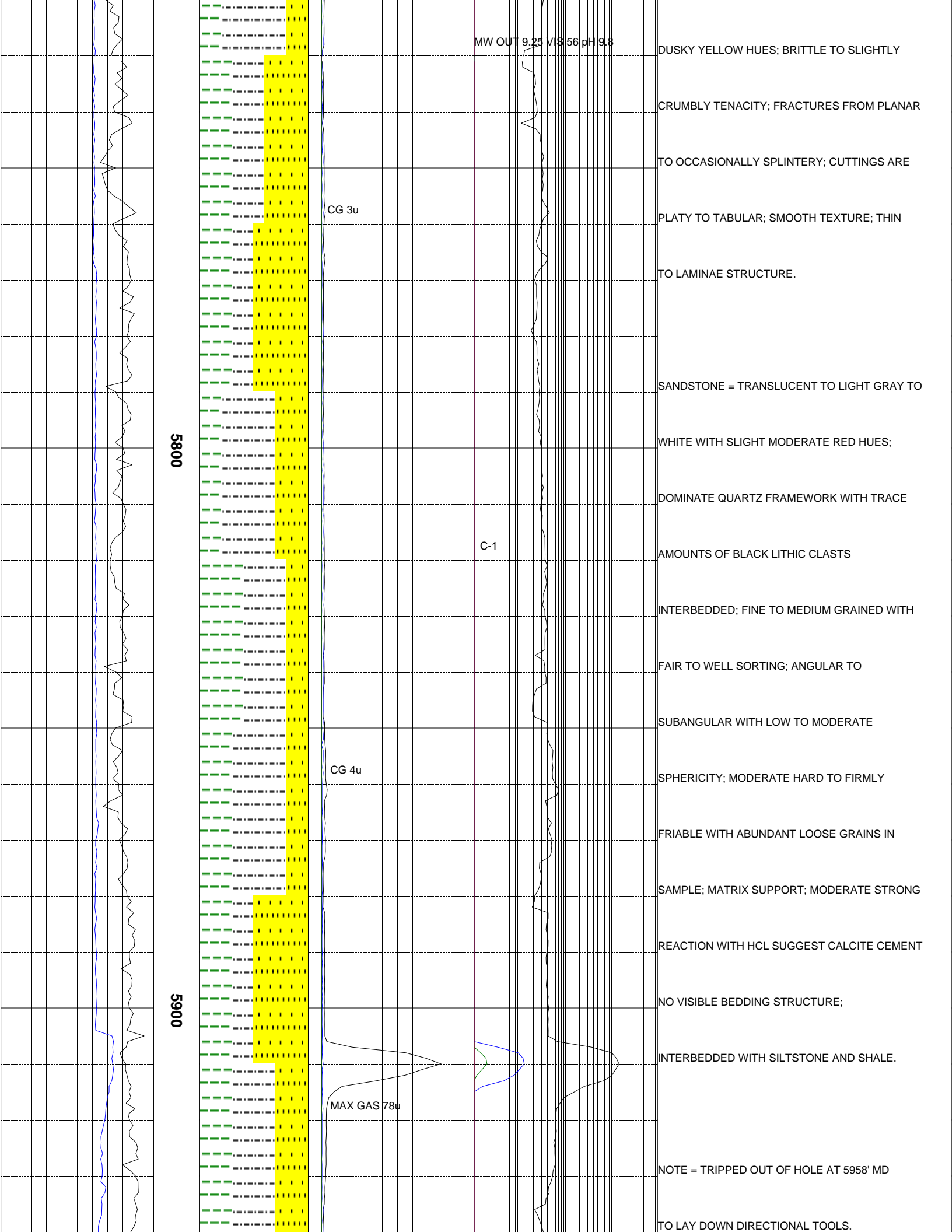
MODERATELY HARD.

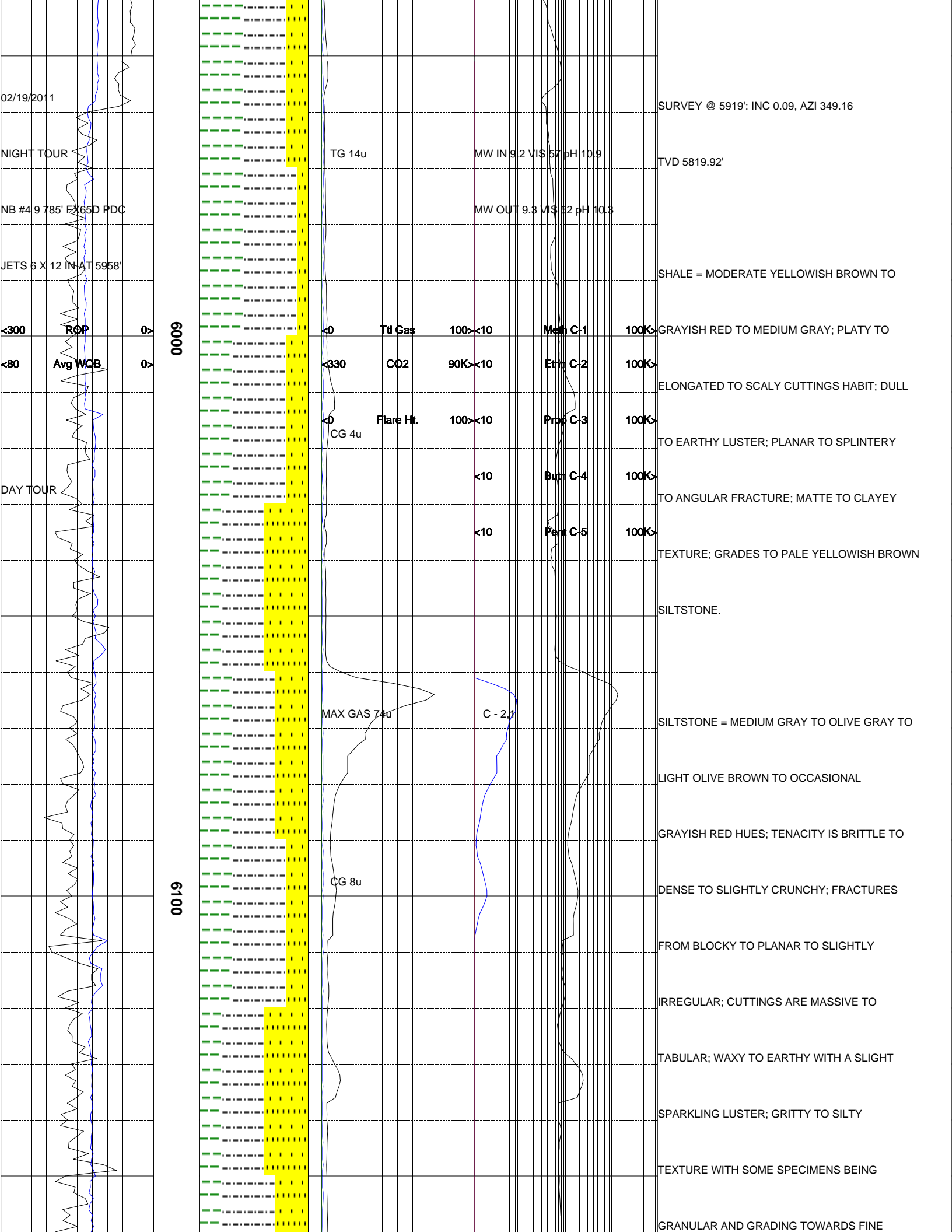
SILTSTONE = PALE YELLOWISH BROWN TO MED



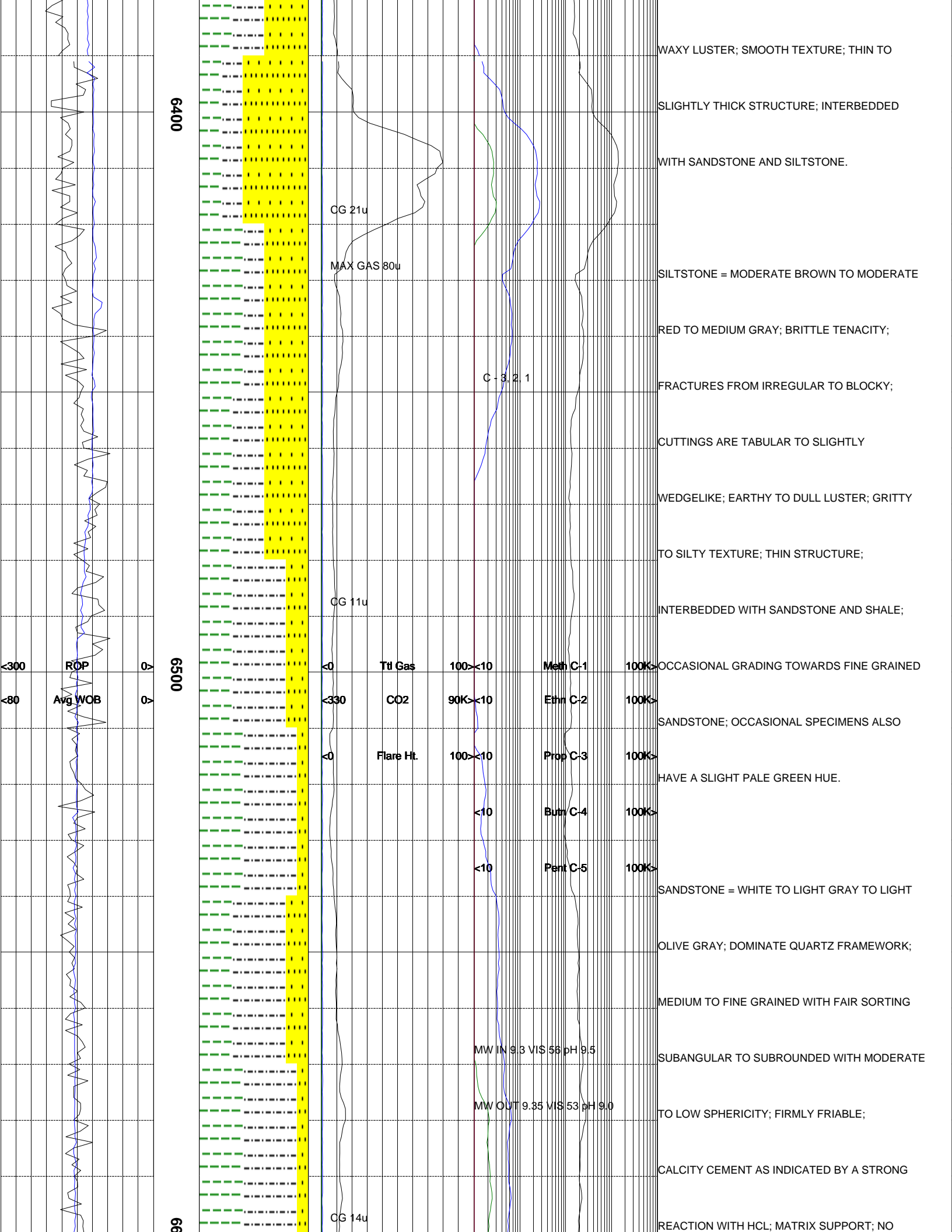


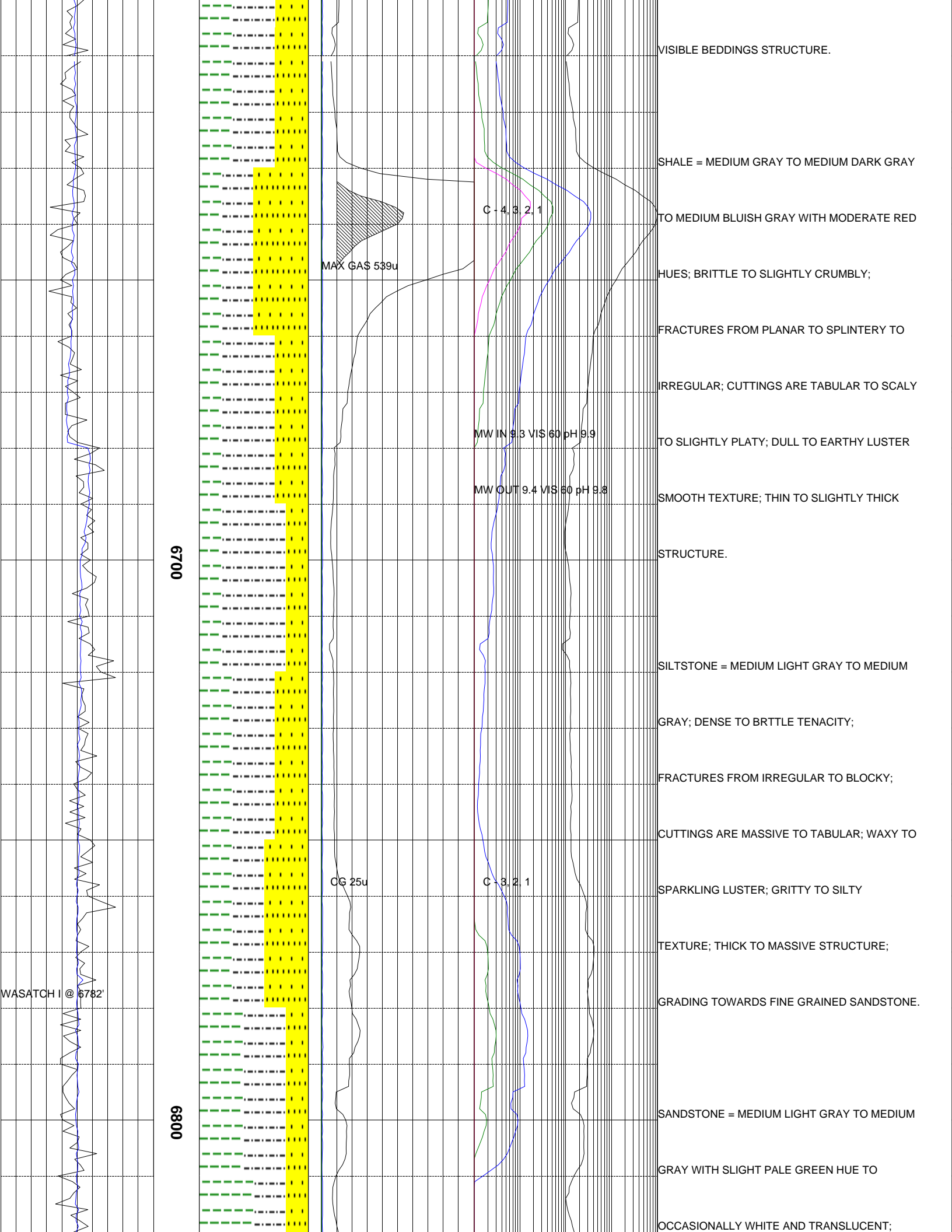


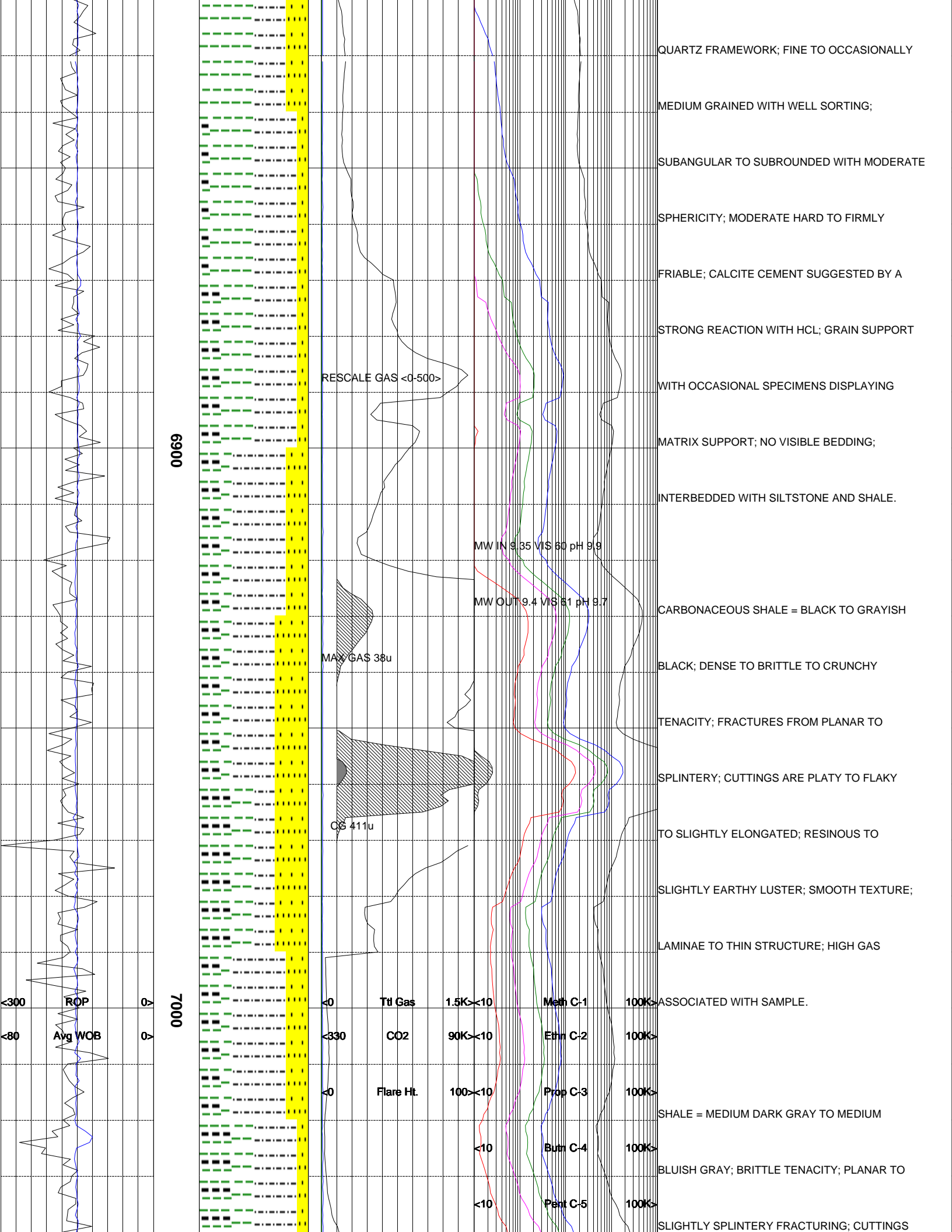




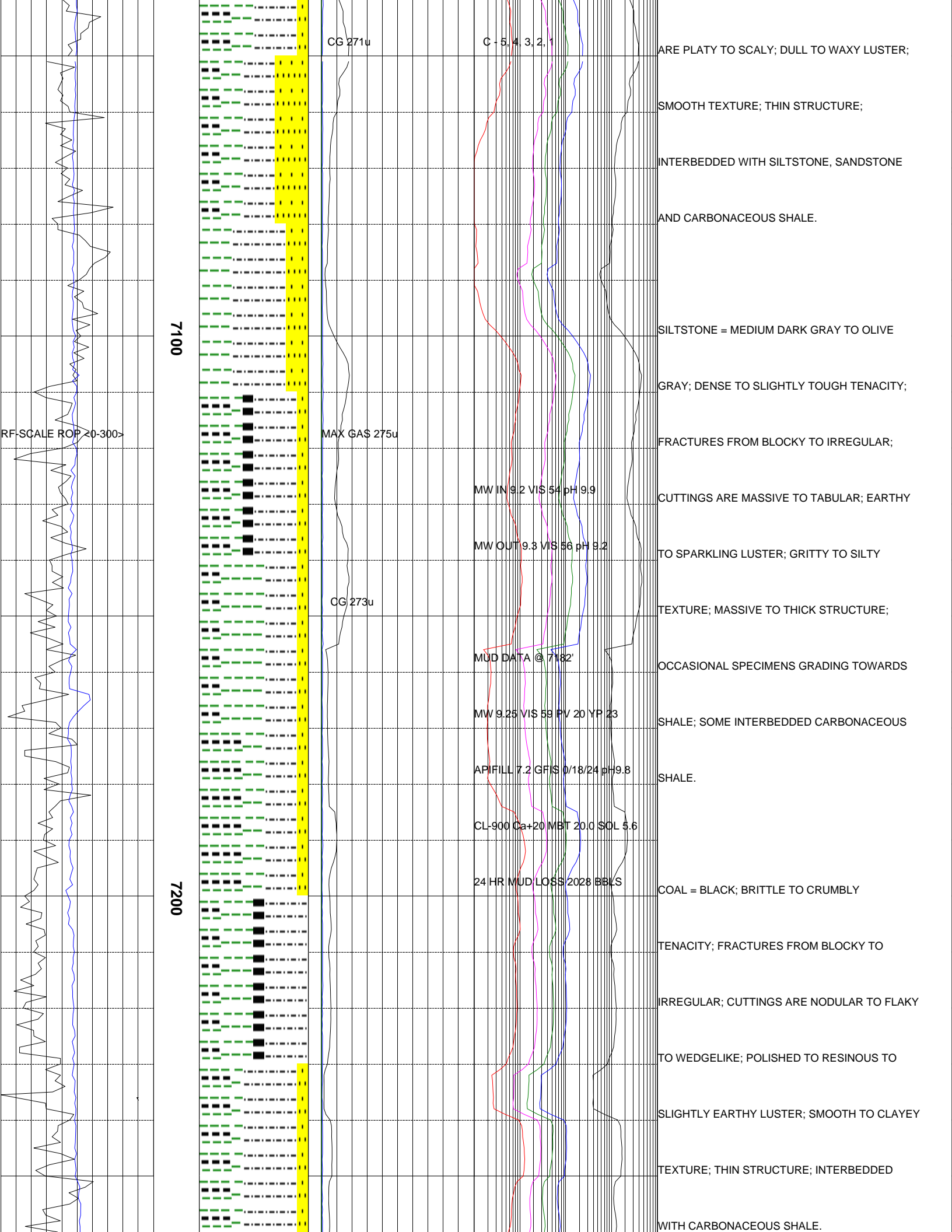


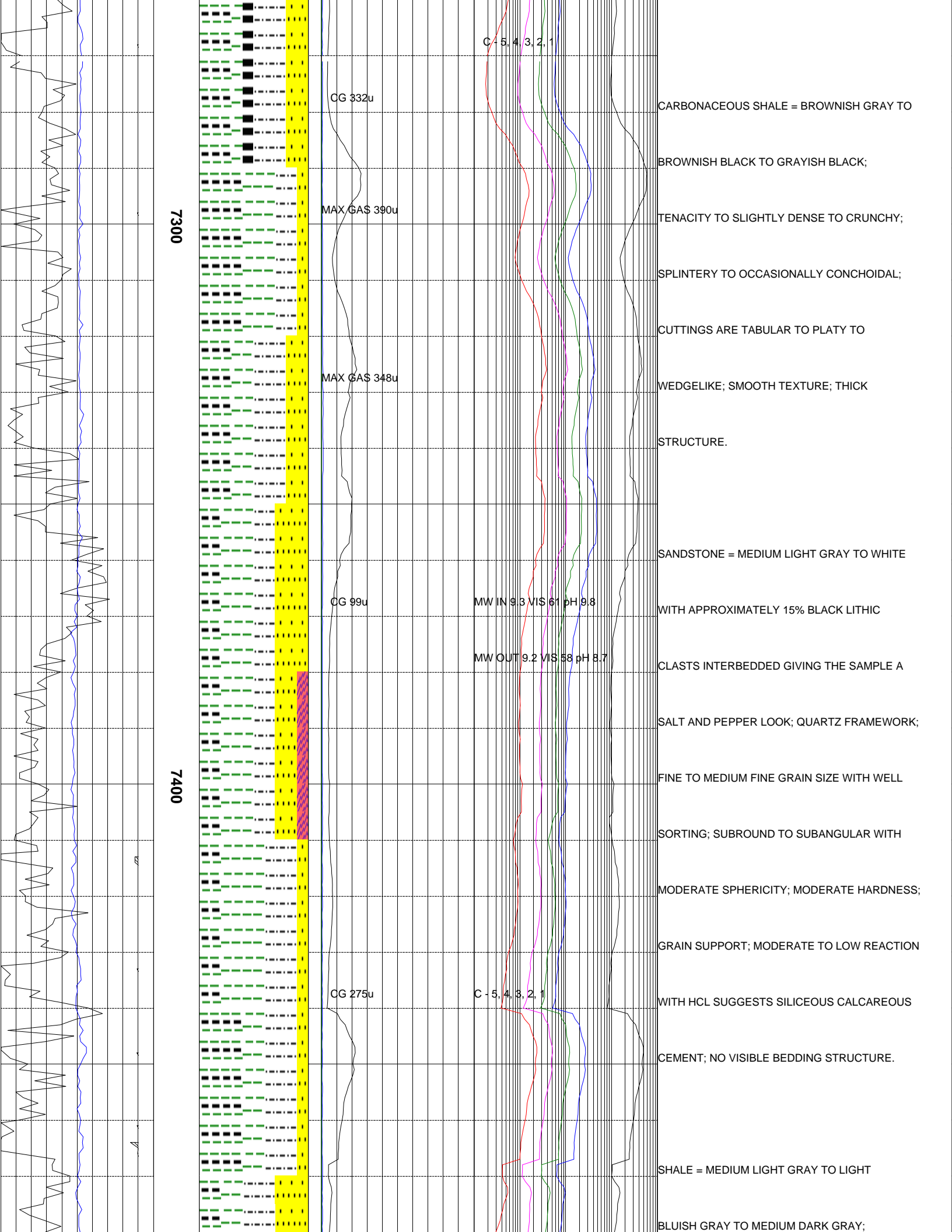


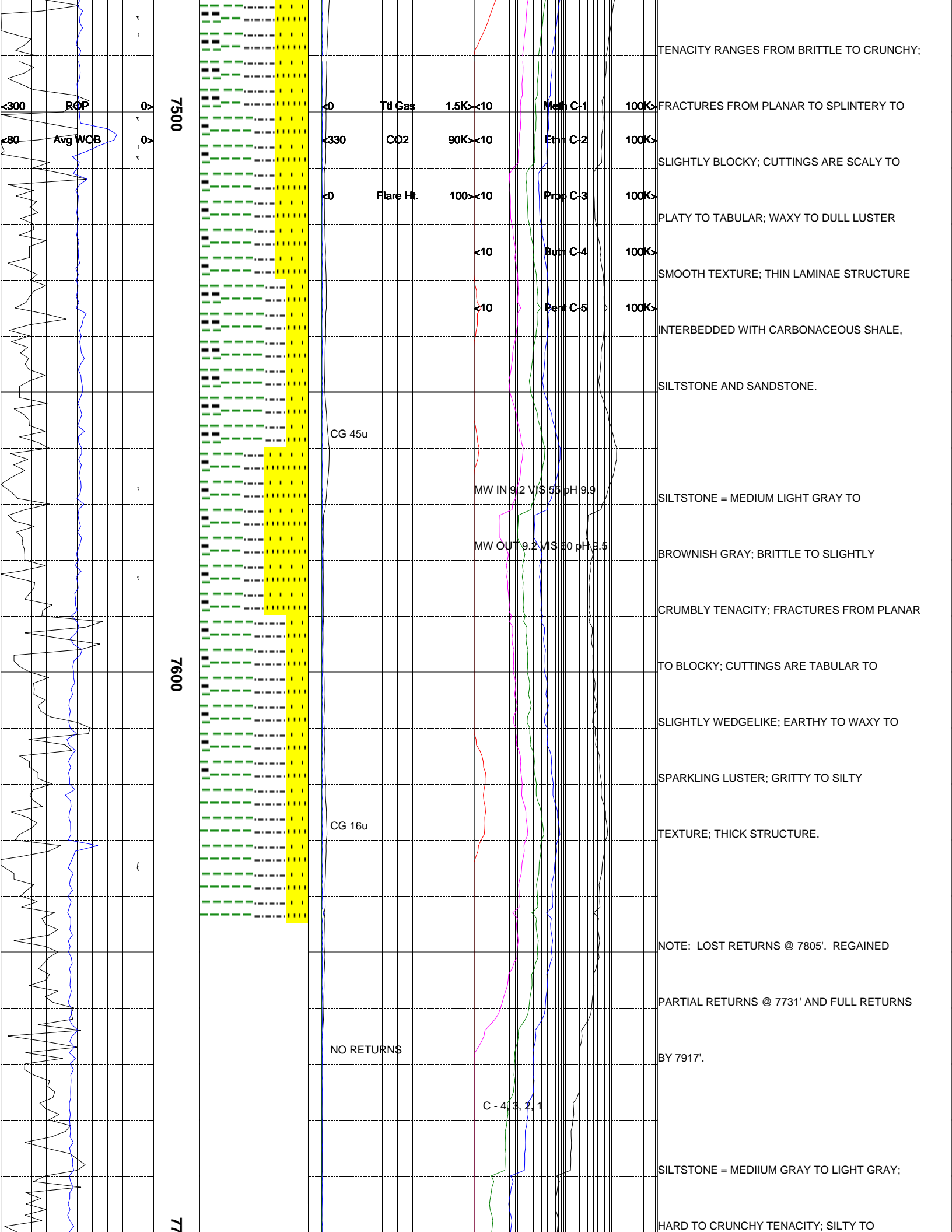


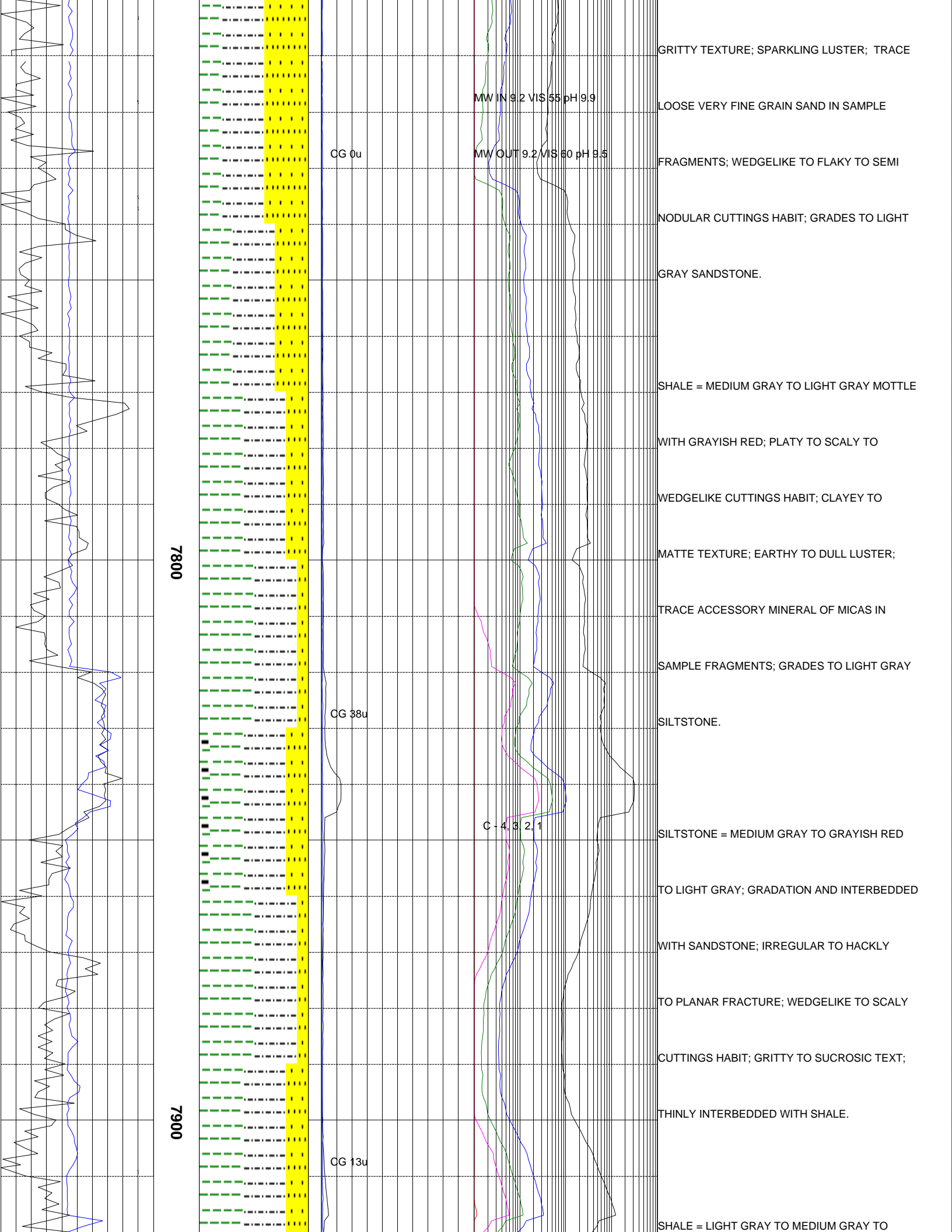


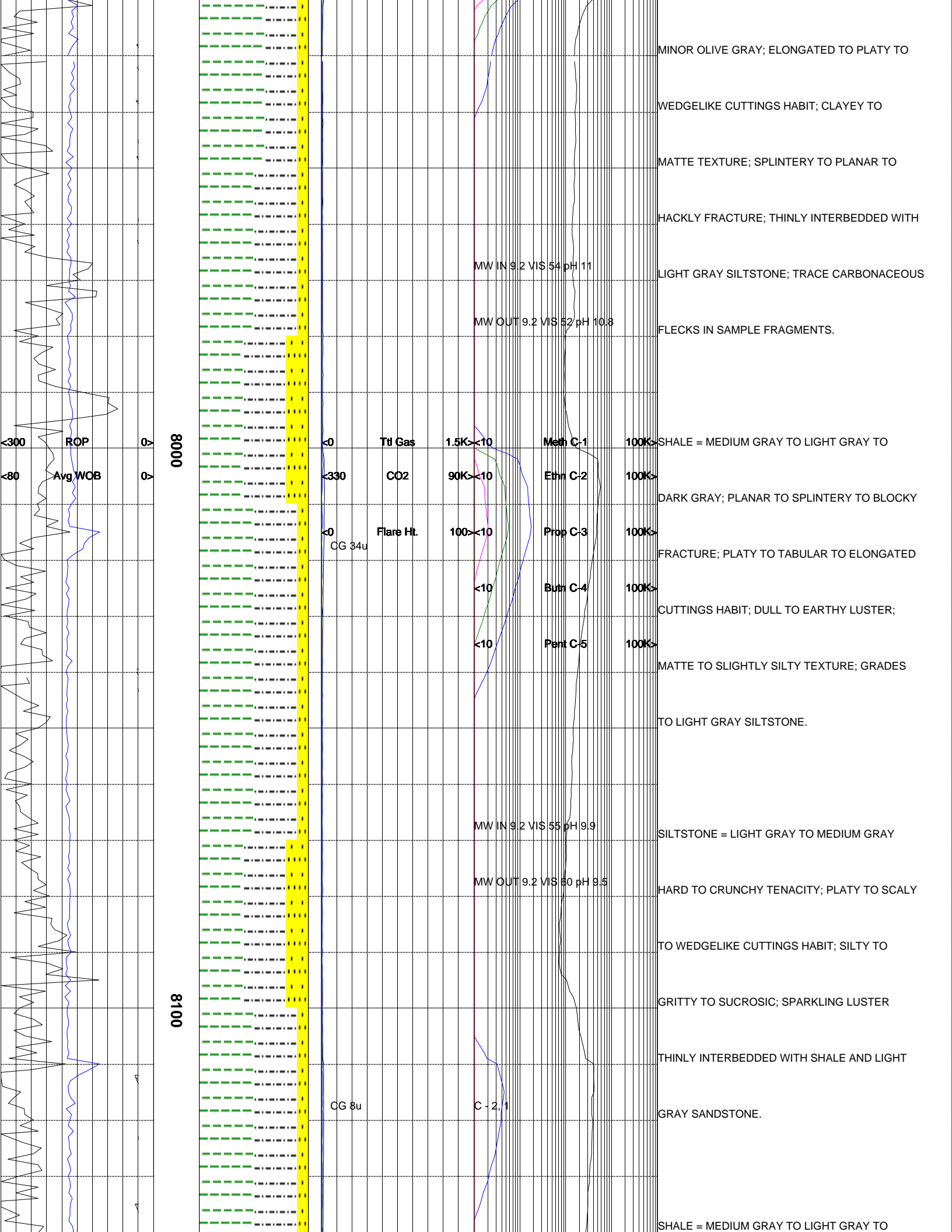


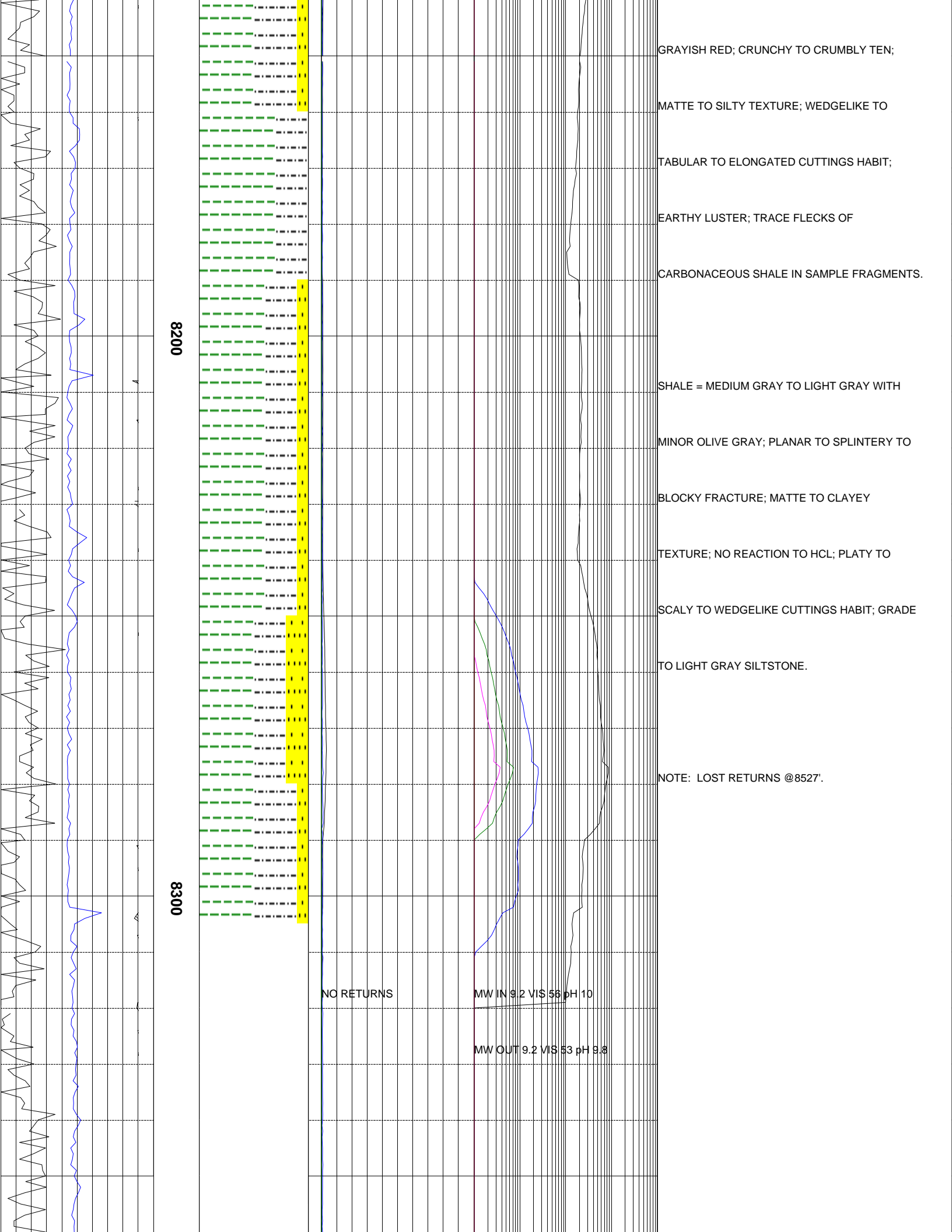












8200

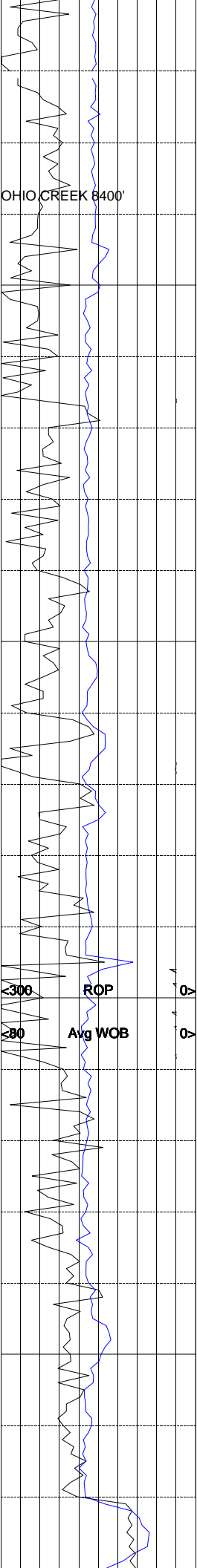
8300

GRAYISH RED; CRUNCHY TO CRUMBLY TEN;  
MATTE TO SILTY TEXTURE; WEDGELIKE TO  
TABULAR TO ELONGATED CUTTINGS HABIT;  
EARTHY LUSTER; TRACE FLECKS OF  
CARBONACEOUS SHALE IN SAMPLE FRAGMENTS.  
SHALE = MEDIUM GRAY TO LIGHT GRAY WITH  
MINOR OLIVE GRAY; PLANAR TO SPLINTERY TO  
BLOCKY FRACTURE; MATTE TO CLAYEY  
TEXTURE; NO REACTION TO HCL; PLATY TO  
SCALY TO WEDGELIKE CUTTINGS HABIT; GRADE  
TO LIGHT GRAY SILTSTONE.  
NOTE: LOST RETURNS @8527'.

NO RETURNS

MW IN 9.2 VIS 56 pH 10

MW OUT 9.2 VIS 53 pH 9.8



NO RETURNS

NO RETURNS

NO RETURNS

<0 Ttl Gas 1.5K<10 Meth C-1 100K>

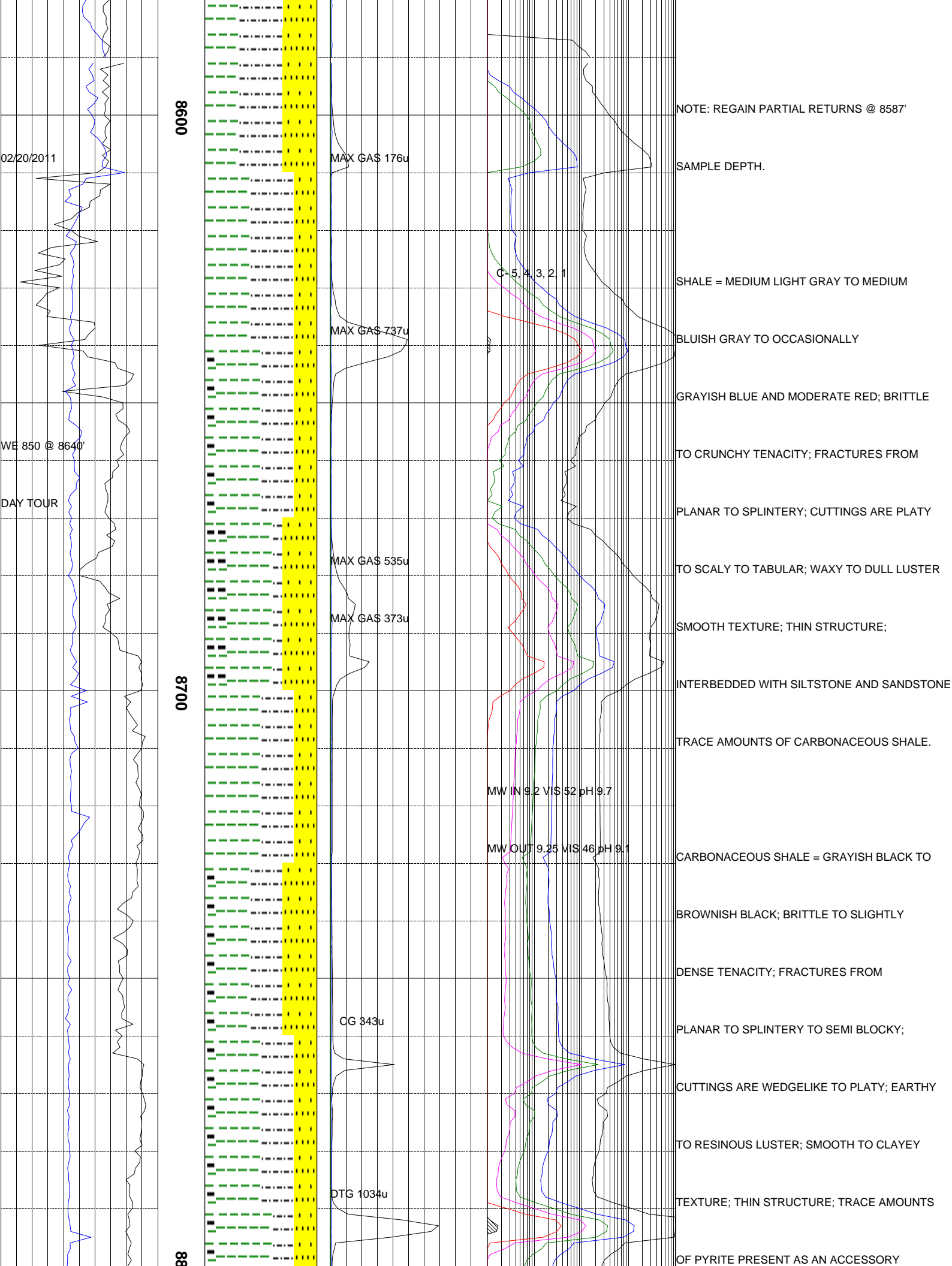
<330 CO2 90K<10 Ethn C-2 100K>

<0 Flare Ht. 100<10 Prop C-3 100K>

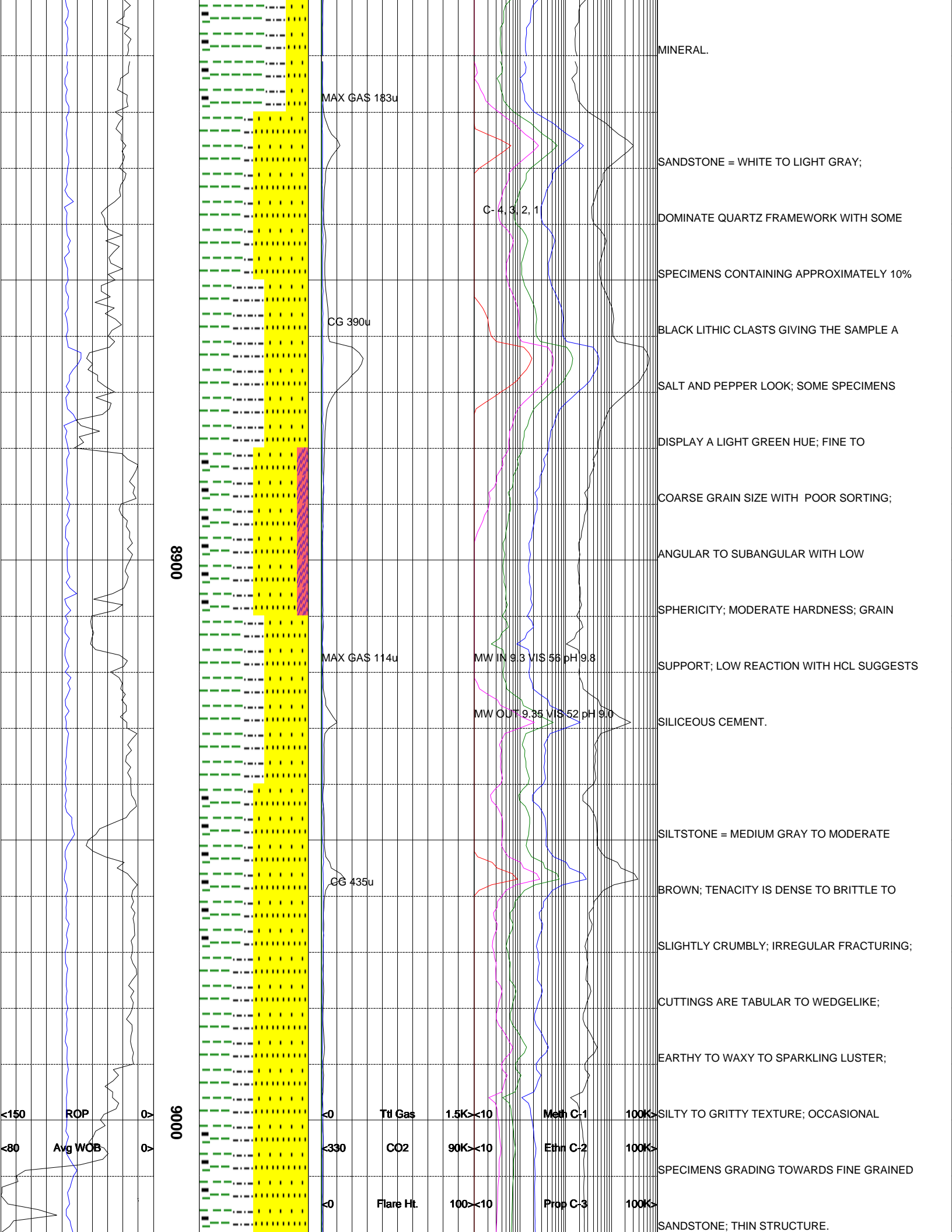
CALIB GAS EQUIPMENT <10 Butn C-4 100K>

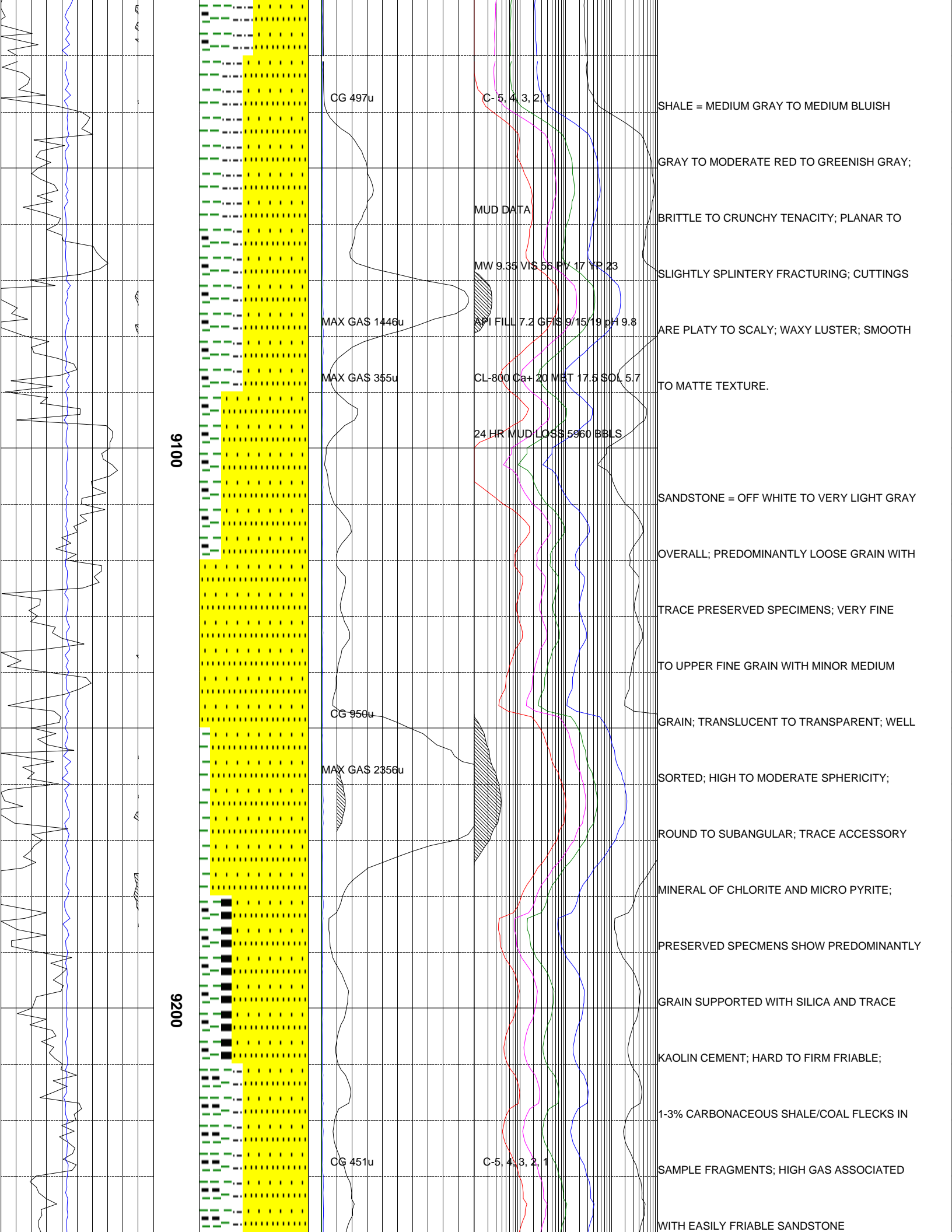
<10 Pent C-5 100K>

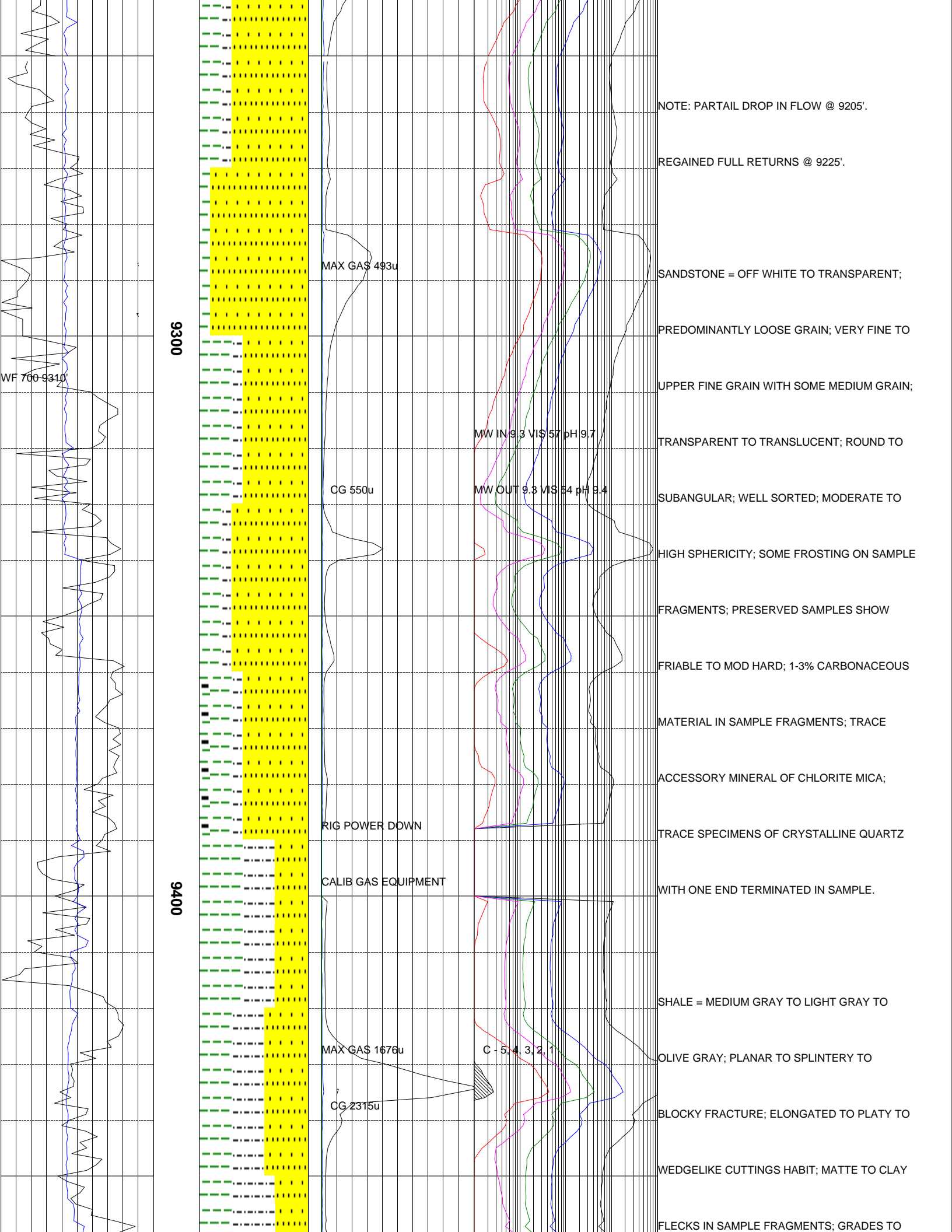


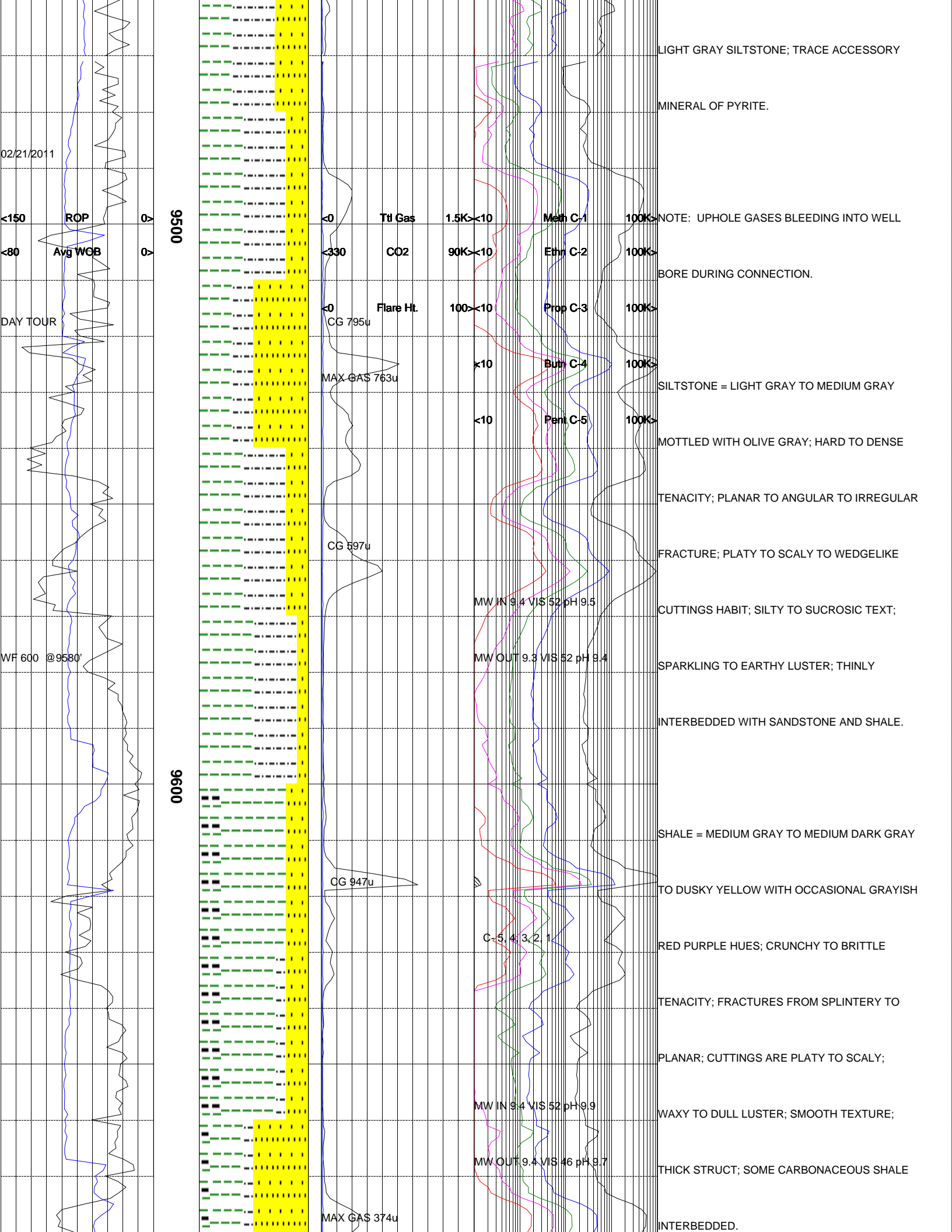


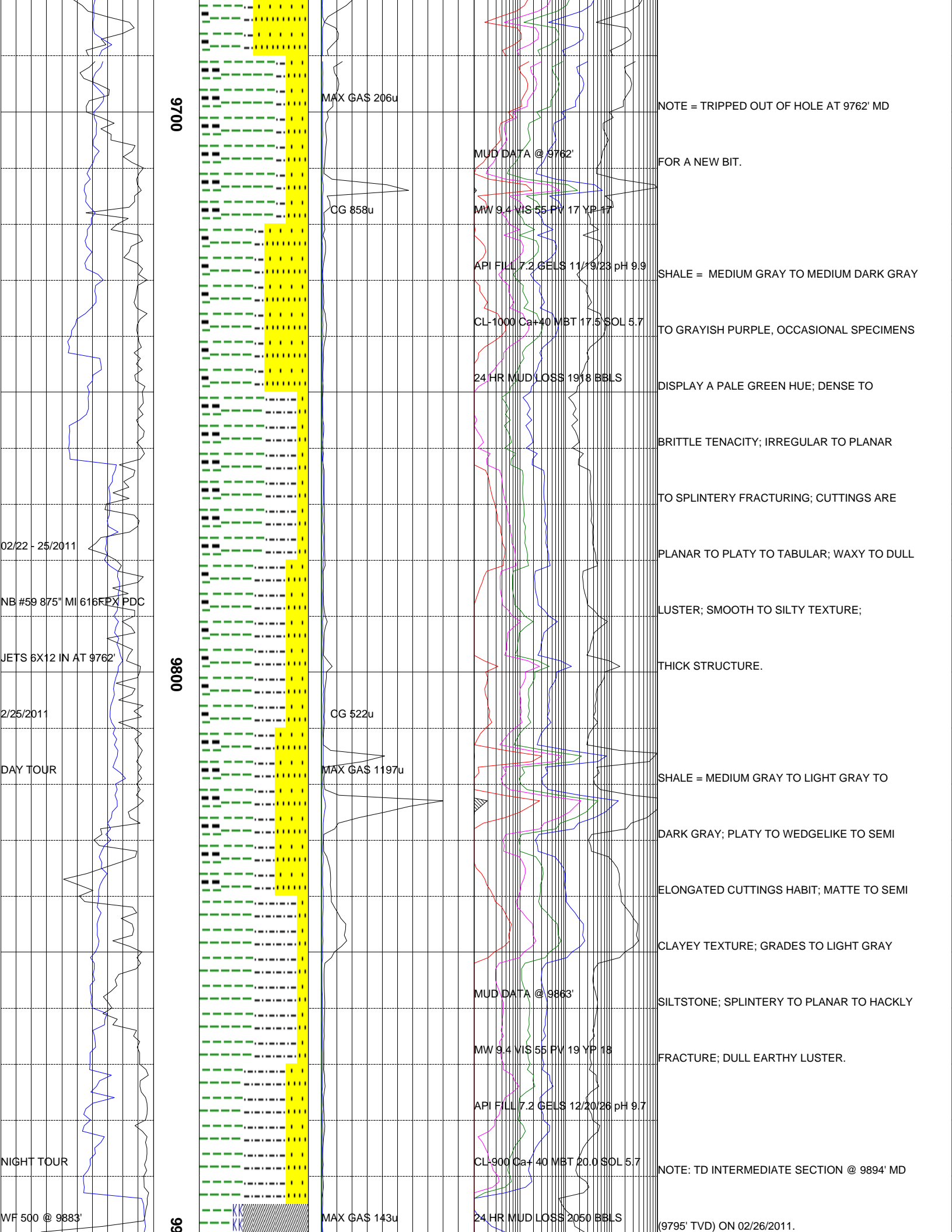


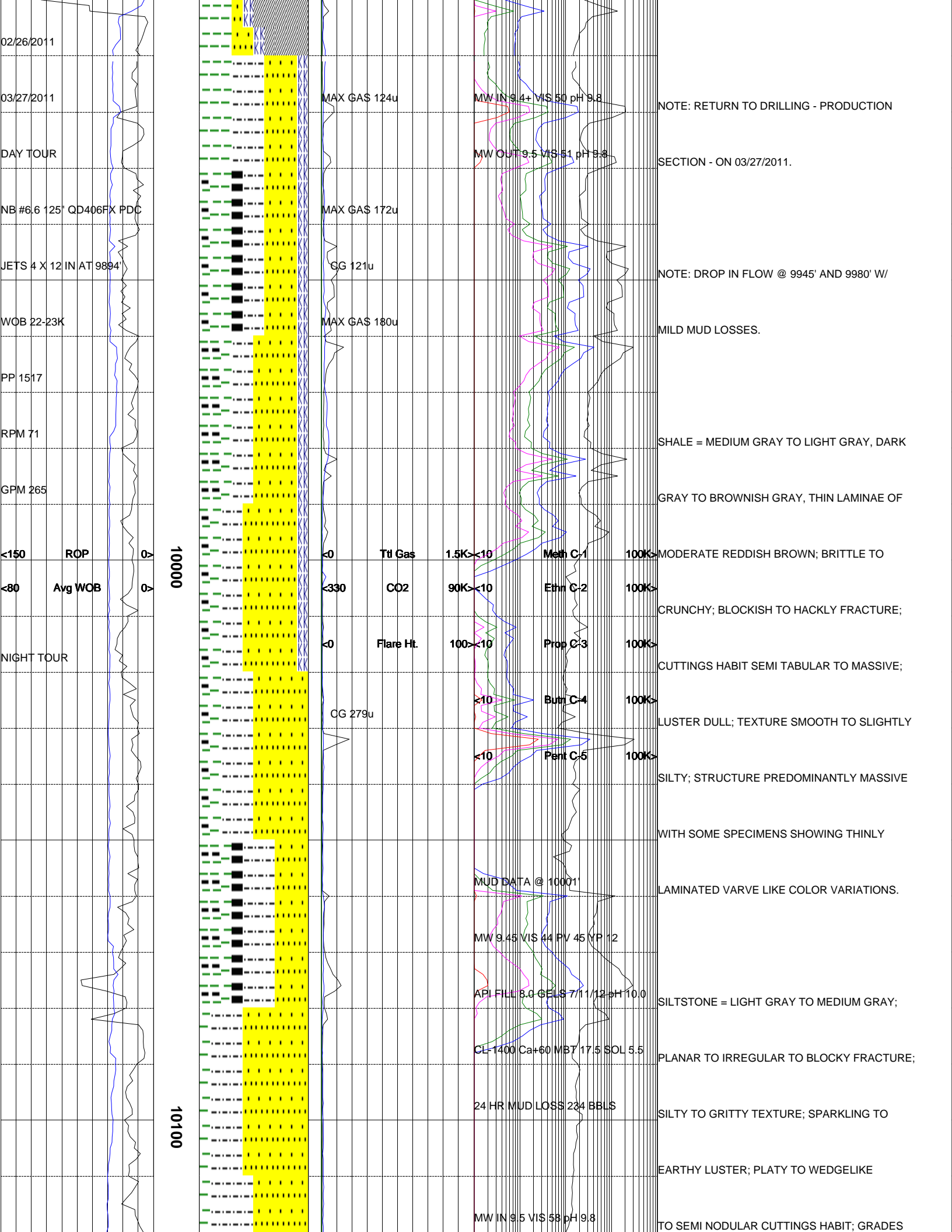












03/28/2011

DAY TOUR

WOB 26 - 27K

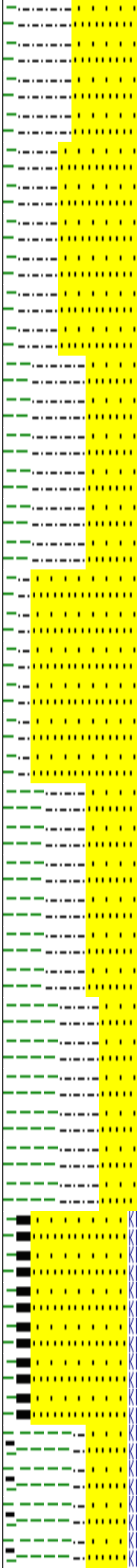
PP 2409

RPM 59

GPM 310

10200

10300



CALIB GAS EQUIPMENT

CG 361u

CHANGE GAS SCALE

AT 10200' MD 0 - 1000u

CG 2581u

MAX GAS 160u

MAX GAS 1809u

MAX GAS 1373u

MW OUT 9.5 VIS 46 pH 9.6

MW IN 9.5 VIS 58 pH 9.8

MW OUT 9.5 VIS 46 pH 9.6

C - 2.1

MW IN 9.5 VIS 49 pH 9.9

MW OUT 9.5 VIS 54 pH 9.6

TO VERY LIGHT GRAY SANDSTONE.

NOTE: DROP IN FLOW @ 10138' W/ INCREASE

IN MUD LOSSES.

SILTSTONE = MEDIUM GRAY TO LIGHT GRAY;

HACKLY TO PLANAR TO IRREGULAR FRACTURE;

SPARKLING TO EARTHY LUSTER; WEDGELIKE TO

TABULAR TO PLATY CUTTINGS HABIT; SILTY

TO GRITTY TEXTURE; TRACE LOOSE SAND IN

SAMPLE FRAGMENTS.

SHALE = LIGHT TO MEDIUM GRAY WITH

COMMON DARK GRAY TO BROWNISH GRAY;

CRUNCHY TO BRITTLE WITH OCCASIONAL

MODERATELY HARD SPECIMENS; FRACTURE

HACKLY TO SUB CONCHOIDAL; CUTTINGS HABIT

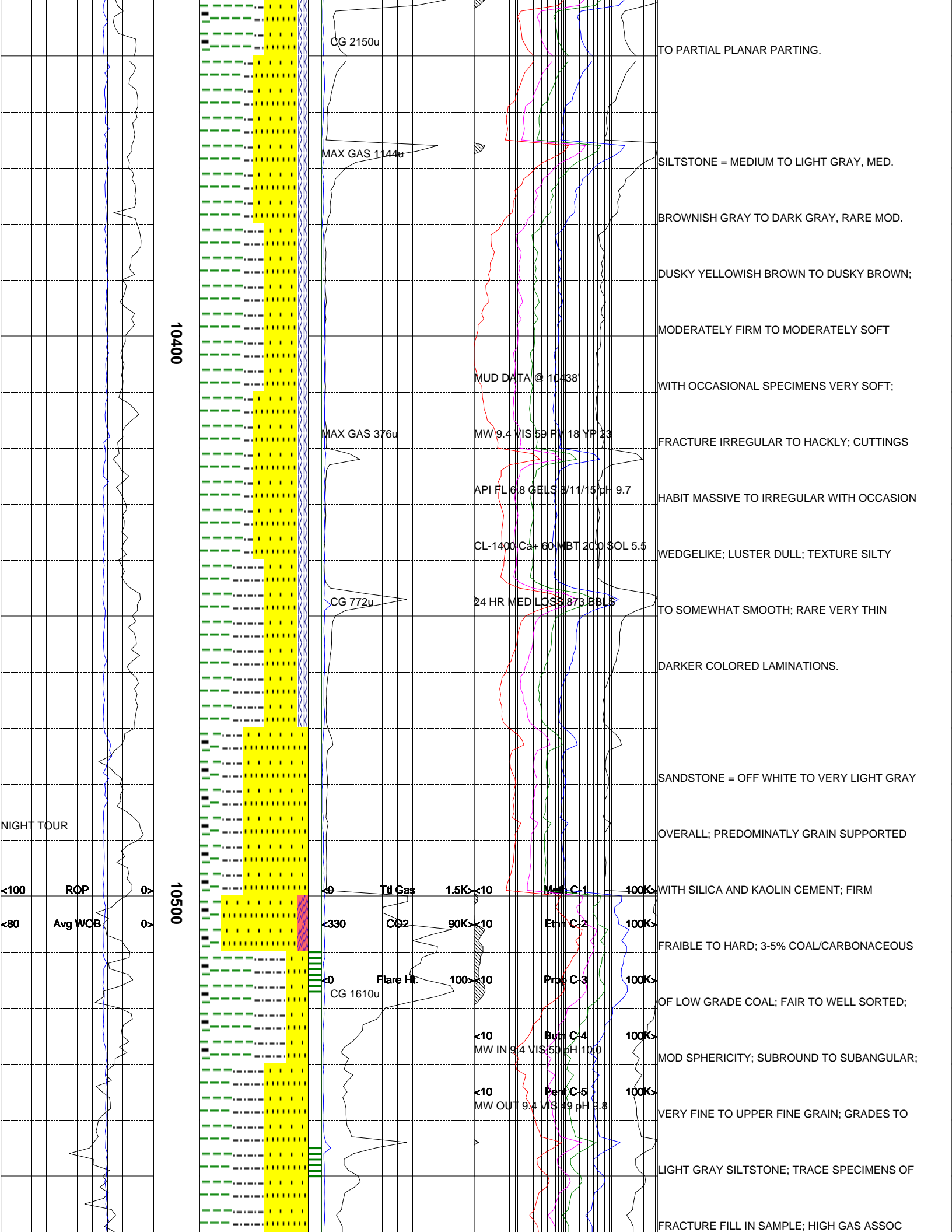
BLADED TO SCALY WITH COMMON WEDGE LIKE

SPECIMENS; TEXTURE SMOOTH TO SLIGHTLY

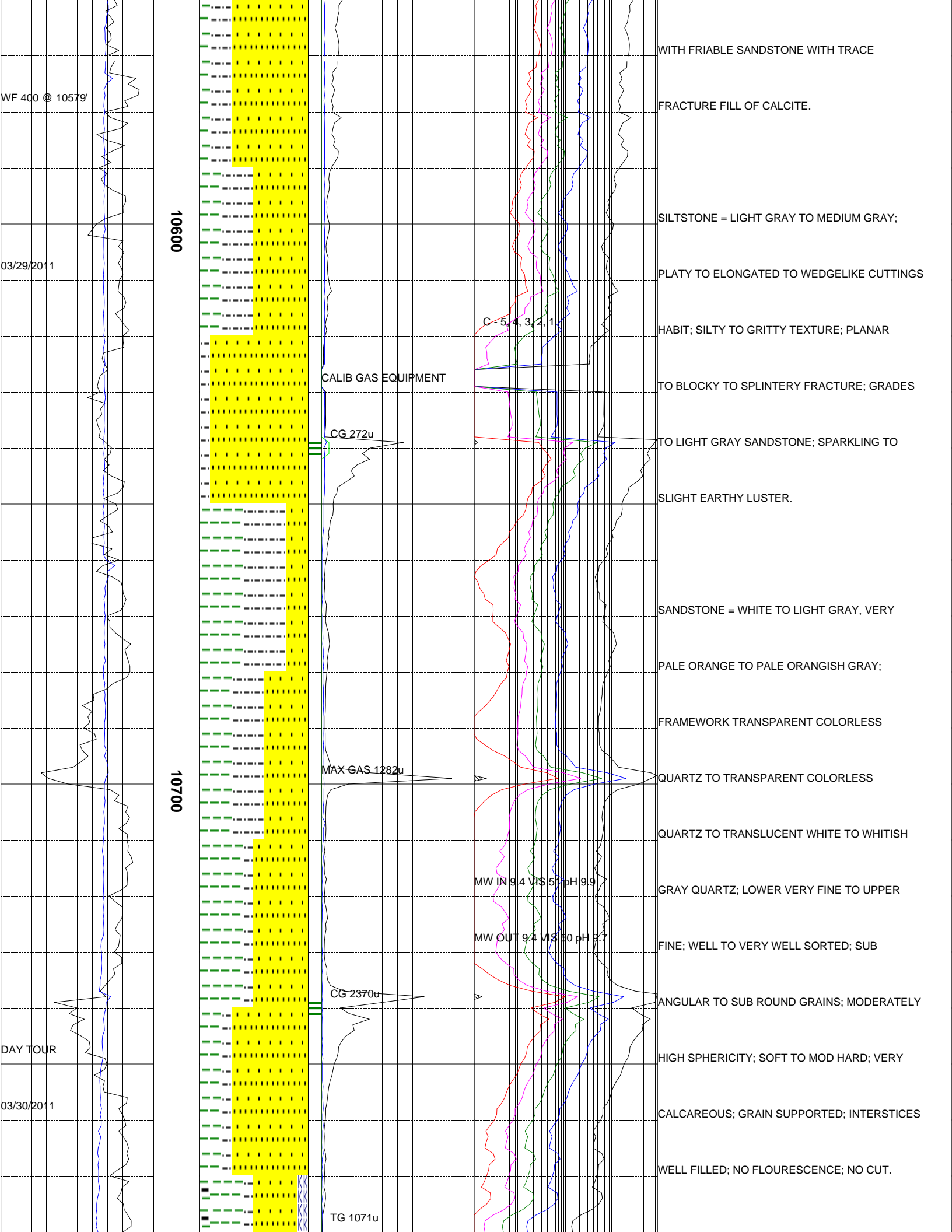
SILTY; STRUCTURE MOSTLY MASSIVE WITH

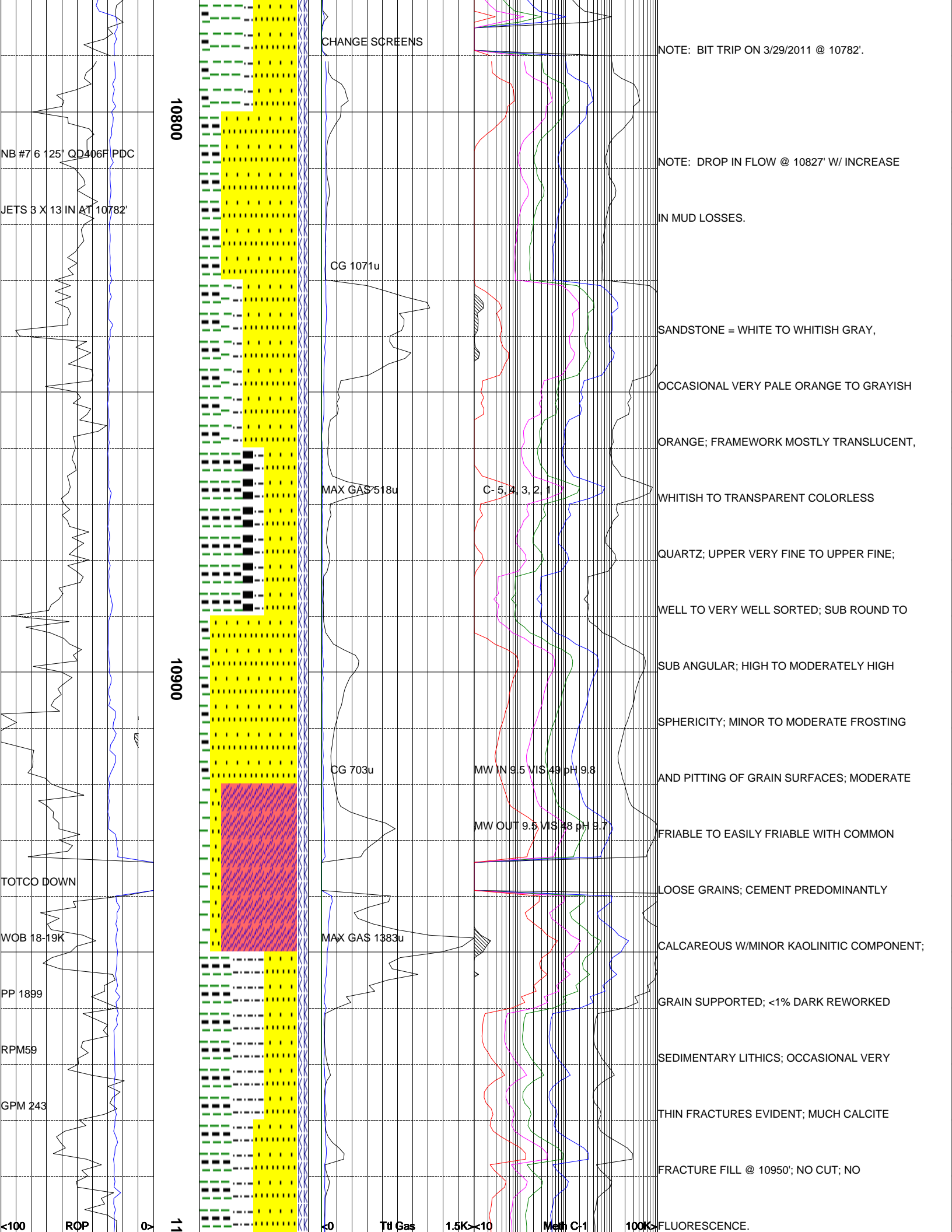
RARE TO OCCASIONAL SPECIMENS

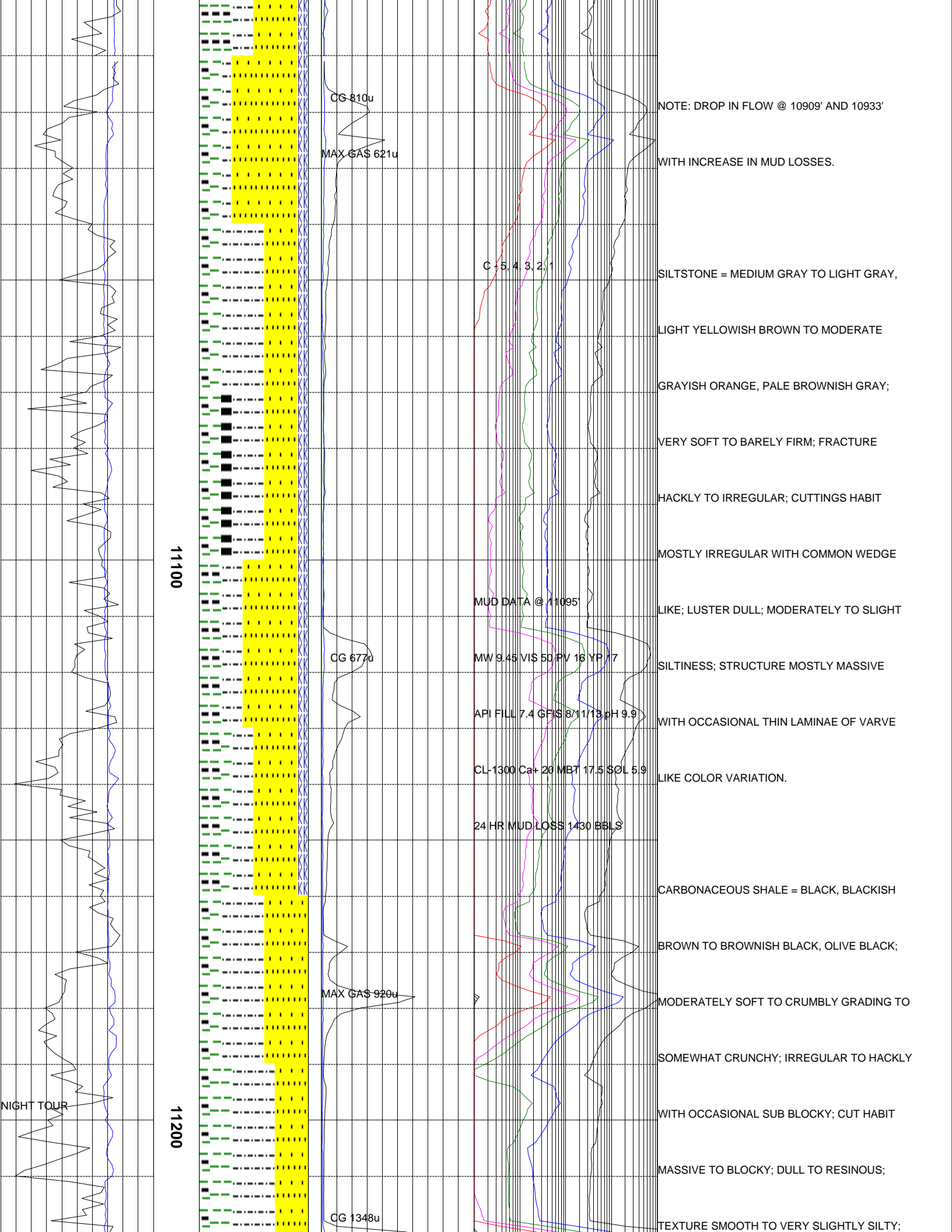
SHOWING THIN LAMINAE AND RARE PLANAR

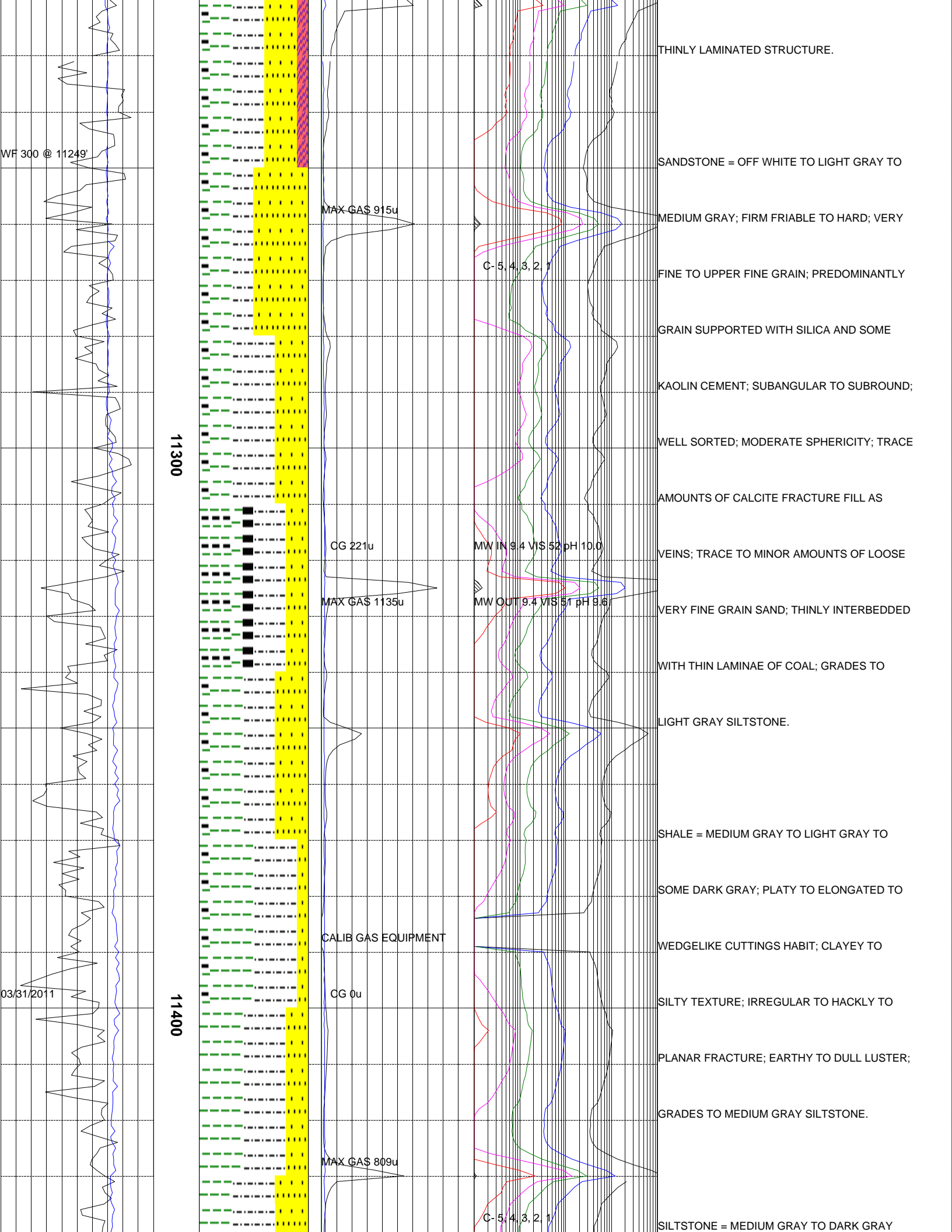


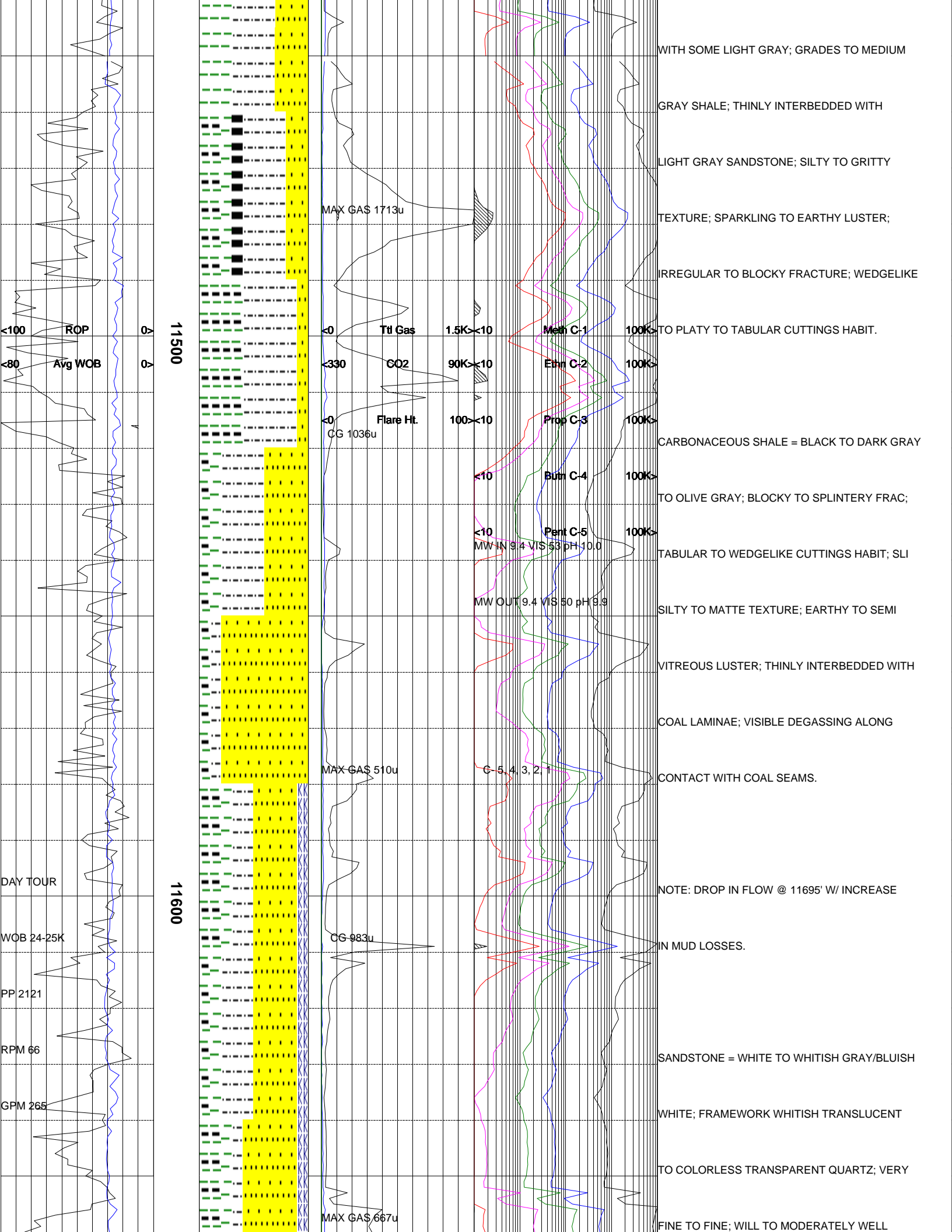


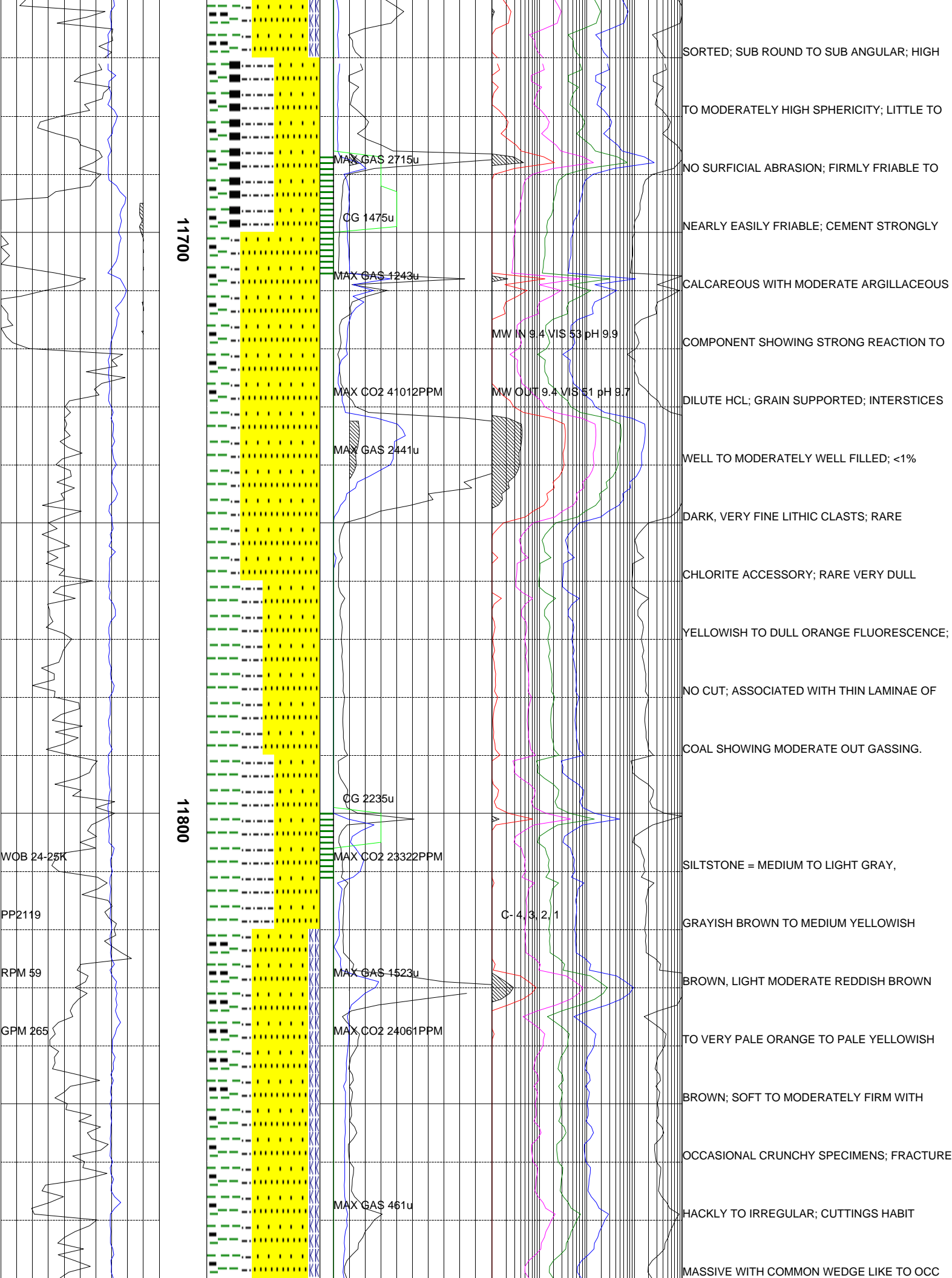


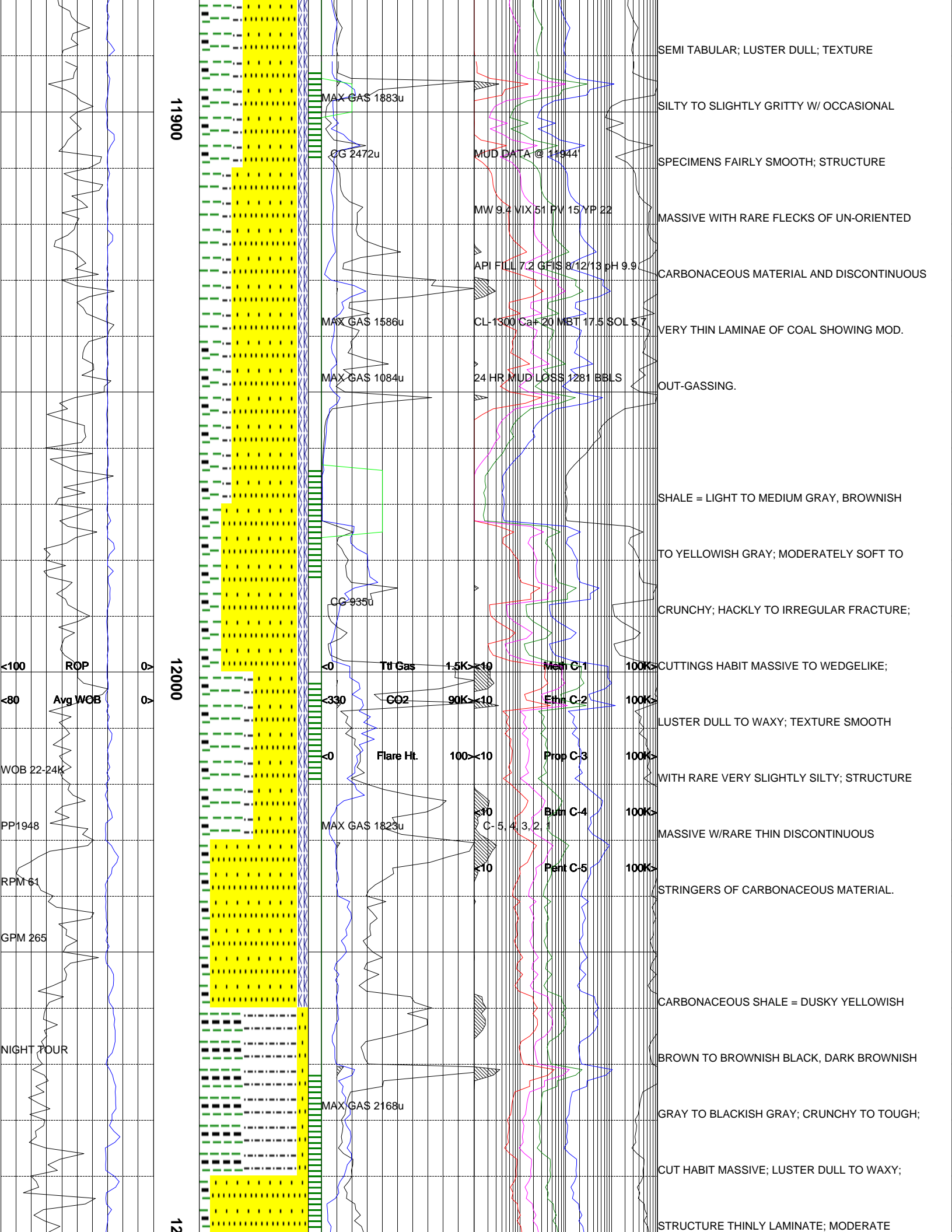




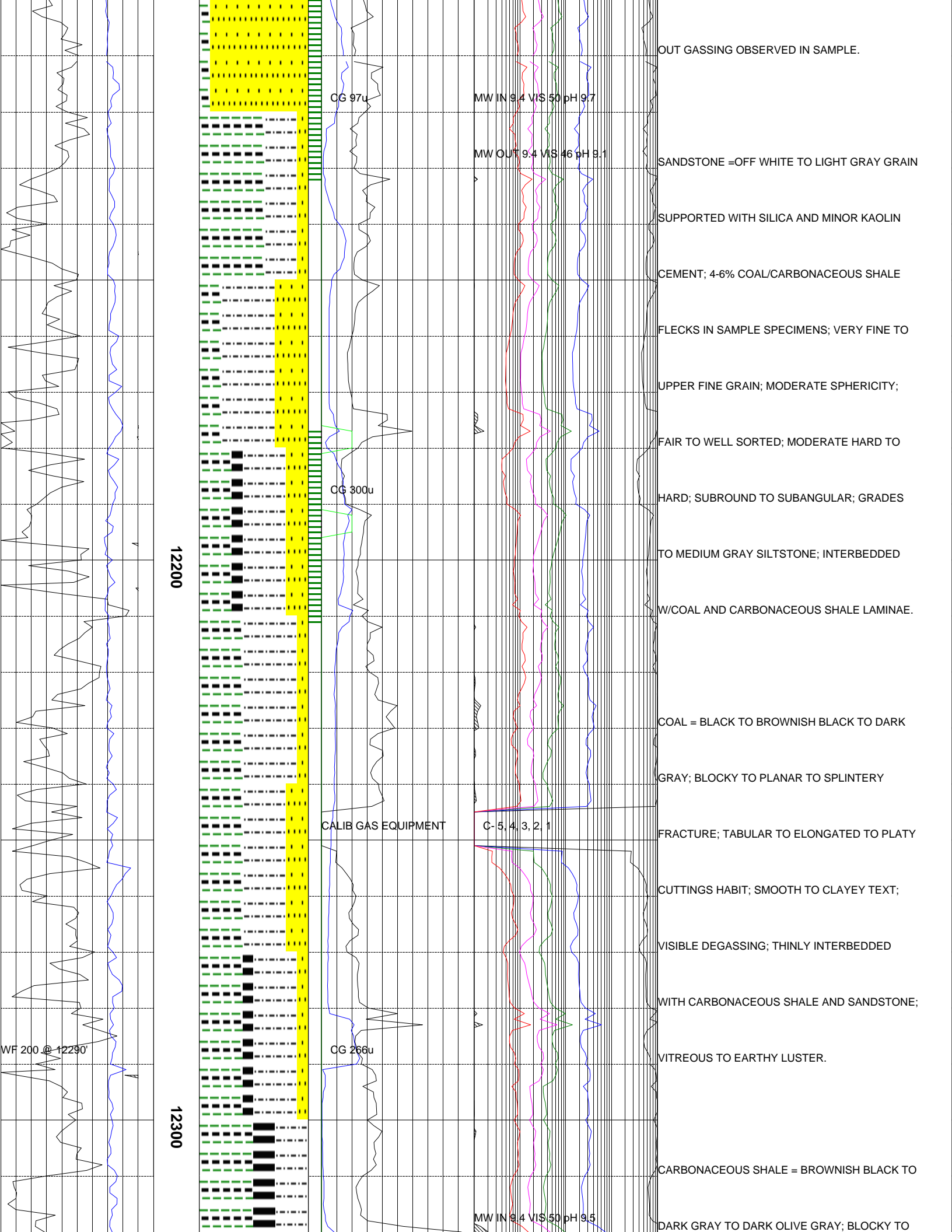




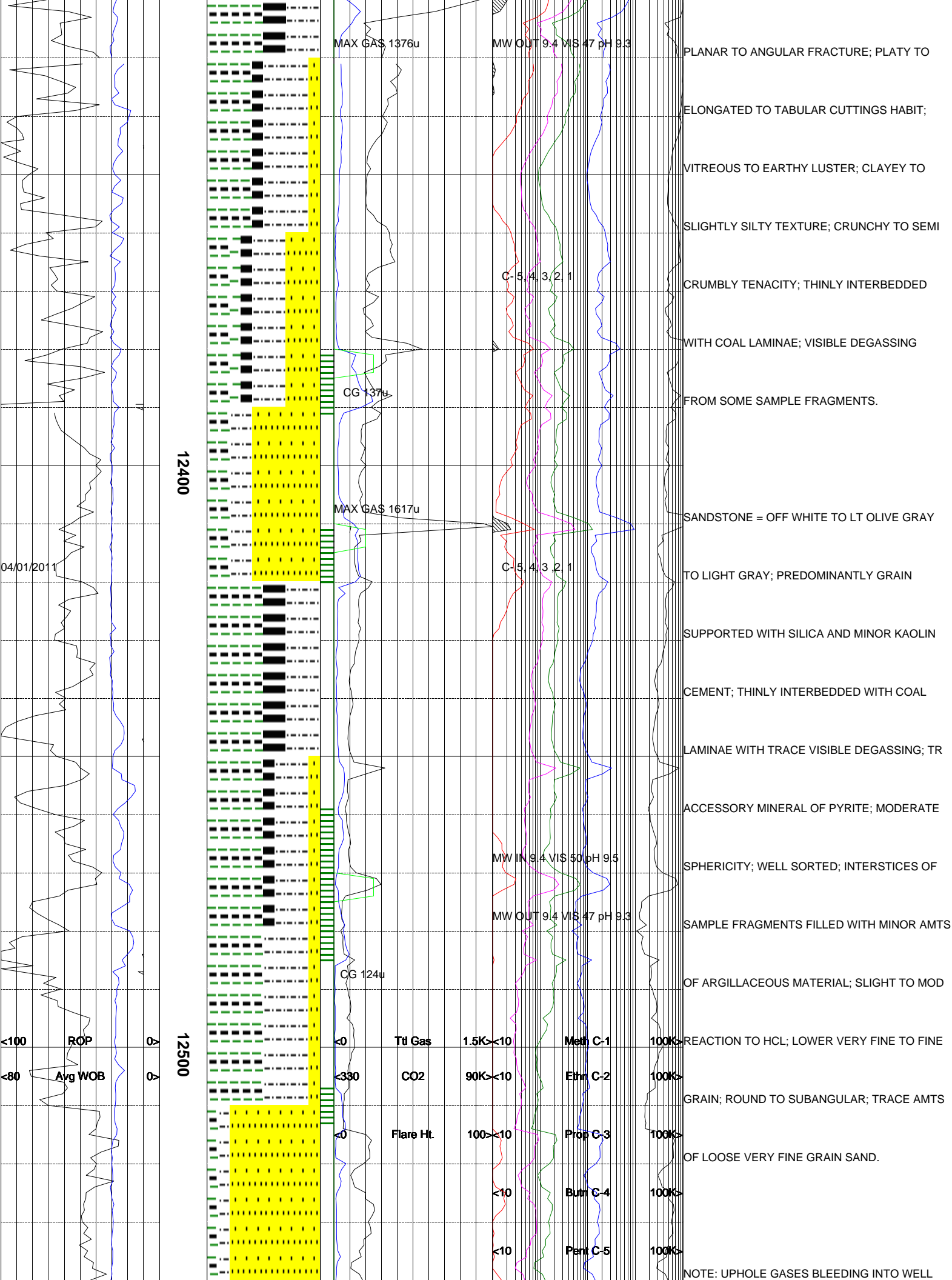


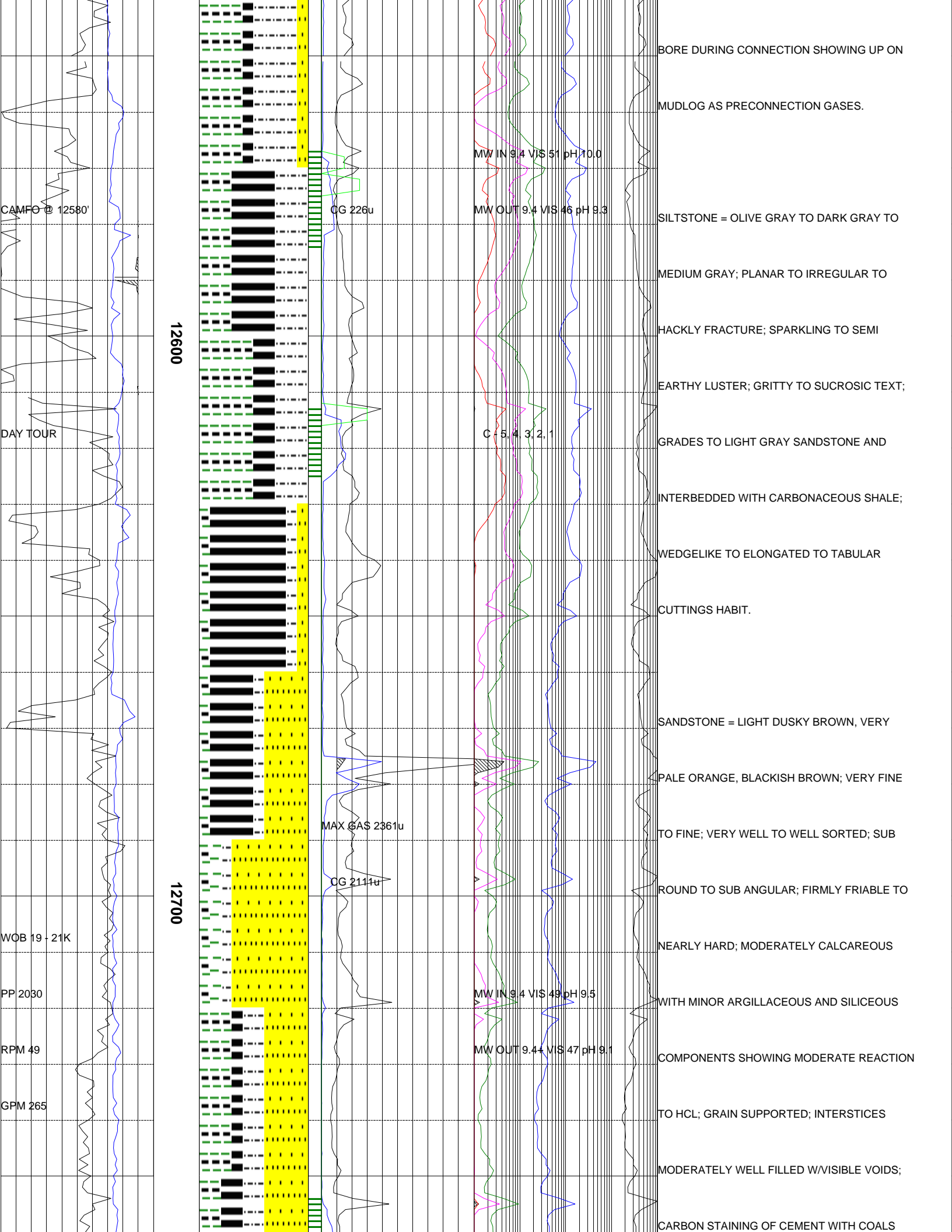












BORE DURING CONNECTION SHOWING UP ON

MUDLOG AS PRECONNECTION GASES.

MW IN 9.4 VIS 51 pH 10.0

CAMFO @ 12580'

CG 226u

MW OUT 9.4 VIS 46 pH 9.3

SILTSTONE = OLIVE GRAY TO DARK GRAY TO

MEDIUM GRAY; PLANAR TO IRREGULAR TO

12600

HACKLY FRACTURE; SPARKLING TO SEMI

EARTHY LUSTER; GRITTY TO SUCROSIC TEXT;

DAY TOUR

C + 5.4 3 2, 1

GRADES TO LIGHT GRAY SANDSTONE AND

INTERBEDDED WITH CARBONACEOUS SHALE;

WEDGELIKE TO ELONGATED TO TABULAR

CUTTINGS HABIT.

SANDSTONE = LIGHT DUSKY BROWN, VERY

PALE ORANGE, BLACKISH BROWN; VERY FINE

MAX GAS 2361u

TO FINE; VERY WELL TO WELL SORTED; SUB

12700

CG 2111u

ROUND TO SUB ANGULAR; FIRMLY FRIABLE TO

NEARLY HARD; MODERATELY CALCAREOUS

WOB 19 - 21K

MW IN 9.4 VIS 49 pH 9.5

PP 2030

WITH MINOR ARGILLACEOUS AND SILICEOUS

RPM 49

MW OUT 9.4+ VIS 47 pH 9.1

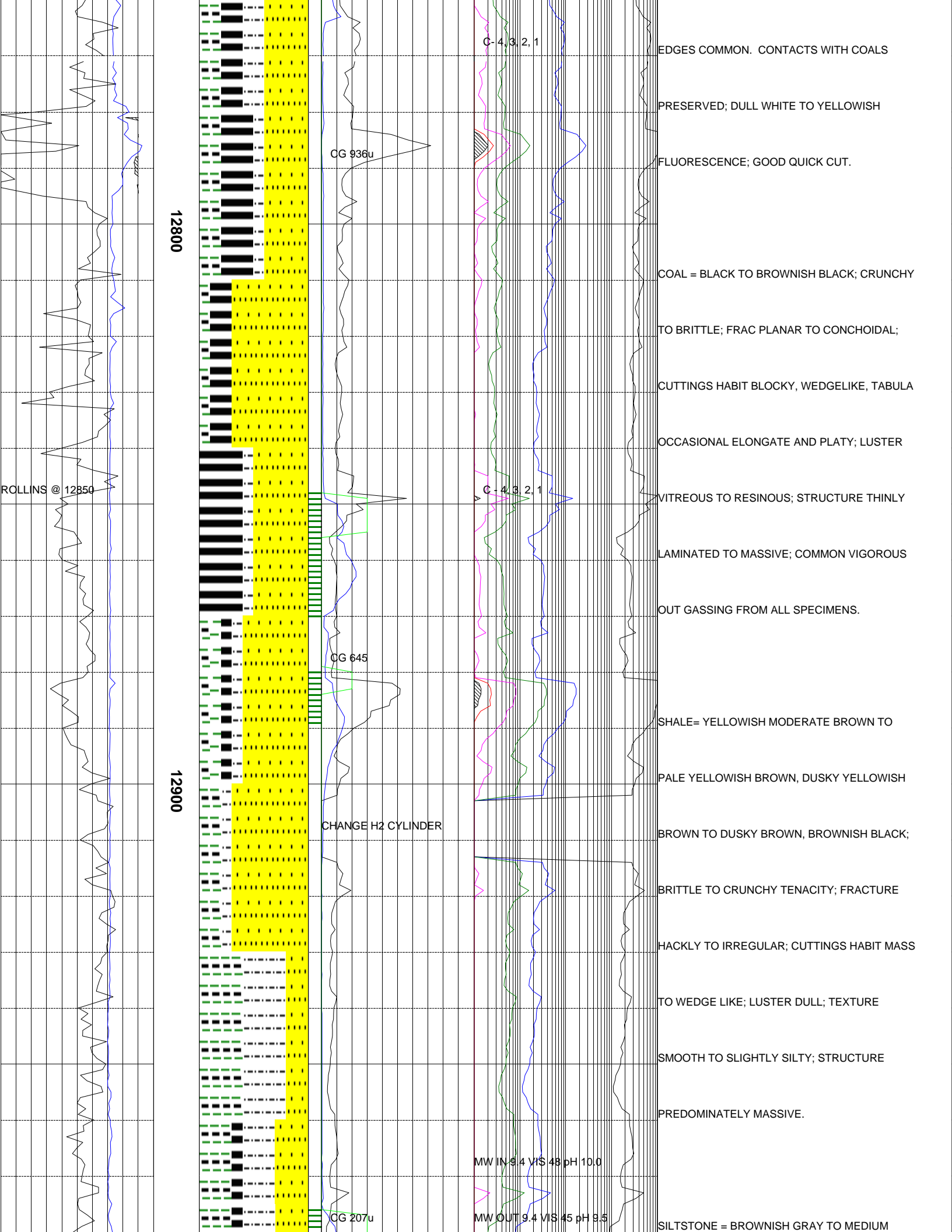
COMPONENTS SHOWING MODERATE REACTION

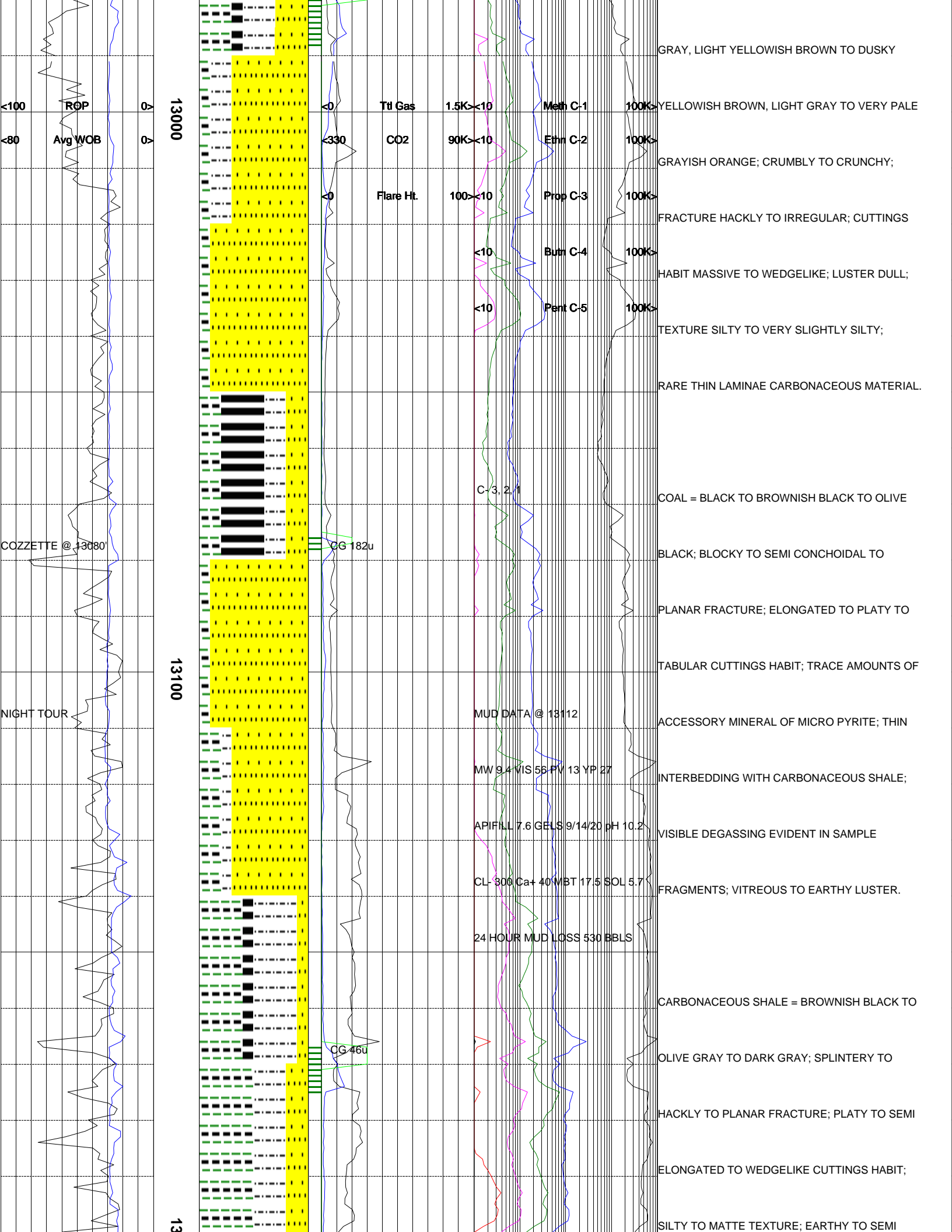
GPM 265

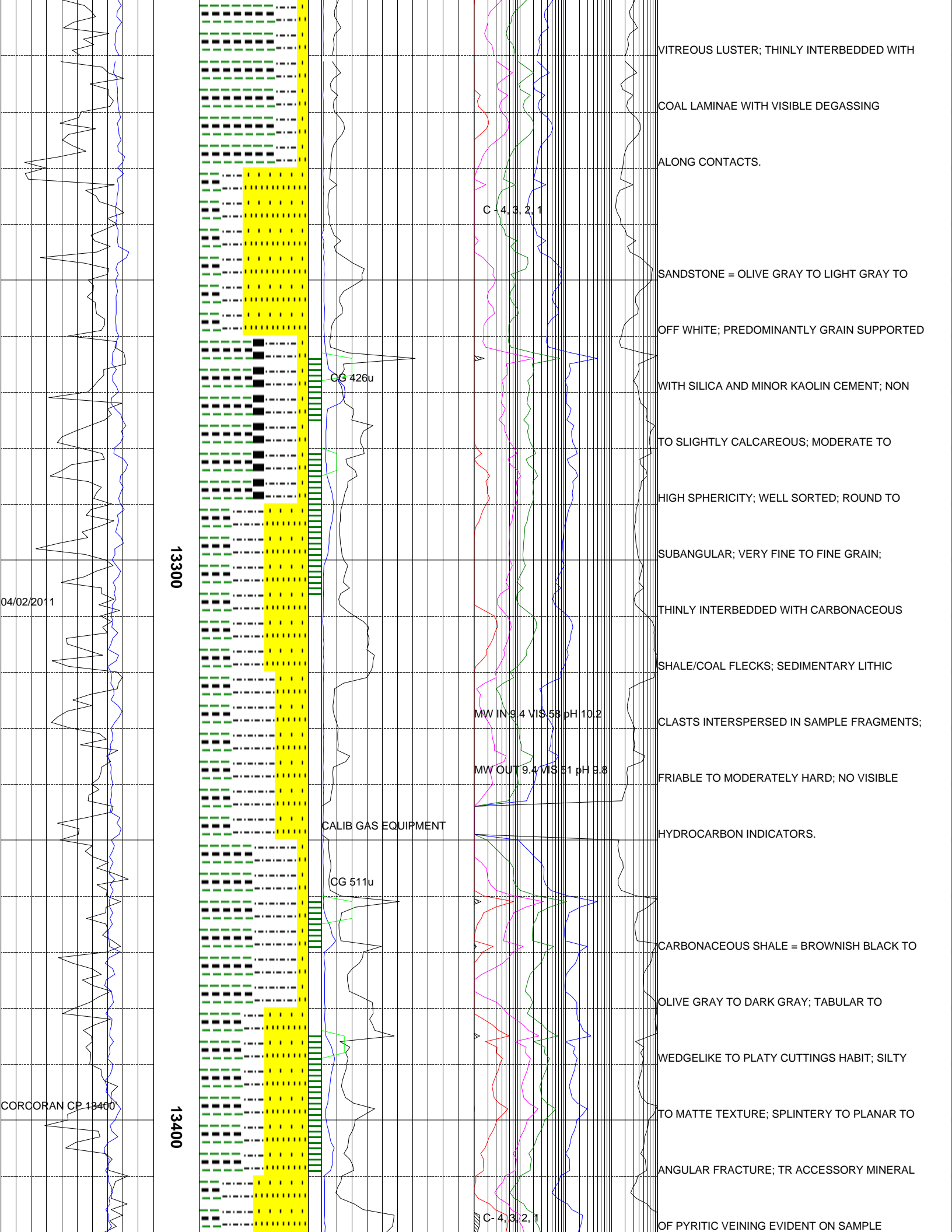
TO HCL; GRAIN SUPPORTED; INTERSTICES

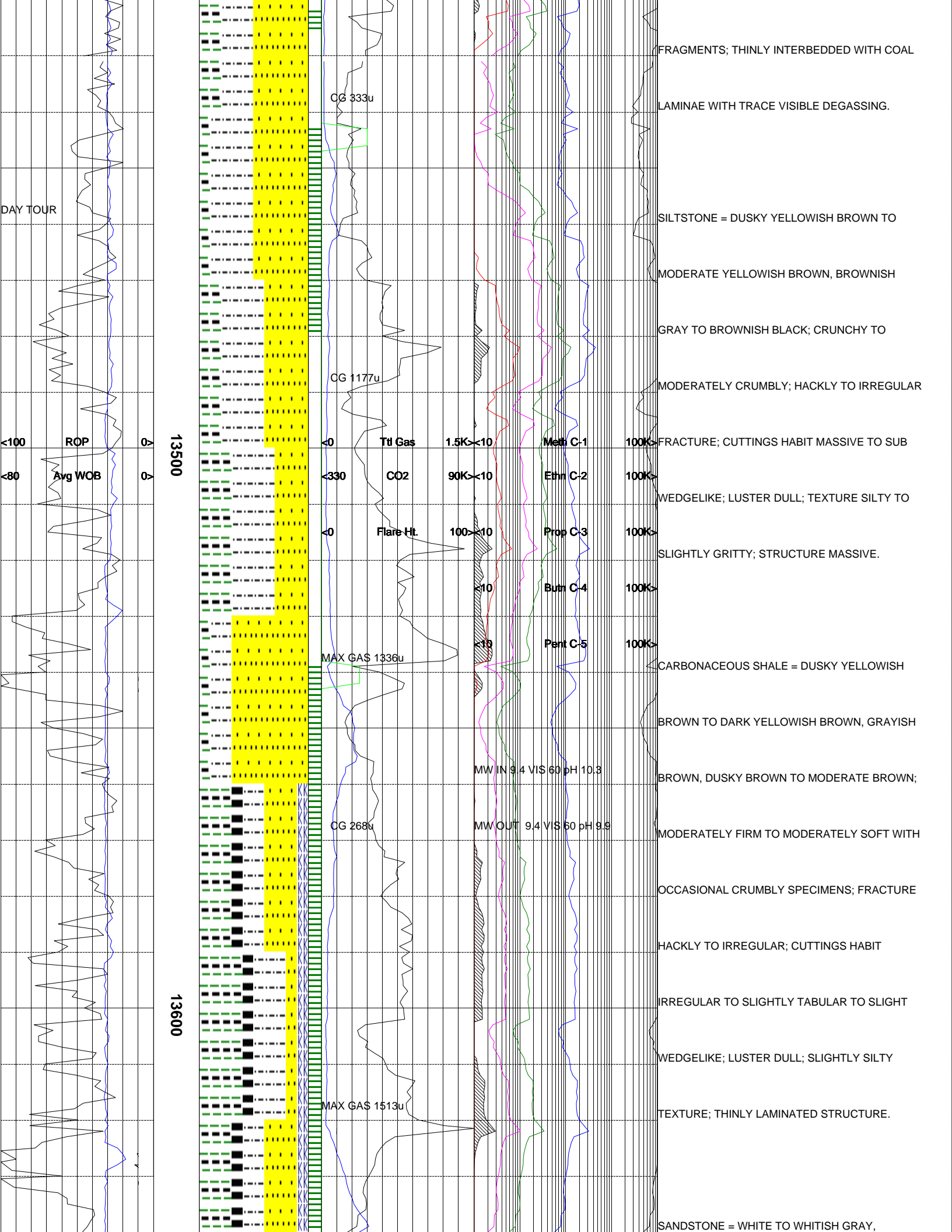
MODERATELY WELL FILLED W/VISIBLE VOIDS;

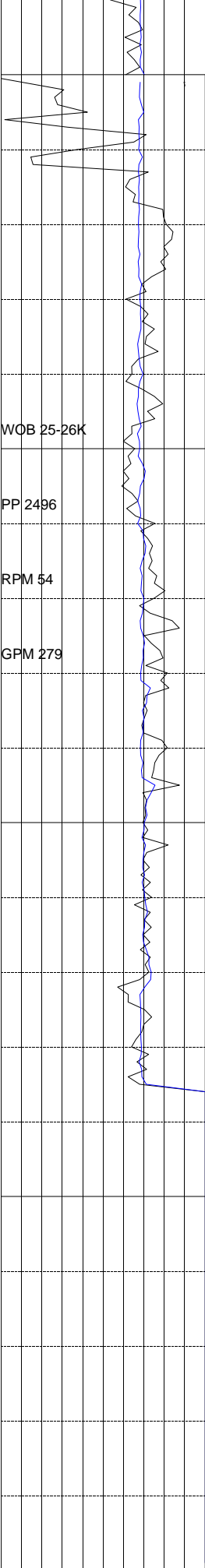
CARBON STAINING OF CEMENT WITH COALS





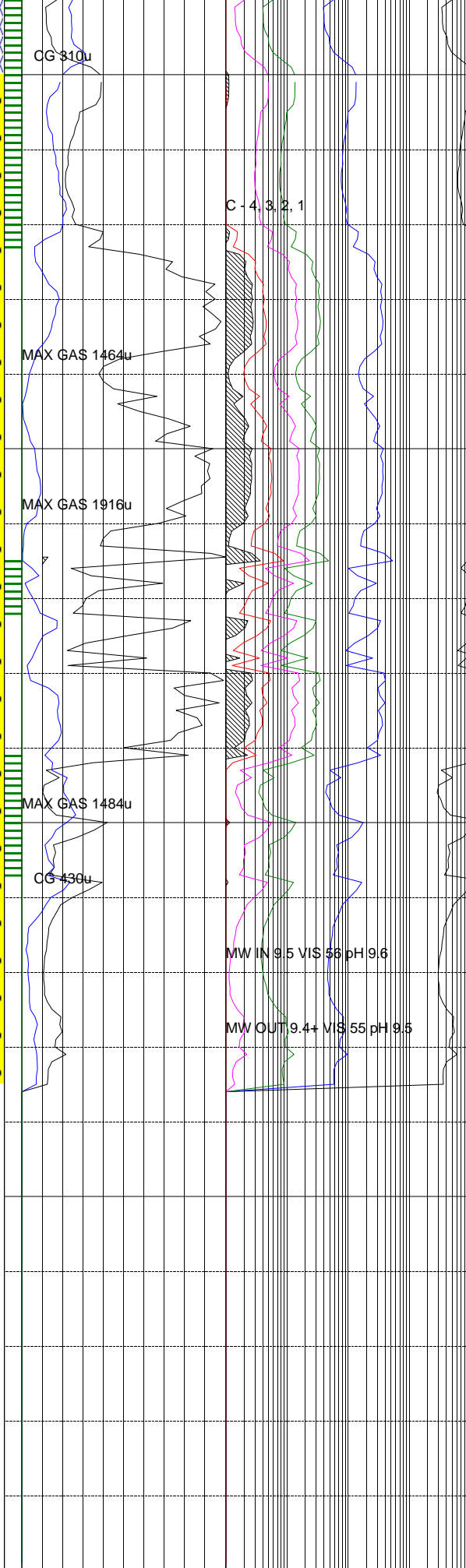
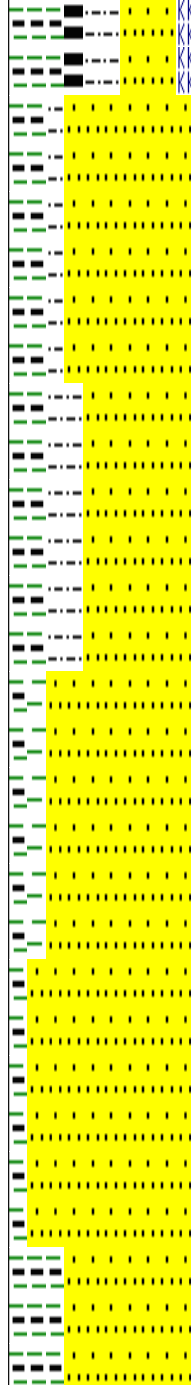






13700

13800



VERY PALE ORANGE TO PALE MODERATE

BROWN, LIGHT YELLOWISH BROWN; FRAME

WORK PREDOMINANTLY TRANSLUCENT

WHITISH TO TRANSPARENT COLORLESS QUARTZ;

VERY FINE TO FINE; WELL TO MODERATELY

WELL SORTED; SUB ROUND TO SUB ANGULAR;

MODERATELY HIGH SPHERICITY; FIRMLY

FRIABLE; ARGILLACEOUS CEMENT WITH

CALCAREOUS COMPONENT; MOD REACTION

TO HCL; INTERSTICES WELL FILLED; <1%

DARK, VERY FINE LITHIC CLASTS; NO CUT;

NO FLUORESCENCE.

NOTE: TD WELL @ 13785' ON 4/02/2011.





