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# MUDLOG TVD

**COMPANY** ExxonMobil Production  
**WELL** FRU197-33B10  
**FIELD** Piceance Creek  
**REGION** Rocky Mountain  
**COORDINATES** 39.921283000  
108.282576000  
**ELEVATION** 6460'  
**COUNTY, STATE** Rio Blanco, CO  
**API INDEX** 051031142300  
**SPUD DATE** 4/13/2010  
**CONTRACTOR** HE  
**CO. REP.** C.Curtis  
**RIG/TYPE** 321 / Flex 4  
**LOGGING UNIT** 31  
**GEOLOGISTS** C. Record  
M. Franco  
**ADD. PERSONS** M.Piper  
R.McCane  
**CO. GEOLOGIST** Nova Roosmawati

## LOG INTERVAL

## CASING DATA

**DEPTHS:** 4124' TO 12667'  
**DATES:** 8/05/2010 TO 8/15/2010  
**SCALE:** 5"=100'

16.0" AT 150'  
10.75" AT 4114'  
4.5" AT 12657'

AT

## MUD TYPES

## HOLE SIZE

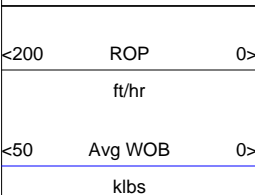
WATERBASED TO 12667'  
TO  
TO  
TO

14.75" TO 4124'  
8.75" TO 12667'  
TO  
TO

## ABBREVIATIONS

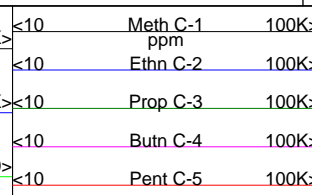
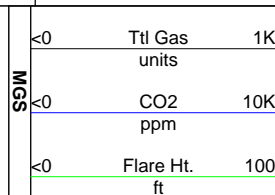
<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</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	

ALTERED ZONE	CHERT - GLASSY	FELSIC SILIC DIKE	MARL - CALC	SANDSTONE
ANDESITE	CHERT - PORCEL	FOSSIL	METAMORPHICS	SANDSTONE-TUFFACEOUS
ANHYDRITE	CHERT - TIGER STRIPE	GABBRO	MUDSTONE	SERICITIZATION
BASALT	CHERT - UNDIFF	GLASSY TUFF	OBSIDIAN	SERPENTINE
BENTONITE	CLAY	GRANITE	PALEOSOL	SHALE
BIOTITIZATION	CLAY-MUDSTONE	GRANITE WASH	PHOSPHATE	SHALE TUFFACEOUS
BRECCIA	CLYST-TUFFACEOUS	GRANODIORITE	PORCELANITE	SHELL FRAGMENTS
CALCARENITE	CHLORITIZATION	GYPSUM	PORCELANEOUS CLYST	SIDERITE
CALCAREOUS TUFF	COAL	HALITE	PYRITE	SILICIFICATION
CALCILUTITE	CONGLOMERATE	HORNBL-QTZ-DIO	PYROCLASTICS	SILTSTONE
CARBONATES	CONGL. SAND	IGNEOUS (ACIDIC)	QUARTZ DIORITE	SILTST-TUFFACEOUS
CARBONACEOUS MAT	CONGL. SANDSTONE	IGNEOUS (BASIC)	QUARTZ LATITE	TUFF
CARBONACEOUS SH	COQUINA	INTRUSIVES	QUARTZ MONZONITE	VOLCANICLASTICS SEDS
CEMENT CONTAM.	DACITE	KAOLINITIC	RECRYSTALLIZED CALCITE	VOLCANICS
CHALK	DIATOMITE	LIMESTONE	RHYOLITE	
CRYSTALLINE TUFF	DIORITE	LITHIC TUFF	SALT	
CHERT - ARGILL	DOLOSTONE	MARL - DOLO	SAND	



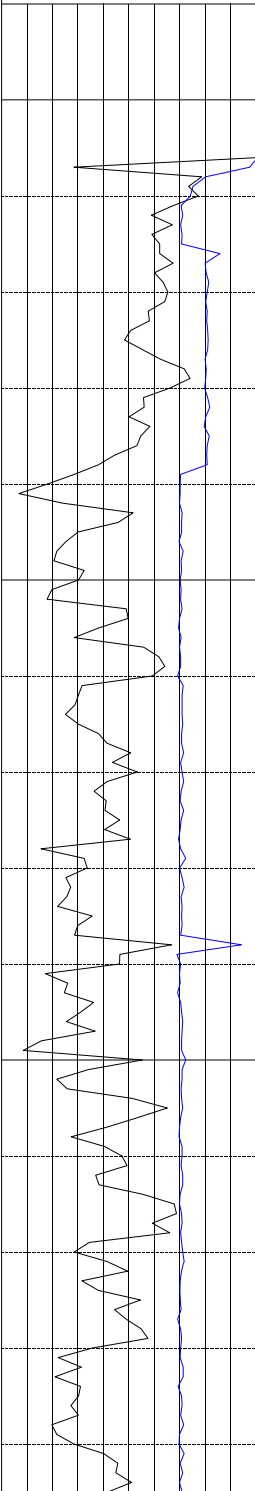
TVD Depth

Lithology

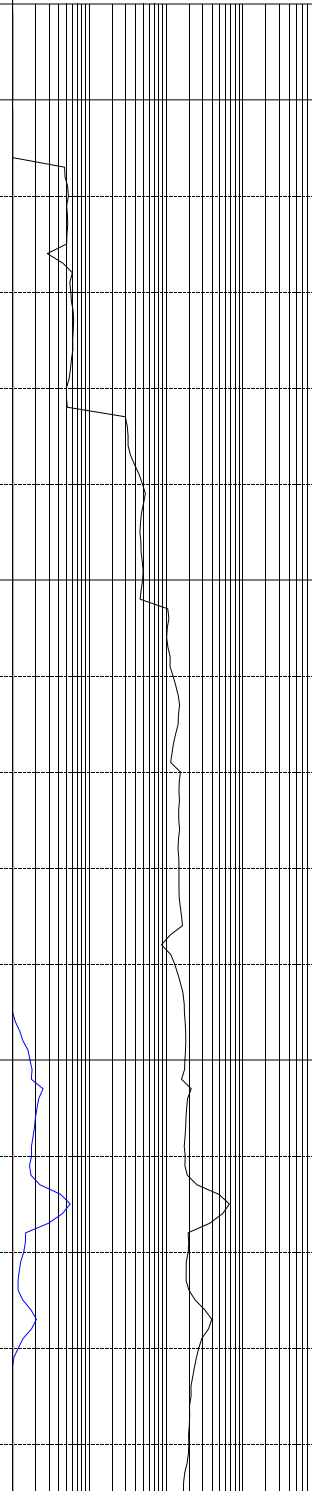
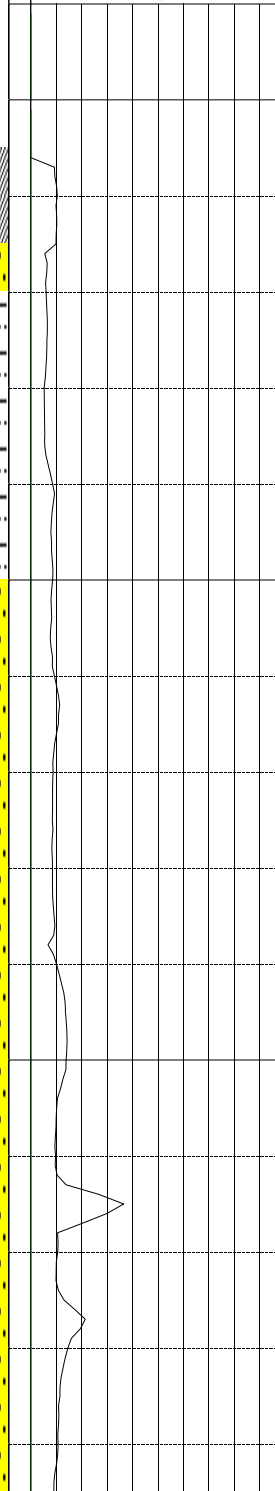


Interp. Lith

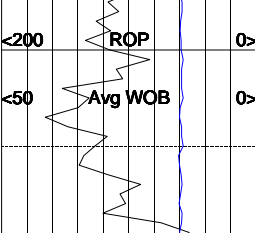
Remarks  
Survey Data, Mud Reports, Other Info.



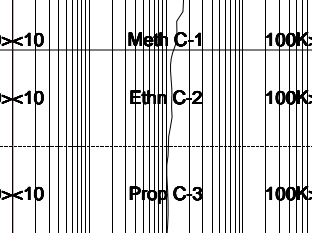
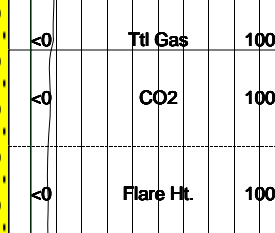
3900



THE FRU197-33B10 WELL ON 8/06/2010  
@ 4124' MD.  
SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY; VERY SLIGHTLY DENSE TO MODERATELY BRITTLE TO MODERATELY CRUMBLY TENACITY; IRREGULAR TO SUB-BLOCKY TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO WEDGE LIKE TO SUB-TABULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-WAXY TO SEMI-FROSTED LUSTER; MODERATELY SMOOTH TO SLIGHTLY CLAYEY TO VERY SLIGHTLY SILTY TEXTURE; NO VISIBLE LAMINAE OR OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

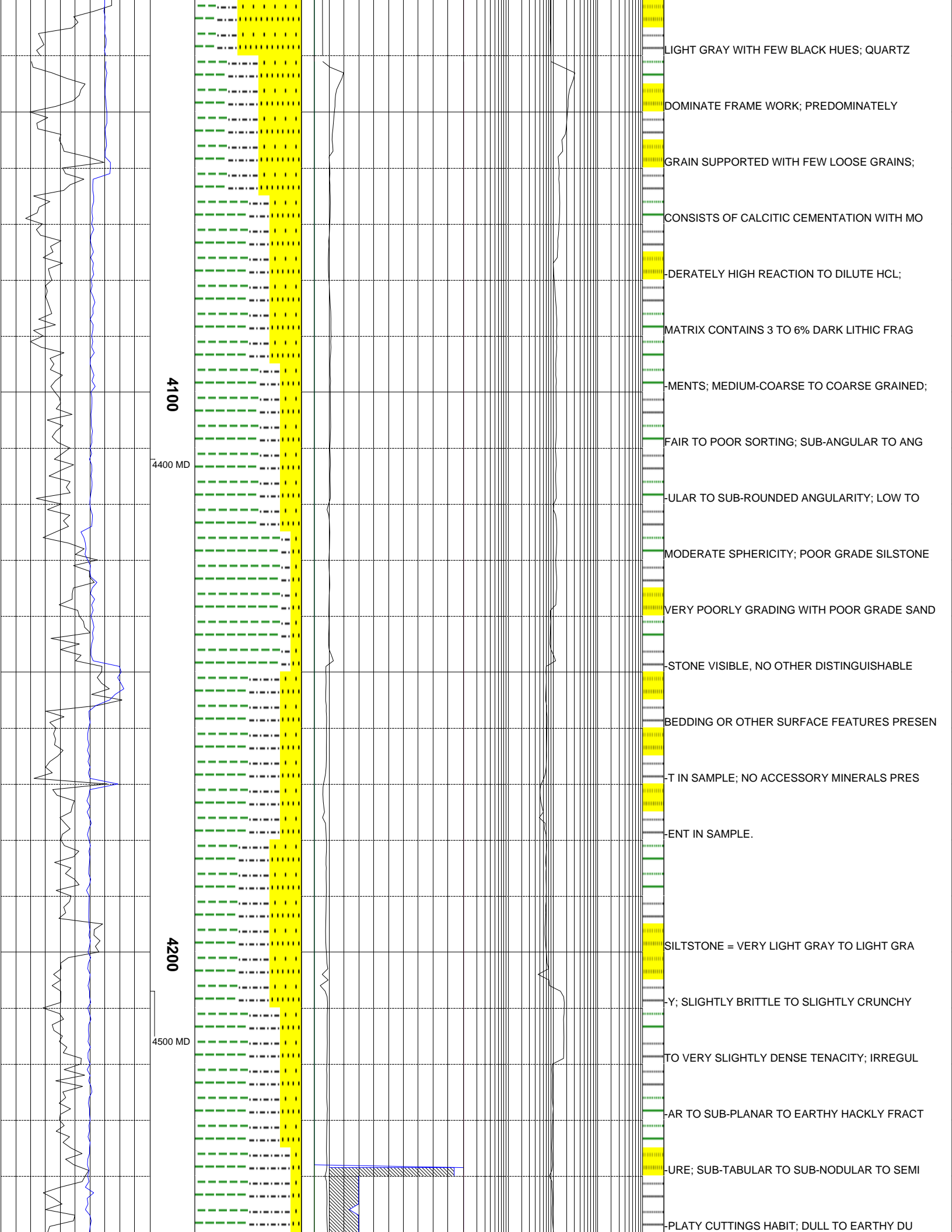


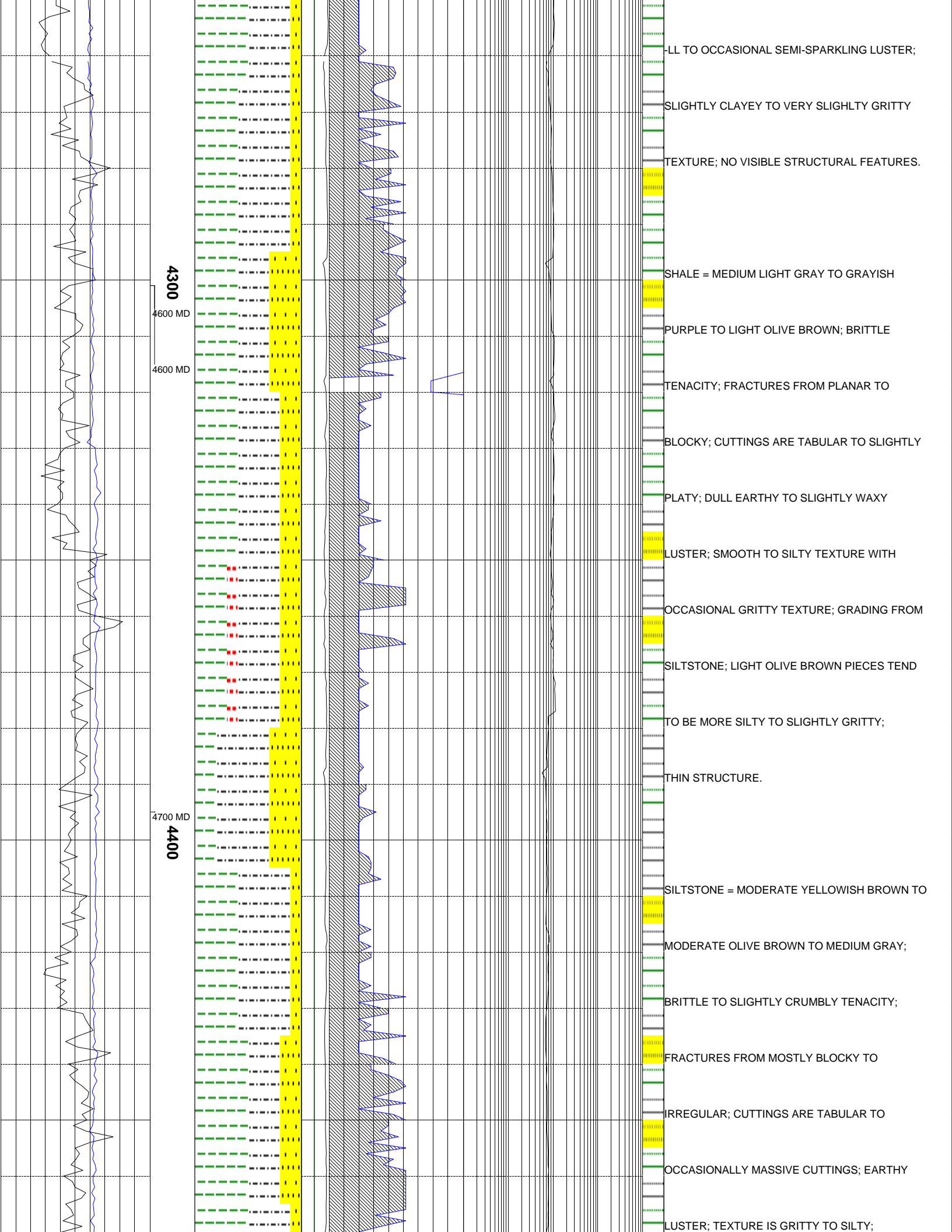
4000

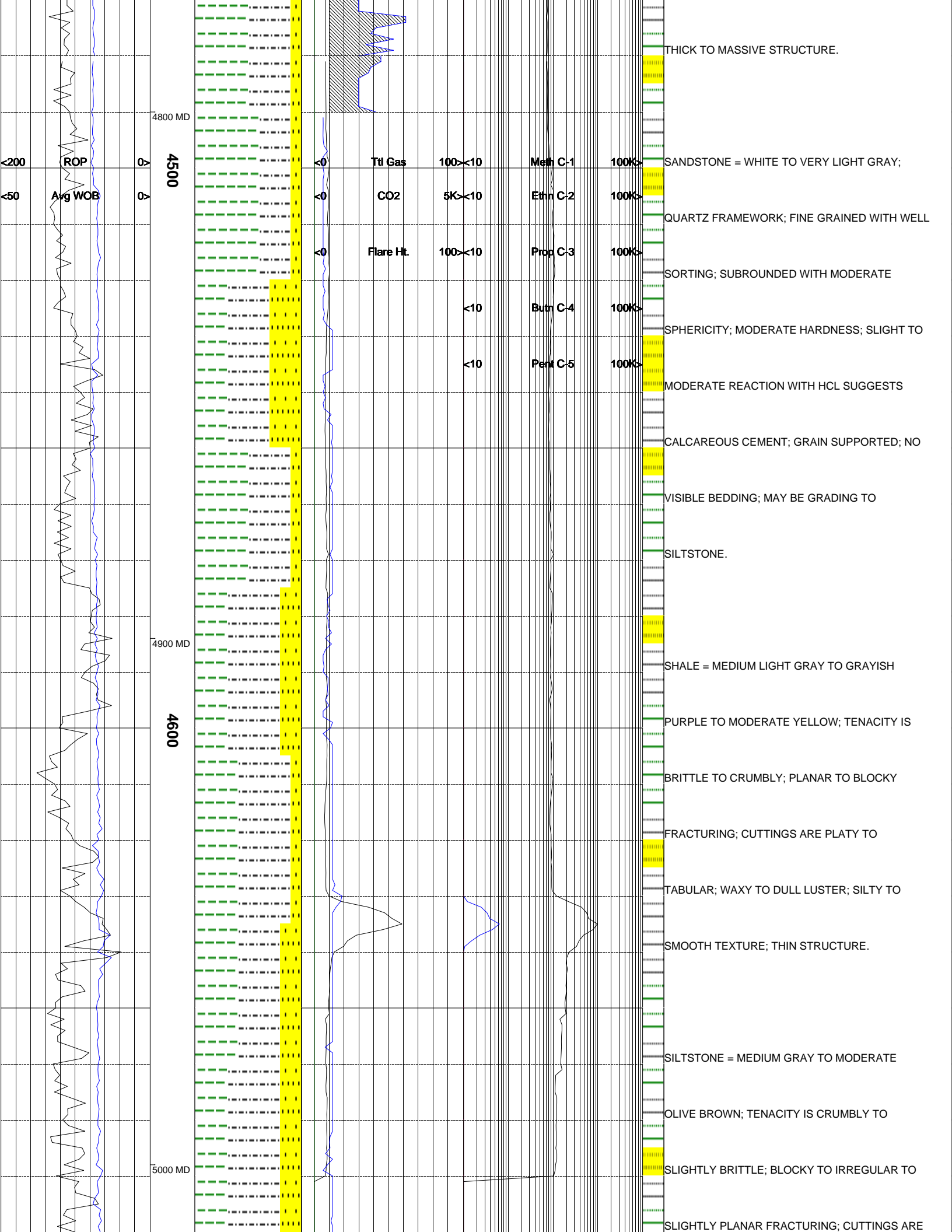


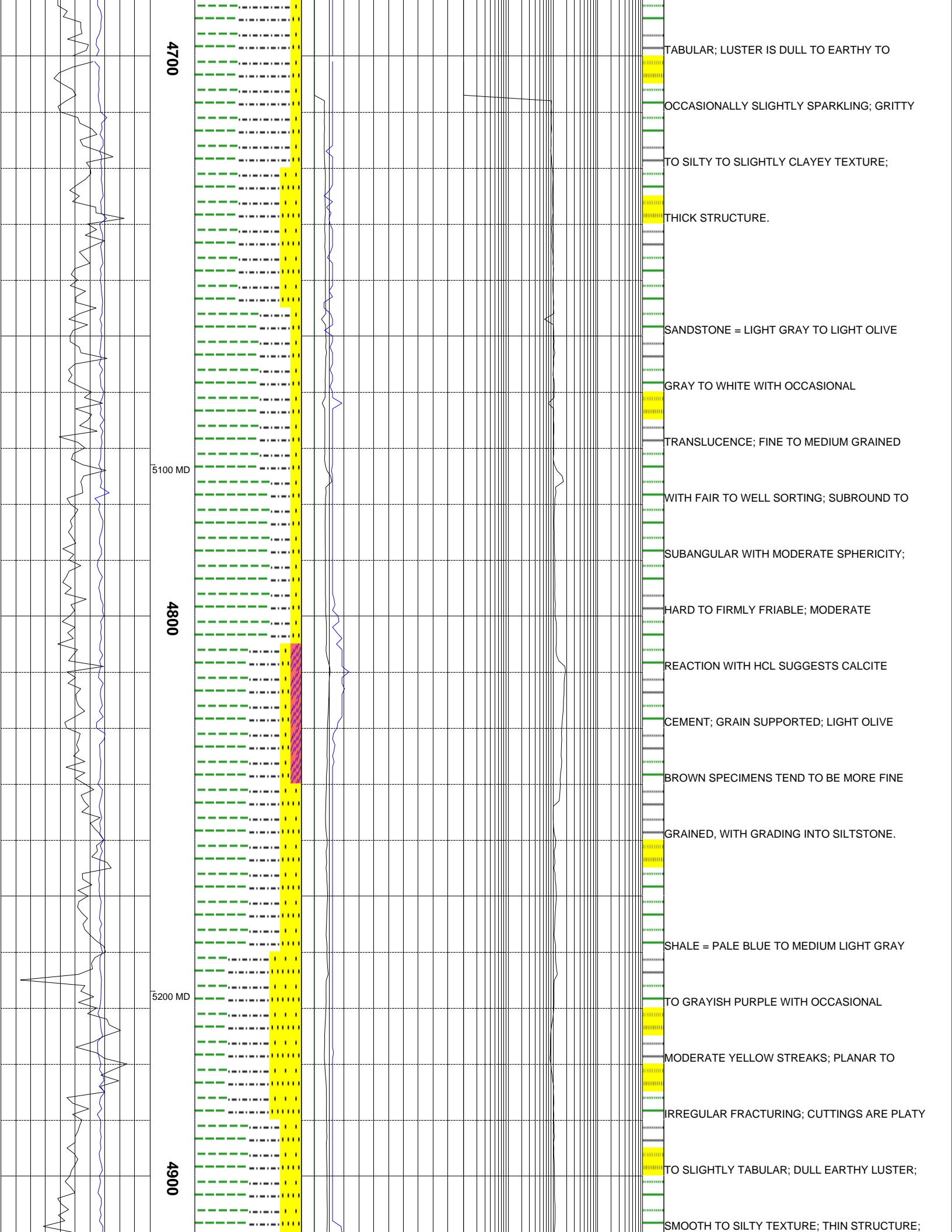
SANDSTONE = OFF WHITE TO WHITE TO VERY

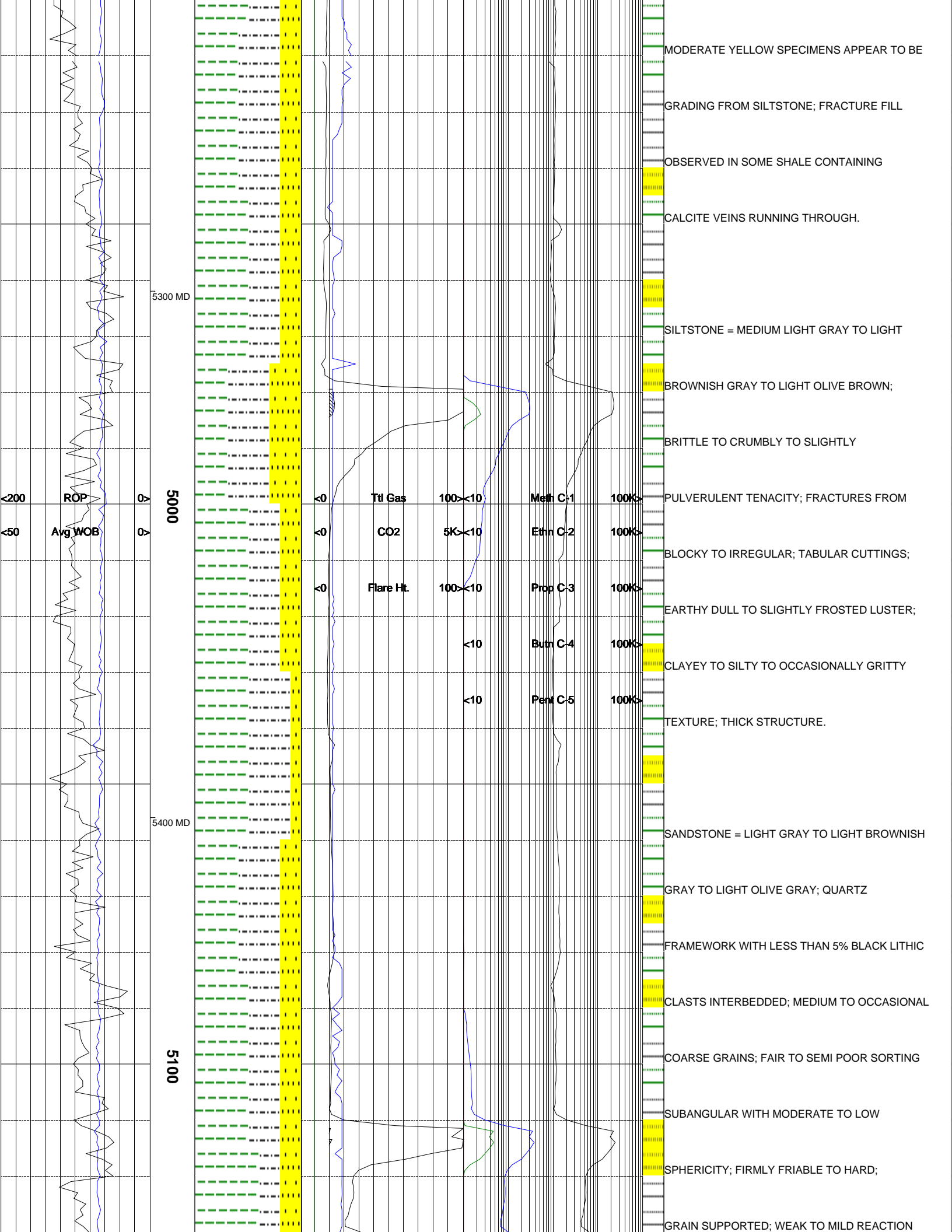
4300 MD

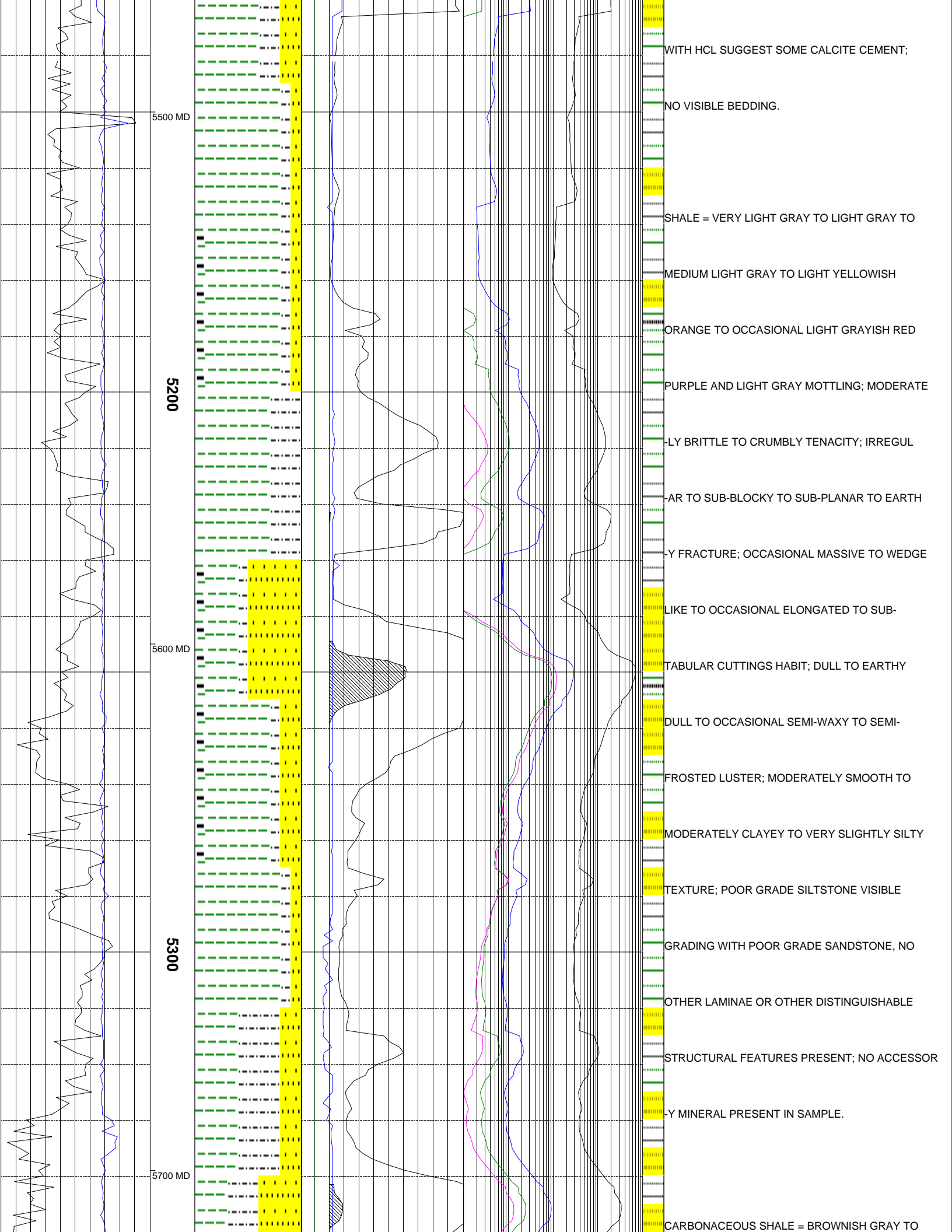












5500 MD

5200

5600 MD

5300

5700 MD

WITH HCL SUGGEST SOME CALCITE CEMENT;

NO VISIBLE BEDDING.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO

MEDIUM LIGHT GRAY TO LIGHT YELLOWISH

ORANGE TO OCCASIONAL LIGHT GRAYISH RED

PURPLE AND LIGHT GRAY MOTTLING; MODERATE

LY BRITTLE TO CRUMBLY TENACITY; IRREGUL

AR TO SUB-BLOCKY TO SUB-PLANAR TO EARTH

Y FRACTURE; OCCASIONAL MASSIVE TO WEDGE

LIKE TO OCCASIONAL ELONGATED TO SUB-

TABULAR CUTTINGS HABIT; DULL TO EARTHY

DULL TO OCCASIONAL SEMI-WAXY TO SEMI-

FROSTED LUSTER; MODERATELY SMOOTH TO

MODERATELY CLAYEY TO VERY SLIGHTLY SILTY

TEXTURE; POOR GRADE SILTSTONE VISIBLE

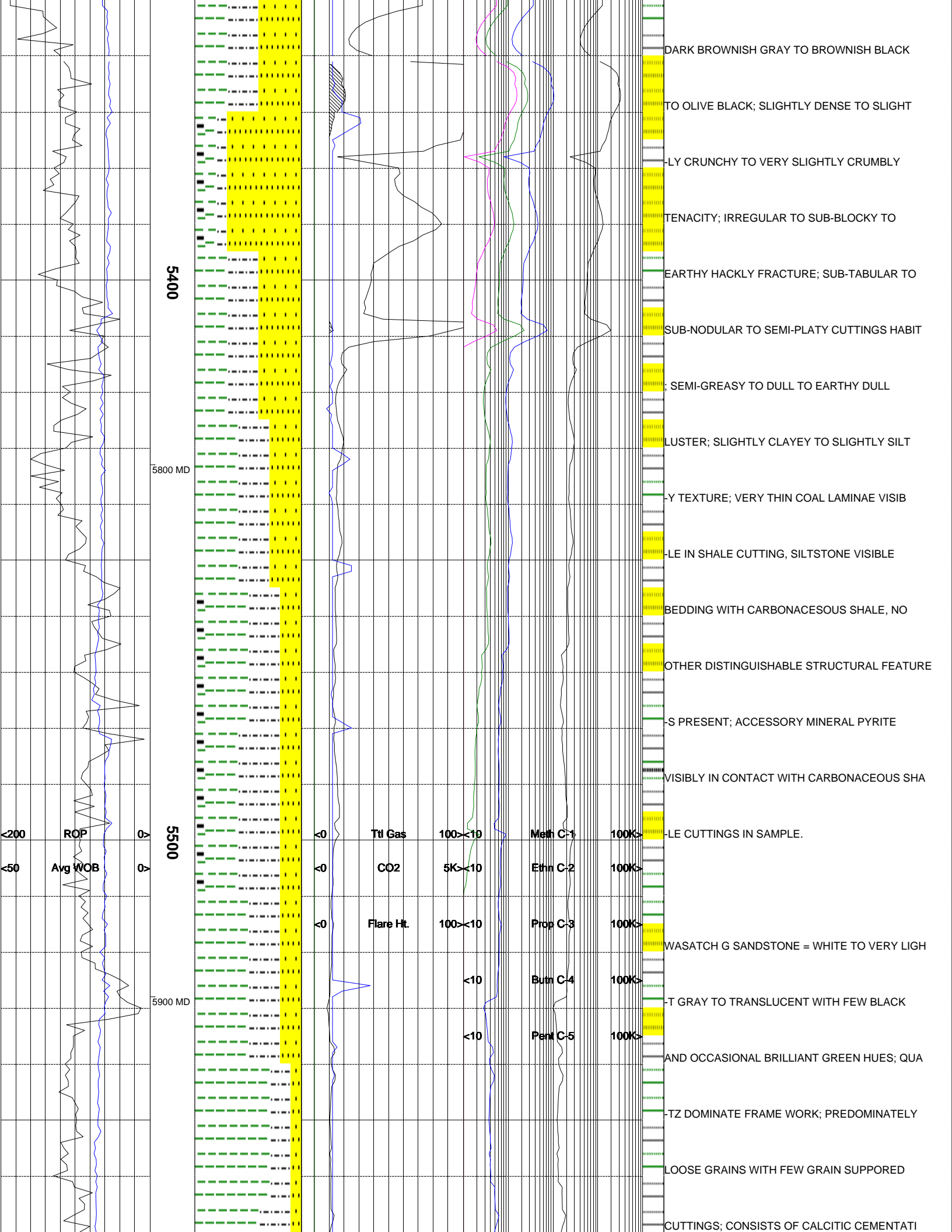
GRADING WITH POOR GRADE SANDSTONE, NO

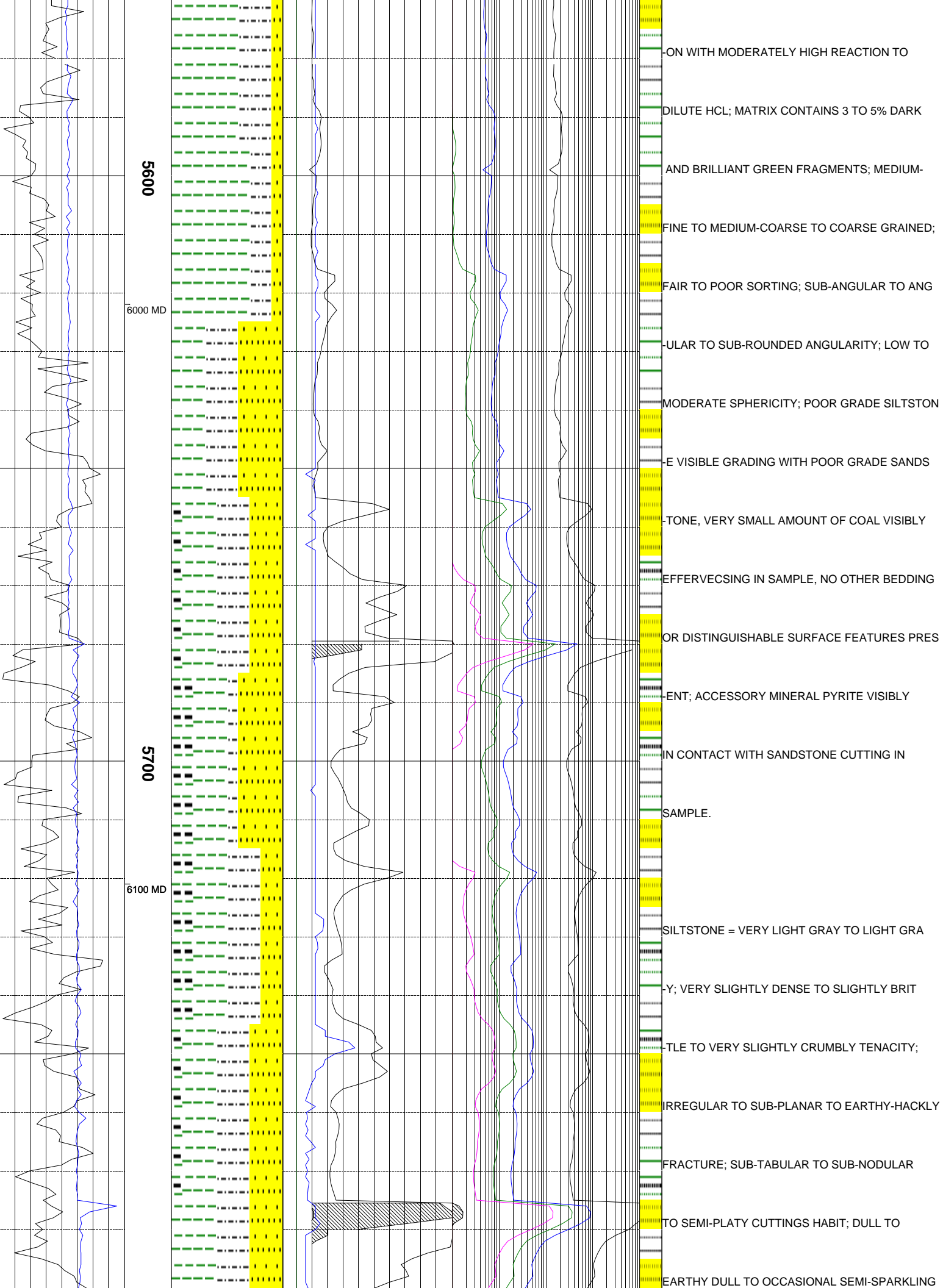
OTHER LAMINAE OR OTHER DISTINGUISHABLE

STRUCTURAL FEATURES PRESENT; NO ACCESSOR

Y MINERAL PRESENT IN SAMPLE.

CARBONACEOUS SHALE = BROWNISH GRAY TO



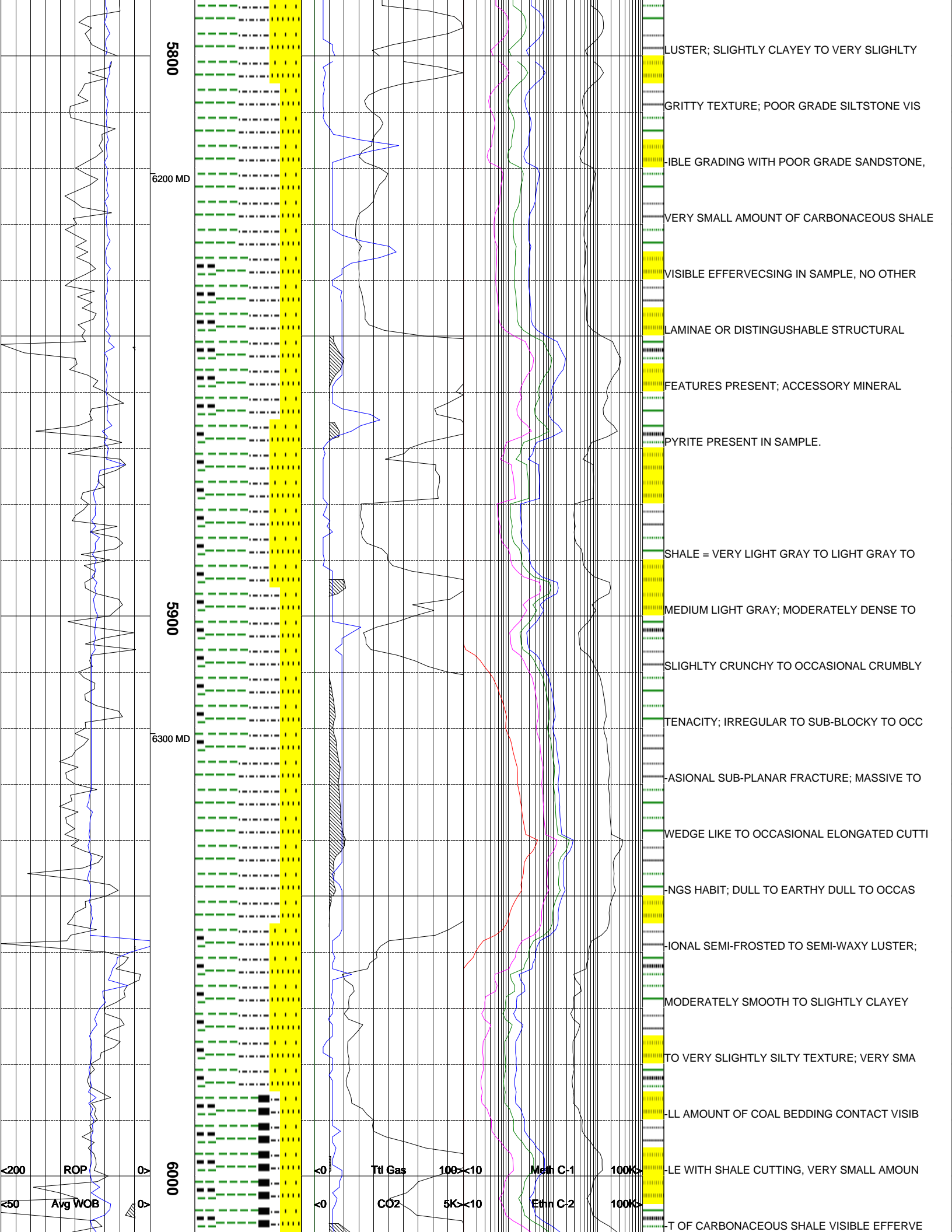


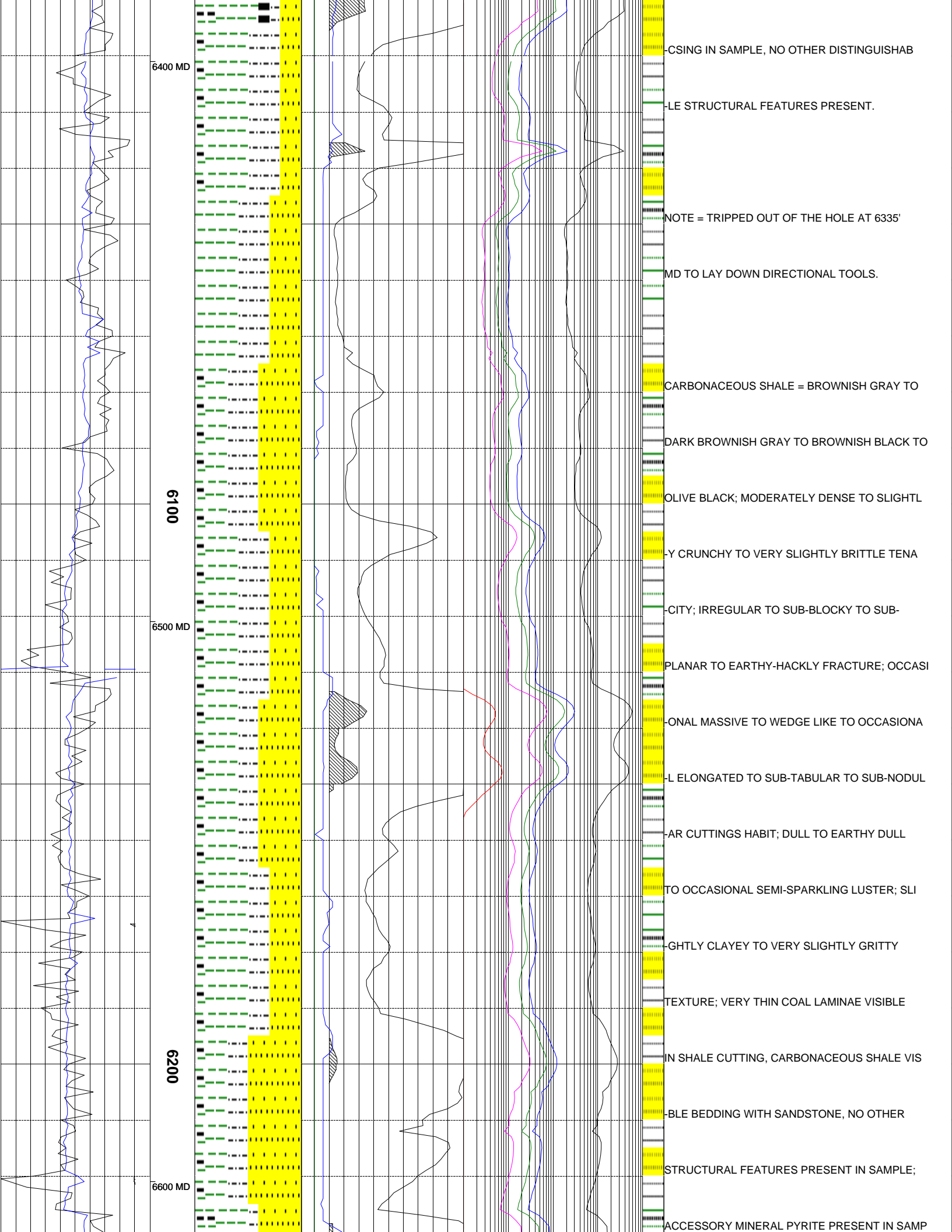
5600

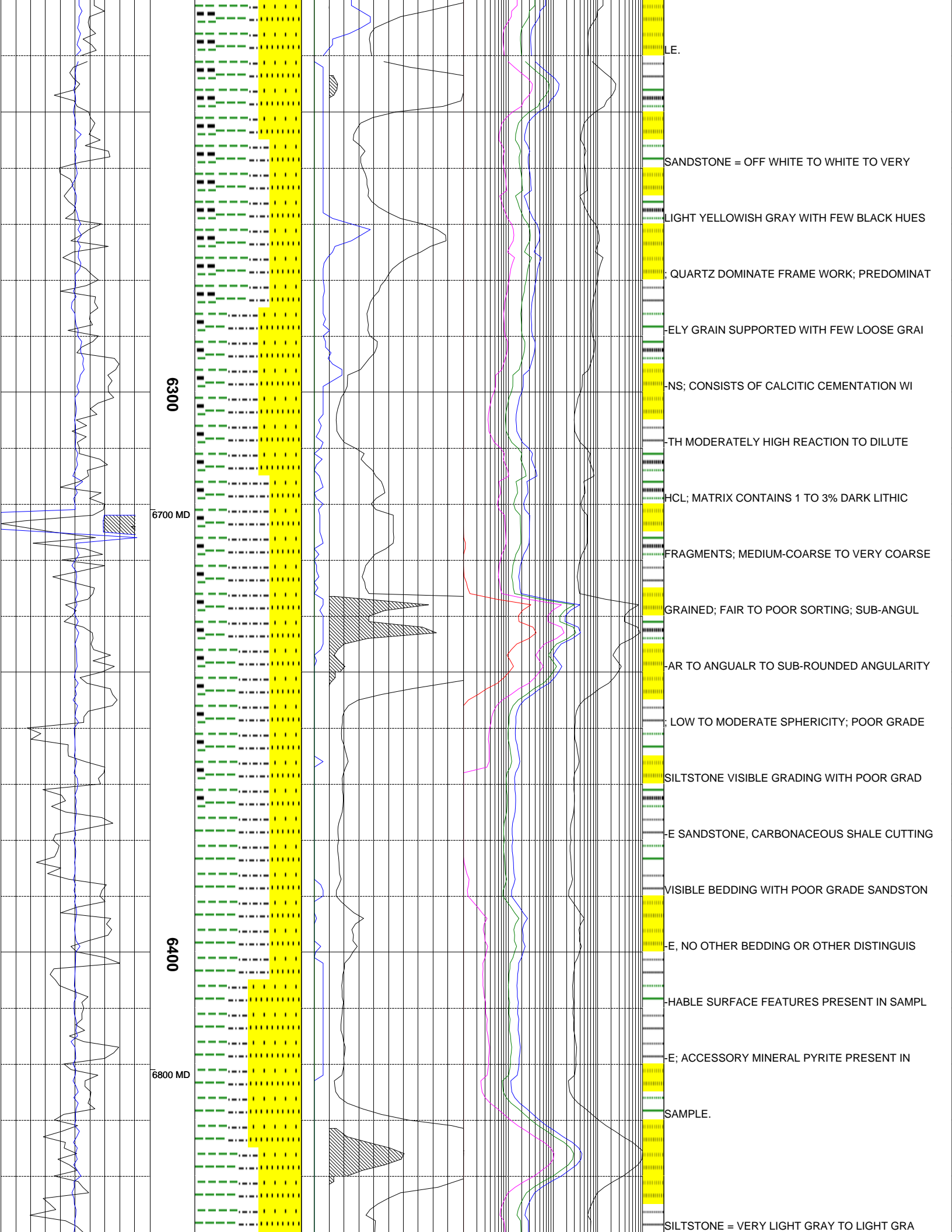
6000 MD

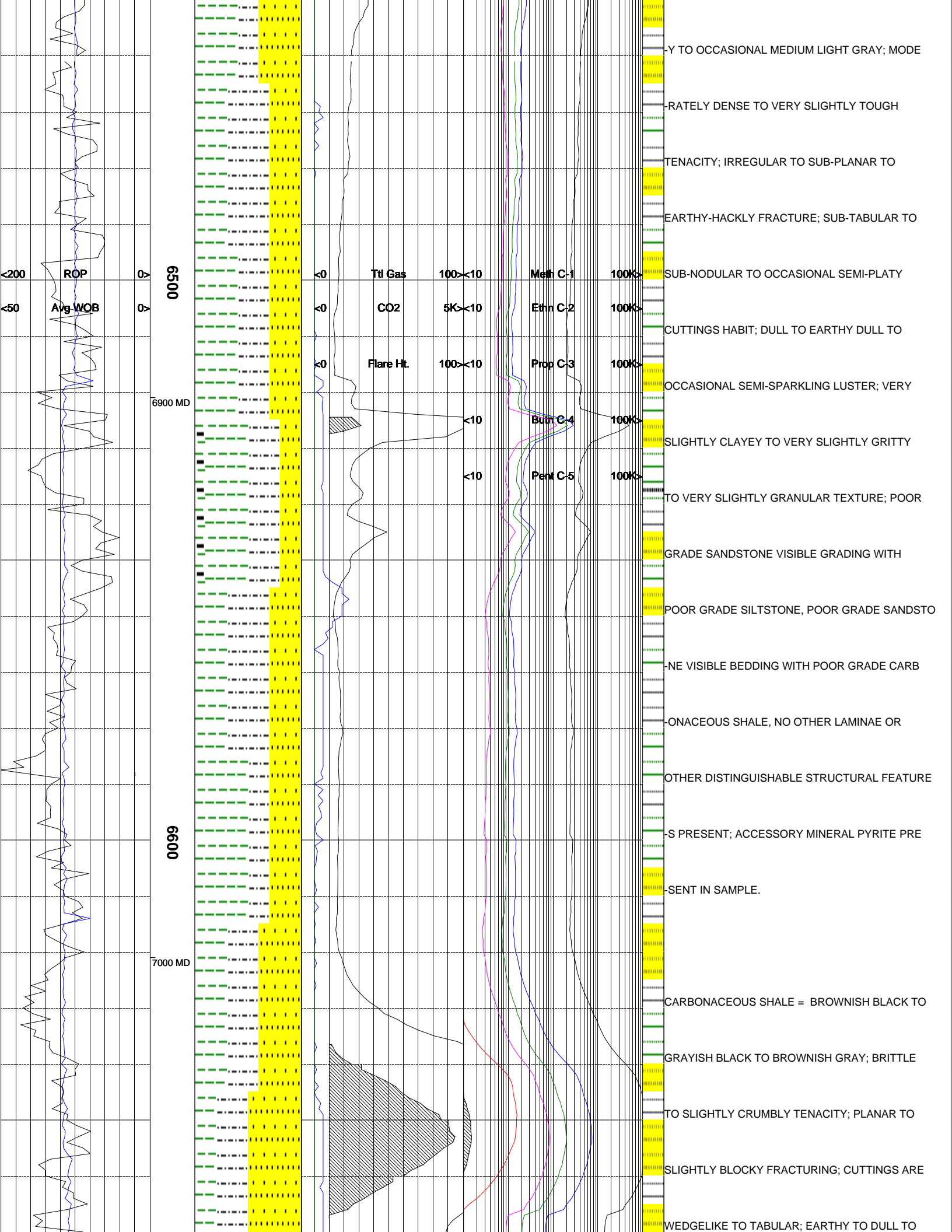
5700

6100 MD









Y TO OCCASIONAL MEDIUM LIGHT GRAY; MODE

RATELY DENSE TO VERY SLIGHTLY TOUGH

TENACITY; IRREGULAR TO SUB-PLANAR TO

EARTHY-HACKLY FRACTURE; SUB-TABULAR TO

SUB-NODULAR TO OCCASIONAL SEMI-PLATY

CUTTINGS HABIT; DULL TO EARTHLY DULL TO

OCCASIONAL SEMI-SPARKLING LUSTER; VERY

SLIGHTLY CLAYEY TO VERY SLIGHTLY GRITTY

TO VERY SLIGHTLY GRANULAR TEXTURE; POOR

GRADE SANDSTONE VISIBLE GRADING WITH

POOR GRADE SILTSTONE, POOR GRADE SANDSTO

NE VISIBLE BEDDING WITH POOR GRADE CARB

ONACEOUS SHALE, NO OTHER LAMINAE OR

OTHER DISTINGUISHABLE STRUCTURAL FEATURE

S PRESENT; ACCESSORY MINERAL PYRITE PRE

SENT IN SAMPLE.

CARBONACEOUS SHALE = BROWNISH BLACK TO

GRAYISH BLACK TO BROWNISH GRAY; BRITTLE

TO SLIGHTLY CRUMBLY TENACITY; PLANAR TO

SLIGHTLY BLOCKY FRACTURING; CUTTINGS ARE

WEDGELIKE TO TABULAR; EARTHLY TO DULL TO

6500

6900 MD

6600

7000 MD

ROP

Avg WOB

Ttl Gas

CO2

Flare Ht.

Meth C-1

Ethn C-2

Prop C-3

Butn C-4

Pent C-5

100 > < 10

5K > < 10

100 > < 10

< 10

< 10

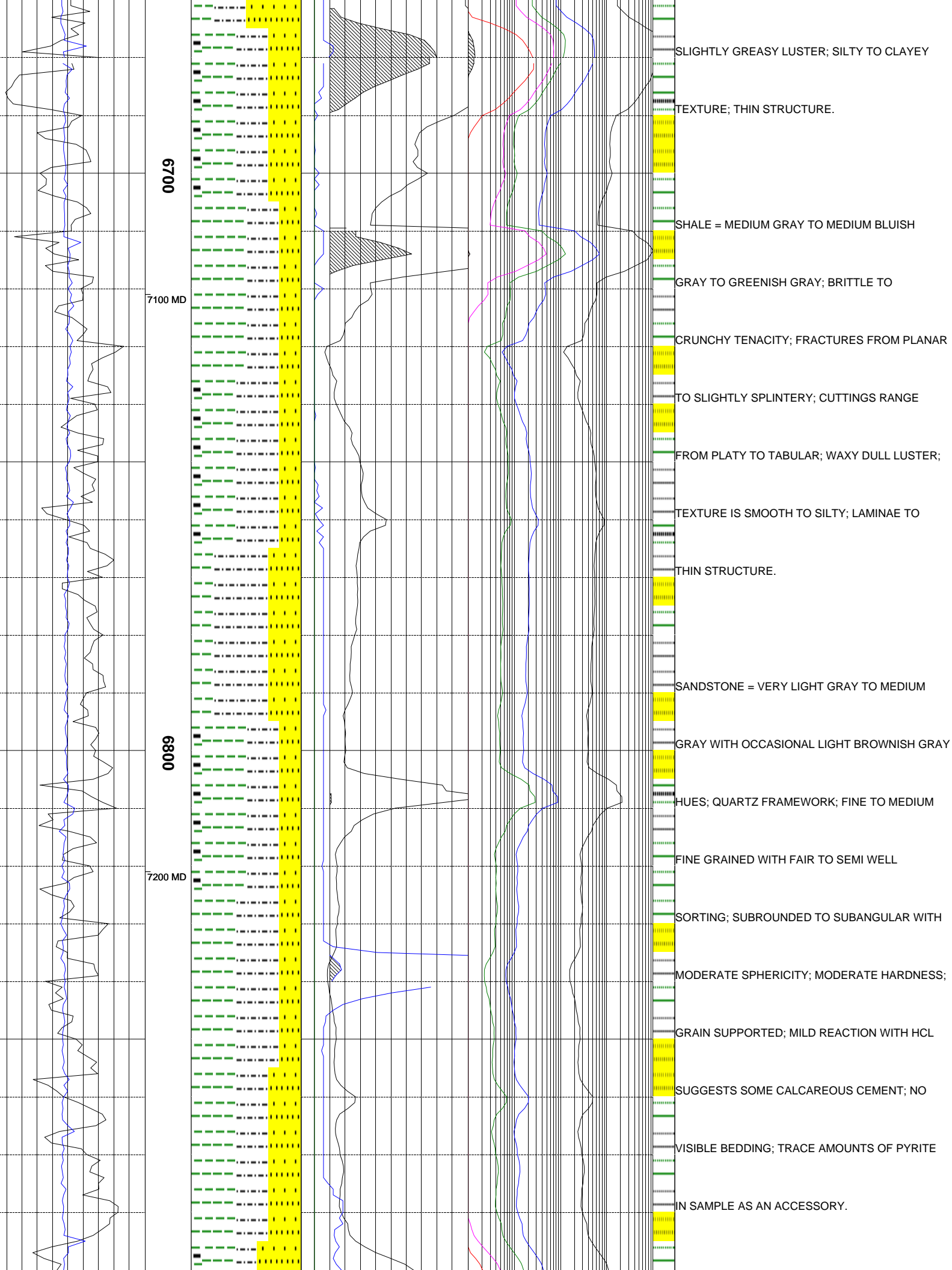
100K >

100K >

100K >

100K >

100K >



SLIGHTLY GREASY LUSTER; SILTY TO CLAYEY

TEXTURE; THIN STRUCTURE.

6700

SHALE = MEDIUM GRAY TO MEDIUM BLUISH

7100 MD

GRAY TO GREENISH GRAY; BRITTLE TO

CRUNCHY TENACITY; FRACTURES FROM PLANAR

TO SLIGHTLY SPLINTERY; CUTTINGS RANGE

FROM PLATY TO TABULAR; WAXY DULL LUSTER;

TEXTURE IS SMOOTH TO SILTY; LAMINAE TO

THIN STRUCTURE.

6800

SANDSTONE = VERY LIGHT GRAY TO MEDIUM

GRAY WITH OCCASIONAL LIGHT BROWNISH GRAY

7200 MD

HUES; QUARTZ FRAMEWORK; FINE TO MEDIUM

FINE GRAINED WITH FAIR TO SEMI WELL

SORTING; SUBROUNDED TO SUBANGULAR WITH

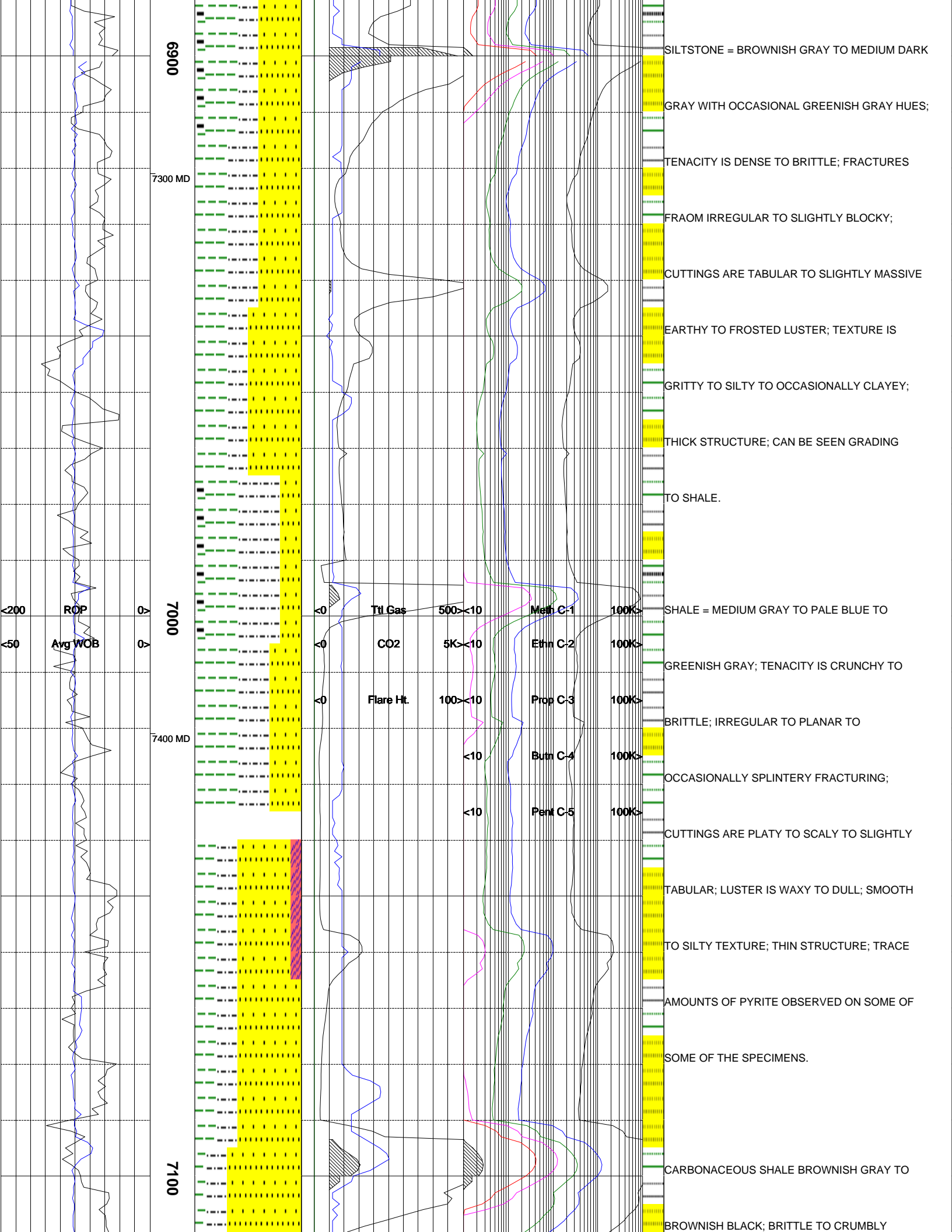
MODERATE SPHERICITY; MODERATE HARDNESS;

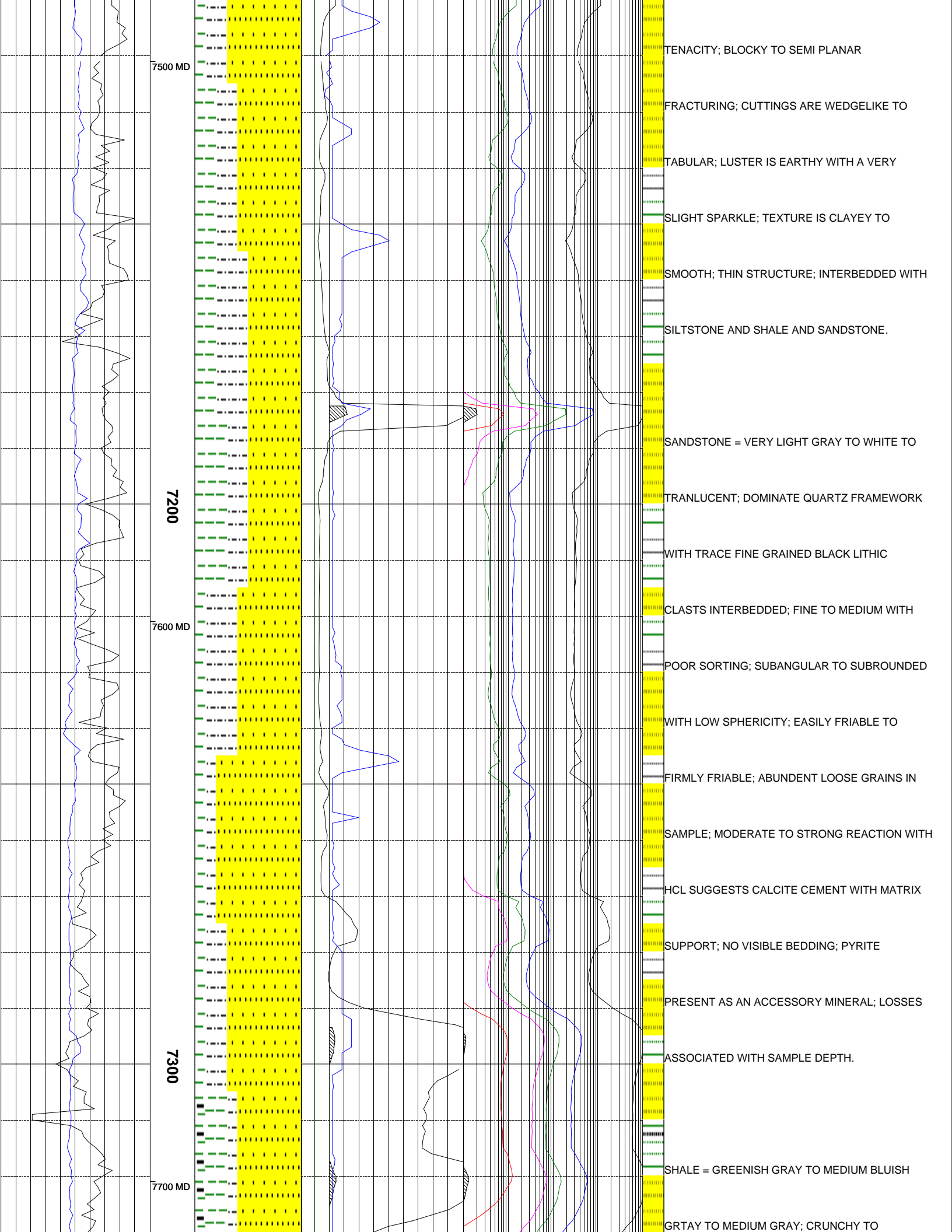
GRAIN SUPPORTED; MILD REACTION WITH HCL

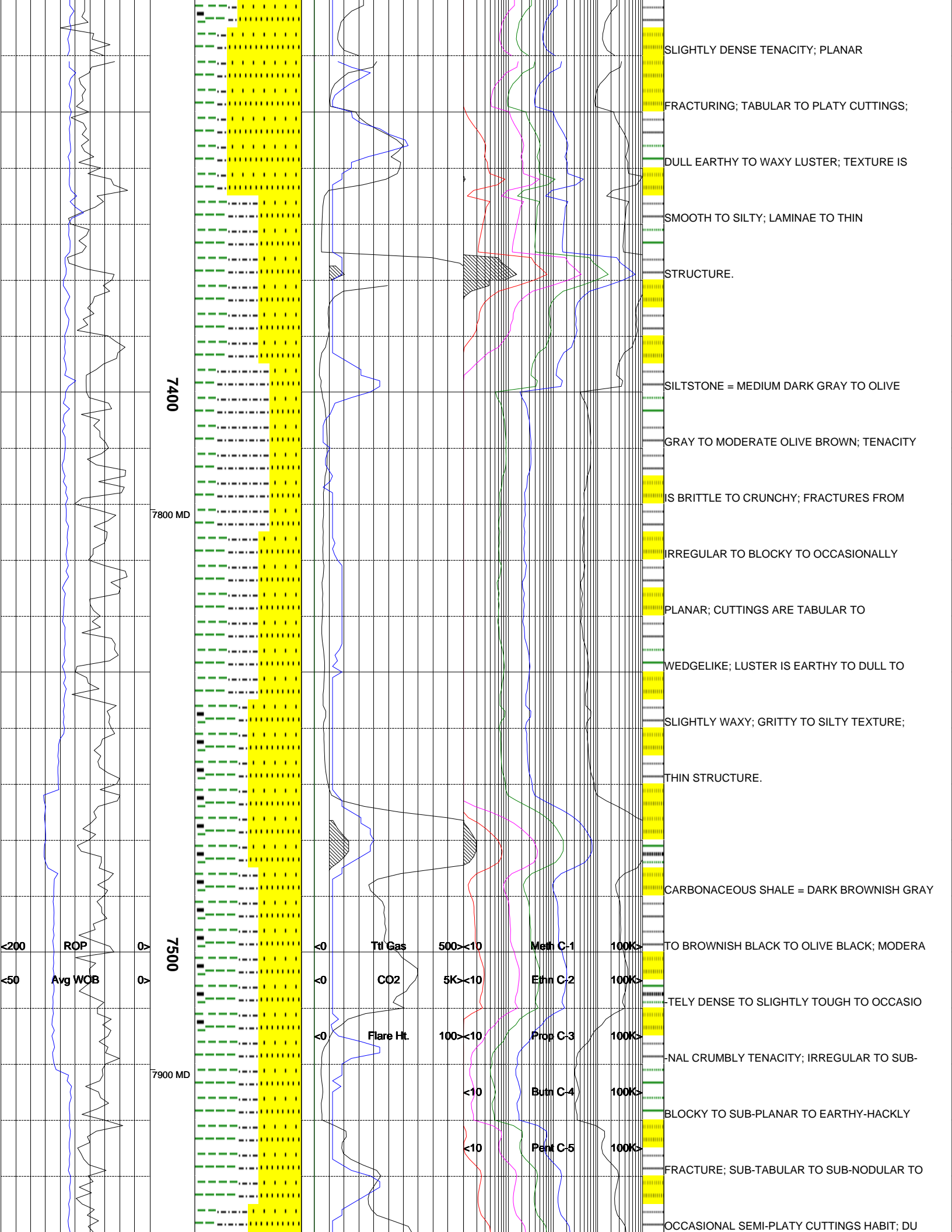
SUGGESTS SOME CALCAREOUS CEMENT; NO

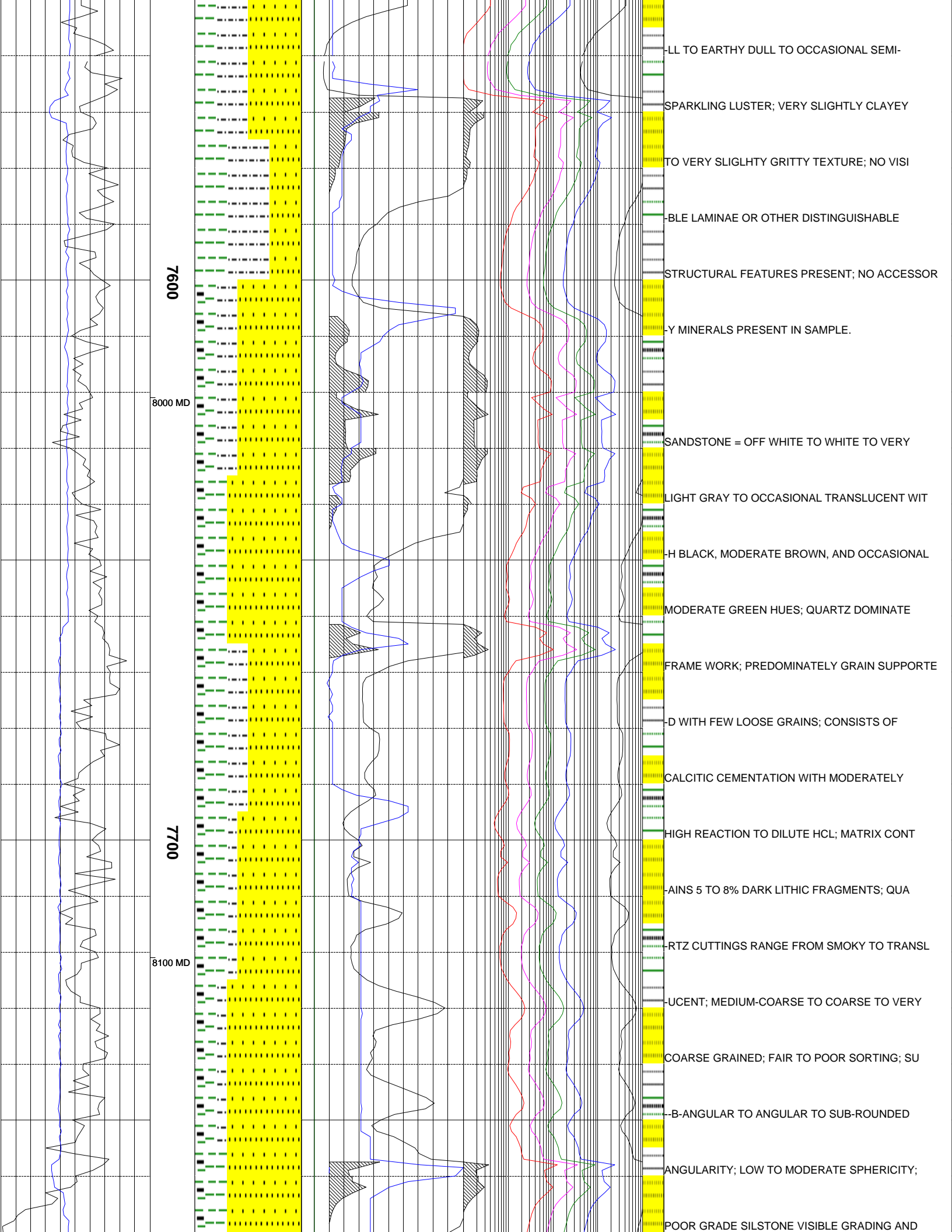
VISIBLE BEDDING; TRACE AMOUNTS OF PYRITE

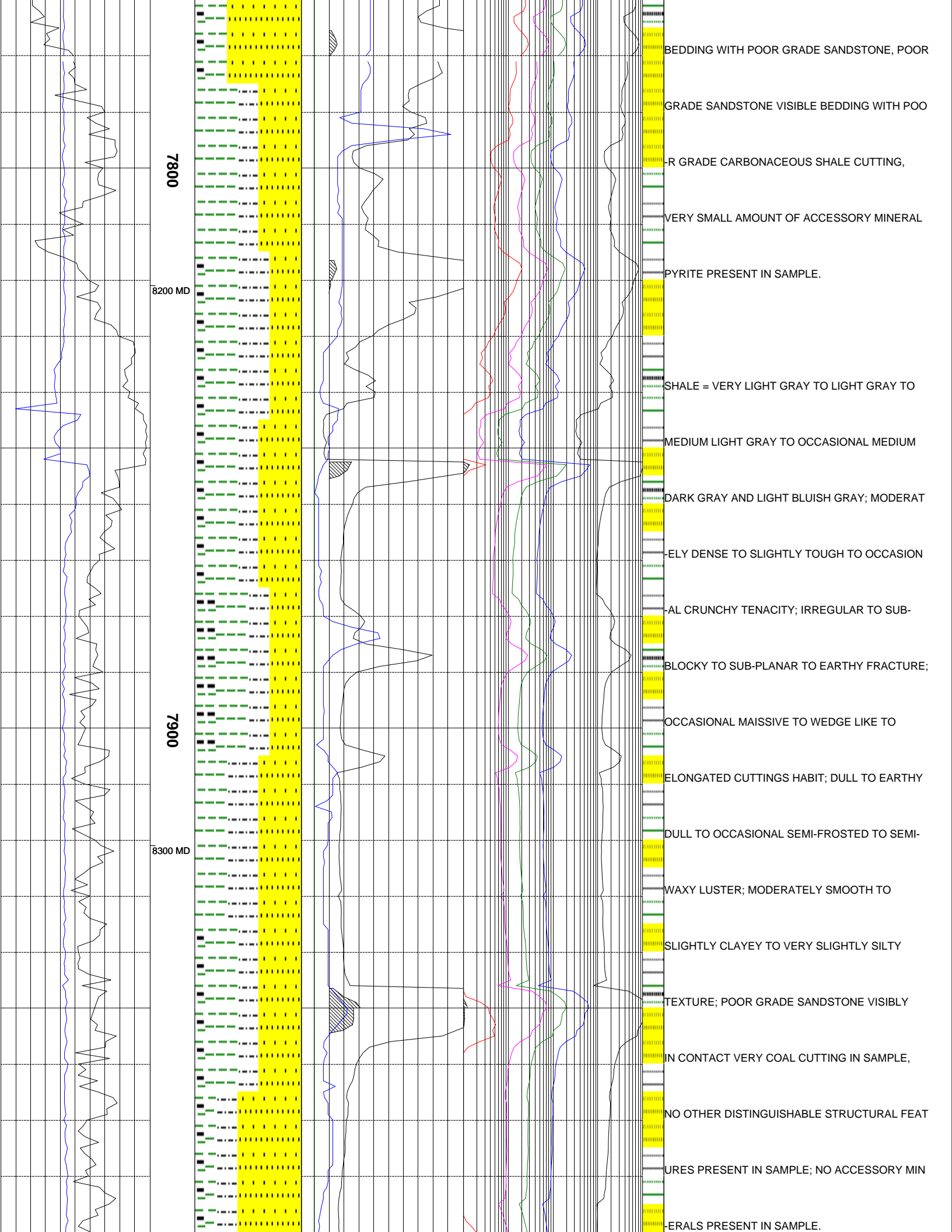
IN SAMPLE AS AN ACCESSORY.

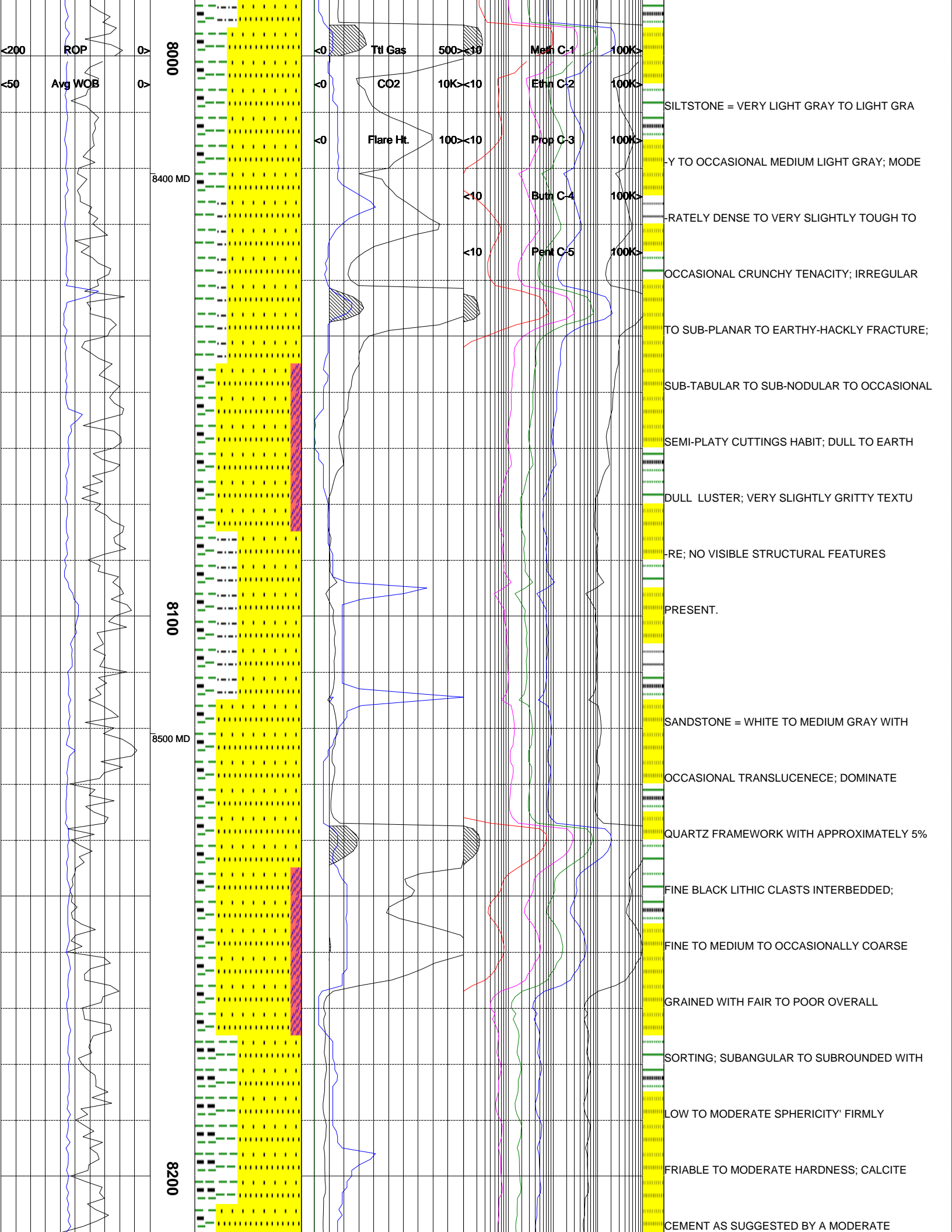


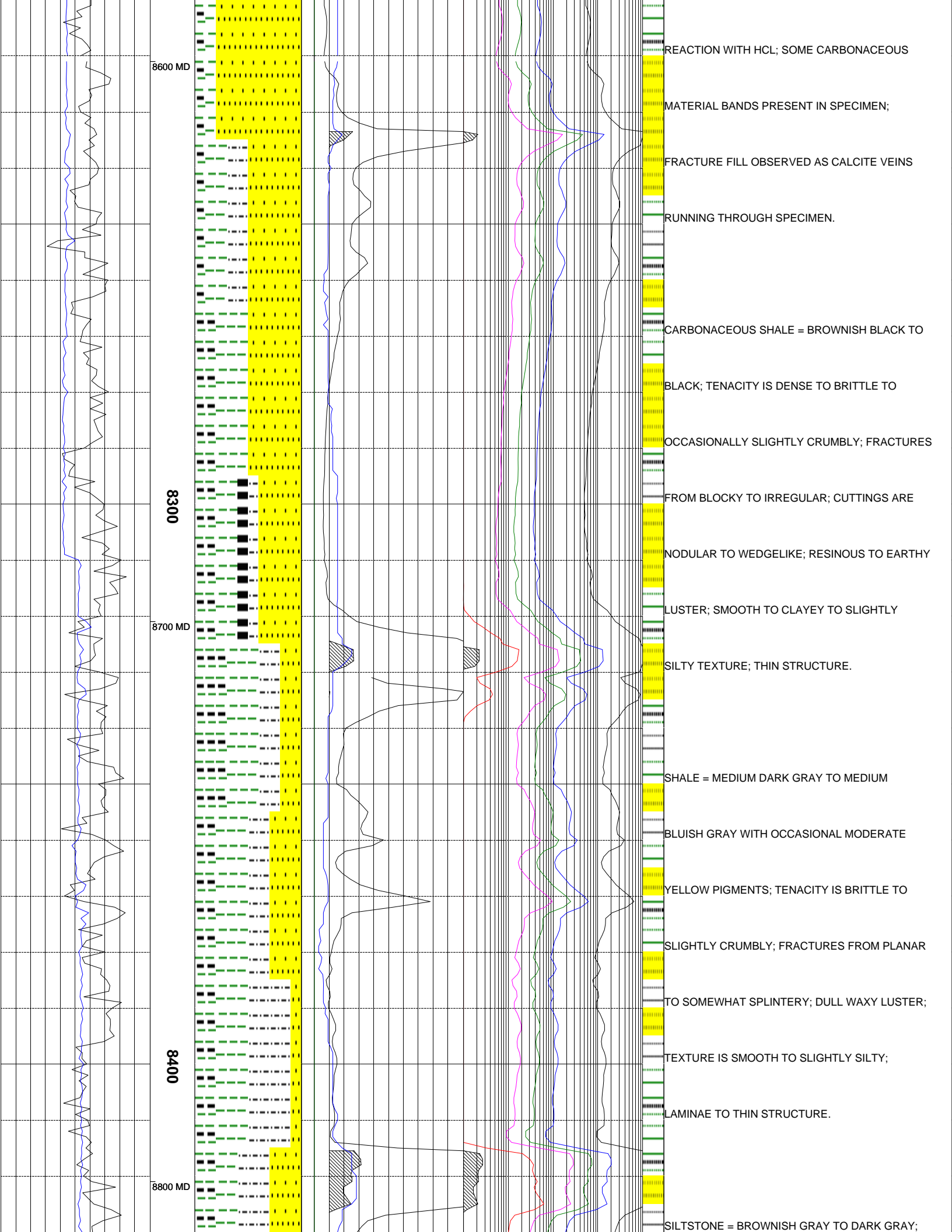


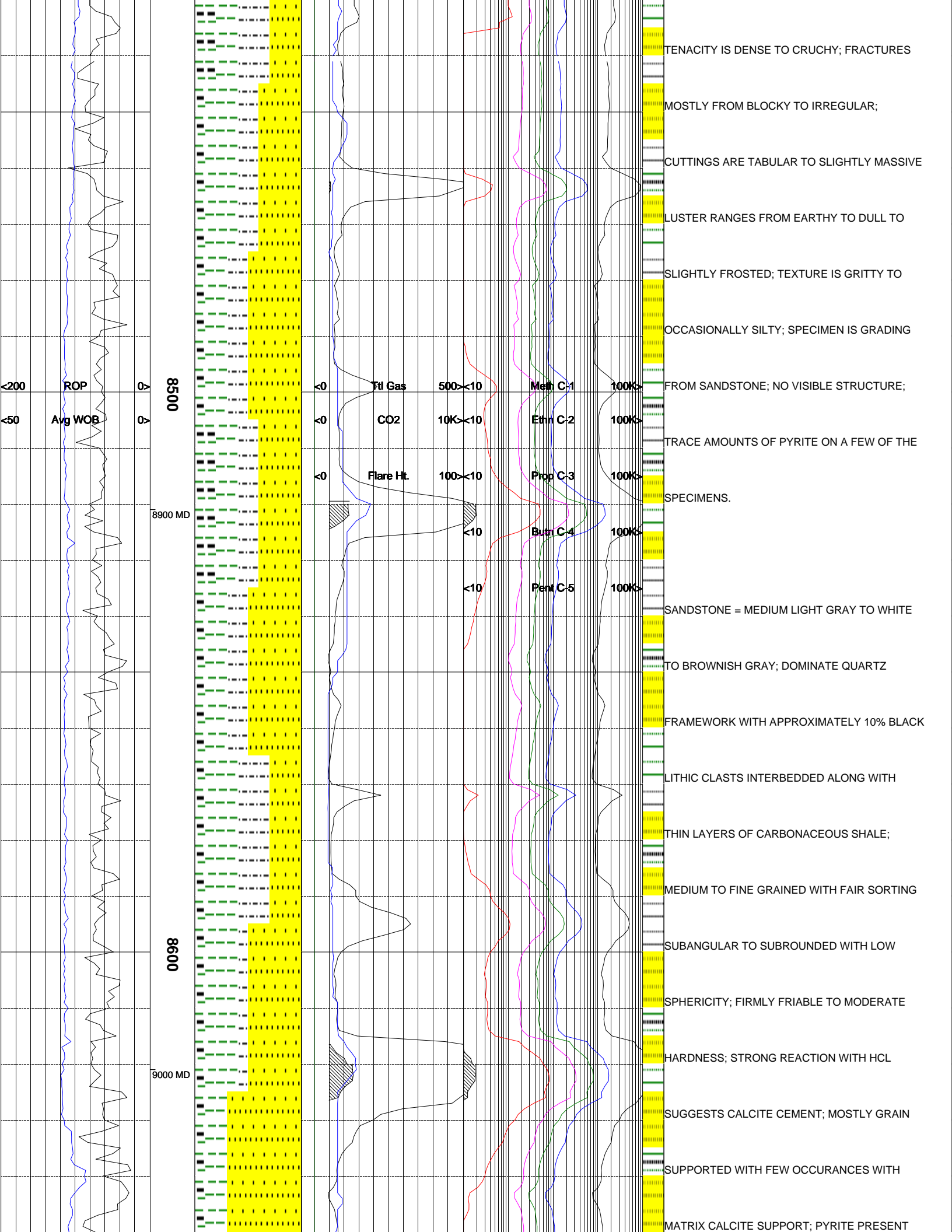


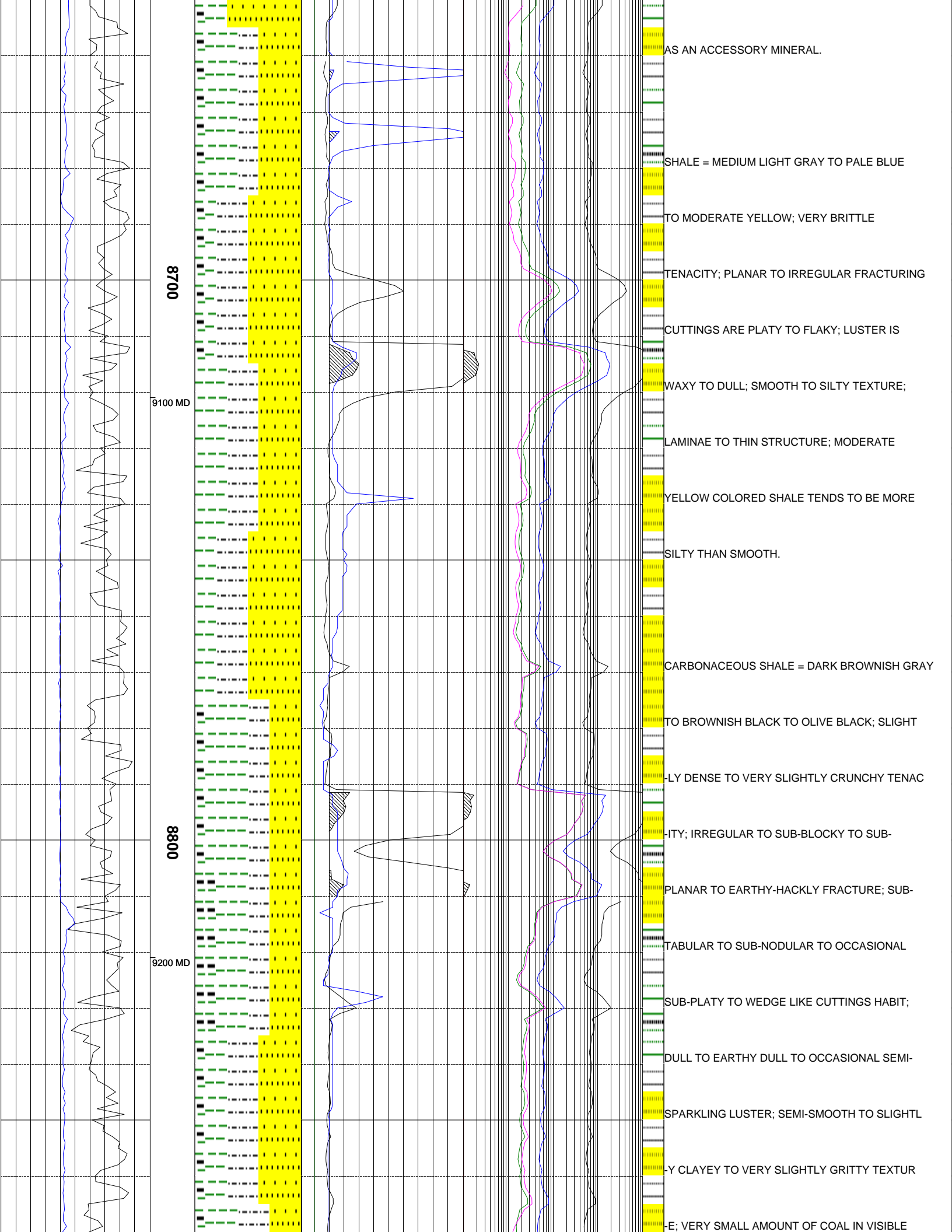












8700

9100 MD

8800

9200 MD

AS AN ACCESSORY MINERAL.

SHALE = MEDIUM LIGHT GRAY TO PALE BLUE

TO MODERATE YELLOW; VERY BRITTLE

TENACITY; PLANAR TO IRREGULAR FRACTURING

CUTTINGS ARE PLATY TO FLAKY; LUSTER IS

WAXY TO DULL; SMOOTH TO SILTY TEXTURE;

LAMINAE TO THIN STRUCTURE; MODERATE

YELLOW COLORED SHALE TENDS TO BE MORE

SILTY THAN SMOOTH.

CARBONACEOUS SHALE = DARK BROWNISH GRAY

TO BROWNISH BLACK TO OLIVE BLACK; SLIGHT

LY DENSE TO VERY SLIGHTLY CRUNCHY TENAC

ITY; IRREGULAR TO SUB-BLOCKY TO SUB-

PLANAR TO EARTHY-HACKLY FRACTURE; SUB-

TABULAR TO SUB-NODULAR TO OCCASIONAL

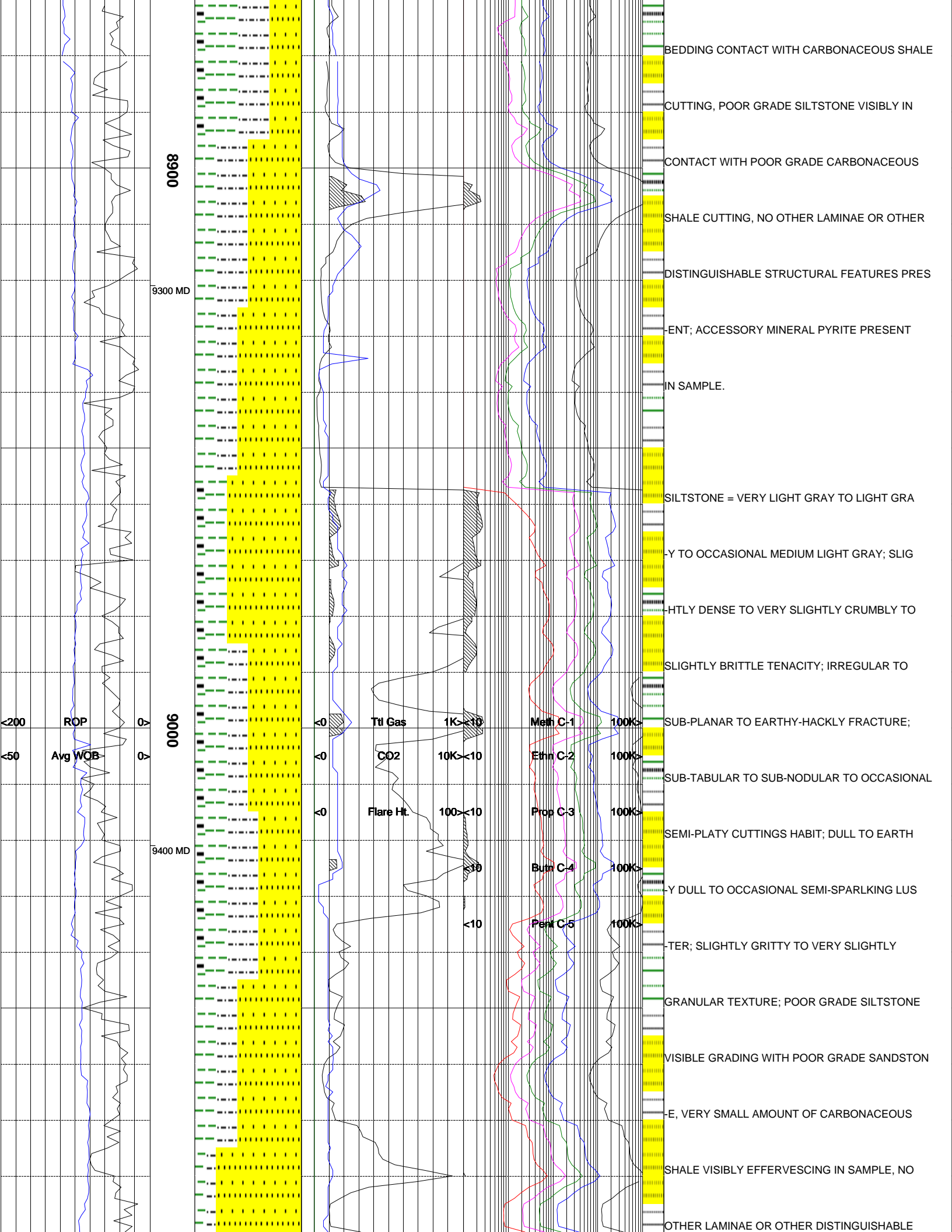
SUB-PLATY TO WEDGE LIKE CUTTINGS HABIT;

DULL TO EARTHY DULL TO OCCASIONAL SEMI-

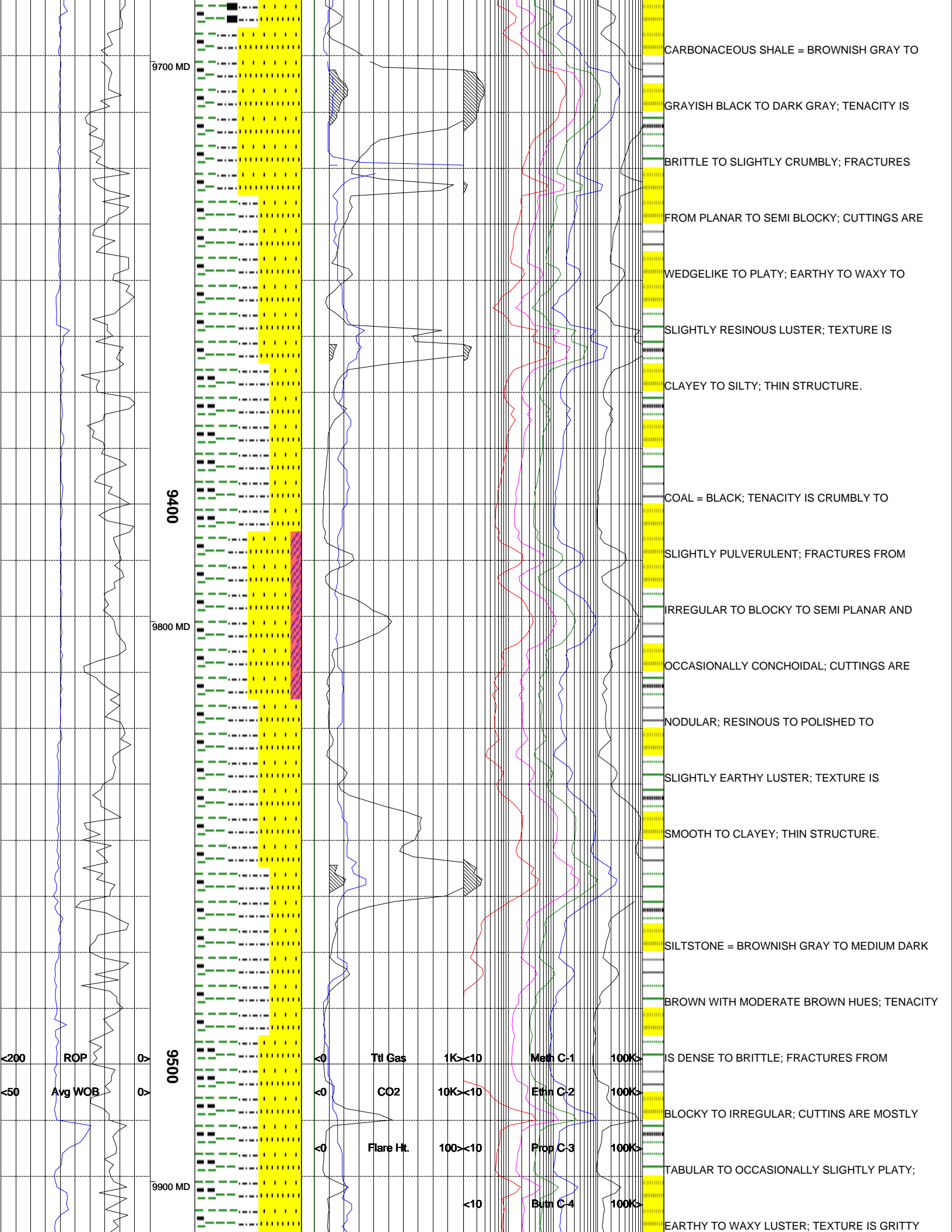
SPARKLING LUSTER; SEMI-SMOOTH TO SLIGHTL

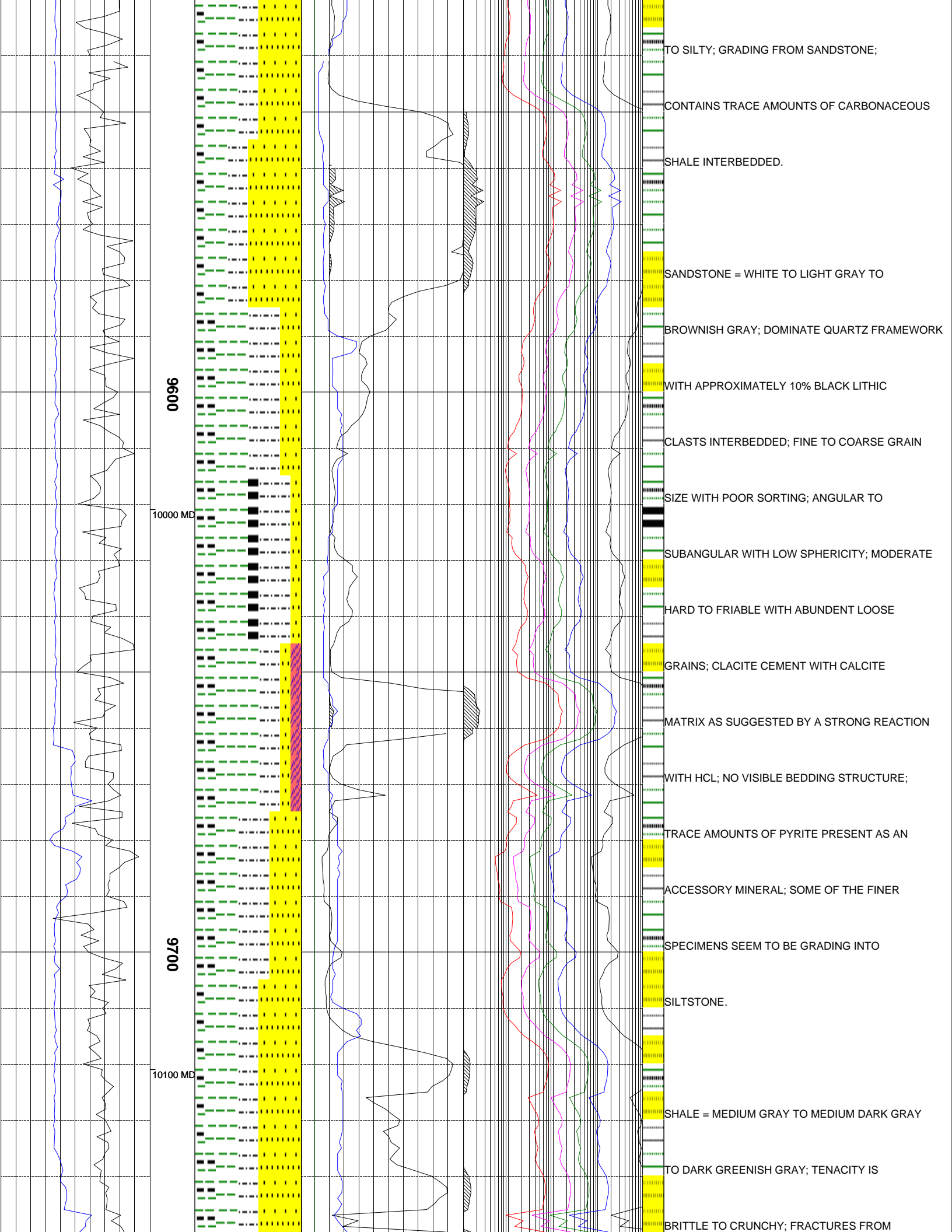
Y CLAYEY TO VERY SLIGHTLY GRITTY TEXTUR

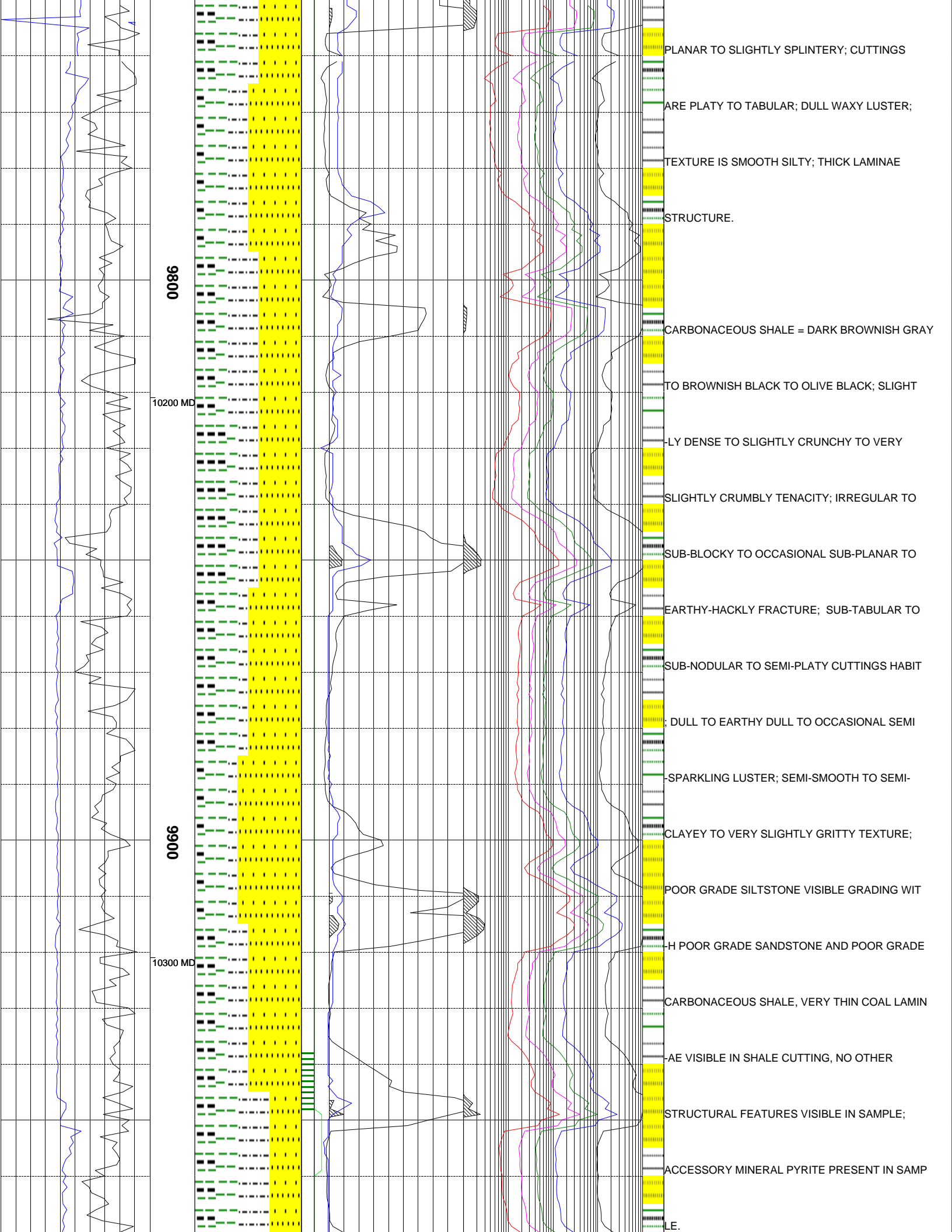
E; VERY SMALL AMOUNT OF COAL IN VISIBLE











0086

10200 MD

0066

10300 MD

PLANAR TO SLIGHTLY SPLINTERED; CUTTINGS

ARE PLATY TO TABULAR; DULL WAXY LUSTER;

TEXTURE IS SMOOTH SILTY; THICK LAMINAE

STRUCTURE.

CARBONACEOUS SHALE = DARK BROWNISH GRAY

TO BROWNISH BLACK TO OLIVE BLACK; SLIGHT

LY DENSE TO SLIGHTLY CRUNCHY TO VERY

SLIGHTLY CRUMBLY TENACITY; IRREGULAR TO

SUB-BLOCKY TO OCCASIONAL SUB-PLANAR TO

EARTHY-HACKLY FRACTURE; SUB-TABULAR TO

SUB-NODULAR TO SEMI-PLATY CUTTINGS HABIT

; DULL TO EARTHY DULL TO OCCASIONAL SEMI

-SPARKLING LUSTER; SEMI-SMOOTH TO SEMI-

CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE;

POOR GRADE SILTSTONE VISIBLE GRADING WITH

TH POOR GRADE SANDSTONE AND POOR GRADE

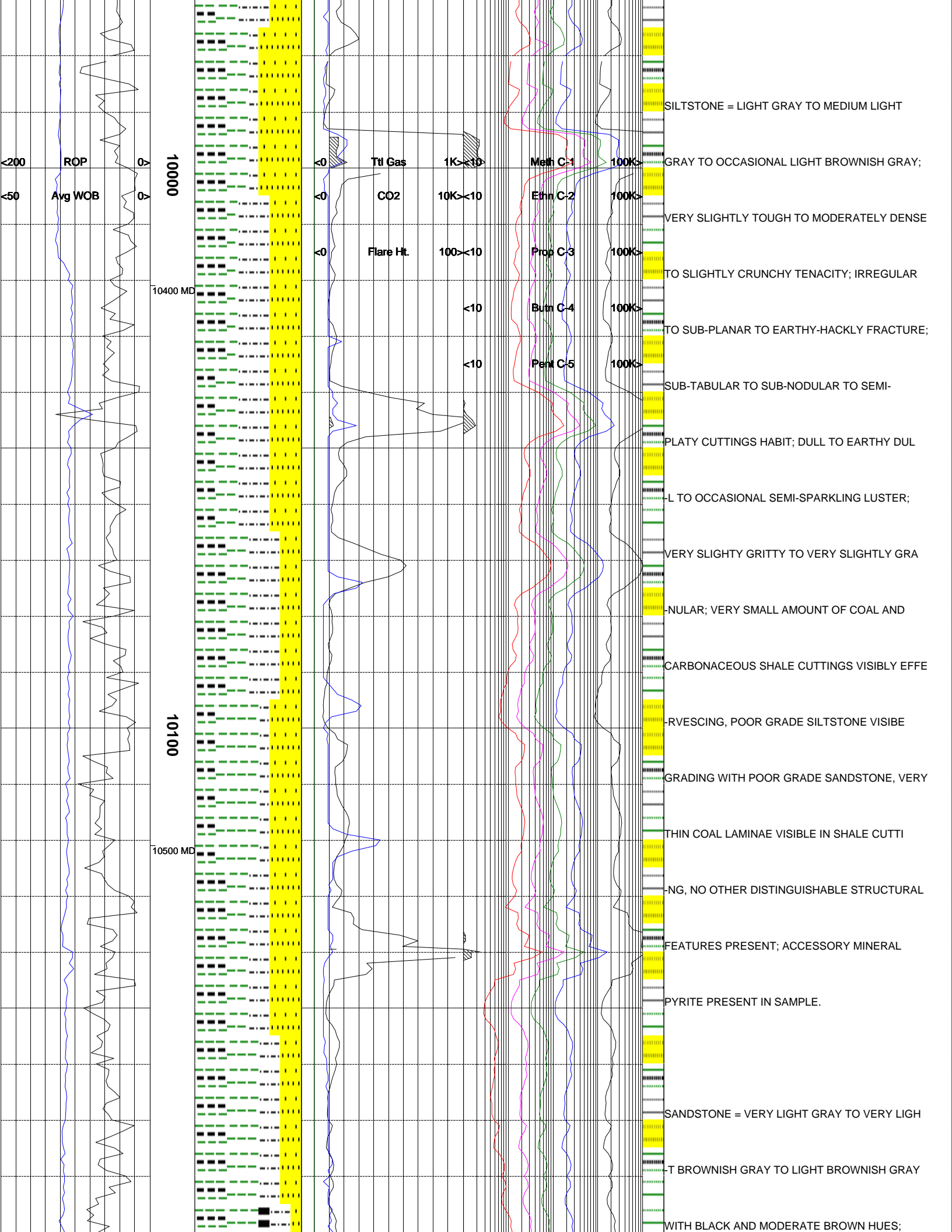
CARBONACEOUS SHALE, VERY THIN COAL LAMINAE

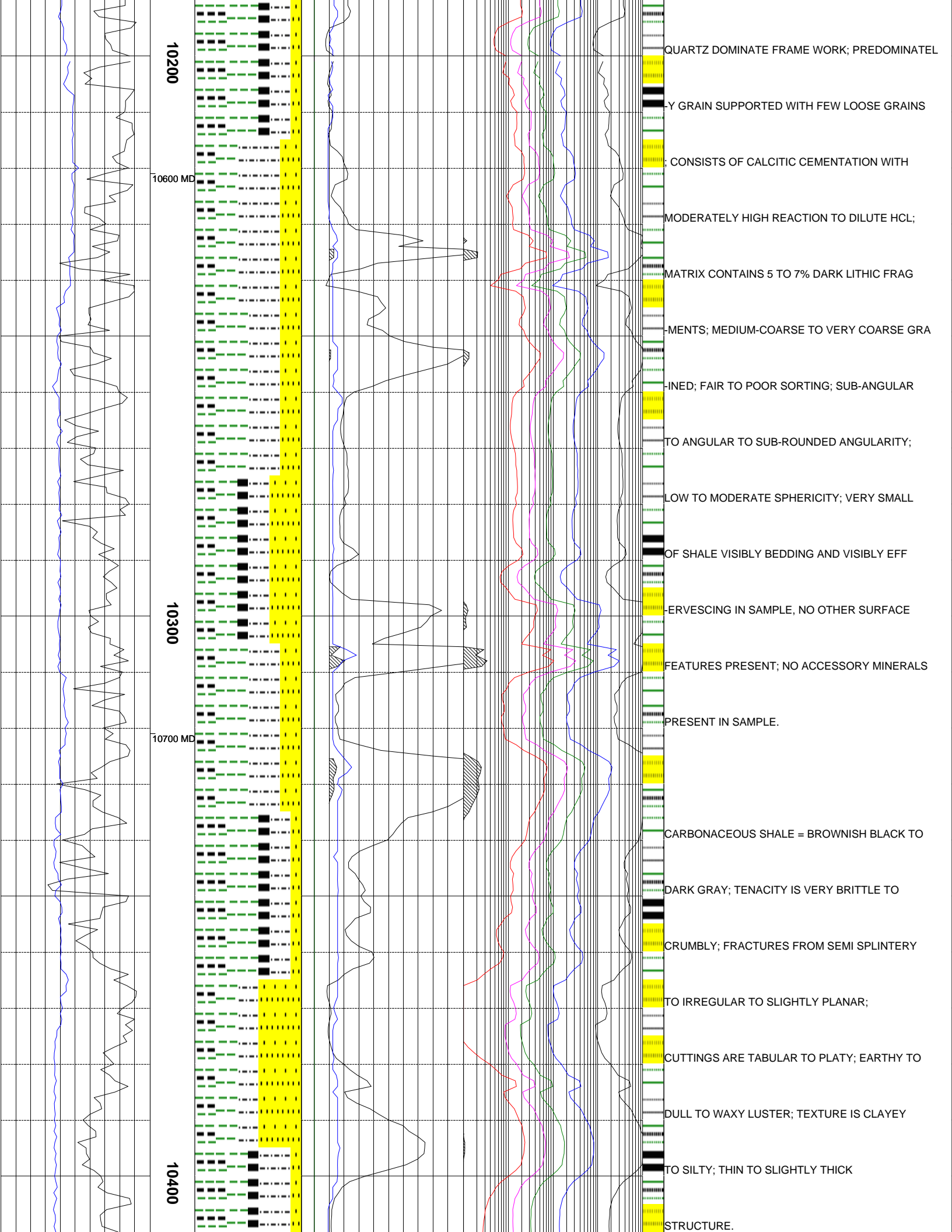
-LAMINAE VISIBLE IN SHALE CUTTING, NO OTHER

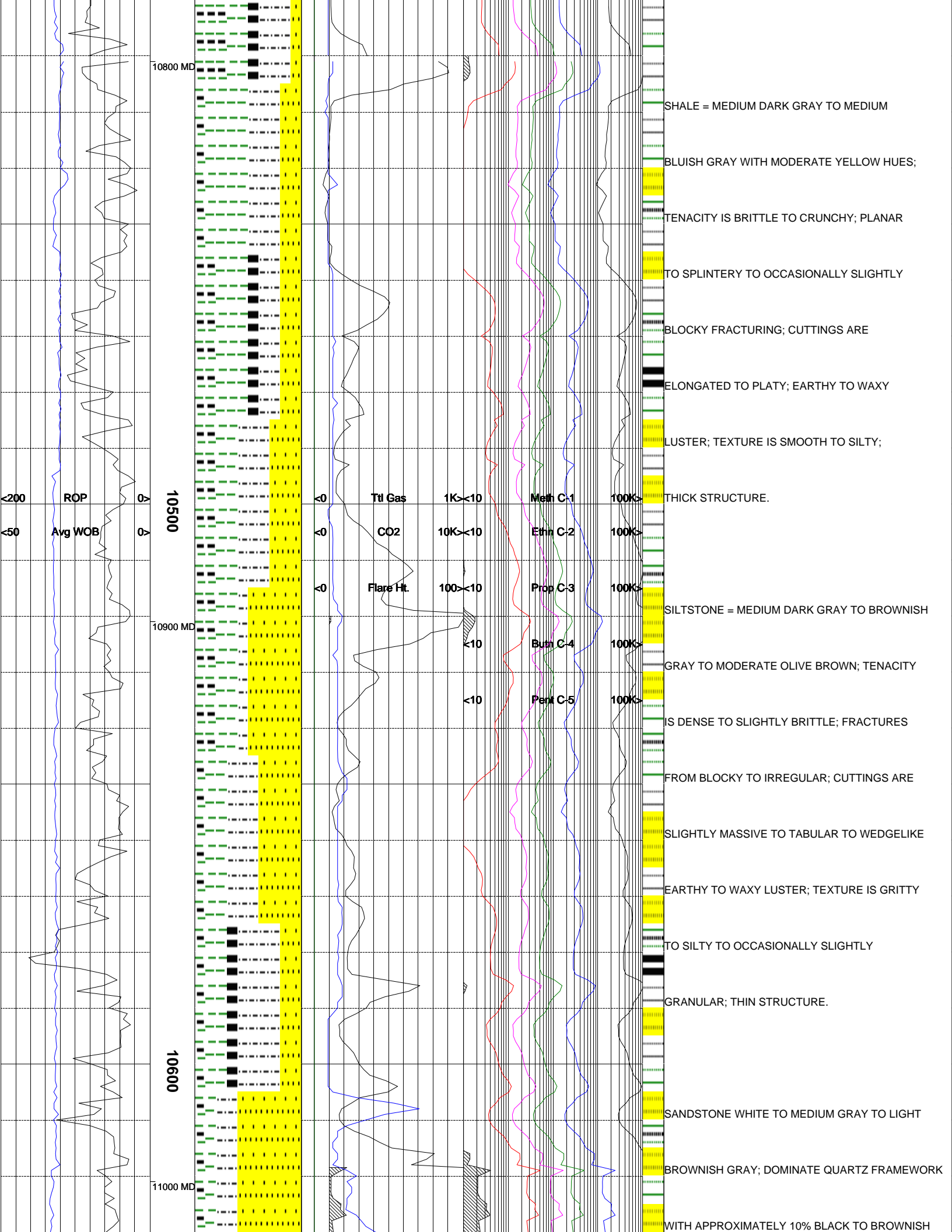
STRUCTURAL FEATURES VISIBLE IN SAMPLE;

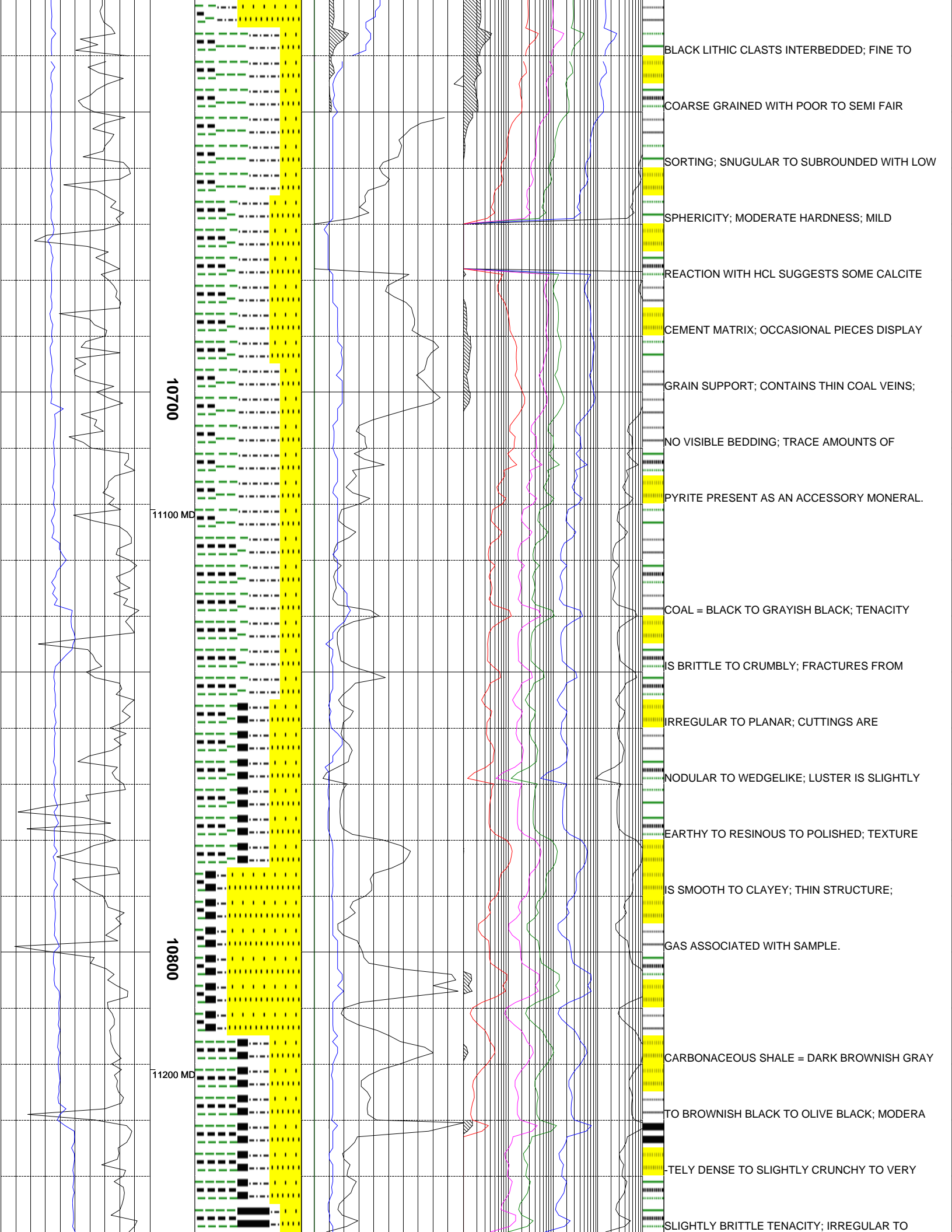
ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

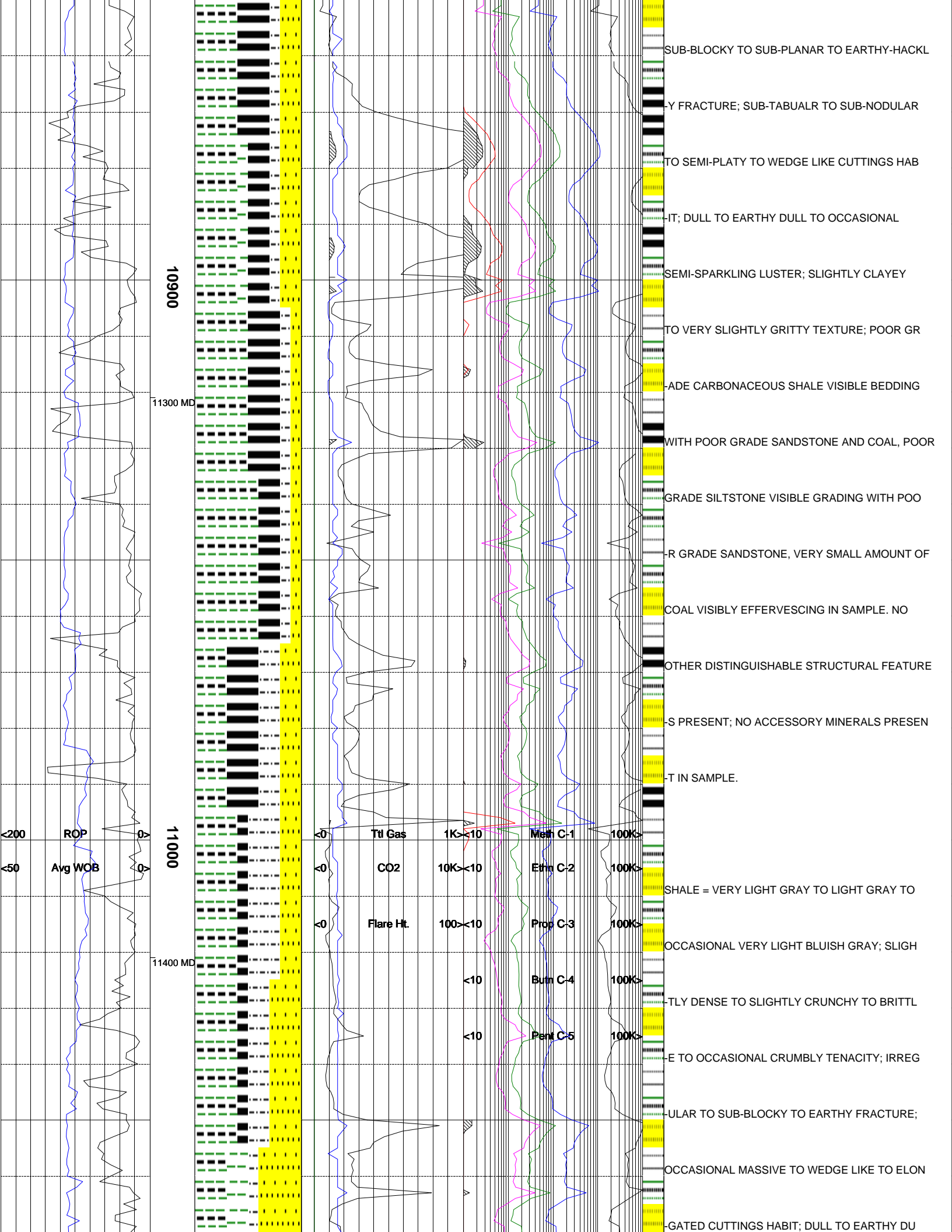
LE.











10900

11300 MD

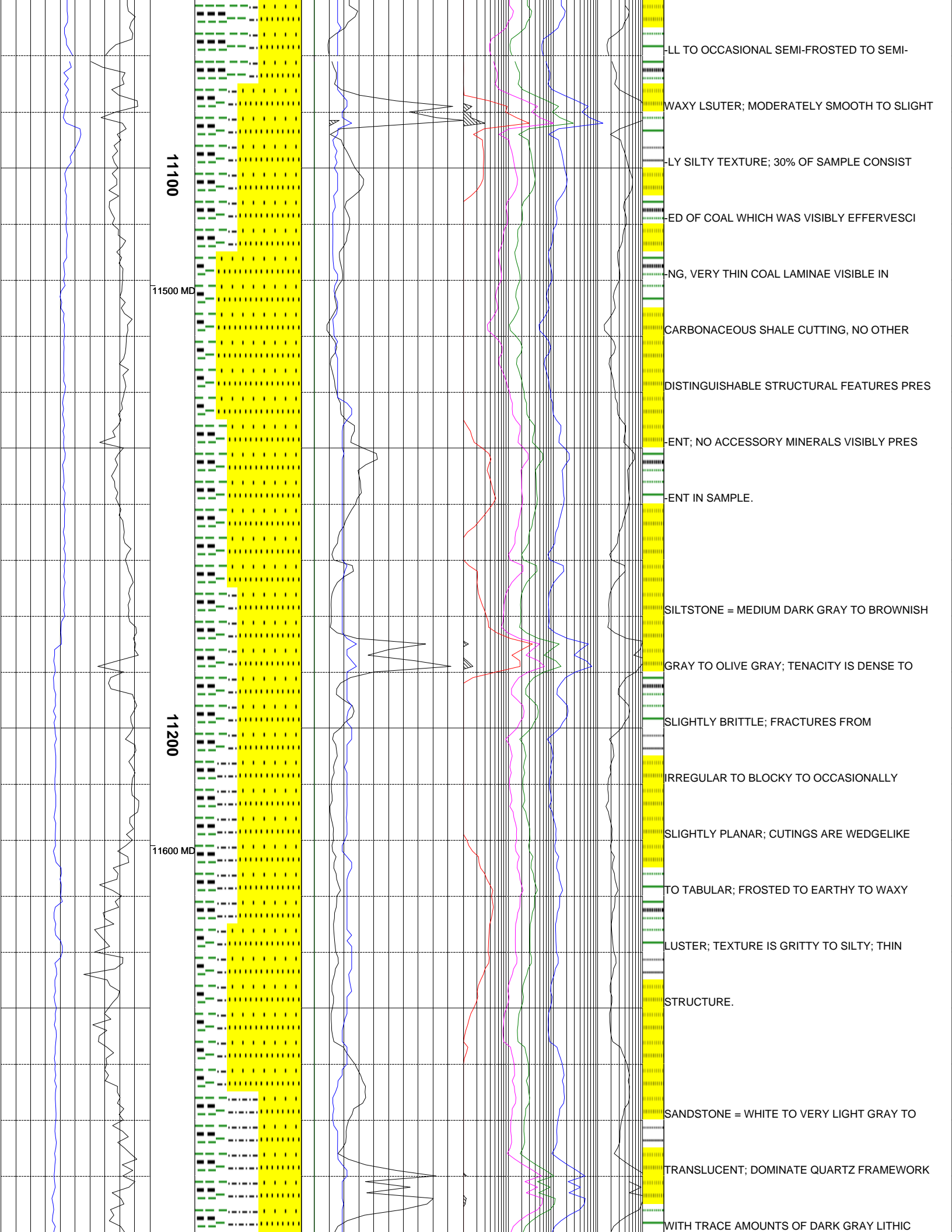
11000

11400 MD

<200 ROP  
<50 Avg WOB

Ttl Gas 1K<>10 Meth C-1 100K<>  
 CO2 10K<>10 Ethn C-2 100K<>  
 Flare Ht. 100<>10 Prop C-3 100K<>  
 <10 Burn C-4 100K<>  
 <10 Pent C-5 100K<>

SUB-BLOCKY TO SUB-PLANAR TO EARTHY-HACKL  
 Y FRACTURE; SUB-TABUALR TO SUB-NODULAR  
 TO SEMI-PLATY TO WEDGE LIKE CUTTINGS HAB  
 IT; DULL TO EARTHY DULL TO OCCASIONAL  
 SEMI-SPARKLING LUSTER; SLIGHTLY CLAYEY  
 TO VERY SLIGHTLY GRITTY TEXTURE; POOR GR  
 MADE CARBONACEOUS SHALE VISIBLE BEDDING  
 WITH POOR GRADE SANDSTONE AND COAL, POOR  
 GRADE SILTSTONE VISIBLE GRADING WITH POO  
 R GRADE SANDSTONE, VERY SMALL AMOUNT OF  
 COAL VISIBLY EFFERVESCING IN SAMPLE. NO  
 OTHER DISTINGUISHABLE STRUCTURAL FEATURE  
 S PRESENT; NO ACCESSORY MINERALS PRESEN  
 T IN SAMPLE.  
 SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO  
 OCCASIONAL VERY LIGHT BLUISH GRAY; SLIGH  
 TLY DENSE TO SLIGHTLY CRUNCHY TO BRITTL  
 E TO OCCASIONAL CRUMBLY TENACITY; IRREG  
 ULAR TO SUB-BLOCKY TO EARTHY FRACTURE;  
 OCCASIONAL MASSIVE TO WEDGE LIKE TO ELON  
 GATED CUTTINGS HABIT; DULL TO EARTHY DU



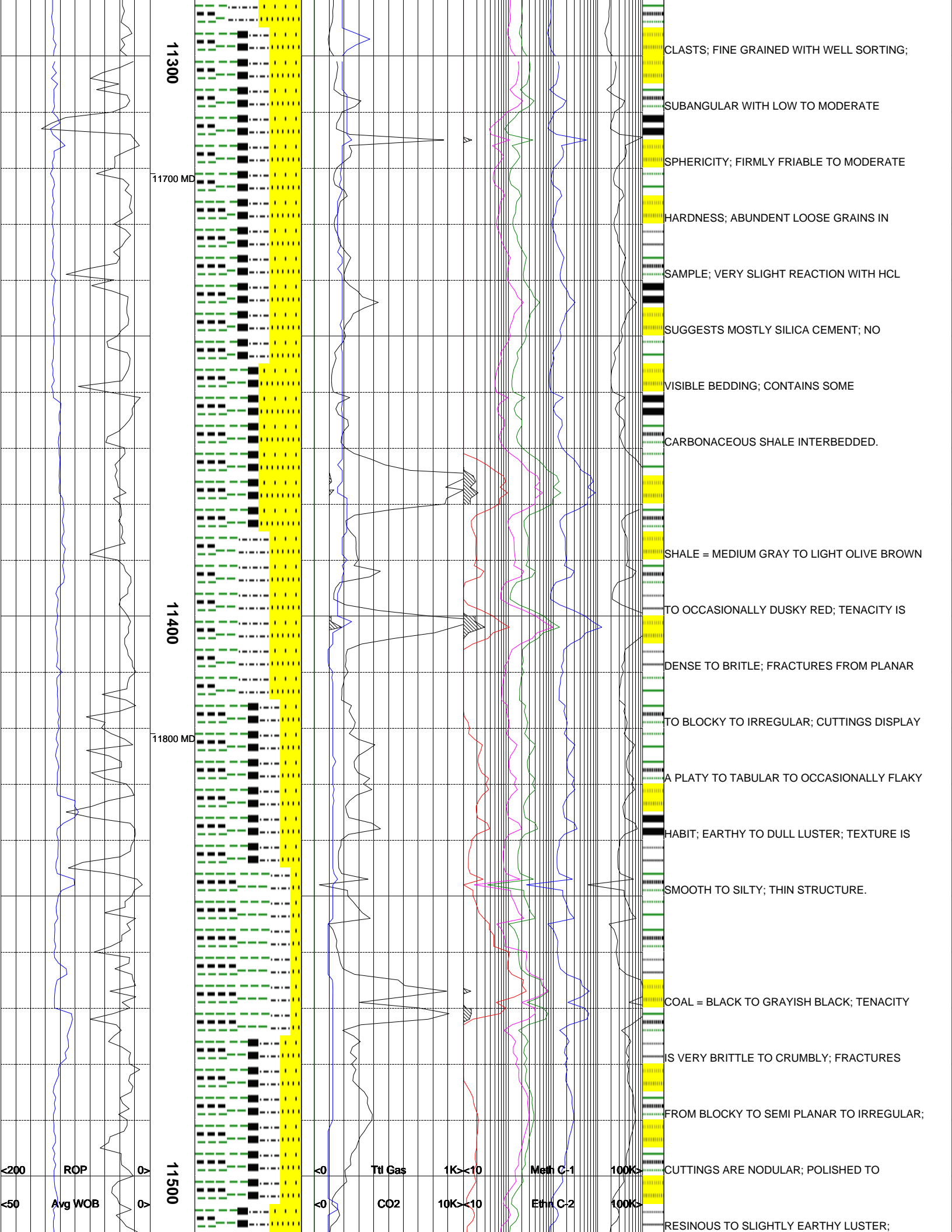
11100

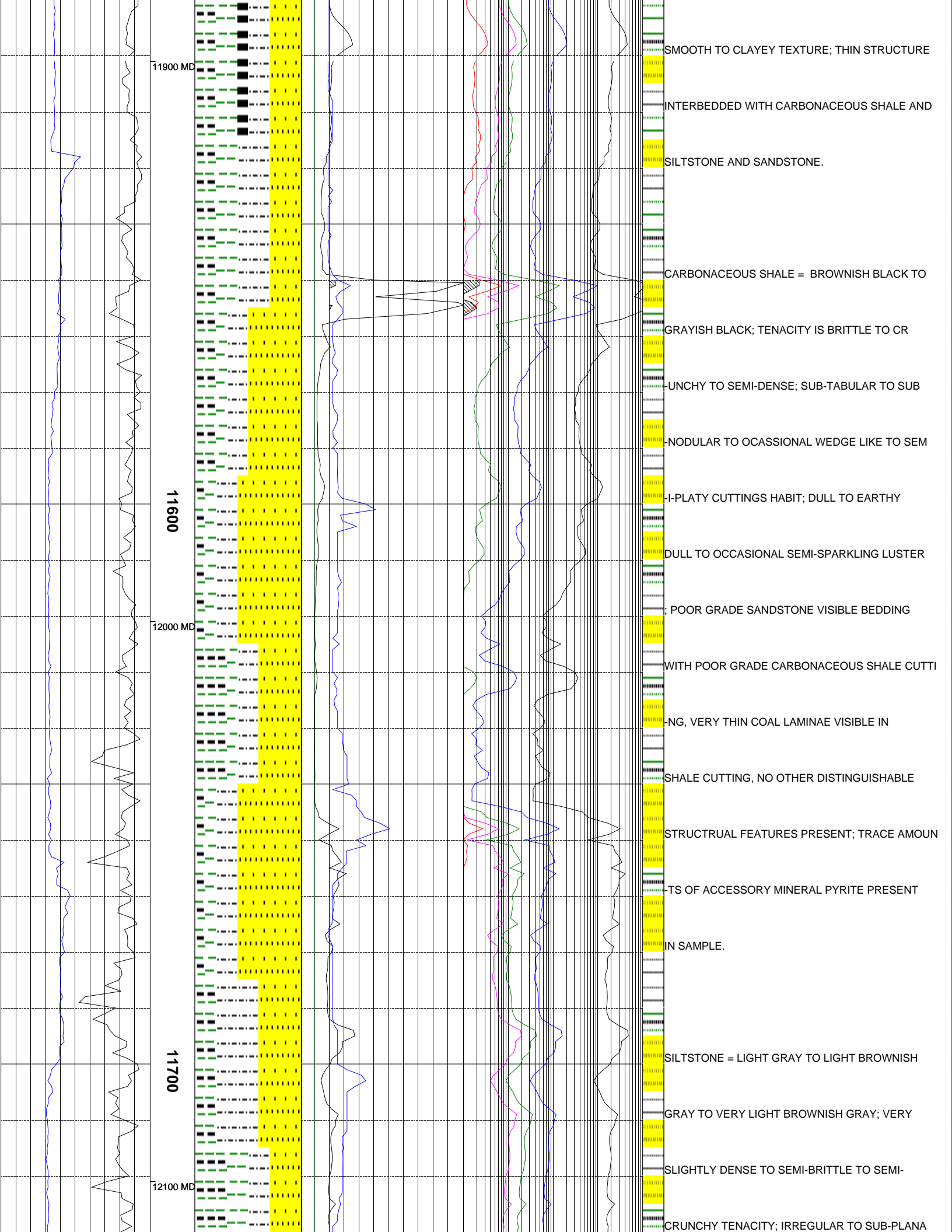
11500 MD

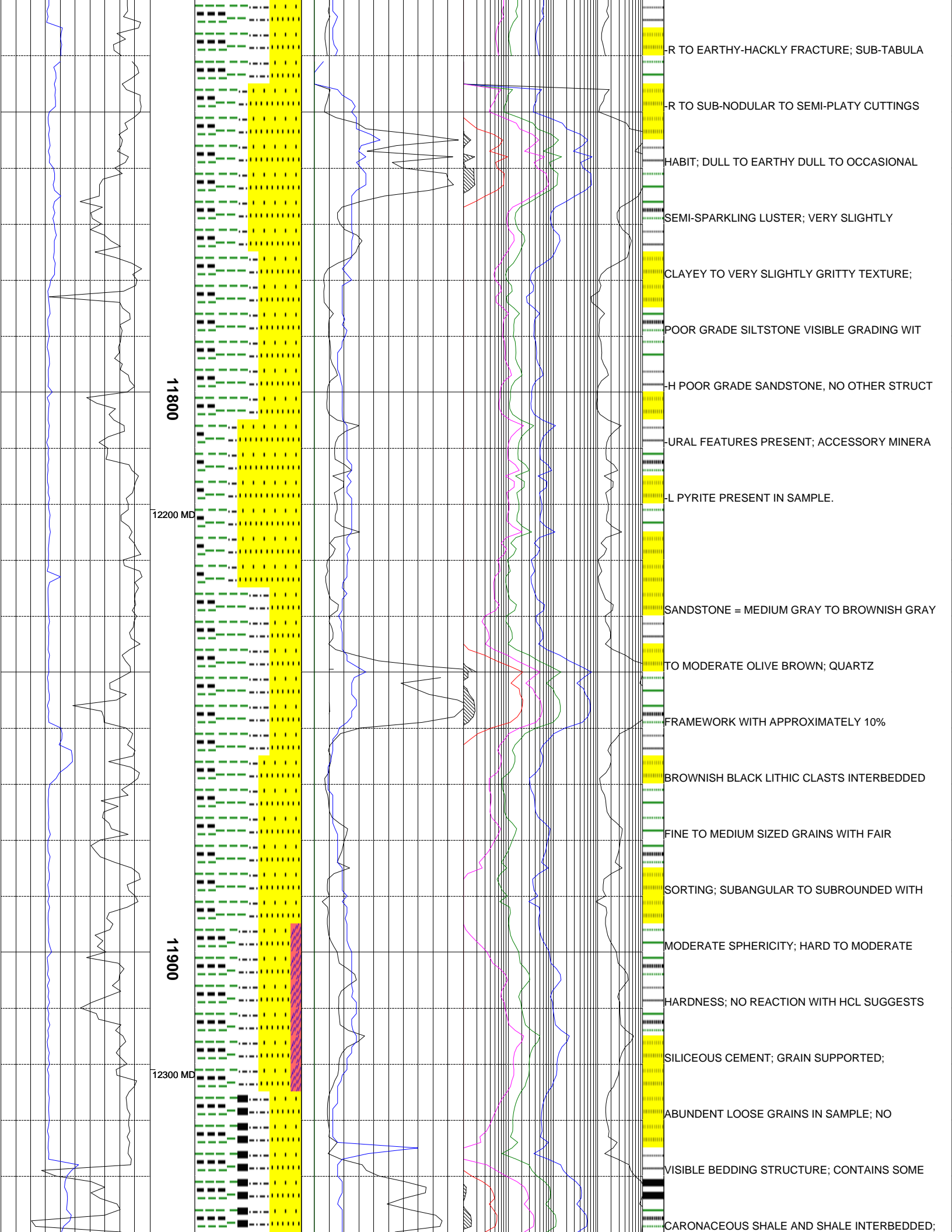
11200

11600 MD

...LL TO OCCASIONAL SEMI-FROSTED TO SEMI-  
 WAXY LUSTER; MODERATELY SMOOTH TO SLIGHT  
 ...LY SILTY TEXTURE; 30% OF SAMPLE CONSIST  
 ...ED OF COAL WHICH WAS VISIBLY EFFERVESCI  
 ...NG, VERY THIN COAL LAMINAE VISIBLE IN  
 ...CARBONEOUS SHALE CUTTING, NO OTHER  
 ...DISTINGUISHABLE STRUCTURAL FEATURES PRES  
 ...ENT; NO ACCESSORY MINERALS VISIBLY PRES  
 ...ENT IN SAMPLE.  
 ...SILTSTONE = MEDIUM DARK GRAY TO BROWNISH  
 ...GRAY TO OLIVE GRAY; TENACITY IS DENSE TO  
 ...SLIGHTLY BRITTLE; FRACTURES FROM  
 ...IRREGULAR TO BLOCKY TO OCCASIONALLY  
 ...SLIGHTLY PLANAR; CUTTINGS ARE WEDGELIKE  
 ...TO TABULAR; FROSTED TO EARTHY TO WAXY  
 ...LUSTER; TEXTURE IS GRITTY TO SILTY; THIN  
 ...STRUCTURE.  
 ...SANDSTONE = WHITE TO VERY LIGHT GRAY TO  
 ...TRANSLUCENT; DOMINATE QUARTZ FRAMEWORK  
 ...WITH TRACE AMOUNTS OF DARK GRAY LITHIC







11800

12200 MD

11900

12300 MD

R TO EARTHY-HACKLY FRACTURE; SUB-TABULA

R TO SUB-NODULAR TO SEMI-PLATY CUTTINGS

HABIT; DULL TO EARTHY DULL TO OCCASIONAL

SEMI-SPARKLING LUSTER; VERY SLIGHTLY

CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE;

POOR GRADE SILTSTONE VISIBLE GRADING WIT

H POOR GRADE SANDSTONE, NO OTHER STRUCT

URAL FEATURES PRESENT; ACCESSORY MINERA

L PYRITE PRESENT IN SAMPLE.

SANDSTONE = MEDIUM GRAY TO BROWNISH GRAY

TO MODERATE OLIVE BROWN; QUARTZ

FRAMEWORK WITH APPROXIMATELY 10%

BROWNISH BLACK LITHIC CLASTS INTERBEDDED

FINE TO MEDIUM SIZED GRAINS WITH FAIR

SORTING; SUBANGULAR TO SUBROUNDED WITH

MODERATE SPHERICITY; HARD TO MODERATE

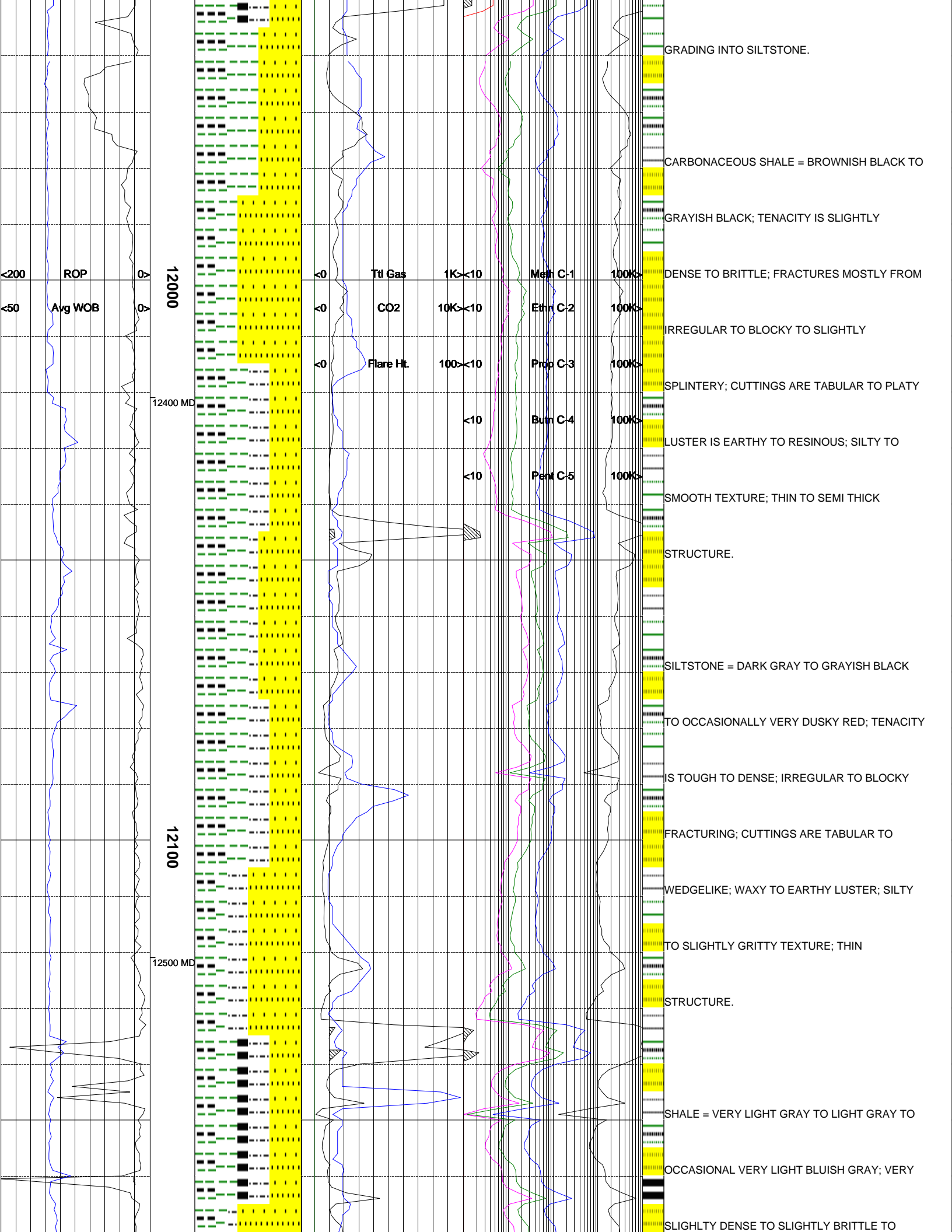
HARDNESS; NO REACTION WITH HCL SUGGESTS

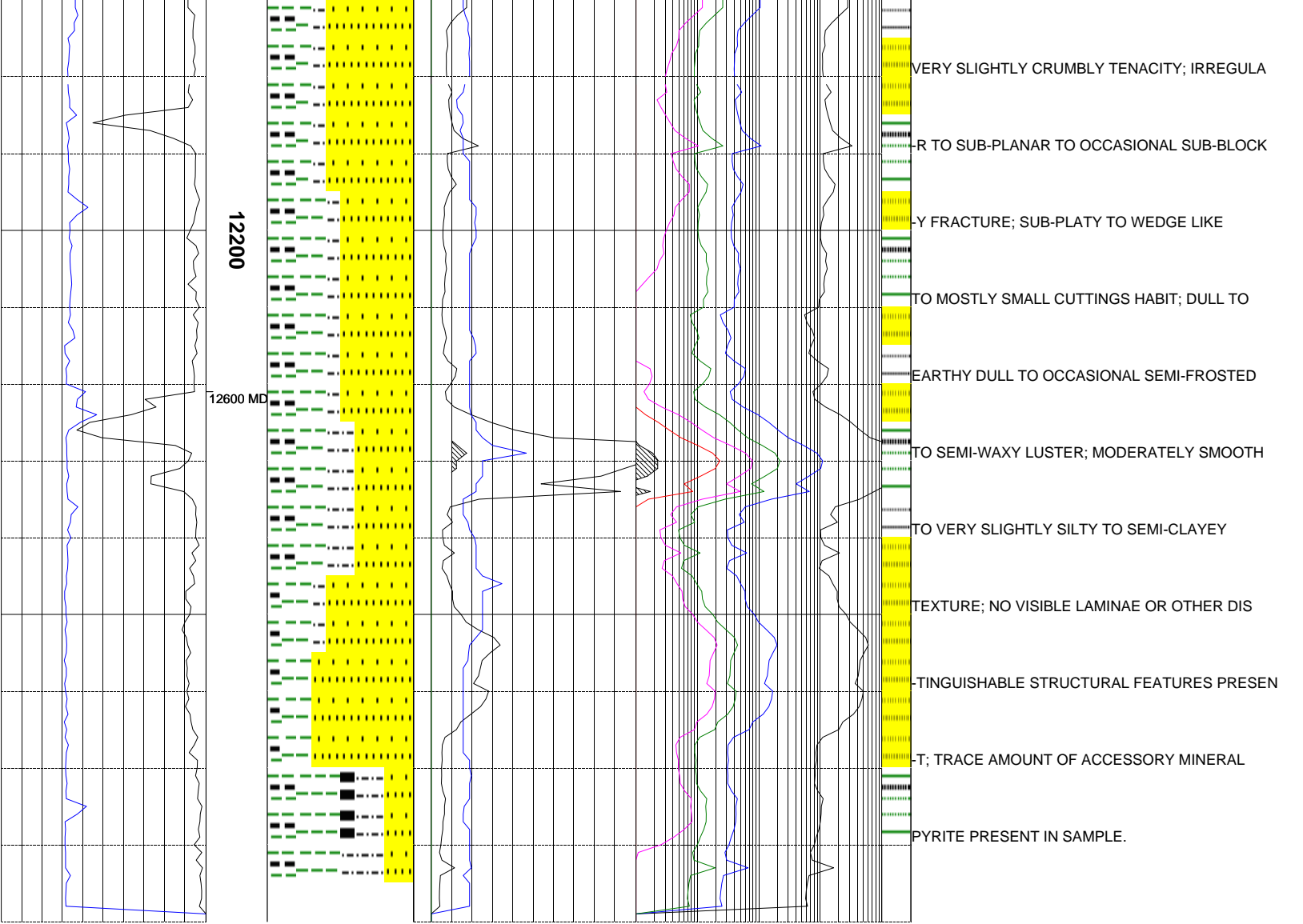
SILICEOUS CEMENT; GRAIN SUPPORTED;

ABUNDANT LOOSE GRAINS IN SAMPLE; NO

VISIBLE BEDDING STRUCTURE; CONTAINS SOME

CARONACEOUS SHALE AND SHALE INTERBEDDED;





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