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Houston, TX (281) 784-5500
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MUDLOG TVD

COMPANY ExxonMobil Production
WELL PCU 297-12A7
FIELD Piceance Creek Unit
REGION Rocky Mountain
COORDINATES Lat. 39.889005 N
Lon. 108.23726 W
ELEVATION GL: 7183.9'
KB: 7214'
COUNTY, STATE RIO BLANCO, CO
API INDEX 05-103-11161-00
SPUD DATE 10/12/2008
CONTRACTOR HP Drilling
CO. REP. J. Woods, M. Sadler
RIG/TYPE 326 / Flex Four
LOGGING UNIT Canrig Unit 36
GEOLOGISTS J.Kokes
B.Laiche
ADD. PERSONS H.Strickland
P.Strickland
CO. GEOLOGIST Chris Alba

LOG INTERVAL

CASING DATA

DEPTHS: 3995' TO 12866'
DATES: 5/22/2009 TO 11/22/2009
SCALE: 5" = 100'

10 3/4" AT 3980'
7" AT 8881'
4.5" AT 12866'
AT

MUD TYPES

HOLE SIZE

WATER BASED TO 3995'
LSND TO 5500'
DSF TO 5882'
LSND TO 12866'

14 1/4" TO 3995'
9 7/8" TO 8896'
6.125" TO 12866'
TO

ABBREVIATIONS

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

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



3700

THE GAS BUSTER, THE INTERVAL IS MARKED  
IN THE MGS COLUMN AND SIZE OF FLARES  
ARE NOTED.

EVIDENCE OF FRACTURE FILL IS NOTED ON  
THE MUD LOG. KAOLIN PERCENTAGE IN SS  
INTERVALS IS ALSO NOTED ON THE MUD LOG.

3900 MD

1 UNIT OF GAS = 200 PPM METHANE

3800

SET 10 3/4" SURFACE CASING AT 3980'

<0 Ttl Gas 500>

EPOCH COMMENCED LOGGING ON 5/22/2009  
AT 3995' MD.

4000 MD

SANDSTONE = LIGHT PALE BROWNISH YELLOW,

LIGHT MODERATE BROWN, SOME CLEAR TO

TRANSLUCENT; UPPER VERY FINE TO FINE

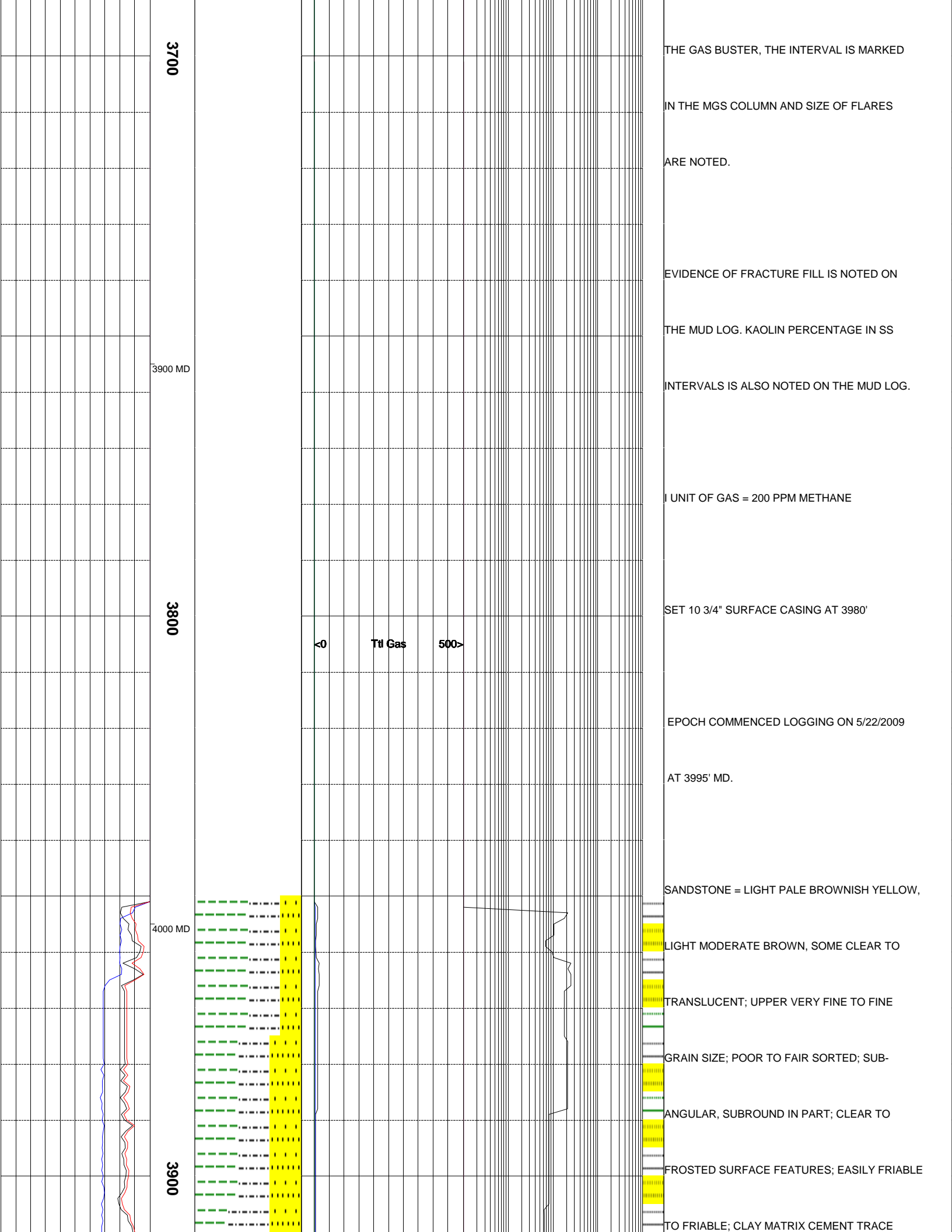
GRAIN SIZE; POOR TO FAIR SORTED; SUB-

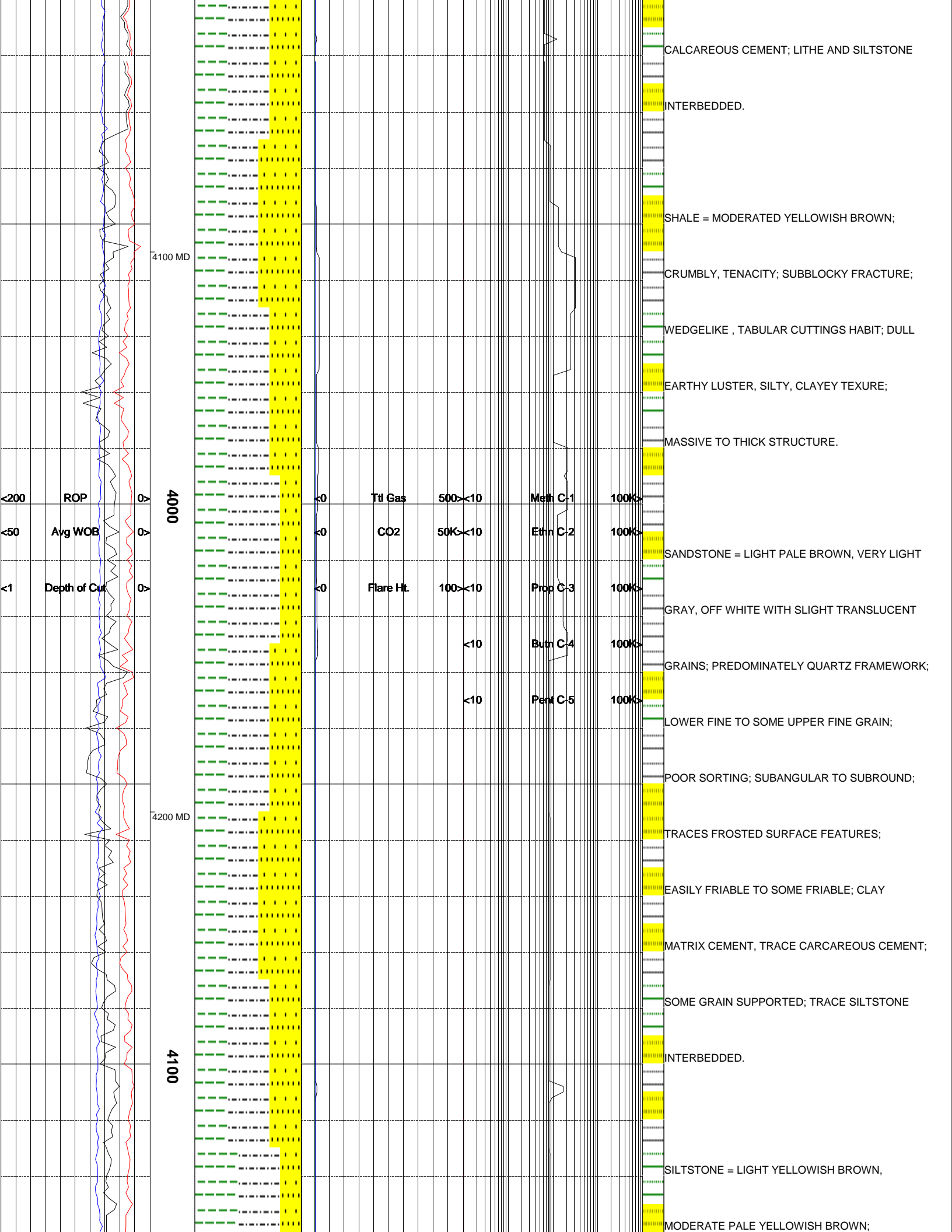
ANGULAR, SUBROUND IN PART; CLEAR TO

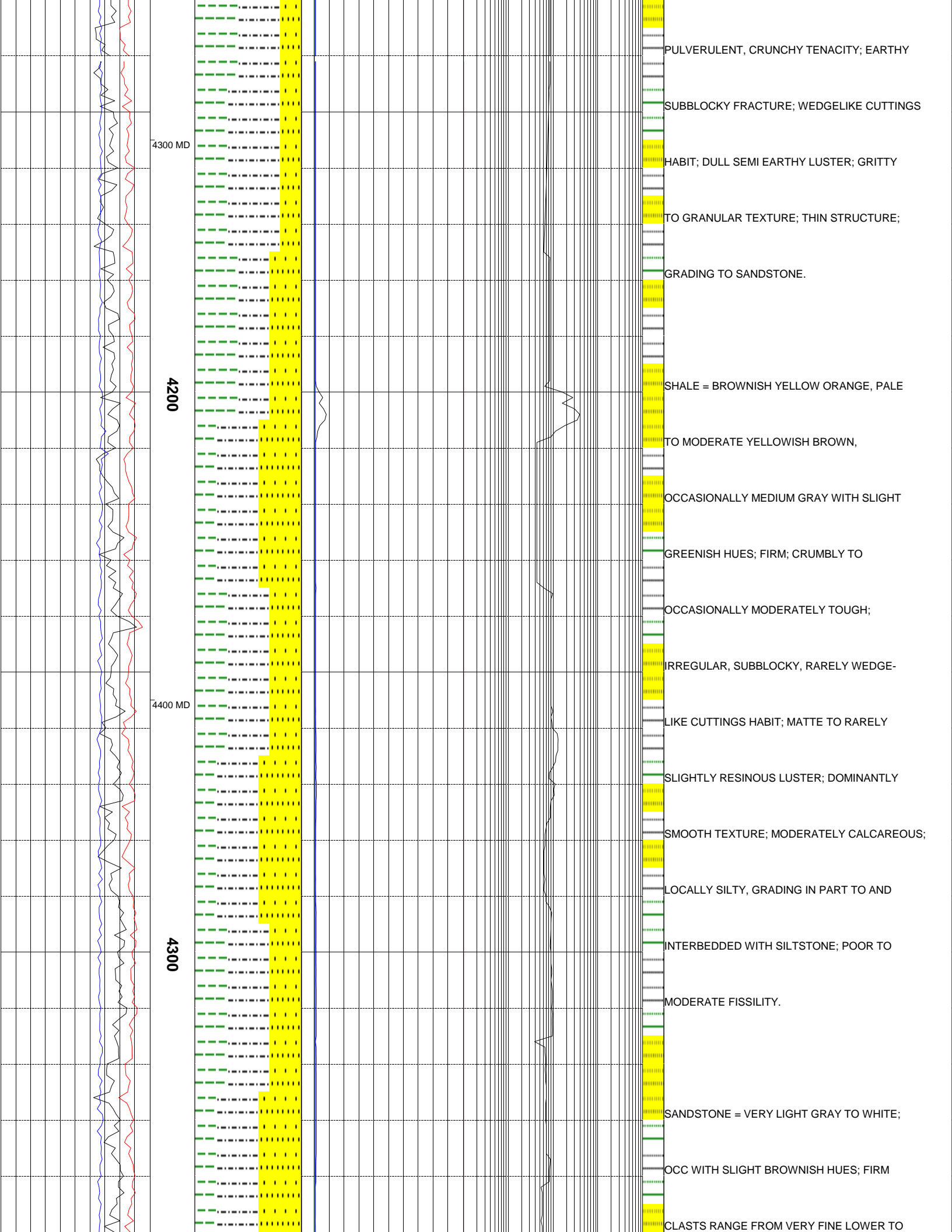
3900

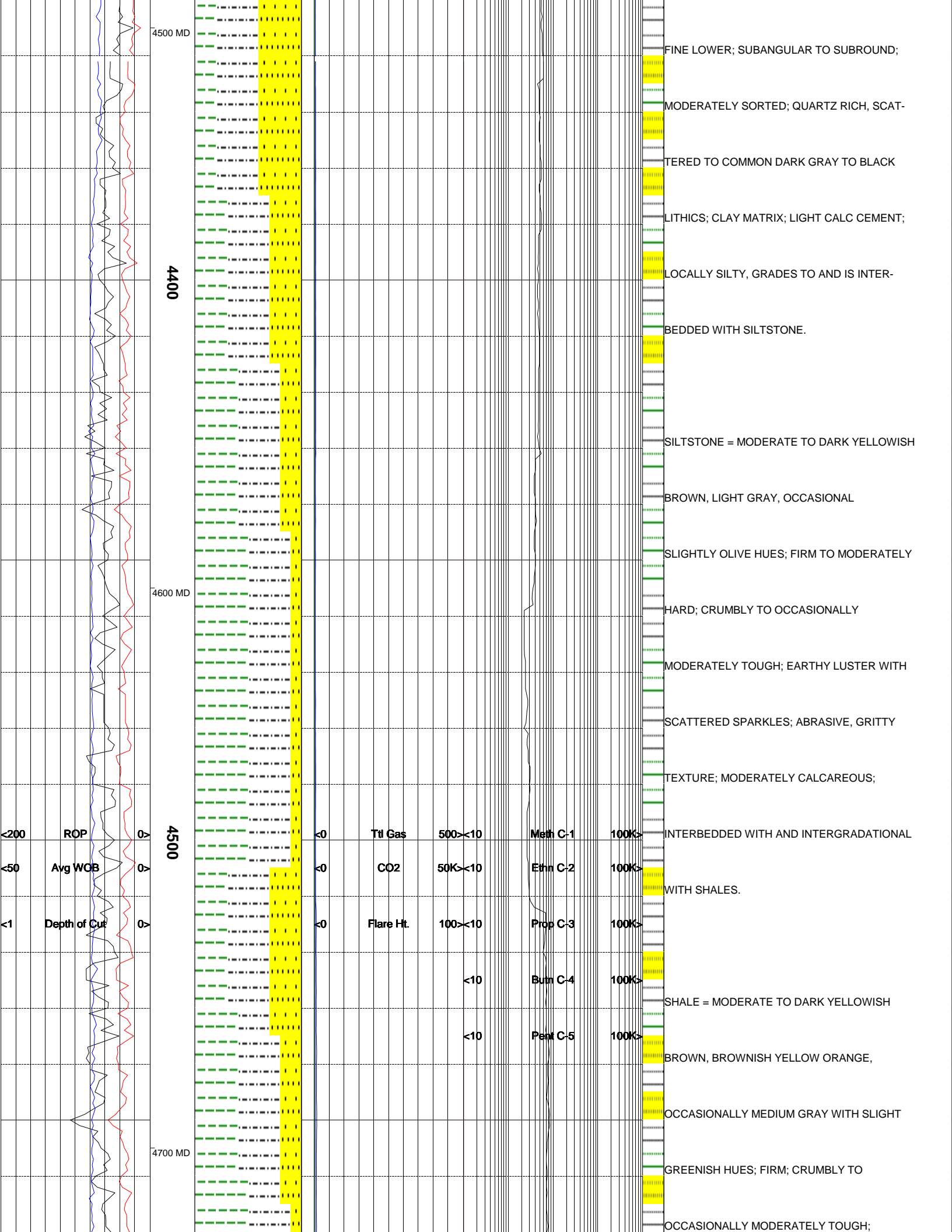
FROSTED SURFACE FEATURES; EASILY FRIABLE

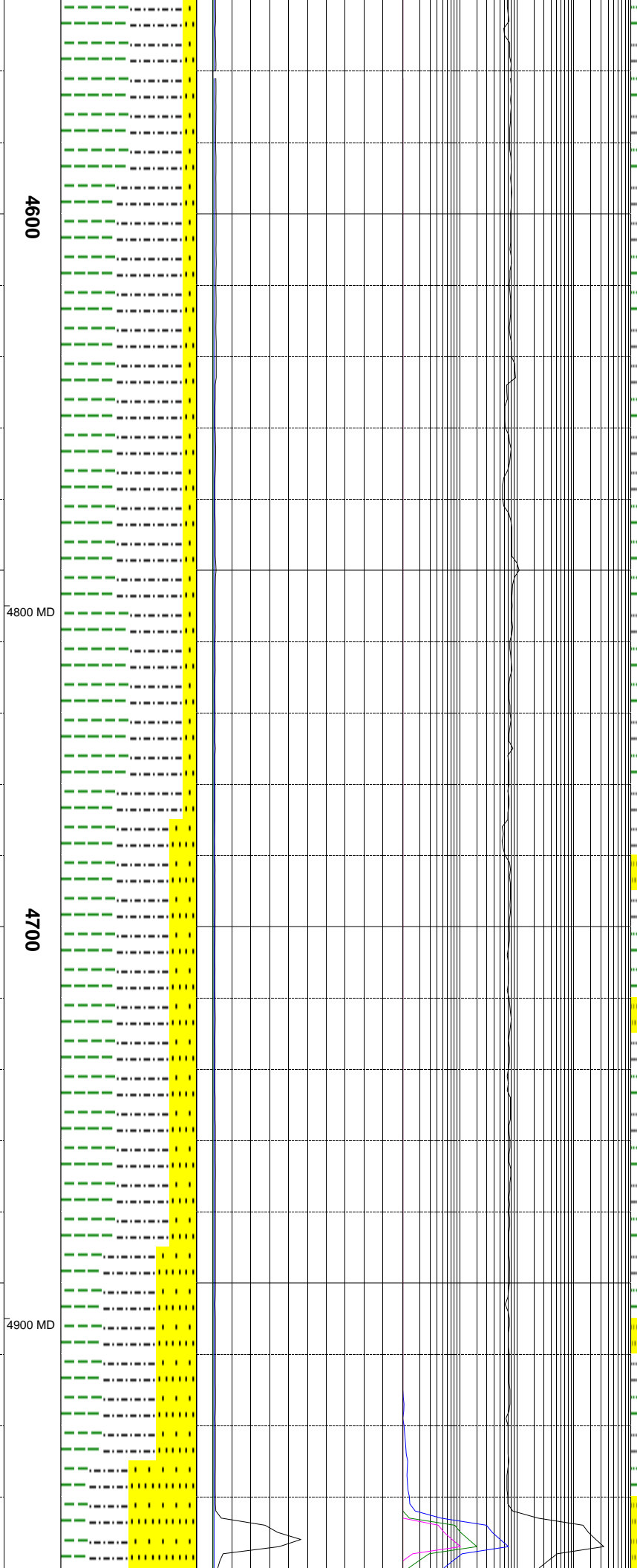
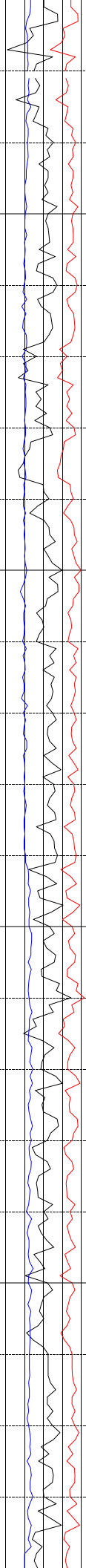
TO FRIABLE; CLAY MATRIX CEMENT TRACE











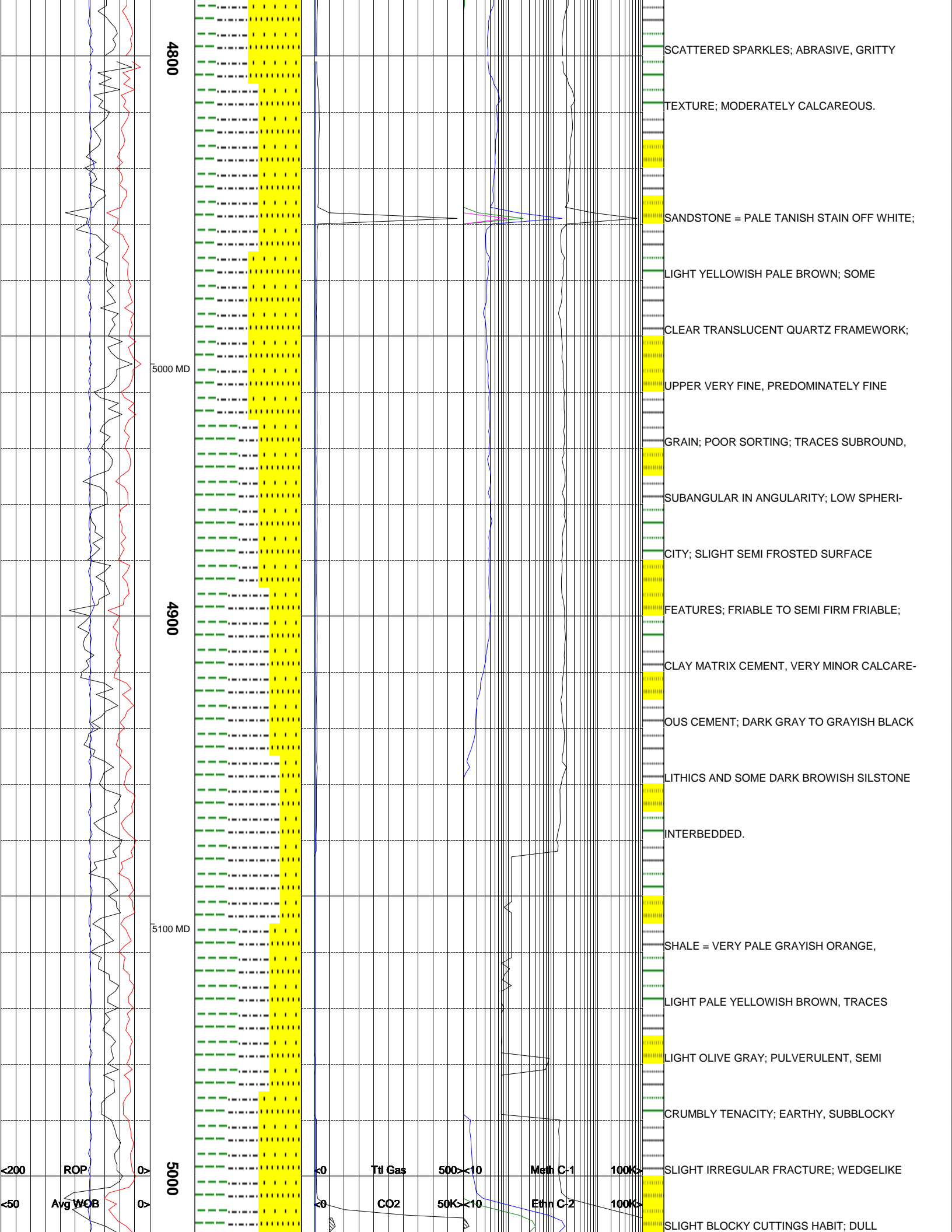
IRREGULAR, SUBBLOCKY, RARELY WEDGE-  
 LIKE CUTTINGS HABIT; MATTE TO RARELY  
 SLIGHTLY RESINOUS LUSTER; DOMINANTLY  
 SMOOTH TEXTURE; MODERATELY CALCAREOUS;  
 LOCALLY SILTY, GRADING IN PART TO AND  
 AND INTERBEDDED WITH SILTSTONE.  
 SANDSTONE = WHITE TO VERY LIGHT GRAY;  
 COMMON "PEPPERED" APPEARANCE; FIRM  
 CLASTS RANGE FROM VERY FINE LOWER TO  
 FINE LOWER; SUBANGULAR TO SUBROUND;  
 MODERATELY SORTED; QUARTZ RICH, SCAT-  
 TERED TO COMMON DARK GRAY TO BLACK  
 LITHICS; CLAY MATRIX; LIGHT CALC CEMENT;  
 LOCALLY SILTY, GRADES TO AND IS INTER-  
 BEDDED WITH SILTSTONE.  
 SILTSTONE = MODERATE TO DARK YELLOWISH  
 BROWN, LIGHT GRAY, COMMON GREENISH  
 GRAY TO OLIVE HUES; FIRM TO MODERATELY  
 HARD; CRUMBLY TO OCCASIONALLY  
 MODERATELY TOUGH; EARTHY LUSTER WITH

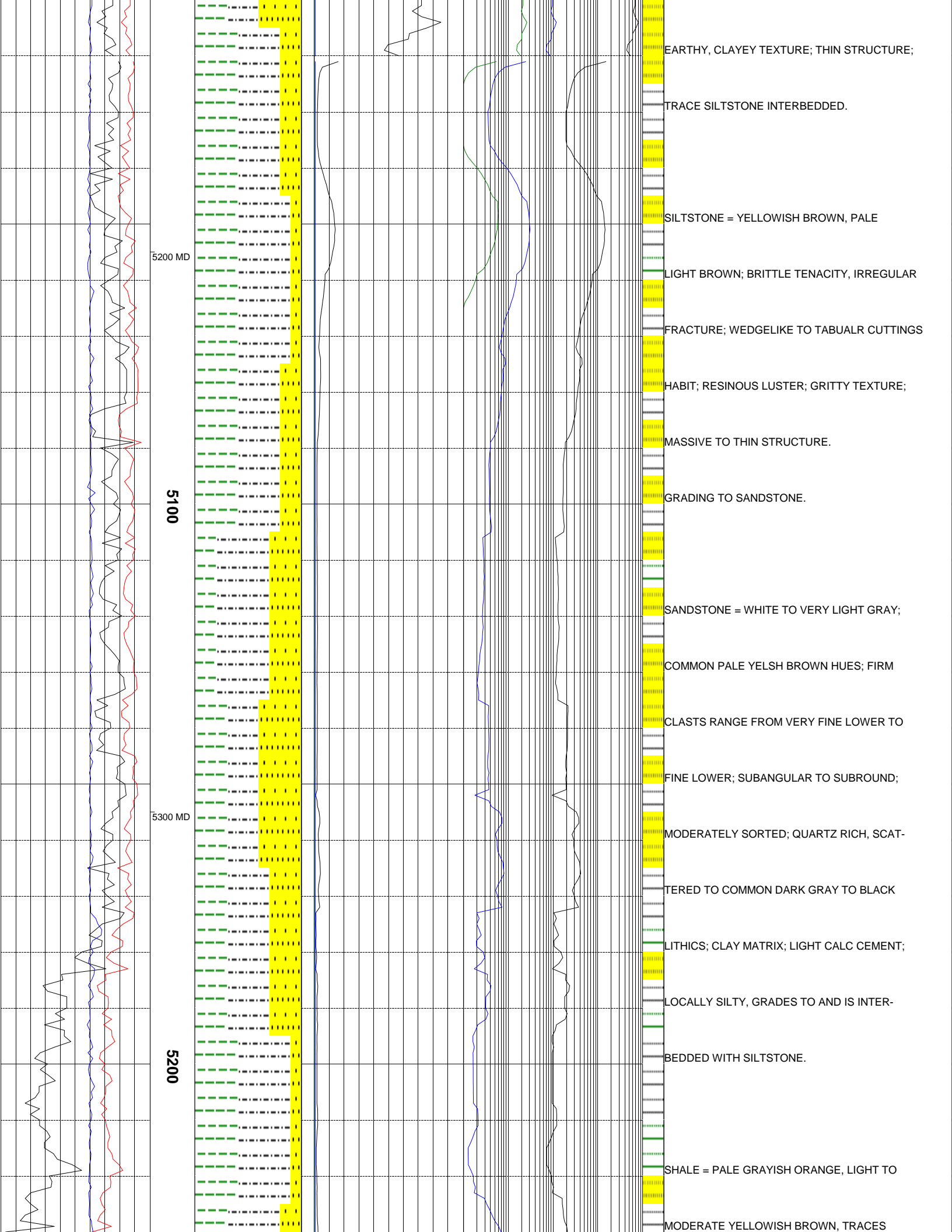
4600

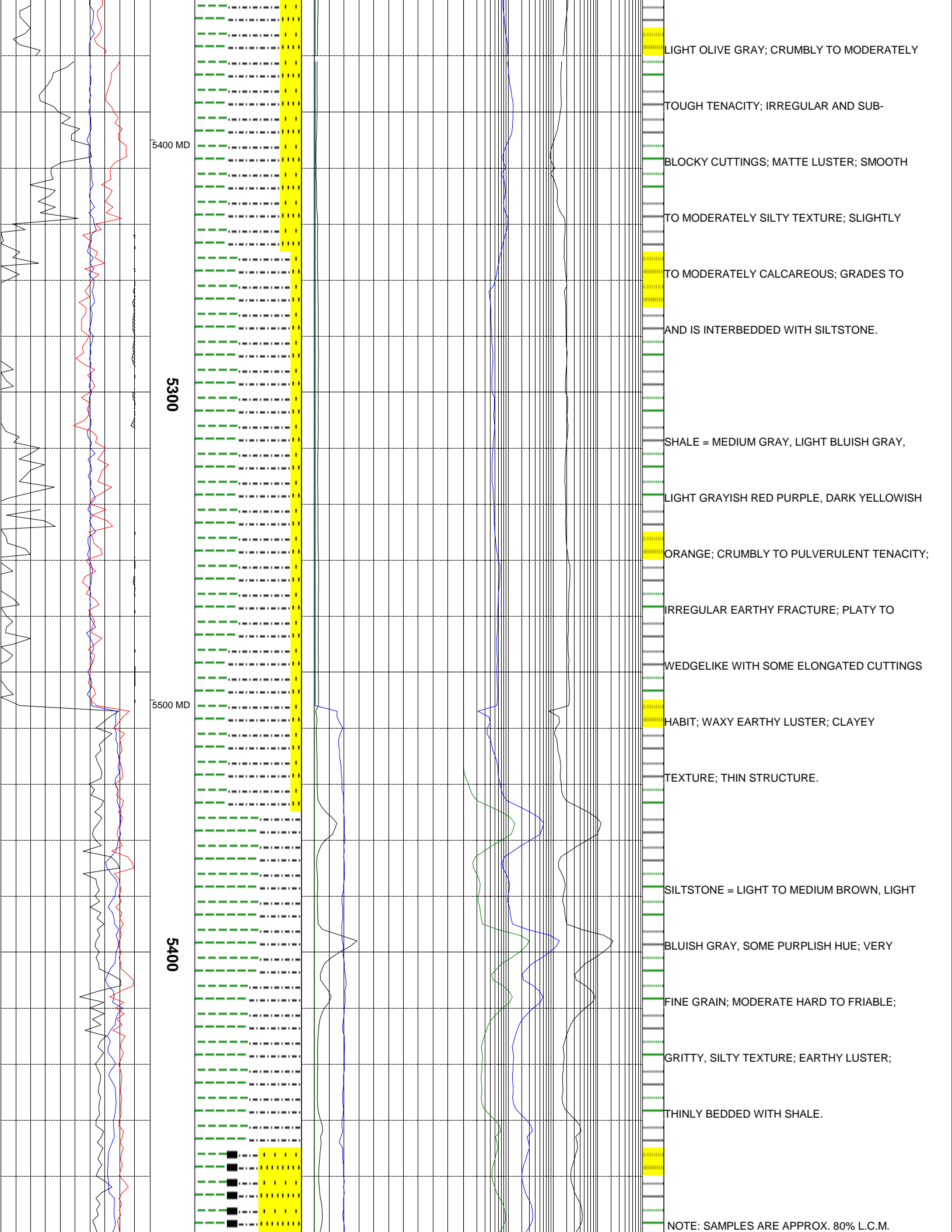
4800 MD

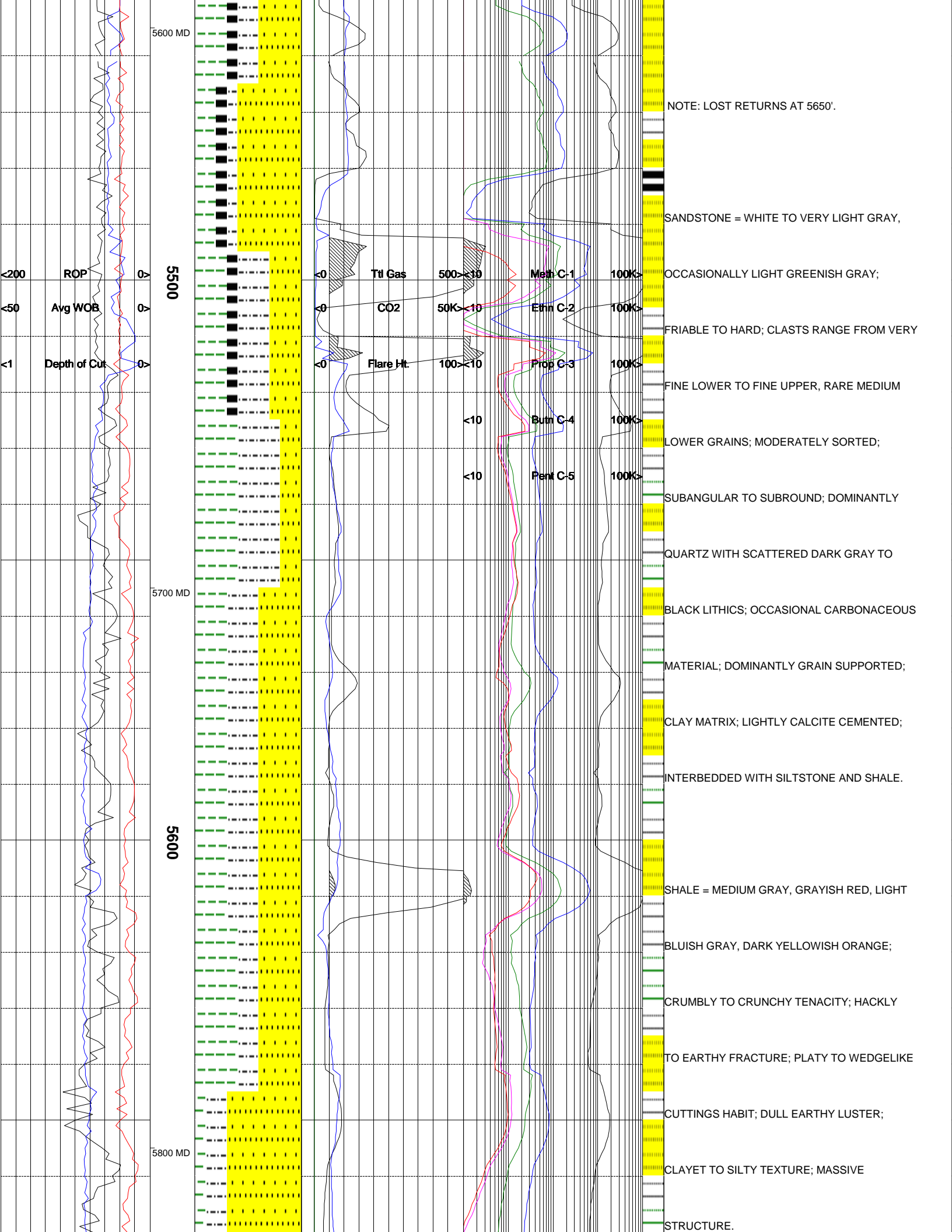
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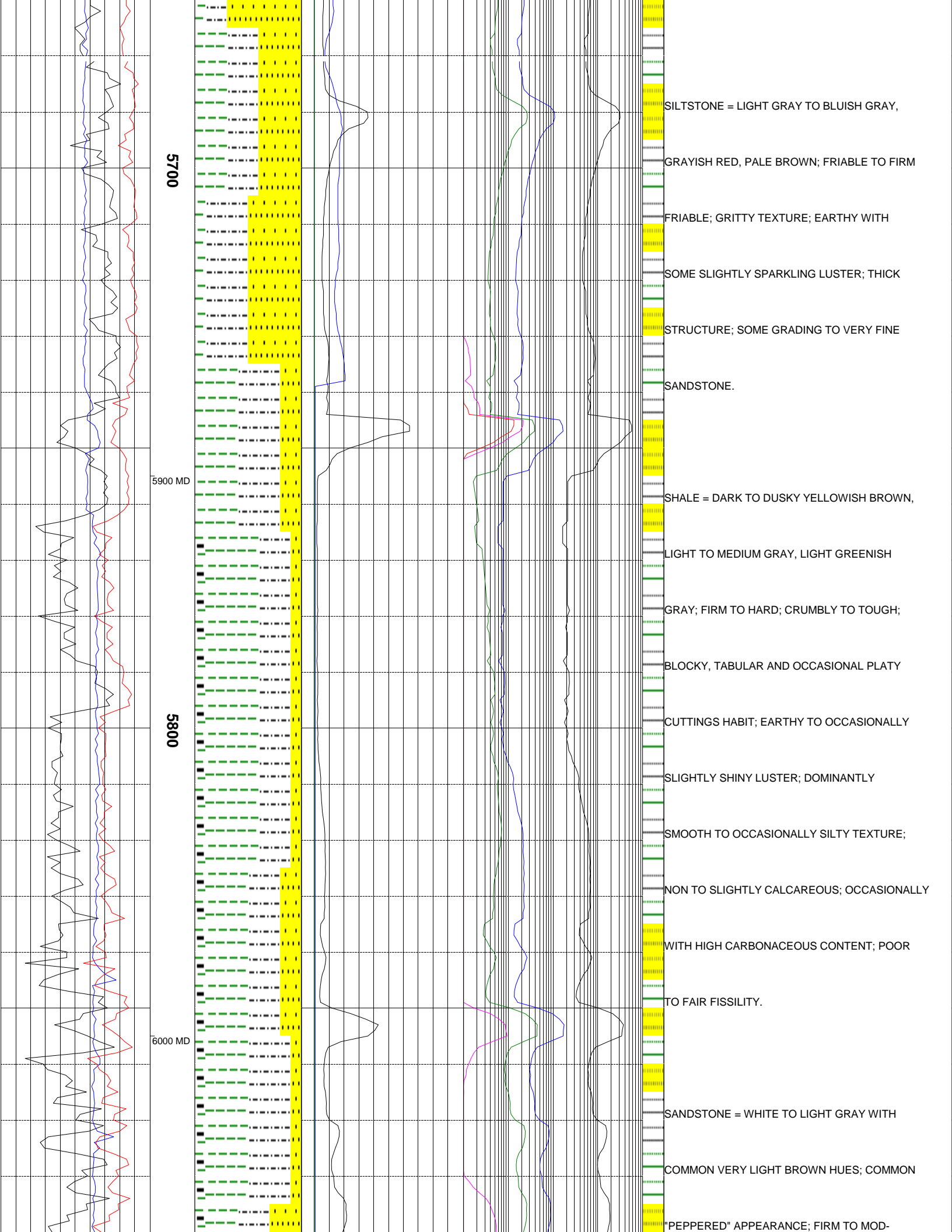
4900 MD











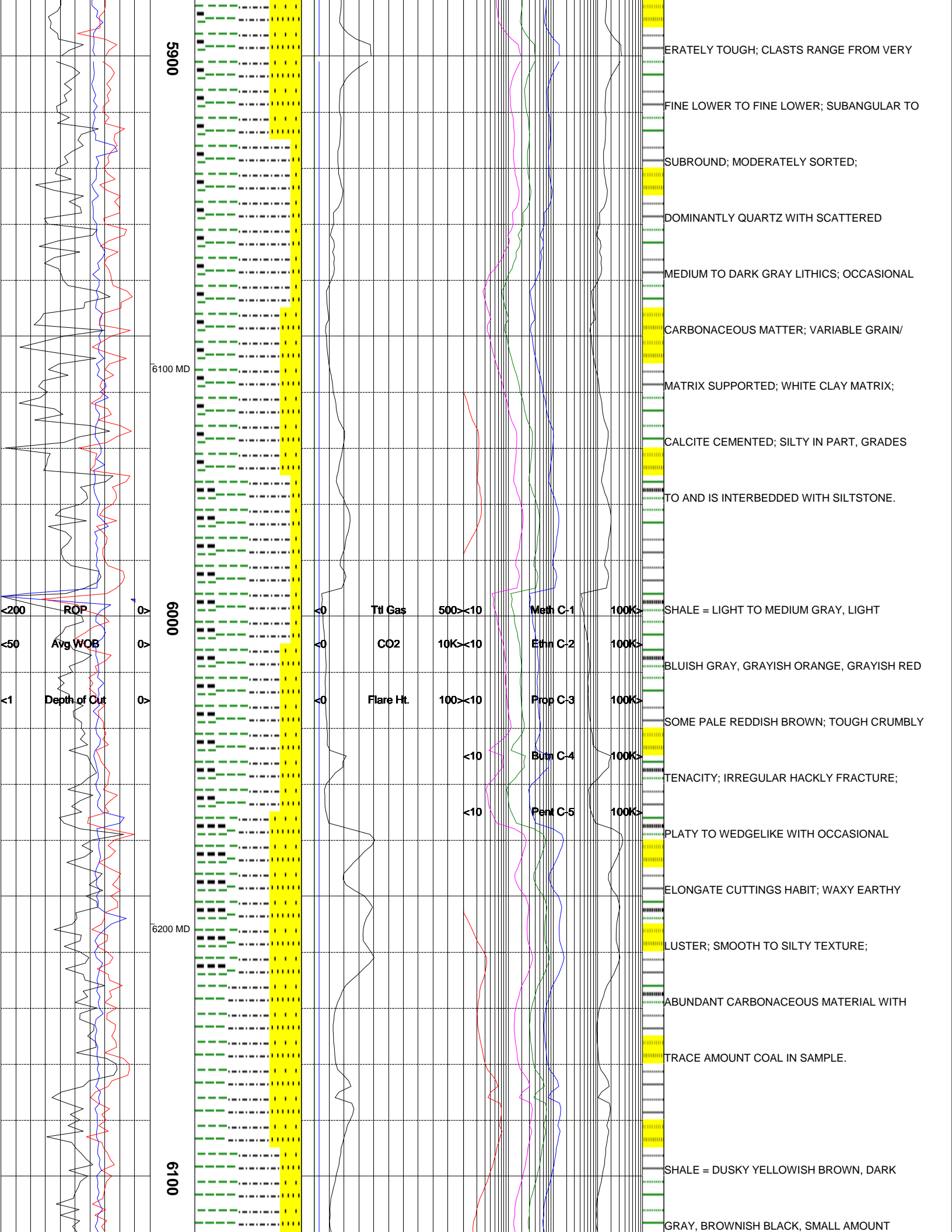
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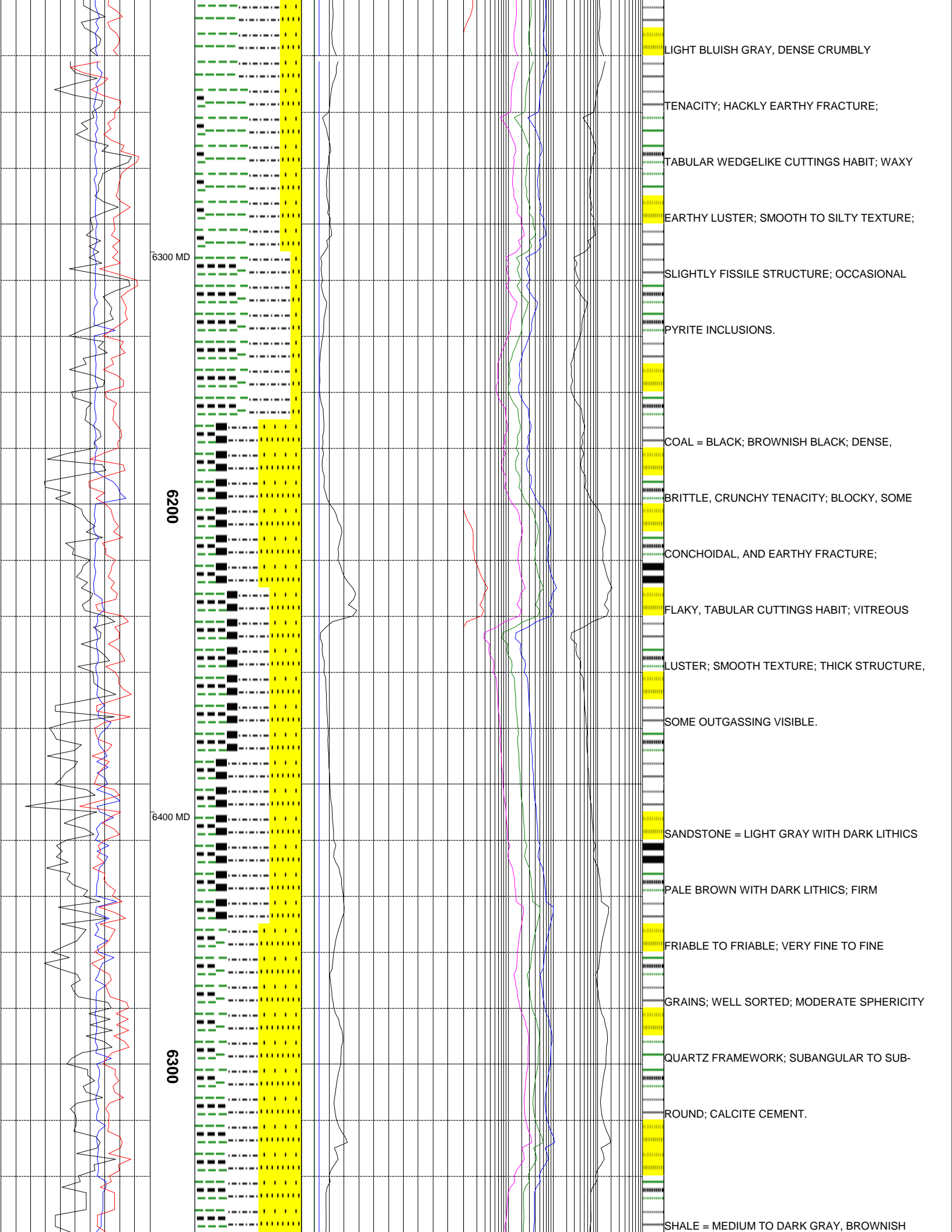
5900 MD

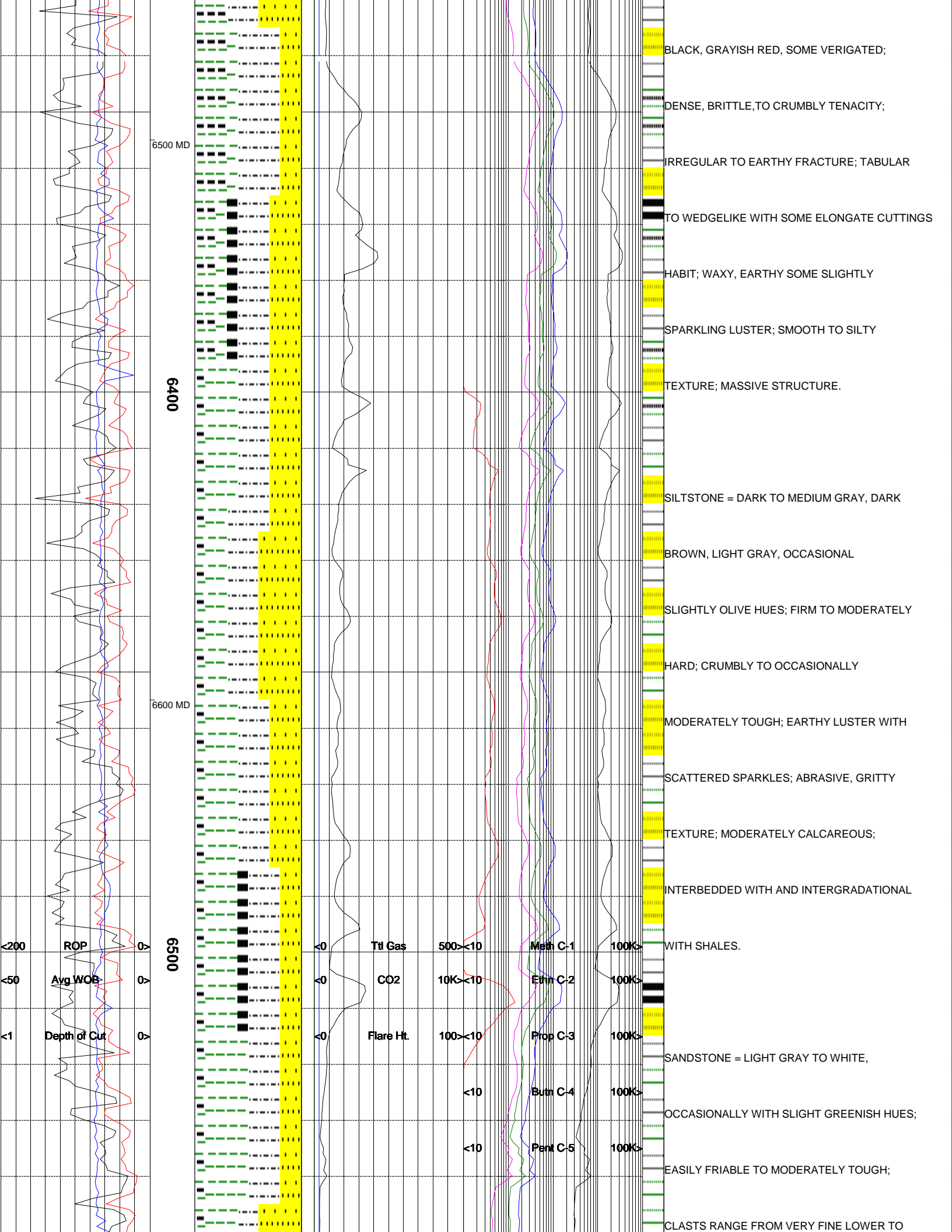
5800

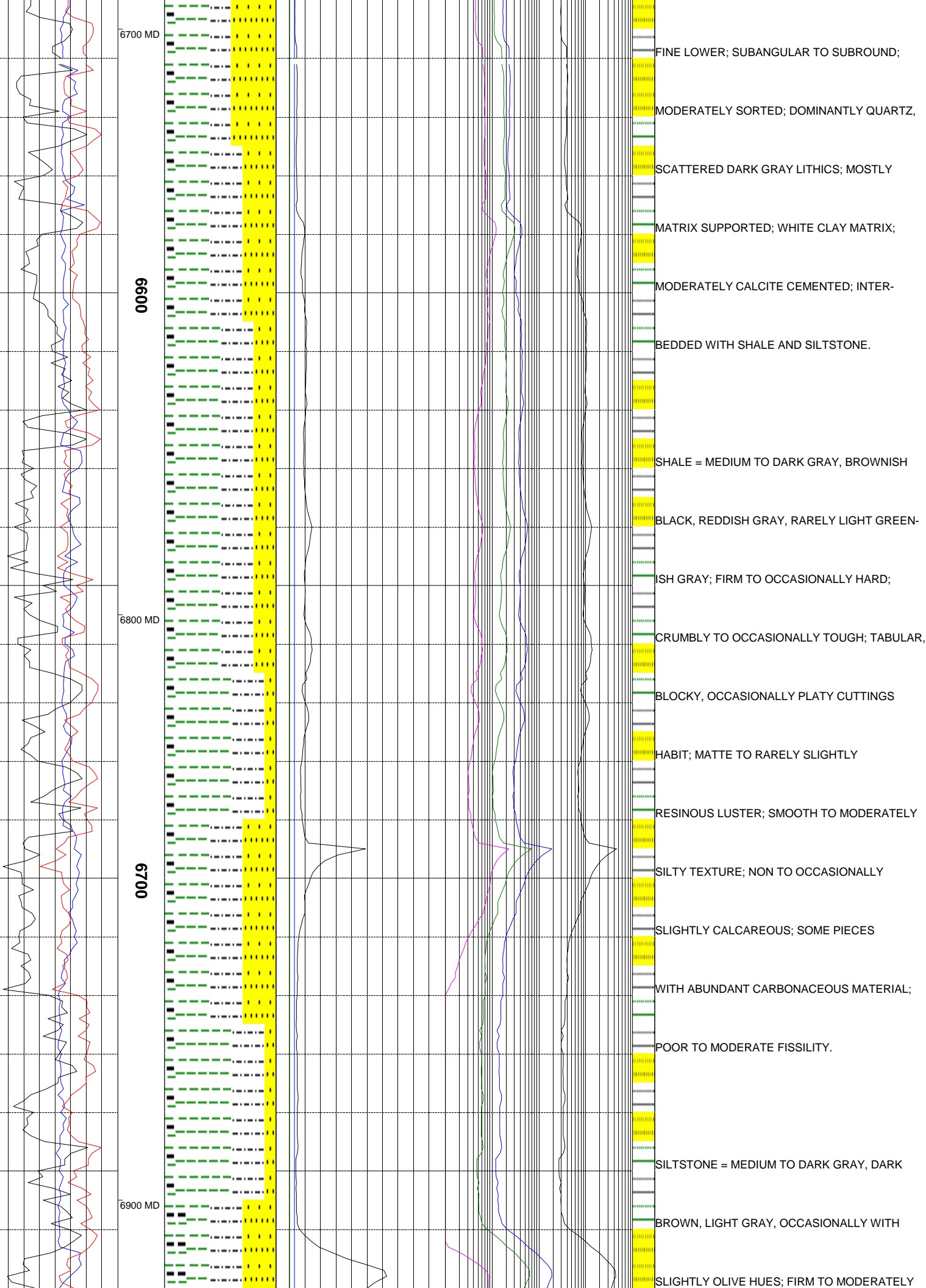
6000 MD

SILTSTONE = LIGHT GRAY TO BLUISH GRAY,  
GRAYISH RED, PALE BROWN; FRIABLE TO FIRM  
FRIABLE; GRITTY TEXTURE; EARTHY WITH  
SOME SLIGHTLY SPARKLING LUSTER; THICK  
STRUCTURE; SOME GRADING TO VERY FINE  
SANDSTONE.  
SHALE = DARK TO DUSKY YELLOWISH BROWN,  
LIGHT TO MEDIUM GRAY, LIGHT GREENISH  
GRAY; FIRM TO HARD; CRUMBLY TO TOUGH;  
BLOCKY, TABULAR AND OCCASIONAL PLATY  
CUTTINGS HABIT; EARTHY TO OCCASIONALLY  
SLIGHTLY SHINY LUSTER; DOMINANTLY  
SMOOTH TO OCCASIONALLY SILTY TEXTURE;  
NON TO SLIGHTLY CALCAREOUS; OCCASIONALLY  
WITH HIGH CARBONACEOUS CONTENT; POOR  
TO FAIR FISSILITY.  
SANDSTONE = WHITE TO LIGHT GRAY WITH  
COMMON VERY LIGHT BROWN HUES; COMMON  
"PEPPERED" APPEARANCE; FIRM TO MOD-









6700 MD

6600

6800 MD

6700

6900 MD

FINE LOWER; SUBANGULAR TO SUBROUND;

MODERATELY SORTED; DOMINANTLY QUARTZ;

SCATTERED DARK GRAY LITHICS; MOSTLY

MATRIX SUPPORTED; WHITE CLAY MATRIX;

MODERATELY CALCITE CEMENTED; INTER-

BEDDED WITH SHALE AND SILTSTONE.

SHALE = MEDIUM TO DARK GRAY, BROWNISH

BLACK, REDDISH GRAY, RARELY LIGHT GREEN-

ISH GRAY; FIRM TO OCCASIONALLY HARD;

CRUMBLY TO OCCASIONALLY TOUGH; TABULAR,

BLOCKY, OCCASIONALLY PLATY CUTTINGS

HABIT; MATTE TO RARELY SLIGHTLY

RESINOUS LUSTER; SMOOTH TO MODERATELY

SILTY TEXTURE; NON TO OCCASIONALLY

SLIGHTLY CALCAREOUS; SOME PIECES

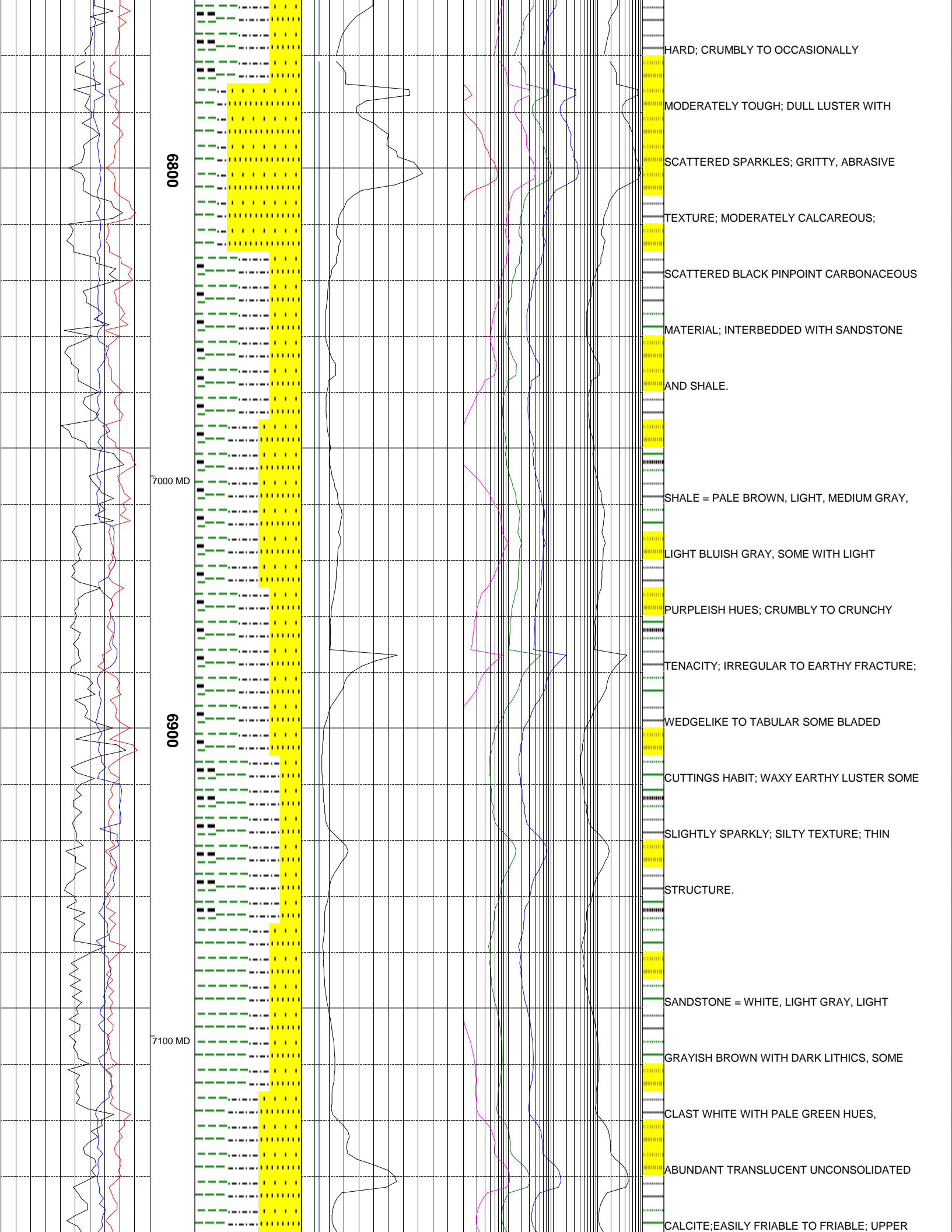
WITH ABUNDANT CARBONACEOUS MATERIAL;

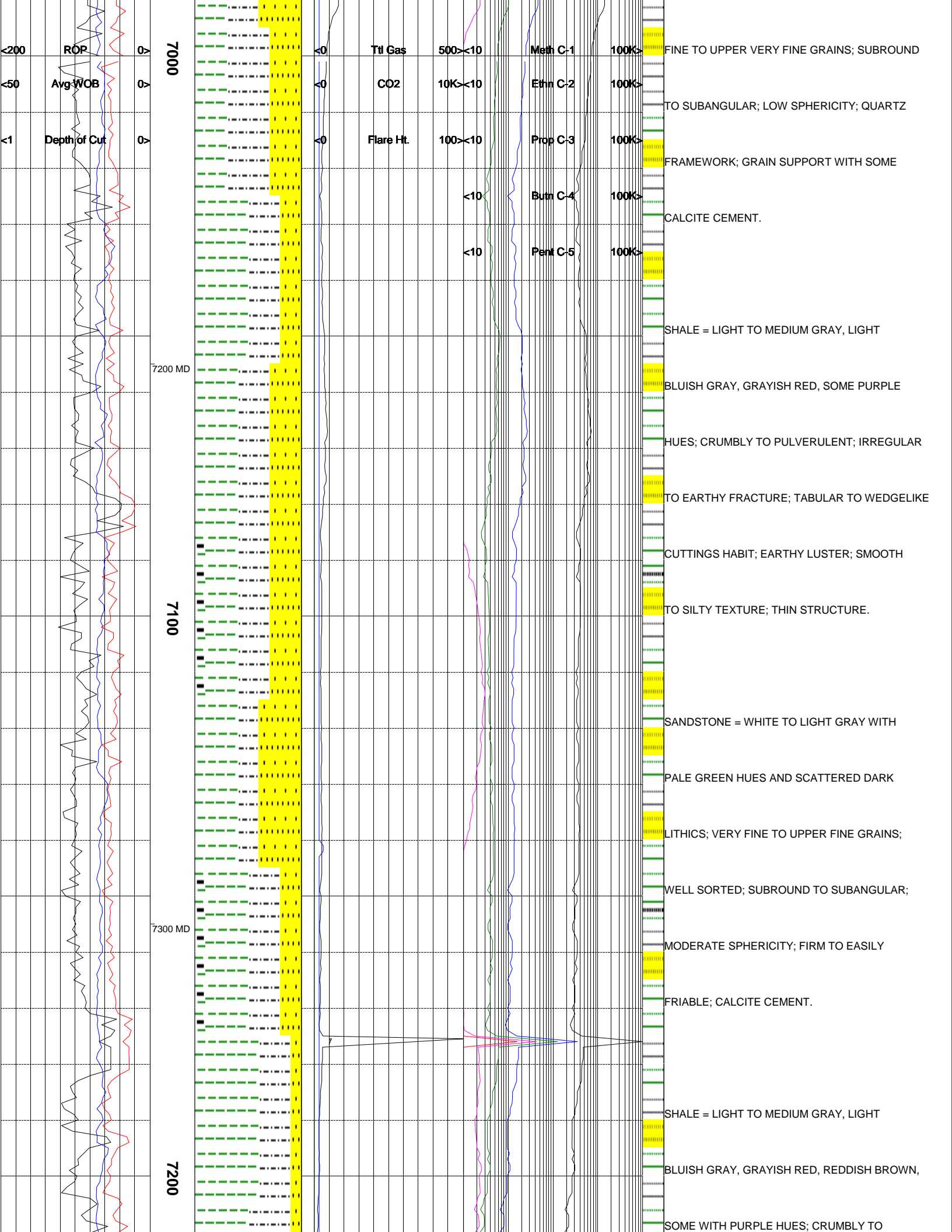
POOR TO MODERATE FISSILITY.

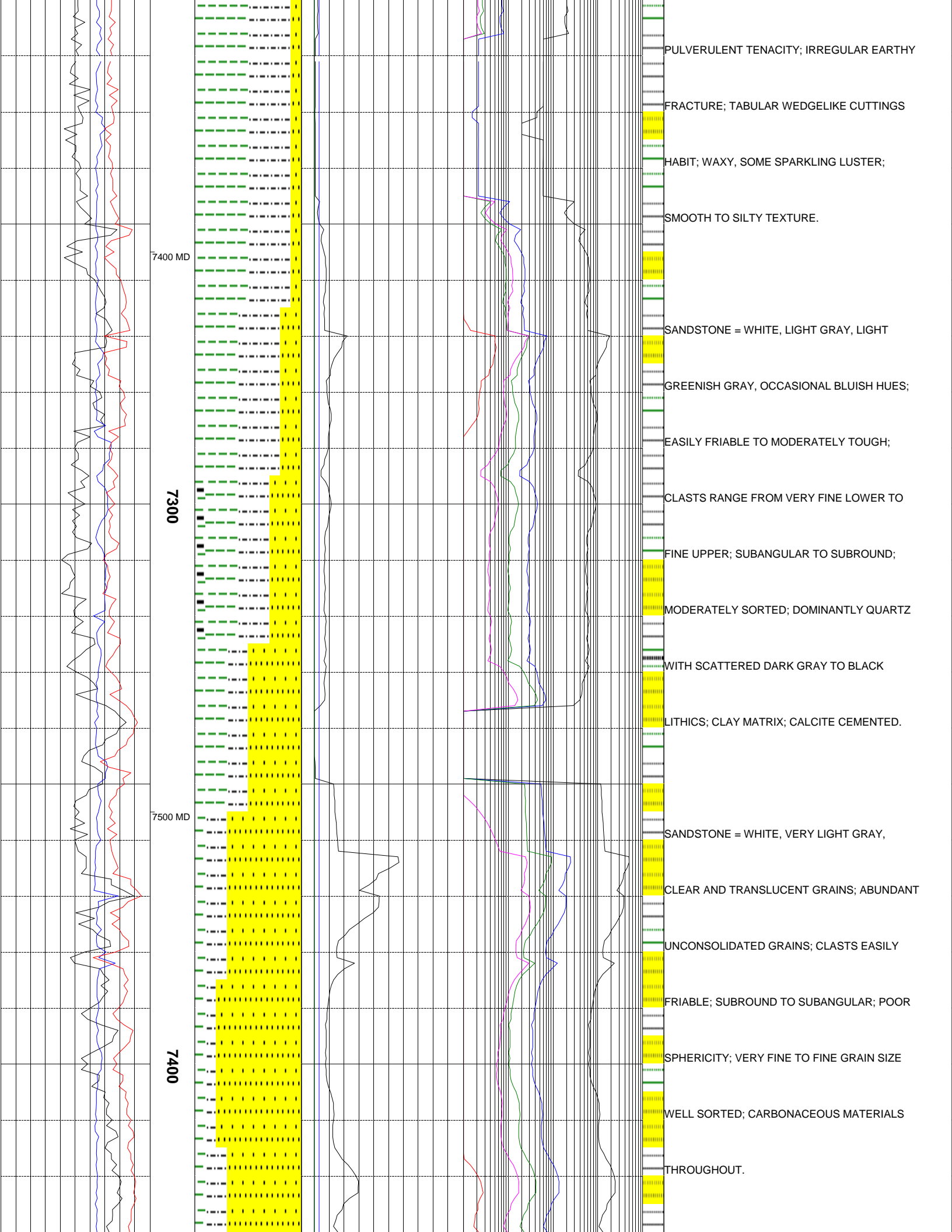
SILTSTONE = MEDIUM TO DARK GRAY, DARK

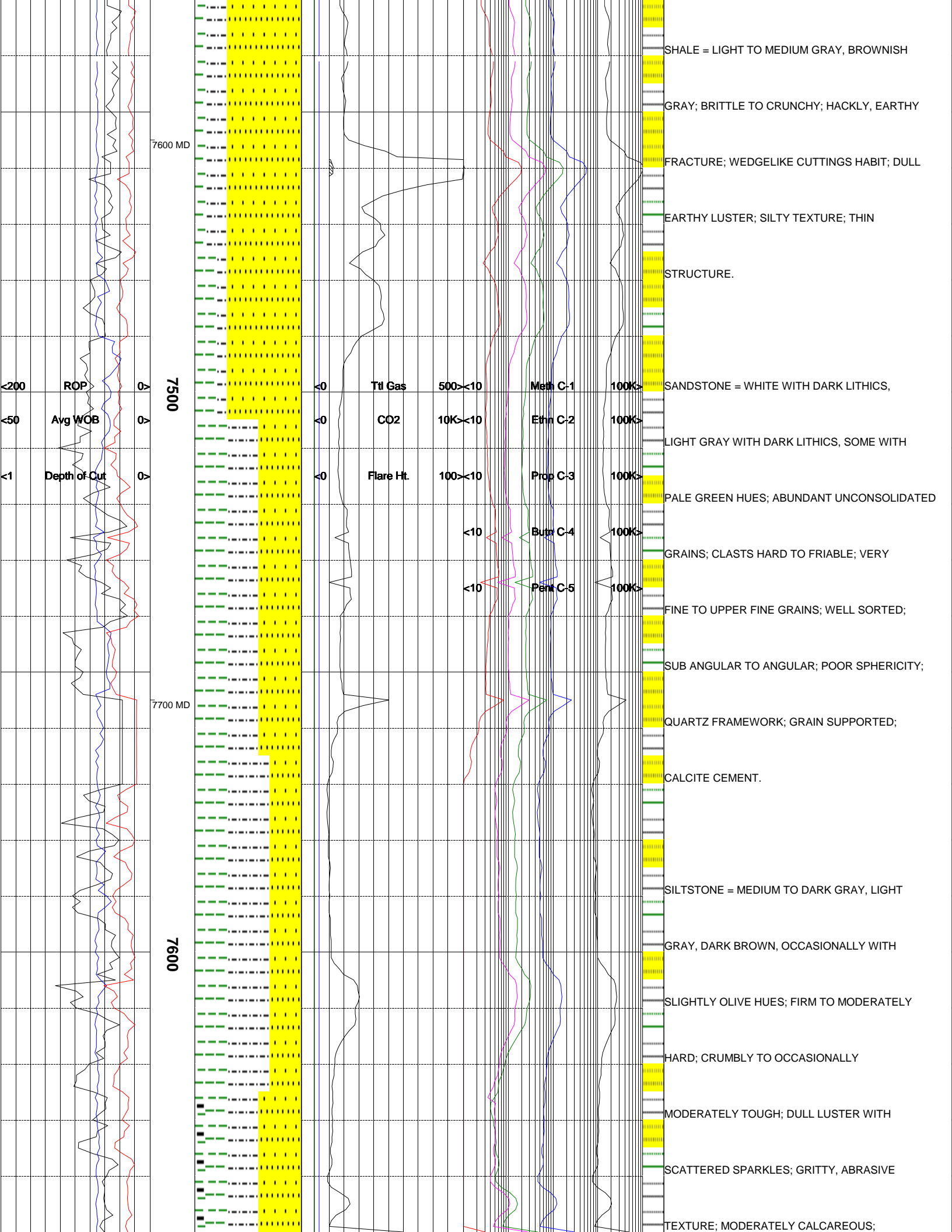
BROWN, LIGHT GRAY, OCCASIONALLY WITH

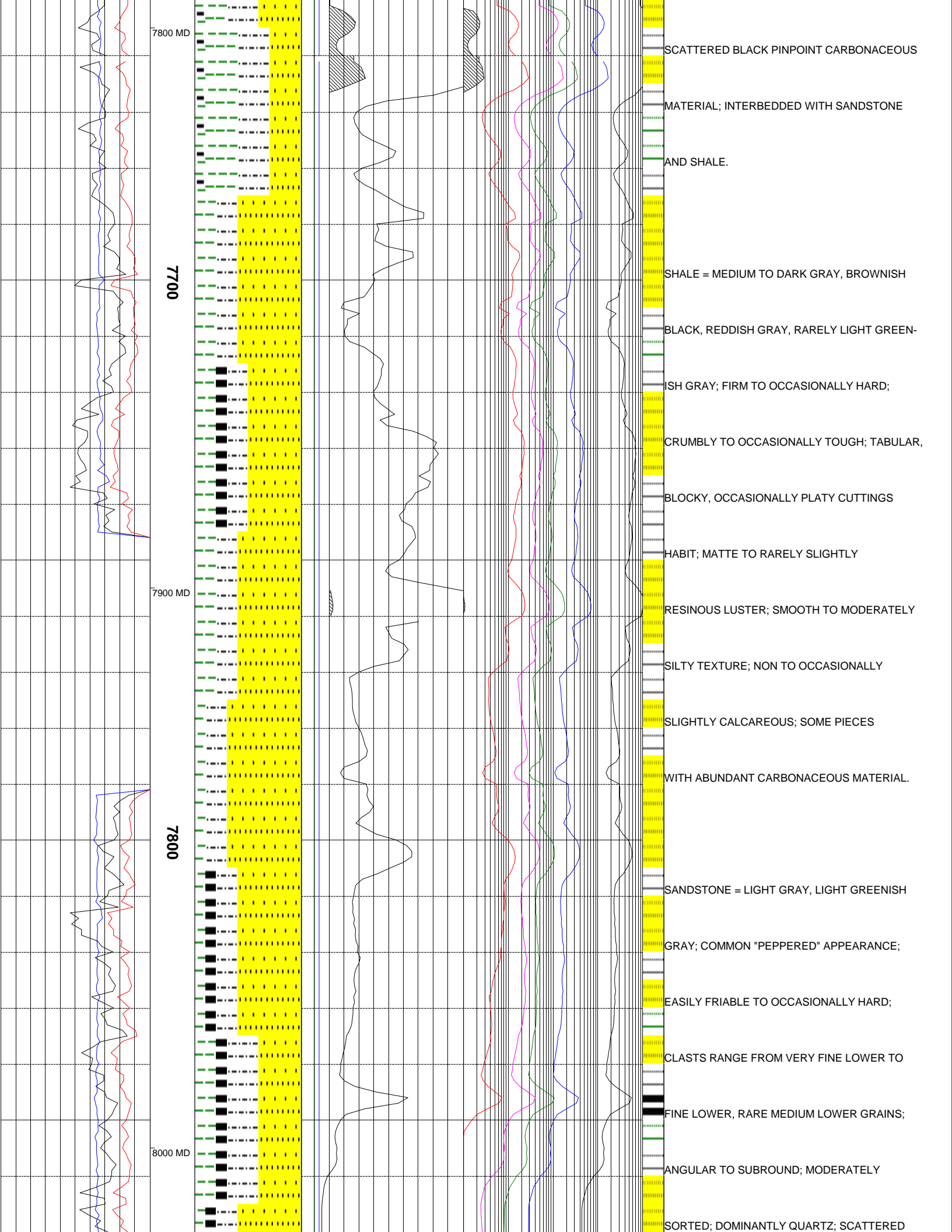
SLIGHTLY OLIVE HUES; FIRM TO MODERATELY











7800 MD

SCATTERED BLACK PINPOINT CARBONEOUS MATERIAL; INTERBEDDED WITH SANDSTONE AND SHALE.

7700

SHALE = MEDIUM TO DARK GRAY, BROWNISH BLACK, REDDISH GRAY, RARELY LIGHT GREENISH GRAY; FIRM TO OCCASIONALLY HARD; CRUMBLY TO OCCASIONALLY TOUGH; TABULAR, BLOCKY, OCCASIONALLY PLATY CUTTINGS HABIT; MATTE TO RARELY SLIGHTLY

7900 MD

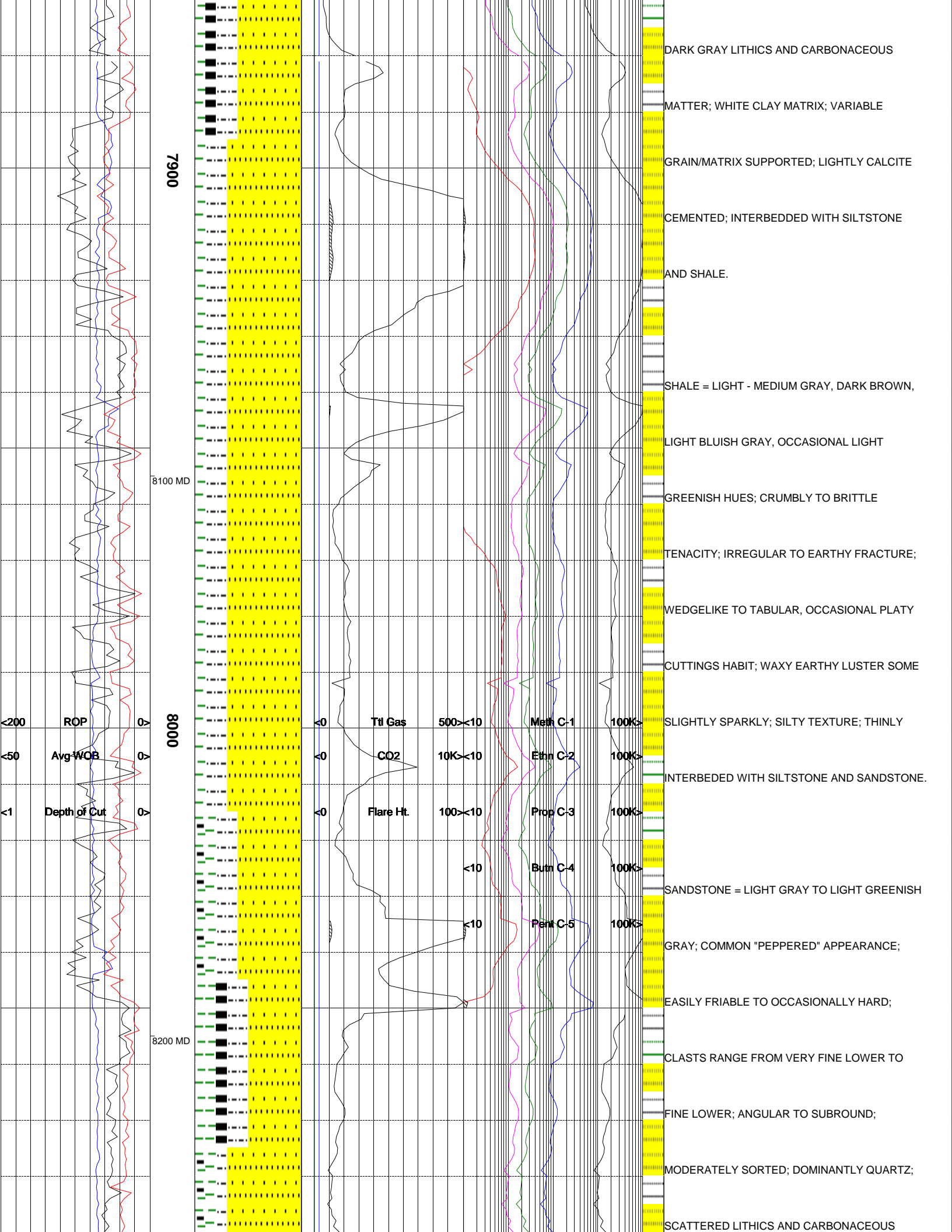
RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; NON TO OCCASIONALLY SLIGHTLY CALCAREOUS; SOME PIECES WITH ABUNDANT CARBONEOUS MATERIAL.

7800

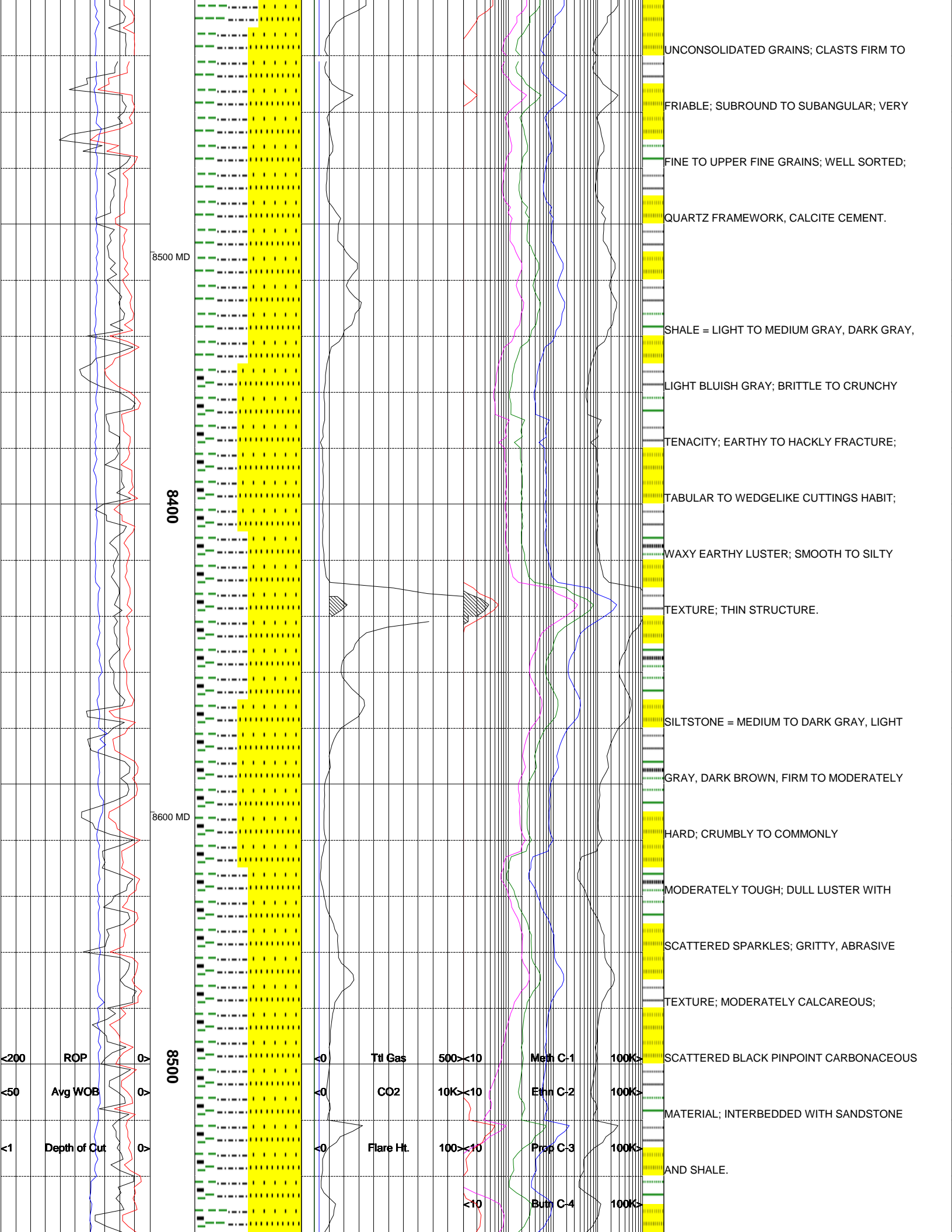
SANDSTONE = LIGHT GRAY, LIGHT GREENISH GRAY; COMMON "PEPPERED" APPEARANCE; EASILY FRIABLE TO OCCASIONALLY HARD; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER, RARE MEDIUM LOWER GRAINS;

8000 MD

ANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ; SCATTERED







8500 MD

8400

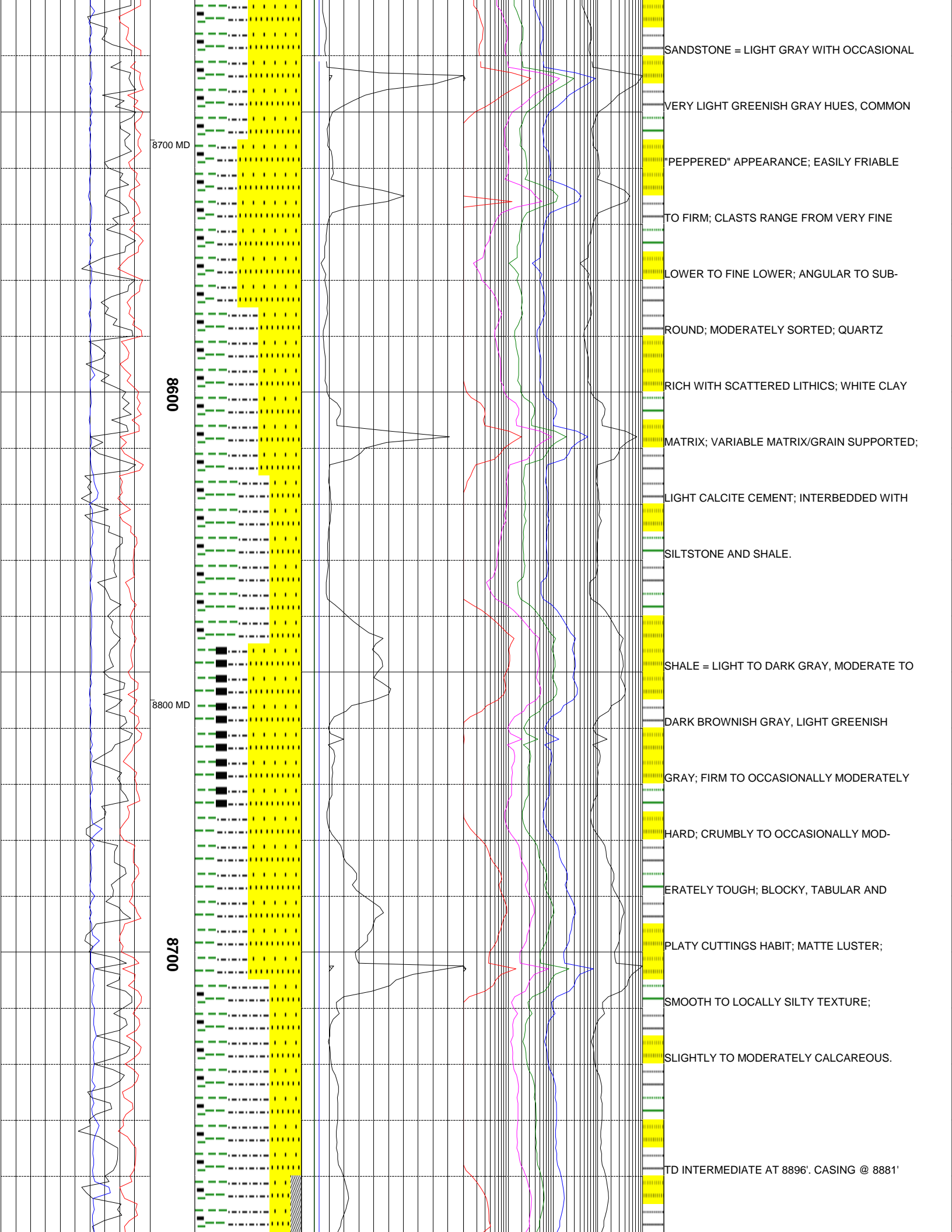
8600 MD

8500

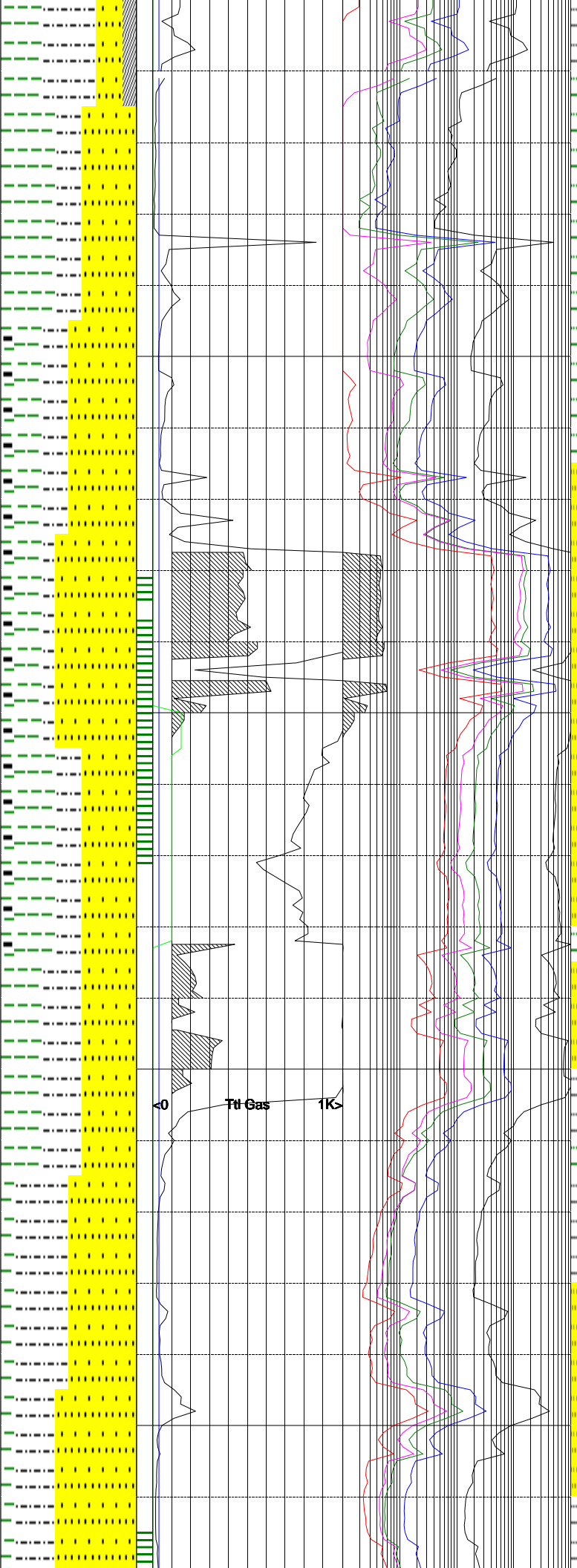
<200 ROP  
<50 Avg WOB  
<1 Depth of Cut

<0 Ttl Gas 500<10 Meth C-1 100K<  
<0 CO2 10K<10 Ethn C-2 100K<  
<0 Flare Ht. 100<10 Prop C-3 100K<  
<10 Burn C-4 100K<

UNCONSOLIDATED GRAINS; CLASTS FIRM TO  
 FRIABLE; SUBROUND TO SUBANGULAR; VERY  
 FINE TO UPPER FINE GRAINS; WELL SORTED;  
 QUARTZ FRAMEWORK, CALCITE CEMENT.  
 SHALE = LIGHT TO MEDIUM GRAY, DARK GRAY,  
 LIGHT BLUISH GRAY; BRITTLE TO CRUNCHY  
 TENACITY; EARTHY TO HACKLY FRACTURE;  
 TABULAR TO WEDGELIKE CUTTINGS HABIT;  
 WAXY EARTHY LUSTER; SMOOTH TO SILTY  
 TEXTURE; THIN STRUCTURE.  
 SILTSTONE = MEDIUM TO DARK GRAY, LIGHT  
 GRAY, DARK BROWN, FIRM TO MODERATELY  
 HARD; CRUMBLY TO COMMONLY  
 MODERATELY TOUGH; DULL LUSTER WITH  
 SCATTERED SPARKLES; GRITTY, ABRASIVE  
 TEXTURE; MODERATELY CALCAREOUS;  
 SCATTERED BLACK PINPOINT CARBONACEOUS  
 MATERIAL; INTERBEDDED WITH SANDSTONE  
 SAND SHALE.

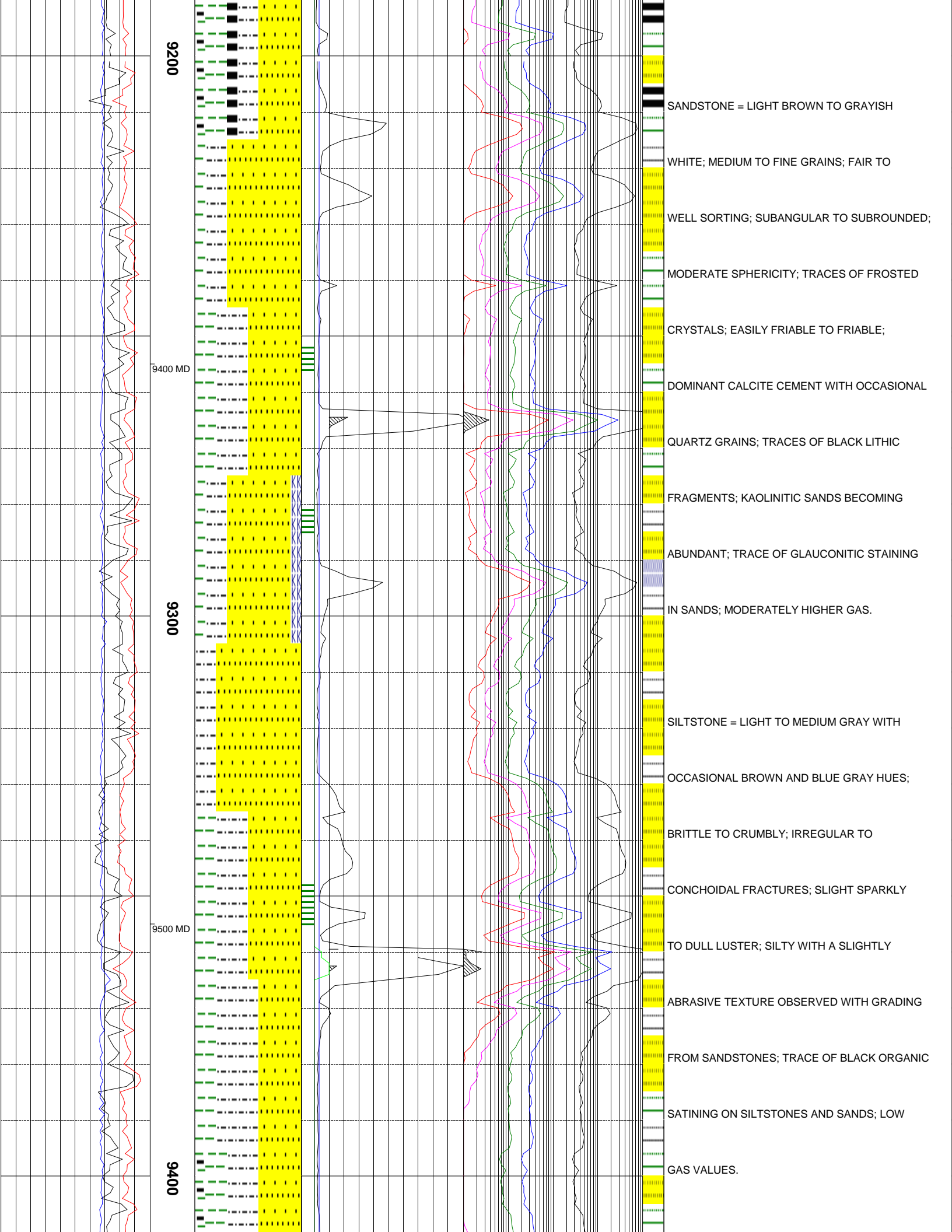


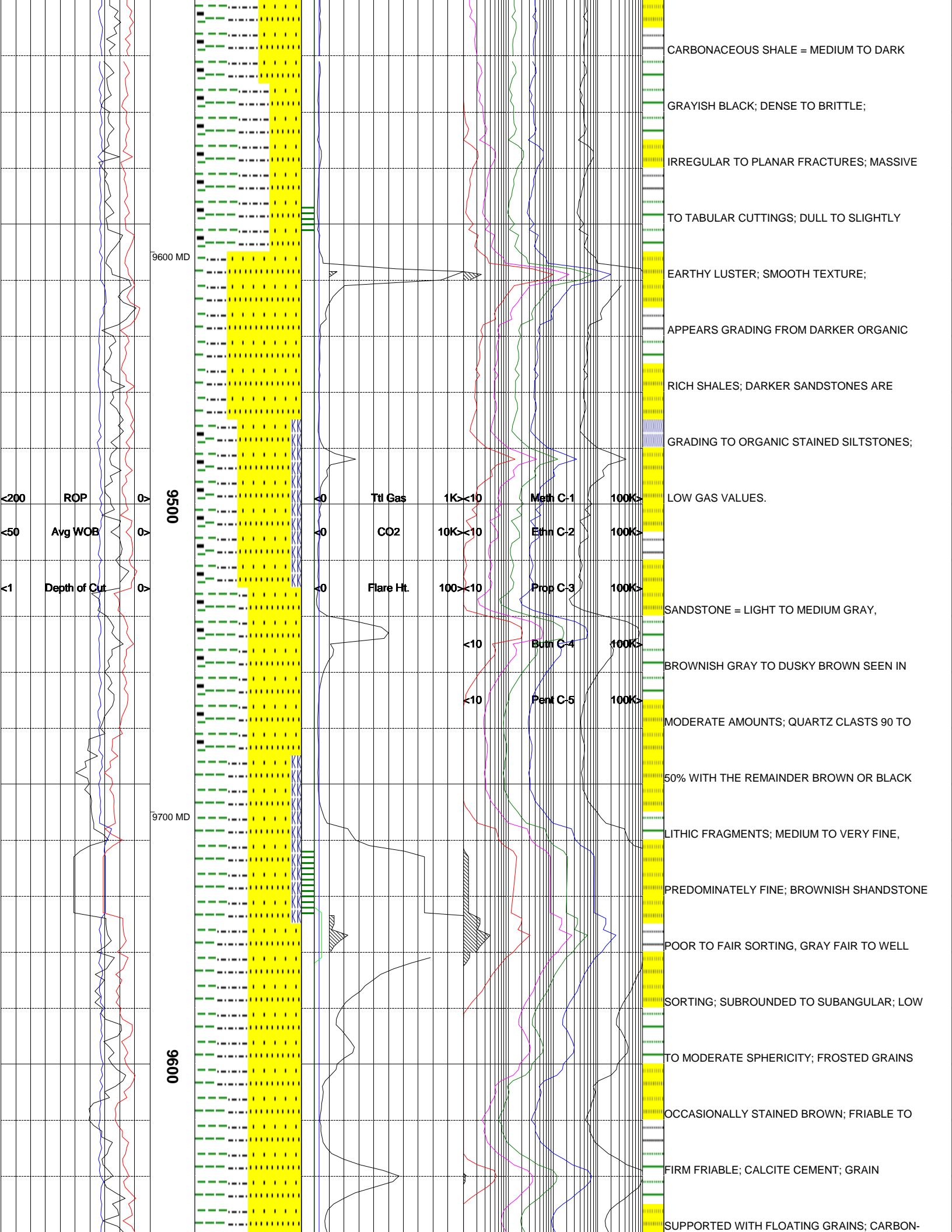
8900 MD  
0088  
9000 MD  
0068  
9100 MD

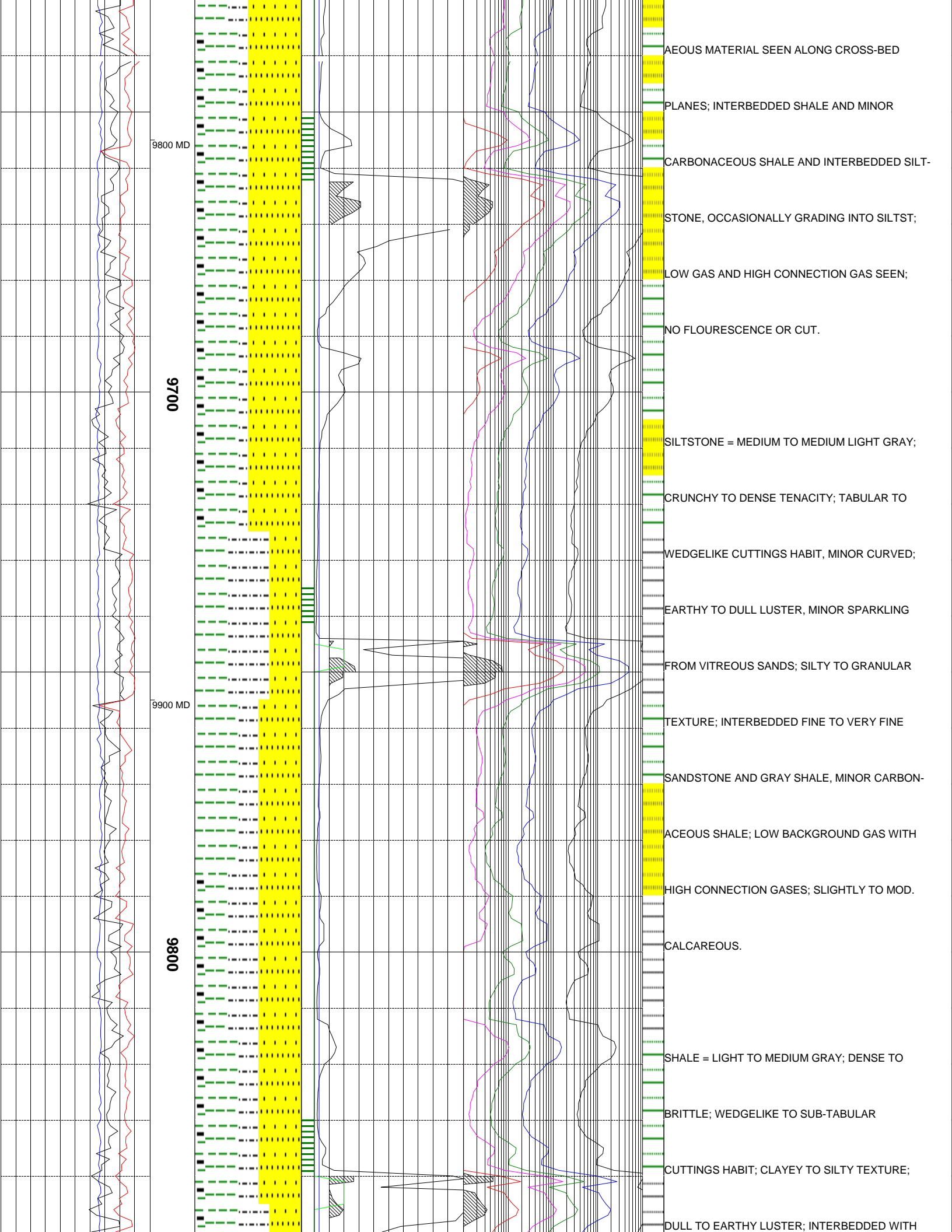


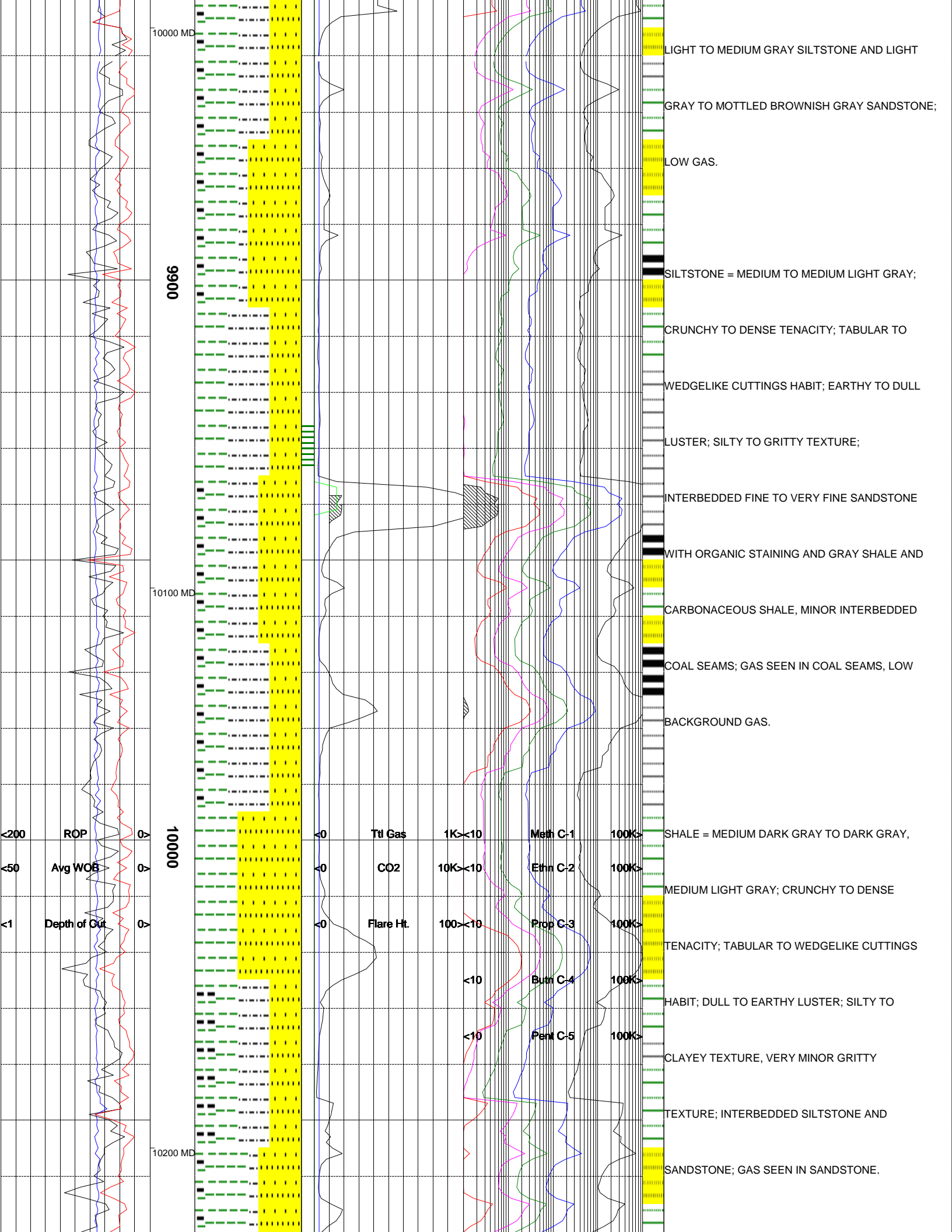
SHALE = LIGHT TO MEDIUM GRAY; DENSE TO  
BRITTLE; WEDGELIKE TO SUB-TABULAR  
CUTTINGS HABIT; CLAYEY TO SILTY TEXTURE;  
DULL TO EARTHY LUSTER; INTERBEDDED WITH  
LIGHT TO MEDIUM GRAY SILTSTON THAT  
GRADES INTO A LIGHT GRAY TO MOTTLED  
BROWNISH GRAY SANDSTONE; LOW GAS.  
SANDSTONE = LIGHT TO MEDIUM GRAY, WITH  
SALT AND PEPPER APPEARANCE WITH BLACK  
AND REDDISH BROWN LITHIC FRAGMENTS; 90  
TO 60% QUARTZ CLASTS WITH THE REMAINDER  
LITHIC FRAGMENTS; FINE TO MEDIUM GRAINED  
FAIR TO POOR SORTING; MODERATE SPERICITY  
INTERBEDDED MEDIUM TO BLUISH GRAY SHALE  
AND GRADES INTO SILTSTONE. ESPECIALLY  
AT BASE; HIGH GAS SEEN THROUGHOUT.  
SANDSTONE = LIGHT GRAY TO MEDIUM GRAY;  
FINE TO VERY FINE, RARE MEDIUM; QUARTZ  
CLASTS WITH MINOR LITHIC FRAGMENTS; FAIR  
TO WELL SORTED; SUBROUNDED TO ROUNDED;

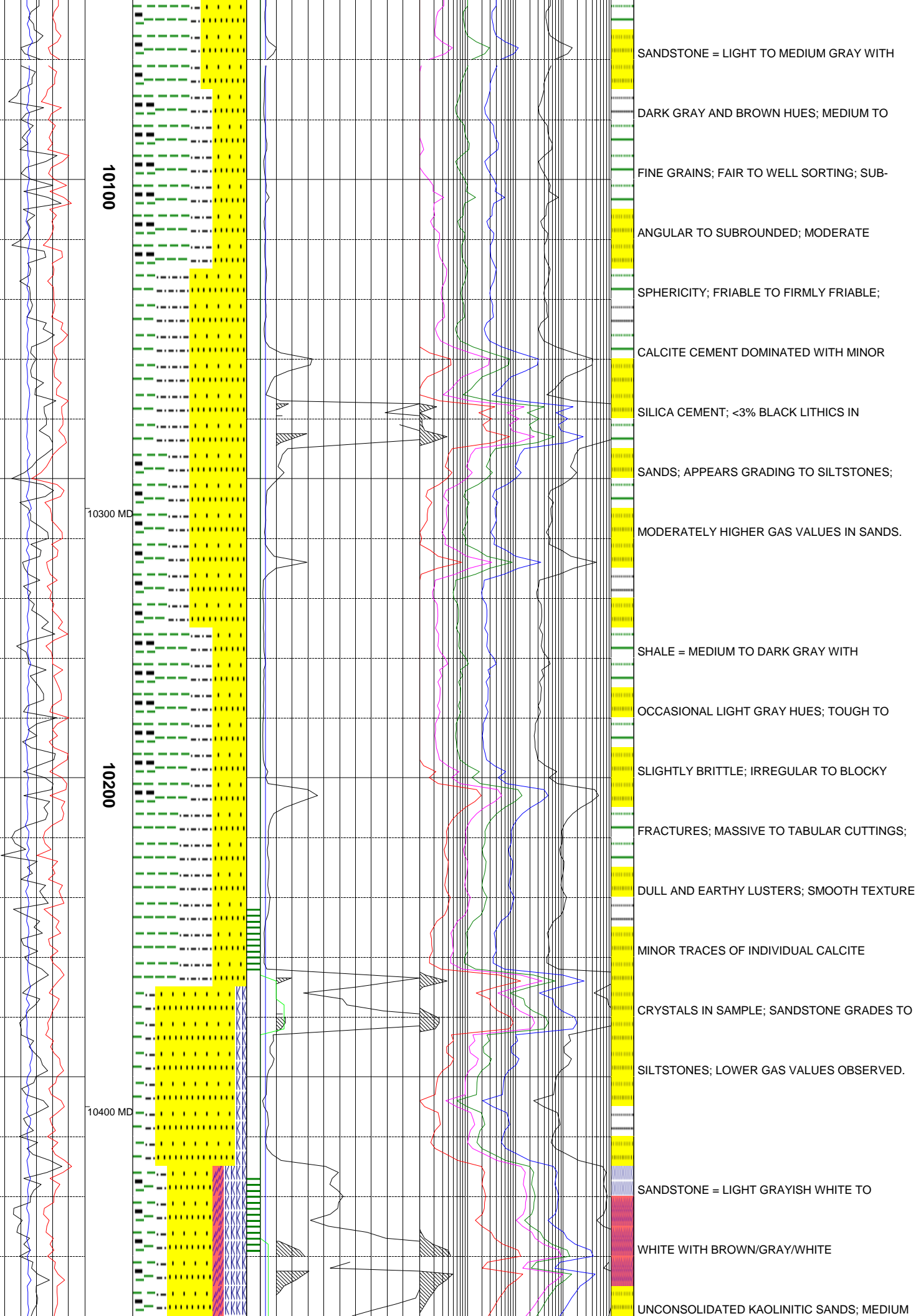


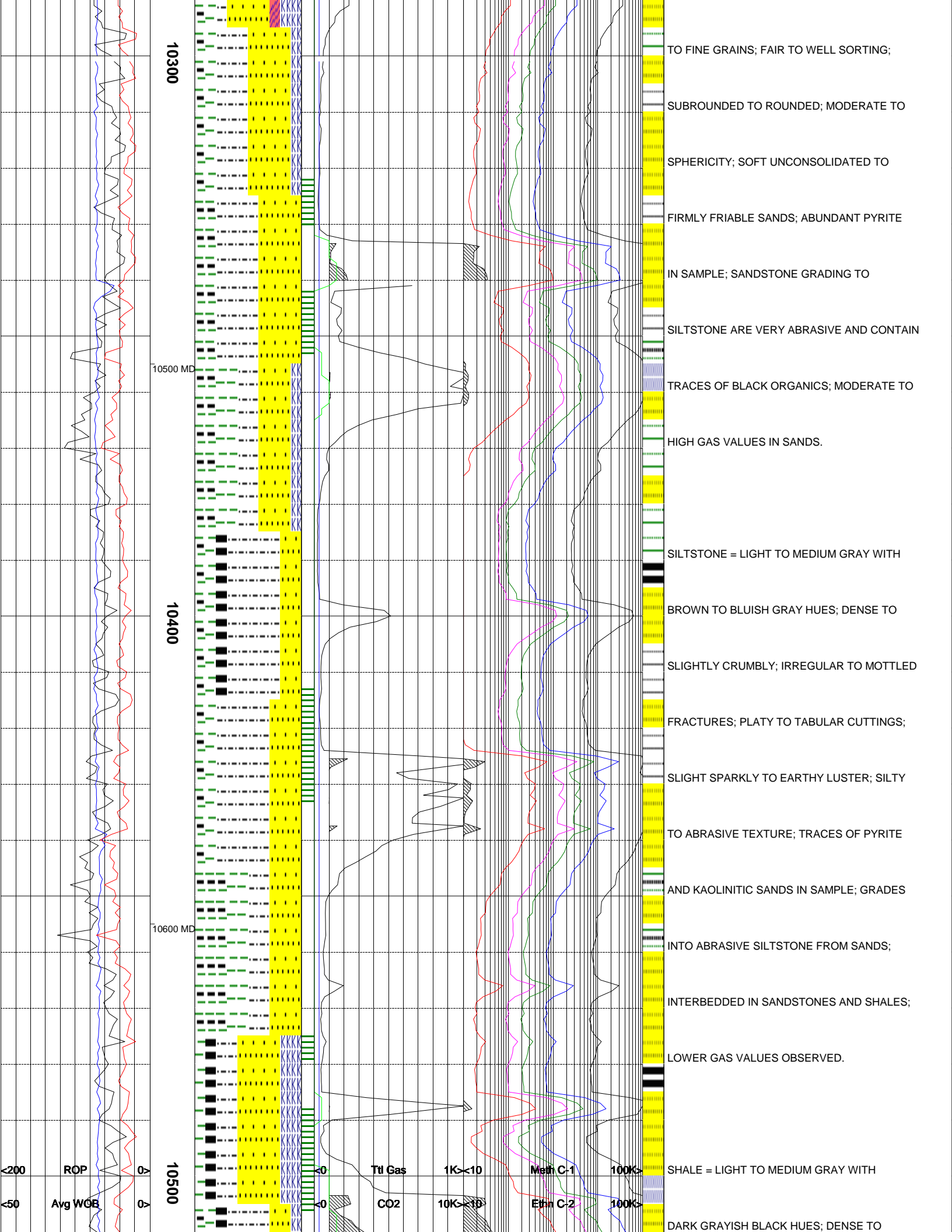












10300

10500 MD

10400

10600 MD

10500

TO FINE GRAINS; FAIR TO WELL SORTING;

SUBROUNDED TO ROUNDED; MODERATE TO

SPHERICITY; SOFT UNCONSOLIDATED TO

FIRMLY FRIABLE SANDS; ABUNDANT PYRITE

IN SAMPLE; SANDSTONE GRADING TO

SILTSTONE ARE VERY ABRASIVE AND CONTAIN

TRACES OF BLACK ORGANICS; MODERATE TO

HIGH GAS VALUES IN SANDS.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH

BROWN TO BLUISH GRAY HUES; DENSE TO

SLIGHTLY CRUMBLY; IRREGULAR TO MOTTLED

FRACTURES; PLATY TO TABULAR CUTTINGS;

SLIGHT SPARKLY TO EARTHY LUSTER; SILTY

TO ABRASIVE TEXTURE; TRACES OF PYRITE

AND KAOLINITIC SANDS IN SAMPLE; GRADES

INTO ABRASIVE SILTSTONE FROM SANDS;

INTERBEDDED IN SANDSTONES AND SHALES;

LOWER GAS VALUES OBSERVED.

SHALE = LIGHT TO MEDIUM GRAY WITH

DARK GRAYISH BLACK HUES; DENSE TO

<200 ROP

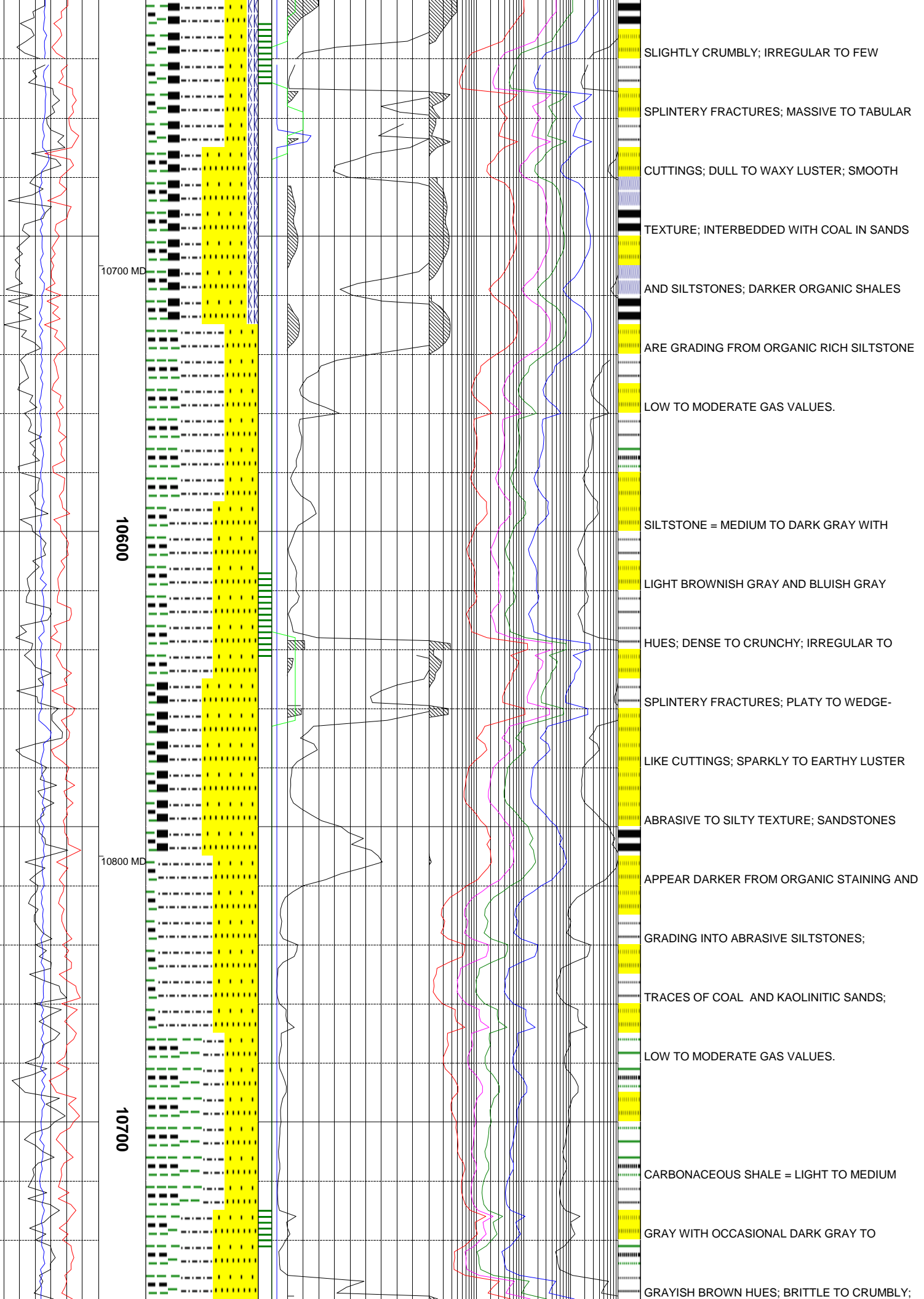
<50 Avg WOB

Ttl Gas 1K < 10

Meth C-1 100K >

CO2 10K > 10

Eth C-2 100K >



10700 MD

10600

10800 MD

10700

SLIGHTLY CRUMBLY; IRREGULAR TO FEW

SPLINTERY FRACTURES; MASSIVE TO TABULAR

CUTTINGS; DULL TO WAXY LUSTER; SMOOTH

TEXTURE; INTERBEDDED WITH COAL IN SANDS

AND SILTSTONES; DARKER ORGANIC SHALES

ARE GRADING FROM ORGANIC RICH SILTSTONE

LOW TO MODERATE GAS VALUES.

SILTSTONE = MEDIUM TO DARK GRAY WITH

LIGHT BROWNISH GRAY AND BLUISH GRAY

HUES; DENSE TO CRUNCHY; IRREGULAR TO

SPLINTERY FRACTURES; PLATY TO WEDGE-

LIKE CUTTINGS; SPARKLY TO EARTHY LUSTER

ABRASIVE TO SILTY TEXTURE; SANDSTONES

APPEAR DARKER FROM ORGANIC STAINING AND

GRADING INTO ABRASIVE SILTSTONES;

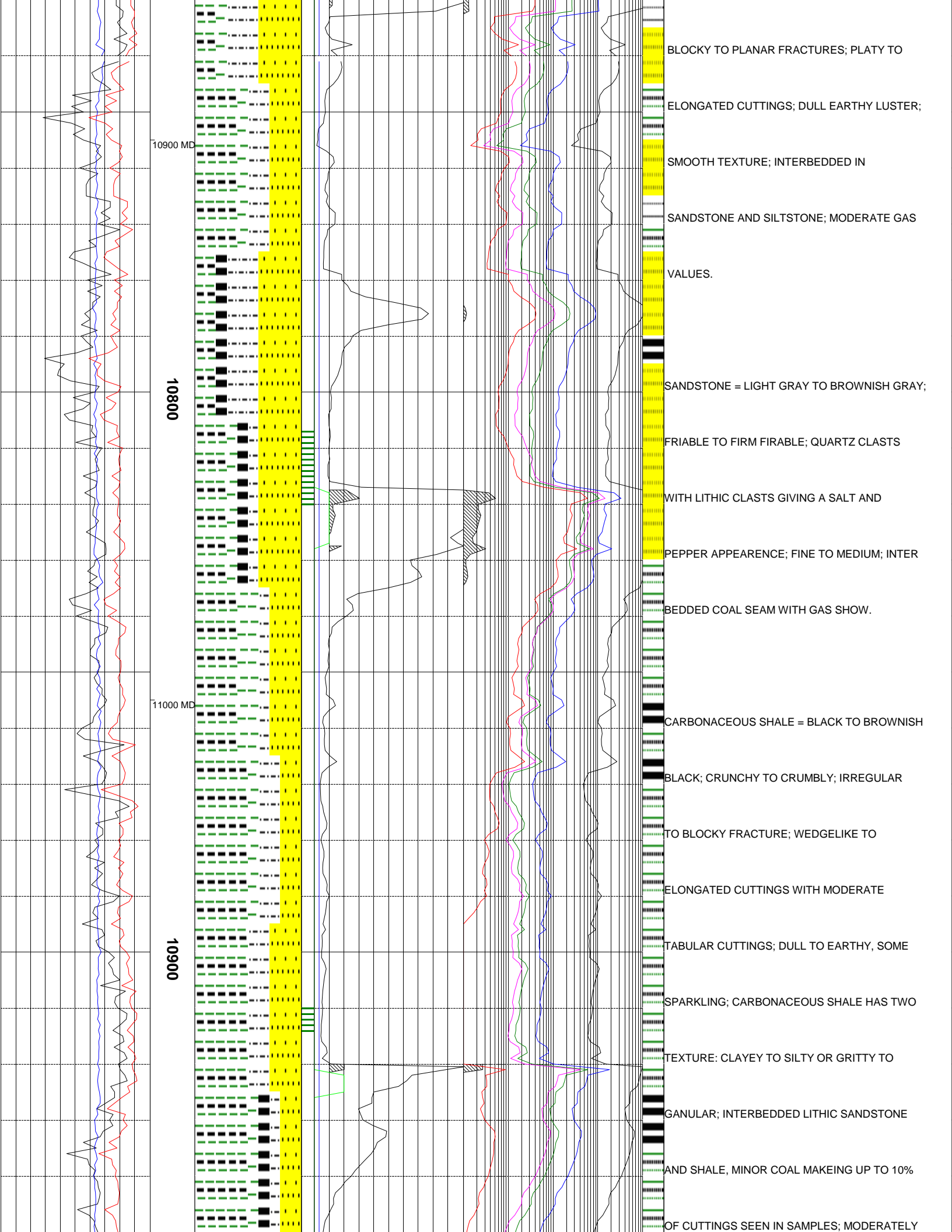
TRACES OF COAL AND KAOLINITIC SANDS;

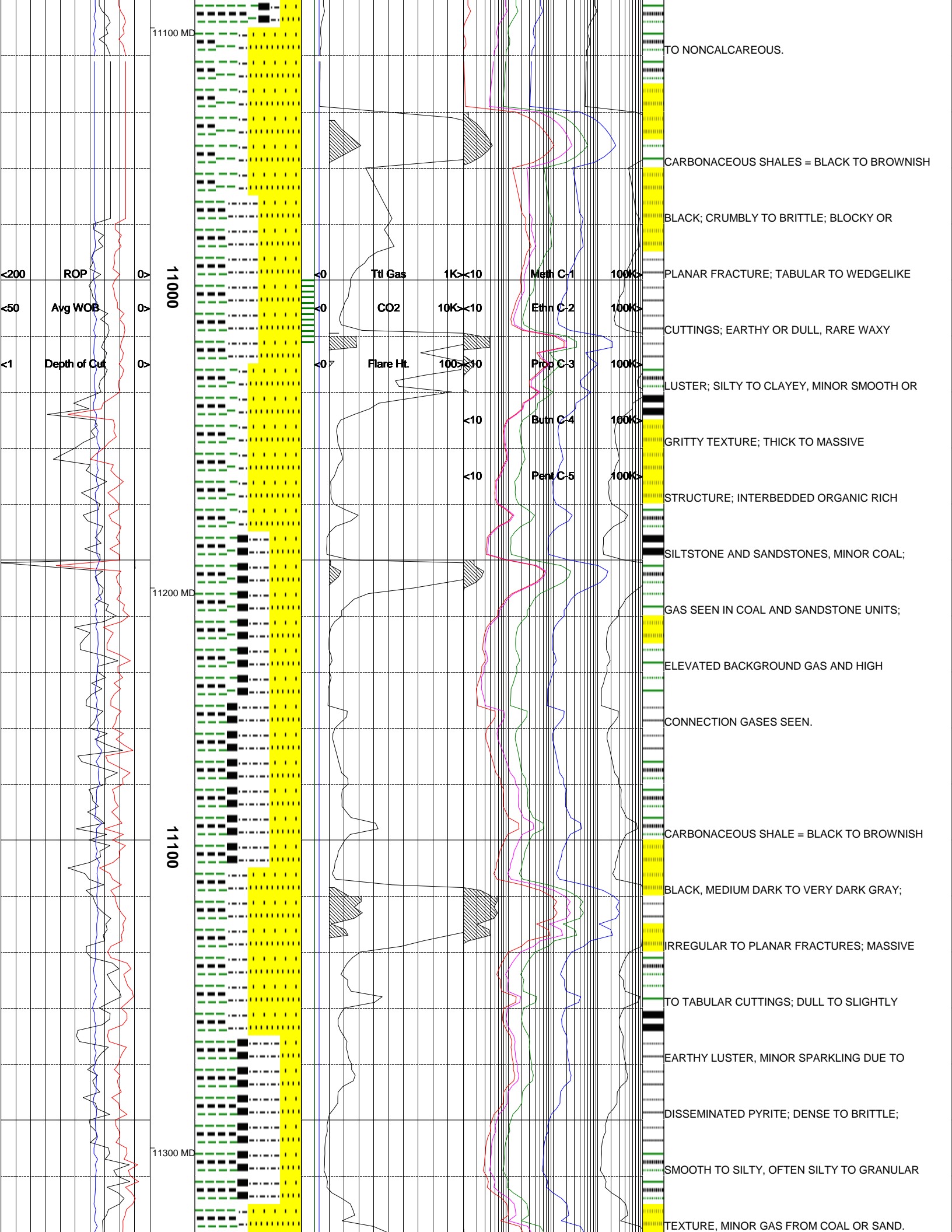
LOW TO MODERATE GAS VALUES.

CARBONACEOUS SHALE = LIGHT TO MEDIUM

GRAY WITH OCCASIONAL DARK GRAY TO

GRAYISH BROWN HUES; BRITTLE TO CRUMBLY;





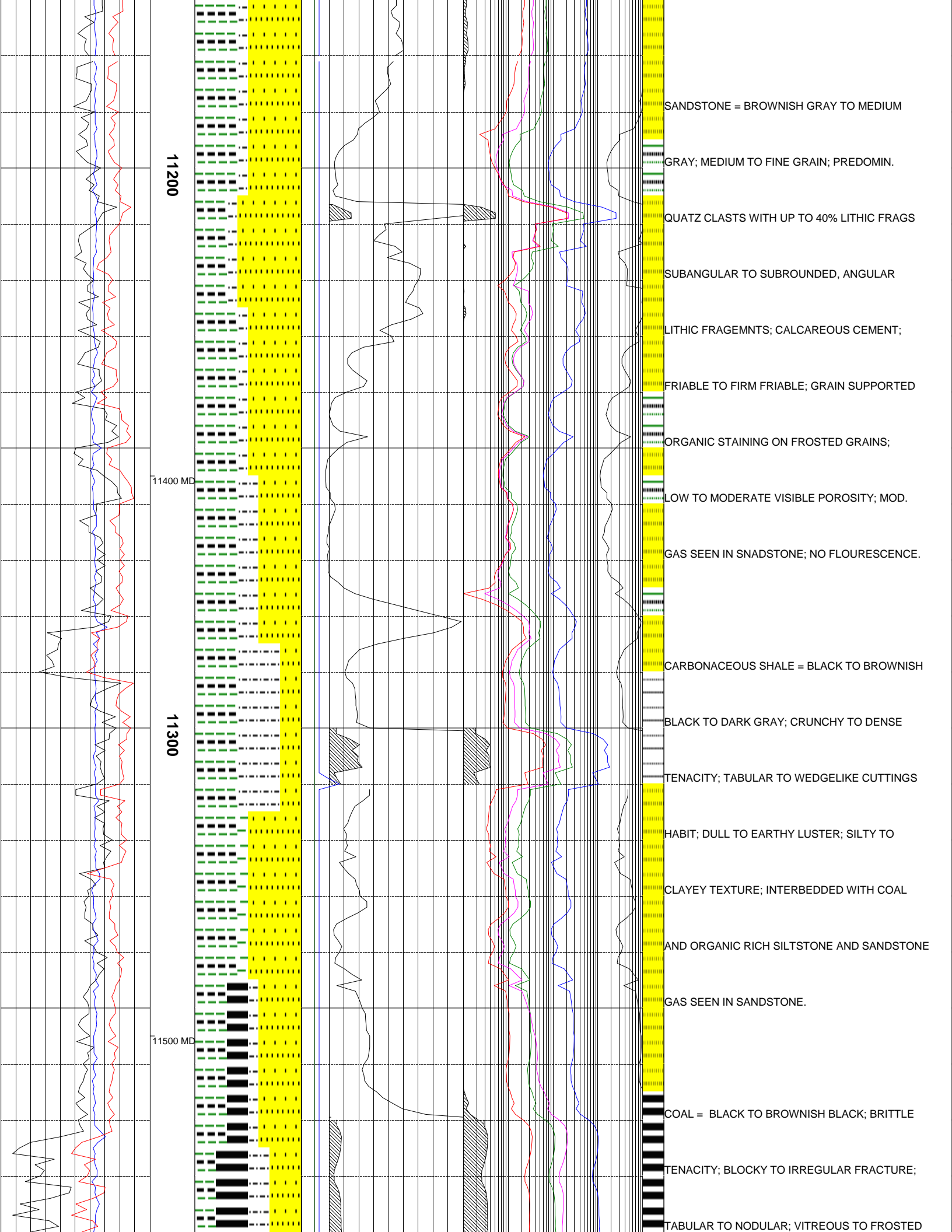
11100 MD  
11000  
11200 MD  
11100  
11300 MD

<200 ROP  
<50 Avg WOB  
<1 Depth of Cut

Ttl Gas 1K<10  
CO2 10K<10  
Flare Ht. 100>10  
<10  
<10

Meth C-1 100K>  
Ethn C-2 100K>  
Prop C-3 100K>  
Butn C-4 100K>  
Pent C-5 100K>

TO NONCALCAREOUS.  
CARBONACEOUS SHALES = BLACK TO BROWNISH  
BLACK; CRUMBLY TO BRITTLE; BLOCKY OR  
PLANAR FRACTURE; TABULAR TO WEDGELIKE  
CUTTINGS; EARTHY OR DULL, RARE WAXY  
LUSTER; SILTY TO CLAYEY, MINOR SMOOTH OR  
GRITTY TEXTURE; THICK TO MASSIVE  
STRUCTURE; INTERBEDDED ORGANIC RICH  
SILTSTONE AND SANDSTONES, MINOR COAL;  
GAS SEEN IN COAL AND SANDSTONE UNITS;  
ELEVATED BACKGROUND GAS AND HIGH  
CONNECTION GASES SEEN.  
CARBONACEOUS SHALE = BLACK TO BROWNISH  
BLACK, MEDIUM DARK TO VERY DARK GRAY;  
IRREGULAR TO PLANAR FRACTURES; MASSIVE  
TO TABULAR CUTTINGS; DULL TO SLIGHTLY  
EARTHY LUSTER, MINOR SPARKLING DUE TO  
DISSEMINATED PYRITE; DENSE TO BRITTLE;  
SMOOTH TO SILTY, OFTEN SILTY TO GRANULAR  
TEXTURE, MINOR GAS FROM COAL OR SAND.

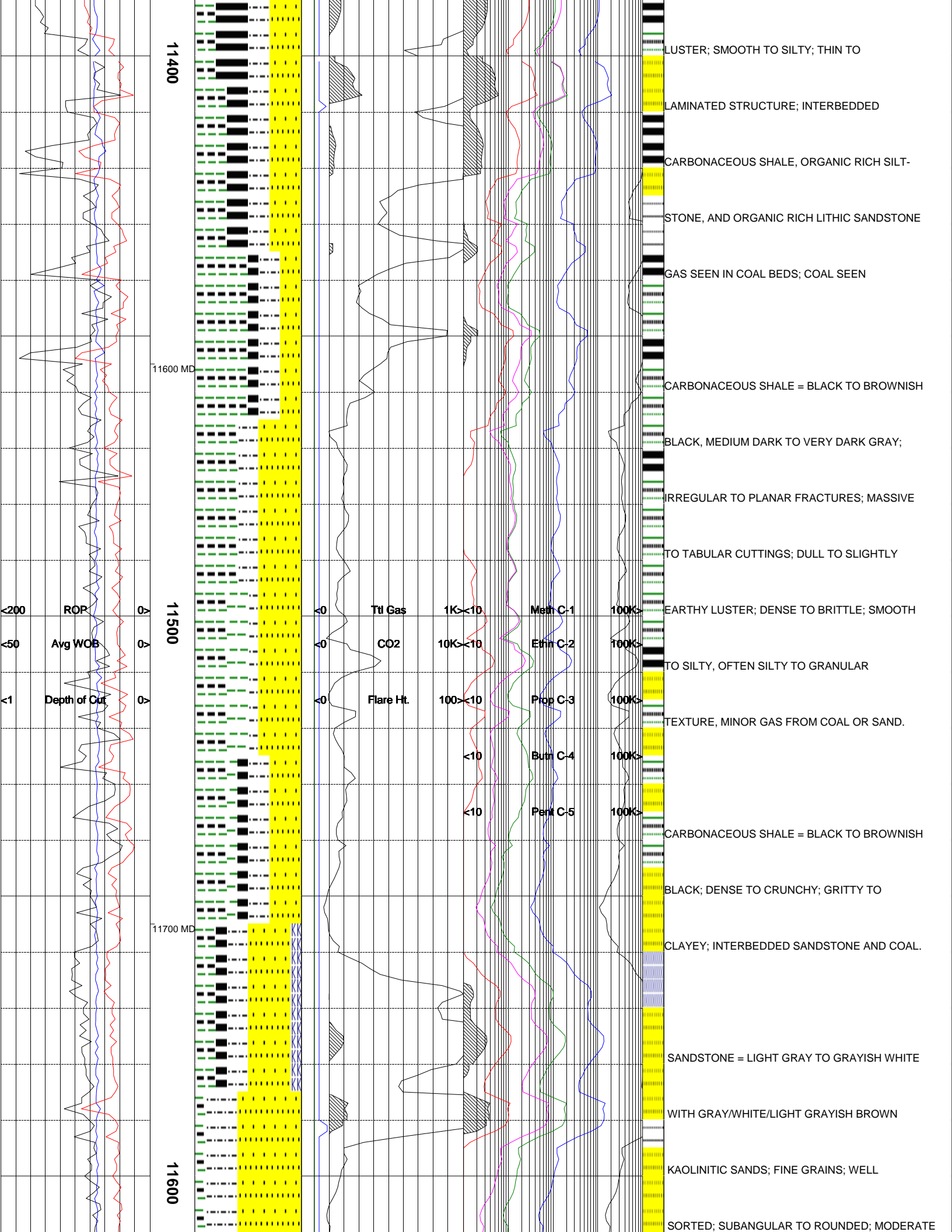


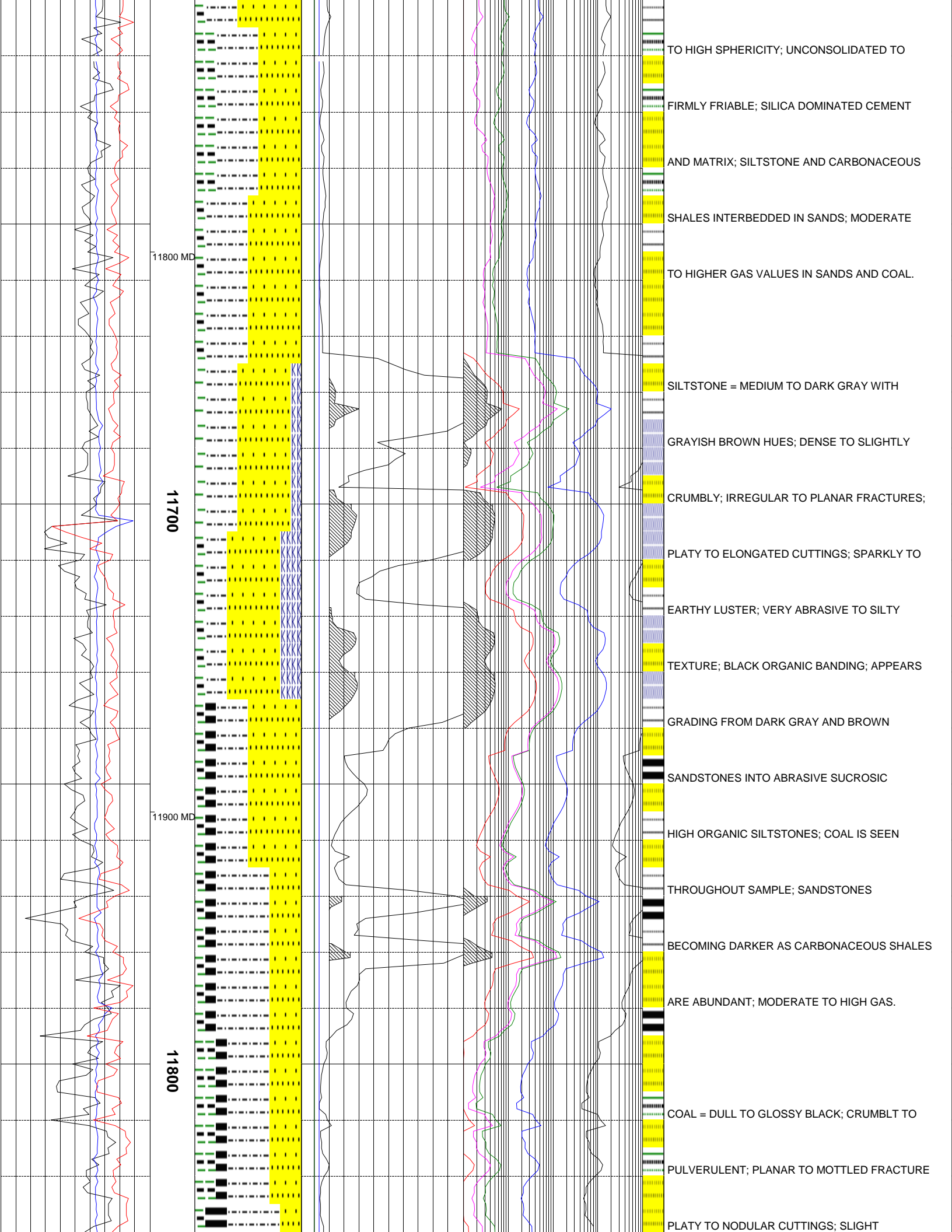
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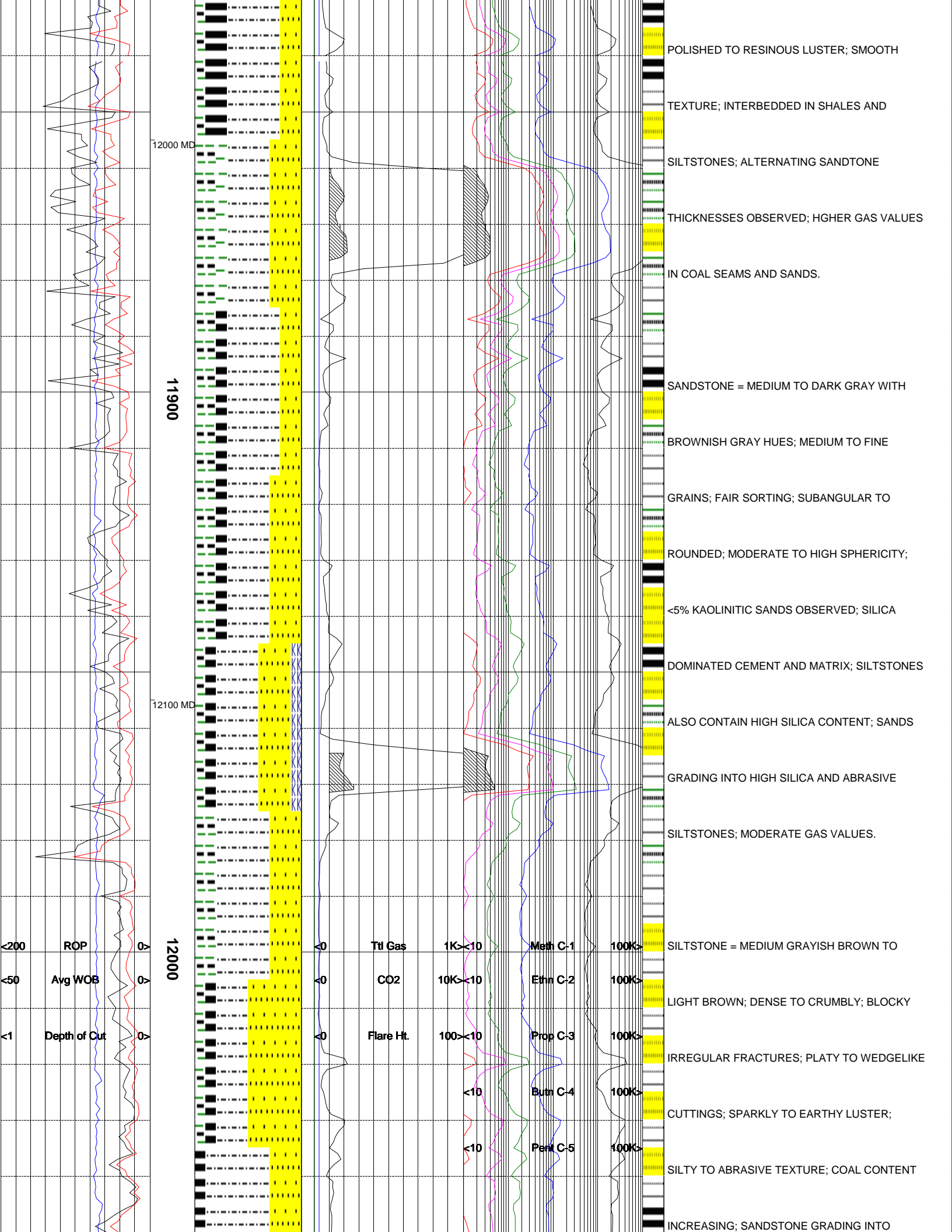
11400 MD

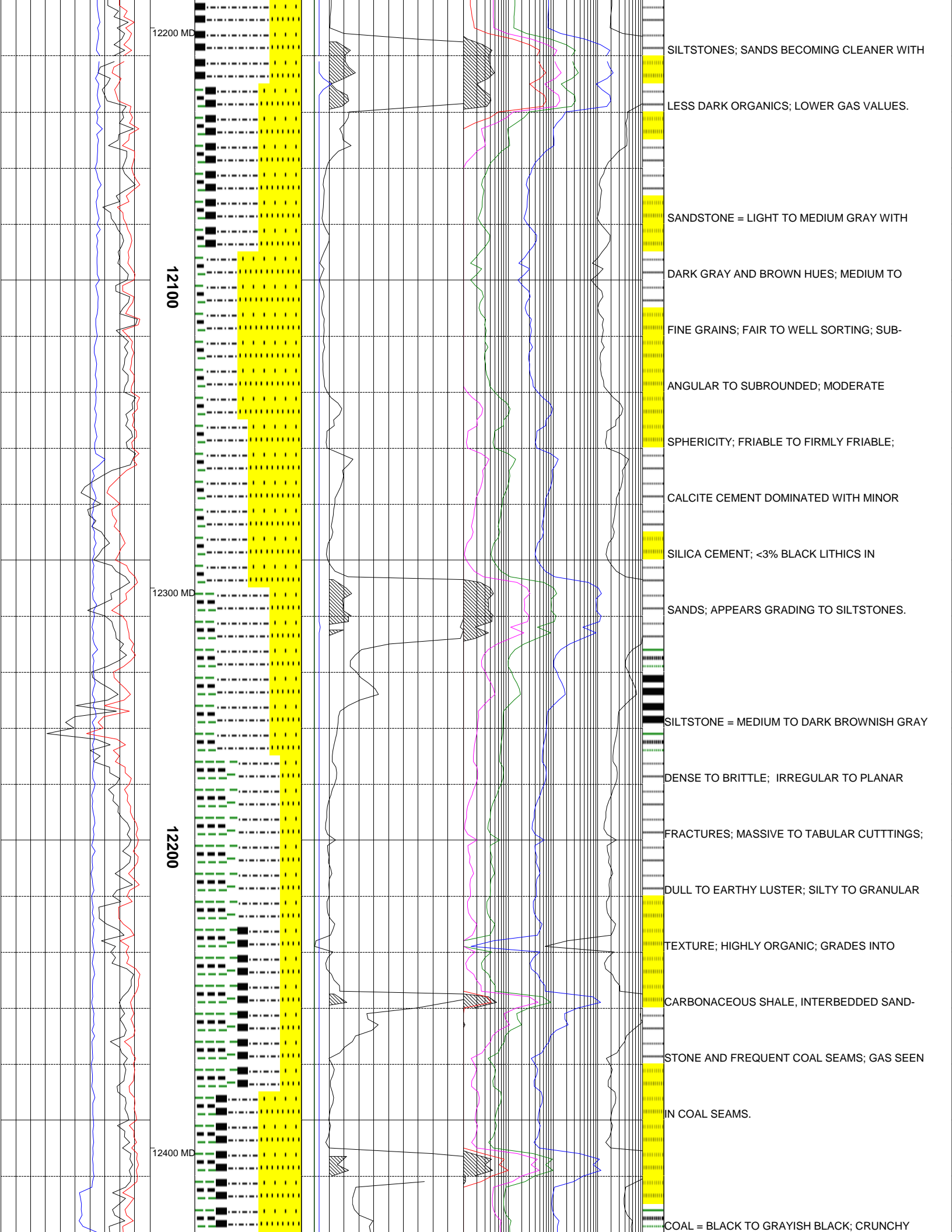
11300

11500 MD









12200 MD

SILTSTONES; SANDS BECOMING CLEANER WITH  
LESS DARK ORGANICS; LOWER GAS VALUES.

12100

SANDSTONE = LIGHT TO MEDIUM GRAY WITH  
DARK GRAY AND BROWN HUES; MEDIUM TO  
FINE GRAINS; FAIR TO WELL SORTING; SUB-  
ANGULAR TO SUBROUNDED; MODERATE  
SPHERICITY; FRIABLE TO FIRMLY FRIABLE;  
CALCITE CEMENT DOMINATED WITH MINOR  
SILICA CEMENT; <3% BLACK LITHICS IN

12300 MD

SANDS; APPEARS GRADING TO SILTSTONES.

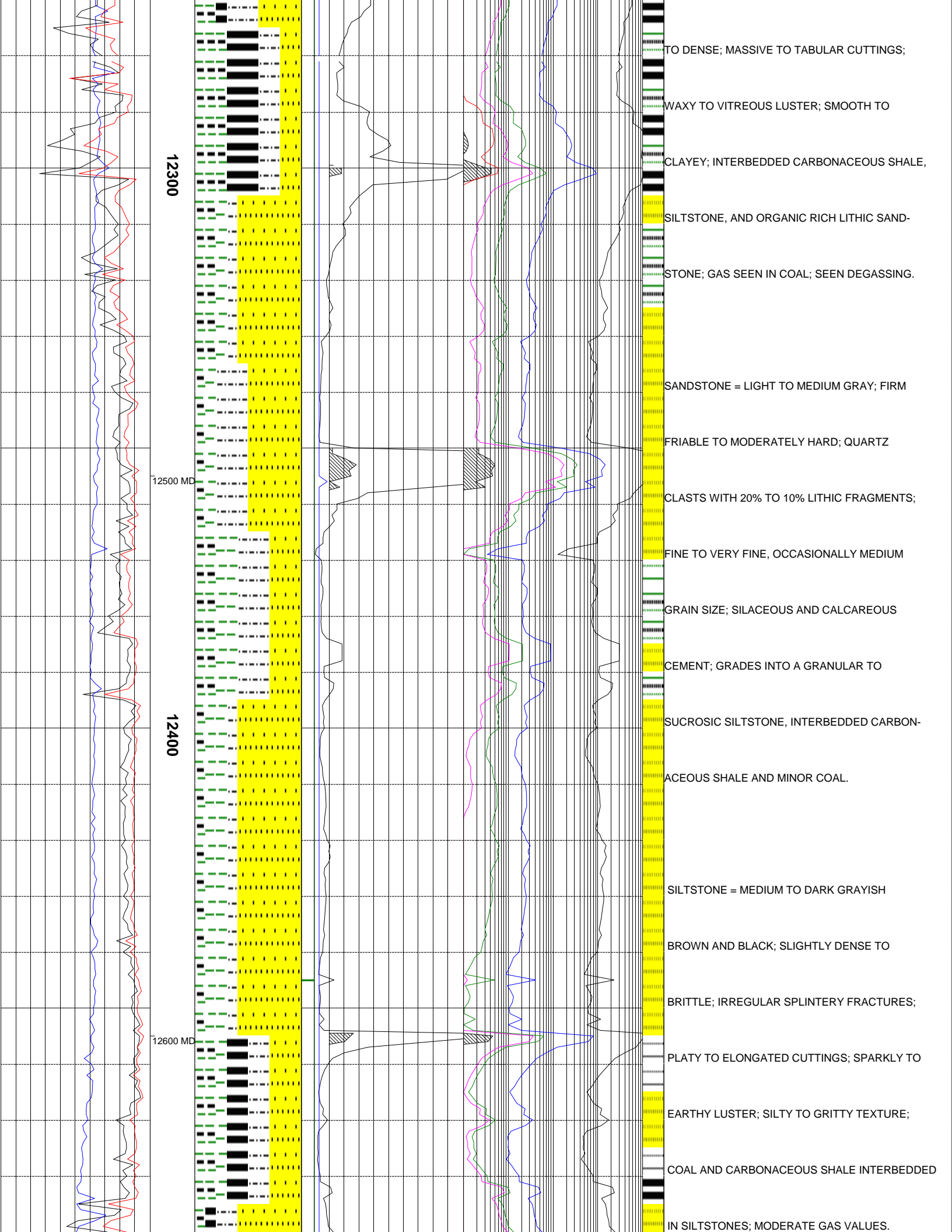
12200

SILTSTONE = MEDIUM TO DARK BROWNISH GRAY  
DENSE TO BRITTLE; IRREGULAR TO PLANAR  
FRACTURES; MASSIVE TO TABULAR CUTTINGS;  
DULL TO EARTHY LUSTER; SILTY TO GRANULAR

12400 MD

TEXTURE; HIGHLY ORGANIC; GRADES INTO  
CARBONACEOUS SHALE, INTERBEDDED SAND-  
STONE AND FREQUENT COAL SEAMS; GAS SEEN  
IN COAL SEAMS.

COAL = BLACK TO GRAYISH BLACK; CRUNCHY

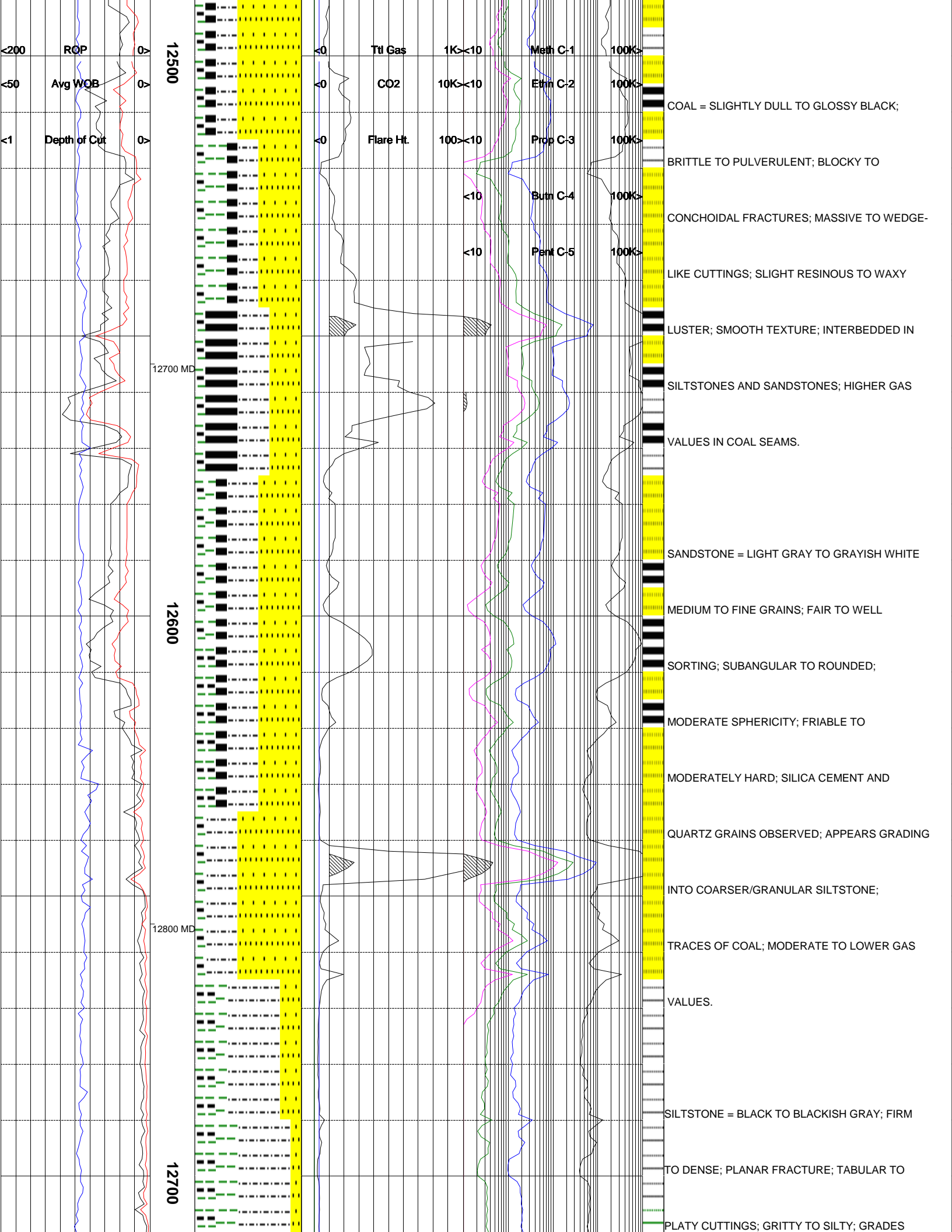


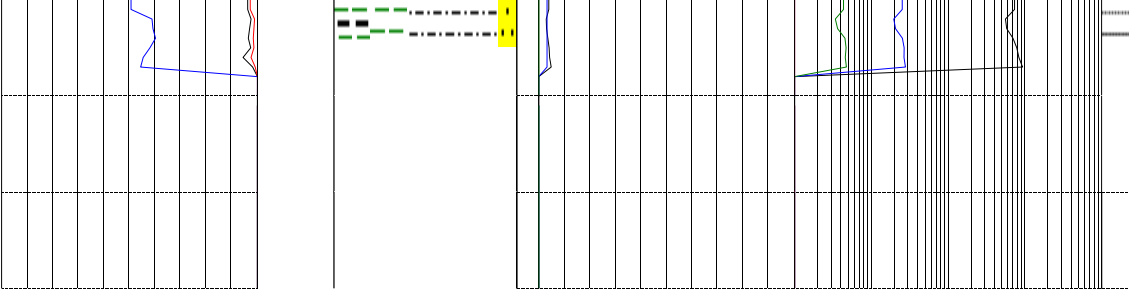
12300

12500 MD

12400

12600 MD





INTO A BLACK TO DARK GRAY SHALE; LOW GAS

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