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Houston, TX (281) 784-5500
Bakersfield, CA (661) 328-1595
New Iberia, LA (337) 364-2322
Anchorage, AK (907) 561-2465

Mudlog TVD

COMPANY EXXONMOBIL
WELL PCU 296-5A6
FIELD PICEANCE CREEK
REGION ROCKIES
COORDINATES LAT: 39.912044
LONG: -108.198659
ELEVATION G.L.:7294'
RKB: 30.2'
COUNTY, STATE RIO BLANCO, CO
API INDEX 051031124000
SPUD DATE 2/28/2011
CONTRACTOR HELMERICH_PAYNE
CO. REP. C. CURTIS/M. HUDON
RIG/TYPE FLEX 4S / HP 321
LOGGING UNIT MLO31
GEOLOGISTS M. GROSS
B. SMELSER
ADD. PERSONS D. NEW
CO. GEOLOGIST C. ALBA

LOG INTERVAL

CASING DATA

DEPTHS: 4885' TO 14007'
DATES: 03/01/2011 TO 3/22/2011
SCALE: 5" = 100'

16.00" AT 119'
10.75" AT 4870'
7.00" AT 10543'
AT

MUD TYPES

HOLE SIZE

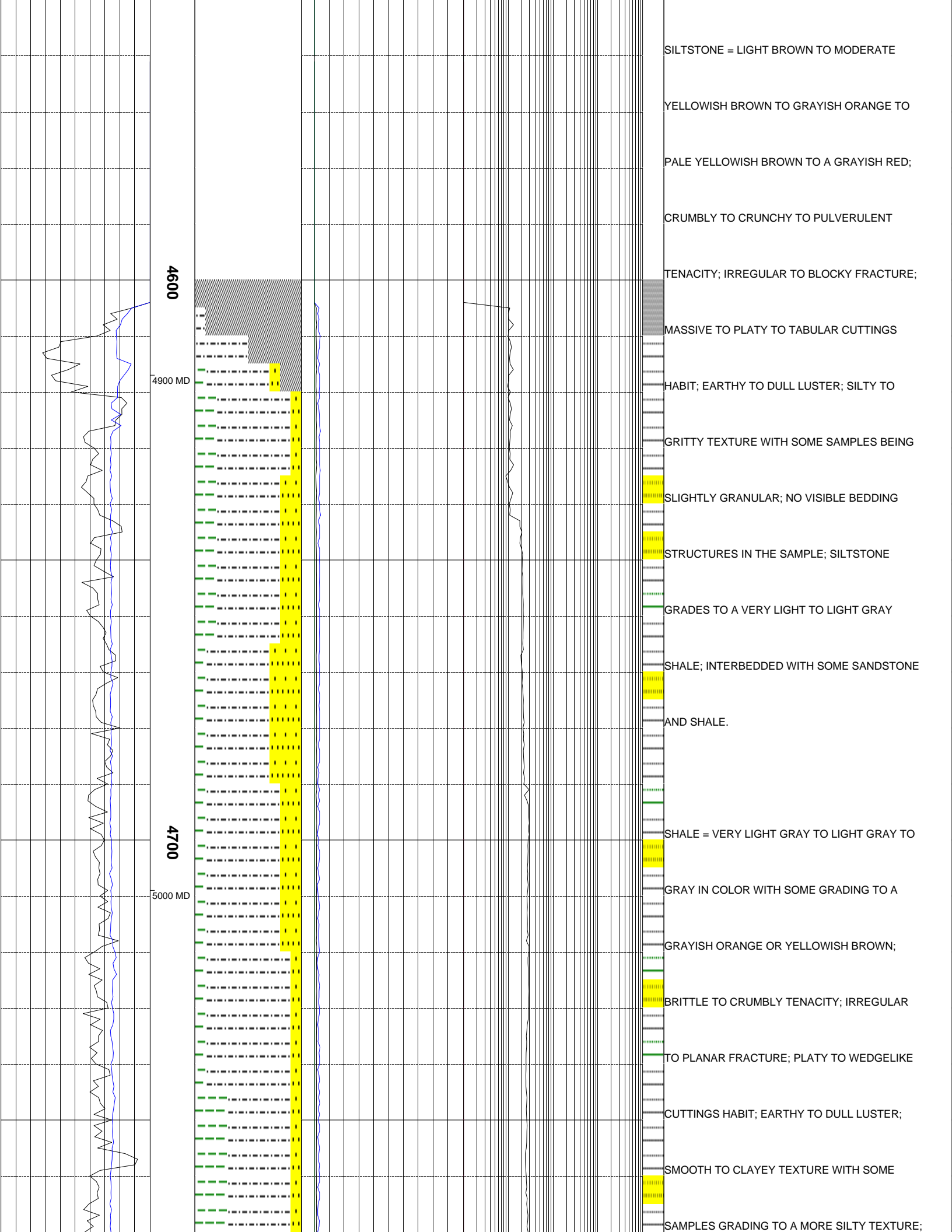
SPUD MUD TO 4885'
LSND TO 14007'
TO
TO

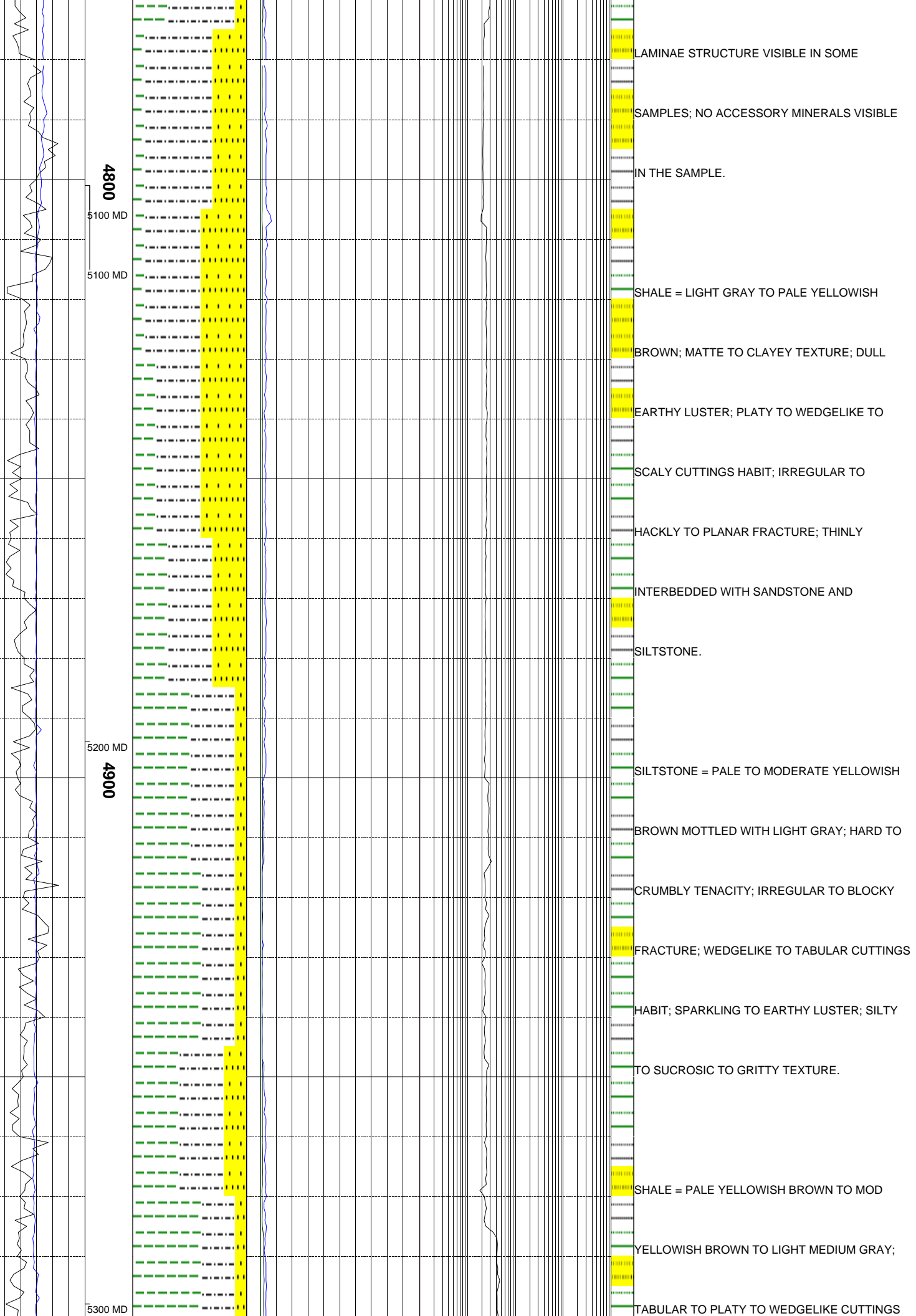
14.75" TO 4885'
9.875" TO 10586'
6.125" TO 14007'
TO

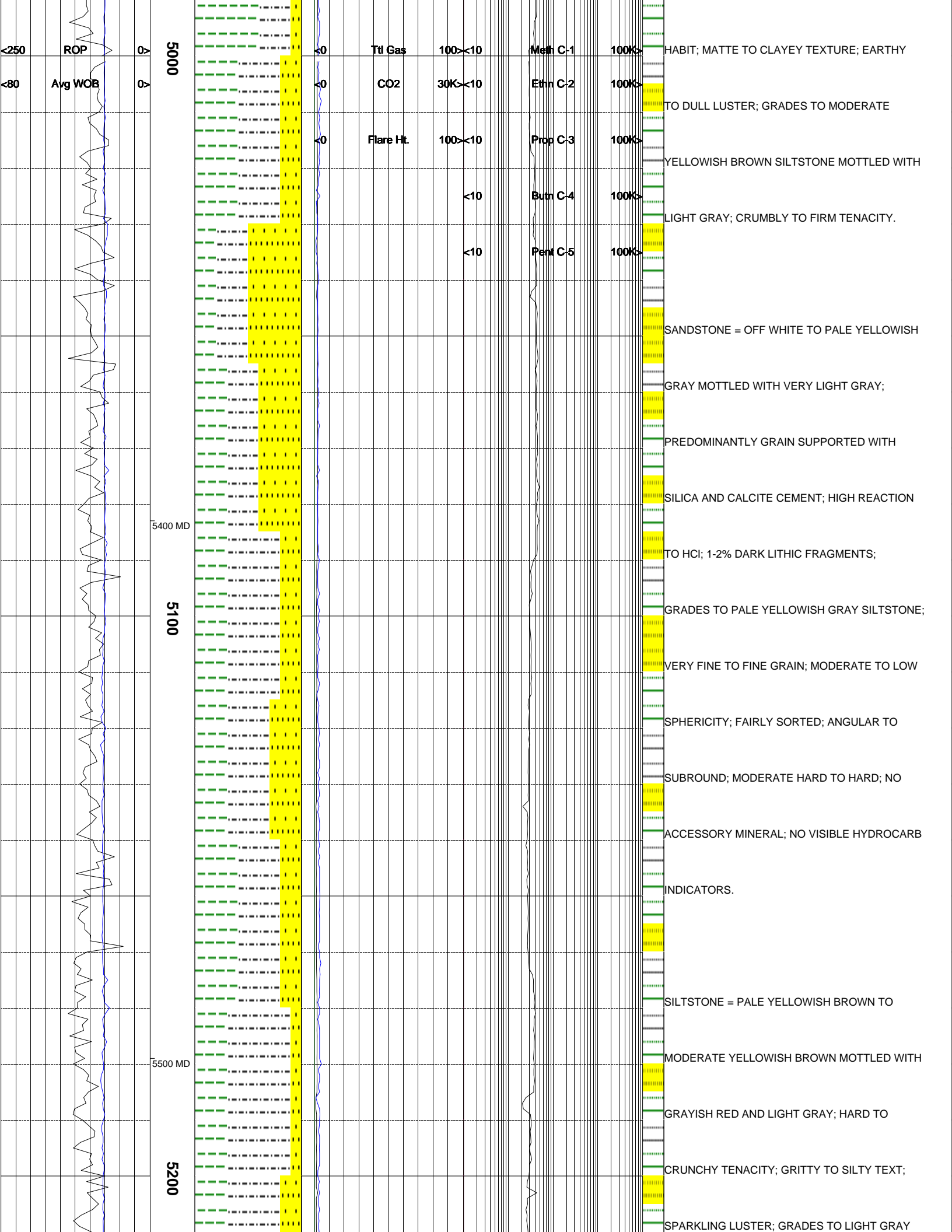
ABBREVIATIONS

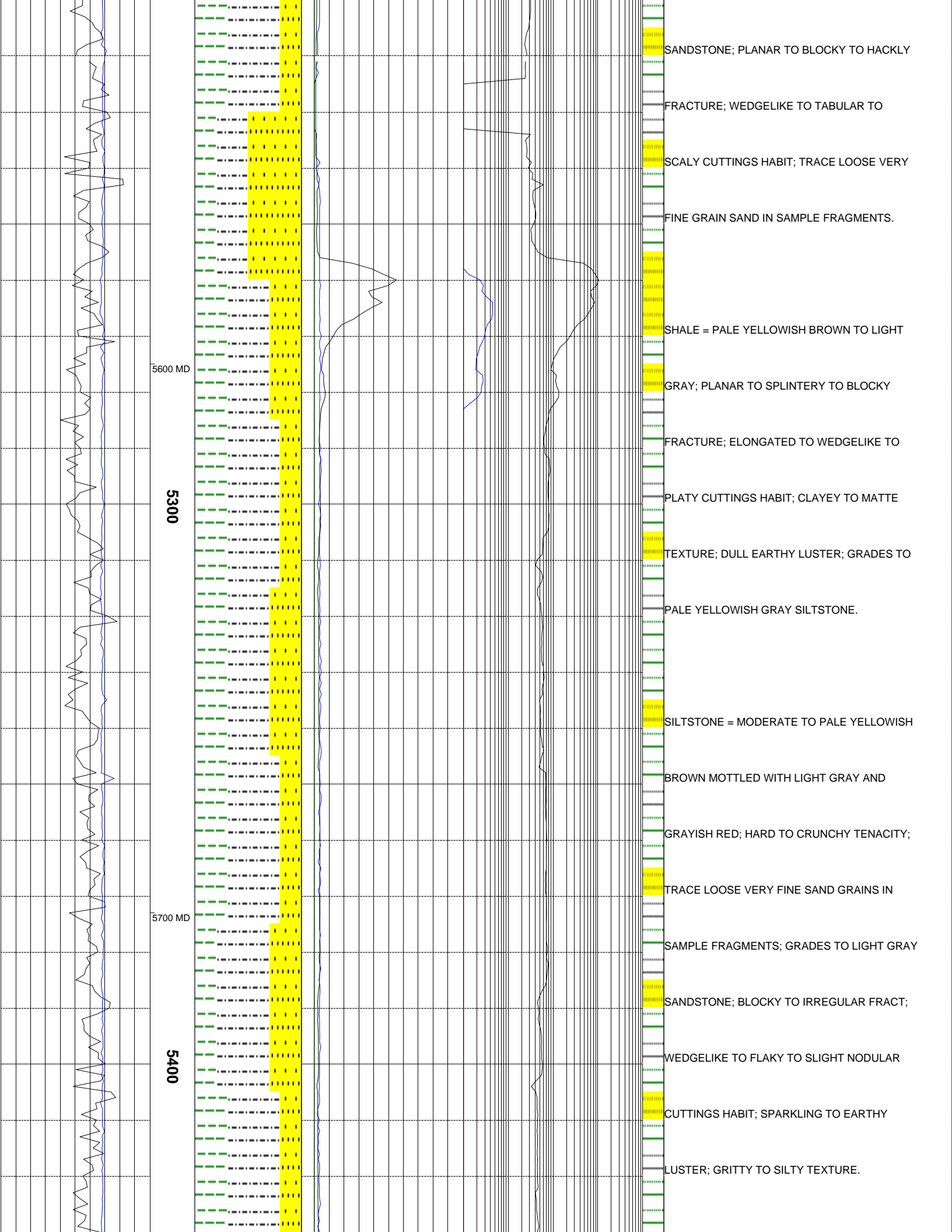
NB NEWBIT PV PLASTIC VISCOSITY LC LOST CIRCULATION
RRB RERUN BIT YP YIELD POINT CO CIRCULATE OUT
CB CORE BIT FL FLUID LOSS NR NO RETURNS
WOB WEIGHT ON BIT CL PPM CLORIDE ION TG TRIP GAS
RPM ROTARY REV/MIN Rm MUD RESISTIVITY SG SURVEY GAS
PP PUMP PRESSURE Rmf FILTRATE RESISTIVITY WG WIPER GAS
SPM STROKES/MIN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

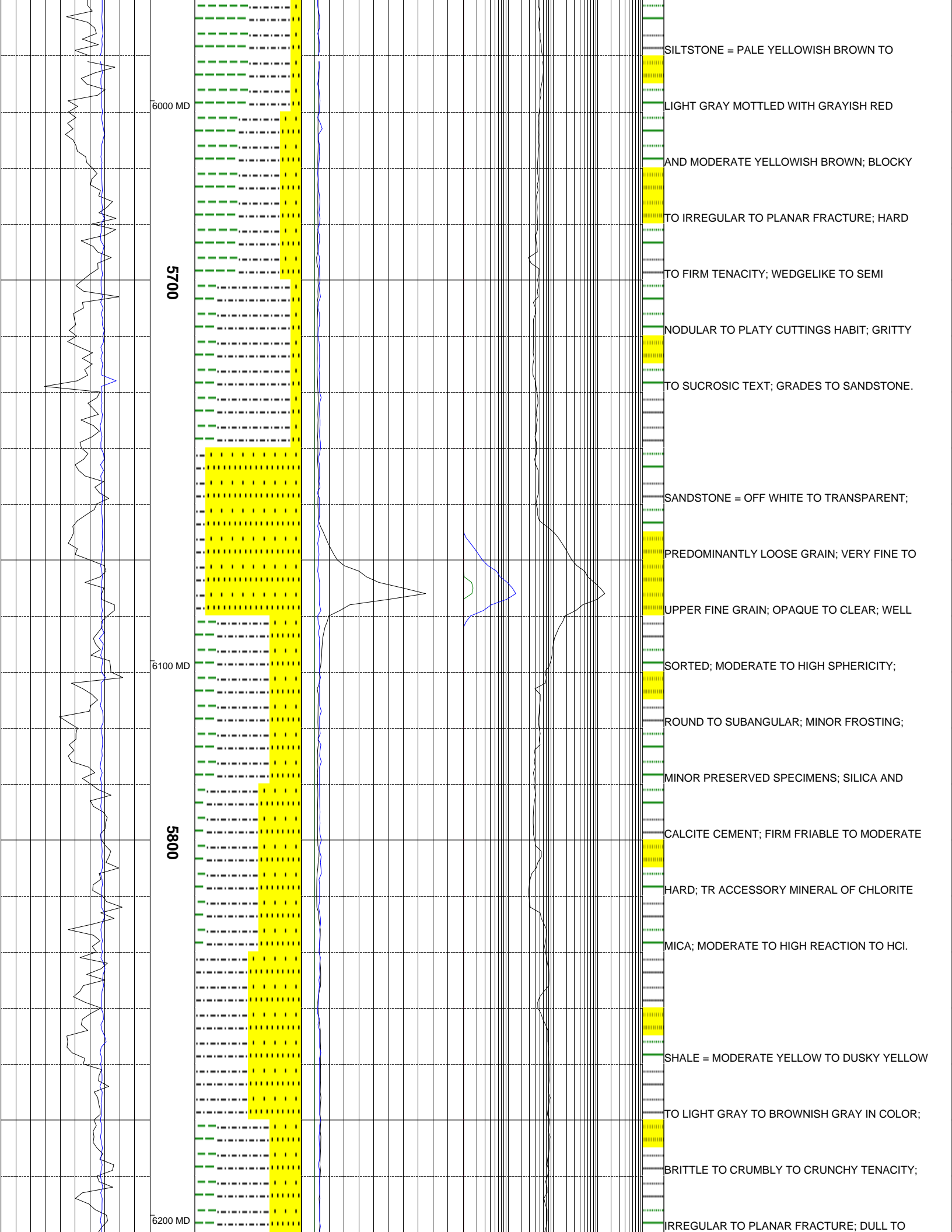
Legend of geological symbols and patterns including: ALTERED ZONE, ANDESITE, ANHYDRITE, BASALT, BASALT, BENTONITE, BIOTITIZATION, BRECCIA, CALCARENITE, CALCAREOUS TUFF, CALCILUTITE, CARBONATES, CARBONACEOUS MAT, CARBONACEOUS SH, CEMENT CONTAM., CHALK, CRYSTALLINE TUFF, CHERT - ARGILL, CHERT - GLASSY, 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, KAOLINIC, 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, SAND, SANDSTONE, SANDSTONE-TUFFACEOUS, SERICITIZATION, SERPENTINE, SHALE, SHALE TUFFACEOUS, SHELL FRAGMENTS, SIDERITE, SILICIFICATION, SILTSTONE, SILTST-TUFFACEOUS, TUFF, VOLCANICLASTICS SEDS, VOLCANICS.

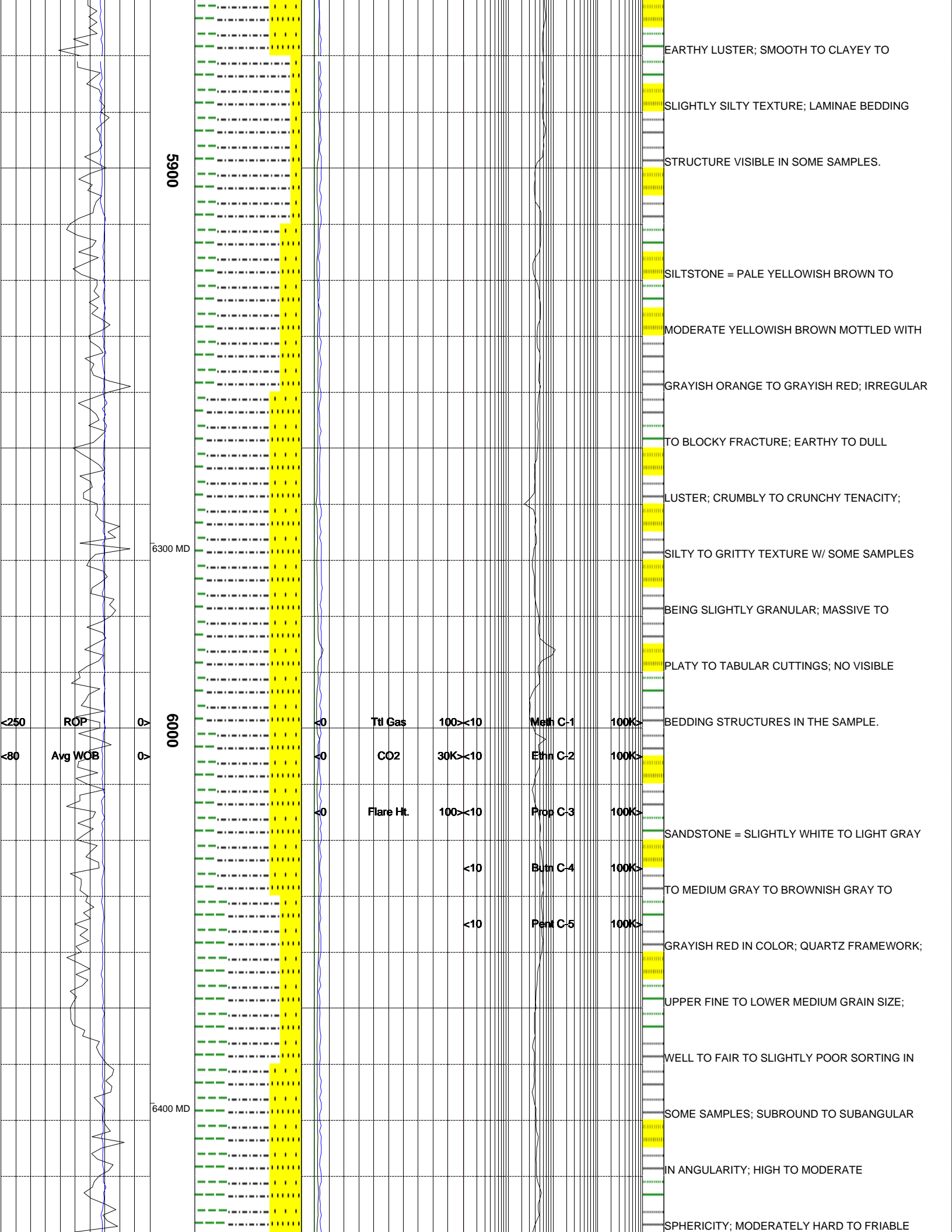


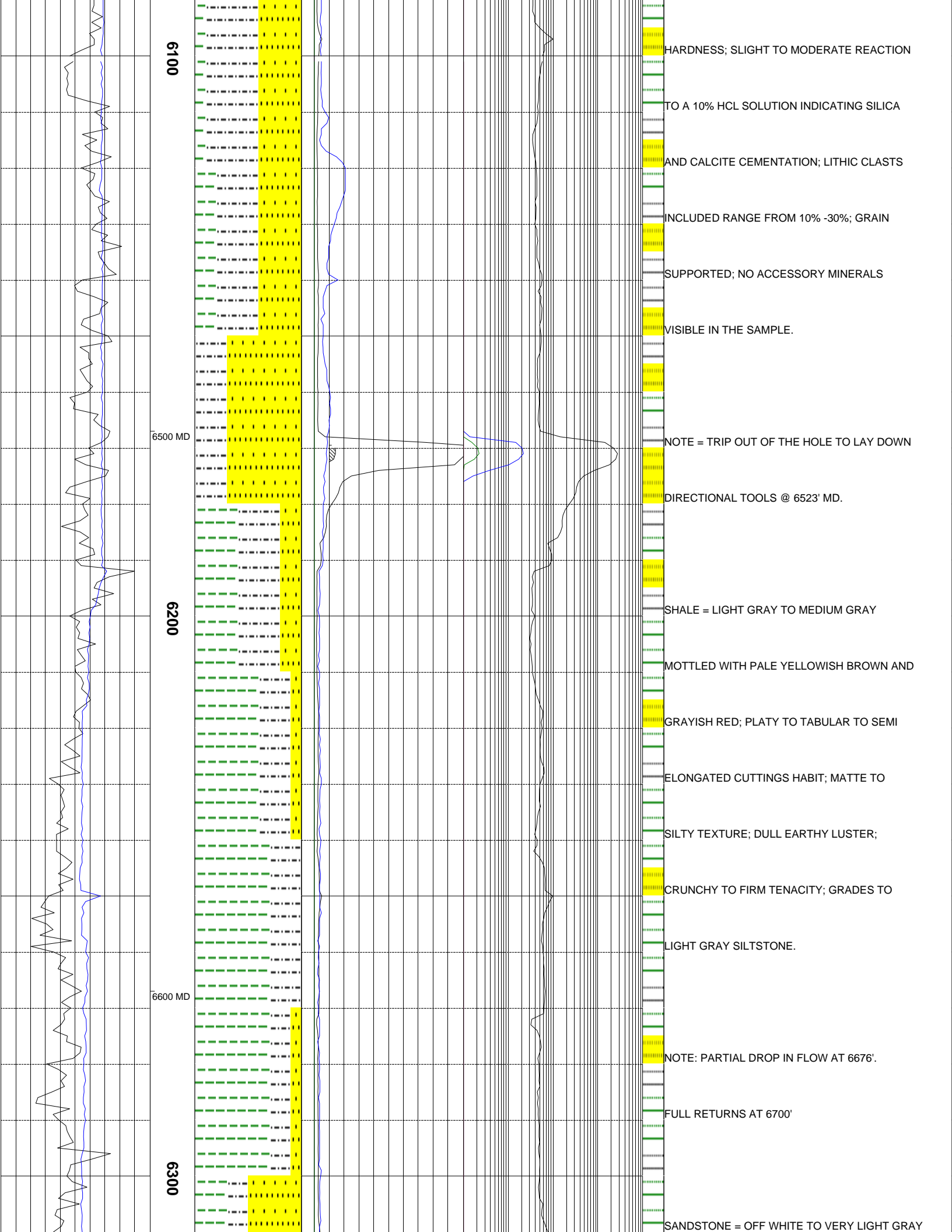


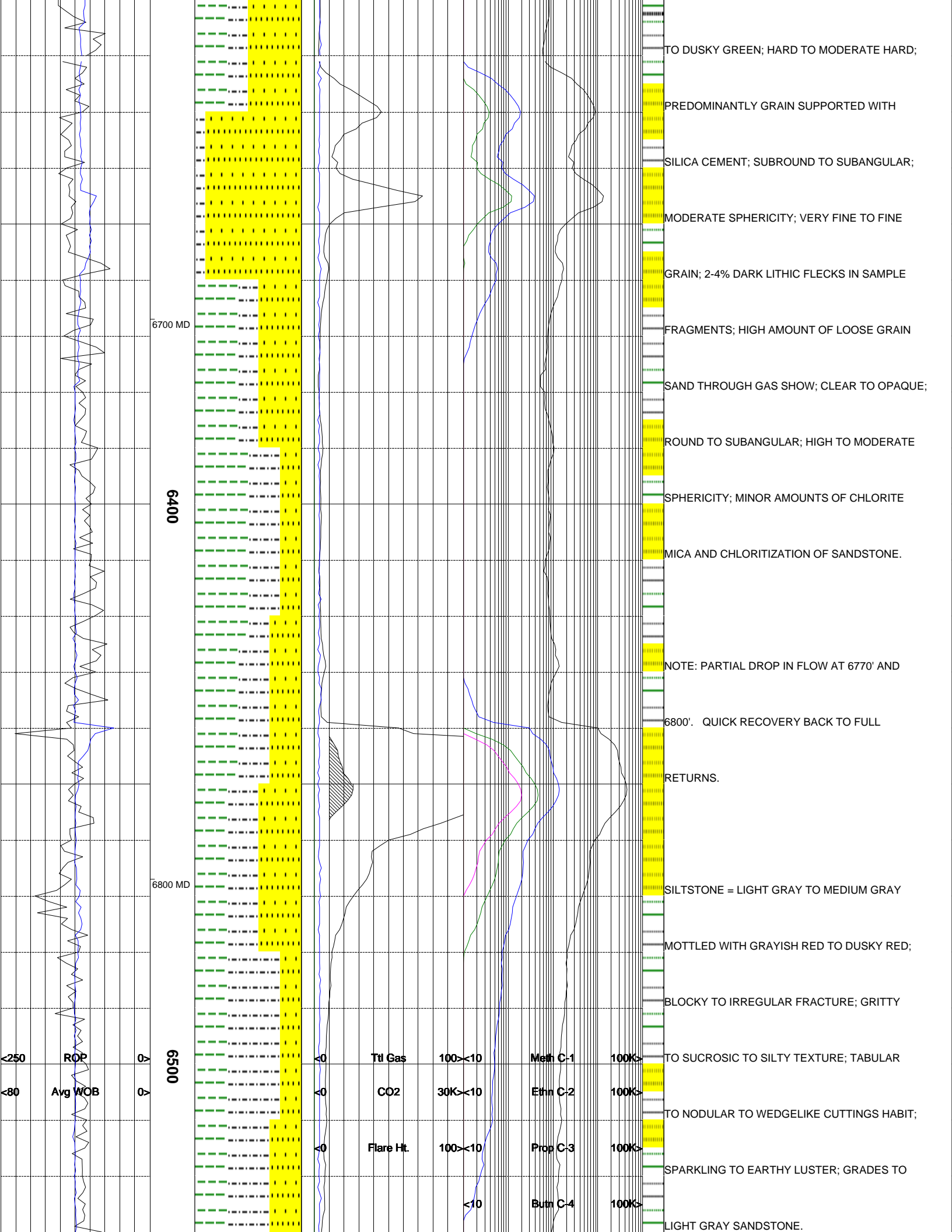












TO DUSKY GREEN; HARD TO MODERATE HARD;

PREDOMINANTLY GRAIN SUPPORTED WITH

SILICA CEMENT; SUBROUND TO SUBANGULAR;

MODERATE SPHERICITY; VERY FINE TO FINE

GRAIN; 2-4% DARK LITHIC FLECKS IN SAMPLE

FRAGMENTS; HIGH AMOUNT OF LOOSE GRAIN

SAND THROUGH GAS SHOW; CLEAR TO OPAQUE;

ROUND TO SUBANGULAR; HIGH TO MODERATE

SPHERICITY; MINOR AMOUNTS OF CHLORITE

MICA AND CHLORITIZATION OF SANDSTONE.

NOTE: PARTIAL DROP IN FLOW AT 6770' AND

6800'. QUICK RECOVERY BACK TO FULL

RETURNS.

SILTSTONE = LIGHT GRAY TO MEDIUM GRAY

MOTTLED WITH GRAYISH RED TO DUSKY RED;

BLOCKY TO IRREGULAR FRACTURE; GRITTY

TO SUCROSIC TO SILTY TEXTURE; TABULAR

TO NODULAR TO WEDGELIKE CUTTINGS HABIT;

SPARKLING TO EARTHY LUSTER; GRADES TO

LIGHT GRAY SANDSTONE.

6700 MD

6400

6800 MD

6500

<250 ROP

<80 Avg WOB

Ttl Gas 100<10

Meth C-1 100K>

CO2 30K<10

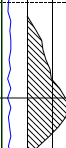
Ethn C-2 100K>

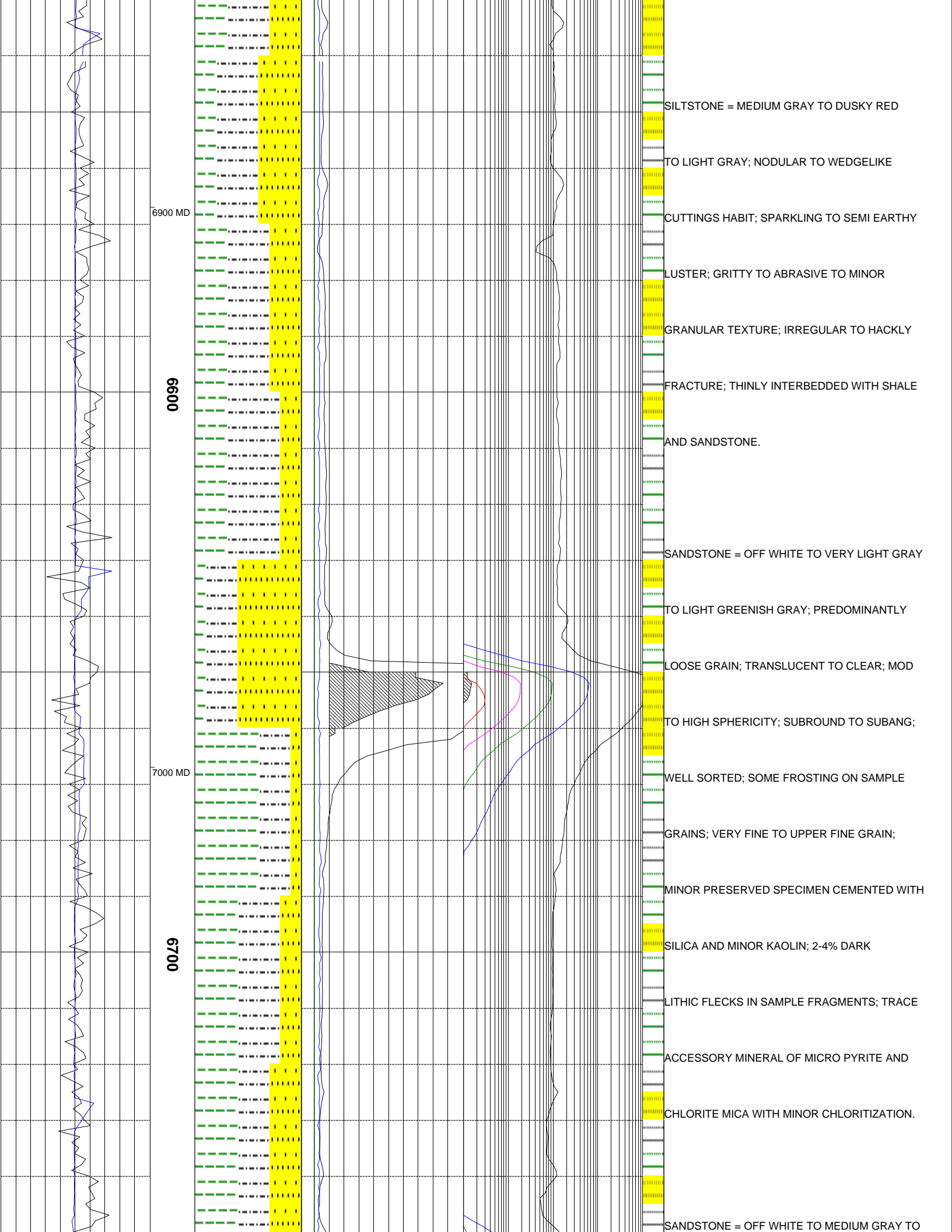
Flare Ht. 100<10

Prop C-3 100K>

Butn C-4 <10

100K>





6900 MD

6600

7000 MD

6700

SILTSTONE = MEDIUM GRAY TO DUSKY RED

TO LIGHT GRAY; NODULAR TO WEDGELIKE

CUTTINGS HABIT; SPARKLING TO SEMI EARTHY

LUSTER; GRITTY TO ABRASIVE TO MINOR

GRANULAR TEXTURE; IRREGULAR TO HACKLY

FRACTURE; THINLY INTERBEDDED WITH SHALE

AND SANDSTONE.

SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

TO LIGHT GREENISH GRAY; PREDOMINANTLY

LOOSE GRAIN; TRANSLUCENT TO CLEAR; MOD

TO HIGH SPHERICITY; SUBROUND TO SUBANG;

WELL SORTED; SOME FROSTING ON SAMPLE

GRAINS; VERY FINE TO UPPER FINE GRAIN;

MINOR PRESERVED SPECIMEN CEMENTED WITH

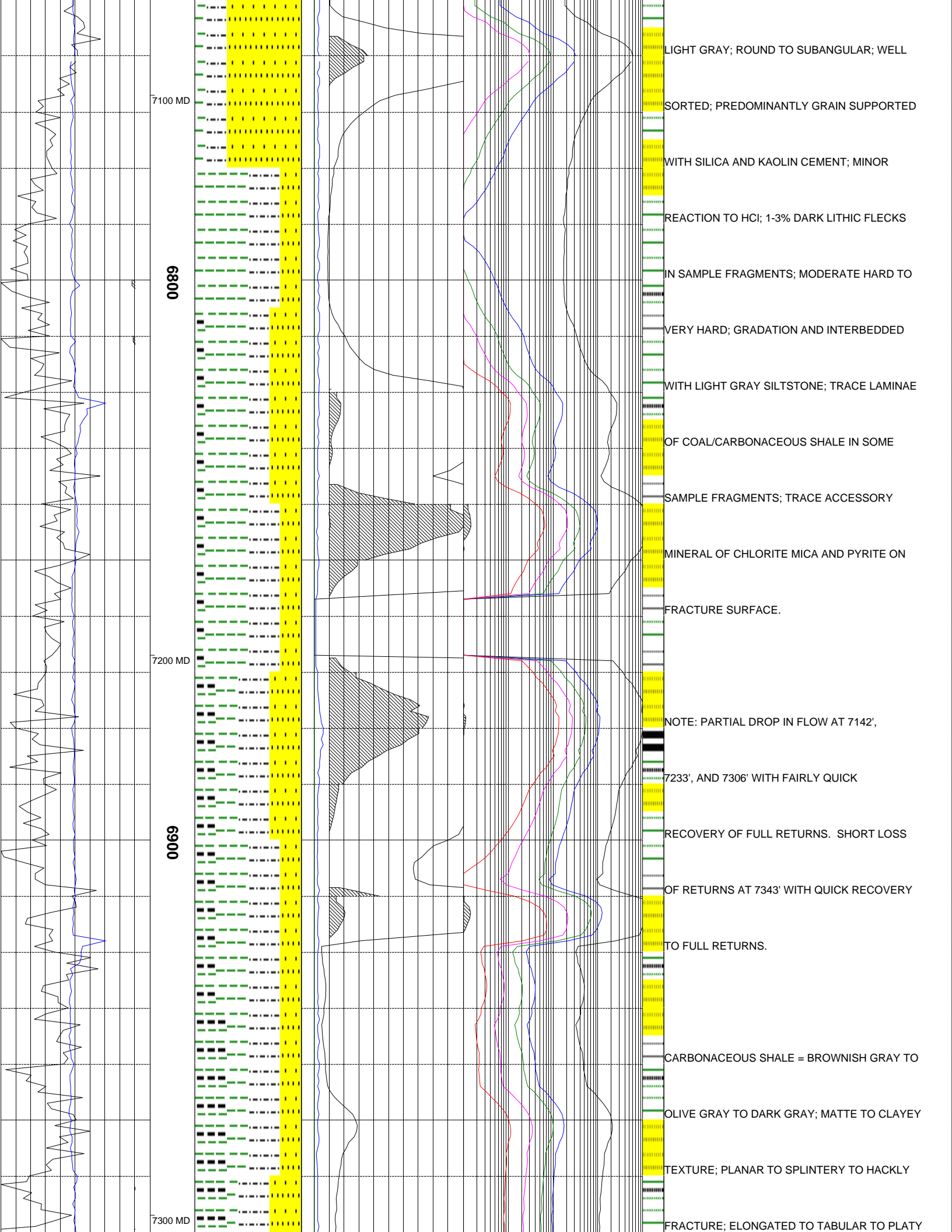
SILICA AND MINOR KAOLIN; 2-4% DARK

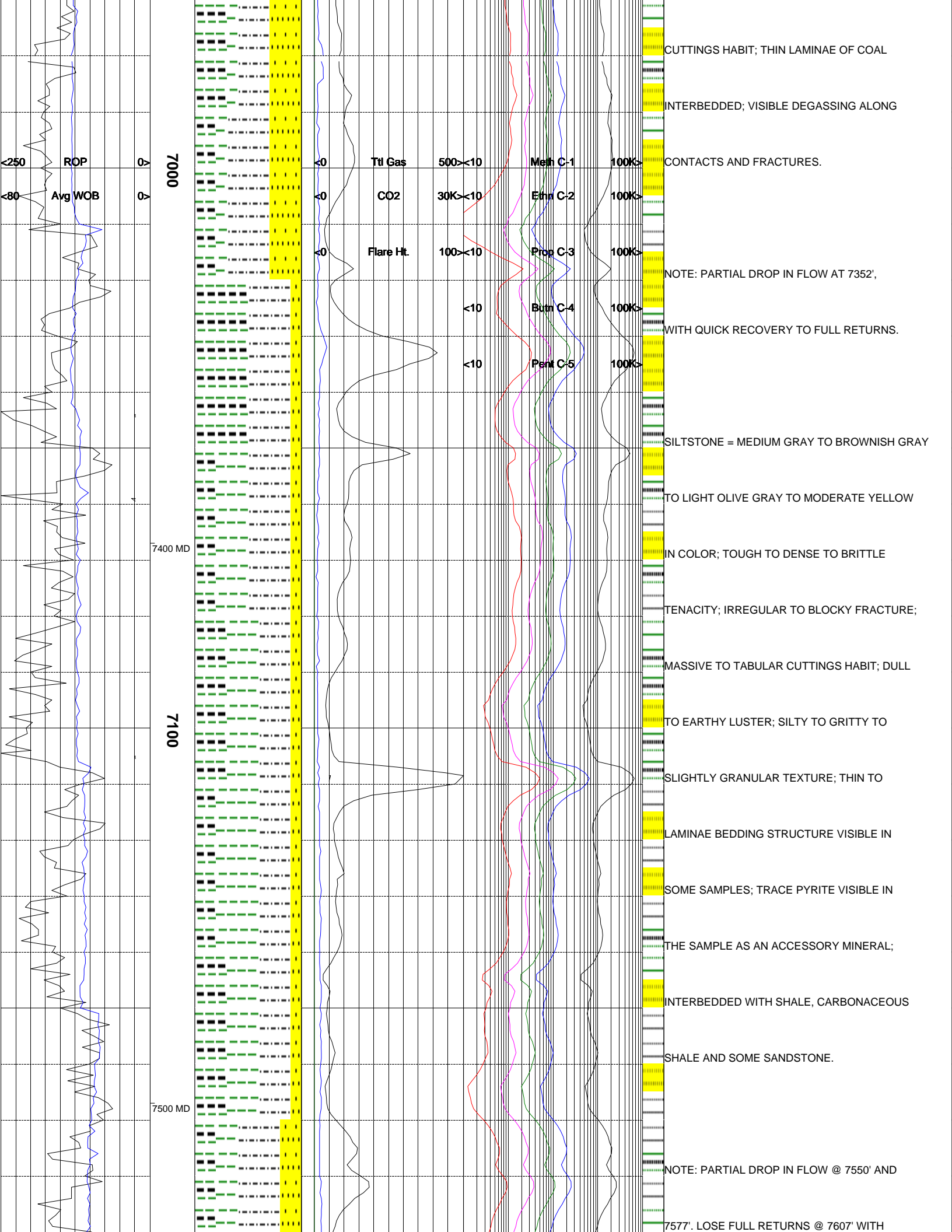
LITHIC FLECKS IN SAMPLE FRAGMENTS; TRACE

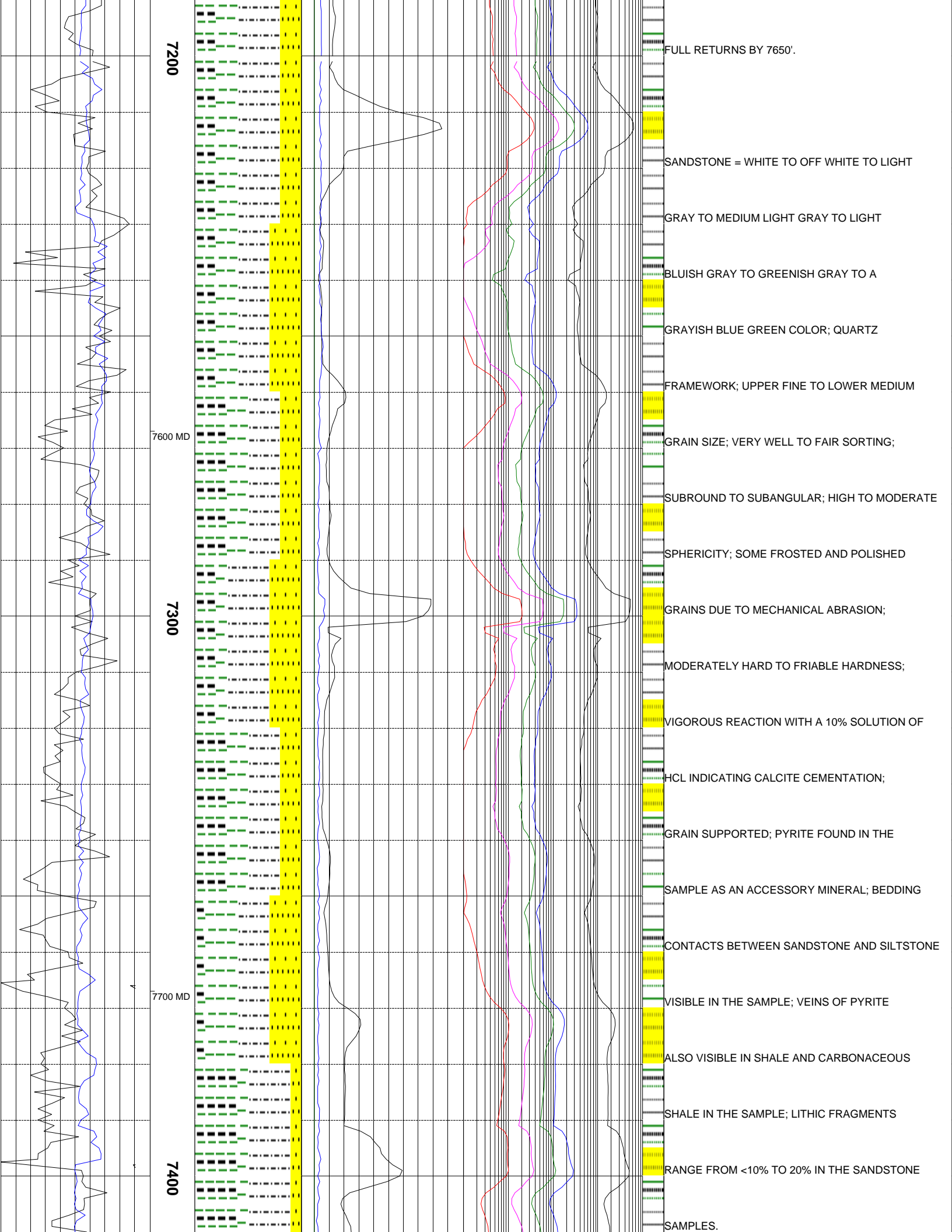
ACCESSORY MINERAL OF MICRO PYRITE AND

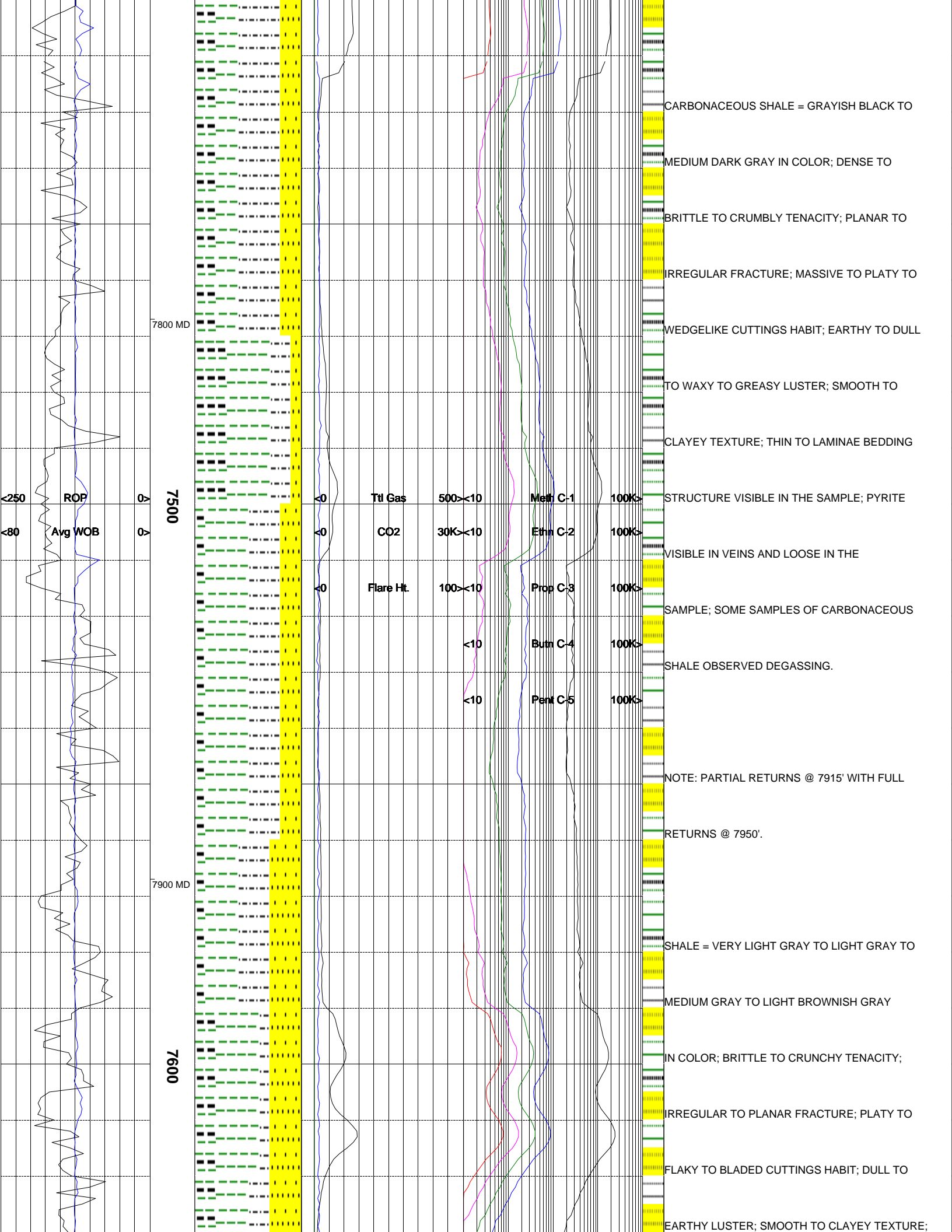
CHLORITE MICA WITH MINOR CHLORITIZATION.

SANDSTONE = OFF WHITE TO MEDIUM GRAY TO









7800 MD

7500

7900 MD

7600

CARBONACEOUS SHALE = GRAYISH BLACK TO

MEDIUM DARK GRAY IN COLOR; DENSE TO

BRITTLE TO CRUMBLY TENACITY; PLANAR TO

IRREGULAR FRACTURE; MASSIVE TO PLATY TO

WEDGELIKE CUTTINGS HABIT; EARTHY TO DULL

TO WAXY TO GREASY LUSTER; SMOOTH TO

CLAYEY TEXTURE; THIN TO LAMINAE BEDDING

STRUCTURE VISIBLE IN THE SAMPLE; PYRITE

VISIBLE IN VEINS AND LOOSE IN THE

SAMPLE; SOME SAMPLES OF CARBONACEOUS

SHALE OBSERVED DEGASSING.

NOTE: PARTIAL RETURNS @ 7915' WITH FULL

RETURNS @ 7950'.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO

MEDIUM GRAY TO LIGHT BROWNISH GRAY

IN COLOR; BRITTLE TO CRUNCHY TENACITY;

IRREGULAR TO PLANAR FRACTURE; PLATY TO

FLAKY TO BLADED CUTTINGS HABIT; DULL TO

EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE;

Ttl Gas 500 < 10 Meth C-1 100K >

CO2 30K < 10 Ethn C-2 100K >

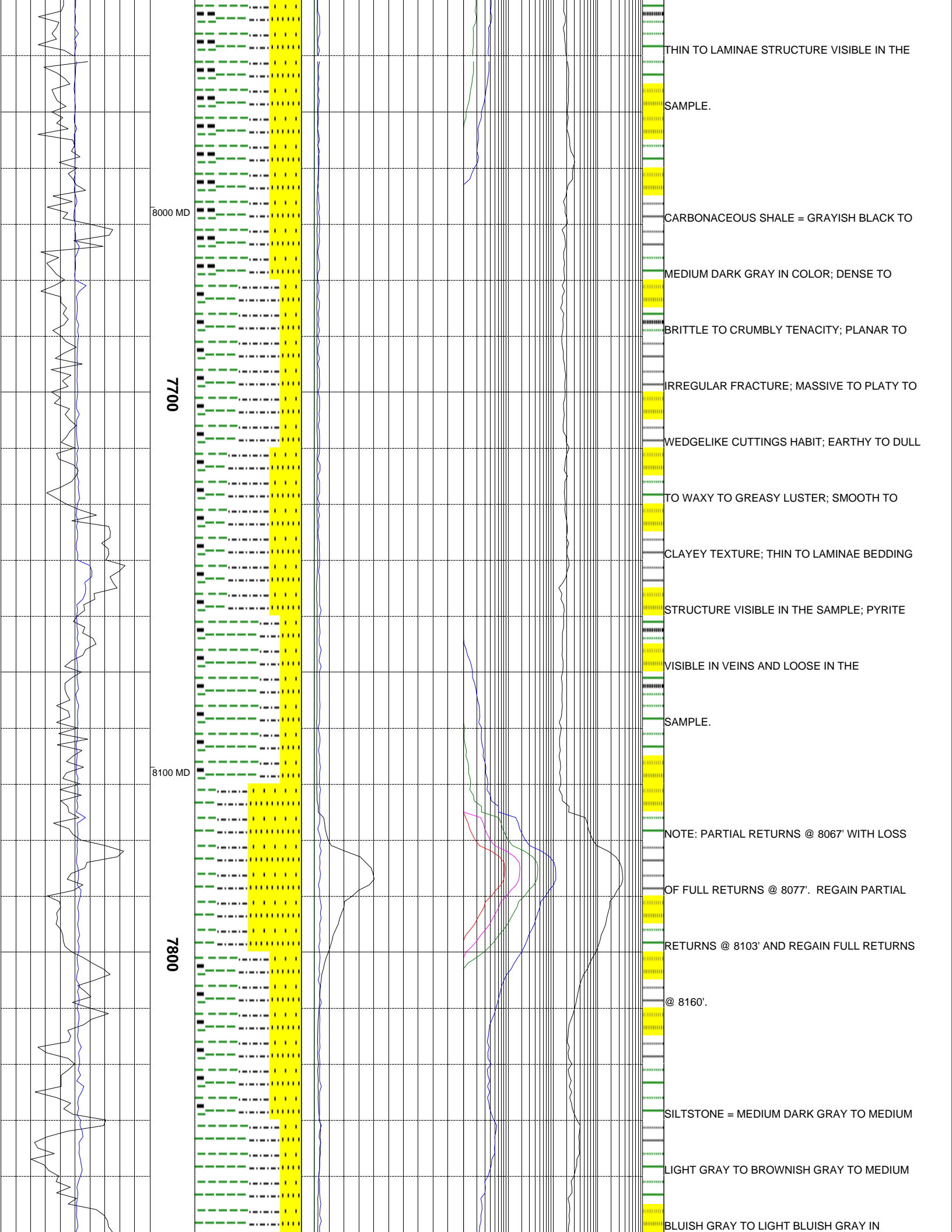
Flare Ht. 100 < 10 Prop C-3 100K >

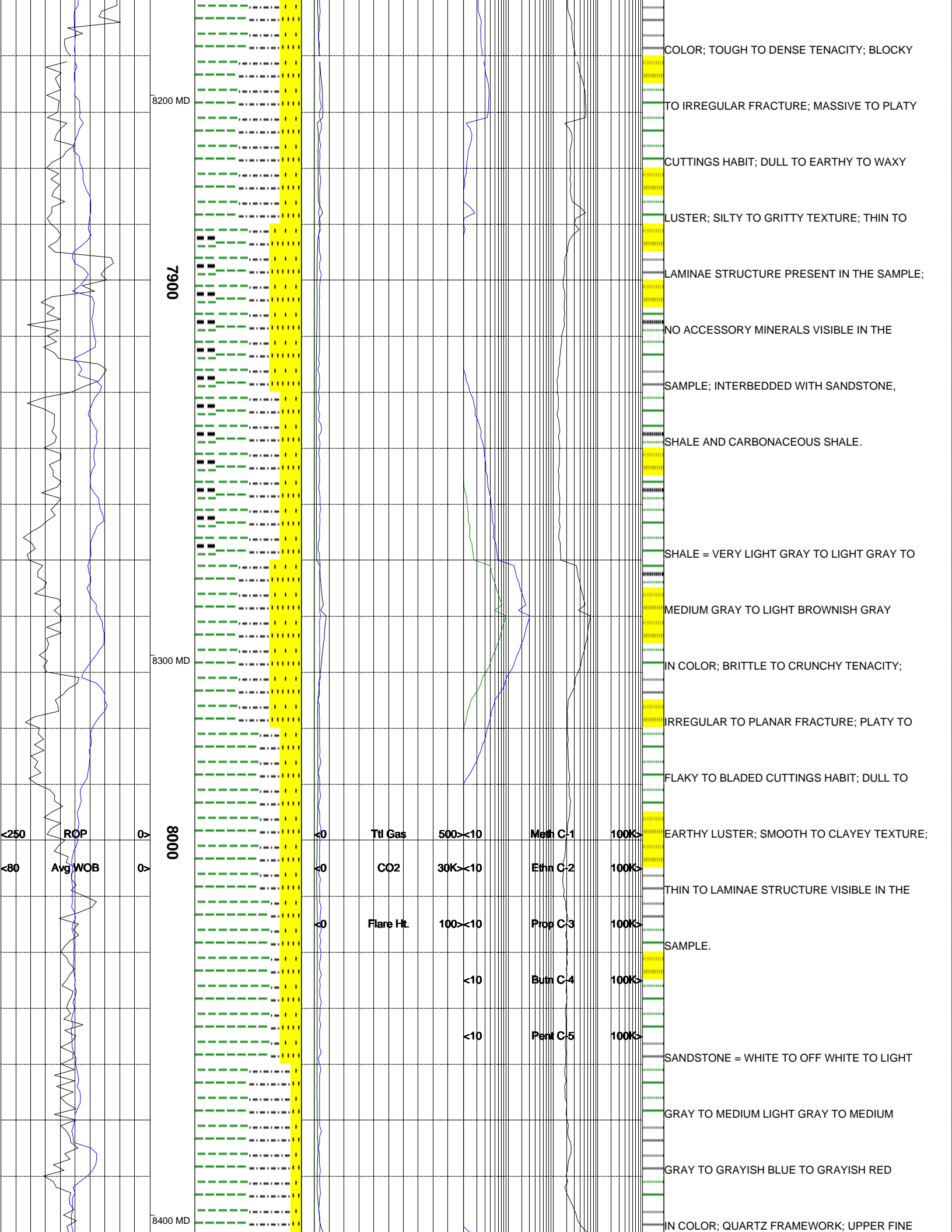
< 10 Butn C-4 100K >

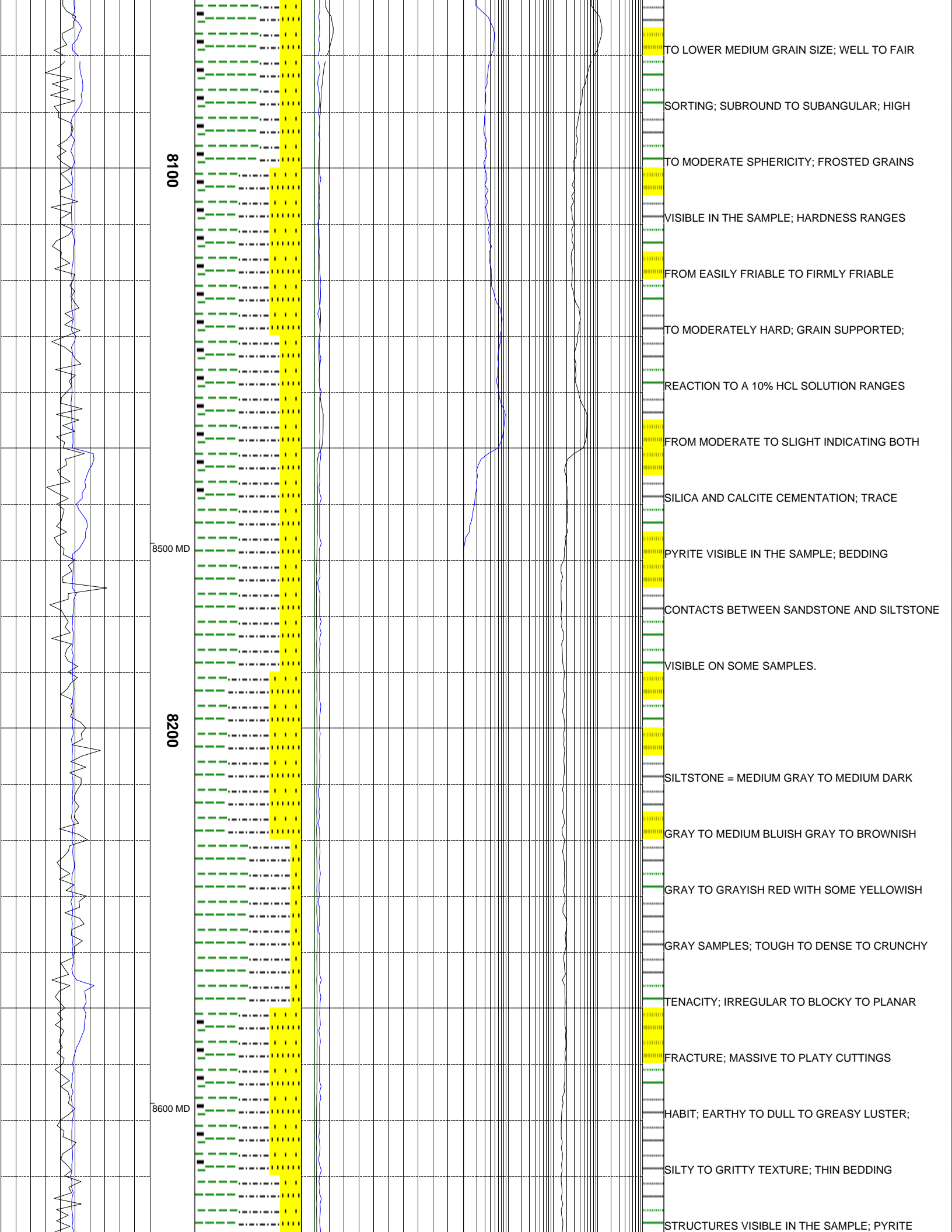
< 10 Pent C-5 100K >

< 250 ROP

< 80 Avg WOB







8100

8500 MD

8200

8600 MD

TO LOWER MEDIUM GRAIN SIZE; WELL TO FAIR

SORTING; SUBROUND TO SUBANGULAR; HIGH

TO MODERATE SPHERICITY; FROSTED GRAINS

VISIBLE IN THE SAMPLE; HARDNESS RANGES

FROM EASILY FRIABLE TO FIRMLY FRIABLE

TO MODERATELY HARD; GRAIN SUPPORTED;

REACTION TO A 10% HCL SOLUTION RANGES

FROM MODERATE TO SLIGHT INDICATING BOTH

SILICA AND CALCITE CEMENTATION; TRACE

PYRITE VISIBLE IN THE SAMPLE; BEDDING

CONTACTS BETWEEN SANDSTONE AND SILTSTONE

VISIBLE ON SOME SAMPLES.

SILTSTONE = MEDIUM GRAY TO MEDIUM DARK

GRAY TO MEDIUM BLUISH GRAY TO BROWNISH

GRAY TO GRAYISH RED WITH SOME YELLOWISH

GRAY SAMPLES; TOUGH TO DENSE TO CRUNCHY

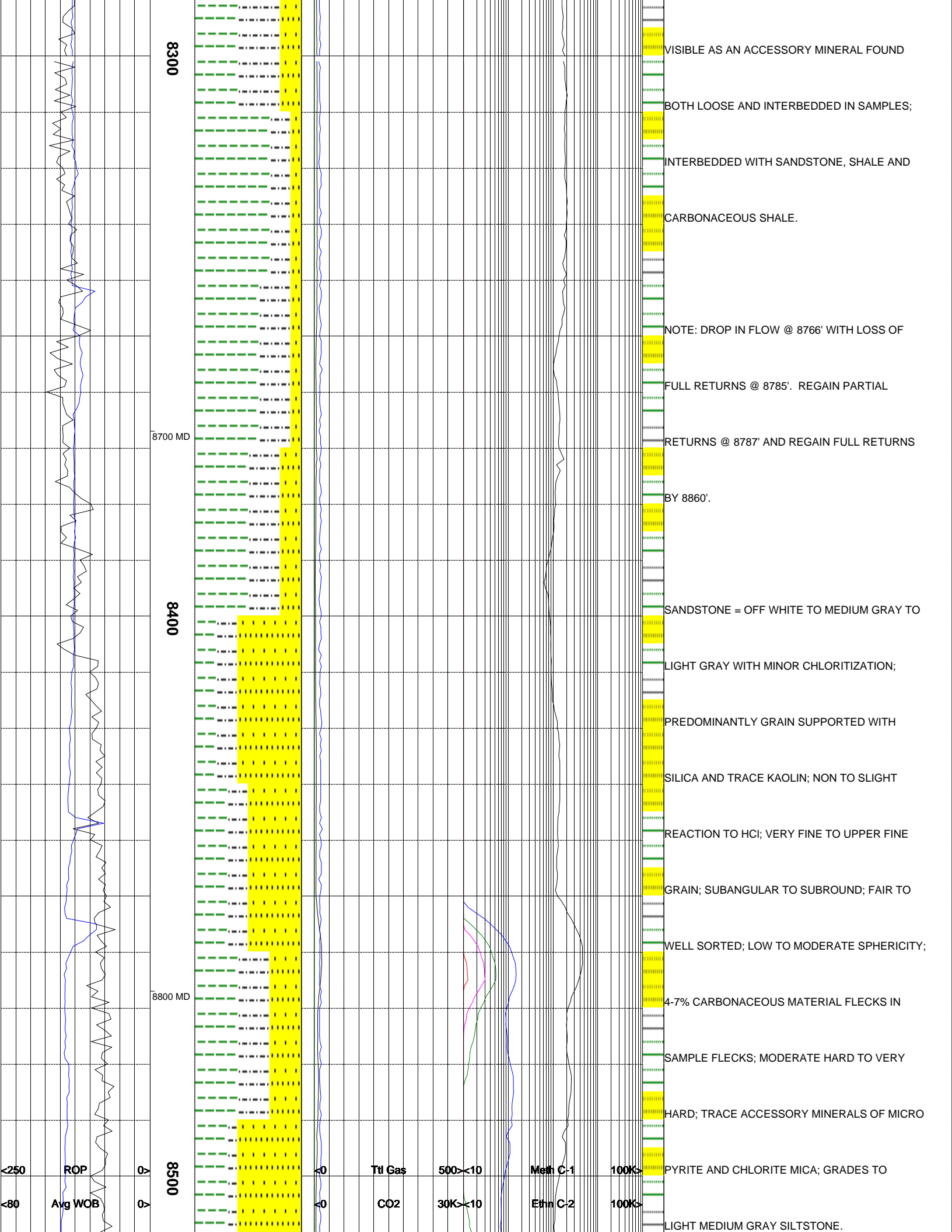
TENACITY; IRREGULAR TO BLOCKY TO PLANAR

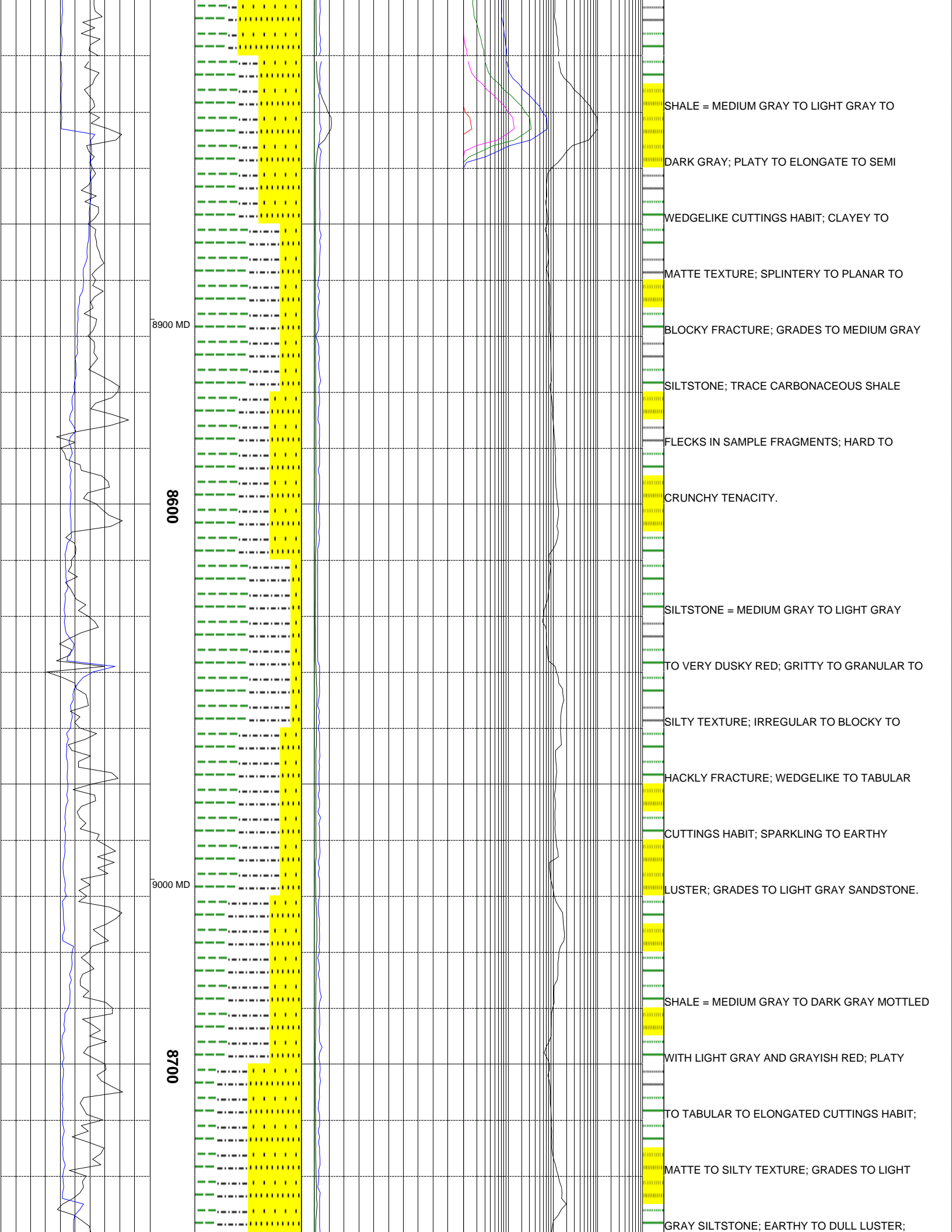
FRACTURE; MASSIVE TO PLATY CUTTINGS

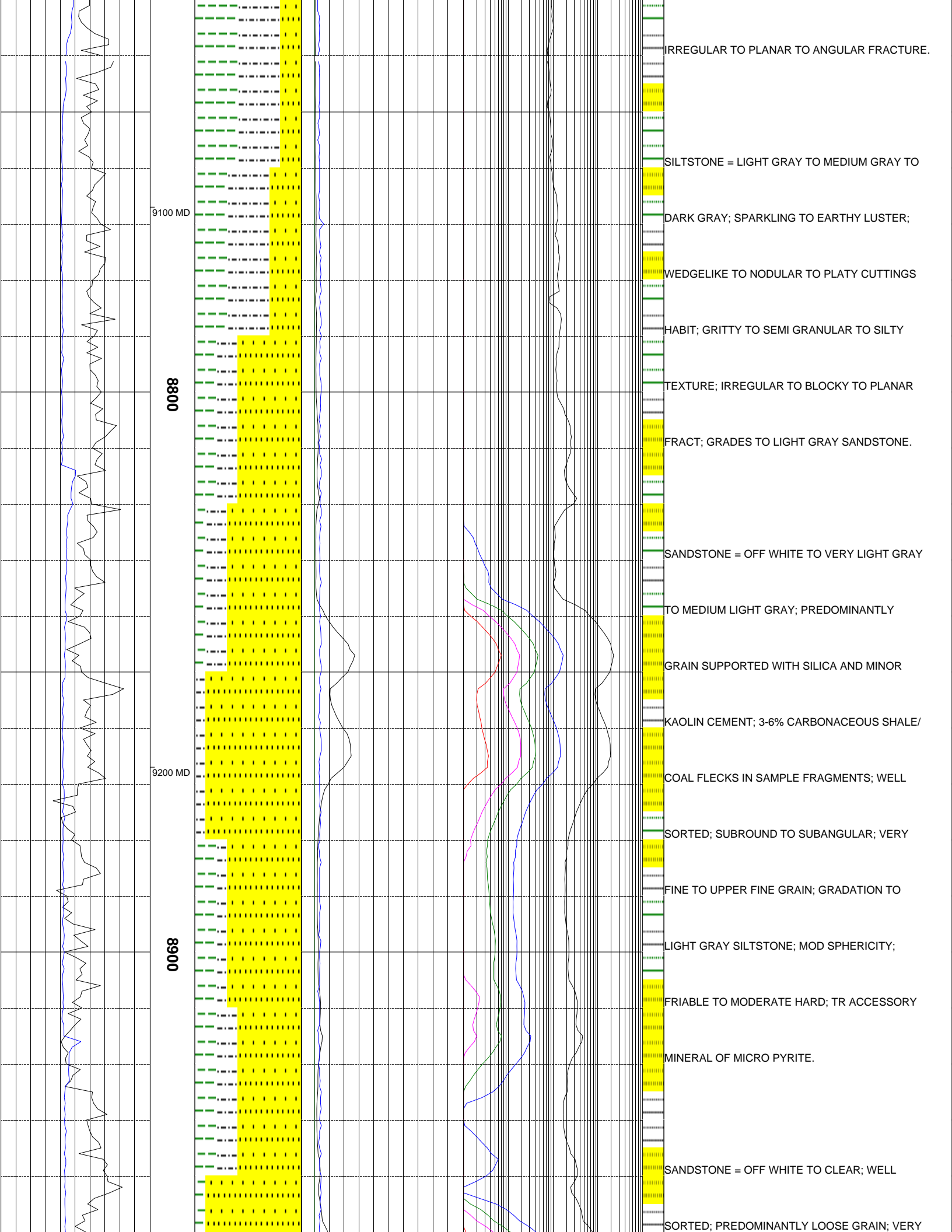
HABIT; EARTHY TO DULL TO GREASY LUSTER;

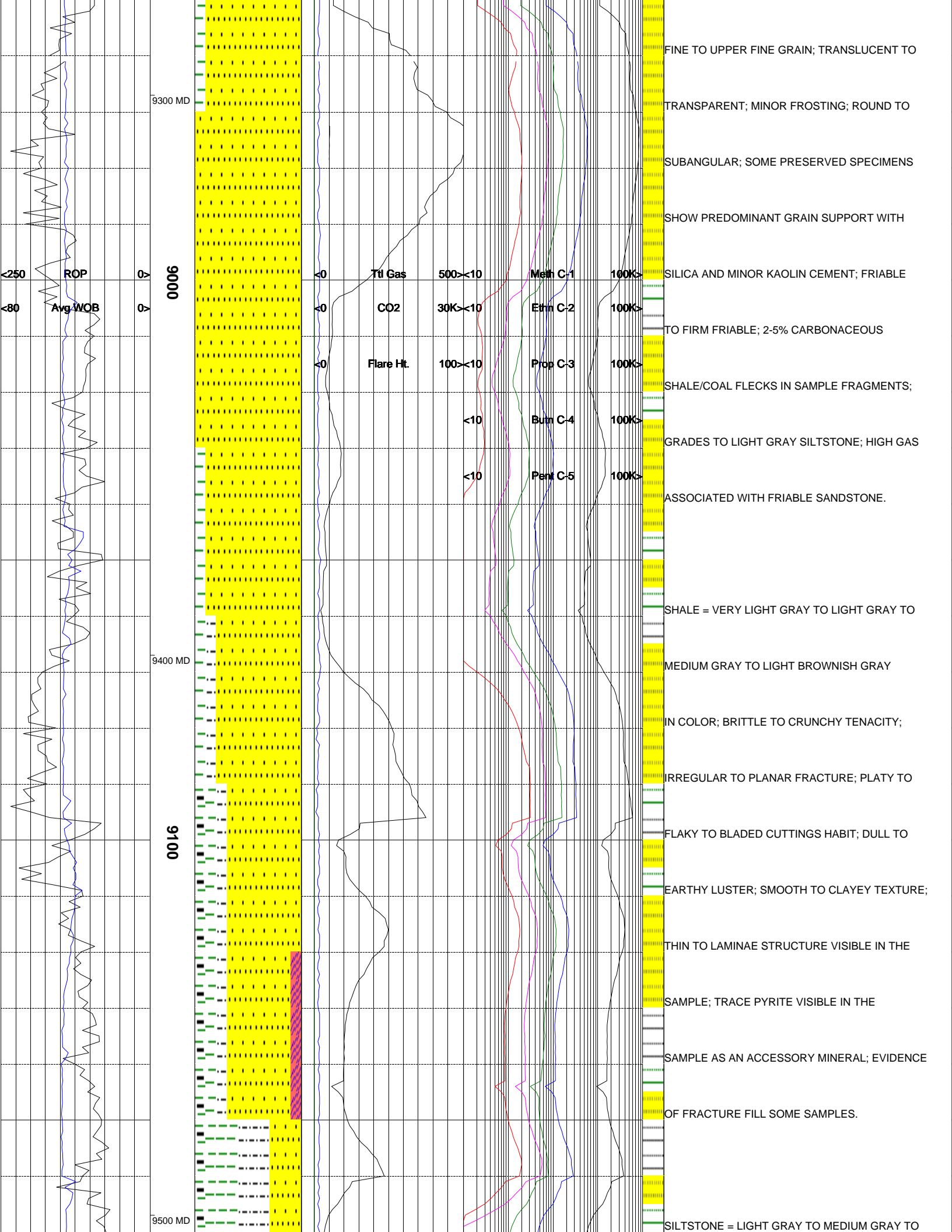
SILTY TO GRITTY TEXTURE; THIN BEDDING

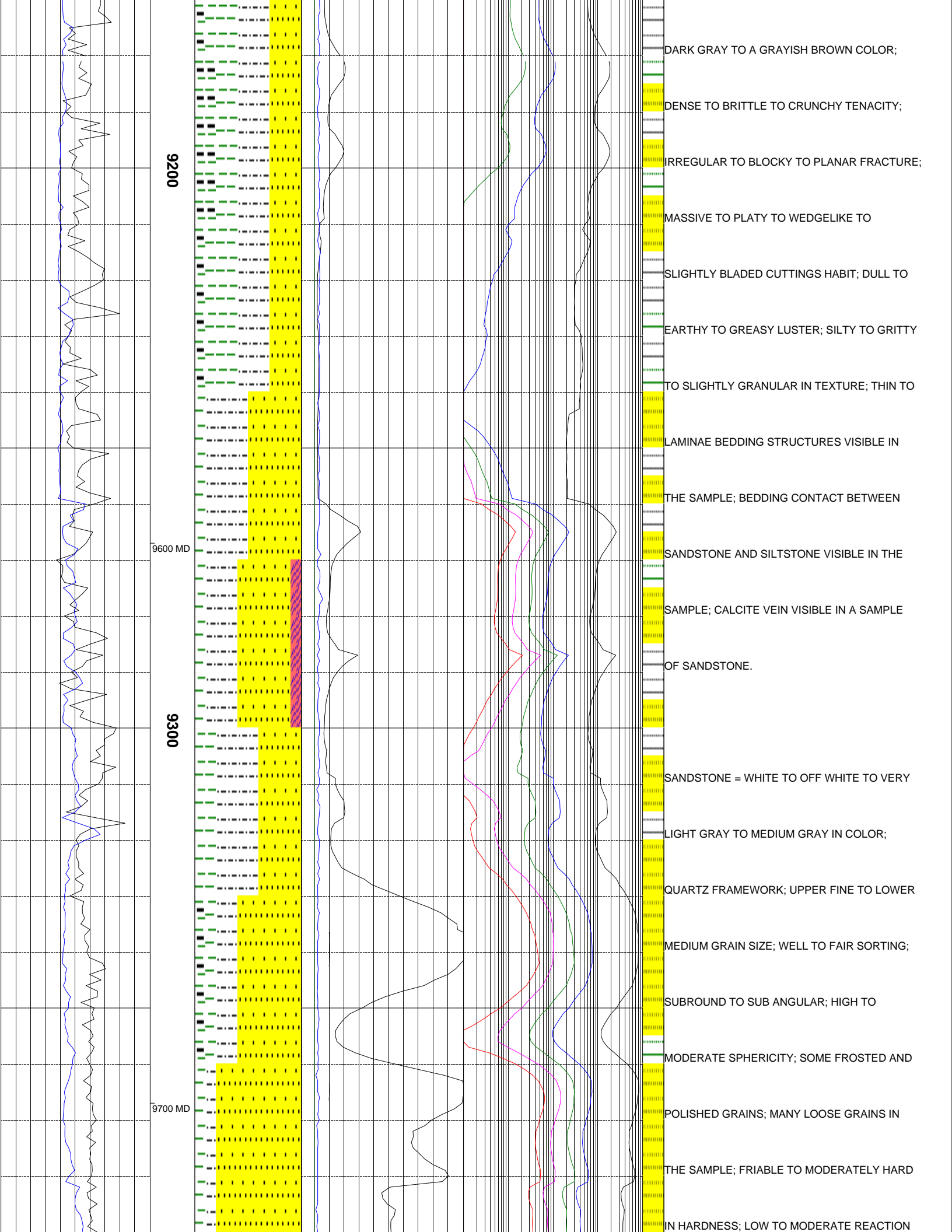
STRUCTURES VISIBLE IN THE SAMPLE; PYRITE











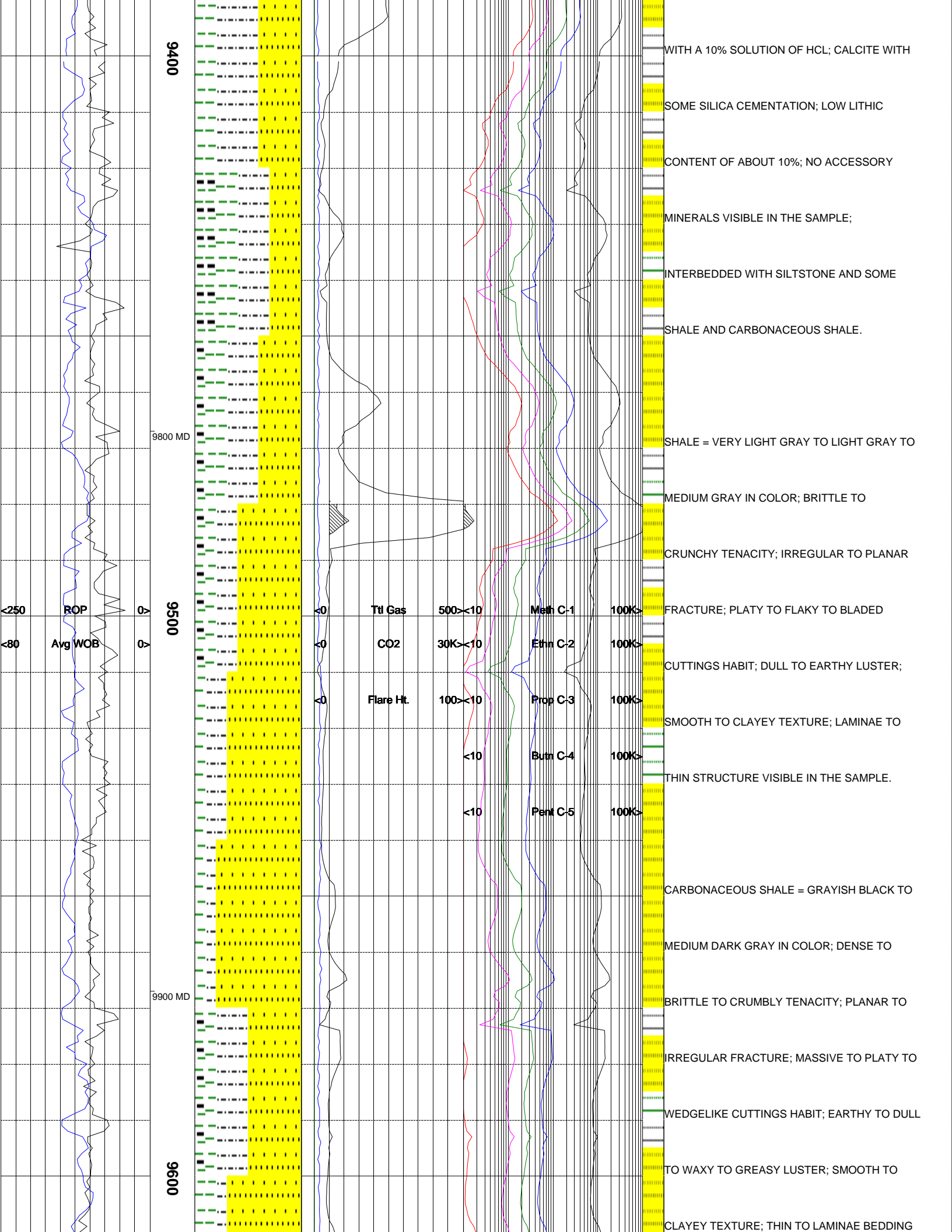
9200

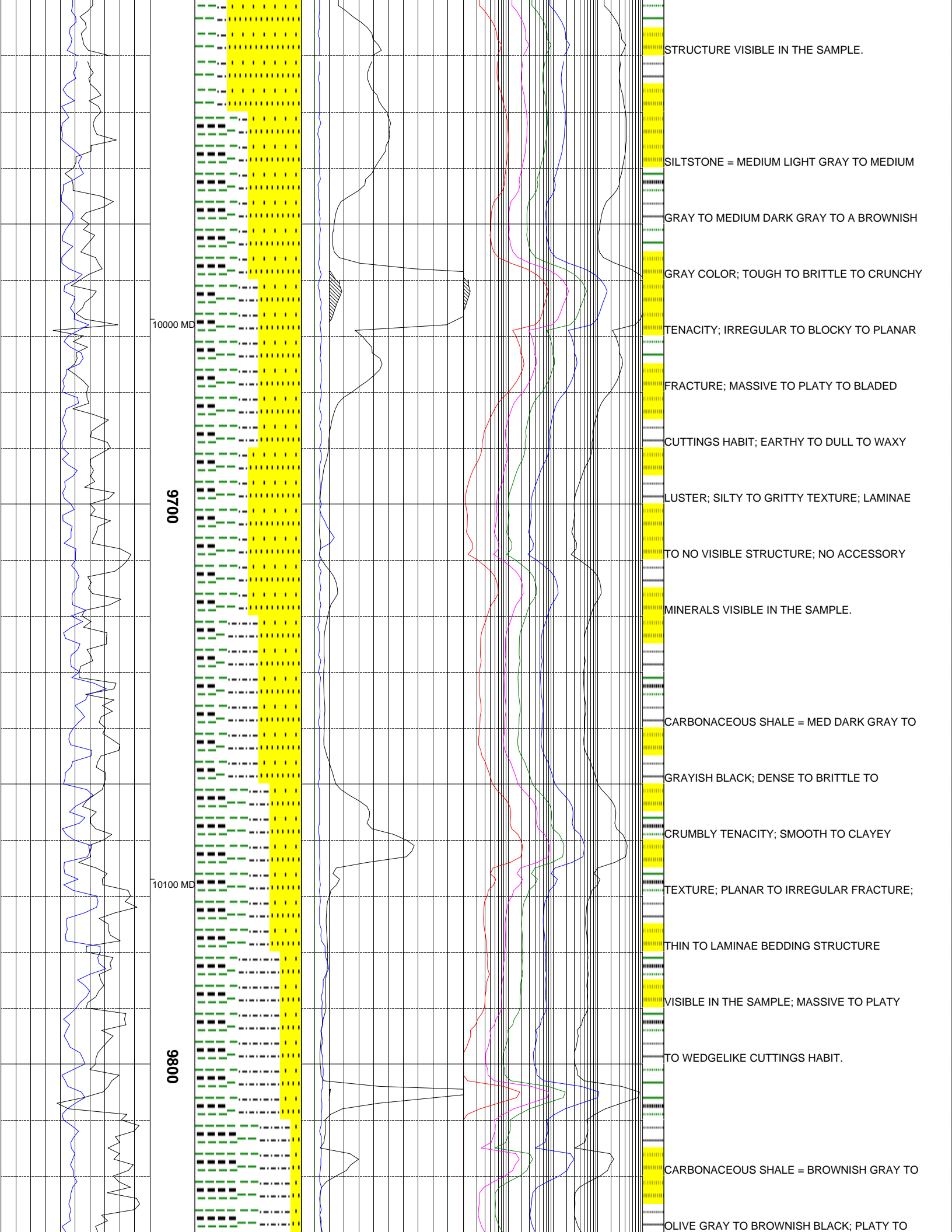
9600 MD

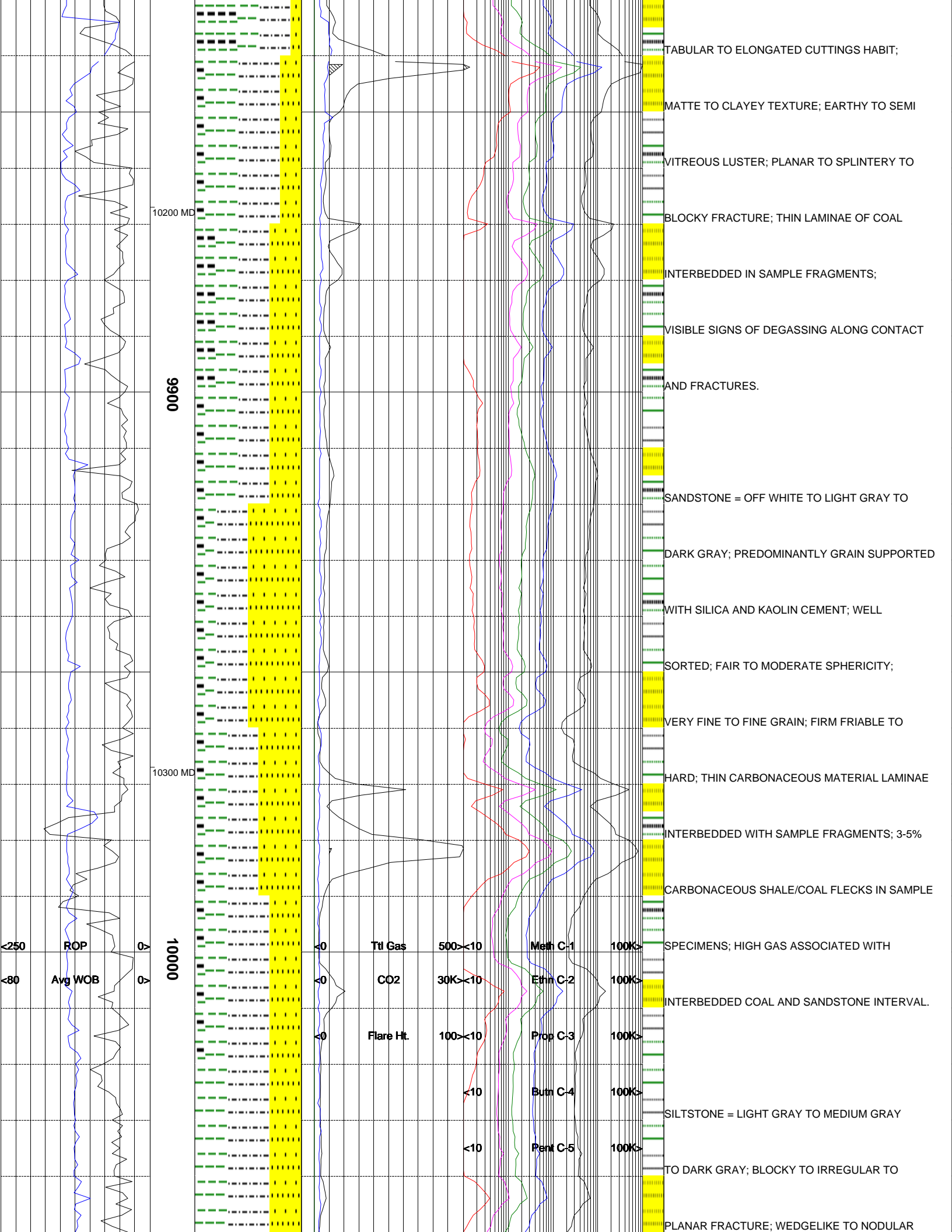
9300

9700 MD

DARK GRAY TO A GRAYISH BROWN COLOR;
 DENSE TO BRITTLE TO CRUNCHY TENACITY;
 IRREGULAR TO BLOCKY TO PLANAR FRACTURE;
 MASSIVE TO PLATY TO WEDGELIKE TO
 SLIGHTLY BLADED CUTTINGS HABIT; DULL TO
 EARTHY TO GREASY LUSTER; SILTY TO GRITTY
 TO SLIGHTLY GRANULAR IN TEXTURE; THIN TO
 LAMINAE BEDDING STRUCTURES VISIBLE IN
 THE SAMPLE; BEDDING CONTACT BETWEEN
 SANDSTONE AND SILTSTONE VISIBLE IN THE
 SAMPLE; CALCITE VEIN VISIBLE IN A SAMPLE
 OF SANDSTONE.
 SANDSTONE = WHITE TO OFF WHITE TO VERY
 LIGHT GRAY TO MEDIUM GRAY IN COLOR;
 QUARTZ FRAMEWORK; UPPER FINE TO LOWER
 MEDIUM GRAIN SIZE; WELL TO FAIR SORTING;
 SUBROUND TO SUB ANGULAR; HIGH TO
 MODERATE SPHERICITY; SOME FROSTED AND
 POLISHED GRAINS; MANY LOOSE GRAINS IN
 THE SAMPLE; FRIABLE TO MODERATELY HARD
 IN HARDNESS; LOW TO MODERATE REACTION







10200 MD

9900

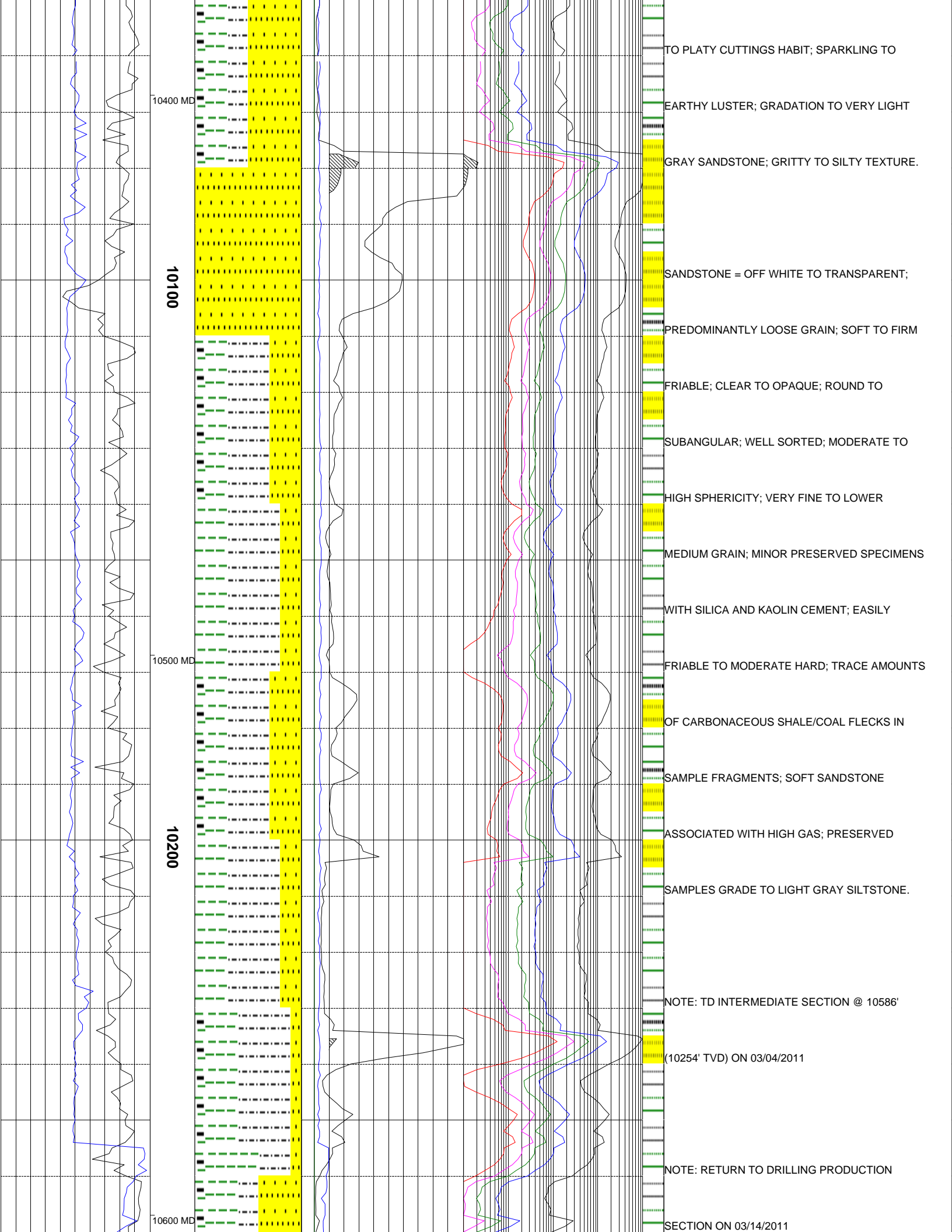
10300 MD

10000

<250 ROP
<80 Avg WOB

<0 Ttl Gas 500 > <10 Meth C-1 100K >
<0 CO2 30K > <10 Ethn C-2 100K >
<0 Flare Ht. 100 > <10 Prop C-3 100K >
<10 Butn C-4 100K >
<10 Pent C-5 100K >

TABULAR TO ELONGATED CUTTINGS HABIT;
 MATTE TO CLAYEY TEXTURE; EARTHY TO SEMI
 VITREOUS LUSTER; PLANAR TO SPLINTERY TO
 BLOCKY FRACTURE; THIN LAMINAE OF COAL
 INTERBEDDED IN SAMPLE FRAGMENTS;
 VISIBLE SIGNS OF DEGASSING ALONG CONTACT
 AND FRACTURES.
 SANDSTONE = OFF WHITE TO LIGHT GRAY TO
 DARK GRAY; PREDOMINANTLY GRAIN SUPPORTED
 WITH SILICA AND KAOLIN CEMENT; WELL
 SORTED; FAIR TO MODERATE SPHERICITY;
 VERY FINE TO FINE GRAIN; FIRM FRIABLE TO
 HARD; THIN CARBONACEOUS MATERIAL LAMINAE
 INTERBEDDED WITH SAMPLE FRAGMENTS; 3-5%
 CARBONACEOUS SHALE/COAL FLECKS IN SAMPLE
 SPECIMENS; HIGH GAS ASSOCIATED WITH
 INTERBEDDED COAL AND SANDSTONE INTERVAL.
 SILTSTONE = LIGHT GRAY TO MEDIUM GRAY
 TO DARK GRAY; BLOCKY TO IRREGULAR TO
 PLANAR FRACTURE; WEDGELIKE TO NODULAR



10400 MD

10100

10500 MD

10200

10600 MD

TO PLATY CUTTINGS HABIT; SPARKLING TO

EARTHY LUSTER; GRADATION TO VERY LIGHT

GRAY SANDSTONE; GRITTY TO SILTY TEXTURE.

SANDSTONE = OFF WHITE TO TRANSPARENT;

PREDOMINANTLY LOOSE GRAIN; SOFT TO FIRM

FRIABLE; CLEAR TO OPAQUE; ROUND TO

SUBANGULAR; WELL SORTED; MODERATE TO

HIGH SPHERICITY; VERY FINE TO LOWER

MEDIUM GRAIN; MINOR PRESERVED SPECIMENS

WITH SILICA AND KAOLIN CEMENT; EASILY

FRIABLE TO MODERATE HARD; TRACE AMOUNTS

OF CARBACEOUS SHALE/COAL FLECKS IN

SAMPLE FRAGMENTS; SOFT SANDSTONE

ASSOCIATED WITH HIGH GAS; PRESERVED

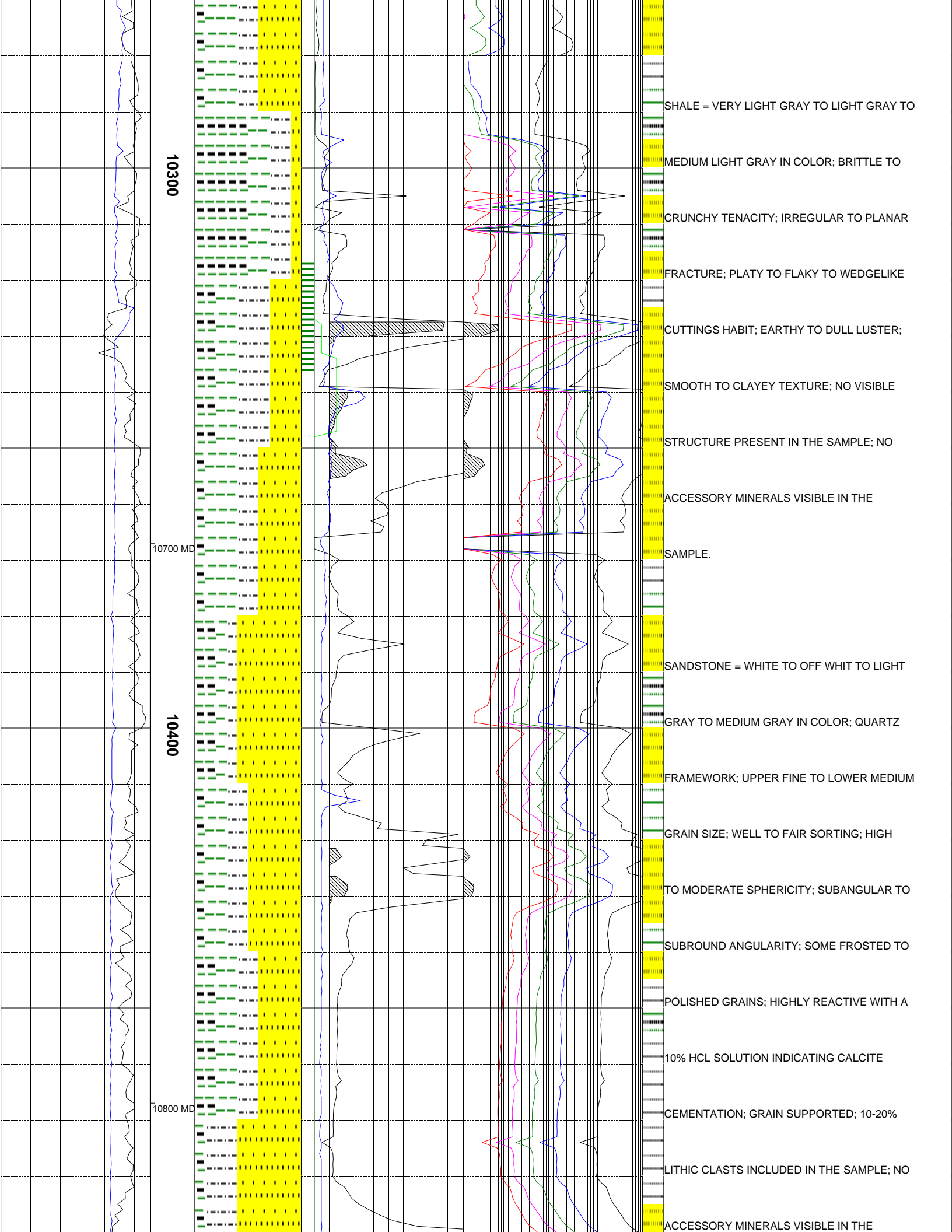
SAMPLES GRADE TO LIGHT GRAY SILTSTONE.

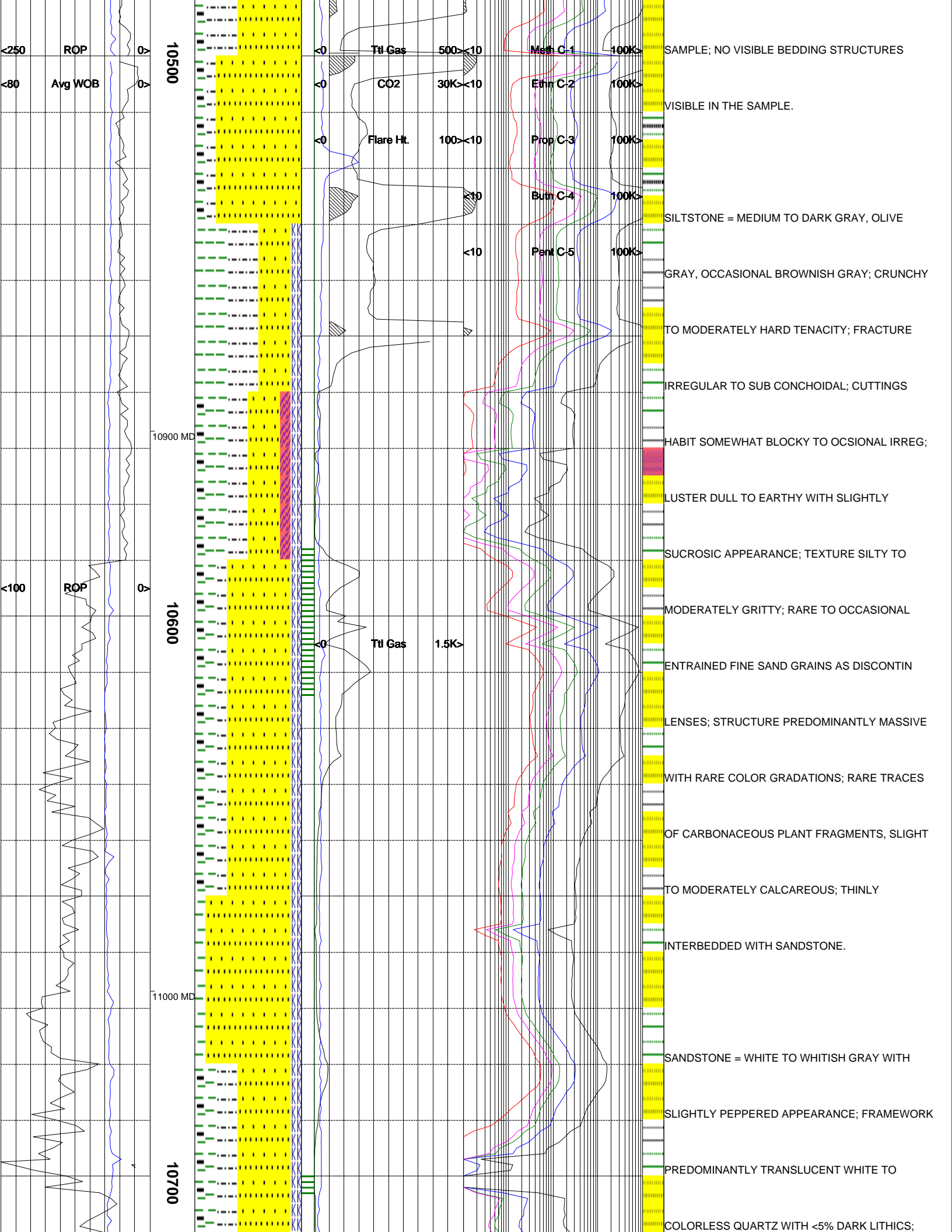
NOTE: TD INTERMEDIATE SECTION @ 10586'

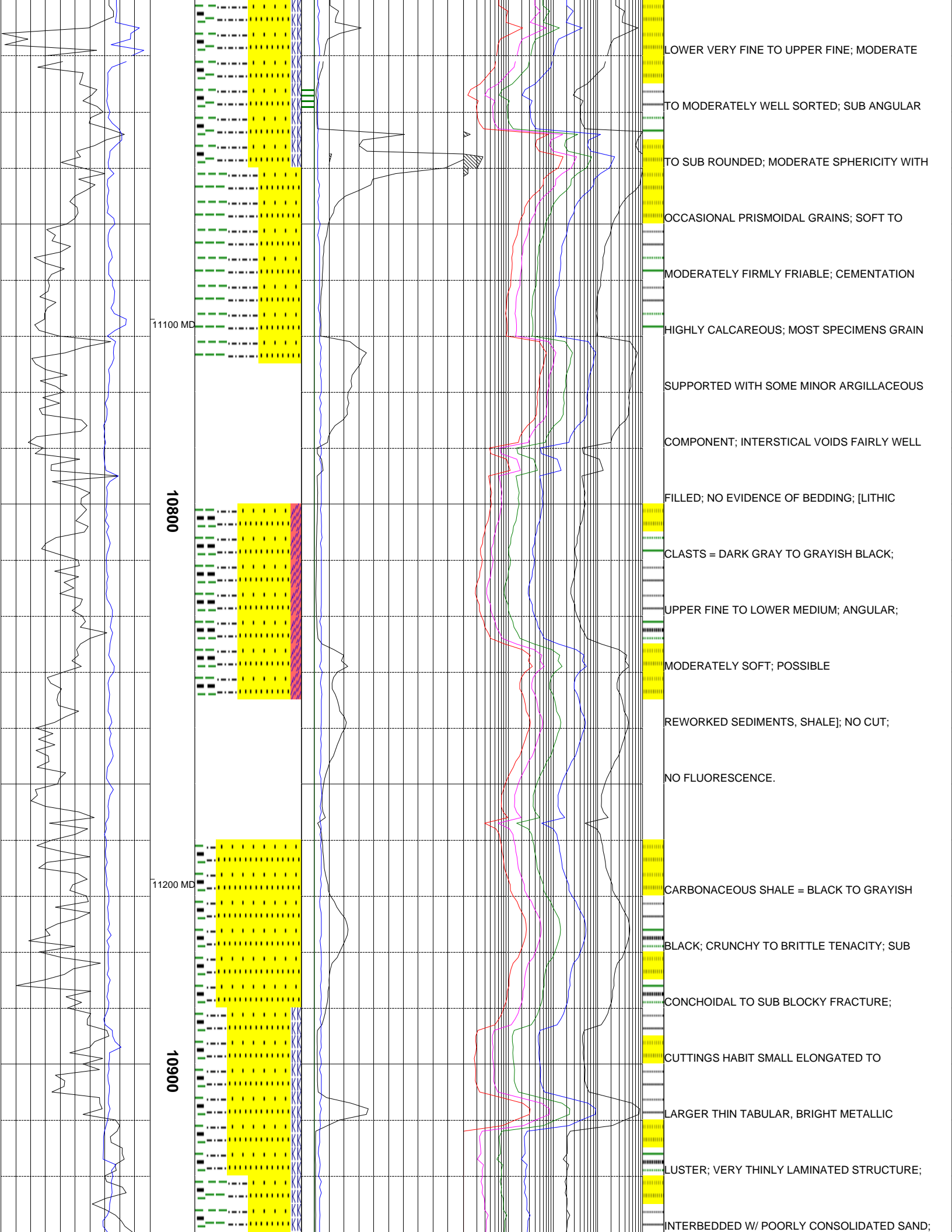
(10254' TVD) ON 03/04/2011

NOTE: RETURN TO DRILLING PRODUCTION

SECTION ON 03/14/2011







11100 MD

10800

11200 MD

10900

LOWER VERY FINE TO UPPER FINE; MODERATE

TO MODERATELY WELL SORTED; SUB ANGULAR

TO SUB ROUNDED; MODERATE SPHERICITY WITH

OCCASIONAL PRISMOIDAL GRAINS; SOFT TO

MODERATELY FIRMLY FRIABLE; CEMENTATION

HIGHLY CALCAREOUS; MOST SPECIMENS GRAIN

SUPPORTED WITH SOME MINOR ARGILLACEOUS

COMPONENT; INTERSTITIAL VOIDS FAIRLY WELL

FILLED; NO EVIDENCE OF BEDDING; [LITHIC

CLASTS = DARK GRAY TO GRAYISH BLACK;

UPPER FINE TO LOWER MEDIUM; ANGULAR;

MODERATELY SOFT; POSSIBLE

REWORKED SEDIMENTS, SHALE]; NO CUT;

NO FLUORESCENCE.

CARBONACEOUS SHALE = BLACK TO GRAYISH

BLACK; CRUNCHY TO BRITTLE TENACITY; SUB

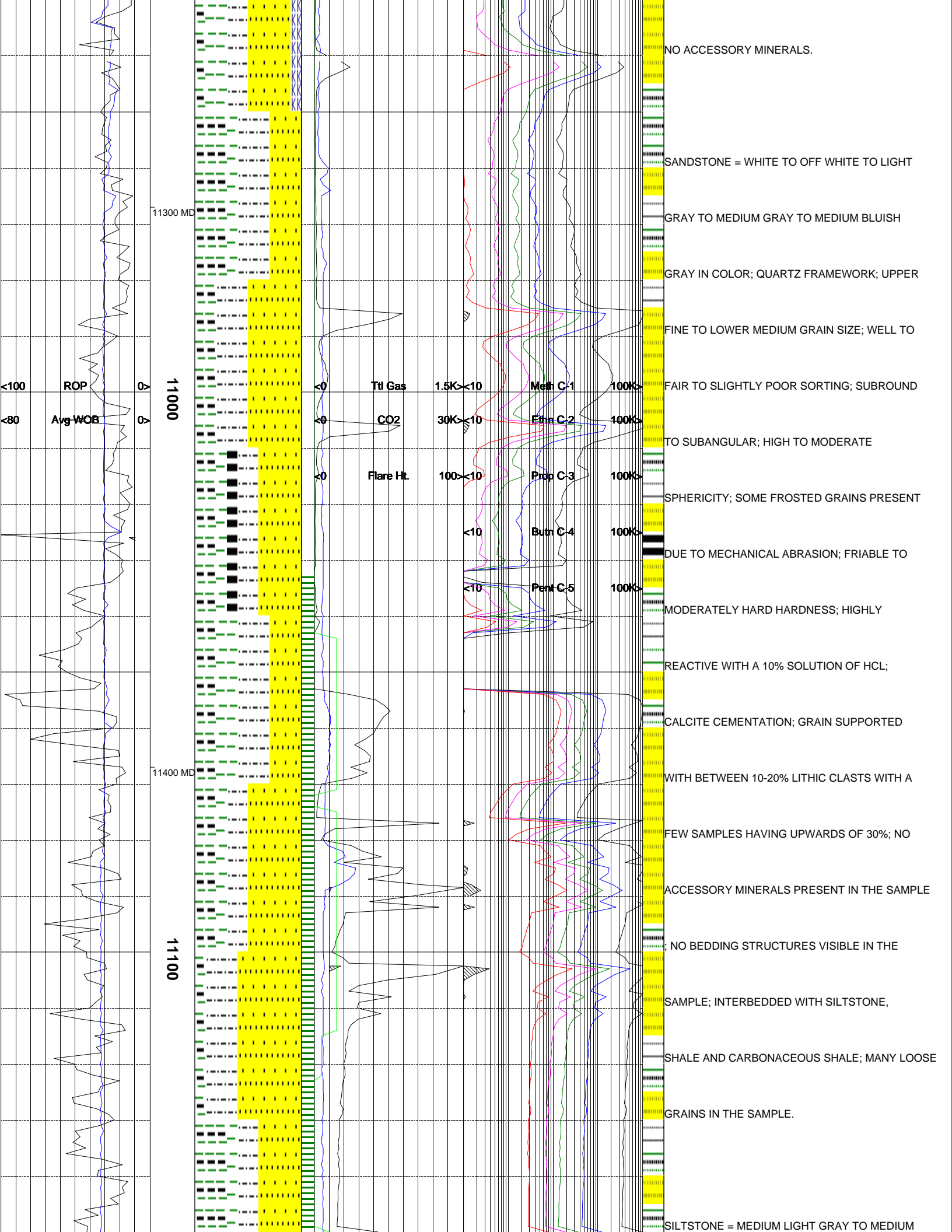
CONCHOIDAL TO SUB BLOCKY FRACTURE;

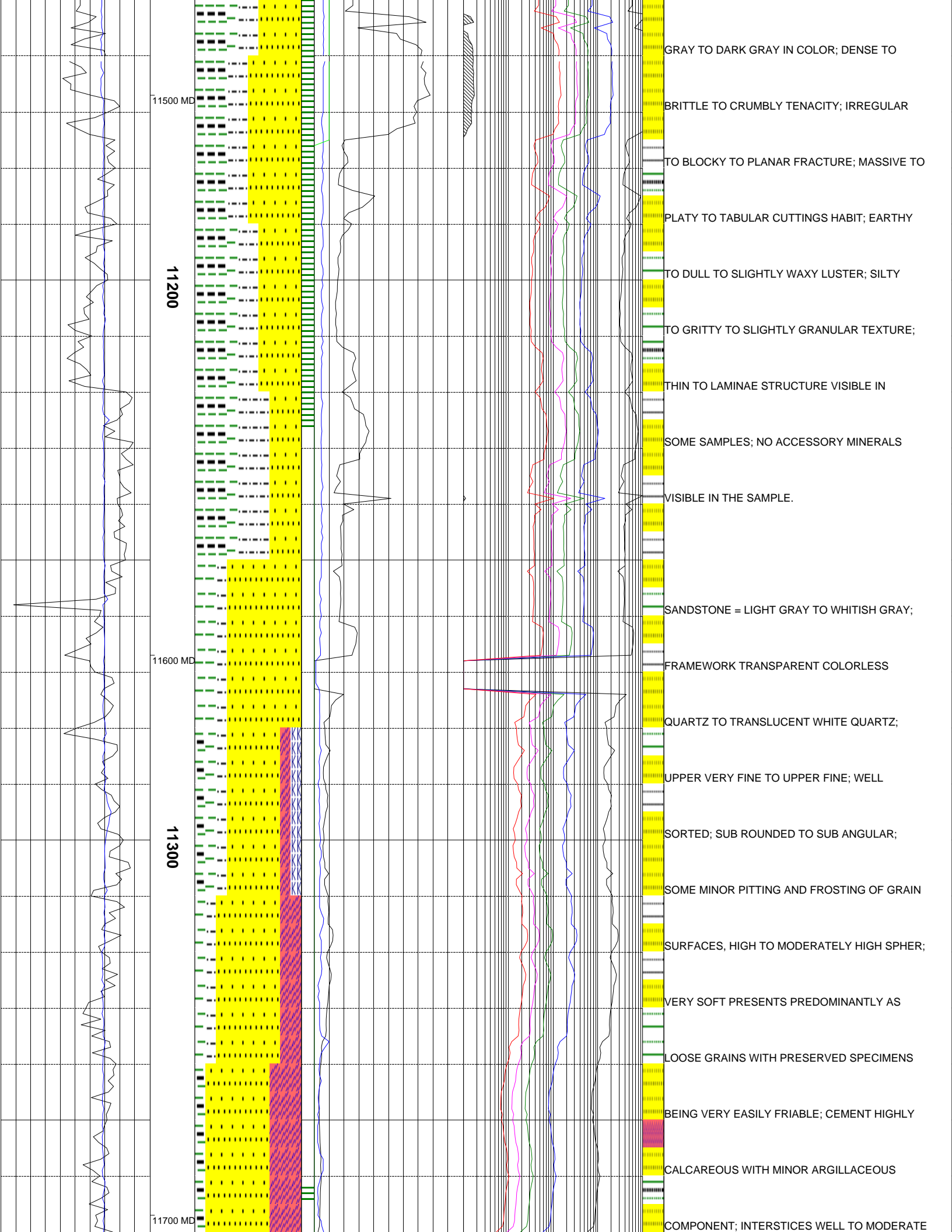
CUTTINGS HABIT SMALL ELONGATED TO

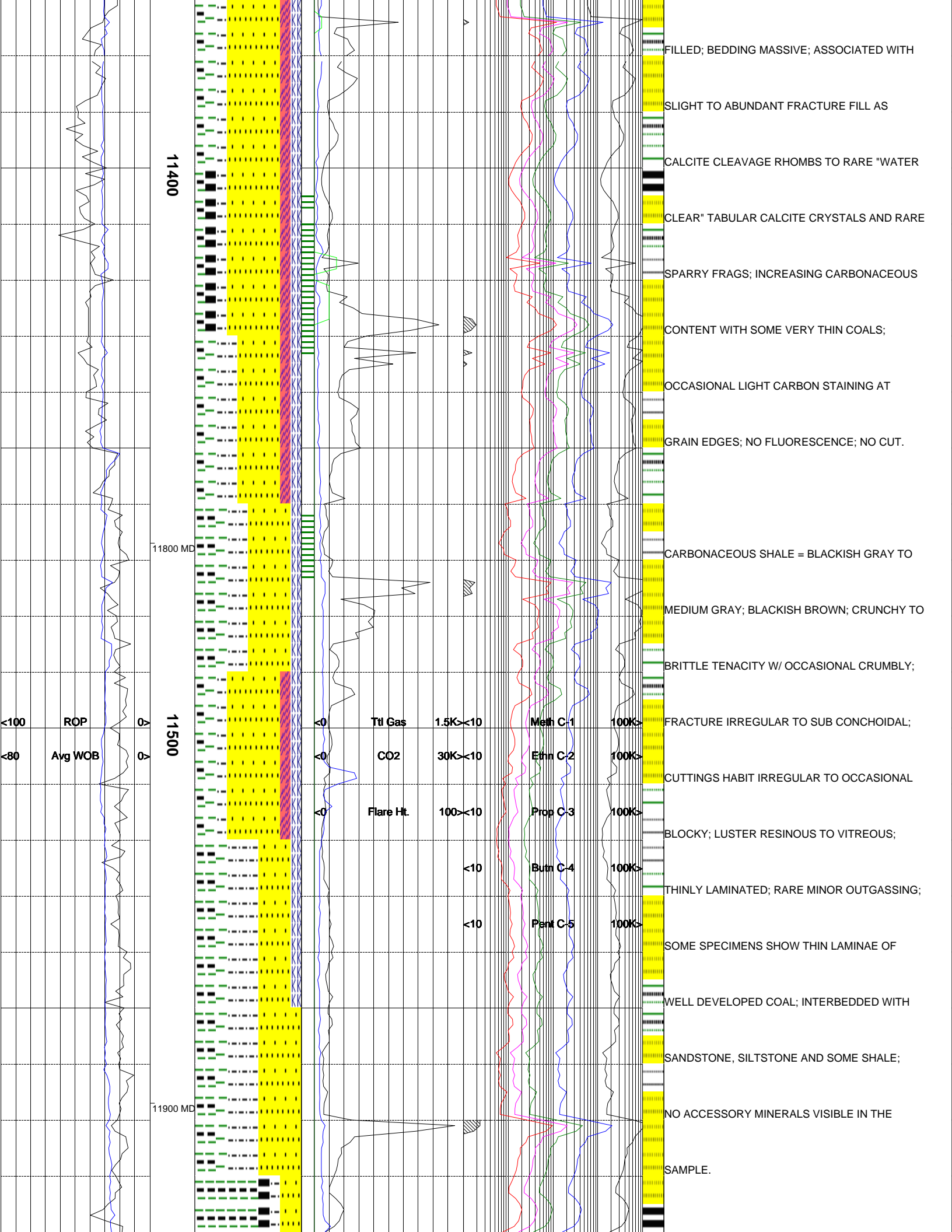
LARGER THIN TABULAR, BRIGHT METALLIC

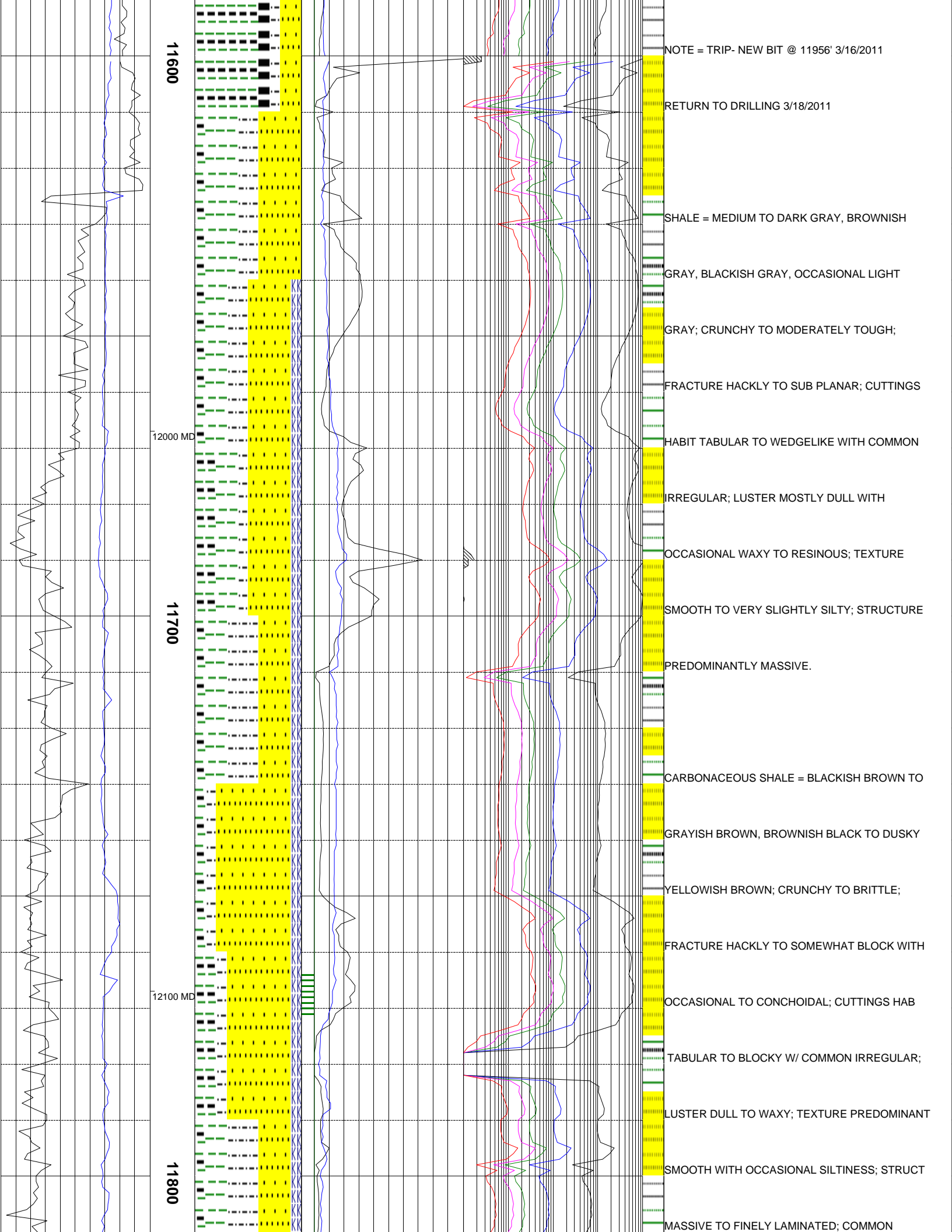
LUSTER; VERY THINLY LAMINATED STRUCTURE;

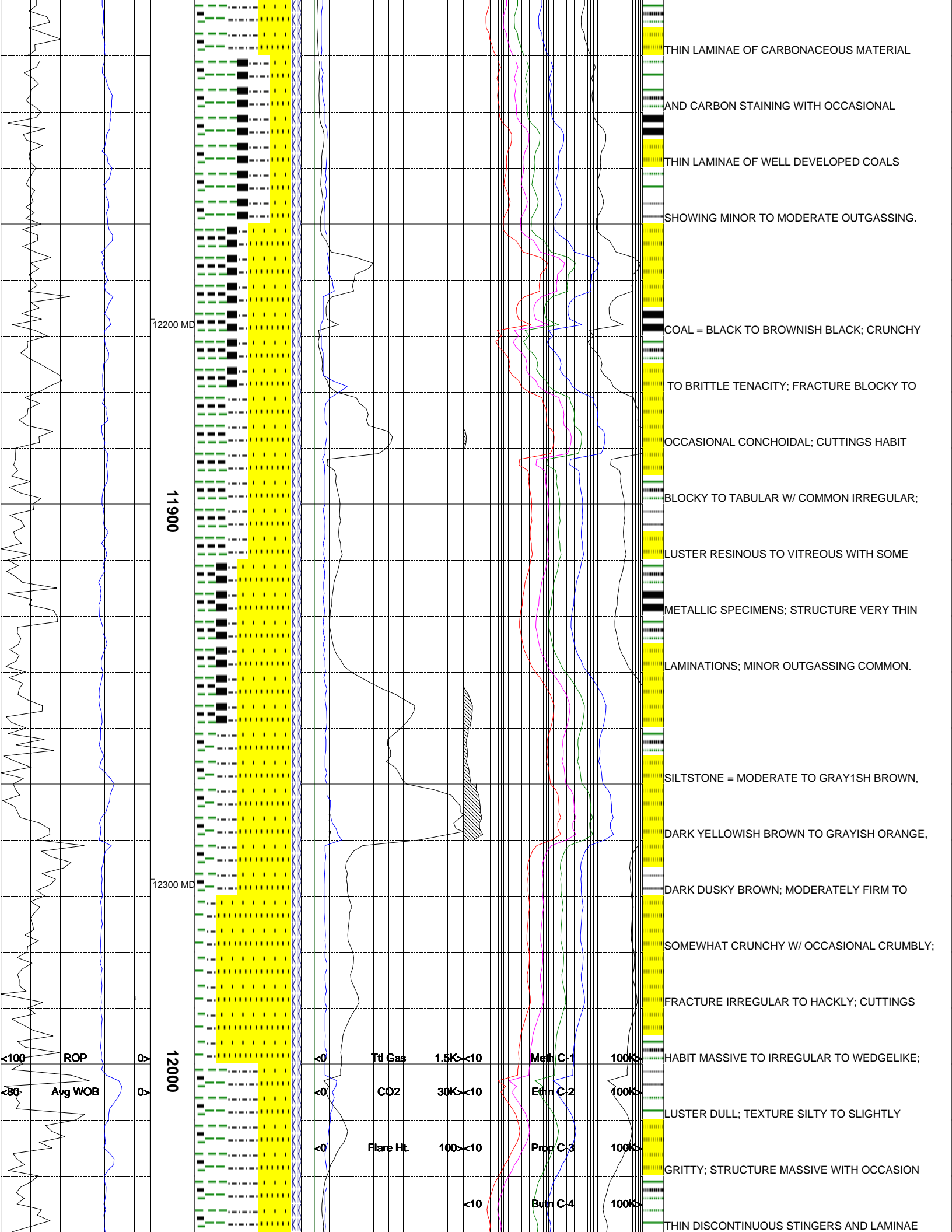
INTERBEDDED W/ POORLY CONSOLIDATED SAND;

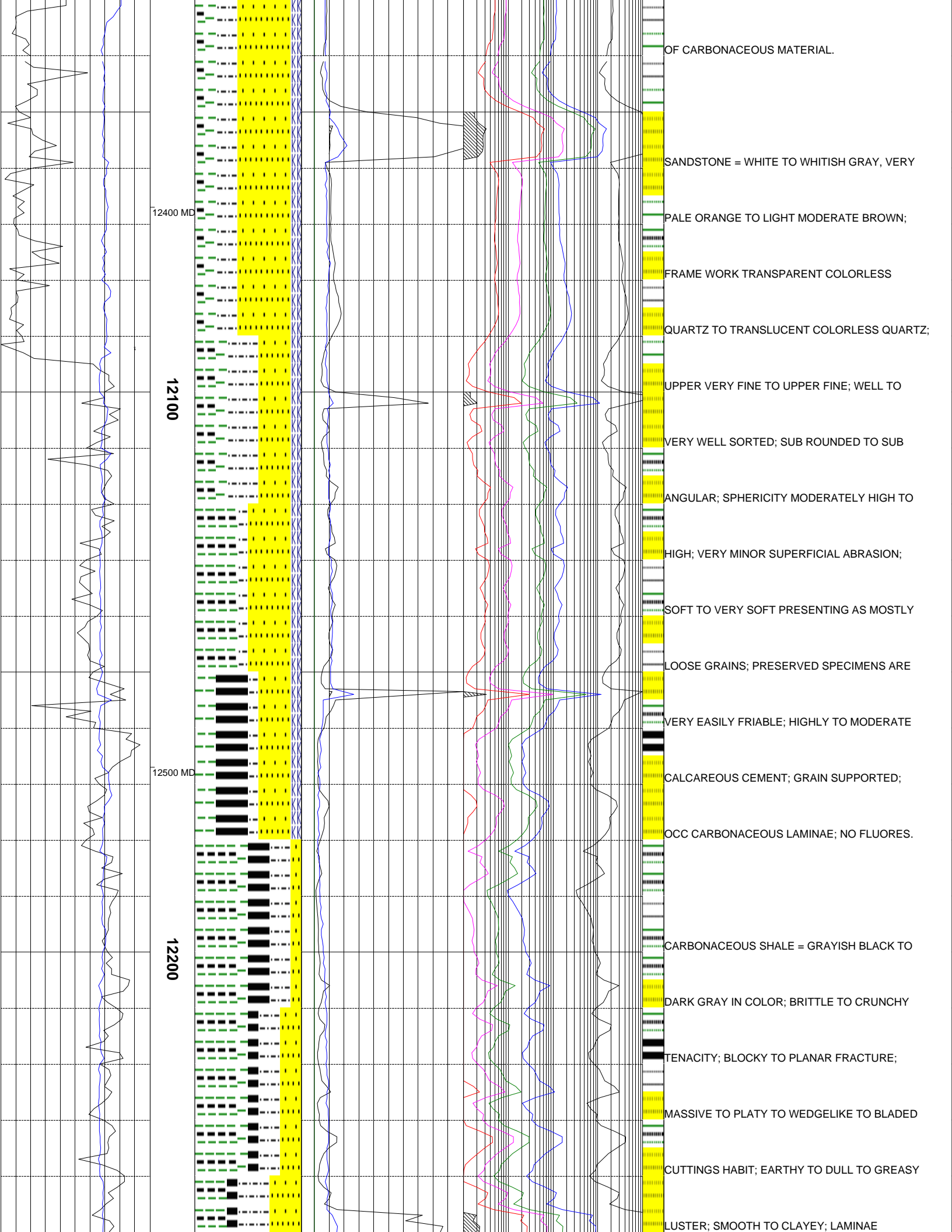


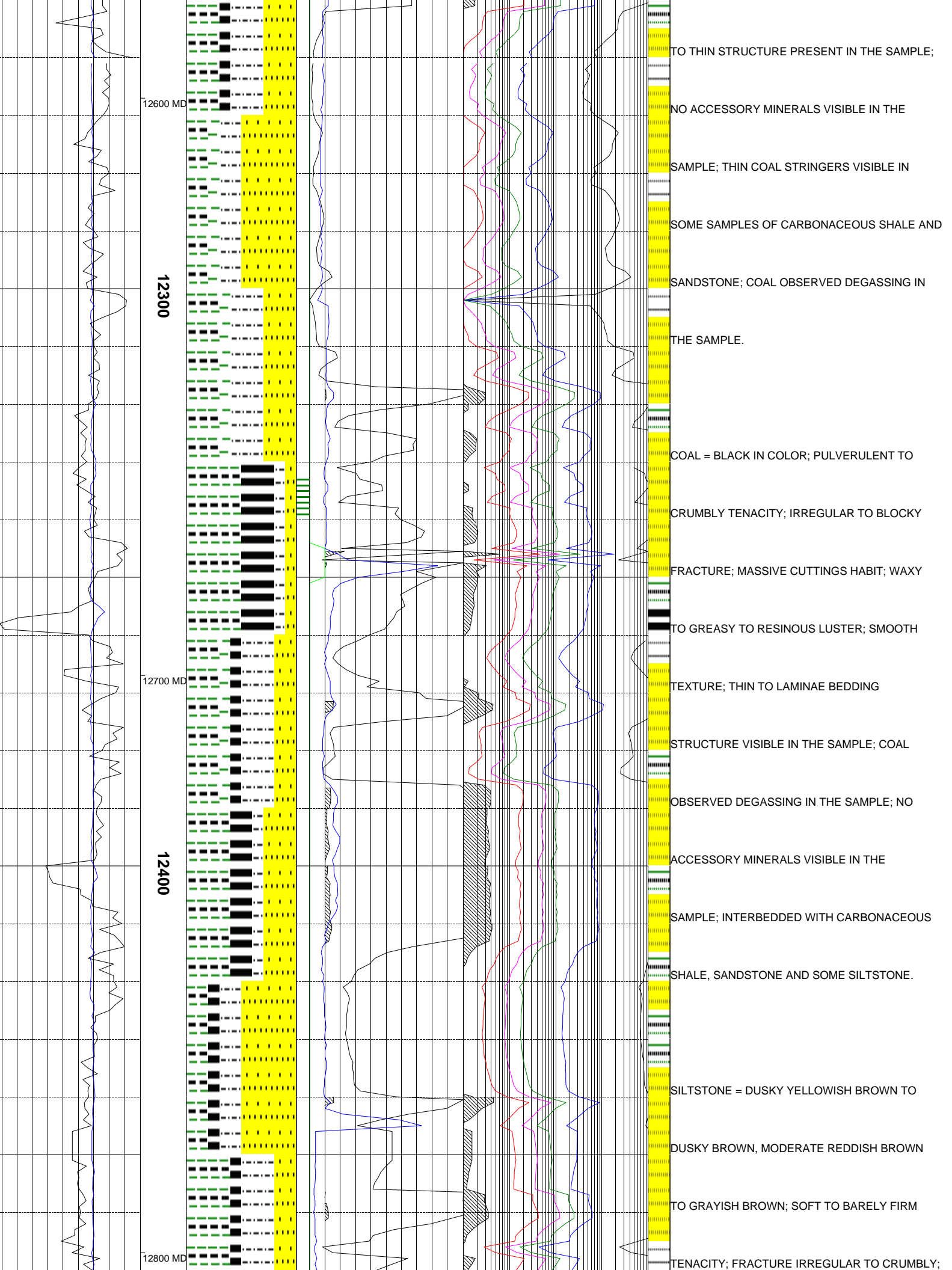












12600 MD

12300

12700 MD

12400

12800 MD

TO THIN STRUCTURE PRESENT IN THE SAMPLE;

NO ACCESSORY MINERALS VISIBLE IN THE

SAMPLE; THIN COAL STRINGERS VISIBLE IN

SOME SAMPLES OF CARBONACEOUS SHALE AND

SANDSTONE; COAL OBSERVED DEGASSING IN

THE SAMPLE.

COAL = BLACK IN COLOR; PULVERULENT TO

CRUMBLY TENACITY; IRREGULAR TO BLOCKY

FRACTURE; MASSIVE CUTTINGS HABIT; WAXY

TO GREASY TO RESINOUS LUSTER; SMOOTH

TEXTURE; THIN TO LAMINAE BEDDING

STRUCTURE VISIBLE IN THE SAMPLE; COAL

OBSERVED DEGASSING IN THE SAMPLE; NO

ACCESSORY MINERALS VISIBLE IN THE

SAMPLE; INTERBEDDED WITH CARBONACEOUS

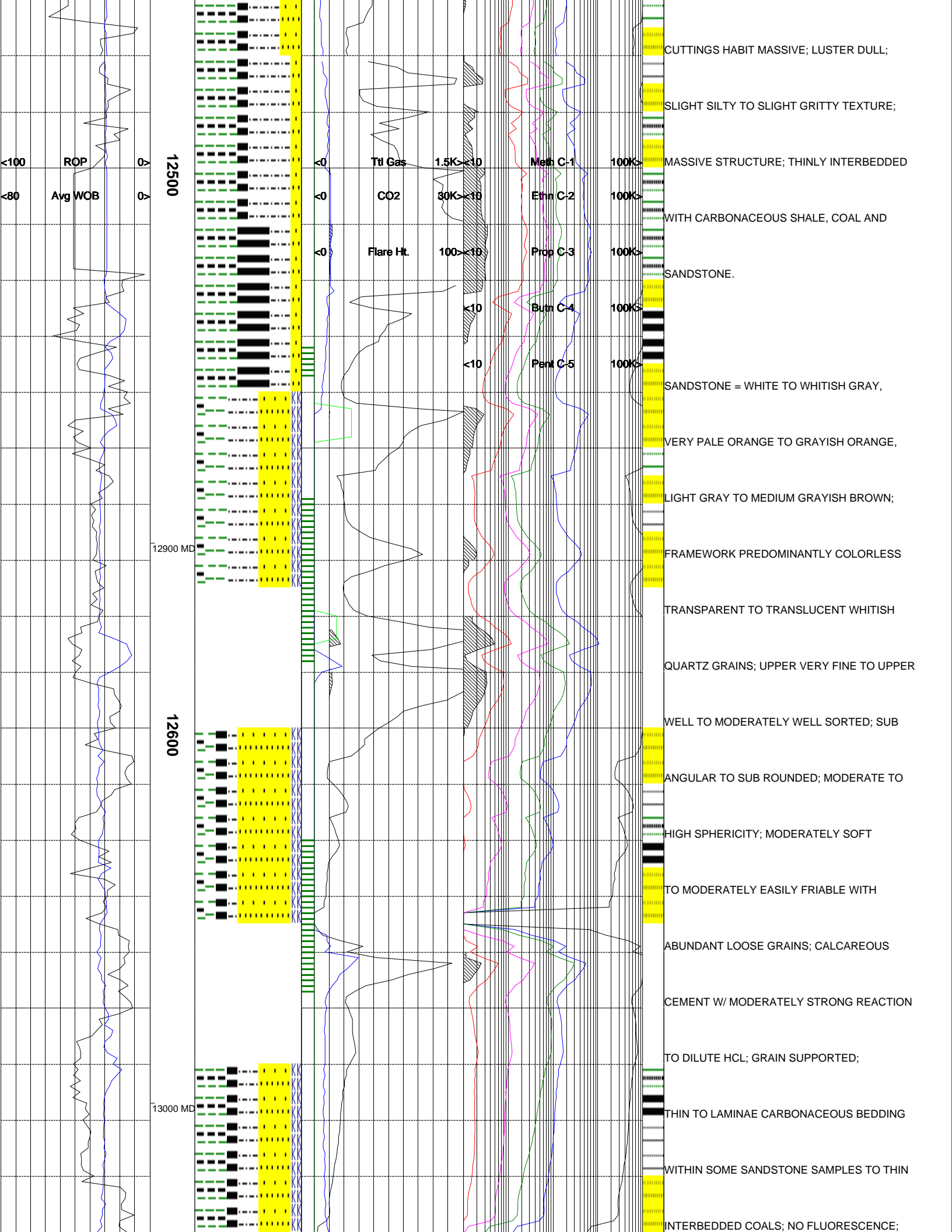
SHALE, SANDSTONE AND SOME SILTSTONE.

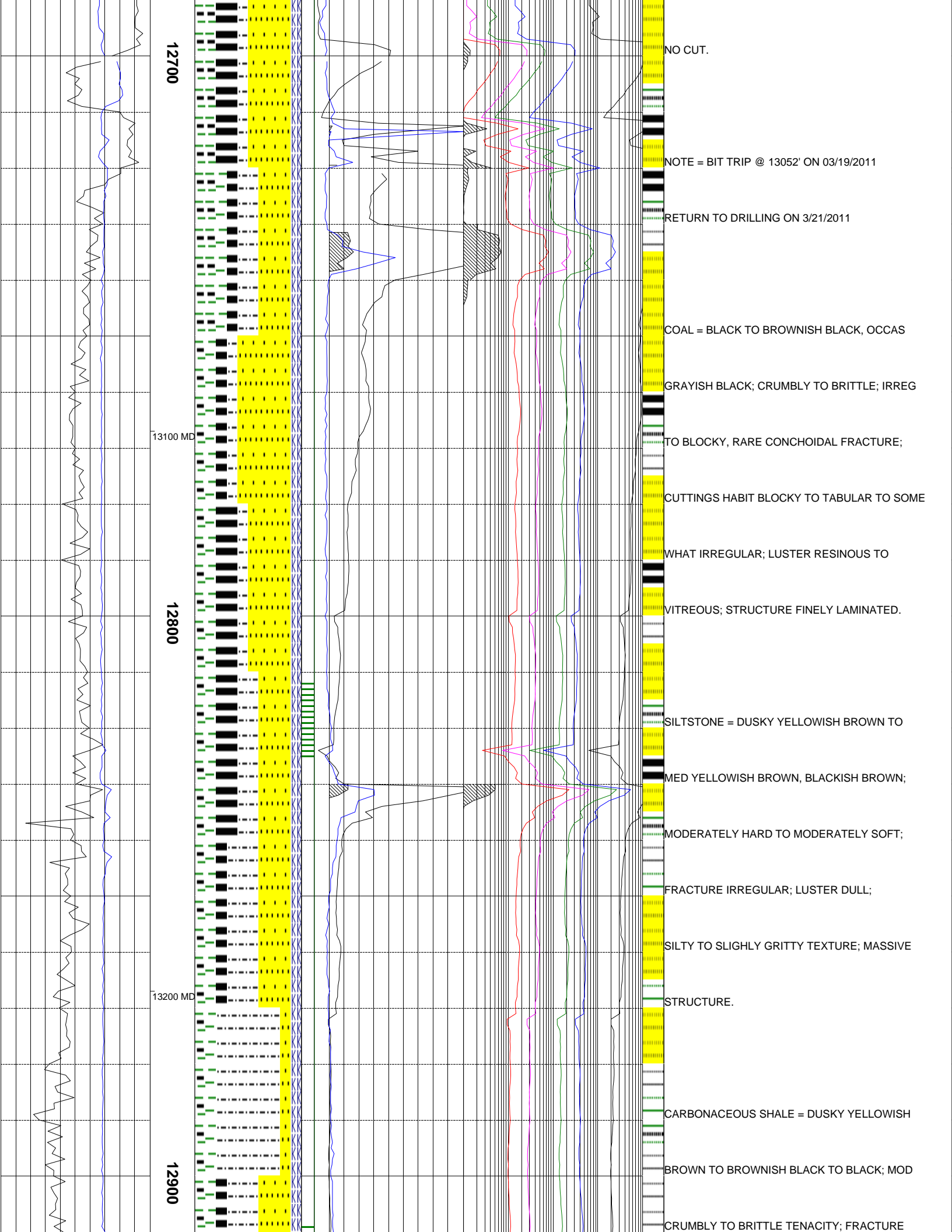
SILTSTONE = DUSKY YELLOWISH BROWN TO

DUSKY BROWN, MODERATE REDDISH BROWN

TO GRAYISH BROWN; SOFT TO BARELY FIRM

TENACITY; FRACTURE IRREGULAR TO CRUMBLY;





12700

NO CUT.

NOTE = BIT TRIP @ 13052' ON 03/19/2011

RETURN TO DRILLING ON 3/21/2011

COAL = BLACK TO BROWNISH BLACK, OCCAS

GRAYISH BLACK; CRUMBLY TO BRITTLE; IRREG

13100 MD

TO BLOCKY, RARE CONCHOIDAL FRACTURE;

CUTTINGS HABIT BLOCKY TO TABULAR TO SOME

WHAT IRREGULAR; LUSTER RESINOUS TO

12800

VITREOUS; STRUCTURE FINELY LAMINATED.

SILTSTONE = DUSKY YELLOWISH BROWN TO

MED YELLOWISH BROWN, BLACKISH BROWN;

MODERATELY HARD TO MODERATELY SOFT;

FRACTURE IRREGULAR; LUSTER DULL;

SILTY TO SLIGHTLY GRITTY TEXTURE; MASSIVE

13200 MD

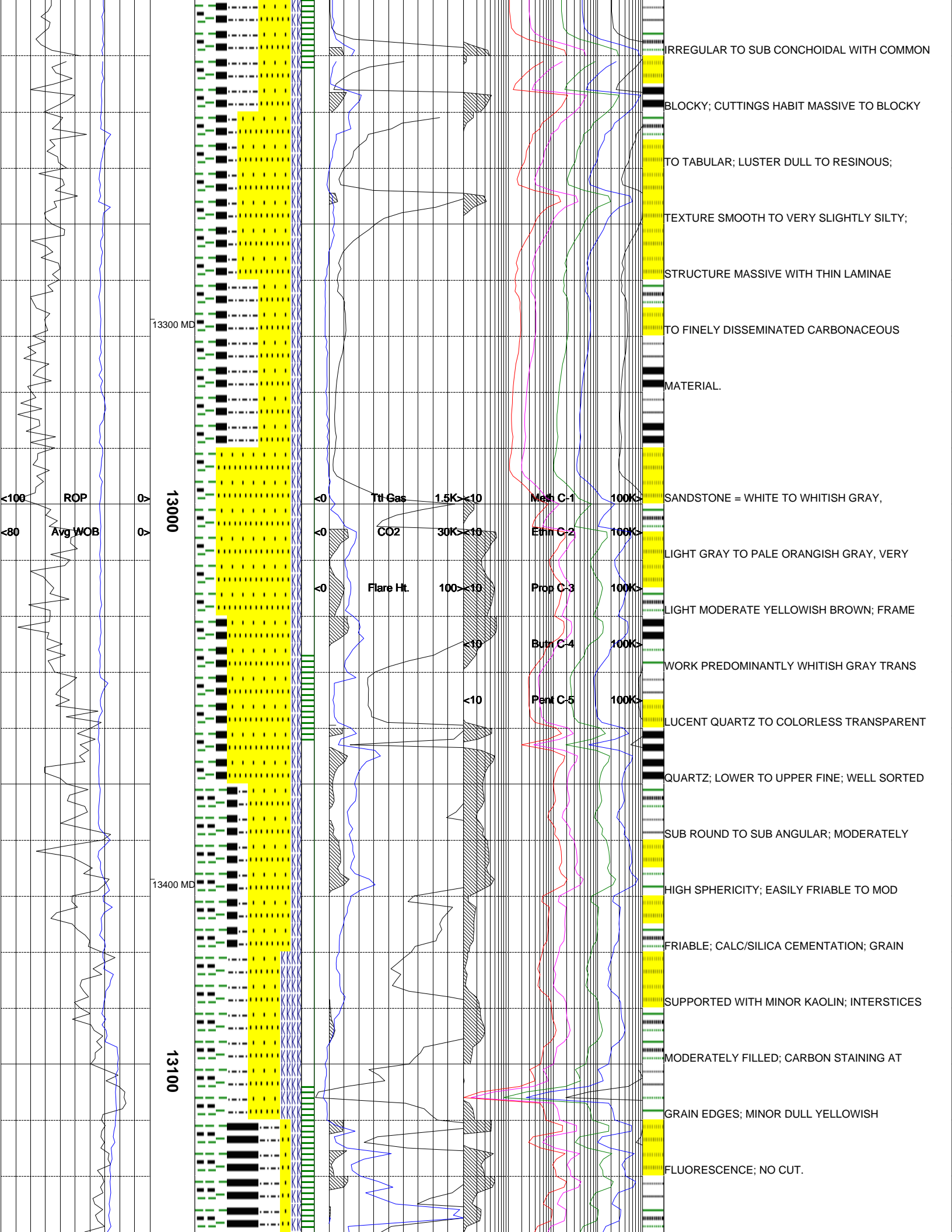
STRUCTURE.

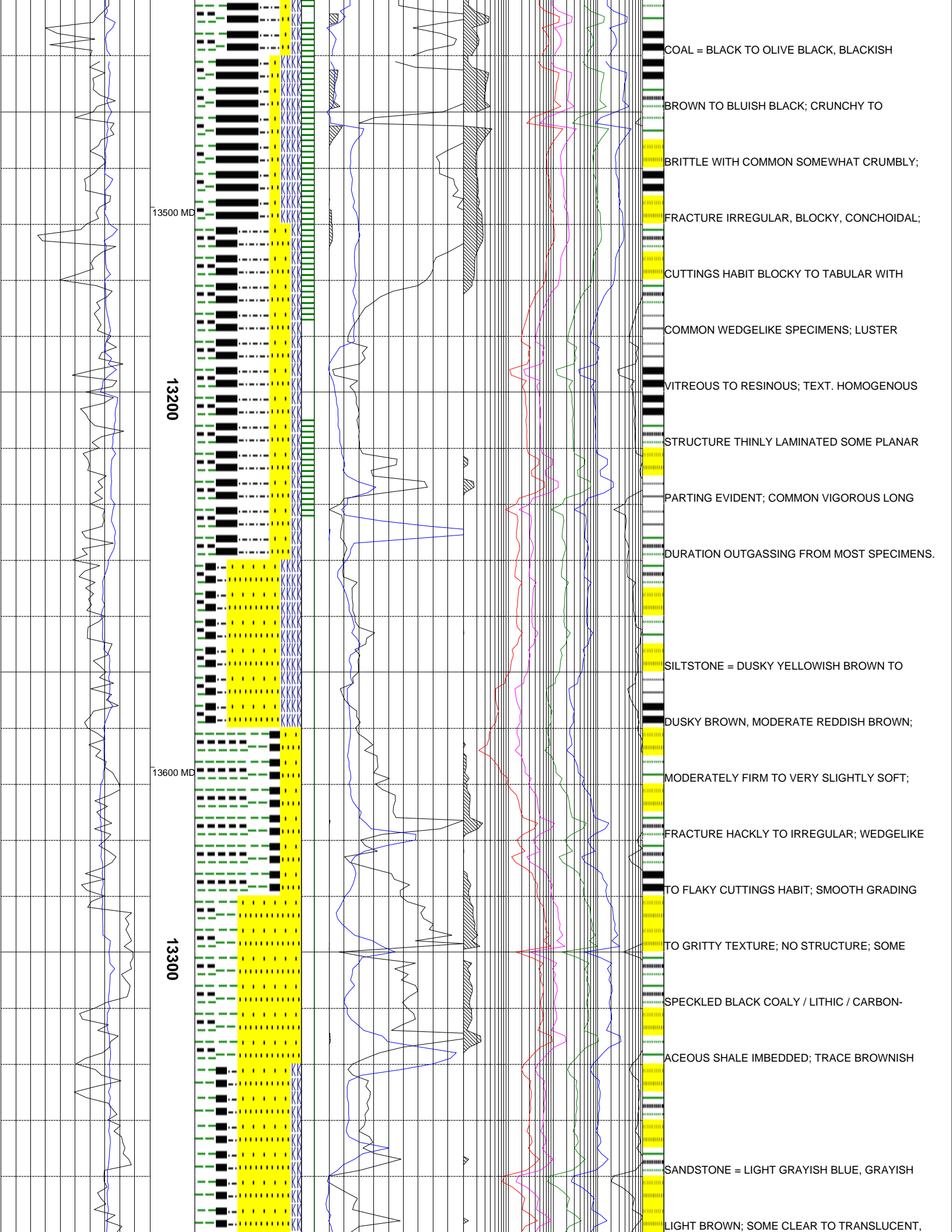
CARBONACEOUS SHALE = DUSKY YELLOWISH

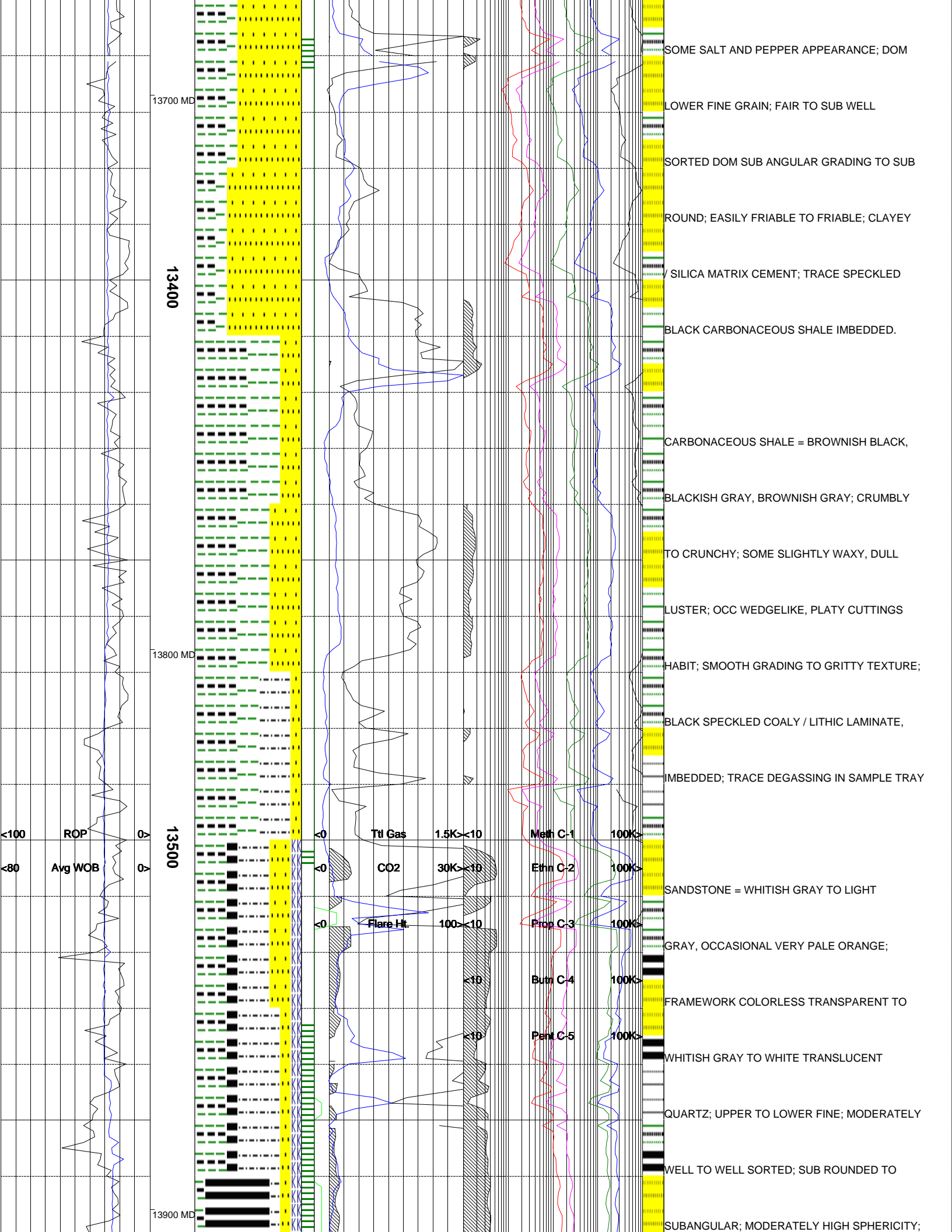
BROWN TO BROWNISH BLACK TO BLACK; MOD

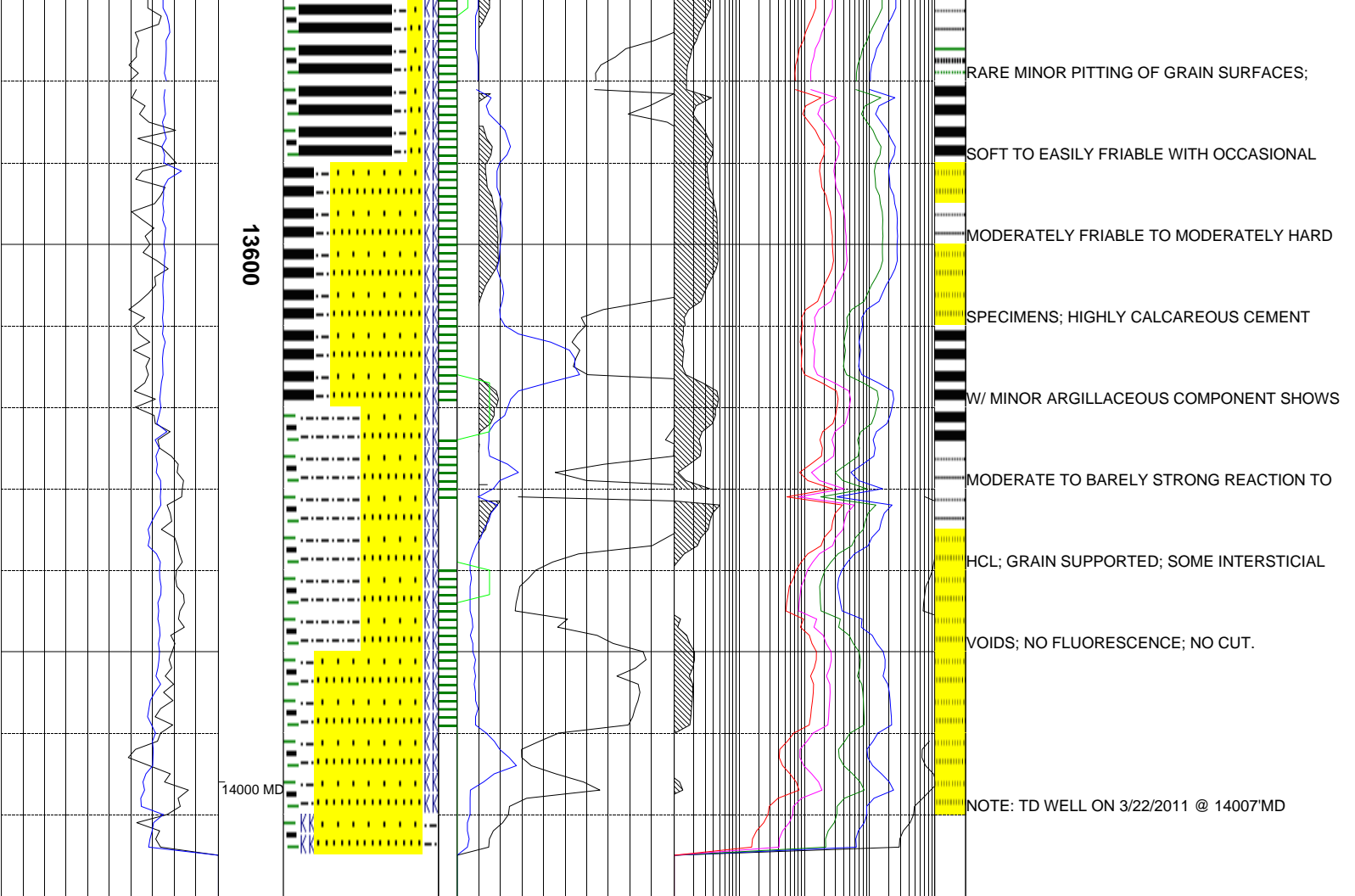
12900

CRUMBLY TO BRITTLE TENACITY; FRACTURE









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