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(281) 784-5500
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Anchorage, AK
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MUDLOG TVD

COMPANY ExxonMobil Production
WELL PCU 197-34A5
FIELD PICEANCE CREEK
REGION ROCKY MOUNTAIN
COORDINATES LAT: 39.918116
LONG: -108.27697
ELEVATION G.L.:6492.9'
RKB: 30.2'
COUNTY, STATE RIO BLANCO, CO
API INDEX 051031154000
SPUD DATE 5/27/2010
CONTRACTOR HELMRICH_PAYNE
CO. REP. JOSEPH THOMAS
RIG/TYPE 325/FLEX 4S
LOGGING UNIT MLU 048
GEOLOGISTS MARK GROSS
DONNA NEW
ADD. PERSONS JENN SELL
CO. GEOLOGIST MELISSA J. SAURBORN

LOG INTERVAL

CASING DATA

DEPTHS: 3644' TO 12633'
DATES: 05/27/2010 TO 08/24/2010
SCALE: 5" = 100'

10.75" AT 3624'
7" AT 8600'
AT
AT

MUD TYPES

HOLE SIZE

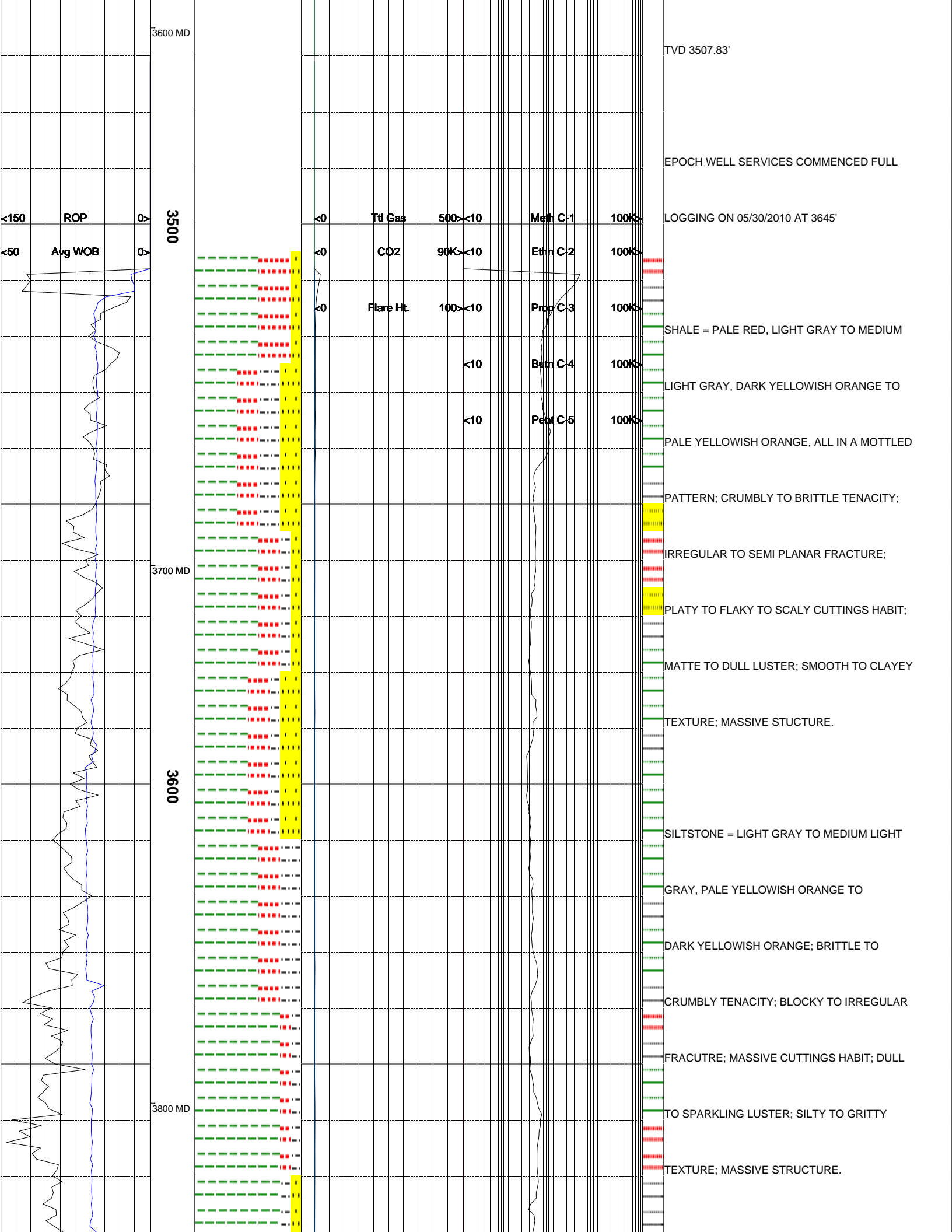
SPUD MUD TO 3644'
LSND TO 12633'
TO
TO

14.75" TO 3644'
9.875" TO 8655'
6.125" TO 12633'
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	



3600 MD

TVD 3507.83'

EPOCH WELL SERVICES COMMENCED FULL

3500

<150 ROP
<50 Avg WOB

<0 Ttl Gas 500<10 Meth C-1 100K<
<0 CO2 90K<10 Ethn C-2 100K<

LOGGING ON 05/30/2010 AT 3645'

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

SHALE = PALE RED, LIGHT GRAY TO MEDIUM

<10 Burn C-4 100K<

LIGHT GRAY, DARK YELLOWISH ORANGE TO

<10 Perm C-5 100K<

PALE YELLOWISH ORANGE, ALL IN A MOTTLED

PATTERN; CRUMBLY TO BRITTLE TENACITY;

IRREGULAR TO SEMI PLANAR FRACTURE;

3700 MD

PLATY TO FLAKY TO SCALY CUTTINGS HABIT;

MATTE TO DULL LUSTER; SMOOTH TO CLAYEY

TEXTURE; MASSIVE STRUCTURE.

3600

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT

GRAY, PALE YELLOWISH ORANGE TO

DARK YELLOWISH ORANGE; BRITTLE TO

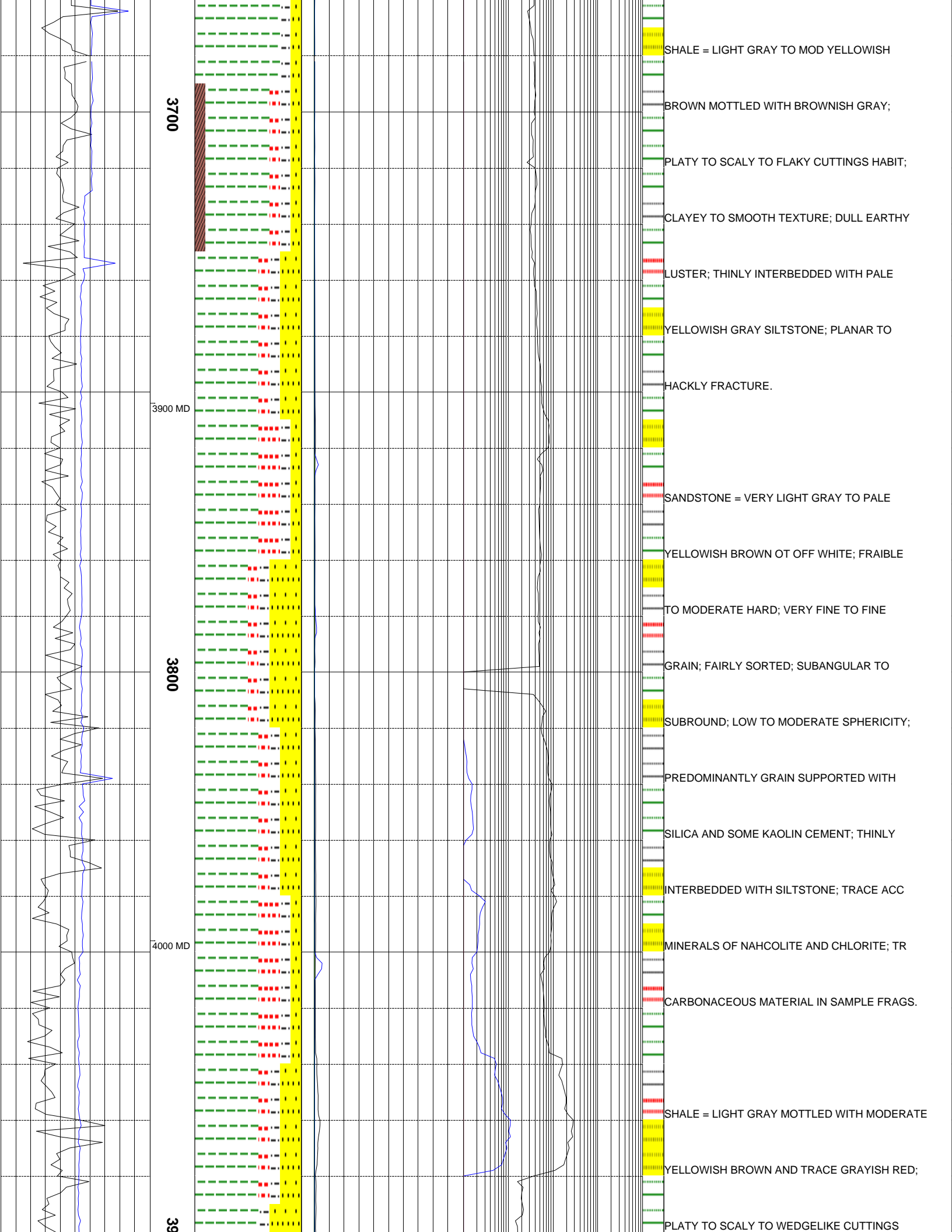
CRUMBLY TENACITY; BLOCKY TO IRREGULAR

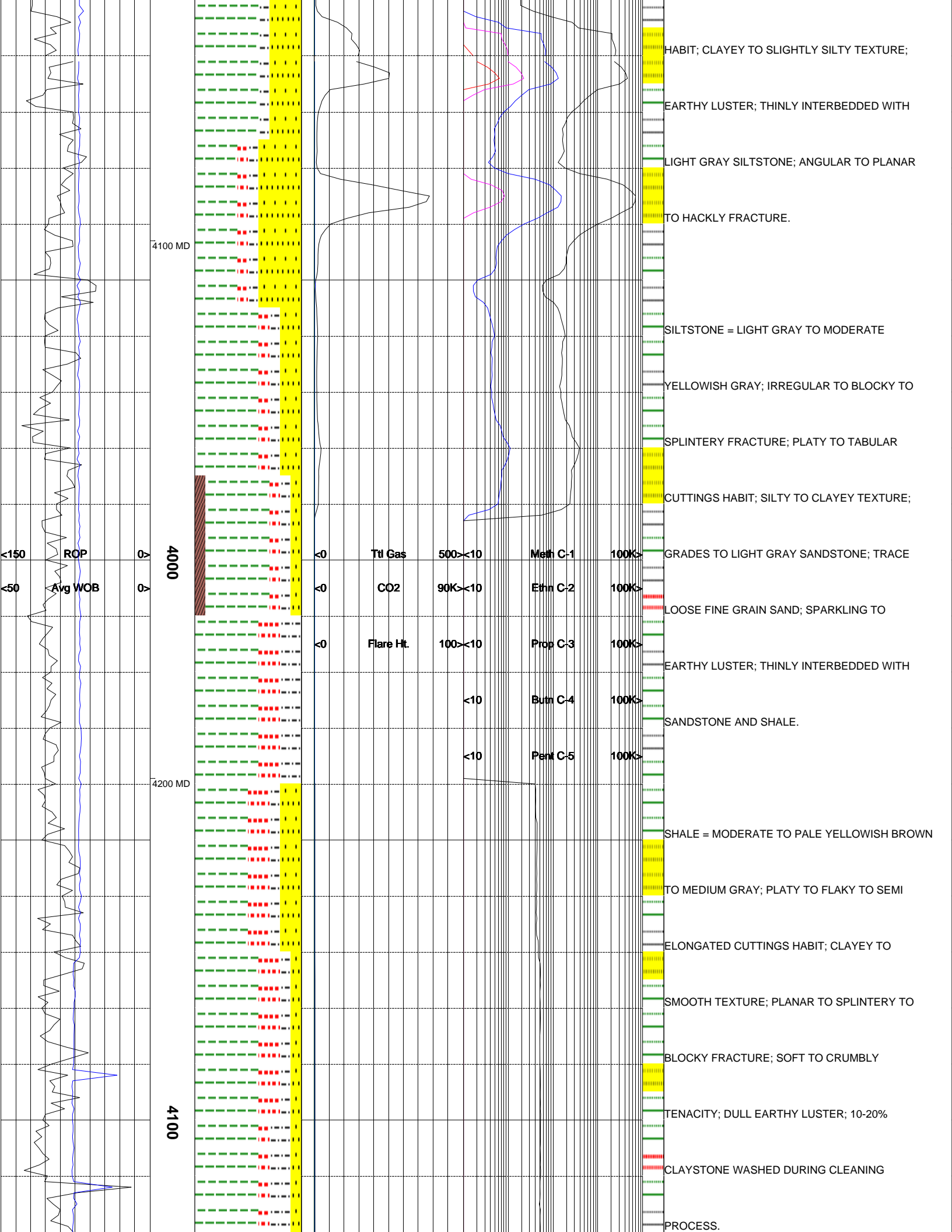
FRACUTRE; MASSIVE CUTTINGS HABIT; DULL

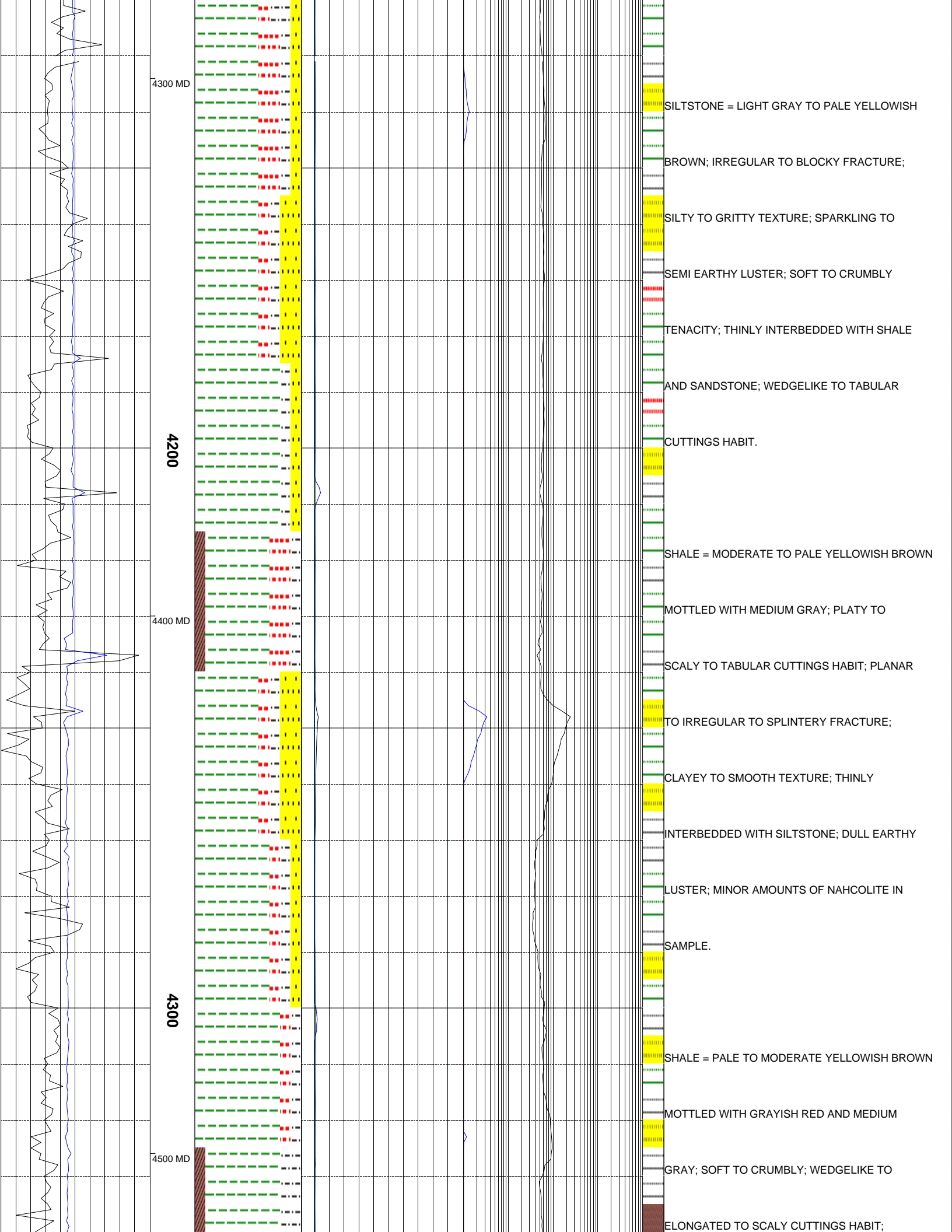
3800 MD

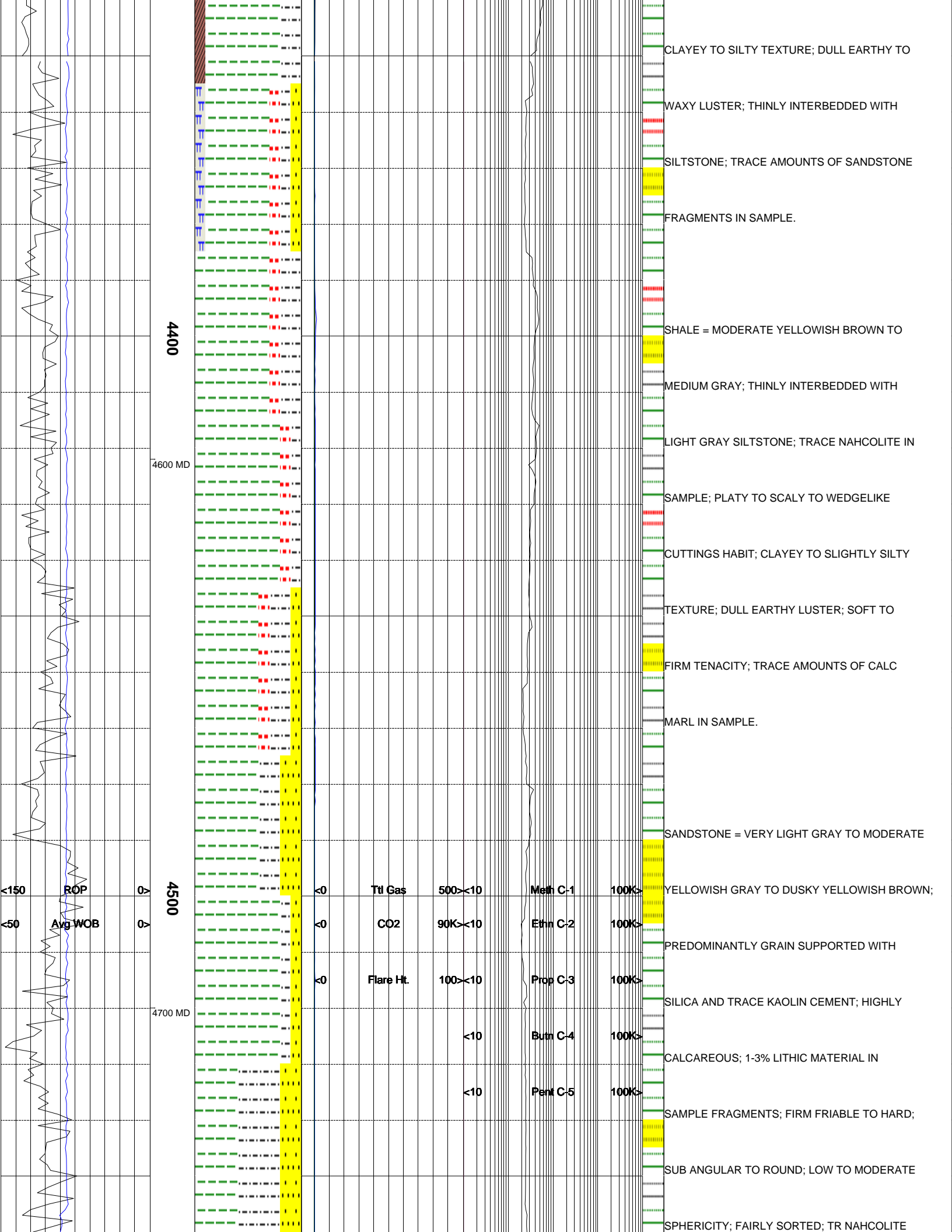
TO SPARKLING LUSTER; SILTY TO GRITTY

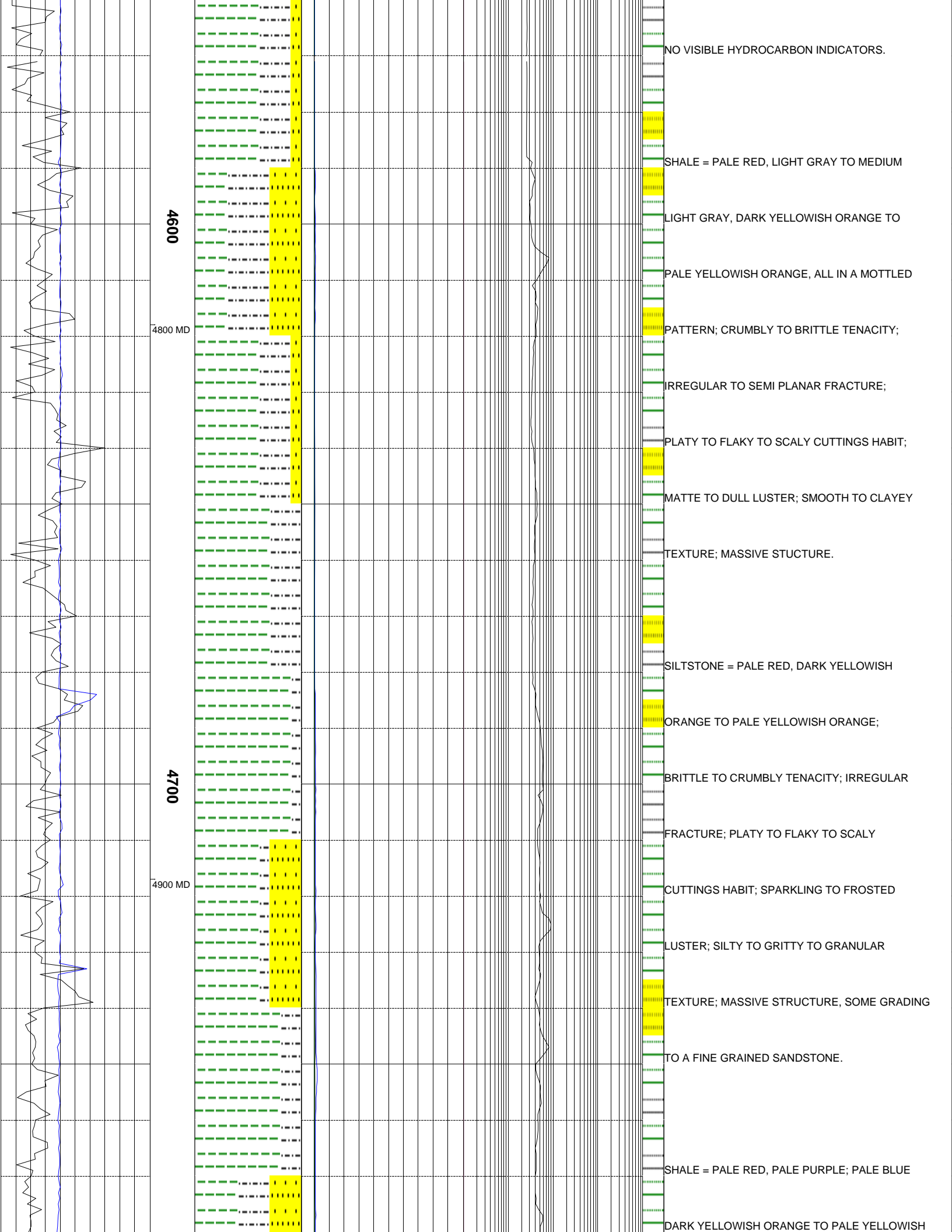
TEXTURE; MASSIVE STRUCTURE.

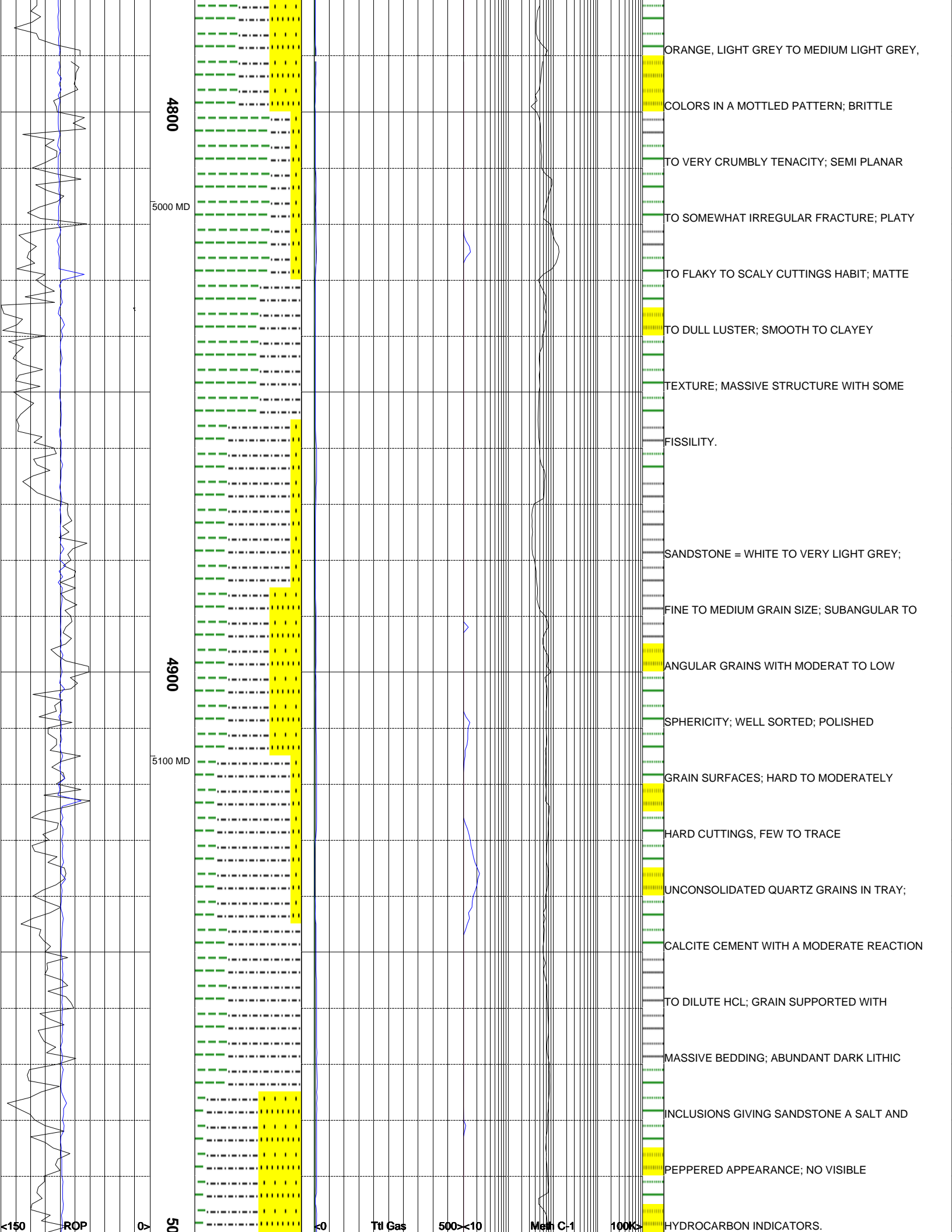


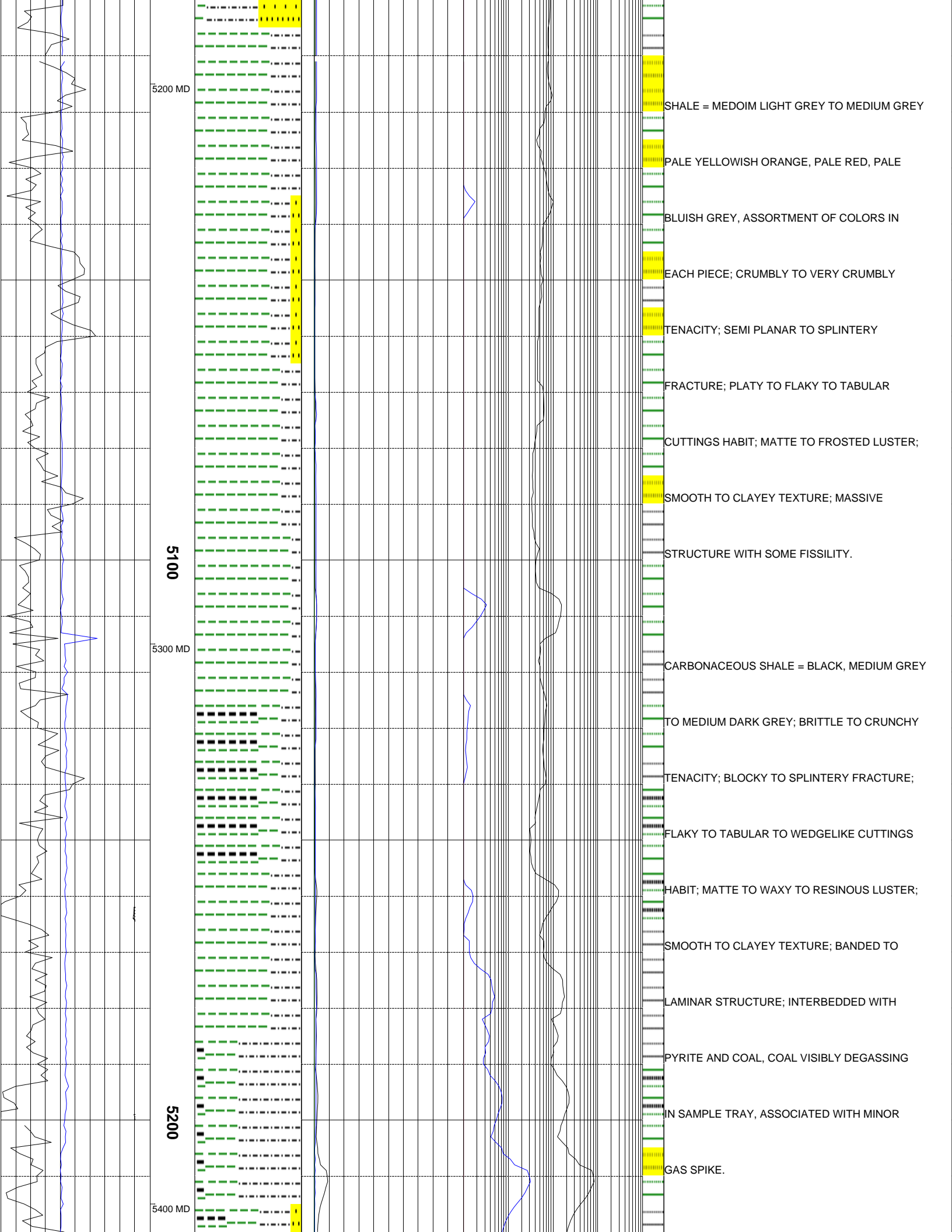












5200 MD

5100

5300 MD

5200

5400 MD

SHALE = MEDIUM LIGHT GREY TO MEDIUM GREY

PALE YELLOWISH ORANGE, PALE RED, PALE

BLUISH GREY, ASSORTMENT OF COLORS IN

EACH PIECE; CRUMBLY TO VERY CRUMBLY

TENACITY; SEMI PLANAR TO SPLINTERY

FRACTURE; PLATY TO FLAKY TO TABULAR

CUTTINGS HABIT; MATTE TO FROSTED LUSTER;

SMOOTH TO CLAYEY TEXTURE; MASSIVE

STRUCTURE WITH SOME FISSILITY.

CARBONACEOUS SHALE = BLACK, MEDIUM GREY

TO MEDIUM DARK GREY; BRITTLE TO CRUNCHY

TENACITY; BLOCKY TO SPLINTERY FRACTURE;

FLAKY TO TABULAR TO WEDGELIKE CUTTINGS

HABIT; MATTE TO WAXY TO RESINOUS LUSTER;

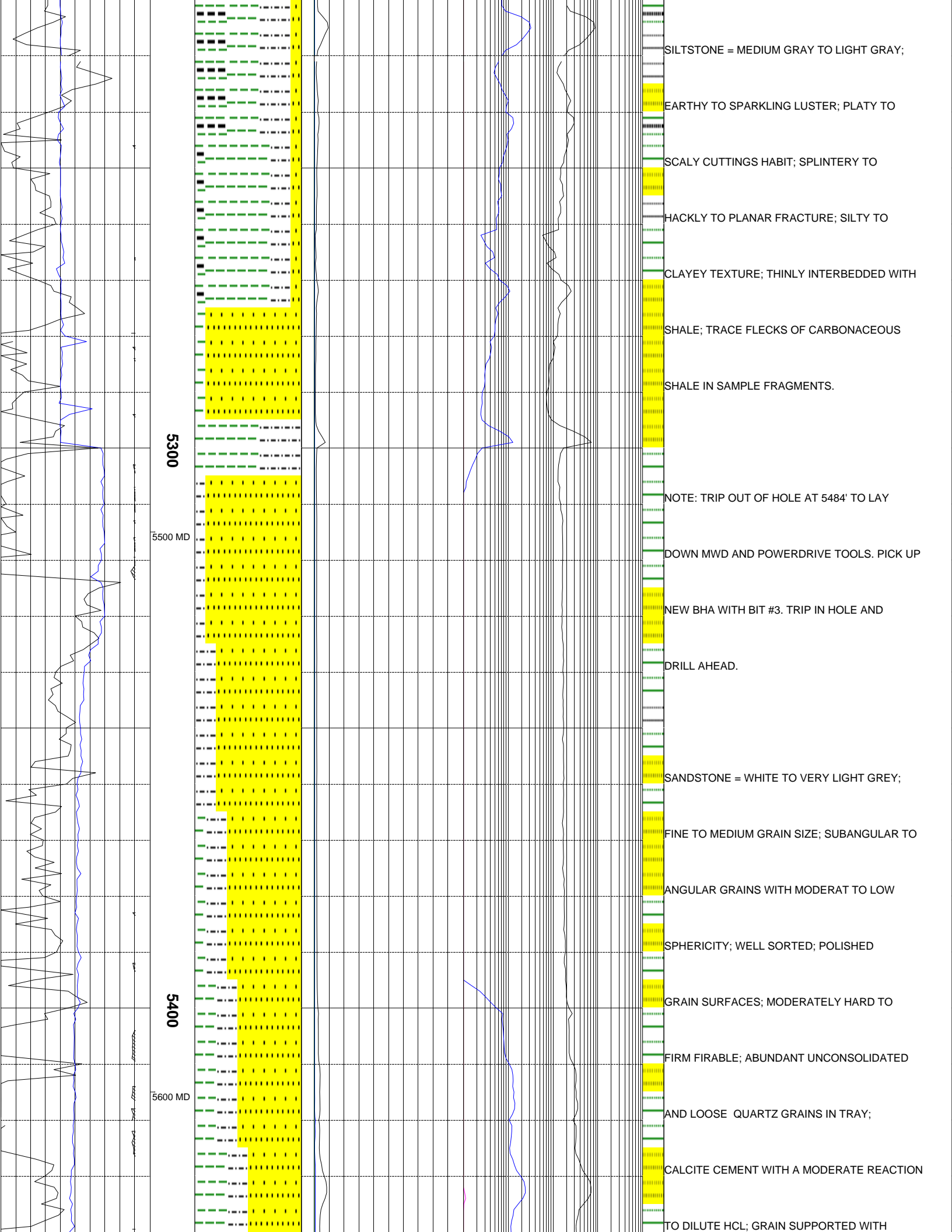
SMOOTH TO CLAYEY TEXTURE; BANDED TO

LAMINAR STRUCTURE; INTERBEDDED WITH

PYRITE AND COAL, COAL VISIBLY DEGASSING

IN SAMPLE TRAY, ASSOCIATED WITH MINOR

GAS SPIKE.



SILTSTONE = MEDIUM GRAY TO LIGHT GRAY;

EARTHY TO SPARKLING LUSTER; PLATY TO

SCALY CUTTINGS HABIT; SPLINTERY TO

HACKLY TO PLANAR FRACTURE; SILTY TO

CLAYEY TEXTURE; THINLY INTERBEDDED WITH

SHALE; TRACE FLECKS OF CARBONACEOUS

SHALE IN SAMPLE FRAGMENTS.

5300

NOTE: TRIP OUT OF HOLE AT 5484' TO LAY

5500 MD

DOWN MWD AND POWERDRIVE TOOLS. PICK UP

NEW BHA WITH BIT #3. TRIP IN HOLE AND

DRILL AHEAD.

SANDSTONE = WHITE TO VERY LIGHT GREY;

FINE TO MEDIUM GRAIN SIZE; SUBANGULAR TO

ANGULAR GRAINS WITH MODERAT TO LOW

SPHERICITY; WELL SORTED; POLISHED

GRAIN SURFACES; MODERATELY HARD TO

5400

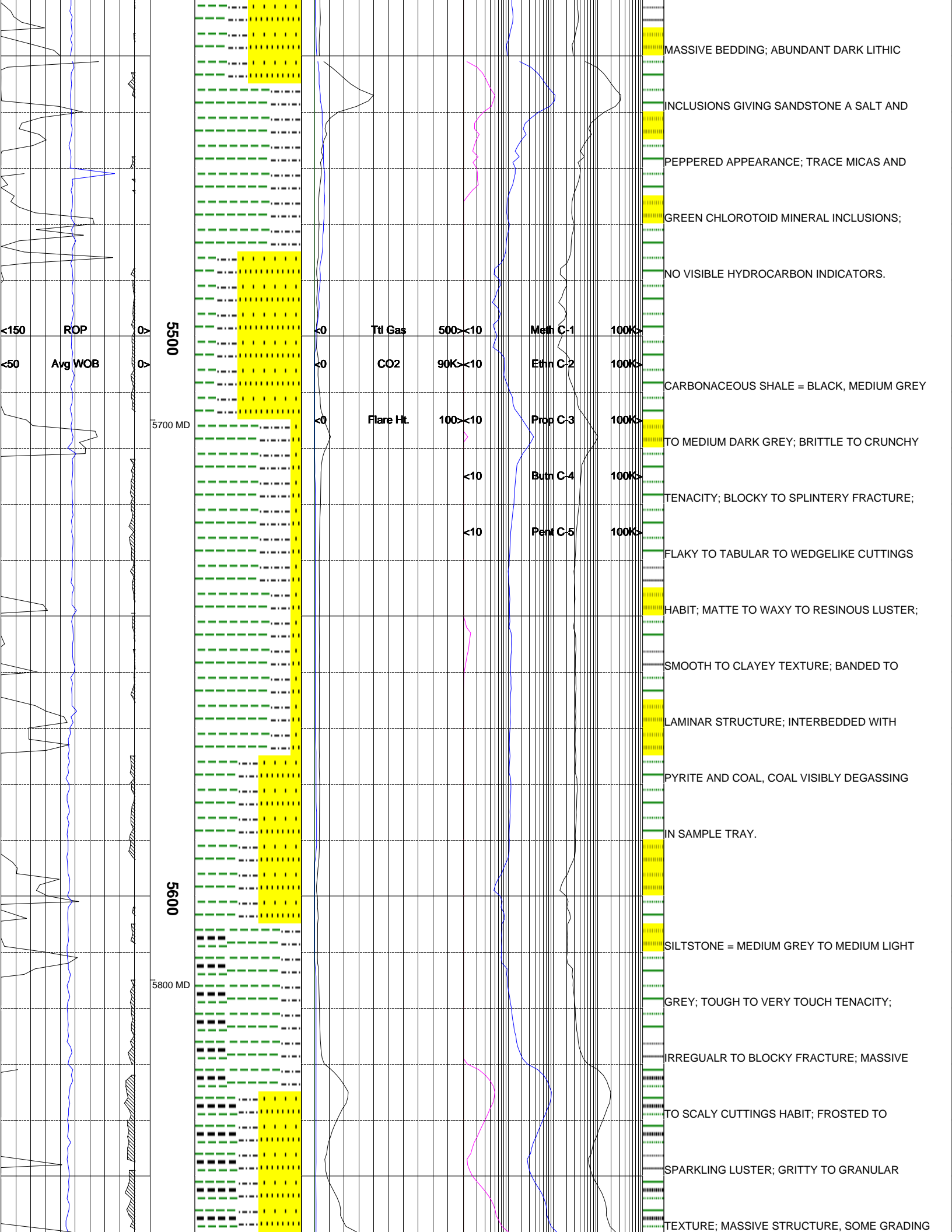
FIRM FIRABLE; ABUNDANT UNCONSOLIDATED

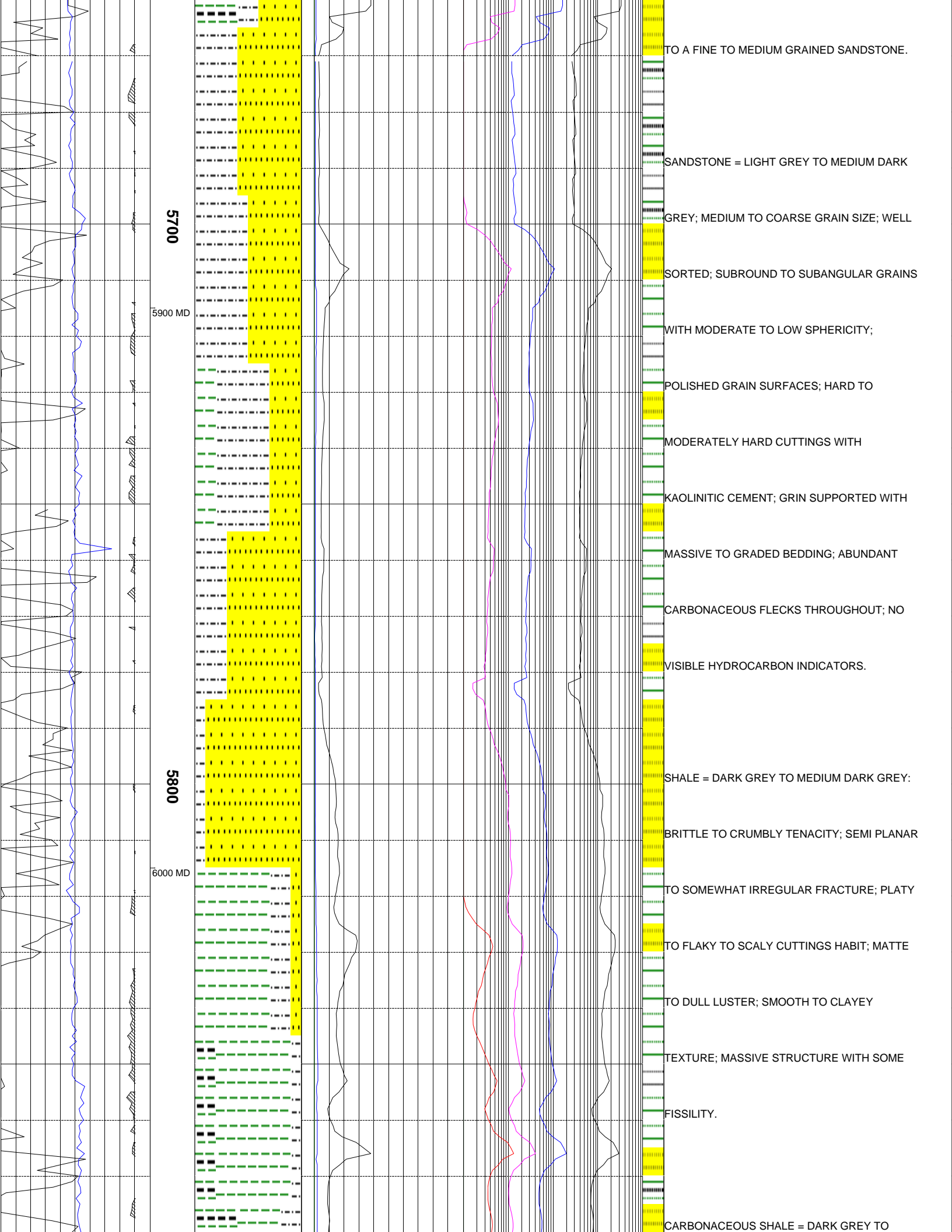
5600 MD

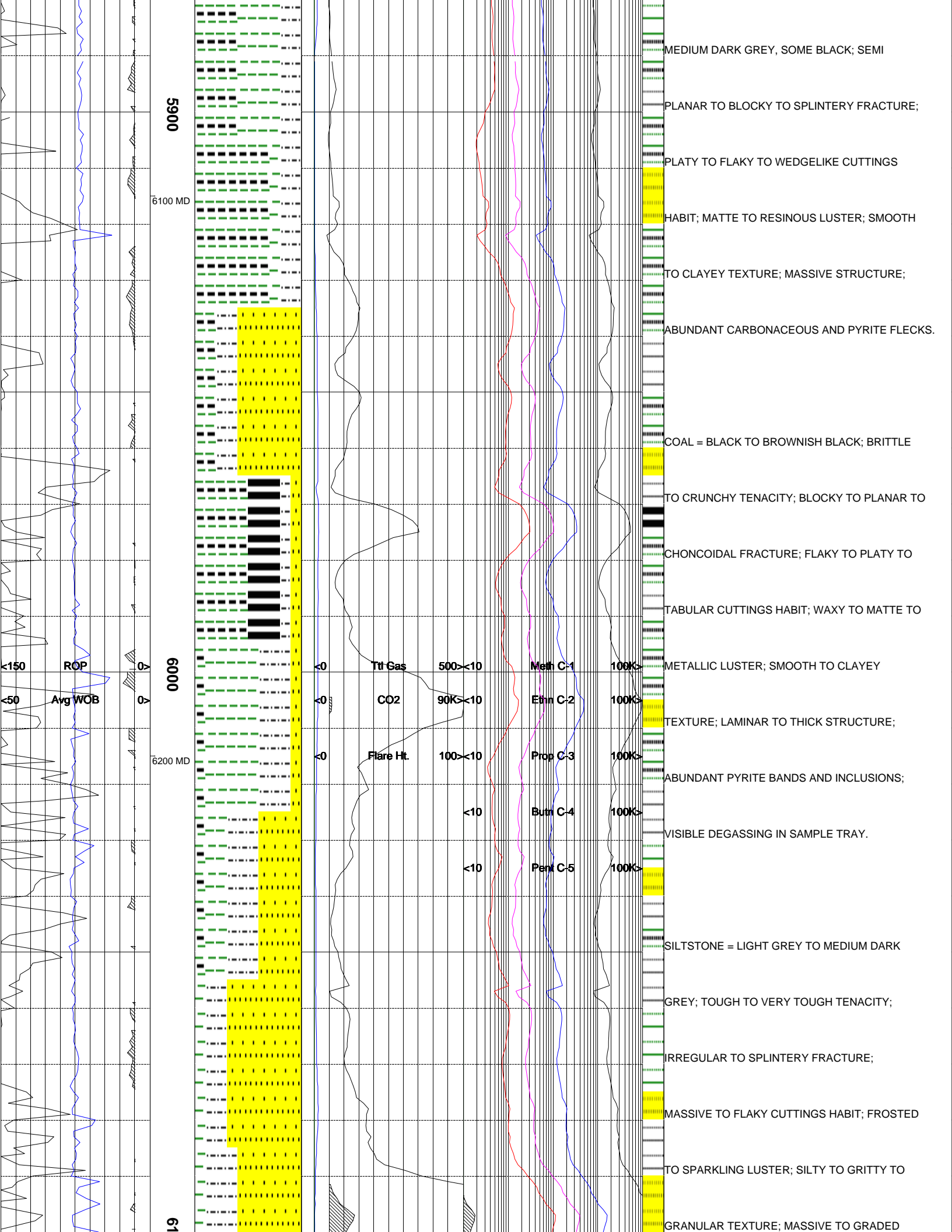
AND LOOSE QUARTZ GRAINS IN TRAY;

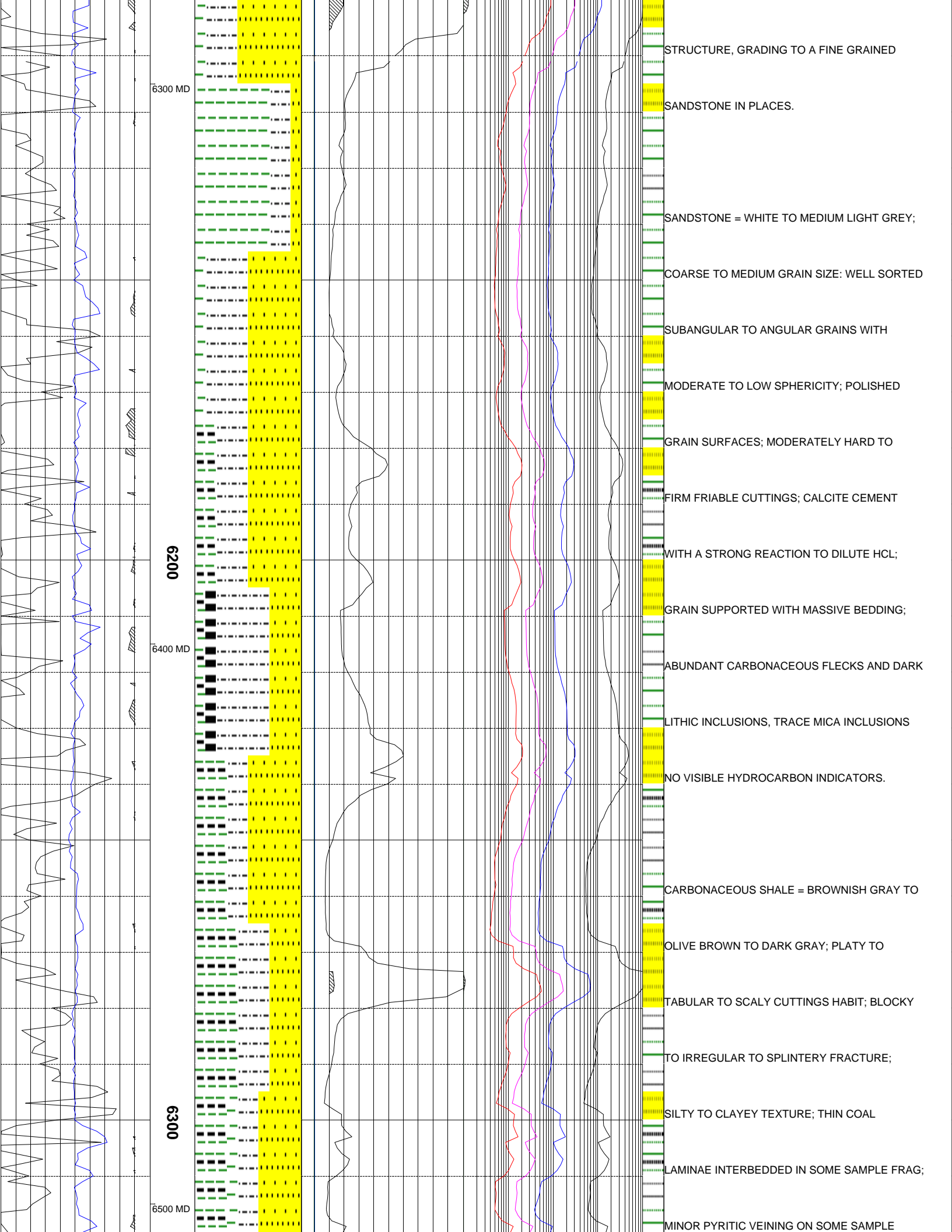
CALCITE CEMENT WITH A MODERATE REACTION

TO DILUTE HCL; GRAIN SUPPORTED WITH









STRUCTURE, GRADING TO A FINE GRAINED

SANDSTONE IN PLACES.

SANDSTONE = WHITE TO MEDIUM LIGHT GREY;

COARSE TO MEDIUM GRAIN SIZE: WELL SORTED

SUBANGULAR TO ANGULAR GRAINS WITH

MODERATE TO LOW SPHERICITY; POLISHED

GRAIN SURFACES; MODERATELY HARD TO

FIRM FRIABLE CUTTINGS; CALCITE CEMENT

WITH A STRONG REACTION TO DILUTE HCL;

GRAIN SUPPORTED WITH MASSIVE BEDDING;

ABUNDANT CARBONACEOUS FLECKS AND DARK

LITHIC INCLUSIONS, TRACE MICA INCLUSIONS

NO VISIBLE HYDROCARBON INDICATORS.

CARBONACEOUS SHALE = BROWNISH GRAY TO

OLIVE BROWN TO DARK GRAY; PLATY TO

TABULAR TO SCALY CUTTINGS HABIT; BLOCKY

TO IRREGULAR TO SPLINTERY FRACTURE;

SILTY TO CLAYEY TEXTURE; THIN COAL

LAMINAE INTERBEDDED IN SOME SAMPLE FRAG;

MINOR PYRITIC VEINING ON SOME SAMPLE

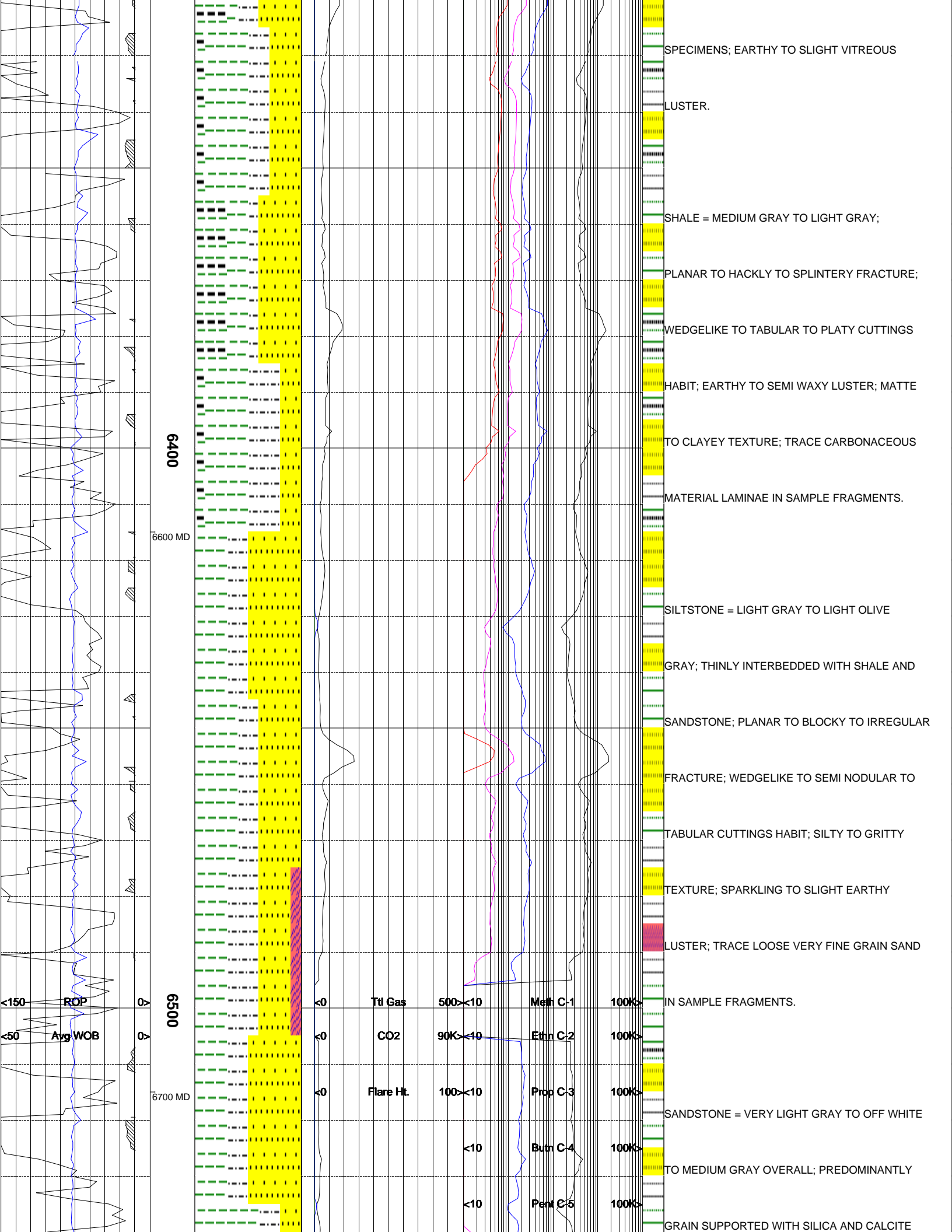
6300 MD

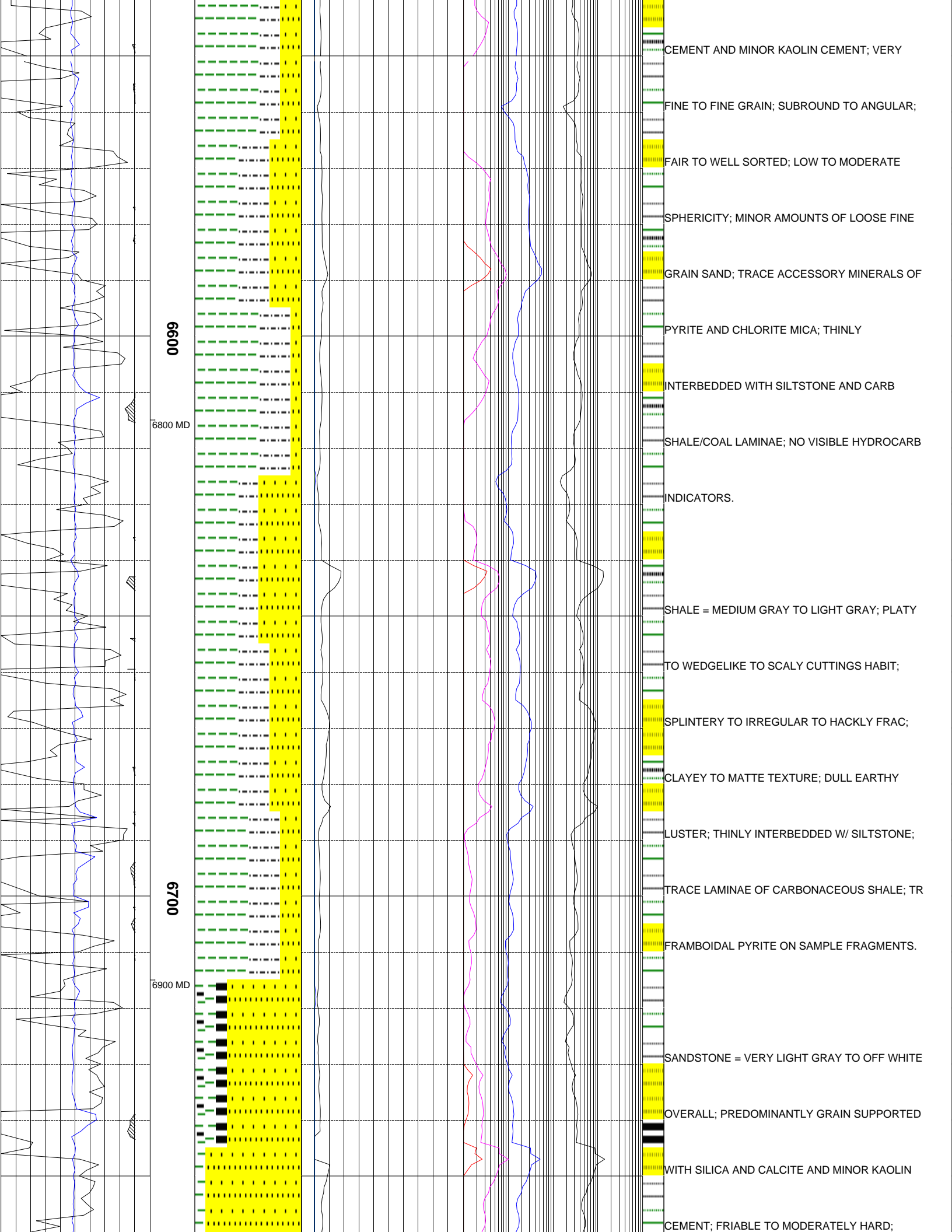
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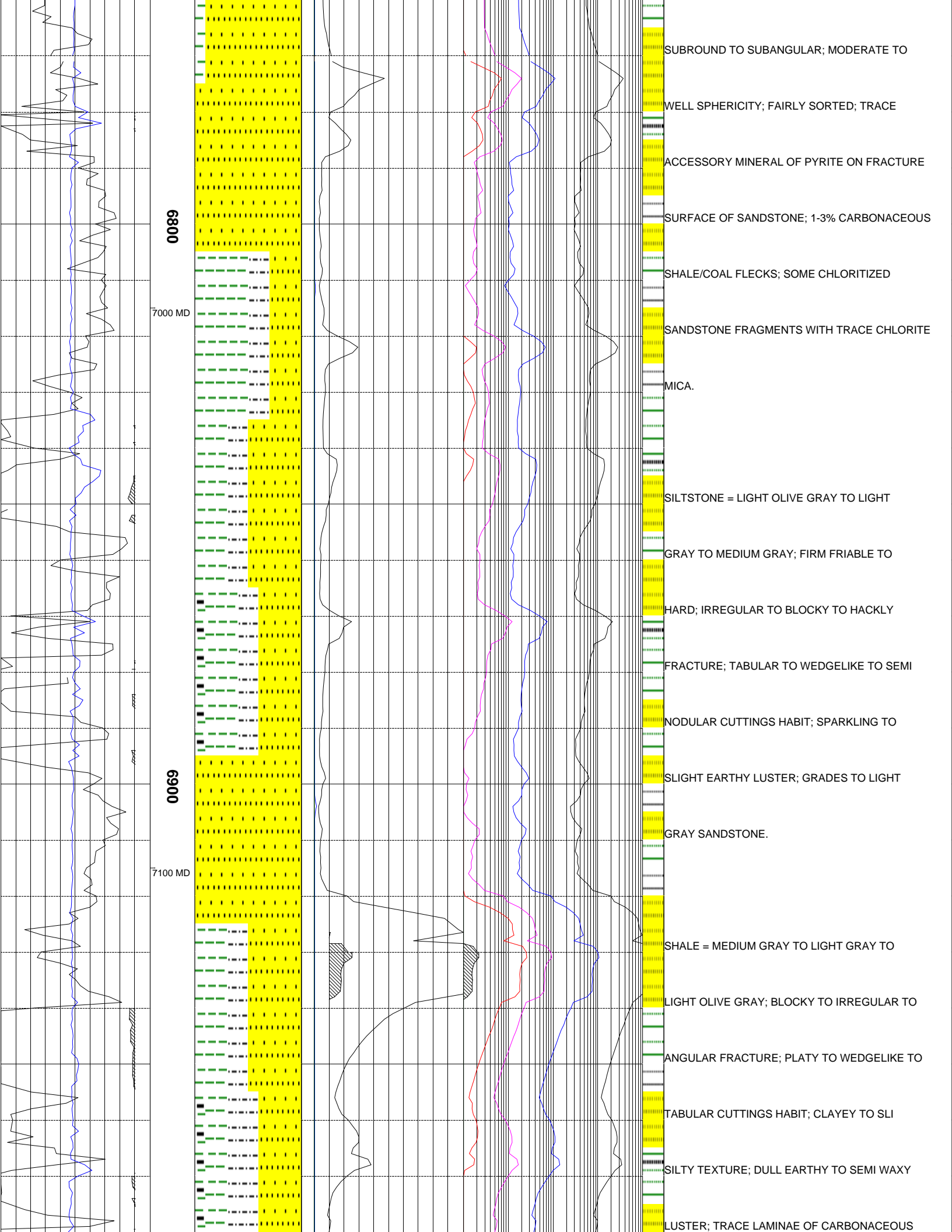
6400 MD

6300

6500 MD







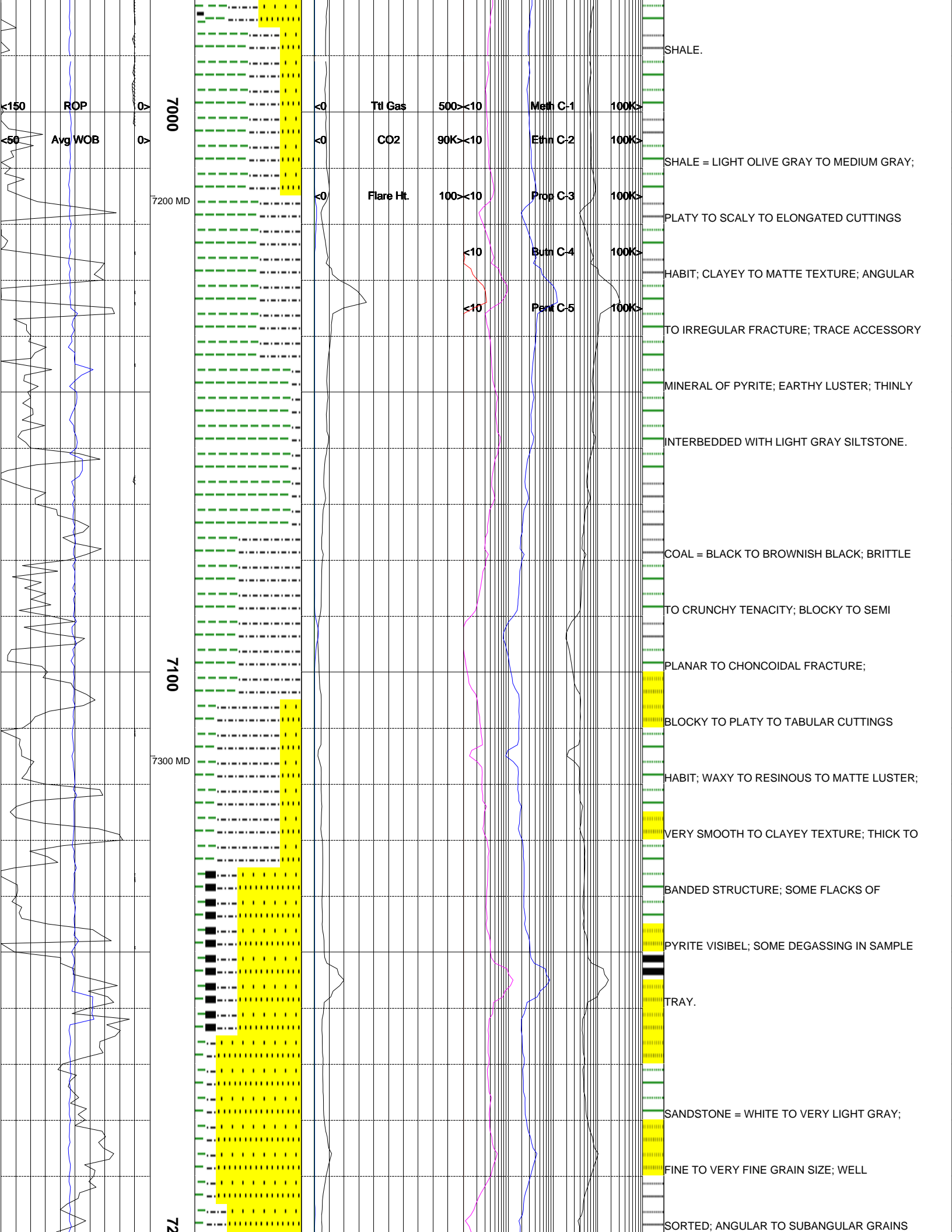
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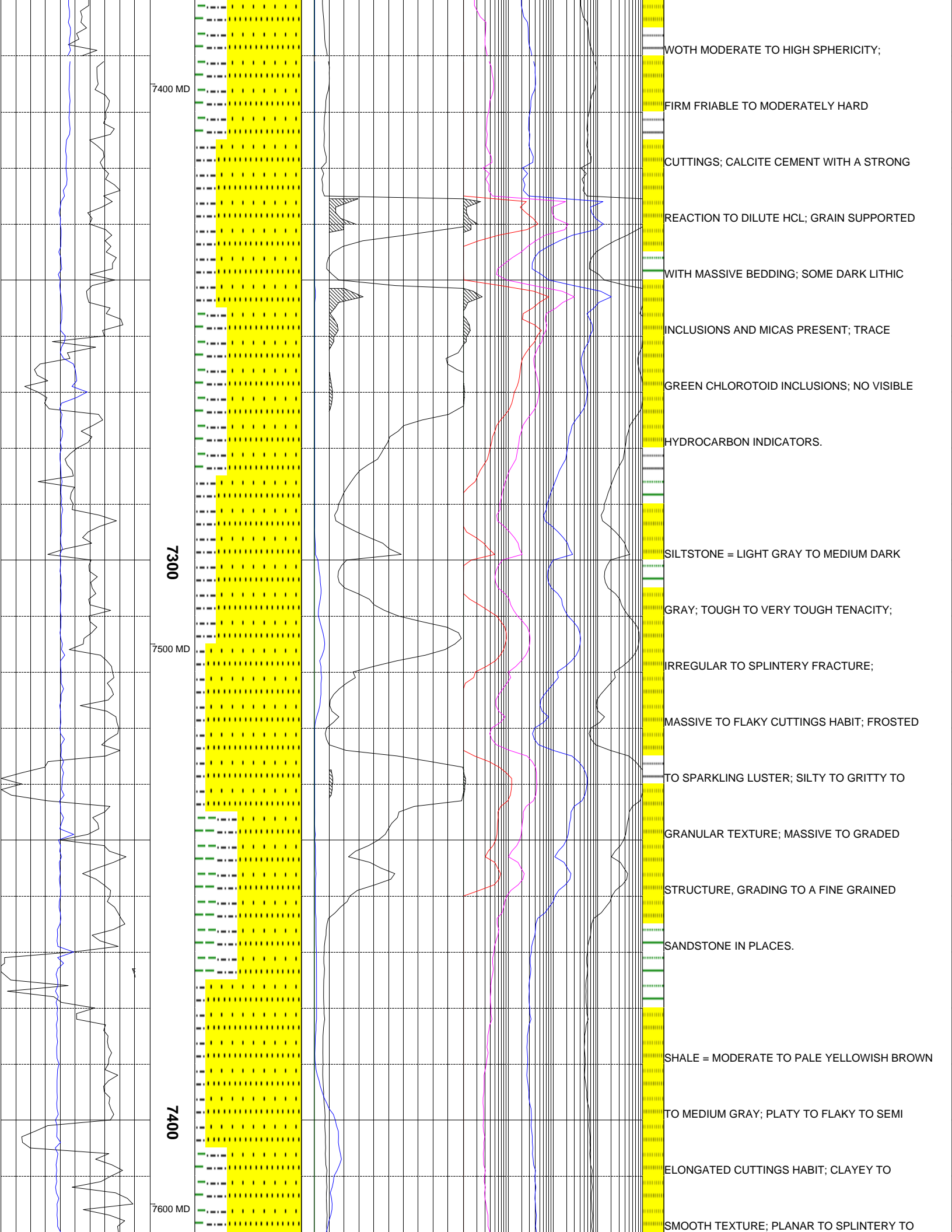
7000 MD

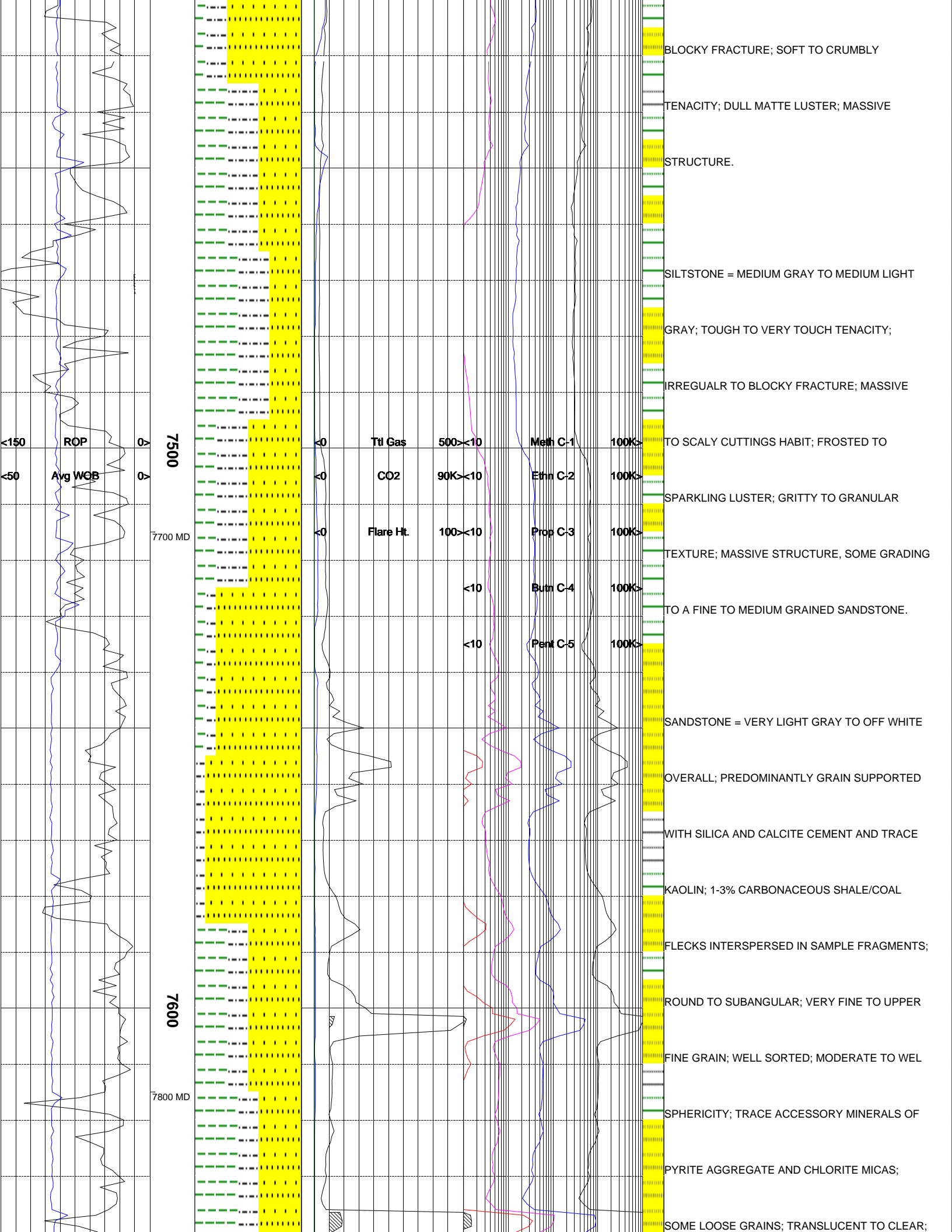
0069

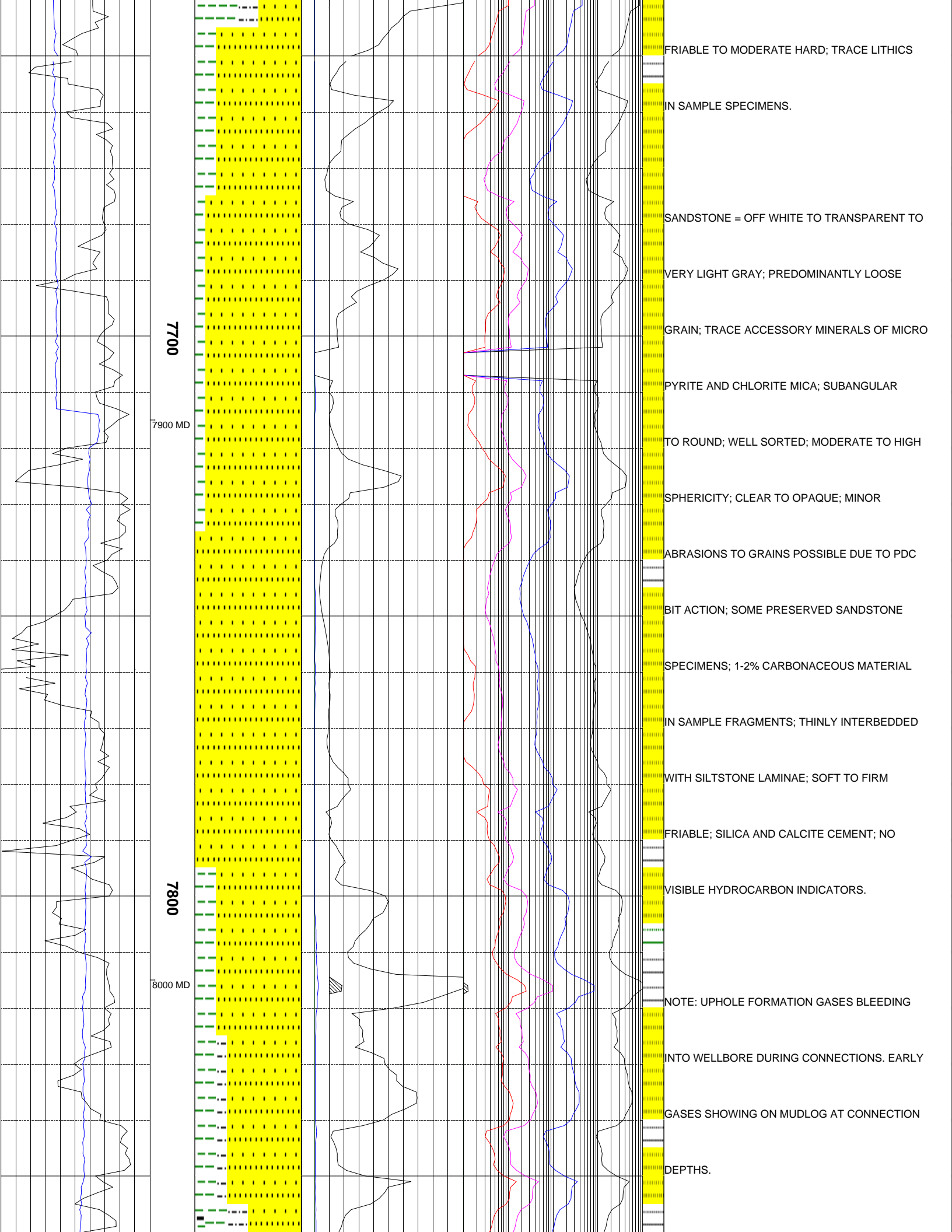
7100 MD

SUBROUND TO SUBANGULAR; MODERATE TO
WELL SPHERICITY; FAIRLY SORTED; TRACE
ACCESSORY MINERAL OF PYRITE ON FRACTURE
SURFACE OF SANDSTONE; 1-3% CARBONACEOUS
SHALE/COAL FLECKS; SOME CHLORITIZED
SANDSTONE FRAGMENTS WITH TRACE CHLORITE
MICA.
SILTSTONE = LIGHT OLIVE GRAY TO LIGHT
GRAY TO MEDIUM GRAY; FIRM FRIABLE TO
HARD; IRREGULAR TO BLOCKY TO HACKLY
FRACTURE; TABULAR TO WEDGELIKE TO SEMI
NODULAR CUTTINGS HABIT; SPARKLING TO
SLIGHT EARTHY LUSTER; GRADES TO LIGHT
GRAY SANDSTONE.
SHALE = MEDIUM GRAY TO LIGHT GRAY TO
LIGHT OLIVE GRAY; BLOCKY TO IRREGULAR TO
ANGULAR FRACTURE; PLATY TO WEDGELIKE TO
TABULAR CUTTINGS HABIT; CLAYEY TO SLI
SILTY TEXTURE; DULL EARTHY TO SEMI WAXY
LUSTER; TRACE LAMINAE OF CARBONACEOUS





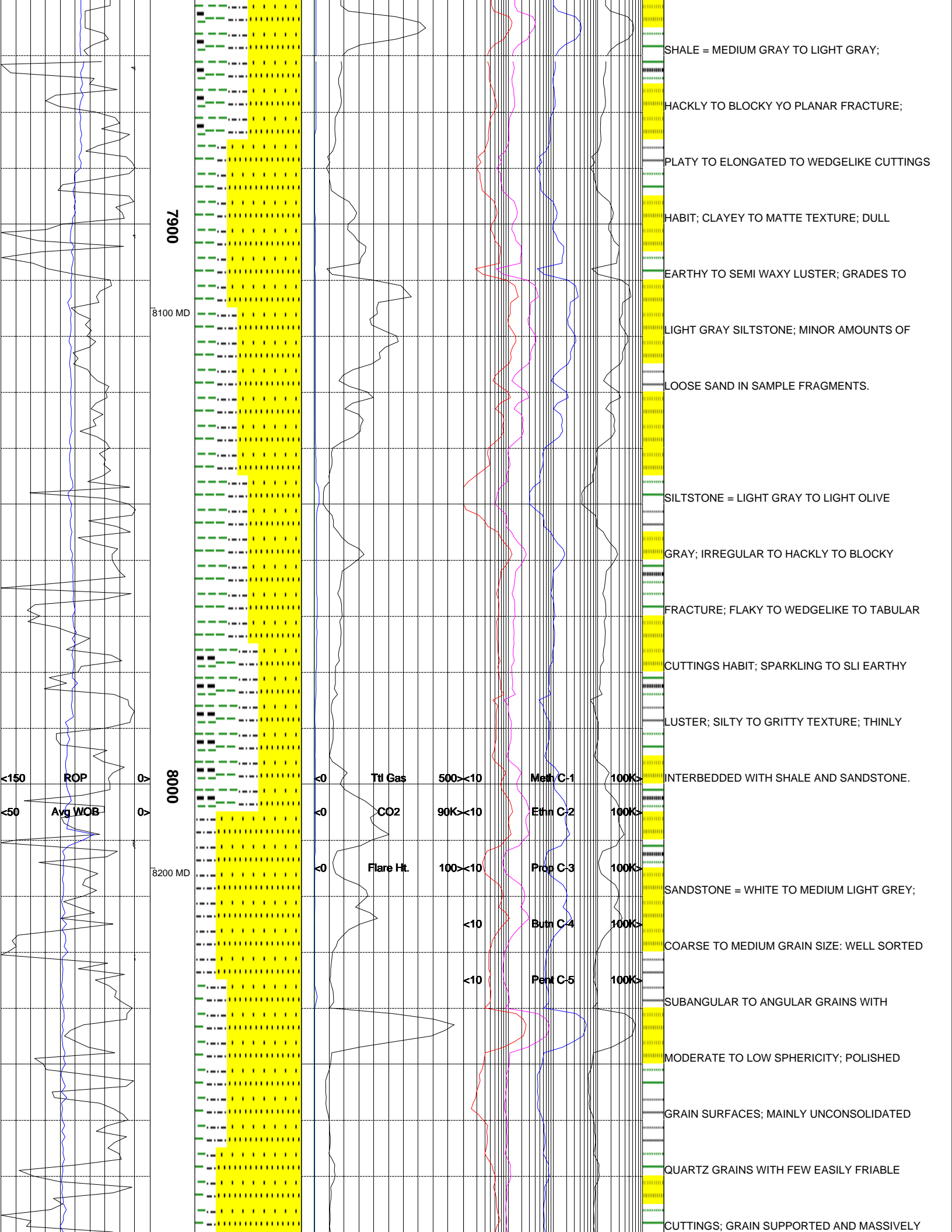


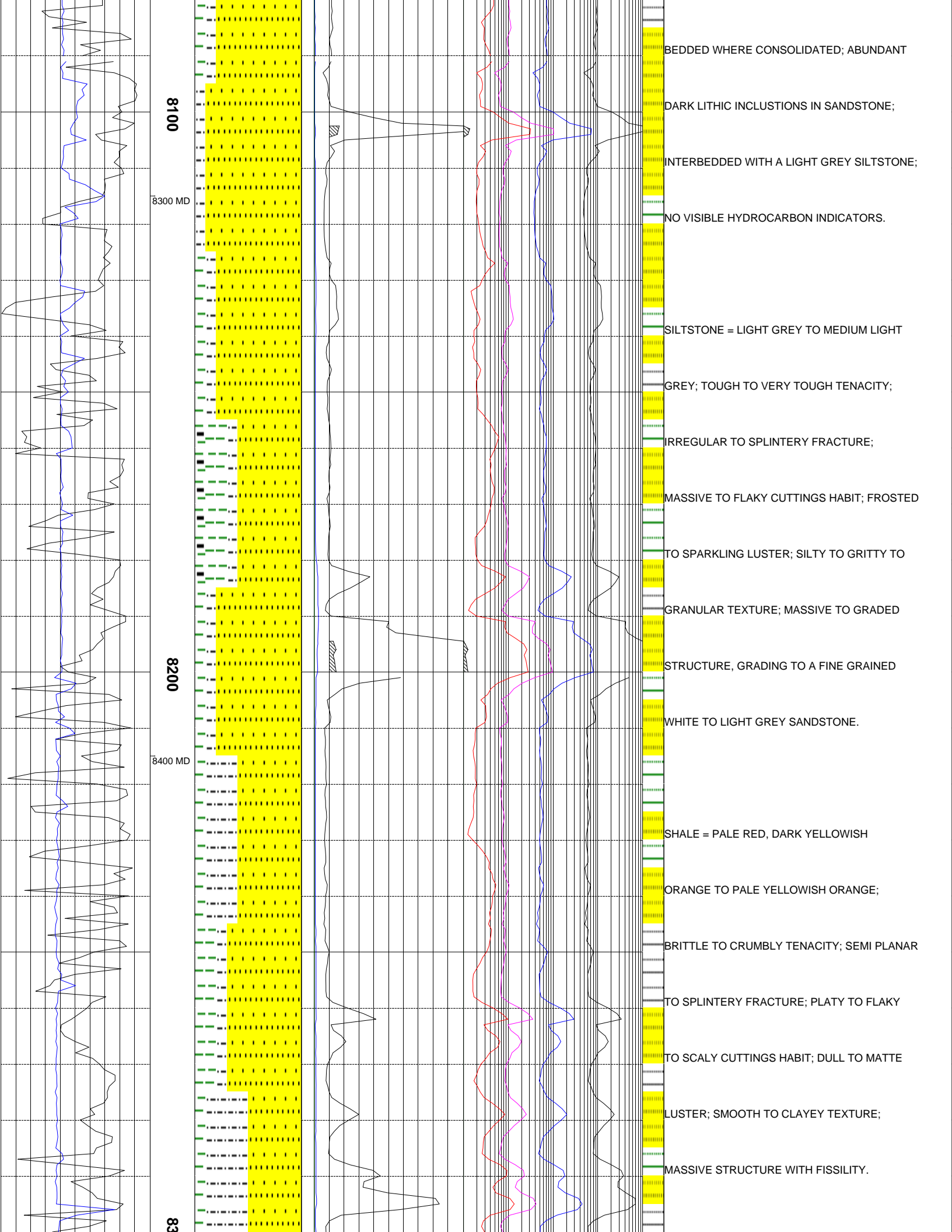


7700
7900 MD

7800
8000 MD

FRIABLE TO MODERATE HARD; TRACE LITHICS
 IN SAMPLE SPECIMENS.
 SANDSTONE = OFF WHITE TO TRANSPARENT TO
 VERY LIGHT GRAY; PREDOMINANTLY LOOSE
 GRAIN; TRACE ACCESSORY MINERALS OF MICRO
 PYRITE AND CHLORITE MICA; SUBANGULAR
 TO ROUND; WELL SORTED; MODERATE TO HIGH
 SPHERICITY; CLEAR TO OPAQUE; MINOR
 ABRASIONS TO GRAINS POSSIBLE DUE TO PDC
 BIT ACTION; SOME PRESERVED SANDSTONE
 SPECIMENS; 1-2% CARBONACEOUS MATERIAL
 IN SAMPLE FRAGMENTS; THINLY INTERBEDDED
 WITH SILTSTONE LAMINAE; SOFT TO FIRM
 FRIABLE; SILICA AND CALCITE CEMENT; NO
 VISIBLE HYDROCARBON INDICATORS.
 NOTE: UPHOLE FORMATION GASES BLEEDING
 INTO WELLBORE DURING CONNECTIONS. EARLY
 GASES SHOWING ON MUDLOG AT CONNECTION
 DEPTHS.





8100

8300 MD

8200

8400 MD

83

BEDDED WHERE CONSOLIDATED; ABUNDANT

DARK LITHIC INCLUSIONS IN SANDSTONE;

INTERBEDDED WITH A LIGHT GREY SILTSTONE;

NO VISIBLE HYDROCARBON INDICATORS.

SILTSTONE = LIGHT GREY TO MEDIUM LIGHT

GREY; TOUGH TO VERY TOUGH TENACITY;

IRREGULAR TO SPLINTERY FRACTURE;

MASSIVE TO FLAKY CUTTINGS HABIT; FROSTED

TO SPARKLING LUSTER; SILTY TO GRITTY TO

GRANULAR TEXTURE; MASSIVE TO GRADED

STRUCTURE, GRADING TO A FINE GRAINED

WHITE TO LIGHT GREY SANDSTONE.

SHALE = PALE RED, DARK YELLOWISH

ORANGE TO PALE YELLOWISH ORANGE;

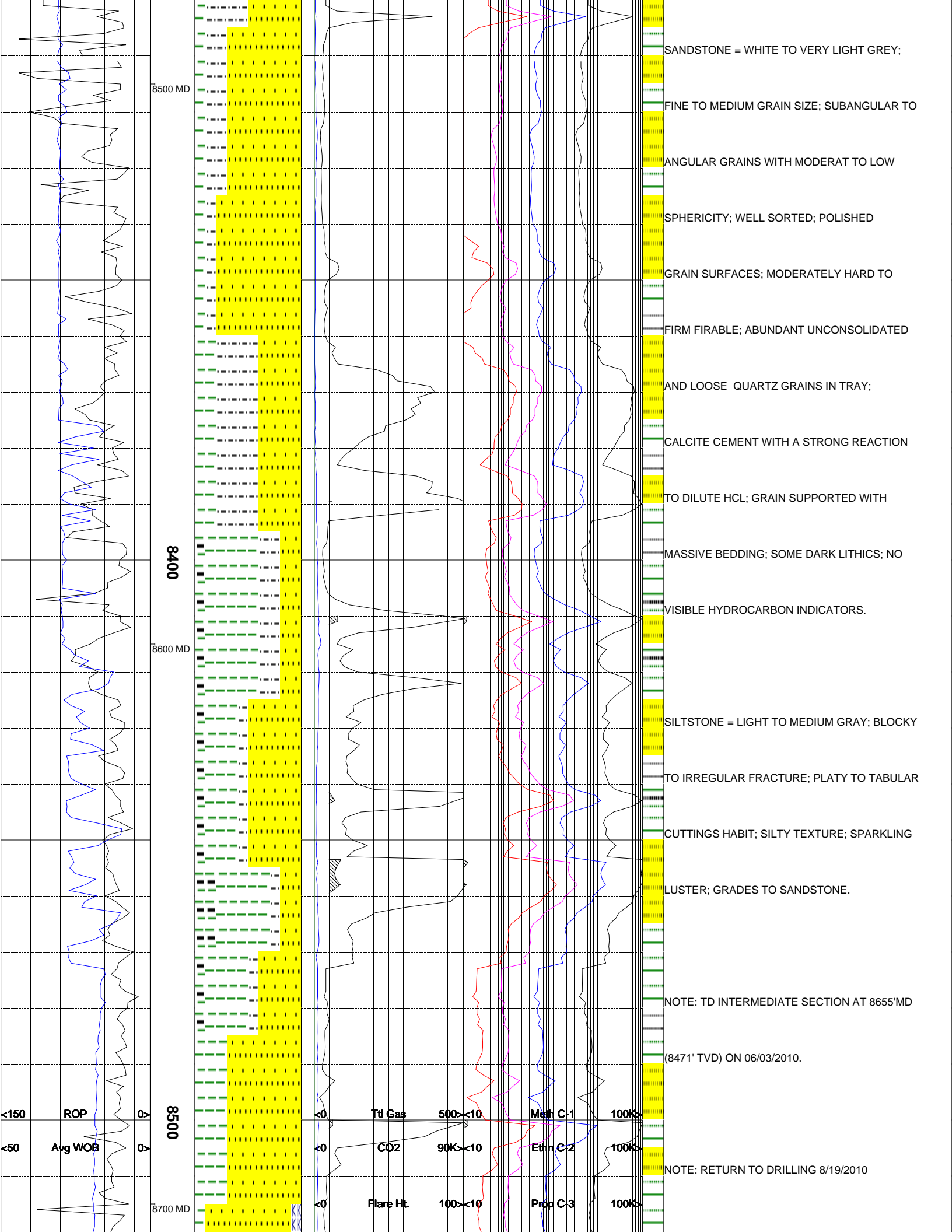
BRITTLE TO CRUMBLY TENACITY; SEMI PLANAR

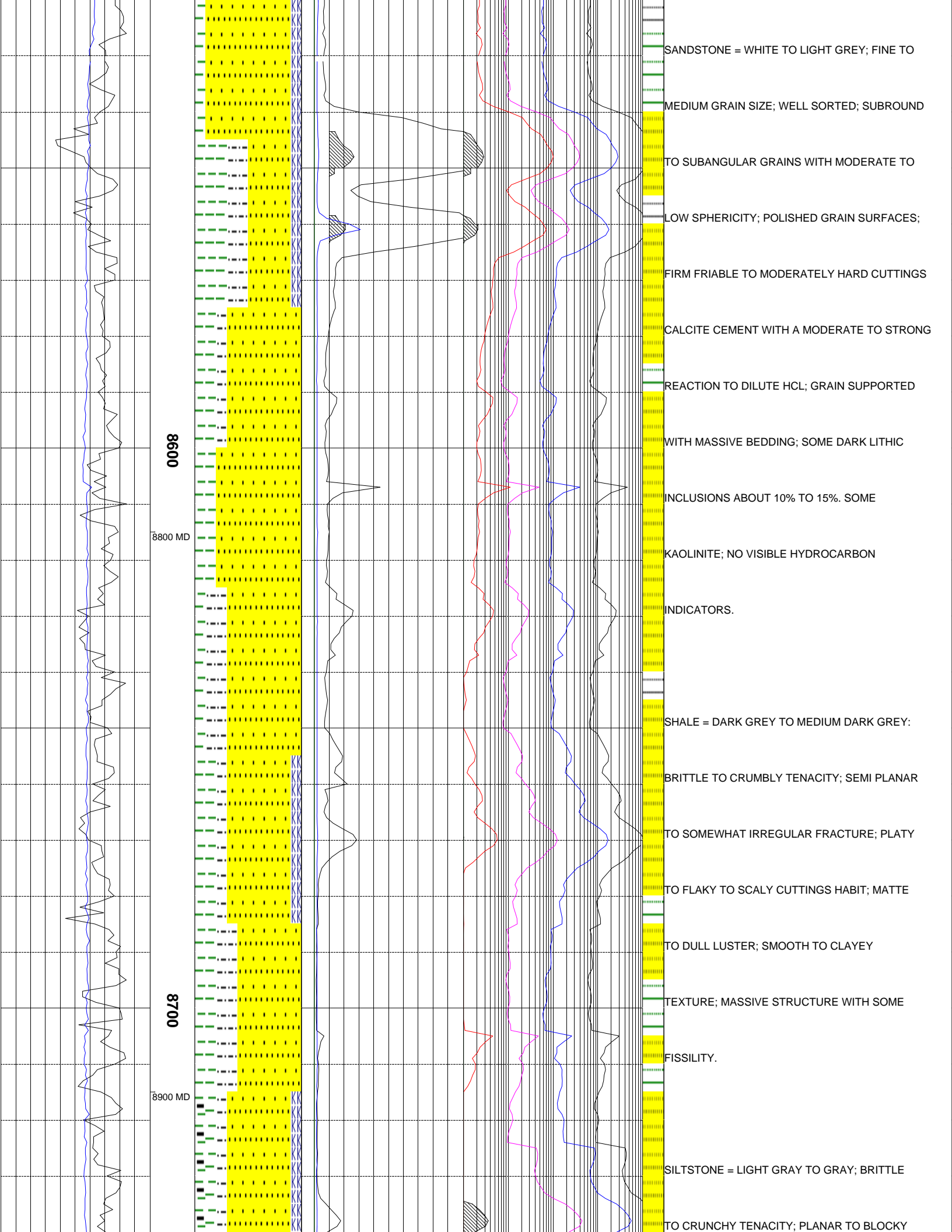
TO SPLINTERY FRACTURE; PLATY TO FLAKY

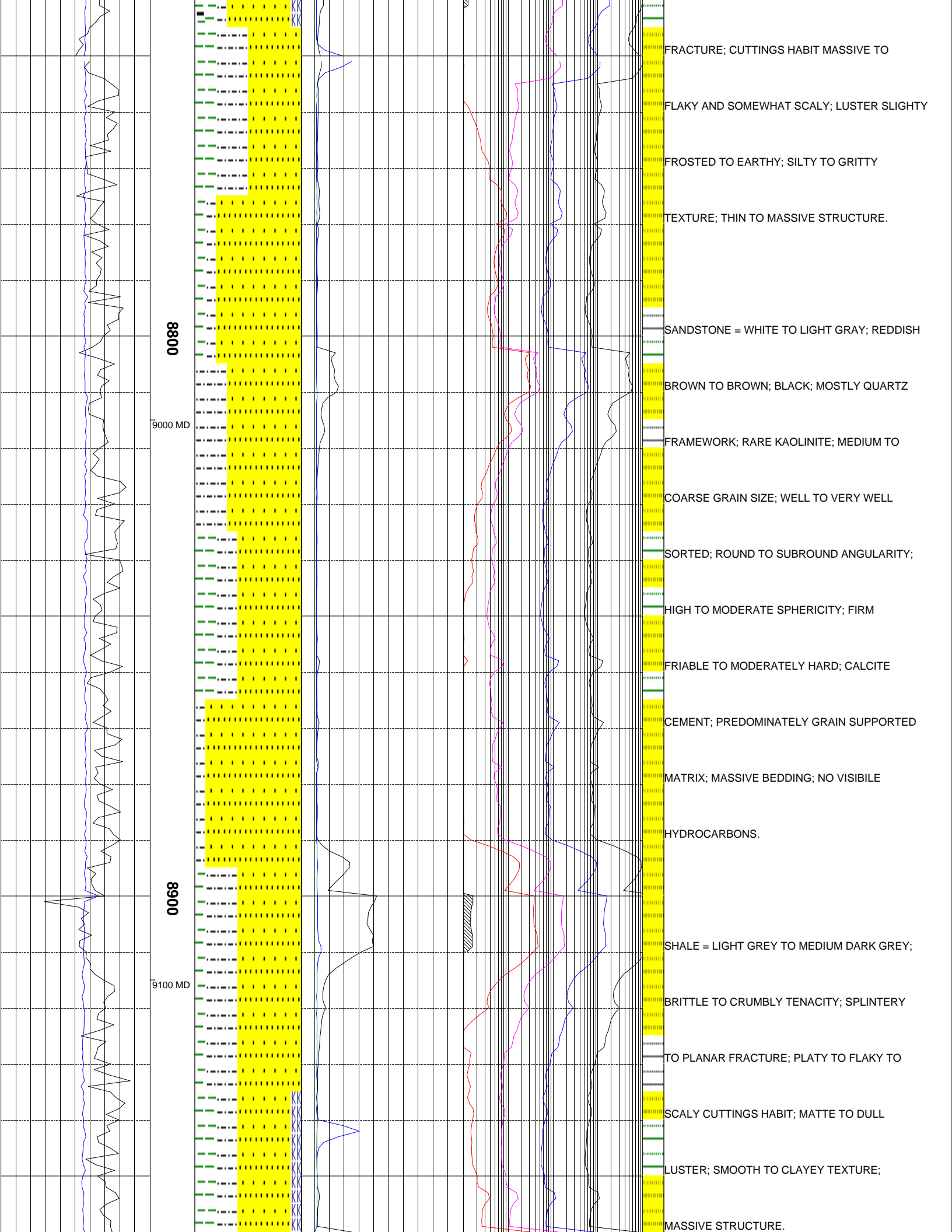
TO SCALY CUTTINGS HABIT; DULL TO MATTE

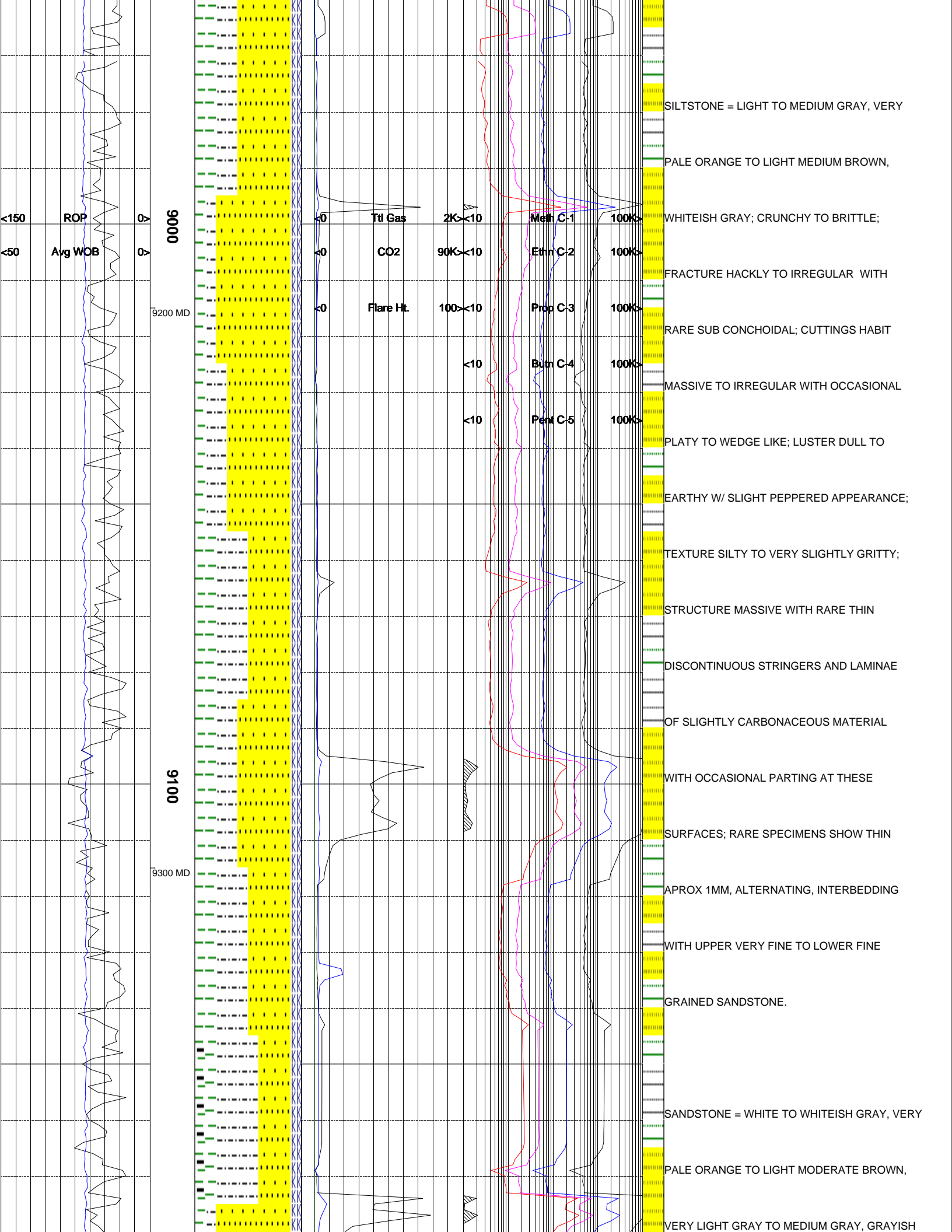
LUSTER; SMOOTH TO CLAYEY TEXTURE;

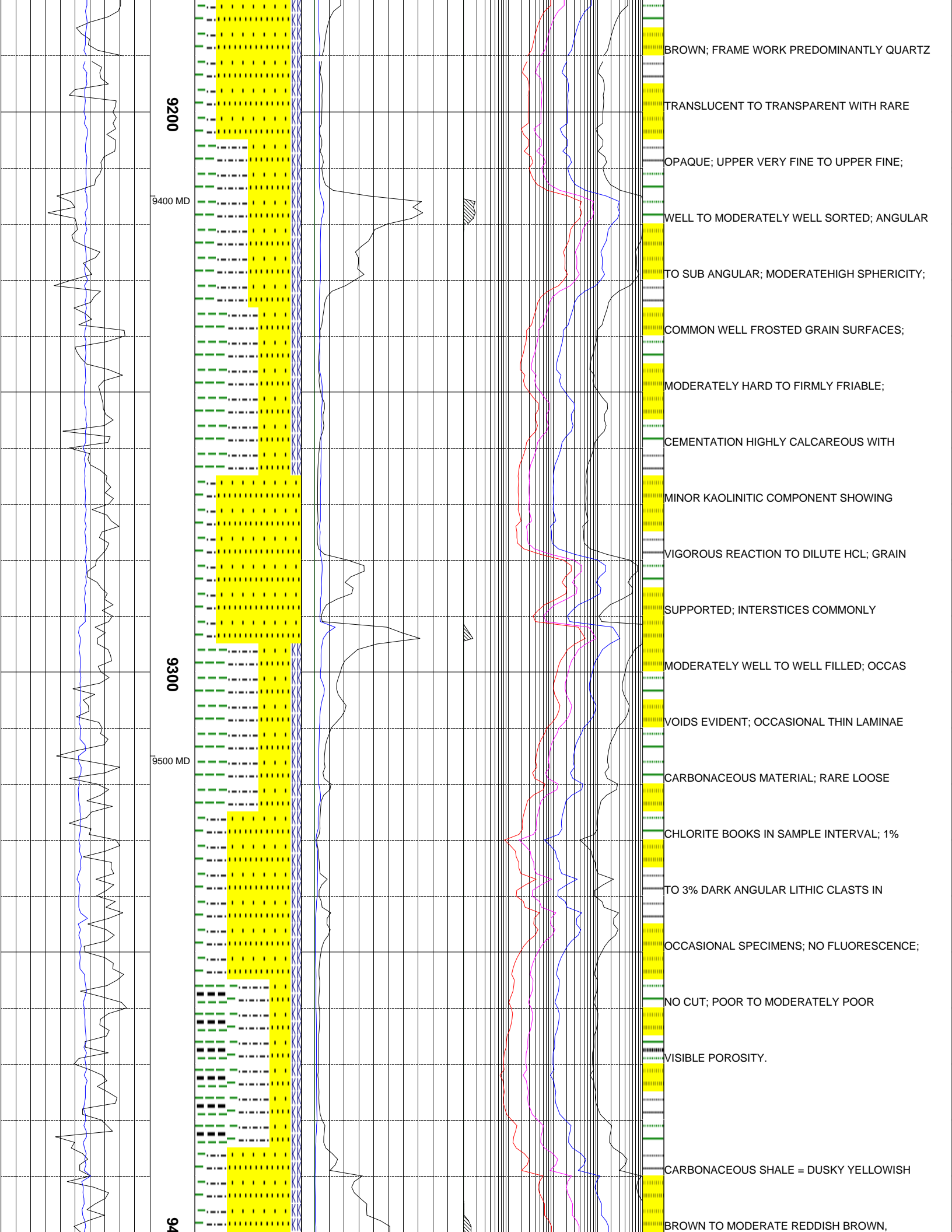
MASSIVE STRUCTURE WITH FISSILITY.





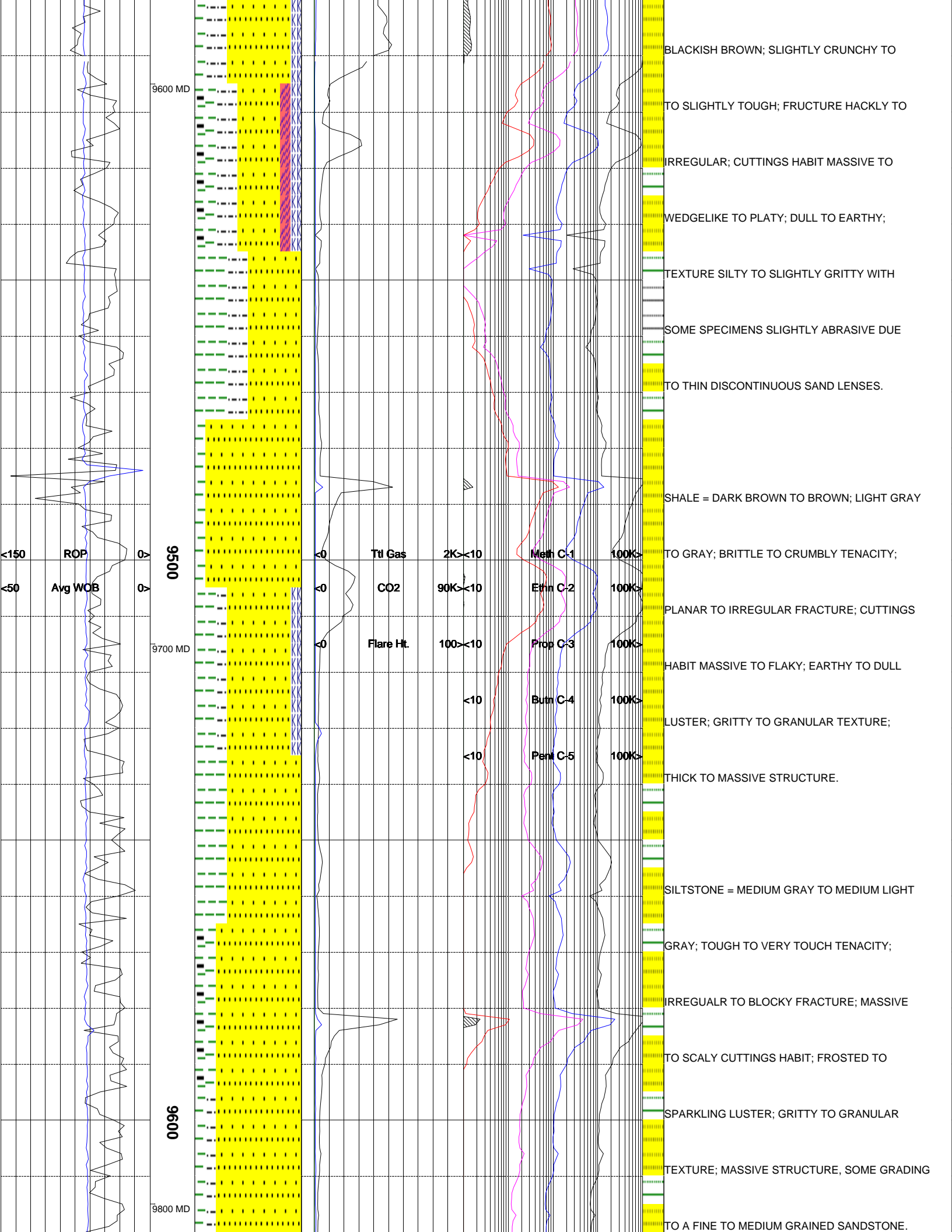


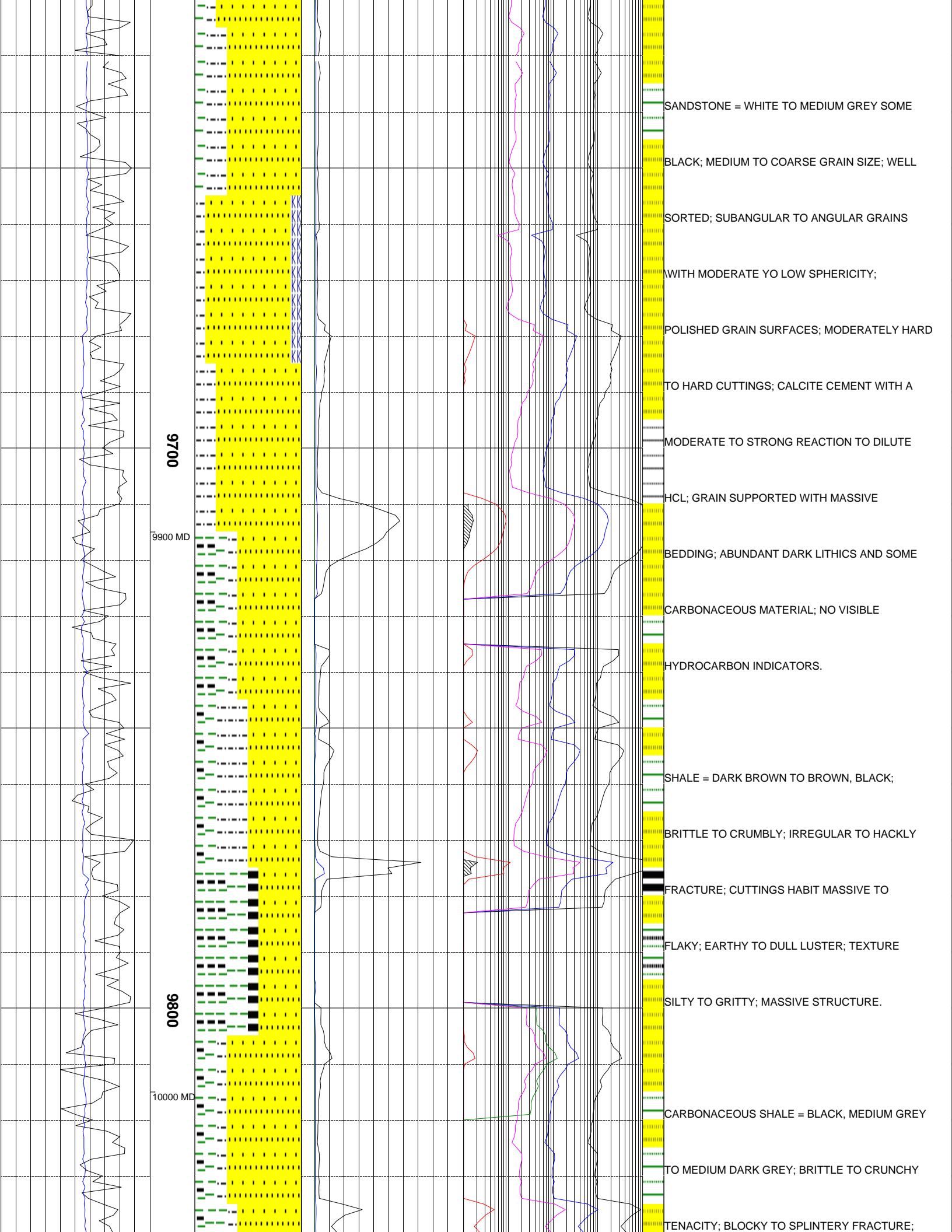




BROWN; FRAME WORK PREDOMINANTLY QUARTZ
 TRANSLUCENT TO TRANSPARENT WITH RARE
 OPAQUE; UPPER VERY FINE TO UPPER FINE;
 WELL TO MODERATELY WELL SORTED; ANGULAR
 TO SUB ANGULAR; MODERATE-HIGH SPHERICITY;
 COMMON WELL FROSTED GRAIN SURFACES;
 MODERATELY HARD TO FIRMLY FRIABLE;
 CEMENTATION HIGHLY CALCAREOUS WITH
 MINOR KAOLINITIC COMPONENT SHOWING
 VIGOROUS REACTION TO DILUTE HCL; GRAIN
 SUPPORTED; INTERSTICES COMMONLY
 MODERATELY WELL TO WELL FILLED; OCCAS
 VOIDS EVIDENT; OCCASIONAL THIN LAMINAE
 CARBONACEOUS MATERIAL; RARE LOOSE
 CHLORITE BOOKS IN SAMPLE INTERVAL; 1%
 TO 3% DARK ANGULAR LITHIC CLASTS IN
 OCCASIONAL SPECIMENS; NO FLUORESCENCE;
 NO CUT; POOR TO MODERATELY POOR
 VISIBLE POROSITY.
 CARBONACEOUS SHALE = DUSKY YELLOWISH
 BROWN TO MODERATE REDDISH BROWN,

9200
 9400 MD
 9300
 9500 MD
 94





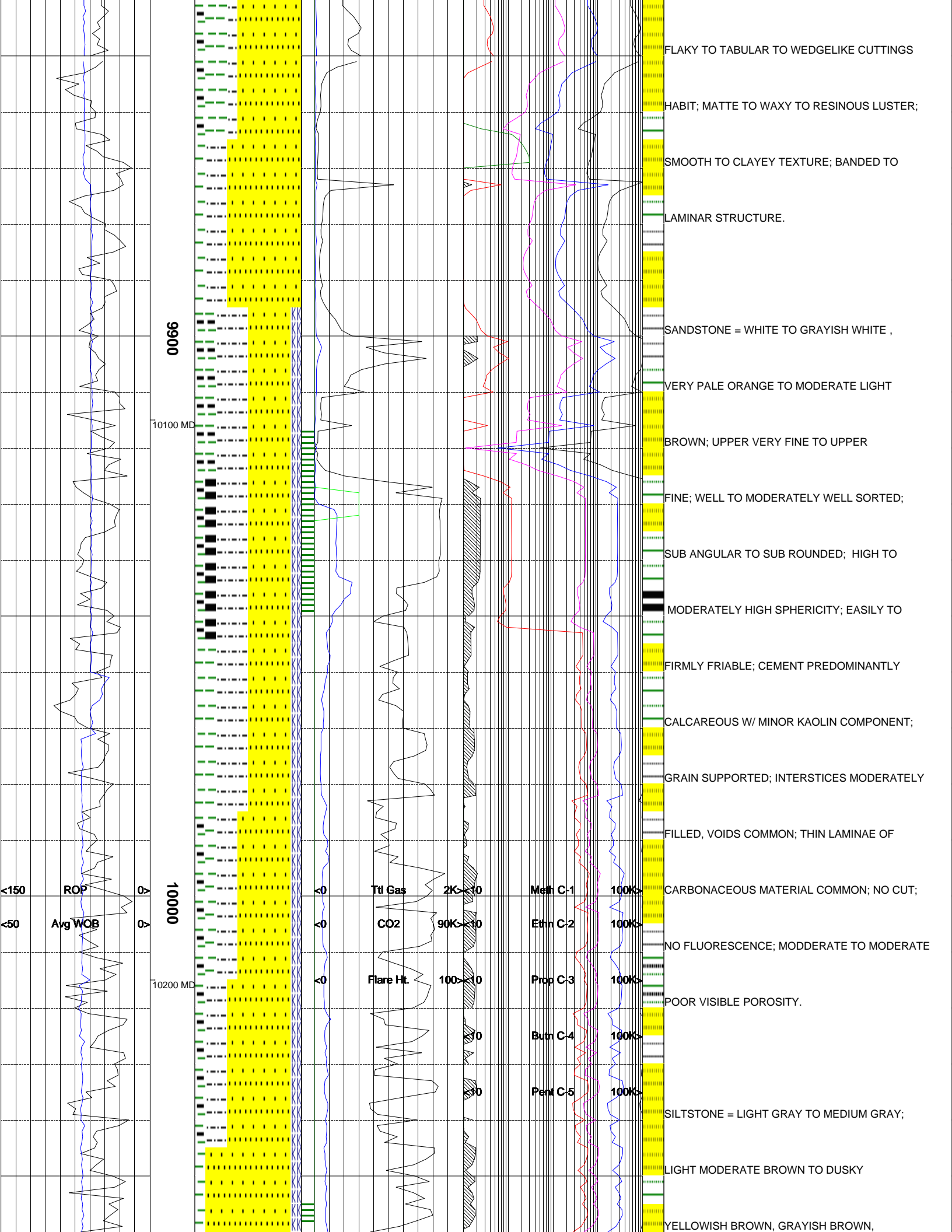
9700

9900 MD

9800

10000 MD

SANDSTONE = WHITE TO MEDIUM GREY SOME
 BLACK; MEDIUM TO COARSE GRAIN SIZE; WELL
 SORTED; SUBANGULAR TO ANGULAR GRAINS
 WITH MODERATE TO LOW SPHERICITY;
 POLISHED GRAIN SURFACES; MODERATELY HARD
 TO HARD CUTTINGS; CALCITE CEMENT WITH A
 MODERATE TO STRONG REACTION TO DILUTE
 HCL; GRAIN SUPPORTED WITH MASSIVE
 BEDDING; ABUNDANT DARK LITHICS AND SOME
 CARBONACEOUS MATERIAL; NO VISIBLE
 HYDROCARBON INDICATORS.
 SHALE = DARK BROWN TO BROWN, BLACK;
 BRITTLE TO CRUMBLY; IRREGULAR TO HACKLY
 FRACTURE; CUTTINGS HABIT MASSIVE TO
 FLAKY; EARTHY TO DULL LUSTER; TEXTURE
 SILTY TO GRITTY; MASSIVE STRUCTURE.
 CARBONACEOUS SHALE = BLACK, MEDIUM GREY
 TO MEDIUM DARK GREY; BRITTLE TO CRUNCHY
 TENACITY; BLOCKY TO SPLINTERY FRACTURE;

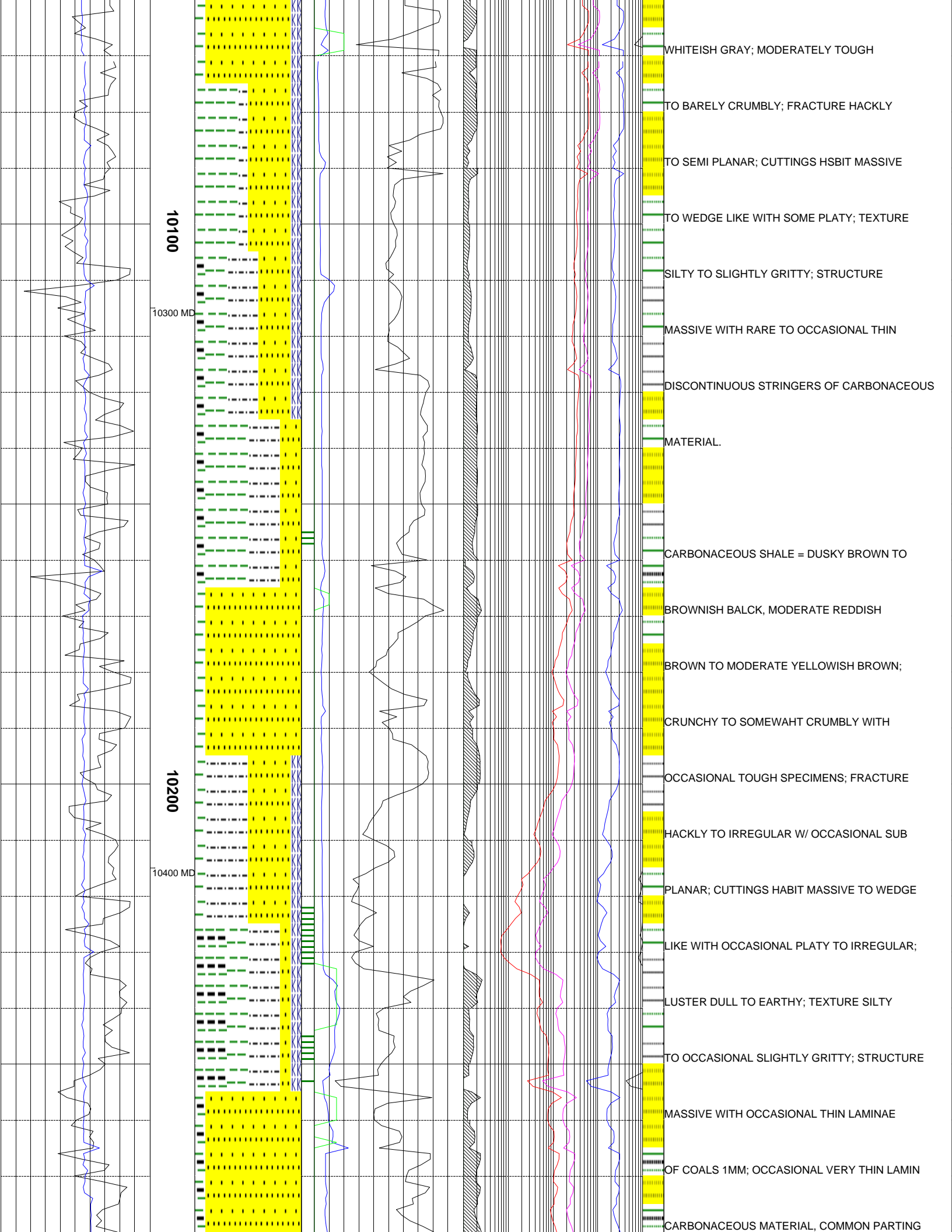


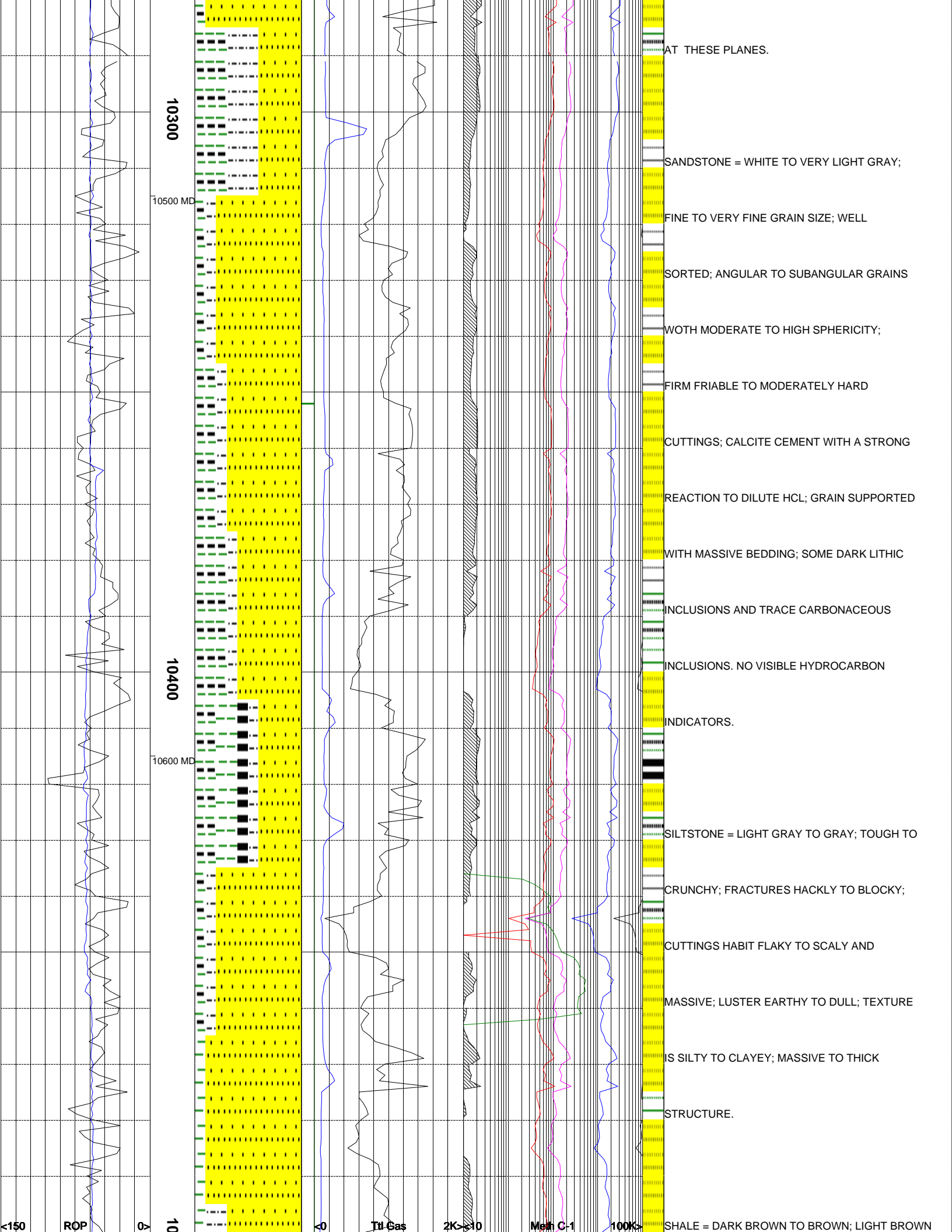
9900
10100 MD
10000
10200 MD

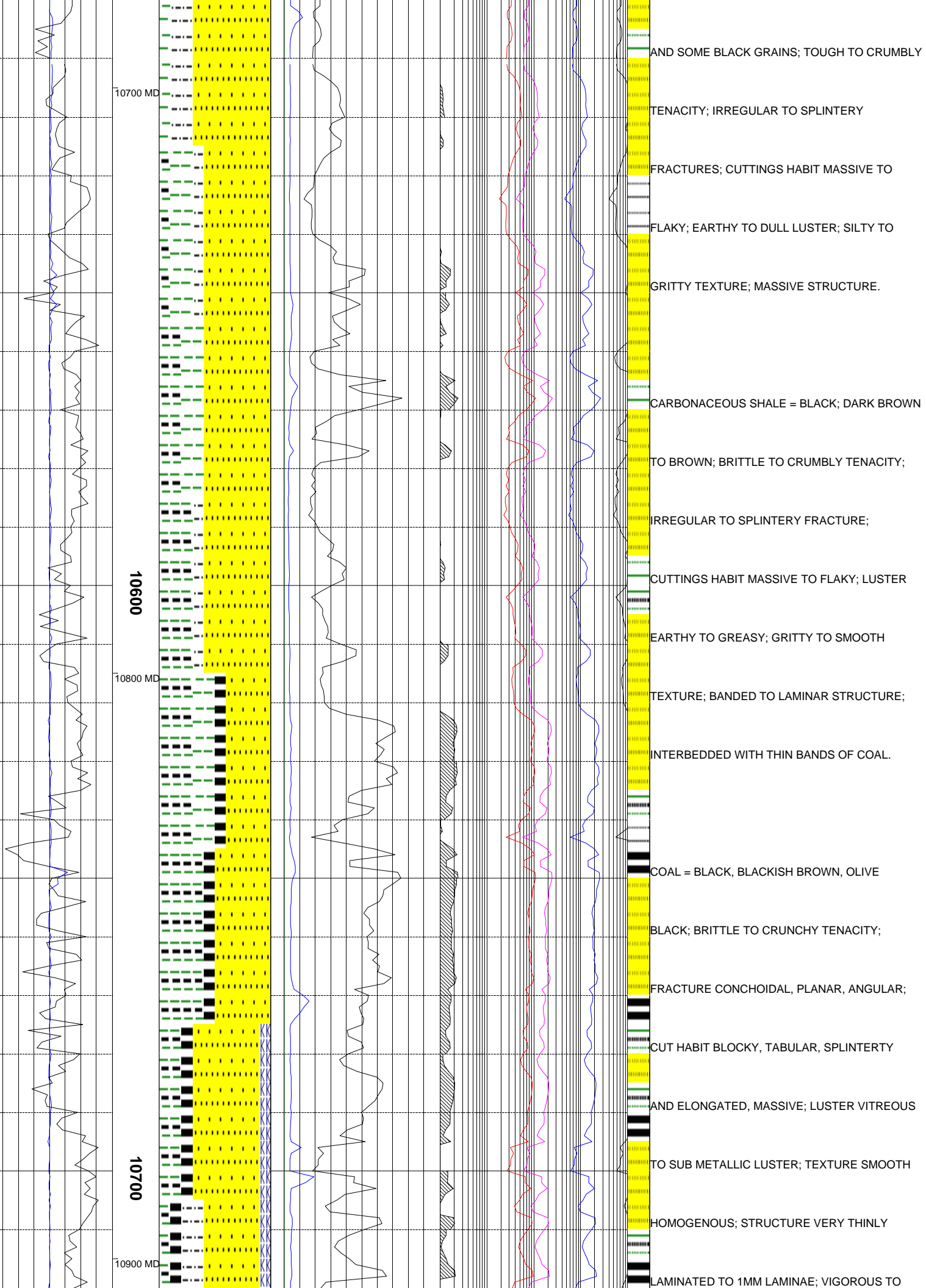
<150 ROP
<50 Avg WOB

Ttl Gas 2K > 10
CO2 90K > 10
Flare Ht. 100 > 10
Meth C-1 100K >
Ethn C-2 100K >
Prop C-3 100K >
Butn C-4 100K >
Pent C-5 100K >

FLAKY TO TABULAR TO WEDGELIKE CUTTINGS
HABIT; MATTE TO WAXY TO RESINOUS LUSTER;
SMOOTH TO CLAYEY TEXTURE; BANDED TO
LAMINAR STRUCTURE.
SANDSTONE = WHITE TO GRAYISH WHITE ,
VERY PALE ORANGE TO MODERATE LIGHT
BROWN; UPPER VERY FINE TO UPPER
FINE; WELL TO MODERATELY WELL SORTED;
SUB ANGULAR TO SUB ROUNDED; HIGH TO
MODERATELY HIGH SPHERICITY; EASILY TO
FIRMLY FRIABLE; CEMENT PREDOMINANTLY
CALCAREOUS W/ MINOR KAOLIN COMPONENT;
GRAIN SUPPORTED; INTERSTICES MODERATELY
FILLED, VOIDS COMMON; THIN LAMINAE OF
CARBONACEOUS MATERIAL COMMON; NO CUT;
NO FLUORESCENCE; MODDERATE TO MODERATE
POOR VISIBLE POROSITY.
SILTSTONE = LIGHT GRAY TO MEDIUM GRAY;
LIGHT MODERATE BROWN TO DUSKY
YELLOWISH BROWN, GRAYISH BROWN,







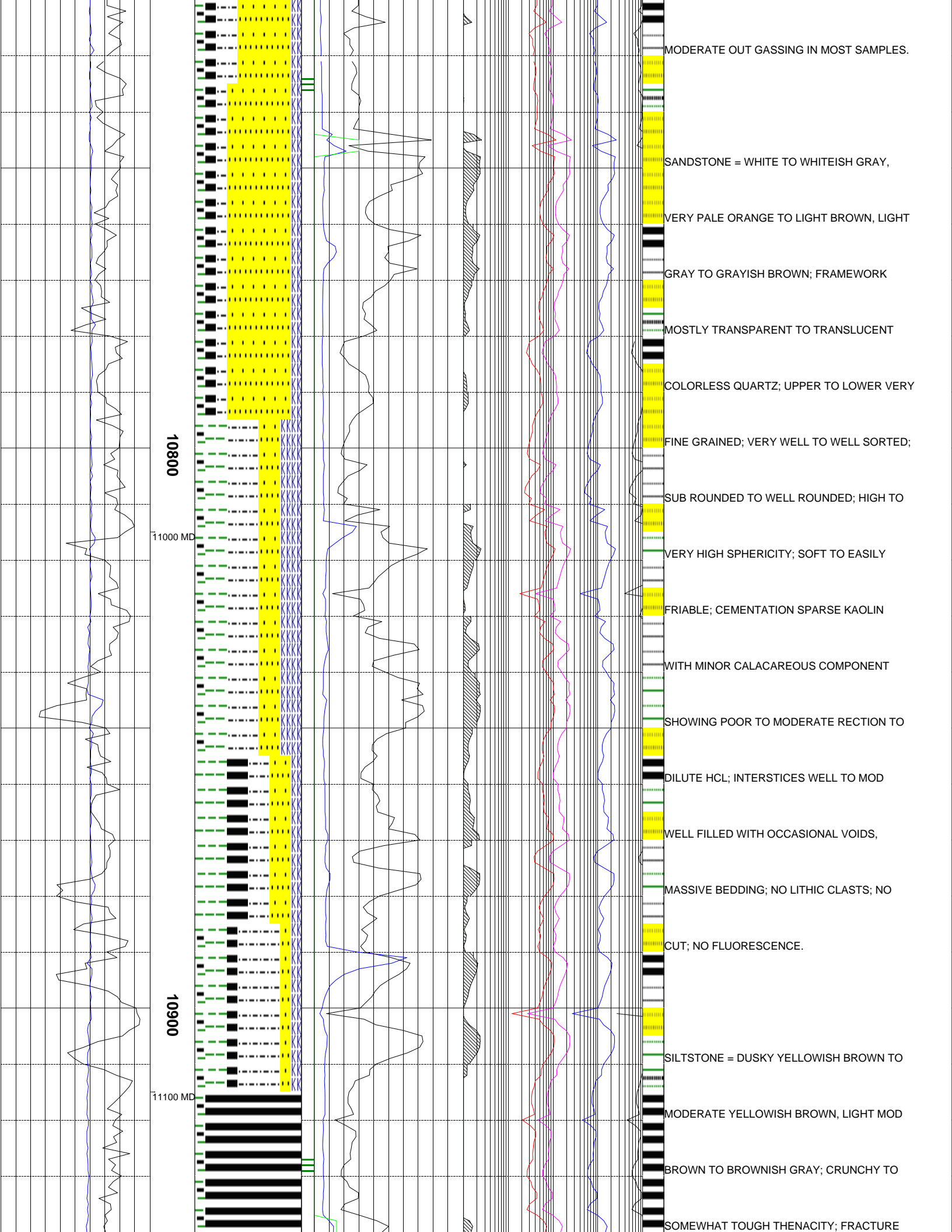
10700 MD

10600

10800 MD

10700

10900 MD



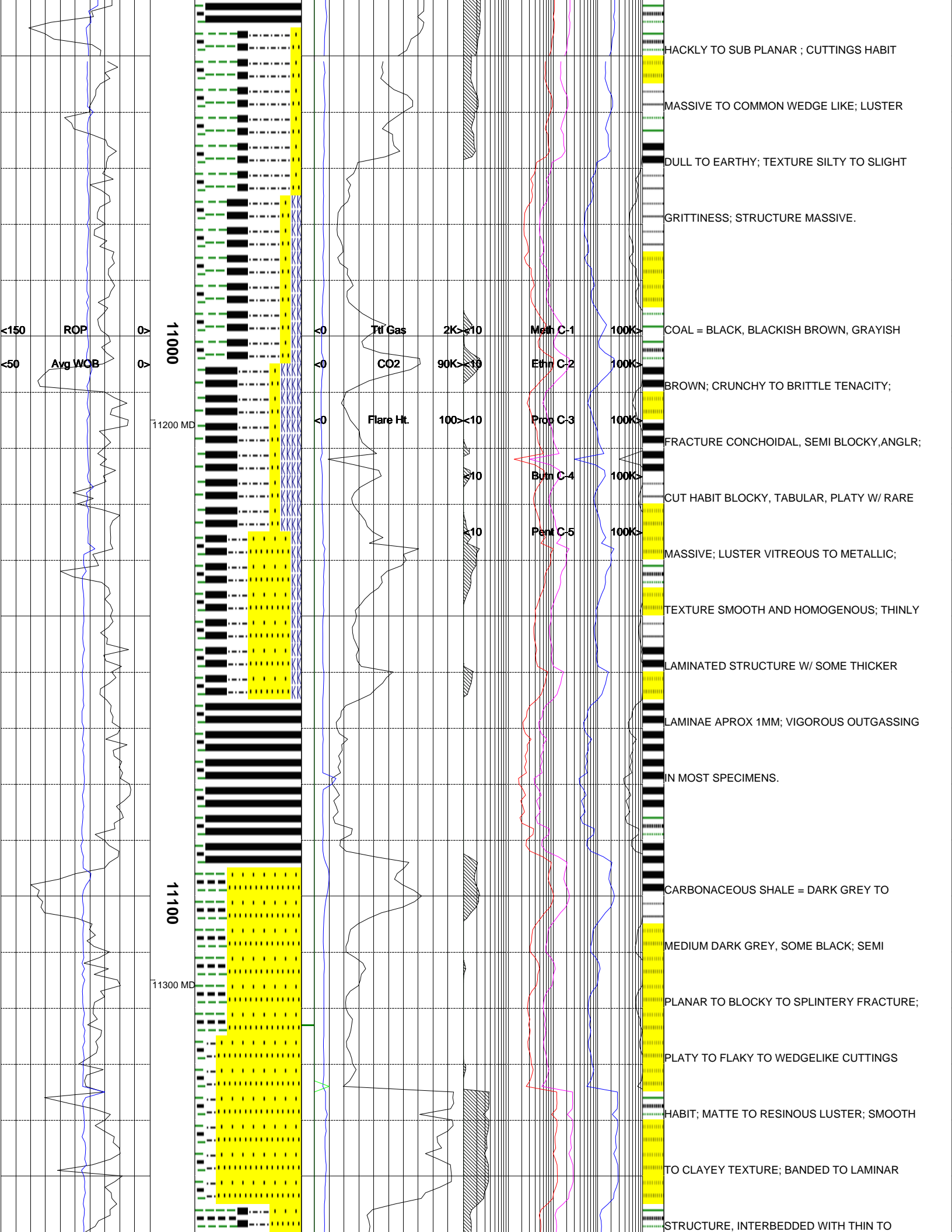
10800
11000 MD

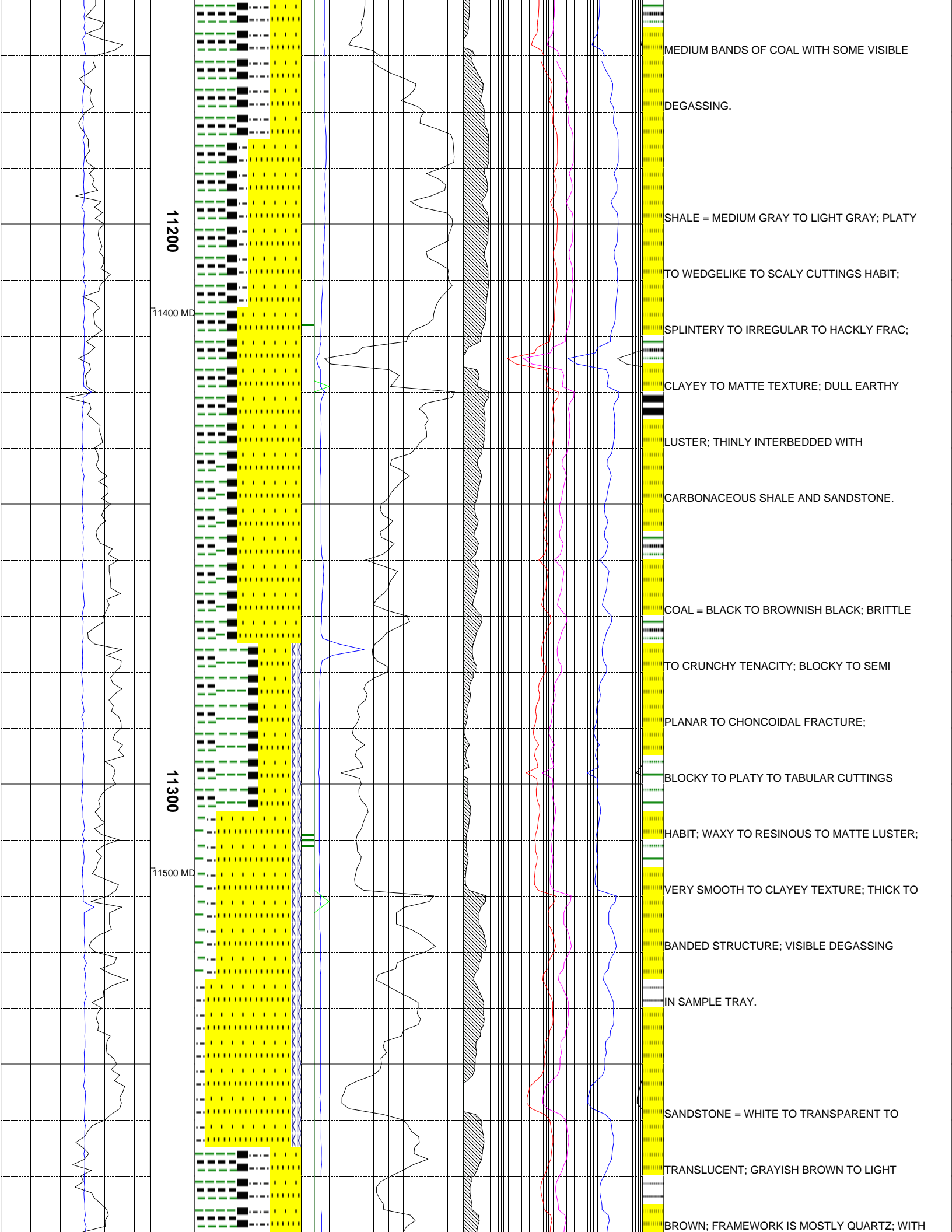
10900
11100 MD

MODERATE OUT GASSING IN MOST SAMPLES.

SANDSTONE = WHITE TO WHITEISH GRAY,
VERY PALE ORANGE TO LIGHT BROWN, LIGHT
GRAY TO GRAYISH BROWN; FRAMEWORK
MOSTLY TRANSPARENT TO TRANSLUCENT
COLORLESS QUARTZ; UPPER TO LOWER VERY
FINE GRAINED; VERY WELL TO WELL SORTED;
SUB ROUNDED TO WELL ROUNDED; HIGH TO
VERY HIGH SPHERICITY; SOFT TO EASILY
FRIABLE; CEMENTATION SPARSE KAOLIN
WITH MINOR CALACAREOUS COMPONENT
SHOWING POOR TO MODERATE RECTION TO
DILUTE HCL; INTERSTICES WELL TO MOD
WELL FILLED WITH OCCASIONAL VOIDS,
MASSIVE BEDDING; NO LITHIC CLASTS; NO
CUT; NO FLUORESCENCE.

SILTSTONE = DUSKY YELLOWISH BROWN TO
MODERATE YELLOWISH BROWN, LIGHT MOD
BROWN TO BROWNISH GRAY; CRUNCHY TO
SOMEWHAT TOUGH THENACITY; FRACTURE





11200

11400 MD

11300

11500 MD

MEDIUM BANDS OF COAL WITH SOME VISIBLE

DEGASSING.

SHALE = MEDIUM GRAY TO LIGHT GRAY; PLATY

TO WEDGELIKE TO SCALY CUTTINGS HABIT;

SPLINTERY TO IRREGULAR TO HACKLY FRAC;

CLAYEY TO MATTE TEXTURE; DULL EARTHY

LUSTER; THINLY INTERBEDDED WITH

CARBONACEOUS SHALE AND SANDSTONE.

COAL = BLACK TO BROWNISH BLACK; BRITTLE

TO CRUNCHY TENACITY; BLOCKY TO SEMI

PLANAR TO CHONCOIDAL FRACTURE;

BLOCKY TO PLATY TO TABULAR CUTTINGS

HABIT; WAXY TO RESINOUS TO MATTE LUSTER;

VERY SMOOTH TO CLAYEY TEXTURE; THICK TO

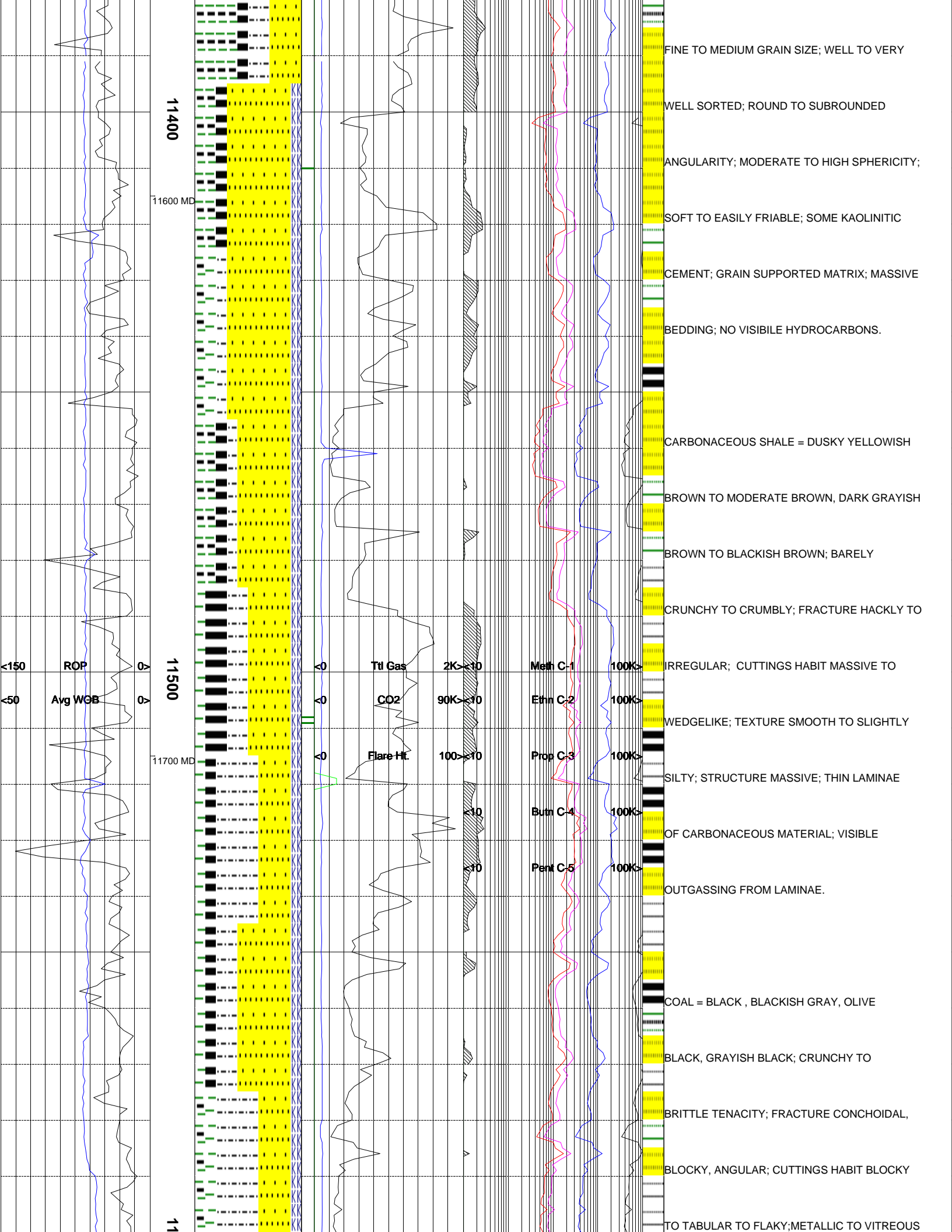
BANDED STRUCTURE; VISIBLE DEGASSING

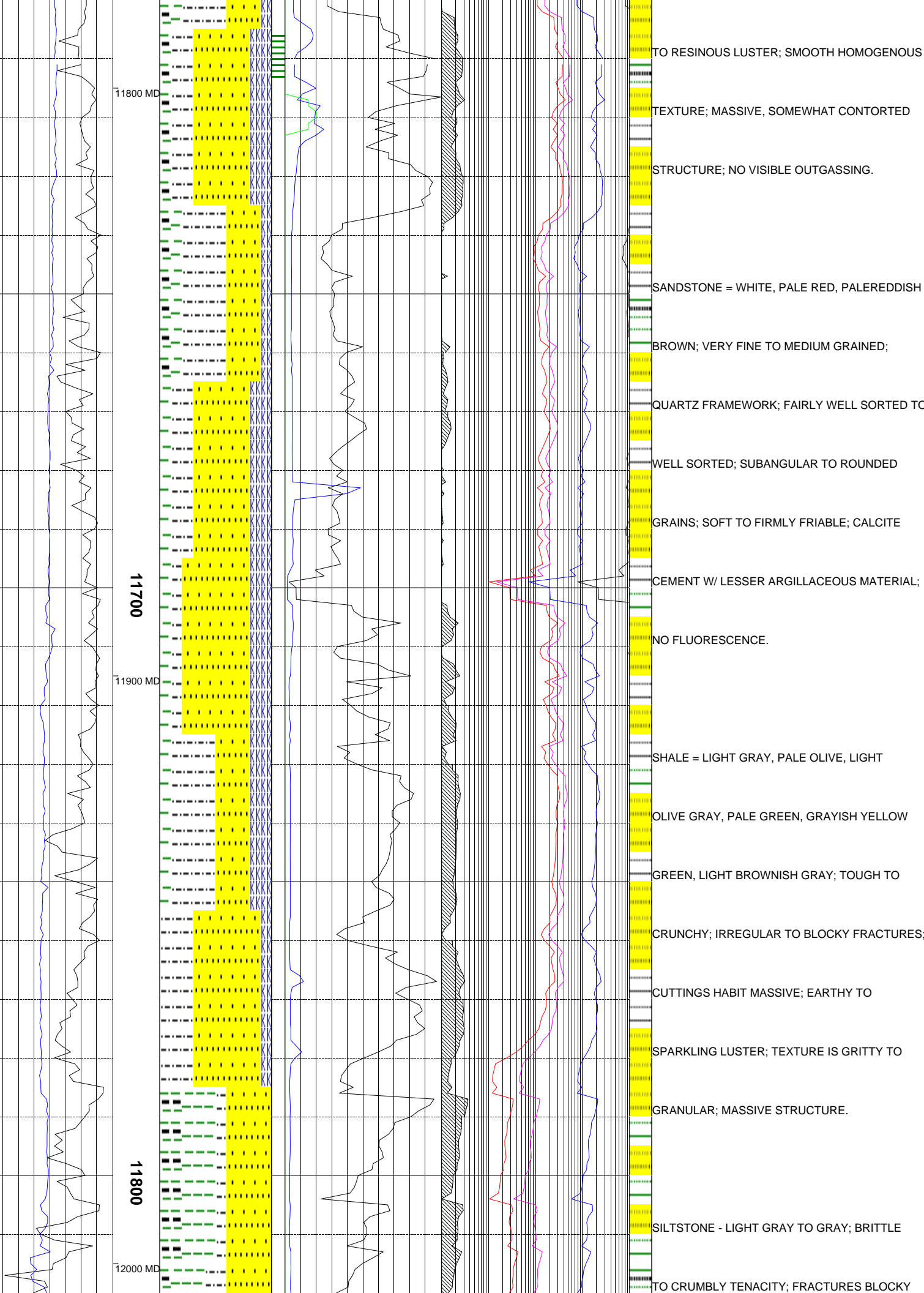
IN SAMPLE TRAY.

SANDSTONE = WHITE TO TRANSPARENT TO

TRANSLUCENT; GRAYISH BROWN TO LIGHT

BROWN; FRAMEWORK IS MOSTLY QUARTZ; WITH





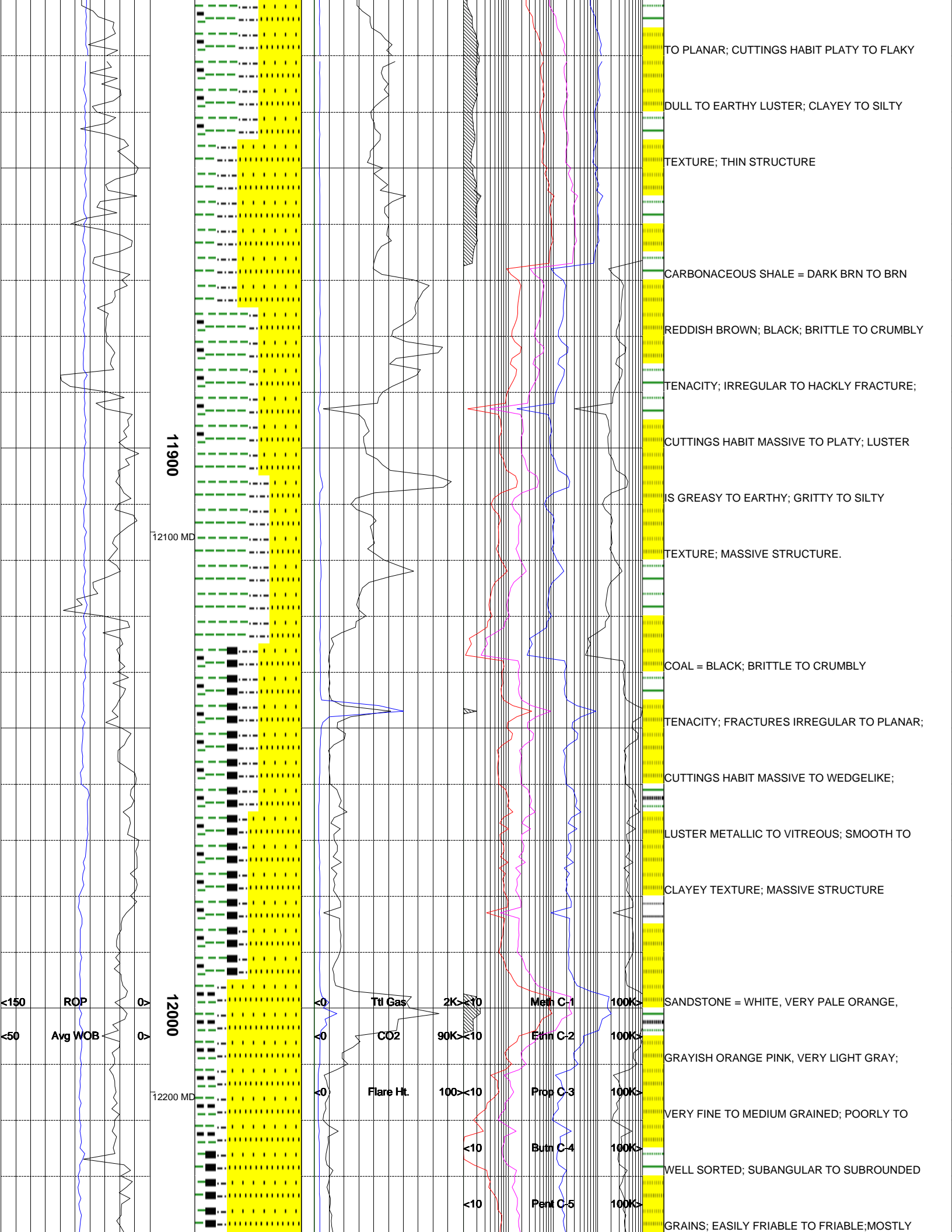
11800 MD

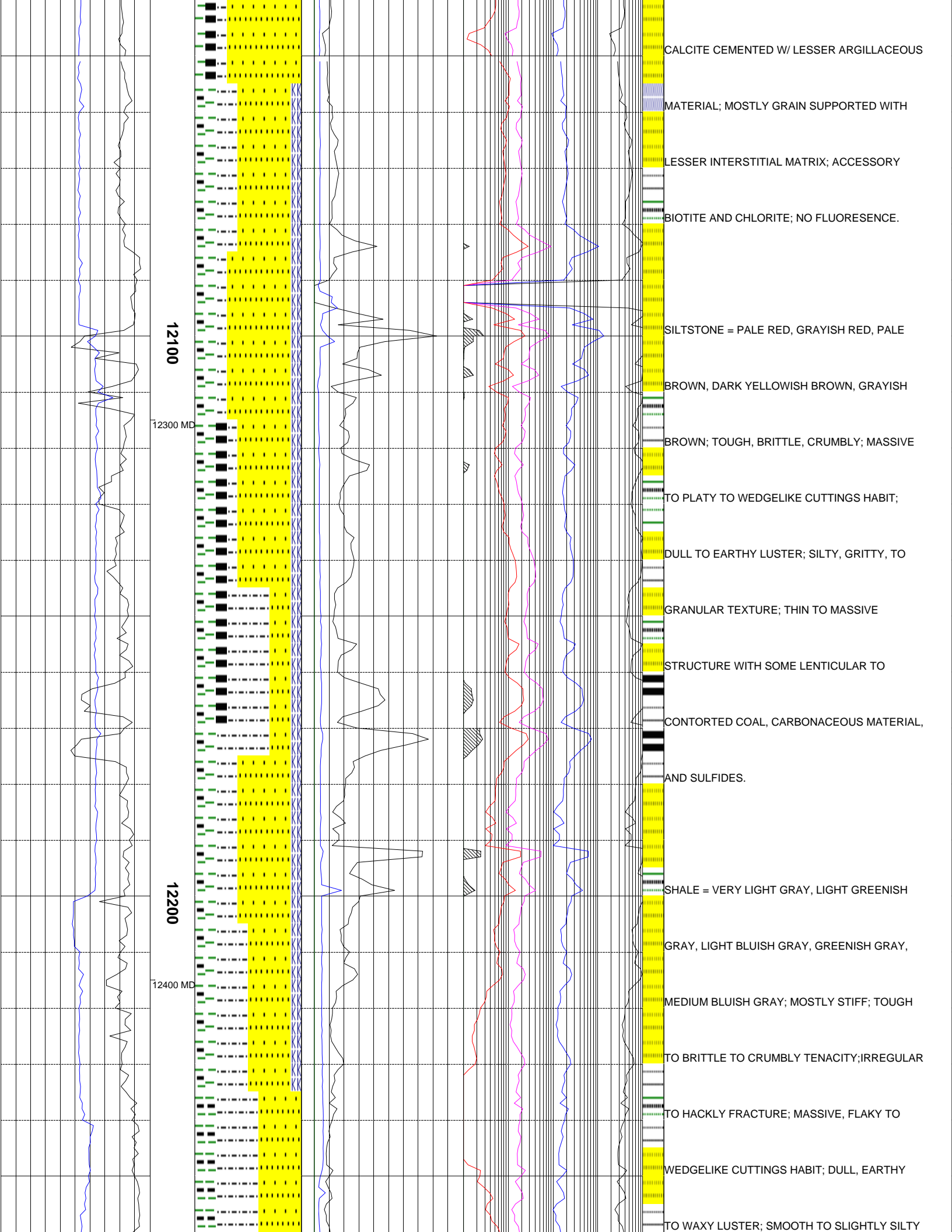
11700

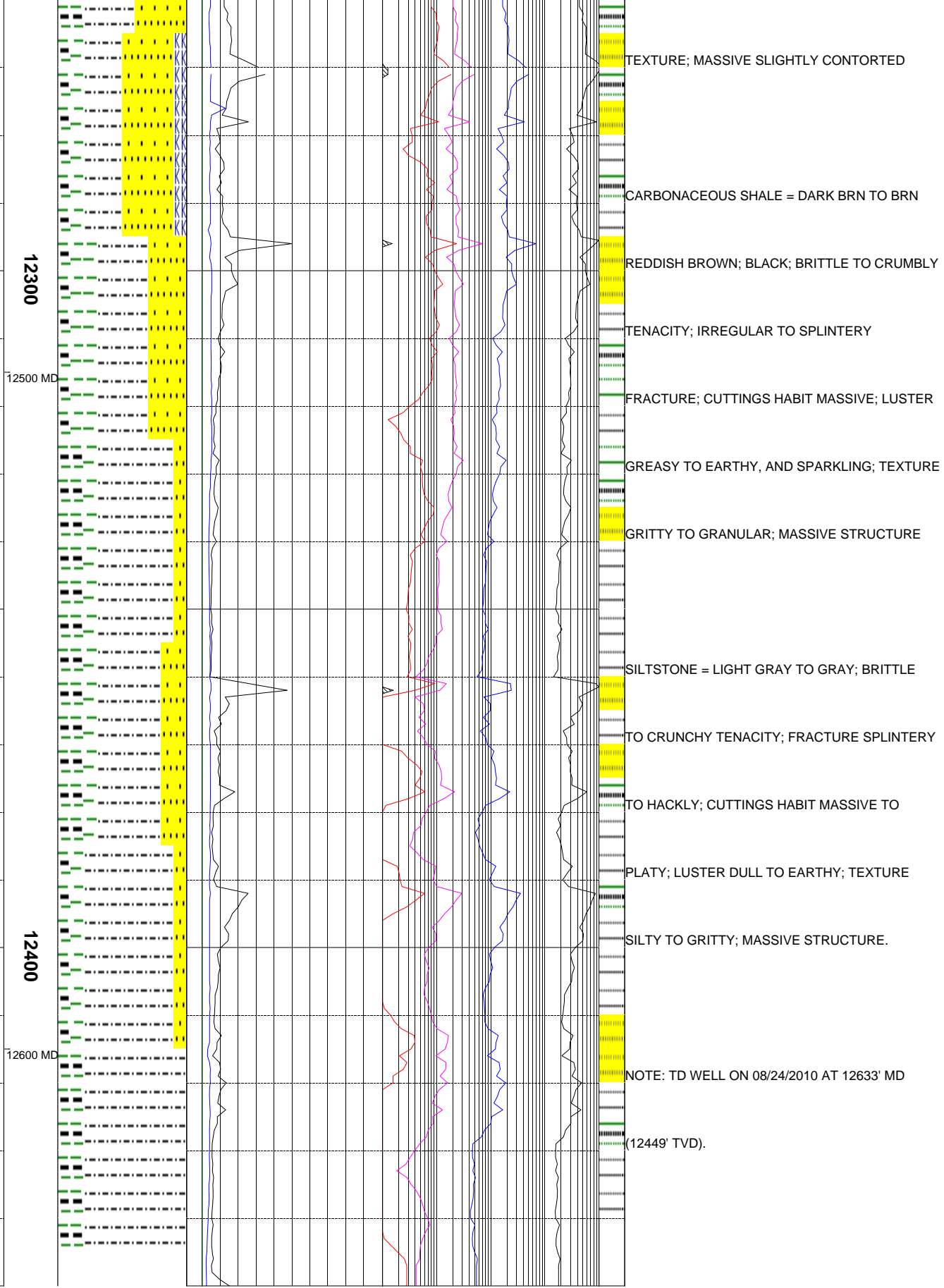
11900 MD

11800

12000 MD







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