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 Production
WELL	PCU 197-34B7
FIELD	PICEANCE CREEK
REGION	ROCKY MOUNTAINS
COORDINATES	39.915669000
	108.261250000
ELEVATION	6647.9'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	05-103-11086-00
SPUD DATE	9/16/2009
CONTRACTOR	H _P
CO. REP.	S. GUYOTE, W. GARNER
RIG/TYPE	# 320/FLEX 4S+
LOGGING UNIT	MLU 032
GEOLOGISTS	J. KEEVAN, C. RECORD
	C. PIERCE
ADD. PERSONS	M. PIPER, B. HICKS
	T. WALKER
CO. GEOLOGIST	CHRIS ALBA

LOG INTERVAL

DEPTHS:	4022'	**TO**	12990'
DATES:	9/15/2009	**TO**	12/13/2009
SCALE:		5"=100'	

MUD TYPES

LSND	**TO**	4022'
LIGCO	**TO**	12990'
	TO	
	TO	

CASING DATA

16"	**AT**	130'
10.75"	**AT**	3990'
7"	**AT**	9220'
	AT	

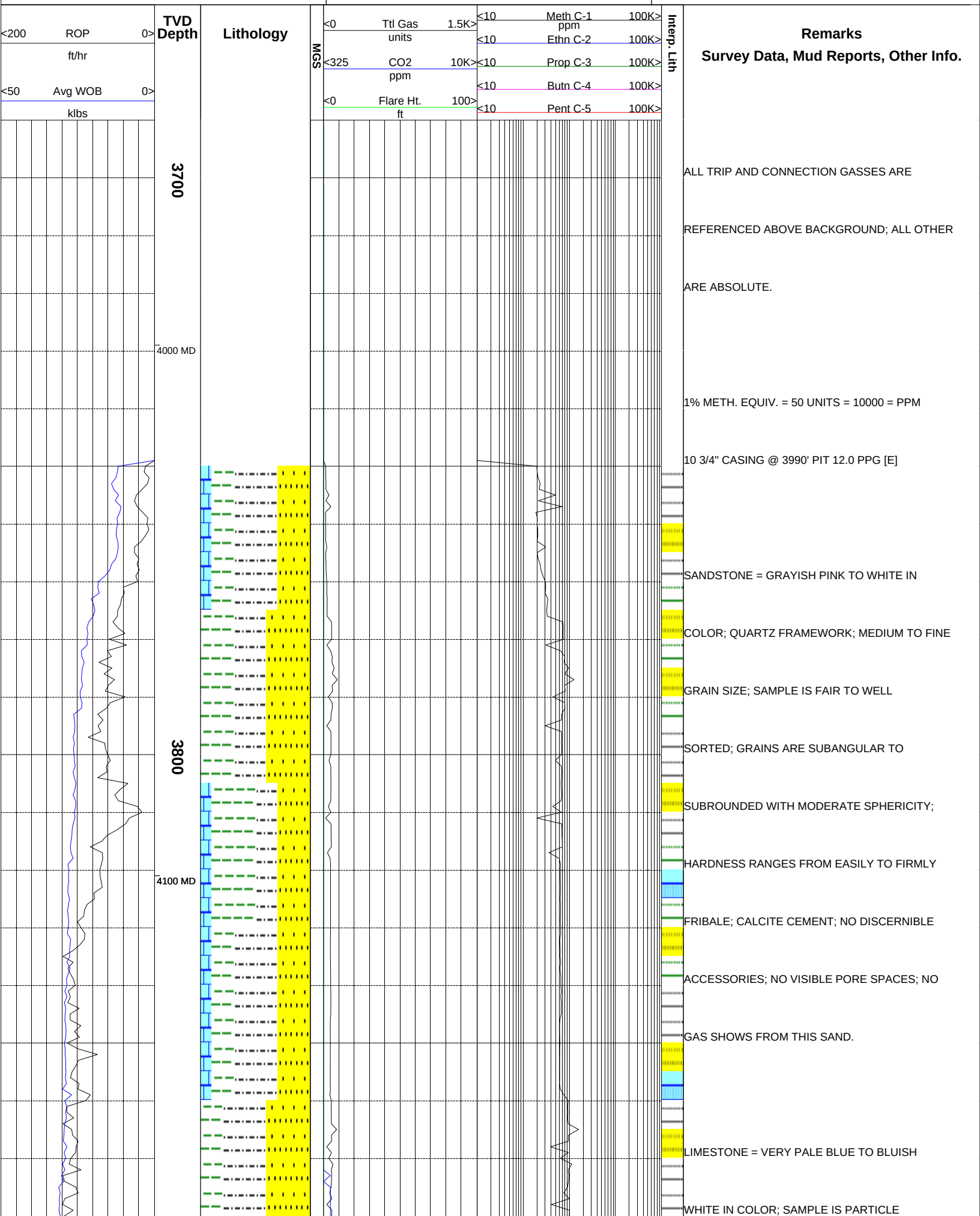
HOLE SIZE

14.75"	**TO**	4022'
9.875"	**TO**	9100'
6.125"	**TO**	12990'
	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		

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
KAOLINITIC
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
SALT
SAND
SANDSTONE
SANDSTONE-TUFFACEOUS
SERICITIZATION
SERPENTINE
SHALE
SHALE TUFFACEOUS
SHELL FRAGMENTS
SIDERITE
SILICIFICATION
SILTSTONE
SILTST-TUFFACEOUS
TUFF
VOLCANICLASTICS SEDS
VOLCANICS



Remarks
Survey Data, Mud Reports, Other Info.

ALL TRIP AND CONNECTION GASSES ARE

REFERENCED ABOVE BACKGROUND; ALL OTHER

ARE ABSOLUTE.

1% METH. EQUIV. = 50 UNITS = 10000 = PPM

10 3/4" CASING @ 3990' PIT 12.0 PPG [E]

SANDSTONE = GRAYISH PINK TO WHITE IN

COLOR; QUARTZ FRAMEWORK; MEDIUM TO FINE

GRAIN SIZE; SAMPLE IS FAIR TO WELL

SORTED; GRAINS ARE SUBANGULAR TO

SUBROUNDED WITH MODERATE SPHERICITY;

HARDNESS RANGES FROM EASILY TO FIRMLY

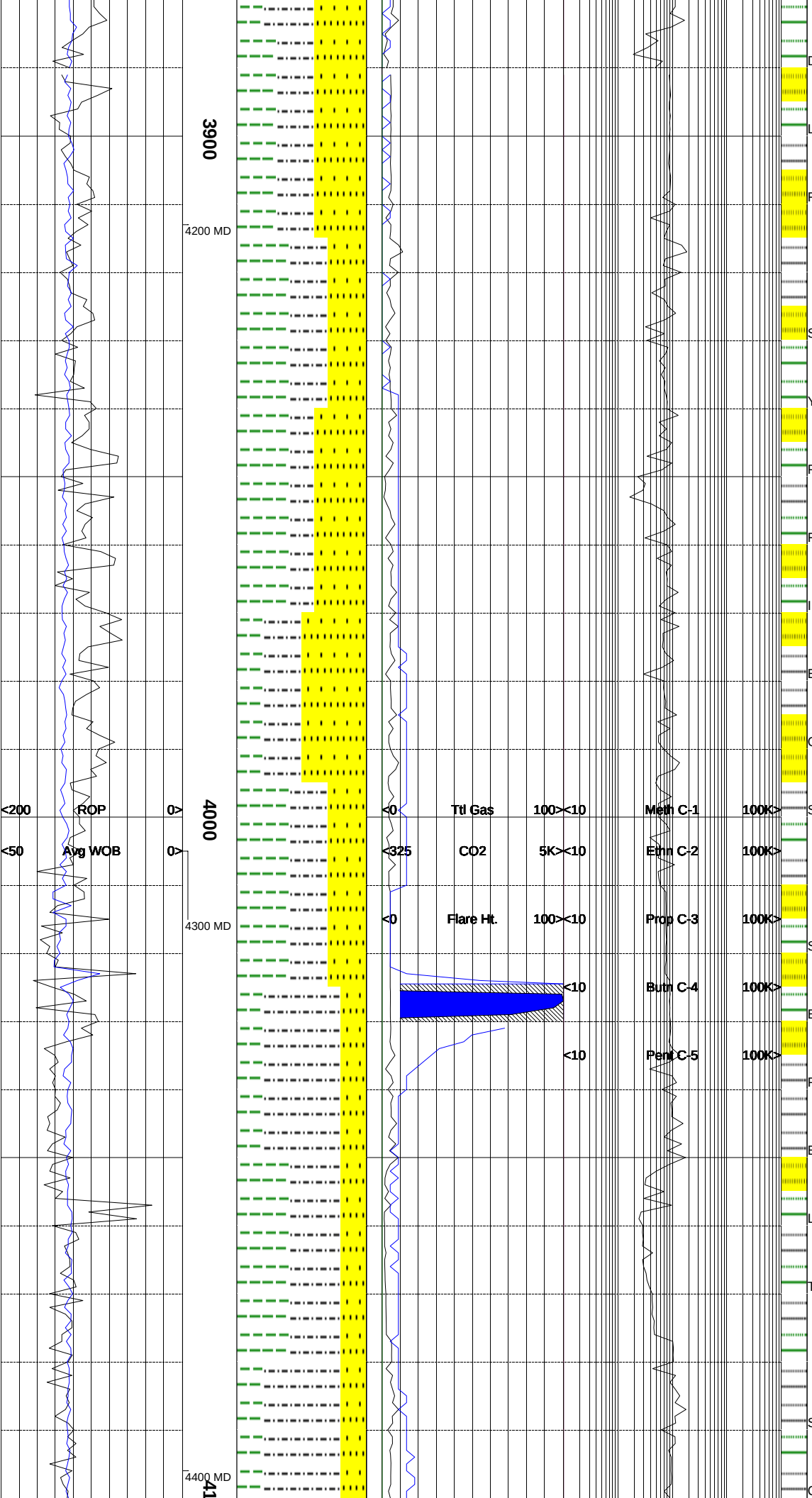
FRIBALE; CALCITE CEMENT; NO DISCERNIBLE

ACCESSORIES; NO VISIBLE PORE SPACES; NO

GAS SHOWS FROM THIS SAND.

LIMESTONE = VERY PALE BLUE TO BLUISH

WHITE IN COLOR; SAMPLE IS PARTICLE



DOMINATED WITH NON SKELETAL PARTICLES;

LIME MUD MATRIX WITH POINT CONTACT

FABRIC; INTRAPARTICAL POROSITY.

SILTSTONE = GRAYISH RED TO DARK

YELLOWISH ORANGE IN COLOR; BRITTLE TO

PULVERANT TENACITY; BLOCKY TO MOTTLED

FRACTURE; CUTTINGS ARE NODULAR TO EQUANT

IN APPEARANCE; DULL TO EARTHY LUSTER

EXHIBITED; SILTY TO GRITTY, ALMOST

GRANULAR TEXTURE; THIN TO THICK

STRUCTURE APPARENT.

SHALE = MEDIUM TO DARK GRAY IN COLORING;

BRITTLE IN TENACITY WITH BLOCKY TO

PLANAR FRACTURING IN A TABULAR TO

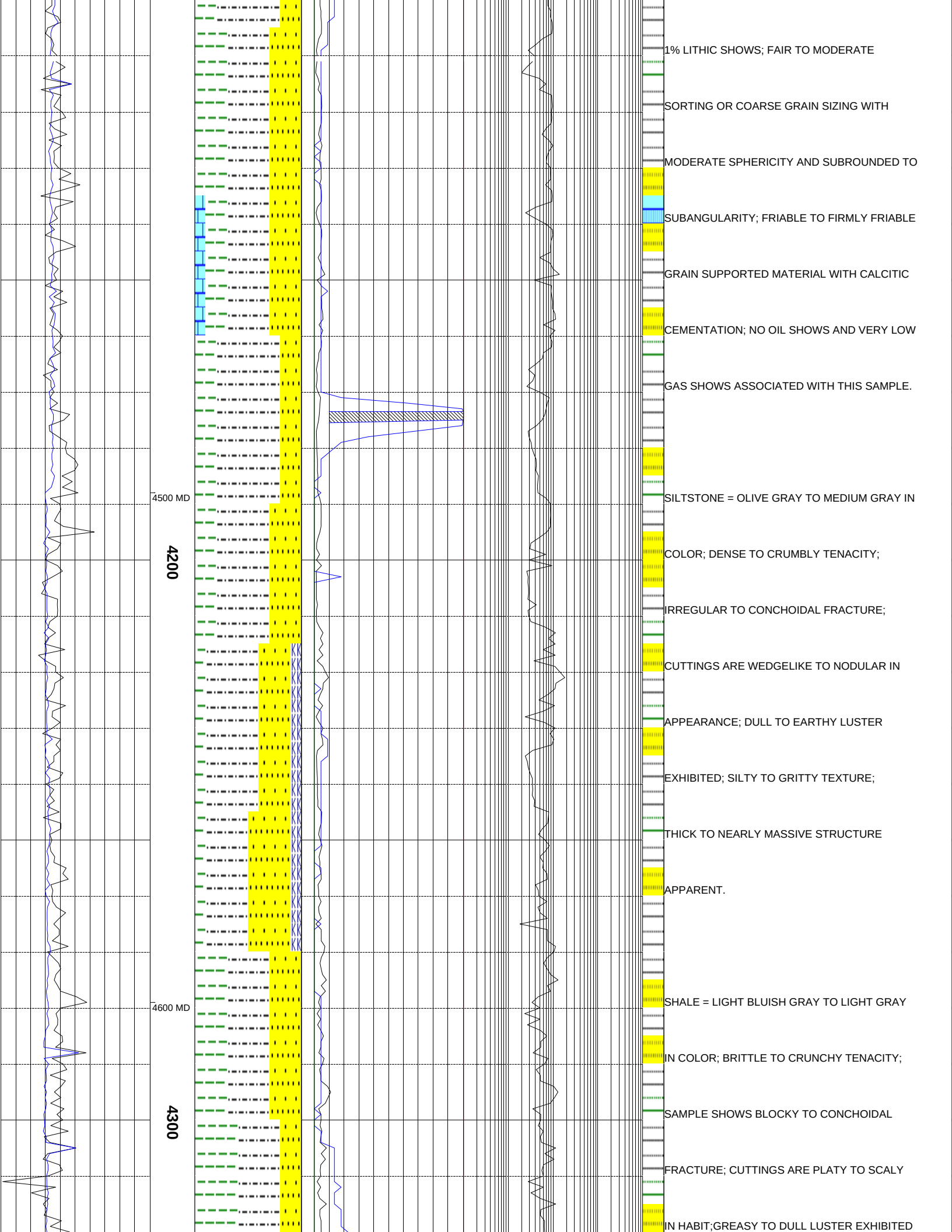
ELONGATED CUTTINGS HABIT; WAXY TO GREASY

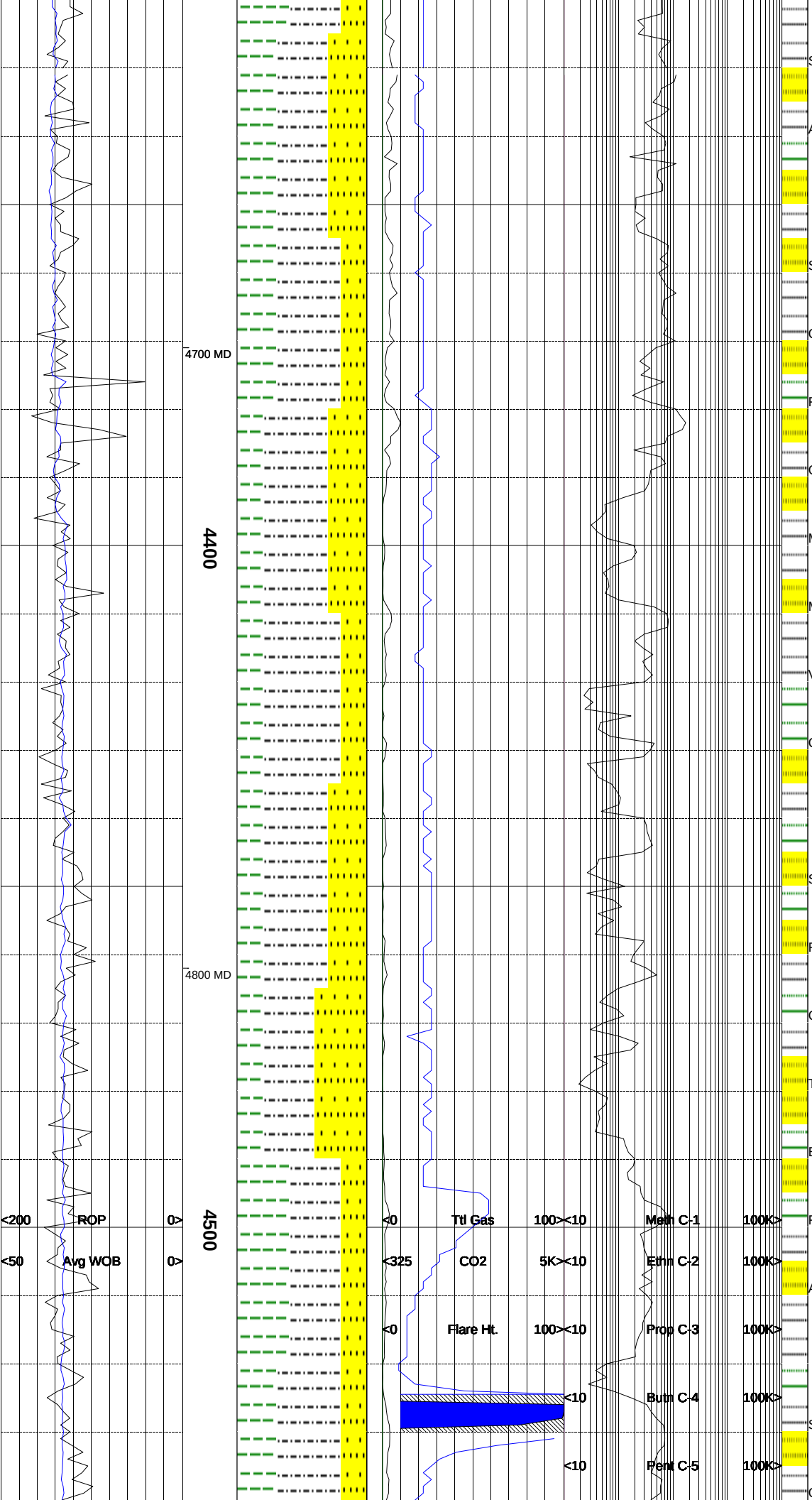
LUSTER WITH A SMOOTH TEXTURE AND THIN

TO LAMINAE STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN

COLORING; QUARTZ FRAMEWORK WITH ABOUT


4500 MD
4200
4600 MD
4300
1% LITHIC SHOWS; FAIR TO MODERATE
SORTING OR COARSE GRAIN SIZING WITH
MODERATE SPHERICITY AND SUBROUNDED TO
SUBANGULARITY; FRIABLE TO FIRMLY FRIABLE
GRAIN SUPPORTED MATERIAL WITH CALCITIC
CEMENTATION; NO OIL SHOWS AND VERY LOW
GAS SHOWS ASSOCIATED WITH THIS SAMPLE.
SILTSTONE = OLIVE GRAY TO MEDIUM GRAY IN
COLOR; DENSE TO CRUMBLY TENACITY;
IRREGULAR TO CONCHOIDAL FRACTURE;
CUTTINGS ARE WEDGELIKE TO NODULAR IN
APPEARANCE; DULL TO EARTHY LUSTER
EXHIBITED; SILTY TO GRITTY TEXTURE;
THICK TO NEARLY MASSIVE STRUCTURE
APPARENT.
SHALE = LIGHT BLUISH GRAY TO LIGHT GRAY
IN COLOR; BRITTLE TO CRUNCHY TENACITY;
SAMPLE SHOWS BLOCKY TO CONCHOIDAL
FRACTURE; CUTTINGS ARE PLATY TO SCALY
IN HABIT;GREASY TO DULL LUSTER EXHIBITED



SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE

APPARENT.

SANDSTONE = LIGHT GRAY TO WHITE IN COLOR

QUARTZ FRAMEWORK WITH SOME CALCITE AND

FELSPAR GRAINS; VERY FINE TO MEDIUM

GRAIN SIZE; ROUNDED TO SUBANGULAR WITH

MODERATE SPHERICITY; FRIABLE TO

MODERATELY HARD; CALCITE CEMENT; NO

VISIBLE PORE SPACES; NO GAS SHOWS;

CHLORITE GRAINS VISIBLE IN MATRIX.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH

REDDISH BROWN AND YELLOWISH GRAY IN

COLORING; DENSE IN TENACITY WITH BLOCKY

TO PLANAR FRACTURING IN A TABULAR TO

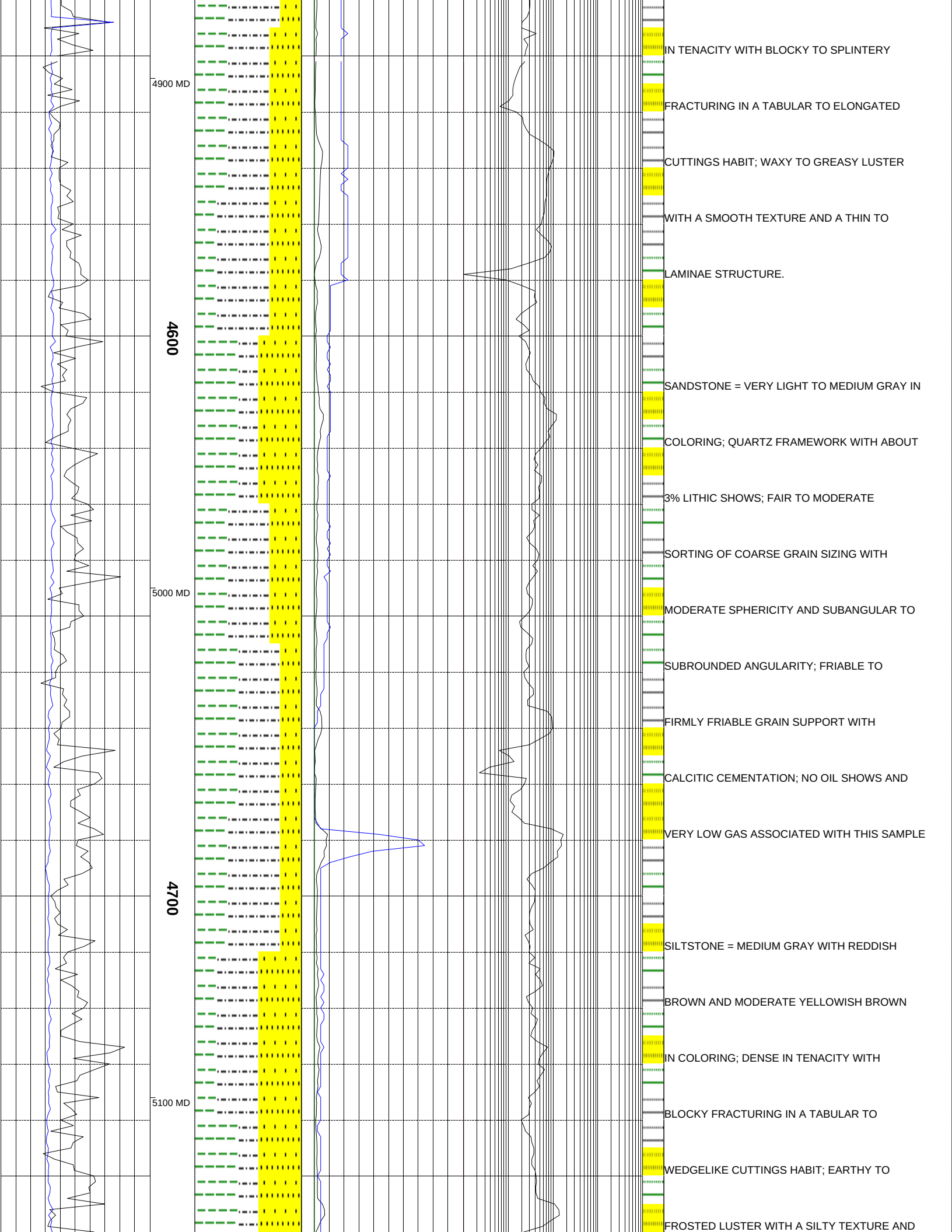
ELONGATED CUTTINGS HABIT; EARTHY TO

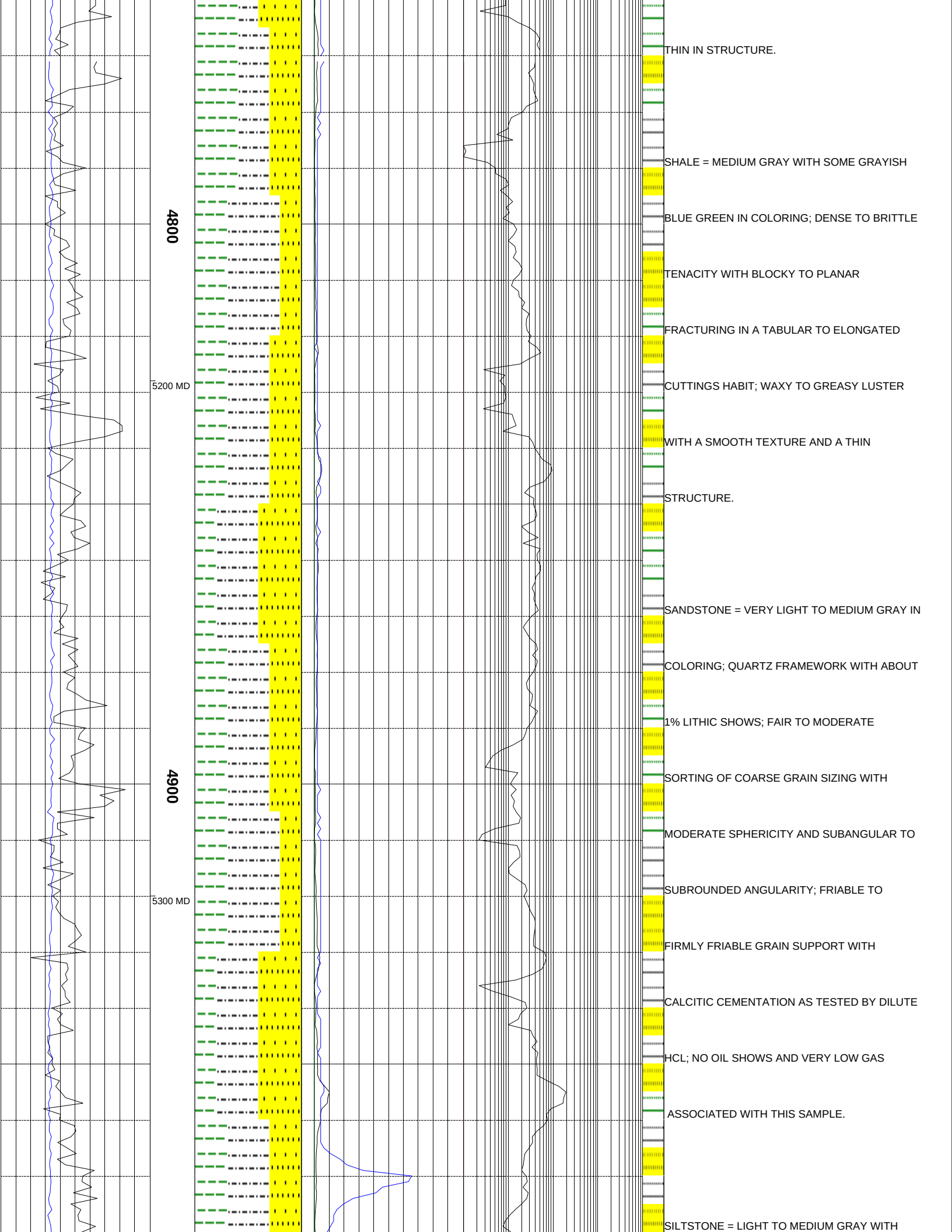
FROSTED LUSTER WITH A SILTY TEXTURE AND

A THIN STRUCTURE.

SHALE = LIGHT TO MEDIUM GRAY WITH

GRAYISH BLUE GREEN COLORATION; BRITTLE


4900 MD
4600
5000 MD
4700
5100 MD
IN TENACITY WITH BLOCKY TO SPLINTERY
FRACTURING IN A TABULAR TO ELONGATED
CUTTINGS HABIT; WAXY TO GREASY LUSTER
WITH A SMOOTH TEXTURE AND A THIN TO
LAMINAE STRUCTURE.
SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN
COLORING; QUARTZ FRAMEWORK WITH ABOUT
3% LITHIC SHOWS; FAIR TO MODERATE
SORTING OF COARSE GRAIN SIZING WITH
MODERATE SPHERICITY AND SUBANGULAR TO
SUBROUNDED ANGULARITY; FRIABLE TO
FIRMLY FRIABLE GRAIN SUPPORT WITH
CALCITIC CEMENTATION; NO OIL SHOWS AND
VERY LOW GAS ASSOCIATED WITH THIS SAMPLE
SILTSTONE = MEDIUM GRAY WITH REDDISH
BROWN AND MODERATE YELLOWISH BROWN
IN COLORING; DENSE IN TENACITY WITH
BLOCKY FRACTURING IN A TABULAR TO
WEDGELIKE CUTTINGS HABIT; EARTHY TO
FROSTED LUSTER WITH A SILTY TEXTURE AND

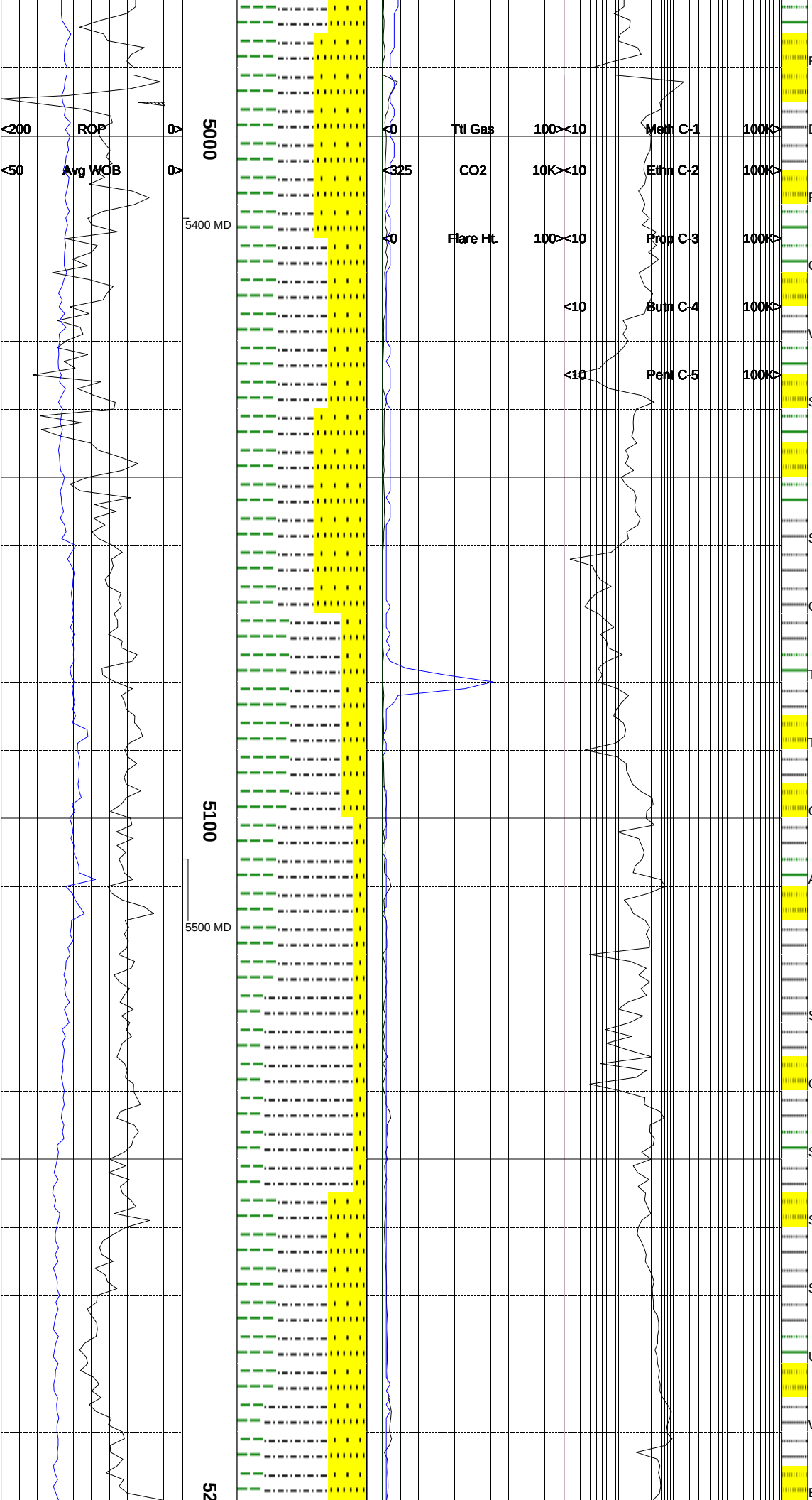


THIN IN STRUCTURE.

SHALE = MEDIUM GRAY WITH SOME GRAYISH BLUE GREEN IN COLORING; DENSE TO BRITTLE TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; WAXY TO GREASY LUSTER WITH A SMOOTH TEXTURE AND A THIN STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 1% LITHIC SHOWS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; FRIABLE TO FIRMLY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION AS TESTED BY DILUTE HCL; NO OIL SHOWS AND VERY LOW GAS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH



REDDISH BROWN AND LIGHT BROWN COLORING;

DENSE IN TENACITY WITH BLOCKY TO PLANAR

FRACTURING IN A TABULAR TO WEDGELIKE

CUTTINGS HABIT; EARTHY TO FROSTED LUSTER

WITH A SILTY TEXTURE AND A THIN

STRUCTURE.

SHALE = MEDIUM GRAY WITH GRAYISH BLUE

GREEN COLORATION; DENSE TO BRITTLE IN

TENACITY WITH PLANAR FRACTURING IN A

TABULAR TO ELONGATED CUTTINGS HABIT;

GREASY IN LUSTER WITH A SMOOTH TEXTURE

AND THIN TO LAMINAE STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY IN

COLOR; QUARTZ FRAMEWORK WITH NO LITHIC

SHOWS; MODERATE SORTING OF COARSE GRAIN

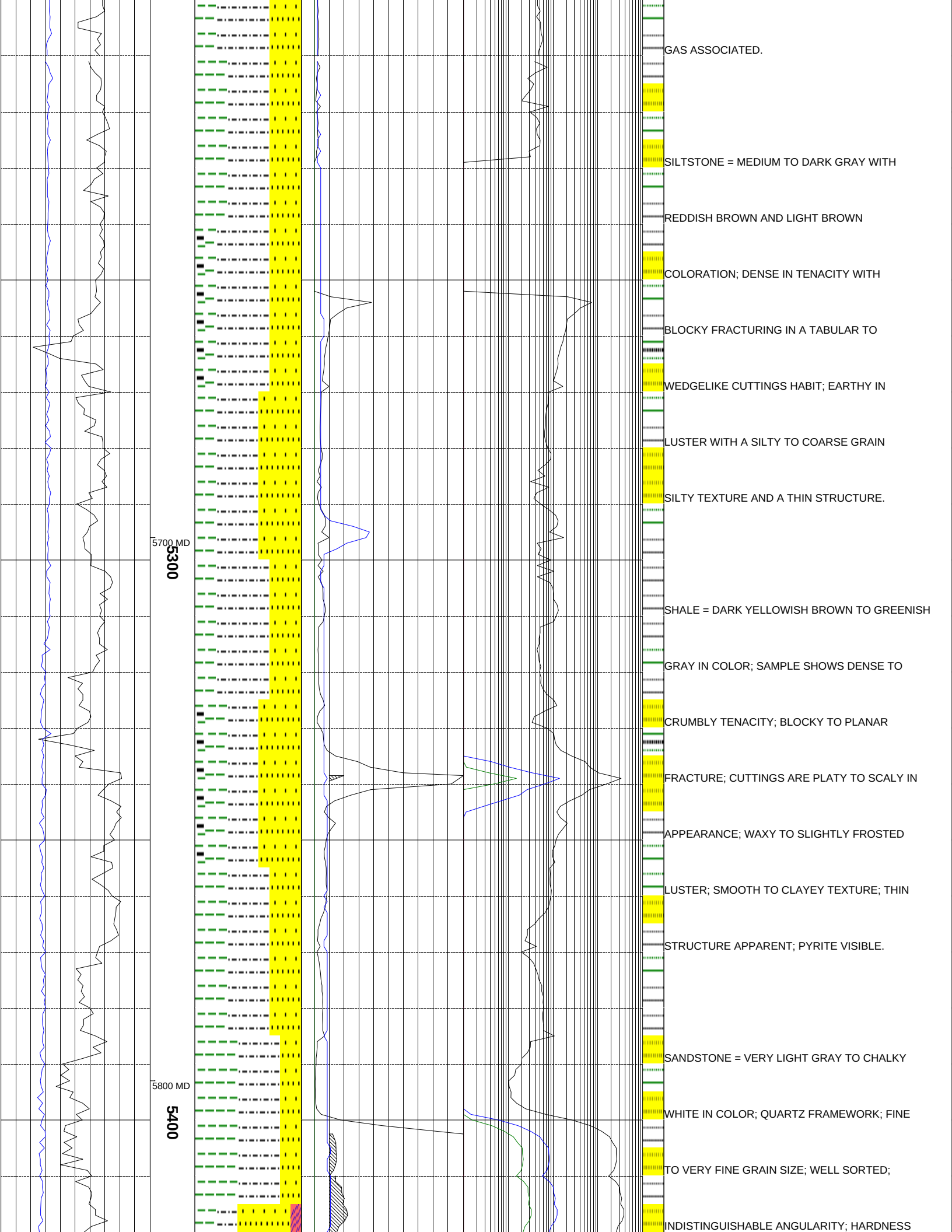
SIZING WITH MODERATE SPHERICITY AND

SUBANGULAR TO SUBROUNDED ANGULARITY;

UNCONSOLIDATED TO FRIABLE GRAIN SUPPORT

WITH CALCITIC CEMENTATION AS SUGGESTED

BY DILUTE HCL; NO OIL SHOWS AND VERY LOW



GAS ASSOCIATED.

SILTSTONE = MEDIUM TO DARK GRAY WITH

REDDISH BROWN AND LIGHT BROWN

COLORATION; DENSE IN TENACITY WITH

BLOCKY FRACTURING IN A TABULAR TO

WEDGELIKE CUTTINGS HABIT; EARTHY IN

LUSTER WITH A SILTY TO COARSE GRAIN

SILTY TEXTURE AND A THIN STRUCTURE.

SHALE = DARK YELLOWISH BROWN TO GREENISH

GRAY IN COLOR; SAMPLE SHOWS DENSE TO

CRUMBLY TENACITY; BLOCKY TO PLANAR

FRACTURE; CUTTINGS ARE PLATY TO SCALY IN

APPEARANCE; WAXY TO SLIGHTLY FROSTED

LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN

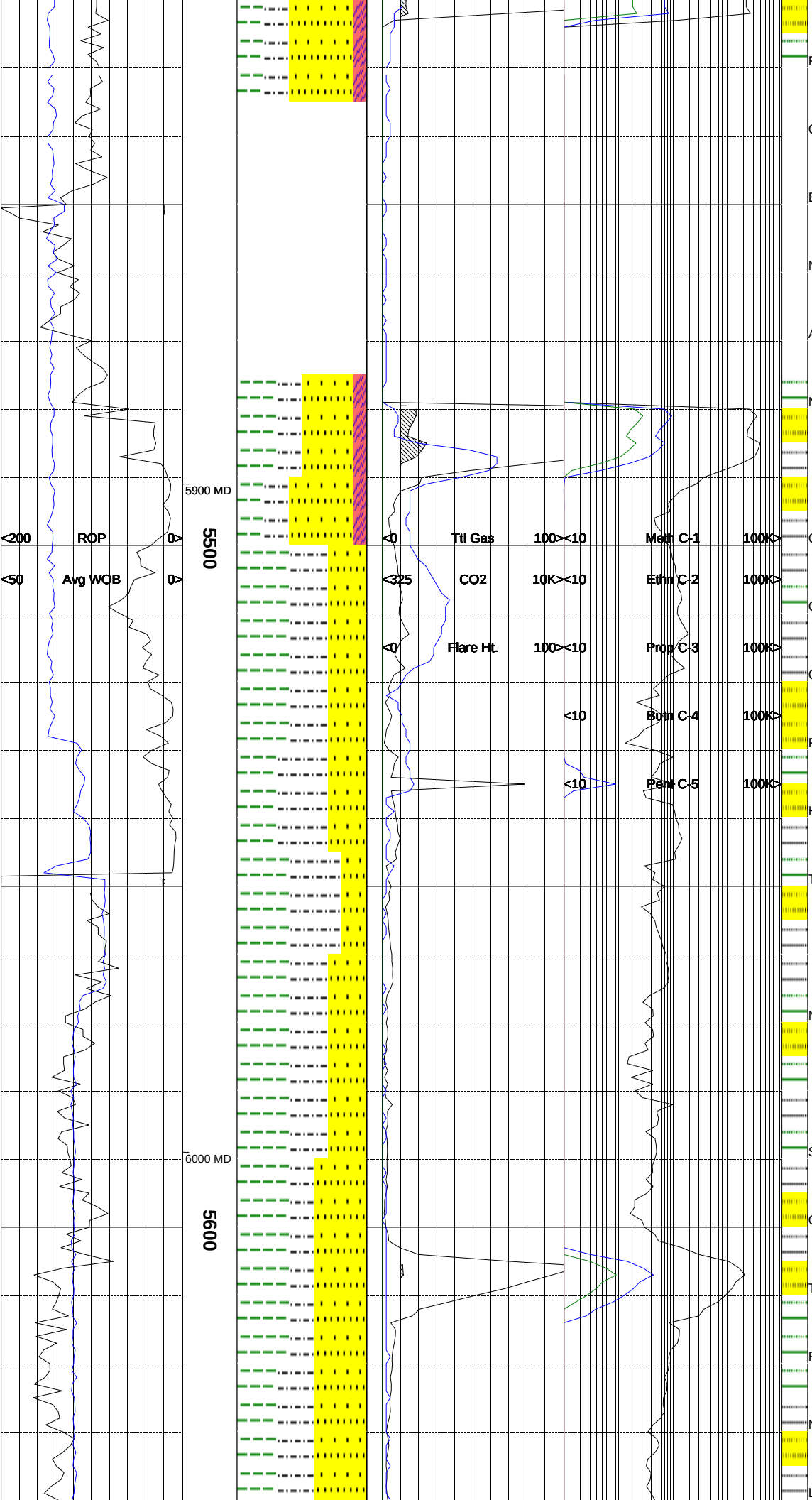
STRUCTURE APPARENT; PYRITE VISIBLE.

SANDSTONE = VERY LIGHT GRAY TO CHALKY

WHITE IN COLOR; QUARTZ FRAMEWORK; FINE

TO VERY FINE GRAIN SIZE; WELL SORTED;

INDISTINGUISHABLE ANGULARITY; HARDNESS



RANGES FROM FRIABLE TO FIRMLY FRIABLE;

CALCITE CEMENT INDICATED BY ACTIVE

EFFERVESENCE IN HCL; GRAIN SUPPORTED;

NO VISIBLE PORE SPACES; KAOLINITE

ALTERATION VISIBLE IN SOME CUTTINGS;

NO GAS SHOWS FROM THIS SAND.

CARBONACEOUS SHALE = OLIVE BLACK TO

GRAYISH BLACK IN COLOR; BRITTLE TO

CRUNCHY TENACITY; PLANAR TO SPLINTERY

FRACTURE; TABULAR TO ELONGATED CUTTINGS

HABIT; RESINOUS TO GREASY LUSTER; SMOOTH

TEXTURE; THIN STRUCTURE APPARENT.

NOTE = LOST COMPLETE RETURNS @ 5835' MD.

SILTSTONE = DARK YELLOWISH BROWN TO

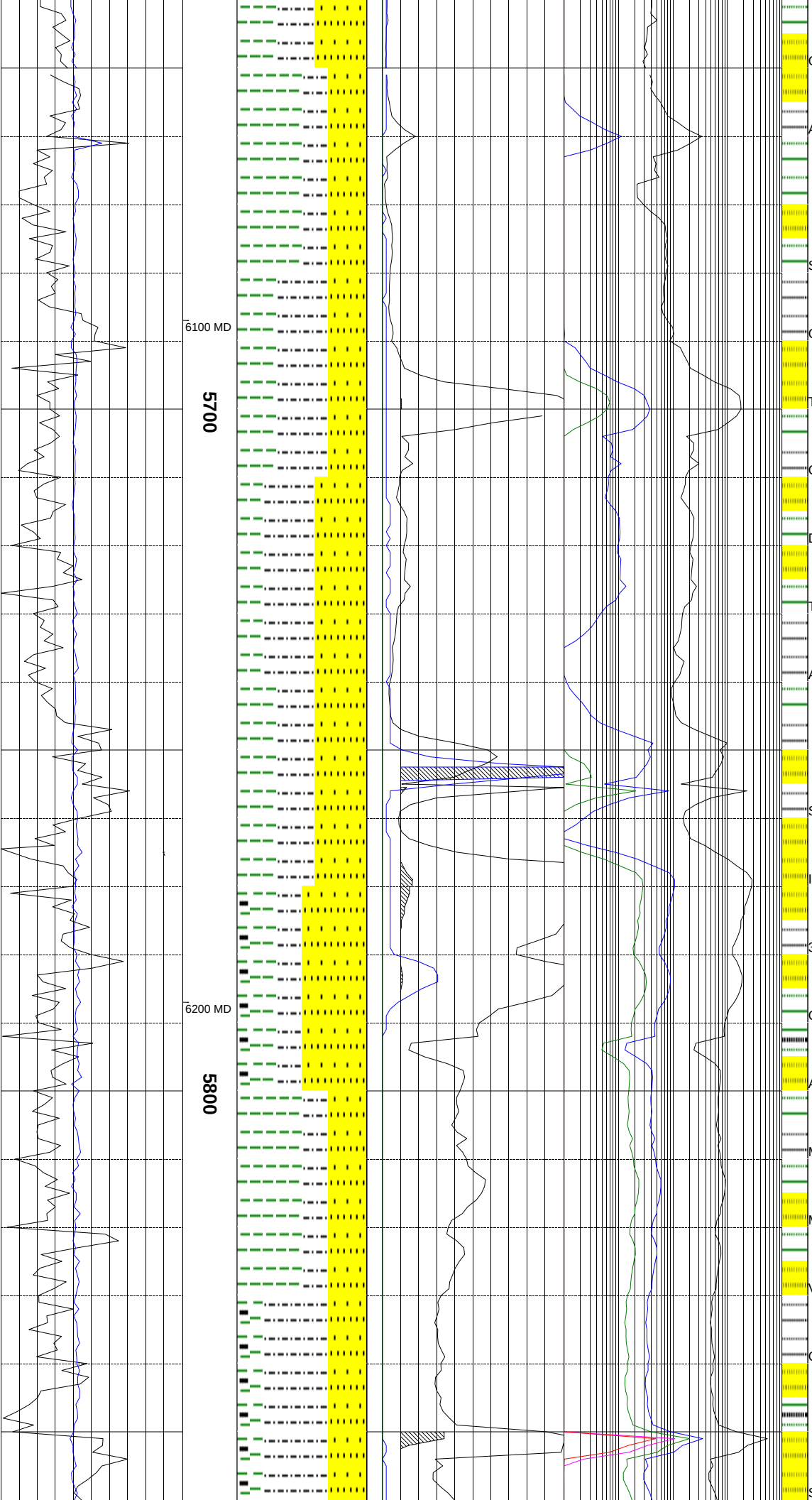
OLIVE GRAY IN COLOR; DENSE TO BRITTLE

TENACITY; IRREGULAR TO CONCHOIDAL

FRACTURE; CUTTINGS ARE WEDGELIKE TO

NODULAR IN APPEARANCE; DULL TO EARTHY

LUSTER EXHIBITED; SILTY TO SLIGHTLY



GRITTY TEXTURE; THIN TO THICK STRUCTURE

APPARENT; PYRITE VISIBLE IN MATRIX.

SHALE = LIGHT OLIVE BROWN TO LIGHT OLIVE

GRAY IN COLOR; DENSE TO CRUMBLY IN

TENACITY; IRREGULAR TO BLOCKY FRACTURE;

CUTTINGS ARE FLAKY TO WEDGELIKE IN HABIT

DULL TO EARTHY LUSTER; TEXTURE IS CLAYEY

TO SILTY; THIN TO LAMINAE STRUCTURE

APPARENT; SLIGHTLY CALCAREOUS.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT

IN COLOR; QUARTZ FRAMEWORK WITH ABOUT

3-5% BLACK LITHIC CLASTS; COARSE TO FINE

GRAIN SIZE; POOR TO FAIR SORTED; GRAINS

ARE ANGULAR TO SUBROUNDED WITH LOW TO

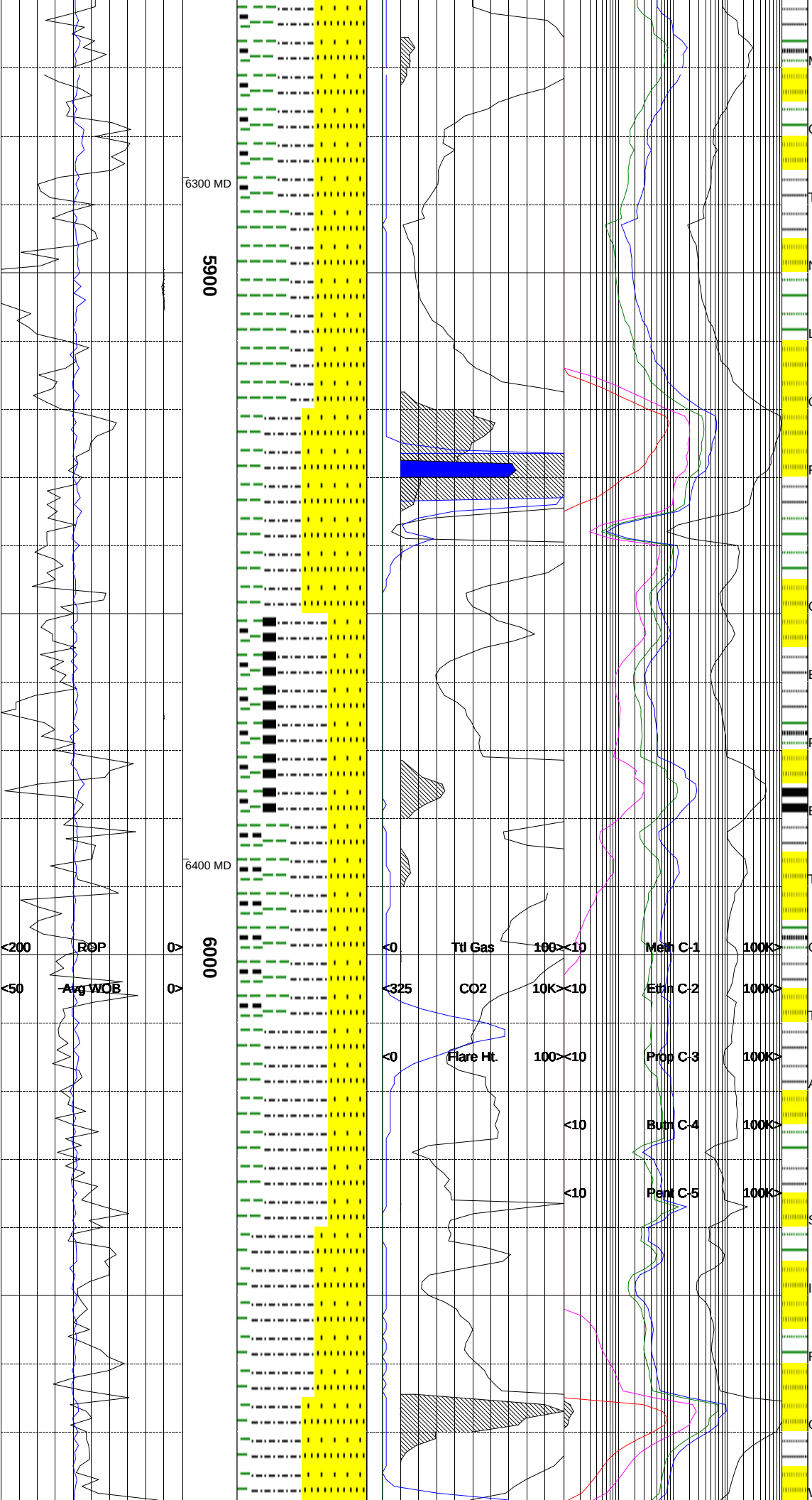
MODERATE SPHERICITY; FRIABLE TO

MODERATELY HARD; CALCITE CEMENT; NO

VISIBLE PORE SPACING; LOW TO MODERATE

GAS SHOWS IN THIS SAND.

SILTSTONE = MODERATE REDDISH BROWN TO



MODERATE BROWN IN COLOR; DENSE TO

CRUNCHY TENACITY; SAMPLE HAS IRREGULAR

TO CONCHOIDAL FRACTURE; WEDGELIKE TO

NODULAR CUTTINGS HABIT; DULL TO EARTHY

LUSTER; SILTY TO GRANULAR TEXTURE WITH

OCCASIONAL SPECIMEN SEEN GRADING INTO

FINE SANDSTONE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = GRAYISH BLACK TO

BLACK IN COLOR; BRITTLE TO NEARLY

PULVERANT IN TENACITY; SPLINTERY TO

BLOCKY FRACTURE; CUTTINGS ARE ELONGATED

TO EQUANT IN APPEARANCE; RESINOUS TO

GREASY LUSTER EXHIBITED; SMOOTH TO SILTY

TEXTURE; THIN TO LAMINAE STRUCTURE

APPARENT.

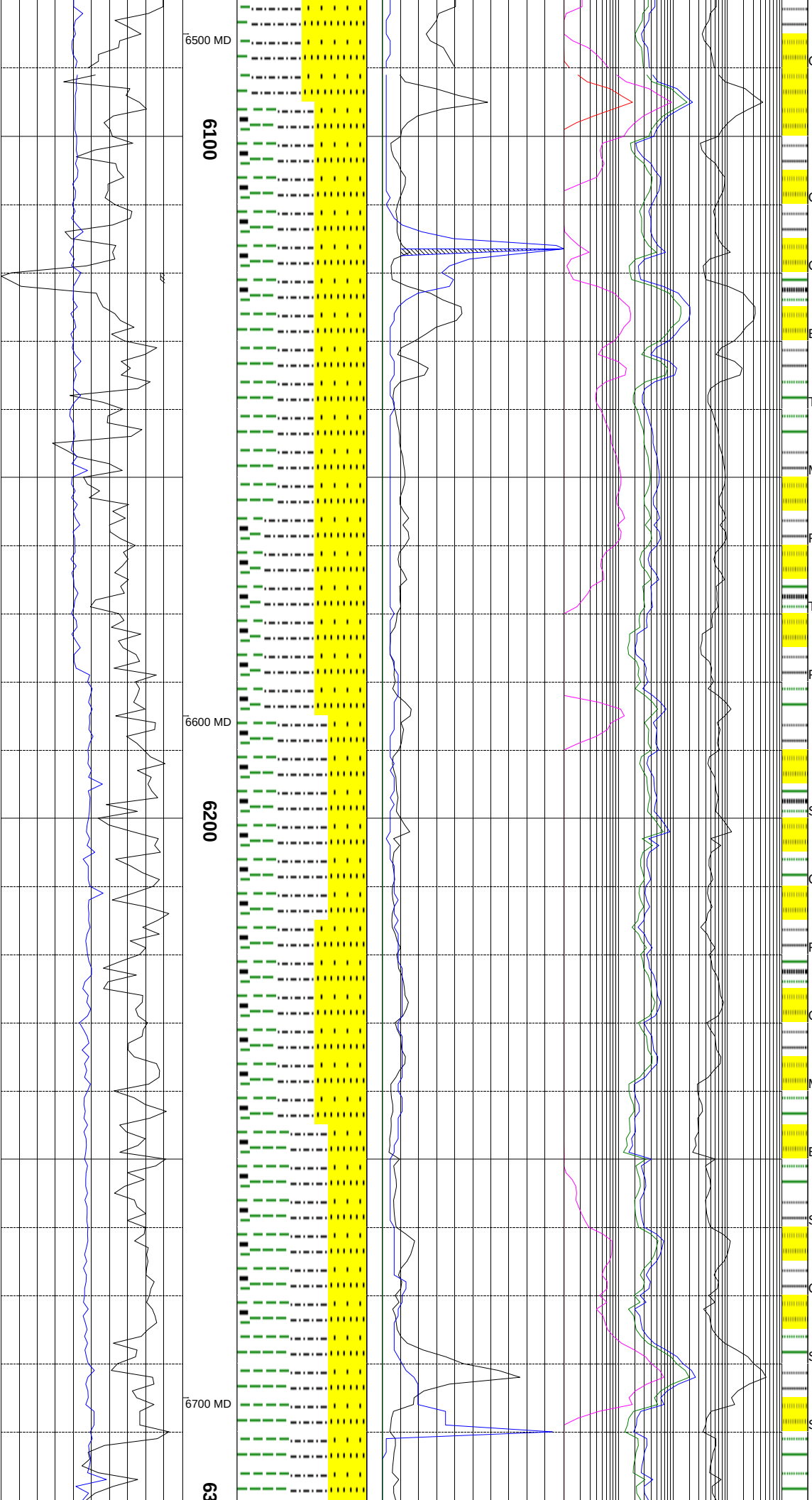
SHALE = MEDIUM LIGHT GRAY TO DARK GRAY

IN COLOR; DENSE TO CRUMBLY IN TENACITY;

FRACTURE RANGES FROM BLOCKY TO PLANAR;

CUTTINGS ARE FLAKY TO TABULAR IN HABIT;

WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO



CLAYEY TEXTURE; THIN STRUCTURE APPARENT.

COAL = DARK GRAY TO GRAYISH BLACK IN

COLOR; DENSE TO BRITTLE IN TENACITY;

BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE

TABULAR TO WEDGELIKE IN APPEARANCE;

METALIC TO RESINOUS LUSTER; TEXTURE

RANGES FROM SMOOTH TO SLIGHTLY SILTY;

THIN STRUCTURE APPARENT; FAIR AMOUNT OF

PYRITE BANDING VISIBLE IN SAMPLE.

SANDSTONE = WHITE TO YELOWISH GRAY IN

COLOR; QUARTZ FRAMEWORK; MEDIUM TO VERY

FINE GRAIN SIZE; FAIR TO WELL SORTED;

GRAINS ARE ROUNDED TO SUBANGULAR WITH

MODERATE TO HIGH SPHERICITY; SAMPLE IS

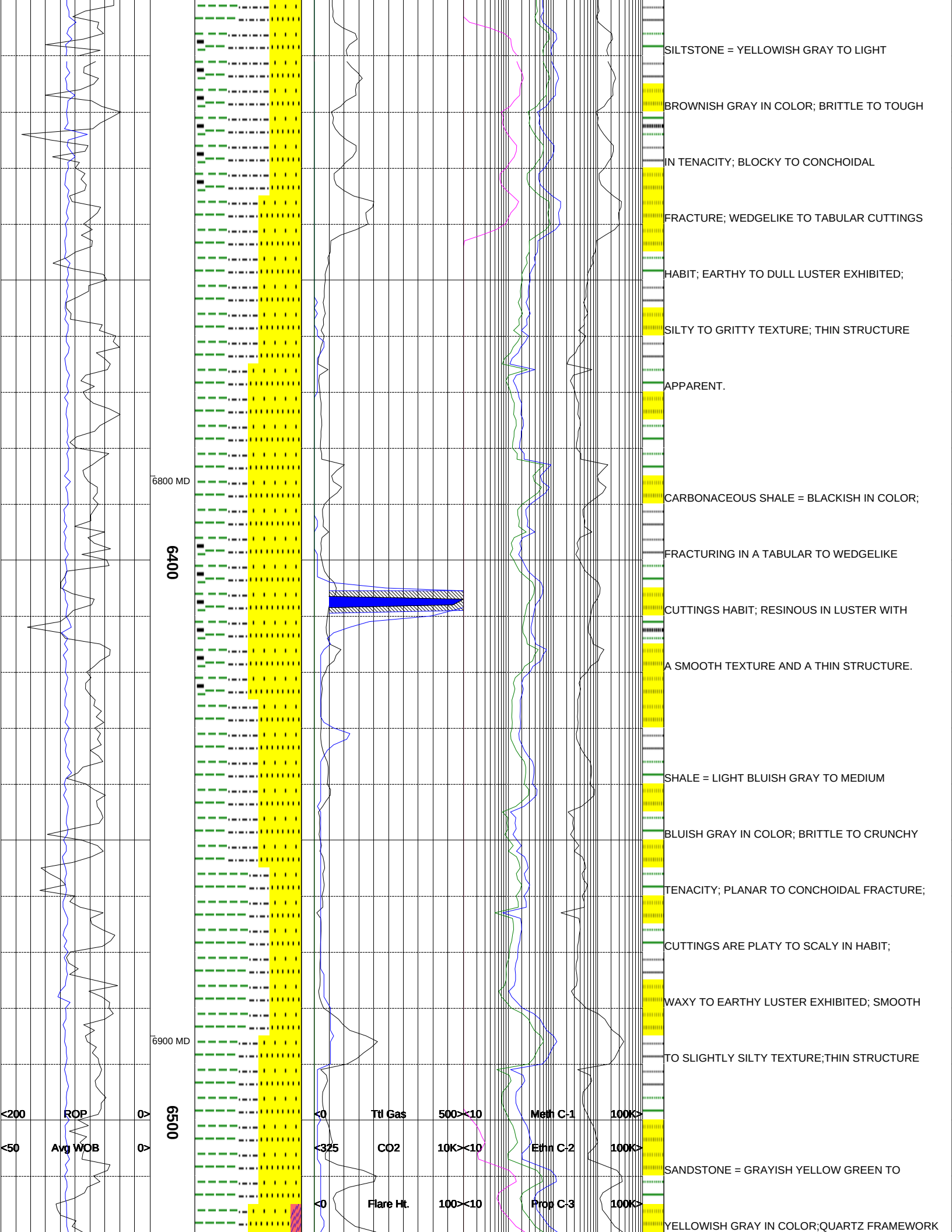
EASILY TO FIRMLY FRIABLE; CALCITE CEMENT

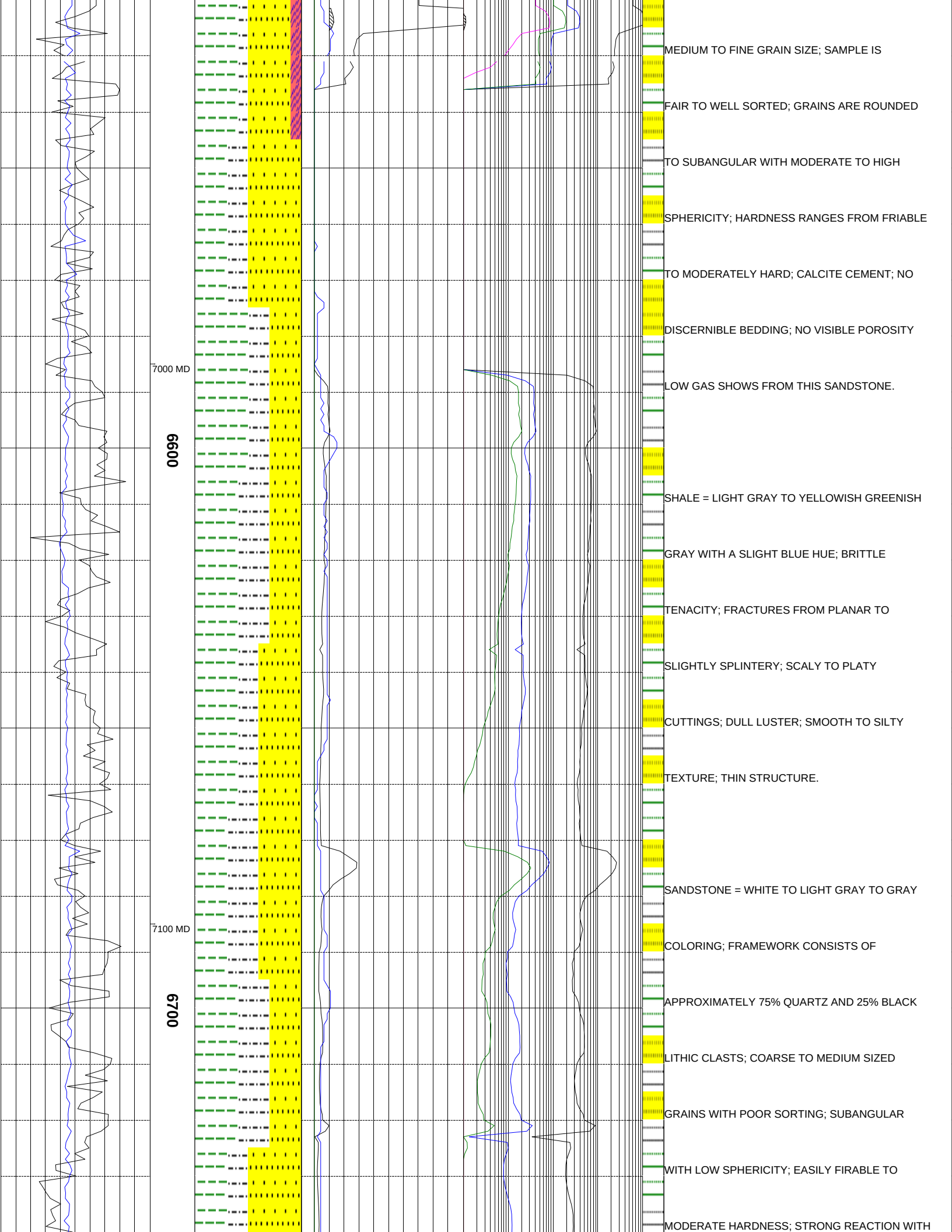
SAMPLE IS GRAIN SUPPORTED WITH POINT

CONTACT FABRIC; SOME INTERBEDDING WITH

SILTSTONES VISIBLE; MODERATE TO HIGH GAS

SHOWS IN THIS SANDSTONE.


6800 MD
6400
6900 MD
6500
<200 ROP 0>
<50 Avg WOB 0>
<0 Ttl Gas 500><10 Meth C-1 100K>
<325 CO2 10K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
SILTSTONE = YELLOWISH GRAY TO LIGHT
BROWNISH GRAY IN COLOR; BRITTLE TO TOUGH
IN TENACITY; BLOCKY TO CONCHOIDAL
FRACTURE; WEDGELIKE TO TABULAR CUTTINGS
HABIT; EARTHY TO DULL LUSTER EXHIBITED;
SILTY TO GRITTY TEXTURE; THIN STRUCTURE
APPARENT.
CARBONACEOUS SHALE = BLACKISH IN COLOR;
FRACTURING IN A TABULAR TO WEDGELIKE
CUTTINGS HABIT; RESINOUS IN LUSTER WITH
A SMOOTH TEXTURE AND A THIN STRUCTURE.
SHALE = LIGHT BLUISH GRAY TO MEDIUM
BLUISH GRAY IN COLOR; BRITTLE TO CRUNCHY
TENACITY; PLANAR TO CONCHOIDAL FRACTURE;
CUTTINGS ARE PLATY TO SCALY IN HABIT;
WAXY TO EARTHY LUSTER EXHIBITED; SMOOTH
TO SLIGHTLY SILTY TEXTURE;THIN STRUCTURE
SANDSTONE = GRAYISH YELLOW GREEN TO
YELLOWISH GRAY IN COLOR;QUARTZ FRAMEWORK



MEDIUM TO FINE GRAIN SIZE; SAMPLE IS

FAIR TO WELL SORTED; GRAINS ARE ROUNDED

TO SUBANGULAR WITH MODERATE TO HIGH

SPHERICITY; HARDNESS RANGES FROM FRIABLE

TO MODERATELY HARD; CALCITE CEMENT; NO

DISCERNIBLE BEDDING; NO VISIBLE POROSITY

LOW GAS SHOWS FROM THIS SANDSTONE.

SHALE = LIGHT GRAY TO YELLOWISH GREENISH

GRAY WITH A SLIGHT BLUE HUE; BRITTLE

TENACITY; FRACTURES FROM PLANAR TO

SLIGHTLY SPLINTERY; SCALY TO PLATY

CUTTINGS; DULL LUSTER; SMOOTH TO SILTY

TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY TO GRAY

COLORING; FRAMEWORK CONSISTS OF

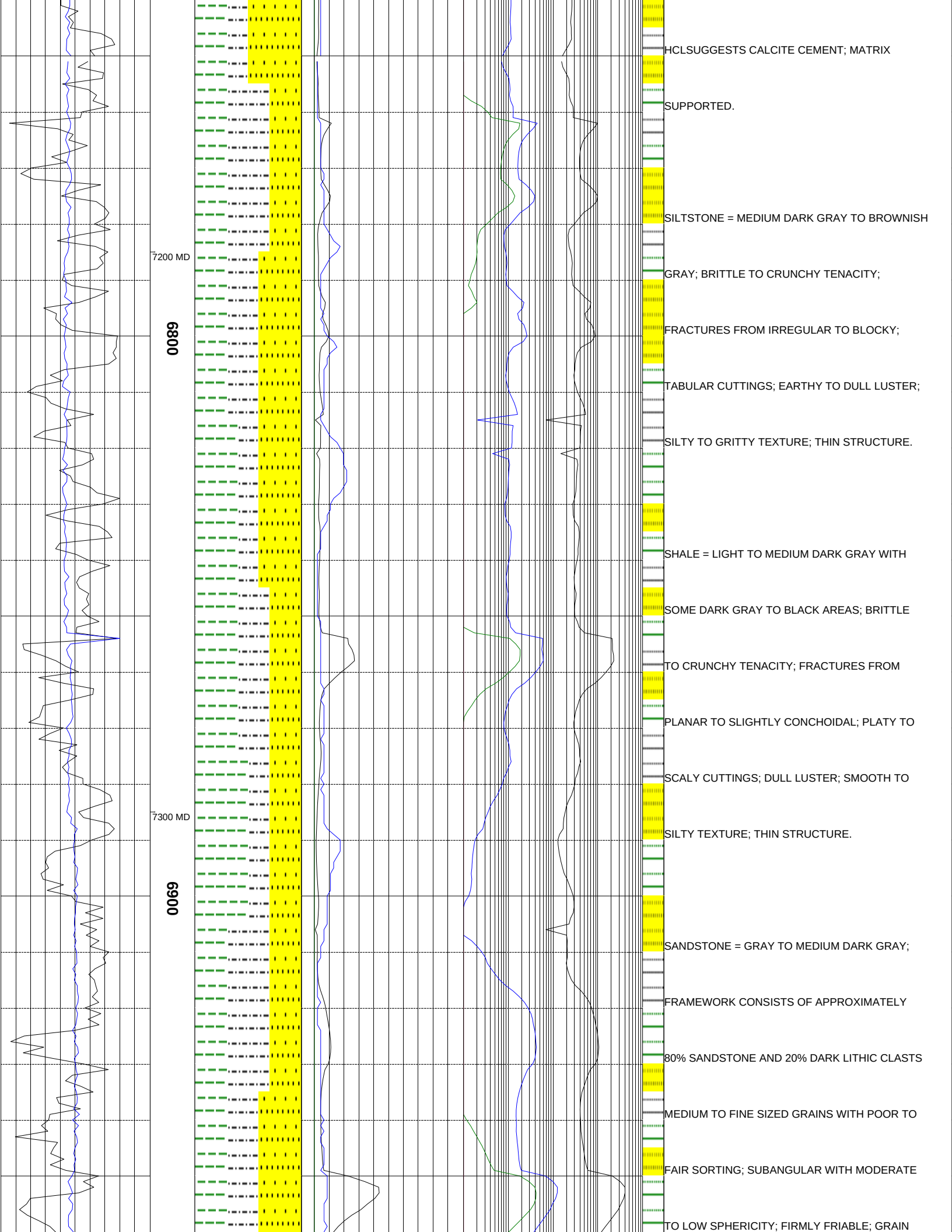
APPROXIMATELY 75% QUARTZ AND 25% BLACK

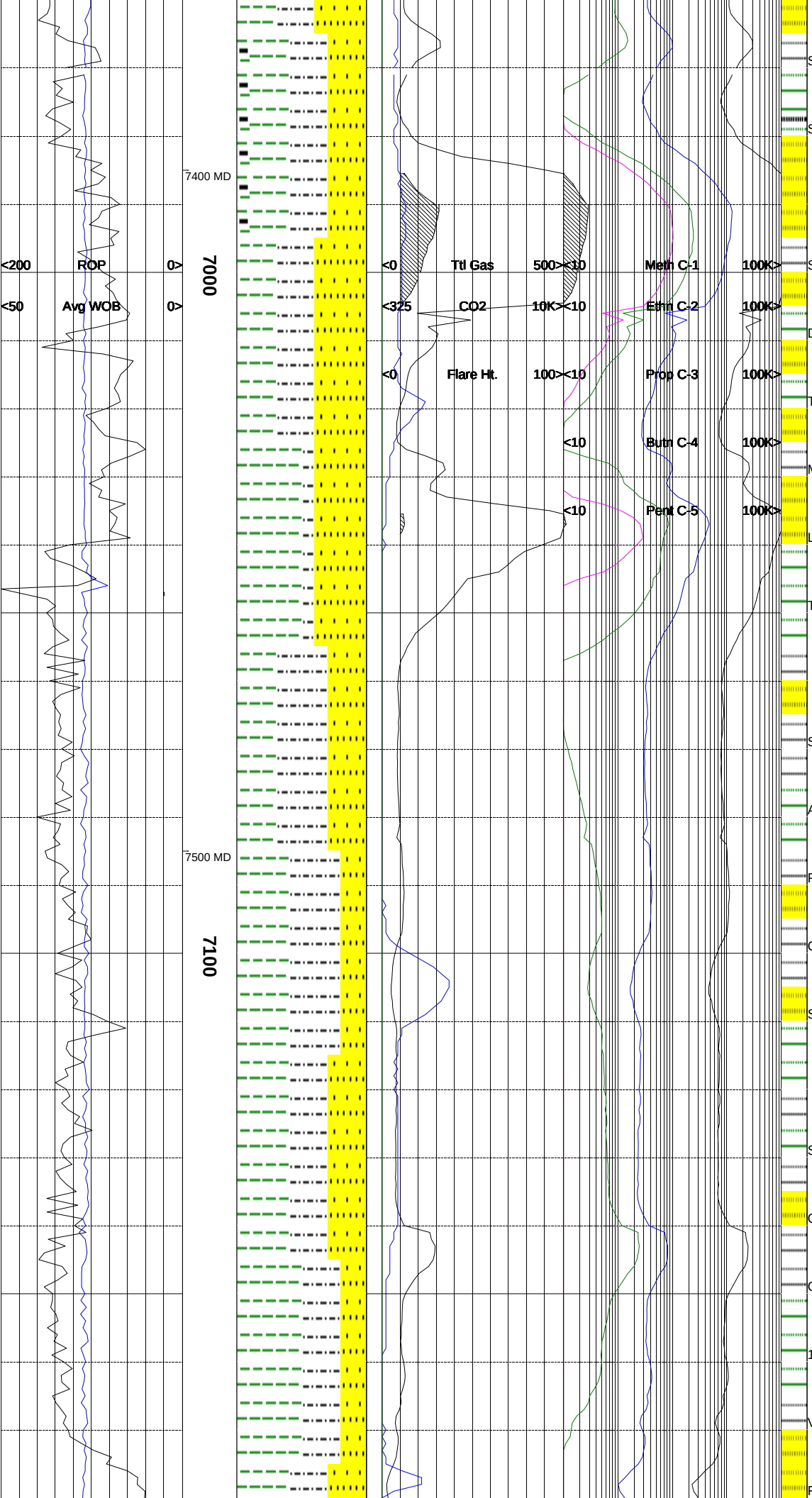
LITHIC CLASTS; COARSE TO MEDIUM SIZED

GRAINS WITH POOR SORTING; SUBANGULAR

WITH LOW SPHERICITY; EASILY FIRABLE TO

MODERATE HARDNESS; STRONG REACTION WITH


7200 MD
6800
7300 MD
6900
HCLSUGGESTS CALCITE CEMENT; MATRIX
SUPPORTED.
SILTSTONE = MEDIUM DARK GRAY TO BROWNISH
GRAY; BRITTLE TO CRUNCHY TENACITY;
FRACTURES FROM IRREGULAR TO BLOCKY;
TABULAR CUTTINGS; EARTHY TO DULL LUSTER;
SILTY TO GRITTY TEXTURE; THIN STRUCTURE.
SHALE = LIGHT TO MEDIUM DARK GRAY WITH
SOME DARK GRAY TO BLACK AREAS; BRITTLE
TO CRUNCHY TENACITY; FRACTURES FROM
PLANAR TO SLIGHTLY CONCHOIDAL; PLATY TO
SCALY CUTTINGS; DULL LUSTER; SMOOTH TO
SILTY TEXTURE; THIN STRUCTURE.
SANDSTONE = GRAY TO MEDIUM DARK GRAY;
FRAMEWORK CONSISTS OF APPROXIMATELY
80% SANDSTONE AND 20% DARK LITHIC CLASTS
MEDIUM TO FINE SIZED GRAINS WITH POOR TO
FAIR SORTING; SUBANGULAR WITH MODERATE
TO LOW SPHERICITY; FIRMLY FRIABLE; GRAIN



SUPPORTED; MODERATE REACTION WITH HCL

SUGGESTS CALCITE CEMENT.

SILTSTONE = BROWNISH GRAY TO MODERATE

DARK GRAY COLORING; DENSE TO BRITTLE

TENACITY; IRREGULAR TO BLOCKY FRACTURING

MASSIVE TO TABULAR CUTTINGS; EARTHY

LUSTER; GRITTY TO SILTY TEXTURE; THICK

TO MASSIVE STRUCTURE.

SHALE = LIGHT GRAY WITH YELLOWISH GREEN

AND REDDISH BROWN HUES; BRITTLE TENACITY

PLANAR FRACTURING; PLATY TO TABULAR

CUTTINGS; DULL TO SLIGHTLY WAXY LUSTER;

SMOOTH TEXTURE; THIN STRUCTURE.

SANDSTONE = GRAY TO MEDIUM DARK GRAY TO

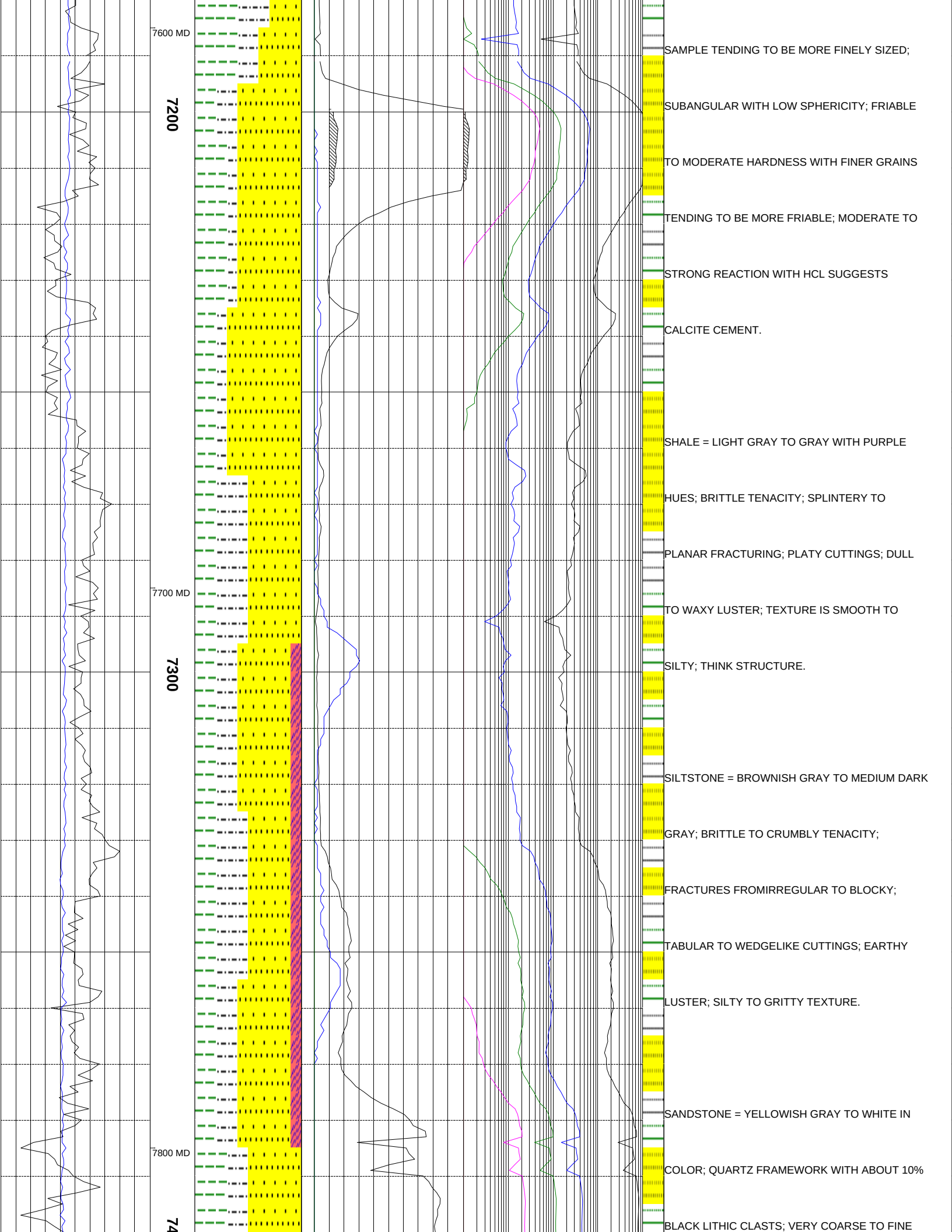
OCCASIONALLY LIGHT GRAY; FRAMEWORK

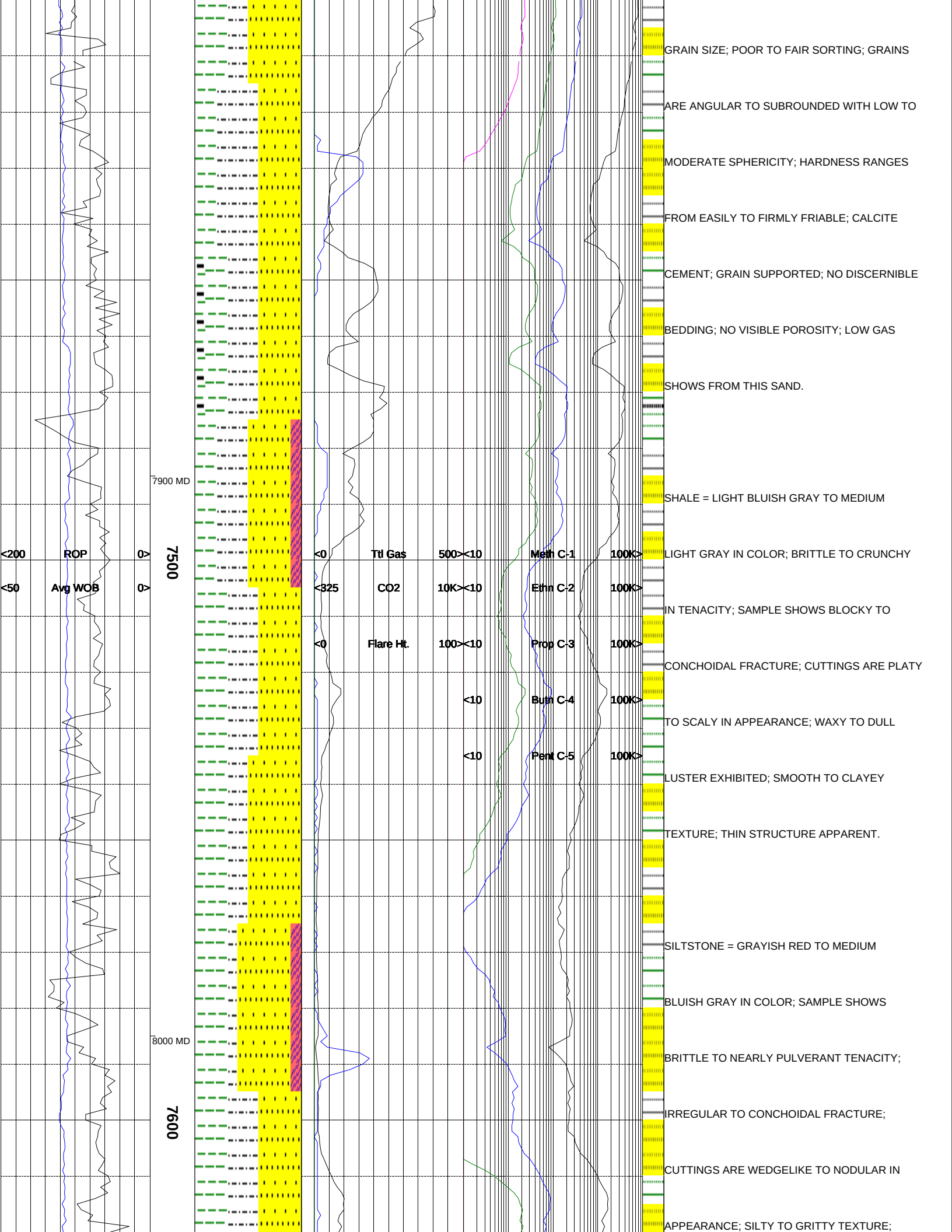
CONSISTS OF APPROXIMATELY 85% QUARTZ AND

15% BLACK LITHIC CLASTS; GRAIN SIZE

VARIES FROM MEDIUM TO FINE WITH POOR TO

FAIR SORTING WITH THE LIGHTER COLORED


7600 MD
7200
SAMPLE TENDING TO BE MORE FINELY SIZED;
SUBANGULAR WITH LOW SPHERICITY; FRIABLE
TO MODERATE HARDNESS WITH FINER GRAINS
TENDING TO BE MORE FRIABLE; MODERATE TO
STRONG REACTION WITH HCL SUGGESTS
CALCITE CEMENT.
SHALE = LIGHT GRAY TO GRAY WITH PURPLE
HUES; BRITTLE TENACITY; SPLINTERY TO
PLANAR FRACTURING; PLATY CUTTINGS; DULL
7700 MD
TO WAXY LUSTER; TEXTURE IS SMOOTH TO
SILTY; THINK STRUCTURE.
7300
SILTSTONE = BROWNISH GRAY TO MEDIUM DARK
GRAY; BRITTLE TO CRUMBLY TENACITY;
FRACTURES FROMIRREGULAR TO BLOCKY;
TABULAR TO WEDGELIKE CUTTINGS; EARTHY
LUSTER; SILTY TO GRITTY TEXTURE.
SANDSTONE = YELLOWISH GRAY TO WHITE IN
7800 MD
COLOR; QUARTZ FRAMEWORK WITH ABOUT 10%
BLACK LITHIC CLASTS; VERY COARSE TO FINE



GRAIN SIZE; POOR TO FAIR SORTING; GRAINS

ARE ANGULAR TO SUBROUNDED WITH LOW TO

MODERATE SPHERICITY; HARDNESS RANGES

FROM EASILY TO FIRMLY FRIABLE; CALCITE

CEMENT; GRAIN SUPPORTED; NO DISCERNIBLE

BEDDING; NO VISIBLE POROSITY; LOW GAS

SHOWS FROM THIS SAND.

SHALE = LIGHT BLUISH GRAY TO MEDIUM

LIGHT GRAY IN COLOR; BRITTLE TO CRUNCHY

IN TENACITY; SAMPLE SHOWS BLOCKY TO

CONCHOIDAL FRACTURE; CUTTINGS ARE PLATY

TO SCALY IN APPEARANCE; WAXY TO DULL

LUSTER EXHIBITED; SMOOTH TO CLAYEY

TEXTURE; THIN STRUCTURE APPARENT.

SILTSTONE = GRAYISH RED TO MEDIUM

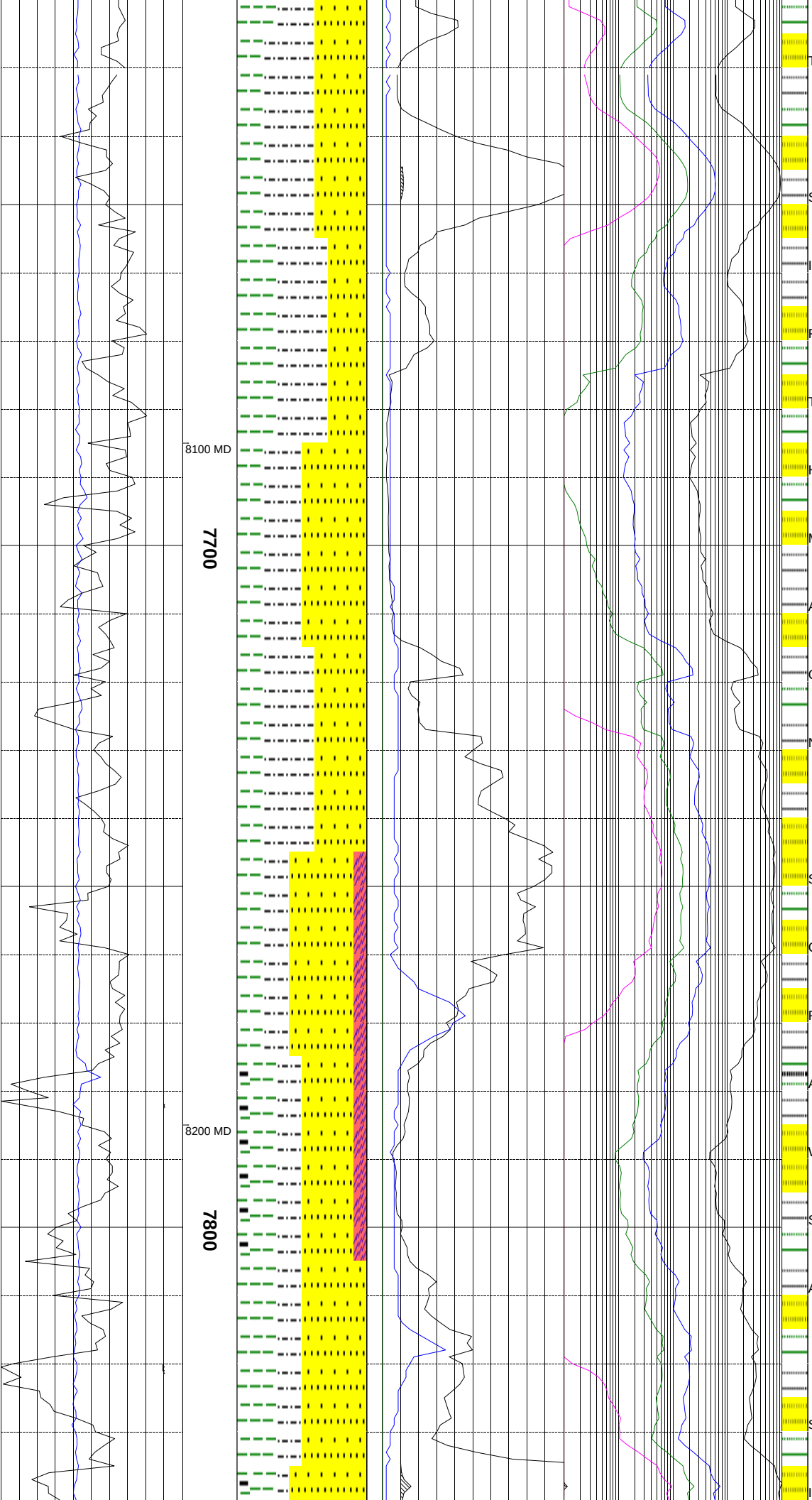
BLUISH GRAY IN COLOR; SAMPLE SHOWS

BRITTLE TO NEARLY PULVERANT TENACITY;

IRREGULAR TO CONCHOIDAL FRACTURE;

CUTTINGS ARE WEDGELIKE TO NODULAR IN

APPEARANCE; SILTY TO GRITTY TEXTURE;

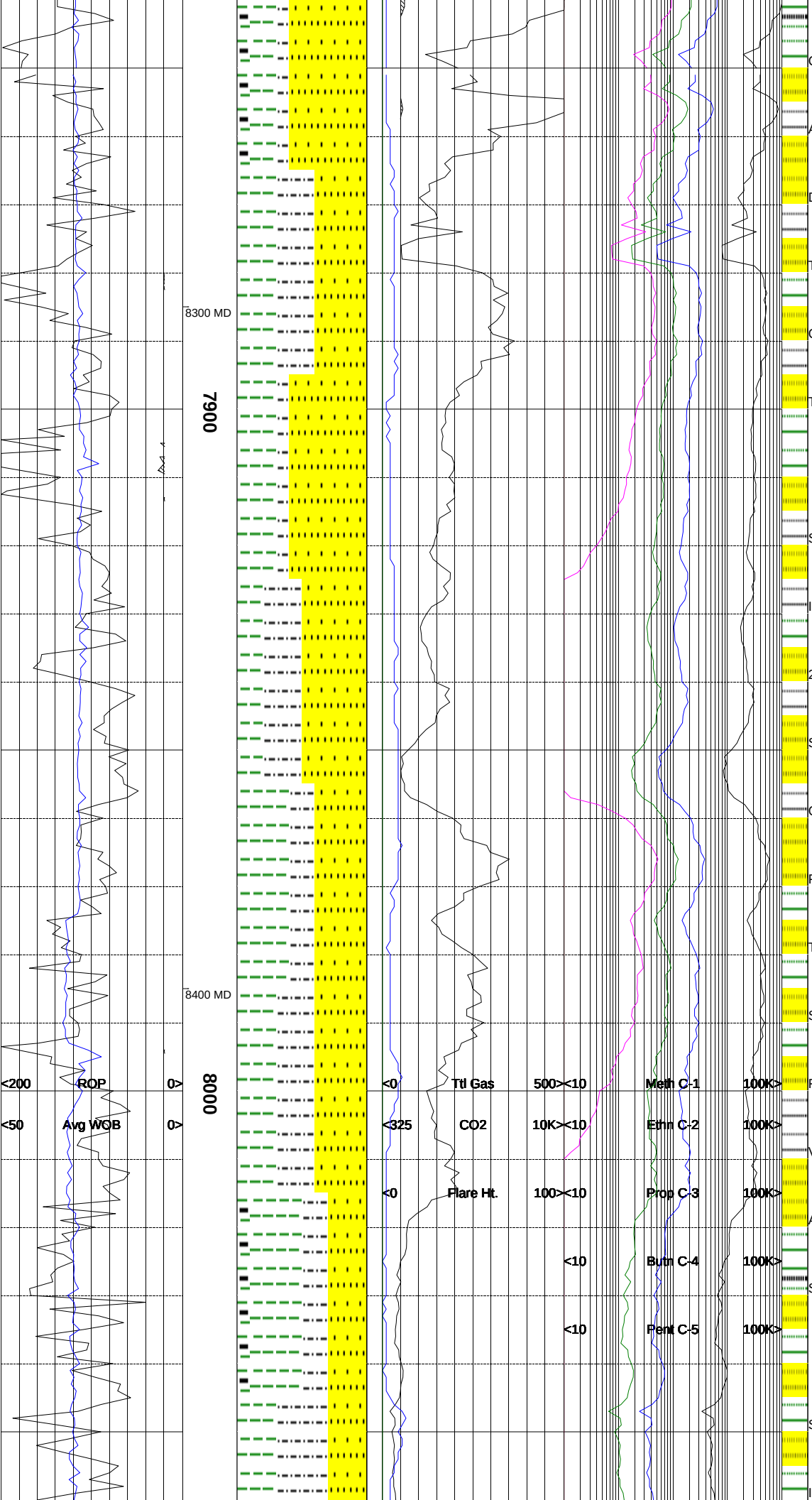


THIN TO THICK STRUCTURE APPARENT.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT IN COLOR; QUARTZ FRAMEWORK; COARSE TO FINE GRAIN SIZE; GRAINS ARE SUBROUNDED TO ANGULAR WITH MODERATE SPHERICITY; HARDNESS RANGES FROM FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO ALTERATION VISINLE IN MATRIX; POINT CONTACT FABRIC WITH NO VISIBLE POROSITY; NO GAS SHOWS FROM THIS SANDSTONE.

SHALE = VERY PALE GREEN TO LIGHT GRAY IN COLOR; BRITTLE TO CRUMBLY TENACITY; PLANAR TO CONCHOIDAL FRACTURE;CUTTINGS ARE FLAKY TO ELONGATED IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SLIGHTLY SILTY TEXTURE; THIN STRUCTURE APPARENT.

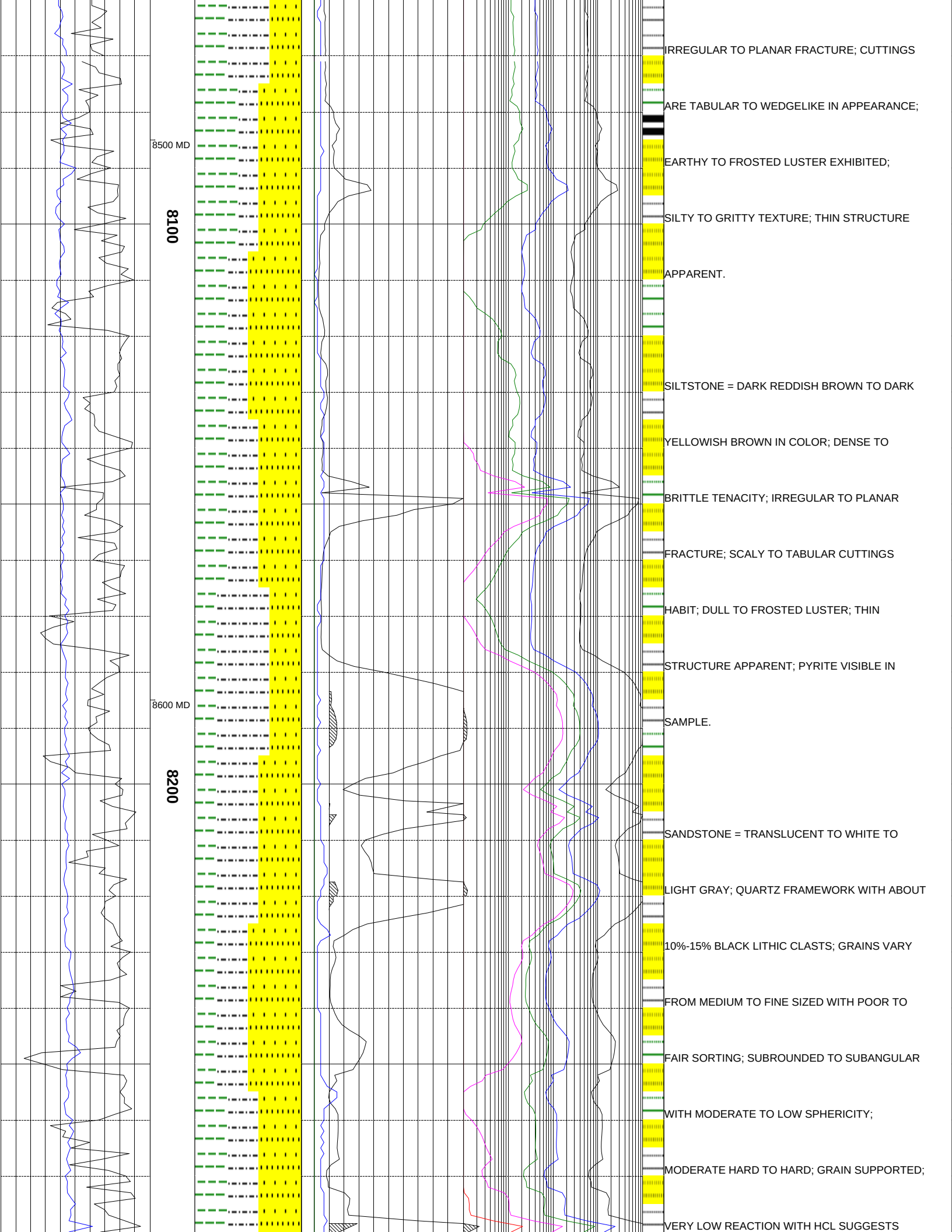
SILTSTONE = GRAYISH BROWN TO MEDIUM GRAY IN COLOR; TOUGH TO BRITTLE TENACITY;



CONCHOIDAL TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER; SILTY TO GRANULAR TEXTURE WITH SEVERAL SPECIMEN SEEN GRADING INTO FINE SANDSTONES; THIN TO THICK STRUCTURE APPARENT.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT IN COLOR; QUARTZ FRAMEWORK WITH ABOUT 20% BLACK LITHIC FRAGMENTS GIVING THE SAMPLE A SALT AND PEPPER APPEARANCE; GRAIN SIZE RANGES FROM COARSE TO FINE; POOR TO FAIR SORTING; GRAINS ARE ANGULAR TO SUBANGULAR WITH LOW TO MODERATE SPHERICITY; HARDNESS RANGES FROM FIRMLY FRIABLE TO HARD; SILICA CEMENT; NO VISIBLE POROSITY; CALCITE GRAINS SEEN AS ACCESSORY GRAINS; LOW TO MODERATE GAS SHOWS FROM THIS SANDSTONE.

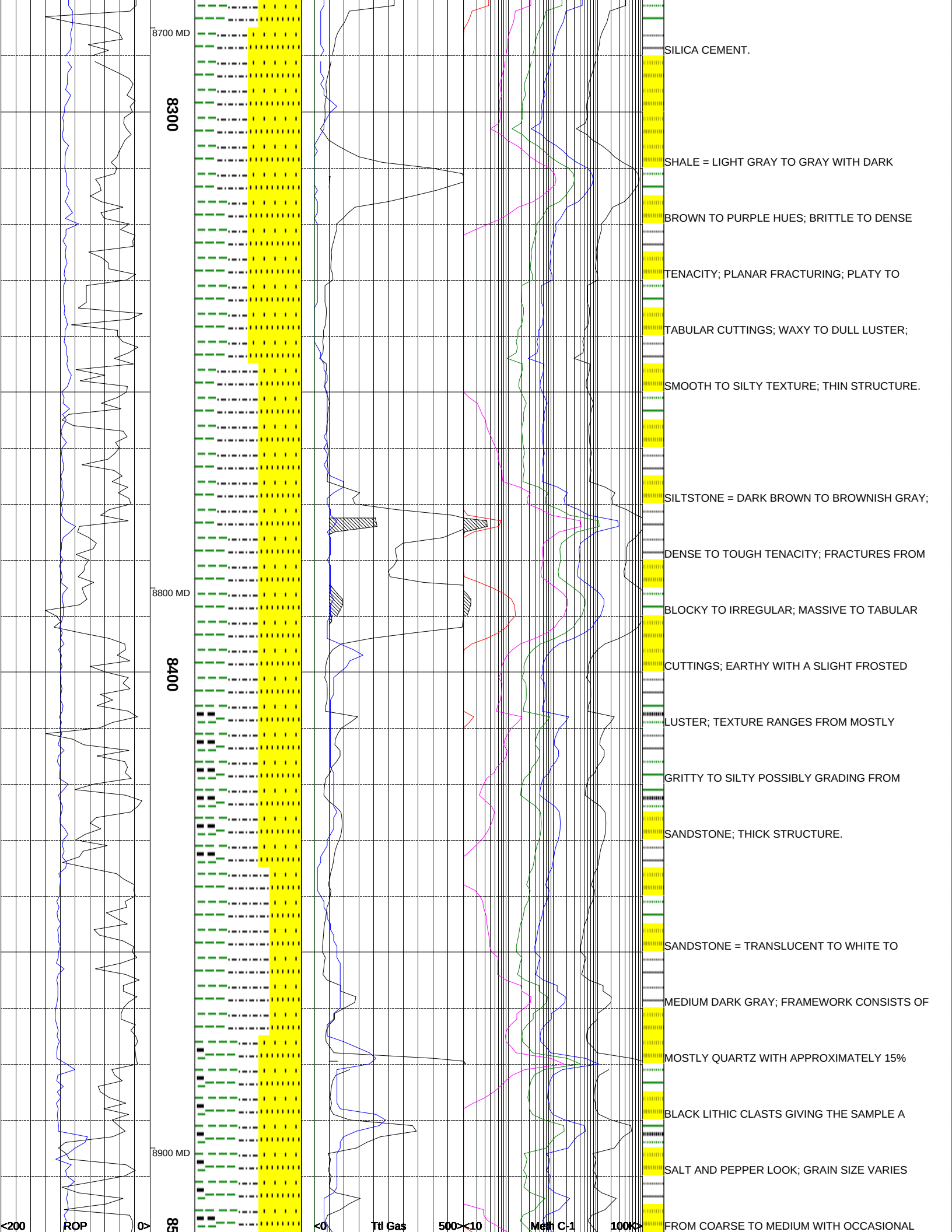
SHALE = GRAYISH RED TO BROWNISH GRAY IN COLOR; TOUGH TO BRITTLE TENACITY;



IRREGULAR TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; EARTHY TO FROSTED LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE APPARENT.

SILTSTONE = DARK REDDISH BROWN TO DARK YELLOWISH BROWN IN COLOR; DENSE TO BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURE; SCALY TO TABULAR CUTTINGS HABIT; DULL TO FROSTED LUSTER; THIN STRUCTURE APPARENT; PYRITE VISIBLE IN SAMPLE.

SANDSTONE = TRANSLUCENT TO WHITE TO LIGHT GRAY; QUARTZ FRAMEWORK WITH ABOUT 10%-15% BLACK LITHIC CLASTS; GRAINS VARY FROM MEDIUM TO FINE SIZED WITH POOR TO FAIR SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE TO LOW SPHERICITY; MODERATE HARD TO HARD; GRAIN SUPPORTED; VERY LOW REACTION WITH HCL SUGGESTS



SILICA CEMENT.

SHALE = LIGHT GRAY TO GRAY WITH DARK

BROWN TO PURPLE HUES; BRITTLE TO DENSE

TENACITY; PLANAR FRACTURING; PLATY TO

TABULAR CUTTINGS; WAXY TO DULL LUSTER;

SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SILTSTONE = DARK BROWN TO BROWNISH GRAY;

DENSE TO TOUGH TENACITY; FRACTURES FROM

BLOCKY TO IRREGULAR; MASSIVE TO TABULAR

CUTTINGS; EARTHY WITH A SLIGHT FROSTED

LUSTER; TEXTURE RANGES FROM MOSTLY

GRITTY TO SILTY POSSIBLY GRADING FROM

SANDSTONE; THICK STRUCTURE.

SANDSTONE = TRANSLUCENT TO WHITE TO

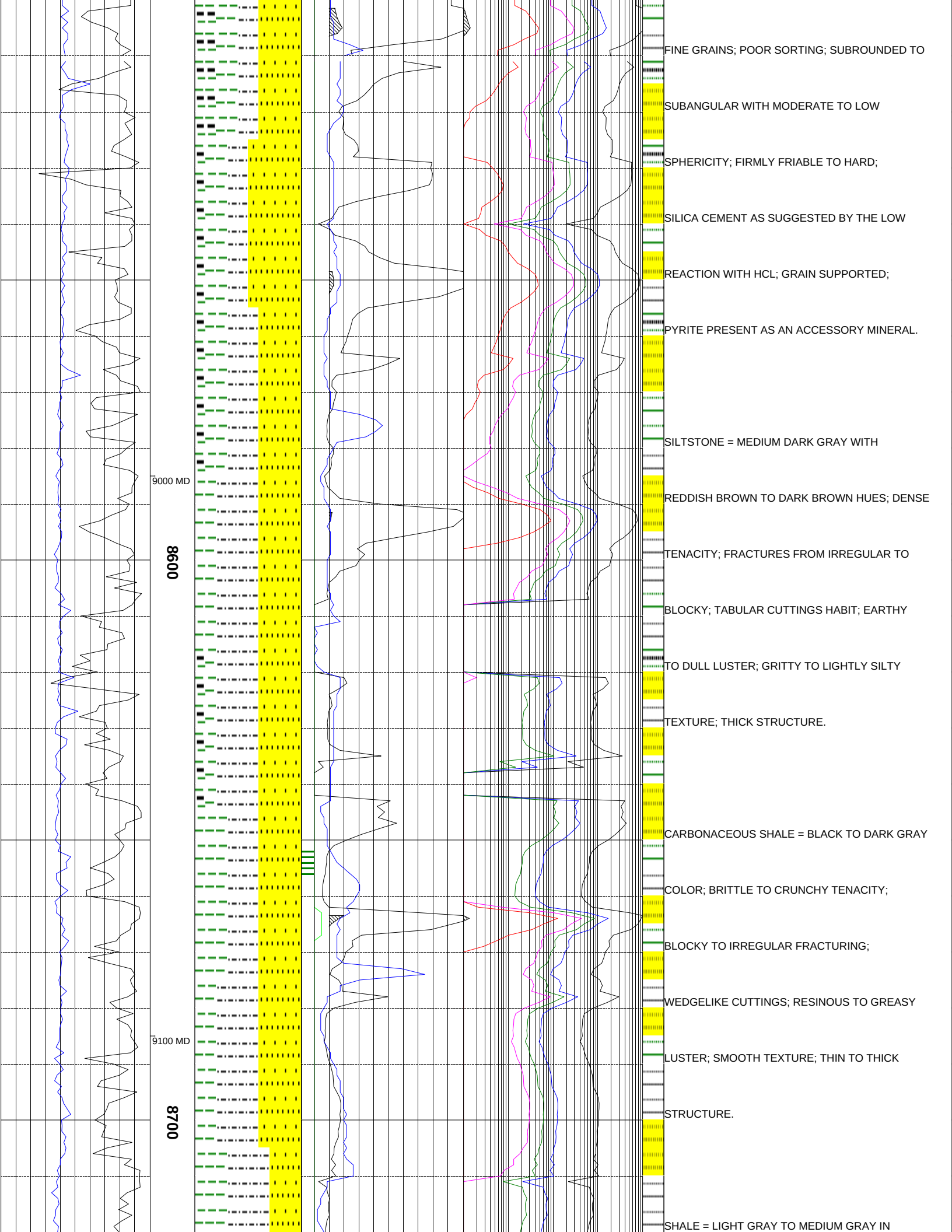
MEDIUM DARK GRAY; FRAMEWORK CONSISTS OF

MOSTLY QUARTZ WITH APPROXIMATELY 15%

BLACK LITHIC CLASTS GIVING THE SAMPLE A

SALT AND PEPPER LOOK; GRAIN SIZE VARIES

FROM COARSE TO MEDIUM WITH OCCASIONAL



FINE GRAINS; POOR SORTING; SUBROUNDED TO

SUBANGULAR WITH MODERATE TO LOW

SPHERICITY; FIRMLY FRIABLE TO HARD;

SILICA CEMENT AS SUGGESTED BY THE LOW

REACTION WITH HCL; GRAIN SUPPORTED;

PYRITE PRESENT AS AN ACCESSORY MINERAL.

SILTSTONE = MEDIUM DARK GRAY WITH

REDDISH BROWN TO DARK BROWN HUES; DENSE

TENACITY; FRACTURES FROM IRREGULAR TO

BLOCKY; TABULAR CUTTINGS HABIT; EARTHY

TO DULL LUSTER; GRITTY TO LIGHTLY SILTY

TEXTURE; THICK STRUCTURE.

CARBONACEOUS SHALE = BLACK TO DARK GRAY

COLOR; BRITTLE TO CRUNCHY TENACITY;

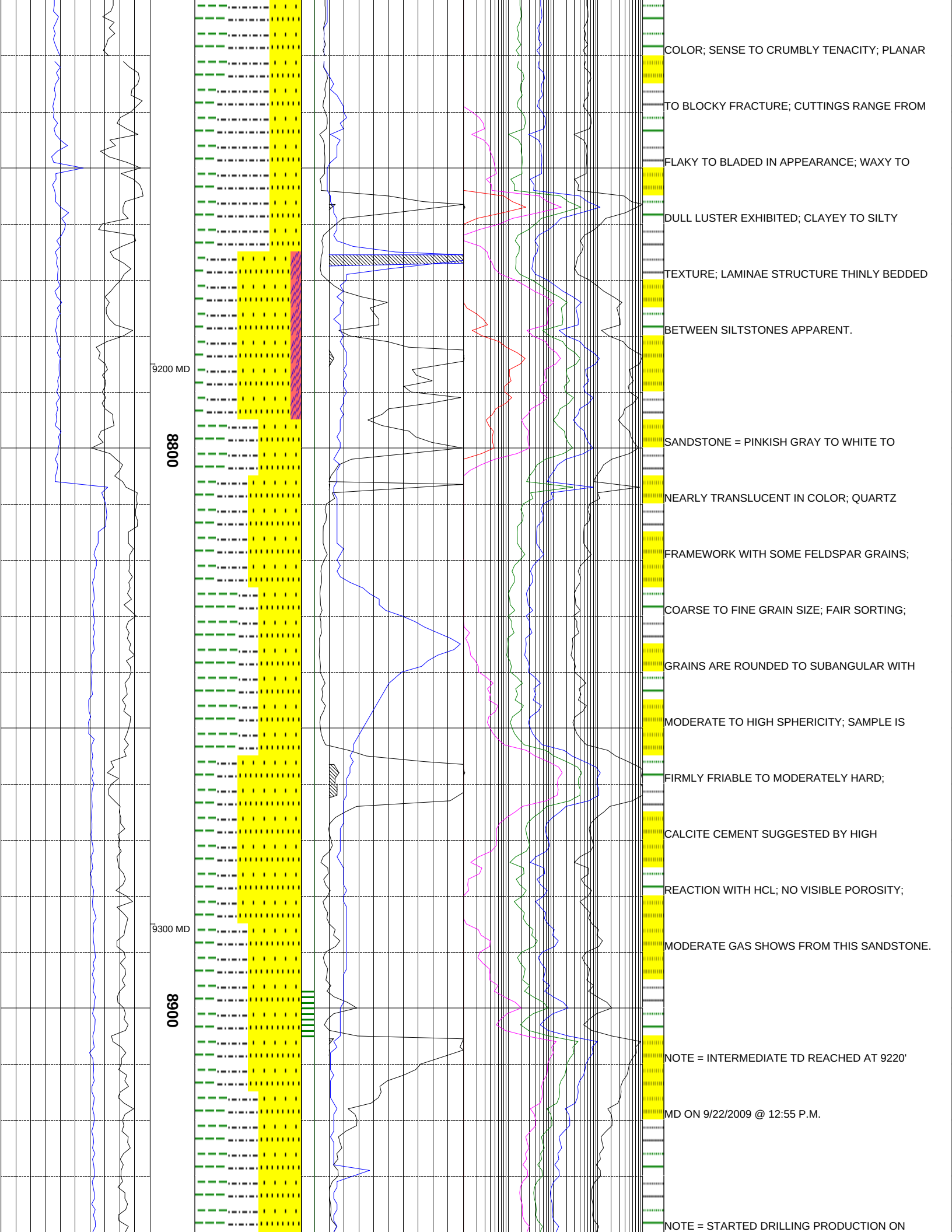
BLOCKY TO IRREGULAR FRACTURING;

WEDGELIKE CUTTINGS; RESINOUS TO GREASY

LUSTER; SMOOTH TEXTURE; THIN TO THICK

STRUCTURE.

SHALE = LIGHT GRAY TO MEDIUM GRAY IN



COLOR; SENSE TO CRUMBLY TENACITY; PLANAR

TO BLOCKY FRACTURE; CUTTINGS RANGE FROM

FLAKY TO BLADED IN APPEARANCE; WAXY TO

DULL LUSTER EXHIBITED; CLAYEY TO SILTY

TEXTURE; LAMINAE STRUCTURE THINLY BEDDED

BETWEEN SILTSTONES APPARENT.

SANDSTONE = PINKISH GRAY TO WHITE TO

NEARLY TRANSLUCENT IN COLOR; QUARTZ

FRAMEWORK WITH SOME FELDSPAR GRAINS;

COARSE TO FINE GRAIN SIZE; FAIR SORTING;

GRAINS ARE ROUNDED TO SUBANGULAR WITH

MODERATE TO HIGH SPHERICITY; SAMPLE IS

FIRMLY FRIABLE TO MODERATELY HARD;

CALCITE CEMENT SUGGESTED BY HIGH

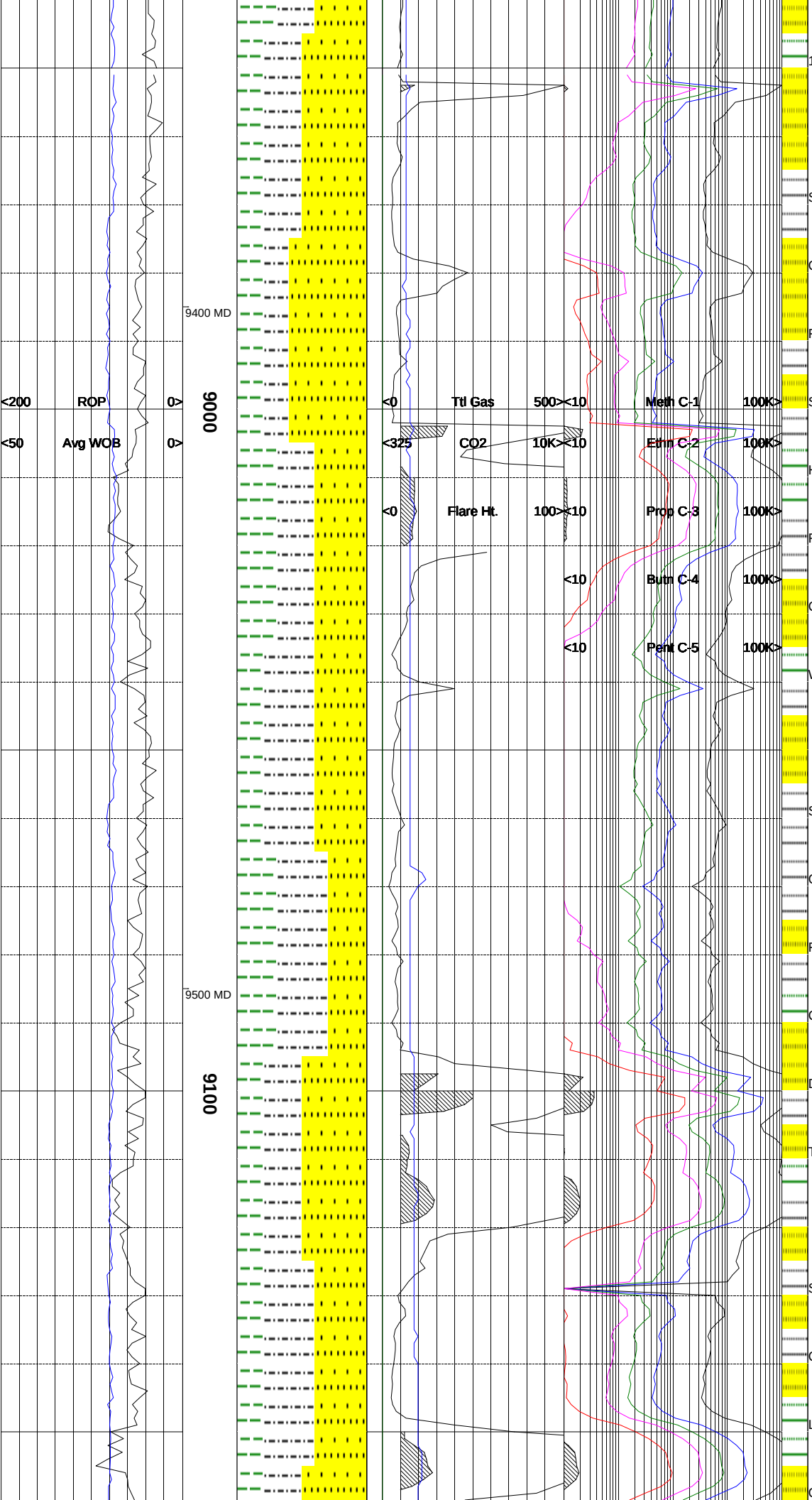
REACTION WITH HCL; NO VISIBLE POROSITY;

MODERATE GAS SHOWS FROM THIS SANDSTONE.

NOTE = INTERMEDIATE TD REACHED AT 9220'

MD ON 9/22/2009 @ 12:55 P.M.

NOTE = STARTED DRILLING PRODUCTION ON

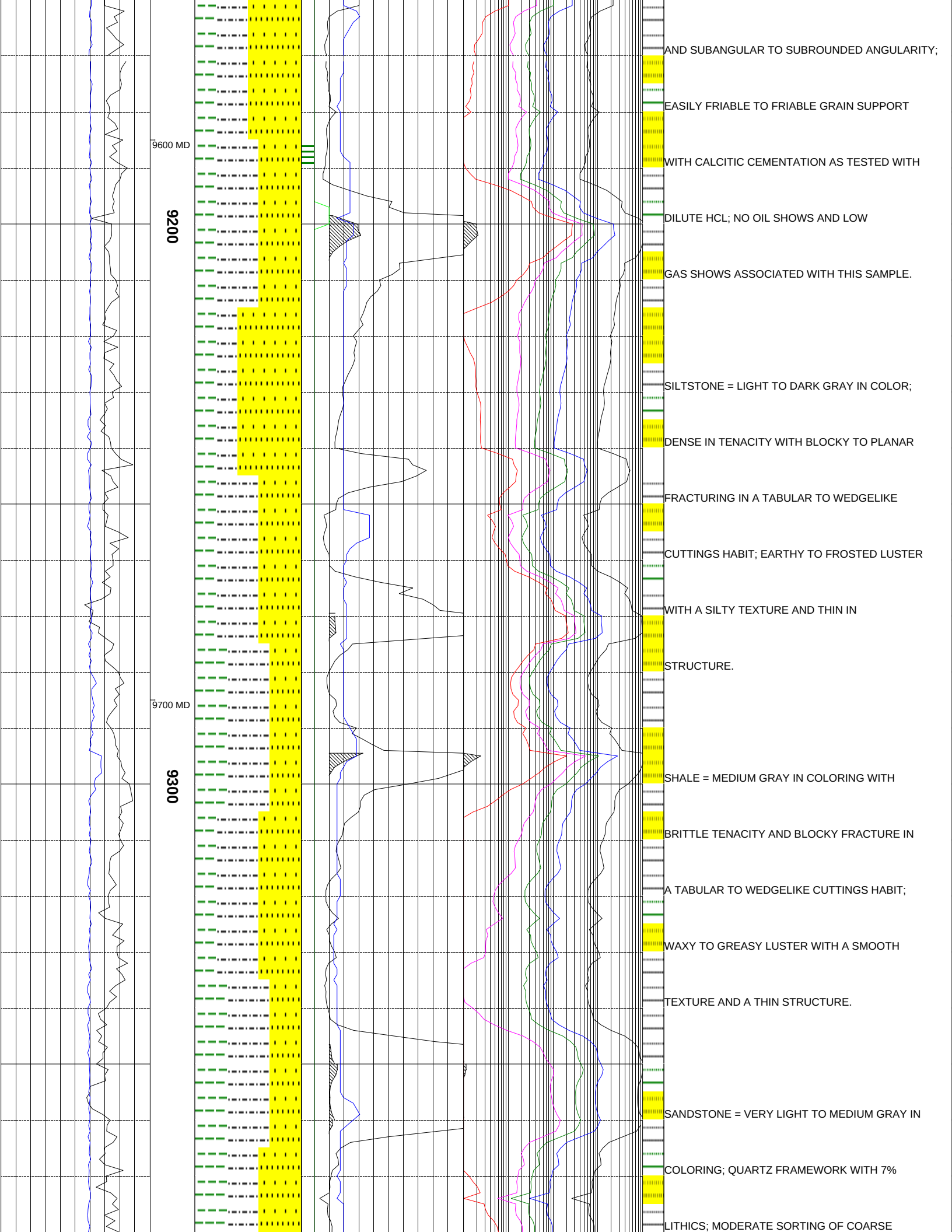


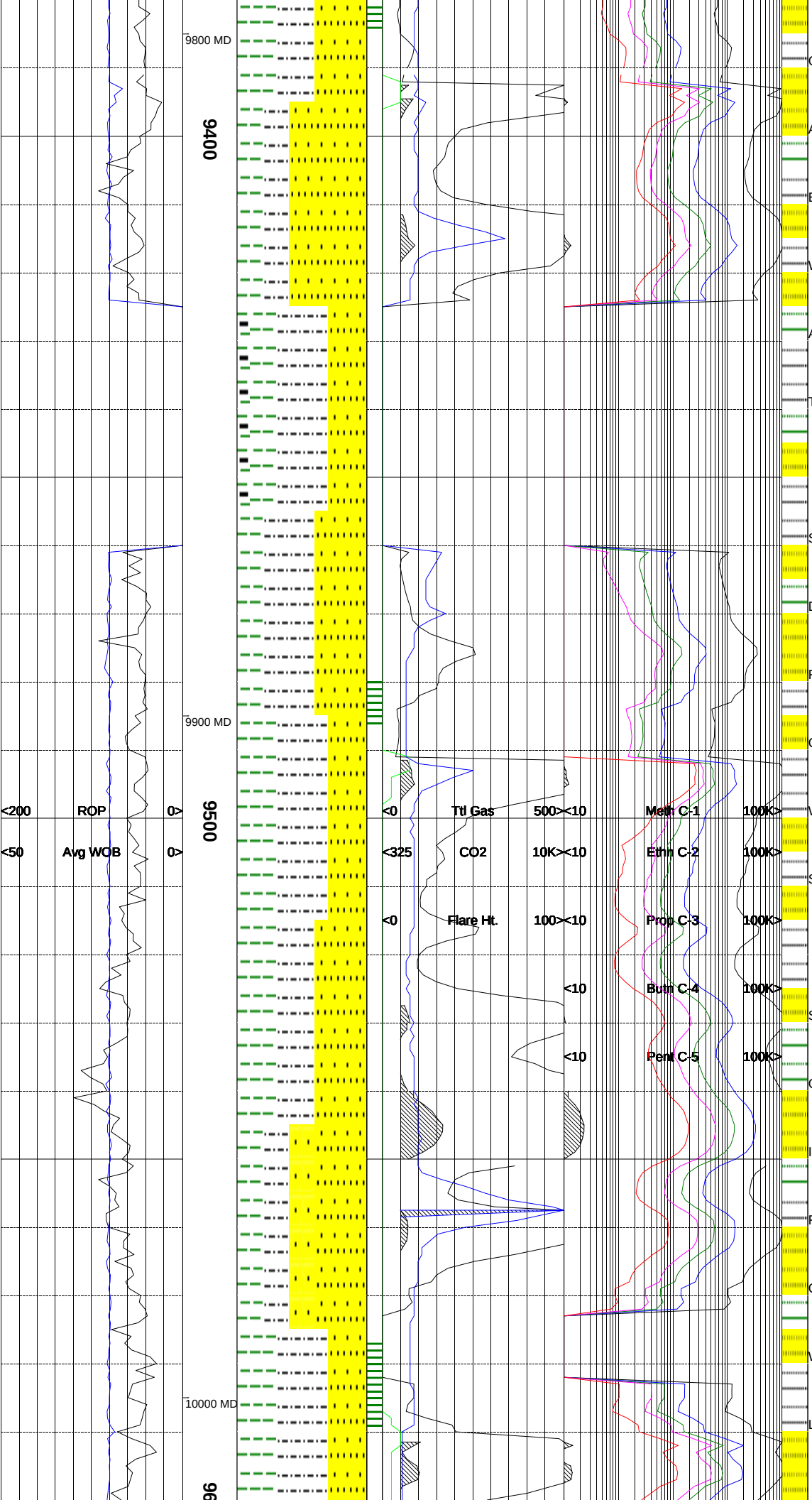
12/09/2009 AT APPROXIMATELY 1:00 PM.

SANDSTONE = WHITE TO LIGHT GRAY WITH A QUARTZ FRAMEWORK; COARSE TO FINE SIZED FRAINS WITH FAIR TO POOR SORTING; SUBANGULAR TO SUBROUNDED; MODERATE HARD TO HARD; GRAIN SUPPORTED; STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT; MODERATE TO LOW GAS ASSOCIATED WITH SAMPLE DEPTH.

SHALE = MEDIUM LIGHT GRAY TO MEDIUM DARK GRAY; TENACITY IS BRITTLE TO CRUNCHY; FRACTURES FROM PLANAR TO IRREGULAR; CUTTINGS ARE PLATY TO SLIGHTLY TABULAR; DULL TO EARTHY LUSTER, SMOOTH TEXTURE; THIN TO LAMINAE STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 5% LITHIC SHOWS; MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY


9600 MD
9200
9700 MD
9300
AND SUBANGULAR TO SUBROUNDED ANGULARITY;
EASILY FRIABLE TO FRIABLE GRAIN SUPPORT
WITH CALCITIC CEMENTATION AS TESTED WITH
DILUTE HCL; NO OIL SHOWS AND LOW
GAS SHOWS ASSOCIATED WITH THIS SAMPLE.
SILTSTONE = LIGHT TO DARK GRAY IN COLOR;
DENSE IN TENACITY WITH BLOCKY TO PLANAR
FRACTURING IN A TABULAR TO WEDGELIKE
CUTTINGS HABIT; EARTHY TO FROSTED LUSTER
WITH A SILTY TEXTURE AND THIN IN
STRUCTURE.
SHALE = MEDIUM GRAY IN COLORING WITH
BRITTLE TENACITY AND BLOCKY FRACTURE IN
A TABULAR TO WEDGELIKE CUTTINGS HABIT;
WAXY TO GREASY LUSTER WITH A SMOOTH
TEXTURE AND A THIN STRUCTURE.
SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN
COLORING; QUARTZ FRAMEWORK WITH 7%
LITHICS; MODERATE SORTING OF COARSE



GRAIN SIZING WITH MODERATE SPHERICITY

AND SUBROUNDED TO SUBANGULAR ANGULARITY;

EASILY FRIABLE TO FRIABLE GRAIN SUPPORT

WITH CALCITIC CEMENTATION; NO OIL SHOWS

AND MODERATE GAS SHOWS ASSOCIATED WITH

THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY IN COLOR

DENSE TO BRITTLE TENACITY WITH BLOCKY

FRACTURING IN A TABULAR TO ELONGATED

CUTTINGS HABIT; EARTHY TO FROSTED LUSTER

WITH A SILTY TEXTURE AND THIN IN

STRUCTURE.

SHALE = LIGHT TO MEDIUM GRAY WITH SOME

GRAYISH BLUE GREEN COLORATION; BRITTLE

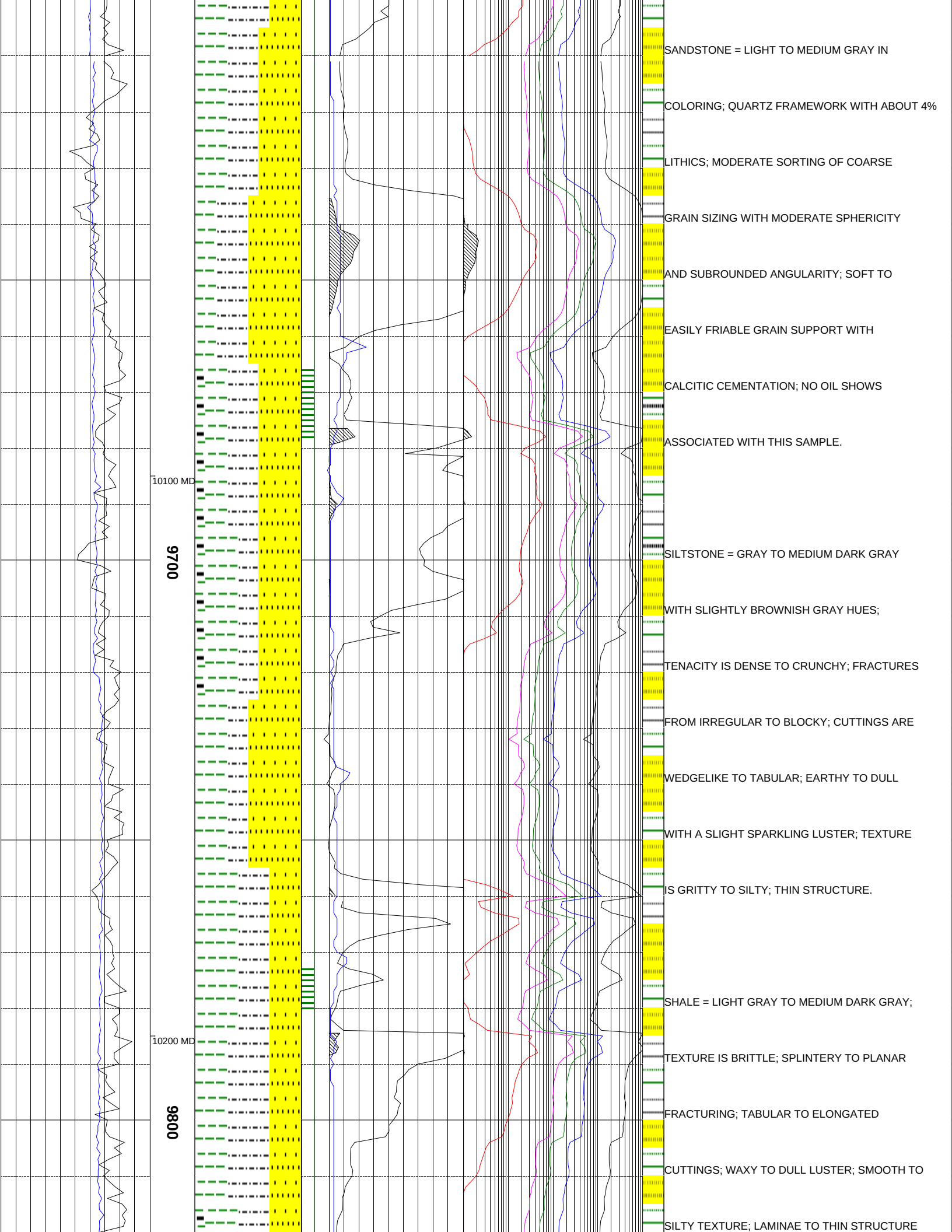
IN TENACITY WITH BLOCKY TO PLANAR

FRACTURING IN A TABULAR TO WEDGELIKE

CUTTINGS HABIT; WAXY TO GREASY LUSTER

WITH A SMOOTH TEXTURE AND A THIN TO

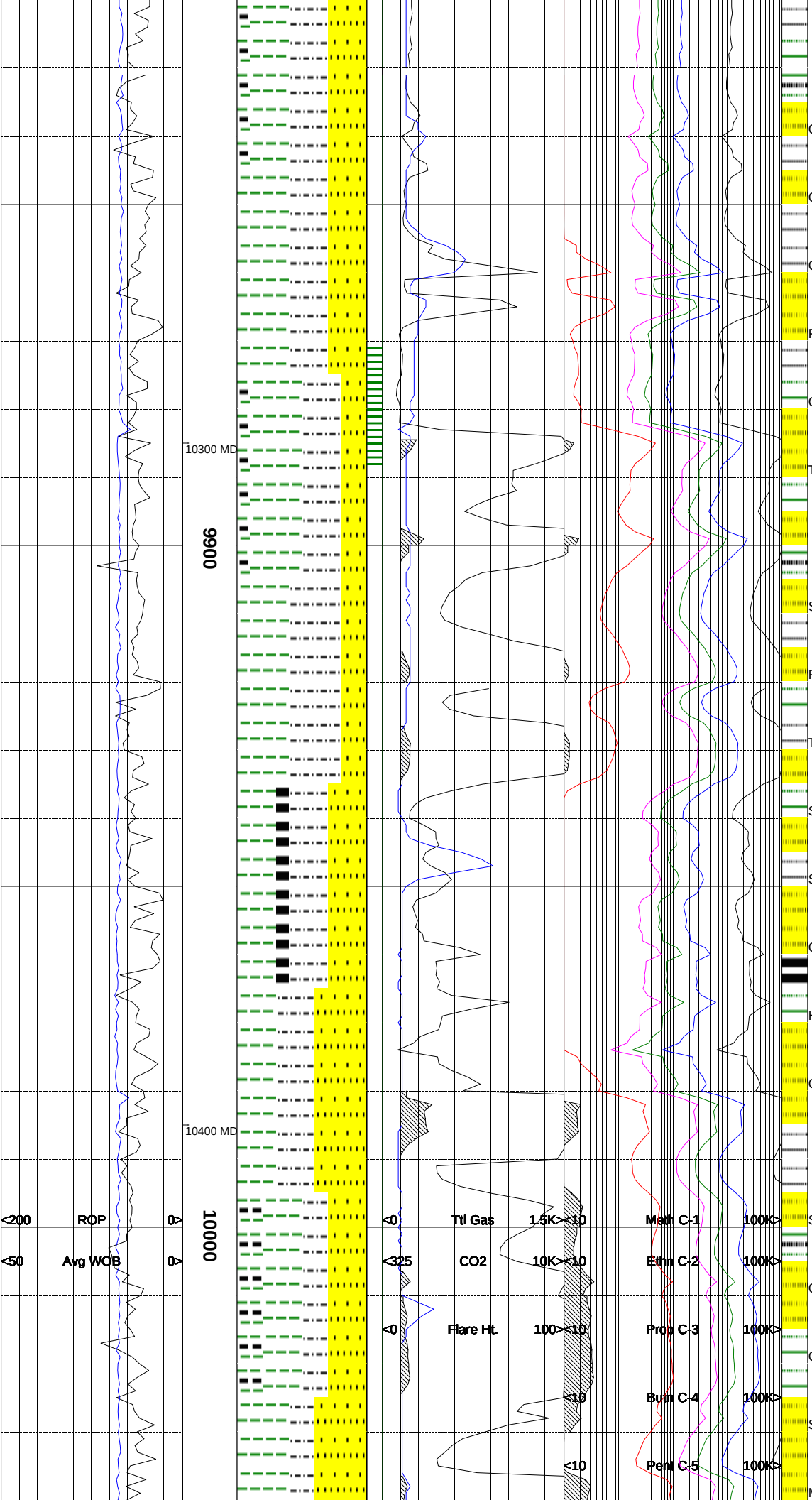
LAMINAE STRUCTURE.



SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 4% LITHICS; MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBROUNDED ANGULARITY; SOFT TO EASILY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = GRAY TO MEDIUM DARK GRAY WITH SLIGHTLY BROWNISH GRAY HUES; TENACITY IS DENSE TO CRUNCHY; FRACTURES FROM IRREGULAR TO BLOCKY; CUTTINGS ARE WEDGELIKE TO TABULAR; EARTHY TO DULL WITH A SLIGHT SPARKLING LUSTER; TEXTURE IS GRITTY TO SILTY; THIN STRUCTURE.

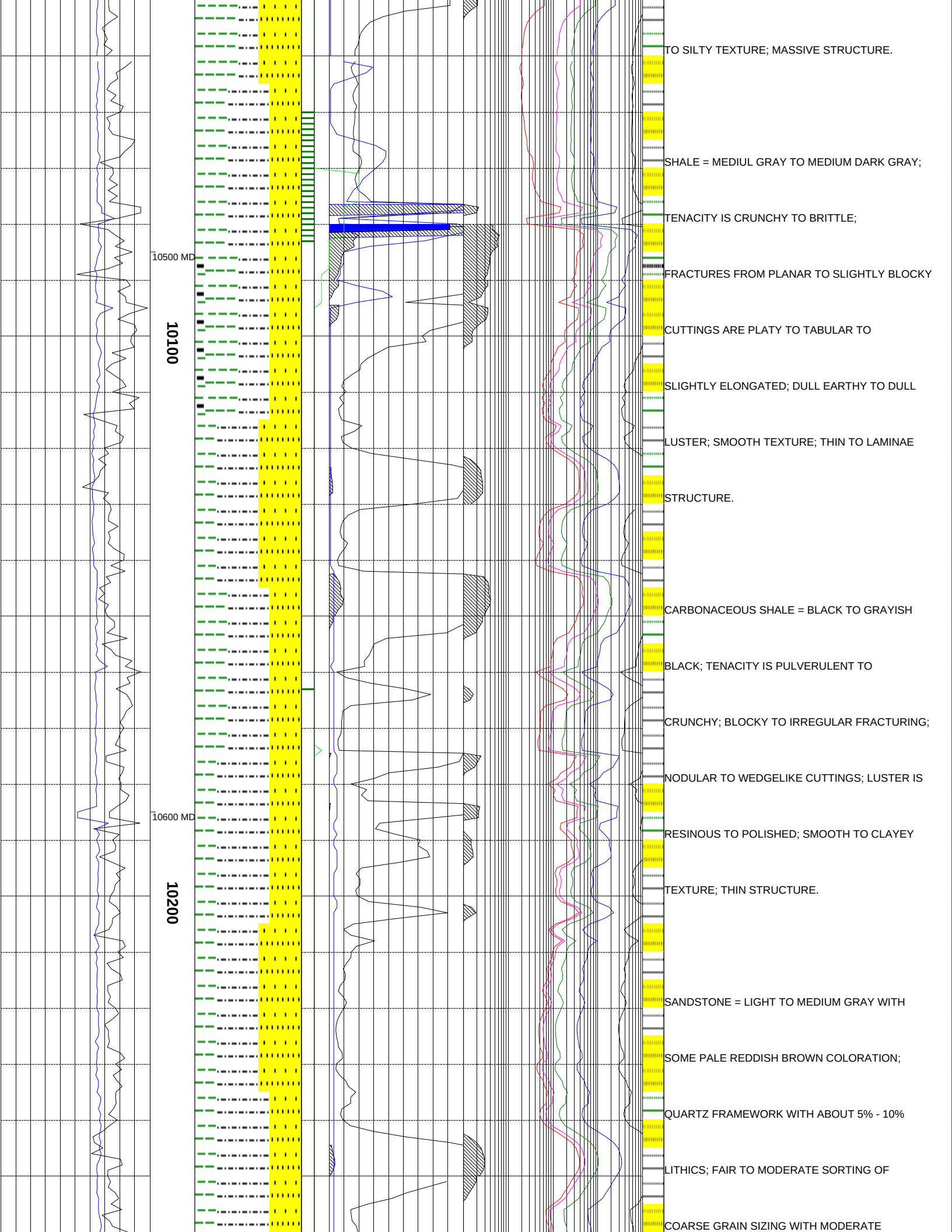
SHALE = LIGHT GRAY TO MEDIUM DARK GRAY; TEXTURE IS BRITTLE; SPLINTERY TO PLANAR FRACTURING; TABULAR TO ELONGATED CUTTINGS; WAXY TO DULL LUSTER; SMOOTH TO SILTY TEXTURE; LAMINAE TO THIN STRUCTURE



CARBONACEOUS SHALE = BROWNISH BLACK TO GRAYISH BLACK TO DARK GRAY; TENACITY IS CRUNCHY TO BRITTLE; IRREGULAR TO BLOCKY FRACTURING; WEDGELIKE TO NODULAR CUTTINGS; RESINOUS TO EARTHY LUSTER; THIN STRUCTURE.

SANDSTONE = WHITE TO MEDIUM GRAY; QUARTZ FRAMEWORK WITH SOME LOOSE GRAINS; COARSE TO FINE SIZED GRAINS WITH POOR TO FAIR SORTING; SUBANGULAR; LOW TO MODERATE SPHERICITY; HARD TO FIRMLY FRIABLE; GRAIN SUPPORTED; STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT; SOME CARBONACEOUS MATERIAL PRESENT.

SILTSTONE = GRAYISH BROWN TO MEDIUM DARK GRAY; TENACITY RANGES FROM DENSE TO CRUMBLY; FRACTURES FROM BLOCKY TO SLIGHTLY IRREGULAR; TABULAR TO SLIGHTLY MASSIVE CUTTINGS; EARTHY LUSTER; GRITTY



TO SILTY TEXTURE; MASSIVE STRUCTURE.

SHALE = MEDIUL GRAY TO MEDIUM DARK GRAY;

TENACITY IS CRUNCHY TO BRITTLE;

FRACTURES FROM PLANAR TO SLIGHTLY BLOCKY

CUTTINGS ARE PLATY TO TABULAR TO

SLIGHTLY ELONGATED; DULL EARTHY TO DULL

LUSTER; SMOOTH TEXTURE; THIN TO LAMINAE

STRUCTURE.

CARBONACEOUS SHALE = BLACK TO GRAYISH

BLACK; TENACITY IS PULVERULENT TO

CRUNCHY; BLOCKY TO IRREGULAR FRACTURING;

NODULAR TO WEDGELIKE CUTTINGS; LUSTER IS

RESINOUS TO POLISHED; SMOOTH TO CLAYEY

TEXTURE; THIN STRUCTURE.

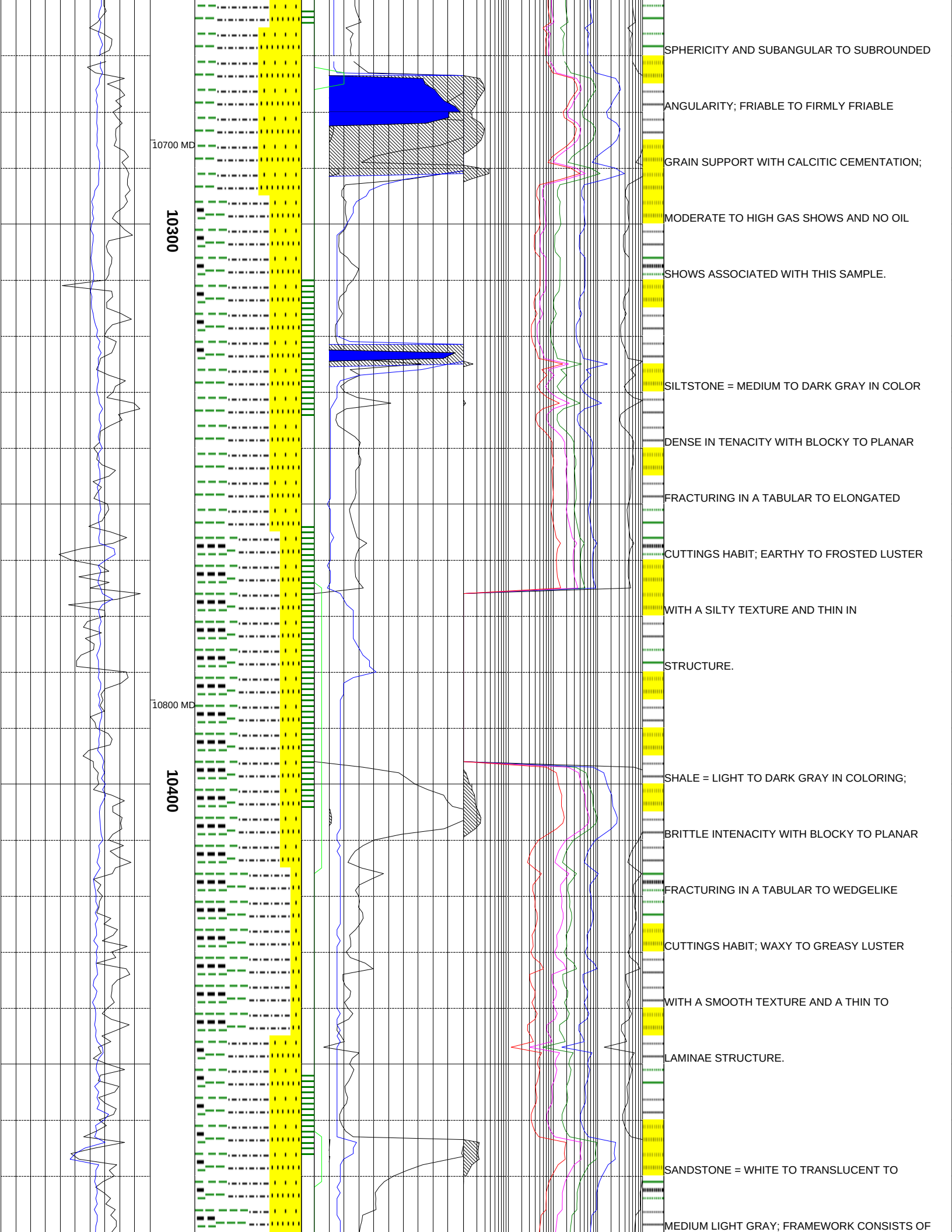
SANDSTONE = LIGHT TO MEDIUM GRAY WITH

SOME PALE REDDISH BROWN COLORATION;

QUARTZ FRAMEWORK WITH ABOUT 5% - 10%

LITHICS; FAIR TO MODERATE SORTING OF

COARSE GRAIN SIZING WITH MODERATE



SPHERICITY AND SUBANGULAR TO SUBROUNDED

ANGULARITY; FRIABLE TO FIRMLY FRIABLE

GRAIN SUPPORT WITH CALCITIC CEMENTATION;

MODERATE TO HIGH GAS SHOWS AND NO OIL

SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY IN COLOR

DENSE IN TENACITY WITH BLOCKY TO PLANAR

FRACTURING IN A TABULAR TO ELONGATED

CUTTINGS HABIT; EARTHY TO FROSTED LUSTER

WITH A SILTY TEXTURE AND THIN IN

STRUCTURE.

SHALE = LIGHT TO DARK GRAY IN COLORING;

BRITTLE INTENACITY WITH BLOCKY TO PLANAR

FRACTURING IN A TABULAR TO WEDGELIKE

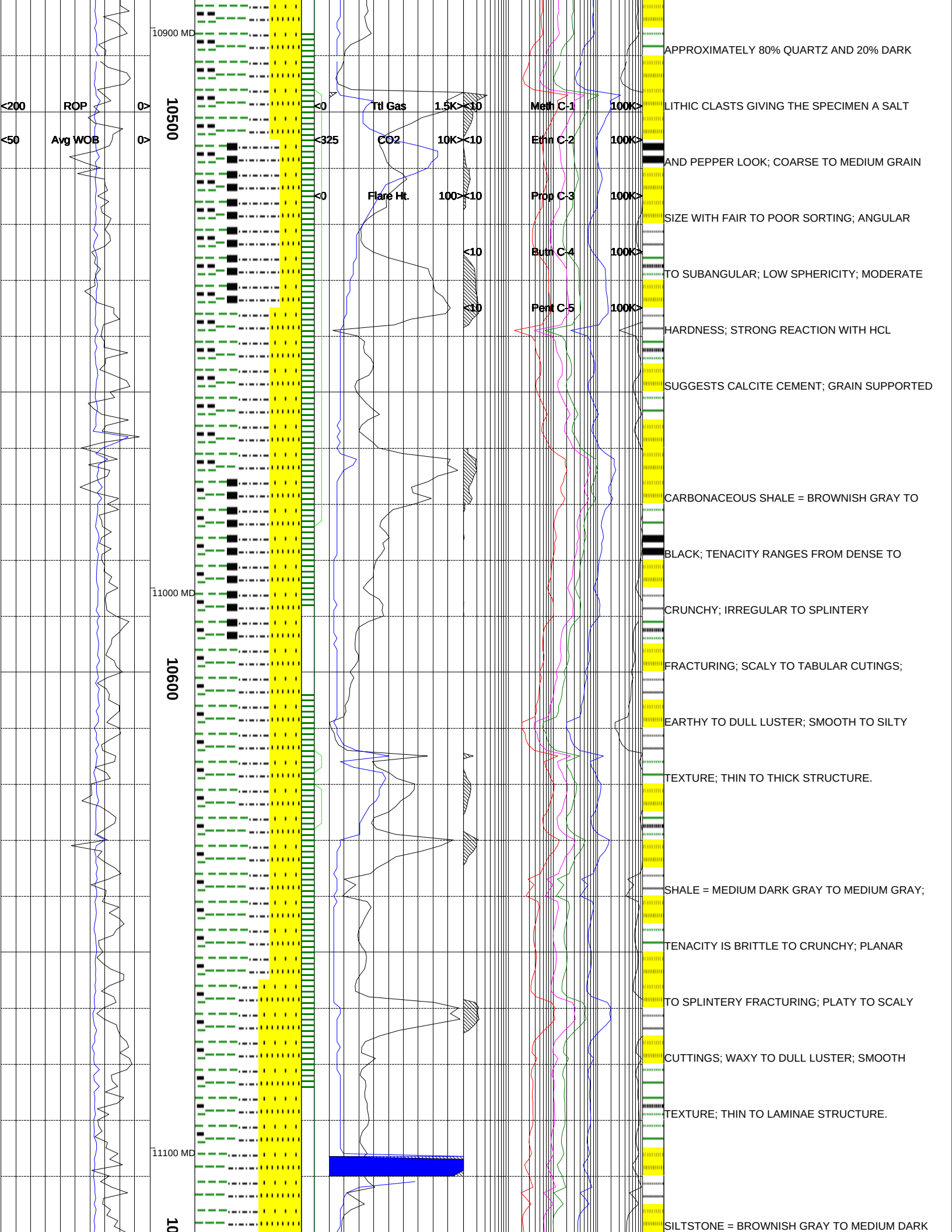
CUTTINGS HABIT; WAXY TO GREASY LUSTER

WITH A SMOOTH TEXTURE AND A THIN TO

LAMINAE STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO

MEDIUM LIGHT GRAY; FRAMEWORK CONSISTS OF


10900 MD
<200
ROP
0>
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Avg WOB
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10500
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Ttl Gas
1.5K>
<10
Meth C-1
100K>
<325
CO2
10K>
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Ethn C-2
100K>
<0
Flare Ht.
100>
<10
Prop C-3
100K>
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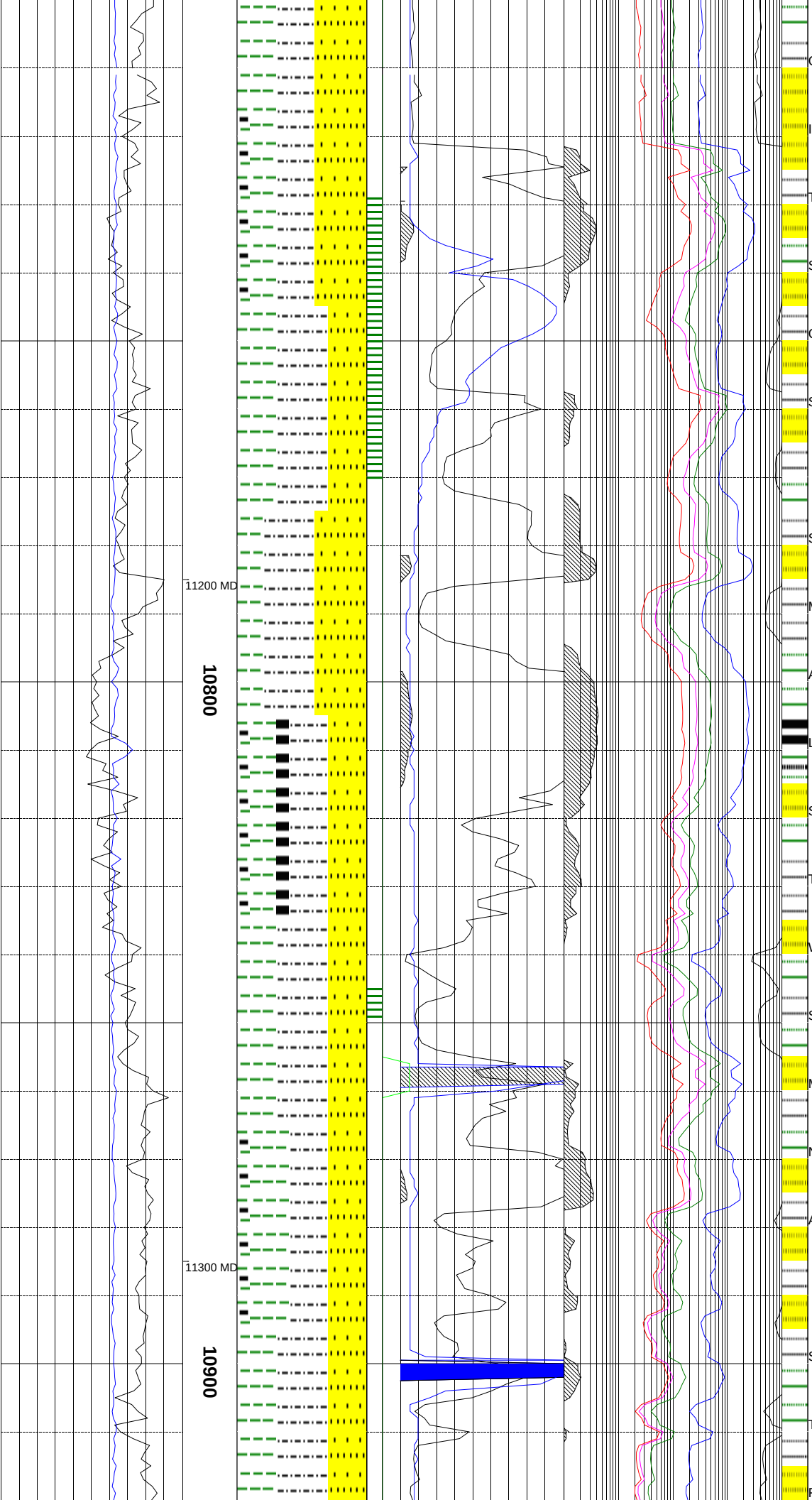
Butn C-4
100K>
<10
Pent C-5
100K>
11000 MD
10600
11100 MD
APPROXIMATELY 80% QUARTZ AND 20% DARK
LITHIC CLASTS GIVING THE SPECIMEN A SALT
AND PEPPER LOOK; COARSE TO MEDIUM GRAIN
SIZE WITH FAIR TO POOR SORTING; ANGULAR
TO SUBANGULAR; LOW SPHERICITY; MODERATE
HARDNESS; STRONG REACTION WITH HCL
SUGGESTS CALCITE CEMENT; GRAIN SUPPORTED
CARBONACEOUS SHALE = BROWNISH GRAY TO
BLACK; TENACITY RANGES FROM DENSE TO
CRUNCHY; IRREGULAR TO SPLINTERY
FRACTURING; SCALY TO TABULAR CUTINGS;
EARTHY TO DULL LUSTER; SMOOTH TO SILTY
TEXTURE; THIN TO THICK STRUCTURE.
SHALE = MEDIUM DARK GRAY TO MEDIUM GRAY;
TENACITY IS BRITTLE TO CRUNCHY; PLANAR
TO SPLINTERY FRACTURING; PLATY TO SCALY
CUTTINGS; WAXY TO DULL LUSTER; SMOOTH
TEXTURE; THIN TO LAMINAE STRUCTURE.
SILTSTONE = BROWNISH GRAY TO MEDIUM DARK



GRAY; TENACITY IS DENSE TO CRUMBLY;

IRREGULAR TO BLOCKY FRACTURING; MASSIVE

TO WEDGELIKE CUTTINGS; EARTHY WITH A

SLIGHT FROSTED LUSTER; TEXTURE IS MOSTLY

GRITTY TO SLIGHTLY SILTY; THICK

STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO

MEDIUM DARK GRAY; FRAMEWORK CONSISTS OF

APPROXIMATELY 85% QUARTZ AND 15% BLACK

LITHIC CLASTS GIVING THE SPECIMEN A

STRONG SALT AND PEPPER LOOK TO SOME OF

THE SAMPLE; COARSE TO FINE GRAINED WITH

WELL TO FAIR SORTING; ANUGULAR TO

SUBROUNDED; MODERATE TO LOW SPHERICITY;

MODERATE HARD TO HARD; SILICA CEMENT;

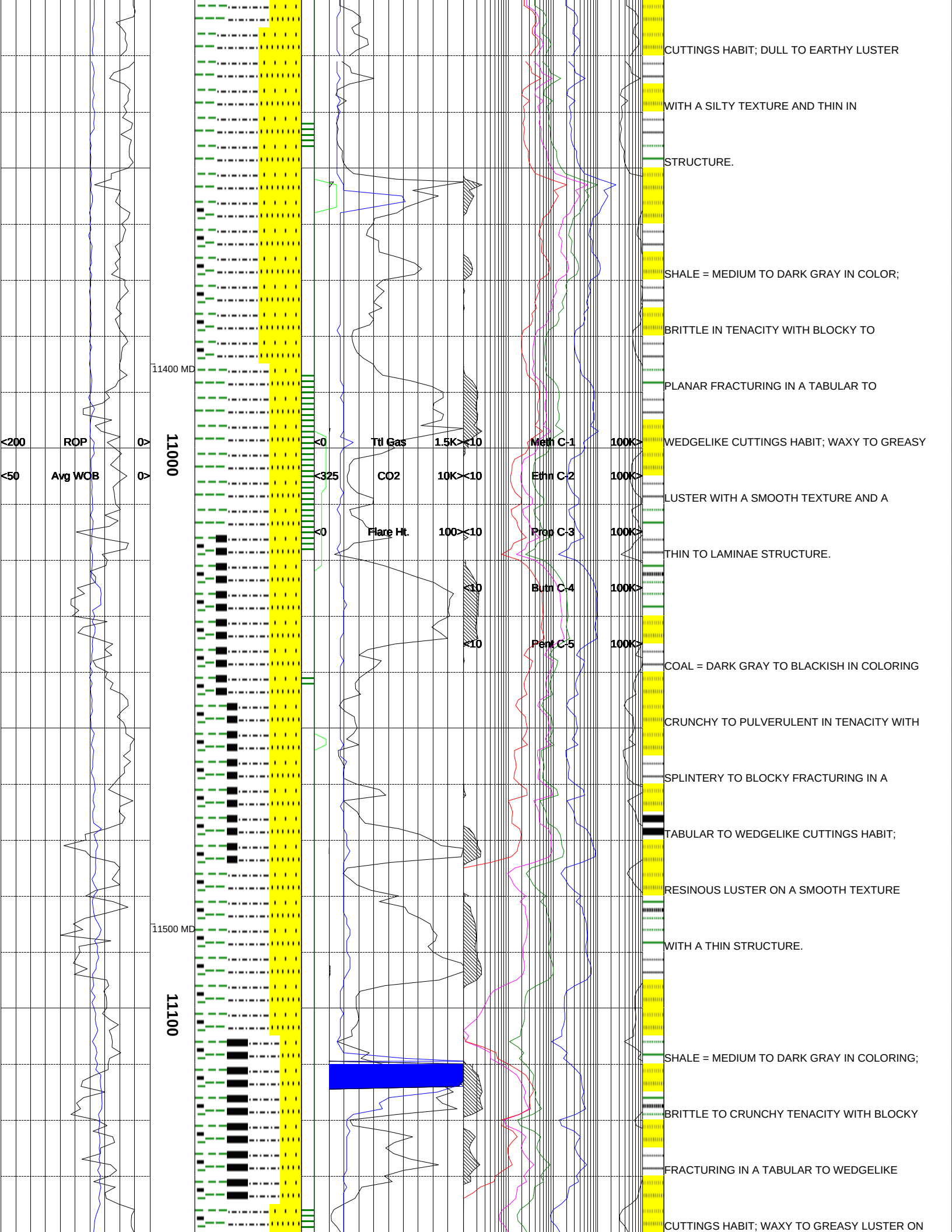
NO REACTION WITH HCL; HIGH GAS

ASSOCCIATED WITH SAMPLE DEPTH.

SILTSTONE = MEDIUM TO DARK GRAY WITH

TENACITY WITH BLOCKY TO SPLINTERY

FRACTURING IN A TABULAR TO ELONGATED



CUTTINGS HABIT; DULL TO EARTHY LUSTER

WITH A SILTY TEXTURE AND THIN IN

STRUCTURE.

SHALE = MEDIUM TO DARK GRAY IN COLOR;

BRITTLE IN TENACITY WITH BLOCKY TO

PLANAR FRACTURING IN A TABULAR TO

WEDGELIKE CUTTINGS HABIT; WAXY TO GREASY

LUSTER WITH A SMOOTH TEXTURE AND A

THIN TO LAMINAE STRUCTURE.

COAL = DARK GRAY TO BLACKISH IN COLORING

CRUNCHY TO PULVERULENT IN TENACITY WITH

SPLINTERY TO BLOCKY FRACTURING IN A

TABULAR TO WEDGELIKE CUTTINGS HABIT;

RESINOUS LUSTER ON A SMOOTH TEXTURE

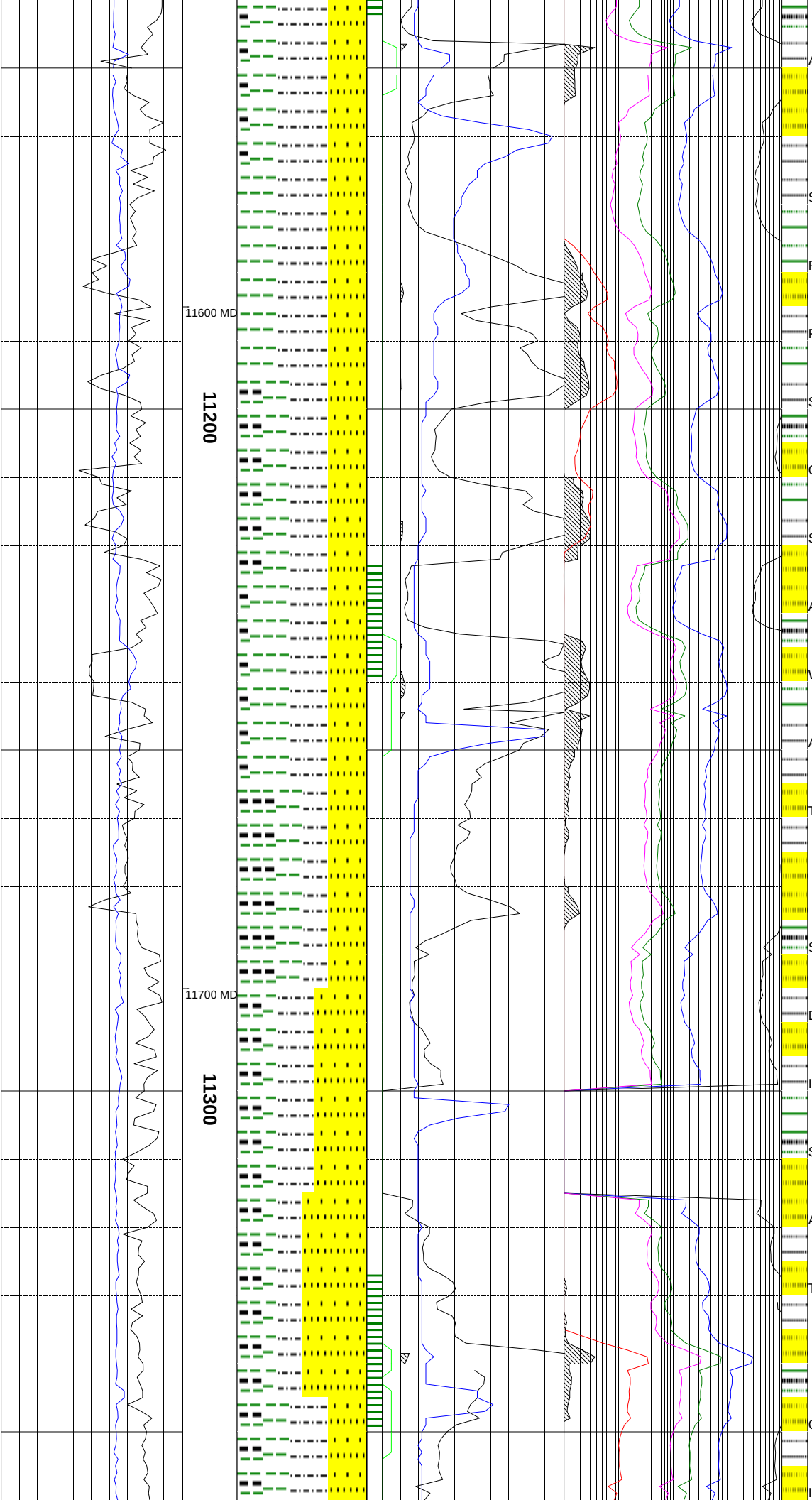
WITH A THIN STRUCTURE.

SHALE = MEDIUM TO DARK GRAY IN COLORING;

BRITTLE TO CRUNCHY TENACITY WITH BLOCKY

FRACTURING IN A TABULAR TO WEDGELIKE

CUTTINGS HABIT; WAXY TO GREASY LUSTER ON



A SMOOTH TEXTURE AND A THIN STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY WITH

PALE REDDISH BROWN COLORATION; QUARTZ

FRAMEWORK WITH ABOUT 5% - 10% LITHIC

SHOWS; FAIR TO MODERATE SORTING OF

COARSE GRAIN SIZING WITH MODERATE

SPHERICITY AND SUBROUNDED TO SUB ANGULAR

ANGULARITY; EASILY FRIABLE GRAIN SUPPORT

WITH CALCITIC CEMENTATION; NO OIL SHOWS

AND MODERATE GAS SHOWS ASSOCIATED WITH

THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY IN COLOR

DENSE IN TENACITY WITH BLOCKY FRACTURING

IN A TABULAR TO WEDGELIKE CUTTINGS HABIT

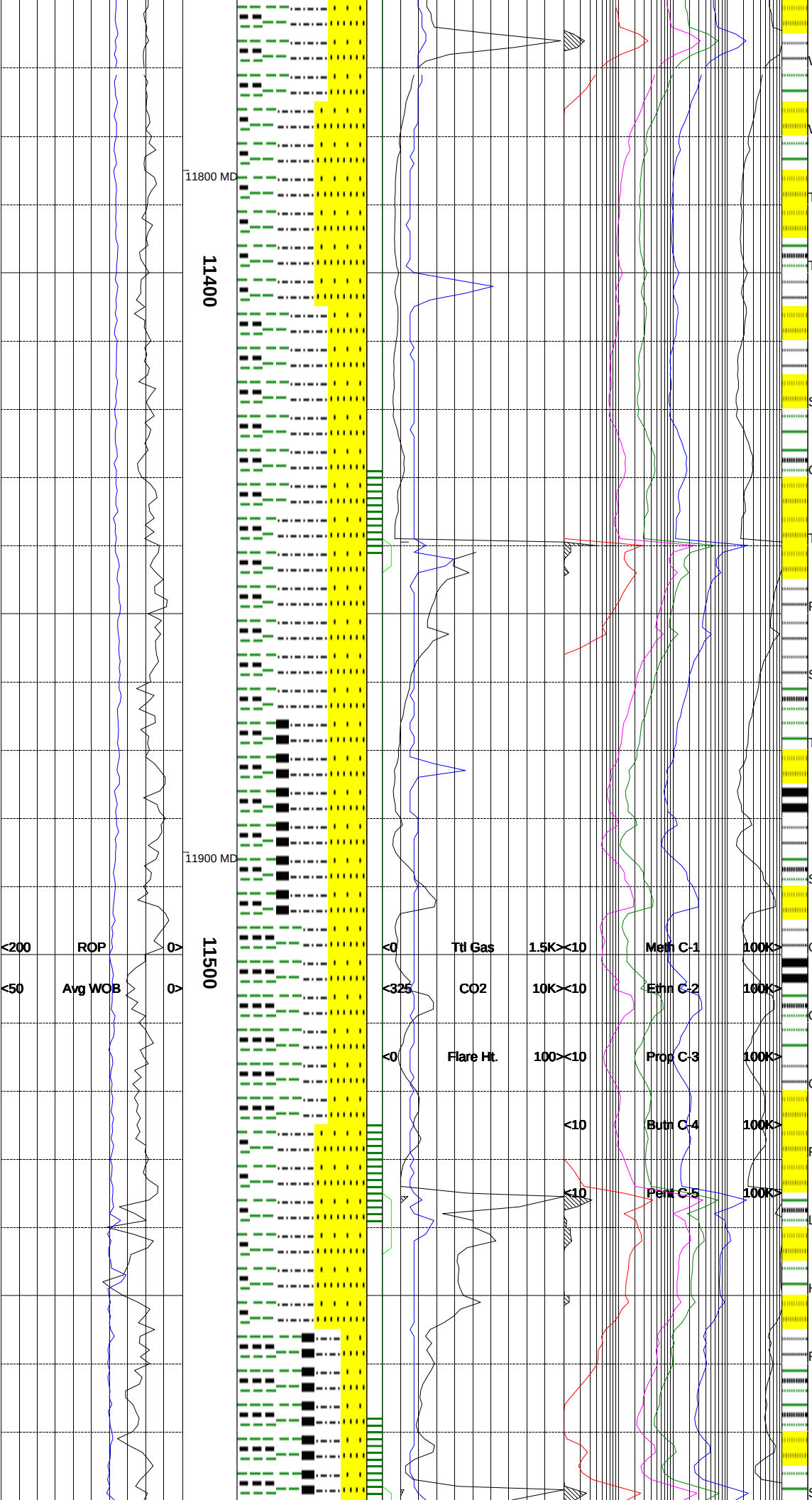
SILTY TO COARSE GRAIN SILTY TEXTURE WITH

AN EARTHY TO FROSTED LUSTER AND THIN TO

THICK STRUCTURE.

CARBONACEOUS SHALE = DARK GRAY TO BLACK

IN COLOR; BRITTLE TO CRUNCHY TENACITY



WITH BLOCKY FRACTURING IN A TABULAR TO

WEDGELIKE CUTTINGS HABIT; SMOOTH IN

TEXTURE WITH A RESINOUS LUSTER AND A

THIN TO THICK STRUCTURE.

SHALE = LIGHT GRAY TO MEDIUM DARK GRAY

COLORING; TENACITY IS DENSE TO BRITTLE

TO SLIGHTLY CRUNCHY; PLANAR FRACTURING;

PLATY TO SCALY CUTTINGS; DULL TO

SLIGHTLY WAXY LUSTER; SMOOTH TEXTURE;

THIN TO LAMINAE STRUCTURE.

SANDSTONE = BROWNISH GRAY TO MEDIUM DARK

GRAY TO TRANSLUCENT; FRAMEWORK CONSISTS

OF QUARTZ WITH ABOUT 10% BLACK LITHIC

CLASTS; FINE TO MEDIUM SIZED GRAINS WITH

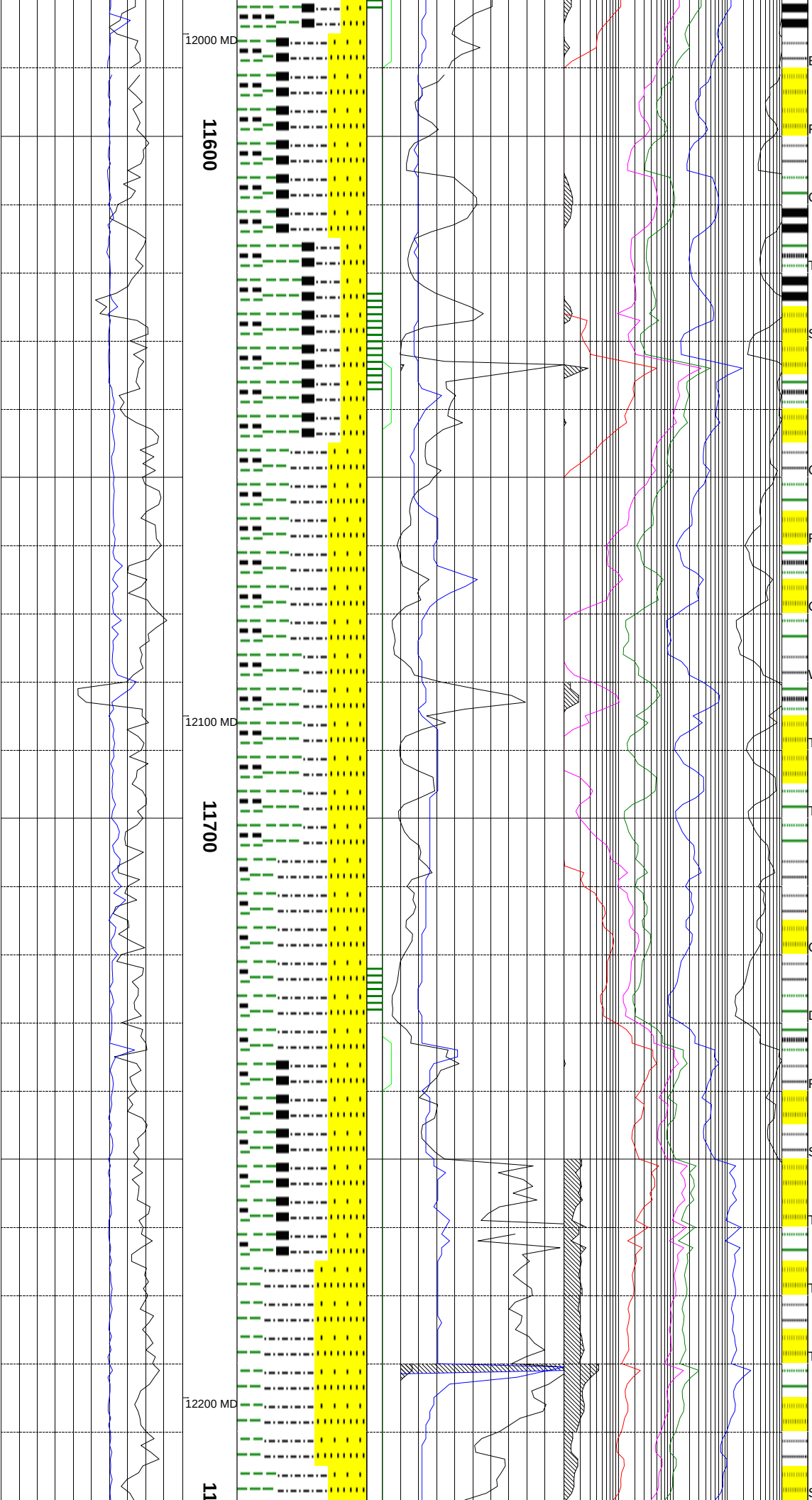
FAIR SORTING; SUBROUNDED TO SUBABGULAR;

LOW TO MODERATE SPHERICITY; MODERATE

HARDNESS; GRAIN SUPPORTED; VERY SLIGHT

REACTION WITH HCLSUGGESTS SILICA CEMENT.

SILTSTONE = BROWNISH GRAY TO BROWNISH



BLACK; TENACITY IS TOUGH TO DENSE;

FRACTURES FROM IRREGULAR TO BLOCKY;

CUTTINGS ARE TABULAR; EARTHY LUSTER;

TEXTURE IS MOSTLY GRITTY TO SLIGHTLY

SILTY; THICK STRUCTURE.

COAL = BLACK; TENACITY IS CRUMBLY TO

PULVERULENT; IRREGULAR TO BLOCKY TO

CONCHOIDAL FRACTURING; NODULAR TO

WEDGELIKE; LUSTER RANGES FROM RESINOUS

TO POLISHED TO EARTHY; TEXTURE IS SMOOTH

TO CLAYEY; THIN STRUCTURE.

CARBONACEOUS SHALE = GRAYISH BLACK TO

DARK GRAY; TOUGH TO DENSE TENACITY;

FRACTURES FROM IRREGULAR TO BLOCKY TO

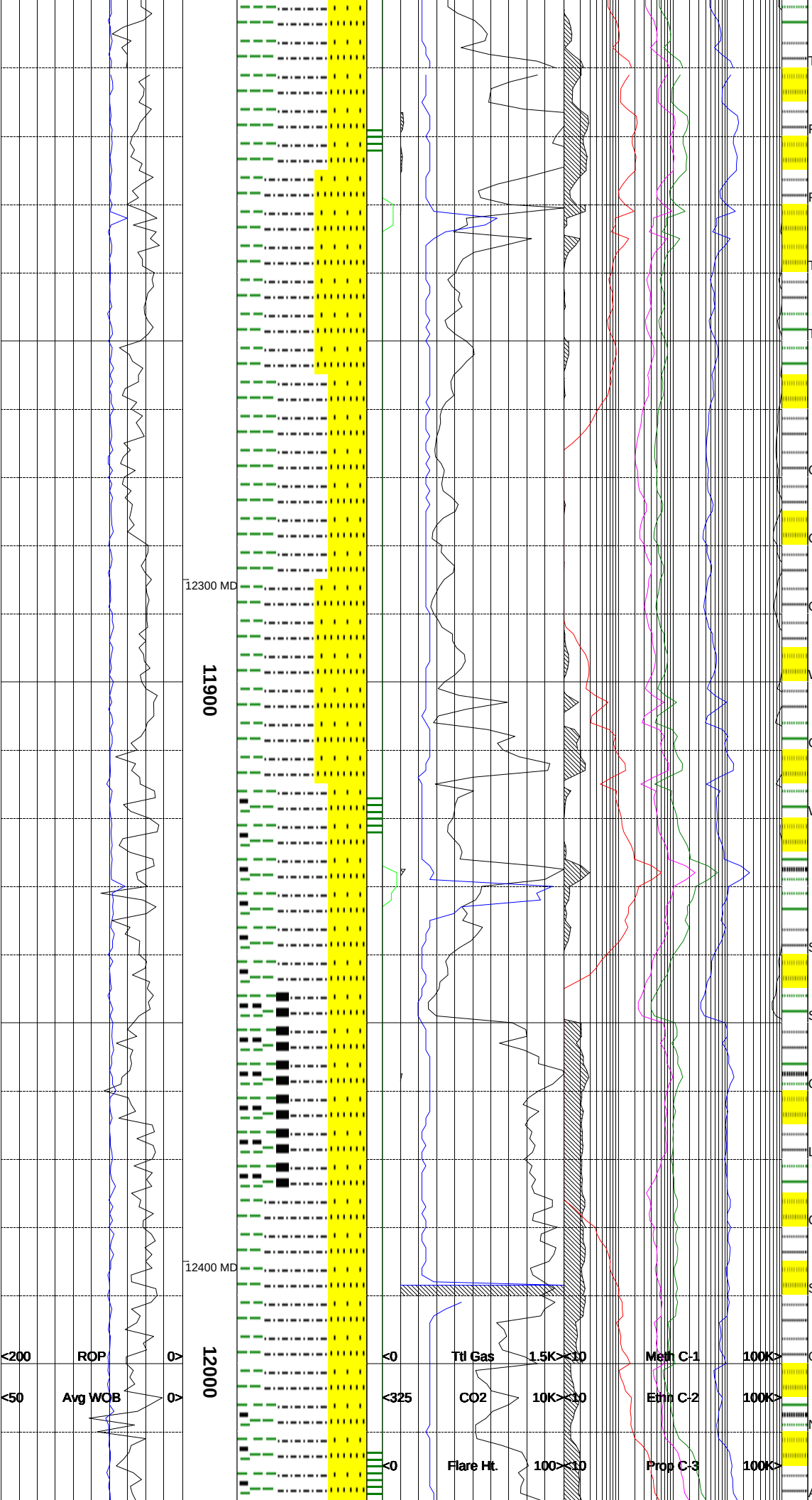
SLIGHTLY PLANAR; CUTTINGS ARE PLATY TO

TABULAR; LUSTER IS POLISHED TO EARTHY;

TEXTURE IS SMOOTH TO SILTY; STRUCTURE IS

THIN TO THICK.

SHALE = LIGHT GRAY TO MEDIUM DARK GRAY;



TENACITY IS CRUNCHY TO DENSE; FRACTURES

FROM PLANAR TO SPLINTERY; CUTTINGS ARE

PLATY TO SCALY; LUSTER IS WAXY TO DULL;

TEXTURE IS SMOOTH TO SILTY; THIN TO

THICK STRUCTURE.

COAL = BLACKIS IN COLORING; BRITTLE TO

CRUNCHY TENACITY WITH BLOCKY TO

CONCHOIDAL FRACTURING IN A TABULAR TO

WEDGELIKE CUTTINGS HABIT; RESINOUS TO

GEMLIKE LUSTER AND A SMMOTH TEXTURE

WITH A THIN TO THICK STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY WITH

SOME PALE REDDISH BROWN COLORATION;

QUARTZ FRAMEWORK SHOWING ABOUT 7% - 10%

LITHICS; FAIR TO MODERATE SORTING OF

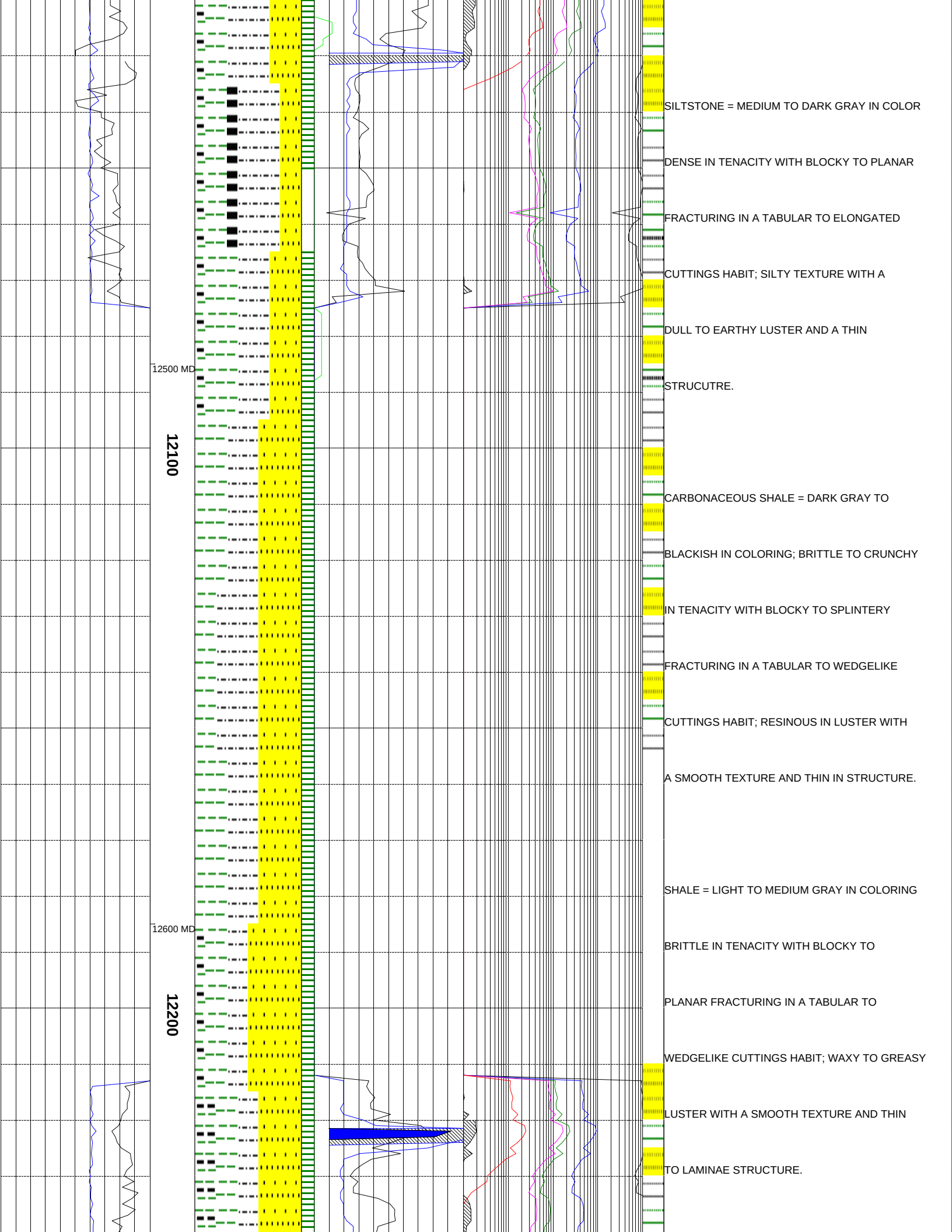
COARSE GRAIN SIZING WITH SUBANGULAR TO

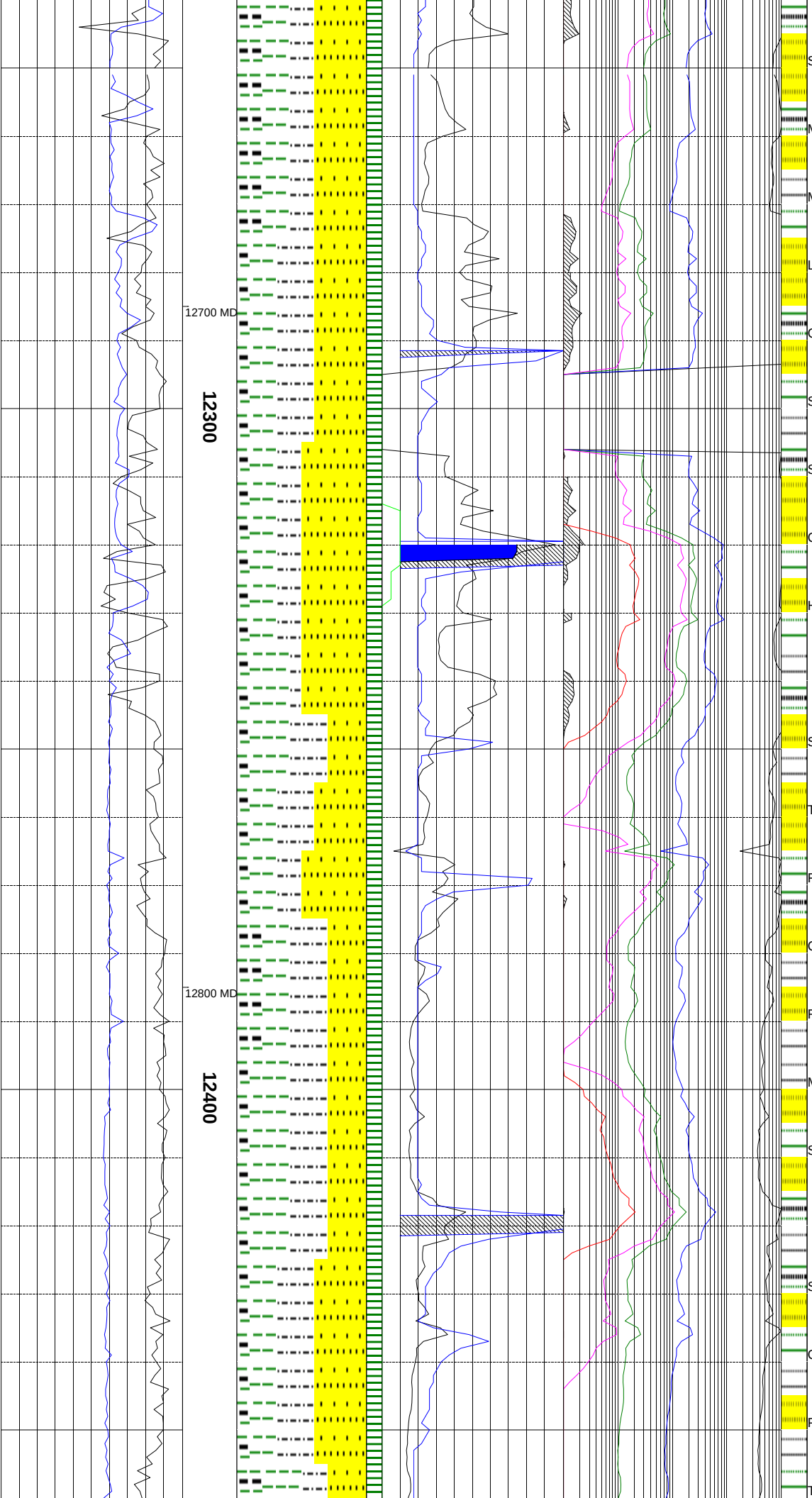
SUBROUNDED ANGULARITY AND MODERATE

GRAIN SUPPORT WITH CALCITIC CEMENTATION;

NO OIL SHOWS AND MODERATE GASES

ASSOCIATED WITH THIS SAMPLE.

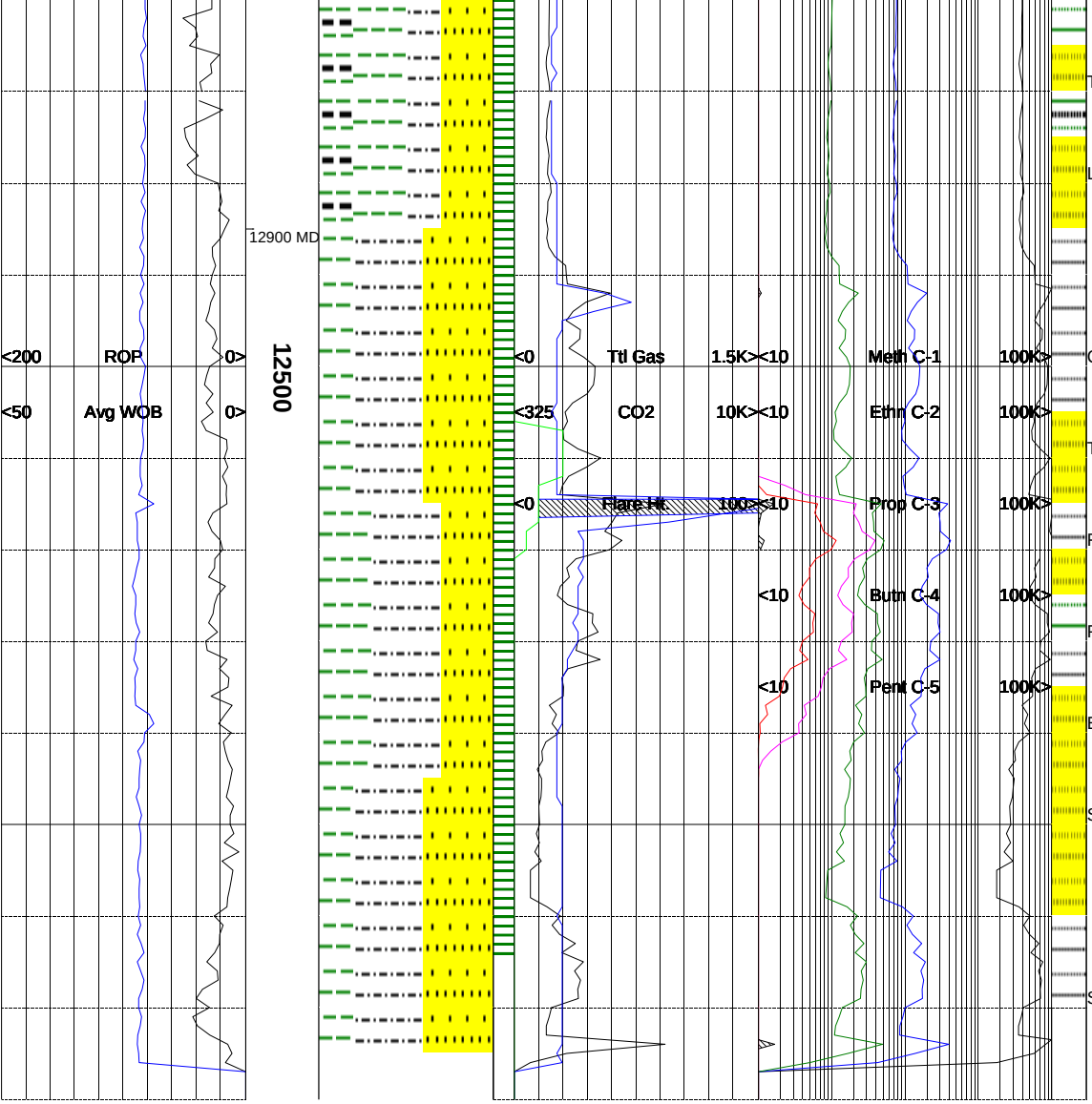

12500 MD
12100
12600 MD
12200
SILTSTONE = MEDIUM TO DARK GRAY IN COLOR
DENSE IN TENACITY WITH BLOCKY TO PLANAR
FRACTURING IN A TABULAR TO ELONGATED
CUTTINGS HABIT; SILTY TEXTURE WITH A
DULL TO EARTHY LUSTER AND A THIN
STRUCUTRE.
CARBONACEOUS SHALE = DARK GRAY TO
BLACKISH IN COLORING; BRITTLE TO CRUNCHY
IN TENACITY WITH BLOCKY TO SPLINTERY
FRACTURING IN A TABULAR TO WEDGELIKE
CUTTINGS HABIT; RESINOUS IN LUSTER WITH
A SMOOTH TEXTURE AND THIN IN STRUCTURE.
SHALE = LIGHT TO MEDIUM GRAY IN COLORING
BRITTLE IN TENACITY WITH BLOCKY TO
PLANAR FRACTURING IN A TABULAR TO
WEDGELIKE CUTTINGS HABIT; WAXY TO GREASY
LUSTER WITH A SMOOTH TEXTURE AND THIN
TO LAMINAE STRUCTURE.



SANDSTONE = WHITE TO TRANSLUCENT TO MEDIUM LIGHT GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ WITH ABOUT 10% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED GRAINS WITH FAIR TO POOR SORTING; SUBROUNDED TO SUBANGULAR; FIRMLY FRIABLE SILICA GRAIN SUPPORTED WITH SILICA CEMENT AS SUGGESTED BY NO REACTION WITH HCL.

SILTSTONE = BROWNISH GRAY TO DARK GRAY; TENACITY IS TOUGH TO DENSE; FRACTURES FROM BLOCKY TO OCCASSIONALY IRREGULAR; CUTTINGS ARE MASSIVE TO TABULAR; LUSTER RANGES FROM EARTHY TO WAXY; TEXTURE IS MOSTLY GRITTY TO SLIGHTLY SILTY; THICK STRUCTURE.

SHALE = MEDIUM LIGHT GRAY TO MEDIUM DARK GRAY; TENACITY IS DENSE TO BRITTLE; PLANAR FRACTURING; CUTTINGS ARE PLATY TO TABULAR; LUSTER IS DULL TO EARTHY;



TEXTURE IS SMOOTH TO SILTY; THIN TO

LAMINAE STRUCTURE.

CARBONACEOUS SHALE = DARK GRAY TO BLACK;

TENACITY IS TOUGH TO DENSE; FRACTURES

FROM IRREGULAR TO BLOCKY TO SLIGHTLY

PLANAR; CUTTINGS ARE TABULAR; LUSTER IS

EARTHY TO DULL; SMOOTH TEXTURE; THIN

STRUCTURE.

SANDSTONE = TRANSLUCENT TO WHITE TO