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Houston, TX (281) 784-5500
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Anchorage, AK (907) 561-2465

MUDLOG TVD

COMPANY EXXONMOBIL
WELL PCU 296-5A9
FIELD PICEANCE CREEK
REGION ROCKIES
COORDINATES LAT: 39.911922
LONG:-108.198686
ELEVATION G.L.: 7294.1'
RKB: 30.2
COUNTY, STATE RIO BLANCO, CO
API INDEX 051031124100
SPUD DATE 12/05/2009
CONTRACTOR HELMERICH_PAYNE
CO. REP. C. CURTIS
RIG/TYPE FLEX 4S / HP 321
LOGGING UNIT ML031
GEOLOGISTS B. SMELSER, M. GROSS
C. RECORD
ADD. PERSONS
CO. GEOLOGIST C. ALBA

LOG INTERVAL

CASING DATA

DEPTHS: 4779' TO 13772'
DATES: 01/27/2011 TO 04/15/2011
SCALE: 5" = 100'

16" AT 150'
10.75" AT 4764'
7.00" AT 10032'
AT

MUD TYPES

HOLE SIZE

SPUD MUD TO 4779'
LSND TO 13772'
TO
TO

14.75" TO 4779'
9.875" TO 10051'
6.125" TO 13772'
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.

<100 ROP 0>
ft/hr
<80 Avg WOB 0>
klbs

TVD Depth

Lithology

MGS
<0 Ttl Gas 1K>
units
<0 CO2 40K>
ppm
<0 Flare Ht. 100>
ft

<10 Meth C-1 100K>
ppm
<10 Ethn C-2 100K>
<10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>

Interp. Lith

Remarks
Survey Data, Mud Reports, Other Info.

4600

4800 MD

4700

EPOCH WELL SERVICES COMMENCED LOGGING

THE PCU 296-5A 09 WELL ON 1/27/2011

@ 4779' MD.

SHALE = DARK YELLOWISH BROWN TO GRAYISH

BROWN TO MODERATE YELLOWISH BROWN;

PLATY TO FLAKY CUTTINGS HABIT; PLANAR TO

SPLINTERY FRACTURE; EARTHY LUSTER;

MINOR AMOUNTS OF CLAY WASHED OUT DURING

CLEANING; THINLY INTERBEDDED WITH

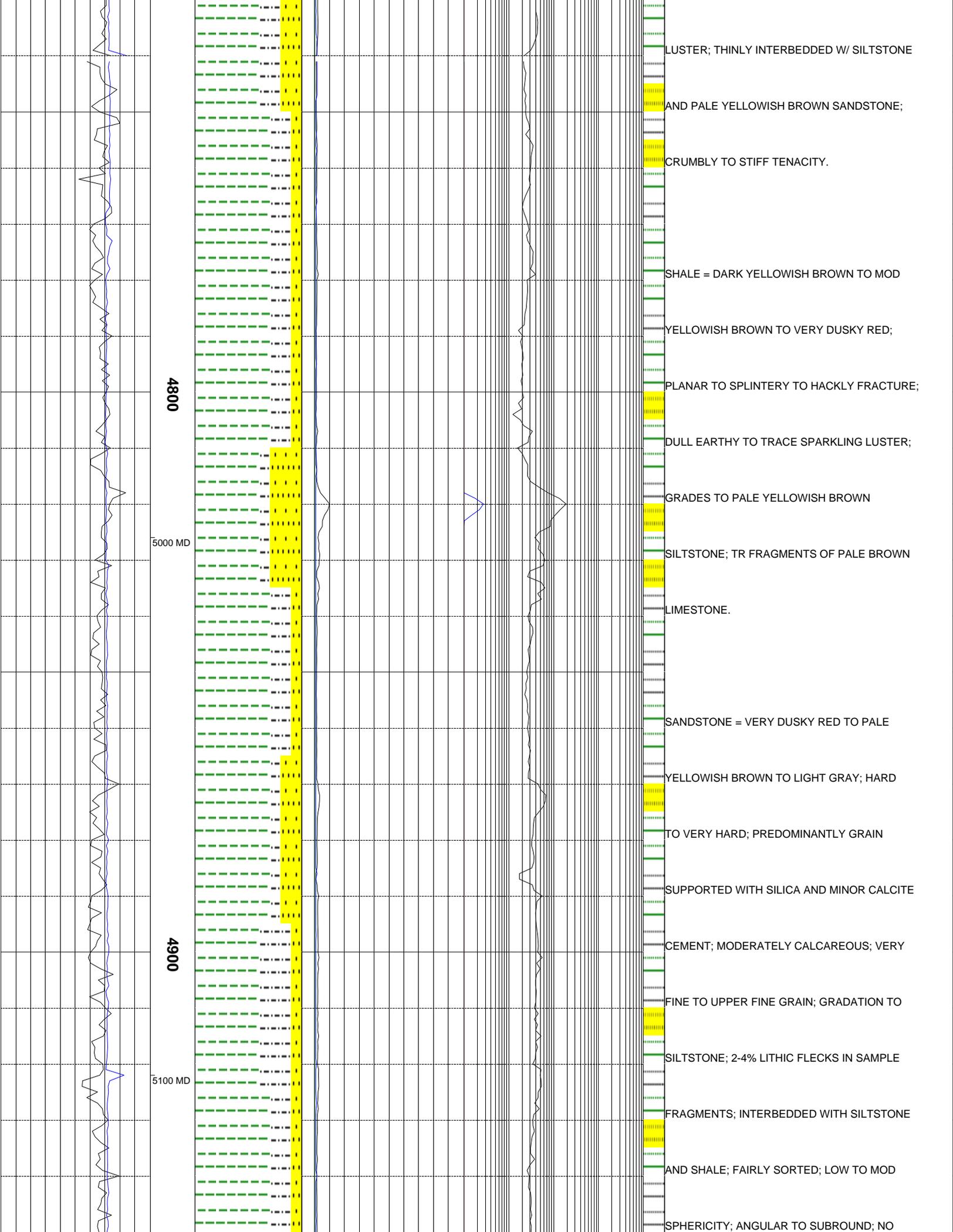
SILTSTONE.

SHALE = DARK YELLOWISH BROWN TO VERY

DUSKY RED TO MEDIUM GRAY; PLATY TO SCALY

TO TABULAR CUTTINGS HABIT; CLAYEY TO

SLIGHTLY SILTY TEXTURE; DULL TO EARTHY

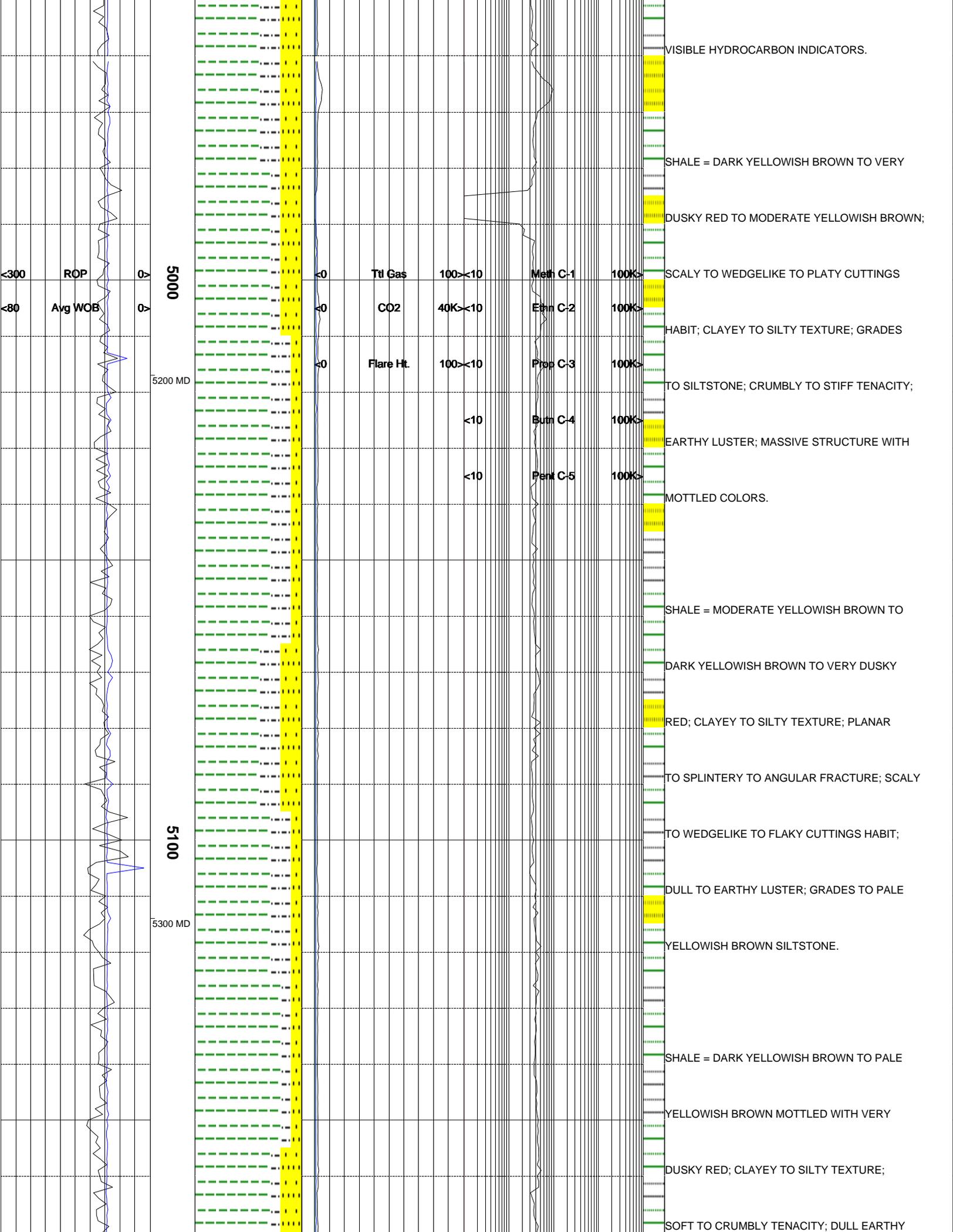


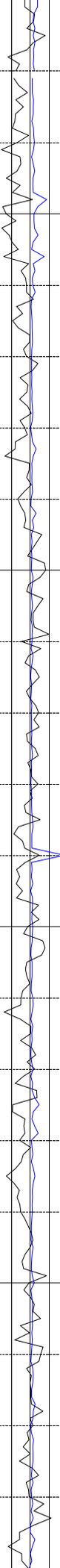
4800

5000 MD

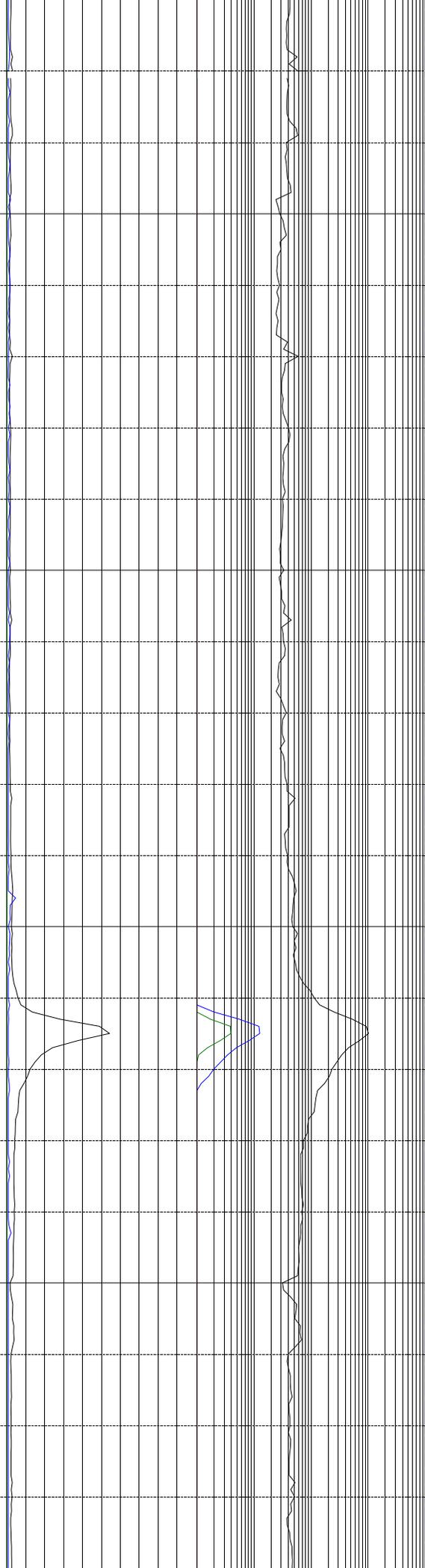
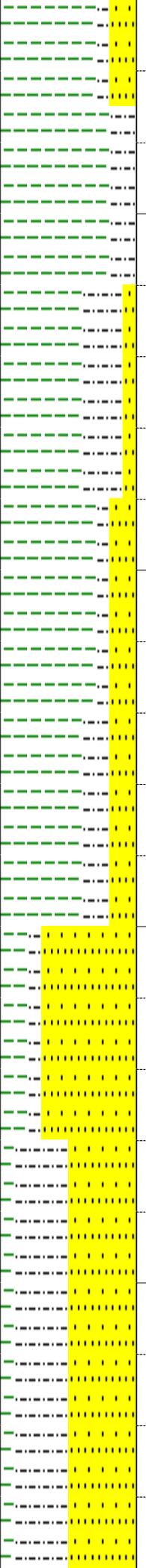
4900

5100 MD

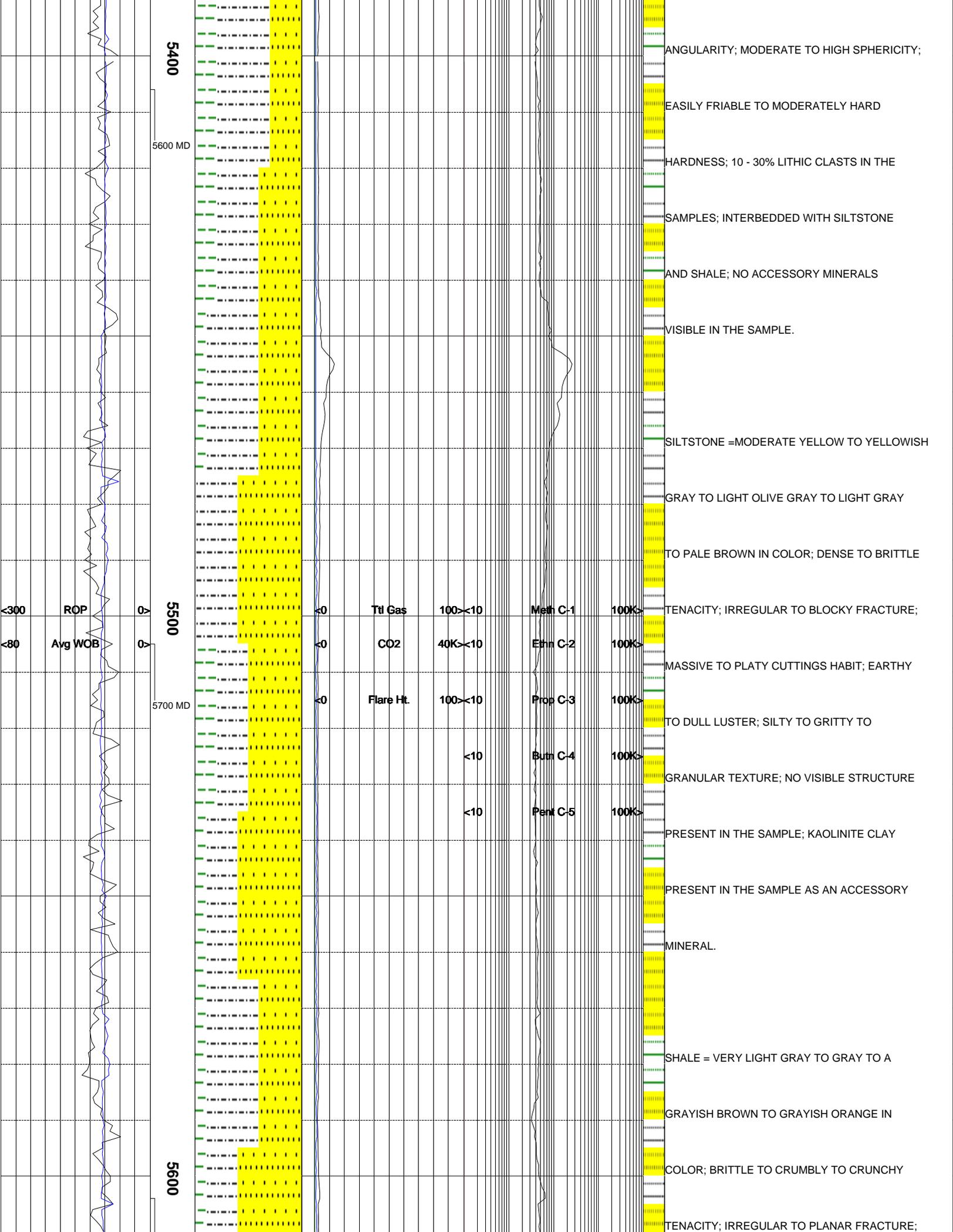


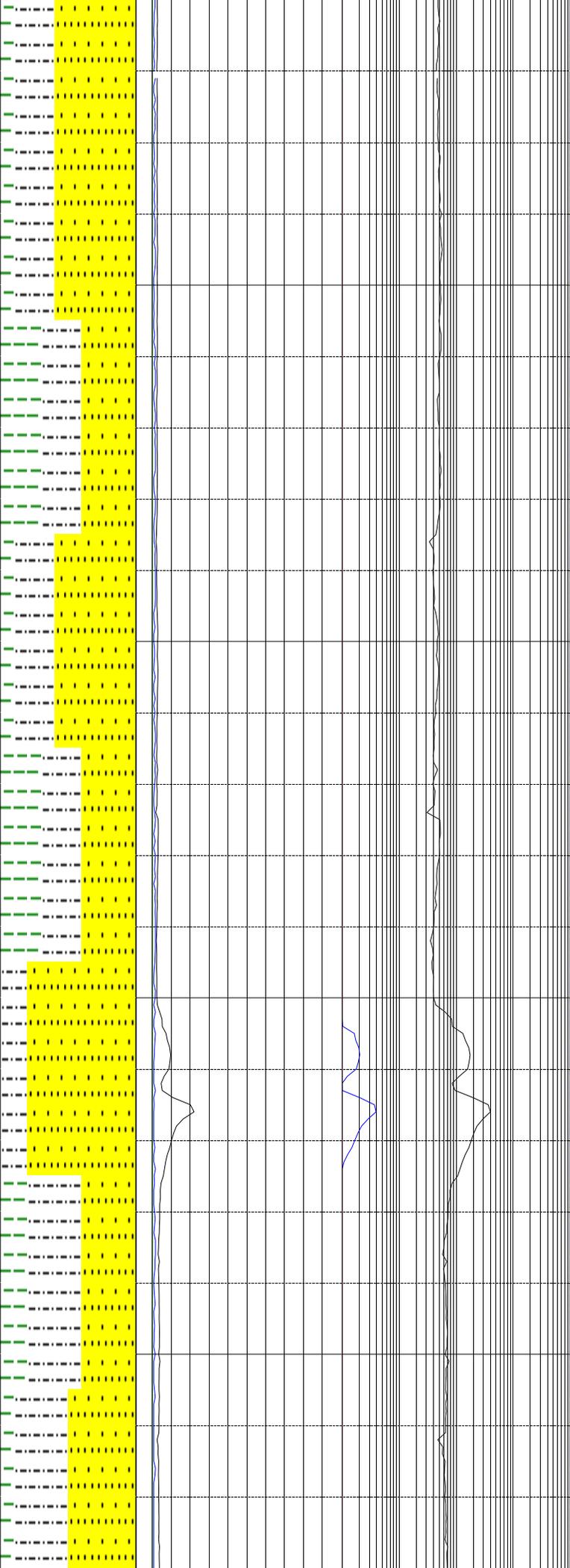
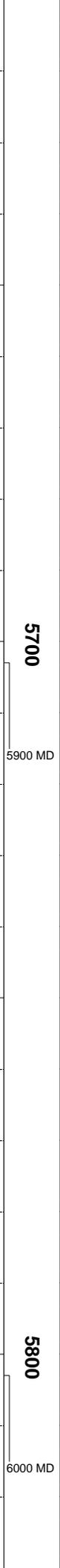
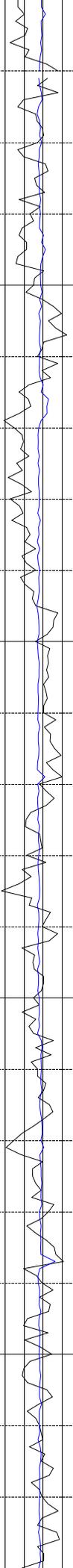


5200
5400 MD
5300
5500 MD

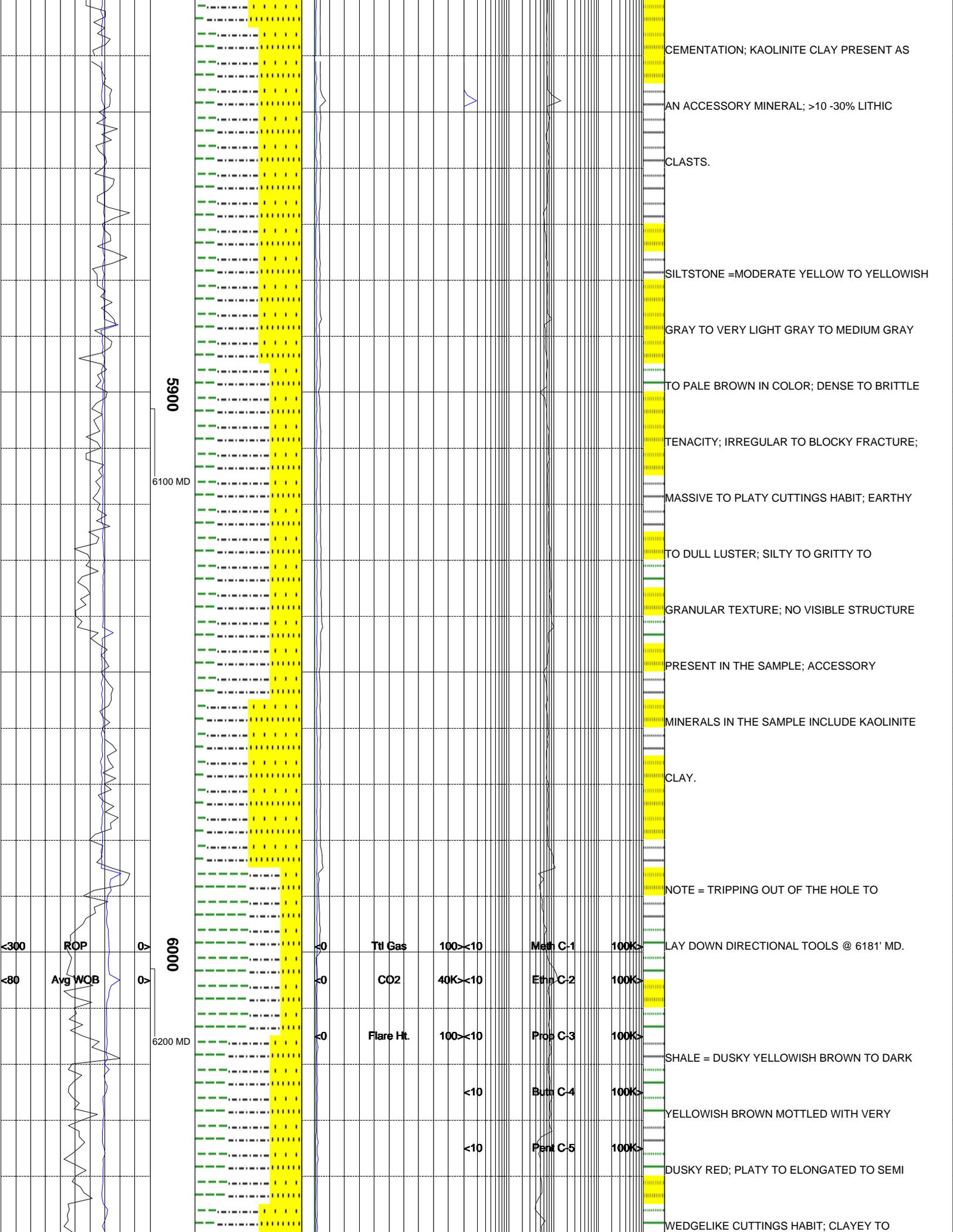


LUSTER; IRREGULAR TO ANGULAR TO PLANAR
FRACTURE; WEDGELIKE TO TABULAR TO PLATY
CUTTINGS HABIT; GRADATION TO SILTSTONE;
MINOR TO MODERATE REACTION TO HCl; TRACE
AMOUNTS OF LIMESTONE FRAGS IN SAMPLE.
SILTSTONE = MODERATE YELLOWISH BROWN
TO GRAYISH RED MOTTLED WITH MEDIUM GRAY;
SEMI NODULAR TO ELONGATED TO PLATY
CUTTINGS HABIT; SILTY TO GRITTY TEXTURE;
SPARKLING LUSTER; MINOR LOOSE FINE GRAIN
SAND IN SAMPLE FRAGMENTS; GRADATION TO
SANDSTONE.
SANDSTONE = WHITE TO LIGHT GRAY TO
MEDIUM GRAY TO BROWNISH GRAY TO A
PALE YELLOWISH BROWN COLOR; QUARTZ
FRAMEWORK WITH A MODERATE REACTION TO
A 10% HCL SOLUTION INDICATING SILICA AND
SLIGHT CALCITE CEMENTATION; UPPER FINE
TO LOWER MEDIUM GRAIN SIZE; FAIR TO WELL
SORTING; SUBANGULAR TO SUBROUND





PLATY TO FLAKY TO WEDGELIKE TO BLADED
CUTTINGS HABIT; SMOOTH TO CLAYEY
TEXTURE; LAMINAE TO NO VISIBLE STRUCTURE
PRESENT IN THE SAMPLE; KAOLINITE CLAY
PRESENT IN THE SAMPLE AS AN ACCESSORY
MINERAL; INTERBEDDED WITH SILTSTONE AND
SANDSTONE; SAMPLE CONTAINS TRACE
AMOUNTS OF A GREEN MINERAL POSSIBLY
CHLORITE.
SANDSTONE = WHITE TO VERY LIGHT GRAY TO
A YELLOWISH BROWN TO A BROWNISH GRAY
COLOR; QUARTZ FRAMEWORK WITH UPPER
FINE TO LOWER MEDIUM GRAIN SIZE; WELL TO
FAIR SORTING WITH SOME SAMPLES BEING
VERY WELL SORTED; ROUND TO SUBANGULAR
ANGULARITY; HIGH TO MODERATE SPHERICITY;
FROSTED GRAIN PRESENT ON SOME SAMPLES;
EASILY FRIABLE TO FRIABLE TO MODERATELY
HARD HARDNESS; MODERATE TO SLIGHT
REACTION TO 10% HCL SOLUTION; SILICA
CEMENTATION WITH SOME CALCITE

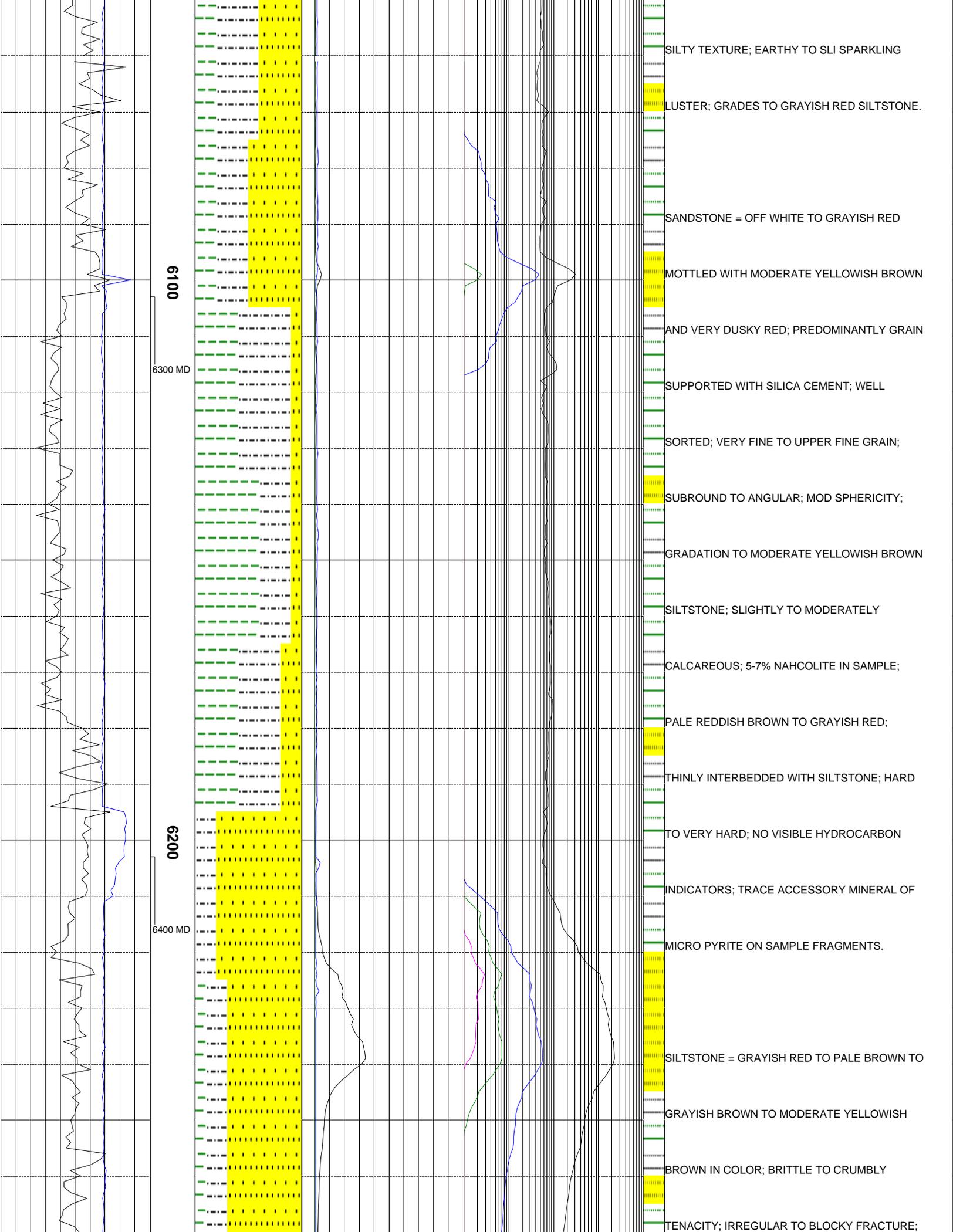


5900
6100 MD
6000
6200 MD

<300 ROP
<80 Avg WOB

<0	Ttl Gas	100<10	Meth C-1	100K>
<0	CO2	40K<10	Ethn C-2	100K>
<0	Flare Ht.	100<10	Prop C-3	100K>
		<10	Butn C-4	100K>
		<10	Pent C-5	100K>

CEMENTATION; KAOLINITE CLAY PRESENT AS
 AN ACCESSORY MINERAL; >10 -30% LITHIC
 CLASTS.
 SILTSTONE = MODERATE YELLOW TO YELLOWISH
 GRAY TO VERY LIGHT GRAY TO MEDIUM GRAY
 TO PALE BROWN IN COLOR; DENSE TO BRITTLE
 TENACITY; IRREGULAR TO BLOCKY FRACTURE;
 MASSIVE TO PLATY CUTTINGS HABIT; EARTHY
 TO DULL LUSTER; SILTY TO GRITTY TO
 GRANULAR TEXTURE; NO VISIBLE STRUCTURE
 PRESENT IN THE SAMPLE; ACCESSORY
 MINERALS IN THE SAMPLE INCLUDE KAOLINITE
 CLAY.
 NOTE = TRIPPING OUT OF THE HOLE TO
 LAY DOWN DIRECTIONAL TOOLS @ 6181' MD.
 SHALE = DUSKY YELLOWISH BROWN TO DARK
 YELLOWISH BROWN MOTTLED WITH VERY
 DUSKY RED; PLATY TO ELONGATED TO SEMI
 WEDGELIKE CUTTINGS HABIT; CLAYEY TO



SILTY TEXTURE; EARTHY TO SLI SPARKLING

LUSTER; GRADES TO GRAYISH RED SILTSTONE.

SANDSTONE = OFF WHITE TO GRAYISH RED

MOTTLED WITH MODERATE YELLOWISH BROWN

AND VERY DUSKY RED; PREDOMINANTLY GRAIN

SUPPORTED WITH SILICA CEMENT; WELL

SORTED; VERY FINE TO UPPER FINE GRAIN;

SUBROUND TO ANGULAR; MOD SPHERICITY;

GRADATION TO MODERATE YELLOWISH BROWN

SILTSTONE; SLIGHTLY TO MODERATELY

CALCAREOUS; 5-7% NAHCOLITE IN SAMPLE;

PALE REDDISH BROWN TO GRAYISH RED;

THINLY INTERBEDDED WITH SILTSTONE; HARD

TO VERY HARD; NO VISIBLE HYDROCARBON

INDICATORS; TRACE ACCESSORY MINERAL OF

MICRO PYRITE ON SAMPLE FRAGMENTS.

SILTSTONE = GRAYISH RED TO PALE BROWN TO

GRAYISH BROWN TO MODERATE YELLOWISH

BROWN IN COLOR; BRITTLE TO CRUMBLY

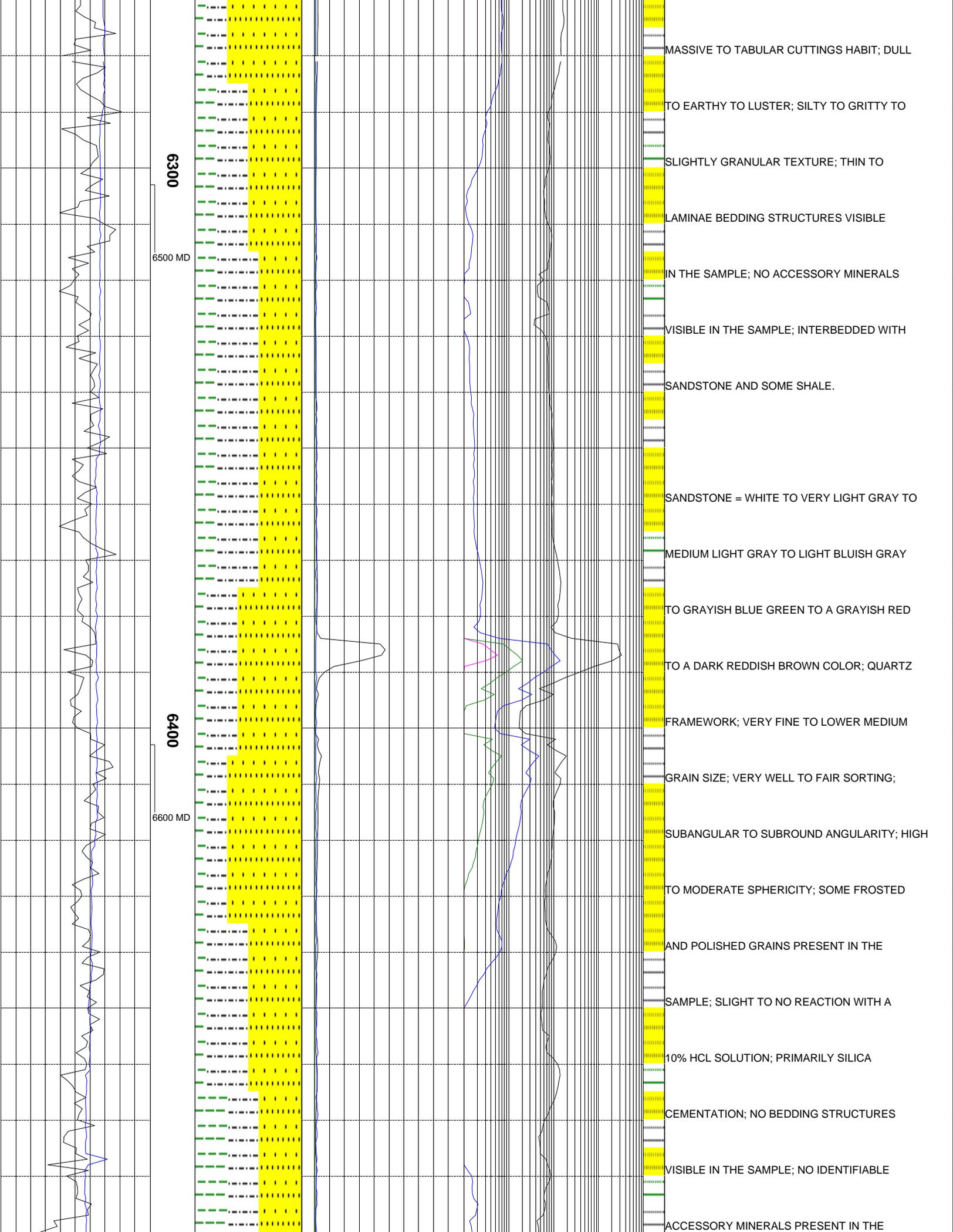
TENACITY; IRREGULAR TO BLOCKY FRACTURE;

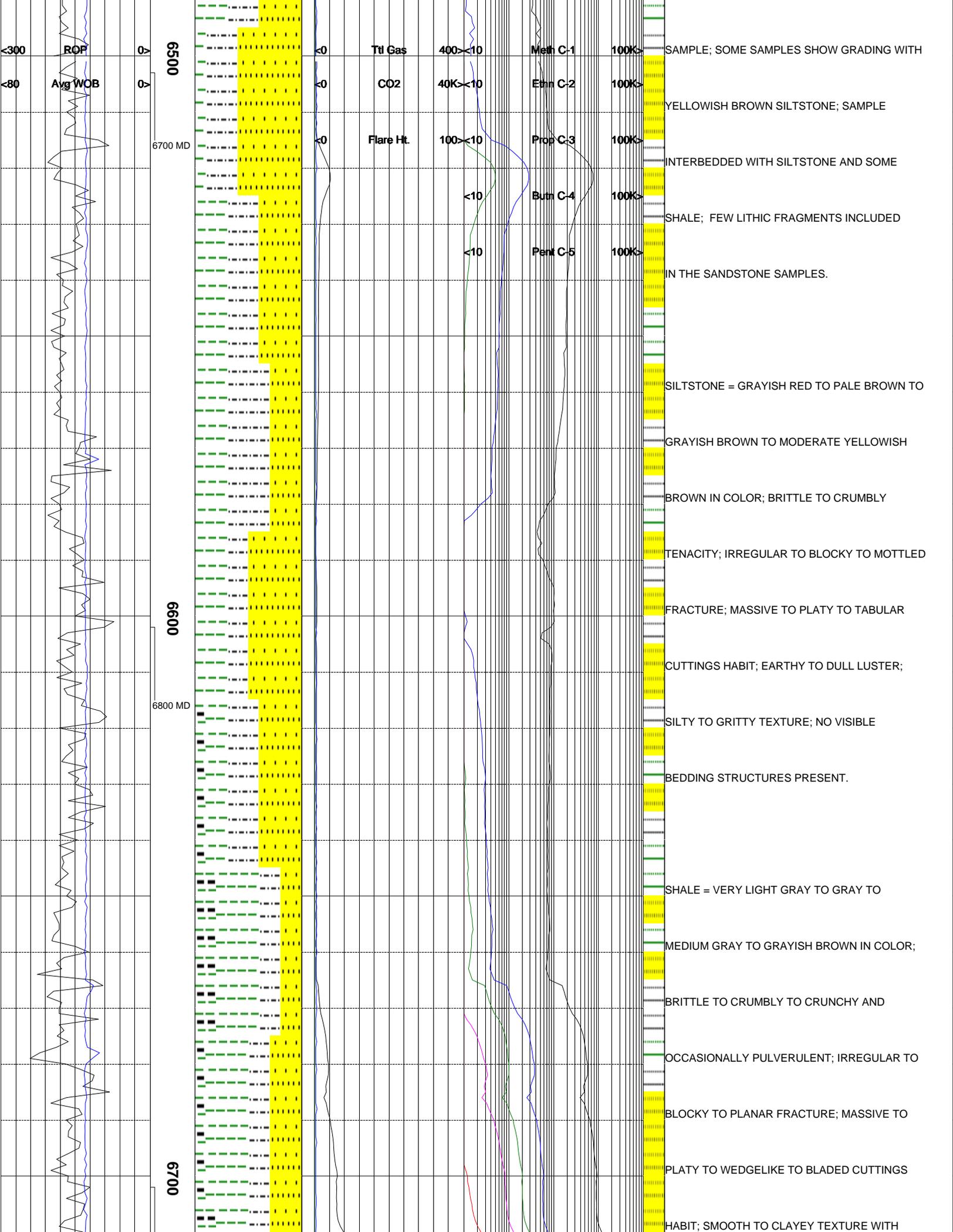
6100

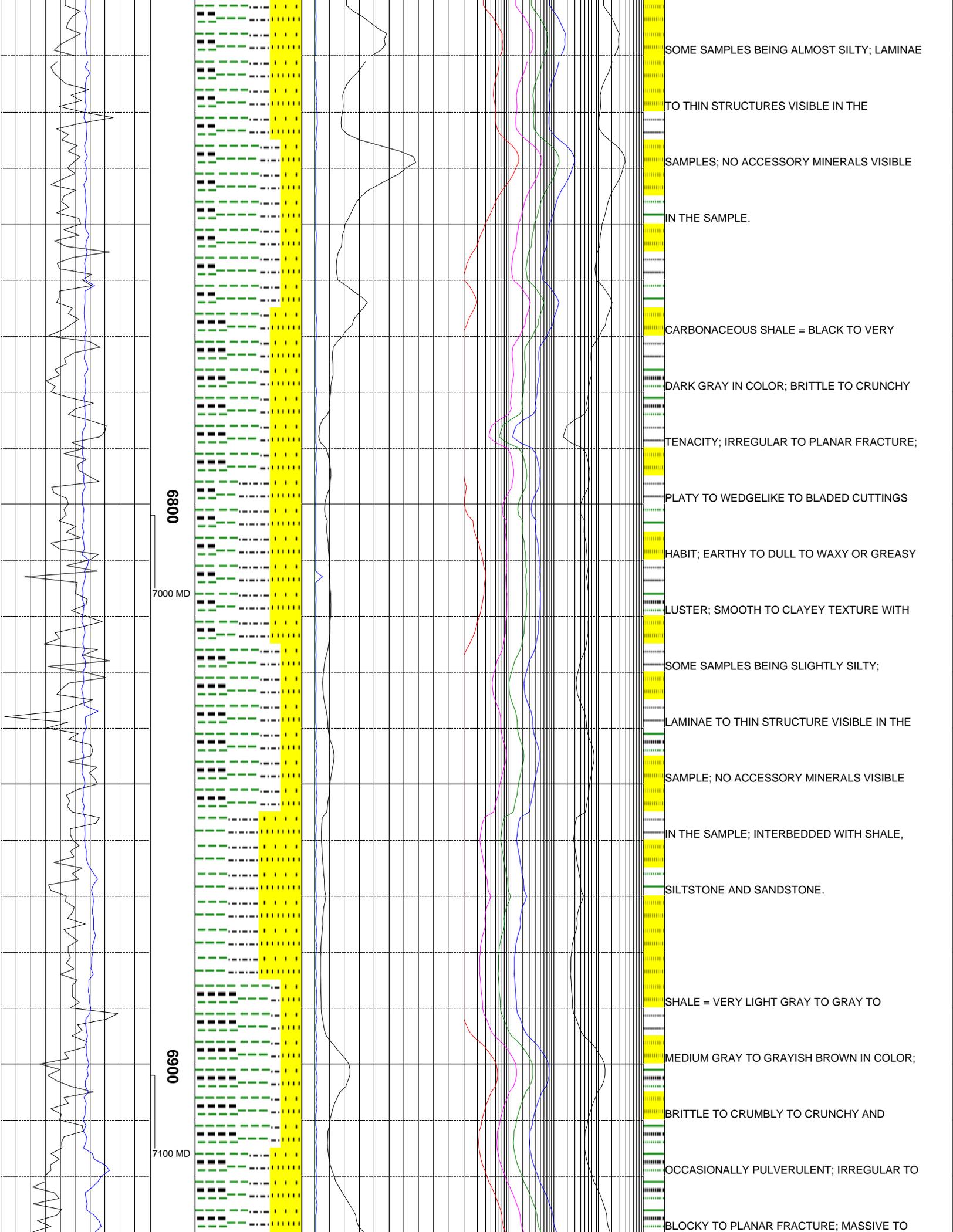
6300 MD

6200

6400 MD







0080

7000 MD

0060

7100 MD

SOME SAMPLES BEING ALMOST SILTY; LAMINAE

TO THIN STRUCTURES VISIBLE IN THE

SAMPLES; NO ACCESSORY MINERALS VISIBLE

IN THE SAMPLE.

CARBONACEOUS SHALE = BLACK TO VERY

DARK GRAY IN COLOR; BRITTLE TO CRUNCHY

TENACITY; IRREGULAR TO PLANAR FRACTURE;

PLATY TO WEDGELIKE TO BLADED CUTTINGS

HABIT; EARTHY TO DULL TO WAXY OR GREASY

LUSTER; SMOOTH TO CLAYEY TEXTURE WITH

SOME SAMPLES BEING SLIGHTLY SILTY;

LAMINAE TO THIN STRUCTURE VISIBLE IN THE

SAMPLE; NO ACCESSORY MINERALS VISIBLE

IN THE SAMPLE; INTERBEDDED WITH SHALE,

SILTSTONE AND SANDSTONE.

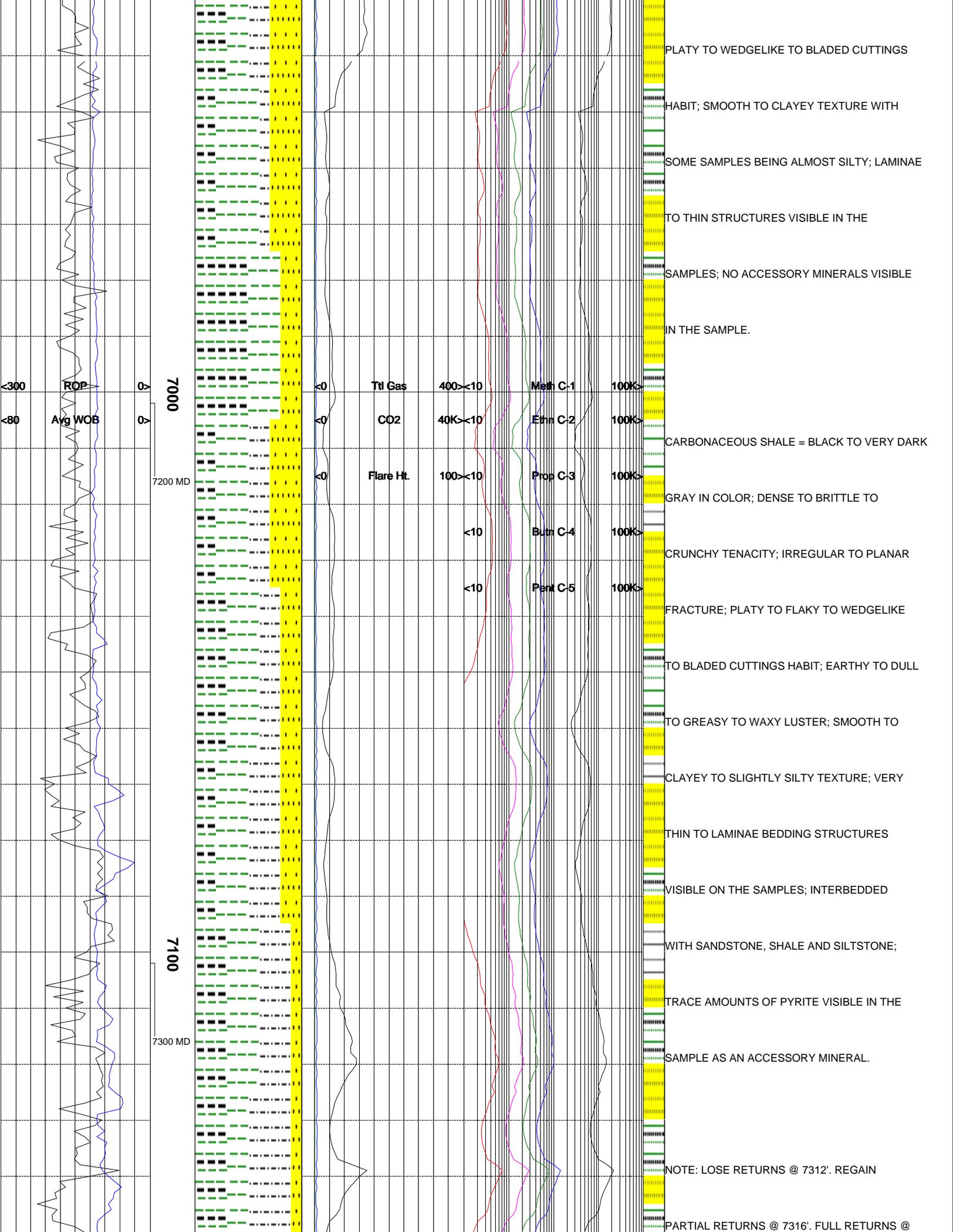
SHALE = VERY LIGHT GRAY TO GRAY TO

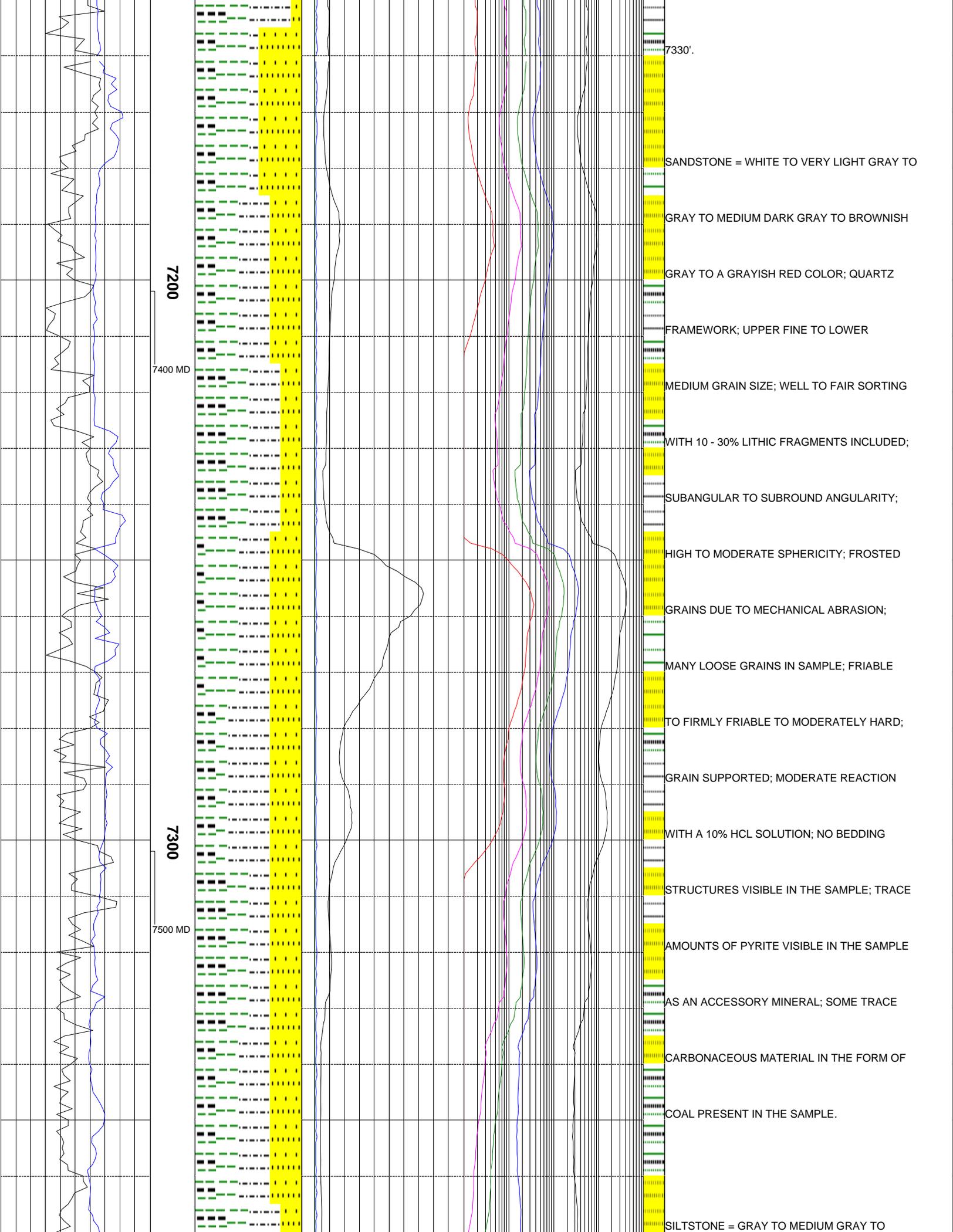
MEDIUM GRAY TO GRAYISH BROWN IN COLOR;

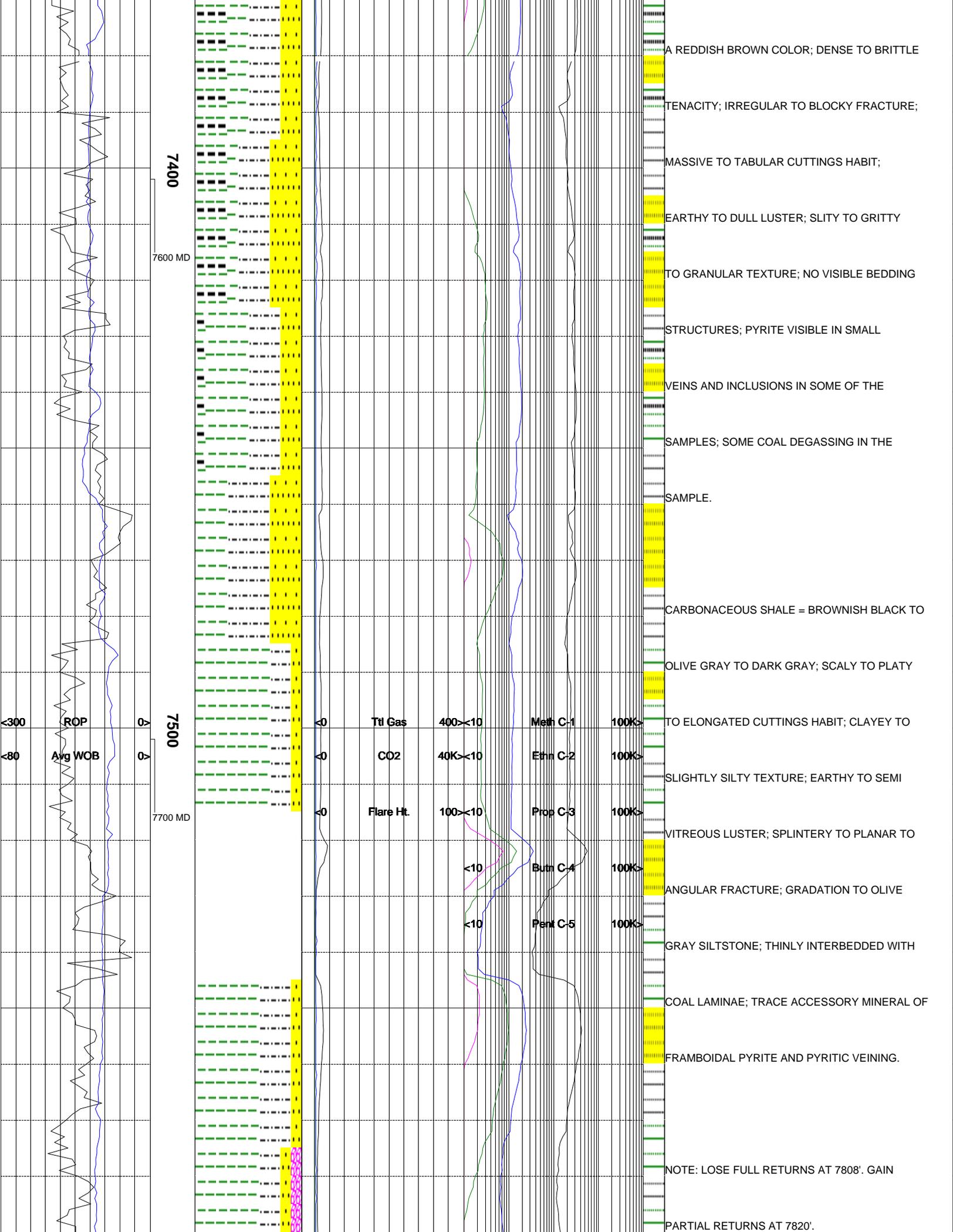
BRITTLE TO CRUMBLY TO CRUNCHY AND

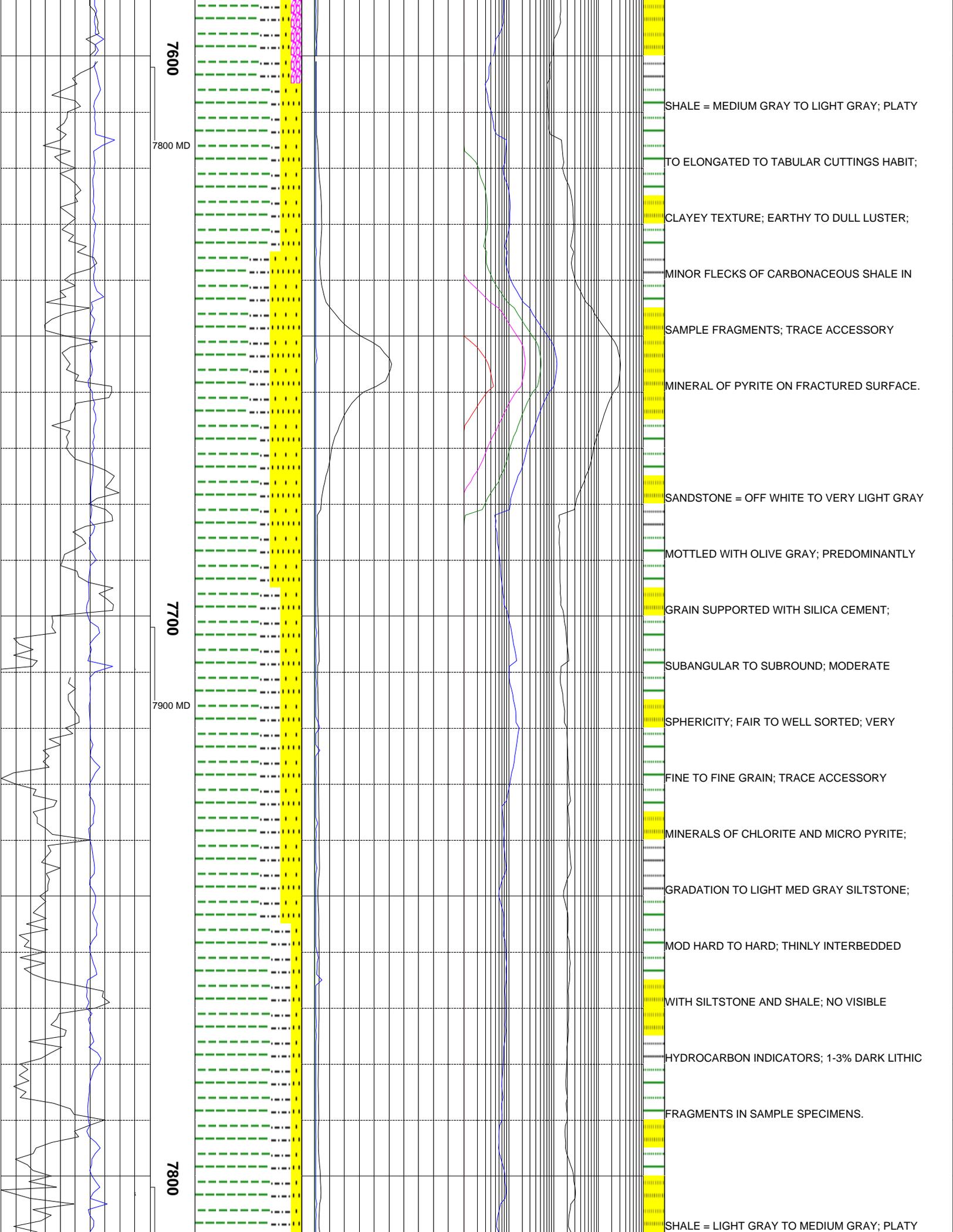
OCCASIONALLY PULVERULENT; IRREGULAR TO

BLOCKY TO PLANAR FRACTURE; MASSIVE TO









7600

7800 MD

7700

7900 MD

7800

SHALE = MEDIUM GRAY TO LIGHT GRAY; PLATY

TO ELONGATED TO TABULAR CUTTINGS HABIT;

CLAYEY TEXTURE; EARTHY TO DULL LUSTER;

MINOR FLECKS OF CARBONACEOUS SHALE IN

SAMPLE FRAGMENTS; TRACE ACCESSORY

MINERAL OF PYRITE ON FRACTURED SURFACE.

SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

MOTTLED WITH OLIVE GRAY; PREDOMINANTLY

GRAIN SUPPORTED WITH SILICA CEMENT;

SUBANGULAR TO SUBROUND; MODERATE

SPHERICITY; FAIR TO WELL SORTED; VERY

FINE TO FINE GRAIN; TRACE ACCESSORY

MINERALS OF CHLORITE AND MICRO PYRITE;

GRADATION TO LIGHT MED GRAY SILTSTONE;

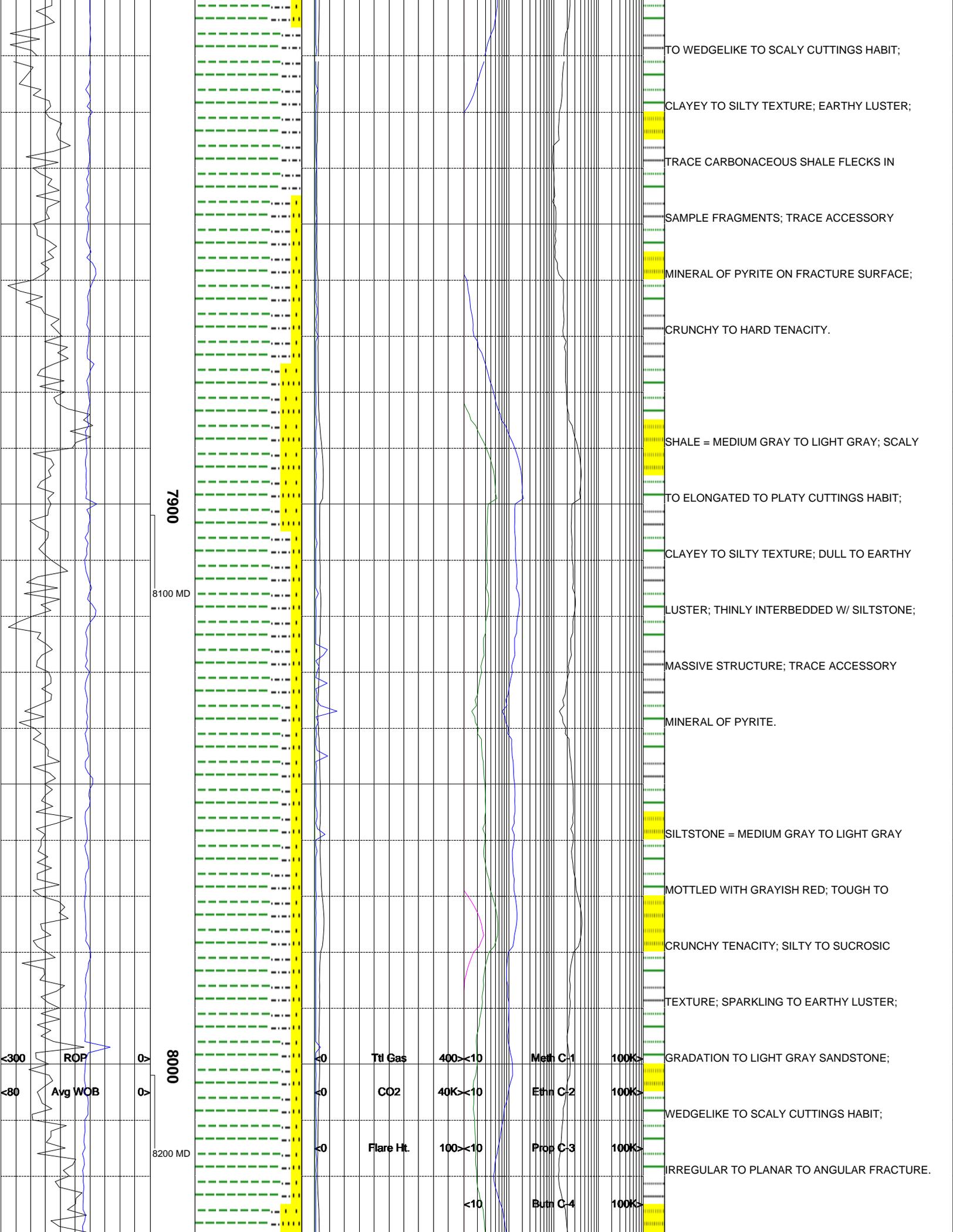
MOD HARD TO HARD; THINLY INTERBEDDED

WITH SILTSTONE AND SHALE; NO VISIBLE

HYDROCARBON INDICATORS; 1-3% DARK LITHIC

FRAGMENTS IN SAMPLE SPECIMENS.

SHALE = LIGHT GRAY TO MEDIUM GRAY; PLATY

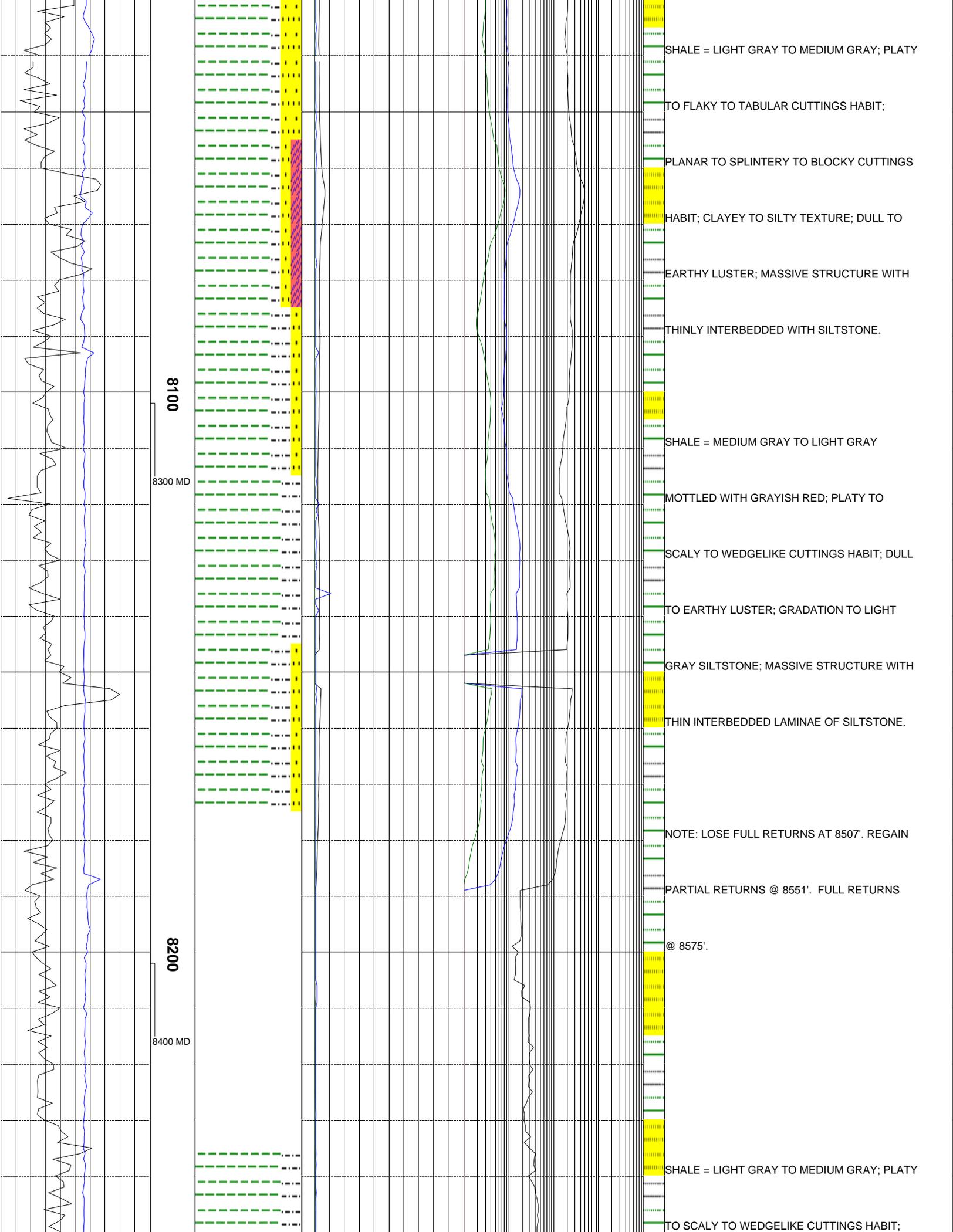


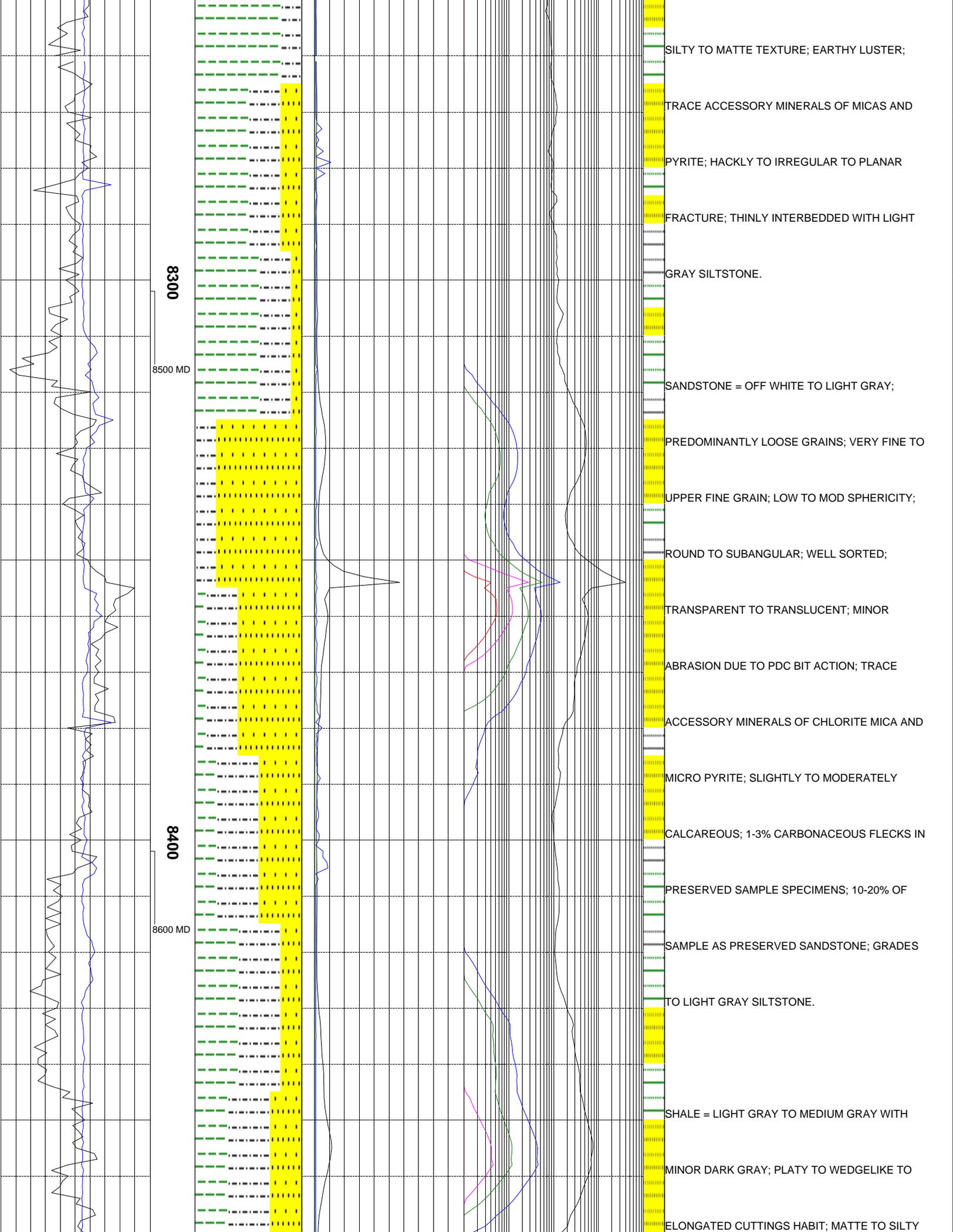
7900
8100 MD
8000
8200 MD

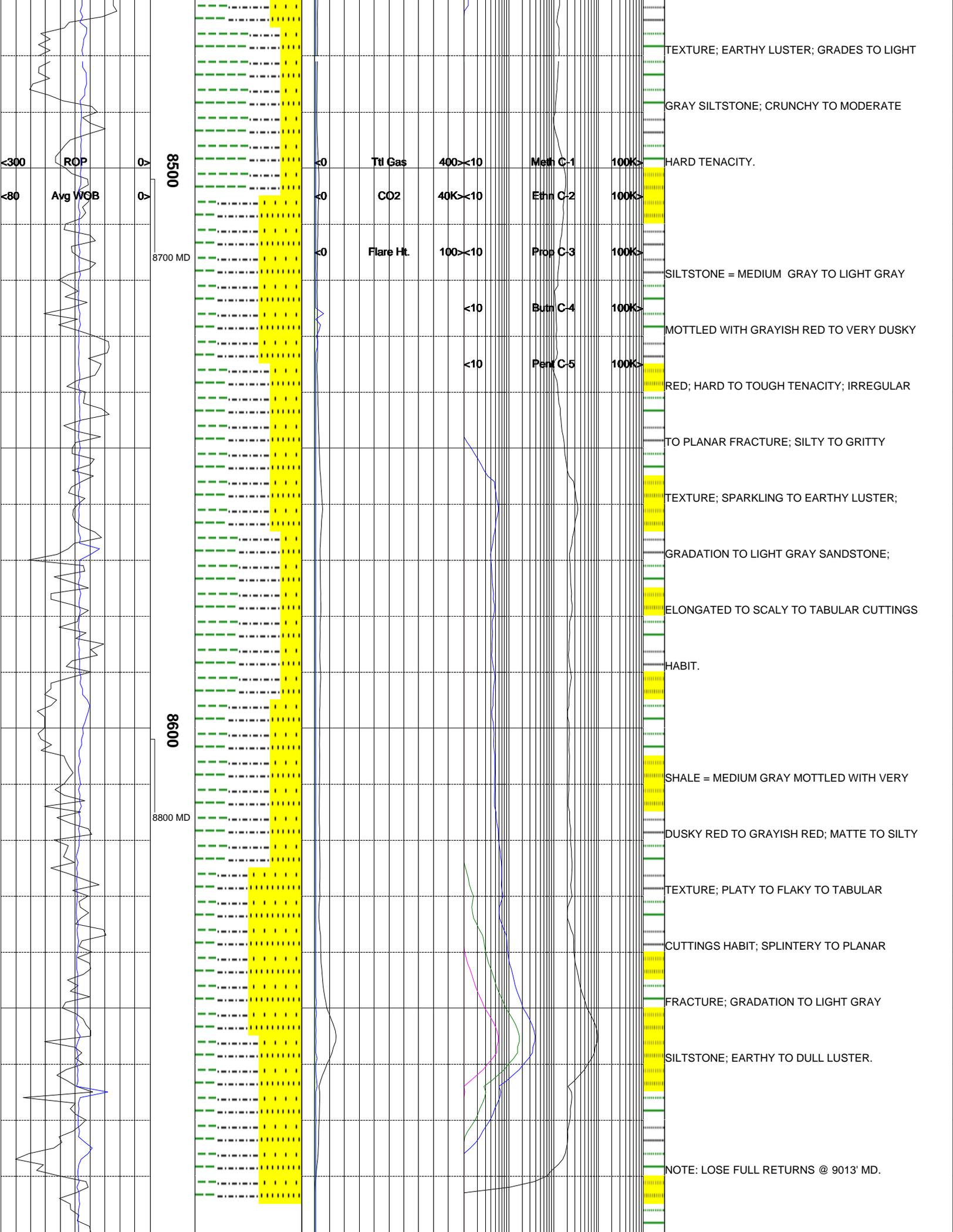
TO WEDGELIKE TO SCALY CUTTINGS HABIT;
 CLAYEY TO SILTY TEXTURE; EARTHY LUSTER;
 TRACE CARBONACEOUS SHALE FLECKS IN
 SAMPLE FRAGMENTS; TRACE ACCESSORY
 MINERAL OF PYRITE ON FRACTURE SURFACE;
 CRUNCHY TO HARD TENACITY.
 SHALE = MEDIUM GRAY TO LIGHT GRAY; SCALY
 TO ELONGATED TO PLATY CUTTINGS HABIT;
 CLAYEY TO SILTY TEXTURE; DULL TO EARTHY
 LUSTER; THINLY INTERBEDDED W/ SILTSTONE;
 MASSIVE STRUCTURE; TRACE ACCESSORY
 MINERAL OF PYRITE.
 SILTSTONE = MEDIUM GRAY TO LIGHT GRAY
 MOTTLED WITH GRAYISH RED; TOUGH TO
 CRUNCHY TENACITY; SILTY TO SUCROSIC
 TEXTURE; SPARKLING TO EARTHY LUSTER;
 GRADATION TO LIGHT GRAY SANDSTONE;
 WEDGELIKE TO SCALY CUTTINGS HABIT;
 IRREGULAR TO PLANAR TO ANGULAR FRACTURE.

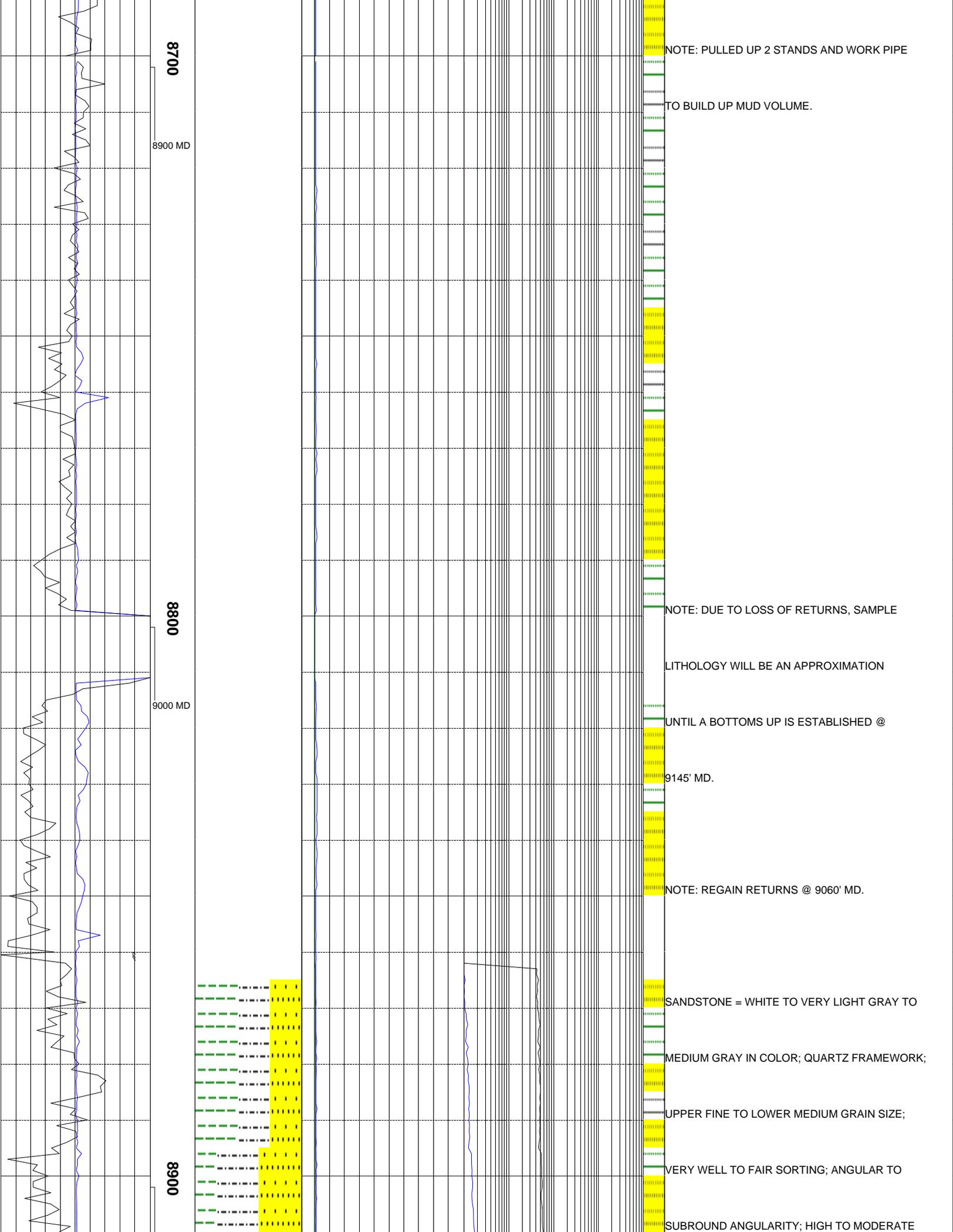
<300 ROP
 <80 Avg WOB

<0	Ttl Gas	400	<10	Meth C-1	100K
<0	CO2	40K	<10	Ethn C-2	100K
<0	Flare Ht.	100	<10	Prop C-3	100K
			<10	Butn C-4	100K









8700

8900 MD

NOTE: PULLED UP 2 STANDS AND WORK PIPE
TO BUILD UP MUD VOLUME.

8800

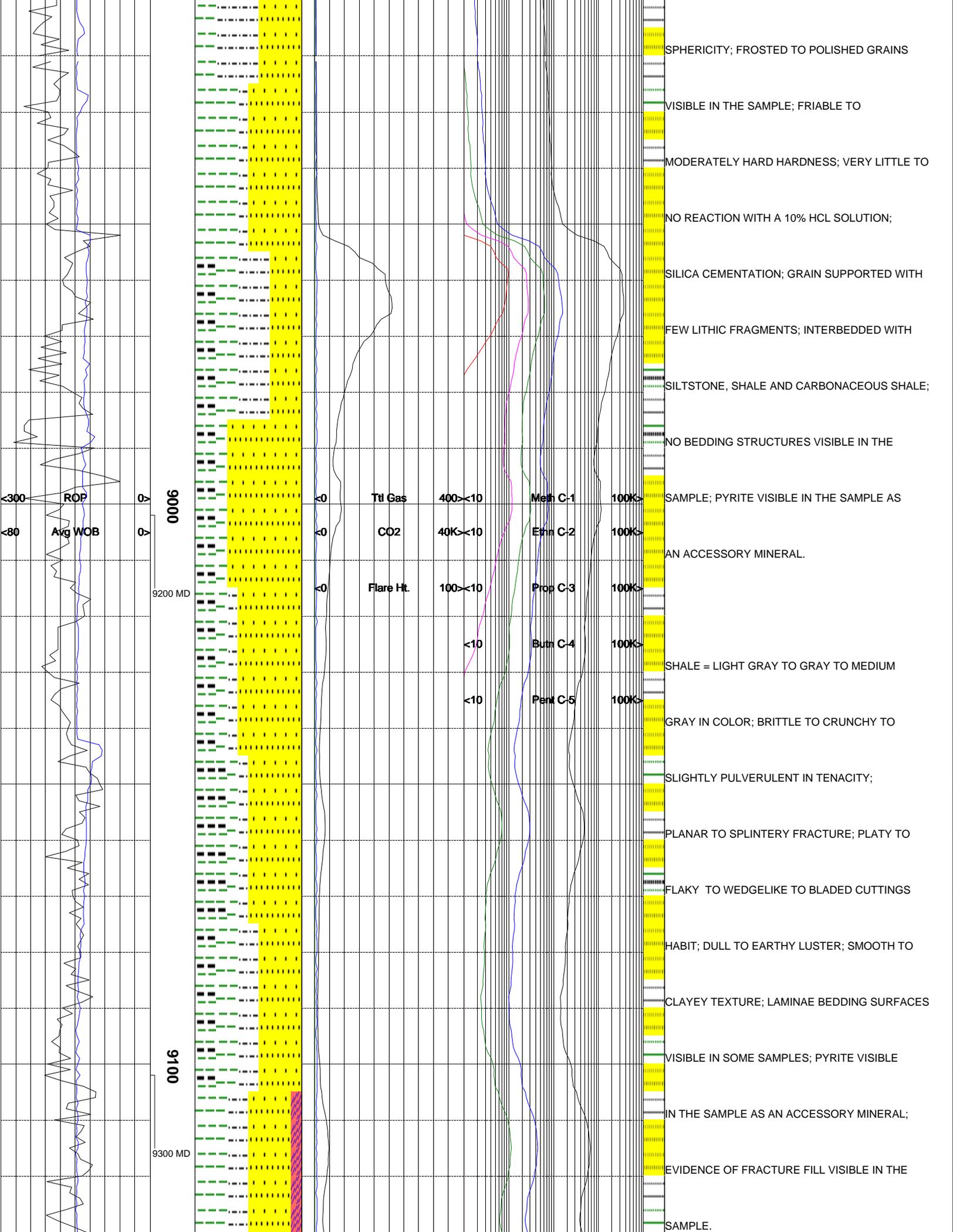
9000 MD

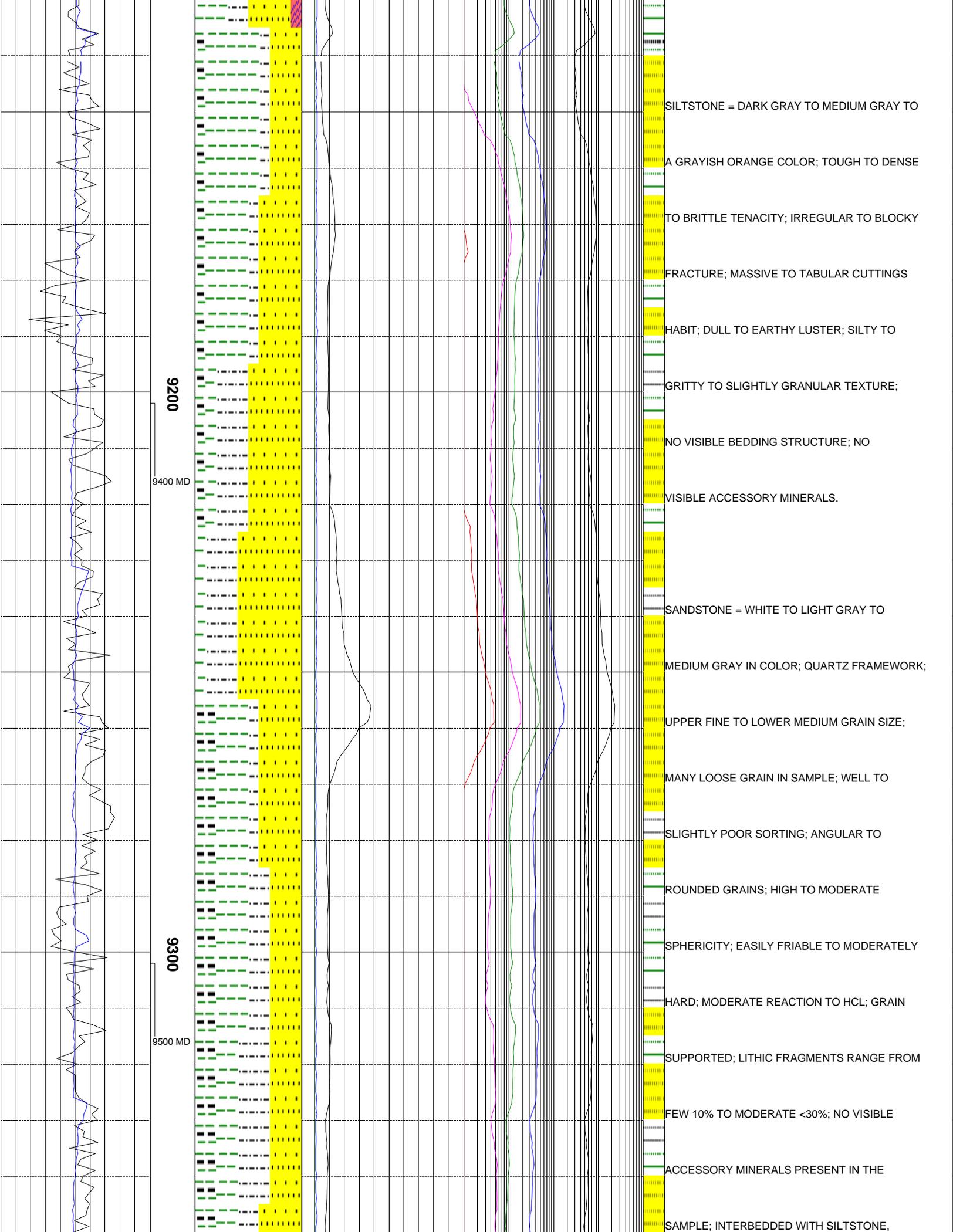
NOTE: DUE TO LOSS OF RETURNS, SAMPLE
LITHOLOGY WILL BE AN APPROXIMATION
UNTIL A BOTTOMS UP IS ESTABLISHED @
9145' MD.

8900

NOTE: REGAIN RETURNS @ 9060' MD.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO
MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK;
UPPER FINE TO LOWER MEDIUM GRAIN SIZE;
VERY WELL TO FAIR SORTING; ANGULAR TO
SUBROUND ANGULARITY; HIGH TO MODERATE





9200

9400 MD

9300

9500 MD

SILTSTONE = DARK GRAY TO MEDIUM GRAY TO

A GRAYISH ORANGE COLOR; TOUGH TO DENSE

TO BRITTLE TENACITY; IRREGULAR TO BLOCKY

FRACTURE; MASSIVE TO TABULAR CUTTINGS

HABIT; DULL TO EARTHY LUSTER; SILTY TO

GRITTY TO SLIGHTLY GRANULAR TEXTURE;

NO VISIBLE BEDDING STRUCTURE; NO

VISIBLE ACCESSORY MINERALS.

SANDSTONE = WHITE TO LIGHT GRAY TO

MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK;

UPPER FINE TO LOWER MEDIUM GRAIN SIZE;

MANY LOOSE GRAIN IN SAMPLE; WELL TO

SLIGHTLY POOR SORTING; ANGULAR TO

ROUNDED GRAINS; HIGH TO MODERATE

SPHERICITY; EASILY FRIABLE TO MODERATELY

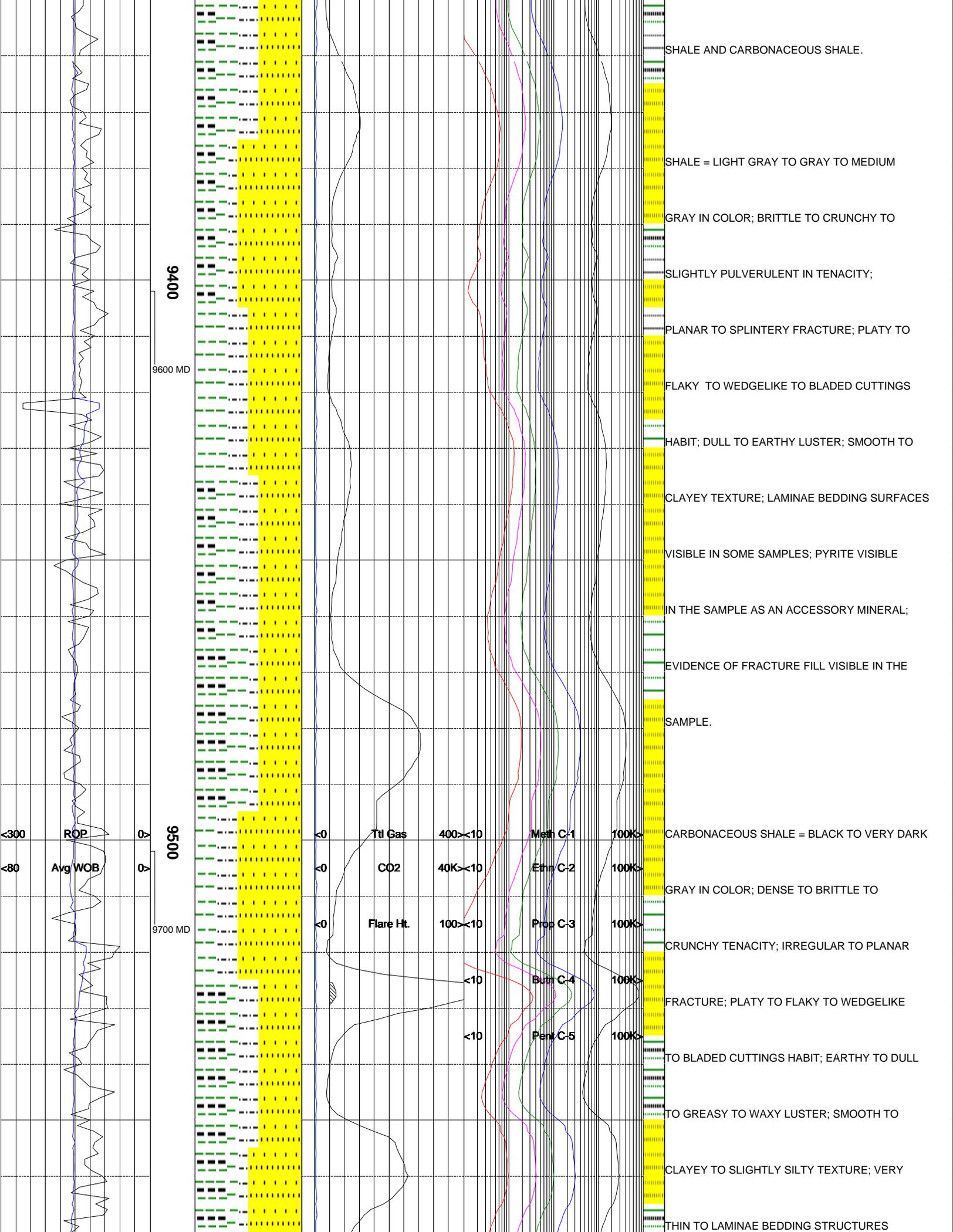
HARD; MODERATE REACTION TO HCL; GRAIN

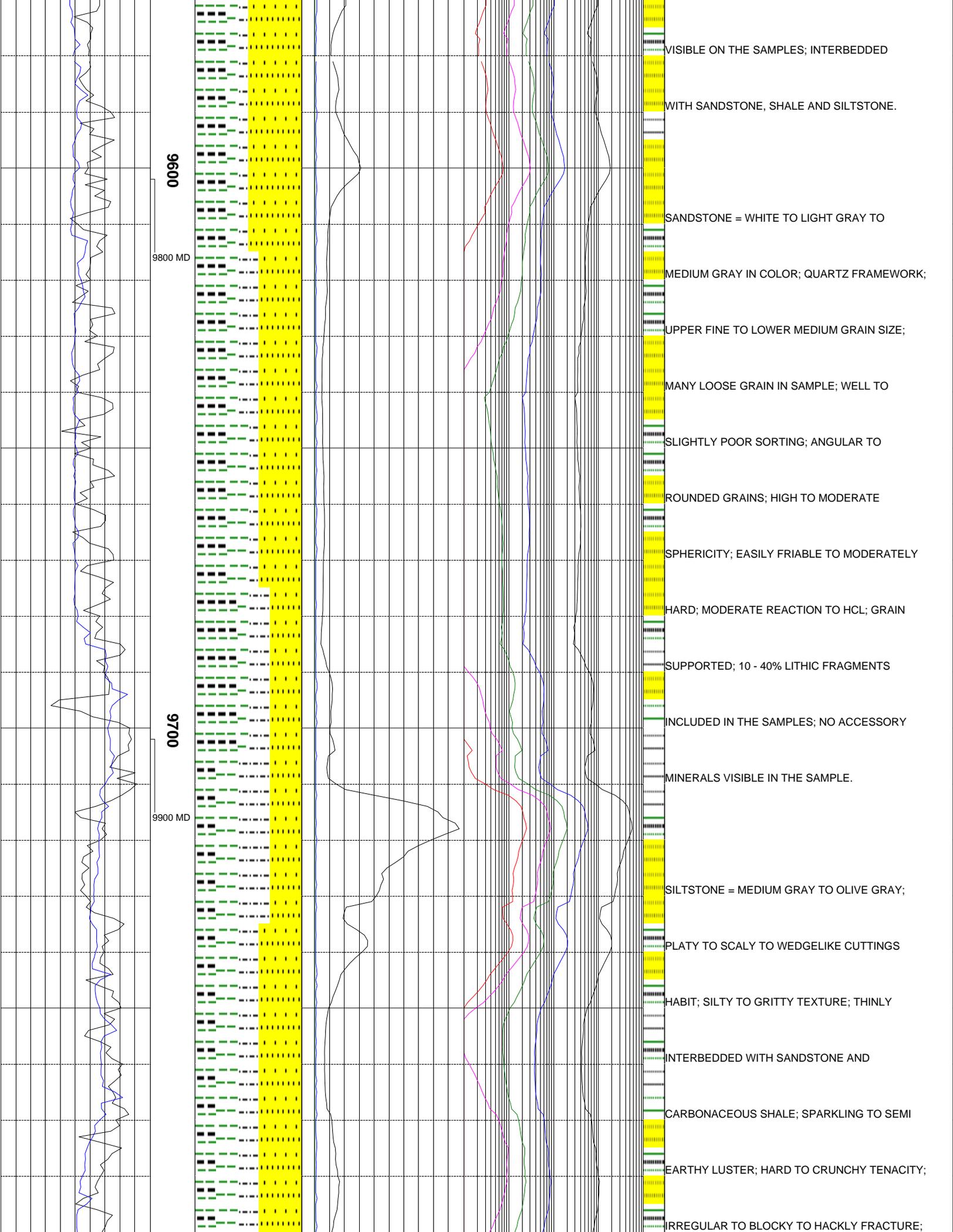
SUPPORTED; LITHIC FRAGMENTS RANGE FROM

FEW 10% TO MODERATE <30%; NO VISIBLE

ACCESSORY MINERALS PRESENT IN THE

SAMPLE; INTERBEDDED WITH SILTSTONE,





0060

9800 MD

0070

9900 MD

VISIBLE ON THE SAMPLES; INTERBEDDED

WITH SANDSTONE, SHALE AND SILTSTONE.

SANDSTONE = WHITE TO LIGHT GRAY TO

MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK;

UPPER FINE TO LOWER MEDIUM GRAIN SIZE;

MANY LOOSE GRAIN IN SAMPLE; WELL TO

SLIGHTLY POOR SORTING; ANGULAR TO

ROUNDED GRAINS; HIGH TO MODERATE

SPHERICITY; EASILY FRIABLE TO MODERATELY

HARD; MODERATE REACTION TO HCL; GRAIN

SUPPORTED; 10 - 40% LITHIC FRAGMENTS

INCLUDED IN THE SAMPLES; NO ACCESSORY

MINERALS VISIBLE IN THE SAMPLE.

SILTSTONE = MEDIUM GRAY TO OLIVE GRAY;

PLATY TO SCALY TO WEDGELIKE CUTTINGS

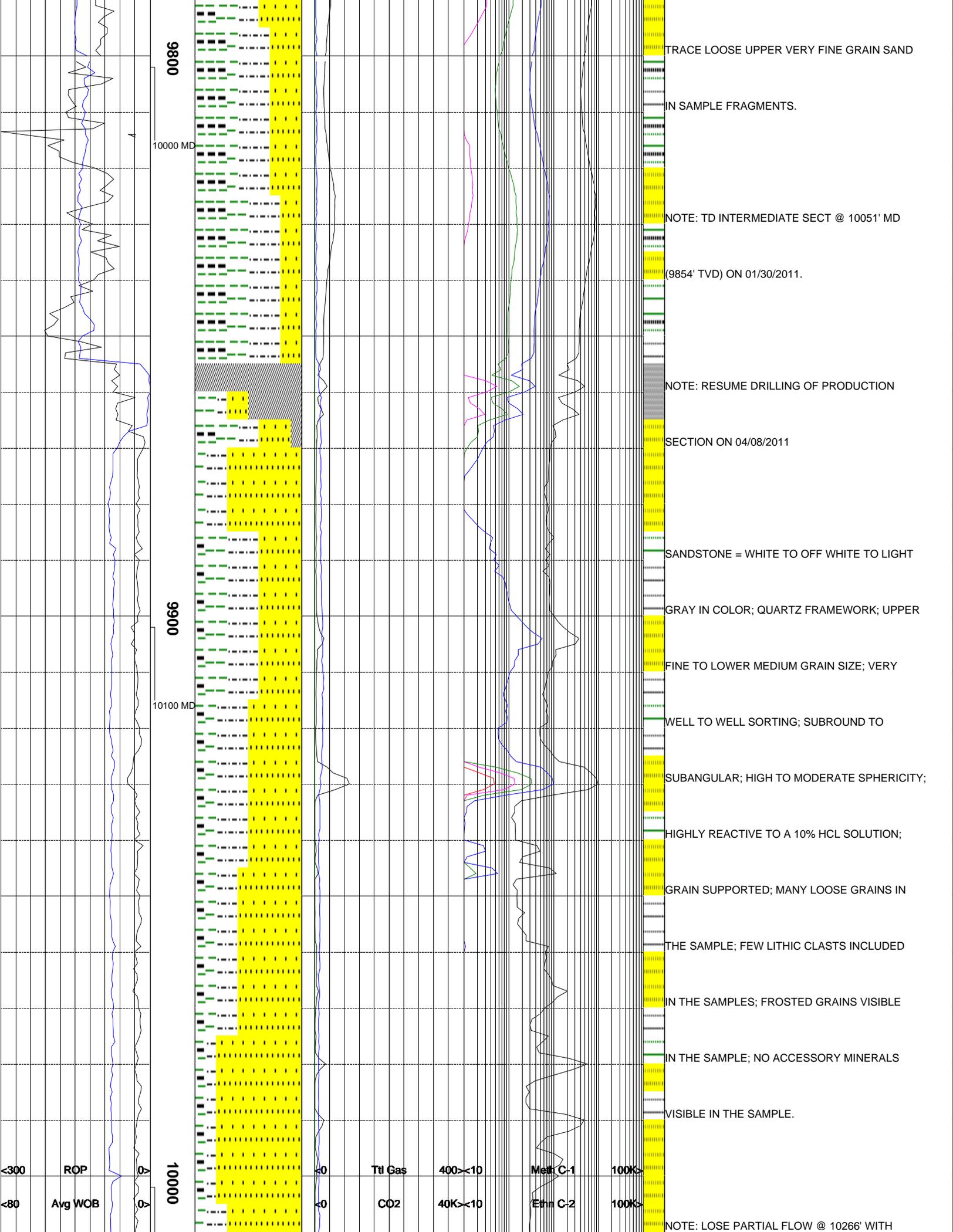
HABIT; SILTY TO GRITTY TEXTURE; THINLY

INTERBEDDED WITH SANDSTONE AND

CARBONACEOUS SHALE; SPARKLING TO SEMI

EARTHY LUSTER; HARD TO CRUNCHY TENACITY;

IRREGULAR TO BLOCKY TO HACKLY FRACTURE;



9800

10000 MD

9900

10100 MD

10000

TRACE LOOSE UPPER VERY FINE GRAIN SAND

IN SAMPLE FRAGMENTS.

NOTE: TD INTERMEDIATE SECT @ 10051' MD

(9854' TVD) ON 01/30/2011.

NOTE: RESUME DRILLING OF PRODUCTION

SECTION ON 04/08/2011

SANDSTONE = WHITE TO OFF WHITE TO LIGHT

GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER

FINE TO LOWER MEDIUM GRAIN SIZE; VERY

WELL TO WELL SORTING; SUBROUND TO

SUBANGULAR; HIGH TO MODERATE SPHERICITY;

HIGHLY REACTIVE TO A 10% HCL SOLUTION;

GRAIN SUPPORTED; MANY LOOSE GRAINS IN

THE SAMPLE; FEW LITHIC CLASTS INCLUDED

IN THE SAMPLES; FROSTED GRAINS VISIBLE

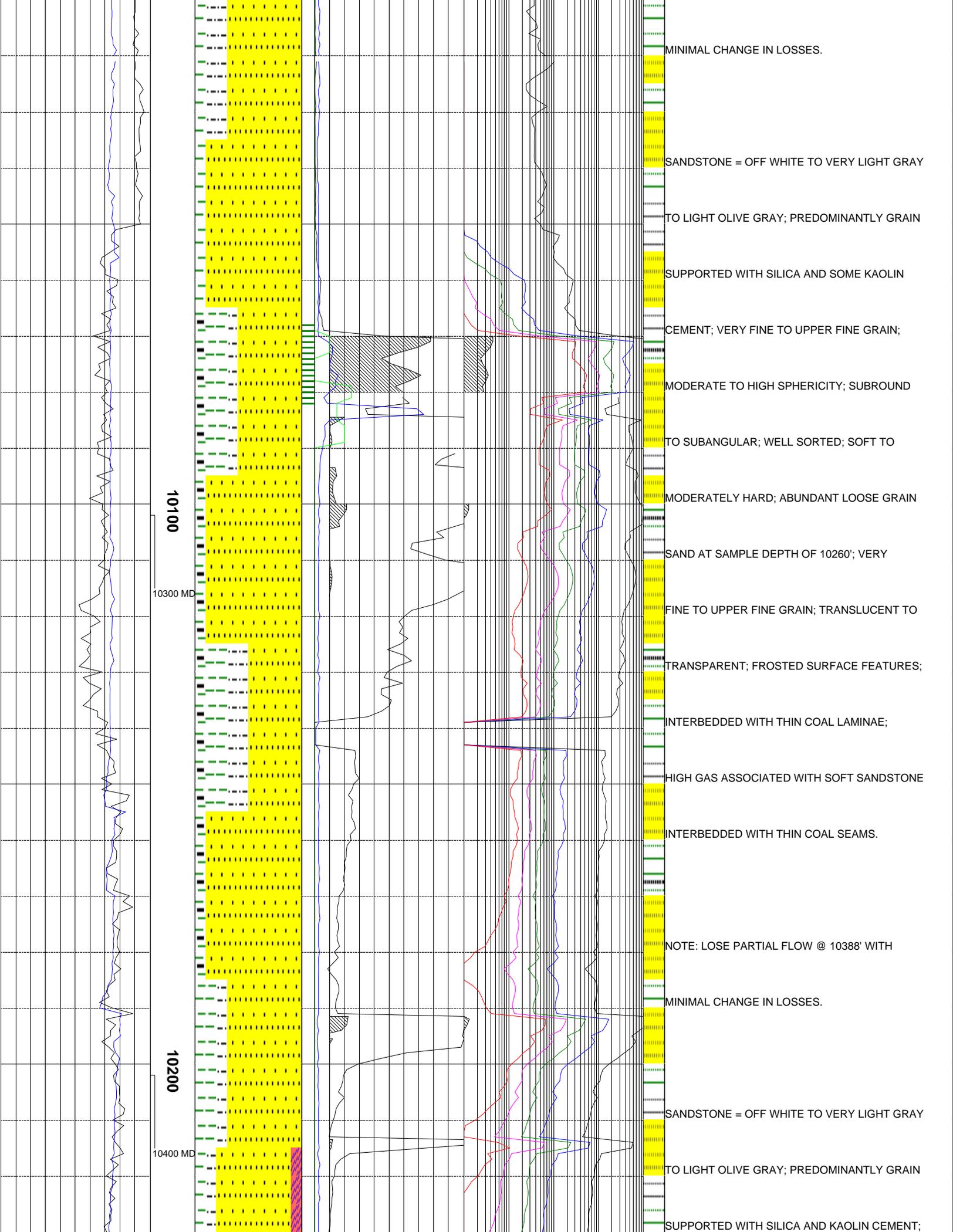
IN THE SAMPLE; NO ACCESSORY MINERALS

VISIBLE IN THE SAMPLE.

<300 ROP <0 Ttl Gas 400<<10 Meth C-1 100K>

<80 Avg WOB <0 CO2 40K<<10 Ethn C-2 100K>

NOTE: LOSE PARTIAL FLOW @ 10266' WITH



MINIMAL CHANGE IN LOSSES.

SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN

SUPPORTED WITH SILICA AND SOME KAOLIN

CEMENT; VERY FINE TO UPPER FINE GRAIN;

MODERATE TO HIGH SPHERICITY; SUBROUND

TO SUBANGULAR; WELL SORTED; SOFT TO

MODERATELY HARD; ABUNDANT LOOSE GRAIN

SAND AT SAMPLE DEPTH OF 10260'; VERY

FINE TO UPPER FINE GRAIN; TRANSLUCENT TO

TRANSPARENT; FROSTED SURFACE FEATURES;

INTERBEDDED WITH THIN COAL LAMINAE;

HIGH GAS ASSOCIATED WITH SOFT SANDSTONE

INTERBEDDED WITH THIN COAL SEAMS.

NOTE: LOSE PARTIAL FLOW @ 10388' WITH

MINIMAL CHANGE IN LOSSES.

SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN

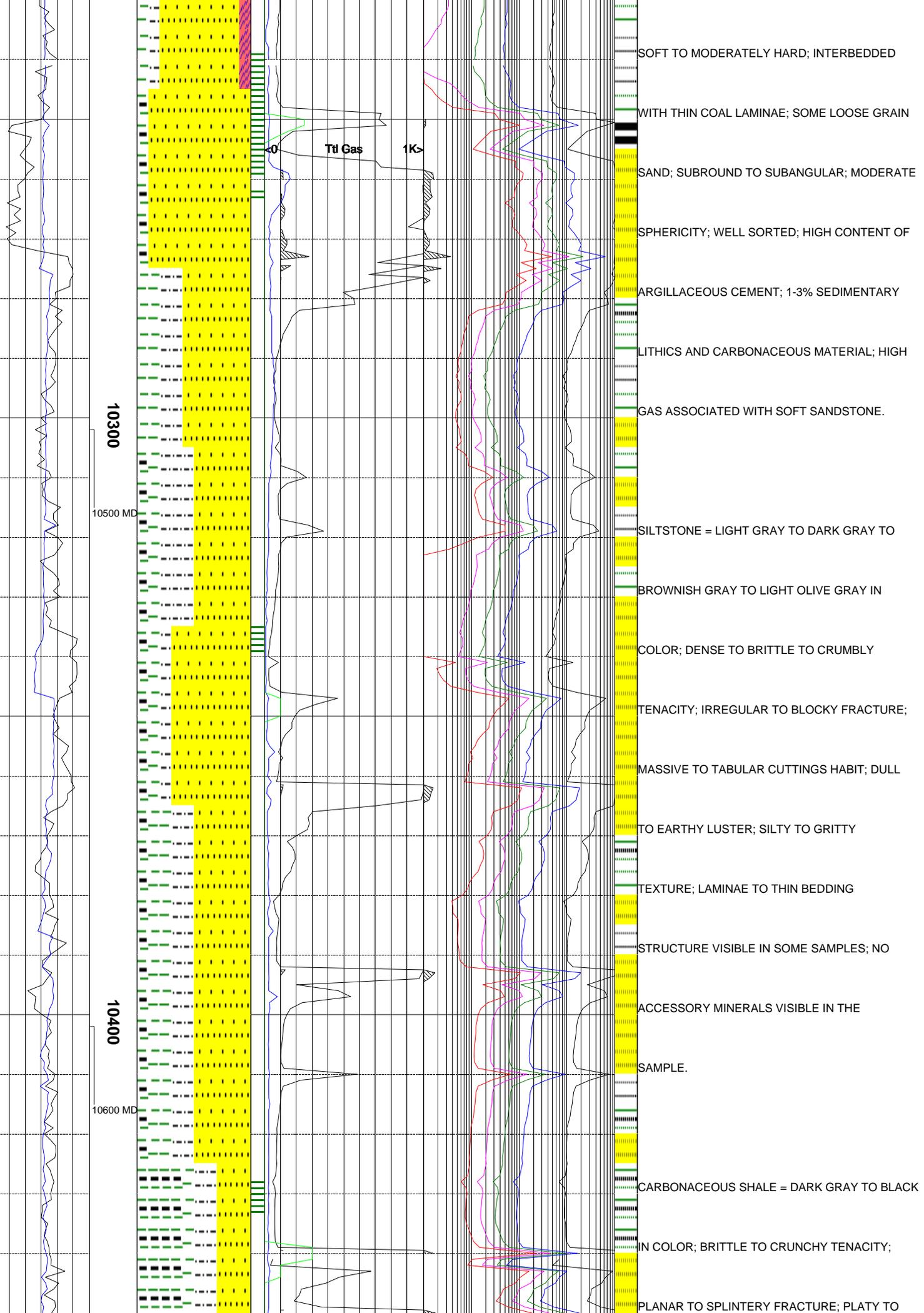
SUPPORTED WITH SILICA AND KAOLIN CEMENT;

10100

10300 MD

10200

10400 MD



SOFT TO MODERATELY HARD; INTERBEDDED

WITH THIN COAL LAMINAE; SOME LOOSE GRAIN

SAND; SUBROUND TO SUBANGULAR; MODERATE SPHERICITY; WELL SORTED; HIGH CONTENT OF ARGILLACEOUS CEMENT; 1-3% SEDIMENTARY LITHICS AND CARBONACEOUS MATERIAL; HIGH GAS ASSOCIATED WITH SOFT SANDSTONE.

SILTSTONE = LIGHT GRAY TO DARK GRAY TO BROWNISH GRAY TO LIGHT OLIVE GRAY IN COLOR; DENSE TO BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO GRITTY TEXTURE; LAMINAE TO THIN BEDDING STRUCTURE VISIBLE IN SOME SAMPLES; NO ACCESSORY MINERALS VISIBLE IN THE SAMPLE.

CARBONACEOUS SHALE = DARK GRAY TO BLACK IN COLOR; BRITTLE TO CRUNCHY TENACITY; PLANAR TO SPLINTERY FRACTURE; PLATY TO

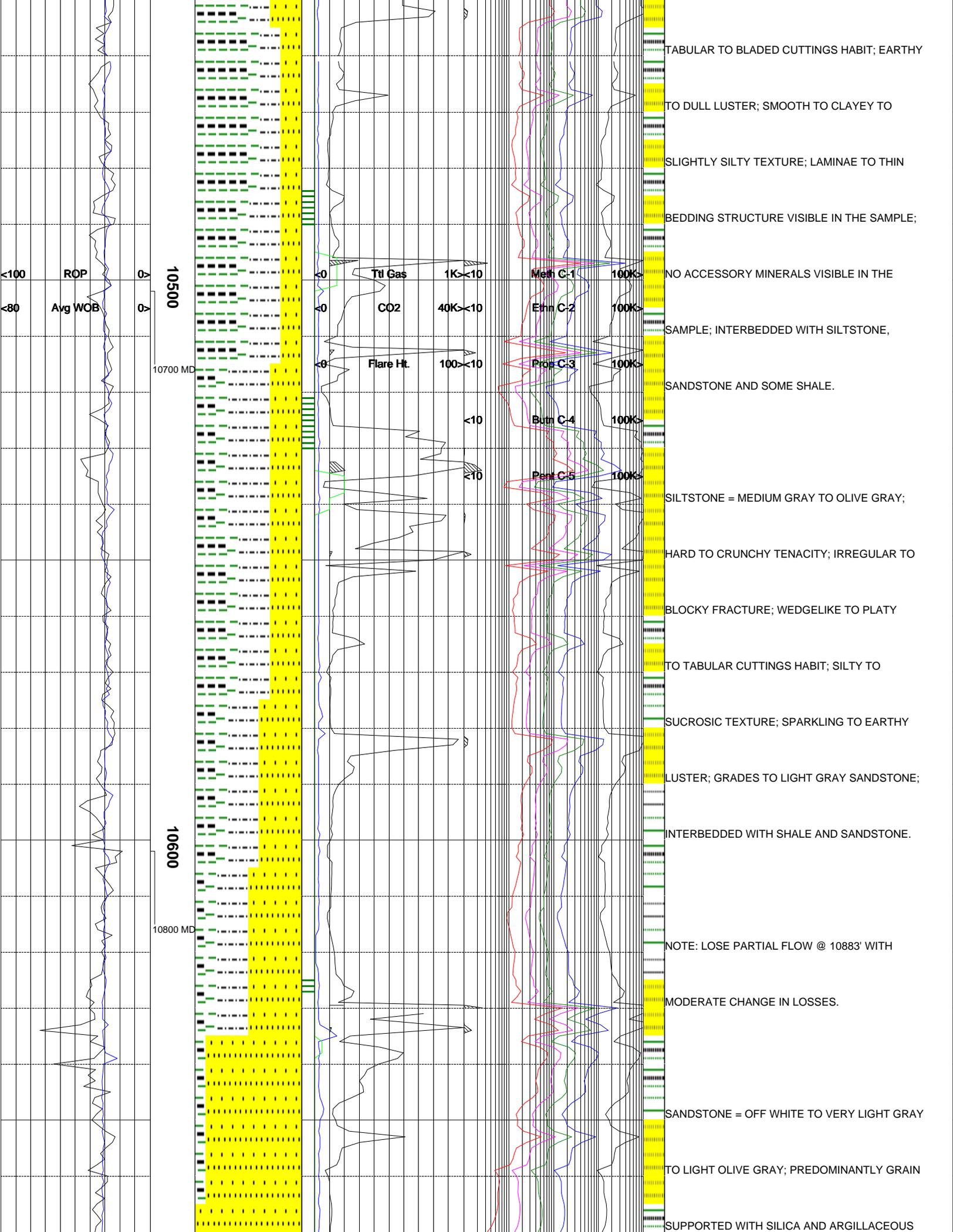
Til Gas 1K

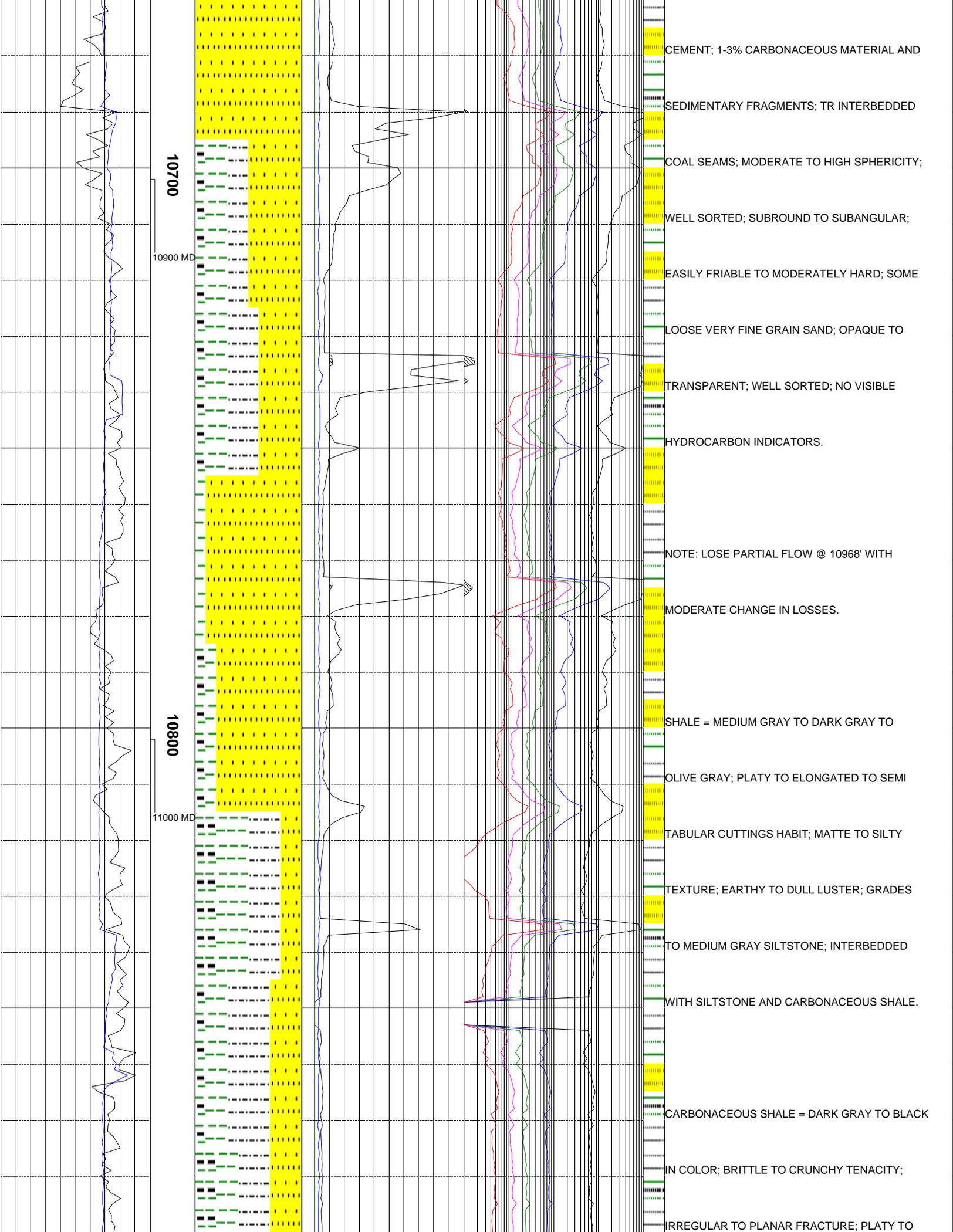
10300

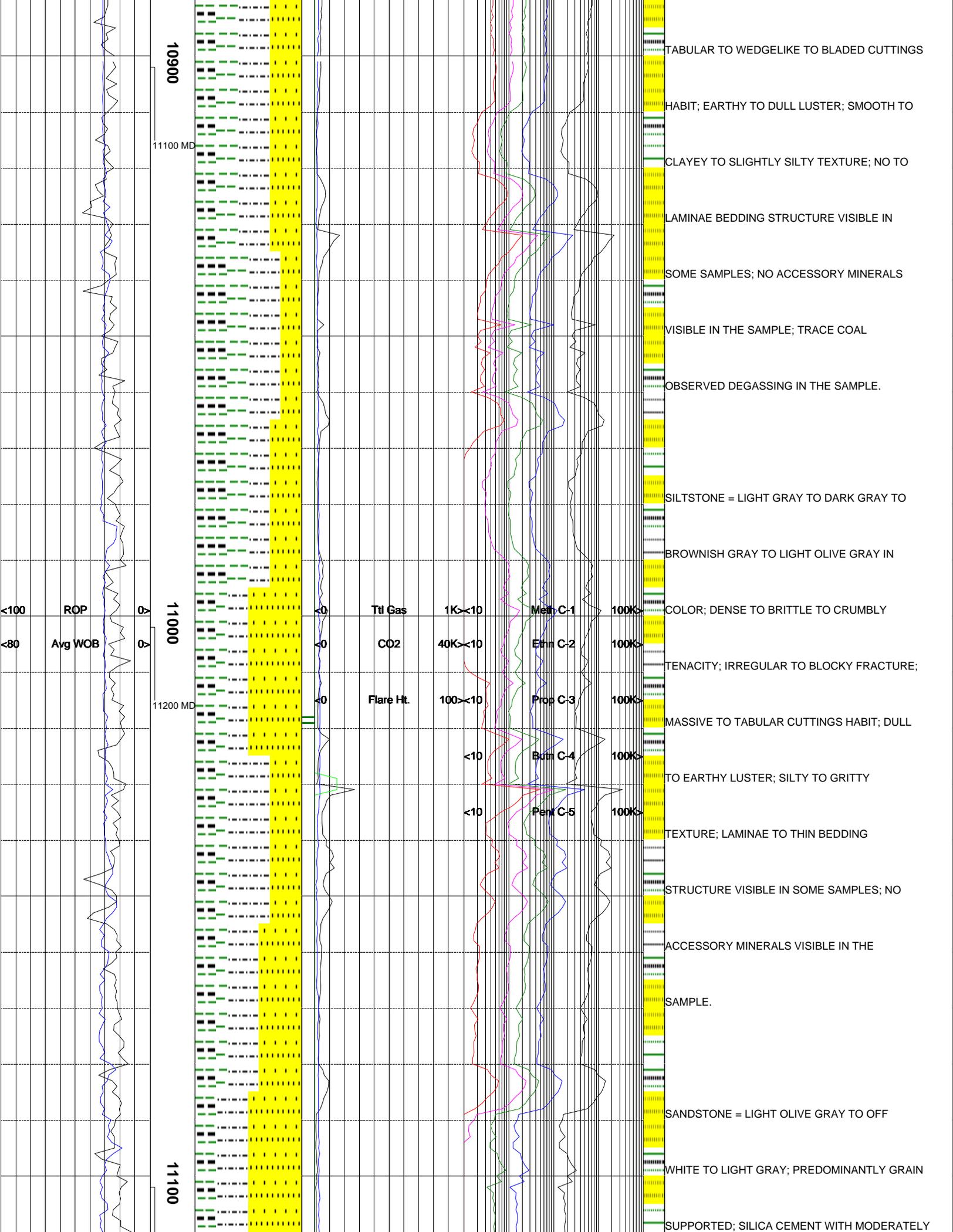
10500 MD

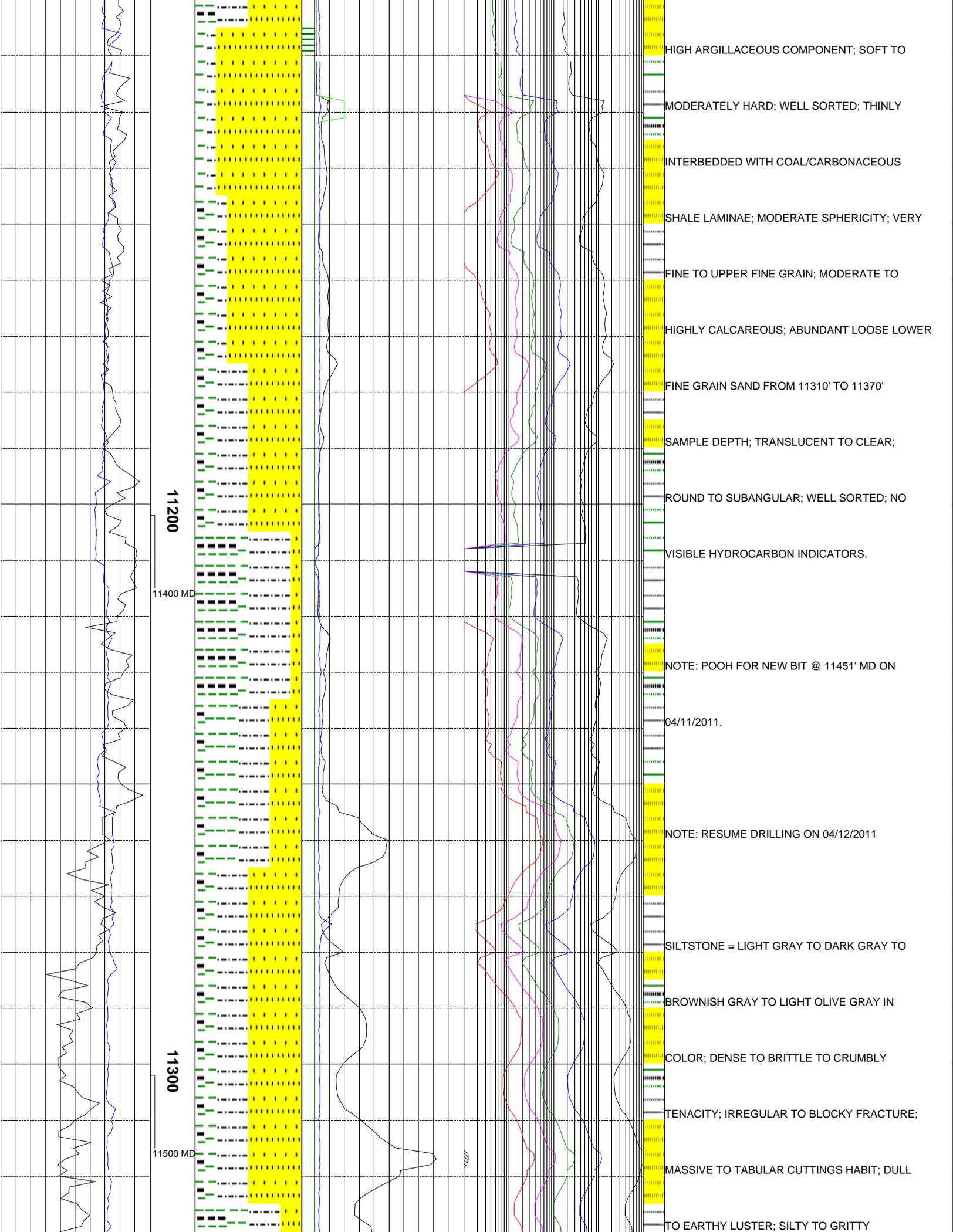
10400

10600 MD







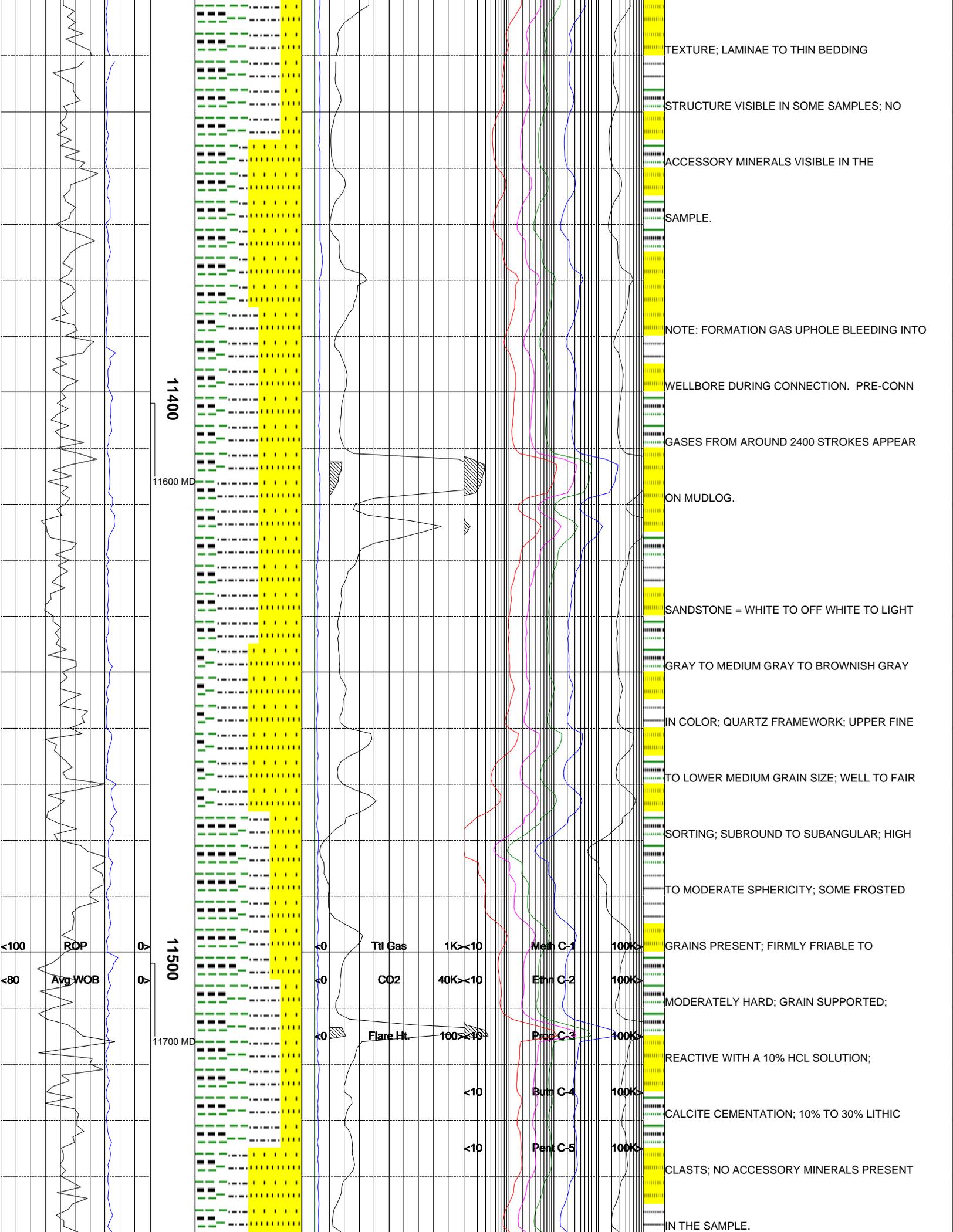


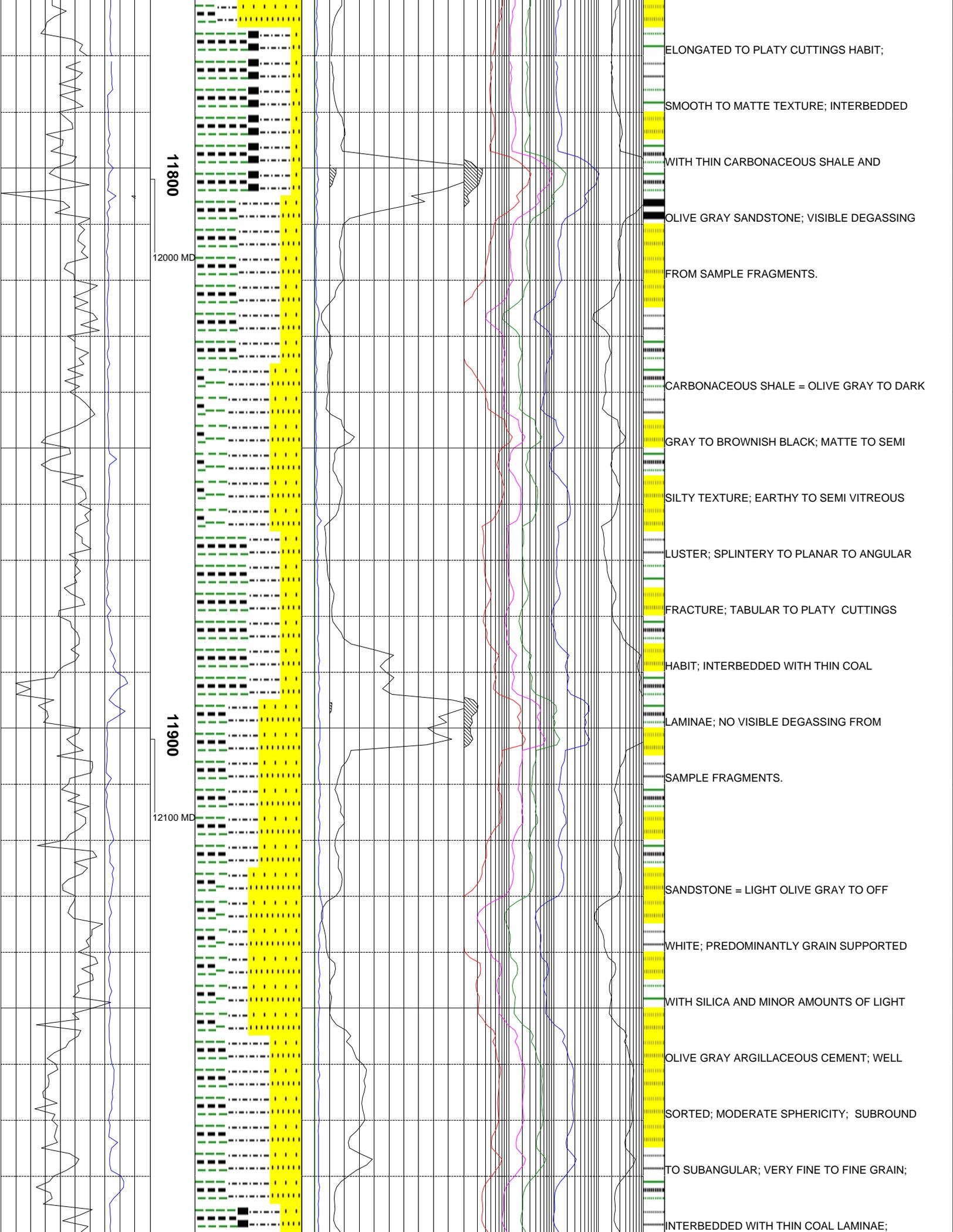
11200

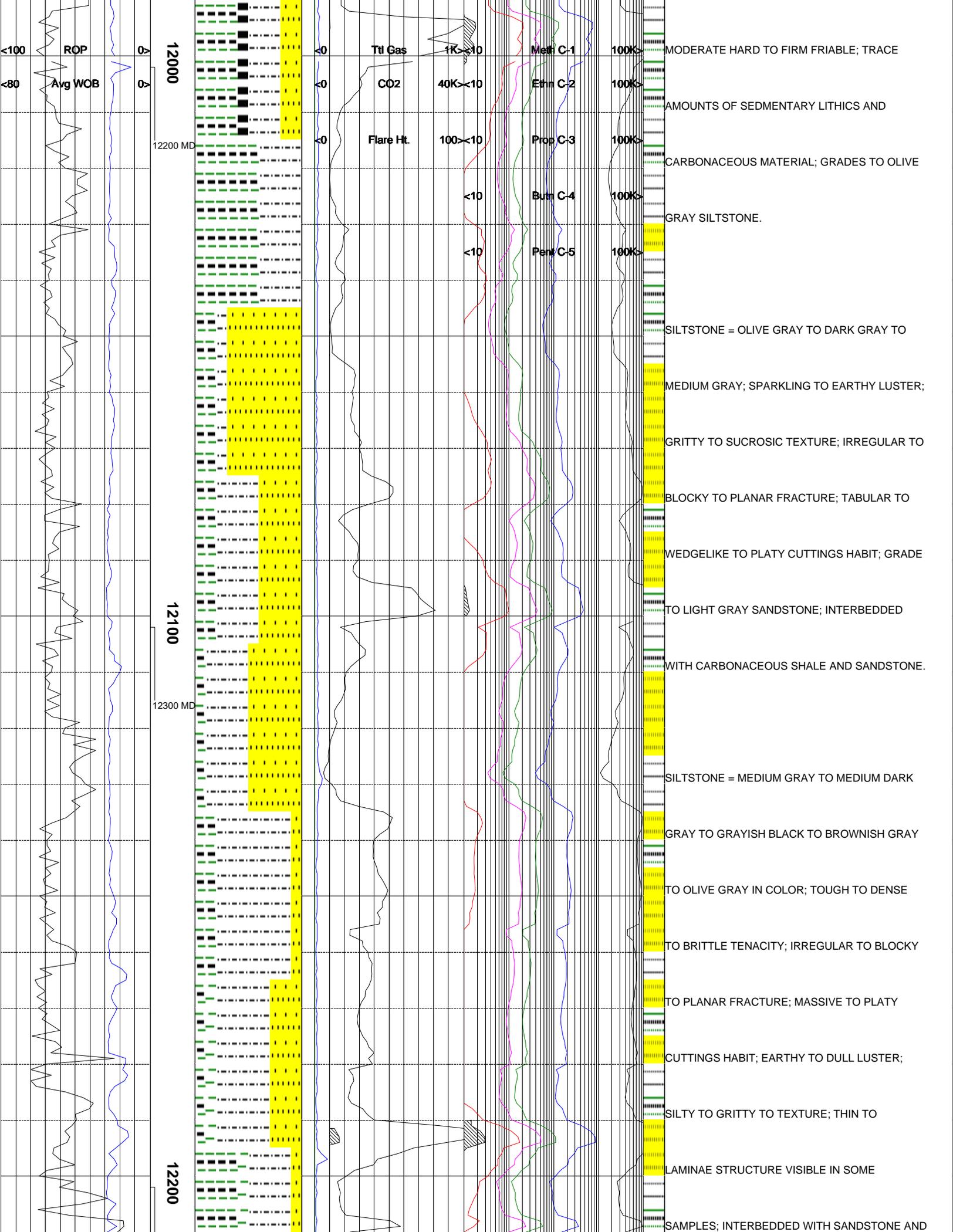
11400 MD

11300

11500 MD







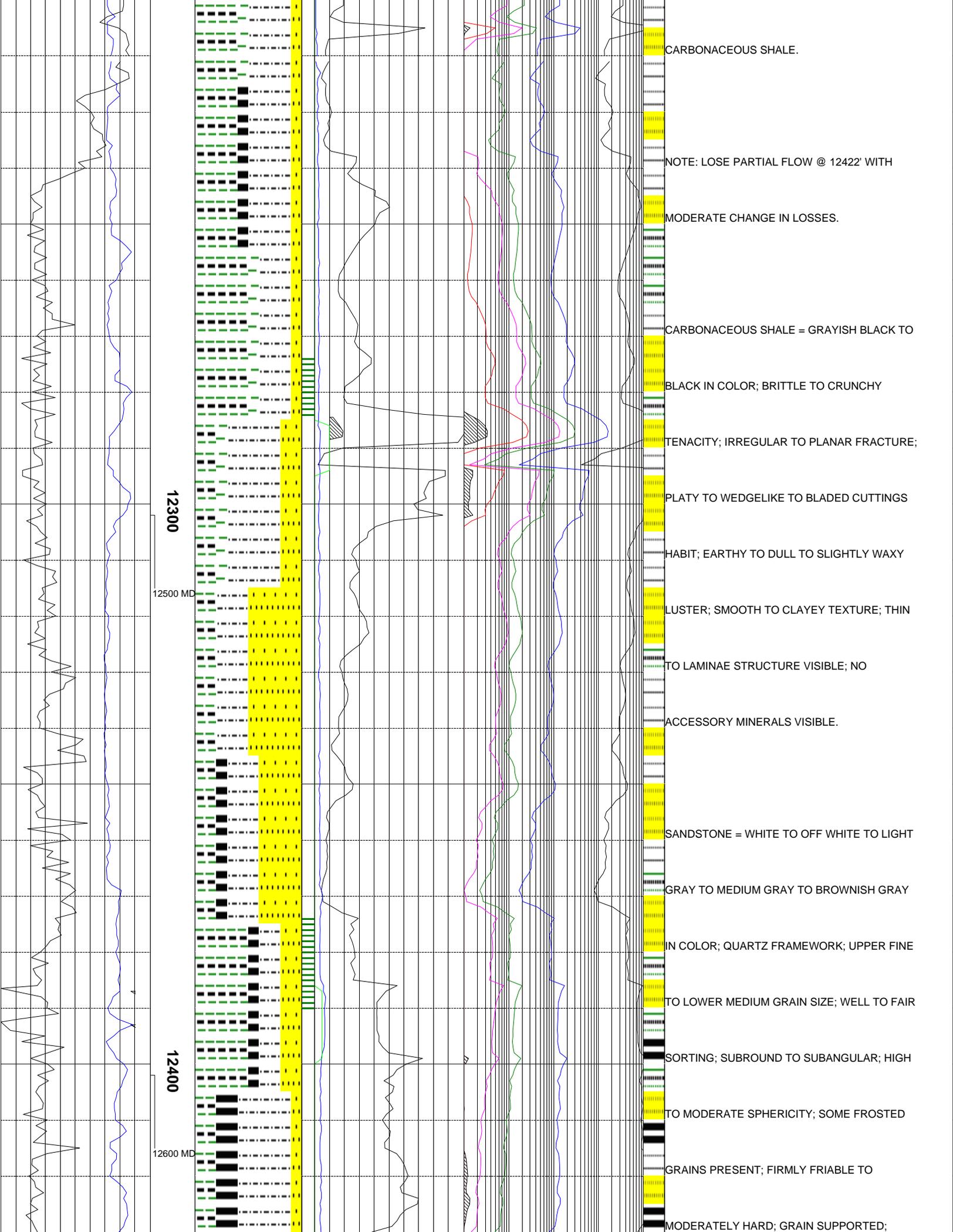
12000
12200 MD
12100
12300 MD
12200

<100 ROP
<80 Avg WOB

Ttl Gas 1K > 10
CO2 40K > 10
Flare Ht. 100 > 10
<10
<10

Met C-1
Ethn C-2
Prop C-3
Butn C-4
Pen C-5

100K >
MODERATE HARD TO FIRM FRIABLE; TRACE
100K >
AMOUNTS OF SEDIMENTARY LITHICS AND
100K >
CARBONACEOUS MATERIAL; GRADES TO OLIVE
100K >
GRAY SILTSTONE.
100K >
SILTSTONE = OLIVE GRAY TO DARK GRAY TO
100K >
MEDIUM GRAY; SPARKLING TO EARTHY LUSTER;
100K >
GRITTY TO SUCROSIC TEXTURE; IRREGULAR TO
100K >
BLOCKY TO PLANAR FRACTURE; TABULAR TO
100K >
WEDGELIKE TO PLATY CUTTINGS HABIT; GRADE
100K >
TO LIGHT GRAY SANDSTONE; INTERBEDDED
100K >
WITH CARBONACEOUS SHALE AND SANDSTONE.
100K >
SILTSTONE = MEDIUM GRAY TO MEDIUM DARK
100K >
GRAY TO GRAYISH BLACK TO BROWNISH GRAY
100K >
TO OLIVE GRAY IN COLOR; TOUGH TO DENSE
100K >
TO BRITTLE TENACITY; IRREGULAR TO BLOCKY
100K >
TO PLANAR FRACTURE; MASSIVE TO PLATY
100K >
CUTTINGS HABIT; EARTHY TO DULL LUSTER;
100K >
SILTY TO GRITTY TO TEXTURE; THIN TO
100K >
LAMINAE STRUCTURE VISIBLE IN SOME
100K >
SAMPLES; INTERBEDDED WITH SANDSTONE AND



CARBONACEOUS SHALE.

NOTE: LOSE PARTIAL FLOW @ 12422' WITH

MODERATE CHANGE IN LOSSES.

CARBONACEOUS SHALE = GRAYISH BLACK TO

BLACK IN COLOR; BRITTLE TO CRUNCHY

TENACITY; IRREGULAR TO PLANAR FRACTURE;

PLATY TO WEDGELIKE TO BLADED CUTTINGS

HABIT; EARTHY TO DULL TO SLIGHTLY WAXY

LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN

TO LAMINAE STRUCTURE VISIBLE; NO

ACCESSORY MINERALS VISIBLE.

SANDSTONE = WHITE TO OFF WHITE TO LIGHT

GRAY TO MEDIUM GRAY TO BROWNISH GRAY

IN COLOR; QUARTZ FRAMEWORK; UPPER FINE

TO LOWER MEDIUM GRAIN SIZE; WELL TO FAIR

SORTING; SUBROUND TO SUBANGULAR; HIGH

TO MODERATE SPHERICITY; SOME FROSTED

GRAINS PRESENT; FIRMLY FRIABLE TO

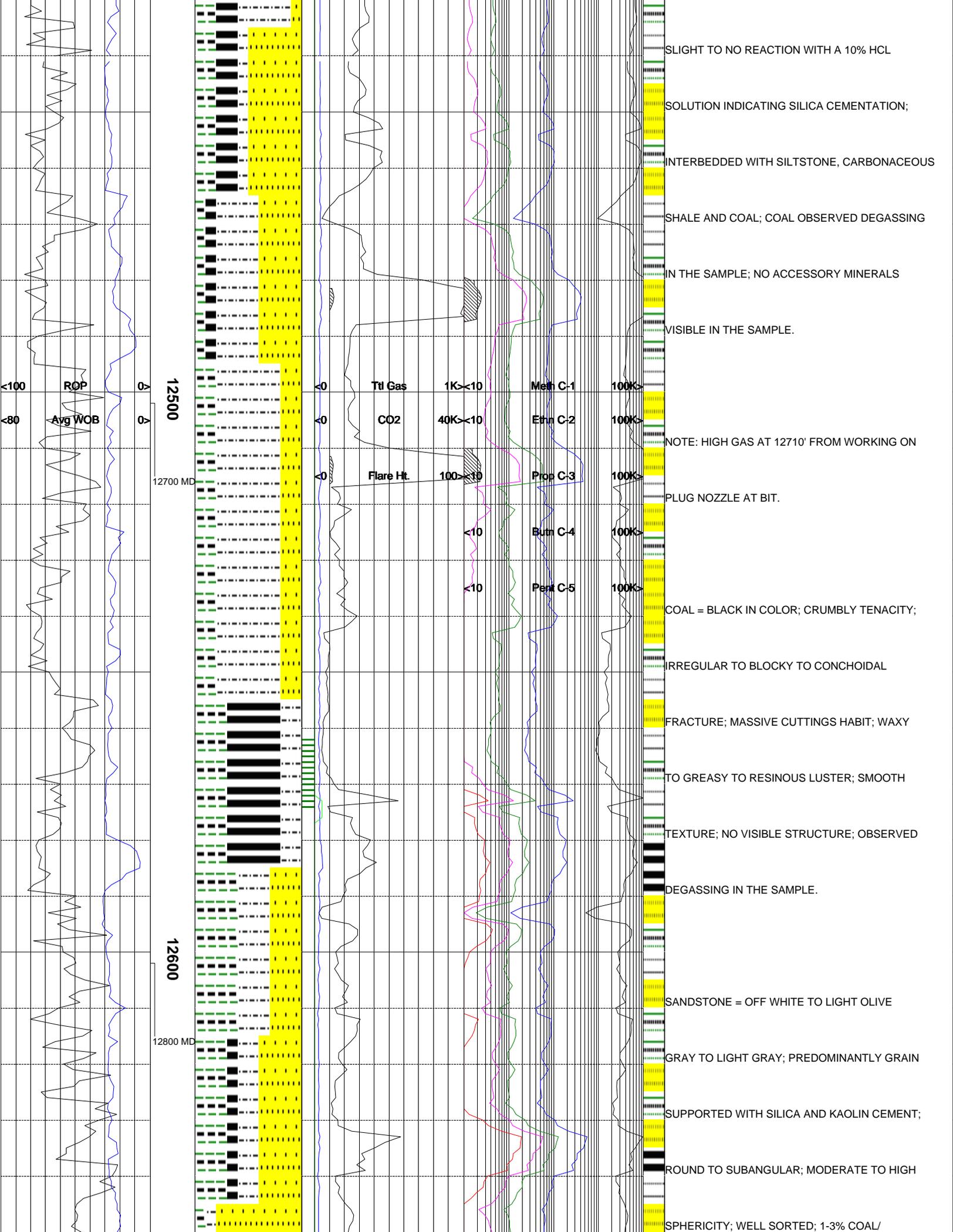
MODERATELY HARD; GRAIN SUPPORTED;

12300

12500 MD

12400

12600 MD



SLIGHT TO NO REACTION WITH A 10% HCL

SOLUTION INDICATING SILICA CEMENTATION;

INTERBEDDED WITH SILTSTONE, CARBONACEOUS

SHALE AND COAL; COAL OBSERVED DEGASSING

IN THE SAMPLE; NO ACCESSORY MINERALS

VISIBLE IN THE SAMPLE.

12500

12700 MD

12600

12800 MD

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

CO2 40K < 10 Ethn C-2 100K >

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

< 10 Butn C-4 100K >

< 10 Pent C-5 100K >

NOTE: HIGH GAS AT 12710' FROM WORKING ON

PLUG NOZZLE AT BIT.

COAL = BLACK IN COLOR; CRUMBLY TENACITY;

IRREGULAR TO BLOCKY TO CONCHOIDAL

FRACTURE; MASSIVE CUTTINGS HABIT; WAXY

TO GREASY TO RESINOUS LUSTER; SMOOTH

TEXTURE; NO VISIBLE STRUCTURE; OBSERVED

DEGASSING IN THE SAMPLE.

SANDSTONE = OFF WHITE TO LIGHT OLIVE

GRAY TO LIGHT GRAY; PREDOMINANTLY GRAIN

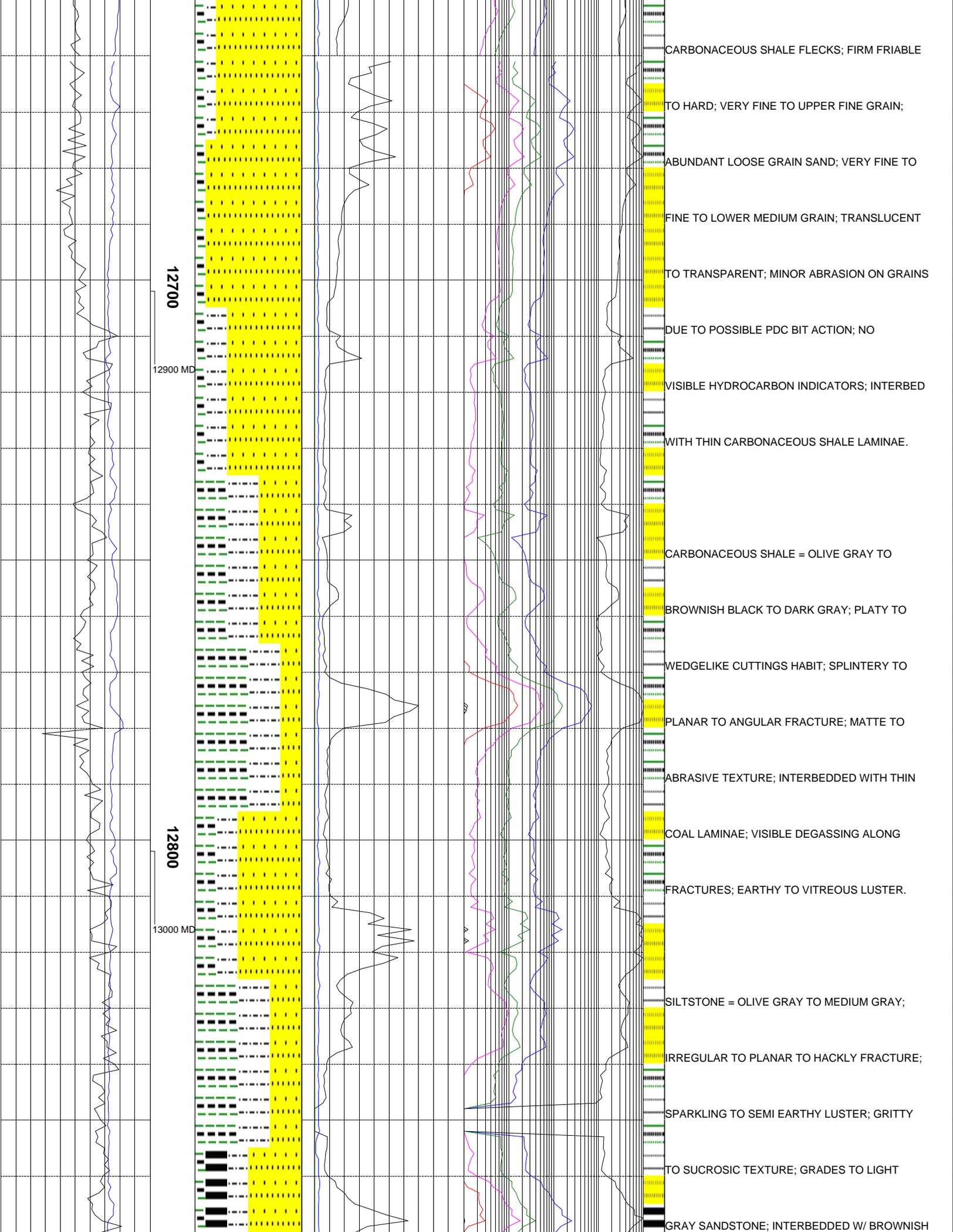
SUPPORTED WITH SILICA AND KAOLIN CEMENT;

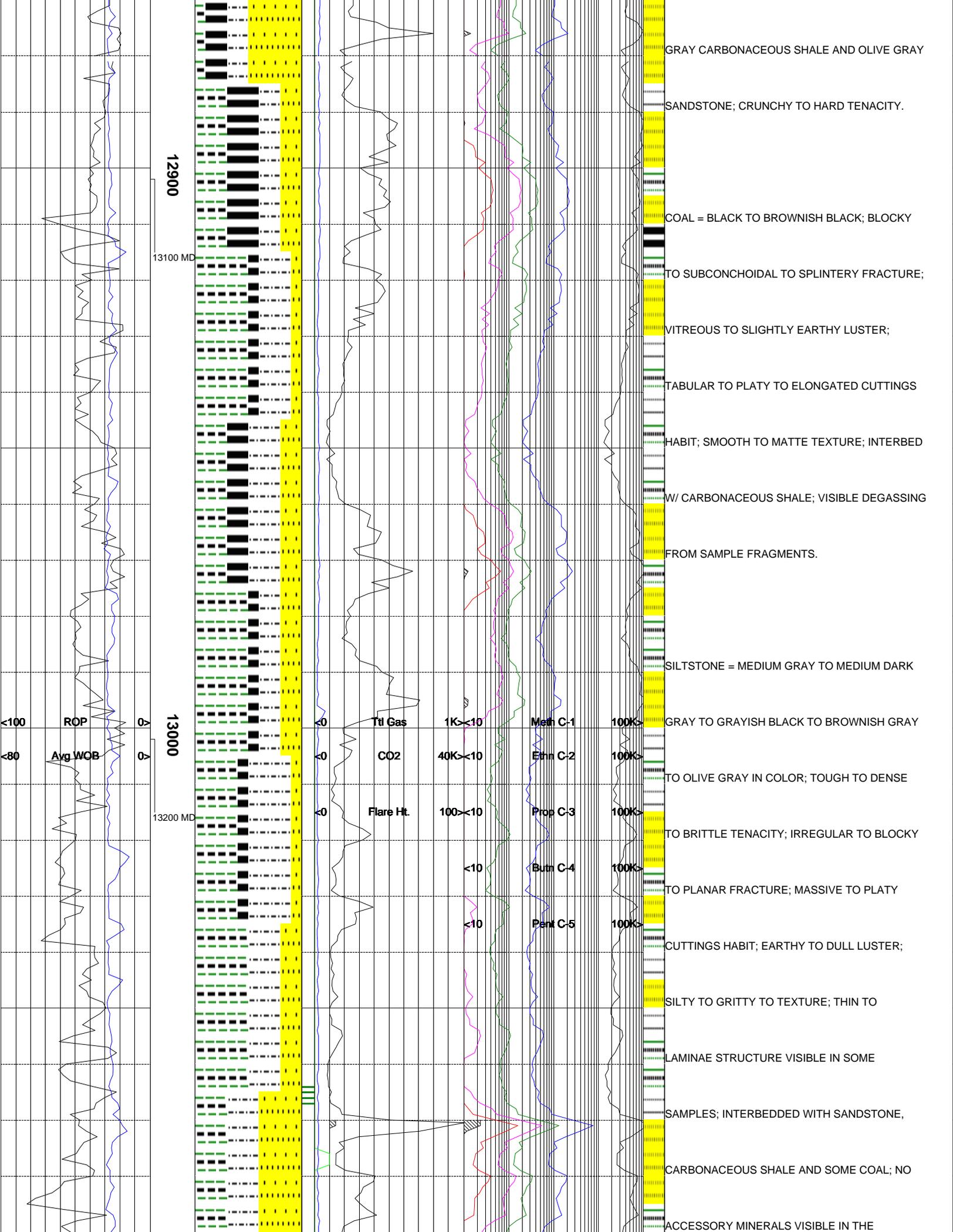
ROUND TO SUBANGULAR; MODERATE TO HIGH

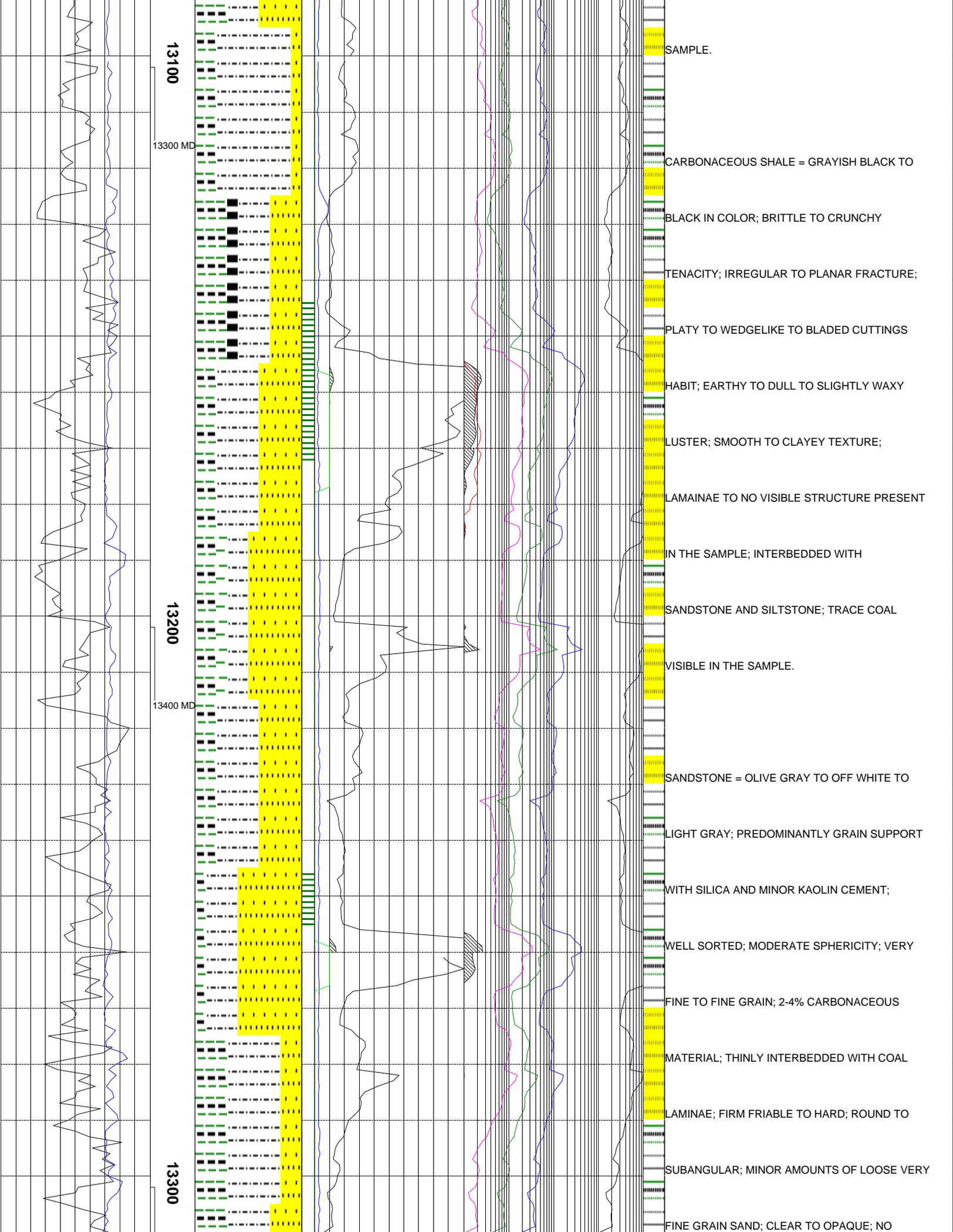
SPHERICITY; WELL SORTED; 1-3% COAL/

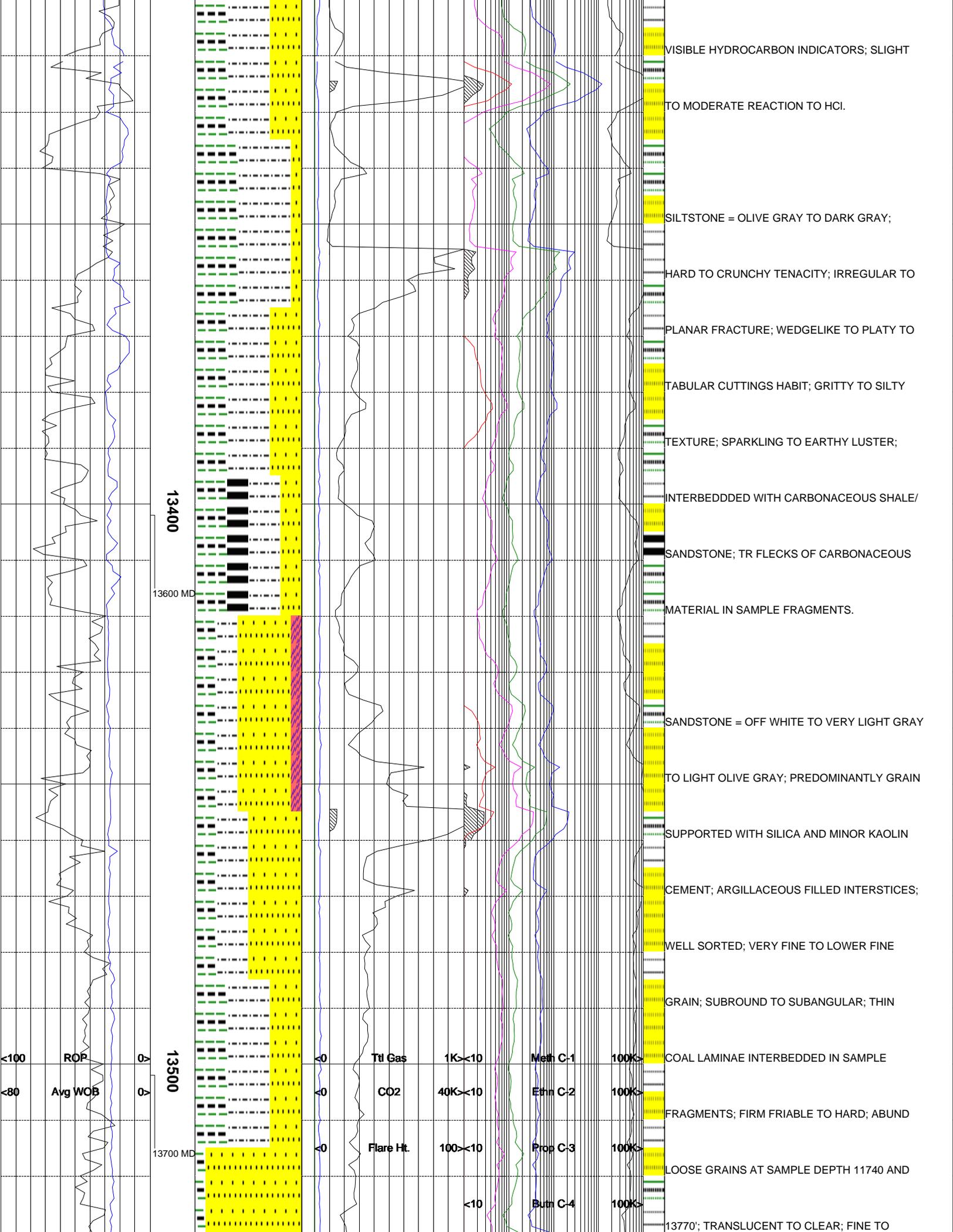
ROP

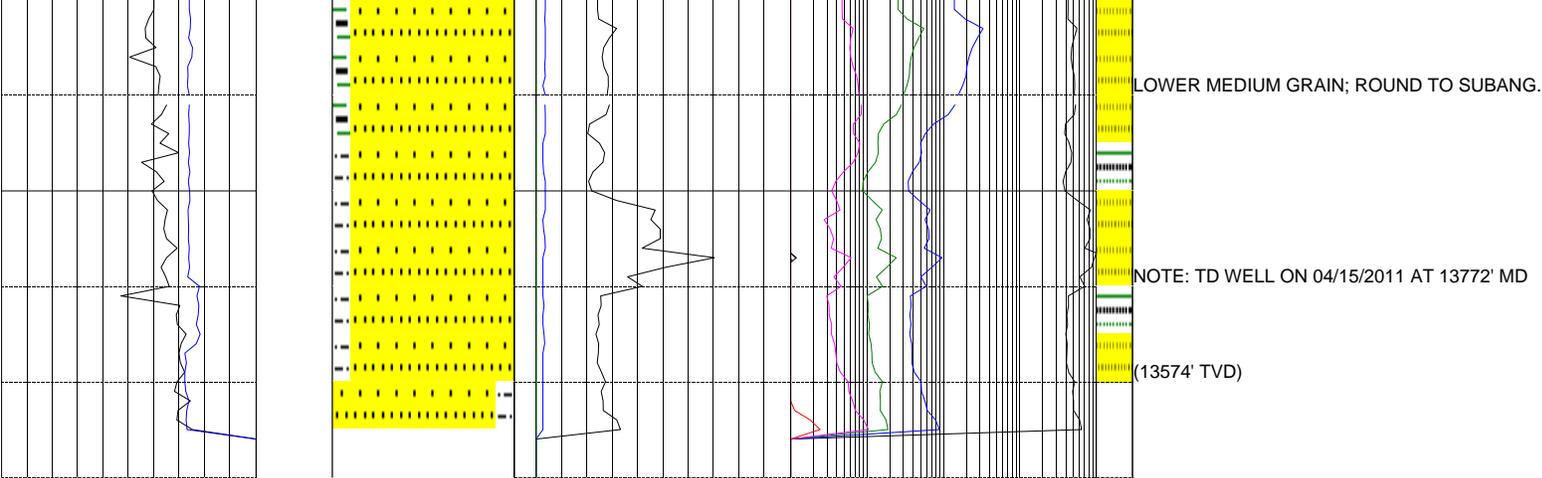
Avg WOB











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