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MUDLOG TVD

COMPANY ExxonMobil Production
WELL FRU 197-33A7
FIELD PICEANCE CREEK
REGION ROCKIES
COORDINATES 39.915575000
108.28575000
ELEVATION GL 6386
KB 6359
COUNTY, STATE RIO BLANCO, CO
API INDEX 05-103-1139-900
SPUD DATE 02/16/2010
CONTRACTOR HE
CO. REP. R.T. OWENS
RIG/TYPE 215/FLEX 3
LOGGING UNIT MLU051
GEOLOGISTS G.BAKER
B.MARSH
ADD. PERSONS D.CLAAR
B.JOHANNING
CO. GEOLOGIST MELANIE BIGGS

LOG INTERVAL

CASING DATA

DEPTHS: 3,790' TO 12,375'
DATES: 02/16/2010 TO 02/26/2010
SCALE: 5"=100'

10.75" AT 3,808'
7.00" AT 8,609'
AT
AT

MUD TYPES

HOLE SIZE

LSND TO 12,375"
TO
TO
TO

9.875" TO 8,619'
6.125" TO 12,375'
TO
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, 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, SANDSTONE, SANDSTONE-TUFFACEOUS, SERICITIZATION, SERPENTINE, SHALE, SHALE TUFFACEOUS, SHELL FRAGMENTS, SIDERITE, SILICIFICATION, SILTSTONE, SILTST-TUFFACEOUS, TUFF, VOLCANICLASTICS SEDS, VOLCANICS.

<200 ROP 0>
ft/hr
<50 Avg WOB 0>
klbs

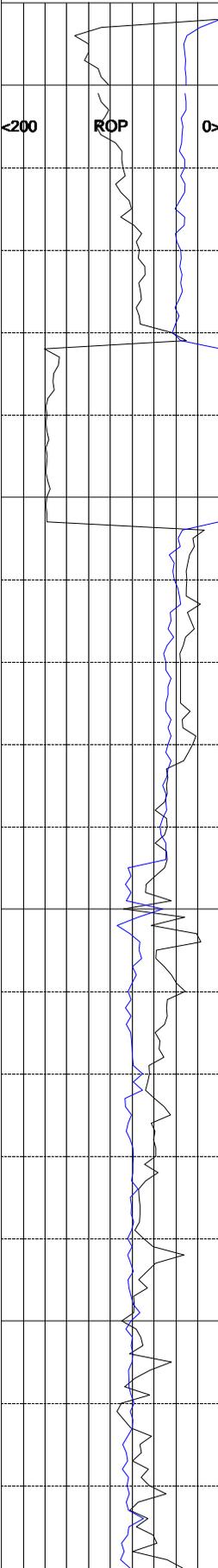
TVD Depth
3700

Lithology

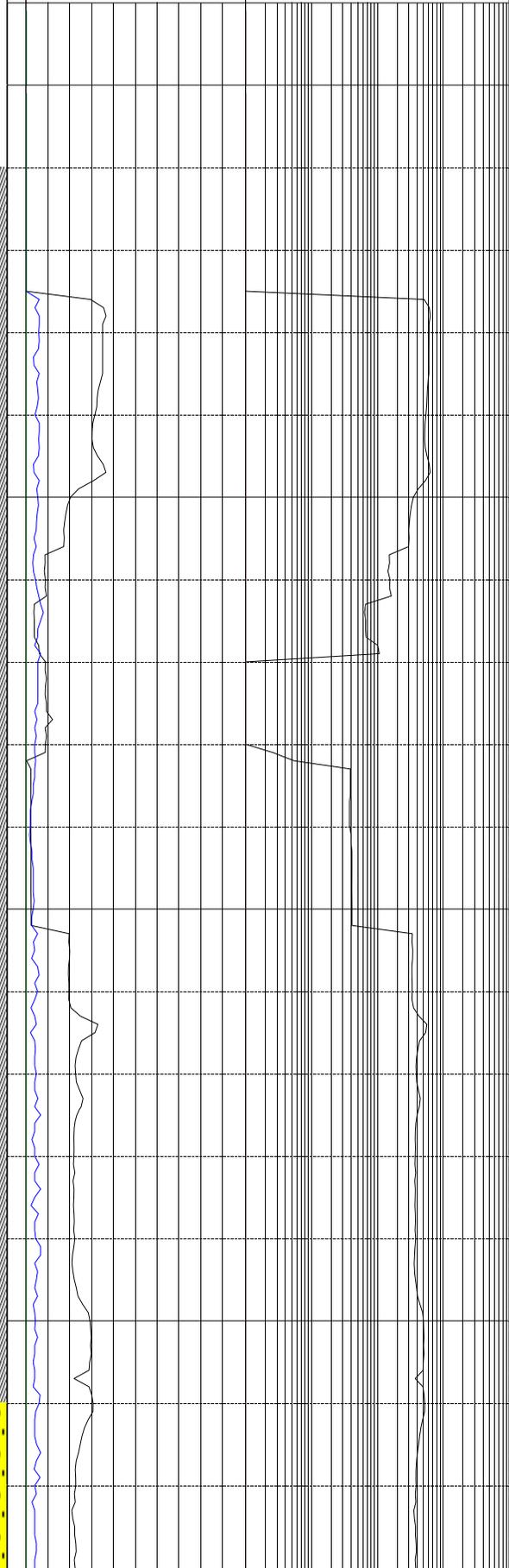
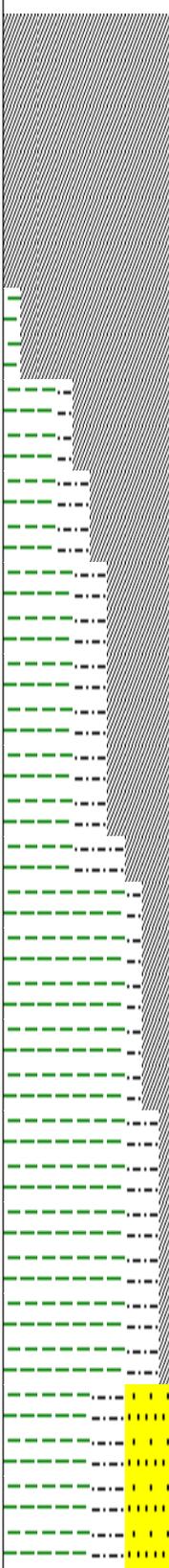
MGS
<0 Ttl Gas 500>
units
<0 CO2 10K>
ppm
<0 Flare Ht. 100>
ft
<10 Meth C-1 100K>
ppm
<10 Ethn C-2 100K>
<10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>

Interp. Lith

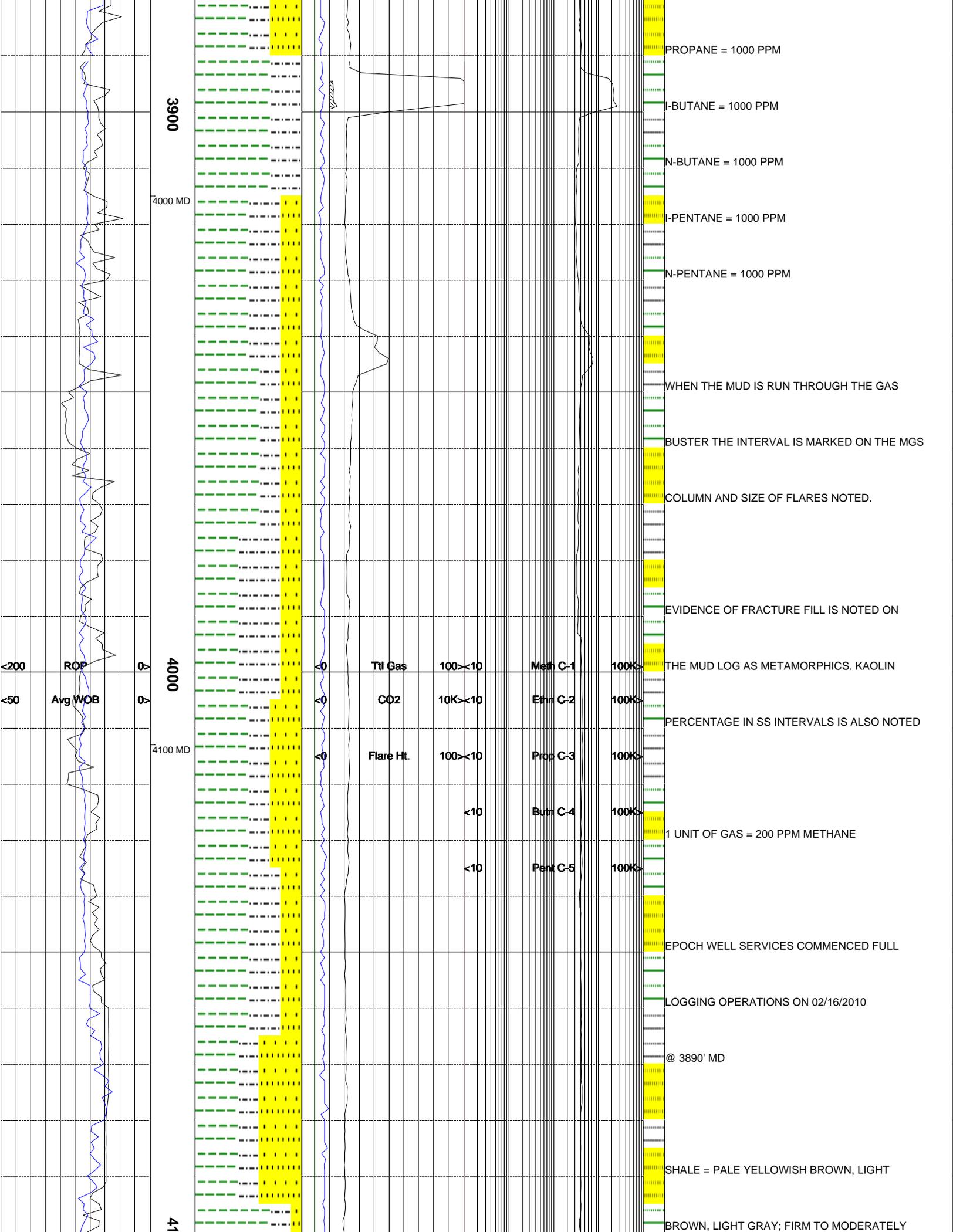
Remarks
Survey Data, Mud Reports, Other Info.



3800 MD
3800
3900 MD



ALL ROCK COLORS ARE REFERENCED TO THE
GSA ROCK COLOR CHART. ROCK CONSTITUENTS
ARE DESCRIBED WET AND LISTED IN ORDER
OF MOST ABUNDANT TO LEAST ABUNDANT. ALL
SAMPLE DEPTHS ARE REFERENCED TO RKB
CONNECTION GASES AS WELL AS TRIP AND
DOWNTIME GASES ARE NOTED ON THE LOG.
LARGE CONNECTION GASES WHICH APPEAR ON
THE MUD LOG USUALLY REFLECT UPHOLE GAS
INTERVALS BLEEDING GAS INTO THE BOREHOLE
DURING CONNECTIONS.
GAS CHROMATOGRAPHY EQUIPMENT IS
CALIBRATED TO A TEST GAS COMPOSED OF
METHANE = 10000 PPM
ETHANE = 1000 PPM



3900

4000 MD

4000

4100 MD

41

<math>< 200</math> ROP

<math>< 50</math> Avg WOB

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

CO2 10K <math>< 10</math> Ethn C-2 100K > 100

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

<math>< 10</math> Butn C-4 100K > 100

<math>< 10</math> Pent C-5 100K > 100

PROPANE = 1000 PPM

I-BUTANE = 1000 PPM

N-BUTANE = 1000 PPM

I-PENTANE = 1000 PPM

N-PENTANE = 1000 PPM

WHEN THE MUD IS RUN THROUGH THE GAS

BUSTER THE INTERVAL IS MARKED ON THE MGS

COLUMN AND SIZE OF FLARES NOTED.

EVIDENCE OF FRACTURE FILL IS NOTED ON

THE MUD LOG AS METAMORPHICS. KAOLIN

PERCENTAGE IN SS INTERVALS IS ALSO NOTED

1 UNIT OF GAS = 200 PPM METHANE

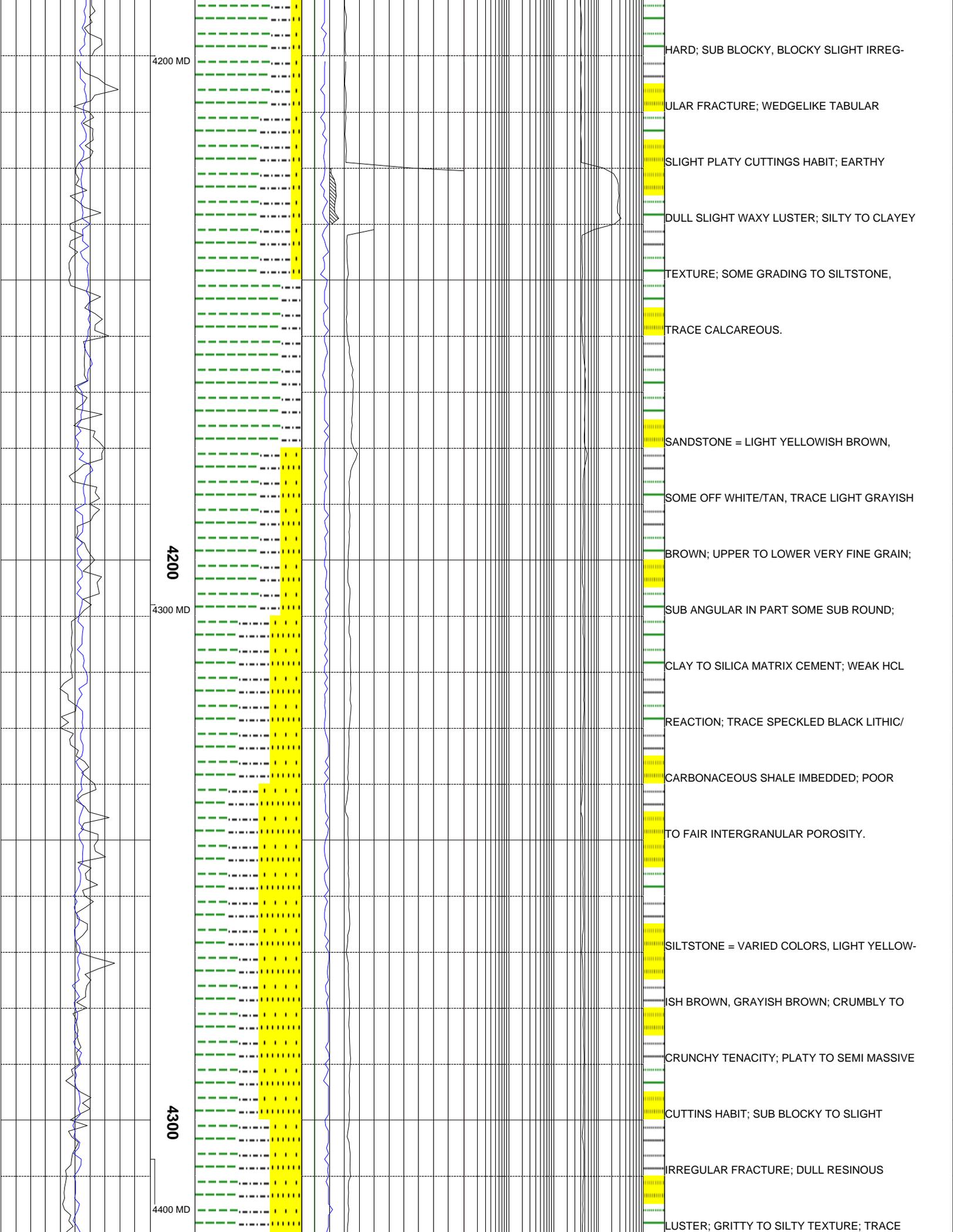
EPOCH WELL SERVICES COMMENCED FULL

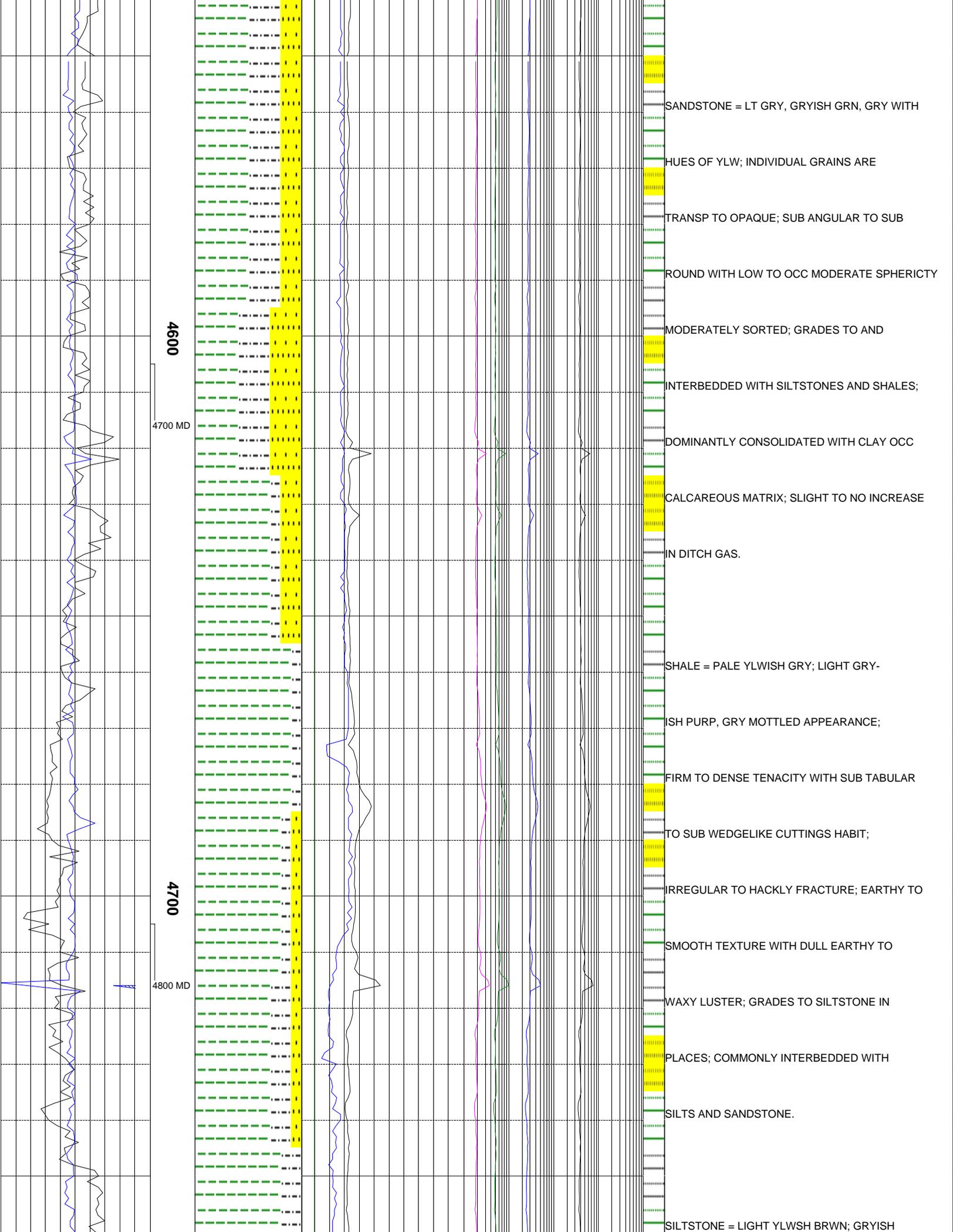
LOGGING OPERATIONS ON 02/16/2010

@ 3890' MD

SHALE = PALE YELLOWISH BROWN, LIGHT

BROWN, LIGHT GRAY; FIRM TO MODERATELY

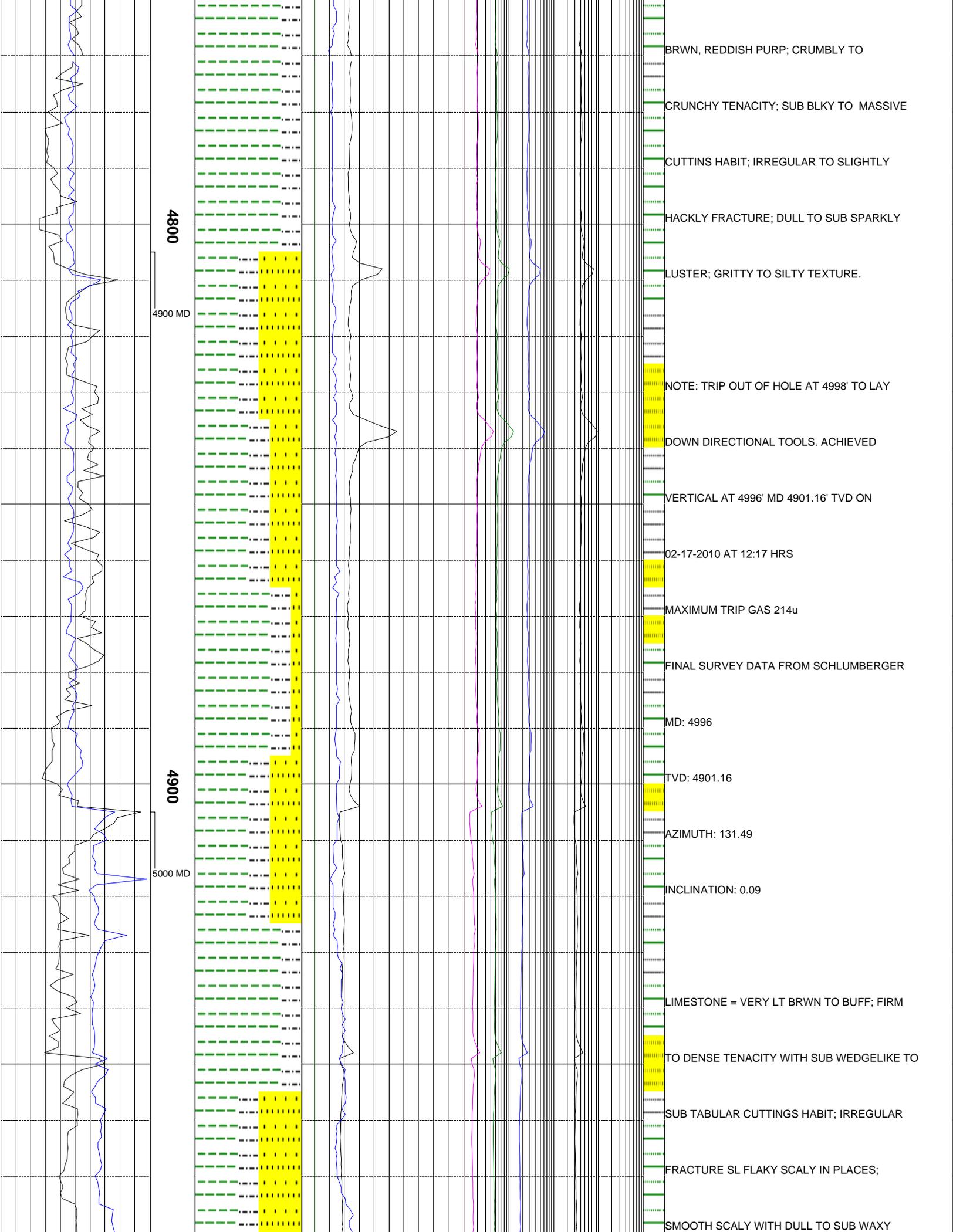


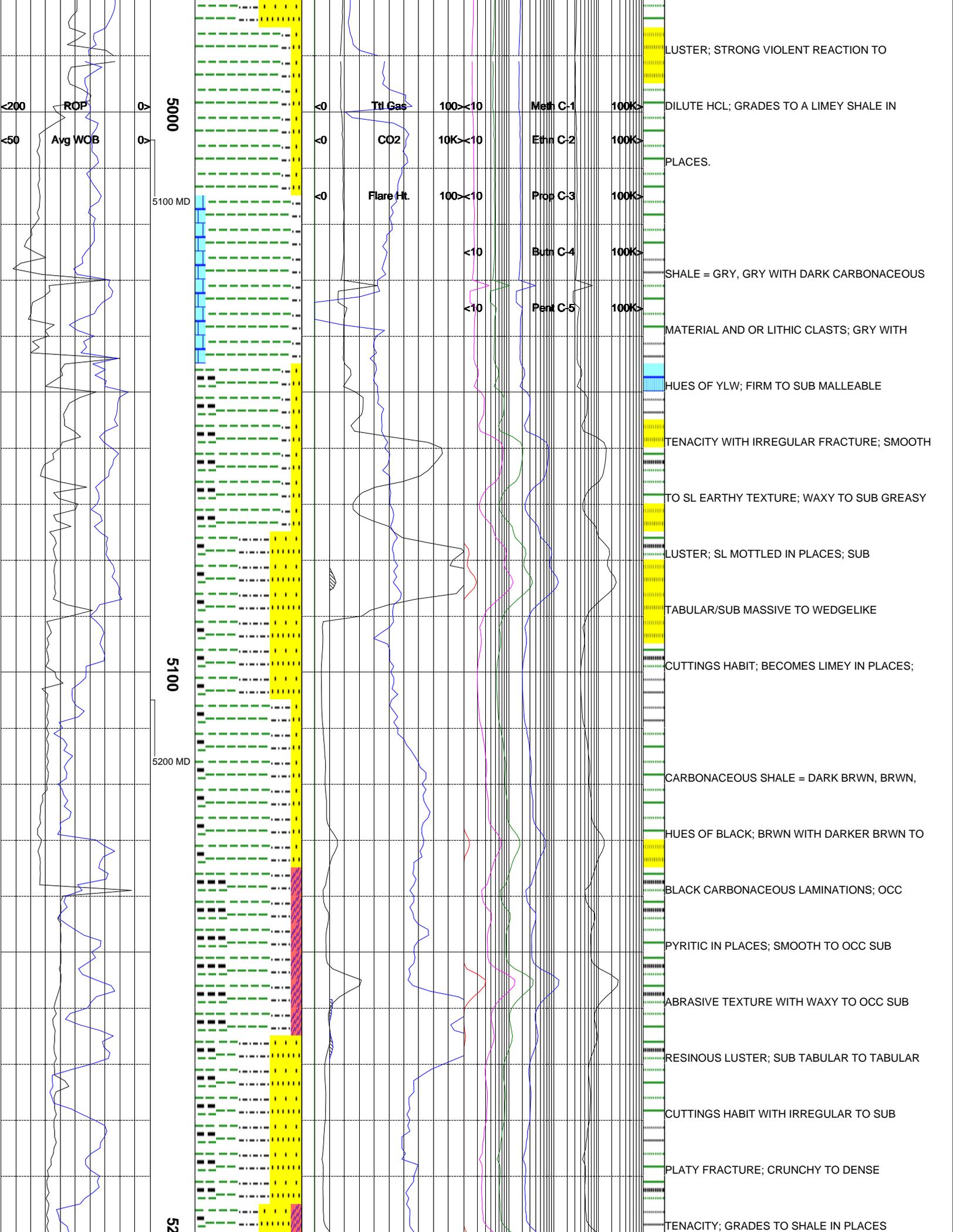


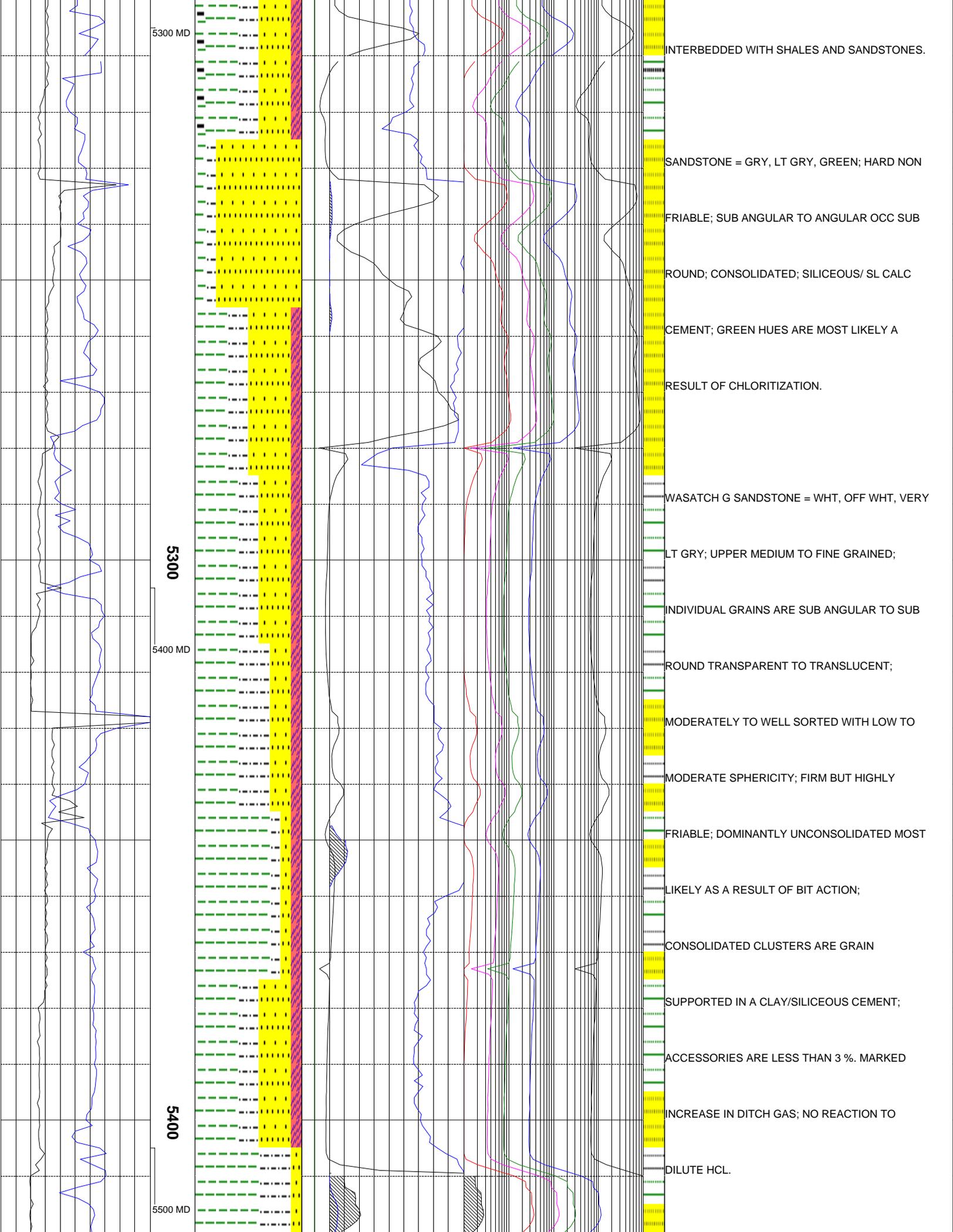
4600
4700 MD

4700
4800 MD

SANDSTONE = LT GRY, GRYISH GRN, GRY WITH
HUES OF YLW; INDIVIDUAL GRAINS ARE
TRANSP TO OPAQUE; SUB ANGULAR TO SUB
ROUND WITH LOW TO OCC MODERATE SPHERICTY
MODERATELY SORTED; GRADES TO AND
INTERBEDDED WITH SILTSTONES AND SHALES;
DOMINANTLY CONSOLIDATED WITH CLAY OCC
CALCAREOUS MATRIX; SLIGHT TO NO INCREASE
IN DITCH GAS.
SHALE = PALE YLWISH GRY; LIGHT GRY-
ISH PURP, GRY MOTTLED APPEARANCE;
FIRM TO DENSE TENACITY WITH SUB TABULAR
TO SUB WEDGELIKE CUTTINGS HABIT;
IRREGULAR TO HACKLY FRACTURE; EARTHY TO
SMOOTH TEXTURE WITH DULL EARTHY TO
WAXY LUSTER; GRADES TO SILTSTONE IN
PLACES; COMMONLY INTERBEDDED WITH
SILTS AND SANDSTONE.
SILTSTONE = LIGHT YLWSH BRWN; GRYISH







5300 MD

INTERBEDDED WITH SHALES AND SANDSTONES.

SANDSTONE = GRY, LT GRY, GREEN; HARD NON

FRIABLE; SUB ANGULAR TO ANGULAR OCC SUB

ROUND; CONSOLIDATED; SILICEOUS/ SL CALC

CEMENT; GREEN HUES ARE MOST LIKELY A

RESULT OF CHLORITIZATION.

WASATCH G SANDSTONE = WHT, OFF WHT, VERY

5300

LT GRY; UPPER MEDIUM TO FINE GRAINED;

INDIVIDUAL GRAINS ARE SUB ANGULAR TO SUB

5400 MD

ROUND TRANSPARENT TO TRANSLUCENT;

MODERATELY TO WELL SORTED WITH LOW TO

MODERATE SPHERICITY; FIRM BUT HIGHLY

FRIABLE; DOMINANTLY UNCONSOLIDATED MOST

LIKELY AS A RESULT OF BIT ACTION;

CONSOLIDATED CLUSTERS ARE GRAIN

SUPPORTED IN A CLAY/SILICEOUS CEMENT;

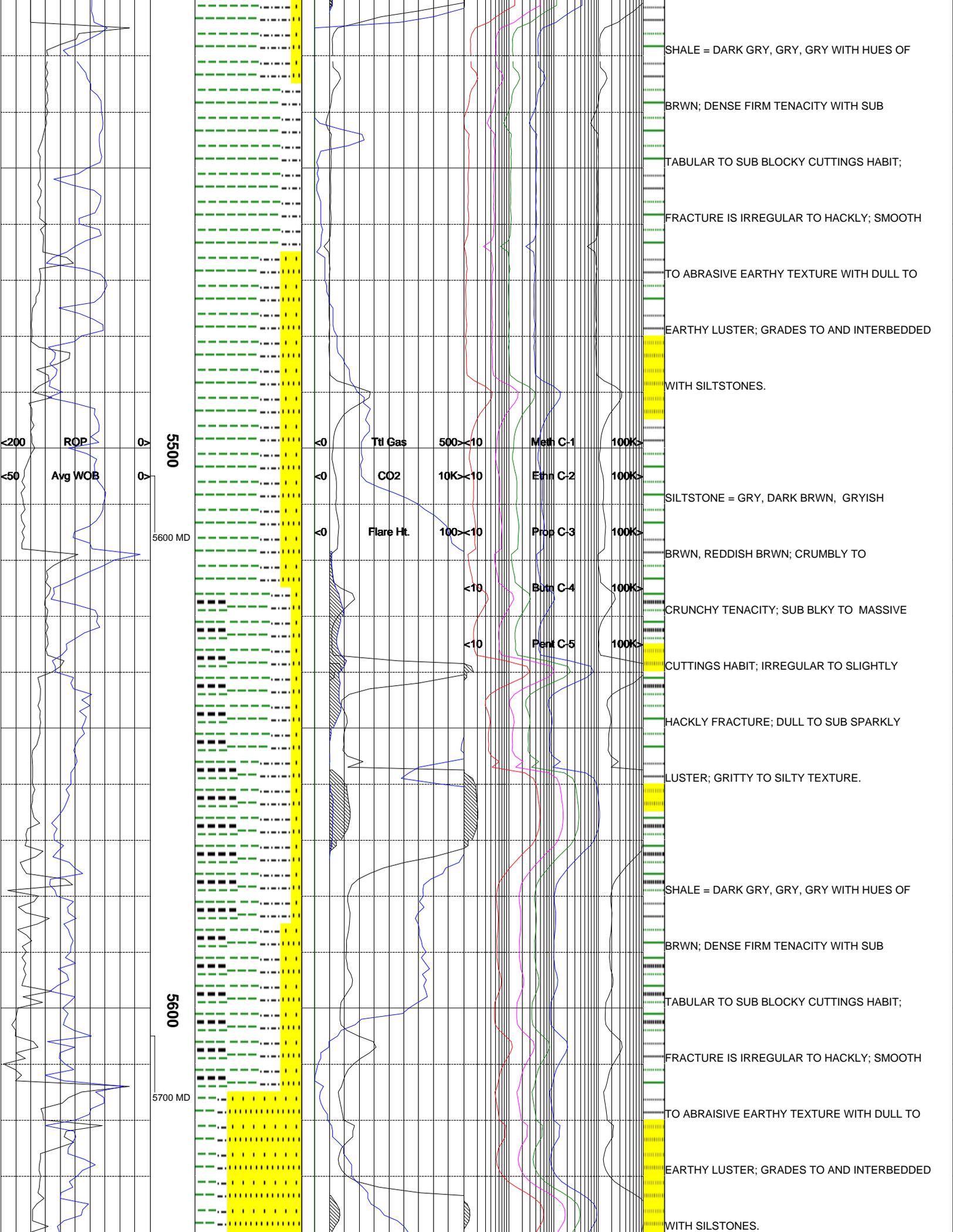
ACCESSORIES ARE LESS THAN 3%. MARKED

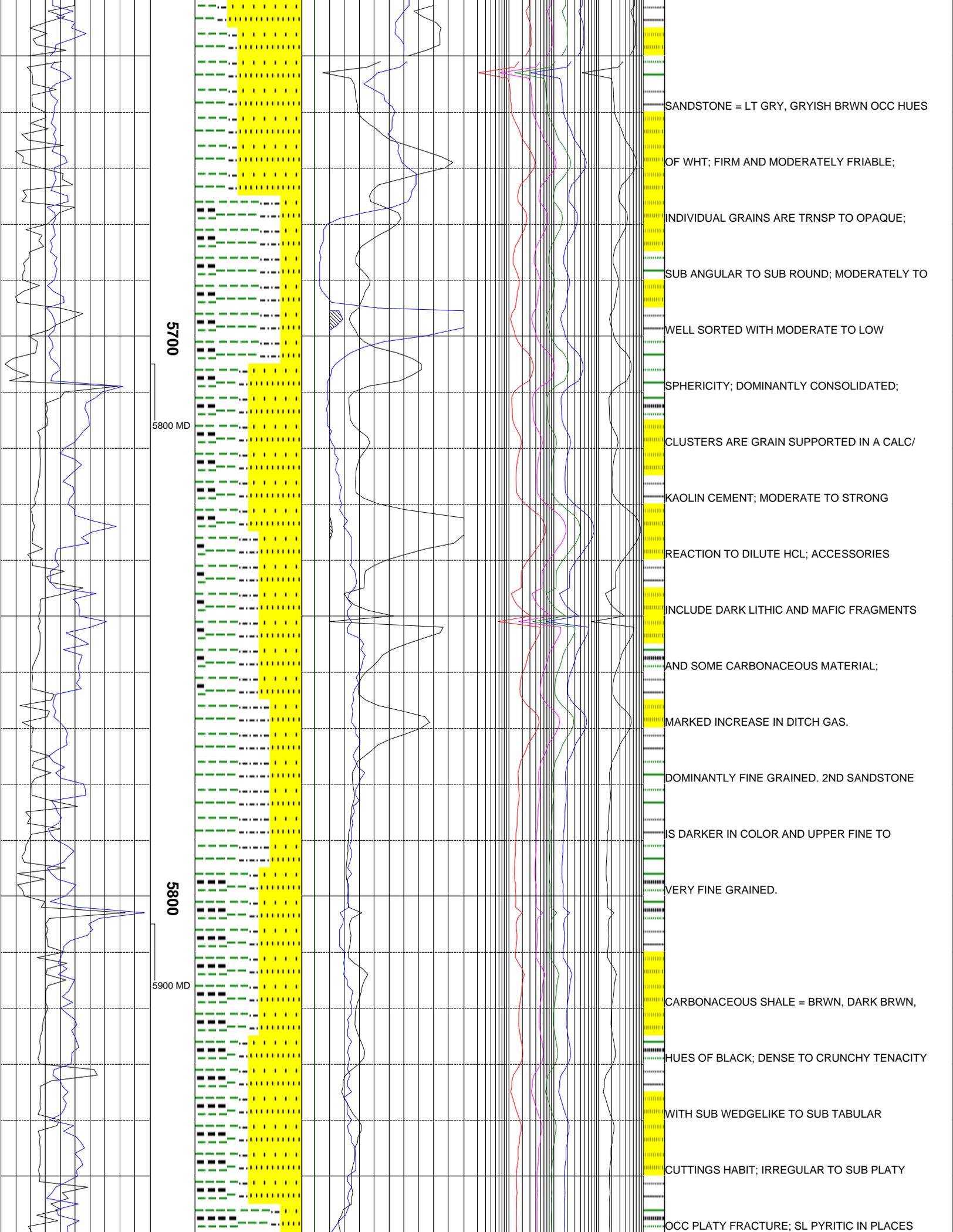
5400

INCREASE IN DITCH GAS; NO REACTION TO

DILUTE HCL.

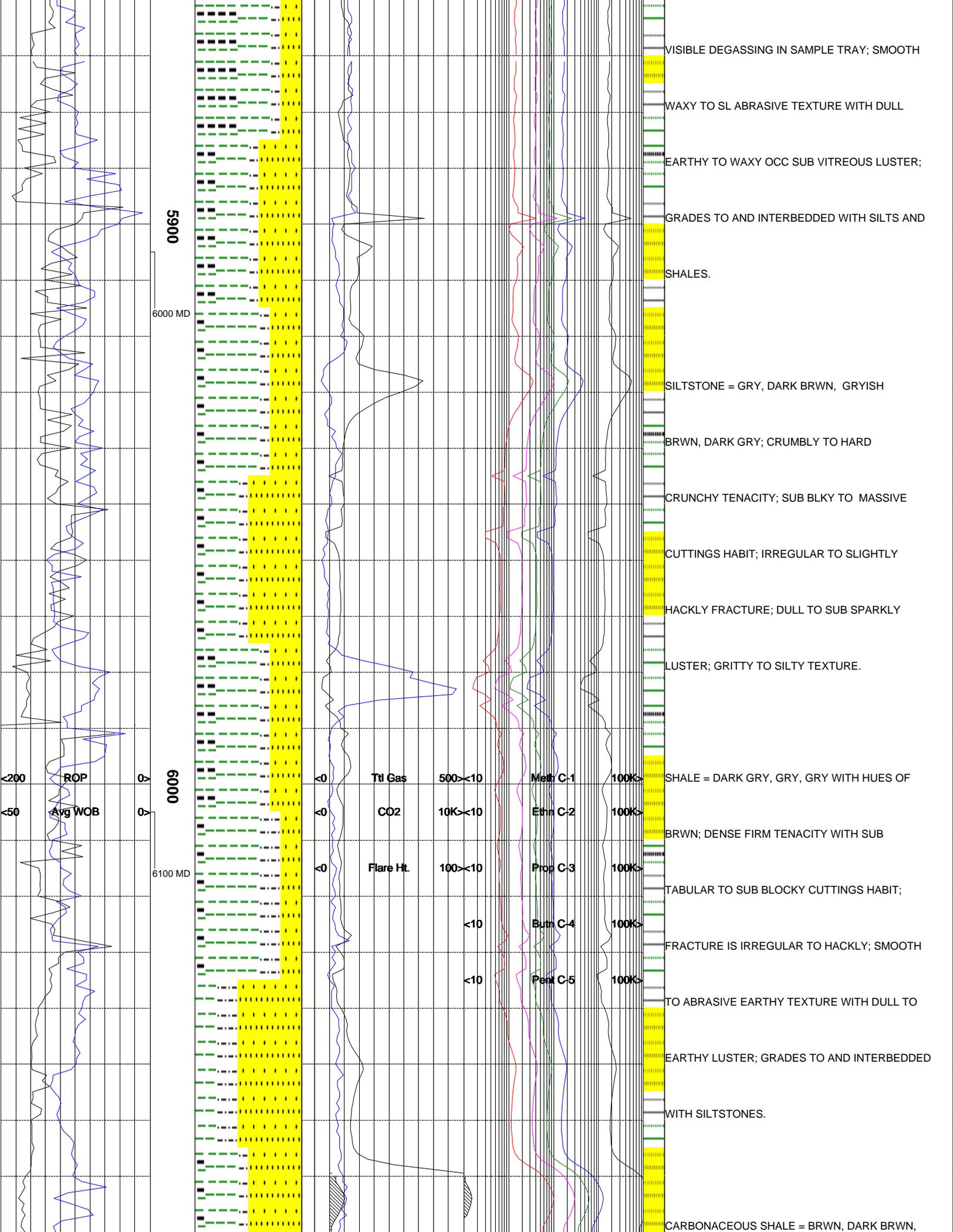
5500 MD





5700
5800 MD

5800
5900 MD



VISIBLE DEGASSING IN SAMPLE TRAY; SMOOTH

WAXY TO SL ABRASIVE TEXTURE WITH DULL

EARTHLY TO WAXY OCC SUB VITREOUS LUSTER;

GRADES TO AND INTERBEDDED WITH SILTS AND

SHALES.

SILTSTONE = GRY, DARK BRWN, GRYISH

BRWN, DARK GRY; CRUMBLY TO HARD

CRUNCHY TENACITY; SUB BLKY TO MASSIVE

CUTTINGS HABIT; IRREGULAR TO SLIGHTLY

HACKLY FRACTURE; DULL TO SUB SPARKLY

LUSTER; GRITTY TO SILTY TEXTURE.

SHALE = DARK GRY, GRY, GRY WITH HUES OF

BRWN; DENSE FIRM TENACITY WITH SUB

TABULAR TO SUB BLOCKY CUTTINGS HABIT;

FRACTURE IS IRREGULAR TO HACKLY; SMOOTH

TO ABRASIVE EARTHLY TEXTURE WITH DULL TO

EARTHLY LUSTER; GRADES TO AND INTERBEDDED

WITH SILTSTONES.

CARBONACEOUS SHALE = BRWN, DARK BRWN,

5900

6000 MD

6000

6100 MD

ROP

Avg WOB

Ttl Gas

CO2

Flare Ht.

Meth C-1

Ethn C-2

Prop C-3

Burn C-4

Pent C-5

500\times10

10K\times10

100\times10

<math><10</math>

<math><10</math>

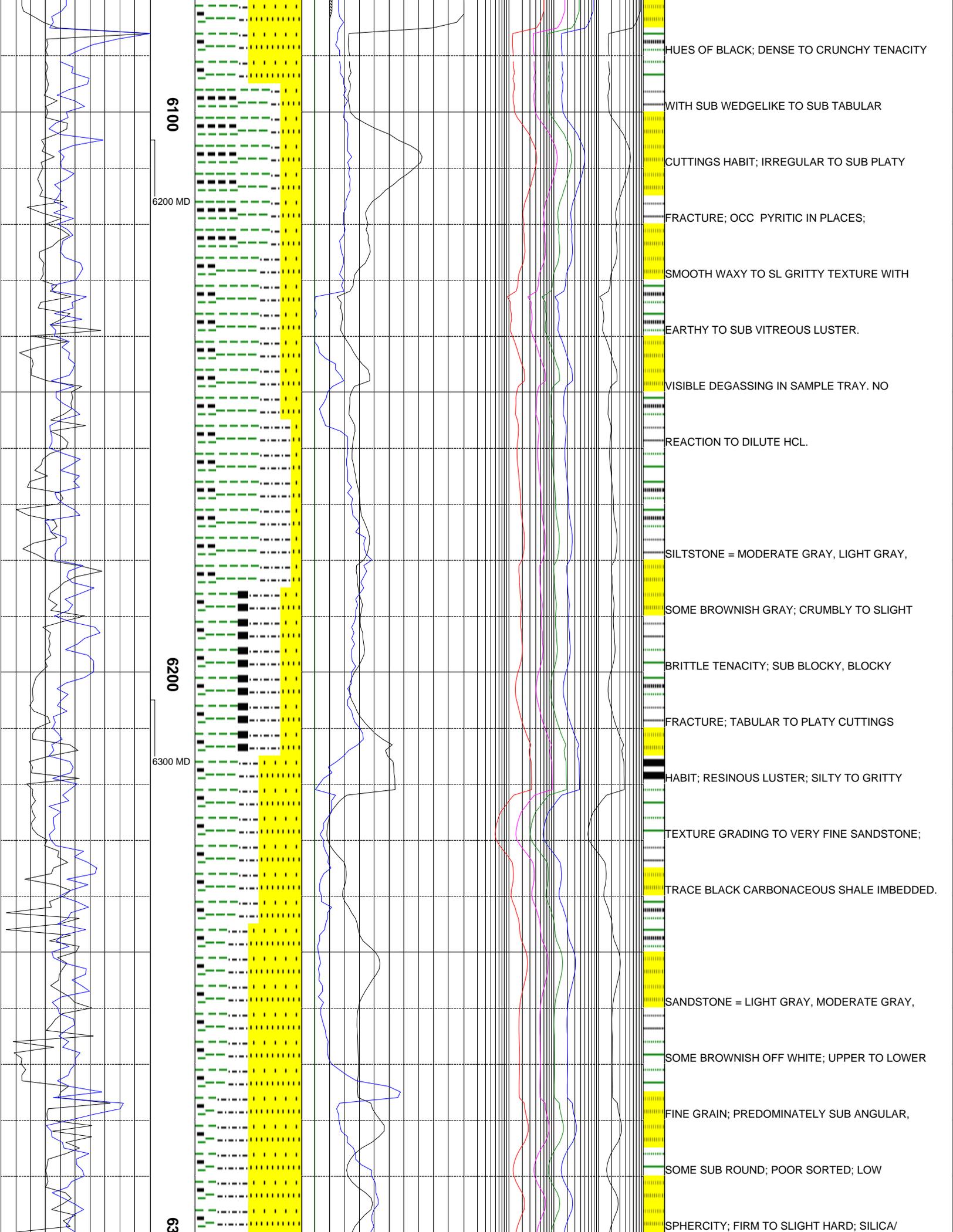
100K>

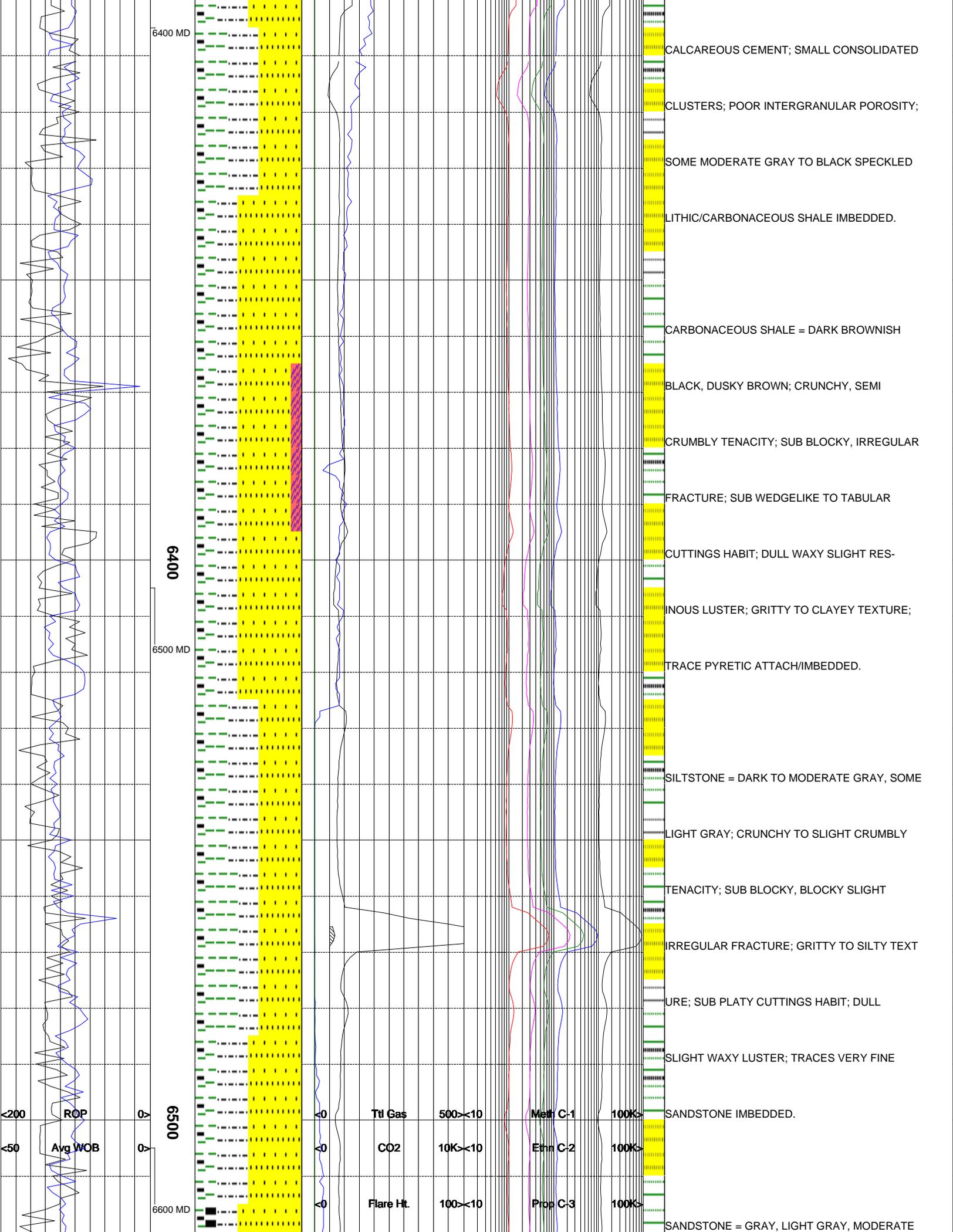
100K>

100K>

100K>

100K>





6400 MD

6400

6500 MD

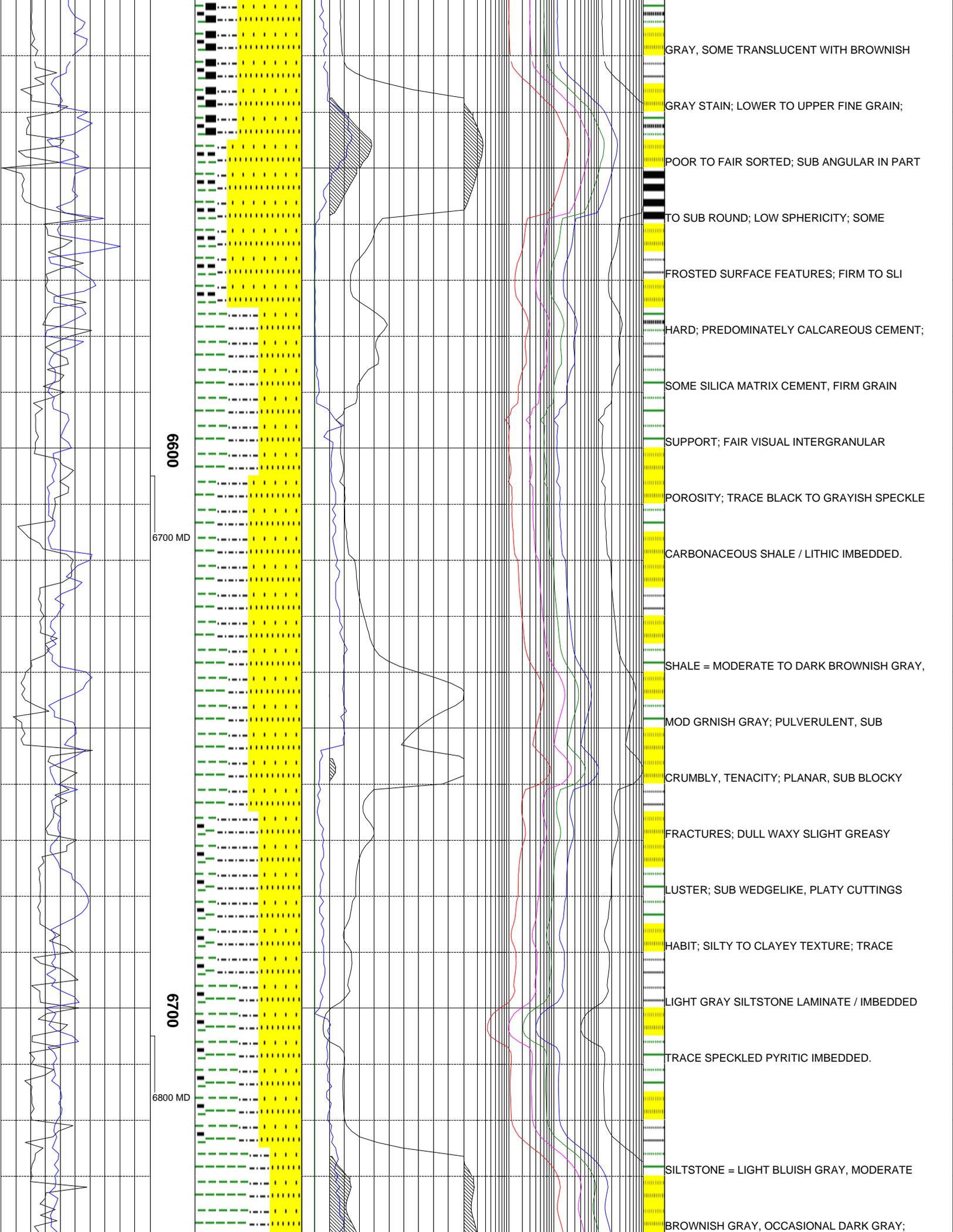
6500

6600 MD

CALCAREOUS CEMENT; SMALL CONSOLIDATED
 CLUSTERS; POOR INTERGRANULAR POROSITY;
 SOME MODERATE GRAY TO BLACK SPECKLED
 LITHIC/CARBONACEOUS SHALE IMBEDDED.
 CARBONACEOUS SHALE = DARK BROWNISH
 BLACK, DUSKY BROWN; CRUNCHY, SEMI
 CRUMBLY TENACITY; SUB BLOCKY, IRREGULAR
 FRACTURE; SUB WEDGELIKE TO TABULAR
 CUTTINGS HABIT; DULL WAXY SLIGHT RES-
 INOUS LUSTER; GRITTY TO CLAYEY TEXTURE;
 TRACE PYRETIC ATTACH/IMBEDDED.
 SILTSTONE = DARK TO MODERATE GRAY, SOME
 LIGHT GRAY; CRUNCHY TO SLIGHT CRUMBLY
 TENACITY; SUB BLOCKY, BLOCKY SLIGHT
 IRREGULAR FRACTURE; GRITTY TO SILTY TEXT
 URE; SUB PLATY CUTTINGS HABIT; DULL
 SLIGHT WAXY LUSTER; TRACES VERY FINE
 SANDSTONE IMBEDDED.
 SANDSTONE = GRAY, LIGHT GRAY, MODERATE

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

ROP
 Avg WOB



6600
6700 MD

6700
6800 MD

GRAY, SOME TRANSLUCENT WITH BROWNISH

GRAY STAIN; LOWER TO UPPER FINE GRAIN;

POOR TO FAIR SORTED; SUB ANGULAR IN PART

TO SUB ROUND; LOW SPHERICITY; SOME

FROSTED SURFACE FEATURES; FIRM TO SLI

HARD; PREDOMINATELY CALCAREOUS CEMENT;

SOME SILICA MATRIX CEMENT, FIRM GRAIN

SUPPORT; FAIR VISUAL INTERGRANULAR

POROSITY; TRACE BLACK TO GRAYISH SPECKLE

CARBONACEOUS SHALE / LITHIC IMBEDDED.

SHALE = MODERATE TO DARK BROWNISH GRAY,

MOD GRNISH GRAY; PULVERULENT, SUB

CRUMBLY, TENACITY; PLANAR, SUB BLOCKY

FRACTURES; DULL WAXY SLIGHT GREASY

LUSTER; SUB WEDGELIKE, PLATY CUTTINGS

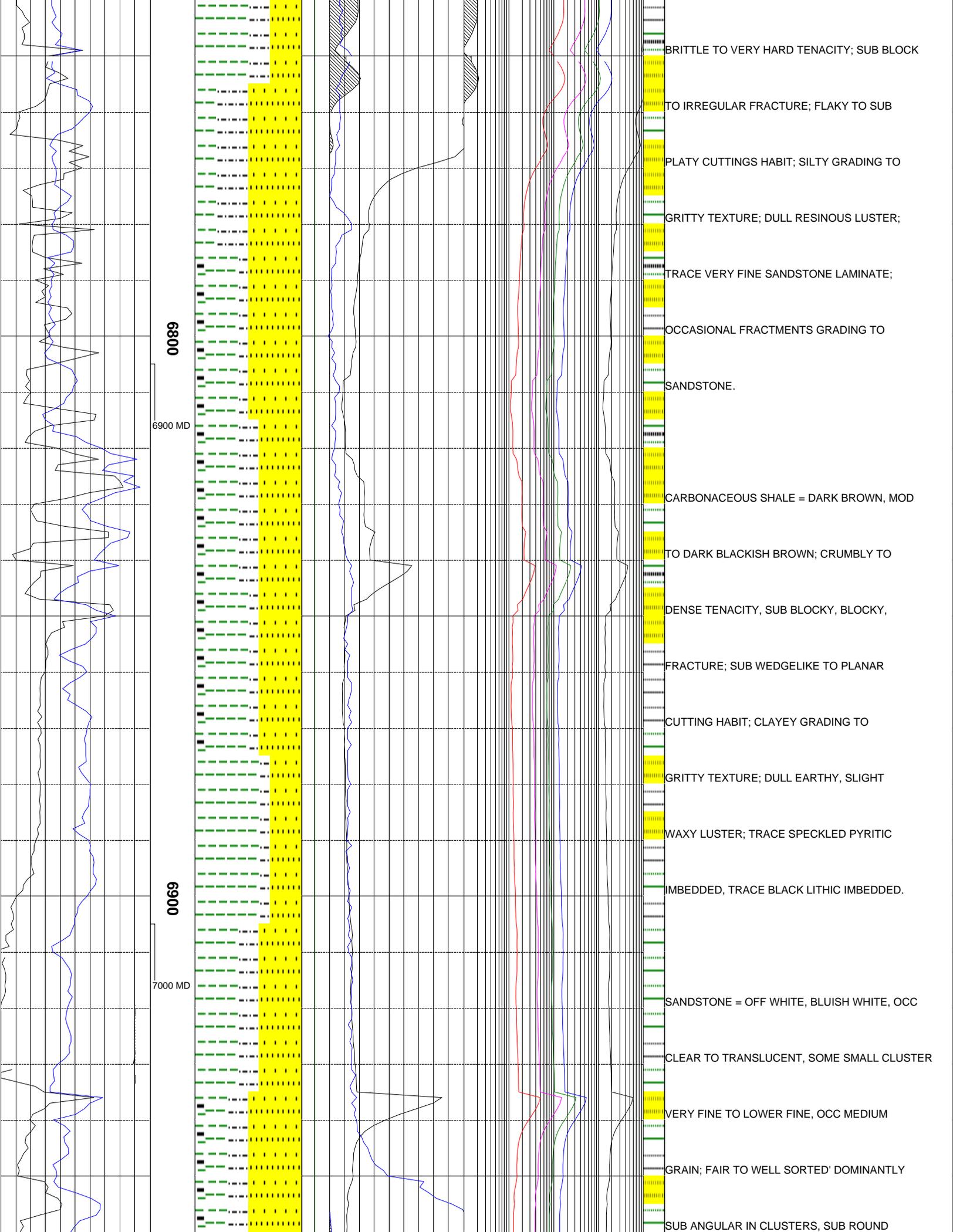
HABIT; SILTY TO CLAYEY TEXTURE; TRACE

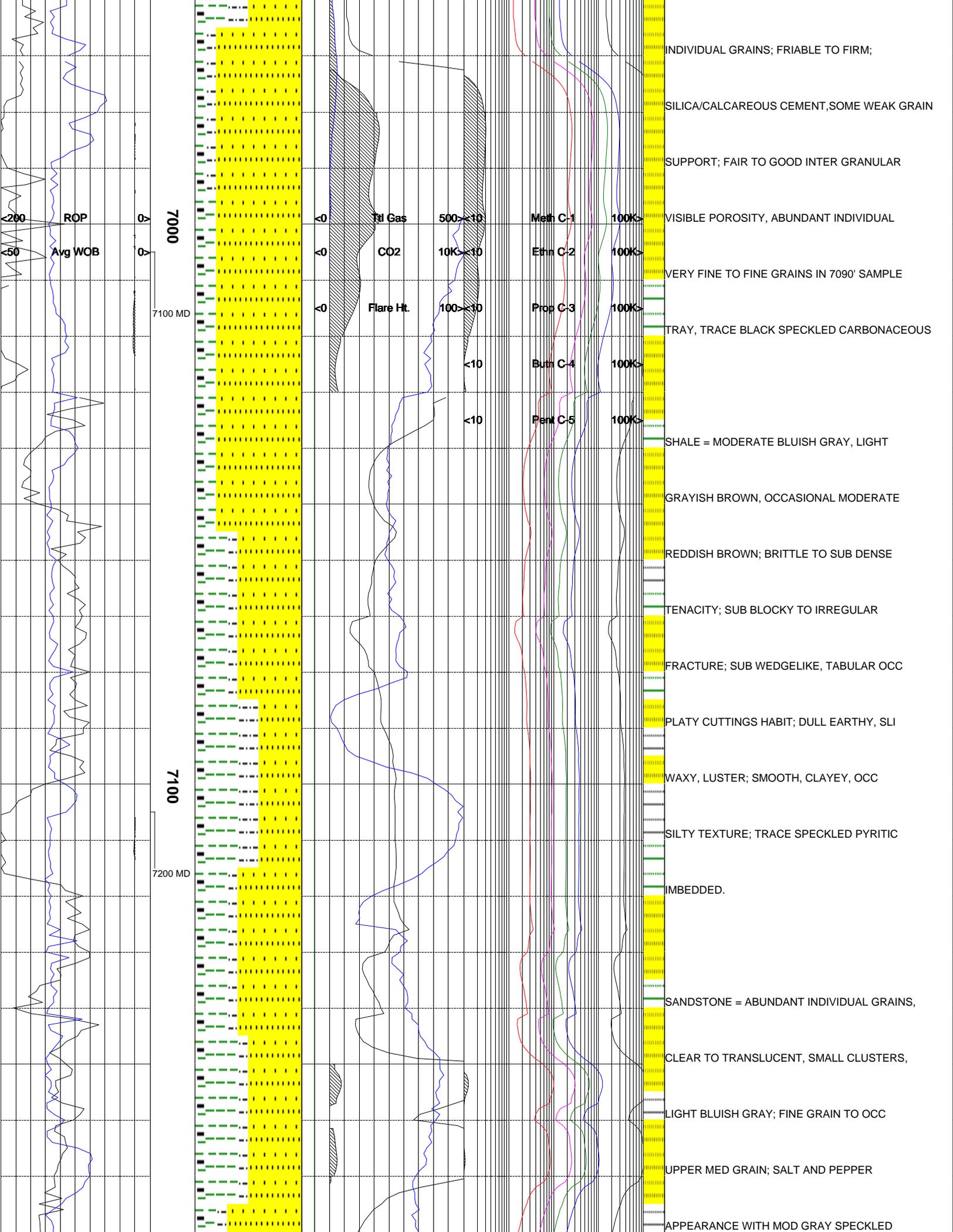
LIGHT GRAY SILTSTONE LAMINATE / IMBEDDED

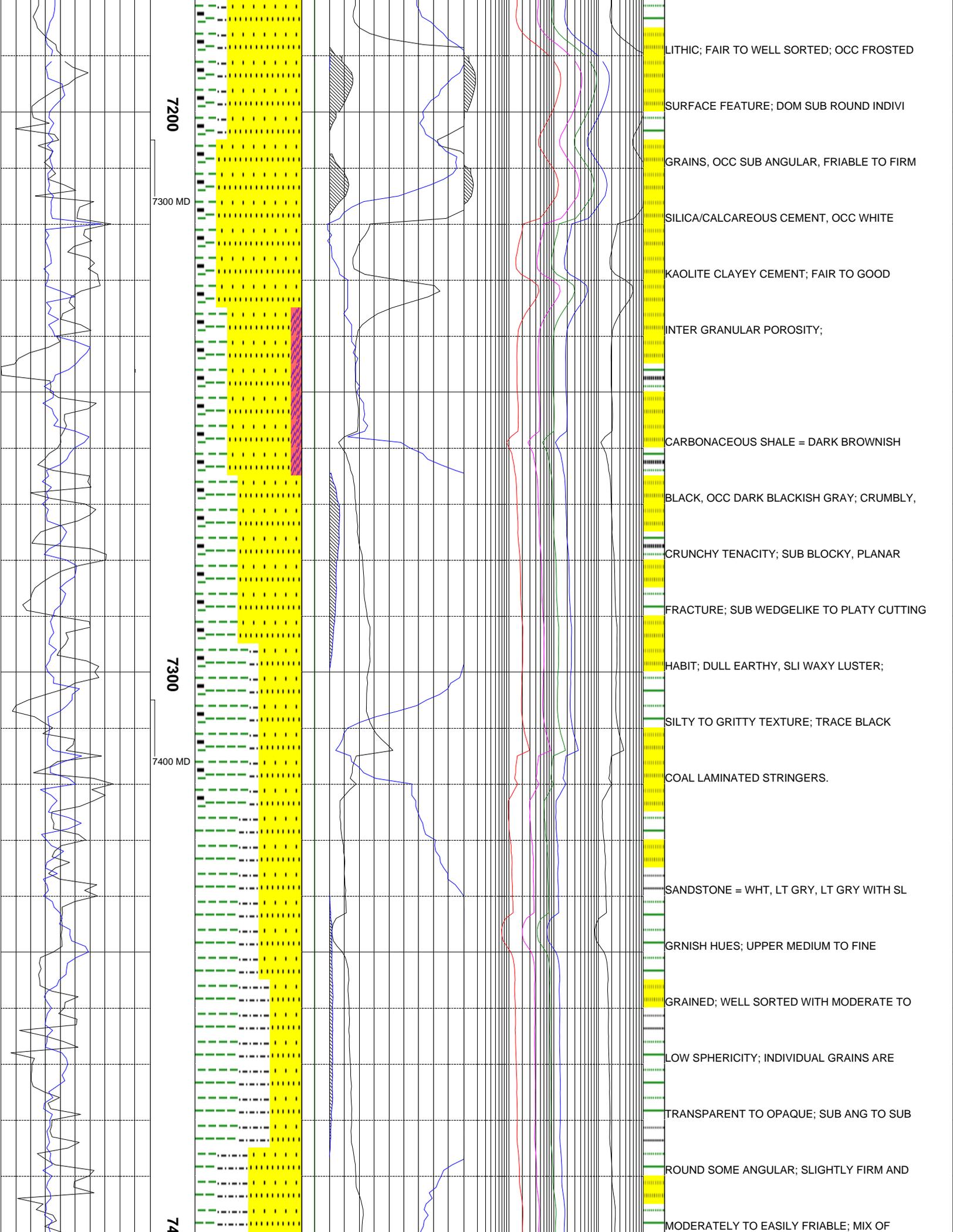
TRACE SPECKLED PYRITIC IMBEDDED.

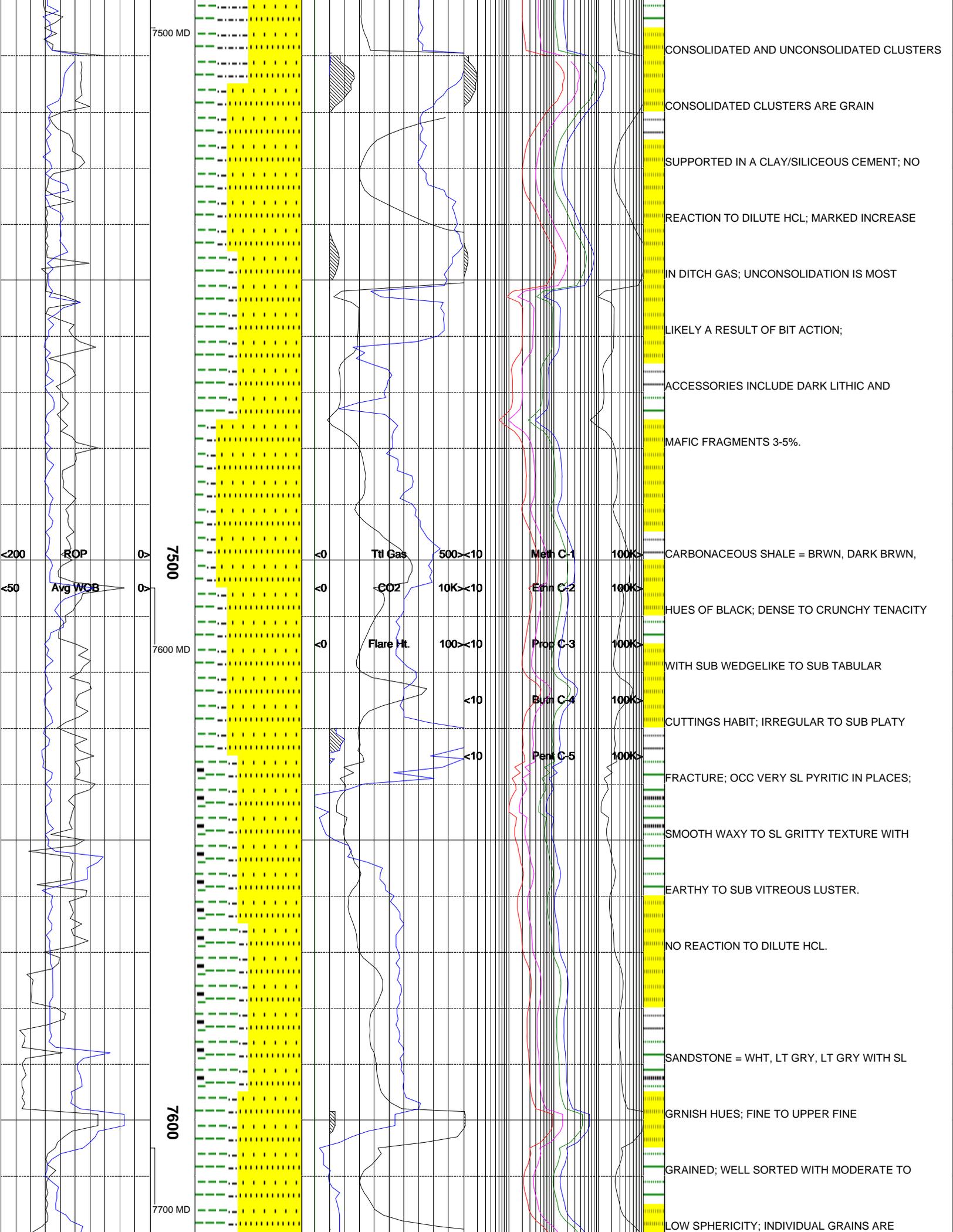
SILTSTONE = LIGHT BLUISH GRAY, MODERATE

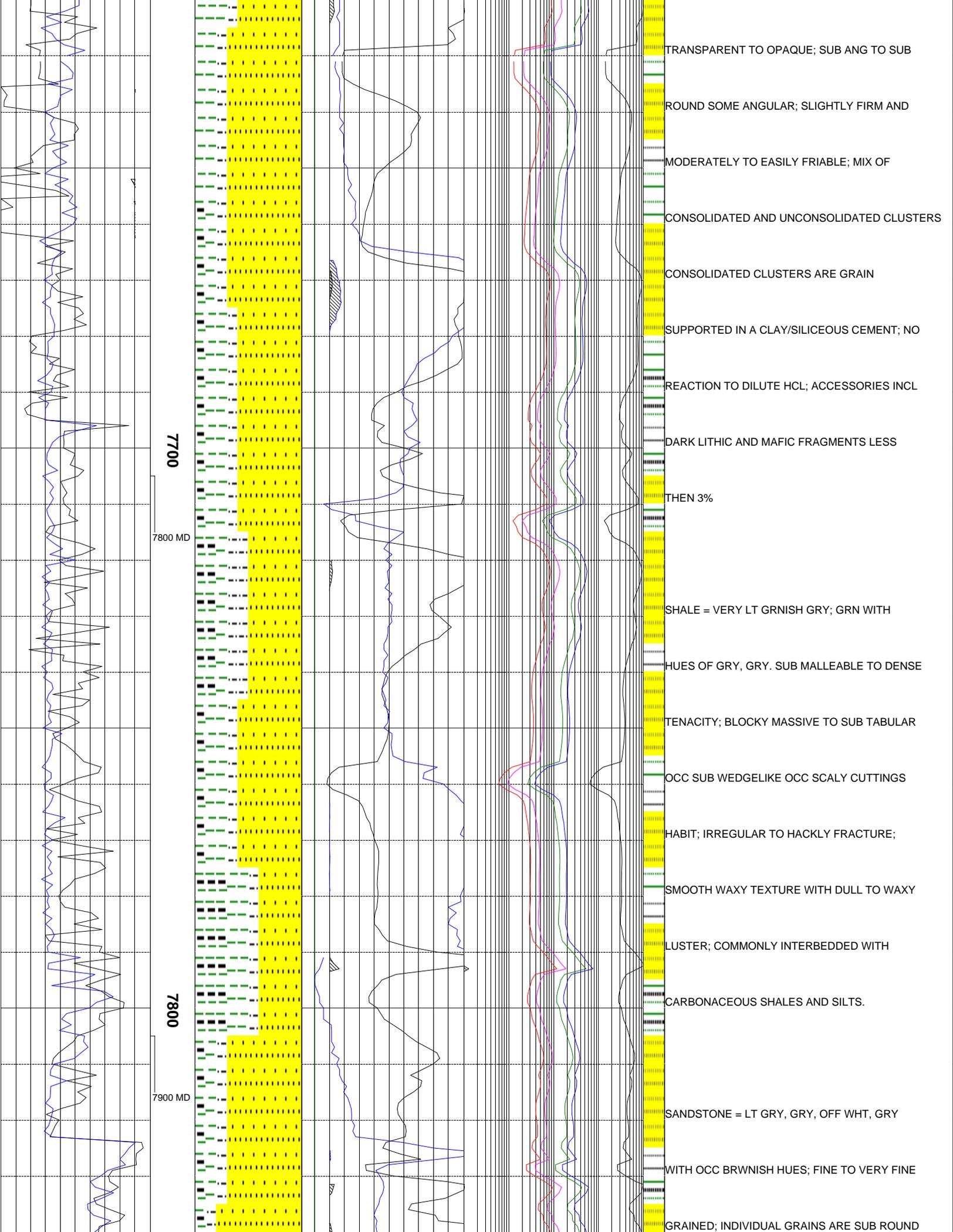
BROWNISH GRAY, OCCASIONAL DARK GRAY;











7700

7800 MD

7800

7900 MD

TRANSPARENT TO OPAQUE; SUB ANG TO SUB

ROUND SOME ANGULAR; SLIGHTLY FIRM AND

MODERATELY TO EASILY FRIABLE; MIX OF

CONSOLIDATED AND UNCONSOLIDATED CLUSTERS

CONSOLIDATED CLUSTERS ARE GRAIN

SUPPORTED IN A CLAY/SILICEOUS CEMENT; NO

REACTION TO DILUTE HCL; ACCESSORIES INCL

DARK LITHIC AND MAFIC FRAGMENTS LESS

THEN 3%

SHALE = VERY LT GRNISH GRY; GRN WITH

HUES OF GRY, GRY. SUB MALLEABLE TO DENSE

TENACITY; BLOCKY MASSIVE TO SUB TABULAR

OCC SUB WEDGELIKE OCC SCALY CUTTINGS

HABIT; IRREGULAR TO HACKLY FRACTURE;

SMOOTH WAXY TEXTURE WITH DULL TO WAXY

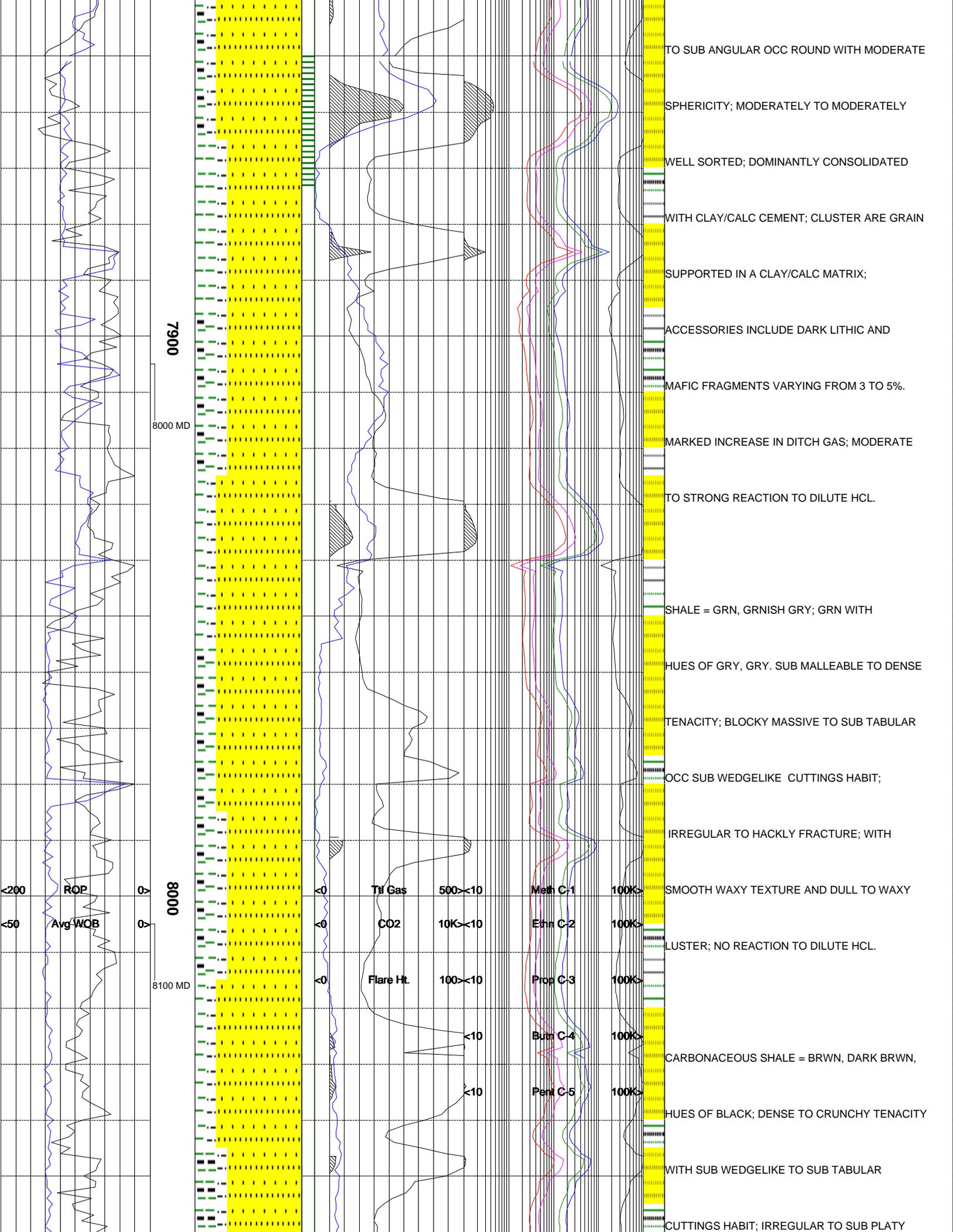
LUSTER; COMMONLY INTERBEDDED WITH

CARBONACEOUS SHALES AND SILTS.

SANDSTONE = LT GRY, GRY, OFF WHT, GRY

WITH OCC BRWNISH HUES; FINE TO VERY FINE

GRAINED; INDIVIDUAL GRAINS ARE SUB ROUND



7900

8000 MD

8000

8100 MD

<200 ROP

<50 Avg WOB

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

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

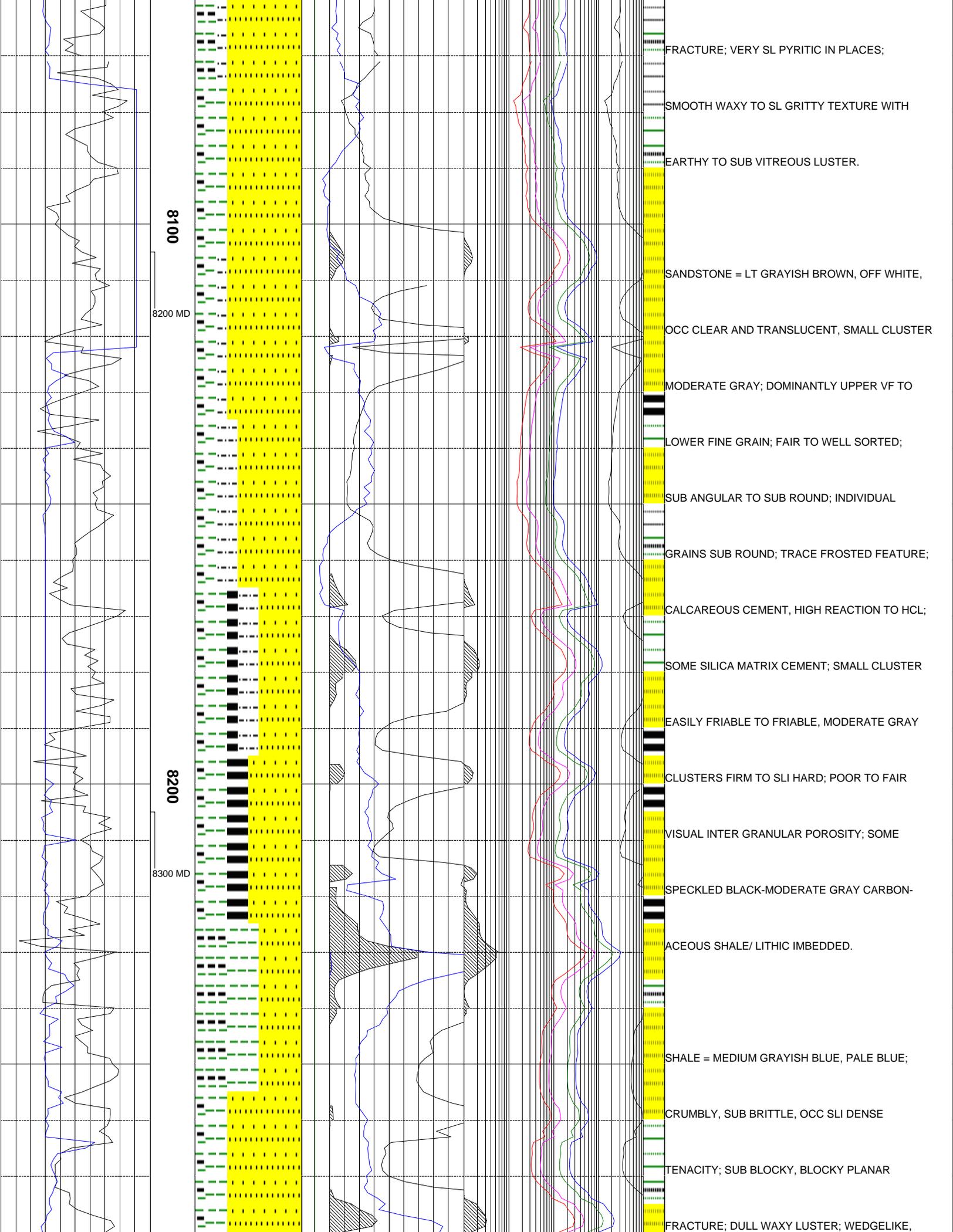
Flare Ht. 100 <10 Prop C-3 100K >

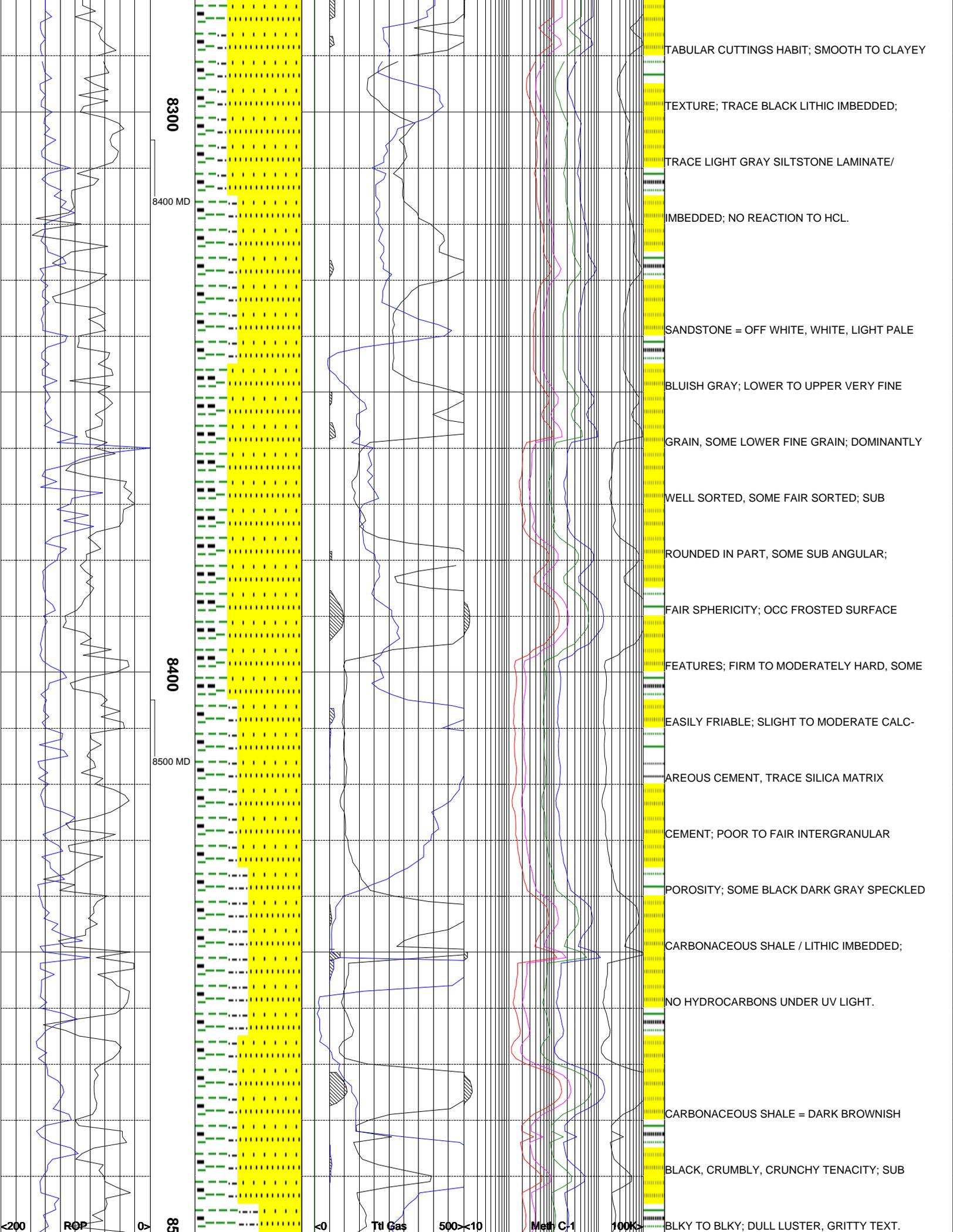
Butn C-4 100K >

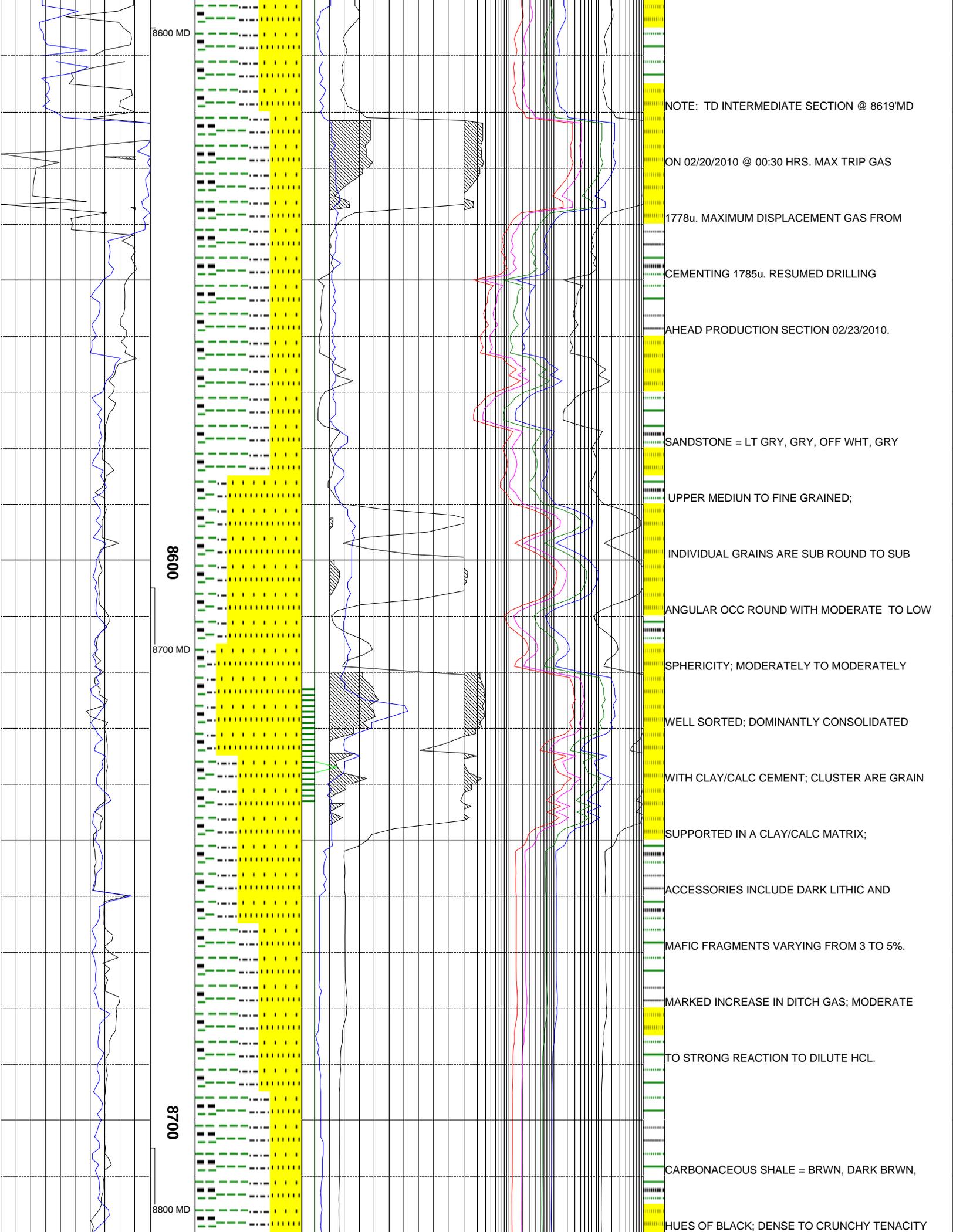
Pent C-5 100K >

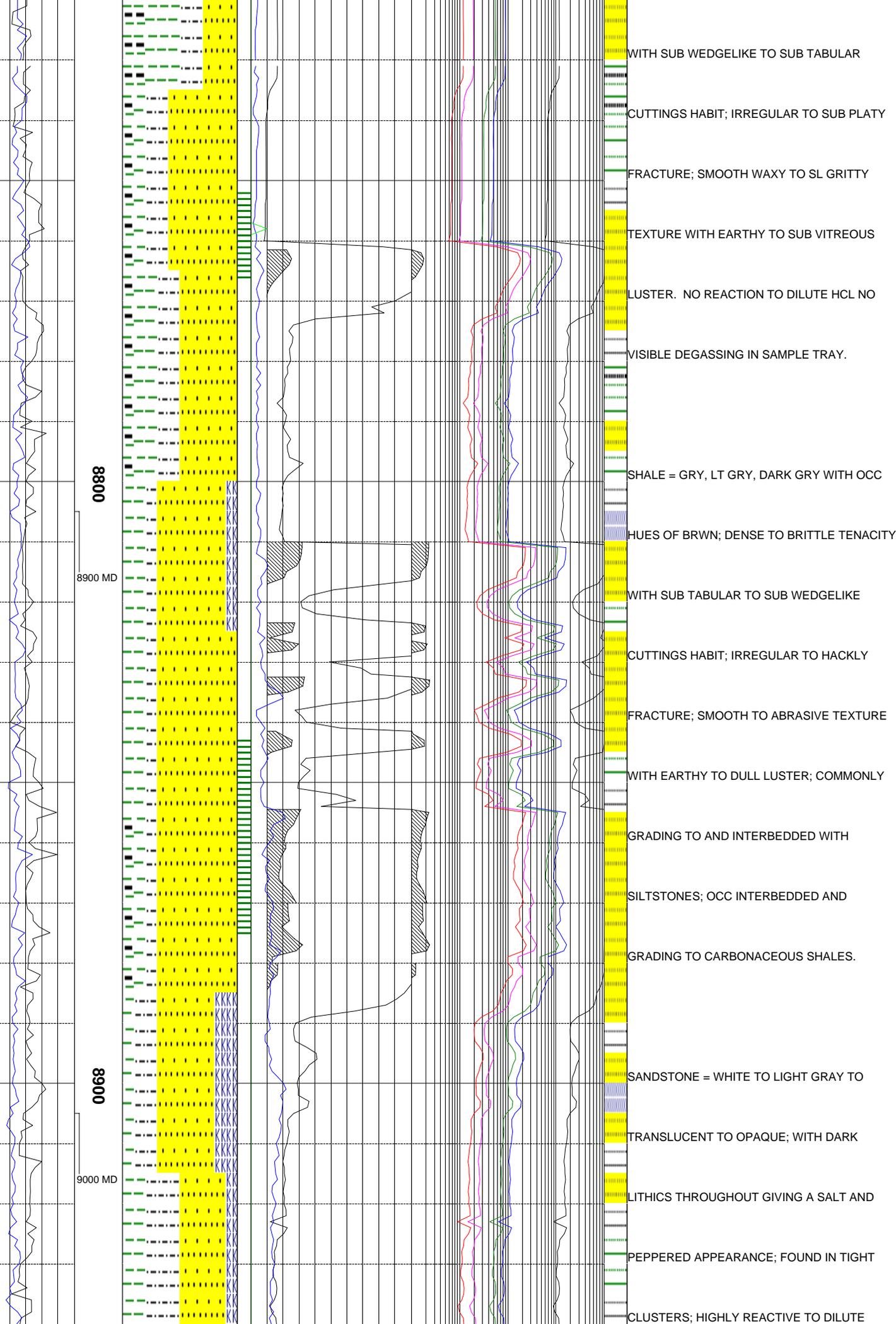
<10

<10









WITH SUB WEDGELIKE TO SUB TABULAR

CUTTINGS HABIT; IRREGULAR TO SUB PLATY

FRACTURE; SMOOTH WAXY TO SL GRITTY

TEXTURE WITH EARTHY TO SUB VITREOUS

LUSTER. NO REACTION TO DILUTE HCL NO

VISIBLE DEGASSING IN SAMPLE TRAY.

SHALE = GRY, LT GRY, DARK GRY WITH OCC

HUES OF BRWN; DENSE TO BRITTLE TENACITY

WITH SUB TABULAR TO SUB WEDGELIKE

CUTTINGS HABIT; IRREGULAR TO HACKLY

FRACTURE; SMOOTH TO ABRASIVE TEXTURE

WITH EARTHY TO DULL LUSTER; COMMONLY

GRADING TO AND INTERBEDDED WITH SILTSTONES; OCC INTERBEDDED AND GRADING TO CARBONACEOUS SHALES.

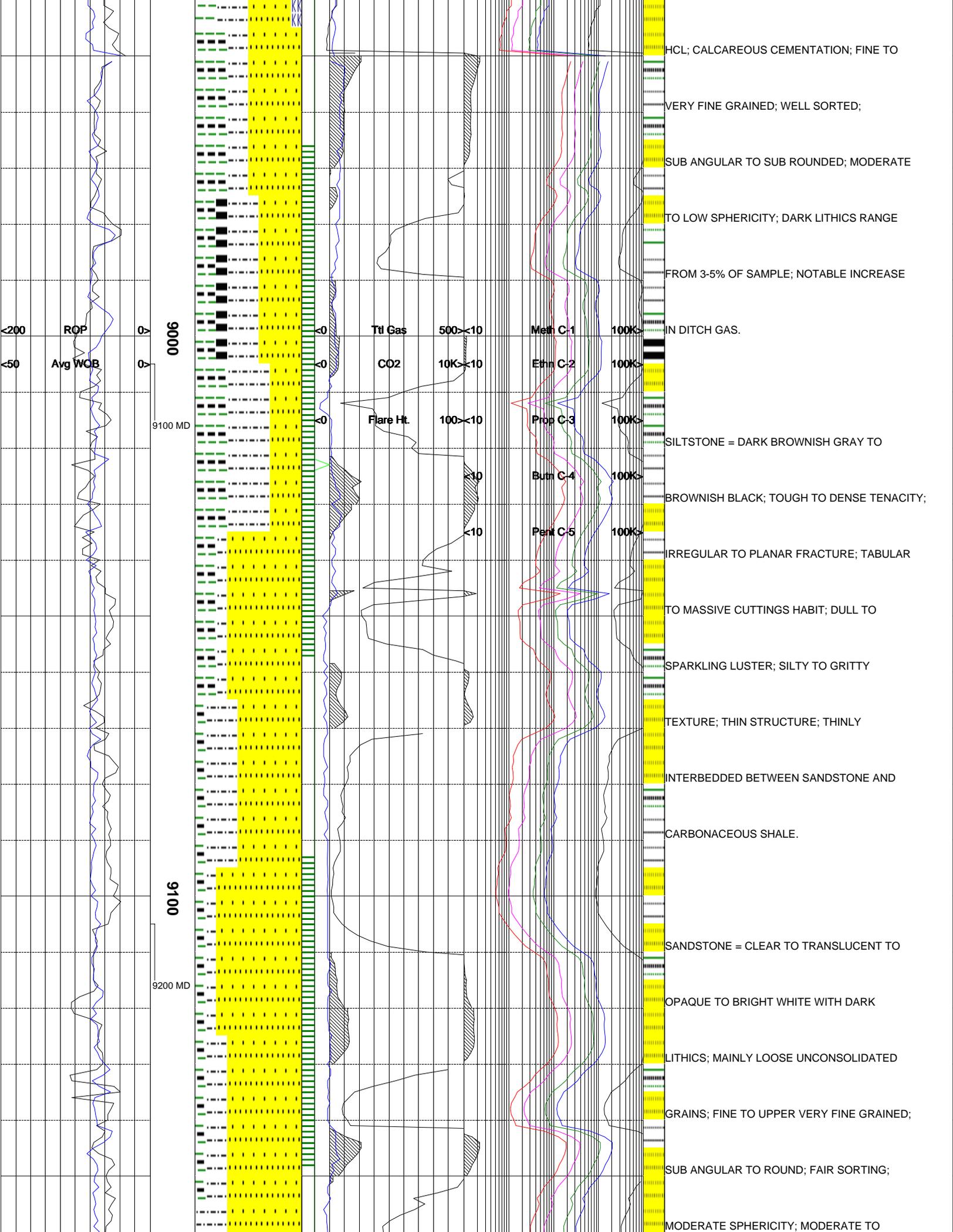
SANDSTONE = WHITE TO LIGHT GRAY TO TRANSLUCENT TO OPAQUE; WITH DARK LITHICS THROUGHOUT GIVING A SALT AND PEPPERED APPEARANCE; FOUND IN TIGHT CLUSTERS; HIGHLY REACTIVE TO DILUTE

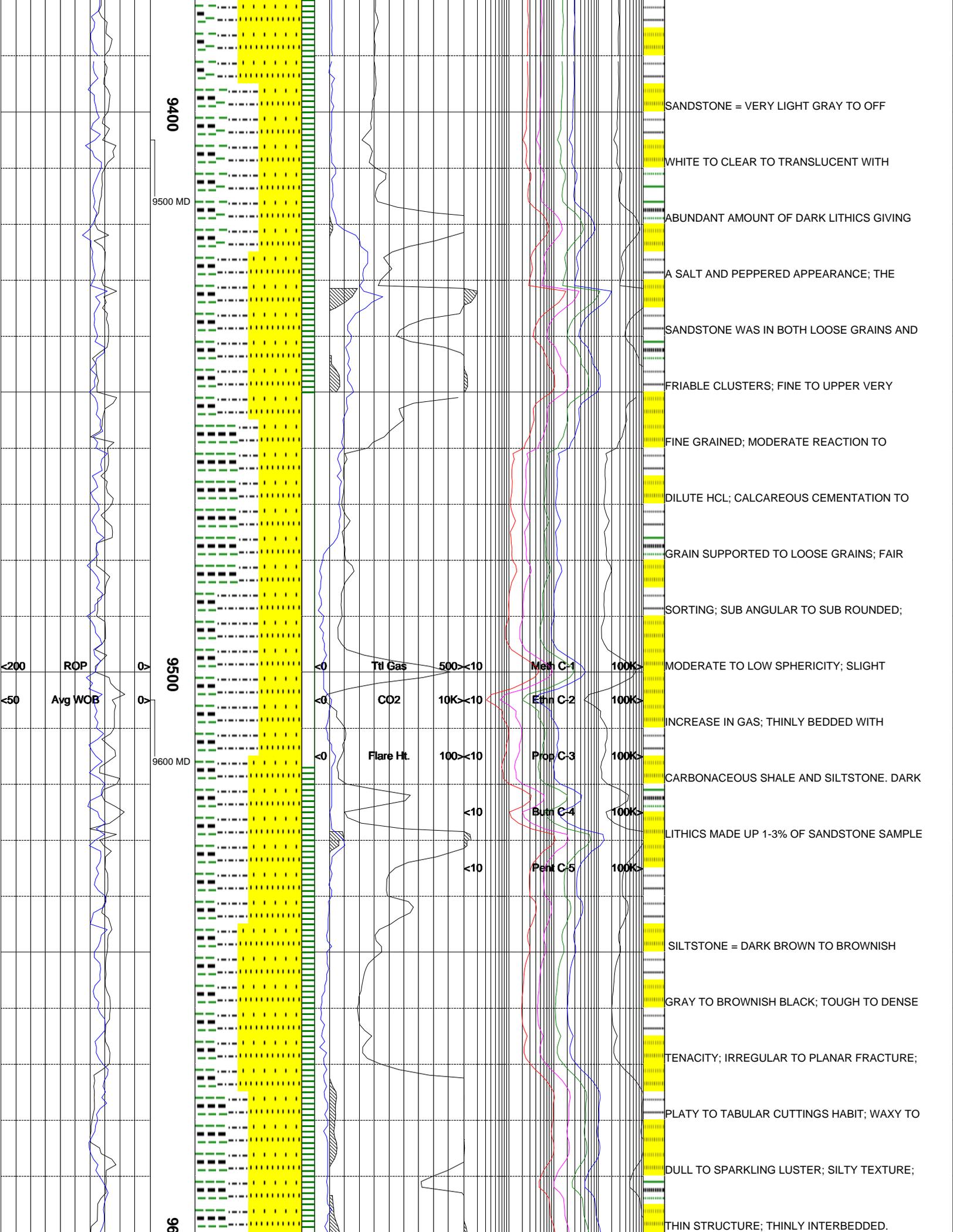
0088

8900 MD

0068

9000 MD





9700 MD

9700

9800 MD

9800

9900 MD

SILTSTONE = DARK BROWN TO BROWNISH

BLACK; TOUGH TO DENSE TENACITY;

MASSIVE TO SUB TABULAR CUTTINGS HABIT;

IRREGULAR TO OCC HACKLY FRACTURE; EARTHY

TO SPARKLY LUSTER; GRITTY/SILTY TEXTURE;

COMMONLY INTERBEDDED WITH SHALE AND

CARBONACEOUS SHALE; GRADES TO AND

INTERBEDDED WITH SHALE AND SANDSTONES.

CARBONACEOUS SHALE = BRWN, DARK BRWN,

HUES OF BLACK; DENSE TO CRUNCHY TENACITY

WITH SUB WEDGELIKE TO SUB TABULAR

CUTTINGS HABIT; IRREGULAR TO SUB PLATY

FRACTURE; SMOOTH WAXY TO SL GRITTY

TEXTURE WITH EARTHY TO SUB VITREOUS

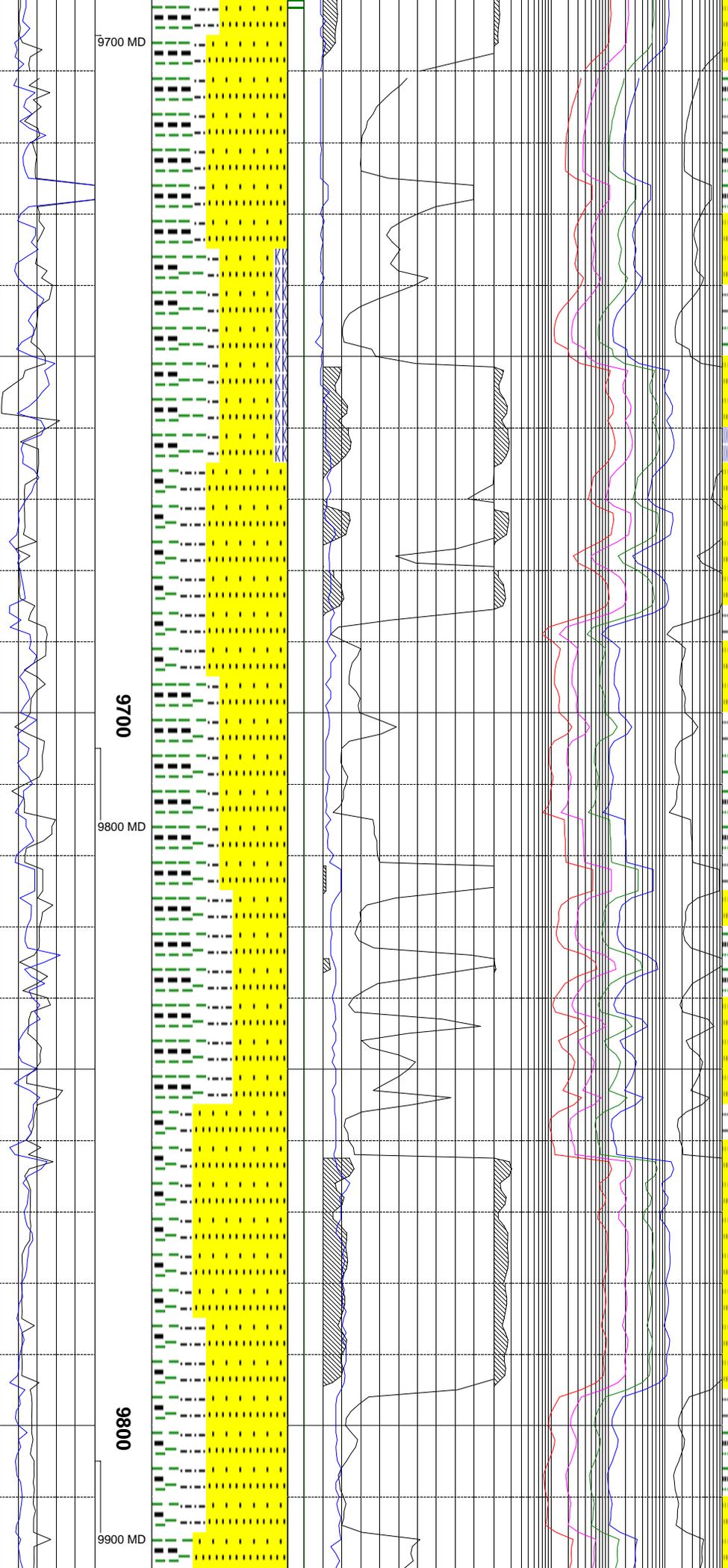
LUSTER. NO REACTION TO DILUTE HCL NO

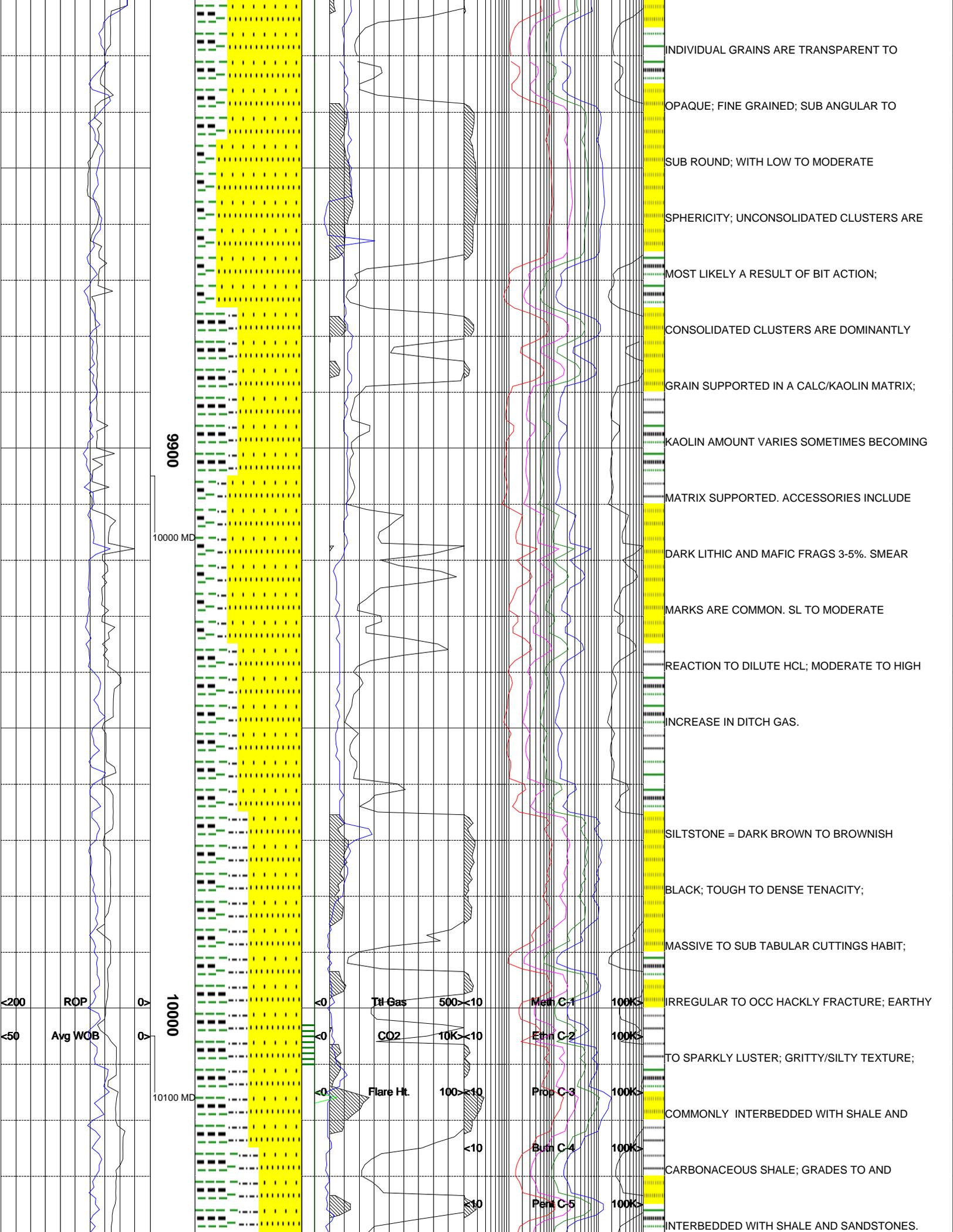
VISIBLE DEGASSING IN SAMPLE TRAY.

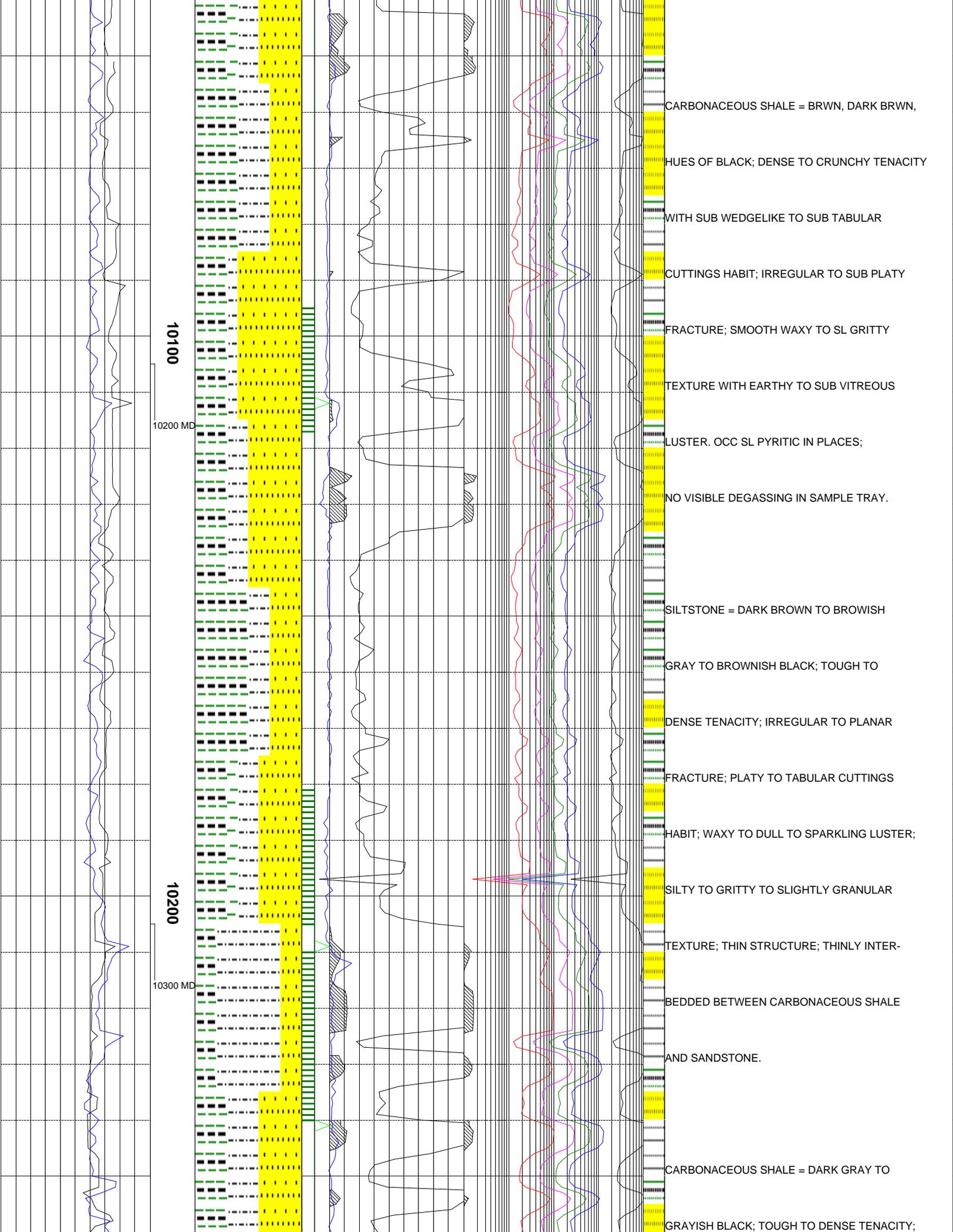
SANDSTONE = LT GRAYISH BRWN, LT GRY, GRY

WITH HUES OF WHT; MODERATELY TO EASILY

FRIABLE; APPEARS SL DIRTY IN PLACES;







10100

10200 MD

10200

10300 MD

CARBONACEOUS SHALE = BRWN, DARK BRWN,

HUES OF BLACK; DENSE TO CRUNCHY TENACITY

WITH SUB WEDGELIKE TO SUB TABULAR

CUTTINGS HABIT; IRREGULAR TO SUB PLATY

FRACTURE; SMOOTH WAXY TO SL GRITTY

TEXTURE WITH EARTHY TO SUB VITREOUS

LUSTER. OCC SL PYRITIC IN PLACES;

NO VISIBLE DEGASSING IN SAMPLE TRAY.

SILTSTONE = DARK BROWN TO BROWISH

GRAY TO BROWNISH BLACK; TOUGH TO

DENSE TENACITY; IRREGULAR TO PLANAR

FRACTURE; PLATY TO TABULAR CUTTINGS

HABIT; WAXY TO DULL TO SPARKLING LUSTER;

SILTY TO GRITTY TO SLIGHTLY GRANULAR

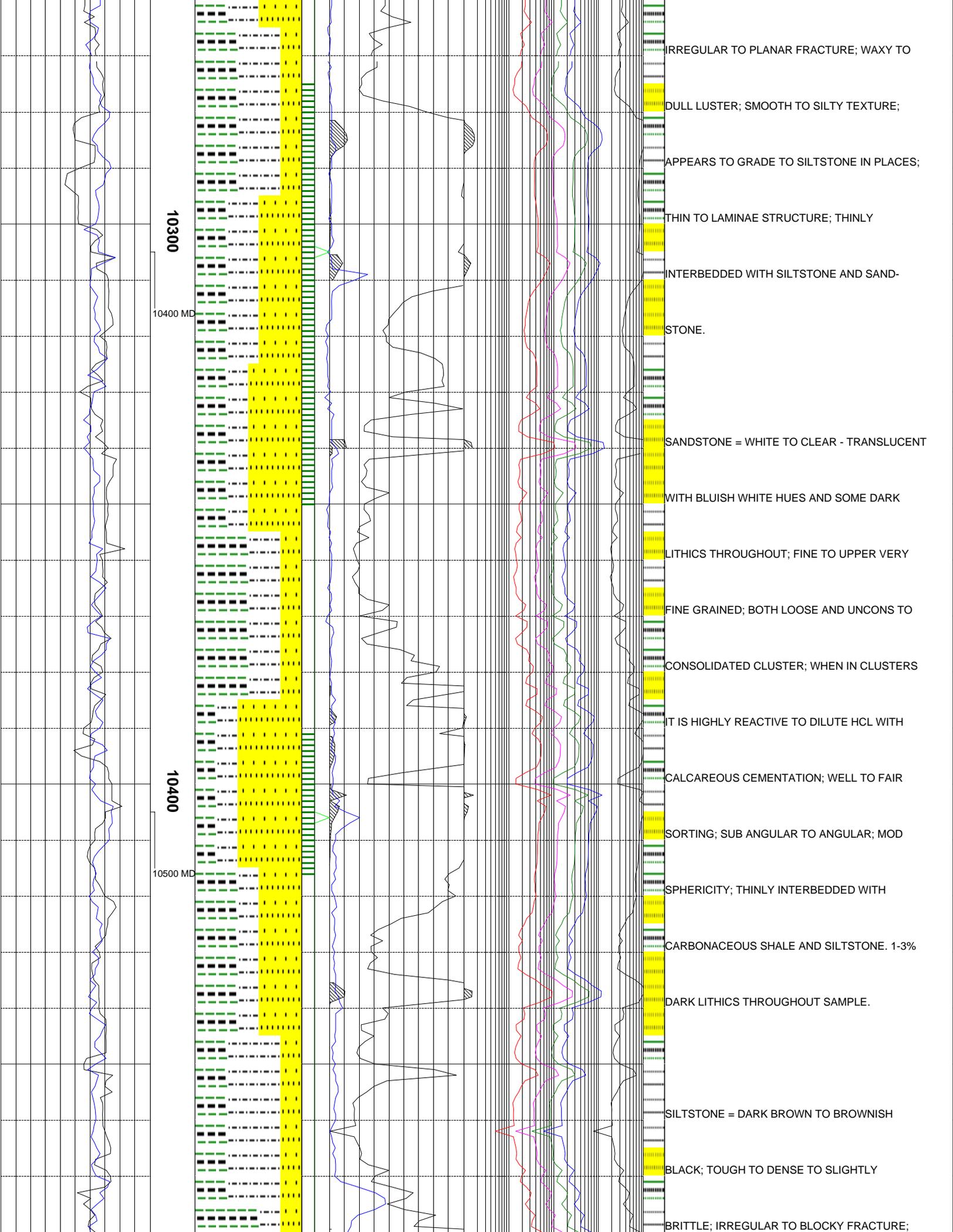
TEXTURE; THIN STRUCTURE; THINLY INTER-

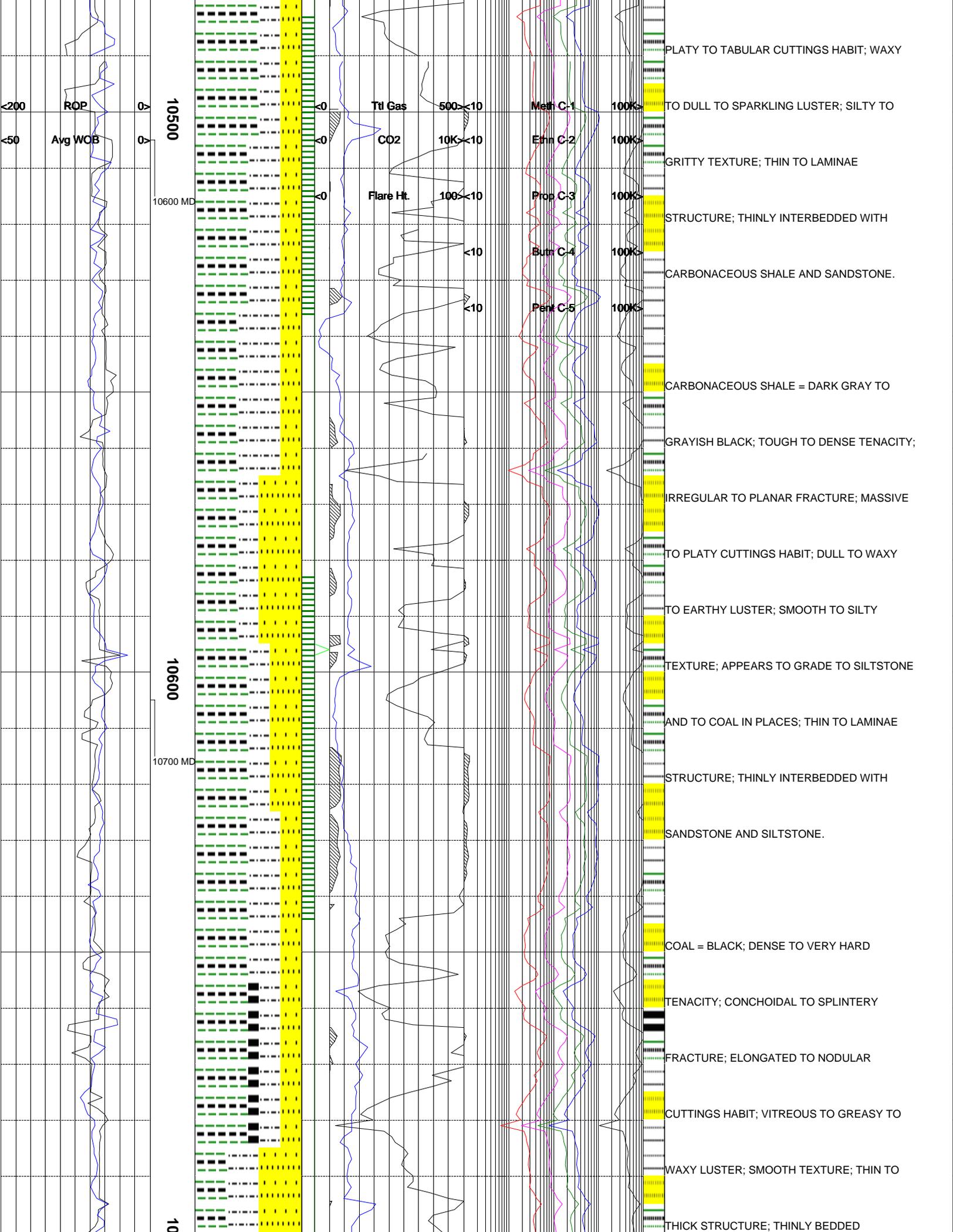
BEDDED BETWEEN CARBONACEOUS SHALE

AND SANDSTONE.

CARBONACEOUS SHALE = DARK GRAY TO

GRAYISH BLACK; TOUGH TO DENSE TENACITY;





PLATY TO TABULAR CUTTINGS HABIT; WAXY

TO DULL TO SPARKLING LUSTER; SILTY TO

GRITTY TEXTURE; THIN TO LAMINAE

STRUCTURE; THINLY INTERBEDDED WITH

CARBONACEOUS SHALE AND SANDSTONE.

CARBONACEOUS SHALE = DARK GRAY TO

GRAYISH BLACK; TOUGH TO DENSE TENACITY;

IRREGULAR TO PLANAR FRACTURE; MASSIVE

TO PLATY CUTTINGS HABIT; DULL TO WAXY

TO EARTHY LUSTER; SMOOTH TO SILTY

TEXTURE; APPEARS TO GRADE TO SILTSTONE

AND TO COAL IN PLACES; THIN TO LAMINAE

STRUCTURE; THINLY INTERBEDDED WITH

SANDSTONE AND SILTSTONE.

COAL = BLACK; DENSE TO VERY HARD

TENACITY; CONCHOIDAL TO SPLINTERY

FRACTURE; ELONGATED TO NODULAR

CUTTINGS HABIT; VITREOUS TO GREASY TO

WAXY LUSTER; SMOOTH TEXTURE; THIN TO

THICK STRUCTURE; THINLY BEDDED

10500

10600 MD

10600

10700 MD

10

ROP

Avg WOB

Ttl Gas

CO2

Flare Ht.

Meth C-1

Ethn C-2

Prop C-3

But C-4

Pent C-5

500 < 10

10K < 10

100 < 10

< 10

< 10

100K >

10800 MD

10800

10900 MD

10900

11000 MD

SANDSTONE = WHITE TO YELLOWISH WHITE

TO OPAQUE TO TRANSLUCENT; ABUNDANT

AMOUNT OF DARK LITHICS 5-10%; MAINLY

LOOSE GRAINS SOME SMALL FRIABLE

CLUSTERS WITH CALCAREOUS CEMENT;

MODERATE REACTION TO DILUTE HCL;

FINE TO UPPER VERY FINE GRAINED; FAIR

TO POOR SORTING; SUB ANGULAR TO ANGULAR

TO SUB ROUNDED; MODERATE TO LOW

SPHERICITY; VERY THINLY INTERBEDDED

WITH CARBONACEOUS SHALE AND SILTSTONE.

CARBONACEOUS SHALE = DARK GRAY TO

GRAYISH BLACK TO BLACK; BRITTLE TO DENSE

TENACITY; IRREGULAR TO SPLINTERY

FRACTURE; PLATY TO WEDGELIKE CUTTINGS

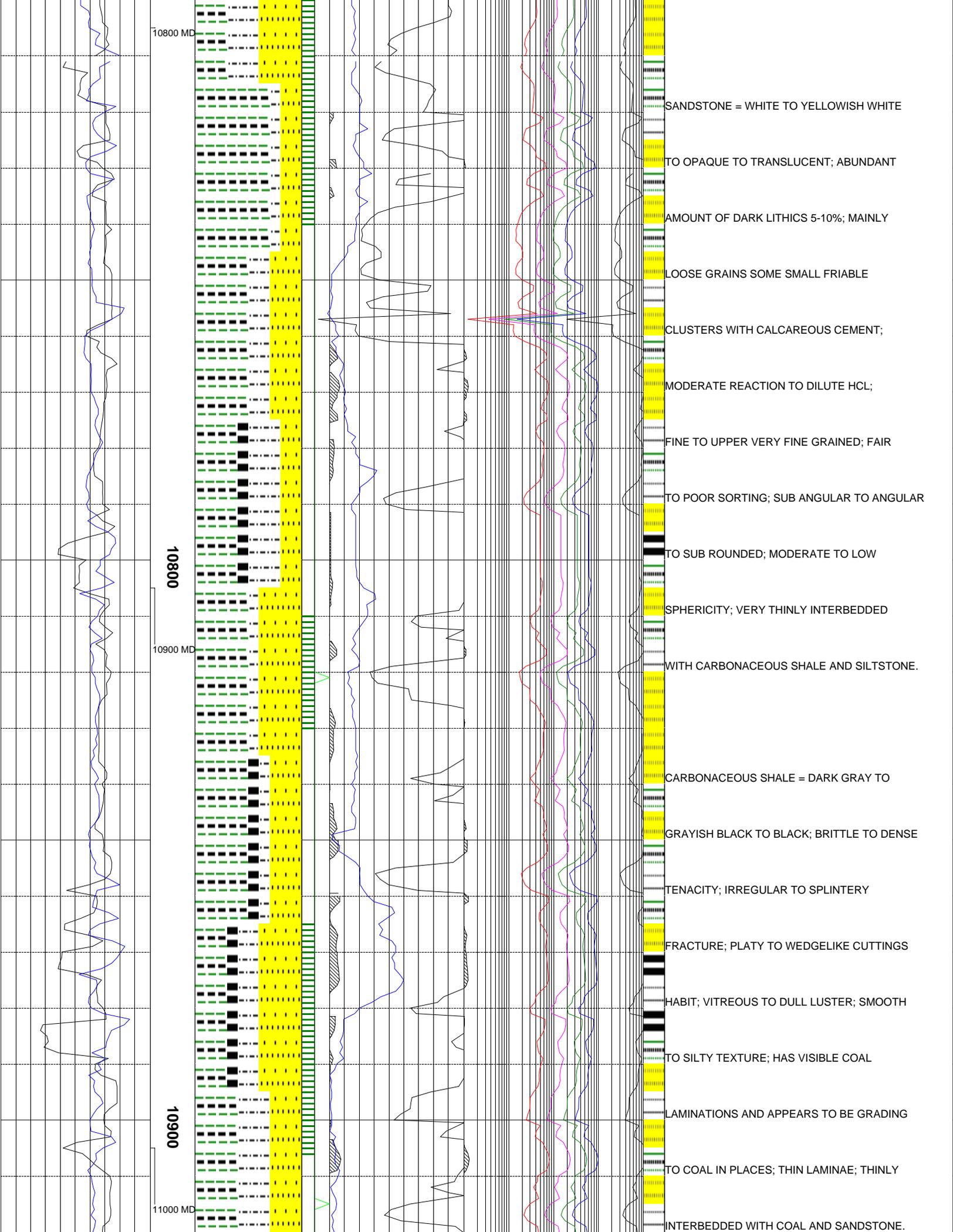
HABIT; VITREOUS TO DULL LUSTER; SMOOTH

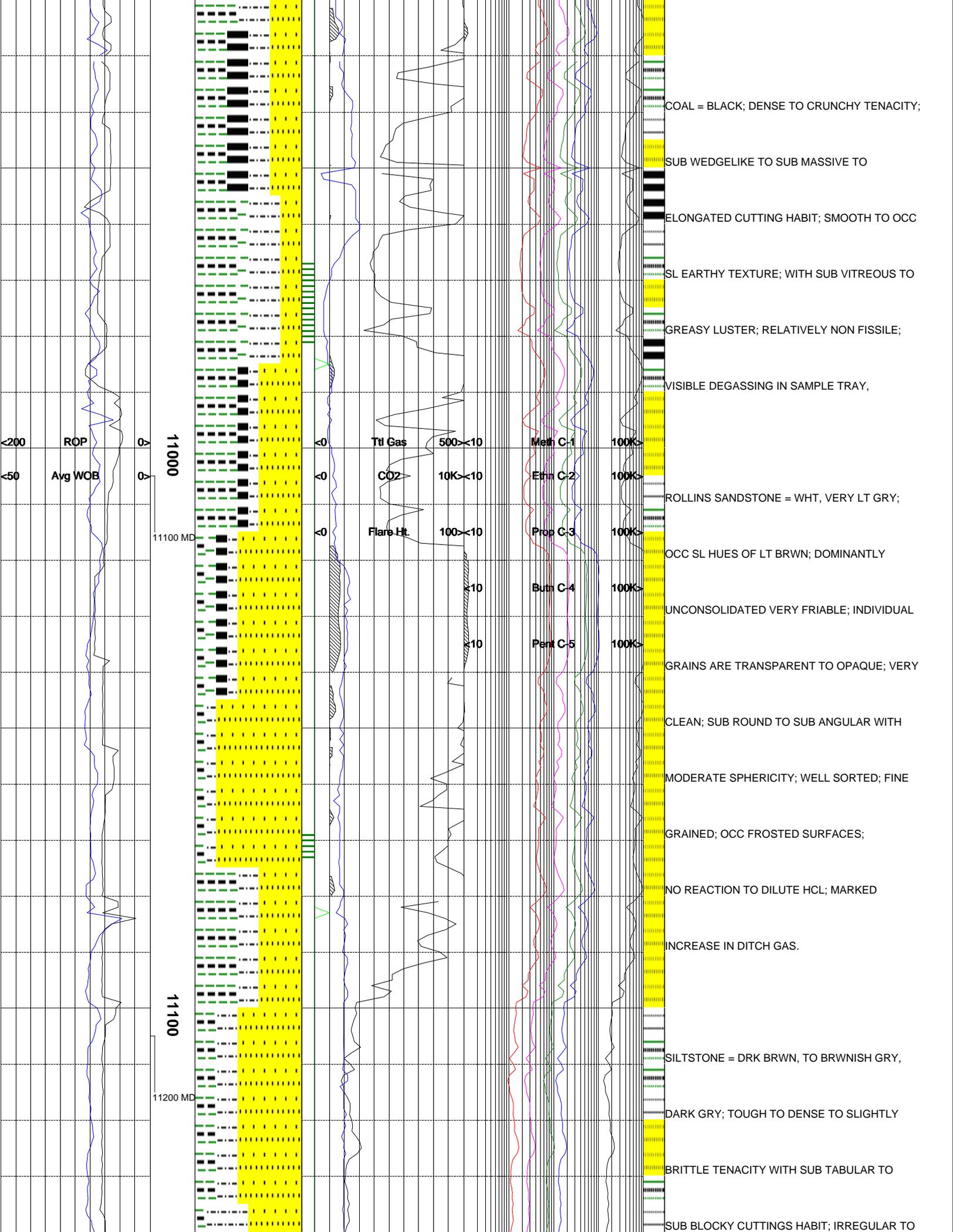
TO SILTY TEXTURE; HAS VISIBLE COAL

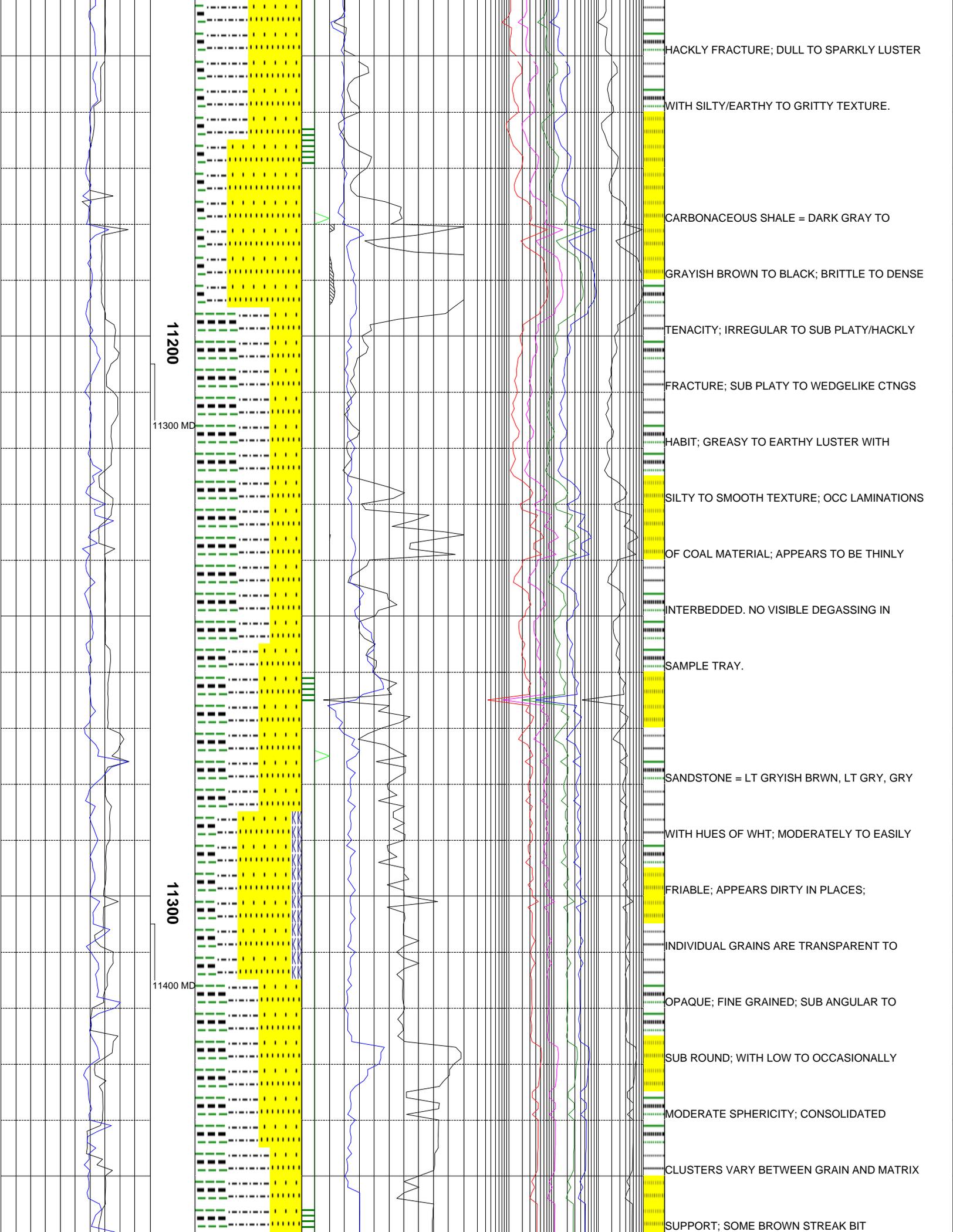
LAMINATIONS AND APPEARS TO BE GRADING

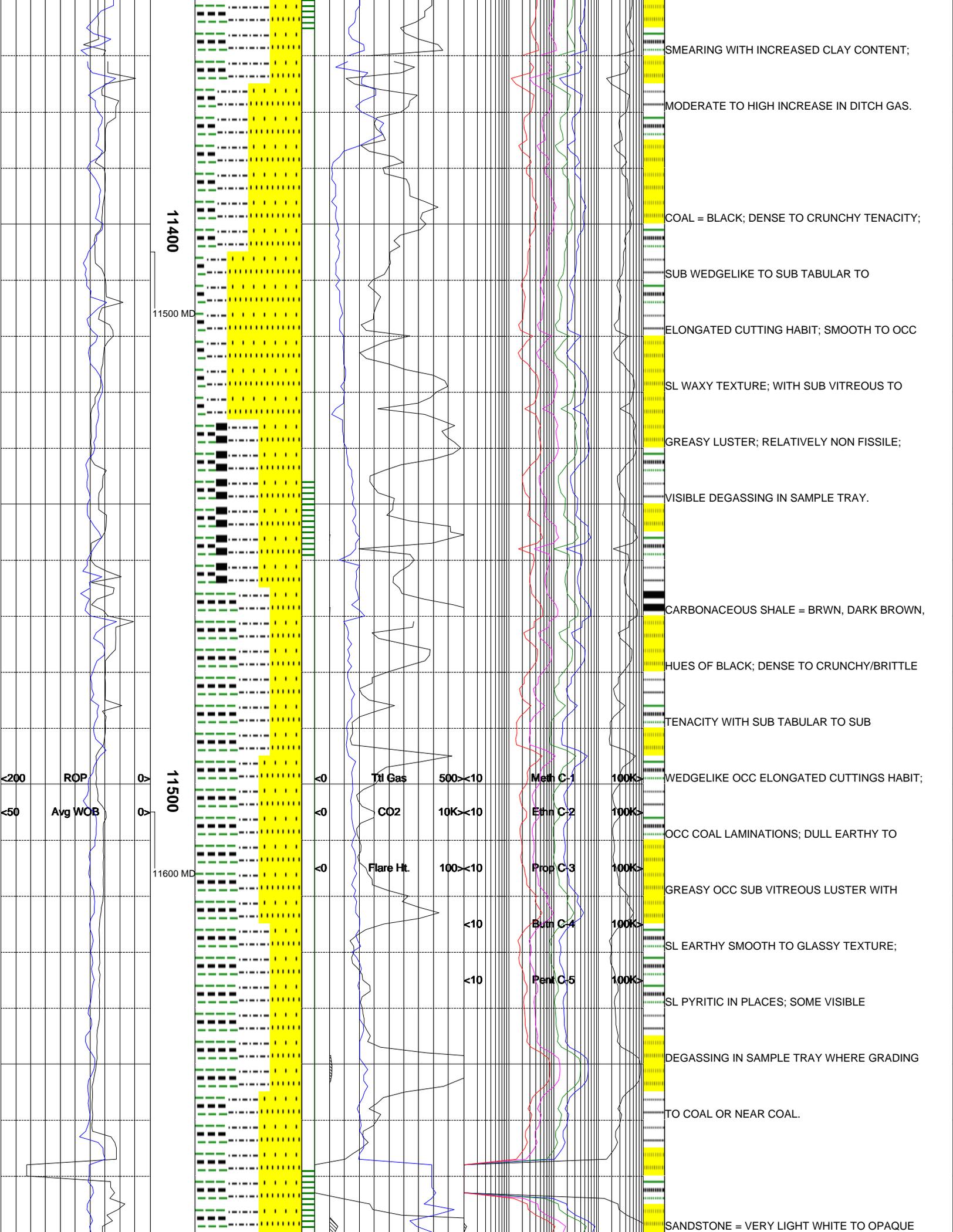
TO COAL IN PLACES; THIN LAMINAE; THINLY

INTERBEDDED WITH COAL AND SANDSTONE.









11400

11500 MD

11500

11600 MD

<200 ROP
<50 Avg WOB

Ttl Gas 500<10
CO2 10K<10
Flare Ht. 100<10
<10
<10

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

SMearing with increased clay content;
MODERATE TO HIGH INCREASE IN DITCH GAS.
COAL = BLACK; DENSE TO CRUNCHY TENACITY;
SUB WEDGELIKE TO SUB TABULAR TO
ELONGATED CUTTING HABIT; SMOOTH TO OCC
SL WAXY TEXTURE; WITH SUB VITREOUS TO
GREASY LUSTER; RELATIVELY NON FISSILE;
VISIBLE DEGASSING IN SAMPLE TRAY.
CARBONACEOUS SHALE = BRWN, DARK BROWN,
HUES OF BLACK; DENSE TO CRUNCHY/BRITTLE
TENACITY WITH SUB TABULAR TO SUB
WEDGELIKE OCC ELONGATED CUTTINGS HABIT;
OCC COAL LAMINATIONS; DULL EARTHY TO
GREASY OCC SUB VITREOUS LUSTER WITH
SL EARTHY SMOOTH TO GLASSY TEXTURE;
SL PYRITIC IN PLACES; SOME VISIBLE
DEGASSING IN SAMPLE TRAY WHERE GRADING
TO COAL OR NEAR COAL.
SANDSTONE = VERY LIGHT WHITE TO OPAQUE

11600

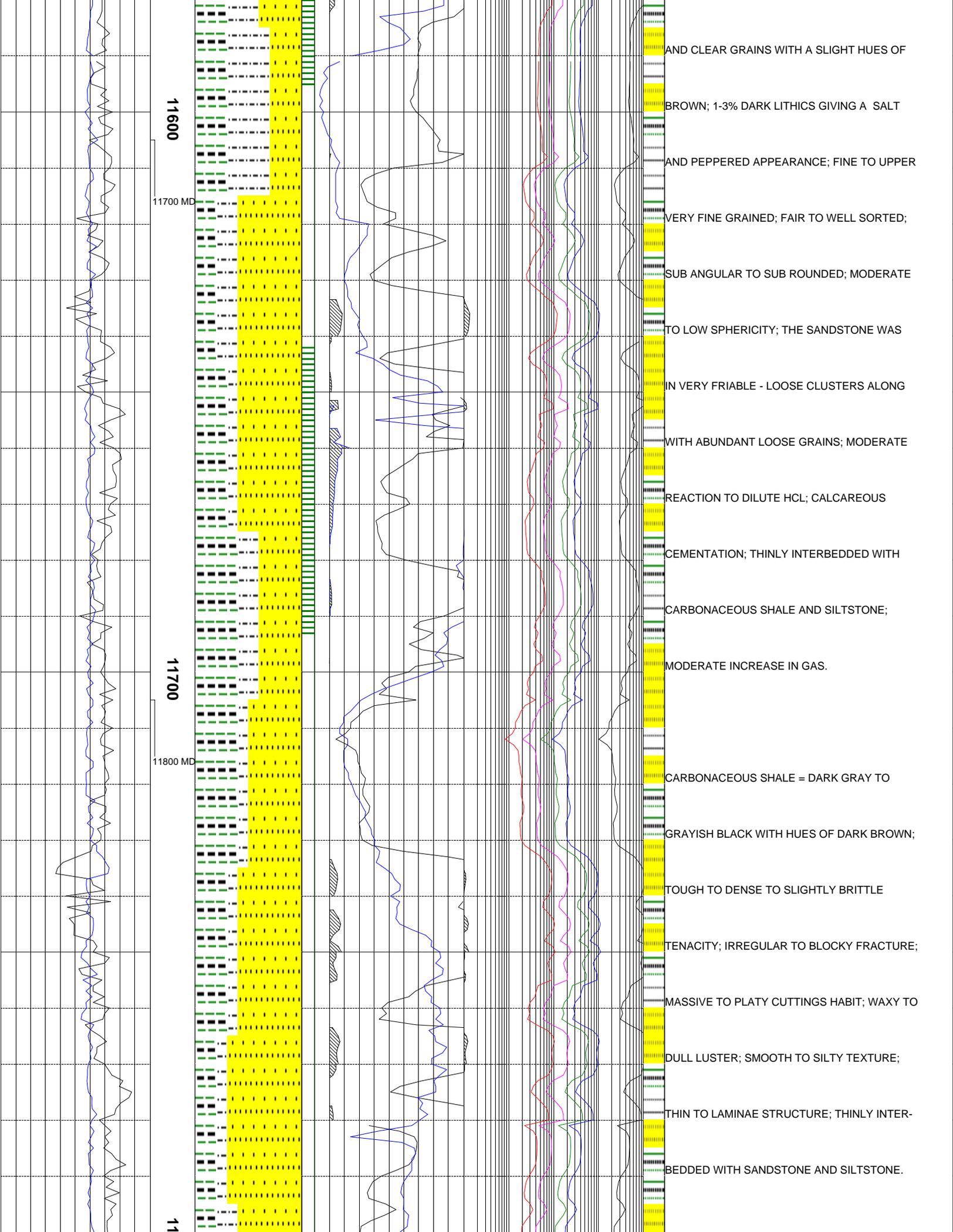
11700 MD

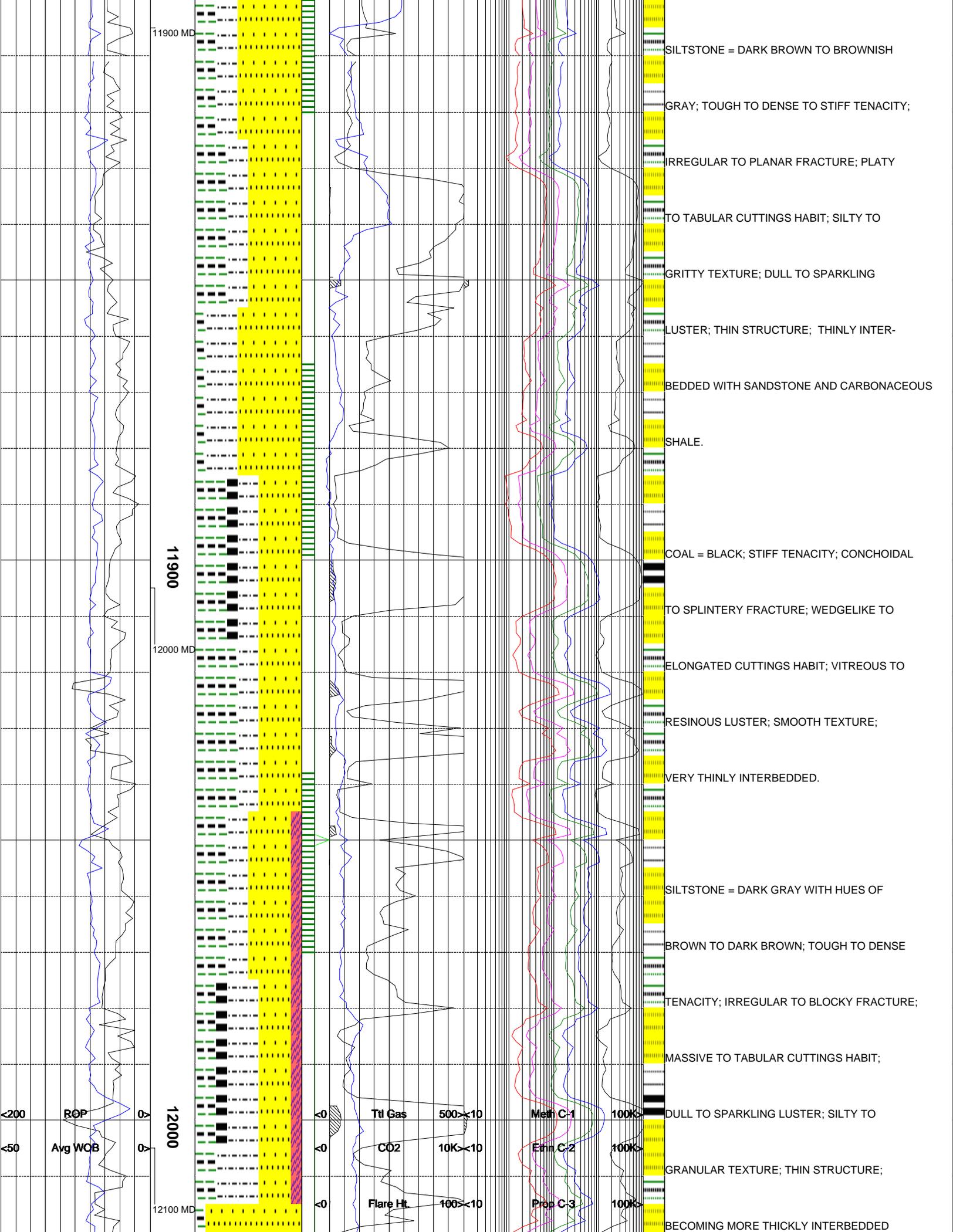
11700

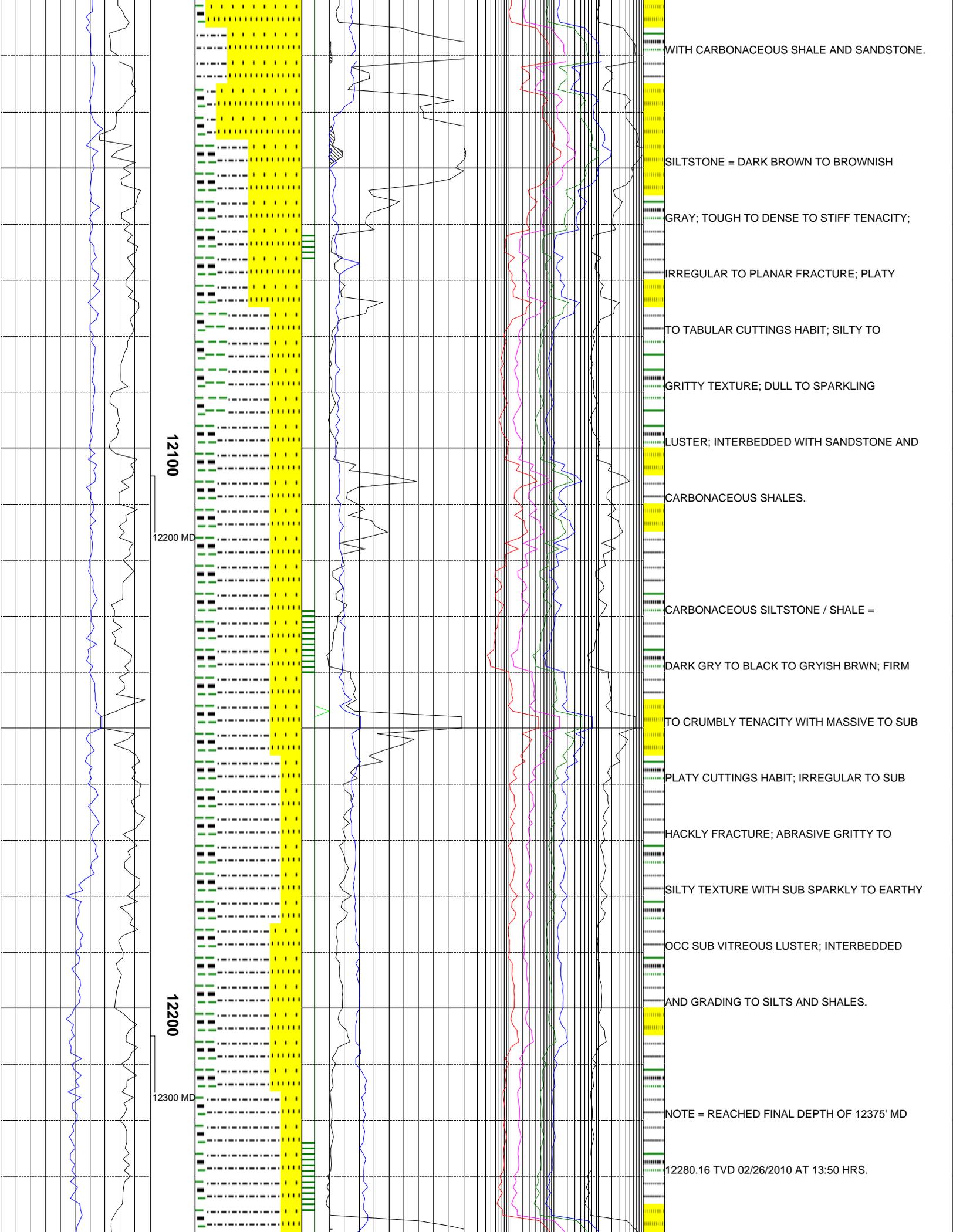
11800 MD

11

AND CLEAR GRAINS WITH A SLIGHT HUES OF
 BROWN; 1-3% DARK LITHICS GIVING A SALT
 AND PEPPERED APPEARANCE; FINE TO UPPER
 VERY FINE GRAINED; FAIR TO WELL SORTED;
 SUB ANGULAR TO SUB ROUNDED; MODERATE
 TO LOW SPHERICITY; THE SANDSTONE WAS
 IN VERY FRIABLE - LOOSE CLUSTERS ALONG
 WITH ABUNDANT LOOSE GRAINS; MODERATE
 REACTION TO DILUTE HCL; CALCAREOUS
 CEMENTATION; THINLY INTERBEDDED WITH
 CARBONACEOUS SHALE AND SILTSTONE;
 MODERATE INCREASE IN GAS.
 CARBONACEOUS SHALE = DARK GRAY TO
 GRAYISH BLACK WITH HUES OF DARK BROWN;
 TOUGH TO DENSE TO SLIGHTLY BRITTLE
 TENACITY; IRREGULAR TO BLOCKY FRACTURE;
 MASSIVE TO PLATY CUTTINGS HABIT; WAXY TO
 DULL LUSTER; SMOOTH TO SILTY TEXTURE;
 THIN TO LAMINAE STRUCTURE; THINLY INTER-
 BEDDED WITH SANDSTONE AND SILTSTONE.







12100

12200 MD

12200

12300 MD

WITH CARBONACEOUS SHALE AND SANDSTONE.

SILTSTONE = DARK BROWN TO BROWNISH

GRAY; TOUGH TO DENSE TO STIFF TENACITY;

IRREGULAR TO PLANAR FRACTURE; PLATY

TO TABULAR CUTTINGS HABIT; SILTY TO

GRITTY TEXTURE; DULL TO SPARKLING

LUSTER; INTERBEDDED WITH SANDSTONE AND

CARBONACEOUS SHALES.

CARBONACEOUS SILTSTONE / SHALE =

DARK GRAY TO BLACK TO GRAYISH BRWN; FIRM

TO CRUMBLY TENACITY WITH MASSIVE TO SUB

PLATY CUTTINGS HABIT; IRREGULAR TO SUB

HACKLY FRACTURE; ABRASIVE GRITTY TO

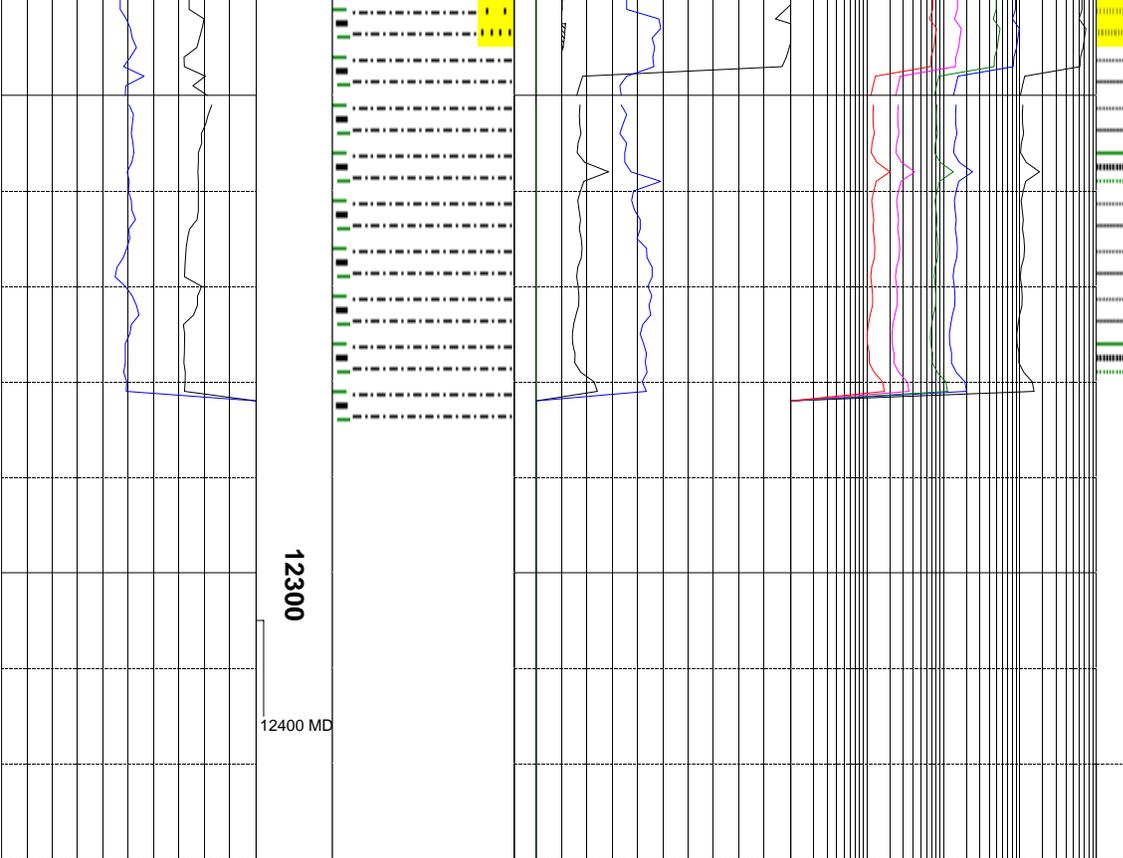
SILTY TEXTURE WITH SUB SPARKLY TO EARTHY

OCC SUB VITREOUS LUSTER; INTERBEDDED

AND GRADING TO SILTS AND SHALES.

NOTE = REACHED FINAL DEPTH OF 12375' MD

12280.16 TVD 02/26/2010 AT 13:50 HRS.



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