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MUDLOG MD

COMPANY ExxonMobil Production
WELL PCU 197-34A9
FIELD PICEANCE CREEK UNIT
REGION ROCKY MOUNTAINS
COORDINATES LAT: 39.918077
LONG: - 108.277049
ELEVATION G.L.: 6489.4'
RKB: 30.2'
COUNTY, STATE RIO BLANCO, CO
API INDEX 051031153600
SPUD DATE 03/15/2010
CONTRACTOR HELMERICH AND PAYNE
CO. REP. JOSH LOVE
RIG/TYPE HP 325 / FLEX 4S
LOGGING UNIT MLU 48
GEOLOGISTS MARK GROSS
DONNA NEW
ADD. PERSONS JENN SELL
CO. GEOLOGIST MELISSA SAURBORN

LOG INTERVAL

CASING DATA

DEPTHS: 3665' TO 12534'
DATES: 05/21/2010 TO 09/05/2010
SCALE: 5" = 100'

10.75" AT 3654'
7.00" AT 8503'
AT
AT

MUD TYPES

HOLE SIZE

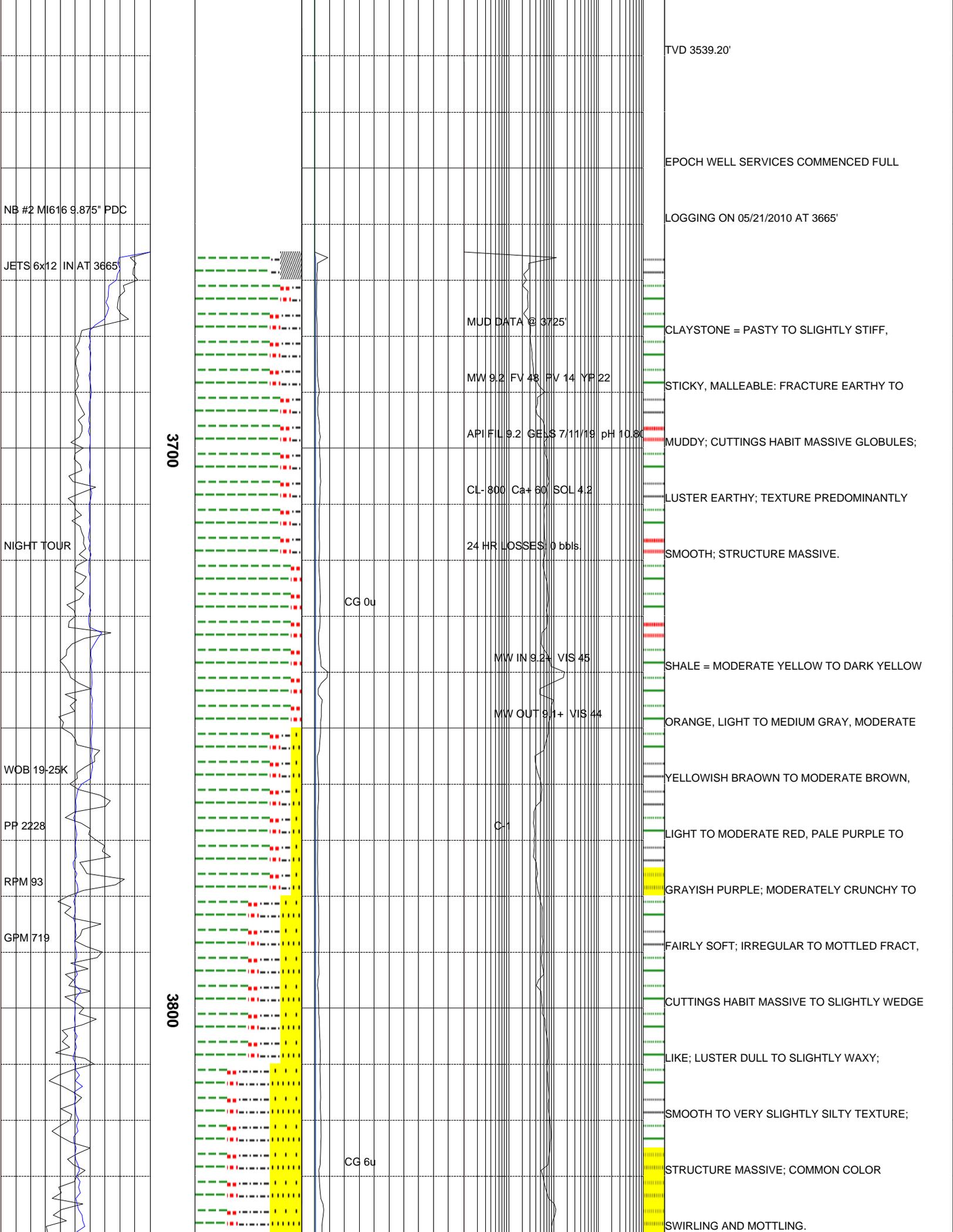
SPUD MUD TO 3665'
LSND TO 12534'
TO
TO

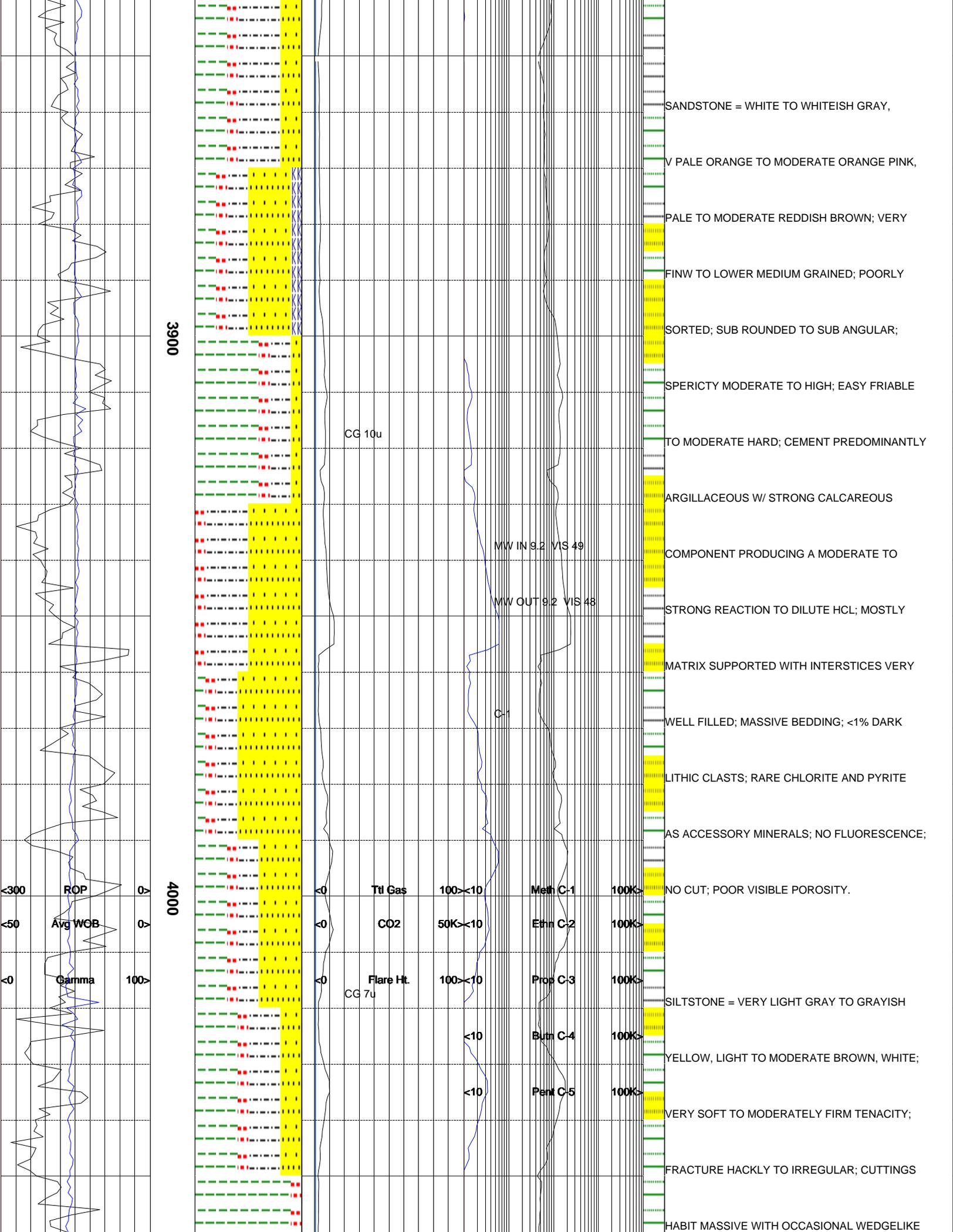
14.75" TO 3665'
9.875" TO 8522'
6.125" TO 12534'
TO

ABBREVIATIONS

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

ALTERED ZONE	CHERT - GLASSY	FELSIC SILIC DIKE	MARL - CALC	SANDSTONE
ANDESITE	CHERT - PORCEL	FOSSIL	METAMORPHICS	SANDSTONE-TUFFACEOUS
ANHYDRITE	CHERT - TIGER STRIPE	GABBRO	MUDSTONE	SERICITIZATION
BASALT	CHERT - UNDIFF	GLASSY TUFF	OBSIDIAN	SERPENTINE
BENTONITE	CLAY	GRANITE	PALEOSOL	SHALE
BIOTITIZATION	CLAY-MUDSTONE	GRANITE WASH	PHOSPHATE	SHALE TUFFACEOUS
BRECCIA	CLYST-TUFFACEOUS	GRANODIORITE	PORCELANITE	SHELL FRAGMENTS
CALCARENITE	CHLORITIZATION	GYPSUM	PORCELANEOUS CLYST	SIDERITE
CALCAREOUS TUFF	COAL	HALITE	PYRITE	SILICIFICATION
CALCILUTITE	CONGLOMERATE	HORNBL-QTZ-DIO	PYROCLASTICS	SILTSTONE
CARBONATES	CONGL. SAND	IGNEOUS (ACIDIC)	QUARTZ DIORITE	SILTST-TUFFACEOUS
CARBONACEOUS MAT	CONGL. SANDSTONE	IGNEOUS (BASIC)	QUARTZ LATITE	TUFF
CARBONACEOUS SH	COQUINA	INTRUSIVES	QUARTZ MONZONITE	VOLCANICLASTICS SEDS
CEMENT CONTAM.	DACITE	KAOLINITIC	RECRYSTALLIZED CALCITE	VOLCANICS
CHALK	DIATOMITE	LIMESTONE	RHYOLITE	
CRYSTALLINE TUFF	DIORITE	LITHIC TUFF	SALT	
CHERT - ARGILL	DOLOSTONE	MARL - DOLO	SAND	





3900

4000

SANDSTONE = WHITE TO WHITEISH GRAY,
 V PALE ORANGE TO MODERATE ORANGE PINK,
 PALE TO MODERATE REDDISH BROWN; VERY
 FINW TO LOWER MEDIUM GRAINED; POORLY
 SORTED; SUB ROUNDED TO SUB ANGULAR;
 SPERICTY MODERATE TO HIGH; EASY FRIABLE
 TO MODERATE HARD; CEMENT PREDOMINANTLY
 ARGILLACEOUS W/ STRONG CALCAREOUS
 COMPONENT PRODUCING A MODERATE TO
 STRONG REACTION TO DILUTE HCL; MOSTLY
 MATRIX SUPPORTED WITH INTERSTICES VERY
 WELL FILLED; MASSIVE BEDDING; <1% DARK
 LITHIC CLASTS; RARE CHLORITE AND PYRITE
 AS ACCESSORY MINERALS; NO FLUORESCENCE;
 NO CUT; POOR VISIBLE POROSITY.
 SILTSTONE = VERY LIGHT GRAY TO GRAYISH
 YELLOW, LIGHT TO MODERATE BROWN, WHITE;
 VERY SOFT TO MODERATELY FIRM TENACITY;
 FRACTURE HACKLY TO IRREGULAR; CUTTINGS
 HABIT MASSIVE WITH OCCASIONAL WEDGELIKE

CG 10u

MW IN 9.2 VIS 49

MW OUT 9.2 VIS 48

C-1

Ttl Gas

CO2

Flare Ht.

CG 7u

Meth C-1

Ethn C-2

Prop C-3

Bltn C-4

Pent C-5

ROP

Avg WOB

Gamma

100 < 10

50K < 10

100 < 10

< 10

< 10

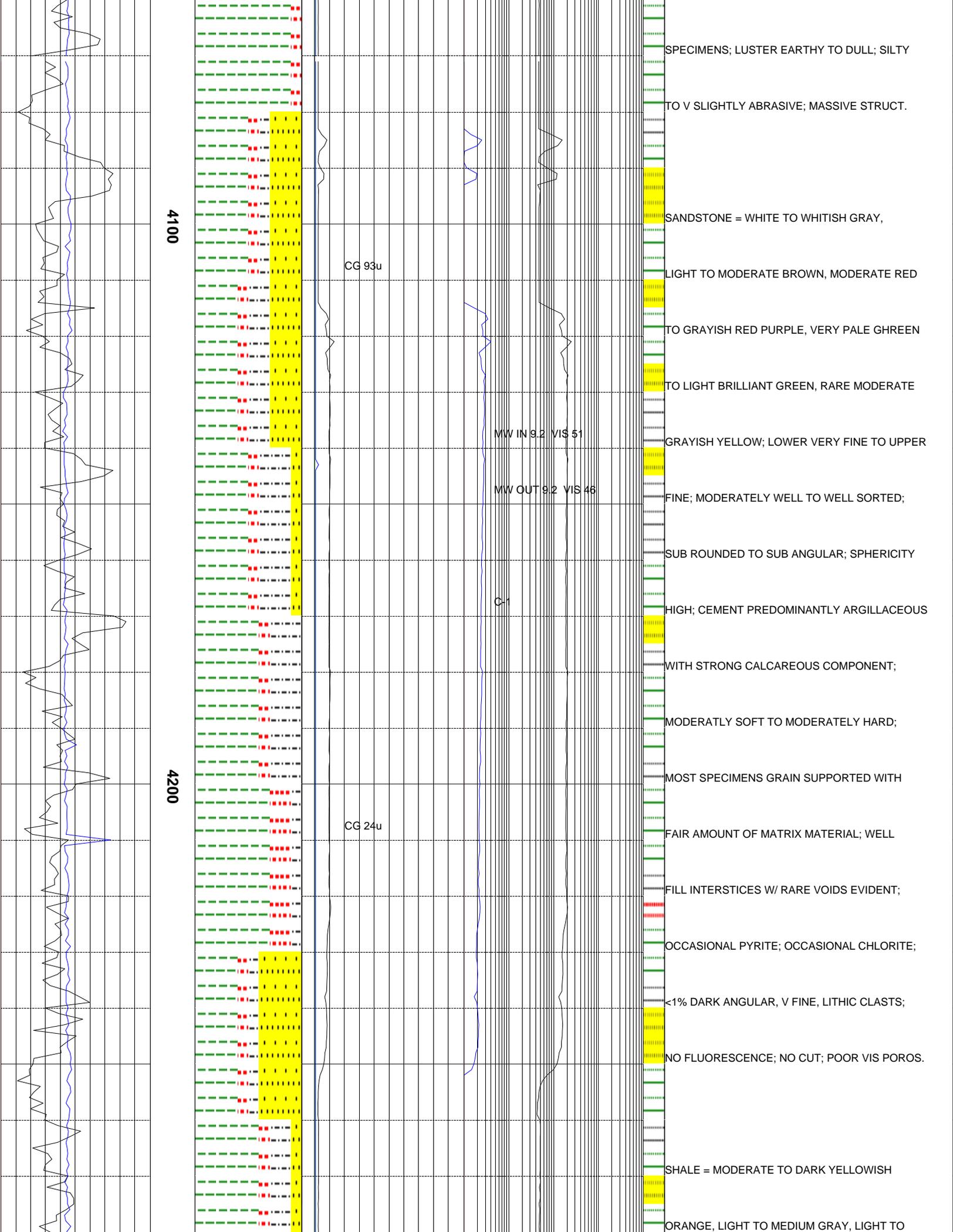
100K >

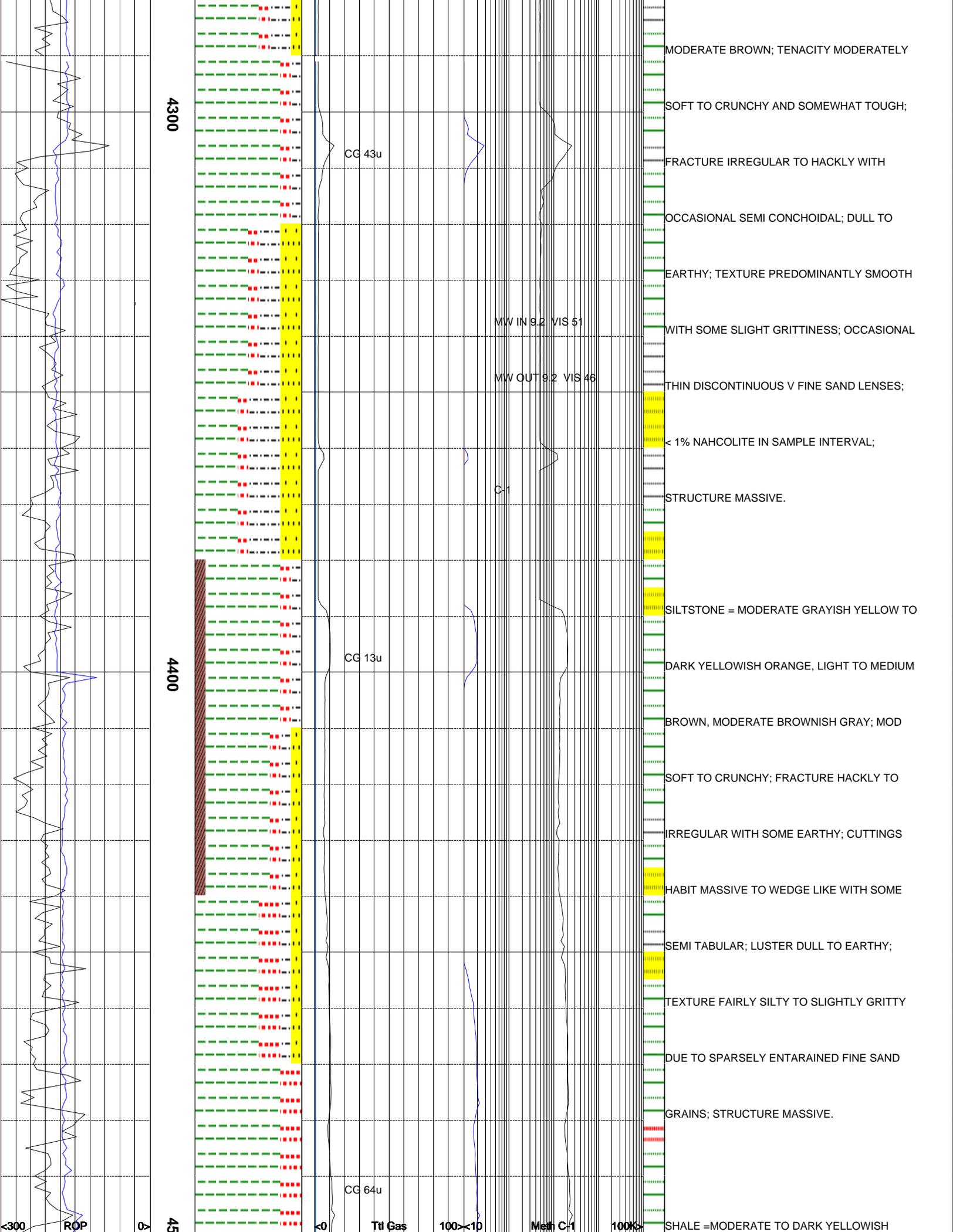
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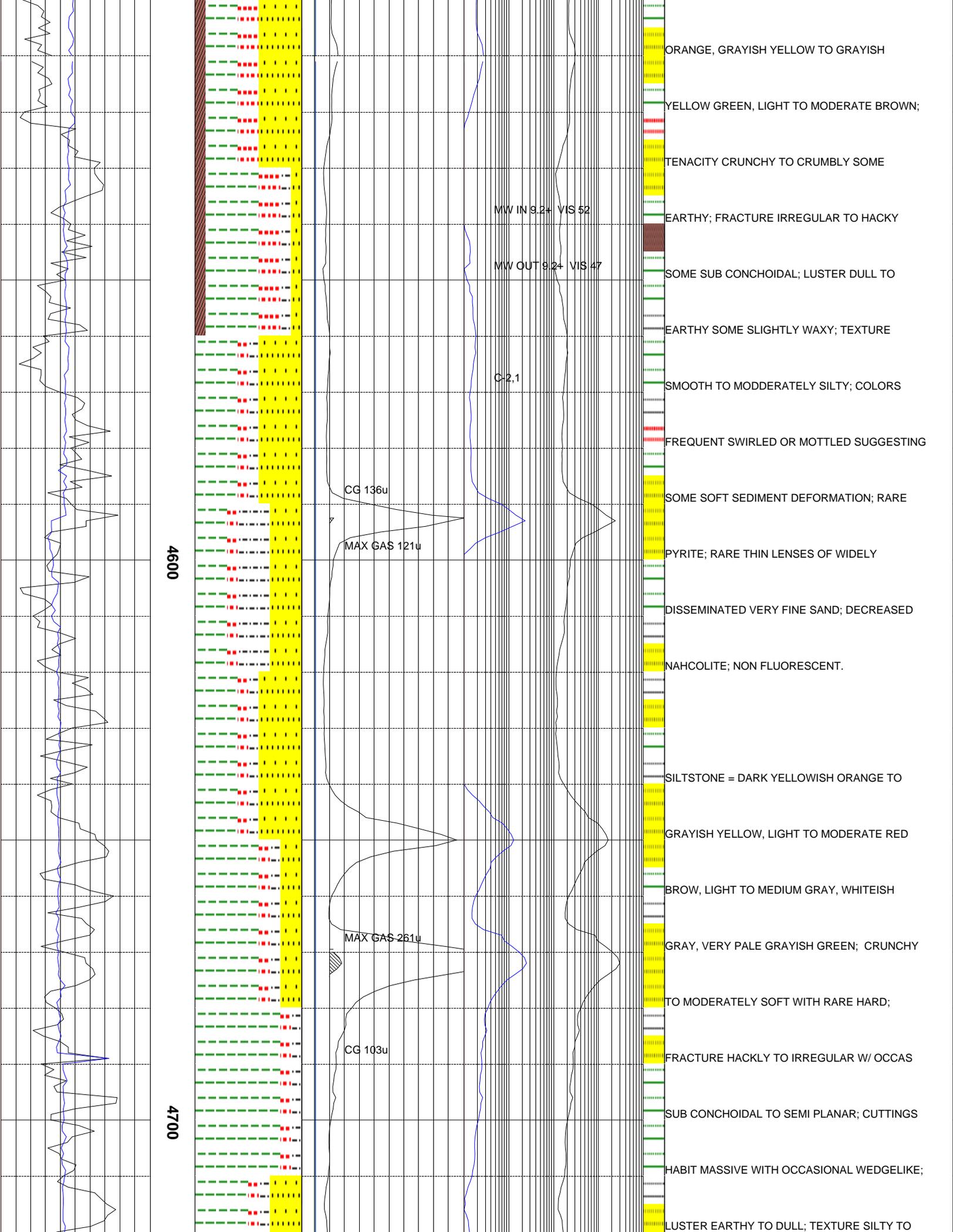
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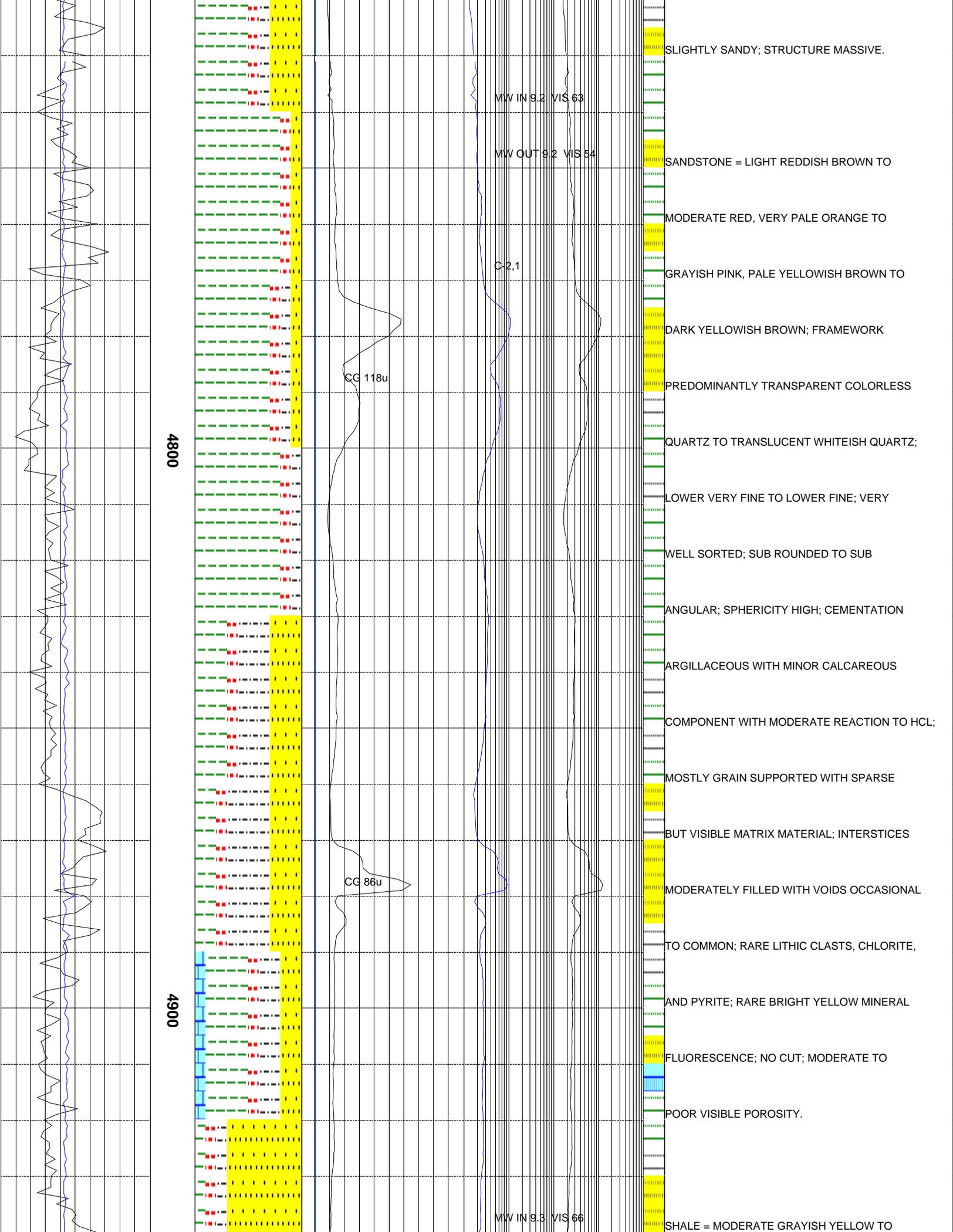
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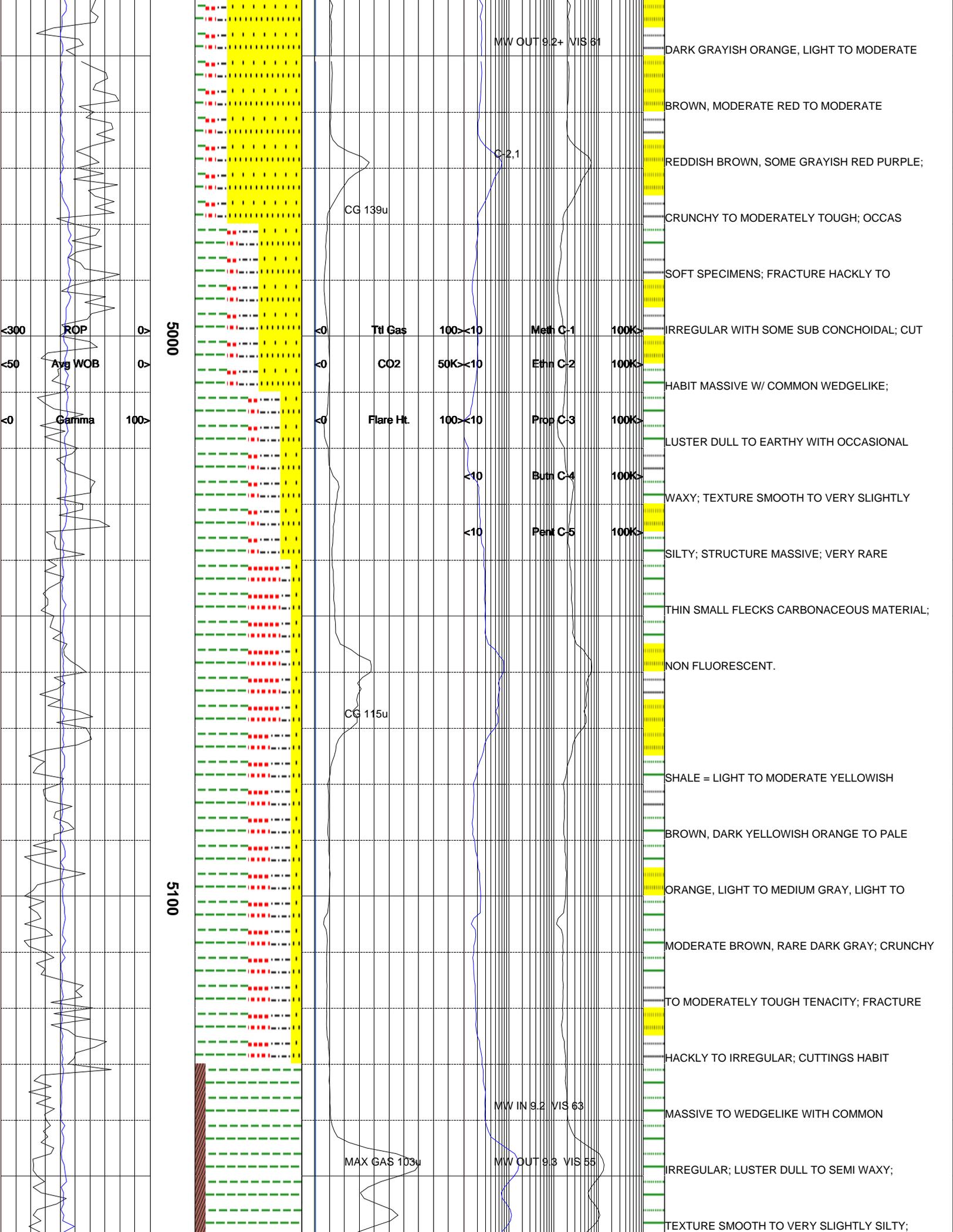
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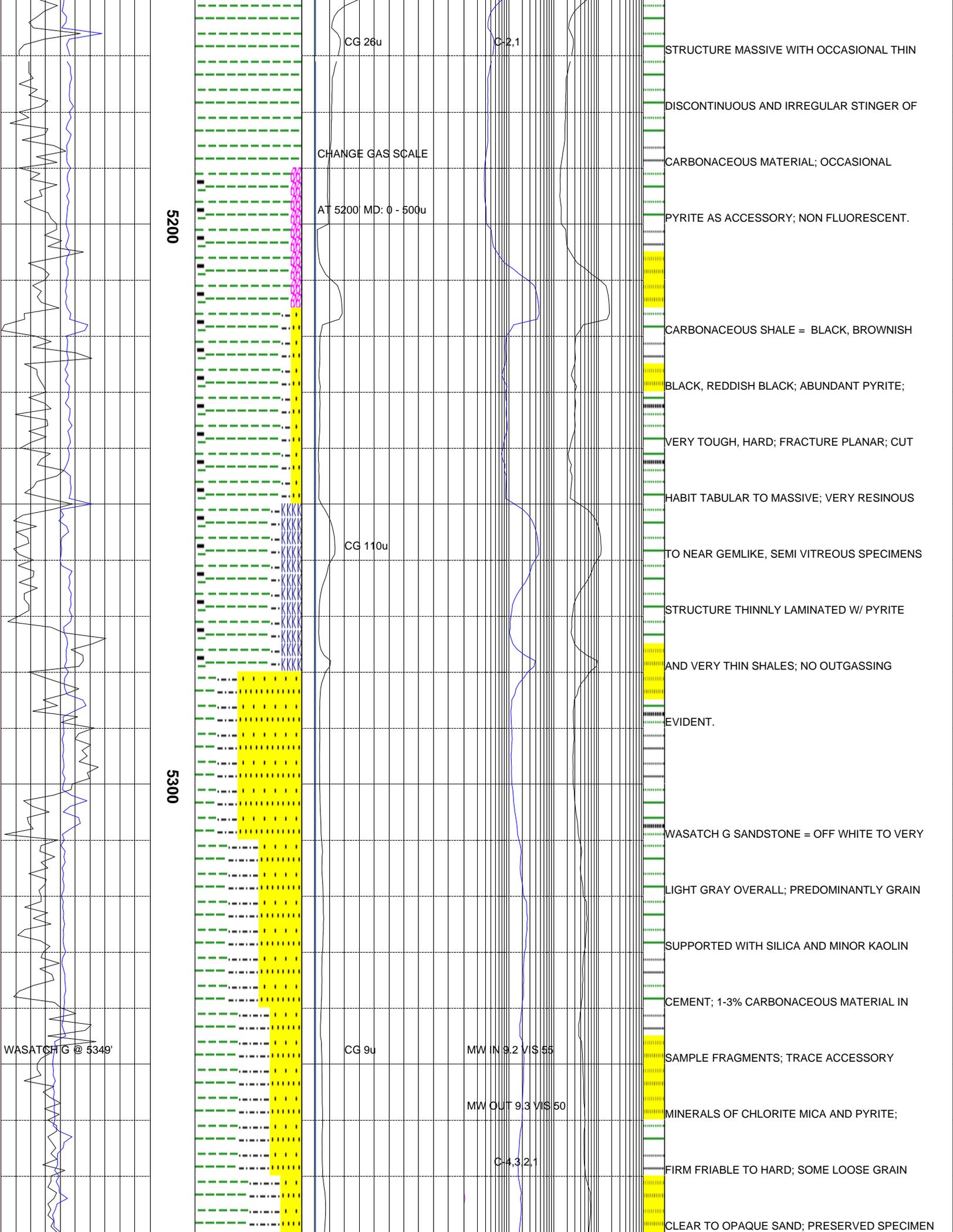


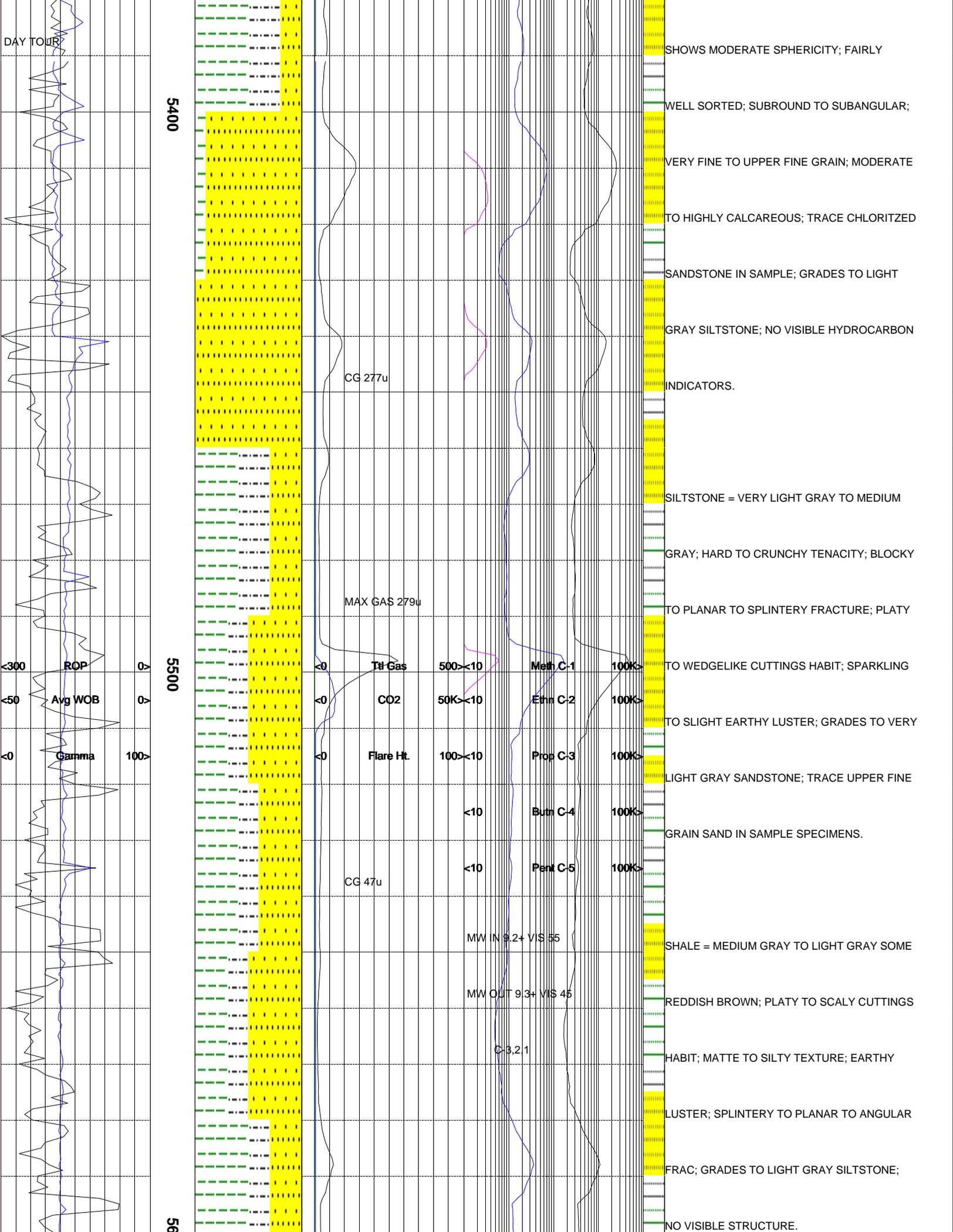


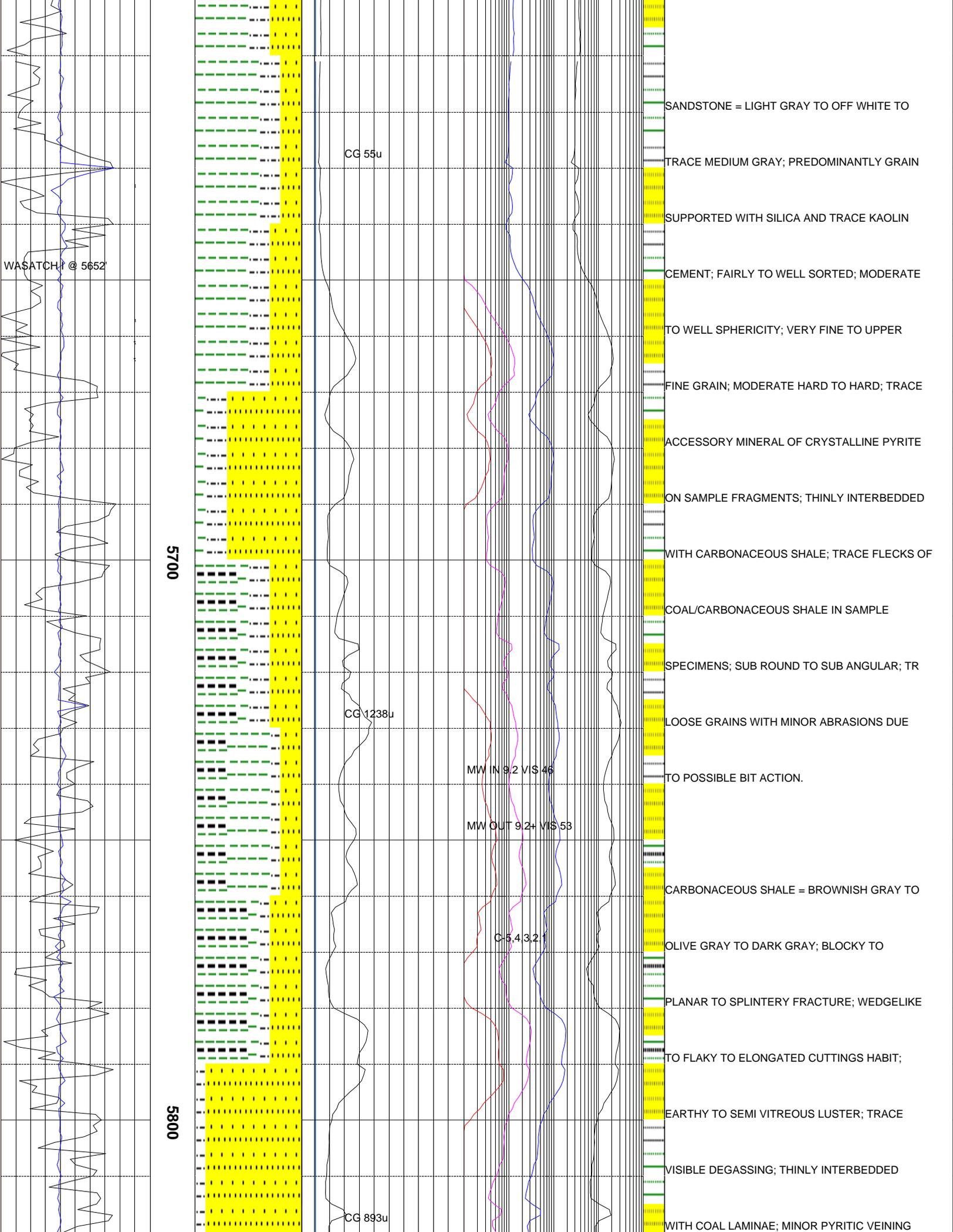


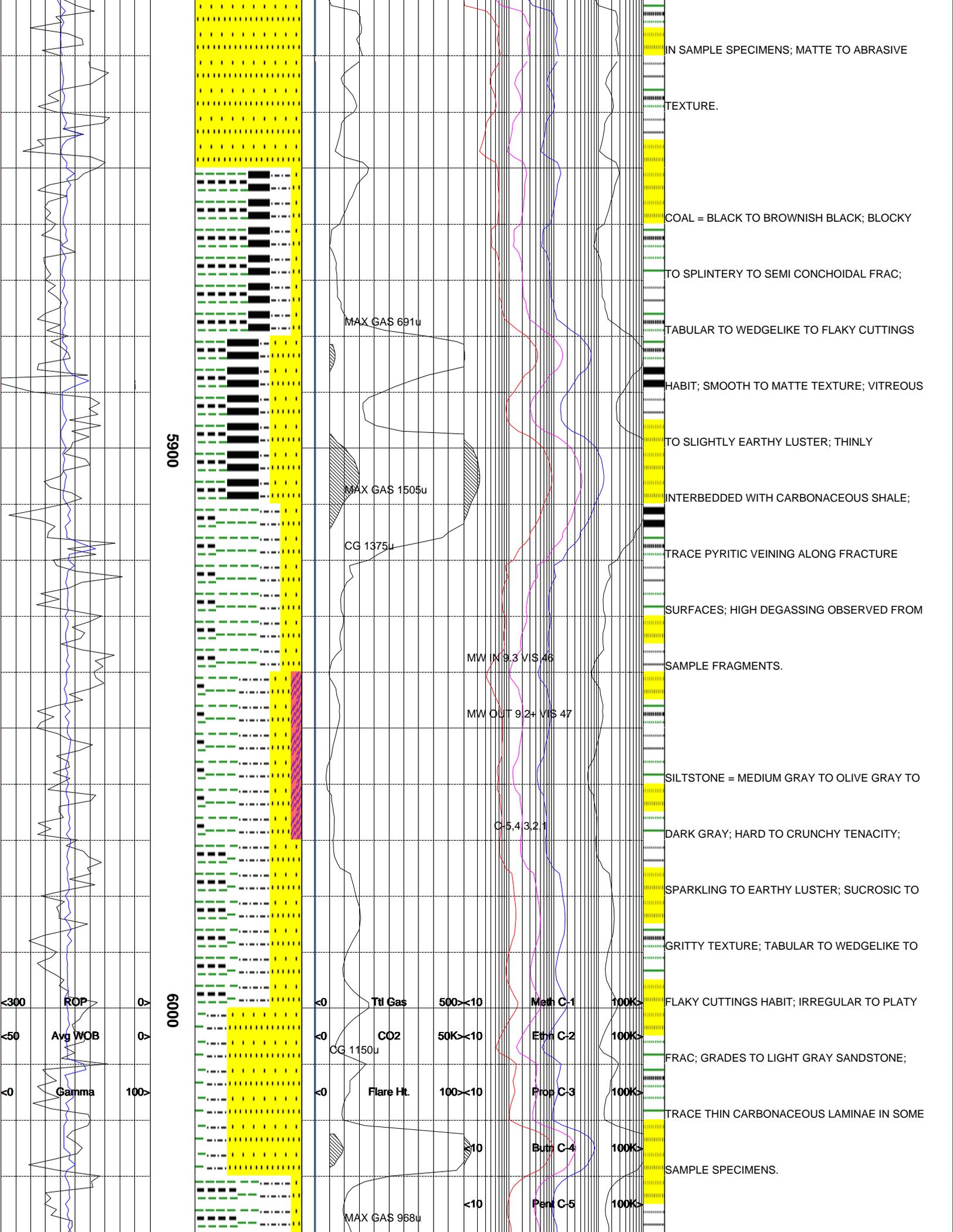


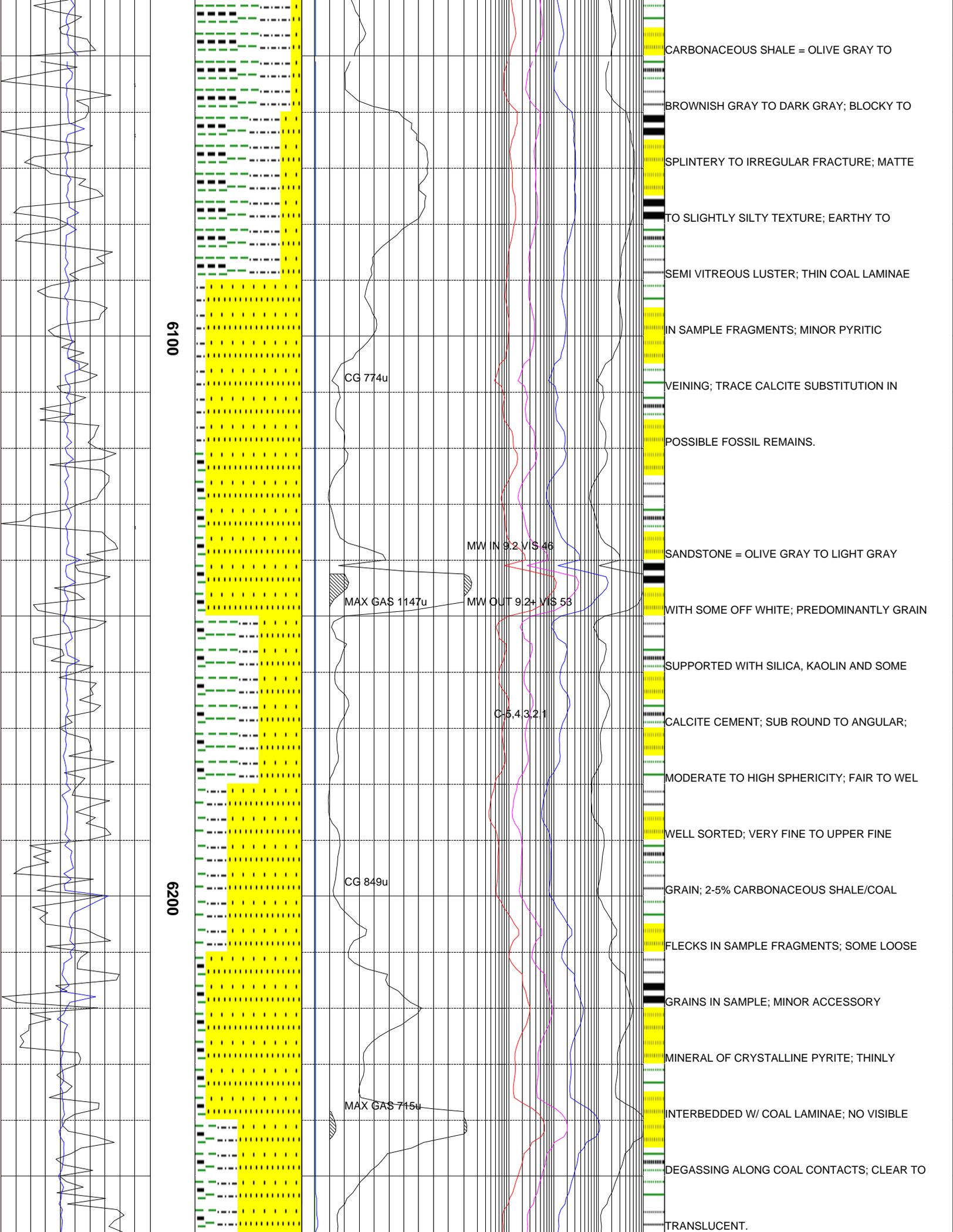


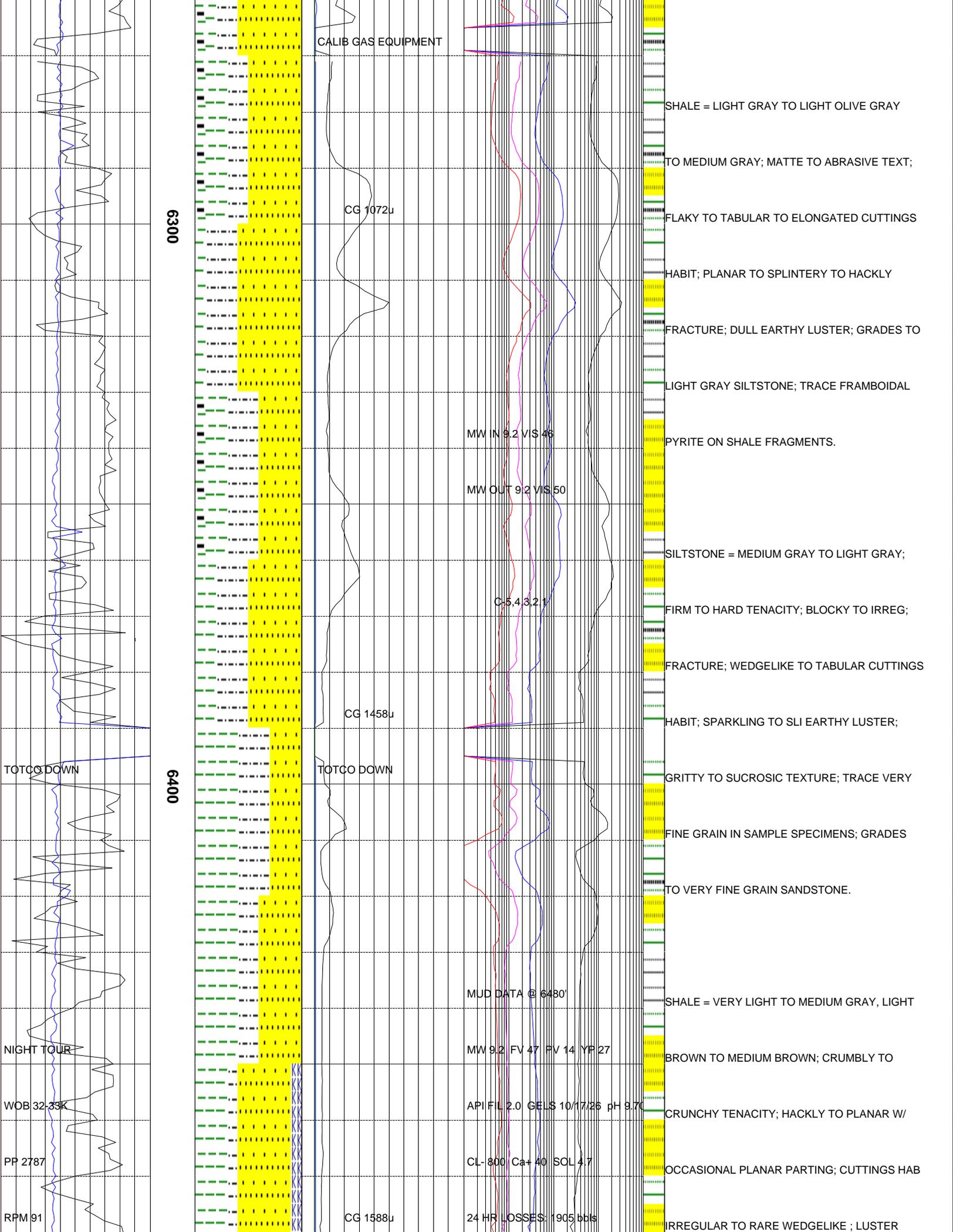












CALIB GAS EQUIPMENT

6300

CG 1072u

SHALE = LIGHT GRAY TO LIGHT OLIVE GRAY
 TO MEDIUM GRAY; MATTE TO ABRASIVE TEXT;
 FLAKY TO TABULAR TO ELONGATED CUTTINGS
 HABIT; PLANAR TO SPLINTERY TO HACKLY
 FRACTURE; DULL EARTHY LUSTER; GRADES TO
 LIGHT GRAY SILTSTONE; TRACE FRAMBOIDAL
 PYRITE ON SHALE FRAGMENTS.

MW IN 9.2 VIS 46

MW OUT 9.2 VIS 50

C=5.4321

SILTSTONE = MEDIUM GRAY TO LIGHT GRAY;
 FIRM TO HARD TENACITY; BLOCKY TO IRREG;
 FRACTURE; WEDGELIKE TO TABULAR CUTTINGS

CG 1458u

HABIT; SPARKLING TO SLI EARTHY LUSTER;
 GRITTY TO SUCROSIC TEXTURE; TRACE VERY

TOTCO DOWN

6400

TOTCO DOWN

MUD DATA @ 6430'

MW 9.2 FV 47 PV 14 YP 27

API FIL 2.0 GELS 10/17/26 pH 9.7

CL-800 Ca+ 40 SOL 4.7

24 HR LOSSES: 1905 bbls

FINE GRAIN IN SAMPLE SPECIMENS; GRADES
 TO VERY FINE GRAIN SANDSTONE.

SHALE = VERY LIGHT TO MEDIUM GRAY, LIGHT

BROWN TO MEDIUM BROWN; CRUMBLY TO

CRUNCHY TENACITY; HACKLY TO PLANAR W/

OCCASIONAL PLANAR PARTING; CUTTINGS HAB

IRREGULAR TO RARE WEDGELIKE ; LUSTER

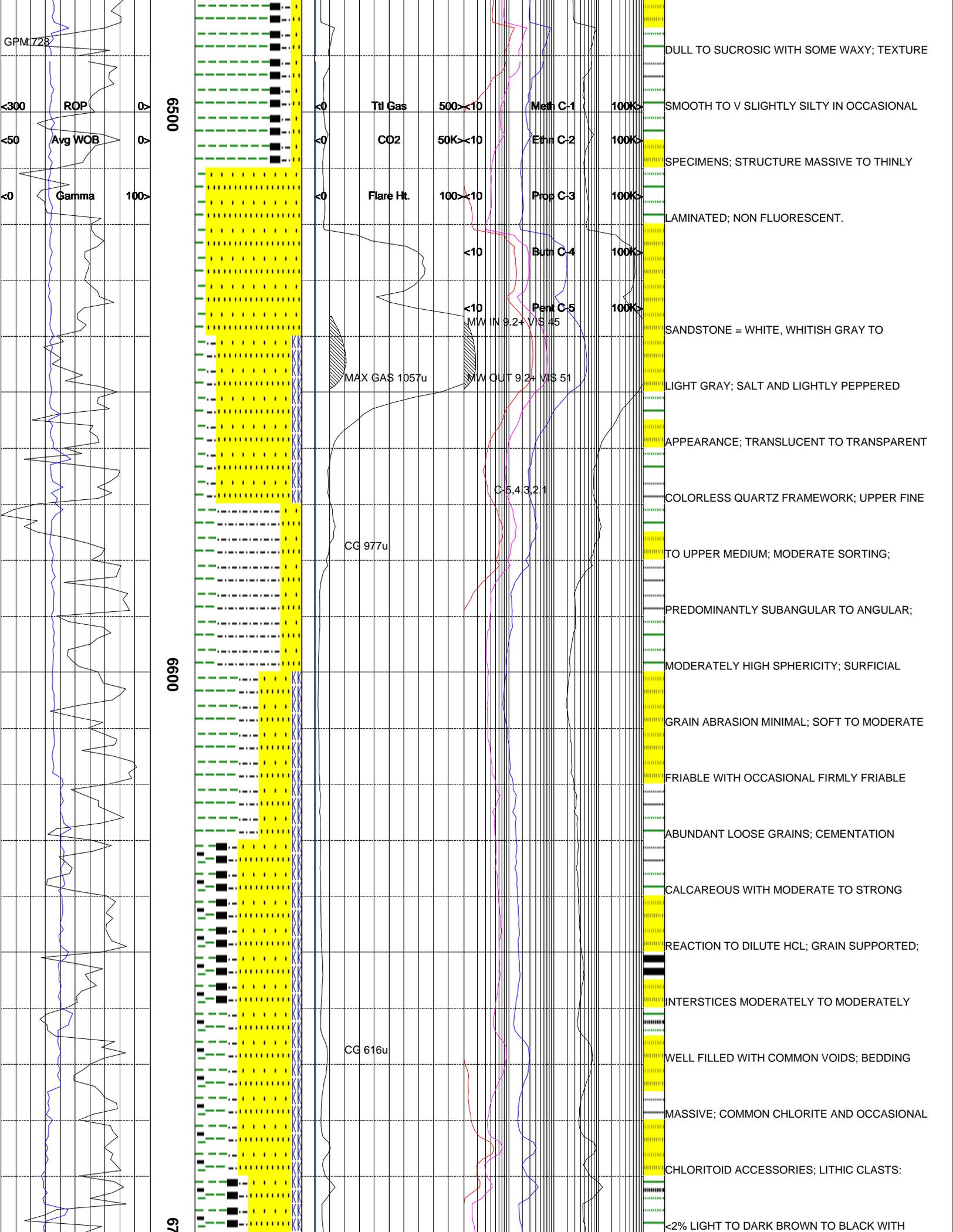
NIGHT TOUR

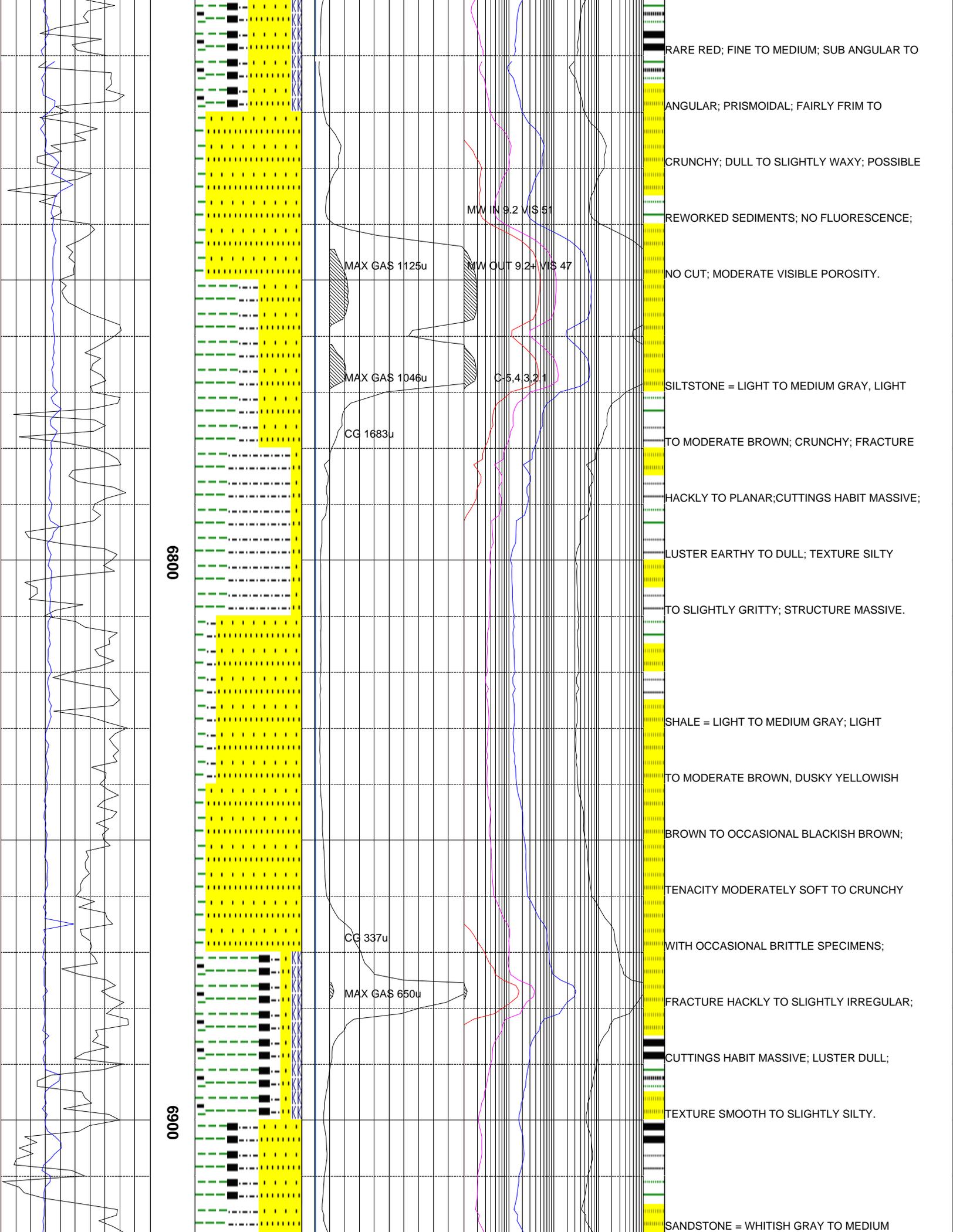
WOB 32.33K

PP 2787

RPM 91

CG 1588u





0089

0069

RARE RED; FINE TO MEDIUM; SUB ANGULAR TO

ANGULAR; PRISMOIDAL; FAIRLY FRIM TO

CRUNCHY; DULL TO SLIGHTLY WAXY; POSSIBLE

REWORKED SEDIMENTS; NO FLUORESCENCE;

NO CUT; MODERATE VISIBLE POROSITY.

SILTSTONE = LIGHT TO MEDIUM GRAY, LIGHT

TO MODERATE BROWN; CRUNCHY; FRACTURE

HACKLY TO PLANAR; CUTTINGS HABIT MASSIVE;

LUSTER EARTHY TO DULL; TEXTURE SILTY

TO SLIGHTLY GRITTY; STRUCTURE MASSIVE.

SHALE = LIGHT TO MEDIUM GRAY; LIGHT

TO MODERATE BROWN, DUSKY YELLOWISH

BROWN TO OCCASIONAL BLACKISH BROWN;

TENACITY MODERATELY SOFT TO CRUNCHY

WITH OCCASIONAL BRITTLE SPECIMENS;

FRACTURE HACKLY TO SLIGHTLY IRREGULAR;

CUTTINGS HABIT MASSIVE; LUSTER DULL;

TEXTURE SMOOTH TO SLIGHTLY SILTY.

SANDSTONE = WHITISH GRAY TO MEDIUM

MW IN 9.2 VIS 51

MAX GAS 1125u

MW OUT 9.2+ VIS 47

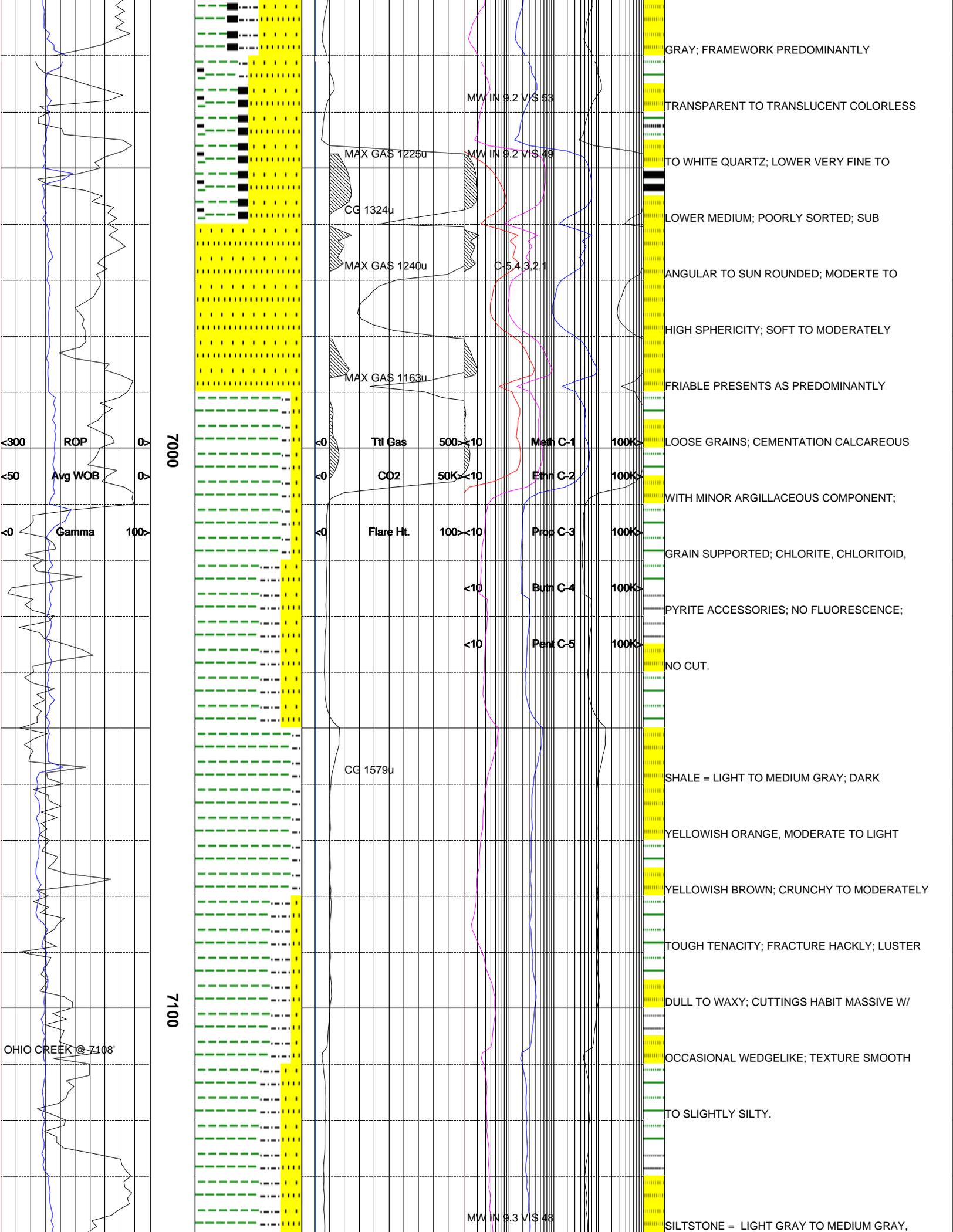
MAX GAS 1046u

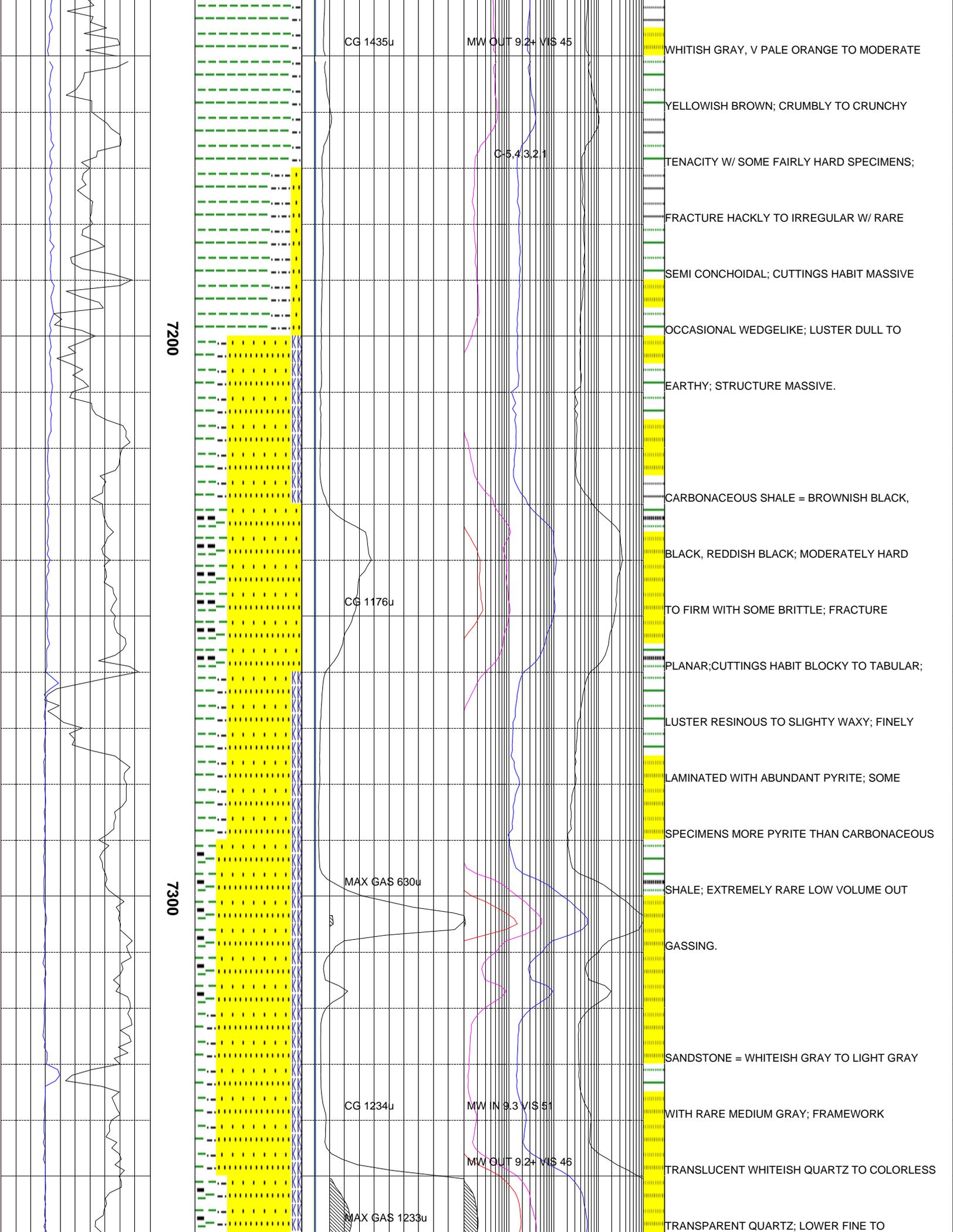
C-5.43.2.1

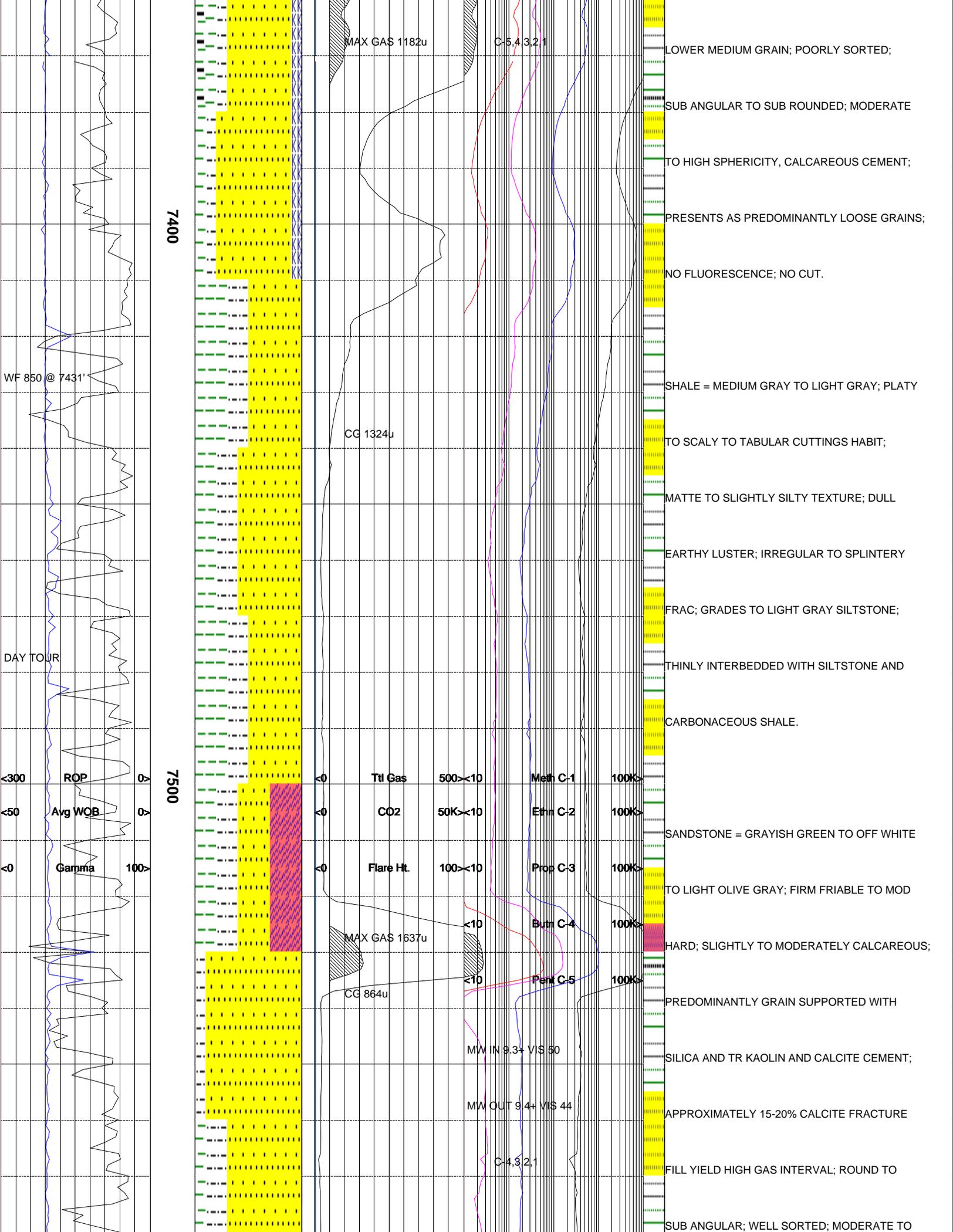
CG 1683u

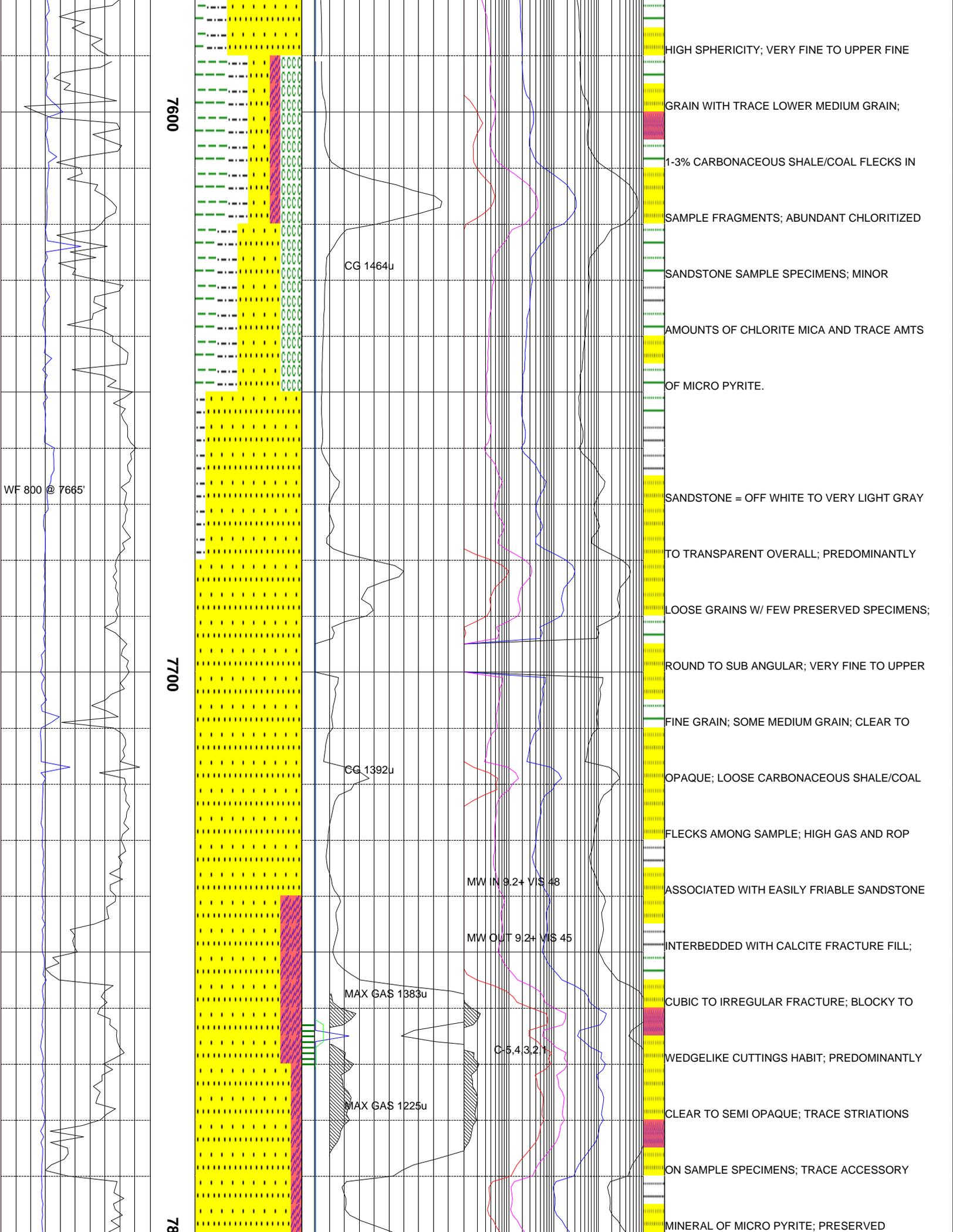
CG 337u

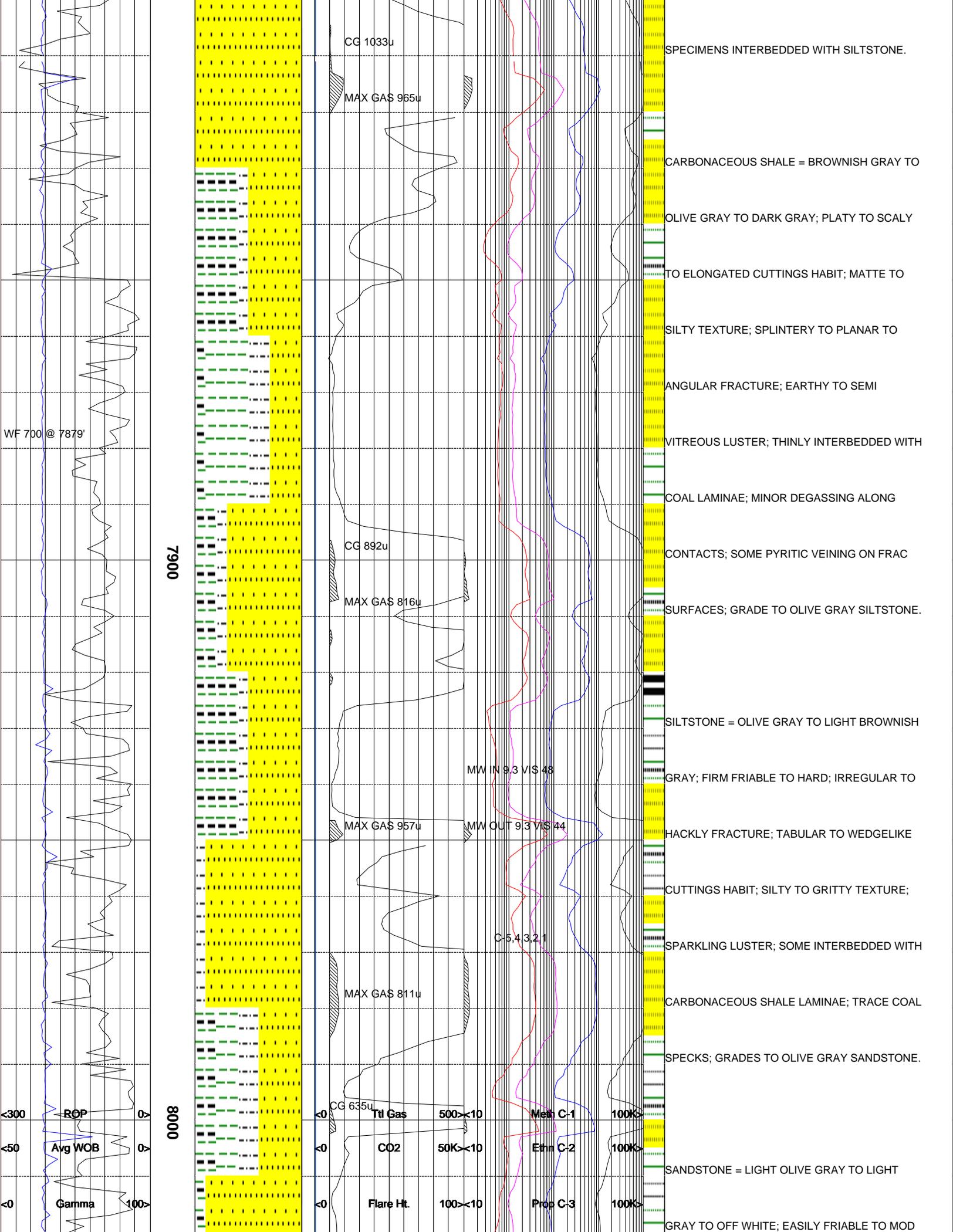
MAX GAS 650u











7900

8000

CG 1033u

MAX GAS 965u

CG 892u

MAX GAS 816u

MAX GAS 957u

MAX GAS 811u

CG 635u

MW IN 9.3 VIS 48

MW OUT 9.3 VIS 44

C-5.432.1

SPECIMENS INTERBEDDED WITH SILTSTONE.

CARBONACEOUS SHALE = BROWNISH GRAY TO

OLIVE GRAY TO DARK GRAY; PLATY TO SCALY

TO ELONGATED CUTTINGS HABIT; MATTE TO

SILTY TEXTURE; SPLINTERY TO PLANAR TO

ANGULAR FRACTURE; EARTHY TO SEMI

VITREOUS LUSTER; THINLY INTERBEDDED WITH

COAL LAMINAE; MINOR DEGASSING ALONG

CONTACTS; SOME PYRITIC VEINING ON FRAC

SURFACES; GRADE TO OLIVE GRAY SILTSTONE.

SILTSTONE = OLIVE GRAY TO LIGHT BROWNISH

GRAY; FIRM FRIABLE TO HARD; IRREGULAR TO

HACKLY FRACTURE; TABULAR TO WEDGELIKE

CUTTINGS HABIT; SILTY TO GRITTY TEXTURE;

SPARKLING LUSTER; SOME INTERBEDDED WITH

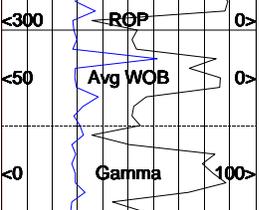
CARBONACEOUS SHALE LAMINAE; TRACE COAL

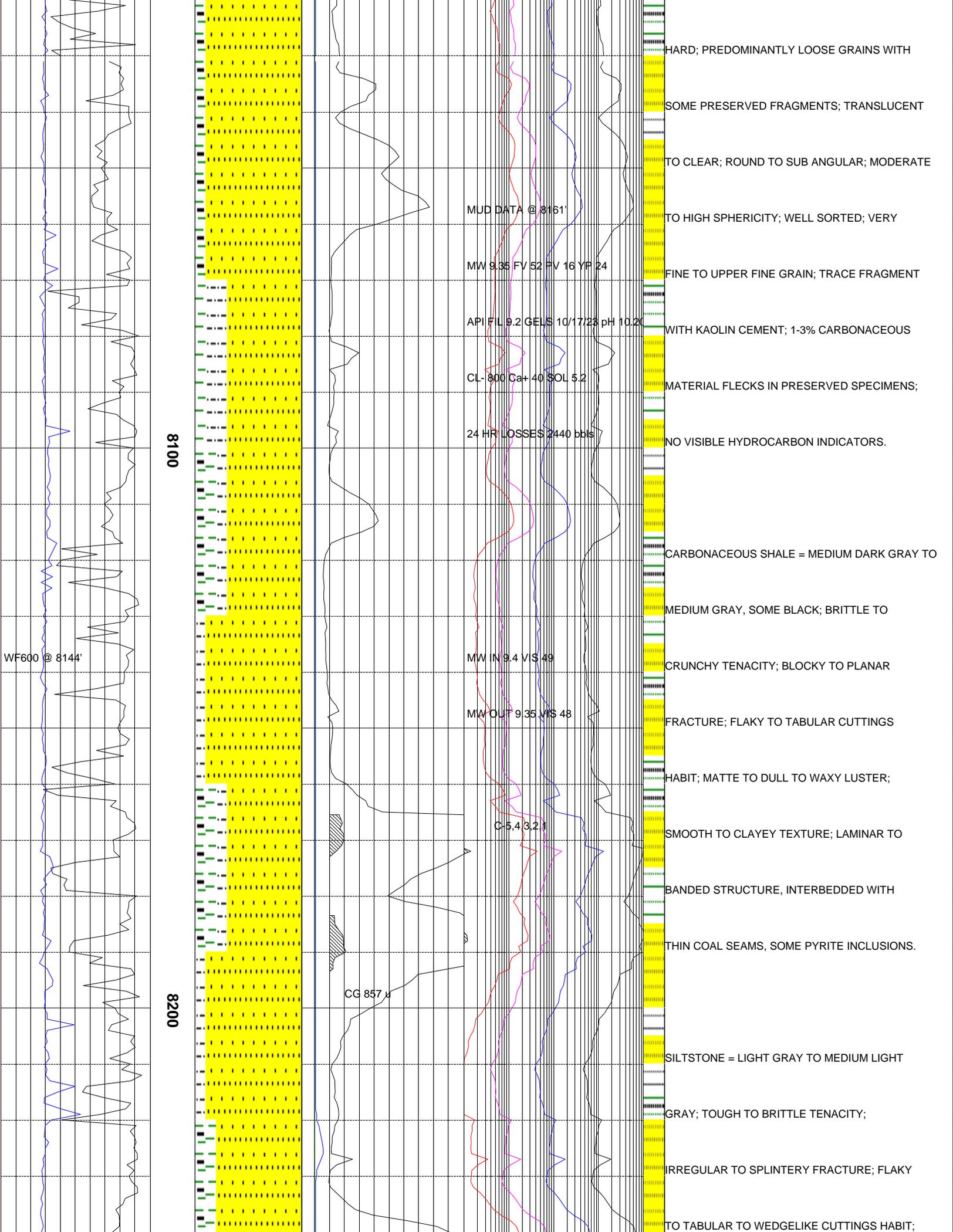
SPECKS; GRADES TO OLIVE GRAY SANDSTONE.

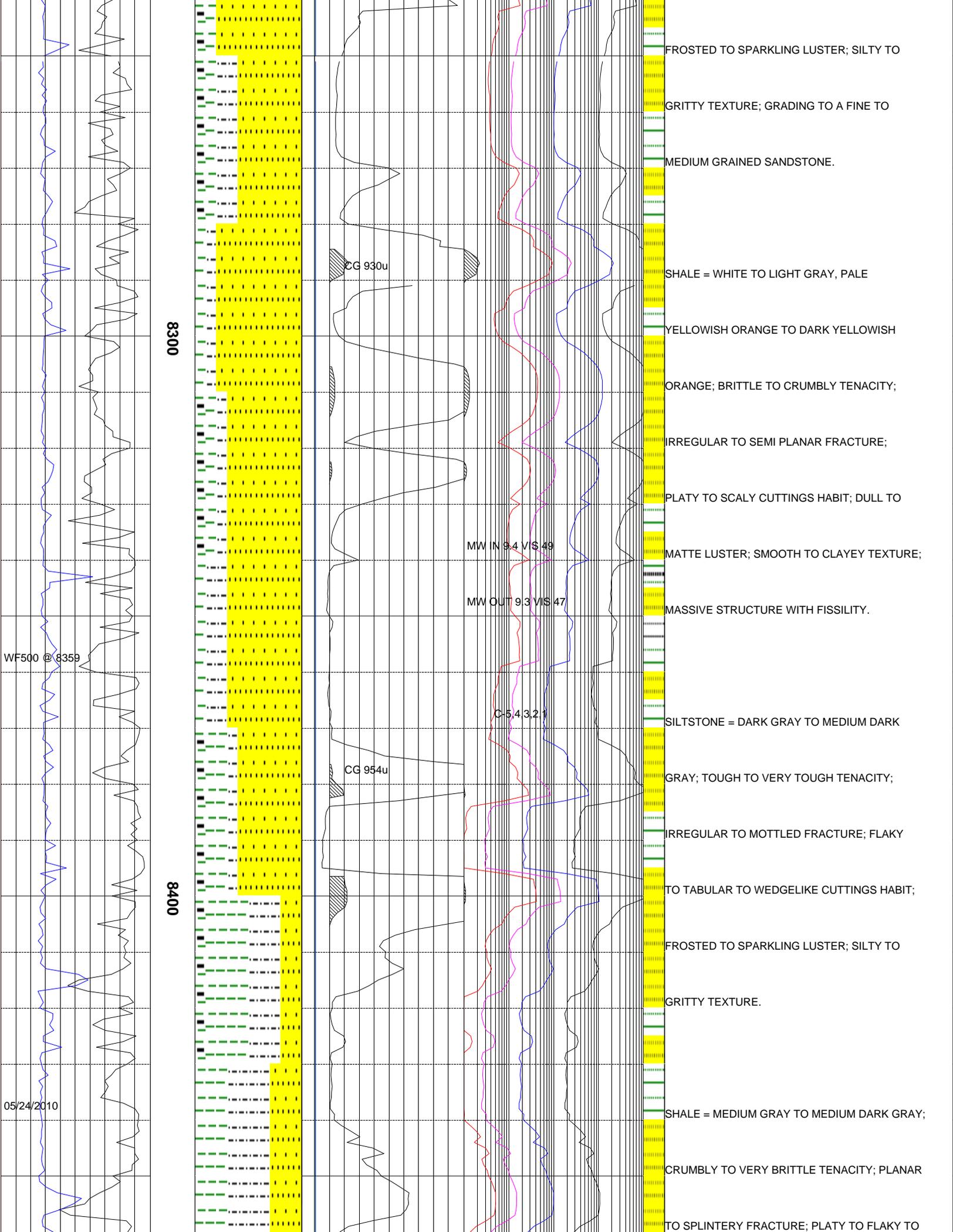
SANDSTONE = LIGHT OLIVE GRAY TO LIGHT

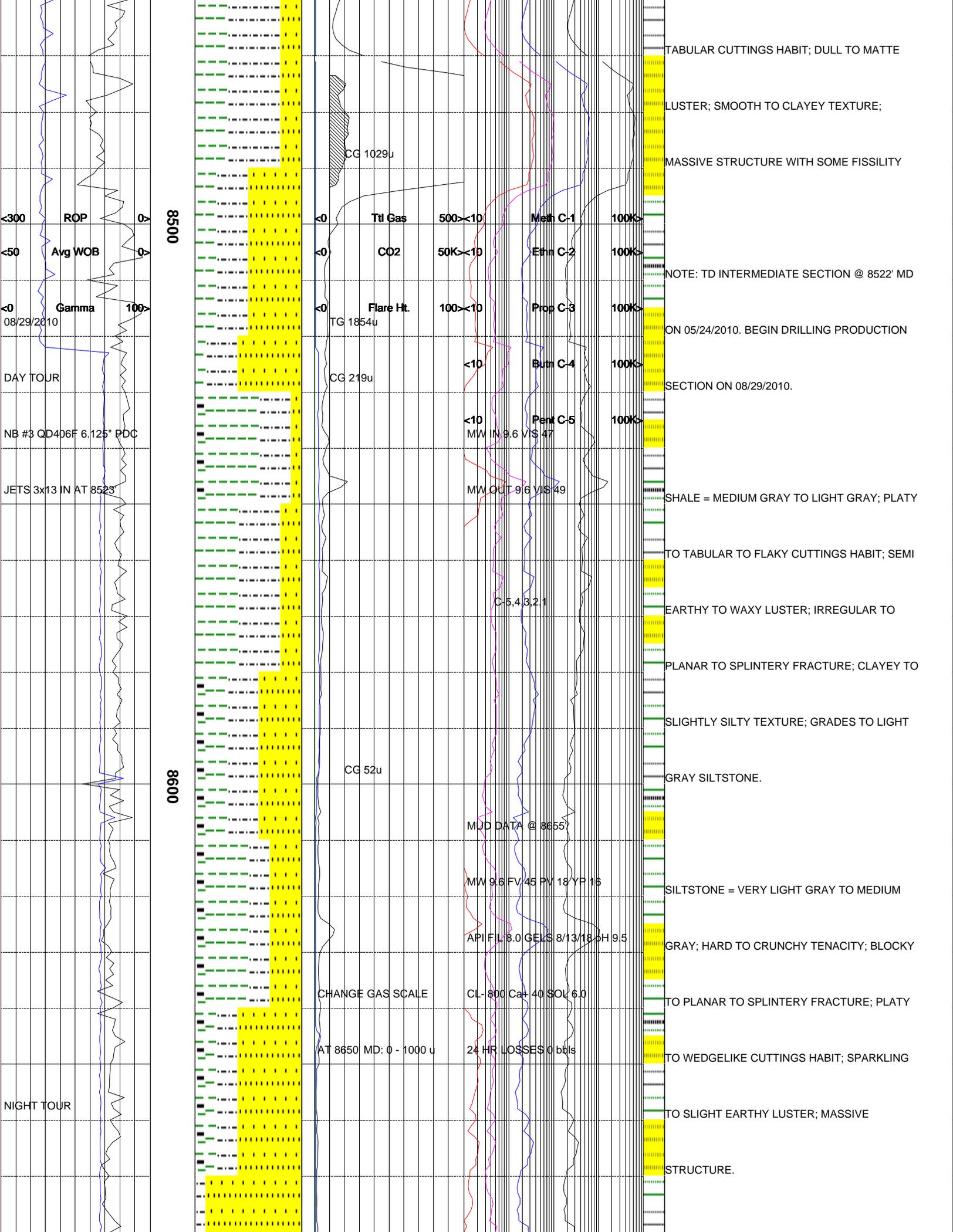
GRAY TO OFF WHITE; EASILY FRIABLE TO MOD

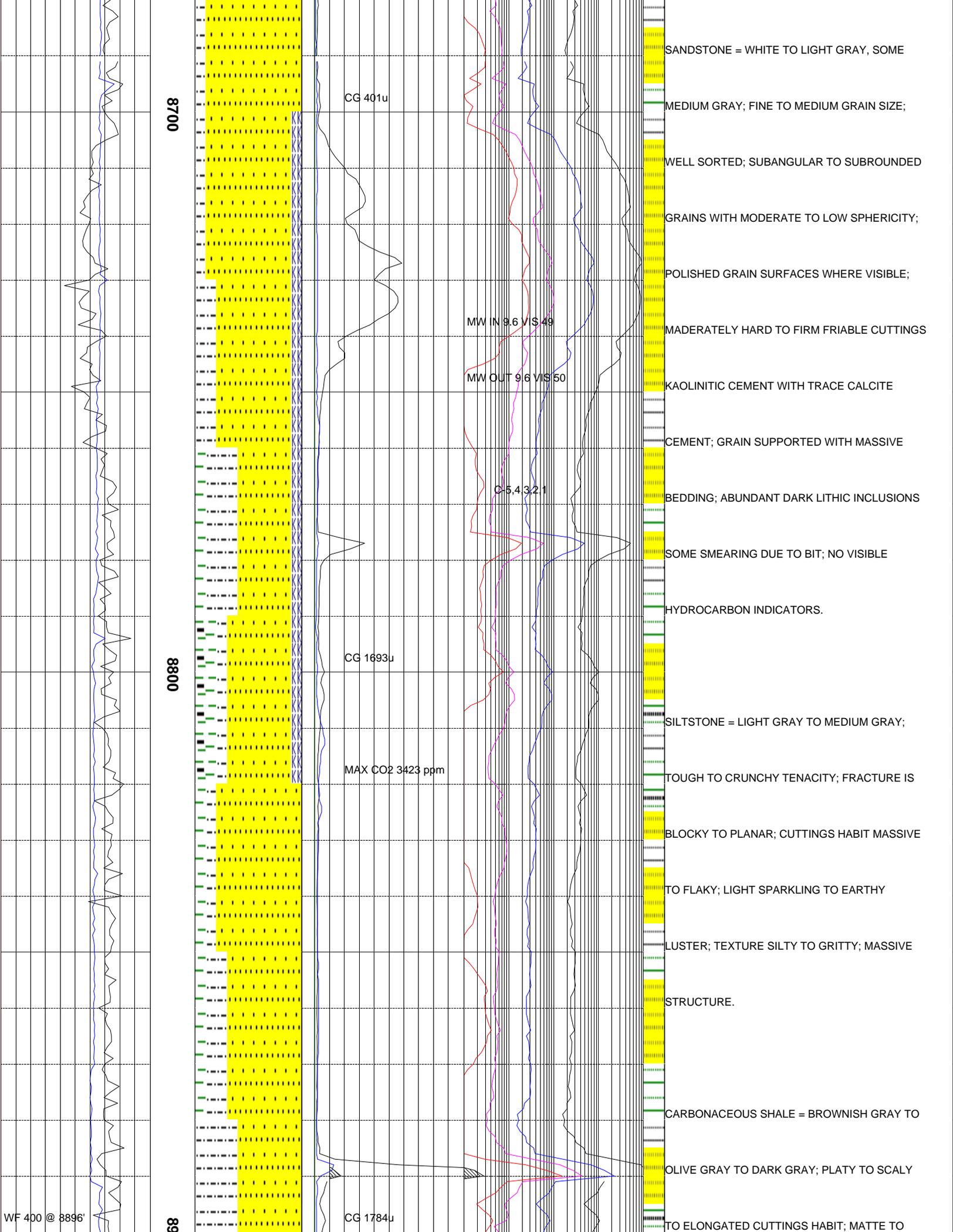
WF 700 @ 7879'











8700

8800

8896

CG 401u

CG 1693u

MAX CO2 3423 ppm

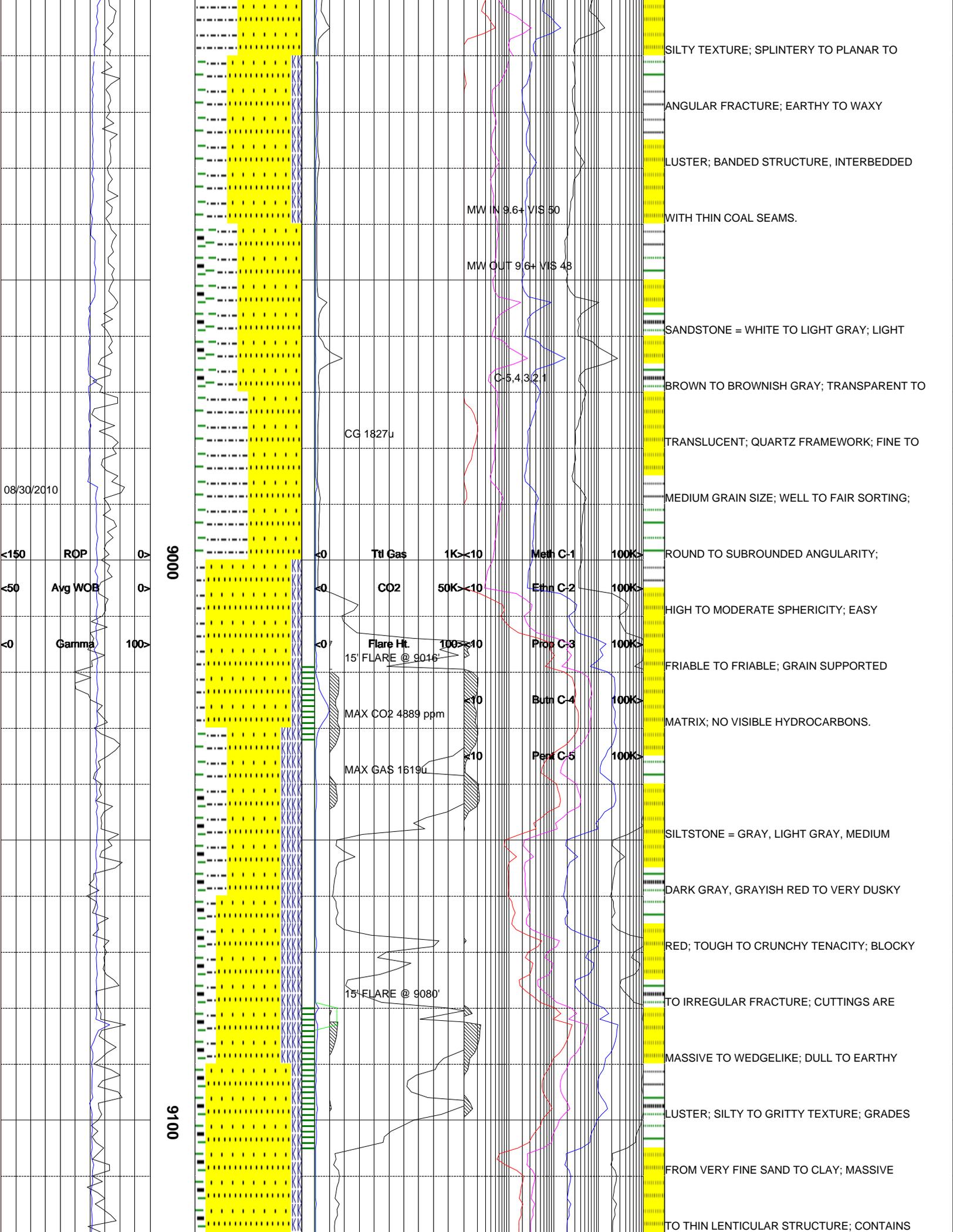
CG 1784u

MW IN 9.6 VIS 49

MW OUT 9.6 VIS 50

C 5.4321

SANDSTONE = WHITE TO LIGHT GRAY, SOME
 MEDIUM GRAY; FINE TO MEDIUM GRAIN SIZE;
 WELL SORTED; SUBANGULAR TO SUBROUNDED
 GRAINS WITH MODERATE TO LOW SPHERICITY;
 POLISHED GRAIN SURFACES WHERE VISIBLE;
 MODERATELY HARD TO FIRM FRIABLE CUTTINGS
 KAOLINIC CEMENT WITH TRACE CALCITE
 CEMENT; GRAIN SUPPORTED WITH MASSIVE
 BEDDING; ABUNDANT DARK LITHIC INCLUSIONS
 SOME SMEARING DUE TO BIT; NO VISIBLE
 HYDROCARBON INDICATORS.
 SILTSTONE = LIGHT GRAY TO MEDIUM GRAY;
 TOUGH TO CRUNCHY TENACITY; FRACTURE IS
 BLOCKY TO PLANAR; CUTTINGS HABIT MASSIVE
 TO FLAKY; LIGHT SPARKLING TO EARTHY
 LUSTER; TEXTURE SILTY TO GRITTY; MASSIVE
 STRUCTURE.
 CARBONACEOUS SHALE = BROWNISH GRAY TO
 OLIVE GRAY TO DARK GRAY; PLATY TO SCALY
 TO ELONGATED CUTTINGS HABIT; MATTE TO



DAY TOUR

MW IN 9.6+ VIS 50

MW OUT 9.6+ VIS 51

C-5.43.21

MW IN 9.6+ VIS 52

9200

9300

FINELY DISSEMINATED CARBONACEOUS

MATERIAL TO THIN, DISCONTINUOUS LENSES

OF COAL AND CARBONACEOUS MATERIAL.

SANDSTONE = VERY LIGHT GRAY, LIGHT

GREENISH GRAY, MEDIUM LIGHT GRAY,

PINKISH GRAY; QUARTZ AND LESSER FELDSPAR

FRAMEWORK; VERY FINE GRAINED TO MEDIUM

GRAINED; FAIR TO VERY WELL SORTED;

SUBANGULAR TO WELL ROUNDED GRAINS;

EASILY FRIABLE TO MODERATELY HARD;

CALCITE CEMENTED WITH LESSER

ARGILLACEOUS MATERIAL; PRIMARILY GRAIN

SUPPORTED; INTERSTICES FILLED WITH

ARGILLACEOUS MATERIAL, KAOLINITE;

UP TO 5 PERCENT OPAQUE MINERALS, BIOTITE

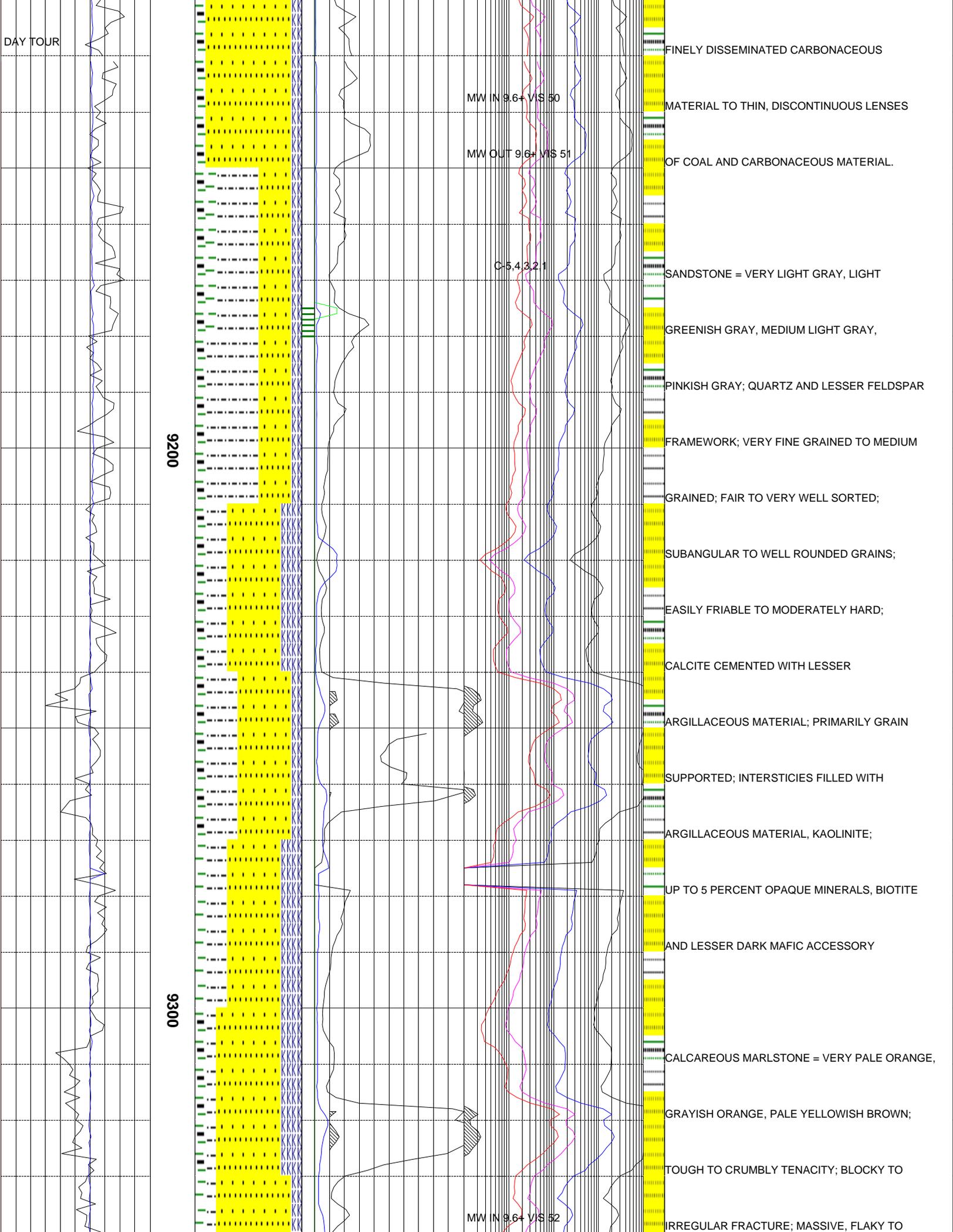
AND LESSER DARK MAFIC ACCESSORY

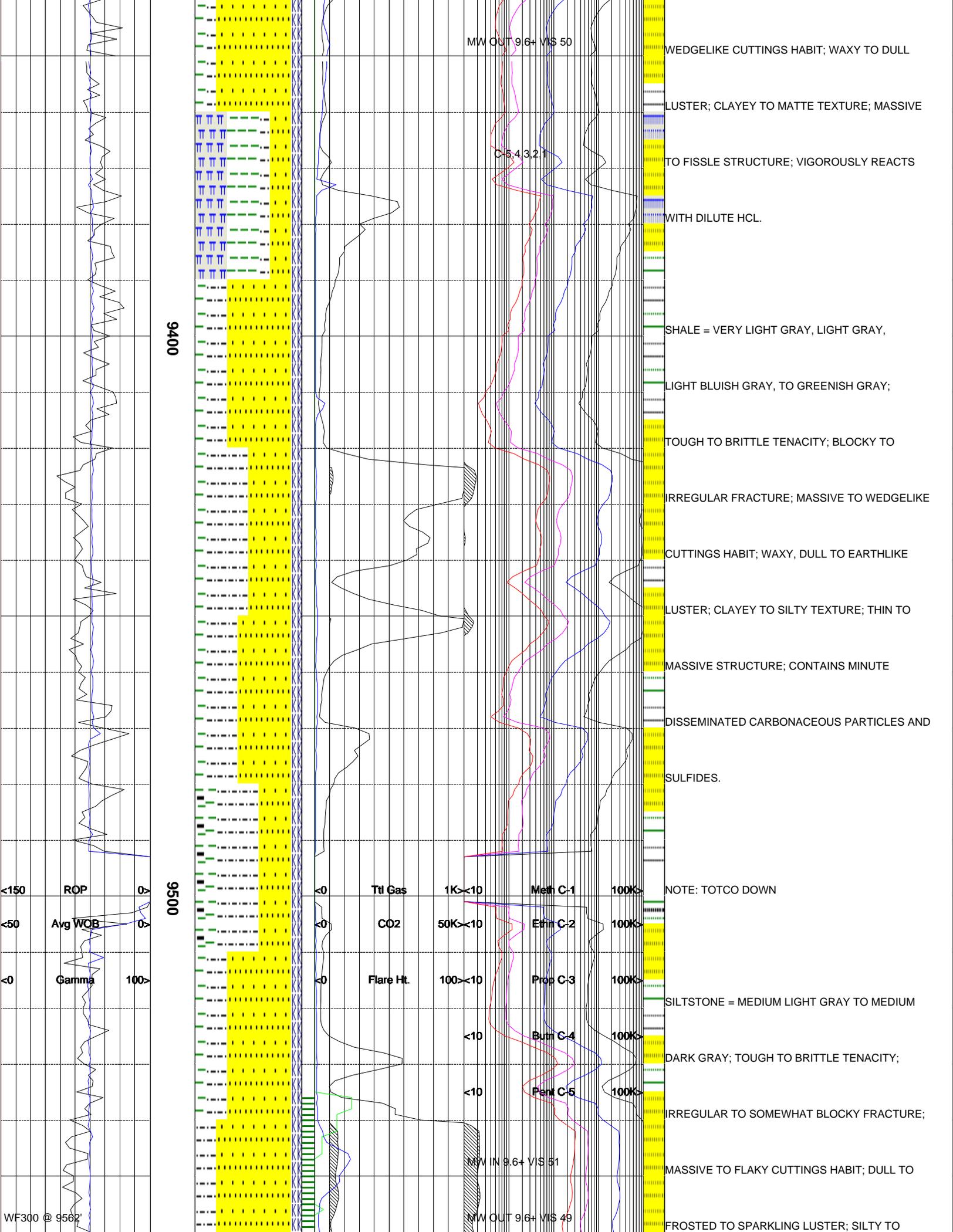
CALCAREOUS MARLSTONE = VERY PALE ORANGE,

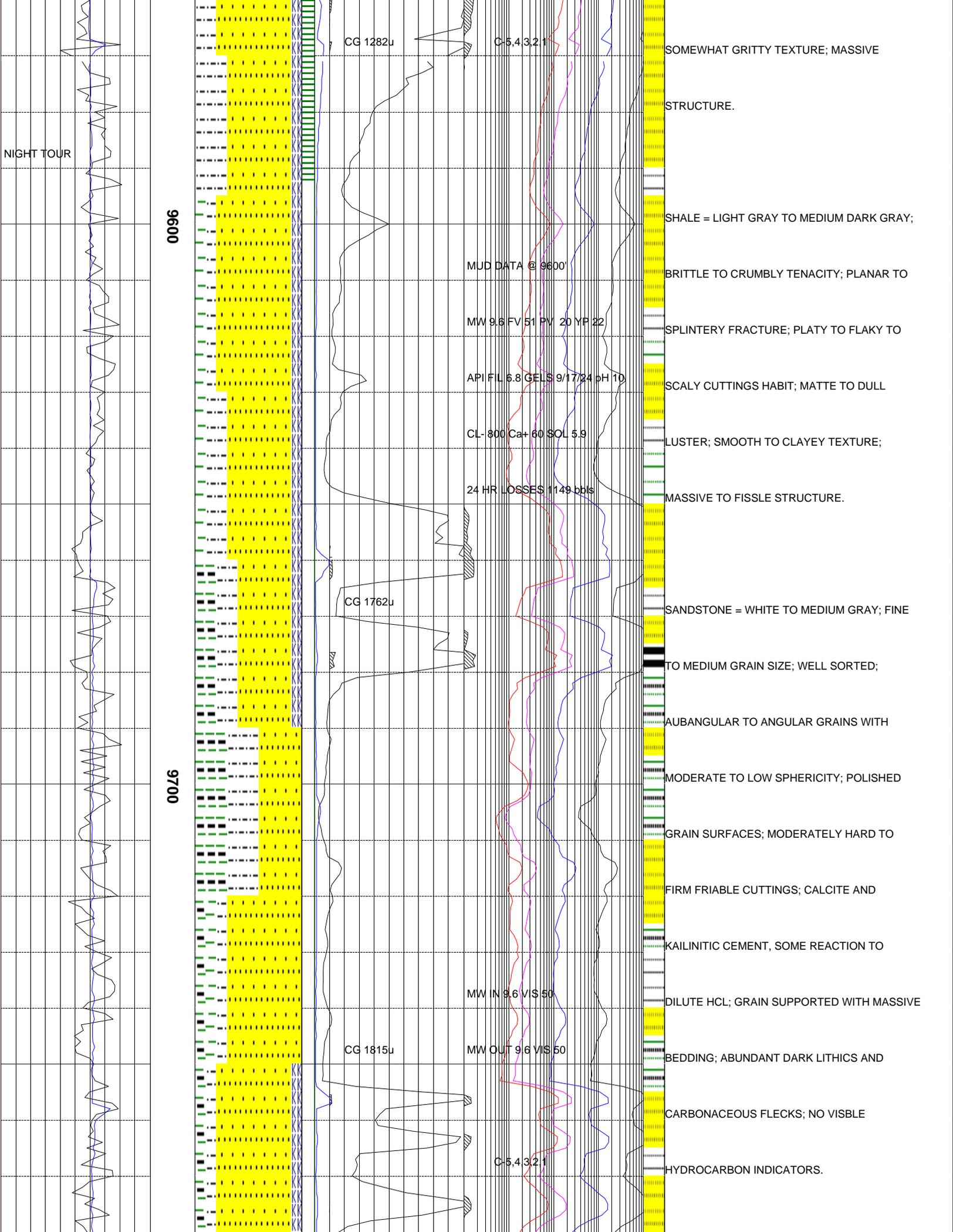
GRAYISH ORANGE, PALE YELLOWISH BROWN;

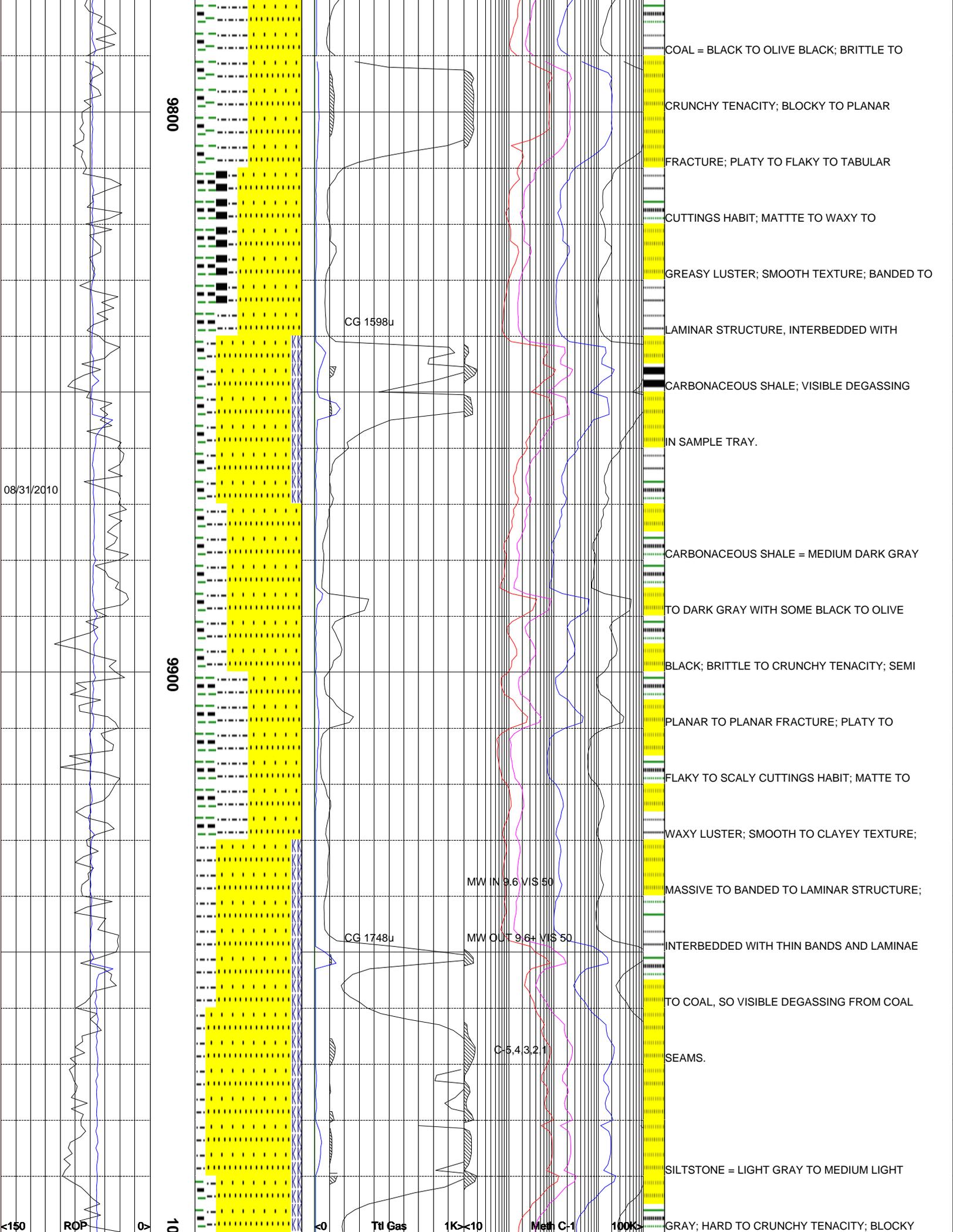
TOUGH TO CRUMBLY TENACITY; BLOCKY TO

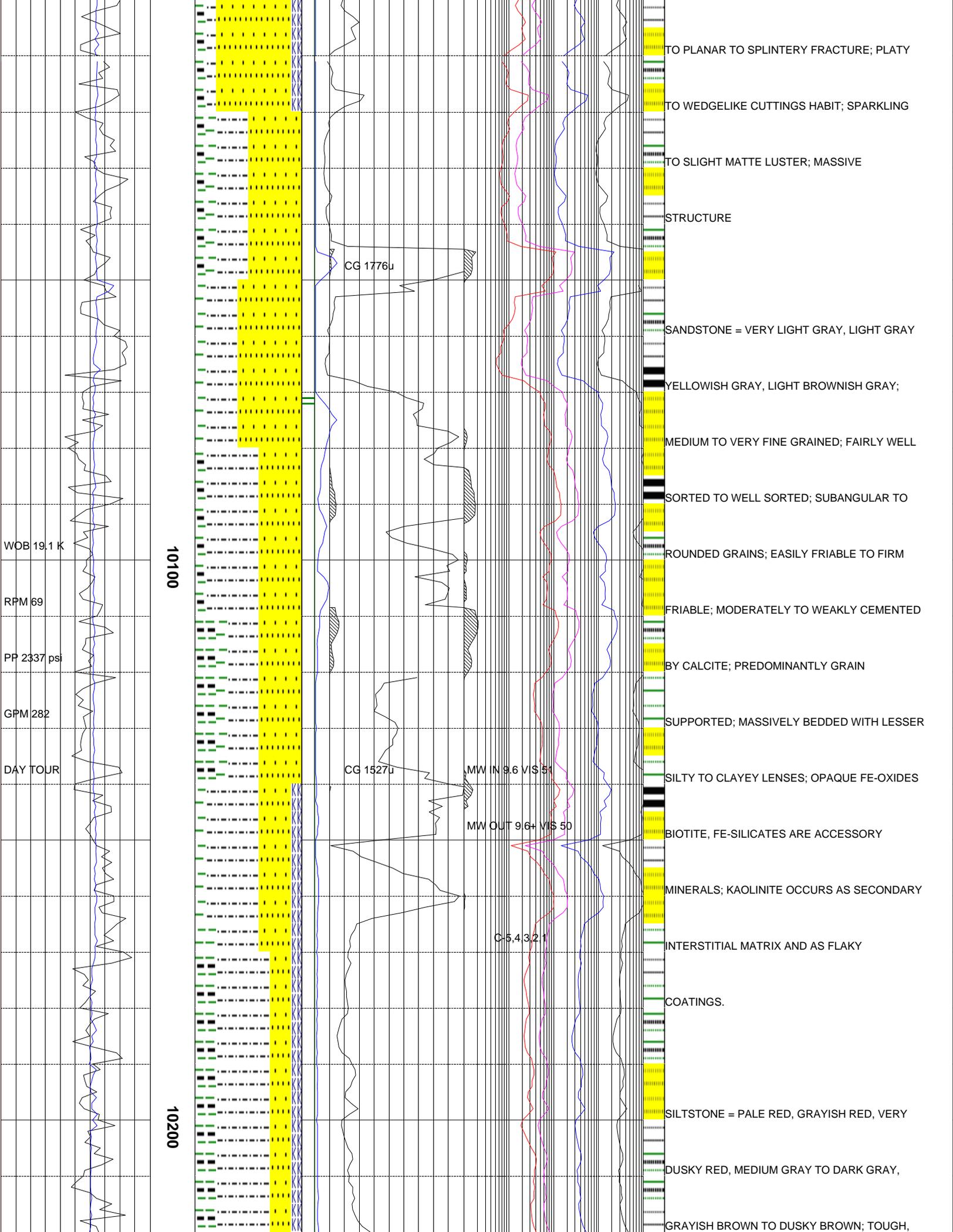
IRREGULAR FRACTURE; MASSIVE, FLAKY TO

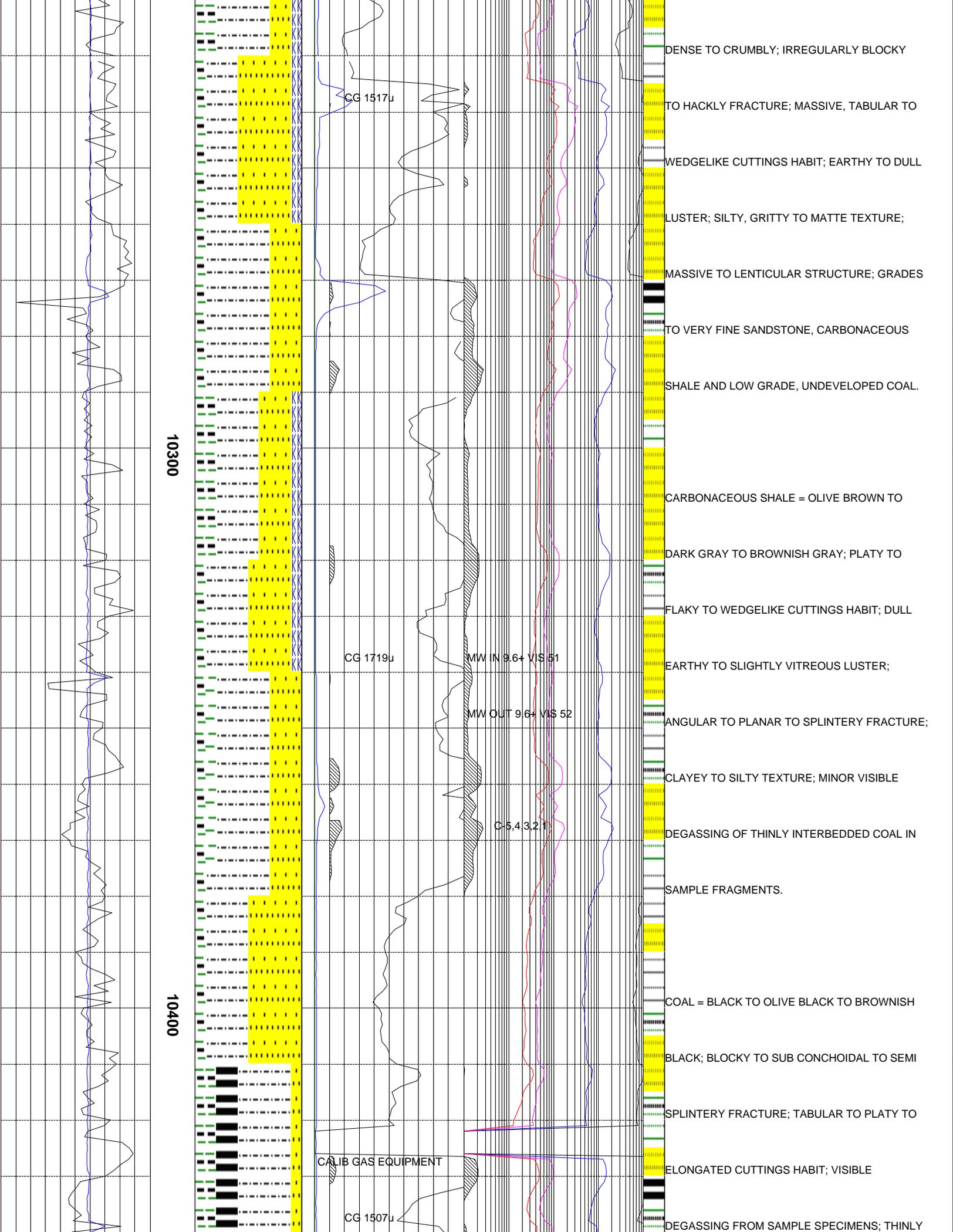


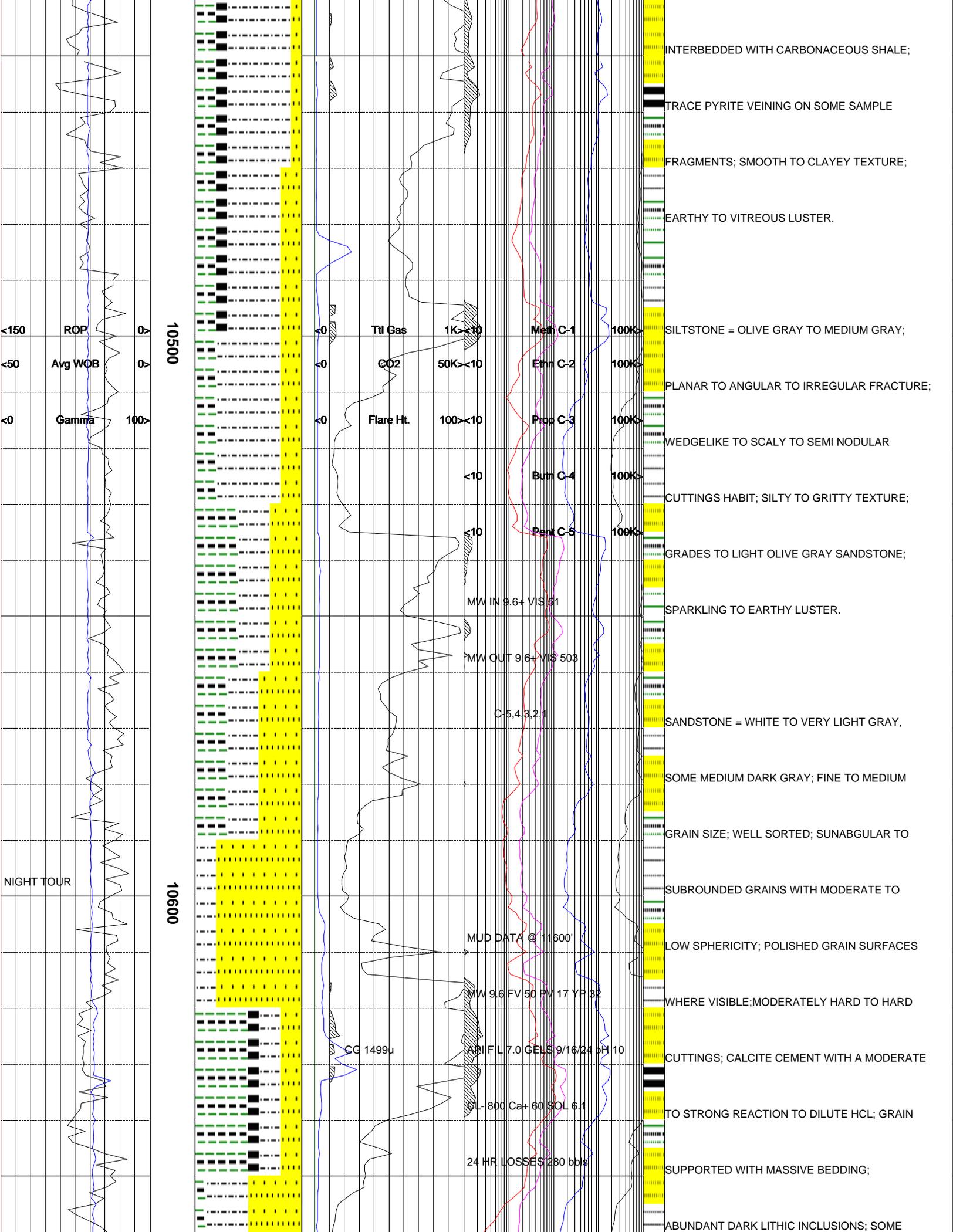












WF200 @ 10670'

10700

10800

09/01/2010

- BLACK TO BROWNISH BLACK CARBONEOUS
- FLECKS; TRACE MICAS AND PYRITE; NO
- VISIBLE HYDROCARBON INCLUSIONS.
- CARBONEOUS SHALE = BLACK TO MEDIUM
- DARK GRAY; BRITTLE TO CRUNCHY TENACITY;
- BLOCKY TO PLANAR TO SEMI PLANAR FRACTURE
- PLATY TO FLAKY TO TABULAR CUTTINGS HABIT
- MATTE TO RESINOUS LUSTER; SMOOTH TO
- CLAYEY TEXTURE; BANDED TO FISSLE
- STRUCTURE, INTERBEDDED WITH THIN BANDS
- OF COAL, SOME VISIBLE DEGASSING OF COAL
- SEAMS IN SAMPLE TRAY.
- COAL = BLACK TO GRAYISH BLACK TO OLIVE
- BLACK; BRITTLE TO CRUNCHY TENACITY;
- BLOCKY TO SEMI PLANAR TO PLANAR FRACTURE
- PLATY TO FLAKY TO TABULAR CUTTINGS HABIT
- MATTE TO RESINOUS TO WAXY LUSTER; SMOOTH
- TO CLAYEY TO MATTE TEXTURE; LAMINAR TO
- BANDED STRUCTURE, INTERBEDDED WITH
- CARBONEOUS SHALE AND SANDSTONE,

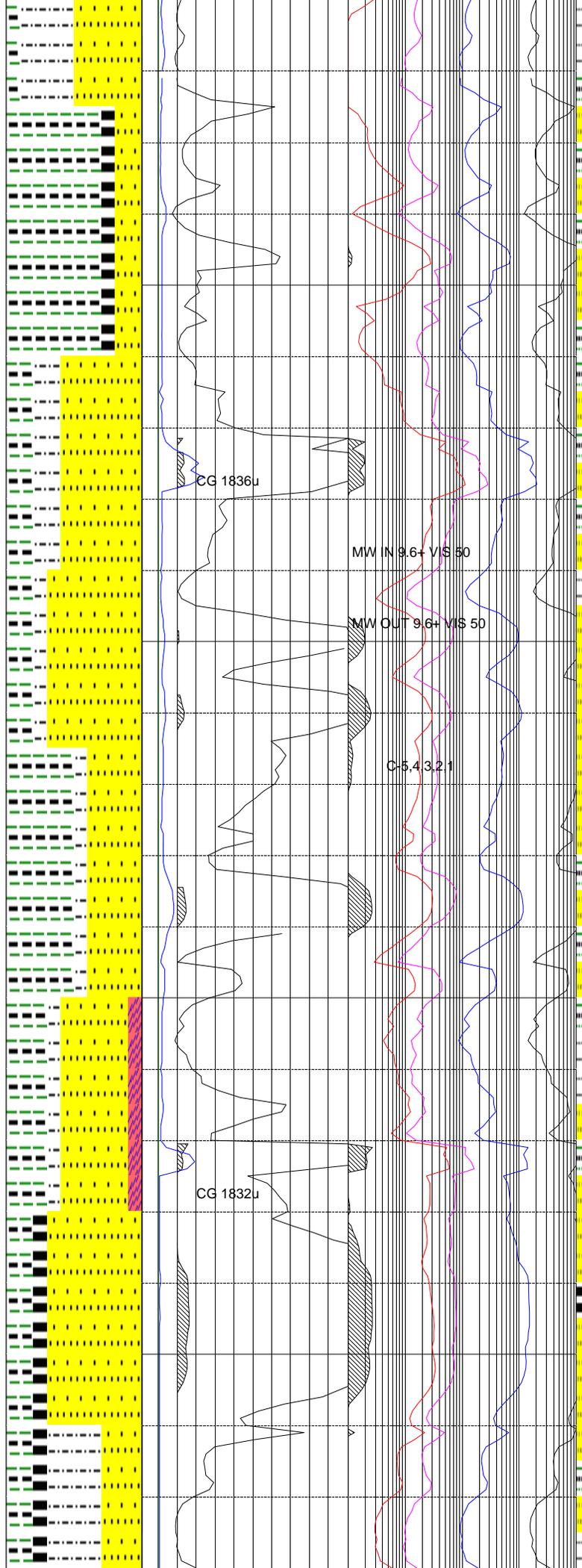
CG 1836u

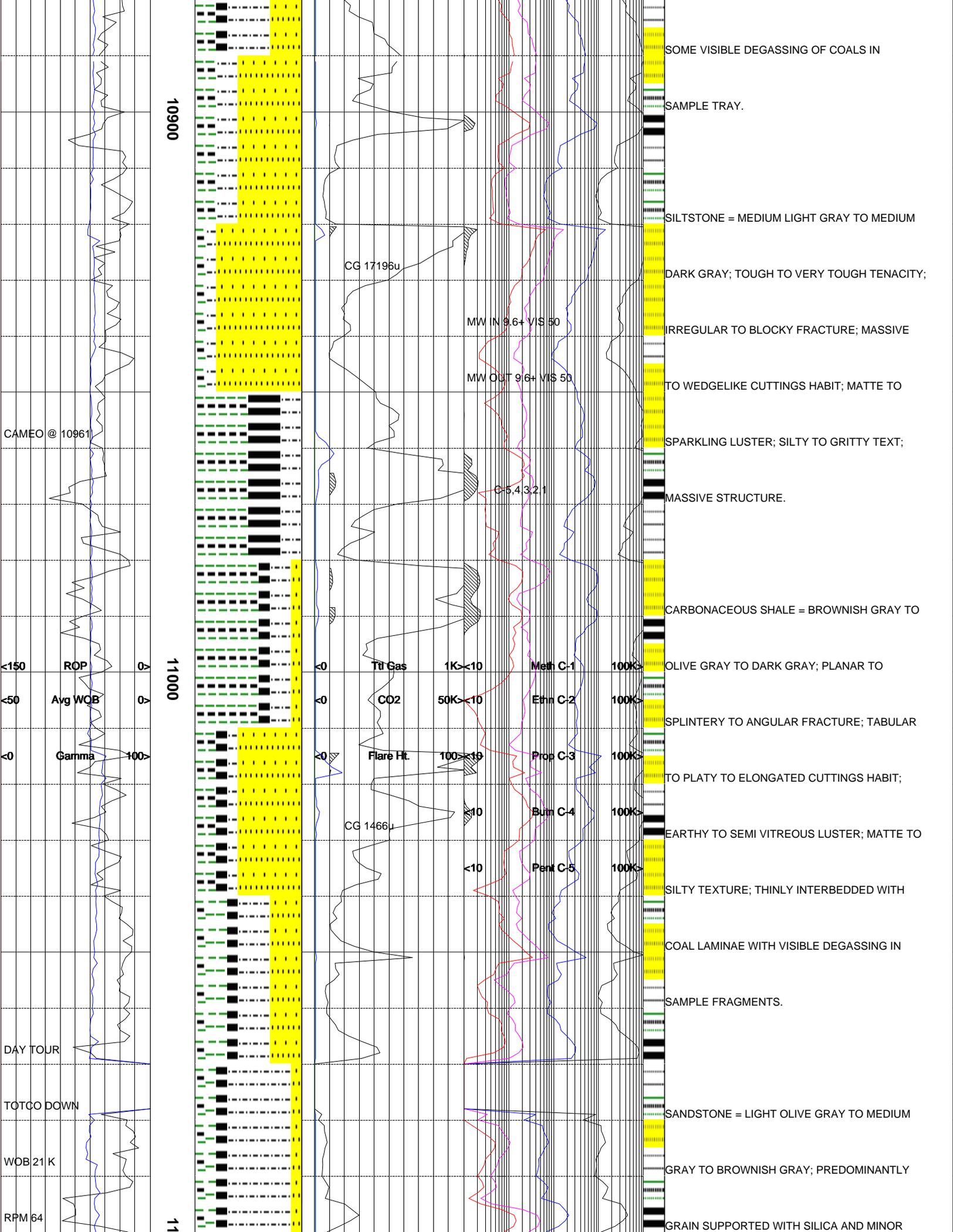
MW IN 9.6+ VIS 50

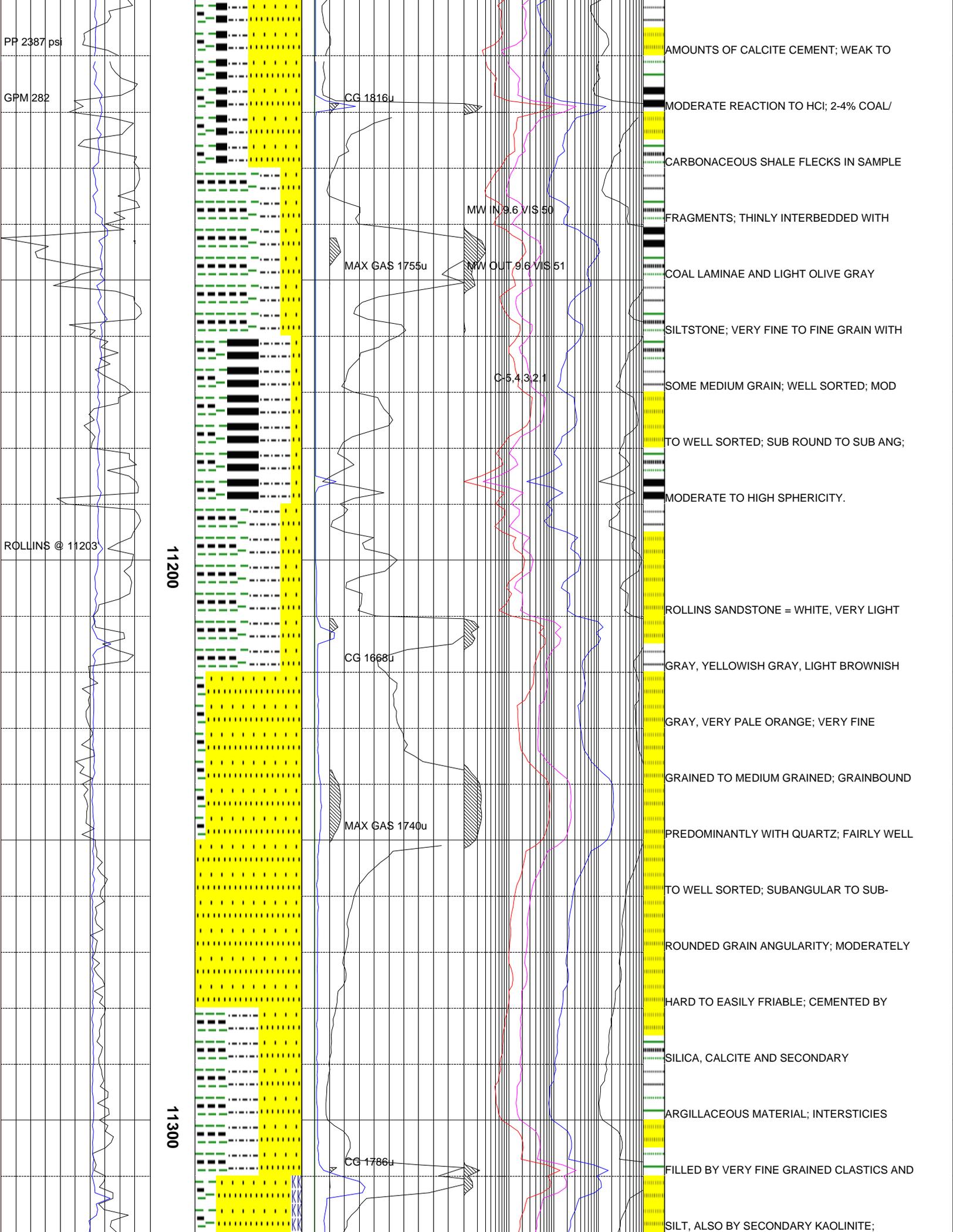
MW OUT 9.6+ VIS 50

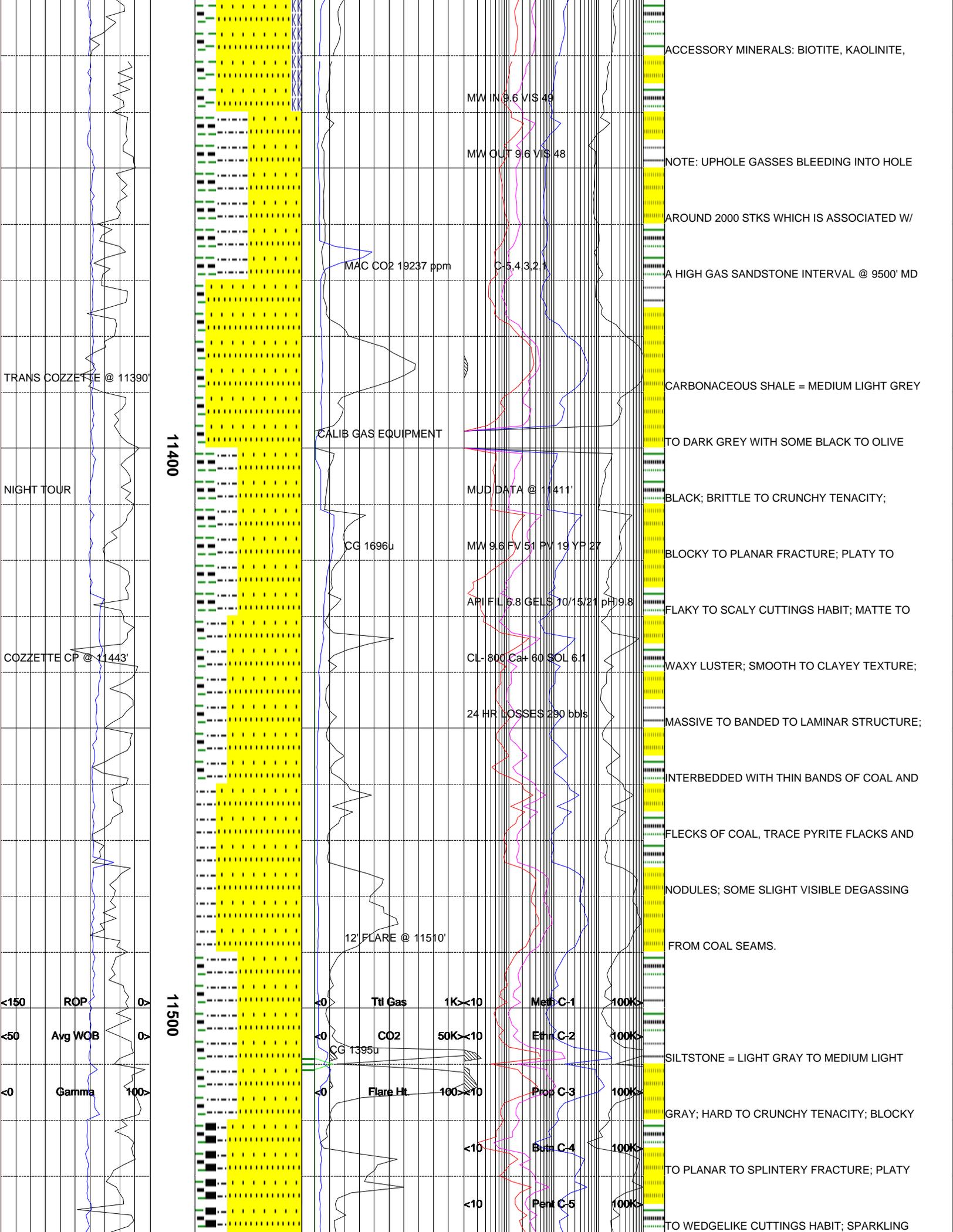
C-54321

CG 1832u









09/02/2010

DAY TOUR

CORCORAN CP @ 11696

11600

11700

MW IN 9.6 V/S 50

MW OUT 9.6 V/S 50

C-5.4321

20' FLARE @ 11604'

CG 499u

CG 706u

MW IN 9.6 V/S 50

MW OUT 9.6 V/S 50

TO SLIGHT MATTE LUSTER; MASSIVE TO

LENTICULAR STRUCTURE; GRADATIONAL IN

TEXTURE TO CARBONACEOUS SHALE.

SHALE = LIGHT BLuish GRAY, LIGHT GRAY,

TO MEDIUM LIGHT GRAY; TOUGH TO BRITTLE

TENACITY; BLOCKY TO IRREGULAR FRACTURE;

MASSIVE, TABULAR TO WEDGELIKE CUTTINGS

HABIT; DULL TO WAXY LUSTER; CLAYEY,

MATTE TO SLIGHTLY GRITTY TEXTURE;

MASSIVE STRUCTURE WITHOUT PLANAR

FEATURES; FRACTURE SURFACES SHOW

DISSEMINATED CARBON FRAGMENTS AND

SULFIDES.

SANDSTONE = WHITE, VERY PALE ORANGE, TO

YELLOWISH GRAY; VERY FINE GRAINED TO

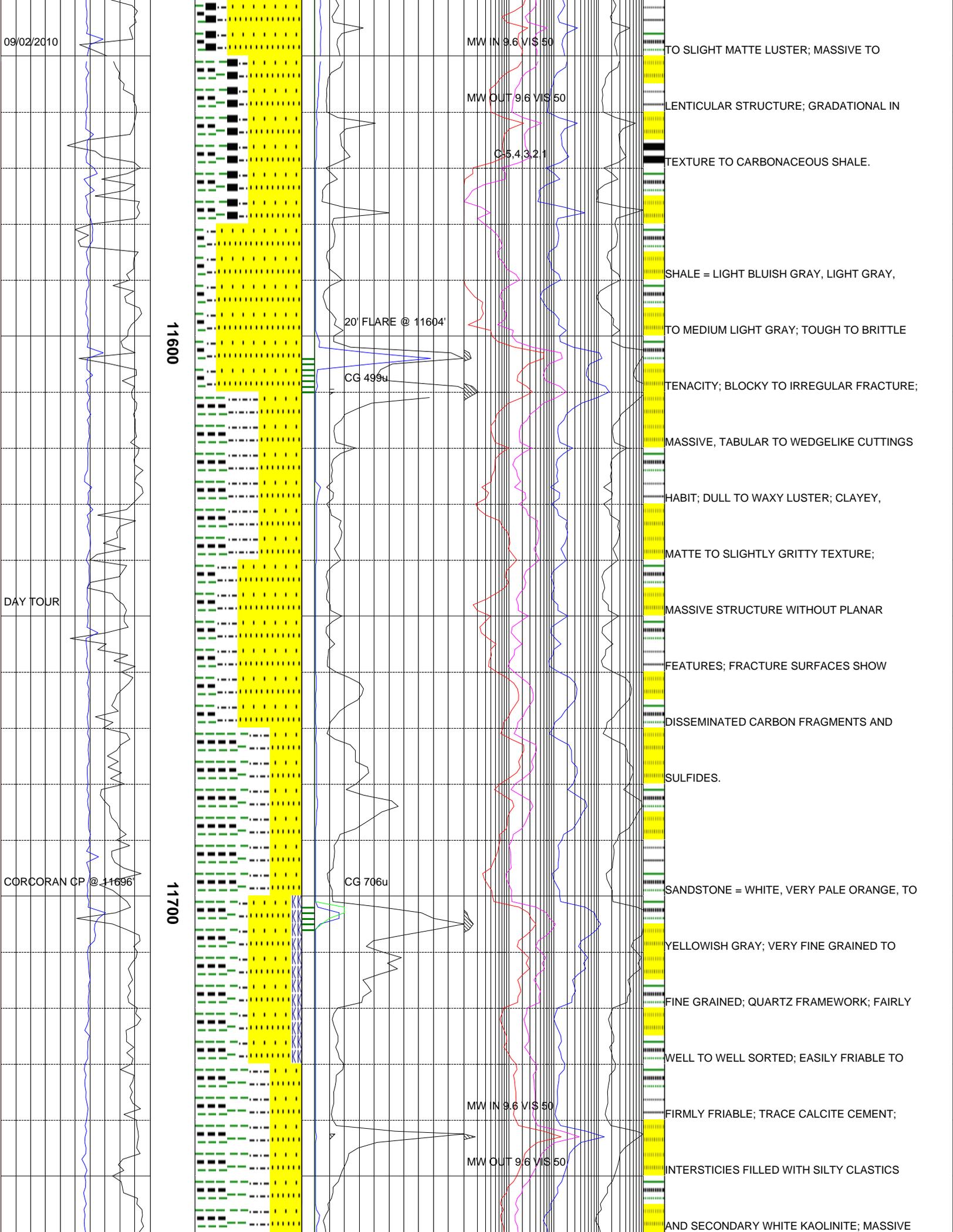
FINE GRAINED; QUARTZ FRAMEWORK; FAIRLY

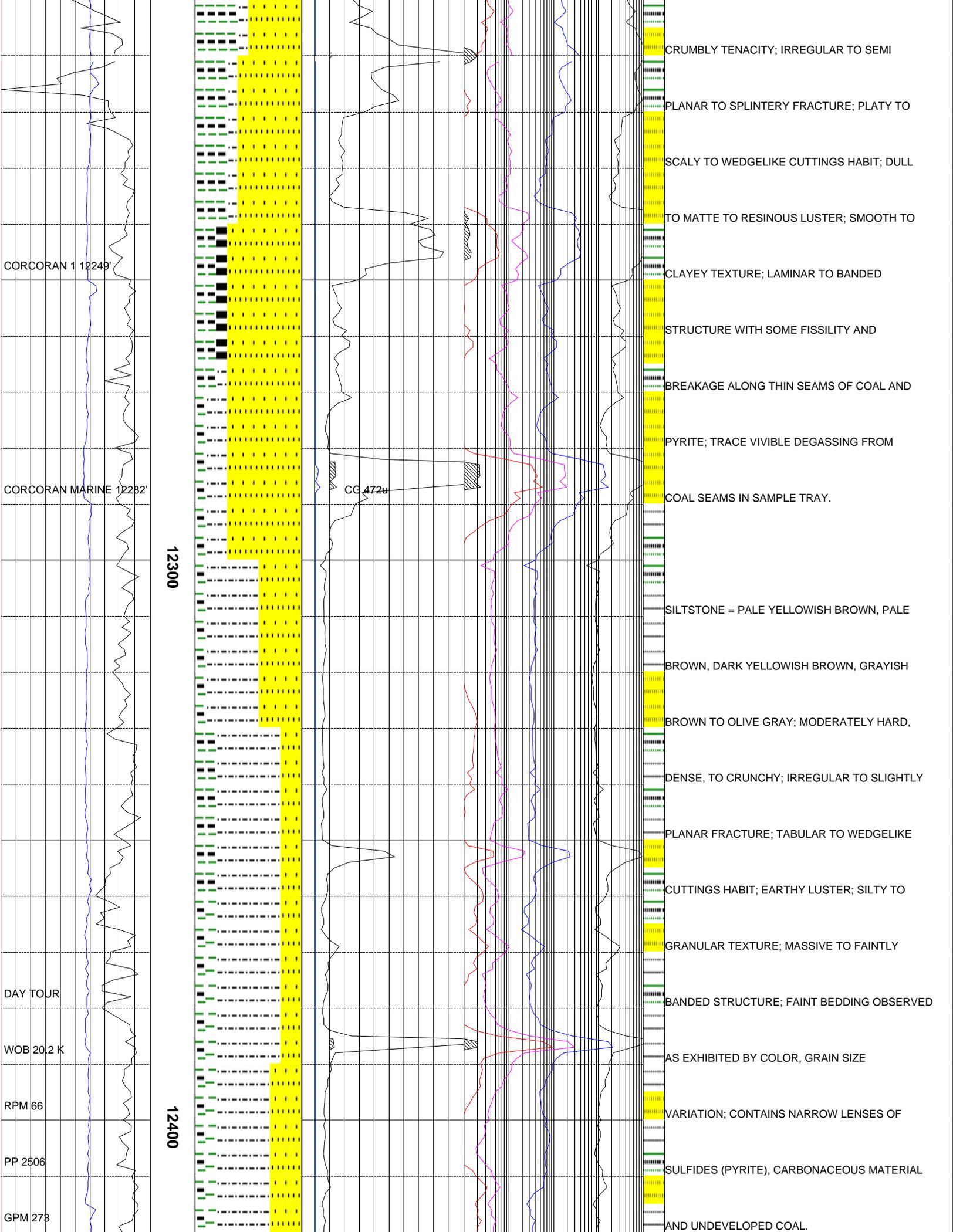
WELL TO WELL SORTED; EASILY FRIABLE TO

FIRMLY FRIABLE; TRACE CALCITE CEMENT;

INTERSTICIES FILLED WITH SILTY CLASTICS

AND SECONDARY WHITE KAOLINITE; MASSIVE





CRUMBLY TENACITY; IRREGULAR TO SEMI

PLANAR TO SPLINTERY FRACTURE; PLATY TO

SCALY TO WEDGELIKE CUTTINGS HABIT; DULL

TO MATTE TO RESINOUS LUSTER; SMOOTH TO

CORCORAN 1 12249

CLAYEY TEXTURE; LAMINAR TO BANDED

STRUCTURE WITH SOME FISSILITY AND

BREAKAGE ALONG THIN SEAMS OF COAL AND

CORCORAN MARINE 12282

CG 472u

PYRITE; TRACE VISIBLE DEGASSING FROM

COAL SEAMS IN SAMPLE TRAY.

12300

SILTSTONE = PALE YELLOWISH BROWN, PALE

BROWN, DARK YELLOWISH BROWN, GRAYISH

BROWN TO OLIVE GRAY; MODERATELY HARD,

DENSE, TO CRUNCHY; IRREGULAR TO SLIGHTLY

PLANAR FRACTURE; TABULAR TO WEDGELIKE

CUTTINGS HABIT; EARTHY LUSTER; SILTY TO

GRANULAR TEXTURE; MASSIVE TO FAINTLY

DAY TOUR

BANDED STRUCTURE; FAINT BEDDING OBSERVED

WOB 20.2 K

AS EXHIBITED BY COLOR, GRAIN SIZE

RPM 66

VARIATION; CONTAINS NARROW LENSES OF

PP 2506

SULFIDES (PYRITE), CARBONACEOUS MATERIAL

GPM 273

AND UNDEVELOPED COAL.

12400

