



Copyright © 2003 by Epoch Well Services, Inc.

Houston, TX
(281) 784-5500
Bakersfield, CA
(661) 328-1595
New Iberia, LA
(337) 364-2322
Anchorage, AK
(907) 561-2465

MUDLOG MD

COMPANY	EXXONMOBIL
WELL	FRU197-33A2
FIELD	FREEDOM RANCH UNIT
REGION	ROCKIES
COORDINATES	39.915658 108.285631
ELEVATION	6390'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	05-103-11098-00
SPUD DATE	2/1/2009
CONTRACTOR	HELMRICH AND PAYNE
CO. REP.	KEVIN GARDNER
RIG/TYPE	239 / Flex 3
LOGGING UNIT	MLU 033
GEOLOGISTS	LAYNE GOOD NICK BAUER
ADD. PERSONS	JASON REISENBICHLER
CO. GEOLOGIST	MELISSA SAURBORN

LOG INTERVAL

DEPTHS: 4000' **TO** 12297'
DATES: 6/26/2009 **TO** 7/10/2009
SCALE: 5" = 100'

CASING DATA

16" **AT** 130'
10.75" **AT** 3956'
7" **AT** 8536'

AT

HOLE SIZE

14.75" **TO** 3983'
9.875" **TO** 8555'
6.125" **TO** 12297'
TO

MUD TYPES

SPUD MUD **TO** 3983'
LSND **TO** 12297'
TO
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	

[illegible]

I-PENTANE = 1000PPM

N-PENTANE = 1000PPM

WHEN THE MUD IS RUN THROUGH THE MGS (MUD
GAS SEPARATOR) THE INTERVAL IS MARKED ON
THE LOG IN THE SLIDE COLUMN AND NOTED ON
THE LOG.

ALL SANDSTONE INTERVALS ARE EXAMINED FOR
SAMPLE FLUORESCENCE IN THE UV SCOPE FOR
HYDROCARBON FLUOREESCENCE AND MINOR
FLUORESCENCE FROM POSSIBLE FRACTURE
FILL. ALL FLUORESCENCE IS NOTED ON THE
MUDLOG.

10.75" SURFACE CASING WAS SET AT 3956'

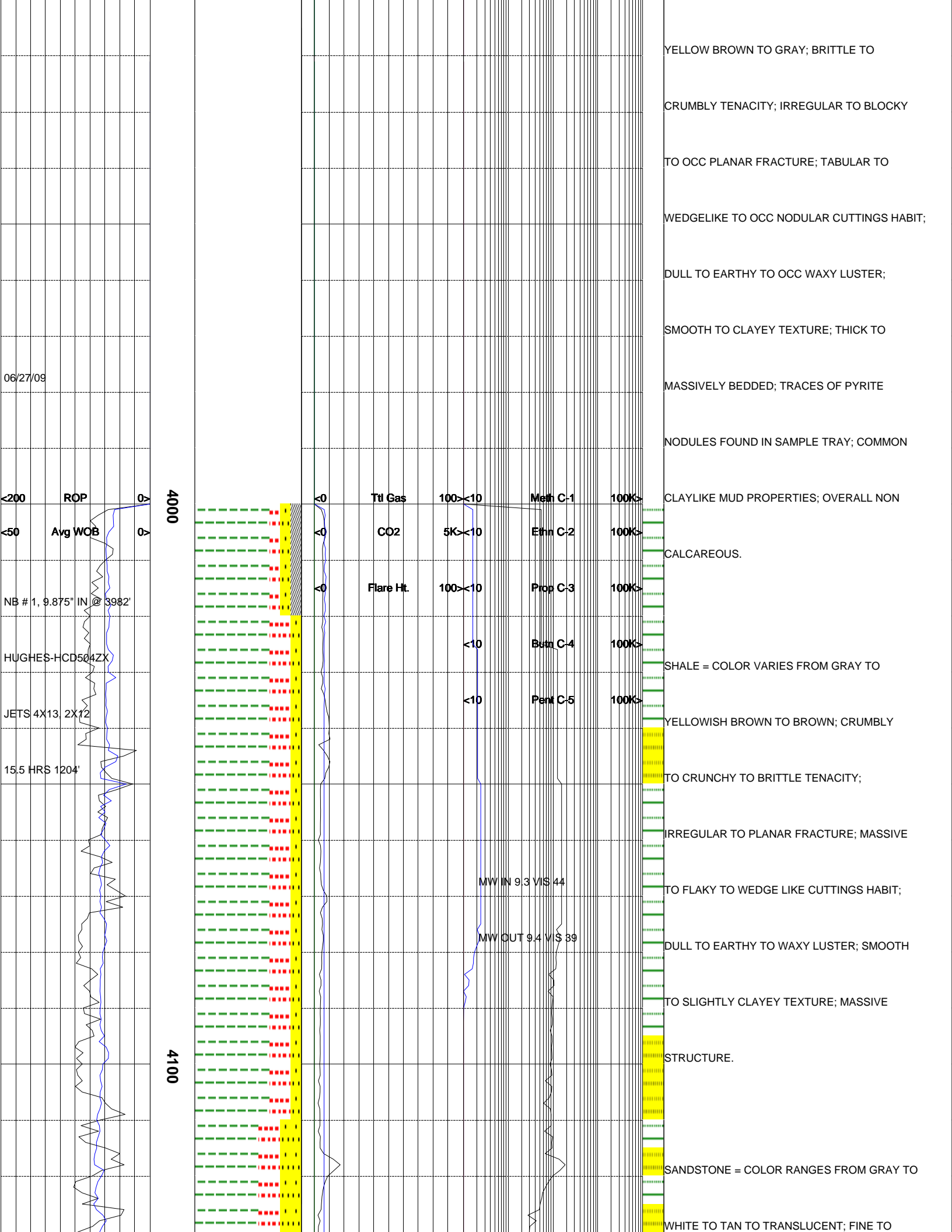
CANRIG DRILLING TECHNOLOGY LTD.
COMMENCED FULL LOGGING SERVICES ON
06/26/2009.

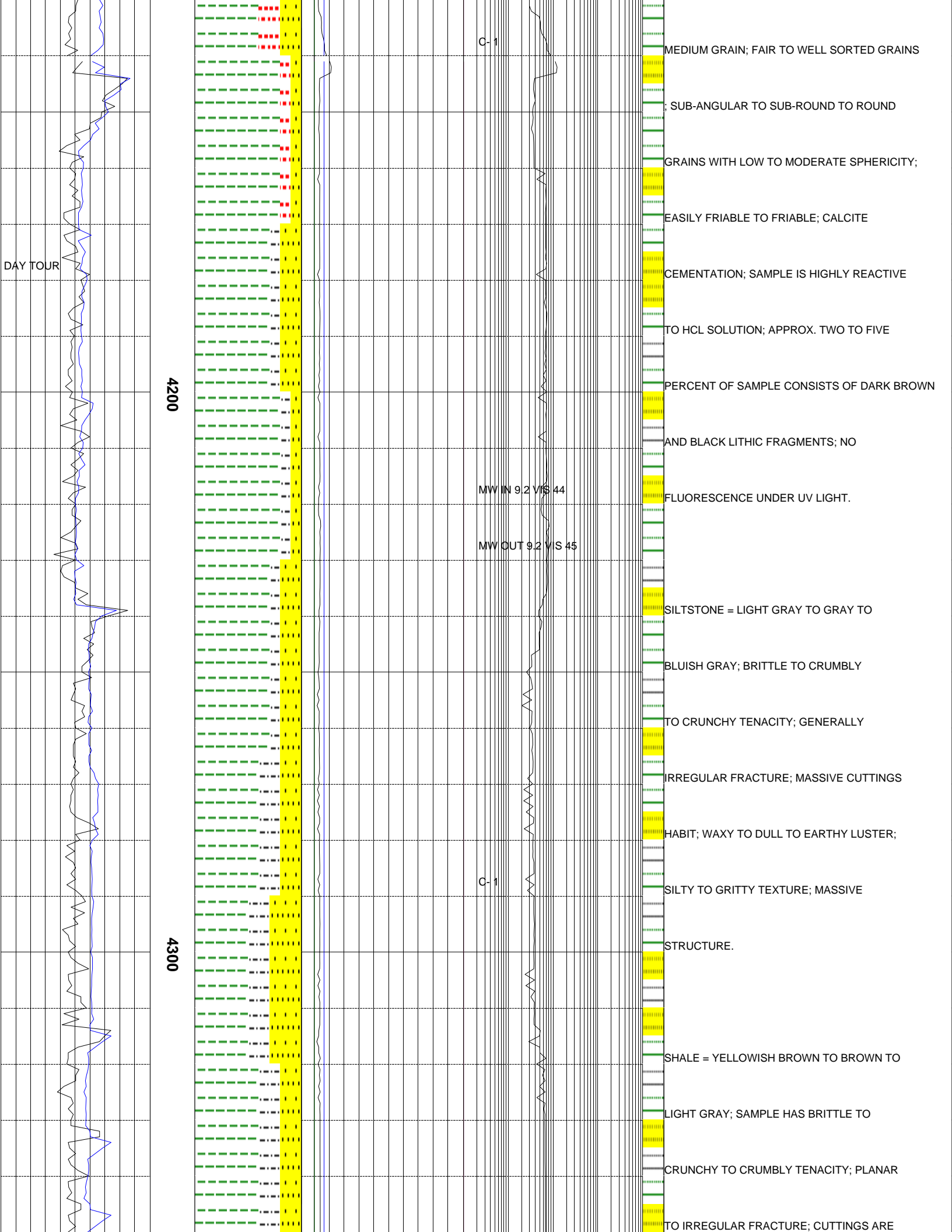
SHALE = LIGHT BLUISH GRAY TO LIGHT

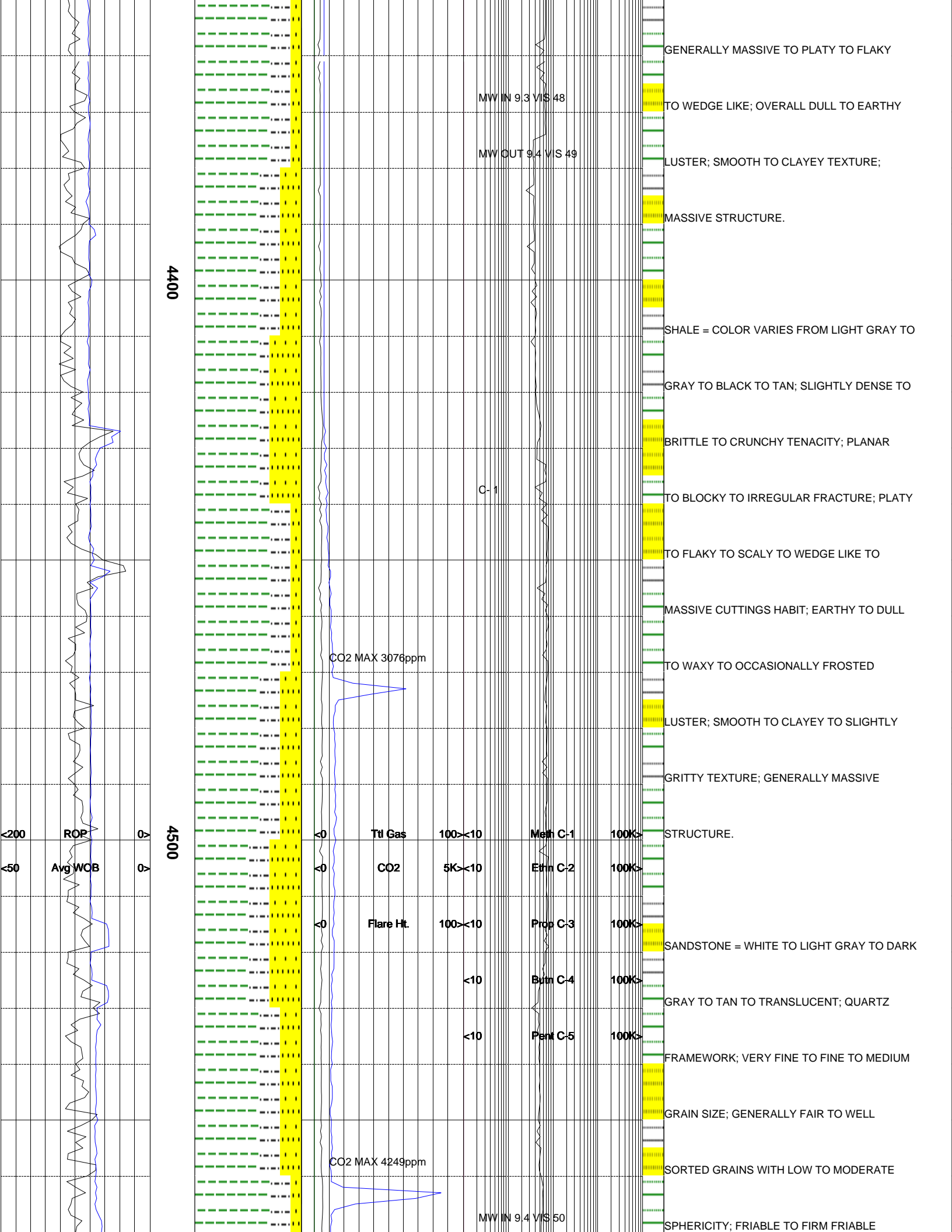
3700

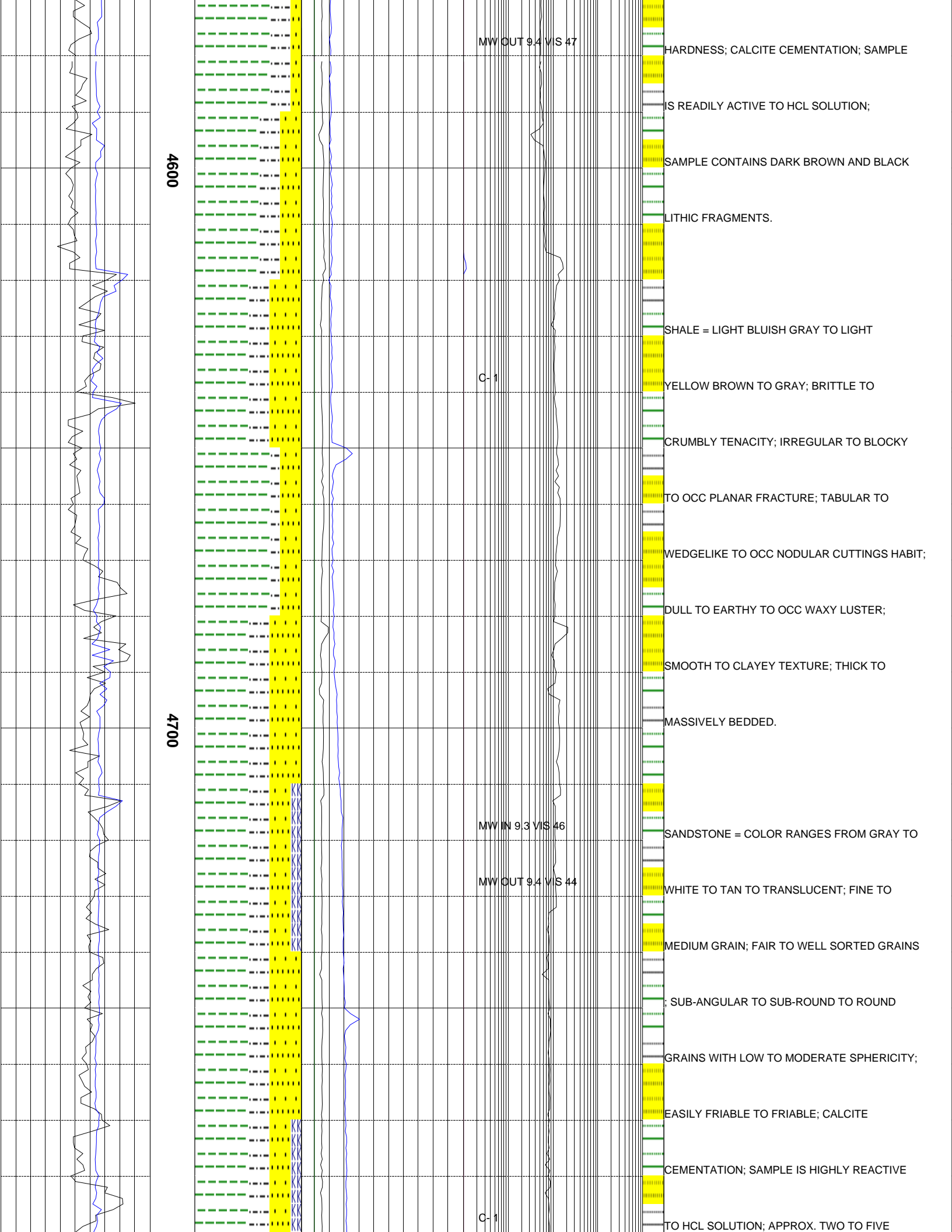
3800

3900









4600

4700

MW OUT 9.4 V/S 47

C-1

MW IN 9.3 V/S 46

MW OUT 9.4 V/S 44

C-1

HARDNESS; CALCITE CEMENTATION; SAMPLE

IS READILY ACTIVE TO HCL SOLUTION;

SAMPLE CONTAINS DARK BROWN AND BLACK

LITHIC FRAGMENTS.

SHALE = LIGHT BLUISH GRAY TO LIGHT

YELLOW BROWN TO GRAY; BRITTLE TO

CRUMBLY TENACITY; IRREGULAR TO BLOCKY

TO OCC PLANAR FRACTURE; TABULAR TO

WEDGELIKE TO OCC NODULAR CUTTINGS HABIT;

DULL TO EARTHY TO OCC WAXY LUSTER;

SMOOTH TO CLAYEY TEXTURE; THICK TO

MASSIVELY BEDDED.

SANDSTONE = COLOR RANGES FROM GRAY TO

WHITE TO TAN TO TRANSLUCENT; FINE TO

MEDIUM GRAIN; FAIR TO WELL SORTED GRAINS

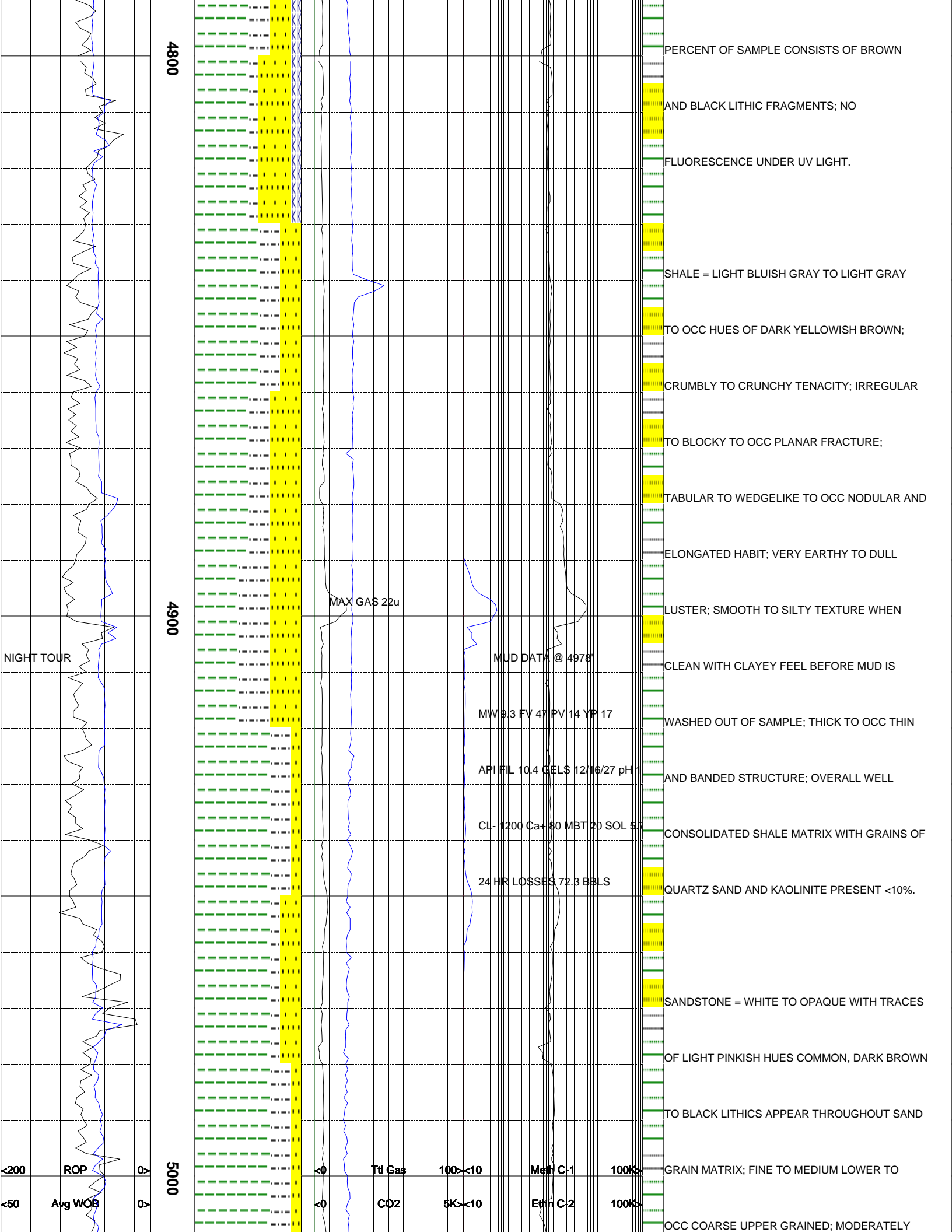
; SUB-ANGULAR TO SUB-ROUND TO ROUND

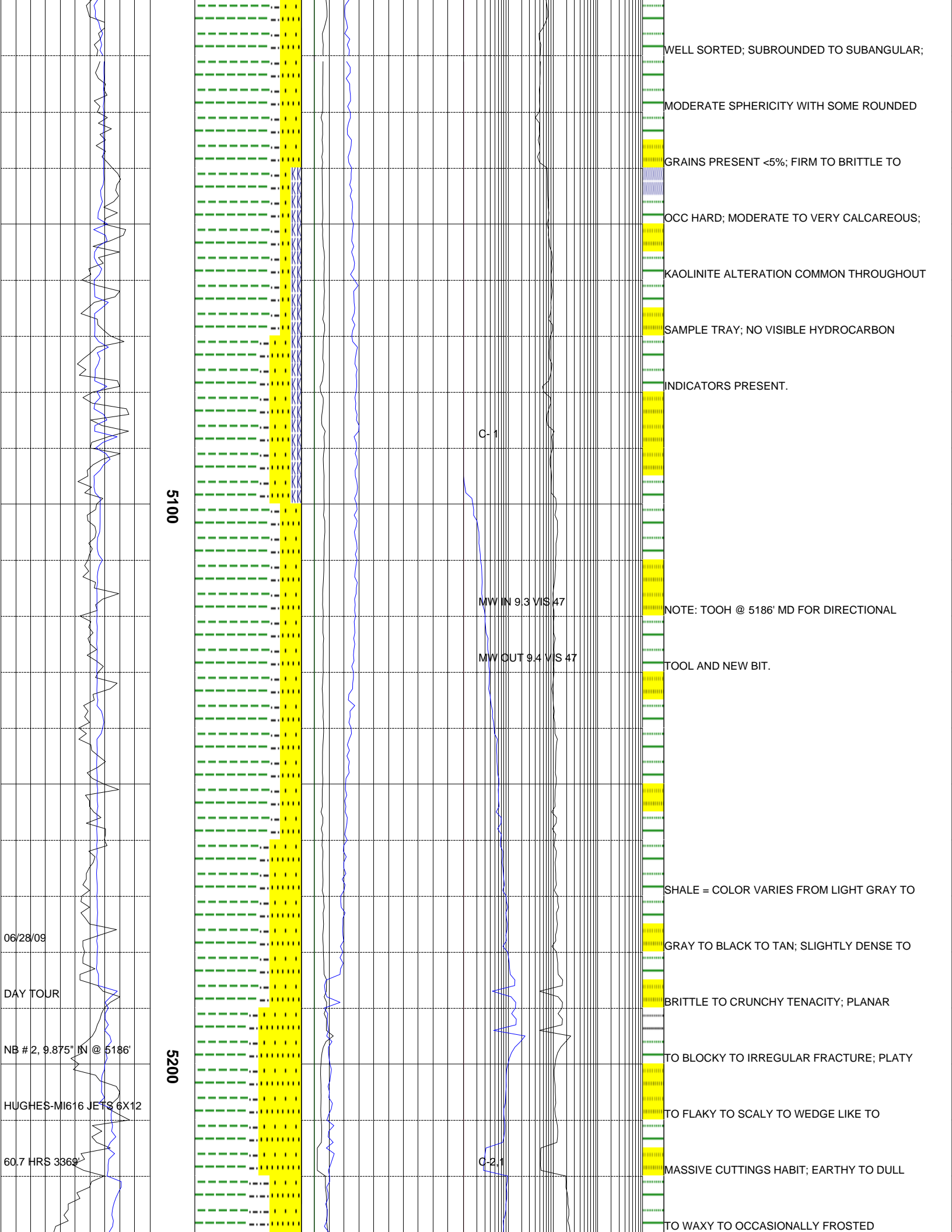
GRAINS WITH LOW TO MODERATE SPHERICITY;

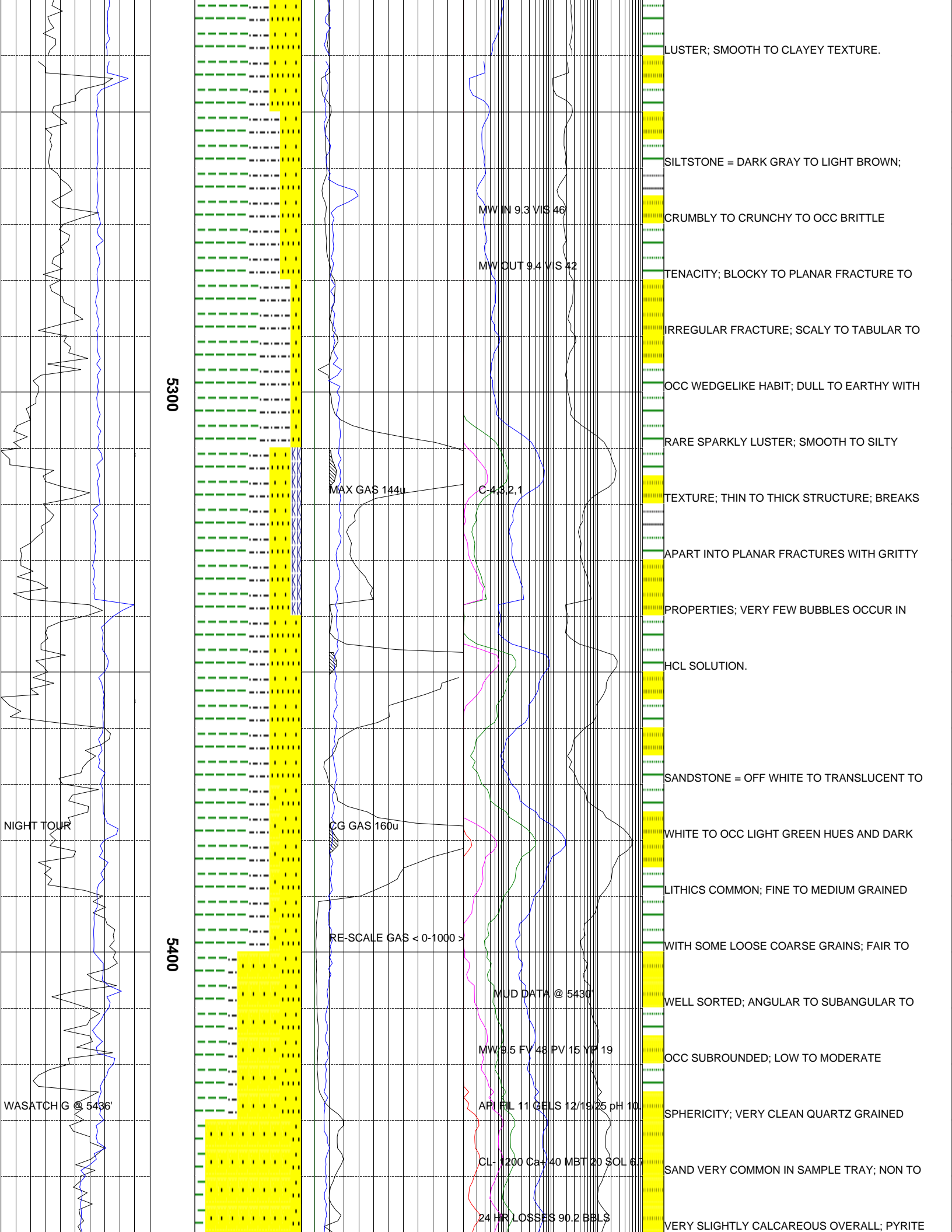
EASILY FRIABLE TO FRIABLE; CALCITE

CEMENTATION; SAMPLE IS HIGHLY REACTIVE

TO HCL SOLUTION; APPROX. TWO TO FIVE







5300

5400

NIGHT TOUR

WASATCH G @ 5436

MAX GAS 144u

CG GAS 160u

RE-SCALE GAS < 0-1000 >

MW IN 9.3 VIS 46

MW OUT 9.4 VIS 42

C-432.1

MUD DATA @ 5430

MW 9.5 FV 48 PV 15 YF 19

API FIL 11 GELS 12/19/25 pH 10

CL- 1200 Ca+ 40 MBT 20 SOL 6.7

24 HR LOSSES 90.2 BBL/S

CLUSTER; SMOOTH TO CLAYEY TEXTURE.

SILTSTONE = DARK GRAY TO LIGHT BROWN;

CRUMBLY TO CRUNCHY TO OCC BRITTLE

TENACITY; BLOCKY TO PLANAR FRACTURE TO

IRREGULAR FRACTURE; SCALY TO TABULAR TO

OCC WEDGELIKE HABIT; DULL TO EARTHY WITH

RARE SPARKLY LUSTER; SMOOTH TO SILTY

TEXTURE; THIN TO THICK STRUCTURE; BREAKS

APART INTO PLANAR FRACTURES WITH GRITTY

PROPERTIES; VERY FEW BUBBLES OCCUR IN

HCL SOLUTION.

SANDSTONE = OFF WHITE TO TRANSLUCENT TO

WHITE TO OCC LIGHT GREEN HUES AND DARK

LITHICS COMMON; FINE TO MEDIUM GRAINED

WITH SOME LOOSE COARSE GRAINS; FAIR TO

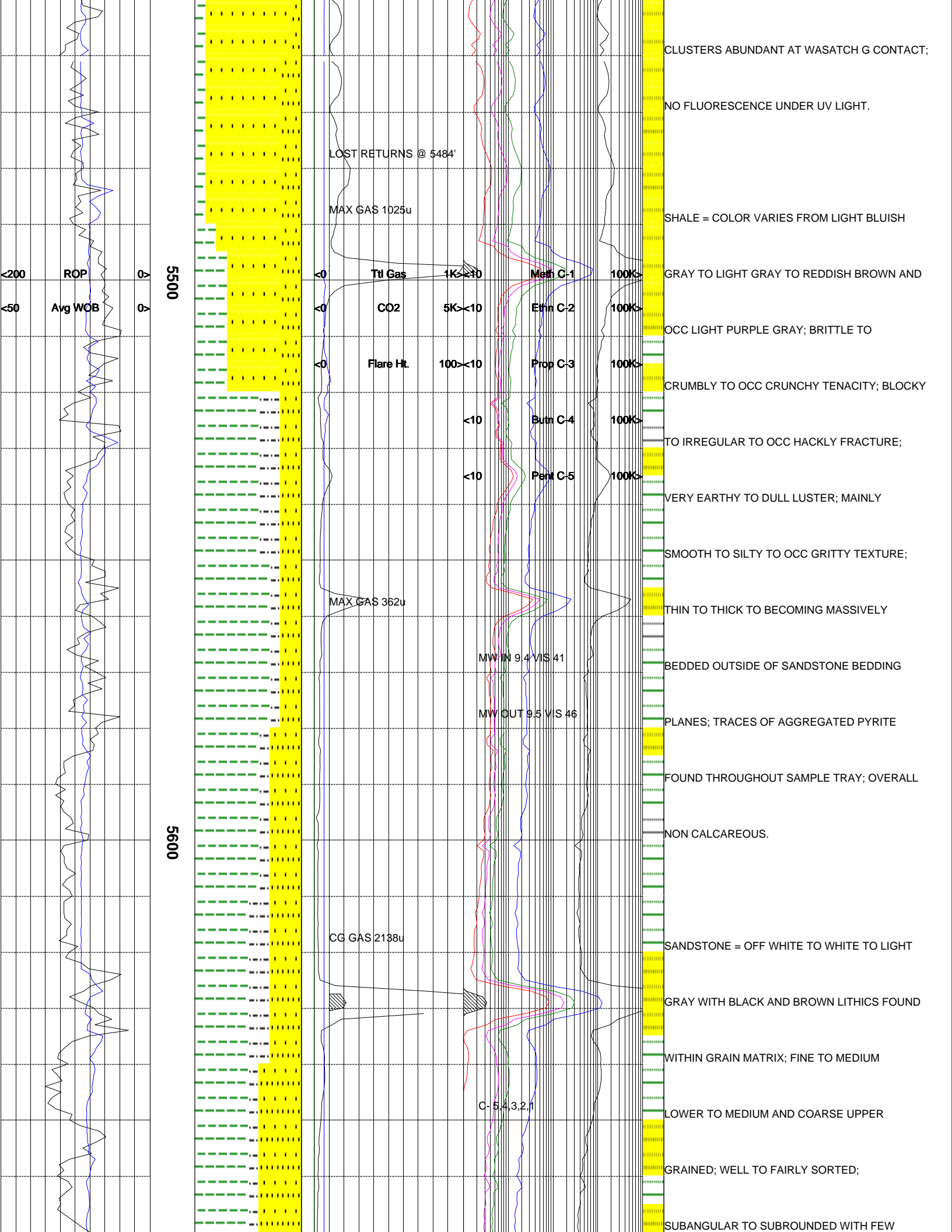
WELL SORTED; ANGULAR TO SUBANGULAR TO

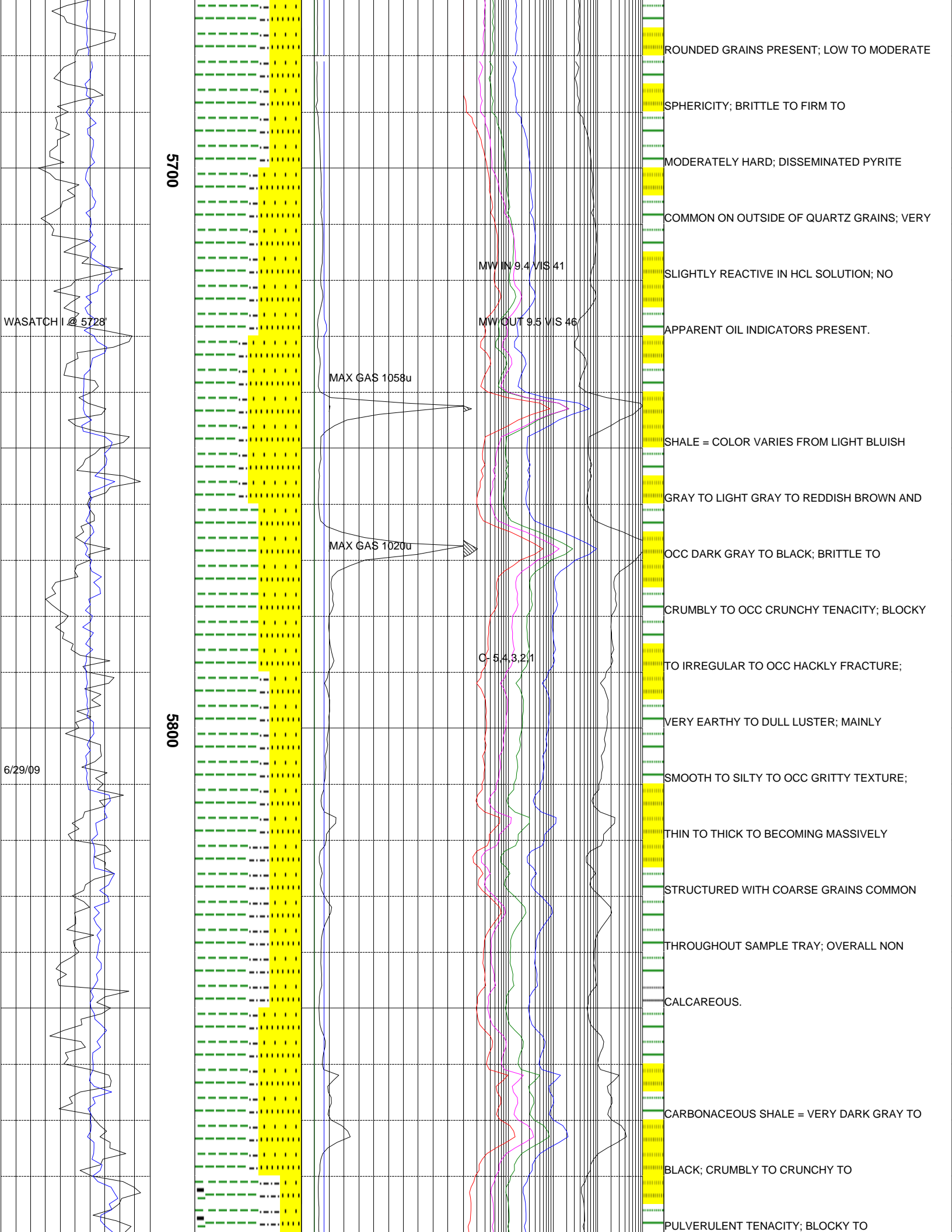
OCC SUBROUNDED; LOW TO MODERATE

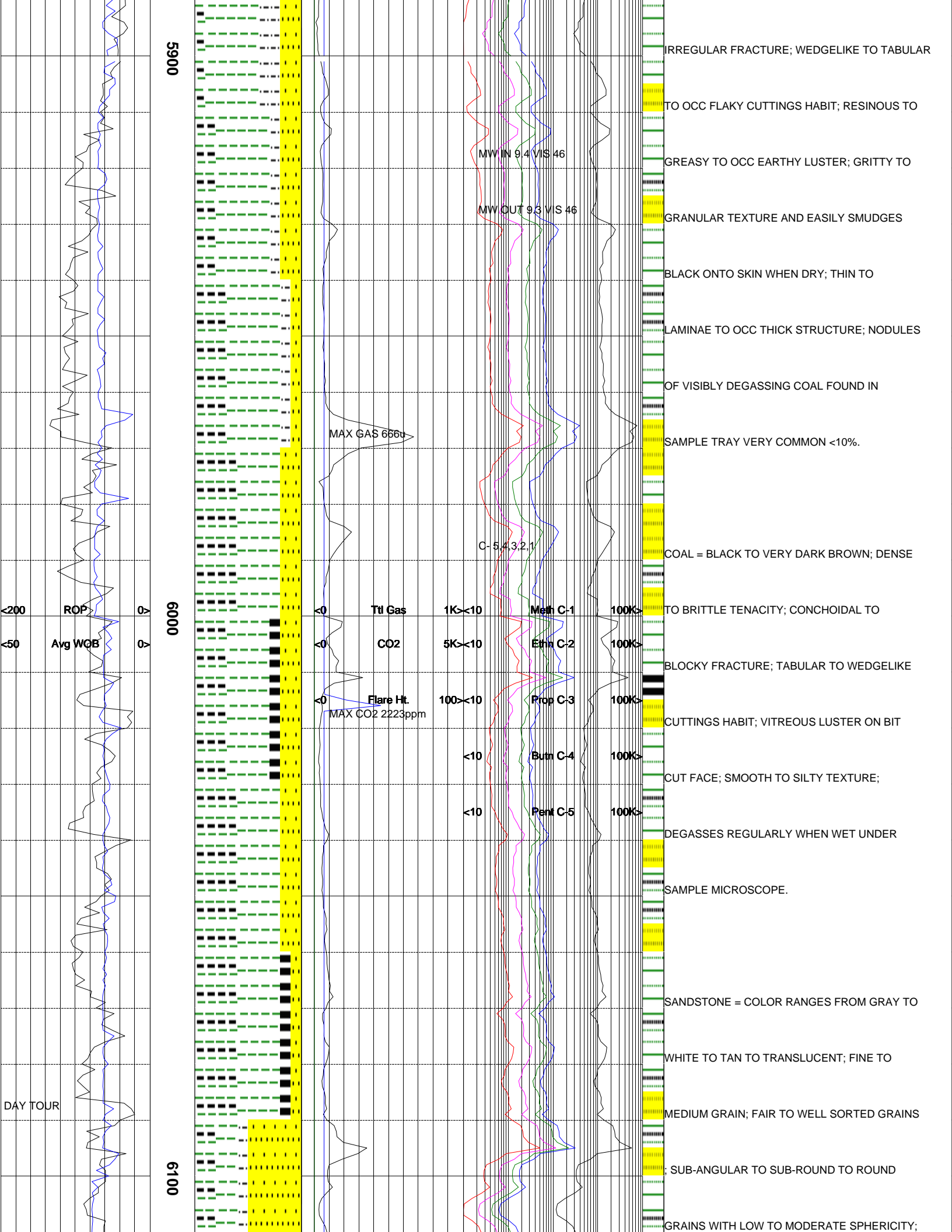
SPHERICITY; VERY CLEAN QUARTZ GRAINED

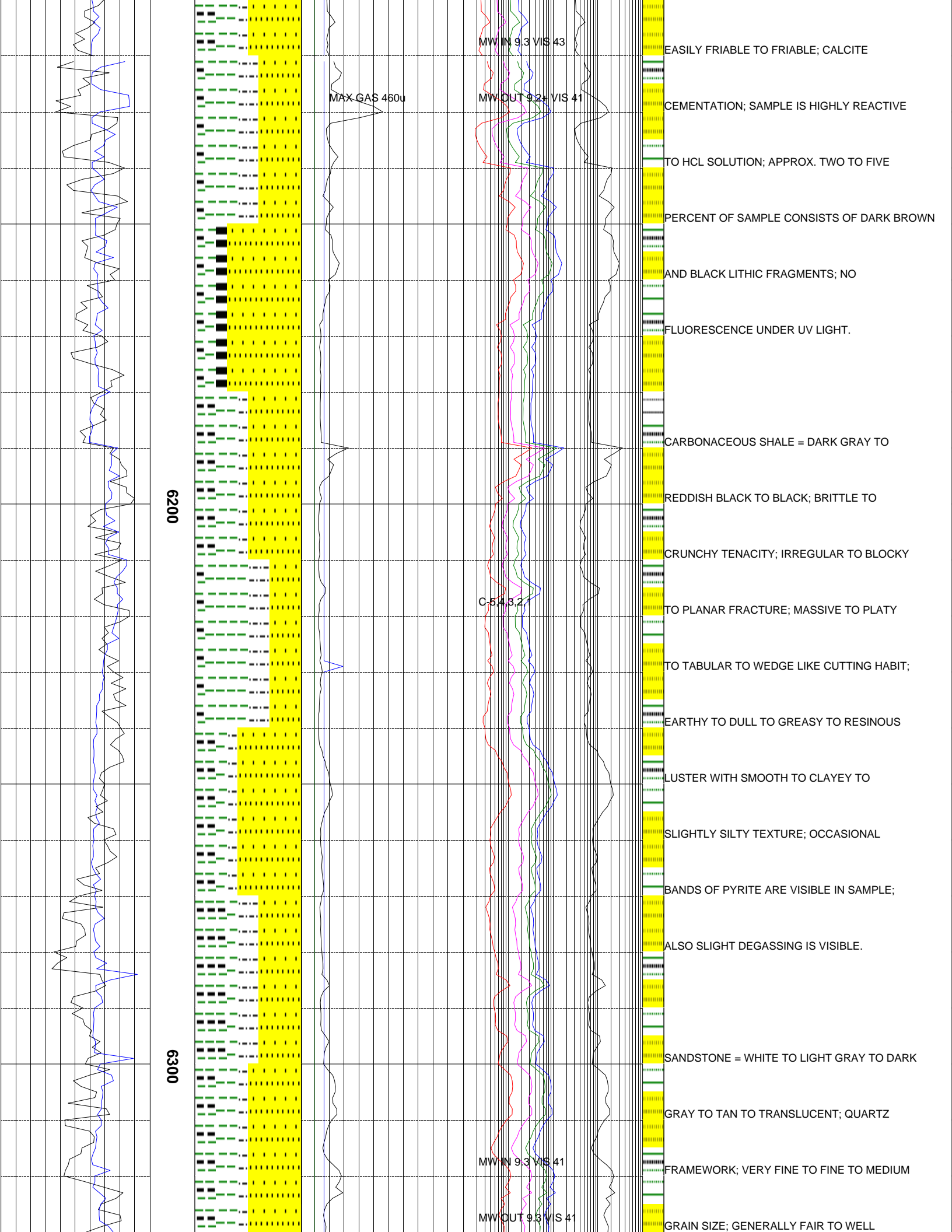
SAND VERY COMMON IN SAMPLE TRAY; NON TO

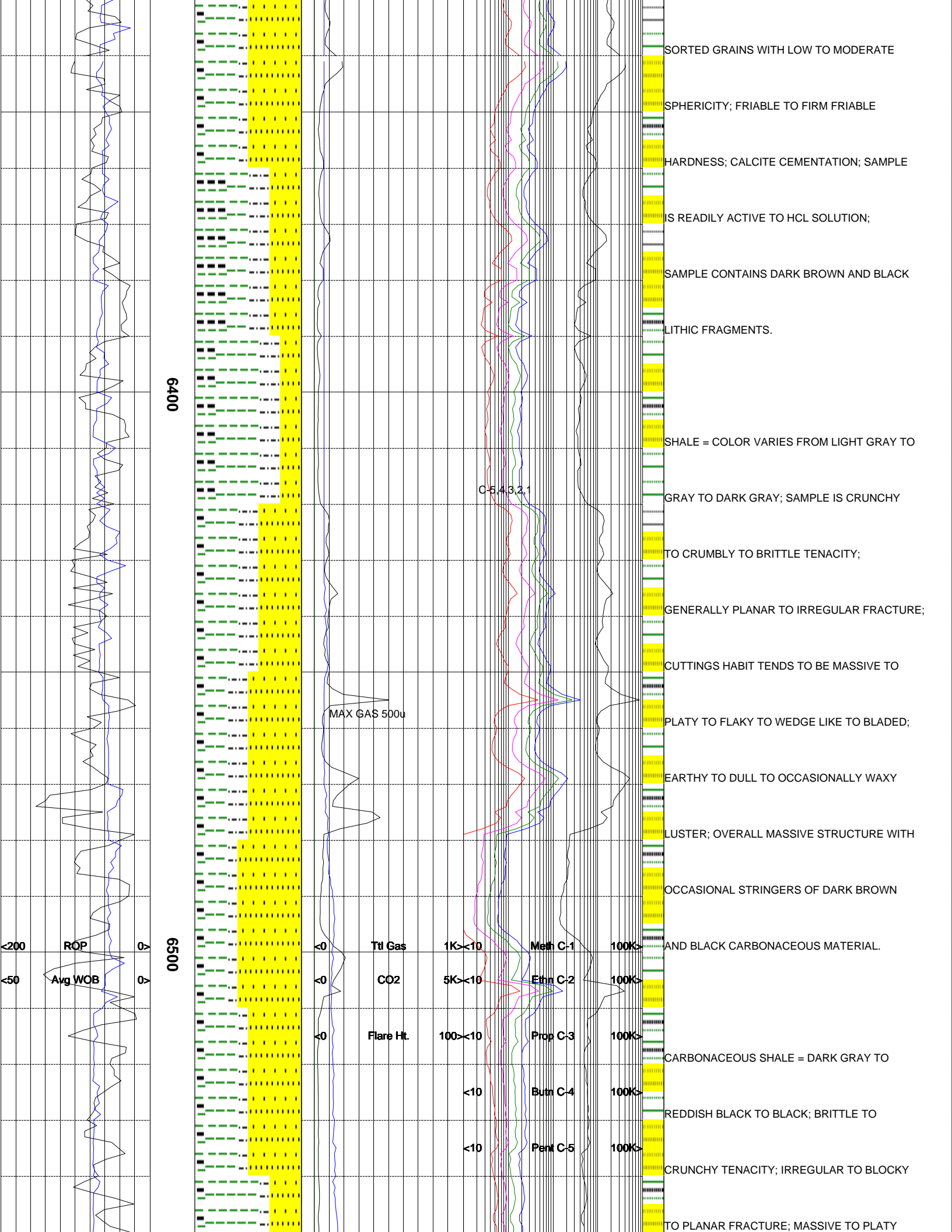
VERY SLIGHTLY CALCAREOUS OVERALL; PYRITE

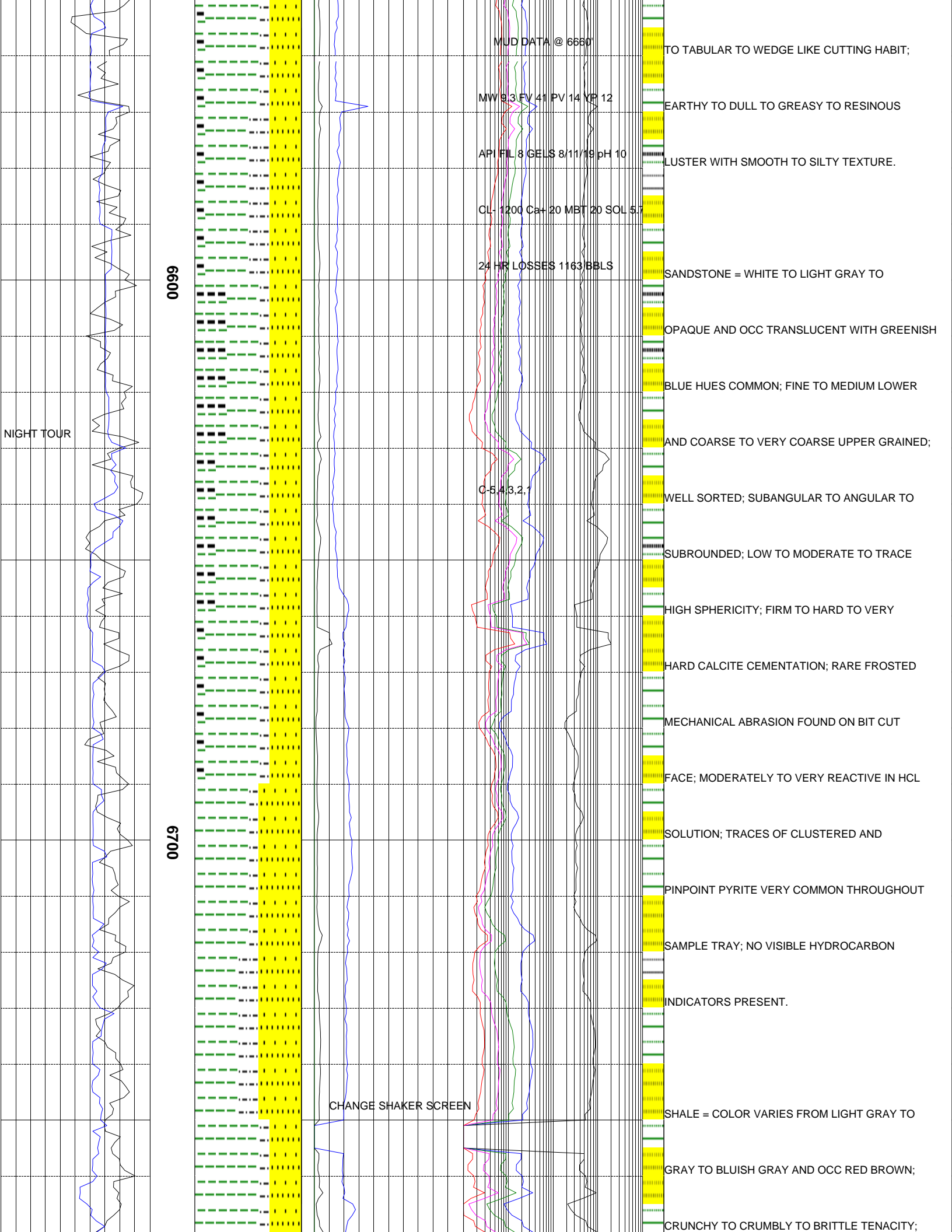


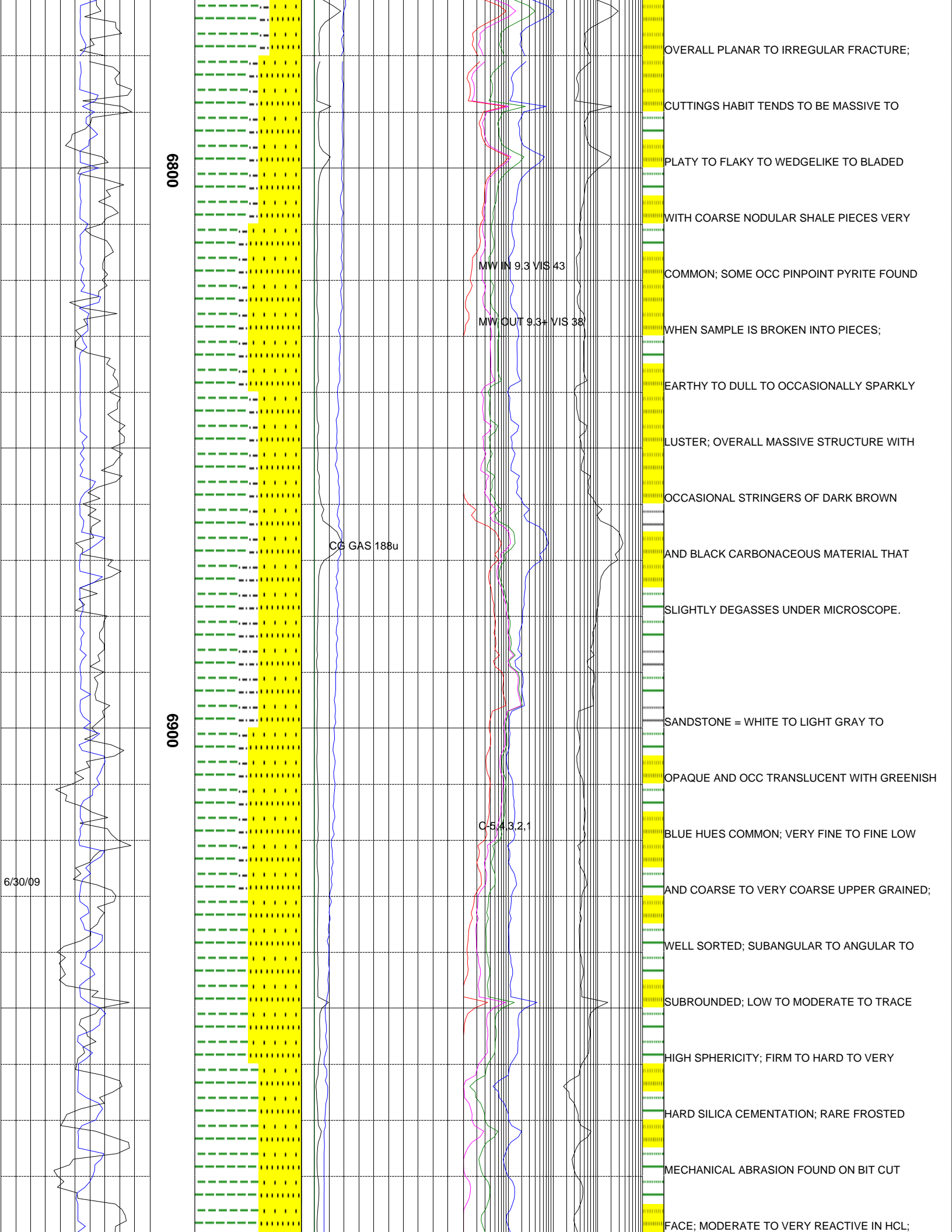


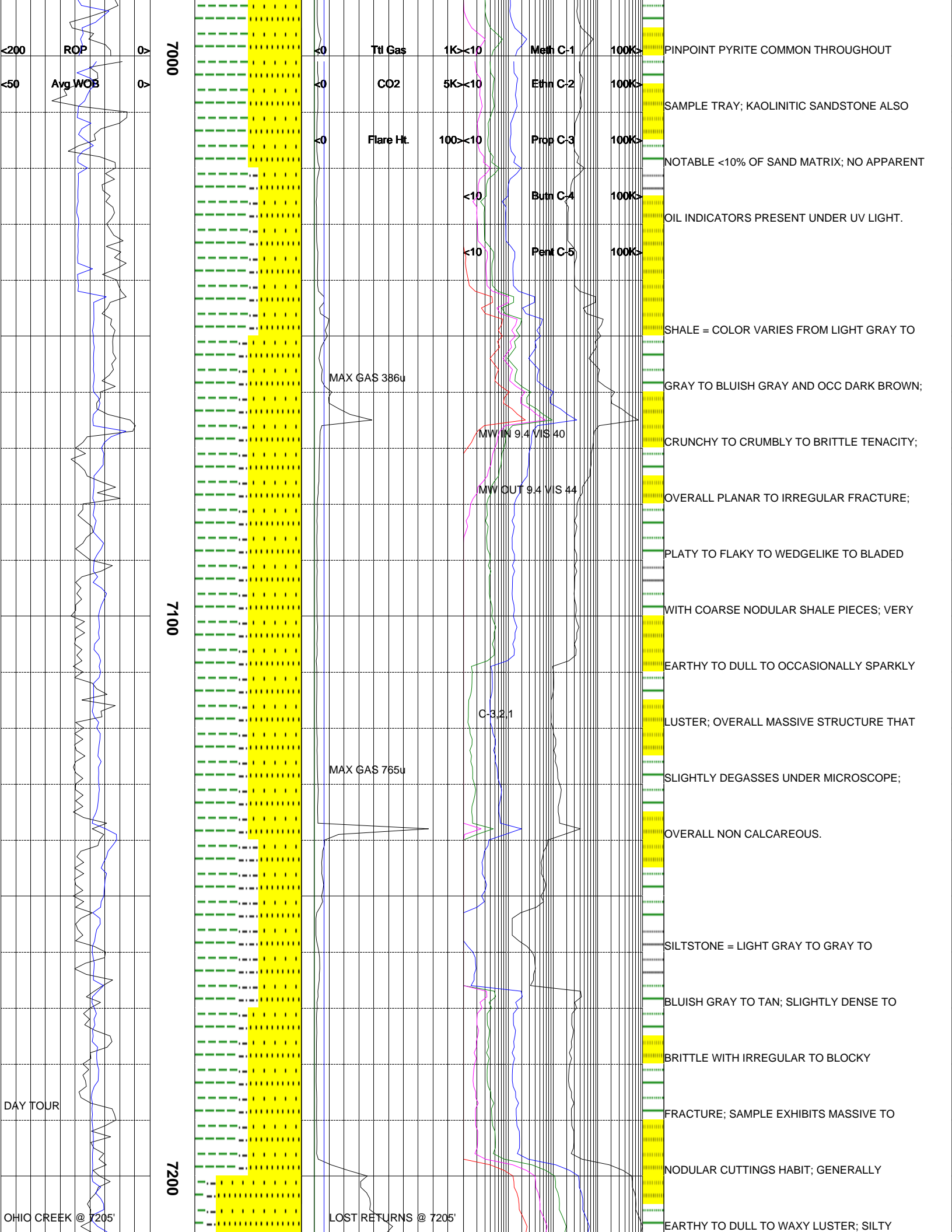


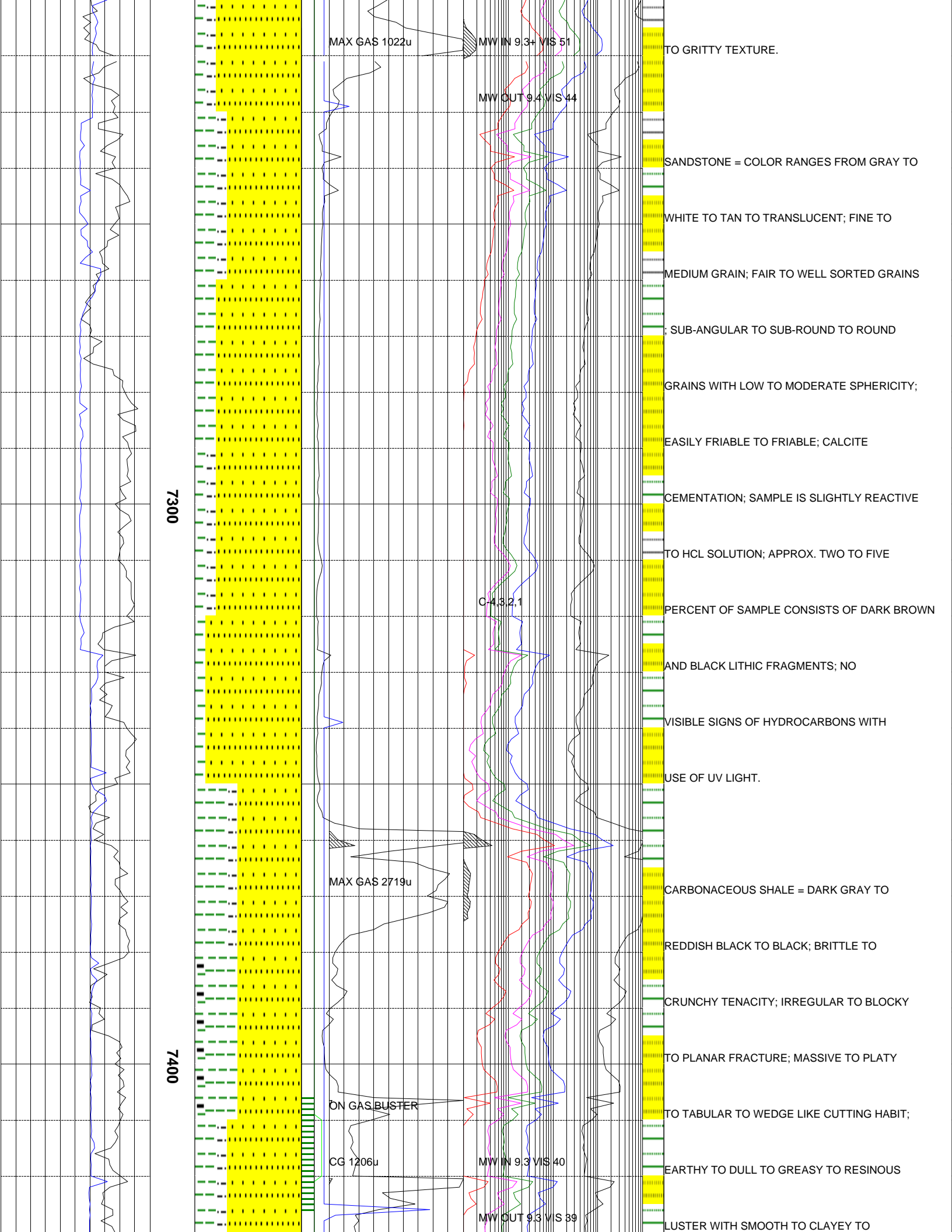












MAX GAS 1022u

MW IN 9.3+ VIS 51

MW OUT 9.4 VIS 44

TO GRITTY TEXTURE.

SANDSTONE = COLOR RANGES FROM GRAY TO

WHITE TO TAN TO TRANSLUCENT; FINE TO

MEDIUM GRAIN; FAIR TO WELL SORTED GRAINS

; SUB-ANGULAR TO SUB-ROUND TO ROUND

GRAINS WITH LOW TO MODERATE SPHERICITY;

EASILY FRIABLE TO FRIABLE; CALCITE

CEMENTATION; SAMPLE IS SLIGHTLY REACTIVE

TO HCL SOLUTION; APPROX. TWO TO FIVE

C-4.3.2.1

PERCENT OF SAMPLE CONSISTS OF DARK BROWN

AND BLACK LITHIC FRAGMENTS; NO

VISIBLE SIGNS OF HYDROCARBONS WITH

USE OF UV LIGHT.

MAX GAS 2719u

CARBONACEOUS SHALE = DARK GRAY TO

REDDISH BLACK TO BLACK; BRITTLE TO

CRUNCHY TENACITY; IRREGULAR TO BLOCKY

TO PLANAR FRACTURE; MASSIVE TO PLATY

ON GAS BUSTER

TO TABULAR TO WEDGE LIKE CUTTING HABIT;

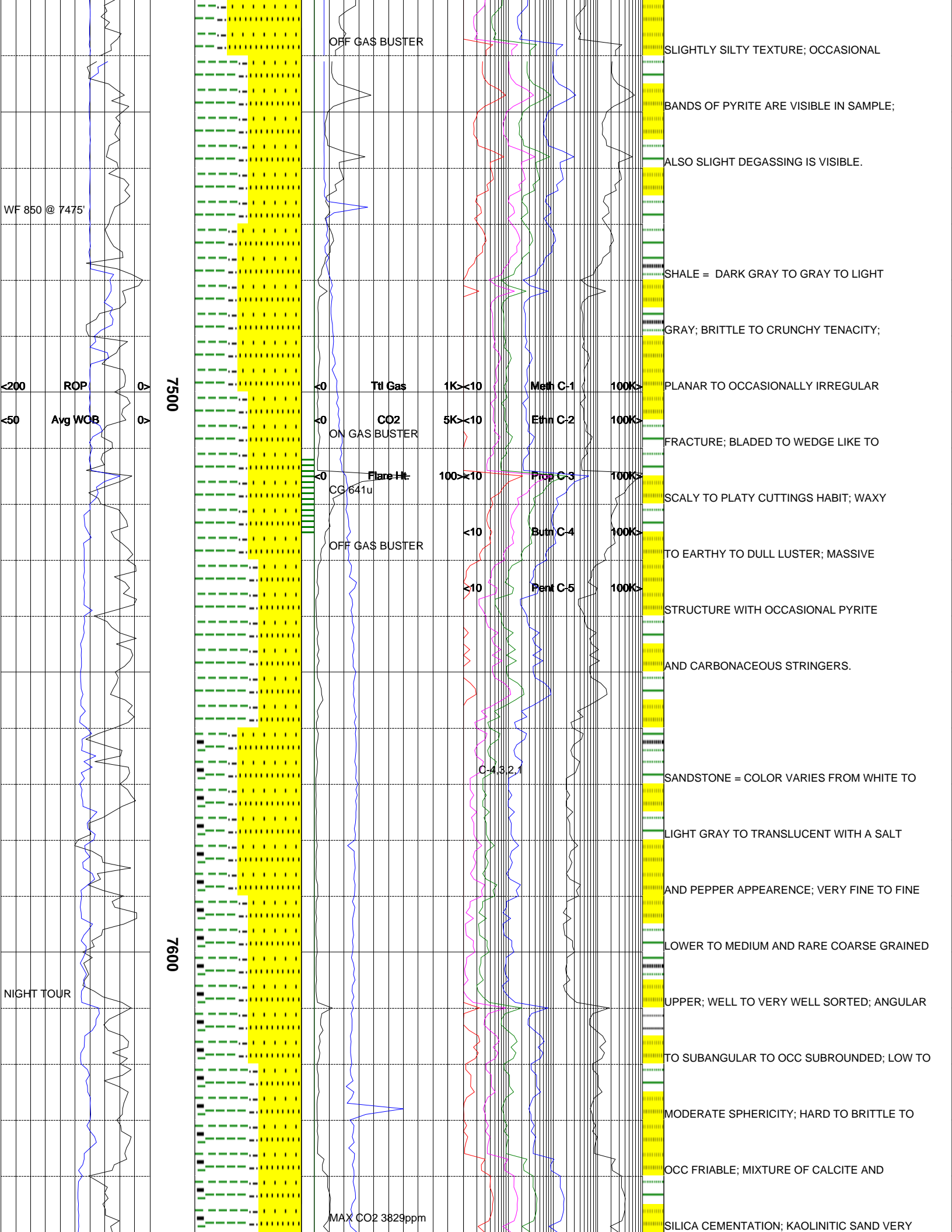
CG 1206u

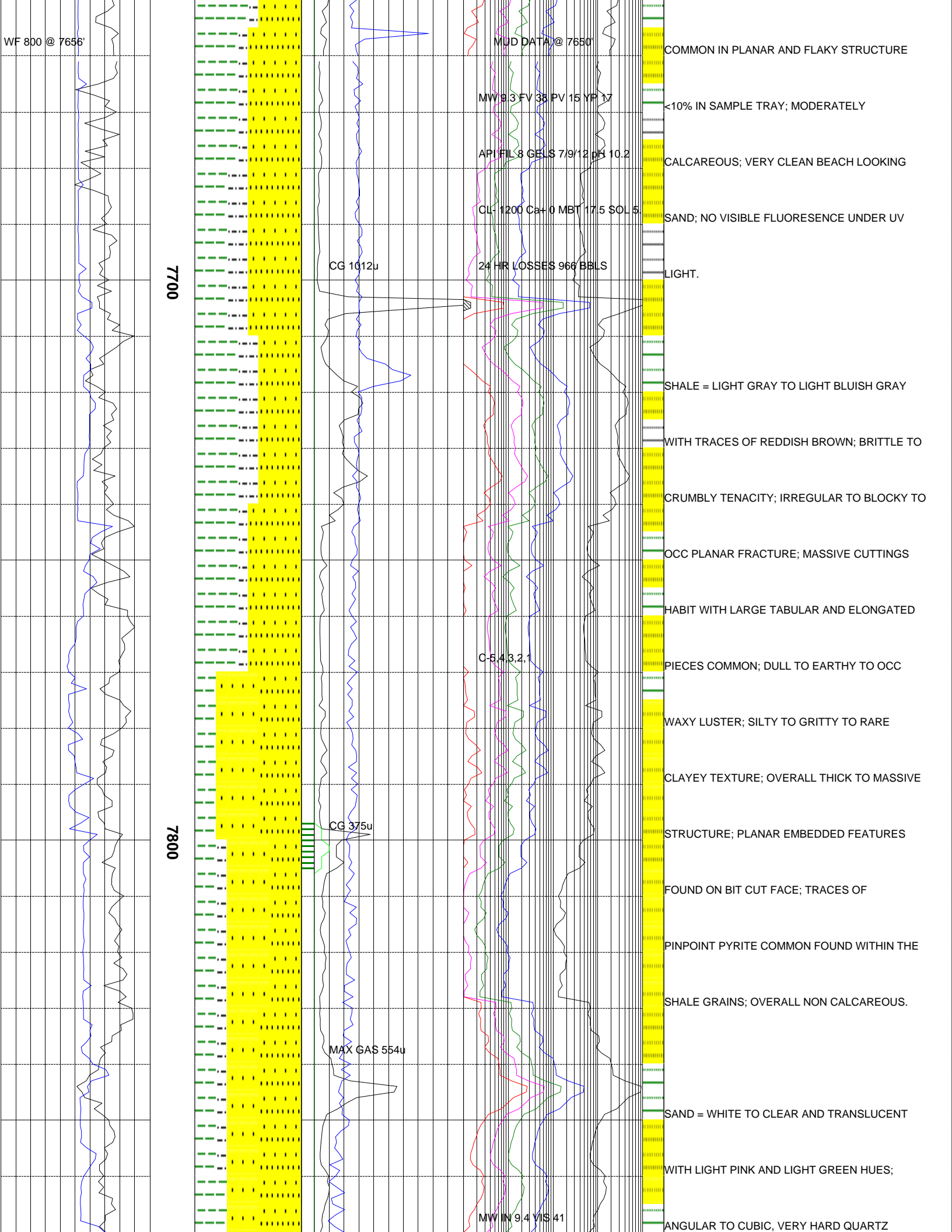
MW IN 9.3 VIS 40

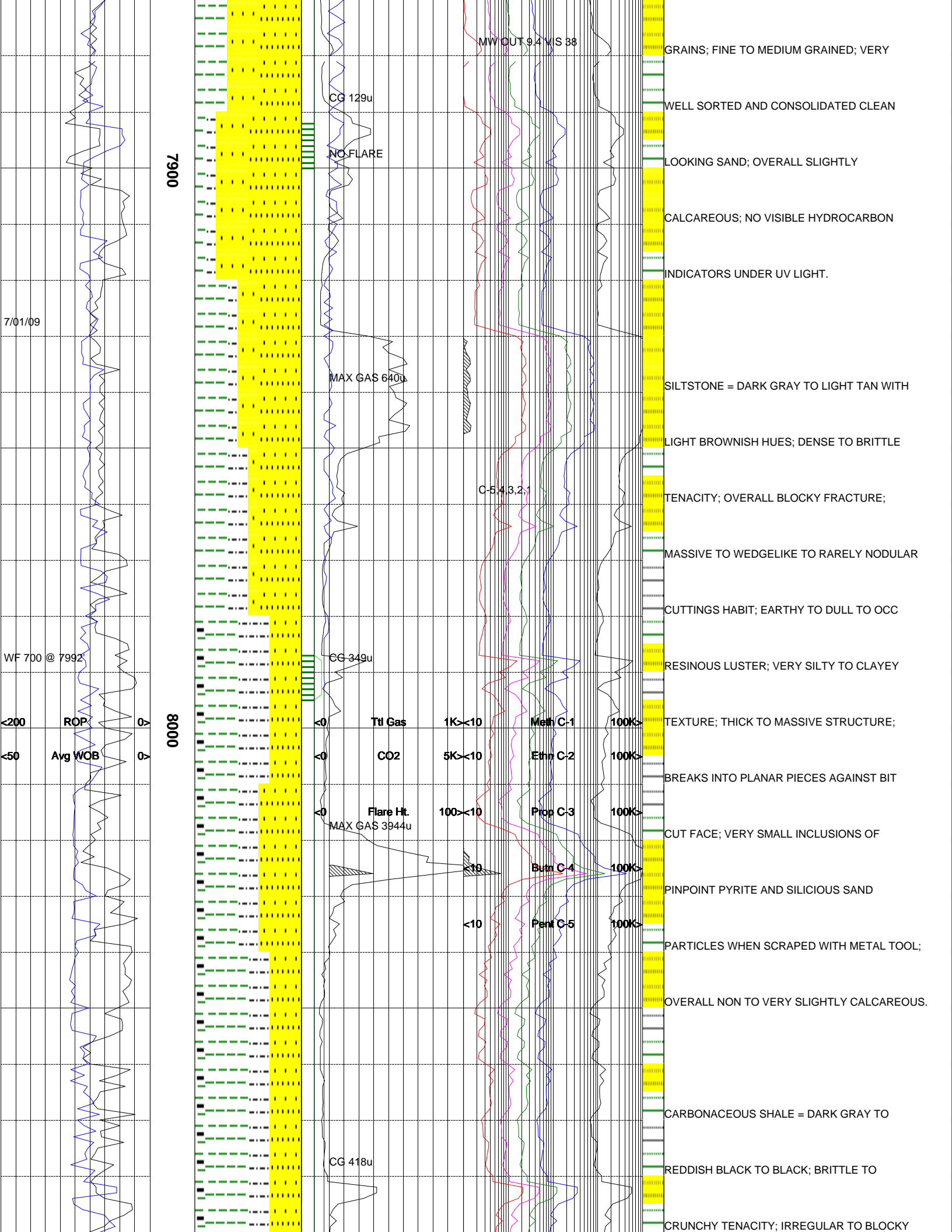
EARTHY TO DULL TO GREASY TO RESINOUS

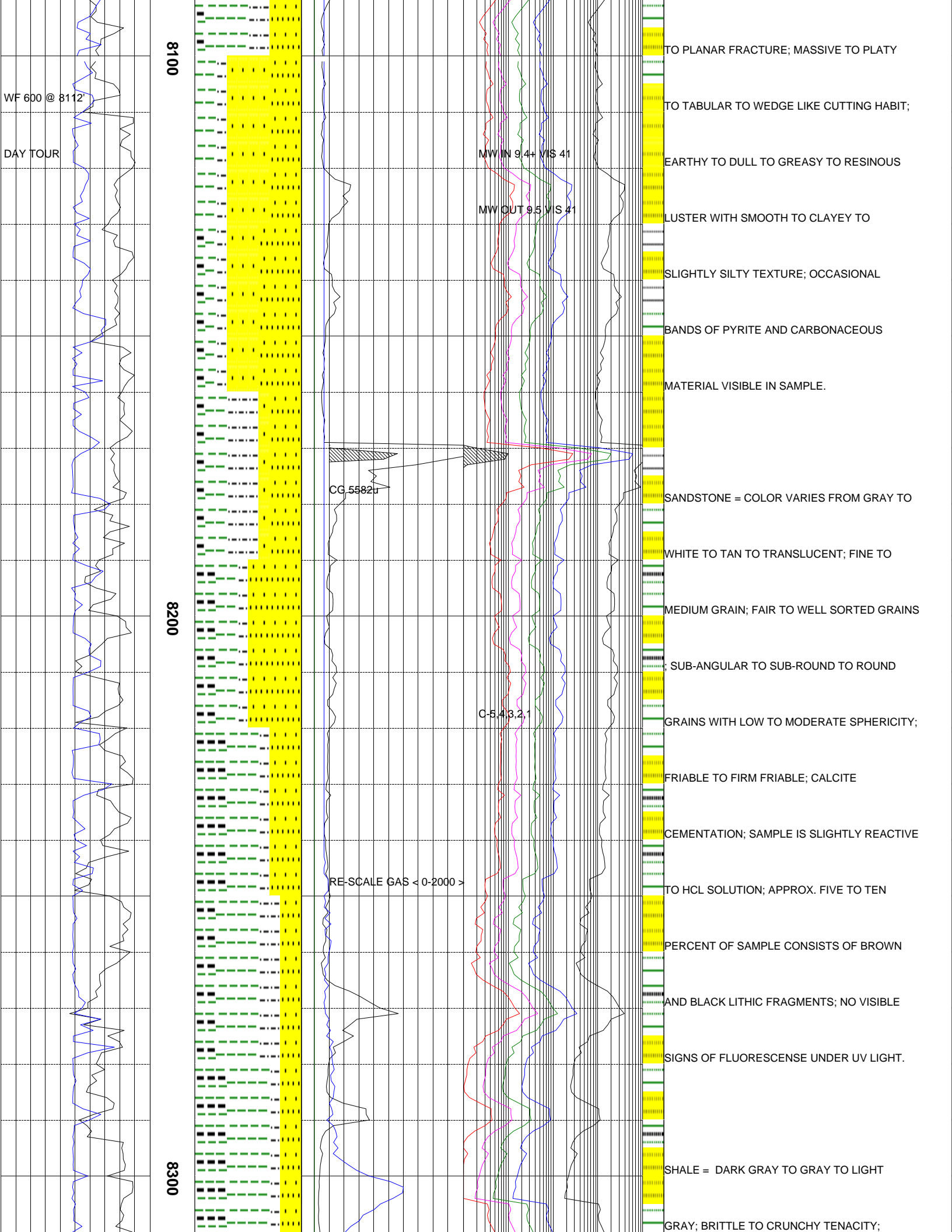
MW OUT 9.3 VIS 39

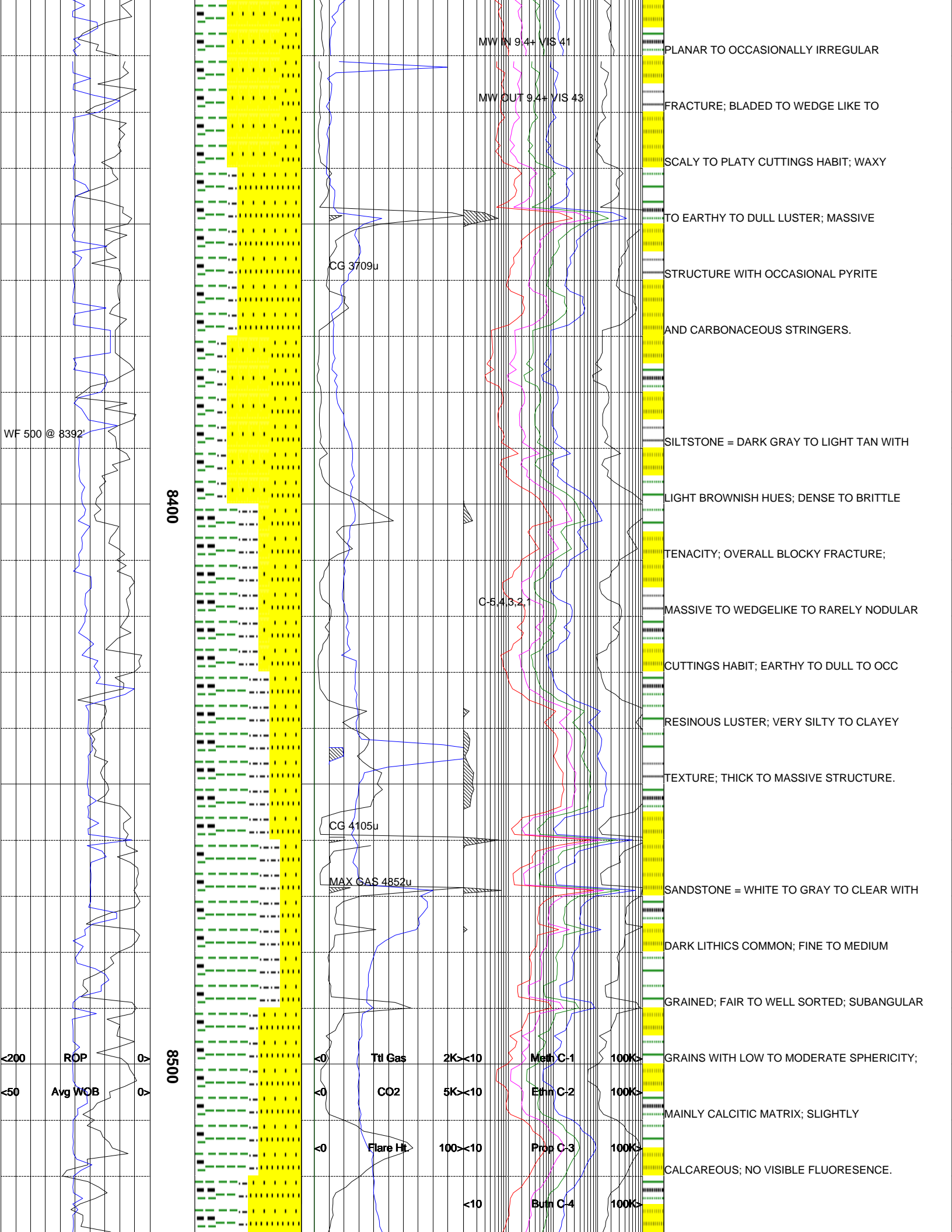
LUSTER WITH SMOOTH TO CLAYEY TO

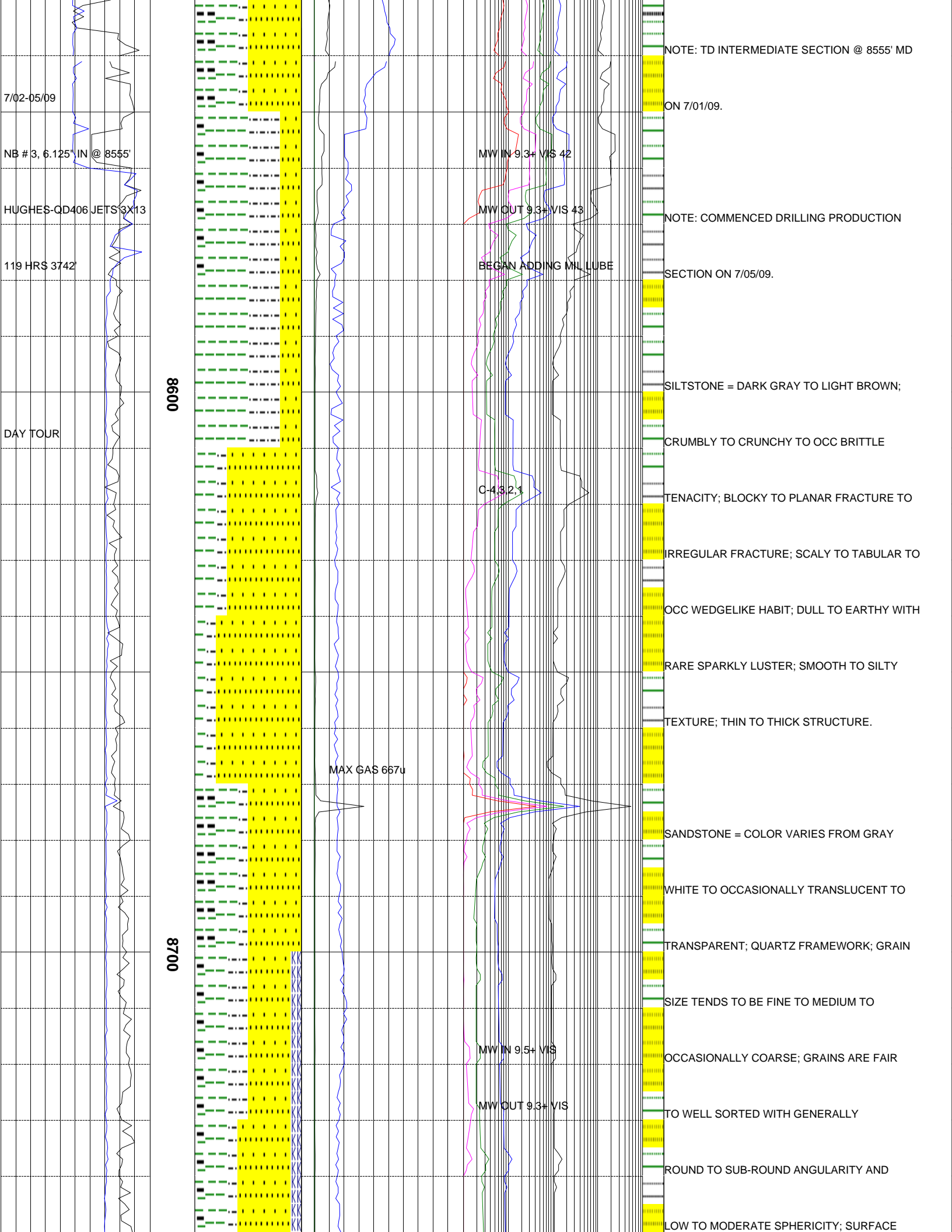


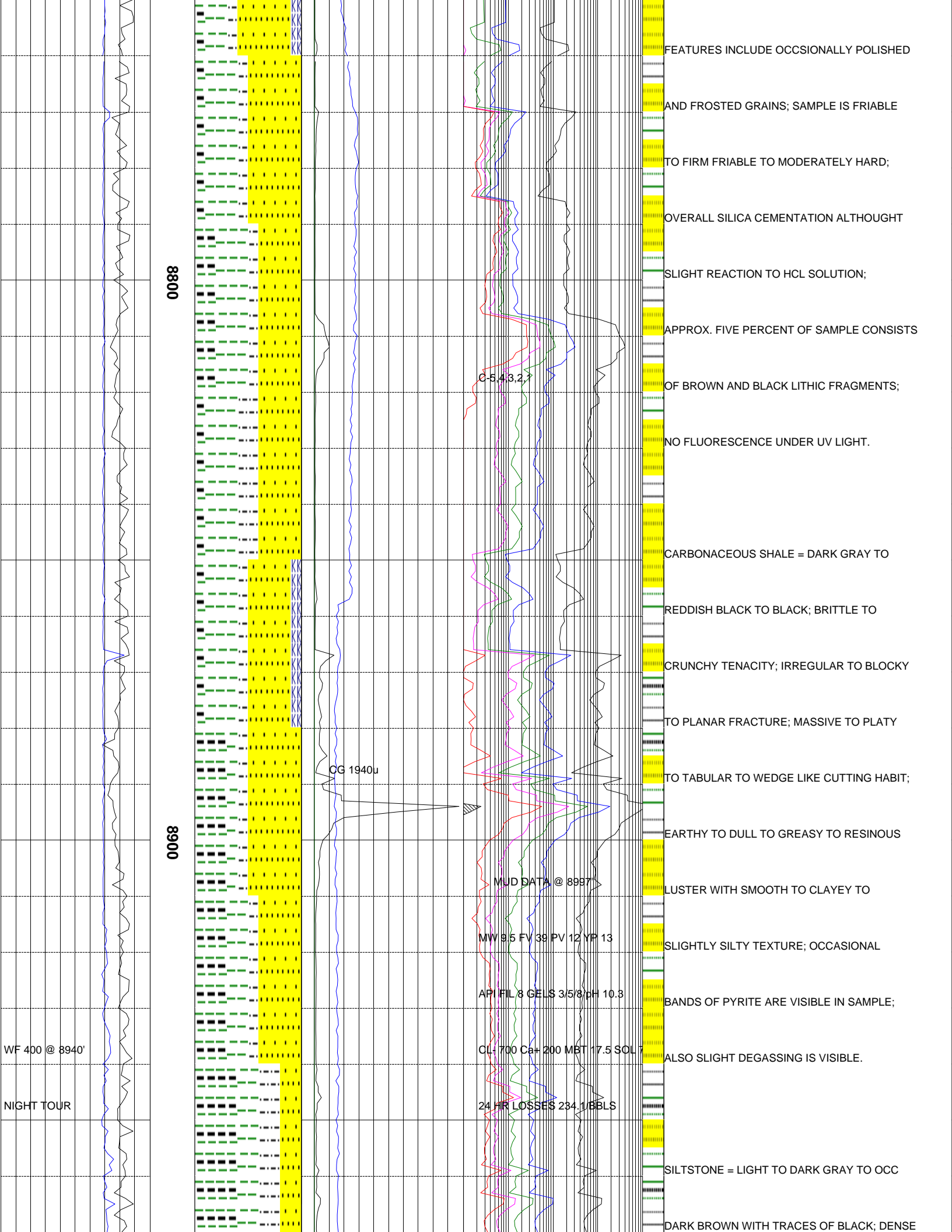












0088

0068

FEATURES INCLUDE OCCSIONALLY POLISHED

AND FROSTED GRAINS; SAMPLE IS FRIABLE

TO FIRM FRIABLE TO MODERATELY HARD;

OVERALL SILICA CEMENTATION ALTHOUGHT

SLIGHT REACTION TO HCL SOLUTION;

APPROX. FIVE PERCENT OF SAMPLE CONSISTS

OF BROWN AND BLACK LITHIC FRAGMENTS;

NO FLUORESCENCE UNDER UV LIGHT.

CARBONACEOUS SHALE = DARK GRAY TO

REDDISH BLACK TO BLACK; BRITTLE TO

CRUNCHY TENACITY; IRREGULAR TO BLOCKY

TO PLANAR FRACTURE; MASSIVE TO PLATY

TO TABULAR TO WEDGE LIKE CUTTING HABIT;

EARTHY TO DULL TO GREASY TO RESINOUS

LUSTER WITH SMOOTH TO CLAYEY TO

SLIGHTLY SILTY TEXTURE; OCCASIONAL

BANDS OF PYRITE ARE VISIBLE IN SAMPLE;

ALSO SLIGHT DEGASSING IS VISIBLE.

SILTSTONE = LIGHT TO DARK GRAY TO OCC

DARK BROWN WITH TRACES OF BLACK; DENSE

0-543.2

CG 1940u

MUD DATA @ 8997

MW 9.5 FV 39 PV 12 YP 13

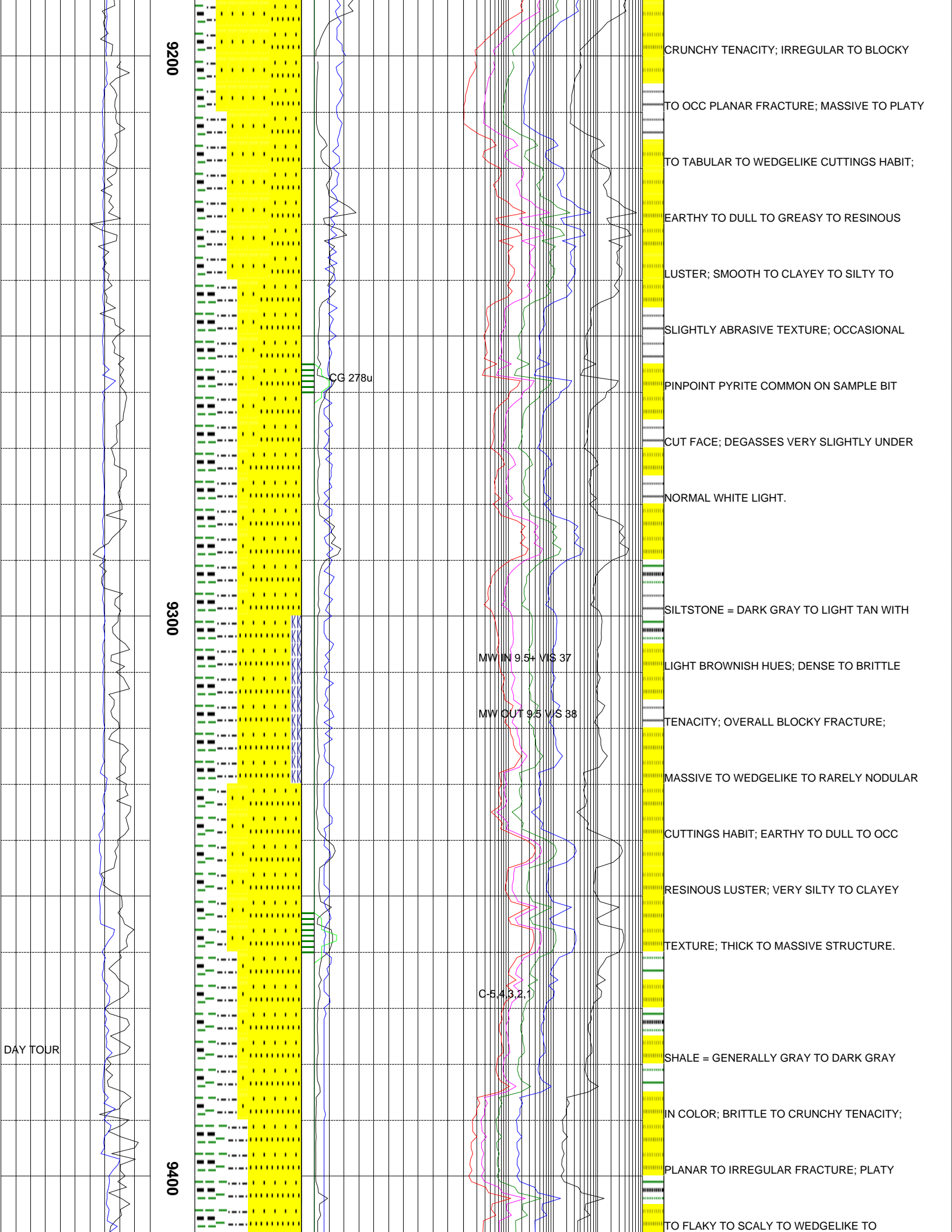
API FIL 8 GELS 3/5/6 pH 10.3

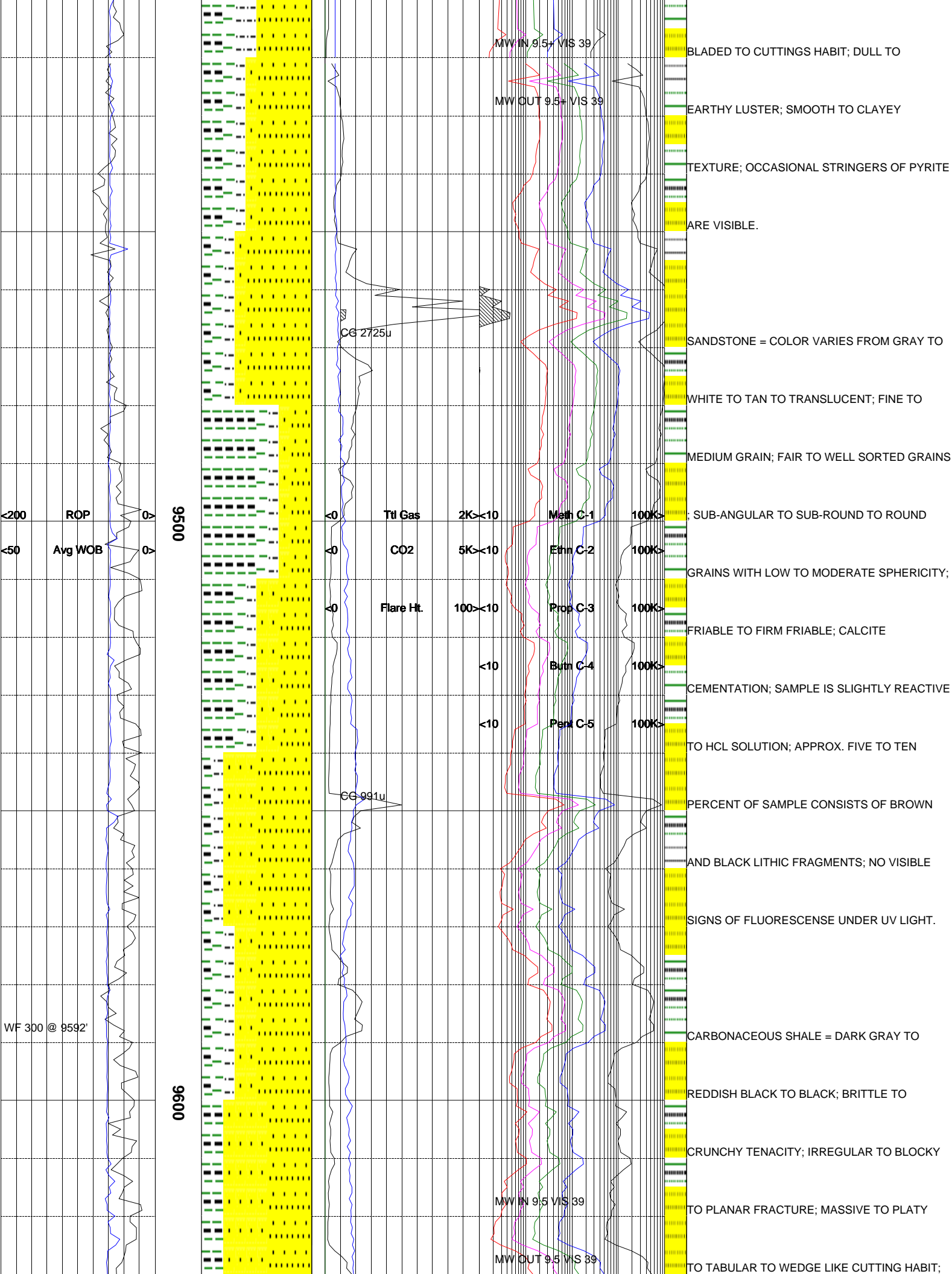
CL: 700 Ca+ 200 MBT 17.5 SOL 7

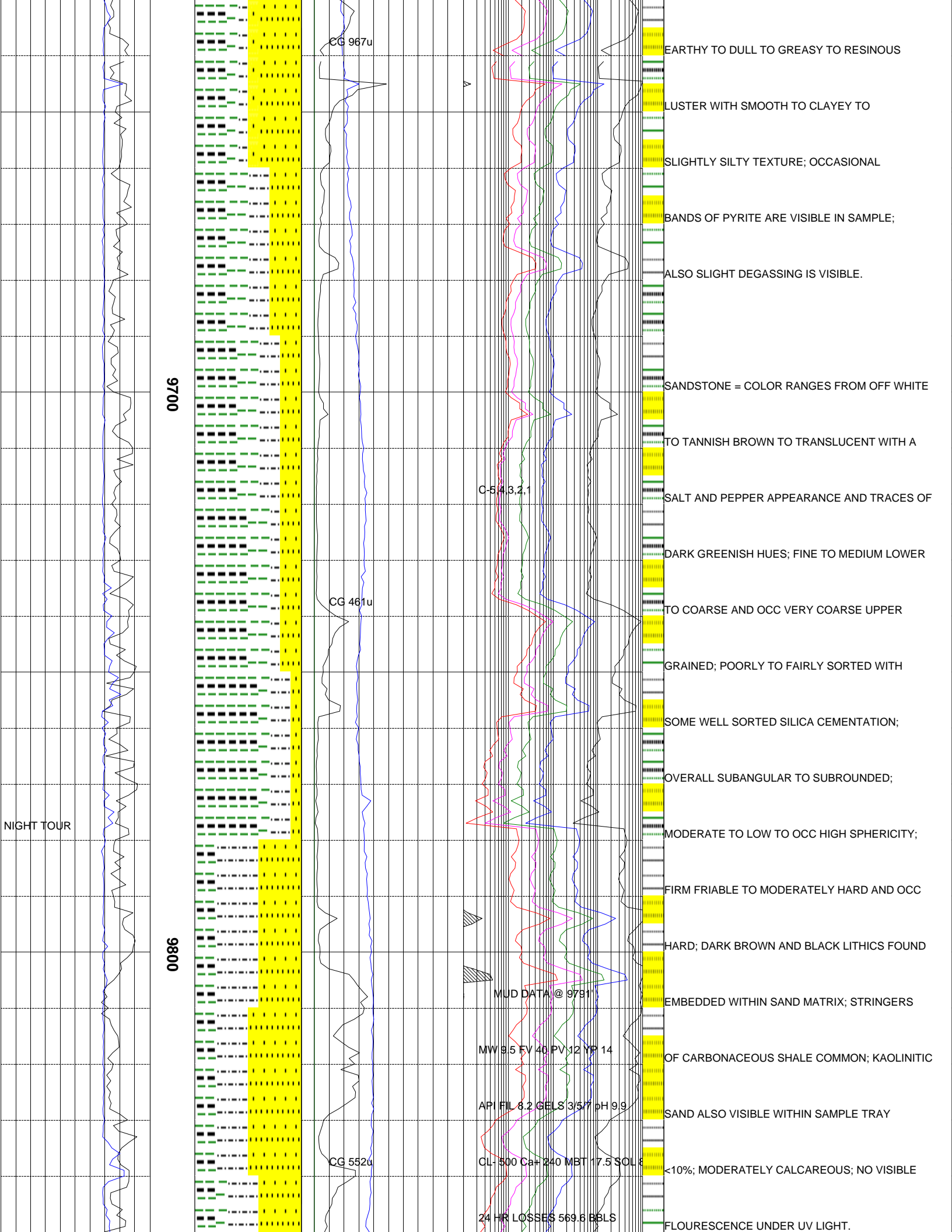
24 HR LOSSES 234.1/BLS

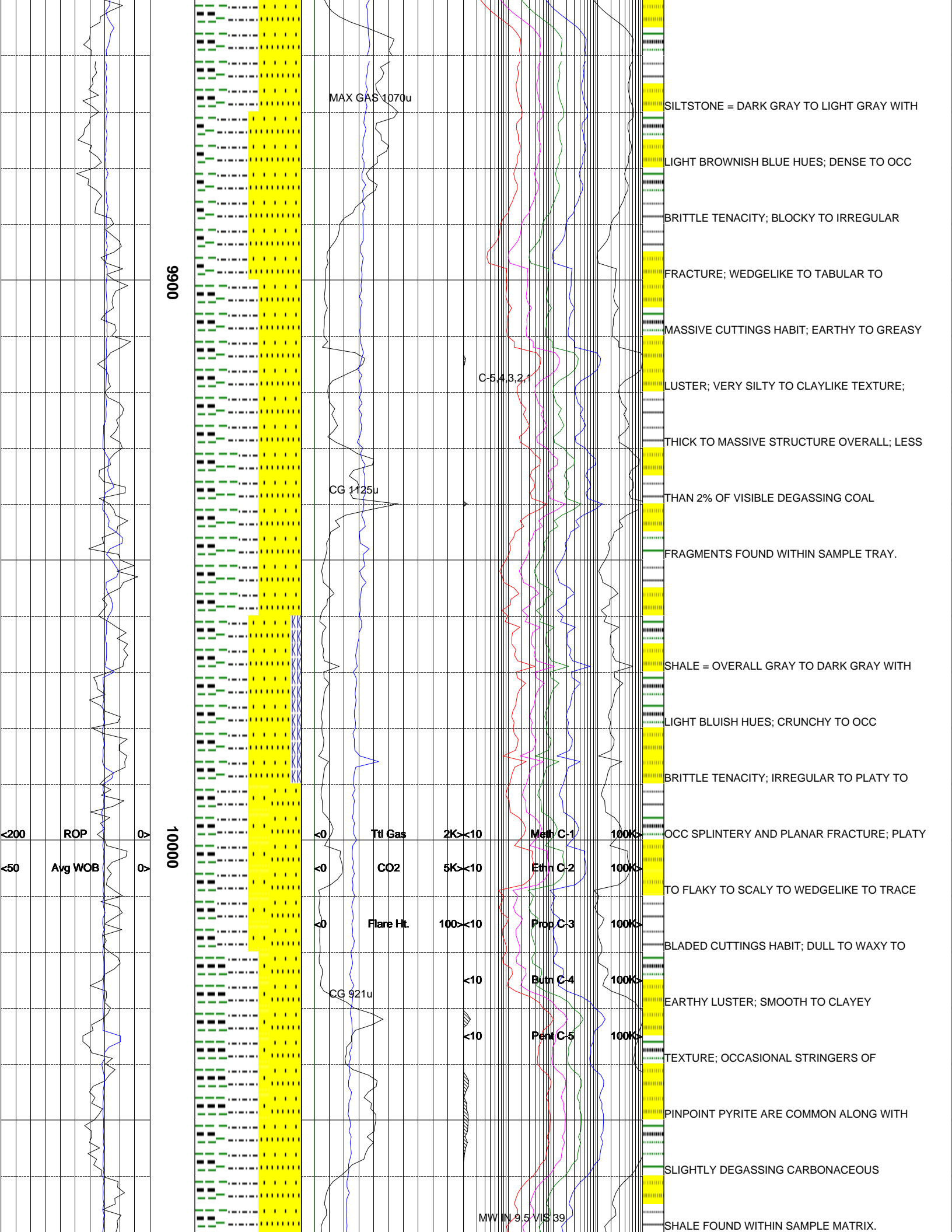
WF 400 @ 8940'

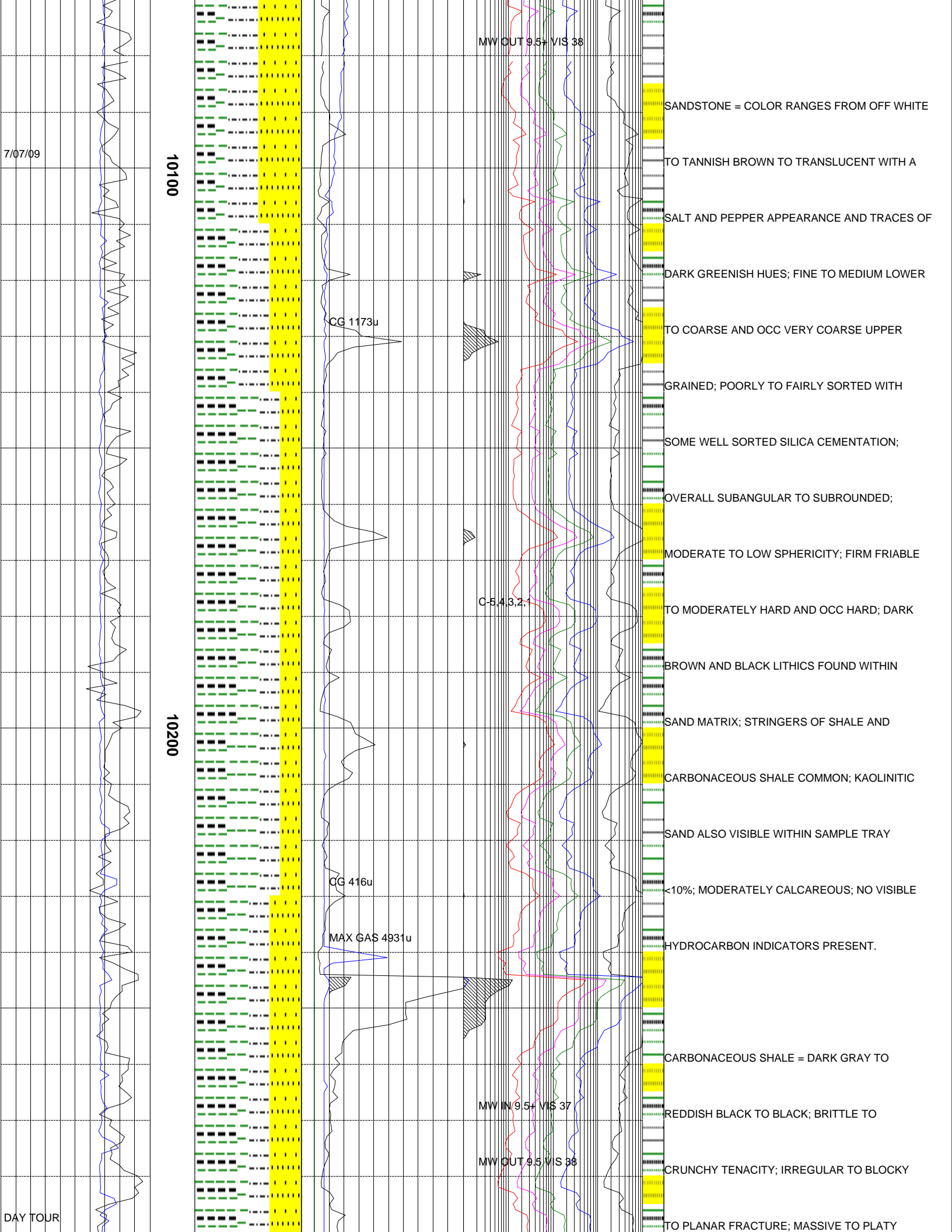
NIGHT TOUR

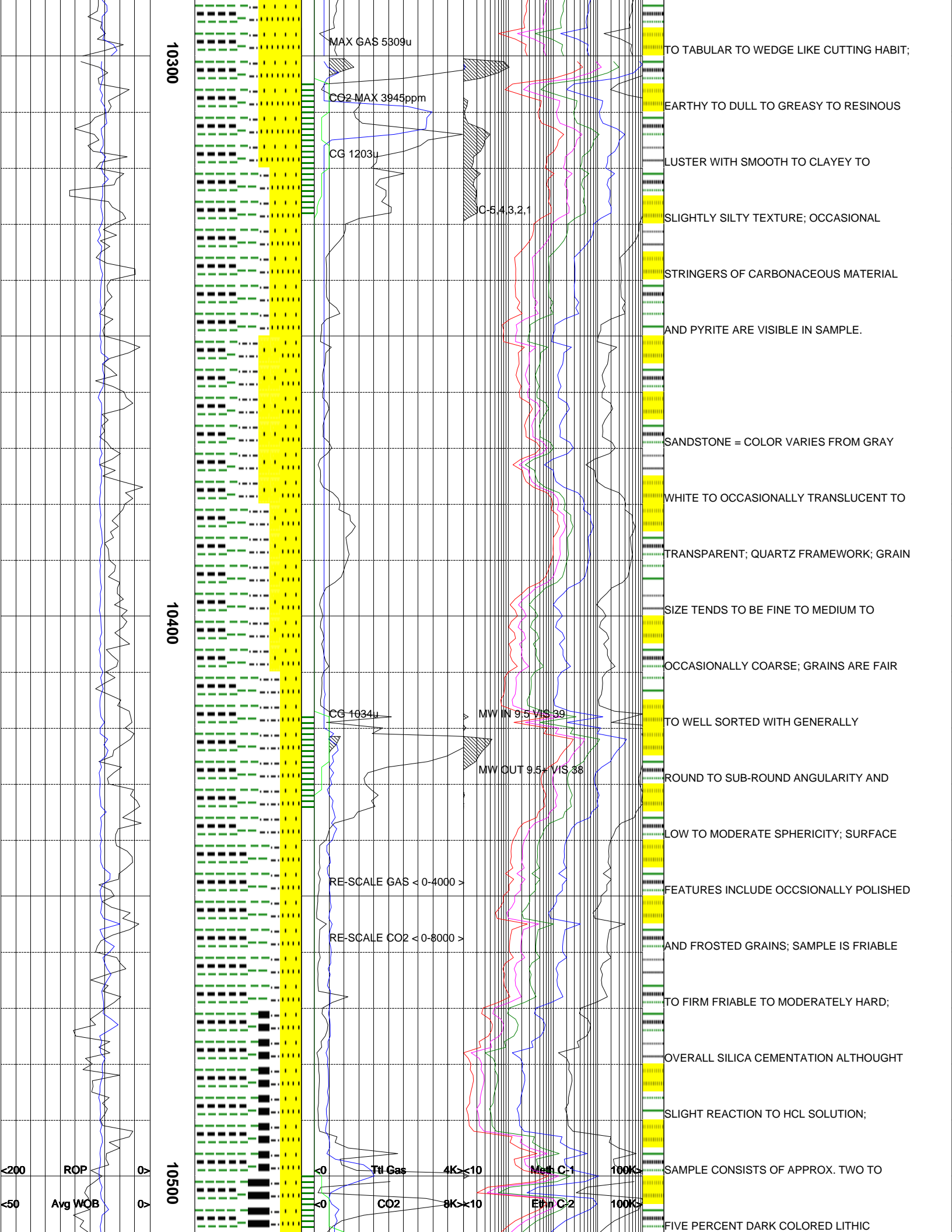


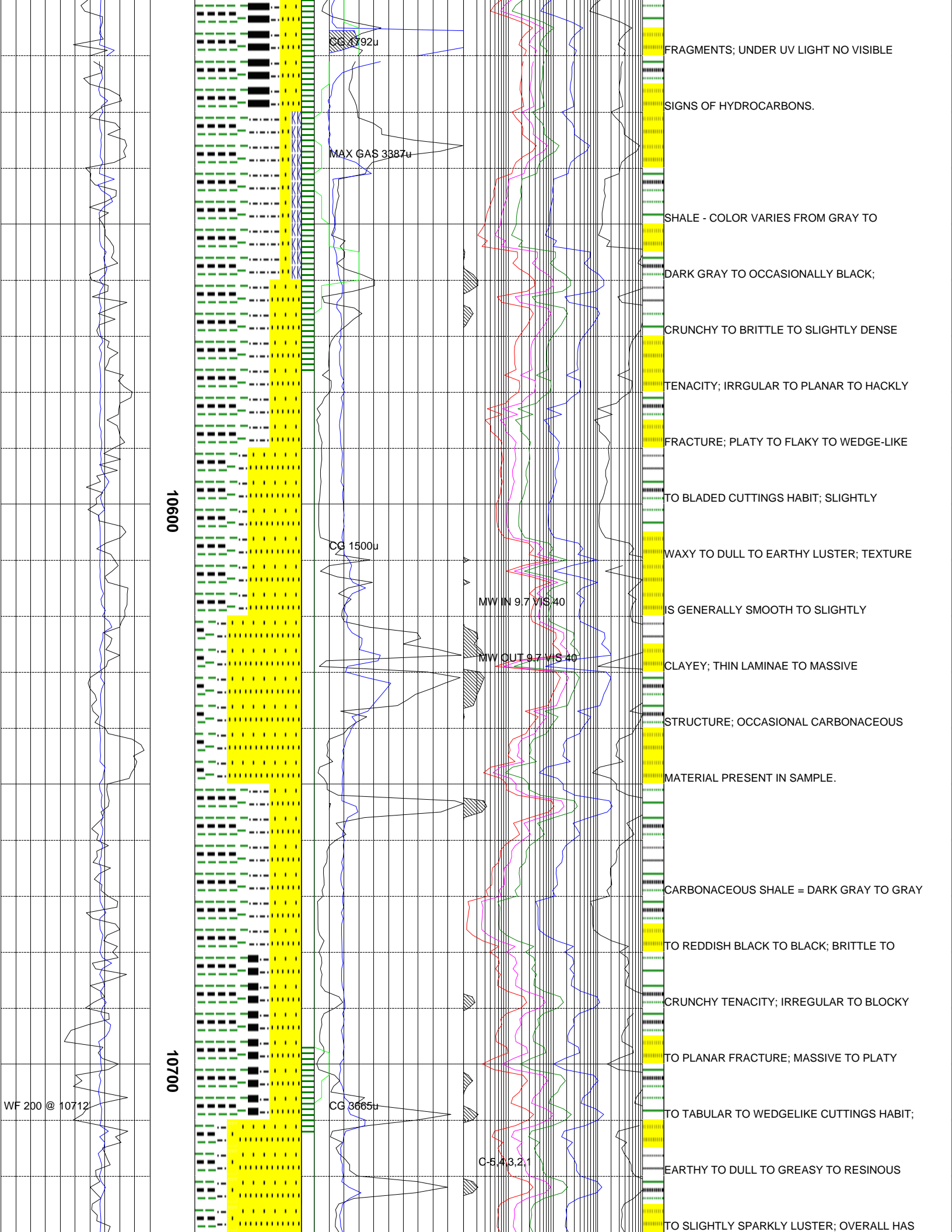


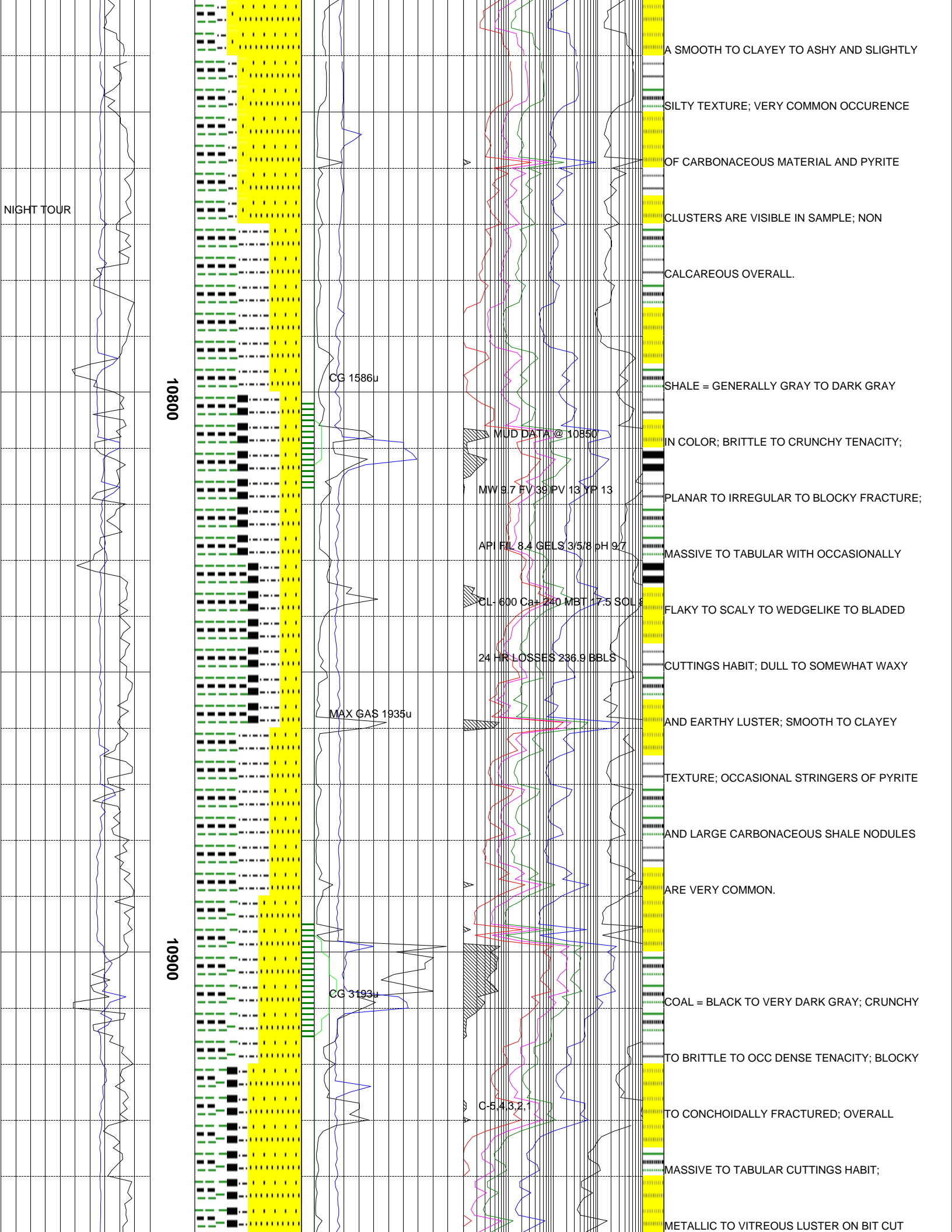


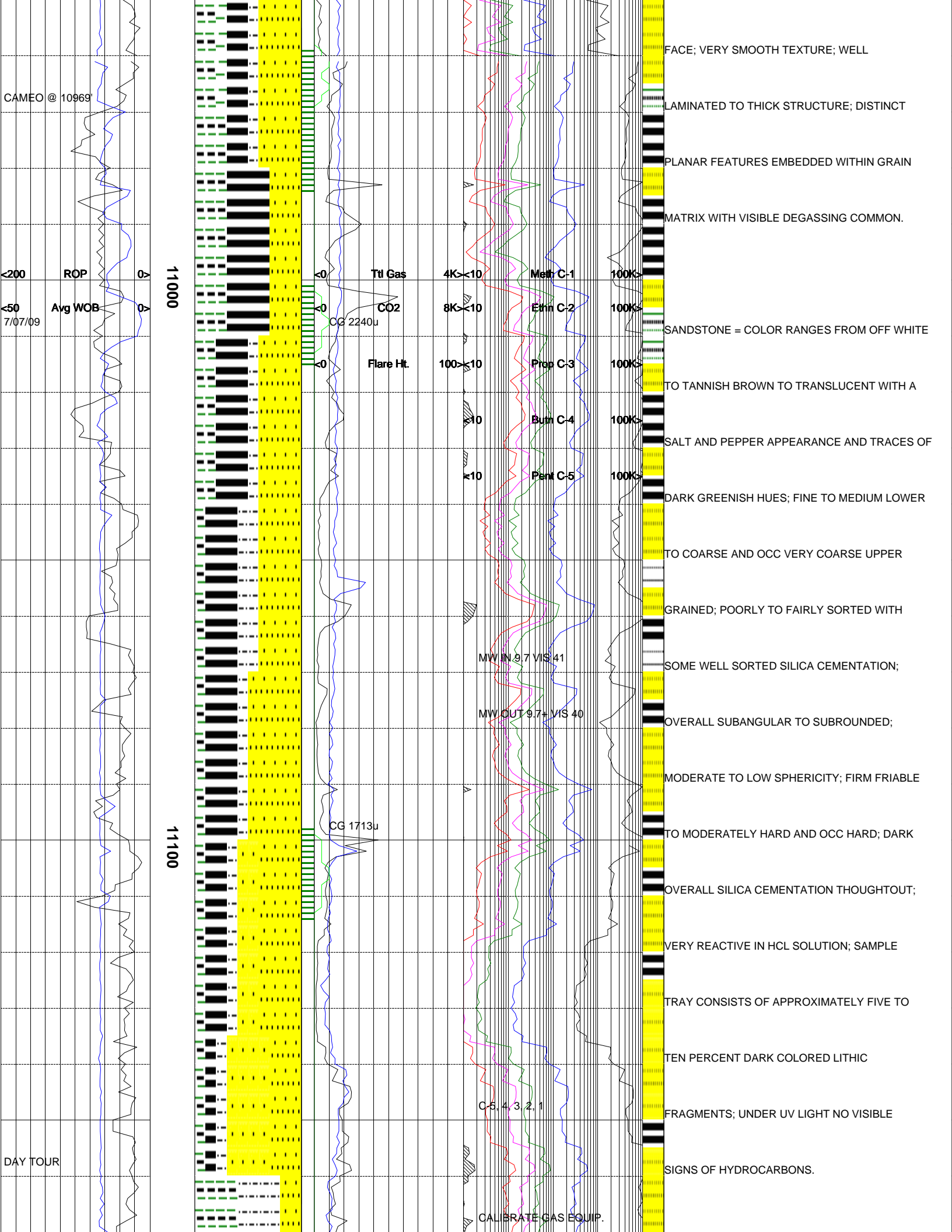


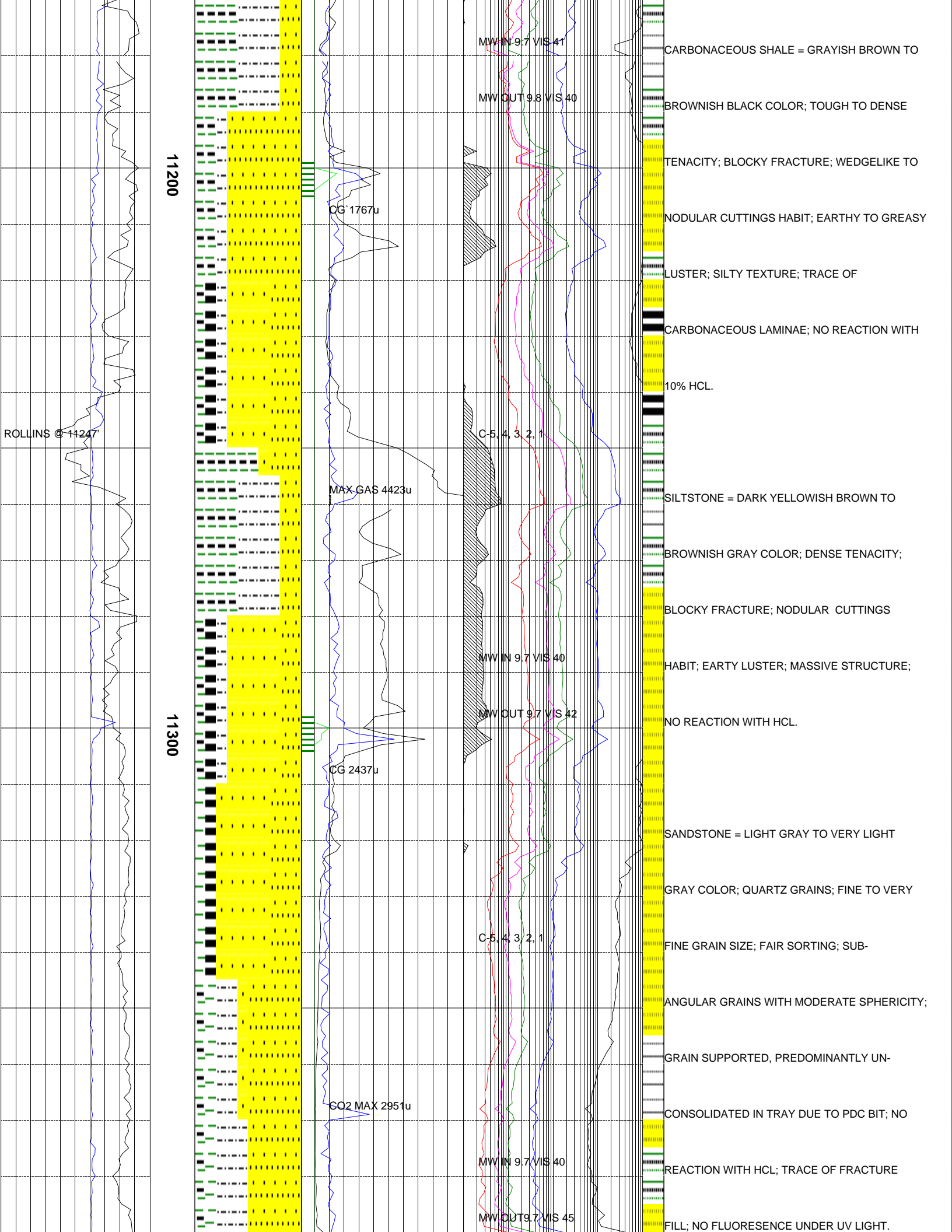


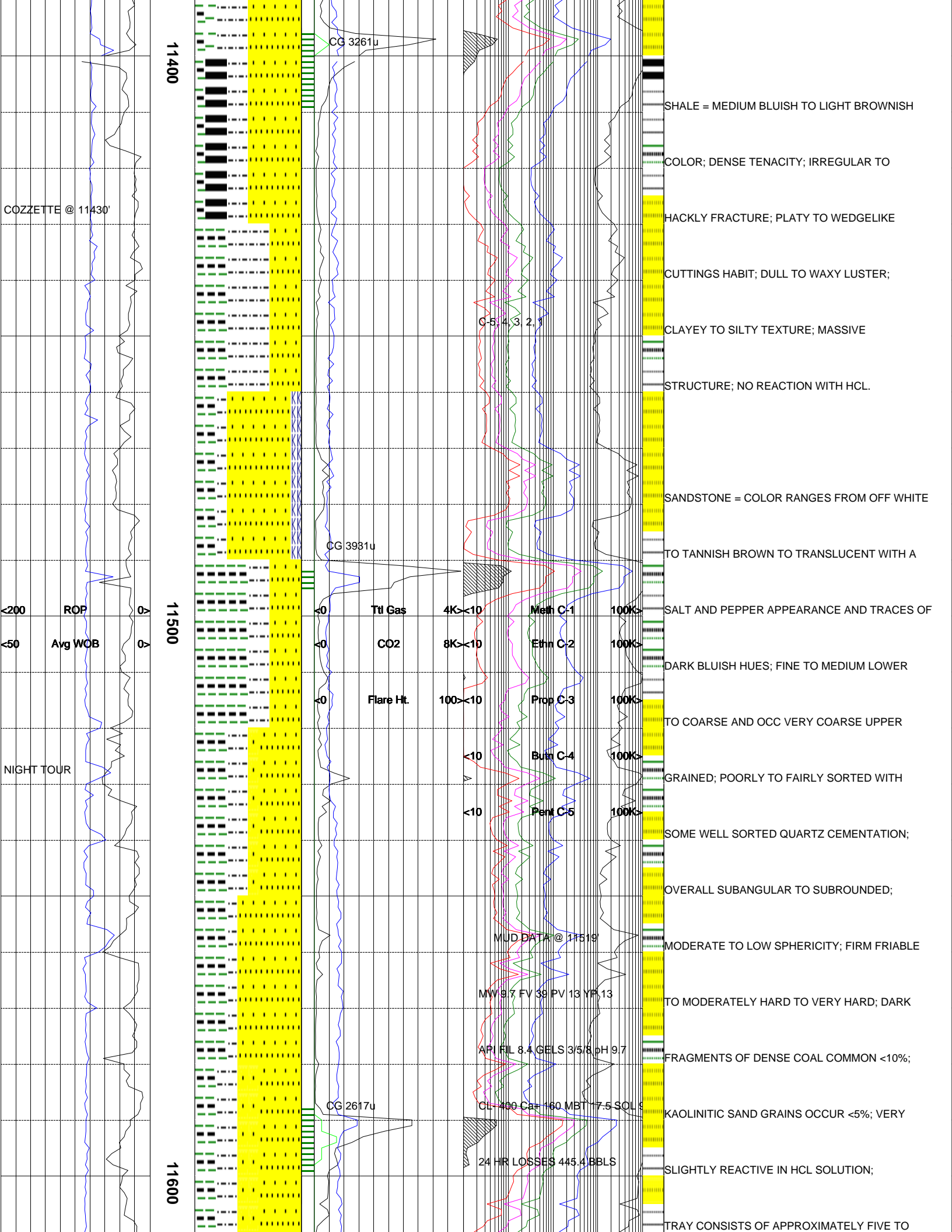


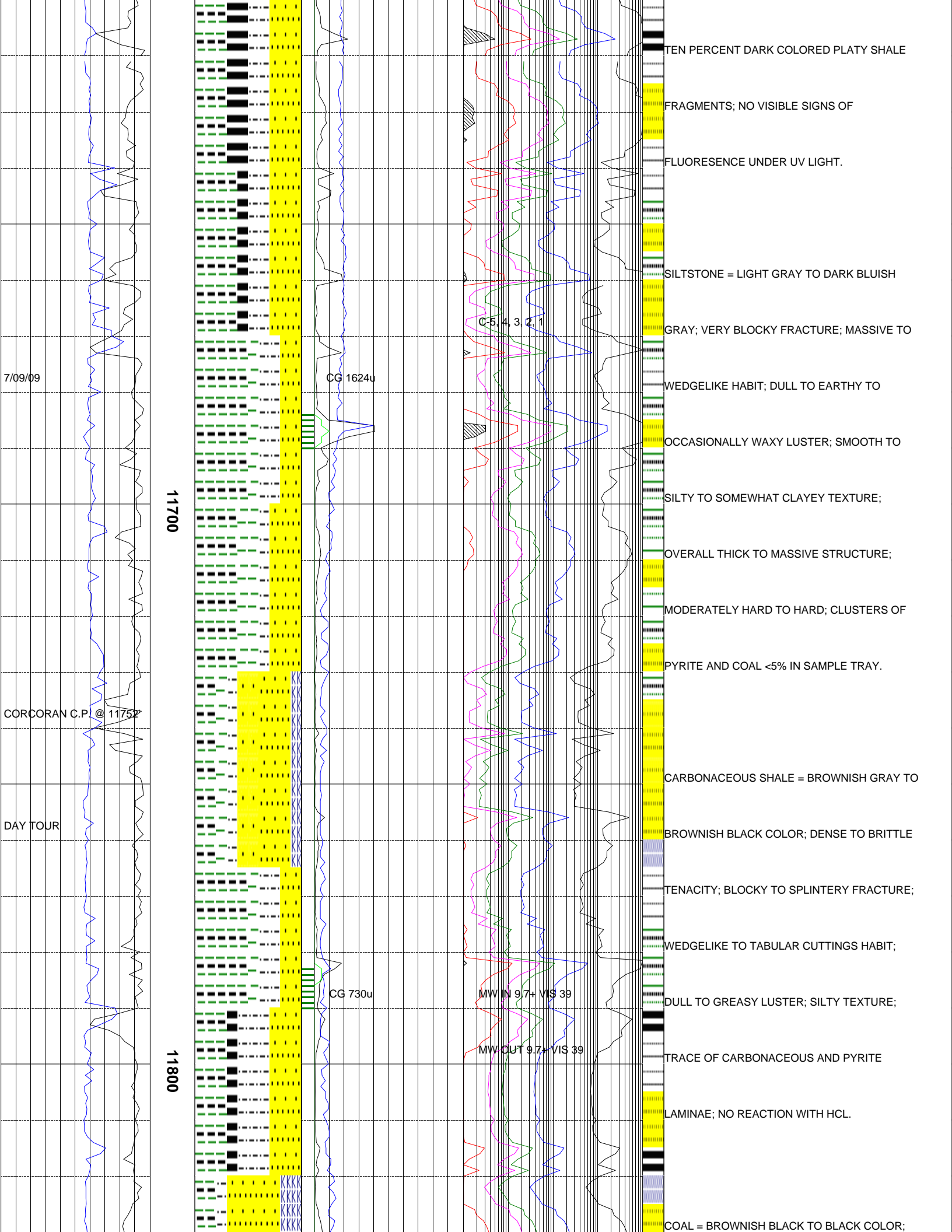


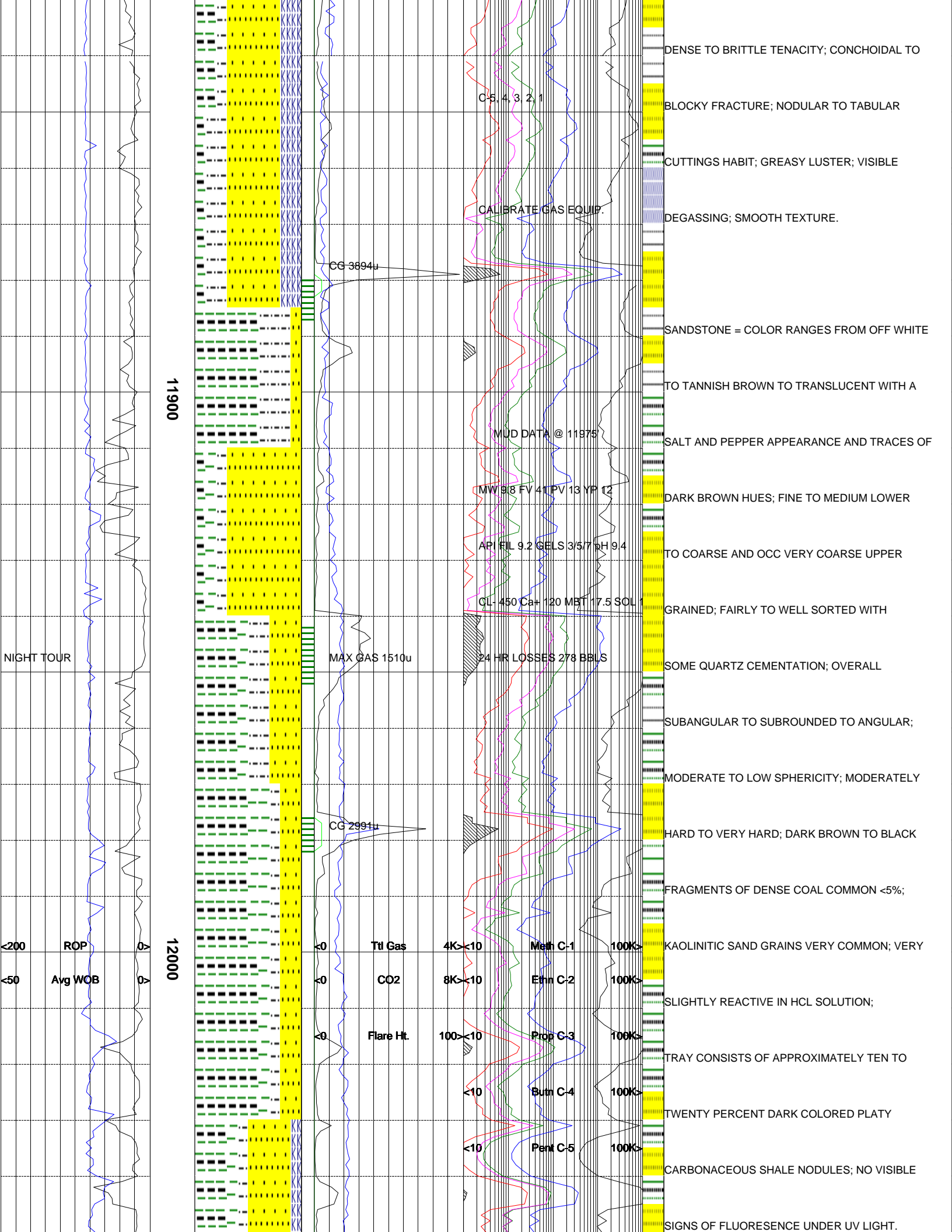


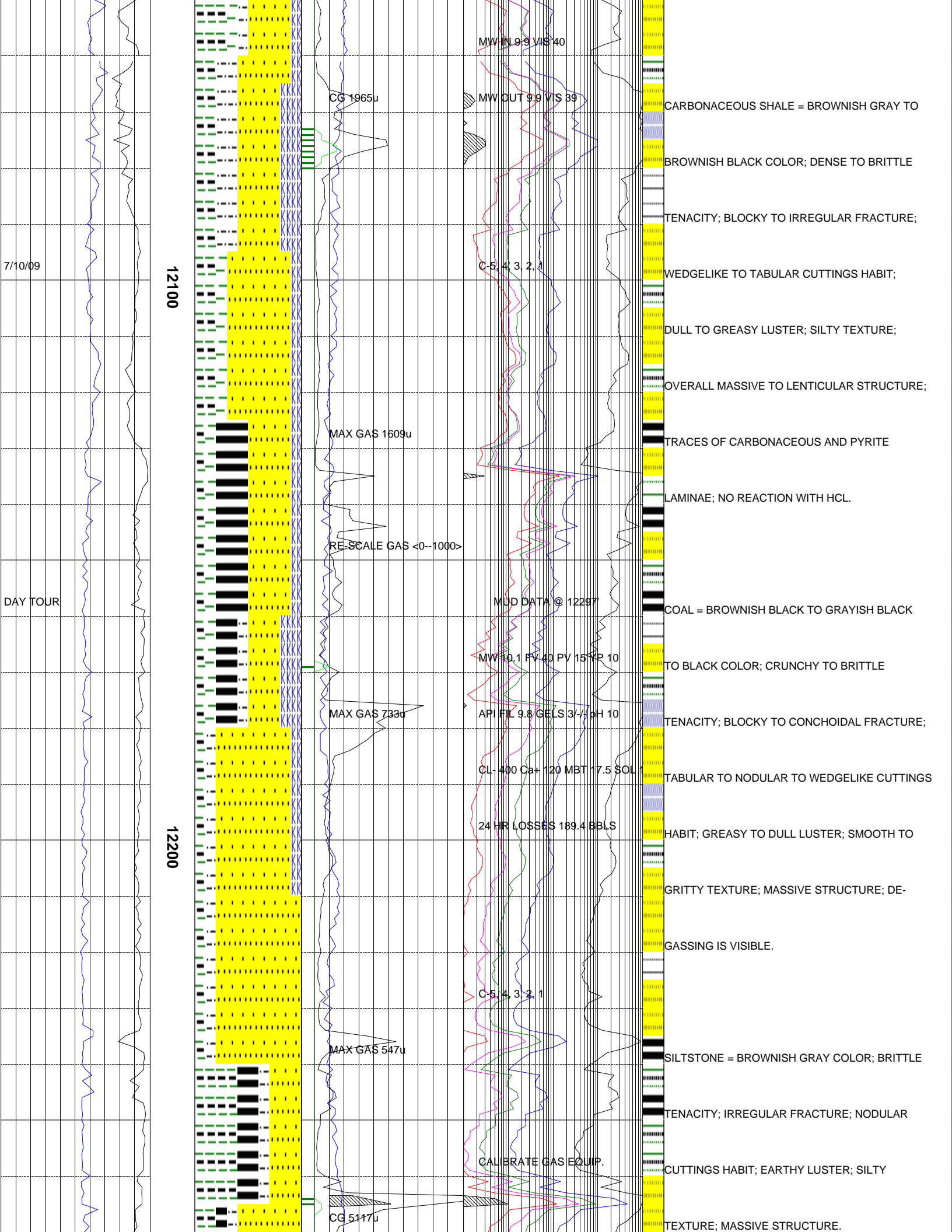


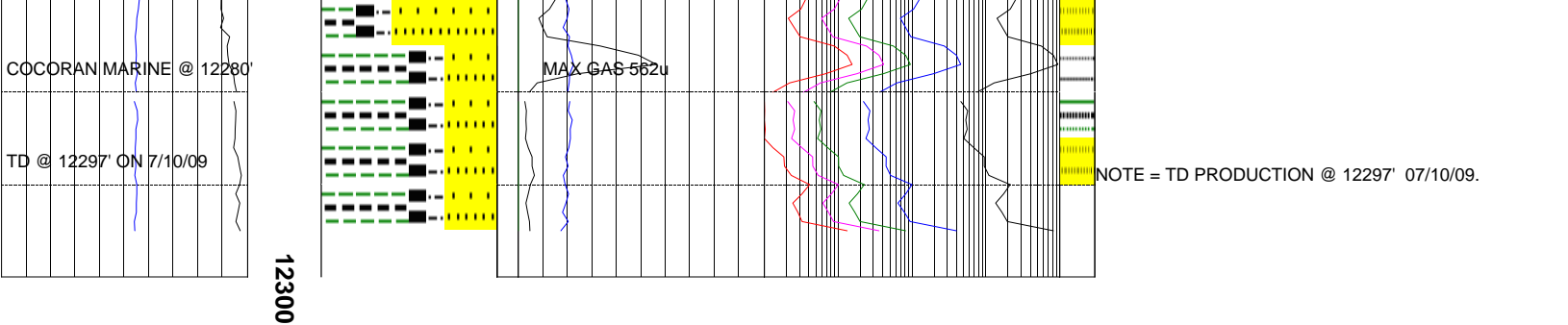












The log data, interpretations and recommendation provided by Epoch are inferences and assumptions based on measurements of drilling fluids. Such inferences and assumptions are not infallible and reasonable professionals may differ. Epoch does not represent or warrant the accuracy, correctness or completeness of any log data, interpretations, recommendations or information provided by Epoch, its officers, agents or employees. Epoch does not and cannot guarantee the accuracy of any such interpretation of the log data, interpretations or recommendations and Company is fully responsible for all decisions and actions it takes based on such log data, interpretations and recommendations.

