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(281) 784-5500
Bakersfield, CA
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(907) 561-2465

MUDLOG MD

COMPANY ExxonMobil Production
WELL PCU 296-5A01
FIELD Piceance Creek Unit
REGION Rocky Mountain
COORDINATES 39.912053000
108.198567000
ELEVATION 7295.5'
COUNTY, STATE Rio Blanco, CO
API INDEX 051031124800
SPUD DATE 10/21/2009
CONTRACTOR Helmerich and Payne
CO. REP. C.Curtis/ M. Hudon
RIG/TYPE 321 / Flex 4
LOGGING UNIT 031
GEOLOGISTS M. Franco
C. Record/ B.Smelsor
ADD. PERSONS M.Piper
R.McCane
CO. GEOLOGIST Nova Roosmawati

LOG INTERVAL

CASING DATA

DEPTHS: 4665' TO 14288'
DATES: 09/06/2010 TO 10/05/2010
SCALE: 5" = 100'

16.0" AT 150'
10.75" AT 4633'
7.0" AT 10105'
4.5" AT 14265'

MUD TYPES

HOLE SIZE

WATERBASED TO 14288'
TO
TO
TO

14.75" TO 126'
9.875" TO 10119'
6.125" TO 14288'
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	

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

Depth

Lithology

MGS	<0	Ttl Gas units	2.5K>
	<0	CO2 ppm	10K>
	<0	Flare Ht. ft	100>

<10	Meth C-1 ppm	100K>
<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.

4200

4300

4400

4500

<200	ROP	Δ
<50	Avg WOB	Δ

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

ALL SAMPLE COLOR DESCRIPTIONS REFERENCED
TO THE G.S.A. ROCK COLOR CHART.

ALL SAMPLE COLOR DESCRIPTIONS REFERENCED
TO THE G.S.A. ROCK COLOR CHART.

ROCK CHARACTERISTICS AND CONSTITUENTS
ARE LISTED FROM MOST ABUNDANT TO LEAST
ABUNDANT PERCENTAGE OF SAMPLE.

GAS CALIBRATED TO S.P.L.W.A.

STANDARDS (2% ME = 100 UNITS).

GAS CHROMATOGRAPHY EQUIPMENT CALIBRATED

TO A TEST GAS COMPOSED OF THE FOLLOWING:

METHANE = 9,990 PPM

ETHANE = 1,010 PPM

4600

PROPANE = 980 PPM

I-BUTANE = 1,000 PPM

N-BUTANE = 1,000 PPM

I-PENTANE = 1,000 PPM

N-PENTANE = 1,000 PPM

EPOCH WELL SERVICES COMMENCED LOGGING

THE FRU 296-5A01 WELL ON 9/7/2010

@ 4665' MD.

NB #2 9,875' HUGHES
 HCD504ZX 2X12" 4X13"
 IN @ 4665' DRLD 5797'
 18:45:00 HRS

4700

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO

OCCASIONAL PALE RED PURPLE AND LIGHT

YELLOWISH TAN GRAY; SLIGHTLY DENSE TO

SLIGHTLY CRUMBLY TO SLIGHTLY BRITTLE

TENACITY; IRREGULAR TO SUB-BLOCKY TO

SUB-PLANAR TO EARTHY FRACTURE; OCCASIONA

L MASSIVE TO WEDGE LIKE CUTTINGS HABIT;

DULL TO EARTHY DULL TO SEMI-FROSTED LUST

ER; MODERATELY SMOOTH TO MODERATELY

CLAYEY TO SLIGHTLY SILTY TEXTURE; VERY

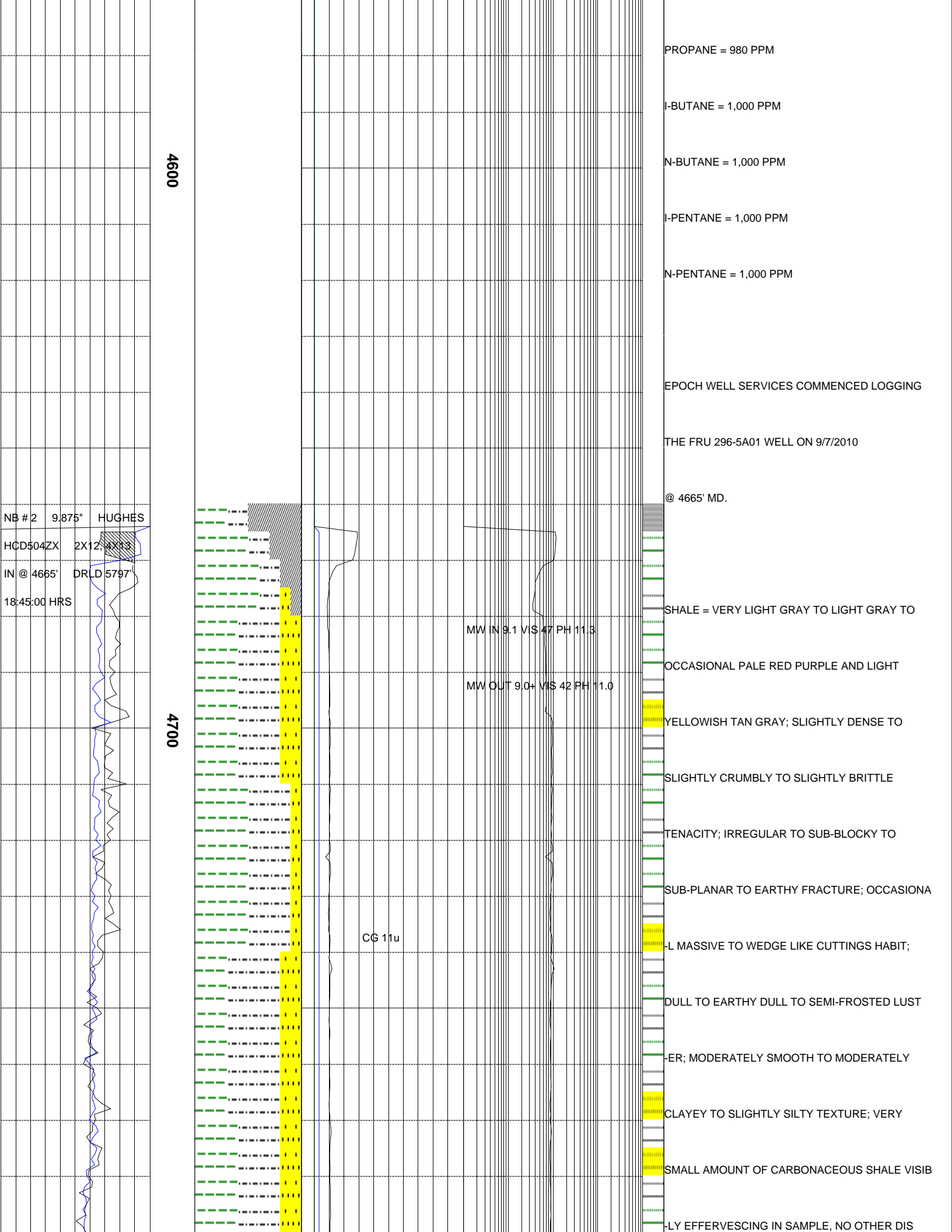
SMALL AMOUNT OF CARBONACEOUS SHALE VISIB

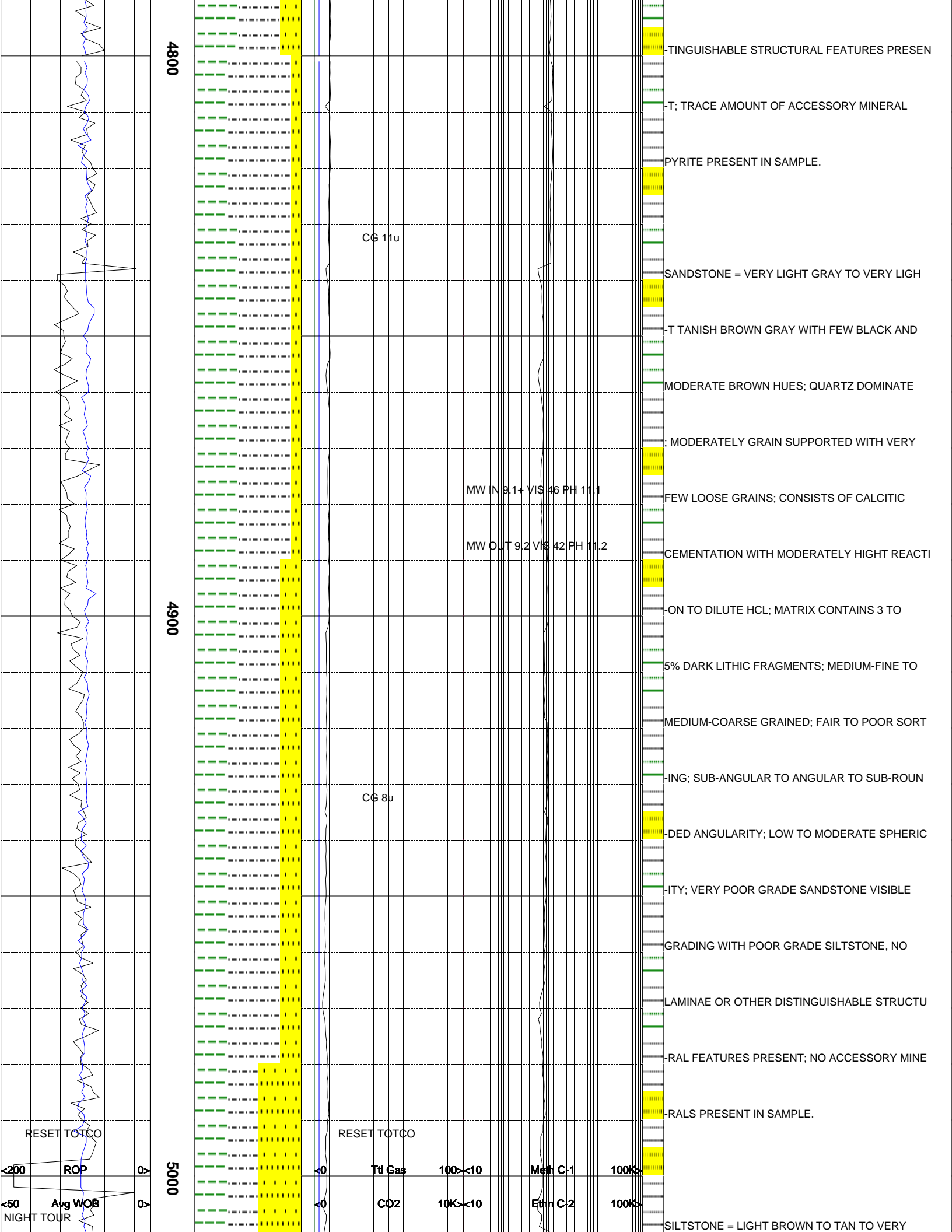
LY EFFERVESCENT IN SAMPLE, NO OTHER DIS

MW IN 9.1 VIS 47 PH 11.3

MW OUT 9.0+ VIS 42 PH 11.0

CG 11u





4800

INDISTINGUISHABLE STRUCTURAL FEATURES PRESENT

...; TRACE AMOUNT OF ACCESSORY MINERAL

... PYRITE PRESENT IN SAMPLE.

CG 11u

SANDSTONE = VERY LIGHT GRAY TO VERY LIGHT

... TANISH BROWN GRAY WITH FEW BLACK AND

... MODERATE BROWN HUES; QUARTZ DOMINANT

...; MODERATELY GRAIN SUPPORTED WITH VERY

MW IN 9.1+ VIS 46 PH 11.1

... FEW LOOSE GRAINS; CONSISTS OF CALCITIC

MW OUT 9.2 VIS 42 PH 11.2

... CEMENTATION WITH MODERATELY HIGH REACTIV

4900

... ON TO DILUTE HCL; MATRIX CONTAINS 3 TO

... 5% DARK LITHIC FRAGMENTS; MEDIUM-FINE TO

... MEDIUM-COARSE GRAINED; FAIR TO POOR SORT

... ING; SUB-ANGULAR TO ANGULAR TO SUB-ROUND

CG 8u

... RED ANGULARITY; LOW TO MODERATE SPHERIC

... ITY; VERY POOR GRADE SANDSTONE VISIBLE

... GRADING WITH POOR GRADE SILTSTONE, NO

... LAMINAE OR OTHER DISTINGUISHABLE STRUCTU

... RAL FEATURES PRESENT; NO ACCESSORY MINE

... RALS PRESENT IN SAMPLE.

RESET TOTCO

RESET TOTCO

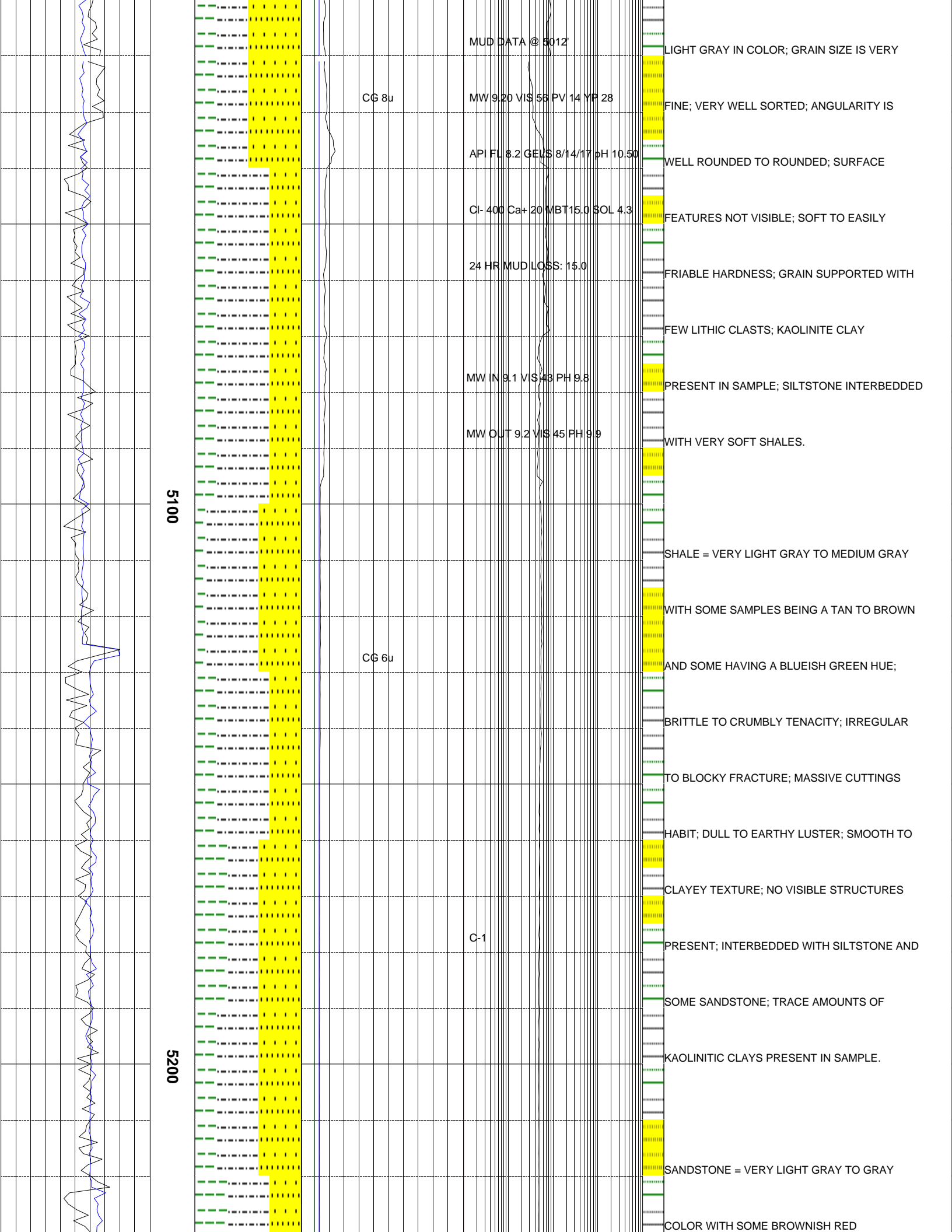
200 ROP
 <50 Avg WOB
 NIGHT TOUR

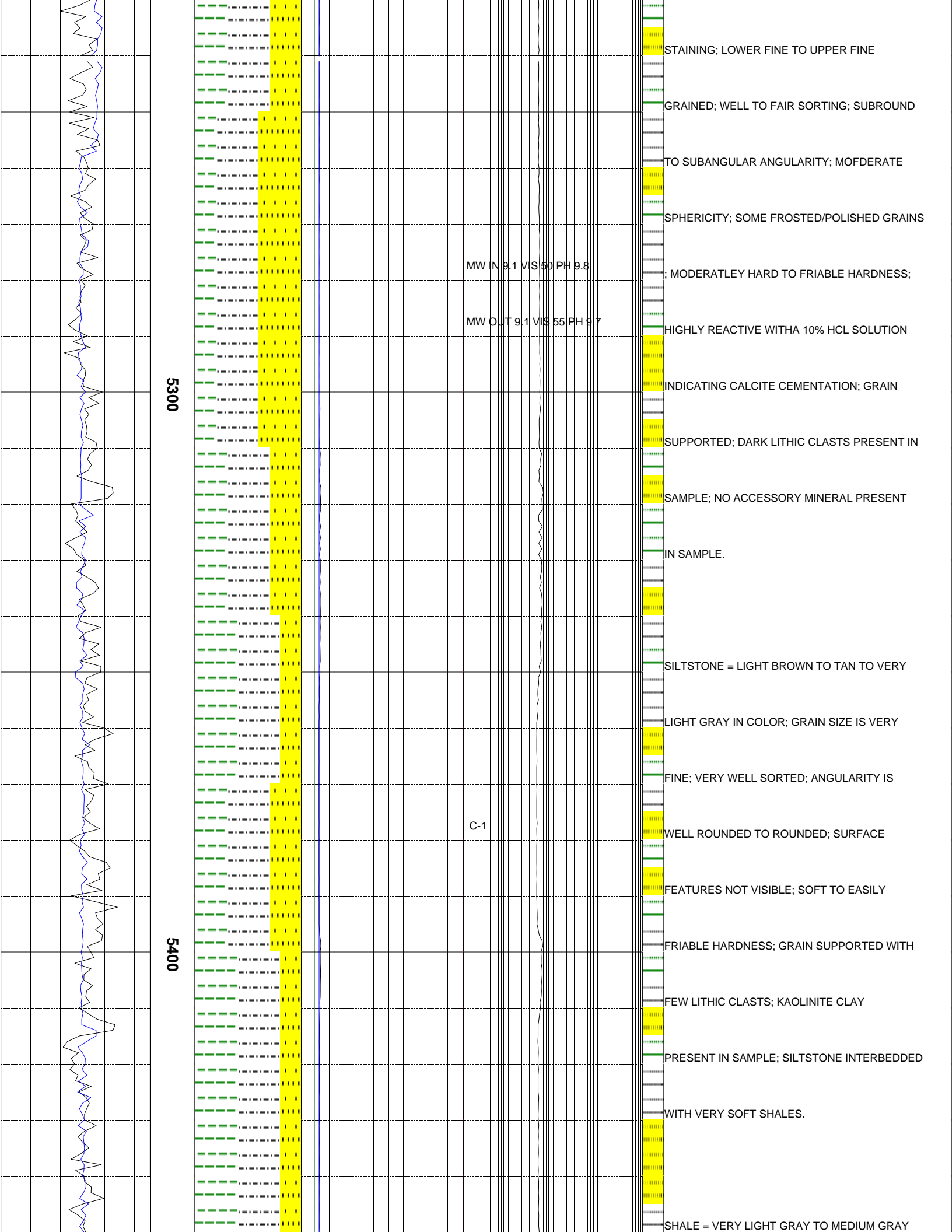
5000

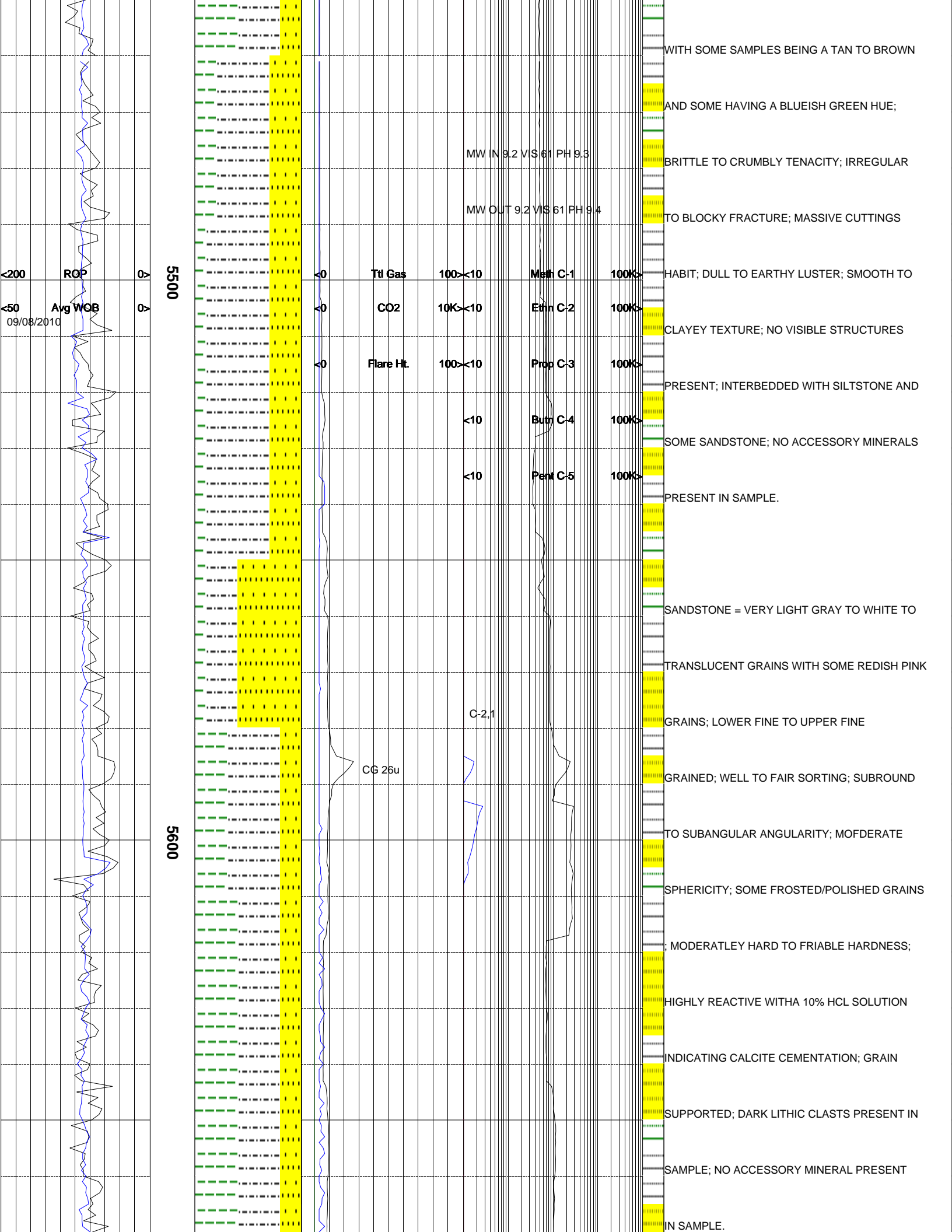
Ttl Gas 100 < 10 Meth C-1 100K >

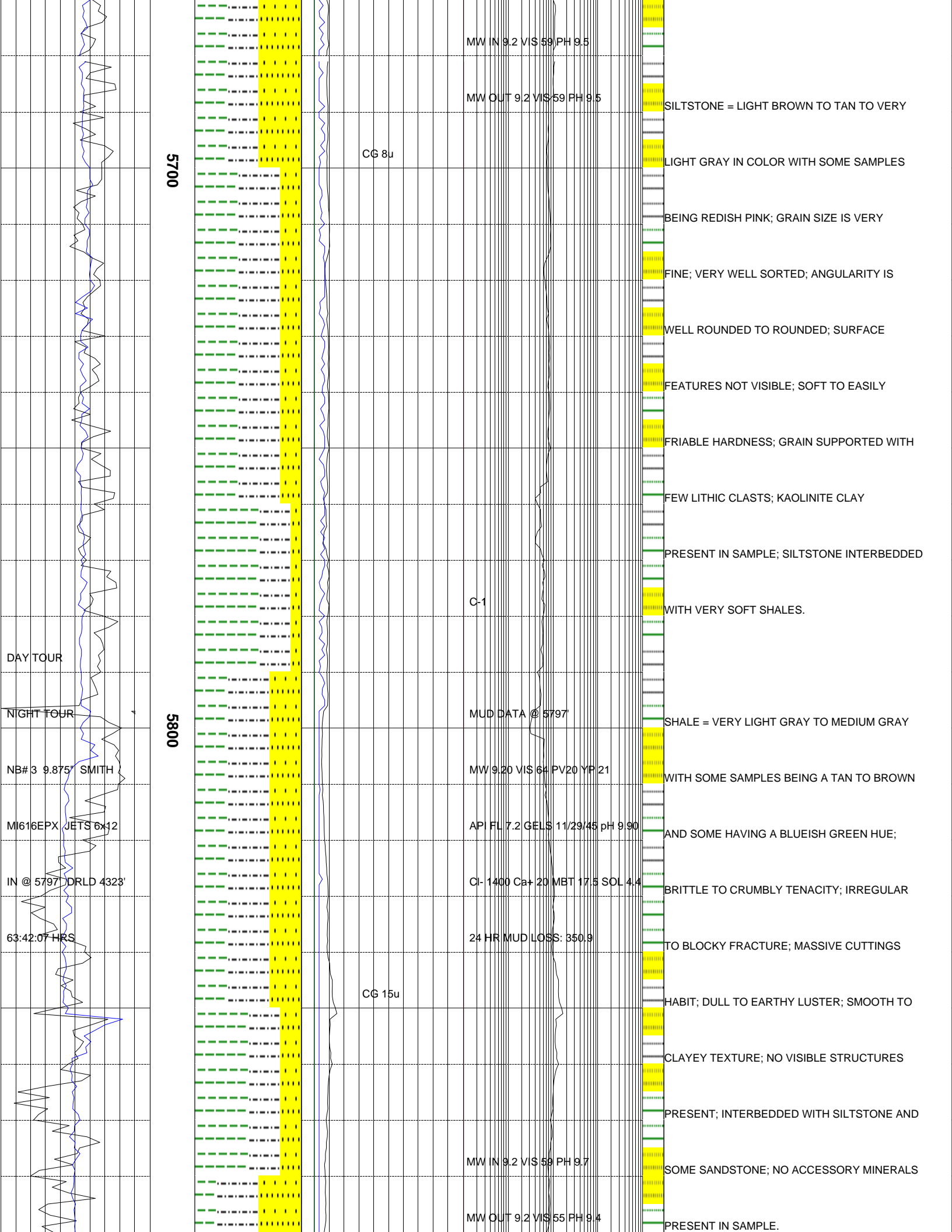
CO2 10K < 10 Ethn C-2 100K >

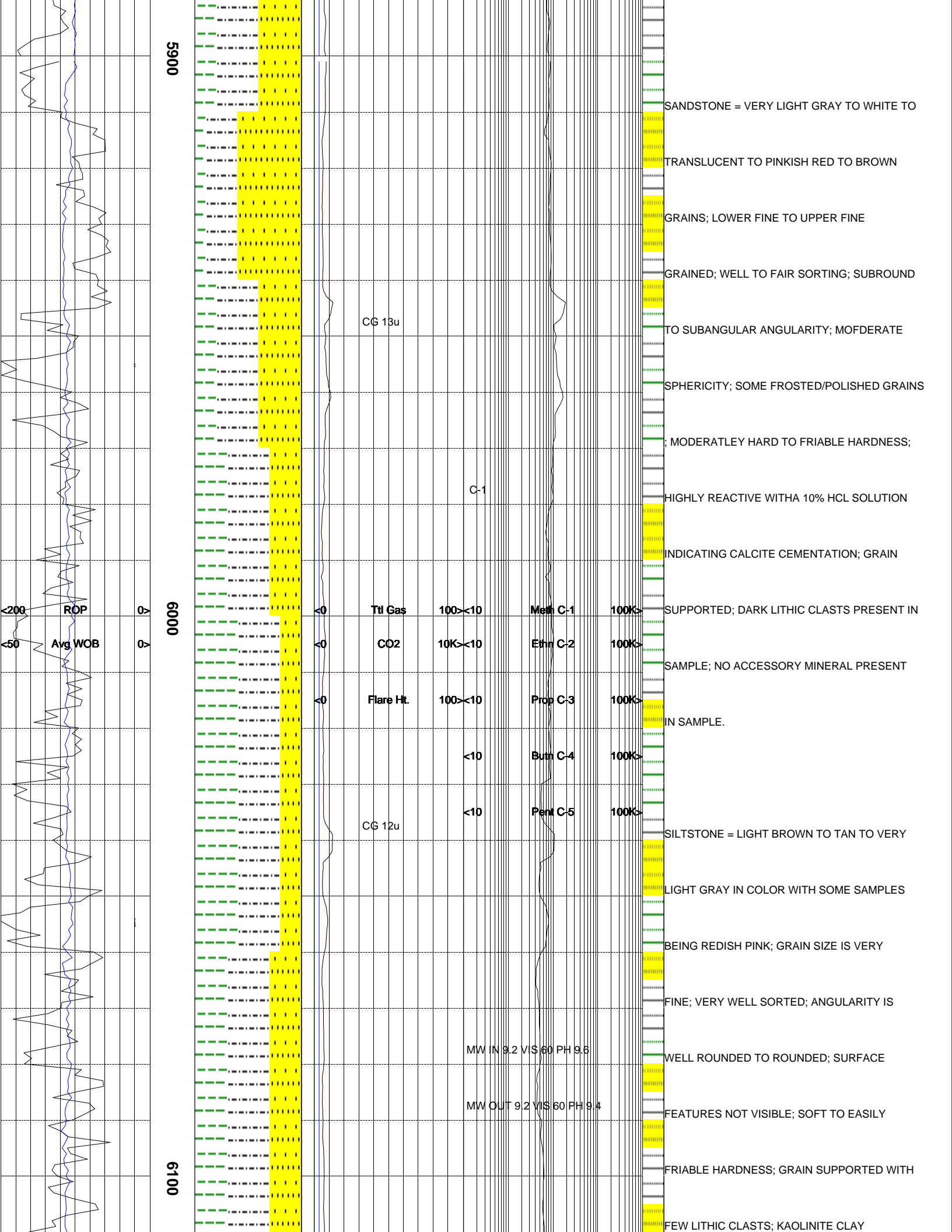
SILTSTONE = LIGHT BROWN TO TAN TO VERY

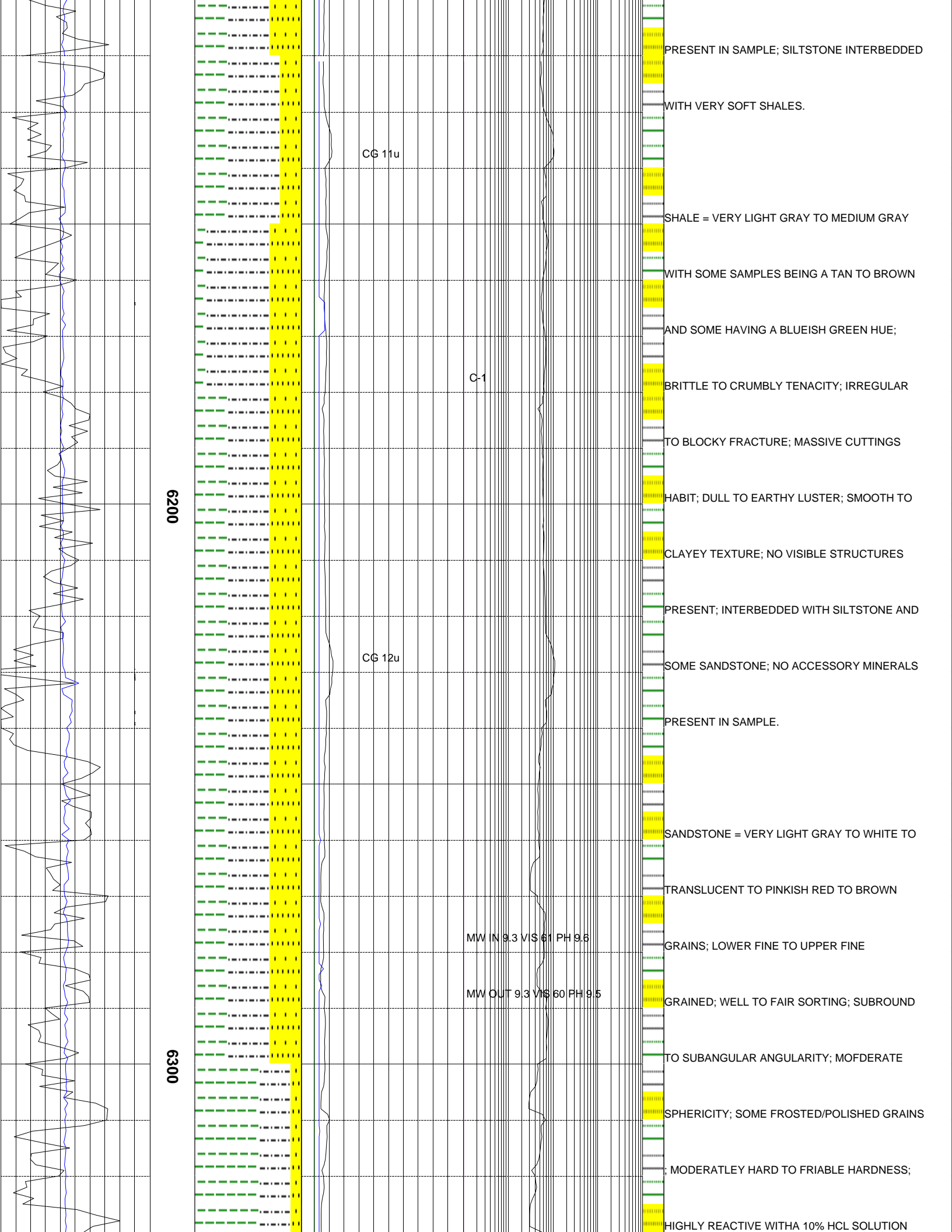












PRESENT IN SAMPLE; SILTSTONE INTERBEDDED

WITH VERY SOFT SHALES.

CG 11u

SHALE = VERY LIGHT GRAY TO MEDIUM GRAY

WITH SOME SAMPLES BEING A TAN TO BROWN

AND SOME HAVING A BLUEISH GREEN HUE;

C-1

BRITTLE TO CRUMBLY TENACITY; IRREGULAR

TO BLOCKY FRACTURE; MASSIVE CUTTINGS

6200

HABIT; DULL TO EARTHY LUSTER; SMOOTH TO

CLAYEY TEXTURE; NO VISIBLE STRUCTURES

PRESENT; INTERBEDDED WITH SILTSTONE AND

CG 12u

SOME SANDSTONE; NO ACCESSORY MINERALS

PRESENT IN SAMPLE.

SANDSTONE = VERY LIGHT GRAY TO WHITE TO

TRANSLUCENT TO PINKISH RED TO BROWN

MW IN 9.3 V/S 61 PH 9.6

GRAINS; LOWER FINE TO UPPER FINE

MW OUT 9.3 V/S 60 PH 9.5

GRAINED; WELL TO FAIR SORTING; SUBROUND

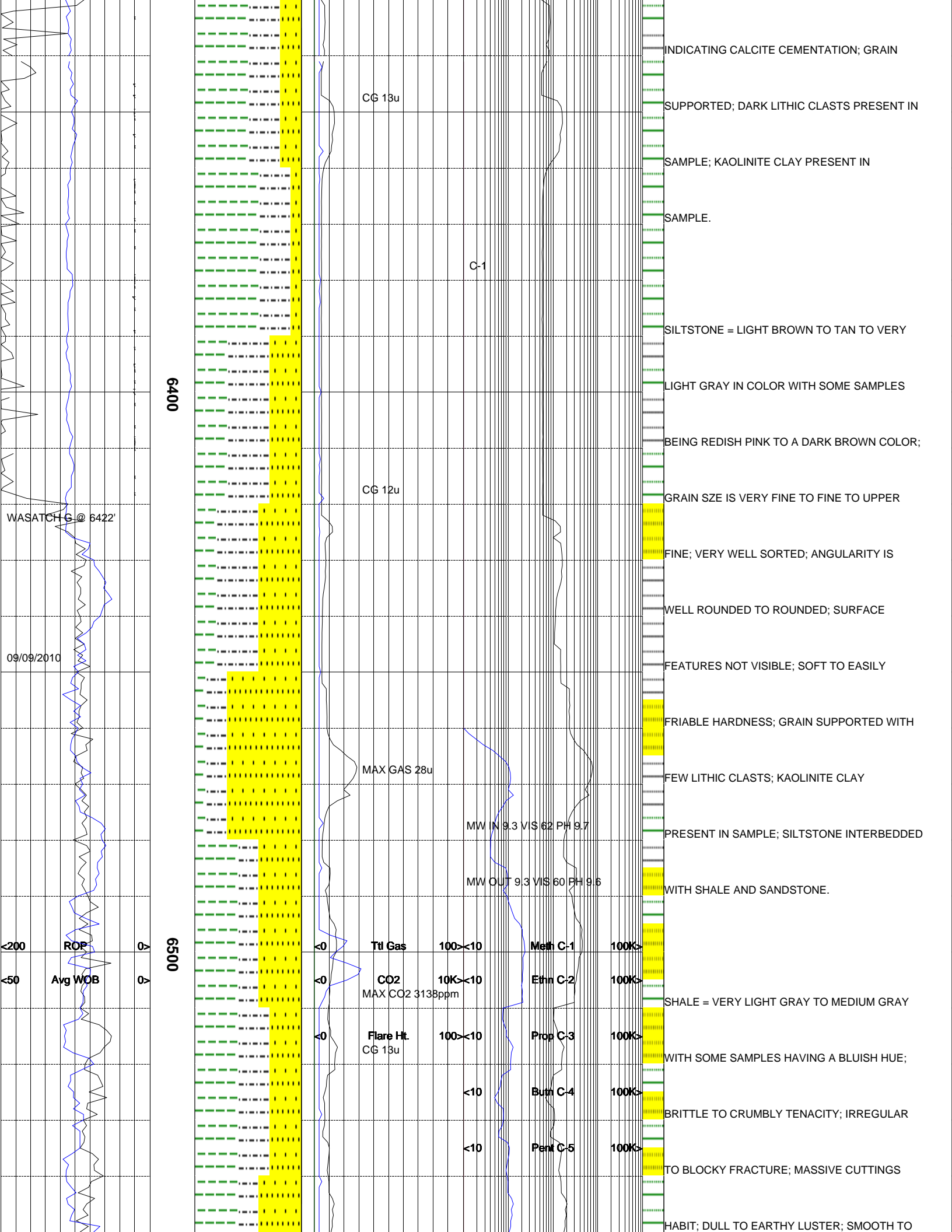
6300

TO SUBANGULAR ANGULARITY; MODERATE

SPHERICITY; SOME FROSTED/POLISHED GRAINS

; MODERATELY HARD TO FRIABLE HARDNESS;

HIGHLY REACTIVE WITH A 10% HCL SOLUTION



6400

6500

WASATCH G @ 6422'

09/09/2010

ROP
Avg WOB

CG 13u

CG 12u

MAX GAS 28u

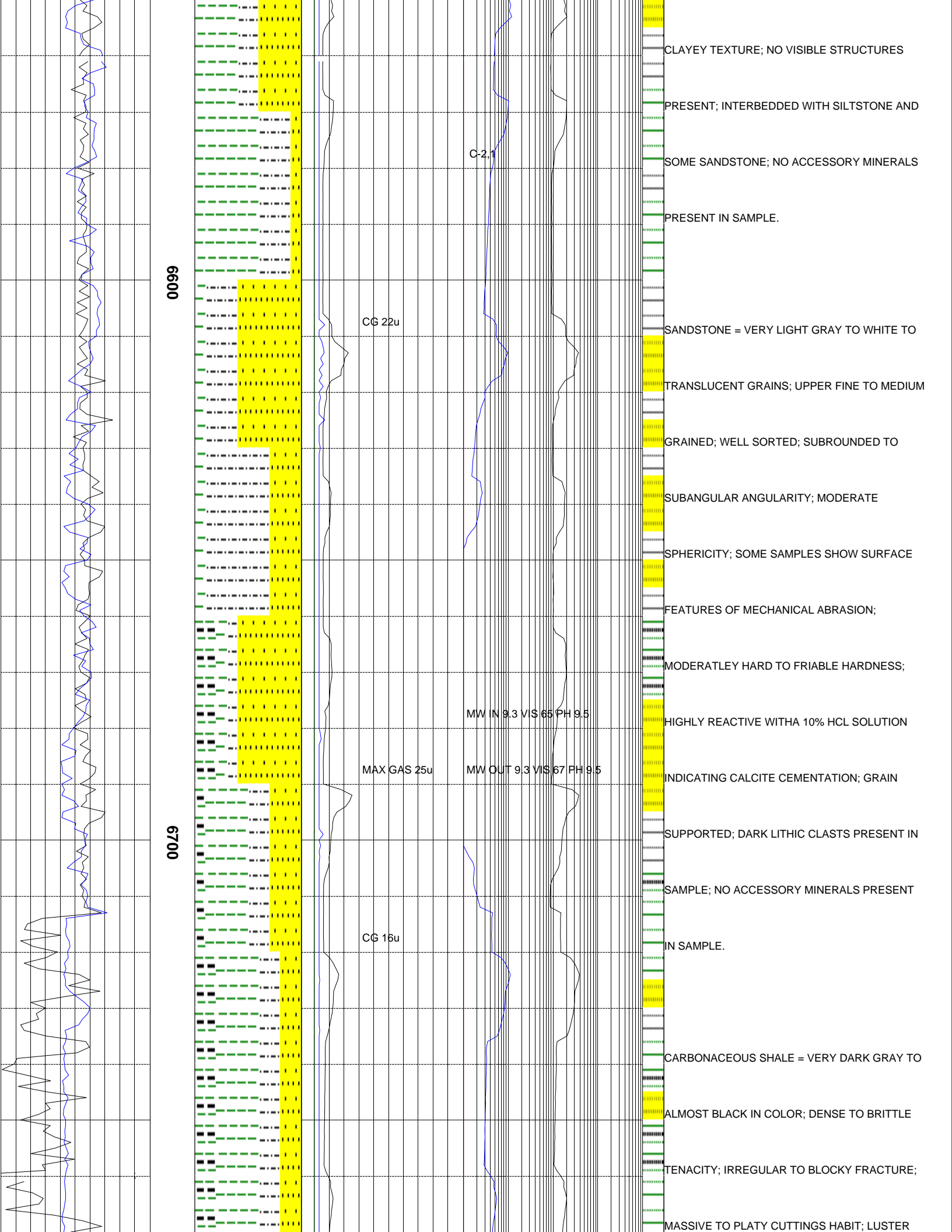
C-1

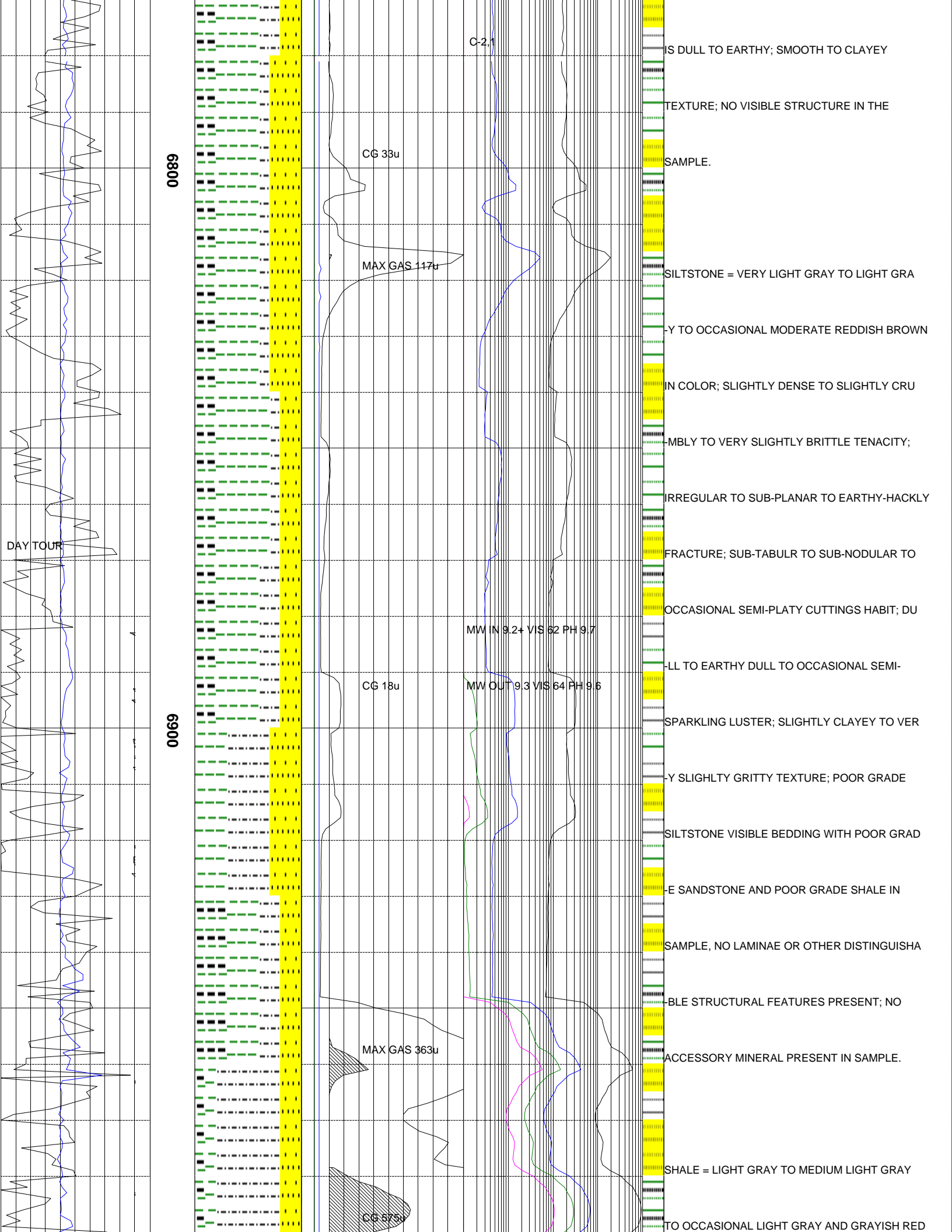
MW IN 9.3 V/S 62 PH 9.7

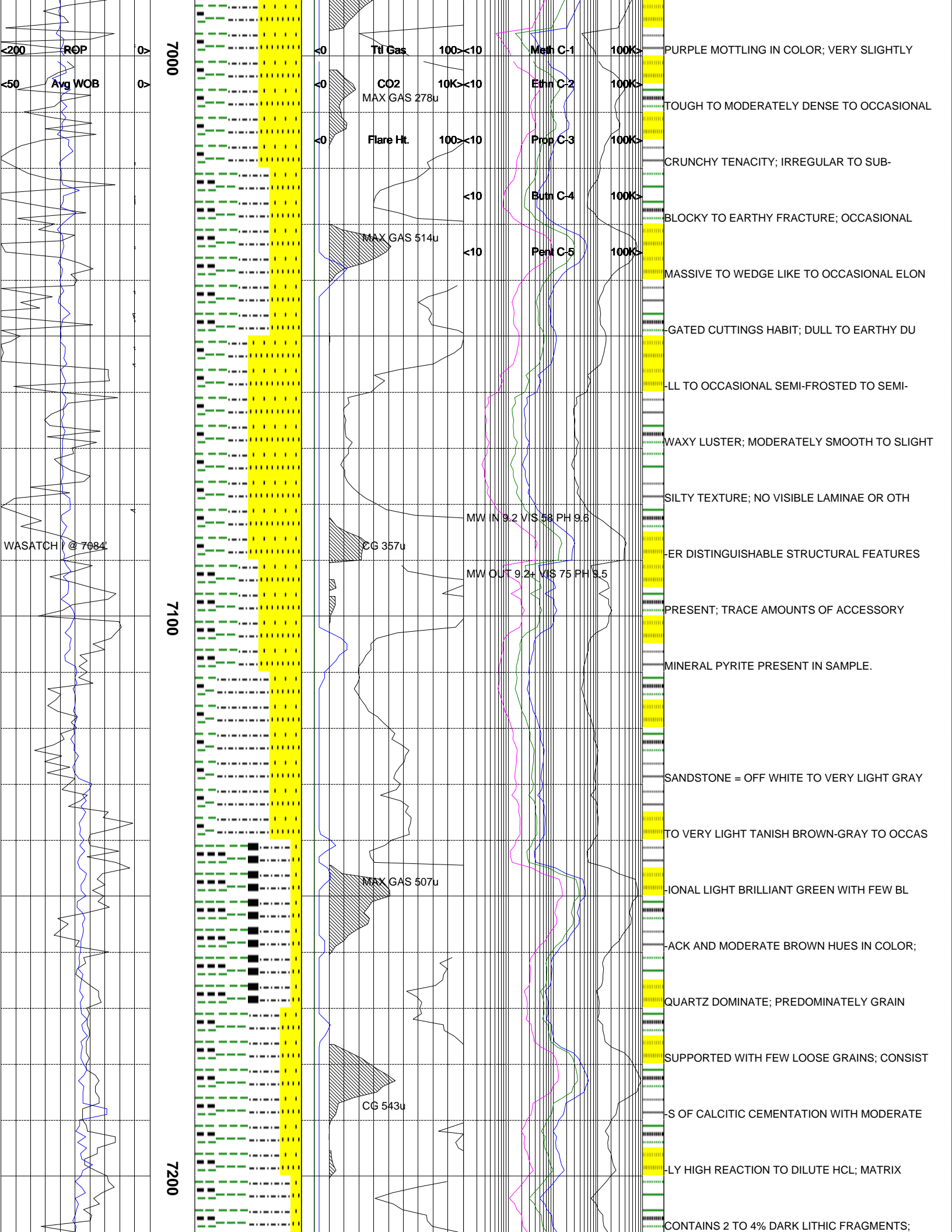
MW OUT 9.3 V/S 60 PH 9.5

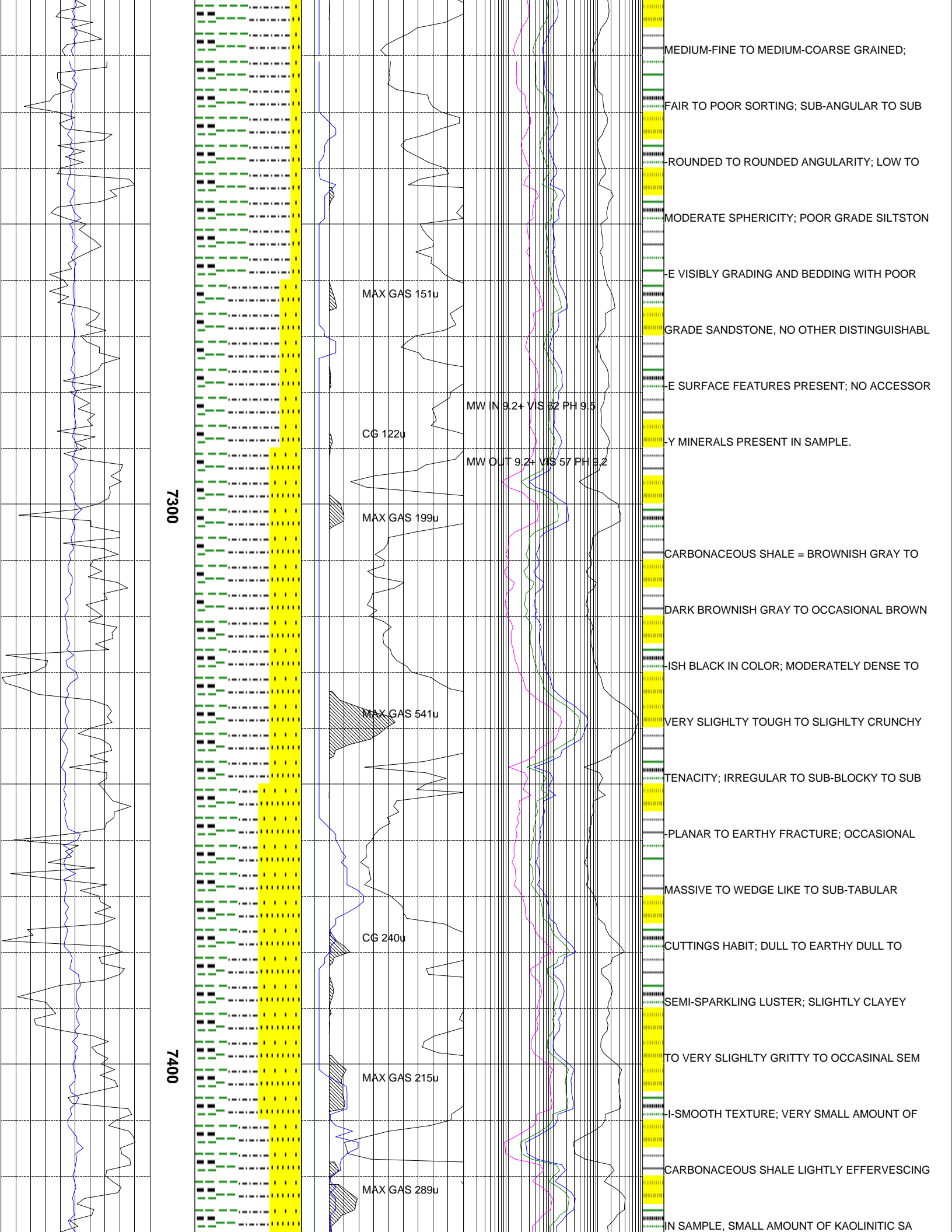
Ttl Gas	100 > < 10	Meth C-1	100K >
CO2	10K > < 10	Ethn C-2	100K >
MAX CO2 3138ppm		Prop C-3	100K >
Flare Ht.	100 > < 10	Burn C-4	100K >
CG 13u		Penl C-5	100K >
	< 10		
	< 10		

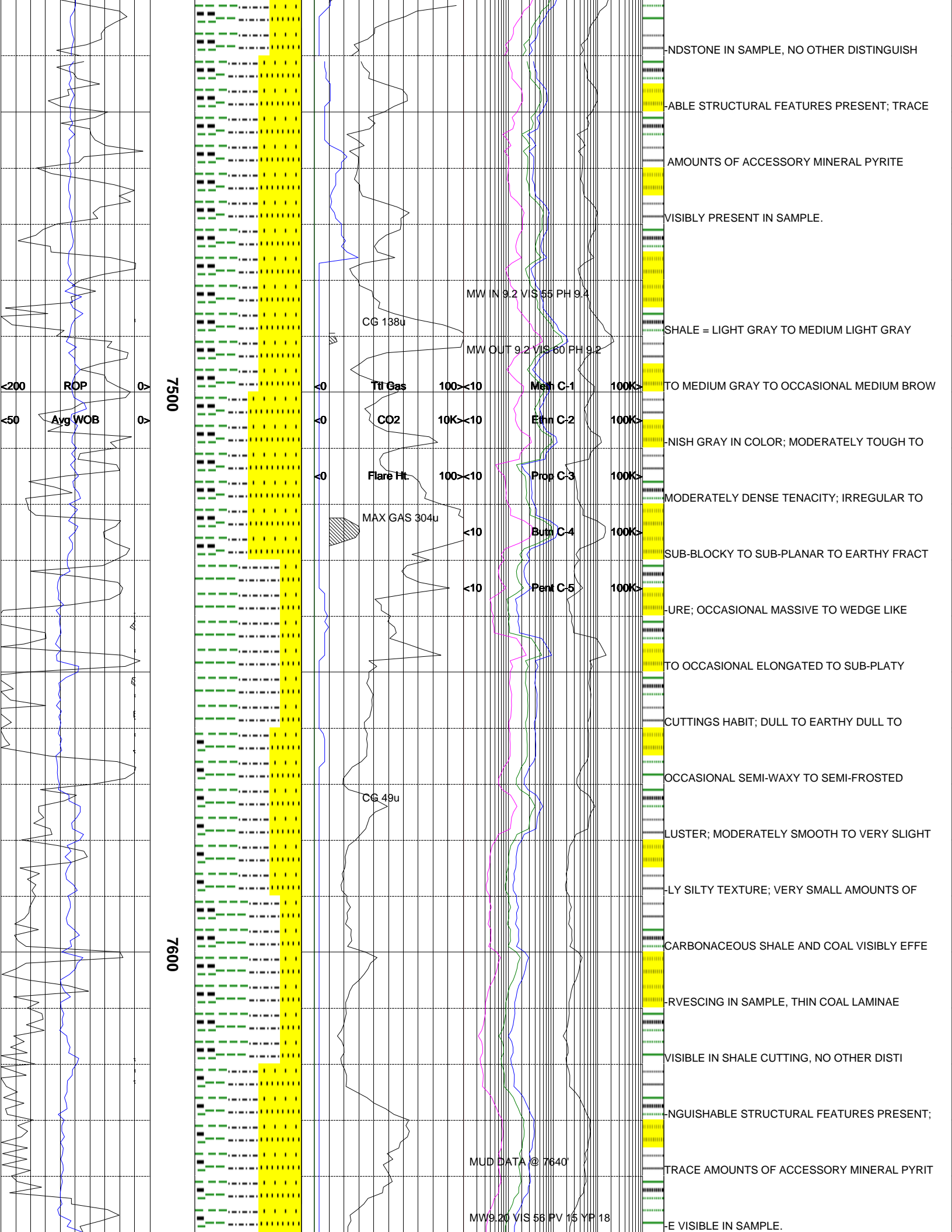
INDICATING CALCITE CEMENTATION; GRAIN
 SUPPORTED; DARK LITHIC CLASTS PRESENT IN
 SAMPLE; KAOLINITE CLAY PRESENT IN
 SAMPLE.
 SILTSTONE = LIGHT BROWN TO TAN TO VERY
 LIGHT GRAY IN COLOR WITH SOME SAMPLES
 BEING REDISH PINK TO A DARK BROWN COLOR;
 GRAIN SIZE IS VERY FINE TO FINE TO UPPER
 FINE; VERY WELL SORTED; ANGULARITY IS
 WELL ROUNDED TO ROUNDED; SURFACE
 FEATURES NOT VISIBLE; SOFT TO EASILY
 FRIABLE HARDNESS; GRAIN SUPPORTED WITH
 FEW LITHIC CLASTS; KAOLINITE CLAY
 PRESENT IN SAMPLE; SILTSTONE INTERBEDDED
 WITH SHALE AND SANDSTONE.
 SHALE = VERY LIGHT GRAY TO MEDIUM GRAY
 WITH SOME SAMPLES HAVING A BLuish HUE;
 BRITTLE TO CRUMBLY TENACITY; IRREGULAR
 TO BLOCKY FRACTURE; MASSIVE CUTTINGS
 HABIT; DULL TO EARTHY LUSTER; SMOOTH TO

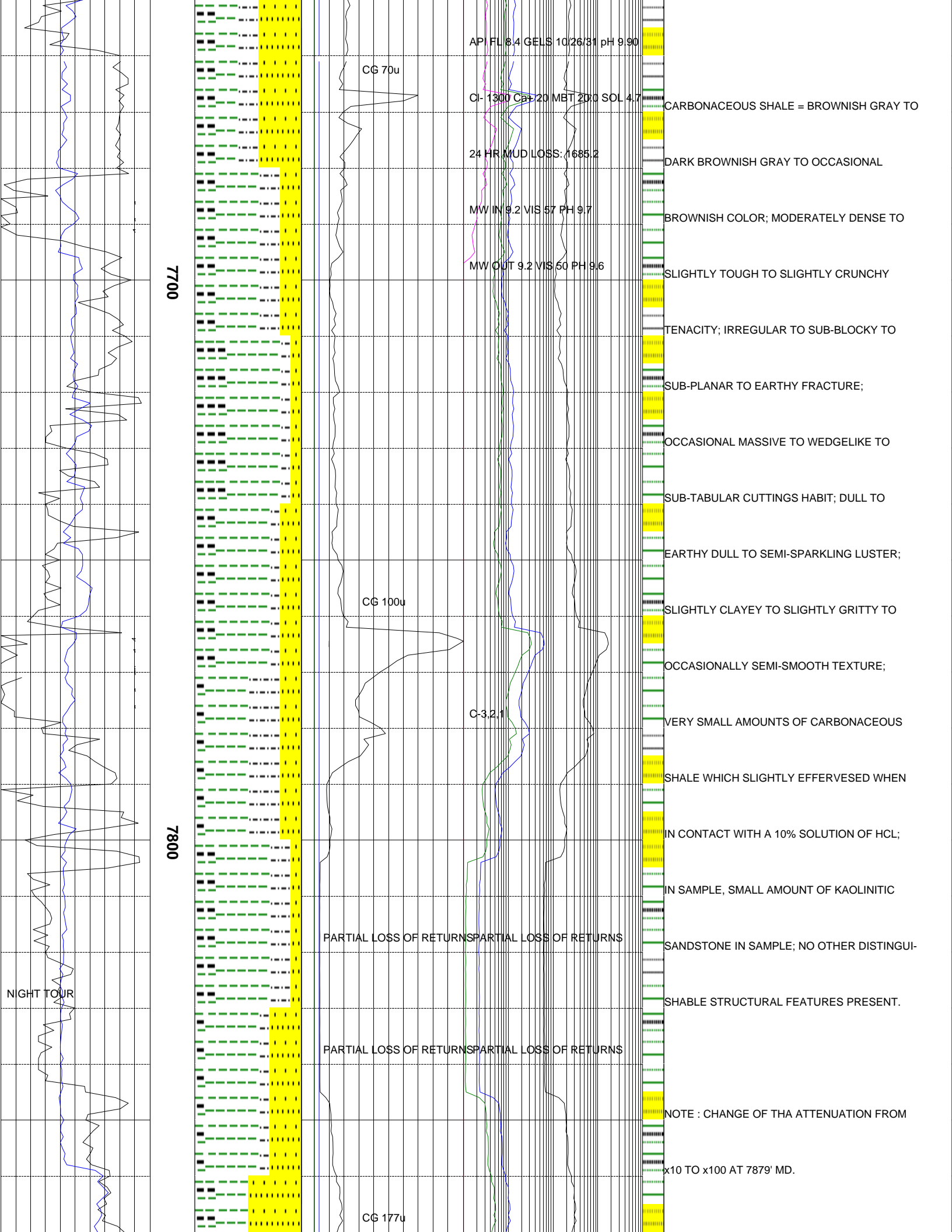


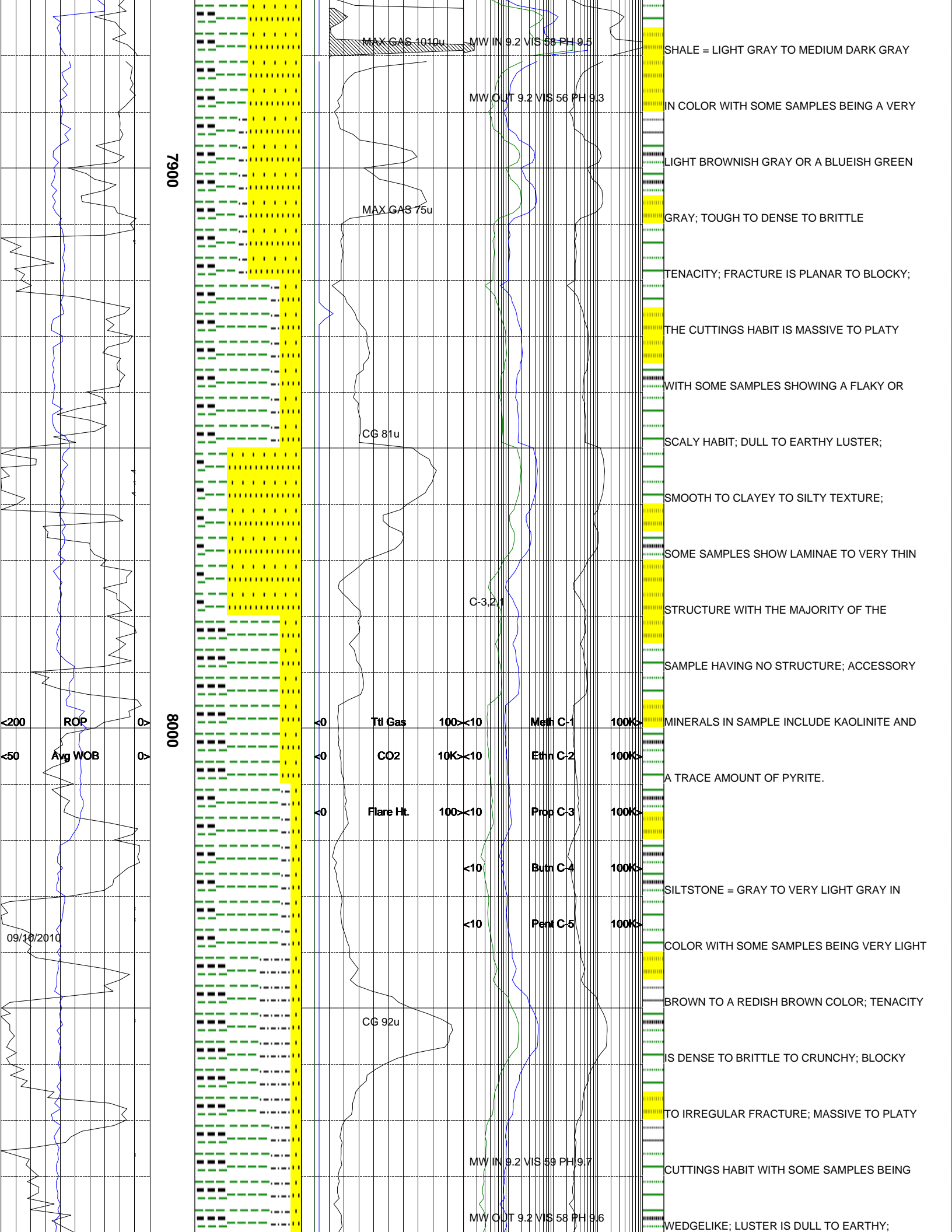


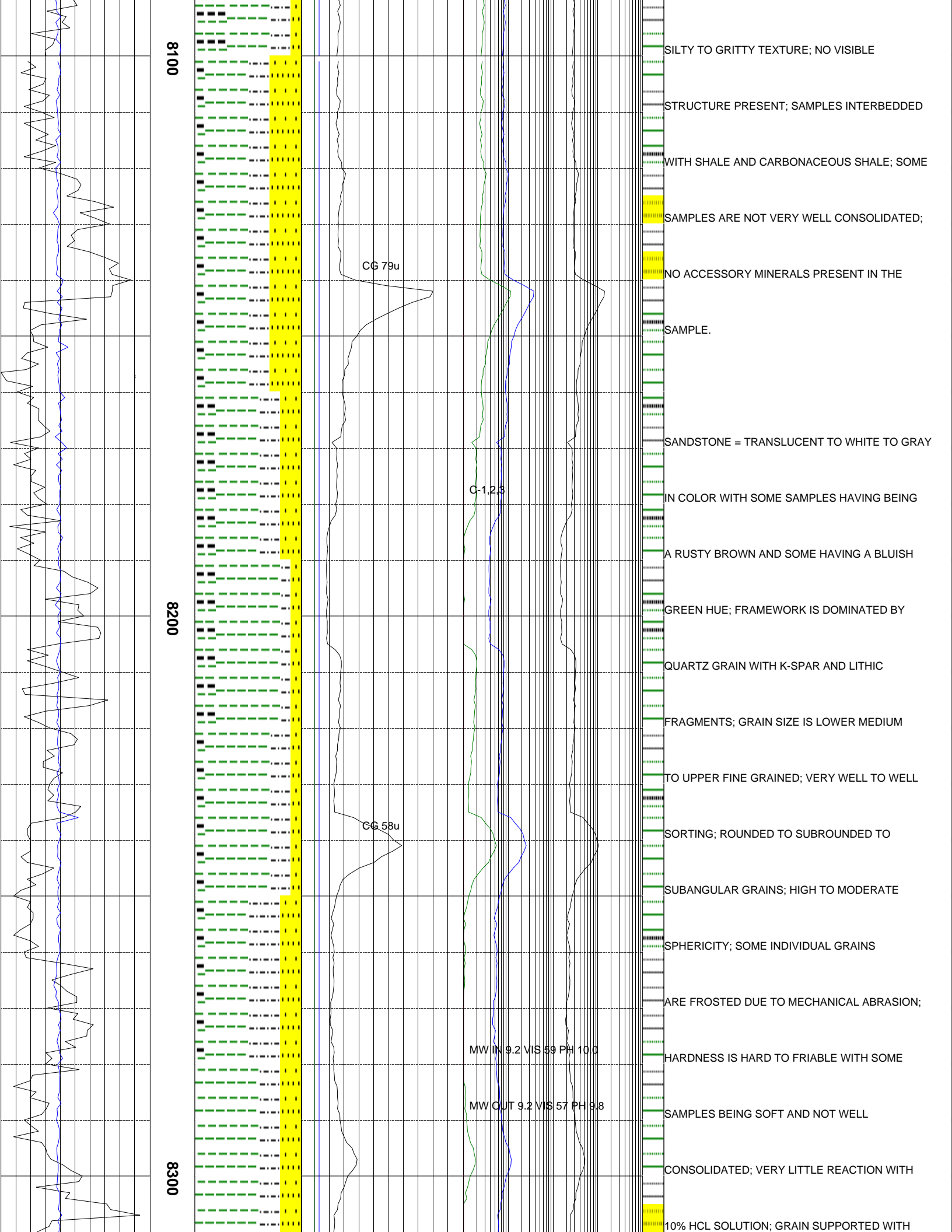












8100

8200

8300

CG 79u

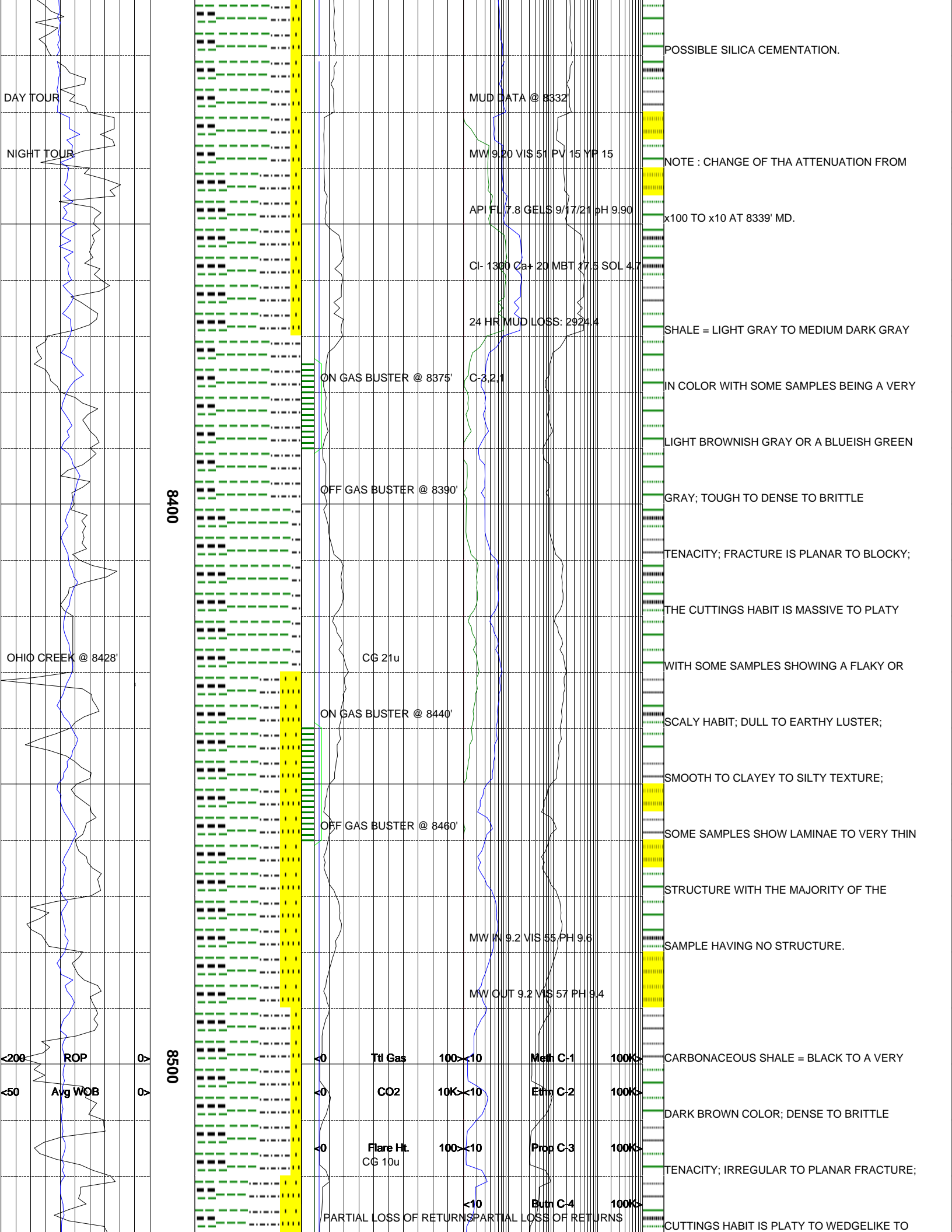
C-123

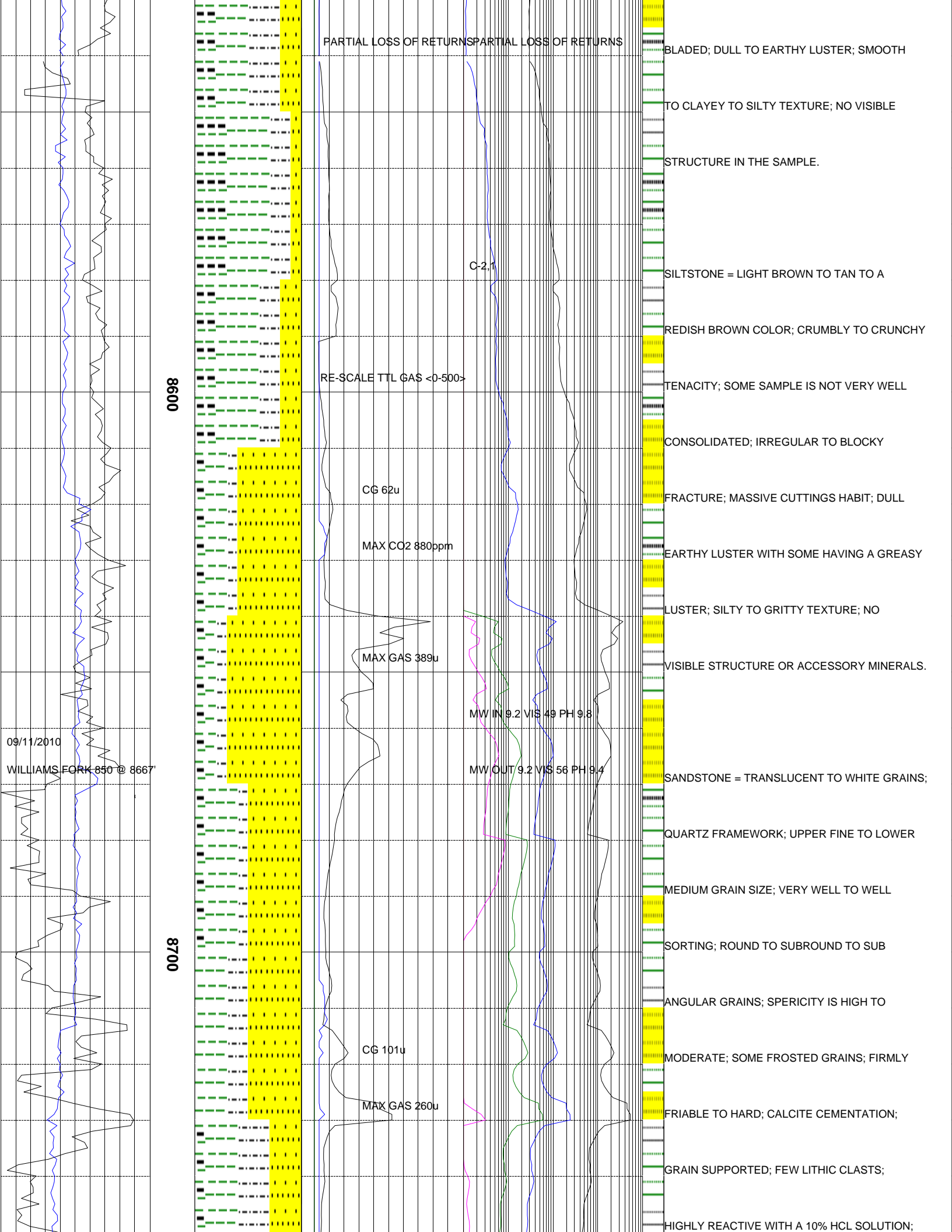
CG 58u

MW IN 9.2 VIS 59 PH 10.0

MW OUT 9.2 VIS 57 PH 9.8

SILTY TO GRITTY TEXTURE; NO VISIBLE
STRUCTURE PRESENT; SAMPLES INTERBEDDED
WITH SHALE AND CARBONACEOUS SHALE; SOME
SAMPLES ARE NOT VERY WELL CONSOLIDATED;
NO ACCESSORY MINERALS PRESENT IN THE
SAMPLE.
SANDSTONE = TRANSLUCENT TO WHITE TO GRAY
IN COLOR WITH SOME SAMPLES HAVING BEING
A RUSTY BROWN AND SOME HAVING A BLuish
GREEN HUE; FRAMEWORK IS DOMINATED BY
QUARTZ GRAIN WITH K-SPAR AND LITHIC
FRAGMENTS; GRAIN SIZE IS LOWER MEDIUM
TO UPPER FINE GRAINED; VERY WELL TO WELL
SORTING; ROUNDED TO SUBROUNDED TO
SUBANGULAR GRAINS; HIGH TO MODERATE
SPHERICITY; SOME INDIVIDUAL GRAINS
ARE FROSTED DUE TO MECHANICAL ABRASION;
HARDNESS IS HARD TO FRIABLE WITH SOME
SAMPLES BEING SOFT AND NOT WELL
CONSOLIDATED; VERY LITTLE REACTION WITH
10% HCL SOLUTION; GRAIN SUPPORTED WITH





PARTIAL LOSS OF RETURNS PARTIAL LOSS OF RETURNS

BLADED; DULL TO EARTHY LUSTER; SMOOTH

TO CLAYEY TO SILTY TEXTURE; NO VISIBLE

STRUCTURE IN THE SAMPLE.

C-2.1

SILTSTONE = LIGHT BROWN TO TAN TO A

REDISH BROWN COLOR; CRUMBLY TO CRUNCHY

RE-SCALE TTL GAS <0-500>

TENACITY; SOME SAMPLE IS NOT VERY WELL

CONSOLIDATED; IRREGULAR TO BLOCKY

CG 62u

FRACTURE; MASSIVE CUTTINGS HABIT; DULL

MAX CQ2 880ppm

EARTHY LUSTER WITH SOME HAVING A GREASY

LUSTER; SILTY TO GRITTY TEXTURE; NO

MAX GAS 389u

VISIBLE STRUCTURE OR ACCESSORY MINERALS.

MW IN 9.2 VIS 49 PH 9.8

MW OUT 9.2 VIS 56 PH 9.4

SANDSTONE = TRANSLUCENT TO WHITE GRAINS;

QUARTZ FRAMEWORK; UPPER FINE TO LOWER

MEDIUM GRAIN SIZE; VERY WELL TO WELL

SORTING; ROUND TO SUBROUND TO SUB

ANGULAR GRAINS; SPERICITY IS HIGH TO

CG 101u

MODERATE; SOME FROSTED GRAINS; FIRMLY

MAX GAS 260u

FRIABLE TO HARD; CALCITE CEMENTATION;

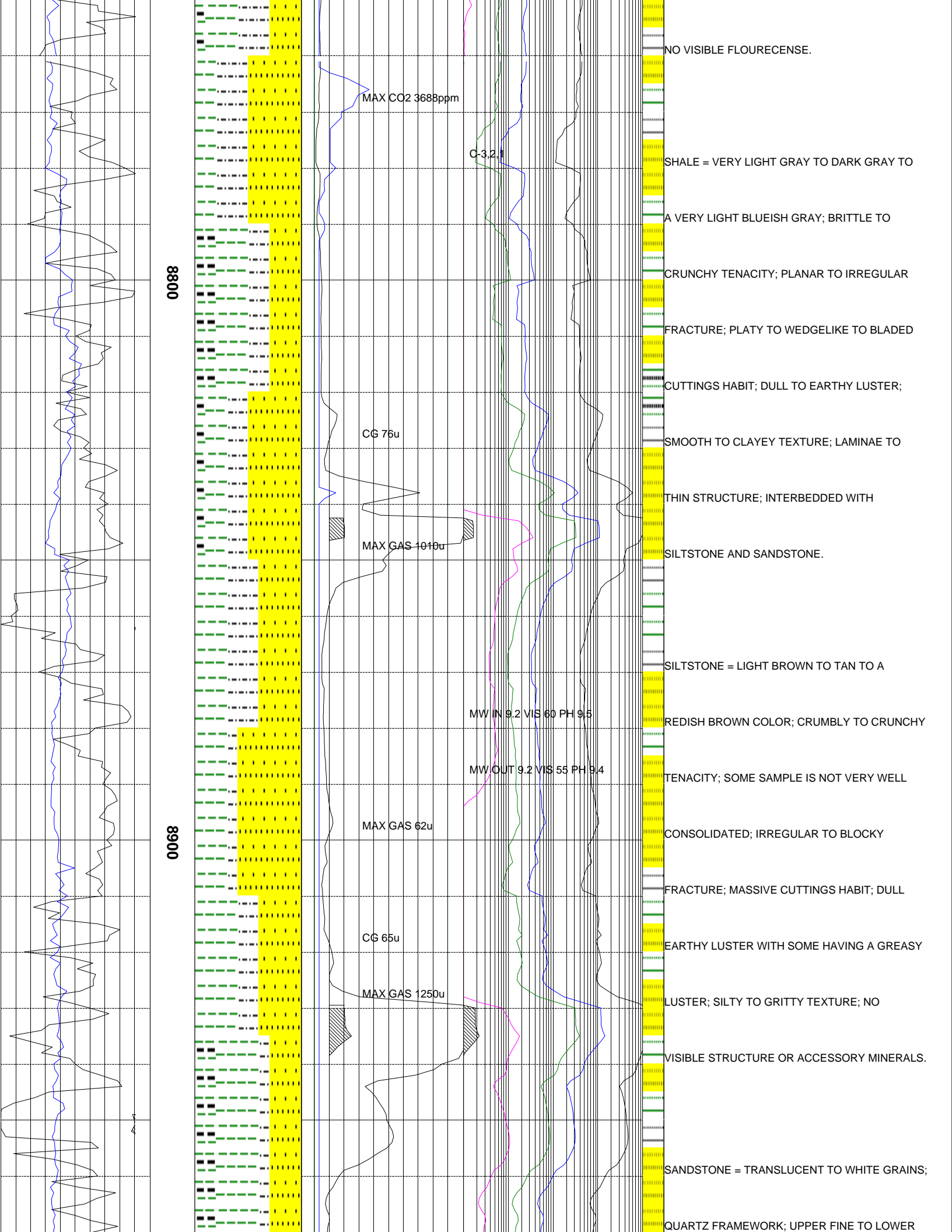
GRAIN SUPPORTED; FEW LITHIC CLASTS;

HIGHLY REACTIVE WITH A 10% HCL SOLUTION;

8600

8700

09/11/2010
WILLIAMS FORK 850 @ 8667'



0088

0068

MAX CO2 3688ppm

C-3.2

CG 76u

MAX GAS 1010u

MW IN 9.2 VIS 60 PH 9.5

MW OUT 9.2 VIS 55 PH 9.4

MAX GAS 62u

CG 65u

MAX GAS 1250u

NO VISIBLE FLOURECENSE.

SHALE = VERY LIGHT GRAY TO DARK GRAY TO

A VERY LIGHT BLUEISH GRAY; BRITTLE TO

CRUNCHY TENACITY; PLANAR TO IRREGULAR

FRACTURE; PLATY TO WEDGELIKE TO BLADED

CUTTINGS HABIT; DULL TO EARTHY LUSTER;

SMOOTH TO CLAYEY TEXTURE; LAMINAE TO

THIN STRUCTURE; INTERBEDDED WITH

SILTSTONE AND SANDSTONE.

SILTSTONE = LIGHT BROWN TO TAN TO A

REDISH BROWN COLOR; CRUMBLY TO CRUNCHY

TENACITY; SOME SAMPLE IS NOT VERY WELL

CONSOLIDATED; IRREGULAR TO BLOCKY

FRACTURE; MASSIVE CUTTINGS HABIT; DULL

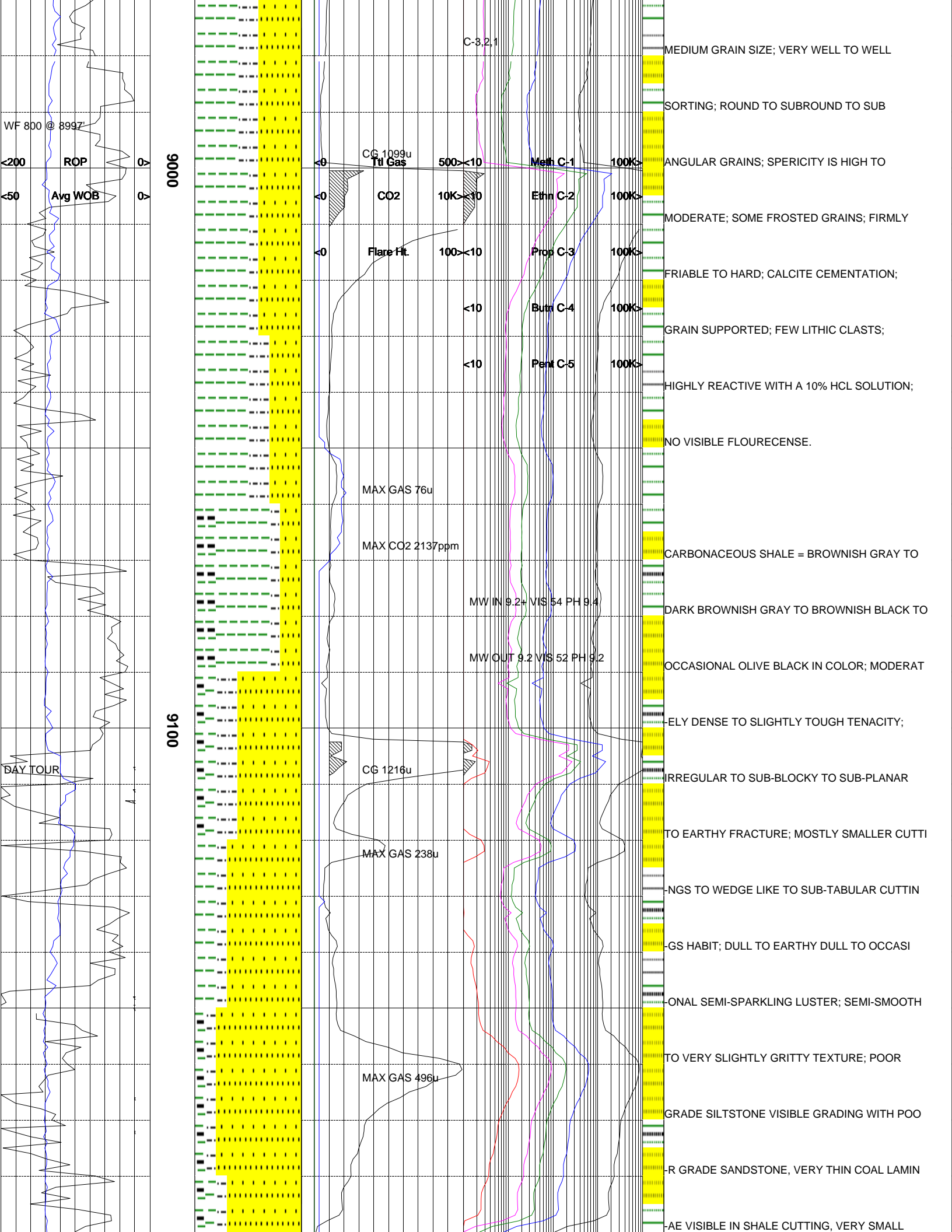
EARTHY LUSTER WITH SOME HAVING A GREASY

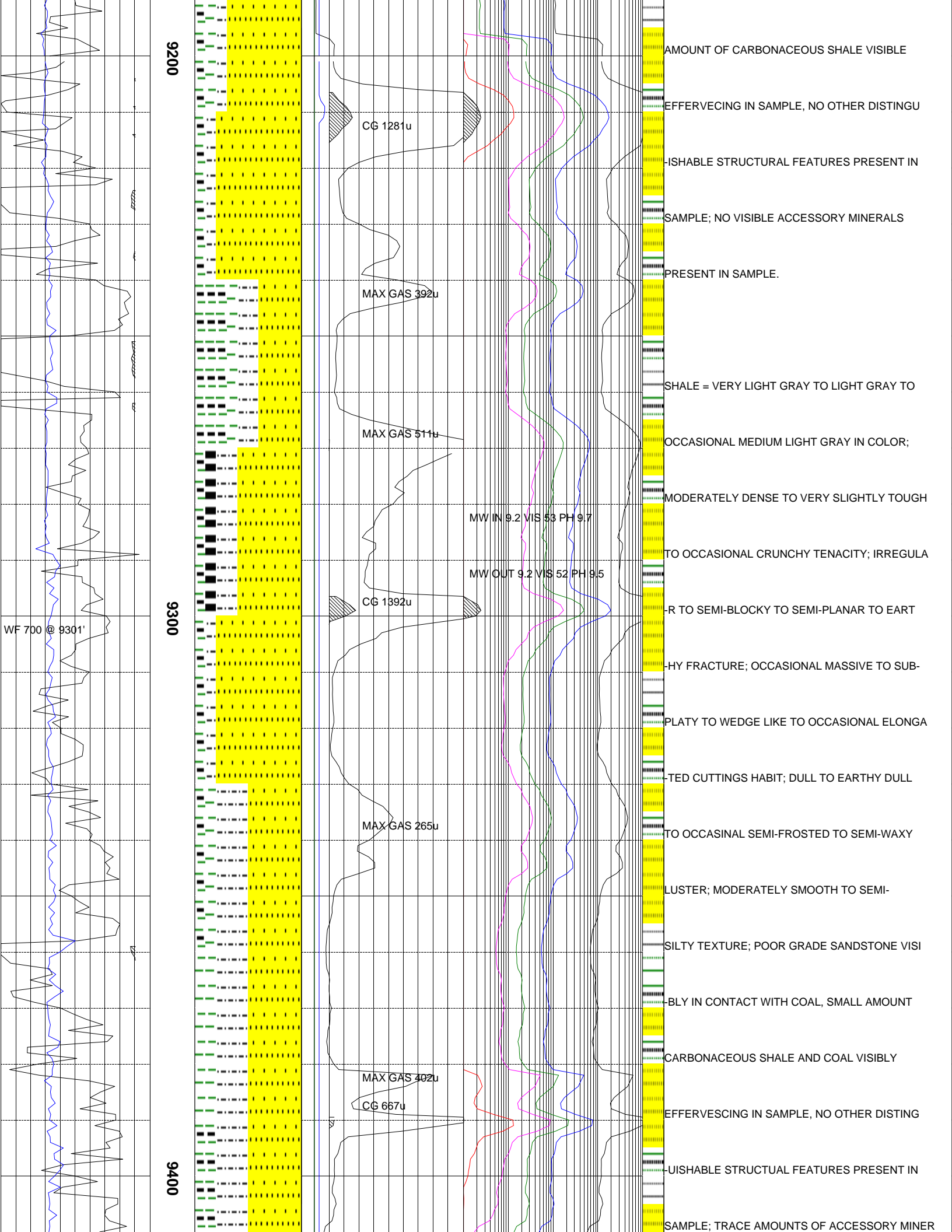
LUSTER; SILTY TO GRITTY TEXTURE; NO

VISIBLE STRUCTURE OR ACCESSORY MINERALS.

SANDSTONE = TRANSLUCENT TO WHITE GRAINS;

QUARTZ FRAMEWORK; UPPER FINE TO LOWER





9200

9300

9400

CG 1281u

MAX GAS 392u

MAX GAS 511u

MW IN 9.2 VIS 53 PH 9.7

MW OUT 9.2 VIS 52 PH 9.5

CG 1392u

MAX GAS 265u

MAX GAS 402u

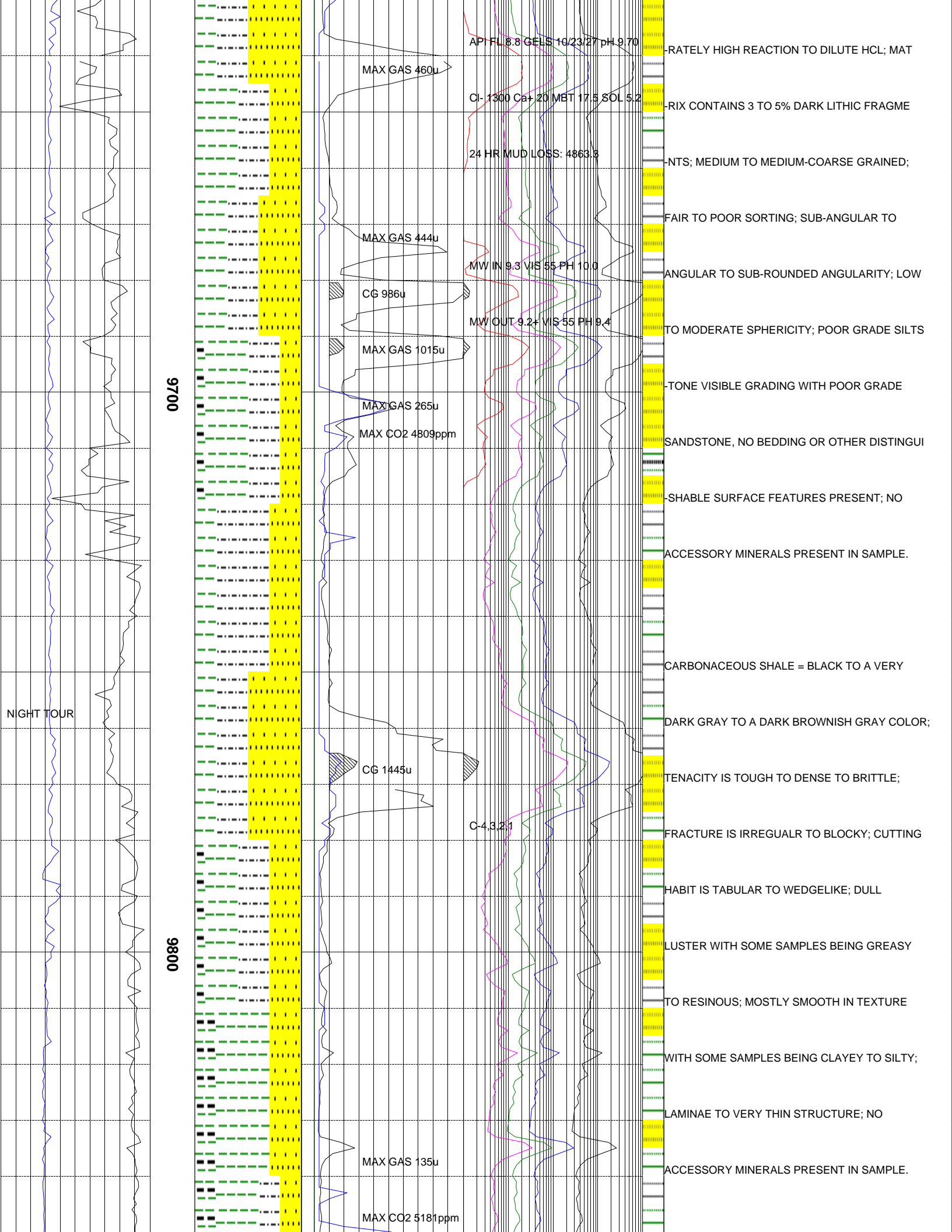
CG 667u

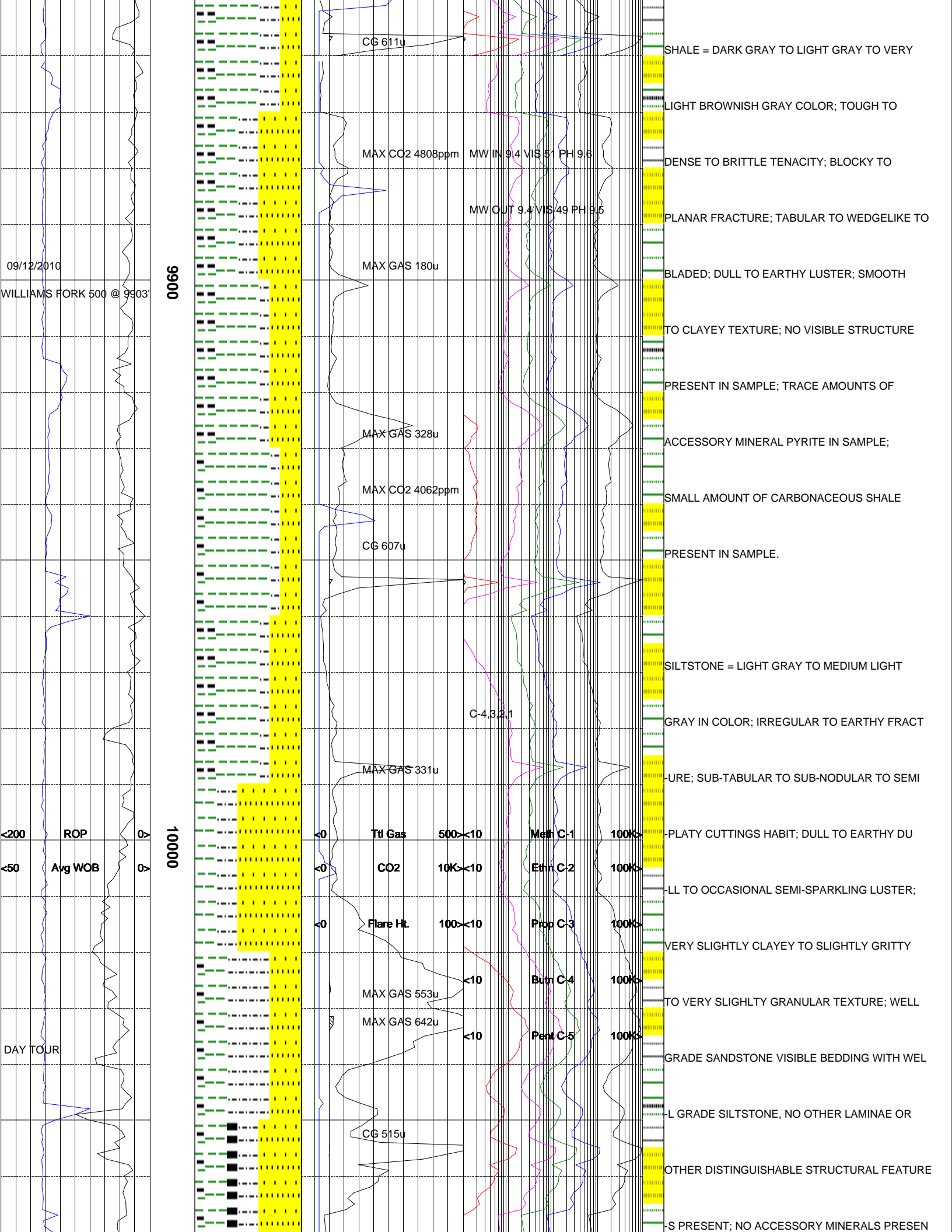
AMOUNT OF CARBONACEOUS SHALE VISIBLE

EFFERVESCING IN SAMPLE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; NO VISIBLE ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO OCCASIONAL MEDIUM LIGHT GRAY IN COLOR; MODERATELY DENSE TO VERY SLIGHTLY TOUGH TO OCCASIONAL CRUNCHY TENACITY; IRREGULAR TO SEMI-BLOCKY TO SEMI-PLANAR TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO SUB-PLATY TO WEDGE LIKE TO OCCASIONAL ELONGATED CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO SEMI-SILTY TEXTURE; POOR GRADE SANDSTONE VISIBLY IN CONTACT WITH COAL, SMALL AMOUNT CARBONACEOUS SHALE AND COAL VISIBLY EFFERVESCING IN SAMPLE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; TRACE AMOUNTS OF ACCESSORY MINERALS

WF 700 @ 9301'





09/12/2010
WILLIAMS FORK 500 @ 9903

9900

10000

<200 ROP
<50 Avg WOB

DAY TOUR

CG 611u

MAX CO2 4803ppm MW IN 9.4 VIS 51 PH 9.6

MW OUT 9.4 VIS 49 PH 9.5

MAX GAS 180u

MAX GAS 328u

MAX CO2 4062ppm

CG 607u

C-4,3,2,1

MAX GAS 331u

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

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

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

MAX GAS 553u <10 Butn C-4 100K>

MAX GAS 642u <10 Pent C-5 100K>

CG 515u

SHALE = DARK GRAY TO LIGHT GRAY TO VERY

LIGHT BROWNISH GRAY COLOR; TOUGH TO

DENSE TO BRITTLE TENACITY; BLOCKY TO

PLANAR FRACTURE; TABULAR TO WEDGELIKE TO

BLADED; DULL TO EARTHY LUSTER; SMOOTH

TO CLAYEY TEXTURE; NO VISIBLE STRUCTURE

PRESENT IN SAMPLE; TRACE AMOUNTS OF

ACCESSORY MINERAL PYRITE IN SAMPLE;

SMALL AMOUNT OF CARBONACEOUS SHALE

PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT

GRAY IN COLOR; IRREGULAR TO EARTHY FRACT

URE; SUB-TABULAR TO SUB-NODULAR TO SEMI

PLATY CUTTINGS HABIT; DULL TO EARTHY DU

LL TO OCCASIONAL SEMI-SPARKLING LUSTER;

VERY SLIGHTLY CLAYEY TO SLIGHTLY GRITTY

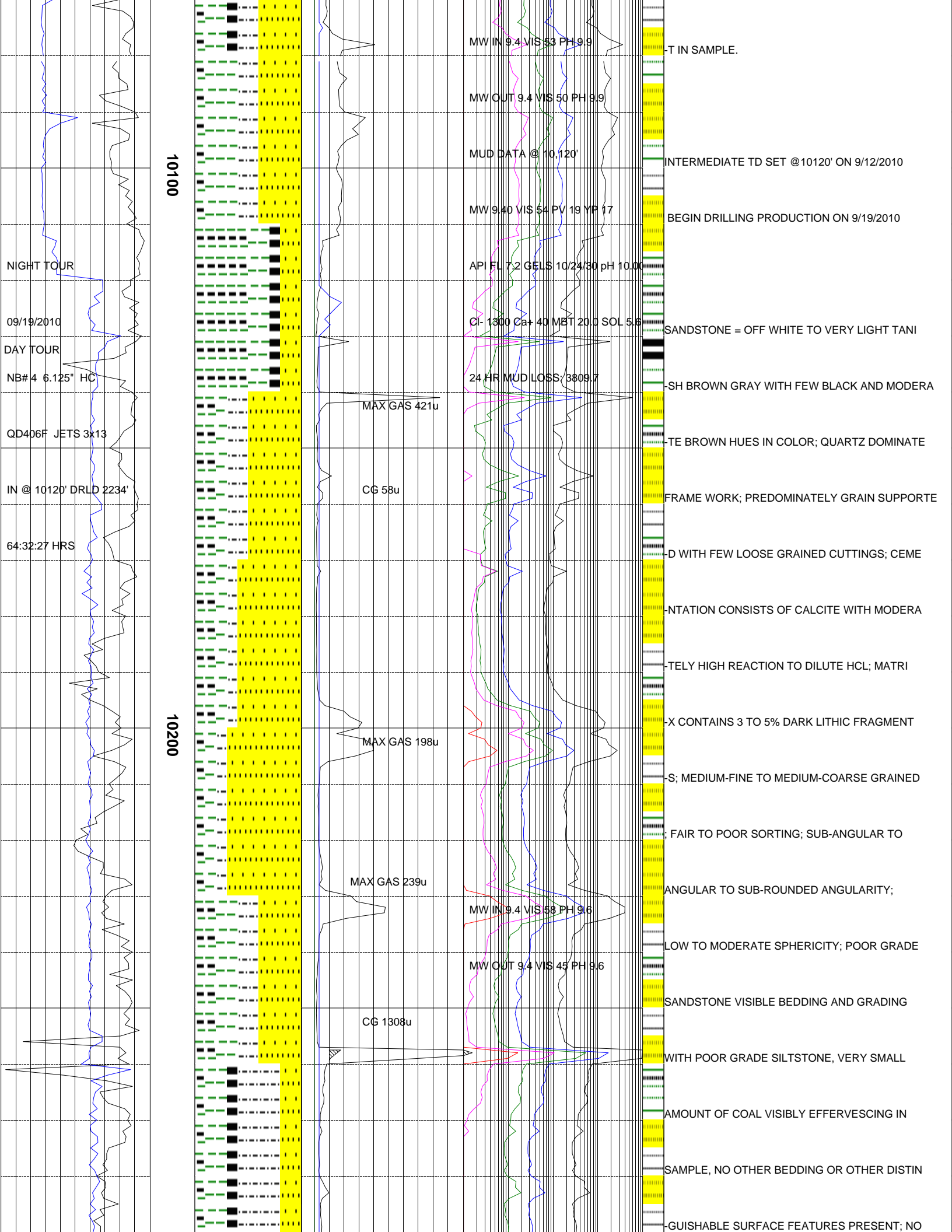
TO VERY SLIGHTLY GRANULAR TEXTURE; WELL

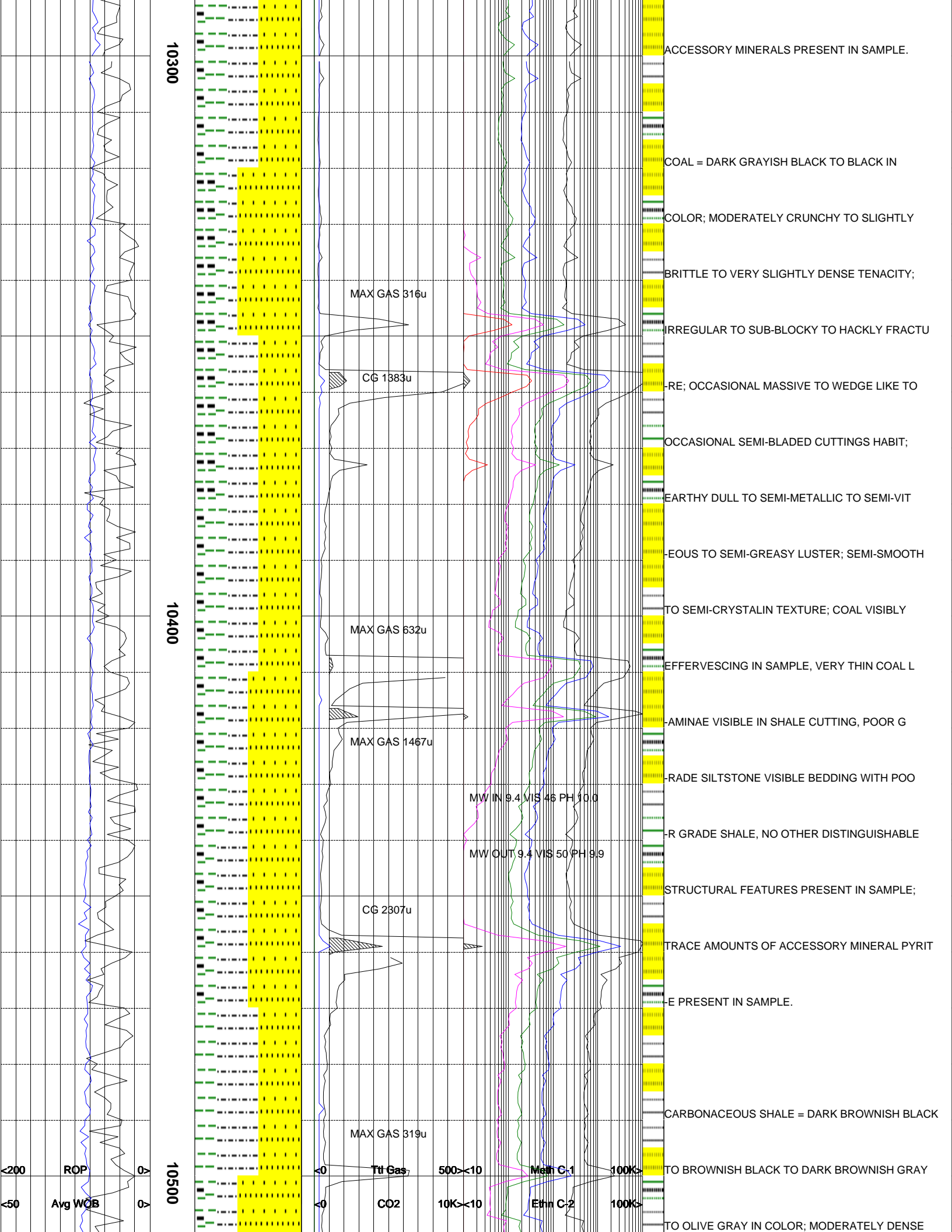
GRADE SANDSTONE VISIBLE BEDDING WITH WEL

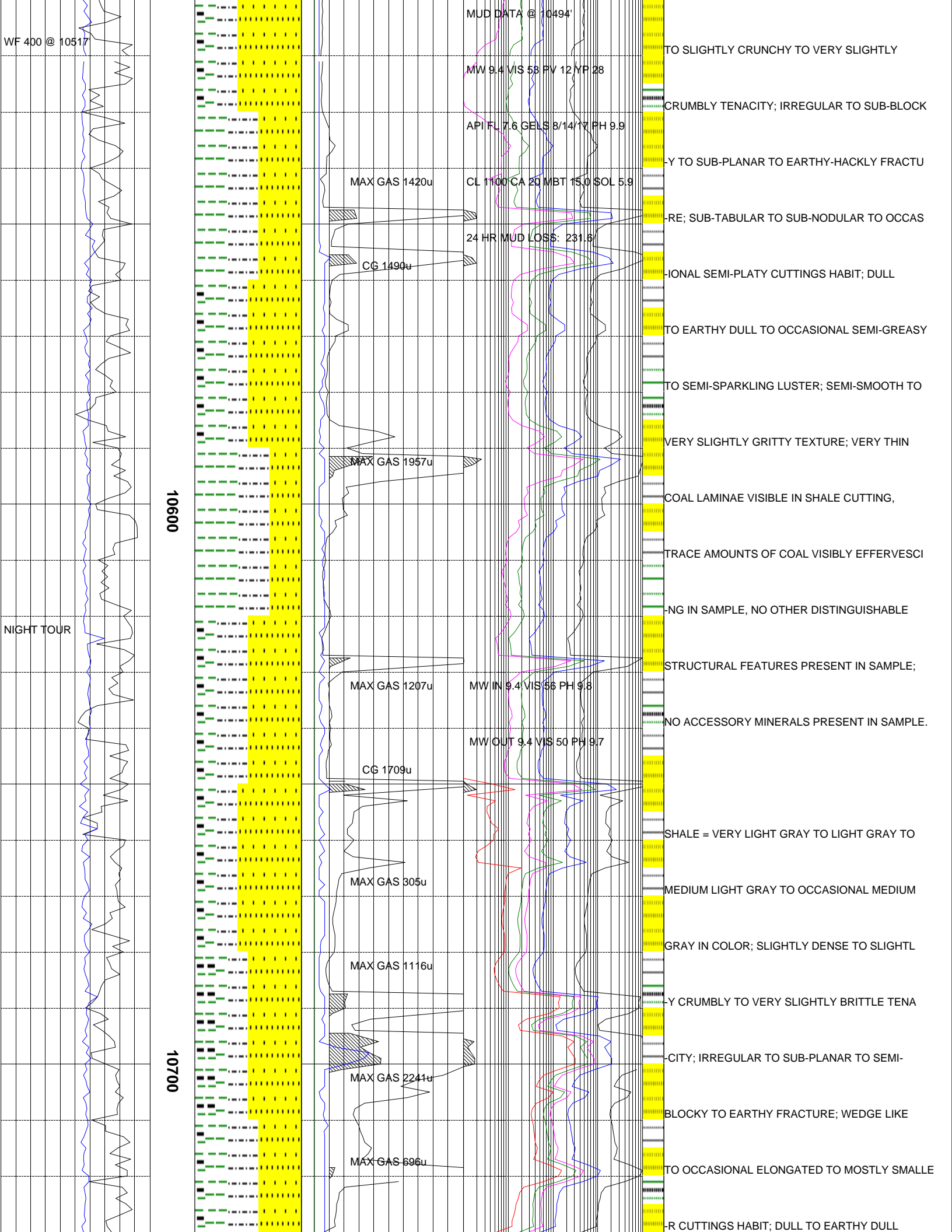
L GRADE SILTSTONE, NO OTHER LAMINAE OR

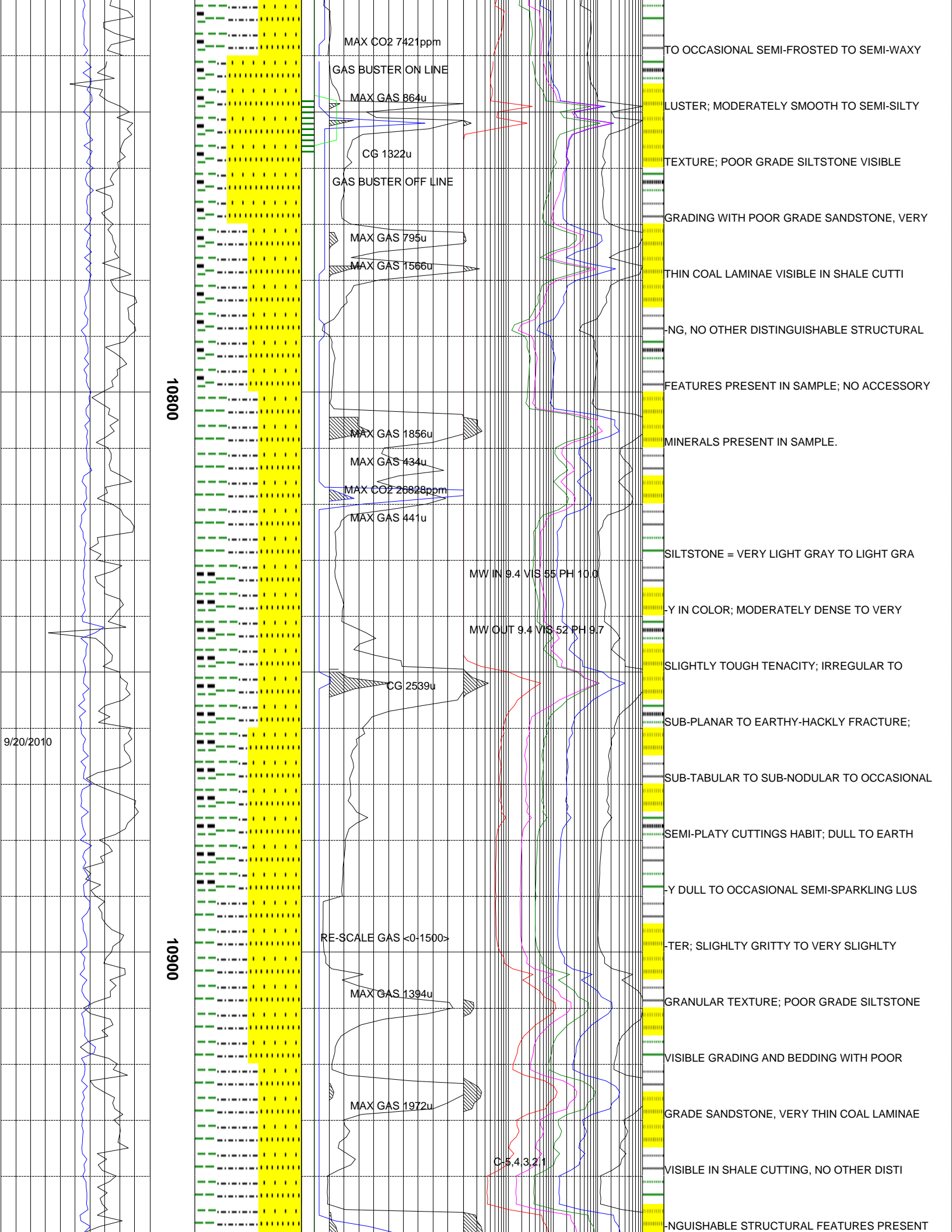
OTHER DISTINGUISHABLE STRUCTURAL FEATURE

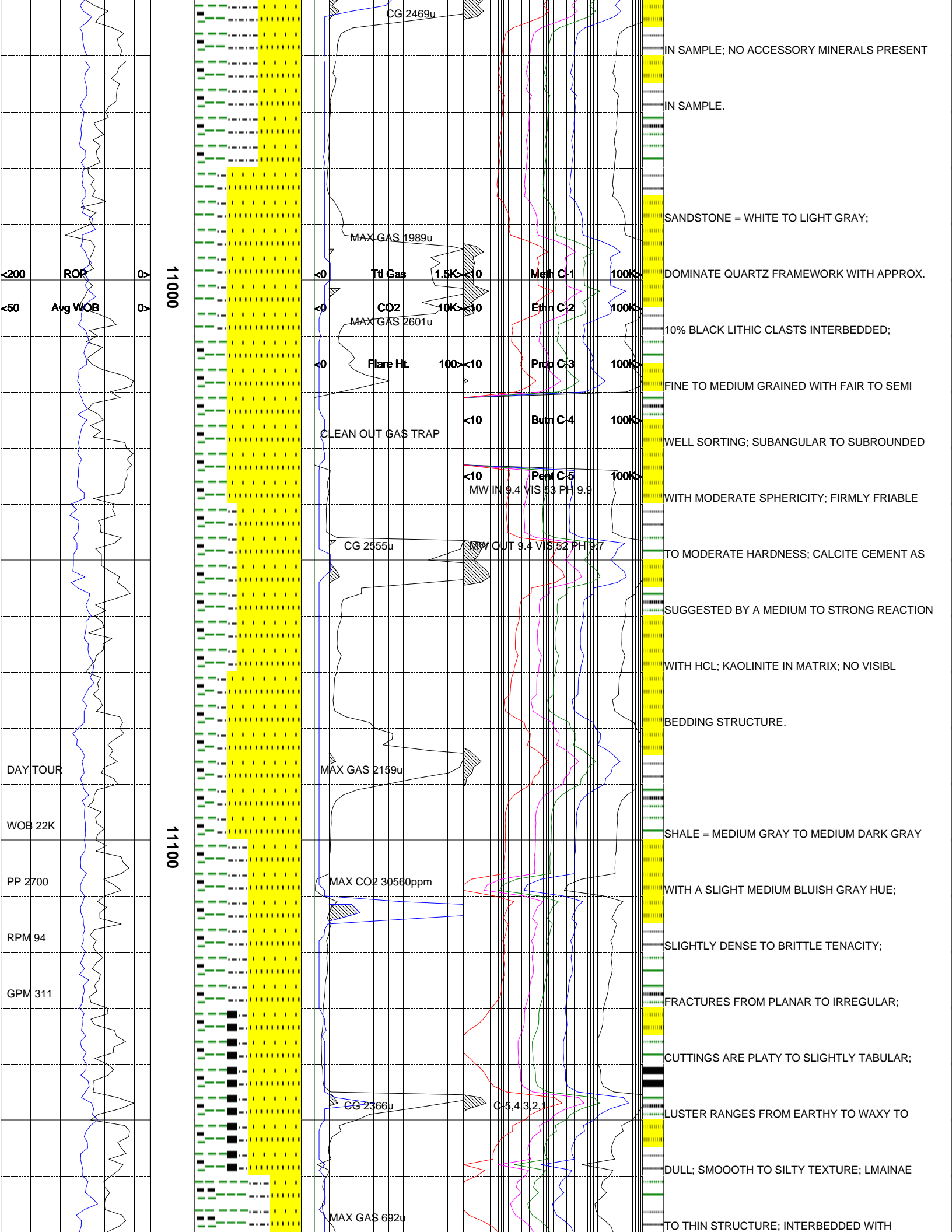
S PRESENT; NO ACCESSORY MINERALS PRESEN











11000

11100

IN SAMPLE; NO ACCESSORY MINERALS PRESENT

IN SAMPLE.

SANDSTONE = WHITE TO LIGHT GRAY;

DOMINATE QUARTZ FRAMEWORK WITH APPROX.

10% BLACK LITHIC CLASTS INTERBEDDED;

FINE TO MEDIUM GRAINED WITH FAIR TO SEMI

WELL SORTING; SUBANGULAR TO SUBROUNDED

WITH MODERATE SPHERICITY; FIRMLY FRIABLE

TO MODERATE HARDNESS; CALCITE CEMENT AS

SUGGESTED BY A MEDIUM TO STRONG REACTION

WITH HCL; KAOLINITE IN MATRIX; NO VISIBL

BEDDING STRUCTURE.

SHALE = MEDIUM GRAY TO MEDIUM DARK GRAY

WITH A SLIGHT MEDIUM BLuish GRAY HUE;

SLIGHTLY DENSE TO BRITTLE TENACITY;

FRACTURES FROM PLANAR TO IRREGULAR;

CUTTINGS ARE PLATY TO SLIGHTLY TABULAR;

LUSTER RANGES FROM EARTHY TO WAXY TO

DULL; SMOOTH TO SILTY TEXTURE; LMAINAE

TO THIN STRUCTURE; INTERBEDDED WITH

CG 2469u

MAX GAS 1989u

Ttl Gas

CO2

MAX GAS 2601u

Flare Ht.

CLEAN OUT GAS TRAP

CG 2555u

MW OUT 9.4 VIS 52 PH 9.7

MAX GAS 2159u

MAX CO2 30560ppm

CG 2366u

MAX GAS 692u

Meth C-1

Ethn C-2

Prop C-3

Butn C-4

Pen C-5

MW IN 9.4 VIS 53 PH 9.9

C-5.4.3.2.1

<200 ROP

<50 Avg WOB

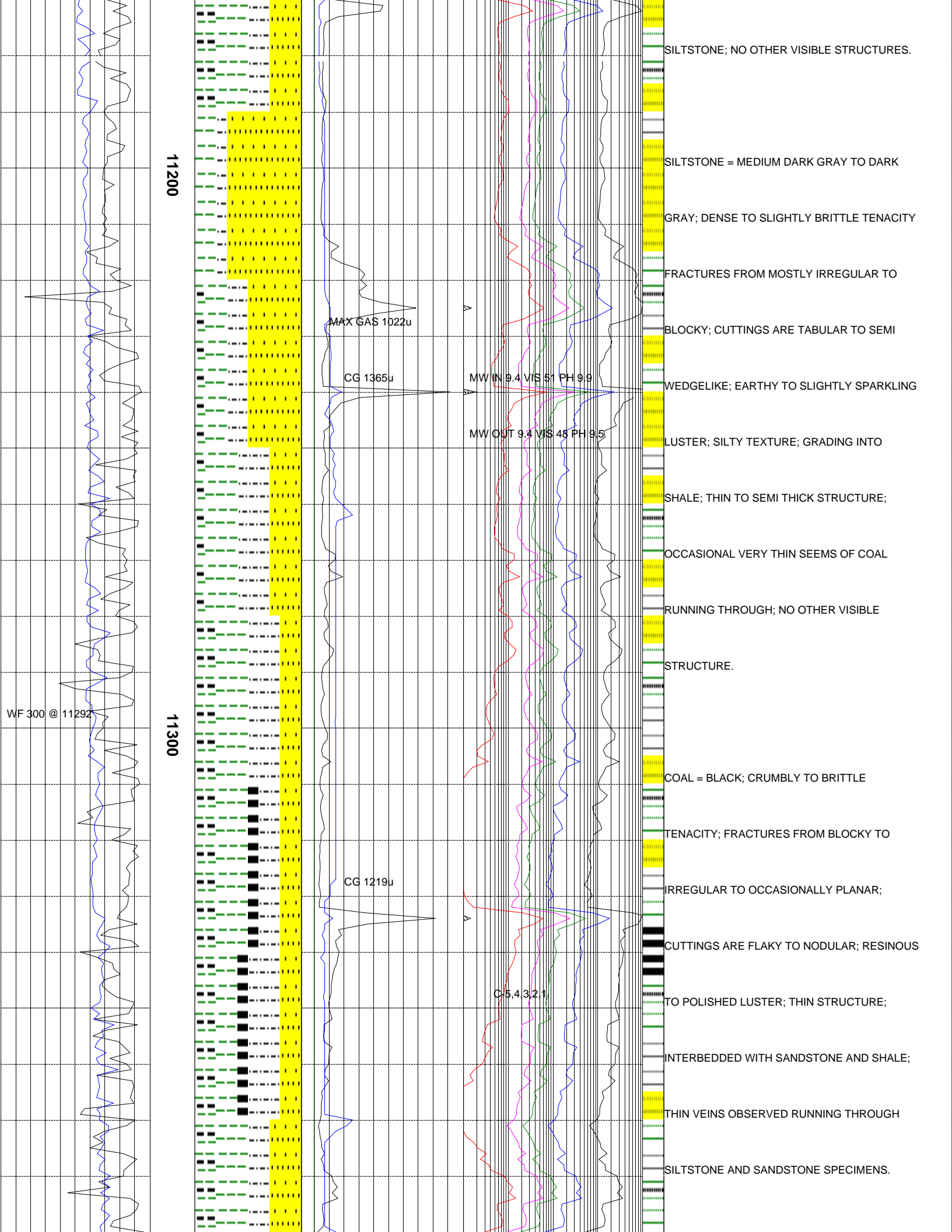
DAY TOUR

WOB 22K

PP 2700

RPM 94

GPM 311



11200

11300

SILTSTONE; NO OTHER VISIBLE STRUCTURES.

SILTSTONE = MEDIUM DARK GRAY TO DARK GRAY; DENSE TO SLIGHTLY BRITTLE TENACITY

FRACTURES FROM MOSTLY IRREGULAR TO BLOCKY; CUTTINGS ARE TABULAR TO SEMI WEDGELIKE; EARTHY TO SLIGHTLY SPARKLING LUSTER; SILTY TEXTURE; GRADING INTO SHALE; THIN TO SEMI THICK STRUCTURE; OCCASIONAL VERY THIN SEAMS OF COAL RUNNING THROUGH; NO OTHER VISIBLE STRUCTURE.

COAL = BLACK; CRUMBLY TO BRITTLE TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR TO OCCASIONALLY PLANAR; CUTTINGS ARE FLAKY TO NODULAR; RESINOUS TO POLISHED LUSTER; THIN STRUCTURE; INTERBEDDED WITH SANDSTONE AND SHALE; THIN VEINS OBSERVED RUNNING THROUGH SILTSTONE AND SANDSTONE SPECIMENS.

MAX GAS 1022u

CG 1365u

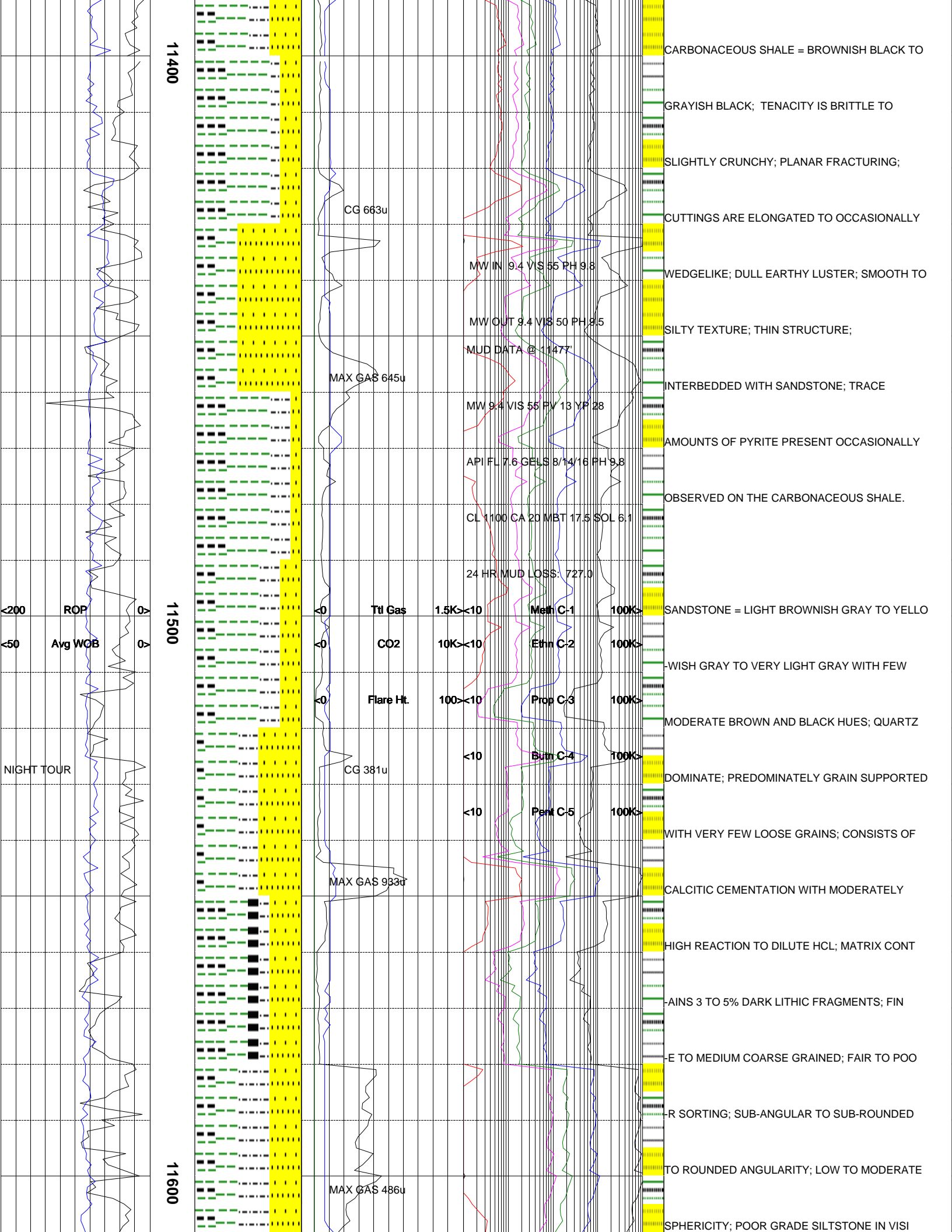
MW IN 9.4 VIS 51 PH 9.9

MW OUT 9.4 VIS 48 PH 9.5

CG 1219u

C:5.4321

WF 300 @ 11292



11400

11500

11600

<200 ROP
<50 Avg WOB
NIGHT TOUR

CG 663u

MAX GAS 645u

CG 381u

MAX GAS 933u

MAX GAS 486u

MW IN 9.4 V/S 55 PH 9.8

MW OUT 9.4 V/S 50 PH 9.5

MUD DATA @ 11477

MW 9.4 VIS 55 PV 13 YP 28

API FL 7.6 GELS 3/14/16 PH 9.8

CL 1100 CA 20 MBT 17.5 SOL 6.1

24 HR MUD LOSS: 727.0

Ttl Gas 1.5K <10 Meth C-1 100K >

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

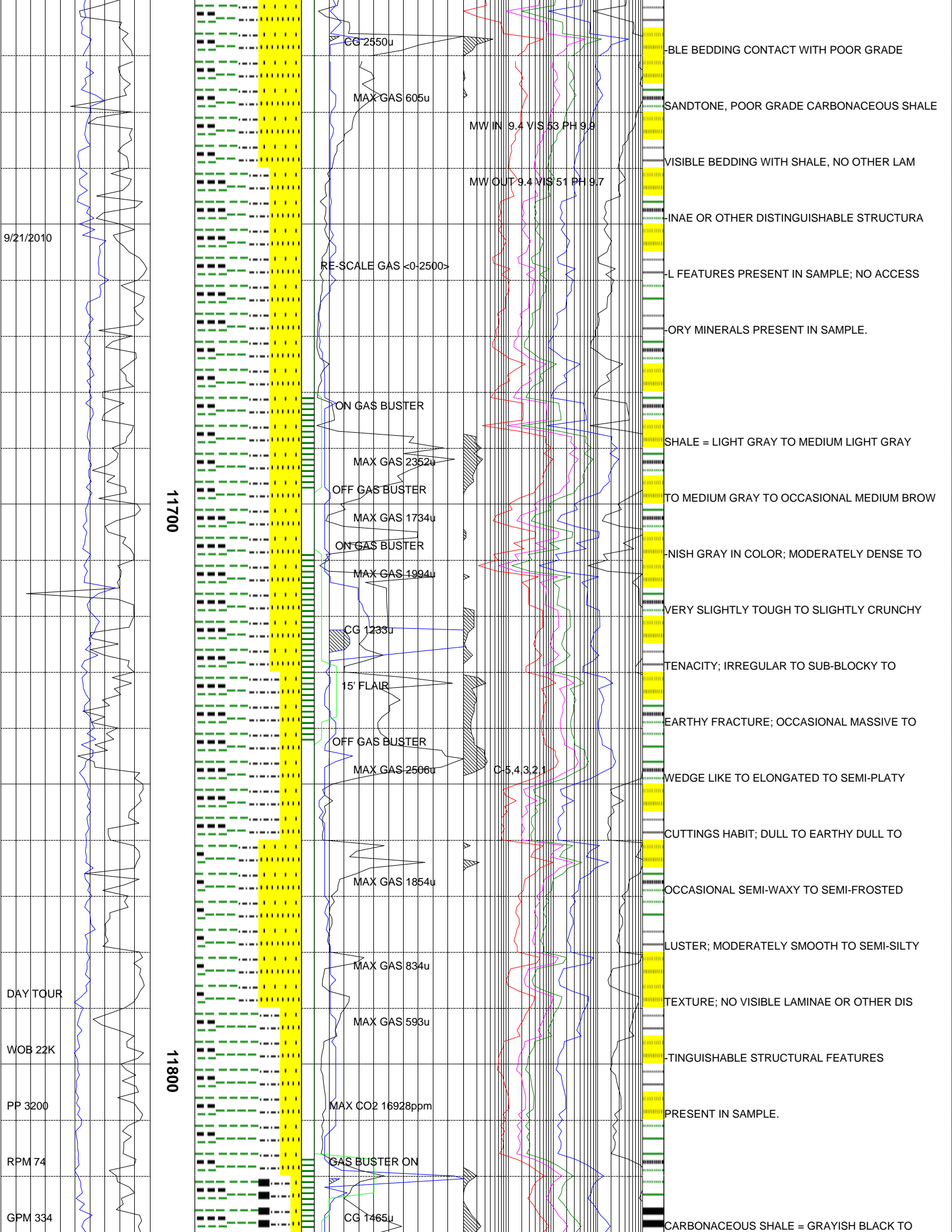
Flare Ht. 100 <10 Prop C-3 100K >

<10 Butn C-4 100K >

<10 Pent C-5 100K >

CARBONACEOUS SHALE = BROWNISH BLACK TO GRAYISH BLACK; TENACITY IS BRITTLE TO SLIGHTLY CRUNCHY; PLANAR FRACTURING; CUTTINGS ARE ELONGATED TO OCCASIONALLY WEDGELIKE; DULL EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE; INTERBEDDED WITH SANDSTONE; TRACE AMOUNTS OF PYRITE PRESENT OCCASIONALLY OBSERVED ON THE CARBONACEOUS SHALE.

SANDSTONE = LIGHT BROWNISH GRAY TO YELLOW WISH GRAY TO VERY LIGHT GRAY WITH FEW MODERATE BROWN AND BLACK HUES; QUARTZ DOMINATE; PREDOMINATELY GRAIN SUPPORTED WITH VERY FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATELY HIGH REACTION TO DILUTE HCL; MATRIX CONTAINS 3 TO 5% DARK LITHIC FRAGMENTS; FINES TO MEDIUM COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGULAR TO SUB-ROUNDED TO ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTSTONE IN VISI



9/21/2010

11700

11800

DAY TOUR

WOB 22K

PP 3200

RPM 74

GPM 334

CG 2550u

MAX GAS 605u

MW IN 9.4 VIS 53 PH 9.9

MW OUT 9.4 VIS 51 PH 9.7

RE-SCALE GAS <0-2500>

ON GAS BUSTER

MAX GAS 2352u

OFF GAS BUSTER

MAX GAS 1734u

ON GAS BUSTER

MAX GAS 1994u

CG 1233u

15' FLAIR

OFF GAS BUSTER

MAX GAS 2506u

C-5.4321

MAX GAS 1854u

MAX GAS 834u

MAX GAS 593u

MAX CO2 16928ppm

GAS BUSTER ON

CG 1465u

BLE BEDDING CONTACT WITH POOR GRADE

SANDTONE, POOR GRADE CARBONACEOUS SHALE

VISIBLE BEDDING WITH SHALE, NO OTHER LAM

LAMINAE OR OTHER DISTINGUISHABLE STRUCTURA

LAMINAR FEATURES PRESENT IN SAMPLE; NO ACCESS

CLAY MINERALS PRESENT IN SAMPLE.

SHALE = LIGHT GRAY TO MEDIUM LIGHT GRAY

TO MEDIUM GRAY TO OCCASIONAL MEDIUM BROW

GREENISH GRAY IN COLOR; MODERATELY DENSE TO

VERY SLIGHTLY TOUGH TO SLIGHTLY CRUNCHY

LOW TENACITY; IRREGULAR TO SUB-BLOCKY TO

CLAYEARTH FRACTURE; OCCASIONAL MASSIVE TO

WEDGE LIKE TO ELONGATED TO SEMI-PLATY

CLAY CUTTINGS HABIT; DULL TO EARTHY DULL TO

SHALE OCCASIONAL SEMI-WAXY TO SEMI-FROSTED

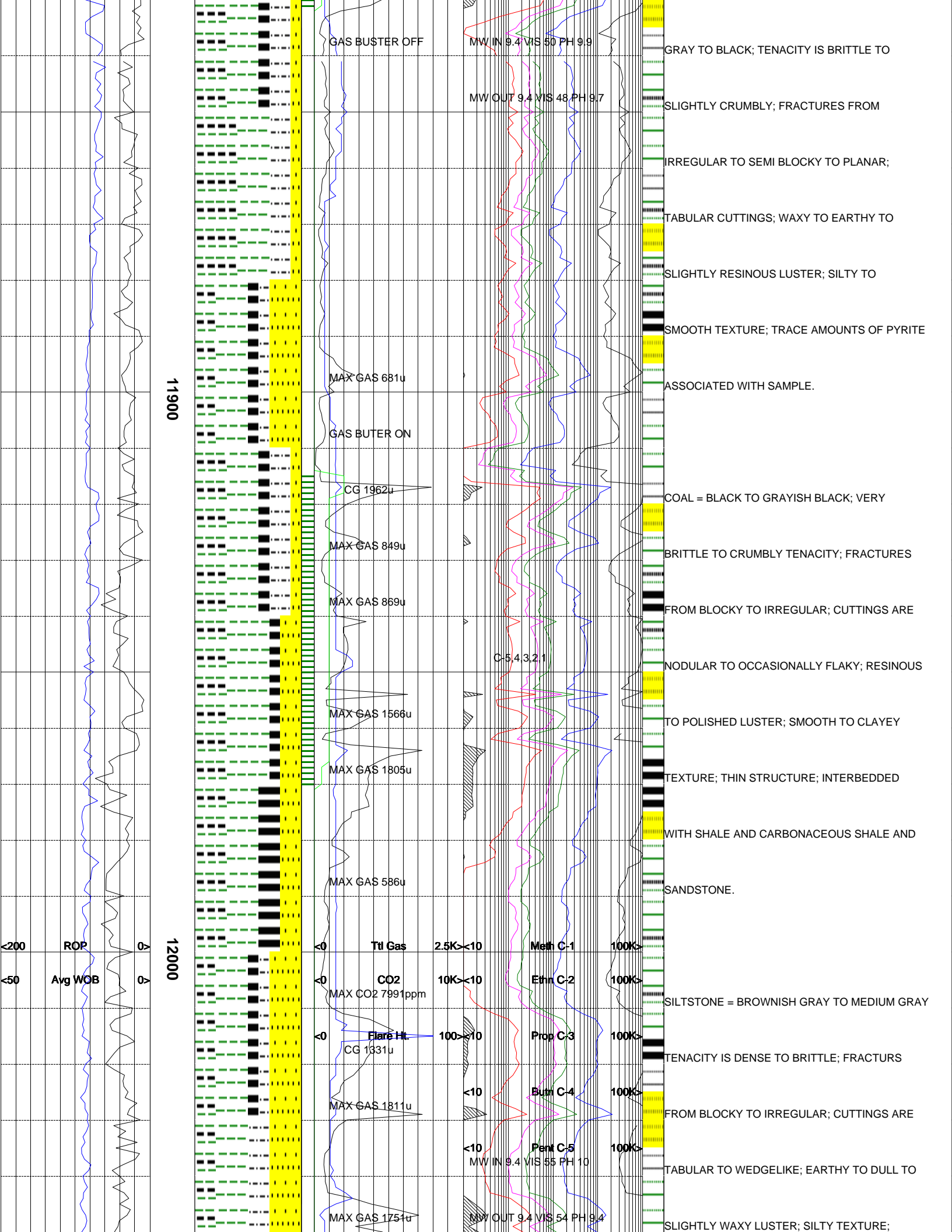
SHALE LUSTER; MODERATELY SMOOTH TO SEMI-SILTY

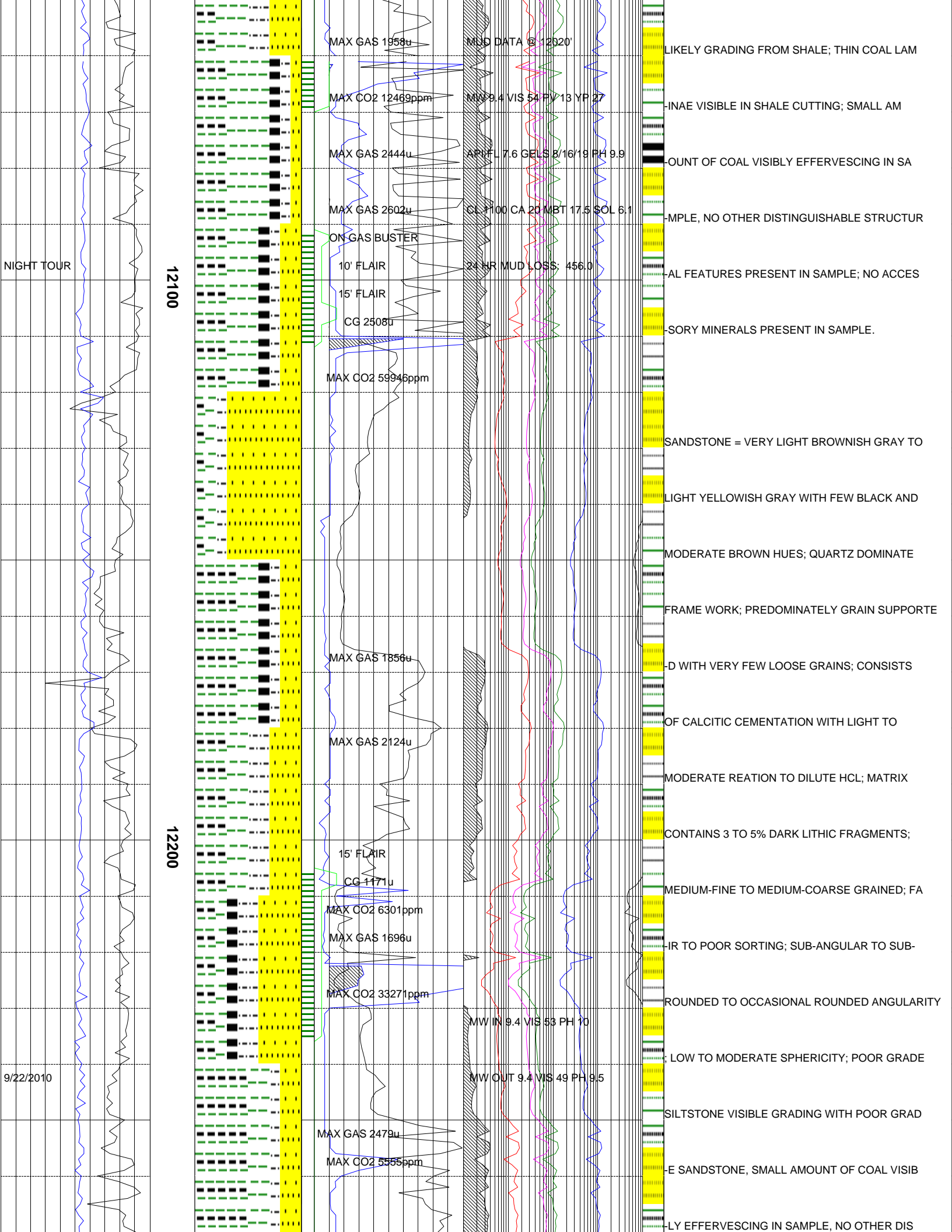
SHALE TEXTURE; NO VISIBLE LAMINAE OR OTHER DIS

SHALE DISTINGUISHABLE STRUCTURAL FEATURES

SHALE PRESENT IN SAMPLE.

CARBONACEOUS SHALE = GRAYISH BLACK TO





MAX GAS 1958u
 MAX CO2 12489ppm
 MAX GAS 2444u
 MAX GAS 2602u
 ON-GAS BUSTER
 10' FLAIR
 15' FLAIR
 CG 2508u
 MAX CO2 5994ppm

MUD DATA @ 12020'
 MW IN 9.4 VIS 53 PH 10
 API FL 7.6 GELS 3/16/19 PH 9.9
 CL 1100 CA 20 MBT 17.5 SOL 6.1
 24 HR MUD LOSS: 456.0

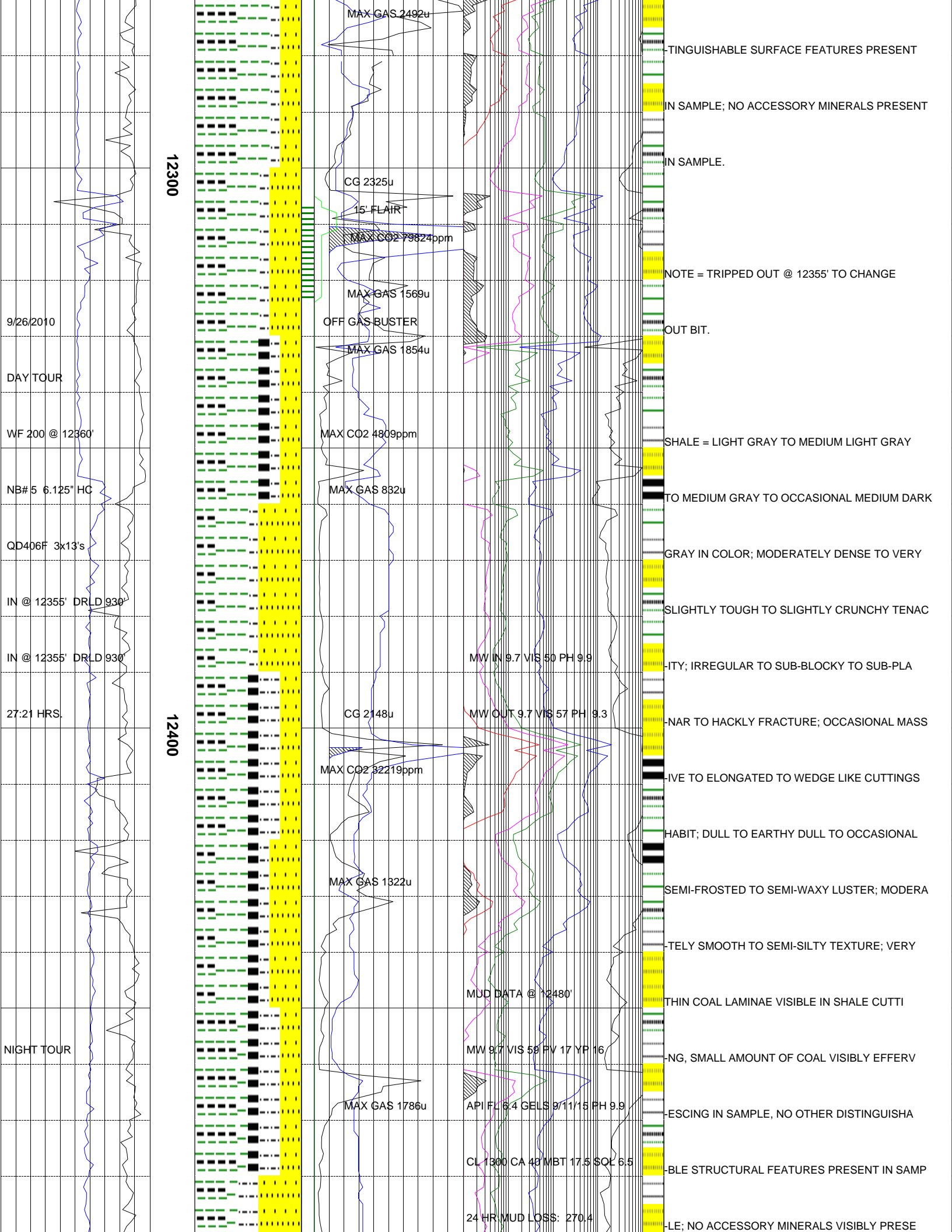
LIKELY GRADING FROM SHALE; THIN COAL LAM
 INAE VISIBLE IN SHALE CUTTING; SMALL AM
 COUNT OF COAL VISIBLY EFFERVESCING IN SA
 MPLE, NO OTHER DISTINGUISHABLE STRUCTUR
 AL FEATURES PRESENT IN SAMPLE; NO ACCES
 SORY MINERALS PRESENT IN SAMPLE.
 SANDSTONE = VERY LIGHT BROWNISH GRAY TO
 LIGHT YELLOWISH GRAY WITH FEW BLACK AND
 MODERATE BROWN HUES; QUARTZ DOMINATE
 FRAME WORK; PREDOMINATELY GRAIN SUPPORTE
 D WITH VERY FEW LOOSE GRAINS; CONSISTS
 OF CALCITIC CEMENTATION WITH LIGHT TO
 MODERATE REACTION TO DILUTE HCL; MATRIX
 CONTAINS 3 TO 5% DARK LITHIC FRAGMENTS;
 MEDIUM-FINE TO MEDIUM-COARSE GRAINED; FA
 IR TO POOR SORTING; SUB-ANGULAR TO SUB-
 ROUNDED TO OCCASIONAL ROUNDED ANGULARITY
 ; LOW TO MODERATE SPHERICITY; POOR GRADE
 SILTSTONE VISIBLE GRADING WITH POOR GRAD
 E SANDSTONE, SMALL AMOUNT OF COAL VISIB
 LY EFFERVESCING IN SAMPLE, NO OTHER DIS

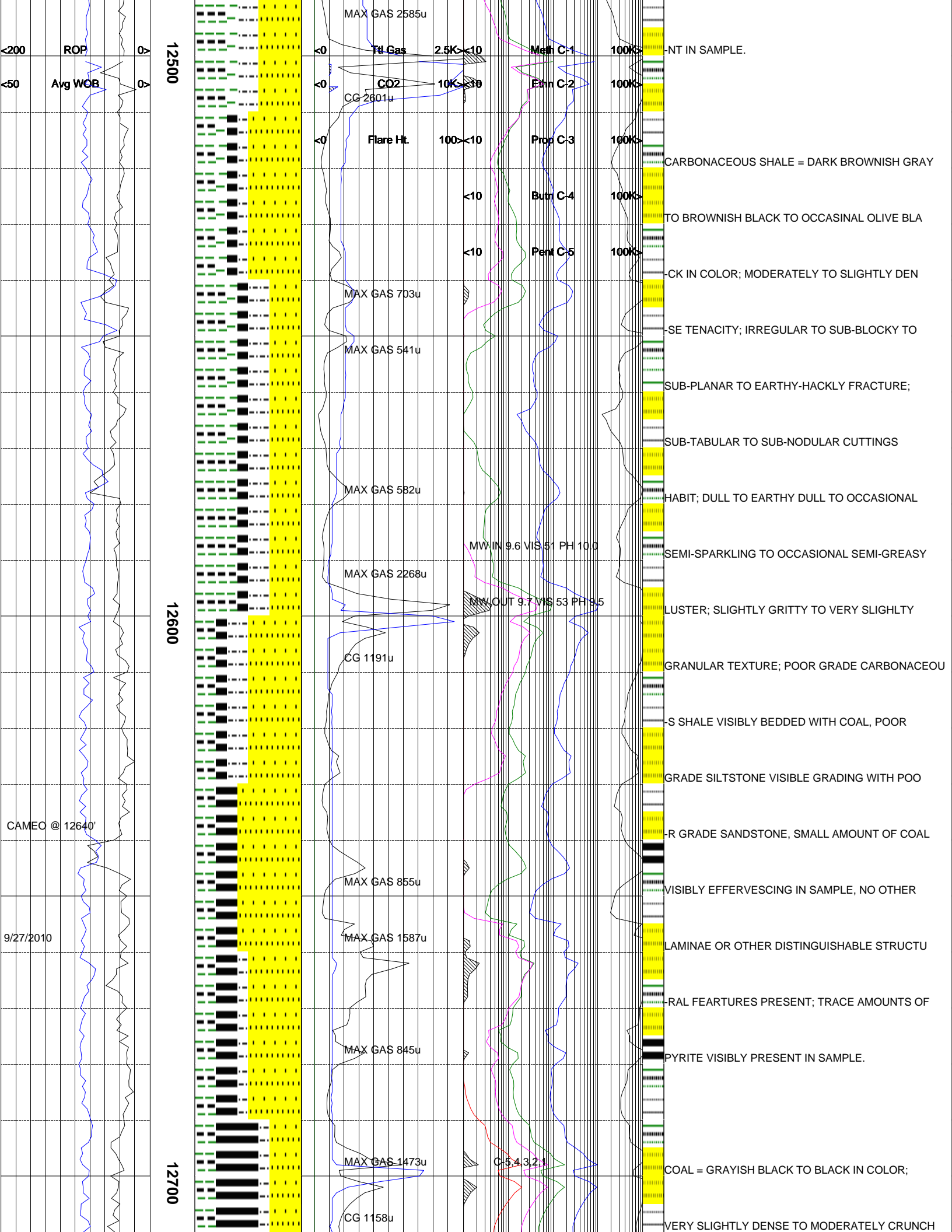
12100

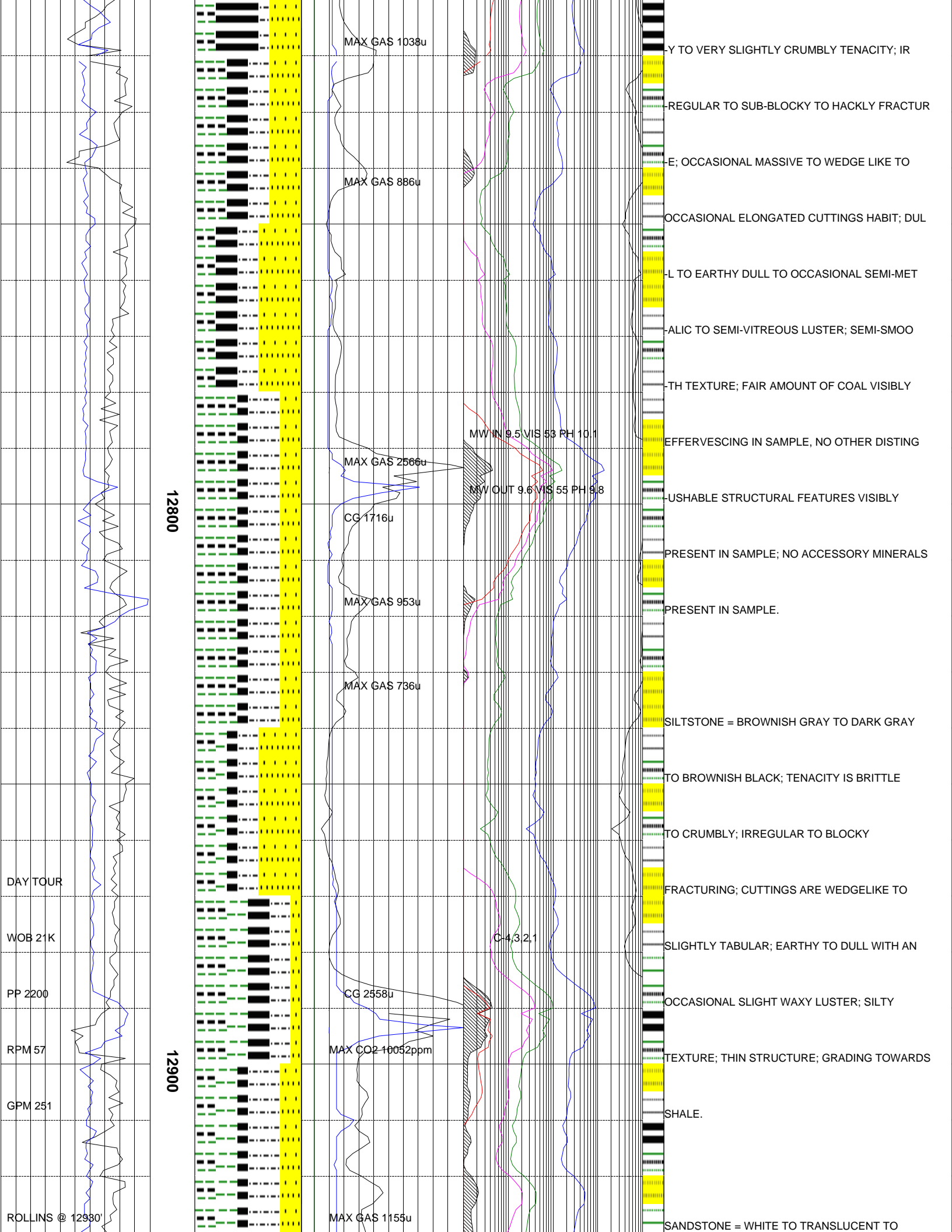
12200

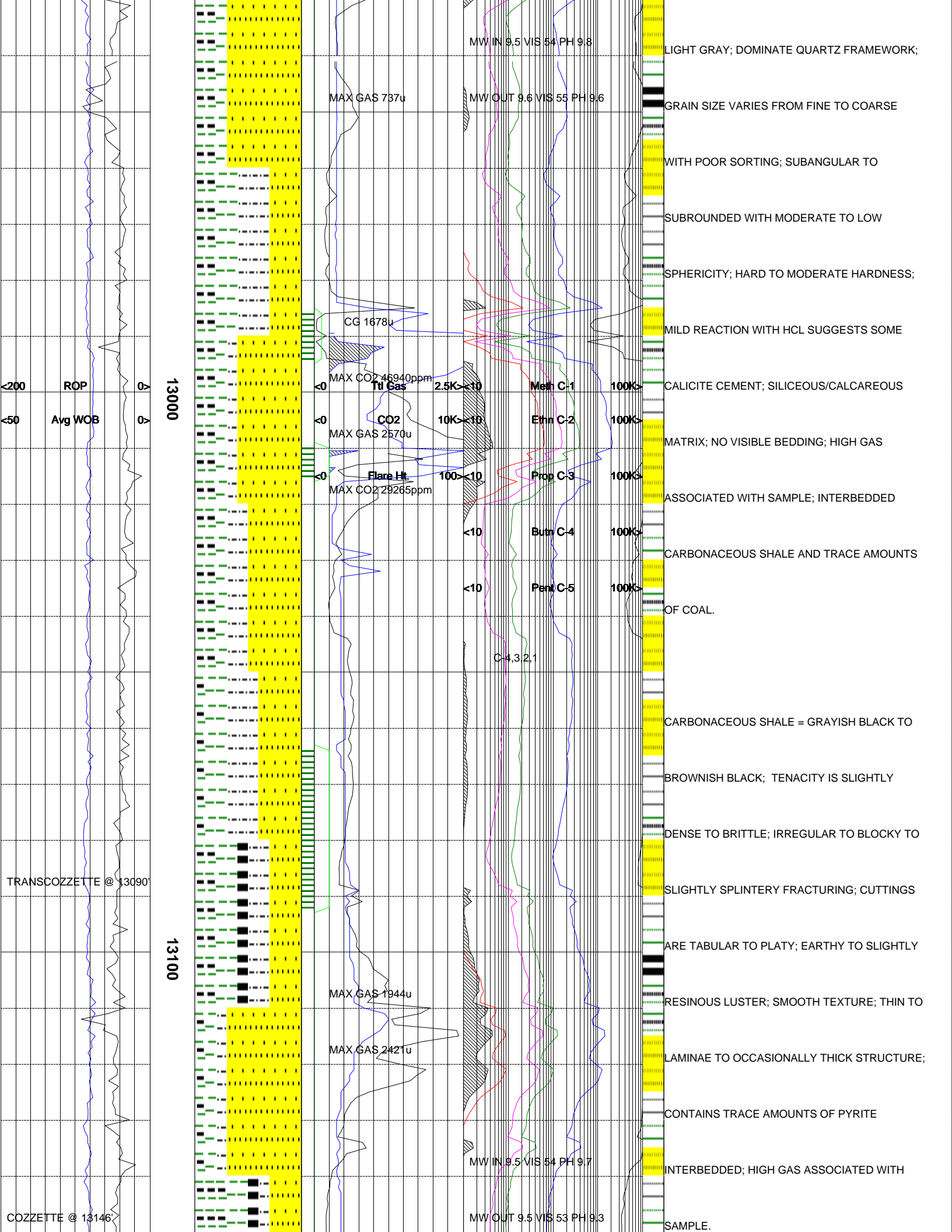
NIGHT TOUR

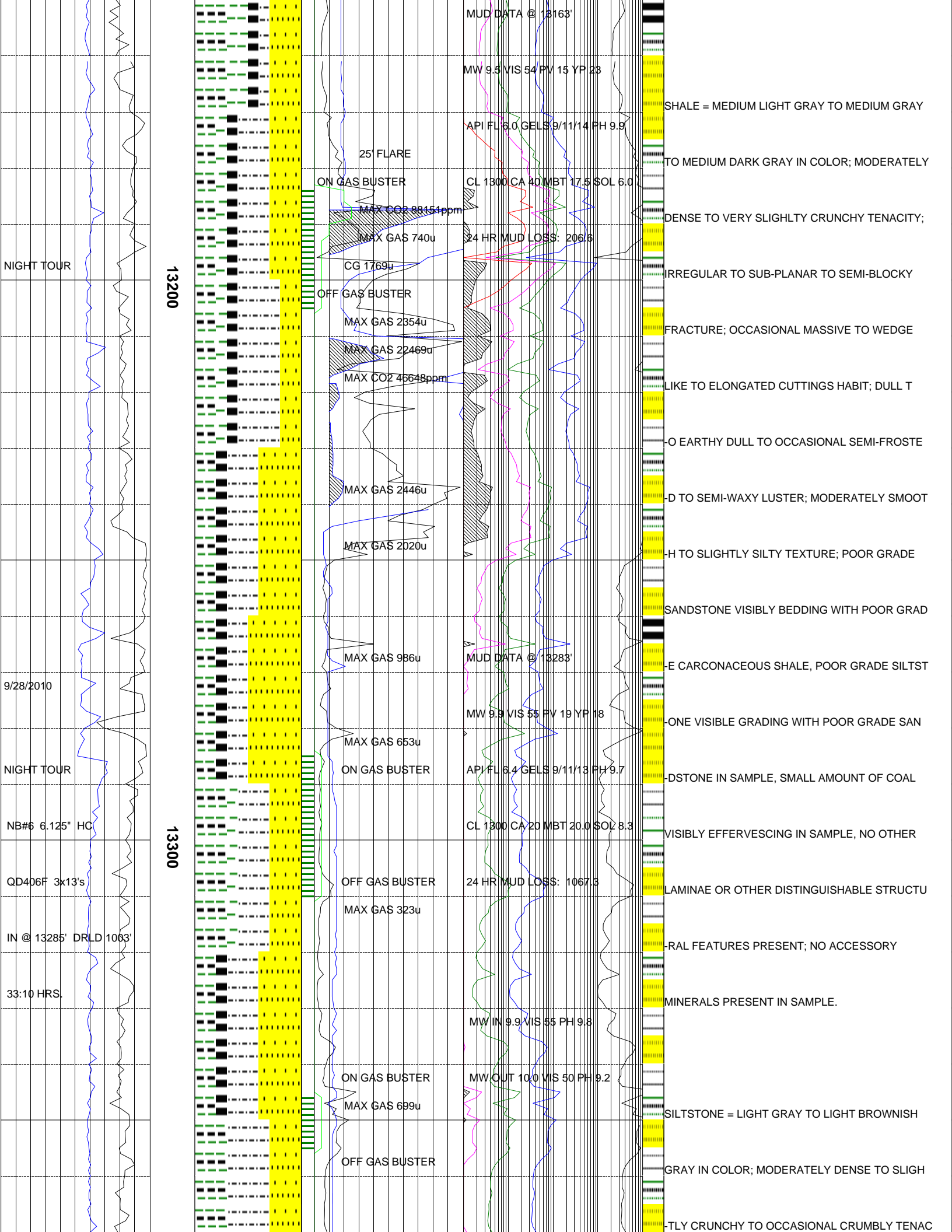
9/22/2010

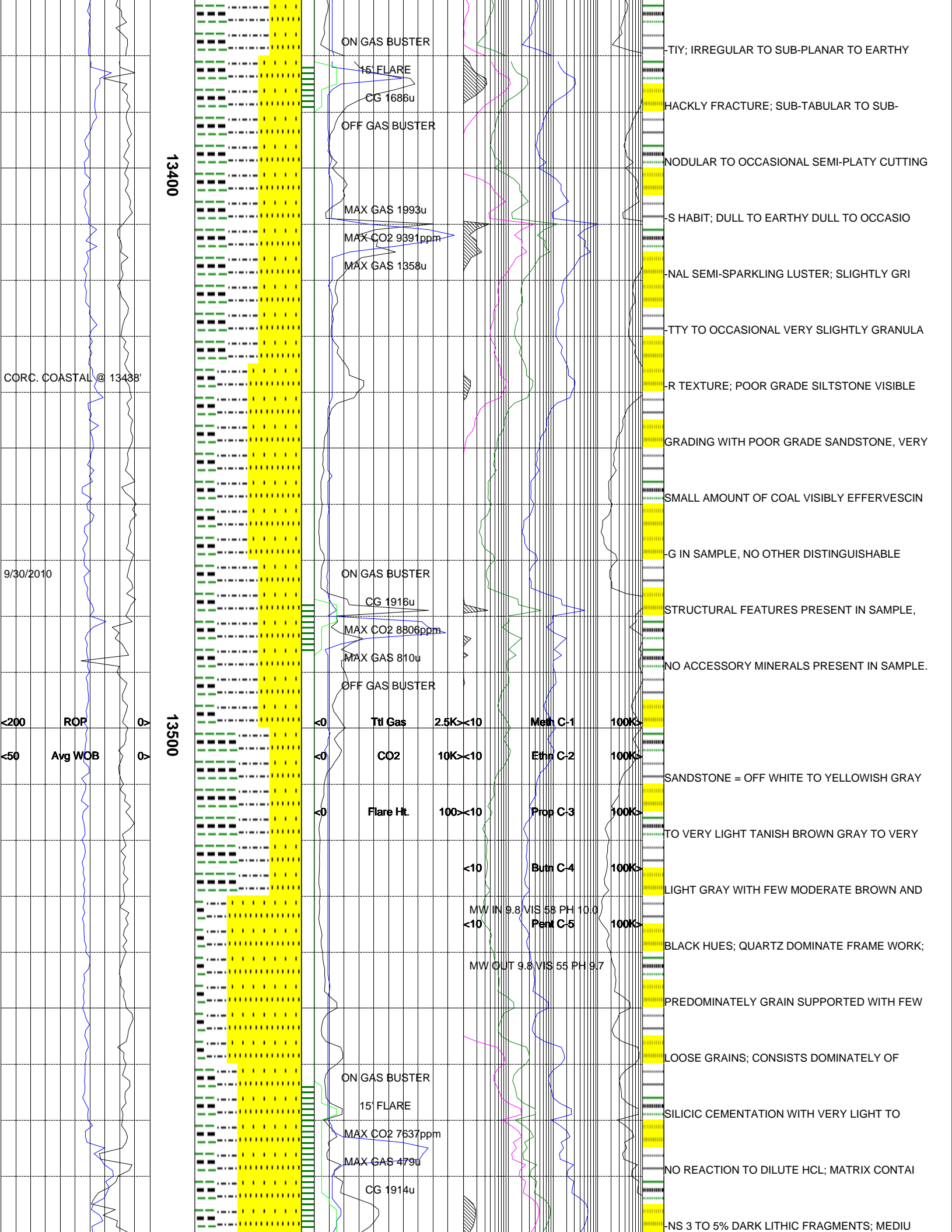












13400

13500

ON GAS BUSTER

15' FLARE

CG 1686u

OFF GAS BUSTER

MAX GAS 1993u

MAX CO2 9391ppm

MAX GAS 1358u

ON GAS BUSTER

CG 1916u

MAX CO2 8806ppm

MAX GAS 810u

OFF GAS BUSTER

ON GAS BUSTER

15' FLARE

MAX CO2 7637ppm

MAX GAS 479u

CG 1914u

TIY; IRREGULAR TO SUB-PLANAR TO EARTHY

HACKLY FRACTURE; SUB-TABULAR TO SUB-

NODULAR TO OCCASIONAL SEMI-PLATY CUTTING

S HABIT; DULL TO EARTHY DULL TO OCCASIO

NAL SEMI-SPARKLING LUSTER; SLIGHTLY GRI

TTY TO OCCASIONAL VERY SLIGHTLY GRANULA

R TEXTURE; POOR GRADE SILTSTONE VISIBLE

GRADING WITH POOR GRADE SANDSTONE, VERY

SMALL AMOUNT OF COAL VISIBLY EFFERVESCIN

G IN SAMPLE, NO OTHER DISTINGUISHABLE

STRUCTURAL FEATURES PRESENT IN SAMPLE,

NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SANDSTONE = OFF WHITE TO YELLOWISH GRAY

TO VERY LIGHT TANISH BROWN GRAY TO VERY

LIGHT GRAY WITH FEW MODERATE BROWN AND

BLACK HUES; QUARTZ DOMINATE FRAME WORK;

PREDOMINATELY GRAIN SUPPORTED WITH FEW

LOOSE GRAINS; CONSISTS DOMINATELY OF

SILICIC CEMENTATION WITH VERY LIGHT TO

NO REACTION TO DILUTE HCL; MATRIX CONTAI

NS 3 TO 5% DARK LITHIC FRAGMENTS; MEDIU

CORC. COASTAL @ 13438'

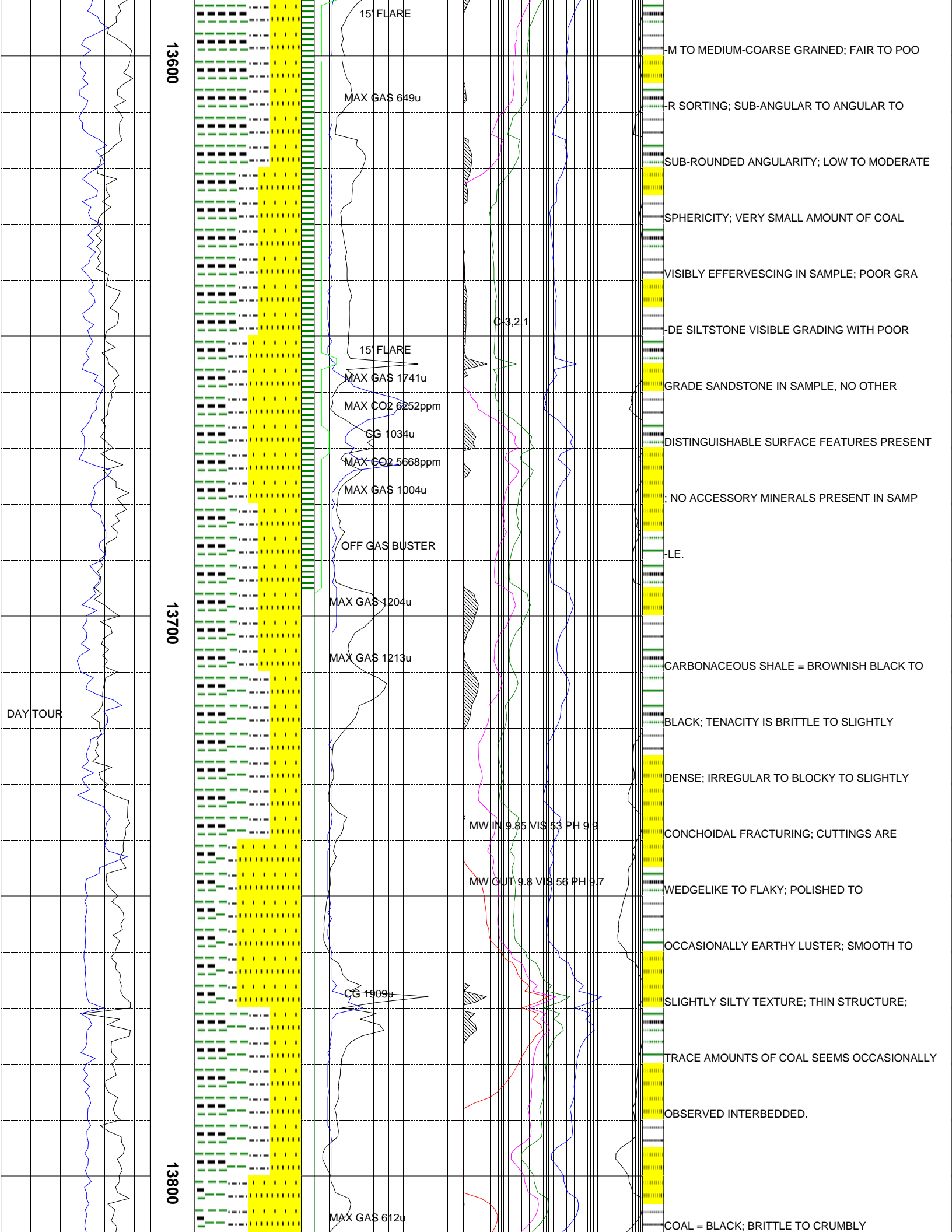
9/30/2010

<200 ROP
<50 Avg WOB

Ttl Gas	2.5K<	<10	Meth C-1	100K>
CO2	10K<	<10	Ethn C-2	100K>
Flare Ht.	100>	<10	Prop C-3	100K>
		<10	Butn C-4	100K>
			Pent C-5	100K>

MW IN 9.8 VIS 58 PH 10.0

MW OUT 9.8 VIS 55 PH 9.7



13600

13700

13800

15' FLARE

MAX GAS 649u

15' FLARE

MAX GAS 1741u

MAX CO2 6252ppm

CG 1034u

MAX CO2 5668ppm

MAX GAS 1004u

OFF GAS BUSTER

MAX GAS 1204u

MAX GAS 1213u

CG 1909u

MAX GAS 612u

C-3.21

MW IN 9.85 VIS 53 PH 9.9

MW OUT 9.8 VIS 56 PH 9.7

M TO MEDIUM-COARSE GRAINED; FAIR TO POOR

R SORTING; SUB-ANGULAR TO ANGULAR TO

SUB-ROUNDED ANGULARITY; LOW TO MODERATE

SPHERICITY; VERY SMALL AMOUNT OF COAL

VISIBLE EFFERVESCING IN SAMPLE; POOR GRA

DE SILTSTONE VISIBLE GRADING WITH POOR

GRADE SANDSTONE IN SAMPLE, NO OTHER

DISTINGUISHABLE SURFACE FEATURES PRESENT

NO ACCESSORY MINERALS PRESENT IN SAMP

LE.

CARBONACEOUS SHALE = BROWNISH BLACK TO

BLACK; TENACITY IS BRITTLE TO SLIGHTLY

DENSE; IRREGULAR TO BLOCKY TO SLIGHTLY

CONCHOIDAL FRACTURING; CUTTINGS ARE

WEDGELIKE TO FLAKY; POLISHED TO

OCCASIONALLY EARTHY LUSTER; SMOOTH TO

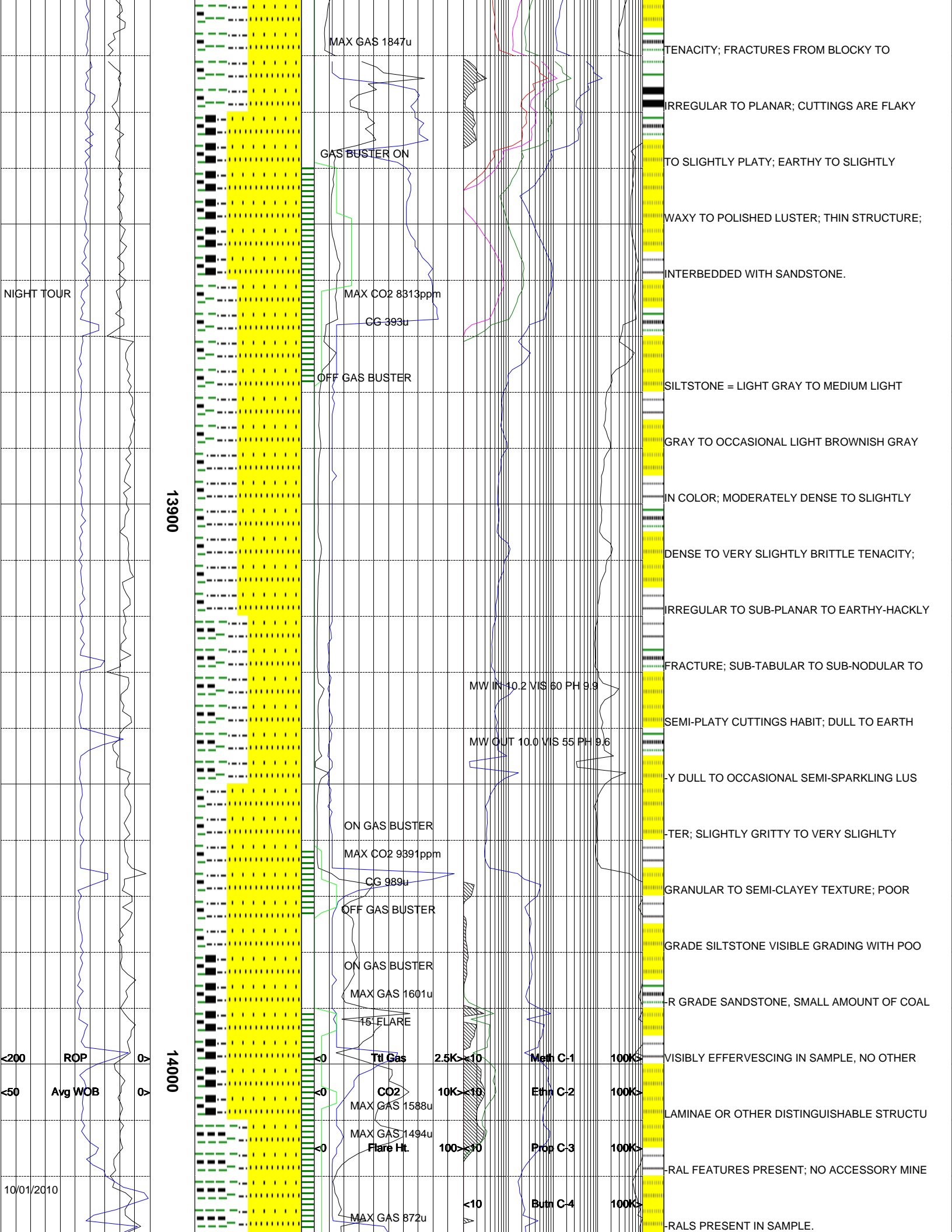
SLIGHTLY SILTY TEXTURE; THIN STRUCTURE;

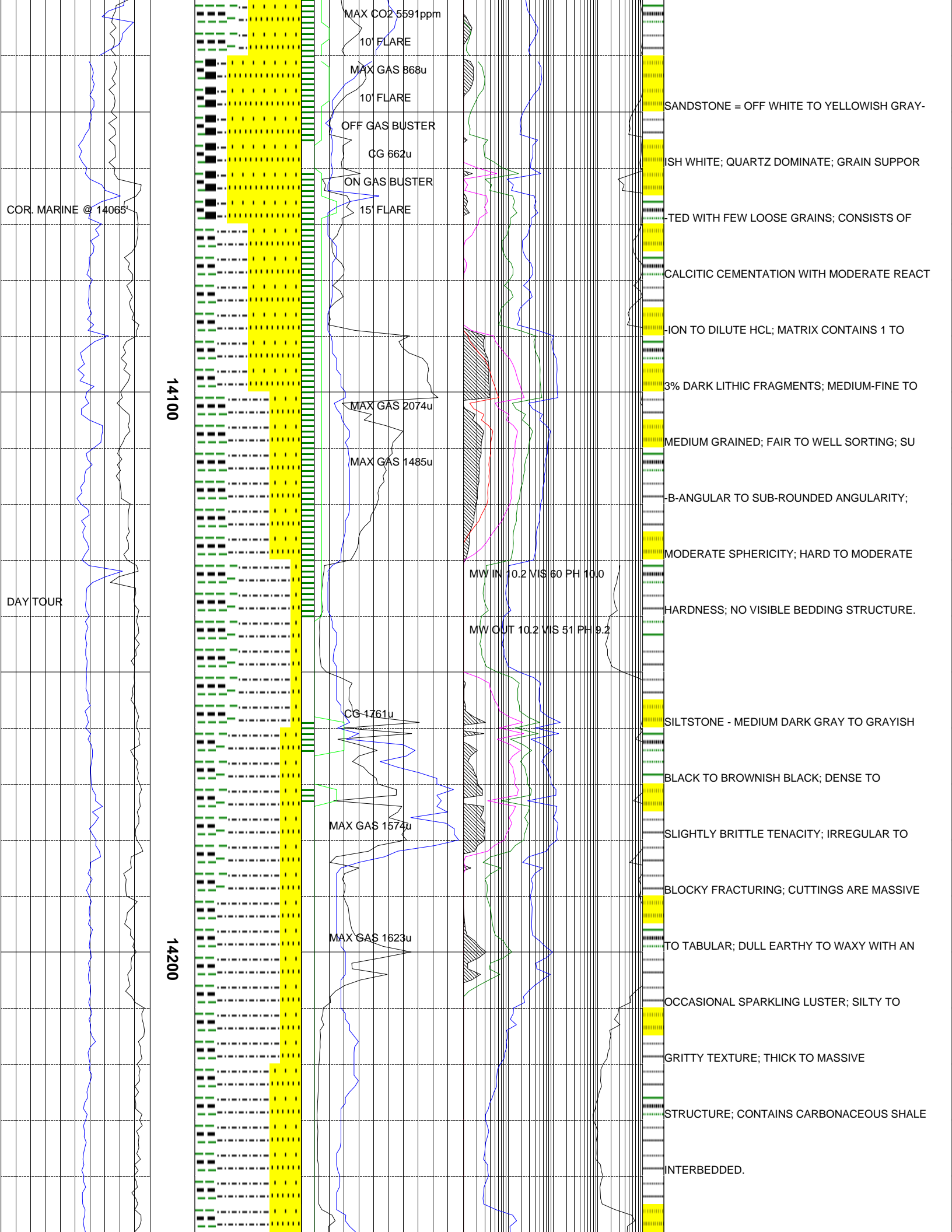
TRACE AMOUNTS OF COAL SEEMS OCCASIONALLY

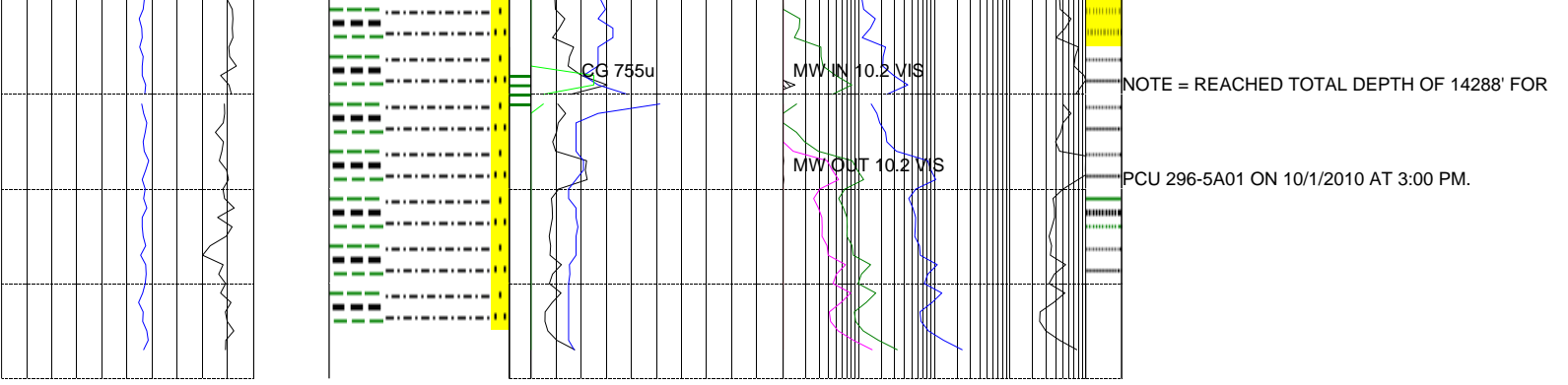
OBSERVED INTERBEDDED.

COAL = BLACK; BRITTLE TO CRUMBLY

DAY TOUR







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