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

# MUDLOG MD

**COMPANY** ExxonMobil Production

**WELL** PCU 297-11C6

**FIELD** Piceance Creek Unit

**REGION** Rocky Mountains

**COORDINATES** 39.896082 N  
108.254572 W

**ELEVATION** GL: 6965.3'  
KB: 6995.5'

**COUNTY, STATE** Rio Blanco, CO

**API INDEX** 051031147200

**SPUD DATE** 02/12/2010

**CONTRACTOR** HP Drilling

**CO. REP.** M. Sadler / J. Wood

**RIG/TYPE** #326/ Flex-Rig 4

**LOGGING UNIT** #36

**GEOLOGISTS** J. Kokes / D. Thibodeaux  
C. Record / J. Keevan

**ADD. PERSONS** H. Strickland / J. Yeagar  
P. Strickland/ D. Lockhart

**CO. GEOLOGIST** Chris Alba

## LOG INTERVAL

## CASING DATA

**DEPTHS:** 3824' TO 12688'

**DATES:** 04/01/2010 TO 06/23/2010

**SCALE:** 5" = 100'

16" AT 150'

10 3/4" AT 3809'

7" AT 8665'

AT

## MUD TYPES

## HOLE SIZE

WATER BASED SPUD MUD TO 3824'

LSND TO 12688'

TO

TO

TO

14 3/4" TO 3824'

9 7/8" TO 8680'

6 1/8" TO 12688'

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	

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	

<300	ROP	0>
	ft/hr	
<50	Avg WOB	0>
	klbs	
<1	Depth of Cut	0>
	in/rev	

Depth

Lithology

MGS	<0	Ttl Gas	1K>	<10	Meth C-1	100K>
		units			ppm	
	<330	CO2	5K>	<10	Ethn C-2	100K>
		ppm				
<0	Flare Ht.	100>	<10	Butn C-4	100K>	
	ft					
				<10	Pent C-5	100K>

Interp. Lith

**Remarks**  
**Survey Data, Mud Reports, Other Info.**

<300	ROP	0>
	ft/hr	
<50	Avg WOB	0>
	klbs	
<1	Depth of Cut	0>
	in/rev	

3500

<0	Ttl Gas	500>	<10	Meth C-1	100K>
	units				
<330	CO2	5K>	<10	Ethn C-2	100K>
	ppm				
<0	Flare Ht.	100>	<10	Prop C-3	100K>
	ft				
			<10	Butn C-4	100K>
			<10	Pent C-5	100K>

ALL SAMPLE DEPTHS ARE REFERENCED TO RKB.

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 CONNECTION GASES, TRIP GASES, AND  
DOWNTIME GASES ARE NOTED ON THE LOG.  
LARGE CONNECTION GASES WHICH APPEAR ON  
THE MUD LOG USUALLY REFLECT UP HOLE GAS  
INTERVALS BLEEDING GAS INTO THE BOREHOLE  
DURING CONNECTIONS.

GAS CHROMATOGRAPHY EQUIPMENT IS  
CALIBRATED TO A TEST GAS COMPOSED OF:

METHANE = 10040 PPM

METHANE = 10040 PPM

3600

3700

3800

ETHANE = 990 PPM

PROPANE = 1000 PPM

ISOBUTANE = 1010 PPM

BUTANE = 1000 PPM

ISOPENTANE = 1000 PPM

PENTANE = 1000 PPM

WHEN THE MUD IS CIRCULATED THROUGH THE

GAS BUSTER, THE INTERVAL IS MARKED IN

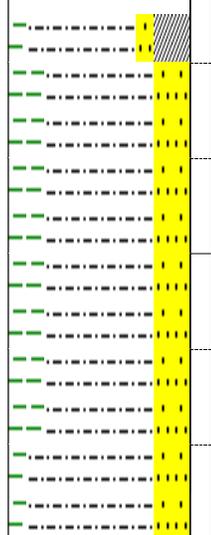
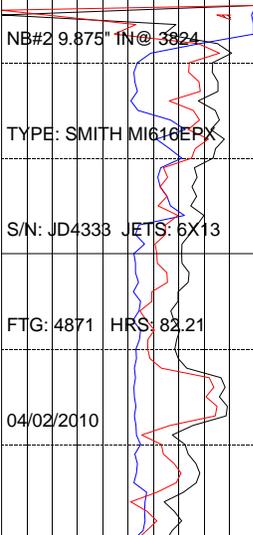
THE MGS COLUMN; THE SIZE OF THE FLARES

ARE NOTED AS WELL.

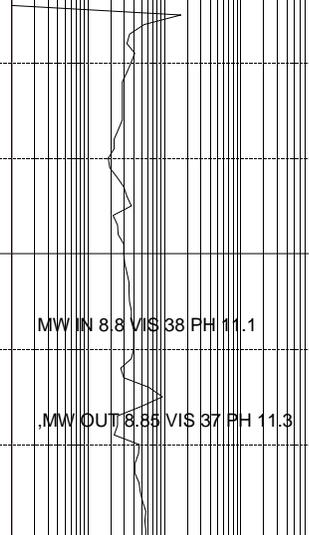
EVIDENCE OF FRACTURE FILL IS NOTED ON

THE MUD LOG. KAOLIN PERCENTAGE IN SS

INTERVALS IS ALSO NOTED ON THE MUD LOG.



CG 3u

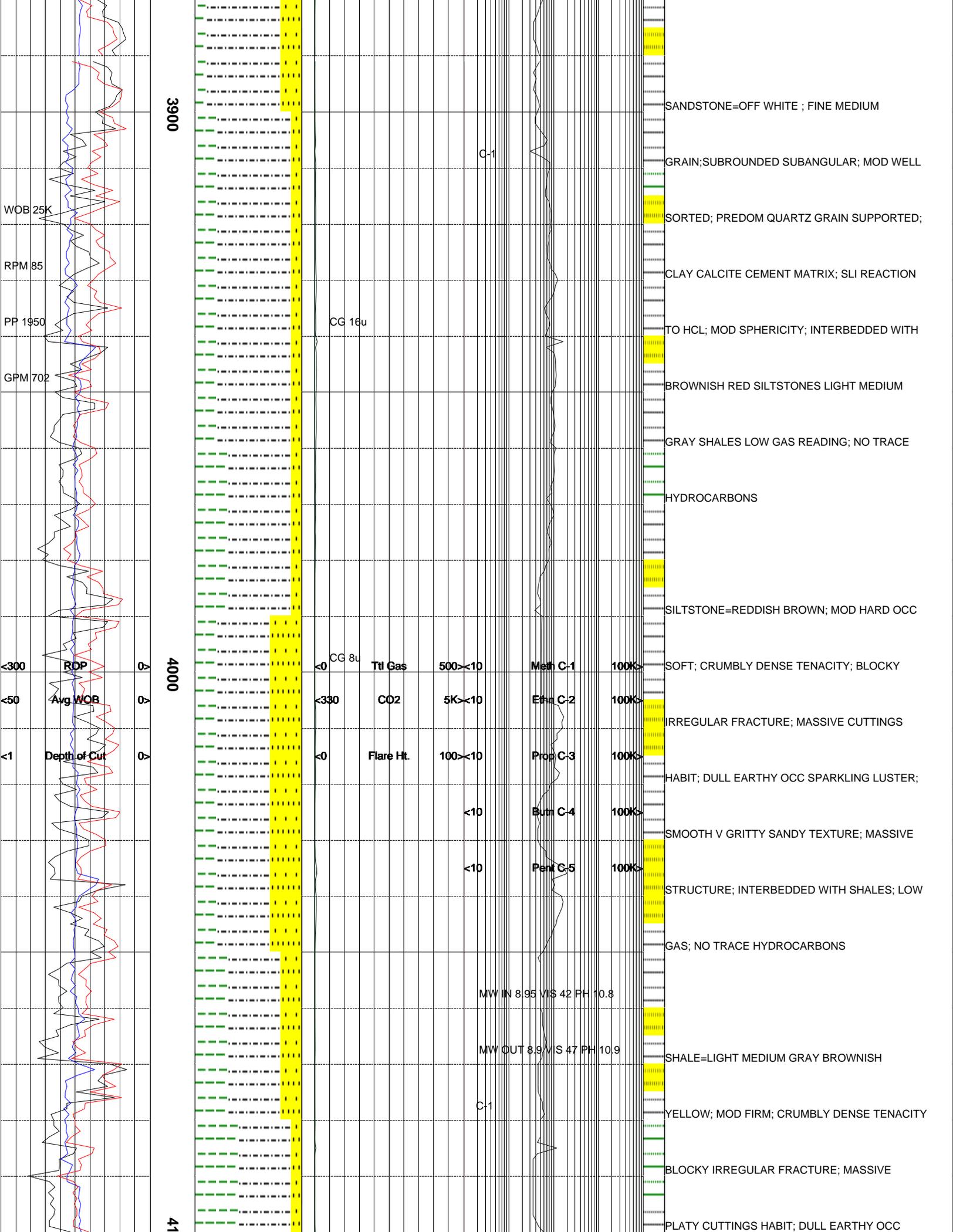


1 UNIT OF GAS = 200 PPM OF METHANE

SET 10.7" CASING @ 3808

BEGAN LOGGING WELL PCU297-11C6 ON

04/01/2010 AT 22:30 HRS.



3900

4000

41

WOB 25K  
 RPM 85  
 PP 1950  
 GPM 702  
 ROP 300  
 Avg WOB 50  
 Depth of Cut 1

CG 16u

CG 8u

C-1

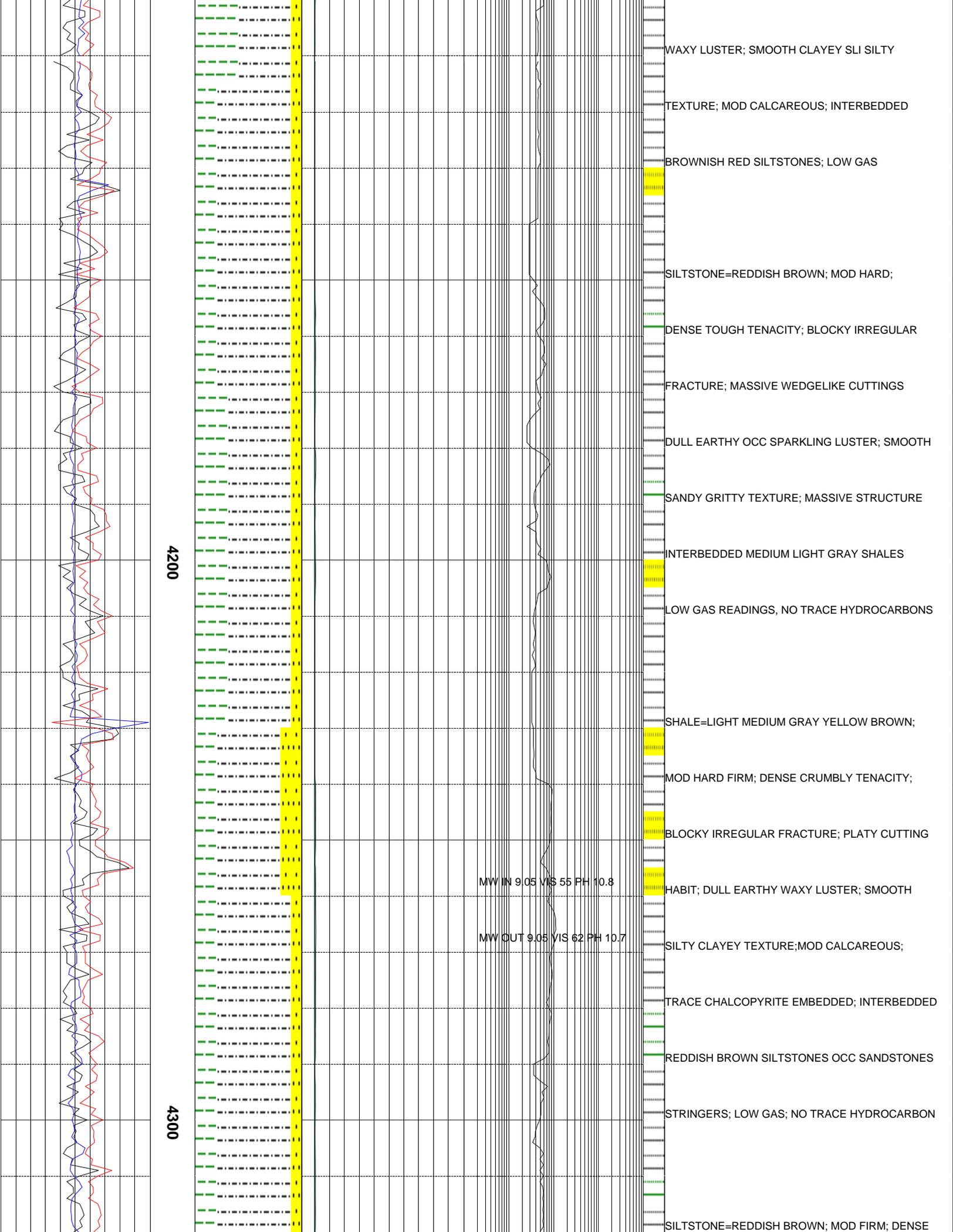
C-1

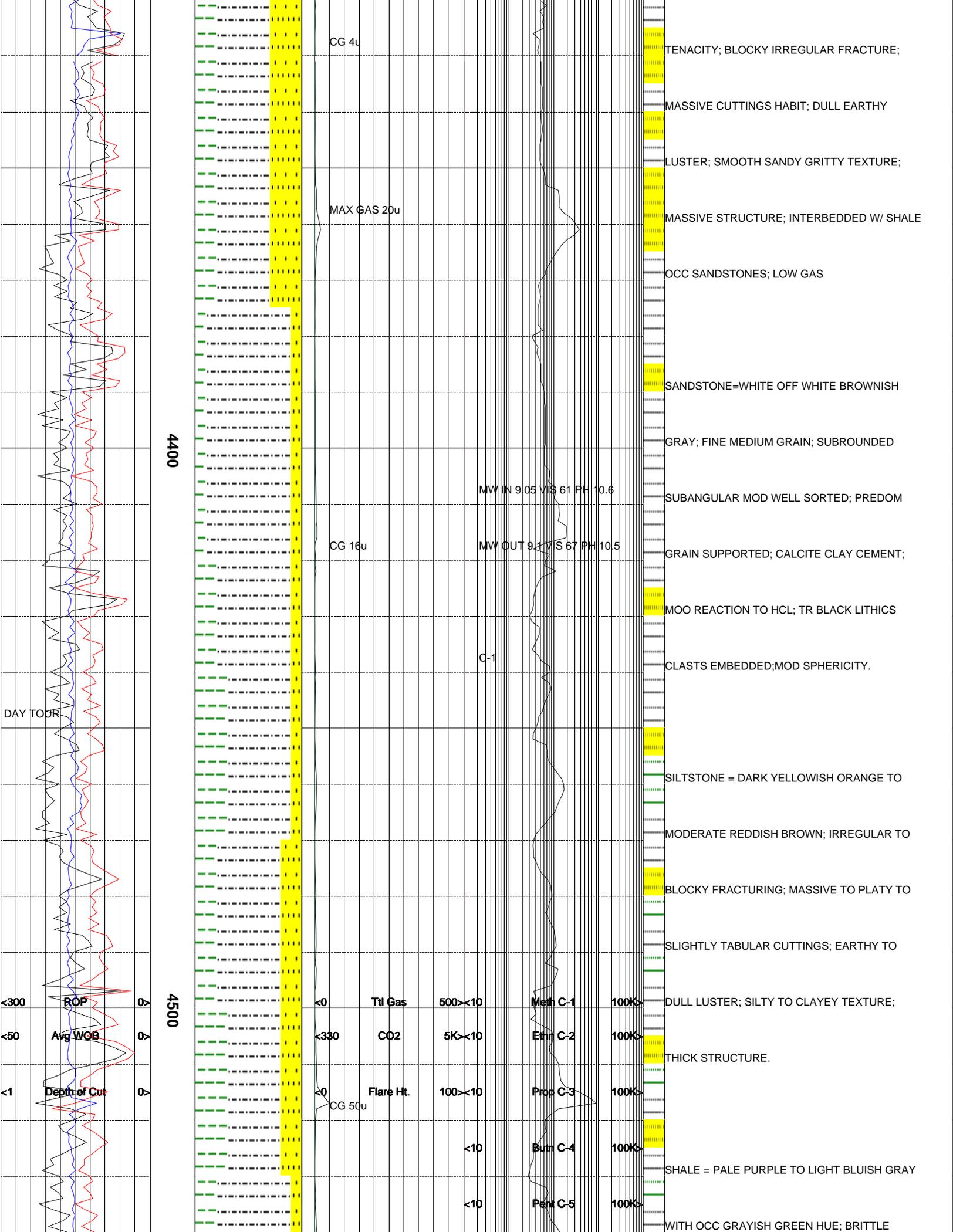
Ttl Gas	500	<10	Meth C-1	100	>
CO2	5K	<10	Eth C-2	100	>
Flare Ht.	100	<10	Prop C-3	100	>
		<10	But C-4	100	>
		<10	Pent C-5	100	>

MW IN 8.95 VIS 42 PH 10.8

MW OUT 8.9 VIS 47 PH 10.9

SANDSTONE=OFF WHITE ; FINE MEDIUM  
 GRAIN;SUBROUNDED SUBANGULAR; MOD WELL  
 SORTED; PREDOM QUARTZ GRAIN SUPPORTED;  
 CLAY CALCITE CEMENT MATRIX; SLI REACTION  
 TO HCL; MOD SPHERICITY; INTERBEDDED WITH  
 BROWNISH RED SILTSTONES LIGHT MEDIUM  
 GRAY SHALES LOW GAS READING; NO TRACE  
 HYDROCARBONS  
 SILTSTONE=REDDISH BROWN; MOD HARD OCC  
 SOFT; CRUMBLY DENSE TENACITY; BLOCKY  
 IRREGULAR FRACTURE; MASSIVE CUTTINGS  
 HABIT; DULL EARTHY OCC SPARKLING LUSTER;  
 SMOOTH V GRITTY SANDY TEXTURE; MASSIVE  
 STRUCTURE; INTERBEDDED WITH SHALES; LOW  
 GAS; NO TRACE HYDROCARBONS  
 SHALE=LIGHT MEDIUM GRAY BROWNISH  
 YELLOW; MOD FIRM; CRUMBLY DENSE TENACITY  
 BLOCKY IRREGULAR FRACTURE; MASSIVE  
 PLATY CUTTINGS HABIT; DULL EARTHY OCC





4400

4500

CG 4u

MAX GAS 20u

CG 16u

MW IN 9.05 VIS 61 PH 10.6

MW OUT 9.11 VIS 67 PH 10.5

C-1

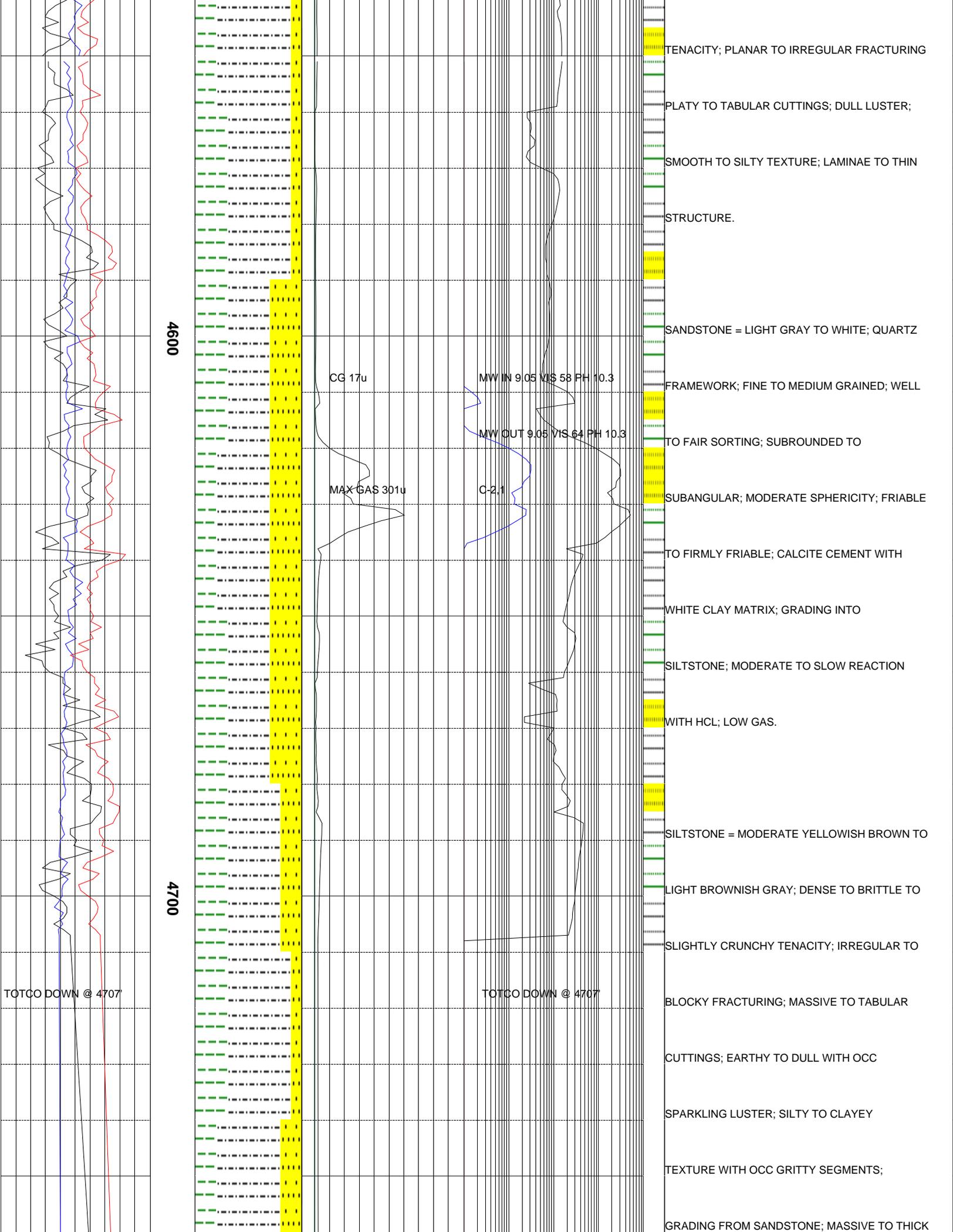
CG 50u

<0	Ttl Gas	500<10	Meth C-1	100K>
<330	CO2	5K<10	Ethin C-2	100K>
<0	Flare Ht.	100<10	Prop C-3	100K>
		<10	Burn C-4	100K>
		<10	Perit C-5	100K>

TENACITY; BLOCKY IRREGULAR FRACTURE;  
 MASSIVE CUTTINGS HABIT; DULL EARTHY  
 LUSTER; SMOOTH SANDY GRITTY TEXTURE;  
 MASSIVE STRUCTURE; INTERBEDDED W/ SHALE  
 OCC SANDSTONES; LOW GAS  
 SANDSTONE=WHITE OFF WHITE BROWNISH  
 GRAY; FINE MEDIUM GRAIN; SUBROUNDED  
 SUBANGULAR MOD WELL SORTED; PREDOM  
 GRAIN SUPPORTED; CALCITE CLAY CEMENT;  
 MOO REACTION TO HCL; TR BLACK LITHICS  
 CLASTS EMBEDDED;MOD SPHERICITY.  
 SILTSTONE = DARK YELLOWISH ORANGE TO  
 MODERATE REDDISH BROWN; IRREGULAR TO  
 BLOCKY FRACTURING; MASSIVE TO PLATY TO  
 SLIGHTLY TABULAR CUTTINGS; EARTHY TO  
 DULL LUSTER; SILTY TO CLAYEY TEXTURE;  
 THICK STRUCTURE.  
 SHALE = PALE PURPLE TO LIGHT BLUISH GRAY  
 WITH OCC GRAYISH GREEN HUE; BRITTLE

DAY TOUR

ROP  
 Avg WOB  
 Depth of Cut



4600

4700

CG 17u

MAX GAS 301u

MW IN 9.05 VIS 58 PH 10.3

MW OUT 9.05 VIS 64 PH 10.3

C-2.1

TOTCO DOWN @ 4707

TOTCO DOWN @ 4707

TENACITY; PLANAR TO IRREGULAR FRACTURING

PLATY TO TABULAR CUTTINGS; DULL LUSTER;

SMOOTH TO SILTY TEXTURE; LAMINAE TO THIN

STRUCTURE.

SANDSTONE = LIGHT GRAY TO WHITE; QUARTZ

FRAMEWORK; FINE TO MEDIUM GRAINED; WELL

TO FAIR SORTING; SUBROUNDED TO

SUBANGULAR; MODERATE SPHERICITY; FRIABLE

TO FIRMLY FRIABLE; CALCITE CEMENT WITH

WHITE CLAY MATRIX; GRADING INTO

SILTSTONE; MODERATE TO SLOW REACTION

WITH HCL; LOW GAS.

SILTSTONE = MODERATE YELLOWISH BROWN TO

LIGHT BROWNISH GRAY; DENSE TO BRITTLE TO

SLIGHTLY CRUNCHY TENACITY; IRREGULAR TO

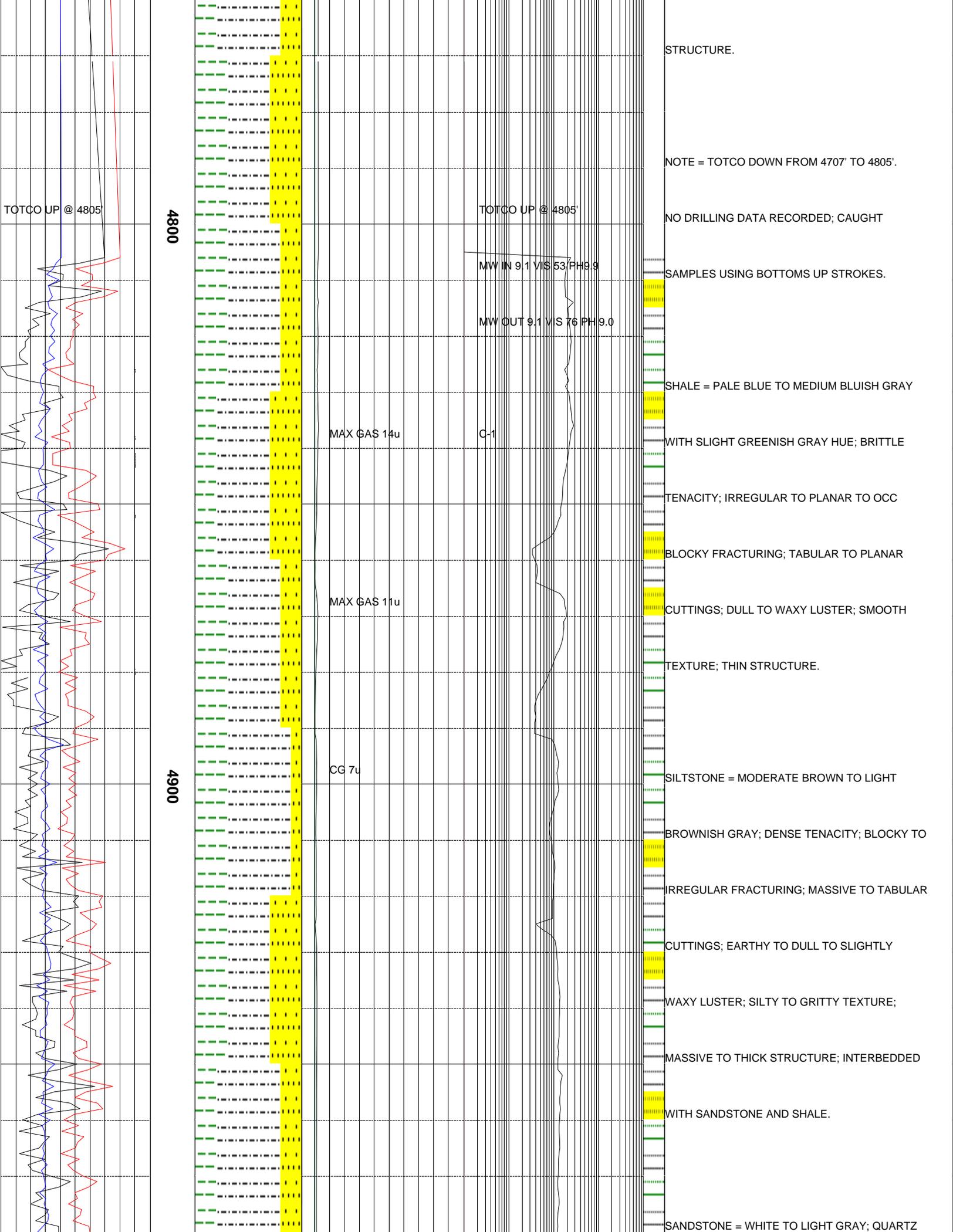
BLOCKY FRACTURING; MASSIVE TO TABULAR

CUTTINGS; EARTHY TO DULL WITH OCC

SPARKLING LUSTER; SILTY TO CLAYEY

TEXTURE WITH OCC GRITTY SEGMENTS;

GRADING FROM SANDSTONE; MASSIVE TO THICK



STRUCTURE.

NOTE = TOTCO DOWN FROM 4707' TO 4805'.

TOTCO UP @ 4805'

4800

TOTCO UP @ 4805'

NO DRILLING DATA RECORDED; CAUGHT

MW IN 9.1 VIS 53 PH 9.9

SAMPLES USING BOTTOMS UP STROKES.

MW OUT 9.1 VIS 76 PH 9.0

SHALE = PALE BLUE TO MEDIUM BLUISH GRAY

MAX GAS 14u

C-1

WITH SLIGHT GREENISH GRAY HUE; BRITTLE

TENACITY; IRREGULAR TO PLANAR TO OCC

BLOCKY FRACTURING; TABULAR TO PLANAR

MAX GAS 11u

CUTTINGS; DULL TO WAXY LUSTER; SMOOTH

TEXTURE; THIN STRUCTURE.

4900

CG 7u

SILTSTONE = MODERATE BROWN TO LIGHT

BROWNISH GRAY; DENSE TENACITY; BLOCKY TO

IRREGULAR FRACTURING; MASSIVE TO TABULAR

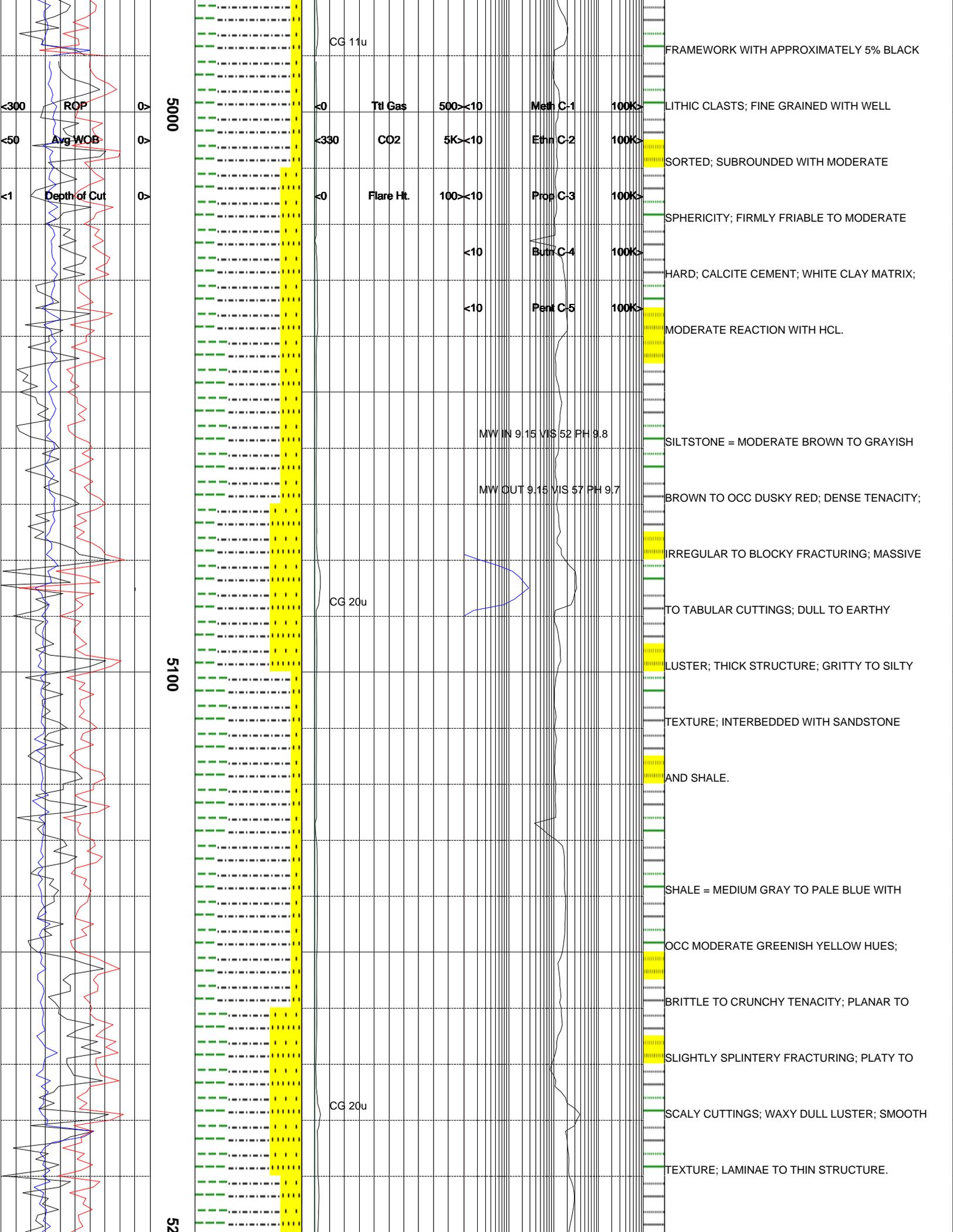
CUTTINGS; EARTHY TO DULL TO SLIGHTLY

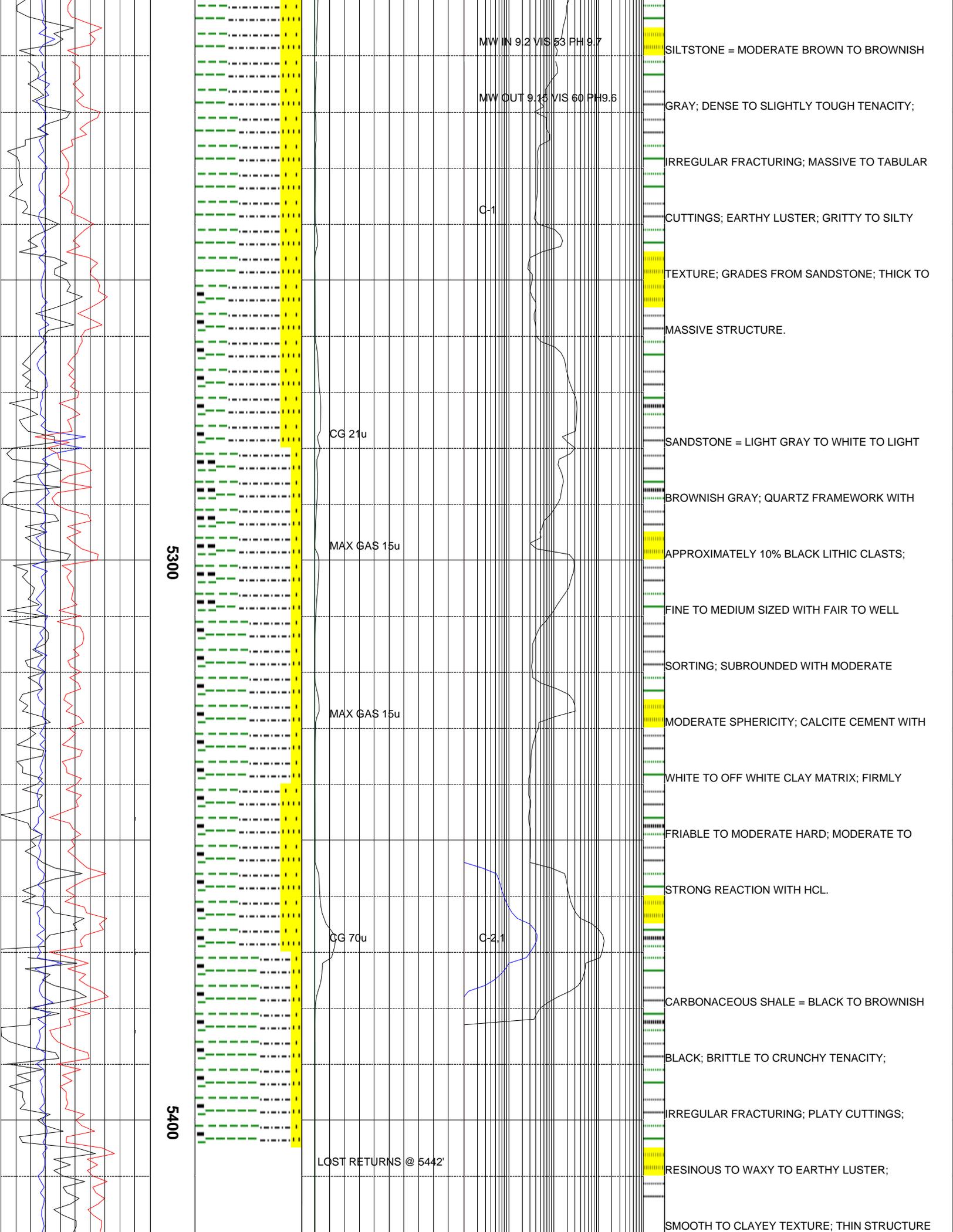
WAXY LUSTER; SILTY TO GRITTY TEXTURE;

MASSIVE TO THICK STRUCTURE; INTERBEDDED

WITH SANDSTONE AND SHALE.

SANDSTONE = WHITE TO LIGHT GRAY; QUARTZ





5300

5400

MW IN 9.2 VIS 53 PH 9.7

MW OUT 9.15 VIS 60 PH 9.6

C-1

CG 21u

MAX GAS 15u

MAX GAS 15u

CG 70u

C-2

LOST RETURNS @ 5442'

SILTSTONE = MODERATE BROWN TO BROWNISH

GRAY; DENSE TO SLIGHTLY TOUGH TENACITY;

IRREGULAR FRACTURING; MASSIVE TO TABULAR

CUTTINGS; EARTHY LUSTER; GRITTY TO SILTY

TEXTURE; GRADES FROM SANDSTONE; THICK TO

MASSIVE STRUCTURE.

SANDSTONE = LIGHT GRAY TO WHITE TO LIGHT

BROWNISH GRAY; QUARTZ FRAMEWORK WITH

APPROXIMATELY 10% BLACK LITHIC CLASTS;

FINE TO MEDIUM SIZED WITH FAIR TO WELL

SORTING; SUBROUNDED WITH MODERATE

MODERATE SPHERICITY; CALCITE CEMENT WITH

WHITE TO OFF WHITE CLAY MATRIX; FIRMLY

FRIABLE TO MODERATE HARD; MODERATE TO

STRONG REACTION WITH HCL.

CARBONACEOUS SHALE = BLACK TO BROWNISH

BLACK; BRITTLE TO CRUNCHY TENACITY;

IRREGULAR FRACTURING; PLATY CUTTINGS;

RESINOUS TO WAXY TO EARTHY LUSTER;

SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE

WASATCH G @ 5442

NOTE = LOST FULL RETURNS @ 5442'.

PARTIAL RETURNS @ 5442'

NOTE = PARTIAL RETURNS FROM 5442' TO

5473'.

RETURNS BACK @ 5508'

NOTE = FULL RETURNS AT 5508'.

ROP  
Avg WOB  
Depth of Cut

5500

<300	Ttl Gas	500	<10	Meth C-1	100K
<50	CO2	5K	<10	Ethn C-2	100K
<1	Flare Ht.	100	<10	Prop C-3	100K
			<10	Burn C-4	100K
			<10	Pent C-5	100K

SILTSTONE = YELLOWISH GRAY TO LIGHT

BROWNISH GRAY; DENSE TO SLIGHTLY CRUMBLY

TENACITY; IRREGULAR TO BLOCKY FRACTURING

TABULAR CUTTINGS; EARTHY TO DULL LUSTER;

GRITTY TO SILTY TEXTURE; THICK STRUCTURE

C-3.2.1

CG 566u

SANDSTONE = TRANSLUCENT TO WHITE TO VERY

LIGHT GRAY; QUARTZ FRAMEWORK; ABUNDANT

MAX GAS 253u

LOOSE GRAINS; TRACE BLACK LITHIC CLASTS

EMBEDDED; FINE TO VERY FINE GRAINED WITH

MW IN 8.85 VIS 68 PH 10.2

WELL TO FAIR SORTING; SUBROUNDED WITH

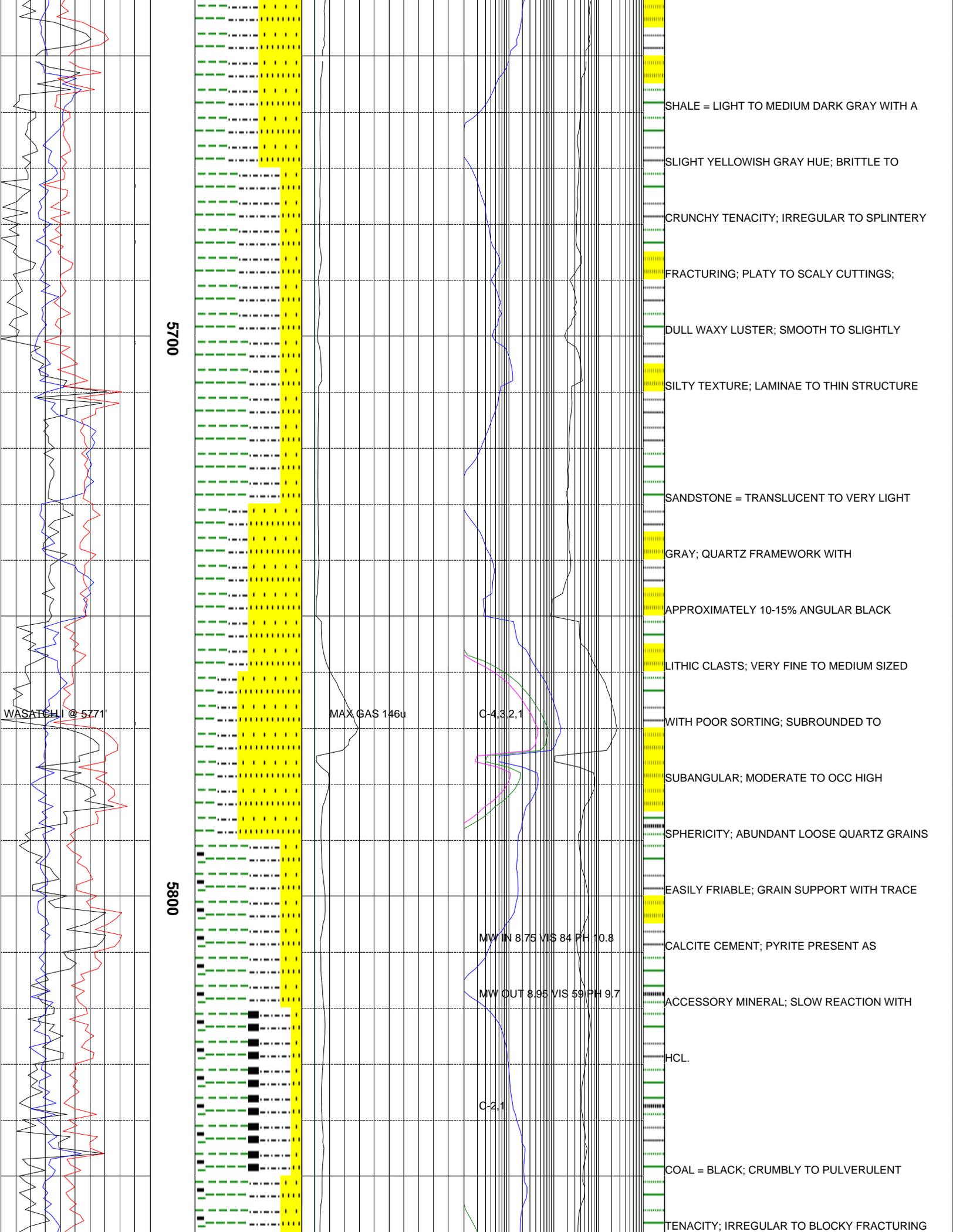
MW OUT 8.85 VIS 65 PH 9.7

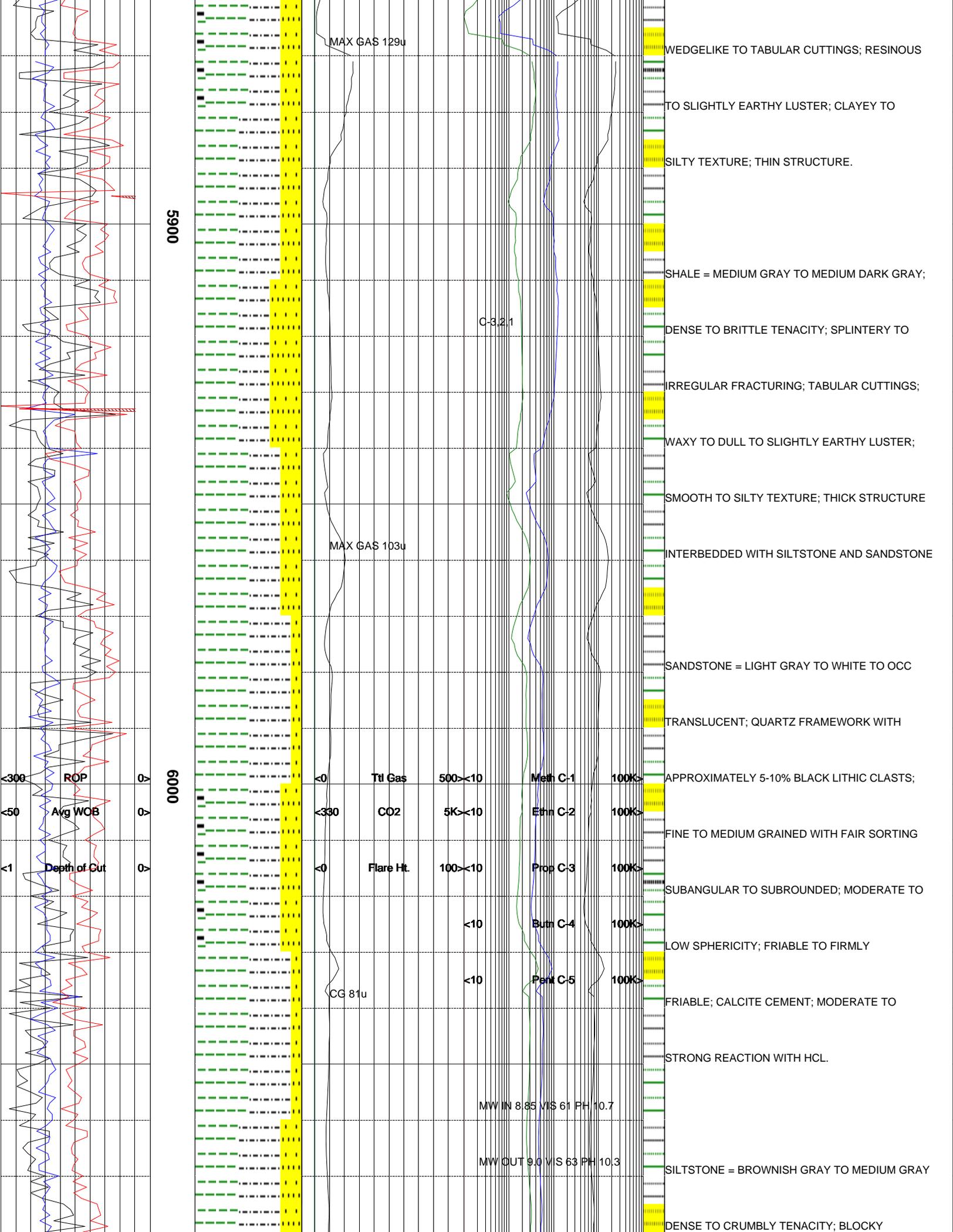
MODERATE SPHERICITY; EASILY FRIABLE;

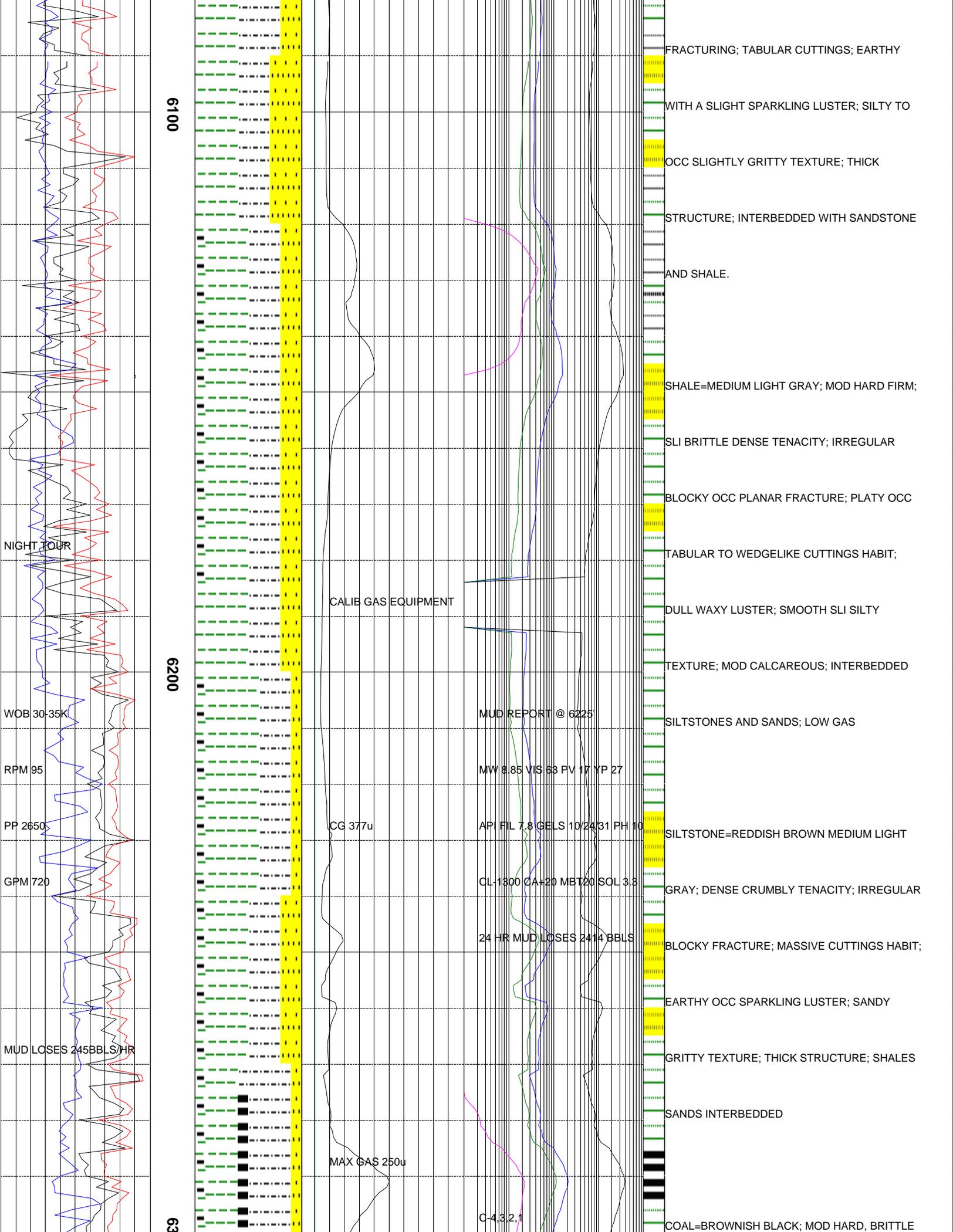
GRAIN SUPPORTED; TRACE AMOUNTS OF PYRITE

AS ACCESSORY MINERAL.

5600







6100

6200

6300

FRACTURING; TABULAR CUTTINGS; EARTHY

WITH A SLIGHT SPARKLING LUSTER; SILTY TO

OCC SLIGHTLY GRITTY TEXTURE; THICK

STRUCTURE; INTERBEDDED WITH SANDSTONE

AND SHALE.

SHALE=MEDIUM LIGHT GRAY; MOD HARD FIRM;

SLI BRITTLE DENSE TENACITY; IRREGULAR

BLOCKY OCC PLANAR FRACTURE; PLATY OCC

TABULAR TO WEDGELIKE CUTTINGS HABIT;

DULL WAXY LUSTER; SMOOTH SLI SILTY

TEXTURE; MOD CALCAREOUS; INTERBEDDED

SILTSTONES AND SANDS; LOW GAS

SILTSTONE=REDDISH BROWN MEDIUM LIGHT

GRAY; DENSE CRUMBLY TENACITY; IRREGULAR

BLOCKY FRACTURE; MASSIVE CUTTINGS HABIT;

EARTHY OCC SPARKLING LUSTER; SANDY

GRITTY TEXTURE; THICK STRUCTURE; SHALES

SANDS INTERBEDDED

COAL=BROWNISH BLACK; MOD HARD, BRITTLE

NIGHT TOUR

CALIB GAS EQUIPMENT

MUD REPORT @ 6225

MW 8.85 VIS 63 PV 17 YP 27

CG 377u

API FIL 7.8 GELS 10/24/31 PH 10

WOB 30-35K

RPM 95

PP 2650

GPM 720

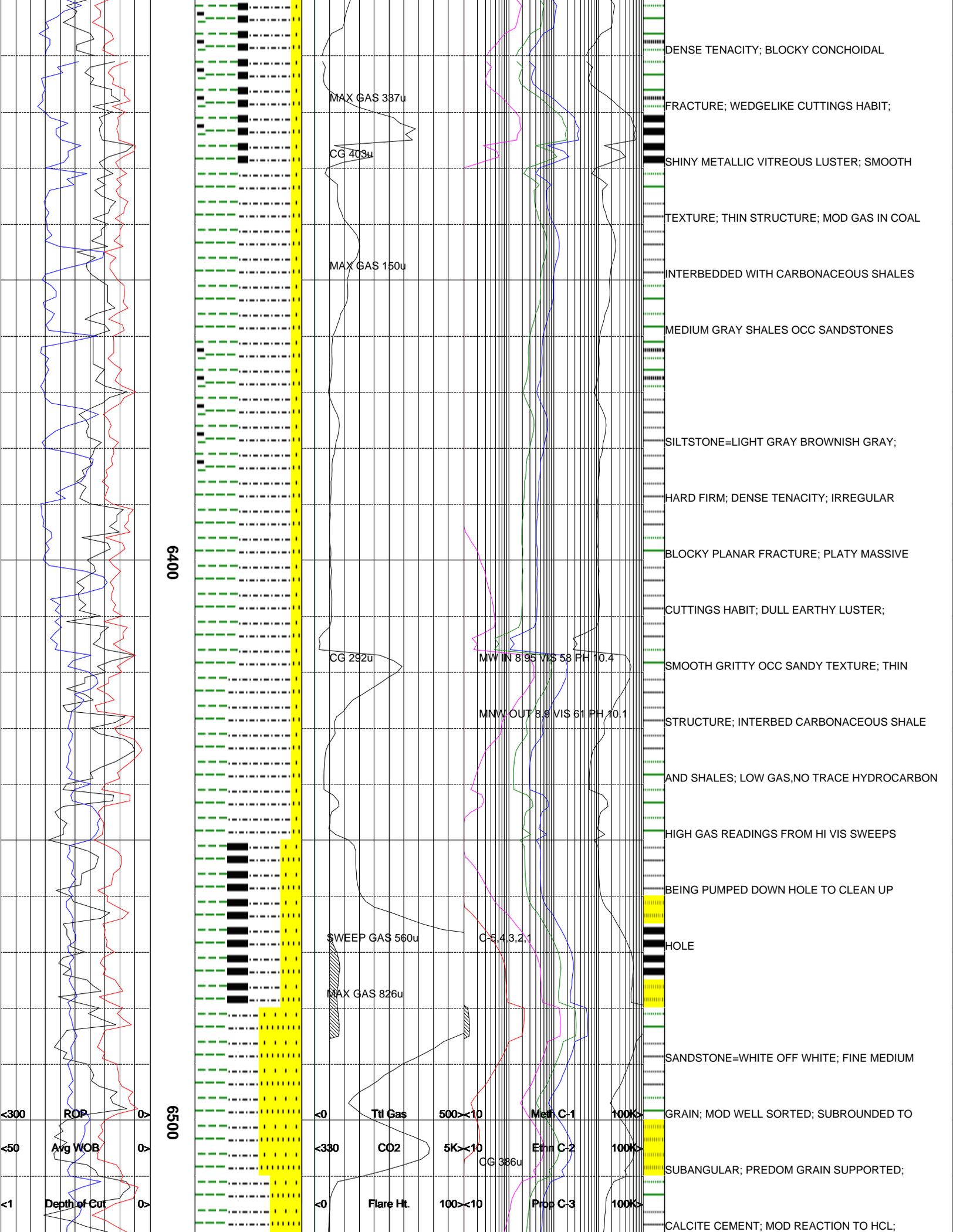
CL-1300 CA+20 MBT20 SQL 3.3

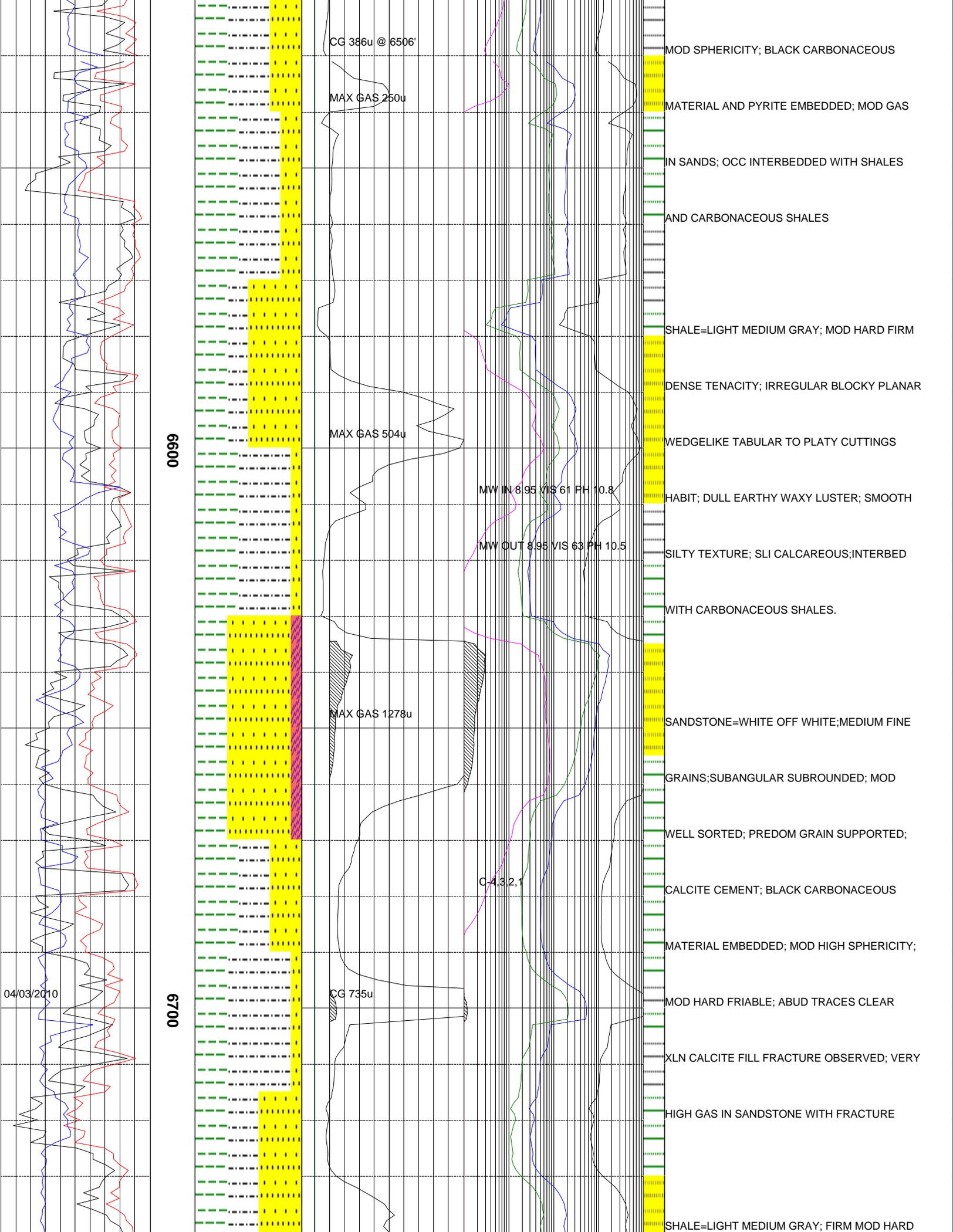
24 HR MUD LOSES 2414 BBLS

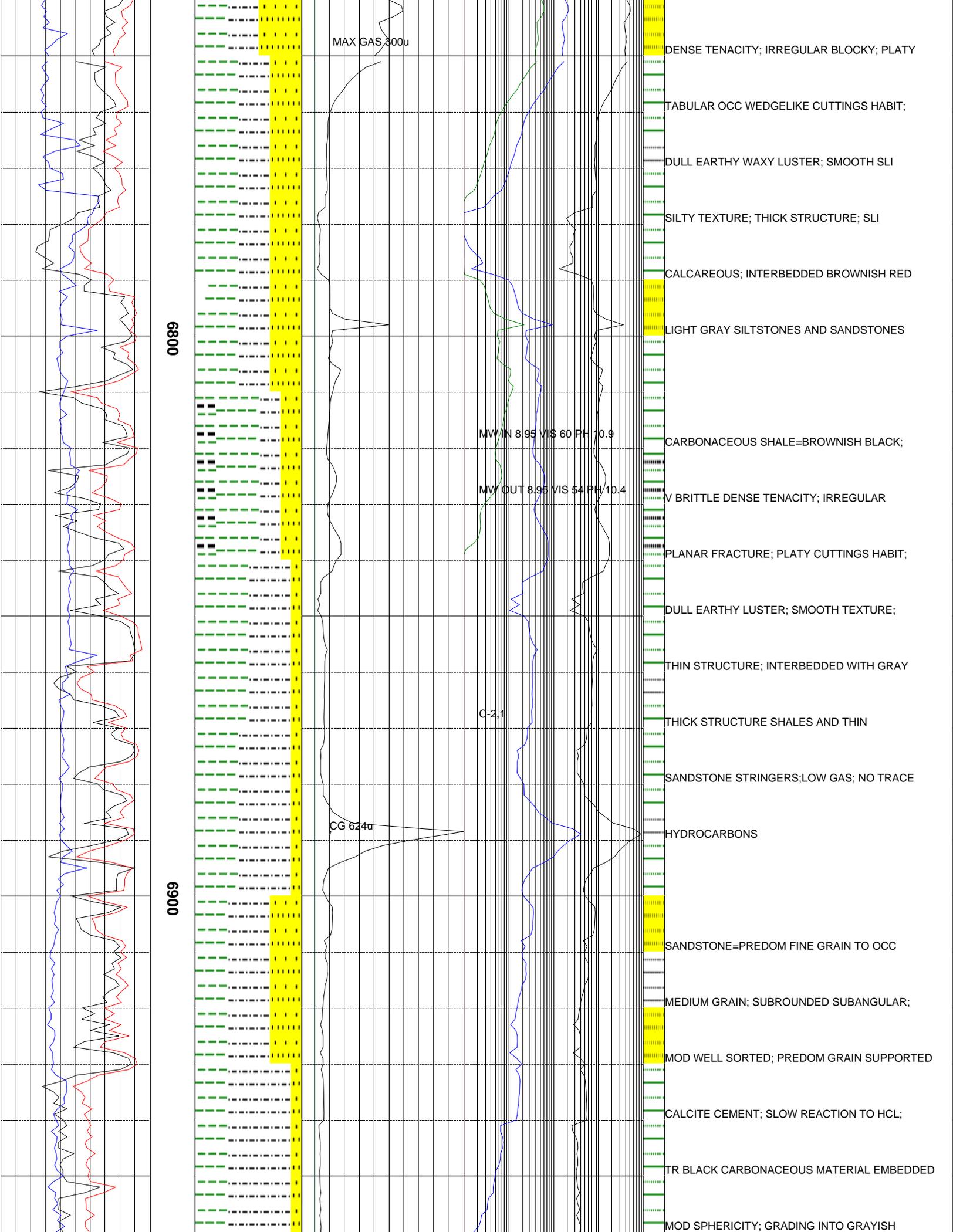
MUD LOSES 245BBLS/HR

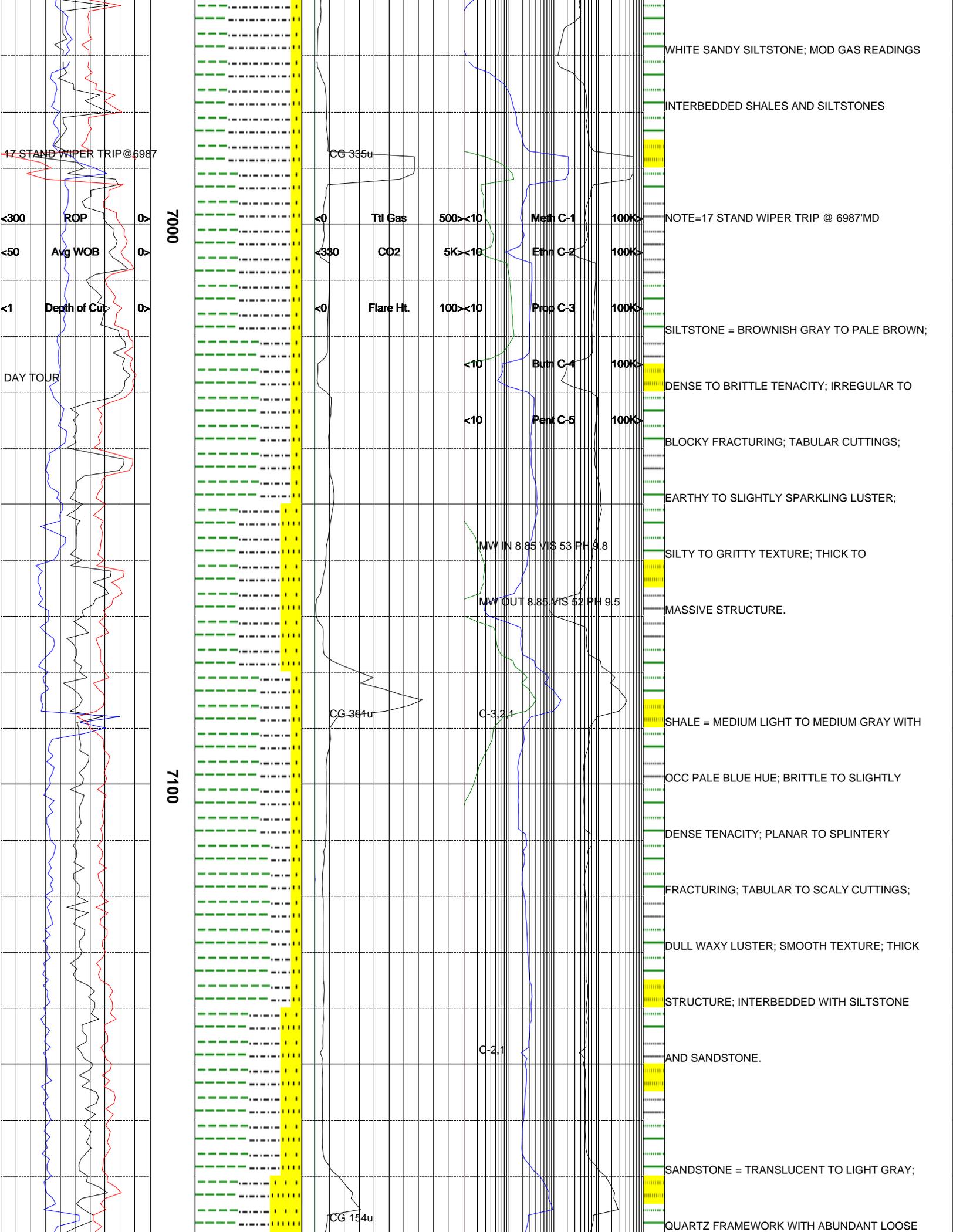
MAX GAS 250u

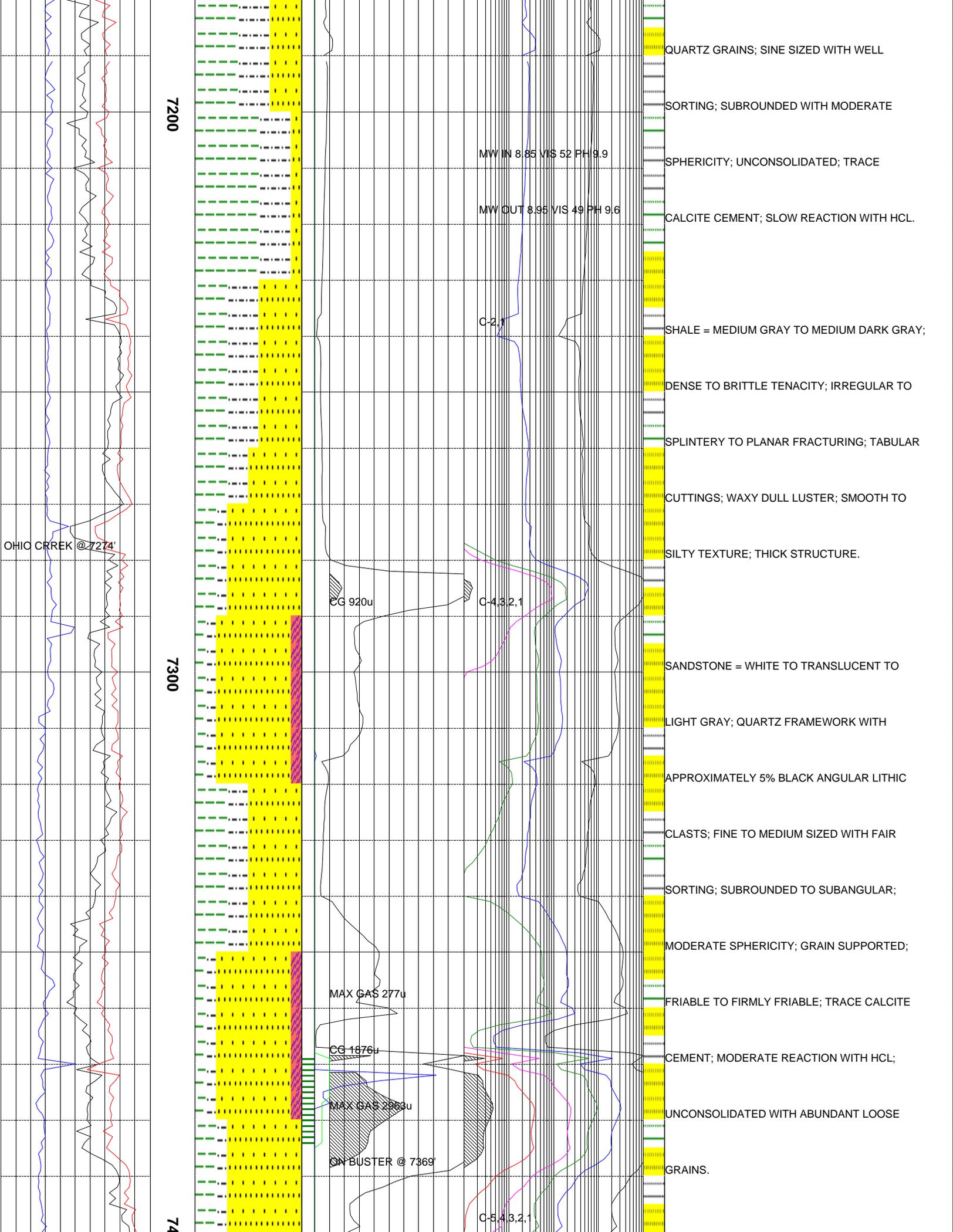
C-432.1

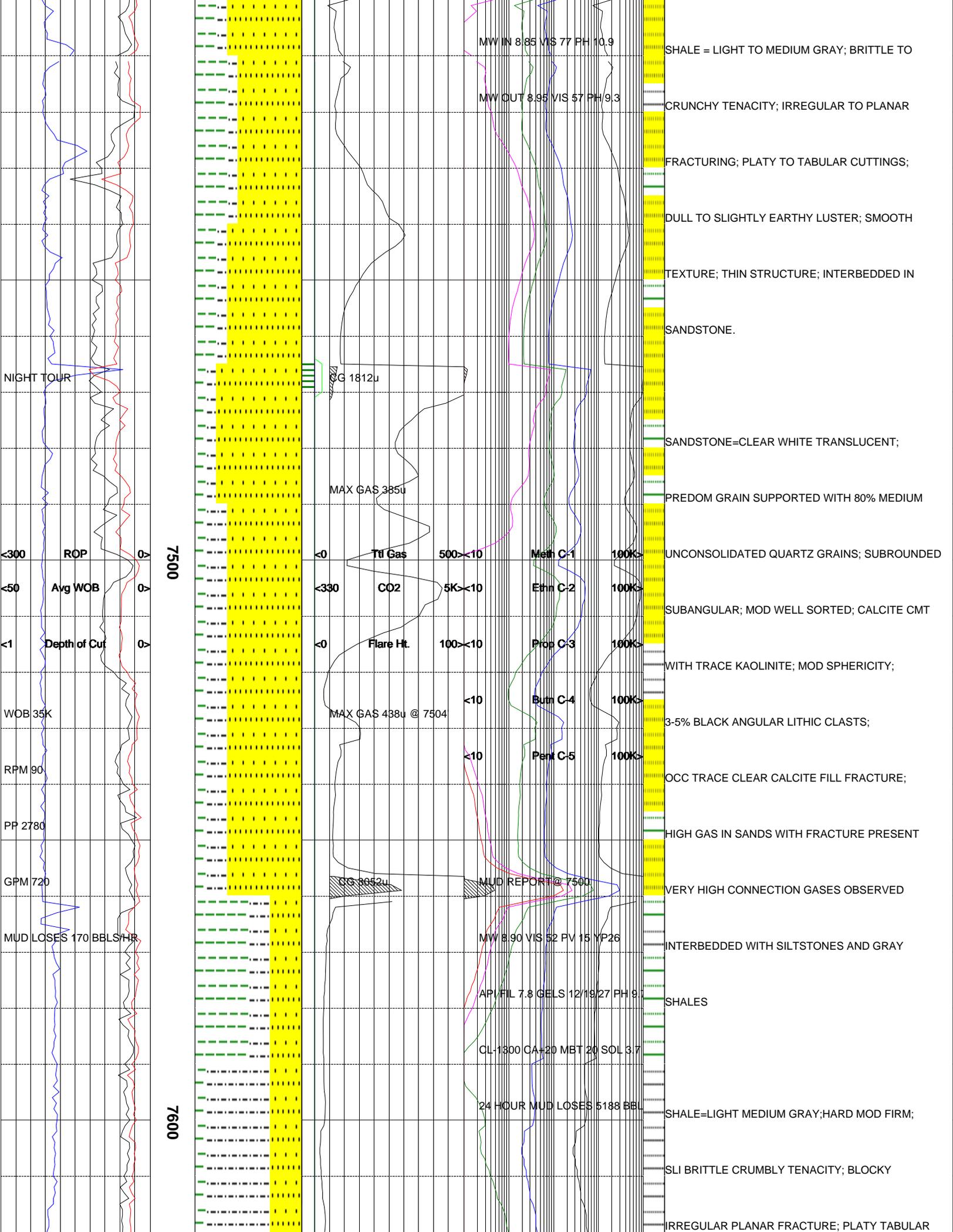












7500

7600

NIGHT TOUR

ROP

Avg WOB

Depth of Cut

WOB 35K

RPM 90

PP 2780

GPM 720

MUD LOSES 170 BBL/HR

CG 1812u

MAX GAS 385u

Ttl Gas 500 <10

CO2 5K <10

Flare Ht. 100 <10

MAX GAS 438u @ 7504

CG 3052u

MUD REPORT @ 7500

MW IN 8.85 VIS 77 PH 10.9

MW OUT 8.95 VIS 57 PH 9.3

Meth C-1 100K <

Ethn C-2 100K <

Prop C-3 100K <

Butn C-4 100K <

Pent C-5 100K <

MW 8.90 VIS 52 PV 15 YP26

API/FIL 7.8 GELS 12/19/27 PH 9.7

CL-1300 CA+20 MBT 20 SOL 3.7

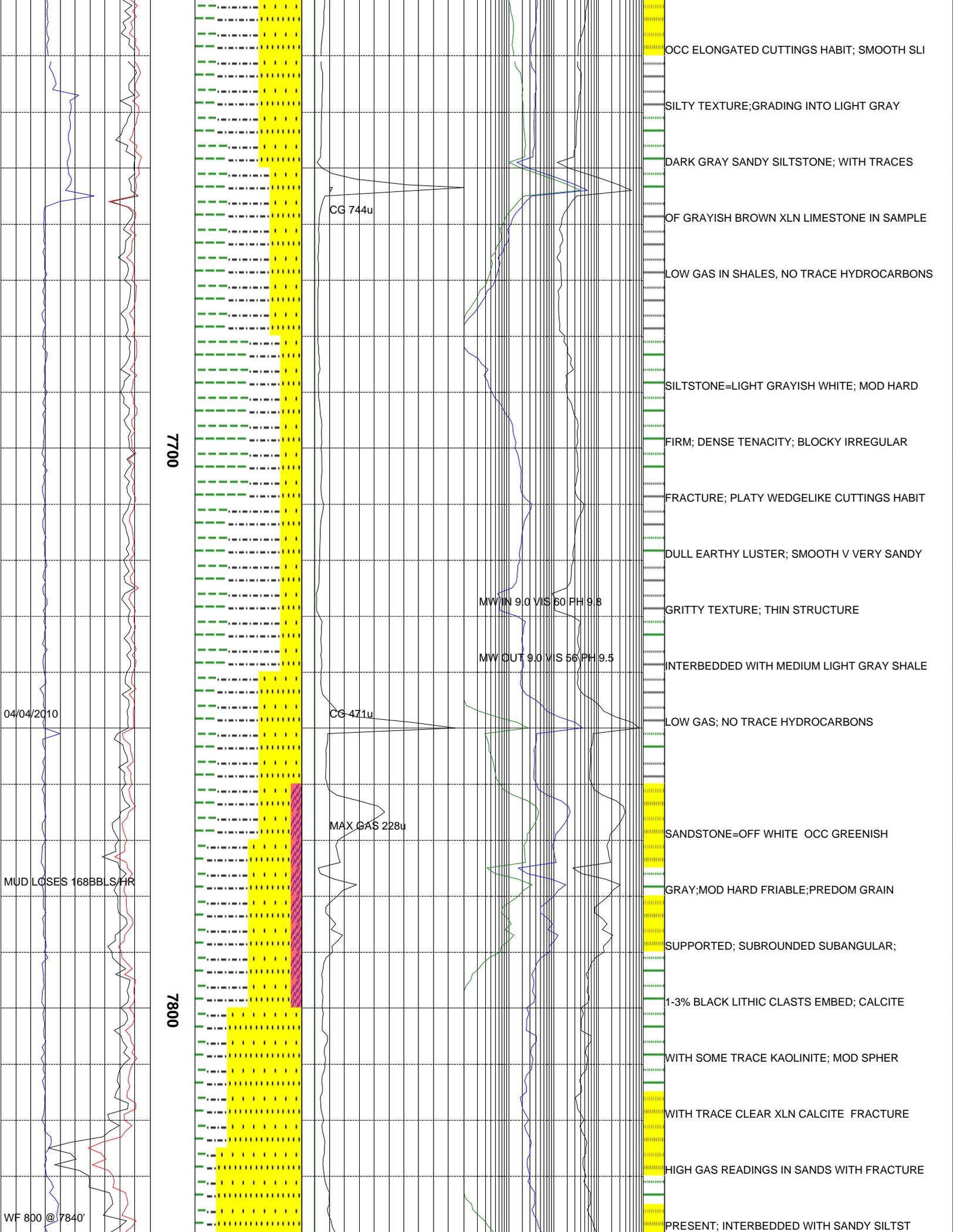
24 HOUR MUD LOSES 5188 BBL

SHALES = LIGHT TO MEDIUM GRAY; BRITTLE TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURING; PLATY TO TABULAR CUTTINGS; DULL TO SLIGHTLY EARTHY LUSTER; SMOOTH TEXTURE; THIN STRUCTURE; INTERBEDDED IN SANDSTONE.

SANDSTONE = CLEAR WHITE TRANSLUCENT; PREDOM GRAIN SUPPORTED WITH 80% MEDIUM UNCONSOLIDATED QUARTZ GRAINS; SUBROUNDED SUBANGULAR; MOD WELL SORTED; CALCITE CMT WITH TRACE KAOLINITE; MOD SPHERICITY; 3-5% BLACK ANGULAR LITHIC CLASTS; OCC TRACE CLEAR CALCITE FILL FRACTURE; HIGH GAS IN SANDS WITH FRACTURE PRESENT VERY HIGH CONNECTION GASES OBSERVED INTERBEDDED WITH SILTSTONES AND GRAY SHALES

SHALES

SHALES = LIGHT MEDIUM GRAY; HARD MOD FIRM; SLI BRITTLE CRUMBLY TENACITY; BLOCKY IRREGULAR PLANAR FRACTURE; PLATY TABULAR



7700

7800

CG 744u

CG 471u

MAX GAS 228u

MW IN 9.0 VIS 60 PH 9.8

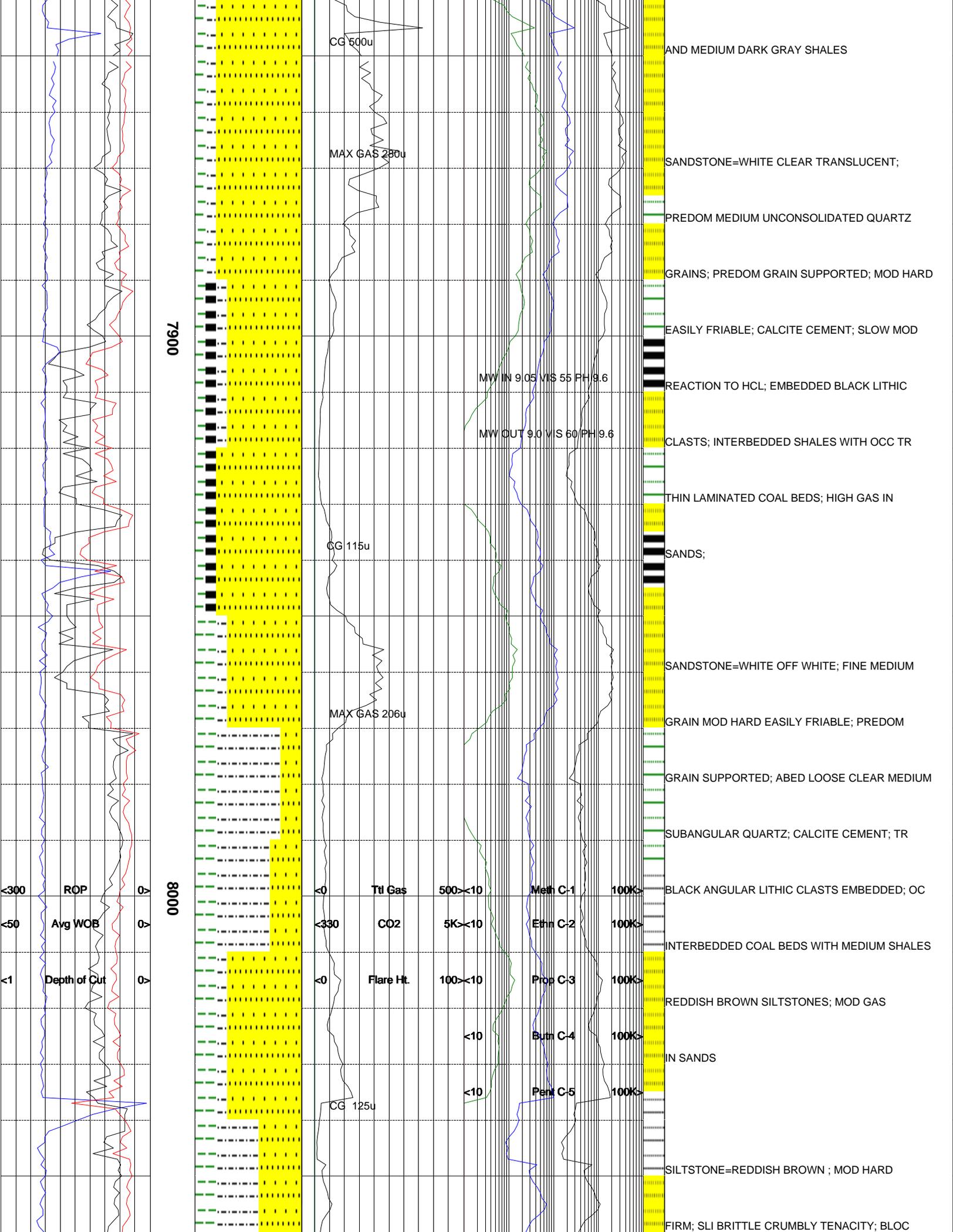
MW OUT 9.0 VIS 56 PH 9.5

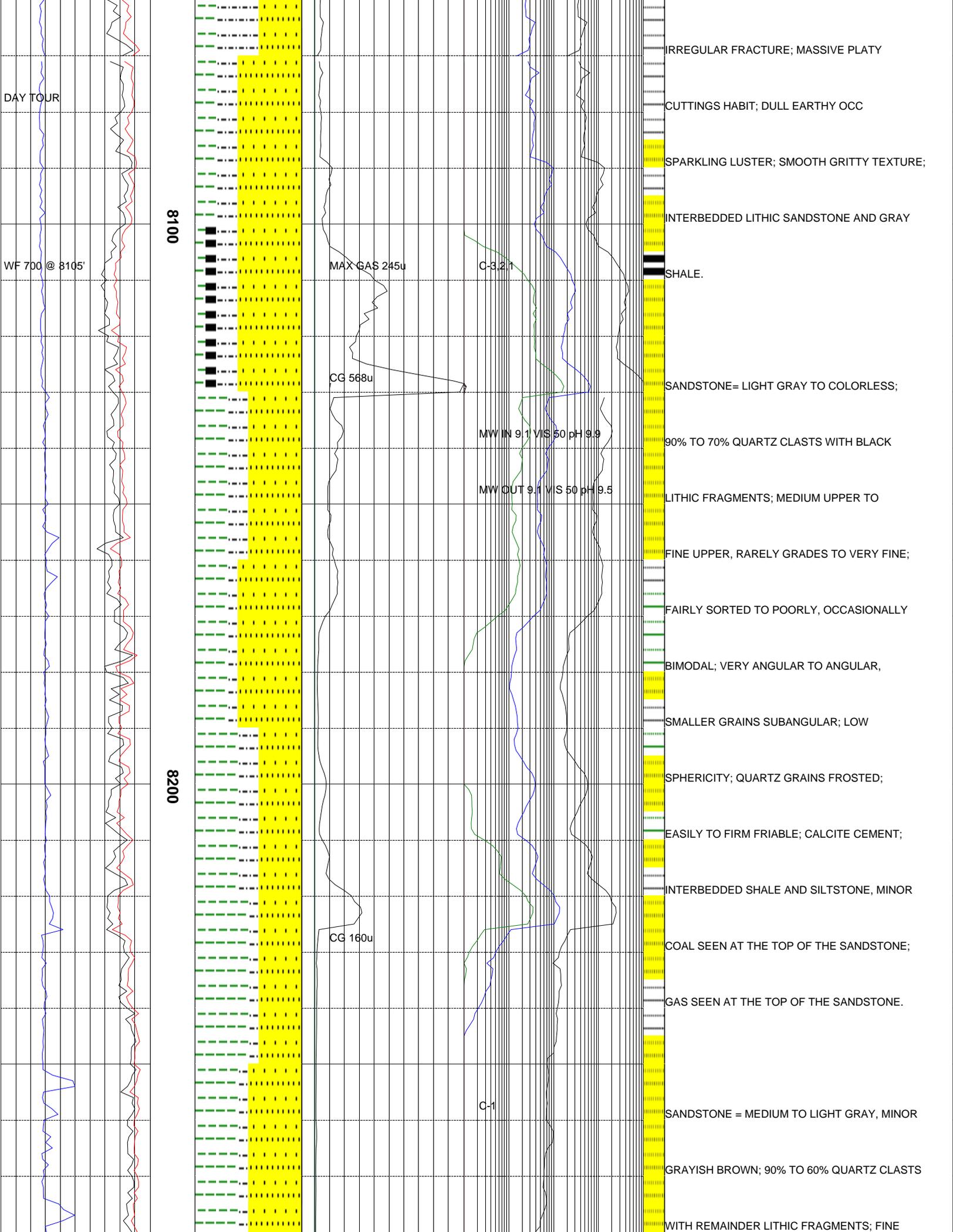
04/04/2010

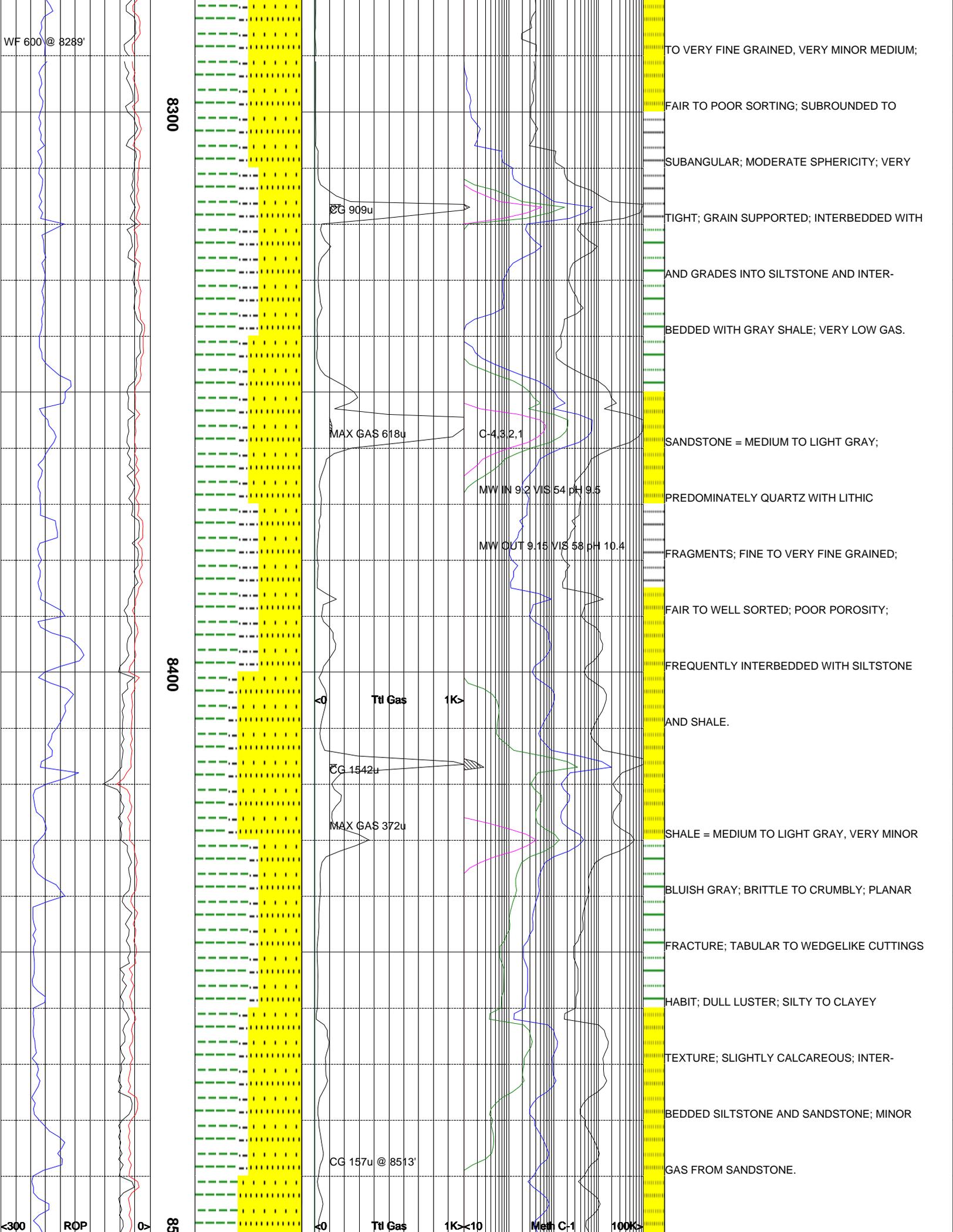
MUD LOSES 168BBS/HR

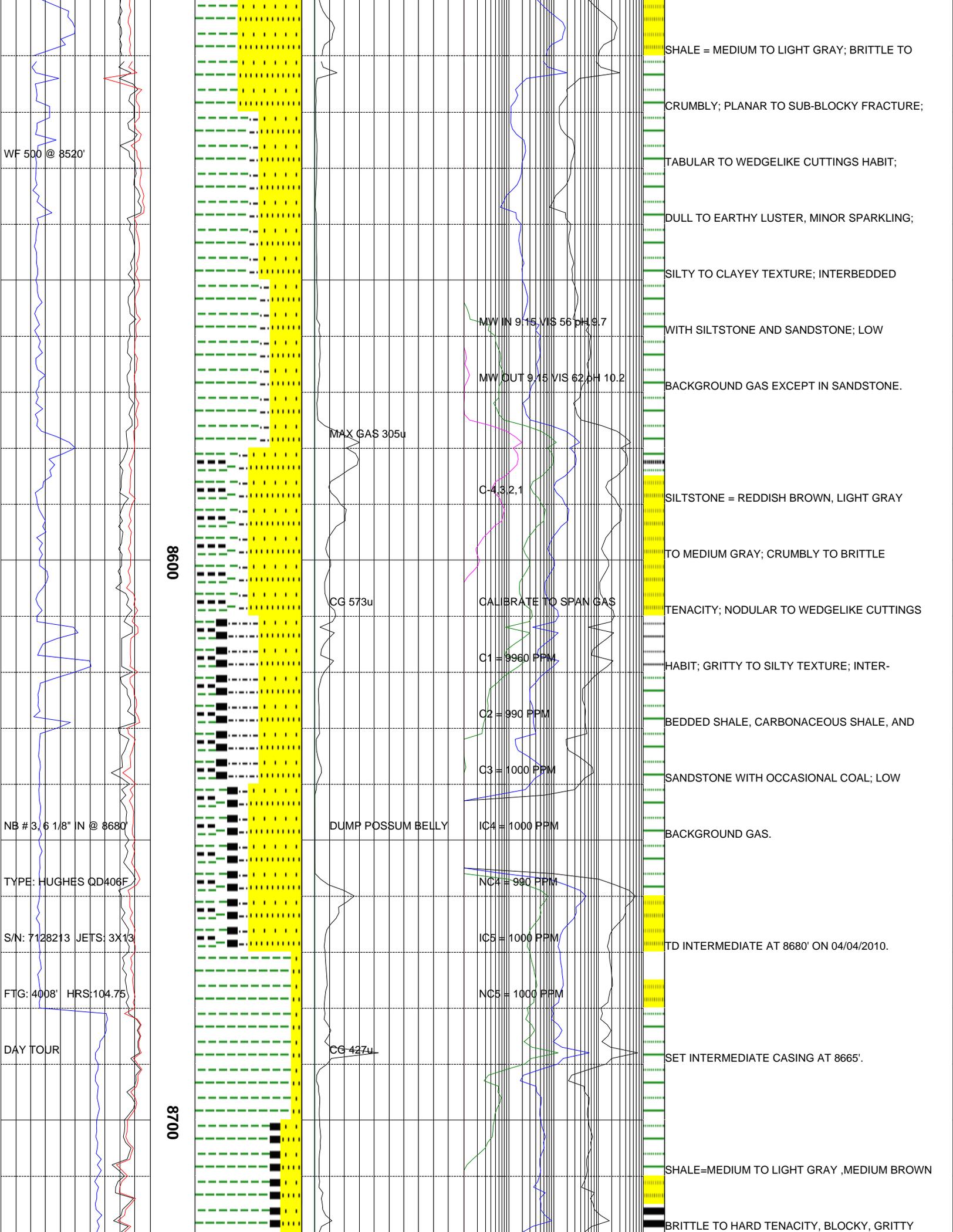
WF 800 @ 7840'

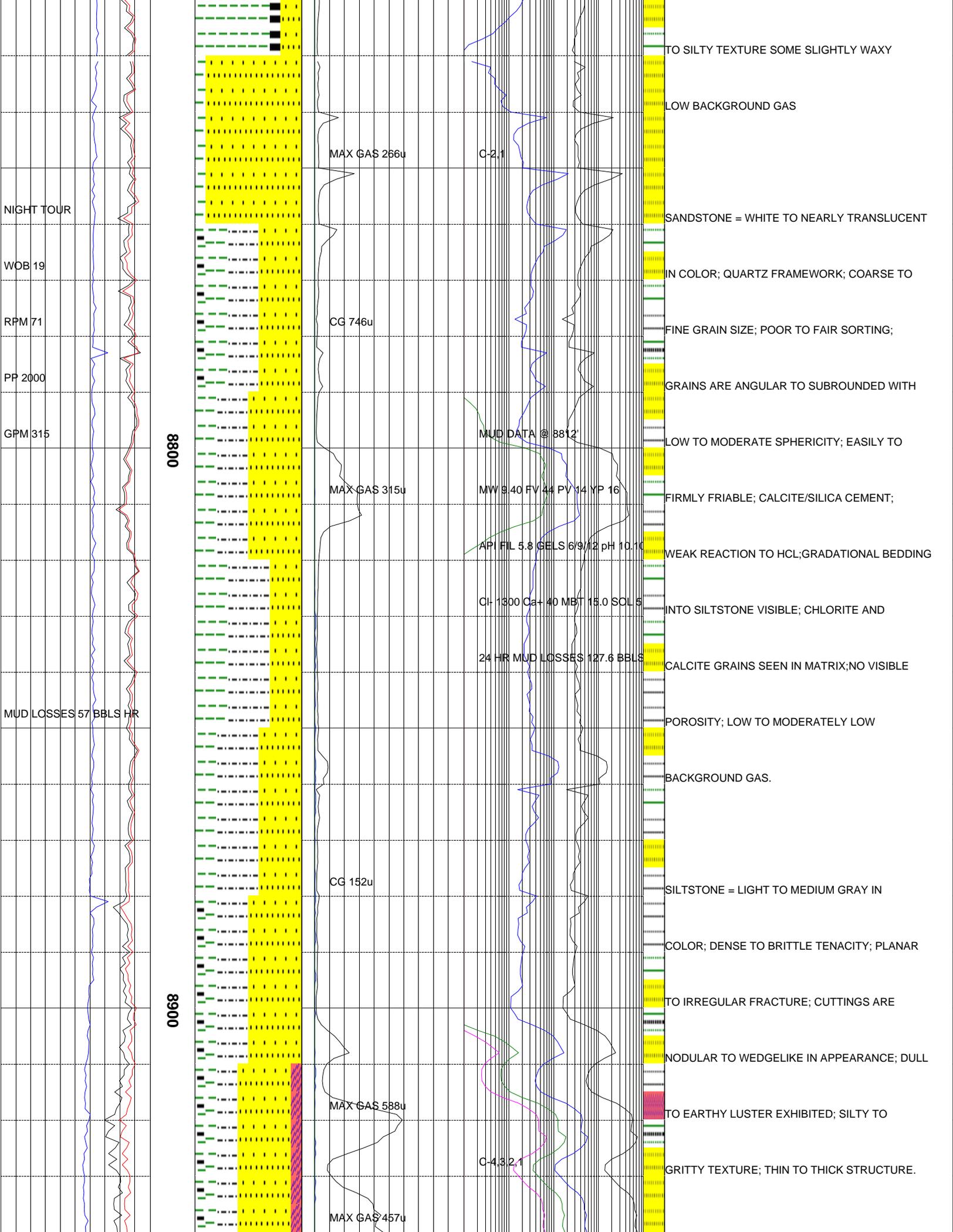
OCC ELONGATED CUTTINGS HABIT; SMOOTH SLI  
 SILTY TEXTURE; GRADING INTO LIGHT GRAY  
 DARK GRAY SANDY SILTSTONE; WITH TRACES  
 OF GRAYISH BROWN XLN LIMESTONE IN SAMPLE  
 LOW GAS IN SHALES, NO TRACE HYDROCARBONS  
 SILTSTONE=LIGHT GRAYISH WHITE; MOD HARD  
 FIRM; DENSE TENACITY; BLOCKY IRREGULAR  
 FRACTURE; PLATY WEDGELIKE CUTTINGS HABIT  
 DULL EARTHY LUSTER; SMOOTH V VERY SANDY  
 GRITTY TEXTURE; THIN STRUCTURE  
 INTERBEDDED WITH MEDIUM LIGHT GRAY SHALE  
 LOW GAS; NO TRACE HYDROCARBONS  
 SANDSTONE=OFF WHITE OCC GREENISH  
 GRAY; MOD HARD FRIABLE; PREDOM GRAIN  
 SUPPORTED; SUBROUNDED SUBANGULAR;  
 1-3% BLACK LITHIC CLASTS EMBED; CALCITE  
 WITH SOME TRACE KAOLINITE; MOD SPHER  
 WITH TRACE CLEAR XLN CALCITE FRACTURE  
 HIGH GAS READINGS IN SANDS WITH FRACTURE  
 PRESENT; INTERBEDDED WITH SANDY SILTST











0088

0068

MAX GAS 256u

C-2.1

CG 746u

MAX GAS 315u

MUD DATA @ 3812

MW 9.40 FV 44 PV 14 YP 16

API FIL 5.8 GELS 6/9/12 pH 10.10

Cl- 1300 Ca++ 40 MBT 15.0 SOL 5

24 HR MUD LOSSES 127.6 BBLS

CG 152u

MAX GAS 588u

C-4.3.2.1

MAX GAS 457u

TO SILTY TEXTURE SOME SLIGHTLY WAXY

LOW BACKGROUND GAS

SANDSTONE = WHITE TO NEARLY TRANSLUCENT

IN COLOR; QUARTZ FRAMEWORK; COARSE TO

FINE GRAIN SIZE; POOR TO FAIR SORTING;

GRAINS ARE ANGULAR TO SUBROUNDED WITH

LOW TO MODERATE SPHERICITY; EASILY TO

FIRMLY FRIABLE; CALCITE/SILICA CEMENT;

WEAK REACTION TO HCL; GRADATIONAL BEDDING

INTO SILTSTONE VISIBLE; CHLORITE AND

CALCITE GRAINS SEEN IN MATRIX; NO VISIBLE

POROSITY; LOW TO MODERATELY LOW

BACKGROUND GAS.

SILTSTONE = LIGHT TO MEDIUM GRAY IN

COLOR; DENSE TO BRITTLE TENACITY; PLANAR

TO IRREGULAR FRACTURE; CUTTINGS ARE

NODULAR TO WEDGE LIKE IN APPEARANCE; DULL

TO EARTHY LUSTER EXHIBITED; SILTY TO

GRITTY TEXTURE; THIN TO THICK STRUCTURE.

NIGHT TOUR

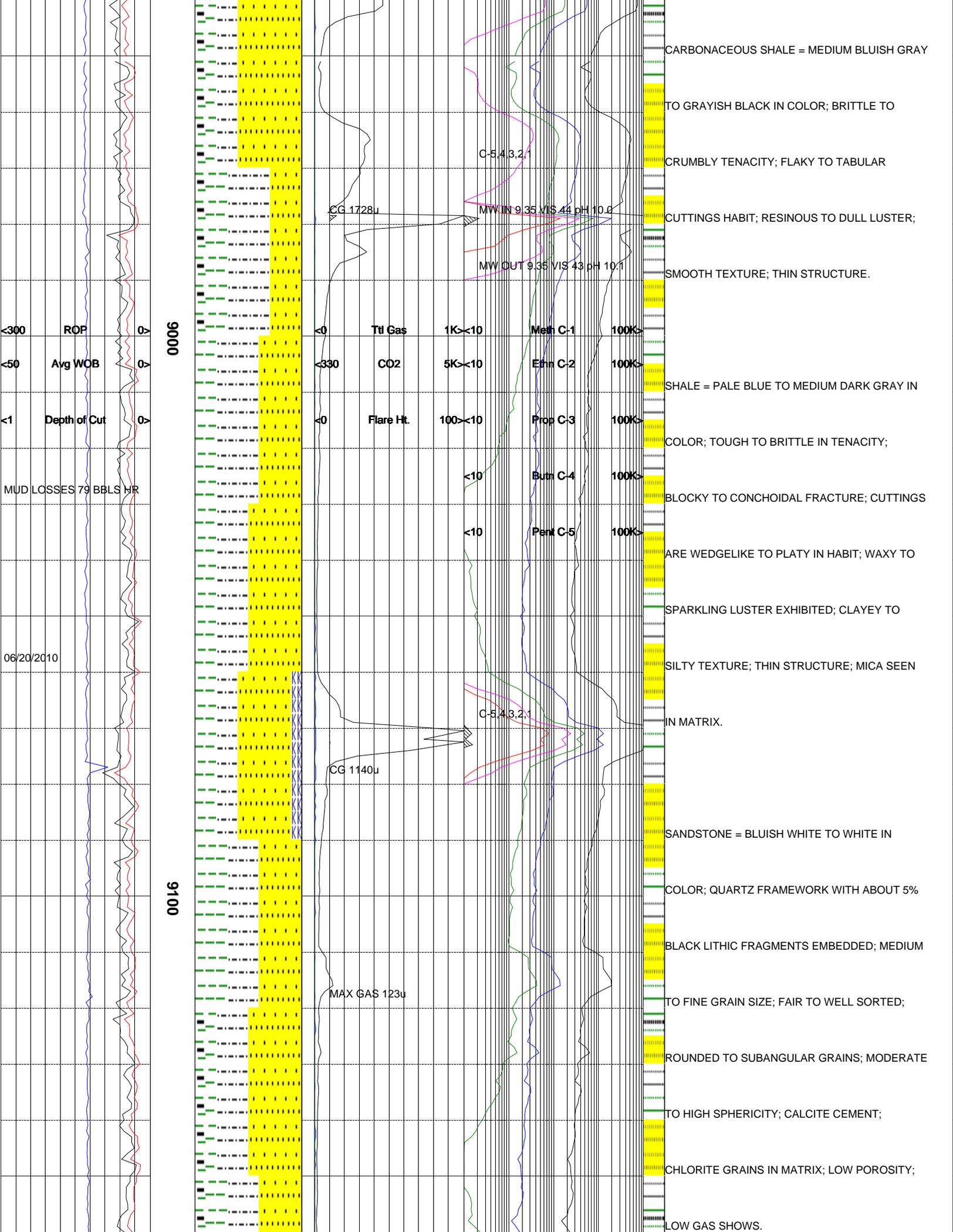
WOB 19

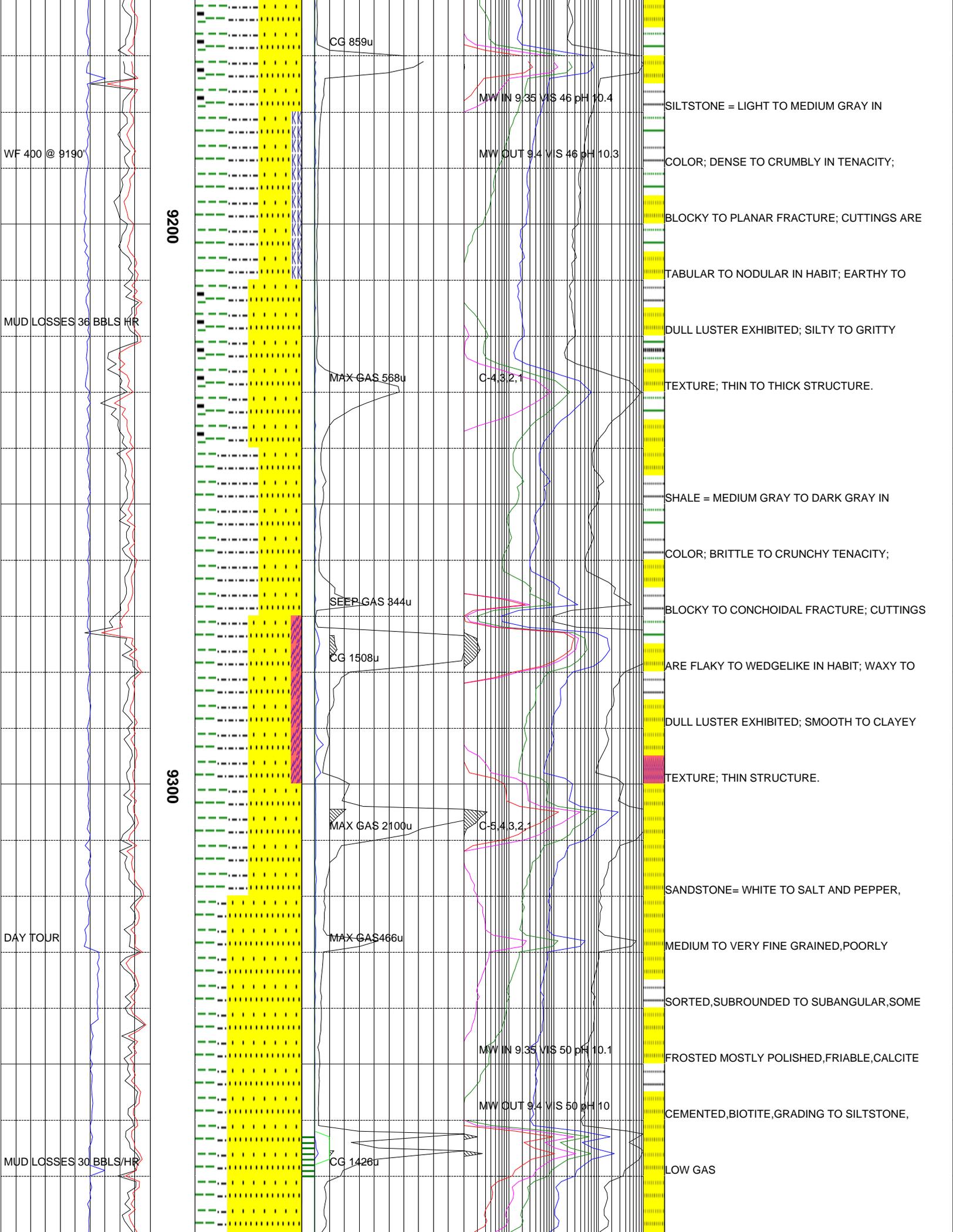
RPM 71

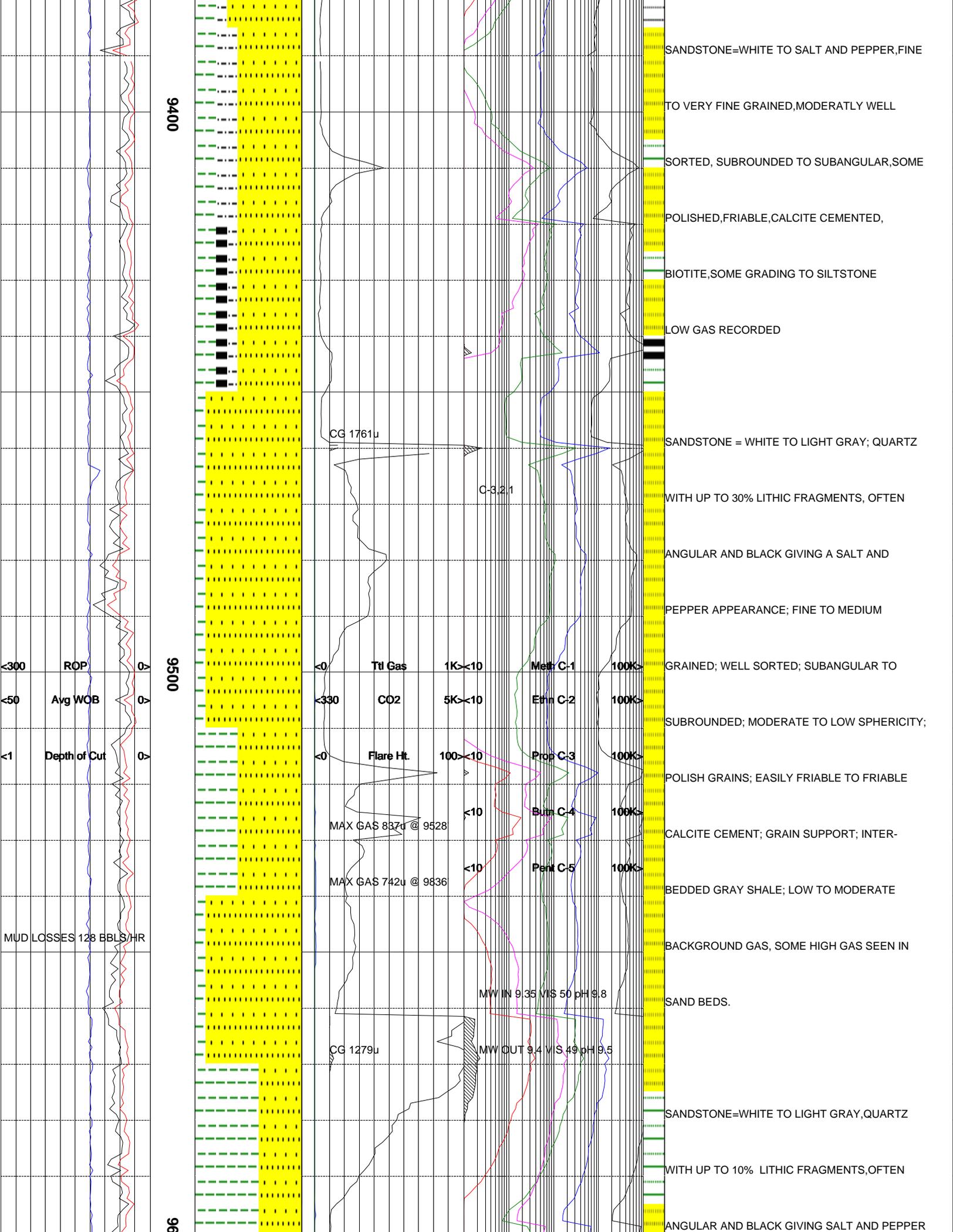
PP 2000

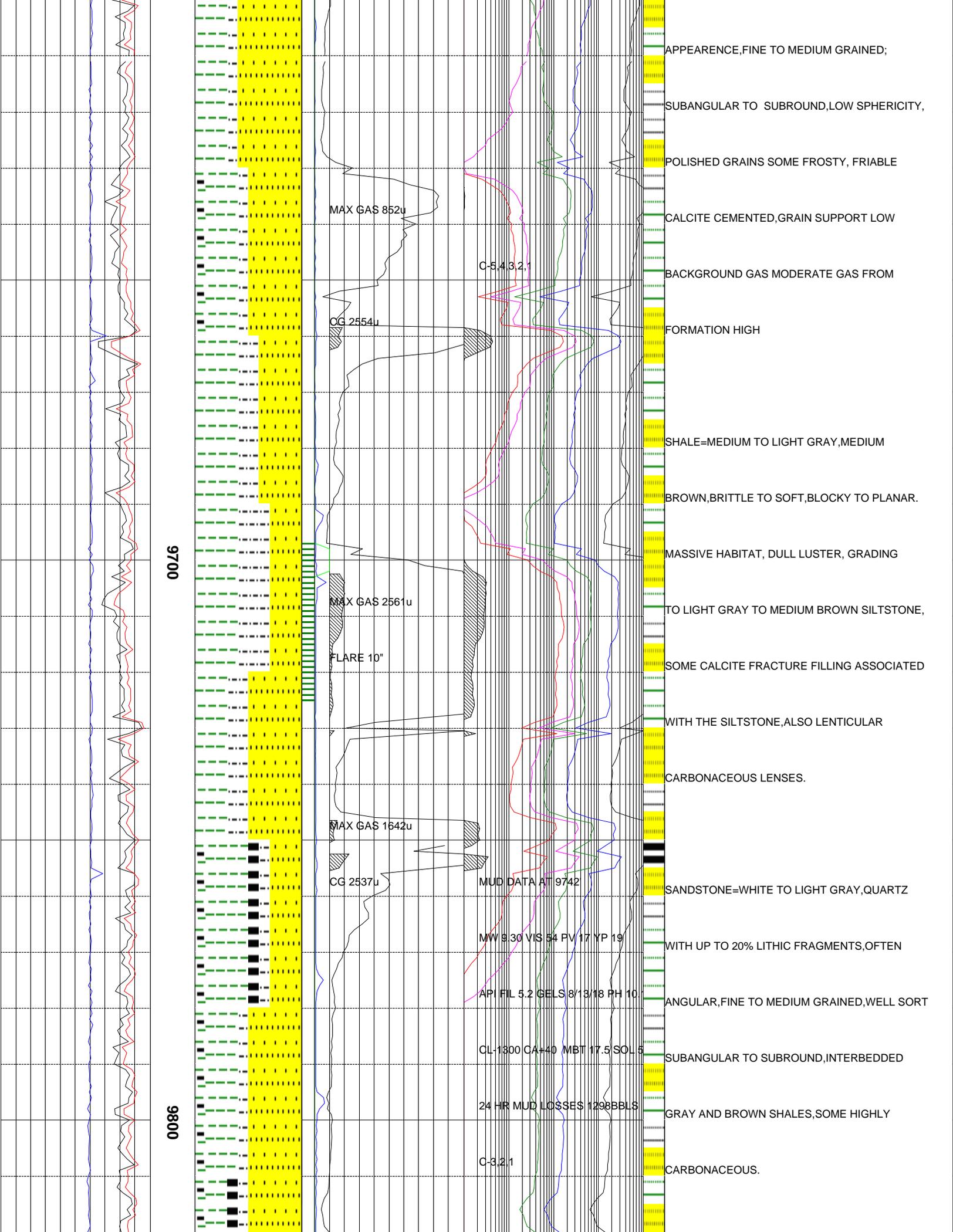
GPM 315

MUD LOSSES 57 BBLS HR









9700

9806

MAX GAS 852u

CG 2554u

MAX GAS 2561u

FLARE 10°

MAX GAS 1642u

CG 2537u

C-5.43.2.1

MUD DATA AT 9742

MW 9.30 VIS 54 PV 17 YP 19

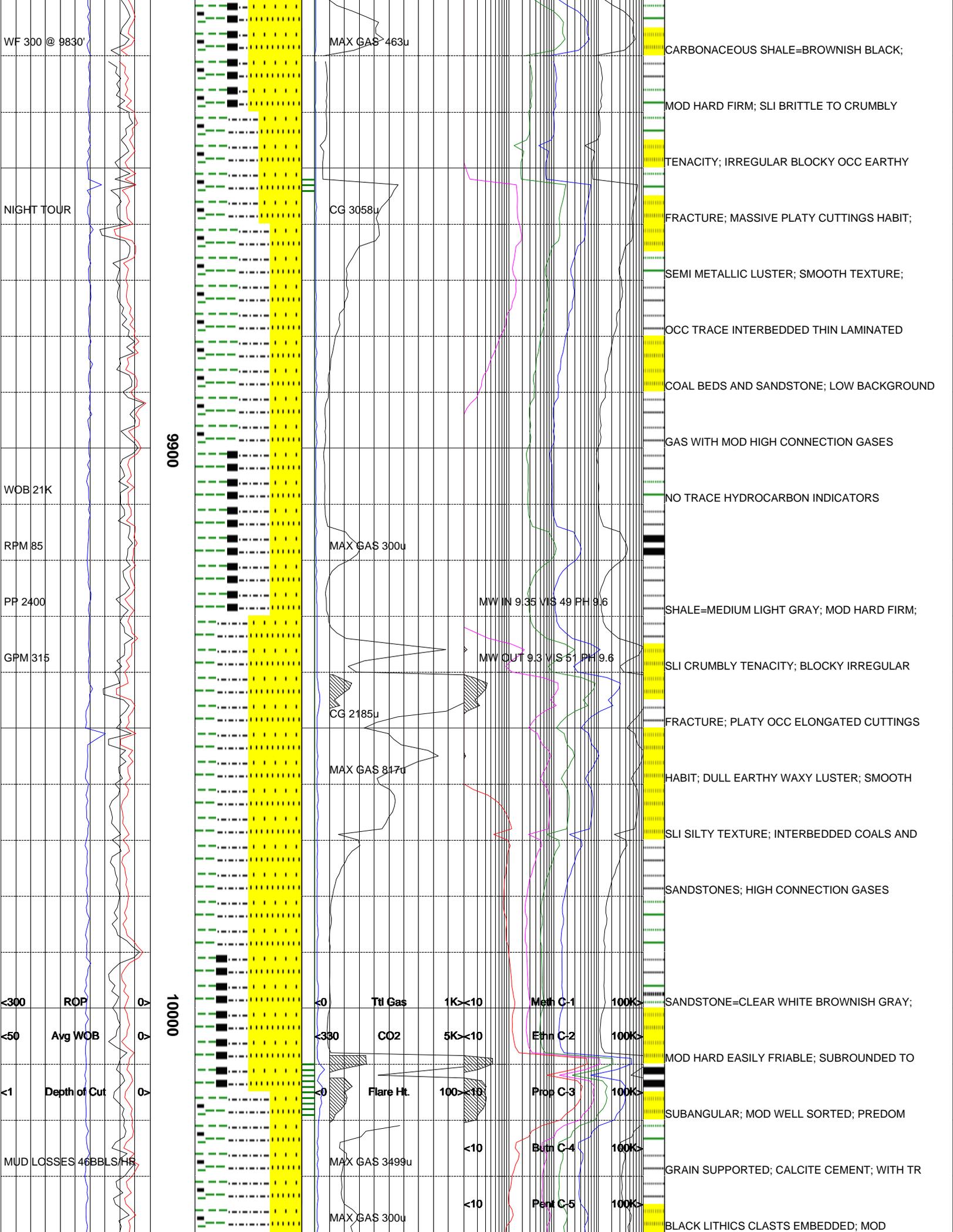
API FIL 5.2 GELS 8/13/18 PH 10

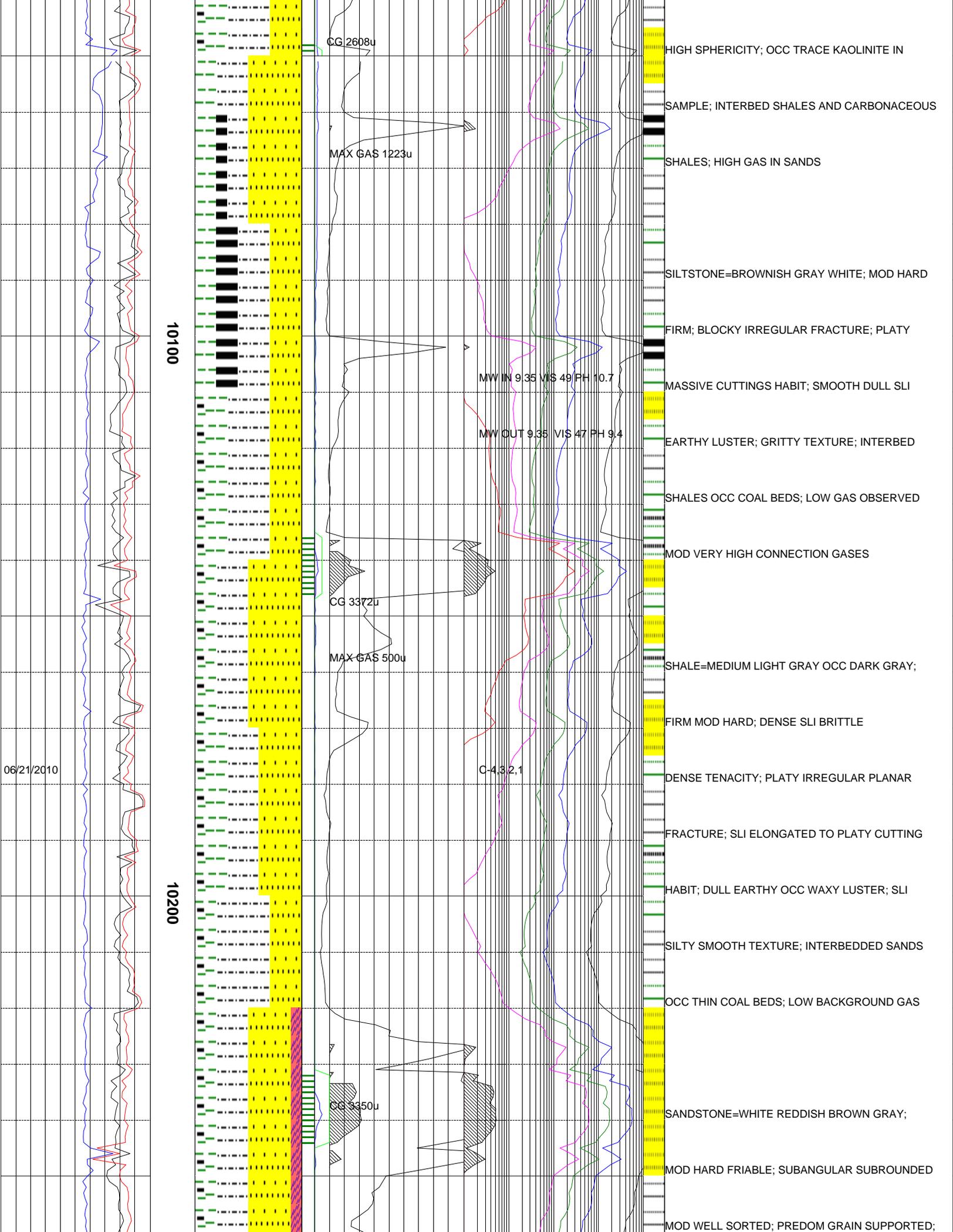
CL 1300 CA+40 MBT 17.5 SOL 5

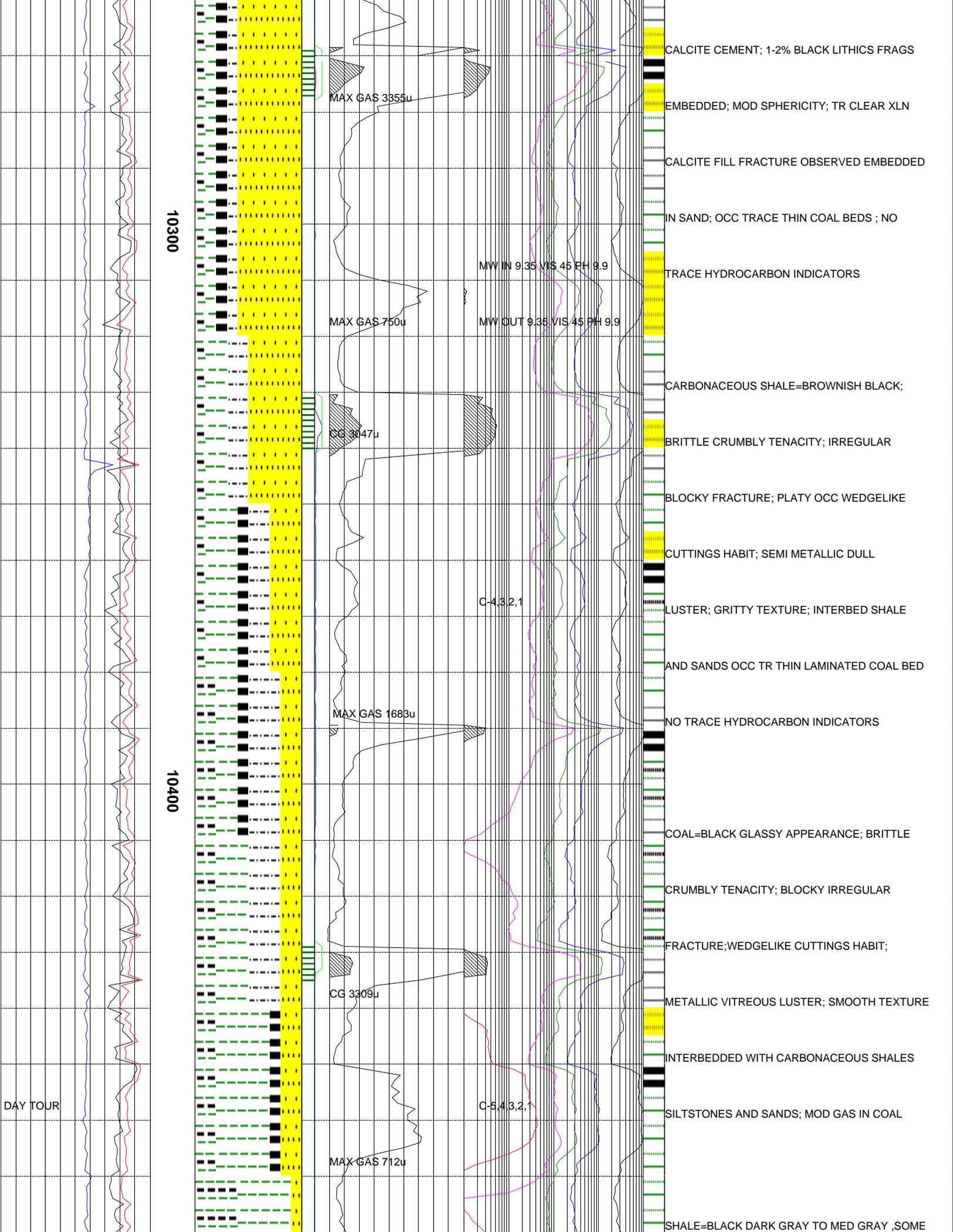
24 HR MUD LOSSES 1298BBLs

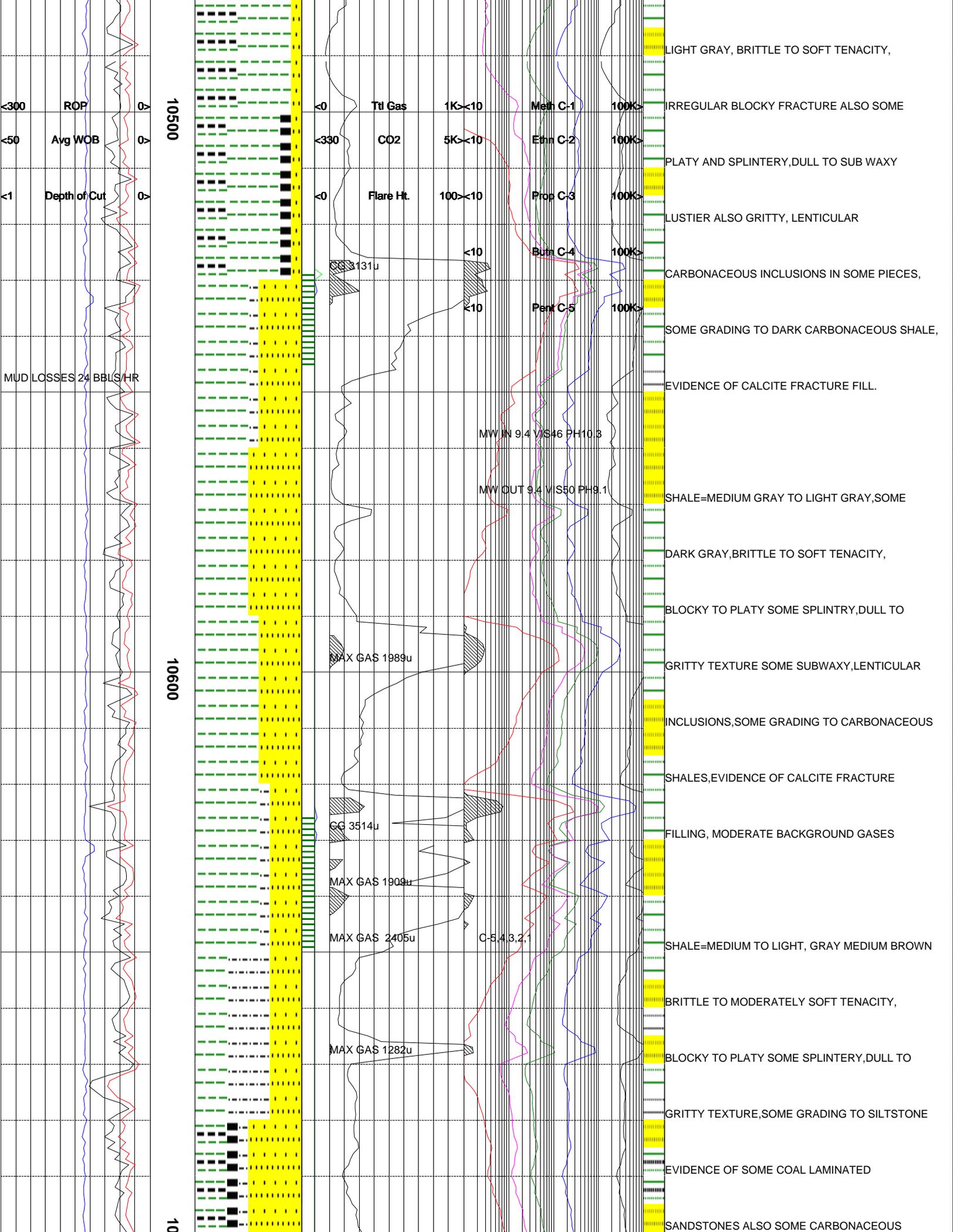
C-3.2.1

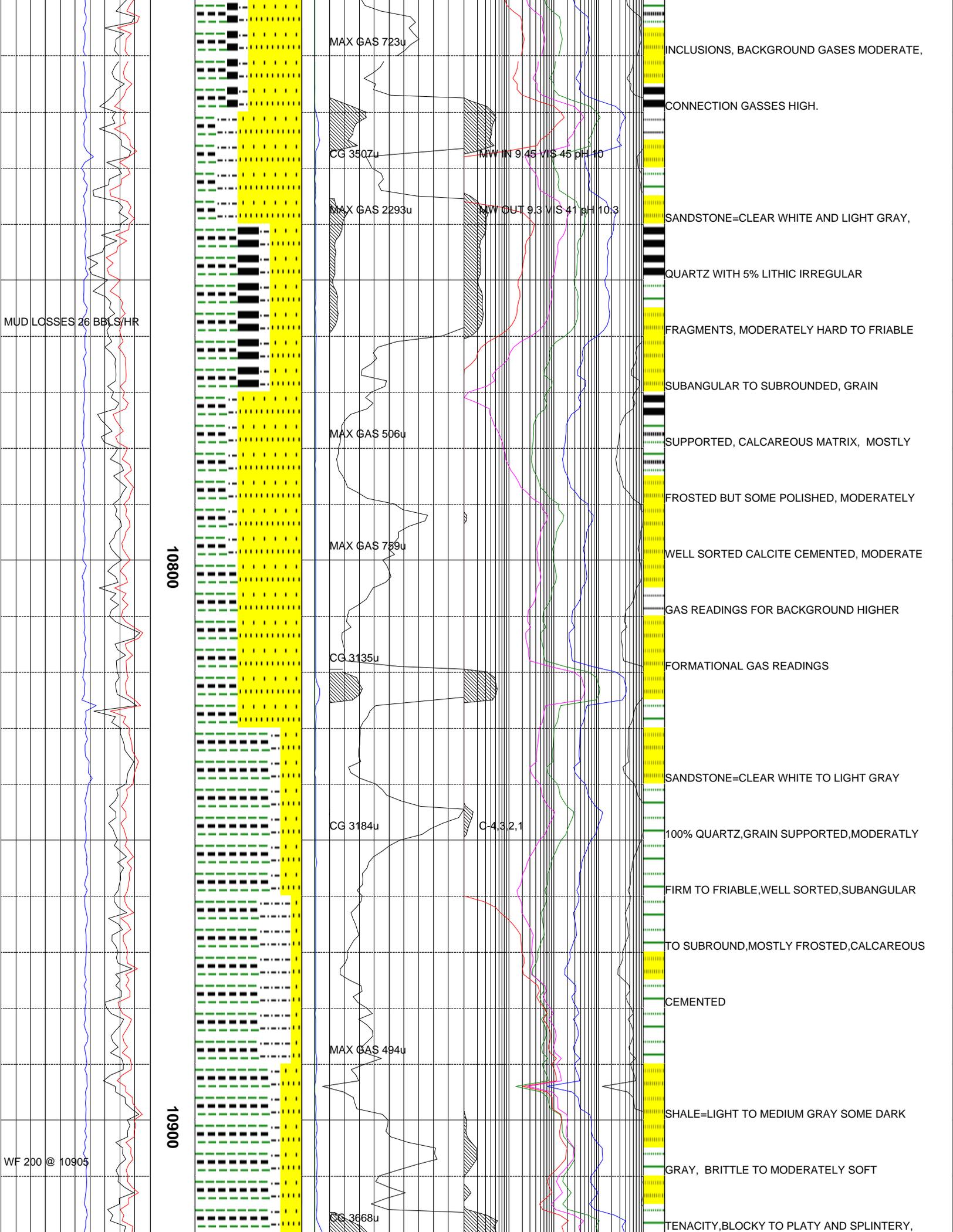
APPEARANCE, FINE TO MEDIUM GRAINED;  
 SUBANGULAR TO SUBROUND, LOW SPHERICITY,  
 POLISHED GRAINS SOME FROSTY, FRIABLE  
 CALCITE CEMENTED, GRAIN SUPPORT LOW  
 BACKGROUND GAS MODERATE GAS FROM  
 FORMATION HIGH  
 SHALE=MEDIUM TO LIGHT GRAY, MEDIUM  
 BROWN, BRITTLE TO SOFT, BLOCKY TO PLANAR.  
 MASSIVE HABITAT, DULL LUSTER, GRADING  
 TO LIGHT GRAY TO MEDIUM BROWN SILTSTONE,  
 SOME CALCITE FRACTURE FILLING ASSOCIATED  
 WITH THE SILTSTONE, ALSO LENTICULAR  
 CARBONACEOUS LENSES.  
 SANDSTONE=WHITE TO LIGHT GRAY, QUARTZ  
 WITH UP TO 20% LITHIC FRAGMENTS, OFTEN  
 ANGULAR, FINE TO MEDIUM GRAINED, WELL SORT  
 SUBANGULAR TO SUBROUND, INTERBEDDED  
 GRAY AND BROWN SHALES, SOME HIGHLY  
 CARBONACEOUS.

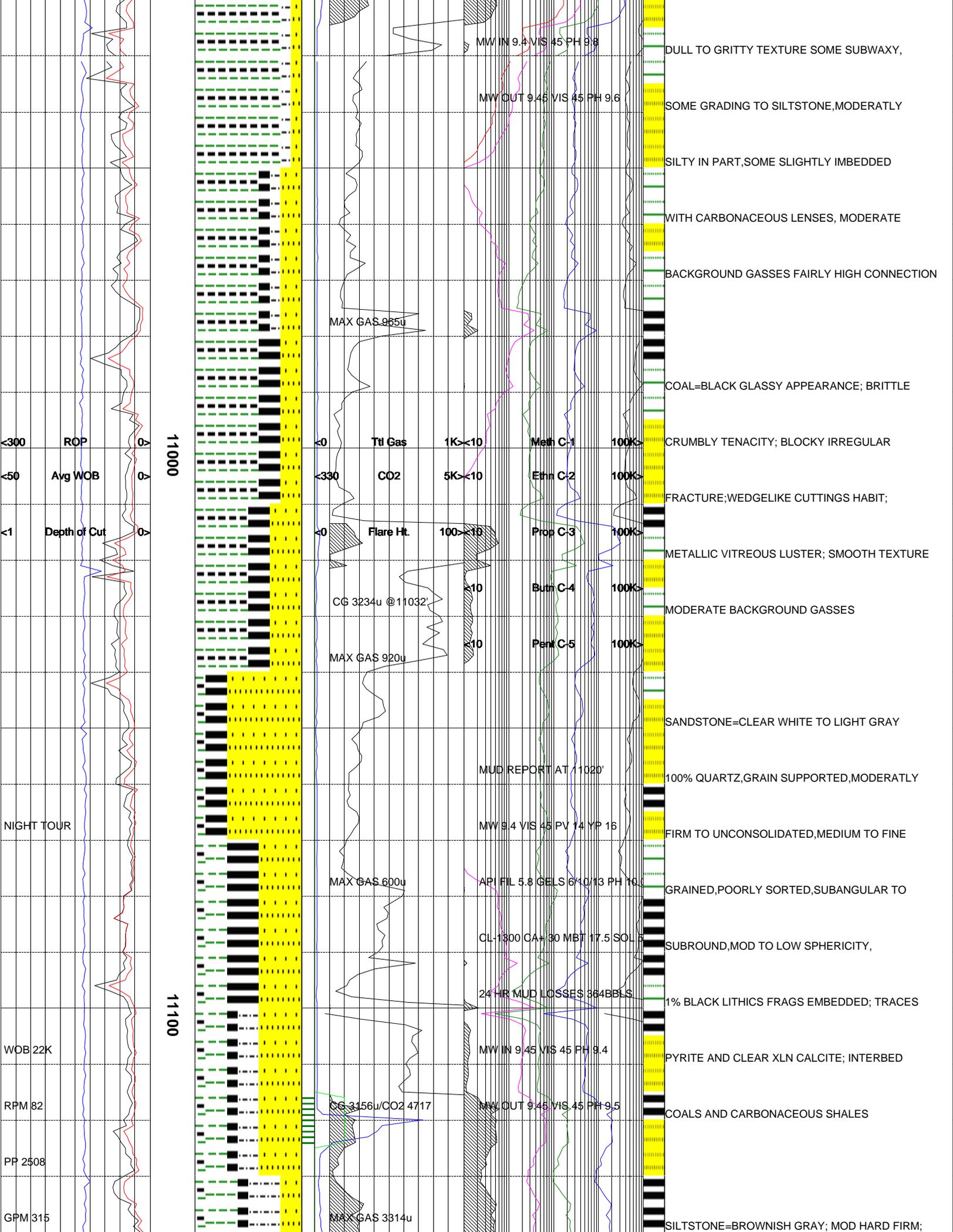


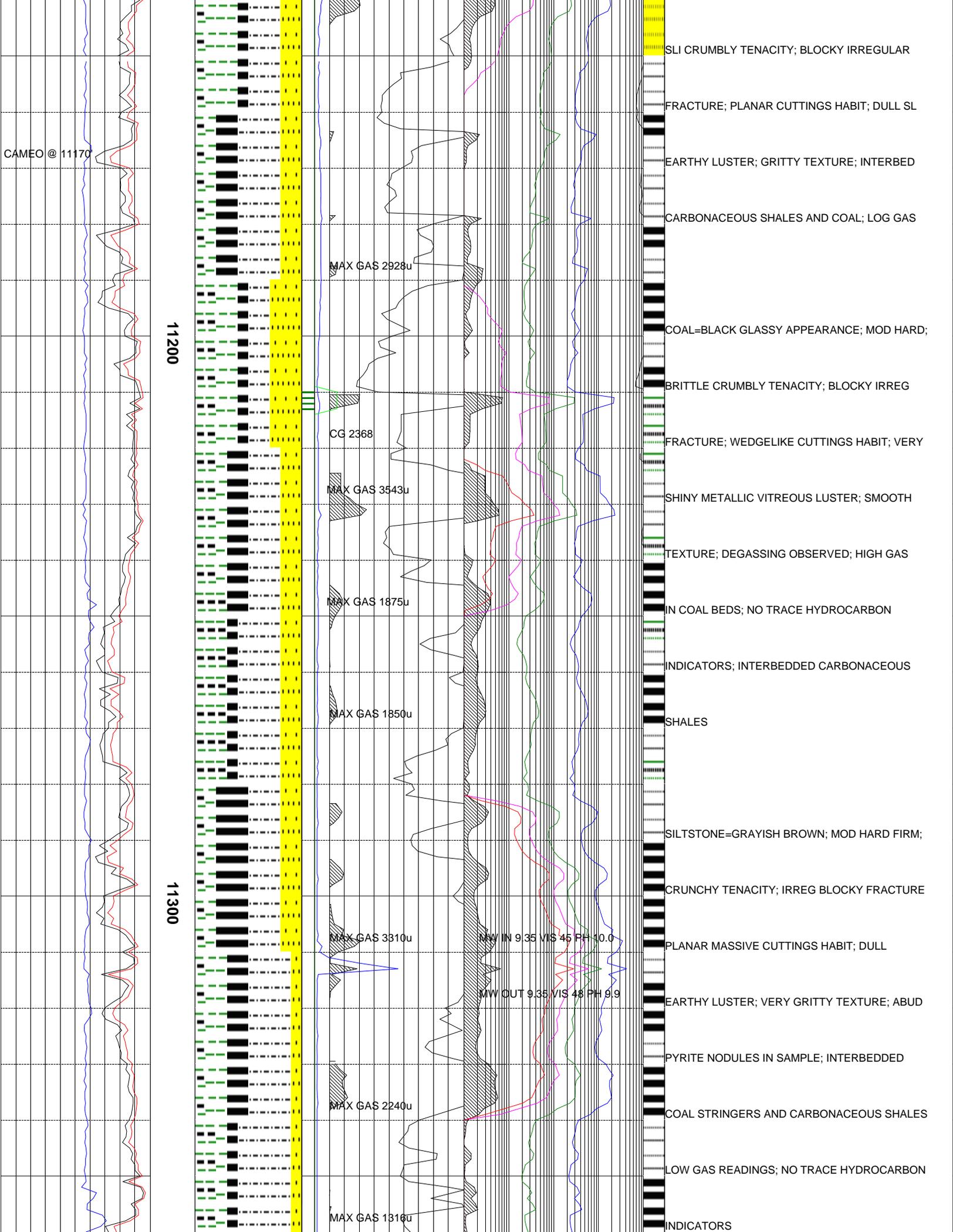












CAMEO @ 11170

11200

11300

MAX GAS 2928u

CG 2368

MAX GAS 3543u

MAX GAS 1875u

MAX GAS 1850u

MAX GAS 3310u

MW IN 9.35 VIS 45 PH 10.0

MW OUT 9.35 VIS 48 PH 9.9

MAX GAS 2240u

MAX GAS 1316u

SLI CRUMBLY TENACITY; BLOCKY IRREGULAR

FRACURE; PLANAR CUTTINGS HABIT; DULL SL

EARTHY LUSTER; GRITTY TEXTURE; INTERBED

CARBONACEOUS SHALES AND COAL; LOG GAS

COAL=BLACK GLASSY APPEARANCE; MOD HARD;

BRITTLE CRUMBLY TENACITY; BLOCKY IRREG

FRACURE; WEDGELIKE CUTTINGS HABIT; VERY

SHINY METALLIC VITREOUS LUSTER; SMOOTH

TEXTURE; DEGASSING OBSERVED; HIGH GAS

IN COAL BEDS; NO TRACE HYDROCARBON

INDICATORS; INTERBEDDED CARBONACEOUS

SHALES

SILTSTONE=GRAYISH BROWN; MOD HARD FIRM;

CRUNCHY TENACITY; IRREG BLOCKY FRACTURE

PLANAR MASSIVE CUTTINGS HABIT; DULL

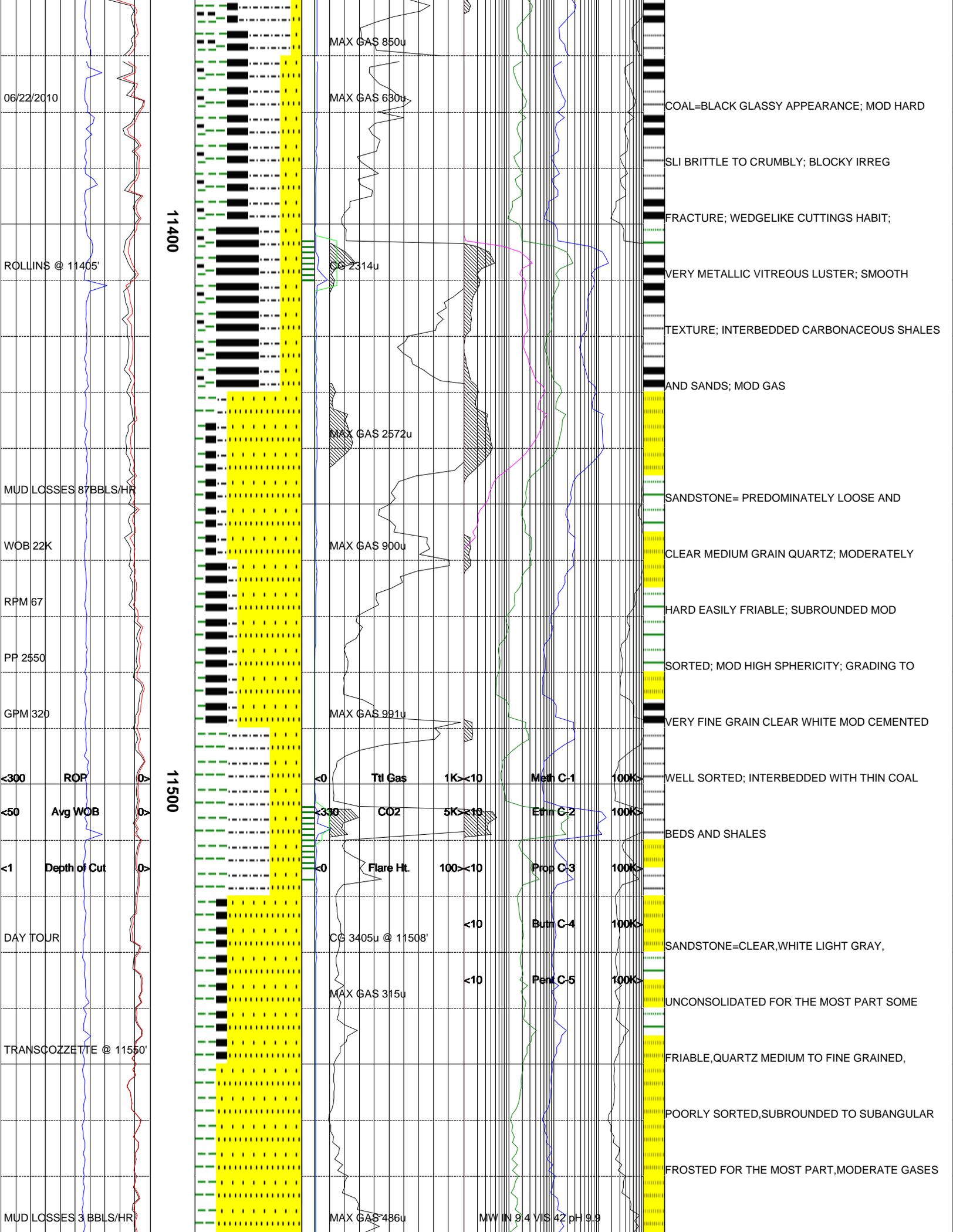
EARTHY LUSTER; VERY GRITTY TEXTURE; ABUD

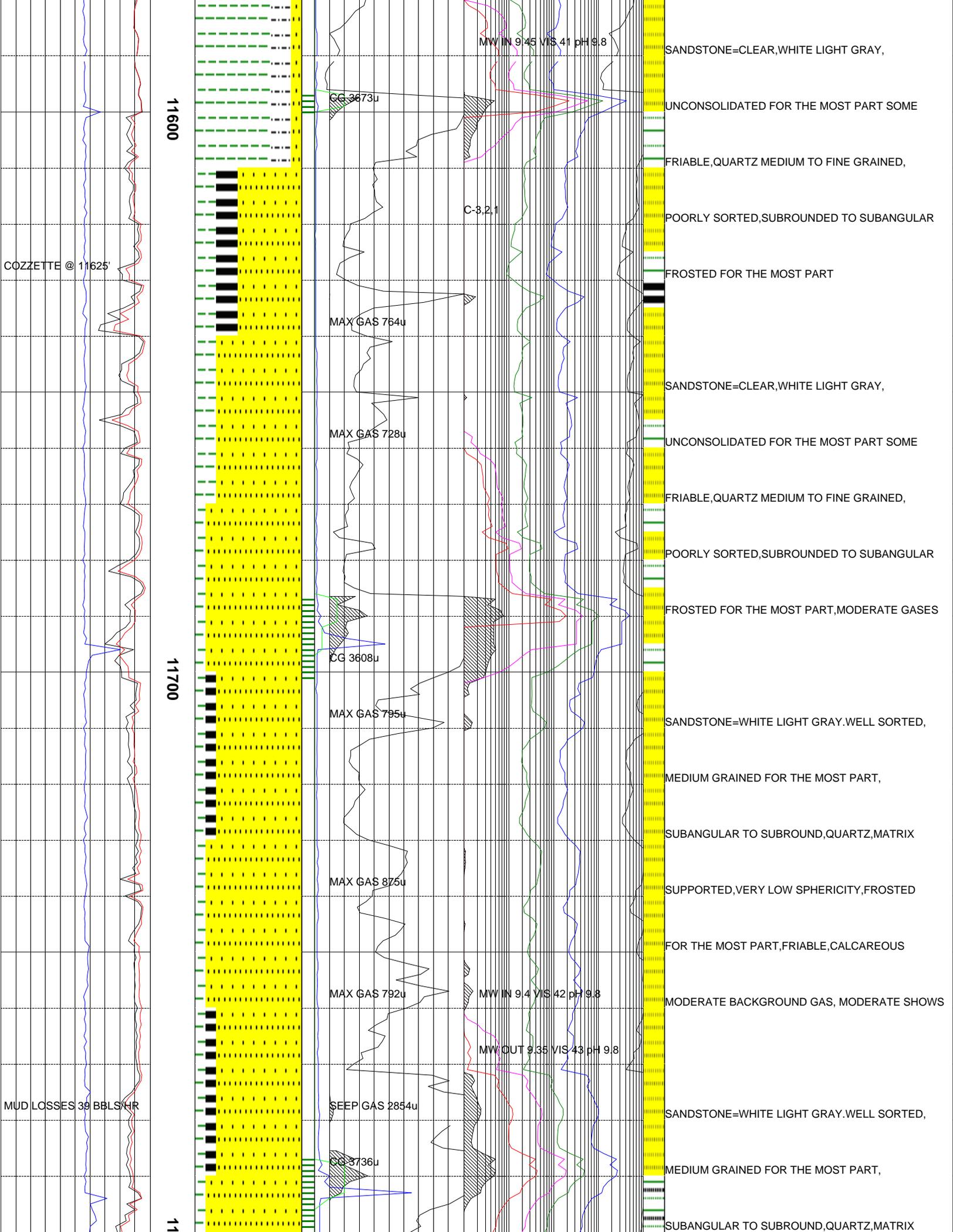
PYRITE NODULES IN SAMPLE; INTERBEDDED

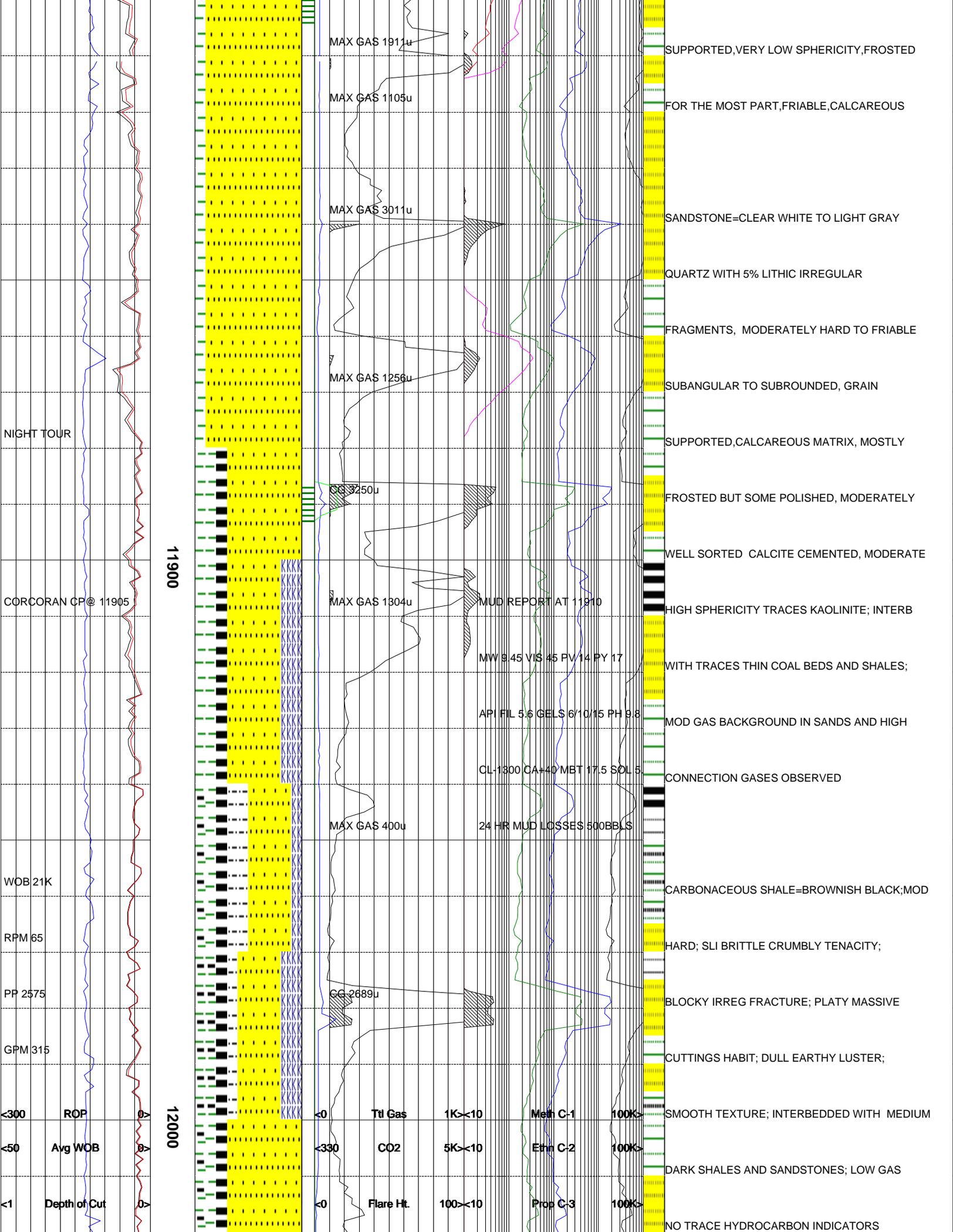
COAL STRINGERS AND CARBONACEOUS SHALES

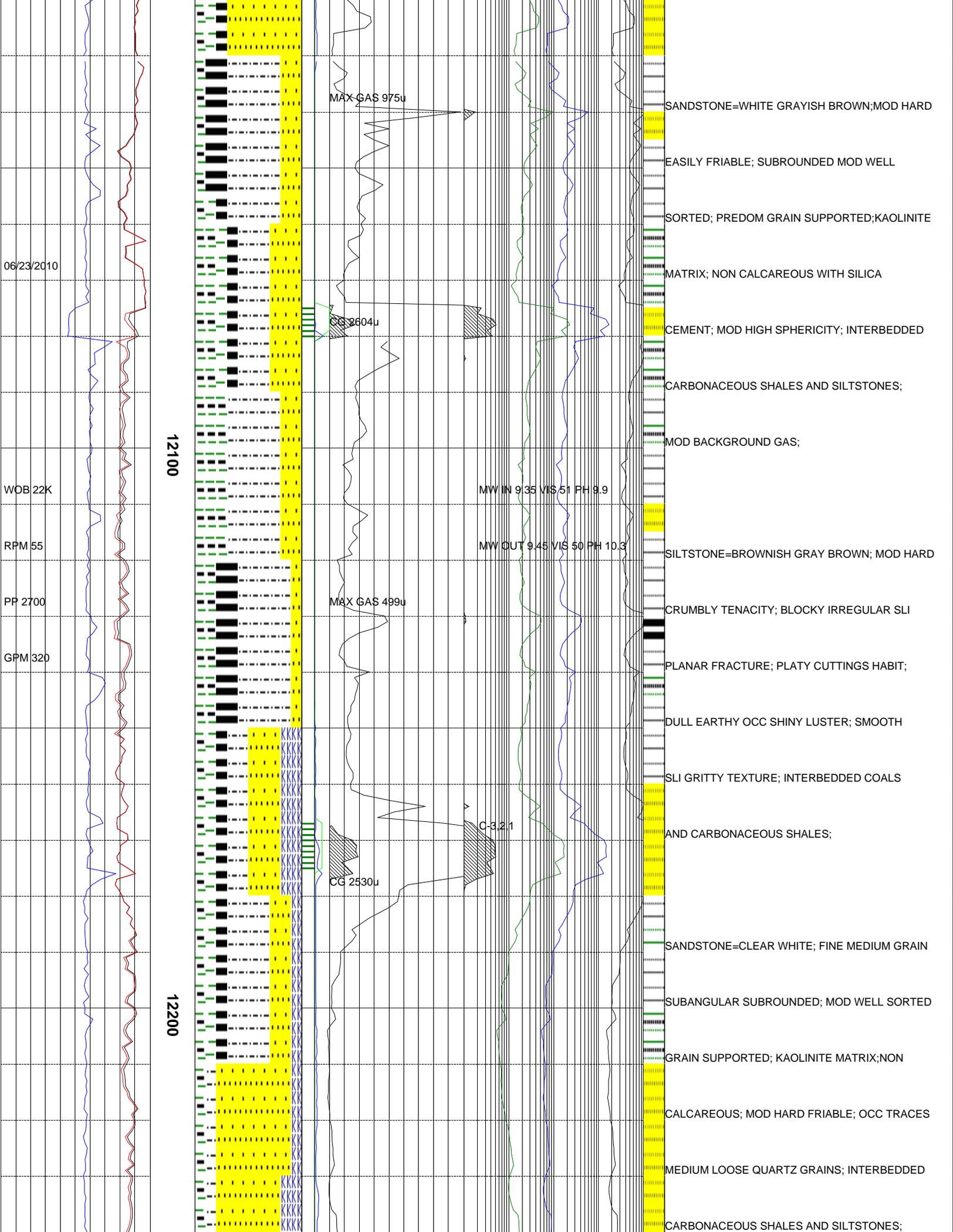
LOW GAS READINGS; NO TRACE HYDROCARBON

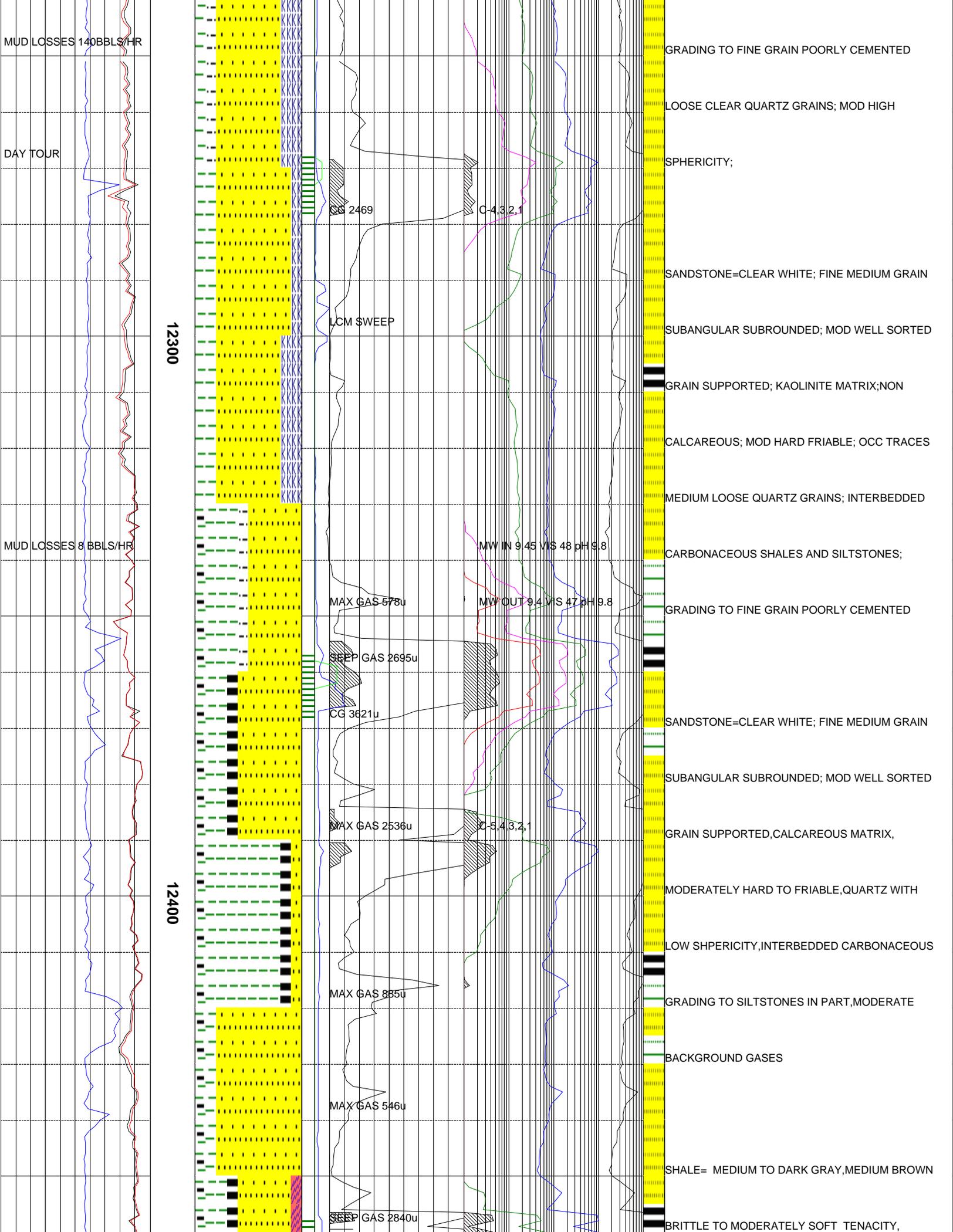
INDICATORS

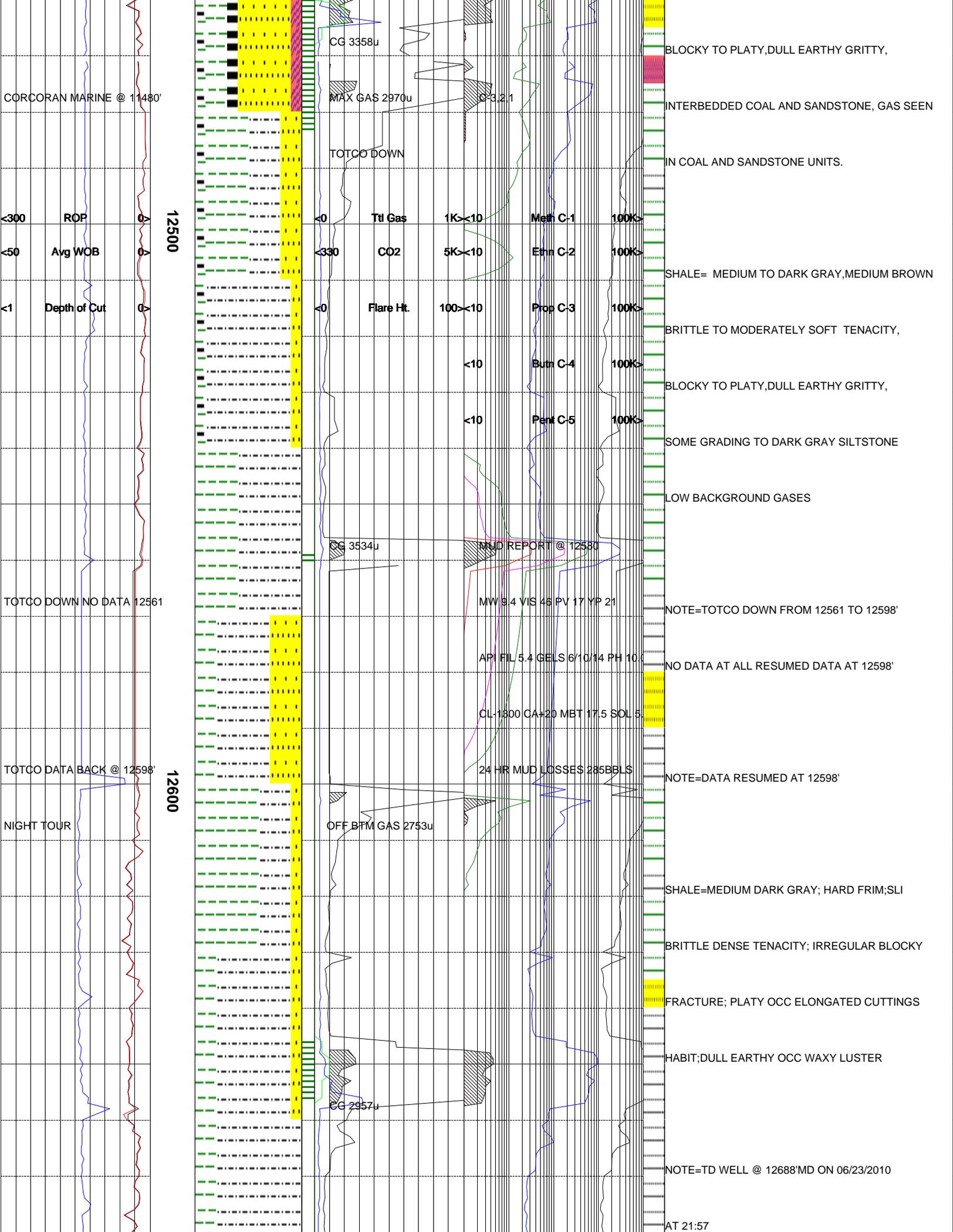


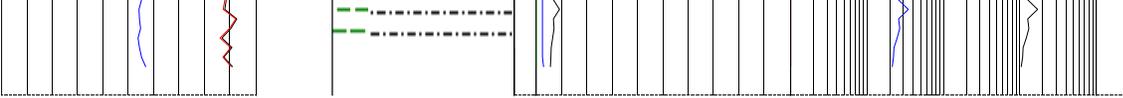












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