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

MUDLOG MD

COMPANY EXXONMOBIL
WELL PCU-297-11B1ST1
FIELD PICEANCE CREEK
REGION ROCKY MT
COORDINATES LAT.39.879628000
LON.108.240365000
ELEVATION GL = 7126'
KB = 7143'
COUNTY, STATE RIO BLANCO CO. CO
API INDEX 051031137801
SPUD DATE 04/10/2009
CONTRACTOR HELMERICH PAYNE
CO. REP. RICKY T. OWENS
RIG/TYPE FLEX 3
LOGGING UNIT MLU038
GEOLOGISTS GEORGE BAKER
BRENDA MARSH
ADD. PERSONS BILL JOHANNING
DEVIN CLAAR
CO. GEOLOGIST MICHAEL HOWELL

LOG INTERVAL

CASING DATA

DEPTHS: 3,960' TO 13,000'
DATES: 09/21/2009 TO 10/10/2009
SCALE: 5" = 100'

16" AT 130'
10.75" AT 3,953'
7.00" AT 9,006'
AT

MUD TYPES

HOLE SIZE

LSND TO 13,000'
TO
TO
TO

9.875" TO 8,976'
6.125" TO 9,006'
6.125" TO 13,000'
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	

3700

3800

3900

1 UNIT OF GAS = 200 PPM C-1 ME

CONNECTION GAS, TRIP GAS AND WIPER GAS

ARE NOTED ON THE MUD LOG. FLARE HEIGHTS

AND DEPTHS OF GAS BUSTER USEAGE ARE ALSO

NOTED.

EARLY CONNECTION GASES REPRESENTING

UP HOLE GAS INTERVALS BLEEDING INTO THE

BOREHOLE ARE COMMON IN THE PRODUCTION

INTERVAL.

EVIDENCE OF FRACTURE FILL IS NOTED ON

THE LOG USING THE LITHOLOGY SYMBOL FOR

METAMORPHICS. THE 10% DOES NOT REPRESENT

10% FRACTURE FILL IN SAMPLE. IT ONLY

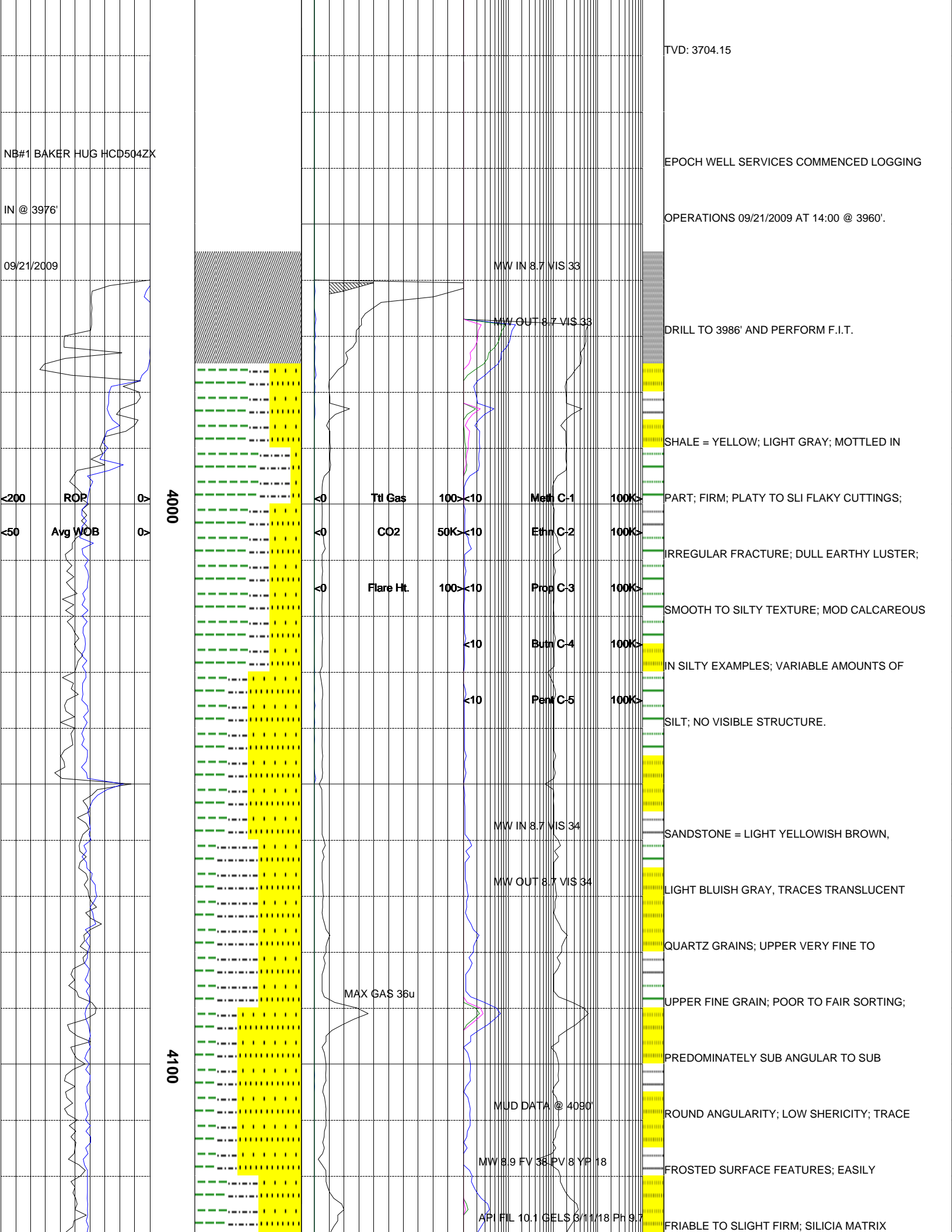
INDICATES THAT FRACTURE FILL HAS BEEN

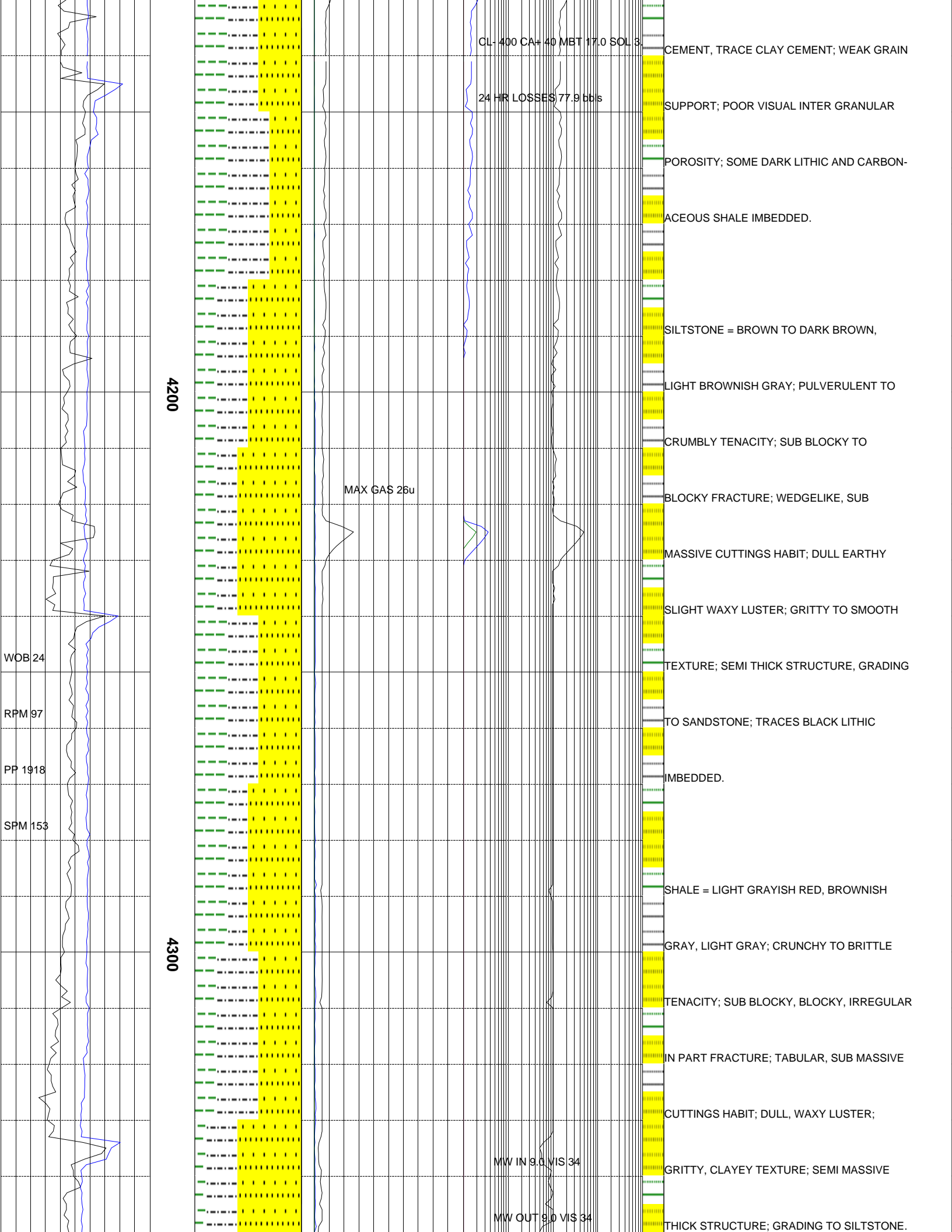
OBSERVED OVER THE INTERVAL.

SURVEY DATA @ 3968'

INC. 25.05

AZIMUTH: 187.66





4200

4300

CL- 400 CA+ 40 MBT 17.0 SOL 3

24 HR LOSSES 77.9 bbs

MAX GAS 26u

MW IN 9.0 VIS 34

MW OUT 9.0 VIS 34

CEMENT, TRACE CLAY CEMENT; WEAK GRAIN

SUPPORT; POOR VISUAL INTER GRANULAR

POROSITY; SOME DARK LITHIC AND CARBON-

ACEOUS SHALE IMBEDDED.

SILTSTONE = BROWN TO DARK BROWN,

LIGHT BROWNISH GRAY; PULVERULENT TO

CRUMBLY TENACITY; SUB BLOCKY TO

BLOCKY FRACTURE; WEDGELIKE, SUB

MASSIVE CUTTINGS HABIT; DULL EARTHY

SLIGHT WAXY LUSTER; GRITTY TO SMOOTH

TEXTURE; SEMI THICK STRUCTURE, GRADING

TO SANDSTONE; TRACES BLACK LITHIC

IMBEDDED.

SHALE = LIGHT GRAYISH RED, BROWNISH

GRAY, LIGHT GRAY; CRUNCHY TO BRITTLE

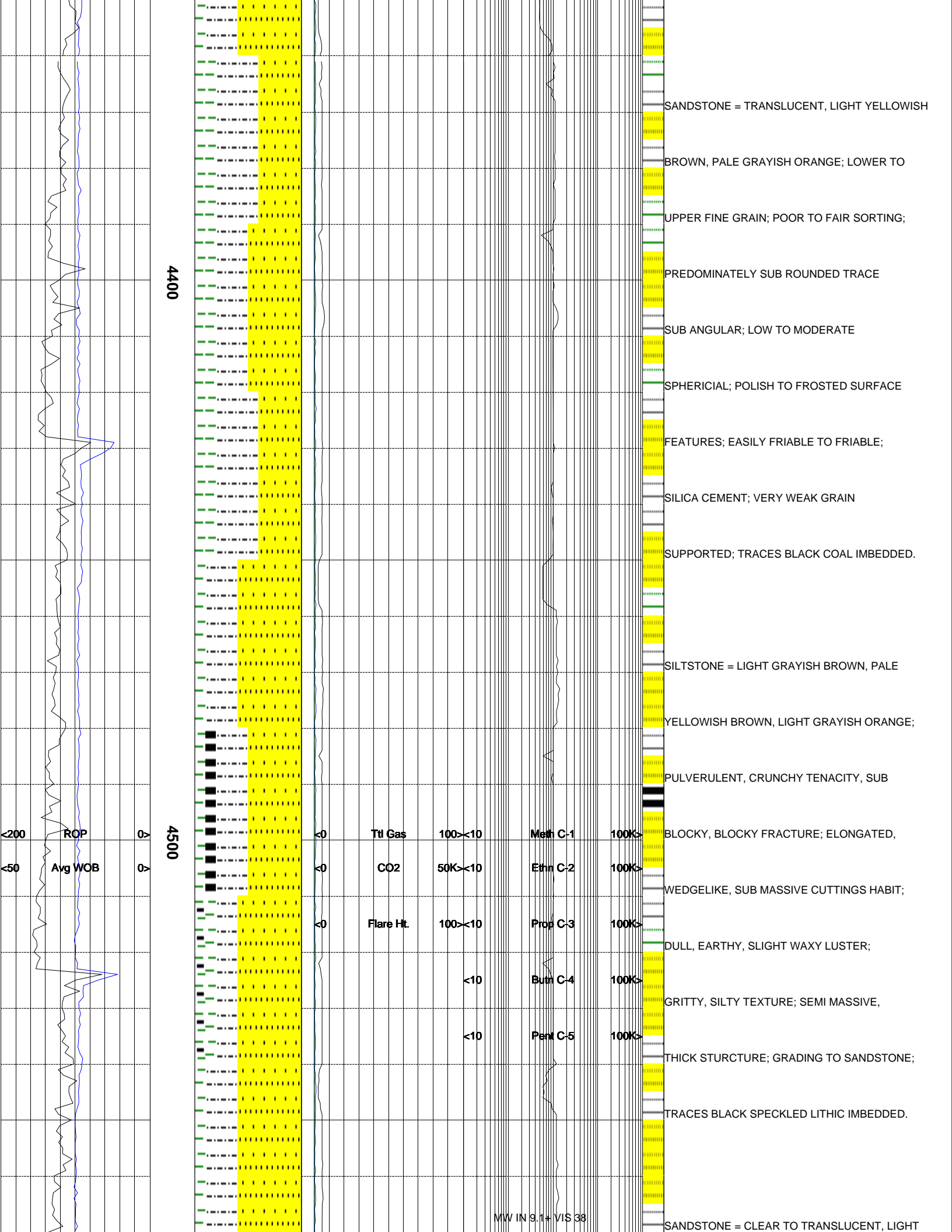
TENACITY; SUB BLOCKY, BLOCKY, IRREGULAR

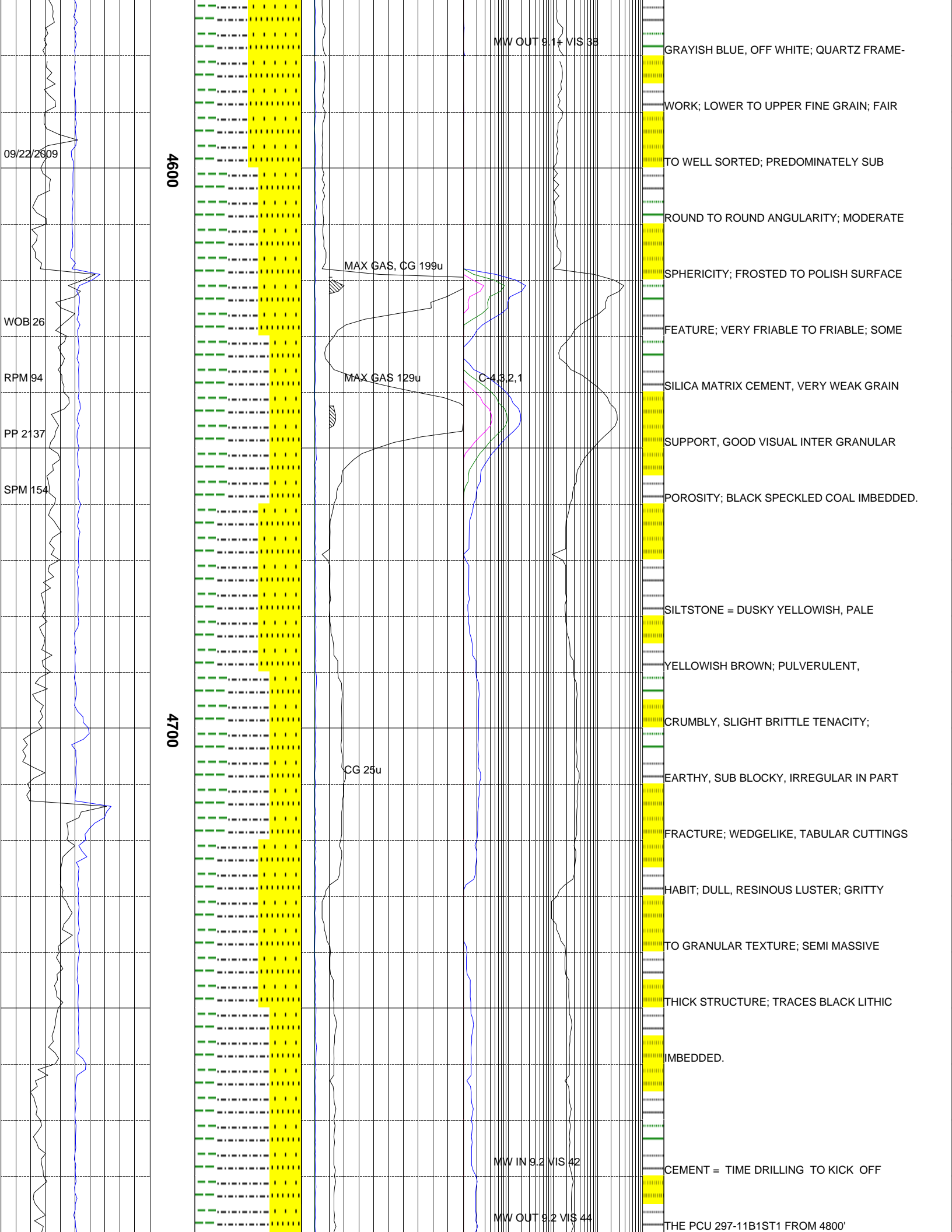
IN PART FRACTURE; TABULAR, SUB MASSIVE

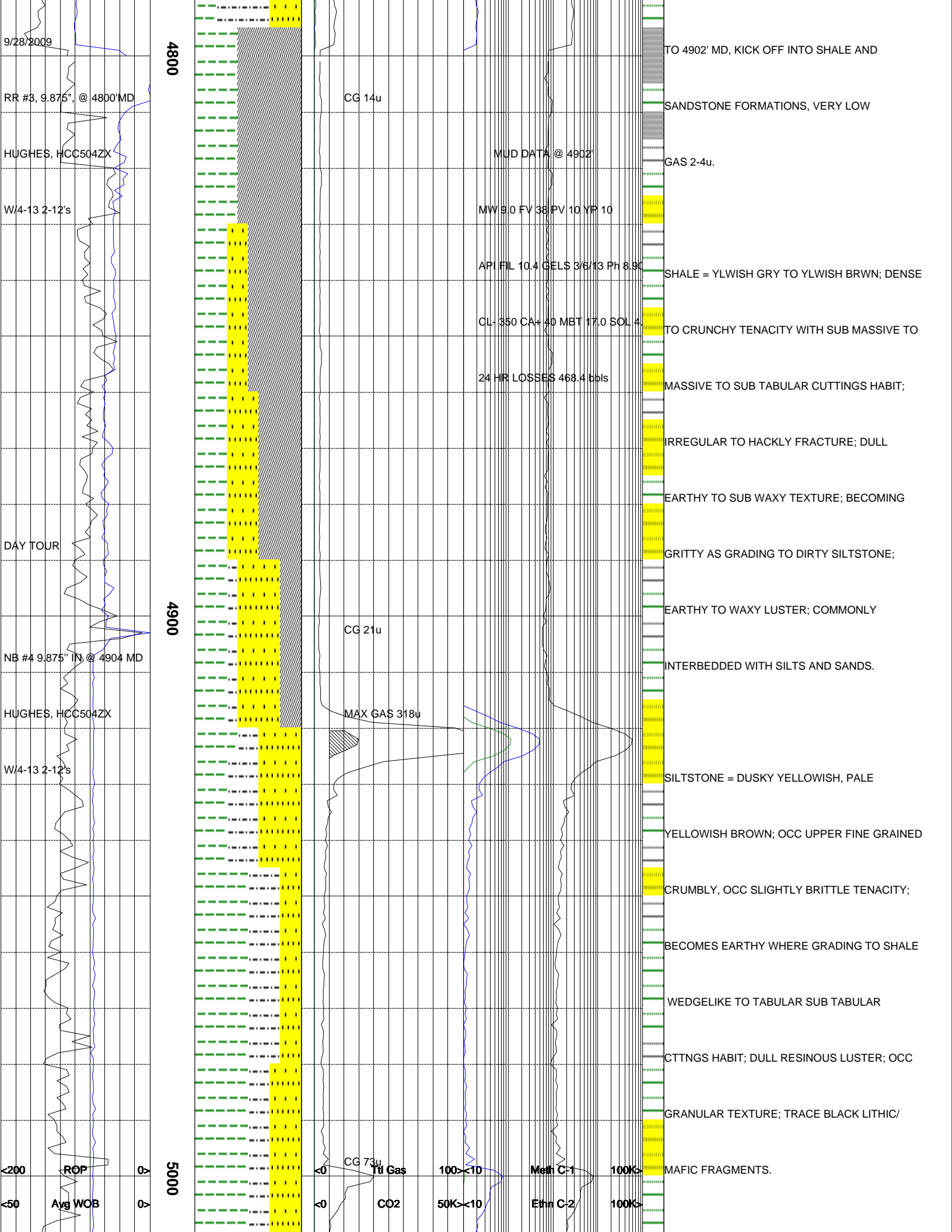
CUTTINGS HABIT; DULL, WAXY LUSTER;

GRITTY, CLAYEY TEXTURE; SEMI MASSIVE

THICK STRUCTURE; GRADING TO SILTSTONE.



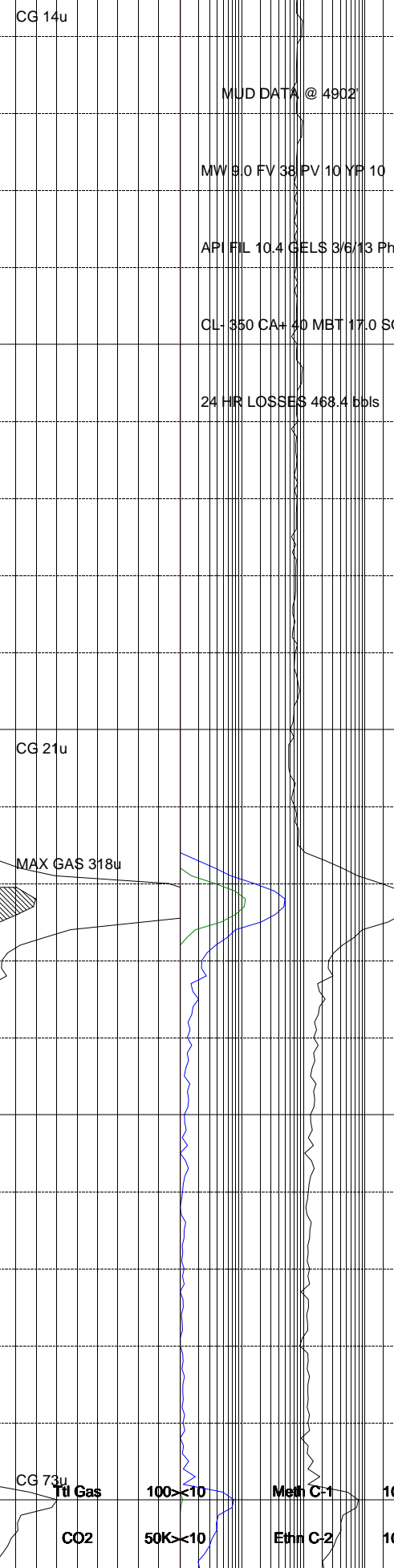
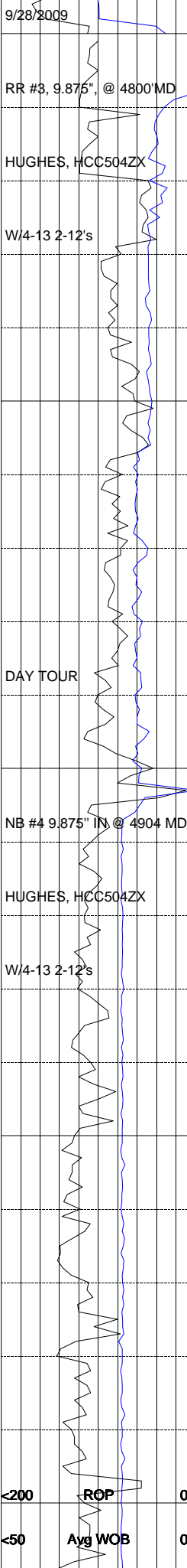




4800

4900

5000



TO 4902' MD, KICK OFF INTO SHALE AND

SANDSTONE FORMATIONS, VERY LOW

GAS 2-4u.

SHALE = YLWISH GRY TO YLWISH BRWN; DENSE

TO CRUNCHY TENACITY WITH SUB MASSIVE TO

MASSIVE TO SUB TABULAR CUTTINGS HABIT;

IRREGULAR TO HACKLY FRACTURE; DULL

EARTHY TO SUB WAXY TEXTURE; BECOMING

GRITTY AS GRADING TO DIRTY SILTSTONE;

EARTHY TO WAXY LUSTER; COMMONLY

INTERBEDDED WITH SILTS AND SANDS.

SILTSTONE = DUSKY YELLOWISH, PALE

YELLOWISH BROWN; OCC UPPER FINE GRAINED

CRUMBLY, OCC SLIGHTLY BRITTLE TENACITY;

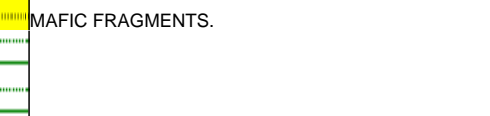
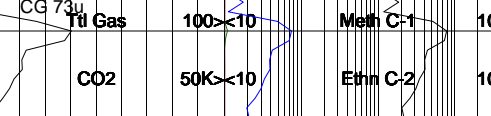
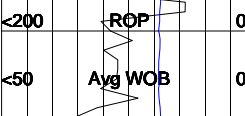
BECOMES EARTHY WHERE GRADING TO SHALE

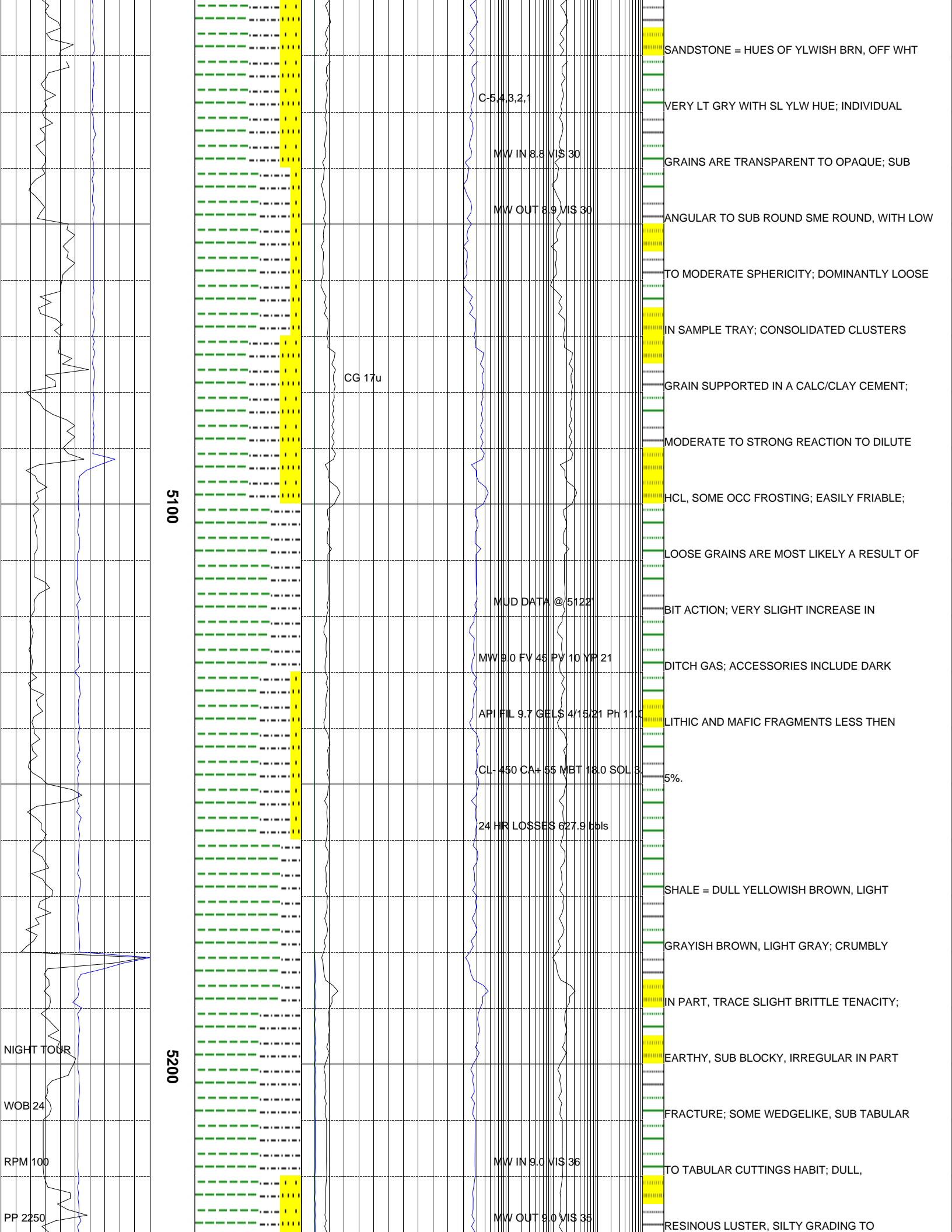
WEDGELIKE TO TABULAR SUB TABULAR

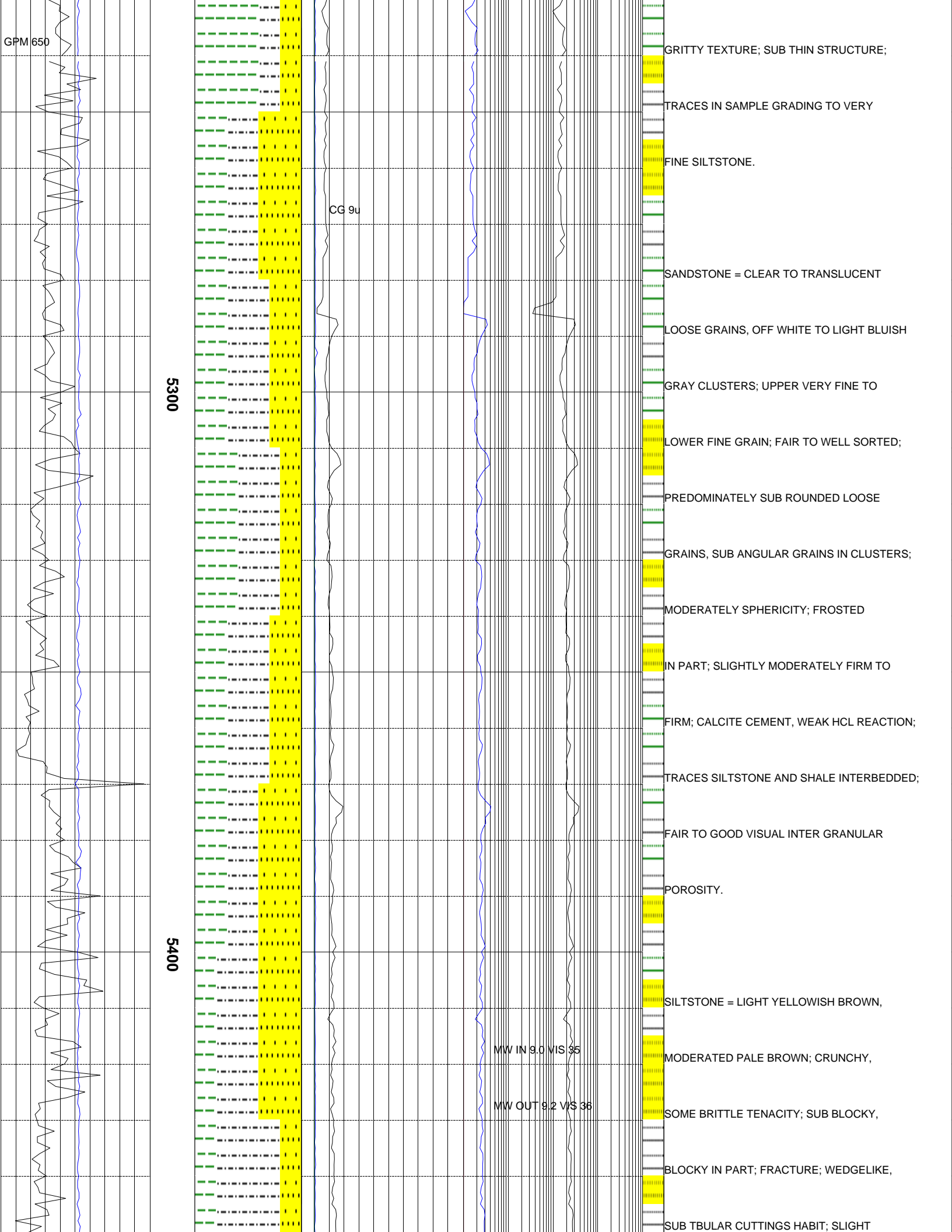
CTTNGS HABIT; DULL RESINOUS LUSTER; OCC

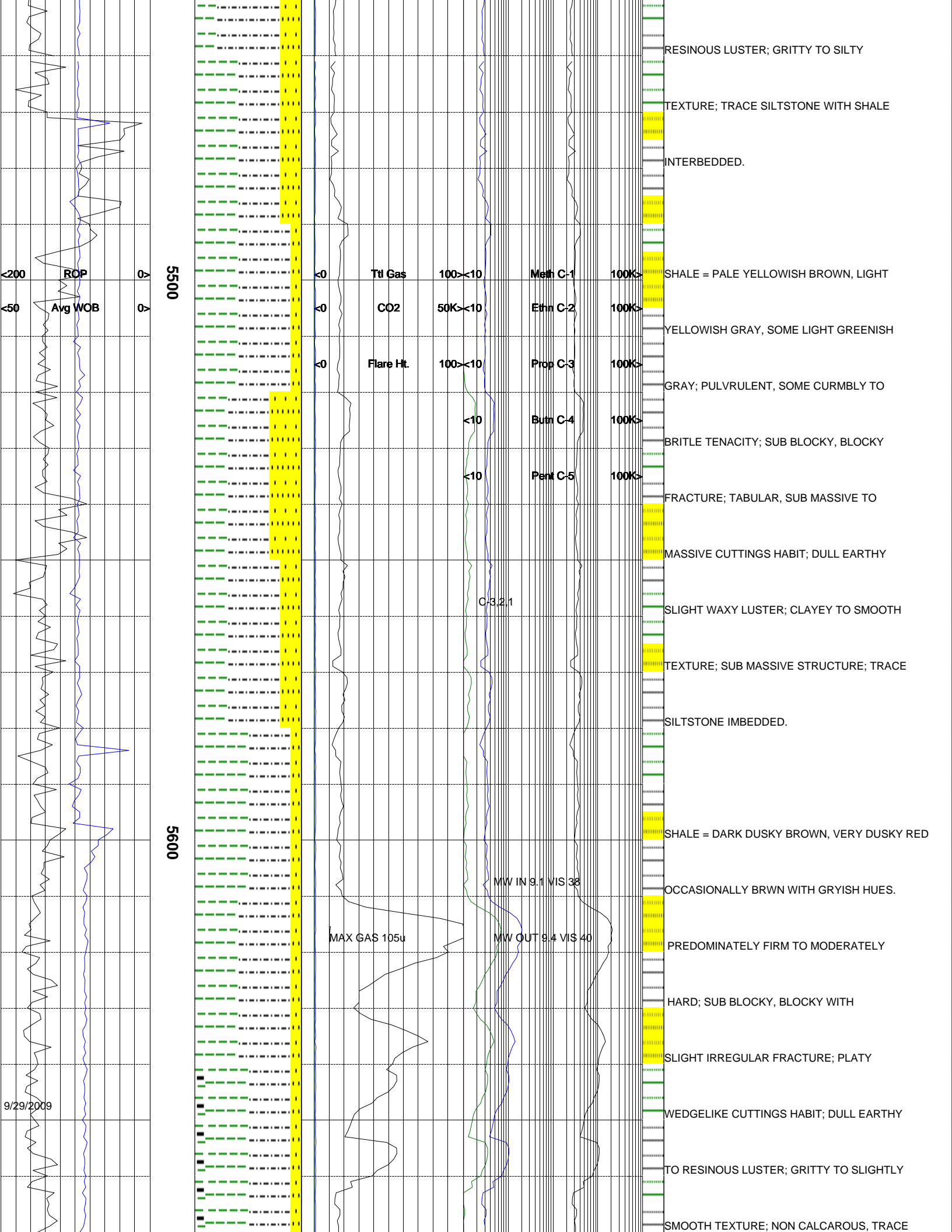
GRANULAR TEXTURE; TRACE BLACK LITHIC/

MAFIC FRAGMENTS.



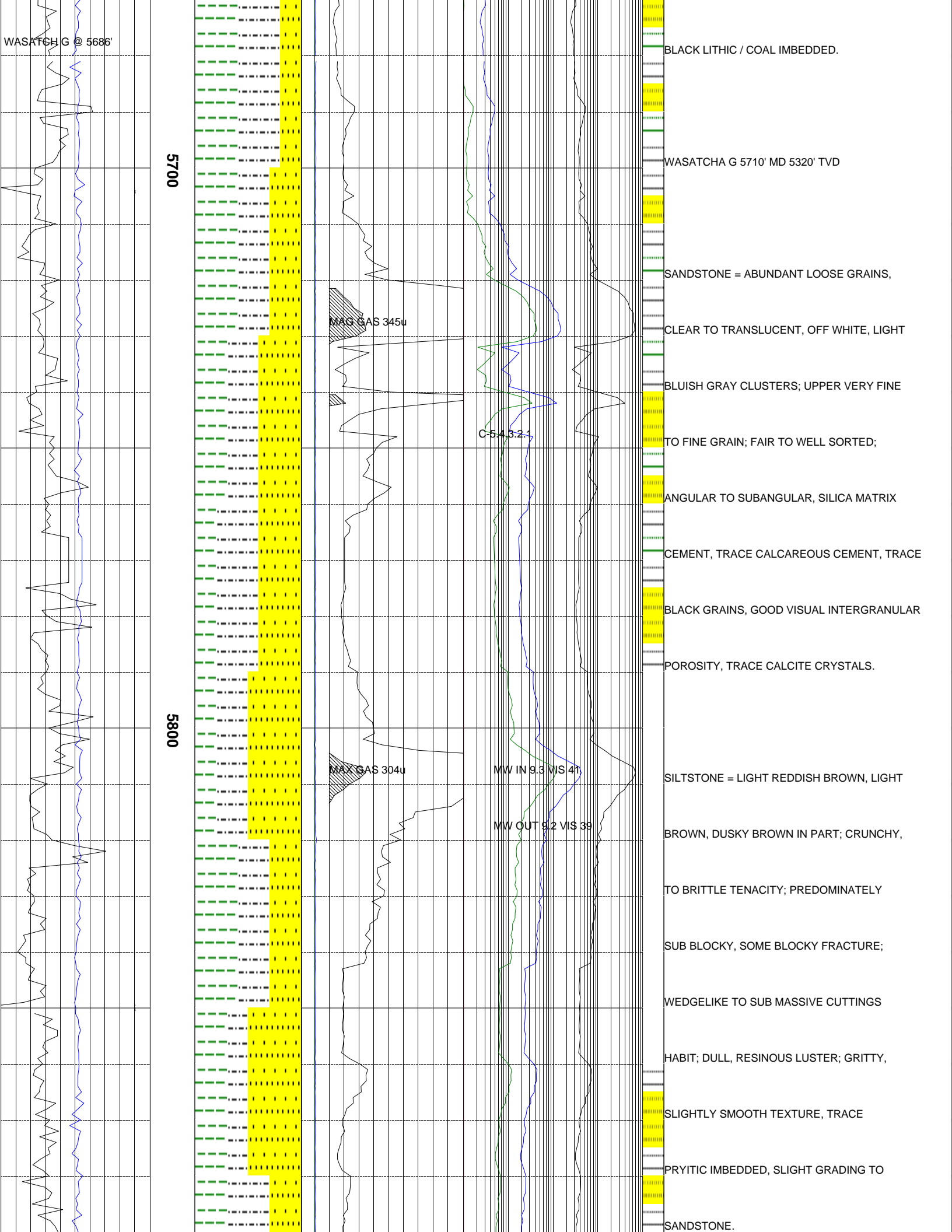






5700

5800



BLACK LITHIC / COAL IMBEDDED.

WASATCHA G 5710' MD 5320' TVD

SANDSTONE = ABUNDANT LOOSE GRAINS,

CLEAR TO TRANSLUCENT, OFF WHITE, LIGHT

BLUISH GRAY CLUSTERS; UPPER VERY FINE

TO FINE GRAIN; FAIR TO WELL SORTED;

ANGULAR TO SUBANGULAR, SILICA MATRIX

CEMENT, TRACE CALCAREOUS CEMENT, TRACE

BLACK GRAINS, GOOD VISUAL INTERGRANULAR

POROSITY, TRACE CALCITE CRYSTALS.

SILTSTONE = LIGHT REDDISH BROWN, LIGHT

BROWN, DUSKY BROWN IN PART; CRUNCHY,

TO BRITTLE TENACITY; PREDOMINATELY

SUB BLOCKY, SOME BLOCKY FRACTURE;

WEDGELIKE TO SUB MASSIVE CUTTINGS

HABIT; DULL, RESINOUS LUSTER; GRITTY,

SLIGHTLY SMOOTH TEXTURE, TRACE

PRYTIC IMBEDDED, SLIGHT GRADING TO

SANDSTONE.

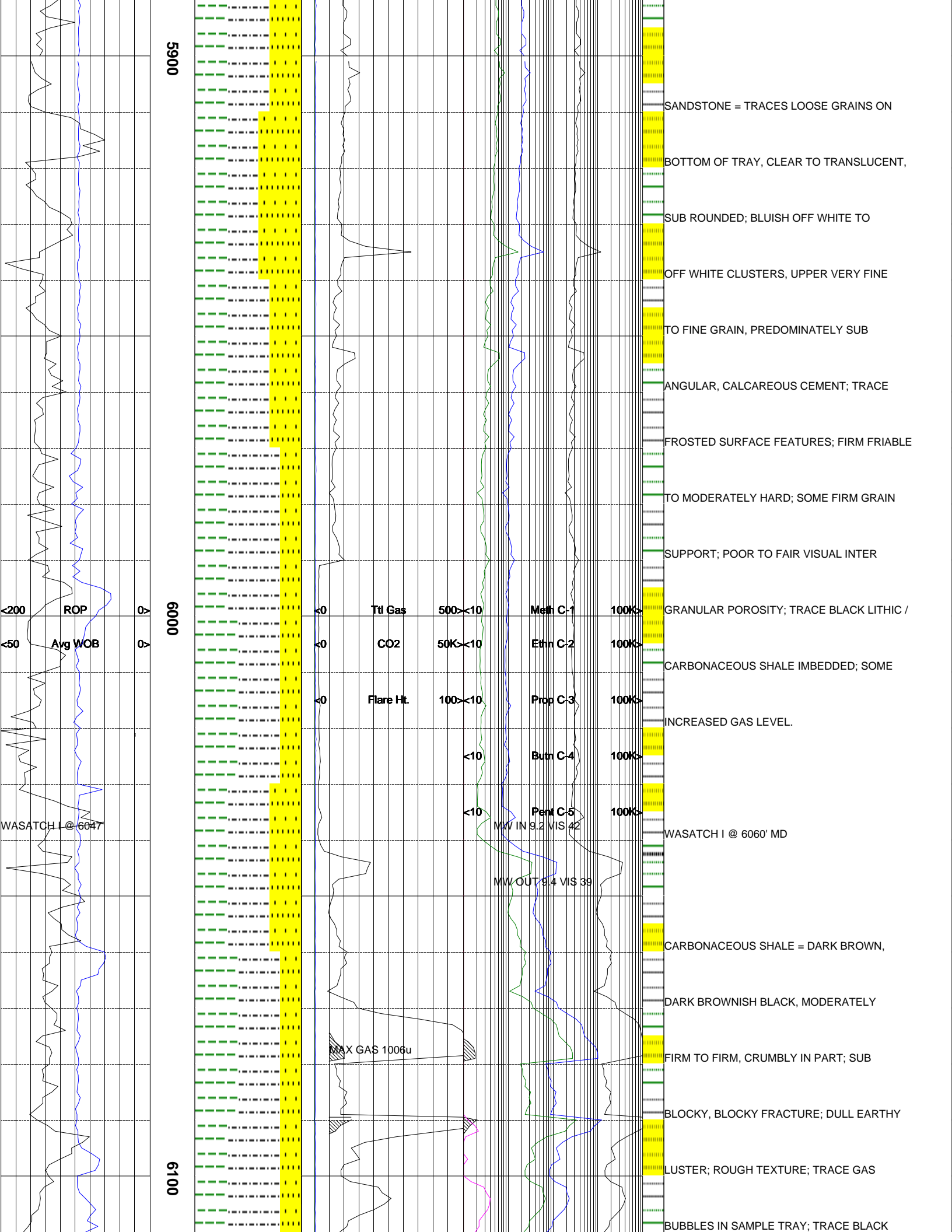
MAG GAS 345u

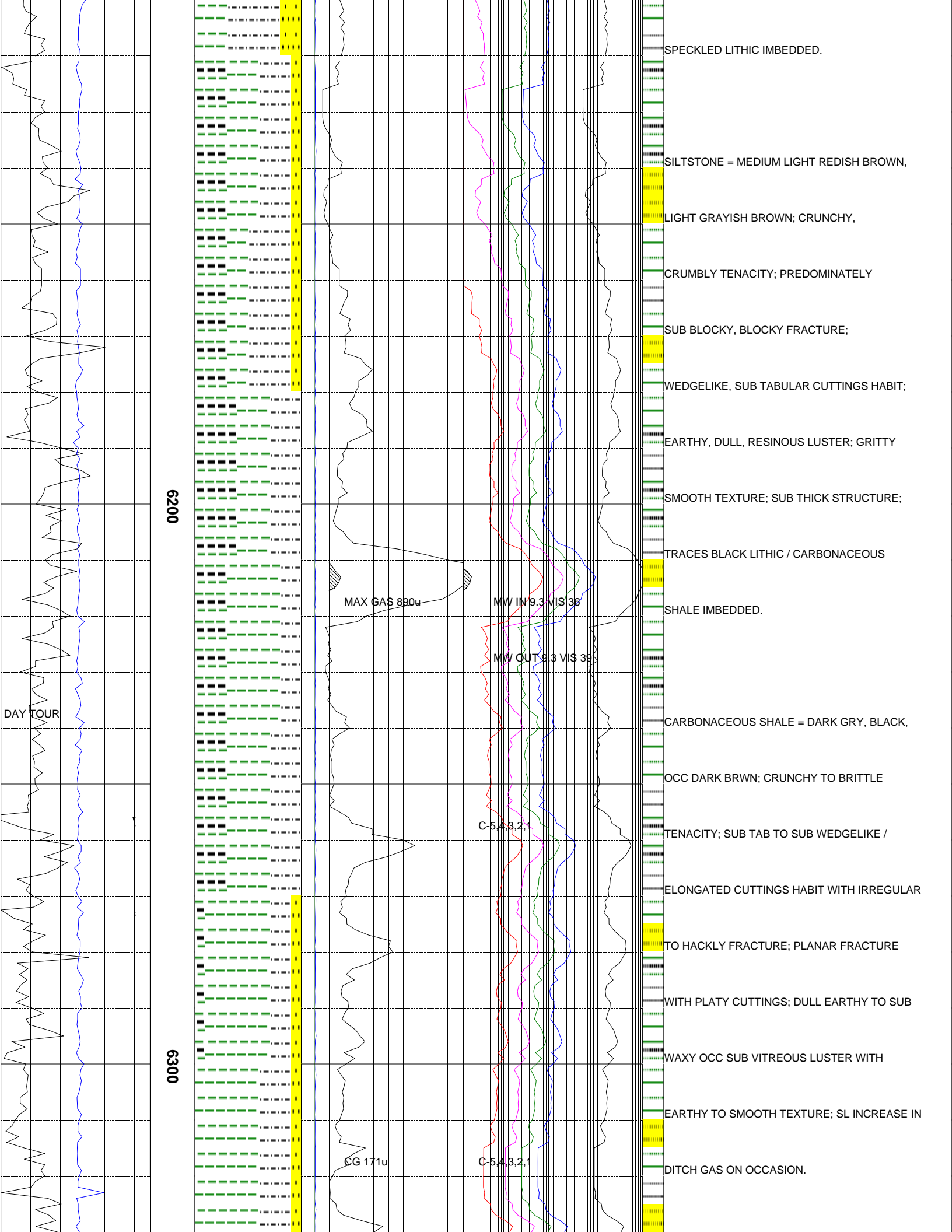
C-543.2

MAG GAS 304u

MW IN 9.3 VIS 41

MW OUT 9.2 VIS 39





6200

6300

DAY TOUR

MAX GAS 890u

MW IN 9.3 VIS 36

MW OUT 9.3 VIS 39

C-5.43.2.1

CG 171u

C-5.43.2.1

SPECKLED LITHIC IMBEDDED.

SILTSTONE = MEDIUM LIGHT REDISH BROWN,

LIGHT GRAYISH BROWN; CRUNCHY,

CRUMBLY TENACITY; PREDOMINATELY

SUB BLOCKY, BLOCKY FRACTURE;

WEDGELIKE, SUB TABULAR CUTTINGS HABIT;

EARTHY, DULL, RESINOUS LUSTER; GRITTY

SMOOTH TEXTURE; SUB THICK STRUCTURE;

TRACES BLACK LITHIC / CARBONACEOUS

SHALE IMBEDDED.

CARBONACEOUS SHALE = DARK GRAY, BLACK,

OCC DARK BRWN; CRUNCHY TO BRITTLE

TENACITY; SUB TAB TO SUB WEDGELIKE /

ELONGATED CUTTINGS HABIT WITH IRREGULAR

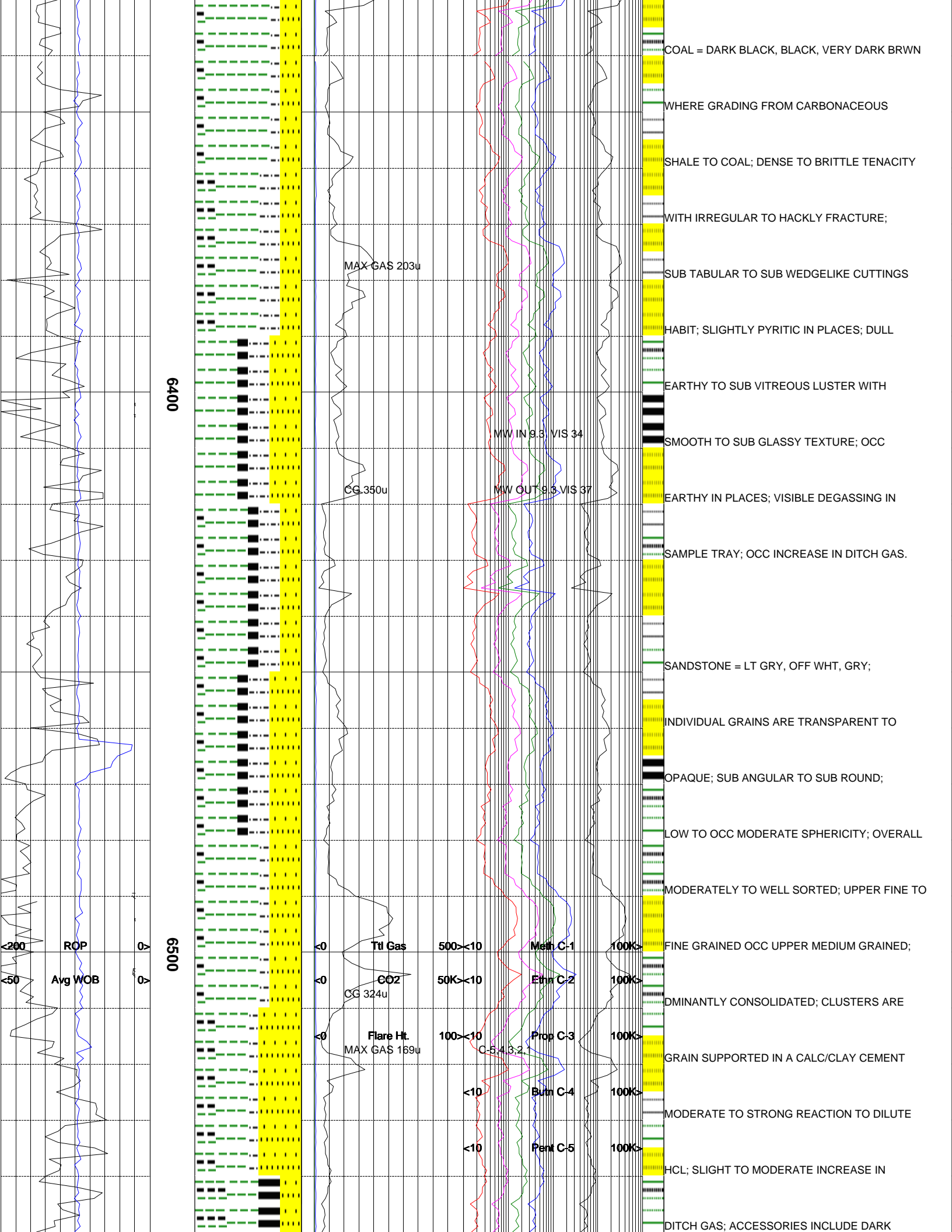
TO HACKLY FRACTURE; PLANAR FRACTURE

WITH PLATY CUTTINGS; DULL EARTHY TO SUB

WAXY OCC SUB VITREOUS LUSTER WITH

EARTHY TO SMOOTH TEXTURE; SL INCREASE IN

DITCH GAS ON OCCASION.



COAL = DARK BLACK, BLACK, VERY DARK BRWN

WHERE GRADING FROM CARBONACEOUS

SHALE TO COAL; DENSE TO BRITTLE TENACITY

WITH IRREGULAR TO HACKLY FRACTURE;

SUB TABULAR TO SUB WEDGELIKE CUTTINGS

HABIT; SLIGHTLY PYRITIC IN PLACES; DULL

EARTHY TO SUB VITREOUS LUSTER WITH

SMOOTH TO SUB GLASSY TEXTURE; OCC

EARTHY IN PLACES; VISIBLE DEGASSING IN

SAMPLE TRAY; OCC INCREASE IN DITCH GAS.

SANDSTONE = LT GRY, OFF WHT, GRY;

INDIVIDUAL GRAINS ARE TRANSPARENT TO

OPAQUE; SUB ANGULAR TO SUB ROUND;

LOW TO OCC MODERATE SPHERICITY; OVERALL

MODERATELY TO WELL SORTED; UPPER FINE TO

FINE GRAINED OCC UPPER MEDIUM GRAINED;

DOMINANTLY CONSOLIDATED; CLUSTERS ARE

GRAIN SUPPORTED IN A CALC/CLAY CEMENT

MODERATE TO STRONG REACTION TO DILUTE

HCL; SLIGHT TO MODERATE INCREASE IN

DITCH GAS; ACCESSORIES INCLUDE DARK

6400

6500

MAX GAS 203u

CG 350u

MW IN 8.3 VIS 34

MW OUT 9.3 VIS 37

Ttl Gas 500 <10

CO2 50K <10

Flare Ht. 100 <10

Meth C-1 100K >

Ethn C-2 100K >

Prop C-3 100K >

Butn C-4 100K >

Pent C-5 100K >

200 ROP

50 Avg WOB

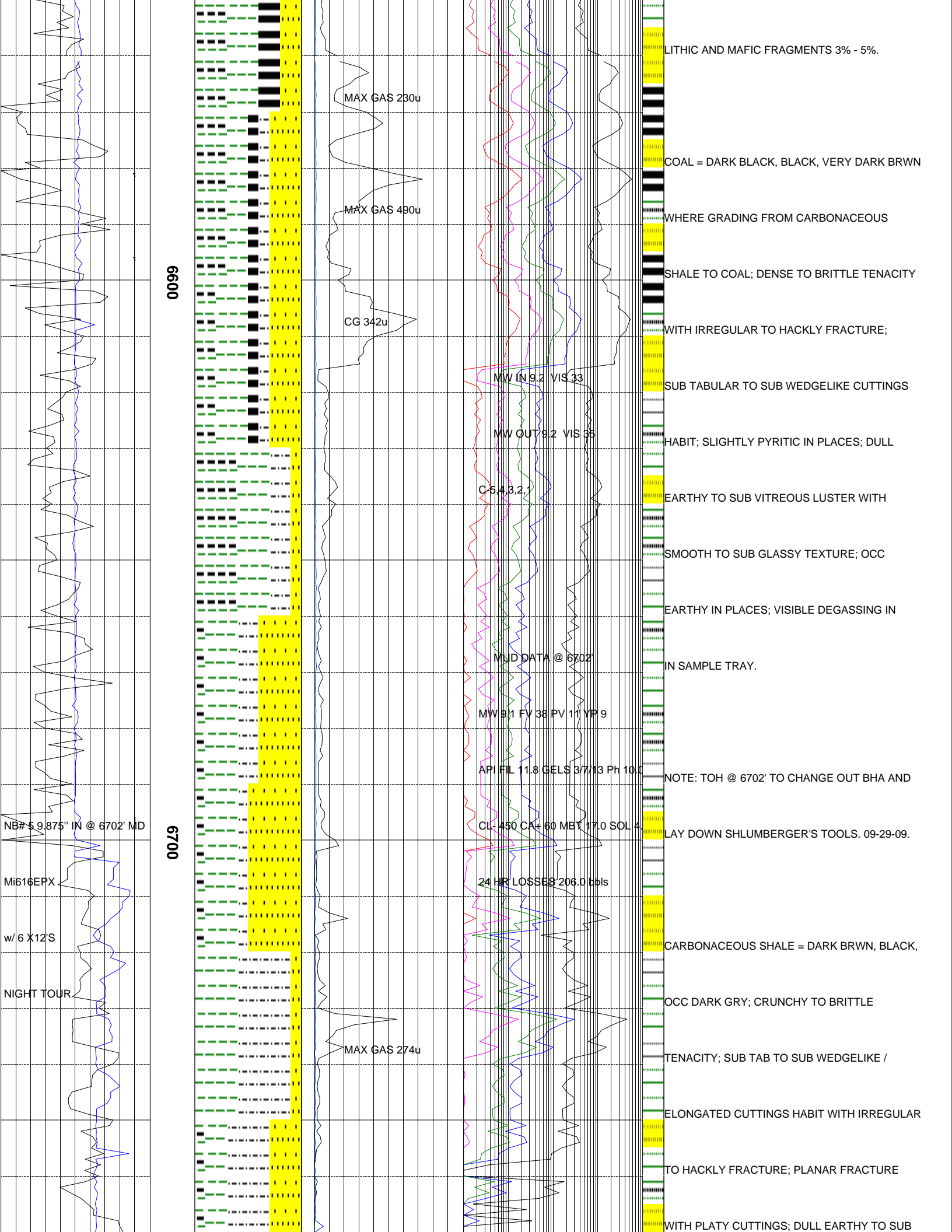
CG 324u

C-5 43.2

MAX GAS 189u

<10

<10



00600

00700

MAX GAS 230u

MAX GAS 490u

CG 342u

MW IN 9.2 VIS 33

MW OUT 9.2 VIS 35

C-543.2.1

MUD DATA @ 6702

MW 9.1 FV 38 PV 11 YF 9

API FIL 11.8 GELS 37/13 Ph 10.0

CL: 450 CA+ 60 MBT 17.0 SOL 4

24 HR LOSSES 206.0 bbls

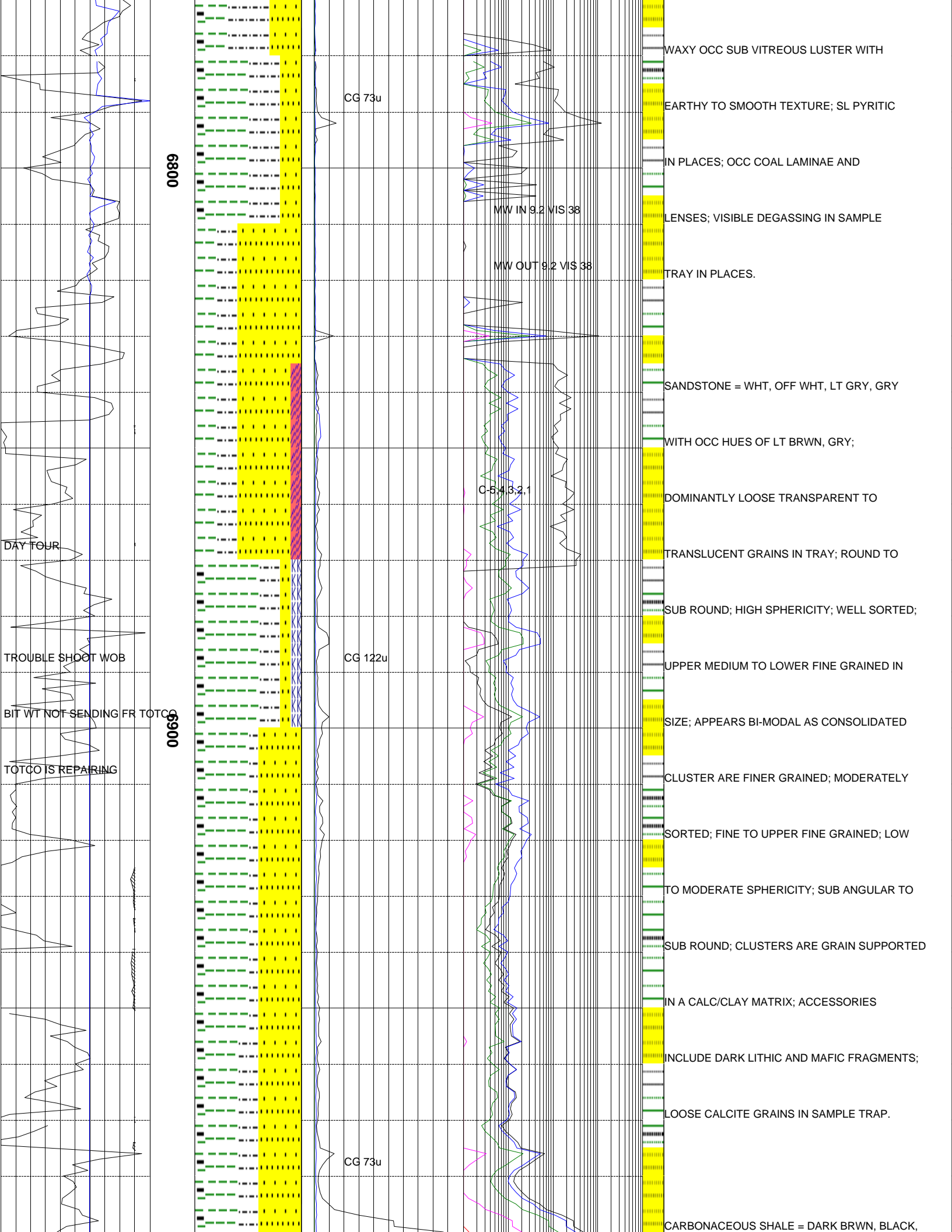
MAX GAS 274u

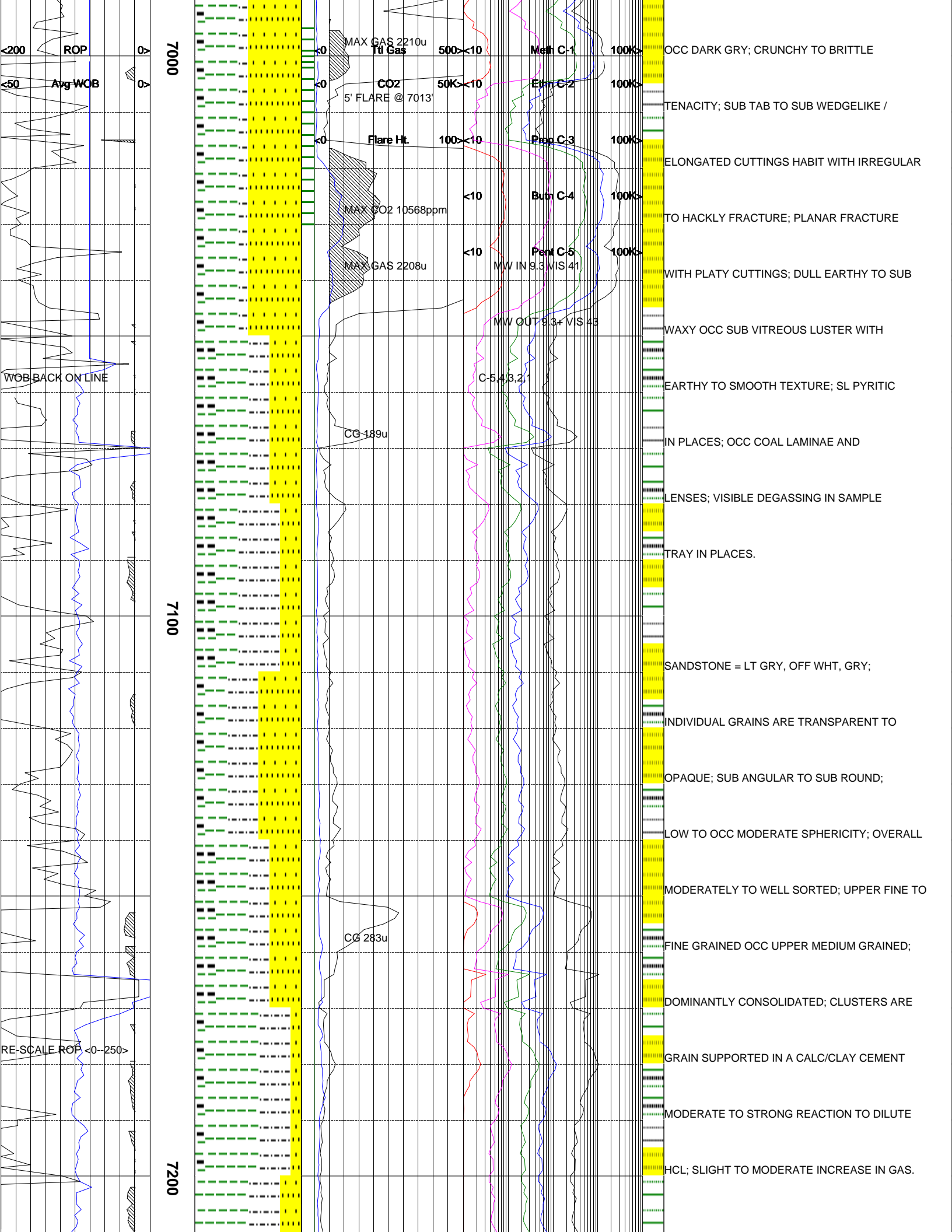
NB# 59.875' IN @ 6702' MD

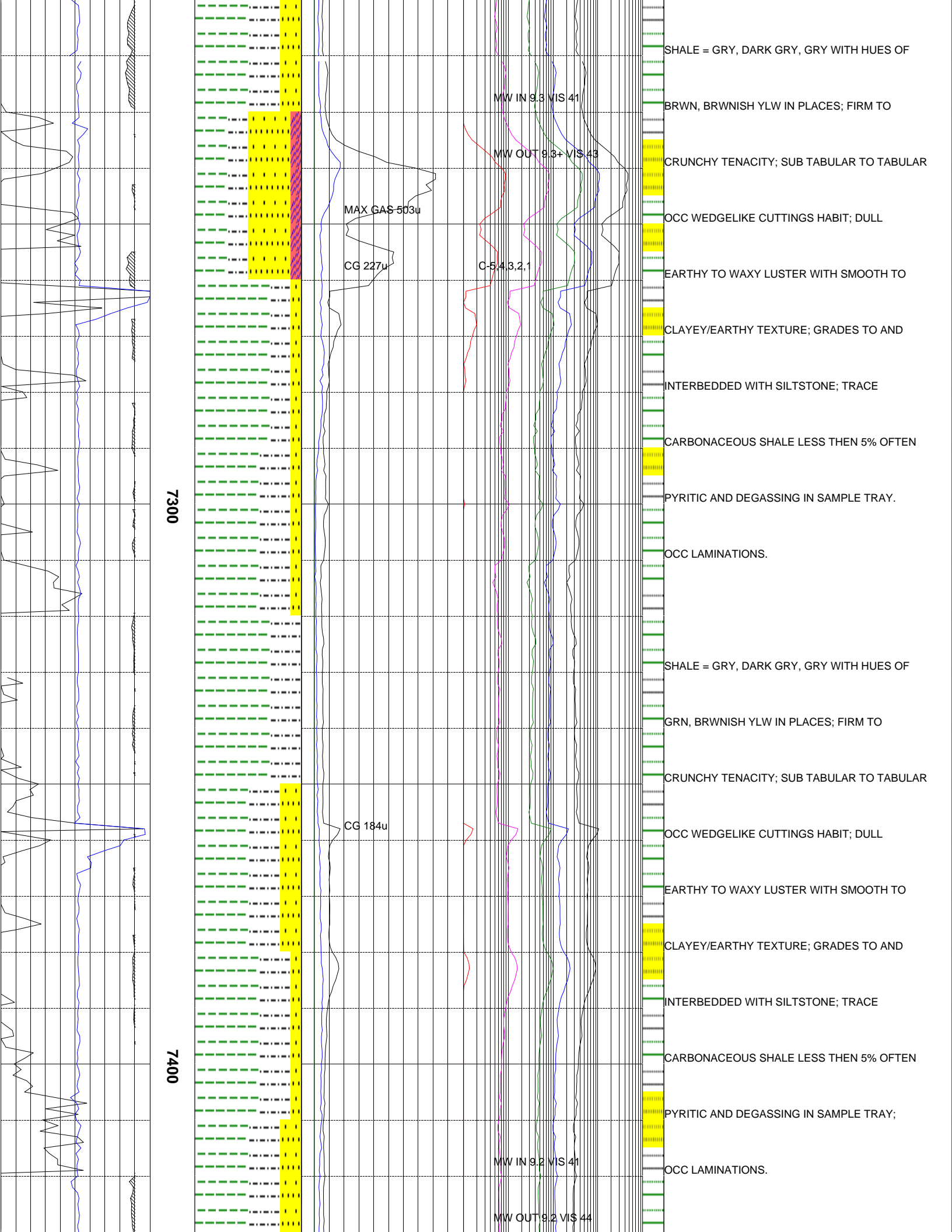
Mi616EPX

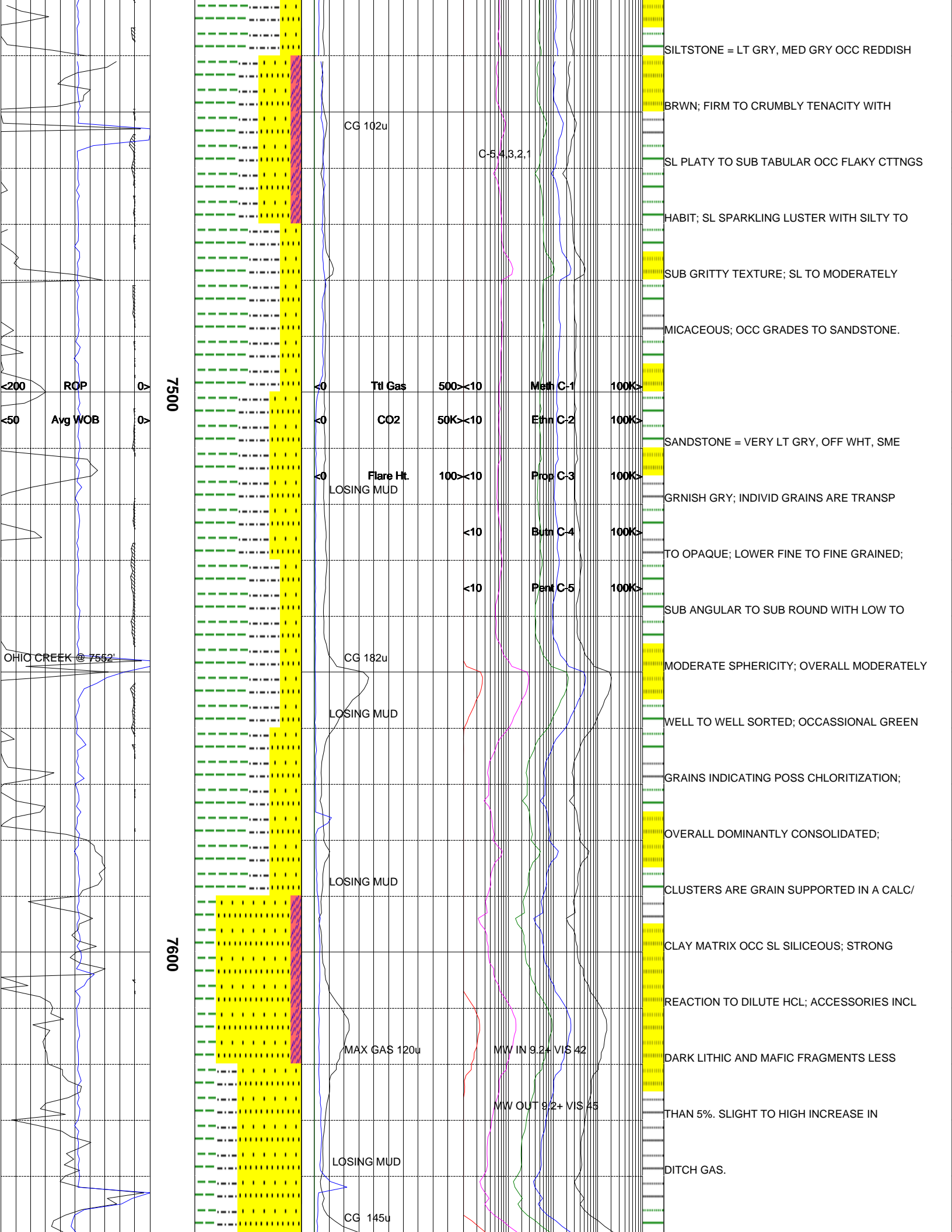
w/6 X12S

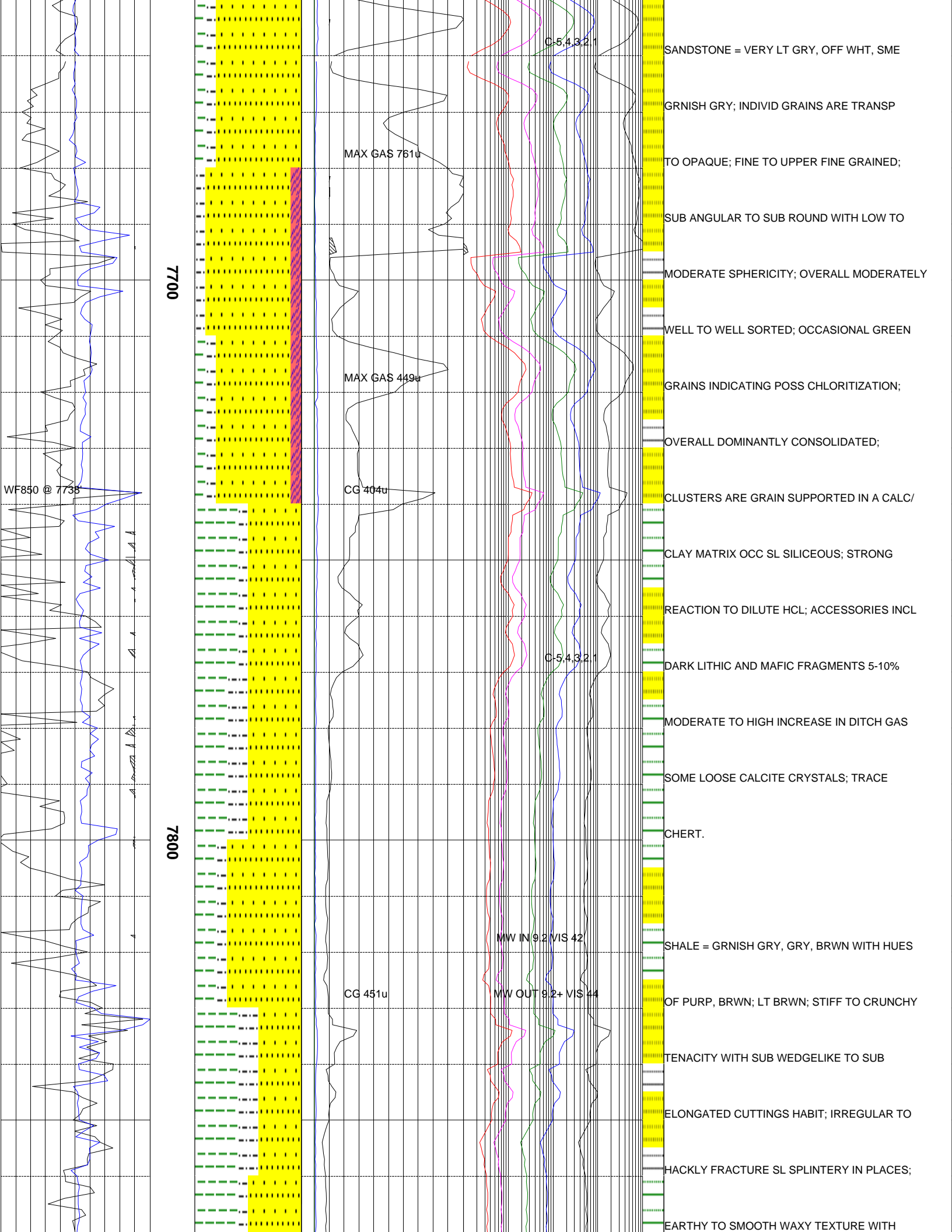
NIGHT TOUR

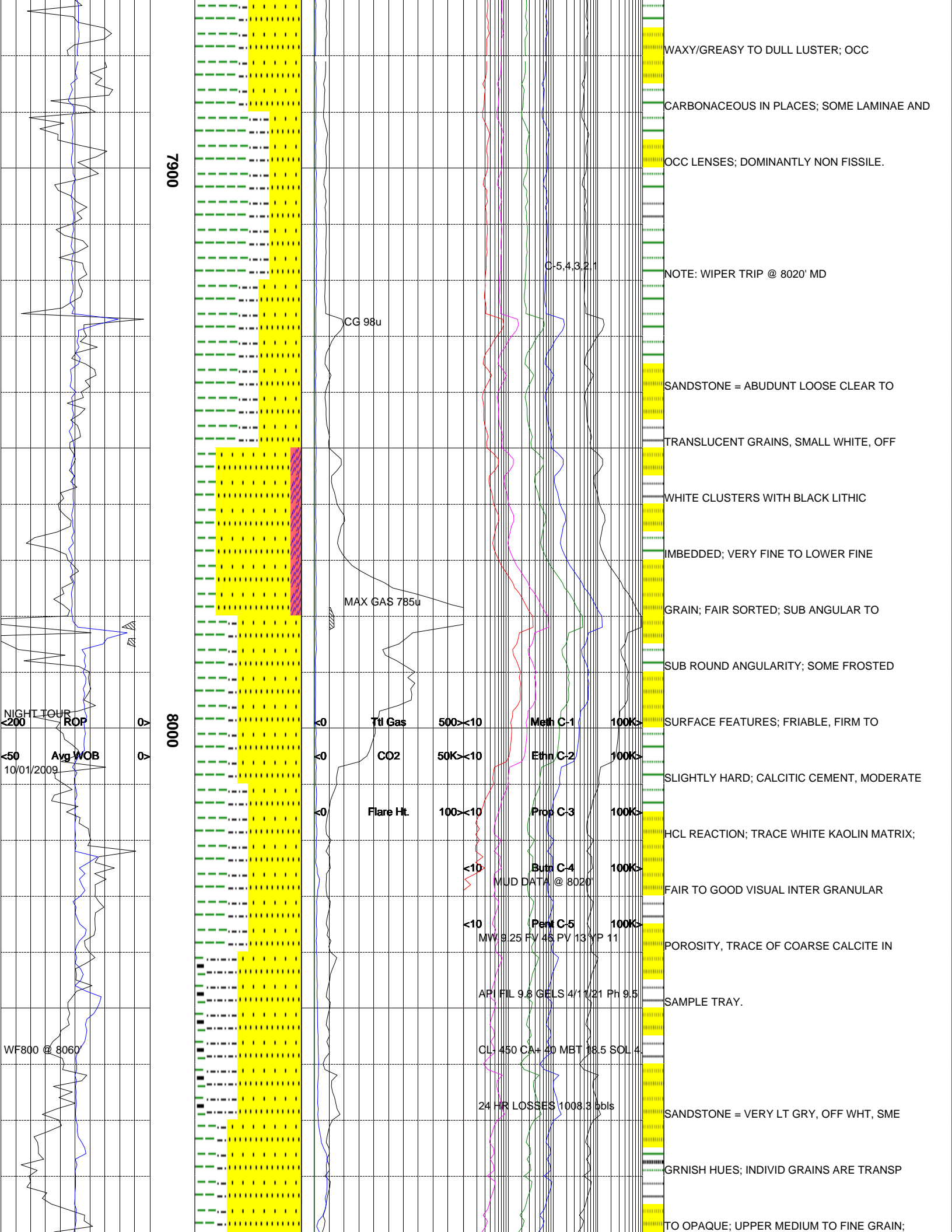












7900

8000

WAXY/GREASY TO DULL LUSTER; OCC

CARBONACEOUS IN PLACES; SOME LAMINAE AND

OCC LENSES; DOMINANTLY NON FISSILE.

NOTE: WIPER TRIP @ 8020' MD

SANDSTONE = ABUDUNT LOOSE CLEAR TO

TRANSLUCENT GRAINS, SMALL WHITE, OFF

WHITE CLUSTERS WITH BLACK LITHIC

IMBEDDED; VERY FINE TO LOWER FINE

GRAIN; FAIR SORTED; SUB ANGULAR TO

SUB ROUND ANGULARITY; SOME FROSTED

SURFACE FEATURES; FRIABLE, FIRM TO

SLIGHTLY HARD; CALCITIC CEMENT, MODERATE

HCL REACTION; TRACE WHITE KAOLIN MATRIX;

FAIR TO GOOD VISUAL INTER GRANULAR

POROSITY, TRACE OF COARSE CALCITE IN

SAMPLE TRAY.

SANDSTONE = VERY LT GRY, OFF WHT, SME

GRNISH HUES; INDIVID GRAINS ARE TRANSP

TO OPAQUE; UPPER MEDIUM TO FINE GRAIN;

C-5,4,3,2,1

CG 98u

MAX GAS 785u

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

CO2 50K < 10 Ethn C-2 100K >

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

< 10 Butn C-4 100K >

MUD DATA @ 8020'

< 10 Pent C-5 100K >

MW 9.25 FV 48 PV 13 YP 11

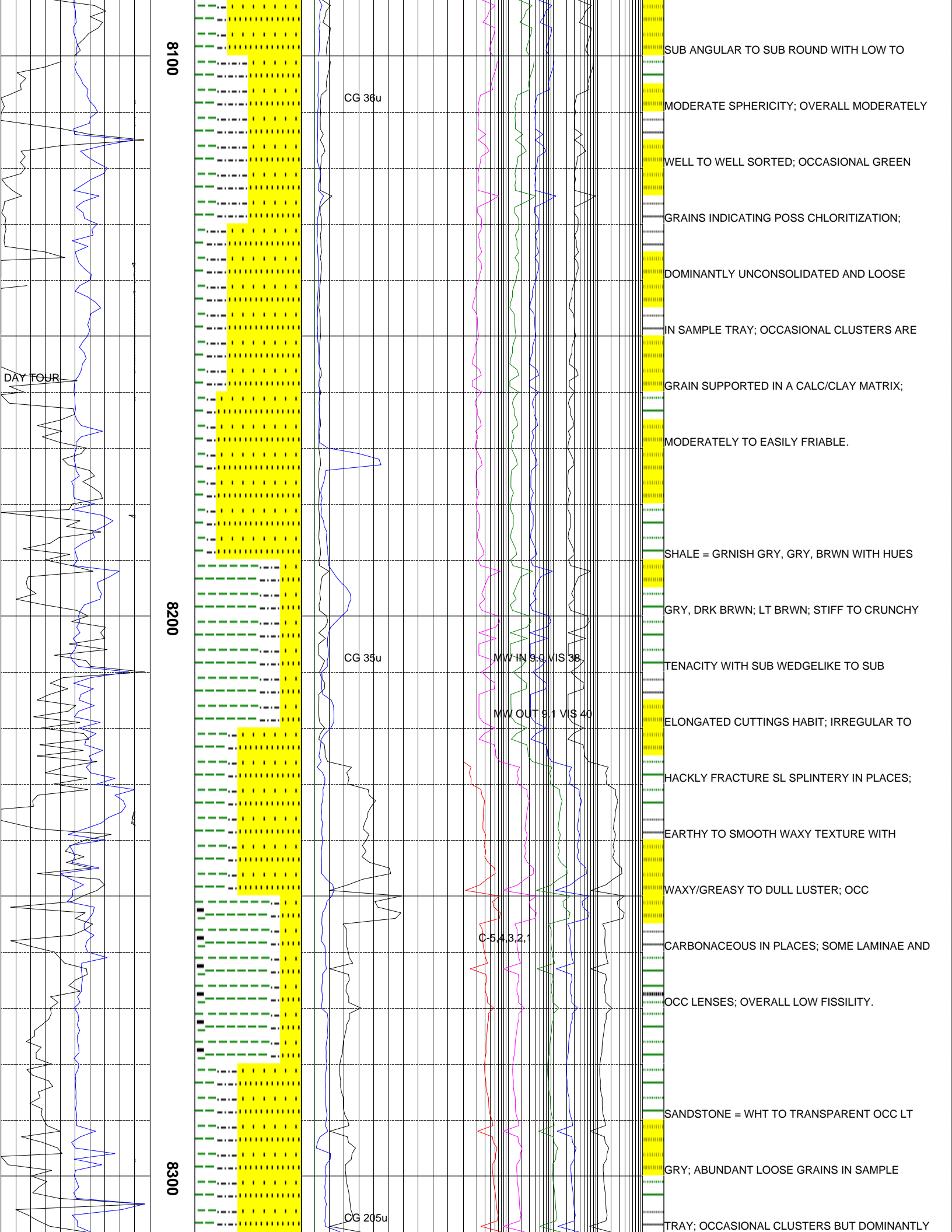
API FIL 9.8 GELS 4/11/21 Ph 9.5

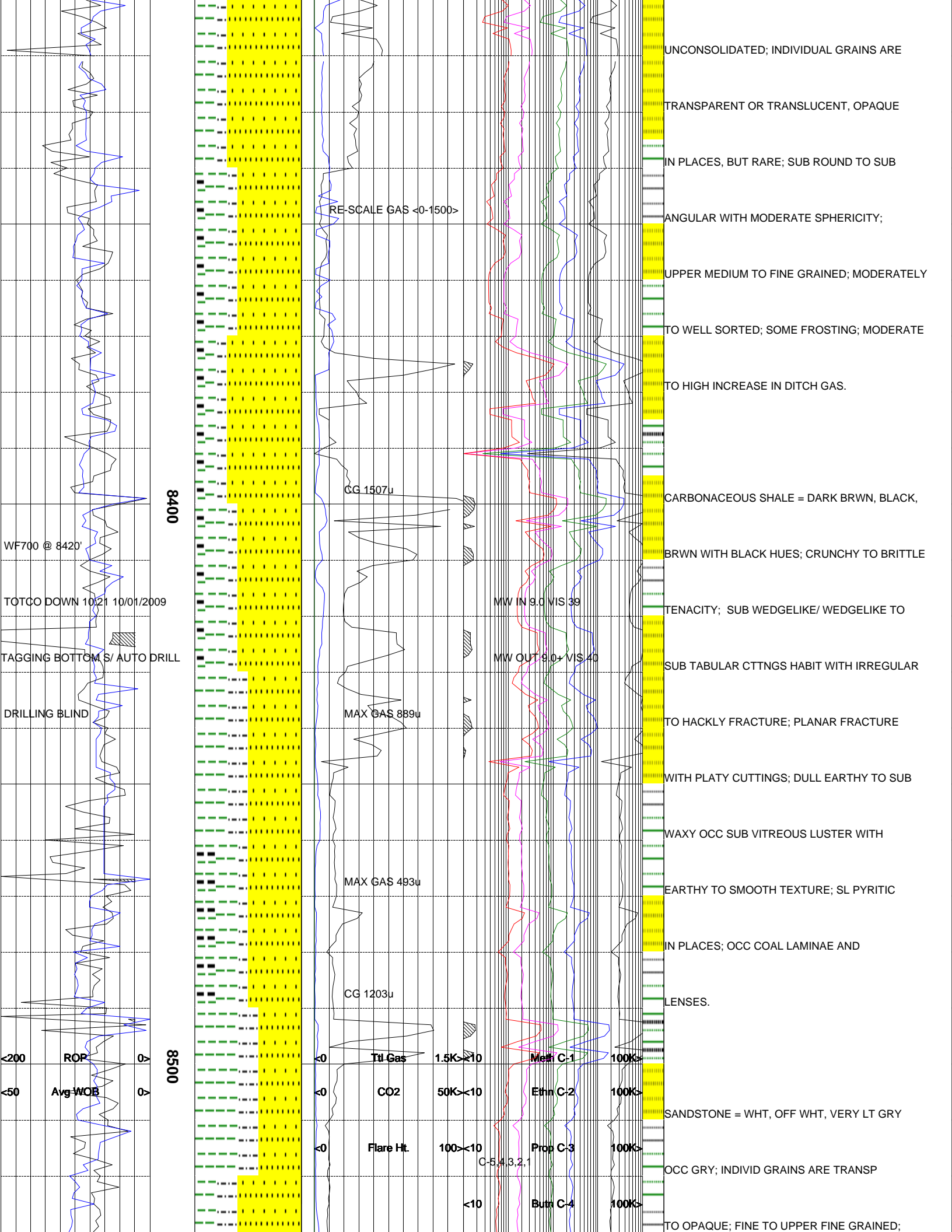
CL: 450 CA+ 40 MBT 18.5 SOL 4

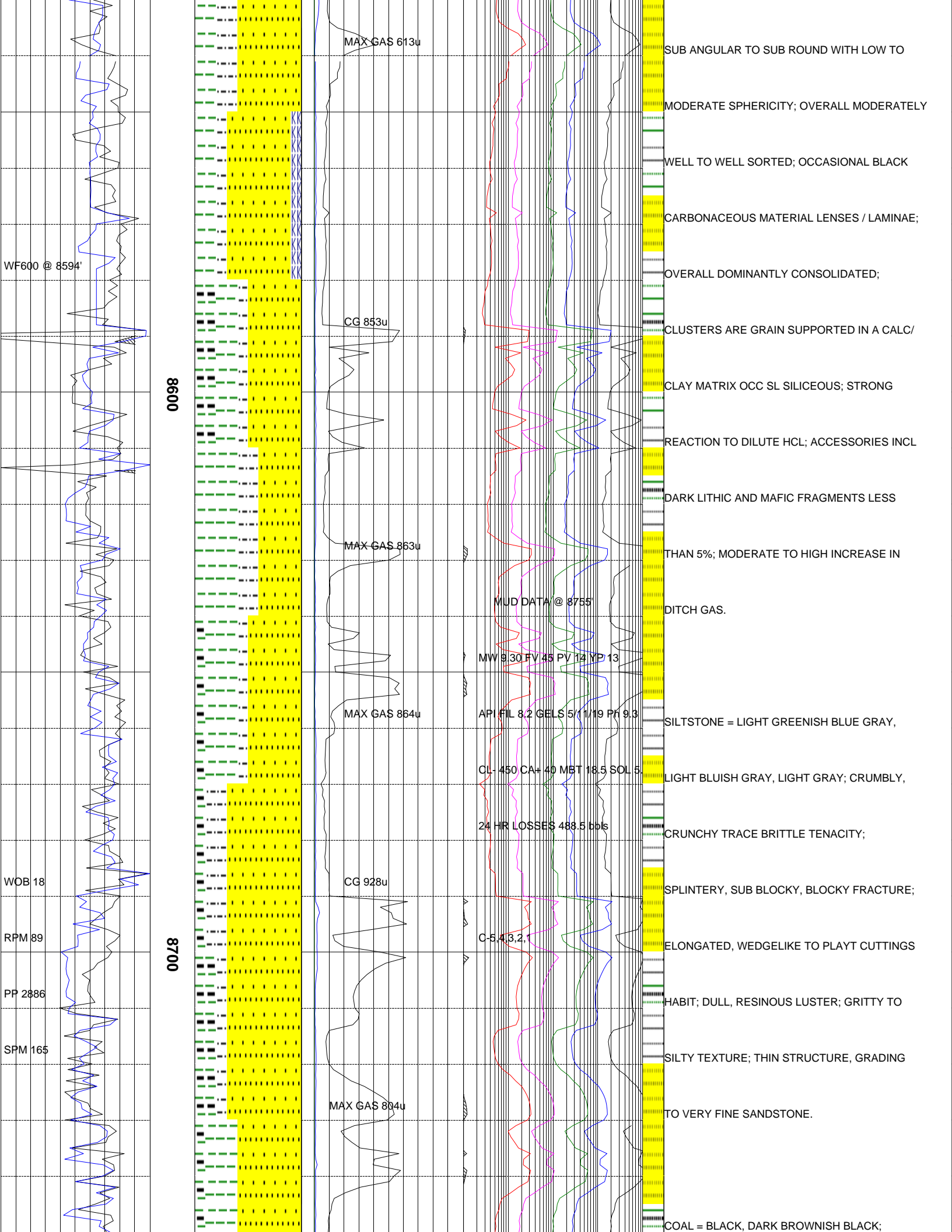
24 HR LOSSES 1008.3 bbls

NIGHT TOUR
 < 200 ROP
 < 50 Avg WOB
 10/01/2009

WF800 @ 8060







8600

8700

MAX GAS 613u

SUB ANGULAR TO SUB ROUND WITH LOW TO MODERATE SPHERICITY; OVERALL MODERATELY

WELL TO WELL SORTED; OCCASIONAL BLACK

CARBONACEOUS MATERIAL LENSES / LAMINAE;

OVERALL DOMINANTLY CONSOLIDATED;

CG 853u

CLUSTERS ARE GRAIN SUPPORTED IN A CALC/

CLAY MATRIX OCC SL SILICEOUS; STRONG

REACTION TO DILUTE HCL; ACCESSORIES INCL

DARK LITHIC AND MAFIC FRAGMENTS LESS

MAX GAS 863u

THAN 5%; MODERATE TO HIGH INCREASE IN

DITCH GAS.

MUD DATA @ 8755'

MW 9.30 FV 45 PV 14 YP 13

MAX GAS 864u

API FIL 8.2 GELS 5(1/19) PFI 9.3

SILTSTONE = LIGHT GREENISH BLUE GRAY,

CL- 450 CA+ 40 MBT 18.5 SOL 5

LIGHT BLUISH GRAY, LIGHT GRAY; CRUMBLY,

24 HR LOSSES 488.5 bbls

CRUNCHY TRACE BRITTLE TENACITY;

WOB 18

CG 928u

SPLINTERY, SUB BLOCKY, BLOCKY FRACTURE;

RPM 89

C-5.4 3.2

ELONGATED, WEDGELIKE TO PLAYT CUTTINGS

PP 2886

HABIT; DULL, RESINOUS LUSTER; GRITTY TO

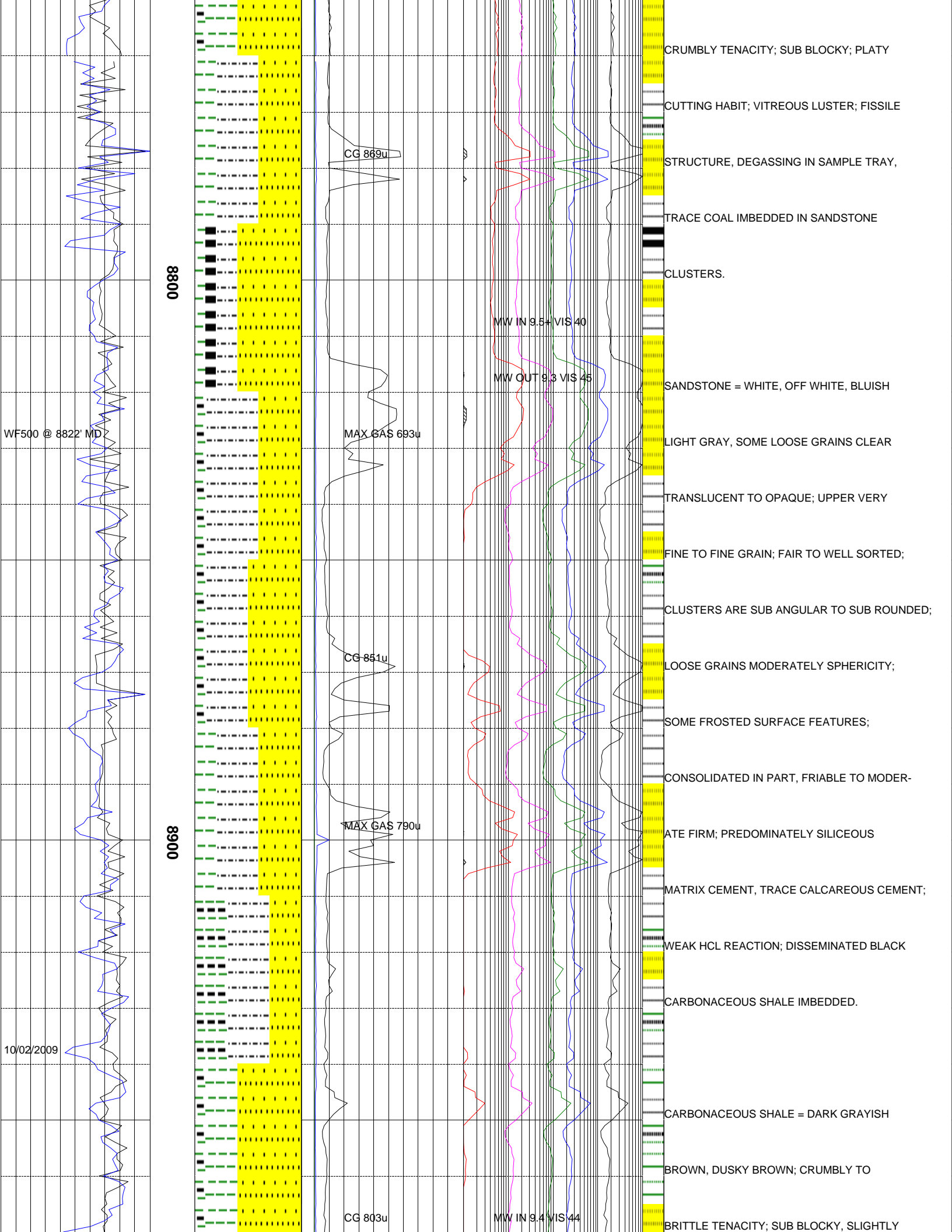
SPM 165

SILTY TEXTURE; THIN STRUCTURE, GRADING

MAX GAS 804u

TO VERY FINE SANDSTONE.

COAL = BLACK, DARK BROWNISH BLACK;



0088

0068

WF500 @ 8822' MD

10/02/2009

CG 869u

MAX GAS 693u

CG 851u

MAX GAS 790u

CG 803u

MW IN 8.5+ VIS 40

MW OUT 9.3 VIS 45

MW IN 8.4 VIS 44

CRUMBLY TENACITY; SUB BLOCKY; PLATY

CUTTING HABIT; VITREOUS LUSTER; FISSILE

STRUCTURE, DEGASSING IN SAMPLE TRAY,

TRACE COAL IMBEDDED IN SANDSTONE

CLUSTERS.

SANDSTONE = WHITE, OFF WHITE, BLUISH

LIGHT GRAY, SOME LOOSE GRAINS CLEAR

TRANSLUCENT TO OPAQUE; UPPER VERY

FINE TO FINE GRAIN; FAIR TO WELL SORTED;

CLUSTERS ARE SUB ANGULAR TO SUB ROUNDED;

LOOSE GRAINS MODERATELY SPHERICITY;

SOME FROSTED SURFACE FEATURES;

CONSOLIDATED IN PART, FRIABLE TO MODER-

ATE FIRM; PREDOMINATELY SILICEOUS

MATRIX CEMENT, TRACE CALCAREOUS CEMENT;

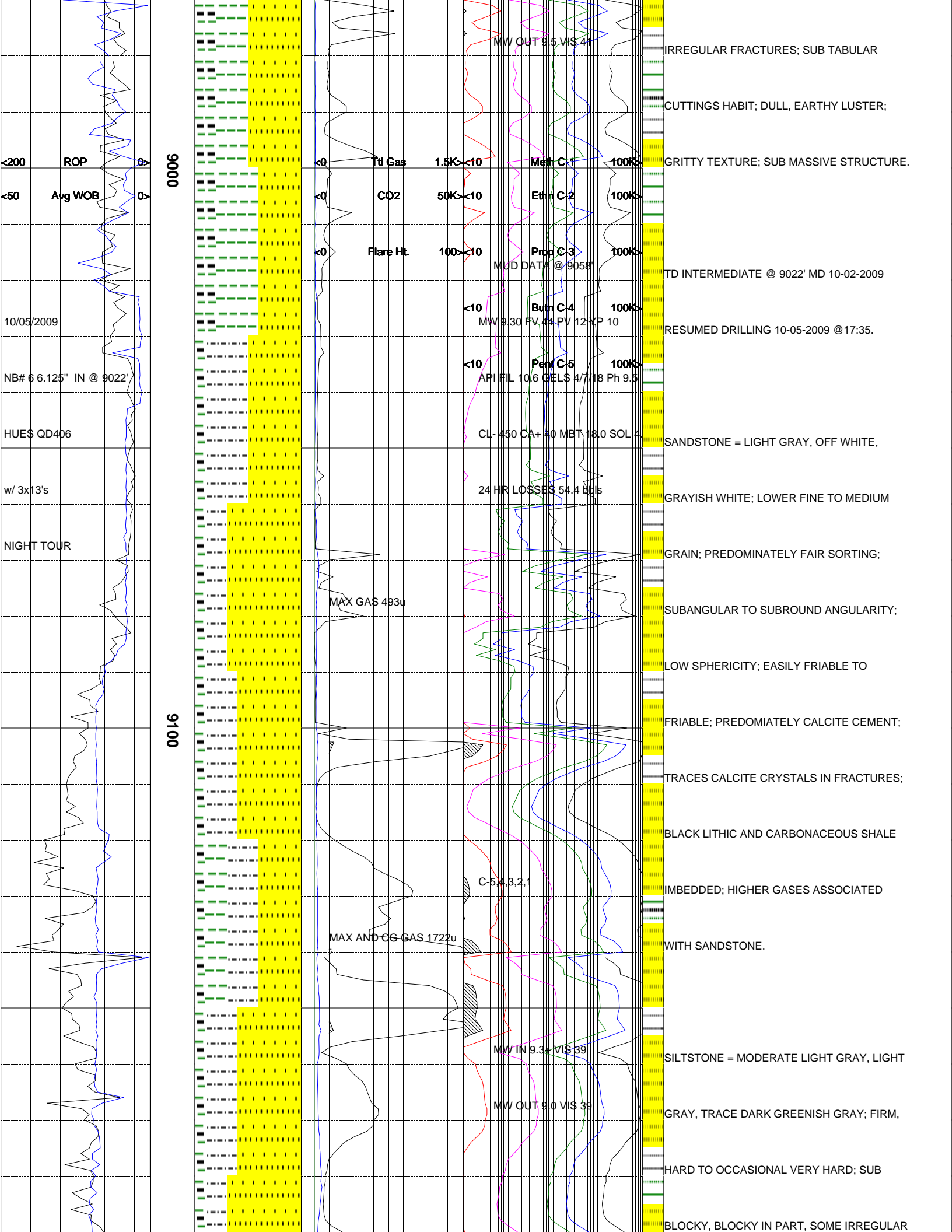
WEAK HCL REACTION; DISSEMINATED BLACK

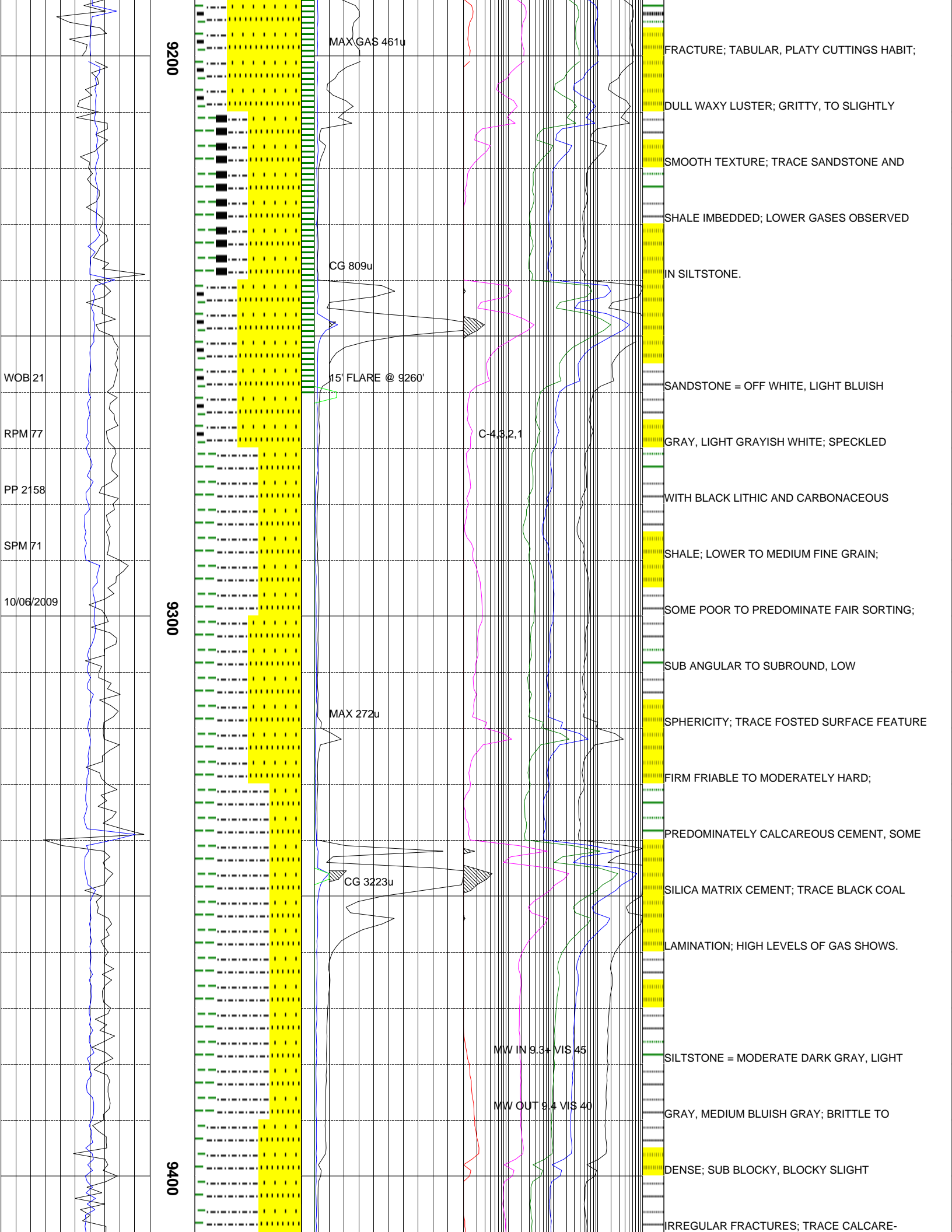
CARBONACEOUS SHALE IMBEDDED.

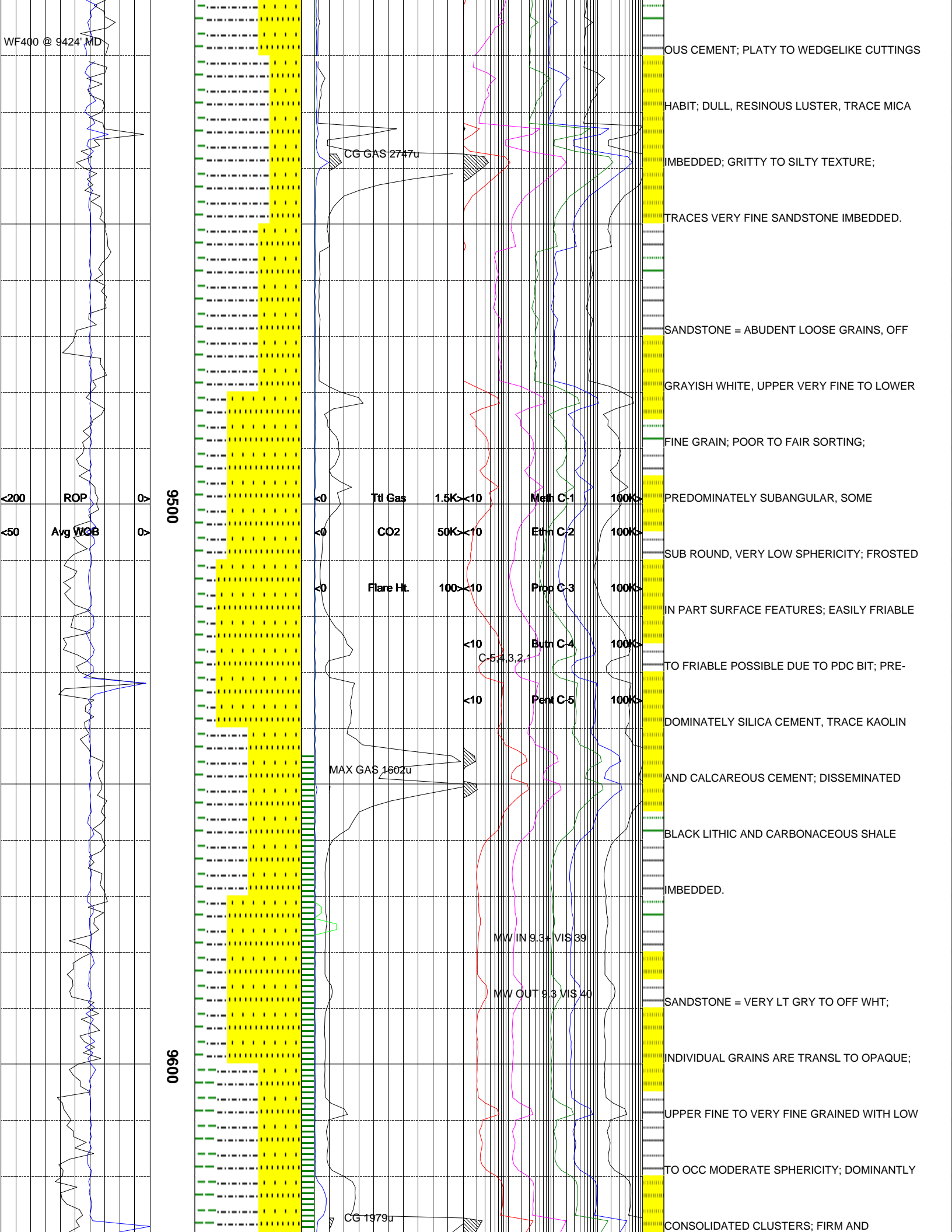
CARBONACEOUS SHALE = DARK GRAYISH

BROWN, DUSKY BROWN; CRUMBLY TO

BRITTLE TENACITY; SUB BLOCKY, SLIGHTLY







9500

0096

OUS CEMENT; PLATY TO WEDGELIKE CUTTINGS

HABIT; DULL, RESINOUS LUSTER, TRACE MICA

IMBEDDED; GRITTY TO SILTY TEXTURE;

TRACES VERY FINE SANDSTONE IMBEDDED.

SANDSTONE = ABUDENT LOOSE GRAINS, OFF

GRAYISH WHITE, UPPER VERY FINE TO LOWER

FINE GRAIN; POOR TO FAIR SORTING;

PREDOMINATELY SUBANGULAR, SOME

SUB ROUND, VERY LOW SPHERICITY; FROSTED

IN PART SURFACE FEATURES; EASILY FRIABLE

TO FRIABLE POSSIBLE DUE TO PDC BIT; PRE-

DOMINATELY SILICA CEMENT, TRACE KAOLIN

AND CALCAREOUS CEMENT; DISSEMINATED

BLACK LITHIC AND CARBONACEOUS SHALE

IMBEDDED.

SANDSTONE = VERY LT GRY TO OFF WHT;

INDIVIDUAL GRAINS ARE TRANSL TO OPAQUE;

UPPER FINE TO VERY FINE GRAINED WITH LOW

TO OCC MODERATE SPHERICITY; DOMINANTLY

CONSOLIDATED CLUSTERS; FIRM AND

CG GAS 27#7u

Ttl Gas 1.5K \times 10 Meth C-1 100K \times 100

CO2 50K \times 10 Ethn C-2 100K \times 100

Flare Ht. 100 \times 10 Prop C-3 100K \times 100

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

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

MAX GAS 1602u

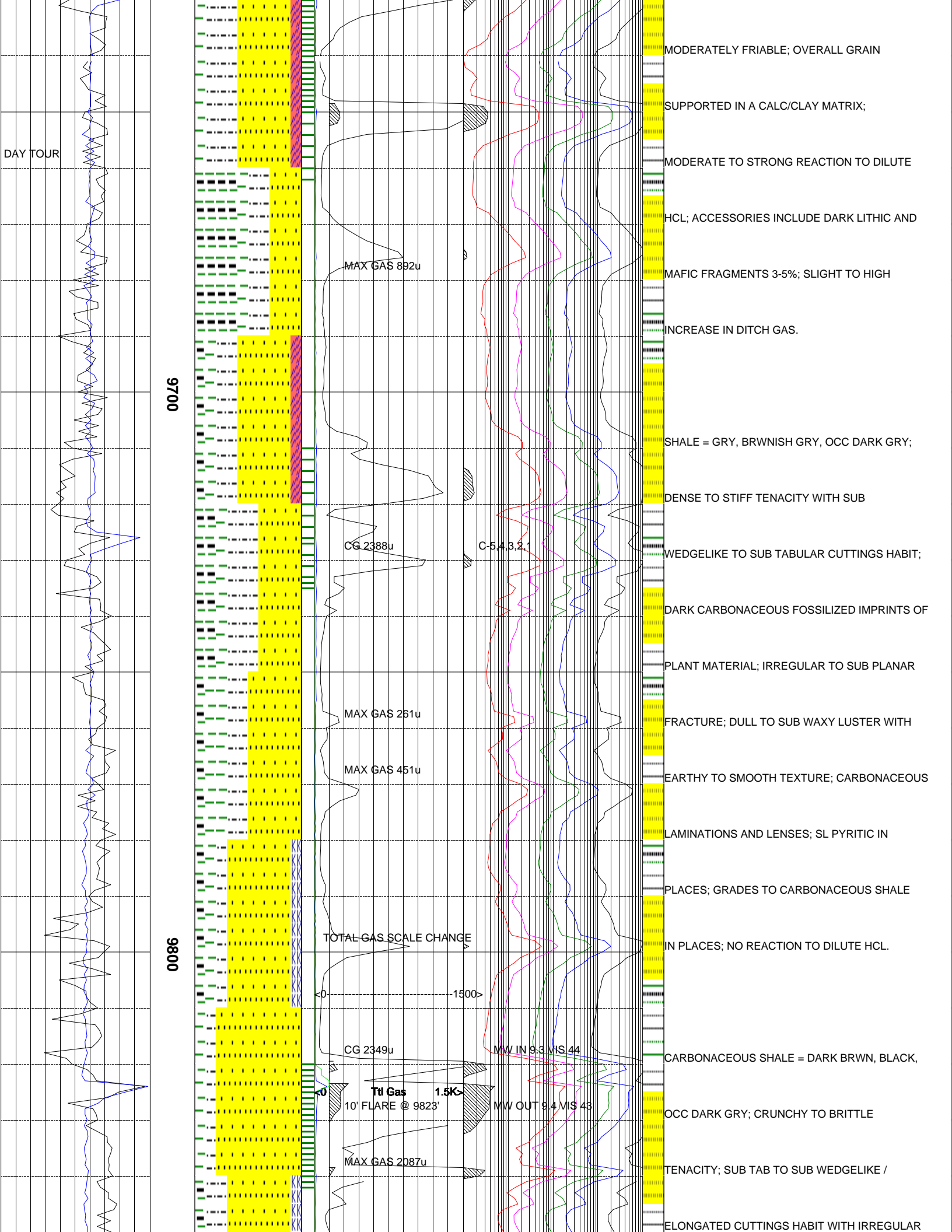
MW IN 9.3+ VIS 39

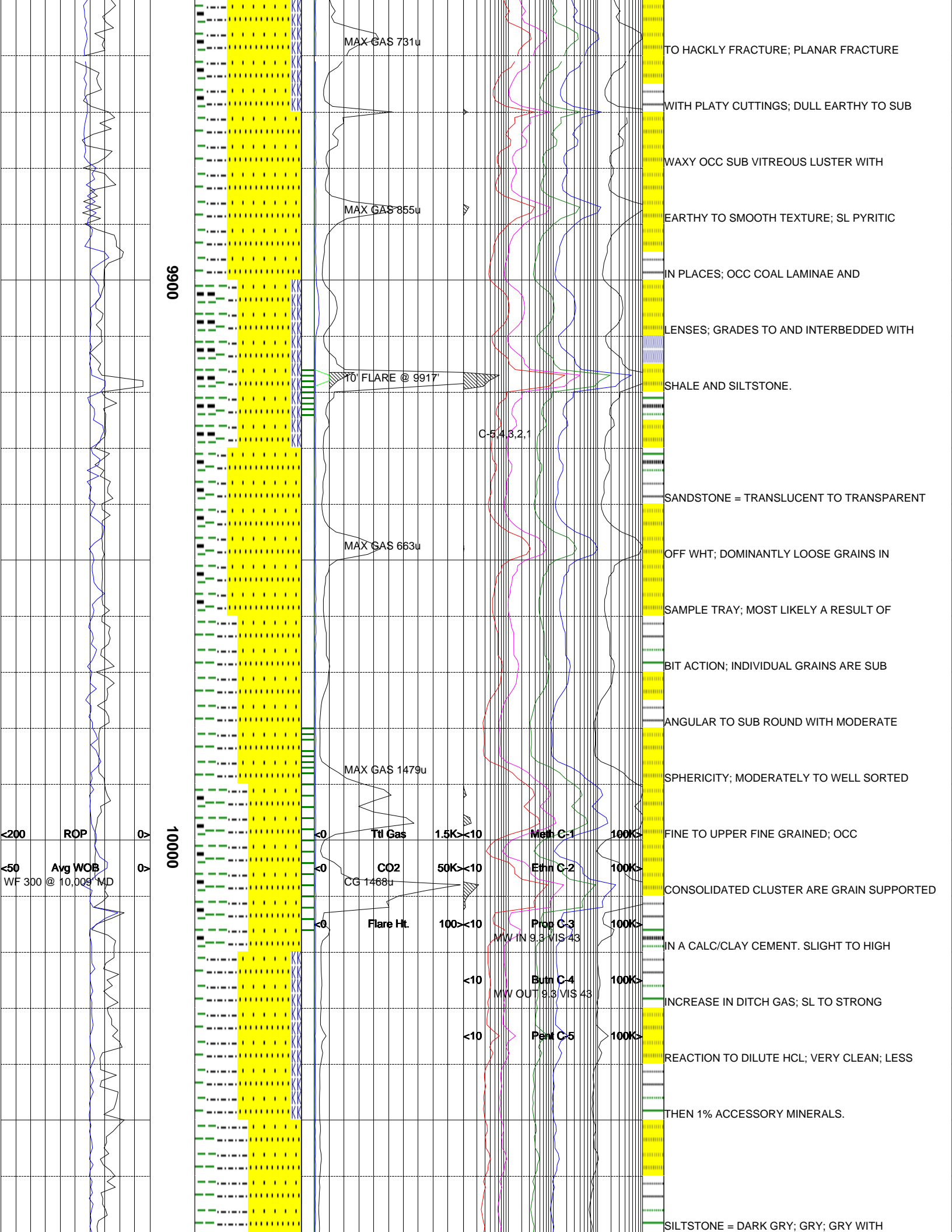
MW OUT 9.3 VIS 40

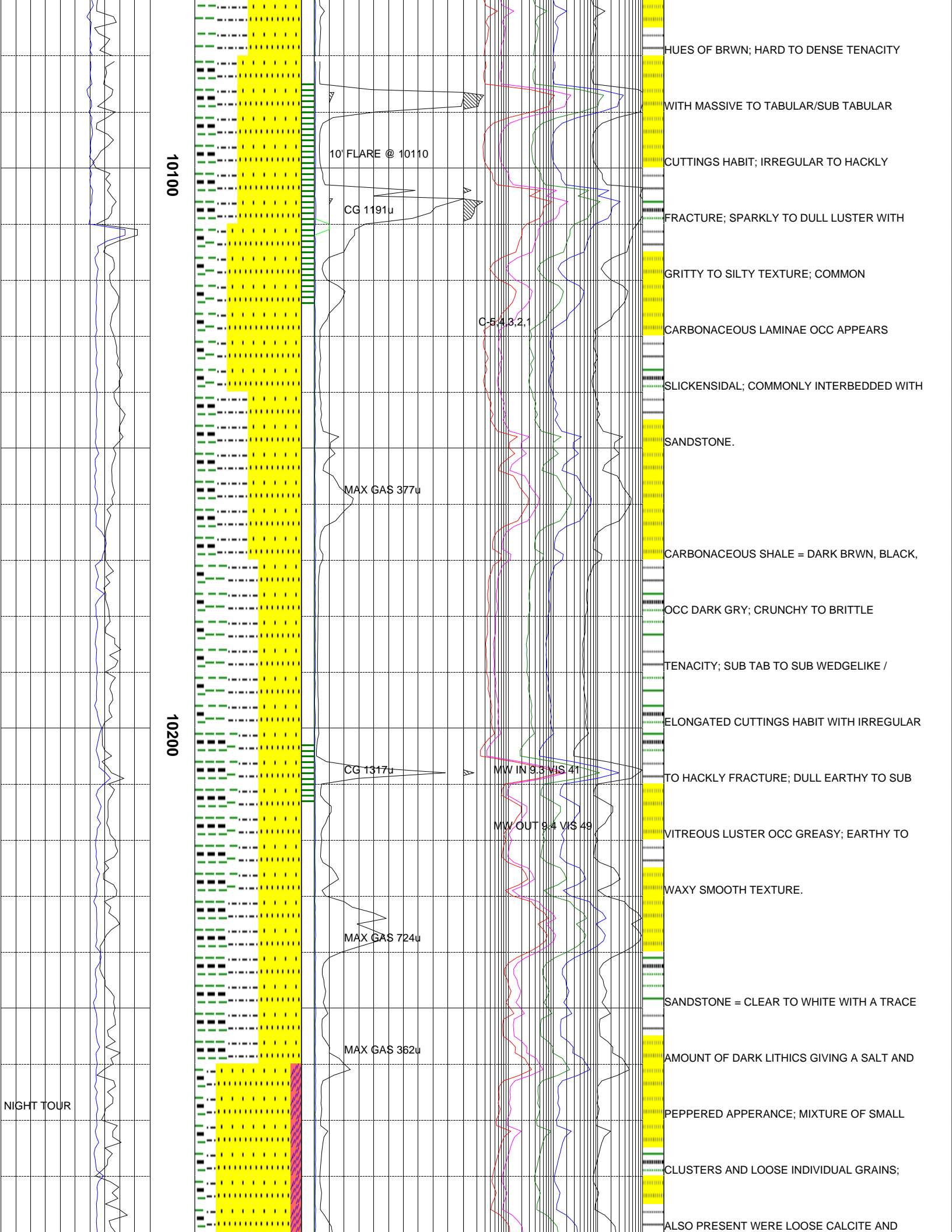
CG 1979u

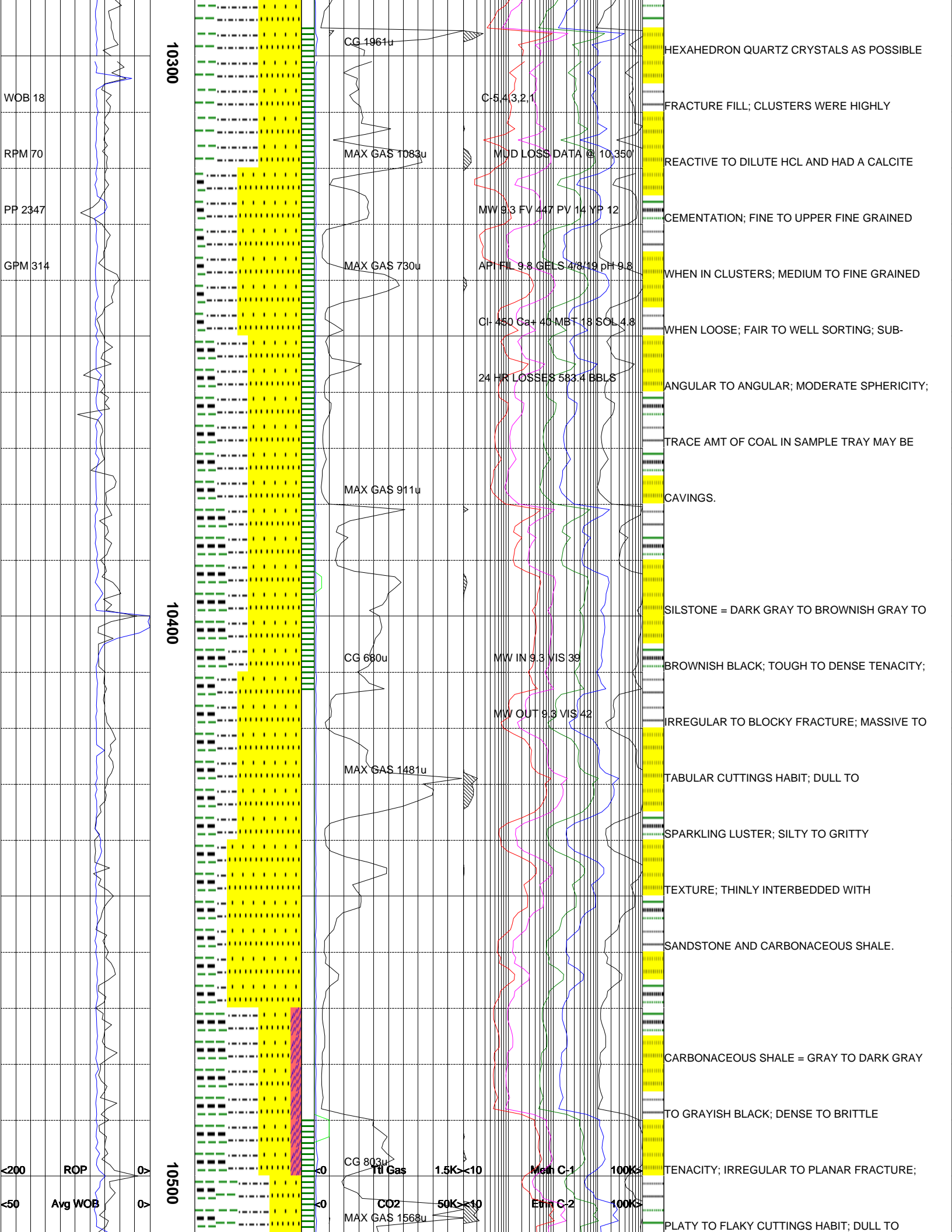
≤ 200 ROP

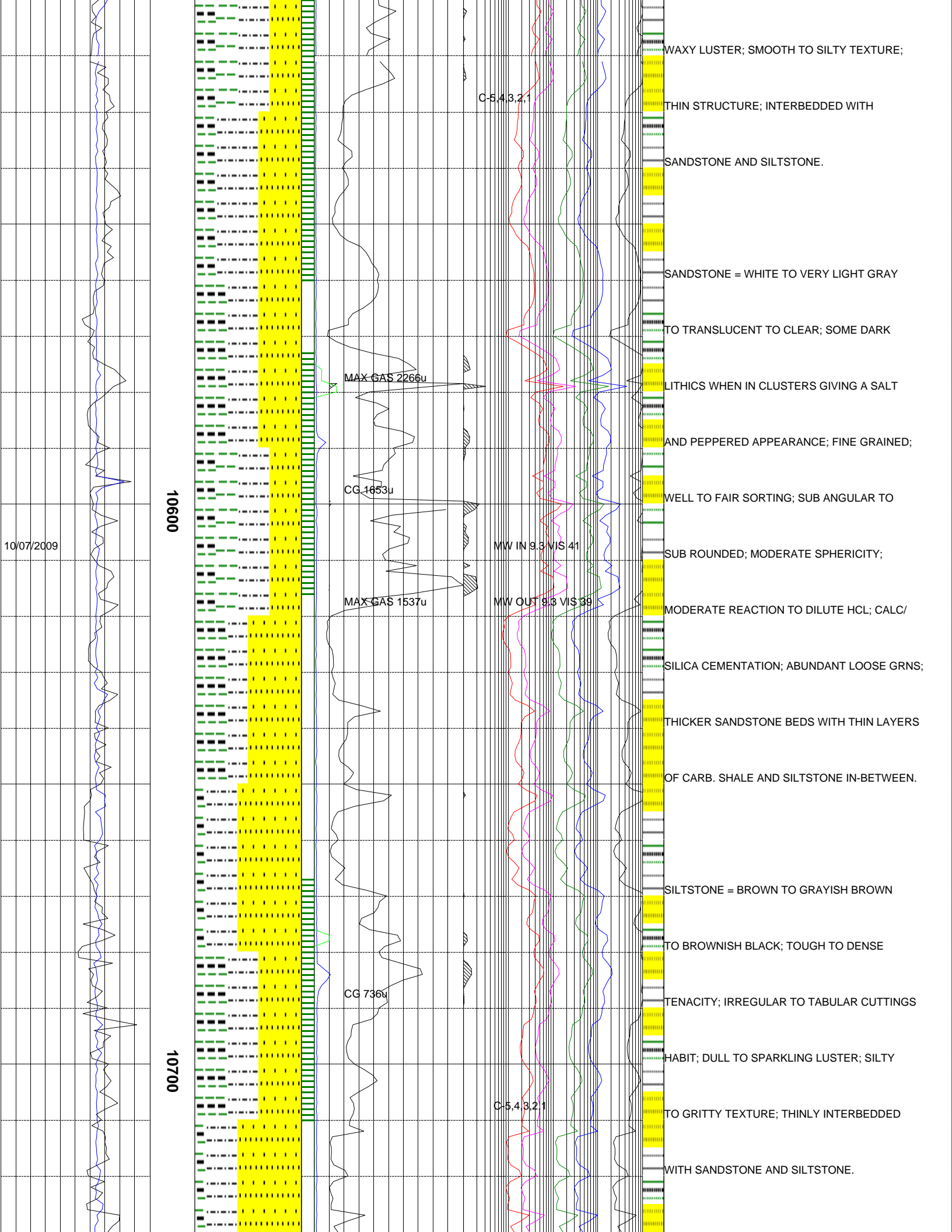
≤ 50 Avg WGB

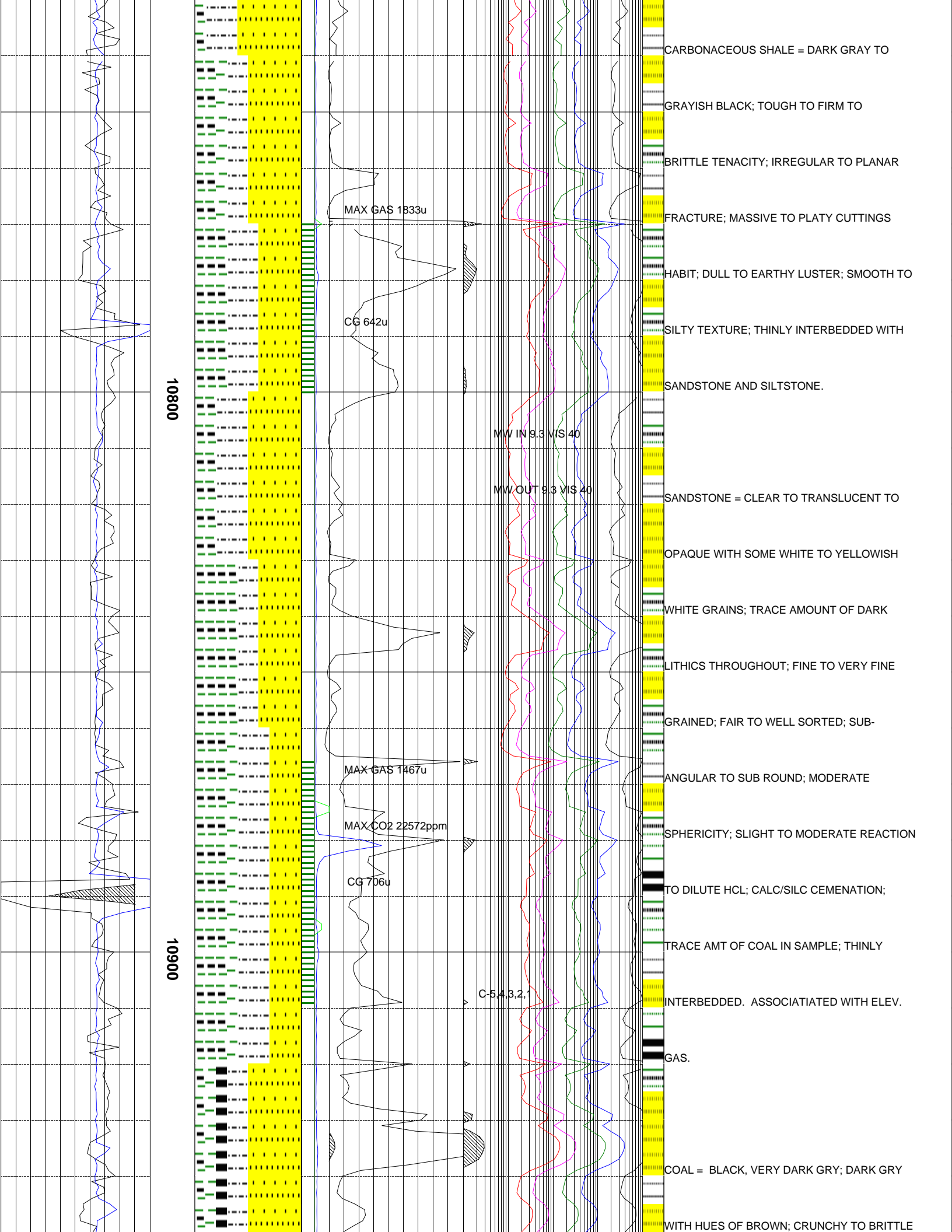


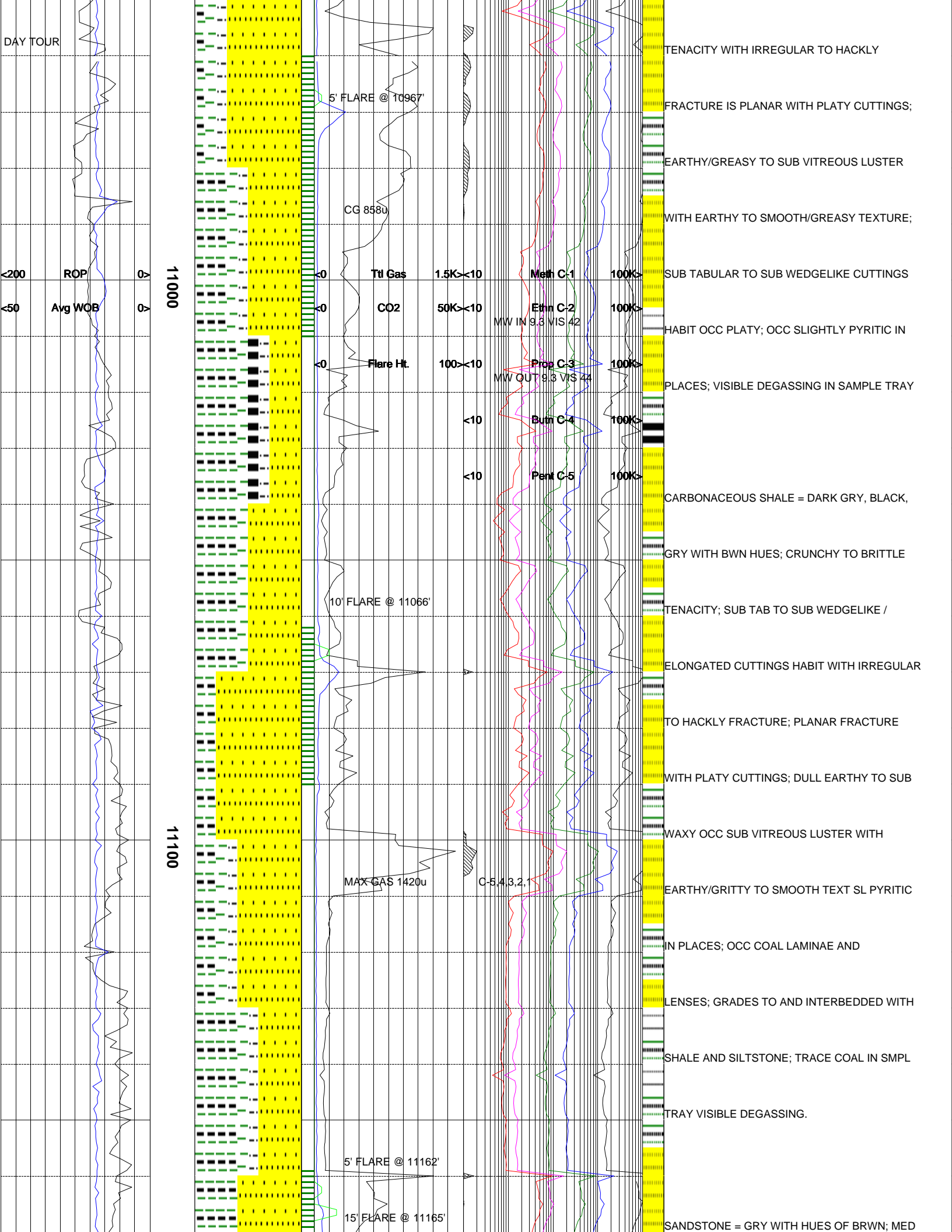












WF 200 @ 11176 MD

11200

11300

CG 1338u

MAX GAS 1367u

MW IN 9.3 VIS 42

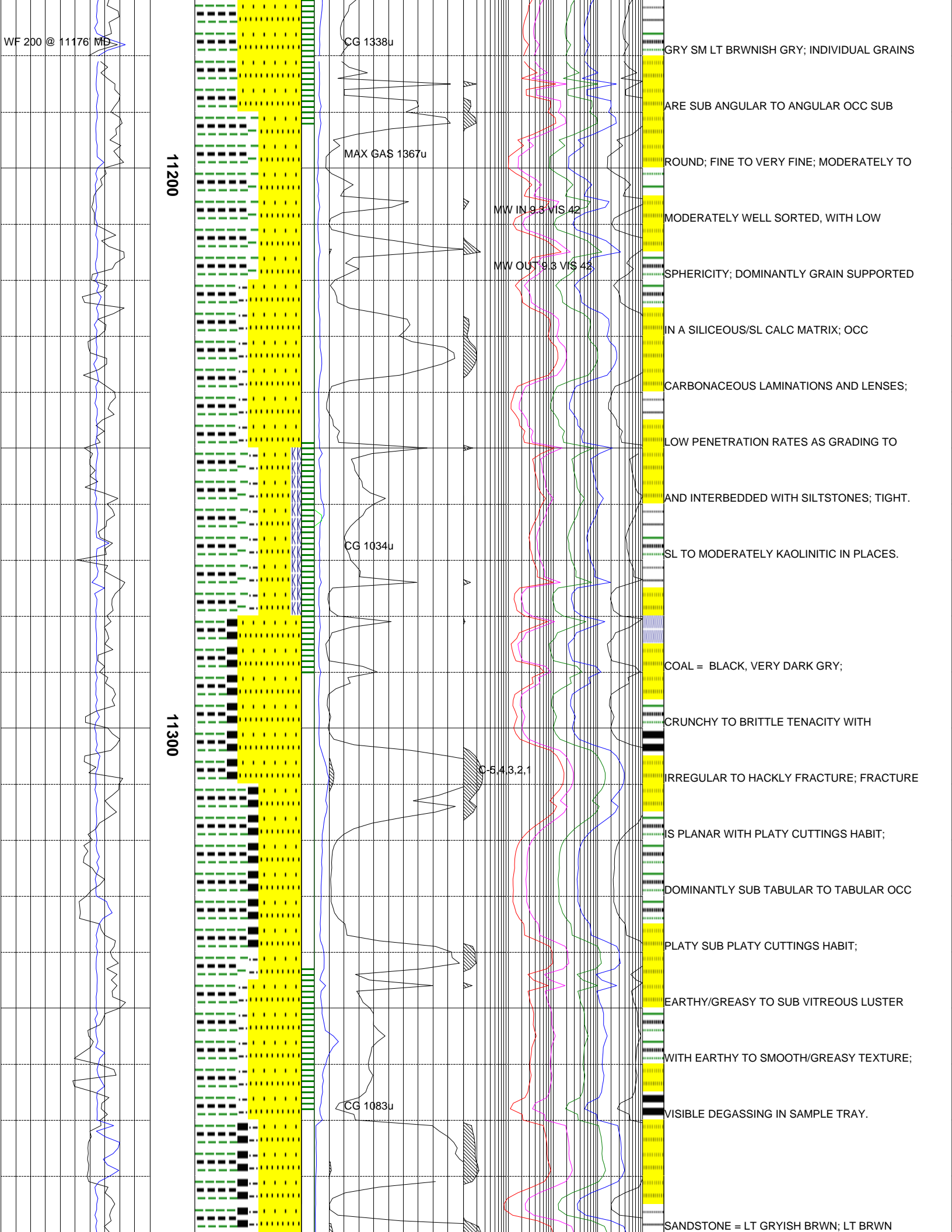
MW OUT 9.3 VIS 42

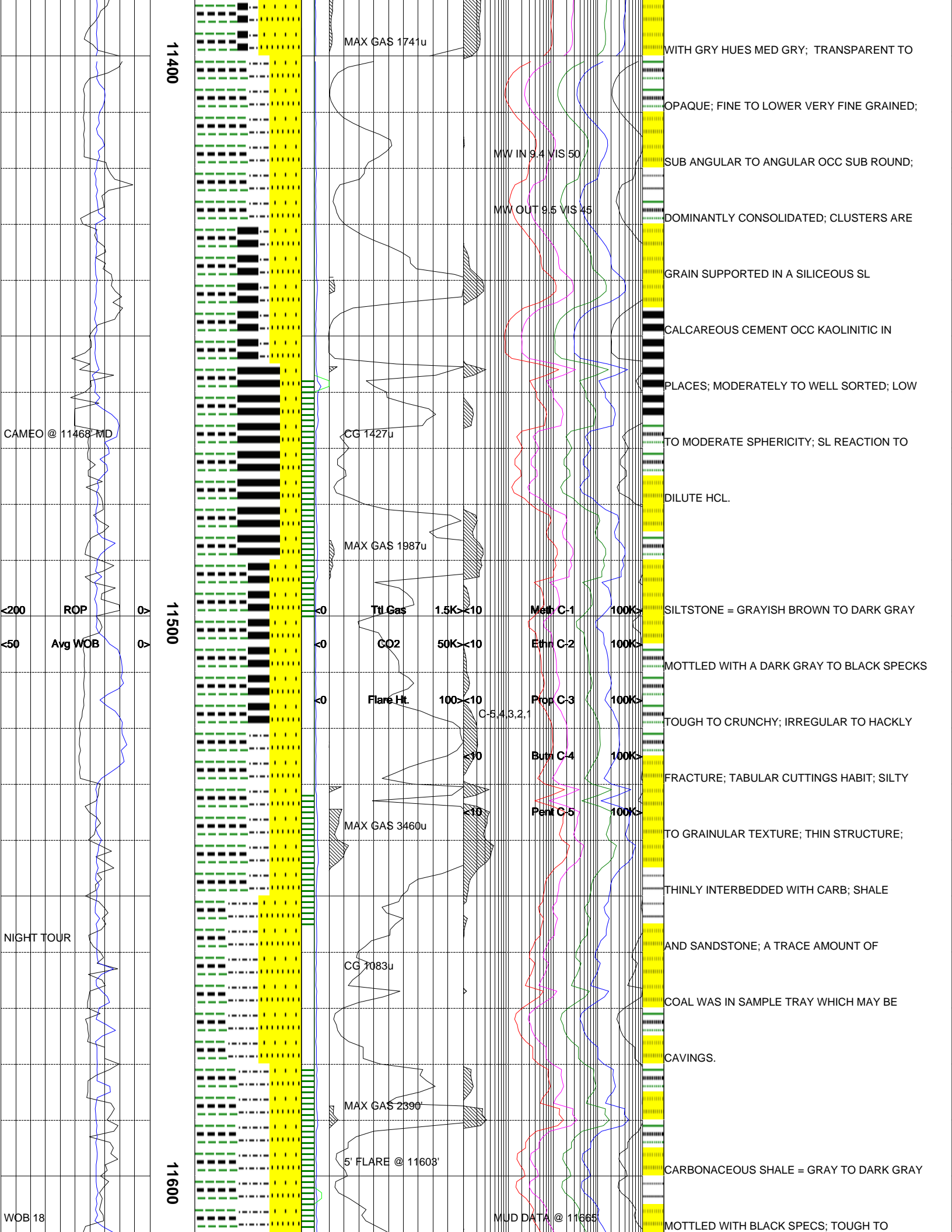
CG 1034u

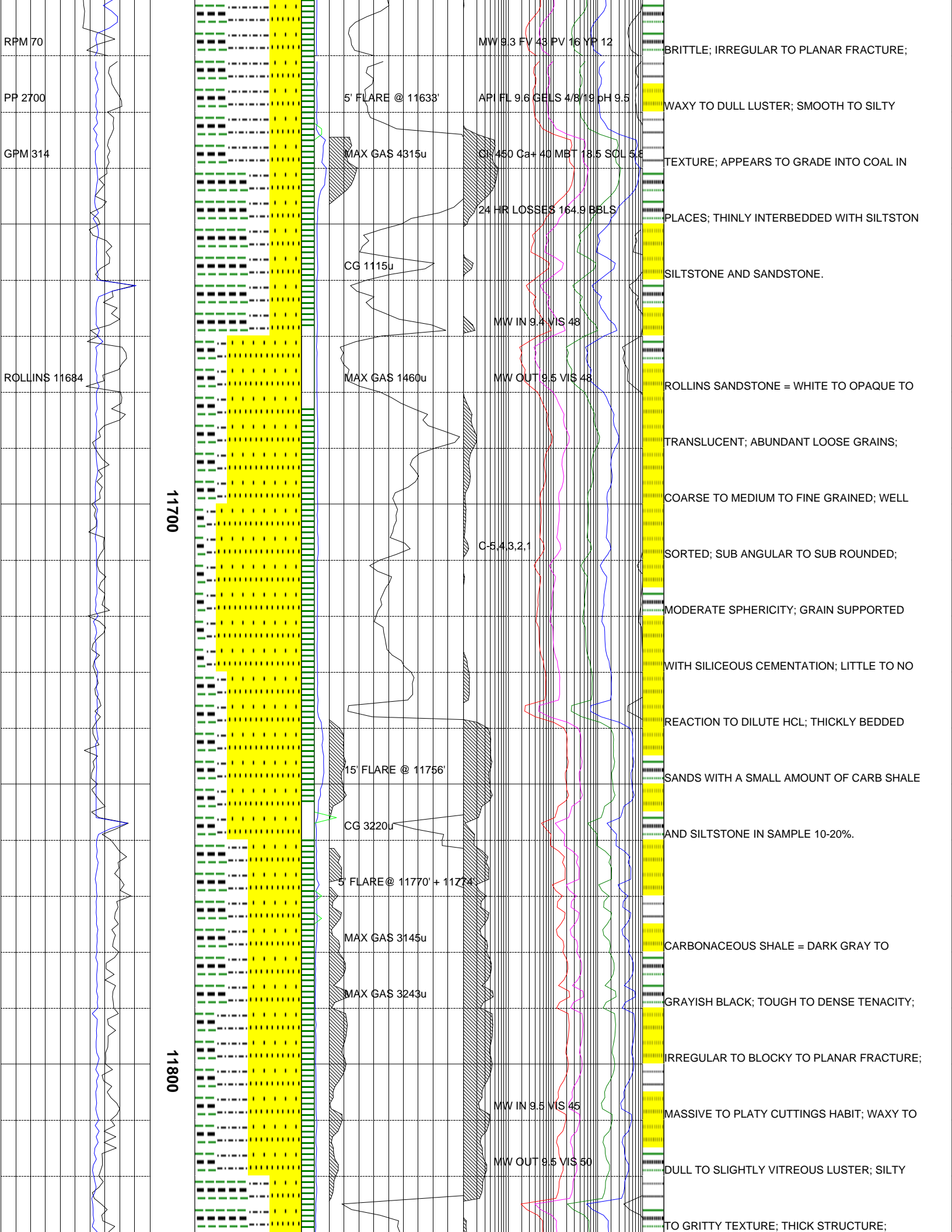
C-543.2.1

CG 1083u

GRY SM LT BRWNISH GRY; INDIVIDUAL GRAINS
 ARE SUB ANGULAR TO ANGULAR OCC SUB
 ROUND; FINE TO VERY FINE; MODERATELY TO
 MODERATELY WELL SORTED, WITH LOW
 SPHERICITY; DOMINANTLY GRAIN SUPPORTED
 IN A SILICEOUS/SL CALC MATRIX; OCC
 CARBACEOUS LAMINATIONS AND LENSES;
 LOW PENETRATION RATES AS GRADING TO
 AND INTERBEDDED WITH SILTSTONES; TIGHT.
 SL TO MODERATELY KAOLINITIC IN PLACES.
 COAL = BLACK, VERY DARK GRY;
 CRUNCHY TO BRITTLE TENACITY WITH
 IRREGULAR TO HACKLY FRACTURE; FRACTURE
 IS PLANAR WITH PLATY CUTTINGS HABIT;
 DOMINANTLY SUB TABULAR TO TABULAR OCC
 PLATY SUB PLATY CUTTINGS HABIT;
 EARTHY/GREASY TO SUB VITREOUS LUSTER
 WITH EARTHY TO SMOOTH/GREASY TEXTURE;
 VISIBLE DEGASSING IN SAMPLE TRAY.
 SANDSTONE = LT GRAYISH BRWN; LT BRWN







RPM 70

PP 2700

GPM 314

ROLLINS 11684

11700

11800

MW 9.3 FV 43 PV 16 YF 12

5' FLARE @ 11633'

API FL 9.6 GELS 4/8/19 pH 9.5

MAX GAS 4315u

CG 450 Ca+ 40 MBT 18.5 SOL 5.8

24 HR LOSSES 164.9 BBLS

CG 1115u

MW IN 9.4 VIS 48

MAX GAS 1460u

MW OUT 9.5 VIS 48

C-5.43.2.1

15' FLARE @ 11756'

CG 3220u

5' FLARE @ 11770' + 11774'

MAX GAS 3145u

MAX GAS 3243u

MW IN 9.5 VIS 45

MW OUT 9.5 VIS 50

BRITTLE; IRREGULAR TO PLANAR FRACTURE;

WAXY TO DULL LUSTER; SMOOTH TO SILTY

TEXTURE; APPEARS TO GRADE INTO COAL IN

PLACES; THINLY INTERBEDDED WITH SILTSTON

SILTSTONE AND SANDSTONE.

ROLLINS SANDSTONE = WHITE TO OPAQUE TO

TRANSLUCENT; ABUNDANT LOOSE GRAINS;

COARSE TO MEDIUM TO FINE GRAINED; WELL

SORTED; SUB ANGULAR TO SUB ROUNDED;

MODERATE SPHERICITY; GRAIN SUPPORTED

WITH SILICEOUS CEMENTATION; LITTLE TO NO

REACTION TO DILUTE HCL; THICKLY BEDDED

SANDS WITH A SMALL AMOUNT OF CARB SHALE

AND SILTSTONE IN SAMPLE 10-20%.

CARBONACEOUS SHALE = DARK GRAY TO

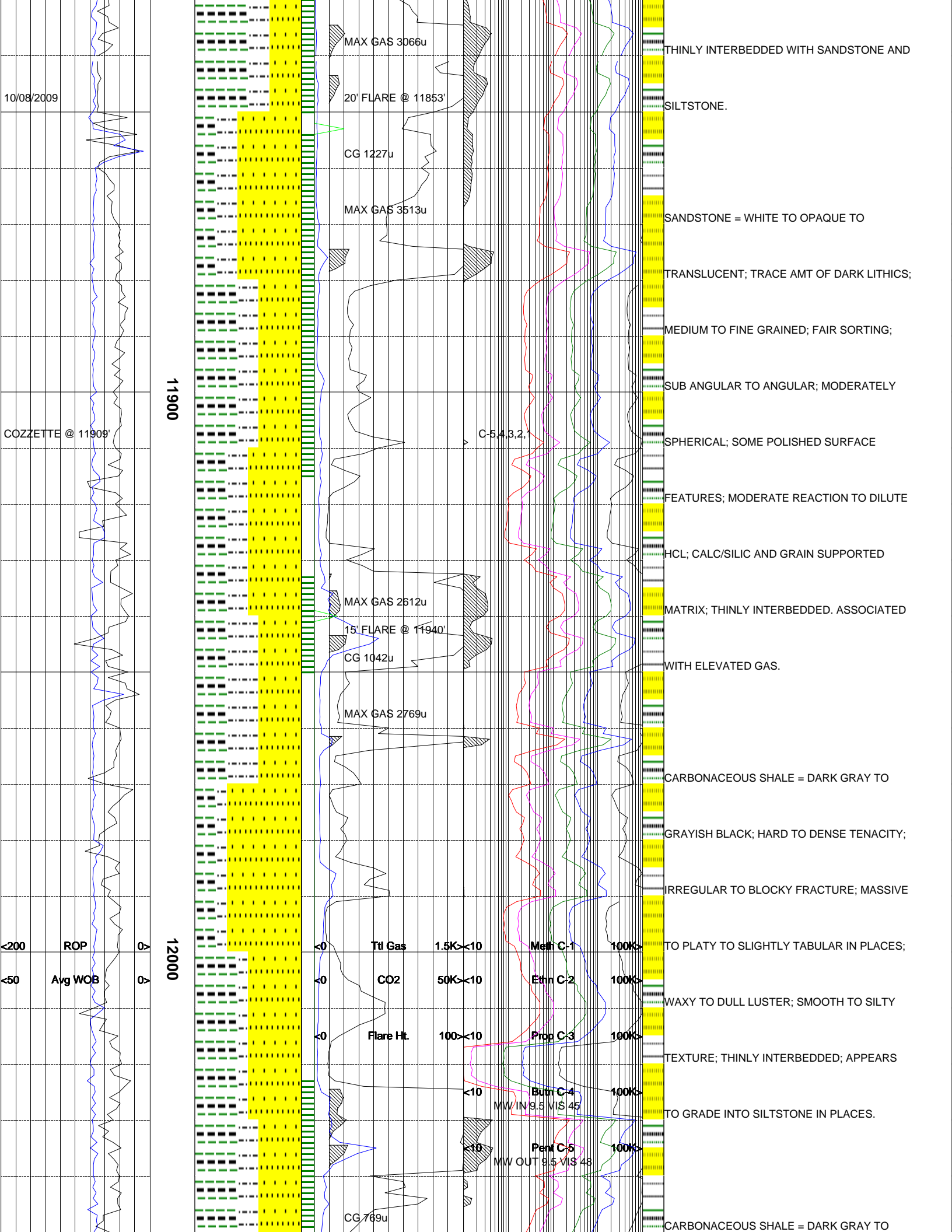
GRAYISH BLACK; TOUGH TO DENSE TENACITY;

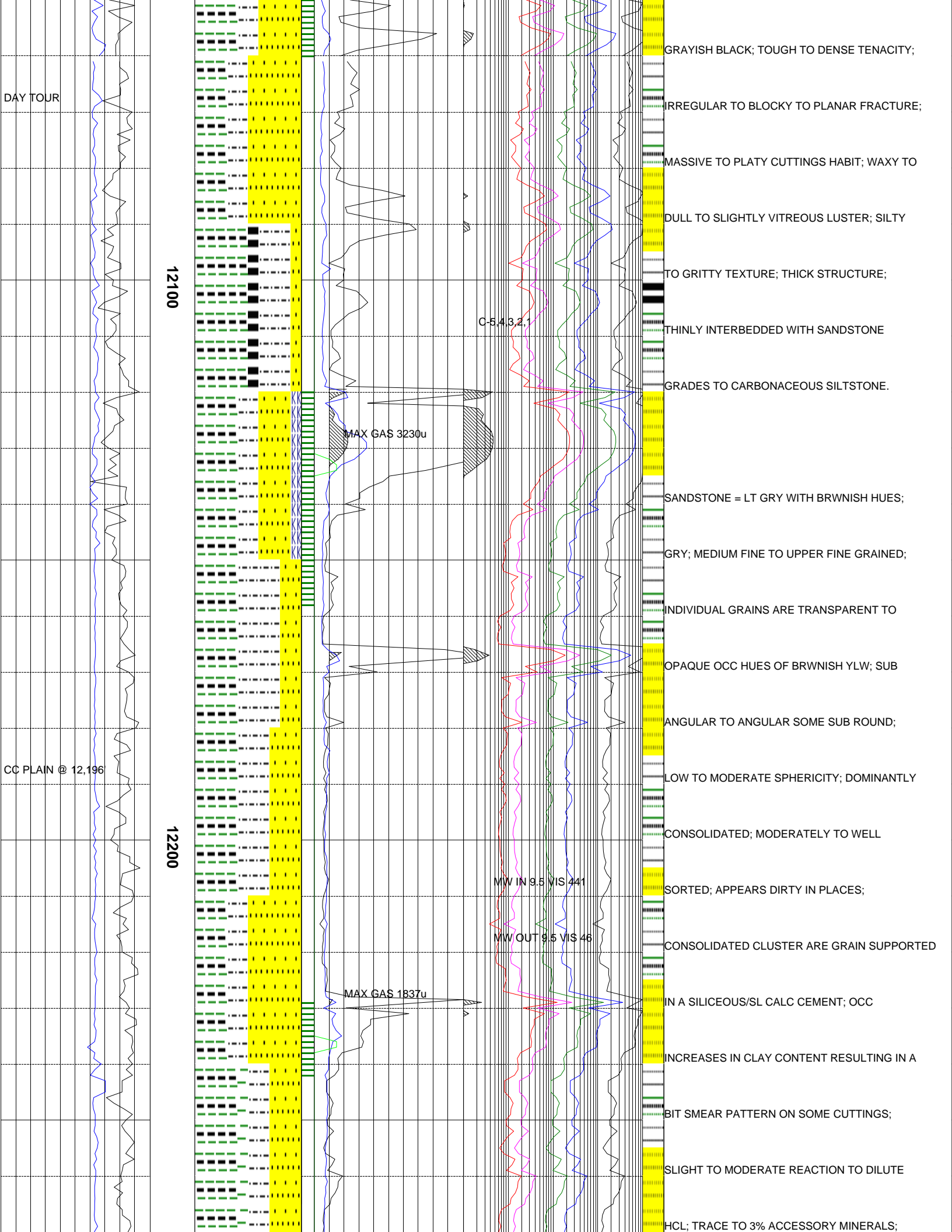
IRREGULAR TO BLOCKY TO PLANAR FRACTURE;

MASSIVE TO PLATY CUTTINGS HABIT; WAXY TO

DULL TO SLIGHTLY VITREOUS LUSTER; SILTY

TO GRITTY TEXTURE; THICK STRUCTURE;





DAY TOUR

12100

MAX GAS 3230u

C-543.2.1

CC PLAIN @ 12,196

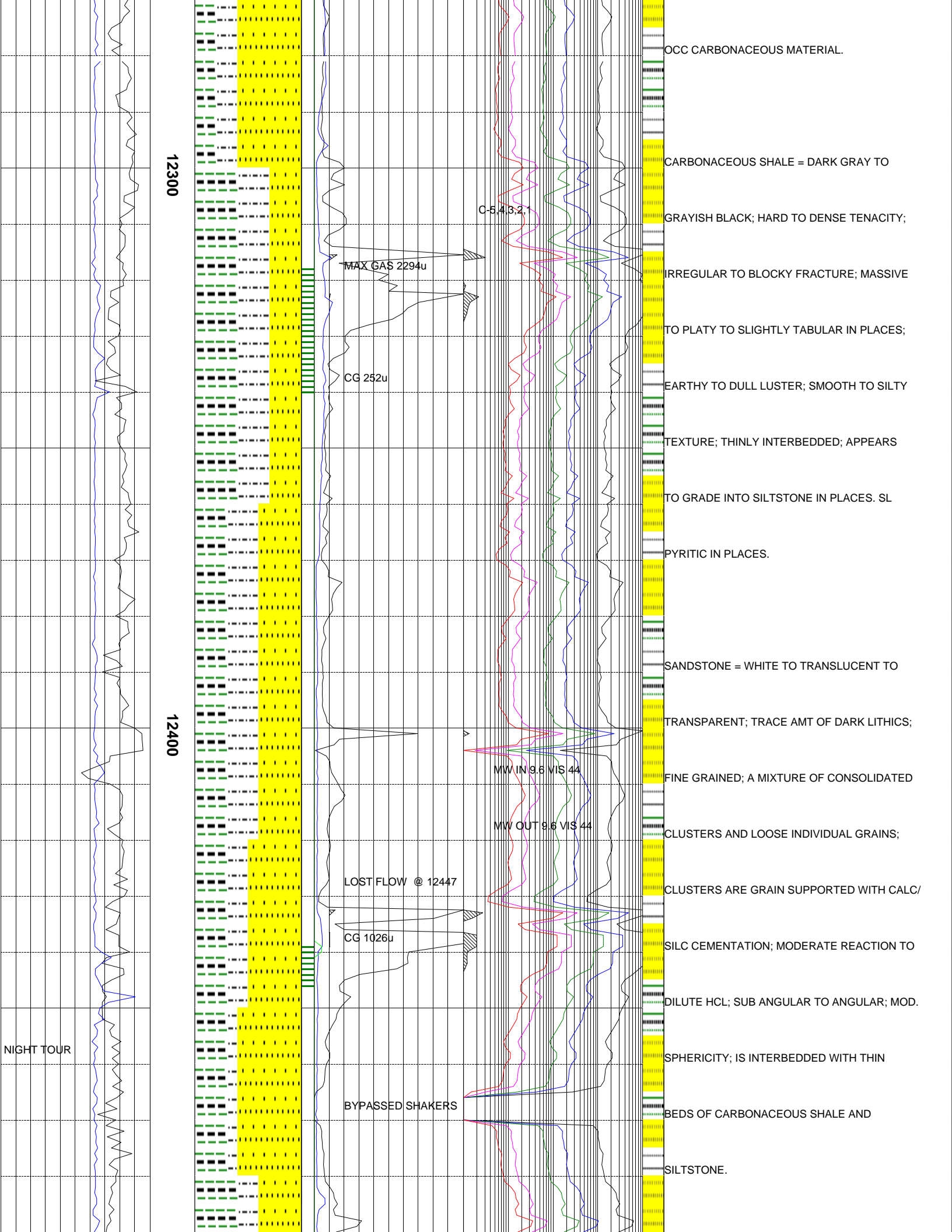
12200

MAX GAS 1837u

MW IN 9.5 VIS 441

MW OUT 9.5 VIS 46

GRAYISH BLACK; TOUGH TO DENSE TENACITY;
 IRREGULAR TO BLOCKY TO PLANAR FRACTURE;
 MASSIVE TO PLATY CUTTINGS HABIT; WAXY TO
 DULL TO SLIGHTLY VITREOUS LUSTER; SILTY
 TO GRITTY TEXTURE; THICK STRUCTURE;
 THINLY INTERBEDDED WITH SANDSTONE
 GRADES TO CARBONACEOUS SILTSTONE.
 SANDSTONE = LT GRY WITH BRWNISH HUES;
 GRY; MEDIUM FINE TO UPPER FINE GRAINED;
 INDIVIDUAL GRAINS ARE TRANSPARENT TO
 OPAQUE OCC HUES OF BRWNISH YLW; SUB
 ANGULAR TO ANGULAR SOME SUB ROUND;
 LOW TO MODERATE SPHERICITY; DOMINANTLY
 CONSOLIDATED; MODERATELY TO WELL
 SORTED; APPEARS DIRTY IN PLACES;
 CONSOLIDATED CLUSTER ARE GRAIN SUPPORTED
 IN A SILICEOUS/SL CALC CEMENT; OCC
 INCREASES IN CLAY CONTENT RESULTING IN A
 BIT SMEAR PATTERN ON SOME CUTTINGS;
 SLIGHT TO MODERATE REACTION TO DILUTE
 HCL; TRACE TO 3% ACCESSORY MINERALS;



12300

12400

C-5.43.2

MAX GAS 2294u

CG 252u

MW IN 9.6 VIS 44

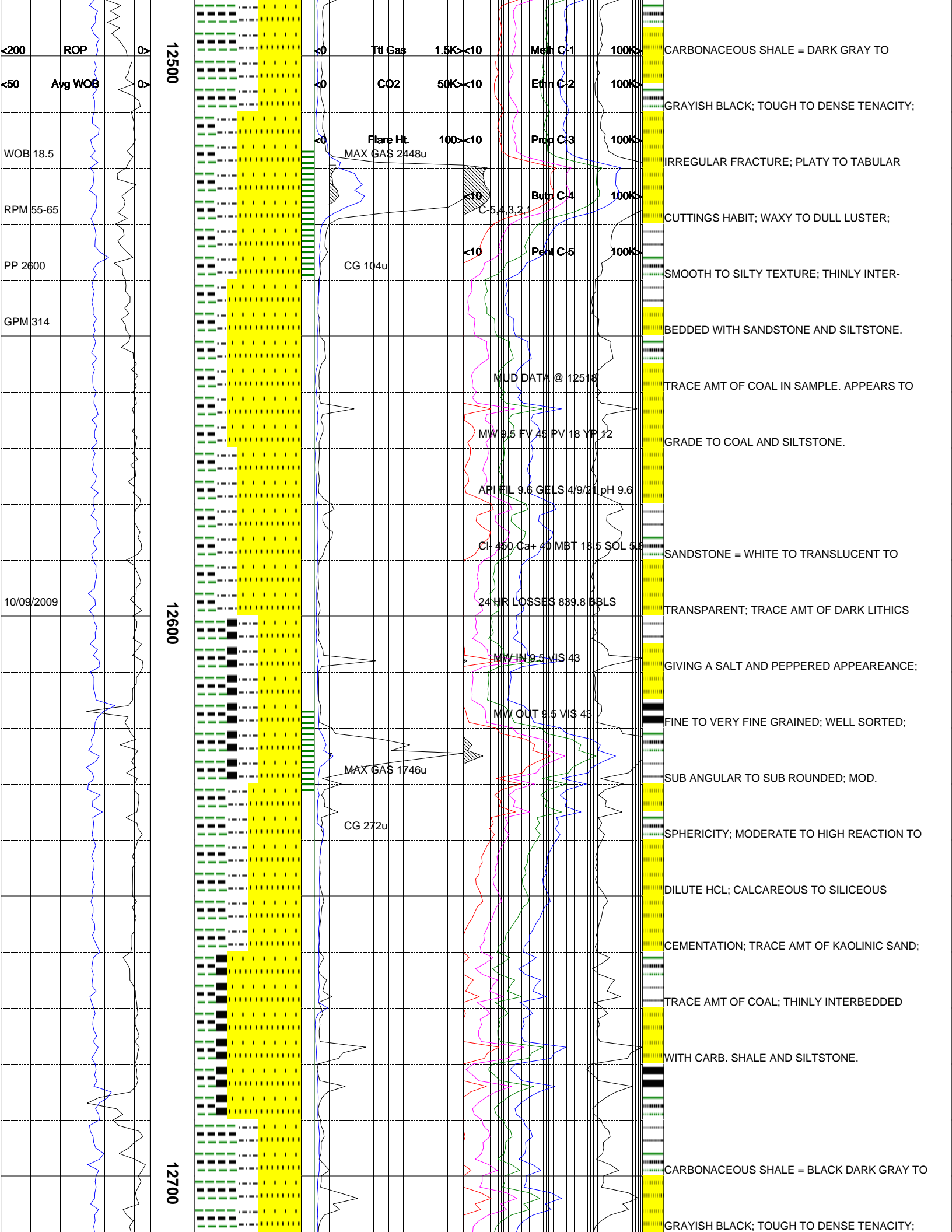
MW OUT 9.6 VIS 44

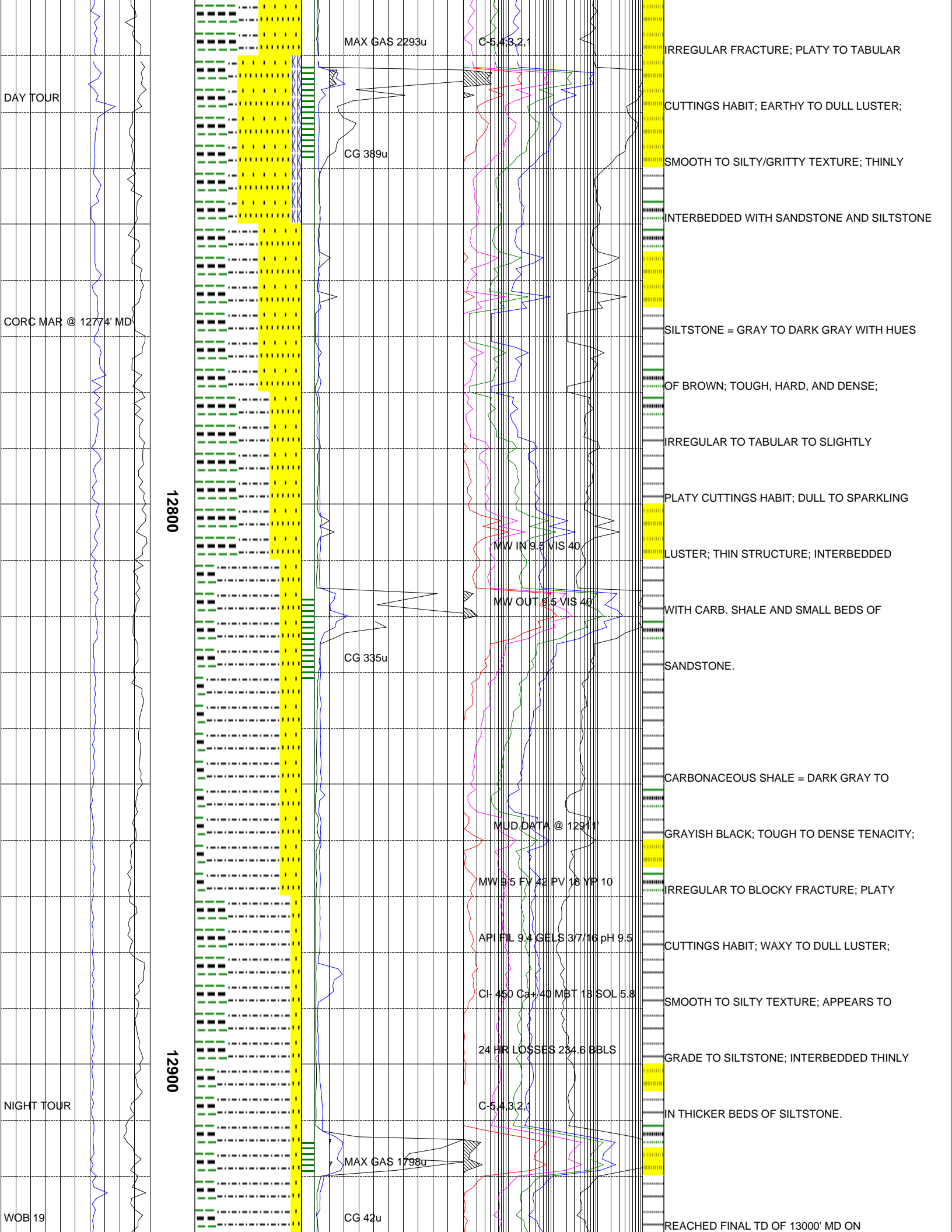
LOST FLOW @ 12447

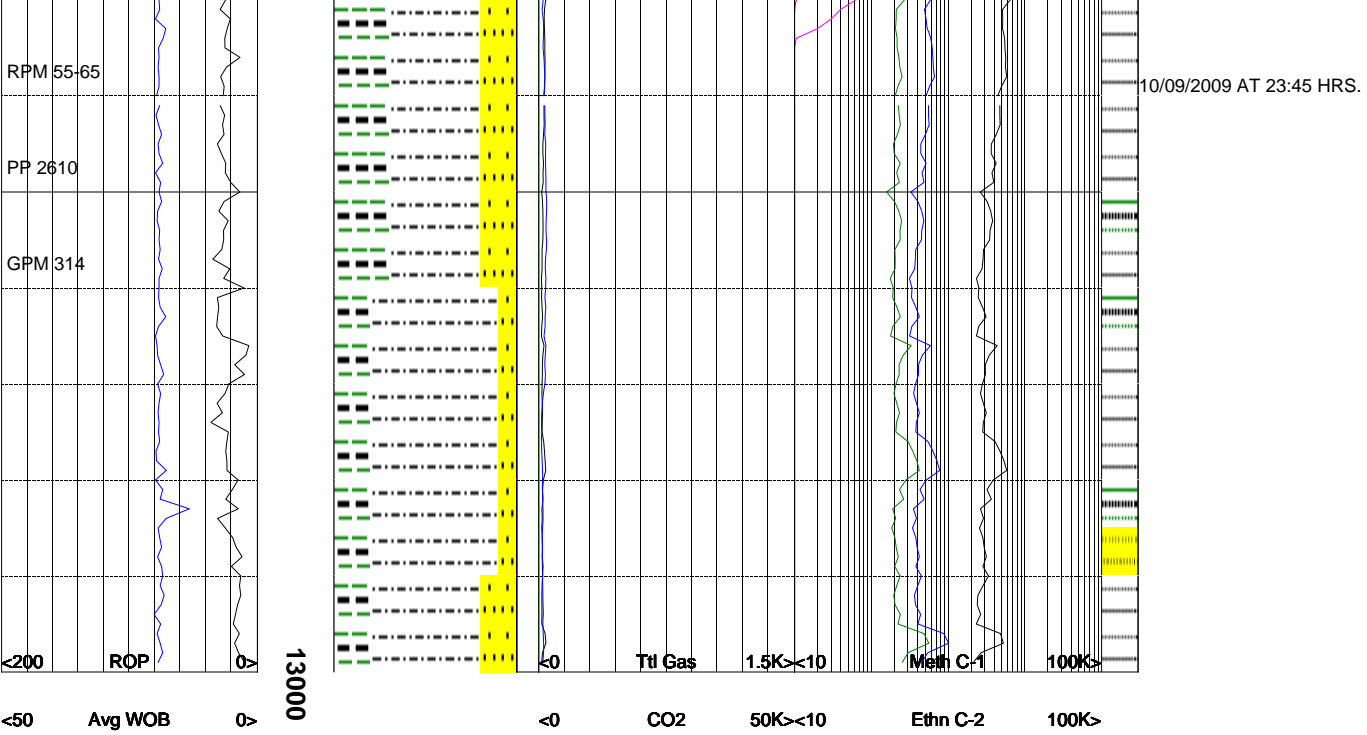
CG 1026u

BYPASSED SHAKERS

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.

<10 Butn C-4 100K>

<10 Pent C-5 100K>

