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	PCU 296-5A9
FIELD	PICEANCE CREEK
REGION	ROCKIES
COORDINATES	LAT: 39.911922
	LONG:-108.198686
ELEVATION	G.L.: 7294.1'
	RKB: 30.2
COUNTY, STATE	RIO BLANCO, CO
API INDEX	051031124100
SPUD DATE	12/05/2009
CONTRACTOR	HELMERICH _PAYNE
CO. REP.	C. CURTIS
RIG/TYPE	FLEX 4S / HP 321
LOGGING UNIT	ML031
GEOLOGISTS	B. SMELSER, M. GROSS
	C. RECORD
ADD. PERSONS	
CO. GEOLOGIST	C. ALBA

LOG INTERVAL

DEPTHS:	4779'	**TO**	13772'
DATES:	01/27/2011	**TO**	04/15/2011
SCALE:	5" = 100'		

MUD TYPES

SPUD MUD	**TO**	4779'
LSND	**TO**	13772'
	TO	
	TO	

CASING DATA

16"	**AT**	150'
10.75"	**AT**	4764'
7.00"	**AT**	10032'
	AT	

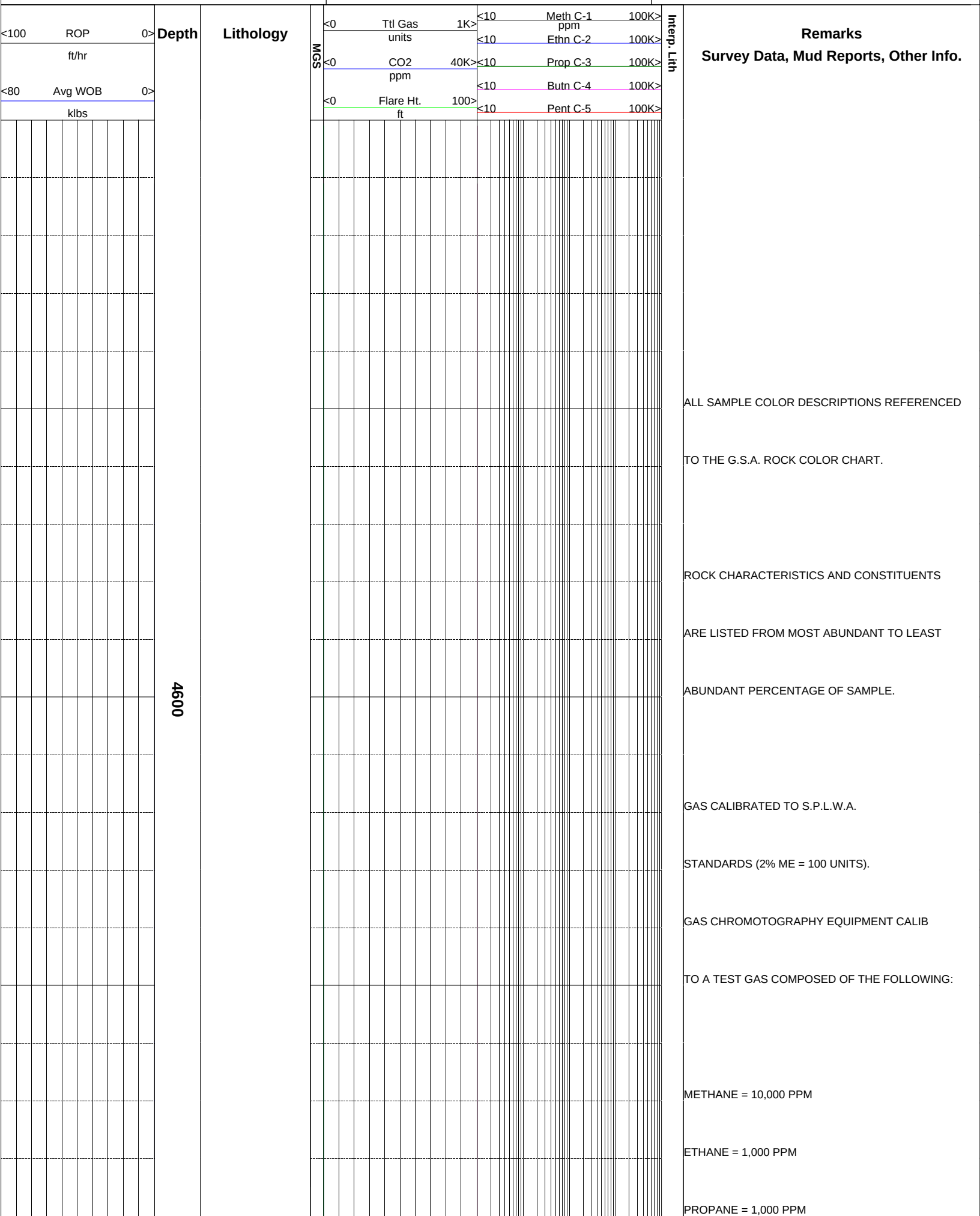
HOLE SIZE

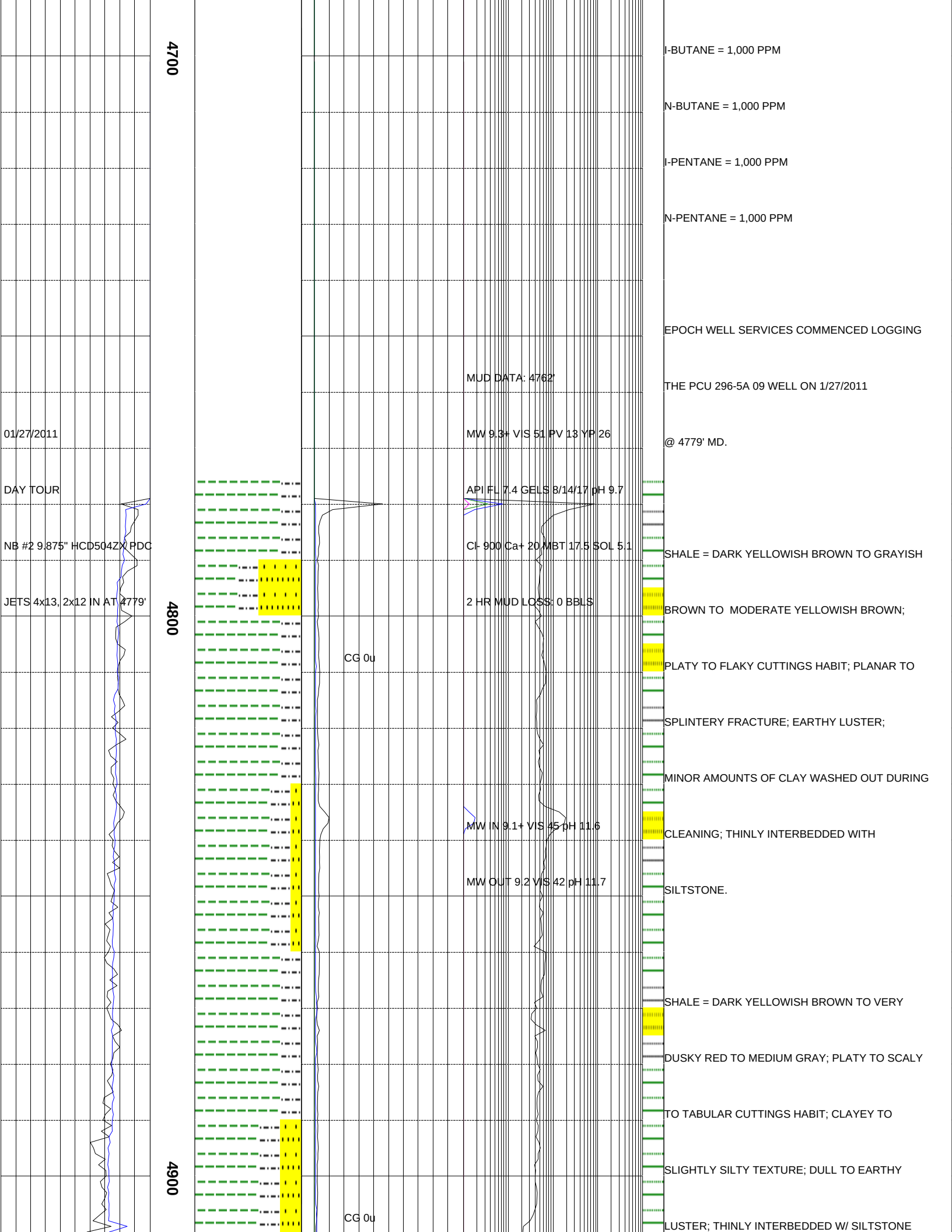
14.75"	**TO**	4779'
9.875"	**TO**	10051'
6.125"	**TO**	13772'
	TO	

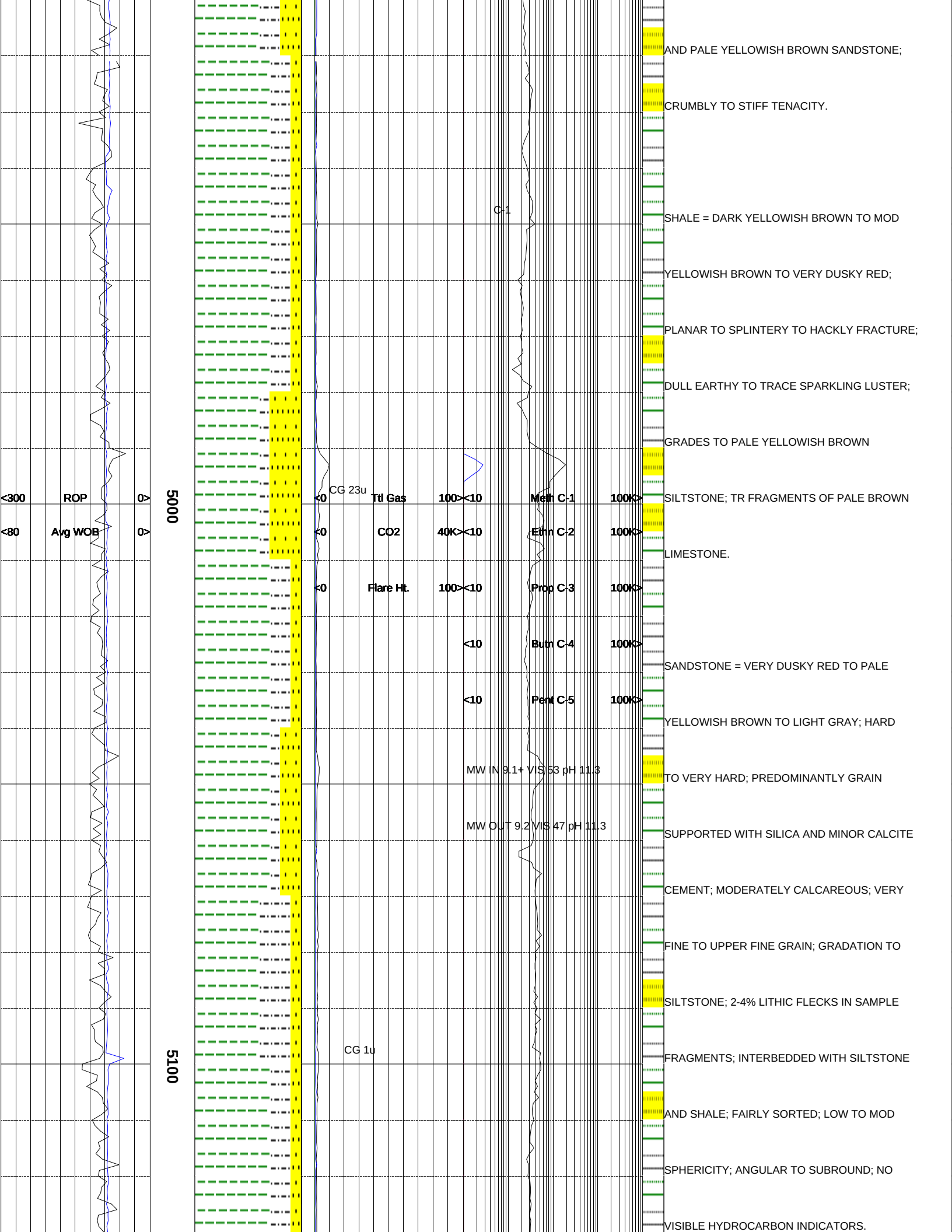
ABBREVIATIONS

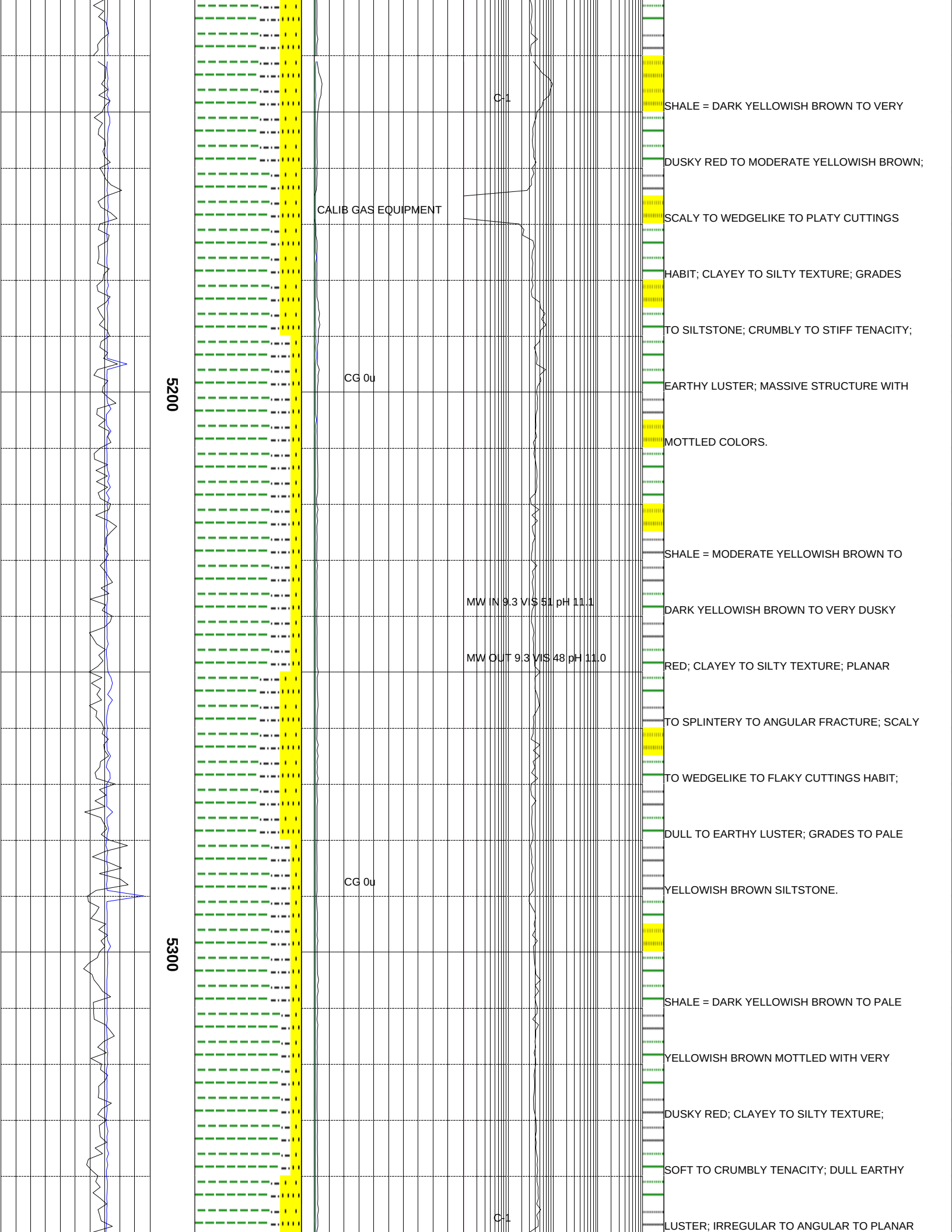
NB	NEWBIT	*PV*	PLASTIC VISCOSITY	*LC*	LOST CIRCULATION
RRB	RERUN BIT	*YP*	YIELD POINT	*CO*	CIRCULATE OUT
CB	CORE BIT	*FL*	FLUID LOSS	*NR*	NO RETURNS
WOB	WEIGHT ON BIT	*CL*	PPM CLORIDE ION	*TG*	TRIP GAS
RPM	ROTARY REV/MIN	*Rm*	MUD RESISTIVITY	*SG*	SURVEY GAS
PP	PUMP PRESSURE	*Rmf*	FILTRATE RESISTIVITY	*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		

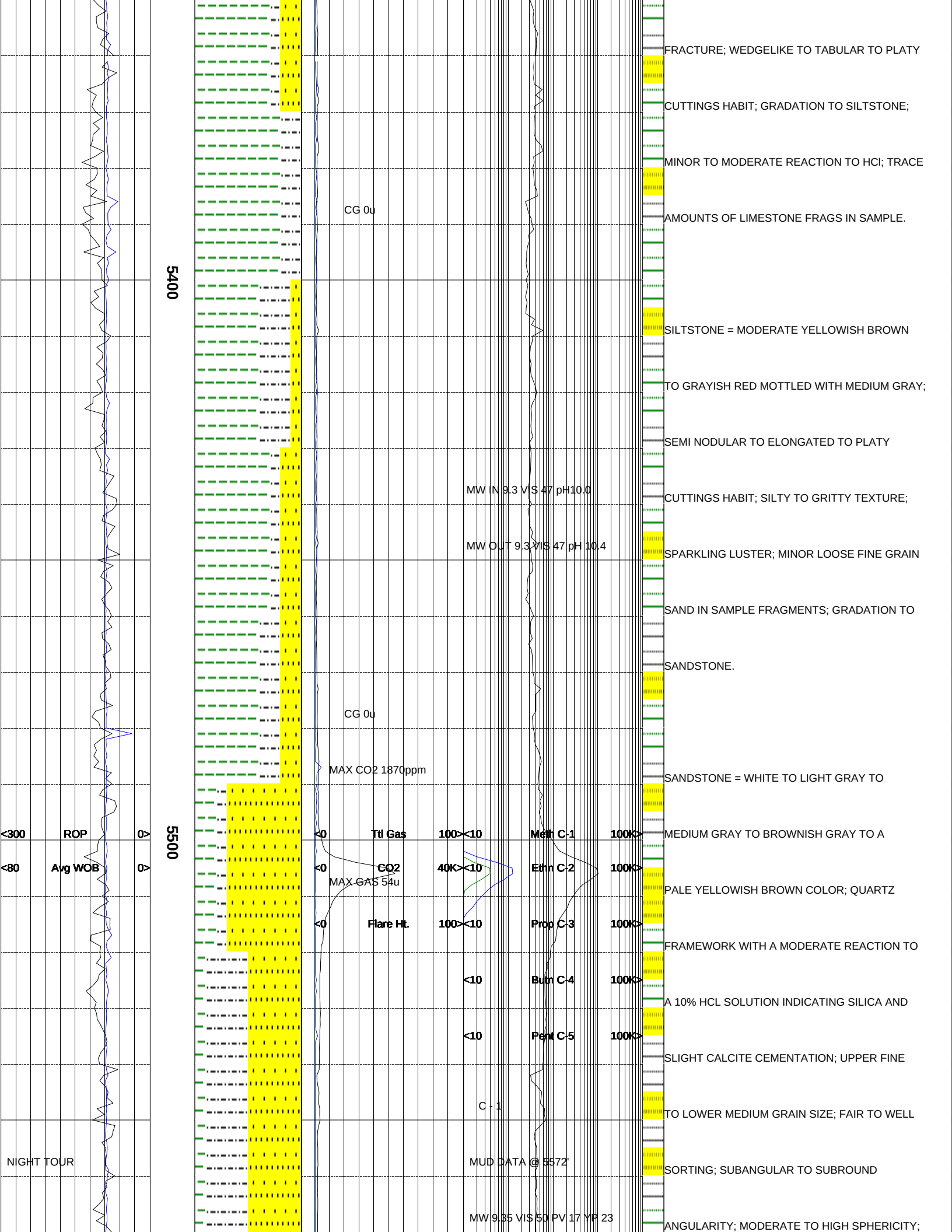
ALTERED ZONE
ANDESITE
ANHYDRITE
BASALT
BENTONITE
BIOTITIZATION
BRECCIA
CALCARENITE
CALCAREOUS TUFF
CALCILUTITE
CARBONATES
CARBONACEOUS MAT
CARBONACEOUS SH
CEMENT CONTAM.
CHALK
CRYSTALLINE TUFF
CHERT - ARGILL
CHERT - GLASSY
CHERT - PORCEL
CHERT - TIGER STRIPE
CHERT - UNDIFF
CLAY
CLAY-MUDSTONE
CLYST-TUFFACEOUS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

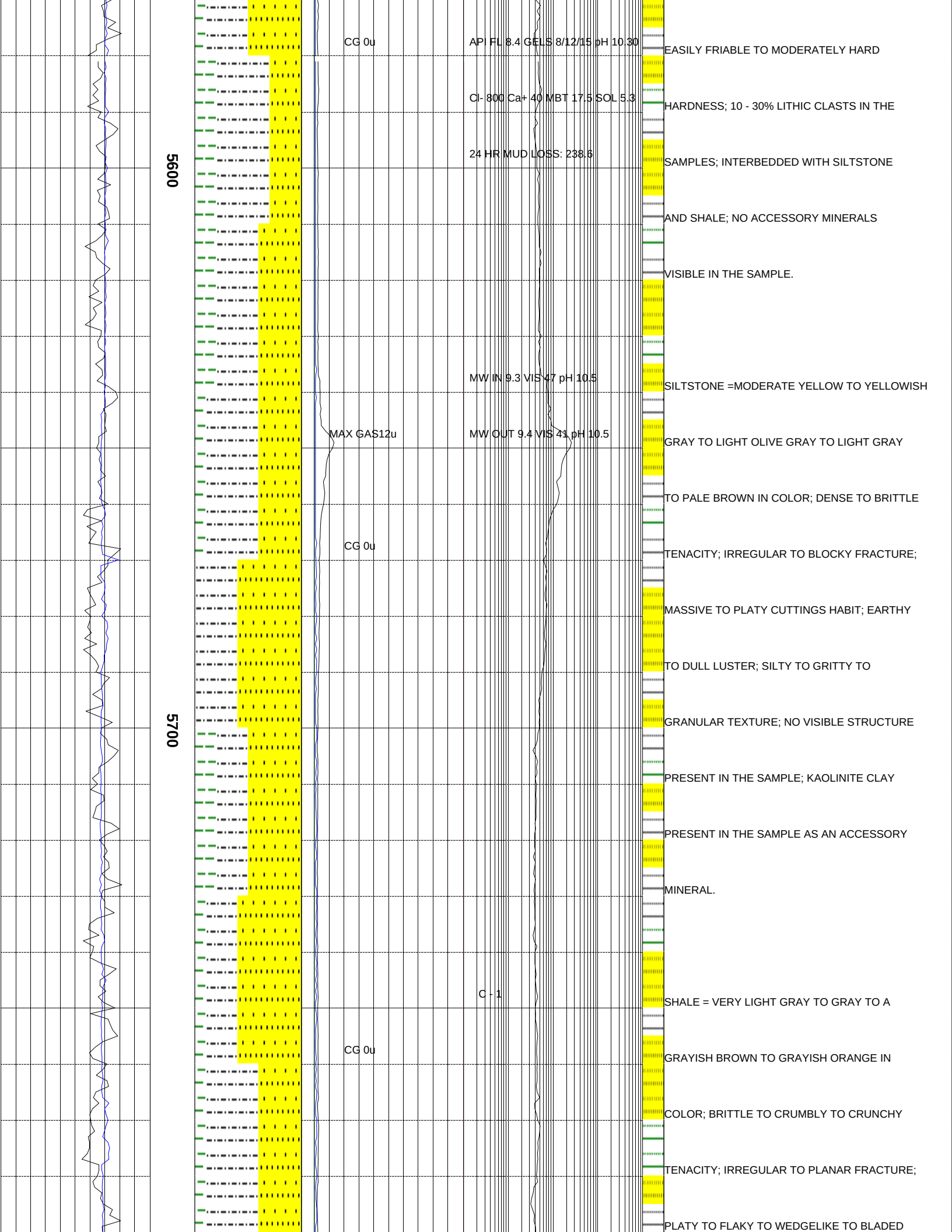

<100 ROP 0>
ft/hr
<80 Avg WOB 0>
klbs
Depth
Lithology
MGS
<0 Ttl Gas 1K>
units
<0 CO2 40K>
ppm
<0 Flare Ht. 100>
ft
<10 Meth C-1 100K>
ppm
<10 Ethn C-2 100K>
<10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>
Interp. Lith
4600
Remarks
Survey Data, Mud Reports, Other Info.
ALL SAMPLE COLOR DESCRIPTIONS 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 CHROMOTOGRAPHY EQUIPMENT CALIB
TO A TEST GAS COMPOSED OF THE FOLLOWING:
METHANE = 10,000 PPM
ETHANE = 1,000 PPM
PROPANE = 1,000 PPM

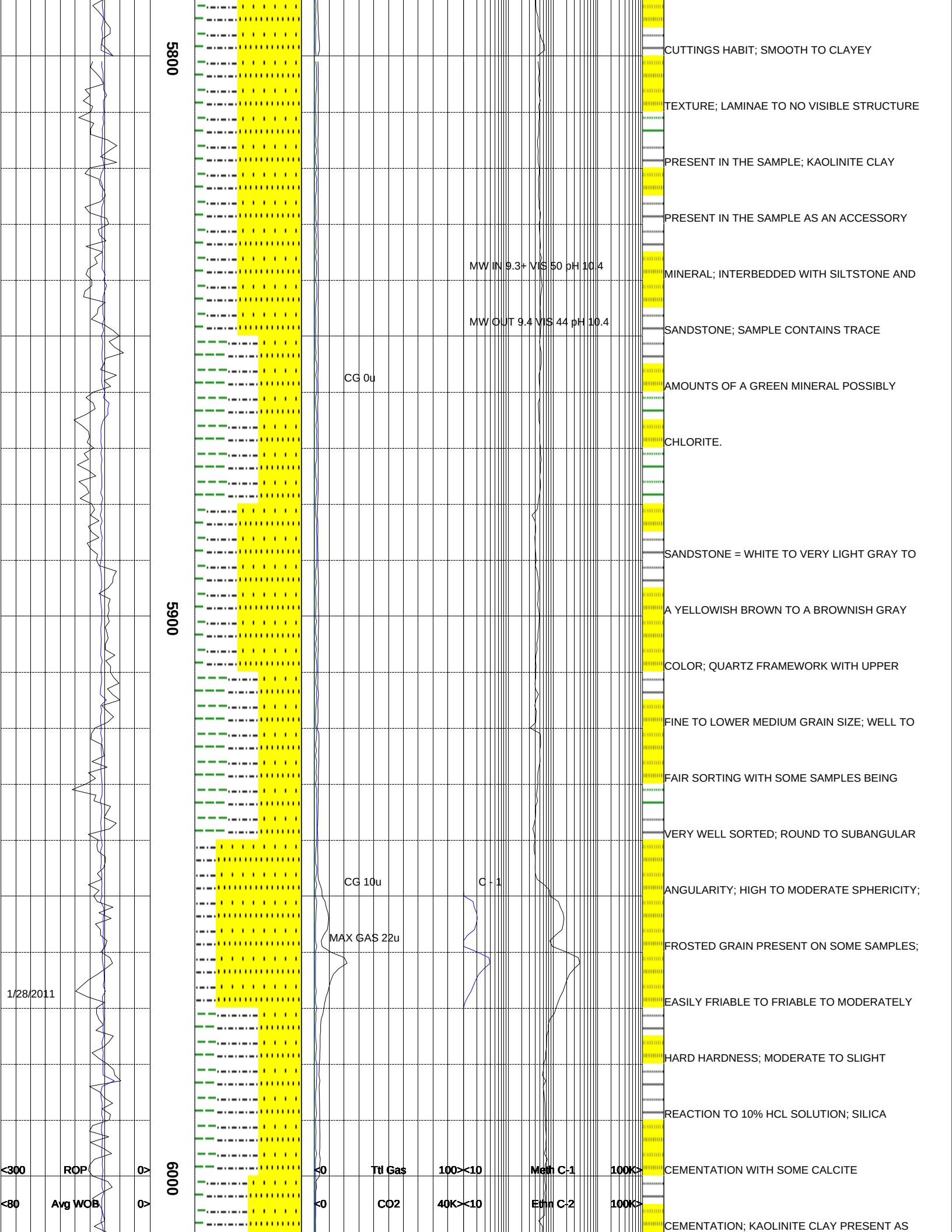

4700
4800
4900
I-BUTANE = 1,000 PPM
N-BUTANE = 1,000 PPM
I-PENTANE = 1,000 PPM
N-PENTANE = 1,000 PPM
EPOCH WELL SERVICES COMMENCED LOGGING
THE PCU 296-5A 09 WELL ON 1/27/2011
@ 4779' MD.
MUD DATA: 4762'
MW 9.3+ VIS 51 PV 13 YP 26
API FL 7.4 GELS 8/14/17 pH 9.7
Cl- 900 Ca+ 20 MBT 17.5 SOL 5.1
2 HR MUD LOSS: 0 BBLS
01/27/2011
DAY TOUR
NB #2 9.875" HCD504ZX PDC
JETS 4x13, 2x12 IN AT 4779'
CG 0u
MW IN 9.1+ VIS 45 pH 11.6
MW OUT 9.2 VIS 42 pH 11.7
CG 0u
SHALE = DARK YELLOWISH BROWN TO GRAYISH
BROWN TO MODERATE YELLOWISH BROWN;
PLATY TO FLAKY CUTTINGS HABIT; PLANAR TO
SPLINTERY FRACTURE; EARTHY LUSTER;
MINOR AMOUNTS OF CLAY WASHED OUT DURING
CLEANING; THINLY INTERBEDDED WITH
SILTSTONE.
SHALE = DARK YELLOWISH BROWN TO VERY
DUSKY RED TO MEDIUM GRAY; PLATY TO SCALY
TO TABULAR CUTTINGS HABIT; CLAYEY TO
SLIGHTLY SILTY TEXTURE; DULL TO EARTHY
LUSTER; THINLY INTERBEDDED W/ SILTSTONE

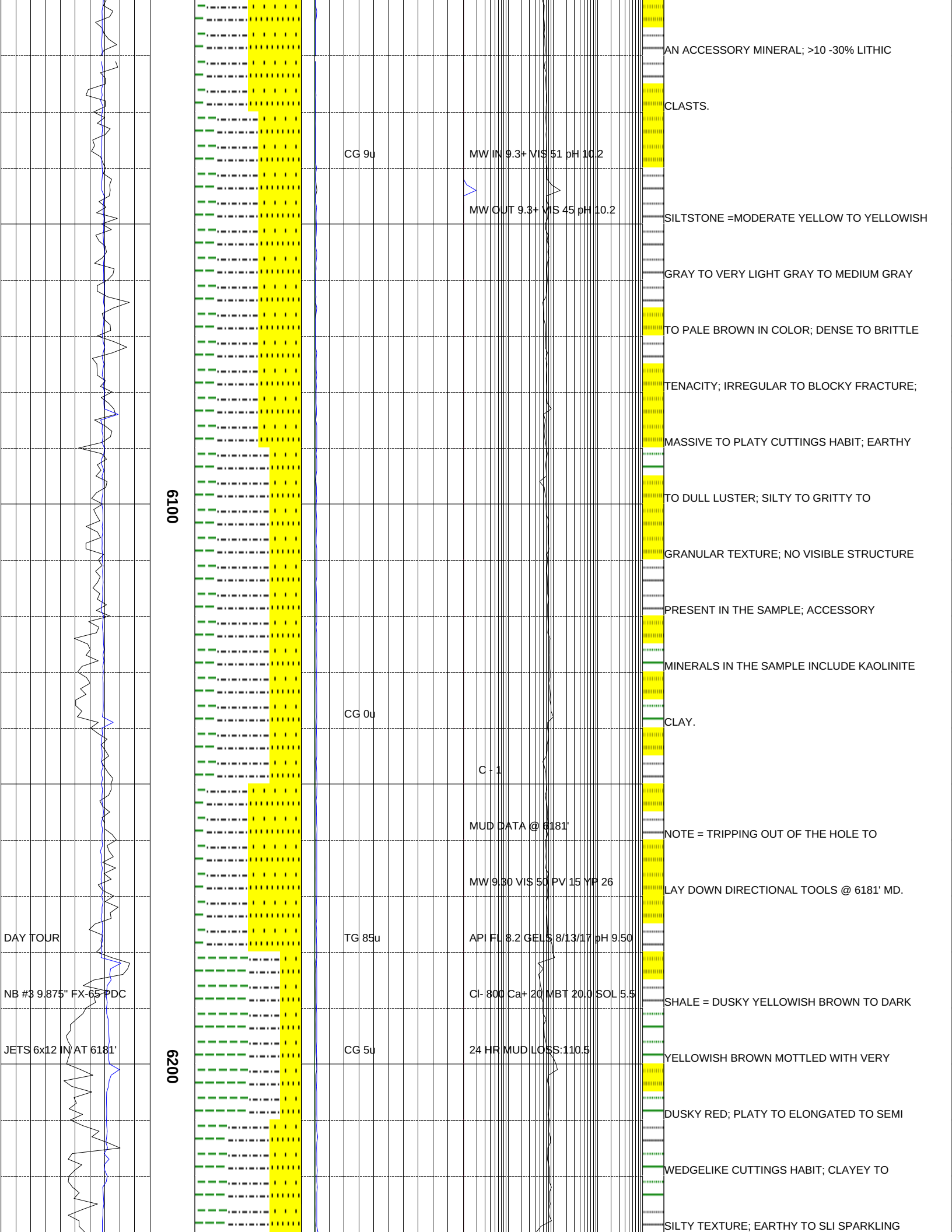

AND PALE YELLOWISH BROWN SANDSTONE;
CRUMBLY TO STIFF TENACITY.
C-1
SHALE = DARK YELLOWISH BROWN TO MOD
YELLOWISH BROWN TO VERY DUSKY RED;
PLANAR TO SPLINTERY TO HACKLY FRACTURE;
DULL EARTHY TO TRACE SPARKLING LUSTER;
GRADES TO PALE YELLOWISH BROWN
<300 ROP 0>
CG 23u
<0 Ttl Gas 100><10 Meth C-1 100K>
SILTSTONE; TR FRAGMENTS OF PALE BROWN
5000
<80 Avg WOB 0>
<0 CO2 40K><10 Ethn C-2 100K>
LIMESTONE.
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Butn C-4 100K>
SANDSTONE = VERY DUSKY RED TO PALE
<10 Pent C-5 100K>
YELLOWISH BROWN TO LIGHT GRAY; HARD
MW IN 9.1+ VIS 53 pH 11.3
TO VERY HARD; PREDOMINANTLY GRAIN
MW OUT 9.2 VIS 47 pH 11.3
SUPPORTED WITH SILICA AND MINOR CALCITE
CEMENT; MODERATELY CALCAREOUS; VERY
FINE TO UPPER FINE GRAIN; GRADATION TO
SILTSTONE; 2-4% LITHIC FLECKS IN SAMPLE
CG 1u
5100
FRAGMENTS; INTERBEDDED WITH SILTSTONE
AND SHALE; FAIRLY SORTED; LOW TO MOD
SPHERICITY; ANGULAR TO SUBROUND; NO
VISIBLE HYDROCARBON INDICATORS.

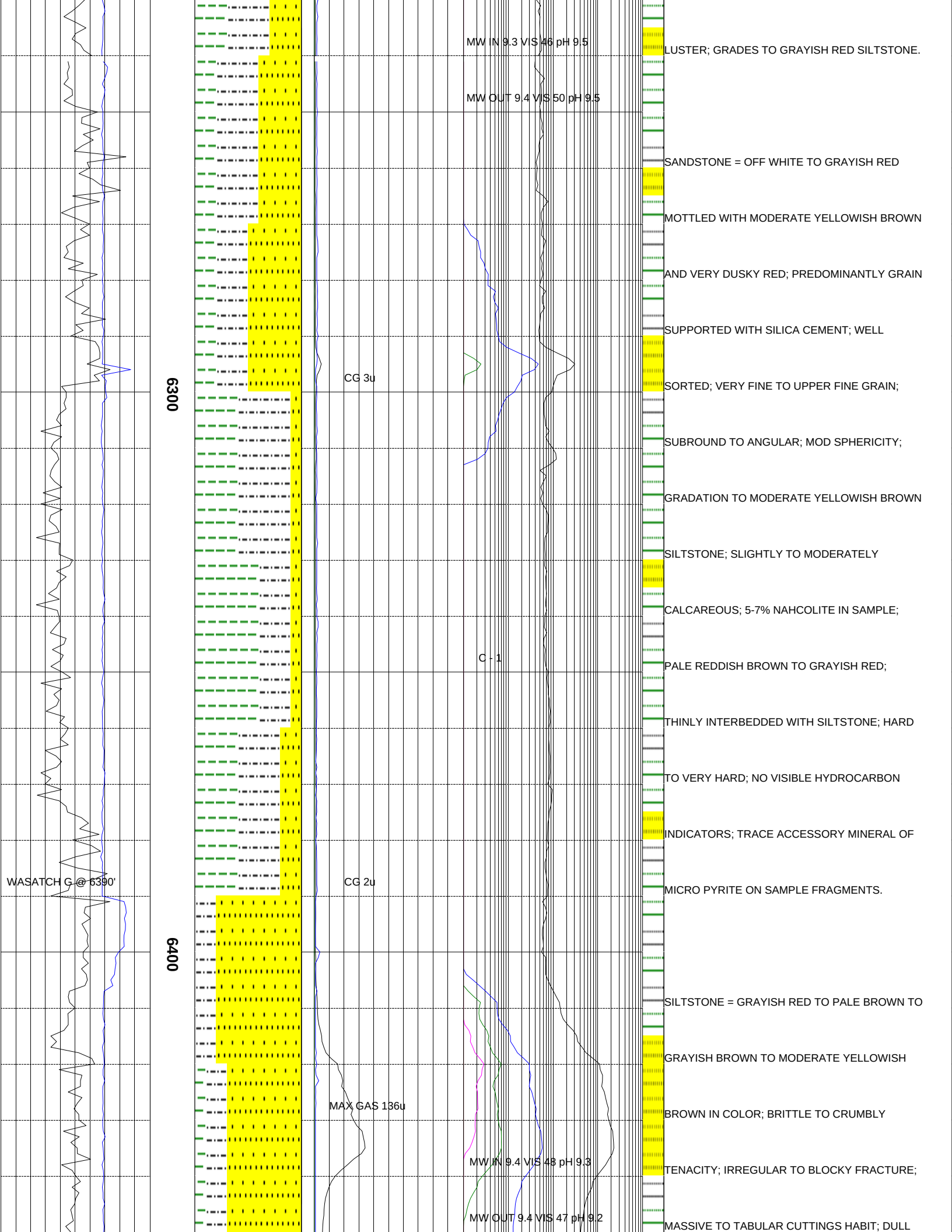

C-1
CALIB GAS EQUIPMENT
CG 0u
5200
MW IN 9.3 VIS 51 pH 11.1
MW OUT 9.3 VIS 48 pH 11.0
CG 0u
5300
C-1
SHALE = DARK YELLOWISH BROWN TO VERY
DUSKY RED TO MODERATE YELLOWISH BROWN;
SCALY TO WEDGELIKE TO PLATY CUTTINGS
HABIT; CLAYEY TO SILTY TEXTURE; GRADES
TO SILTSTONE; CRUMBLY TO STIFF TENACITY;
EARTHY LUSTER; MASSIVE STRUCTURE WITH
MOTTLED COLORS.
SHALE = MODERATE YELLOWISH BROWN TO
DARK YELLOWISH BROWN TO VERY DUSKY
RED; CLAYEY TO SILTY TEXTURE; PLANAR
TO SPLINTERY TO ANGULAR FRACTURE; SCALY
TO WEDGELIKE TO FLAKY CUTTINGS HABIT;
DULL TO EARTHY LUSTER; GRADES TO PALE
YELLOWISH BROWN SILTSTONE.
SHALE = DARK YELLOWISH BROWN TO PALE
YELLOWISH BROWN MOTTLED WITH VERY
DUSKY RED; CLAYEY TO SILTY TEXTURE;
SOFT TO CRUMBLY TENACITY; DULL EARTHY
LUSTER; IRREGULAR TO ANGULAR TO PLANAR

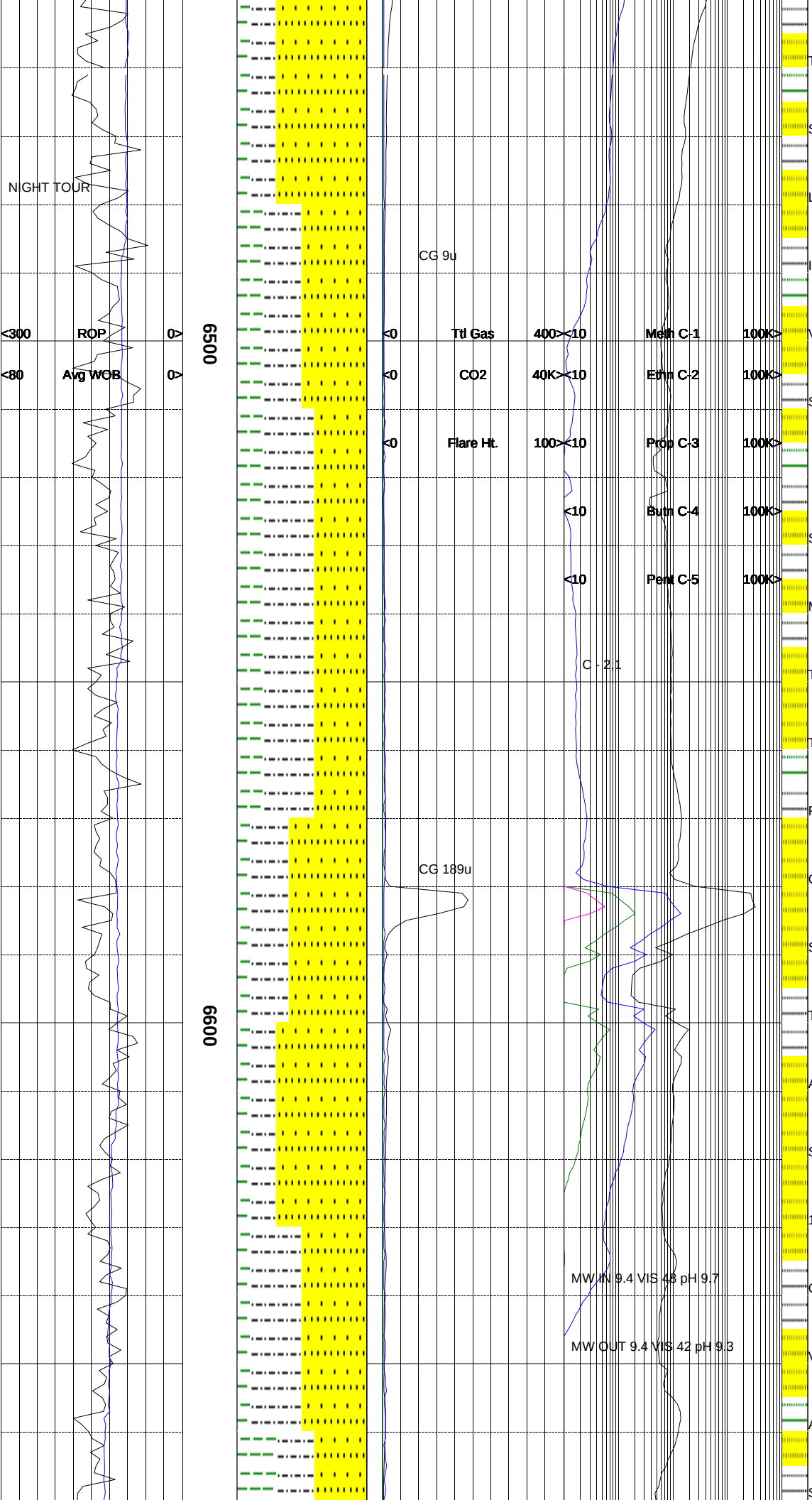

FRACTURE; WEDGELIKE TO TABULAR TO PLATY
CUTTINGS HABIT; GRADATION TO SILTSTONE;
MINOR TO MODERATE REACTION TO HCl; TRACE
CG 0u
AMOUNTS OF LIMESTONE FRAGS IN SAMPLE.
5400
SILTSTONE = MODERATE YELLOWISH BROWN
TO GRAYISH RED MOTTLED WITH MEDIUM GRAY;
SEMI NODULAR TO ELONGATED TO PLATY
MW IN 9.3 VIS 47 pH10.0
CUTTINGS HABIT; SILTY TO GRITTY TEXTURE;
MW OUT 9.3 VIS 47 pH 10.4
SPARKLING LUSTER; MINOR LOOSE FINE GRAIN
SAND IN SAMPLE FRAGMENTS; GRADATION TO
SANDSTONE.
CG 0u
MAX CO2 1870ppm
SANDSTONE = WHITE TO LIGHT GRAY TO
<300 ROP 0>
<0 Ttl Gas 100>
<10 Meth C-1 100K>
MEDIUM GRAY TO BROWNISH GRAY TO A
5500
<80 Avg WOB 0>
<0 CO2 40K>
<10 Ethn C-2 100K>
MAX GAS 54u
PALE YELLOWISH BROWN COLOR; QUARTZ
<0 Flare Ht. 100>
<10 Prop C-3 100K>
FRAMEWORK WITH A MODERATE REACTION TO
<10 Butn C-4 100K>
A 10% HCL SOLUTION INDICATING SILICA AND
<10 Pent C-5 100K>
SLIGHT CALCITE CEMENTATION; UPPER FINE
C - 1
TO LOWER MEDIUM GRAIN SIZE; FAIR TO WELL
NIGHT TOUR
MUD DATA @ 5572'
SORTING; SUBANGULAR TO SUBROUND
MW 9.35 VIS 50 PV 17 YP 23
ANGULARITY; MODERATE TO HIGH SPHERICITY;


5600
5700
CG 0u
API FL 8.4 GELS 8/12/15 pH 10.30
Cl- 800 Ca+ 40 MBT 17.5 SOL 5.3
24 HR MUD LOSS: 238.6
MW IN 9.3 VIS 47 pH 10.5
MAX GAS12u
MW OUT 9.4 VIS 41 pH 10.5
CG 0u
C - 1
CG 0u
EASILY FRIABLE TO MODERATELY HARD
HARDNESS; 10 - 30% LITHIC CLASTS IN THE
SAMPLES; INTERBEDDED WITH SILTSTONE
AND SHALE; NO ACCESSORY MINERALS
VISIBLE IN THE SAMPLE.
SILTSTONE =MODERATE YELLOW TO YELLOWISH
GRAY TO LIGHT OLIVE GRAY TO LIGHT GRAY
TO PALE BROWN IN COLOR; DENSE TO BRITTLE
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MASSIVE TO PLATY CUTTINGS HABIT; EARTHY
TO DULL LUSTER; SILTY TO GRITTY TO
GRANULAR TEXTURE; NO VISIBLE STRUCTURE
PRESENT IN THE SAMPLE; KAOLINITE CLAY
PRESENT IN THE SAMPLE AS AN ACCESSORY
MINERAL.
SHALE = VERY LIGHT GRAY TO GRAY TO A
GRAYISH BROWN TO GRAYISH ORANGE IN
COLOR; BRITTLE TO CRUMBLY TO CRUNCHY
TENACITY; IRREGULAR TO PLANAR FRACTURE;
PLATY TO FLAKY TO WEDGELIKE TO BLADED


5800
5900
6000
MW IN 9.3+ VIS 50 pH 10.4
MW OUT 9.4 VIS 44 pH 10.4
CG 0u
CG 10u
C - 1
MAX GAS 22u
1/28/2011
<300 ROP 0>
<80 Avg WOB 0>
<0 Ttl Gas 100><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
CUTTINGS HABIT; SMOOTH TO CLAYEY
TEXTURE; LAMINAE TO NO VISIBLE STRUCTURE
PRESENT IN THE SAMPLE; KAOLINITE CLAY
PRESENT IN THE SAMPLE AS AN ACCESSORY
MINERAL; INTERBEDDED WITH SILTSTONE AND
SANDSTONE; SAMPLE CONTAINS TRACE
AMOUNTS OF A GREEN MINERAL POSSIBLY
CHLORITE.
SANDSTONE = WHITE TO VERY LIGHT GRAY TO
A YELLOWISH BROWN TO A BROWNISH GRAY
COLOR; QUARTZ FRAMEWORK WITH UPPER
FINE TO LOWER MEDIUM GRAIN SIZE; WELL TO
FAIR SORTING WITH SOME SAMPLES BEING
VERY WELL SORTED; ROUND TO SUBANGULAR
ANGULARITY; HIGH TO MODERATE SPHERICITY;
FROSTED GRAIN PRESENT ON SOME SAMPLES;
EASILY FRIABLE TO FRIABLE TO MODERATELY
HARD HARDNESS; MODERATE TO SLIGHT
REACTION TO 10% HCL SOLUTION; SILICA
CEMENTATION WITH SOME CALCITE
CEMENTATION; KAOLINITE CLAY PRESENT AS


6100
6200
CG 9u
MW IN 9.3+ VIS 51 pH 10.2
MW OUT 9.3+ VIS 45 pH 10.2
CG 0u
C - 1
MUD DATA @ 6181'
MW 9.30 VIS 50 PV 15 YP 26
API FL 8.2 GELS 8/13/17 pH 9.50
Cl- 800 Ca+ 20 MBT 20.0 SOL 5.5
24 HR MUD LOSS:110.5
TG 85u
CG 5u
DAY TOUR
NB #3 9.875" FX-65 PDC
JETS 6x12 IN AT 6181'
AN ACCESSORY MINERAL; >10 -30% LITHIC
CLASTS.
SILTSTONE =MODERATE YELLOW TO YELLOWISH
GRAY TO VERY LIGHT GRAY TO MEDIUM GRAY
TO PALE BROWN IN COLOR; DENSE TO BRITTLE
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MASSIVE TO PLATY CUTTINGS HABIT; EARTHY
TO DULL LUSTER; SILTY TO GRITTY TO
GRANULAR TEXTURE; NO VISIBLE STRUCTURE
PRESENT IN THE SAMPLE; ACCESSORY
MINERALS IN THE SAMPLE INCLUDE KAOLINITE
CLAY.
NOTE = TRIPPING OUT OF THE HOLE TO
LAY DOWN DIRECTIONAL TOOLS @ 6181' MD.
SHALE = DUSKY YELLOWISH BROWN TO DARK
YELLOWISH BROWN MOTTLED WITH VERY
DUSKY RED; PLATY TO ELONGATED TO SEMI
WEDGELIKE CUTTINGS HABIT; CLAYEY TO
SILTY TEXTURE; EARTHY TO SLI SPARKLING


MW IN 9.3 VIS 46 pH 9.5
MW OUT 9.4 VIS 50 pH 9.5
6300
CG 3u
C - 1
WASATCH G @ 6390'
CG 2u
6400
MAX GAS 136u
MW IN 9.4 VIS 48 pH 9.3
MW OUT 9.4 VIS 47 pH 9.2
LUSTER; GRADES TO GRAYISH RED SILTSTONE.
SANDSTONE = OFF WHITE TO GRAYISH RED
MOTTLED WITH MODERATE YELLOWISH BROWN
AND VERY DUSKY RED; PREDOMINANTLY GRAIN
SUPPORTED WITH SILICA CEMENT; WELL
SORTED; VERY FINE TO UPPER FINE GRAIN;
SUBROUND TO ANGULAR; MOD SPHERICITY;
GRADATION TO MODERATE YELLOWISH BROWN
SILTSTONE; SLIGHTLY TO MODERATELY
CALCAREOUS; 5-7% NAHCOLITE IN SAMPLE;
PALE REDDISH BROWN TO GRAYISH RED;
THINLY INTERBEDDED WITH SILTSTONE; HARD
TO VERY HARD; NO VISIBLE HYDROCARBON
INDICATORS; TRACE ACCESSORY MINERAL OF
MICRO PYRITE ON SAMPLE FRAGMENTS.
SILTSTONE = GRAYISH RED TO PALE BROWN TO
GRAYISH BROWN TO MODERATE YELLOWISH
BROWN IN COLOR; BRITTLE TO CRUMBLY
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MASSIVE TO TABULAR CUTTINGS HABIT; DULL



TO EARTHY TO LUSTER; SILTY TO GRITTY TO

SLIGHTLY GRANULAR TEXTURE; THIN TO

LAMINAE BEDDING STRUCTURES VISIBLE

IN THE SAMPLE; NO ACCESSORY MINERALS

VISIBLE IN THE SAMPLE; INTERBEDDED WITH

SANDSTONE AND SOME SHALE.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO

MEDIUM LIGHT GRAY TO LIGHT BLUISH GRAY

TO GRAYISH BLUE GREEN TO A GRAYISH RED

TO A DARK REDDISH BROWN COLOR; QUARTZ

FRAMEWORK; VERY FINE TO LOWER MEDIUM

GRAIN SIZE; VERY WELL TO FAIR SORTING;

SUBANGULAR TO SUBROUND ANGULARITY; HIGH

TO MODERATE SPHERICITY; SOME FROSTED

AND POLISHED GRAINS PRESENT IN THE

SAMPLE; SLIGHT TO NO REACTION WITH A

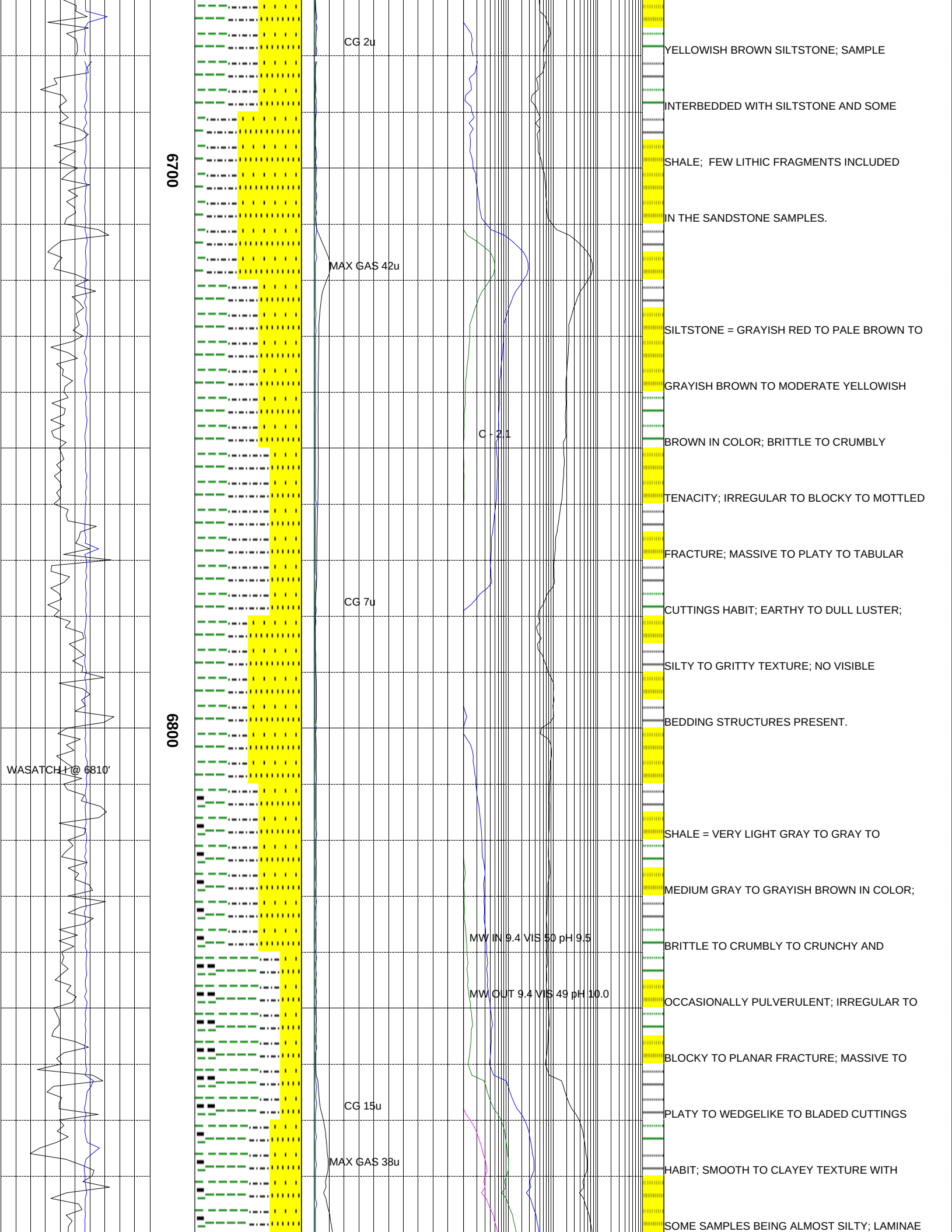
10% HCL SOLUTION; PRIMARILY SILICA

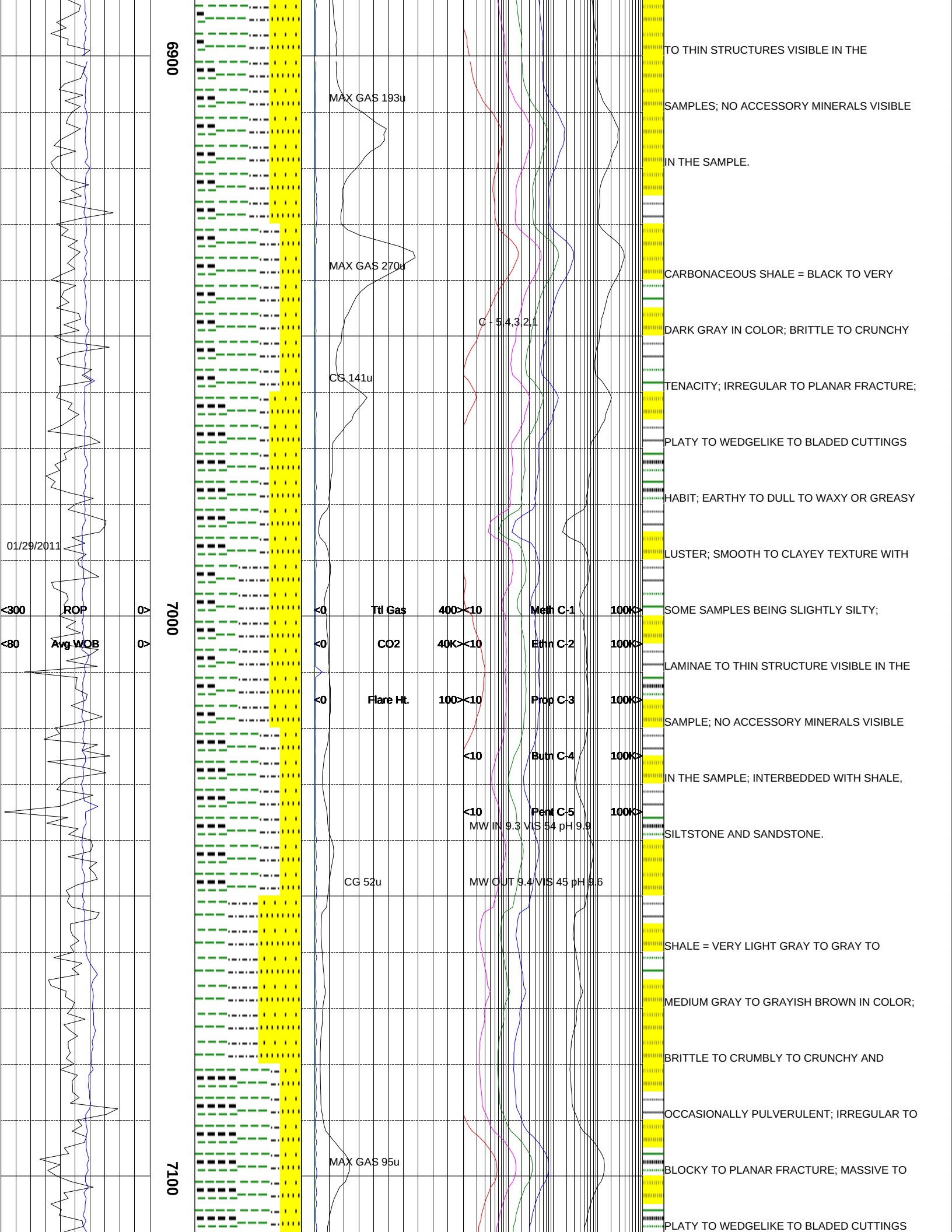
CEMENTATION; NO BEDDING STRUCTURES

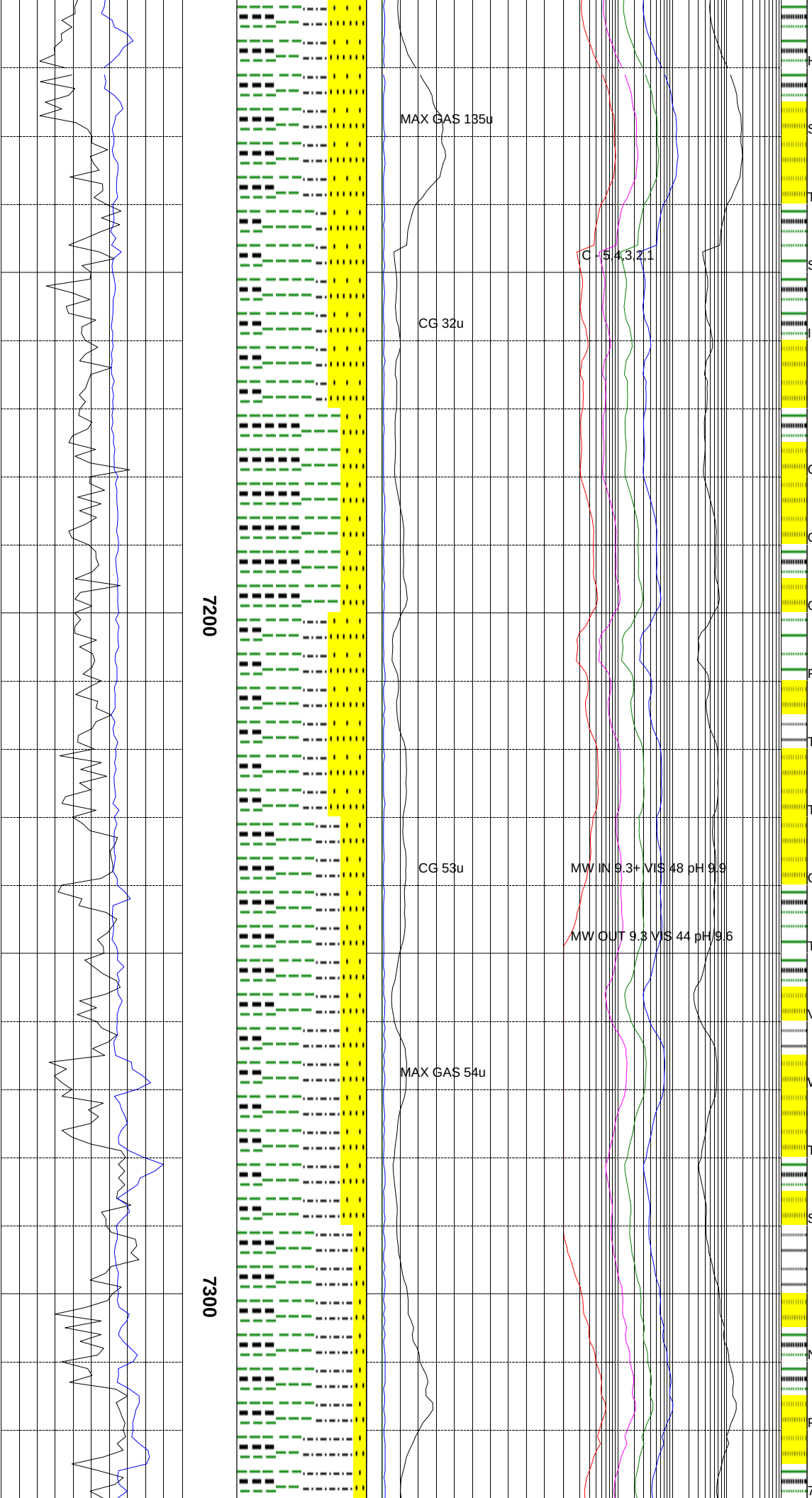
VISIBLE IN THE SAMPLE; NO IDENTIFIABLE

ACCESSORY MINERALS PRESENT IN THE

SAMPLE; SOME SAMPLES SHOW GRADING WITH


6700
6800
CG 2u
MAX GAS 42u
C - 2.1
CG 7u
WASATCH T @ 6810'
MW IN 9.4 VIS 50 pH 9.5
MW OUT 9.4 VIS 49 pH 10.0
CG 15u
MAX GAS 38u
YELLOWISH BROWN SILTSTONE; SAMPLE
INTERBEDDED WITH SILTSTONE AND SOME
SHALE; FEW LITHIC FRAGMENTS INCLUDED
IN THE SANDSTONE SAMPLES.
SILTSTONE = GRAYISH RED TO PALE BROWN TO
GRAYISH BROWN TO MODERATE YELLOWISH
BROWN IN COLOR; BRITTLE TO CRUMBLY
TENACITY; IRREGULAR TO BLOCKY TO MOTTLED
FRACTURE; MASSIVE TO PLATY TO TABULAR
CUTTINGS HABIT; EARTHY TO DULL LUSTER;
SILTY TO GRITTY TEXTURE; NO VISIBLE
BEDDING STRUCTURES PRESENT.
SHALE = VERY LIGHT GRAY TO GRAY TO
MEDIUM GRAY TO GRAYISH BROWN IN COLOR;
BRITTLE TO CRUMBLY TO CRUNCHY AND
OCCASIONALLY PULVERULENT; IRREGULAR TO
BLOCKY TO PLANAR FRACTURE; MASSIVE TO
PLATY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; SMOOTH TO CLAYEY TEXTURE WITH
SOME SAMPLES BEING ALMOST SILTY; LAMINAE

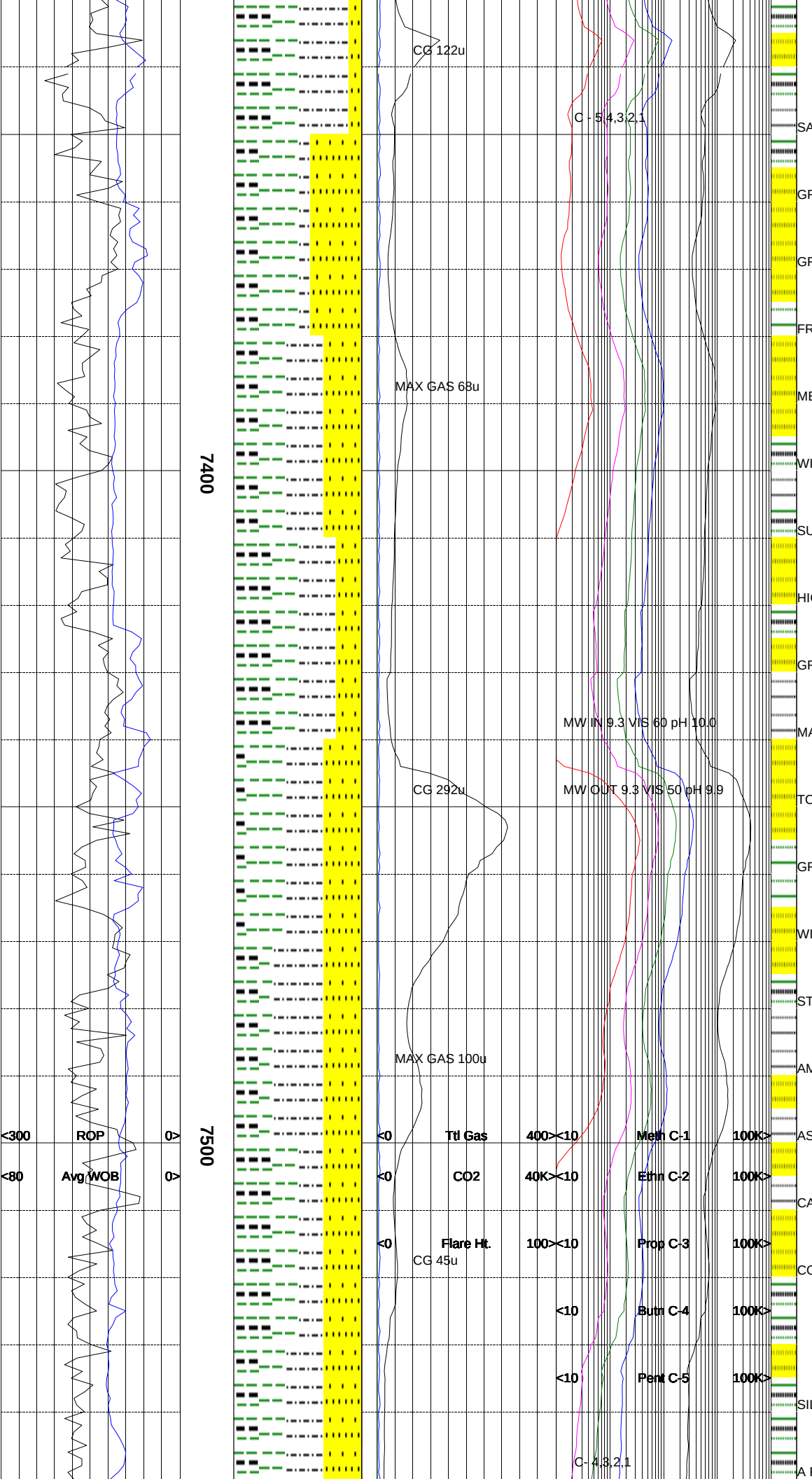

6900
7000
7100
01/29/2011
<300 ROP 0>
<80 Avg WOB 0>
MAX GAS 193u
MAX GAS 270u
CG 141u
CG 52u
MAX GAS 95u
C - 5,4,3,2,1
<0 Ttl Gas 400><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>
MW IN 9.3 VIS 54 pH 9.9
MW OUT 9.4 VIS 45 pH 9.6
TO THIN STRUCTURES VISIBLE IN THE
SAMPLES; NO ACCESSORY MINERALS VISIBLE
IN THE SAMPLE.
CARBONACEOUS SHALE = BLACK TO VERY
DARK GRAY IN COLOR; BRITTLE TO CRUNCHY
TENACITY; IRREGULAR TO PLANAR FRACTURE;
PLATY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; EARTHY TO DULL TO WAXY OR GREASY
LUSTER; SMOOTH TO CLAYEY TEXTURE WITH
SOME SAMPLES BEING SLIGHTLY SILTY;
LAMINAE TO THIN STRUCTURE VISIBLE IN THE
SAMPLE; NO ACCESSORY MINERALS VISIBLE
IN THE SAMPLE; INTERBEDDED WITH SHALE,
SILTSTONE AND SANDSTONE.
SHALE = VERY LIGHT GRAY TO GRAY TO
MEDIUM GRAY TO GRAYISH BROWN IN COLOR;
BRITTLE TO CRUMBLY TO CRUNCHY AND
OCCASIONALLY PULVERULENT; IRREGULAR TO
BLOCKY TO PLANAR FRACTURE; MASSIVE TO
PLATY TO WEDGELIKE TO BLADED CUTTINGS



HABIT; SMOOTH TO CLAYEY TEXTURE WITH SOME SAMPLES BEING ALMOST SILTY; LAMINAE TO THIN STRUCTURES VISIBLE IN THE SAMPLES; NO ACCESSORY MINERALS VISIBLE IN THE SAMPLE.

CARBONACEOUS SHALE = BLACK TO VERY DARK GRAY IN COLOR; DENSE TO BRITTLE TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY TO WEDGELIKE TO BLADED CUTTINGS HABIT; EARTHY TO DULL TO GREASY TO WAXY LUSTER; SMOOTH TO CLAYEY TO SLIGHTLY SILTY TEXTURE; VERY THIN TO LAMINAE BEDDING STRUCTURES VISIBLE ON THE SAMPLES; INTERBEDDED WITH SANDSTONE, SHALE AND SILTSTONE; TRACE AMOUNTS OF PYRITE VISIBLE IN THE SAMPLE AS AN ACCESSORY MINERAL.

NOTE: LOSE RETURNS @ 7312'. REGAIN PARTIAL RETURNS @ 7316'. FULL RETURNS @ 7330'.



SANDSTONE = WHITE TO VERY LIGHT GRAY TO

GRAY TO MEDIUM DARK GRAY TO BROWNISH

GRAY TO A GRAYISH RED COLOR; QUARTZ

FRAMEWORK; UPPER FINE TO LOWER

MEDIUM GRAIN SIZE; WELL TO FAIR SORTING

WITH 10 - 30% LITHIC FRAGMENTS INCLUDED;

SUBANGULAR TO SUBROUND ANGULARITY;

HIGH TO MODERATE SPHERICITY; FROSTED

GRAINS DUE TO MECHANICAL ABRASION;

MANY LOOSE GRAINS IN SAMPLE; FRIABLE

TO FIRMLY FRIABLE TO MODERATELY HARD;

GRAIN SUPPORTED; MODERATE REACTION

WITH A 10% HCL SOLUTION; NO BEDDING

STRUCTURES VISIBLE IN THE SAMPLE; TRACE

AMOUNTS OF PYRITE VISIBLE IN THE SAMPLE

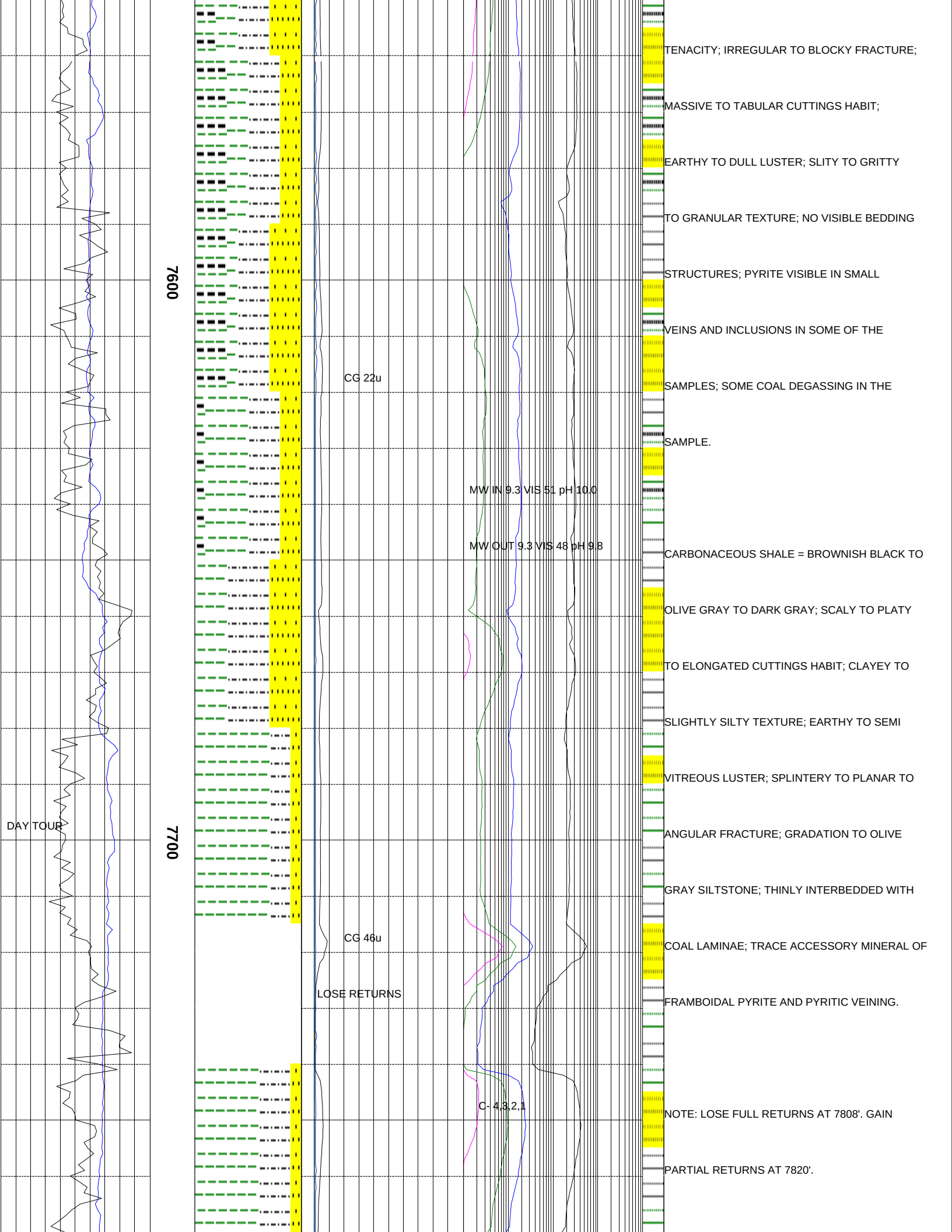
AS AN ACCESSORY MINERAL; SOME TRACE

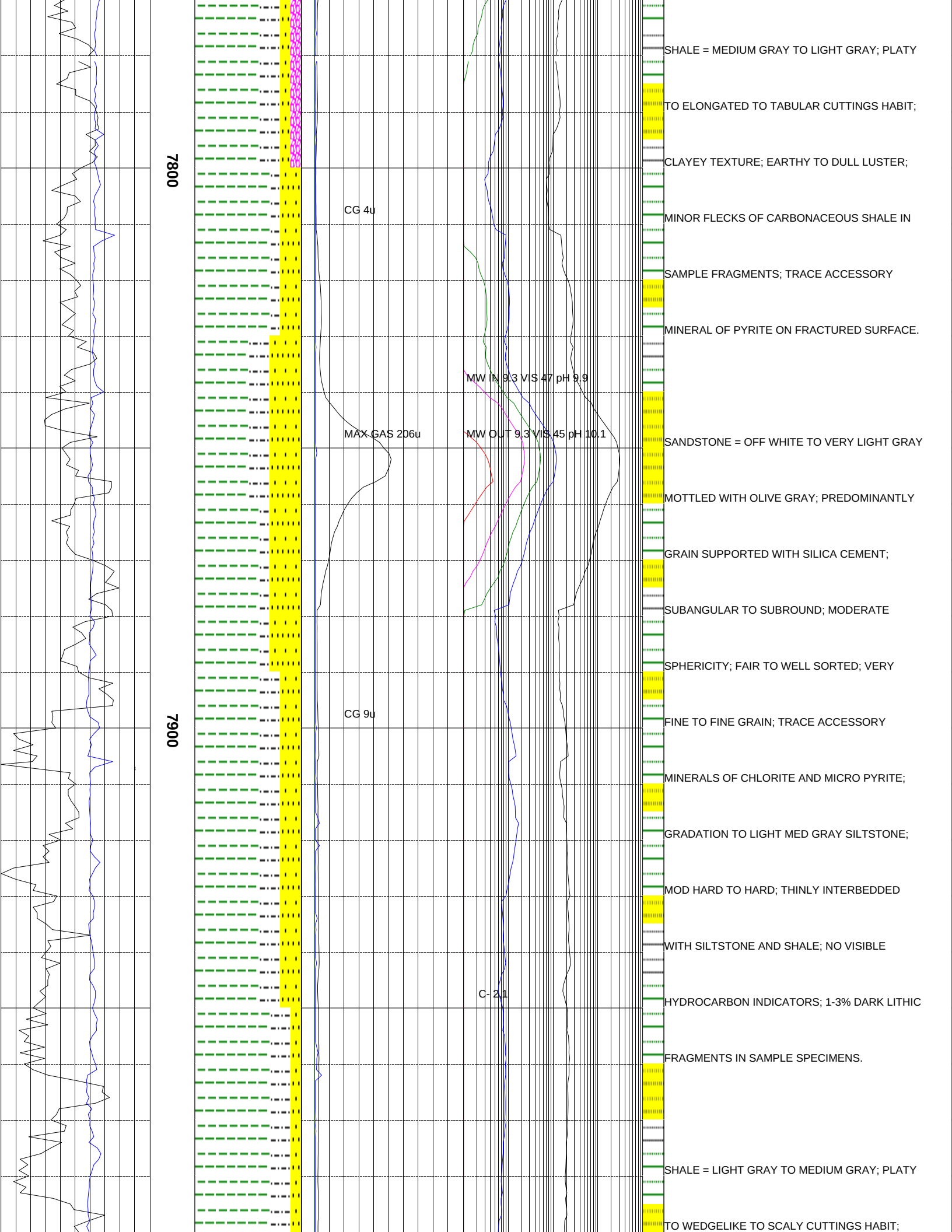
CARBONACEOUS MATERIAL IN THE FORM OF

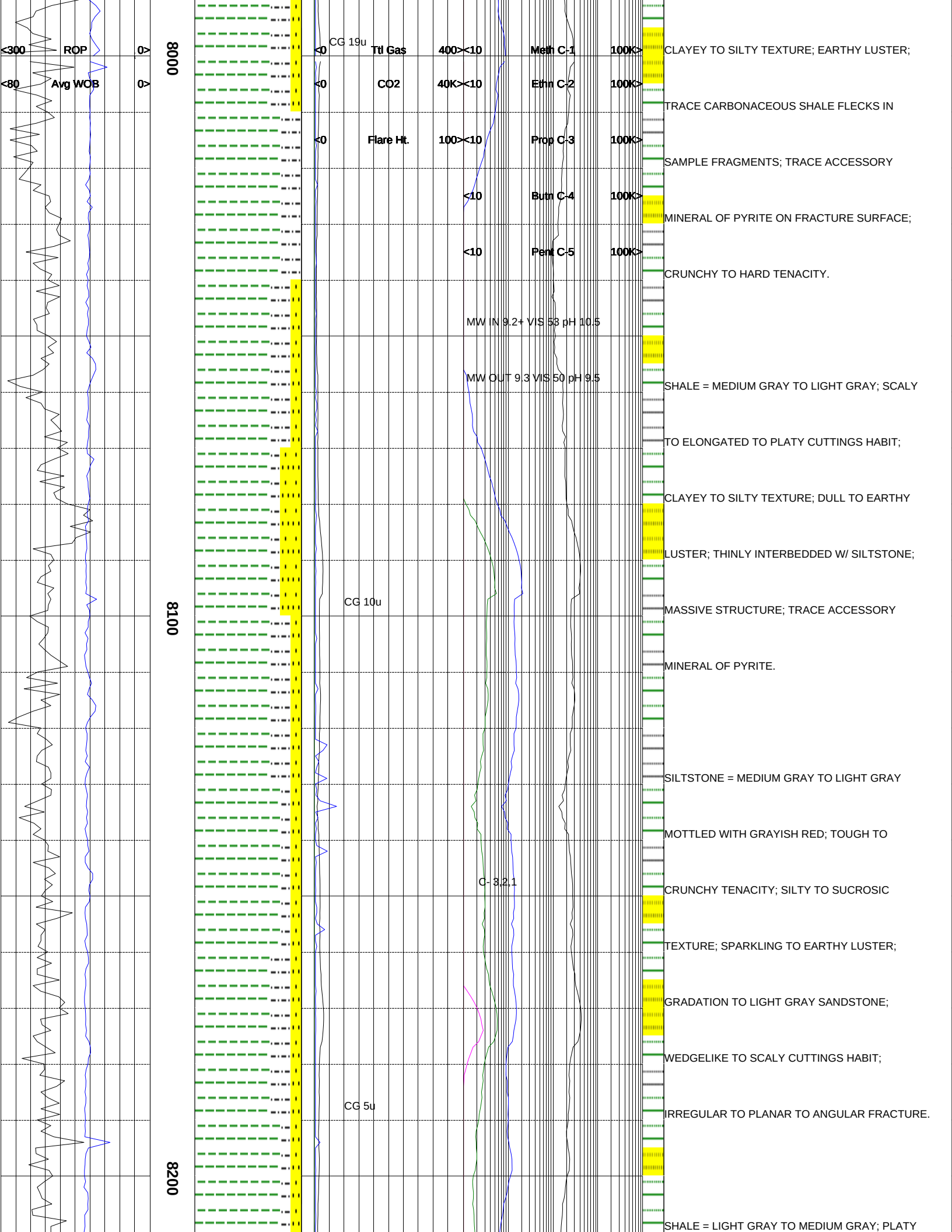
COAL PRESENT IN THE SAMPLE.

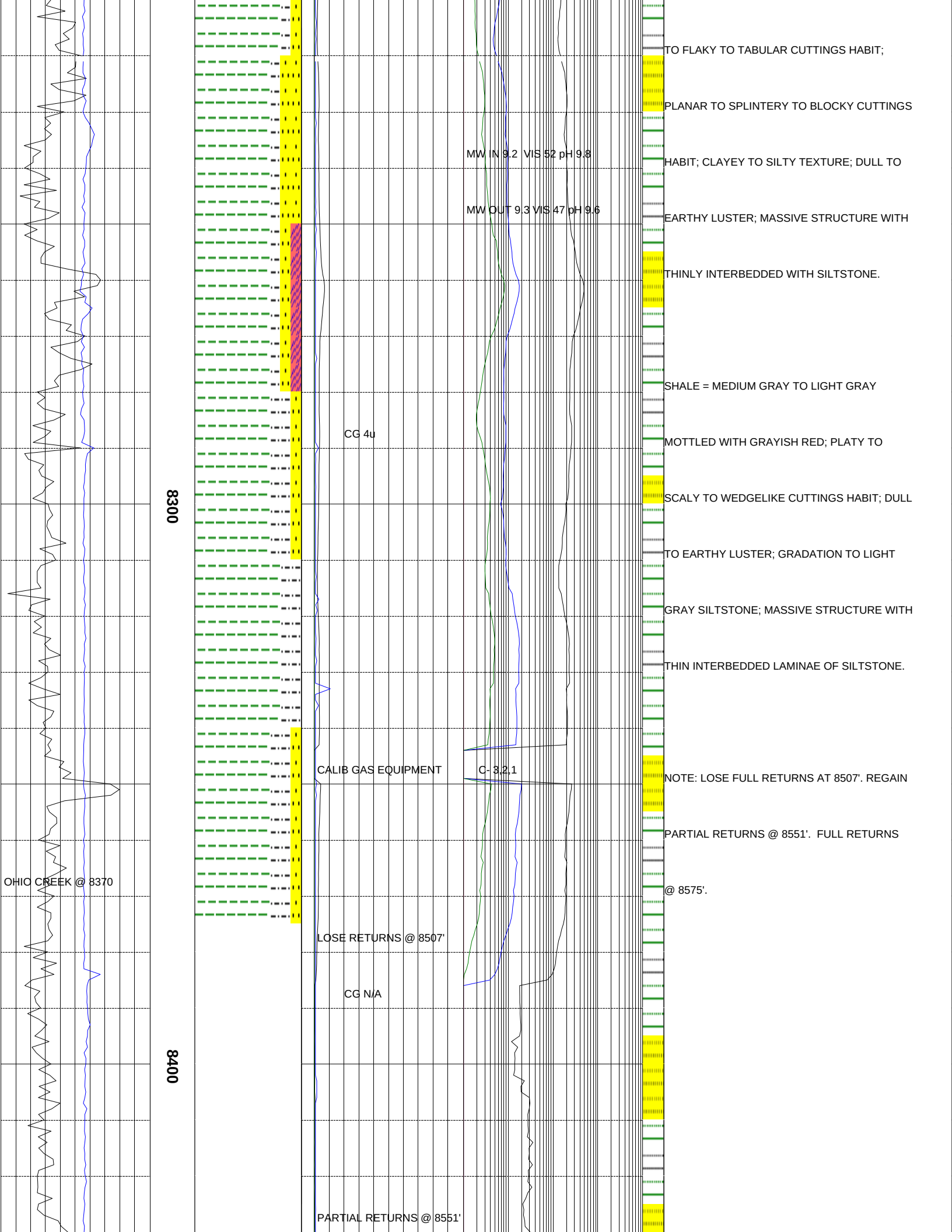
SILTSTONE = GRAY TO MEDIUM GRAY TO

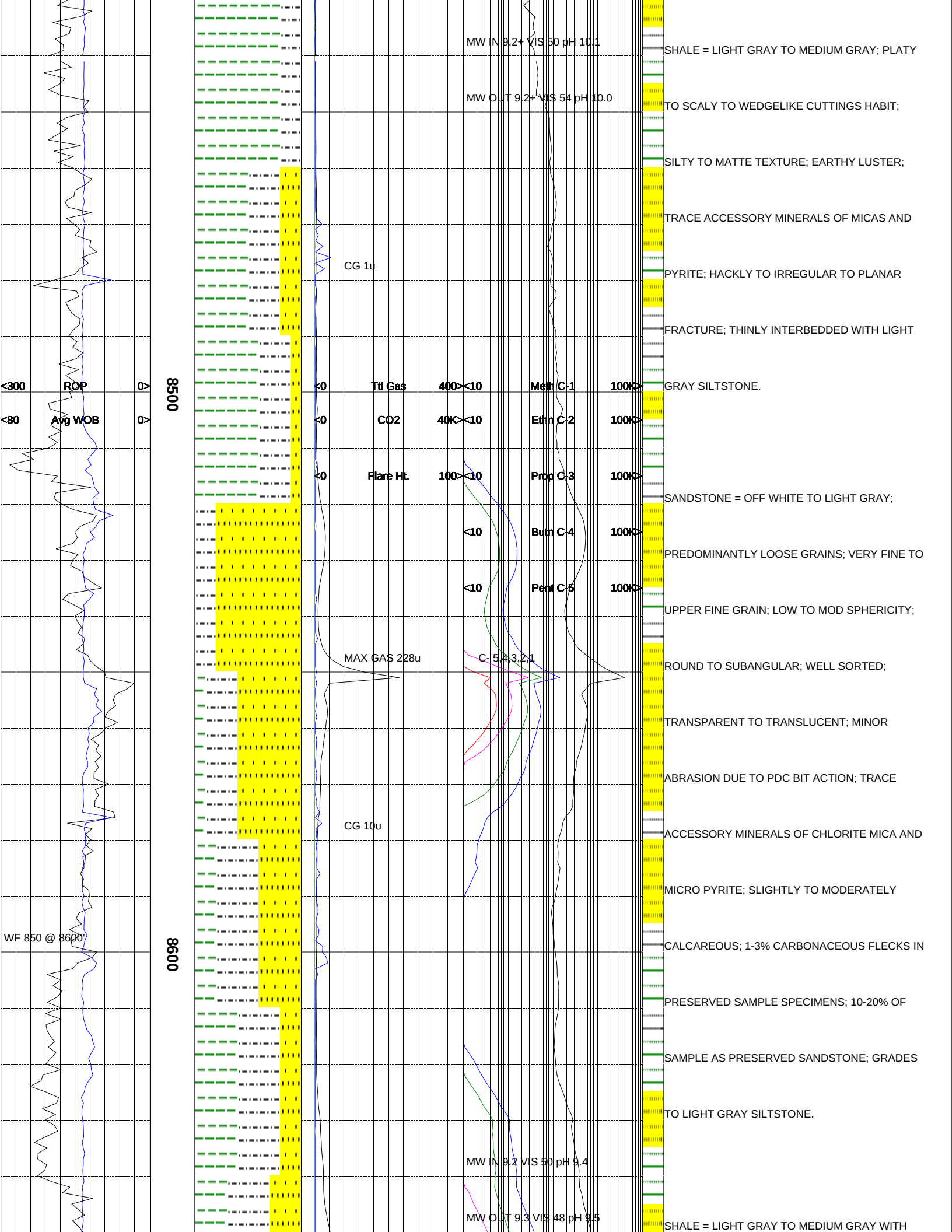
A REDDISH BROWN COLOR; DENSE TO BRITTLE

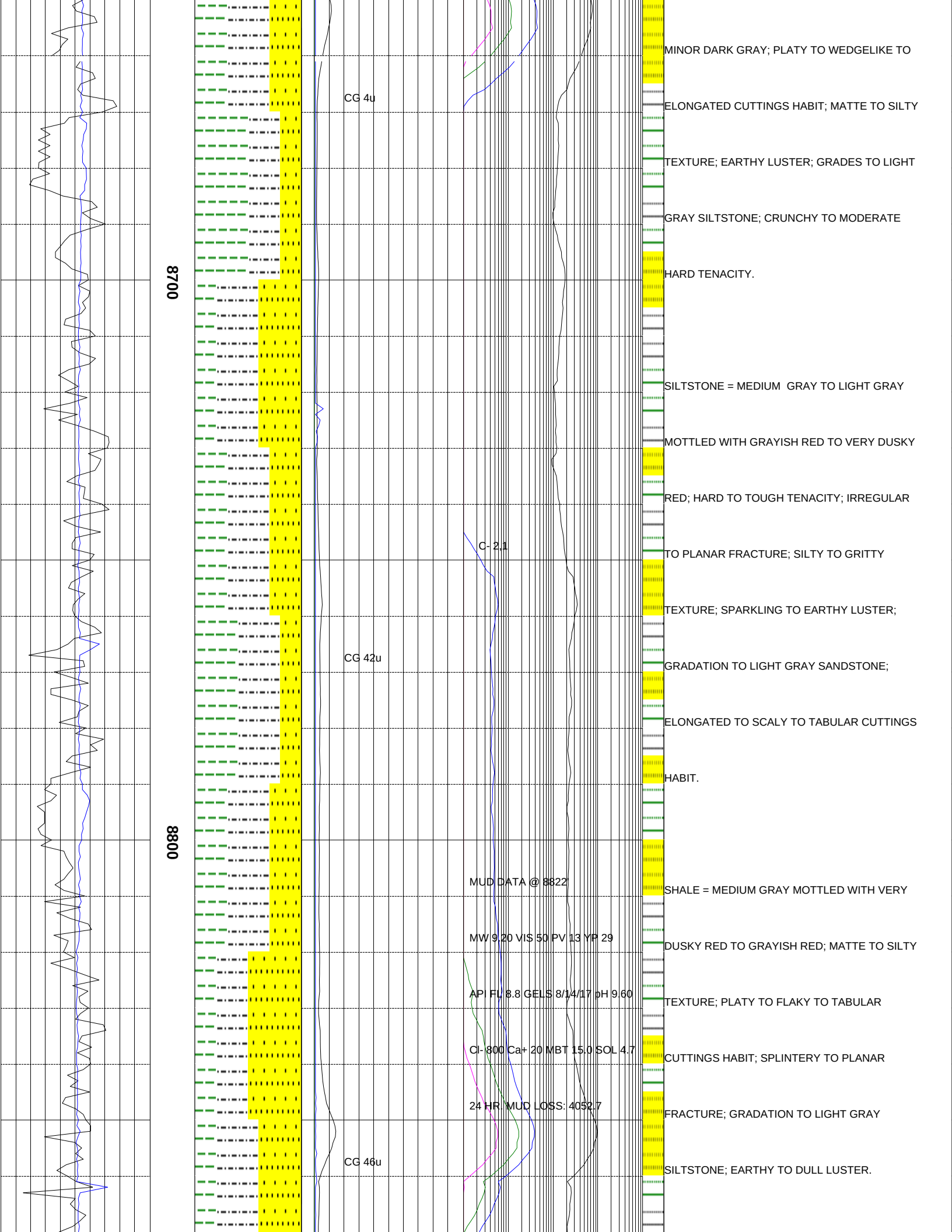

7600
7700
DAY TOUR
CG 22u
MW IN 9.3 VIS 51 pH 10.0
MW OUT 9.3 VIS 48 pH 9.8
CG 46u
LOSE RETURNS
C- 4,3,2,1
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MASSIVE TO TABULAR CUTTINGS HABIT;
EARTHY TO DULL LUSTER; SLITY TO GRITTY
TO GRANULAR TEXTURE; NO VISIBLE BEDDING
STRUCTURES; PYRITE VISIBLE IN SMALL
VEINS AND INCLUSIONS IN SOME OF THE
SAMPLES; SOME COAL DEGASSING IN THE
SAMPLE.
CARBONACEOUS SHALE = BROWNISH BLACK TO
OLIVE GRAY TO DARK GRAY; SCALY TO PLATY
TO ELONGATED CUTTINGS HABIT; CLAYEY TO
SLIGHTLY SILTY TEXTURE; EARTHY TO SEMI
VITREOUS LUSTER; SPLINTERY TO PLANAR TO
ANGULAR FRACTURE; GRADATION TO OLIVE
GRAY SILTSTONE; THINLY INTERBEDDED WITH
COAL LAMINAE; TRACE ACCESSORY MINERAL OF
FRAMBOIDAL PYRITE AND PYRITIC VEINING.
NOTE: LOSE FULL RETURNS AT 7808'. GAIN
PARTIAL RETURNS AT 7820'.

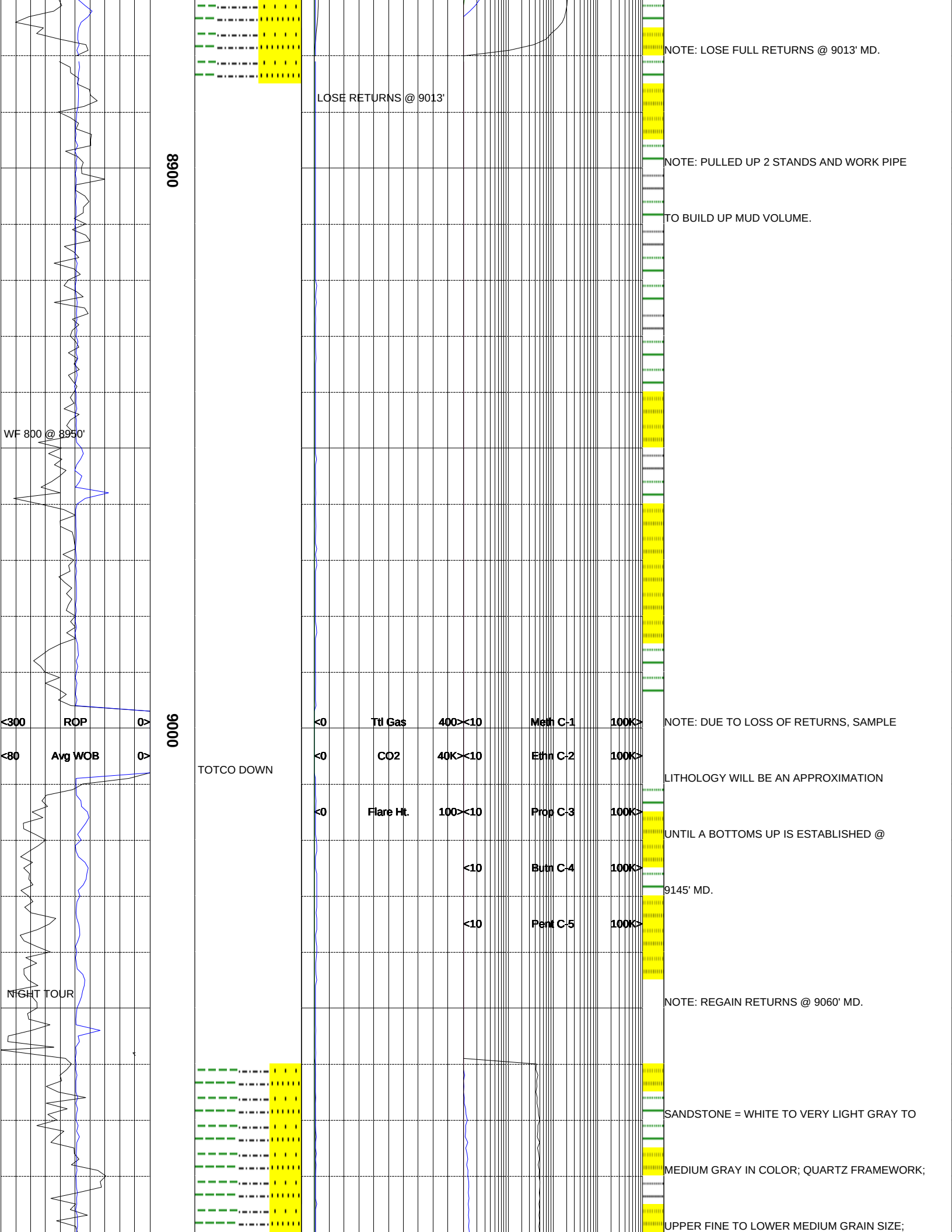

7800
CG 4u
MW IN 9.3 VIS 47 pH 9.9
MAX GAS 206u
MW OUT 9.3 VIS 45 pH 10.1
7900
CG 9u
C- 2,1
SHALE = MEDIUM GRAY TO LIGHT GRAY; PLATY
TO ELONGATED TO TABULAR CUTTINGS HABIT;
CLAYEY TEXTURE; EARTHY TO DULL LUSTER;
MINOR FLECKS OF CARBONACEOUS SHALE IN
SAMPLE FRAGMENTS; TRACE ACCESSORY
MINERAL OF PYRITE ON FRACTURED SURFACE.
SANDSTONE = OFF WHITE TO VERY LIGHT GRAY
MOTTLED WITH OLIVE GRAY; PREDOMINANTLY
GRAIN SUPPORTED WITH SILICA CEMENT;
SUBANGULAR TO SUBROUND; MODERATE
SPHERICITY; FAIR TO WELL SORTED; VERY
FINE TO FINE GRAIN; TRACE ACCESSORY
MINERALS OF CHLORITE AND MICRO PYRITE;
GRADATION TO LIGHT MED GRAY SILTSTONE;
MOD HARD TO HARD; THINLY INTERBEDDED
WITH SILTSTONE AND SHALE; NO VISIBLE
HYDROCARBON INDICATORS; 1-3% DARK LITHIC
FRAGMENTS IN SAMPLE SPECIMENS.
SHALE = LIGHT GRAY TO MEDIUM GRAY; PLATY
TO WEDGELIKE TO SCALY CUTTINGS HABIT;

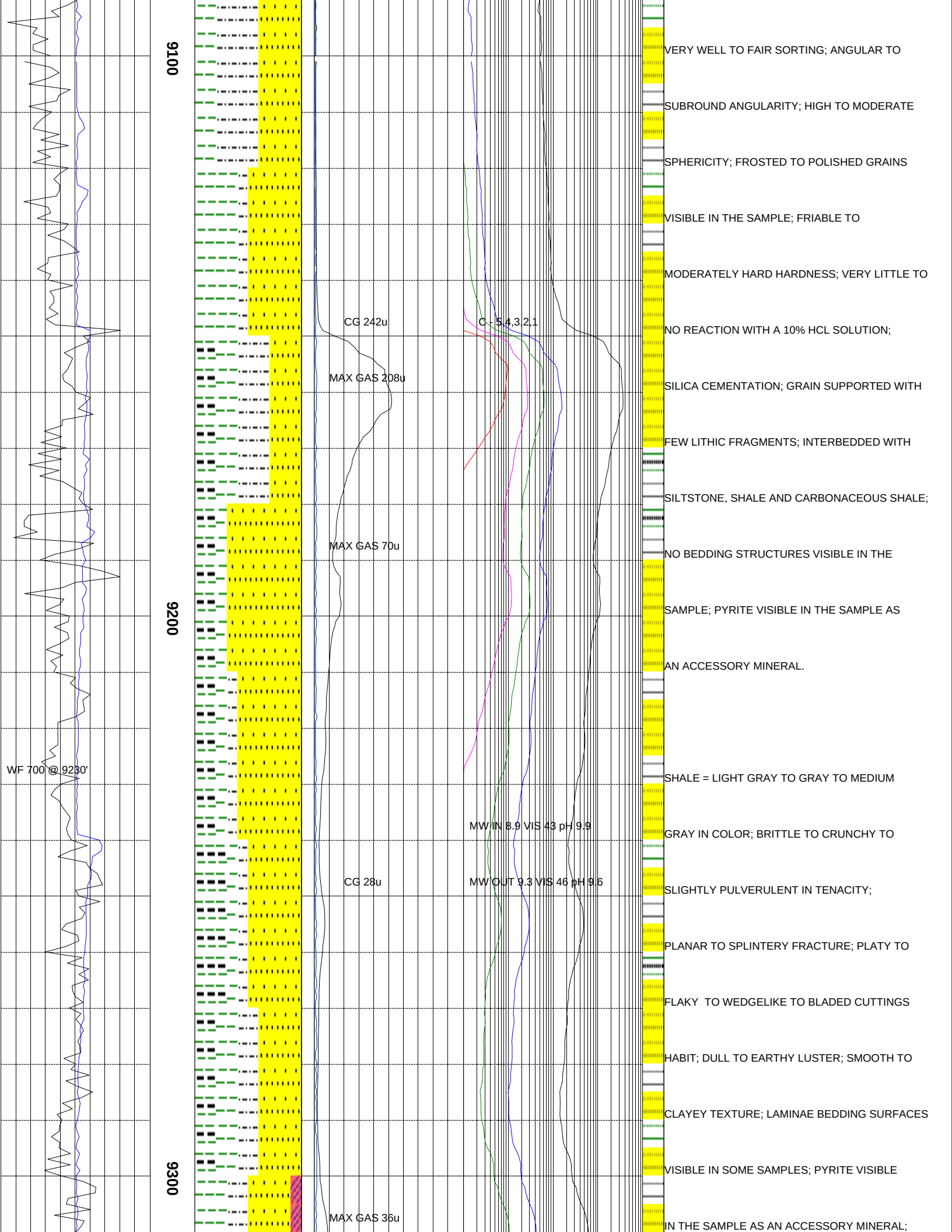

<300 ROP 0>
<80 Avg WOB 0>
8000
8100
8200
CG 19u
CG 10u
CG 5u
<0 Ttl Gas 400><10 Meth C-1 100K>
<0 CO2 40K><10 Eth C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Buth C-4 100K>
<10 Pent C-5 100K>
MW IN 9.2+ VIS 53 pH 10.5
MW OUT 9.3 VIS 50 pH 9.5
C- 3,2,1
CLAYEY TO SILTY TEXTURE; EARTHY LUSTER;
TRACE CARBONACEOUS SHALE FLECKS IN
SAMPLE FRAGMENTS; TRACE ACCESSORY
MINERAL OF PYRITE ON FRACTURE SURFACE;
CRUNCHY TO HARD TENACITY.
SHALE = MEDIUM GRAY TO LIGHT GRAY; SCALY
TO ELONGATED TO PLATY CUTTINGS HABIT;
CLAYEY TO SILTY TEXTURE; DULL TO EARTHY
LUSTER; THINLY INTERBEDDED W/ SILTSTONE;
MASSIVE STRUCTURE; TRACE ACCESSORY
MINERAL OF PYRITE.
SILTSTONE = MEDIUM GRAY TO LIGHT GRAY
MOTTLED WITH GRAYISH RED; TOUGH TO
CRUNCHY TENACITY; SILTY TO SUCROSIC
TEXTURE; SPARKLING TO EARTHY LUSTER;
GRADATION TO LIGHT GRAY SANDSTONE;
WEDGELIKE TO SCALY CUTTINGS HABIT;
IRREGULAR TO PLANAR TO ANGULAR FRACTURE.
SHALE = LIGHT GRAY TO MEDIUM GRAY; PLATY

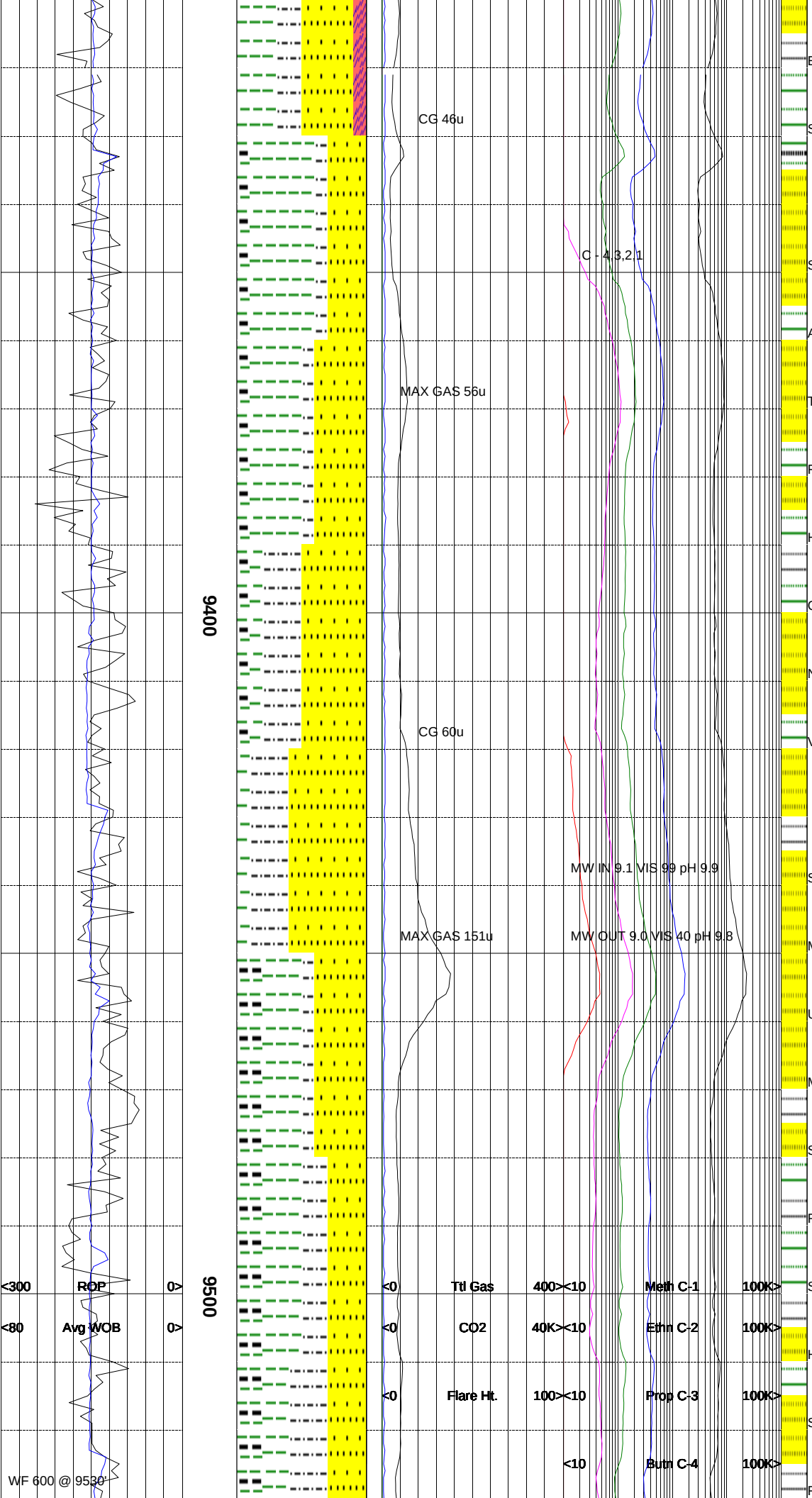

TO FLAKY TO TABULAR CUTTINGS HABIT;
PLANAR TO SPLINTERY TO BLOCKY CUTTINGS
MW IN 9.2 VIS 52 pH 9.8
HABIT; CLAYEY TO SILTY TEXTURE; DULL TO
MW OUT 9.3 VIS 47 pH 9.6
EARTHY LUSTER; MASSIVE STRUCTURE WITH
THINLY INTERBEDDED WITH SILTSTONE.
SHALE = MEDIUM GRAY TO LIGHT GRAY
CG 4u
MOTTLED WITH GRAYISH RED; PLATY TO
SCALY TO WEDGELIKE CUTTINGS HABIT; DULL
TO EARTHY LUSTER; GRADATION TO LIGHT
GRAY SILTSTONE; MASSIVE STRUCTURE WITH
THIN INTERBEDDED LAMINAE OF SILTSTONE.
8300
CALIB GAS EQUIPMENT
C- 3,2,1
NOTE: LOSE FULL RETURNS AT 8507'. REGAIN
PARTIAL RETURNS @ 8551'. FULL RETURNS
@ 8575'.
OHIO CREEK @ 8370
LOSE RETURNS @ 8507'
CG N/A
8400
PARTIAL RETURNS @ 8551'


MW IN 9.2+ VIS 50 pH 10.1
MW OUT 9.2+ VIS 54 pH 10.0
CG 1u
<300 ROP 0>
<80 Avg WOB 0>
8500
<0 Ttl Gas 400>
<0 CO2 40K>
<0 Flare Ht. 100>
<10 Meth C-1 100K>
<10 Ethn C-2 100K>
<10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>
MAX GAS 228u
C- 5,4,3,2,1
CG 10u
WF 850 @ 8600'
8600
MW IN 9.2 VIS 50 pH 9.4
MW OUT 9.3 VIS 48 pH 9.5
SHALE = LIGHT GRAY TO MEDIUM GRAY; PLATY
TO SCALY TO WEDGELIKE CUTTINGS HABIT;
SILTY TO MATTE TEXTURE; EARTHY LUSTER;
TRACE ACCESSORY MINERALS OF MICAS AND
PYRITE; HACKLY TO IRREGULAR TO PLANAR
FRACTURE; THINLY INTERBEDDED WITH LIGHT
GRAY SILTSTONE.
SANDSTONE = OFF WHITE TO LIGHT GRAY;
PREDOMINANTLY LOOSE GRAINS; VERY FINE TO
UPPER FINE GRAIN; LOW TO MOD SPHERICITY;
ROUND TO SUBANGULAR; WELL SORTED;
TRANSPARENT TO TRANSLUCENT; MINOR
ABRASION DUE TO PDC BIT ACTION; TRACE
ACCESSORY MINERALS OF CHLORITE MICA AND
MICRO PYRITE; SLIGHTLY TO MODERATELY
CALCAREOUS; 1-3% CARBONACEOUS FLECKS IN
PRESERVED SAMPLE SPECIMENS; 10-20% OF
SAMPLE AS PRESERVED SANDSTONE; GRADES
TO LIGHT GRAY SILTSTONE.
SHALE = LIGHT GRAY TO MEDIUM GRAY WITH


8700
8800
CG 4u
CG 42u
CG 46u
C- 2.1
MUD DATA @ 8822'
MW 9.20 VIS 50 PV 13 YP 29
API FL 8.8 GELS 8/14/17 pH 9.60
Cl- 800 Ca+ 20 MBT 15.0 SOL 4.7
24 HR. MUD LOSS: 4052.7
MINOR DARK GRAY; PLATY TO WEDGELIKE TO
ELONGATED CUTTINGS HABIT; MATTE TO SILTY
TEXTURE; EARTHY LUSTER; GRADES TO LIGHT
GRAY SILTSTONE; CRUNCHY TO MODERATE
HARD TENACITY.
SILTSTONE = MEDIUM GRAY TO LIGHT GRAY
MOTTLED WITH GRAYISH RED TO VERY DUSKY
RED; HARD TO TOUGH TENACITY; IRREGULAR
TO PLANAR FRACTURE; SILTY TO GRITTY
TEXTURE; SPARKLING TO EARTHY LUSTER;
GRADATION TO LIGHT GRAY SANDSTONE;
ELONGATED TO SCALY TO TABULAR CUTTINGS
HABIT.
SHALE = MEDIUM GRAY MOTTLED WITH VERY
DUSKY RED TO GRAYISH RED; MATTE TO SILTY
TEXTURE; PLATY TO FLAKY TO TABULAR
CUTTINGS HABIT; SPLINTERY TO PLANAR
FRACTURE; GRADATION TO LIGHT GRAY
SILTSTONE; EARTHY TO DULL LUSTER.


9068
9000
WF 800 @ 8950'
LOSE RETURNS @ 9013'
TOTCO DOWN
NIGHT TOUR
<300 ROP 0>
<80 Avg WOB 0>
<0 Ttl Gas 400><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Buth C-4 100K>
<10 Pent C-5 100K>
NOTE: LOSE FULL RETURNS @ 9013' MD.
NOTE: PULLED UP 2 STANDS AND WORK PIPE
TO BUILD UP MUD VOLUME.
NOTE: DUE TO LOSS OF RETURNS, SAMPLE
LITHOLOGY WILL BE AN APPROXIMATION
UNTIL A BOTTOMS UP IS ESTABLISHED @
9145' MD.
NOTE: REGAIN RETURNS @ 9060' MD.
SANDSTONE = WHITE TO VERY LIGHT GRAY TO
MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK;
UPPER FINE TO LOWER MEDIUM GRAIN SIZE;

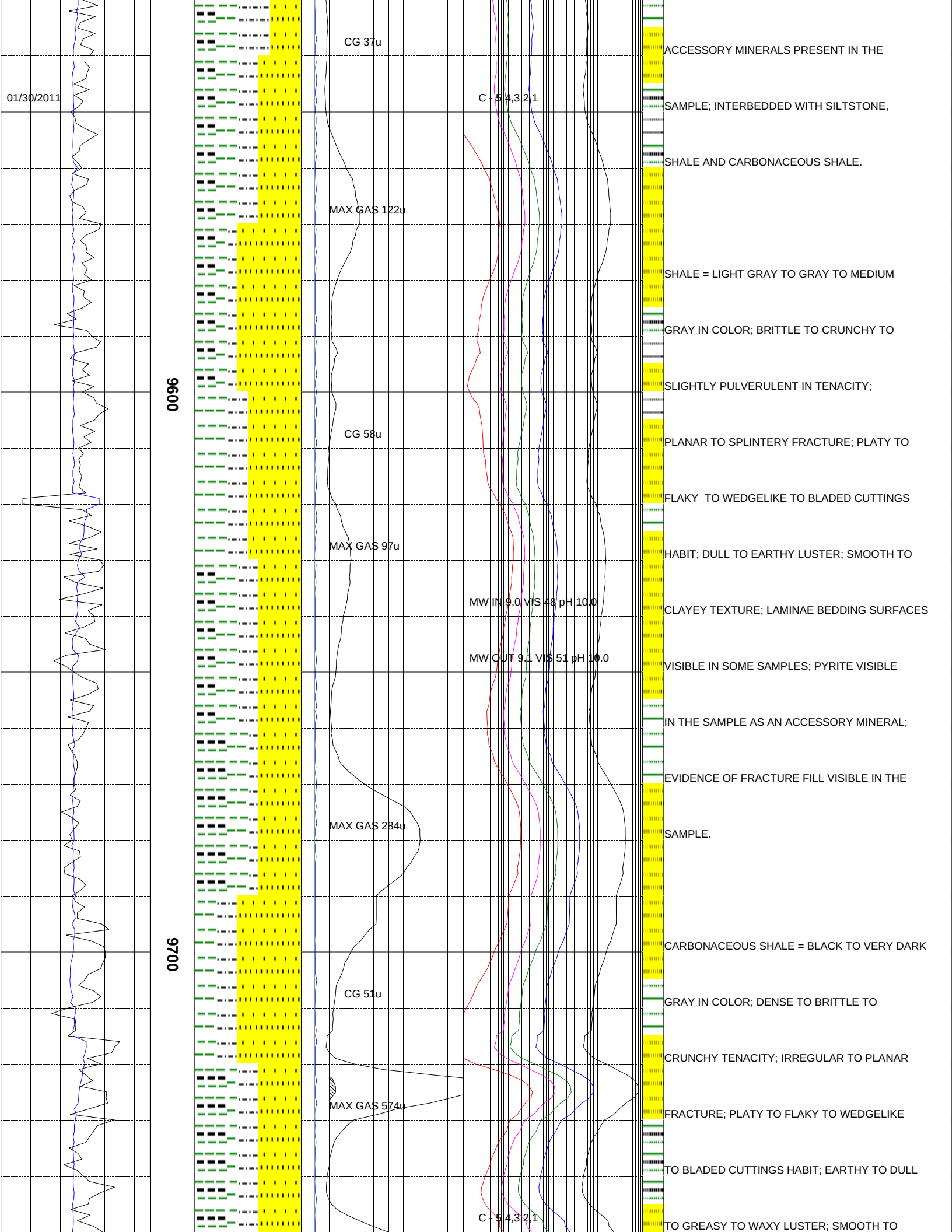

9100
9200
9300
CG 242u
C - 5,4,3,2,1
MAX GAS 208u
MAX GAS 70u
WF 700 @ 9230'
MW IN 8.9 VIS 43 pH 9.9
CG 28u
MW OUT 9.3 VIS 46 pH 9.6
MAX GAS 36u
VERY WELL TO FAIR SORTING; ANGULAR TO
SUBROUND ANGULARITY; HIGH TO MODERATE
SPHERICITY; FROSTED TO POLISHED GRAINS
VISIBLE IN THE SAMPLE; FRIABLE TO
MODERATELY HARD HARDNESS; VERY LITTLE TO
NO REACTION WITH A 10% HCL SOLUTION;
SILICA CEMENTATION; GRAIN SUPPORTED WITH
FEW LITHIC FRAGMENTS; INTERBEDDED WITH
SILTSTONE, SHALE AND CARBONACEOUS SHALE;
NO BEDDING STRUCTURES VISIBLE IN THE
SAMPLE; PYRITE VISIBLE IN THE SAMPLE AS
AN ACCESSORY MINERAL.
SHALE = LIGHT GRAY TO GRAY TO MEDIUM
GRAY IN COLOR; BRITTLE TO CRUNCHY TO
SLIGHTLY PULVERULENT IN TENACITY;
PLANAR TO SPLINTERY FRACTURE; PLATY TO
FLAKY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; DULL TO EARTHY LUSTER; SMOOTH TO
CLAYEY TEXTURE; LAMINAE BEDDING SURFACES
VISIBLE IN SOME SAMPLES; PYRITE VISIBLE
IN THE SAMPLE AS AN ACCESSORY MINERAL;

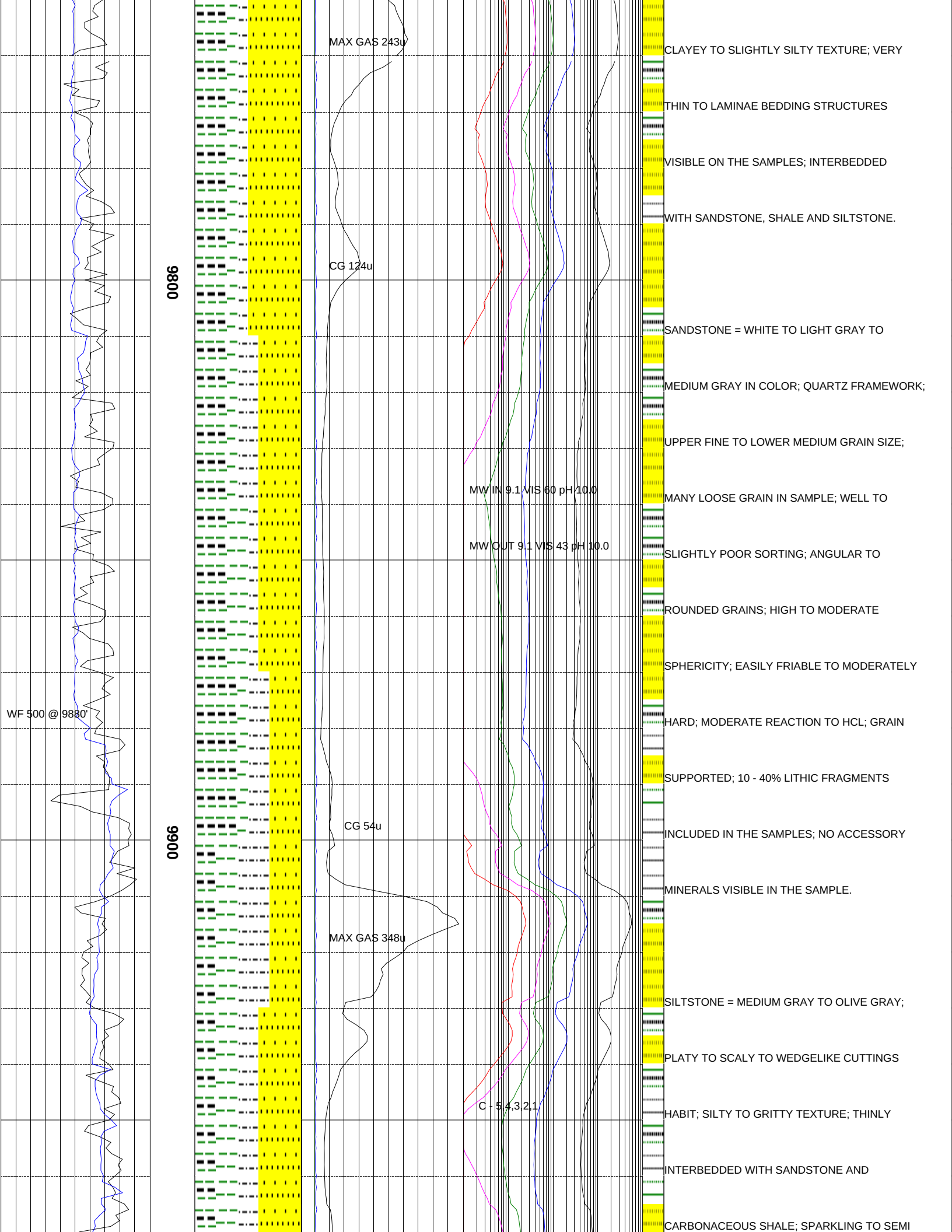


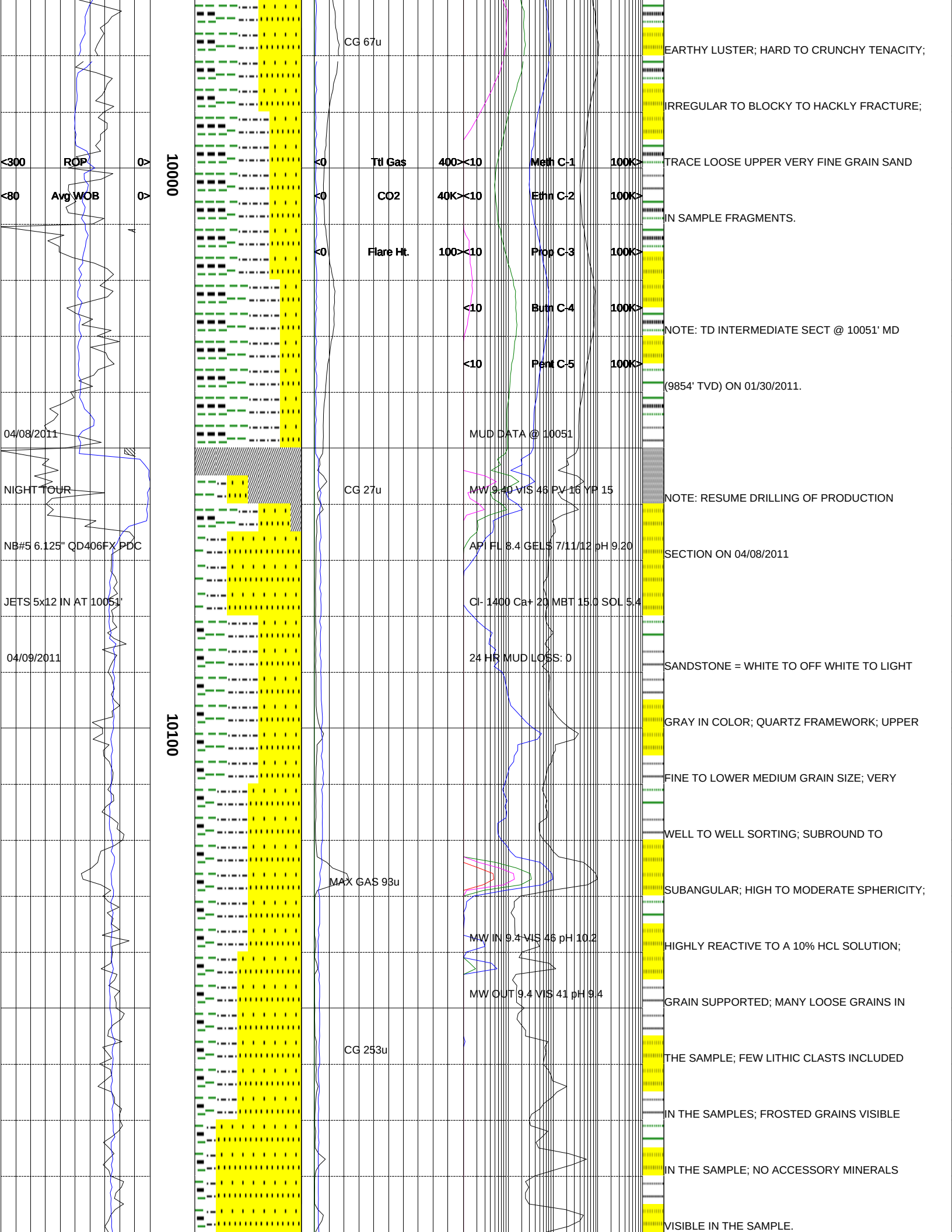
EVIDENCE OF FRACTURE FILL VISIBLE IN THE SAMPLE.

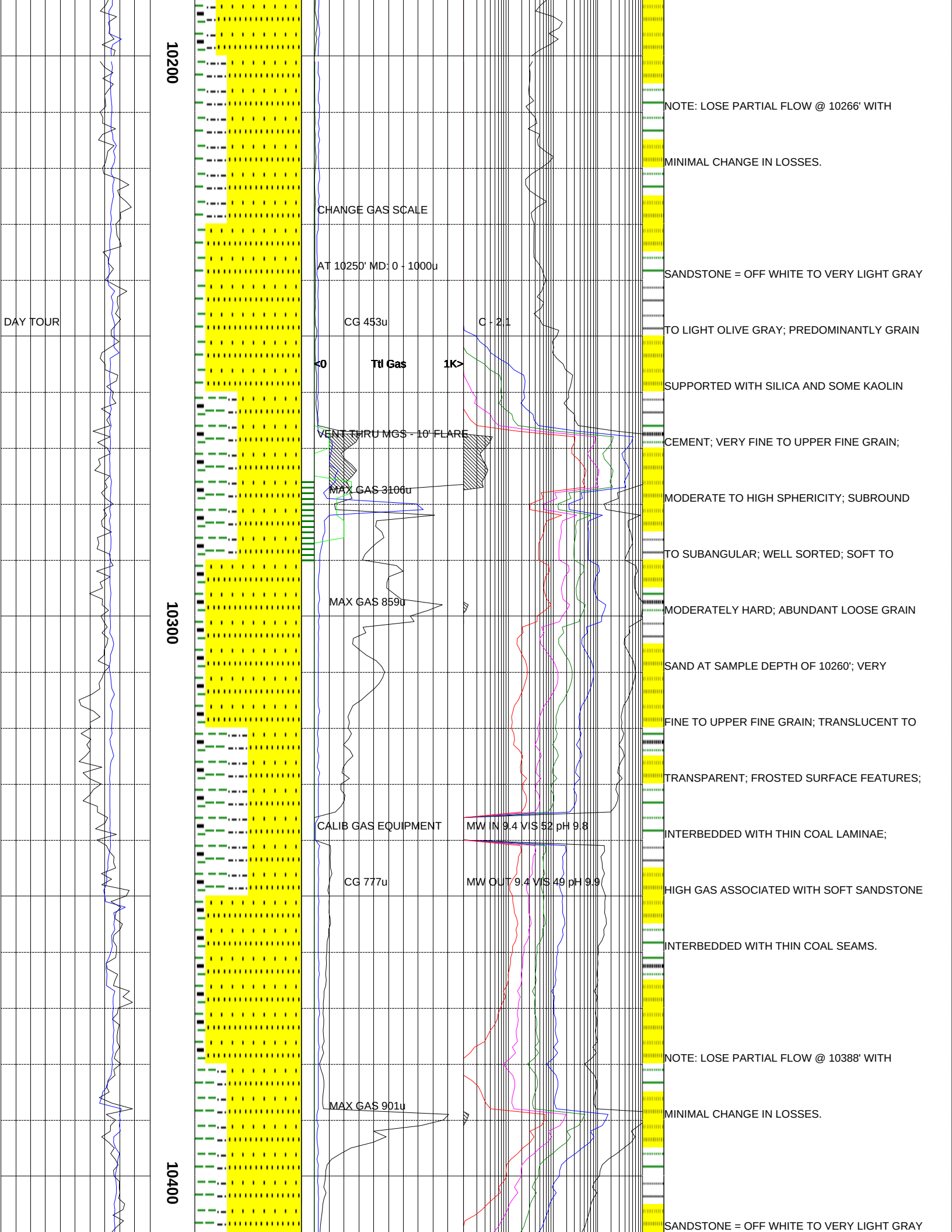
SILTSTONE = DARK GRAY TO MEDIUM GRAY TO A GRAYISH ORANGE COLOR; TOUGH TO DENSE TO BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO GRITTY TO SLIGHTLY GRANULAR TEXTURE; NO VISIBLE BEDDING STRUCTURE; NO VISIBLE ACCESSORY MINERALS.

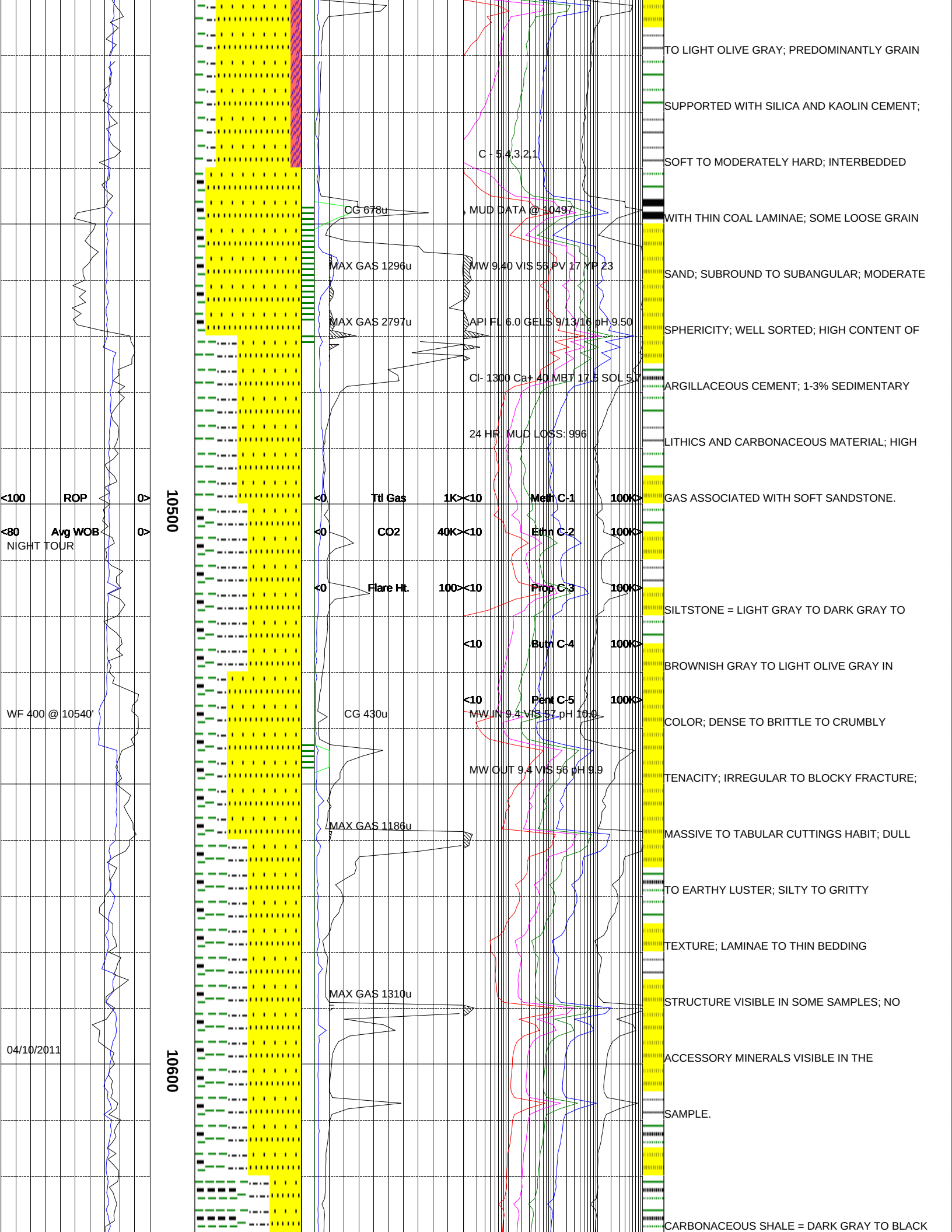
SANDSTONE = WHITE TO LIGHT GRAY TO MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; MANY LOOSE GRAIN IN SAMPLE; WELL TO SLIGHTLY POOR SORTING; ANGULAR TO ROUNDED GRAINS; HIGH TO MODERATE SPHERICITY; EASILY FRIABLE TO MODERATELY HARD; MODERATE REACTION TO HCL; GRAIN SUPPORTED; LITHIC FRAGMENTS RANGE FROM FEW 10% TO MODERATE <30%; NO VISIBLE

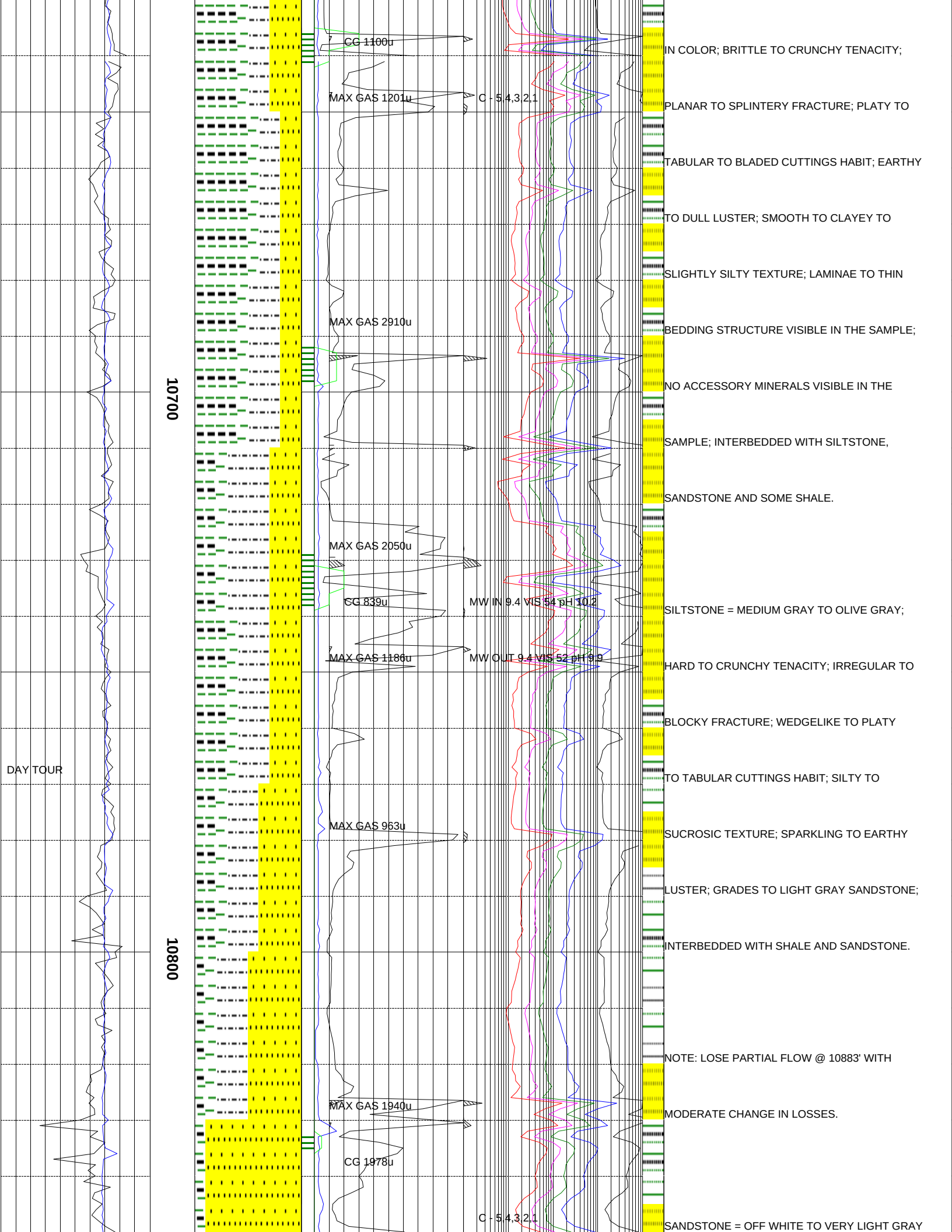

01/30/2011
9600
9700
CG 37u
MAX GAS 122u
CG 58u
MAX GAS 97u
MW IN 9.0 VIS 48 pH 10.0
MW OUT 9.1 VIS 51 pH 10.0
MAX GAS 284u
CG 51u
MAX GAS 574u
C - 5,4,3,2,1
C - 5,4,3,2,1
ACCESSORY MINERALS PRESENT IN THE
SAMPLE; INTERBEDDED WITH SILTSTONE,
SHALE AND CARBONACEOUS SHALE.
SHALE = LIGHT GRAY TO GRAY TO MEDIUM
GRAY IN COLOR; BRITTLE TO CRUNCHY TO
SLIGHTLY PULVERULENT IN TENACITY;
PLANAR TO SPLINTERY FRACTURE; PLATY TO
FLAKY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; DULL TO EARTHY LUSTER; SMOOTH TO
CLAYEY TEXTURE; LAMINAE BEDDING SURFACES
VISIBLE IN SOME SAMPLES; PYRITE VISIBLE
IN THE SAMPLE AS AN ACCESSORY MINERAL;
EVIDENCE OF FRACTURE FILL VISIBLE IN THE
SAMPLE.
CARBONACEOUS SHALE = BLACK TO VERY DARK
GRAY IN COLOR; DENSE TO BRITTLE TO
CRUNCHY TENACITY; IRREGULAR TO PLANAR
FRACTURE; PLATY TO FLAKY TO WEDGELIKE
TO BLADED CUTTINGS HABIT; EARTHY TO DULL
TO GREASY TO WAXY LUSTER; SMOOTH TO

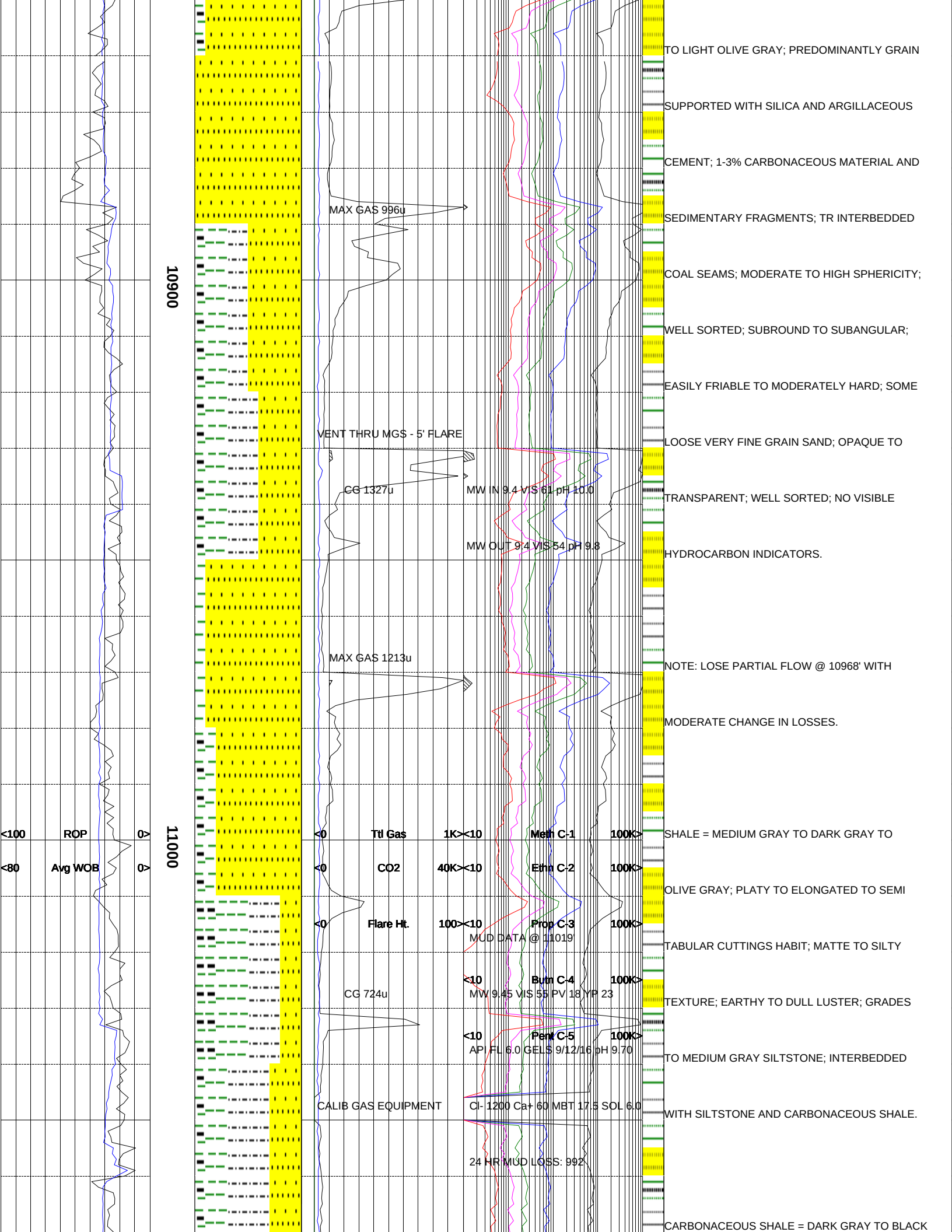

MAX GAS 243u
CG 124u
9860
WF 500 @ 9880'
MW IN 9.1 VIS 60 pH 10.0
MW OUT 9.1 VIS 43 pH 10.0
CG 54u
9900
MAX GAS 348u
C - 5,4,3,2,1
CLAYEY TO SLIGHTLY SILTY TEXTURE; VERY
THIN TO LAMINAE BEDDING STRUCTURES
VISIBLE ON THE SAMPLES; INTERBEDDED
WITH SANDSTONE, SHALE AND SILTSTONE.
SANDSTONE = WHITE TO LIGHT GRAY TO
MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK;
UPPER FINE TO LOWER MEDIUM GRAIN SIZE;
MANY LOOSE GRAIN IN SAMPLE; WELL TO
SLIGHTLY POOR SORTING; ANGULAR TO
ROUNDED GRAINS; HIGH TO MODERATE
SPHERICITY; EASILY FRIABLE TO MODERATELY
HARD; MODERATE REACTION TO HCL; GRAIN
SUPPORTED; 10 - 40% LITHIC FRAGMENTS
INCLUDED IN THE SAMPLES; NO ACCESSORY
MINERALS VISIBLE IN THE SAMPLE.
SILTSTONE = MEDIUM GRAY TO OLIVE GRAY;
PLATY TO SCALY TO WEDGELIKE CUTTINGS
HABIT; SILTY TO GRITTY TEXTURE; THINLY
INTERBEDDED WITH SANDSTONE AND
CARBONACEOUS SHALE; SPARKLING TO SEMI

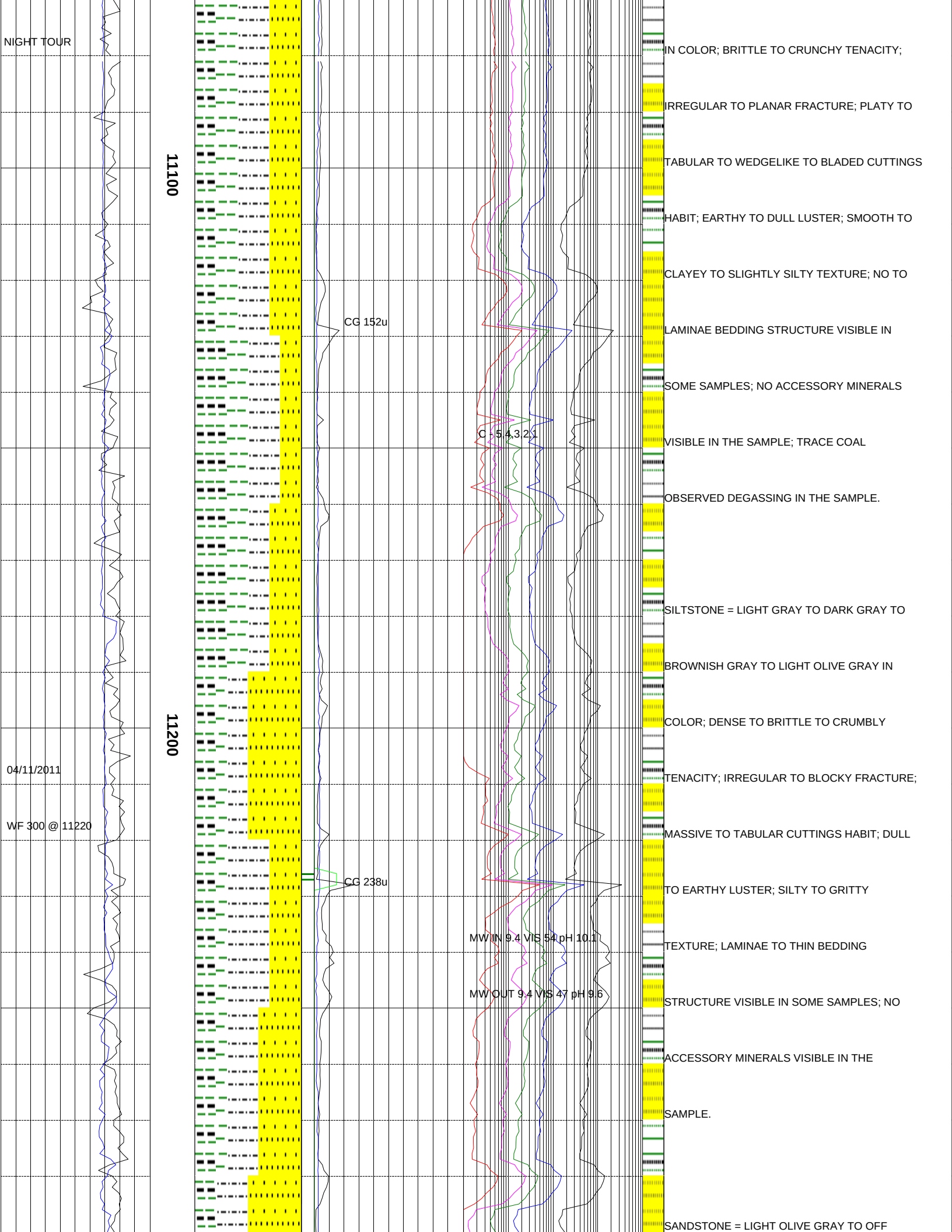

<300 ROP 0>
<80 Avg WOB 0>
10000
<0 Ttl Gas 400><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Buth C-4 100K>
<10 Pent C-5 100K>
CG 67u
EARTHY LUSTER; HARD TO CRUNCHY TENACITY;
IRREGULAR TO BLOCKY TO HACKLY FRACTURE;
TRACE LOOSE UPPER VERY FINE GRAIN SAND
IN SAMPLE FRAGMENTS.
NOTE: TD INTERMEDIATE SECT @ 10051' MD
(9854' TVD) ON 01/30/2011.
04/08/2011
MUD DATA @ 10051
NIGHT TOUR
CG 27u
MW 9.40 VIS 46 PV 16 YP 15
NOTE: RESUME DRILLING OF PRODUCTION
NB#5 6.125" QD406FX PDC
API FL 8.4 GELS 7/11/12 pH 9.20
SECTION ON 04/08/2011
JETS 5x12 IN AT 10051'
Cl- 1400 Ca+ 20 MBT 15.0 SOL 5.4
04/09/2011
24 HR MUD LOSS: 0
SANDSTONE = WHITE TO OFF WHITE TO LIGHT
GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER
FINE TO LOWER MEDIUM GRAIN SIZE; VERY
WELL TO WELL SORTING; SUBROUND TO
10100
MAX GAS 93u
SUBANGULAR; HIGH TO MODERATE SPHERICITY;
MW IN 9.4 VIS 46 pH 10.2
HIGHLY REACTIVE TO A 10% HCL SOLUTION;
MW OUT 9.4 VIS 41 pH 9.4
GRAIN SUPPORTED; MANY LOOSE GRAINS IN
CG 253u
THE SAMPLE; FEW LITHIC CLASTS INCLUDED
IN THE SAMPLES; FROSTED GRAINS VISIBLE
IN THE SAMPLE; NO ACCESSORY MINERALS
VISIBLE IN THE SAMPLE.

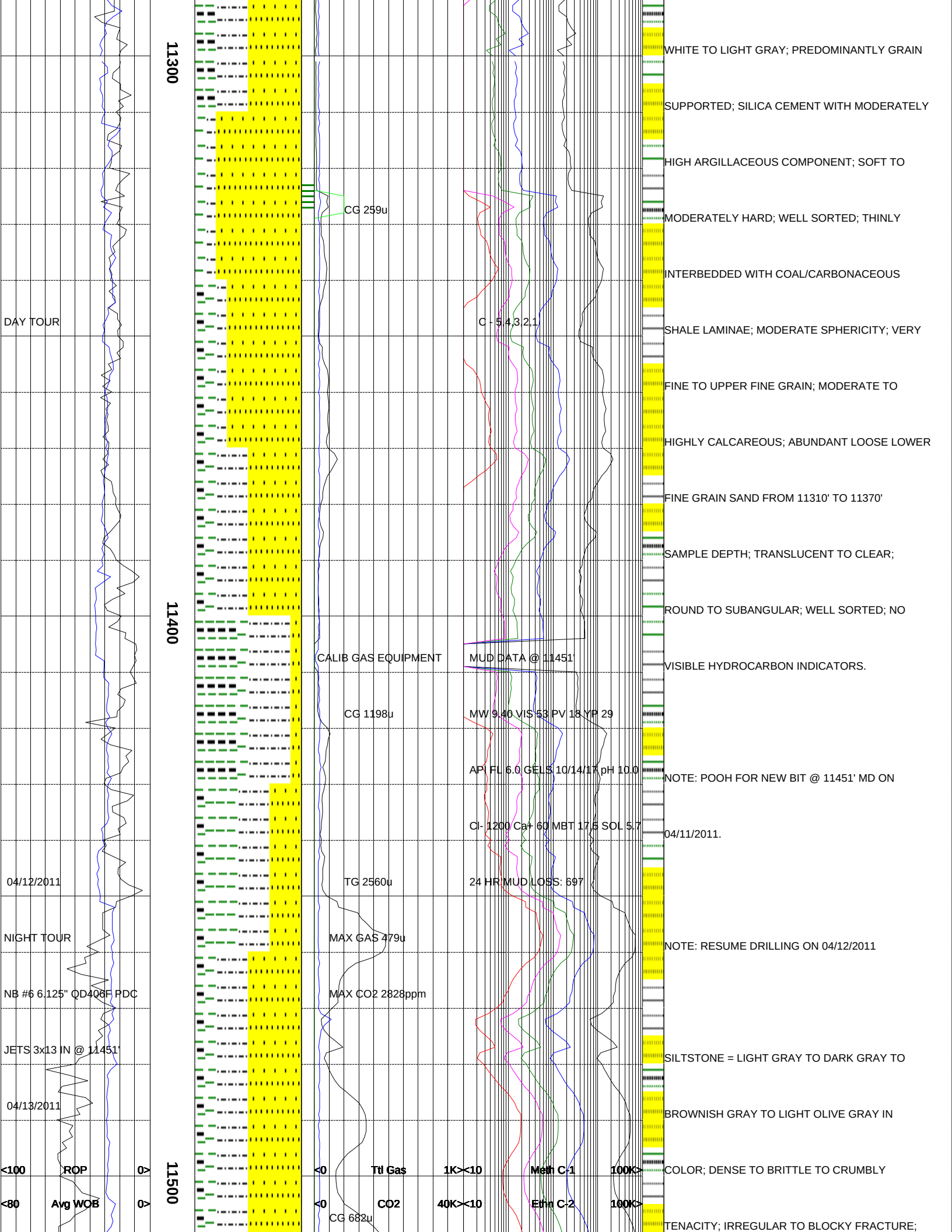

10200
10300
10400
DAY TOUR
CHANGE GAS SCALE
AT 10250' MD: 0 - 1000u
CG 453u
C - 2.1
<0
Ttl Gas
1K>
VENT THRU MGS - 10' FLARE
MAX GAS 3106u
MAX GAS 859u
CALIB GAS EQUIPMENT
MW IN 9.4 VIS 52 pH 9.8
CG 777u
MW OUT 9.4 VIS 49 pH 9.9
MAX GAS 901u
NOTE: LOSE PARTIAL FLOW @ 10266' WITH
MINIMAL CHANGE IN LOSSES.
SANDSTONE = OFF WHITE TO VERY LIGHT GRAY
TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN
SUPPORTED WITH SILICA AND SOME KAOLIN
CEMENT; VERY FINE TO UPPER FINE GRAIN;
MODERATE TO HIGH SPHERICITY; SUBROUND
TO SUBANGULAR; WELL SORTED; SOFT TO
MODERATELY HARD; ABUNDANT LOOSE GRAIN
SAND AT SAMPLE DEPTH OF 10260'; VERY
FINE TO UPPER FINE GRAIN; TRANSLUCENT TO
TRANSPARENT; FROSTED SURFACE FEATURES;
INTERBEDDED WITH THIN COAL LAMINAE;
HIGH GAS ASSOCIATED WITH SOFT SANDSTONE
INTERBEDDED WITH THIN COAL SEAMS.
NOTE: LOSE PARTIAL FLOW @ 10388' WITH
MINIMAL CHANGE IN LOSSES.
SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

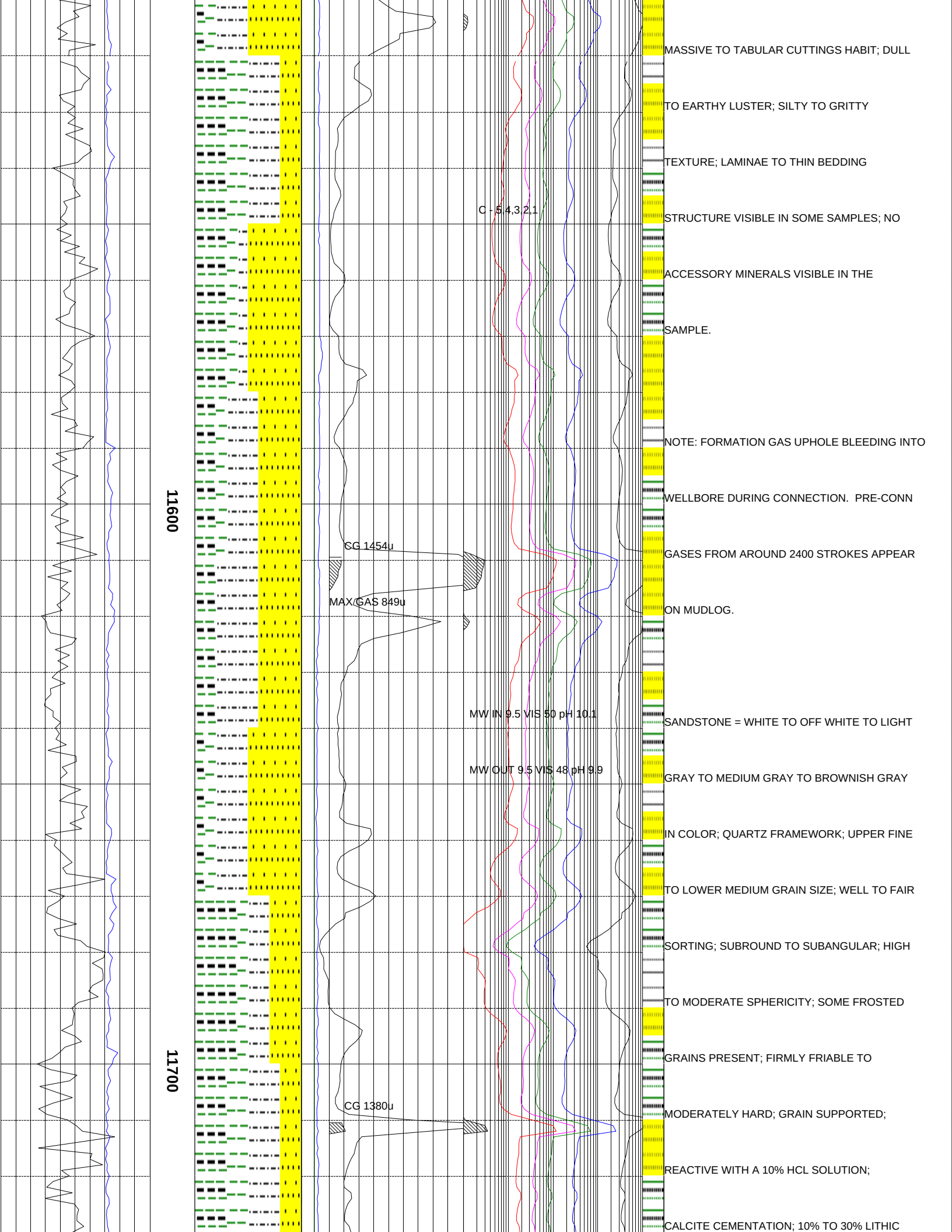

TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN
SUPPORTED WITH SILICA AND KAOLIN CEMENT;
C - 5,4,3,2,1
SOFT TO MODERATELY HARD; INTERBEDDED
CG 678u
MUD DATA @ 10497'
WITH THIN COAL LAMINAE; SOME LOOSE GRAIN
MAX GAS 1296u
MW 9.40 VIS 56 PV 17 YP 23
SAND; SUBROUND TO SUBANGULAR; MODERATE
MAX GAS 2797u
API FL 6.0 GELS 9/13/16 pH 9.50
SPHERICITY; WELL SORTED; HIGH CONTENT OF
Cl- 1300 Ca+ 40 MBT 17.5 SOL 5.7
ARGILLACEOUS CEMENT; 1-3% SEDIMENTARY
24 HR. MUD LOSS: 996
LITHICS AND CARBONACEOUS MATERIAL; HIGH
<100 ROP 0>
<0 Ttl Gas 1K>
<10 Meth C-1 100K>
GAS ASSOCIATED WITH SOFT SANDSTONE.
10500
<80 Avg WOB 0>
<0 CO2 40K>
<10 Ethn C-2 100K>
NIGHT TOUR
<0 Flare Ht. 100>
<10 Prop C-3 100K>
SILTSTONE = LIGHT GRAY TO DARK GRAY TO
<10 Butn C-4 100K>
BROWNISH GRAY TO LIGHT OLIVE GRAY IN
<10 Pent C-5 100K>
WF 400 @ 10540'
CG 430u
MW IN 9.4 VIS 57 pH 10.0
COLOR; DENSE TO BRITTLE TO CRUMBLY
MW OUT 9.4 VIS 56 pH 9.9
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MAX GAS 1186u
MASSIVE TO TABULAR CUTTINGS HABIT; DULL
TO EARTHY LUSTER; SILTY TO GRITTY
TEXTURE; LAMINAE TO THIN BEDDING
MAX GAS 1310u
STRUCTURE VISIBLE IN SOME SAMPLES; NO
04/10/2011
ACCESSORY MINERALS VISIBLE IN THE
10600
SAMPLE.
CARBONACEOUS SHALE = DARK GRAY TO BLACK


CG 1100u
MAX GAS 1201u
C - 5,4,3,2,1
10700
MAX GAS 2910u
MAX GAS 2050u
CG 839u
MW IN 9.4 VIS 54 pH 10.2
MAX GAS 1186u
MW OUT 9.4 VIS 52 pH 9.9
DAY TOUR
MAX GAS 963u
10800
MAX GAS 1940u
CG 1978u
C - 5,4,3,2,1
IN COLOR; BRITTLE TO CRUNCHY TENACITY;
PLANAR TO SPLINTERY FRACTURE; PLATY TO
TABULAR TO BLADED CUTTINGS HABIT; EARTHY
TO DULL LUSTER; SMOOTH TO CLAYEY TO
SLIGHTLY SILTY TEXTURE; LAMINAE TO THIN
BEDDING STRUCTURE VISIBLE IN THE SAMPLE;
NO ACCESSORY MINERALS VISIBLE IN THE
SAMPLE; INTERBEDDED WITH SILTSTONE,
SANDSTONE AND SOME SHALE.
SILTSTONE = MEDIUM GRAY TO OLIVE GRAY;
HARD TO CRUNCHY TENACITY; IRREGULAR TO
BLOCKY FRACTURE; WEDGELIKE TO PLATY
TO TABULAR CUTTINGS HABIT; SILTY TO
SUCROSIC TEXTURE; SPARKLING TO EARTHY
LUSTER; GRADES TO LIGHT GRAY SANDSTONE;
INTERBEDDED WITH SHALE AND SANDSTONE.
NOTE: LOSE PARTIAL FLOW @ 10883' WITH
MODERATE CHANGE IN LOSSES.
SANDSTONE = OFF WHITE TO VERY LIGHT GRAY


10900
11000
MAX GAS 996u
VENT THRU MGS - 5' FLARE
CG 1327u
MW IN 9.4 VIS 61 pH 10.0
MW OUT 9.4 VIS 54 pH 9.8
MAX GAS 1213u
CG 724u
CALIB GAS EQUIPMENT
MUD DATA @ 11019'
MW 9.45 VIS 55 PV 18 YP 23
API FL 6.0 GELS 9/12/16 pH 9.70
Cl- 1200 Ca+ 60 MBT 17.5 SOL 6.0
24 HR MUD LOSS: 992
<100 ROP 0>
<80 Avg WOB 0>
<0 Ttl Gas 1K>
<0 CO2 40K>
<0 Flare Ht. 100>
<10 Meth C-1 100K>
<10 Eth C-2 100K>
<10 Prop C-3 100K>
<10 Butn C-4 100K>
<10 Pent C-5 100K>
TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN
SUPPORTED WITH SILICA AND ARGILLACEOUS
CEMENT; 1-3% CARBONACEOUS MATERIAL AND
SEDIMENTARY FRAGMENTS; TR INTERBEDDED
COAL SEAMS; MODERATE TO HIGH SPHERICITY;
WELL SORTED; SUBROUND TO SUBANGULAR;
EASILY FRIABLE TO MODERATELY HARD; SOME
LOOSE VERY FINE GRAIN SAND; OPAQUE TO
TRANSPARENT; WELL SORTED; NO VISIBLE
HYDROCARBON INDICATORS.
NOTE: LOSE PARTIAL FLOW @ 10968' WITH
MODERATE CHANGE IN LOSSES.
SHALE = MEDIUM GRAY TO DARK GRAY TO
OLIVE GRAY; PLATY TO ELONGATED TO SEMI
TABULAR CUTTINGS HABIT; MATTE TO SILTY
TEXTURE; EARTHY TO DULL LUSTER; GRADES
TO MEDIUM GRAY SILTSTONE; INTERBEDDED
WITH SILTSTONE AND CARBONACEOUS SHALE.
CARBONACEOUS SHALE = DARK GRAY TO BLACK


NIGHT TOUR
11100
CG 152u
C - 5,4,3,2,1
11200
04/11/2011
WF 300 @ 11220
CG 238u
MW IN 9.4 VIS 54 pH 10.1
MW OUT 9.4 VIS 47 pH 9.6
IN COLOR; BRITTLE TO CRUNCHY TENACITY;
IRREGULAR TO PLANAR FRACTURE; PLATY TO
TABULAR TO WEDGELIKE TO BLADED CUTTINGS
HABIT; EARTHY TO DULL LUSTER; SMOOTH TO
CLAYEY TO SLIGHTLY SILTY TEXTURE; NO TO
LAMINAE BEDDING STRUCTURE VISIBLE IN
SOME SAMPLES; NO ACCESSORY MINERALS
VISIBLE IN THE SAMPLE; TRACE COAL
OBSERVED DEGASSING IN THE SAMPLE.
SILTSTONE = LIGHT GRAY TO DARK GRAY TO
BROWNISH GRAY TO LIGHT OLIVE GRAY IN
COLOR; DENSE TO BRITTLE TO CRUMBLY
TENACITY; IRREGULAR TO BLOCKY FRACTURE;
MASSIVE TO TABULAR CUTTINGS HABIT; DULL
TO EARTHY LUSTER; SILTY TO GRITTY
TEXTURE; LAMINAE TO THIN BEDDING
STRUCTURE VISIBLE IN SOME SAMPLES; NO
ACCESSORY MINERALS VISIBLE IN THE
SAMPLE.
SANDSTONE = LIGHT OLIVE GRAY TO OFF

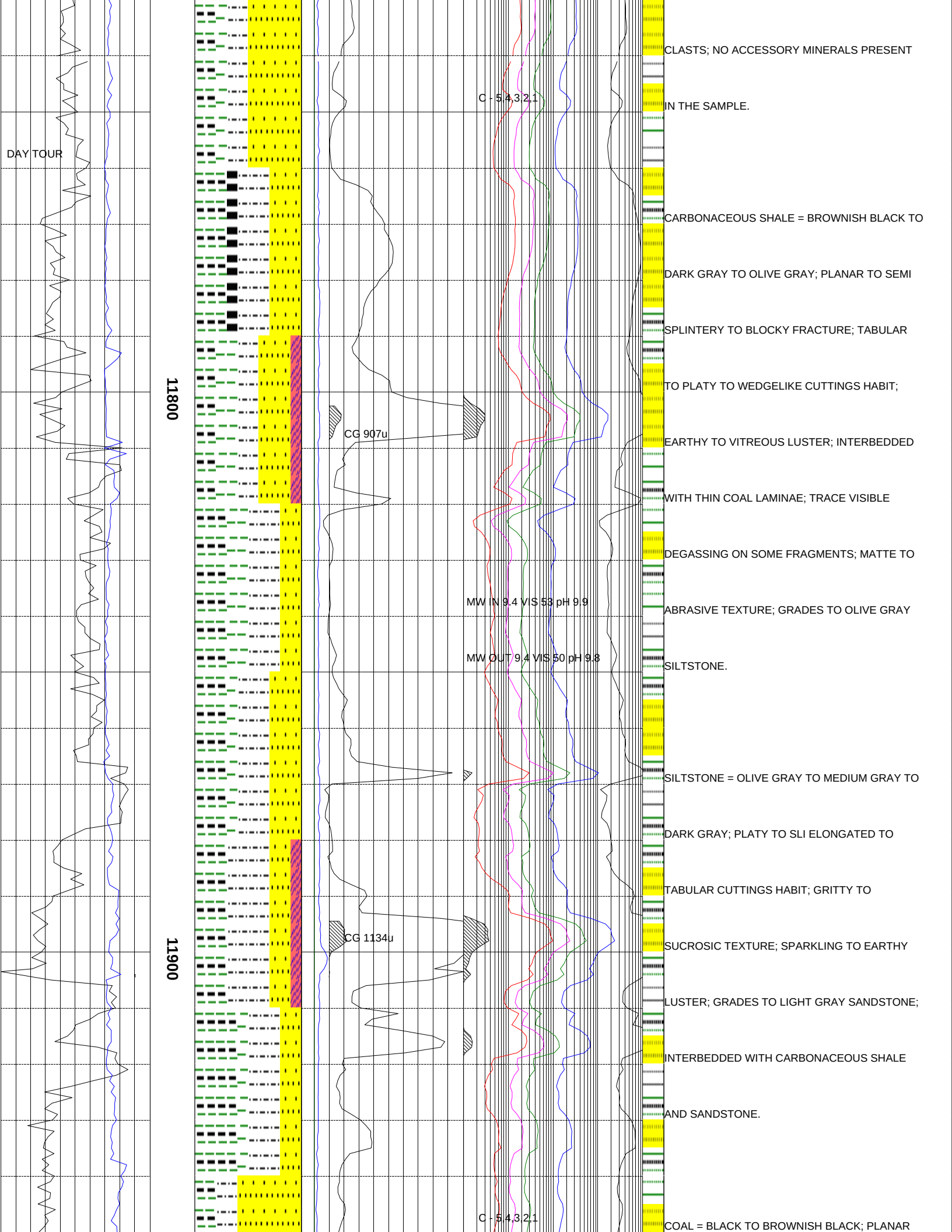

11300
11400
11500
DAY TOUR
04/12/2011
NIGHT TOUR
NB #6 6.125" QD406F PDC
JETS 3x13 IN @ 11451'
04/13/2011
CG 259u
C - 5,4,3,2,1
CALIB GAS EQUIPMENT
CG 1198u
TG 2560u
MAX GAS 479u
MAX CO2 2828ppm
CG 682u
MUD DATA @ 11451'
MW 9.40 VIS 53 PV 18 YP 29
API FL 6.0 GELS 10/14/17 pH 10.0
Cl- 1200 Ca+ 60 MBT 17.5 SOL 5.7
24 HR MUD LOSS: 697
<100 ROP 0>
<80 Avg WOB 0>
<0 Ttl Gas 1K><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
WHITE TO LIGHT GRAY; PREDOMINANTLY GRAIN
SUPPORTED; SILICA CEMENT WITH MODERATELY
HIGH ARGILLACEOUS COMPONENT; SOFT TO
MODERATELY HARD; WELL SORTED; THINLY
INTERBEDDED WITH COAL/CARBONACEOUS
SHALE LAMINAE; MODERATE SPHERICITY; VERY
FINE TO UPPER FINE GRAIN; MODERATE TO
HIGHLY CALCAREOUS; ABUNDANT LOOSE LOWER
FINE GRAIN SAND FROM 11310' TO 11370'
SAMPLE DEPTH; TRANSLUCENT TO CLEAR;
ROUND TO SUBANGULAR; WELL SORTED; NO
VISIBLE HYDROCARBON INDICATORS.
NOTE: POOH FOR NEW BIT @ 11451' MD ON
04/11/2011.
NOTE: RESUME DRILLING ON 04/12/2011
SILTSTONE = LIGHT GRAY TO DARK GRAY TO
BROWNISH GRAY TO LIGHT OLIVE GRAY IN
COLOR; DENSE TO BRITTLE TO CRUMBLY
TENACITY; IRREGULAR TO BLOCKY FRACTURE;

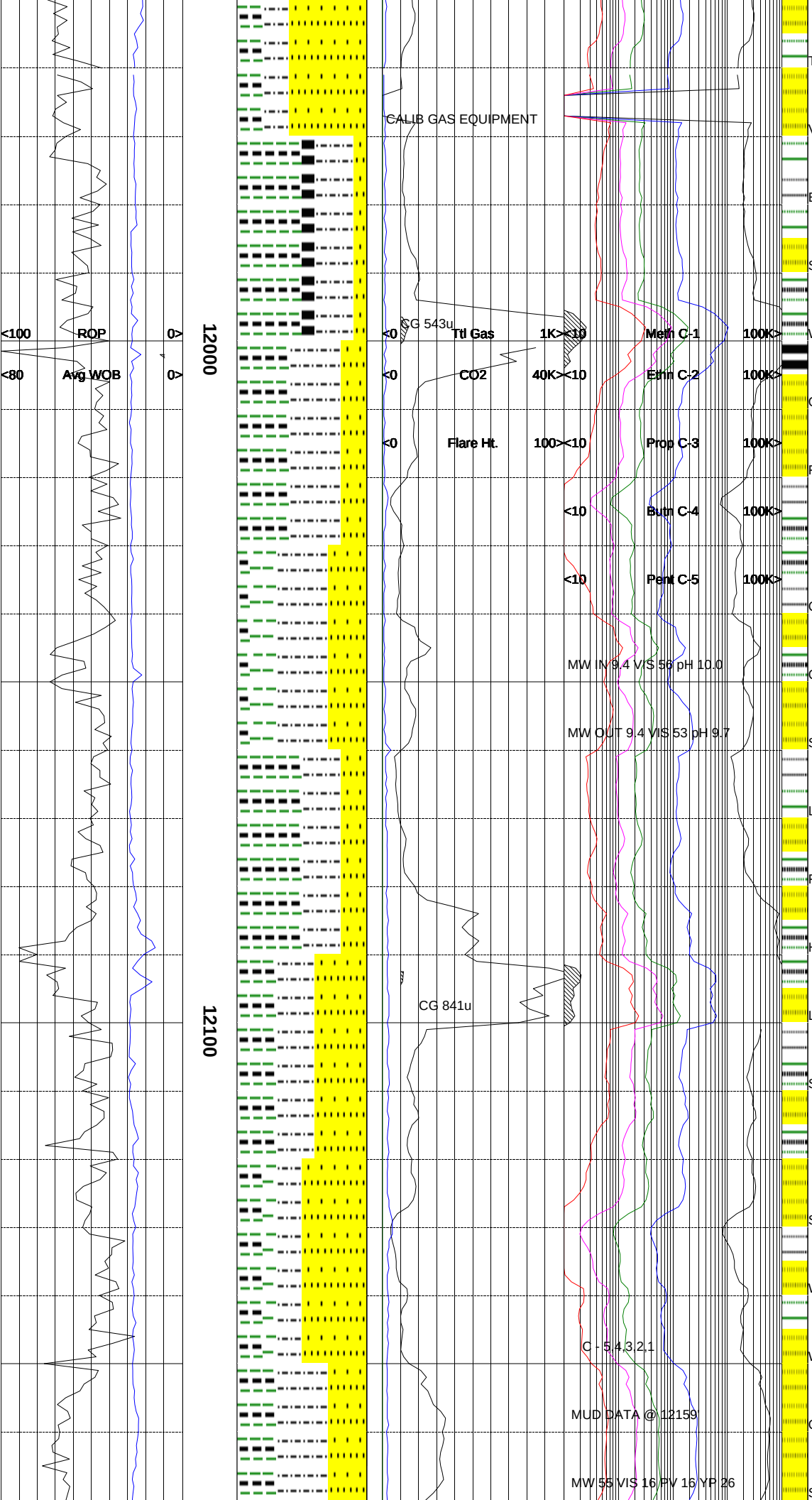


MASSIVE TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO GRITTY TEXTURE; LAMINAE TO THIN BEDDING STRUCTURE VISIBLE IN SOME SAMPLES; NO ACCESSORY MINERALS VISIBLE IN THE SAMPLE.

NOTE: FORMATION GAS UPHOLE BLEEDING INTO WELLBORE DURING CONNECTION. PRE-CONN GASES FROM AROUND 2400 STROKES APPEAR ON MUDLOG.

SANDSTONE = WHITE TO OFF WHITE TO LIGHT GRAY TO MEDIUM GRAY TO BROWNISH GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; WELL TO FAIR SORTING; SUBROUND TO SUBANGULAR; HIGH TO MODERATE SPHERICITY; SOME FROSTED GRAINS PRESENT; FIRMLY FRIABLE TO MODERATELY HARD; GRAIN SUPPORTED; REACTIVE WITH A 10% HCL SOLUTION; CALCITE CEMENTATION; 10% TO 30% LITHIC


CLASTS; NO ACCESSORY MINERALS PRESENT
C - 5,4,3,2,1
IN THE SAMPLE.
DAY TOUR
CARBONACEOUS SHALE = BROWNISH BLACK TO
DARK GRAY TO OLIVE GRAY; PLANAR TO SEMI
SPLINTERY TO BLOCKY FRACTURE; TABULAR
TO PLATY TO WEDGELIKE CUTTINGS HABIT;
11800
CG 907u
EARTHY TO VITREOUS LUSTER; INTERBEDDED
WITH THIN COAL LAMINAE; TRACE VISIBLE
DEGASSING ON SOME FRAGMENTS; MATTE TO
MW IN 9.4 VIS 53 pH 9.9
ABRASIVE TEXTURE; GRADES TO OLIVE GRAY
MW OUT 9.4 VIS 50 pH 9.8
SILTSTONE.
SILTSTONE = OLIVE GRAY TO MEDIUM GRAY TO
DARK GRAY; PLATY TO SLI ELONGATED TO
TABULAR CUTTINGS HABIT; GRITTY TO
CG 1134u
SUCROSIC TEXTURE; SPARKLING TO EARTHY
11900
LUSTER; GRADES TO LIGHT GRAY SANDSTONE;
INTERBEDDED WITH CARBONACEOUS SHALE
AND SANDSTONE.
C - 5,4,3,2,1
COAL = BLACK TO BROWNISH BLACK; PLANAR



TO SUBCONCHOIDAL TO ANGULAR FRACTURE;

VITREOUS TO EARTHY LUSTER; TABULAR TO

ELONGATED TO PLATY CUTTINGS HABIT;

SMOOTH TO MATTE TEXTURE; INTERBEDDED

WITH THIN CARBONACEOUS SHALE AND

OLIVE GRAY SANDSTONE; VISIBLE DEGASSING

FROM SAMPLE FRAGMENTS.

CARBONACEOUS SHALE = OLIVE GRAY TO DARK

GRAY TO BROWNISH BLACK; MATTE TO SEMI

SILTY TEXTURE; EARTHY TO SEMI VITREOUS

LUSTER; SPLINTERY TO PLANAR TO ANGULAR

FRACTURE; TABULAR TO PLATY CUTTINGS

HABIT; INTERBEDDED WITH THIN COAL

LAMINAE; NO VISIBLE DEGASSING FROM

SAMPLE FRAGMENTS.

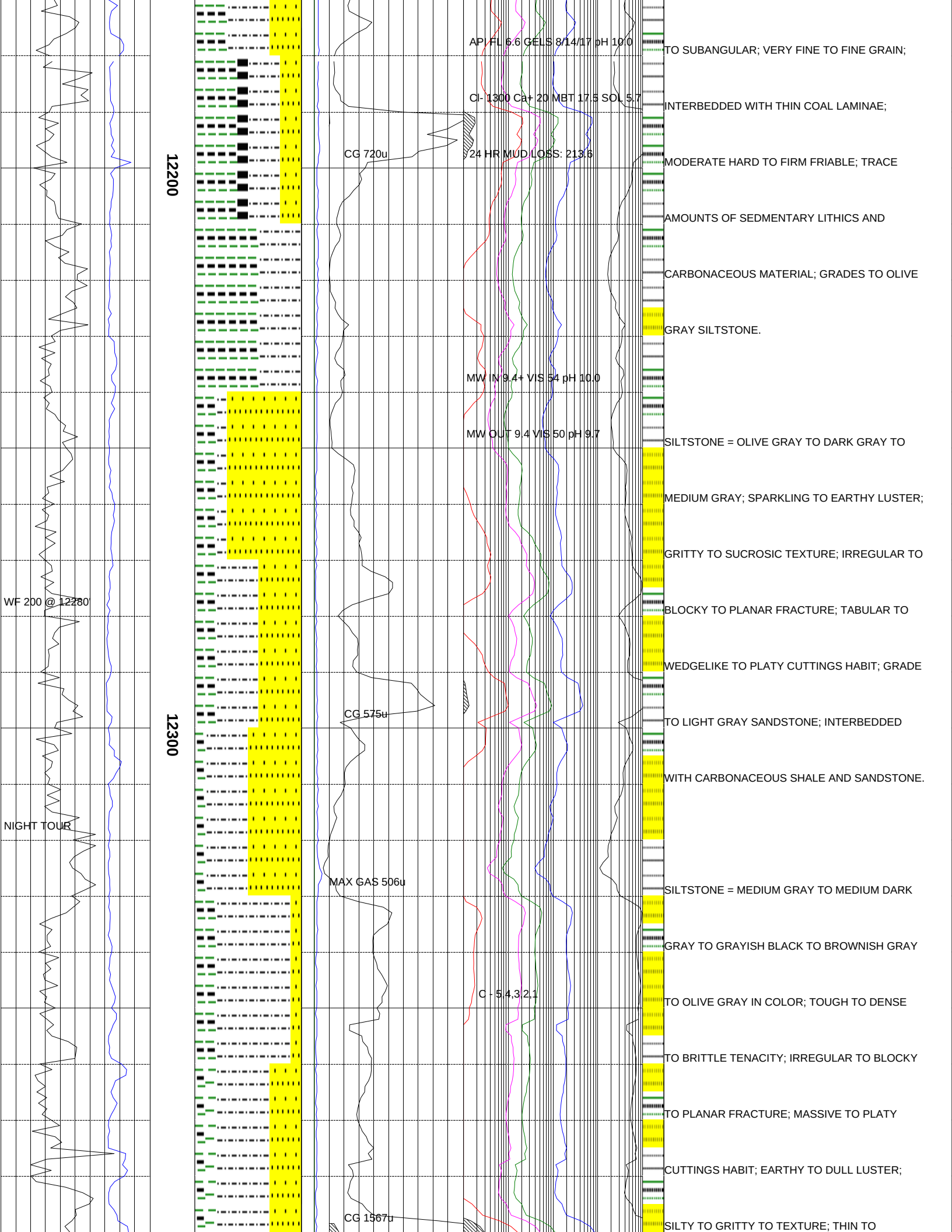
SANDSTONE = LIGHT OLIVE GRAY TO OFF

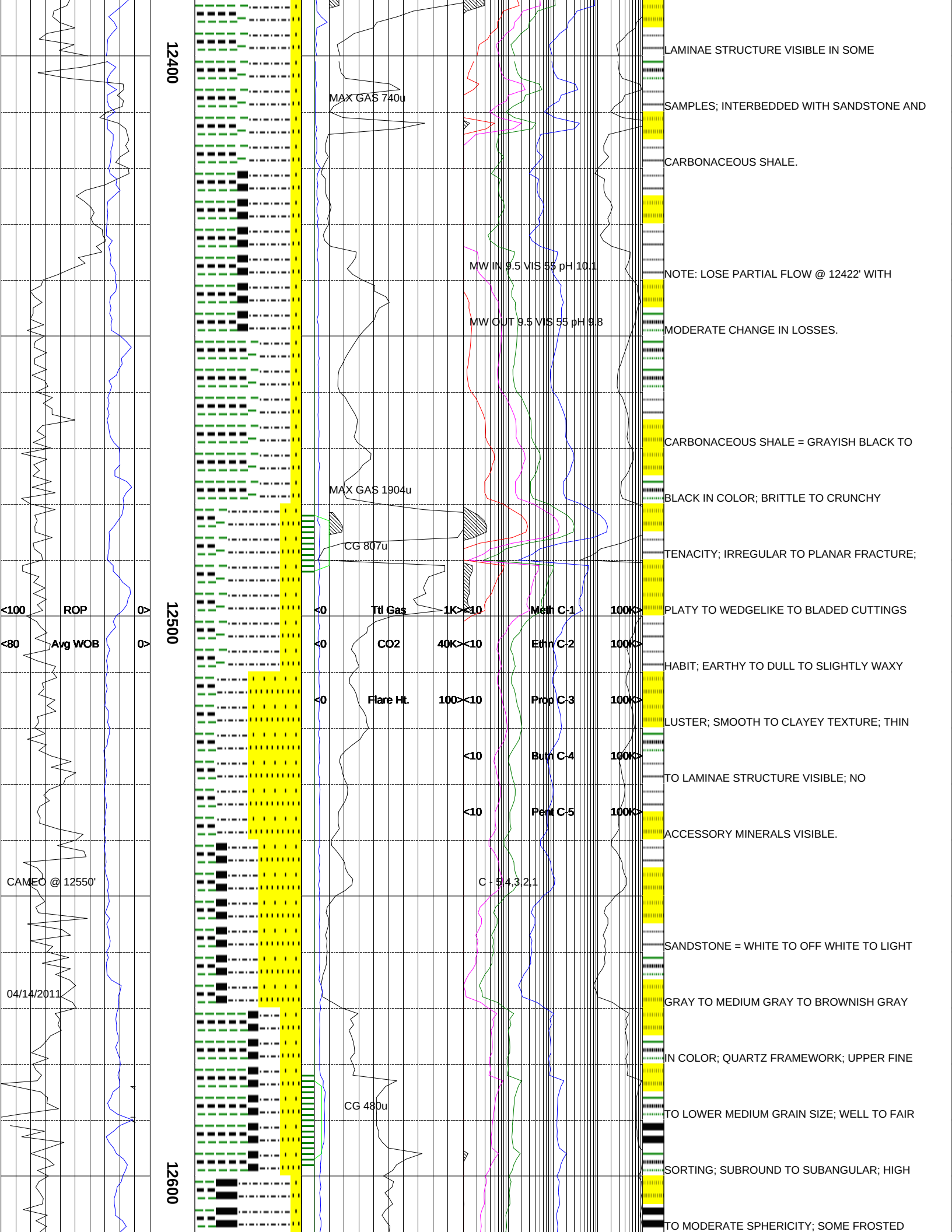
WHITE; PREDOMINANTLY GRAIN SUPPORTED

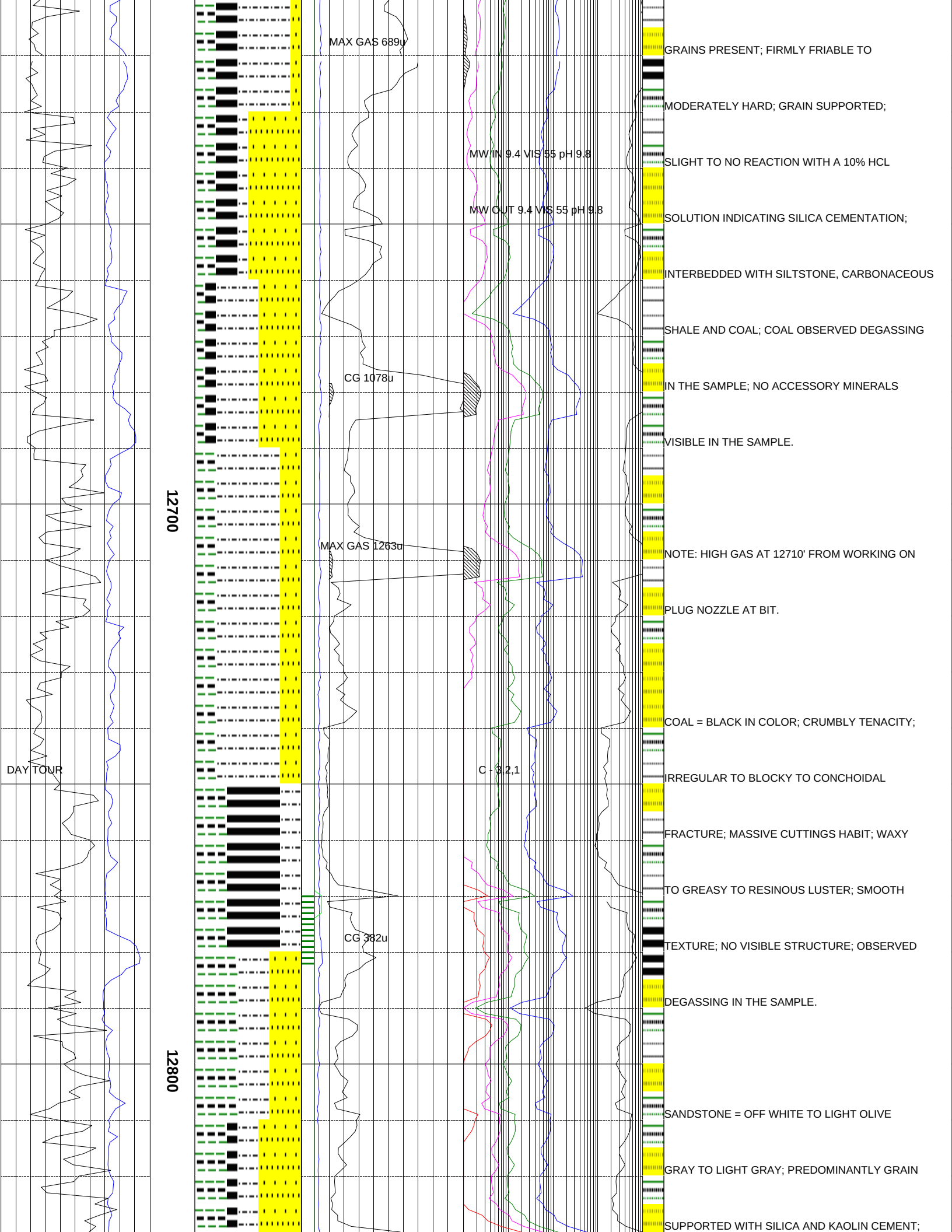
WITH SILICA AND MINOR AMOUNTS OF LIGHT

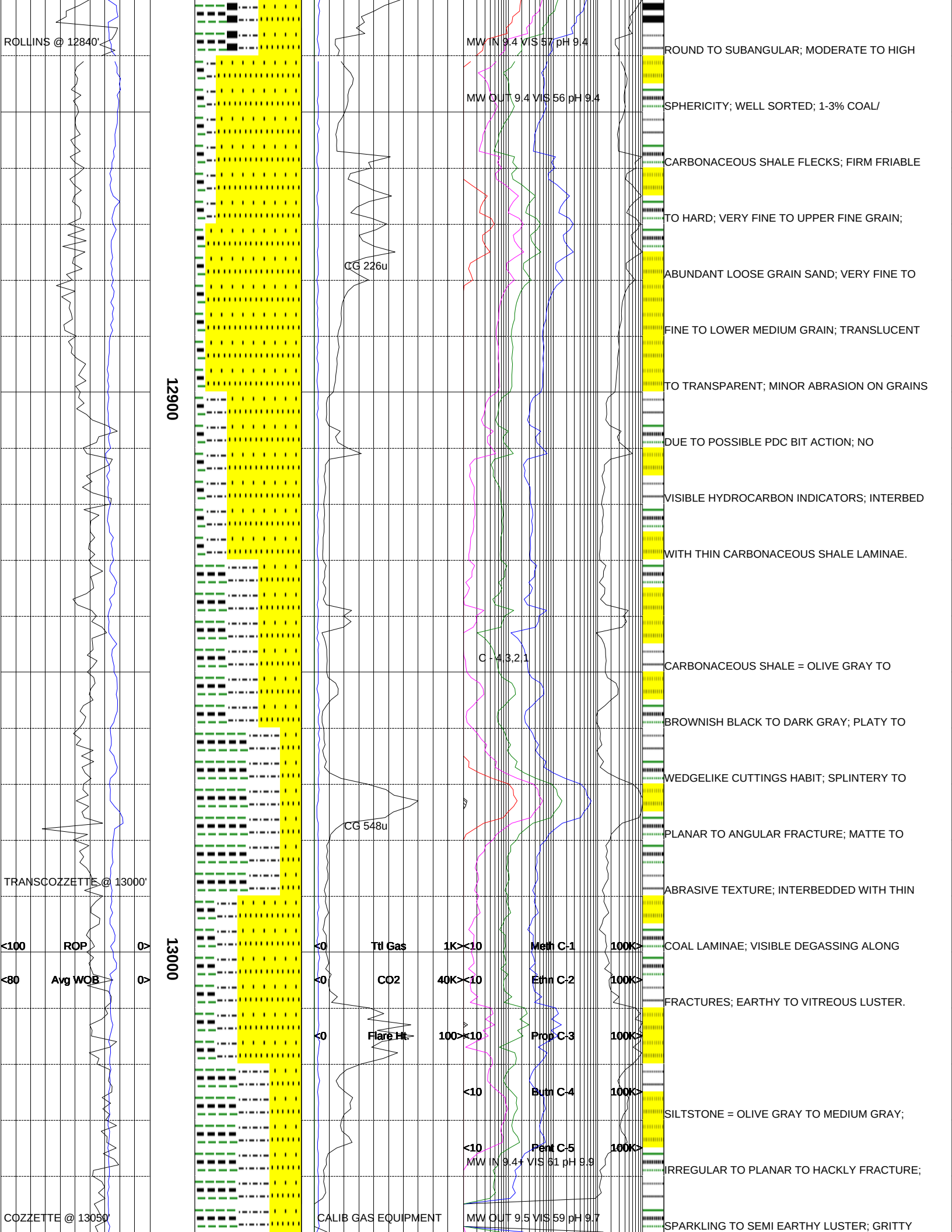
OLIVE GRAY ARGILLACEOUS CEMENT; WELL

SORTED; MODERATE SPHERICITY; SUBROUND


12200
12300
WF 200 @ 12280'
NIGHT TOUR
API FL 6.6 GELS 8/14/17 pH 10.0
Cl- 1300 Ca+ 20 MBT 17.5 SOL 5.7
CG 720u
24 HR MUD LOSS: 213.6
MW IN 9.4+ VIS 54 pH 10.0
MW OUT 9.4 VIS 50 pH 9.7
CG 575u
MAX GAS 506u
C - 5,4,3,2,1
CG 1567u
TO SUBANGULAR; VERY FINE TO FINE GRAIN;
INTERBEDDED WITH THIN COAL LAMINAE;
MODERATE HARD TO FIRM FRIABLE; TRACE
AMOUNTS OF SEDMENTARY LITHICS AND
CARBONACEOUS MATERIAL; GRADES TO OLIVE
GRAY SILTSTONE.
SILTSTONE = OLIVE GRAY TO DARK GRAY TO
MEDIUM GRAY; SPARKLING TO EARTHY LUSTER;
GRITTY TO SUCROSIC TEXTURE; IRREGULAR TO
BLOCKY TO PLANAR FRACTURE; TABULAR TO
WEDGELIKE TO PLATY CUTTINGS HABIT; GRADE
TO LIGHT GRAY SANDSTONE; INTERBEDDED
WITH CARBONACEOUS SHALE AND SANDSTONE.
SILTSTONE = MEDIUM GRAY TO MEDIUM DARK
GRAY TO GRAYISH BLACK TO BROWNISH GRAY
TO OLIVE GRAY IN COLOR; TOUGH TO DENSE
TO BRITTLE TENACITY; IRREGULAR TO BLOCKY
TO PLANAR FRACTURE; MASSIVE TO PLATY
CUTTINGS HABIT; EARTHY TO DULL LUSTER;
SILTY TO GRITTY TO TEXTURE; THIN TO


12400
12500
12600
MAX GAS 740u
MAX GAS 1904u
CG 807u
CG 480u
MW IN 9.5 VIS 55 pH 10.1
MW OUT 9.5 VIS 55 pH 9.8
<100 ROP 0>
<80 Avg WOB 0>
<0 Ttl Gas 1K><10 Meth C-1 100K>
<0 CO2 40K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Buth C-4 100K>
<10 Pent C-5 100K>
C - 5,4,3,2,1
CAMEO @ 12550'
04/14/2011
LAMINAE STRUCTURE VISIBLE IN SOME
SAMPLES; INTERBEDDED WITH SANDSTONE AND
CARBONACEOUS SHALE.
NOTE: LOSE PARTIAL FLOW @ 12422' WITH
MODERATE CHANGE IN LOSSES.
CARBONACEOUS SHALE = GRAYISH BLACK TO
BLACK IN COLOR; BRITTLE TO CRUNCHY
TENACITY; IRREGULAR TO PLANAR FRACTURE;
PLATY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; EARTHY TO DULL TO SLIGHTLY WAXY
LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN
TO LAMINAE STRUCTURE VISIBLE; NO
ACCESSORY MINERALS VISIBLE.
SANDSTONE = WHITE TO OFF WHITE TO LIGHT
GRAY TO MEDIUM GRAY TO BROWNISH GRAY
IN COLOR; QUARTZ FRAMEWORK; UPPER FINE
TO LOWER MEDIUM GRAIN SIZE; WELL TO FAIR
SORTING; SUBROUND TO SUBANGULAR; HIGH
TO MODERATE SPHERICITY; SOME FROSTED

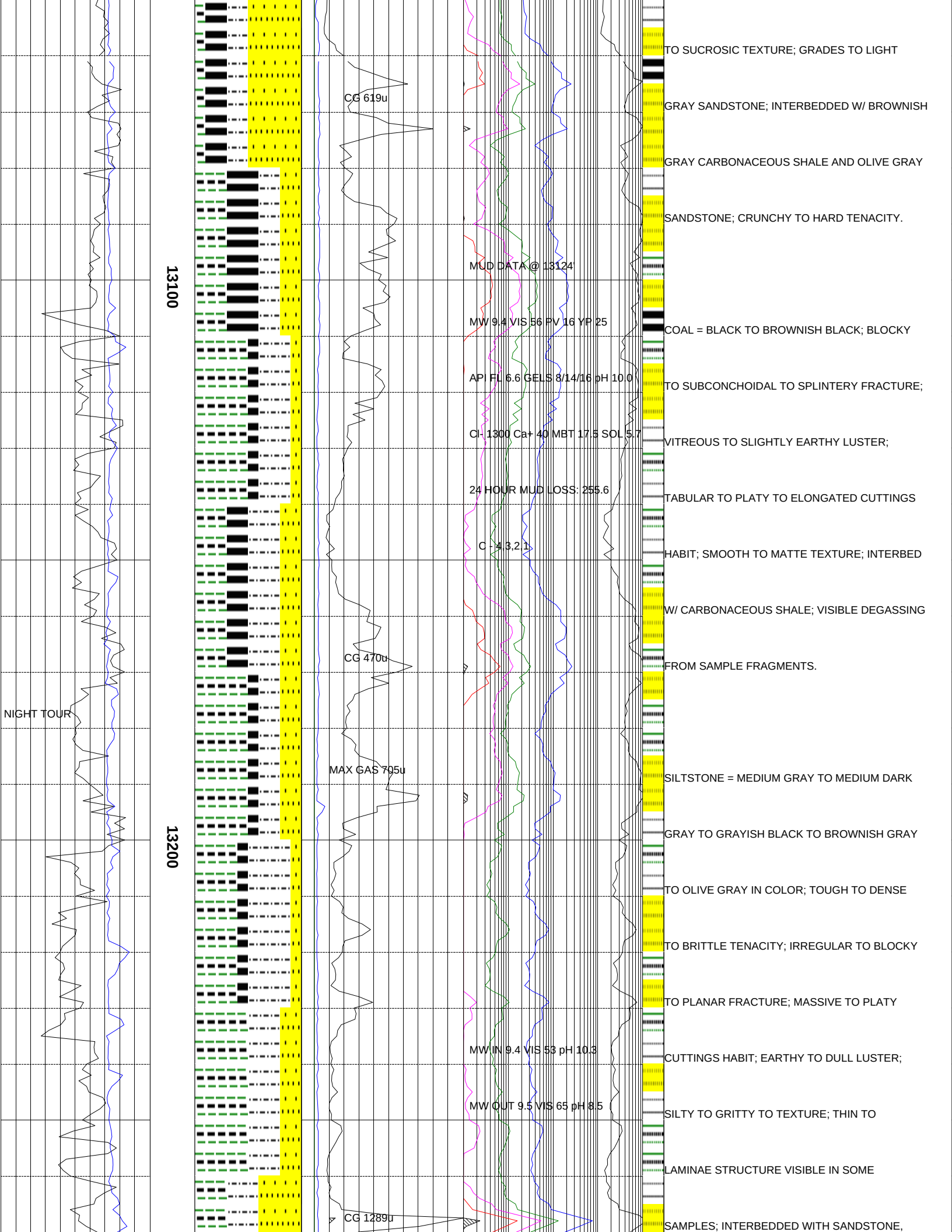

MAX GAS 689u
MW IN 9.4 VIS 55 pH 9.8
MW OUT 9.4 VIS 55 pH 9.8
CG 1078u
12700
MAX GAS 1263u
DAY TOUR
C - 3,2,1
CG 382u
12800
GRAINS PRESENT; FIRMLY FRIABLE TO
MODERATELY HARD; GRAIN SUPPORTED;
SLIGHT TO NO REACTION WITH A 10% HCL
SOLUTION INDICATING SILICA CEMENTATION;
INTERBEDDED WITH SILTSTONE, CARBONACEOUS
SHALE AND COAL; COAL OBSERVED DEGASSING
IN THE SAMPLE; NO ACCESSORY MINERALS
VISIBLE IN THE SAMPLE.
NOTE: HIGH GAS AT 12710' FROM WORKING ON
PLUG NOZZLE AT BIT.
COAL = BLACK IN COLOR; CRUMBLY TENACITY;
IRREGULAR TO BLOCKY TO CONCHOIDAL
FRACTURE; MASSIVE CUTTINGS HABIT; WAXY
TO GREASY TO RESINOUS LUSTER; SMOOTH
TEXTURE; NO VISIBLE STRUCTURE; OBSERVED
DEGASSING IN THE SAMPLE.
SANDSTONE = OFF WHITE TO LIGHT OLIVE
GRAY TO LIGHT GRAY; PREDOMINANTLY GRAIN
SUPPORTED WITH SILICA AND KAOLIN CEMENT;

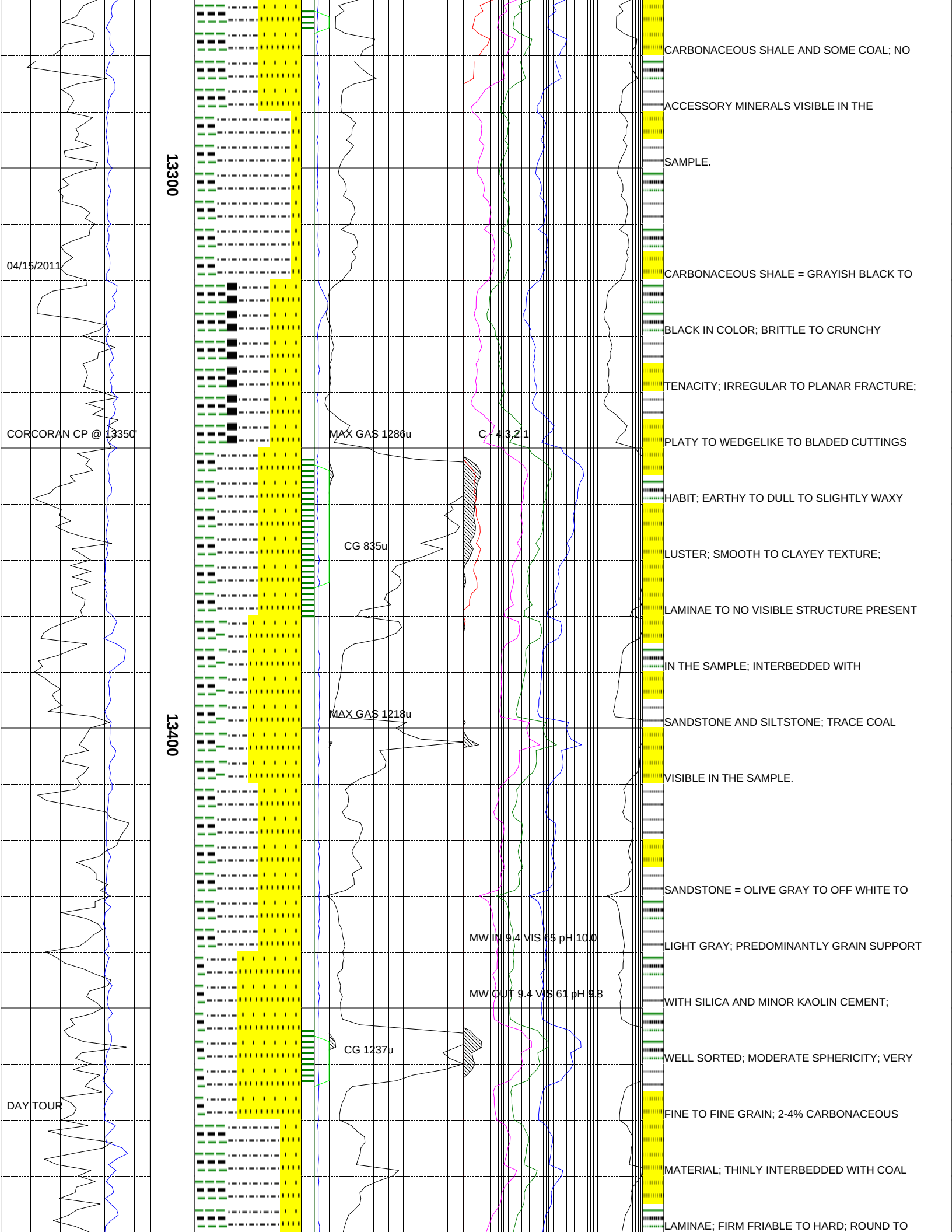


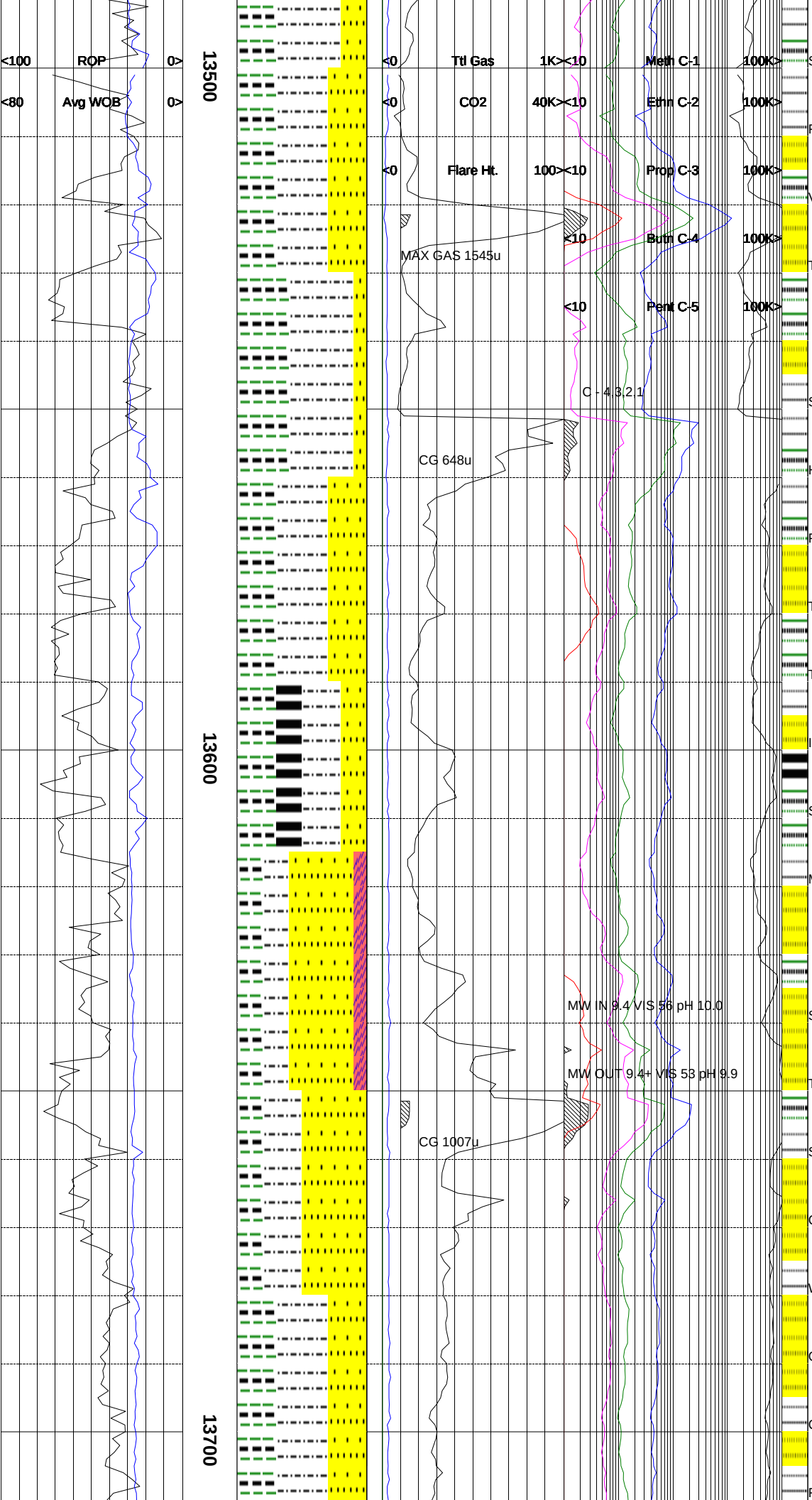
ROUND TO SUBANGULAR; MODERATE TO HIGH SPHERICITY; WELL SORTED; 1-3% COAL/ CARBONACEOUS SHALE FLECKS; FIRM FRIABLE TO HARD; VERY FINE TO UPPER FINE GRAIN; ABUNDANT LOOSE GRAIN SAND; VERY FINE TO FINE TO LOWER MEDIUM GRAIN; TRANSLUCENT TO TRANSPARENT; MINOR ABRASION ON GRAINS DUE TO POSSIBLE PDC BIT ACTION; NO VISIBLE HYDROCARBON INDICATORS; INTERBED WITH THIN CARBONACEOUS SHALE LAMINAE.

CARBONACEOUS SHALE = OLIVE GRAY TO BROWNISH BLACK TO DARK GRAY; PLATY TO WEDGELIKE CUTTINGS HABIT; SPLINTERY TO PLANAR TO ANGULAR FRACTURE; MATTE TO ABRASIVE TEXTURE; INTERBEDDED WITH THIN COAL LAMINAE; VISIBLE DEGASSING ALONG FRACTURES; EARTHY TO VITREOUS LUSTER.

SILTSTONE = OLIVE GRAY TO MEDIUM GRAY; IRREGULAR TO PLANAR TO HACKLY FRACTURE; SPARKLING TO SEMI EARTHY LUSTER; GRITTY


13100
13200
NIGHT TOUR
CG 619u
CG 470u
MAX GAS 705u
CG 1289u
MUD DATA @ 13124'
MW 9.4 VIS 56 PV 16 YP 25
API FL 6.6 GELS 8/14/16 pH 10.0
Cl- 1300 Ca+ 40 MBT 17.5 SOL 5.7
24 HOUR MUD LOSS: 255.6
C - 4,3,2,1
MW IN 9.4 VIS 53 pH 10.3
MW OUT 9.5 VIS 65 pH 8.5
TO SUCROSIC TEXTURE; GRADES TO LIGHT
GRAY SANDSTONE; INTERBEDDED W/ BROWNISH
GRAY CARBONACEOUS SHALE AND OLIVE GRAY
SANDSTONE; CRUNCHY TO HARD TENACITY.
COAL = BLACK TO BROWNISH BLACK; BLOCKY
TO SUBCONCHOIDAL TO SPLINTERY FRACTURE;
VITREOUS TO SLIGHTLY EARTHY LUSTER;
TABULAR TO PLATY TO ELONGATED CUTTINGS
HABIT; SMOOTH TO MATTE TEXTURE; INTERBED
W/ CARBONACEOUS SHALE; VISIBLE DEGASSING
FROM SAMPLE FRAGMENTS.
SILTSTONE = MEDIUM GRAY TO MEDIUM DARK
GRAY TO GRAYISH BLACK TO BROWNISH GRAY
TO OLIVE GRAY IN COLOR; TOUGH TO DENSE
TO BRITTLE TENACITY; IRREGULAR TO BLOCKY
TO PLANAR FRACTURE; MASSIVE TO PLATY
CUTTINGS HABIT; EARTHY TO DULL LUSTER;
SILTY TO GRITTY TO TEXTURE; THIN TO
LAMINAE STRUCTURE VISIBLE IN SOME
SAMPLES; INTERBEDDED WITH SANDSTONE,


13300
04/15/2011
CORCORAN CP @ 13350'
MAX GAS 1286u
C - 4,3,2,1
CG 835u
13400
MAX GAS 1218u
MW IN 9.4 VIS 65 pH 10.0
MW OUT 9.4 VIS 61 pH 9.8
CG 1237u
DAY TOUR
CARBONACEOUS SHALE AND SOME COAL; NO
ACCESSORY MINERALS VISIBLE IN THE
SAMPLE.
CARBONACEOUS SHALE = GRAYISH BLACK TO
BLACK IN COLOR; BRITTLE TO CRUNCHY
TENACITY; IRREGULAR TO PLANAR FRACTURE;
PLATY TO WEDGELIKE TO BLADED CUTTINGS
HABIT; EARTHY TO DULL TO SLIGHTLY WAXY
LUSTER; SMOOTH TO CLAYEY TEXTURE;
LAMINAE TO NO VISIBLE STRUCTURE PRESENT
IN THE SAMPLE; INTERBEDDED WITH
SANDSTONE AND SILTSTONE; TRACE COAL
VISIBLE IN THE SAMPLE.
SANDSTONE = OLIVE GRAY TO OFF WHITE TO
LIGHT GRAY; PREDOMINANTLY GRAIN SUPPORT
WITH SILICA AND MINOR KAOLIN CEMENT;
WELL SORTED; MODERATE SPHERICITY; VERY
FINE TO FINE GRAIN; 2-4% CARBONACEOUS
MATERIAL; THINLY INTERBEDDED WITH COAL
LAMINAE; FIRM FRIABLE TO HARD; ROUND TO



SUBANGULAR; MINOR AMOUNTS OF LOOSE VERY

FINE GRAIN SAND; CLEAR TO OPAQUE; NO

VISIBLE HYDROCARBON INDICATORS; SLIGHT

TO MODERATE REACTION TO HCl.

SILTSTONE = OLIVE GRAY TO DARK GRAY;

HARD TO CRUNCHY TENACITY; IRREGULAR TO

PLANAR FRACTURE; WEDGELIKE TO PLATY TO

TABULAR CUTTINGS HABIT; GRITTY TO SILTY

TEXTURE; SPARKLING TO EARTHY LUSTER;

INTERBEDDED WITH CARBONACEOUS SHALE/

SANDSTONE; TR FLECKS OF CARBONACEOUS

MATERIAL IN SAMPLE FRAGMENTS.

SANDSTONE = OFF WHITE TO VERY LIGHT GRAY

TO LIGHT OLIVE GRAY; PREDOMINANTLY GRAIN

SUPPORTED WITH SILICA AND MINOR KAOLIN

CEMENT; ARGILLACEOUS FILLED INTERSTICES;

WELL SORTED; VERY FINE TO LOWER FINE

GRAIN; SUBROUND TO SUBANGULAR; THIN

COAL LAMINAE INTERBEDDED IN SAMPLE

FRAGMENTS; FIRM FRIABLE TO HARD; ABUND