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MUDLOG MD

COMPANY ExxonMobil

WELL FRU197-33B5

FIELD Freedom Ranch

REGION Rockies

COORDINATES 39.921295000
108.282534000

ELEVATION 6460.5'

COUNTY, STATE Rio Blanco, CO

API INDEX 051031142500

SPUD DATE 04/24/2010

CONTRACTOR HP

CO. REP. Chad Jarvis

RIG/TYPE HP321

LOGGING UNIT Unit #31

GEOLOGISTS Barbara Delaney
Mike Franco

ADD. PERSONS Chad Record

CO. GEOLOGIST Chris Alba

LOG INTERVAL

DEPTHS: 4524' **TO** 12445'

DATES: 04/25/2010 **TO** 05/13/2010

SCALE: 1"=100'

CASING DATA

10.75" **AT** 4524'

4.5" **AT** 12444'

AT

AT

MUD TYPES

WATER-BASED **TO** 12445'

TO

TO

TO

HOLE SIZE

8.750" **TO** 11087'

7.875" **TO** 12445'

TO

TO

ABBREVIATIONS

| | | |
|-----------------------------|---------------------------------|----------------------------|
| <i>NB</i> NEWBIT | <i>PV</i> PLASTIC VISCOSITY | <i>LC</i> LOST CIRCULATION |
| <i>RRB</i> RERUN BIT | <i>YP</i> YIELD POINT | <i>CO</i> CIRCULATE OUT |
| <i>CB</i> CORE BIT | <i>FL</i> FLUID LOSS | <i>NR</i> NO RETURNS |
| <i>WOB</i> WEIGHT ON BIT | <i>CL</i> PPM CLORIDE ION | <i>TG</i> TRIP GAS |
| <i>RPM</i> ROTARY REV/MIN | <i>Rm</i> MUD RESISTIVITY | <i>SG</i> SURVEY GAS |
| <i>PP</i> PUMP PRESSURE | <i>Rmf</i> FILTRATE RESISTIVITY | <i>WG</i> WIPER GAS |
| <i>SPM</i> STROKES/MIN | <i>PR</i> POOR RETURNS | <i>CG</i> CONNECTION GAS |
| <i>MW</i> MUD WEIGHT | <i>LAT</i> LOGGED AFTER TRIP | |
| <i>VIS</i> FUNNEL VISCOSITY | <i>LAS</i> LOGGED AFTER SURVEY | |

| | |
|--|------------------|
| | ALTERED ZONE |
| | ANDESITE |
| | ANHYDRITE |
| | BASALT |
| | BENTONITE |
| | BIOTITIZATION |
| | BRECCIA |
| | CALCARENITE |
| | CALCAREOUS TUFF |
| | CALCILUTITE |
| | CARBONATES |
| | CARBONACEOUS MAT |
| | CARBONACEOUS SH |
| | CEMENT CONTAM. |
| | CHALK |
| | CRYSTALLINE TUFF |
| | CHERT - ARGILL |

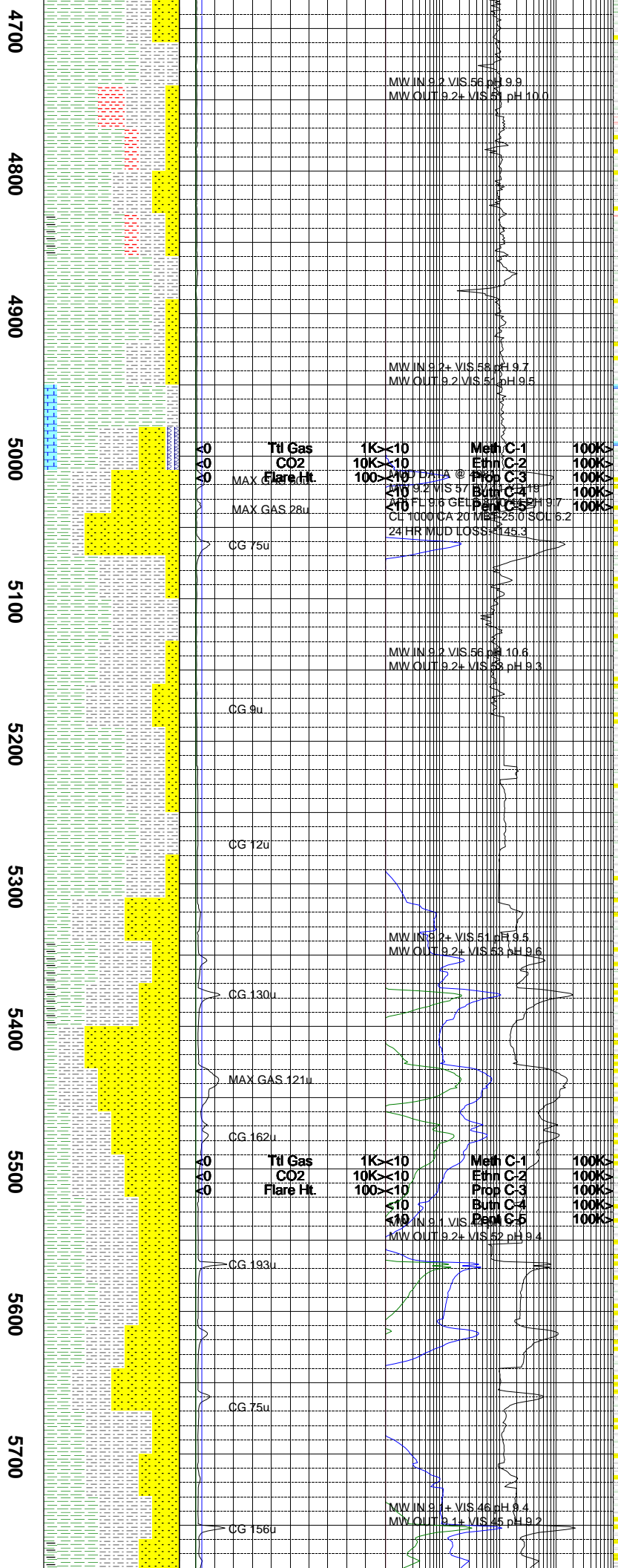
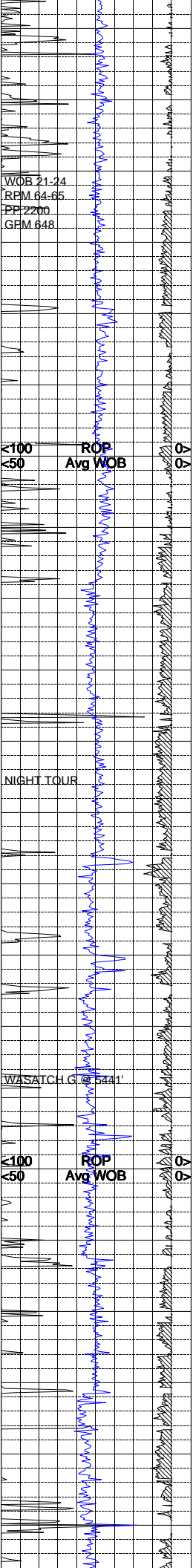
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| | CHERT - GLASSY |
| | CHERT - PORCEL |
| | CHERT - TIGER STRIPE |
| | CHERT - UNDIFF |
| | CLAY |
| | CLAY-MUDSTONE |
| | CLYST-TUFFACEOUS |
| | CHLORITIZATION |
| | COAL |
| | CONGLOMERATE |
| | CONGL. SAND |
| | CONGL. SANDSTONE |
| | COQUINA |
| | 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 |

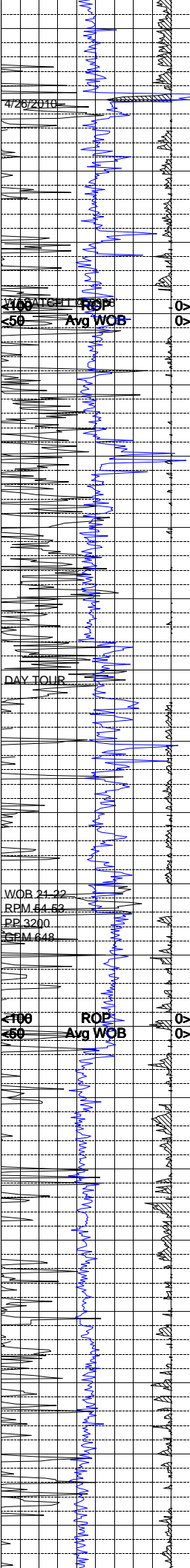
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| | MARL - CALC |
| | METAMORPHICS |
| | MUDSTONE |
| | OBSIDIAN |
| | PALEOSOL |
| | PHOSPHATE |
| | PORCELANITE |
| | PORCELANEOUS CLYST |
| | PYRITE |
| | PYROCLASTICS |
| | QUARTZ DIORITE |
| | QUARTZ LATITE |
| | QUARTZ MONZONITE |
| | RECRYSTALLIZED CALCITE |
| | RHYOLITE |
| | SALT |
| | SAND |

| | |
|--|----------------------|
| | SANDSTONE |
| | SANDSTONE-TUFFACEOUS |
| | SERICITIZATION |
| | SERPENTINE |
| | SHALE |
| | SHALE TUFFACEOUS |
| | SHELL FRAGMENTS |
| | SIDERITE |
| | SILICIFICATION |
| | SILTSTONE |
| | SILTST-TUFFACEOUS |
| | TUFF |
| | VOLCANICLASTICS SEDS |
| | VOLCANICS |

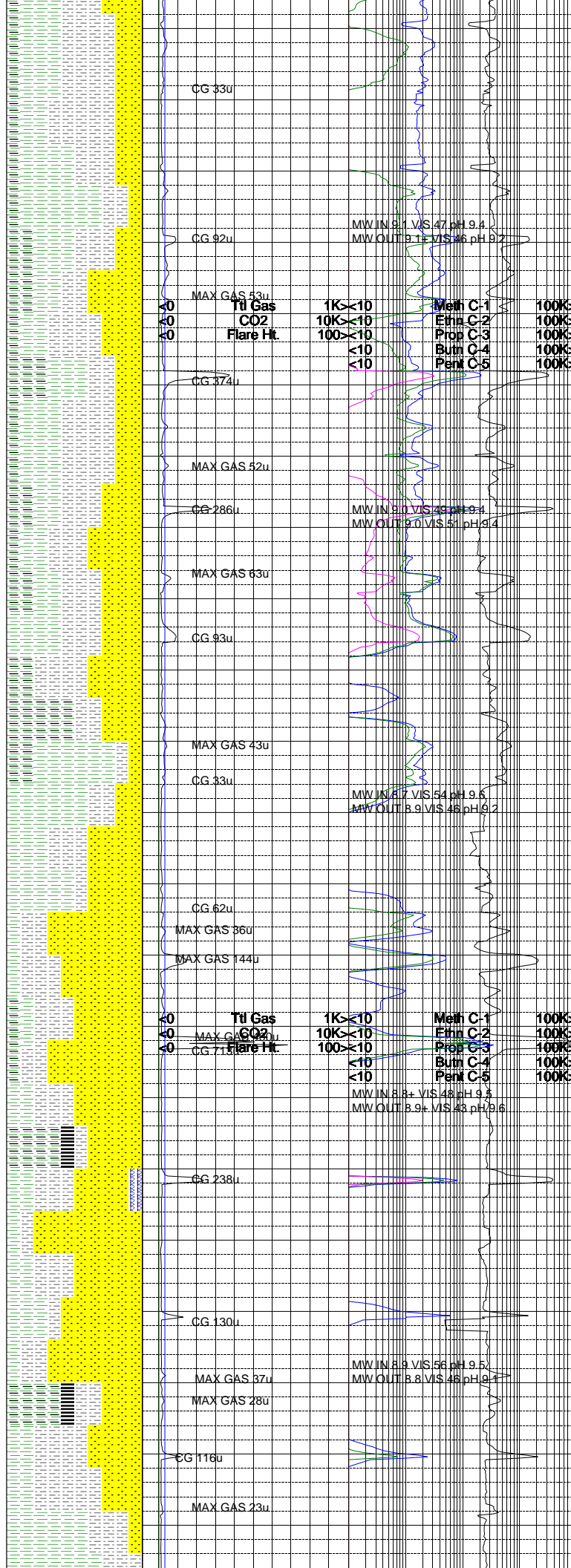
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FAIR TO POORLY SORTED; SUBROUND TO ROUND GRAINS; MODERATE TO HIGH SPHERICITY; A FEW SAMPLES HAVE A FROSTED APPEARANCE; A FEW CONSOLIDATED GRAINS DUE TO BIT ACTION; CALCITE CEMENTATION DUE TO MODERATE REACTION IN DILUTE HCl; GRAIN-SUPPORTED; NO VISIBLE HYDROCARBONS IN SAMPLE



5800
5900
6000
6100
6200
6300
6400
6500
6600
6700
6800



WEDGE LIKE CUTTINGS HABIT; DULL TO EARTH-
Y DULL TO OCCASIONAL SEMI-WAXY TO SEMI-
FROSTED LUSTER; MODERATELY SMOOTH TO
SLIGHTLY SILTY TEXTURE; NO VISIBLE LAMIN-
AE OR OTHER DISTINGUISHABLE STRUCTURAL
FEATURES PRESENT; ACCESSORY MINERAL
PYRITE PRESENT IN SAMPLE.

CARBONACEOUS SHALE = BROWNISH BLACK TO
OLIVE BLACK TO DARK BROWNISH GRAY; MODER-
ATELY DENSE TO SLIGHTLY TOUGH TENACITY;
SUB-PLANAR TO SUB-TABULAR TO EARTH-
Y FRACTURE; OCCASIONAL MASSIVE TO SUB-
TABULAR TO SUB-NODULAR CUTTINGS HABIT;
DULL TO EARTH-
Y DULL TO OCCASIONAL SLIGHT-
LY SEMI-SPARKLING LUSTER; VERY SLIGHTLY
GRITTY TO VERY SLIGHTLY CLAYEY TEXTURE;
POOR GRADE SILTSTONE VISIBLE BEDDING WITH
POOR GRADE SHALE, NO OTHER DISTINGUISH-
ABLE STRUCTURAL FEATURES PRESENT; ACCESS-
ORY MINERAL PYRITE PRESENT IN SAMPLE.

WASATCH I SANDSTONE = OFF WHITE TO VERY
LIGHT GRAY TO VERY LIGHT BROWNISH GRAY
WITH BLACK AND DARK BROWNISH GRAY HUES;
QUARTZ DOMINATE FRAME WORK; QUARTZ
CUTTINGS RANGE FROM SMOKY TO OFF WHITE;
CONSISTS OF CALCITIC CEMENTATION; MODERATELY
HIGH REACTION TO DILUTE HCL; MATRIX
CONTAINS 3 TO 5% DARK LITHIC FRAGMENT
S; MEDIUM-COARSE TO VERY COARSE GRAINED
; FAIR TO POOR SORTING; SUB-ANGULAR TO
SUB-ROUNDED ANGULARITY; LOW TO MODERATE
SPHERICITY; POOR GRADE SILTSTONE VISIBLE
GRADING WITH POOR GRADE SANDSTONE, VERY
SMALL AMOUNT OF COAL VISIBLE DEGASSING,
AND FRACTURE EVIDENCE IN SAMPLE; ACCESS-
ORY MINERALS PYRITE AND CALCITE PRESENT
IN SAMPLE.

SILTSTONE = LIGHT GRAY TO LIGHT BROWNISH
GRAY; SLIGHTLY DENSE TO SLIGHTLY TOUGH
TENACITY; IRREGULAR TO SUB-PLANAR TO
EARTH-
Y HACKLY FRACTURE; SUB-TABULAR TO
SUB-NODULAR CUTTINGS HABIT; DULL TO EARTH-
Y DULL TO OCCASIONAL SEMI-SPARKLING
LUSTER; SLIGHTLY GRITTY TEXTURE; NO
OTHER VISIBLE BEDDING FEATURES.

CARBONACEOUS SHALE = BROWNISH GRAY TO
OLIVE GRAY TO OCCASIONALLY LIGHT OLIVE
GRAY; CRUNCHY TO CRUMBLY TO PREDOMINATE
BRITTLE TENACITY; PLANAR TO HACKLY TO
SEMI BLOCKY FRACTURING; CUTTINGS TEND TO
BE PLATY TO FLAKY TO ELONGATED TABULAR
IN HABIT; DULL EARTH-
Y TO SLIGHT GREASY
TO OCCASIONALLY SPARKLING LUSTER; GRITTY
TO SILTY TO OCCASIONAL GRANULAR TEXTURE;
VISIBLE PYRITE CRYSTALS; VISIBLE BANDS
OF CARBONACEOUS MATERIAL; GRADES INTO A
LIGHT GRAY SHALE.

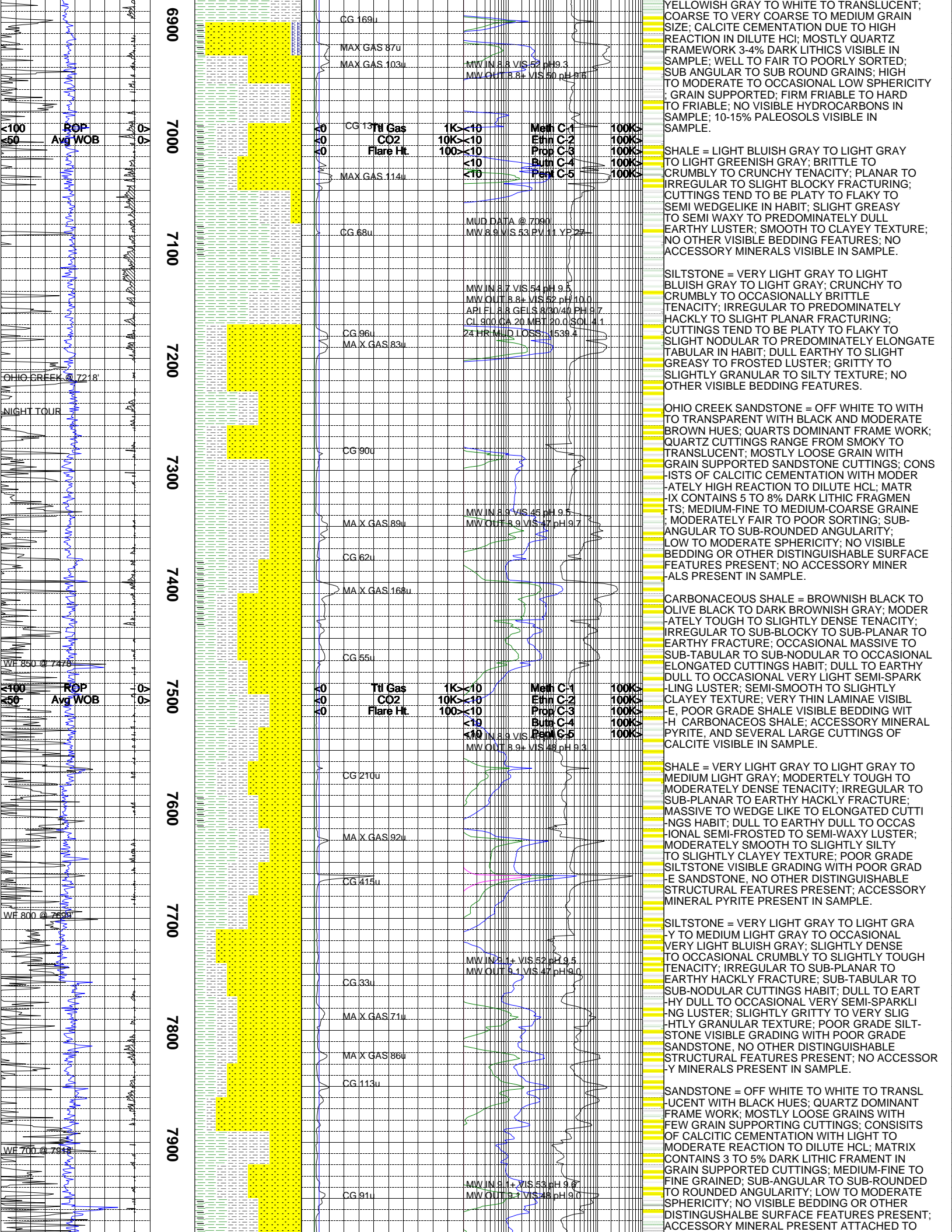
SANDSTONE = LIGHT BROWNISH GRAY TO WHITE
TO TRANSLUCENT TO SEMI YELLOWISH GRAY;
MOSTLY QUARTZ FRAMEWORK WITH 1-2% DARK
LITHICS VISIBLE IN SAMPLE; VERY COARSE
TO COARSE TO MEDIUM TO VERY FINE GRAIN;
VERY WELL TO WELL TO FAIR SORTED; SUB-
ANGULAR TO SUB ROUND TO ROUND GRAINS;
LOW TO MODERATE SPHERICITY; COARSE GRAIN
SAMPLES HAVE A SLIGHT POLISH APPEARANCE;
FINE GRAIN SANDSTONES HAVE A SLIGHT
FROSTED APPEARANCE; UNCONSOLIDATED GRAIN
DUE TO BIT ACTION; GRAIN SUPPORTED;
CALCITE CEMENTATION DUE TO MODERATE
REACTION TO DILUTE HCL; NO VISIBLE HYDRO-
CARBONS IN SAMPLE.

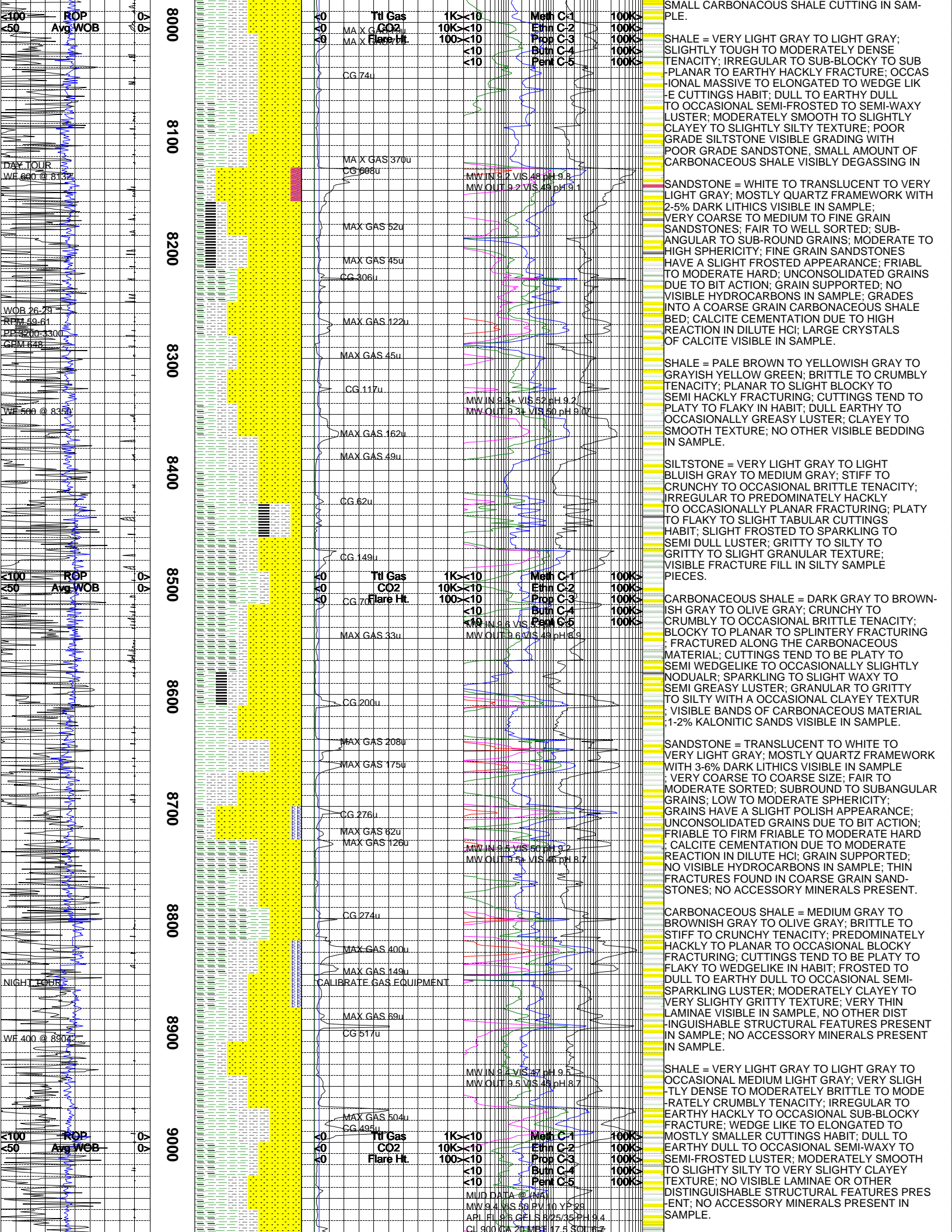
SILTSTONE = VERY LIGHT GRAY TO LIGHT
BLUISH GRAY TO OCCASIONAL LIGHT YELLOWISH
GRAY; STIFF TO CRUNCHY TENACITY; HACKLY
TO IRREGULAR FRACTURING; CUTTINGS TEND
TO BE WEDGE LIKE TO PLATY TO SLIGHT BLADE
IN HABIT; DULL EARTH-
Y TO SLIGHT GREASY
TO SEMI FROSTED LUSTER; GRANULAR TO
GRITTY TO SILTY TEXTURE; NO OTHER VISIBLE
BEDDING FEATURES.

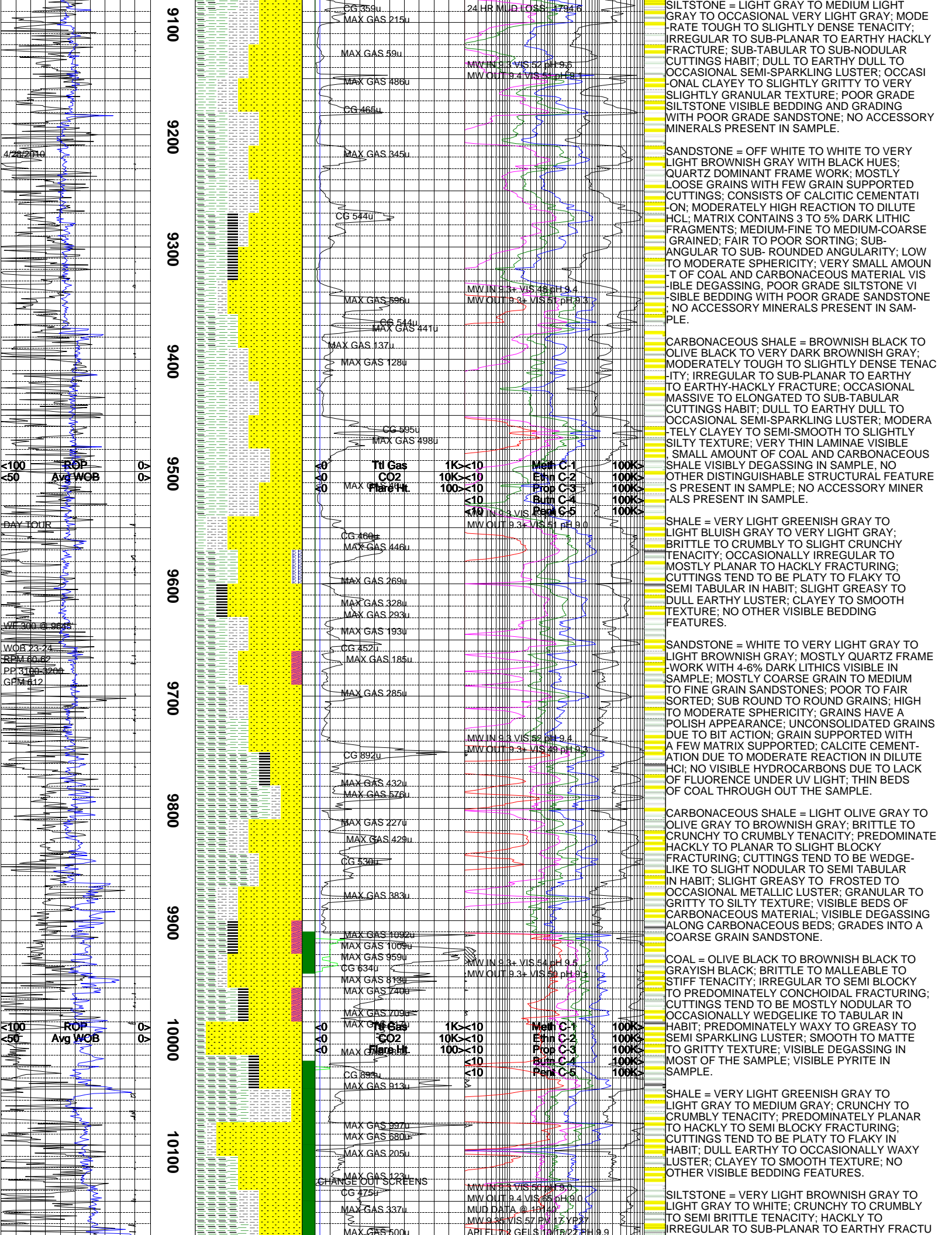
COAL = BLACK TO GRAYISH BLACK TO SLIGHT
BROWNISH BLACK; BRITTLE TO CRUMBLY TO
CRUNCHY TENACITY; CONCHOIDAL TO SPLINTER
TO IRREGULAR FRACTURING; WEDGE LIKE TO
SLIGHTLY NODULAR TO OCCASIONALLY BLADED
CUTTINGS HABIT; DULL TO SPARKLING TO SEMI
GREASY TO PREDOMINATELY WAXY LUSTER;
CLAYEY TO SEMI SILTY TO MOSTLY SMOOTH
TEXTURE; VISIBLE DEGASSING IN MOST OF
SAMPLE; VISIBLE CRYSTALS OF PYRITE.

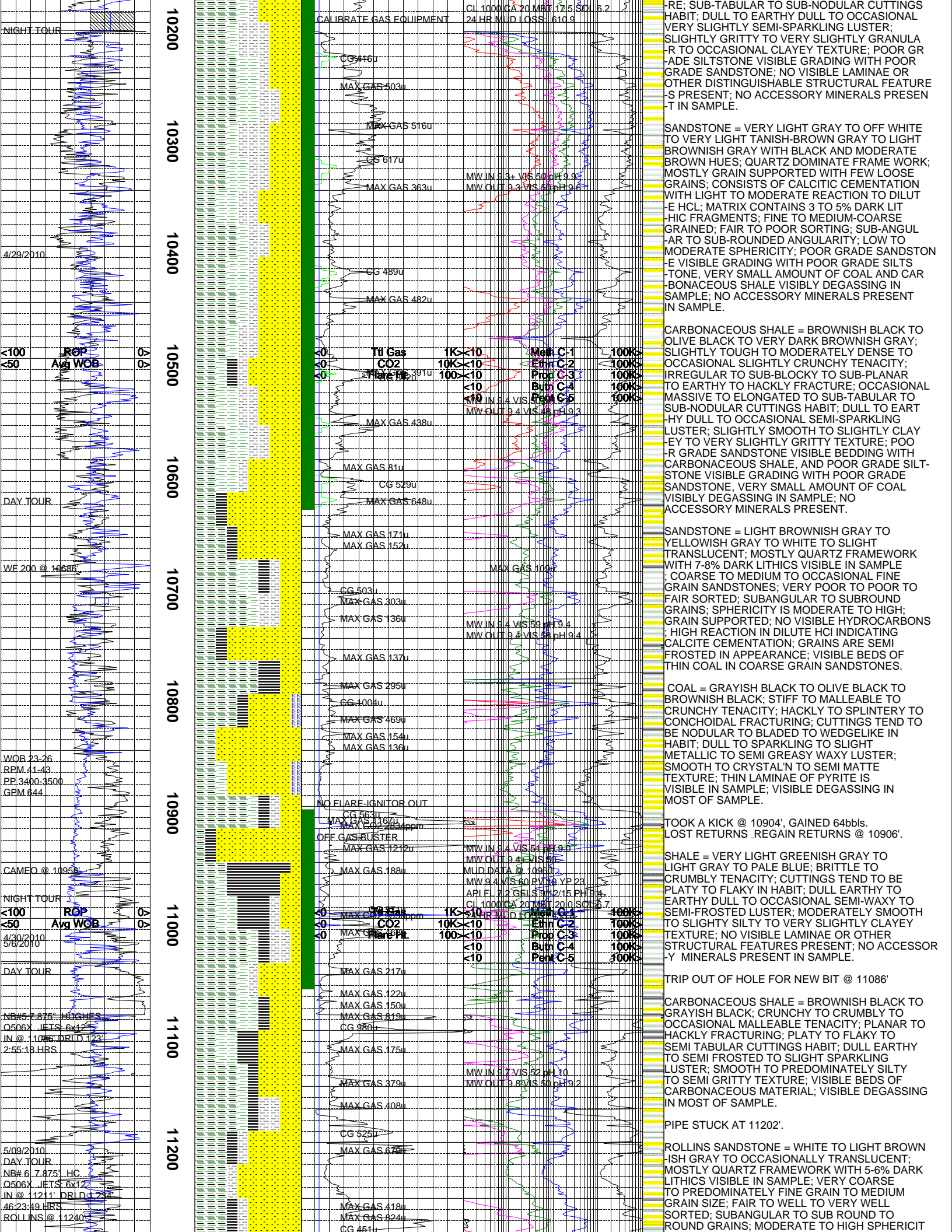
SHALE = VERY LIGHT GRAY TO LIGHT OLIVE
GRAY; CRUMBLY TO BRITTLE TENACITY; HACK-
LY TO IRREGULAR TO BLOCKY FRACTURING;
CUTTINGS TEND TO BE PLATY TO FLAKY TO
ELONGATED TABULAR; EARTH-
Y TO DULL TO
SEMI GREASY LUSTER; PREDOMINATELY CLAYEY
TO SMOOTH TEXTURE; NO VISIBLE BEDDING
IN SAMPLE; NO VISIBLE ACCESSORY MINERALS
PRESENT.

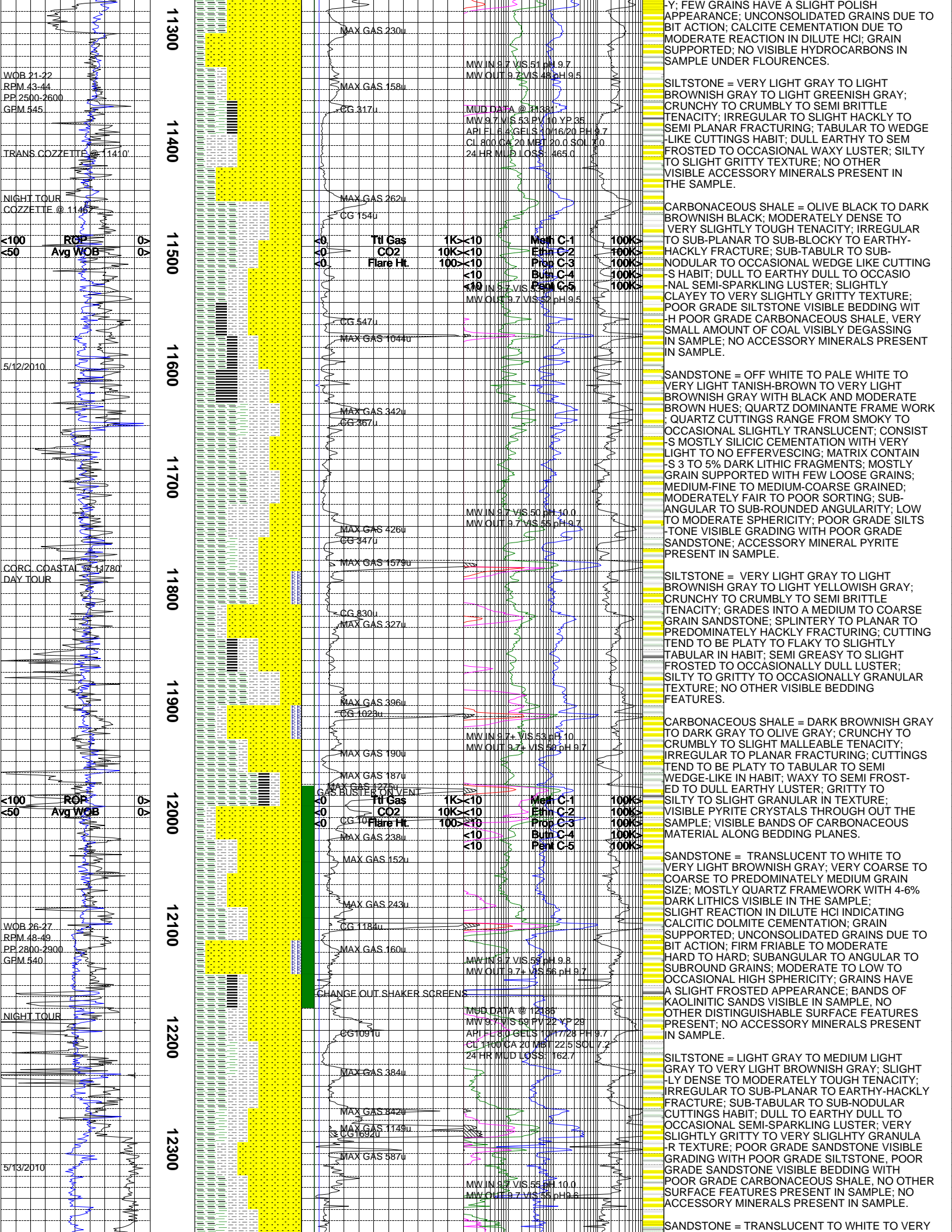
SANDSTONE = VERY LIGHT GRAY TO LIGHT





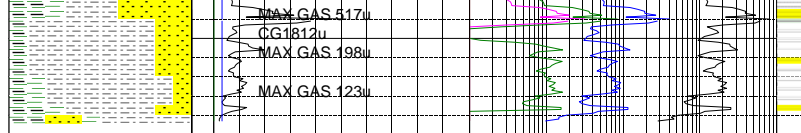






DAY TOUR
CORCORAN MARINE @ 12345
WOB 24-26
RPM 48-50
PP 2600-2700
GPM 540

12400



LIGHT GRAY; MOSTLY QUARTZ FRAMEWORK WITH
2-3% DARK LITHICS VISIBLE IN SAMPLE;
COARSE TO MEDIUM TO FINE GRAIN; FAIR TO
WELL TO VERY WELL SORTED; SUBANGULAR TO
SUBROUND TO PREDOMINATELY ROUND GRAINS.
TD FRU197-33B5 @ 12445' ON 05/13/2010.

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