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## Drilling Dynamics MD

|                      |   |
|----------------------|---|
| <b>COMPANY</b>       | ExxonMobil Production                   |
| <b>WELL</b>          | PCU-296-6B7                             |
| <b>FIELD</b>         | PICEANCE CREEK                          |
| <b>REGION</b>        | ROCKIES                                 |
| <b>COORDINATES</b>   | LAT: 39.905338000<br>LONG:108.205056000 |
| <b>ELEVATION</b>     | GL = 7361.5'<br>KB = 7388.5'            |
| <b>COUNTY, STATE</b> | RIO BLANCO, COLORADO                    |
| <b>API INDEX</b>     | 051031153100                            |
| <b>SPUD DATE</b>     | AUGUST 21, 2011                         |
| <b>CONTRACTOR</b>    | HELMERICH AND PAYNE                     |
| <b>CO. REP.</b>      | JOHN WOOD                               |
| <b>RIG/TYPE</b>      | HP 215/FLEX 3                           |
| <b>LOGGING UNIT</b>  | 051                                     |
| <b>GEOLOGISTS</b>    | G.BAKER<br>D. CLAAR                     |
| <b>ADD. PERSONS</b>  | B. JOHANNING<br>D. EVANS                |
| <b>CO. GEOLOGIST</b> | W. HOFFMAN / M. BOYER                   |

### LOG INTERVAL

**DEPTHS:** 150' **TO** 14,446'

**DATES:** 08/21/2011 **TO** 09/16/2011

**SCALE:** 1" = 100'

### CASING DATA

16" **AT** 144'

10.75" **AT** 4,727'

7.00" **AT** 10,166'

**AT**

### MUD TYPES

SPUD MUD **TO** 14,446'

**TO**

**TO**

**TO**

### HOLE SIZE

14.75" **TO** 4,741'

9.875' **TO** 10,179'

6.125" **TO** 14,446'

**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                   |                      |

Lithology

Ttl Gas 1.5K  
units  
CO2 10K  
ppm  
Flare Ht. 100  
ft

Depth

100

200

300

400

500

600

700

800

900

Ttl Gas 100  
CO2 10K  
Flare Ht. 100

Avg RPM 0  
ROP 0  
Avg WOB 0  
FTLBS klbs

MGS

Remarks  
Survey Data, Mud Reports, Other Info.

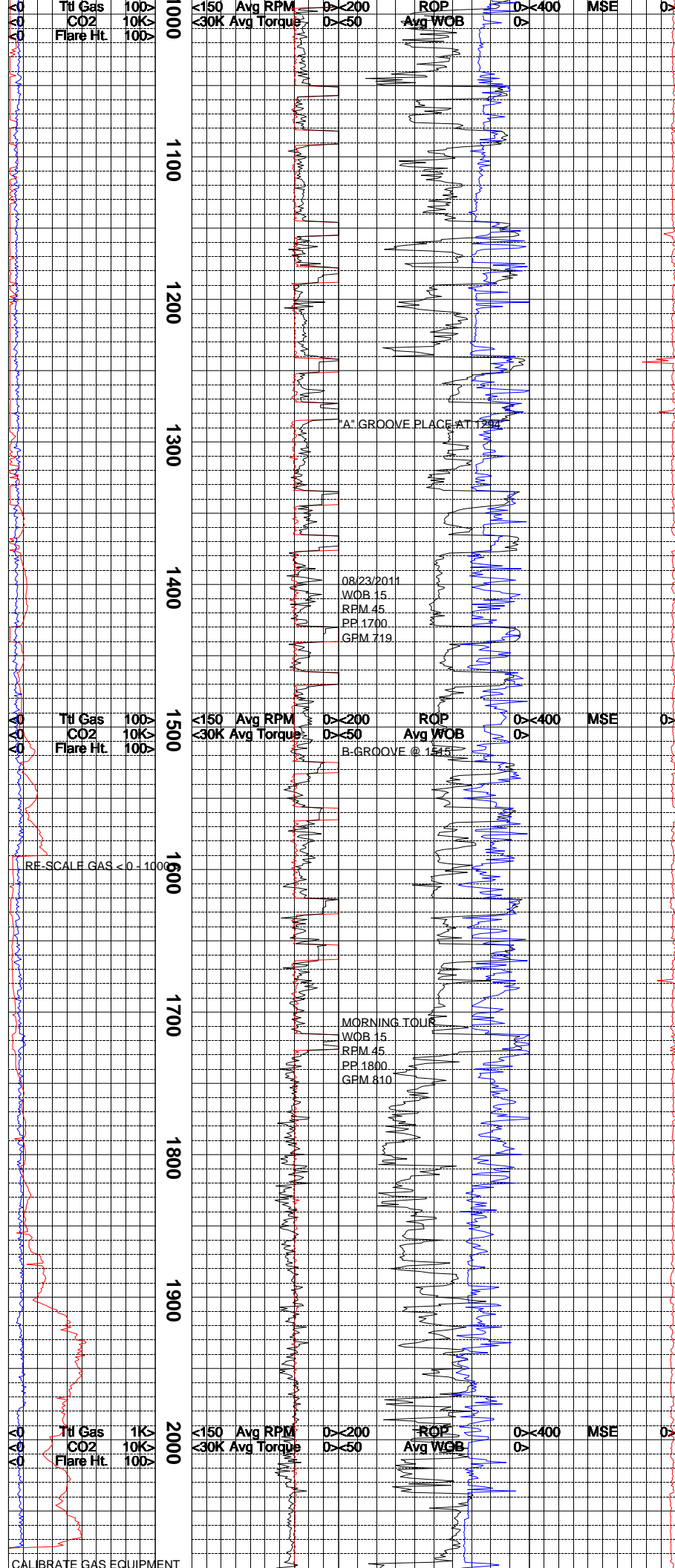
THE PCU- 296-6B7 WAS SPUDDED AT 07:30HRS  
ON 8/21/2011

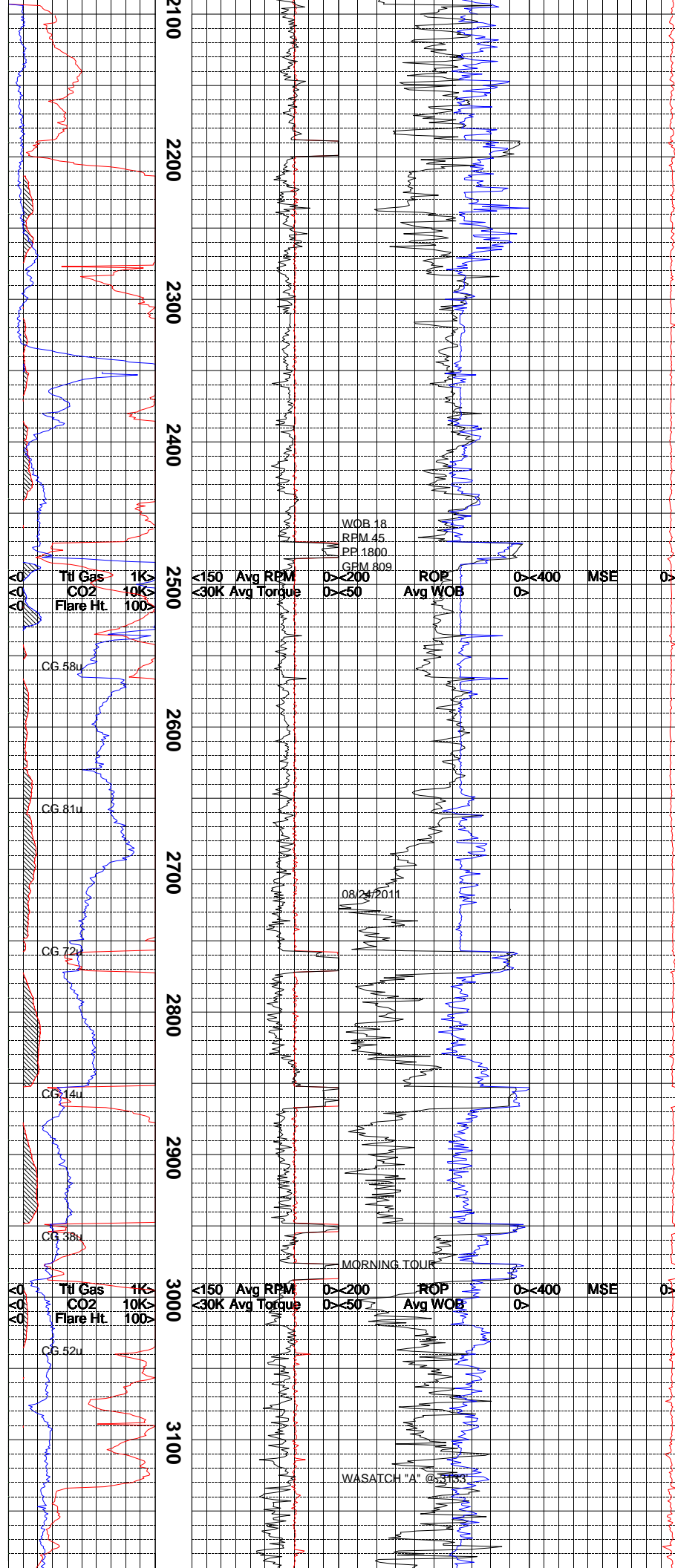
NB #1 14.75" in @ 144'  
SEC FX75M w/7-13's  
105 Hrs 4597

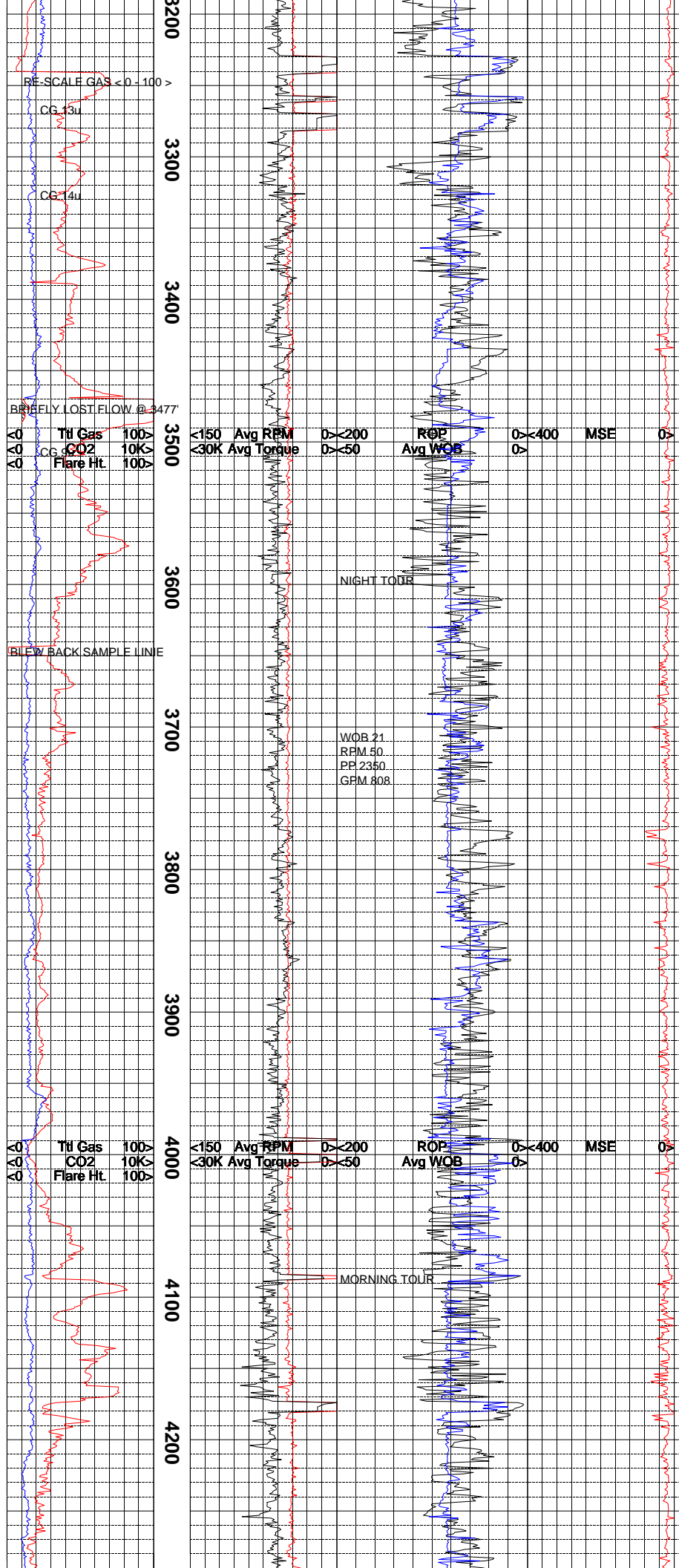
WOB 5K  
RPM 30  
PP 900  
GPM 702

WOB 8  
RPM 45  
PP 1200  
GPM 701

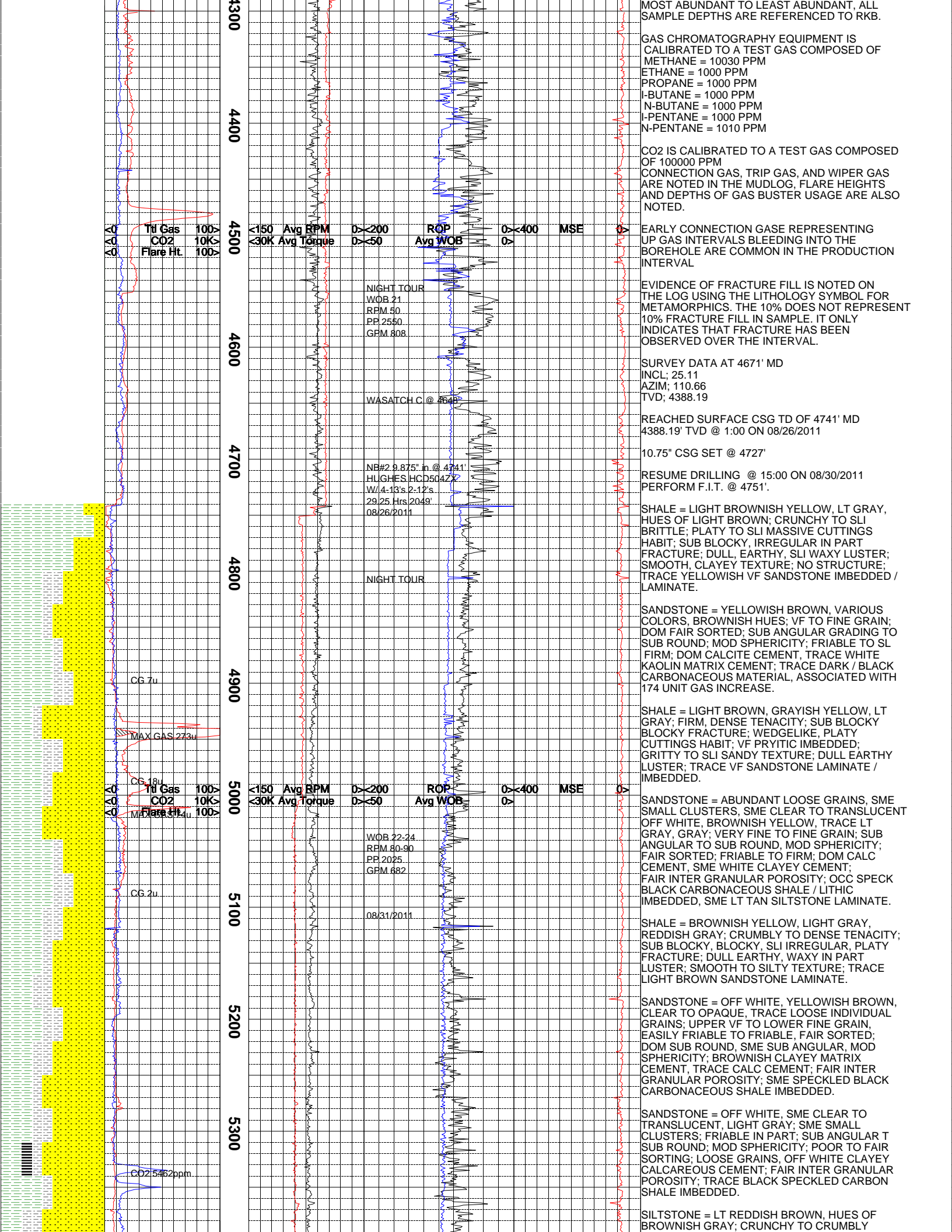
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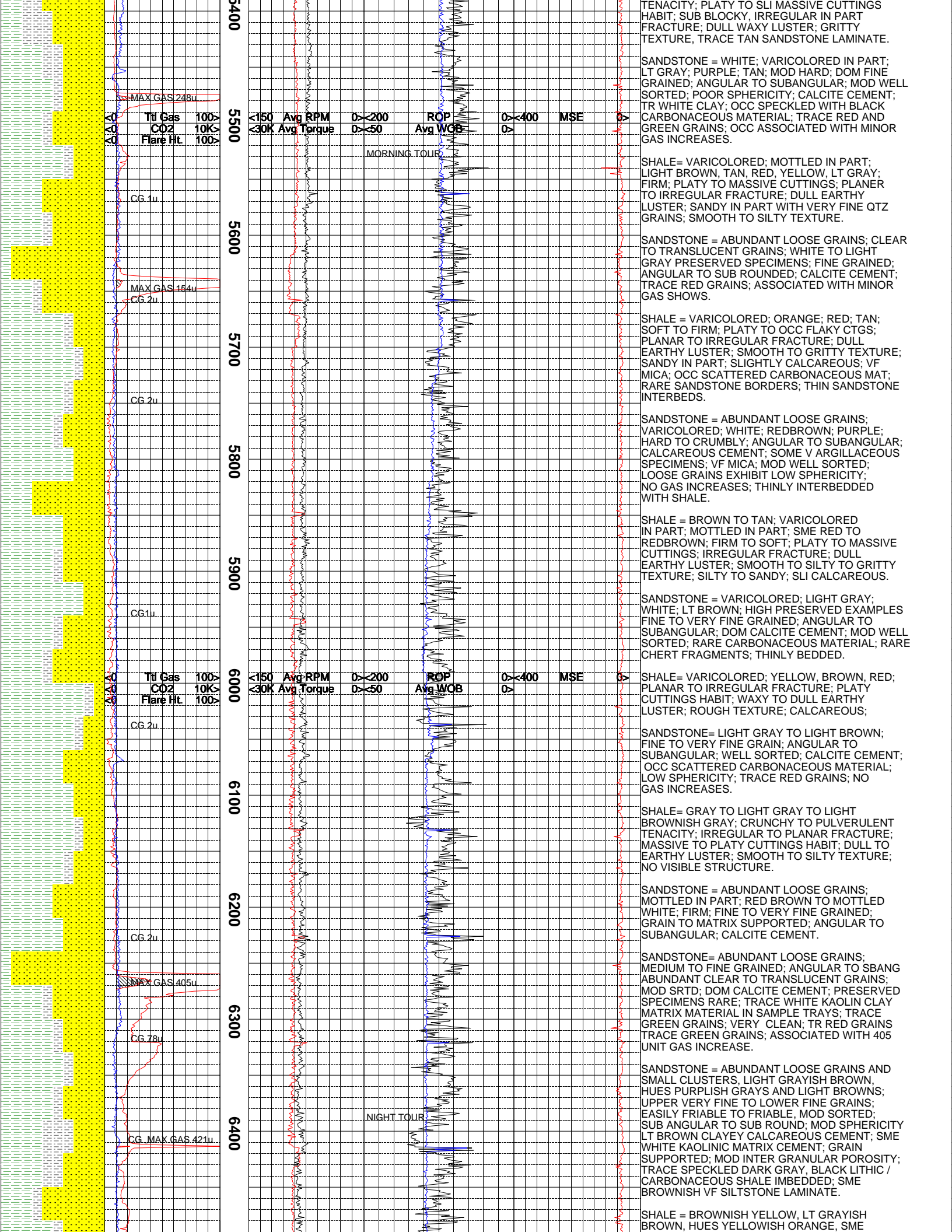


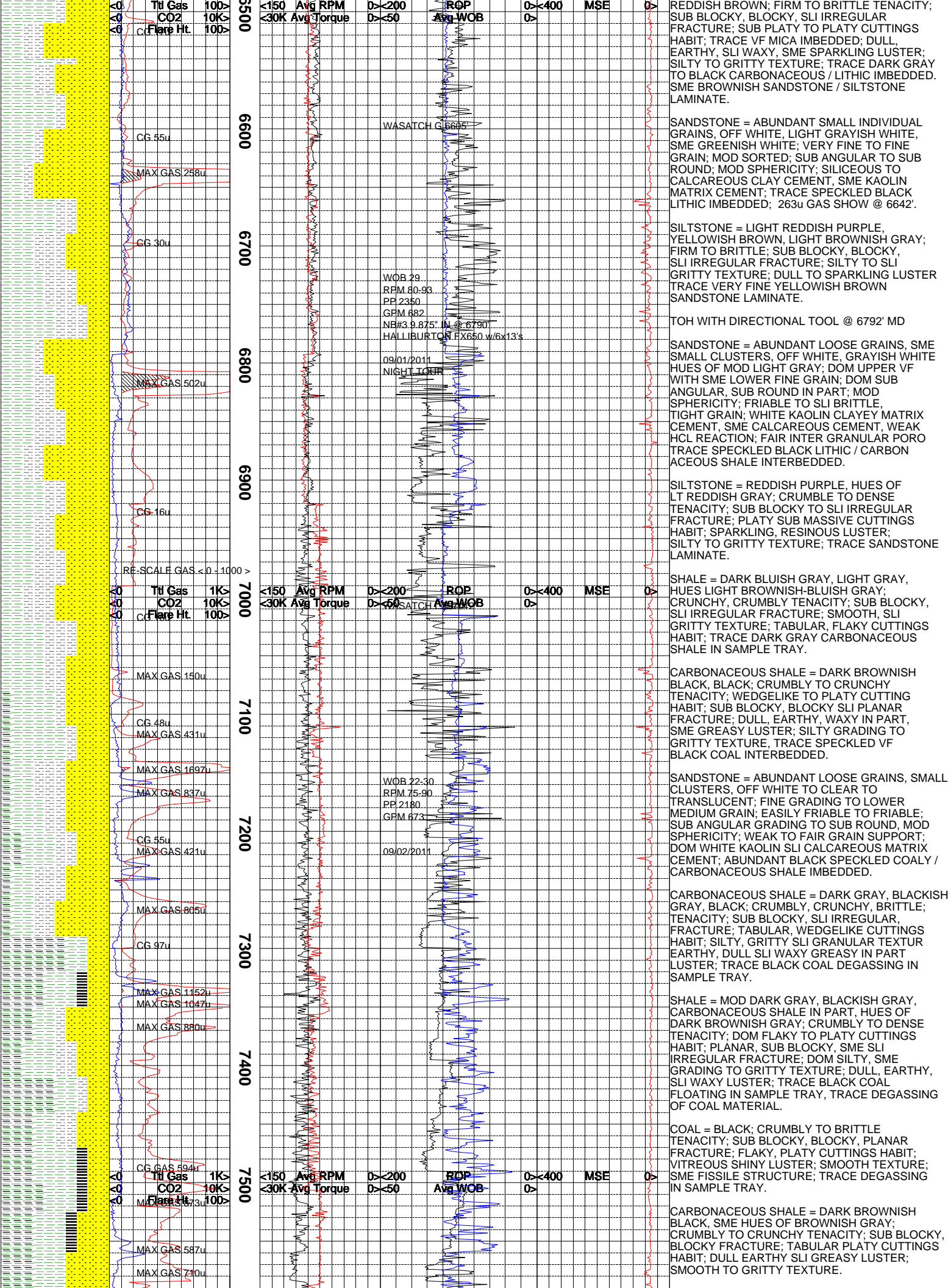


ALL ROCK COLORS ARE REFERENCED TO THE  
GAS ROCK COLOR CHART, ROCK CONSTITUENTS  
ARE DESCRIBED WET AND LISTED IN ORDER OF

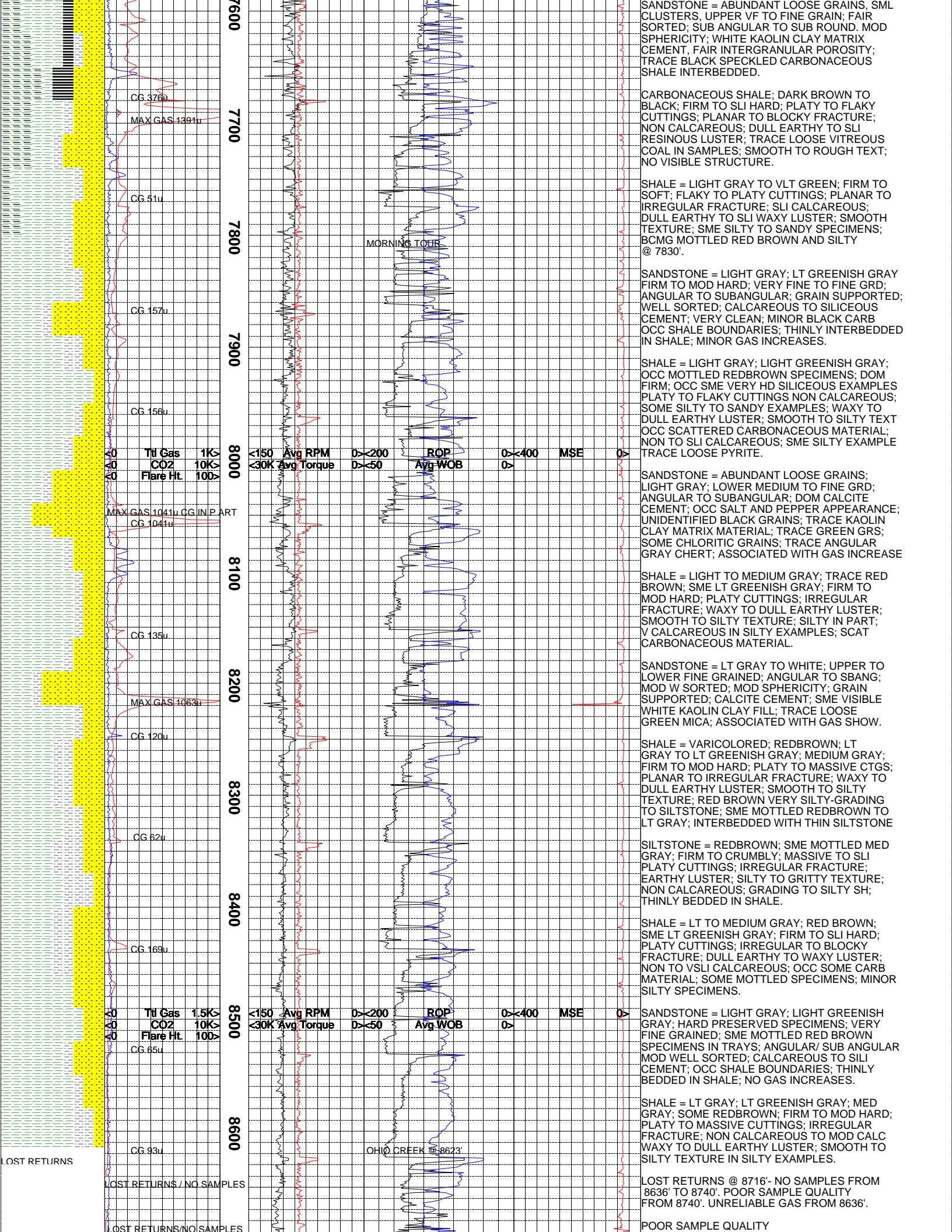












LOST RETURNS @ 8716'

REGAIN PARTIAL RETURNS  
@ 8765'  
FULL RETURNS @ 8809'  
MAX GAS 394u

CG 1662u

MAX GAS 1532u  
Tf Gas 1.5K  
CO2 10K  
Flare Ht 100

CG 127u

CG 171u

MAX GAS 2692u  
MAX GAS 2459u

MAX GAS 1670u

CG 1526u

MAX GAS 1766u

MAX GAS 1847u

CG 253u

MAX GAS 1283u

CG 142u

MAX GAS 1052u

CG 369u

MAX GAS 788u

CG 261u

MAX GAS 3537u

CG 426u  
MAX GAS 1486u

OHIO CREEK SANDSTONE

WF 850 @ 8805'

NIGHT TOUR

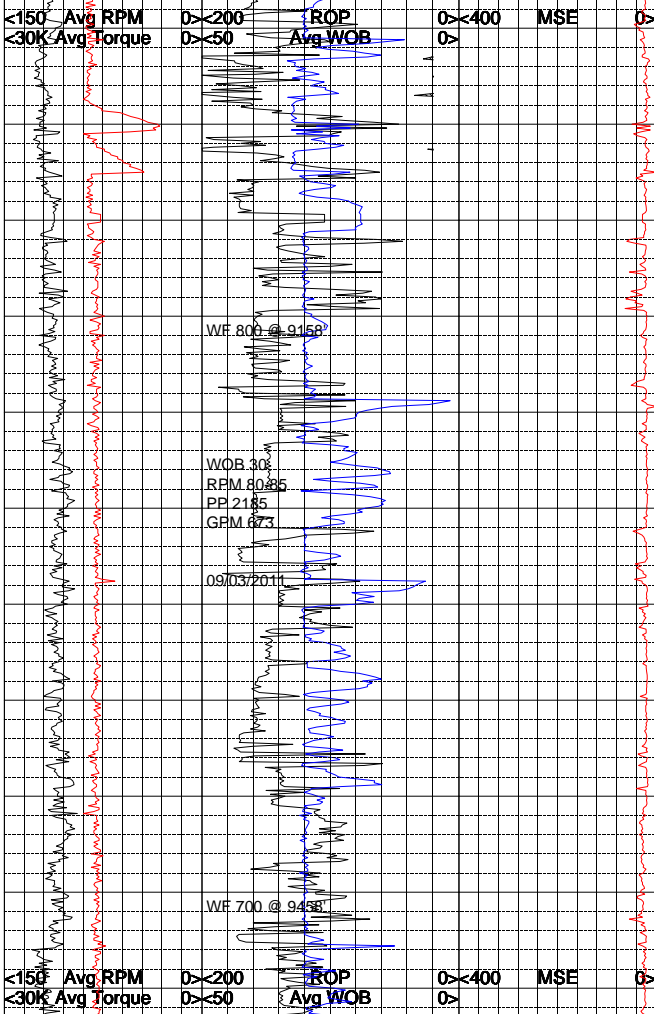
WF 800 @ 9158'

WOB 308  
RPM 8085  
PB 2185  
GPM 673

09/03/2011

WF 700 @ 9438'

WF 600 @ 9730'



POOR SAMPLE QUALITY

PARTIAL RETURNS @ 8765'

OHIO CREEK SANDSTONE; ABUNDANT LOOSE GRAINS; CLEAR TO TRANSLUCENT GRAINS; RARE PRESERVED CLUSTERS; LIGHT GRAY; LOWER MEDIUM TO UPPER FINE GRAINED; WELL SORTED; ANGULAR TO SUBROUNDED; CALC/SILICEOUS CEMENT; TRACE CHERT; ASSOCIATED WITH LOST CIRCULATION.

SANDSTONE = BLuish GRAY, LIGHT GRAY, SME SALT AND PEPPER APPEARANCE, SME SMALL CLUSTERS; FRIABLE TO SLI FIRM; DOM VF GRADING TO LOWER FINE GRAIN; FAIR SORTED; SUB ANGULAR TO SUB ROUND; FAIR TO MOD SPHERICITY; DOM SILICA MATRIX CEMENT, OCC CALCAREOUS CEMENT; POOR TO FAIR VISUAL INTER GRANULAR POROSITY; ABUNDANT VF SPECKLED BLACK LITHIC / CARBONACEOUS SHALE INTERBEDDED.

SHALE = LIGHT GRAY, BLuish GRAY, HUES OF BLuish GREEN GRAY; CRUMBLY TO BRITTLE SME DENSE TENACITY; PLANAR, SUB BLOCKY, BLOCKY IN PART FRACTURE; DULL, EARTHY, SLI WAXY LUSTER; SMOOTH, SILTY IN PART, SLI GRITTY TEXTURE; TRACE DARK BROWNISH GRAY LITHIC / CARBONACEOUS SHALE INTERBEDDED; SME VF PYRITE LAMINATE.

SANDSTONE = OFF WHITE, CLEAR TO OPAQUE, ABUNDANT SMALL CLUSTERS, SALT AND PEPPER APPEARANCE; DOM FINE GRAIN W/ SME VF LOOSE GRAINS; MOD SORTED; SUB ANGULAR GRADING TO SUB ROUND; MOD SPHERICITY; SMALL CLUSTERS SILICA MATRIX CEMENT, SME WHITE CLAYEY W/ TRACE CALCAREOUS CEMENT, WEAK REACTION TO HCL SOLUTION; DOM EASILY FRIABLE TO FRIABLE TO SME HARD; OCC SML CLUSTERS W/ SPECKLED VF BLACK DARK BROWN LITHIC / CARBONACEOUS SHALE INTERBEDDED.

CARBONACEOUS SHALE = DARK BROWN TO BROWNISH BLACK; CRUMBLY, CRUNCHY, SLI DENSE TENACITY; SUB BLOCKY IN PART, IRREGULAR FRACTURE; SILTY TO GRITTY TEXTURE; DULL EARTHY, WAXY IN PART LUSTER; TRACE VF SANDSTONE LAMINATE.

SANDSTONE = ABUNDANT LOOSE INDIVIDUAL GRAINS, CLEAR TO TRANSLUCENT TO OPAQUE, OCC SML CLUSTERS W/ SALT AND PEPPER APPEARANCE, LOWER TO UPPER FINE GRAIN; DON SUB ROUND SME SUB ANGULAR; MOD TO HIGH SPHERICITY; EASILY FRIABLE TO FRIABLE; SILICA MATRIX CEMENT, WEAK GRAIN SUPPORT, GOOD VISUAL INTER GRANULA POROSITY; TRACE SPECKLED BLACK LITHIC INTERBEDDED; ABUNDANT SHOWS BETWEEN 9225' AND 9364', MARKED INCREASE IN DITCH GAS.

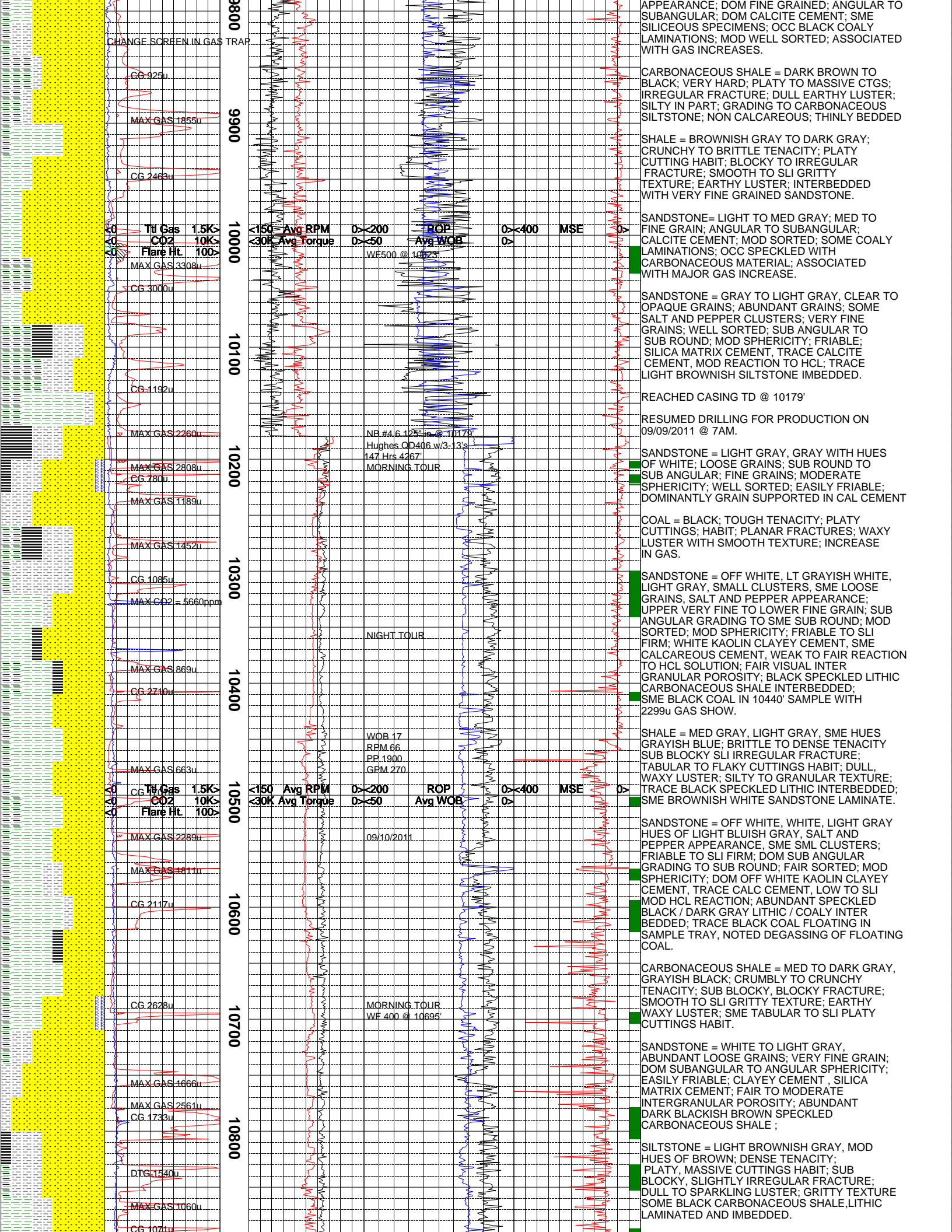
SILTSTONE = LIGHT GRAY, GRAY, BROWNISH GRAY; BRITTLE TO DENSE TENACITY; SUB BLOCKY TO SLI IRREGULAR FRACTURE; DULL WAXY SME SPARKLING LUSTER; PLATY TO FLAKY CUTTINGS HABIT; SILKY GRADING TO GRITTY TEXTURE; TRACE VF BROWNISH SANDSTONE LAMINATE.

SANDSTONE = WHITE TO OFF WHITE, CLEAR TO TRANSLUCENT, OCC OPAQUE, SME SALT AND PEPPER APPEARANCE, ABUNDANT LOOSE GRAINS OR SMALL CLUSTERS; FINE, OCC MED GRAIN. DOM SUB ANGULAR TO SLI SUB ROUND. FAIR TO MOD SPHERICITY; FRIABLE TO SLI FIRM; SILICA MATRIX CEMENT, SME CALC CEMENT, VERY WEAK REACTION TO HCL; FAIR TO GOOD VISUAL INTER GRANULAR POROSITY; TRACE DARK GRAY / BLACK SPECKLED LITHIC / SHALE INTERBEDDED. HIGH DITCH GAS FROM 9400' TO 9460'.

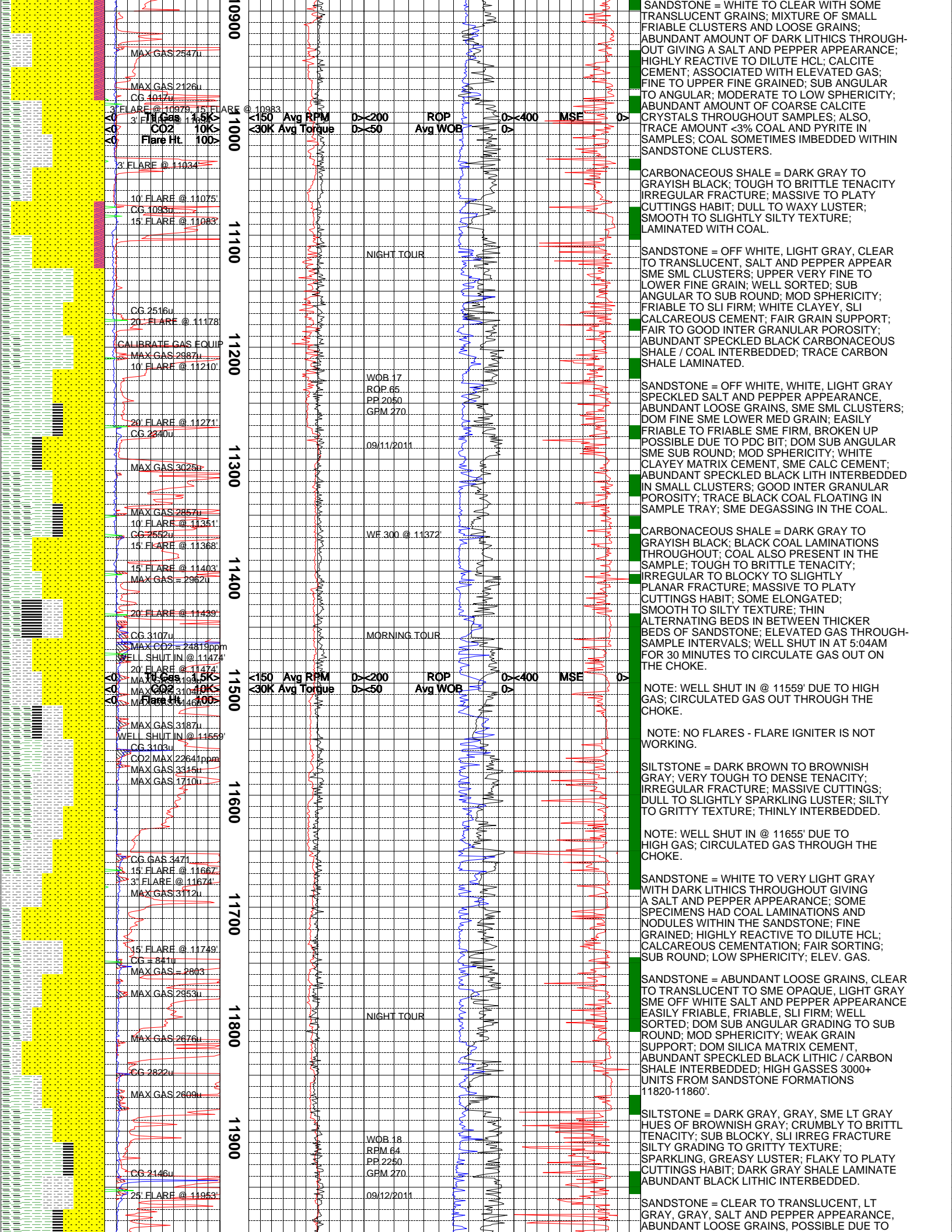
CARBONACEOUS SHALE = DARK BROWNISH GRAY, DARK GRAY, BROWNISH BLACK; CRUMBLY TO CRUNCHY TENACITY; SUB BLOCKY, BLOCKY, PLANAR FRACTURE; SILTY TO GRITTY TEXTURE; DULL, EARTHY, SLI WAXY LUSTER; TRACE LIGHT GRAY SHALE LAMINATE; NO NOTED DEGASSING IN SAMPLE TRAY.

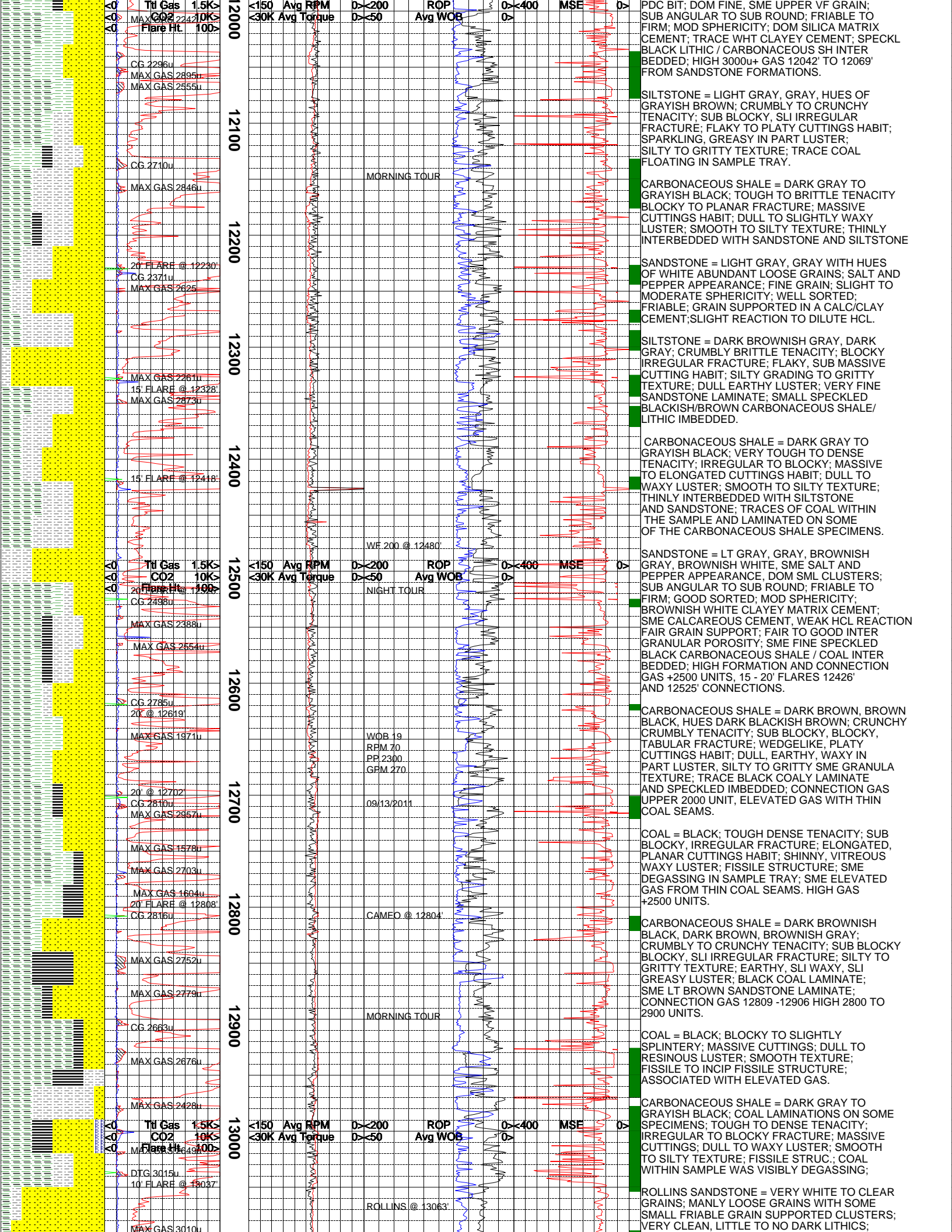
SANDSTONE = ABUNDANT LOOSE GRAINS, CLEAR TO OPAQUE, SME TRANSLUCENT, OFF WHITE, SALT AND PEPPER APPEARANCE, SME SMALL CLUSTERS; FINE GRAIN, EASILY FRIABLE TO FRIABLE; WELL SORTED; DOM SUB ANGULAR GRADING TO SUB ROUND; WEAK GRAIN SUPPORT SILICA MATRIX CEMENT, TRACE WHITE CLAYEY CEMENT, SME CALCAREOUS CEMENT; ELEVATED GAS SHOW @ 3537u @ 9744' ABUNDANT FINE BLACK LITHIC / COALY / CARBONACEOUS SHALE LOOSE IN SAMPLE TRAY.

SANDSTONE = LIGHT TO MEDIUM GRAY; HARD PRESERVED SPECIMENS; OCC SALT AND PEPPER

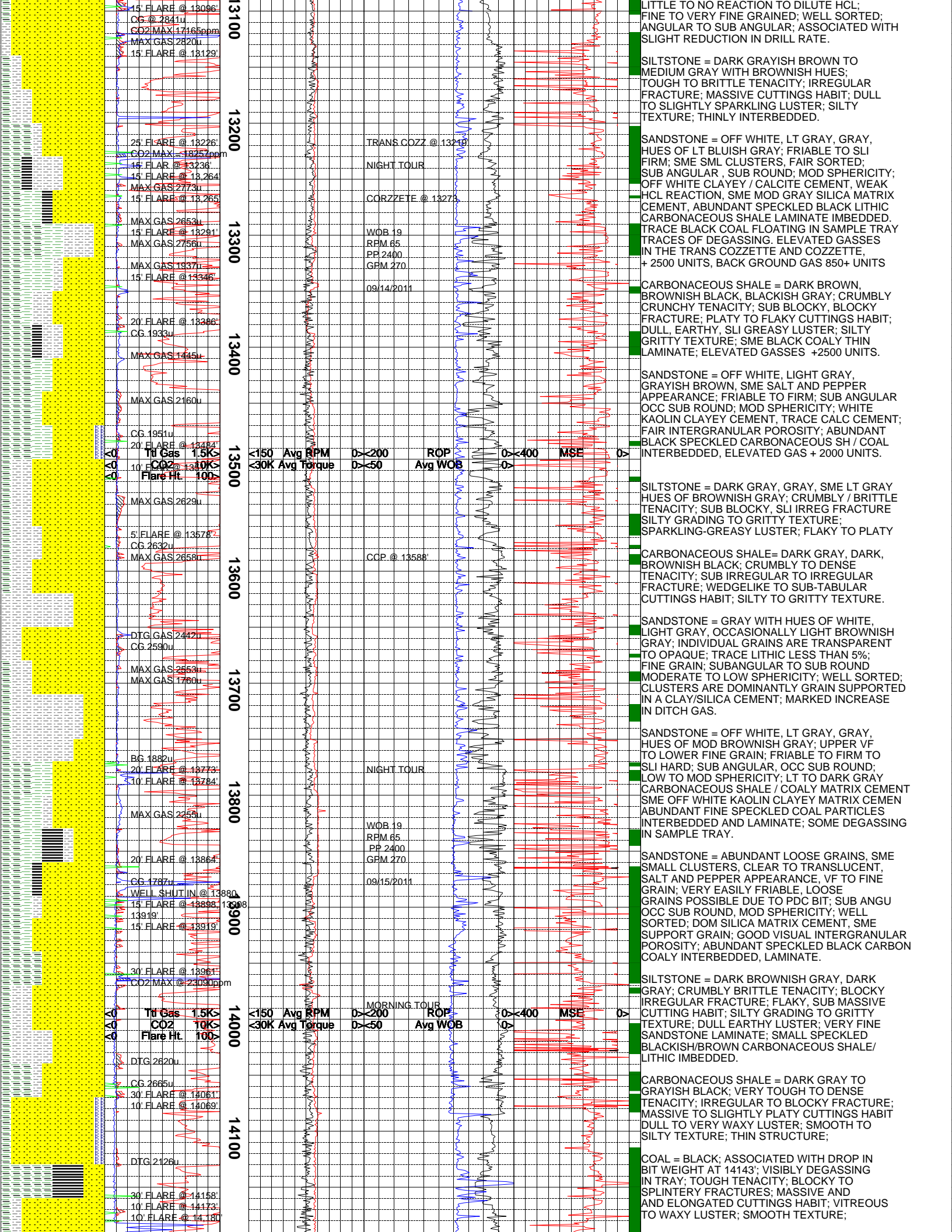


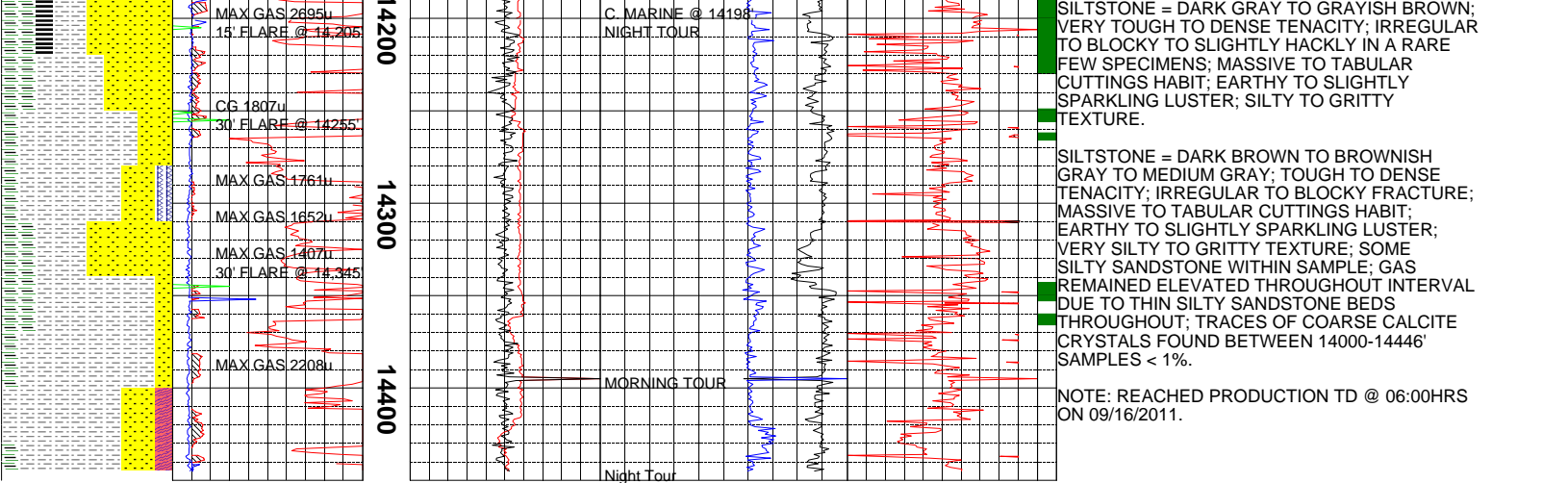












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