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Drilling Dynamics MD

COMPANY ExxonMobil Oil Corporation
WELL PCU 297-12A1-ST1
FIELD Piceance Creek
REGION Rocky Mountains
COORDINATES Lat: 39.8890710
Long: 108.2372410
ELEVATION GL: 7183.6'
RKB: 7213'
COUNTY, STATE Rio Blanco, Colorado
API INDEX 051031115701
SPUD DATE 09/22/2009
CONTRACTOR HE DRILLING
CO. REP. M. SADLER / J. WOODS
RIG/TYPE 326 FLEX FOUR
LOGGING UNIT CANRIG UNIT ML036
GEOLOGISTS Don Thibodeaux
Brandon Laiche
ADD. PERSONS Huel Patti Strickland
Linda Davison/Darryl Ebbert
CO. GEOLOGIST CHRIS ALBA

LOG INTERVAL

DEPTHS: 4111' TO 13338'
DATES: 6/16/2009 TO 9/24/2009
SCALE: 1" = 100'

CASING DATA

16.000" AT 150'
10.750" AT 4111'
7.00" AT 9131'
4.50" AT 13338'

MUD TYPES

WATER BASE TO 5730'
DSF TO 6200'
LSND TO 13338'
TO

HOLE SIZE

14.250" TO 4111'
9.875" TO 9131'
6.125" TO 13338'
TO

ABBREVIATIONS

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

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

Lithology

<0 Ttl Gas 1K>
units

<0 CO2 25K>
ppm

<0 Flare Ht. 100>
ft

Depth

<200 Avg RPM 0>
<20K Avg Torque 0>

ROP
ft/hr

Avg WOB
klbs

0<400 MSE 0>
psi

MGS

Remarks
Survey Data, Mud Reports, Other Info.

3800

3900

4000

4100

4200

4300

4400

4500

4600

47

100% Ttl Gas
5K% CO2
100% Flare Ht.

<200 Avg RPM 0>
<20K Avg Torque 0>

ROP
Avg WOB

0<400 MSE 0>

ALL ROCK COLORS ARE REFERENCED TO THE GSA ROCK COLOR CHART. ROCK CONSTITUENTS ARE DESCRIBED WET AND LISTED IN ORDER OF MOST ABUNDANT TO LEAST ABUNDANT. ALL SAMPLE DEPTHS ARE REFERENCED TO RKB. ALL ROCK COLORS ARE REFERENCED TO THE CONNECTION GASES AS WELL AS TRIP AND DOWNTIME GASES ARE NOTED ON THE LOG. LARGE CONNECTION GASES WHICH APPEAR ON THE MUD LOG USUALLY REFLECT UPHOLE GAS INTERVALS BLEEDING GAS INTO THE BOREHOLE DURING CONNECTIONS.

GAS CHROMATOGRAPHY EQUIPMENT IS CALIBRATED TO A TEST GAS COMPOSED OF
METHANE = 10000 PPM
ETHANE = 1000 PPM
PROPANE = 1000 PPM
I-BUTANE = 1000 PPM
N-BUTANE = 1000 PPM
I-PENTANE = 1000 PPM
N-PENTANE = 1000 PPM

WHEN THE MUD IS CIRCULATED THROUGH THE GAS BUSTER, THE INTERVAL IS MARKED IN THE MGS COLUMN AND SIZE OF FLARES ARE NOTED.

EVIDENCE OF FRACTURE FILL IS NOTED ON THE MUD LOG. KAOLIN PERCENTAGE IN SS INTERVALS IS ALSO NOTED ON THE MUD LOG.

1 UNIT OF GAS = 200 PPM METHANE
EPOCH COMMENCED LOGGING ON 6/16/2009 AT 4111' MD.

NOTE: DRILLING WITH POWER DRIVE AND MWD

SHALE = DARK YELLOWISH BROWN, MEDIUM TO DARK OLIVE GRAY; FIRM TO MODERATELY HARD; CRUMBLY TO MODERATELY TOUGH; IRREGULAR, PLANER AND WEDGELIKE CUTTINGS HABIT; MATTE TO OCCASIONALLY SLIGHTLY RESINOUS LUSTER DOMINANTLY SMOOTH TEXTURE; SLIGHTLY TO VERY CALCAREOUS; LOCALLY SILTY, GRADING IN PART AND INTER BEDDED WITH SILTSTONE; POOR TO MODERATE FISSILITY.

SILTSTONE = DARK YELLOWISH BROWN TO MEDIUM GRAY; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY TOUGH; IRREG AND SUBBLOCKY OR WEDGELIKE CUTTINGS HABIT; MATTE LUSTER WITH SCATTERED SPARKLES; MODERATELY CALCAREOUS

SANDSTONE = PALE YELLOWISH LIGHT BROWN, LIGHT OFF WHITE, LIGHT PALE GRAYISH BROWN; SOME CLEAR TO SLIGHT TRANSLUCENT; QUARTZ FRAMEWORK; UPPER TO LOWER FINE GRAIN SIZE; POOR TO FAIR SORTING; CONSOLIDATED IN PART; PREDOMINATELY SUBANGULAR ANGULARITY; SEMI FROSTED SURFACE FEATURES; EASILY FRIABLE TO FIRM FRIABLE; CLAY MATRIX CEMENT; WEAK GRAIN SUPPORTED; TRACES CALCITE CEMENT; WEAK HCL REACTION; VERY POOR VISUAL INTER GRANULAR POROSITY; TRACES DARK BROWNISH SILTSTONE INTERBEDDED.

NOTE: START KICK-OFF AT 4436'.
SIDETRACK DATA BEGINS AT 4450'.

SHALE = DARK YELLOWISH TO BROWNISH ORANGE, TRACES LIGHT YELLOWISH BROWN; PULVERULENT, CRUMBLY TO SOME FIRM TENACITY, SUB BLOCKY, IRREGULAR IN PART FRACTURE; WEDGELIKE, ELONGATED CUTTINGS HABIT; DULL, EARTHY, SEMI WAXY LUSTER; CLAYEY TO SMOOTH TEXTURE; MASSIVE TO THICK STRUCTURE.

SILTSTONE - LIGHT ORANGISH GRAY, LIGHT YELLOWISH BROWN; CRUMBLY TO SLIGHT BRITTLE TENACITY; BLOCKY TO SUB BLOCKY FRACTURES; WEDGELIKE, SUB BLOCKY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE; SEMI THICK STRUCTURE.

KICK-OFF FAILED, TRIP FOR BHA @ 4648'.

SANDSTONE = LIGHT GRAY TO VERY LIGHT GRAY, OCCASIONALLY BLUISH GRAY; EASILY FRIABLE TO FIRM; VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO ANGULAR; MOD SORTED; DOMINANTLY QUARTZ WITH MINOR LITHICS; SCATTERED FROSTED GRAINS;

06/16/09
NB #2 9.7/8" IN AT 4111'
HTC
JETS
SN

WOB 15
RPM 60
PP 2315
SPM 160

NB #3 9.7/8" AT 4437'
HC 504 W/ MOTOR MWD
JETS: 4X13, 2X12
SN: 7011849
FTG: 212' HRS: 21

TOTCO DOWN

6/26/2009
WOB 6.8
RPM
PP 1979
SPM 122

NB #4 9.7/8" IN AT 4648'
SMITH W/ MOTOR MWD
JETS 4X15
SN: PL1453
FTG: 256' HRS: 21

ROTATE @ 4680'

100% Ttl Gas
5K% CO2
100% Flare Ht.

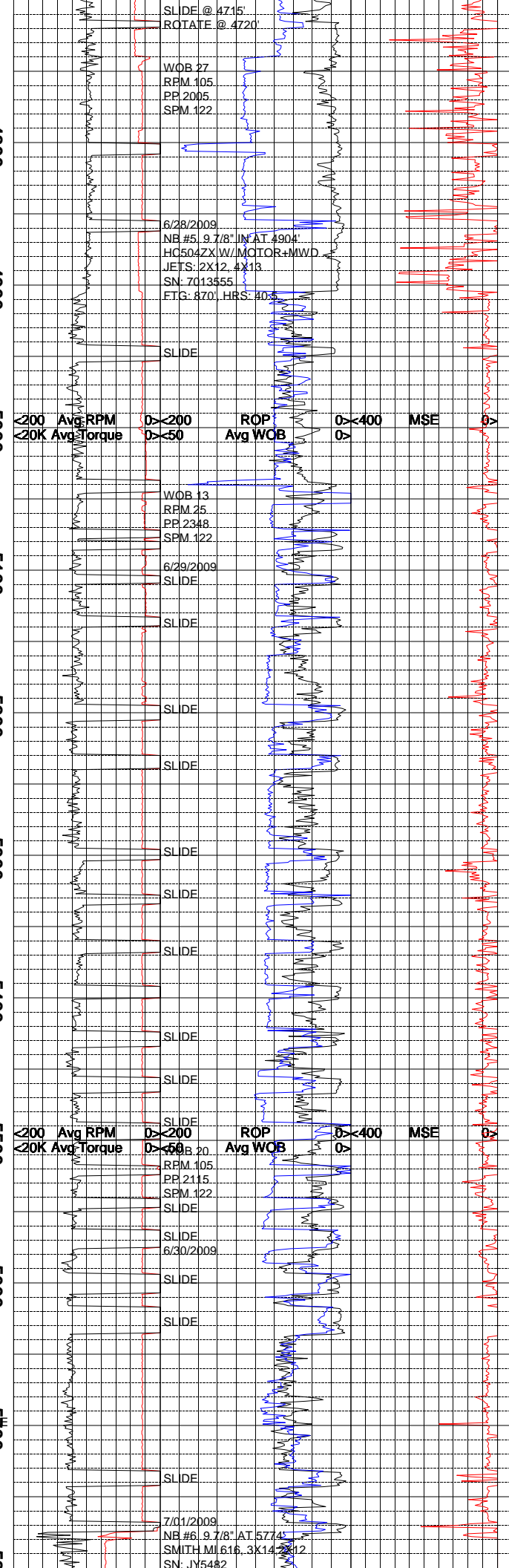
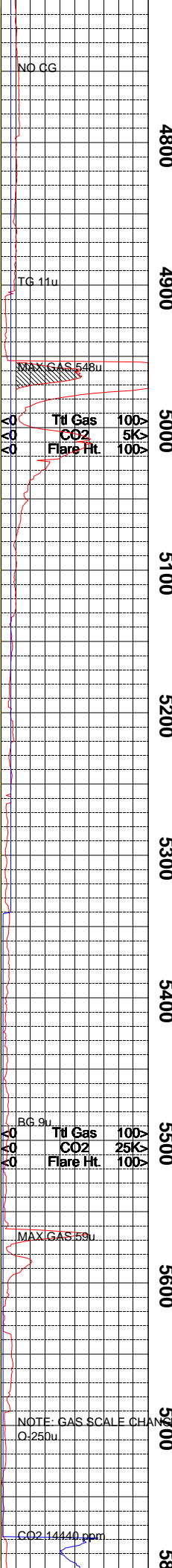
<200 Avg RPM 0>
<20K Avg Torque 0>

ROP
Avg WOB

0<400 MSE 0>

SILTSTONE - LIGHT ORANGISH GRAY, LIGHT YELLOWISH BROWN; CRUMBLY TO SLIGHT BRITTLE TENACITY; BLOCKY TO SUB BLOCKY FRACTURES; WEDGELIKE, SUB BLOCKY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE; SEMI THICK STRUCTURE.

SANDSTONE = LIGHT GRAY TO VERY LIGHT GRAY, OCCASIONALLY BLUISH GRAY; EASILY FRIABLE TO FIRM; VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO ANGULAR; MOD SORTED; DOMINANTLY QUARTZ WITH MINOR LITHICS; SCATTERED FROSTED GRAINS;



CLAY MATRIX; VARIABLE GRAIN/SUPPORTED; LIGHT CALCITE CEMENT; INTERBEDDED WITH SILTSTONE AND SHALE.

SHALE = PALE YELLOWISH BROWN, VERY LIGHT BLuish GRAY, LIGHT YELLOWISH GRAY; CRUMBLY, SLIGHT PULVERULENT TENACITY; SUB BLOCKY, BLOCKY SEMIL IRREGULAR FRACTURE; WEDGELIKE, OCCASIONALLY TABULAR CUTTINGS HABIT; PREDOMINATELY DULL, EARTHY, SOME WAXY LUSTER; CLAYEY, SLIGHT SILTY TEXTURE; THICK MASSIVE STRUCTURE.

SILTSTONE = LIGHT TO MEDIUM GRAY, PURPLISH BROWN; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY TOUGH; SUB-BLOCKY, IRREGULAR AND WEDGELIKE CUTTINGS; DULL LUSTER WITH SCATTERED SPARKLES; SLIGHTLY TO MODERATELY CALCAREOUS; SCATTERED TO COMMON VERY FINE SAND DISSEMINATED THROUGHOUT.

SANDSTONE = VERY LIGHT GRAY TO OFF WHITE OCCASIONALLY LIGHT BROWNISH GRAY; LOWER TO UPPER VERY FINE GRAIN, SOME TRACES FINE GRAIN; POOR TO FAIR SORTING; SUB ANGULAR TO SUBROUND ANGULARITY; FRIABLE IN PART; PREDOMINATELY CLAY MATRIX, TRACES WEAK CALCAREOUS CEMENT; SCATTERED SPECKLED DARK GRAY TO BLACK LITHICS; TRACES INTERBEDDED WITH SILTSTONE.

SHALE = DARK YELLOWISH BROWN, MODERATE GRAYISH YELLOW; BRITTLE TO MODERATE DENSE TENACITY, SUBBLOCKY, BLOCKY TO SLIGHT IRREGULAR FRACTURE; WEDGELIKE ELONGATED, SUB PLATY CUTTINGS HABIT; DULL, EARTHY, SEMI WAXY LUSTER; CLAYEY SLIGHTLY SILTY TEXTURE; THICK MASSIVE STRUCTURE.

SILTSTONE = LIGHT TO MODERATE YELLOWISH BROWN, TRACES GRAYISH BROWN; CRUMBLY, BRITTLE IN PART; SUB BLOCKY, BLOCKY WITH OCCASIONAL IRREGULAR FRACTURE; WEDGELIKE CUTTINGS HABIT; DULL RESINOUS LUSTER; SILTY TO GRITTY TEXTURE; THICK STRUCTURE

SANDSTONE = LIGHT TO MEDIUM GRAY WITH SLIGHT BROWNISH ORANGE HUES; FIRM; VERY FINE LOWER TO FINE LOWER; ANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ WITH MINOR LITHICS; CLAY MATRIX; VARIABLE MATRIX/GRAIN SUPPORTED; MODERATE CALCITE CEMENT; INTERBEDDED WITH SILTSTONE AND SHALE.

SHALE = MODERATE YELLOWISH BROWN, LIGHT YELLOWISH GRAY; FIRM TO MODERATELY HARD; CRUMBLY TO MODERATELY TOUGH; PLANER, IRREGULAR AND WEDGELIKE CUTTINGS; DULL TO SLIGHTLY RESINOUS LUSTER; DOMINANTLY SMOOTH TEXTURE; SLIGHTLY TO OCCASIONALLY VERY CALCAREOUS; INTERBEDDED WITH SILTSTONE AND SANDSTONE.

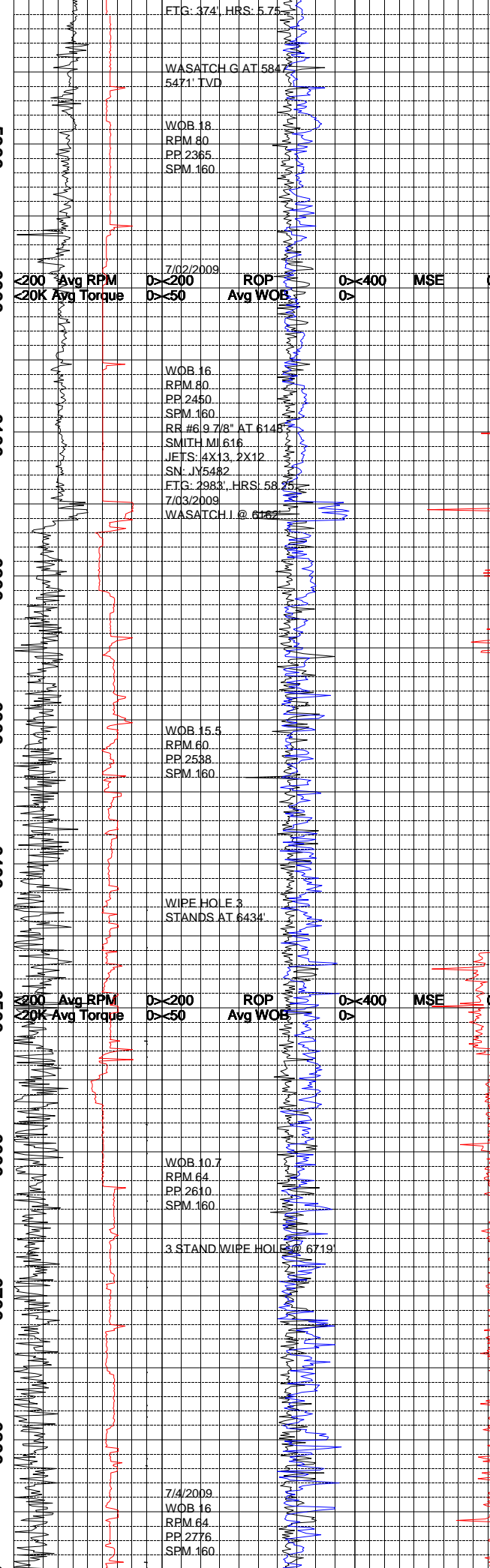
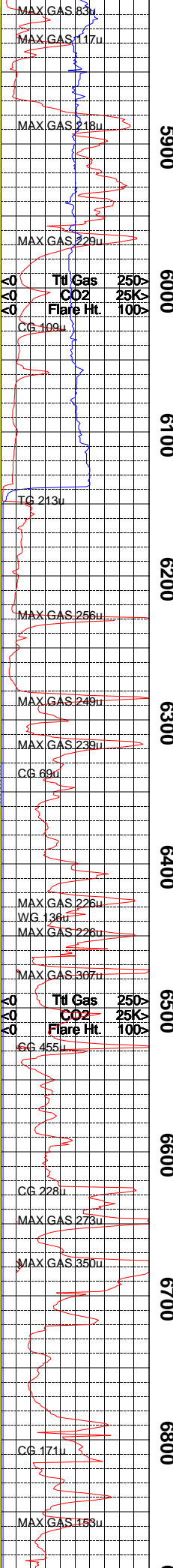
SILTSTONE = MODERATE TO PALE YELLOWISH BROWN, GRAYISH ORANGE; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR AND SUBBLOCKY CUTTINGS; DULL LUSTER WITH SCATTERED MICRO SPARKLES; GRITTY TEXTURE; CALCAREOUS; SCATTERED BLACK PINPOINT SPECKS; INTERBEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = GRAYISH ORANGE, OFF WHITE IN PART, SOME LIGHT PALE YELLOWISH BROWN PREDOMINATELY FINE GRAIN, TRACES VERY FINE GRAIN; FAIR TO WELL SORTED; SUB ANGULAR TO SUBROUND ANGULARITY; LOW SPHERICITY; TRACE FROSTED SURFACE FEATURE; EASILY FRIABLE TO FRIABLE; CLAY MATRIX CEMENT, TRACES SILICA CEMENT, VERY WEAK CALCAREOUS CEMENT REACTION TO HCL, FAIR GRAIN SUPPORT; TRACES BLACK SPECKLED LITHIC IMBEDDED.

SHALE = LIGHT YELLOWISH GRAY, MODERATE YELLOWISH BROWN; FIRM TO MOD HARD; CRUMBLY TO MODERATELY TOUGH; IRREGULAR, PLANER, WEDGELIKE CUTTINGS; DULL TO SLIGHTLY RESINOUS LUSTER; DOMINANTLY SMOOTH TEXTURE; SLIGHTLY TO OCCASIONALLY VERY CALCAREOUS; OCCASIONALLY SILTY, GRADING TO AND INTERBEDDED WITH SILTSTONE; POOR TO MODERATE FISSILITY.

SHALE = PALE LIGHT BROWNISH GRAY, LIGHT YELLOWISH GRAY; PULVERULENT, SEMI BRITTLE TENACITY; SUB BLOCKY, BLOCKY, SLIGHT IRREGULAR FRACTURE; NODULAR, WEDGELIKE, SUB BLOCKY CUTTINGS HABIT; DULL EARTHY, WAXY IN PART LUSTER; CLAYEY, SEMI SMOOTH TEXTURE; THICK MASSIVE STRUCTURE.

SANDSTONE = LIGHT GRAY, VERY LIGHT BLuish GRAY, TRACES LIGHT GREENISH



GRAY; PREDOMINATELY QUARTZ FRAMEWORK; VERY FINE LOWER TO FINE UPPER GRAIN SIZE; FAIR TO WELL SORTED; LOW SPHERICITY; SUB ANGULAR TO SUB ROUNDED IN PART; PREDOMINATELY QUARTZ WITH SPECKLED LITHICS; SOME FROSTED SURFACE FEATURES; FRIABLE TO FIRM FRIABLE; DOMINATELY GRAIN SUPPORTED, SOME CLAY MATRIX, TRACES CALCITE CEMENT; TRACES BLACK SPECKLED CARBACEOUS SHALE IMBEDDED.

SANDSTONE = VERY LIGHT GRAY, OFF WHITE, VERY PALE BLUISH GRAY; PREDOMINATELY QUARTZ FRAMEWORK; LOWER VERY FINE GRAIN TO SOME UPPER FINE GRAIN; WELL SORTED; PREDOMINATELY SUB ANGULAR, TRACES SUB ROUND ANGULARITY; VERY LOW SPHERICITY; FROSTED SURFACE FEATURES IN PART; FRIABLE TO FIRM FRIABLE; SILICA MATRIX, TRACE CALCITE CEMENT; TRACES BLACK SPECKLED CARBACEOUS SHALE IMBEDDED.

SHALE = MODERATE DUSKEY BROWN, LIGHT PALE REDDISH BROWN, SOME GREENISH GRAY; PULVERULEANT TO CRUMBLEY TENACITY, SUB BLOCKY, BLOCKY WITH TRACE IRREGULAR FRACTURES; WEDGELIKE CUTTINGS HABIT; EARTHY DULL LUSTER; SILTY TO CLAYEY TEXTURE; MASSIVE TO SEMI THICK STRUCTURE.

SILTSTONE = DARK REDDISH BROWN, OCCASIONALLY DUSKY REDDISH BROWN; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR AND SUBBLOCKY CUTTINGS; MATTE LUSTER WITH SCATTERED SPARKLES; GRITTY TEXTURE; MODERATELY CALCAREOUS; LOCALLY COMMON VERY FINE SAND GRAINS; INTERBEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = VERY LIGHT GRAY, LIGHT GRAY, VERY PALE BLUISH GRAY; PREDOMINATELY QUARTZ WITH SCAT LITHICS; VERY FINE GRAIN TO SOME UPPER FINE GRAIN; MOD WELL SORTED; PREDOMINATELY SUB ANGULAR, TRACES SUB ROUND; CLAY MATRIX; CALCITE CEMENTED; ESTIMATED FAIR POROSITY AND PERMEABILITY.

SHALE = LIGHT TO MEDIUM GRAY, MEDIUM TO DARK BROWNISH GRAY, RARELY LIGHT GREENISH GRAY; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR, BLOCKY AND WEDGELIKE CUTTINGS HABIT; MATTE TO OCCASIONALLY SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; MODERATELY TO VERY CALCAREOUS; OCCASIONALLY VERY CARBACEOUS; INTERBEDDED WITH SANDSTONE AND SILTSTONE.

SILTSTONE = DARK TO DUSKY YELLOWISH BROWN, OCCASIONALLY DARK GRAYISH BROWN; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR AND SUBBLOCKY CUTTINGS; MATTE LUSTER WITH SCATTERED SPARKLES; GRITTY TEXTURE; MODERATELY CALCAREOUS; LOCALLY COMMON VERY FINE SAND GRAINS DISSEMINATED THROUGHOUT; INTERBEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = LIGHT CHARCOAL GRAY, OFF WHITE, SOME VERY LIGHT BLUISH GRAY; PREDOMINATELY QUARTZ FRAMEWORK; LOWER VERY FINE TO UPPER FINE GRAIN SIZE; POOR TO FAIR SORTED; DOMINATELY SUB ANGULAR, TRACES SUB ROUNDED ANGULARITY; VERY LOW SPHERICITY; TRACE FROSTED IN PART; FIRM FRIABLE TO SLIGHTLY HARD; CONSOLIDATED SOME VERY TIGHT; CALCAREOUS CEMENT, SOME SILICA MATRIX; TIGHT GRAIN SUPPORT; FAIR HCL REACTION; DISSEMINATED FINE BLACK SPECKLED LITHIC EMBEDDED.

SHALE = MODERATE YELLOWISH BROWN, OCCASIONAL LIGHT GREENISH GRAY; CRUNCHY PULVERULENT, TRACE FIRM TENACITY; SUB BLOCKY, BLOCKY TO IRREGULAR FRACTURE; WEDGELIKE, ELONGATED, SUB BLOCKY CUTTINGS HABIT; DULL SEMI WAXY LUSTER; SILTY TO CLAYEY TEXTURE; SUB THICK TO MASSIVE STRUCTURE.

SILTSTONE = GRAYISH RED, DARK YELLOWISH BROWN; FRIABLE TO FIRM FRIABLE; SUB BLOCKY, BLOCKY, SOME IRREGULAR FRACTURE; WEDGELIKE, TABULAR CUTTINGS HABIT; DULL RESINOUS LUSTER; GRITTY SILTY TEXTURE, THICK STRUCTURE; TRACES VERY FINE SANDSTONE IMBEDDED.

SANDSTONE = LIGHT BLUISH GRAY, MODERATE LIGHT GRAY, TRACE OFF WHITE; DOMINATELY QUARTZ FRAMEWORK; LOWER TO UPPER VERY FINE GRAIN; FAIR TO WELL SORTED; SUB ANGULAR TO SOME SUB ROUNDED ANGULARITY; TRACES FROSTED SURFACE

FTG: 374, HRS: 5.75

WASATCH GAT 5847
5471' TVD

WOB: 18
RFM: 80
PP: 2365
SPM: 160

7/02/2009
200 Avg RPM < 200 ROP < 400 MSE 0
20K Avg Torque > 50 Avg WOB >

WOB: 16
RFM: 80
PP: 2450
SPM: 160
RR #6 9 7/8" AT 6145
SMITH MI 616
JETS: 4X13, 2X12
SN: JY5482
FTG: 2983, HRS: 58.25
7/03/2009
WASATCH I @ 6167

WOB: 15.5
RFM: 80
PP: 2538
SPM: 160

WIPE HOLE 3
STANDS AT 6434'

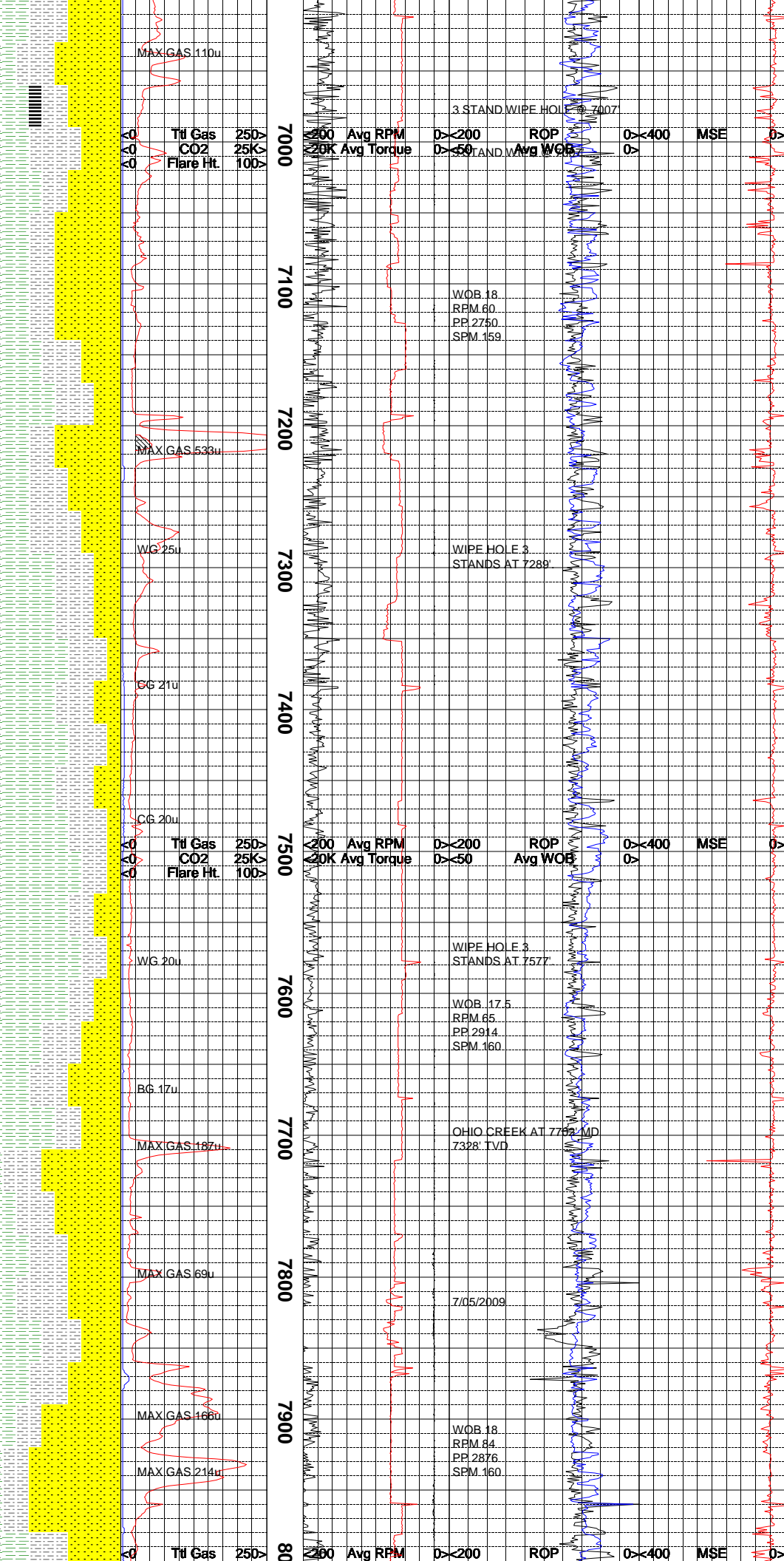
7/4/2009
200 Avg RPM < 200 ROP < 400 MSE 0
20K Avg Torque > 50 Avg WOB >

WOB: 10.7
RFM: 64
PP: 2610
SPM: 160

3 STAND WIPE HOLE @ 6719

7/4/2009
WOB: 16
RFM: 64
PP: 2776
SPM: 160

FEATURES; FIRM FRIABLE TO DENSE; SILICA MATRIX, TRACE CALCAREOUS CEMENT; SOME BLACK DISSEMINATED SPECKLED LITHIC.



SHALE = PALE LIGHT BLUISH GRAY, MODERATE MEDIUM BLUISH GRAY, TO MEDIUM LIGHT GRAY; CRUNCHEY, BRITTLE, SLIGHT DENSE TENACITY; SUB BLOCKY, BLOCKY FRACTURE; ELONGATED, WEDGELIKE CUTTINGS HABIT; DULL EARTHY SEMI WAXY LUSTER; SILTY SMOOTH TEXTURE; SEMI MASSIVE STRUCTURE.

SILTSTONE = MEDIUM TO DARK BROWNISH GRAY, OCC WITH SLIGHT GREENISH HUES; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR AND SUBBLOCKY CUTTINGS; DULL LUSTER WITH SCATTERED SPARKLES; GRITTY TEXTURE; MODERATELY CALCAREOUS; SCATTERED TO COMMON VERY FINE SAND DISSEMINATED THROUGHOUT; INTERBEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = VERY LIGHT GRAY TO LIGHT GRAY OVERALL; "PEPPERED" APPEARANCE; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER; ANGULAR TO SUBROUND; MODERATELY SORTED; MOSTLY QUARTZ WITH COMMON DARK GRAY TO BLACK LITHICS; WHITE CLAY MATRIX; GRAIN SUPPORTED; LIGHT CALCITE CEMENT; ESTIMATED POOR TO FAIR POROSITY AND PERMEABILITY; INTERBEDDED WITH SHALE AND SILTSTONE.

SHALE = MEDIUM TO DARK BROWNISH GRAY, DARK REDDISH BROWN, OCCASIONALLY LIGHT GREENISH GRAY; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR, BLOCKY AND WEDGELIKE CUTTINGS HABIT; MATTE TO OCCASIONALLY SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; MODERATELY TO VERY CALCAREOUS; OCCASIONALLY VERY CARBONACEOUS; INTERBEDDED WITH SANDSTONE AND SILTSTONE.

SILTSTONE = DARK REDDISH BROWN, LIGHT TO MEDIUM GRAY, OCCASIONAL GREENISH HUES; FIRM TO MODERATELY HARD; CRUMBLY TO TOUGH; IRREGULAR AND SUBBLOCKY CUTTINGS; EARTHY LUSTER WITH SCATTERED SPARKLES; GRAINY TEXTURE; MODERATELY CALCAREOUS; SCATTERED TO COMMON VERY FINE SAND DISSEMINATED THROUGHOUT; INTERBEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = LIGHT GRAY TO VERY LIGHT GRAY OVERALL; "PEPPERED" APPEARANCE; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER; ANGULAR TO SUBROUND; MODERATELY SORTED; DOM QUARTZ WITH COMMON DARK GRAY TO BLACK LITHICS; WHITE CLAY MATRIX; GRAIN SUPPORTED; LIGHT CALCITE CEMENT; ESTIMATED POOR TO FAIR POROSITY AND PERMEABILITY; INTERBEDDED WITH SHALE AND SILTSTONE.

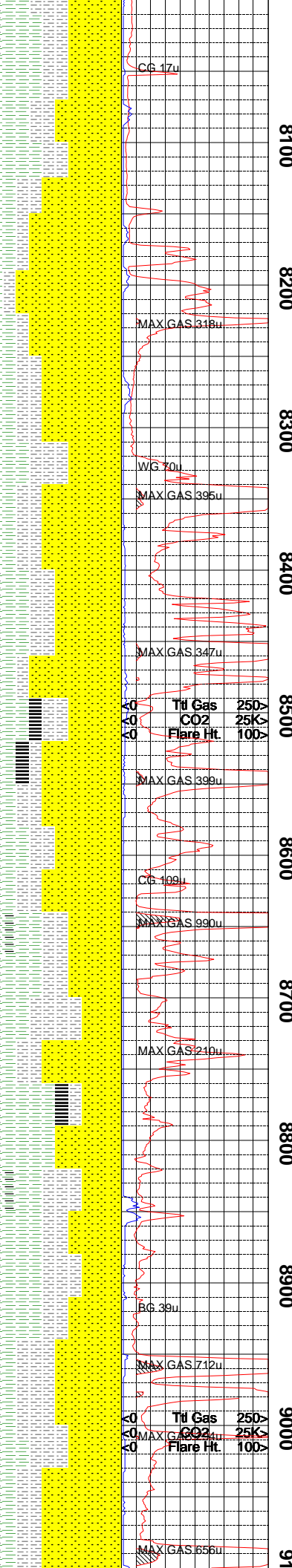
SHALE = LIGHT TO MEDIUM BROWNISH GRAY, LIGHT TO MEDIUM OLIVE GRAY; OCCASIONALLY GREENISH GRAY; MODERATELY HARD TO FIRM; TOUGH TO CRUMBLY; BLOCKY, IRREGULAR AND WEDGELIKE CUTTINGS HABIT; MATTE TO OCC SLIGHTLY RESINOUS LUSTER; SMOOTH TO MOD GRAINY TEX; MOD CALCAREOUS; FAIR FISSILITY.

SANDSTONE = LIGHT GRAY, VERY LIGHT GRAY OFF WHITE; PREDOMINATELY QUARTZ FRAMEWORK; LOWER VERY FINE SOME UPPER FINE GRAIN; POOR TO WELL SORTED; ANGULAR TO SLIGHT SUB ROUNDED ANGULARITY; TRACE FROSTED SURFACE FEATURES; EASILY FRIABLE, SEMI FRIABLE; CLAY MATRIX, TRACE CALCITE CEMENT; TRACE BLACK SPECKLED LITHIC INTERBEDDED; POOR VISUAL INTERGRANULAR POROSITY.

SILTSTONE = MODERATELY DARK GRAY, SOME DARK OLIVE BLACK, GREENISH BLACK; FRIABLE TO FRIABLE FIRM, BRITTLE IN PART SUB BLOCKY, BLOCKY SEMI IRREGULAR FRACTURES; WEDGELIKE, ELONGATED CUTTINGS HABIT; DULL, EARTHY, SLIGHT RESINOUS SPARKLING LUSTER; GRITTY SILTY TEXTURE; MASSIVE STRUCTURE; TRACES SANDSTONE AND SHALE INTERBEDDED.

SANDSTONE = VERY LIGHT GRAY, OFF WHITE, CLEAR TO TRANSLUCENT; PREDOMINATELY QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE, WELL TO VERY WELL SORTED; ANGULAR, SUB ANGULAR, TO SOME SUB ROUND ANGULARITY; TRACES FROSTED SURFACE FEATURES; EASILY FRIABLE; PREDOMINATELY SILICA CEMENT, TRACE WHITE CLAY CEMENT; VERY WEAK GRAIN SUPPORTED; BLACK SPECKLED CARBONACEOUS SHALE IMBEDDED.

SHALE = LIGHT TO MEDIUM BROWNISH GRAY,



8100

8200

8300

8400

8500

8600

8700

8800

8900

9000

9100

WF 800 AT 8254'
7880' TVD
WIPE HOLE 3
STANDS AT 8338'

WF 700 @ 8515'
8141' TVD

7/06/2009
WOB 19.3
RPM 70
PR 2711
SPM 150

WF 500 AT 8960'
8586' TVD

<200 Avg RPM >200 ROP <400 MSE >
<20K Avg Torque >50 Avg WOB >

<200 Avg RPM >200 ROP <400 MSE >
<20K Avg Torque >50 Avg WOB >

LIGHT TO MEDIUM OLIVE GRAY; OCCASIONALLY GREENISH GRAY, OCCASIONALLY DARK REDDISH BROWN; FIRM TO MODERATELY HARD; BLOCKY, TABULAR AND WEDGELIKE CUTTINGS; CRUMBLY TO TOUGH; MATTE TO SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; CALCAREOUS; INTERBEDDED WITH SANDSTONE AND SILTSTONE; MODERATELY FISSILE.

SANDSTONE = LIGHT GRAY, PALE GREENISH GRAY; COMMON "PEPPERED" APPEARANCE; EASILY FRIABLE TO FIRM; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER; ANGULAR TO SUBROUND; MODERATELY WELL SORTED; DOMINANTLY QUARTZ WITH SCATTERED TO COMMON DARK GRAY AND BLACK LITHICS; WHITE CLAY MATRIX; MOSTLY GRAIN SUPPORTED; CALCITE CEMENT.

SILTSTONE = LIGHT TO MEDIUM BROWNISH GRAY, LIGHT GREENISH GRAY; FIRM TO MODERATELY HARD; MODERATELY TOUGH; IRREGULAR, SUBBLOCKY AND WEDGELIKE CUTTINGS; DULL, EARTHY LUSTER WITH SCATTERED SPARKLES; GRITTY, ABRASIVE TEXTURE; CALCAREOUS; SCATTERED BLACK PINPOINT SPECKS; SCATTERED TO COMMON VERY FINE SAND GRAINS DISSEMINATED THROUGHOUT; INTERBEDDED WITH SHALE AND SANDSTONE.

SHALE = DARK TO DUSKY YELLOWISH BROWN; LIGHT TO MEDIUM GREENISH GRAY, LIGHT TO MEDIUM GRAY, OCCASIONALLY DARK REDDISH BROWN; FIRM TO MODERATELY HARD; BLOCKY, TABULAR AND WEDGELIKE CUTTINGS; CRUMBLY TO TOUGH; MATTE TO SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; SLIGHTLY CALCAREOUS; MODERATELY FISSILE; INTERBEDDED WITH SILTSTONE AND SANDSTONE.

SANDSTONE = LIGHT GRAY, OCC PALE GREENISH GRAY; COMMON "PEPPERED" APPEARANCE; EASILY FRIABLE TO FIRM; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER; ANGULAR TO SUBROUND; MODERATELY WELL SORTED; DOMINANTLY QUARTZ WITH SCATTERED TO COMMON DARK GRAY AND BLACK LITHICS; WHITE CLAY MATRIX; MOSTLY GRAIN SUPPORTED; CALCITE CEMENT.

SANDSTONE = LIGHT GRAY, LIGHT GREENISH GRAY, CLEAR TO TRANSLUCENT; PREDOMINATELY QUARTZ FRAMEWORK; LOWER TO UPPER FINE GRAIN; FAIR TO WELL SORTED; DOMINATELY SUB ANGULAR, TRACE SUB ROUND, LOW SPHERICITY; FROSTED SURFACE FEATURES; EASILY FRIABLE, SOME UNCONSOILED POSSIBLE DUE TO PDC BIT; SILICA MATRIX CEMENT, TRACE WHITE CLAY CEMENT, VERY WEAK GRAIN SUPPORT; DISSEMINATED BLACK SPECKLED CARBONACEOUS SHALE IMBEDDED.

SHALE = DARK GRAYISH RED, MEDIUM LIGHT GRAY, DARK YELLOWISH ORANGE; CRUMBLY, PULVERULENT, SEMI HARD TENACITY; SUB BLOCKY, BLOCKY, SLIGHT IRREGULAR FRACTURE; WEDGELIKE, TABULAR, SUB MASSIVE CUTTINGS HABIT; DULL, EARTHY, SLIGHT RESINOUS LUSTER; GRITTY TO SILTY SOME CLAYEY TEXTURE; SEMI MASSIVE STRUCTURE; GRADING TO SILTSTONE.

CARBONACEOUS SHALE= DUSKY REDDISH BROWN, DARK BROWNISH BLACK; CRUNCHY, FIRM TENACITY, PREDOMINATELY IRREGULAR FRACTURE; WEDGELIKE, FLAKY CUTTINGS HABIT; GRITTY, VITREOUS LUSTER; CLAYEY TEXTURE; THIN STRUCTURE.

SANDSTONE = VERY LIGHT GRAY, OFF WHITE, LIGHT GRAYISH BROWN WITH DARK BROWN LITHICS; LOWER TO UPPER FINE GRAIN SIZE; POOR TO FAIR SORTED; SUB ANGULAR TO SUB ROUNDED ANGULARITY; V LOW SPHERICITY, FROSTED SURFACE FEATURES; FRIABLE TO FIRM FRIABLE, DENSE ; SILICA MATRIX CEMENT, TRACE CALCITE CEMENT; POOR VISUAL INTER GRANULAR POROSITY; DARK BROWN, BLACK SPECKLED LITHIC INTERBEDDED.

SILTSTONE = LIGHT TO MEDIUM GRAY, LIGHT TO MEDIUM BROWNISH GRAY; FIRM TO MODERATELY HARD; MODERATELY TOUGH; IRREGULAR, SUBBLOCKY AND WEDGELIKE CUTTINGS; DULL, EARTHY LUSTER WITH SCATTERED SPARKLES; GRITTY, ABRASIVE TEXTURE; CALCAREOUS; SCATTERED BLACK PINPOINT SPECKS; SCATTERED TO COMMON VERY FINE SAND GRAINS DISSEMINATED THROUGHOUT.

SHALE = MEDIUM TO DARK GRAYISH BROWN, OCC DARK REDDISH BROWN; FIRM TO MOD HARD; BLOCKY AND TABULAR CUTTINGS; DULL LUSTER; SMOOTH TEXTURE; SLIGHTLY

CALCREOUS; MODERATELY FISSILE.

INTERMEDIATE CASING POINT = 9131'

SANDSTONE = WHITE; LIGHT GRAY TO LIGHT BROWNISH GRAY; FEW MEDIUM TO FINER GRAINS; FAIR TO WELL SORTING; SUBANGULAR TO SUBROUNDED; MODERATE SPHERICITY; ABUNDANT UNCONSOLIDATED TO VERY FRIABLE SANDSTONE; CALCITE CEMENT WITH MINOR SILICA GRAINS; GLAUCONITIC STAINING ON SANDS; TRACES OF COAL; INTERBEDDED SILTSTONE LAYERS; MODERATE TO HIGH GAS VALUES IN SANDS.

SILTSTONE = DARK GRAY TO GRAYISH BLACK; BRITTLE TO CRUMBLY; IRREGULAR FRACTURES NODULAR TO WEDGELIKE CUTTINGS; SLIGHT RESINOUS TO EARTHY DULL LUSTER; SILTY TO CLAYEY TEXTURE; APPEARS GRADING TO SHALES; 5-8% KAOLINITIC SANDS PRESENT; MODERATE TO LOWER GAS IN SILTSTONES.

SHALE = LIGHT TO MEDIUM GRAY; CRUNCHY TO CRUMBLY; ELONGATED TO TRACES OF PLATY CUTTINGS; IRREGULAR TO SPLINTERY FRACTURES; EARTHY DULL TO SLIGHT WAXY LUSTER; SLIGHTLY SILTY TO SMOOTH; APPEARS GRADING TO SILTSTONE; 5% COAL OBSERVED; 5-8% KAOLINITIC SANDS; HIGHER GAS IN COALS AND SANDSTONES.

NOTE = MAX GAS 1245u AND CO2 FROM LCM PILL RETURN AT 9418'.

SANDSTONE = WHITE; LIGHT GRAY TO LIGHT BROWNISH GRAY; FINE GRAINS; WELL SORTING; SUBANGULAR TO ROUNDED; HIGH SPHERICITY; ABUNDANT UNCONSOLIDATED TO VERY FRIABLE GRAINS; CALCITE CEMENT WITH 50% SILICA MATRIX; KAOLINITIC SAND AND TRACES OF COAL OBSERVED; HIGHER GAS VALUES OBSERVED IN KAOLINITIC SANDS AND COAL SEAMS.

SHALE=LIGHT MEDIUM GRAY OCC TRACE YELLOW BROWN; MOD HARD FIRM; BLOCKY IRREGULAR FRACTURE; MASSIVE CUTTINGS HABIT;DULL EARTHY OCC WAXY LUSTER; SMOOTH TO CLAYEY TEXTURE.

SANDSTONE=CLEAR WHITE; PREDOM MEDIUM UNCONSOLIDATED QUARTZ ; SUBANGULAR SUBROUNDED; MOD WELL SORTED;EASILY FRIABLE; CALCITE CEMENT WITH TRACE KAOLINITE; MOD HIGH SPHERICITY; SHALES INTERBEDDED; HIGH GAS IN SANDS.

SHALE=LIGHT MEDIUM GRAY OCC DARK GRAY TO SLI PALE YELLOW; MOD HARD FIRM; DULL EARTHY OCC WAXY LUSTER; SMOOTH SILTY GRITTY TEXTURE; NON CALCREOUS; GRADING TO GRAYISH BROWN SILTSTONE.

SANDSTONE=CLEAR WHITE; FINE TO VERY FINE PREDOM ABUD CLEAR LOOSE MEDIUM QUARTZ GRAINS; SUBANGULAR SUBROUNDED; MOD WELL SORTED; PREDOM GRAIN SUPPORTED; CALCITE CEMENT; HIGH SPHERICITY; OCC TRACE BLACK LITHICS CLAST FRAGMENTS; SLI TRACE KAOLINITE; HIGH GAS READINGS IN SANDS.

SHALE=LIGHT GRAY OCC DARK GRAY; MOD HARD PLANULAR IRREGULAR FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL EARTHY OCC WAXY LUSTER; SILTY OCC GRITTY TEXTURE; INTERBEDDED SANDS YIELDING HIGH GAS.

SANDSTONE = LIGHT GRAY TO OFF WHITE AND CLEAR; FINE TO MEDIUM GRAINS; SUB ANGULAR TO SUBROUNDED; MODERATELY WELL SORTED; DOMINANT GRAIN SUPPORT; ABUNDANT CLEAR UNCONSOLIDATED MEDIUM QUARTZ GRAINS; CALCITE CEMENT; TRACES OF KAOLINITIC SAND; SILTSTONE AND SHALE INTERBEDDED; MODERATE GAS.

SILTSTONE = MEDIUM TO DARK GRAY; TO SLIGHTLY DENSE; SPLINTERY TO PLANAR FRACTURES; ELONGATED TO NODULAR CUTTINGS; LITTLE RESINOUS TO EARTHY LUSTER; SILTY TEXTURE; INTERBEDDED IN SANDSTONE LAYERS; APPEARS GRADING TO SHALE; <3% INDIVIDUAL QUARTZ GRAINS OBSERVED; LOWER GAS VALUES.

CARBONACEOUS SHALE = MEDIUM TO DARK GRAY; DENSE TO CRUMBLY; WEDGELIKE TO NODULAR CUTTINGS; EARTHY TO SLIGHT RESINOUS LUSTER; SMOOTH TO SILTY TEXTURE; 5% KAOLINITIC SANDS OBSERVED; SILTSTONE APPEARS GRADING TO SHALE; MODERATE GAS VALUES.

SANDSTONE = WHITE; LIGHT GRAY TO GRAYISH WHITE; VERY FINE TO FINE GRAINS WELL SORTING FOR CONSOLIDATED GRAINS; 10-20% UNCONSOLIDATED GRAINES; <3% KAOLINITIC SANDS; SUBROUNDED TO ROUNDED

MAX GAS 470u
MAX GAS 406u

MAX GAS 164u

RE SCALE ROP < -1000

MAX GAS 354u
MAX GAS 319u

MAX GAS 562u

MAX GAS 143u

MAX GAS 172u

CG 1287u

CG 1102u

MAX GAS 246u

MAX GAS 1249u

AC Ttl Gas 1K
AC CO2 25K
AC Flare Ht. 100

MAX GAS 250u

CG 1413u

MAX GAS 1535u

CG 295u

MAX GAS 1203u

CG 1246u

MAX GAS 1120u

MAX GAS 300u

MAX GAS 407u

CG 1241u

LCM PILL RETURN
MAX GAS 389u

AC Ttl Gas 1K
AC CO2 25K
AC Flare Ht. 100

CG 1296u

LCM PILL RETURN
MAX GAS 393u

LCM PILL RETURN
MAX GAS 444u

CG 1244u

07/07/2009
09/18/2009
NB#7 6 1/8" in @ 9131'
Hughes QD406 w/ 3-13'
120.3 Hrs: 4207
DAY TOUR

NIGHT TOUR
WOB 17K
RPM 65
PP 1700
GFM 265

MUD LOSSES 36BBL/HR
WF 400 @ 9685 MD/9302 TV

MUD LOSSES 150BBL/HR

9/20/2009

MUD LOSSES 115BBL/HR

WOB 17K
RPM 70
PP 1700
GFM 270

DAY TOUR

MUD LOSSES 47BBL/HR

MUD LOSSES 40BBL/HR

<200 Avg RPM
<20K Avg Torque
ROP
Avg WOB
<200
<50
<400
MSE

<200 Avg RPM
<20K Avg Torque
ROP
Avg WOB
<200
<50
<400
MSE

9200

9300

9400

9500

9600

9700

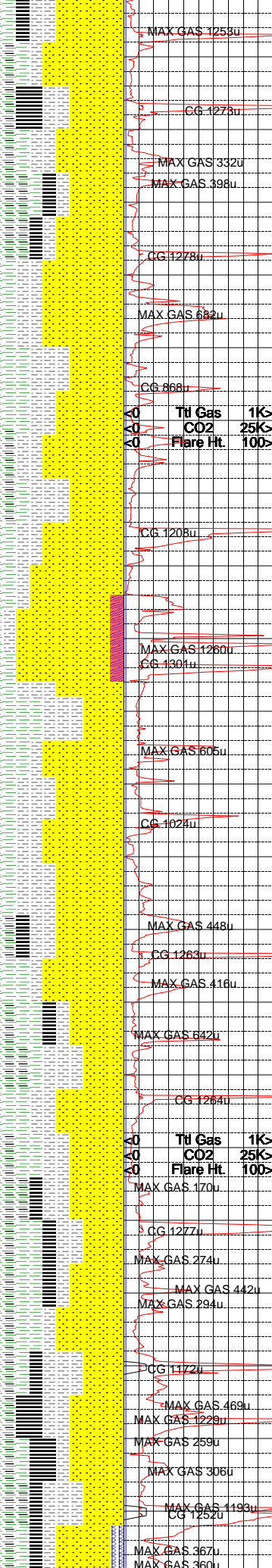
9800

9900

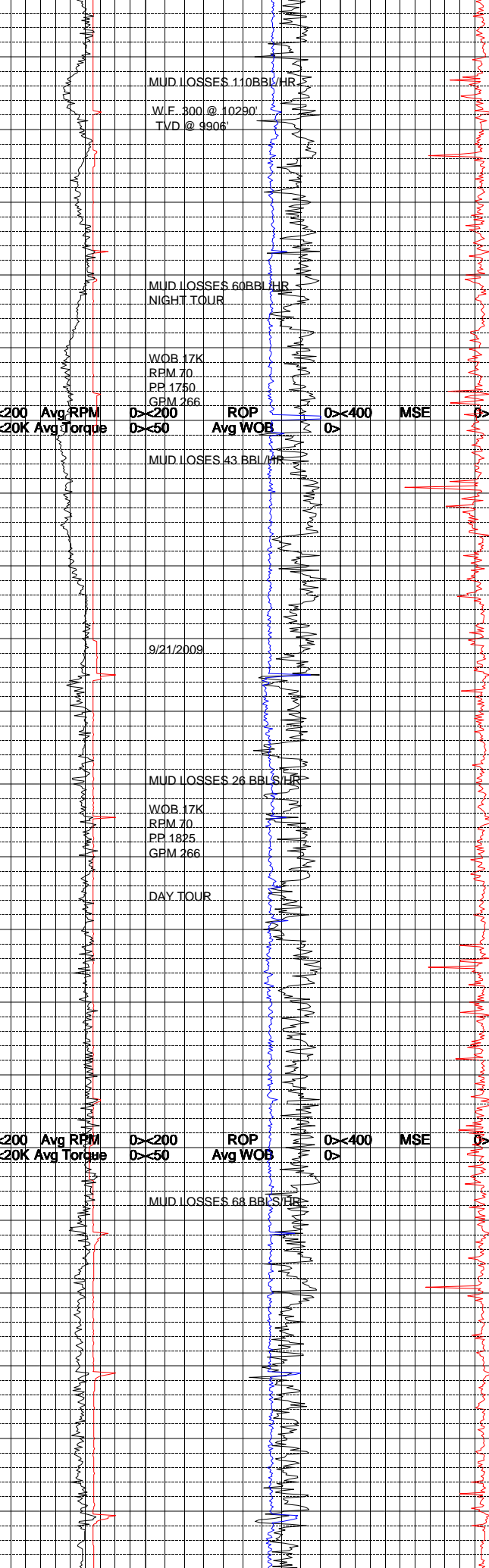
10000

10100

10



10300
10400
10500
10600
10700
10800
10900
11000
11100
11200



HIGH SPHERICITY; EASILY FRIABLE; SLIGHT CALCITE CEMENT; COAL AND SHALE INTERBEDDED; HIGHER GAS VALUES WITH COAL SEAM.

COAL = BLACK TO DARK GRAYISH BLACK; PULVERULENT; IRREGULAR FRACTURES; WEDGE LIKE TO NODULAR; DULL EARTHY LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SANDS AND CARBONACEOUS SHALES; HIGH GAS VALUES OBSERVED IN COAL AND THICK SAND BEDS.

CARBONACEOUS SHALE = GRAYISH BLACK TO DARK GRAY; SLIGHTLY DENSE TO CRUMBLY; IRREGULAR TO SPLINTERY FRACTURES; TABULAR TO ELONGATED CUTTINGS; DULL TO SLIGHT RESINOUS LUSTER; SILTY TEXTURE; TRACES OF KAOLINIC SANDS; MODERATE GAS WITH CLEAR WHITE FROSTED MEDIUM QUARTZ GRAINS IN SAMPLE.

SANDSTONE=WHITE; VERY FINE TO FINE GRAIN ABUD CLEAR LOOSE UNCONSOLIDATED MED QUARTZ GRAINS; SUBANGULAR SUBROUNDED MOD WELL SORTED; CALCITE CEMENT SLI CLAY MATRIX; OCC TRACE BLACK LITHIC CLAST FRAGMENTS EMBEDDED; HIGH MOD HIGH SPHERICITY; INTERBED WITH SHALES AND CARBONACEOUS SHALES; HIGH GAS READINGS IN SANDS.

SILTSTONE=LIGHT BROWNISH GRAY TO GRAY; MOD HARD DENSE TENACITY; BLOCKY IRREG FRACTURE; MASSIVE PLATY TO CUTTINGS HABIT; DULL EARTH LUSTER ; GRITTY GRANULAR TEXTURE; GRADING VERY FINE TO FINE WHITE SANDSTONE.

SANDSTONE=CLEAR WHITE; FINE MEDIUM GRAIN MOD WELL SORTED; SUBANGULAR SUBROUNDED PREDOM GRAIN SUPPORTED; ABUD LOOSE MEDIUM QUARTZ GRAINS IN SAMPLE; SLOW REACTION TO HCL; CALCITE CEMENT SLI TRACE KAOLINITE; HIGH SPHERICITY; MOD AMOUNTS OF FREE XLN CALCITE FILL FRAGS TRACE EMBEDDED BLACK LITHIC CLAST FRAGS INTERBEDDED WITH CARBONACEOUS SHALE AND SILTSTONES; HIGH GAS IN SANDS.

SHALE=LIGHT MEDIUM GRAY OCC DARK GRAY; MOD HARD FIRM; CRUMBLY SLI BRITTLE TENACITY; MASSIVE PLATY TO TABULAR CUTTINGS HABIT; DULL OCC WAXY TO RESINOUS LUSTER; SMOOTH SLI CLAYEY TO SILTY TEXTURE; GRADING INTO LIGHT GRAYISH BROWN MOD HARD SILTSTONE; LOW GAS READINGS IN SHALE.

SANDSTONE = WHITE; LIGHT GRAYISH WHITE; FINE TO VERY FINE GRAINS; WELL SORTING; SUBANGULAR TO ROUNDED; MODERATE TO HIGH SPHERICITY; 10% UNCONSOLIDATED QUARTZ XL'S; TRACES OF CALCITE CEMENT WITH DOMINANT SILICA MATRIX; <5% BLACK LITHIC CLASTS IN SANDS; SILTSTONE APPEARS GRADING TO SHALE; TRACES OF KAOLINIC SANDS; MODERATE TO HIGH GAS ASSOCIATED WITH SANDSTONES.

COAL = BLACK; DARK GRAYISH BLACK; PULVERULENT TO TO SLIGHTLY CRUMBLY; HACKLY TO IRREGULAR FRACTURES; NODULAR TO WEDGELIKE FRACTURES; WAXY TO GREASY LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SHALES AND SANDSTONES; HIGH GAS VALUES.

CARBONACEOUS SHALE = DARK GRAY TO GRAYISH BLACK; DENSE TO CRUMBLY; PLANAR TO SPLINTERY FRACTURES; ELONGATED TO TABULAR CUTTINGS; EARTHY TO SLIGHT WAXY LUSTER; SILTY TO SLIGHT CLAYEY TEXTURE; VISIBLE DEGASSING OF COAL OBSERVED; SILTSTONE APPEARS GRADING TO DARKER CARBONACEOUS SHALE; HIGHER GAS WITH COALS AND SANDS.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH OCCASIONAL DARK GRAY HUES; SLIGHTLY DENSE TO BRITTLE; IRREGULAR TO SPLINTERY FRACTURES; PLATY TO WEDGELIKE CUTTINGS; SLIGHTLY GREASY TO EARTHY LUSTER; SILTY TO SLIGHT CLAYEY TEXTURE; 5% COAL OBSERVED WITH VISIBLE DEGASSING <5% KAOLINIC SANDS; MODERATE GAS.

SANDSTONE = LIGHT TO MEDIUM GRAY WITH OFF WHITE OCCURANCES; FEW MEDIUM TO PREDOMINATELY FINE GRAINS; FAIR TO WELL SORTING; SUBANGULAR TO ROUNDED; HIGH TO MODERATE SPHERICITY; FEW UNCONSOLIDATED QUARTZ GRAINS <5% TO FIRMLY FRIABLE; HIGHER % OF SILICA CEMENT THAN CALCITE; 5-8% KAOLINIC SANDS; ABUNDANT COAL PRESENT; SILTSTONE GRADING TO SHALE; HIGH GAS WITH COAL AND SANDSTONES.

COAL = DARK GRAY TO BLACK; SLIGHTLY CRUMBLY TO PULVERULENT; IRREGULAR FRACTURING; PLATY TO TABULAR CUTTINGS;

MAX GAS 1253u
CG 1278u
MAX GAS 332u
MAX GAS 398u
CG 1278u
MAX GAS 682u
CG 868u
MAX GAS 1260u
CG 1301u
MAX GAS 605u
CG 1024u
MAX GAS 448u
CG 1263u
MAX GAS 416u
MAX GAS 642u
CG 1264u
MAX GAS 170u
CG 1277u
MAX GAS 274u
MAX GAS 442u
MAX GAS 294u
CG 1172u
MAX GAS 469u
MAX GAS 1229u
MAX GAS 259u
MAX GAS 306u
MAX GAS 1193u
CG 1252u
MAX GAS 367u
MAX GAS 360u

MUD LOSSES 110 BBL/HR
W.F. 300 @ 10290'
TVD @ 9906'

MUD LOSSES 60 BBL/HR
NIGHT TOUR

WOB 17K
RPM 70
PP 1750
GEM 266

MUD LOSSES 43 BBL/HR

9/21/2009

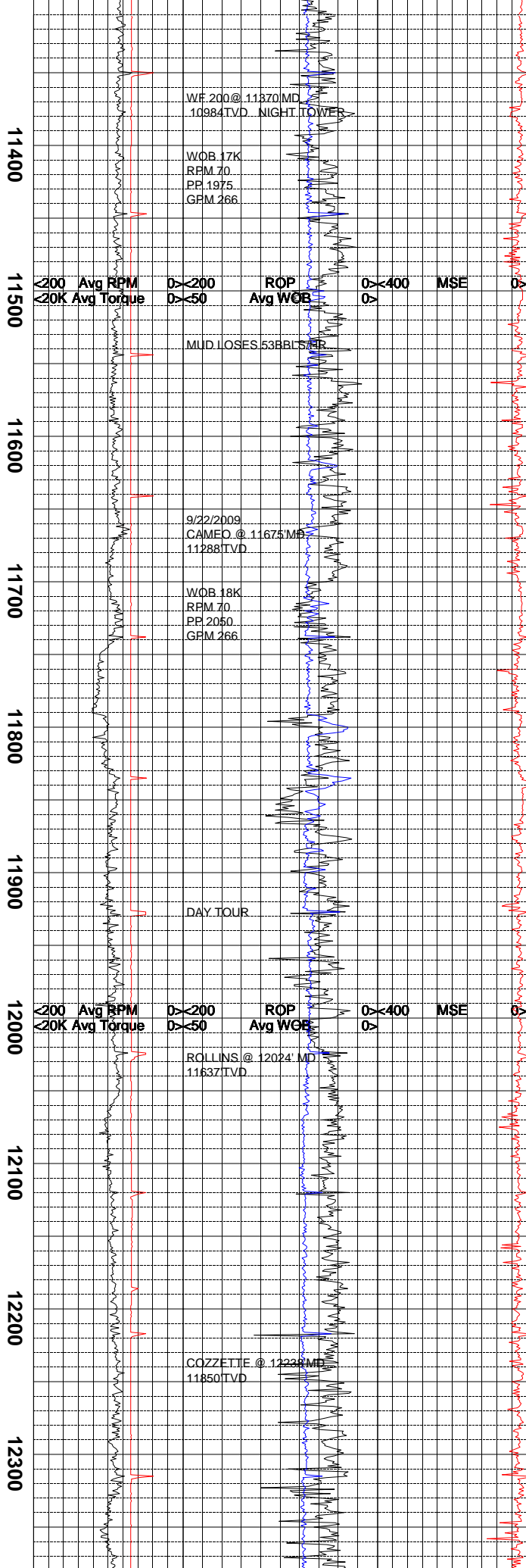
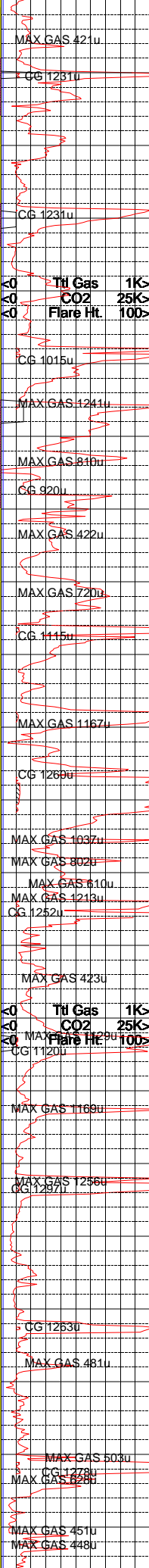
MUD LOSSES 26 BBL/HR

WOB 17K
RPM 70
PP 1825
GEM 266

DAY TOUR

MUD LOSSES 68 BBL/HR

<200 Avg RPM
<20K Avg Torque
ROP
Avg WOB
MSE



SLIGHT WAXY TO DULL LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SHALES AND SAND HIGH GAS VALUES OBSERVED.

SANDSTONE= WHITE TO BROWNISH GRAY; SLIGHTLY HARD TO FRIABLE; SUBROUNDED TO SUBANGULAR; WELL SORTED; PREDOMINATELY GRAIN SUPPORTED; SLIGHT CALCITE CEMENT WITH HIGHER SILICA CEMENT; MODERATE SPHERICITY; TRACES OF BLACK CARBONACEOUS FRAGMENTS; CLEAR WHITE CRYSTALLINE FREE CALCITE FILL; INTERBEDDED DARK GRAY SHALES AND BLACK CARBONACEOUS SHALES; HIGH GAS IN SANDS.

SHALE= DARK GRAY TO LIGHT GRAY; HARD TO BRITTLE TENACITY; IRREGULAR TO SPLINTERY FRACTURES; MASSIVE TABULAR TO ELONGATED CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH SILTY TEXTURE; INTERBEDDED DARK BLACK COAL BEDS; HIGH GAS IN COAL BEDS.

COAL= BLACK ; CRUMBLY BRITTLE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE WEDGE LIKE CUTTINGS HABIT; SMOOTH VITREOUS SEMI-METALIC LUSTER; SMOOTH TEXTURE; INTERBEDDED WITH BROWNISH BLACK CARBONACEOUS SHALES AND SILTSTONES; HIGH GAS READINGS IN COAL BEDS WITH TRACES OF CLEAR XL'N CALCITE FILL FRACTURES GIVING WAY TO HIGHER GAS READINGS IN ZONES WITH FRACTURE FILL OBSERVED.

SILTSTONE= BROWNISH GRAY TO BROWN; HARD TO FIRM; BLOCKY IRREGULAR FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; GRITTY GRANULAR TEXTURE GRADING TO VERY FINE GRAN BROWNISH GRAY AND FRIABLE SANDSTONES; HIGH GAS.

COAL= BLACK TO BROWNISH BLACK; BRITTLE CRUMBLY TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE WEDGELIKE CUTTINGS HABIT; METALIC VITREOUS LUSTER; SMOOTH TEXTURE; INTERBEDDED BROWNISH BLACK CARBONACEOUS SHALES AND SANDSTONES; HIGH GAS IN THIN COAL BEDS.

SANDSTONE= CLEAR TO WHITE; LOOSE MEDIUM QUARTZ GRAINS; SUBROUNDED TO SUBANGULAR; WELL SORTED; PRIMARILY GRAIN SUPPORTED; HIGH SPHERICITY; TRACES OF BLACK CARBONACEOUS FRAGMENTS EMBEDDED; INTERBEDDED COAL BEDS WITH HIGH GAS READINGS.

SILTSTONE = LIGHT TO DARK GRAYISH BLACK WITH OCCASIONAL BROWN HUES; BRITTLE TO CRUMBLY; ELONGATED TO TABULAR CUTTINGS; SLIGHT WAXY TO EARTHY LUSTER; SILTY TO GRITTY TEXTURE; INTERBEDDED IN SHALES AND SANDSTONE; MODERATE GAS VALUES.

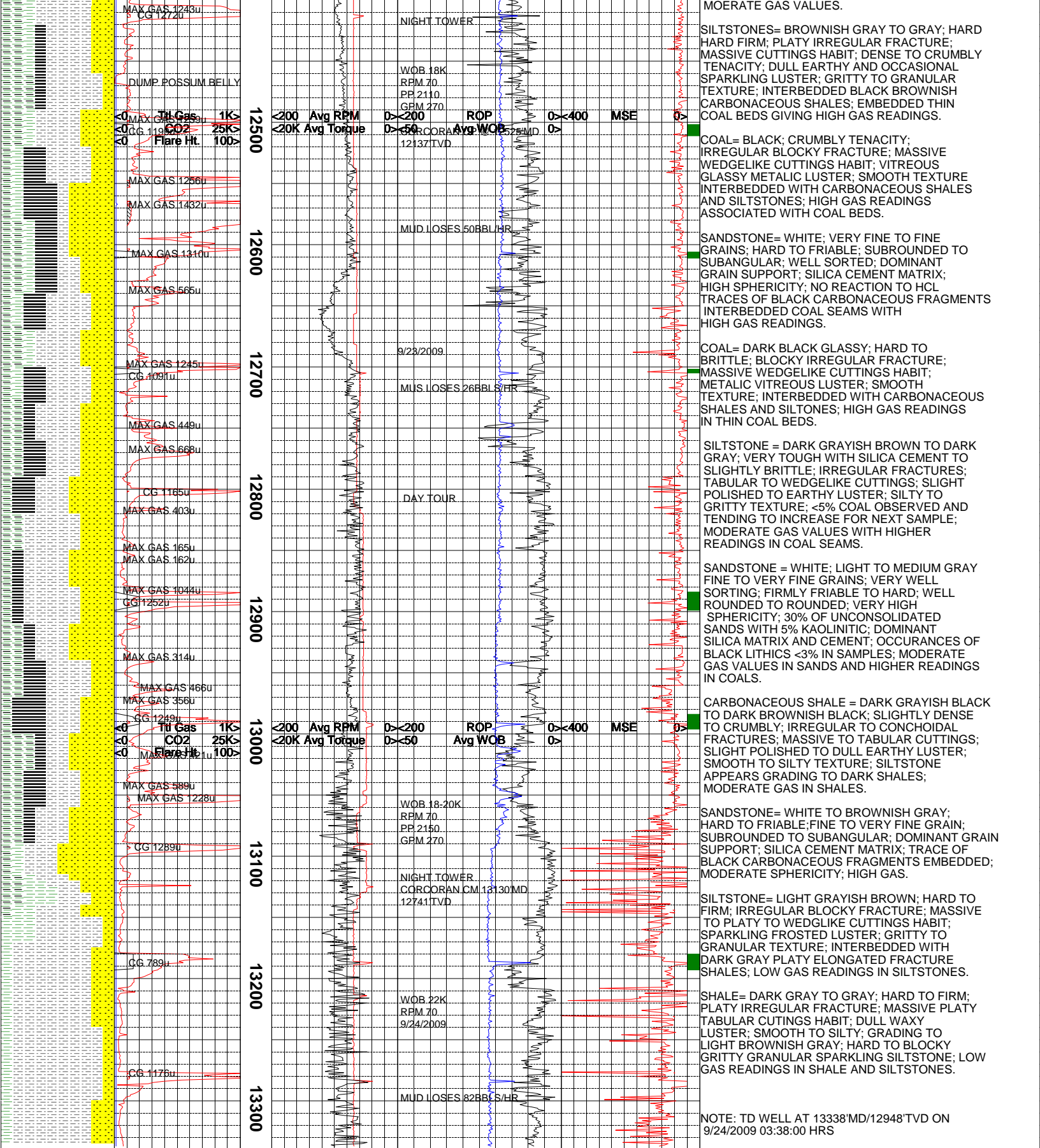
CARBONACEOUS SHALE = DARK GRAYISH BLACK TO MEDIUM GRAY; DENSE TO BRITTLE; IRREGULAR TO CONCHOIDAL FRACTURES; MASSIVE TO WEDGELIKE CUTTINGS; EARTHY TO SLIGHT RESINOUS LUSTER; SILTY TO SMOOTH TEXTURE; MODERATE GAS WITH COAL SEAMS.

SANDSTONE = BROWN TO GRAYISH WHITE WITH UNCONSOLIDATED WHITE XL'S; FINE TO VERY FINE GRAINS; WELL SORTED; ROUNDED; HIGH SPHERICITY; VERY FIRM TO FRIABLE; HIGH SILICA CONTENT; ABUNDANT QUARTZ XL'S; GRAIN SUPPORTED WITH SMALL % CALCITE CEMENT PRESENT; 5% KAOLINITIC SANDS; 5-8% COAL OBSERVED; MODERATE TO HIGH GAS VALUES WITH SANDSTONES AND COAL SEAMS.

SILTSTONE = DARK GRAY TO LIGHT GRAYISH BROWN; BRITTLE TO CRUNCHY; IRREGULAR TO CONCHOIDAL FRACTURES; MASSIVE TO WEDGELIKE CUTTINGS; DULL TO SLIGHT SPARKLY LUSTER; GRITTY TO SILTY TEXTURE 5-8% COAL OBSERVED; SILTSTONE APPEARS GRADING TO DARKER SHALES; MODERATE GAS IN SILTSTONE WITH HIGHER GAS IN COAL.

COAL = DARK GRAYISH BLACK TO BLACK; BRITTLE TO PULVERULENT; IRREGULAR TO PLANAR FRACTURES; TABULAR TO ELONGATED; SLIGHT WAXY TO EARTHY LUSTER; SMOOTH TEXTURE; INTERBEDDED IN CARBONACEOUS SHALES AND SILTSTONES; SILTSTONES ARE GRADING TO SHALES; 5% KAOLINITIC SANDS OBSERVED; HIGHER GAS VALUES IN COAL SEAMS.

CARBONACEOUS SHALE = DARK GRAYISH BLACK BRITTLE TO CRUNCHY; IRREGULAR TO SPLINTERY FRACTURES; ELONGATED TO TABULAR CUTTINGS; EARTHY TO SLIGHT POLISHED LUSTER; SLIGHTLY GRITTY TO SILTY TEXTURE; OCCURS WITH SILTSTONES AND SANDSTONES ALTERNATING THICKNESS;



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