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Houston, TX
(281) 784-5500
Bakersfield, CA
(661) 328-1595
New Iberia, LA
(337) 364-2322
Anchorage, AK
(907) 561-2465

Drilling Dynamics MD

COMPANY ExxonMobil Production

WELL FRU197-28A6

FIELD FREEDOM RANCH UNIT

REGION ROCKIES

COORDINATES LAT: 39.934490000
LON: 108.295893000

ELEVATION GL = 6,082'
KB = 6,109'

COUNTY, STATE RIO BLANCO, COLORADO

API INDEX 051031163400

SPUD DATE 07/10/2010

CONTRACTOR HELMRICH AND PAYNE

CO. REP. RICKY T. OWENS

RIG/TYPE 215 / FLEX 3

LOGGING UNIT MLU 051

GEOLOGISTS GEORGE BAKER
DEVIN CLAAR

ADD. PERSONS BILL JOHANNING
PATRICIA ORTIZ

CO. GEOLOGIST MELANIE A. BIGGS

LOG INTERVAL

CASING DATA

DEPTHS: 3,600' TO 12,191'

16.0" AT 120'

DATES: 07/10/2010 TO 7/30/2010

10.75" AT 3,603'

SCALE: 1" = 100'

4.50" AT 12,191'

AT

MUD TYPES

HOLE SIZE

LSND TO 12,191'

14.75" TO 3,603'

TO

8.75" TO 12,191'

TO

TO

TO

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	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

<0 Ttl Gas 2K>
units

<0 CO2 20K>
ppm

<0 Flare Ht. 100>
ft

Depth

<150 Avg RPM 0><200 ROP 0><400 MSE 0>

ft/hr

psi

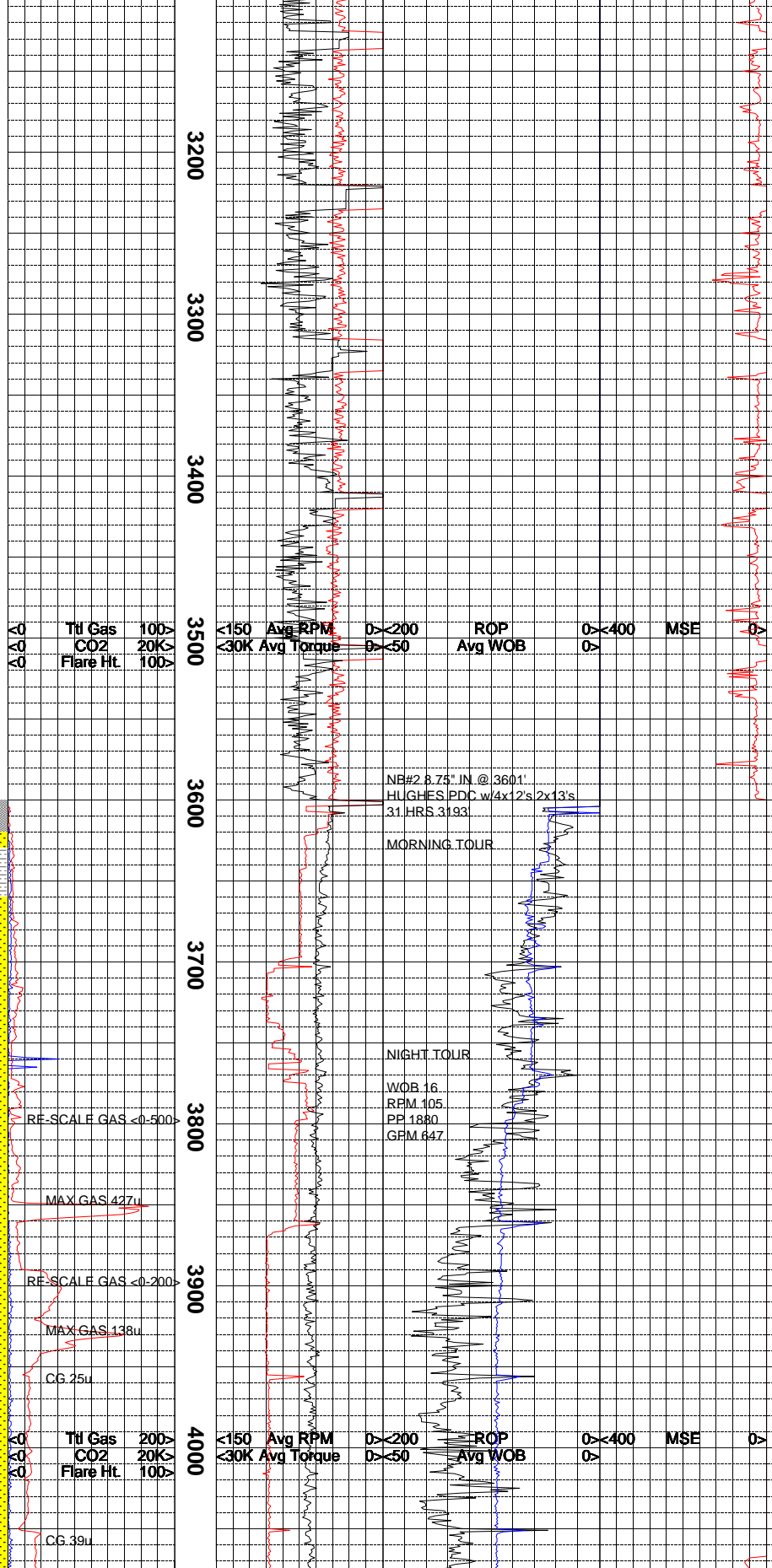
<30K Avg Torque 0><50 Avg WOB 0>

FTLBS

klbs

MGS

Remarks
Survey Data, Mud Reports, Other Info.



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.

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

CO2 IS CALIBRATED TO A TEST GAS COMPOSED OF 100000 PPM

CONNECTION GAS, TRIP GAS, AND WIPER GAS ARE NOTED ON THE MUDLOG, FLARE HEIGHTS AND DEPTHS OF GAS BUSTER USAGE ARE ALSO NOTED.

EARLY CONNECTION GASES REPRESENTING UP HOLE GAS INTERVALS BLEEDING INTO THE BOREHOLE ARE COMMON IN THE PRODUCTION INTERVAL.

EVIDENCE OF FRACTURE FILL IS NOTED ON THE LOG USING THE LITHOLOGY SYMBOL FOR METAMORPHICS. THE 10% DOES NOT REPRESENT 10% FRACTURE FILL IN SAMPLE. IT ONLY INDICATES THAT FRACTURE FILL HAS BEEN OBSERVED OVER THE INTERVAL.

CANRIG WELL SERVICE COMMENCED FULL LOGGING OPERATIONS ON 07/17/2010 @ 13:00 HRS AT A DEPTH OF 3,605'

SURVEY DATA AT 6,794' MD
INCLINATION : 00.15
AZIM: 190.79
TVD: 6,638.22'

SHALE = VARICOLORED; MEDIUM GRAY TO MAROON; LT YELLOW TO LIGHT BROWN; FIRM; SLI PLATY CUTTINGS; IRREGULAR TO PLANAR FRACTURE; SLI CALCAREOUS; VERY FINELY MICACEOUS; SILTY IN PART; GRADING TO SILTSTONE; SME ISOLATED QUARTZ GRAINS; DULL TO WAXY LUSTER; SMOOTH TO ROUGH TEXTURE; TRACE AMTS OF FINE GRAINED SANDSTONE.

SANDSTONE = DOM LIGHT GRAY; SME REDBRN STAINED SPECIMENS; MOD HARD; FINE TO V FINE GRAINED; ANGULAR TO SUBROUNDED; GRAIN SUPPORTED; CALCITE CEMENT; LOW TO MOD SPHERICITY; 5% BLACK GRAINS; TIGHT TO POOR VISIBLE POROSITY; NO GAS INCREASES.

SILTSTONE= VARIOUS COLORS, LIGHT GRAY TO BLUISH GRAY, PURPLE, YELLOWS TO BURNT ORANGES, VERY LITE BROWN TO MEDIUM BROWN; BRITTLE TO CRUMBLY TENACITY; DOMINANTLY IRREGULAR, BLOCKY TO SUB BLOCKY, SUB PLANAR FRACTURE; SUB PLATY TO TABULAR CUTTINGS HABIT; DULL TO EARTH WITH OCCASIONAL SPARKLING LUSTER; SILTY TO GRITTY TEXTURE.

SHALE= VERY LITE GRAY TO MEDIUM GRAY, OCCASIONAL YELLOW HUES; DENSE TO TOUGH TENACITY; PLANAR TO IRREGULAR FRACTURE; PLATY TO SUB TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO SMOOTH TEXTURE.

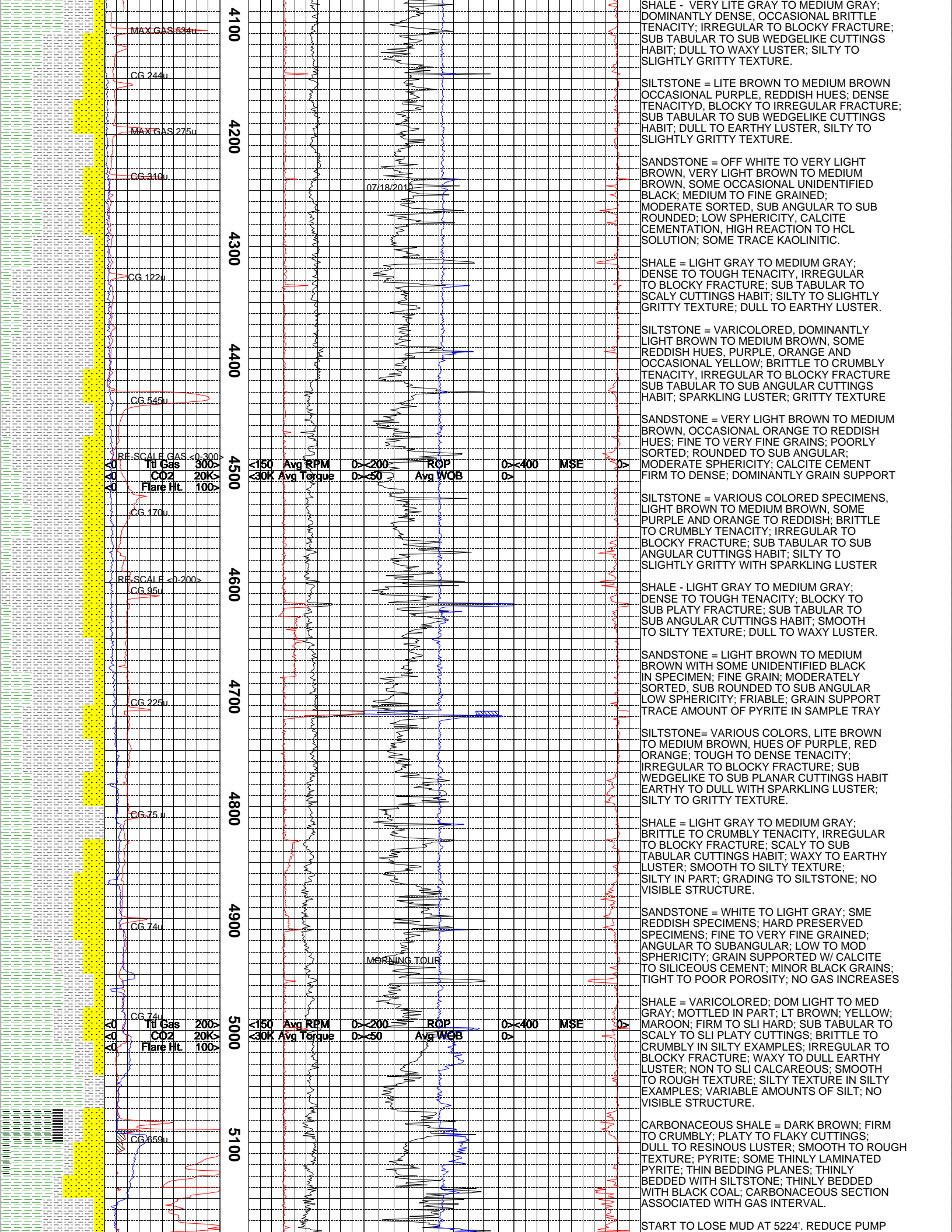
SANDSTONE = DOMINANTLY OFF WHITE, SOME VERY LIGHT GRAY HUES TO VERY LIGHT BROWN HUES; FINE TO VERY FINE GRAINS; MODERATE TO WELL SORTED, SUB ROUNDED TO SUB ANGULAR; LOW SPHERICITY; FRIABLE; CALCITE SUPPORTED, WITH MODERATE RE ACTION TO HCL.

SILTSTONE = VARICOLORED, MEDIUM BROWN TO LIGHT BROWN, PURPLE AND YELLOW HUES, OCCASIONAL GREENS; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; EARTHY TO SLIGHTLY GRITT SOME SPARKLING LUSTER THROUGHOUT.

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<30K Avg Torque 0><50 Avg WOB 0>

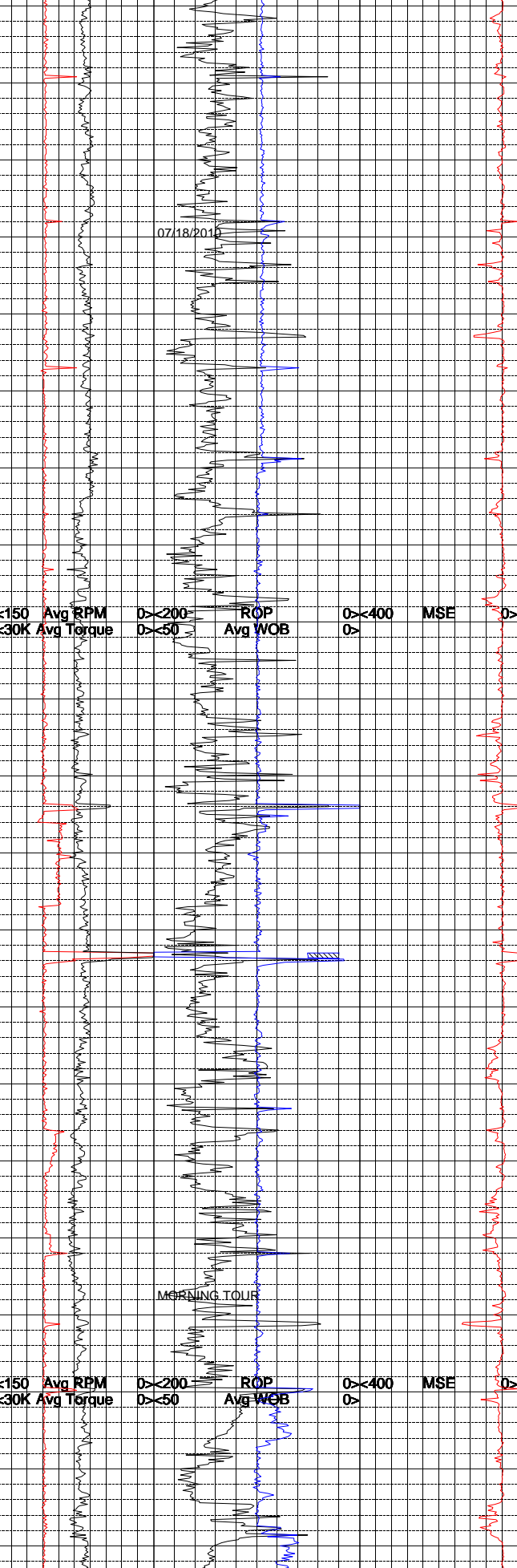
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Ttl Gas 200K
CO2 20K
Flare Ht. 100



MAX GAS: 534u
 CG: 244u
 MAX GAS: 275u
 CG: 310u
 CG: 122u
 CG: 545u
 RE-SCALE GAS <0-300>
 Ti Gas 800V
 CO2 20K
 Flare Hit 100V
 CG: 170u
 RE-SCALE <0-200>
 CG: 95u
 CG: 225u
 CG: 75u
 CG: 74u
 CG: 74u
 CG: 659u

4100
 4200
 4300
 4400
 4500
 4600
 4700
 4800
 4900
 5000
 5100



SHALE - VERY LITE GRAY TO MEDIUM GRAY; DOMINANTLY DENSE, OCCASIONAL BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO WAXY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE.

SILTSTONE = LITE BROWN TO MEDIUM BROWN OCCASIONAL PURPLE, REDDISH HUES; DENSE TENACITY, BLOCKY TO IRREGULAR FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER, SILTY TO SLIGHTLY GRITTY TEXTURE.

SANDSTONE = OFF WHITE TO VERY LIGHT BROWN, VERY LIGHT BROWN TO MEDIUM BROWN, SOME OCCASIONAL UNIDENTIFIED BLACK; MEDIUM TO FINE GRAINED; MODERATE SORTED, SUB ANGULAR TO SUB ROUNDED; LOW SPHERICITY, CALCITE CEMENTATION, HIGH REACTION TO HCL SOLUTION; SOME TRACE KAOLINIC.

SHALE = LIGHT GRAY TO MEDIUM GRAY; DENSE TO TOUGH TENACITY, IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SCALY CUTTINGS HABIT; SILTY TO SLIGHTLY GRITTY TEXTURE; DULL TO EARTHY LUSTER.

SILTSTONE = VARICOLORED, DOMINANTLY LIGHT BROWN TO MEDIUM BROWN, SOME REDDISH HUES, PURPLE, ORANGE AND OCCASIONAL YELLOW; BRITTLE TO CRUMBLY TENACITY, IRREGULAR TO BLOCKY FRACTURE SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SPARKLING LUSTER; GRITTY TEXTURE

SANDSTONE = VERY LIGHT BROWN TO MEDIUM BROWN, OCCASIONAL ORANGE TO REDDISH HUES; FINE TO VERY FINE GRAINS; POORLY SORTED; ROUNDED TO SUB ANGULAR; MODERATE SPHERICITY; CALCITE CEMENT FIRM TO DENSE; DOMINANTLY GRAIN SUPPORT

SILTSTONE = VARIOUS COLORED SPECIMENS, LIGHT BROWN TO MEDIUM BROWN, SOME PURPLE AND ORANGE TO REDDISH; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SILTY TO SLIGHTLY GRITTY WITH SPARKLING LUSTER

SHALE - LIGHT GRAY TO MEDIUM GRAY; DENSE TO TOUGH TENACITY; BLOCKY TO SUB PLATY FRACTURE; SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SMOOTH TO SILTY TEXTURE; DULL TO WAXY LUSTER.

SANDSTONE = LIGHT BROWN TO MEDIUM BROWN WITH SOME UNIDENTIFIED BLACK IN SPECIMEN; FINE GRAIN; MODERATELY SORTED, SUB ROUNDED TO SUB ANGULAR LOW SPHERICITY; FRIABLE; GRAIN SUPPORT TRACE AMOUNT OF PYRITE IN SAMPLE TRAY

SILTSTONE= VARIOUS COLORS, LITE BROWN TO MEDIUM BROWN, HUES OF PURPLE, RED ORANGE; TOUGH TO DENSE TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB WEDGELIKE TO SUB PLANAR CUTTINGS HABIT EARTHY TO DULL WITH SPARKLING LUSTER; SILTY TO GRITTY TEXTURE.

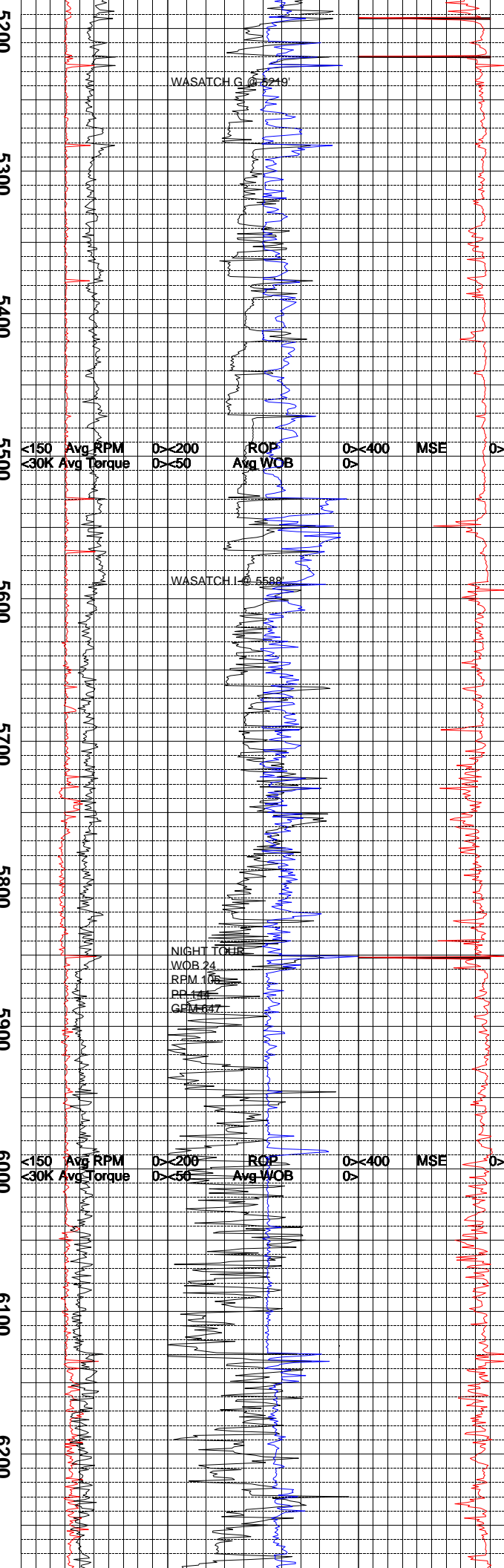
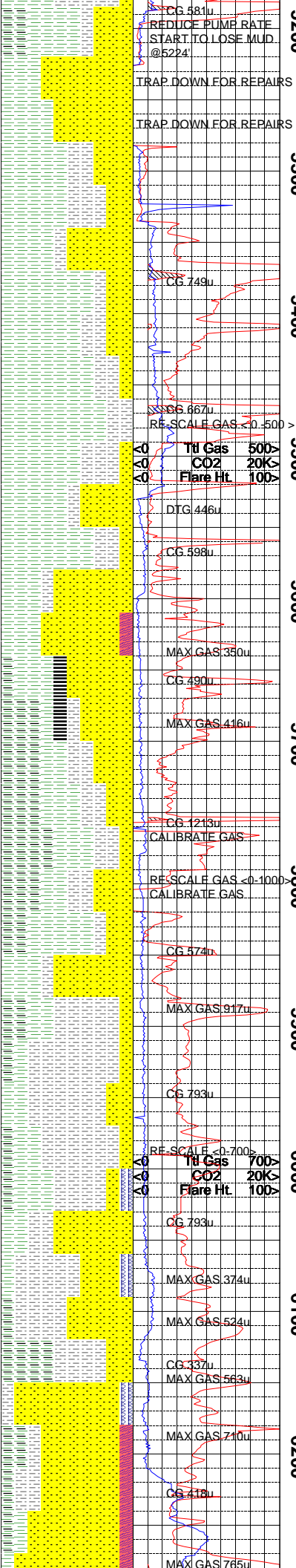
SHALE = LIGHT GRAY TO MEDIUM GRAY; BRITTLE TO CRUMBLY TENACITY, IRREGULAR TO BLOCKY FRACTURE; SCALY TO SUB TABULAR CUTTINGS HABIT; WAXY TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; SILTY IN PART; GRADING TO SILTSTONE; NO VISIBLE STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY; SME REDDISH SPECIMENS; HARD PRESERVED SPECIMENS; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; LOW TO MOD SPHERICITY; GRAIN SUPPORTED W/ CALCITE TO SILICEOUS CEMENT; MINOR BLACK GRAINS; TIGHT TO POOR POROSITY; NO GAS INCREASES

SHALE = VARICOLORED; DOM LIGHT TO MED GRAY; MOTTLED IN PART; LT BROWN; YELLOW; MAROON; FIRM TO SLI HARD; SUB TABULAR TO SCALY TO SLI PLATY CUTTINGS; BRITTLE TO CRUMBLY IN SILTY EXAMPLES; IRREGULAR TO BLOCKY FRACTURE; WAXY TO DULL EARTHY LUSTER; NON TO SLI CALCAREOUS; SMOOTH TO ROUGH TEXTURE; SILTY TEXTURE IN SILTY EXAMPLES; VARIABLE AMOUNTS OF SILT; NO VISIBLE STRUCTURE.

CARBONACEOUS SHALE = DARK BROWN; FIRM TO CRUMBLY; PLATY TO FLAKY CUTTINGS; DULL TO RESINOUS LUSTER; SMOOTH TO ROUGH TEXTURE; PYRITE; SOME THINLY LAMINATED PYRITE; THIN BEDDING PLANES; THINLY BEDDED WITH SILTSTONE; THINLY BEDDED WITH BLACK COAL; CARBONACEOUS SECTION ASSOCIATED WITH GAS INTERVAL.

START TO LOSE MUD AT 5224'. REDUCE PUMP



WASATCH G PLACED AT 5219' MD

SANDSTONE = ABUNDANT LOOSE GRAINS; WHITE GRAY TO WHITE PRESERVED CLUSTERS; LOWER MEDIUM TO FINE GRAINED; ANGULAR TO SUBANGULAR; MOD SORTED; SMC GREEN GRs; MINOR AMOUNTS OF LOOSE WHITE KAOLIN CLAY IN SAMPLES; DOM CALCAREOUS CEMENT; NO SAMPLE SHOWS.

SHALE = VARICOLORED; LT TO MEDIUM GRAY; SMC GREENISH GRAY; LT BROWN TO YELLOW; SOME DARK BROWN TO DARK GRAY CARB EXAMPLES; CRUNCHY TO MOD HARD; SLI PLATY CUTTINGS; HABIT; SLI TO MODERATELY CALCAREOUS; SILTY IN PART; ROUGH TO SILTY TEXTURE; NO VISIBLE STRUCTURE.

SILTSTONE = LT GRAY TO LT GREENISH GRAY; SMC VARICOLORED EXAMPLES FROM RED BRN TO MAROON; HARD TO CRUNCHY; MASSIVE TO PLATY CUTTINGS; SILTY TO OCC GRITTY TEXT SL CALCAREOUS; CALCITE CEMENT; IRREGULAR FRACTURE; VF MICA; OCC SPECKLED WITH CARBONACEOUS MATERIAL; NO VISIBLE STRUCTURE.

SHALE = BECOMING LIGHT TO MEDIUM GRAY; DECREASE IN MOTTLED SPECIMENS; FIRM TO MODERATELY HARD TO CRUNCHY; PLATY TO WEDGELIKE CUTTINGS; PLANAR TO IRREGULAR FRACTURE; SLI CALCAREOUS; OCC CARBONACEOUS MATERIAL; ROUGH TO SILTY TEXTURE; DECREASE IN AMT OF SILT; VERY FINE MICACEOUS; VERY FINE PYRITE; CLAY; NO VISIBLE STRUCTURE.

SANDSTONE = MINOR AMT OF LOOSE GRAINS; LIGHT GRAY TO LIGHT BROWN; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; MOD WELL SORTED; LOW TO MOD SPHERICITY; GRAIN SUPPORTED; DOM CALCITE CEMENT; TRACE GREEN GRAINS; SMC ELONGATED CARB MATERIAL IN MATRIX; SMC COARSE CALCITE ADHERING TO SPECIMENS IN THE 5610' TO 5649' SAMPLE- PROBABLE FRACTURE FILL; SOME COAL ADHERING TO CLUSTERS; ASSOC WITH GAS SHOWS.

SHALE = DARK GRAY TO DARK BROWN; FIRM TO BRITTLE; PLATY TO FLAKY CUTTINGS; DULL EARTHY TO SLI RESINOUS LUSTER; PLANAR TO BLOCKY FRACTURE; NON CALC; CARBONACEOUS SHALE IN PART; SMOOTH TO ROUGH TEXTURE; SMC BLEEDING GAS IN CARBONACEOUS SHALE EXAMPLES.

SILTSTONE = DARK GRAY TO VERY DARK BROWN; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER; GRITTY TO SLIGHTLY SILTY TEXTURE.

SANDSTONE = LIGHT BROWN TO MEDIUM BROWN TO LIGHT GRAY TO WHITE; MODERATE TO POOR SORTING; SUB-ROUNDED TO SUB ANGULAR; LOW SPHERICITY; CALCITE CEMENTATION, GRAIN SUPPORTED; DOMINANTLY FRIABLE WITH OCCASIONAL FRIABLE.

SHALE = LIGHT GRAY TO MEDIUM GRAY, WITH BLUSH HUES; BRITTLE TO CRUMBLY TENACITY IRREGULAR TO BLOCKY FRACTURE; DOMINANTLY SUB TABULAR WITH SUB WEDGELIKE; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE. KAOLINITICS PRESENT IN SAMPLE TRAY.

CARBONACEOUS SHALE = VERY DARK BROWN TO BLACK; TOUGH TO DENSE TENACITY; BLOCK TO IRREGULAR, OCCASIONAL PLANAR FRAC; SCALY TO SUBTABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; GRITTY TO ABRASIVE TEXTURE.

SILTSTONE = VERY DARK BROWN; TOUGH TO DENSE TENACITY, IRREGULAR TO BLOCKY FRACTURE; SUB PLATY TO SUB TABULAR CUTTINGS HABIT; DULL TO WAXY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE.

SANDSTONE = LIGHT GRAY TO DARK GRAY, LIGHT BROWN TO MEDIUM BROWN, VARICOLORED UNIDENTIFIED INCLUSIONS; FINE TO VERY FINE GRAINS, WELL SORTED; SUB ROUNDED TO SUB ANGULAR; LOW SPHERICITY; MODERATELY HARD; GRAIN SUPPORTED; HIGH REACTION TO HCL.

SHALE = LIGHT GRAY TO MEDIUM GRAY; CRUNCHY TO PULVERULENT; IRREGULAR TO BLOCKY WITH OCCASIONAL PLANAR; MASSIVE SUB TABULAR TO SUB WEDGE LIKE; WAXY TO EARTHY LUSTER; SILTY TO SMOOTH TEXTURE.

CG 481u

REDUCE PUMP RATE
START TO LOSE MUD
@ 5224'

TRAP DOWN FOR REPAIRS

TRAP DOWN FOR REPAIRS

CG 749u

CG 867u
RE SCALE GAS <0-500 >

TR Gas 500Y
CO2 20K
Flare Hit 100Y

DTG 446u

CG 598u

MAX GAS 350u

CG 490u

MAX GAS 416u

CG 1213u

CALIBRATE GAS

RE SCALE GAS <0-1000 >
CALIBRATE GAS

CG 574u

MAX GAS 917u

CG 793u

RE SCALE GAS <0-700 >
TR Gas 700Y
CO2 20K
Flare Hit 100Y

CG 793u

MAX GAS 374u

MAX GAS 524u

CG 337u

MAX GAS 563u

MAX GAS 710u

CG 418u

MAX GAS 765u

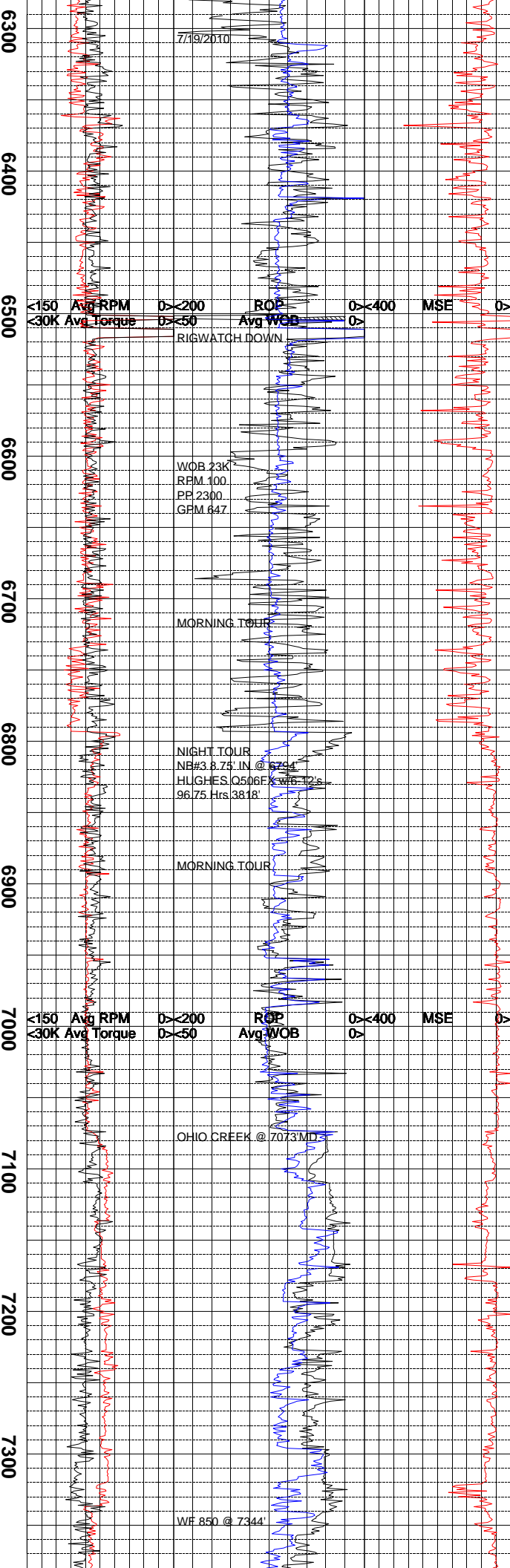
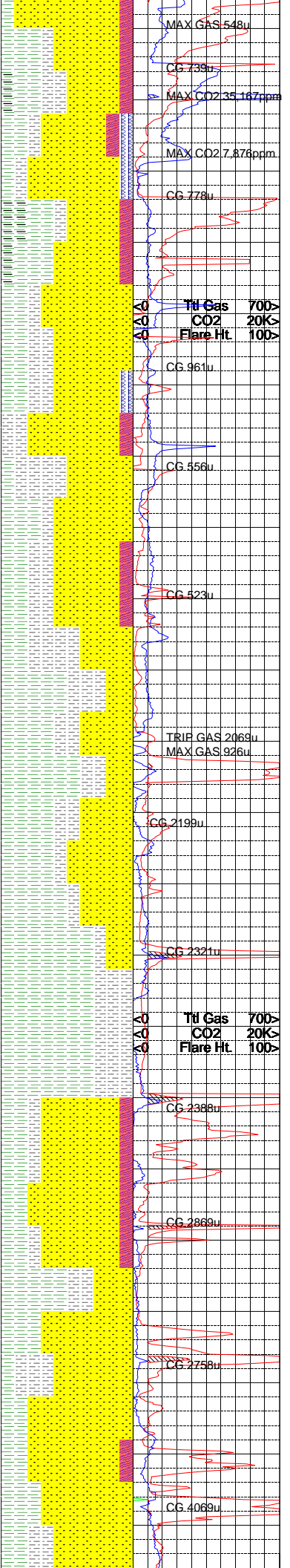
<150 Avg RPM > >> <200 ROP > >> <400 MSE > >>
<30K Avg Torque > >> <50 Avg WOB > >>

WASATCH G @ 5219'

WASATCH I @ 5588'

NIGHT TORQUE
WOB 24
RPM 106
ROP 14
GMA 447

<150 Avg RPM > >> <200 ROP > >> <400 MSE > >>
<30K Avg Torque > >> <50 Avg WOB > >>



SANDSTONE = VERY LIGHT GRAY TO DARK GRAY; ABUNDANT LOOSE GRAINS; VERY FINE TO FINE GRAINED; LOW TO MOD SPHERICITY; ANGULAR TO SUBANGULAR; CALCAREOUS TO SILICEOUS CEMENT; SME CARBONACEOUS TO COALY LAMINATIONS; TRACE LT GREEN GRAINS; 5% DARK GRAINS; MODERATE TO HIGH REACTION IN DILUTE HCL; COARSE CALCITE-PROBABLE FRACTURE FILL OBSERVED IN THE 6,180' TO 6,380' SAMPLES; ASSOC WITH MINOR GAS SHOWS.

SHALE = LIGHT GRAY TO LT GREENISH GRAY; SOME DARK GRAY TO DARK BROWN CARB EXAMPLES; SLI TO VERY HARD; PLATY TO WEDGELIKE TO ELONGATED CUTTINGS; PLANAR TO IRREGULAR FRACTURE; SLI TO MODERATELY CALCAREOUS IN SILTY SPECIMENS; DULL EARTHY TO WAXY LUSTER IN LIGHT GRAY SPECIMENS; BCMG DULL EARTHY TO RESINOUS IN CARBONACEOUS EXAMPLES; ROUGH TO SILTY TEXTURE; VERY FINE MICA; VERY FINE TO THIN CARBONACEOUS LAMINATIONS; SME SILTSTONE TO VERY FINE GRAINED SANDSTONE LAMINATIONS; THINLY BEDDED W/SILTSTONE.

SANDSTONE = MODERATE AMOUNT OF LOOSE GRAINS; WHITE TO OFF WHITE TO LIGHT GRAY ABUNDANT HARD PRESERVED SPECIMENS; LOWER MEDIUM TO FINE GRAINED; MOD SRDT; ANGULAR TO SUBANGULAR; GRAIN SUPPORTED; DOM CALCITE CEMENT WITH MINOR SILICEOUS WHITE CLAY FILL; SME BLACK CARBONACEOUS TO COALY LAMINATIONS; 3 TO 5% BLACK UNID GRAINS; COARSE CALCITE-PROBABLE FRACTURE FILL OBSERVED IN 6420' TO 6480' SAMPLES AND THE 6570' TO 6600' SAMPLES.

SILTSTONE = LT TO MEDIUM GRAY; SME BRN GRAY TO REDDISH BROWN; VERY HARD; PLATY TO SLI NODULAR CUTTINGS; IRREGULAR TO BLOCKY FRACTURE; SLI SPARKLING LUSTER WHEN DRIED; SILTY TO GRITTY TEXTURE; SOME COARSE BROWN MICA; GRADING TO VERY FINE GRAINED SANDSTONE; CEMENT IS CALC/SILICEOUS; THINLY BEDDED WITH SHALE AND SANDSTONE.

TRIP OUT AT 6794' TO CHANGE OUT BHA.

SHALE = LIGHT GRAY TO MEDIUM LT GRAY; MODERATELY HARD TO BRITTLE; IRREGULAR TO PLANAR FRACTURE; PLATY TO SLI FLAKY CUTTINGS; DULL TO EARTHY TO SLI WAXY LUSTER; ROUGH TO SMOOTH TEXTURE; VF MICA; SLI SILTY; NON TO VERY SLI CALC; NO VISIBLE STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY; HARD PRESERVED SPECIMENS; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; VERY CALCAREOUS IN DILUTE HCL; DOM CALCITE CEMENT; GRAIN SUPPORTED; MINOR AMT OF LITHIC FRAGMENTS- RED TO BLACK GRAINS; POOR POROSITY; THINLY BEDDED; NO GAS INCREASES.

SILTSTONE = MOTTLED IN PART; REDBROWN; LT GRAY; MOTTLED GRAY-REDBROWN; HARD TO CRUMBLY; MASSIVE CUTTINGS; IRREGULAR FRACTURE; DULL EARTHY LUSTER; SILTY TO GRITTY TEXTURE; NON TO VSL CALCAREOUS; THINLY BEDDED WITH SHALE.

OHIO CREEK @ 7073' MD 6917.22 TVD

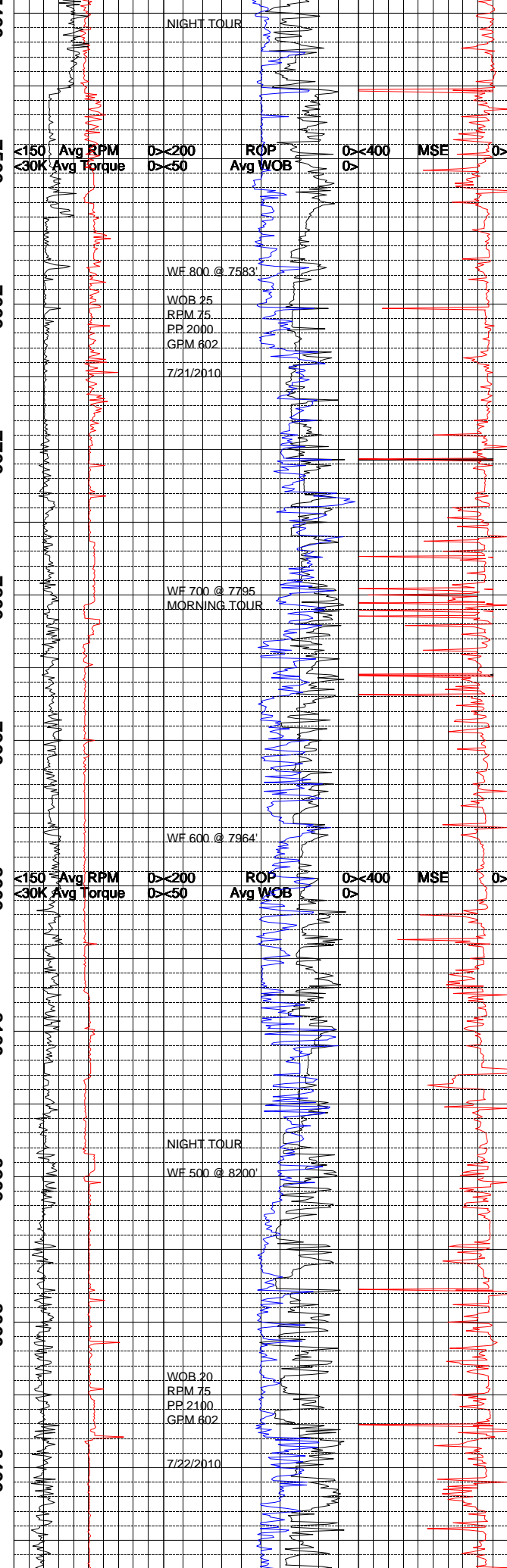
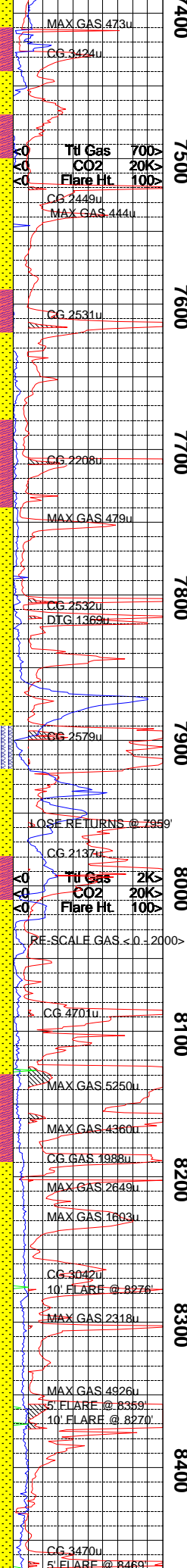
SANDSTONE = ABUNDANT LOOSE GRAINS; LT GRAY TO OFF WHITE PRESERVED SPECIMENS; DOM FINE TO VERY FINE GRAINED; SME UPPER TO LOWER GRAINED CLUSTERS; SME FRIABLE EXAMPLES; BECOMING MEDIUM GRAINED WITH DEPTH; ANGULAR TO SUBANGULAR; SILICEOUS CEMENT W/SME WHITE CLAY FILL; SLI CALC; OCC SPECKLED WITH LITHIC FRAGMENTS AND UNIDENTIFIED BLACK GRAINS; COARSE CALC CRYSTALS- PROBABLE FRACTURE FILL; ASSOC WITH GAS SHOWS.

SHALE = LT GREENISH GRAY TO LT GRAY; CRUMBLY TO HARD IN SILICEOUS SPECIMENS; SLI PLATY TO MASSIVE CUTTINGS; IRREGULAR FRACTURE; NON CALCAREOUS; DULL EARTHY LUSTER; SMOOTH TEXTURE; SANDY SHALE W/ VARIABLE AMOUNTS OF VERY FINE SAND; SME VF SANDSTONE EDGES; NO VISIBLE STRUCTURE

SANDSTONE = OFF WHITE TO LIGHT GRAY; SME VERY DARK FINE GRAINED SPECIMENS; DOM UPPER TO LOWER MEDIUM GRAINED; GRAIN SUPPORTED; ANGULAR TO SUBROUNDED; DOM CALCITE CEMENT W/SOME LT GREEN SILICEOUS CLAY FILL; COM SPECKLED WITH BLACK GRs; COARSE QUARTZ AND CALCITE- FRACTURE FILL IN THE 7290' TO 7320' SAMPLES; ASSOC W/ GAS SHOWS.

SILTSTONE = LT TO MEDIUM GRAY; GREENISH GRAY; HARD SLI NODULAR TO PLATY TO MASSIVE CTGS; IRREGULAR FRACTURE; DULL

TO SPARKLING LUSTER; MOD CALCAREOUS;



SANDSTONE = LT BLUISH GRAY, SL OFF WHITE TR SALT AND PEPPER APPEARANCE; VF GRADING TO FINE GRAIN; FAIR TO POOR SRD SUB ANGULAR IN PART; VERY LOW SPHERICITY FRIABLE TO FIRM TO HARD; SILICA MATRIX CEMENT, WEAK CALCAREOUS CEMENT; POOR VISUAL INTERGRANULAR POROSITY; TRACE BLACK LITHIC IMBEDDED; SOME COARSE CALCITE IN SAMPLE TRAY, CONNECTION GAS BETWEEN 2500 UNITS AND 3500 UNITS.

WF 800 @ 7,583'

SANDSTONE = ABUNDANT LOOSE GRAINS, OFF WHITE, DULL FROSTED TO TRANSLUCENT, SME LT BLUISH GRAY; VF GRAIN, WELL SRD; SUB ROUND; MOD SPHERICITY; VERY FRIABLE, FRIABLE, WEAK GRAIN SUPPORT; TRACE CALC CEMENT, WEAK HCL REACTION; V GOOD VISUAL INTER GRANULAR POROSITY; TRACE LT GRY SILTSTONE LAMINATE; SPECKLED BLACK CARBONACEOUS SHALE IMBEDDED; HIGH CONNECTION GASES.

SHALE = LT GREENISH GRY, LT GRYISH BRWN; CRUMBLY, CRUNCHY TO BRITTLE TENACITY; SUB BLOCKY, BLOCKY SLI PLANAR FRACTURE; WEDGELIKE, TABULAR CUTTINGS HABIT; DULL SUB WAXY LUSTER; SMOOTH CLAYEY TEXTURE; NO VISUAL STRUCTURE; TRACE CARBONACEOUS SHALE IN SAMPLE TRAY, TRACE LT BROWNISH SILTSTONE LAMINATE.

SANDSTONE = ABUNDANT LOOSE GRAINS; PRESERVED SPECIMENS OFF WHITE TO LT GRAY; HARD; FINE TO VERY FINE GRAINED; LOOSE LOWER MEDIUM GRAINS; ANGULAR TO SUBANGULAR; DOM SILICEOUS CEMENT W/ MINOR CALCITE AND WHITE CLAY FILL; 5% BLACK GRAINS- OCC SPECKLED SALT AND PEPPER APPEARANCE; THINLY BEDDED W/ SHALE AND SILTSTONE.

SANDSTONE = ABUNDANT LOOSE GRAINS- CAVINGS IN PART; LT TO MEDIUM GRAY; HARD PRESERVED SPECIMENS; DOM FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR LOW TO MOD SPHERICITY; MOD W SORTED; DOM SILICEOUS CEMENT W/ MINOR CALCITE; SME WHITE SILICEOUS CLAY FILL; MINOR AMT OF DARK LITHICS; ASSOCIATED WITH MINOR GAS SHOWS.

SANDSTONE = ABUNDANT LOOSE GRAINS; LT GRAY TO OFF WHITE; FINE TO VERY FINE GRAINED; LOOSE LOWER MEDIUM QUARTZ GRAINS; ANGULAR TO SUBANGULAR; OCC SALT AND PEPPER APPEARANCE WITH BLACK CARBONACEOUS MATERIAL AND LITHIC FRAGS; COARSE CALCITE- FRACTURE FILL IN THE 7980' TO 8010' SAMPLES; ASSOCIATED W/ MINOR GAS.

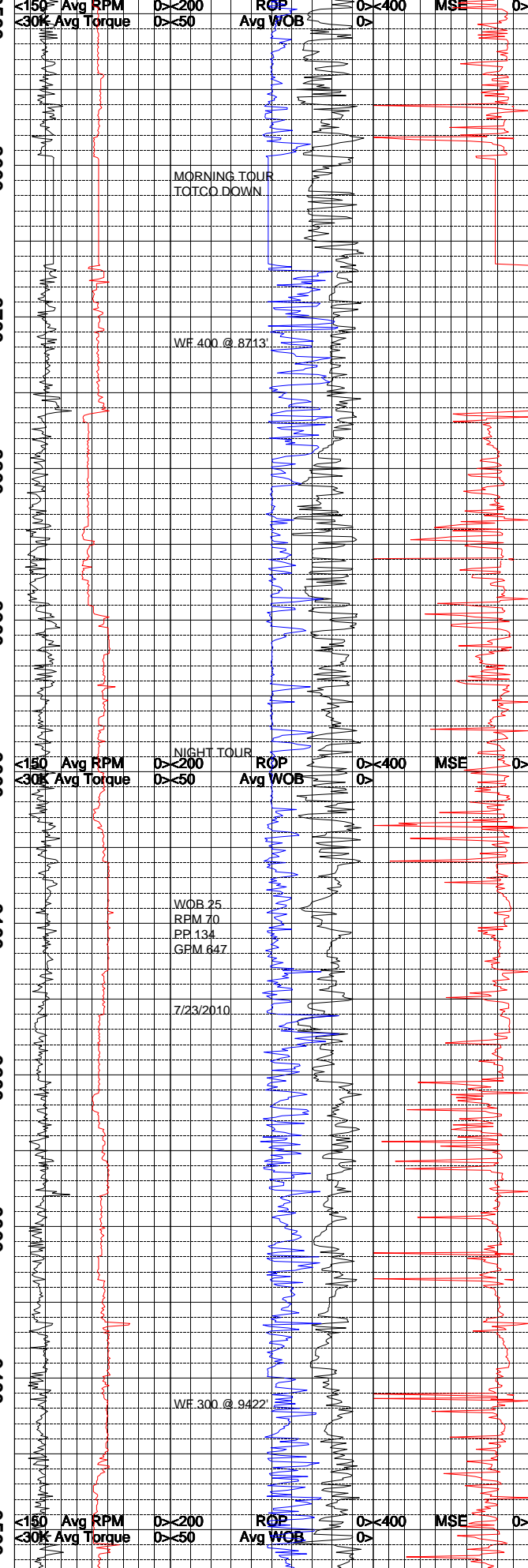
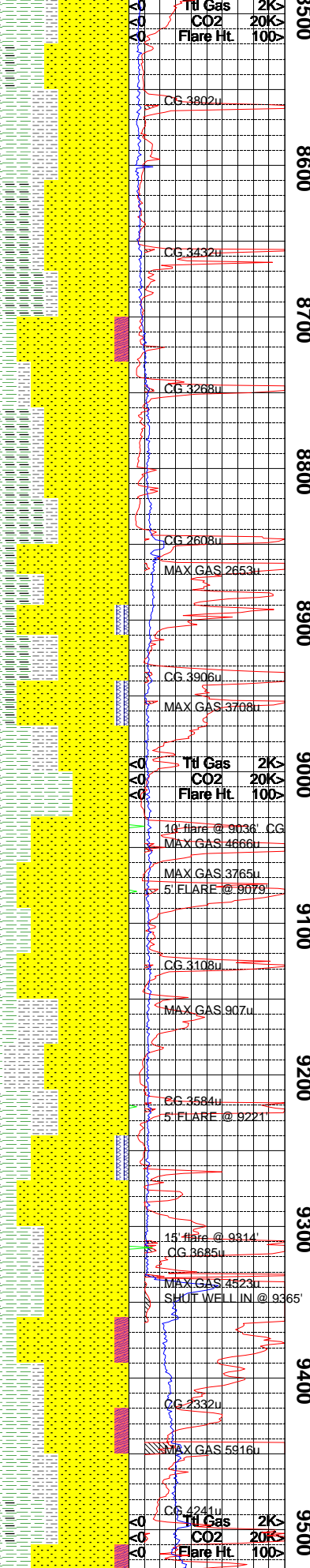
SILTSTONE = LT TO MEDIUM GRAY; HARD; SLI PLATY CUTTINGS; SME THIN FLAKY CUTTINGS; IRREGULAR FRACTURE; SILTY TO GRITTY TEXTURE; SILICEOUS/CALCITE CEMENT; VF CARBONACEOUS MATERIAL; TRACE PYRITE; NO VISIBLE STRUCTURE.

SANDSTONE = ABUNDANT LOOSE GRAINS; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; MOD WELL SORTED; SILICEOUS/ CALCAREOUS CEMENT; MINOR CLAY FILL; WHITE CALCITE- FRACTURE FILL MATERIAL ADHERING TO CLUSTERS IN THE 8120' TO 8150' SAMPLE; 5250 UNIT GAS SHOW.

SANDSTONE = ABUNDANT LOOSE GRAINS AND SMALL CLUSTERS, OFF WHITE, SME CLEAR TO TRANSLUCENT, TRACE SALT AND PEPPER APPEARANCE; VERY FINE TO FINE GRAIN; POOR TO FAIR SORTED; SUB ANGULAR GRADING TO SUB ROUND LOW SPHERICITY; WEAK GRAIN SUPPORT; SME SILICA MATRIX CEMENT, WHITE KAOLINITIC CEMENT; GOOD VISUAL INTER GRANULAR POROSITY; SPECKLED BLACK CARBONACEOUS SHALE / LITHIC IMBEDDED.

CARBONACEOUS SHALE = DARK BROWNISH BLACK, DARK GRAYISH BROWN; CRUMBLY TO CRUNCHY TENACITY; SUB BLOCKY, BLOCKY TO SLI IRREGULAR FRACTURE; WEDGELIKE TO TABULAR CUTTINGS HABIT; DULL, SUB WAXY TO WAXY LUSTER; GRITTY TO GRAINY TEXTURE TRACE GRAYISH BROWN SILTSTONE LAMINATE; TRACE BLACK LITHIC-COALY SPECKLED IMBEDDED; NO NOTED DEGASSING IN SAMPLE TRAY.

SANDSTONE = OFF WHITE, CLEAR TO TRNSLUCT LT BLUISH GRY, SME SALT AND PEPPER APPEARANCE, OCC SMALL CLUSTERS; UPPER VF TO LOWER FINE GRAIN; FAIR TO WELL SORTED; SUB ANGULAR GRADING TO SUB ROUND, LOW TO MOD SPHERICITY; TRACE FROSTED SURFACE FEATURES; EASILY FRIABLE



TO FRIABLE AND FIRM; KAOLINITIC CLAYEY CEMENT, SOME SILICA MATRIX CEMENT, LOW CALC CEMENT, LOW HCL REACTION, WEAK GRAIN SUPPORT; GOOD VIS INTER GRANULAR POROSITY; TRACE BLACK DISSEMINATED CARBONACEOUS SHALE IMBEDDED; VERY LITTLE DEGASSING IN SAMPLE TRAY.

SHALE = MEDIUM TO DARK GRAY; SME DARK BROWN EXAMPLES; CARBONACEOUS IN PART; FIRM; PLATY TO WEDGELIKE CUTTINGS; DULL EARTHY TO SLI RESINOUS LUSTER; IRREGULAR FRACTURE; NON CALCAREOUS; ROUGH TO SMOOTH TEXTURE; SME BLACK CARBONACEOUS LAMINATIONS; W/MINOR AMOUNTS OF LOOSE COAL IN SAMPLES.

SANDSTONE = ABUNDANT LOOSE GRAINS- CVGS IN PART; LOOSE GRAINS RANGE FROM LOWER COARSE TO FINE GRAINED; MEDIUM GRAY TO DARK GRAY TO DARK BROWN PRESERVED SPECIMENS; HARD PRESERVED SPECIMENS; SPECIMENS TEND TO BE THIN AND PLATY; SILICEOUS/CALCAREOUS CEMENT; ANGULAR TO SUBANGULAR; SME WHITE SILICEOUS CLAY FILL; COARSE CALCITE- FRACTURE FILL IN THE 8700' TO 8730' SAMPLE.

SHALE = MED TO DARK GRAY; CARBONACEOUS IN PART; FIRM; PLANAR TO SPLINTERY FRAC; WEDGELIKE TO PLATY TO FLAKY CUTTINGS; SME HARD SILICEOUS SPECIMENS; NON TO SLI CALCAREOUS; CARBONACEOUS LAMINATIONS ROUGH TO SMOOTH TEXTURE; DULL EARTHY LUSTER; THINLY BEDDED.

SANDSTONE = ABUNDANT LOOSE GRAINS; DOM FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; MOD WELL SORTED; CALC/ SILICEOUS CEMENT; GRAIN SUPPORTED; SME BLACK CARBONACEOUS LAMINATIONS; SME VERY HARD AND SILICEOUS EXAMPLES; THINLY BEDDED.

SHALE = MOD LT GRAY, LT BROWNISH GRAY, SME LT BRWN; CRUNCHY, CRUMBLY W/SME BRITTLE TO V HARD; SUB BLOCKY, BLOCKY, SME IRREGULAR FRACTURE; WEDGELIKE, SME FLAKY CUTTINGS HABIT; DULL, EARTHY OCC WAXY LUSTER; MOD SMOOTH GRADING TO GRITTY TEXTURE; NO VISIBLE OR DISTINGUISHING STRUCTURE; TRACE DARK BROWNISH BLACK CARBONACEOUS SHALE, NO VISUAL DEGASSING IN SAMPLE TRAY.

SANDSTONE = ABUNDANT LOOSE GRAINS, SOME SMALL CLUSTERS, CLEAR TO TRANSLUCENT, OFF WHITE, LT BLUISH GRAY, TRACE SALT AND PEPPER APPEARANCE; VF TO FINE GRAIN; WELL SORTED; SUB ANGULAR GRADING TO SUB ROUND; MODERATE SPHERICITY; EASILY FRIABLE, FRIABLE; WEAK GRAIN SUPPORT; SILICA MATRIX TO CALCAREOUS CEMENT; TR WEAK HCL REACTION; GOOD VISUAL INTER GRANULAR POROSITY; SME BLACK DISSEMINATE CARBONACEOUS SHALE/LITHIC IMBEDDED, NO VISUAL DEGASSING IN SAMPLE TRAY.

SANDSTONE = ABUNDANT LOOSE GRAINS, SMALL CLUSTERS, CLEAR TO TRANSLUCENT, TRACE SALT AND PEPPER APPEARANCE, LT BLUISH GRAY; UPPER VERY FINE TO FINE GRAIN; W SORTED; SUB ROUND IN PART, SOME SUB ANGULAR; MOD SPHERICITY; TRACE FROSTED FEATURES; EASILY FRIABLE TO FRIABLE; SMALL CLUSTERS POSSIBLE DUE TO PDC BIT; DOM SILICA MATRIX CEMENT, TRACE CALC CEMENT, WEAK HCL REACTION; GOOD VISUAL INTER GRANULAR POROSITY; TRACE BROWNISH BLACK LITHIC/CARBONACEOUS SHALE SPECKLED IMBEDDED.

DRILLED TO 9365'. GAINED 80 BARRELS. SHUT WELL IN. CIRCULATE OUT ON CHOKE FROM 9334' TO 9365'.

SANDSTONE = MEDIUM GRAY TO LT BROWN; ABUNDANT LOOSE GRAINS; DOM LOWER MEDIUM TO LOWER FINE GRAINED; ANGULAR TO SBANG; VERY HARD PRESERVED SPECIMENS; OCC SPECKLED WITH BLACK GRAINS; MOD SORTED; LOW SPHERICITY; DOM SILICEOUS CEMENT; TRACE CALCITE IN MATRIX; COARSE CALCITE FRACTURE FILL IN THE 9360'-9390' SAMPLE; ASSOCIATED WITH MAJOR GAS INCREASES.

SHALE = MEDIUM TO DARK GRAY; MOD HARD; CARBONACEOUS IN PART; SLI PLATY TO FLAKY CUTTINGS; SMOOTH TO ROUGH TEXTURE; IRREG FRACTURE; VARIABLE AMOUNTS OF SILT; DULL EARTHY TO SLI RESINOUS LUSTER; NON TO VSL CALCAREOUS.

SANDSTONE = ABUNDANT LOOSE GRAINS; ABUNDANT SAND CVGS; LOOSE GRAINS RANGE FROM UPPER MEDIUM TO FINE GRAINED; LT TO MEDIUM GRAY PRESERVED SPECIMENS; FINE GRAINED; WELL SORTED; ANGULAR TO SUBANGULAR; SILICEOUS CEMENT; ASSOC WITH GAS SHOWS.

MORNING TOUR TOTCO DOWN

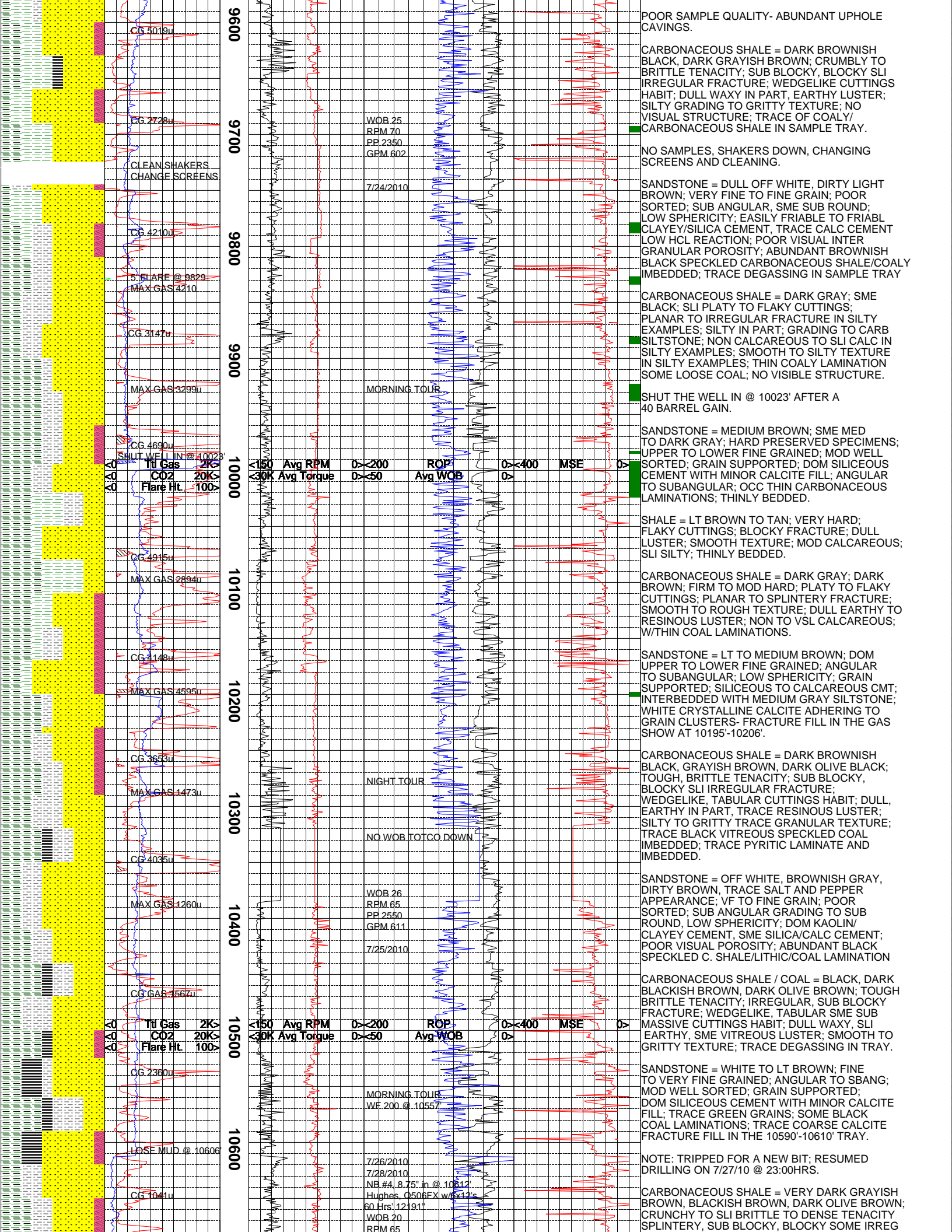
WF 400 @ 8713'

NIGHT TOUR

WOB 25
RPM 70
PP 134
GPM 647

7/23/2010

WF 300 @ 9422'



CG 5019u

9600

POOR SAMPLE QUALITY- ABUNDANT UPHOLE CAVINGS.

CG 2728u

9700

WOB 25
RPM 70
PP 2350
GPM 602

CARBONACEOUS SHALE = DARK BROWNISH BLACK, DARK GRAYISH BROWN; CRUMBLY TO BRITTLE TENACITY; SUB BLOCKY, BLOCKY SLI IRREGULAR FRACTURE; WEDGELIKE CUTTINGS HABIT; DULL WAXY IN PART, EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; NO VISUAL STRUCTURE; TRACE OF COALY/ CARBONACEOUS SHALE IN SAMPLE TRAY.

CLEAN SHAKERS
CHANGE SCREENS

7/24/2010

NO SAMPLES, SHAKERS DOWN, CHANGING SCREENS AND CLEANING.

CG 4210u

9800

SANDSTONE = DULL OFF WHITE, DIRTY LIGHT BROWN; VERY FINE TO FINE GRAIN; POOR SORTED; SUB ANGULAR, SME SUB ROUND; LOW SPHERICITY; EASILY FRIABLE TO FRIABL CLAYEY/SILICA CEMENT, TRACE CALC CEMENT LOW HCL REACTION; POOR VISUAL INTER GRANULAR POROSITY; ABUNDANT BROWNISH BLACK SPECKLED CARBONACEOUS SHALE/COALY IMBEDDED; TRACE DEGASSING IN SAMPLE TRAY

5. FLARE @ 9829
MAX GAS 4210

CARBONACEOUS SHALE = DARK GRAY; SME BLACK; SLI PLATY TO FLAKY CUTTINGS; PLANAR TO IRREGULAR FRACTURE IN SILTY EXAMPLES; SILTY IN PART; GRADING TO CARB SILTSTONE; NON CALCAREOUS TO SLI CALC IN SILTY EXAMPLES; SMOOTH TO SILTY TEXTURE IN SILTY EXAMPLES; THIN COALY LAMINATION SOME LOOSE COAL; NO VISIBLE STRUCTURE.

CG 3147u

9900

MORNING TOUR

SHUT THE WELL IN @ 10023' AFTER A 40 BARREL GAIN.

MAX GAS 3299u

CG 4690u

10000

SHUT WELL IN @ 10023'
Flare Hit
CO2 20K
Flare Hit 100Y

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

SANDSTONE = MEDIUM BROWN; SME MED TO DARK GRAY; HARD PRESERVED SPECIMENS; UPPER TO LOWER FINE GRAINED; MOD WELL SORTED; GRAIN SUPPORTED; DOM SILICEOUS CEMENT WITH MINOR CALCITE FILL; ANGULAR TO SUBANGULAR; OCC THIN CARBONACEOUS LAMINATIONS; THINLY BEDDED.

CG 4915u

10100

SHALE = LT BROWN TO TAN; VERY HARD; FLAKY CUTTINGS; BLOCKY FRACTURE; DULL LUSTER; SMOOTH TEXTURE; MOD CALCAREOUS; SLI SILTY; THINLY BEDDED.

MAX GAS 2694u

CARBONACEOUS SHALE = DARK GRAY; DARK BROWN; FIRM TO MOD HARD; PLATY TO FLAKY CUTTINGS; PLANAR TO SPLINTERY FRACTURE; SMOOTH TO ROUGH TEXTURE; DULL EARTHY TO RESINOUS LUSTER; NON TO VSL CALCAREOUS; WITHIN COAL LAMINATIONS.

CG 4148u

10200

SANDSTONE = LT TO MEDIUM BROWN; DOM UPPER TO LOWER FINE GRAINED; ANGULAR TO SUBANGULAR; LOW SPHERICITY; GRAIN SUPPORTED; SILICEOUS TO CALCAREOUS CMT; INTERBEDDED WITH MEDIUM GRAY SILTSTONE; WHITE CRYSTALLINE CALCITE ADHERING TO GRAIN CLUSTERS- FRACTURE FILL IN THE GAS SHOW AT 10195'-10206'.

MAX GAS 4595u

CG 3653u

10300

NIGHT TOUR

CARBONACEOUS SHALE = DARK BROWNISH BLACK, GRAYISH BROWN, DARK OLIVE BLACK; TOUGH, BRITTLE TENACITY; SUB BLOCKY, BLOCKY SLI IRREGULAR FRACTURE; WEDGELIKE, TABULAR CUTTINGS HABIT; DULL, EARTHY IN PART, TRACE RESINOUS LUSTER; SILTY TO GRITTY TRACE GRANULAR TEXTURE; TRACE BLACK VITREOUS SPECKLED COAL IMBEDDED; TRACE PYRITIC LAMINATE AND IMBEDDED.

MAX GAS 1473u

NO WOB TOTCO DOWN

CG 4035u

10400

WOB 26
RPM 65
PP 2550
GPM 611

SANDSTONE = OFF WHITE, BROWNISH GRAY, DIRTY BROWN, TRACE SALT AND PEPPER APPEARANCE; VF TO FINE GRAIN; POOR SORTED; SUB ANGULAR GRADING TO SUB ROUND, LOW SPHERICITY; DOM KAOLIN/ CLAYEY CEMENT, SME SILICA/CALC CEMENT; POOR VISUAL POROSITY; ABUNDANT BLACK SPECKLED C. SHALE/LITHIC/COAL LAMINATION

MAX GAS 1260u

CG GAS 1567u

10500

Flare Hit
CO2 20K
Flare Hit 100Y

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

CARBONACEOUS SHALE / COAL = BLACK, DARK BLACKISH BROWN, DARK OLIVE BROWN; TOUGH BRITTLE TENACITY; IRREGULAR, SUB BLOCKY FRACTURE; WEDGELIKE, TABULAR SME SUB MASSIVE CUTTINGS HABIT; DULL WAXY, SLI EARTHY, SME VITREOUS LUSTER; SMOOTH TO GRITTY TEXTURE; TRACE DEGASSING IN TRAY.

CG 2360u

10600

MORNING TOUR
WF 200 @ 10557

SANDSTONE = WHITE TO LT BROWN; FINE TO VERY FINE GRAINED; ANGULAR TO SBANG; MOD WELL SORTED; GRAIN SUPPORTED; DOM SILICEOUS CEMENT WITH MINOR CALCITE FILL; TRACE GREEN GRAINS; SOME BLACK COAL LAMINATIONS; TRACE COARSE CALCITE FRACTURE FILL IN THE 10590'-10610' TRAY.

LOSE MUD @ 10606

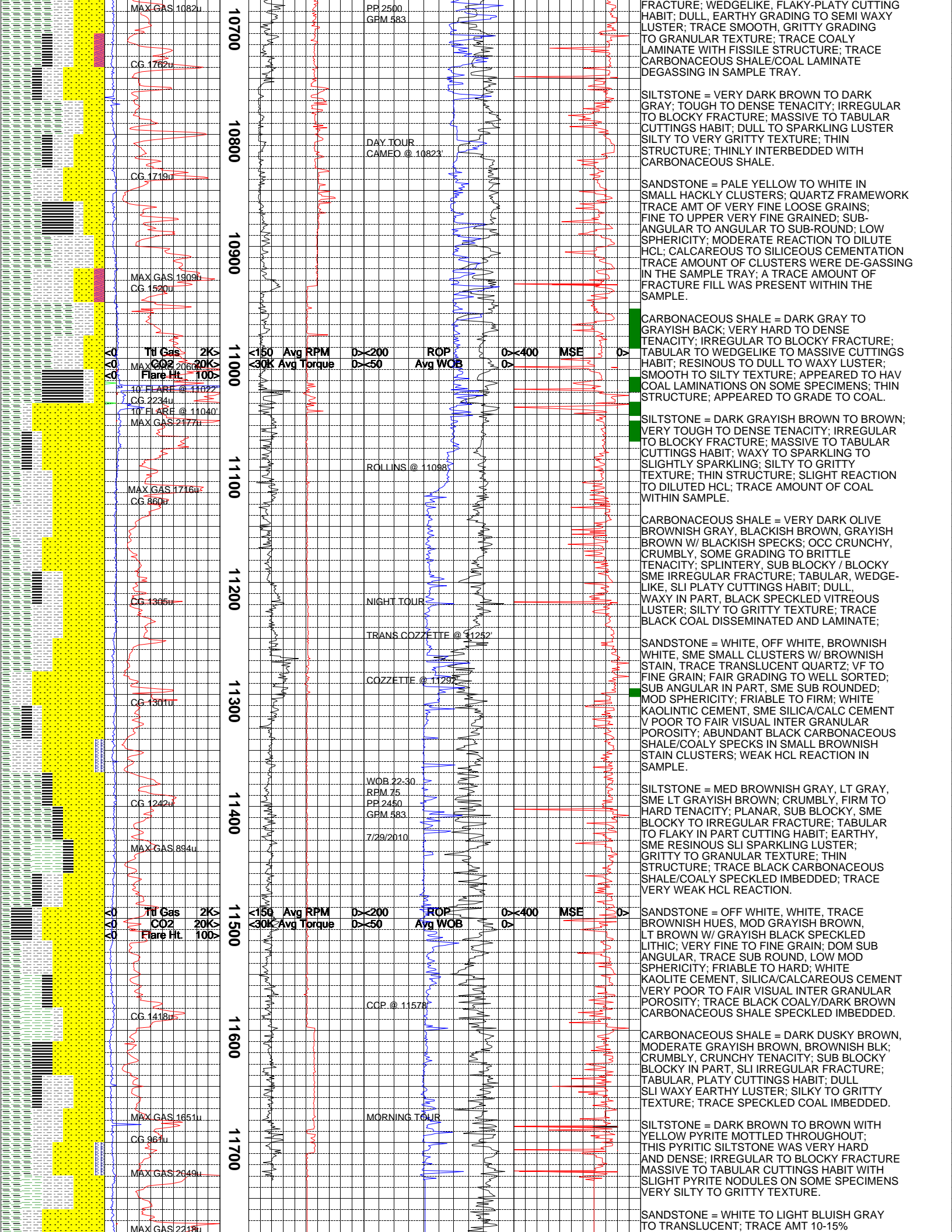
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7/28/2010

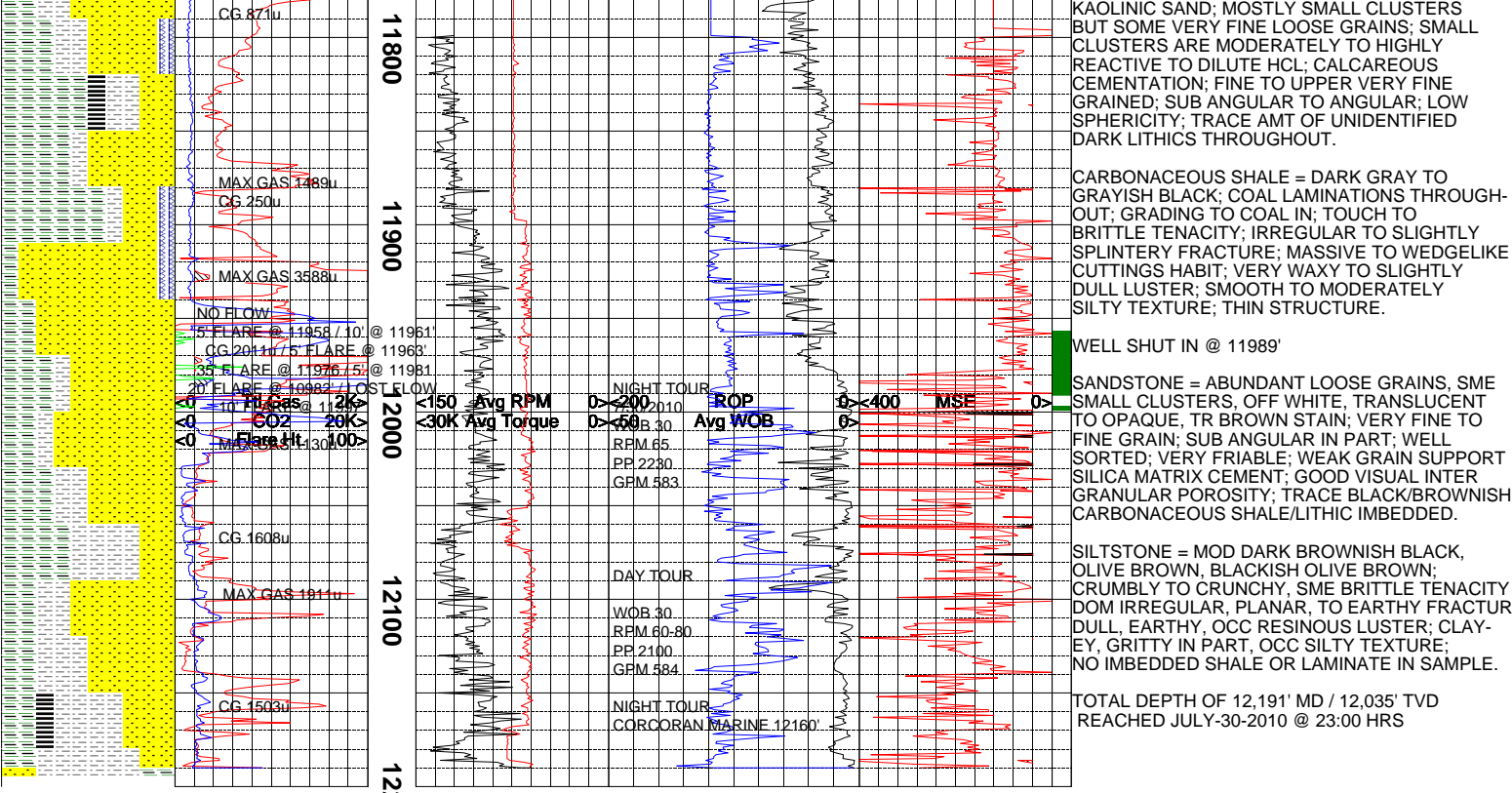
NOTE: TRIPPED FOR A NEW BIT; RESUMED DRILLING ON 7/27/10 @ 23:00HRS.

CG 1041u

NB #4, 8.75" in @ 10612
Hughes_Q506FX w/6x12
60 Hrs; 12:191
WOB 20
RPM 65

CARBONACEOUS SHALE = VERY DARK GRAYISH BROWN, BLACKISH BROWN, DARK OLIVE BROWN; CRUNCHY TO SLI BRITTLE TO DENSE TENACITY SPLINTERY, SUB BLOCKY, BLOCKY SOME IRREG





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