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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

MUDLOG MD

COMPANY ExxonMobil Production
WELL PCU 197-34B7
FIELD PICEANCE CREEK
REGION ROCKY MOUNTAINS
COORDINATES 39.915669000
108.261250000
ELEVATION 6647.9'
COUNTY, STATE RIO BLANCO, CO
API INDEX 05-103-11086-00
SPUD DATE 9/16/2009
CONTRACTOR H_P
CO. REP. S. GUYOTE, W. GARNER
RIG/TYPE # 320/FLEX 4S+
LOGGING UNIT MLU 032
GEOLOGISTS J. KEEVAN, C. RECORD
C. PIERCE
ADD. PERSONS M. PIPER, B. HICKS
T. WALKER
CO. GEOLOGIST CHRIS ALBA

LOG INTERVAL

CASING DATA

DEPTHS: 4022' TO 12990'
DATES: 9/15/2009 TO 12/13/2009
SCALE: 1"=100'

16" AT 130'
10.75" AT 3990'
7" AT 9220'

AT

MUD TYPES

HOLE SIZE

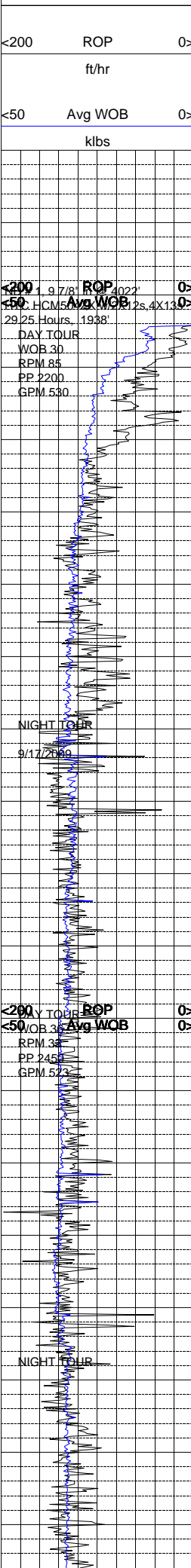
LSND TO 4022'
LIGCO TO 12990'

14.75" TO 4022'
9.875" TO 9100'
6.125" TO 12990'
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

Legend of geological symbols and patterns including: 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, SAND, SANDSTONE, SANDSTONE-TUFFACEOUS, SERICITIZATION, SERPENTINE, SHALE, SHALE TUFFACEOUS, SHELL FRAGMENTS, SIDERITE, SILICIFICATION, SILTSTONE, SILTST-TUFFACEOUS, TUFF, VOLCANICLASTICS SEDS, VOLCANICS.



Depth

4000

4100

4200

4300

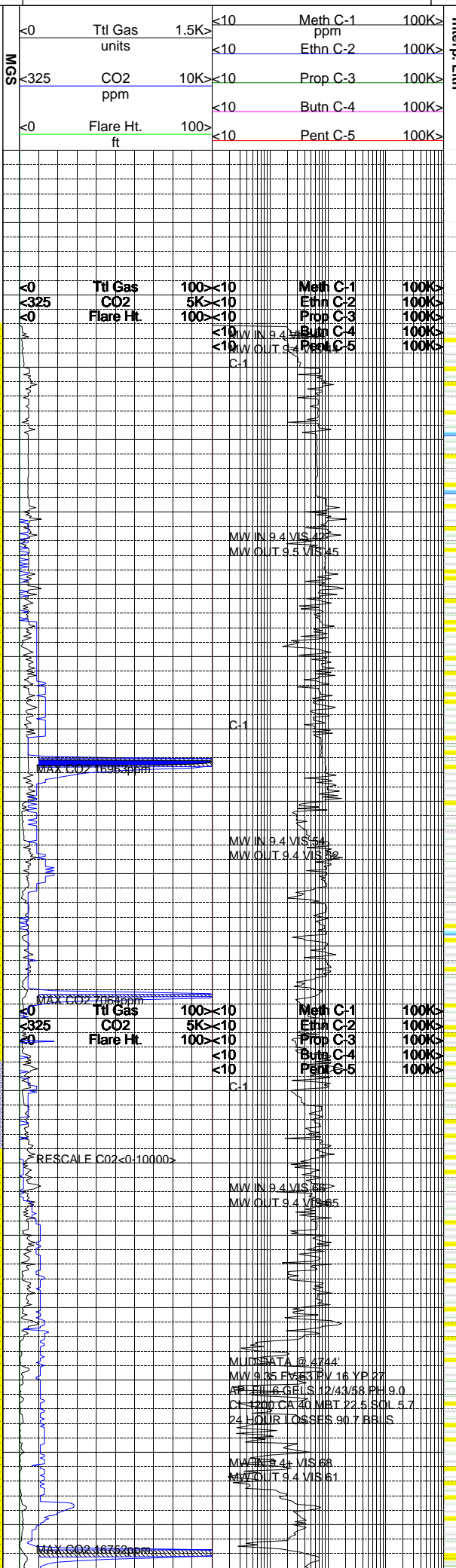
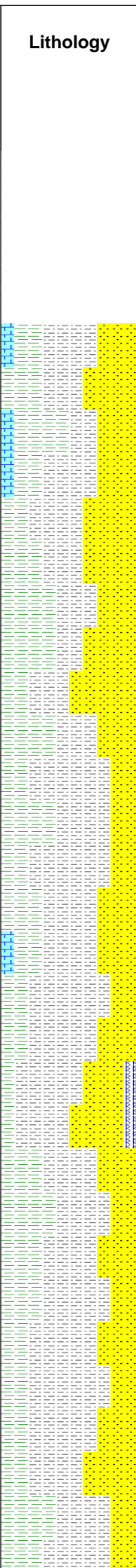
4400

4500

4600

4700

4800



Interp. Lith

Remarks

Survey Data, Mud Reports, Other Info.

EPOCH WELL SERVICES COMMENCED MUDLOGGING ON THE EXXONMOBIL PCU 197-34B7 WELL ON 09/16/2009 AT 4022' MD. ALL COLORS ARE REFERENCED TO THE GSA ROCK COLOR CHART. ALL TRIP AND CONNECTION GASSES ARE REFERENCED ABOVE BACKGROUND; ALL OTHER ARE ABSOLUTE.

1% METH. EQUIV. = 50 UNITS = 10000 = PPM
10 3/4" CASING @ 3990' PIT 12.0 PPG [E]

SANDSTONE = GRAYISH PINK TO WHITE IN COLOR; QUARTZ FRAMEWORK; MEDIUM TO FINE GRAIN SIZE; SAMPLE IS FAIR TO WELL SORTED; GRAINS ARE SUBANGULAR TO SUBROUNDED WITH MODERATE SPHERICITY; HARDNESS RANGES FROM EASILY TO FIRMLY FRIBALE; CALCITE CEMENT; NO DISCERNIBLE ACCESSORIES; NO VISIBLE PORE SPACES; NO GAS SHOWS FROM THIS SAND.

LIMESTONE = VERY PALE BLUE TO BLUISH WHITE IN COLOR; SAMPLE IS PARTICLE DOMINATED WITH NON SKELETAL PARTICLES; LIME MUD MATRIX WITH POINT CONTACT FABRIC; INTRAPARTICULAR POROSITY.

SILTSTONE = GRAYISH RED TO DARK YELLOWISH ORANGE IN COLOR; BRITTLE TO PULVERANT TENACITY; BLOCKY TO MOTTLED FRACTURE; CUTTINGS ARE NODULAR TO EQUANT IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY, ALMOST GRANULAR TEXTURE; THIN TO THICK STRUCTURE APPARENT.

SHALE = MEDIUM TO DARK GRAY IN COLORING; BRITTLE IN TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; WAXY TO GREASY LUSTER WITH A SMOOTH TEXTURE AND THIN TO LAMINAE STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 1% LITHIC SHOWS; FAIR TO MODERATE SORTING OR COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBROUNDED TO SUBANGULARITY; FRIABLE TO FIRMLY FRIABLE GRAIN SUPPORTED MATERIAL WITH CALCITIC CEMENTATION; NO OIL SHOWS AND VERY LOW GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = OLIVE GRAY TO MEDIUM GRAY IN COLOR; DENSE TO CRUMBLY TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGE LIKE TO NODULAR IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THICK TO NEARLY MASSIVE STRUCTURE APPARENT.

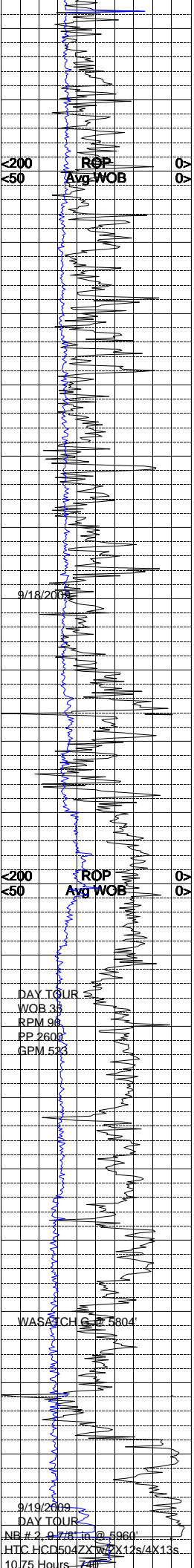
SHALE = LIGHT BLUISH GRAY TO LIGHT GRAY IN COLOR; BRITTLE TO CRUNCHY TENACITY; SAMPLE SHOWS BLOCKY TO CONCHOIDAL FRACTURE; CUTTINGS ARE PLATY TO SCALY IN HABIT; GREASY TO DULL LUSTER EXHIBITED SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT.

SANDSTONE = LIGHT GRAY TO WHITE IN COLOR QUARTZ FRAMEWORK WITH SOME CALCITE AND FELSPAR GRAINS; VERY FINE TO MEDIUM GRAIN SIZE; ROUNDED TO SUBANGULAR WITH MODERATE SPHERICITY; FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO VISIBLE PORE SPACES; NO GAS SHOWS; CHLORITE GRAINS VISIBLE IN MATRIX.

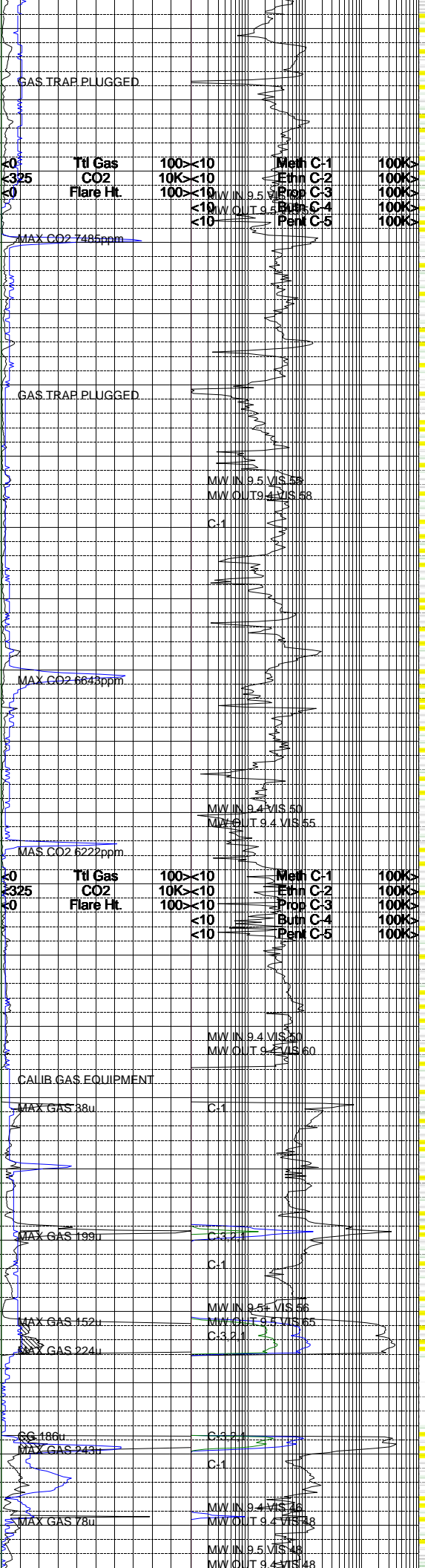
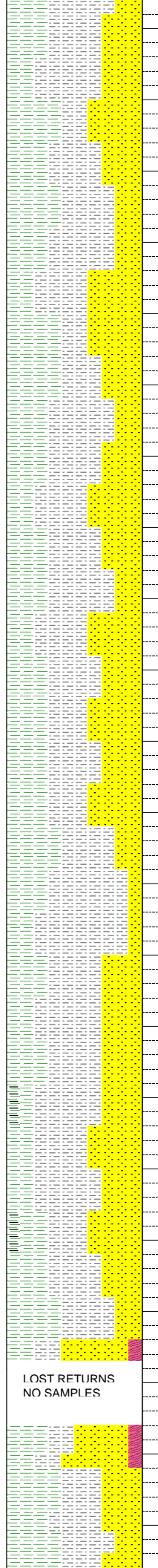
SILTSTONE = LIGHT TO MEDIUM GRAY WITH REDDISH BROWN AND YELLOWISH GRAY IN COLORING; DENSE IN TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; EARTHY TO FROSTED LUSTER WITH A SILTY TEXTURE AND A THIN STRUCTURE.

SHALE = LIGHT TO MEDIUM GRAY WITH GRAYISH BLUE GREEN COLORATION; BRITTLE IN TENACITY WITH BLOCKY TO SPLINTERY FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; WAXY TO GREASY LUSTER WITH A SMOOTH TEXTURE AND A THIN TO LAMINAE STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT



4900
5000
5100
5200
5300
5400
5500
5600
5700
5800
5900



3% LITHIC SHOWS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; FRIABLE TO FIRMLY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND VERY LOW GAS ASSOCIATED WITH THIS SAMPLE

SILTSTONE = MEDIUM GRAY WITH REDDISH BROWN AND MODERATE YELLOWISH BROWN IN COLORING; DENSE IN TENACITY WITH BLOCKY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; EARTHY TO FROSTED LUSTER WITH A SILTY TEXTURE AND THIN STRUCTURE.

SHALE = MEDIUM GRAY WITH SOME GRAYISH BLUE GREEN IN COLORING; DENSE TO BRITTLE TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; WAXY TO GREASY LUSTER WITH A SMOOTH TEXTURE AND A THIN STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 1% LITHIC SHOWS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; FRIABLE TO FIRMLY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION AS TESTED BY DILUTE HCL; NO OIL SHOWS AND VERY LOW GAS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH REDDISH BROWN AND LIGHT BROWN COLORING; DENSE IN TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; EARTHY TO FROSTED LUSTER WITH A SILTY TEXTURE AND A THIN STRUCTURE.

SHALE = MEDIUM GRAY WITH GRAYISH BLUE GREEN COLORATION; DENSE TO BRITTLE IN TENACITY WITH PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; GREASY IN LUSTER WITH A SMOOTH TEXTURE AND THIN TO LAMINAE STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK WITH NO LITHIC SHOWS; MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; UNCONSOLIDATED TO FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION AS SUGGESTED BY DILUTE HCL; NO OIL SHOWS AND VERY LOW GAS ASSOCIATED.

SILTSTONE = MEDIUM TO DARK GRAY WITH REDDISH BROWN AND LIGHT BROWN COLORATION; DENSE IN TENACITY WITH BLOCKY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; EARTHY IN LUSTER WITH A SILTY TO COARSE GRAIN SILTY TEXTURE AND A THIN STRUCTURE.

SHALE = DARK YELLOWISH BROWN TO GREENISH GRAY IN COLOR; SAMPLE SHOWS DENSE TO CRUMBLY TENACITY; BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE PLATY TO SCALY IN APPEARANCE; WAXY TO SLIGHTLY FROSTED LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT; PYRITE VISIBLE.

SANDSTONE = VERY LIGHT GRAY TO CHALKY WHITE IN COLOR; QUARTZ FRAMEWORK; FINE TO VERY FINE GRAIN SIZE; WELL SORTED; INDISTINGUISHABLE ANGULARITY; HARDNESS RANGES FROM FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT INDICATED BY ACTIVE EFFERVESENCE IN HCL; GRAIN SUPPORTED; NO VISIBLE PORE SPACES; KAOLINITE ALTERATION VISIBLE IN SOME CUTTINGS; NO GAS SHOWS FROM THIS SAND.

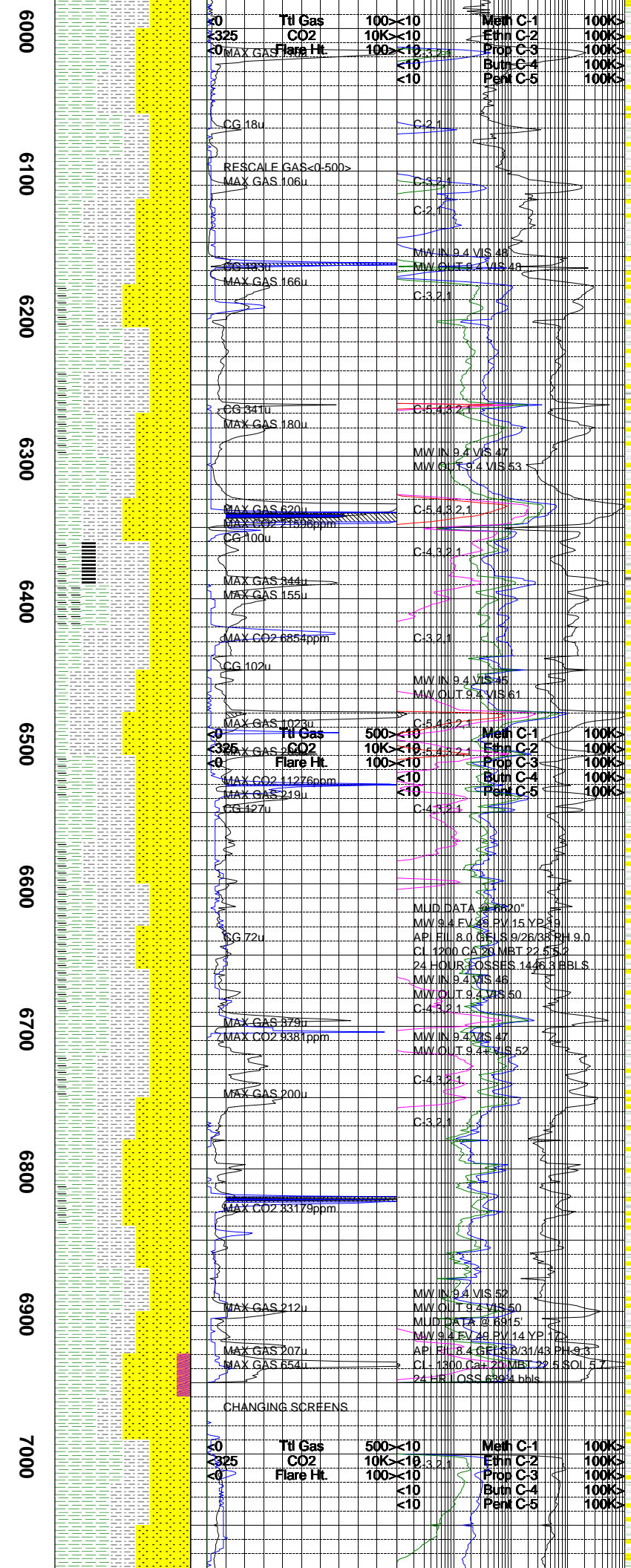
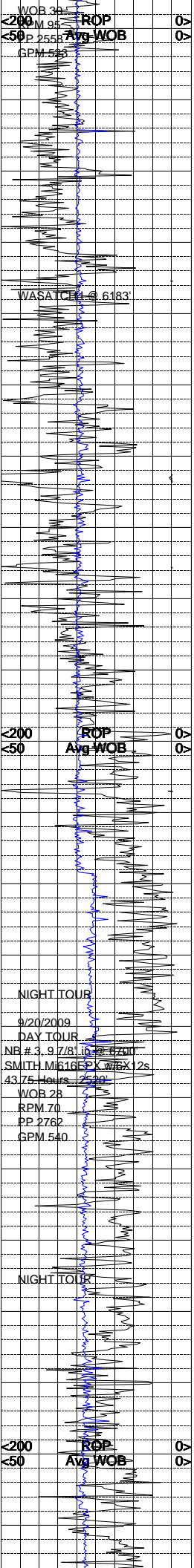
CARBONACEOUS SHALE = OLIVE BLACK TO GRAYISH BLACK IN COLOR; BRITTLE TO CRUNCHY TENACITY; PLANAR TO SPLINTERY FRACTURE; TABULAR TO ELONGATED CUTTINGS HABIT; RESINOUS TO GREASY LUSTER; SMOOTH TEXTURE; THIN STRUCTURE APPARENT.

NOTE = LOST COMPLETE RETURNS @ 5835' MD.

SILTSTONE = DARK YELLOWISH BROWN TO OLIVE GRAY IN COLOR; DENSE TO BRITTLE TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGELIKE TO NODULAR IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO SLIGHTLY GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT; PYRITE VISIBLE IN MATRIX.

SHALE = LIGHT OLIVE BROWN TO LIGHT OLIVE GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; IRREGULAR TO BLOCKY FRACTURE; CUTTINGS ARE FLAKY TO WEDGELIKE IN HABIT DULL TO EARTHY LUSTER; TEXTURE IS CLAYEY

LOST RETURNS
NO SAMPLES



TO SILTY; THIN TO LAMINAE STRUCTURE APPARENT; SLIGHTLY CALCAREOUS.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT IN COLOR; QUARTZ FRAMEWORK WITH ABOUT 3-5% BLACK LITHIC CLASTS; COARSE TO FINE GRAIN SIZE; POOR TO FAIR SORTED; GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO VISIBLE PORE SPACING; LOW TO MODERATE GAS SHOWS IN THIS SAND.

SILTSTONE = MODERATE REDDISH BROWN TO MODERATE BROWN IN COLOR; DENSE TO CRUNCHY TENACITY; SAMPLE HAS IRREGULAR TO CONCHOIDAL FRACTURE; WEDGELIKE TO NODULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO GRANULAR TEXTURE WITH OCCASIONAL SPECIMEN SEEN GRADING INTO FINE SANDSTONE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = GRAYISH BLACK TO BLACK IN COLOR; BRITTLE TO NEARLY PULVERANT IN TENACITY; SPLINTERY TO BLOCKY FRACTURE; CUTTINGS ARE ELONGATED TO EQUANT IN APPEARANCE; RESINOUS TO GREASY LUSTER EXHIBITED; SMOOTH TO SILTY TEXTURE; THIN TO LAMINAE STRUCTURE APPARENT.

SHALE = MEDIUM LIGHT GRAY TO DARK GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; FRACTURE RANGES FROM BLOCKY TO PLANAR; CUTTINGS ARE FLAKY TO TABULAR IN HABIT; WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT.

COAL = DARK GRAY TO GRAYISH BLACK IN COLOR; DENSE TO BRITTLE IN TENACITY; BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; METALIC TO RESINOUS LUSTER; TEXTURE RANGES FROM SMOOTH TO SLIGHTLY SILTY; THIN STRUCTURE APPARENT; FAIR AMOUNT OF PYRITE BANDING VISIBLE IN SAMPLE.

SANDSTONE = WHITE TO YELLOWISH GRAY IN COLOR; QUARTZ FRAMEWORK; MEDIUM TO VERY FINE GRAIN SIZE; FAIR TO WELL SORTED; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPHERICITY; SAMPLE IS EASILY TO FIRMLY FRIABLE; CALCITE CEMENT SAMPLE IS GRAIN SUPPORTED WITH POINT CONTACT FABRIC; SOME INTERBEDDING WITH SILTSTONES VISIBLE; MODERATE TO HIGH GAS SHOWS IN THIS SANDSTONE.

SILTSTONE = YELLOWISH GRAY TO LIGHT BROWNISH GRAY IN COLOR; BRITTLE TO TOUGH IN TENACITY; BLOCKY TO CONCHOIDAL FRACTURE; WEDGELIKE TO TABULAR CUTTINGS HABIT; EARTHY TO DULL LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = BLACKISH IN COLOR; FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; RESINOUS IN LUSTER WITH A SMOOTH TEXTURE AND A THIN STRUCTURE.

SHALE = LIGHT BLUISH GRAY TO MEDIUM BLUISH GRAY IN COLOR; BRITTLE TO CRUNCHY TENACITY; PLANAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE PLATY TO SCALY IN HABIT; WAXY TO EARTHY LUSTER EXHIBITED; SMOOTH TO SLIGHTLY SILTY TEXTURE; THIN STRUCTURE APPARENT.

SANDSTONE = GRAYISH YELLOW GREEN TO YELLOWISH GRAY IN COLOR; QUARTZ FRAMEWORK MEDIUM TO FINE GRAIN SIZE; SAMPLE IS FAIR TO WELL SORTED; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPHERICITY; HARDNESS RANGES FROM FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO DISCERNIBLE BEDDING; NO VISIBLE POROSITY LOW GAS SHOWS FROM THIS SANDSTONE.

SHALE = LIGHT GRAY TO YELLOWISH GREENISH GRAY WITH A SLIGHT BLUE HUE; BRITTLE TENACITY; FRACTURES FROM PLANAR TO SLIGHTLY SPLINTERY; SCALY TO PLATY CUTTINGS; DULL LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

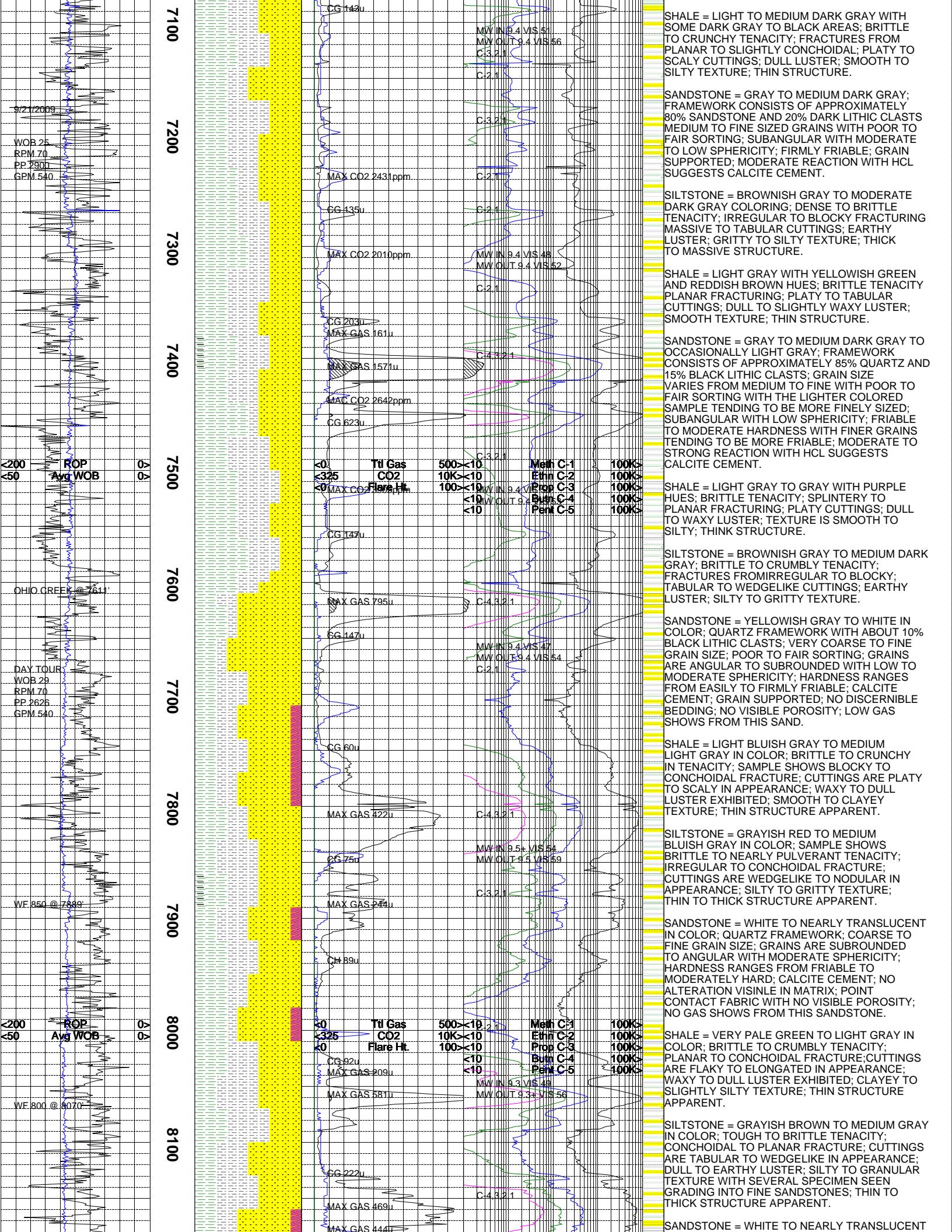
SANDSTONE = WHITE TO LIGHT GRAY TO GRAY COLORING; FRAMEWORK CONSISTS OF APPROXIMATELY 75% QUARTZ AND 25% BLACK LITHIC CLASTS; COARSE TO MEDIUM SIZED GRAINS WITH POOR SORTING; SUBANGULAR WITH LOW SPHERICITY; EASILY FRIABLE TO MODERATE HARDNESS; STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT; MATRIX SUPPORTED.

SILTSTONE = MEDIUM DARK GRAY TO BROWNISH GRAY; BRITTLE TO CRUNCHY TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY; TABULAR CUTTINGS; EARTHY TO DULL LUSTER; SILTY TO GRITTY TEXTURE; THIN STRUCTURE.

MUD DATA @ 6620"
 MW 9.4 FV 48 PV 15 YP 3.9
 AP FIL 8.0 GF 1.89/28/38 PH 9.0
 CL 1200 CA 20 MBT 22.5 SOL 5.2
 24 HOUR LOSS 14.46 BBLS
 MW IN 9.4 VIS 48
 MW OUT 9.4 VIS 50

MW IN 9.4 VIS 47
 MW OUT 9.4 VIS 52

MW IN 9.4 VIS 52
 MW OUT 9.4 VIS 50
 MUD DATA @ 6915"
 MW 9.4 FV 49 PV 14 YP 1.2
 AP FIL 8.4 GF 1.8/31/43 PH 9.3
 CL 1300 CA 20 MBT 22.5 SOL 5.7
 24 HR LOSS 6.94 bbbls



7100
9/21/2009
WOB 25
RPM 70
PP 2900
GPM 540

7200

7300

7400

7500
ROP
Avg WOB

7600
OHIO CREEK @ 7611'

7700
DAY TOUR
WOB 29
RPM 70
PP 2625
GPM 540

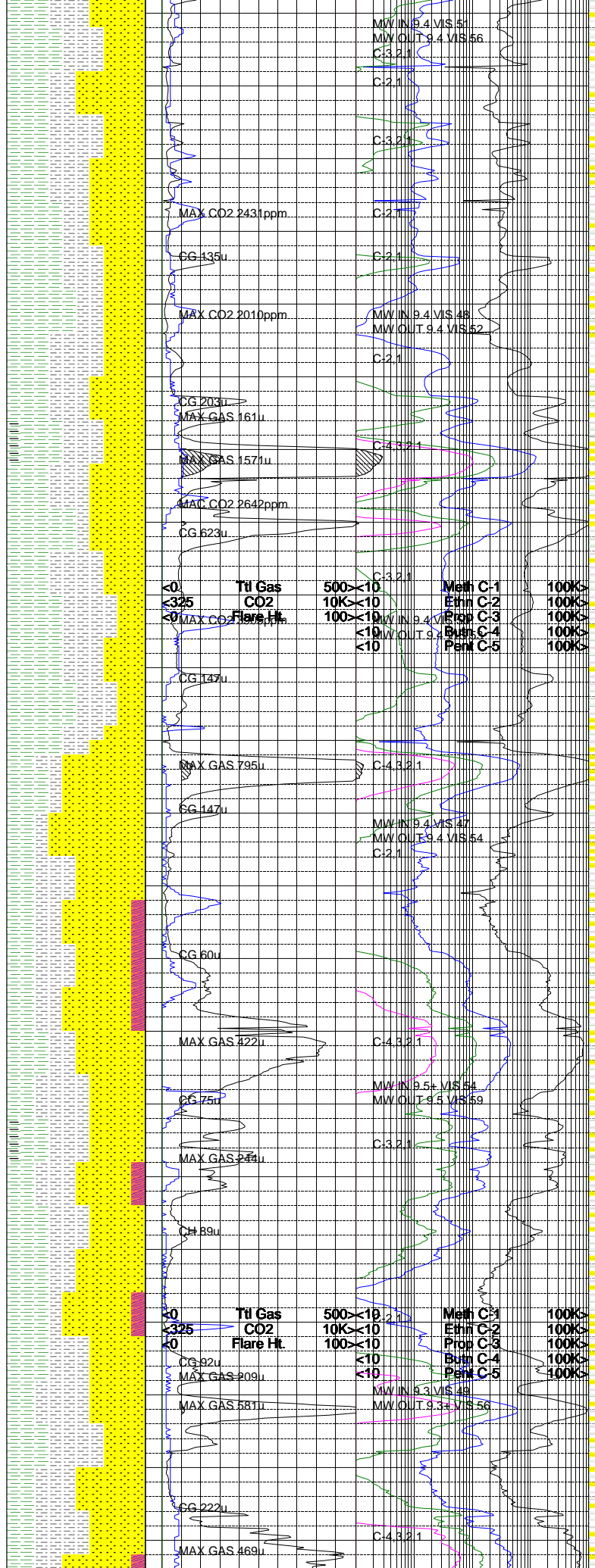
7800

7900
WF 850 @ 7889'

8000
ROP
Avg WOB

8100
WF 800 @ 8070'

7100
7200
7300
7400
7500
7600
7700
7800
7900
8000
8100



SHALE = LIGHT TO MEDIUM DARK GRAY WITH SOME DARK GRAY TO BLACK AREAS; BRITTLE TO CRUNCHY TENACITY; FRACTURES FROM PLANAR TO SLIGHTLY CONCHOIDAL; PLATY TO SCALY CUTTINGS; DULL LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = GRAY TO MEDIUM DARK GRAY; FRAMEWORK CONSISTS OF APPROXIMATELY 80% SANDSTONE AND 20% DARK LITHIC CLASTS MEDIUM TO FINE SIZED GRAINS WITH POOR TO FAIR SORTING; SUBANGULAR WITH MODERATE TO LOW SPHERICITY; FIRMLY FRIABLE; GRAIN SUPPORTED; MODERATE REACTION WITH HCL SUGGESTS CALCITE CEMENT.

SILTSTONE = BROWNISH GRAY TO MODERATE DARK GRAY COLORING; DENSE TO BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURING MASSIVE TO TABULAR CUTTINGS; EARTHY LUSTER; GRITTY TO SILTY TEXTURE; THICK TO MASSIVE STRUCTURE.

SHALE = LIGHT GRAY WITH YELLOWISH GREEN AND REDDISH BROWN HUES; BRITTLE TENACITY PLANAR FRACTURING; PLATY TO TABULAR CUTTINGS; DULL TO SLIGHTLY WAXY LUSTER; SMOOTH TEXTURE; THIN STRUCTURE.

SANDSTONE = GRAY TO MEDIUM DARK GRAY TO OCCASIONALLY LIGHT GRAY; FRAMEWORK CONSISTS OF APPROXIMATELY 85% QUARTZ AND 15% BLACK LITHIC CLASTS; GRAIN SIZE VARIES FROM MEDIUM TO FINE WITH POOR TO FAIR SORTING WITH THE LIGHTER COLORED SAMPLE TENDING TO BE MORE FINELY SIZED; SUBANGULAR WITH LOW SPHERICITY; FRIABLE TO MODERATE HARDNESS WITH FINER GRAINS TENDING TO BE MORE FRIABLE; MODERATE TO STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT.

SHALE = LIGHT GRAY TO GRAY WITH PURPLE HUES; BRITTLE TENACITY; SPLINTERY TO PLANAR FRACTURING; PLATY CUTTINGS; DULL TO WAXY LUSTER; TEXTURE IS SMOOTH TO SILTY; THIN STRUCTURE.

SILTSTONE = BROWNISH GRAY TO MEDIUM DARK GRAY; BRITTLE TO CRUMBLY TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY; TABULAR TO WEDGELIKE CUTTINGS; EARTHY LUSTER; SILTY TO GRITTY TEXTURE.

SANDSTONE = YELLOWISH GRAY TO WHITE IN COLOR; QUARTZ FRAMEWORK WITH ABOUT 10% BLACK LITHIC CLASTS; VERY COARSE TO FINE GRAIN SIZE; POOR TO FAIR SORTING; GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; HARDNESS RANGES FROM EASILY TO FIRMLY FRIABLE; CALCITE CEMENT; GRAIN SUPPORTED; NO DISCERNIBLE BEDDING; NO VISIBLE POROSITY; LOW GAS SHOWS FROM THIS SAND.

SHALE = LIGHT BLUISH GRAY TO MEDIUM LIGHT GRAY IN COLOR; BRITTLE TO CRUNCHY IN TENACITY; SAMPLE SHOWS BLOCKY TO CONCHOIDAL FRACTURE; CUTTINGS ARE PLATY TO SCALY IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT.

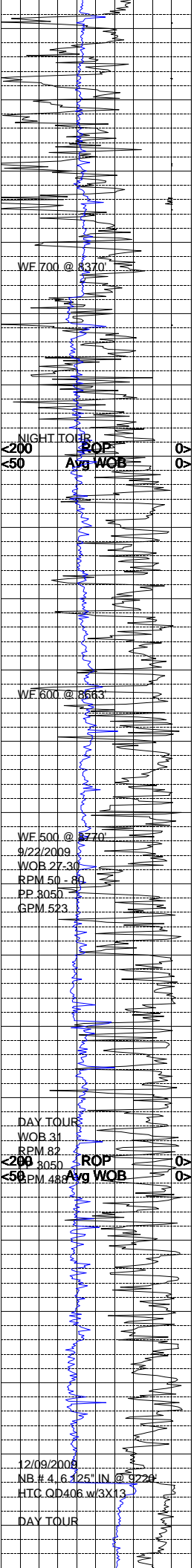
SILTSTONE = GRAYISH RED TO MEDIUM BLUISH GRAY IN COLOR; SAMPLE SHOWS BRITTLE TO NEARLY PULVERANT TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGELIKE TO NODULAR IN APPEARANCE; SILTY TO GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT IN COLOR; QUARTZ FRAMEWORK; COARSE TO FINE GRAIN SIZE; GRAINS ARE SUBROUNDED TO ANGULAR WITH MODERATE SPHERICITY; HARDNESS RANGES FROM FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO ALTERATION VISINLE IN MATRIX; POINT CONTACT FABRIC WITH NO VISIBLE POROSITY; NO GAS SHOWS FROM THIS SANDSTONE.

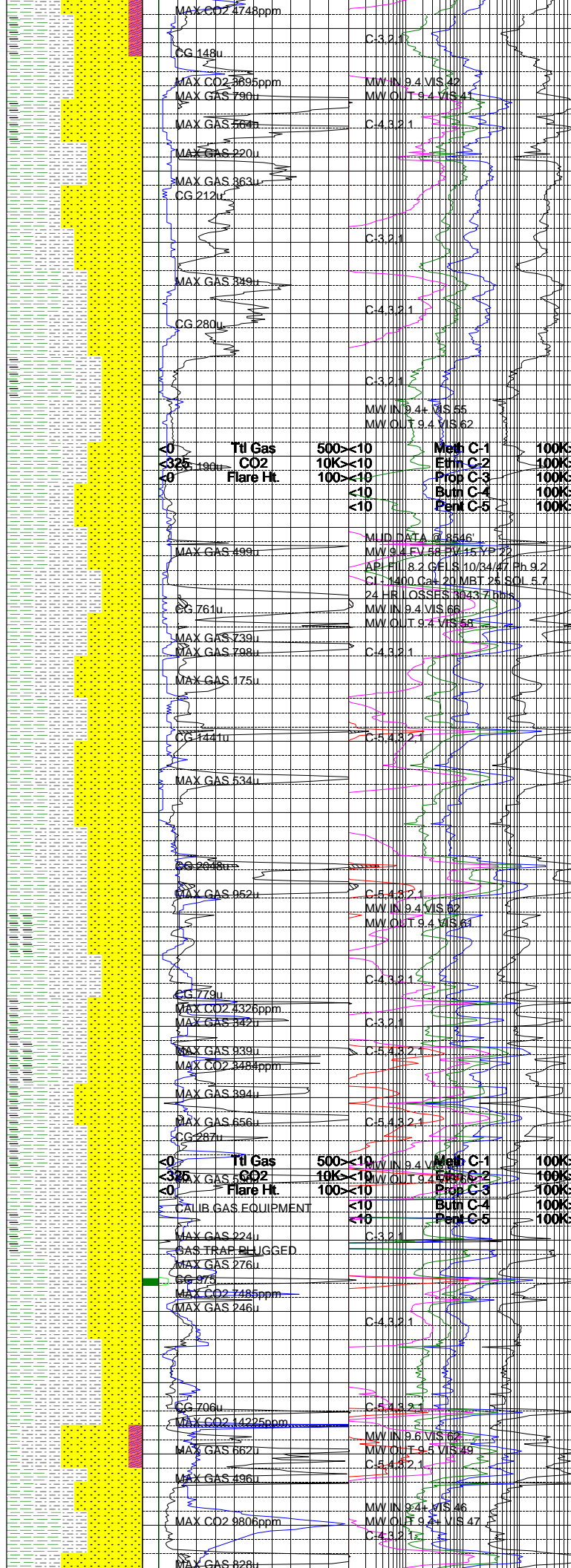
SHALE = VERY PALE GREEN TO LIGHT GRAY IN COLOR; BRITTLE TO CRUMBLY TENACITY; PLANAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE FLAKY TO ELONGATED IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SLIGHTLY SILTY TEXTURE; THIN STRUCTURE APPARENT.

SILTSTONE = GRAYISH BROWN TO MEDIUM GRAY IN COLOR; TOUGH TO BRITTLE TENACITY; CONCHOIDAL TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER; SILTY TO GRANULAR TEXTURE WITH SEVERAL SPECIMEN SEEN GRADING INTO FINE SANDSTONES; THIN TO THICK STRUCTURE APPARENT.

SANDSTONE = WHITE TO NEARLY TRANSLUCENT



8200
8300
8400
8500
8600
8700
8800
8900
9000
9100
9200



IN COLOR; QUARTZ FRAMEWORK WITH ABOUT 20% BLACK LITHIC FRAGMENTS GIVING THE SAMPLE A SALT AND PEPPER APPEARANCE; GRAIN SIZE RANGES FROM COARSE TO FINE; POOR TO FAIR SORTING; GRAINS ARE ANGULAR TO SUBANGULAR WITH LOW TO MODERATE SPHERICITY; HARDNESS RANGES FROM FIRMLY FRIABLE TO HARD; SILICA CEMENT; NO VISIBLE POROSITY; CALCITE GRAINS SEEN AS ACCESSORY GRAINS; LOW TO MODERATE GAS SHOWS FROM THIS SANDSTONE.

SHALE = GRAYISH RED TO BROWNISH GRAY IN COLOR; TOUGH TO BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; EARTHY TO FROSTED LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE APPARENT.

SILTSTONE = DARK REDDISH BROWN TO DARK YELLOWISH BROWN IN COLOR; DENSE TO BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURE; SCALY TO TABULAR CUTTINGS HABIT; DULL TO FROSTED LUSTER; THIN STRUCTURE APPARENT; PYRITE VISIBLE IN SAMPLE.

SANDSTONE = TRANSLUCENT TO WHITE TO LIGHT GRAY; QUARTZ FRAMEWORK WITH ABOUT 10%-15% BLACK LITHIC CLASTS; GRAINS VARY FROM MEDIUM TO FINE SIZED WITH POOR TO FAIR SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE TO LOW SPHERICITY; MODERATE HARD TO HARD; GRAIN SUPPORTED; VERY LOW REACTION WITH HCL SUGGESTS SILICA CEMENT.

SHALE = LIGHT GRAY TO GRAY WITH DARK BROWN TO PURPLE HUES; BRITTLE TO DENSE TENACITY; PLANAR FRACTURING; PLATY TO TABULAR CUTTINGS; WAXY TO DULL LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SILTSTONE = DARK BROWN TO BROWNISH GRAY; DENSE TO TOUGH TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR; MASSIVE TO TABULAR CUTTINGS; EARTHY WITH A SLIGHT FROSTED LUSTER; TEXTURE RANGES FROM MOSTLY GRITTY TO SILTY POSSIBLY GRADING FROM SANDSTONE; THICK STRUCTURE.

SANDSTONE = TRANSLUCENT TO WHITE TO MEDIUM DARK GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ WITH APPROXIMATELY 15% BLACK LITHIC CLASTS GIVING THE SAMPLE A SALT AND PEPPER LOOK; GRAIN SIZE VARIES FROM COARSE TO MEDIUM WITH OCCASIONAL FINE GRAINS; POOR SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE TO LOW SPHERICITY; FIRMLY FRIABLE TO HARD; SILICA CEMENT AS SUGGESTED BY THE LOW REACTION WITH HCL; GRAIN SUPPORTED; PYRITE PRESENT AS AN ACCESSORY MINERAL.

SILTSTONE = MEDIUM DARK GRAY WITH REDDISH BROWN TO DARK BROWN HUES; DENSE TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY; TABULAR CUTTINGS HABIT; EARTHY TO DULL LUSTER; GRITTY TO LIGHTLY SILTY TEXTURE; THICK STRUCTURE.

CARBONACEOUS SHALE = BLACK TO DARK GRAY COLOR; BRITTLE TO CRUNCHY TENACITY; BLOCKY TO IRREGULAR FRACTURING; WEDGELIKE CUTTINGS; RESINOUS TO GREASY LUSTER; SMOOTH TEXTURE; THIN TO THICK STRUCTURE.

SHALE = LIGHT GRAY TO MEDIUM GRAY IN COLOR; SENSE TO CRUMBLY TENACITY; PLANAR TO BLOCKY FRACTURE; CUTTINGS RANGE FROM FLAKY TO BLADED IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE; LAMINAE STRUCTURE THINLY BEDDED BETWEEN SILTSTONES APPARENT.

SANDSTONE = PINKISH GRAY TO WHITE TO NEARLY TRANSLUCENT IN COLOR; QUARTZ FRAMEWORK WITH SOME FELDSPAR GRAINS; COARSE TO FINE GRAIN SIZE; FAIR SORTING; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPHERICITY; SAMPLE IS FIRMLY FRIABLE TO MODERATELY HARD; CALCITE CEMENT SUGGESTED BY HIGH REACTION WITH HCL; NO VISIBLE POROSITY; MODERATE GAS SHOWS FROM THIS SANDSTONE.

NOTE = INTERMEDIATE TD REACHED AT 9220' MD ON 9/22/2009 @ 12:55 P.M.

NOTE = STARTED DRILLING PRODUCTION ON 12/09/2009 AT APPROXIMATELY 1:00 PM.

SANDSTONE = WHITE TO LIGHT GRAY WITH A QUARTZ FRAMEWORK; COARSE TO FINE SIZED GRAINS WITH FAIR TO POOR SORTING; SUBANGULAR TO SUBROUNDED; MODERATE HARD TO HARD; GRAIN SUPPORTED; STRONG REACTION WITH HCL SUGGESTS CALCITE

NIGHT TOUR
ROP
Avg WOB

WF 600 @ 8663

WF 500 @ 8770
9/22/2009
WOB 27-30
RPM 50 - 80
PP 3050
GPM 523

DAY TOUR
WOB 31
RPM 82
PP 3050
GPM 488
ROP
Avg WOB

12/09/2008
NB # 4.16.425' IN @ 9224'
HTC OD406 w/3X13

DAY TOUR

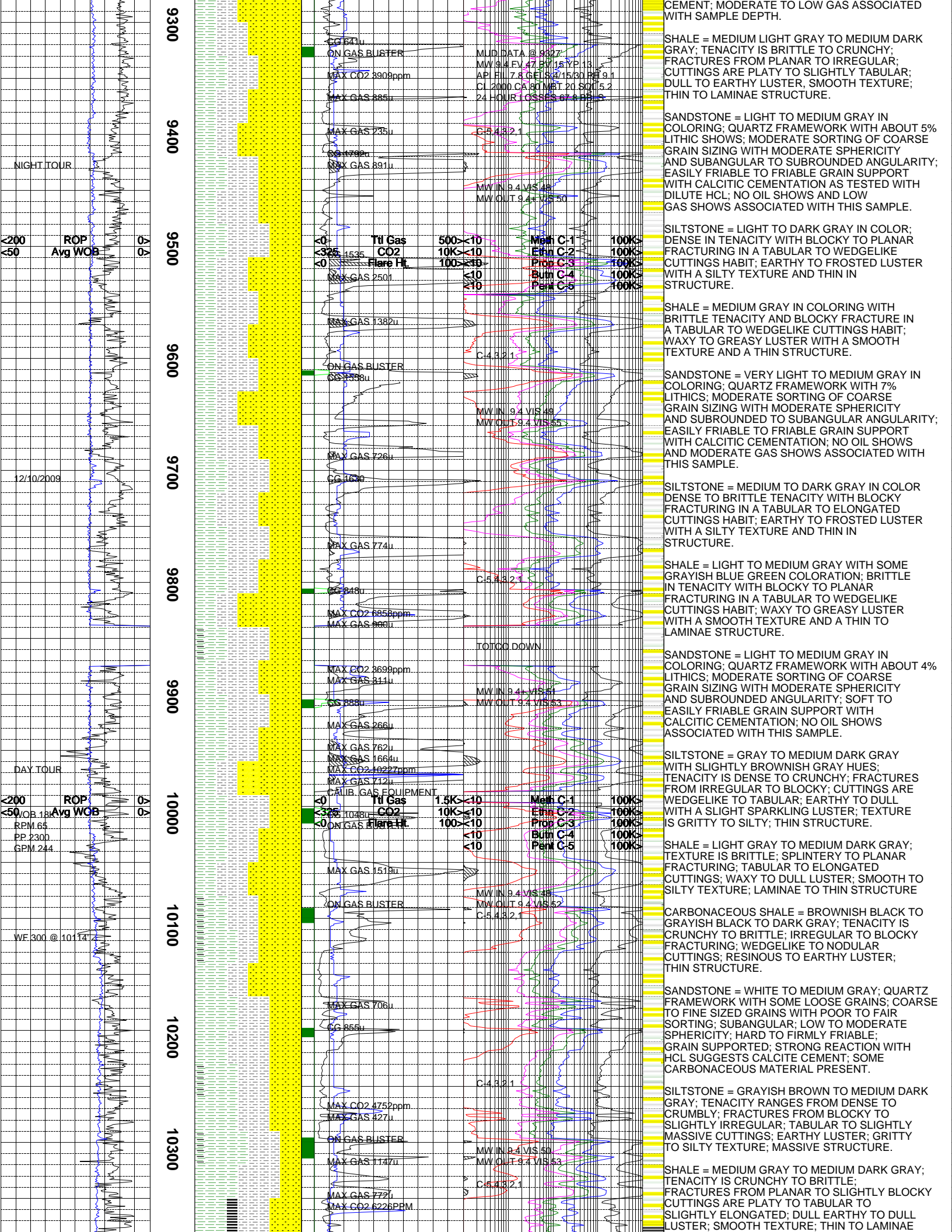
Til Gas	500	>10	Meth C-1	100%
CO2	10K	>10	Ethin C-2	100%
Flare Hit	100	>10	Prop C-3	100%
	<10		Butn C-4	100%
	<10		Perw C-5	100%

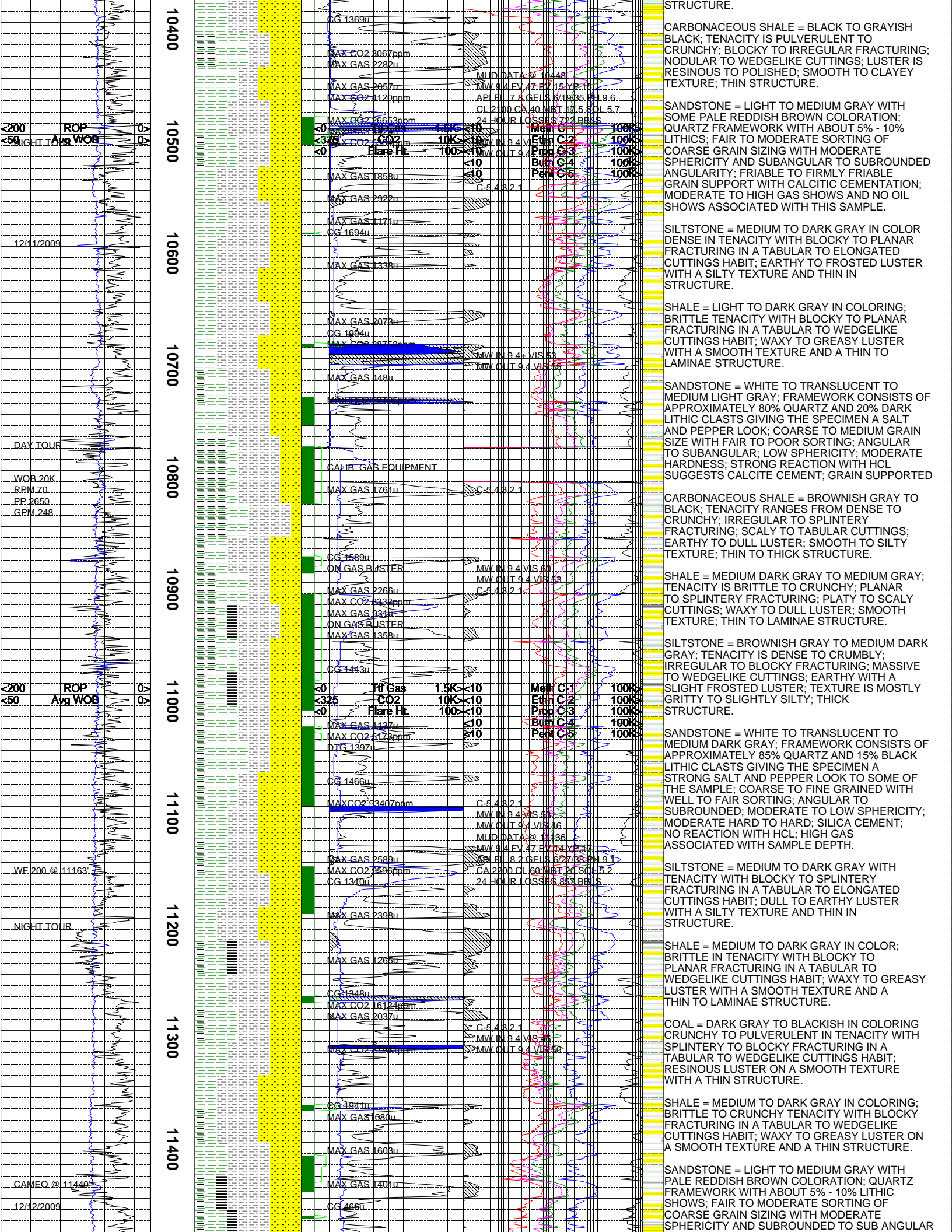
MUD DATA @ 8546'
MW IN 9.4 VIS 55
MW OUT 9.4 VIS 62
API FL 8.2 GFLS 10/34/47 Ph 9.2
CL 1400 Ca 20 MBT 26 SOL 5.7
24 HR LOSSES 3043.7 bbls
MW IN 9.4 VIS 66
MW OUT 9.4 VIS 55

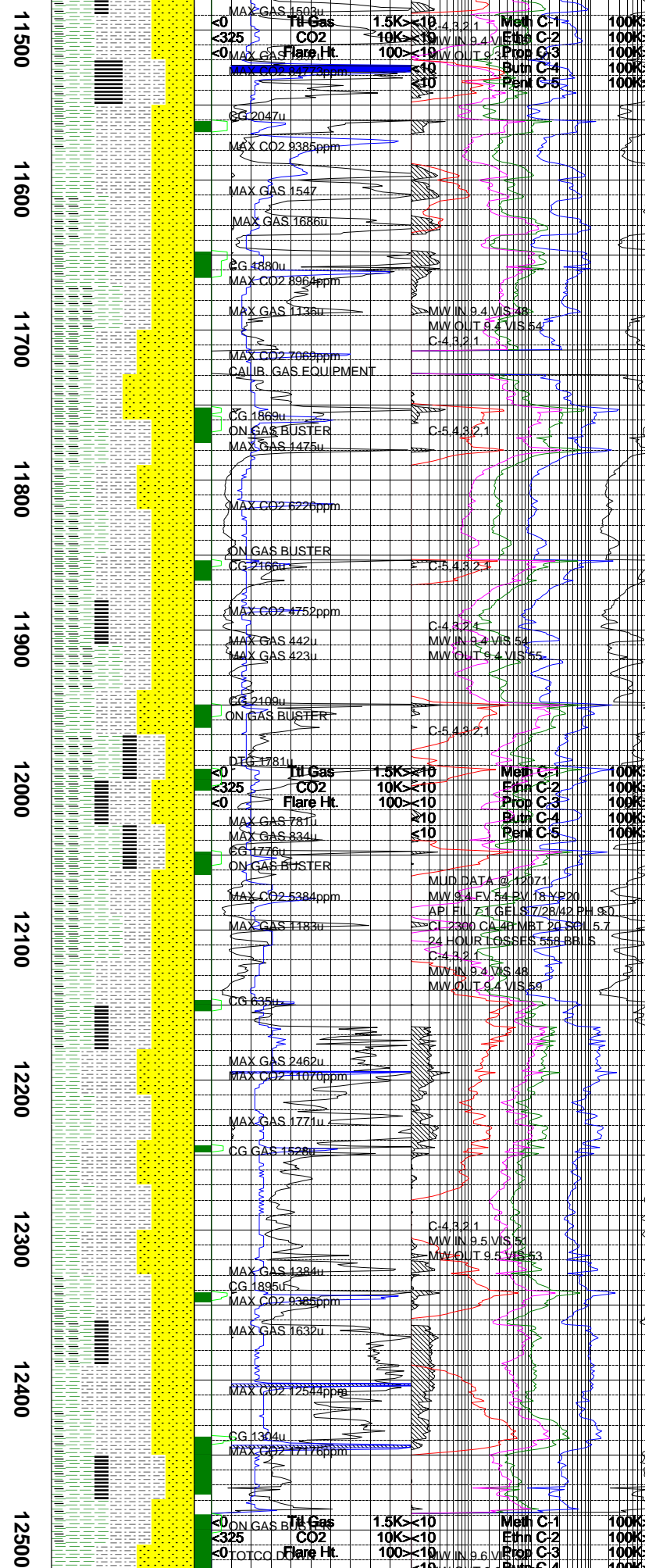
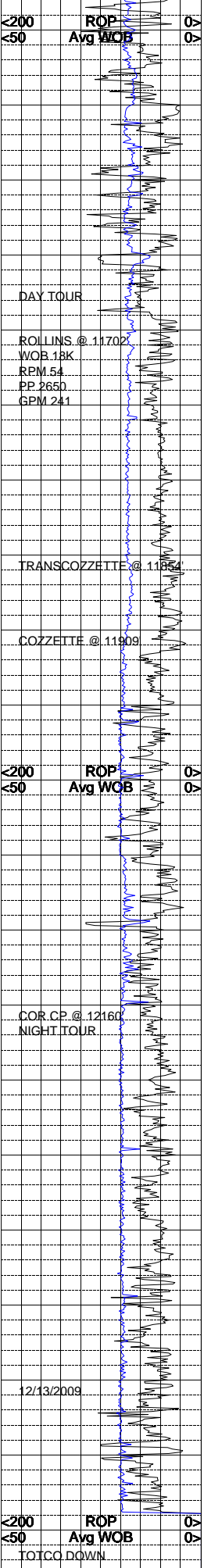
Til Gas	500	>10	Meth C-1	100%
CO2	10K	>10	Ethin C-2	100%
Flare Hit	100	>10	Prop C-3	100%
	<10		Butn C-4	100%
	<10		Perw C-5	100%

WOB 31
RPM 82
PP 3050
GPM 488
ROP
Avg WOB

MAX GAS 828u







ANGULARITY; EASILY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND MODERATE GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY IN COLOR DENSE IN TENACITY WITH BLOCKY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT SILTY TO COARSE GRAIN SILTY TEXTURE WITH AN EARTHY TO FROSTED LUSTER AND THIN TO THICK STRUCTURE.

CARBONACEOUS SHALE = DARK GRAY TO BLACK IN COLOR; BRITTLE TO CRUNCHY TENACITY WITH BLOCKY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; SMOOTH IN TEXTURE WITH A RESINOUS LUSTER AND A THIN TO THICK STRUCTURE.

SHALE = LIGHT GRAY TO MEDIUM DARK GRAY COLORING; TENACITY IS DENSE TO BRITTLE TO SLIGHTLY CRUNCHY; PLANAR FRACTURING; PLATY TO SCALY CUTTINGS; DULL TO SLIGHTLY WAXY LUSTER; SMOOTH TEXTURE; THIN TO LAMINAE STRUCTURE.

SANDSTONE = BROWNISH GRAY TO MEDIUM DARK GRAY TO TRANSLUCENT; FRAMEWORK CONSISTS OF QUARTZ WITH ABOUT 10% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED GRAINS WITH FAIR SORTING; SUBROUNDED TO SUBANGULAR; LOW TO MODERATE SPHERICITY; MODERATE HARDNESS; GRAIN SUPPORTED; VERY SLIGHT REACTION WITH HCL SUGGESTS SILICA CEMENT

SILTSTONE = BROWNISH GRAY TO BROWNISH BLACK; TENACITY IS TOUGH TO DENSE; FRACTURES FROM IRREGULAR TO BLOCKY; CUTTINGS ARE TABULAR; EARTHY LUSTER; TEXTURE IS MOSTLY GRITTY TO SLIGHTLY SILTY; THICK STRUCTURE.

COAL = BLACK; TENACITY IS CRUMBLY TO PULVERULENT; IRREGULAR TO BLOCKY TO CONCHOIDAL FRACTURING; NODULAR TO WEDGELIKE; LUSTER RANGES FROM RESINOUS TO POLISHED TO EARTHY; TEXTURE IS SMOOTH TO CLAYEY; THIN STRUCTURE.

CARBONACEOUS SHALE = GRAYISH BLACK TO DARK GRAY; TOUGH TO DENSE TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY TO SLIGHTLY PLANAR; CUTTINGS ARE PLATY TO TABULAR; LUSTER IS POLISHED TO EARTHY; TEXTURE IS SMOOTH TO SILTY; STRUCTURE IS THIN TO THICK.

SHALE = LIGHT GRAY TO MEDIUM DARK GRAY; TENACITY IS CRUNCHY TO DENSE; FRACTURES FROM PLANAR TO SPLINTERY; CUTTINGS ARE PLATY TO SCALY; LUSTER IS WAXY TO DULL; TEXTURE IS SMOOTH TO SILTY; THIN TO THICK STRUCTURE.

COAL = BLACK IN COLORING; BRITTLE TO CRUNCHY TENACITY WITH BLOCKY TO CONCHOIDAL FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; RESINOUS TO GEMLIKE LUSTER AND A SMOOTH TEXTURE WITH A THIN TO THICK STRUCTURE.

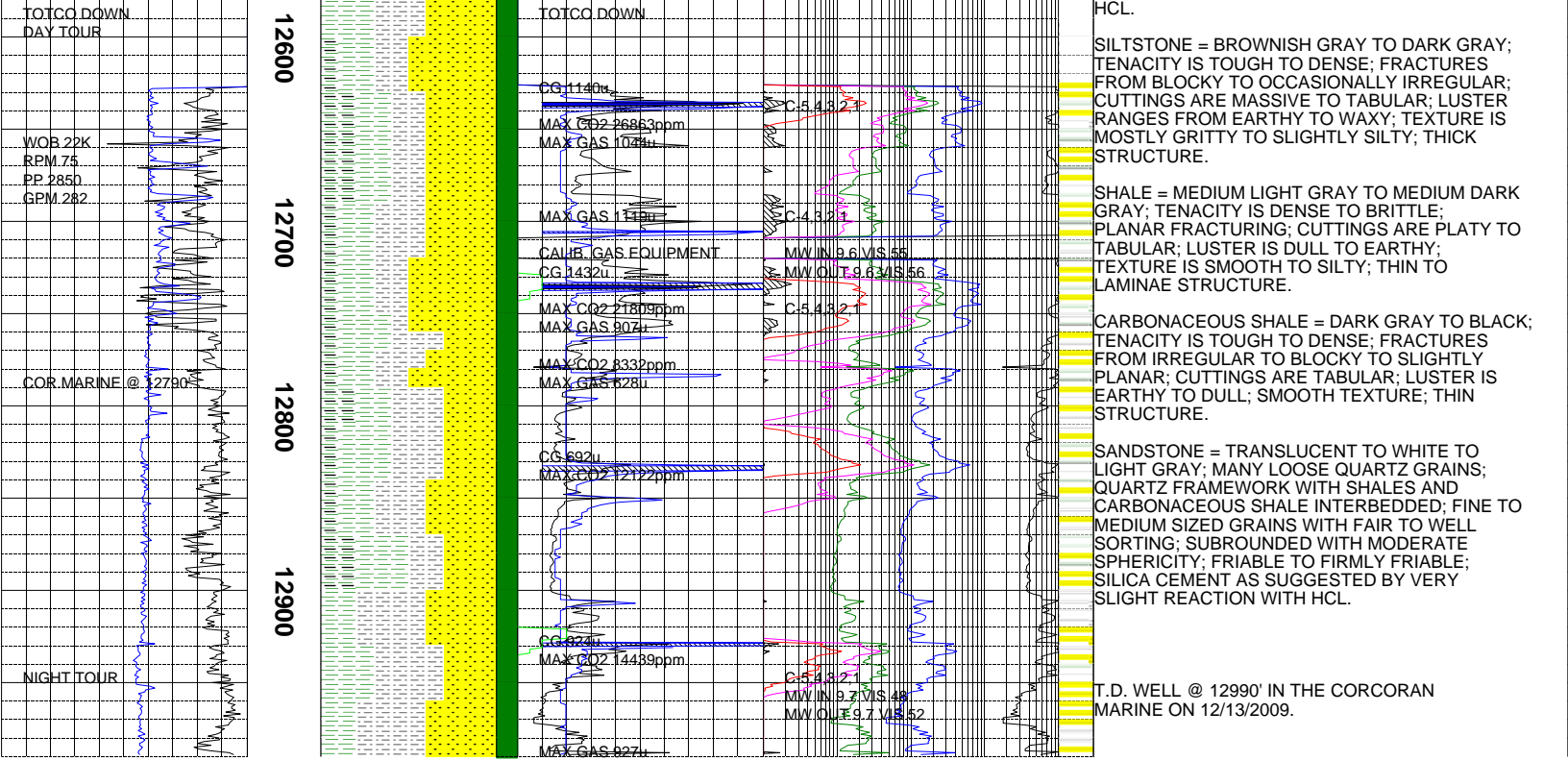
SANDSTONE = LIGHT TO MEDIUM GRAY WITH SOME PALE REDDISH BROWN COLORATION; QUARTZ FRAMEWORK SHOWING ABOUT 7% - 10% LITHICS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH SUBANGULAR TO SUBROUNDED ANGULARITY AND MODERATE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND MODERATE GASES ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY IN COLOR DENSE IN TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO ELONGATED CUTTINGS HABIT; SILTY TEXTURE WITH A DULL TO EARTHY LUSTER AND A THIN STRUCTURE.

CARBONACEOUS SHALE = DARK GRAY TO BLACKISH IN COLORING; BRITTLE TO CRUNCHY IN TENACITY WITH BLOCKY TO SPLINTERY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; RESINOUS IN LUSTER WITH A SMOOTH TEXTURE AND THIN IN STRUCTURE.

SHALE = LIGHT TO MEDIUM GRAY IN COLORING BRITTLE IN TENACITY WITH BLOCKY TO PLANAR FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; WAXY TO GREASY LUSTER WITH A SMOOTH TEXTURE AND THIN TO LAMINAE STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO MEDIUM LIGHT GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ WITH ABOUT 10% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED GRAINS WITH FAIR TO POOR SORTING; SUBROUNDED TO SUBANGULAR; FIRMLY FRIABLE SILICA GRAIN SUPPORTED WITH SILICA CEMENT AS SUGGESTED BY NO REACTION WITH



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