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MUDLOG MD

COMPANY ExxonMobil Production
WELL PCU 197-34B10
FIELD PICEANCE CREEK
REGION ROCKY MOUNTAIN
COORDINATES 39.91558 108.261224
ELEVATION GL 6651.2' KB 6683.2'
COUNTY, STATE RIO BLANCO, CO
API INDEX 05-103-11146-00
SPUD DATE 12/23/2008
CONTRACTOR HE
CO. REP. W.GARNER, S.GUYOTE
RIG/TYPE # 320/FLEX 4S+
LOGGING UNIT ML # 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: 3,944' TO 12,747'
DATES: 10/26/2009 TO 11/18/2009
SCALE: 1" = 100'

16" AT 130'
10.75" AT 3,927'
7" AT 9,005'
AT

MUD TYPES

HOLE SIZE

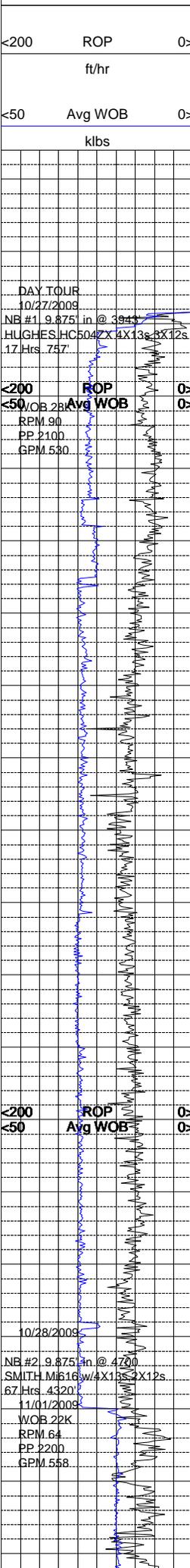
SPUD MUD TO 3,943'
LSND TO 12,747'
TO
TO

14.75" TO 3,943'
9.875" TO 9,020'
6.125" TO 12,747'
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

3900

4000

4100

4200

4300

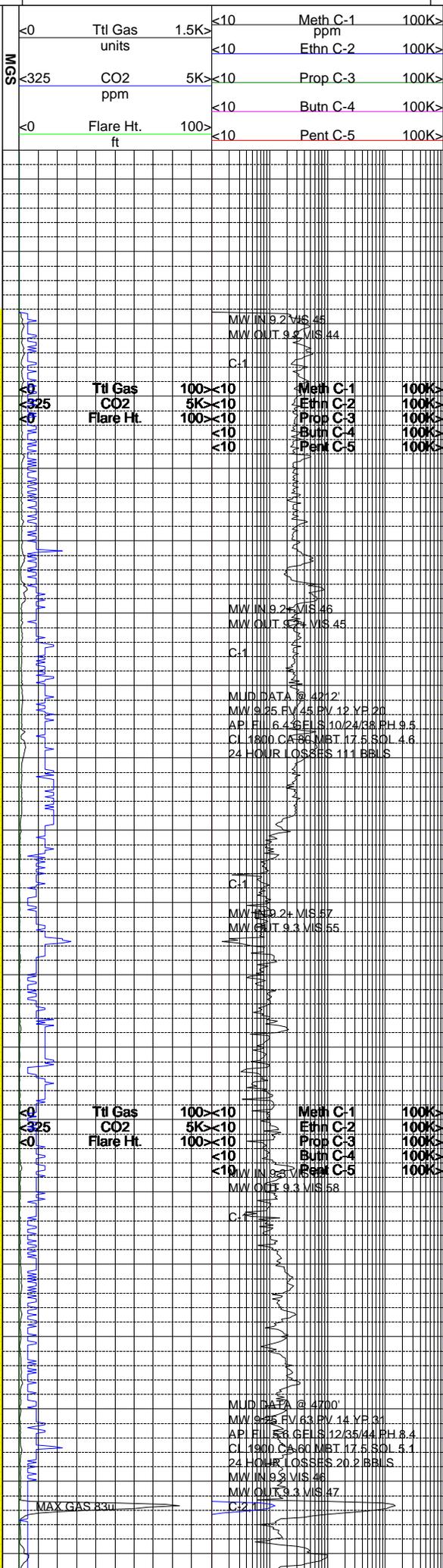
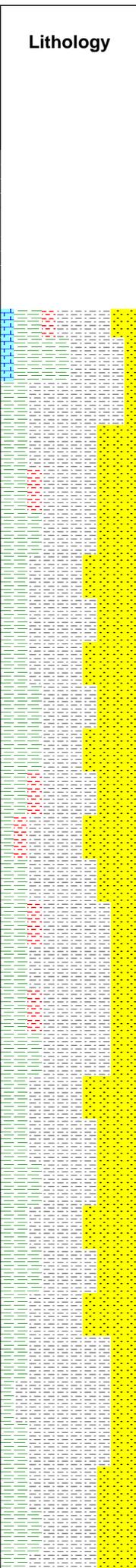
4400

4500

4600

4700

480

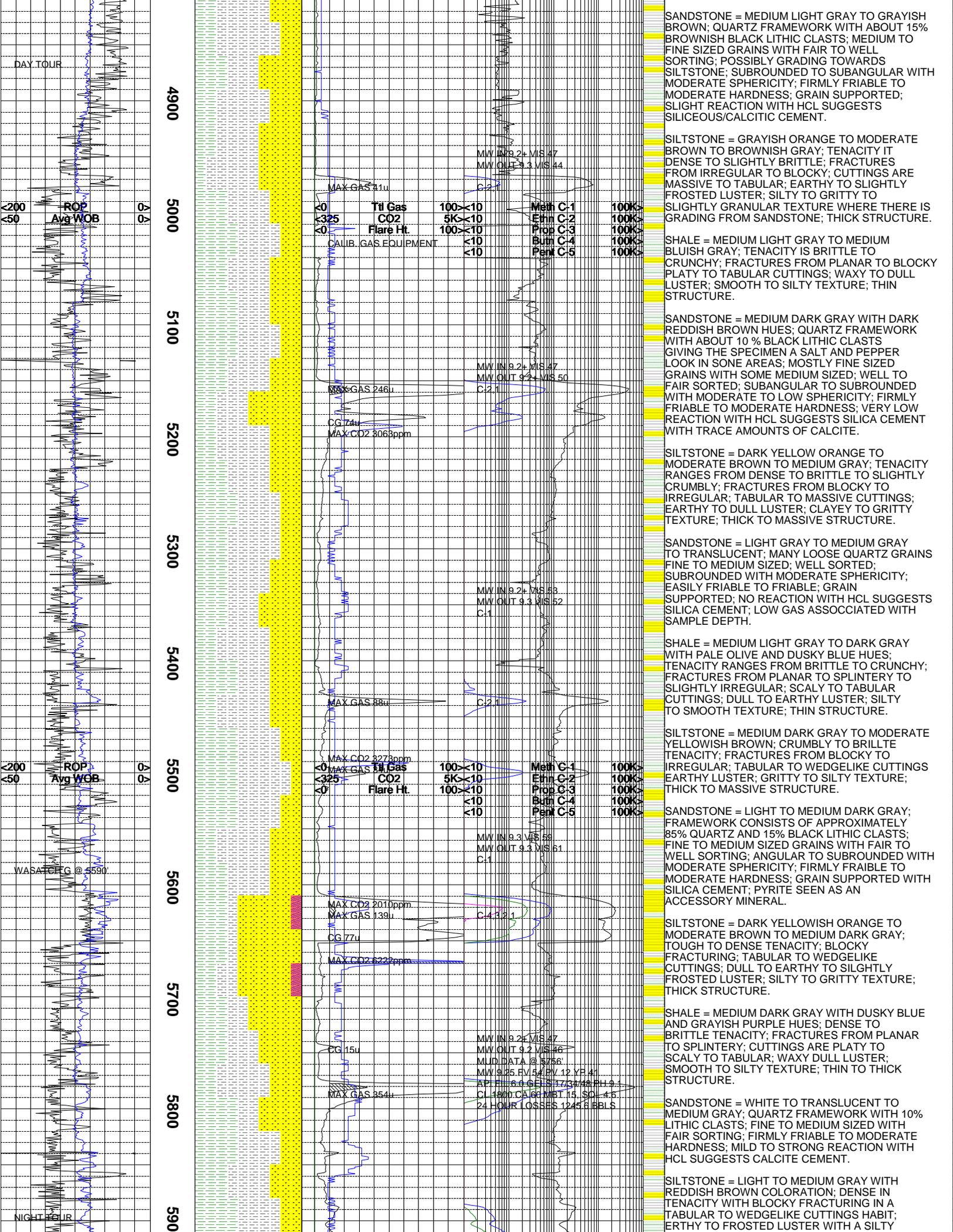


Interp. Lith

Remarks

SURVEY DATA, MUD REPORTS, OTHER INFO.

MUDLOGGING ON THE EXXONMOBIL PCU 197-34B10 WELL ON 10/26/2009 AT 3943' MD ALL COLORS ARE REFERENCED TO THE GSA ROCK COLOR CHART. ALL TRIP AND CONNECTION GASES ARE REFERENCED ABOVE BACKGROUND; ALL OTHERS ARE ABSOLUTE. 1% METH. EQUIV. = 50 UNIT = 10000 PPM. 10 3/4" CASING @ 3927' PIT 12.0 PPG (E)



DAY TOUR

4900

200
500
ROP
Avg WOB

5000

5100

5200

5300

5400

5500

200
500
ROP
Avg WOB

5600

WASATCH @ 5590'

5700

5800

NIGHT TOUR

5900

MAX GAS 21u

<0	Ttl Gas	100X<10	Meth C-1	100K<
<325	CO2	5KX<10	Ethn C-2	100K<
<0	Flare Ht.	100X<10	Prop C-3	100K<
			Burn C-4	100K<
			Penk C-5	100K<

CALIB. GAS EQUIPMENT

<10
<10

MW IN 9.2# VIS 47
MW OUT 9.3# VIS 44

C-2

MAX GAS 246u

CG 74u

MAX CO2 3063ppm

MW IN 9.2# VIS 47
MW OUT 9.2# VIS 50

C-2

MW IN 9.2# VIS 53
MW OUT 9.3# VIS 52

C-1

MAX GAS 88u

C-2

MAX CO2 3273ppm

<0	MAX GAS 11u	100X<10	Meth C-1	100K<
<325	CO2	5KX<10	Ethn C-2	100K<
<0	Flare Ht.	100X<10	Prop C-3	100K<
			Burn C-4	100K<
			Penk C-5	100K<

<10
<10

MW IN 9.3# VIS 58
MW OUT 9.3# VIS 61

C-1

MAX CO2 2010ppm

MAX GAS 139u

CG 77u

MAX CO2 6222ppm

C-4

MW IN 9.2# VIS 47
MW OUT 9.2# VIS 46

C-1

MAX GAS 354u

MUD DATA @ 8766'
MW 9.25 FV 54/PV 12 YR 41
AP: FILL 6.0 GELS 17.3/48 RH 9
C1 1200 CA 60 MBT 15, SOL 4.5
24 HOUR LOSSES 1245.6 EBLS

SANDSTONE = MEDIUM LIGHT GRAY TO GRAYISH BROWN; QUARTZ FRAMEWORK WITH ABOUT 15% BROWNISH BLACK LITHIC CLASTS; MEDIUM TO FINE SIZED GRAINS WITH FAIR TO WELL SORTING; POSSIBLY GRADING TOWARDS SILTSTONE; SUBROUNDED TO SUBANGULAR WITH MODERATE SPHERICITY; FIRMLY FRIABLE TO MODERATE HARDNESS; GRAIN SUPPORTED; SLIGHT REACTION WITH HCL SUGGESTS SILICEOUS/CALCITIC CEMENT.

SILTSTONE = GRAYISH ORANGE TO MODERATE BROWN TO BROWNISH GRAY; TENACITY IT DENSE TO SLIGHTLY BRITTLE; FRACTURES FROM IRREGULAR TO BLOCKY; CUTTINGS ARE MASSIVE TO TABULAR; EARTHY TO SLIGHTLY FROSTED LUSTER; SILTY TO GRITTY TO SLIGHTLY GRANULAR TEXTURE WHERE THERE IS GRADING FROM SANDSTONE; THICK STRUCTURE.

SHALE = MEDIUM LIGHT GRAY TO MEDIUM BLUISH GRAY; TENACITY IS BRITTLE TO CRUNCHY; FRACTURES FROM PLANAR TO BLOCKY PLATY TO TABULAR CUTTINGS; WAXY TO DULL LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = MEDIUM DARK GRAY WITH DARK REDDISH BROWN HUES; QUARTZ FRAMEWORK WITH ABOUT 10 % BLACK LITHIC CLASTS GIVING THE SPECIMEN A SALT AND PEPPER LOOK IN SOME AREAS; MOSTLY FINE SIZED GRAINS WITH SOME MEDIUM SIZED; WELL TO FAIR SORTED; SUBANGULAR TO SUBROUNDED WITH MODERATE TO LOW SPHERICITY; FIRMLY FRIABLE TO MODERATE HARDNESS; VERY LOW REACTION WITH HCL SUGGESTS SILICA CEMENT WITH TRACE AMOUNTS OF CALCITE.

SILTSTONE = DARK YELLOW ORANGE TO MODERATE BROWN TO MEDIUM GRAY; TENACITY RANGES FROM DENSE TO BRITTLE TO SLIGHTLY CRUMBLY; FRACTURES FROM BLOCKY TO IRREGULAR; TABULAR TO MASSIVE CUTTINGS; EARTHY TO DULL LUSTER; CLAYEY TO GRITTY TEXTURE; THICK TO MASSIVE STRUCTURE.

SANDSTONE = LIGHT GRAY TO MEDIUM GRAY TO TRANSLUCENT; MANY LOOSE QUARTZ GRAINS FINE TO MEDIUM SIZED; WELL SORTED; SUBROUNDED WITH MODERATE SPHERICITY; EASILY FRIABLE TO FRIABLE; GRAIN SUPPORTED; NO REACTION WITH HCL SUGGESTS SILICA CEMENT; LOW GAS ASSOCIATED WITH SAMPLE DEPTH.

SHALE = MEDIUM LIGHT GRAY TO DARK GRAY WITH PALE OLIVE AND DUSKY BLUE HUES; TENACITY RANGES FROM BRITTLE TO CRUNCHY; FRACTURES FROM PLANAR TO SPLINTERY TO SLIGHTLY IRREGULAR; SCALY TO TABULAR CUTTINGS; DULL TO EARTHY LUSTER; SILTY TO SMOOTH TEXTURE; THIN STRUCTURE.

SILTSTONE = MEDIUM DARK GRAY TO MODERATE YELLOWISH BROWN; CRUMBLY TO BRITTLE TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR; TABULAR TO WEDGELIKE CUTTINGS EARTHY LUSTER; GRITTY TO SILTY TEXTURE; THICK TO MASSIVE STRUCTURE.

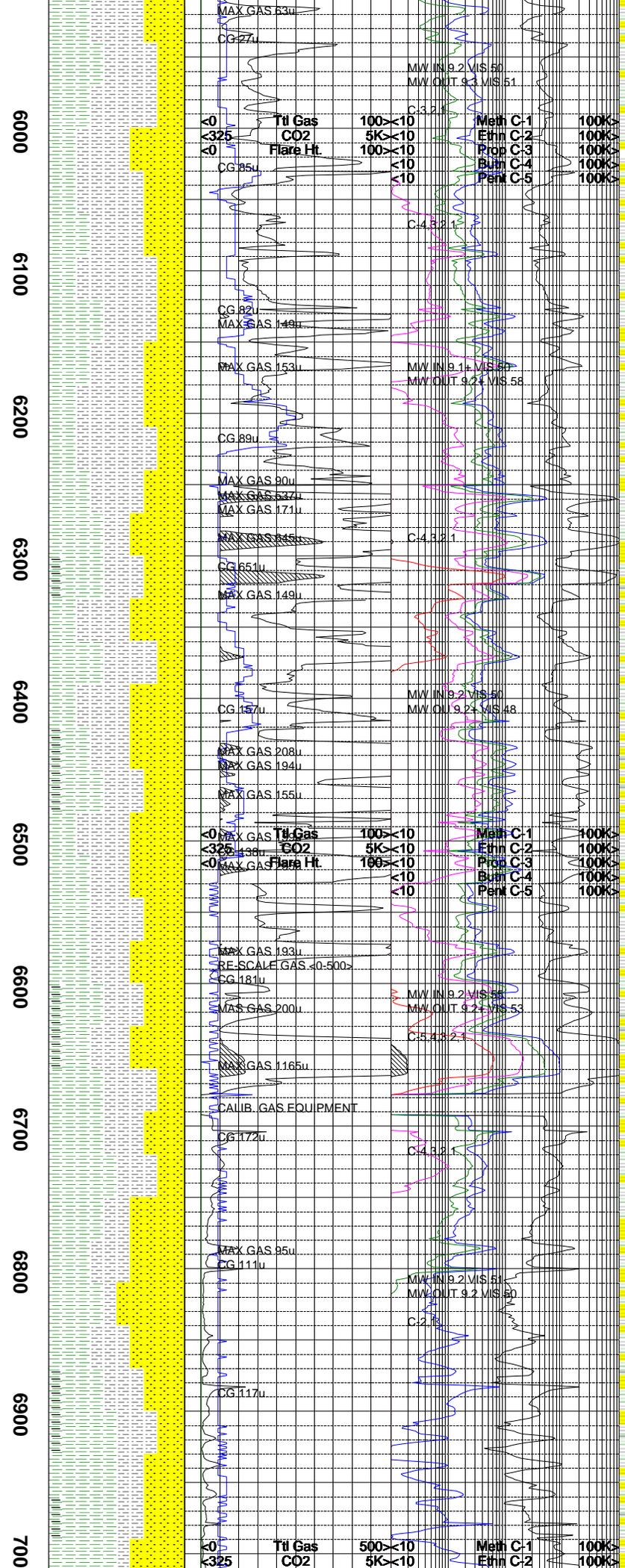
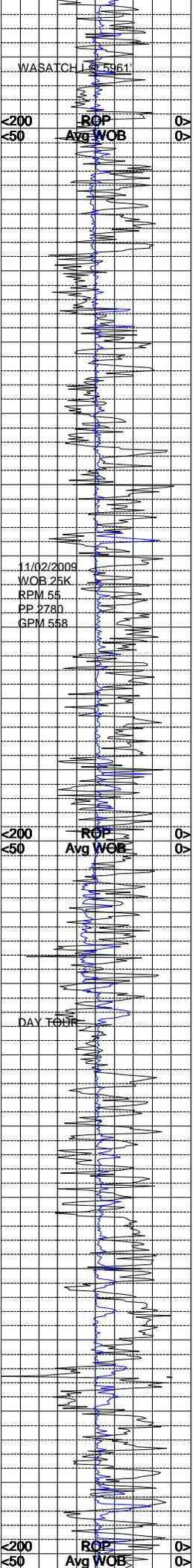
SANDSTONE = LIGHT TO MEDIUM DARK GRAY; FRAMEWORK CONSISTS OF APPROXIMATELY 85% QUARTZ AND 15% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED GRAINS WITH FAIR TO WELL SORTING; ANGULAR TO SUBROUNDED WITH MODERATE SPHERICITY; FIRMLY FRIABLE TO MODERATE HARDNESS; GRAIN SUPPORTED WITH SILICA CEMENT; PYRITE SEEN AS AN ACCESSORY MINERAL.

SILTSTONE = DARK YELLOWISH ORANGE TO MODERATE BROWN TO MEDIUM DARK GRAY; TOUGH TO DENSE TENACITY; BLOCKY FRACTURING; TABULAR TO WEDGELIKE CUTTINGS; DULL TO EARTHY TO SILHTLY FROSTED LUSTER; SILTY TO GRITTY TEXTURE; THICK STRUCTURE.

SHALE = MEDIUM DARK GRAY WITH DUSKY BLUE AND GRAYISH PURPLE HUES; DENSE TO BRITTLE TENACITY; FRACTURES FROM PLANAR TO SPLINTERY; CUTTINGS ARE PLATY TO SCALY TO TABULAR; WAXY DULL LUSTER; SMOOTH TO SILTY TEXTURE; THIN TO THICK STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO MEDIUM GRAY; QUARTZ FRAMEWORK WITH 10% LITHIC CLASTS; FINE TO MEDIUM SIZED WITH FAIR SORTING; FIRMLY FRIABLE TO MODERATE HARDNESS; MILD TO STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH REDDISH BROWN COLORATION; DENSE IN TENACITY WITH BLOCKY FRACTURING IN A TABULAR TO WEDGELIKE CUTTINGS HABIT; ERTHY TO FROSTED LUSTER WITH A SILTY



TEXTURE AND THIN IN STRUCTURE.

SHALE = LIGHT TO MEDIUM GRAY WITH GRAYISH BLUE GREEN 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 IN STRUCTURE.

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK INCLUDING 5% - 10% LITHICS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; EASILY FRIABLE TO FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND LOW GAS SHOWS ASSOCIATED WITH THESE SANDS.

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

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

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING WITH A QUARTZ FRAMEWORK; MODERATE SORTING OF COARSE GRAIN SIZING WITH FAIR TO MODERATE SPHERICITY AND SUBROUNDED ANGULARITY; FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND LOW GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

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

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

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING WITH A QUARTZ FRAMEWORK; MODERATE SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBANGULAR TO SUBROUNDED ANGULARITY; EASILY FRIABLE TO FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND LOW GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = MEDIUM TO DARK GRAY WITH SOME REDDISH BROWN COLORATION; DENSE IN TENACITY WITH BLOCKY FRACTURING IN A TABULAR TYPE CUTTINGS HABIT; EARTHY IN LUSTER WITH A SMOOTH TEXTURE AND THIN IN STRUCTURE.

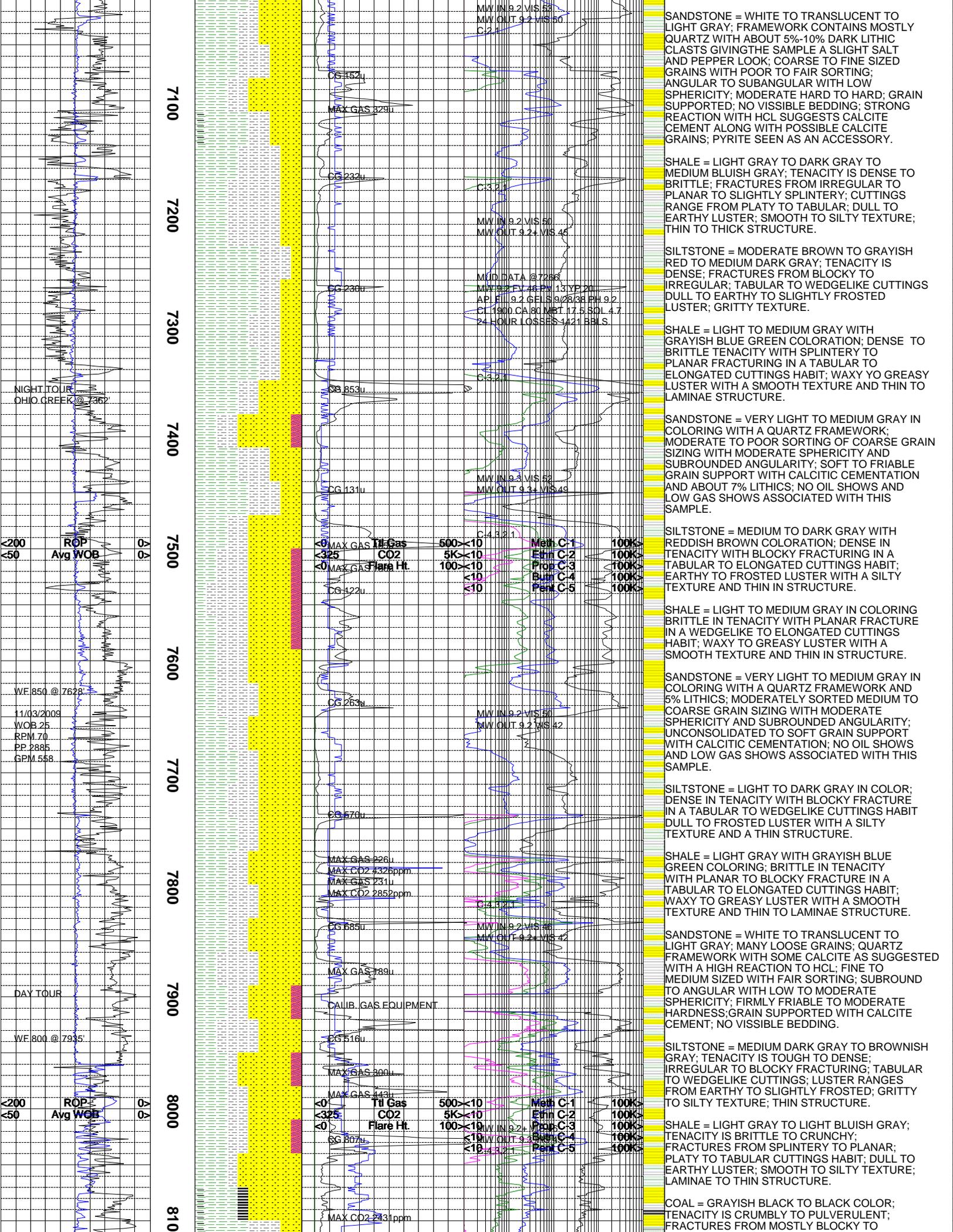
SHALE = LIGHT GRAY TO MEDIUM GRAY WITH GREENISH GRAY AND LIGHT BLuish GRAY HUES DENSE TO BRITTLE TENACITY; FRACTURES FROM PLANAR TO SPLINTERY; PLATY TO SCALY CUTTINGS; WAXY TO DULL TO SLIGHTLY EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = MEDIUM DARK GRAY TO LIGHT GRAY TO WHITE; QUARTZ FRAMEWORK WITH ABOUT 10% BLACK LITHIC CLASTS GIVING THE SPECIMEN A SALT AND PEPPER APPEARANCE; MEDIUM TO FINE SIZED GRAINS WITH FAIR TO WELL SORTING; SUBANGULAR TO SUBROUNDED; MODERATE HARD TO HARD; GRAIN SUPPORTED WITH SILICA CEMENT AS INDICATED WITH A STRONG REACTION TO HCL.

SHALE = LIGHT GRAY TO MEDIUM BLuish GRAY TENACITY IT DENSE TO BRITTLE TO SLIGHTLY CRUNCHY; FRACTURES FROM PLANAR TO BLOCKY PLATY TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; TEXTURE IS SMOOTH TO SILTY; THIN TO THICK STRUCTURE.

CARBONACEOUS SHALE = BROWNISH BLACK TO BLACK; BRITTLE TO CRUMBLY TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR; WEDGELIKE TO TABULAR CUTTINGS; EARTHY TO SLIGHTLY RESINOUS LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SILTSTONE = LIGHT TO MEDIUM DARK GRAY TO BROWNISH GRAY; TENACITY IS TOUGH TO DENSE TO SLIGHTLY BRITTLE; BLOCKY FRACTURING; TABULAR CUTTINGS; LUSTER IS EARTHY TO SLIGHTLY FROSTED; GRITTY TO SILTY TEXTURE; THIN STRUCTURE.



7100
7200
7300
7400
7500
7600
7700
7800
7900
8000
810

SANDSTONE = WHITE TO TRANSLUCENT TO LIGHT GRAY; FRAMEWORK CONTAINS MOSTLY QUARTZ WITH ABOUT 5%-10% DARK LITHIC CLASTS GIVING THE SAMPLE A SLIGHT SALT AND PEPPER LOOK; COARSE TO FINE SIZED GRAINS WITH POOR TO FAIR SORTING; ANGULAR TO SUBANGULAR WITH LOW SPHERICITY; MODERATE HARD TO HARD; GRAIN SUPPORTED; NO VISIBLE BEDDING; STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT ALONG WITH POSSIBLE CALCITE GRAINS; PYRITE SEEN AS AN ACCESSORY.

SHALE = LIGHT GRAY TO DARK GRAY TO MEDIUM BLuish GRAY; TENACITY IS DENSE TO BRITTLE; FRACTURES FROM IRREGULAR TO PLANAR TO SLIGHTLY SPLINTERY; CUTTINGS RANGE FROM PLATY TO TABULAR; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN TO THICK STRUCTURE.

SILTSTONE = MODERATE BROWN TO GRAYISH RED TO MEDIUM DARK GRAY; TENACITY IS DENSE; FRACTURES FROM BLOCKY TO IRREGULAR; TABULAR TO WEDGELIKE CUTTINGS DULL TO EARTHY TO SLIGHTLY FROSTED LUSTER; GRITTY TEXTURE.

SHALE = LIGHT TO MEDIUM GRAY WITH GRAYISH BLUE GREEN COLORATION; DENSE TO BRITTLE TENACITY WITH SPLINTERY 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 WITH A QUARTZ FRAMEWORK; MODERATE TO POOR SORTING OF COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBROUNDED ANGULARITY; SOFT TO FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION AND ABOUT 7% LITHICS; NO OIL SHOWS AND LOW GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

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

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

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING WITH A QUARTZ FRAMEWORK AND 5% LITHICS; MODERATELY SORTED MEDIUM TO COARSE GRAIN SIZING WITH MODERATE SPHERICITY AND SUBROUNDED ANGULARITY; UNCONSOLIDATED TO SOFT GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND LOW GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

SILTSTONE = LIGHT TO DARK GRAY IN COLOR; DENSE IN TENACITY WITH BLOCKY FRACTURE IN A TABULAR TO WEDGELIKE CUTTINGS HABIT DULL TO FROSTED LUSTER WITH A SILTY TEXTURE AND A THIN STRUCTURE.

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

SANDSTONE = WHITE TO TRANSLUCENT TO LIGHT GRAY; MANY LOOSE GRAINS; QUARTZ FRAMEWORK WITH SOME CALCITE AS SUGGESTED WITH A HIGH REACTION TO HCL; FINE TO MEDIUM SIZED WITH FAIR SORTING; SUBROUND TO ANGULAR WITH LOW TO MODERATE SPHERICITY; FIRMLY FRIABLE TO MODERATE HARDNESS; GRAIN SUPPORTED WITH CALCITE CEMENT; NO VISIBLE BEDDING.

SILTSTONE = MEDIUM DARK GRAY TO BROWNISH GRAY; TENACITY IS TOUGH TO DENSE; IRREGULAR TO BLOCKY FRACTURING; TABULAR TO WEDGELIKE CUTTINGS; LUSTER RANGES FROM EARTHY TO SLIGHTLY FROSTED; GRITTY TO SILTY TEXTURE; THIN STRUCTURE.

SHALE = LIGHT GRAY TO LIGHT BLuish GRAY; TENACITY IS BRITTLE TO CRUNCHY; FRACTURES FROM SPLINTERY TO PLANAR; PLATY TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; LAMINAE TO THIN STRUCTURE.

COAL = GRAYISH BLACK TO BLACK COLOR; TENACITY IS CRUMBLY TO PULVERULENT; FRACTURES FROM MOSTLY BLOCKY TO

MAX GAS	Ti Gas	500x<10	Meth C-1	100%
<325	CO2	5Kx<10	Ethn C-2	100%
<0	Flare Ht	100x<10	Prop C-3	100%
		<10	Burn C-4	100%
			Perm C-5	100%

NIGHT TOUR
OHIO CREEK @ 7362

ROP
Avg WOB

WF 850 @ 7628
11/03/2009
WOB 25
RPM 70
PP 2885
GPM 558

DAY TOUR

WF 800 @ 7935

ROP
Avg WOB

MAX CO2 2431ppm

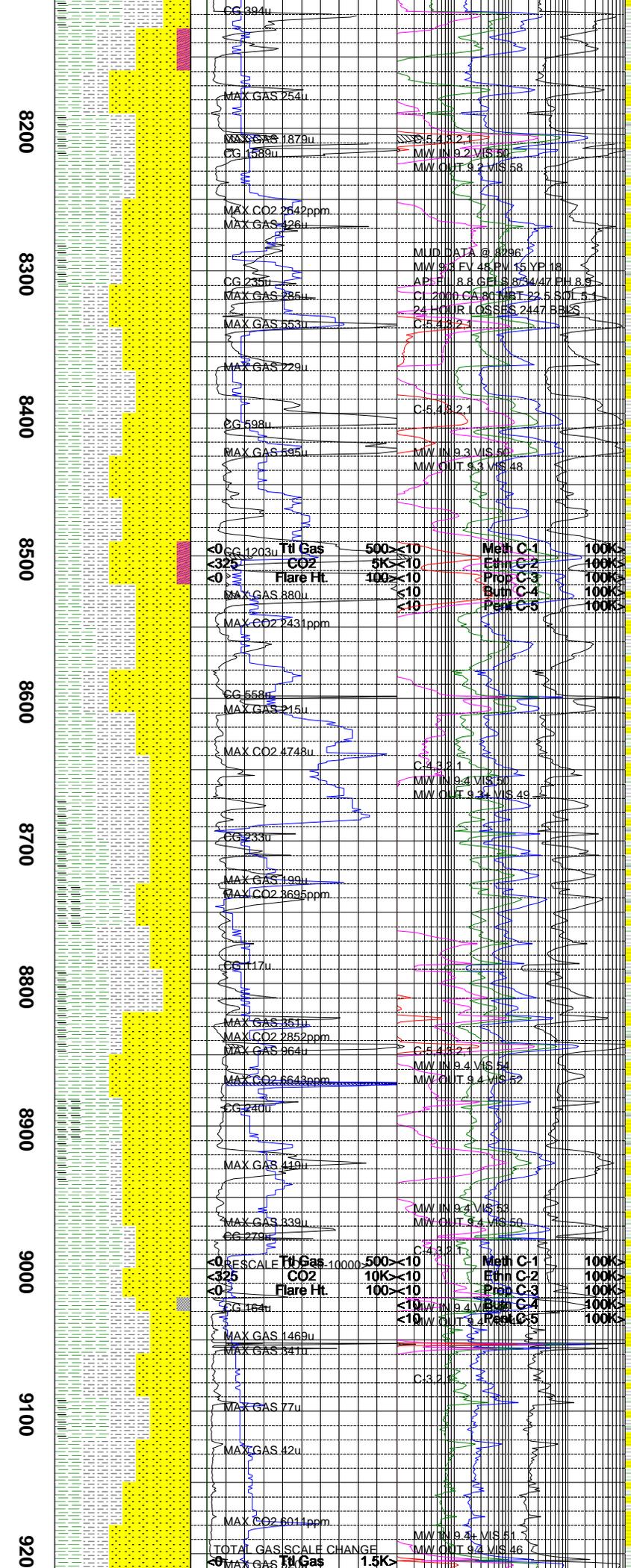
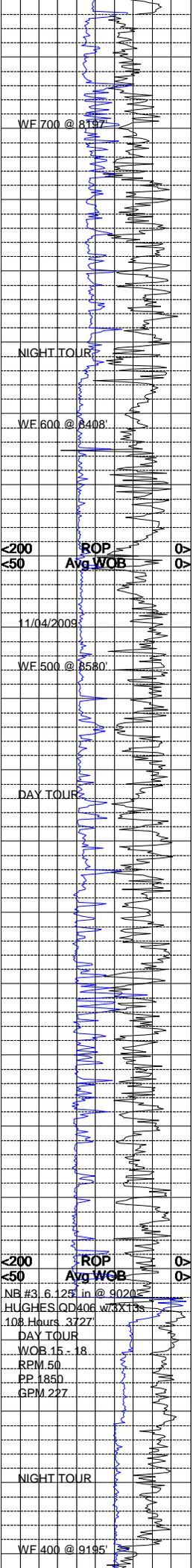
MWD DATA @ 7286
MW IN 9.2 VIS 50
MW OUT 9.2+ VIS 46
API FL 9.2 GELS 9/26/38 PH 9.2
CT 1900 CA 80 MBT 17.5 SOL 4.7
24 HOUR LOSSES 4421.5 BL S

MW IN 9.3 VIS 52
MW OUT 9.3+ VIS 46

MW IN 9.2 VIS 50
MW OUT 9.2+ VIS 42

MW IN 9.2 VIS 46
MW OUT 9.2+ VIS 41

MW IN 9.2+ VIS 46
MW OUT 9.3+ VIS 41



IRREGULAR; WEDGELIKE TO NODULAR CUTTINGS RESINOUS TO EARTHY LUSTER; SMOOTH TEXTURE; THIN STRUCTURE; SLIGHTLY HIGHER GAS THAN CURRENT BACKGROUND LEVELS.

SANDSTONE = TRANSLUCENT TO WHITE; MANY LOOSE GRAINS; VERY FINE TO MEDIUM SIZED WITH FAIR TO POOR SORTING; SUBROUNDED TO SUBANGULAR WITH POOR TO MODERATE SPHERICITY; FRIABLE TO MODERATE HARDNESS STRONG REACTION WITH HCL SUGGEST CALCITE CEMENT AND POSSIBLE SOME CALCITE GRAINS; PYRITE SEEN AS AN ACCESSORY MINERAL; DOMINATE MATRIX SUPPORTED; NO VISSIBLE BEDDING.

SHALE = LIGHT GRAY TO MEDIUM DARK GRAY; CRUNCHY TO BRITTLE TENACITY; SPLINTERY TO PLANAR FRACTURING; SCALY TO ELONGATED CUTTINGS; DULL TO EARTHY LUSTER; SMOOTH TEXTURE, LAMINAE TO THIN STRUCTURE.

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

SANDSTONE = VERY LIGHT TO MEDIUM GRAY IN COLORING WITH A QUARTZ FRAMEWORK AND 3% LITHICS; FAIR TO MODERATE SORTING OF COARSE GRAIN SIZING WITH SUBROUNDED ANGULARITY AND MODERATE SPHERICITY; SOFT TO UNCONSOLIDATED GRAIN SUPPORT WITH CALCITIC CEMENTATION; NO OIL SHOWS AND MEDIUM GAS SHOWS ASSOCIATED WITH THIS SAMPLE.

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

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

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING WITH A QUARTZ FRAMEWORK AND 6% LITHICS; EASILY FRIABLE TO FRIABLE WITH MEDIUM TO COARSE GRAIN SIZING; MODERATE SPHERICITY WITH SUBANGULAR TO SUBROUNDED ANGULARITY; GRAIN SUPPORT WITH CALCITIC CEMENTATION.

CARBONACEOUS SHALE = GRAYISH BLACK TO BLACK TO BROWNISH BLACK; TENACITY IS DENSE TO BRITTLE; FRACTURES FROM BLOCKY TO IRREGULAR AND SLIGHTLY CONCHOIDAL; NODULAR TO WEDGELIKE CUTTINGS HABIT; RESINOUS TO EARTHY LUSTER.

SILTSTONE = BROWNISH GRAY TO MEDIUM DARK GRAY; TENACITY IS DENSE TO CRUNCHY; MOSTLY IRREGULAR TO BLOCKY FRACTURING; TABULAR CUTTINGS; DULL TO EARTHY TO SLIGHTLY FROSTED LUSTER; GRITTY TO SILTY TEXTURE; THIN TO THICK STRUCTURE.

SHALE = MEDIUM DARK GRAY TO MEDIUM BLUIISH GRAY; TENACITY IS BRITTLE TO CRUNCHY; SPLINTERY TO PLANAR FRACTURING; CUTTINGS ARE PLATY TO FLAKY TO ELONGATED SMOOTH TO SILTY TEXTURE.

SANDSTONE = LIGHT GRAY TO WHITE TO TRANSLUCENT; QUARTZ FRAMEWORK WITH ABUNDENT LOOSE GRAINS; FINE TO COARSE SIZED GTAINS WITH FAIR SORTING; ANGULAR TO SUBROUNDED; FIRMLY FRIABLE; SILICEOUS CALCITIC CEMENT; NO VISSIBLE BEDDING.

NOTE = INTERMEDIATE TD REACHED AT 9020' MD ON 11/04/2009 AT APPROXIMATELY 12:00 PM.

NOTE = BEGAN DRILLING PRODUCTION ON 11/13/2009 AT APPROXIMATELY 12:30 PM.

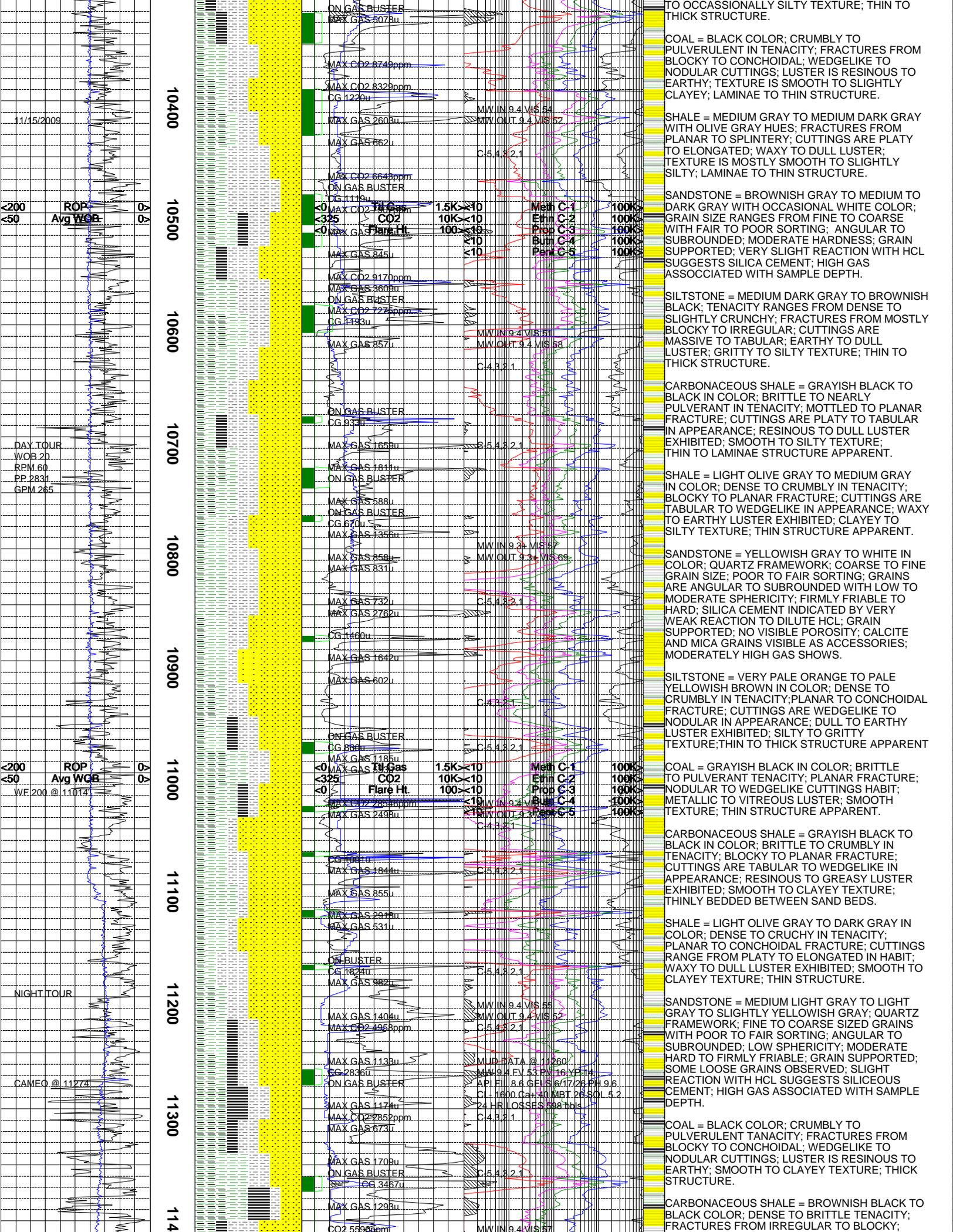
SHALE = YELLOWISH GRAY TO DARK GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; CONCHOIDAL TO PLANAR FRACTURE; CUTTINGS ARE SCALY TO TABULAR IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE; THIN STRUCTURE APPARENT; NONCALCAREOUS.

SANDSTONE = MEDIUM GRAY TO WHITE TO SLIGHTLY BROWNISH GRAY; QUARTZ FRAMEWORK FINE TO MEDIUM SIZED GRAINS WITH FAIR TO WELL SORTING; ANGULAR TO SUBROUNDED WITH MODERATE TO LOW SPHERICITY; MODERATE HARD TO HARD WITH SOME LOOSE GRAINS; STRONG REACTION WITH HCL SUGGESTS CALCAREOUS CEMENT; GRAIN SUPPORTED.

<0	CG 1203u	Ttl Gas	500	<10	Meth C-1	100%
<325		CO2	5K	<10	Ethn C-2	100%
<0		Flare Ht	100	<10	Prop C-3	100%
					Bum C-4	100%
					Penk C-5	100%

<0	RESCALE	Ttl Gas	10000	500	<10	Meth C-1	100%
<325		CO2	10K	<10	Ethn C-2	100%	
<0		Flare Ht	100	<10	Prop C-3	100%	
					Bum C-4	100%	
					Penk C-5	100%	

TOTAL GAS SCALE CHANGE
 MAX GAS 1.5K



COAL = BLACK COLOR; CRUMBLY TO PULVERULENT IN TENACITY; FRACTURES FROM BLOCKY TO CONCHOIDAL; WEDGELIKE TO NODULAR CUTTINGS; LUSTER IS RESINOUS TO EARTHY; TEXTURE IS SMOOTH TO SLIGHTLY CLAYEY; LAMINAE TO THIN STRUCTURE.

SHALE = MEDIUM GRAY TO MEDIUM DARK GRAY WITH OLIVE GRAY HUES; FRACTURES FROM PLANAR TO SPLINTERY; CUTTINGS ARE PLATY TO ELONGATED; WAXY TO DULL LUSTER; TEXTURE IS MOSTLY SMOOTH TO SLIGHTLY SILTY; LAMINAE TO THIN STRUCTURE.

SANDSTONE = BROWNISH GRAY TO MEDIUM TO DARK GRAY WITH OCCASIONAL WHITE COLOR; GRAIN SIZE RANGES FROM FINE TO COARSE WITH FAIR TO POOR SORTING; ANGULAR TO SUBROUNDED; MODERATE HARDNESS; GRAIN SUPPORTED; VERY SLIGHT REACTION WITH HCL SUGGESTS SILICA CEMENT; HIGH GAS ASSOCIATED WITH SAMPLE DEPTH.

SILTSTONE = MEDIUM DARK GRAY TO BROWNISH BLACK; TENACITY RANGES FROM DENSE TO SLIGHTLY CRUNCHY; FRACTURES FROM MOSTLY BLOCKY TO IRREGULAR; CUTTINGS ARE MASSIVE TO TABULAR; EARTHY TO DULL LUSTER; GRITTY TO SILTY TEXTURE; THIN TO THICK STRUCTURE.

CARBONACEOUS SHALE = GRAYISH BLACK TO BLACK IN COLOR; BRITTLE TO NEARLY PULVERULENT IN TENACITY; MOTTLED TO PLANAR FRACTURE; CUTTINGS ARE PLATY TO TABULAR IN APPEARANCE; RESINOUS TO DULL LUSTER EXHIBITED; SMOOTH TO SILTY TEXTURE; THIN TO LAMINAE STRUCTURE APPARENT.

SHALE = LIGHT OLIVE GRAY TO MEDIUM GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; WAXY TO EARTHY LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE; THIN STRUCTURE APPARENT.

SANDSTONE = YELLOWISH GRAY TO WHITE IN COLOR; QUARTZ FRAMEWORK; COARSE TO FINE GRAIN SIZE; POOR TO FAIR SORTING; GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; FIRMLY FRIABLE TO HARD; SILICA CEMENT INDICATED BY VERY WEAK REACTION TO DILUTE HCL; GRAIN SUPPORTED; NO VISIBLE POROSITY; CALCITE AND MICA GRAINS VISIBLE AS ACCESSORIES; MODERATELY HIGH GAS SHOWS.

SILTSTONE = VERY PALE ORANGE TO PALE YELLOWISH BROWN IN COLOR; DENSE TO CRUMBLY IN TENACITY; PLANAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGELIKE TO NODULAR IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT.

COAL = GRAYISH BLACK IN COLOR; BRITTLE TO PULVERULENT TENACITY; PLANAR FRACTURE; NODULAR TO WEDGELIKE CUTTINGS HABIT; METALLIC TO VITREOUS LUSTER; SMOOTH TEXTURE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = GRAYISH BLACK TO BLACK IN COLOR; BRITTLE TO CRUMBLY IN TENACITY; BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO WEDGELIKE IN APPEARANCE; RESINOUS TO GREASY LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THINLY BEDDED BETWEEN SAND BEDS.

SHALE = LIGHT OLIVE GRAY TO DARK GRAY IN COLOR; DENSE TO CRUNCHY IN TENACITY; PLANAR TO CONCHOIDAL FRACTURE; CUTTINGS RANGE FROM PLATY TO ELONGATED IN HABIT; WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE.

SANDSTONE = MEDIUM LIGHT GRAY TO LIGHT GRAY TO SLIGHTLY YELLOWISH GRAY; QUARTZ FRAMEWORK; FINE TO COARSE SIZED GRAINS WITH POOR TO FAIR SORTING; ANGULAR TO SUBROUNDED; LOW SPHERICITY; MODERATE HARD TO FIRMLY FRIABLE; GRAIN SUPPORTED; SOME LOOSE GRAINS OBSERVED; SLIGHT REACTION WITH HCL SUGGESTS SILICEOUS CEMENT; HIGH GAS ASSOCIATED WITH SAMPLE DEPTH.

COAL = BLACK COLOR; CRUMBLY TO PULVERULENT TENACITY; FRACTURES FROM BLOCKY TO CONCHOIDAL; WEDGELIKE TO NODULAR CUTTINGS; LUSTER IS RESINOUS TO EARTHY; SMOOTH TO CLAYEY TEXTURE; THICK STRUCTURE.

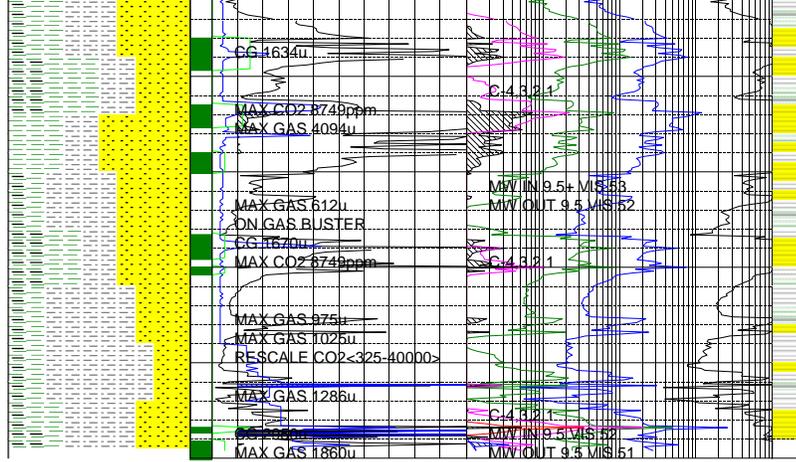
CARBONACEOUS SHALE = BROWNISH BLACK TO BLACK COLOR; DENSE TO BRITTLE TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY;

11/18/2009

COR. MARINE @ 12650'
DAY TOUR
WOB 25
RPM 55
PP 2800
GPM 227

12600

12700



SHALE = LIGHT GRAY TO MEDIUM DARK GRAY;
DENSE TO BRITTLE TENACITY; SPLINTERY
FRACTURING; SCALY TO ELONGATED CUTTINGS;
WAXY TO EARTHY LUSTER; SILTY TO SMOOTH
TEXTURE; THIN TO THICK STRUCTURE.

SILTSTONE = BROWNISH GRAY TO BROWNISH
BLACK TO GRAYISH BLACK; TOUGH TO DENSE
TENACITY; FRACTURES FROM MOSTLY BLOCKY
TO IRREGULAR; CUTTINGS ARE SLIGHTLY
MASSIVE TO TABULAR; LUSTER IS EARTHY TO
DULL LUSTER; SILTY TO GRITTY LUSTER WITH
GRADING TOWARDS SHALE.

SHALE = MEDIUM DARK GRAY TO BLACK IN
COLOR; TOUGH TO BRITTLE IN TENACITY;
PLANAR TO CONCHOIDAL FRACTURE; BLADED TO
ELONGATED CUTTINGS HABIT; WAXY TO DULL
LUSTER; THIN STRUCTURE APPARENT.

NOTE = TD WELL AT 12744' MD ON 11/18/09
AT APPROXIMATELY 15:00.

The log data, interpretations and recommendation provided by Epoch are inferences and assumptions based on measurements of drilling fluids. Such inferences and assumptions are not infallible and reasonable professionals may differ. Epoch does not represent or warrant the accuracy, correctness or completeness of any log data, interpretations, recommendations or information provided by Epoch, its officers, agents or employees. Epoch does not and cannot guarantee the accuracy of any such interpretation of the log data, interpretations or recommendations and Company is fully responsible for all decisions and actions it takes based on such log data, interpretations and recommendations.