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	PCU 297-12A7
FIELD	Piceance Creek Unit
REGION	Rocky Mountain
COORDINATES	Lat. 39.889005 N
	Lon. 108.23726 W
ELEVATION	GL: 7183.9'
	KB: 7214'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	05-103-11161-00
SPUD DATE	10/12/2008
CONTRACTOR	HP Drilling
CO. REP.	J. Woods, M. Sadler
RIG/TYPE	326 / Flex Four
LOGGING UNIT	Canrig Unit 36
GEOLOGISTS	J.Kokes
	B.Laiche
ADD. PERSONS	H.Strickland
	P.Strickland
CO. GEOLOGIST	Chris Alba

LOG INTERVAL

DEPTHS:	3995'	**TO**	12866'
DATES:	5/22/2009	**TO**	11/22/2009
SCALE:	1" = 100'		

MUD TYPES

WATER BASED	**TO**	3995'
LSND	**TO**	5500'
DSF	**TO**	5882'
LSND	**TO**	12866'

CASING DATA

10 3/4"	**AT**	3980'
7"	**AT**	8881'
4.5"	**AT**	12866'
	AT	

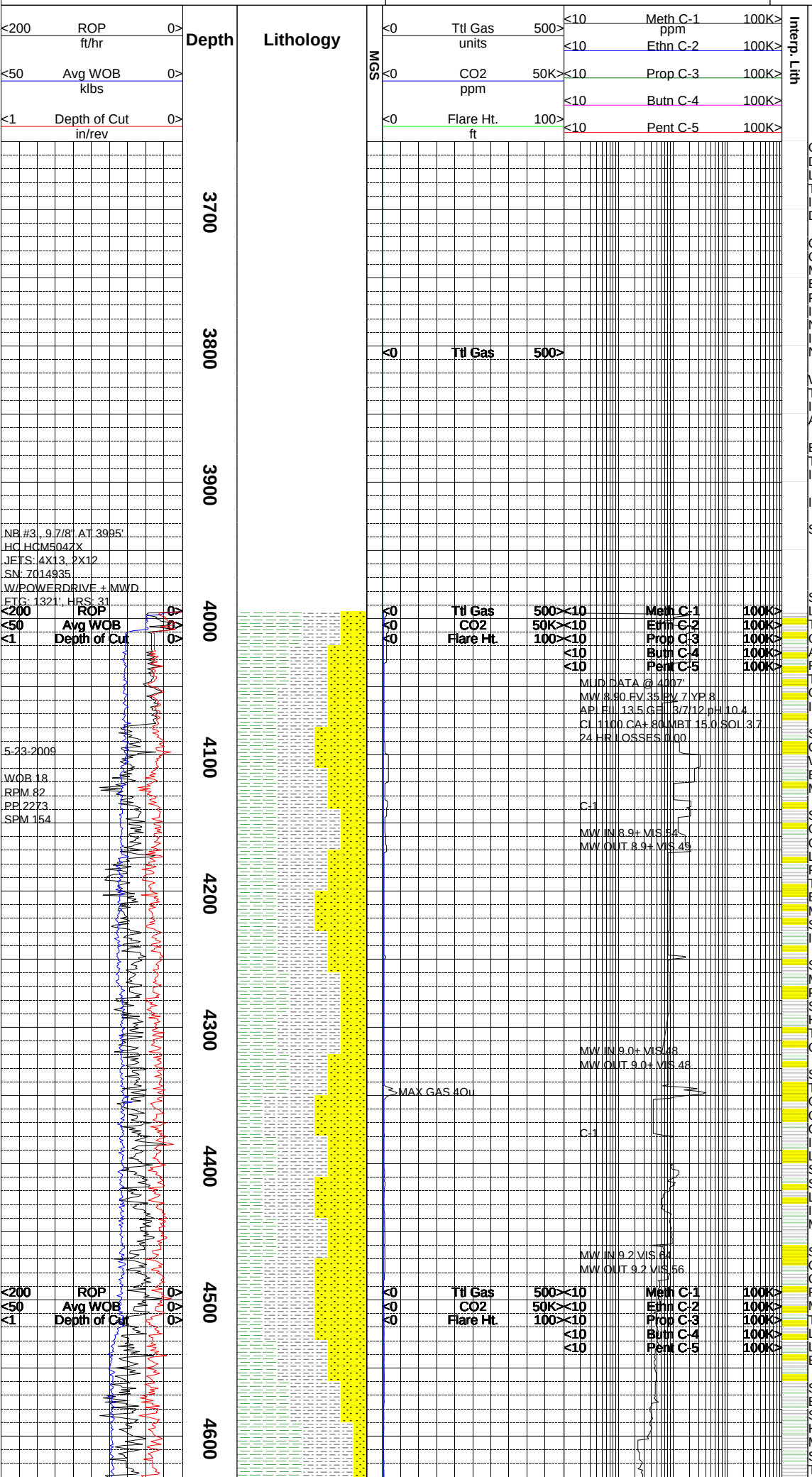
HOLE SIZE

14 1/4"	**TO**	3995'
9 7/8"	**TO**	8896'
6.125"	**TO**	12866'
	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
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
SALT
SAND
SANDSTONE
SANDSTONE-TUFFACEOUS
SERICITIZATION
SERPENTINE
SHALE
SHALE TUFFACEOUS
SHELL FRAGMENTS
SIDERITE
SILICIFICATION
SILTSTONE
SILTST-TUFFACEOUS
TUFF
VOLCANICLASTICS SEDS
VOLCANICS



Remarks

Survey Data, Mud Reports, Other Info.

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 = 10040 PPM
ETHANE = 990 PPM
PROPANE = 1000 PPM
I-BUTANE = 1010 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.

I UNIT OF GAS = 200 PPM METHANE

SET 10 3/4" SURFACE CASING AT 3980'

EPOCH COMMENCED LOGGING ON 5/22/2009 AT 3995' MD.

SANDSTONE = LIGHT PALE BROWNISH YELLOW, LIGHT MODERATE BROWN, SOME CLEAR TO TRANSLUCENT; UPPER VERY FINE TO FINE GRAIN SIZE; POOR TO FAIR SORTED; SUB-ANGULAR, SUBROUND IN PART; CLEAR TO FROSTED SURFACE FEATURES; EASILY FRIABLE TO FRIABLE; CLAY MATRIX CEMENT TRACE CALCAREOUS CEMENT; LITHE AND SILTSTONE INTERBEDDED.

SHALE = MODERATED YELLOWISH BROWN; CRUMBLY, TENACITY; SUBBLOCKY FRACTURE; WEDGELIKE , TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER, SILTY, CLAYEY TEXTURE; MASSIVE TO THICK STRUCTURE.

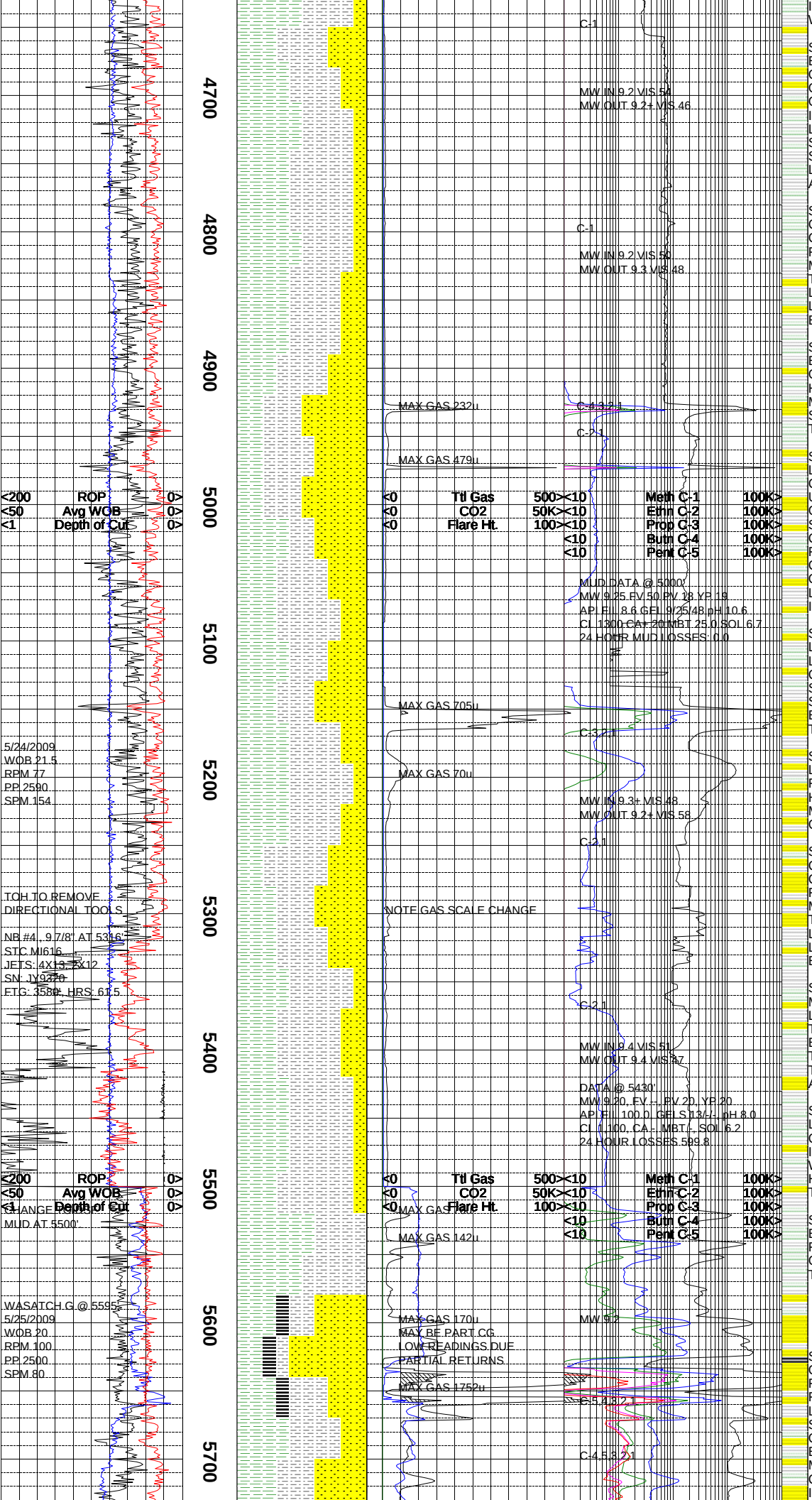
SANDSTONE = LIGHT PALE BROWN, VERY LIGHT GRAY, OFF WHITE WITH SLIGHT TRANSLUCENT GRAINS; PREDOMINATELY QUARTZ FRAMEWORK; LOWER FINE TO SOME UPPER FINE GRAIN; POOR SORTING; SUBANGULAR TO SUBROUND; TRACES FROSTED SURFACE FEATURES; EASILY FRIABLE TO SOME FRIABLE; CLAY MATRIX CEMENT, TRACE CALCAREOUS CEMENT; SOME GRAIN SUPPORTED; TRACE SILTSTONE INTERBEDDED.

SILTSTONE = LIGHT YELLOWISH BROWN, MODERATE PALE YELLOWISH BROWN; PULVERULENT, CRUNCHY TENACITY; EARTHY SUBBLOCKY FRACTURE; WEDGELIKE CUTTINGS HABIT; DULL SEMI EARTHY LUSTER; GRITTY TO GRANULAR TEXTURE; THIN STRUCTURE; GRADING TO SANDSTONE.

SHALE = BROWNISH YELLOW ORANGE, PALE TO MODERATE YELLOWISH BROWN, OCCASIONALLY MEDIUM GRAY WITH SLIGHT GREENISH HUES; FIRM; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; IRREGULAR, SUBBLOCKY, RARELY WEDGE-LIKE CUTTINGS HABIT; MATTE TO RARELY SLIGHTLY RESINOUS LUSTER; DOMINANTLY SMOOTH TEXTURE; MODERATELY CALCAREOUS; LOCALLY SILTY, GRADING IN PART TO AND INTERBEDDED WITH SILTSTONE; POOR TO MODERATE FISSILITY.

SANDSTONE = VERY LIGHT GRAY TO WHITE; OCC WITH SLIGHT BROWNISH HUES; FIRM CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; QUARTZ RICH, SCAT-TERED TO COMMON DARK GRAY TO BLACK LITHICS; CLAY MATRIX; LIGHT CALC CEMENT; LOCALLY SILTY, GRADES TO AND IS INTER-BEDDED WITH SILTSTONE.

SILTSTONE = MODERATE TO DARK YELLOWISH BROWN, LIGHT GRAY, OCCASIONAL SLIGHTLY OLIVE HUES; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; EARTHY LUSTER WITH SCATTERED SPARKLES; ABRASIVE, GRITTY TEXTURE; MODERATELY CALCAREOUS;



INTERBEDDED WITH AND INTERGRADATIONAL WITH SHALES.

SHALE = MODERATE TO DARK YELLOWISH BROWN, BROWNISH YELLOW ORANGE, OCCASIONALLY MEDIUM GRAY WITH SLIGHT GREENISH HUES; FIRM; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; IRREGULAR, SUBBLOCKY, RARELY WEDGE-LIKE CUTTINGS HABIT; MATTE TO RARELY SLIGHTLY RESINOUS LUSTER; DOMINANTLY SMOOTH TEXTURE; MODERATELY CALCAREOUS; LOCALLY SILTY, GRADING IN PART TO AND AND INTERBEDDED WITH SILTSTONE.

SANDSTONE = WHITE TO VERY LIGHT GRAY; COMMON "PEPPERED" APPEARANCE; FIRM CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; QUARTZ RICH, SCATTERED TO COMMON DARK GRAY TO BLACK LITHICS; CLAY MATRIX; LIGHT CALC CEMENT; LOCALLY SILTY, GRADES TO AND IS INTERBEDDED WITH SILTSTONE.

SILTSTONE = MODERATE TO DARK YELLOWISH BROWN, LIGHT GRAY, COMMON GREENISH GRAY TO OLIVE HUES; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; EARTHY LUSTER WITH SCATTERED SPARKLES; ABRASIVE, GRITTY TEXTURE; MODERATELY CALCAREOUS.

SANDSTONE = PALE TAN STAIN OFF WHITE; LIGHT YELLOWISH PALE BROWN; SOME CLEAR TRANSLUCENT QUARTZ FRAMEWORK; UPPER VERY FINE, PREDOMINATELY FINE GRAIN; POOR SORTING; TRACES SUBROUND, SUBANGULAR IN ANGULARITY; LOW SPHERICITY; SLIGHT SEMI FROSTED SURFACE FEATURES; FRIABLE TO SEMI FIRM FRIABLE; CLAY MATRIX CEMENT, VERY MINOR CALCAREOUS CEMENT; DARK GRAY TO GRAYISH BLACK LITHICS AND SOME DARK BROWNISH SILTSTONE INTERBEDDED.

SHALE = VERY PALE GRAYISH ORANGE, LIGHT PALE YELLOWISH BROWN, TRACES LIGHT OLIVE GRAY; PULVERULENT, SEMI CRUMBLY TENACITY; EARTHY, SUBBLOCKY SLIGHT IRREGULAR FRACTURE; WEDGELIKE SLIGHT BLOCKY CUTTINGS HABIT; DULL EARTHY, CLAYEY TEXTURE; THIN STRUCTURE; TRACE SILTSTONE INTERBEDDED.

SILTSTONE = YELLOWISH BROWN, PALE LIGHT BROWN; BRITTLE TENACITY, IRREGULAR FRACTURE; WEDGELIKE TO TABULAR CUTTINGS HABIT; RESINOUS LUSTER; GRITTY TEXTURE; MASSIVE TO THIN STRUCTURE. GRADING TO SANDSTONE.

SANDSTONE = WHITE TO VERY LIGHT GRAY; COMMON PALE YELSH BROWN HUES; FIRM CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; QUARTZ RICH, SCATTERED TO COMMON DARK GRAY TO BLACK LITHICS; CLAY MATRIX; LIGHT CALC CEMENT; LOCALLY SILTY, GRADES TO AND IS INTERBEDDED WITH SILTSTONE.

SHALE = PALE GRAYISH ORANGE, LIGHT TO MODERATE YELLOWISH BROWN, TRACES LIGHT OLIVE GRAY; CRUMBLY TO MODERATELY TOUGH TENACITY; IRREGULAR AND SUB-BLOCKY CUTTINGS; MATTE LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; SLIGHTLY TO MODERATELY CALCAREOUS; GRADES TO AND IS INTERBEDDED WITH SILTSTONE.

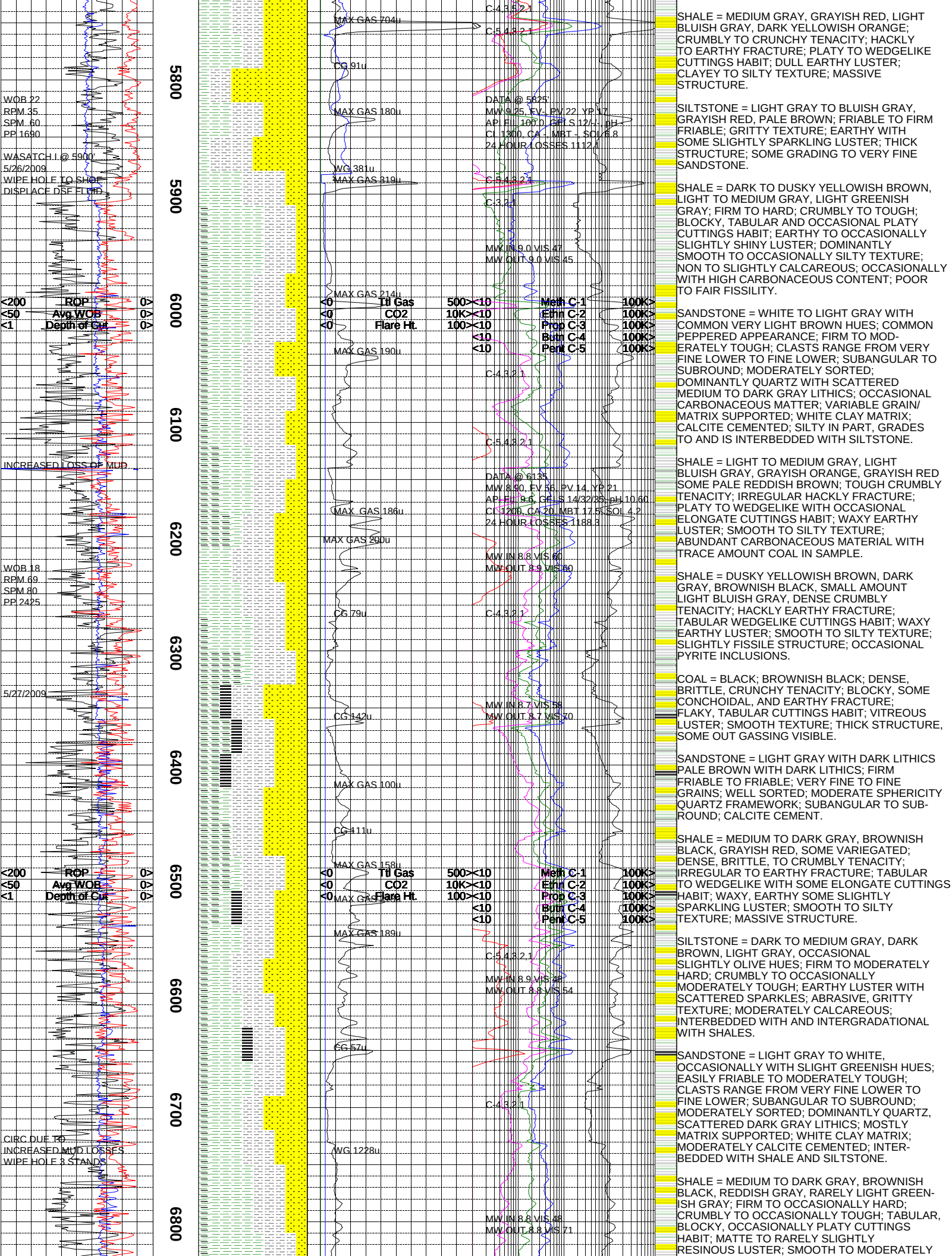
SHALE = MEDIUM GRAY, LIGHT BLUISH GRAY, LIGHT GRAYISH RED PURPLE, DARK YELLOWISH ORANGE; CRUMBLY TO PULVERULENT TENACITY; IRREGULAR EARTHY FRACTURE; PLATY TO WEDGELIKE WITH SOME ELONGATED CUTTINGS HABIT; WAXY EARTHY LUSTER; CLAYEY TEXTURE; THIN STRUCTURE.

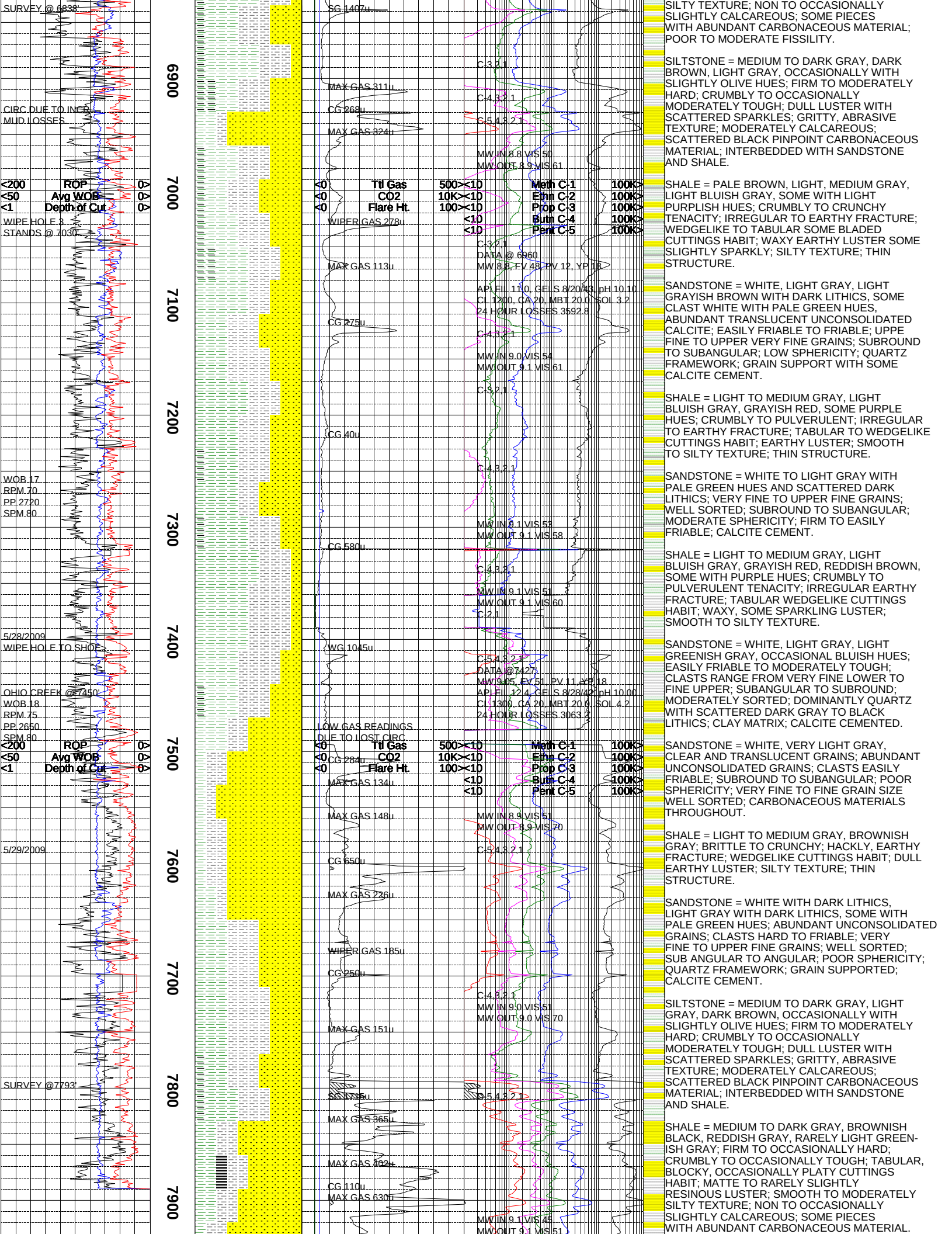
SILTSTONE = LIGHT TO MEDIUM BROWN, LIGHT BLUISH GRAY, SOME PURPLISH HUE; VERY FINE GRAIN; MODERATE HARD TO FRIABLE; GRITTY, SILTY TEXTURE; EARTHY LUSTER; THINLY BEDDED WITH SHALE.

NOTE: SAMPLES ARE APPROX. 80% LCM.

NOTE: LOST RETURNS AT 5650'.

SANDSTONE = WHITE TO VERY LIGHT GRAY, OCCASIONALLY LIGHT GREENISH GRAY; FRIABLE TO HARD; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER, RARE MEDIUM LOWER GRAINS; MODERATELY SORTED; SUBANGULAR TO SUBROUND; DOMINANTLY QUARTZ WITH SCATTERED DARK GRAY TO BLACK LITHICS; OCCASIONAL CARBONACEOUS MATERIAL; DOMINANTLY GRAIN SUPPORTED; CLAY MATRIX; LIGHTLY CALCITE CEMENTED; INTERBEDDED WITH SILTSTONE AND SHALE.


5800
5900
6000
6100
6200
6300
6400
6500
6600
6700
6800
WOB 22
RPM 35
SPM 60
PP 1690
WASATCH I @ 5900'
5/26/2009
WIPE HOLE TO SHOE
DISPLACE DSF FLUID
INCREASED LOSS OF MUD
WOB 18
RPM 69
SPM 80
PP 2425
5/27/2009
CIRC DUE TO
INCREASED MUD LOSSES
WIPE HOLE 3 STANDS
<200 ROP 0>
<50 Avg WOB 0>
<1 Depth of Cut 0>
MAX GAS 704u
CG 91u
MAX GAS 180u
WG 381u
MAX GAS 319u
MAX GAS 214u
MAX GAS 190u
MAX GAS 186u
MAX GAS 200u
CG 79u
CG 142u
MAX GAS 100u
CG 111u
MAX GAS 158u
MAX GAS 188u
MAX GAS 189u
CG 57u
WG 1228u
C-4 3 2 1
C-5 4 3 2 1
C-3 2 1
DATA @ 5825'
MW 9.25, FV -, PV 22, YP 17,
API FL 10.0, GELS 12/-/-, pH -,
CL 1300, CA -, MBT -, SOL 6.8
24 HOUR LOSSES 1112.1
MW IN 9.0 VIS 47
MW OUT 9.0 VIS 45
DATA @ 6135'
MW 8.90, FV 56, PV 14, YP 21,
API FL 9.6, GELS 14/32/35, pH 10.60,
CL 1200, CA 20, MBT 17.5, SOL 4.2
24 HOUR LOSSES 1188.3
MW IN 8.8 VIS 60
MW OUT 8.9 VIS 60
MW IN 8.7 VIS 58
MW OUT 8.7 VIS 70
MW IN 8.9 VIS 48
MW OUT 8.8 VIS 54
MW IN 8.8 VIS 48
MW OUT 8.8 VIS 71
<0 Tll Gas 500><10 Meth C-1 100K>
<0 CO2 10K><10 Ethn C-2 100K>
<0 Flare Ht. 100><10 Prop C-3 100K>
<10 Buth C-4 100K>
<10 Pent C-5 100K>
SHALE = MEDIUM GRAY, GRAYISH RED, LIGHT BLUISH GRAY, DARK YELLOWISH ORANGE; CRUMBLY TO CRUNCHY TENACITY; HACKLY TO EARTHY FRACTURE; PLATY TO WEDGELIKE CUTTINGS HABIT; DULL EARTHY LUSTER; CLAYEY TO SILTY TEXTURE; MASSIVE STRUCTURE.
SILTSTONE = LIGHT GRAY TO BLUISH GRAY, GRAYISH RED, PALE BROWN; FRIABLE TO FIRM FRIABLE; GRITTY TEXTURE; EARTHY WITH SOME SLIGHTLY SPARKLING LUSTER; THICK STRUCTURE; SOME GRADING TO VERY FINE SANDSTONE.
SHALE = DARK TO DUSKY YELLOWISH BROWN, LIGHT TO MEDIUM GRAY, LIGHT GREENISH GRAY; FIRM TO HARD; CRUMBLY TO TOUGH; BLOCKY, TABULAR AND OCCASIONAL PLATY CUTTINGS HABIT; EARTHY TO OCCASIONALLY SLIGHTLY SHINY LUSTER; DOMINANTLY SMOOTH TO OCCASIONALLY SILTY TEXTURE; NON TO SLIGHTLY CALCAREOUS; OCCASIONALLY WITH HIGH CARBONACEOUS CONTENT; POOR TO FAIR FISSILITY.
SANDSTONE = WHITE TO LIGHT GRAY WITH COMMON VERY LIGHT BROWN HUES; COMMON PEPPERED APPEARANCE; FIRM TO MOD-ERATELY TOUGH; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ WITH SCATTERED MEDIUM TO DARK GRAY LITHICS; OCCASIONAL CARBONACEOUS MATTER; VARIABLE GRAIN/ MATRIX SUPPORTED; WHITE CLAY MATRIX; CALCITE CEMENTED; SILTY IN PART, GRADES TO AND IS INTERBEDDED WITH SILTSTONE.
SHALE = LIGHT TO MEDIUM GRAY, LIGHT BLUISH GRAY, GRAYISH ORANGE, GRAYISH RED SOME PALE REDDISH BROWN; TOUGH CRUMBLY TENACITY; IRREGULAR HACKLY FRACTURE; PLATY TO WEDGELIKE WITH OCCASIONAL ELONGATE CUTTINGS HABIT; WAXY EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; ABUNDANT CARBONACEOUS MATERIAL WITH TRACE AMOUNT COAL IN SAMPLE.
SHALE = DUSKY YELLOWISH BROWN, DARK GRAY, BROWNISH BLACK, SMALL AMOUNT LIGHT BLUISH GRAY, DENSE CRUMBLY TENACITY; HACKLY EARTHY FRACTURE; TABULAR WEDGELIKE CUTTINGS HABIT; WAXY EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; SLIGHTLY FISSILE STRUCTURE; OCCASIONAL PYRITE INCLUSIONS.
COAL = BLACK; BROWNISH BLACK; DENSE, BRITTLE, CRUNCHY TENACITY; BLOCKY, SOME CONCHOIDAL, AND EARTHY FRACTURE; FLAKY, TABULAR CUTTINGS HABIT; VITREOUS LUSTER; SMOOTH TEXTURE; THICK STRUCTURE, SOME OUT GASSING VISIBLE.
SANDSTONE = LIGHT GRAY WITH DARK LITHICS PALE BROWN WITH DARK LITHICS; FIRM FRIABLE TO FRIABLE; VERY FINE TO FINE GRAINS; WELL SORTED; MODERATE SPHERICITY QUARTZ FRAMEWORK; SUBANGULAR TO SUB-ROUND; CALCITE CEMENT.
SHALE = MEDIUM TO DARK GRAY, BROWNISH BLACK, GRAYISH RED, SOME VARIEGATED; DENSE, BRITTLE, TO CRUMBLY TENACITY; IRREGULAR TO EARTHY FRACTURE; TABULAR TO WEDGELIKE WITH SOME ELONGATE CUTTINGS HABIT; WAXY, EARTHY SOME SLIGHTLY SPARKLING LUSTER; SMOOTH TO SILTY TEXTURE; MASSIVE STRUCTURE.
SILTSTONE = DARK TO MEDIUM GRAY, DARK BROWN, LIGHT GRAY, OCCASIONAL SLIGHTLY OLIVE HUES; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; EARTHY LUSTER WITH SCATTERED SPARKLES; ABRASIVE, GRITTY TEXTURE; MODERATELY CALCAREOUS; INTERBEDDED WITH AND INTERGRADATIONAL WITH SHALES.
SANDSTONE = LIGHT GRAY TO WHITE, OCCASIONALLY WITH SLIGHT GREENISH HUES; EASILY FRIABLE TO MODERATELY TOUGH; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ, SCATTERED DARK GRAY LITHICS; MOSTLY MATRIX SUPPORTED; WHITE CLAY MATRIX; MODERATELY CALCITE CEMENTED; INTER-BEDDED WITH SHALE AND SILTSTONE.
SHALE = MEDIUM TO DARK GRAY, BROWNISH BLACK, REDDISH GRAY, RARELY LIGHT GREEN-ISH GRAY; FIRM TO OCCASIONALLY HARD; CRUMBLY TO OCCASIONALLY TOUGH; TABULAR, BLOCKY, OCCASIONALLY PLATY CUTTINGS HABIT; MATTE TO RARELY SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY



SILTY TEXTURE; NON TO OCCASIONALLY SLIGHTLY CALCAREOUS; SOME PIECES WITH ABUNDANT CARBONACEOUS MATERIAL; POOR TO MODERATE FISSILITY.

SILTSTONE = MEDIUM TO DARK GRAY, DARK BROWN, LIGHT GRAY, OCCASIONALLY WITH SLIGHTLY OLIVE HUES; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; DULL LUSTER WITH SCATTERED SPARKLES; GRITTY, ABRASIVE TEXTURE; MODERATELY CALCAREOUS; SCATTERED BLACK PINPOINT CARBONACEOUS MATERIAL; INTERBEDDED WITH SANDSTONE AND SHALE.

SHALE = PALE BROWN, LIGHT, MEDIUM GRAY, LIGHT BLUISH GRAY, SOME WITH LIGHT PURPLISH HUES; CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO EARTHY FRACTURE; WEDGELIKE TO TABULAR SOME BLADED CUTTINGS HABIT; WAXY EARTHY LUSTER SOME SLIGHTLY SPARKLY; SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE, LIGHT GRAY, LIGHT GRAYISH BROWN WITH DARK LITHICS, SOME CLAST WHITE WITH PALE GREEN HUES, ABUNDANT TRANSLUCENT UNCONSOLIDATED CALCITE; EASILY FRIABLE TO FRIABLE; UPPE FINE TO UPPER VERY FINE GRAINS; SUBROUND TO SUBANGULAR; LOW SPHERICITY; QUARTZ FRAMEWORK; GRAIN SUPPORT WITH SOME CALCITE CEMENT.

SHALE = LIGHT TO MEDIUM GRAY, LIGHT BLUISH GRAY, GRAYISH RED, SOME PURPLE HUES; CRUMBLY TO PULVERULENT; IRREGULAR TO EARTHY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS HABIT; EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY WITH PALE GREEN HUES AND SCATTERED DARK LITHICS; VERY FINE TO UPPER FINE GRAINS; WELL SORTED; SUBROUND TO SUBANGULAR; MODERATE SPHERICITY; FIRM TO EASILY FRIABLE; CALCITE CEMENT.

SHALE = LIGHT TO MEDIUM GRAY, LIGHT BLUISH GRAY, GRAYISH RED, REDDISH BROWN, SOME WITH PURPLE HUES; CRUMBLY TO PULVERULENT TENACITY; IRREGULAR EARTHY FRACTURE; TABULAR WEDGELIKE CUTTINGS HABIT; WAXY, SOME SPARKLING LUSTER; SMOOTH TO SILTY TEXTURE.

SANDSTONE = WHITE, LIGHT GRAY, LIGHT GREENISH GRAY, OCCASIONAL BLUISH HUES; EASILY FRIABLE TO MODERATELY TOUGH; CLASTS RANGE FROM VERY FINE LOWER TO FINE UPPER; SUBANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ WITH SCATTERED DARK GRAY TO BLACK LITHICS; CLAY MATRIX; CALCITE CEMENTED.

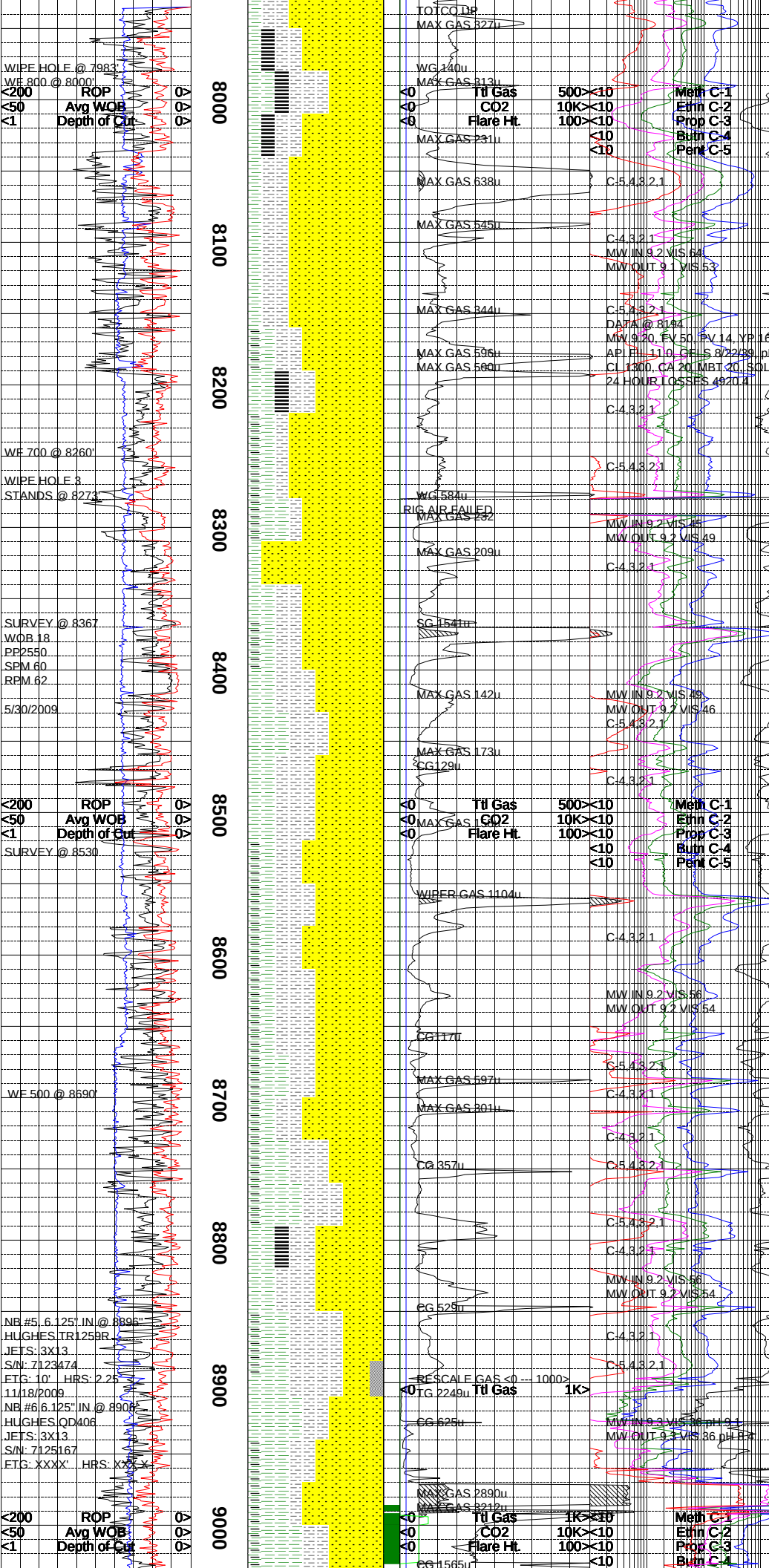
SANDSTONE = WHITE, VERY LIGHT GRAY, CLEAR AND TRANSLUCENT GRAINS; ABUNDANT UNCONSOLIDATED GRAINS; CLASTS EASILY FRIABLE; SUBROUND TO SUBANGULAR; POOR SPHERICITY; VERY FINE TO FINE GRAIN SIZE WELL SORTED; CARBONACEOUS MATERIALS THROUGHOUT.

SHALE = LIGHT TO MEDIUM GRAY, BROWNISH GRAY; BRITTLE TO CRUNCHY; HACKLY, EARTHY FRACTURE; WEDGELIKE CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE WITH DARK LITHICS, LIGHT GRAY WITH DARK LITHICS, SOME WITH PALE GREEN HUES; ABUNDANT UNCONSOLIDATED GRAINS; CLASTS HARD TO FRIABLE; VERY FINE TO UPPER FINE GRAINS; WELL SORTED; SUB ANGULAR TO ANGULAR; POOR SPHERICITY; QUARTZ FRAMEWORK; GRAIN SUPPORTED; CALCITE CEMENT.

SILTSTONE = MEDIUM TO DARK GRAY, LIGHT GRAY, DARK BROWN, OCCASIONALLY WITH SLIGHTLY OLIVE HUES; FIRM TO MODERATELY HARD; CRUMBLY TO OCCASIONALLY MODERATELY TOUGH; DULL LUSTER WITH SCATTERED SPARKLES; GRITTY, ABRASIVE TEXTURE; MODERATELY CALCAREOUS; SCATTERED BLACK PINPOINT CARBONACEOUS MATERIAL; INTERBEDDED WITH SANDSTONE AND SHALE.

SHALE = MEDIUM TO DARK GRAY, BROWNISH BLACK, REDDISH GRAY, RARELY LIGHT GREEN-ISH GRAY; FIRM TO OCCASIONALLY HARD; CRUMBLY TO OCCASIONALLY TOUGH; TABULAR, BLOCKY, OCCASIONALLY PLATY CUTTINGS HABIT; MATTE TO RARELY SLIGHTLY RESINOUS LUSTER; SMOOTH TO MODERATELY SILTY TEXTURE; NON TO OCCASIONALLY SLIGHTLY CALCAREOUS; SOME PIECES WITH ABUNDANT CARBONACEOUS MATERIAL.



SANDSTONE = LIGHT GRAY, LIGHT GREENISH GRAY; COMMON "PEPPERED" APPEARANCE; EASILY FRIABLE TO OCCASIONALLY HARD; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER, RARE MEDIUM LOWER GRAINS; ANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ; SCATTERED DARK GRAY LITHICS AND CARBONACEOUS MATTER; WHITE CLAY MATRIX; VARIABLE GRAIN/MATRIX SUPPORTED; LIGHTLY CALCITE CEMENTED; INTERBEDDED WITH SILTSTONE AND SHALE.

SHALE = LIGHT - MEDIUM GRAY, DARK BROWN, LIGHT BLUISH GRAY, OCCASIONAL LIGHT GREENISH HUES; CRUMBLY TO BRITTLE TENACITY; IRREGULAR TO EARTHY FRACTURE; WEDGELIKE TO TABULAR, OCCASIONAL PLATY CUTTINGS HABIT; WAXY EARTHY LUSTER SOME SLIGHTLY SPARKLY; SILTY TEXTURE; THINLY INTERBEDDED WITH SILTSTONE AND SANDSTONE

SANDSTONE = LIGHT GRAY TO LIGHT GREENISH GRAY; COMMON "PEPPERED" APPEARANCE; EASILY FRIABLE TO OCCASIONALLY HARD; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; ANGULAR TO SUBROUND; MODERATELY SORTED; DOMINANTLY QUARTZ; SCATTERED LITHICS AND CARBONACEOUS MATTER; MOSTLY LOOSE GRAINS IN SAMPLE; WHITE CLAY MATRIX; LIGHT CALCITE CEMENT.

SHALE = LIGHT TO MEDIUM GRAY, BROWNISH BLACK, LIGHT BLUISH GRAY, SOME WITH PURPLE; CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO HACKLY FRACTURE; PLATY TO WEDGELIKE CUTTINGS HABIT; EARTHY ,SOME SLIGHTLY SPARKLY LUSTER; SMOOTH TO SILTY TEXTURE; TRACE COAL IN SAMPLE.

SANDSTONE = WHITE, SOME WITH PALE GREEN HUE, TRANSPARENT AND TRANSLUCENT; PREDOMINATELY UNCONSOLIDATED GRAINS; CLASTS EASILY FRIABLE; LOWER FINE TO LOWER MEDIUM GRAIN SIZE; WELL SORTED; SUBANGULAR TO ANGULAR; POOR SPHERICITY; CARBONACEOUS MATERIAL THROUGHOUT; SLIGHT CALCITE CEMENT; QUART FRAMEWORK.

SANDSTONE = WHITE WITH DARK LITHICS, SOME WITH PALE GREEN HUE; ABUNDANT UNCONSOLIDATED GRAINS; CLASTS FIRM TO FRIABLE; SUBROUND TO SUBANGULAR; VERY FINE TO UPPER FINE GRAINS; WELL SORTED; QUARTZ FRAMEWORK, CALCITE CEMENT.

SHALE = LIGHT TO MEDIUM GRAY, DARK GRAY, LIGHT BLUISH GRAY; BRITTLE TO CRUNCHY TENACITY; EARTHY TO HACKLY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS HABIT; WAXY EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SILTSTONE = MEDIUM TO DARK GRAY, LIGHT GRAY, DARK BROWN, FIRM TO MODERATELY HARD; CRUMBLY TO COMMONLY MODERATELY TOUGH; DULL LUSTER WITH SCATTERED SPARKLES; GRITTY, ABRASIVE TEXTURE; MODERATELY CALCAREOUS; SCATTERED BLACK PINPOINT CARBONACEOUS MATERIAL; INTERBEDDED WITH SANDSTONE AND SHALE.

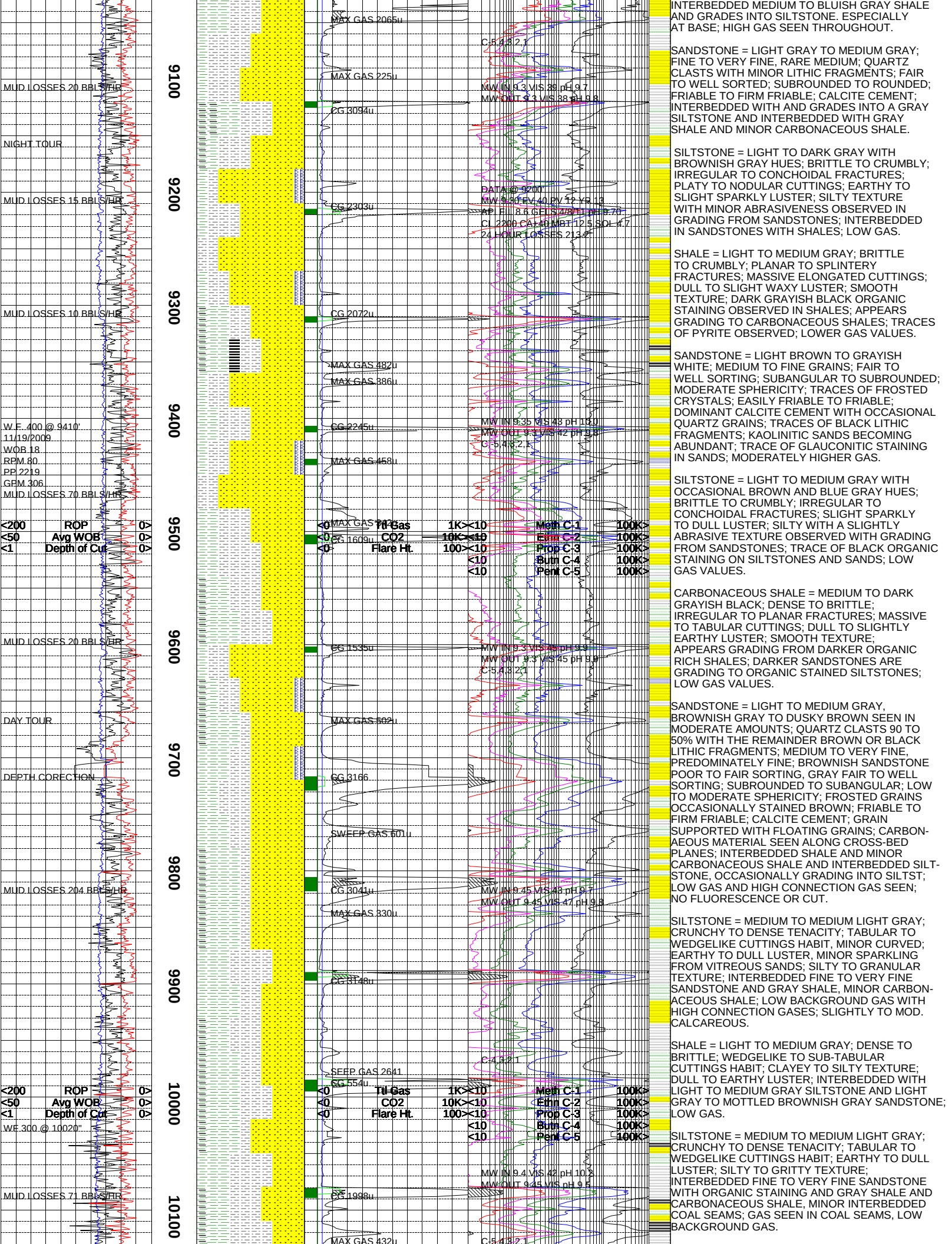
SANDSTONE = LIGHT GRAY WITH OCCASIONAL VERY LIGHT GREENISH GRAY HUES, COMMON PEPPERED APPEARANCE; EASILY FRIABLE TO FIRM; CLASTS RANGE FROM VERY FINE LOWER TO FINE LOWER; ANGULAR TO SUB-ROUND; MODERATELY SORTED; QUARTZ RICH WITH SCATTERED LITHICS; WHITE CLAY MATRIX; VARIABLE MATRIX/GRAIN SUPPORTED; LIGHT CALCITE CEMENT; INTERBEDDED WITH SILTSTONE AND SHALE.

SHALE = LIGHT TO DARK GRAY, MODERATE TO DARK BROWNISH GRAY, LIGHT GREENISH GRAY; FIRM TO OCCASIONALLY MODERATELY HARD; CRUMBLY TO OCCASIONALLY MOD-ERATELY TOUGH; BLOCKY, TABULAR AND PLATY CUTTINGS HABIT; MATTE LUSTER; SMOOTH TO LOCALLY SILTY TEXTURE; SLIGHTLY TO MODERATELY CALCAREOUS.

TD INTERMEDIATE AT 8896'. CASING @ 8881'

SHALE = LIGHT TO MEDIUM GRAY; DENSE TO BRITTLE; WEDGELIKE TO SUB-TABULAR CUTTINGS HABIT; CLAYEY TO SILTY TEXTURE; DULL TO EARTHY LUSTER; INTERBEDDED WITH LIGHT TO MEDIUM GRAY SILTSTONE THAT GRADES INTO A LIGHT GRAY TO MOTTLED BROWNISH GRAY SANDSTONE; LOW GAS.

SANDSTONE = LIGHT TO MEDIUM GRAY, WITH SALT AND PEPPER APPEARANCE WITH BLACK AND REDDISH BROWN LITHIC FRAGMENTS; 90 TO 60% QUARTZ CLASTS WITH THE REMAINDER LITHIC FRAGMENTS; FINE TO MEDIUM GRAINED FAIR TO POOR SORTING; MODERATE SPHERICIT



INTERBEDDED MEDIUM TO BLUISH GRAY SHALE AND GRADES INTO SILTSTONE. ESPECIALLY AT BASE; HIGH GAS SEEN THROUGHOUT.

SANDSTONE = LIGHT GRAY TO MEDIUM GRAY; FINE TO VERY FINE, RARE MEDIUM; QUARTZ CLASTS WITH MINOR LITHIC FRAGMENTS; FAIR TO WELL SORTED; SUBROUNDED TO ROUNDED; FRIABLE TO FIRM FRIABLE; CALCITE CEMENT; INTERBEDDED WITH AND GRADES INTO A GRAY SILTSTONE AND INTERBEDDED WITH GRAY SHALE AND MINOR CARBONACEOUS SHALE.

SILTSTONE = LIGHT TO DARK GRAY WITH BROWNISH GRAY HUES; BRITTLE TO CRUMBLY; IRREGULAR TO CONCHOIDAL FRACTURES; PLATY TO NODULAR CUTTINGS; EARTHY TO SLIGHT SPARKLY LUSTER; SILTY TEXTURE WITH MINOR ABRASIVENESS OBSERVED IN GRADING FROM SANDSTONES; INTERBEDDED IN SANDSTONES WITH SHALES; LOW GAS.

SHALE = LIGHT TO MEDIUM GRAY; BRITTLE TO CRUMBLY; PLANAR TO SPLINTERY FRACTURES; MASSIVE ELONGATED CUTTINGS; DULL TO SLIGHT WAXY LUSTER; SMOOTH TEXTURE; DARK GRAYISH BLACK ORGANIC STAINING OBSERVED IN SHALES; APPEARS GRADING TO CARBONACEOUS SHALES; TRACES OF PYRITE OBSERVED; LOWER GAS VALUES.

SANDSTONE = LIGHT BROWN TO GRAYISH WHITE; MEDIUM TO FINE GRAINS; FAIR TO WELL SORTING; SUBANGULAR TO SUBROUNDED; MODERATE SPHERICITY; TRACES OF FROSTED CRYSTALS; EASILY FRIABLE TO FRIABLE; DOMINANT CALCITE CEMENT WITH OCCASIONAL QUARTZ GRAINS; TRACES OF BLACK LITHIC FRAGMENTS; KAOLINITIC SANDS BECOMING ABUNDANT; TRACE OF GLAUCONITIC STAINING IN SANDS; MODERATELY HIGHER GAS.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH OCCASIONAL BROWN AND BLUE GRAY HUES; BRITTLE TO CRUMBLY; IRREGULAR TO CONCHOIDAL FRACTURES; SLIGHT SPARKLY TO DULL LUSTER; SILTY WITH A SLIGHTLY ABRASIVE TEXTURE OBSERVED WITH GRADING FROM SANDSTONES; TRACE OF BLACK ORGANIC STAINING ON SILTSTONES AND SANDS; LOW GAS VALUES.

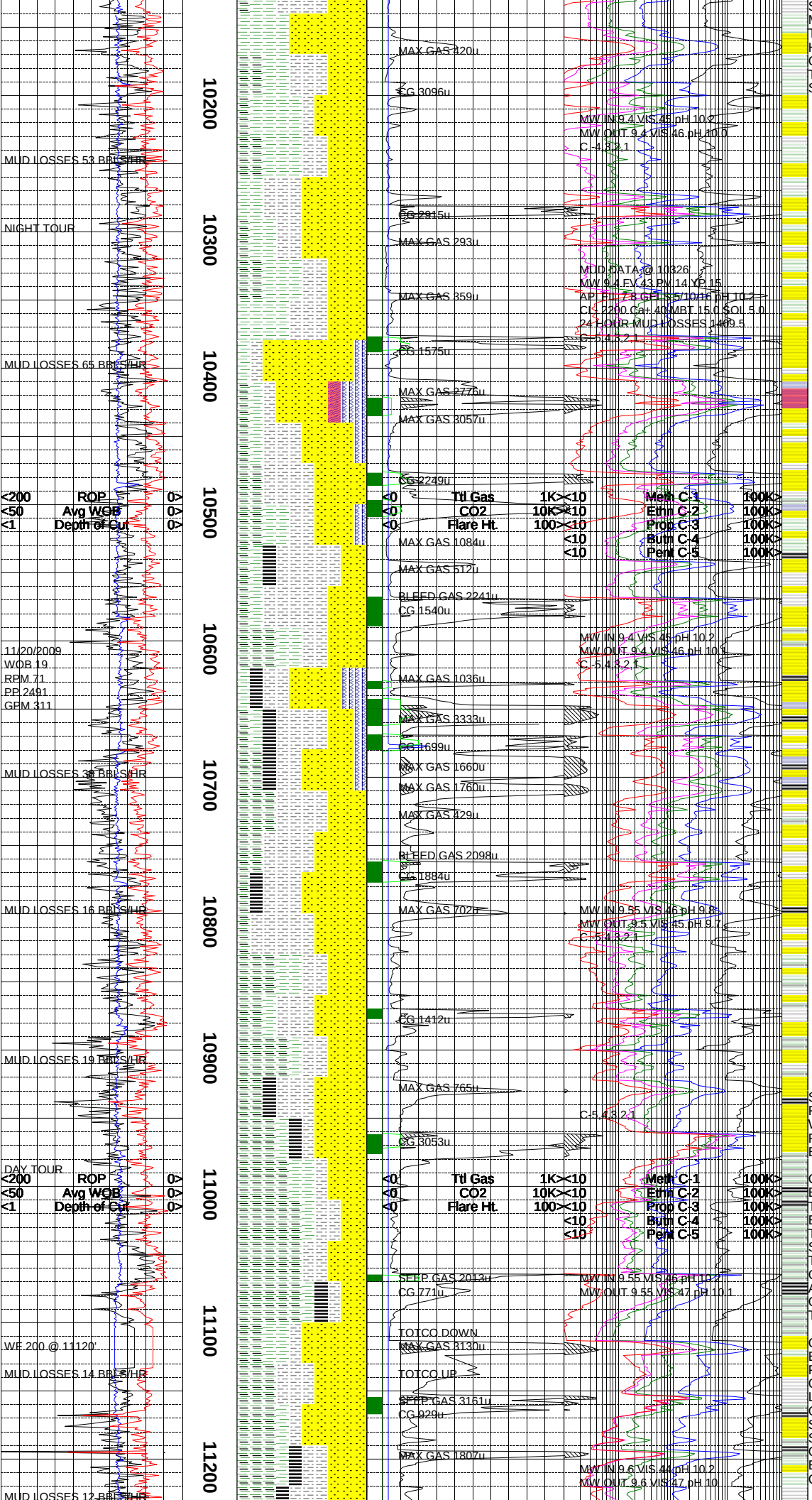
CARBONACEOUS SHALE = MEDIUM TO DARK GRAYISH BLACK; DENSE TO BRITTLE; IRREGULAR TO PLANAR FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL TO SLIGHTLY EARTHY LUSTER; SMOOTH TEXTURE; APPEARS GRADING FROM DARKER ORGANIC RICH SHALES; DARKER SANDSTONES ARE GRADING TO ORGANIC STAINED SILTSTONES; LOW GAS VALUES.

SANDSTONE = LIGHT TO MEDIUM GRAY, BROWNISH GRAY TO DUSKY BROWN SEEN IN MODERATE AMOUNTS; QUARTZ CLASTS 90 TO 50% WITH THE REMAINDER BROWN OR BLACK LITHIC FRAGMENTS; MEDIUM TO VERY FINE, PREDOMINATELY FINE; BROWNISH SANDSTONE POOR TO FAIR SORTING, GRAY FAIR TO WELL SORTING; SUBROUNDED TO SUBANGULAR; LOW TO MODERATE SPHERICITY; FROSTED GRAINS OCCASIONALLY STAINED BROWN; FRIABLE TO FIRM FRIABLE; CALCITE CEMENT; GRAIN SUPPORTED WITH FLOATING GRAINS; CARBONAEOUS MATERIAL SEEN ALONG CROSS-BED PLANES; INTERBEDDED SHALE AND MINOR CARBONACEOUS SHALE AND INTERBEDDED SILTSTONE, OCCASIONALLY GRADING INTO SILTST; LOW GAS AND HIGH CONNECTION GAS SEEN; NO FLUORESCENCE OR CUT.

SILTSTONE = MEDIUM TO MEDIUM LIGHT GRAY; CRUNCHY TO DENSE TENACITY; TABULAR TO WEDGELIKE CUTTINGS HABIT, MINOR CURVED; EARTHY TO DULL LUSTER, MINOR SPARKLING FROM VITREOUS SANDS; SILTY TO GRANULAR TEXTURE; INTERBEDDED FINE TO VERY FINE SANDSTONE AND GRAY SHALE, MINOR CARBONACEOUS SHALE; LOW BACKGROUND GAS WITH HIGH CONNECTION GASES; SLIGHTLY TO MOD. CALCAREOUS.

SHALE = LIGHT TO MEDIUM GRAY; DENSE TO BRITTLE; WEDGELIKE TO SUB-TABULAR CUTTINGS HABIT; CLAYEY TO SILTY TEXTURE; DULL TO EARTHY LUSTER; INTERBEDDED WITH LIGHT TO MEDIUM GRAY SILTSTONE AND LIGHT GRAY TO MOTTLED BROWNISH GRAY SANDSTONE; LOW GAS.

SILTSTONE = MEDIUM TO MEDIUM LIGHT GRAY; CRUNCHY TO DENSE TENACITY; TABULAR TO WEDGELIKE CUTTINGS HABIT; EARTHY TO DULL LUSTER; SILTY TO GRITTY TEXTURE; INTERBEDDED FINE TO VERY FINE SANDSTONE WITH ORGANIC STAINING AND GRAY SHALE AND CARBONACEOUS SHALE, MINOR INTERBEDDED COAL SEAMS; GAS SEEN IN COAL SEAMS, LOW BACKGROUND GAS.



SHALE = MEDIUM DARK GRAY TO DARK GRAY, MEDIUM LIGHT GRAY; CRUNCHY TO DENSE TENACITY; TABULAR TO WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO CLAYEY TEXTURE, VERY MINOR GRITTY TEXTURE; INTERBEDDED SILTSTONE AND SANDSTONE; GAS SEEN IN SANDSTONE.

SANDSTONE = LIGHT TO MEDIUM GRAY WITH DARK GRAY AND BROWN HUES; MEDIUM TO FINE GRAINS; FAIR TO WELL SORTING; SUB-ANGULAR TO SUBROUNDED; MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT DOMINATED WITH MINOR SILICA CEMENT; <3% BLACK LITHICS IN SANDS; APPEARS GRADING TO SILTSTONES; MODERATELY HIGHER GAS VALUES IN SANDS.

SHALE = MEDIUM TO DARK GRAY WITH OCCASIONAL LIGHT GRAY HUES; TOUGH TO SLIGHTLY BRITTLE; IRREGULAR TO BLOCKY FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL AND EARTHY LUSTER; SMOOTH TEXTURE MINOR TRACES OF INDIVIDUAL CALCITE CRYSTALS IN SAMPLE; SANDSTONE GRADES TO SILTSTONES; LOWER GAS VALUES OBSERVED.

SANDSTONE = LIGHT GRAYISH WHITE TO WHITE WITH BROWN/GRAY/WHITE UNCONSOLIDATED KAOLINITIC SANDS; MEDIUM TO FINE GRAINS; FAIR TO WELL SORTING; SUBROUNDED TO ROUNDED; MODERATE TO SPHERICITY; SOFT UNCONSOLIDATED TO FIRMLY FRIABLE SANDS; ABUNDANT PYRITE IN SAMPLE; SANDSTONE GRADING TO SILTSTONE ARE VERY ABRASIVE AND CONTAIN TRACES OF BLACK ORGANICS; MODERATE TO HIGH GAS VALUES IN SANDS.

SILTSTONE = LIGHT TO MEDIUM GRAY WITH BROWN TO BLUISH GRAY HUES; DENSE TO SLIGHTLY CRUMBLY; IRREGULAR TO MOTTLED FRACTURES; PLATY TO TABULAR CUTTINGS; SLIGHT SPARKLY TO EARTHY LUSTER; SILTY TO ABRASIVE TEXTURE; TRACES OF PYRITE AND KAOLINITIC SANDS IN SAMPLE; GRADES INTO ABRASIVE SILTSTONE FROM SANDS; INTERBEDDED IN SANDSTONES AND SHALES; LOWER GAS VALUES OBSERVED.

SHALE = LIGHT TO MEDIUM GRAY WITH DARK GRAYISH BLACK HUES; DENSE TO SLIGHTLY CRUMBLY; IRREGULAR TO FEW SPLINTERY FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL TO WAXY LUSTER; SMOOTH TEXTURE; INTERBEDDED WITH COAL IN SANDS AND SILTSTONES; DARKER ORGANIC SHALES ARE GRADING FROM ORGANIC RICH SILTSTONE LOW TO MODERATE GAS VALUES.

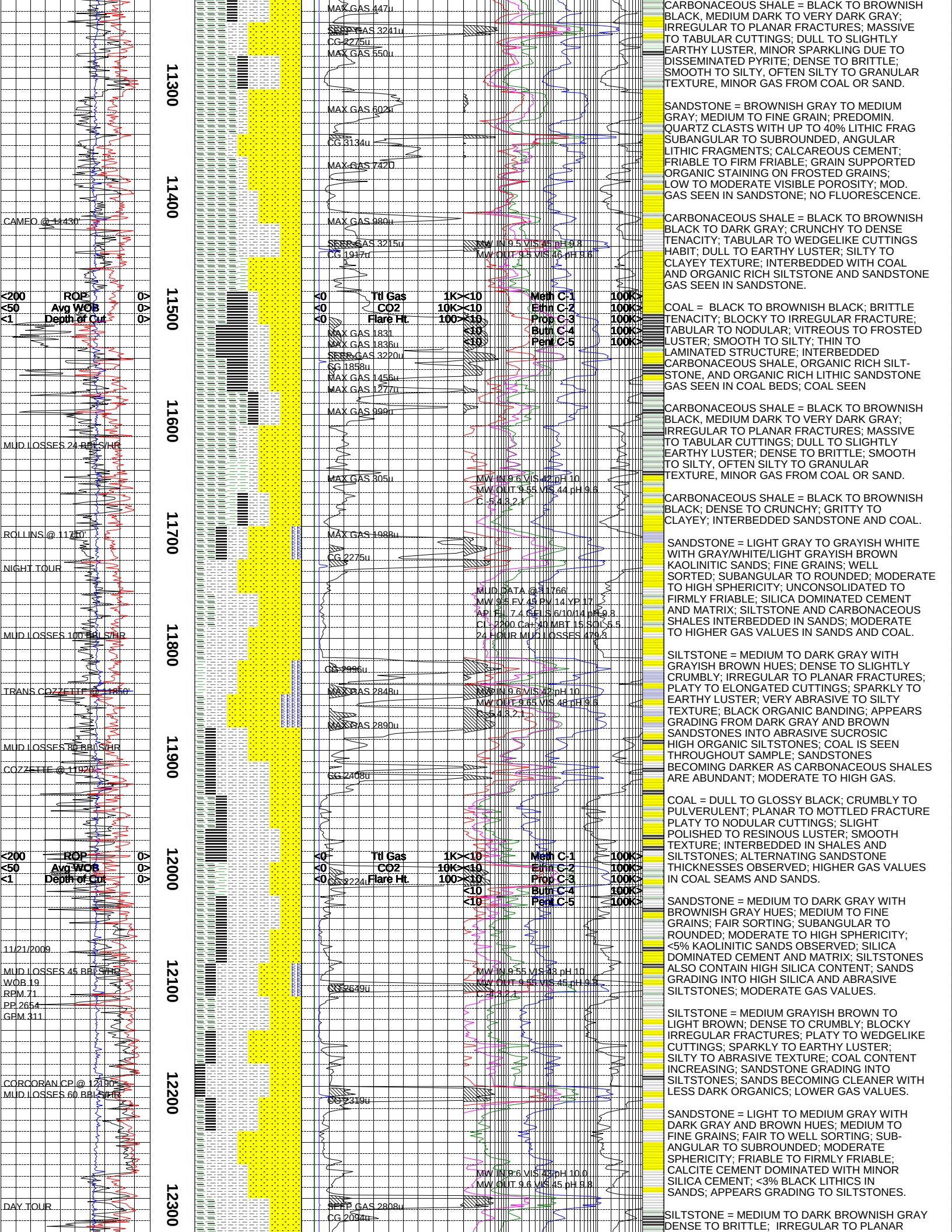
SILTSTONE = MEDIUM TO DARK GRAY WITH LIGHT BROWNISH GRAY AND BLUISH GRAY HUES; DENSE TO CRUNCHY; IRREGULAR TO SPLINTERY FRACTURES; PLATY TO WEDGE-LIKE CUTTINGS; SPARKLY TO EARTHY LUSTER ABRASIVE TO SILTY TEXTURE; SANDSTONES APPEAR DARKER FROM ORGANIC STAINING AND GRADING INTO ABRASIVE SILTSTONES; TRACES OF COAL AND KAOLINITIC SANDS; LOW TO MODERATE GAS VALUES.

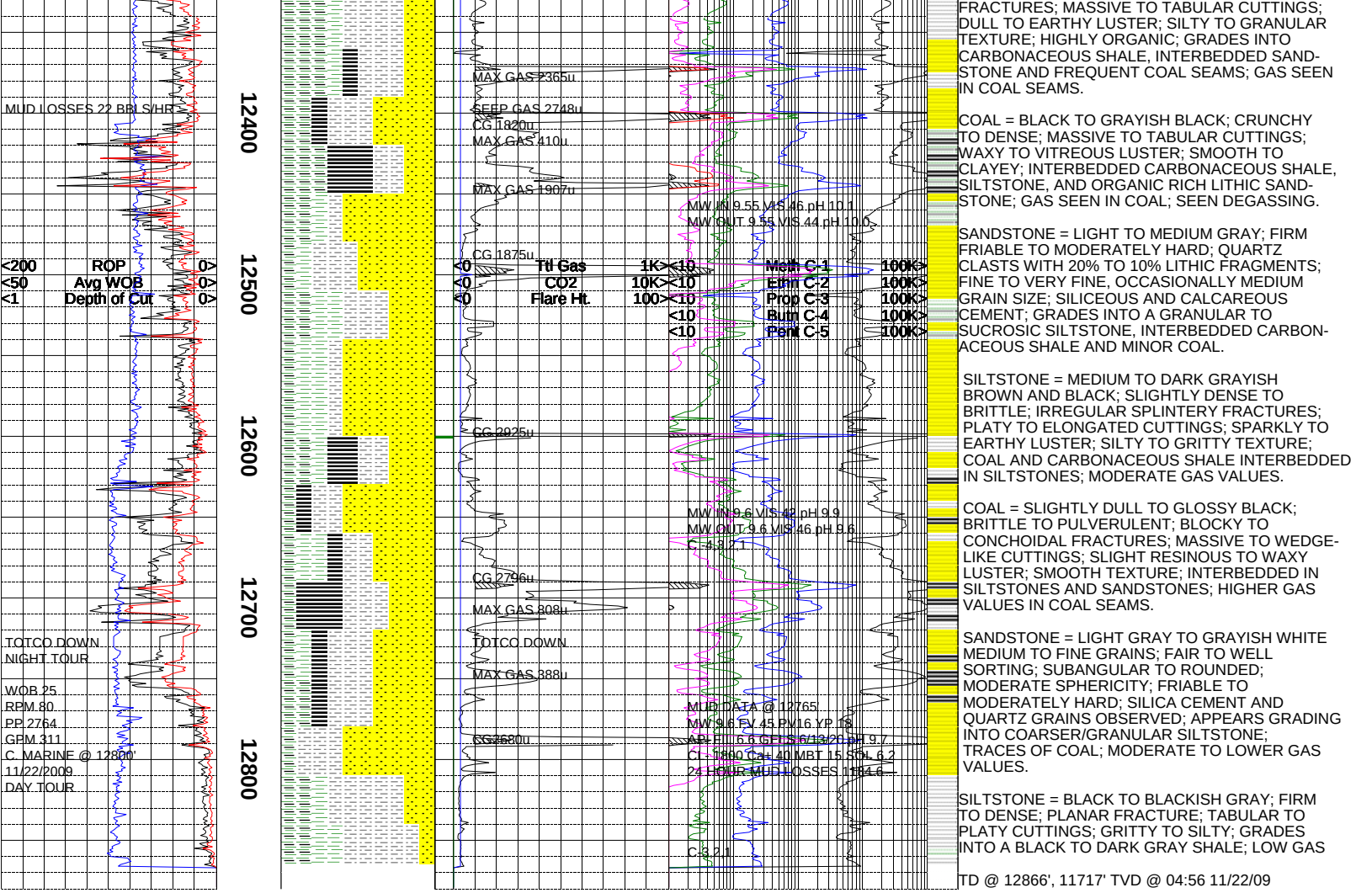
CARBONACEOUS SHALE = LIGHT TO MEDIUM GRAY WITH OCCASIONAL DARK GRAY TO GRAYISH BROWN HUES; BRITTLE TO CRUMBLY; BLOCKY TO PLANAR FRACTURES; PLATY TO ELONGATED CUTTINGS; DULL EARTHY LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SANDSTONE AND SILTSTONE; MODERATE GAS VALUES.

SANDSTONE = LIGHT GRAY TO BROWNISH GRAY; FRIABLE TO FIRM FRIABLE; QUARTZ CLASTS WITH LITHIC CLASTS GIVING A SALT AND PEPPER APPEARANCE; FINE TO MEDIUM; INTER BEDDED COAL SEAM WITH GAS SHOW.

CARBONACEOUS SHALE = BLACK TO BROWNISH BLACK; CRUNCHY TO CRUMBLY; IRREGULAR TO BLOCKY FRACTURE; WEDGELIKE TO ELONGATED CUTTINGS WITH MODERATE TABULAR CUTTINGS; DULL TO EARTHY, SOME SPARKLING; CARBONACEOUS SHALE HAS TWO TEXTURE: CLAYEY TO SILTY OR GRITTY TO GRANULAR; INTERBEDDED LITHIC SANDSTONE AND SHALE, MINOR COAL MAKING UP TO 10% OF CUTTINGS SEEN IN SAMPLES; MODERATELY TO NONCALCAREOUS.

CARBONACEOUS SHALES = BLACK TO BROWNISH BLACK; CRUMBLY TO BRITTLE; BLOCKY OR PLANAR FRACTURE; TABULAR TO WEDGELIKE CUTTINGS; EARTHY OR DULL, RARE WAXY LUSTER; SILTY TO CLAYEY, MINOR SMOOTH OR GRITTY TEXTURE; THICK TO MASSIVE STRUCTURE; INTERBEDDED ORGANIC RICH SILTSTONE AND SANDSTONES, MINOR COAL; GAS SEEN IN COAL AND SANDSTONE UNITS; ELEVATED BACKGROUND GAS AND HIGH CONNECTION GASES SEEN.


11300
11400
11500
11600
11700
11800
11900
12000
12100
12200
12300
CAMEO @ 11430'
MUD LOSSES 24 BBLS/HR
ROLLINS @ 11710'
NIGHT TOUR
MUD LOSSES 100 BBLS/HR
TRANS COZZETTE @ 11850'
MUD LOSSES 80 BBLS/HR
COZZETTE @ 11920'
11/21/2009
MUD LOSSES 45 BBLS/HR
WOB 19
RPM 71
PP 2654
GPM 311
CORCORAN CP @ 12190'
MUD LOSSES 60 BBLS/HR
DAY TOUR
<200 ROP 0>
<50 Avg WOB 0>
<1 Depth of Cut 0>
<0 Ttl Gas 1K><10
<0 CO2 10K><10
<0 Flare Ht. 100><10
Meth C-1 100K>
Ethn C-2 100K>
Prop C-3 100K>
Buth C-4 100K>
Pent C-5 100K>
MAX GAS 447u
SEEP GAS 3241u
CG 2275u
MAX GAS 550u
MAX GAS 602u
CG 3134u
MAX GAS 7420
MAX GAS 980u
SEEP GAS 3215u
CG 1917u
MW IN 9.5 VIS 45 pH 9.8
MW OUT 9.5 VIS 46 pH 9.6
MAX GAS 1831
MAX GAS 1836u
SEEP GAS 3220u
CG 1858u
MAX GAS 1456u
MAX GAS 1277u
MAX GAS 999u
MAX GAS 305u
MW IN 9.6 VIS 42 pH 10
MW OUT 9.55 VIS 44 pH 9.6
C-5,4,3,2,1
MAX GAS 1988u
CG 2275u
MUD DATA @ 11766'
MW 9.5 FV 48 PV 14 YP 17
AP, Fl., 7.4 GELS 6/10/14 pH 9.8
CL- 2200 Ca+ 40 MBT 15 SOL 6.5
24 HOUR MUD LOSSES 479.3
CG 2996u
MAX GAS 2848u
MW IN 9.6 VIS 42 pH 10
MW OUT 9.65 VIS 48 pH 9.6
C-5,4,3,2,1
MAX GAS 2890u
CG 2408u
CG 3224u
MW IN 9.55 VIS 48 pH 10
MW OUT 9.55 VIS 45 pH 9.8
C-5,4,3,2,1
CG 2649u
CG 2319u
MW IN 9.6 VIS 43 pH 10.0
MW OUT 9.6 VIS 45 pH 9.8
SEEP GAS 2808u
CG 2094u
CARBONACEOUS SHALE = BLACK TO BROWNISH BLACK, MEDIUM DARK TO VERY DARK GRAY; IRREGULAR TO PLANAR FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL TO SLIGHTLY EARTHY LUSTER, MINOR SPARKLING DUE TO DISSEMINATED PYRITE; DENSE TO BRITTLE; SMOOTH TO SILTY, OFTEN SILTY TO GRANULAR TEXTURE, MINOR GAS FROM COAL OR SAND.
SANDSTONE = BROWNISH GRAY TO MEDIUM GRAY; MEDIUM TO FINE GRAIN; PREDOMIN. QUARTZ CLASTS WITH UP TO 40% LITHIC FRAG SUBANGULAR TO SUBROUNDED, ANGULAR LITHIC FRAGMENTS; CALCAREOUS CEMENT; FRIABLE TO FIRM FRIABLE; GRAIN SUPPORTED ORGANIC STAINING ON FROSTED GRAINS; LOW TO MODERATE VISIBLE POROSITY; MOD. GAS SEEN IN SANDSTONE; NO FLUORESCENCE.
CARBONACEOUS SHALE = BLACK TO BROWNISH BLACK TO DARK GRAY; CRUNCHY TO DENSE TENACITY; TABULAR TO WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO CLAYEY TEXTURE; INTERBEDDED WITH COAL AND ORGANIC RICH SILTSTONE AND SANDSTONE GAS SEEN IN SANDSTONE.
COAL = BLACK TO BROWNISH BLACK; BRITTLE TENACITY; BLOCKY TO IRREGULAR FRACTURE; TABULAR TO NODULAR; VITREOUS TO FROSTED LUSTER; SMOOTH TO SILTY; THIN TO LAMINATED STRUCTURE; INTERBEDDED CARBONACEOUS SHALE, ORGANIC RICH SILTSTONE, AND ORGANIC RICH LITHIC SANDSTONE GAS SEEN IN COAL BEDS; COAL SEEN
CARBONACEOUS SHALE = BLACK TO BROWNISH BLACK, MEDIUM DARK TO VERY DARK GRAY; IRREGULAR TO PLANAR FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL TO SLIGHTLY EARTHY LUSTER; DENSE TO BRITTLE; SMOOTH TO SILTY, OFTEN SILTY TO GRANULAR TEXTURE, MINOR GAS FROM COAL OR SAND.
CARBONACEOUS SHALE = BLACK TO BROWNISH BLACK; DENSE TO CRUNCHY; GRITTY TO CLAYEY; INTERBEDDED SANDSTONE AND COAL.
SANDSTONE = LIGHT GRAY TO GRAYISH WHITE WITH GRAY/WHITE/LIGHT GRAYISH BROWN KAOLINITIC SANDS; FINE GRAINS; WELL SORTED; SUBANGULAR TO ROUNDED; MODERATE TO HIGH SPHERICITY; UNCONSOLIDATED TO FIRMLY FRIABLE; SILICA DOMINATED CEMENT AND MATRIX; SILTSTONE AND CARBONACEOUS SHALES INTERBEDDED IN SANDS; MODERATE TO HIGHER GAS VALUES IN SANDS AND COAL.
SILTSTONE = MEDIUM TO DARK GRAY WITH GRAYISH BROWN HUES; DENSE TO SLIGHTLY CRUMBLY; IRREGULAR TO PLANAR FRACTURES; PLATY TO ELONGATED CUTTINGS; SPARKLY TO EARTHY LUSTER; VERY ABRASIVE TO SILTY TEXTURE; BLACK ORGANIC BANDING; APPEARS GRADING FROM DARK GRAY AND BROWN SANDSTONES INTO ABRASIVE SUCROSIC HIGH ORGANIC SILTSTONES; COAL IS SEEN THROUGHOUT SAMPLE; SANDSTONES BECOMING DARKER AS CARBONACEOUS SHALES ARE ABUNDANT; MODERATE TO HIGH GAS.
COAL = DULL TO GLOSSY BLACK; CRUMBLY TO PULVERULENT; PLANAR TO MOTTLED FRACTURE PLATY TO NODULAR CUTTINGS; SLIGHT POLISHED TO RESINOUS LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SHALES AND SILTSTONES; ALTERNATING SANDSTONE THICKNESSES OBSERVED; HIGHER GAS VALUES IN COAL SEAMS AND SANDS.
SANDSTONE = MEDIUM TO DARK GRAY WITH BROWNISH GRAY HUES; MEDIUM TO FINE GRAINS; FAIR SORTING; SUBANGULAR TO ROUNDED; MODERATE TO HIGH SPHERICITY; <5% KAOLINITIC SANDS OBSERVED; SILICA DOMINATED CEMENT AND MATRIX; SILTSTONES ALSO CONTAIN HIGH SILICA CONTENT; SANDS GRADING INTO HIGH SILICA AND ABRASIVE SILTSTONES; MODERATE GAS VALUES.
SILTSTONE = MEDIUM GRAYISH BROWN TO LIGHT BROWN; DENSE TO CRUMBLY; BLOCKY IRREGULAR FRACTURES; PLATY TO WEDGELIKE CUTTINGS; SPARKLY TO EARTHY LUSTER; SILTY TO ABRASIVE TEXTURE; COAL CONTENT INCREASING; SANDSTONE GRADING INTO SILTSTONES; SANDS BECOMING CLEANER WITH LESS DARK ORGANICS; LOWER GAS VALUES.
SANDSTONE = LIGHT TO MEDIUM GRAY WITH DARK GRAY AND BROWN HUES; MEDIUM TO FINE GRAINS; FAIR TO WELL SORTING; SUB-ANGULAR TO SUBROUNDED; MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT DOMINATED WITH MINOR SILICA CEMENT; <3% BLACK LITHICS IN SANDS; APPEARS GRADING TO SILTSTONES.
SILTSTONE = MEDIUM TO DARK BROWNISH GRAY DENSE TO BRITTLE; IRREGULAR TO PLANAR



FRACTURES; MASSIVE TO TABULAR CUTTINGS; DULL TO EARTHY LUSTER; SILTY TO GRANULAR TEXTURE; HIGHLY ORGANIC; GRADES INTO CARBONACEOUS SHALE, INTERBEDDED SAND-STONE AND FREQUENT COAL SEAMS; GAS SEEN IN COAL SEAMS.

COAL = BLACK TO GRAYISH BLACK; CRUNCHY TO DENSE; MASSIVE TO TABULAR CUTTINGS; WAXY TO VITREOUS LUSTER; SMOOTH TO CLAYEY; INTERBEDDED CARBONACEOUS SHALE, SILTSTONE, AND ORGANIC RICH LITHIC SAND-STONE; GAS SEEN IN COAL; SEEN DEGASSING.

SANDSTONE = LIGHT TO MEDIUM GRAY; FIRM FRIABLE TO MODERATELY HARD; QUARTZ CLASTS WITH 20% TO 10% LITHIC FRAGMENTS; FINE TO VERY FINE, OCCASIONALLY MEDIUM GRAIN SIZE; SILICEOUS AND CALCAREOUS CEMENT; GRADES INTO A GRANULAR TO SUCROSIC SILTSTONE, INTERBEDDED CARBON-ACEOUS SHALE AND MINOR COAL.

SILTSTONE = MEDIUM TO DARK GRAYISH BROWN AND BLACK; SLIGHTLY DENSE TO BRITTLE; IRREGULAR SPLINTERY FRACTURES; PLATY TO ELONGATED CUTTINGS; SPARKLY TO EARTHY LUSTER; SILTY TO GRITTY TEXTURE; COAL AND CARBONACEOUS SHALE INTERBEDDED IN SILTSTONES; MODERATE GAS VALUES.

COAL = SLIGHTLY DULL TO GLOSSY BLACK; BRITTLE TO PULVERULENT; BLOCKY TO CONCHOIDAL FRACTURES; MASSIVE TO WEDGE-LIKE CUTTINGS; SLIGHT RESINOUS TO WAXY LUSTER; SMOOTH TEXTURE; INTERBEDDED IN SILTSTONES AND SANDSTONES; HIGHER GAS VALUES IN COAL SEAMS.

SANDSTONE = LIGHT GRAY TO GRAYISH WHITE MEDIUM TO FINE GRAINS; FAIR TO WELL SORTING; SUBANGULAR TO ROUNDED; MODERATE SPHERICITY; FRIABLE TO MODERATELY HARD; SILICA CEMENT AND QUARTZ GRAINS OBSERVED; APPEARS GRADING INTO COARSER/GRANULAR SILTSTONE; TRACES OF COAL; MODERATE TO LOWER GAS VALUES.

SILTSTONE = BLACK TO BLACKISH GRAY; FIRM TO DENSE; PLANAR FRACTURE; TABULAR TO PLATY CUTTINGS; GRITTY TO SILTY; GRADES INTO A BLACK TO DARK GRAY SHALE; LOW GAS

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