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

MUDLOG TVD

COMPANY	ExxonMobil Production
WELL	FRU197-33B5
FIELD	Freedom Ranch
REGION	Rockies
COORDINATES	39.921295000
	108.282534000
ELEVATION	6460.5'
COUNTY, STATE	Rio Blanco, CO
API INDEX	051031142500
SPUD DATE	04/24/2010
CONTRACTOR	HP
CO. REP.	Chad Jarvis
RIG/TYPE	HP321
LOGGING UNIT	Unit #31
GEOLOGISTS	Barbara Delaney
	Mike Franco
ADD. PERSONS	Chad Record
CO. GEOLOGIST	Chris Alba

LOG INTERVAL

DEPTHS:	4524'	**TO**	12445'
DATES:	04/25/2010	**TO**	05/13/2010
SCALE:	1"=100'		

MUD TYPES

WATER-BASED	**TO**	12445'
	TO	
	TO	
	TO	

CASING DATA

10.75"	**AT**	4524'
4.5"	**AT**	12444'
	AT	
	AT	

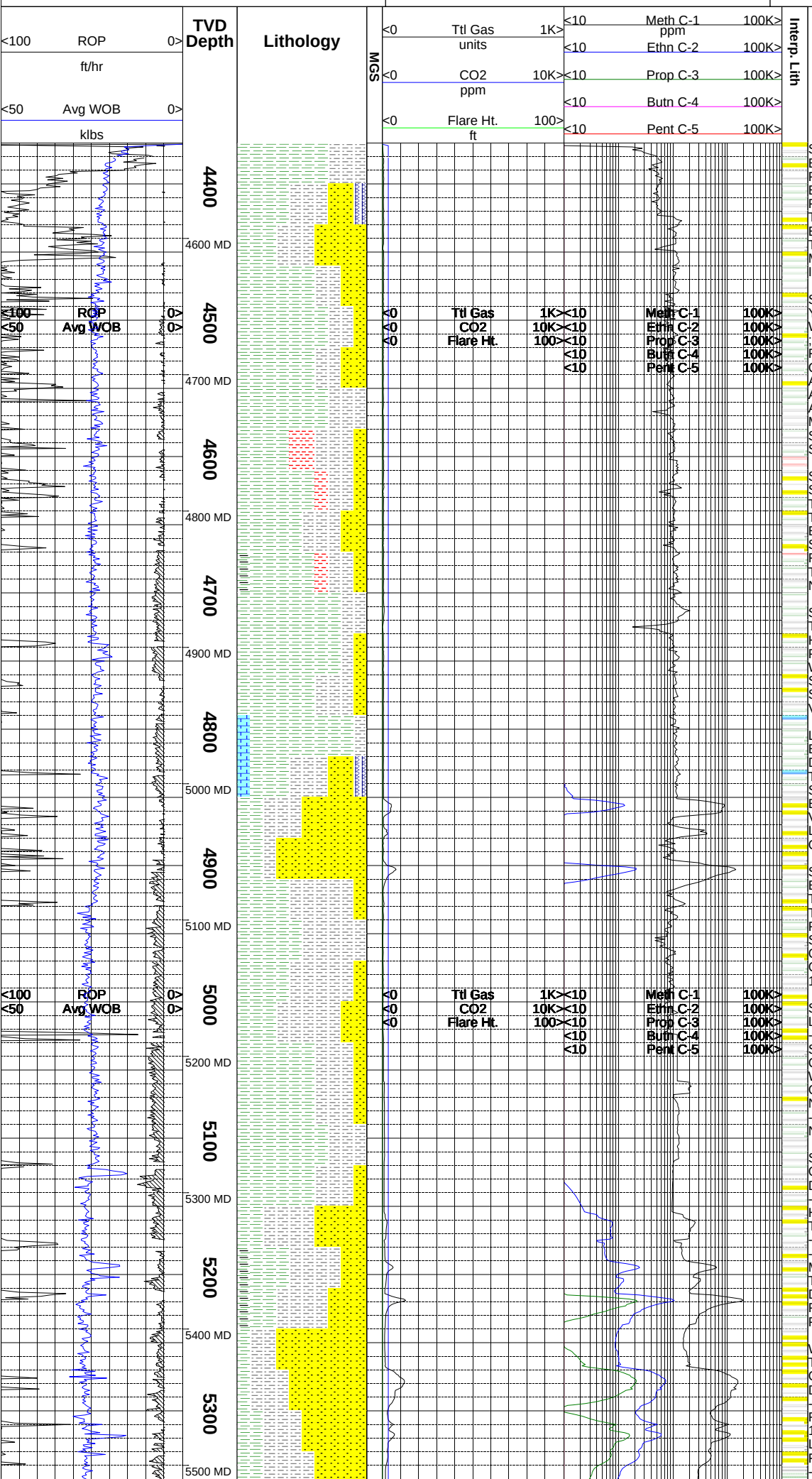
HOLE SIZE

8.750"	**TO**	11087'
7.875"	**TO**	12445'
	TO	
	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.

SHALE = LIGHT GRAY TO LIGHT OLIVE GRAY; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; PREDOMINATELY PLANAR TO OCCASIONALLY BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO OCCASIONALLY ELONGATED TABULAR IN HABIT; DULL TO SEMI GREASY TO EARTHY LUSTER; SILTY TO SMOOTH TO CLAYEY TEXTURE; VISIBLE NACHOLITE CRYSTALS IN MOST OF SAMPLE; 5-10% PALEOSOLS VISIBLE IN SAMPLE.

SANDSTONE = TRANSLUCENT TO WHITE TO SEMI YELLOWISH GRAY; MOSTLY QUARTZ FRAMEWORK WITH 2-3% DARK LITHICS VISIBLE IN SAMPLE ; COARSE TO MEDIUM TO FINE GRAIN SIZE; FAIR TO POORLY SORTED; SUBROUND TO ROUND GRAINS; MODERATE TO HIGH SPHERICITY; A FEW SAMPLES HAVE A FROSTED APPEARANCE; A FEW CONSOLIDATED GRAINS DUE TO BIT ACTION; CALCITE CEMENTATION DUE TO MODERATE REACTION IN DILUTE HCl; GRAIN-SUPPORTED; NO VISIBLE HYDROCARBONS IN SAMPLE.

SILTSTONE = LIGHT BROWNISH GRAY TO SLIGHT PINISH GRAY TO PALE BROWN; STIFF TO CRUNCHY TO OCCASIONALLY BRITTLE TENACITY; IRREGULAR TO HACKLY TO SEMI BLOCKY FRACTURING; PLATY TO FLAKY TO SLIGHT TABULAR CUTTINGS HABIT; DULL TO FROSTED TO SEMI SPARKLING LUSTER; SILTY TO GRITTY TO OCCASIONAL GRITTY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SHALE = CRUMBLY TO CRUNCHY TO BRITTLE TENACITY; PLANAR TO BLOCKY TO OCCASIONAL HACKLY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SLIGHT TABULAR TO SEMI WEDGELIKE IN HABIT; SEMI GREASY TO SLIGHT WAXY TO DULL EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

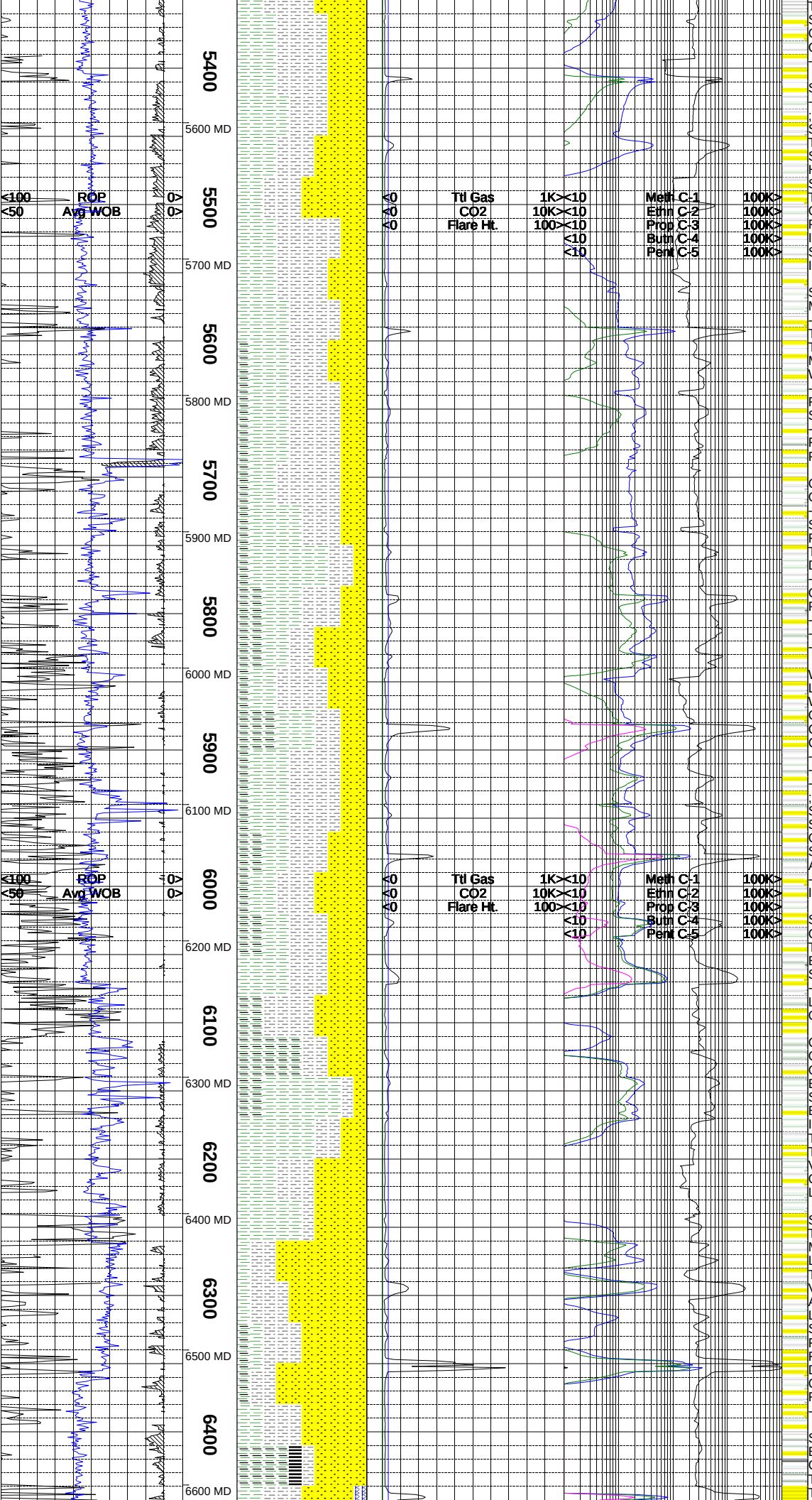
LIMESTONE = VERY LIGHT GRAY TO LIGHT BROWNISH GRAY TO WHITE; HIGH REACTION IN DILUTE HCl; STIFF TO TOUGH TO CRUNCHY TENACITY; IRREGULAR TO SEMI BLOCKY TO SPLINTERY FRACTURING; WEDGELIKE TO BLADED TO TABULAR CUTTINGS HABIT; VITREOUS TO WAXY TO SLIGHT SPARKLING LUSTER; SMOOTH TO CRYSTAL'N TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SILTSTONE = VERY LIGHT GRAY TO LIGHT BROWNISH GRAY TO BROWNISH GRAY; STIFF TO CRUNCHY TENACITY; IRREGULAR TO HACKLY TO SEMI PLANAR FRACTURING; TABULAR TO PLATY TO FLAKY CUTTINGS HABIT; DULL TO SPARKLING TO SLIGHT FROSTED TO SEMI GREASY LUSTER; GRITTY TO OCCASIONALLY GRANULAR TO PREDOMINATELY SILTY TEXTURE; 1-5% PALEOSOLS VISIBLE IN SAMPLE.

SANDSTONE = WHITE TO TRANSLUCENT TO SEMI LIGHT BROWNISH GRAY; MOSTLY QUARTZ FRAME -WORK WITH 1-5% DARK LITHICS VISIBLE IN SAMPLE; MEDIUM TO FINE TO PREDOMINATELY COARSE GRAIN SIZE; FAIR TO WELL TO VERY WELL SORTED; SUBANGULAR TO SUBROUND GRAINS; MODERATE TO HIGHT SPHERICITY; NO VISIBLE BEDDING OR OTHER DISTINGUISHA -BLE SURFACE FEATURES PRESENT IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO OCCASIONAL MEDIUM LIGHT GRAY; MODERATELY DENSE TO SLIGHTLY CRUNCHY TENACITY; IRRE -GULAR TO SUB-BLOCKY TO SUB-PLANAR TO HACKLY FRACTURE; MOSTLYL MASSIVE TO SUB-TABUALR TO WEDGE LIKE TO ELONGATED CUTTI -NGS HABIT; DULL TO EARTHY DULL TO OCCAS -IONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO SLIGHTLY SILTY TEXTURE; NO VISIBLE LAMINAE OR OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

WASATCH G SANDSTONE = WHITE TO OFF WHITE TO VERY LIGHT GRAY TO TRANSLUCENT WITH OCCASIONAL MODERATE GREEN HUES; QUARTZ DOMINATE FRAME WORK; CONSISTS OF CALCITI -C CEMENTATION WITH LIGHT TO MODERATE REACTION TO DILUTE HCL; MATRIX CONTAINS 1 TO 3% DARK LITHIC FRAGMENTS; MOSTLY LOOSE GRAINS WITH FEW SUPPORTING GRAINS; FINE TO MEDIUM-FINE GRAINED; FAIR TO WEL -L SORTING; SUB-ANGULAR TO SUB-ROUNDED



TO ROUNDED ANGULARITY; LOW TO MODERATE SPERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE; NO OTHER SURFACE FEATURES PRESENT; ACCESSOR -Y MINERAL PYRITE PRESENT IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GRA -Y TO OCCCASIONAL MODERATE REDDISH BROWN ; SLIGHTLY DENSE TO SLIGHTLY BRITTLE TO SLIGHTLY CRUMBLY TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULAR TEXTURE; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE AND SHALE VISIBLE INTERBEDDED IN SILTSTONE, PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY WITH OCCASIONAL GRAYIS -H RED PURPLE MOTTLING; SLIGHTLY DENSE TO SLIGHTLY CRUMBLY TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR FRACTURE; MODERATELY MASSIVE TO ELONGATED TO WEDGE LIKE CUTTINGS HABIT; DULL TO EARTH -Y DULL TO OCCASIONAL SEMI-WAXY TO SEMI-FROSTED LUSTER; MODERATELY SMOOTH TO SLIGHTLY SILTY TEXTURE; NO VISIBLE LAMIN -AE OR OTHER DISTINGUISHALBE STRUCTURAL FEATURES PRESENT; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

CARBONACEOUS SHALE = BROWNISH BLACK TO OLIVE BLACK TO DARK BROWNISH GRAY; MODER -ATELY DENSE TO SLIGHTLY TOUGH TENACITY; SUB-PLANAR TO SUB-TABULAR TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SLIGHT -LY SEMI-SPARKLING LUSTER; VERY SLIGHTLY GRITTY TO VERY SLIGHTLY CLAYEY TEXTURE; POOR GRADE SILTSTONE VISIBLE BEDDING WIT -H POOR GRADE SHALE, NO OTHER DISTINGUIS -HABLE STRUCTURAL FEATURES PRESENT; ACCE -SSORY MINERAL PYRITE PRESENT IN SAMPLE.

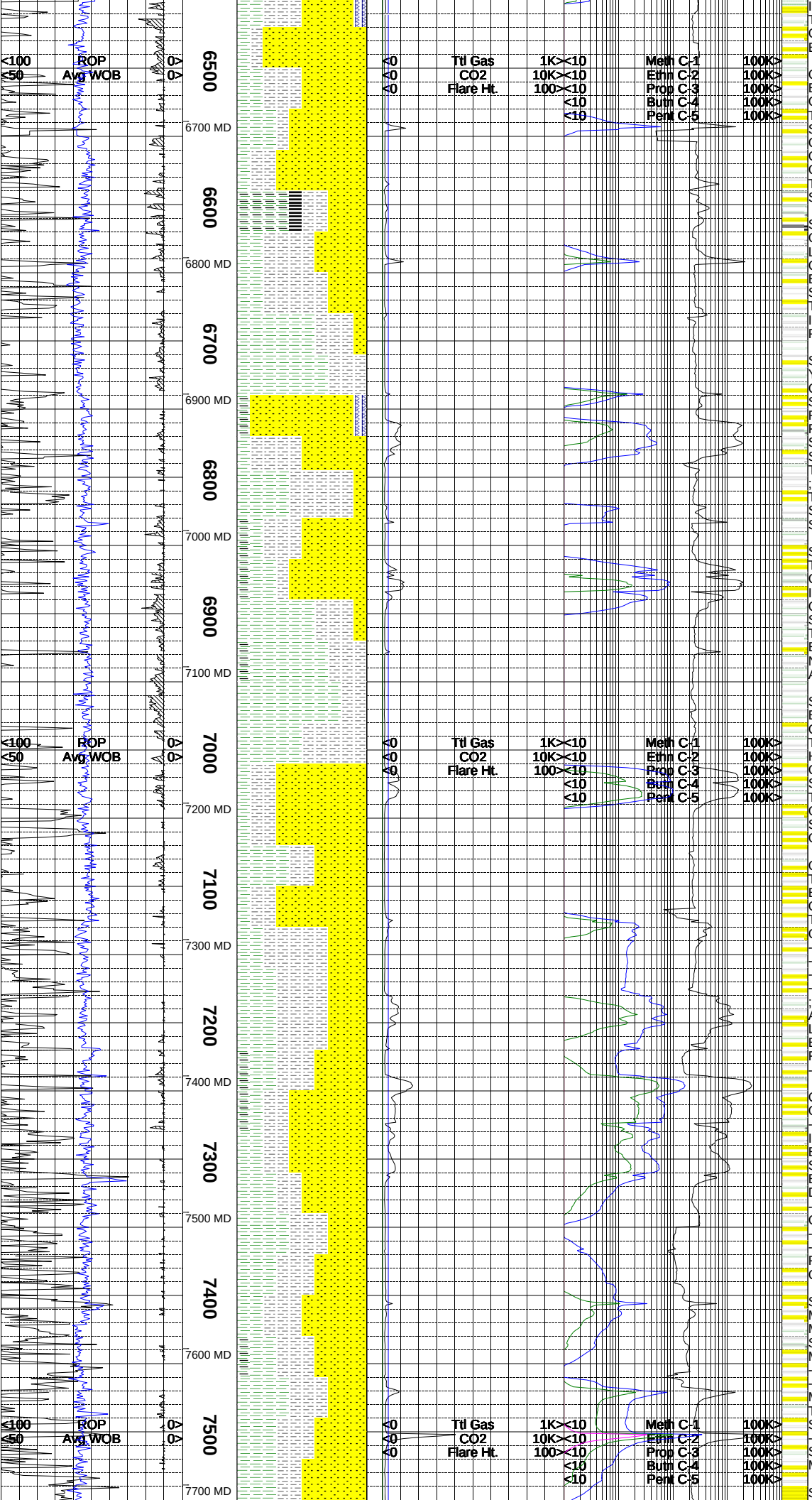
WASATCH I SANDSTONE = OFF WHITE TO VERY LIGHT GRAY TO VERY LIGHT BROWNISH GRAY WITH BLACK AND DARK BROWNISH GRAY HUES; QUARTZ DOMINATE FRAME WORK; QUARTZ CUTTINGS RANGE FROM SMOKY TO OFF WHITE; CONSISTS OF CALCITIC CEMENTATION; MODERA -TELY HIGH REACTION TO DILUTE HCL; MATRI -X CONTAINS 3 TO 5% DARK LITHIC FRAGMENT -S; MEDIUM-COARSE TO VERY COARSE GRAINED ; FAIR TO POOR SORTING; SUB-ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, VERY SMALL AMOUNT OF COAL VISIBLE DEGASSING, AND FRACTURE EVIDENCE IN SAMPLE; ACCESSO -RY MINERALS PYRITE AND CALCITE PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO LIGHT BROWNISH GRAY; SLIGHTLY DENSE TO SLIGHTLY TOUGH TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EART -HY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHTLY GRITTY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

CARBONACEOUS SHALE = BROWNISH GRAY TO OLIVE GRAY TO OCCASIONALLY LIGHT OLIVE GRAY; CRUNCHY TO CRUMBLY TO PREDOMINATE BRITTLE TENACITY; PLANAR TO HACKLY TO SEMI BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO ELONGATED TABULAR IN HABIT; DULL EARTHY TO SLIGHT GREASY TO OCCASIONALLY SPARKLING LUSTER; GRITTY TO SILTY TO OCCASIONAL GRANULAR TEXTURE; VISIBLE PYRITE CRYSTALS; VISIBLE BANDS OF CARBONACEOUS MATERIAL; GRADES INTO A LIGHT GRAY SHALE.

SANDSTONE = LIGHT BROWNISH GRAY TO WHITE TO TRANSLUCENT TO SEMI YELLOWISH GRAY; MOSTLY QUARTZ FRAMEWORK WITH 1-2% DARK LITHICS VISIBLE IN SAMPLE; VERY COARSE TO COARSE TO MEDIUM TO VERY FINE GRAIN; VERY WELL TO WELL TO FAIR SORTED; SUB-ANGULAR TO SUB ROUND TO ROUND GRAINS; LOW TO MODERATE SPHERICITY; COARSE GRAIN SAMPLES HAVE A SLIGHT POLISH APPEARANCE; FINE GRAIN SANDSTONES HAVE A SLIGHT FROSTED APPEARANCE; UNCONSOLIDATED GRAIN DUE TO BIT ACTION; GRAIN SUPPORTED ; CALCITE CEMENTATION DUE TO MODERATE REACTION TO DILUTE HCl; NO VISIBLE HYDRO -CARBONS IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT BLUISH GRAY TO OCCASIONAL LIGHT YELLOWIS GRAY; STIFF TO CRUNCHY TENACITY; HACKLY TO IRREGULAR FRACTURING; CUTTINGS TEND TO BE WEDGELIKE TO PLATY TO SLIGHT BLADE



IN HABIT; DULL EARTHY TO SLIGHT GREASY TO SEMI FROSTED LUSTER; GRANULAR TO GRITTY TO SILTY TEXTURE; NO OTHER VISIBL BEDDING FEATURES.

COAL = BLACK TO GRAYISH BLACK TO SLIGHT BROWNISH BLACK; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; CONCHOIDAL TO SPLINTER TO IRREGULAR FRACTURING; WEDGELIKE TO SLIGHTLY NODULAR TO OCCASIONALLY BLADED CUTTINGS HABIT; DULL TO SPARKLING TO SEM GREASY TO PREDOMINATELY WAXY LUSTER; CLAYEY TO SEMI SILTY TO MOSTLY SMOOTH TEXTURE; VISIBLE DEGASSING IN MOST OF SAMPLE; VISIBLE CRYSTALS OF PYRITE.

SHALE = VERY LIGHT GRAY TO LIGHT OLIVE GRAY; CRUMBLY TO BRITTLE TENACITY; HACK-LY TO IRREGULAR TO BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO ELONGATED TABULAR; EARTHY TO DULL TO SEMI GREASY LUSTER; PREDOMINATELY CLAYEY TO SMOOTH TEXTURE; NO VISIBLE BEDDING IN SAMPLE; NO VISIBLE ACCESSORY MINERALS PRESENT.

SANDSTONE = VERY LIGHT GRAY TO LIGHT YELLOWISH GRAY TO WHITE TO TRANSLUCENT; COARSE TO VERY COARSE TO MEDIUM GRAIN SIZE; CALCITE CEMENTATION DUE TO HIGH REACTION IN DILUTE HCl; MOSTLY QUARTZ FRAMEWORK 3-4% DARK LITHICS VISIBLE IN SAMPLE; WELL TO FAIR TO POORLY SORTED; SUB ANGULAR TO SUB ROUND GRAINS; HIGH TO MODERATE TO OCCASIONAL LOW SPHERICITY ; GRAIN SUPPORTED; FIRM FRIABLE TO HARD TO FRIABLE; NO VISIBLE HYDROCARBONS IN SAMPLE; 10-15% PALEOSOLS VISIBLE IN SAMPLE.

SHALE = LIGHT BLUISH GRAY TO LIGHT GRAY TO LIGHT GREENISH GRAY; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; PLANAR TO IRREGULAR TO SLIGHT BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI WEDGELIKE IN HABIT; SLIGHT GREASY TO SEMI WAXY TO PREDOMINATELY DULL EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES; NO ACCESSORY MINERALS VISIBLE IN SAMPLE.

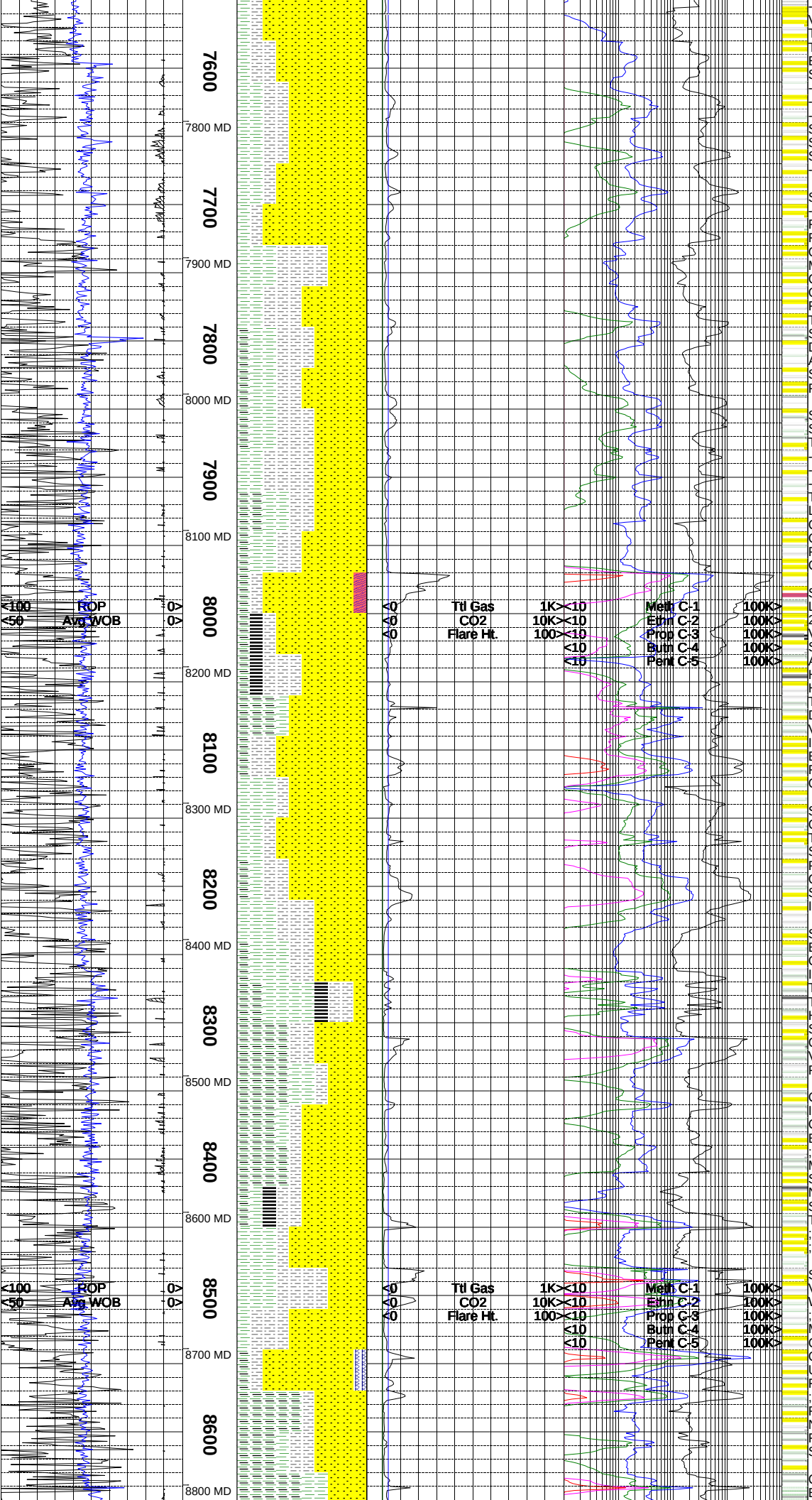
SILTSTONE = VERY LIGHT GRAY TO LIGHT BLUISH GRAY TO LIGHT GRAY; CRUNCHY TO CRUMBLY TO OCCASIONALLY BRITTLE TENACITY; IRREGULAR TO PREDOMINATELY HACKLY TO SLIGHT PLANAR FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SLIGHT NODULAR TO PREDOMINATELY ELONGATE TABULAR IN HABIT; DULL EARTHY TO SLIGHT GREASY TO FROSTED LUSTER; GRITTY TO SLIGHTLY GRANULAR TO SILTY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

OHIO CREEK SANDSTONE = OFF WHITE TO WITH TO TRANSPARENT WITH BLACK AND MODERATE BROWN HUES; QUARTS DOMINANT FRAME WORK; QUARTZ CUTTINGS RANGE FROM SMOKY TO TRANSLUCENT; MOSTLY LOOSE GRAIN WITH GRAIN SUPPORTED SANDSTONE CUTTINGS; CONS -ISTS OF CALCITIC CEMENTATION WITH MODER -ATELY HIGH REACTION TO DILUTE HCL; MATR -IX CONTAINS 5 TO 8% DARK LITHIC FRAGMEN -TS; MEDIUM-FINE TO MEDIUM-COARSE GRAINE ; MODERATELY FAIR TO POOR SORTING; SUB-ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; NO VISIBLE BEDDING OR OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT; NO ACCESSORY MINER -ALS PRESENT IN SAMPLE.

CARBONACEOUS SHALE = BROWNISH BLACK TO OLIVE BLACK TO DARK BROWNISH GRAY; MODER -ATELY TOUGH TO SLIGHTLY DENSE TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL ELONGATED CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL VERY LIGHT SEMI-SPARK -LING LUSTER; SEMI-SMOOTH TO SLIGHTLY CLAYEY TEXTURE; VERY THIN LAMINAE VISIBL -E, POOR GRADE SHALE VISIBLE BEDDING WIT -H CARBONACEOS SHALE; ACCESSORY MINERAL PYRITE, AND SEVERAL LARGE CUTTINGS OF CALCITE VISIBLE IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY; MODERTELY TOUGH TO MODERATELY DENSE TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY HACKLY FRACTURE; MASSIVE TO WEDGE LIKE TO ELONGATED CUTTI -NGS HABIT; DULL TO EARTHY DULL TO OCCAS -IONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO SLIGHTLY SILTY TO SLIGHTLY CLAYEY TEXTURE; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRAD -E SANDSTONE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GRA



-Y TO MEDIUM LIGHT GRAY TO OCCASIONAL VERY LIGHT BLUISH GRAY; SLIGHTLY DENSE TO OCCASIONAL CRUMBLY TO SLIGHTLY TOUGH TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EART -HY DULL TO OCCASIONAL VERY SEMI-SPARKLI -NG LUSTER; SLIGHTLY GRITTY TO VERY SLIG -HTLY GRANULAR TEXTURE; POOR GRADE SILT-STONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSOR -Y MINERALS PRESENT IN SAMPLE.

SANDSTONE = OFF WHITE TO WHITE TO TRANSL -UCENT WITH BLACK HUES; QUARTZ DOMINANT FRAME WORK; MOSTLY LOOSE GRAINS WITH FEW GRAIN SUPPORTING CUTTINGS; CONSISITS OF CALCITIC CEMENTATION WITH LIGHT TO MODERATE REACTION TO DILUTE HCL; MATRIX CONTAINS 3 TO 5% DARK LITHIC FRAMENT IN GRAIN SUPPORTED CUTTINGS; MEDIUM-FINE TO FINE GRAINED; SUB-ANGULAR TO SUB-ROUNDED TO ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; NO VISIBLE BEDDING OR OTHER DISTINGUSHALBE SURFACE FEATURES PRESENT; ACCESSORY MINERAL PRESENT ATTACHED TO SMALL CARBONACOUS SHALE CUTTING IN SAM-PLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY; SLIGHTLY TOUGH TO MODERATELY DENSE TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB -PLANAR TO EARTHY HACKLY FRACTURE; OCCAS -IONAL MASSIVE TO ELONGATED TO WEDGE LIK -E CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO SLIGHTLY CLAYEY TO SLIGHTLY SILTY TEXTURE; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, SMALL AMOUNT OF CARBONACEOUS SHALE VISIBLY DEGASSING IN

SANDSTONE = WHITE TO TRANSLUCENT TO VERY LIGHT GRAY; MOSTLY QUARTZ FRAMEWORK WITH 2-5% DARK LITHICS VISIBLE IN SAMPLE; VERY COARSE TO MEDIUM TO FINE GRAIN SANDSTONES; FAIR TO WELL SORTED; SUB-ANGULAR TO SUB-ROUND GRAINS; MODERATE TO HIGH SPHERICITY; FINE GRAIN SANDSTONES HAVE A SLIGHT FROSTED APPEARANCE; FRIABL TO MODERATE HARD; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; GRAIN SUPPORTED; NO VISIBLE HYDROCARBONS IN SAMPLE; GRADES INTO A COARSE GRAIN CARBONACEOUS SHALE BED; CALCITE CEMENTATION DUE TO HIGH REACTION IN DILUTE HCl; LARGE CRYSTALS OF CALCITE VISIBLE IN SAMPLE.

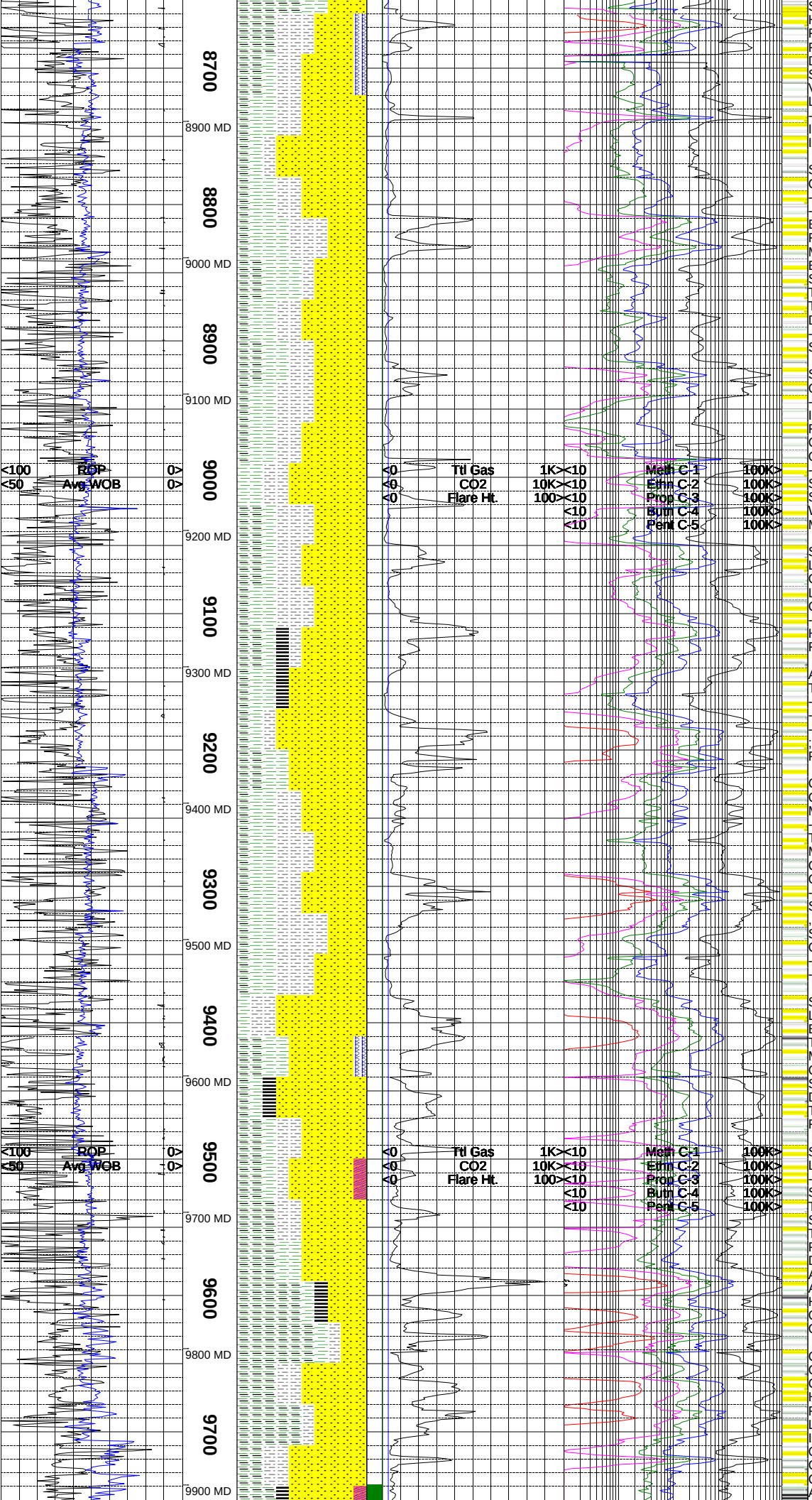
SHALE = PALE BROWN TO YELLOWISH GRAY TO GRAYISH YELLOW GREEN; BRITTLE TO CRUMBLY TENACITY; PLANAR TO SLIGHT BLOCKY TO SEMI HACKLY FRACTURING; CUTTINGS TEND TO PLATY TO FLAKY IN HABIT; DULL EARTHY TO OCCASIONALLY GREASY LUSTER; CLAYEY TO SMOOTH TEXTURE; NO OTHER VISIBLE BEDDING IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT BLUISH GRAY TO MEDIUM GRAY; STIFF TO CRUNCHY TO OCCASIONAL BRITTLE TENACITY; IRREGULAR TO PREDOMINATELY HACKLY TO OCCASIONALLY PLANAR FRACTURING; PLATY TO FLAKY TO SLIGHT TABULAR CUTTINGS HABIT; SLIGHT FROSTED TO SPARKLING TO SEMI DULL LUSTER; GRITTY TO SILTY TO GRITTY TO SLIGHT GRANULAR TEXTURE; VISIBLE FRACTURE FILL IN SILTY SAMPLE PIECES.

CARBONACEOUS SHALE = DARK GRAY TO BROWN-ISH GRAY TO OLIVE GRAY; CRUNCHY TO CRUMBLY TO OCCASIONAL BRITTLE TENACITY; BLOCKY TO PLANAR TO SPLINTERY FRACTURING ; FRACTURED ALONG THE CARBONACEOUS MATERIAL; CUTTINGS TEND TO BE PLATY TO SEMI WEDGELIKE TO OCCASIONALLY SLIGHTLY NODUALR; SPARKLING TO SLIGHT WAXY TO SEMI GREASY LUSTER; GRANULAR TO GRITTY TO SILTY WITH A OCCASIONAL CLAYEY TEXTUR ; VISIBLE BANDS OF CARBONACEOUS MATERIAL ;1-2% KALONITIC SANDS VISIBLE IN SAMPLE.

SANDSTONE = TRANSLUCENT TO WHITE TO VERY LIGHT GRAY; MOSTLY QUARTZ FRAMEWORK WITH 3-6% DARK LITHICS VISIBLE IN SAMPLE ; VERY COARSE TO COARSE SIZE; FAIR TO MODERATE SORTED; SUBROUND TO SUBANGULAR GRAINS; LOW TO MODERATE SPHERICITY; GRAINS HAVE A SLIGHT POLISH APPEARANCE; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; FRIABLE TO FIRM FRIABLE TO MODERATE HARD ; CALCITE CEMENTATION DUE TO MODERATE REACTION IN DILUTE HCl; GRAIN SUPPORTED; NO VISIBLE HYDROCARBONS IN SAMPLE; THIN FRACTURES FOUND IN COARSE GRAIN SAND-STONES; NO ACCESSORY MINERALS PRESENT.

CARBONACEOUS SHALE = MEDIUM GRAY TO BROWNISH GRAY TO OLIVE GRAY; BRITTLE TO



STIFF TO CRUNCHY TENACITY; PREDOMINATELY HACKLY TO PLANAR TO OCCASIONAL BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO WEDGELIKE IN HABIT; FROSTED TO DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; MODERATELY CLAYEY TO VERY SLIGHTY GRITTY TEXTURE; VERY THIN LAMINAE VISIBLE IN SAMPLE, NO OTHER DIST -INGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO OCCASIONAL MEDIUM LIGHT GRAY; VERY SLIGH -TLY DENSE TO MODERATELY BRITTLE TO MODE -RATELY CRUMBLY TENACITY; IRREGULAR TO EARTHY HACKLY TO OCCASIONAL SUB-BLOCKY FRACTURE; WEDGE LIKE TO ELONGATED TO MOSTLY SMALLER CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-WAXY TO SEMI-FROSTED LUSTER; MODERATELY SMOOTH TO SLIGHTY SILTY TO VERY SLIGHTY CLAYEY TEXTURE; NO VISIBLE LAMINAE OR OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRES -ENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL VERY LIGHT GRAY; MODE -RATE TOUGH TO SLIGHTLY DENSE TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; OCCASI -ONAL CLAYEY TO SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULAR TEXTURE; POOR GRADE SILTSTONE VISIBLE BEDDING AND GRADING WITH POOR GRADE SANDSTONE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

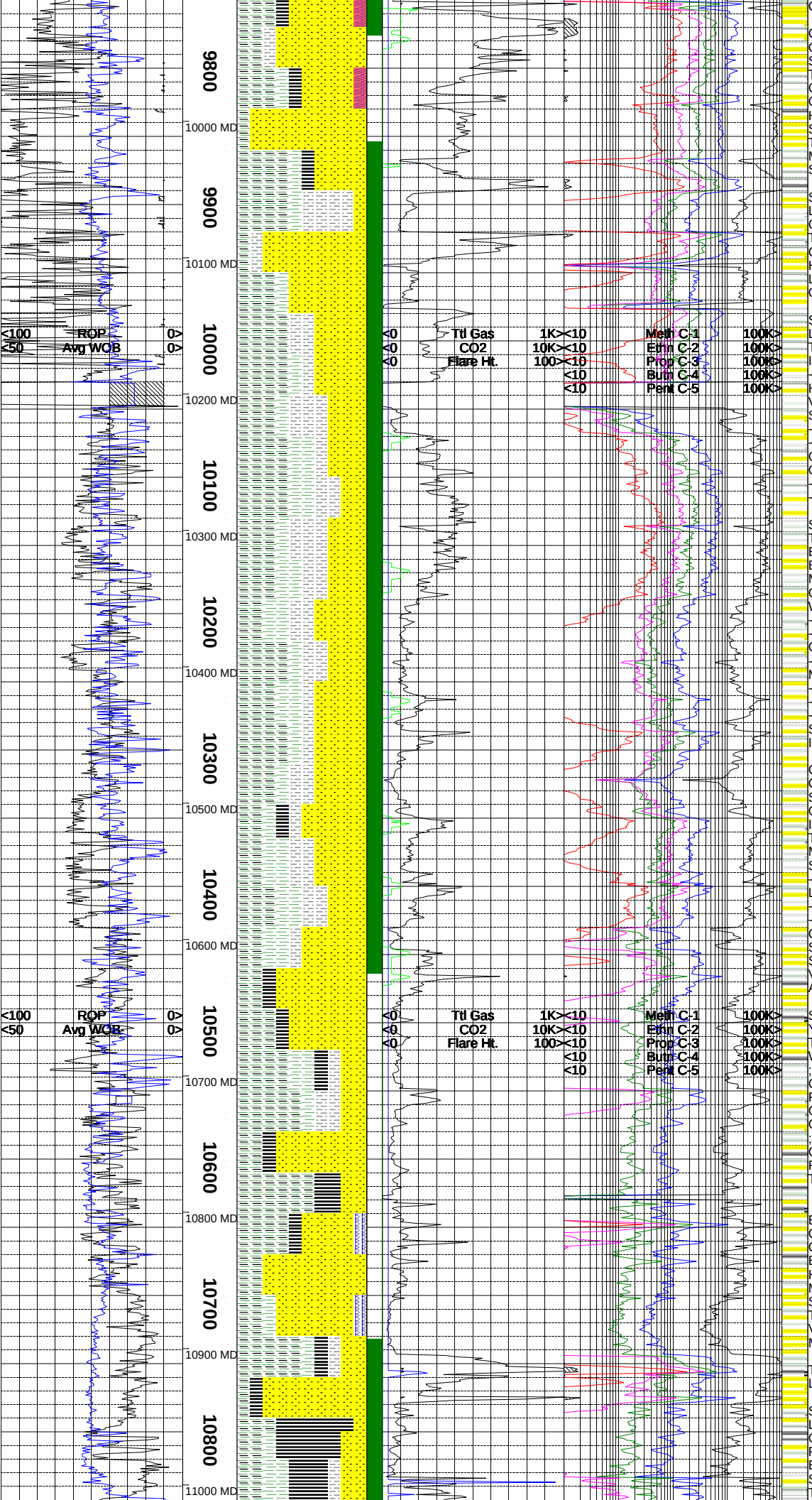
SANDSTONE = OFF WHITE TO WHITE TO VERY LIGHT BROWNISH GRAY WITH BLACK HUES; QUARTZ DOMINANT FRAME WORK; MOSTLY LOOSE GRAINS WITH FEW GRAIN SUPPORTED CUTTINGS; CONSISTS OF CALCITIC CEMENTATI -ON; MODERATELY HIGH REACTION TO DILUTE HCL; MATRIX CONTAINS 3 TO 5% DARK LITHIC FRAGMENTS; MEDIUM-FINE TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGULAR TO SUB- ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; VERY SMALL AMOUN -T OF COAL AND CARBONACEOUS MATERIAL VIS -IBLE DEGASSING, POOR GRADE SILTSTONE VI -SIBLE BEDDING WITH POOR GRADE SANDSTONE , NO ACCESSORY MINERALS PRESENT IN SAM-PLE.

CARBONACEOUS SHALE = BROWNISH BLACK TO OLIVE BLACK TO VERY DARK BROWNISH GRAY; MODERATELY TOUGH TO SLIGHTLY DENSE TENAC -ITY; IRREGULAR TO SUB-PLANAR TO EARTHY TO EARTHY-HACKLY FRACTURE; OCCASIONAL MASSIVE TO ELONGATED TO SUB-TABULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; MODERA -TELY CLAYEY TO SEMI-SMOOTH TO SLIGHTLY SILTY TEXTURE; VERY THIN LAMINAE VISIBLE , SMALL AMOUNT OF COAL AND CARBONACEOUS SHALE VISIBLY DEGASSING IN SAMPLE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURE -S PRESENT IN SAMPLE; NO ACCESSORY MINER -ALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GREENISH GRAY TO LIGHT BLUISH GRAY TO VERY LIGHT GRAY; BRITTLE TO CRUMBLY TO SLIGHT CRUNCHY TENACITY; OCCASIONALLY IRREGULAR TO MOSTLY PLANAR TO HACKLY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI TABULAR IN HABIT; SLIGHT GREASY TO DULL EARTHY LUSTER; CLAYEY TO SMOOTH TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO LIGHT BROWNISH GRAY; MOSTLY QUARTZ FRAME -WORK WITH 4-6% DARK LITHICS VISIBLE IN SAMPLE; MOSTLY COARSE GRAIN TO MEDIUM TO FINE GRAIN SANDSTONES; POOR TO FAIR SORTED; SUB ROUND TO ROUND GRAINS; HIGH TO MODERATE SPHERICITY; GRAINS HAVE A POLISH APPEARANCE; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; GRAIN SUPPORTED WITH A FEW MATRIX SUPPORTED; CALCITE CEMENT-ATION DUE TO MODERATE REACTION IN DILUTE HCl; NO VISIBLE HYDROCARBONS DUE TO LACK OF FLUORENCE UNDER UV LIGHT; THIN BEDS OF COAL THROUGH OUT THE SAMPLE.

CARBONACEOUS SHALE = LIGHT OLIVE GRAY TO OLIVE GRAY TO BROWNISH GRAY; BRITTLE TO CRUNCHY TO CRUMBLY TENACITY; PREDOMINATE HACKLY TO PLANAR TO SLIGHT BLOCKY FRACTURING; CUTTINGS TEND TO BE WEDGE-LIKE TO SLIGHT NODULAR TO SEMI TABULAR IN HABIT; SLIGHT GREASY TO FROSTED TO OCCASIONAL METALLIC LUSTER; GRANULAR TO GRITTY TO SILTY TEXTURE; VISIBLE BEDS OF CARBONACEOUS MATERIAL; VISIBLE DEGASSING ALONG CARBONACEOUS BEDS; GRADES INTO A



COARSE GRAIN SANDSTONE.

COAL = OLIVE BLACK TO BROWNISH BLACK TO GRAYISH BLACK; BRITTLE TO MALLEABLE TO STIFF TENACITY; IRREGULAR TO SEMI BLOCKY TO PREDOMINATELY CONCHOIDAL FRACTURING; CUTTINGS TEND TO BE MOSTLY NODULAR TO OCCASIONALLY WEDGELIKE TO TABULAR IN HABIT; PREDOMINATELY WAXY TO GREASY TO SEMI SPARKLING LUSTER; SMOOTH TO MATTE TO GRITTY TEXTURE; VISIBLE DEGASSING IN MOST OF THE SAMPLE; VISIBLE PYRITE IN SAMPLE.

SHALE = VERY LIGHT GREENISH GRAY TO LIGHT GRAY TO MEDIUM GRAY; CRUNCHY TO CRUMBLY TENACITY; PREDOMINATELY PLANAR TO HACKLY TO SEMI BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY IN HABIT; DULL EARTHY TO OCCASIONALLY WAXY LUSTER; CLAYEY TO SMOOTH TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SILTSTONE = VERY LIGHT BROWNISH GRAY TO LIGHT GRAY TO WHITE; CRUNCHY TO CRUMBLY TO SEMI BRITTLE TENACITY; HACKLY TO IRREGULAR TO SUB-PLANAR TO EARTHY FRACTU -RE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL VERY SLIGHTLY SEMI-SPARKLING LUSTER; SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULA -R TO OCCASIONAL CLAYEY TEXTURE; POOR GR -ADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE; NO VISIBLE LAMINAE OR OTHER DISTINGUISHABLE STRUCTURAL FEATURE -S PRESENT; NO ACCESSORY MINERALS PRESEN -T IN SAMPLE.

SANDSTONE = VERY LIGHT GRAY TO OFF WHITE TO VERY LIGHT TANISH-BROWN GRAY TO LIGHT BROWNISH GRAY WITH BLACK AND MODERATE BROWN HUES; QUARTZ DOMINATE FRAME WORK; MOSTLY GRAIN SUPPORTED WITH FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH LIGHT TO MODERATE REACTION TO DILUT -E HCL; MATRIX CONTAINS 3 TO 5% DARK LIT -HIC FRAGMENTS; FINE TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGUL -AR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SANDSTON -E VISIBLE GRADING WITH POOR GRADE SILTS -TONE, VERY SMALL AMOUNT OF COAL AND CAR -BONACEOUS SHALE VISIBLY DEGASSING IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

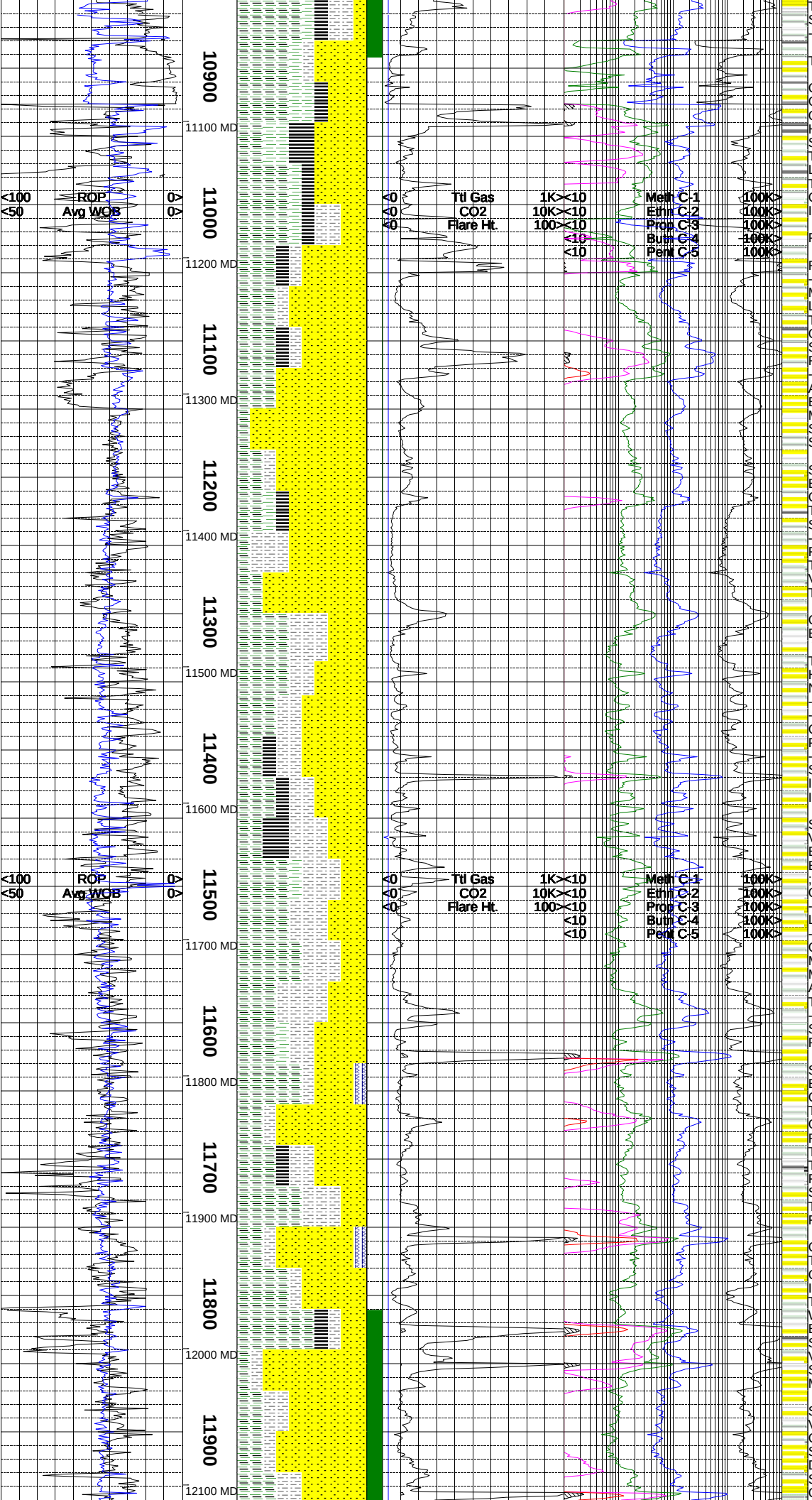
CARBONACEOUS SHALE = BROWNISH BLACK TO OLIVE BLACK TO VERY DARK BROWNISH GRAY; SLIGHTLY TOUGH TO MODERATELY DENSE TO OCCASIONAL SLIGHTLY CRUNCHY TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY TO HACKLY FRACTURE; OCCASIONAL MASSIVE TO ELONGATED TO SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EART -HY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHTLY SMOOTH TO SLIGHTLY CLAY -EY TO VERY SLIGHTLY GRITTY TEXTURE; POO -R GRADE SANDSTONE VISIBLE BEDDING WITH CARBONACEOUS SHALE, AND POOR GRADE SILT- STONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, VERY SMALL AMOUNT OF COAL VISIBLY DEGASSING IN SAMPLE; NO ACCESSORY MINERALS PRESENT.

SANDSTONE = LIGHT BROWNISH GRAY TO YELLOWISH GRAY TO WHITE TO SLIGHT TRANSLUCENT; MOSTLY QUARTZ FRAMEWORK WITH 7-8% DARK LITHICS VISIBLE IN SAMPLE ; COARSE TO MEDIUM TO OCCASIONAL FINE GRAIN SANDSTONES; VERY POOR TO POOR TO FAIR SORTED; SUBANGULAR TO SUBROUND GRAINS; SPHERICITY IS MODERATE TO HIGH; GRAIN SUPPORTED; NO VISIBLE HYDROCARBONS ; HIGH REACTION IN DILUTE HCl INDICATING CALCITE CEMENTATION; GRAINS ARE SEMI FROSTED IN APPEARANCE; VISIBLE BEDS OF THIN COAL IN COARSE GRAIN SANDSTONES.

COAL = GRAYISH BLACK TO OLIVE BLACK TO BROWNISH BLACK; STIFF TO MALLEABLE TO CRUNCHY TENACITY; HACKLY TO SPLINTERY TO CONCHOIDAL FRACTURING; CUTTINGS TEND TO BE NODULAR TO BLADED TO WEDGELIKE IN HABIT; DULL TO SPARKLING TO SLIGHT METALLIC TO SEMI GREASY WAXY LUSTER; SMOOTH TO CRYSTAL'N TO SEMI MATTE TEXTURE; THIN LAMINAE OF PYRITE IS VISIBLE IN SAMPLE; VISIBLE DEGASSING IN MOST OF SAMPLE.

TOOK A KICK @ 10904', GAINED 64bbls. LOST RETURNS .REGAIN RETURNS @ 10906'.

SHALE = VERY LIGHT GREENISH GRAY TO LIGHT GRAY TO PALE BLUE; BRITTLE TO CRUMBLY TENACITY; CUTTINGS TEND TO BE PLATY TO FLAKY IN HABIT; DULL EARTHY TO EARTHY DULL TO OCCASIONAL SEMI-WAXY TO SEMI-FROSTED LUSTER; MODERATELY SMOOTH TO SLIGHTY SILTY TO VERY SLIGHTLY CLAYEY



TEXTURE; NO VISIBLE LAMINAE OR OTHER STRUCTURAL FEATURES PRESENT; NO ACCESSOR -Y MINERALS PRESENT IN SAMPLE.

TRIP OUT OF HOLE FOR NEW BIT @ 11086'

CARBONACEOUS SHALE = BROWNISH BLACK TO GRAYISH BLACK; CRUNCHY TO CRUMBLY TO OCCASIONAL MALLEABLE TENACITY; PLANAR TO HACKLY FRACTURING; PLATY TO FLAKY TO SEMI TABULAR CUTTINGS HABIT; DULL EARTHY TO SEMI FROSTED TO SLIGHT SPARKLING LUSTER; SMOOTH TO PREDOMINATELY SILTY TO SEMI GRITTY TEXTURE; VISIBLE BEDS OF CARBONACEOUS MATERIAL; VISIBLE DEGASSING IN MOST OF SAMPLE.

PIPE STUCK AT 11202'.

ROLLINS SANDSTONE = WHITE TO LIGHT BROWN -ISH GRAY TO OCCASIONALLY TRANSLUCENT; MOSTLY QUARTZ FRAMEWORK WITH 5-6% DARK LITHICS VISIBLE IN SAMPLE; VERY COARSE TO PREDOMINATELY FINE GRAIN TO MEDIUM GRAIN SIZE; FAIR TO WELL TO VERY WELL SORTED; SUBANGULAR TO SUB ROUND TO ROUND GRAINS; MODERATE TO HIGH SPHERICIT -Y; FEW GRAINS HAVE A SLIGHT POLISH APPEARANCE; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; CALCITE CEMENTATION DUE TO MODERATE REACTION IN DILUTE HCl; GRAIN SUPPORTED; NO VISIBLE HYDROCARBONS IN SAMPLE UNDER FLOURENCES.

SILTSTONE = VERY LIGHT GRAY TO LIGHT BROWNISH GRAY TO LIGHT GREENISH GRAY; CRUNCHY TO CRUMBLY TO SEMI BRITTLE TENACITY; IRREGULAR TO SLIGHT HACKLY TO SEMI PLANAR FRACTURING; TABULAR TO WEDGE -LIKE CUTTINGS HABIT; DULL EARTHY TO SEM FROSTED TO OCCASIONAL WAXY LUSTER; SILTY TO SLIGHT GRITTY TEXTURE; NO OTHER VISIBLE ACCESSORY MINERALS PRESENT IN THE SAMPLE.

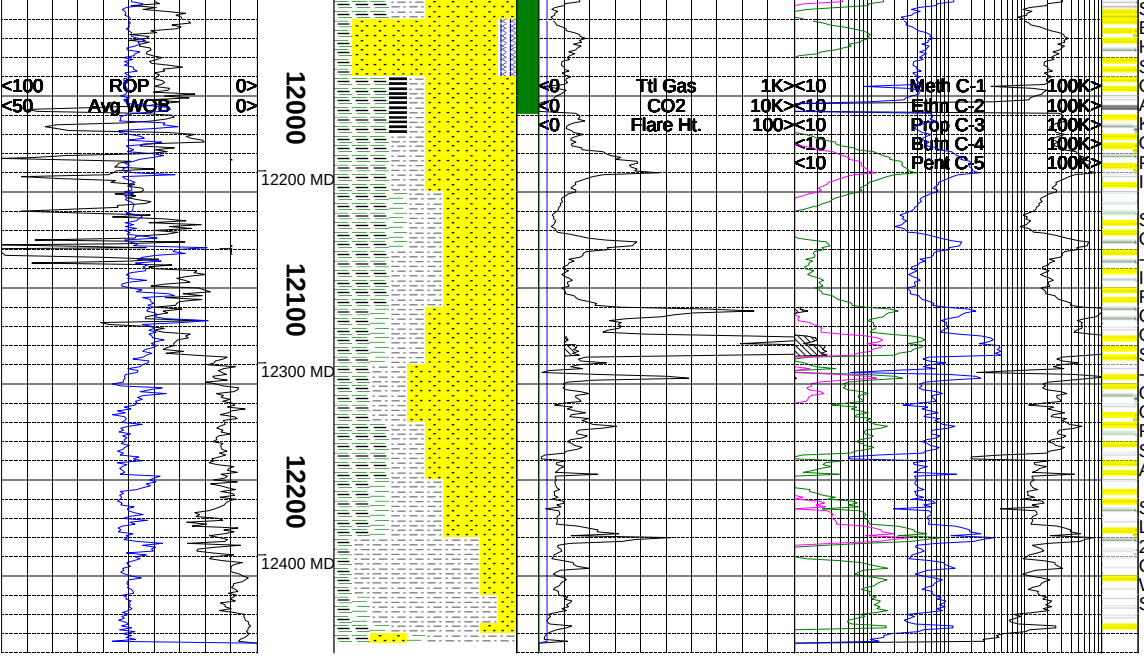
CARBONACEOUS SHALE = OLIVE BLACK TO DARK BROWNISH BLACK; MODERATELY DENSE TO VERY SLIGHTLY TOUGH TENACITY; IRREGULAR TO SUB-PLANAR TO SUB-BLOCKY TO EARTHY- HACKLY FRACTURE; SUB-TABULR TO SUB- NODULAR TO OCCASIONAL WEDGE LIKE CUTTING -S HABIT; DULL TO EARTHY DULL TO OCCASIO -NAL SEMI-SPARKLING LUSTER; SLIGHTLY CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE; POOR GRADE SILTSTONE VISIBLE BEDDING WIT -H POOR GRADE CARBONACEOUS SHALE, VERY SMALL AMOUNT OF COAL VISIBLY DEGASSING IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SANDSTONE = OFF WHITE TO PALE WHITE TO VERY LIGHT TANISH-BROWN TO VERY LIGHT BROWNISH GRAY WITH BLACK AND MODERATE BROWN HUES; QUARTZ DOMINANTE FRAME WORK ; QUARTZ CUTTINGS RANGE FROM SMOKY TO OCCASIONAL SLIGHTLY TRANSLUCENT; CONSIST -S MOSTLY SILICIC CEMENTATION WITH VERY LIGHT TO NO EFFERVESCING; MATRIX CONTAIN -S 3 TO 5% DARK LITHIC FRAGMENTS; MOSTLY GRAIN SUPPORTED WITH FEW LOOSE GRAINS; MEDIUM-FINE TO MEDIUM-COARSE GRAINED; MODERATELY FAIR TO POOR SORTING; SUB- ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTS -TONE VISIBLE GRADING WITH POOR GRADE SANDSTONE; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT BROWNISH GRAY TO LIGHT YELLOWISH GRAY; CRUNCHY TO CRUMBLY TO SEMI BRITTLE TENACITY; GRADES INTO A MEDIUM TO COARSE GRAIN SANDSTONE; SPLINTERY TO PLANAR TO PREDOMINATELY HACKLY FRACTURING; CUTTING TEND TO BE PLATY TO FLAKY TO SLIGHTLY TABULAR IN HABIT; SEMI GREASY TO SLIGHT FROSTED TO OCCASIONALLY DULL LUSTER; SILTY TO GRITTY TO OCCASIONALLY GRANULAR TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO DARK GRAY TO OLIVE GRAY; CRUNCHY TO CRUMBLY TO SLIGHT MALLEABLE TENACITY; IRREGULAR TO PLANAR FRACTURING; CUTTINGS TEND TO BE PLATY TO TABULAR TO SEMI WEDGE-LIKE IN HABIT; WAXY TO SEMI FROST- ED TO DULL EARTHY LUSTER; GRITTY TO SILTY TO SLIGHT GRANULAR IN TEXTURE; VISIBLE PYRITE CRYSTALS THROUGH OUT THE SAMPLE; VISIBLE BANDS OF CARBONACEOUS MATERIAL ALONG BEDDING PLANES.

SANDSTONE = TRANSLUCENT TO WHITE TO VERY LIGHT BROWNISH GRAY; VERY COARSE TO COARSE TO PREDOMINATELY MEDIUM GRAIN SIZE; MOSTLY QUARTZ FRAMEWORK WITH 4-6% DARK LITHICS VISIBLE IN THE SAMPLE; SLIGHT REACTION IN DILUTE HCl INDICATING CALCITIC DOLMITE CEMENTATION; GRAIN



SUPPORTED; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; FIRM FRIABLE TO MODERATE HARD TO HARD; SUBANGULAR TO ANGULAR TO SUBROUND GRAINS; MODERATE TO LOW TO OCCASIONAL HIGH SPHERICITY; GRAINS HAVE A SLIGHT FROSTED APPEARANCE; BANDS OF KAOLINITIC SANDS VISIBLE IN SAMPLE, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO VERY LIGHT BROWNISH GRAY; SLIGHT -LY DENSE TO MODERATELY TOUGH TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; VERY SLIGHTLY GRITTY TO VERY SLIGLHTY GRANULA -R TEXTURE; POOR GRADE SANDSTONE VISIBLE GRADING WITH POOR GRADE SILTSTONE, POOR GRADE SANDSTONE VISIBLE BEDDING WITH POOR GRADE CARBONACEOUS SHALE, NO OTHER SURFACE FEATURES PRESENT IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SANDSTONE = TRANSLUCENT TO WHITE TO VERY LIGHT GRAY; MOSTLY QUARTZ FRAMEWORK WITH 2-3% DARK LITHICS VISIBLE IN SAMPLE; COARSE TO MEDIUM TO FINE GRAIN; FAIR TO WELL TO VERY WELL SORTED; SUBANGULAR TO SUBROUND TO PREDOMINATELY ROUND GRAINS. TD FRU197-33B5 @ 12445' ON 05/13/2010.