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

MUDLOG MD

COMPANY	Exxon Mobil
WELL	FRU197-33B9
FIELD	Piceance Creek
REGION	Rockies
COORDINATES	39.921322000
	-108.282561000
ELEVATION	GL: 6459.3'
	RKB: 30.2'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	051031142200
SPUD DATE	04/08/2010
CONTRACTOR	HP
CO. REP.	C. CURTIS
RIG/TYPE	HP321
LOGGING UNIT	MLU#31
GEOLOGISTS	B.DELANEY; C.RECORD
	M.FRANCO
ADD. PERSONS	M.PIPER; K.WALLANDER
CO. GEOLOGIST	C.ALBA / N. ROOSMAWATI

LOG INTERVAL

DEPTHS:	3950'	**TO**	12300'
DATES:	07/21/2010	**TO**	08/02/2010
SCALE:	1"=100'		

MUD TYPES

WATER-BASED	**TO**	3950'
LSND	**TO**	12300'
	TO	
	TO	

CASING DATA

16.00"	**AT**	150'
10.75"	**AT**	3940'
4.5"	**AT**	12285'
	AT	

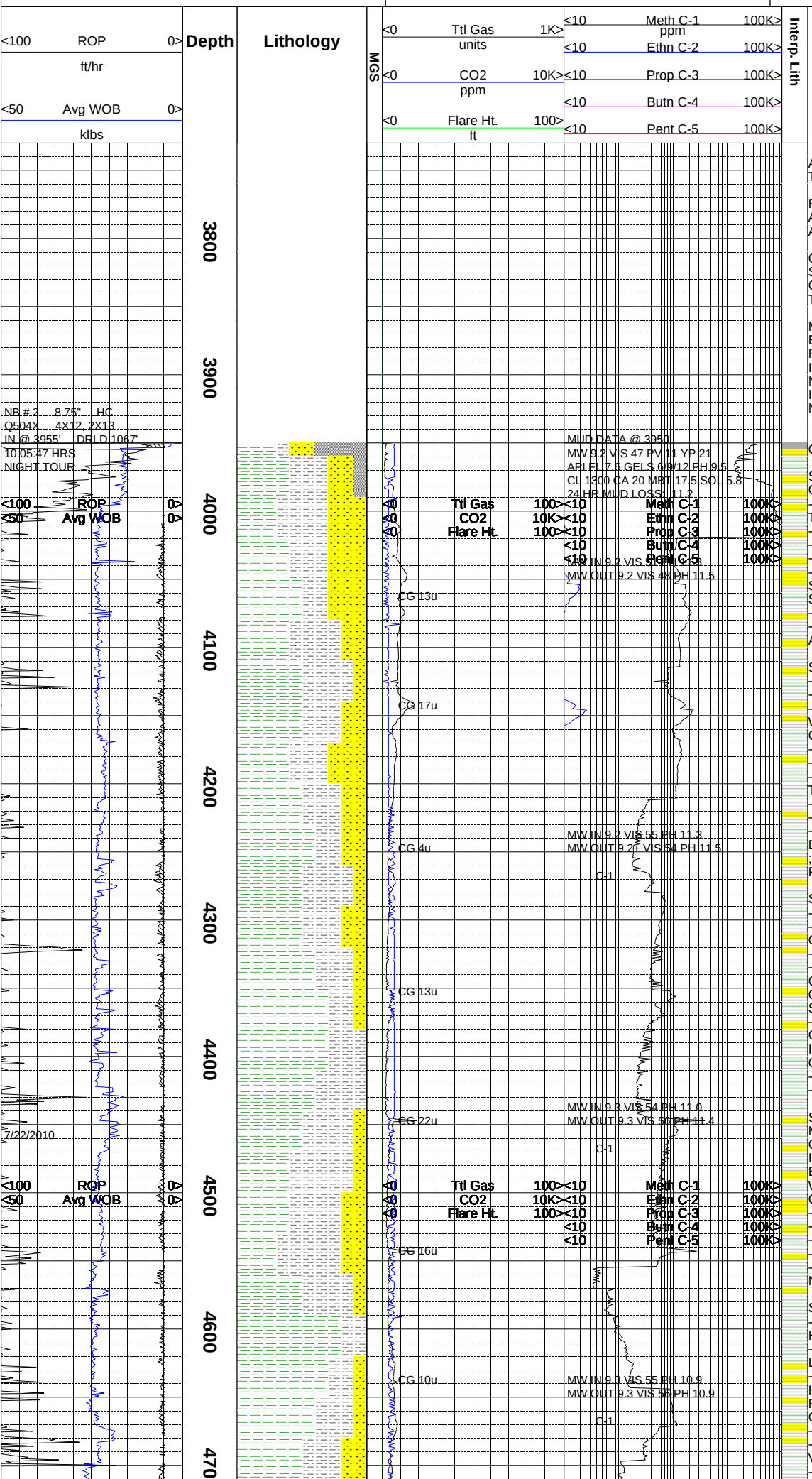
HOLE SIZE

14.75"	**TO**	3950'
8.75"	**TO**	12300'
	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.

ALL SAMPLE COLOR DESCRIPTIONS REFERENCED TO THE G.S.A. ROCK COLOR CHART.

ROCK CHARACTERISTICS AND CONSTITUENTS ARE LISTED FROM MOST ABUNDANT TO LEAST ABUNDANT PERCENTAGE OF SAMPLE.

GAS CALIBRATED TO S.P.L.W.A. STANDARDS (2% ME = 100 UNITS)
GAS CHROMOTOGRAPHY EQUIPMENT CALIBRATED TO A TEST GAS COMPOSED OF THE FOLLOWING:

METHANE = 9,990 PPM
ETHANE = 1,010 PPM
PROPANE = 980 PPM
I-BUTANE =1,000 PPM
N-BUTANE= 1,000 PPM
I-PENTANE = 1,000 PPM
N-PENTANE = 1,000 PPM

EPOCH WELL SERVICES COMMENCED LOGGING ON 7/21/2010 @ 3950'.

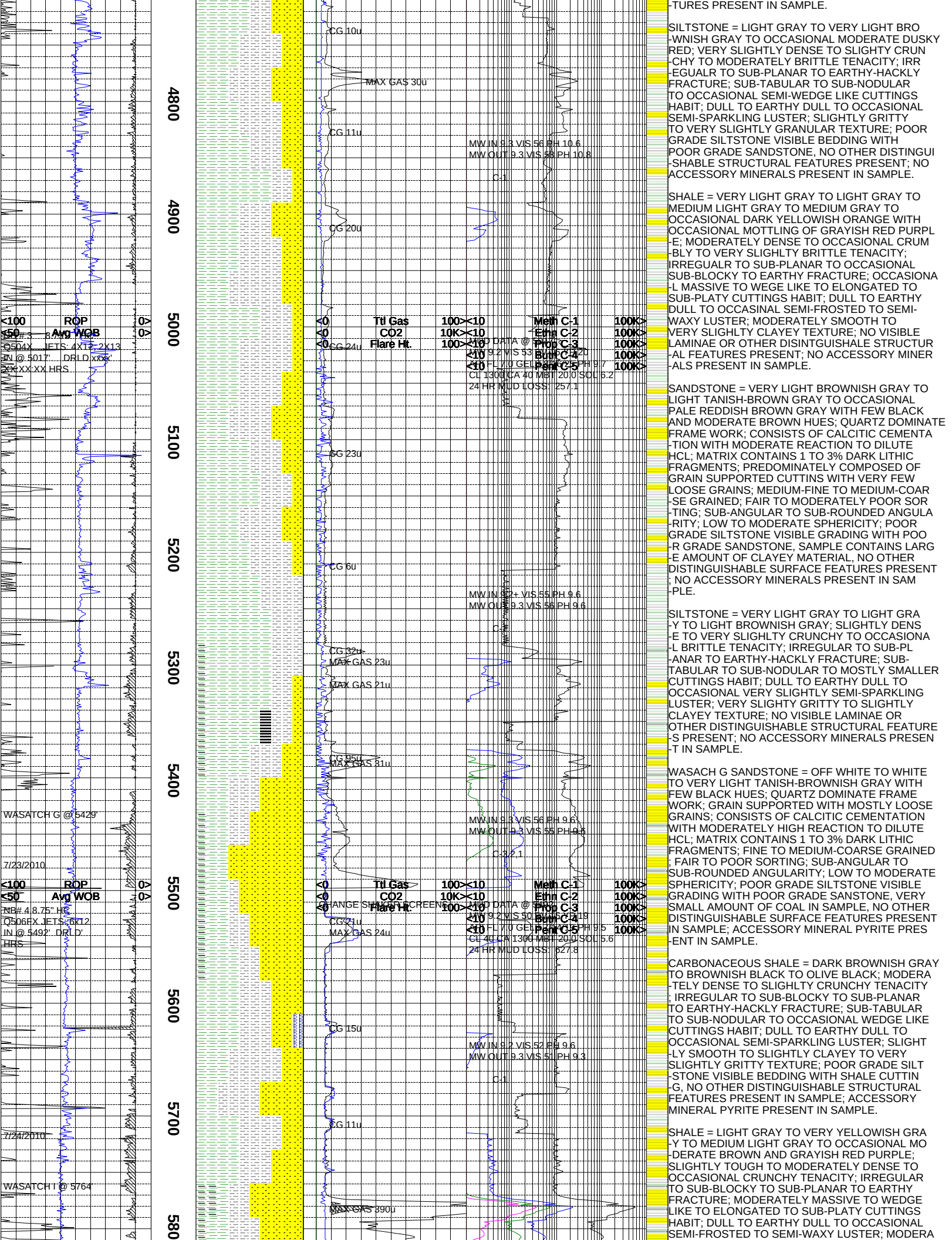
SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO OCCASIONAL MEDIUM LIGHT GRAY; VERY SLIGH -TLY DENSE TO MOSTLY BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB -PLANAR TO EARTHY HACKLY FRACTURE; OCCAS -IONAL MASSIVE TO WEGE LIKE TO OCCASIONA -L ELONGATED CUTTINGS HABIT; DULL TO EAR -THY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO SLIGHTLY CLAYEY TO SLIGHTLY SILTY TEXTUR -E; NO VISIBLE LAMINAE OR OTHER DISTINGU -ISHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SANDSTONE = OFF WHITE TO VERY LIGHT BROW -NISH GRAY TO YELLOWISH GRAY WITH MODERA -TE BROWN AND BLACK HUES; QUARTZ DOMINAT -E FRAME WORK; MOSTLY GRAIN SUPPORTED WITH VERY FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATELY HIG -H REACTION TO DILUTE HCL; MATRIX CONTAI -NS 3 TO 5% DARK LITIHC FRAGMENTS; MEDIU -M FINE TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGULAR TO SUB-ROUN -DED ANGULARITY; LOW TO MODERATE SPHERIC -ITY; POOR GRADE SILTSTONE VISIBLE GRADI -NG WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT ; NO ACCESSORY MINERALS PRESENT IN SAM-PLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GRA -Y TO LIGHT BROWNISH GRAY; SLIGHTLY DENS -E TO MODERATELY BRITTLE TO SLIGHTLY CRUNCHY TENACITY; IRREGULAR TO SUB-PLANA -R TO EARTHY HACKLY FRACTURE; SUB-TABULA -R TO SUB-NODULAR TO OCCASIONAL PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; VERY SLIGHTLY GRITTY TO VERY SLIGHLTY GRANULA -R TEXTURE; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE; CUTT-INGS IN SAMPLE ARE SLIGHTLY CLAYEY; NO OTHER DISTINGUISHABLE STRUCTURAL FEATURE -S PRESENT IN SAMPLE; NO ACCESSORY MINER -ALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY; MOSTLY BRITTLE TO CRUMBLY TO VERY SLIGHTLY DENSE TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO WEDGE LIKE TO ELONGATED TO OCCASIONAL CURVED CUTTINGS HABIT; DULL TO EARTHY DU -LL TO OCCASIONAL SEMI-FROSTED TO SEMI-W -AXY LUSTER; MODERATELY SMOOTH TO SLIGHT -LY CLAYEY TO VERY SLIGHTLY SILTY TEXTUR -E; NO VISIBLE LAMINAE OR OTHER DISTINGU -ISHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SANDSTONE = OFF WHITE TO VERY LIGHT BROW -NISH GRAY WITH BLACK AND MODERATE BROWN HUES; QUARTZ DOMINATE FRAME WORK; PREDOM -INATELY GRAIN SUPPORTED WITH VERY FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMEN -TATION WITH MODERATE REACTION TO DILUTE HCL; MARTIX CONTAINS 2 TO 5% DARK LITHIC FRAGMENTS; MEDIUM-FINE TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGUL -AR TO SUB-ROUNDED ANGULARITY; LOW TO MO -DERATE SPHERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTON -E, NO OTHER DISTINGUISHABLE SURFACE FEA



-TURES PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO VERY LIGHT BRO -WNISH GRAY TO OCCASIONAL MODERATE DUSKY RED; VERY SLIGHTLY DENSE TO SLIGHTY CRUN -CHY TO MODERATELY BRITTLE TENACITY; IRR -EGUALR TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL SEMI-WEDGE LIKE CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULAR TEXTURE; POOR GRADE SILTSTONE VISIBLE BEDDING WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUI -SHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY TO MEDIUM GRAY TO OCCASIONAL DARK YELLOWISH ORANGE WITH OCCASIONAL MOTTLING OF GRAYISH RED PURPL -E; MODERATELY DENSE TO OCCASIONAL CRUM -BLY TO VERY SLIGHLTY BRITTLE TENACITY; IRREGUALR TO SUB-PLANAR TO OCCASIONAL SUB-BLOCKY TO EARTHY FRACTURE; OCCASIONA -L MASSIVE TO WEGE LIKE TO ELONGATED TO SUB-PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASINAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO VERY SLIGHLTY CLAYEY TEXTURE; NO VISIBLE LAMINAE OR OTHER DISINTGUISHALE STRUCTUR -AL FEATURES PRESENT; NO ACCESSORY MINER -ALS PRESENT IN SAMPLE.

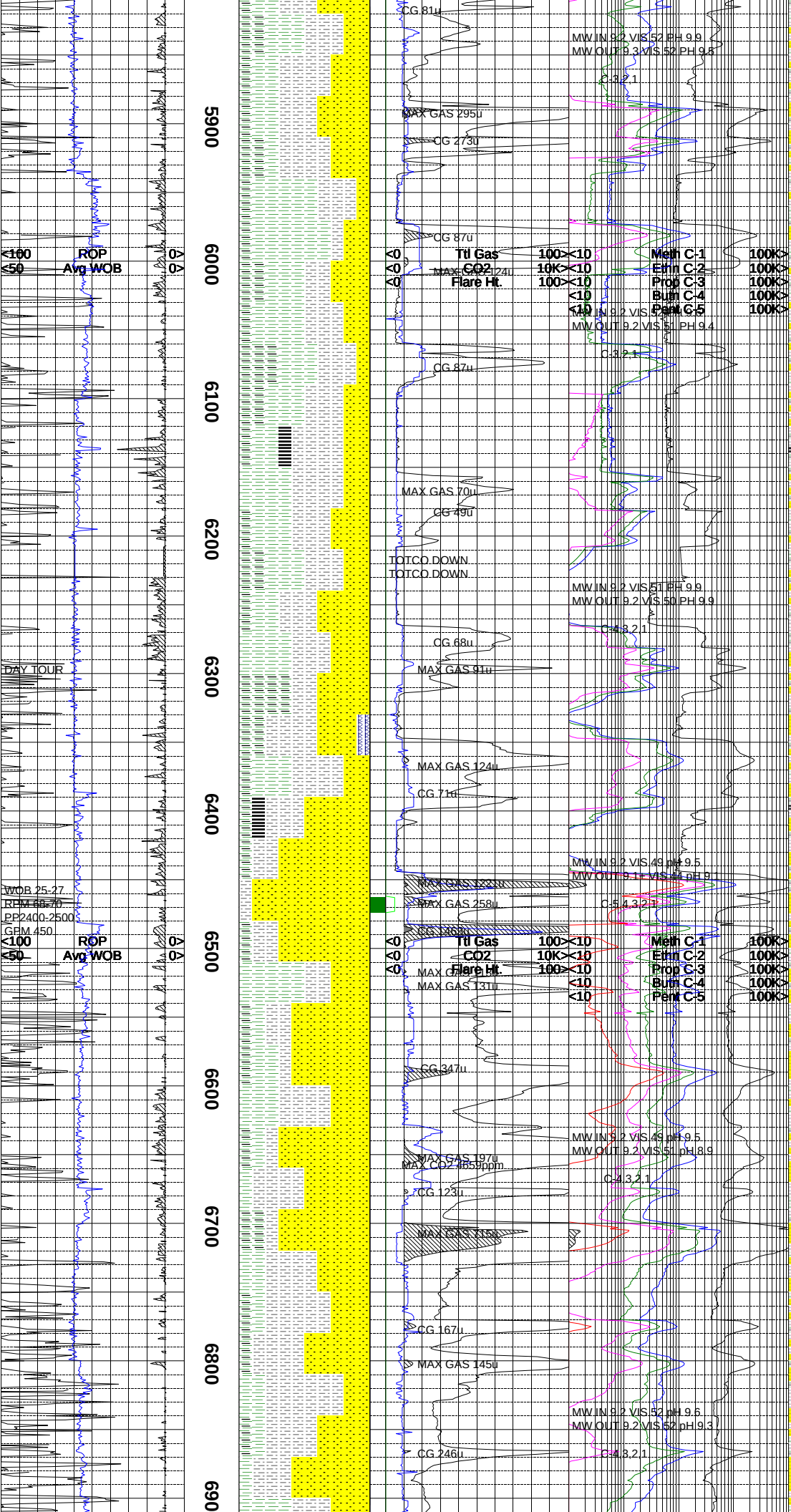
SANDSTONE = VERY LIGHT BROWNISH GRAY TO LIGHT TANISH-BROWN GRAY TO OCCASIONAL PALE REDDISH BROWN GRAY WITH FEW BLACK AND MODERATE BROWN HUES; QUARTZ DOMINATE FRAME WORK; CONSISTS OF CALCITIC CEMENTA -TION WITH MODERATE REACTION TO DILUTE HCL; MATRIX CONTAINS 1 TO 3% DARK LITHIC FRAGMENTS; PREDOMINATELY COMPOSED OF GRAIN SUPPORTED CUTTINS WITH VERY FEW LOOSE GRAINS; MEDIUM-FINE TO MEDIUM-COAR -SE GRAINED; FAIR TO MODERATELY POOR SOR -TING; SUB-ANGULAR TO SUB-ROUNDED ANGULA -RITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POO -R GRADE SANDSTONE, SAMPLE CONTAINS LARG -E AMOUNT OF CLAYEY MATERIAL, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT ; NO ACCESSORY MINERALS PRESENT IN SAM -PLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GRA -Y TO LIGHT BROWNISH GRAY; SLIGHTLY DENS -E TO VERY SLIGHLTY CRUNCHY TO OCCASIONA -L BRITTLE TENACITY; IRREGULAR TO SUB-PL -ANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO MOSTLY SMALLER CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL VERY SLIGHTLY SEMI-SPARKLING LUSTER; VERY SLIGHTY GRITTY TO SLIGHTLY CLAYEY TEXTURE; NO VISIBLE LAMINAE OR OTHER DISTINGUISHABLE STRUCTURAL FEATURE -S PRESENT; NO ACCESSORY MINERALS PRESEN -T IN SAMPLE.

WASACH G SANDSTONE = OFF WHITE TO WHITE TO VERY LIGHT TANISH-BROWNISH GRAY WITH FEW BLACK HUES; QUARTZ DOMINATE FRAME WORK; GRAIN SUPPORTED WITH MOSTLY LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATELY HIGH REACTION TO DILUTE HCL; MATRIX CONTAINS 1 TO 3% DARK LITHIC FRAGMENTS; FINE TO MEDIUM-COARSE GRAINED ; FAIR TO POOR SORTING; SUB-ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANSTONE, VERY SMALL AMOUNT OF COAL IN SAMPLE, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRES -ENT IN SAMPLE.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO BROWNISH BLACK TO OLIVE BLACK; MODERA -TELY DENSE TO SLIGHLTY CRUNCHY TENACITY ; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL WEDGE LIKE CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHT -LY SMOOTH TO SLIGHTLY CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE; POOR GRADE SILT -STONE VISIBLE BEDDING WITH SHALE CUTTIN -G, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SHALE = LIGHT GRAY TO VERY YELLOWISH GRA -Y TO MEDIUM LIGHT GRAY TO OCCASIONAL MO -DERATE BROWN AND GRAYISH RED PURPLE; SLIGHTLY TOUGH TO MODERATELY DENSE TO OCCASIONAL CRUNCHY TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY FRACTURE; MODERATELY MASSIVE TO WEDGE LIKE TO ELONGATED TO SUB-PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERA



-TELY SMOOTH TO VERY SLIGHLTY CLAYEY TO SLIGHTLY SILTY TEXTURE; VERY SMALL AMOUN -T OF CARBONACEOUS SHALE AND COAL VISIBL -Y EFFERVECSING IN SAMPLE, POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRAD -E SANDSTONE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL MEDIUM GRAY; MODERATE -LY TOUGH TO MODERTELY DENSE TENACITY; IRREGULAR TO SUB-PLANAR TO SUB-BLOCKY TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL ELONGATED TO SUB-PLATY CUTTINGS HABIT; DULL TO EAR -THY DULL TO OCCASIONAL SEMI-SPARKLING LUSTER; SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULAR TEXTURE; POOR GRADE SHALE VIS -IBLE BEDDING AND INTERBEDDING WITH POOR GRADE SILTSTONE, VERY THIN COAL LAMINAE VISIBLE IN SMALL CARBONACEOUS SHALE CUTT -ING, NO OTHER DISTINGUISHABLE STRUCTURA -L FEATURES PRESENT; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SANDSTONE = VERY LIGHT BROWNISH GRAY TO LIGHT TANISH-BROWN GRAY TO VERY LIGHT GRAY WITH MODERATE BROWN AND BLACK HUES; QUARTZ DOMINATE FRAME WORK; PREDOMINATEL -Y GRAIN SUPPORTED WITH VERY FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATELY HIGH REACTION TO DILUTE HCL; MATRIX CONTAINS 5 TO 11% DARK LITHI -C FRAGMENTS; MEDIUM-FINE TO MEDIUM-COARSE GRAINED; FAIR TO VERY POOR SORTIN -G; SUB-ANGULAR TO ANGULAR TO SUB-ROUNDE -D ANGULARITY; LOW TO MODERATE SPHERICIT -Y; BEDDING CONTACT VISIBLE BETWEEN POOR GRADE SANDSTONE AND CARBONACEOUS SHALE, POOR GRADE SILTSTONE VISIBLE GRADING WIT -H POOR GRADE SANDSTONE, NO OTHER DISTIN -GUISHABLE SURFACE FEATURES PRESENT; ACC -ESSORY MINERAL PYRITE PRESENT IN SAM -PLE.

CARBONACEOUS SHALE = LIGHT OLIVE GRAY TO MEDIUM GRAY TO BROWNISH GRAY; CRUNCHY TO CRUMBLY TO SLIGHTLY BRITTLE TENACITY; IRREGULAR TO SLIGHT HACKLY FRACTURING; CUTTINGS TEND TO BE PLATY TO SLIGHT ELONGATED WEDGE-LIKE TO SEMI TABULAR IN HABIT; DULL EARTHY TO SEMI SPARKLING TO SLIGHT GREASY LUSTER; GRITTY TO SILTY TEXTURE; THINLY BEDDED CARBONACEOUS MATERIAL.

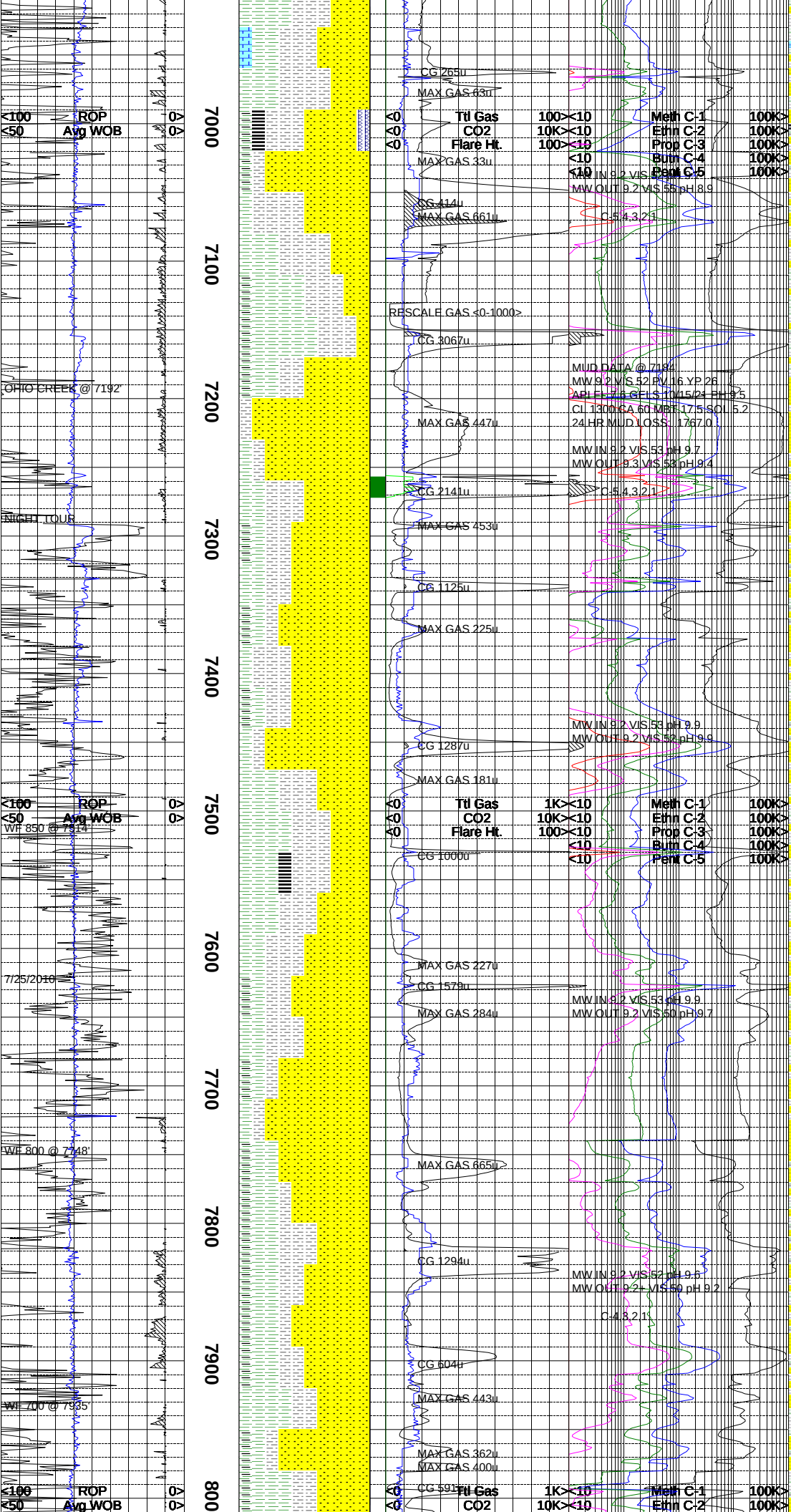
SILTSTONE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM GRAY; CRUNCHY TO STIFF TO SEMI CRUMBLY TENACITY; PREDOMINATELY PLANAR TO SLIGHT HACKLY TO OCCASIONAL BLOCKY FRACTURING; CUTTINGS TEND TO BE TABULAR TO SEMI WEDGE LIKE IN HABIT; SEMI FROSTED TO SLIGHT GREASY TO WAXY LUSTER; GRITTY TO SILTY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SANDSTONE = LIGHT GREENISH GRAY TO WHITE TO VERY LIGHT GRAY TO TRANSLUCENT; MOSTLY QUARTZ FRAMEWORK WITH 3-5 % DARK LITHICS VISIBLE IN SAMPLE; VISIBLE CHLOR -ITE CRYSTALS IN SAMPLE; VERY COARSE TO COARSE TO MEDIUM GRAIN SIZE; FAIR TO WELL SORTED; SUBROUND TO ROUND GRAINS; LOW TO MODERATE SPHERICITY; VISIBLE PITS IN SURFACE OF GRAINS; FIRM FRIABLE TO FRIABLE TO MODERATE HARD; CALCITE CEM-ENTATION DUE TO HIGH REACTION IN DILUTE HCl; GRAIN SUPPORTED; NO VISIBLE HYDRO-CARBONS IN SAMPLE; 2-3% VISIBLE CALCITE FRACTURE-FILL.

SHALE = VERY LIGHT GRAY TO LIGHT BROWNIS -H GRAY TO PREDOMINATELY YELLOWISH GRAY; BRITTLE TO CRUMBLY TENACITY; MOSTLY PLANAR TO SLIGHT HACKLY FRACTURING; CUT-TINGS TEND TO BE PLATY TO ELONGATED TAB-ULAR TO SEMI BLADED IN HABIT; DULL EARTH -Y TO SEMI GREASY TO SLIGHT WAXY LUSTER; SMOOTH TO SEMI CLAYEY TO MATTE TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SILTSTONE = VERY LIGHT GRAY TO MEDIUM GRAY; CRUNCHY TO STIFF TO SEMI CRUMBLY TENACITY; PREDOMINATELY HACKLY TO PLANAR TO OCCASIONALLY BLOCKY FRACTURING; CUTTINGS TEND TO BE WEDGE LIKE TO SEMI TABULAR IN HABIT; DULL EARTHY TO SEMI GREASY LUSTER; GRITTY TO SILTY TEXTURE; GRADES INTO MEDIUM GRAIN SANDSTONE.

SANDSTONE = TRANSLUCENT TO VERY LIGHT GRAY TO LIGHT BROWNISH GRAY; PREDOMINATE -LY QUARTZ FRAMEWORK WIT 2-3% DARK LITH-ICS VISIBLE IN SAMPLE; FINE TO MEDIUM TO COARSE GRAIN SIZE; GRAIN SUPPORTED; LOW TO MODERATE SPHERICITY; GRAINS HAVE A SLIGHT POLISH APPERANCE; SUB-ANGULAR TO SUB-ROUND; WELL TO VERY WELL SORTED; CALCITE CEMENTATION DUE TO MODERATE



REACTION IN DILUTE HCl; NO VISBLE HYDRO-CARBONS IN SAMPLE.

LIMESTONE = REACTS STRONGLY TO DILUTE HCl; STIFF TO TOUGH TENACITY; PLANAR TO SEMI HACKLY TO BLOCKY FRACTURING; CUTTIN-GS TEND TO BE WEDGE-LIKE TO TABULAR TO SLIGHT NODULAR IN HABIT; WAXY TO DULL EARTHY TO SEMI GREASY LUSTER; CRYSTALL'N TO MATTE TO SMOOTH TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GREENISH GRAY TO LIGHT BLUISH GRAY; CRUNCHY TO STIFF TO TOUGH TENACITY; IRREGULAR TO SEMI PLANAR FRACTURING; CUTTINGS TEND TO BE PLATY TO TABULAR TO SEMI WEDGE LIKE IN HABIT; SLIGHT GREASY TO SPARKLING TO OCCASIONALLY DULL EARTHY LUSTER; SILTY TO GRITTY TO SEMI GRANULAR TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SHALE = LIGHT GREENISH GRAY TO LIGHT BLUISH GRAY TO LIGHT GRAY; CRUMBLY TO BRITTLE TO OCCASIONALLY CRUNCHY TENACITY; PREDOMINATELY PLANAR TO SLIGHTLY BLOCKY TO SEMI HACKLY FRACTURING; CUTTIN-GS TEND TO BE WEDGE-LIKE TO SEMI PLATY TO FLAKY IN HABIT; DULL EARTHY TO SEMI GREASY LUSTER; SMOOTH TO MATTE TEXTURE GRADES INTO A THIN CARBONACEOUS SHALE.

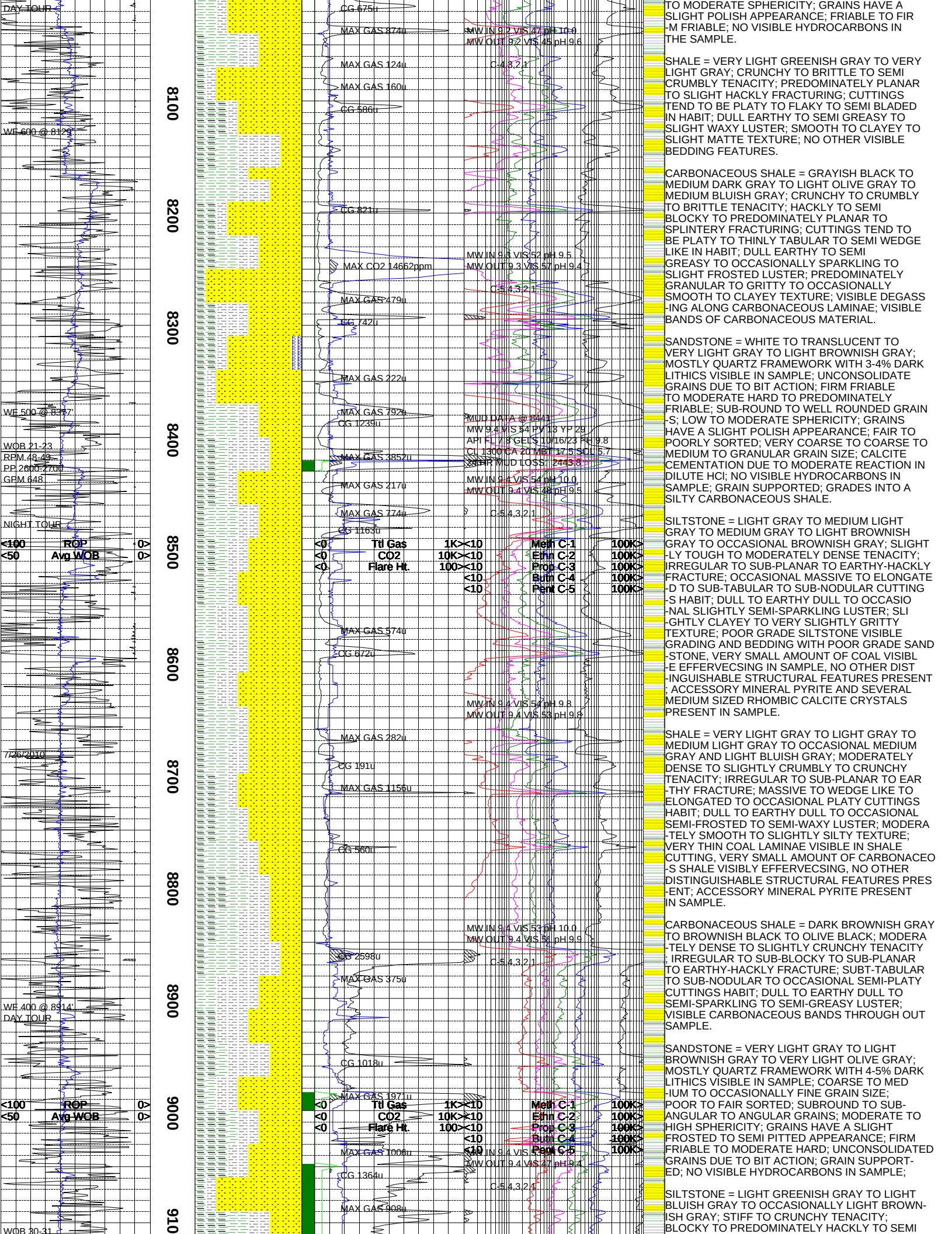
OHIO CREEK SANDSTONE = VERY LIGHT GRAY TO TRANSLUCENT TO WHITE; COARSE TO VERY COARSE GRAIN; MOSTLY QUARTZ WITH 1-3% DARK LITHICS VISIBLE IN SAMPLE; UNCONSOL-IDATED; PREDOMINATELY LOOSE GRAINS TO FEW GRAIN SUPPORTED CUTTINGS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATE EFFERVECSING REACTION TO DILUTE HCL; MED-IUM-FINE TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGULAR TO ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODER-ATE SPHERCITY; VERY THIN COAL LAMINAE VISIBLE IN SHALE CUTTING, NO OTHER DISTI-NGUISHABLE SURFACE FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE VISI-BLE IN CONTACT WITH SANDSTONE AND LARGE AMOUNT OF CALCITE CUTTINGS PRESENT IN SAMPLE.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO BROWNISH BLACK TO OLIVE BLACK; SLIGHT-LY DENSE TO SLIGHTLY CRUNCHY TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL ELONGATED CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL VERY SLIGHTLY SEMI-SPARKLING LUSTER; SLIGHTLY CLAYEY TO VERY SLIGHLTY GRITTY TEXTURE; VERY THIN COAL LAMINAE VISIBLE IN CARBONACEOUS SHALE CUTTING, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL LIGHT BROWNISH GRAY; SLIGHLTY TOUGH TO MODERATELY DENSE TO SLIGHLTY CRUNCHY 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 CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE; VERY THIN COAL LAMINAE VISIBLE IN SHALE CUTTI-NG, POOR GRADE SILTSTONE VISIBLE GRADIN-G WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; ACCESSORY MINERAL PYRITE PRESEN-T IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL LIGHT BLUISH GRAY; SLIGHTLY TOUGH TO MODERATEL-Y DENSE TENACITY; IRREGULAR TO SUB-BLOC-KY TO SUB-PLANAR TO EARTHY FRACTURE; OCCASIONAL MASSIVE TO WEDGE LIKE TO ELONGATED TO OCCASIONAL PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERA-TELY SMOOTH TO SLIGHTLY CLAYEY TO VERY SLIGHLTY SILTY TEXTURE; VERY THIN LAMINA-E VISIBLE IN SHALE CUTTING, OCCASIONAL MOTTLING OF SHALE VISIBLE, NO OTHER DIST-INGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRES-ENT IN SAMPLE.

SANDSTONE = OFF WHITE TO WHITE TO VERY LIGHT GRAY TO TRANSLUCENT; QUARTZ DOMINA-TE FRAME WORK; PREDOMINATELY LOOSE GRAINED WITH FEW GRAIN SUPPORTED CUTTING-S; CONSISTS OF CALCITIC CEMENTATION WIT-H LIGHT REACTION TO DILUTE HCL; MATRIX CONTAINS 1 TO 3% DARK LITHIC FRAGMENTS; MEDIUM TO MEDIUM-COARSE GRAINED; FAIR TO VERY POOR SORTING; SUB-ANGULAR TO ROUNDED TO SUB-ROUNDED ANGULARITY; LOW



TO MODERATE SPHERICITY; GRAINS HAVE A SLIGHT POLISH APPEARANCE; FRIABLE TO FIR -M FRIABLE; NO VISIBLE HYDROCARBONS IN THE SAMPLE.

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

CARBONACEOUS SHALE = GRAYISH BLACK TO MEDIUM DARK GRAY TO LIGHT OLIVE GRAY TO MEDIUM BLUISH GRAY; CRUNCHY TO CRUMBLY TO BRITTLE TENACITY; HACKLY TO SEMI BLOCKY TO PREDOMINATELY PLANAR TO SPLINTERY FRACTURING; CUTTINGS TEND TO BE PLATY TO THINLY TABULAR TO SEMI WEDGE LIKE IN HABIT; DULL EARTHY TO SEMI GREASY TO OCCASIONALLY SPARKLING TO SLIGHT FROSTED LUSTER; PREDOMINATELY GRANULAR TO GRITTY TO OCCASIONALLY SMOOTH TO CLAYEY TEXTURE; VISIBLE DEGASS -ING ALONG CARBONACEOUS LAMINAE; VISIBLE BANDS OF CARBONACEOUS MATERIAL.

SANDSTONE = WHITE TO TRANSLUCENT TO VERY LIGHT GRAY TO LIGHT BROWNISH GRAY; MOSTLY QUARTZ FRAMEWORK WITH 3-4% DARK LITHICS VISIBLE IN SAMPLE; UNCONSOLIDATE GRAINS DUE TO BIT ACTION; FIRM FRIABLE TO MODERATE HARD TO PREDOMINATELY FRIABLE; SUB-ROUND TO WELL ROUNDED GRAIN -S; LOW TO MODERATE SPHERICITY; GRAINS HAVE A SLIGHT POLISH APPEARANCE; FAIR TO POORLY SORTED; VERY COARSE TO COARSE TO MEDIUM TO GRANULAR GRAIN SIZE; CALCITE CEMENTATION DUE TO MODERATE REACTION IN DILUTE HCl; NO VISIBLE HYDROCARBONS IN SAMPLE; GRAIN SUPPORTED; GRADES INTO A SILTY CARBONACEOUS SHALE.

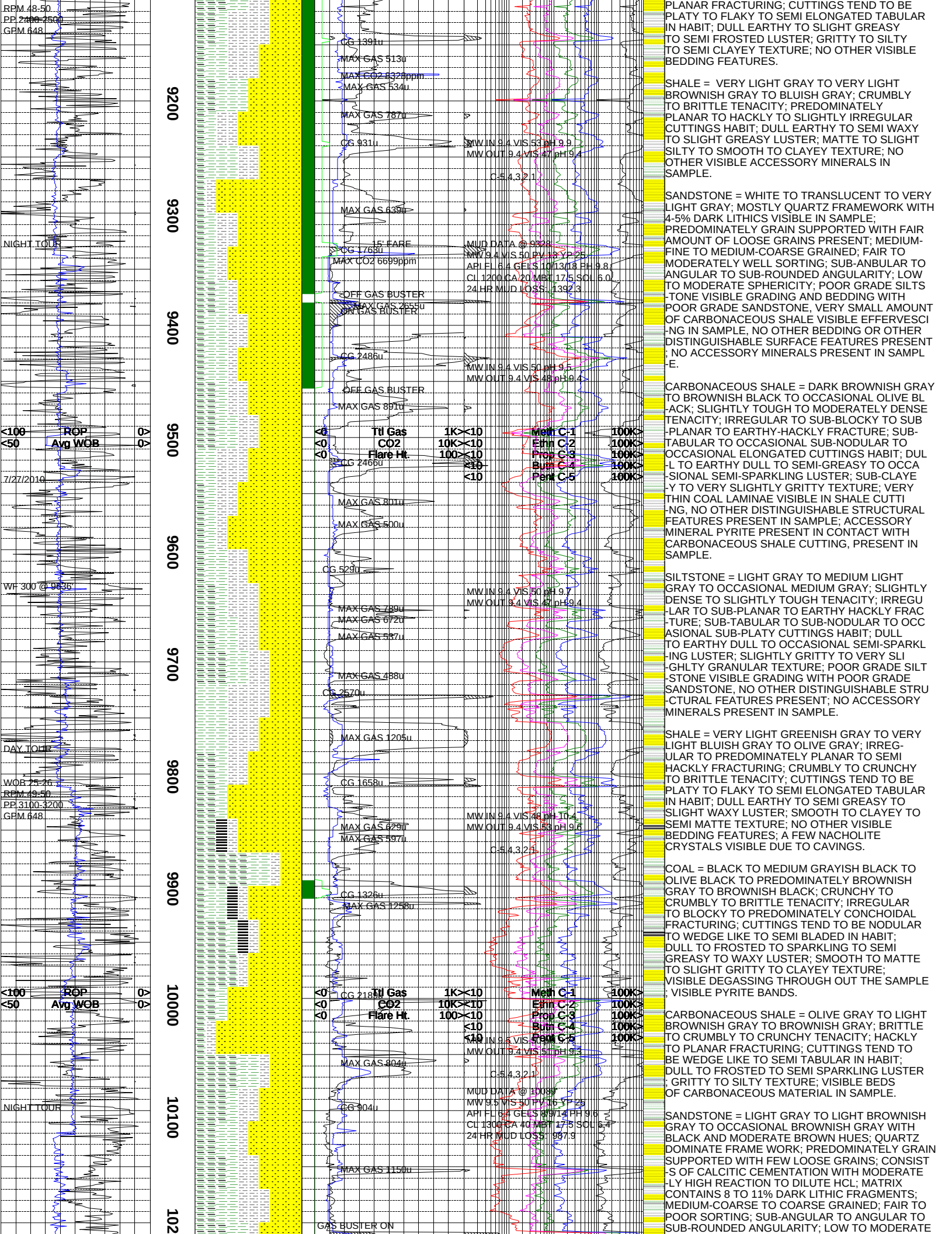
SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO MEDIUM GRAY TO LIGHT BROWNISH GRAY TO OCCASIONAL BROWNISH GRAY; SLIGHT -LY TOUGH TO MODERATELY DENSE TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; OCCASIONAL MASSIVE TO ELONGATE -D TO SUB-TABULAR TO SUB-NODULAR CUTTING -S HABIT; DULL TO EARTHY DULL TO OCCASIO -NAL SLIGHTLY SEMI-SPARKLING LUSTER; SLI -GHTLY CLAYEY TO VERY SLIGHTLY GRITTY TEXTURE; POOR GRADE SILTSTONE VISIBLE GRADING AND BEDDING WITH POOR GRADE SAND -STONE, VERY SMALL AMOUNT OF COAL VISIBL -E EFFERVECSING IN SAMPLE, NO OTHER DIST -INGUISHABLE STRUCTURAL FEATURES PRESENT , ACCESSORY MINERAL PYRITE AND SEVERAL MEDIUM SIZED RHOMBIC CALCITE CRYSTALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL MEDIUM GRAY AND LIGHT BLUISH GRAY; MODERATELY DENSE TO SLIGHTLY CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO SUB-PLANAR TO EAR -THY FRACTURE; MASSIVE TO WEDGE LIKE TO ELONGATED TO OCCASIONAL PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERA -TELY SMOOTH TO SLIGHTLY SILTY TEXTURE; VERY THIN COAL LAMINAE VISIBLE IN SHALE CUTTING, VERY SMALL AMOUNT OF CARBONACEO -S SHALE VISIBLY EFFERVECSING, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRES -ENT; ACCESSORY MINERAL PYRITE PRESENT IN SAMPLE.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO BROWNISH BLACK TO OLIVE BLACK; MODERA -TELY DENSE TO SLIGHTLY CRUNCHY TENACITY ; IRREGULAR TO SUB-BLOCKY TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUBT-TABULAR TO SUB-NODULAR TO OCCASIONAL SEMI-PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO SEMI-SPARKLING TO SEMI-GREASY LUSTER; VISIBLE CARBONACEOUS BANDS THROUGH OUT SAMPLE.

SANDSTONE = VERY LIGHT GRAY TO LIGHT BROWNISH GRAY TO VERY LIGHT OLIVE GRAY; MOSTLY QUARTZ FRAMEWORK WITH 4-5% DARK LITHICS VISIBLE IN SAMPLE; COARSE TO MED -IUM TO OCCASIONALLY FINE GRAIN SIZE; POOR TO FAIR SORTED; SUBROUND TO SUB-ANGULAR TO ANGULAR GRAINS; MODERATE TO HIGH SPHERICITY; GRAINS HAVE A SLIGHT FROSTED TO SEMI PITTED APPEARANCE; FIRM FRIABLE TO MODERATE HARD; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; GRAIN SUPPORT-ED; NO VISIBLE HYDROCARBONS IN SAMPLE;

SILTSTONE = LIGHT GREENISH GRAY TO LIGHT BLUISH GRAY TO OCCASIONALLY LIGHT BROWN-ISH GRAY; STIFF TO CRUNCHY TENACITY; BLOCKY TO PREDOMINATELY HACKLY TO SEMI



PLANAR FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI ELONGATED TABULAR IN HABIT; DULL EARTHY TO SLIGHT GREASY TO SEMI FROSTED LUSTER; GRITTY TO SILTY TO SEMI CLAYEY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

SHALE = VERY LIGHT GRAY TO VERY LIGHT BROWNISH GRAY TO BLUISH GRAY; CRUMBLY TO BRITTLE TENACITY; PREDOMINATELY PLANAR TO HACKLY TO SLIGHTLY IRREGULAR CUTTINGS HABIT; DULL EARTHY TO SEMI WAXY TO SLIGHT GREASY LUSTER; MATTE TO SLIGHT SILTY TO SMOOTH TO CLAYEY TEXTURE; NO OTHER VISIBLE ACCESSORY MINERALS IN SAMPLE.

SANDSTONE = WHITE TO TRANSLUCENT TO VERY LIGHT GRAY; MOSTLY QUARTZ FRAMEWORK WITH 4-5% DARK LITHICS VISIBLE IN SAMPLE; PREDOMINATELY GRAIN SUPPORTED WITH FAIR AMOUNT OF LOOSE GRAINS PRESENT; MEDIUM-FINE TO MEDIUM-COARSE GRAINED; FAIR TO MODERATELY WELL SORTING; SUB-ANBULAR TO ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE SPHERICITY; POOR GRADE SILTS -TONE VISIBLE GRADING AND BEDDING WITH POOR GRADE SANDSTONE, VERY SMALL AMOUNT OF CARBONACEOUS SHALE VISIBLE EFFERVESCI -NG IN SAMPLE, NO OTHER BEDDING OR OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT ; NO ACCESSORY MINERALS PRESENT IN SAMPL -E.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO BROWNISH BLACK TO OCCASIONAL OLIVE BL -ACK; SLIGHTLY TOUGH TO MODERATELY DENSE TENACITY; IRREGULAR TO SUB-BLOCKY TO SUB -PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO OCCASIONAL SUB-NODULAR TO OCCASIONAL ELONGATED CUTTINGS HABIT; DUL -L TO EARTHY DULL TO SEMI-GREASY TO OCCA -SIONAL SEMI-SPARKLING LUSTER; SUB-CLAYE -Y TO VERY SLIGHTLY GRITTY TEXTURE; VERY THIN COAL LAMINAE VISIBLE IN SHALE CUTTI -NG, NO OTHER DISTINGUISHABLE STRUCTURAL FEATURES PRESENT IN SAMPLE; ACCESSORY MINERAL PYRITE PRESENT IN CONTACT WITH CARBONACEOUS SHALE CUTTING, PRESENT IN SAMPLE.

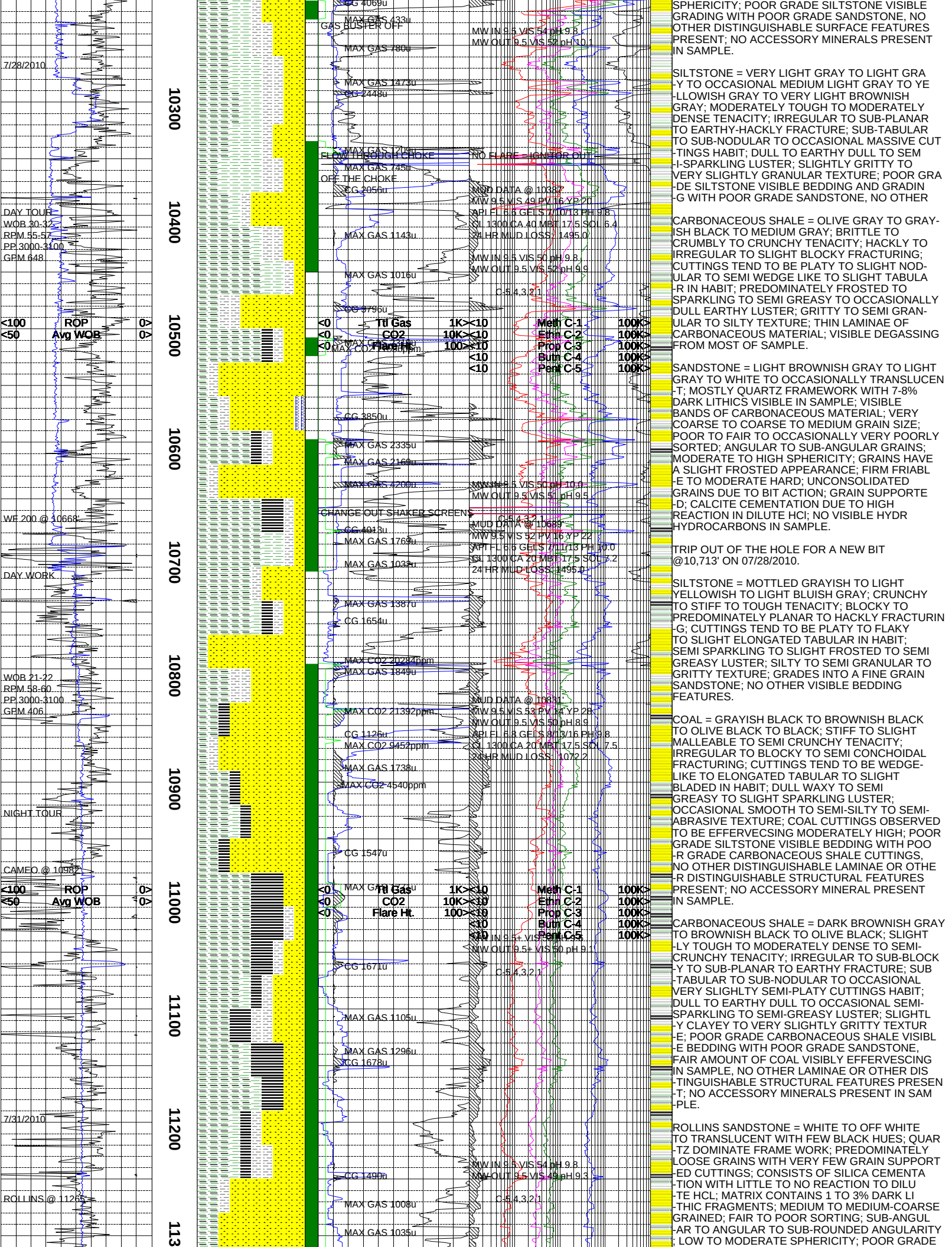
SILTSTONE = LIGHT GRAY TO MEDIUM LIGHT GRAY TO OCCASIONAL MEDIUM GRAY; SLIGHTLY DENSE TO SLIGHTLY TOUGH TENACITY; IRREGU -LAR TO SUB-PLANAR TO EARTHY HACKLY FRAC -TURE; SUB-TABULAR TO SUB-NODULAR TO OCC ASIONAL SUB-PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-SPARKL -ING LUSTER; SLIGHTLY GRITTY TO VERY SLI -GHLTY GRANULAR TEXTURE; POOR GRADE SILT -STONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUISHABLE STRU -CTURAL FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GREENISH GRAY TO VERY LIGHT BLUISH GRAY TO OLIVE GRAY; IRREG-ULAR TO PREDOMINATELY PLANAR TO SEMI HACKLY FRACTURING; CRUMBLY TO CRUNCHY TO BRITTLE TENACITY; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI ELONGATED TABULAR IN HABIT; DULL EARTHY TO SEMI GREASY TO SLIGHT WAXY LUSTER; SMOOTH TO CLAYEY TO SEMI MATTE TEXTURE; NO OTHER VISIBLE BEDDING FEATURES; A FEW NACHOLITE CRYSTALS VISIBLE DUE TO CAVINGS.

COAL = BLACK TO MEDIUM GRAYISH BLACK TO OLIVE BLACK TO PREDOMINATELY BROWNISH GRAY TO BROWNISH BLACK; CRUNCHY TO CRUMBLY TO BRITTLE TENACITY; IRREGULAR TO BLOCKY TO PREDOMINATELY CONCHOIDAL FRACTURING; CUTTINGS TEND TO BE NODULAR TO WEDGE LIKE TO SEMI BLADED IN HABIT; DULL TO FROSTED TO SPARKLING TO SEMI GREASY TO WAXY LUSTER; SMOOTH TO MATTE TO SLIGHT GRITTY TO CLAYEY TEXTURE; VISIBLE DEGASSING THROUGH OUT THE SAMPLE ; VISIBLE PYRITE BANDS.

CARBONACEOUS SHALE = OLIVE GRAY TO LIGHT BROWNISH GRAY TO BROWNISH GRAY; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; HACKLY TO PLANAR FRACTURING; CUTTINGS TEND TO BE WEDGE LIKE TO SEMI TABULAR IN HABIT; DULL TO FROSTED TO SEMI SPARKLING LUSTER ; GRITTY TO SILTY TEXTURE; VISIBLE BEDS OF CARBONACEOUS MATERIAL IN SAMPLE.

SANDSTONE = LIGHT GRAY TO LIGHT BROWNISH GRAY TO OCCASIONAL BROWNISH GRAY WITH BLACK AND MODERATE BROWN HUES; QUARTZ DOMINATE FRAME WORK; PREDOMINATELY GRAIN SUPPORTED WITH FEW LOOSE GRAINS; CONSIST -S OF CALCITIC CEMENTATION WITH MODERATE -LY HIGH REACTION TO DILUTE HCL; MATRIX CONTAINS 8 TO 11% DARK LITHIC FRAGMENTS; MEDIUM-COARSE TO COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGULAR TO ANGULAR TO SUB-ROUNDED ANGULARITY; LOW TO MODERATE



SPHERICITY; POOR GRADE SILTSTONE VISIBLE GRADING WITH POOR GRADE SANDSTONE, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SILTSTONE = VERY LIGHT GRAY TO LIGHT GRA -Y TO OCCASIONAL MEDIUM LIGHT GRAY TO YE -LLOWISH GRAY TO VERY LIGHT BROWNISH GRAY; MODERATELY TOUGH TO MODERATELY DENSE TENACITY; IRREGULAR TO SUB-PLANAR TO EARTHY-HACKLY FRACTURE; SUB-TABULAR TO SUB-NODULAR TO OCCASIONAL MASSIVE CUT -TINGS HABIT; DULL TO EARTHY DULL TO SEM -I-SPARKLING LUSTER; SLIGHTLY GRITTY TO VERY SLIGHTLY GRANULAR TEXTURE; POOR GRA -DE SILTSTONE VISIBLE BEDDING AND GRADIN -G WITH POOR GRADE SANDSTONE, NO OTHER

CARBONACEOUS SHALE = OLIVE GRAY TO GRAY- ISH BLACK TO MEDIUM GRAY; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; HACKLY TO IRREGULAR TO SLIGHT BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO SLIGHT NOD- ULAR TO SEMI WEDGE LIKE TO SLIGHT TABULA -R IN HABIT; PREDOMINATELY FROSTED TO SPARKLING TO SEMI GREASY TO OCCASIONALLY DULL EARTHY LUSTER; GRITTY TO SEMI GRAN- ULAR TO SILTY TEXTURE; THIN LAMINAE OF CARBONACEOUS MATERIAL; VISIBLE DEGASSING FROM MOST OF SAMPLE.

SANDSTONE = LIGHT BROWNISH GRAY TO LIGHT GRAY TO WHITE TO OCCASIONALLY TRANSLUCEN -T; MOSTLY QUARTZ FRAMEWORK WITH 7-8% DARK LITHICS VISIBLE IN SAMPLE; VISIBLE BANDS OF CARBONACEOUS MATERIAL; VERY COARSE TO COARSE TO MEDIUM GRAIN SIZE; POOR TO FAIR TO OCCASIONALLY VERY POORLY SORTED; ANGULAR TO SUB-ANGULAR GRAINS; MODERATE TO HIGH SPHERICITY; GRAINS HAVE A SLIGHT FROSTED APPEARANCE; FIRM FRIABL -E TO MODERATE HARD; UNCONSOLIDATED GRAINS DUE TO BIT ACTION; GRAIN SUPPORTE -D; CALCITE CEMENTATION DUE TO HIGH REACTION IN DILUTE HCl; NO VISIBLE HYDR HYDROCARBONS IN SAMPLE.

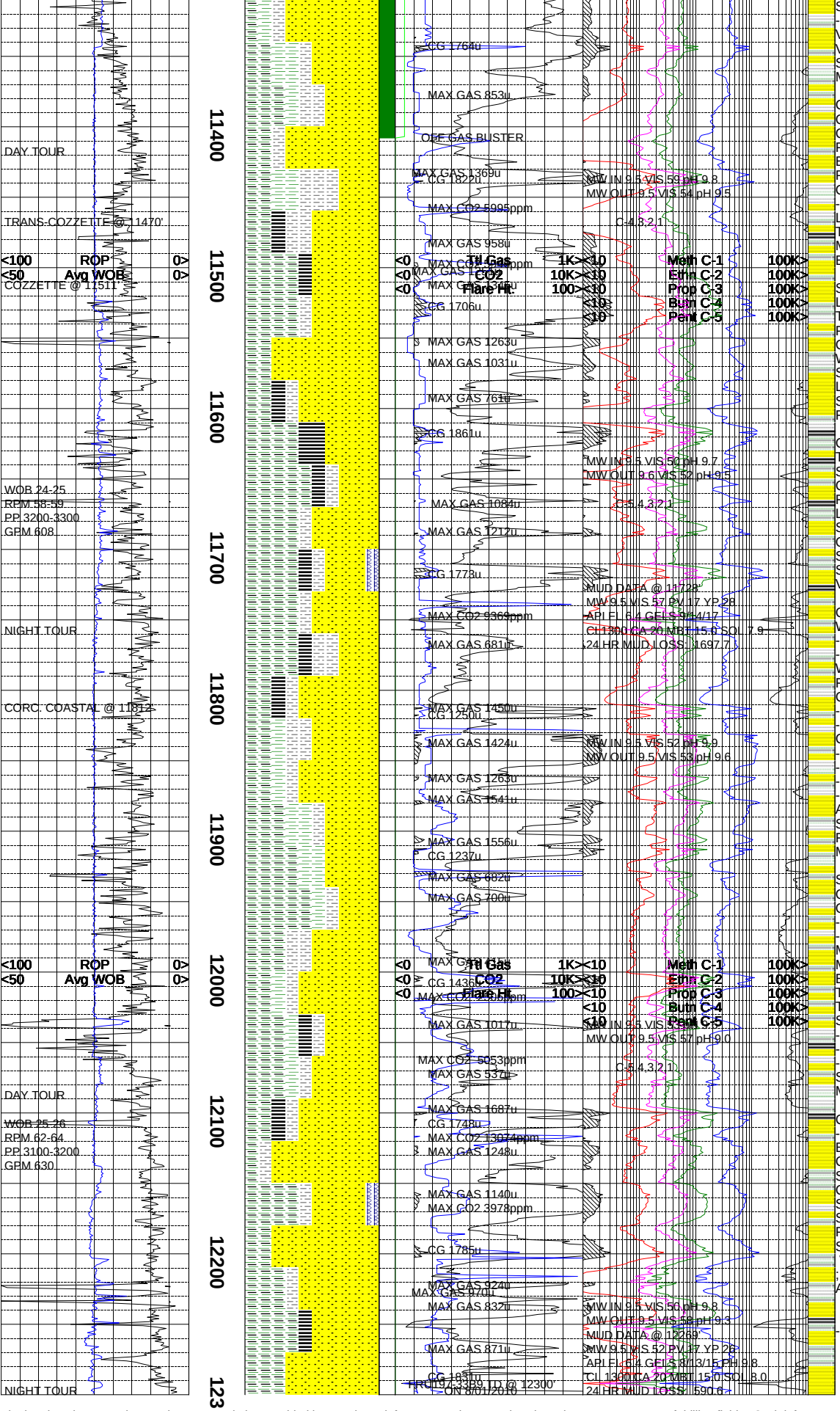
TRIP OUT OF THE HOLE FOR A NEW BIT @10,713' ON 07/28/2010.

SILTSTONE = MOTTLED GRAYISH TO LIGHT YELLOWISH TO LIGHT BLUISH GRAY; CRUNCHY TO STIFF TO TOUGH TENACITY; BLOCKY TO PREDOMINATELY PLANAR TO HACKLY FRACTURIN -G; CUTTINGS TEND TO BE PLATY TO FLAKY TO SLIGHT ELONGATED TABULAR IN HABIT; SEMI SPARKLING TO SLIGHT FROSTED TO SEMI GREASY LUSTER; SILTY TO SEMI GRANULAR TO GRITTY TEXTURE; GRADES INTO A FINE GRAIN SANDSTONE; NO OTHER VISIBLE BEDDING FEATURES.

COAL = GRAYISH BLACK TO BROWNISH BLACK TO OLIVE BLACK TO BLACK; STIFF TO SLIGHT MALLEABLE TO SEMI CRUNCHY TENACITY; IRREGULAR TO BLOCKY TO SEMI CONCHOIDAL FRACTURING; CUTTINGS TEND TO BE WEDGE- LIKE TO ELONGATED TABULAR TO SLIGHT BLADED IN HABIT; DULL WAXY TO SEMI GREASY TO SLIGHT SPARKLING LUSTER; OCCASIONAL SMOOTH TO SEMI-SILTY TO SEMI- ABRASIVE TEXTURE; COAL CUTTINGS OBSERVED TO BE EFFERVECSING MODERATELY HIGH; POOR GRADE SILTSTONE VISIBLE BEDDING WITH POO -R GRADE CARBONACEOUS SHALE CUTTINGS, NO OTHER DISTINGUISHABLE LAMINAE OR OTHE -R DISTINGUISHABLE STRUCTURAL FEATURES PRESENT; NO ACCESSORY MINERAL PRESENT IN SAMPLE.

CARBONACEOUS SHALE = DARK BROWNISH GRAY TO BROWNISH BLACK TO OLIVE BLACK; SLIGHT -LY TOUGH TO MODERATELY DENSE TO SEMI- CRUNCHY TENACITY; IRREGULAR TO SUB-BLOCK -Y TO SUB-PLANAR TO EARTHY FRACTURE; SUB -TABULAR TO SUB-NODULAR TO OCCASIONAL VERY SLIGHLTY SEMI-PLATY CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI- SPARKLING TO SEMI-GREASY LUSTER; SLIGHTL -Y CLAYEY TO VERY SLIGHTLY GRITTY TEXTUR -E; POOR GRADE CARBONACEOUS SHALE VISIBL -E BEDDING WITH POOR GRADE SANDSTONE, FAIR AMOUNT OF COAL VISIBLY EFFERVESCING IN SAMPLE, NO OTHER LAMINAE OR OTHER DIS -TINGUISHABLE STRUCTURAL FEATURES PRESEN -T; NO ACCESSORY MINERALS PRESENT IN SAM -PLE.

ROLLINS SANDSTONE = WHITE TO OFF WHITE TO TRANSLUCENT WITH FEW BLACK HUES; QUAR -TZ DOMINATE FRAME WORK; PREDOMINATELY LOOSE GRAINS WITH VERY FEW GRAIN SUPPORT -ED CUTTINGS; CONSISTS OF SILICA CEMENTA -TION WITH LITTLE TO NO REACTION TO DILU -TE HCL; MATRIX CONTAINS 1 TO 3% DARK LI -THIC FRAGMENTS; MEDIUM TO MEDIUM-COARSE GRAINED; FAIR TO POOR SORTING; SUB-ANGUL -AR TO ANGULAR TO SUB-ROUNDED ANGULARITY ; LOW TO MODERATE SPHERICITY; POOR GRADE



SILTSTONE VISIBLE BEDDING WITH POOR GRAD -E SANDSTONE, VERY SMALL AMOUNT OF COAL VISIBLE EFFERVECSING IN SAMPLE, NO OTHER VISIBLE BEDDING OR OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

CARBONACEOUS SHALE = GRAYISH BLACK TO OLIVE GRAY TO BROWNISH GRAY; CRUNCHY TO CRUMBLY TO OCCASIONALLY STIFF TENACITY; PREDOMINATELY HACKLY TO PLANAR TO SEMI BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI WEDGE LIKE TO OCCASIONALLY BLADED IN HABIT; DULL EARTH -Y TO SEMI SPARKLING TO SLIGHT GREASY LUSTER; GRITTY TO SEMI GRANULAR TO SILTY TEXTURE; VISIBLE BANDS OF CARBONACEOUS MATERIAL; VISIBLE DEGASSING ALONG THE BANDS.

SILTSTONE = VERY LIGHT BROWNISH GRAY TO LIGHT YELLOWISH GRAY; CRUNCHY TO STIFF TO TOUGH TENACITY; IRREGULAR TO SLIGHT PLANAR TO SEMI HACKLY FRACTURING; CUTTINGS TEND TO BE ELONGATED TABULAR TO WEDGE LIKE TO SEMI BLADED IN HABIT; SEMI SPARKLING TO SLIGHT FROSTED TO GREASY LUSTER; GRITTY TO SLIGHTLY GRANULAR TO SILTY TEXTURE; NO OTHER VISIBLE BEDDING FEATURES.

COAL = GRAYISH BLACK TO BROWNISH BLACK TO BLACK; STIFF TO SLIGHTLY MALLEABLE TO SEMI CRUNCHY TENACITY; PREDOMINATELY CONCHOIDAL TO BLOCKY TO SLIGHT SPLINTERY FRACTURING; CUTTINGS TEND TO BE WEDGE-LIKE TO TABULAR TO SEMI BLADED IN HABIT; SPARKLING TO WAXY TO SLIGHTLY DULL TO OCCASIONALLY SLIGHTLY METALLIC LUSTER; SMOOTH TO SLIGHT CLAYEY TO OCCASIONALLY SILTY TEXTURE; VISIBLE PYRITE IN SAMPLE; VISIBLE DEGASSING ALONG MOST OF SAMPLE.

CORCORAN COASTAL PLAIN SANDSTONE = OFF WHITE TO WHITE TO VERY LIGHT GRAY TO LIG -HT BROWNISH GRAY WITH BLACK AND MODERAT -E BROWN HUES; QUARTZ DOMINATE FRAME WORK; PREDOMINATELY GRAIN SUPPORTED WITH FEW LOOSE GRAINS; CONSISTS OF CALCITIC CEMENTATION WITH MODERATELY HIGH REACTIO -N TO DILUTE HCL; MATRIX CONTAINS 2 TO 4 -% DARK LITHIC FRAGMENTS; MEDIUM-FINE TO COARSE GRAINED; FAIR TO VERY POORLY SORT -ED; SUB-ANGULAR TO ANGULAR TO SUB-ROUND -ED ANGULARITY; LOW TO MODERATE SPHERICI -TY; POOR GRADE SILTSTONE VISIBLE GRADIN -G WITH POOR GRADE SANDSTONE, VERY SMALL AMOUNT OF COAL VISIBLY EFFERVESCING IN SAMPLE, NO OTHER DISTINGUISHABLE SURFACE FEATURES PRESENT IN SAMPLE; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

SHALE = VERY LIGHT GRAY TO LIGHT GRAY TO OCCASIONAL VERY LIGHT PALE YELLOWISH ORANGE; SLIGHLTY DENSE TO SLIGHTLY BRITT -LE TO SLIGHTLY CRUMBLY TENACITY; IRREGU -AR TO SUB-PLANAR TO EARTHY FRACTURE; MODERATELY WEDGE LIKE TO SUB-PLATY TO MOSTLY SMALLER CUTTINGS HABIT; DULL TO EARTHY DULL TO OCCASIONAL SEMI-FROSTED TO SEMI-WAXY LUSTER; MODERATELY SMOOTH TO MODERATELY CLAYEY TO VERY SLIGHTLY SILTY TEXTURE; POOR GRADE SILTSTONE VISI -BLE BEDDING WITH POOR GRADE CARBONACEOU -S SHALE, VERY SMALL AMOUNT OF COAL VISI -BLE EFFERVESCING IN SAMPLE, NO OTHER SURFACE FEATURES PRESENT; NO ACCESSORY MINERALS PRESENT IN SAMPLE.

CARBONACEOUS SHALE = OLIVE GRAY TO MEDIU -M DARK GRAY TO BROWNISH GRAY; VISIBLE BANDS OF CARBONACEOUS MATERIAL; CRUNCHY TO CRUMBLY TENACITY; PLANAR TO SLIGHT HACKLY TO BLOCKY FRACTURING; CUTTINGS TEND TO BE PLATY TO FLAKY TO SEMI TABULAR IN HABIT; DULL EARTHY TO SEMI SPARKLING TO SLIGHT GREASY LUSTER; PREDOMINATELY GRITTY TO SEMI GRANULAR TO SILTY TO OCCASIONALLY SMOOTH TEXTURE; VISIBLE DEGASSING IN SOME OF THE SAMPLE ; VISIBLE HYDROCARBONS UNDER FLUORESCES AT 12180' -12210'.

FRU197-33B9 TD @ 12300' IN COCORAN COAS -TAL PLAIN DUE TO LOW ROP, ON 8/1/2010