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

MUDLOG MD

COMPANY	ExxonMobil Production
WELL	PCU 197-34B8 ST1
FIELD	PICEANCE CREEK
REGION	ROCKY MOUNTAINS
COORDINATES	39.915659000
	108.261198000
ELEVATION	6649.1'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	05-103-11082-01
SPUD DATE	12/13/2008
CONTRACTOR	H _P
CO. REP.	M. MARTINEZ/W. GARNER
RIG/TYPE	# 320/FLEX 4S+
LOGGING UNIT	MLU # 032
GEOLOGISTS	J. KEEVAN, C. RECORD
	C. PIERCE
ADD. PERSONS	M. PIPER, B.HICKS
	T. WALKER
CO. GEOLOGIST	CHRIS ALBA

LOG INTERVAL

DEPTHS:	4,000'	**TO**	8,889'
DATES:	9/30/2009	**TO**	3/4/2010
SCALE:	1" = 100'		

MUD TYPES

LSND	**TO**	8,889'
	TO	
	TO	
	TO	

CASING DATA

16"	**AT**	132'
10.75"	**AT**	3,976'
7"	**AT**	8,675'
	AT	

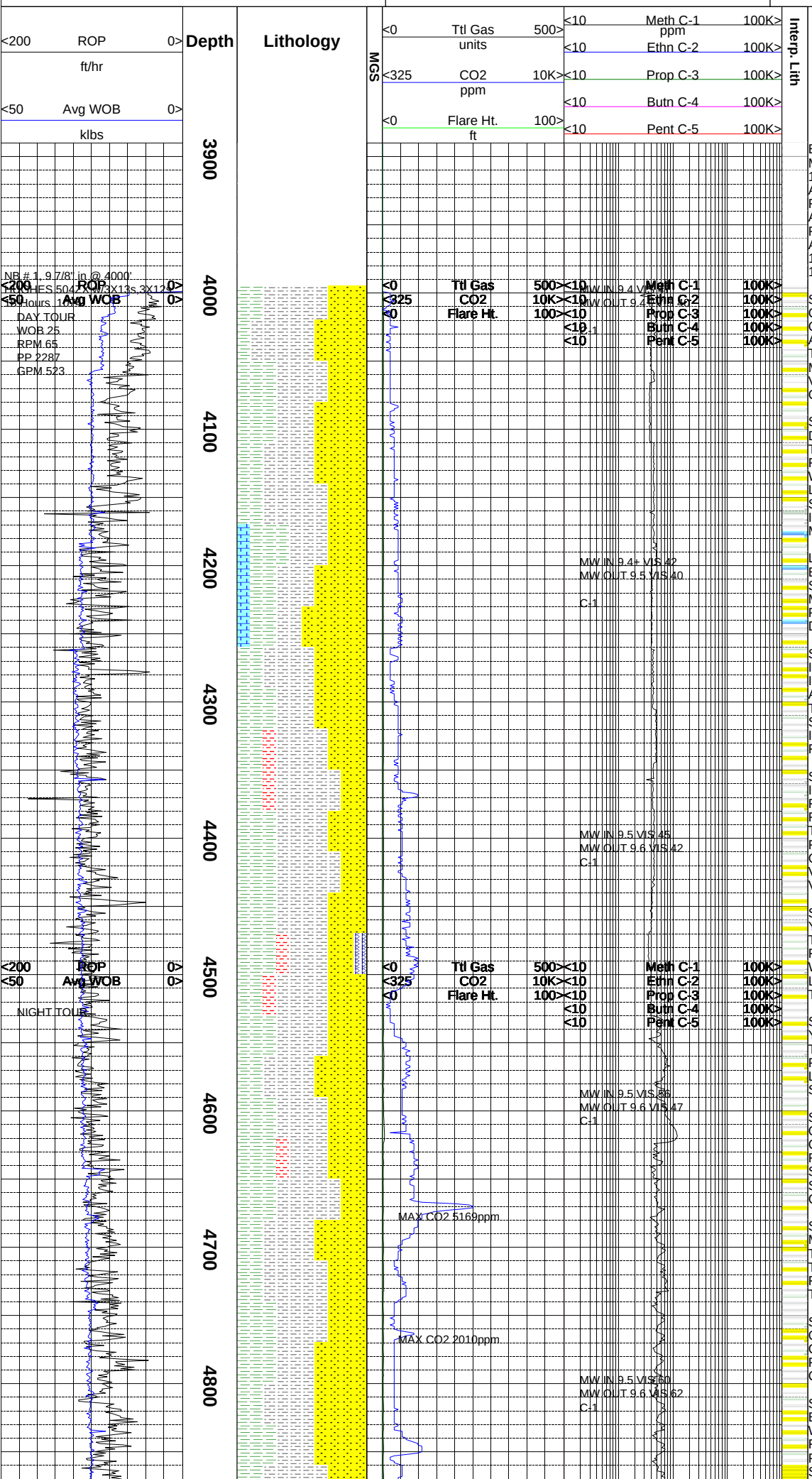
HOLE SIZE

14.75"	**TO**	4,000'
9.875"	**TO**	8,675'
6.125"	**TO**	8,889'
	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.

EPOCH WELL SERVICES COMMENCED MUDLOGGING ON THE EXXONMOBIL PCU 197-34B8 WELL ON 09/30/2009 AT 4000' MD.
ALL COLORS ARE REFERENCED TO THE GSA ROCK COLOR CHART.
ALL TRIP AND CONNECTION GASES ARE REFERENCED ABOVE BACKGROUND; ALL OTHERS ARE ABSOLUTE.
1% METH. EQUIV. = 50 UNIT = 10000 PPM.
10 3/4" CASING @ 3957' PIT 12.0 PPG (E)

SANDSTONE = YELLOWISH GRAY TO WHITE IN COLOR; QUARTZ FRAMEWORK; MEDIUM TO FINE GRAIN SIZE; FAIR TO WELL SORTING; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPHERICITY; SAMPLE IS FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO VISIBLE BEDDING; NO VISIBLE VOIDS; NO GAS SHOWS FROM THIS SANDSTONE.

SILTSTONE = DARK YELLOWISH ORANGE TO DARK YELLOWISH BROWN IN COLOR; BRITTLE TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURE; CUTTINGS RANGE FROM PLATY TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; TEXTURE RANGES FROM SILTY TO GRANULAR WITH SOME GRADATION INTO SANDSTONE NOTICEABLE; THICK TO MASSIVE STRUCTURE APPARENT.

LIMESTONE = LIGHT BLUISH GRAY TO MEDIUM BLUISH GRAY WITH POSSIBLE LIMONITE STAINING; MATRIX DOMINATED - MUDSTONE; MATRIX APPEARS TO BE CLASTIC IN ORIGIN; POINT CONTACTS FABRIC WITH NO DISCERNIBLE POROSITY.

SHALE = LIGHT GRAY TO MEDIUM LIGHT GRAY IN COLOR; CRUMBLY TO PULVERANT TENACITY; IRREGULAR TO BLOCKY FRACTURE; CUTTINGS ARE PLATY TO TABULAR IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE; THIN TO LAMINAE STRUCTURE INTERBEDDED WITH SILTSTONES APPARENT FROM DRILL BREAKS.

SANDSTONE = LIGHT GREENISH GRAY TO WHITE IN COLOR; QUARTZ FRAMEWORK; COARSE TO FINE GRAIN SIZE; POOR TO FAIR SORTING; ROUNDED TO SUBANGULAR GRAINS WITH LOW TO MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE HARDNESS; CALCITE CEMENT; GRAIN SUPPORTED WITH CEMENT FABRIC; NO VISIBLE POROSITY; CHLORITE GRAINS VISIBLE IN MATRIX; NO GAS SHOWS.

SILTSTONE = GRAYISH ORANGE TO DUSKY YELLOW IN COLOR; DENSE TO CRUMBLY IN TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN COLOR; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN TO THICK STRUCTURE.

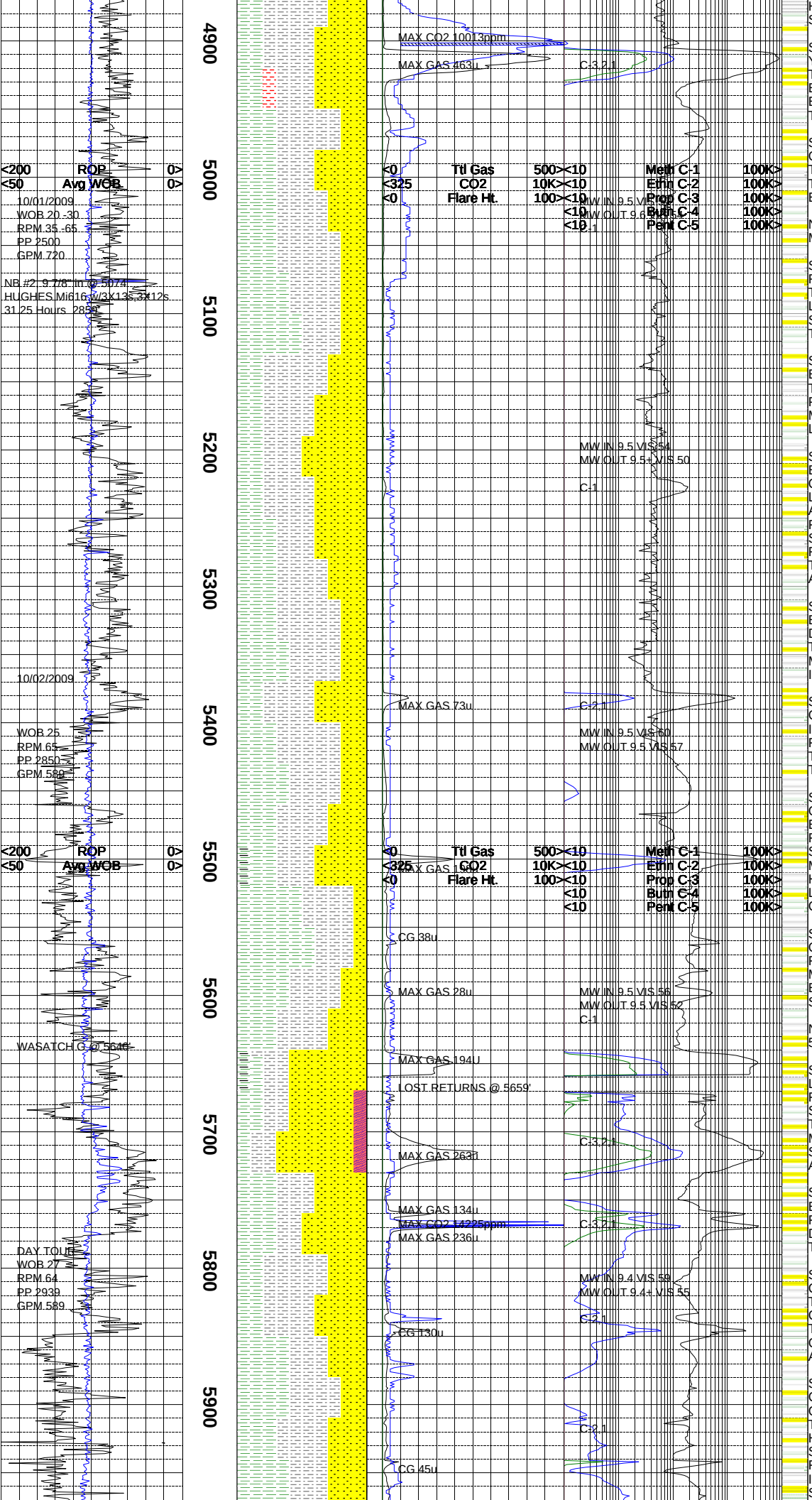
SHALE = LIGHT GRAY TO MODERATE GREENISH YELLOW WITH GRAYISH PURPLE HUES; BRITTLE TENACITY; PLANAR TO IRREGULAR FRACTURING PLATY TO SCALY CUTTINGS; DULL TO WAXY LUSTER; SMOOTH TEXTURE; THIN TO LAMINAE STRUCTURE.

SANDSTONE = LIGHT GREENISH GRAY TO LIGHT OLIVE GRAY TO LIGHT GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ; MEDIUM TO FINE SIZED GRAINS WITH POOR SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE SPHERICITY; FIRMLY FRIABLE WITH CALCITE CEMENT; MODERATE REACTION WITH HCL.

SILTSTONE = PALE REDDISH BROWN TO MODERATE BROWN; DENSE TO CRUMBLY TENACITY; BLOCKY TO IRREGULAR FRACTURING TABULAR CUTTINGS; EARTHY WITH A SLIGHT FROSTED LUSTER; GRITTY TO SILTY TEXTURE; THICK TO MASSIVE STRUCTURE.

SHALE = MEDIUM BLUISH GRAY TO GREENISH GRAY TO LIGHT GRAY; BRITTLE TO SLIGHTLY CRUNCHY TENACITY; PLANAR FRACTURING; PLATY TO TABULAR TO SLIGHTLY SCALY CUTTINGS; DULL LUSTER; THIN STRUCTURE.

SANDSTONE = BROWNISH GRAY TO MODERATE BROWN TO GRAY COLOR; QUARTZ FRAMEWORK WITH APPROXIMATELY 5% DARK LITHIC CLASTS FINE TO MEDIUM SIZED GRAINS WITH FAIR TO POOR SORTING; SUBANGULAR WITH LOW SPHERICITY; FIRMLY FRIABLE TO MODERATE



HARDNESS; LOW REACTION TO HCL SUGGESTS SILICA CEMENT.

SILTSTONE = REDDISH BROWN TO DARK YELLOWISH BROWN; CRUMBLY TO DENSE TENACITY; FRACTURES FROM IRREGULAR TO BLOCKY; TABULAR TO WEDGELIKE CUTTINGS; EARTHY LUSTER; GRITTY TO SMOOTH TEXTURE; THICK TO MASSIVE STRUCTURE.

SHALE = LIGHT GRAY TO GRAYISH YELLOW GREEN; BRITTLE TO SLIGHTLY CRUNCHY TENACITY; PLANAR FRACTURING; PLATY TO TABULAR CUTTINGS; DULL TO SLIGHTLY EARTHY LUSTER; SMOOTH TO SILTY TEXTURE.

NOTE = TRIPPED OUT AT 5074' TO RIG DOWN MWD TOOLS ON 10/01/2009 AT 1:30 AM.

SILTSTONE = BROWNISH GRAY TO MODERATE REDDISH BROWN; DENSE TO CRUMBLY TENACITY TABULAR TO WEDGELIKE CUTTINGS; EARTHY LUSTER; SILTY TEXTURE WITH A THICK STRUCTURE; FRACTURES FROM IRREGULAR TO TABULAR.

SHALE = LIGHT GRAY TO TO LIGHT OLIVE BROWN WITH OCCASSIONAL PALE PURPLE HUES; TENACITY IS BRITTLE TO SLIGHTLY DENSE; PLANAR FRACTURING; CUTTINGS RANGE FROM MOSTLY PLANAR TO TABULAR; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN ST

SANDSTONE = MEDIUM DARK GRAY TO GRAYISH BROWN; FRAMEWORK CONSIST MOSTLY OF QUARTZ WITH APPROXIMATELY 10% BLACK LITHIC CLASTS CREATING A SALT AND PEPPER APPEARANCE; FINE TO MEDIUM SIZED WITH FAIR SORTING; SUB ROUNDED WITH MODERATE SPHERICITY; MODERATE HARD TO HARD; NO REACTION WITH HCL SUGGESTS SILICA CEMENT TRACE AMOUNTS OF PYRITE ARE PRESENT AS AN ACCESSORY MINERAL.

SILTSTONE = MEDIUM DARK GRAY TO MODERATE BROWN TO GRAYISH BROWN; TENACITY IS DENSE TO CRUNCHY; FRACTURES FROM BLOCKY TO IRREGULAR; TABULAR TO SLIGHTLY MASSIVE CUTTINGS; EARTHY LUSTER; TEXTURE IS GRITTY TO SILTY; THICK STRUCTURE.

SHALE = MEDIUM BLUISH GRAY TO MEDIUM GRAY WITH GRAYISH PURPLE HUES; TENACITY IS BRITTLE TO SLIGHTLY CRUNCHY; PLANAR FRACTURING; CUTTINGS ARE PLANAR TO TABULAR; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = GRAYISH BROWN TO MEDIUM DARK GRAY; QUARTZ FRAMEWORK WITH ABOUT 15% BLACK LITHIC CLAST; GRAINS RANGE FROM FINE TO COARSE WITH POOR TO FAIR SORTING SUBANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; HARD TO MODERATE HARDNESS; GRAIN SUPPORTED WITH VERY LITTLE REACTION TO HCL SUGGESTING SILICA CEMENT; NO VISSIBLE BEDDING.

SILTSTONE = MEDIUM DARK GRAY TO BROWNISH GRAY; BRITTLE TO CRUMBLY TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR; MASSIVE TO TABULAR CUTTINGS; DULL TO EARTHY WITH A SLIGHT FROSTED LUSTER ON SOME AREAS OF THE SAMPLE; SILTY TO GRITT

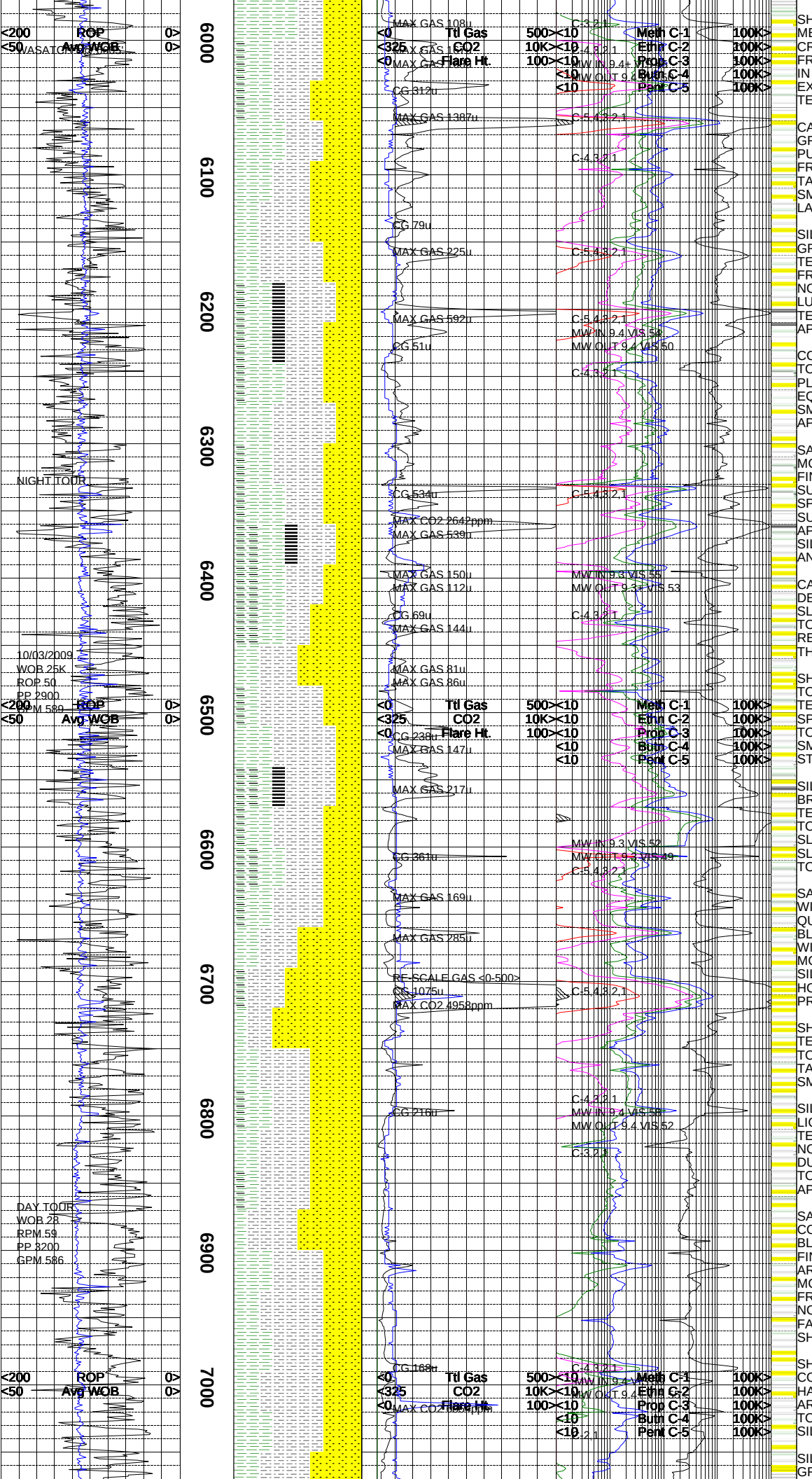
NOTE = LOST RETURNS FROM 5659' MD TO 5671' MD.

SANDSTONE = TRANSLUCENT TO WHITE TO VERY LIGHT GRAY; QUARTZ FRAMEWORK; COARSE TO FINE GRAINED WITH POOR SORTING; SUBANGULAR WITH POOR SPHERICITY; FRIABLE TO FIRMLY FRIABLE WITH MANY LOOSE GRAINS MILD REACTION TO HCL SUGGESTS CALCITE/ SILICA CEMENT; PYRITE PRESENT AS AN ACCESSORY MINERAL.

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

SILTSTONE = PALE RED TO GRAYISH RED IN COLOR; BRITTLE TO NEARLY PULVERANT IN TENACITY; MOTTLED TO IRREGULAR FRACUTRE; CUTTINGS ARE TABULAR TO WEDGELIKE; DULL TO FROSTED LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT.

SANDSTONE = WHITE TO YELLOWISH GRAY IN COLOR; QUARTZ FRAMEWORK; MEDIUM TO FINE GRAIN SIZE; FAIR TO WELL SORTED; ROUNDED TO SUBROUNDED GRAINS WIT MODERATE TO HIGH SPHERICITY; FIRMLY FRIABLE TO HARD; SILICA CEMENTATION; NO DISCERNIBLE FABRIC OR BEDDING; CALCITE GRAINS SEEN IN MATRIX; NO VISIBLE POROSITY; LOW GAS SHOWS FROM THIS SANDSTONE.



SHALE = LIGHT BLUISH GRAY TO MEDIUM TO MEDIUM LIGHT GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; SPLINTERY TO PLANAR FRACTURE; CUTTINGS ARE PLATY TO TABULAR IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SLIGHTLY SILTY TEXTURE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = GREENISH BLACK TO GRAYISH BLACK IN COLOR; BRITTLE TO PULVERANT IN TENACITY; PLANAR TO MOTTLED FRACTURE; CUTTINGS ARE WEDGELIKE TO TABULAR IN HABIT; GREASY TO DULL LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN TO LAMINAE STRUCTURE APPARENT.

SILTSTONE = PALE OLIVE TO VERY LIGHT GRAY IN COLOR; DENSE TO BRITTLE IN TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGELIKE TO NODULAR IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT.

COAL = GRAYISH BLACK IN COLOR; BRITTLE TO PULVERANT IN TENACITY; HACKLY TO PLANAR FRACTURE; CUTTINGS ARE TABULAR TO EQUANT IN APPEARANCE; METALLIC LUSTER; SMOOTH TEXTURE; THICK TO THIN STRUCTURE APPARENT.

SANDSTONE = WHITE TO LIGHT GRAY WITH MODERATE YELLOWISH BROWN HUES; MEDIUM TO FINE SIZED GRAINS WITH FAIR SORTING; SUBROUNDED WITH MODERATE TO HIGH SPHERICITY; HARD TO MODERATE HARD; GRAIN SUPPORTED; QUARTZ FRAMEWORK WITH APPROXIMATELY 5%-10% BLACK LITHIC CLASTS SILICA CEMENT; TRACE AMOUNTS OF PYRITE AND CALCITE AS ACCESSORY MINERALS.

CARBONACEOUS SHALE = DARK GRAY TO BLACK; DENSE TO BRITTLE TENACITY; BLOCKY TO SLIGHTLY CONCHOIDAL FRACTURING; NODULAR TO WEDGELIKE CUTTINGS; EARTHY TO RESINOUS LUSTER; SILTY TO SMOOTH TEXTURE THIN TO THICK STRUCTURE.

SHALE = PALE OLIVE TO MEDIUM LIGHT GRAY TO LIGHT BLUISH GRAY; DENSE TO BRITTLE TENACITY; FRACTURES FROM PLANAR TO SPLINTERY; PLATY TO SCALY CUTTINGS; DULL TO SLIGHTLY WAXY LUSTER; TEXTURE IS SMOOTH TO SILTY; THIN TO LAMINAE STRUCTURE.

SILTSTONE = DARK YELLOWISH BROWN TO BROWNISH BLACK; DENSE TO CRUMBLY TENACITY; FRACTURES FROM MOSTLY BLOCKY TO OCCASSIONALLY IRREGULAR; TABULAR TO SLIGHTLY MASSIVE CUTTINGS; EARTHY WITH A SLIGHT FROSTED LUSTER; TEXTURE IS SILTY TO GRITTY; THICK STRUCTURE.

SANDSTONE = WHITE TO MEDIUM DARK GRAY WITH SOME MODERATE GREENISH YELLOW HUES; QUARTZ FRAME WORK WITH APPROXIMATELY 10% BLACK LITHIC CLASTS; FINE GRAIN SIZE WITH WELL SORTING; SUBROUNDED; HARD TO MODERATE HARD; GRAINS SUPPORTED WITH SILICA CEMENT; VERY SLIGHT REACTION TO HCL SUGGESTS SOME CALCITE GRAINS MAY BE PRESENT.

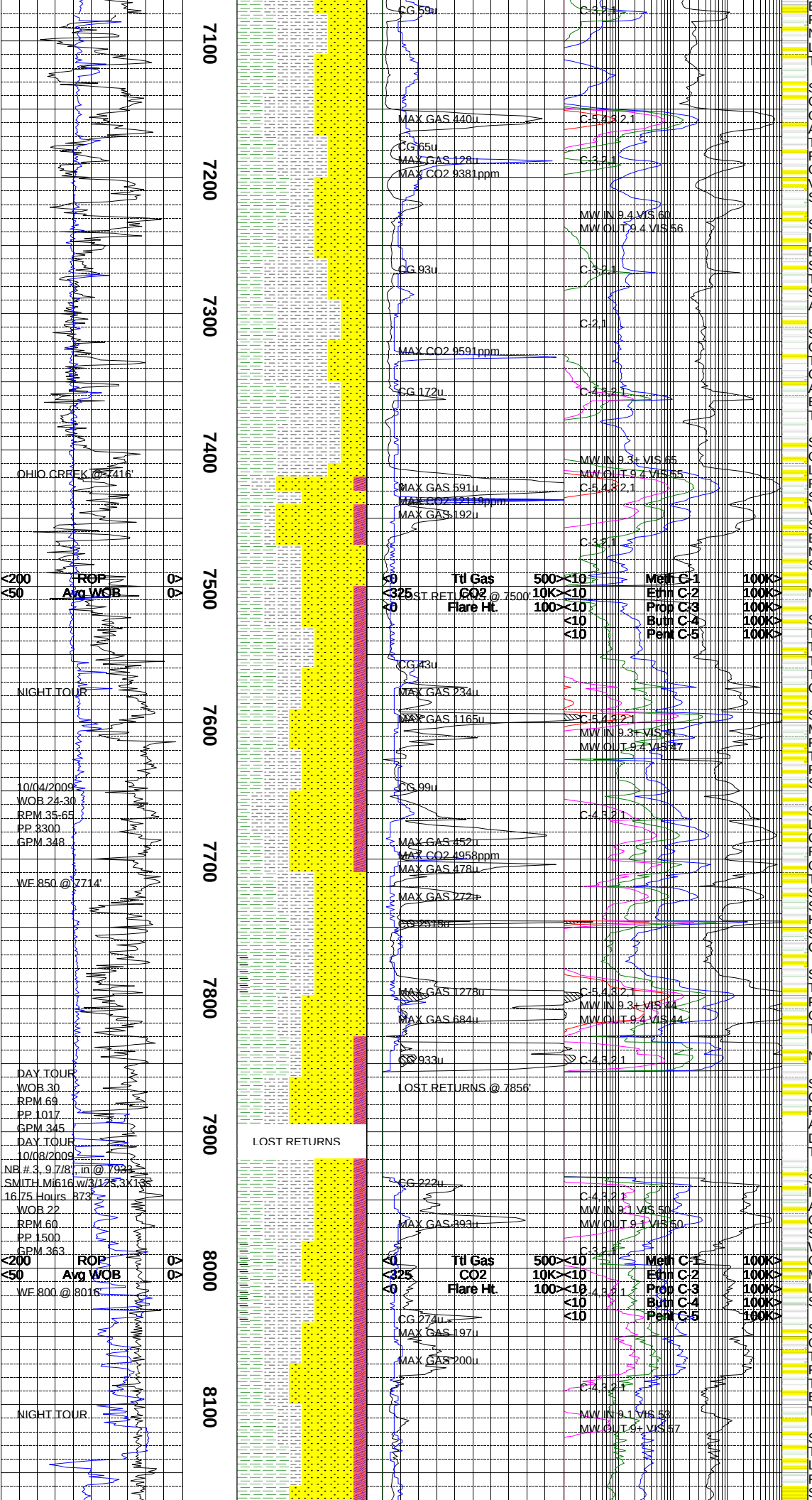
SHALE = LIGHT GRAY TO GREENISH GRAY; TENACITY IS BRITTLE TO CRUNCHY; PLANAR TO SPLINTERY FRACTURING; SCALY TO TABULAR CUTTINGS; LUSTER IS DULL TO WAXY SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SILTSTONE = LIGHT OLIVE GRAY TO VERY LIGHT GRAY IN COLOR; DENSE TO BRITTLE IN TENACITY; CONCHOIDAL TO PLANAR FRACTURE; NODULAR TO WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE APPARENT.

SANDSTONE = WHITE TO YELLOWISH GRAY IN COLOR; QUARTZ FRAMEWORK WITH ABOUT 3% BLACK LITHIC FRAGMENTS; MEDIUM TO VERY FINE GRAIN SIZE; FAIR SORTING; GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT; TIGHT SAND WITH NO VISIBLE POROSITY; POINT CONTACT FABRIC WITH NO VISIBLE BEDDING; LOW GAS SHOWS.

SHALE = GREENISH GRAY TO MEDIUM GRAY IN COLOR; DENSE TO CRUCNHY IN TENACITY; HACKLY TO IRREGULAR FRACTURING; CUTTINGS ARE WEDGELIKE TO NODULAR IN HABIT; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE, SOME ABRUPT CONTACTS WITH

SILTSTONE = MODERATE REDDISH BROWN TO GRAYISH ORANGE IN COLOR; DENSE TO



BRITTLE IN TENACITY; BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE WEDGELIKE TO NODULAR, SOME MASSIVE; EARTHY TO FROSTED LUSTER EXHIBITED; SILTY TO GRITTY LUSTER THIN STRUCTURE APPARENT.

SANDSTONE = WHITE TO VERY LIGHT GRAY IN COLOR; QUARTZ FRAMEWORK. MEDIUM TO FINE GRAIN SIZE; FAIR TO WELL SORTED; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPERICITY; HARDNESS RANGES FROM FRIABLE TO MODERATELY HARD; CALCITE CEMENT; NO DISCERNIBLE BEDDING; NO VISIBLE POROSITY; LOW TO MODERATE GAS SHOWS.

SHALE = LIGHT GRAY TO MEDIUM LIGHT GRAY IN COLOR; BRITTLE TO CRUMBLY IN TENACITY BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE SCALY TO ELONGATED IN APPEARANCE; WAXY TO DULL LUSTER EXHIBITED; CLAYEY TO SLIGHTLY SILTY TEXTURE; THIN STRUCTURE APPARENT.

SILTSTONE = LIGHT BROWNISH GRAY TO LIGHT GRAY IN COLOR; DENSE TO CRUMBLY IN TENACITY; IRREGULAR TO BLOCKY FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN APPEARANCE; EARTHY TO FROSTED LUSTER EXHIBITED; SILTY TO GRITTY IN TEXTURE; THICK STRUCTURE APPARENT.

SANDSTONE = LIGHT GRAY TO WHITE IN COLOR QUARTZ FRAMEWORK WITH 3 - 5% BLACK LITHIC FRAGMENTS GIVING A SALT AND PEPPER APPEARANCE; MEDIUM TO FINE GRAIN SIZE WITH SOME COARSE GRAINS; FAIR TO WELL SORTED; GRAINS ARE SUBANGULAR TO SUBROUNDED WITH MODERATE SPHERICITY; EASILY TO FIRMLY FRIABLE; CALCITE CEMENT NO VISIBLE POROSITY; MODERATE TO LOW GAS SHOWS.

NOTE = LOST RETURNS @ 7500'.

SHALE = PALE BLUE TO MEDIUM GRAY; TENACITY IS BRITTLE TO CRUMBLY; PLANAR TO SLIGHTLY BLOCKY FRACTURING; SCALY TO TABULAR CUTTINGS; DULL WO WAXY LUSTER; TEXTURE IS SMOOTH TO SILTY TO SLIGHTLY CLAYEY; THIN STRUCTURE.

SILTSTONE = LIGHT BROWNISH GRAY TO MEDIUM GRAY; DENSE TO BRITTLE TENACITY; FRACTURES FROM BLOCKY TO IRREGULAR; TABULAR TO WEDGELIKE CUTTINGS; LUSTER RANGES FROM EARTHY TO DULL; TEXTURE IS SILTY TO GRITTY; THIN STRUCTURE.

SANDSTONE = TRANSLUCENT TO WHITE TO LIGHT GRAY; QUARTZ FRAMEWORK WITH SOME CRYSTAL CLEAR SILICA WICH INDICATES FRACTURING AND ABOUT 10% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED WITH FAIR TO WELL SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE TO LOW SPHERICITY; FIRMLY FRIABLE TO MODERATE HARDNESS WITH SOME LOOSE GRAINS; STRONG REACTION WITH HCL SUGGESTS CALCITE CEMENT; PYRITE AS ACCESSORY.

SHALE = LIGHT GRAY TO PALE BLUE; BRITTLE TO CRUNCHY TENACITY; FRACTURES FROM PLANAR TO IREGULAR; SCALY TO TABULAR CUTTINGS; DULL LUSTER; SMOOTH TEXTURE; THIN STRUCTURE.

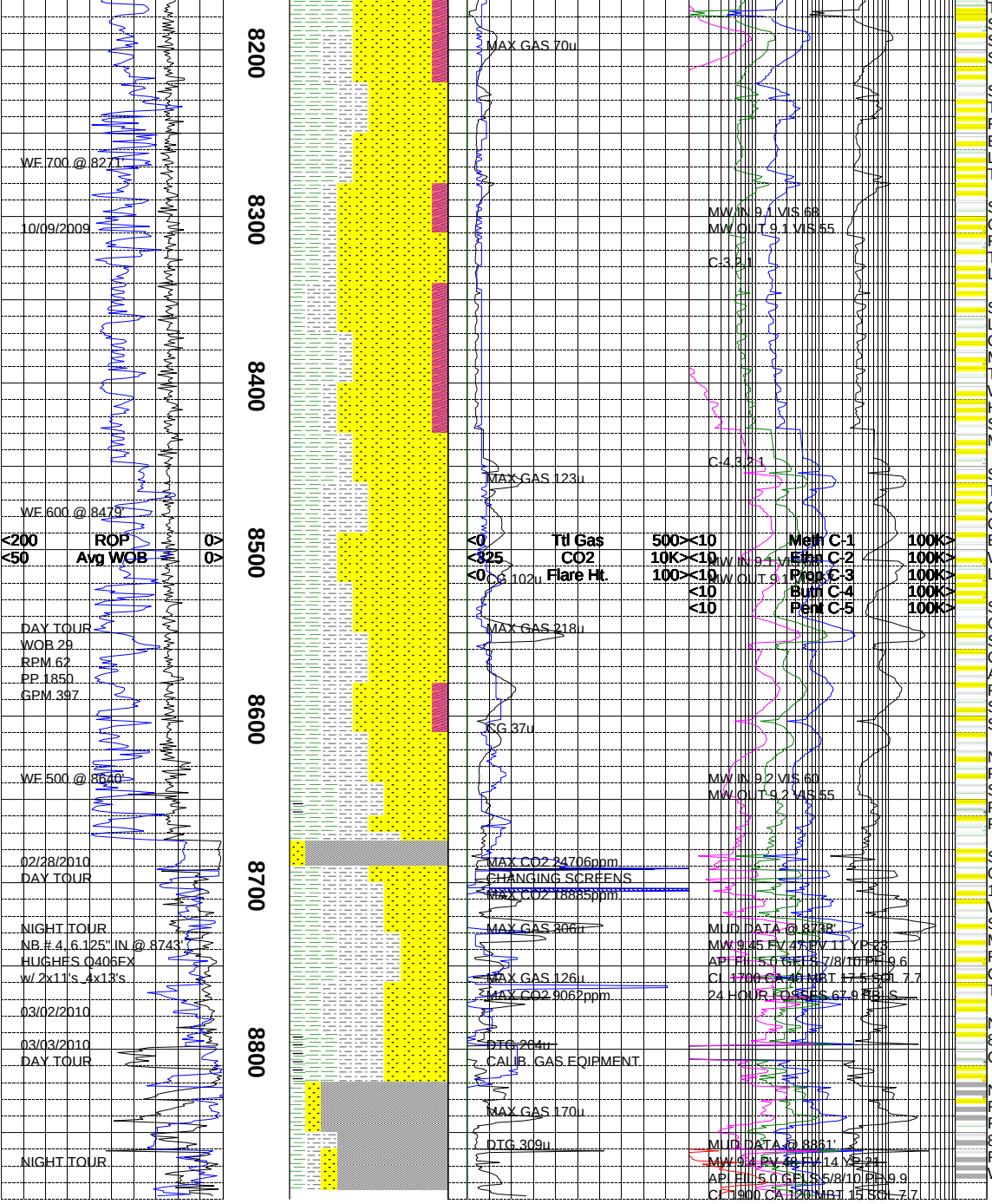
NOTE = LOST COMPLETE RETURNS @ 7856'.

SILTSTONE = LIGHT GRAY TO MEDIUM GRAY IN COLOR; TOUGH TO DENSE IN TENACITY; PLANAR TO IRREGULAR FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO CLAYEY TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE TO NEARLY COLORLESS IN COLOR; QUARTZ FRAMEWORK WITH CALCITE AND BLACK LITHIC FRAGMENTS PRESENT; COARSE TO VERY FINE GRAIN SIZE; POOR SORTING;GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; SILICA CEMENT; HARDNESS RENGES FROM FRIABLE TO MODERATELY HARD; NO VISIBLE POROSITY; LOW TO MODERATE GAS SHOWS FROM THIS SANDSTONE.

SHALE = GREENISH GRAY TO MEDIUM DARK GRAY IN COLOR; DENSE TO BRITTLE IN TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS AREWEDGELIKE TO TABULAR IN HABIT; WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT; NONCALCAREOUS.

SANDSTONE = LIGHT GRAY TO WHITE TO TRANSLUCENT; QUARTZ FRAMEWORK WITH MANY LOOSE GRAINS; MEDIUM TO FINE SIZED WITH FAIR TO WELL SORTING; SUBANGULAR TO SUBROUNDED; MODERATE SPHERICITY; FRIABLE



TO MODERATE HARDNESS DEPENDING ON THE SPECIMEN; GRAIN SUPPORTED WITH CALCITE/ SILICEOUS CEMENT AS SUGGESTED BY A STRONG REACTION WITH HCL.

SHALE = MEDIUM DARK GRAY TO LIGHT GRAY; TENACITY IS DENSE TO CRUNCHY; FRACTURES FROM PLANAR TO SPLINTERY; TABULAR TO ELONGATED CUTTINGS; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; LAMINAE TO THIN STRUCTURE.

SILTSTONE = LIGHT GRAY TO MEDIUM DARK GRAY; TENACITY IS DENSE TO CRUMBLY; FRACTURES FROM IRREGULAR TO BLOCKY; TABULAR TO WEDGELIKE CUTTINGS; EARTHY LUSTER; THIN STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO LIGHT GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ GRAINS WITH SOME CALCITE IN THE MATRIX; MEDIUM TO FINE SIZED WITH FAIR TO WELL SORTING; ANGULAR TO SUBROUNDED WITH MODERATE SOHERICITY; MODERATE HARDNESS WITH MANY LOOSE GRAINS; GRAIN SUPPORTED WITH SOME CALCITE MATRIX; MODERATE TO STRONG REACTION WITH HCL.

SHALE = LIGHT GRAY TO DARK GRAY COLORING TENACITY IS DENSE TO BRITTLE TO SLIGHTY CRUNCHY; PLANAR TO SPLINTERY TO SLIGHTLY CONSHOIDAL FRACTURING; PLATY TO ELONGATED CUTTINGS; DULL TO SLIGHTLY WAXY LUSTER; SILTY TO SMOOTH TEXTURE; LAMINAE TO THIN STRUCTURE.

SILTSTONE = MEDIUM DARK GRAY TO DARK GRAY IN COLOR; DENSE TO BRITTLE TENACITY SAMPLE SHOWS BLOCKY TO PLANAR FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER; SOME PYRITE VISIBLE IN MATRIX; SILTY TO SLIGHTLY GRITTY TEXTURE; THIN TO THICK STRUCTURE APPARENT.

NOTE = THIS WELL WAS SIDETRACKED FOR THE PRODUCTION PORTION. THE WHIPSTOCK WAS SET AT 8675' MD ON 2/26/2010. THIS PORTION OF THE WELL IS REFERRED TO AS PCU 197-34B8 ST1.

SANDSTONE = LIGHT TO MEDIUM GRAY IN COLORING; QUARTZ FRAMEWORK WITH ABOUT 10% LITHICS; MEDIUM TO COARSE GRAIN SIZE WITH MODERATE SPHERICITY; SUBANGULAR TO SUBROUNDED ANGULARITY AND FAIR TO MODERATE SORTING; FRIABLE TO FIRMLY FRIABLE GRAIN SUPPORT WITH CALCITIC CEMENTATION; LOW GASES ASSOCIATED WITH THIS SAMPLE.

NOTE= SAMPLES HAVE BEEN CONTAINING 70% - 80% CEMENT CONTAMINATION FROM A RANGE OF DEPTHS FROM 8,855' TO 8,880'.

NOTE = AFTER FURTHER COMPLICATIONS WITH REDRILLING INTO THE OLD WELL, PCU 197-34B8ST1 HAS STOPPED DRILLING AT 8889' MD ON 3/4/2010. THIS WELL WILL BE PLUGGED AND TURNED INTO AN INJECTION WELL.