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MUDLOG MD

COMPANY	EXXONMOBIL
WELL	PCU 296-5A9
FIELD	PICEANCE CREEK
REGION	ROCKIES
COORDINATES	LAT: 39.911922 LONG:-108.198686
ELEVATION	G.L.: 7294.1' RKB: 30.2
COUNTY, STATE	RIO BLANCO, CO
API INDEX	051031124100
SPUD DATE	12/05/2009
CONTRACTOR	HELMERICH_PAYNE
CO. REP.	C. CURTIS
RIG/TYPE	FLEX 4S / HP 321
LOGGING UNIT	ML031
GEOLOGISTS	B. SMELSER, M. GROSS C. RECORD
ADD. PERSONS	
CO. GEOLOGIST	C. ALBA

LOG INTERVAL

DEPTHS: 4779' TO 13772'

DATES: 01/27/2011 TO 04/15/2011

SCALE: 1" = 100'

CASING DATA

16" AT 150'

10.75" AT 4764'

7.00" AT 10032'

AT

HOLE SIZE

14.75" TO 4779'

9.875" TO 10051'

6.125" TO 13772'

TO

MUD TYPES

SPUD MUD TO 4779'

LSND TO 13772'

TO

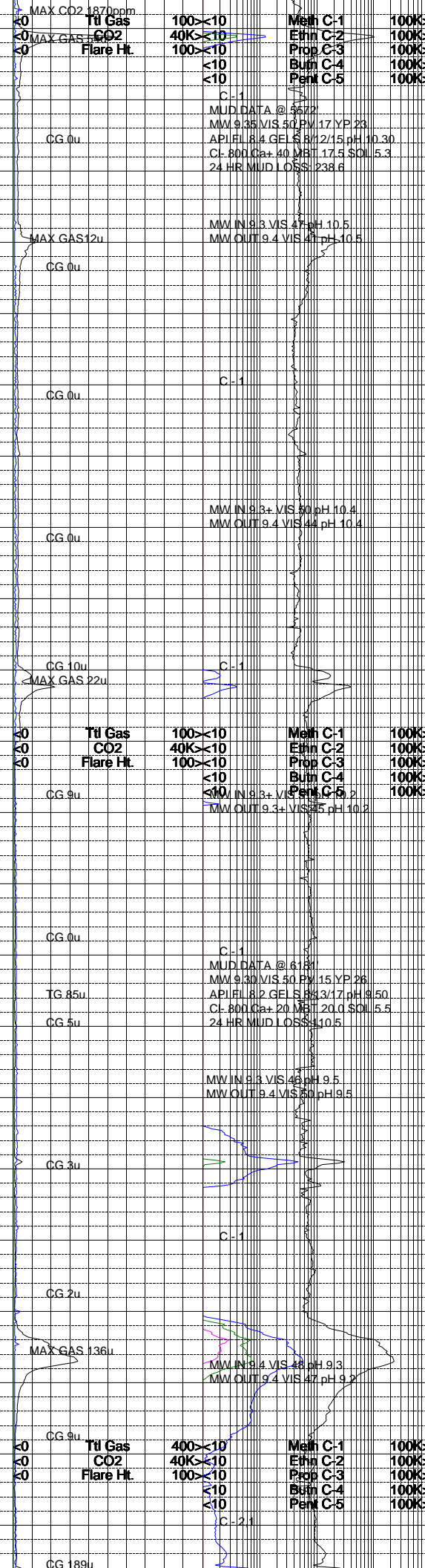
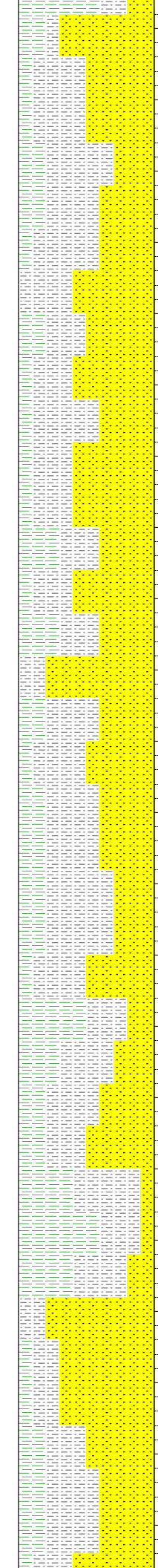
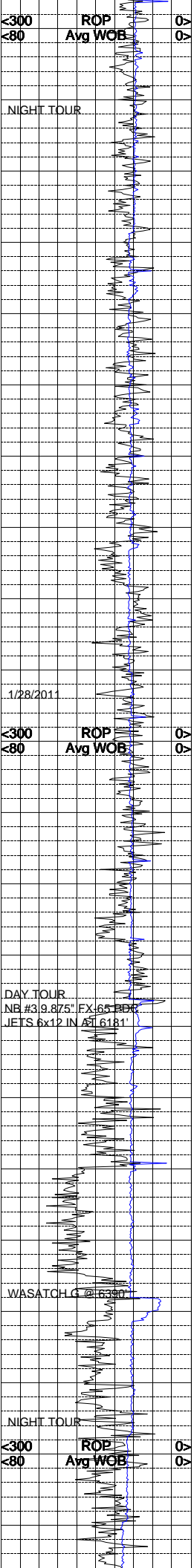
TO

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		CHERT - GLASSY		FELSIC SILIC DIKE		MARL - CALC		SANDSTONE
	ANDESITE		CHERT - PORCEL		FOSSIL		METAMORPHICS		SANDSTONE-TUFFACEOUS
	ANHYDRITE		CHERT - TIGER STRIPE		GABBRO		MUDSTONE		SERICITIZATION
	BASALT		CHERT - UNDIFF		GLASSY TUFF		OBSIDIAN		SERPENTINE
	BENTONITE		CLAY		GRANITE		PALEOSOL		SHALE
	BIOTITIZATION		CLAY-MUDSTONE		GRANITE WASH		PHOSPHATE		SHALE TUFFACEOUS
	BRECCIA		CLYST-TUFFACEOUS		GRANODIORITE		PORCELANITE		SHELL FRAGMENTS
	CALCARENITE		CHLORITIZATION		GYPSUM		PORCELANEOUS CLYST		SIDERITE
	CALCAREOUS TUFF		COAL		HALITE		PYRITE		SILICIFICATION
	CALCILUTITE		CONGLOMERATE		HORNBL-QTZ-DIO		PYROCLASTICS		SILTSTONE
	CARBONATES		CONGL. SAND		IGNEOUS (ACIDIC)		QUARTZ DIORITE		SILTST-TUFFACEOUS
	CARBONACEOUS MAT		CONGL. SANDSTONE		IGNEOUS (BASIC)		QUARTZ LATITE		TUFF
	CARBONACEOUS SH		COQUINA		INTRUSIVES		QUARTZ MONZONITE		VOLCANICLASTICS SEDS
	CEMENT CONTAM.		DACITE		KAOLINITIC		RECRYSTALLIZED CALCITE		VOLCANICS
	CHALK		DIATOMITE		LIMESTONE		RHYOLITE		
	CRYSTALLINE TUFF		DIORITE		LITHIC TUFF		SALT		
	CHERT - ARGILL		DOLOSTONE		MARL - DOLO		SAND		

ROP			Depth	Lithology	MGS			Interp. Lith			Remarks
<100	ft/hr	>0			<0	Ttl Gas units	1K>	<10	Meth C-1 ppm	100K>	
<80	Avg WOB	>0			<0	CO2 ppm	40K>	<10	Ethn C-2	100K>	Survey Data, Mud Reports, Other Info.
	klbs				<0	Flare Ht. ft	100>	<10	Prop C-3	100K>	
								<10	Butn C-4	100K>	
								<10	Pent C-5	100K>	
01/27/2011 DAY TOUR NB #2 9.875" HCD504ZX PDC JETS 4x13, 2x12 IN AT 4779'											
MUD DATA: 4762' MW IN 9.3+ VIS 51 PV 13 YP 26 API FL 7.4 GEL 5.8 4/17 pH 9.7 CL 900 Ca+ 20 MP 17.5 SOL 5.1 2 HR MUD LOSS 0 BBLS											
MW IN 9.1+ VIS 45 pH 11.6 MW OUT 9.2 VIS 42 pH 11.7											
SHALE = DARK YELLOWISH BROWN TO GRAYISH BROWN TO MODERATE YELLOWISH BROWN; PLATY TO FLAKY CUTTINGS HABIT; PLANAR TO SPLINTERY FRACTURE; EARTHY LUSTER; MINOR AMOUNTS OF CLAY WASHED OUT DURING CLEANING; THINLY INTERBEDDED WITH SILTSTONE.											
SHALE = DARK YELLOWISH BROWN TO VERY DUSKY RED TO MEDIUM GRAY; PLATY TO SCALY TO TABULAR CUTTINGS HABIT; CLAYEY TO SLIGHTLY SILTY TEXTURE; DULL TO EARTHY LUSTER; THINLY INTERBEDDED W/ SILTSTONE AND PALE YELLOWISH BROWN SANDSTONE; CRUMBLY TO STIFF TENACITY.											
SHALE = DARK YELLOWISH BROWN TO MOD YELLOWISH BROWN TO VERY DUSKY RED; PLANAR TO SPLINTERY TO HACKLY FRACTURE; DULL EARTHY TO TRACE SPARKLING LUSTER; GRADES TO PALE YELLOWISH BROWN SILTSTONE; TR FRAGMENTS OF PALE BROWN LIMESTONE.											
SANDSTONE = VERY DUSKY RED TO PALE YELLOWISH BROWN TO LIGHT GRAY; HARD TO VERY HARD; PREDOMINANTLY GRAIN SUPPORTED WITH SILICA AND MINOR CALCITE CEMENT; MODERATELY CALCAREOUS; VERY FINE TO UPPER FINE GRAIN; GRADATION TO SILTSTONE; 2-4% LITHIC FLECKS IN SAMPLE FRAGMENTS; INTERBEDDED WITH SILTSTONE AND SHALE; FAIRLY SORTED; LOW TO MOD SPHERICITY; ANGULAR TO SUBROUND; NO VISIBLE HYDROCARBON INDICATORS.											
SHALE = DARK YELLOWISH BROWN TO VERY DUSKY RED TO MODERATE YELLOWISH BROWN; SCALY TO WEDGELIKE TO PLATY CUTTINGS HABIT; CLAYEY TO SILTY TEXTURE; GRADES TO SILTSTONE; CRUMBLY TO STIFF TENACITY; EARTHY LUSTER; MASSIVE STRUCTURE WITH MOTTLED COLORS.											
SHALE = MODERATE YELLOWISH BROWN TO DARK YELLOWISH BROWN TO VERY DUSKY RED; CLAYEY TO SILTY TEXTURE; PLANAR TO SPLINTERY TO ANGULAR FRACTURE; SCALY TO WEDGELIKE TO FLAKY CUTTINGS HABIT; DULL TO EARTHY LUSTER; GRADES TO PALE YELLOWISH BROWN SILTSTONE.											
SHALE = DARK YELLOWISH BROWN TO PALE YELLOWISH BROWN MOTTLED WITH VERY DUSKY RED; CLAYEY TO SILTY TEXTURE; SOFT TO CRUMBLY TENACITY; DULL EARTHY LUSTER; IRREGULAR TO ANGULAR TO PLANAR FRACTURE; WEDGELIKE TO TABULAR TO PLATY CUTTINGS HABIT; GRADATION TO SILTSTONE; MINOR TO MODERATE REACTION TO HCl; TRACE AMOUNTS OF LIMESTONE FRAGS IN SAMPLE.											
SILTSTONE = MODERATE YELLOWISH BROWN TO GRAYISH RED MOTTLED WITH MEDIUM GRAY; SEMI NODULAR TO ELONGATED TO PLATY CUTTINGS HABIT; SILTY TO GRITTY TEXTURE; SPARKLING LUSTER; MINOR LOOSE FINE GRAIN SAND IN SAMPLE FRAGMENTS; GRADATION TO SANDSTONE.											



SANDSTONE = WHITE TO LIGHT GRAY TO MEDIUM GRAY TO BROWNISH GRAY TO A PALE YELLOWISH BROWN COLOR; QUARTZ FRAMEWORK WITH A MODERATE REACTION TO A 10% HCL SOLUTION INDICATING SILICA AND SLIGHT CALCITE CEMENTATION; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; FAIR TO WELL SORTING; SUBANGULAR TO SUBROUND ANGULARITY; MODERATE TO HIGH SPHERICITY; EASILY FRIABLE TO MODERATELY HARD HARDNESS; 10 - 30% LITHIC CLASTS IN THE SAMPLES; INTERBEDDED WITH SILTSTONE AND SHALE; NO ACCESSORY MINERALS VISIBLE IN THE SAMPLE.

SILTSTONE =MODERATE YELLOW TO YELLOWISH GRAY TO LIGHT OLIVE GRAY TO LIGHT GRAY TO PALE BROWN IN COLOR; DENSE TO BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; EARTHY TO DULL LUSTER; SILTY TO GRITTY TO GRANULAR TEXTURE; NO VISIBLE STRUCTURE PRESENT IN THE SAMPLE; KAOLINITE CLAY PRESENT IN THE SAMPLE AS AN ACCESSORY MINERAL.

SHALE = VERY LIGHT GRAY TO GRAY TO A GRAYISH BROWN TO GRAYISH ORANGE IN COLOR; BRITTLE TO CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY TO WEDGE LIKE TO BLADED CUTTINGS HABIT; SMOOTH TO CLAYEY TEXTURE; LAMINAE TO NO VISIBLE STRUCTURE PRESENT IN THE SAMPLE; KAOLINITE CLAY PRESENT IN THE SAMPLE AS AN ACCESSORY MINERAL; INTERBEDDED WITH SILTSTONE AND SANDSTONE; SAMPLE CONTAINS TRACE AMOUNTS OF A GREEN MINERAL POSSIBLY CHLORITE.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO A YELLOWISH BROWN TO A BROWNISH GRAY COLOR; QUARTZ FRAMEWORK WITH UPPER FINE TO LOWER MEDIUM GRAIN SIZE; WELL TO FAIR SORTING WITH SOME SAMPLES BEING VERY WELL SORTED; ROUND TO SUBANGULAR ANGULARITY; HIGH TO MODERATE SPHERICITY; FROSTED GRAIN PRESENT ON SOME SAMPLES; EASILY FRIABLE TO FRIABLE TO MODERATELY HARD HARDNESS; MODERATE TO SLIGHT REACTION TO 10% HCL SOLUTION; SILICA CEMENTATION WITH SOME CALCITE CEMENTATION; KAOLINITE CLAY PRESENT AS AN ACCESSORY MINERAL; >10 -30% LITHIC CLASTS.

SILTSTONE =MODERATE YELLOW TO YELLOWISH GRAY TO VERY LIGHT GRAY TO MEDIUM GRAY TO PALE BROWN IN COLOR; DENSE TO BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; EARTHY TO DULL LUSTER; SILTY TO GRITTY TO GRANULAR TEXTURE; NO VISIBLE STRUCTURE PRESENT IN THE SAMPLE; ACCESSORY MINERALS IN THE SAMPLE INCLUDE KAOLINITE CLAY.

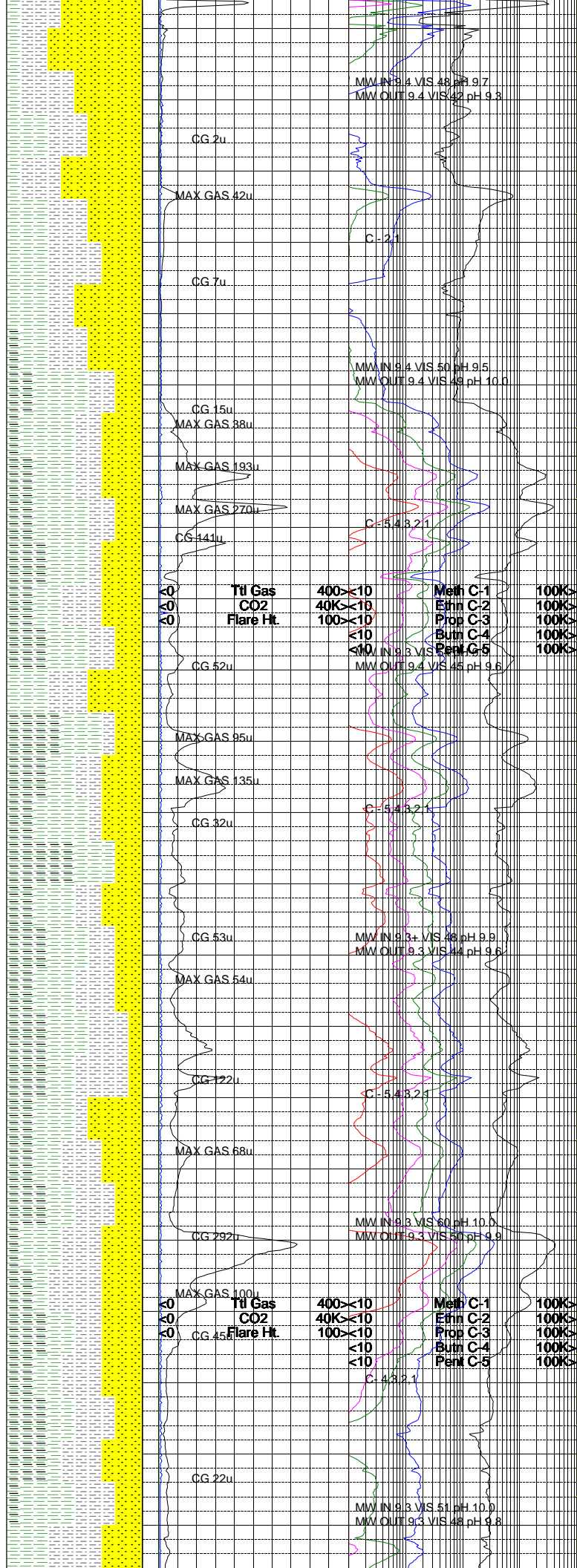
NOTE = TRIPPING OUT OF THE HOLE TO LAY DOWN DIRECTIONAL TOOLS @ 6181' MD.

SHALE = DUSKY YELLOWISH BROWN TO DARK YELLOWISH BROWN MOTTLED WITH VERY DUSKY RED; PLATY TO ELONGATED TO SEMI WEDGE LIKE CUTTINGS HABIT; CLAYEY TO SILTY TEXTURE; EARTHY TO SLI SPARKLING LUSTER; GRADES TO GRAYISH RED SILTSTONE.

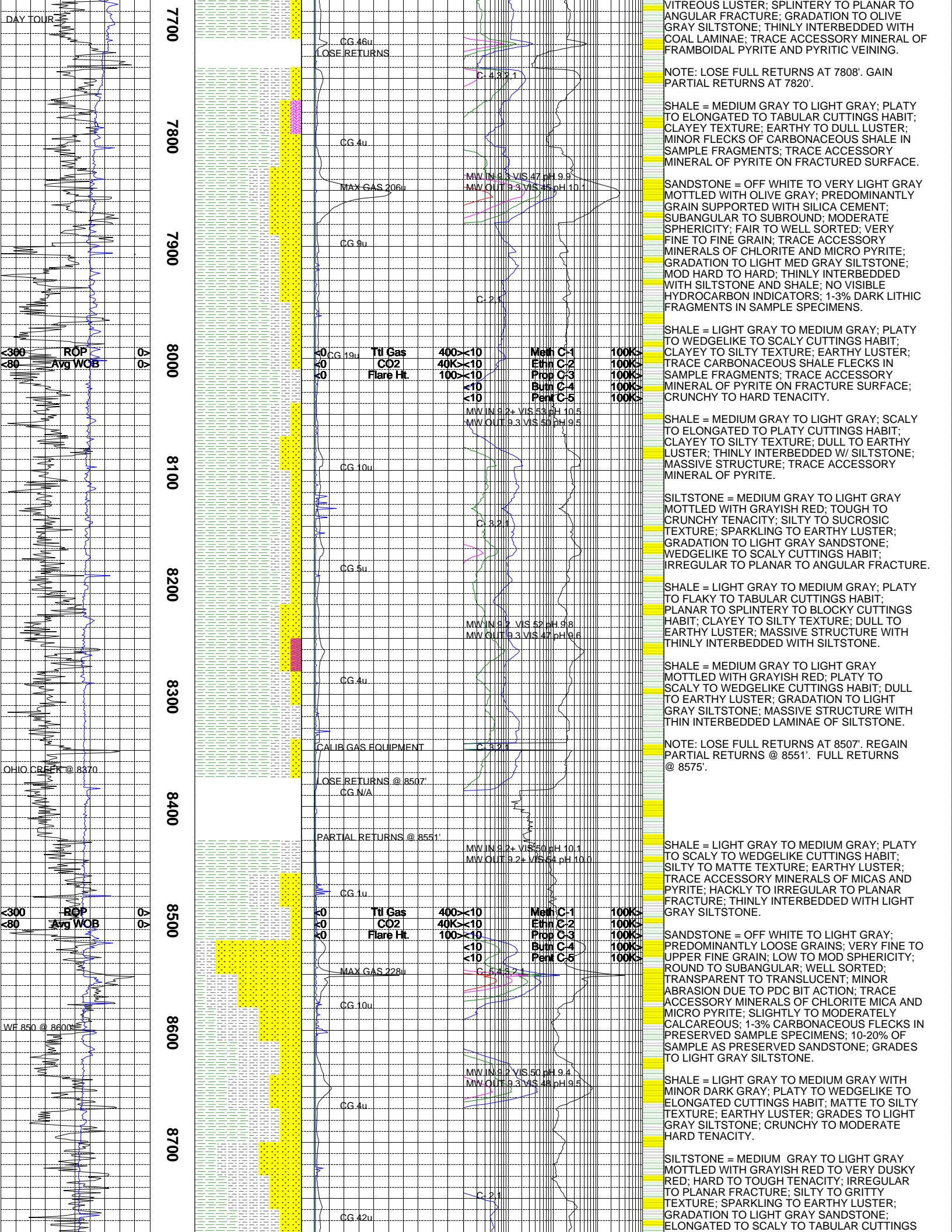
SANDSTONE = OFF WHITE TO GRAYISH RED MOTTLED WITH MODERATE YELLOWISH BROWN AND VERY DUSKY RED; PREDOMINANTLY GRAIN SUPPORTED WITH SILICA CEMENT; WELL SORTED; VERY FINE TO UPPER FINE GRAIN; SUBROUND TO ANGULAR; MOD SPHERICITY; GRADATION TO MODERATE YELLOWISH BROWN SILTSTONE; SLIGHTLY TO MODERATELY CALCAREOUS; 5-7% NAHCOLITE IN SAMPLE; PALE REDDISH BROWN TO GRAYISH RED; THINLY INTERBEDDED WITH SILTSTONE; HARD TO VERY HARD; NO VISIBLE HYDROCARBON INDICATORS; TRACE ACCESSORY MINERAL OF MICRO PYRITE ON SAMPLE FRAGMENTS.

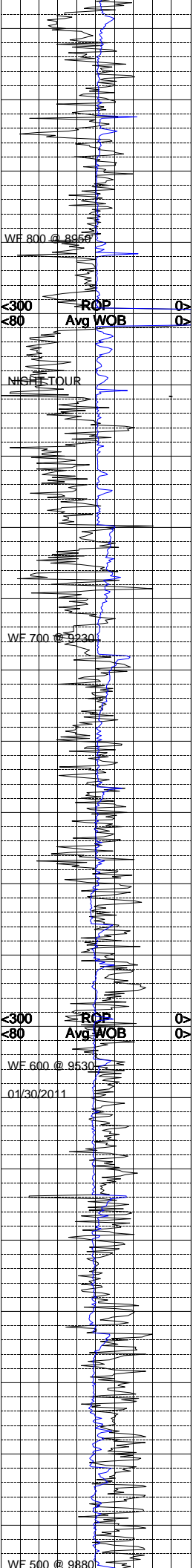
SILTSTONE = GRAYISH RED TO PALE BROWN TO GRAYISH BROWN TO MODERATE YELLOWISH BROWN IN COLOR; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO TABULAR CUTTINGS HABIT; DULL TO EARTHY TO LUSTER; SILTY TO GRITTY TO SLIGHTLY GRANULAR TEXTURE; THIN TO LAMINAE BEDDING STRUCTURES VISIBLE IN THE SAMPLE; NO ACCESSORY MINERALS VISIBLE IN THE SAMPLE; INTERBEDDED WITH SANDSTONE AND SOME SHALE.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO MEDIUM LIGHT GRAY TO LIGHT BLUISH GRAY TO GRAYISH BLUE GREEN TO A GRAYISH RED TO A DARK REDDISH BROWN COLOR; QUARTZ FRAMEWORK; VERY FINE TO LOWER MEDIUM GRAIN SIZE; VERY WELL TO FAIR SORTING;

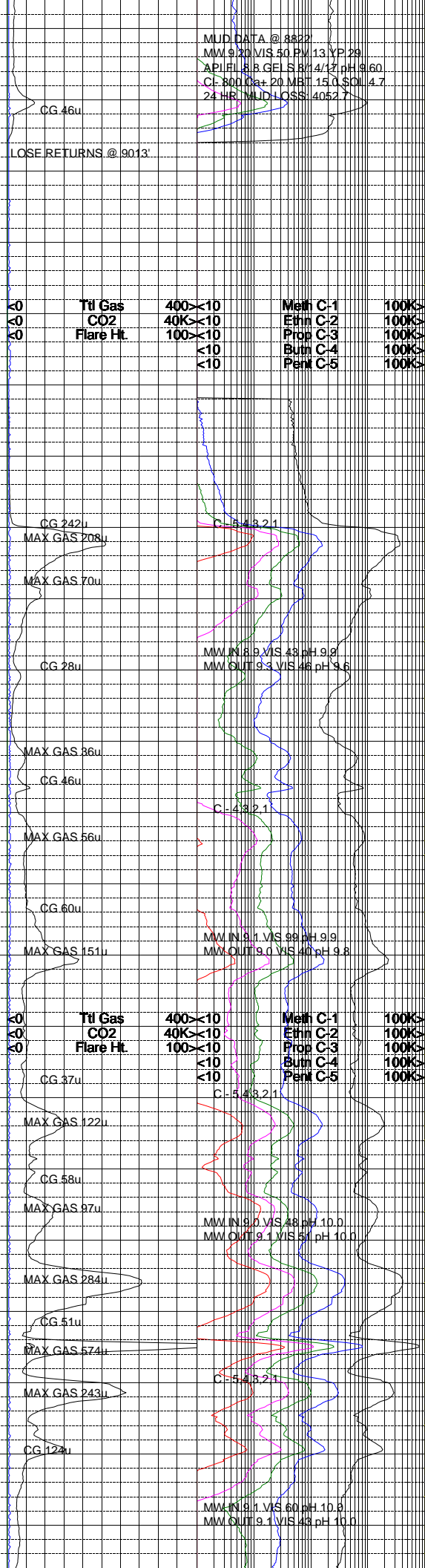
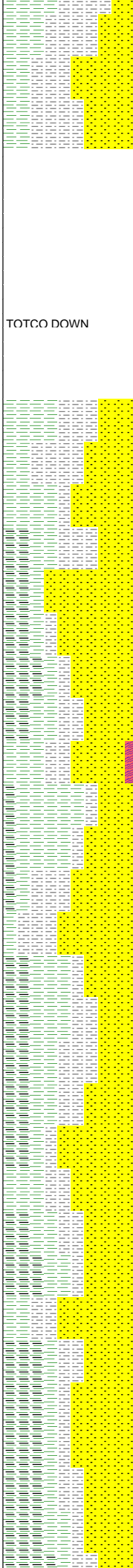


CARBONACEOUS SHALE = BROWNISH BLACK TO OLIVE GRAY TO DARK GRAY; SCALY TO PLATY TO ELONGATED CUTTINGS HABIT; CLAYEY TO SLIGHTLY SILTY TEXTURE; EARTHY TO SEMI





8800
8900
9000
9100
9200
9300
9400
9500
9600
9700
9800



HABIT.

SHALE = MEDIUM GRAY MOTTLED WITH VERY DUSKY RED TO GRAYISH RED; MATTE TO SILTY TEXTURE; PLATY TO FLAKY TO TABULAR CUTTINGS HABIT; SPLINTERY TO PLANAR FRACTURE; GRADATION TO LIGHT GRAY SILTSTONE; EARTHY TO DULL LUSTER.

NOTE: LOSE FULL RETURNS @ 9013' MD.

NOTE: PULLED UP 2 STANDS AND WORK PIPE TO BUILD UP MUD VOLUME.

NOTE: DUE TO LOSS OF RETURNS, SAMPLE LITHOLOGY WILL BE AN APPROXIMATION UNTIL A BOTTOMS UP IS ESTABLISHED @ 9145' MD.

NOTE: REGAIN RETURNS @ 9060' MD.

SANDSTONE = WHITE TO VERY LIGHT GRAY TO MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; VERY WELL TO FAIR SORTING; ANGULAR TO SUBROUND ANGULARITY; HIGH TO MODERATE SPHERICITY; FROSTED TO POLISHED GRAINS VISIBLE IN THE SAMPLE; FRIABLE TO MODERATELY HARD HARDNESS; VERY LITTLE TO NO REACTION WITH A 10% HCL SOLUTION; SILICA CEMENTATION; GRAIN SUPPORTED WITH FEW LITHIC FRAGMENTS; INTERBEDDED WITH SILTSTONE, SHALE AND CARBONACEOUS SHALE; NO BEDDING STRUCTURES VISIBLE IN THE SAMPLE; PYRITE VISIBLE IN THE SAMPLE AS AN ACCESSORY MINERAL.

SHALE = LIGHT GRAY TO GRAY TO MEDIUM GRAY IN COLOR; BRITTLE TO CRUNCHY TO SLIGHTLY PULVERULENT IN TENACITY; PLANAR TO SPLINTERY FRACTURE; PLATY TO FLAKY TO WEDGELIKE TO BLADED CUTTINGS HABIT; DULL TO EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; LAMINAE BEDDING SURFACES VISIBLE IN SOME SAMPLES; PYRITE VISIBLE IN THE SAMPLE AS AN ACCESSORY MINERAL; EVIDENCE OF FRACTURE FILL VISIBLE IN THE SAMPLE.

SILTSTONE = DARK GRAY TO MEDIUM GRAY TO A GRAYISH ORANGE COLOR; TOUGH TO DENSE TO BRITTLE TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO GRITTY TO SLIGHTLY GRANULAR TEXTURE; NO VISIBLE BEDDING STRUCTURE; NO VISIBLE ACCESSORY MINERALS.

SANDSTONE = WHITE TO LIGHT GRAY TO MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; MANY LOOSE GRAIN IN SAMPLE; WELL TO SLIGHTLY POOR SORTING; ANGULAR TO ROUNDED GRAINS; HIGH TO MODERATE SPHERICITY; EASILY FRIABLE TO MODERATELY HARD; MODERATE REACTION TO HCL; GRAIN SUPPORTED; LITHIC FRAGMENTS RANGE FROM FEW 10% TO MODERATE <30%; NO VISIBLE ACCESSORY MINERALS PRESENT IN THE SAMPLE; INTERBEDDED WITH SILTSTONE, SHALE AND CARBONACEOUS SHALE.

SHALE = LIGHT GRAY TO GRAY TO MEDIUM GRAY IN COLOR; BRITTLE TO CRUNCHY TO SLIGHTLY PULVERULENT IN TENACITY; PLANAR TO SPLINTERY FRACTURE; PLATY TO FLAKY TO WEDGELIKE TO BLADED CUTTINGS HABIT; DULL TO EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; LAMINAE BEDDING SURFACES VISIBLE IN SOME SAMPLES; PYRITE VISIBLE IN THE SAMPLE AS AN ACCESSORY MINERAL; EVIDENCE OF FRACTURE FILL VISIBLE IN THE SAMPLE.

CARBONACEOUS SHALE = BLACK TO VERY DARK GRAY IN COLOR; DENSE TO BRITTLE TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY TO WEDGELIKE TO BLADED CUTTINGS HABIT; EARTHY TO DULL TO GREASY TO WAXY LUSTER; SMOOTH TO CLAYEY TO SLIGHTLY SILTY TEXTURE; VERY THIN TO LAMINAE BEDDING STRUCTURES VISIBLE ON THE SAMPLES; INTERBEDDED WITH SANDSTONE, SHALE AND SILTSTONE.

SANDSTONE = WHITE TO LIGHT GRAY TO MEDIUM GRAY IN COLOR; QUARTZ FRAMEWORK; UPPER FINE TO LOWER MEDIUM GRAIN SIZE; MANY LOOSE GRAIN IN SAMPLE; WELL TO SLIGHTLY POOR SORTING; ANGULAR TO ROUNDED GRAINS; HIGH TO MODERATE SPHERICITY; EASILY FRIABLE TO MODERATELY HARD; MODERATE REACTION TO HCL; GRAIN

