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## MUDLOG MD

<b>COMPANY</b>	ExxonMobil Production
<b>WELL</b>	PCU 297-11C7
<b>FIELD</b>	Piceance Creek
<b>REGION</b>	Rocky Mountain
<b>COORDINATES</b>	39.896041 N 108.254563 W
<b>ELEVATION</b>	GL: 6966.2' RKB: 6996.4'
<b>COUNTY, STATE</b>	Rio Blanco, CO
<b>API INDEX</b>	051031146900
<b>SPUD DATE</b>	02/19/2010
<b>CONTRACTOR</b>	HP Drilling
<b>CO. REP.</b>	M. Sadler / J. Wood
<b>RIG/TYPE</b>	#326/ Flex-Rig 4
<b>LOGGING UNIT</b>	MLU # 036
<b>GEOLOGISTS</b>	J. Kokes/ D. Thibodeaux C. Record
<b>ADD. PERSONS</b>	H. Strickland/ J. Yeagar P. Strickland/ D. Lockhart
<b>CO. GEOLOGIST</b>	C. Alba

### LOG INTERVAL

<b>DEPTHS:</b>	3882'	<b>TO</b>	12785'
<b>DATES:</b>	03/25/2010	<b>TO</b>	07/01/2010
<b>SCALE:</b>	1" = 100'		

### CASING DATA

16"	<b>AT</b>	150'
10 3/4"	<b>AT</b>	3866'
7"	<b>AT</b>	8707'

**AT**

### HOLE SIZE

14 3/4"	<b>TO</b>	3882'
9 7/8"	<b>TO</b>	8722'
6 1/8"	<b>TO</b>	12785'
	<b>TO</b>	

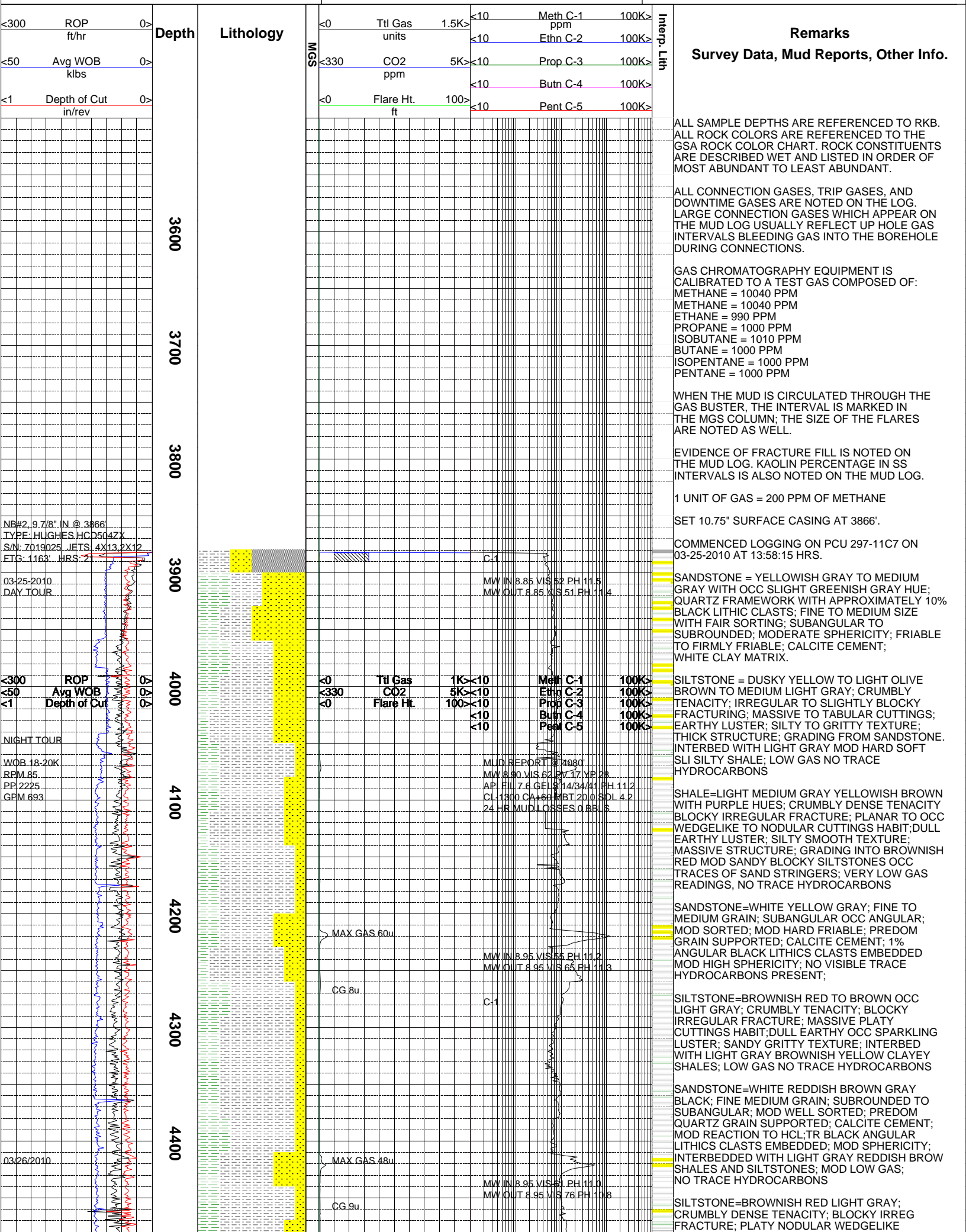
### MUD TYPES

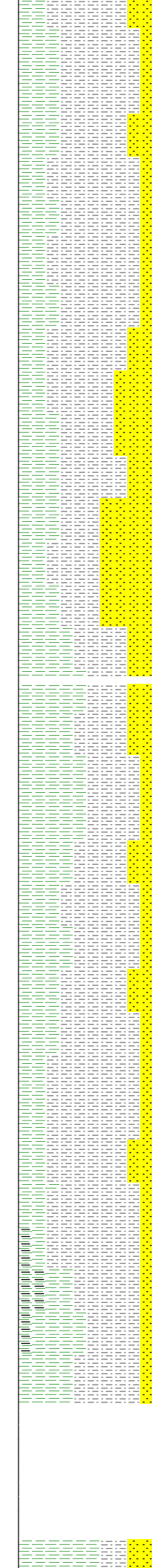
Water Based Spud Mud	<b>TO</b>	3882'
LSND	<b>TO</b>	12785'
	<b>TO</b>	
	<b>TO</b>	

### ABBREVIATIONS

<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</i> MUD RESISTIVITY	<i>SG</i> SURVEY GAS
<i>PP</i> PUMP PRESSURE	<i>Rmf</i> FILTRATE RESISTIVITY	<i>WG</i> WIPER GAS
<i>SPM</i> STROKES/MIN	<i>PR</i> POOR RETURNS	<i>CG</i> CONNECTION GAS
<i>MW</i> MUD WEIGHT	<i>LAT</i> LOGGED AFTER TRIP	
<i>VIS</i> FUNNEL VISCOSITY	<i>LAS</i> LOGGED AFTER SURVEY	







	Ttl Gas	CO2	Flare Ht.	Meth C-1	Ethn C-2	Prop C-3	Butn C-4	Pent C-5
<0	<330	<0	1K	<10	100K	100K	100K	100K
<0	<330	<0	5K	<10	100K	100K	100K	100K
<0	<330	<0	100	<10	100K	100K	100K	100K
<0	<330	<0	<10	<10	100K	100K	100K	100K
<0	<330	<0	<10	<10	100K	100K	100K	100K

C-1  
 MW IN 8.95 VIS 53 PH 11.0  
 MW OUT 8.95 VIS 78 PH 10.8  
 POSSUM BELL Y FULL NO GAS  
 MAX GAS 12u  
 CG 8u  
 MAX GAS 38u  
 TG 59u  
 CG 6u  
 CG 203u  
 POSSUM BELL Y FULL NO GAS READINGS  
 LOST RETURNS FROM 5464 TO 5511  
 RETURNS BACK AT 5561  
 MAX GAS 1202u

MW IN 9.1 VIS 65 PH 10.7  
 MW OUT 9.1 VIS 74 PH 10.7  
 C-1  
 MUD REPORT 5029  
 MW 9.1 VIS 62 PH 17 YP 25  
 API FIL 8.0 GELS 12/44/55 PH 10.8  
 CI-1300CA-55 MBT 22.5 SOL 5.6  
 24 HR MUD LOSSES 56.8 BBLs  
 MW IN 9.3 VIS 44 PH 10.4  
 MW OUT 9.3 VIS 56 PH 10.2  
 MW IN 9.0 VIS 40 PH 9.7  
 MW OUT 9.3 VIS 73 PH 9.9

CUTTINGS HABIT; DULL EARTHLY LUSTER; SLI SMOOTH GRITTY TEXTURE OCC SANDY; WITH REDDISH BROWN YELLOW BROWN LIGHT GRAY SHALES INTERBEDDED, LOW GAS READINGS

SHALE=LIGHT MEDIUM GRAY; MOD HARD FIRM PLATY IRREGULAR FRACTURE; MASSIVE WEDGELIKE CUTTINGS HABIT; SMOOTH CLAYEY SILTY TEXTURE; DULL EARTHLY OCC WAXY LUSTER; GRADING TO BROWNISH BLOCKY SILTSTONE WITH OCC SANDSTONES INTERBEDDED VERY LOW GAS; NO TRACE HYDROCARBONS

SILTSTONE=BROWNISH RED;MOD HARD FIRM; CRUMBLY DENSE TENACITY; IRREGULAR BLOCKY PLANAR CUTTINGS HABIT; DULL EARTHLY OCC SPARKLING LUSTER; SMOOTH GRITTY TEXTURE; NON CALCAREOUS; MASSIVE STRUCTURE; WITH LIGHT GRAY OCC BROWN SHALES INTERBEDDED AND OCC WHITE FINE GRAIN HARD FRIABLE SANDSTONES; LOW GAS; NO TRACE HYDROCARBONS

SANDSTONE = MODERATE YELLOWISH BROWN TO MEDIUM LIGHT GRAY; QUARTZ FRAMEWORK WITH 15% LITHICS; FINE TO VERY FINE GRAINED; GRADES INTO SILTSTONE; SUBROUNDED; MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT; SLIGHT LIGHT BROWN TO WHITE CLAY MATRIX.

SHALE = MEDIUM LIGHT GRAY TO OCC GRAYISH PURPLE AND PALE GREEN; BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURING; TABULAR CUTTINGS; WAXY TO EARTHLY LUSTER; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE; INTERBEDDED WITH SILTSTONE AND SANDSTONE GRADES FROM SILTSTONE.

SILTSTONE = LIGHT OLIVE BROWN TO DARK YELLOWISH ORANGE; BRITTLE TO CRUMBLY TENACITY; IRREGULAR FRACTURING; MASSIVE TO TABULAR CUTTINGS; EARTHLY TO WAXY LUSTER; GRITTY TO SILTY TO OCC CLAYEY TEXTURE; THICK STRUCTURE; INTERBEDDED WITH SANDSTONE AND SHALE.

SHALE = MEDIUM LIGHT GRAY TO MODERATE GREENISH YELLOW AND OCC GRAYISH PURPLE HUE; BRITTLE TENACITY; IRREGULAR TO PLANAR TO OCC SPLINTERY FRACTURING; TABULAR TO PLATY CUTTINGS; DULL TO WAXY; SILTY TO SMOOTH TEXTURE.

DRILLED TO 5039' POOH PICKED UP PACKED HOLE DRILLING ASSEMBLY AND NEW BIT LAID OUT DIRECTIONAL TOOLS

SHALE=LIGHT MEDIUM GRAY YELLOW BROWN; MOD HARD FIRM; CRUMBLY DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; PLATY OCC TABULAR MASSIVE CUTTINGS HABIT; SMOOTH SILTY CLAYEY TEXTURE; MASSIVE STRUCTURE INTERBEDDED WITH REDDISH BROWN SILTSTONE LOW GAS READINGS

SILTSTONE=REDDISH BROWN; MOD FIRM; BLOCK IRREGULAR FRACTURE;MASSIVE WEDGELIKE CUTTINGS HABIT; DULL EARTHLY LUSTER; SMOOTH GRITTY TEXTURE; INTERBEDDED WITH MULTICOLOR SHALES TR WHITE SANDSTONES VERY LOW GAS READINGS; NO TRACE VISIBLE HYDROCARBONS

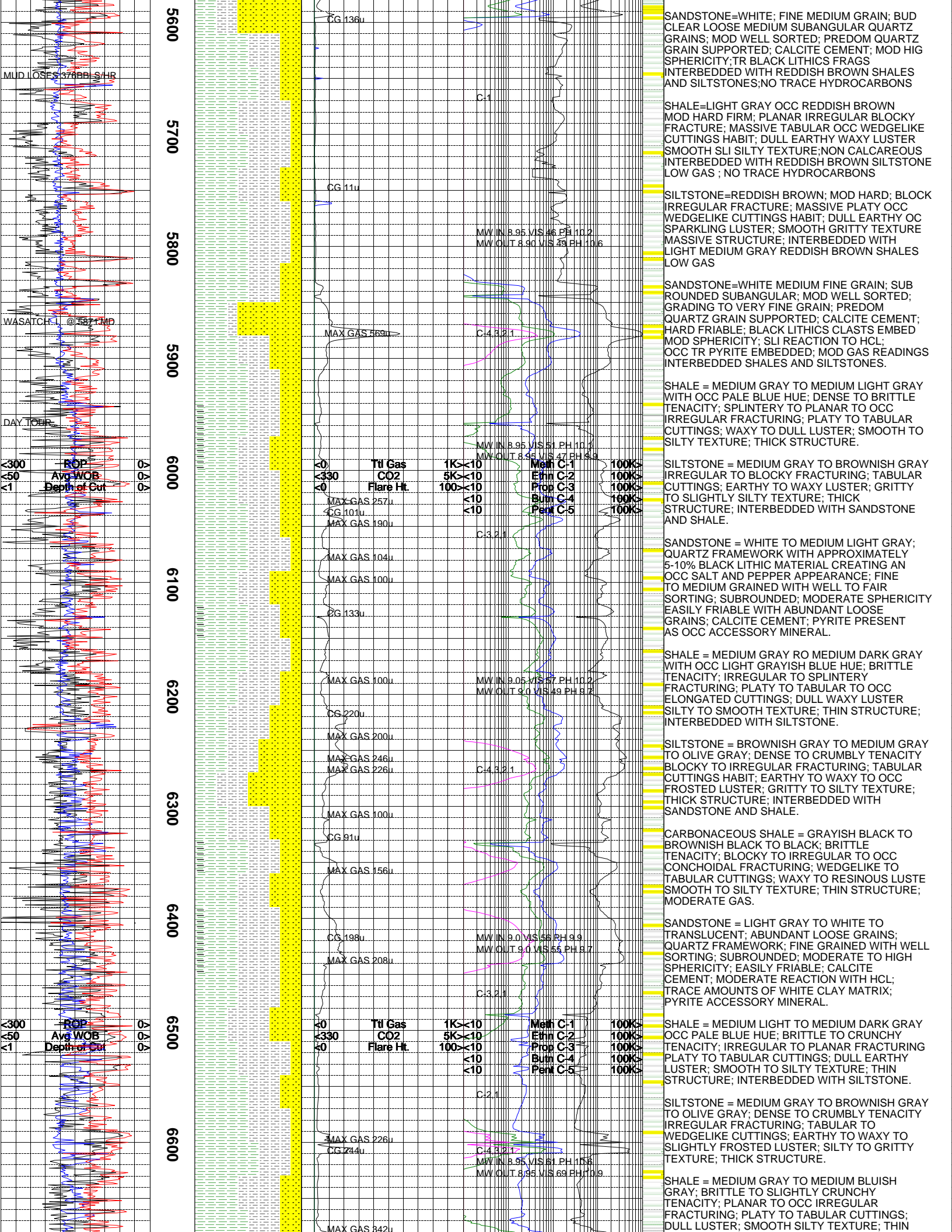
SHALE=REDDISH BROWN OCC LIGHT MEDIUM GRAY; MOD HARD FIRM; CRUMBLY DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY OCC WEDGELIKE CUTTINGS HABIT; DULL EARTHLY OCC WAXY LUSTER; SMOOTH SLI SILTY TO CLAYEY TEXTURE; OCC SANDY TO GRITTY; NON CALCAREOUS; MASSIVE STRUCTURE; GRADES INTO SANDY BROWNISH RED SILTSTONE; INTERBEDDED SANDS ; LOW GAS READINGS; NO TRACE HYDROCARBONS PRESENT

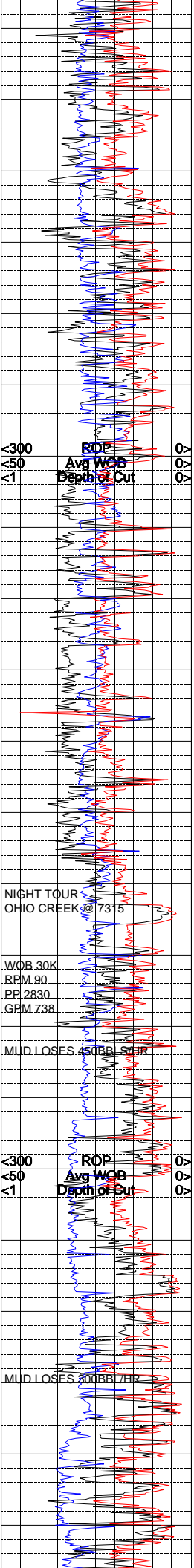
CARBONACEOUS SHALE=BROWNISH BLACK; BRITTLE DENSE TENACITY; PLANAR FRACTURE SCALY MASSIVE PLATY CUTTINGS HABIT; DULL EARTHLY OCC VITREOUS LUSTER; SMOOTH TEXTURE; INTERBEDDED WITH GRAY BROWNISH RED SHALES AND SILTSTONES TRACES PYRITE AND CHALCOPYRITE EMBEDDED IN SHALES

NOTE; DRILLED TO 5513 TOP WASATCH G AT 5513'/MD/5399TVD LOST FULL RETURNS PUMPED 2 30BBLs LCM PILLS NO RETURNS FROM 5464 TO 5560 CONTINUE TO STACK 30BBLs LCM PILLS DOWN HOLE REDUCED PUMPS GAINED BACK PARTIAL RETURNS AT SAMPLE 5560 WAS OUT OF HOLE NO SAMPLES OR GAS READINGS FROM 5464 TO 5560'

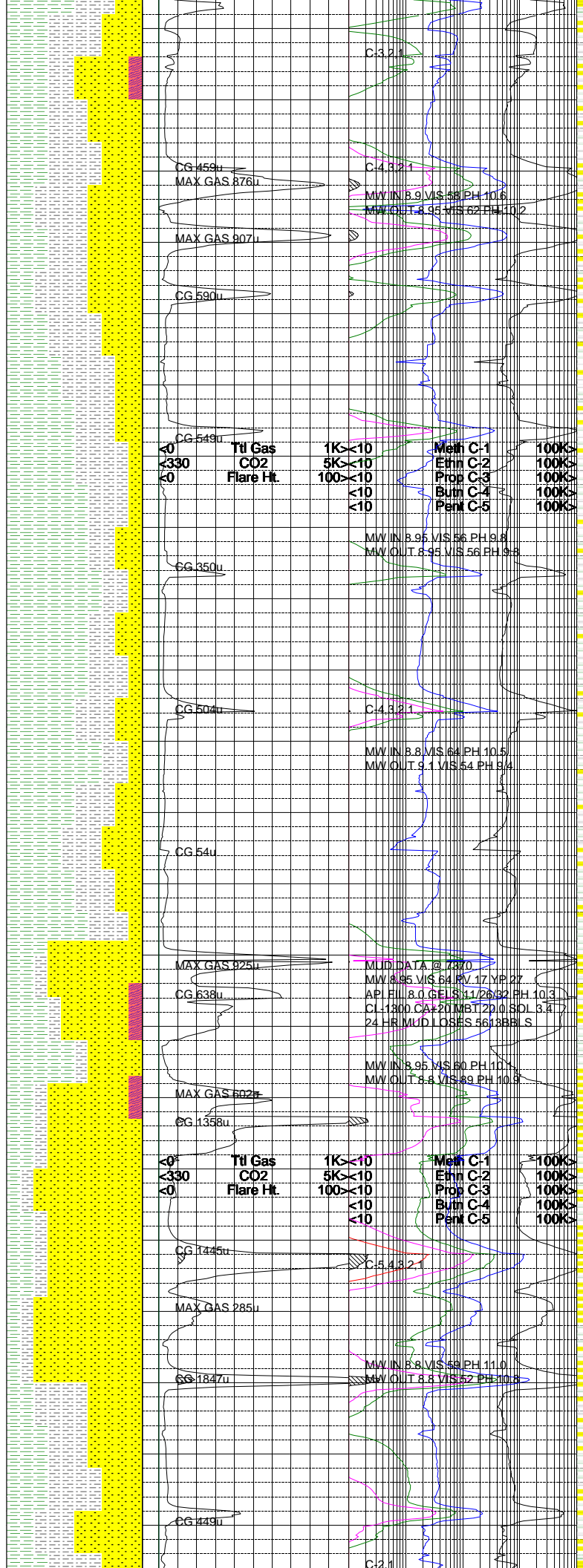
SHALE=LIGHT MEDIUM GRAY; MOD HARD FIRM CRUMBLY DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY OCC SLI WEDGELIKE CUTTINGS HABIT; DULL EARTHLY OC WAXY LUSTER; SMOOTH SLI SILTY TEXTURE







6700  
6800  
6900  
7000  
7100  
7200  
7300  
7400  
7500  
7600  
7700



TO SLIGHTLY THICK STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY; QUARTZ FRAMEWORK WITH 5% BLACK LITHIC CLASTS; FINE TO MEDIUM SIZED WITH FAIR SORTING; SUBANGULAR TO SUBROUNDED WITH MODERATE SPHERICITY; FRIABLE TO FIRMLY FRIABLE; CALCITE CEMENT; STRONG REACTION WITH HCL LOW GAS ASSOCIATED.

SILTSTONE = BROWNISH GRAY TO MEDIUM DARK GRAY; BRITTLE TO CRUMBLY TENACITY; IRREGULAR FRACTURING; TABULAR CUTTINGS; FROSTED TO WAXY TO EARTHY LUSTER; GRITTY TO SILTY TEXTURE; THICK STRUCTURE; INTERBEDDED WITH SANDSTONE AND SHALE; GRADES FROM SANDSTONE.

SHALE = MEDIUM GRAY TO MEDIUM BLuish GRAY WITH A SLIGHT LIGHT OLIVE GRAY HUE; BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURING; TABULAR TO PLATY TO OCC SCALY; WAXY DULL SLIGHT EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE INTERBEDDED WITH SILTSTONE AND SANDSTONE

SILTSTONE = BROWNISH GRAY TO GRAYISH RED WITH OCC MEDIUM GRAY; IRREGULAR TO BLOCKY FRACTURING; TABULAR CUTTINGS; DENSE TO CRUMBLY TENACITY; EARTHY LUSTER GRITTY TO CLAYEY TEXTURE; THICK STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY TO TRANSLUCENT; ABUNDANT LOOSE QUARTZ GRAINS; QUARTZ FRAMEWORK WITH 5% BLACK LITHIC CLASTS; FINE TO MEDIUM GRAINED; FAIR TO WELL SORTING; SUBROUNDED TO SUBANGULAR; FIRMLY FRIABLE; CALCITE CEMENT WITH GRAIN SUPPORT.

SHALE = LIGHT TO MEDIUM GRAY; BRITTLE TO SLIGHTLY CRUNCHY TENACITY; IRREGULAR TO PLANAR TO SPLINTERY FRACTURING; PLATY TABULAR CUTTINGS; DULL TO WAXY LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN TO THICK STRUCTURE.

SILTSTONE = BROWNISH RED TO BROWNISH GRA CRUMBLY TO SLIGHTLY PULVERULENT TENACITY IRREGULAR TO BLOCKY FRACTURING; TABULAR TO WEDGELIKE CUTTINGS; EARTHY LUSTER; SILTY TO GRITTY TO OCC CLAYEY TEXTURE; THIN STRUCTURE.

SHALE = MEDIUM BLuish GRAY TO MEDIUM GRAY; BRITTLE TO CRUNCHY TENACITY; PLANAR TO SPLINTERY FRACTURING; PLATY CUTTINGS; WAXY TO DULL LUSTER; SMOOTH TO CLAYEY TEXTURE; THICK STRUCTURE; INTERBEDDED WITH SILTSTONE.

SANDSTONE=WHITE; FINE GRAIN; MOD WELL SORTED;SUBROUNDED SUBANGULAR;PREDOM QUARTZ GRAIN SUPPORTED; CALCITE CEMENT WITH TRACES LOOSE MEDIUM GRAIN QUARTZ; MOD SPHERICITY; TR BLACK LITHICS CLASTS LOWER PORTION LARGE AMOUNTS LOOSE MEDIUM CLEAR QUARTZ GRAINS; HIGH GAS OCC TRACE OF VISIBLE CLEAR CALCITE FIL FRACTURE IN SAMPLE WHERE HIGH GAS WAS OBSERVED IN SANDSTONE

SANDSTONE=WHITE, FINE MEDIUM GRAINS; SUBROUNDED SUBANGULAR; MOD HARD EASILY FRIABLE; ABUD CLEAR MEDIUM LOOSE QUARTZ GRAINS IN SAMPLE; MOD WELL SORTED; CALCITE OCC CLAY MATRIX,TR KAOLINITE; SLOW REACTION TO HCL; INTERBED SHALES AND SILTSTONES HIGH GAS WHEN CALCITE FIL FRACTURE IS OBSERVED; OCC TRACE 1-3% BLACK LITHICS CLASTS

SHALE=LIGHT MEDIUM GRAY; MOD HARD FIRM IRREGULAR BLOCKY TO PLANAR FRACTURE; MASSIVE PLATY OCC TABULAR WEDGELIKE CUTTINGS HABIT:DULL EARTHY WAXY LUSTER; SMOOTH SILTY TEXTURE; ABUT CLEAR MEDIUM QUARTZ GRAINS IN SAMPLE WITH WHITE FINE MEDIUM GRAIN SANDS WITH TR GLAUC AND ABUD BLACK CARBONACEOUS FRAGS EMBEDDED IN SANDS; LOW GAS IN SHALES HIGH CONN GASES ASSOCIATED WITH SANDS

SILTSTONE=LIGHT GRAY OCC MEDIUM GRAY; VERY HARD FIRM; TOUGH DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH GRITTY SANDY TEXTURE; GRADING FINE GRAIN SANDSTONES; LOW GAS; NO TRACE HYDROCARBONS

SHALE=GREENISH GRAY LIGHT MEDIUM GRAY FIRM; PLATY IRREGULAR FRACTURE; TABULAR PLANAR OCC WEDGELIKE CUTTINGS HABIT; WAX LUSTER; SMOOTH SLI SILTY TEXTURE THIN STRUCTURE; INTERBEDDED WITH GREENIS GRAY MOD HARD VERY SANDY SILTSTONES; OCC SANDSTONES; VERY LOW GAS; NO TRACE HYDROCARBONS PRESENT



MUD LOSSES 6 BBL/S/HR

880

MAX GAS 5521

MW OUT 9.45 VIS 40 pH 10.1

SILTSTONE= WHITE,LIGHT GRAY;BRITTLE TO

