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

MUDLOG TVD

COMPANY EXXON MOBIL
WELL PCU 197-34B8
FIELD PICEANCE CREEK
REGION ROCKY MOUNTAINS
COORDINATES 39.915659000
108.261198000
ELEVATION 6,649.1'
COUNTY, STATE RIO BLANCO, CO
API INDEX 05-103-11082-00
SPUD DATE 12/13/2008
CONTRACTOR H_P
CO. REP. S.GUYOTE/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

CASING DATA

DEPTHS: 4,000' TO 12,645'
DATES: 9/30/2009 TO 12/28/2009
SCALE: 1"=100'

15" AT 150'
10.75" AT 3,976'
7" AT 8,794'

AT

MUD TYPES

HOLE SIZE

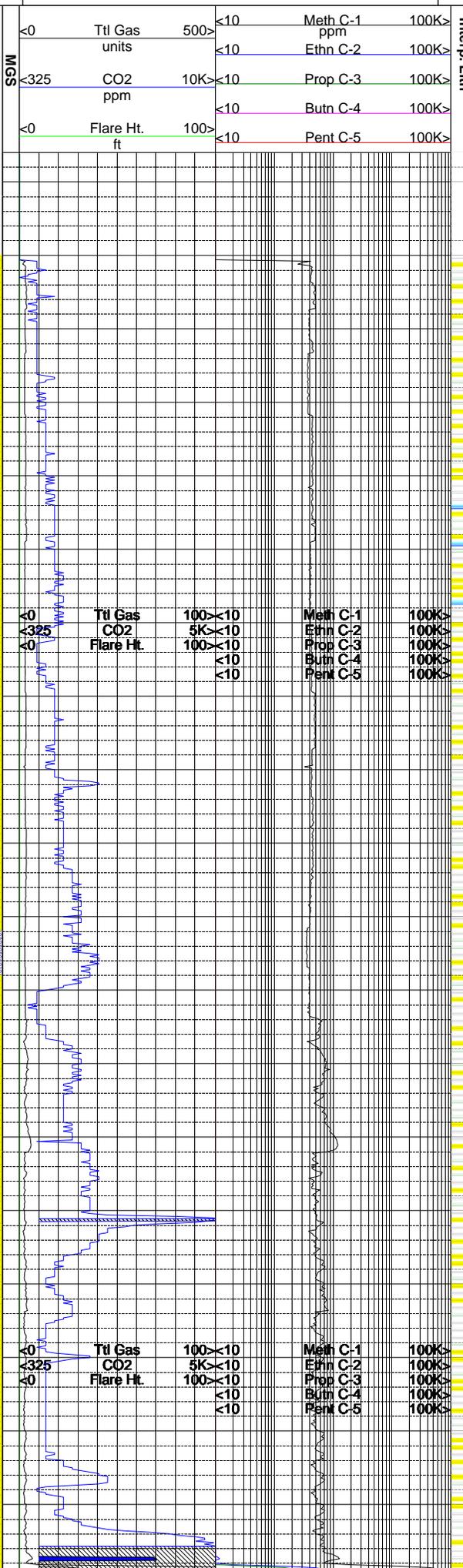
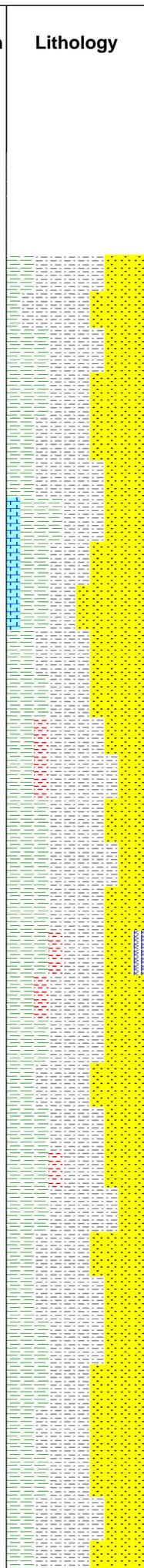
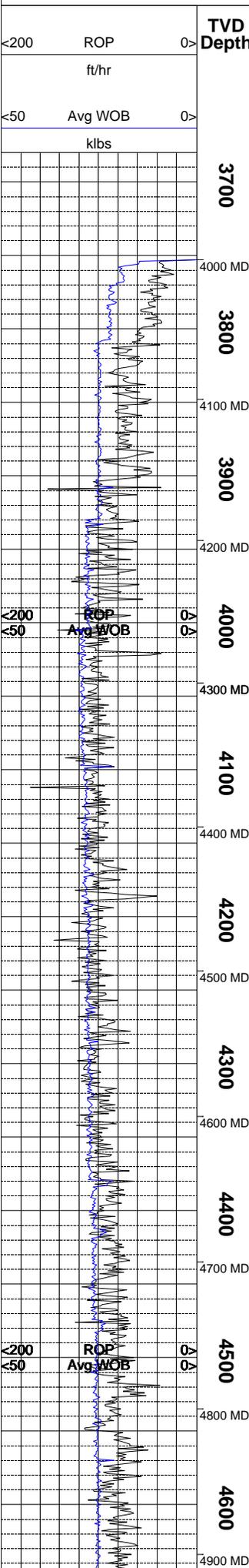
LSND TO 12,645'
TO
TO
TO

14.75" TO 4,000'
9.875" TO 8,806'
6.125" TO 12,645'
TO

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	

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	



Remarks
Survey Data, Mud Reports, Other Info.

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.

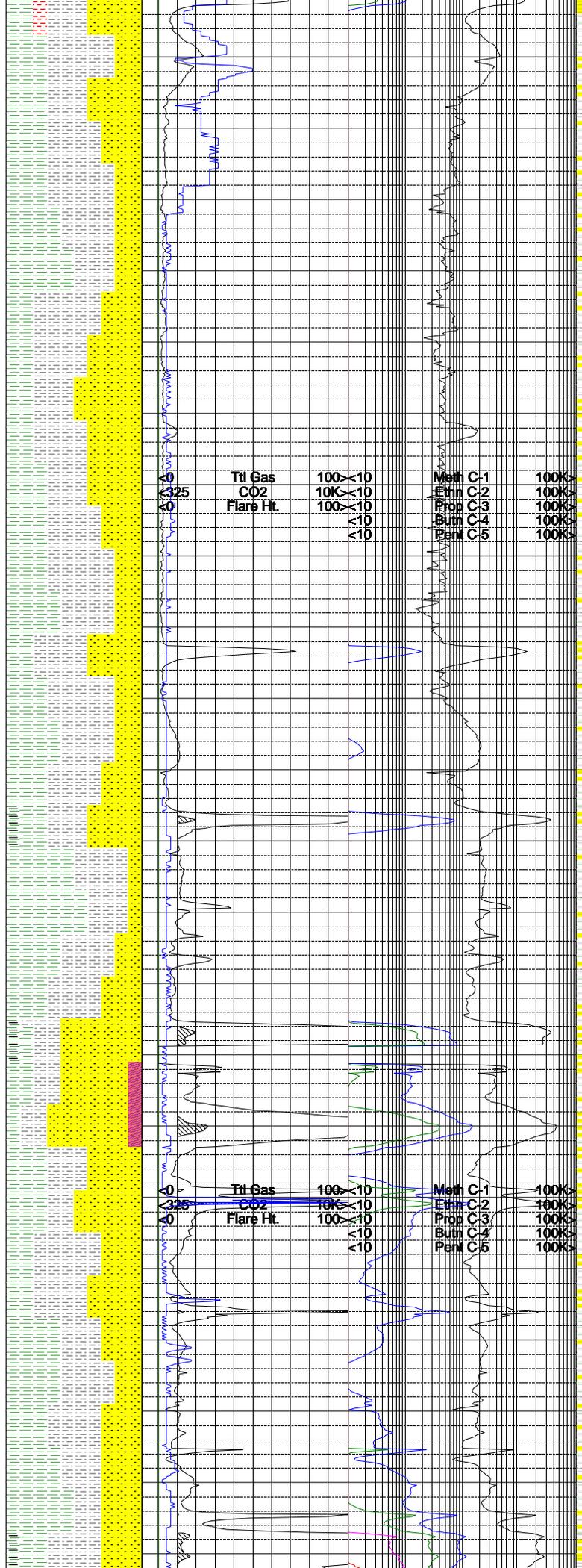
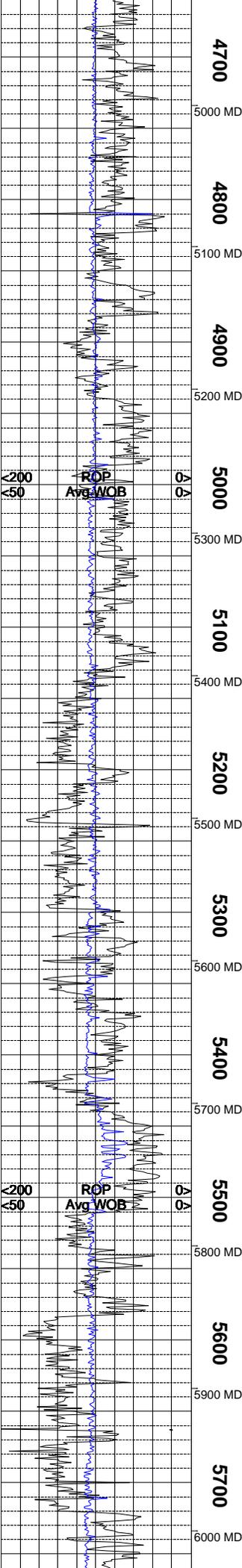
SANDSTONE = LIGHT GREENISH GRAY TO LIGHT OLIVE GRAY TO LIGHT GRAY; FRAMEWORK CONSISTS OF MOSTLY QUARTZ; MEDIUM TO FINE SIZED GRAINS WITH POOR SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE SPHERICITY; FIRMLY FRIABLE WITH CALCITE CEMENT; MODERATE REACTION WITH HCL.

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 VISIBLE 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 GRITTY

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

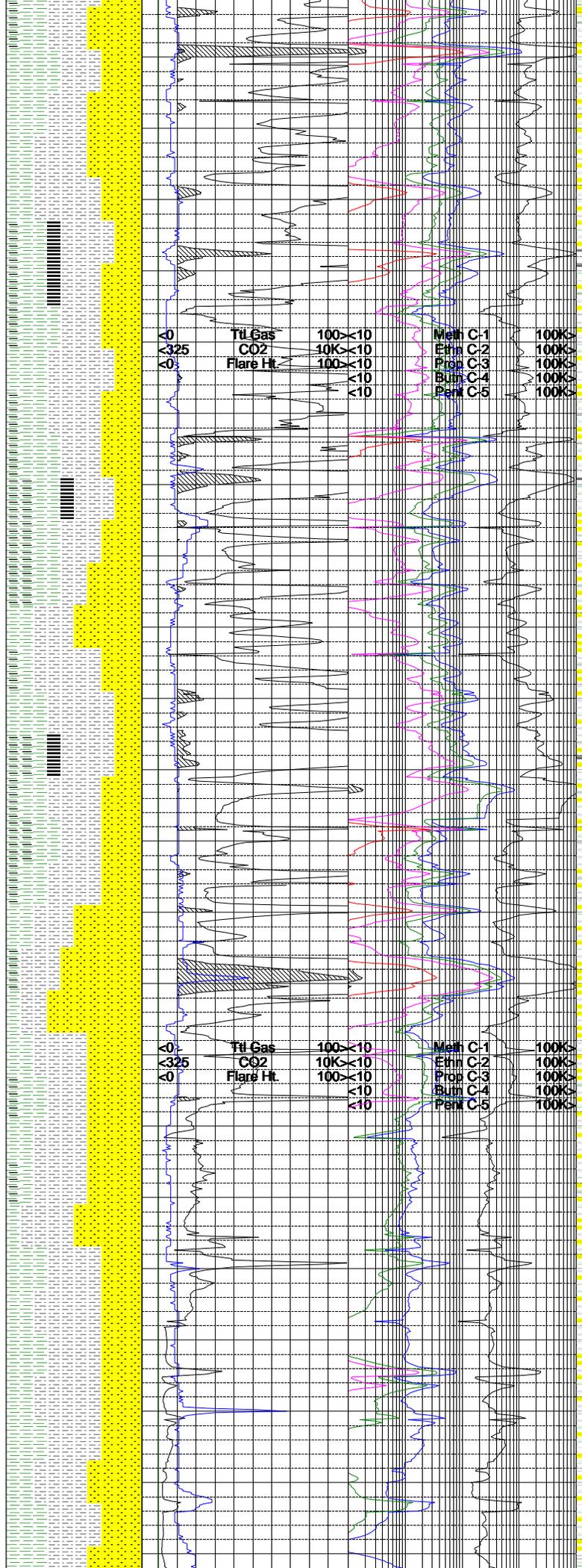
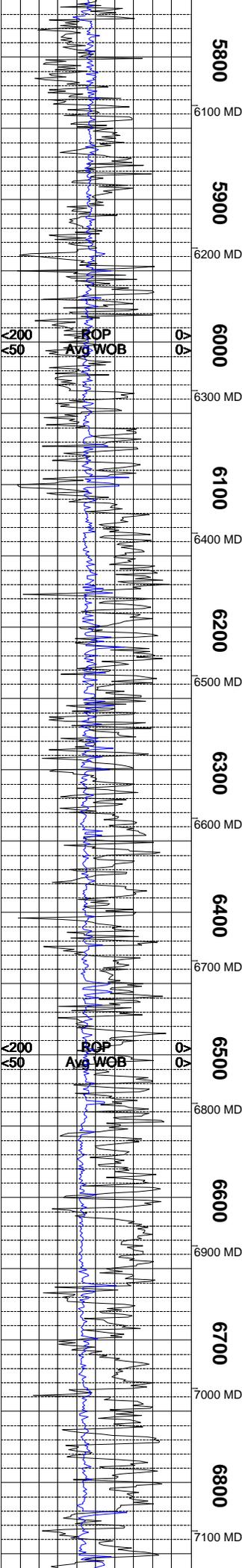
SANDSTONE = TRANSLUCENT TO WHITE TO VERY LIGHT GRAY; QUARTZ FRAMEWORK; COARSE TO FINE GRAINED WITH POOR SORTING; SUBANGULAR WITH POOR SPHERICITY; FRIABLE TO FIRMLY FRIABLE WITH MANY LOOSE GRAINS MILD REACTION TO HCL SUGGESTS CALCITE/ SILICA CEMENT; PYRITE PRESENT AS AN ACCESSORY MINERAL.

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 OCCASIONALLY 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.

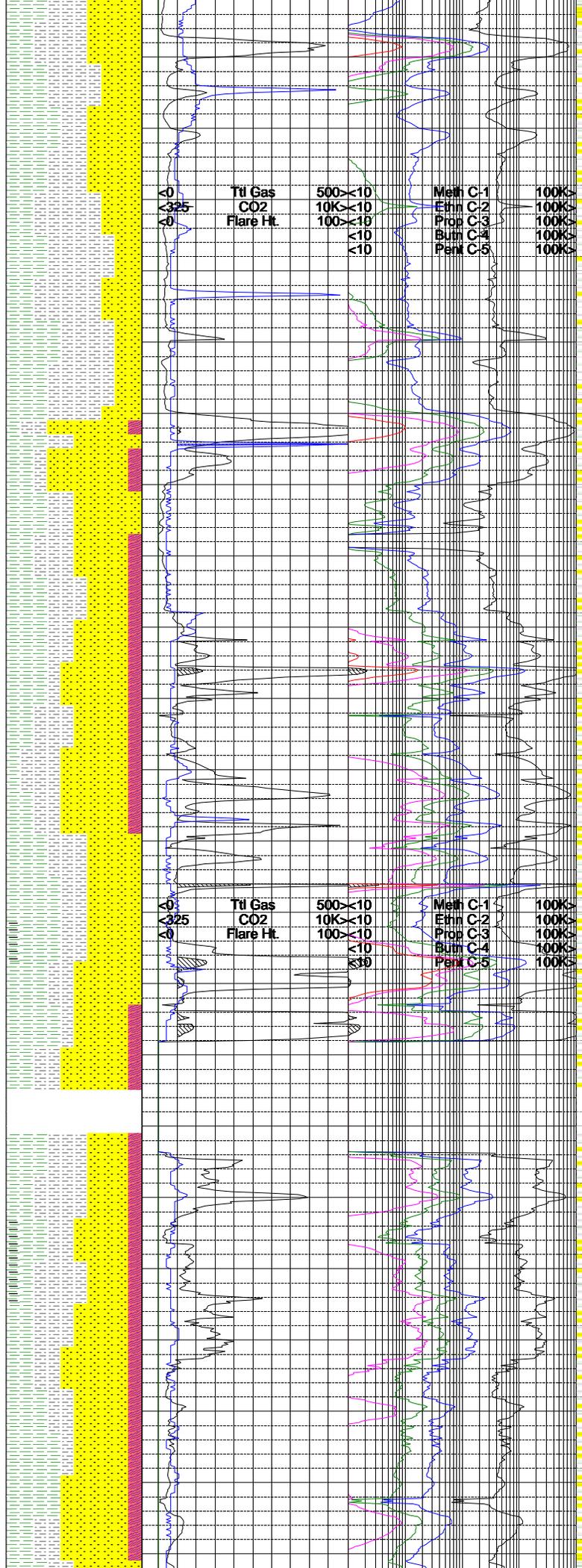
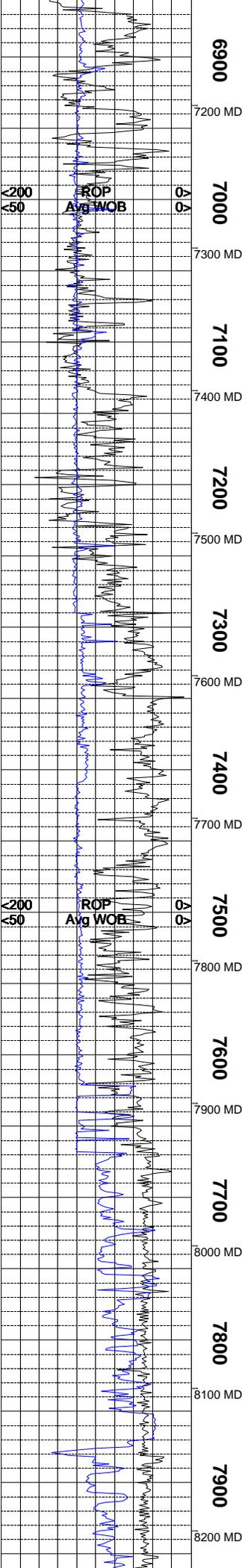
SILTSTONE = LIGHT OLIVE GRAY TO VERY LIGHT GRAY IN COLOR; DENSE TO BRITTLE IN TENACITY; CONCHOIDAL TO PLANAR FRACTURE; NODULAR TO WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE APPARENT.

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 SPHERICITY; 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 IRREGULAR; SCALY TO TABULAR CUTTINGS; DULL LUSTER; SMOOTH TEXTURE; THIN STRUCTURE.

NOTE = LOST COMPLETE RETURNS @ 7856'.

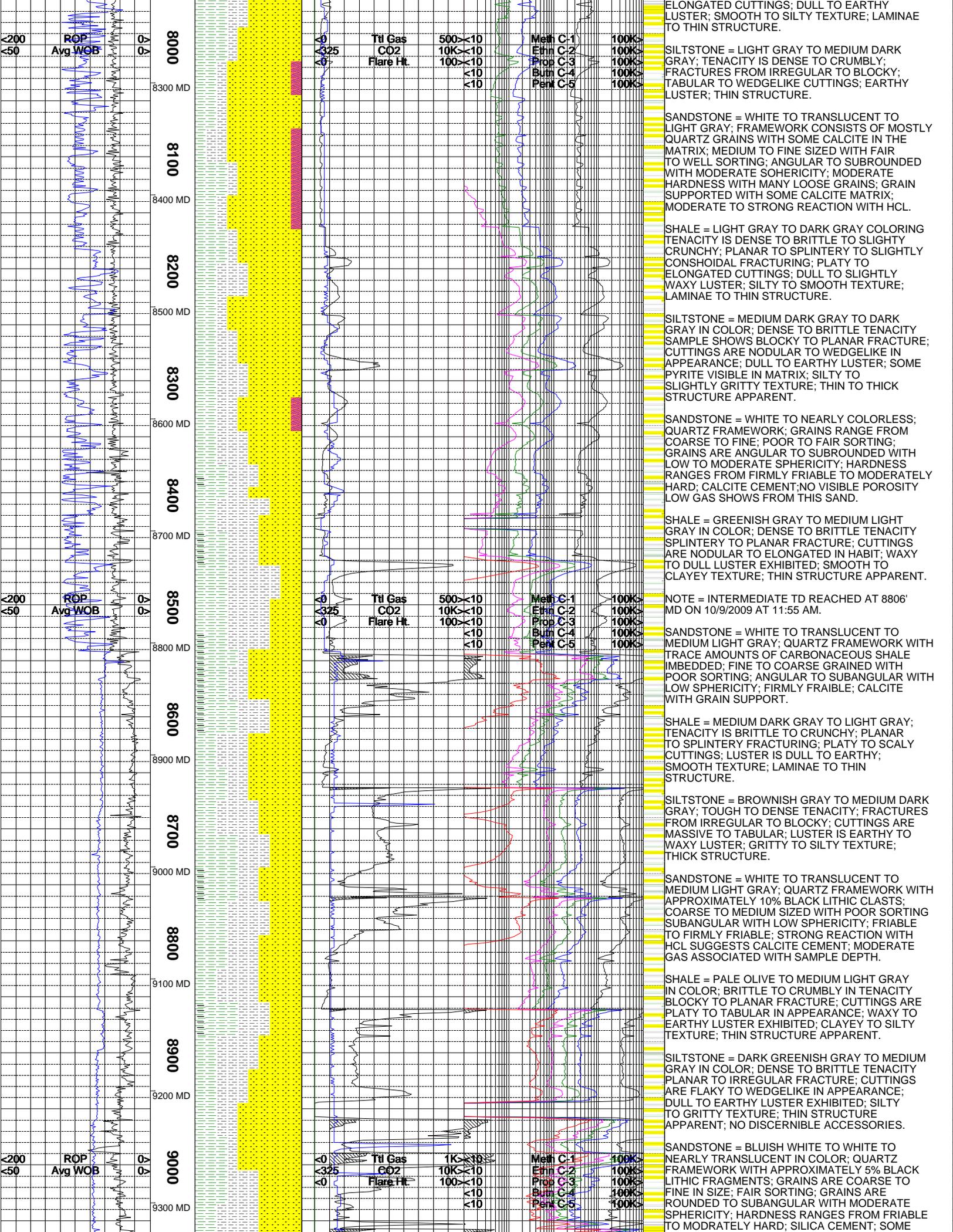
SILTSTONE = LIGHT GRAY TO MEDIUM GRAY IN COLOR; TOUGH TO DENSE IN TENACITY; PLANAR TO IRREGULAR FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO CLAYEY TEXTURE; THIN STRUCTURE.

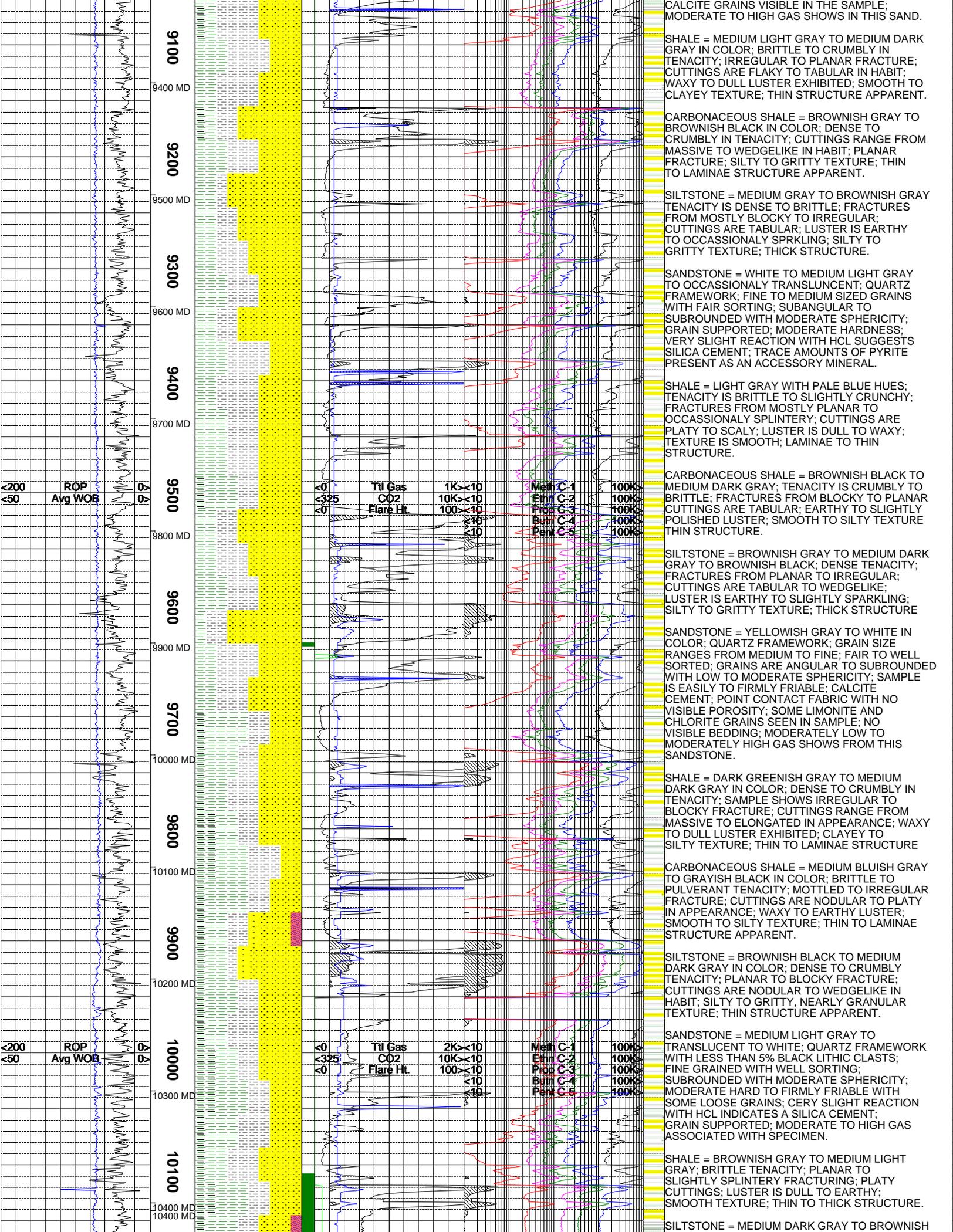
SANDSTONE = WHITE TO NEARLY COLORLESS IN COLOR; QUARTZ FRAMEWORK WITH CALCITE AND BLACK LITHIC FRAGMENTS PRESENT; COARSE TO VERY FINE GRAIN SIZE; POOR SORTING; GRAINS ARE ANGULAR TO SUBROUNDED WITH LOW TO MODERATE SPHERICITY; SILICA CEMENT; HARDNESS RENGES FROM FRIABLE TO MODERATELY HARD; NO VISIBLE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

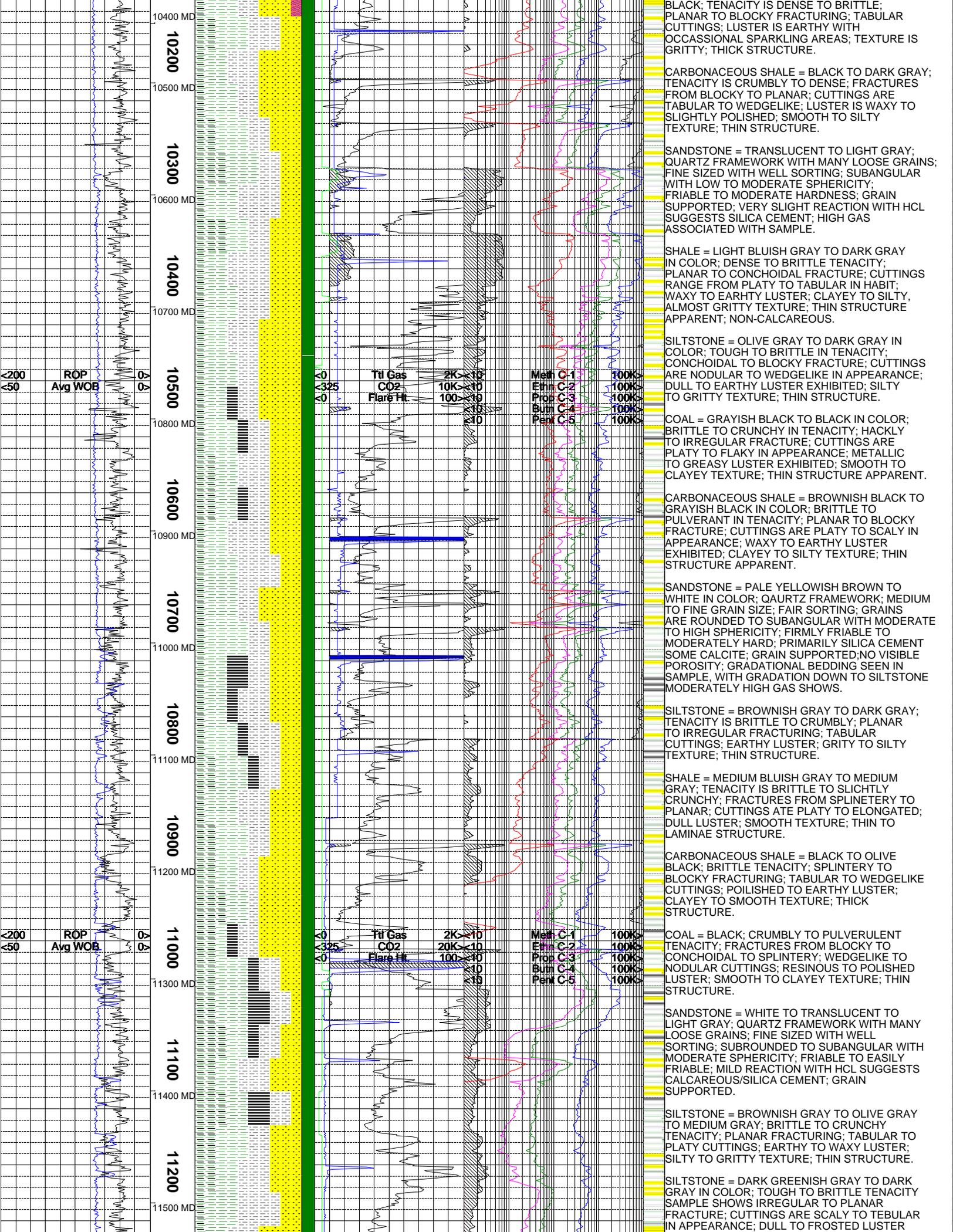
SHALE = GREENISH GRAY TO MEDIUM DARK GRAY IN COLOR; DENSE TO BRITTLE IN TENACITY; IRREGULAR TO CONCHOIDAL FRACTURE; CUTTINGS ARE WEDGELIKE TO TABULAR IN HABIT; WAXY TO DULL LUSTER EXHIBITED; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT; NONCALCAREOUS.

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







10400 MD
10200
10500 MD
10300
10600 MD
10400
10700 MD
10500
10800 MD
10600
10900 MD
10700
11000 MD
10800
11100 MD
10900
11200 MD
11000
11300 MD
11100
11400 MD
11200
11500 MD

200
500
ROP
Avg WOB

325
Ttl Gas
CO2
Flare Ht

2K
10K
100K
Meth C-1
Ethn C-2
Prop C-3
Burn C-4
Pen C-5

100K
100K
100K
100K
100K

BLACK; TENACITY IS DENSE TO BRITTLE; PLANAR TO BLOCKY FRACTURING; TABULAR CUTTINGS; LUSTER IS EARTHY WITH OCCASSIONAL SPARKLING AREAS; TEXTURE IS GRITTY; THICK STRUCTURE.

CARBONACEOUS SHALE = BLACK TO DARK GRAY; TENACITY IS CRUMBLY TO DENSE; FRACTURES FROM BLOCKY TO PLANAR; CUTTINGS ARE TABULAR TO WEDGELIKE; LUSTER IS WAXY TO SLIGHTLY POLISHED; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE.

SANDSTONE = TRANSLUCENT TO LIGHT GRAY; QUARTZ FRAMEWORK WITH MANY LOOSE GRAINS; FINE SIZED WITH WELL SORTING; SUBANGULAR WITH LOW TO MODERATE SPHERICITY; FRIABLE TO MODERATE HARDNESS; GRAIN SUPPORTED; VERY SLIGHT REACTION WITH HCL SUGGESTS SILICA CEMENT; HIGH GAS ASSOCIATED WITH SAMPLE.

SHALE = LIGHT BLUISH GRAY TO DARK GRAY IN COLOR; DENSE TO BRITTLE TENACITY; PLANAR TO CONCHOIDAL FRACTURE; CUTTINGS RANGE FROM PLATY TO TABULAR IN HABIT; WAXY TO EARTHY LUSTER; CLAYEY TO SILTY, ALMOST GRITTY TEXTURE; THIN STRUCTURE APPARENT; NON-CALCAREOUS.

SILTSTONE = OLIVE GRAY TO DARK GRAY IN COLOR; TOUGH TO BRITTLE IN TENACITY; CONCHOIDAL TO BLOCKY FRACTURE; CUTTINGS ARE NODULAR TO WEDGELIKE IN APPEARANCE; DULL TO EARTHY LUSTER EXHIBITED; SILTY TO GRITTY TEXTURE; THIN STRUCTURE.

COAL = GRAYISH BLACK TO BLACK IN COLOR; BRITTLE TO CRUNCHY IN TENACITY; HACKLY TO IRREGULAR FRACTURE; CUTTINGS ARE PLATY TO FLAKY IN APPEARANCE; METALLIC TO GREASY LUSTER EXHIBITED; MODERATE TO CLAYEY TEXTURE; THIN STRUCTURE APPARENT.

CARBONACEOUS SHALE = BROWNISH BLACK TO GRAYISH BLACK IN COLOR; BRITTLE TO PULVERULENT IN TENACITY; PLANAR TO BLOCKY FRACTURE; CUTTINGS ARE PLATY TO SCALY IN APPEARANCE; WAXY TO EARTHY LUSTER EXHIBITED; CLAYEY TO SILTY TEXTURE; THIN STRUCTURE APPARENT.

SANDSTONE = PALE YELLOWISH BROWN TO WHITE IN COLOR; QUARTZ FRAMEWORK; MEDIUM TO FINE GRAIN SIZE; FAIR SORTING; GRAINS ARE ROUNDED TO SUBANGULAR WITH MODERATE TO HIGH SPHERICITY; FIRMLY FRIABLE TO MODERATELY HARD; PRIMARILY SILICA CEMENT SOME CALCITE; GRAIN SUPPORTED; NO VISIBLE POROSITY; GRADATIONAL BEDDING SEEN IN SAMPLE, WITH GRADATION DOWN TO SILTSTONE MODERATELY HIGH GAS SHOWS.

SILTSTONE = BROWNISH GRAY TO DARK GRAY; TENACITY IS BRITTLE TO CRUMBLY; PLANAR TO IRREGULAR FRACTURING; TABULAR CUTTINGS; EARTHY LUSTER; GRITTY TO SILTY TEXTURE; THIN STRUCTURE.

SHALE = MEDIUM BLUISH GRAY TO MEDIUM GRAY; TENACITY IS BRITTLE TO SLIGHTLY CRUNCHY; FRACTURES FROM SPINLETARY TO PLANAR; CUTTINGS ARE PLATY TO ELONGATED; DULL LUSTER; SMOOTH TEXTURE; THIN TO LAMINAE STRUCTURE.

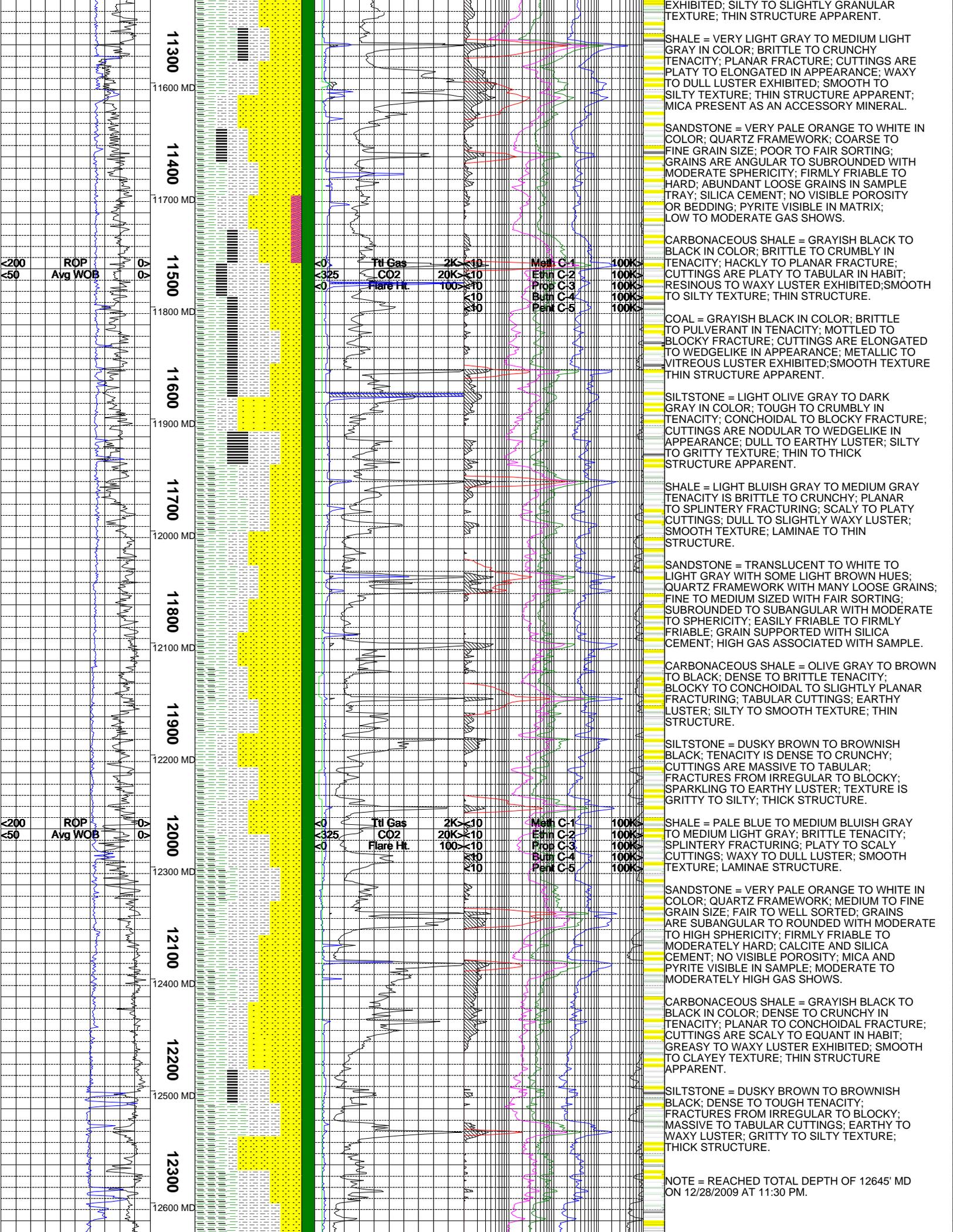
CARBONACEOUS SHALE = BLACK TO OLIVE BLACK; BRITTLE TENACITY; SPINLETARY TO BLOCKY FRACTURING; TABULAR TO WEDGELIKE CUTTINGS; POLISHED TO EARTHY LUSTER; CLAYEY TO SMOOTH TEXTURE; THICK STRUCTURE.

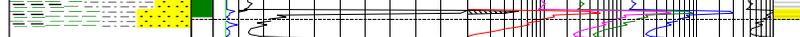
COAL = BLACK; CRUMBLY TO PULVERULENT TENACITY; FRACTURES FROM BLOCKY TO CONCHOIDAL TO SPINLETARY; WEDGELIKE TO NODULAR CUTTINGS; RESINOUS TO POLISHED LUSTER; SMOOTH TO CLAYEY TEXTURE; THIN STRUCTURE.

SANDSTONE = WHITE TO TRANSLUCENT TO LIGHT GRAY; QUARTZ FRAMEWORK WITH MANY LOOSE GRAINS; FINE SIZED WITH WELL SORTING; SUBROUNDED TO SUBANGULAR WITH MODERATE SPHERICITY; FRIABLE TO EASILY FRIABLE; MILD REACTION WITH HCL SUGGESTS CALCAREOUS/SILICA CEMENT; GRAIN SUPPORTED.

SILTSTONE = BROWNISH GRAY TO OLIVE GRAY TO MEDIUM GRAY; BRITTLE TO CRUNCHY TENACITY; PLANAR FRACTURING; TABULAR TO PLATY CUTTINGS; EARTHY TO WAXY LUSTER; SILTY TO GRITTY TEXTURE; THIN STRUCTURE.

SILTSTONE = DARK GREENISH GRAY TO DARK GRAY IN COLOR; TOUGH TO BRITTLE TENACITY SAMPLE SHOWS IRREGULAR TO PLANAR FRACTURE; CUTTINGS ARE SCALY TO TEBULAR IN APPEARANCE; DULL TO FROSTED LUSTER





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