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(907) 561-2465

MUDLOG TVD

COMPANY ExxonMobil Production

WELL FRU197-28A6

FIELD FREEDOM RANCH UNIT

REGION ROCKIES

COORDINATES LAT: 39.934490000
LON: 108.295893000

ELEVATION GL = 6,082'
KB = 6,109'

COUNTY, STATE RIO BLANCO, COLORADO

API INDEX 051031163400

SPUD DATE 07/10/2010

CONTRACTOR HELMRICH AND PAYNE

CO. REP. RICKY T. OWENS

RIG/TYPE 215 / FLEX 3

LOGGING UNIT MLU 051

GEOLOGISTS GEORGE BAKER
DEVIN CLAAR

ADD. PERSONS BILL JOHANNING
PATRICIA ORTIZ

CO. GEOLOGIST MELANIE A. BIGGS

LOG INTERVAL

CASING DATA

DEPTHS: 3,600' TO 12,191'

DATES: 07/10/2010 TO 7/30/2010

SCALE: 1" = 100'

16.0" AT 120'

10.75" AT 3,603'

4.50" AT 12,191'

AT

MUD TYPES

HOLE SIZE

LSND TO 12,191'

TO

TO

TO

TO

14.75" TO 3,603'

8.75" TO 12,191'

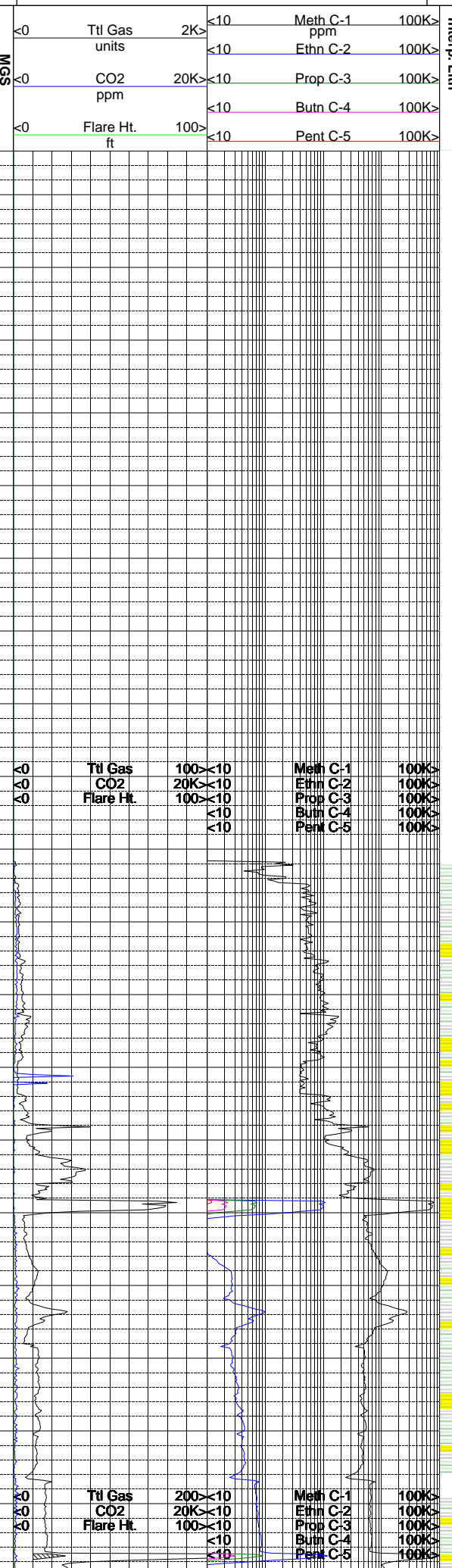
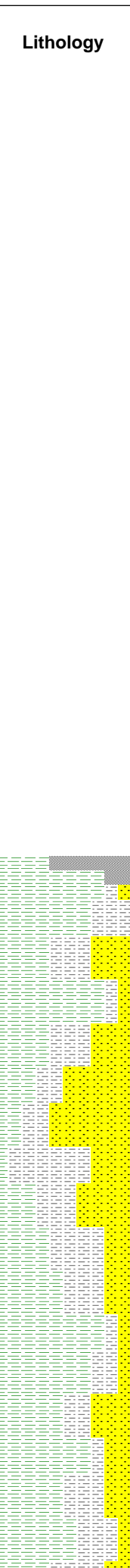
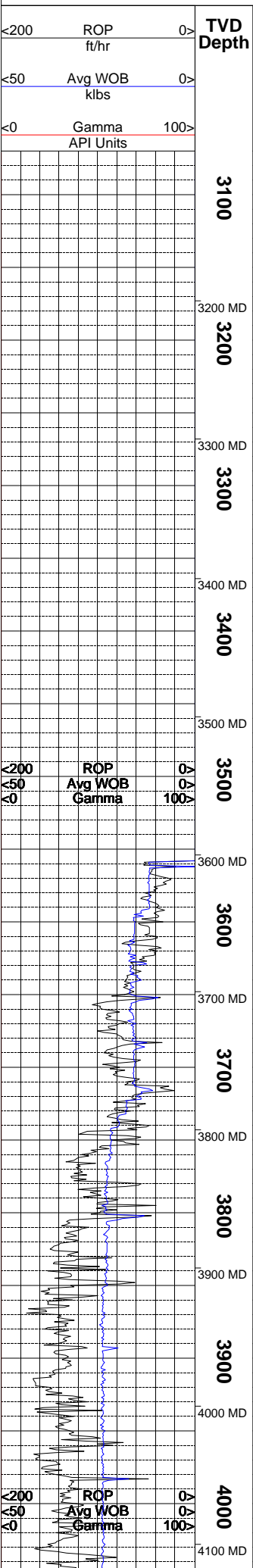
TO

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.

ALL ROCK COLORS ARE REFERENCED TO THE GSA ROCK COLOR CHART, ROCK CONSTITUENTS ARE DESCRIBED WET AND LISTED IN ORDER OF MOST ABUNDANT TO LEAST ABUNDANT, ALL SAMPLE DEPTHS ARE REFERENCED TO RKB.

GAS CHROMATOGRAPHY EQUIPMENT IS CALIBRATED TO A TEST GAS COMPOSED OF METHANE = 10000 PPM ETHANE = 1000 PPM PROPANE = 1000 PPM I-BUTANE = 1000 PPM N-BUTANE = 1000 PPM I-PENTANE = 1000 PPM N-PENTANE = 1000 PPM

CO2 IS CALIBRATED TO A TEST GAS COMPOSED OF 100000 PPM

CONNECTION GAS, TRIP GAS, AND WIPER GAS ARE NOTED ON THE MUDLOG, FLARE HEIGHTS AND DEPTHS OF GAS BUSTER USAGE ARE ALSO NOTED.

EARLY CONNECTION GASES REPRESENTING UP HOLE GAS INTERVALS BLEEDING INTO THE BOREHOLE ARE COMMON IN THE PRODUCTION INTERVAL.

EVIDENCE OF FRACTURE FILL IS NOTED ON THE LOG USING THE LITHOLOGY SYMBOL FOR METAMORPHICS. THE 10% DOES NOT REPRESENT 10% FRACTURE FILL IN SAMPLE. IT ONLY INDICATES THAT FRACTURE FILL HAS BEEN OBSERVED OVER THE INTERVAL.

CANRIG WELL SERVICE COMMENCED FULL LOGGING OPERATIONS ON 07/17/2010 @ 13:00 HRS AT A DEPTH OF 3,605'

SURVEY DATA AT 6,794' MD
 INCLINATION : 00.15
 AZIM: 190.79
 TVD: 6,638.22'

SHALE = VARICOLORED; MEDIUM GRAY TO MAROON; LT YELLOW TO LIGHT BROWN; FIRM; SLI PLATY CUTTINGS; IRREGULAR TO PLANAR FRACTURE; SLI CALCAREOUS; VERY FINELY MICACEOUS; SILTY IN PART; GRADING TO SILTSTONE; SME ISOLATED QUARTZ GRAINS; DULL TO WAXY LUSTER; SMOOTH TO ROUGH TEXTURE; TRACE AMTS OF FINE GRAINED SANDSTONE.

SANDSTONE = DOM LIGHT GRAY; SME REDBRN STAINED SPECIMENS; MOD HARD; FINE TO V FINE GRAINED; ANGULAR TO SUBROUNDED; GRAIN SUPPORTED; CALCITE CEMENT; LOW TO MOD SPHERICITY; 5% BLACK GRAINS; TIGHT TO POOR VISIBLE POROSITY; NO GAS INCREASES.

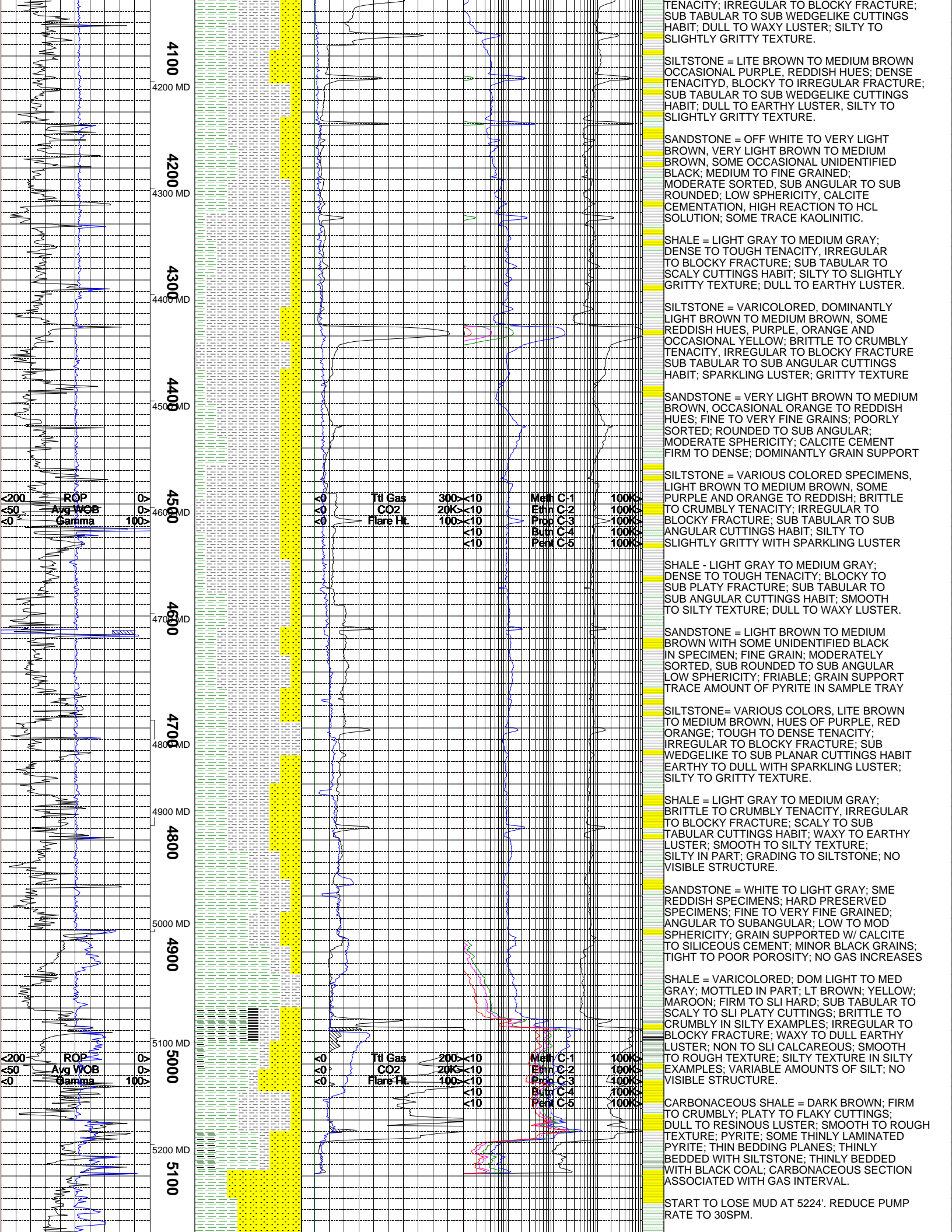
SILTSTONE= VARIOUS COLORS, LIGHT GRAY TO BLUISH GRAY, PURPLE, YELLOWS TO BURNT ORANGES, VERY LITE BROWN TO MEDIUM BROWN; BRITTLE TO CRUMBLY TENACITY; DOMINANTLY IRREGULAR, BLOCKY TO SUB BLOCKY, SUB PLANAR FRACTURE; SUB PLATY TO TABULAR CUTTINGS HABIT; DULL TO EARTH WITH OCCASIONAL SPARKLING LUSTER; SILTY TO GRITTY TEXTURE.

SHALE= VERY LITE GRAY TO MEDIUM GRAY, OCCASIONAL YELLOW HUES; DENSE TO TOUGH TENACITY; PLANAR TO IRREGULAR FRACTURE; PLATY TO SUB TABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TO SMOOTH TEXTURE.

SANDSTONE = DOMINANTLY OFF WHITE, SOME VERY LIGHT GRAY HUES TO VERY LIGHT BROWN HUES; FINE TO VERY FINE GRAINS; MODERATE TO WELL SORTED, SUB ROUNDED TO SUB ANGULAR; LOW SPHERICITY; FRIABLE; CALCITE SUPPORTED, WITH MODERATE RE ACTION TO HCL.

SILTSTONE = VARICOLORED, MEDIUM BROWN TO LIGHT BROWN, PURPLE AND YELLOW HUES, OCCASIONAL GREENS; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; EARTHY TO SLIGHTLY GRITT SOME SPARKLING LUSTER THROUGHOUT.

SHALE - VERY LITE GRAY TO MEDIUM GRAY; DOMINANTLY DENSE, OCCASIONAL BRITTLE



4100
4200 MD
4300 MD
4400 MD
4500 MD
4600 MD
4700 MD
4800 MD
4900 MD
5000 MD
5100 MD
5200 MD

200
50
ROP
Avg WOB
Gamma
100

Ttl Gas 300
CO2 200
Flare Ht 100
<10
<10

Meth C-1 100
Ethn C-2 100
Prop C-3 100
Bum C-4 100
Pent C-5 100

200
50
ROP
Avg WOB
Gamma
100

Ttl Gas 200
CO2 200
Flare Ht 100
<10
<10

Meth C-1 100
Ethn C-2 100
Prop C-3 100
Bum C-4 100
Pent C-5 100

TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO WAXY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE.

SILTSTONE = LITE BROWN TO MEDIUM BROWN OCCASIONAL PURPLE, REDDISH HUES; DENSE TENACITY, BLOCKY TO IRREGULAR FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER, SILTY TO SLIGHTLY GRITTY TEXTURE.

SANDSTONE = OFF WHITE TO VERY LIGHT BROWN, VERY LIGHT BROWN TO MEDIUM BROWN, SOME OCCASIONAL UNIDENTIFIED BLACK; MEDIUM TO FINE GRAINED; MODERATE SORTED, SUB ANGULAR TO SUB ROUNDED; LOW SPHERICITY, CALCITE CEMENTATION, HIGH REACTION TO HCL SOLUTION; SOME TRACE KAOLINITIC.

SHALE = LIGHT GRAY TO MEDIUM GRAY; DENSE TO TOUGH TENACITY, IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SCALY CUTTINGS HABIT; SILTY TO SLIGHTLY GRITTY TEXTURE; DULL TO EARTHY LUSTER.

SILTSTONE = VARICOLORED, DOMINANTLY LIGHT BROWN TO MEDIUM BROWN, SOME REDDISH HUES, PURPLE, ORANGE AND OCCASIONAL YELLOW; BRITTLE TO CRUMBLY TENACITY, IRREGULAR TO BLOCKY FRACTURE SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SPARKLING LUSTER; GRITTY TEXTURE

SANDSTONE = VERY LIGHT BROWN TO MEDIUM BROWN, OCCASIONAL ORANGE TO REDDISH HUES; FINE TO VERY FINE GRAINS; POORLY SORTED; ROUNDED TO SUB ANGULAR; MODERATE SPHERICITY; CALCITE CEMENT FIRM TO DENSE; DOMINANTLY GRAIN SUPPORT

SILTSTONE = VARIOUS COLORED SPECIMENS, LIGHT BROWN TO MEDIUM BROWN, SOME PURPLE AND ORANGE TO REDDISH; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SILTY TO SLIGHTLY GRITTY WITH SPARKLING LUSTER

SHALE - LIGHT GRAY TO MEDIUM GRAY; DENSE TO TOUGH TENACITY; BLOCKY TO SUB PLATY FRACTURE; SUB TABULAR TO SUB ANGULAR CUTTINGS HABIT; SMOOTH TO SILTY TEXTURE; DULL TO WAXY LUSTER.

SANDSTONE = LIGHT BROWN TO MEDIUM BROWN WITH SOME UNIDENTIFIED BLACK IN SPECIMEN; FINE GRAIN; MODERATELY SORTED, SUB ROUNDED TO SUB ANGULAR LOW SPHERICITY; FRIABLE; GRAIN SUPPORT TRACE AMOUNT OF PYRITE IN SAMPLE TRAY

SILTSTONE= VARIOUS COLORS, LITE BROWN TO MEDIUM BROWN, HUES OF PURPLE, RED ORANGE; TOUGH TO DENSE TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB WEDGELIKE TO SUB PLANAR CUTTINGS HABIT EARTHY TO DULL WITH SPARKLING LUSTER; SILTY TO GRITTY TEXTURE.

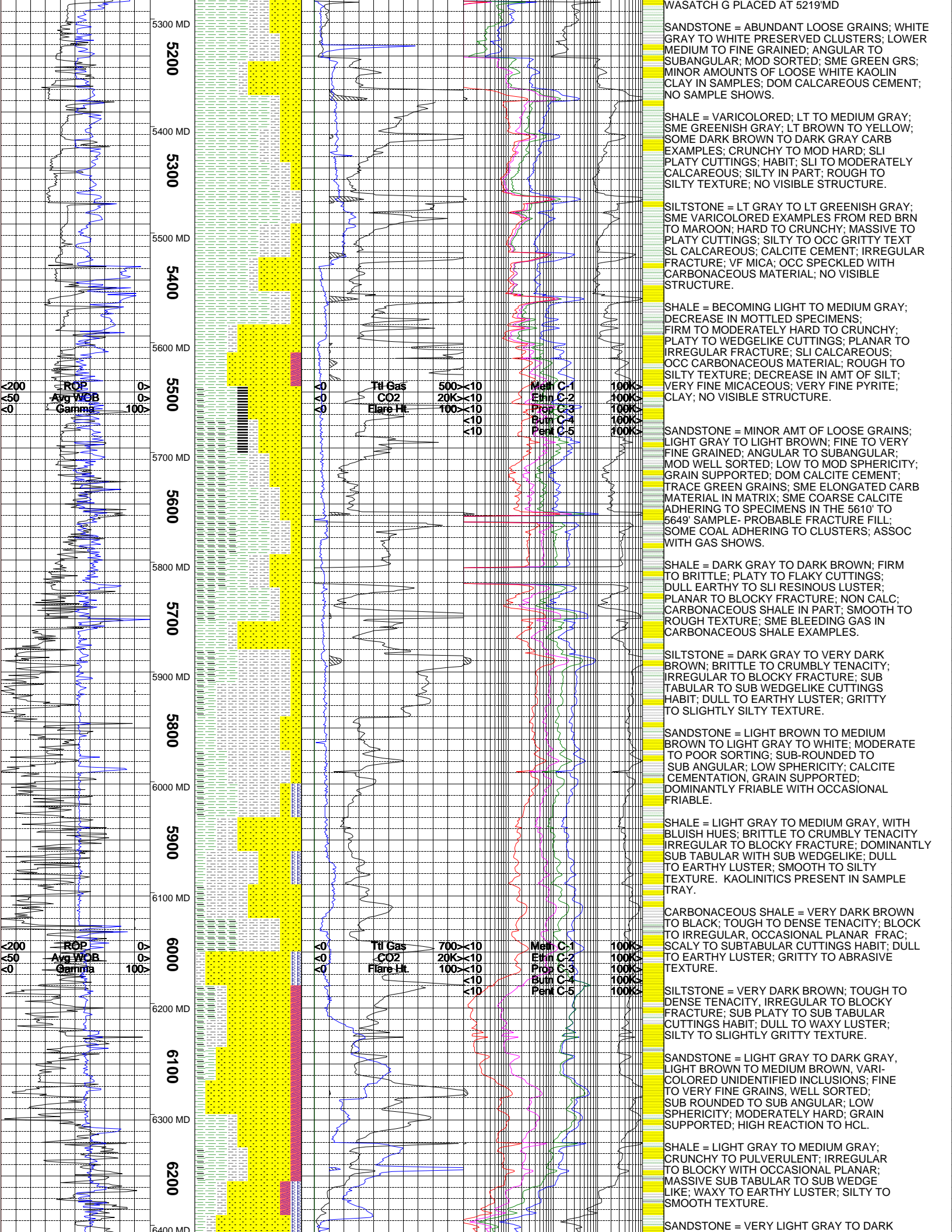
SHALE = LIGHT GRAY TO MEDIUM GRAY; BRITTLE TO CRUMBLY TENACITY, IRREGULAR TO BLOCKY FRACTURE; SCALY TO SUB TABULAR CUTTINGS HABIT; WAXY TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; SILTY IN PART; GRADING TO SILTSTONE; NO VISIBLE STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY; SME REDDISH SPECIMENS; HARD PRESERVED SPECIMENS; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; LOW TO MOD SPHERICITY; GRAIN SUPPORTED W/ CALCITE TO SILICEOUS CEMENT; MINOR BLACK GRAINS; TIGHT TO POOR POROSITY; NO GAS INCREASES

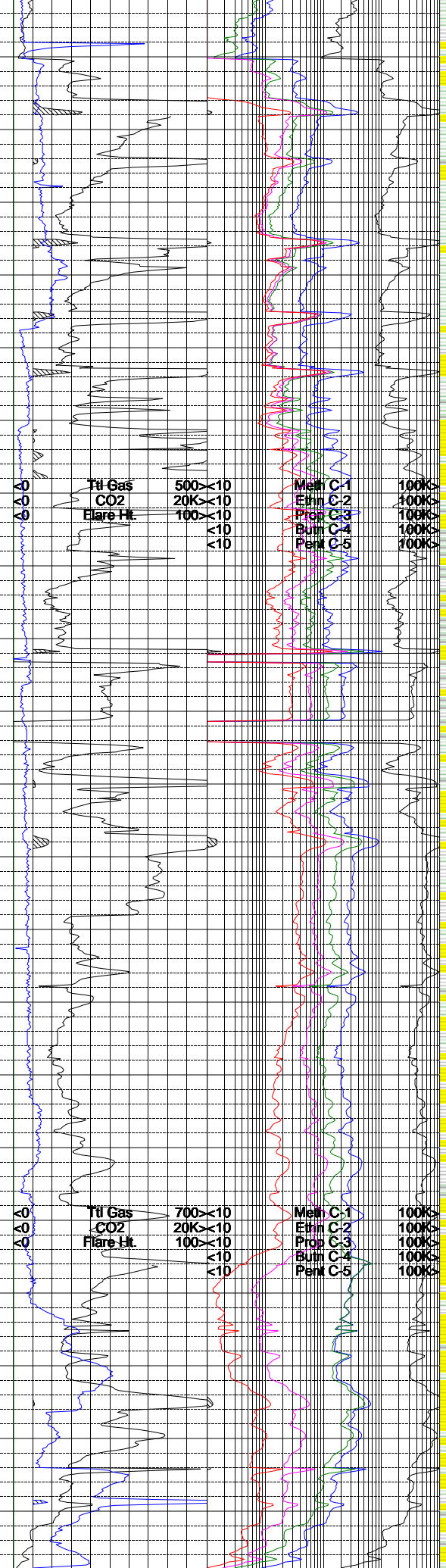
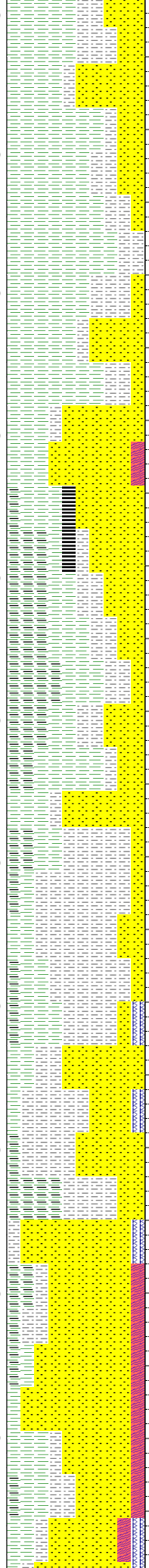
SHALE = VARICOLORED; DOM LIGHT TO MED GRAY; MOTTLED IN PART; LT BROWN; YELLOW; MAROON; FIRM TO SLI HARD; SUB TABULAR TO SCALY TO SLI PLATY CUTTINGS; BRITTLE TO CRUMBLY IN SILTY EXAMPLES; IRREGULAR TO BLOCKY FRACTURE; WAXY TO DULL EARTHY LUSTER; NON TO SLI CALCAREOUS; SMOOTH TO ROUGH TEXTURE; SILTY TEXTURE IN SILTY EXAMPLES; VARIABLE AMOUNTS OF SILT; NO VISIBLE STRUCTURE.

CARBONACEOUS SHALE = DARK BROWN; FIRM TO CRUMBLY; PLATY TO FLAKY CUTTINGS; DULL TO RESINOUS LUSTER; SMOOTH TO ROUGH TEXTURE; PYRITE; SOME THINLY LAMINATED PYRITE; THIN BEDDING PLANES; THINLY BEDDED WITH SILTSTONE; THINLY BEDDED WITH BLACK COAL; CARBONACEOUS SECTION ASSOCIATED WITH GAS INTERVAL.

START TO LOSE MUD AT 5224'. REDUCE PUMP RATE TO 30SPM.



5300 MD
5200
5400 MD
5300
5500 MD
5400
5600 MD
5500
5700 MD
5600
5800 MD
5700
5900 MD
5800
6000 MD
5900
6100 MD
6000
6200 MD
6100
6300 MD
6200
6400 MD



WASATCH G PLACED AT 5219MD

SANDSTONE = ABUNDANT LOOSE GRAINS; WHITE GRAY TO WHITE PRESERVED CLUSTERS; LOWER MEDIUM TO FINE GRAINED; ANGULAR TO SUBANGULAR; MOD SORTED; SME GREEN GRs; MINOR AMOUNTS OF LOOSE WHITE KAOLIN CLAY IN SAMPLES; DOM CALCAREOUS CEMENT; NO SAMPLE SHOWS.

SHALE = VARICOLORED; LT TO MEDIUM GRAY; SME GREENISH GRAY; LT BROWN TO YELLOW; SOME DARK BROWN TO DARK GRAY CARB EXAMPLES; CRUNCHY TO MOD HARD; SLI PLATY CUTTINGS; HABIT; SLI TO MODERATELY CALCAREOUS; SILTY IN PART; ROUGH TO SILTY TEXTURE; NO VISIBLE STRUCTURE.

SILTSTONE = LT GRAY TO LT GREENISH GRAY; SME VARICOLORED EXAMPLES FROM RED BRN TO MAROON; HARD TO CRUNCHY; MASSIVE TO PLATY CUTTINGS; SILTY TO OCC GRITTY TEXT SL CALCAREOUS; CALCITE CEMENT; IRREGULAR FRACTURE; VF MICA; OCC SPECKLED WITH CARBONACEOUS MATERIAL; NO VISIBLE STRUCTURE.

SHALE = BECOMING LIGHT TO MEDIUM GRAY; DECREASE IN MOTTLED SPECIMENS; FIRM TO MODERATELY HARD TO CRUNCHY; PLATY TO WEDGELIKE CUTTINGS; PLANAR TO IRREGULAR FRACTURE; SLI CALCAREOUS; OCC CARBONACEOUS MATERIAL; ROUGH TO SILTY TEXTURE; DECREASE IN AMT OF SILT; VERY FINE MICACEOUS; VERY FINE PYRITE; CLAY; NO VISIBLE STRUCTURE.

SANDSTONE = MINOR AMT OF LOOSE GRAINS; LIGHT GRAY TO LIGHT BROWN; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; MOD WELL SORTED; LOW TO MOD SPHERICITY; GRAIN SUPPORTED; DOM CALCITE CEMENT; TRACE GREEN GRAINS; SME ELONGATED CARB MATERIAL IN MATRIX; SME COARSE CALCITE ADHERING TO SPECIMENS IN THE 5610' TO 5649' SAMPLE- PROBABLE FRACTURE FILL; SOME COAL ADHERING TO CLUSTERS; ASSOC WITH GAS SHOWS.

SHALE = DARK GRAY TO DARK BROWN; FIRM TO BRITTLE; PLATY TO FLAKY CUTTINGS; DULL EARTHY TO SLI RESINOUS LUSTER; PLANAR TO BLOCKY FRACTURE; NON CALC; CARBONACEOUS SHALE IN PART; SMOOTH TO ROUGH TEXTURE; SME BLEEDING GAS IN CARBONACEOUS SHALE EXAMPLES.

SILTSTONE = DARK GRAY TO VERY DARK BROWN; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; SUB TABULAR TO SUB WEDGELIKE CUTTINGS HABIT; DULL TO EARTHY LUSTER; GRITTY TO SLIGHTLY SILTY TEXTURE.

SANDSTONE = LIGHT BROWN TO MEDIUM BROWN TO LIGHT GRAY TO WHITE; MODERATE TO POOR SORTING; SUB-ROUNDED TO SUB ANGULAR; LOW SPHERICITY; CALCITE CEMENTATION, GRAIN SUPPORTED; DOMINANTLY FRIABLE WITH OCCASIONAL FRIABLE.

SHALE = LIGHT GRAY TO MEDIUM GRAY, WITH BLUISH HUES; BRITTLE TO CRUMBLY TENACITY IRREGULAR TO BLOCKY FRACTURE; DOMINANTLY SUB TABULAR WITH SUB WEDGELIKE; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE. KAOLINITICS PRESENT IN SAMPLE TRAY.

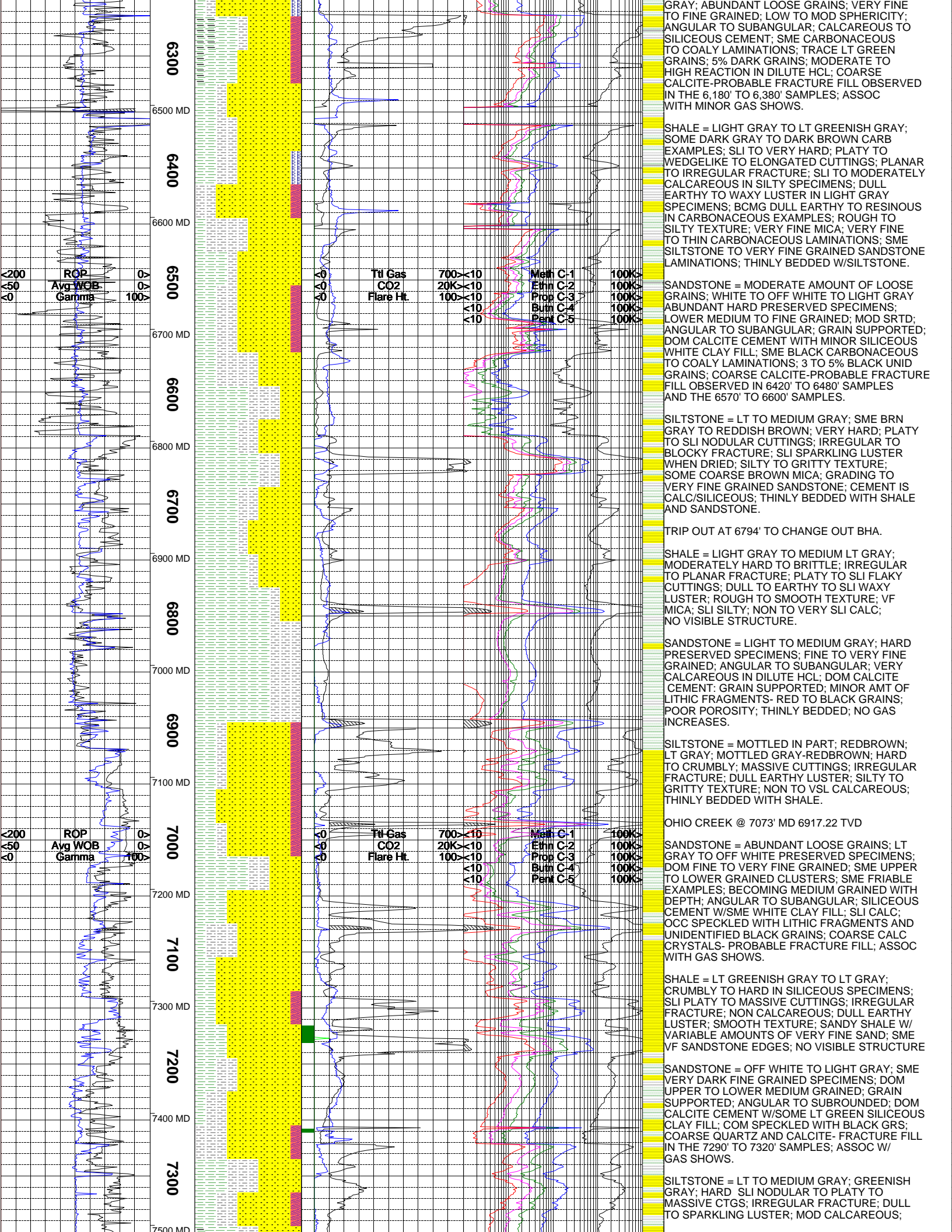
CARBONACEOUS SHALE = VERY DARK BROWN TO BLACK; TOUGH TO DENSE TENACITY; BLOCK TO IRREGULAR, OCCASIONAL PLANAR FRAC; SCALY TO SUBTABULAR CUTTINGS HABIT; DULL TO EARTHY LUSTER; GRITTY TO ABRASIVE TEXTURE.

SILTSTONE = VERY DARK BROWN; TOUGH TO DENSE TENACITY, IRREGULAR TO BLOCKY FRACTURE; SUB PLATY TO SUB TABULAR CUTTINGS HABIT; DULL TO WAXY LUSTER; SILTY TO SLIGHTLY GRITTY TEXTURE.

SANDSTONE = LIGHT GRAY TO DARK GRAY, LIGHT BROWN TO MEDIUM BROWN, VARICOLORED UNIDENTIFIED INCLUSIONS; FINE TO VERY FINE GRAINS, WELL SORTED; SUB ROUNDED TO SUB ANGULAR; LOW SPHERICITY; MODERATELY HARD; GRAIN SUPPORTED; HIGH REACTION TO HCL.

SHALE = LIGHT GRAY TO MEDIUM GRAY; CRUNCHY TO PULVERULENT; IRREGULAR TO BLOCKY WITH OCCASIONAL PLANAR; MASSIVE SUB TABULAR TO SUB WEDGE LIKE; WAXY TO EARTHY LUSTER; SILTY TO SMOOTH TEXTURE.

SANDSTONE = VERY LIGHT GRAY TO DARK



6300
6500 MD
6400
6600 MD
6500
6700 MD
6600
6800 MD
6700
6900 MD
6800
7000 MD
6900
7100 MD
7000
7200 MD
7100
7300 MD
7200
7400 MD
7300
7500 MD

200
50
ROP
Avg WOB
Gamma
100

Ttl Gas
CO2
Flare Ht

700x<10
20Kx<10
100x<10
<10
<10

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

200
50
ROP
Avg WOB
Gamma
100

Ttl Gas
CO2
Flare Ht

700x<10
20Kx<10
100x<10
<10
<10

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

GRAY; ABUNDANT LOOSE GRAINS; VERY FINE TO FINE GRAINED; LOW TO MOD SPHERICITY; ANGULAR TO SUBANGULAR; CALCAREOUS TO SILICEOUS CEMENT; SME CARBONACEOUS TO COALY LAMINATIONS; TRACE LT GREEN GRAINS; 5% DARK GRAINS; MODERATE TO HIGH REACTION IN DILUTE HCL; COARSE CALCITE-PROBABLE FRACTURE FILL OBSERVED IN THE 6,180' TO 6,380' SAMPLES; ASSOC WITH MINOR GAS SHOWS.

SHALE = LIGHT GRAY TO LT GREENISH GRAY; SOME DARK GRAY TO DARK BROWN CARB EXAMPLES; SLI TO VERY HARD; PLATY TO WEDGELIKE TO ELONGATED CUTTINGS; PLANAR TO IRREGULAR FRACTURE; SLI TO MODERATELY CALCAREOUS IN SILTY SPECIMENS; DULL EARTHY TO WAXY LUSTER IN LIGHT GRAY SPECIMENS; BCMG DULL EARTHY TO RESINOUS IN CARBONACEOUS EXAMPLES; ROUGH TO SILTY TEXTURE; VERY FINE MICA; VERY FINE TO THIN CARBONACEOUS LAMINATIONS; SME SILTSTONE TO VERY FINE GRAINED SANDSTONE LAMINATIONS; THINLY BEDDED W/SILTSTONE.

SANDSTONE = MODERATE AMOUNT OF LOOSE GRAINS; WHITE TO OFF WHITE TO LIGHT GRAY ABUNDANT HARD PRESERVED SPECIMENS; LOWER MEDIUM TO FINE GRAINED; MOD SRTD; ANGULAR TO SUBANGULAR; GRAIN SUPPORTED; DOM CALCITE CEMENT WITH MINOR SILICEOUS WHITE CLAY FILL; SME BLACK CARBONACEOUS TO COALY LAMINATIONS; 3 TO 5% BLACK UNID GRAINS; COARSE CALCITE-PROBABLE FRACTURE FILL OBSERVED IN 6420' TO 6480' SAMPLES AND THE 6570' TO 6600' SAMPLES.

SILTSTONE = LT TO MEDIUM GRAY; SME BRN GRAY TO REDDISH BROWN; VERY HARD; PLATY TO SLI NODULAR CUTTINGS; IRREGULAR TO BLOCKY FRACTURE; SLI SPARKLING LUSTER WHEN DRIED; SILTY TO GRITTY TEXTURE; SOME COARSE BROWN MICA; GRADING TO VERY FINE GRAINED SANDSTONE; CEMENT IS CALC/SILICEOUS; THINLY BEDDED WITH SHALE AND SANDSTONE.

TRIP OUT AT 6794' TO CHANGE OUT BHA.

SHALE = LIGHT GRAY TO MEDIUM LT GRAY; MODERATELY HARD TO BRITTLE; IRREGULAR TO PLANAR FRACTURE; PLATY TO SLI FLAKY CUTTINGS; DULL TO EARTHY TO SLI WAXY LUSTER; ROUGH TO SMOOTH TEXTURE; VF MICA; SLI SILTY; NON TO VERY SLI CALC; NO VISIBLE STRUCTURE.

SANDSTONE = LIGHT TO MEDIUM GRAY; HARD PRESERVED SPECIMENS; FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; VERY CALCAREOUS IN DILUTE HCL; DOM CALCITE CEMENT; GRAIN SUPPORTED; MINOR AMT OF LITHIC FRAGMENTS- RED TO BLACK GRAINS; POOR POROSITY; THINLY BEDDED; NO GAS INCREASES.

SILTSTONE = MOTTLED IN PART; REDBROWN; LT GRAY; MOTTLED GRAY-REDBROWN; HARD TO CRUMBLY; MASSIVE CUTTINGS; IRREGULAR FRACTURE; DULL EARTHY LUSTER; SILTY TO GRITTY TEXTURE; NON TO VSL CALCAREOUS; THINLY BEDDED WITH SHALE.

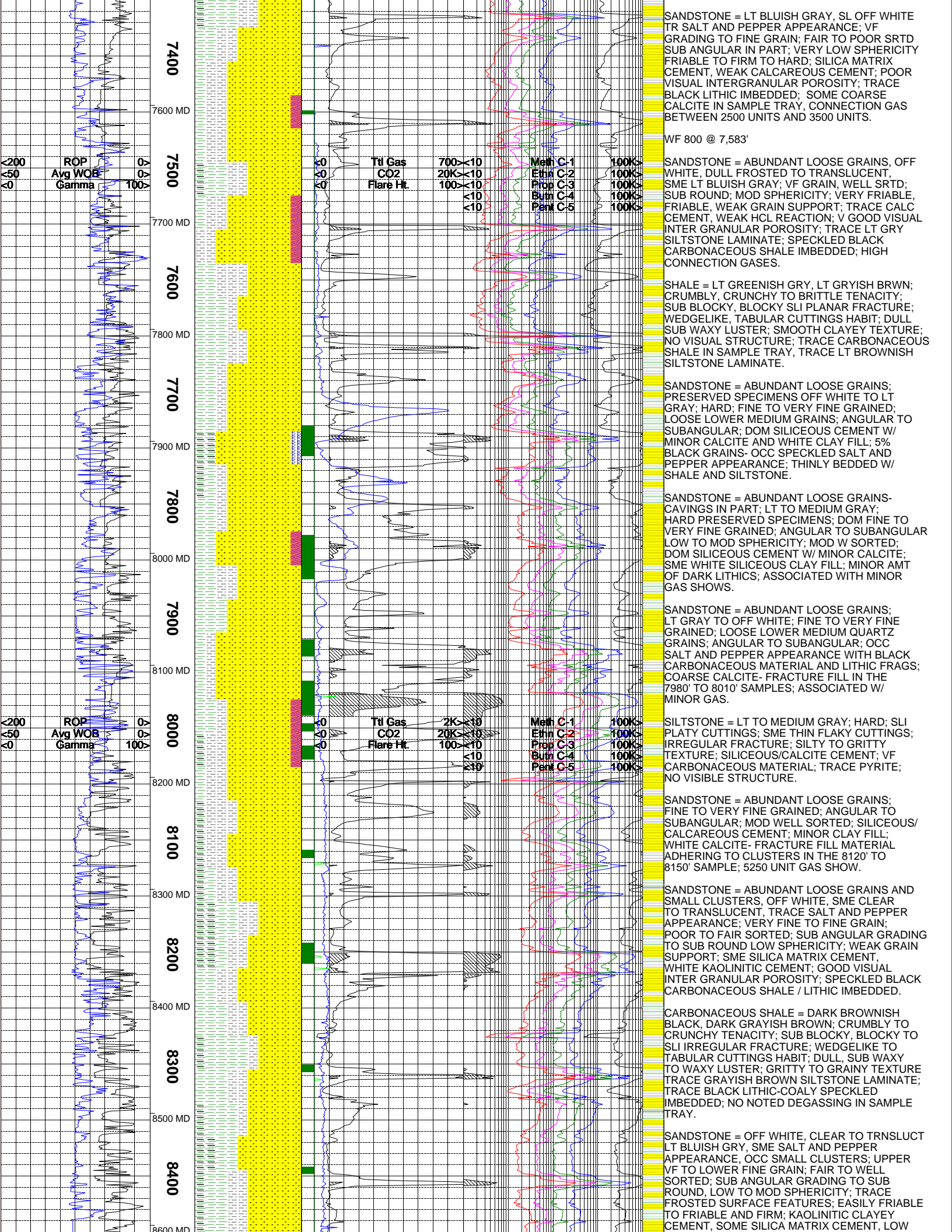
OHIO CREEK @ 7073' MD 6917.22 TVD

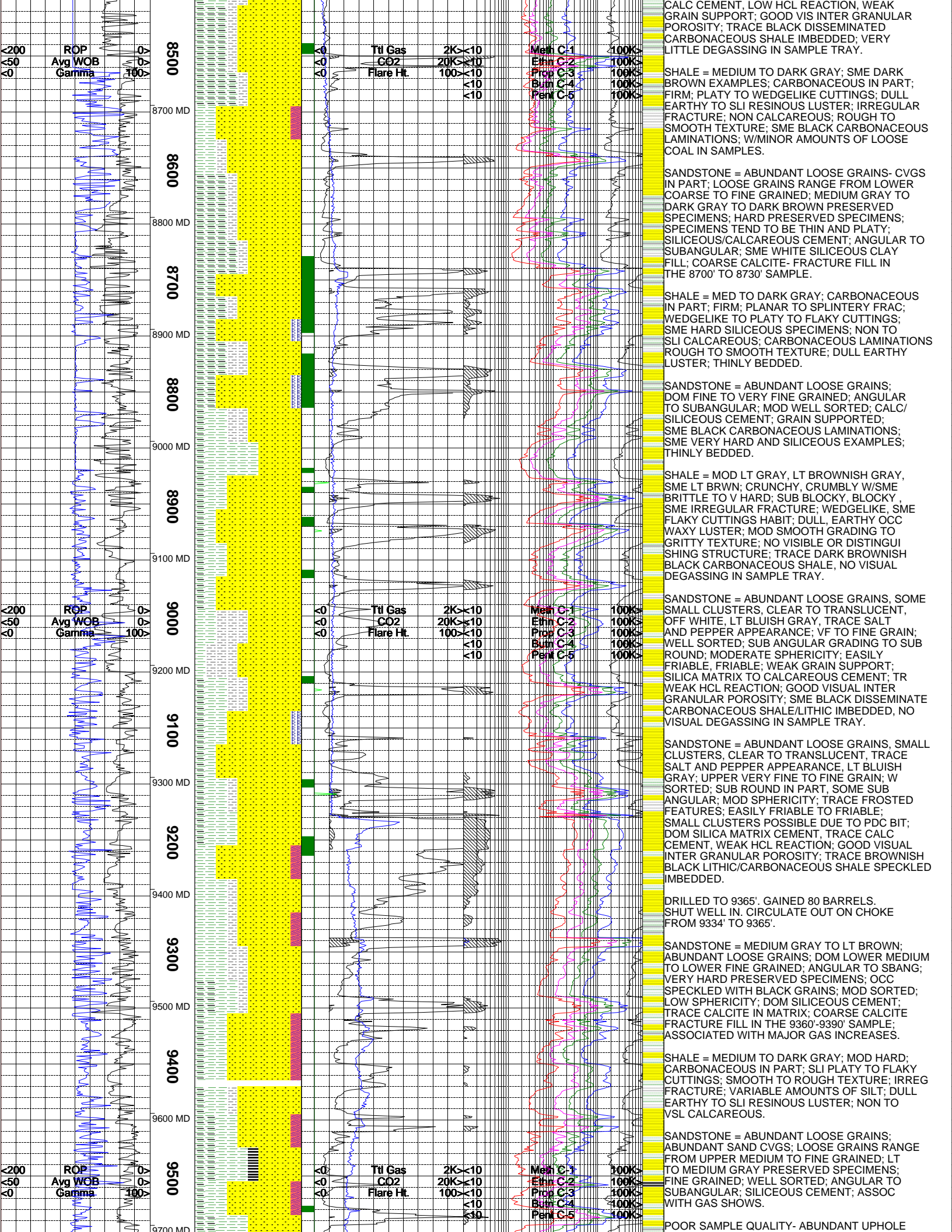
SANDSTONE = ABUNDANT LOOSE GRAINS; LT GRAY TO OFF WHITE PRESERVED SPECIMENS; DOM FINE TO VERY FINE GRAINED; SME UPPER TO LOWER GRAINED CLUSTERS; SME FRIABLE EXAMPLES; BECOMING MEDIUM GRAINED WITH DEPTH; ANGULAR TO SUBANGULAR; SILICEOUS CEMENT W/SME WHITE CLAY FILL; SLI CALC; OCC SPECKLED WITH LITHIC FRAGMENTS AND UNIDENTIFIED BLACK GRAINS; COARSE CALC CRYSTALS- PROBABLE FRACTURE FILL; ASSOC WITH GAS SHOWS.

SHALE = LT GREENISH GRAY TO LT GRAY; CRUMBLY TO HARD IN SILICEOUS SPECIMENS; SLI PLATY TO MASSIVE CUTTINGS; IRREGULAR FRACTURE; NON CALCAREOUS; DULL EARTHY LUSTER; SMOOTH TEXTURE; SANDY SHALE W/ VARIABLE AMOUNTS OF VERY FINE SAND; SME VF SANDSTONE EDGES; NO VISIBLE STRUCTURE

SANDSTONE = OFF WHITE TO LIGHT GRAY; SME VERY DARK FINE GRAINED SPECIMENS; DOM UPPER TO LOWER MEDIUM GRAINED; GRAIN SUPPORTED; ANGULAR TO SUBROUNDED; DOM CALCITE CEMENT W/SOME LT GREEN SILICEOUS CLAY FILL; COM SPECKLED WITH BLACK GRs; COARSE QUARTZ AND CALCITE- FRACTURE FILL IN THE 7290' TO 7320' SAMPLES; ASSOC W/ GAS SHOWS.

SILTSTONE = LT TO MEDIUM GRAY; GREENISH GRAY; HARD SLI NODULAR TO PLATY TO MASSIVE CTGS; IRREGULAR FRACTURE; DULL TO SPARKLING LUSTER; MOD CALCAREOUS;





CALC CEMENT, LOW HCL REACTION, WEAK GRAIN SUPPORT; GOOD VIS INTER GRANULAR POROSITY; TRACE BLACK DISSEMINATED CARBONACEOUS SHALE IMBEDDED; VERY LITTLE DEGASSING IN SAMPLE TRAY.

SHALE = MEDIUM TO DARK GRAY; SME DARK BROWN EXAMPLES; CARBONACEOUS IN PART; FIRM; PLATY TO WEDGELIKE CUTTINGS; DULL EARTHY TO SLI RESINOUS LUSTER; IRREGULAR FRACTURE; NON CALCAREOUS; ROUGH TO SMOOTH TEXTURE; SME BLACK CARBONACEOUS LAMINATIONS; W/MINOR AMOUNTS OF LOOSE COAL IN SAMPLES.

SANDSTONE = ABUNDANT LOOSE GRAINS- CVGS IN PART; LOOSE GRAINS RANGE FROM LOWER COARSE TO FINE GRAINED; MEDIUM GRAY TO DARK GRAY TO DARK BROWN PRESERVED SPECIMENS; HARD PRESERVED SPECIMENS; SPECIMENS TEND TO BE THIN AND PLATY; SILICEOUS/CALCAREOUS CEMENT; ANGULAR TO SUBANGULAR; SME WHITE SILICEOUS CLAY FILL; COARSE CALCITE- FRACTURE FILL IN THE 8700' TO 8730' SAMPLE.

SHALE = MED TO DARK GRAY; CARBONACEOUS IN PART; FIRM; PLANAR TO SPLINTERY FRAC; WEDGELIKE TO PLATY TO FLAKY CUTTINGS; SME HARD SILICEOUS SPECIMENS; NON TO SLI CALCAREOUS; CARBONACEOUS LAMINATIONS ROUGH TO SMOOTH TEXTURE; DULL EARTHY LUSTER; THINLY BEDDED.

SANDSTONE = ABUNDANT LOOSE GRAINS; DOM FINE TO VERY FINE GRAINED; ANGULAR TO SUBANGULAR; MOD WELL SORTED; CALC/ SILICEOUS CEMENT; GRAIN SUPPORTED; SME BLACK CARBONACEOUS LAMINATIONS; SME VERY HARD AND SILICEOUS EXAMPLES; THINLY BEDDED.

SHALE = MOD LT GRAY, LT BROWNISH GRAY, SME LT BRWN; CRUNCHY, CRUMBLY W/SME BRITTLE TO V HARD; SUB BLOCKY, BLOCKY, SME IRREGULAR FRACTURE; WEDGELIKE, SME FLAKY CUTTINGS HABIT; DULL, EARTHY OCC WAXY LUSTER; MOD SMOOTH GRADING TO GRITTY TEXTURE; NO VISIBLE OR DISTINGUI SHING STRUCTURE; TRACE DARK BROWNISH BLACK CARBONACEOUS SHALE, NO VISUAL DEGASSING IN SAMPLE TRAY.

SANDSTONE = ABUNDANT LOOSE GRAINS, SOME SMALL CLUSTERS, CLEAR TO TRANSLUCENT, OFF WHITE, LT BLUISH GRAY, TRACE SALT AND PEPPER APPEARANCE; VF TO FINE GRAIN; WELL SORTED; SUB ANGULAR GRADING TO SUB ROUND; MODERATE SPHERICITY; EASILY FRIABLE, FRIABLE; WEAK GRAIN SUPPORT; SILICA MATRIX TO CALCAREOUS CEMENT; TR WEAK HCL REACTION; GOOD VISUAL INTER GRANULAR POROSITY; SME BLACK DISSEMINATE CARBONACEOUS SHALE/LITHIC IMBEDDED, NO VISUAL DEGASSING IN SAMPLE TRAY.

SANDSTONE = ABUNDANT LOOSE GRAINS, SMALL CLUSTERS, CLEAR TO TRANSLUCENT, TRACE SALT AND PEPPER APPEARANCE, LT BLUISH GRAY; UPPER VERY FINE TO FINE GRAIN; W SORTED; SUB ROUND IN PART, SOME SUB ANGULAR; MOD SPHERICITY; TRACE FROSTED FEATURES; EASILY FRIABLE TO FRIABLE; SMALL CLUSTERS POSSIBLE DUE TO PDC BIT; DOM SILICA MATRIX CEMENT, TRACE CALC CEMENT, WEAK HCL REACTION; GOOD VISUAL INTER GRANULAR POROSITY; TRACE BROWNISH BLACK LITHIC/CARBONACEOUS SHALE SPECKLED IMBEDDED.

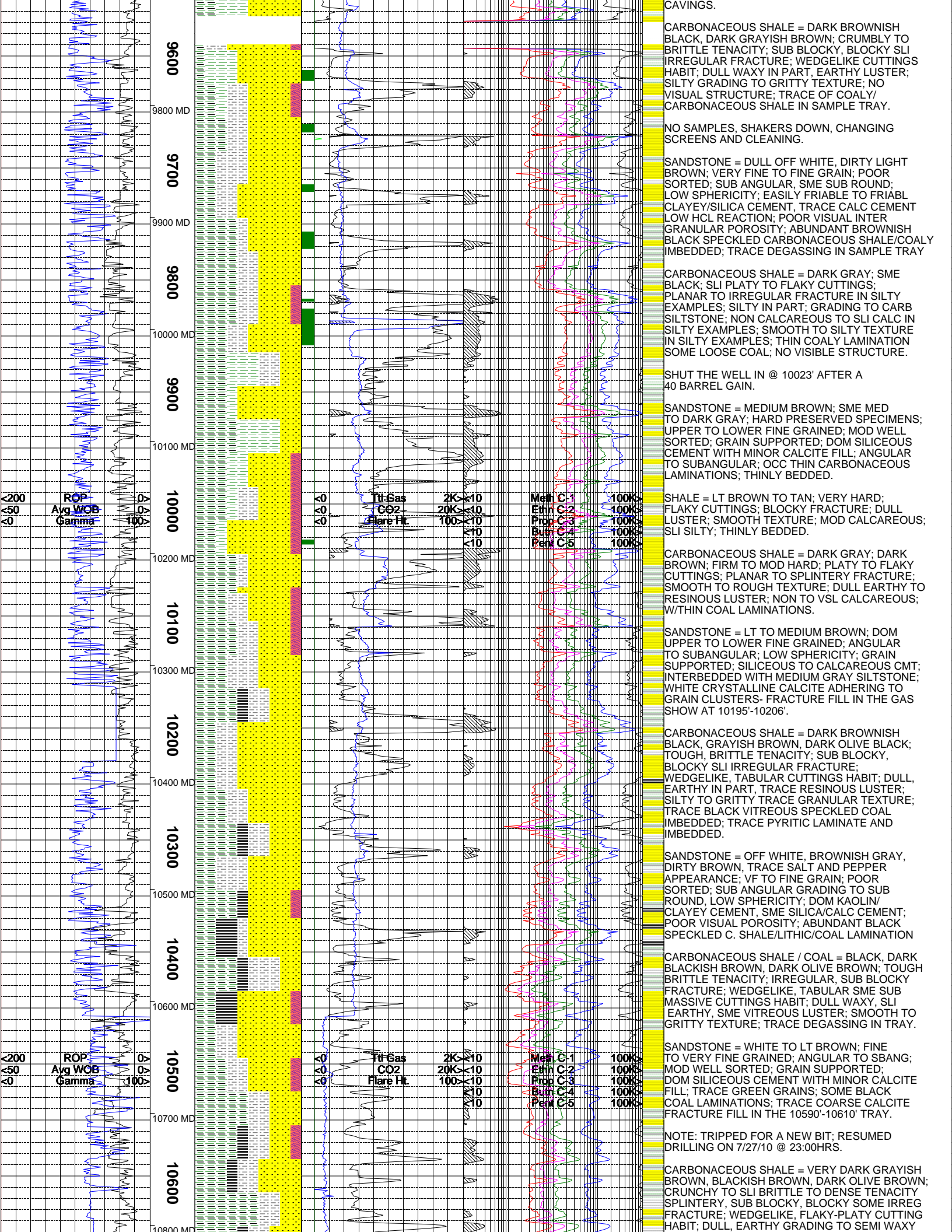
DRILLED TO 9365'. GAINED 80 BARRELS. SHUT WELL IN. CIRCULATE OUT ON CHOKE FROM 9334' TO 9365'.

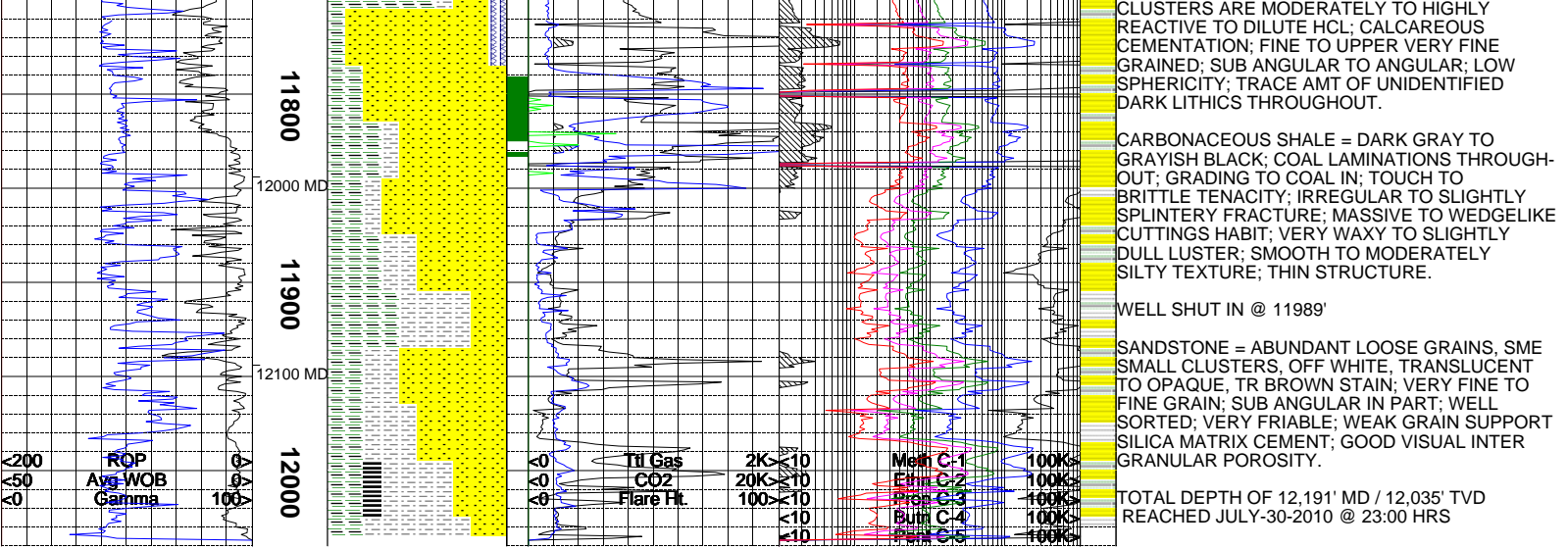
SANDSTONE = MEDIUM GRAY TO LT BROWN; ABUNDANT LOOSE GRAINS; DOM LOWER MEDIUM TO LOWER FINE GRAINED; ANGULAR TO SBANG; VERY HARD PRESERVED SPECIMENS; OCC SPECKLED WITH BLACK GRAINS; MOD SORTED; LOW SPHERICITY; DOM SILICEOUS CEMENT; TRACE CALCITE IN MATRIX; COARSE CALCITE FRACTURE FILL IN THE 9360'-9390' SAMPLE; ASSOCIATED WITH MAJOR GAS INCREASES.

SHALE = MEDIUM TO DARK GRAY; MOD HARD; CARBONACEOUS IN PART; SLI PLATY TO FLAKY CUTTINGS; SMOOTH TO ROUGH TEXTURE; IRREG FRACTURE; VARIABLE AMOUNTS OF SILT; DULL EARTHY TO SLI RESINOUS LUSTER; NON TO VSL CALCAREOUS.

SANDSTONE = ABUNDANT LOOSE GRAINS; ABUNDANT SAND CVGS; LOOSE GRAINS RANGE FROM UPPER MEDIUM TO FINE GRAINED; LT TO MEDIUM GRAY PRESERVED SPECIMENS; FINE GRAINED; WELL SORTED; ANGULAR TO SUBANGULAR; SILICEOUS CEMENT; ASSOC WITH GAS SHOWS.

POOR SAMPLE QUALITY- ABUNDANT UPHOLE





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