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Gamma Mudlog MD

COMPANY	ExxonMobil Production
WELL	PCU 296-6B1
FIELD	PICEANCE CREEK UNIT
REGION	ROCKIES MOUNTAINS
COORDINATES	LAT 39.905268000 LON 108.204977000
ELEVATION	GL = 7364.3' KB = 7391.3'
COUNTY, STATE	RIO BLANCO CO.
API INDEX	051031154600
SPUD DATE	12-17-2010
CONTRACTOR	HELMRICH AND PAYNE
CO. REP.	RICKY T OWENS
RIG/TYPE	215 / FLEX 3
LOGGING UNIT	MLU 51
GEOLOGISTS	BRENDA MARSH GEORGE BAKER
ADD. PERSONS	DEVIN CLAAR BILL JOHANNING
CO. GEOLOGIST	WILLIAM HOFFMAN

LOG INTERVAL

DEPTHS: 144' **TO** 14,015'
DATES: 12-19-2010 **TO** 01-16-2011
SCALE: 1" = 100'

CASING DATA

16" **AT** 144'
10.75" **AT** 4,528'
7" **AT** 9,967'
AT

HOLE SIZE

20" **TO** 144'
14.75" **TO** 4,528'
9.875" **TO** 10,067'
6.125" **TO** 14,015'

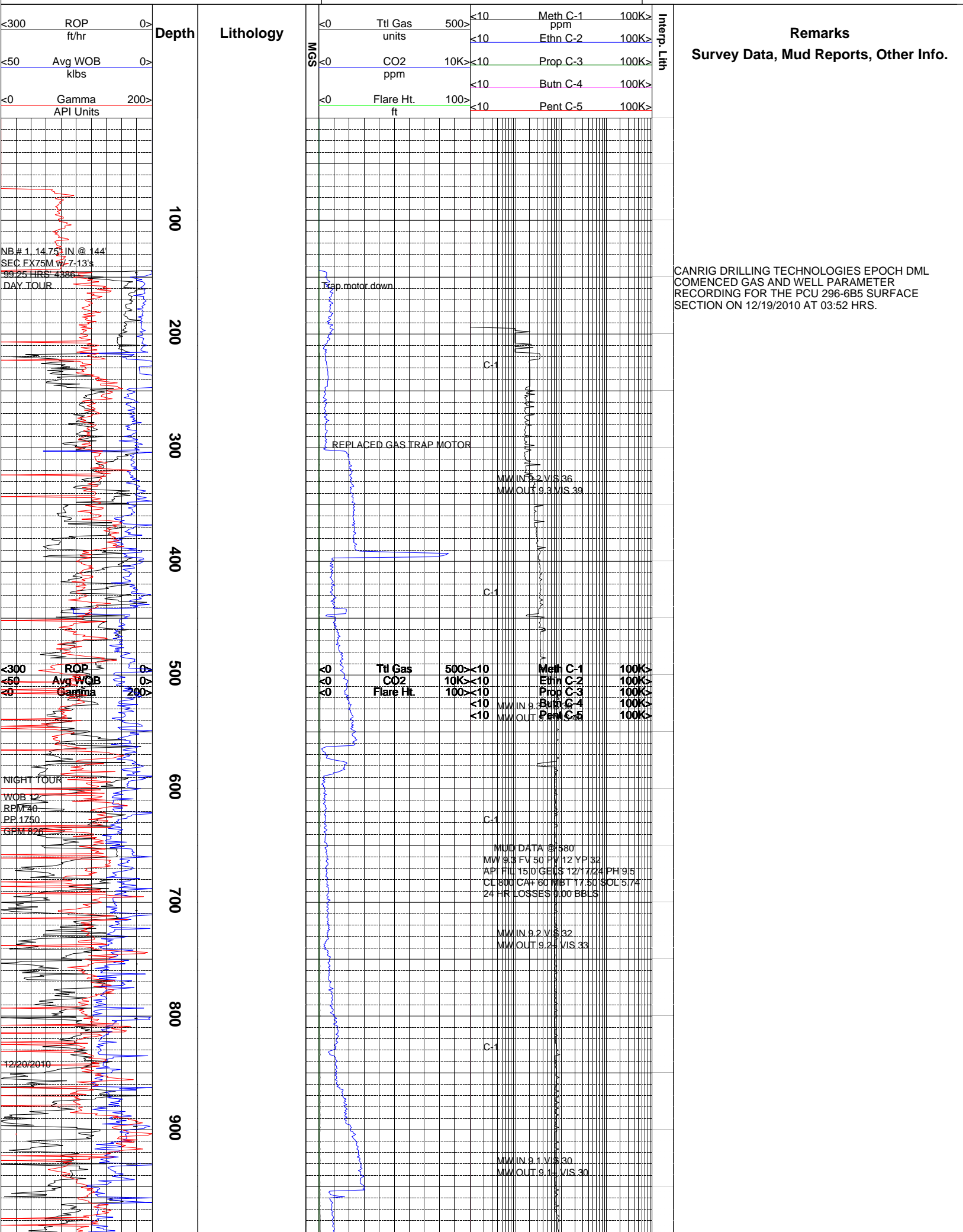
MUD TYPES

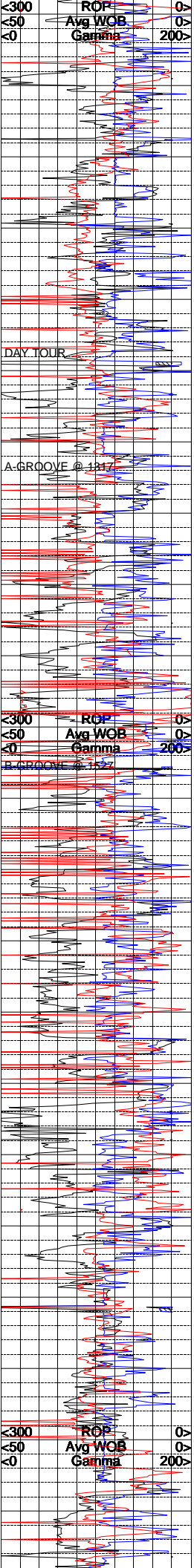
LSND **TO** 14,015'
TO
TO
TO

ABBREVIATIONS

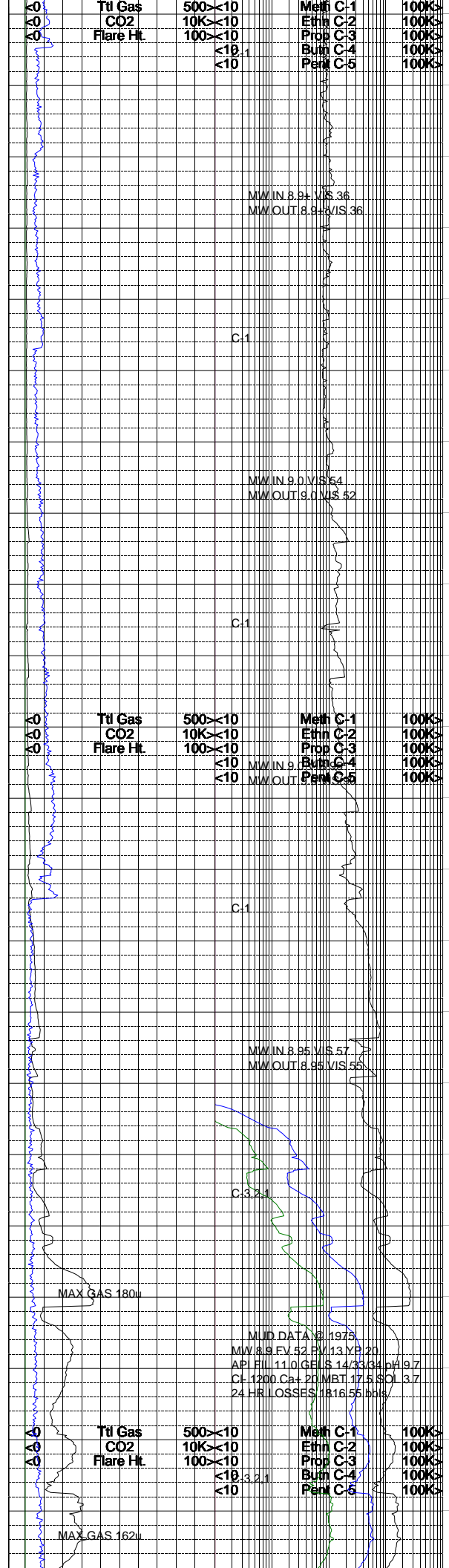
<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</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	





1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000



1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000

MW IN 8.9+ V/S 36
MW OUT 8.9+ V/S 36

C.1

MW IN 9.0 V/S 54
MW OUT 9.0 V/S 52

C.1

MW IN 9.0 V/S 54
MW OUT 9.0 V/S 52

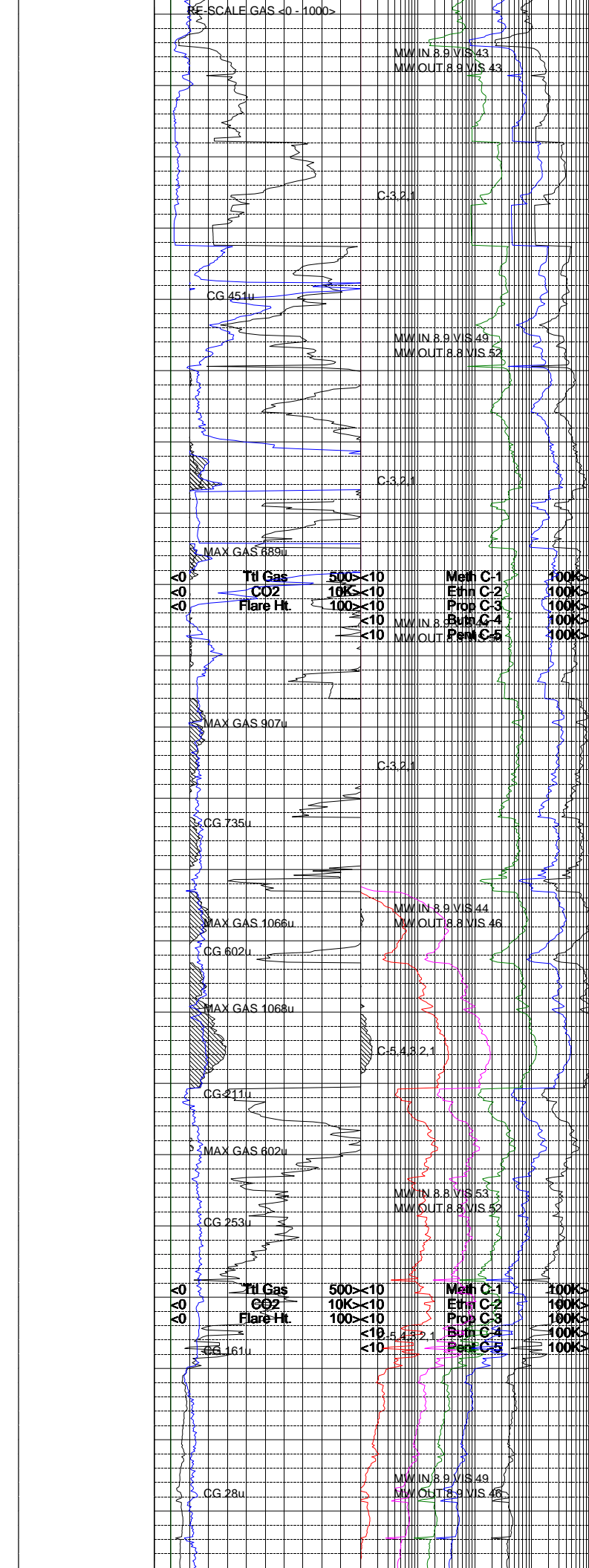
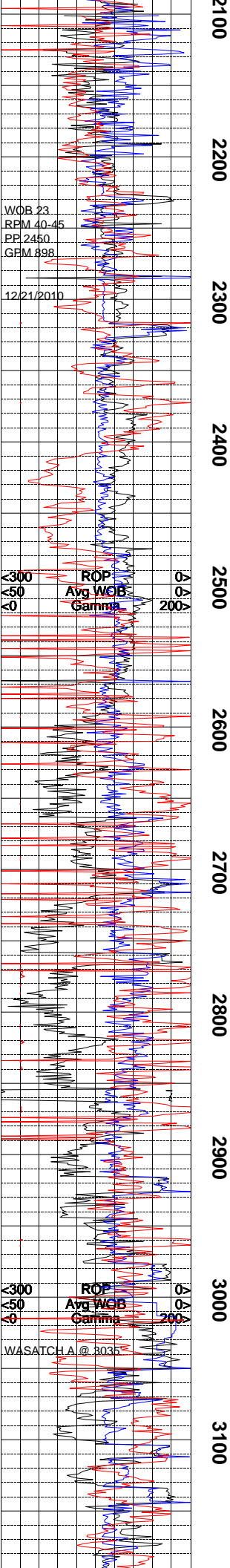
C.1

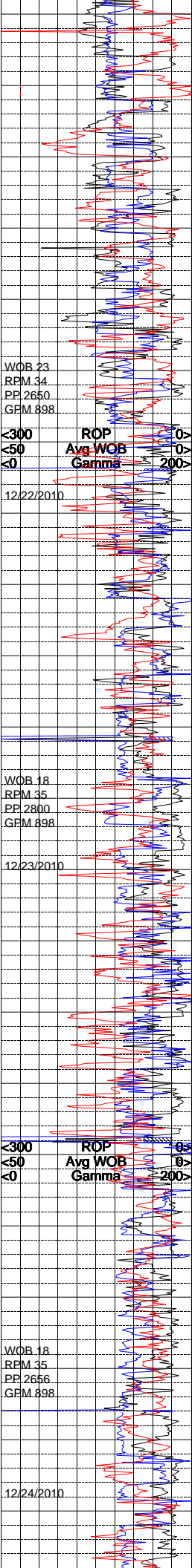
MW IN 8.95 V/S 57
MW OUT 8.95 V/S 55

C.3 2.4

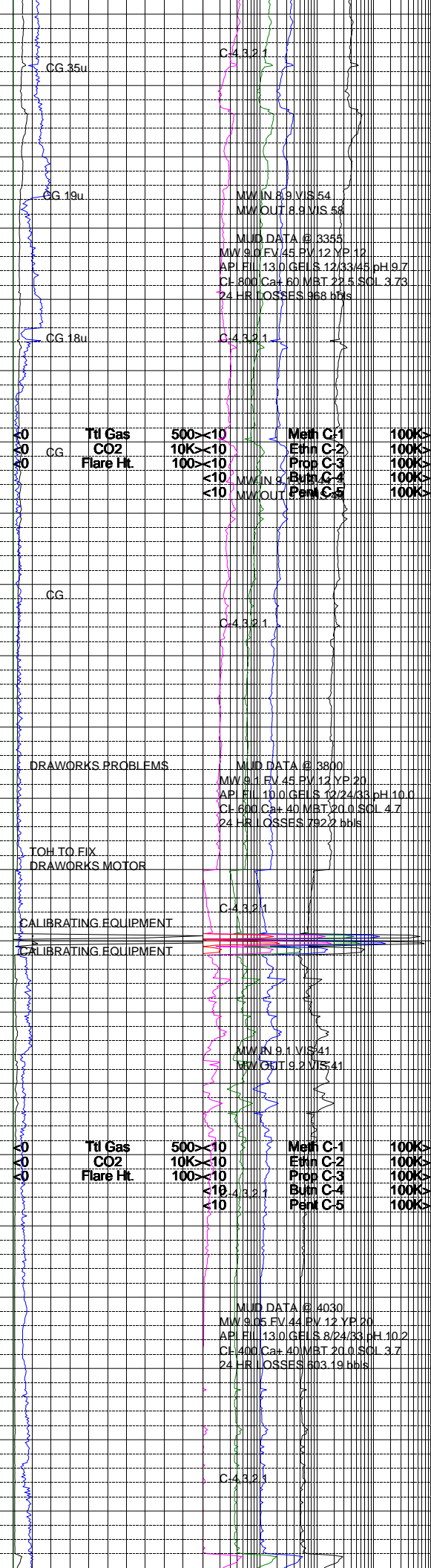
MUD DATA @ 1975
MW 8.8 FV 52 PV 13 YP 20
API FIL 11.0 GEL S 14/33/34 pH 9.7
CL 1200 Ca+ 20 MBT 17.5 SOL 3.7
24 HR LOSSES 1816.55 bbl

Meth C-1
Ethn C-2
Prop C-3
Butn C-4
Pent C-5



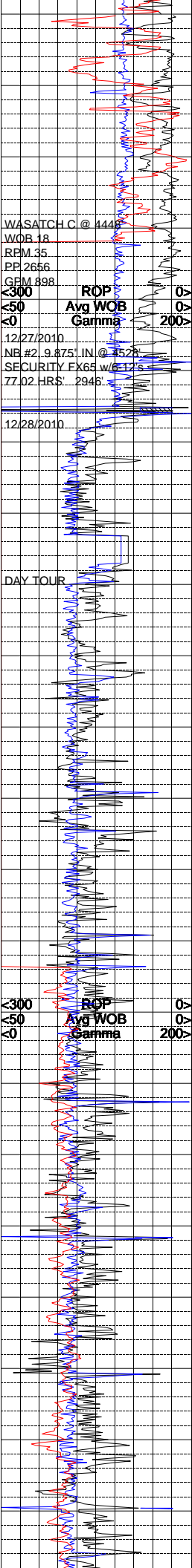


3200
3300
3400
3500
3600
3700
3800
3900
4000
4100
4200

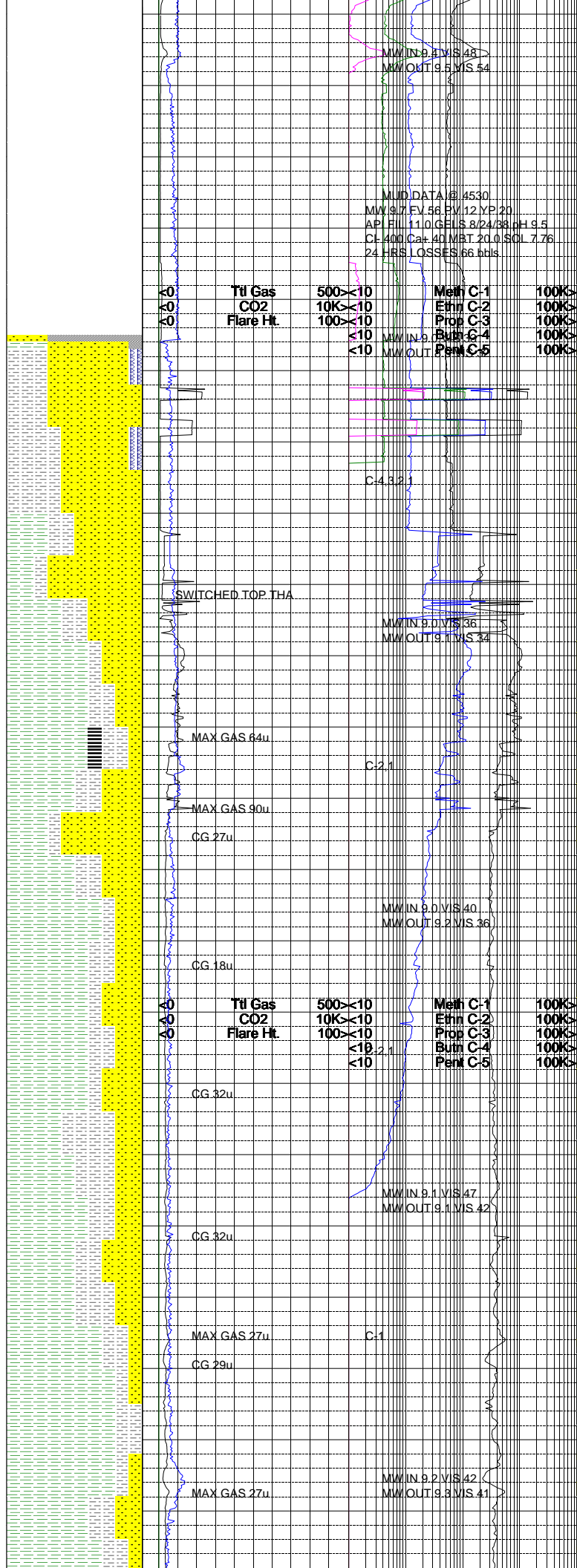


NOTE: DEPTH NOT TRACKING. TROUBLE SHOOTING DRAWWORKS MOTOR AND SENSORS.

NOTE: TOH CHECK BIT FIX DRAWWORKS MOTOR 12/22/2010 @ 15:30HRS. RESUMED DRILLING AHEAD 12/23/2010 05:00 HRS.



4300
4400
4500
4600
4700
4800
4900
5000
5100
5200
5300



NOTE = REACHED CASING POINT 12/24/2010
BEGAN TRIPPING OUT OF HOLE AT 16:30 HRS.
RESUMED DRILLING AHEAD IN INTERMEDIATE
SECTION 12/28/2010 AT 02:13 HRS

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 LOGGING
OPERATION ON 12/17/2010 @ 16:25 HRS AT A
DEPTH OF 144'.

SURVEY DATA AT 4530 MD
INCL: 0.80
AZIM: 80.79
TVD: 4420.16

SHALE = YLWISH GRY, YLWISH BRWN WITH
HUES OF REDDISH BRWN; GRY; COMMON
MOTTLED APPEARANCE; DENSE TO CRUNCHY
TENACITY WITH MASSIVE TO SUB TABULAR OCC
SUB WEDGELIKE CUTTINGS HABIT; DOMINANTLY
IRREGULAR FRACTURE OCC HACKLY; EARTHY
GRITTY TO SMOOTH TEXTURE WITH DULL TO
SL WAXY TEXTURE WHERE SMOOTH; GRADES TO
AND INTERBEDDED WITH SILTSTONE.

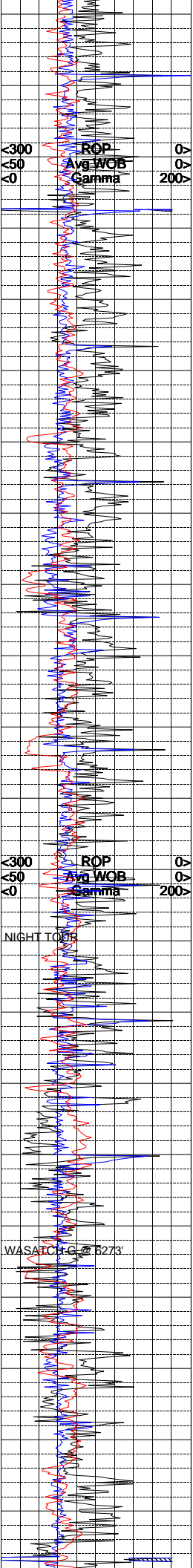
SHALE = YLWISH GRY, YLWISH TAN WITH OCC
HUES OF REDDISH BRWN; GRY; COMMON
MOTTLED APPEARANCE; DENSE TO CRUNCHY
TENACITY WITH MASSIVE TO SUB TABULAR OCC
SUB WEDGELIKE CUTTINGS HABIT; DOMINANTLY
IRREGULAR FRACTURE OCC HACKLY; EARTHY
GRITTY TO SMOOTH TEXTURE WITH DULL TO
SL WAXY TEXTURE WHERE SMOOTH; GRADES TO
AND INTERBEDDED WITH SILTSTONE.

SANDSTONE = LT GRY, GRY, GRY WITH HUES
YLW TAN; INDIVIDUAL GRAINS ARE TANSP
TO OPAQUE; SUB ANGULAR TO SUB ROUND
WITH LOW TO OCC MODERATE SPHERICITY;
OVERALL MODERTELY SORTED; HARD TO
FRIABLE; DOMINANTLY CONSOLIDATED;
CLUSTERS ARE GRAIN SUPPORTED IN A CALC/
CLAY CEMENT; SL TO MODERATE REACTION TO
DILUTE HCL; SL TO NO INCREASE IN DITCH
GAS; ACCESSORIES INCLUDE DARK LITHIC AND
MAFIC FRAGMENTS LESS THAN 3%.

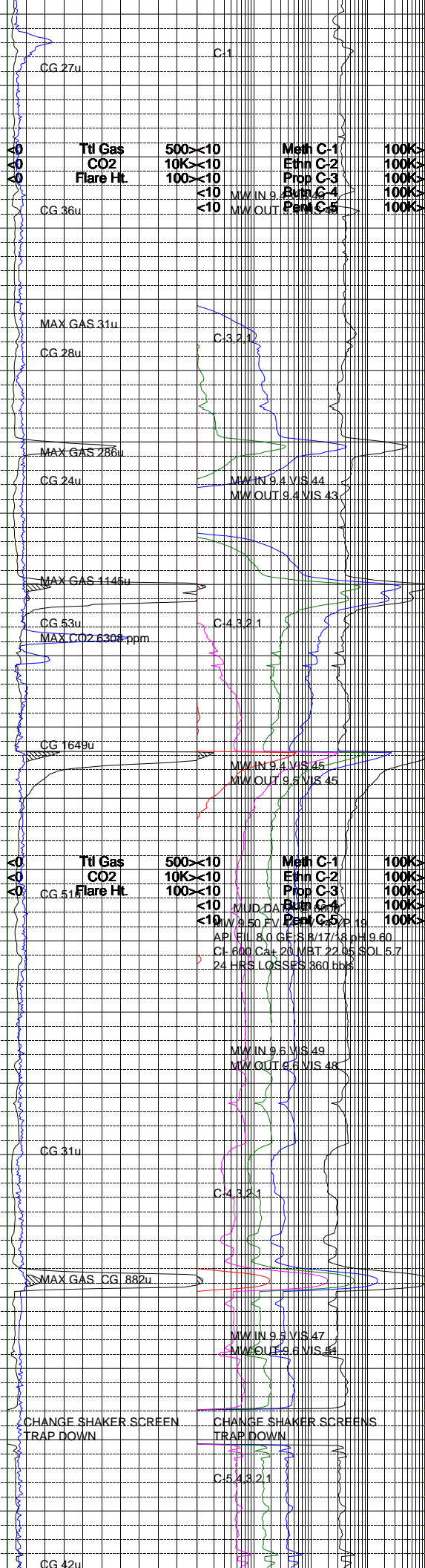
SHALE = YLW GRY, YLW TAN, GRY, GRY WITH
PURPLE HUES, MOTTLED APPEARANCE; DENSE
TO CRUNCHY TENACITY OCC SUB SECTILE
WHEN HYDRATED; EARTHY TO SMOOTH OCC
GRITTY TEXTURE WITH DULL EARTHY TO SL
WAXY LUSTER; MASSIVE TO SUB TABULAR
CUTTINGS HABIT WITH IRREGULAR TO HACKLY
FRACTURE; BECOMES SILTY IN PLACES.

NOTE= VERY POOR QULITY SAMPLE.
DOMINANTLY CAVINGS. HI VIS SWEEPS EVERY
STAND.

SHALE = YLWISH GRY, YLWISH TAN WITH OCC



5400
5500
5600
5700
5800
5900
6000
6100
6200
6300
6400



HUES OF REDDISH BRWN; GRY; COMMON
MOTTLED APPEARANCE; DENSE TO CRUNCHY
TENACITY WITH MASSIVE TO SUB TABULAR OCC
SUB WEDGELIKE CUTTINGS HABIT; DOMINANTLY
IRREGULAR FRACTURE OCC HACKLY; EARTHY
GRITTY TO SMOOTH TEXTURE WITH DULL TO
SL WAXY TEXTURE WHERE SMOOTH; GRADES TO
AND INTERBEDDED WITH SILTSTONE.

SANDSTONE = LT GRY, GRY, GRY WITH HUES
YLW TAN; GRY WITH HUES OF REDDISH BRWN;
SUB ANGULAR TO SUB ROUND; FINE TO UPPER
MEDIUM GRAINED WITH LOW SPHERICITY;
OVERALL POORLY SORTED; FIRM TO
FRIABLE; DOMINANTLY CONSOLIDATED;
CLUSTERS ARE GRAIN SUPPORTED IN A CALC/
CLAY OCC SILICEOUS CEMENT.

SILTSTONE = GRY WITH REDDISH BRWN HUES;
GRY, REDDISH BRWN; TOUGH TO DENSE
TENACITY WITH MASSIVE CUTTINGS HABIT;
IRREGULAR TO HACKLY FRACTURE; GRADES
BACK AND FORTH BETWEEN SANDSTONE AND
SHALE; INTERBEDDED WITH SAME; FINE
GRAINED; VARIES GRAIN TO MATRIX SUPPORT;
OCC MOTTLED APPEARANCE.

SANDSTONE = LT GRY, GRY WITH HUES OF WHT
UPPER MEDIUM GRAINED; INDIVIDUAL GRAINS
ARE TRANSP TO OPAQUE; SUB ANGULAR OCC
SUB ROUND; DOMINANTLY CONSOLIDATED
WELL SORTED; GRAIN SUPPORTED IN A CALC/
CLAY CEMENT; ACCESSORIES INCLUDE
DARK LITHIC AND MAFIC FRAGMENTS 3-5%
LENDING TO A SL SALT AND PEPPER
APPEARANCE; MODERATE REACTION TO DILUTE
HCL; MARKED INCREASE IN DITCH GAS.

SHALE = YLWISH GRY, YLWISH TAN WITH OCC
HUES OF REDDISH BRWN, GRY; COMMON
MOTTLED APPEARANCE; DENSE TO CRUNCHY
TENACITY WITH MASSIVE TO SUB TABULAR OCC
SUB WEDGELIKE CUTTINGS HABIT; DOMINANTLY
IRREGULAR FRACTURE OCC HACKLY; EARTHY
GRITTY TO SMOOTH TEXTURE WITH DULL TO
SL WAXY TEXTURE WHERE SMOOTH; OCC
LAMINATIONS.

SANDSTONE = REDDISH BRWN, BRWN, BRWN
WITH HUES OF GRY, LT GRY; FINE GRAINED
OCC UPPER MEDIUM; TRANSP TO OPAQUE
SUB ANGULAR TO SUB ROUND LOW TO OCC
MODERATE SPHERICITY; MODERATELY TO
POORLY SORTED; DOMINANTLY CONSOLIDATED;
FIRM TO FRIABLE; OCC MARKED INCREASE IN
DITCH GAS.

SILTSTONE = GRY WITH REDDISH BRWN HUES;
REDDISH BRWN, BRWN; TOUGH TO DENSE
TENACITY WITH MASSIVE CUTTINGS HABIT;
IRREGULAR TO HACKLY FRACTURE; GRADES
BACK AND FORTH BETWEEN SANDSTONE AND
SHALE.

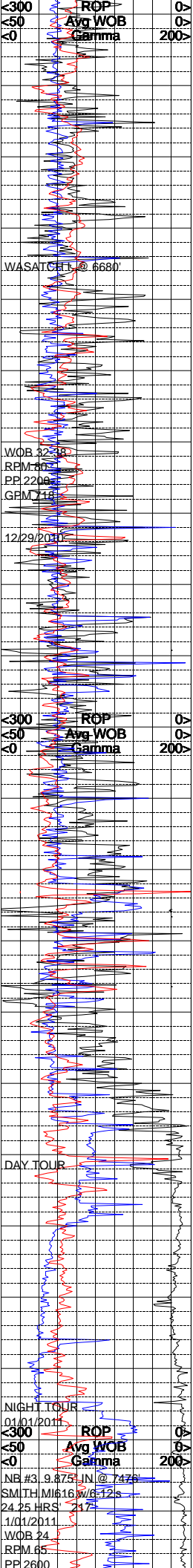
SHALE = LIGHT GRAY, GRNISH GRAY, DULL
GRAY, SME BROWNISH GRAY; CRUMBLY TO
DENSE TENACITY; SUB BLOCKY, BLOCKY SLI
IRREGULAR FRACTURE; TABULAR, SME SUB
MASSIVE, TRC WEDGELIKE CUTTINGS HABIT;
DULL EARTHY, WAXY IN PART LUSTER; SMOOTH
GRADING TO SLI GRITTY TEXTURE; NO VISUAL
STRUCTURE; TRACE MICRO SPECKLED BLACK
LITHIC / SHALE DISSEMINATED IMBEDDED.

SANDSTONE = LT BROWNISH GRAY, LT YELLWIS
BRWN, SME OFF WHITE; VF TO MOD COARSE
GRAIN; DOM SUB ANGULAR W/SME GRADING TO
SUB ROUND; POOR TO MOD SPHERICITY; TIGHT
FRIABLE TO MOD HARD; MOD SORTED; SME
KAOL/CALCAREOUS CEMENT; FAIR GRAIN
SUPPORT; TRACE BLACK LITHIC/DARK SHALE
SPECKLED IMBEDDED; NO VISUAL INTER
GRANULAR POROSITY.

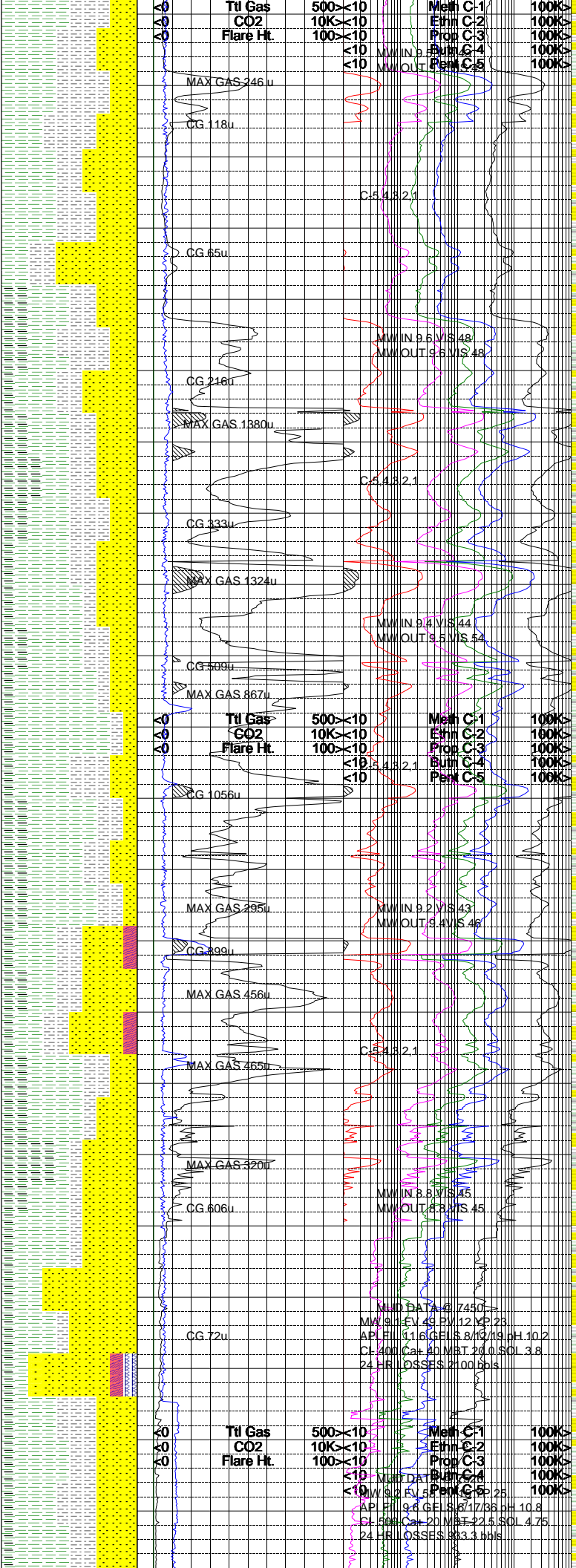
SILTSTONE = LIGHT GRAY, MOD DARK GRAY;
SME BROWNISH GRAY; TOUGH TO DENSE
TENACITY; SUB BLOCKY TO IRREGULAR
FRACTURE; SUB TABULAR TO SUB MASSIVE
CUTTINGS HABIT; DULL, SME SPARKLING TO
EARTHY LUSTER; SILTY, WITH SMEN GRITTY
TEXTURE; TRACE LIGHT BROWNISH VERY
FINE SANDSTONE IMBEDDED LAMINATE.

SANDSTONE = TRANSLUCENT TO OPAQUE, OFF
WHITE, SMALL CLUSTERS TO INDIVIDUAL
GRAINS, SME LIGHT GRAYISH WHITE; UPPER
VERY FINE TO UPPER FINE GRAIN, WELL
SORTED; EASILY FRIABLE TO FRIABLE; DOM
SUB ANGULAR GRADING TO SUB ROUND
MOD SPHERICITY; WEAK GRAIN SUPPORT;
DOM SILICA MATRIX CEMENT, TRACE CALC
CEMENT; GOOD VISUAL INTER GRANULAR
POROSITY; SPIKE GAS SHOW JUST AFTER
THE WASATCH G @ 6273' MD.

SANDSTONE = LT GRAYISH OFF WHITE, BLUISH
GRAY, SME MOTTLED HUES OF MOD GRAY;
TRACE INDIVIDUAL TRANSPARENT TO TRANSLU-
CENT GRAINS, UPPER VERY FINE TO LOWER
FINE GRAIN, SOME SMALL CLUSTERS, BROKEN



5500
6600
6700
6800
6900
7000
7100
7200
7300
7400
7500



APART POSSIBLE BY PDC BIT; DOM FINE TO LOWER MED GRAIN; WELL SORTED; SUB ANGULAR GRADING TO SUB ROUND; MOD SPHERICITY; EASILY FRIABLE TO FRIABLE TO SME FIRM IN PART; DOM SILICA MATRIX CEMENT TRACE CLAY/CALC CEMENT; WEAK GRAIN SUPPORT; WEAK REACTION TO HCL SOLUTION; TRACE VERY DARK GRAY/ MOD BLACK SPECKLED LITHIC/SHALE IMBEDDED; SPIKE GAS OF 246 UNITS, BACKGROUND GAS RELATIVE LOW.

CARBONACEOUS SHALE = DARK BLACKISH BROWN, DARK GRAYISH BROWN, DARK GRAY, DARK BROWNISH HUES; CRUMBLY, DENSE, SME CRUNCHY TENACITY; TRACE PYRITIC LAMINATE/ SPECKLED IMBEDDED; SUB TABULAR TO SME SUB WEDGELIKE CUTTINGS HABIT; SUB BLOCKY, BLOCKY, IRREGULAR IN PART FRACTURE; DULL, EARTHY, SME SLI WAXY, TRACE SPARKLING LUSTER; GRITTY, SLI GRAINEY, SME SILTY TEXTURE; TRACE BLACK LITHIC/COALY SPECKLED/LAMINATE IMBEDDED.

SANDSTONE = LIGHT GRAY, LIGHT BROWNISH TAN, TRACE BROWNISH GRAY, SME HUES OF MOD GRAY; DOM LOWER AND UPPER FINE GRAIN SME INDIVIDUAL TRANSLUCENT/OPAQUE SML GRAIN CLUSTERS; FRIABLE GRADING TO FIRM; POOR TO FAIR SORTED; DOM SUB ANGULAR W/ SME SUB ROUNDED; MOD LOW SPHERICITY; BROWNISH CLAYEY/CALC CEMENT, TRACE SILICA MATRIX CEMENT, LOW HCL REACTION; POOR VISUAL INTER GRANULAR POROSITY; TRACE DARK GRAY/BLACKISH LITHIC/CARBON ACEOUS SHALE SPECKLED IMBEDDED.

SHALE = GRAY, DARK GRAY, BROWNISH GRAY, HUES OF MOD GRAYISH BROWN, TRACE DARK BROWNISH BLACK CARBONACEOUS SHALE LAMINATE; CRUMBLY, SME DENSE TENACITY; SUB BLOCKY, BLOCKY, TRACE PLANAR, IRREG FRACTURE; WEDGELIKE, PLATY, TABULAR IN PART CUTTINGS HABIT; DULL, EARTHY, SME WAXY, TRACE SPARKLING LUSTER; GRITTY TO SLI GRANULAR TEXTURE; TRACE LIGHT BROWN VERY FINE SANDSTONE IMBEDDED.

CARBONACEOUS SHALE = DARK BROWNISH GRAY, BLACKISH BROWN, DARK HUES GRAYISH BROWN; TRACE PYRITIC SPECKLED OCC LAMINATE; CRUNCHY, DENSE IN PART TENACITY; SUB BLOCKY, IRREGULAR SME PLANAR FRACTURE; WEDGELIKE, TABULAR, SME PLATY CUTTINGS HABIT; DULL, SLI WAXY EARTHY, SME SPARKLING LUSTER; SILTY, GRADING TO GRITTY, TRACE SANDSTONE GRANULAR TEXTURE; TRACE BLACK COALY/ LITHIC DISSEMATED IMBEDDED.

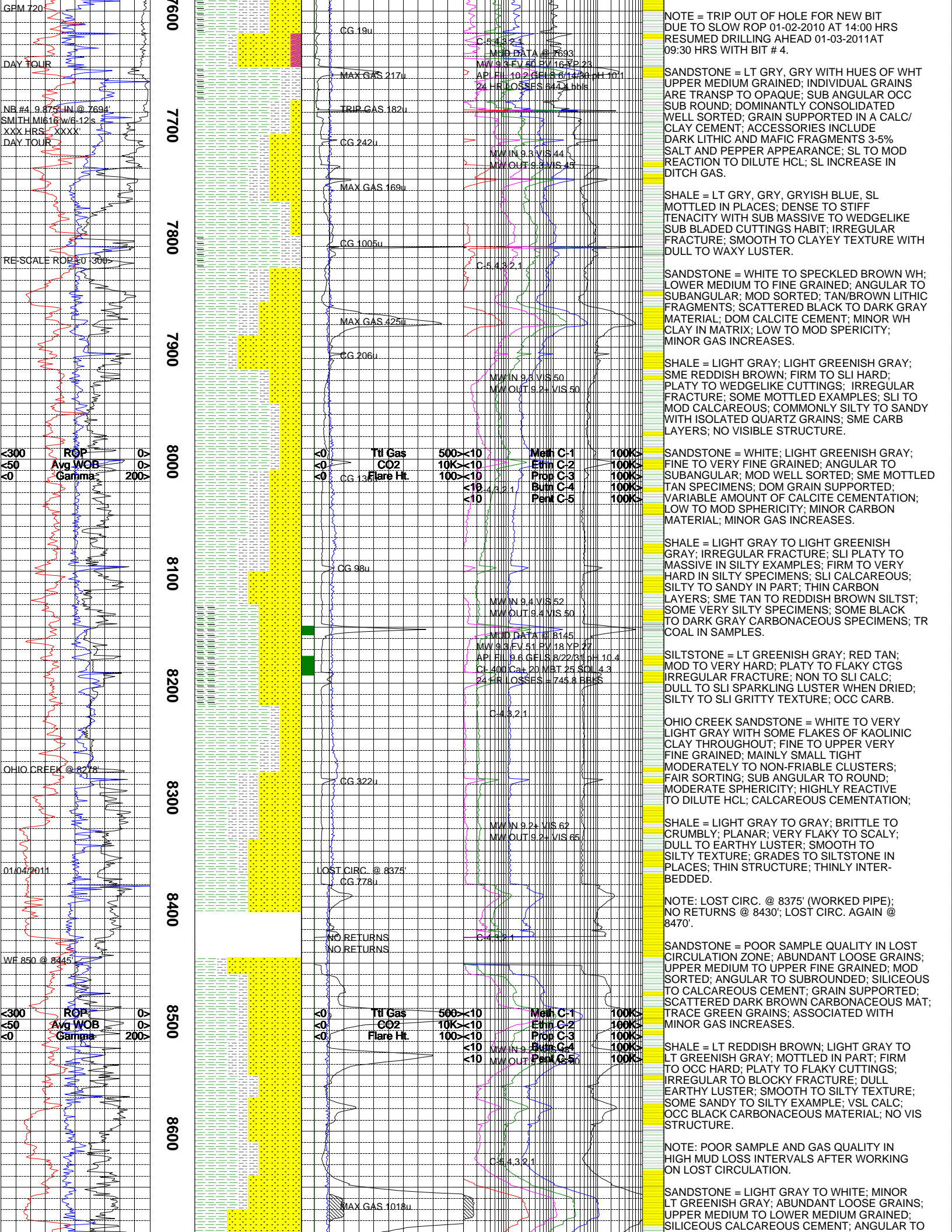
SANDSTONE = LIGHT YELLOWISH BROWN, LIGHT BROWNISH GRAY, LIGHT GRAY; DOM UPPER FINE, SME UPPER VERY FINE/LOWER FINE GRAIN; FAIR TO GOOD SORTED; SUB ANGULAR GRADING TO SUB ROUND, MOD SPHERICITY; FRIABLE TO FIRM TO SME HARD; DOM LT BROWNISH CLAYEY/ WEAK CALC CEMENT, TRACE SILICA MATRIX CEMENT; LOW HCL REACTION; FAIR GRAIN SUPPORTED; TRAC BLACKISH/BROWN CARBONACEOUS SHALE/ LITHIC LAMINATE, SOME DISSEMATED IMBEDDED; TRACE YELLOW BROWN SILTY SILTSTONE LAMIATED.

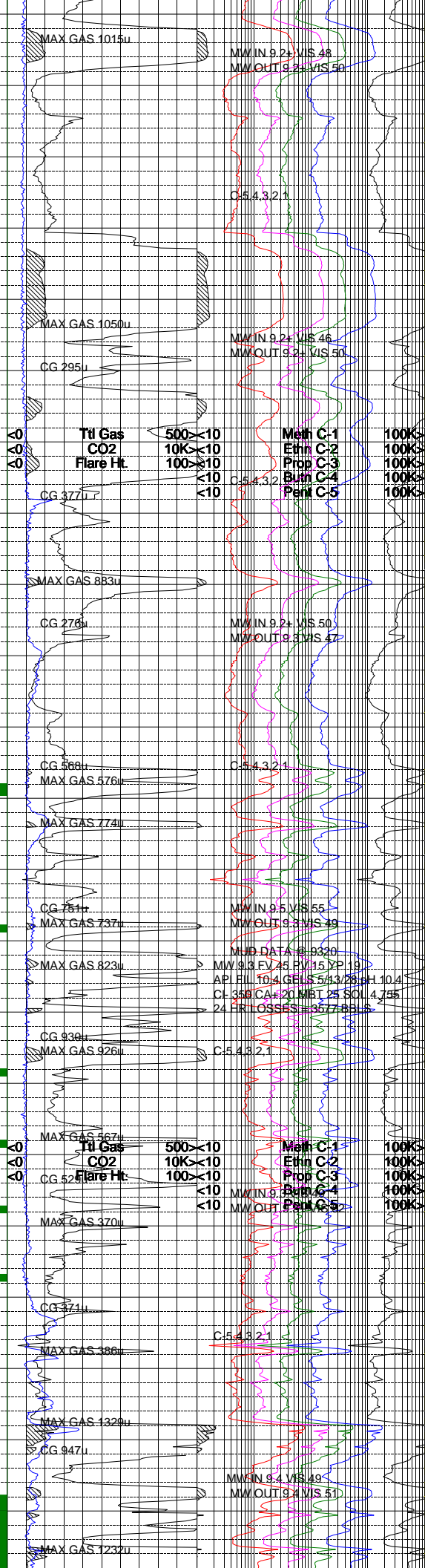
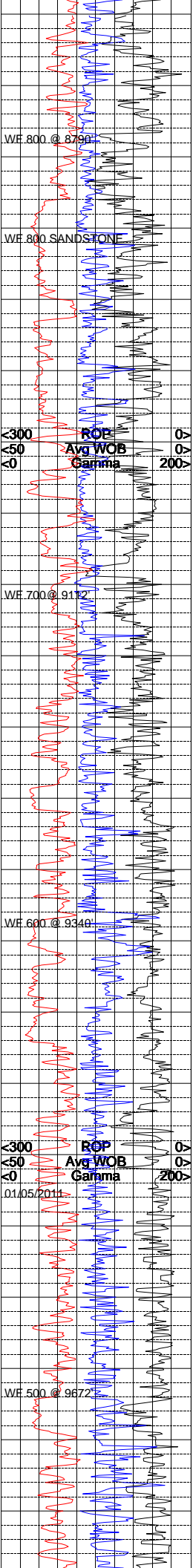
CARBONACEOUS SHALE = DARK BROWN, BLACK, DENSE TO CRUNCHY TENACITY WITH SUB TABULAR TO SUB PLATY CUTTINGS HABIT OCC WEDGELIKE; IRREGULAR TO HACKLY FRACTURE WITH PLANAR FRACTURE WHERE PLATY; OCC OCCURS AS LAMINATIONS; MODERATELY TO STRONGLY PYRITIC; SMOOTH TO SL EARTHY TEXTURE WITH EARTHY TO WAXY TO OCC SUB VITREOUS LUSTER; GRADES TO AND INTER BEDDED WITH SHALES. SL TO MODERATE INCREASE IN DITCH GAS; NO REACTION TO DILUTE HCL.

SHALE = GRAY, DARK GRAY, BROWNISH GRAY, HUES OF LT GRAYISH BROWN, OCCASIONAL DARK BRWNHSH BLACK CARBONACEOUS MATERIAL LAMINAE; DENSE TO CRUMBLY TENACITY WITH MASSIVE TO SUB TABULAR CUTTINGS HABIT; IRREGULAR FRACTURE OCC PLANAR WHEN LAMINATED OR PLATY, OCC SL PYRITIC IN PLACES. EARTHY TO WAXY TEXTURE OCC GRANULAR IN PLACES; DULL TO WAXY LUSTER OCC SL SPARKLY WHEN BECOMING SILTY.

NOTE=TOH FOR NEW BIT @ 7473' MD 12-29-10 RESUMED DRILLING AHEAD 01-01-11 @ 13:02 HRS.

SANDSTONE = LT BLUISH GRY, OFF WHITE, LT GRAY, TRACE SALT AND PEPPER APPEARANCE, DOM W SORTED; SUB ANGULAR GRADING TO LOW SUB ROUNDED; MOD SPHERICITY; FRIABLE TO FIRM AND HARD; SILICA MATRIX CEMENT; TRACE CLAYEY/CALC CEMENT, WEAK HCL REACT FAIR TO POOR VISUAL INTER GRANULAR PORO; TRCE BLACK SPECKLED CARBONACEOUS SHALE/ LITHIC IMBEDDED; VERY LOW BACKGROUND GAS





SUBBOUNDED; MOD WELL SORTED; GRAIN SUPPORTED; LOW TO MOD SPHERICITY; SCATT BLACK MAFIC AND CARBONACEOUS GRAINS; TR GREEN GRAINS; SOME SILICEOUS WHITE CLAY IN MATRIX; TRACE MICA; RARE BLACK COALY LAMINATIONS; ASSOCIATED WITH MODERATE GAS INCREASES; THIN WHITE CALCITE LAYERS FRACTURE FILL MATERIAL IN THE 8760-8790' SAMPLE.

SHALE = LT GRAY; SOME GREENISH GRAY; FIRM TO MOD HARD; PLATY TO FLAKY TO WEDGELIKE CUTTINGS; IRREGULAR FRACTURE; VSL CALCAREOUS; GRADING TO SILTSTONE; DULL EARTHY TO WAXY WHEN DRIED; SMOOTH TO ROUGH TEXTURE; NO VISIBLE STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY; UPPER TO LOWER MEDIUM GRAINED; ANGULAR TO SUBBOUNDED; MOD SORTED; OCC SALT AND PEPPER APPEARANCE WITH SCATTERED BLACK MAFIC FRAGMENTS AND CARBONACEOUS MAT; SILICEOUS/CALC CEMENT WITH SME SILICEOUS WHITE CLAY FILL; GRAIN SUPPORTED; ASSOC WITH MODERATE GAS INCREASES; TRACE AMT OF FLAT WHITE FRACTURE FILL CALCITE IN 8940'-8970' SAMPLE.

SHALE = MEDIUM TO DARK BROWN; SME MOTTLED GRAYBROWN; MOD TO VERY HARD; PLATY TO MASSIVE CUTTING HABIT; IRREG TO BLOCKY FRACTURE; DULL EARTHY LUSTER; NON CALCAREOUS; SME VERY SILICEOUS EXAMPLES; SME THIN BLACK CARBONACEOUS LAMINATIONS; NO VISIBLE STRUCTURE.

SANDSTONE = WHITE TO LIGHT GRAY; LOWER MEDIUM TO UPPER FINE GRAINED; ABUNDANT LOOSE GRAINS; ANGULAR TO SUBANGULAR; MOD WELL SORTED; DOM SILICEOUS CEMENT WITH MINOR CALCITE; GRAIN SUPPORTED; SOME VERY HARD AND TIGHT SILICEOUS SPECIMENS; 5% UNIDENTIFIED BLACK GRAINS; ASSOCIATED WITH MINOR GAS INCREASES.

SHALE = LIGHT GRAY TO MEDIUM GRAY; SME MEDIUM BROWN EXAMPLES; PLATY TO FLAKY CUTTINGS; SME MASSIVE VERY HARD SILIC SPECIMENS; NON TO VSL CALCAREOUS; IRREG FRACTURE; DULL EARTHY TO WAXY LUSTER; SMOOTH TO ROUGH TO SILTY TEXTURE; SILTY EXAMPLES.

SANDSTONE = WHITE TO LIGHT BROWN; LOWER MEDIUM TO UPPER FINE GRAINED; ANGULAR TO SUBANGULAR; HARD PRESERVED SPECIMENS; MOD W SORTED; CALCITE CEMENT W/ MINOR SILICEOUS FILL; DARK BROWN TO BLACK CARB MATERIAL; MINOR GAS INCREASES; HIGHLY REACTIVE TO DILUTE HCL; STARTS TO BECOME THINNER ALTERNATING BEDS WITH SHALE AND OCC. SILTSTONE.

SHALE = REDDISH BROWN TO GRAY TO LIGHT GRAY; TOUGH TO BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURE; MASSIVE TO FLAKY CUTTINGS HABIT; DULL TO EARTHY LUSTER; SMOOTH TO SILTY TEXTURE; GRADES TO A SILTSTONE IN PLACES; THIN STRUCTURE THINLY INTERBEDDED.

SANDSTONE = WHITE TO LIGHT GRAY SOME CLEAR TO TRANSLUCENT; VERY FINE TO UPPER VERY FINE GRAINED; WELL SORTED; SUB ROUND TO SUB ANGULAR; MODERATE SPHERICITY; MODERATE REACTION TO DILUTE HCL; CALCAREOUS TO GRAIN SUPPORTED CEMENTATION; MODERATE INCREASE IN DITCH GAS.

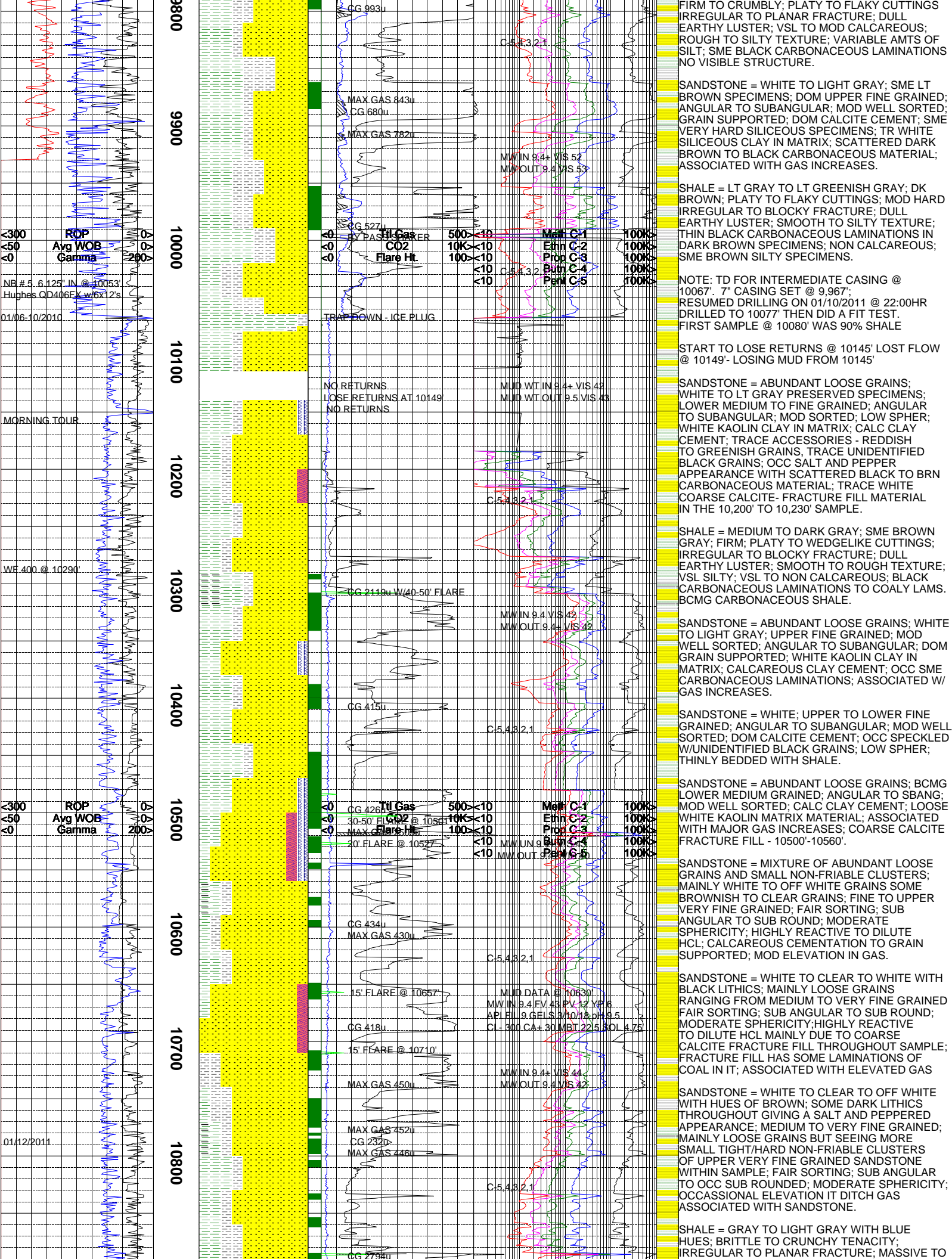
SILTSTONE = BROWN TO BROWNISH GRAY; TOUGH TO DENSE TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO TABULAR CUTTINGS HABIT; DULL TO SLIGHTLY SPARKLING LUSTER; SILTY TO GRITTY TEXTURE; THIN STRUCTURE; VERY THINLY INTERBEDDED WITH SANDSTONE AND SHALE.

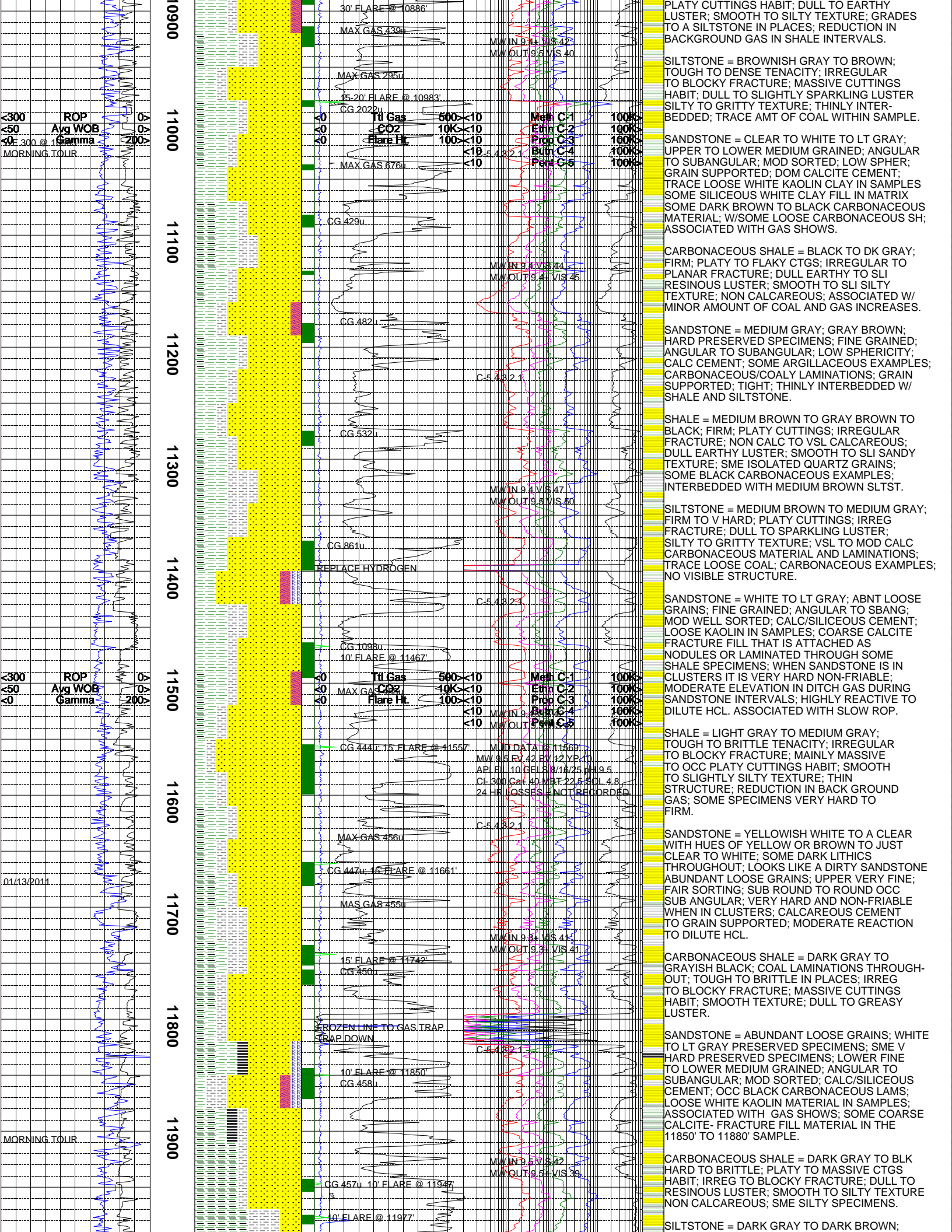
NOTE - GAS BUSTER TURNED ON EVERY HOUR BRIEFLY TO KEEP IT FROM FREEZING.

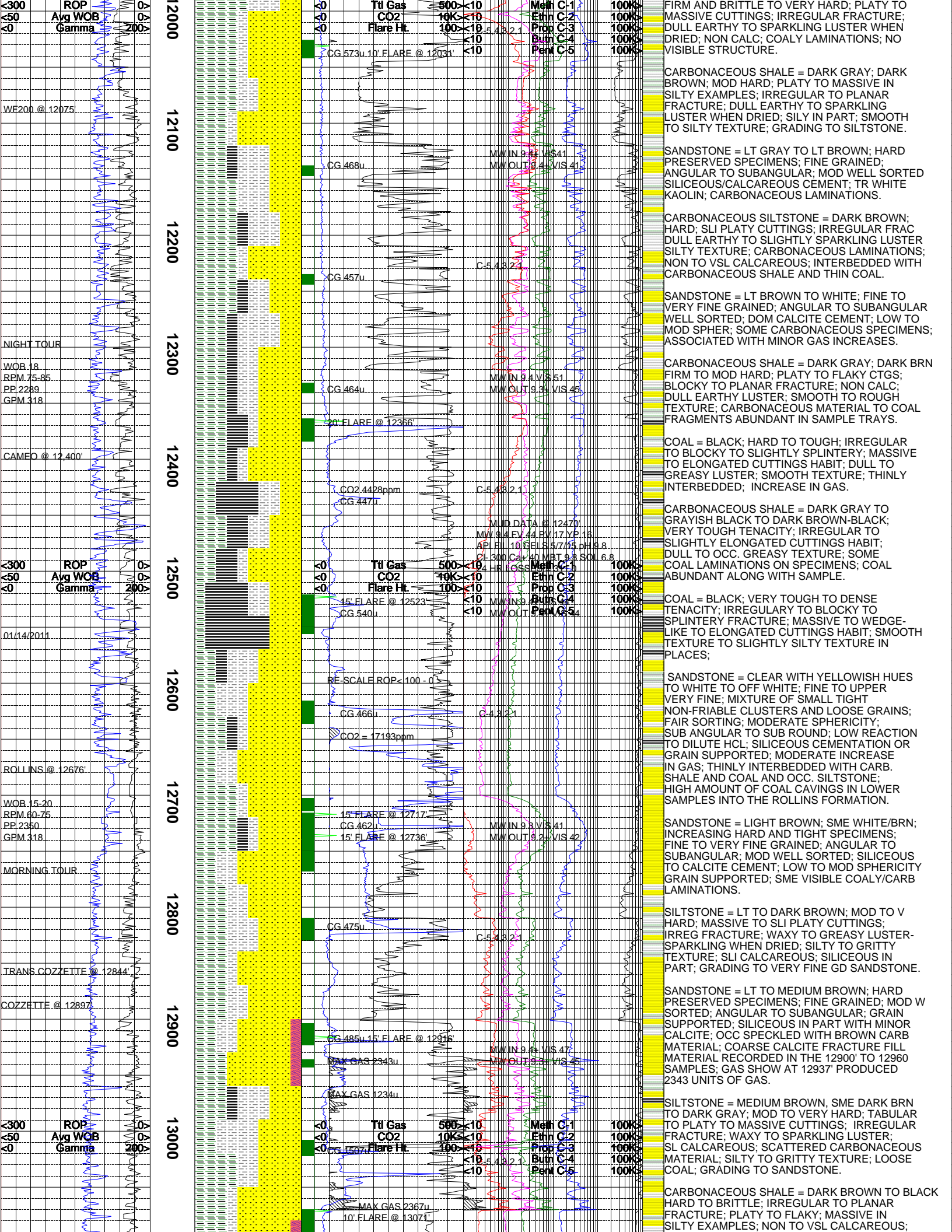
SANDSTONE = WHITE TO LIGHT GRAY TO CLEAR AND TRANSLUCENT GRAINS; ABUNDANT LOOSE GRAINS MIXED IN WITH SMALL TIGHT NON-FRIABLE CLUSTERS; FINE TO UPPER VERY FINE GRAINED; SUB ANGULAR TO ANGULAR - OCC ROUND; MODERATE TO LOW SPHERICITY; HIGHLY REACTIVE TO DILUTE HCL; CALCAREOUS CEMENTATION OR GRAIN SUPPORTED; MODERATE TO HIGH INCREASE IN BACKGROUND GAS.

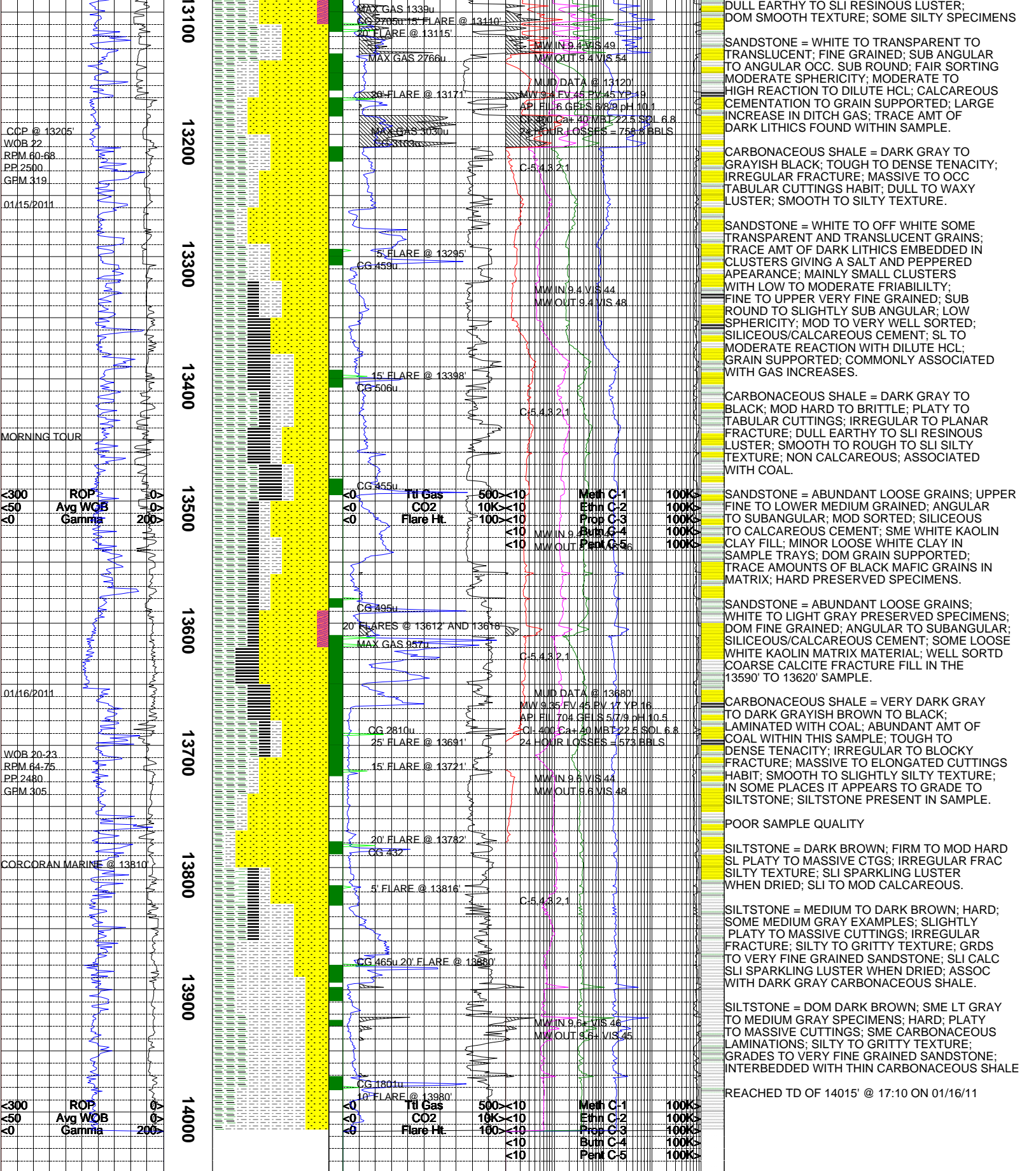
SHALE = GRAY TO LIGHT BLuish GRAY; BRITTLE TO VERY CRUMBLY TENACITY; PLANAR TO EARTHY FRACTURE; PLATY TO FLAKY CUTTINGS HABIT; DULL TO EARTHY LUSTER; SILTY TEXTURE; VERY THIN STRUCTURE; THINLY INTERBEDDED.

SHALE = BCMG DARK BROWN; DARK GRAY









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