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COMBO LOG MD

COMPANY ExxonMobil Oil Corporation
WELL PCU 297-11C5
FIELD Piceance Creek Unit
REGION Rocky Mountians
COORDINATES 39.895944 N
108.254506 W
ELEVATION GL: 6963'
RKB: 6993.2'
COUNTY, STATE Rio Blanco, CO
API INDEX 051031146500
SPUD DATE 12/19/2009
CONTRACTOR HP Drilling
CO. REP. M. Sadler / J. Wood
RIG/TYPE #326/ Flex-Rig 4
LOGGING UNIT #36
GEOLOGISTS J. Kokes / D. Thibodeaux
ADD. PERSONS H. Strickland / D. Evans
CO. GEOLOGIST Chris Alba

LOG INTERVAL

CASING DATA

DEPTHS: 3835' TO 12571'
DATES: 12/26/2009 TO 01/12/2010
SCALE: 1" = 100'

16" AT 150'
10 3/4" AT 3825'
7" AT 8673'
AT

MUD TYPES

HOLE SIZE

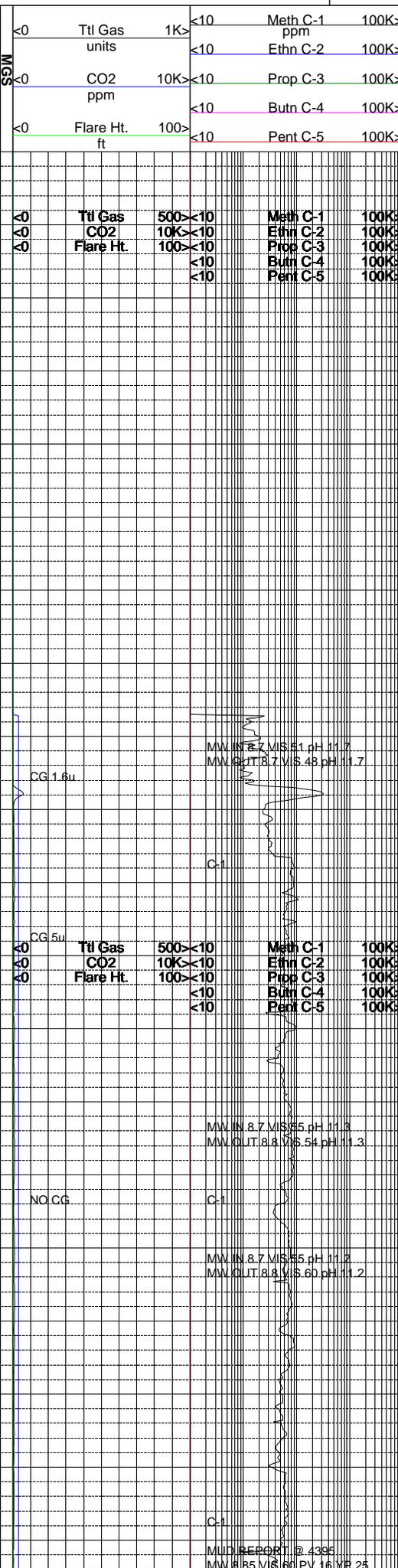
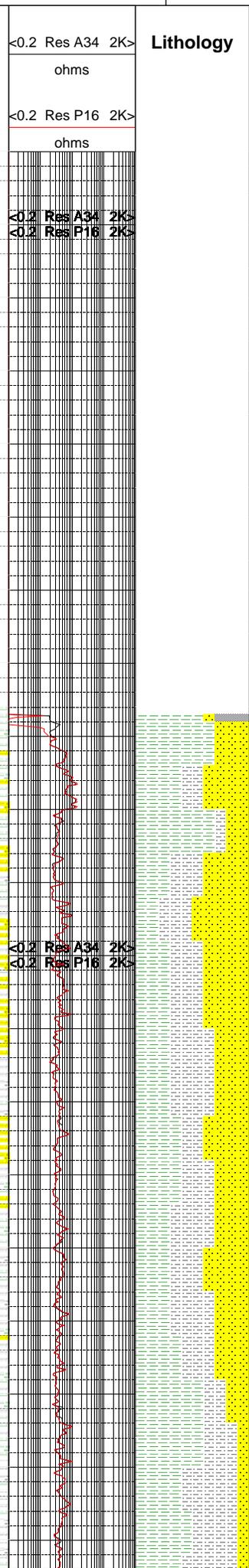
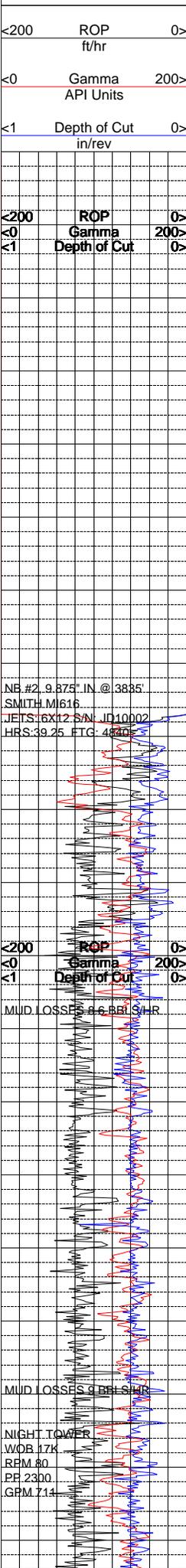
WATER SPUD MUD TO 3846'
LSND TO 12571'
TO
TO

14 3/4" TO 3846'
9 7/8" TO 8684'
6 1/8" TO 12571'
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	



Remarks
Survey Data, Mud Reports, Other Info.

ALL SAMPLE DEPTHS ARE REFERENCED TO RKB
 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 CONNECTION GASES, TRIP GASES, AND
 DOWNTIME GASES ARE NOTED ON THE LOG.
 LARGE CONNECTION GASES WHICH APPEAR ON
 THE MUD LOG USUALLY REFLECT UP HOLE GAS
 INTERVALS BLEEDING GAS INTO THE BOREHOLE
 DURING CONNECTIONS.

GAS CHROMATOGRAPHY EQUIPMENT IS
 CALIBRATED TO A TEST GAS COMPOSED OF:
 METHANE = 10040 PPM
 ETHANE = 990 PPM
 PROPANE = 1000 PPM
 ISOBUTANE = 1010 PPM
 BUTANE = 1000 PPM
 ISOPENTANE = 1000 PPM
 PENTANE = 1000 PPM

WHEN THE MUD IS CIRCULATED THROUGH THE
 GAS BUSTER, THE INTERVAL IS MARKED IN
 THE MGS COLUMN; THE SIZE OF THE FLARES
 ARE NOTED AS WELL.

EVIDENCE OF FRACTURE FILL IS NOTED ON
 THE MUD LOG. KAOLIN PERCENTAGE IN SS
 INTERVALS IS ALSO NOTED ON THE MUD LOG.

1 UNIT OF GAS = 200 PPM OF METHANE
 SET 10.75" SURFACE CASING AT 3825'.

CANRIG DRILLING TECHNOLOGY, LTD
 COMMENCED LOGGING ON PCU 297-11C5 ON
 12-27-09 AT 04:42:00 HRS

SHALE = GRAYISH ORANGE TO PALE YELLOWISH
 ORANGE MOTTLED WITH LIGHT BROWNISH GRAY
 CRUMBLY TO PULVERULENT TENACITY;
 IRREGULAR TO EARTHLY FRACTURE; NODULAR
 CUTTINGS HABIT; EARTHLY TO DULL LUSTER;
 INTERBEDDED BROWNISH GRAY SANDSTONE
 GRADING INTO SILTSTONE; MODERATELY
 CALCAREOUS; LOW GAS, NO FLUORESCENCE
 OR OIL STAINING.

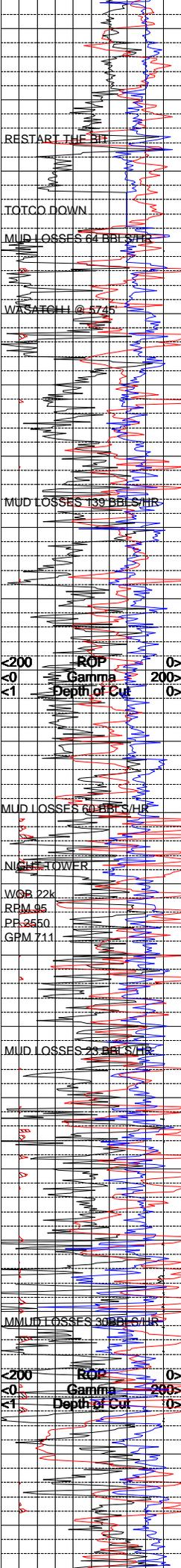
SANDSTONE = MODERATE YELLOWISH BROWN TO
 PALE YELLOWISH BROWN OR BROWNISH
 GRAY; QUARTZ AND LITHIC CLASTS; FINE TO
 VERY FINE GRAINED; POOR TO FAIR SORTING;
 SUBROUNDED TO SUBANGULAR; FROSTED
 GRAINS; SOFT TO EASILY FRIABLE; CALCITE
 CEMENT; CLAY MATRIX SUPPORTED TO VERY
 MINOR GRAIN SUPPORTED; MODERATELY
 CALCAREOUS; GRADES INTO AND INTERBEDDED
 WITH SILTSTONE AND INTERBEDDED WITH
 YELLOWISH SHALE; LOW GAS SEEN DURING
 THIS INTERVAL.

SILTSTONE = MODERATE YELLOWISH BROWN TO
 PALE YELLOWISH BROWN OR LIGHT BROWNISH
 GRAY, OCCASIONALLY MOTTLED TOGETHER;
 CRUMBLY TENACITY; IRREGULAR FRACTURE;
 NODULAR TO TABULAR CUTTINGS HABIT;
 EARTHLY TO DULL LUSTER; SILTY TO GRANULAR
 TEXTURE; INTERBEDDED WITH AND GRADES
 INTO VERY FINE TO FINE GRAIN SANDSTONE,
 INTERBEDDED WITH SHALE, ALL SIMILAR IN
 COLORATION; MODERATELY CALCAREOUS; LOW
 GAS THROUGHOUT SECTION.

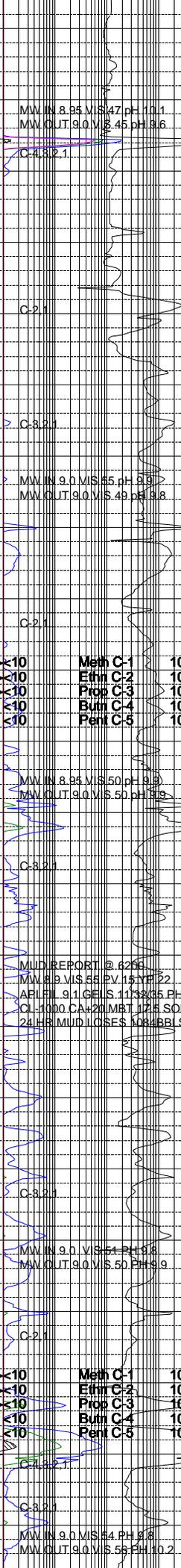
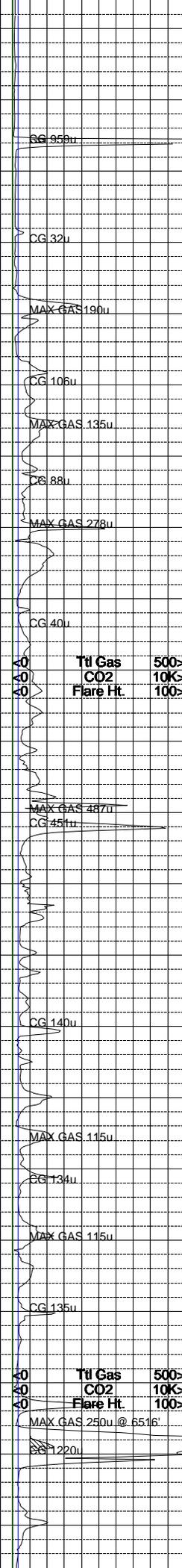
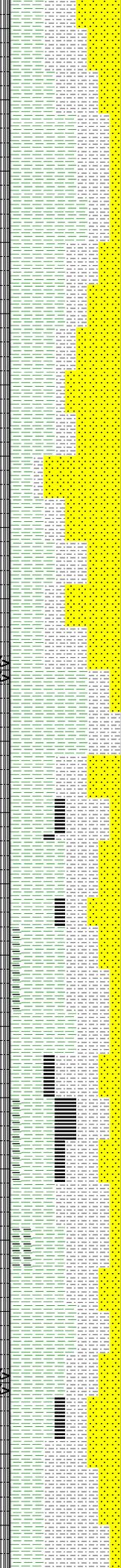
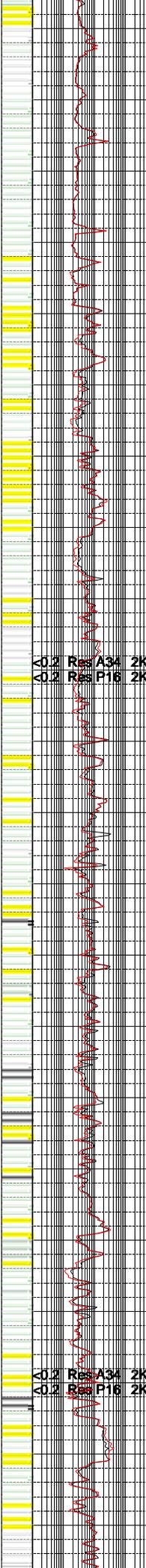
SILTSTONE = MODERATE YELLOWISH BROWN TO
 PALE YELLOWISH BROWN OT LIGHT BROWNISH
 GRAY TO BROWNISH GRAY; CRUMBLY TENACITY;
 IRREGULAR TO BLOCKY FRACTURE; NODULAR TO
 WEDGELIKE CUTTING HABIT; DULL TO EARTHLY
 LUSTER; SILTY TO GRITTY TEXTURE, OCC.
 CLAYEY; GRADES INTO SIMILARLY COLORED
 SHALE AND VERY FINE GRAINED SANDSTONE;
 MODERATELY CALCAREOUS; PUNKY TO PASTY
 CONSISTENCY OBSERVED IN SAMPLES DIRECTLY
 FROM SHAKER SCREEN; LOW GAS THROUGHOUT

SHALE=YELLOW BROWN OCC PURPLE HUES;
 VERY SOFT CRUMBLY TENACITY; IRREGULAR
 BLOCKY FRACTURE; MASSIVE PLATY CUTTINGS
 HABIT; DULL EARTHLY LUSTER; VERY SILTY
 CLAYEY SMOOTH TEXTURE; GRADING TO
 BROWNISH YELLOW SANDY SILTSTONE.

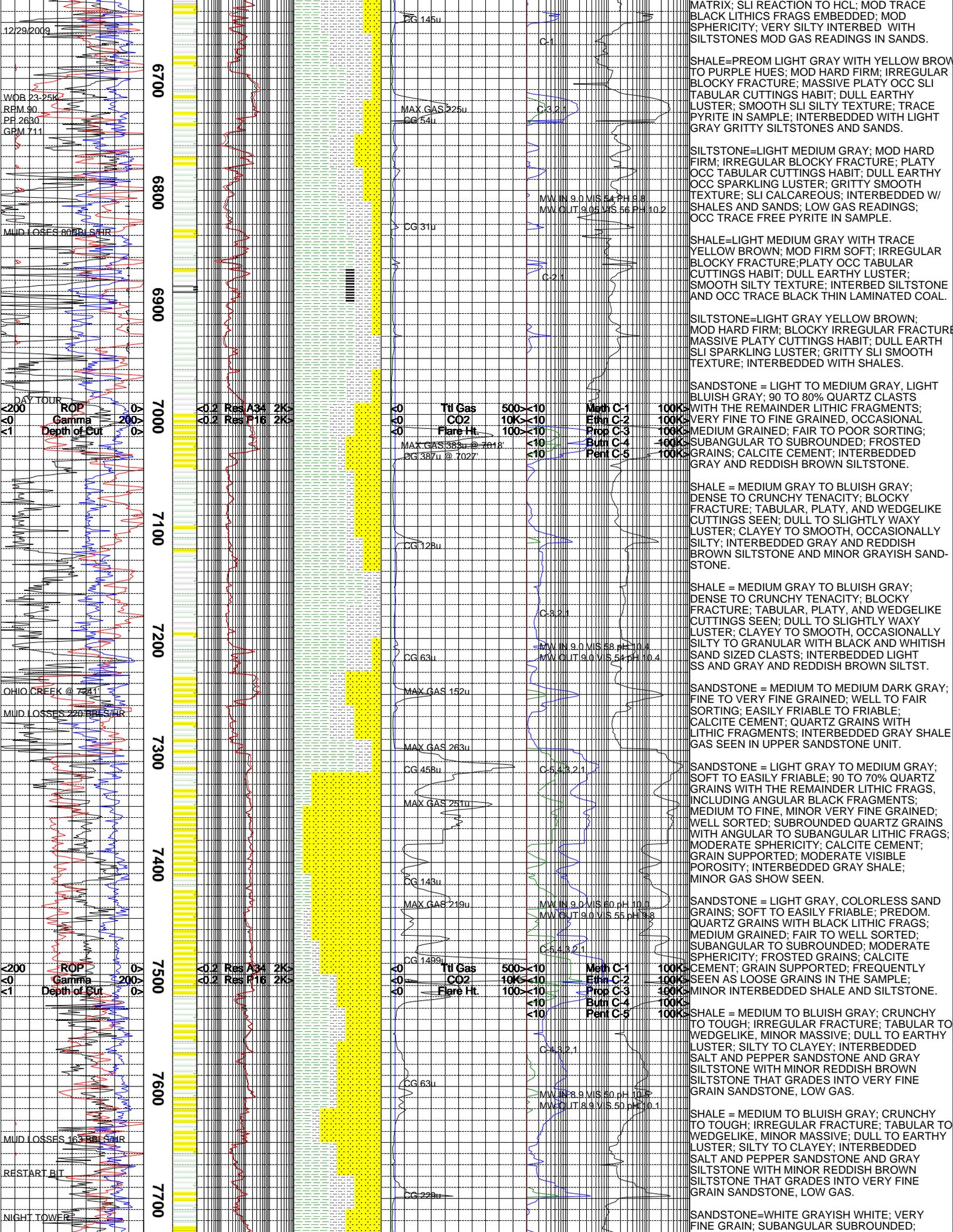
SANDSTONE=OFF WHITE BROWNISH GRAY;
 MOD HARD EASILY FRIABLE; SUBANGULAR
 SUBROUNDED; MOD WELL SORTED; CLAY MATRIX
 SLI CALCITE CEMENT; PREDOM GRAIN SUPPORT



5600
5700
5800
5900
6000
6100
6200
6300
6400
6500
6600



CUTTINGS GRAY; EARTHY TO DULL LUSTER; GRITTY TO SILTY WITH MINOR ABRASIVE TEXTURE; INTERBEDDED SHALE AND SANDSTONE MODERATELY CALCAREOUS; LOW BACKGROUND GAS SEEN THROUGHOUT.
 SHALE = MOTTLED VERY PALE ORANGE AND GRAYISH RED PURPLE WITH OCCASIONAL MEDIUM GRAY; CRUNCHY TO BRITTLE TENACITY BLOCKY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS HABIT; SILTY TO CLAYEY, MINOR GRITTY TENACITY; YELLOWISH STAINING SEEN ON SOME FRACTURE SURFACES; GRADES INTO SILTSTONE AND INTERBEDDED WITH FINE SANDSTONE; MINOR GAS SEEN.
 SHALE = MEDIUM DARK TO MEDIUM GRAY WITH MINOR GRAYISH RED PURPLE; CRUNCHY TO BRITTLE TENACITY; BLOCKY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS HABIT; SILTY TO CLAYEY, MINOR GRITTY TEXTURE; GRADES INTO SILTSTONE AND INTERBEDDED WITH FINE SANDSTONE; MINOR GAS SEEN SANDSTONE.
 SHALE = MEDIUM DARK TO MEDIUM GRAY; CRUNCHY TO BRITTLE TENACITY; BLOCKY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS; CLAYEY TO SILTY TEXTURE; GRADES INTO SILTSTONE AND INTERBEDDED WITH FREQUENT SANDSTONE BEDS; GAS IN SANDSTONE.
 SANDSTONE = BROWNISH GRAY TO MEDIUM GRAY; QUARTZ AND LITHIC GRAINS; FINE TO VERY FINE, MINOR MEDIUM GRAIN; POOR TO FAIR SORTING; SUBROUNDED TO ROUNDED; EASILY FRIABLE TO FIRM FRIABLE; CALCITE CEMENT; MATRIX TO MINOR GRAIN SUPPORTED; MINOR ORGANIC STAINING; FREQUENT AND OCCASIONALLY THICK BEDS OF SHALE, SILTSTONE AND RARE COAL; NO TO VERY WEAK FLUORESCENCE; LOW VISIBLE POROSITY; MINOR GAS SHOWS SEEN IN SANDSTONE.
 SHALE = MEDIUM TO MEDIUM DARK GRAY, BROWNISH GRAY; CRUMBLY TO CRUNCHY TENACITY; BLOCKY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS HABIT; DULL TO FROSTED LUSTER; SILTY TO CLAYEY; SOME GRITTY TEXTURE; INTERBEDDED WITH AND GRADES INTO A CLAYEY SILTSTONE AND INTERBEDDED WITH SANDSTONE; SLIGHTLY CALCAREOUS; MINOR GAS IN SANDSTONE.
 SANDSTONE=WHITE LIGHT GRAYISH BROWN; MOD HARD FRIABLE; FINE GRAINED; MOD WELL SORTED; PREDOM GRAIN SUPPORTED; CLAY MATRIX; OCC CALCITE CEMENT; MOD SPHERICITY; TR BLACK LITHICS FRAGS EMBED SLOW REACTION TO HCL; GRADING INTO LIGHT GRAY MOD HARD SILTSTONE AND MINOR THIN COAL BEDS.
 SHALE=LIGHT MEDIUM GRAY BROWNISH GRAY; CRUNCHY TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY TO CLAYEY TEXTURE; GRADING TO CLAYEY SILTSTONE; GRADING TO BLACK BROWNISH BRITTLE CARBONACEOUS SHALE; INTERBED PYRITE IN SAMPLE.
 COAL=BLACK BROWNISH BLACK; BRITTLE CRUMBLY TENACITY; BLOCKY IRREGULAR WITH TRACE CONCHOIDAL FRACTURE; TABULAR TO WEDGE LIKE CUTTINGS HABIT; VITREOUS GLASSY LUSTER; SMOOTH TEXTURE; DEGASSING OBSERVED; INTERBED WITH CARBONACEOUS SHALES AND SANDSTONES; HIGH GAS IN COAL BEDS.
 SHALE=PREDOM LIGHT GRAY OCC MEDIUM DARK GRAY; MOD HARD FIRM; CRUMBLY DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY OCC TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER; V SILTY SMOOTH TEXTURE; GRADING TO BROWNISH BLACK CARBONACEOUS SHALE; INTERBEDDED SANDS.
 SANDSTONE=WHITE FINE GRAIN; MOD WELL SORTED; MOD HARD FRIABLE; SUBROUNDED SUBANGULAR; CLAY TO OCC CALCITE MATRIX; MOD REACTION TO HCL; PREDOM GRAIN SUPPORTED; TRACE BLACK LITHICS FRAGS V SILTY IN PART; INTERBEDDED WITH GRAY BROWN SILTSTONES OCC THIN LAMINATED COAL BEDS; MOD GAS READINGS IN SANDS.
 SHALE=PREDOM LIGHT MEDIUM GRAY OCC YELLOW HUES; MOD HARD FIRM; BLOCKY IRREGULAR FRACTURE; MASSIVE PLATY OCC TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY SMOOTH TEXTURE; INTERBEDDED WITH SILTSTONES AND TRACES CARBONACEOUS SHALES.
 SANDSTONE=WHITE FINE GRAIN; MOD WELL SORTED; SUBANGULAR SUBROUNDED; PREDOM GRAIN SUPPORTED; CLAY TO CALCITE CEMENT



MATRIX; SLI REACTION TO HCL; MOD TRACE BLACK LITHICS FRAGS EMBEDDED; MOD SPHERICITY; VERY SILTY INTERBED WITH SILTSTONES MOD GAS READINGS IN SANDS.

SHALE=PREOM LIGHT GRAY WITH YELLOW BROWN TO PURPLE HUES; MOD HARD FIRM; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY OCC SLI TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH SLI SILTY TEXTURE; TRACE PYRITE IN SAMPLE; INTERBEDDED WITH LIGHT GRAY GRITTY SILTSTONES AND SANDS.

SILTSTONE=LIGHT MEDIUM GRAY; MOD HARD FIRM; IRREGULAR BLOCKY FRACTURE; PLATY OCC TABULAR CUTTINGS HABIT; DULL EARTHY OCC SPARKLING LUSTER; GRITTY SMOOTH TEXTURE; SLI CALCAREOUS; INTERBEDDED W/ SHALES AND SANDS; LOW GAS READINGS; OCC TRACE FREE PYRITE IN SAMPLE.

SHALE=LIGHT MEDIUM GRAY WITH TRACE YELLOW BROWN; MOD FIRM SOFT; IRREGULAR BLOCKY FRACTURE; PLATY OCC TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH SILTY TEXTURE; INTERBEDDED SILTSTONE AND OCC TRACE BLACK THIN LAMINATED COAL.

SILTSTONE=LIGHT GRAY YELLOW BROWN; MOD HARD FIRM; BLOCKY IRREGULAR FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL EARTH SLI SPARKLING LUSTER; GRITTY SLI SMOOTH TEXTURE; INTERBEDDED WITH SHALES.

SANDSTONE = LIGHT TO MEDIUM GRAY, LIGHT BLuish GRAY; 90 TO 80% QUARTZ CLASTS WITH THE REMAINDER LITHIC FRAGMENTS; VERY FINE TO FINE GRAINED, OCCASIONAL MEDIUM GRAINED; FAIR TO POOR SORTING; SUBANGULAR TO SUBROUNDED; FROSTED GRAINS; CALCITE CEMENT; INTERBEDDED GRAY AND REDDISH BROWN SILTSTONE.

SHALE = MEDIUM GRAY TO BLuish GRAY; DENSE TO CRUNCHY TENACITY; BLOCKY FRACTURE; TABULAR, PLATY, AND WEDGELIKE CUTTINGS SEEN; DULL TO SLIGHTLY WAXY LUSTER; CLAYEY TO SMOOTH, OCCASIONALLY SILTY; INTERBEDDED GRAY AND REDDISH BROWN SILTSTONE AND MINOR GRAYISH SANDSTONE.

SHALE = MEDIUM GRAY TO BLuish GRAY; DENSE TO CRUNCHY TENACITY; BLOCKY FRACTURE; TABULAR, PLATY, AND WEDGELIKE CUTTINGS SEEN; DULL TO SLIGHTLY WAXY LUSTER; CLAYEY TO SMOOTH, OCCASIONALLY SILTY TO GRANULAR WITH BLACK AND WHITISH SAND SIZED CLASTS; INTERBEDDED LIGHT SS AND GRAY AND REDDISH BROWN SILTST.

SANDSTONE = MEDIUM TO MEDIUM DARK GRAY; FINE TO VERY FINE GRAINED; WELL TO FAIR SORTING; EASILY FRIABLE TO FRIABLE; CALCITE CEMENT; QUARTZ GRAINS WITH LITHIC FRAGMENTS; INTERBEDDED GRAY SHALE GAS SEEN IN UPPER SANDSTONE UNIT.

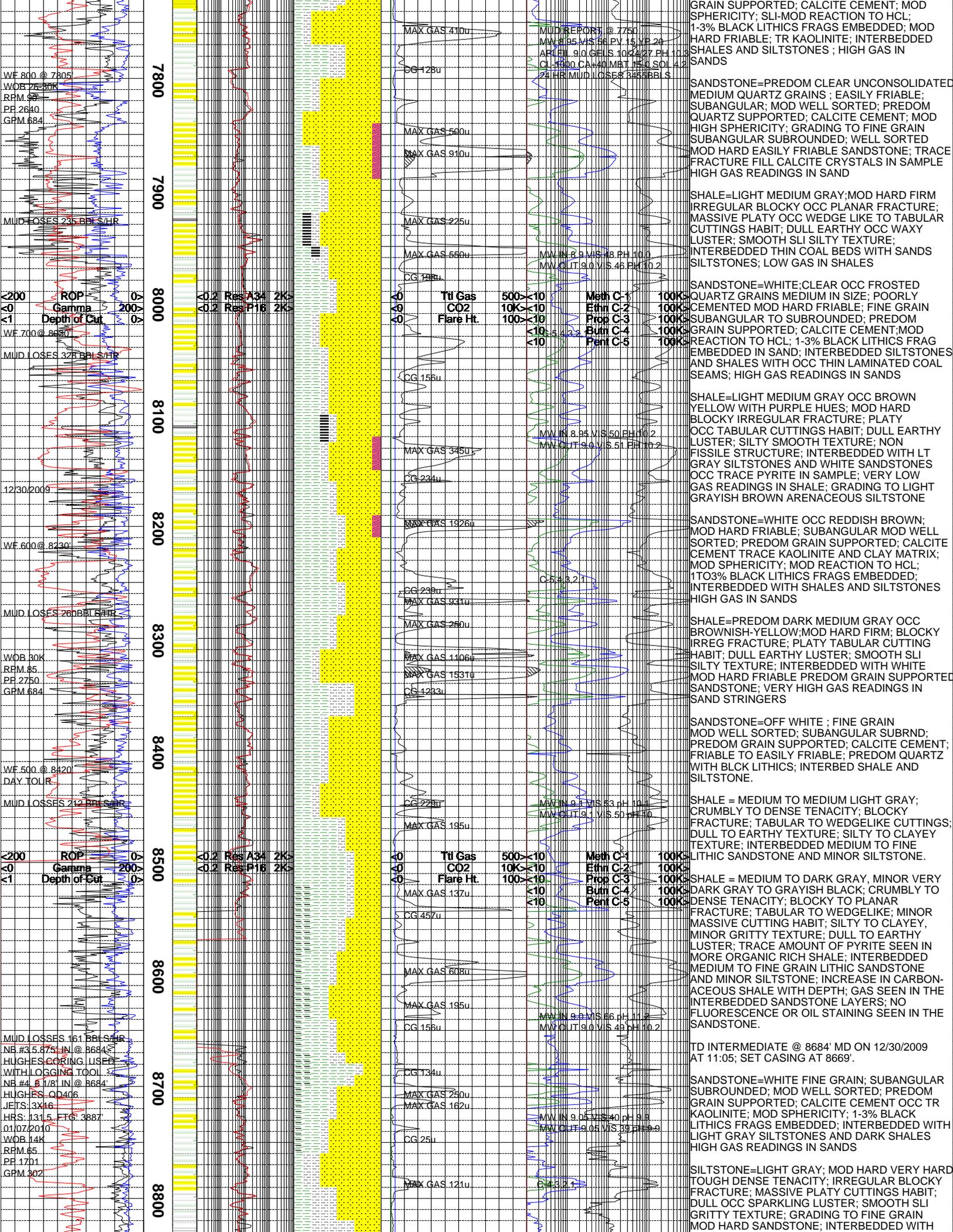
SANDSTONE = LIGHT GRAY TO MEDIUM GRAY; SOFT TO EASILY FRIABLE; 90 TO 70% QUARTZ GRAINS WITH THE REMAINDER LITHIC FRAGS, INCLUDING ANGULAR BLACK FRAGMENTS; MEDIUM TO FINE, MINOR VERY FINE GRAINED; WELL SORTED; SUBROUNDED QUARTZ GRAINS WITH ANGULAR TO SUBANGULAR LITHIC FRAGS; MODERATE SPHERICITY; CALCITE CEMENT; GRAIN SUPPORTED; MODERATE VISIBLE POROSITY; INTERBEDDED GRAY SHALE; MINOR GAS SHOW SEEN.

SANDSTONE = LIGHT GRAY, COLORLESS SAND GRAINS; SOFT TO EASILY FRIABLE; PREDOM. QUARTZ GRAINS WITH BLACK LITHIC FRAGS; MEDIUM GRAINED; FAIR TO WELL SORTED; SUBANGULAR TO SUBROUNDED; MODERATE SPHERICITY; FROSTED GRAINS; CALCITE CEMENT; GRAIN SUPPORTED; FREQUENTLY SEEN AS LOOSE GRAINS IN THE SAMPLE; MINOR INTERBEDDED SHALE AND SILTSTONE.

SHALE = MEDIUM TO BLuish GRAY; CRUNCHY TO TOUGH; IRREGULAR FRACTURE; TABULAR TO WEDGELIKE, MINOR MASSIVE; DULL TO EARTHY LUSTER; SILTY TO CLAYEY; INTERBEDDED SALT AND PEPPER SANDSTONE AND GRAY SILTSTONE WITH MINOR REDDISH BROWN SILTSTONE THAT GRADES INTO VERY FINE GRAIN SANDSTONE, LOW GAS.

SHALE = MEDIUM TO BLuish GRAY; CRUNCHY TO TOUGH; IRREGULAR FRACTURE; TABULAR TO WEDGELIKE, MINOR MASSIVE; DULL TO EARTHY LUSTER; SILTY TO CLAYEY; INTERBEDDED SALT AND PEPPER SANDSTONE AND GRAY SILTSTONE WITH MINOR REDDISH BROWN SILTSTONE THAT GRADES INTO VERY FINE GRAIN SANDSTONE, LOW GAS.

SANDSTONE=WHITE GRAYISH WHITE; VERY FINE GRAIN; SUBANGULAR SUBROUNDED;



WF 800 @ 7805
WOB 2630K
RPM 86
PP 2640
GPM 684

MUD LOSSES 235 BBL/S/HR

<200 ROP
<0 Gamma
<1 Depth of Cut

WF 700 @ 8650
MUD LOSSES 325 BBL/S/HR

12/30/2009

WF 600 @ 8230
MUD LOSSES 260 BBL/S/HR

WOB 30K
RPM 85
PP 2750
GPM 684

WF 500 @ 8420
DAY TOUR
MUD LOSSES 212 BBL/S/HR

<200 ROP
<0 Gamma
<1 Depth of Cut

MUD LOSSES 161 BBL/S/HR
NE #3 5.875 IN @ 3664
HUGHES CORING USED
WITH LOGGING TOOL
NE #4 6 1/8 IN @ 3664
HUGHES QD406
JETS: 3X46
HRS: 131.5 FTG: 3887
01/07/2010
WOB 14K
RPM 85
PP 1701
GPM 302

7800
7900
8000
8100
8200
8300
8400
8500
8600
8700
8800

<0.2 Res A34 2K
<0.2 Res P16 2K

<0 Ttl Gas
<0 CO2
<0 Flare Ht.

500<10
10K<10
100<10

Meth C-1
Efrin C-2
Prop C-3
Butn C-4
Perm C-5

100K
100K
100K
100K
100K

MAX GAS 410u
CG 128u
MAX GAS 560u
MAX GAS 910u
MAX GAS 225u
MAX GAS 550u
CG 188u
MAX GAS 156u
CG 234u
MAX GAS 192u
CG 239u
MAX GAS 931u
MAX GAS 260u
MAX GAS 1106u
MAX GAS 1531u
CG 1233u
MAX GAS 195u
CG 228u
MAX GAS 137u
CG 457u
MAX GAS 608u
MAX GAS 195u
CG 156u
CG 134u
MAX GAS 250u
MAX GAS 162u
CG 25u
MAX GAS 121u

MUD REPORT @ 7750
MW IN 8.95 VIS 56 PV 15 PH 20
APTEL 9.0 GELS 100.4 PH 10.3
CL 1000 CA 40 MBT 15.0 SOL 4.2
24 HR MUD LOSSES 345 BBL/S
MW IN 8.9 VIS 48 PH 10.0
MW OUT 9.0 VIS 45 PH 10.2
MW IN 8.95 VIS 50 PH 10.2
MW OUT 9.0 VIS 51 PH 10.2
C-5 @ 821
MW IN 9.1 VIS 63 PH 10.0
MW OUT 9.1 VIS 50 PH 10.0
MW IN 9.05 VIS 40 PH 9.9
MW OUT 9.05 VIS 39 PH 9.9
6 @ 832

GRAIN SUPPORTED; CALCITE CEMENT; MOD SPHERICITY; SLI-MOD REACTION TO HCL; 1-3% BLACK LITHICS FRAGS EMBEDDED; MOD HARD FRIABLE; TR KAOLINITE; INTERBEDDED SHALES AND SILTSTONES ; HIGH GAS IN SANDS

SANDSTONE=PREDOM CLEAR UNCONSOLIDATED MEDIUM QUARTZ GRAINS ; EASILY FRIABLE; SUBANGULAR; MOD WELL SORTED; PREDOM QUARTZ SUPPORTED; CALCITE CEMENT; MOD HIGH SPHERICITY; GRADING TO FINE GRAIN SUBANGULAR SUBROUNDED; WELL SORTED MOD HARD EASILY FRIABLE SANDSTONE; TRACE FRACTURE FILL CALCITE CRYSTALS IN SAMPLE HIGH GAS READINGS IN SAND

SHALE=LIGHT MEDIUM GRAY;MOD HARD FIRM IRREGULAR BLOCKY OCC PLANAR FRACTURE; MASSIVE PLATY OCC WEDGE LIKE TO TABULAR CUTTINGS HABIT; DULL EARTHY OCC WAXY LUSTER; SMOOTH SLI SILTY TEXTURE; INTERBEDDED THIN COAL BEDS WITH SANDS SILTSTONES; LOW GAS IN SHALES

SANDSTONE=WHITE;CLEAR OCC FROSTED QUARTZ GRAINS MEDIUM IN SIZE; POORLY CEMENTED MOD HARD FRIABLE; FINE GRAIN SUBANGULAR TO SUBROUNDED; PREDOM GRAIN SUPPORTED; CALCITE CEMENT;MOD REACTION TO HCL; 1-3% BLACK LITHICS FRAG EMBEDDED IN SAND; INTERBEDDED SILTSTONES AND SHALES WITH OCC THIN LAMINATED COAL SEAMS; HIGH GAS READINGS IN SANDS

SHALE=LIGHT MEDIUM GRAY OCC BROWN YELLOW WITH PURPLE HUES; MOD HARD BLOCKY IRREGULAR FRACTURE; PLATY OCC TABULAR CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY SMOOTH TEXTURE; NON FISSILE STRUCTURE; INTERBEDDED WITH LT GRAY SILTSTONES AND WHITE SANDSTONES OCC TRACE PYRITE IN SAMPLE; VERY LOW GAS READINGS IN SHALE; GRADING TO LIGHT GRAYISH BROWN ARENACEOUS SILTSTONE

SANDSTONE=WHITE OCC REDDISH BROWN; MOD HARD FRIABLE; SUBANGULAR MOD WELL SORTED; PREDOM GRAIN SUPPORTED; CALCITE CEMENT TRACE KAOLINITE AND CLAY MATRIX; MOD SPHERICITY; MOD REACTION TO HCL; 1 TO 3% BLACK LITHICS FRAGS EMBEDDED; INTERBEDDED WITH SHALES AND SILTSTONES HIGH GAS IN SANDS

SHALE=PREDOM DARK MEDIUM GRAY OCC BROWNISH-YELLOW;MOD HARD FIRM; BLOCKY IRREG FRACTURE; PLATY TABULAR CUTTING HABIT; DULL EARTHY LUSTER; SMOOTH SLI SILTY TEXTURE; INTERBEDDED WITH WHITE MOD HARD FRIABLE PREDOM GRAIN SUPPORTED SANDSTONE; VERY HIGH GAS READINGS IN SAND STRINGERS

SANDSTONE=OFF WHITE ; FINE GRAIN MOD WELL SORTED; SUBANGULAR SUBRND; PREDOM GRAIN SUPPORTED; CALCITE CEMENT; FRIABLE TO EASILY FRIABLE; PREDOM QUARTZ WITH BLK LITHICS; INTERBED SHALE AND SILTSTONE.

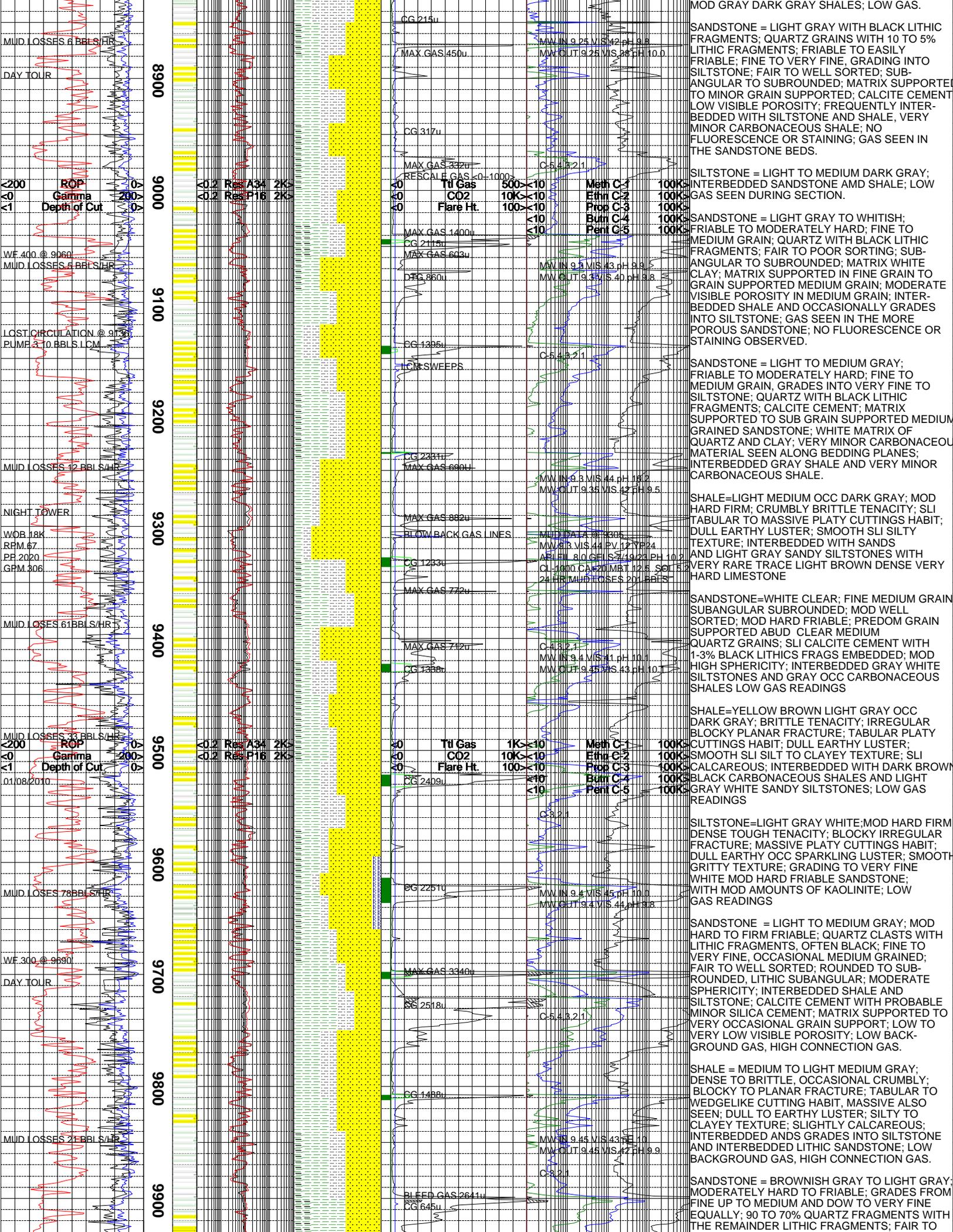
SHALE = MEDIUM TO MEDIUM LIGHT GRAY; CRUMBLY TO DENSE TENACITY; BLOCKY FRACTURE; TABULAR TO WEDGELIKE CUTTINGS; DULL TO EARTHY TEXTURE; SILTY TO CLAYEY TEXTURE; INTERBEDDED MEDIUM TO FINE LITHIC SANDSTONE AND MINOR SILTSTONE.

SHALE = MEDIUM TO DARK GRAY, MINOR VERY DARK GRAY TO GRAYISH BLACK; CRUMBLY TO DENSE TENACITY; BLOCKY TO PLANAR FRACTURE; TABULAR TO WEDGELIKE; MINOR MASSIVE CUTTING HABIT; SILTY TO CLAYEY, MINOR GRITTY TEXTURE; DULL TO EARTHY LUSTER; TRACE AMOUNT OF PYRITE SEEN IN MORE ORGANIC RICH SHALE; INTERBEDDED MEDIUM TO FINE GRAIN LITHIC SANDSTONE AND MINOR SILTSTONE; INCREASE IN CARBONACEOUS SHALE WITH DEPTH; GAS SEEN IN THE INTERBEDDED SANDSTONE LAYERS; NO FLUORESCENCE OR OIL STAINING SEEN IN THE SANDSTONE.

TD INTERMEDIATE @ 8684' MD ON 12/30/2009 AT 11:05; SET CASING AT 8669'.

SANDSTONE=WHITE FINE GRAIN; SUBANGULAR SUBROUNDED; MOD WELL SORTED; PREDOM GRAIN SUPPORTED; CALCITE CEMENT OCC TR KAOLINITE; MOD SPHERICITY; 1-3% BLACK LITHICS FRAGS EMBEDDED; INTERBEDDED WITH LIGHT GRAY SILTSTONES AND DARK SHALES HIGH GAS READINGS IN SANDS

SILTSTONE=LIGHT GRAY; MOD HARD VERY HARD TOUGH DENSE TENACITY; IRREGULAR BLOCKY FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL OCC SPARKLING LUSTER; SMOOTH SLI GRITTY TEXTURE; GRADING TO FINE GRAIN MOD HARD SANDSTONE; INTERBEDDED WITH



SANDSTONE = LIGHT GRAY WITH BLACK LITHIC FRAGMENTS; QUARTZ GRAINS WITH 10 TO 5% LITHIC FRAGMENTS; FRIABLE TO EASILY FRIABLE; FINE TO VERY FINE, GRADING INTO SILTSTONE; FAIR TO WELL SORTED; SUB-ANGULAR TO SUBROUNDED; MATRIX SUPPORTED TO MINOR GRAIN SUPPORTED; CALCITE CEMENT LOW VISIBLE POROSITY; FREQUENTLY INTERBEDDED WITH SILTSTONE AND SHALE, VERY MINOR CARBONACEOUS SHALE; NO FLUORESCENCE OR STAINING; GAS SEEN IN THE SANDSTONE BEDS.

SILTSTONE = LIGHT TO MEDIUM DARK GRAY; INTERBEDDED SANDSTONE AND SHALE; LOW GAS SEEN DURING SECTION.

SANDSTONE = LIGHT GRAY TO WHITISH; FRIABLE TO MODERATELY HARD; FINE TO MEDIUM GRAIN; QUARTZ WITH BLACK LITHIC FRAGMENTS; FAIR TO POOR SORTING; SUB-ANGULAR TO SUBROUNDED; MATRIX WHITE CLAY; MATRIX SUPPORTED IN FINE GRAIN TO GRAIN SUPPORTED MEDIUM GRAIN; MODERATE VISIBLE POROSITY IN MEDIUM GRAIN; INTERBEDDED SHALE AND OCCASIONALLY GRADES INTO SILTSTONE; GAS SEEN IN THE MORE POROUS SANDSTONE; NO FLUORESCENCE OR STAINING OBSERVED.

SANDSTONE = LIGHT TO MEDIUM GRAY; FRIABLE TO MODERATELY HARD; FINE TO MEDIUM GRAIN, GRADES INTO VERY FINE TO SILTSTONE; QUARTZ WITH BLACK LITHIC FRAGMENTS; CALCITE CEMENT; MATRIX SUPPORTED TO SUB GRAIN SUPPORTED MEDIUM GRAINED SANDSTONE; WHITE MATRIX OF QUARTZ AND CLAY; VERY MINOR CARBONACEOUS MATERIAL SEEN ALONG BEDDING PLANES; INTERBEDDED GRAY SHALE AND VERY MINOR CARBONACEOUS SHALE.

SHALE=LIGHT MEDIUM OCC DARK GRAY; MOD HARD FIRM; CRUMBLY BRITTLE TENACITY; SLI TABULAR TO MASSIVE PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH SLI SILTY TEXTURE; INTERBEDDED WITH SANDS AND LIGHT GRAY SANDY SILTSTONES WITH VERY RARE TRACE LIGHT BROWN DENSE VERY HARD LIMESTONE

SANDSTONE=WHITE CLEAR; FINE MEDIUM GRAIN SUBANGULAR SUBROUNDED; MOD WELL SORTED; MOD HARD FRIABLE; PREDOM GRAIN SUPPORTED ABUD CLEAR MEDIUM QUARTZ GRAINS; SLI CALCITE CEMENT WITH 1-3% BLACK LITHIC FRAGS EMBEDDED; MOD HIGH SPHERICITY; INTERBEDDED GRAY WHITE SILTSTONES AND GRAY OCC CARBONACEOUS SHALES LOW GAS READINGS

SHALE=YELLOW BROWN LIGHT GRAY OCC DARK GRAY; BRITTLE TENACITY; IRREGULAR BLOCKY PLANAR FRACTURE; TABULAR PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH SLI SILT TO CLAYEY TEXTURE; SLI CALCAREOUS; INTERBEDDED WITH DARK BROWN BLACK CARBONACEOUS SHALES AND LIGHT GRAY WHITE SANDY SILTSTONES; LOW GAS READINGS

SILTSTONE=LIGHT GRAY WHITE; MOD HARD FIRM DENSE TOUGH TENACITY; BLOCKY IRREGULAR FRACTURE; MASSIVE PLATY CUTTINGS HABIT; DULL EARTHY OCC SPARKLING LUSTER; SMOOTH GRITTY TEXTURE; GRADING TO VERY FINE WHITE MOD HARD FRIABLE SANDSTONE; WITH MOD AMOUNTS OF KAOLINITE; LOW GAS READINGS

SANDSTONE = LIGHT TO MEDIUM GRAY; MOD HARD TO FIRM FRIABLE; QUARTZ CLASTS WITH LITHIC FRAGMENTS, OFTEN BLACK; FINE TO VERY FINE, OCCASIONAL MEDIUM GRAINED; FAIR TO WELL SORTED; ROUNDED TO SUB-ROUNDED, LITHIC SUBANGULAR; MODERATE SPHERICITY; INTERBEDDED SHALE AND SILTSTONE; CALCITE CEMENT WITH PROBABLE MINOR SILICA CEMENT; MATRIX SUPPORTED TO VERY OCCASIONAL GRAIN SUPPORT; LOW TO VERY LOW VISIBLE POROSITY; LOW BACKGROUND GAS, HIGH CONNECTION GAS.

SHALE = MEDIUM TO LIGHT MEDIUM GRAY; DENSE TO BRITTLE, OCCASIONAL CRUMBLY; BLOCKY TO PLANAR FRACTURE; TABULAR TO WEDGELIKE CUTTING HABIT, MASSIVE ALSO SEEN; DULL TO EARTHY LUSTER; SILTY TO CLAYEY TEXTURE; SLIGHTLY CALCAREOUS; INTERBEDDED ANDS GRADES INTO SILTSTONE AND INTERBEDDED LITHIC SANDSTONE; LOW BACKGROUND GAS, HIGH CONNECTION GAS.

SANDSTONE = BROWNISH GRAY TO LIGHT GRAY; MODERATELY HARD TO FRIABLE; GRADES FROM FINE UP TO MEDIUM AND DOW TO VERY FINE EQUALLY; 90 TO 70% QUARTZ FRAGMENTS WITH THE REMAINDER LITHIC FRAGMENTS; FAIR TO

<200 ROP
<0 Gamma
<1 Depth of Cut

WF 400 @ 9060
MUD LOSSES 5 BBL S/HR

LOST CIRCULATION @ 9175
PUMP 3 @ 10 BBL S/HR

MUD LOSSES 12 BBL S/HR

NIGHT TOWER

WDB 118K
REM.67
PF 2020
GPM 306

MUD LOSSES 61 BBL S/HR

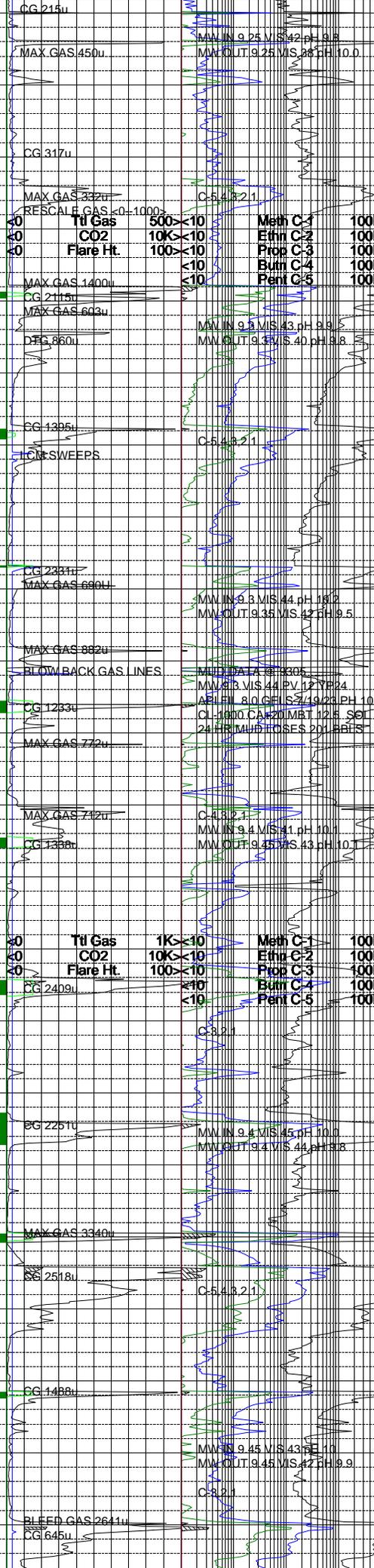
<200 ROP
<0 Gamma
<1 Depth of Cut

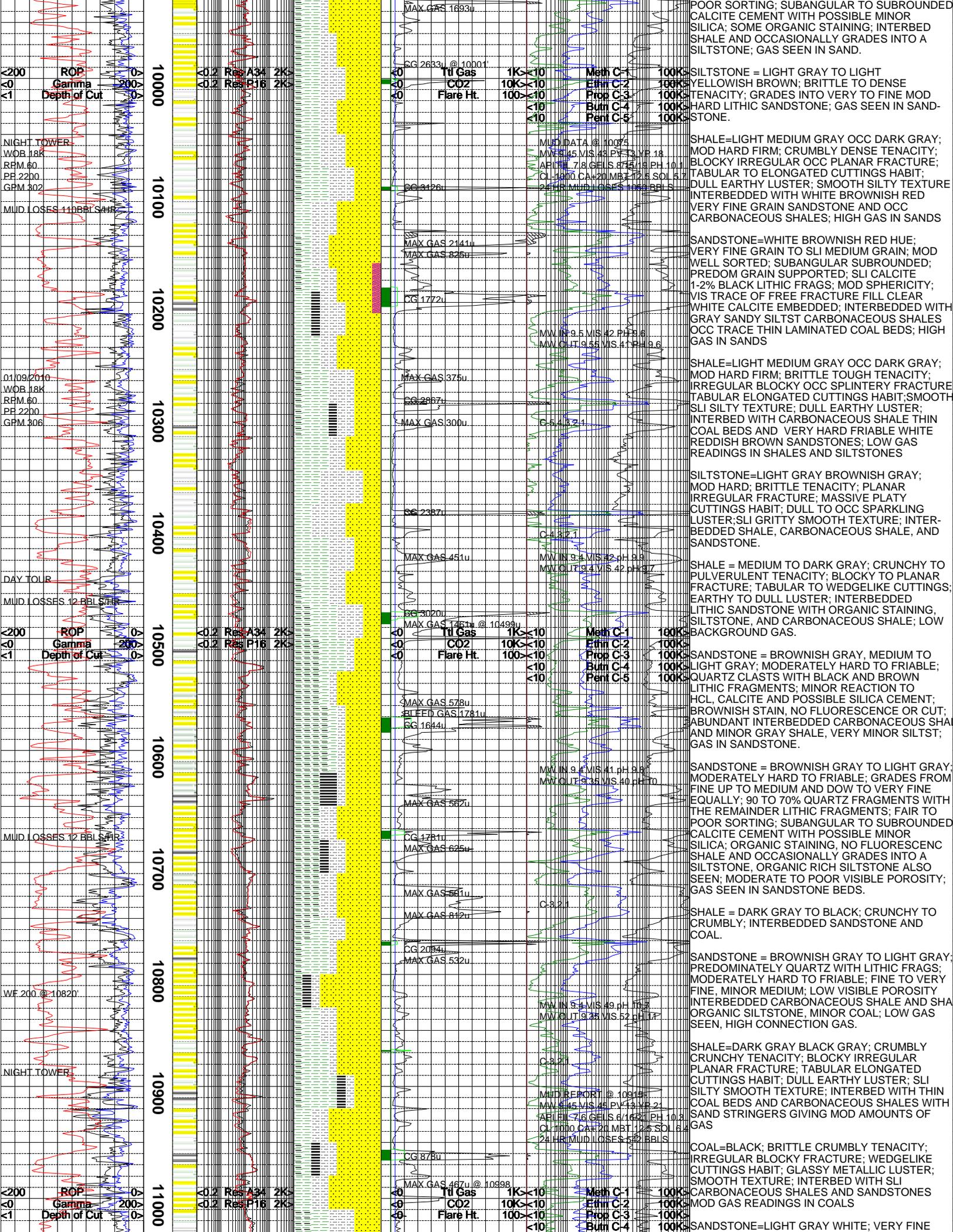
01.08.2010

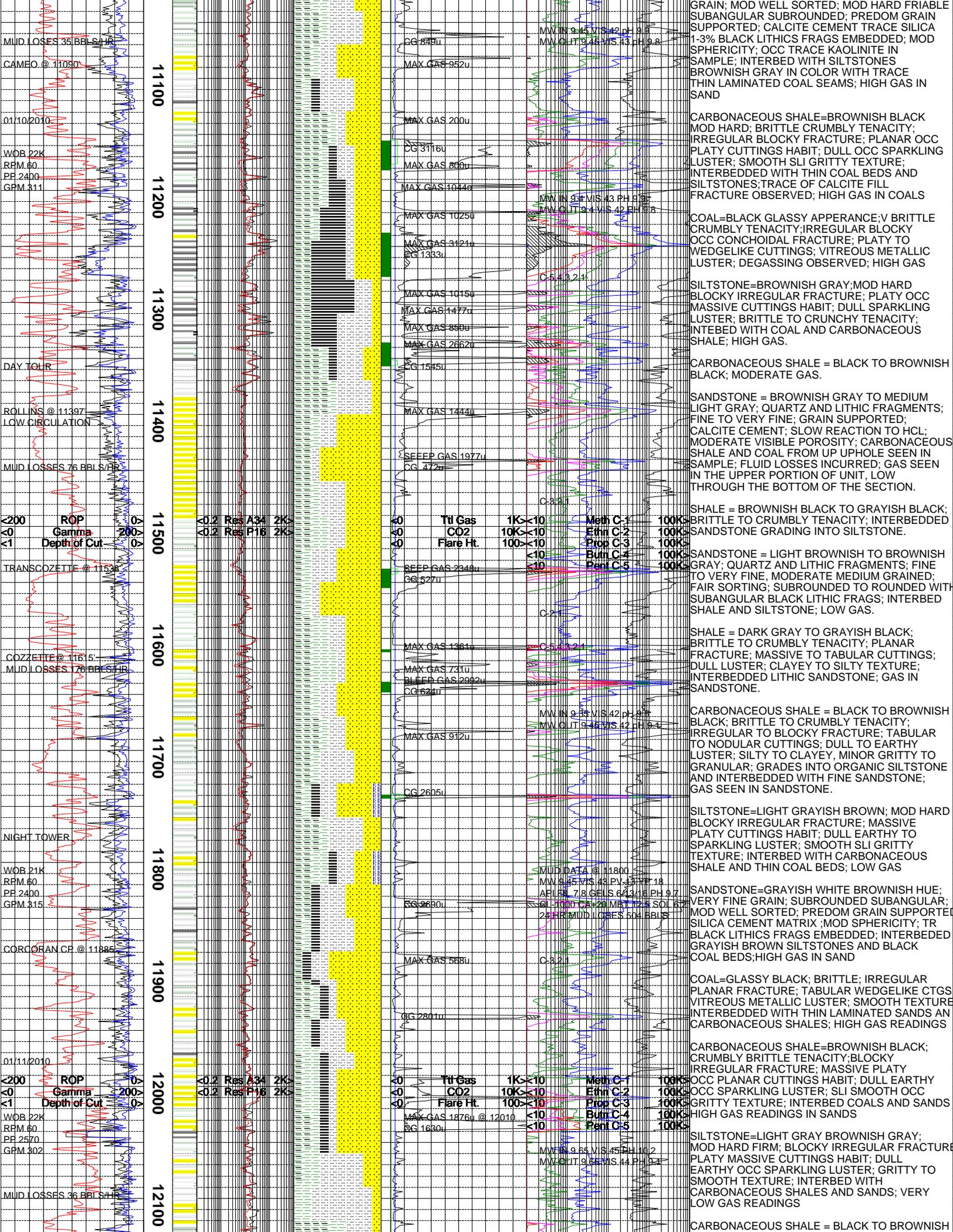
MUD LOSSES 78 BBL S/HR

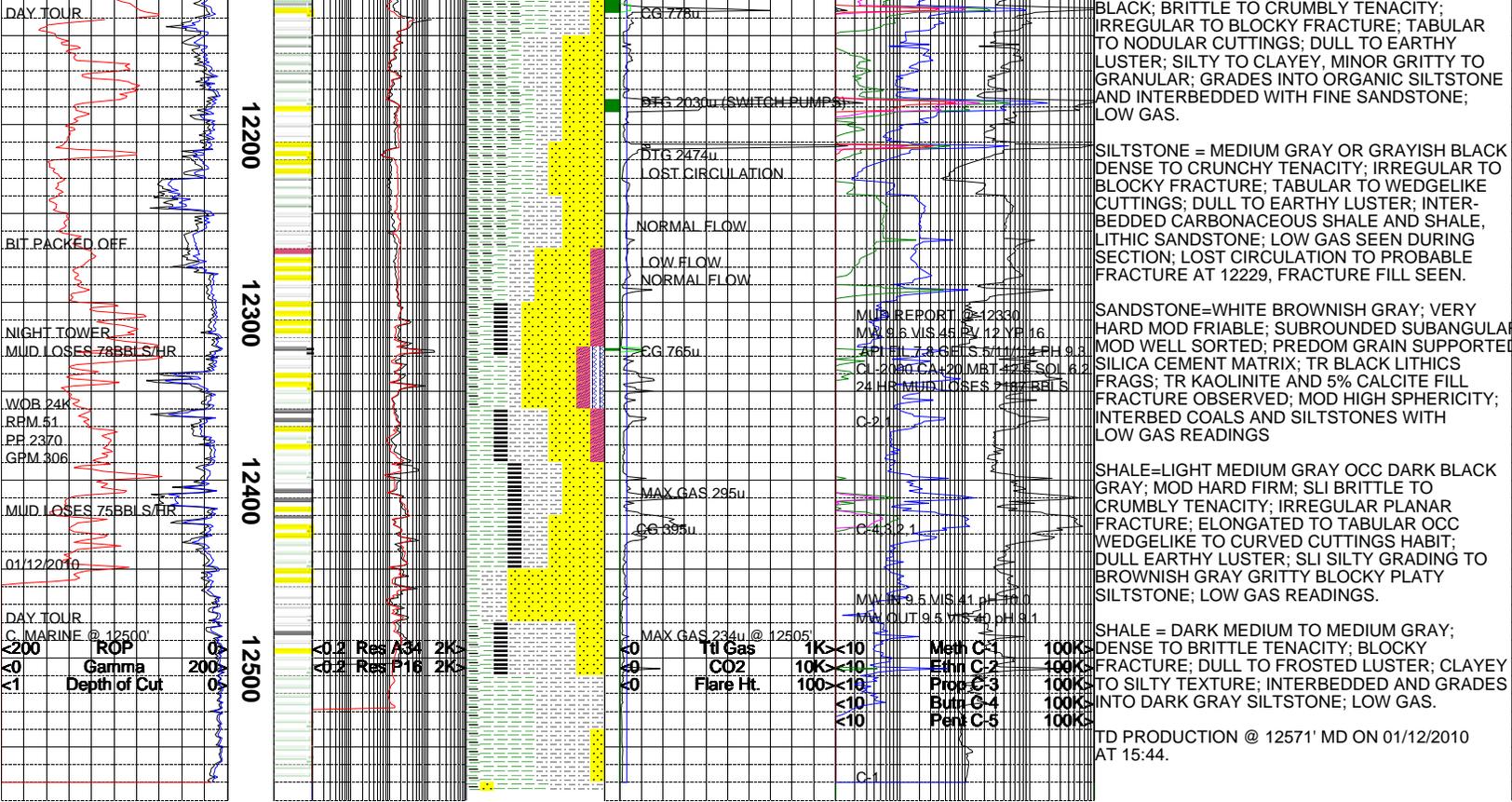
WF 300 @ 9690
DAY TOUR

MUD LOSSES 21 BBL S/HR









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