



Copyright © 2003 by Epoch Well Services, Inc.

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

## MUDLOG MD

COMPANY	ExxonMobil Production
WELL	FRU197-33A6
FIELD	FREEDOM RANCH UNIT
REGION	ROCKY MOUNTAINS
COORDINATES	39.915536 108.285764
ELEVATION	GL = 6385' KB = 6412'
COUNTY, STATE	RIO BLANCO, CO
API INDEX	051031153500
SPUD DATE	10/17/2009
CONTRACTOR	HELMRICH AND PAYNE
CO. REP.	RICKY OWENS
RIG/TYPE	215/FLEX 3
LOGGING UNIT	MLU 051
GEOLOGISTS	D.CLAAR B.MARSH
ADD. PERSONS	B. JOHANNING G.BAKER
CO. GEOLOGIST	M. BIGGS

### LOG INTERVAL

DEPTHS:	3,852'	TO	12,294'
DATES:	03/02/2010	TO	03/16/2010
SCALE:	5" = 100'		

### CASING DATA

10.75"	AT	3,862'
7.00"	AT	8,465'
	AT	
	AT	

### MUD TYPES

LSND	TO	12,294'
	TO	
	TO	
	TO	

### HOLE SIZE

9.875"	TO	8,465'
6.125"	TO	12,294'
	TO	
	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
	ANDESITE
	ANHYDRITE
	BASALT
	BENTONITE
	BIOTITIZATION
	BRECCIA
	CALCARENITE
	CALCAREOUS TUFF
	CALCILUTITE
	CARBONATES
	CARBONACEOUS MAT
	CARBONACEOUS SH
	CEMENT CONTAM.
	CHALK
	CRYSTALLINE TUFF
	CHERT - ARGILL

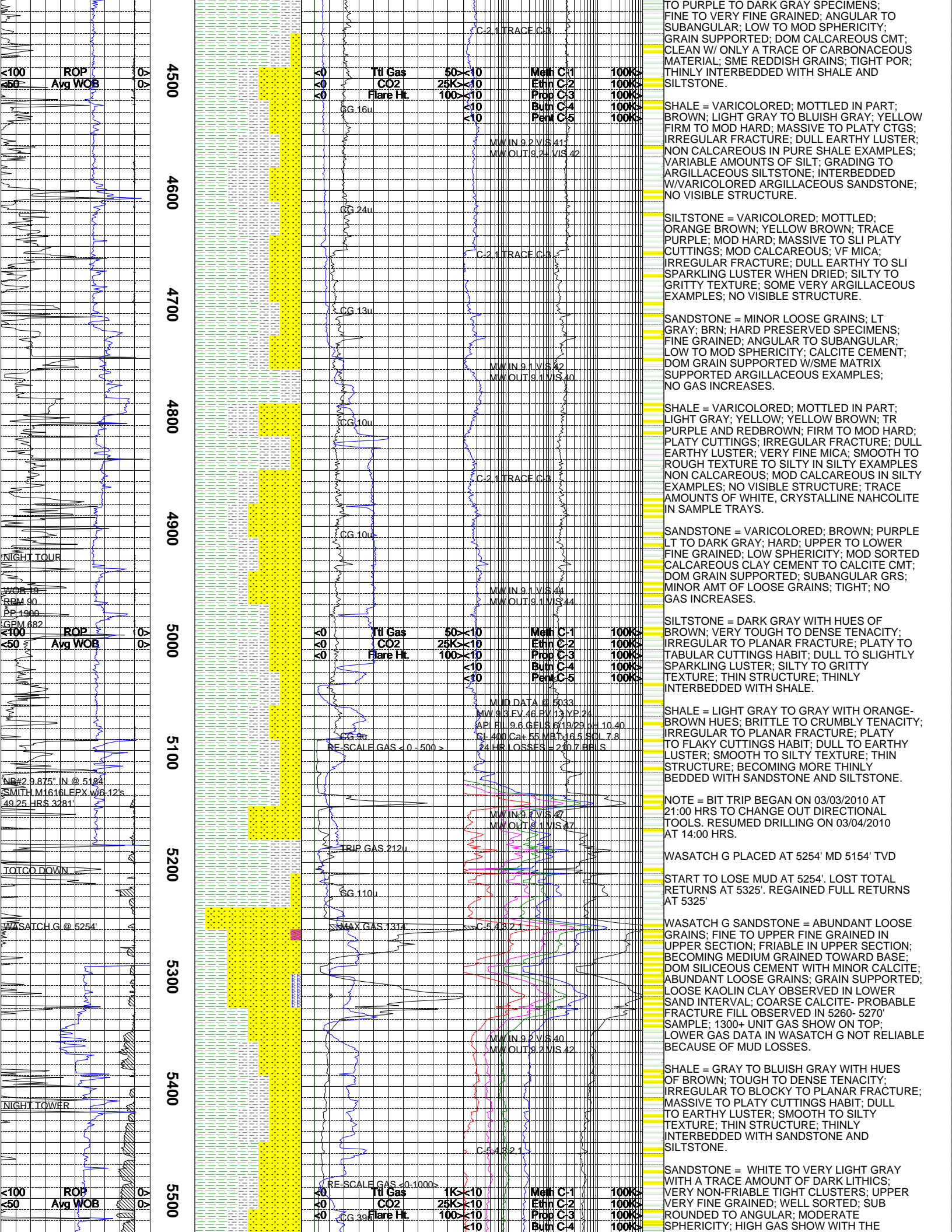
	CHERT - GLASSY
	CHERT - PORCEL
	CHERT - TIGER STRIPE
	CHERT - UNDIFF
	CLAY
	CLAY-MUDSTONE
	CLYST-TUFFACEOUS
	CHLORITIZATION
	COAL
	CONGLOMERATE
	CONGL. SAND
	CONGL. SANDSTONE
	COQUINA
	DACITE
	DIATOMITE
	DIORITE
	DOLOSTONE

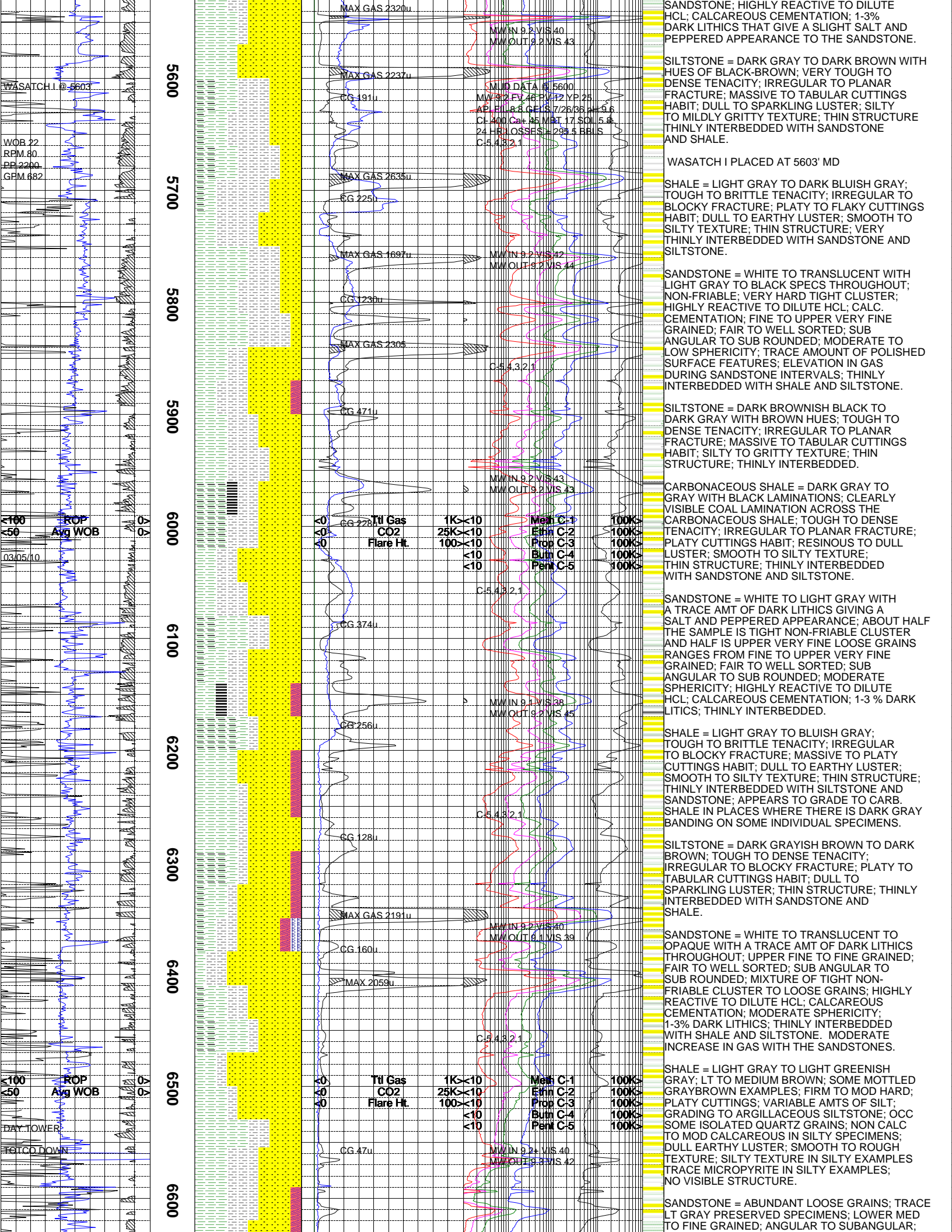
	FELSIC SILIC DIKE
	FOSSIL
	GABBRO
	GLASSY TUFF
	GRANITE
	GRANITE WASH
	GRANODIORITE
	GYPSUM
	HALITE
	HORNBL-QTZ-DIO
	IGNEOUS (ACIDIC)
	IGNEOUS (BASIC)
	INTRUSIVES
	KAOLINITIC
	LIMESTONE
	LITHIC TUFF
	MARL - DOLO

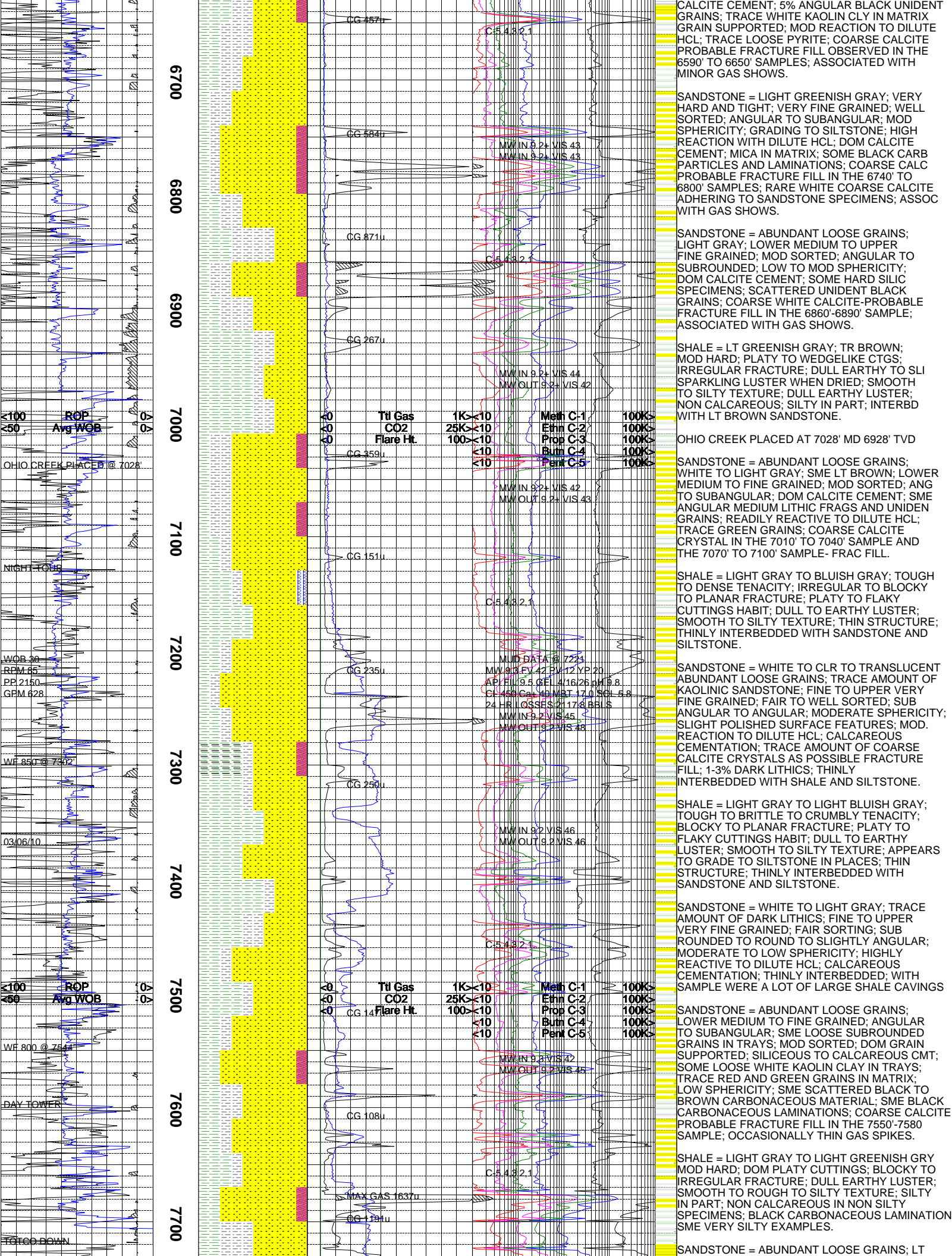
	MARL - CALC
	METAMORPHICS
	MUDSTONE
	OBSIDIAN
	PALEOSOL
	PHOSPHATE
	PORCELANITE
	PORCELANEOUS CLYST
	PYRITE
	PYROCLASTICS
	QUARTZ DIORITE
	QUARTZ LATITE
	QUARTZ MONZONITE
	RECRYSTALLIZED CALCITE
	RHYOLITE
	SALT
	SAND

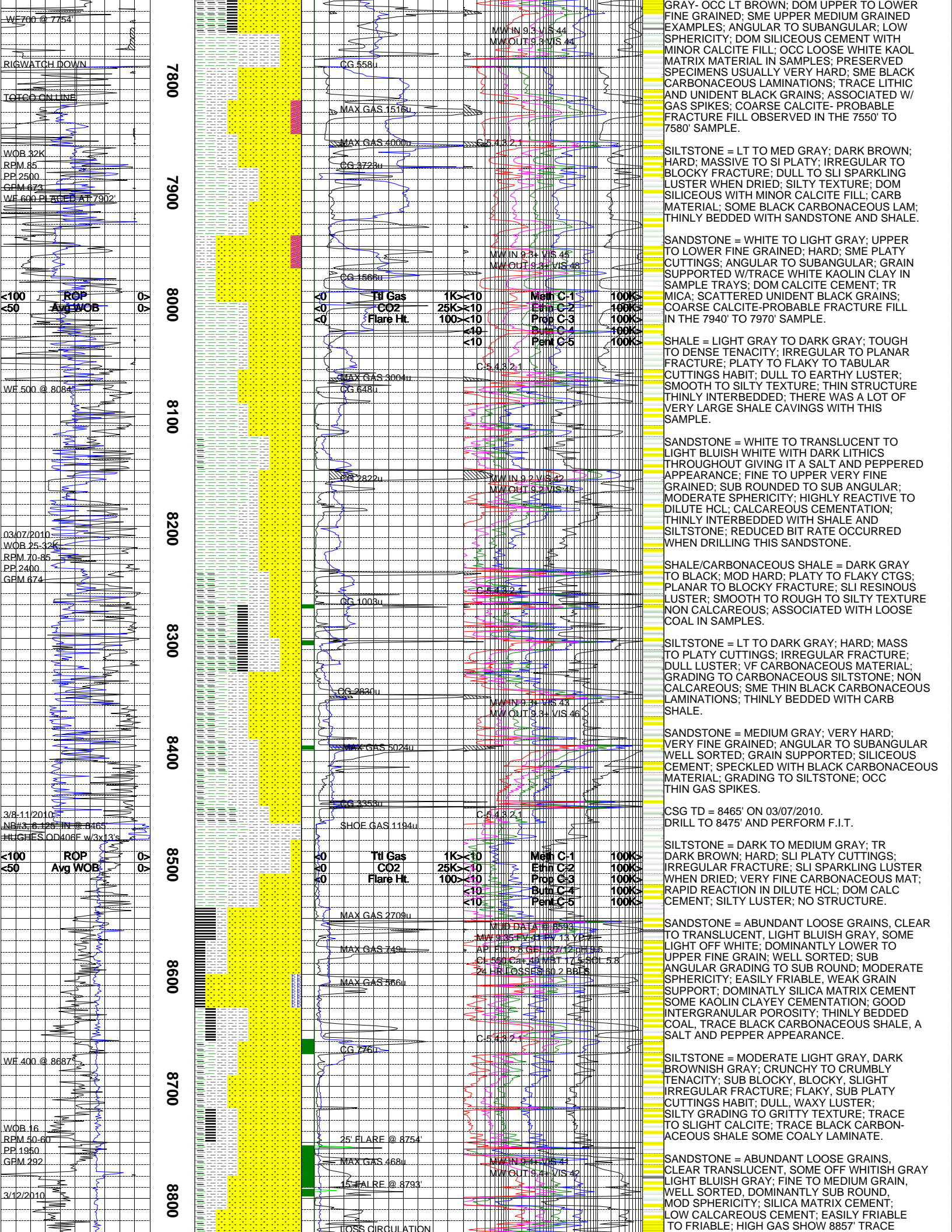
	SANDSTONE
	SANDSTONE-TUFFACEOUS
	SERICITIZATION
	SERPENTINE
	SHALE
	SHALE TUFFACEOUS
	SHELL FRAGMENTS
	SIDERITE
	SILICIFICATION
	SILTSTONE
	SILTST-TUFFACEOUS
	TUFF
	VOLCANICLASTICS SEDS
	VOLCANICS

[illegible]









WF 700 @ 7754

RIGWATCH DOWN

TOTCO ON LINE

WOB 32K  
RPM 85  
PP 2500  
GPM 673  
WF 600 PL 800 D ACT 7902

<100 ROP  
<50 Avg WOB

WF 500 @ 8084

03/07/2010  
WOB 25-32K  
RPM 70-85  
PP 2400  
GPM 674

3/8-11/2010  
NO 3-16-126 IN @ 8465  
HUGHES OD 406F w/3x13's

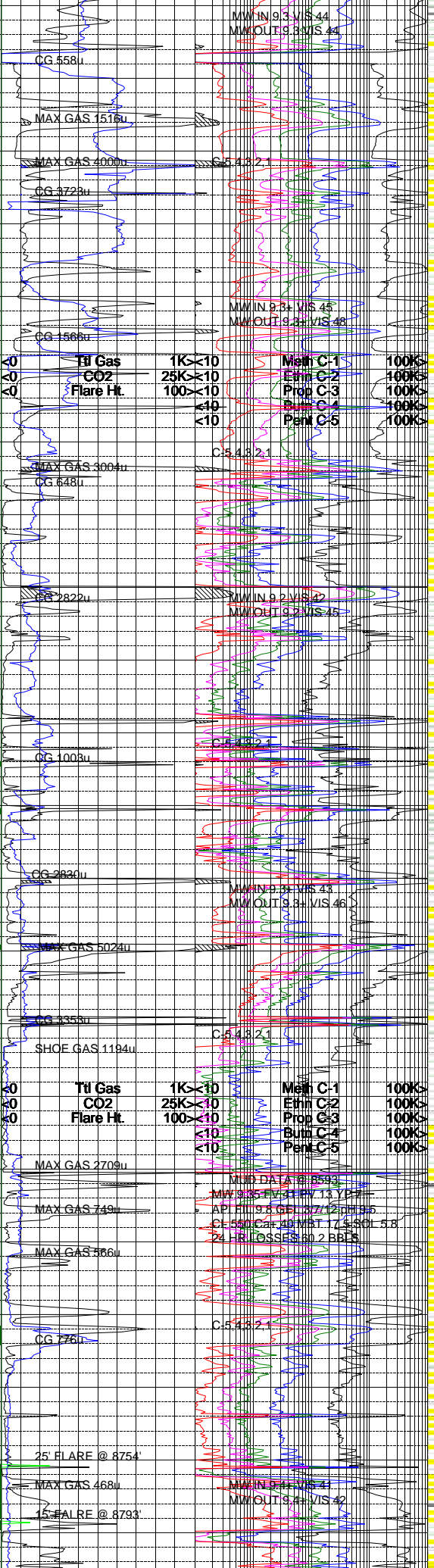
<100 ROP  
<50 Avg WOB

WF 400 @ 8687

WOB 16  
RPM 50-60  
PP 1950  
GPM 292

3/12/2010

7800  
7900  
8000  
8100  
8200  
8300  
8400  
8500  
8600  
8700  
8800



GRAY - OCC LT BROWN; DOM UPPER TO LOWER FINE GRAINED; SME UPPER MEDIUM GRAINED EXAMPLES; ANGULAR TO SUBANGULAR; LOW SPHERICITY; DOM SILICEOUS CEMENT WITH MINOR CALCITE FILL; OCC LOOSE WHITE KAOL MATRIX MATERIAL IN SAMPLES; PRESERVED SPECIMENS USUALLY VERY HARD; SME BLACK CARBONACEOUS LAMINATIONS; TRACE LITHIC AND UNIDENT BLACK GRAINS; ASSOCIATED W/ GAS SPIKES; COARSE CALCITE - PROBABLE FRACTURE FILL OBSERVED IN THE 7550' TO 7580' SAMPLE.

SILTSTONE = LT TO MED GRAY; DARK BROWN; HARD; MASSIVE TO SL PLATY; IRREGULAR TO BLOCKY FRACTURE; DULL TO SLI SPARKLING LUSTER WHEN DRIED; SILTY TEXTURE; DOM SILICEOUS WITH MINOR CALCITE FILL; CARB MATERIAL; SOME BLACK CARBONACEOUS LAM; THINLY BEDDED WITH SANDSTONE AND SHALE.

SANDSTONE = WHITE TO LIGHT GRAY; UPPER TO LOWER FINE GRAINED; HARD; SME PLATY CUTTINGS; ANGULAR TO SUBANGULAR; GRAIN SUPPORTED W/TRACE WHITE KAOLIN CLAY IN SAMPLE TRAYS; DOM CALCITE CEMENT; TR MICA; SCATTERED UNIDENT BLACK GRAINS; COARSE CALCITE-PROBABLE FRACTURE FILL IN THE 7940' TO 7970' SAMPLE.

SHALE = LIGHT GRAY TO DARK GRAY; TOUGH TO DENSE TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY TO TABULAR CUTTINGS HABIT; DULL TO EARTHY TEXTURE; SMOOTH TO SILTY TEXTURE; THIN STRUCTURE THINLY INTERBEDDED; THERE WAS A LOT OF VERY LARGE SHALE CAVINGS WITH THIS SAMPLE.

SANDSTONE = WHITE TO TRANSLUCENT TO LIGHT BLUISH WHITE WITH DARK LITHICS THROUGHOUT GIVING IT A SALT AND PEPPERED APPEARANCE; FINE TO UPPER VERY FINE GRAINED; SUB ROUNDED TO SUB ANGULAR; MODERATE SPHERICITY; HIGHLY REACTIVE TO DILUTE HCL; CALCAREOUS CEMENTATION; THINLY INTERBEDDED WITH SHALE AND SILTSTONE; REDUCED BIT RATE OCCURRED WHEN DRILLING THIS SANDSTONE.

SHALE/CARBONACEOUS SHALE = DARK GRAY TO BLACK; MOD HARD; PLATY TO FLAKY CTGS; PLANAR TO BLOCKY FRACTURE; SLI RESINOUS LUSTER; SMOOTH TO ROUGH TO SILTY TEXTURE NON CALCAREOUS; ASSOCIATED WITH LOOSE COAL IN SAMPLES.

SILTSTONE = LT TO DARK GRAY; HARD; MASS TO PLATY CUTTINGS; IRREGULAR FRACTURE; DULL LUSTER; VF CARBONACEOUS MATERIAL; GRADING TO CARBONACEOUS SILTSTONE; NON CALCAREOUS; SME THIN BLACK CARBONACEOUS LAMINATIONS; THINLY BEDDED WITH CARB SHALE.

SANDSTONE = MEDIUM GRAY; VERY HARD; VERY FINE GRAINED; ANGULAR TO SUBANGULAR WELL SORTED; GRAIN SUPPORTED; SILICEOUS CEMENT; SPECKLED WITH BLACK CARBONACEOUS MATERIAL; GRADING TO SILTSTONE; OCC THIN GAS SPIKES.

CSG TD = 8465' ON 03/07/2010.  
DRILL TO 8475' AND PERFORM F.I.T.

SILTSTONE = DARK TO MEDIUM GRAY; TR DARK BROWN; HARD; SLI PLATY CUTTINGS; IRREGULAR FRACTURE; SLI SPARKLING LUSTER WHEN DRIED; VERY FINE CARBONACEOUS MAT; RAPID REACTION IN DILUTE HCL; DOM CALC CEMENT; SILTY LUSTER; NO STRUCTURE.

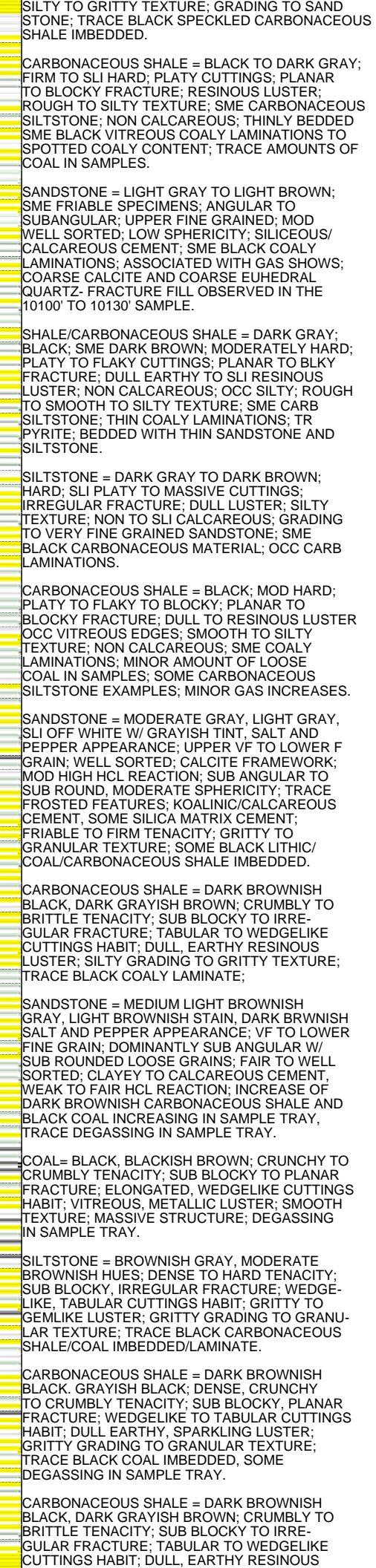
SANDSTONE = ABUNDANT LOOSE GRAINS, CLEAR TO TRANSLUCENT, LIGHT BLUISH GRAY, SOME LIGHT OFF WHITE; DOMINANTLY LOWER TO UPPER FINE GRAIN; WELL SORTED; SUB ANGULAR GRADING TO SUB ROUND; MODERATE SPHERICITY; EASILY FRIABLE, WEAK GRAIN SUPPORT; DOMINATLY SILICA MATRIX CEMENT SOME KAOLIN CLAYEY CEMENTATION; GOOD INTERGRANULAR POROSITY; THINLY BEDDED COAL, TRACE BLACK CARBONACEOUS SHALE, A SALT AND PEPPER APPEARANCE.

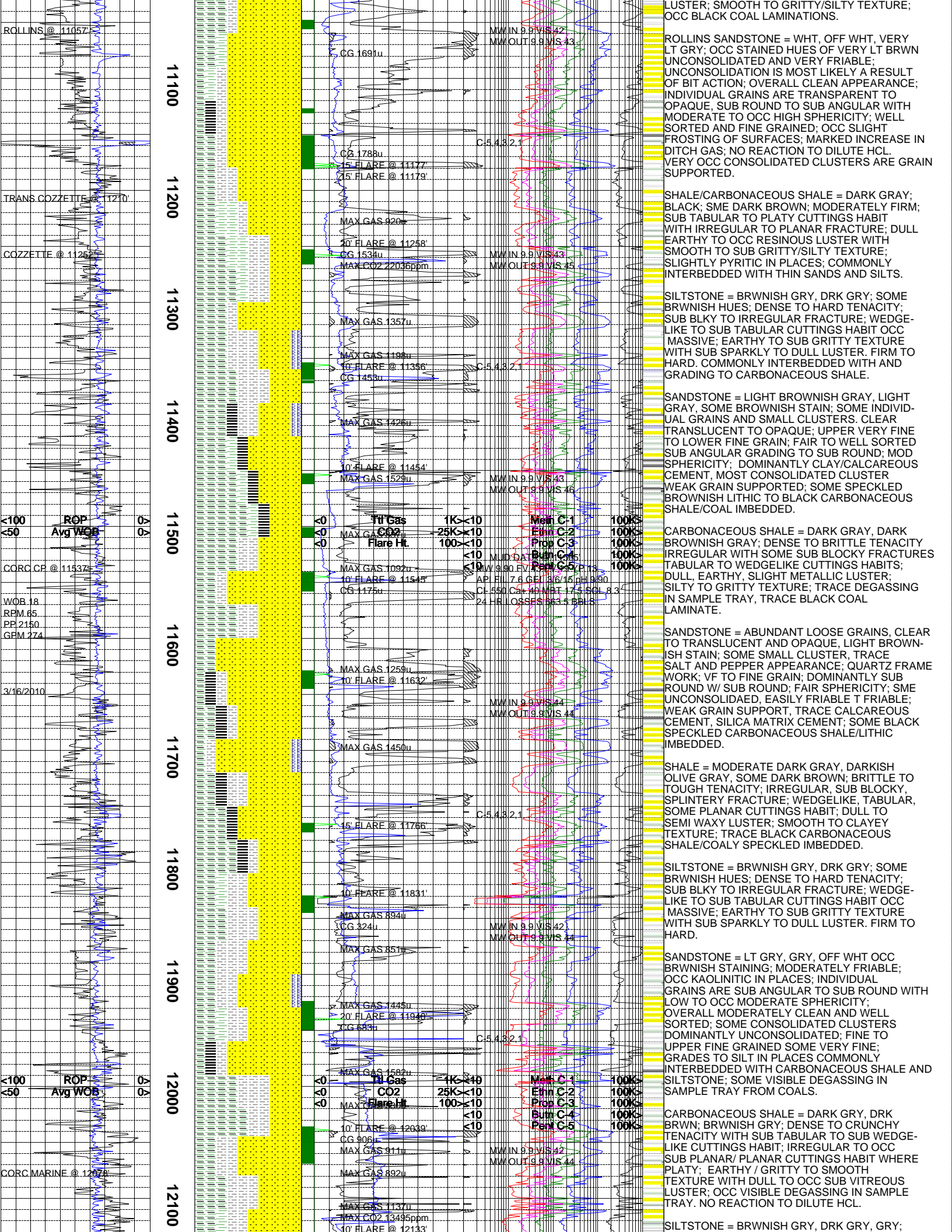
SILTSTONE = MODERATE LIGHT GRAY, DARK BROWNISH GRAY; CRUNCHY TO CRUMBLY TENACITY; SUB BLOCKY, BLOCKY, SLIGHT IRREGULAR FRACTURE; FLAKY, SUB PLATY CUTTINGS HABIT; DULL, WAXY LUSTER; SILTY GRADING TO GRITTY TEXTURE; TRACE TO SLIGHT CALCITE; TRACE BLACK CARBONACEOUS SHALE SOME COALY LAMINATE.

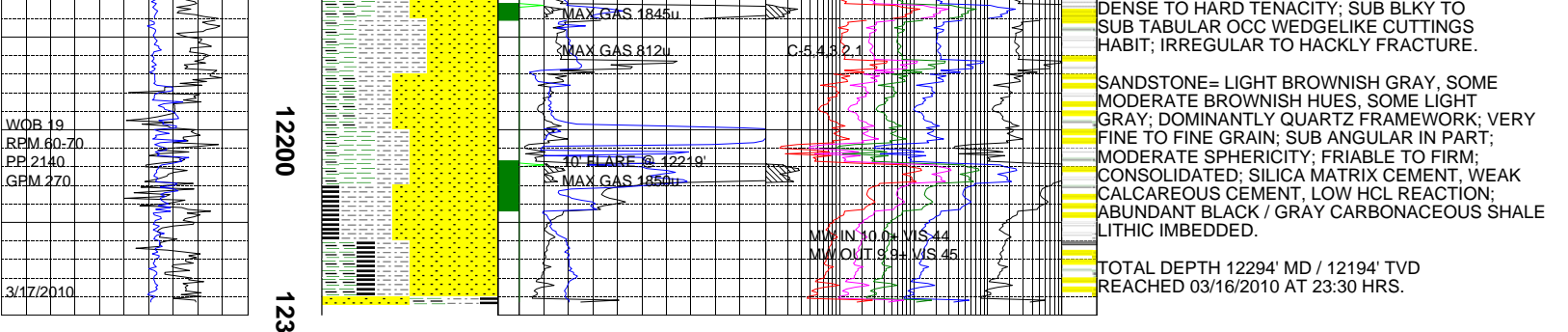
SANDSTONE = ABUNDANT LOOSE GRAINS, CLEAR TRANSLUCENT, SOME OFF WHITISH GRAY LIGHT BLUISH GRAY; FINE TO MEDIUM GRAIN, WELL SORTED, DOMINANTLY SUB ROUND, MOD SPHERICITY; SILICA MATRIX CEMENT; LOW CALCAREOUS CEMENT; EASILY FRIABLE TO FRIABLE; HIGH GAS SHOW 8857' TRACE



10000	10100	10200	10300	10400	10500	10600	10700	10800	10900	11000
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------







The log data, interpretations and recommendation provided by Epoch are inferences and assumptions based on measurements of drilling fluids. Such inferences and assumptions are not infallible and reasonable professionals may differ. Epoch does not represent or warrant the accuracy, correctness or completeness of any log data, interpretations, recommendations or information provided by Epoch, its officers, agents or employees. Epoch does not and cannot guarantee the accuracy of any such interpretation of the log data, interpretations or recommendations and Company is fully responsible for all decisions and actions it takes based on such log data, interpretations and recommendations.