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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 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: 1" = 100'

CASING DATA

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

MUD TYPES

LSND TO 12,294'
TO
TO
TO

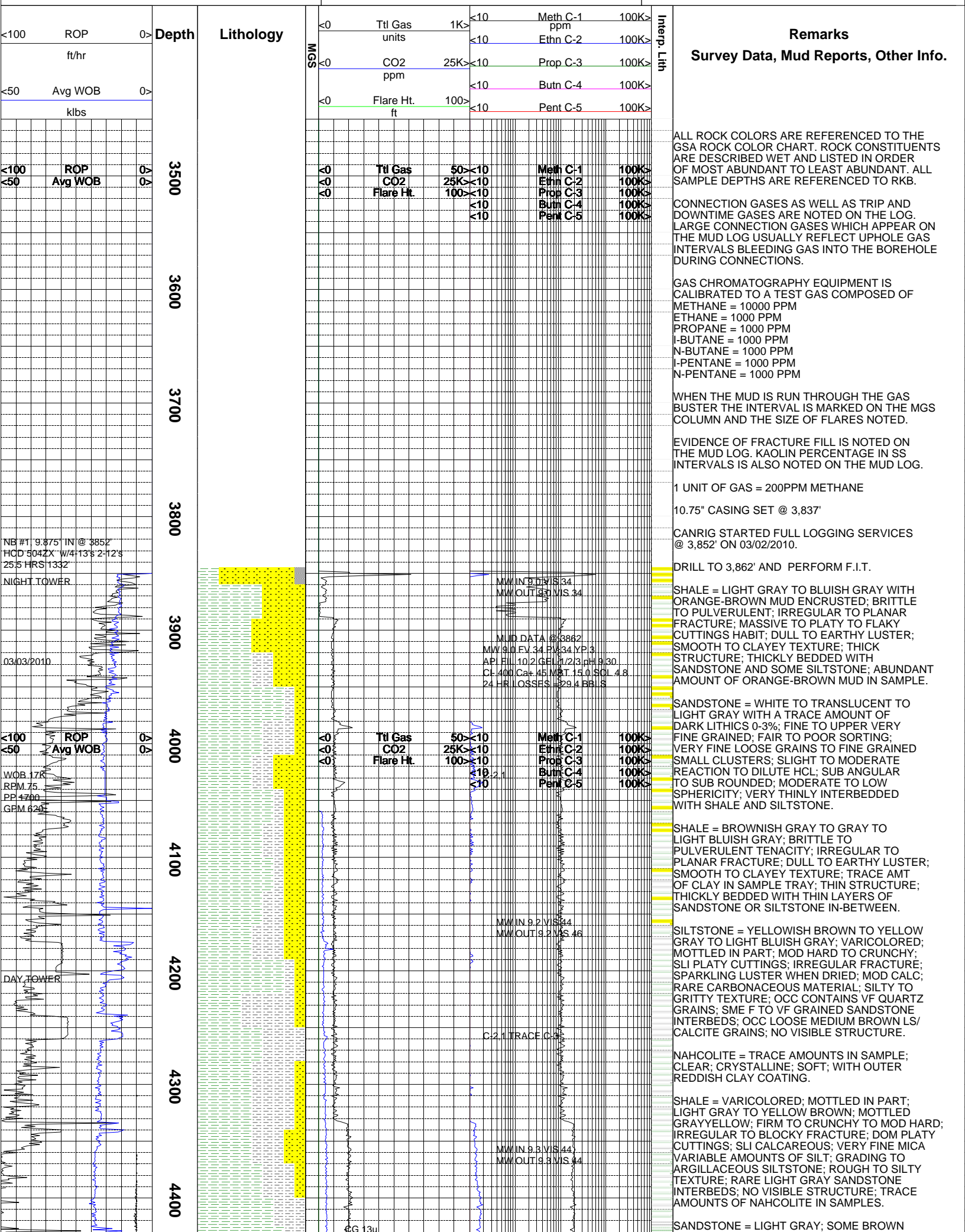
HOLE SIZE

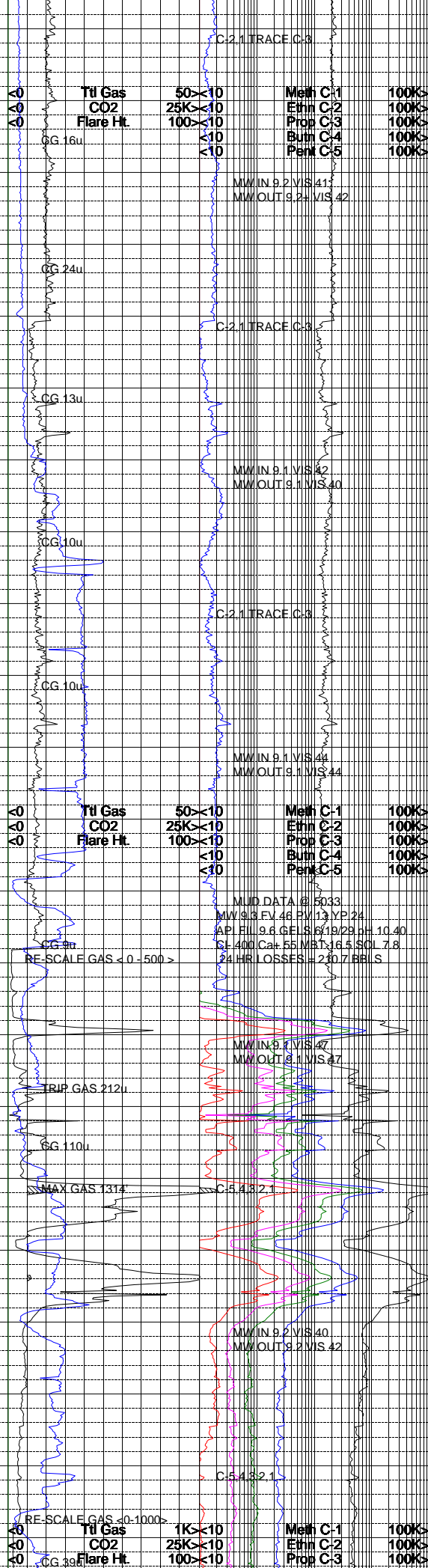
9.875" TO 8,465'
6.125" TO 12,294'
TO
TO

ABBREVIATIONS

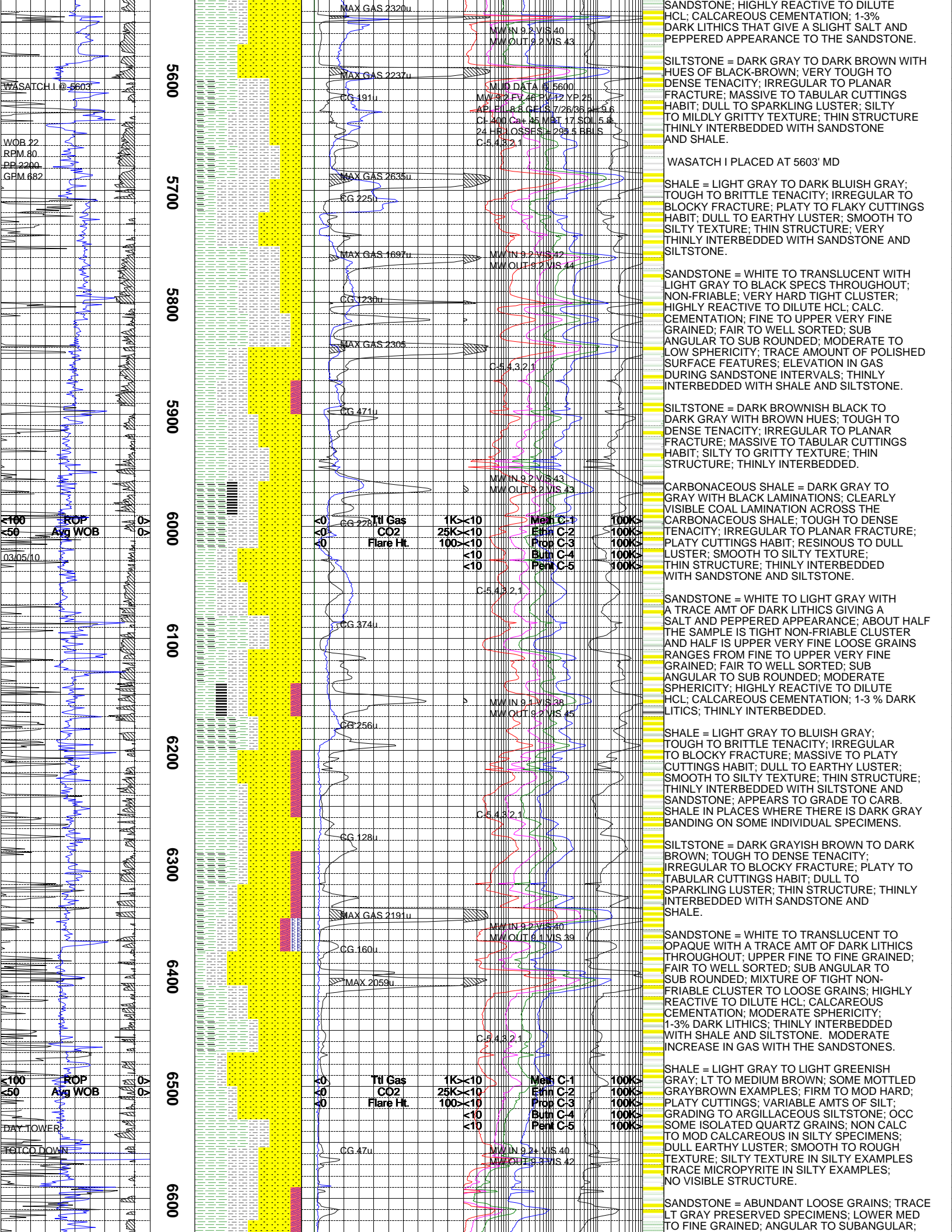
NB	NEWBIT	PV	PLASTIC VISCOSITY	LC	LOST CIRCULATION
RRB	RERUN BIT	YP	YIELD POINT	CO	CIRCULATE OUT
CB	CORE BIT	FL	FLUID LOSS	NR	NO RETURNS
WOB	WEIGHT ON BIT	CL	PPM CLORIDE ION	TG	TRIP GAS
RPM	ROTARY REV/MIN	Rm	MUD RESISTIVITY	SG	SURVEY GAS
PP	PUMP PRESSURE	Rmf	FILTRATE RESISTIVITY	WG	WIPER GAS
SPM	STROKES/MIN	PR	POOR RETURNS	CG	CONNECTION GAS
MW	MUD WEIGHT	LAT	LOGGED AFTER TRIP		
VIS	FUNNEL VISCOSITY	LAS	LOGGED AFTER SURVEY		

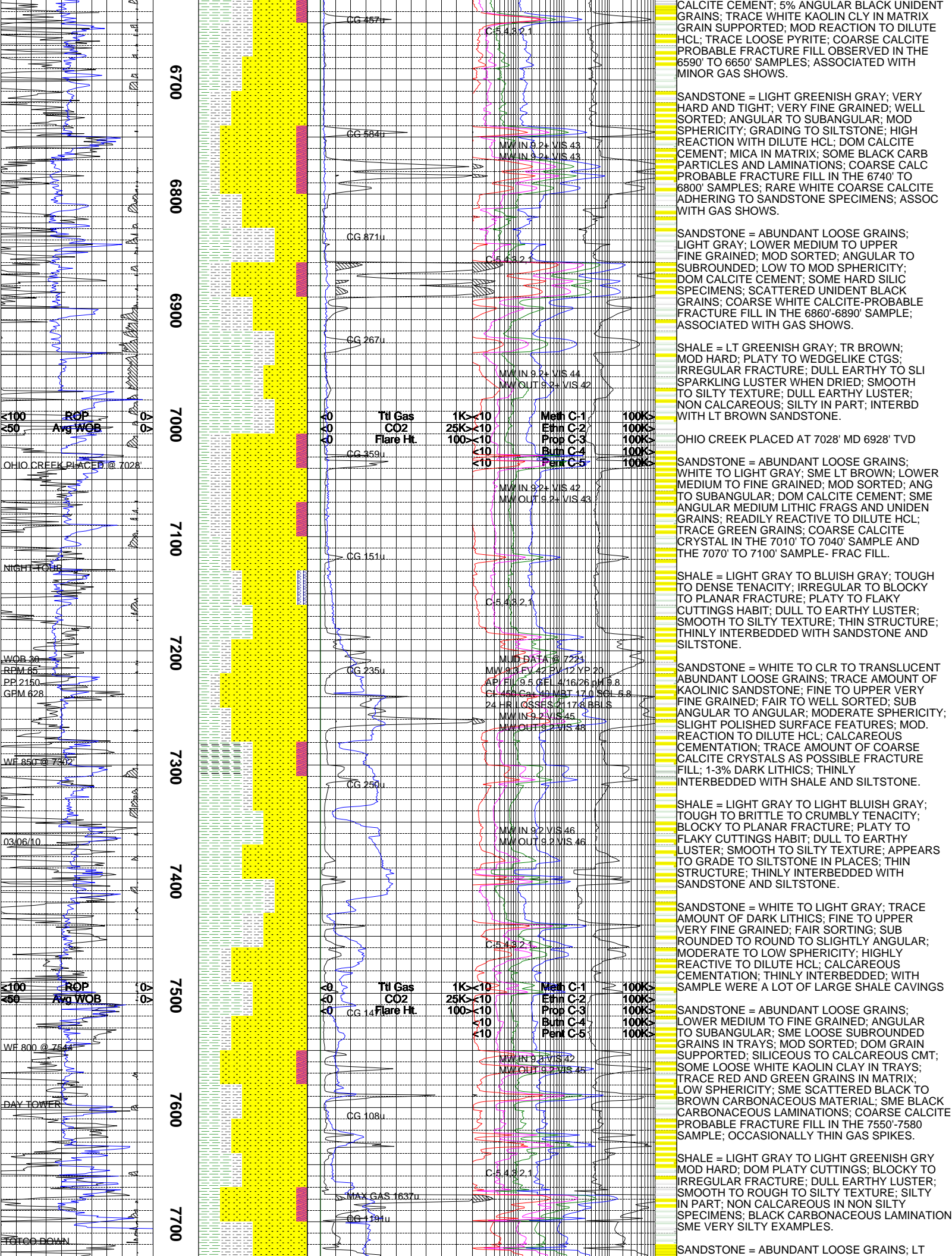
	ALTERED ZONE		CHERT - GLASSY		FELSIC SILIC DIKE		MARL - CALC		SANDSTONE
	ANDESITE		CHERT - PORCEL		FOSSIL		METAMORPHICS		SANDSTONE-TUFFACEOUS
	ANHYDRITE		CHERT - TIGER STRIPE		GABBRO		MUDSTONE		SERICITIZATION
	BASALT		CHERT - UNDIFF		GLASSY TUFF		OBSIDIAN		SERPENTINE
	BENTONITE		CLAY		GRANITE		PALEOSOL		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		DIORITE		LIMESTONE		RHYOLITE		
	CRYSTALLINE TUFF		DOLOSTONE		LITHIC TUFF		SALT		
	CHERT - ARGILL				MARL - DOLO		SAND		

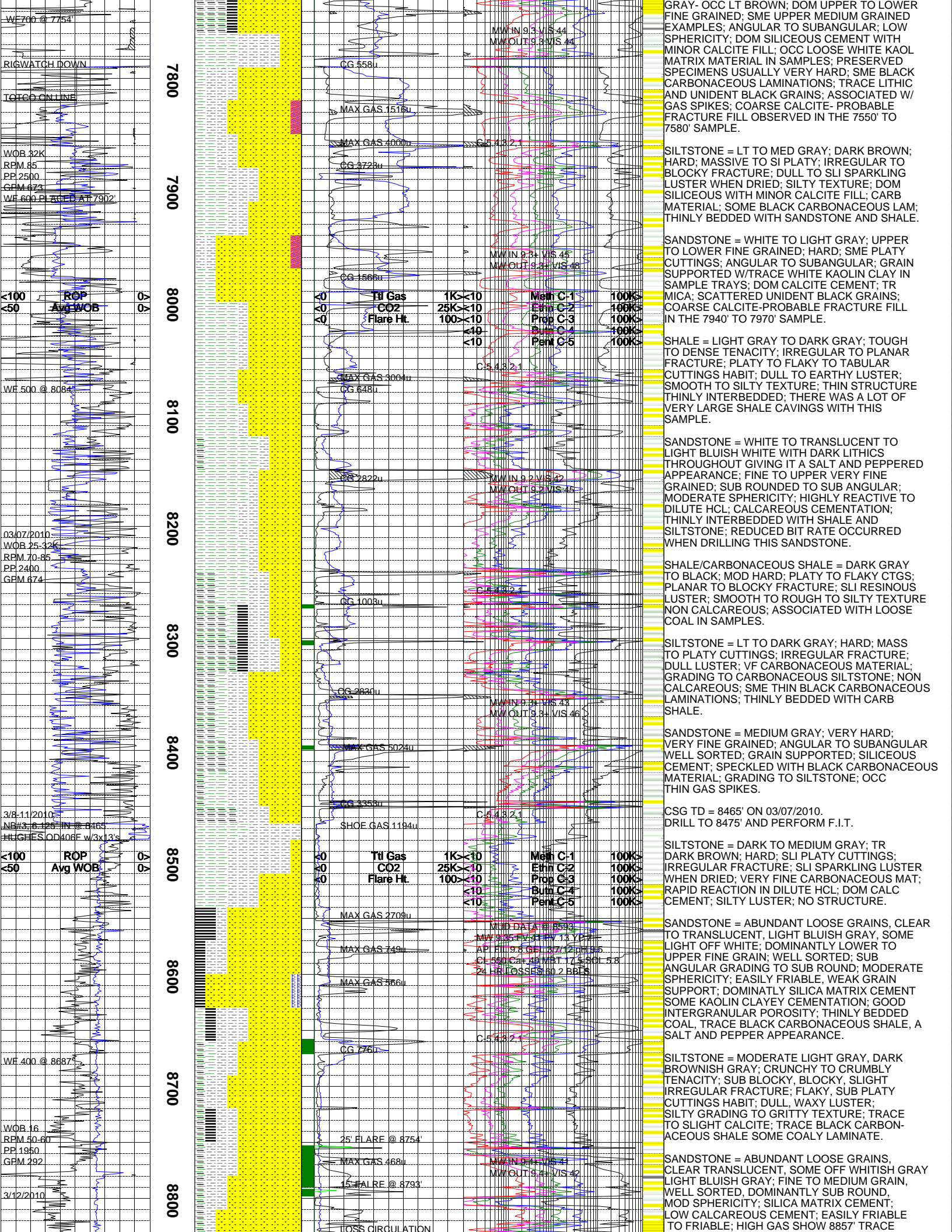


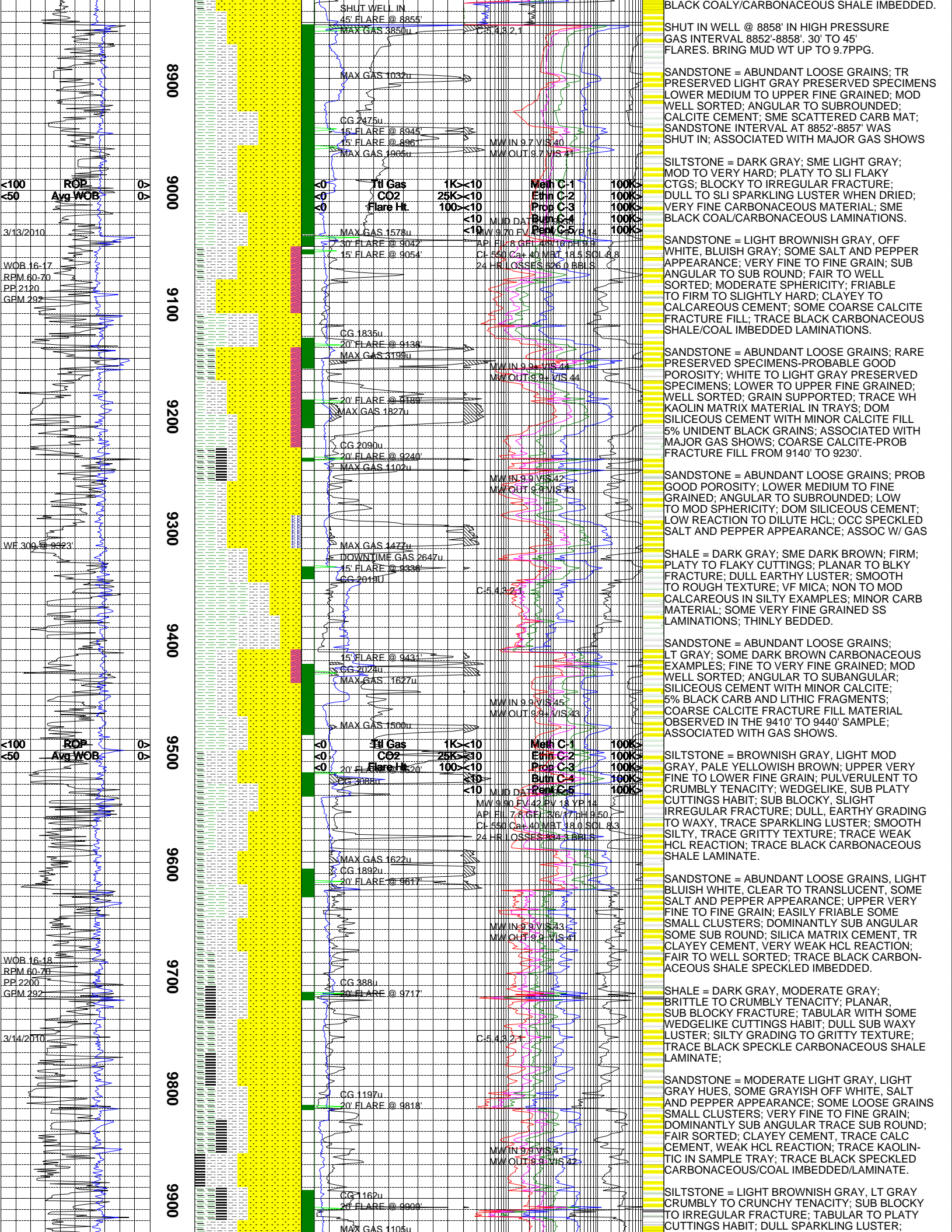


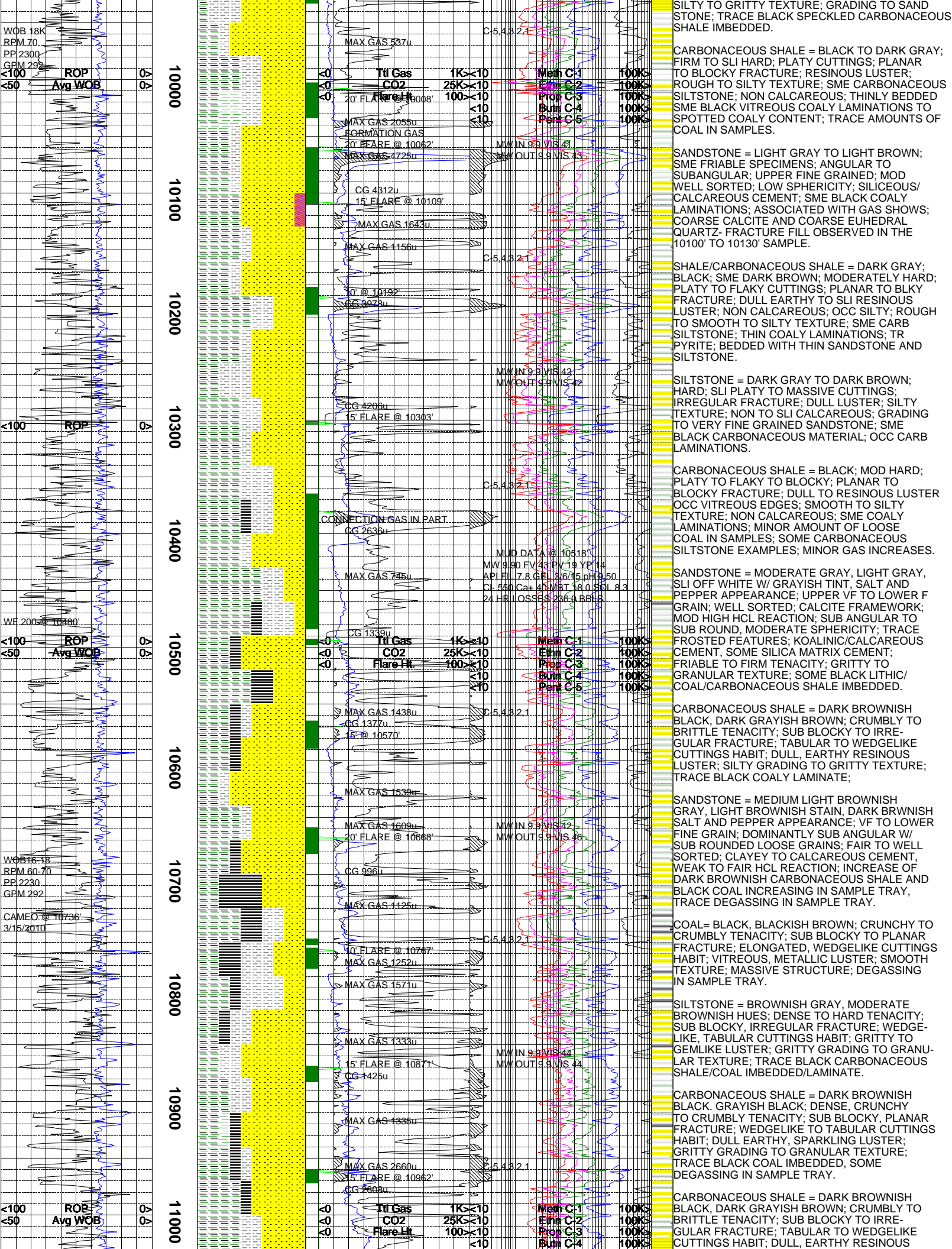
SANDSTONE = WHITE TO VERY LIGHT GRAY
WITH A TRACE AMOUNT OF DARK LITHICS;
VERY NON-FRIABLE TIGHT CLUSTERS; UPPER
VERY FINE GRAINED; WELL SORTED; SUB
ROUNDED TO ANGULAR; MODERATE
SPHERICITY; HIGH GAS SHOW WITH THE











ROLLINS SANDSTONE = WHT, OFF WHT, VERY LT GRAY; OCC STAINED HUES OF VERY LT BRWN UNCONSOLIDATED AND VERY FRIABLE; UNCONSOLIDATION IS MOST LIKELY A RESULT OF BIT ACTION; OVERALL CLEAN APPEARANCE; INDIVIDUAL GRAINS ARE TRANSPARENT TO OPAQUE, SUB ROUND TO SUB ANGULAR WITH MODERATE TO OCC HIGH SPHERICITY; WELL SORTED AND FINE GRAINED; OCC SLIGHT FROSTING OF SURFACES; MARKED INCREASE IN DITCH GAS; NO REACTION TO DILUTE HCL. VERY OCC CONSOLIDATED CLUSTERS ARE GRAIN SUPPORTED.

SHALE/CARBONACEOUS SHALE = DARK GRAY; BLACK; SME DARK BROWN; MODERATELY FIRM; SUB TABULAR TO PLATY CUTTINGS HABIT WITH IRREGULAR TO PLANAR FRACTURE; DULL EARTHY TO OCC RESINOUS LUSTER WITH SMOOTH TO SUB GRITTY/SILTY TEXTURE; SLIGHTLY PYRITIC IN PLACES; COMMONLY INTERBEDDED WITH THIN SANDS AND SILTS.

SILTSTONE = BRWNISH GRAY, DRK GRAY; SOME BRWNISH HUES; DENSE TO HARD TENACITY; SUB BLKY TO IRREGULAR FRACTURE; WEDGE-LIKE TO SUB TABULAR CUTTINGS HABIT OCC MASSIVE; EARTHY TO SUB GRITTY TEXTURE WITH SUB SPARKLY TO DULL LUSTER. FIRM TO HARD. COMMONLY INTERBEDDED WITH AND GRADING TO CARBONACEOUS SHALE.

SANDSTONE = LIGHT BROWNISH GRAY, LIGHT GRAY, SOME BROWNISH STAIN; SOME INDIVIDUAL GRAINS AND SMALL CLUSTERS. CLEAR TRANSLUCENT TO OPAQUE; UPPER VERY FINE TO LOWER FINE GRAIN; FAIR TO WELL SORTED SUB ANGULAR GRADING TO SUB ROUND; MOD SPHERICITY; DOMINANTLY CLAY/CALCAREOUS CEMENT, MOST CONSOLIDATED CLUSTER WEAK GRAIN SUPPORTED; SOME SPECKLED BROWNISH LITHIC TO BLACK CARBONACEOUS SHALE/COAL IMBEDDED.

CARBONACEOUS SHALE = DARK GRAY, DARK BROWNISH GRAY; DENSE TO BRITTLE TENACITY IRREGULAR WITH SOME SUB BLOCKY FRACTURES TABULAR TO WEDGE-LIKE CUTTINGS HABITS; DULL, EARTHY, SLIGHT METALLIC LUSTER; SILTY TO GRITTY TEXTURE; TRACE DEGASSING IN SAMPLE TRAY, TRACE BLACK COAL LAMINATE.

SANDSTONE = ABUNDANT LOOSE GRAINS, CLEAR TO TRANSLUCENT AND OPAQUE, LIGHT BROWNISH STAIN; SOME SMALL CLUSTER, TRACE SALT AND PEPPER APPEARANCE; QUARTZ FRAME WORK; VF TO FINE GRAIN; DOMINANTLY SUB ROUND W/ SUB ROUND; FAIR SPHERICITY; SME UNCONSOLIDATED, EASILY FRIABLE T FRIABLE; WEAK GRAIN SUPPORT, TRACE CALCAREOUS CEMENT, SILICA MATRIX CEMENT; SOME BLACK SPECKLED CARBONACEOUS SHALE/LITHIC IMBEDDED.

SHALE = MODERATE DARK GRAY, DARKISH OLIVE GRAY, SOME DARK BROWN; BRITTLE TO TOUGH TENACITY; IRREGULAR, SUB BLOCKY, SPLINTERY FRACTURE; WEDGE-LIKE, TABULAR, SOME PLANAR CUTTINGS HABIT; DULL TO SEMI WAXY LUSTER; SMOOTH TO CLAYEY TEXTURE; TRACE BLACK CARBONACEOUS SHALE/COALY SPECKLED IMBEDDED.

SILTSTONE = BRWNISH GRAY, DRK GRAY; SOME BRWNISH HUES; DENSE TO HARD TENACITY; SUB BLKY TO IRREGULAR FRACTURE; WEDGE-LIKE TO SUB TABULAR CUTTINGS HABIT OCC MASSIVE; EARTHY TO SUB GRITTY TEXTURE WITH SUB SPARKLY TO DULL LUSTER. FIRM TO HARD.

SANDSTONE = LT GRAY, GRAY, OFF WHT OCC BRWNISH STAINING; MODERATELY FRIABLE; OCC KAOLINITIC IN PLACES; INDIVIDUAL GRAINS ARE SUB ANGULAR TO SUB ROUND WITH LOW TO OCC MODERATE SPHERICITY; OVERALL MODERATELY CLEAN AND WELL SORTED; SOME CONSOLIDATED CLUSTERS DOMINANTLY UNCONSOLIDATED; FINE TO UPPER FINE GRAINED SOME VERY FINE; GRADES TO SILT IN PLACES COMMONLY INTERBEDDED WITH CARBONACEOUS SHALE AND SILTSTONE; SOME VISIBLE DEGASSING IN SAMPLE TRAY FROM COALS.

CARBONACEOUS SHALE = DARK GRAY, DRK BRWN; BRWNISH GRAY; DENSE TO CRUNCHY TENACITY WITH SUB TABULAR TO SUB WEDGE-LIKE CUTTINGS HABIT; IRREGULAR TO OCC SUB PLANAR/ PLANAR CUTTINGS HABIT WHERE PLATY; EARTHY / GRITTY TO SMOOTH TEXTURE WITH DULL TO OCC SUB VITREOUS LUSTER; OCC VISIBLE DEGASSING IN SAMPLE TRAY. NO REACTION TO DILUTE HCL.

SILTSTONE = BRWNISH GRAY, DRK GRAY, GRAY;

TRANS.COZZETTE @ 11270

COZZETTE @ 11252

1200

MAX GAS 920u

20 FLARE @ 11258

CG 1534u

MAX CO2 22036ppm

MW IN 9.9 V/S 43

MW OUT 9.8 V/S 45

SHALE/CARBONACEOUS SHALE = DARK GRAY;
BLACK; SME DARK BROWN; MODERATELY FIRM;
SUB TABULAR TO PLATY CUTTINGS HABIT
WITH IRREGULAR TO PLANAR FRACTURE; DULL
EARTHY TO OCC RESINOUS LUSTER WITH
SMOOTH TO SUB GRITTY/SILTY TEXTURE;
SLIGHTLY PYRITIC IN PLACES; COMMONLY
INTERBEDDED WITH THIN SANDS AND SILTS.

11300

MAX GAS 1357u

MAX GAS 1198u

10' FLARE @ 11336

CG 453u

C 5.43 Z 1

SILTSTONE = BRWNISH GRY, DRK GRY; SOME BRWNISH HUES; DENSE TO HARD TENACITY; SUB BLKY TO IRREGULAR FRACTURE; WEDGE-LIKE TO SUB TABULAR CUTTINGS HABIT OCC MASSIVE; EARTHY TO SUB GRITTY TEXTURE WITH SUB SPARKLY TO DULL LUSTER. FIRM TO HARD. COMMONLY INTERBEDDED WITH AND GRADING TO CARBONACEOUS SHALE.

11400

MAX GAS 1426u

10' FLARE @ 11454'

MAX GAS 1529u

MM IN 9.9 V/S 43

MM OUT 9.9 V/S 46

SANDSTONE = LIGHT BROWNISH GRAY, LIGHT GRAY, SOME BROWNISH STAIN; SOME INDIVIDUAL GRAINS AND SMALL CLUSTERS. CLEAR TRANSLUCENT TO OPAQUE; UPPER VERY FINE TO LOWER FINE GRAIN; FAIR TO WELL SORTED SUB ANGULAR GRADING TO SUB ROUND; MOD SPHERICITY; DOMINANTLY CLAY/CALCAREOUS CEMENT, MOST CONSOLIDATED CLUSTER WEAK GRAIN SUPPORTED; SOME SPECKLED BROWNISH LITHIC TO BLACK CARBONACEOUS SHALE/COAL IMBEDDED.

[illegible]

11600

11610

MAX GAS 1259u

10' FLARE @ 11632'

MAX GAS 1450u

MM IN 9.3 VS 44

MM OUT 9.3 VS 44

SANDSTONE = ABUNDANT LOOSE GRAINS, CLEAR TO TRANSLUCENT AND OPAQUE, LIGHT BROWNISH STAIN; SOME SMALL CLUSTER, TRACE SALT AND PEPPER APPEARANCE; QUARTZ FRAME WORK; VF TO FINE GRAIN; DOMINANTLY SUB ROUND W/ SUB ROUND; FAIR SPHERICITY; SME UNCONSOLIDAED, EASILY FRIABLE T FRIABLE; WEAK GRAIN SUPPORT, TRACE CALCAREOUS CEMENT, SILICA MATRIX CEMENT; SOME BLACK SPECKLED CARBONACEOUS SHALE/LITHIC IMBEDDED.

SHALE = MODERATE DARK GRAY, DARKISH OLIVE GRAY, SOME DARK BROWN; BRITTLE TO TOUGH TENACITY; IRREGULAR, SUB BLOCKY, SPLINTERY FRACTURE; WEDGE LIKE, TABULAR, SOME PLANAR CUTTINGS HABIT; DULL TO SEMI WAXY LUSTER; SMOOTH TO CLAYEY TEXTURE; TRACE BLACK CARBONACEOUS SHALE/COALY SPECKLED IMBEDDED.

11800

10' P-ARE @ 11831'

MAX GAS 8941
SCG 3241

MIN 9.9 V/S 42
MWCT 9.9 V/S 34

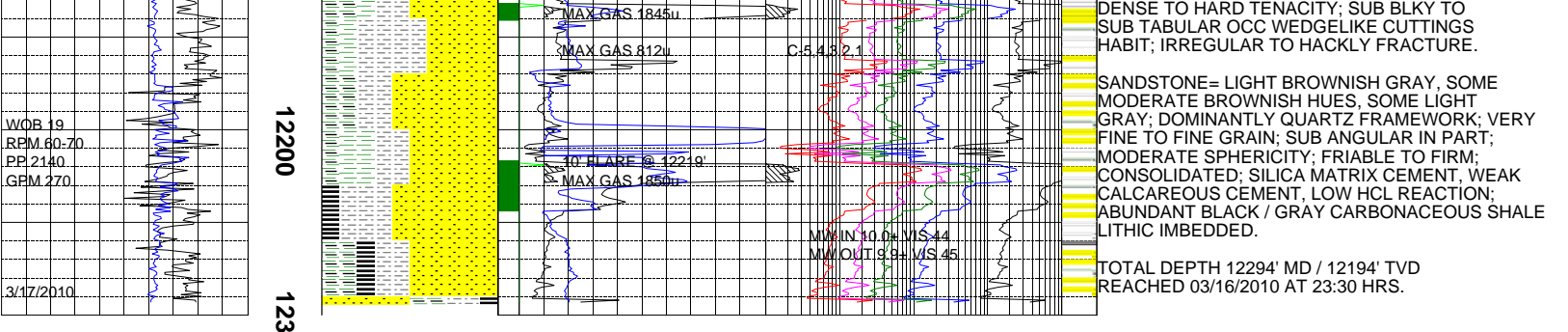
SILTSTONE = BRWNISH GRY, DRK GRY; SOME BRWNISH HUES; DENSE TO HARD TENACITY; SUB BLKY TO IRREGULAR FRACTURE; WEDGE-LIKE TO SUB TABULAR CUTTINGS HABIT OCC MASSIVE; EARTHY TO SUB GRITTY TEXTURE WITH SUB SPARKLY TO DULL LUSTER. FIRM TO HARD.

SANDSTONE = LT GRY, GRY, OFF WHT OCC BRWNISH STAINING; MODERATELY FRIABLE; OCC KAOLINITIC IN PLACES; INDIVIDUAL GRAINS ARE SUB ANGULAR TO SUB ROUND WITH LOW TO OCC MODERATE SPHERICITY; OVERALL MODERATELY CLEAN AND WELL SORTED; SOME CONSOLIDATED CLUSTERS DOMINANTLY UNCONSOLIDATED; FINE TO UPPER FINE GRAINED SOME VERY FINE; GRADES TO SILT IN PLACES COMMONLY INTERBEDDED WITH CARBONACEOUS SHALE AND SILTSTONE; SOME VISIBLE DEGASSING IN SAMPLE TRAY FROM COALS.

CORC MARINE @ 12074	10	MAX GAS 9110	100%	100%	100%	CARBONACEOUS SHALE = DARK GRAY, DRK BRWN; BRWNISH GRAY; DENSE TO CRUNCHY TENACITY WITH SUB TABULAR TO SUB WEDGE- LIKE CUTTINGS HABIT; IRREGULAR TO OCC SUB PLANAR/ PLANAR CUTTINGS HABIT WHERE PLATY; EARTHY / GRITTY TO SMOOTH TEXTURE WITH DULL TO OCC SUB VITREOUS LUSTER; OCC VISIBLE DEGASSING IN SAMPLE TRAY. NO REACTION TO DILUTE HCL.
	121	MAX GAS 8920	100%	100%	100%	

MAX CO₂ 1,349ppm
10' FLARE @ 12133'

SILTSTONE = BRWNISH GRY, DRK GRY, GRY;



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