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MUDLOG TVD

COMPANY	EXXONMOBIL
WELL	FRU197-33A4
FIELD	FREEDOM RANCH UNIT
REGION	ROCKY MOUNTAINS
COORDINATES	N39,54,56.038 W108,17,6.105
ELEVATION	6415' 6388'
COUNTY, STATE	RIO BLANCO COUNTY, COLO
API INDEX	05-103-11100-00
SPUD DATE	05/19/2009
CONTRACTOR	HELMRICH AND PAYNE
CO. REP.	K.GARDNER/G.PERKINS
RIG/TYPE	239/FLEX 3
LOGGING UNIT	MLU 033
GEOLOGISTS	LAYNE GOOD NICK BAUER
ADD. PERSONS	JASON REISENBICHLER JASON REYNOLDS
CO. GEOLOGIST	MELISSA SAURBORN

LOG INTERVAL

DEPTHS: 3900' **TO** 12512'

DATES: 05/19/2008 **TO** 06/06/09

SCALE: 1"=100'

CASING DATA

16" **AT** 130'

10.75" **AT** 3877'

7" **AT** 8717'

4.5" **AT** 12500'

HOLE SIZE

9.875" **TO** 8723"

6.125" **TO** 12512'

TO

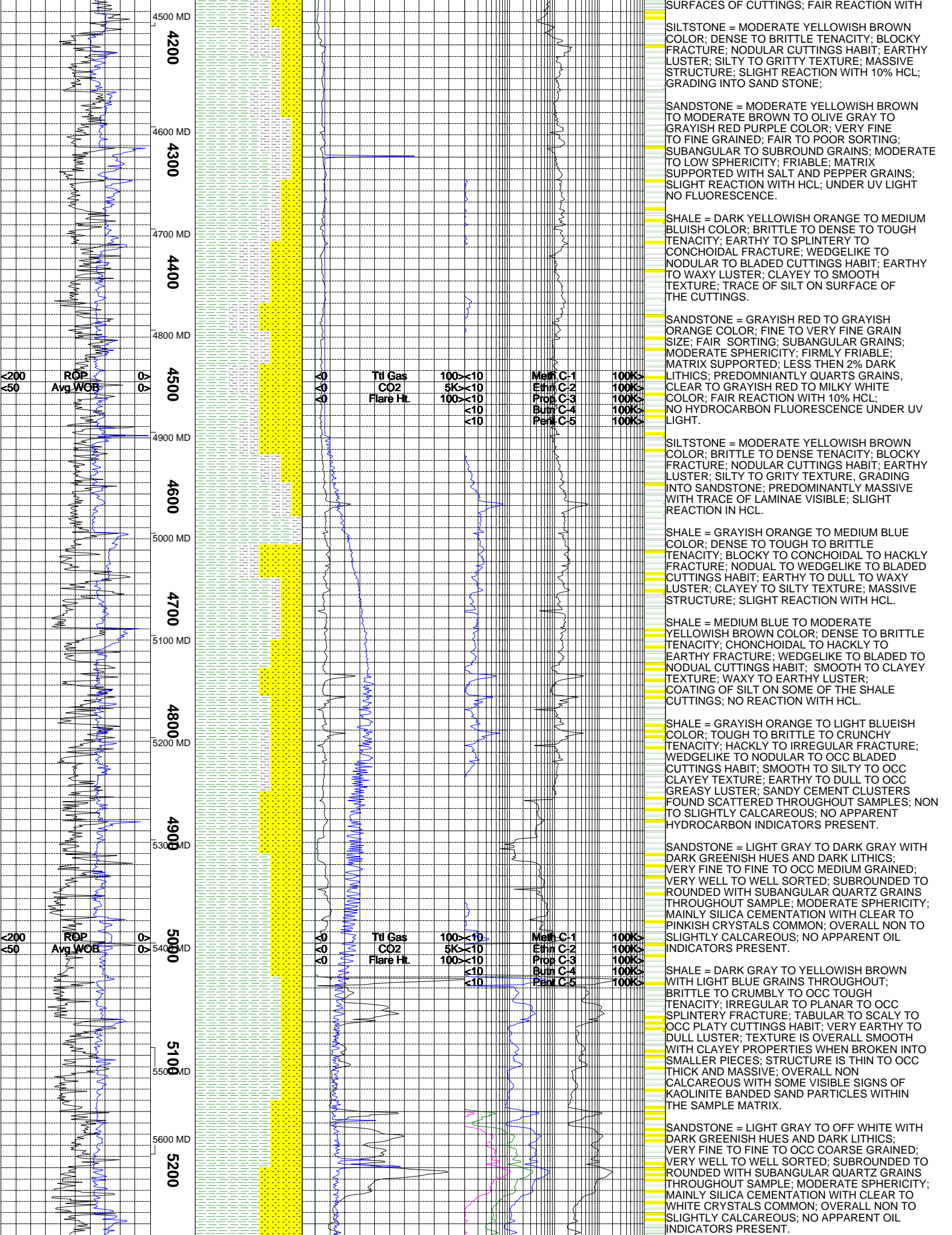
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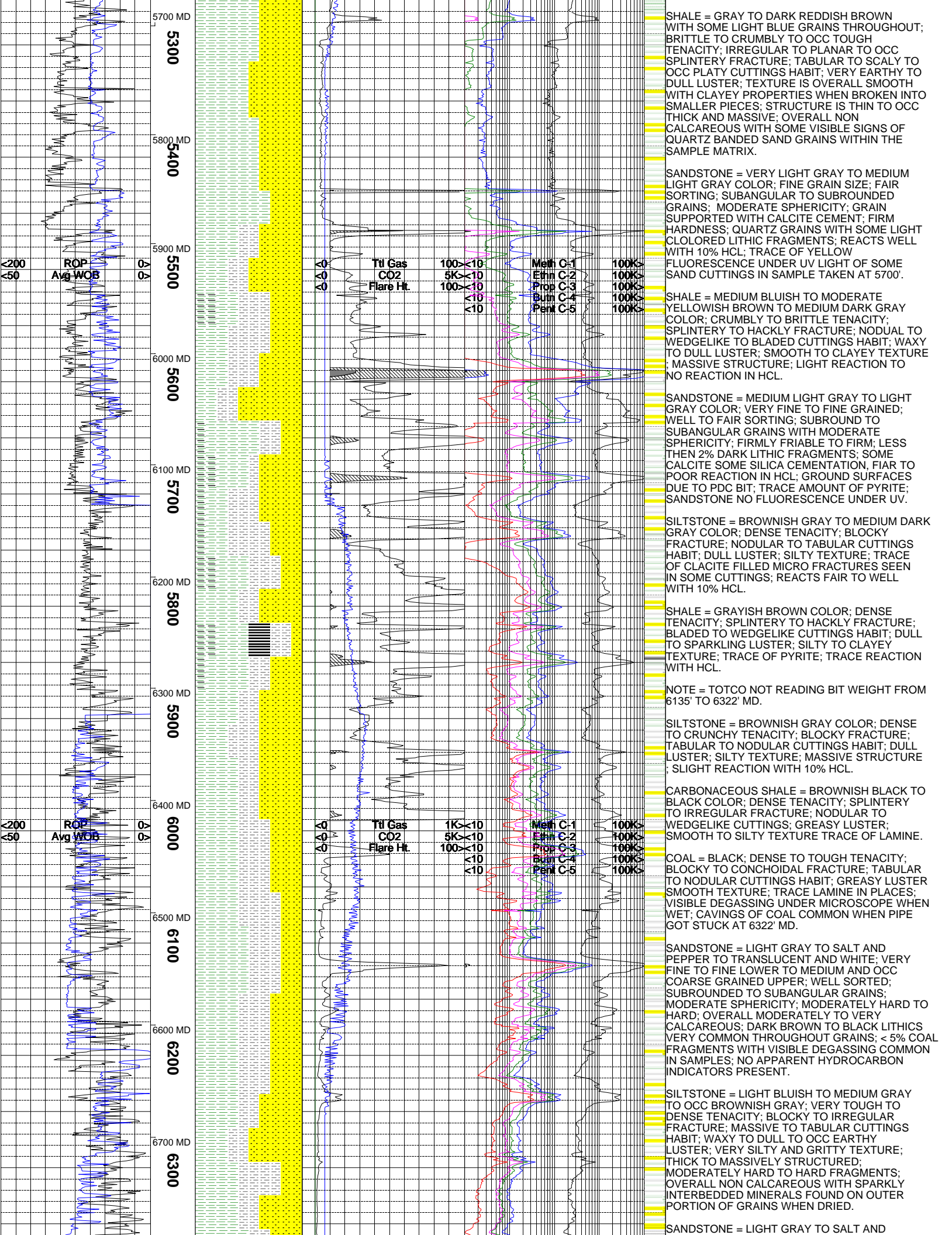
ABBREVIATIONS

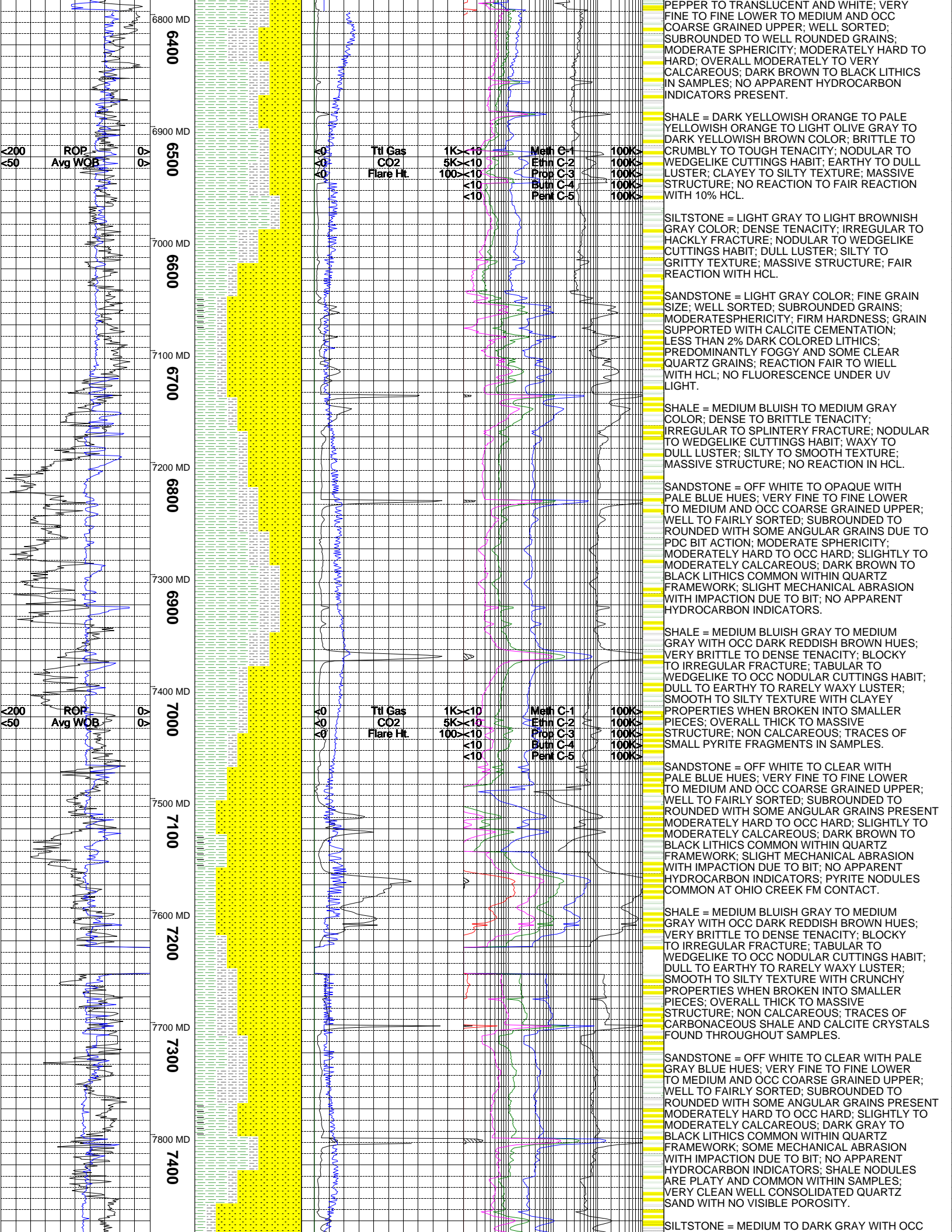
<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm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

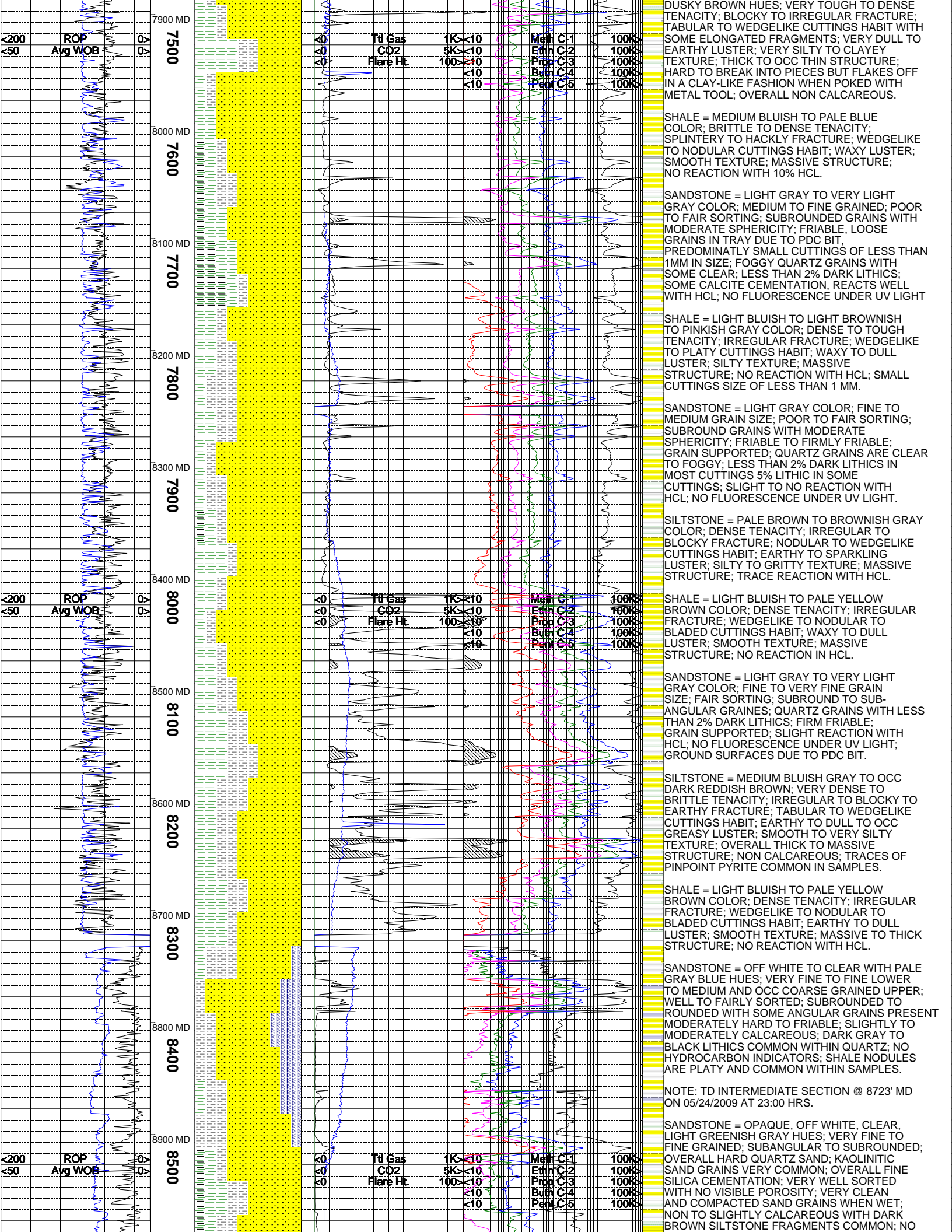
ALTERED ZONE	CHERT - GLASSY	FELSIC SILIC DIKE	MARL - CALC	SANDSTONE
ANDESITE	CHERT - PORCEL	FOSSIL	METAMORPHICS	SANDSTONE-TUFFACEOUS
ANHYDRITE	CHERT - TIGER STRIPE	GABBRO	MUDSTONE	SERICITIZATION
BASALT	CHERT - UNDIFF	GLASSY TUFF	OBSIDIAN	SERPENTINE
BENTONITE	CLAY	GRANITE	PALEOSOL	SHALE
BIOTITIZATION	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	

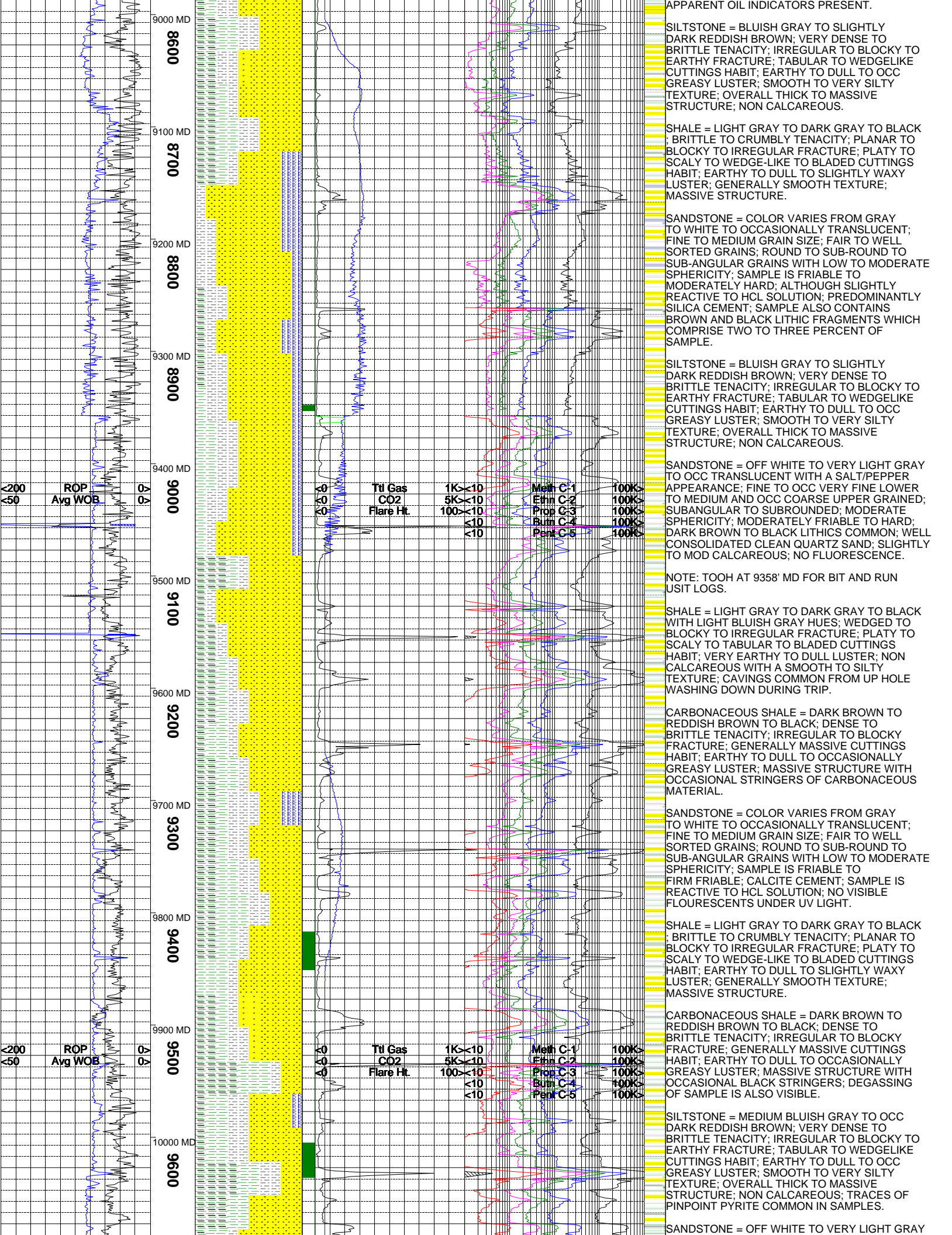
TVD Depth			Lithology	MGS			Interp. Lith					Remarks		
<200	ROP	>0		<0	Ttl Gas	1K	<10	Meth C-1	100K	<10	Ethn C-2		100K	
ft/hr			units									Survey Data, Mud Reports, Other Info.		
<50	Avg WOB	>0	<0	CO2	5K	<10	Prop C-3	100K	<10	Butn C-4	100K	<10	Pent C-5	100K
klbs			ppm											
			<0	Flare Ht.	100	<10			<10			<10		
			ft											
3200												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 WITH RESPECT TO PERCENTAGE IN SAMPLE. DEPTH IS REFERENCED TO RKB.		
3500 MD												CONNECTION GASES AS WELL AS TRIP GASES AND DOWNTIME GASES ARE NOTED ON THE LOG LARGE CONNECTION GASES WHICH APPEAR ON THE MUDLOG USUALLY REFLECT UPHOLE GAS INTERVALS BLEEDING INTO THE BORE HOLE DURING CONNECTIONS.		
3300												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		
3600 MD												WHEN THE MUD IS RUN THROUGH THE MGS (MUD GAS SEPERATOR) THE INTERVAL IS MARKED ON THE LOG IN THE SLIDE COLUMN AND NOTED ON THE LOG.		
3400												ALL SANDSTONE INTERVALS ARE EXAMINED FOR SAMPLE FLUORESCENCE IN THE UV SCOPE FOR HYDROCARBON FLUORESCENCE AND MINOR FLUORESCENCE FROM POSSIBLE FRACTURE FILL. ALL FLUORESCENCE IS NOTED ON THE MUDLOG.		
3700 MD												10.5" SURFACE CASING WAS SET AT 3876'.		
>200	ROP	>0	>0	Ttl Gas	100	>10	Meth C-1	100K	>10	Ethn C-2	100K	>10	Pent C-5	100K
>50	Avg WOB	>0	>0	CO2	5K	>10	Prop C-3	100K	>10	Butn C-4	100K	>10		
			>0	Flare Ht.	100	>10			>10			>10		
												CANRIG DRILLING TECHNOLOGY LTD. COMMENCED FULL LOGGING SERVICES ON 05/19/2009 at 3900'.		
3600												SHALE = DARK YELLOW TO LIGHT BROWN WITH SOME LIGHT BLUE FRAGMENTS; CRUNCHY TO CRUMBLY TO OCC BRITTLE TENACITY; PLANAR TO HACKLY TO EARTHY FRACTURE; SCALY TO TABULAR CUTTINGS HABIT; EARTHY TEXTURE WITH WAXY APPEARANCE WHEN WET; SMOOTH TO GRITTY WITH OCC SILTY GRAINS PRESENT; THIN TO THICK STRUCTURE WITH IRREGULAR SIZING OF CUTTINGS; CEMENT VERY COMMON AT BEGINNING OF HOLE; RARE PIECES OF LIGHT TO DARK PURPLE CLAYSTONE THAT APPEARS VERY SILTY AND GRITTY; NO APPARENT HYDROCARBON INDICATORS PRESENT; OVERALL NON CALCAREOUS.		
3900 MD												SANDSTONE = LIGHT GRAY, CLEAR, SALT AND PEPPER GRAINS WITH DARK LITHICS PRESENT, OCC LIGHT BLUE AND LIGHT PINK QUARTZ; MODERATELY HARD TO HARD; FINE LOWER TO MEDIUM AND OCC COARSE GRAINED UPPER; FAIR TO POORLY SORTED; SUBROUNDED TO ROUNDED WITH SOME IRREGULAR QUARTZ GRAINS PRESENT; MAINLY SILICA CEMENT WITH OCC CALCITE CRYSTALS COMMON; SLIGHTLY CALCAREOUS; KAOLINITE SAND VERY RARE BUT PRESENT IN SAMPLES; NO OIL INDICATORS PRESENT.		
3700												SHALE = DARK BROWN, TAN, LIGHT BLUE, WITH SOME DARK ORANGISH HUES; CRUMBLY TO CRUNCHY TO OCC BRITTLE TENACITY; EARTHY TO OCC SPLINTERY AND HACKLY FRACTURE; SCALY TO TABULAR CUTTINGS HABIT; OVERALL DULL TO EARTHY LUSTER; GRITTY TO SILTY TO OCC CLAYEY TEXTURE; MASSIVE TO LENTICULAR STRUCTURE; VERY WELL SORTED SHALE NODULES WITH OCC TRACES OF CALCITE AND QUARTZ FINE GRAINS THROUGHOUT SAMPLE; NON CALCAREOUS; NO APPARENT HYDROCARBON INDICATORS.		
4000 MD												SANDSTONE = LIGHT GRAY TO DARK YELLOWISH ORANGE COLOR; VERY FINE GRAINED; WELL SORTED; SUBROUNDED GRAINS WITH MODERATE SPHERICITY; LIGHT GRAY CUTTINGS ARE GRAIN SUPPORTED, DARK YELLOWISH ORANGE CUTTINGS ARE MUD MATRIX SUPPORTED; FIRM TO FRIABLE CUTTINGS; FAIR REACTION WITH 10% HCL.		
3800												SHALE = PALE BLUE TO DARK YELLOWISH ORANGE COLOR; CRUMBLY TO BRITTLE TENACITY; SPLINTERY TO HACKLY TO EARTHY FRACTURE; WEDGELIKE TO NODULAR CUTTINGS HABIT; EARTHY TO WAXY LUSTER; CLAYEY TO SMOOTH TEXTURE; TRACE OF LAMINE ON SOME		
4100 MD														
3900														
4200 MD														
>200	ROP	>0	>0	Ttl Gas	100	>10	Meth C-1	100K	>10	Ethn C-2	100K	>10	Pent C-5	100K
>50	Avg WOB	>0	>0	CO2	5K	>10	Prop C-3	100K	>10	Butn C-4	100K	>10		
			>0	Flare Ht.	100	>10			>10			>10		
4000														
4300 MD														
4100														
4400 MD														

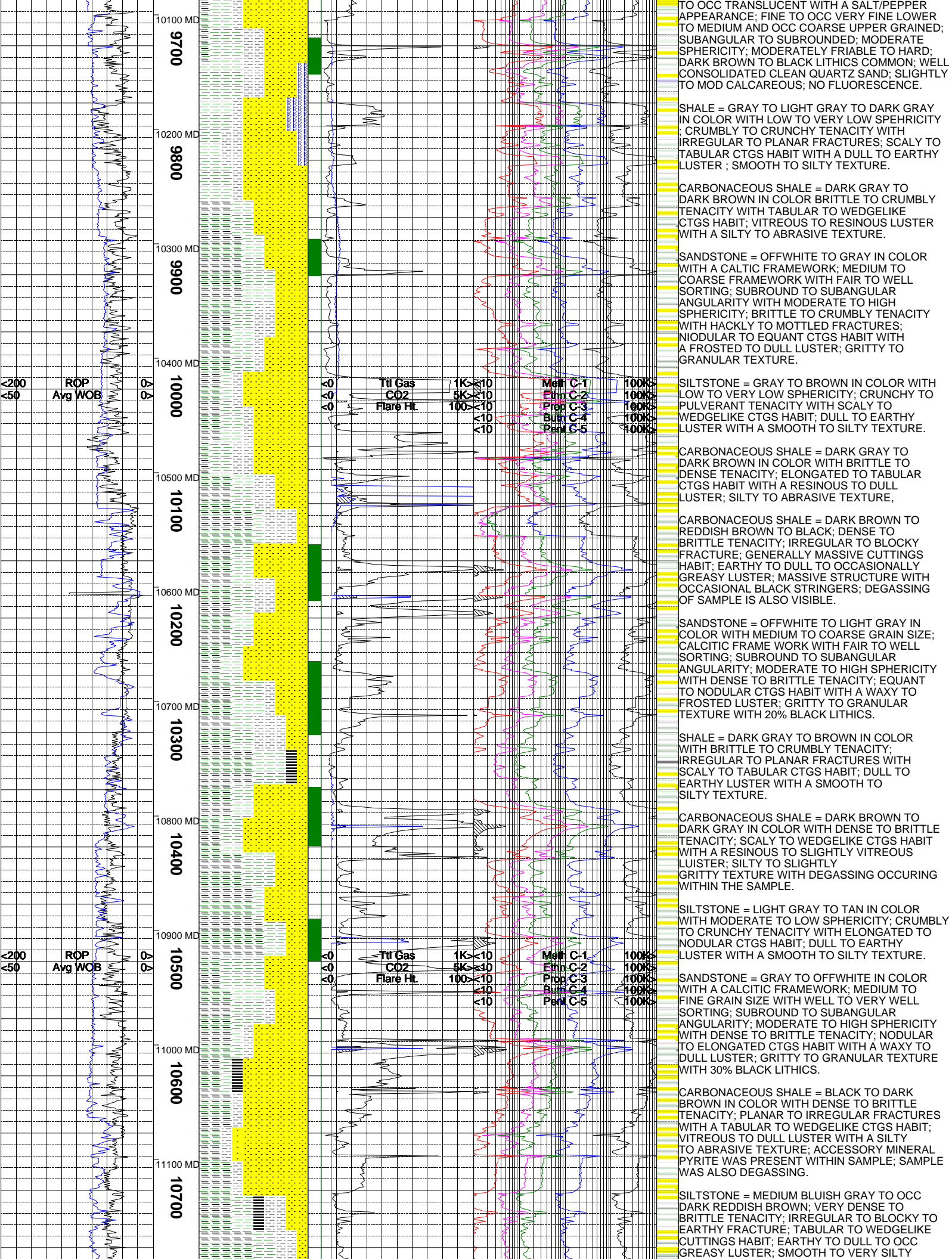


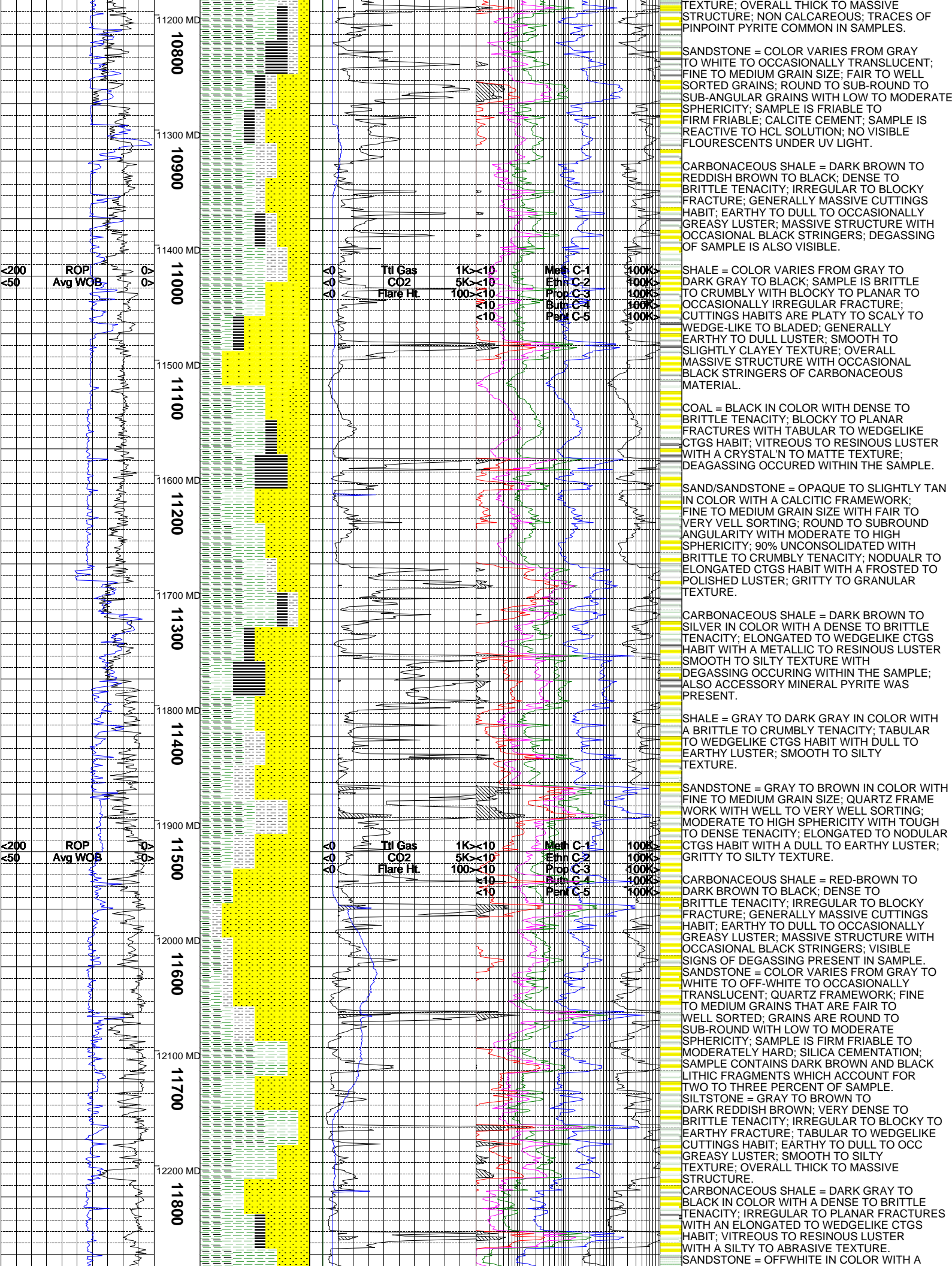


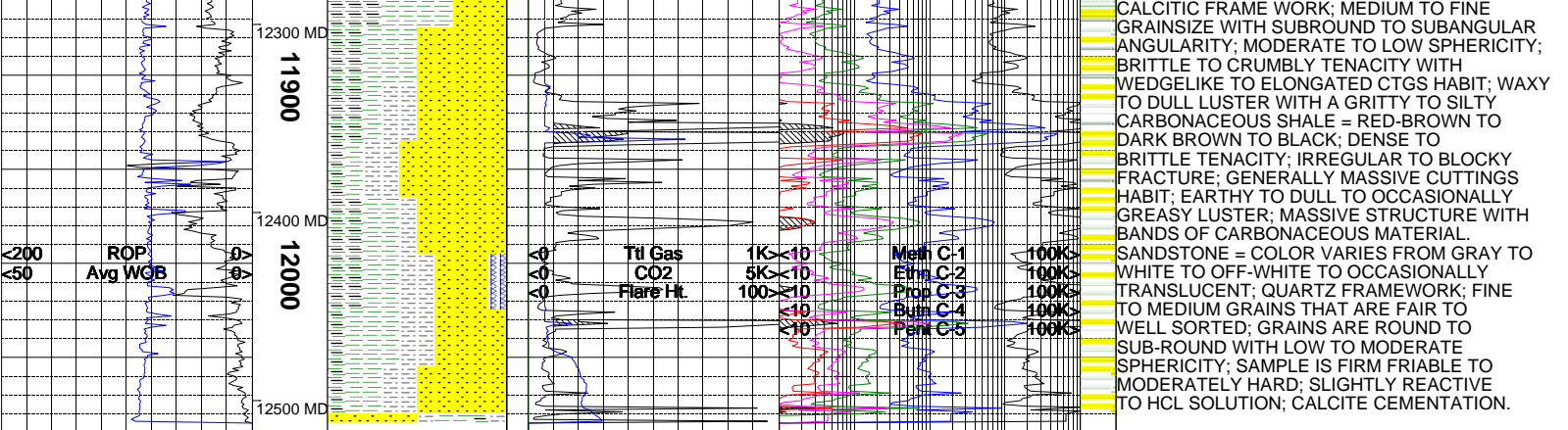












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