



Confidentiality Requested:

Yes  No

KANSAS CORPORATION COMMISSION 1190187  
OIL & GAS CONSERVATION DIVISION

Form ACO-1  
August 2013

Form must be Typed  
Form must be Signed  
All blanks must be Filled

WELL COMPLETION FORM  
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # \_\_\_\_\_

Name: \_\_\_\_\_

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ + \_\_\_\_\_

Contact Person: \_\_\_\_\_

Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

CONTRACTOR: License # \_\_\_\_\_

Name: \_\_\_\_\_

Wellsite Geologist: \_\_\_\_\_

Purchaser: \_\_\_\_\_

Designate Type of Completion:

- New Well       Re-Entry       Workover
- Oil       WSW       SWD       SIOW
- Gas       D&A       ENHR       SIGW
- OG       GSW       Temp. Abd.
- CM (Coal Bed Methane)
- Cathodic       Other (Core, Expl., etc.): \_\_\_\_\_

If Workover/Re-entry: Old Well Info as follows:

Operator: \_\_\_\_\_

Well Name: \_\_\_\_\_

Original Comp. Date: \_\_\_\_\_ Original Total Depth: \_\_\_\_\_

- Deepening       Re-perf.       Conv. to ENHR       Conv. to SWD
- Plug Back       Conv. to GSW       Conv. to Producer
- Commingled      Permit #: \_\_\_\_\_
- Dual Completion      Permit #: \_\_\_\_\_
- SWD      Permit #: \_\_\_\_\_
- ENHR      Permit #: \_\_\_\_\_
- GSW      Permit #: \_\_\_\_\_

Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date
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API No. 15 - \_\_\_\_\_

Spot Description: \_\_\_\_\_

\_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West

\_\_\_\_\_ Feet from  North /  South Line of Section

\_\_\_\_\_ Feet from  East /  West Line of Section

Footages Calculated from Nearest Outside Section Corner:

- NE       NW       SE       SW

GPS Location: Lat: \_\_\_\_\_, Long: \_\_\_\_\_  
(e.g. xx.xxxxx)      (e.g. -xxx.xxxxx)

Datum:  NAD27       NAD83       WGS84

County: \_\_\_\_\_

Lease Name: \_\_\_\_\_ Well #: \_\_\_\_\_

Field Name: \_\_\_\_\_

Producing Formation: \_\_\_\_\_

Elevation: Ground: \_\_\_\_\_ Kelly Bushing: \_\_\_\_\_

Total Vertical Depth: \_\_\_\_\_ Plug Back Total Depth: \_\_\_\_\_

Amount of Surface Pipe Set and Cemented at: \_\_\_\_\_ Feet

Multiple Stage Cementing Collar Used?  Yes  No

If yes, show depth set: \_\_\_\_\_ Feet

If Alternate II completion, cement circulated from: \_\_\_\_\_

feet depth to: \_\_\_\_\_ w/ \_\_\_\_\_ sx cmt.

Drilling Fluid Management Plan

*(Data must be collected from the Reserve Pit)*

Chloride content: \_\_\_\_\_ ppm Fluid volume: \_\_\_\_\_ bbls

Dewatering method used: \_\_\_\_\_

Location of fluid disposal if hauled offsite:

Operator Name: \_\_\_\_\_

Lease Name: \_\_\_\_\_ License #: \_\_\_\_\_

Quarter \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West

County: \_\_\_\_\_ Permit #: \_\_\_\_\_

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY

- Confidentiality Requested  
Date: \_\_\_\_\_
- Confidential Release Date: \_\_\_\_\_
- Wireline Log Received
- Geologist Report Received
- UIC Distribution
- ALT  I  II  III Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

1190187

Operator Name: \_\_\_\_\_ Lease Name: \_\_\_\_\_ Well #: \_\_\_\_\_

Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West County: \_\_\_\_\_

**INSTRUCTIONS:** Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to kcc-well-logs@kcc.ks.gov. Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i>  Samples Sent to Geological Survey <input type="checkbox"/> Yes <input type="checkbox"/> No  Cores Taken <input type="checkbox"/> Yes <input type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input type="checkbox"/> No  List All E. Logs Run: _____	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample  Name Top Datum
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CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input type="checkbox"/> Perforate <input type="checkbox"/> Protect Casing <input type="checkbox"/> Plug Back TD <input type="checkbox"/> Plug Off Zone				

Did you perform a hydraulic fracturing treatment on this well?  Yes  No *(If No, skip questions 2 and 3)*

Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons?  Yes  No *(If No, skip question 3)*

Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry?  Yes  No *(If No, fill out Page Three of the ACO-1)*

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated	Acid, Fracture, Shot, Cement Squeeze Record <i>(Amount and Kind of Material Used)</i>	Depth

TUBING RECORD:      Size: \_\_\_\_\_ Set At: \_\_\_\_\_ Packer At: \_\_\_\_\_ Liner Run:  Yes  No

Date of First, Resumed Production, SWD or ENHR: \_\_\_\_\_ Producing Method:  
 Flowing  Pumping  Gas Lift  Other *(Explain)* \_\_\_\_\_

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity

<b>DISPOSITION OF GAS:</b> <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	<b>METHOD OF COMPLETION:</b> <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5)</i> <input type="checkbox"/> Other <i>(Specify)</i> _____ <i>(Submit ACO-4)</i>	<b>PRODUCTION INTERVAL:</b> _____ _____
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Form	ACO1 - Well Completion
Operator	Seneca Resources Corporation
Well Name	Bock 3-SWD
Doc ID	1190187

Tops

Name	Top	Datum
Heebner	3415	-1561
Lansing	3606	-1752
Cherokee Shale	4035	-2181
Mississippian	4040	-2186
Kinderhook Shale	4135	-2281
Viola	4274	-2420
Simpson	4360	-2506
Arbuckle	4438	-2584





Rig Name: HWD 14  
 State/County: KANSAS/PRATT  
 Latitude: 37.81, Longitude: -98.50  
 GRID North is 0.00 Degrees West of True North  
 VS-Azi: 0.00 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB 15 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: survey\_run-01-de\_01.ut  
 Minimum Curvature Method  
 Report Date/Time: 1/15/2014 / 23:31

Vaughn Energy Services  
 Woodward, Ok  
 580-254-5000  
 Surveyor: Andrew Meadville

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N-S FT	+E-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.63	35.39	100.00	0.44	0.32	0.44	0.55	35.39	0.63
200.00	1.11	32.88	199.99	1.71	1.16	1.71	2.06	34.21	0.49
300.00	0.90	30.38	299.97	3.20	2.08	3.20	3.82	33.09	0.22
400.00	0.63	29.54	399.96	4.35	2.75	4.35	5.15	32.30	0.27
500.00	0.85	26.08	499.95	5.50	3.35	5.50	6.44	31.34	0.23
600.00	1.16	16.62	599.94	7.14	3.97	7.14	8.17	29.06	0.35
700.00	1.44	22.82	699.91	9.27	4.74	9.27	10.41	27.11	0.31
800.00	1.60	30.80	799.88	11.62	5.95	11.62	13.06	27.09	0.27
900.00	2.09	35.90	899.82	14.30	7.73	14.30	16.25	28.39	0.51
1000.00	1.87	39.14	999.77	17.04	9.83	17.04	19.67	29.97	0.24
1100.00	1.97	43.95	1099.71	19.55	12.06	19.55	22.97	31.66	0.19
1200.00	1.98	55.75	1199.65	21.76	14.68	21.76	26.25	34.00	0.41
1300.00	1.77	59.53	1299.60	23.51	17.43	23.51	29.27	36.55	0.24
1400.00	1.07	63.55	1399.57	24.71	19.60	24.71	31.54	38.42	0.70
1500.00	1.16	77.49	1499.55	25.35	21.43	25.35	33.19	40.21	0.28
1600.00	0.98	91.74	1599.53	25.54	23.27	25.54	34.56	42.34	0.32
1700.00	1.64	95.27	1699.50	25.39	25.55	25.39	36.02	45.19	0.66
1800.00	1.65	101.97	1799.46	24.96	28.39	24.96	37.80	48.68	0.19
1900.00	2.19	103.64	1899.40	24.21	31.65	24.21	39.85	52.59	0.53
2000.00	2.29	99.78	1999.33	23.42	35.47	23.42	42.51	56.57	0.18
2100.00	1.98	96.09	2099.26	22.89	39.17	22.89	45.37	59.69	0.34
2200.00	1.85	91.54	2199.20	22.67	42.50	22.67	48.17	61.93	0.20
2300.00	1.66	89.56	2299.16	22.63	45.56	22.63	50.87	63.58	0.20
2400.00	1.89	93.17	2399.11	22.55	48.66	22.55	53.63	65.13	0.26
2500.00	1.90	94.00	2499.05	22.35	51.96	22.35	56.56	66.73	0.03
2600.00	1.60	95.29	2599.01	22.10	55.00	22.10	59.28	68.11	0.30
2700.00	1.81	83.35	2698.96	22.16	57.96	22.16	62.05	69.08	0.41
2800.00	1.41	76.89	2798.92	22.62	60.73	22.62	64.80	69.57	0.44
2900.00	1.07	87.29	2898.90	22.94	62.85	22.94	66.91	69.95	0.41
3000.00	1.18	92.10	2998.88	22.95	64.81	22.95	68.75	70.50	0.15
3100.00	1.19	96.71	3098.86	22.79	66.87	22.79	70.65	71.18	0.10
3200.00	1.34	98.40	3198.83	22.50	69.06	22.50	72.63	71.96	0.15
3300.00	1.20	104.81	3298.81	22.06	71.23	22.06	74.57	72.80	0.19
3400.00	1.90	110.93	3398.77	21.20	73.80	21.20	76.78	73.98	0.71

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
3500.00	1.29	112.48	3498.73	20.17	76.39	20.17	79.01	75.21	0.61
3600.00	1.24	106.48	3598.71	19.43	78.47	19.43	80.84	76.09	0.14
3700.00	1.37	101.17	3698.68	18.90	80.68	18.90	82.86	76.82	0.18
3800.00	2.30	99.82	3798.63	18.32	83.83	18.32	85.81	77.67	0.93
3900.00	2.67	97.82	3898.54	17.66	88.11	17.66	89.86	78.66	0.38
4000.00	2.66	96.66	3998.43	17.08	92.72	17.08	94.28	79.56	0.06
4100.00	2.73	106.43	4098.32	16.14	97.30	16.14	98.63	80.58	0.46
4200.00	1.86	114.05	4198.24	14.80	101.07	14.80	102.15	81.67	0.92
4300.00	1.82	119.06	4298.19	13.36	103.95	13.36	104.80	82.67	0.17
4400.00	1.75	122.55	4398.14	11.77	106.63	11.77	107.27	83.70	0.13

HORIZONTAL DISPLACEMENT IS  
107.27 FEET AT 83.70 DEGREES

# BASIC

energy services, L.P.

## TREATMENT REPORT

Customer: <b>Seneca Resources</b>	Lease No. <b>2311</b>	Date <b>1-1-14</b>
Lease <b>Block</b>	Well # <b>3 SWD</b>	
Field Order # <b>9128</b>	Station <b>Pratt</b>	Casing <b>13 3/8</b> Depth <b>377</b> County <b>Pratt</b> State <b>KS</b>
Type Job <b>CNW COND.</b>	Formation	Legal Description <b>3-26-11</b>

PIPE DATA		PERFORATING DATA		FLUID USED		TREATMENT RESUME		
Casing Size <b>13 3/8</b>	Tubing Size	Shots/Ft		Acid <b>195 SKS 12-500</b>	Rate <b>6%</b>	Press <b>290 cc</b>	ISIP <b>1/4 # SK</b>	C.F.
Depth <b>377</b>	Depth	From	To	Pre-Pad <b>150 SKS COND</b>	Max <b>290 cc</b>			5 Min.
Volume <b>59.2</b>	Volume	From	To	Pad <b>50-500 COND</b>	Min <b>3%</b>			10 Min.
Max Press <b>500</b>	Max Press	From	To	Frac	Avg			15 Min.
Well Connection <b>3</b>	Annulus Vol.	From	To		HHP Used			Annulus Pressure
Plug Depth <b>1570</b>	Packer Depth	From	To	Flush <b>58</b>	Gas Volume			Total Load

Customer Representative <b>ROD MILLS</b>	Station Manager <b>KEVIN GOULLEY</b>	Treater <b>MIKE MARTIN</b>
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Service Units <b>37586</b>	19889	19843	19960	21010
Driver Names <b>MARTIN</b>	MARTIN	HAMBY		

Time	Casing Pressure	Tubing Pressure	Bbbs. Pumped	Rate	Service Log
12:05					ON LOCATION / SAFELY MEETING
1:15					CSNS ON BOTTOM
2:24	150		30	6	PUMP 30 BBL H <sub>2</sub> O
2:30	150		57	6	MIX 195 SKS 12-500 LTR
2:40	100		32	5	MIX 150 SKS CONDENSED
2:50	100			5	START VIB.
3:10	200		58		PLUG DOWN SHUT IN WELL
					NO COMMENT TO SURFACE
9:40			9	2	MIX 50 SKS CONDENSED, 1" BETWEEN
					13 3/8 AND VIB HOLD
9:45					COMMENT TO SURFACE

JOB COMPLETE  
THANK YOU!  
MIKE MARTIN

Customer <i>SENECA - RASOILCOES</i>	Lease No.	Date <i>01-04-13</i>
Lease <i>ROCK 2-SWD</i>	Well #	
Field Order # <i>9694</i>	Station <i>PRATT KS</i>	Casing <i>9 5/8</i>
		Depth <i>1902'</i>
Type Job <i>CNW 9 5/8 surface</i>	Formation	County <i>PRATT</i>
		State <i>KS</i>
		Legal Description <i>3-26-11</i>

PIPE DATA		PERFORATING DATA		FLUID USED		TREATMENT RESUME		
Casing Size <i>9 5/8</i>	Tubing Size	Shots/Ft		Acid		RATE	PRESS	ISIP
Depth <i>1902</i>	Depth	From	To	Pre Pad	Max			5 Min.
Volume <i>143.42</i>	Volume	From	To	Pad	Min			10 Min.
Max Press <i>800</i>	Max Press	From	To	Frac	Avg			15 Min.
Well Connection <i>P.O.</i>	Annulus Vol.	From	To		HHP Used			Annulus Pressure
Plug Depth <i>1801'</i>	Packer Depth	From	To	Flush	Gas Volume			Total Load

Customer Representative	Station Manager <i>DAVE SCOTT</i>	Treater <i>Robert J. [Signature]</i>
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Service Units	<i>37900</i>	<i>33708</i>	<i>20920</i>	<i>19831</i>	<i>19862</i>	<i>19959</i>	<i>19860</i>			
Driver Names	<i>Gallin</i>	<i>GRAVES</i>	<i>Pierse</i>	<i>W</i>	<i>HANSON</i>					

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
<i>10:15</i>					<i>on the set, ready</i>
					<i>Run 9 5/8 36" csg.</i>
<i>10:40</i>					<i>Casing on Bottom</i>
<i>10:55</i>					<i>Rig Circ CSC.</i>
<i>12:15</i>	<i>200</i>		<i>3</i>	<i>4.5</i>	<i>At SAGCM</i>
			<i>167</i>	<i>5.5</i>	<i>At mix 340 sk A con cont 3% cc 1/4 CF</i>
			<i>64</i>		<i>11.6 ppd 2.77 yield 16.75 gal/sk</i>
					<i>st mix Tail 300 sk comm 2% cc 1/4 CF 15.5 ppd</i>
					<i>1.20 yield 5.23 gal/sk</i>
					<i>cont mix d shut down</i>
					<i>Relieve Plug</i>
			<i>113 1/2</i>	<i>6</i>	<i>At Pump 1'</i>
<i>1:15</i>	<i>150</i>		<i>90</i>		<i>lit</i>
<i>1:40</i>	<i>800</i>		<i>143 1/2</i>	<i>3.5</i>	<i>Plug down</i>
					<i>circled 0 Bbl cont pit</i>
					<i>did not circ cont 1" IN 4 1/2 HIG</i>
					<i>SOB complete</i>
					<i>THANK YOU</i>



# BASIC

energy services, L.P.

## TREATMENT REPORT

Customer: Seneca Resources Corporation Lease No. \_\_\_\_\_ Date: 1-11-14  
 Lease: Bocht SWD Well # 3  
 Field Order # 4837 Station: Pratt, Kansas Casing: 2 3/4" Depth: 4,506 Feet County: Pratt State: Kansas  
 Type Job: C.N.W. - Longstring Formation: \_\_\_\_\_ Legal Description: 3-265-11W

PIPE DATA		PERFORATING DATA		CEMENT + FLUID USED		TREATMENT RESUME		
Casing Size: <u>2 3/4" b./ft.</u>	Tubing Size: _____	Shots/Ft: <u>80</u>	Shots: <u>80</u>	Material: <u>A-ServLite with</u>	Rate: <u>25 lb./sh.</u>	Pressure: <u>Cellflite</u>	ISIP: <u>5 Min</u>	
Depth: <u>4,506 Feet</u>	Depth: _____	From: _____	To: <u>13.3 lb./gal.</u>	Volume: <u>8.30 Gal.</u>	Max: <u>25 lb./sh.</u>	Fluid Loss: <u>1.62 CU.F.</u>	Friction: <u>19 Min</u>	
Volume: <u>12.6 Bbl.</u>	Volume: _____	From: <u>140</u>	To: _____	Material: <u>Premium Cement with</u>	Min: <u>88 F</u>	Annulus Pressure: <u>25 lb./sh. Cellflite</u>		
Max Press: <u>800 PSI</u>	Max Press: _____	From: <u>Reducer</u>	To: _____	Material: <u>.258 Defoamer, 108 Gal.</u>	Avg: <u>5 lb./sh.</u>	Annulus Pressure: <u>15 Min</u>		
Well Connection: <u>Plug Container</u>	Annulus Vol.: _____	From: _____	To: <u>14.8 lb./gal.</u>	Volume: <u>6.60 Gal.</u>	WHP Used: <u>1.54 CU.F.T.</u>			
Plug Depth: <u>4,473 Feet</u>	Packer Depth: _____	From: _____	To: _____	Flush: <u>171.3 Bbl.</u>	Gas Volume: <u>Fresh Water</u>			Total Load

Customer Representative: Red Mills Station Manager: Kevin Gordley Treater: Clarence R. Messich

Service Units	<u>37,216</u>	<u>77,686</u>	<u>19,905</u>	<u>19,960</u>	<u>21,010</u>				
Driver Names	<u>Messich</u>	<u>Mc Graw</u>	<u>Young</u>						

Time	Casing Pressure	Tubing Pressure	Bbls. Pumped	Rate	Service Log
<u>10:30</u>					<u>Truck on location and hold Safety meeting.</u>
<u>12:00</u>					<u>Casing in well. Circulate for 1 Hour.</u>
<u>1:15</u>					<u>Shut in well. Pressure Test. Open Well.</u>
<u>2:00</u>	<u>400</u>			<u>6</u>	<u>Start Fresh water Pre-Flush.</u>
	<u>400</u>		<u>20</u>	<u>6</u>	<u>Start mud Flush.</u>
	<u>400</u>		<u>32</u>	<u>6</u>	<u>Start Fresh water spacer.</u>
<u>2:06</u>	<u>500</u>		<u>52</u>	<u>5</u>	<u>Start mixing 80sacks A-ServLite cement.</u>
<u>2:10</u>	<u>500</u>		<u>75</u>	<u>5</u>	<u>Start mixing 140sacks Premium cement.</u>
	<u>-0-</u>		<u>113</u>		<u>Stop pumping. Shut in well. Wash per</u>
<u>2:26</u>	<u>150</u>			<u>6.5</u>	<u>Release Top Rubber Plug. Open Well.</u>
			<u>120</u>	<u>5</u>	<u>Start Fresh water Displacement.</u>
<u>3:00</u>	<u>1,100</u>		<u>171.3</u>		<u>Start to lift cement.</u>
	<u>1800</u>				<u>Plug down.</u>
					<u>Pressure up</u>
					<u>Release pressure. Float Collar &amp; shoe held.</u>
<u>4:00</u>					<u>Wash up pump truck.</u>
					<u>Job Complete.</u>
					<u>Thank You</u>
					<u>Clarence, Mitre, Steve</u>

## Well Completion Form

### Casing Record Supplemental Data

**Seneca Resources**  
**Bock 3-SWD**  
**15-151-22425**  
**Sec. 3-26S-11W**  
**Pratt County, Kansas**

Purpose of String	Hole Size	Casing Size	Weight	Depth	Cement Type	Sacks Used	Type/Percent Additives
Surface	17-1/2"	13-3/8"	48 lb/ft	374'	65/35 Poz	195 sx	6% gel, 3% CaCl, 1/4 lb celloflake
					Common	150 sx	2% gel, 1/4 lb celloflake
Intermediate	12-1/4"	9-5/8"	36 lb/ft	1,902'	Common	340 sx	3% CaCl, 1/4 lb celloflake
					Common	300 sx	2% CaCl, 1/4 lb celloflake
Production	8-3/4"	7"	26 lb/ft	4,502'	65/35 Poz	80 sx	1/4 lb celloflake
					Premium	140 sx	0.8% FL, 0.3% FR, 0.25% defoam, 10% gypsum, 10% salt, 1/4 lb celloflake, 5 lb gilsonite

Seneca Resources  
Bock 3-SWD  
15-151-22425  
Sec. 3-26S-11W  
Pratt County, Kansas

<b>Formation</b>	<b>Log Top TVD</b>	<b>Log Top Subsea</b>
Heebner	3415	-1561
Lansing	3606	-1752
Cherokee Shale	4035	-2181
Mississippian	4040	-2186
Kinderhook Shale	4135	-2281
Viola	4274	-2420
Simpson	4360	-2506
Arbuckle	4438	-2584



# Empirica

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Bock 3-SWD

**Location** Sec 3, T26S, R11W

**State** Kansas

**County** Pratt

**Country** United States

**Rig Number** HWD # 14

**API Number** 15-151-22425

**AFE #** 131881

**Spud Date** 12/31/2013

**Drilling Completed** 1/12/2014

**Ground Elevation** 1839

**K.B. Elevation** 1854'

**Logged Interval** 350 To 5156

**Total Depth** 5156

**Formation** Permian through Mississippian

**Type of Drilling Fluid** Water Based

## Operator

**Company** Seneca Resources Corp.

**Address** McCandles Corporate Center  
5800 Corporate Drive, Suite 300  
Pittsburgh, PA 15237

# Geologist

**Name** Paul Campbell/Steve Ziverk

**Company** ALS Oil and Gas

**Address** 609 Westland Drive  
Edmond, Ok 73013

## Other

**Product Description** Regular 2 Man Logging Services  
Logging Began: 12-31-2013  
Released: 1-13-2014

**Equiptmen** MLogger: # 364

**Calibration** Standard Calibration for Redbox  
Total Gas & Chromatigraph

## Core Information

**Contractor** COREPRO

**Formation** CHEROKEE THROUGH MISSISSIPPIAN

**Core Intervals**

From	To	Cut	Recovered
4036.0	4042.0	6.0	4.1
4042.0	4092.0	50.0	48.6

**Bit Type** PDC COREPRO SN# 3232 & PDC COREPRO SN#2980

**Size** 8.5"

**Coring Time** 1/06/2012 @ 22:47 TO 10:12 1/08/2014

## Rock Types

UNKNOWN	DOLOMITE	SHALE GRAY	TILL
ANHYDRITE	CHERT	SHALE COLORED	BENTONITE
GYPSUM	COAL	SILTSTONE	TUFF
SALT	MARLSTONE	SANDSTONE	IGNEOUS
SIDERITE or LIMONITE	CLAYSTONE	CONGLOMERATE	METAMORPHIC
LIMESTONE	SHALE	BRECCIA	CEMENT

## Accessories

**Fossils**

F FOSSIL

GASTROPOD

ARGILLACEOUS

ARGILLITE GRAIN

GLAUCONITE

GYPSIFEROUS

**Stringer**

- ALGAE
- AMPHIPORA
- BELEMNITE
- BIOCLASTIC
- BRACHIOPOD
- BRYOZOA
- CEPHALOPOD
- CORAL
- CRINOID
- ECHINOID
- FISH
- FORAMINIFERA

- OSTRACOD
- OOLITE
- OSTRACOD
- PELECYPOD
- PELLET
- PISOLITE
- PLANT REMAINS
- PLANT SPORES
- SCAPHOPOD
- STROMATOPOROID

### Minerals

- ANHYDRITIC

- BENTONITE
- BITUMENOUS SUBSTANCE
- BRECCIA FRAGMENTS
- CALCAREOUS
- CARBONACEOUS FLAKES
- CHTDK
- CHTLT
- COAL - THIN BEDS
- DOLOMITIC
- FELDSPAR

- FERRUGINOUS PELLET
- FERRUGINOUS

- HEAVY MINERAL
- KAOLIN
- MARLSTONE
- MINERAL CRYSTALS
- NODULES
- PHOSPHATE PELLETS
- PYRITE
- SALT CAST
- SANDY
- SILICEOUS

- SILTY
- TUFFACEOUS

- ANHYDRITE STRINGER
- BENTONITE STRINGER
- COAL STRINGER
- DOLOMITE STRINGER
- GYPHUM STRINGER
- LIMESTONE STRINGER
- MARLSTONE (CALC) STRG
- MARLSTONE (DOL) STRG
- SANDSTONE STRINGER
- SHALE STRINGER
- SILTSTONE STRINGER

### Oil Show

- DEAD
- EVEN
- QUESTIONABLE
- SPOTTED STAINING

### Porosity

- EARTHY
- FENESTRAL
- FRACTURE
- INTERCRYSTALLINE
- INTEROOLITIC
- MOLDIC

- ORGANIC
- PINPOINT
- VUGGY

### Engineering

- BIT
- CASING
- CONNECTION (LEFT)
- CONNECTION (RIGHT)
- CONNECTION GAS
- CORE - LOST
- CORE - RECOVERED
- DST INTERVAL
- FAULT

### Other Symbols

- FORMATION TOP
- GAS SHOW
- MN DEPTH
- NORMAL FAULT
- OIL SHOW
- OVERTURNED STRATA
- REVERSE FAULT
- SIDEWALL CORE (LEFT)
- SIDEWALL CORE (RIGHT)
- SLIDE
- SURVEY
- TRIP GAS
- WIRELINE TESTED - LEFT
- WIRELINE TESTED - RT

### Rounding

- ANGULAR
- ROUNDED
- SUBANG
- SUBRND

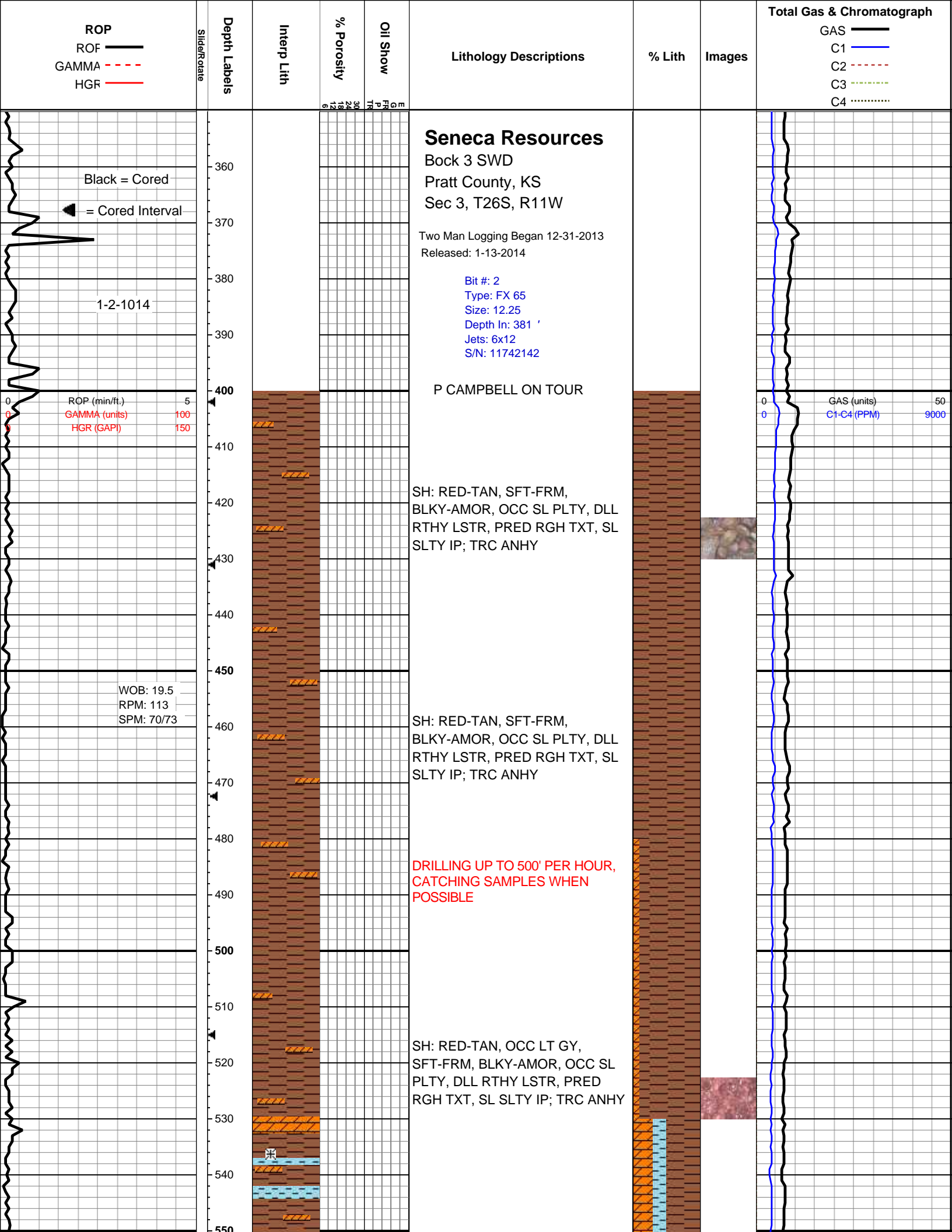
### Textures

- BOUNDSTONE
- CHALKY
- CRYPTOXLN
- EARTHY
- FINELYXLN
- GRAINSTONE

- LITHOGRAPHIC
- MICROXLN
- MUDSTONE
- PACKSTONE
- WACKESTONE

### Sorting

- MODERATE
- POOR
- WELL



**ROP**  
 ROF ———  
 GAMMA - - - -  
 HGR ———

Slide/Rotate

Depth Labels

Interp Lith

% Porosity

Oil Show

Lithology Descriptions

% Lith

Images

Total Gas & Chromatograph

GAS ———  
 C1 ———  
 C2 - - - -  
 C3 - - - -  
 C4 ······

**Seneca Resources**  
 Bock 3 SWD  
 Pratt County, KS  
 Sec 3, T26S, R11W

Two Man Logging Began 12-31-2013  
 Released: 1-13-2014

Bit #: 2  
 Type: FX 65  
 Size: 12.25  
 Depth In: 381 '  
 Jets: 6x12  
 S/N: 11742142

P CAMPBELL ON TOUR

SH: RED-TAN, SFT-FRM,  
 BLKY-AMOR, OCC SL PLTY, DLL  
 RTHY LSTR, PRED RGH TXT, SL  
 SLTY IP; TRC ANHY

SH: RED-TAN, SFT-FRM,  
 BLKY-AMOR, OCC SL PLTY, DLL  
 RTHY LSTR, PRED RGH TXT, SL  
 SLTY IP; TRC ANHY

DRILLING UP TO 500' PER HOUR,  
 CATCHING SAMPLES WHEN  
 POSSIBLE

SH: RED-TAN, OCC LT GY,  
 SFT-FRM, BLKY-AMOR, OCC SL  
 PLTY, DLL RTHY LSTR, PRED  
 RGH TXT, SL SLTY IP; TRC ANHY

Black = Cored

▲ = Cored Interval

1-2-1014

ROP (min/ft.) 5  
 GAMMA (units) 100  
 HGR (GAPI) 150

WOB: 19.5  
 RPM: 113  
 SPM: 70/73

GAS (units) 50  
 C1-C4 (PPM) 9000



WOB: 17.4  
RPM: 110  
SPM: 107

**STONE CORRAL @ 564' MD**

SH: RED-TAN, OCC LT GY,  
SFT-FRM, BLKY-AMOR, OCC SL  
PLTY, DLL RTHY LSTR, PRED  
RGH TXT, SL SLTY IP; ANHY: OFF  
WHT-TRNSP, SFT-FRM, HD IP,  
TRC ELONG XLS; CLY: LT GY-GY,  
OCC GRNSH BL, SFT, SL WTR  
SNS; TRC CHT NODULES, SL  
TRC UNCONS SS

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

GAS (units) 50  
C1-C4 (PPM) 9000

LOSING RETURNS  
BYPASSING SHAKERS  
NO SAMPLES

**NINNESCAH SHALE @ 649' MD**

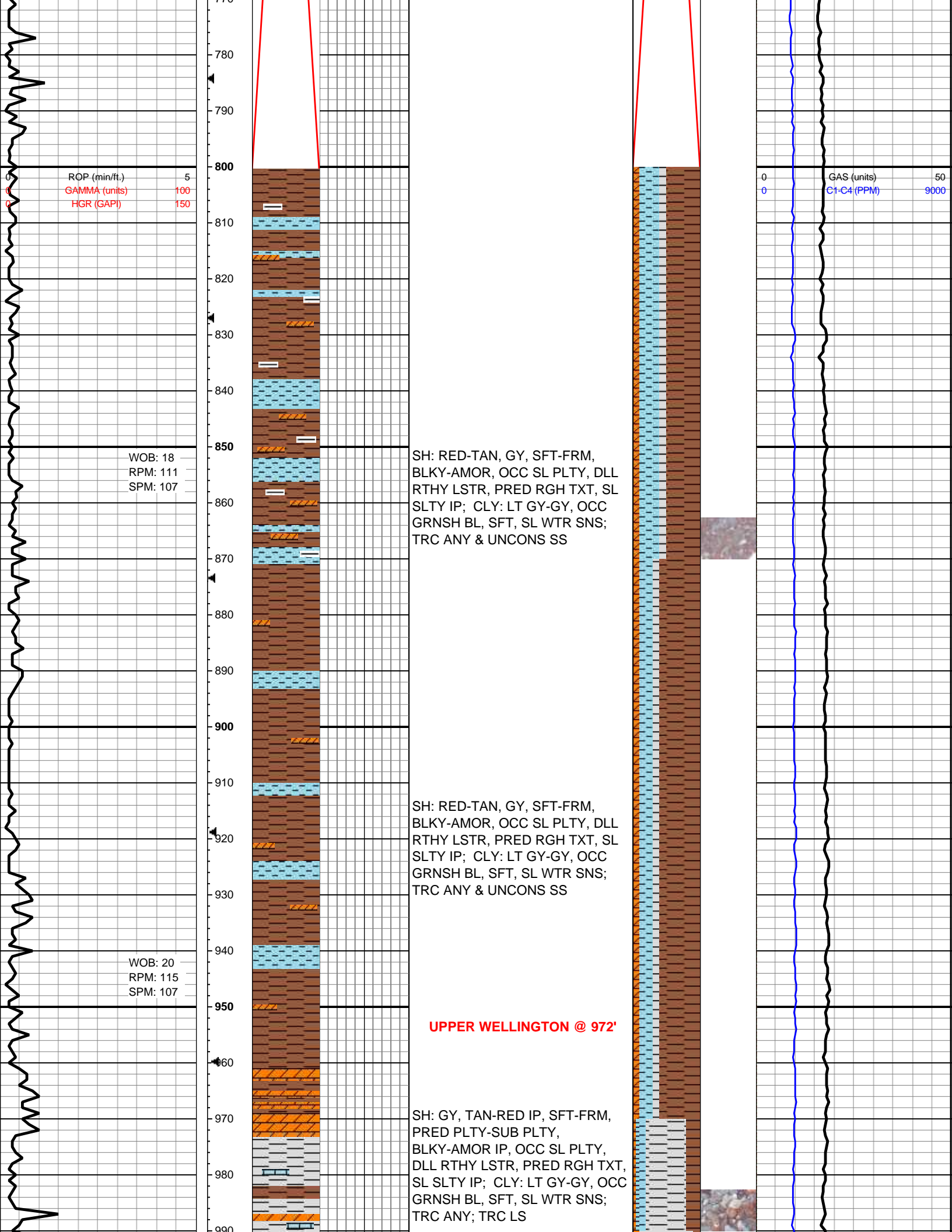
WOB: 13.5  
RPM: 106  
SPM: 70/72

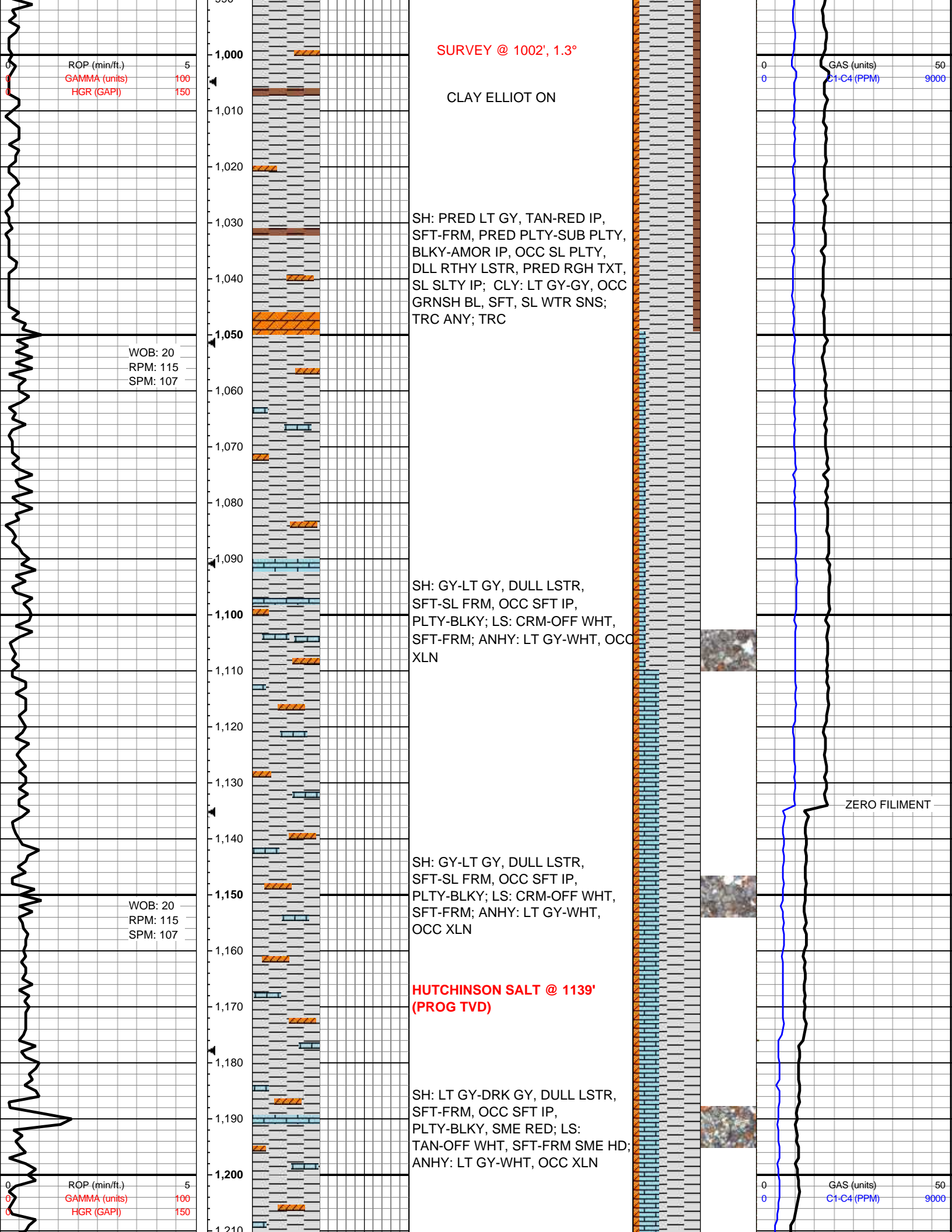
MW: 8.8  
VIS: 28  
PV: 3  
YP: 2  
GELS: 1/10  
FIL: 96  
CAKE: 10  
SOL: 3.5  
H2O: 96.4  
PH: 8.1  
CHL: 4.000  
CAL: 240

LOSING RETURNS  
BYPASSING SHAKERS  
NO SAMPLES

WOB: 15  
RPM: 114  
SPM: 107







**SURVEY @ 1002', 1.3°**

**CLAY ELLIOT ON**

SH: PRED LT GY, TAN-RED IP, SFT-FRM, PRED PLTY-SUB PLTY, BLKY-AMOR IP, OCC SL PLTY, DLL RTHY LSTR, PRED RGH TXT, SL SLTY IP; CLY: LT GY-GY, OCC GRNSH BL, SFT, SL WTR SNS; TRC ANY; TRC

SH: GY-LT GY, DULL LSTR, SFT-SL FRM, OCC SFT IP, PLTY-BLKY; LS: CRM-OFF WHT, SFT-FRM; ANHY: LT GY-WHT, OCC XLN

SH: GY-LT GY, DULL LSTR, SFT-SL FRM, OCC SFT IP, PLTY-BLKY; LS: CRM-OFF WHT, SFT-FRM; ANHY: LT GY-WHT, OCC XLN

**HUTCHINSON SALT @ 1139' (PROG TVD)**

SH: LT GY-DRK GY, DULL LSTR, SFT-FRM, OCC SFT IP, PLTY-BLKY, SME RED; LS: TAN-OFF WHT, SFT-FRM SME HD; ANHY: LT GY-WHT, OCC XLN

ROP (min/ft.) 5  
 GAMMA (units) 100  
 HGR (GAPI) 150

WOB: 20  
 RPM: 115  
 SPM: 107

WOB: 20  
 RPM: 115  
 SPM: 107

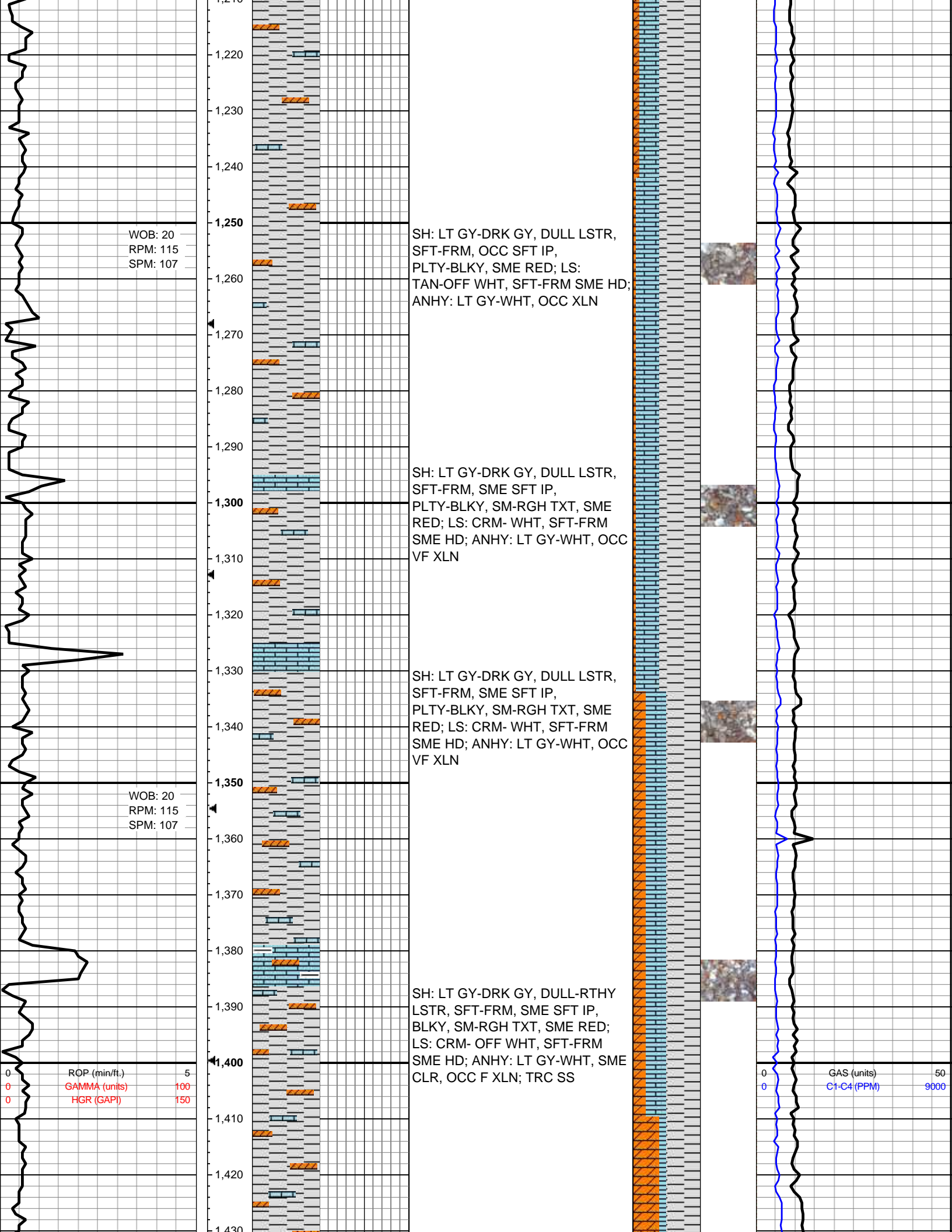
ROP (min/ft.) 5  
 GAMMA (units) 100  
 HGR (GAPI) 150

GAS (units) 50  
 C1-C4 (PPM) 9000

GAS (units) 50  
 C1-C4 (PPM) 9000

ZERO FILIMENT





WOB: 20  
RPM: 115  
SPM: 107

SH: LT GY-DRK GY, DULL LSTR,  
SFT-FRM, OCC SFT IP,  
PLTY-BLKY, SME RED; LS:  
TAN-OFF WHT, SFT-FRM SME HD;  
ANHY: LT GY-WHT, OCC XLN

SH: LT GY-DRK GY, DULL LSTR,  
SFT-FRM, SME SFT IP,  
PLTY-BLKY, SM-RGH TXT, SME  
RED; LS: CRM- WHT, SFT-FRM  
SME HD; ANHY: LT GY-WHT, OCC  
VF XLN

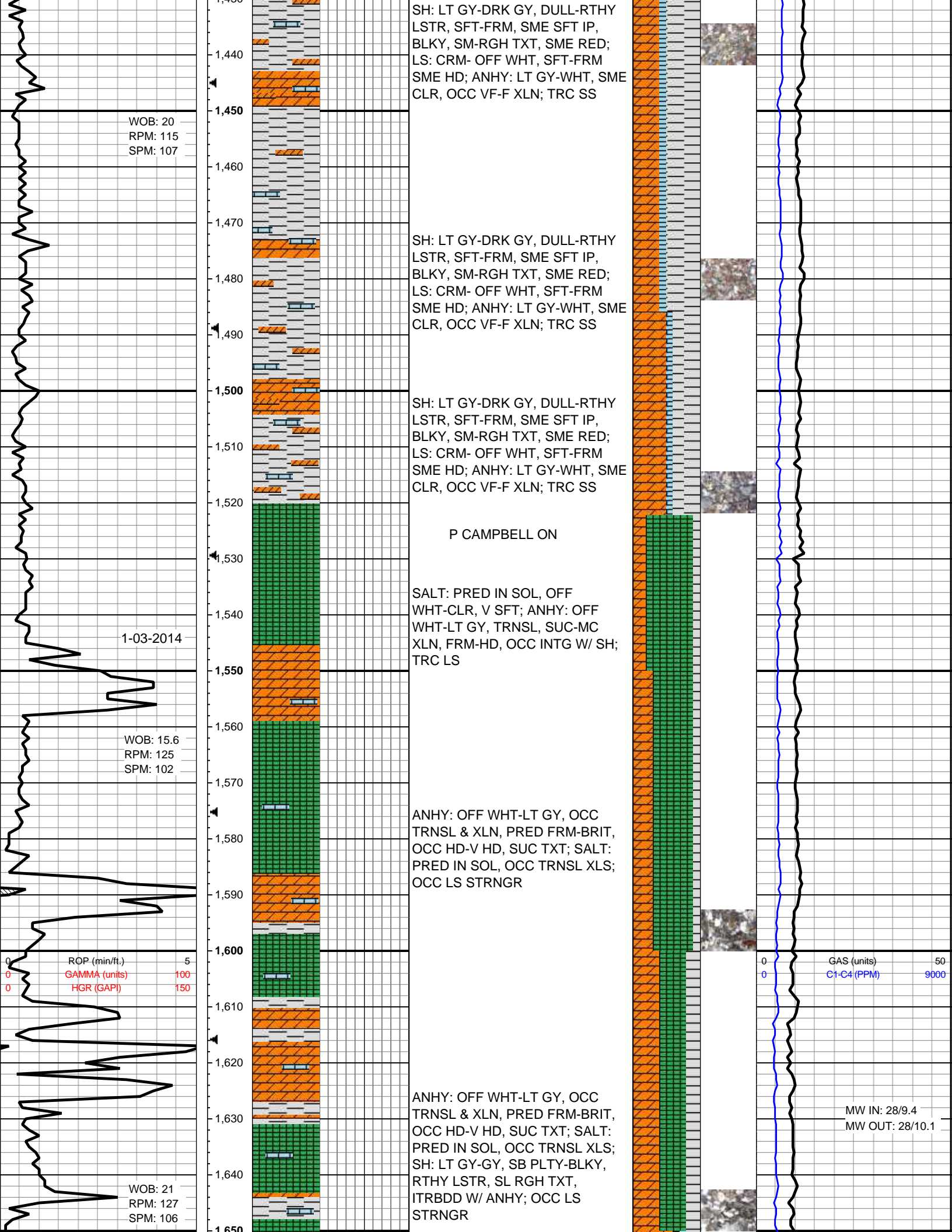
SH: LT GY-DRK GY, DULL LSTR,  
SFT-FRM, SME SFT IP,  
PLTY-BLKY, SM-RGH TXT, SME  
RED; LS: CRM- WHT, SFT-FRM  
SME HD; ANHY: LT GY-WHT, OCC  
VF XLN

WOB: 20  
RPM: 115  
SPM: 107

SH: LT GY-DRK GY, DULL-RTHY  
LSTR, SFT-FRM, SME SFT IP,  
BLKY, SM-RGH TXT, SME RED;  
LS: CRM- OFF WHT, SFT-FRM  
SME HD; ANHY: LT GY-WHT, SME  
CLR, OCC F XLN; TRC SS

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

GAS (units) 50  
C1-C4 (PPM) 9000



WOB: 20  
RPM: 115  
SPM: 107

1-03-2014

WOB: 15.6  
RPM: 125  
SPM: 102

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

WOB: 21  
RPM: 127  
SPM: 106

SH: LT GY-DRK GY, DULL-RTHY LSTR, SFT-FRM, SME SFT IP, BLKY, SM-RGH TXT, SME RED; LS: CRM- OFF WHT, SFT-FRM SME HD; ANHY: LT GY-WHT, SME CLR, OCC VF-F XLN; TRC SS

SH: LT GY-DRK GY, DULL-RTHY LSTR, SFT-FRM, SME SFT IP, BLKY, SM-RGH TXT, SME RED; LS: CRM- OFF WHT, SFT-FRM SME HD; ANHY: LT GY-WHT, SME CLR, OCC VF-F XLN; TRC SS

SH: LT GY-DRK GY, DULL-RTHY LSTR, SFT-FRM, SME SFT IP, BLKY, SM-RGH TXT, SME RED; LS: CRM- OFF WHT, SFT-FRM SME HD; ANHY: LT GY-WHT, SME CLR, OCC VF-F XLN; TRC SS

P CAMPBELL ON

SALT: PRED IN SOL, OFF WHT-CLR, V SFT; ANHY: OFF WHT-LT GY, TRNSL, SUC-MC XLN, FRM-HD, OCC INTG W/ SH; TRC LS

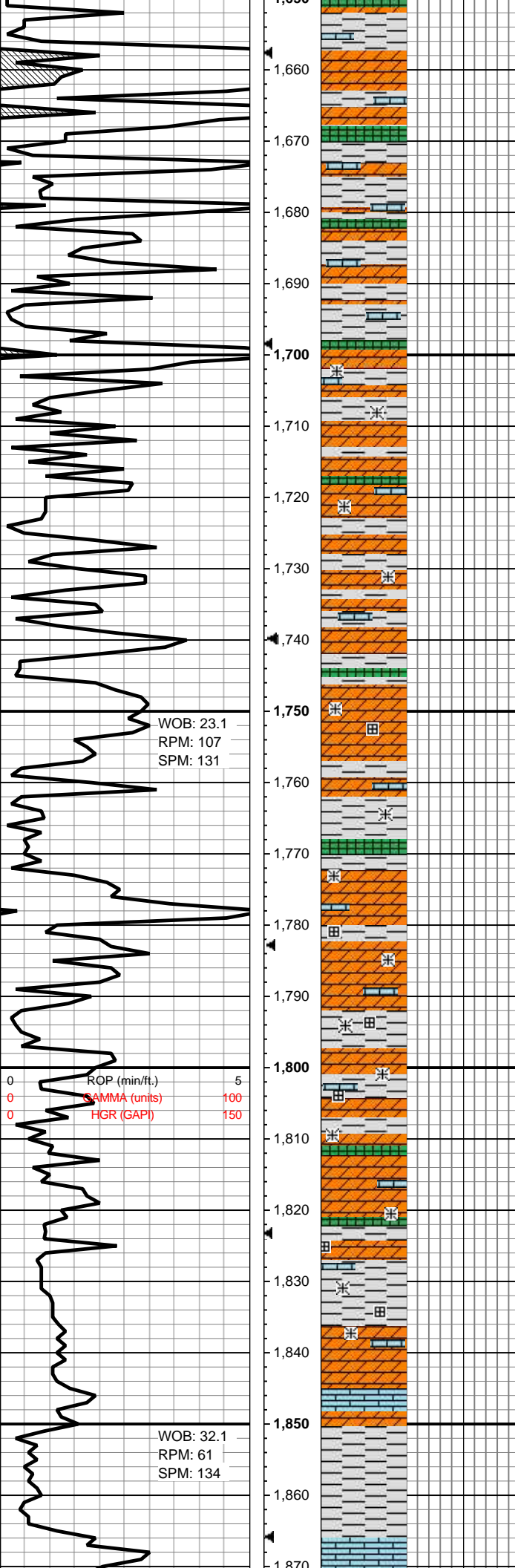
ANHY: OFF WHT-LT GY, OCC TRNSL & XLN, PRED FRM-BRIT, OCC HD-V HD, SUC TXT; SALT: PRED IN SOL, OCC TRNSL XLS; OCC LS STRNGR

ANHY: OFF WHT-LT GY, OCC TRNSL & XLN, PRED FRM-BRIT, OCC HD-V HD, SUC TXT; SALT: PRED IN SOL, OCC TRNSL XLS; SH: LT GY-GY, SB PLTY-BLKY, RTHY LSTR, SL RGH TXT, ITRBDD W/ ANHY; OCC LS STRNGR

GAS (units) 50  
C1-C4 (PPM) 9000

MW IN: 28/9.4  
MW OUT: 28/10.1

**LOWER WELLINGTON FORMATION @ 1657' MD**

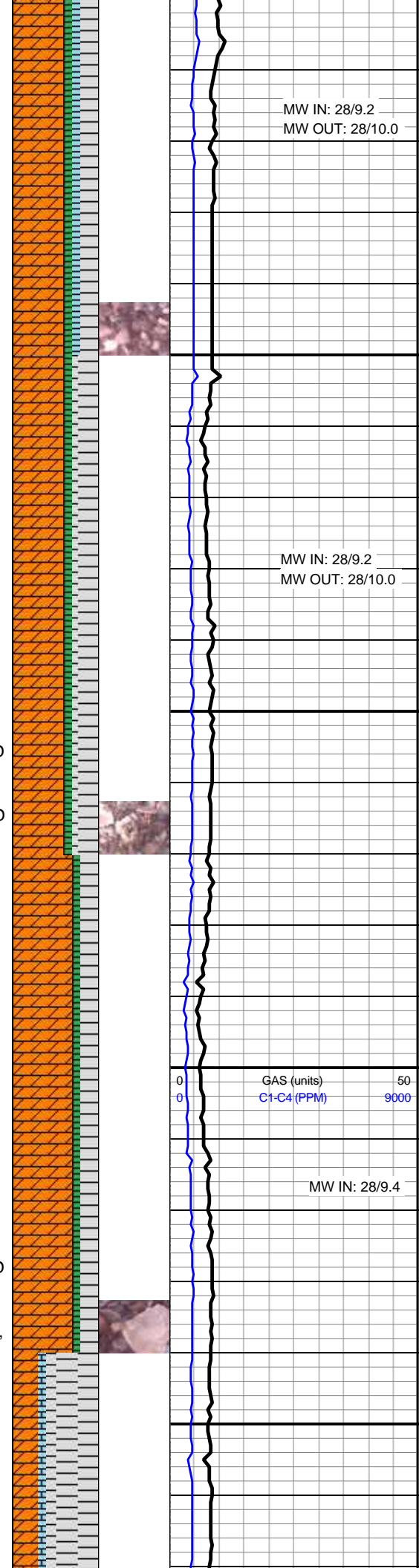


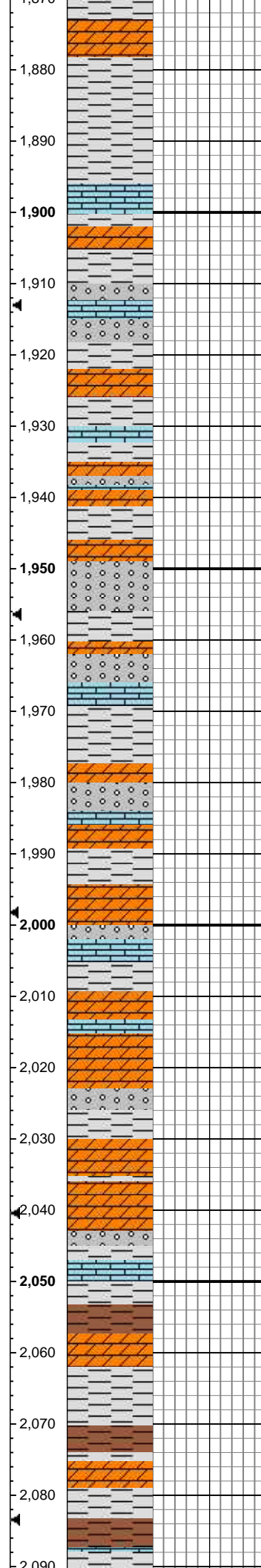
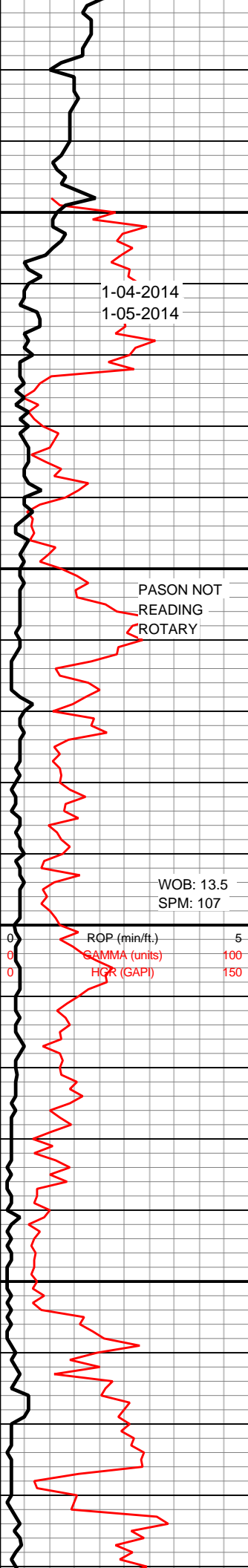
ANHY: OFF WHT-LT GY, OCC TRNSL & XLN, PRED FRM-BRIT, OCC HD-V HD, SUC TXT; SALT: PRED IN SOL, OCC TRNSL XLS; SH: LT GY-GY, SB PLTY-BLKY, DLL RTHY LSTR, SL RGH TXT, ITRBDD W/ ANHY; LS STRNGR

ANHY: OFF WHT-LT GY, OCC TRNSL & XLN, PRED SFT-FRM, OCC HD, SUC TXT, OCC ELONG XLS; SALT: PRED IN SOL, OCC TRNSL XLS; SH: LT GY-GY, PRED BLKY-SB BLKY, AMOR, SL WXY-DLL RTHY LSTR, SL RGH TXT, ITRBDD W/ ANHY; TRC V HD QTZ XLS, OCC LS STRNGR

**CHASE GROUP @ 1820' MD**

ANHY: OFF WHT-LT GY, OCC TRNSL & XLN, PRED SFT-FRM, OCC HD, SUC TXT, OCC ELONG XLS; SALT: PRED IN SOL, OCC TRNSL XLS; SH: LT GY-GY, PRED BLKY-SB BLKY, AMOR, SL WXY-DLL RTHY LSTR, SL RGH TXT, ITRBDD W/ ANHY; TRC QTZ, OCC LS STRNGR





SH: LT GY-GY, PRED BLKY-SB  
BLKY, AMOR, SL WXY-DLL RTHY  
LSTR, SL RGH TXT, ITRBDD W/  
ANHY; ANHY: OFF WHT-LT GY,  
OCC TRNSL & XLN, PRED  
SFT-FRM, OCC HD, SUC TXT,  
OCC ELONG XLS; LS: LT GY-OFF  
WHT, SFT FRM, CR XLN, PRED  
SM TXT

PUMP HIGH VIS SWEEP, CIRC,  
TOOH FOR CASING @ 1911' MD

Bit #: 3  
Type: SEC FX55M  
Size: 8.75  
Depth In: 1,911 '  
Jets: 5x20s  
S/N: 11996294

S. ZIVERK ON

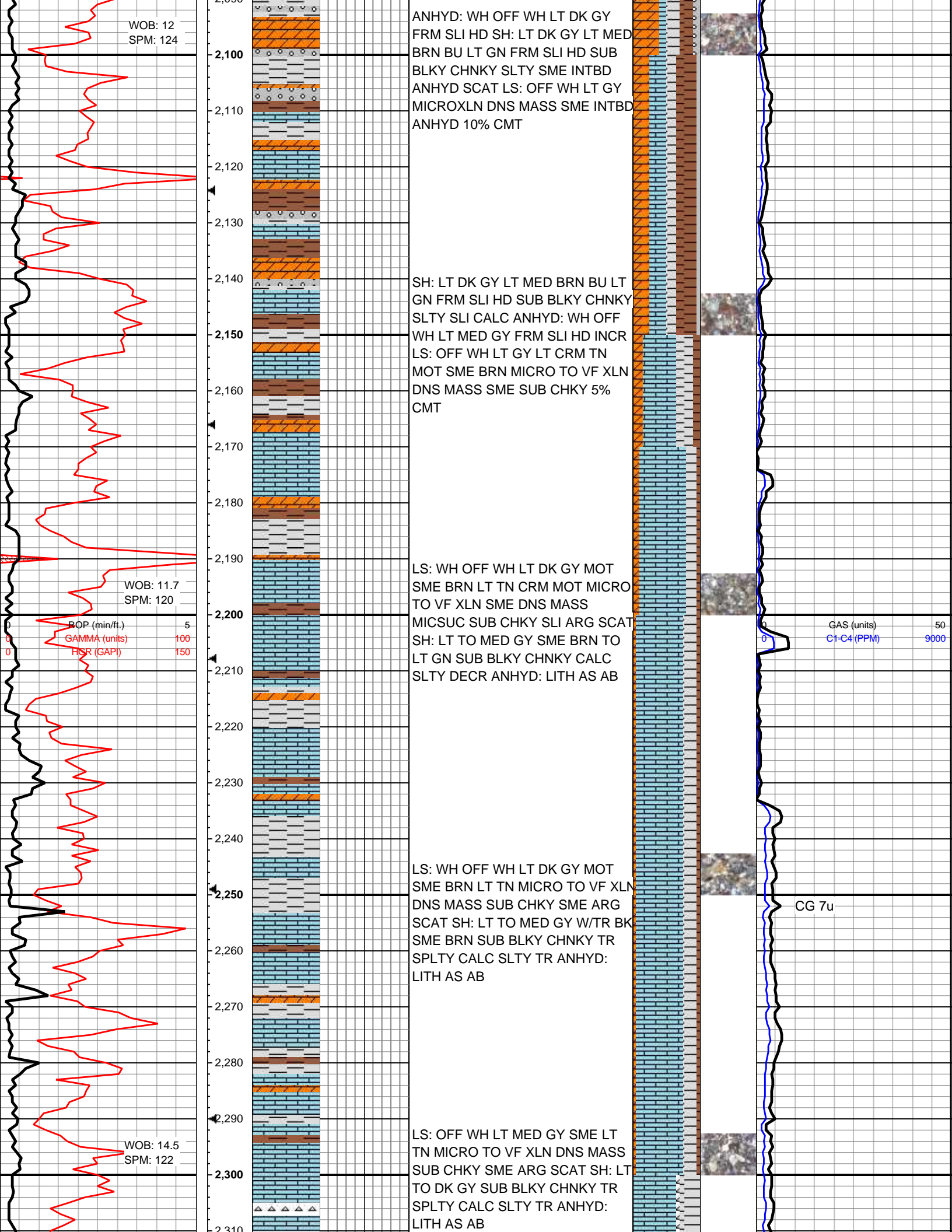
SH: LT MED GY FRM SLI HD SUB  
BLKY CHNKY SLTY SME ANHYD  
SH SCAT ANHYD: WH OFF WH LT  
DK GY FRM SLI HD SCAT LS: OFF  
WH LT GY MICROXLN DNS MASS  
SME INTBD ANHYD 25% CMT

SH: LT MED GY FRM SLI HD SUB  
BLKY CHNKY SLTY SME ANHYD  
SH SCAT ANHYD: WH OFF WH LT  
DK GY FRM SLI HD SCAT LS: OFF  
WH LT GY MICROXLN DNS MASS  
SME INTBD ANHYD 25% CMT

ANHYD: WH OFF WH LT DK GY  
FRM SLI HD DECR SH: LT DK GY  
FRM SLI HD SUB BLKY CHNKY  
SLTY SLI CALC INTBD ANHYD  
DECR LS: OFF WH LT GY  
MICROXLN DNS MASS SME INTBD  
ANHYD 20% CMT



GAS (units) 50  
C1-C4 (PPM) 9000



WOB: 12  
SPM: 124

ANHYD: WH OFF WH LT DK GY  
FRM SLI HD SH: LT DK GY LT MED  
BRN BU LT GN FRM SLI HD SUB  
BLKY CHNKY SLTY SME INTBD  
ANHYD SCAT LS: OFF WH LT GY  
MICROXLN DNS MASS SME INTBD  
ANHYD 10% CMT

SH: LT DK GY LT MED BRN BU LT  
GN FRM SLI HD SUB BLKY CHNKY  
SLTY SLI CALC ANHYD: WH OFF  
WH LT MED GY FRM SLI HD INCR  
LS: OFF WH LT GY LT CRM TN  
MOT SME BRN MICRO TO VF XLN  
DNS MASS SME SUB CHKY 5%  
CMT

LS: WH OFF WH LT DK GY MOT  
SME BRN LT TN CRM MOT MICRO  
TO VF XLN SME DNS MASS  
MICSUC SUB CHKY SLI ARG SCAT  
SH: LT TO MED GY SME BRN TO  
LT GN SUB BLKY CHNKY CALC  
SLTY DECR ANHYD: LITH AS AB

LS: WH OFF WH LT DK GY MOT  
SME BRN LT TN MICRO TO VF XLN  
DNS MASS SUB CHKY SME ARG  
SCAT SH: LT TO MED GY W/TR BK  
SME BRN SUB BLKY CHNKY TR  
SPLTY CALC SLTY TR ANHYD:  
LITH AS AB

LS: OFF WH LT MED GY SME LT  
TN MICRO TO VF XLN DNS MASS  
SUB CHKY SME ARG SCAT SH: LT  
TO DK GY SUB BLKY CHNKY TR  
SPLTY CALC SLTY TR ANHYD:  
LITH AS AB

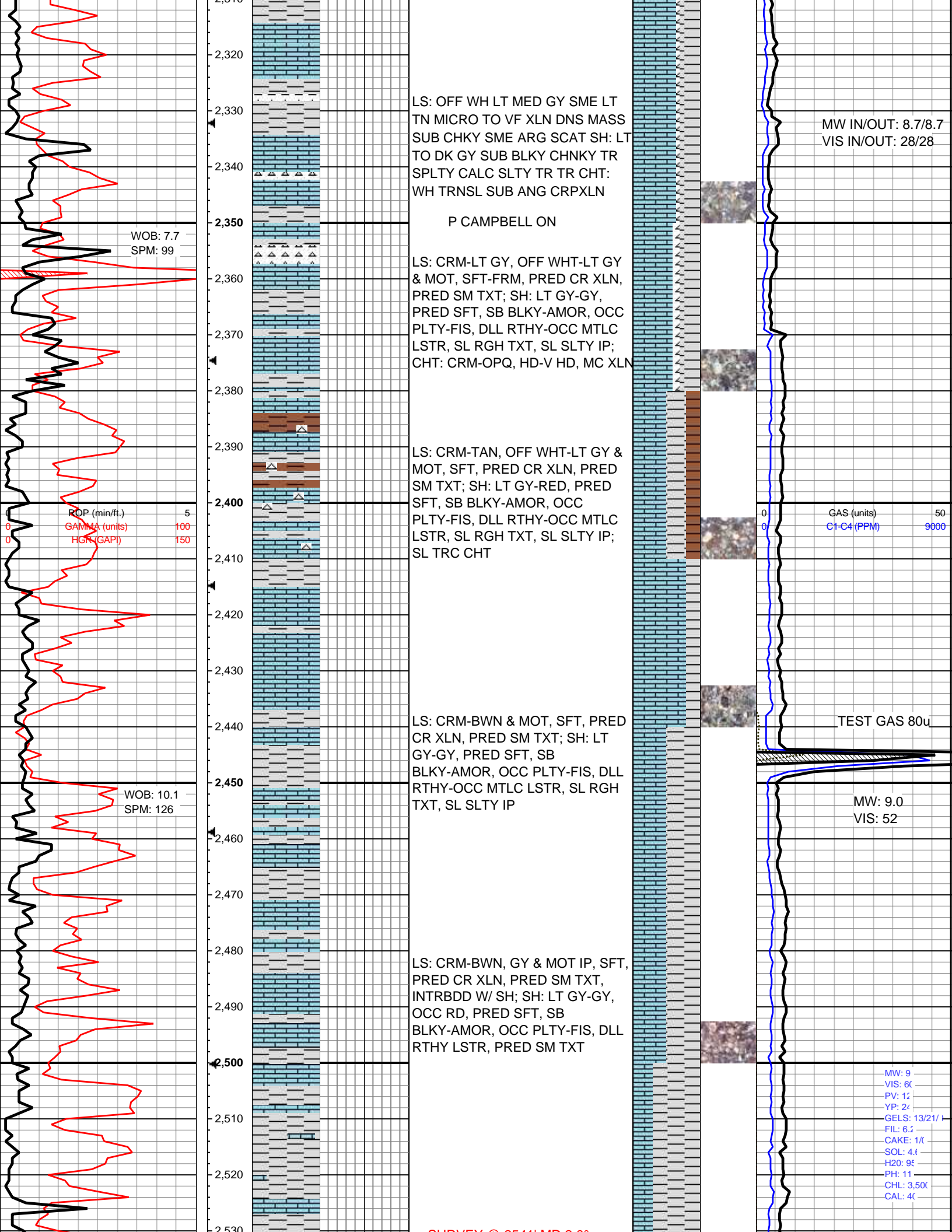
WOB: 11.7  
SPM: 120

ROP (min/ft.) 5  
GAMMA (units) 100  
HSR (GAPI) 150

GAS (units) 50  
C1-C4 (PPM) 9000

CG 7u

WOB: 14.5  
SPM: 122



2,310  
2,320  
2,330  
2,340  
2,350  
2,360  
2,370  
2,380  
2,390  
2,400  
2,410  
2,420  
2,430  
2,440  
2,450  
2,460  
2,470  
2,480  
2,490  
2,500  
2,510  
2,520  
2,530

LS: OFF WH LT MED GY SME LT  
TN MICRO TO VF XLN DNS MASS  
SUB CHKY SME ARG SCAT SH: LT  
TO DK GY SUB BLKY CHNKY TR  
SPLTY CALC SLTY TR TR CHT:  
WH TRNSL SUB ANG CRPXLN

P CAMPBELL ON

LS: CRM-LT GY, OFF WHT-LT GY &  
MOT, SFT-FRM, PRED CR XLN,  
PRED SM TXT; SH: LT GY-GY,  
PRED SFT, SB BLKY-AMOR, OCC  
PLTY-FIS, DLL RTHY-OCC MTLN  
LSTR, SL RGH TXT, SL SLTY IP;  
CHT: CRM-OPQ, HD-V HD, MC XLN

LS: CRM-TAN, OFF WHT-LT GY &  
MOT, SFT, PRED CR XLN, PRED  
SM TXT; SH: LT GY-RED, PRED  
SFT, SB BLKY-AMOR, OCC  
PLTY-FIS, DLL RTHY-OCC MTLN  
LSTR, SL RGH TXT, SL SLTY IP;  
SL TRC CHT

LS: CRM-BWN & MOT, SFT, PRED  
CR XLN, PRED SM TXT; SH: LT  
GY-GY, PRED SFT, SB  
BLKY-AMOR, OCC PLTY-FIS, DLL  
RTHY-OCC MTLN LSTR, SL RGH  
TXT, SL SLTY IP

LS: CRM-BWN, GY & MOT IP, SFT,  
PRED CR XLN, PRED SM TXT,  
INTRBDD W/ SH; SH: LT GY-GY,  
OCC RD, PRED SFT, SB  
BLKY-AMOR, OCC PLTY-FIS, DLL  
RTHY LSTR, PRED SM TXT

MW IN/OUT: 8.7/8.7  
VIS IN/OUT: 28/28

WOB: 7.7  
SPM: 99

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

WOB: 10.1  
SPM: 126

GAS (units) 50  
C1-C4 (PPM) 9000

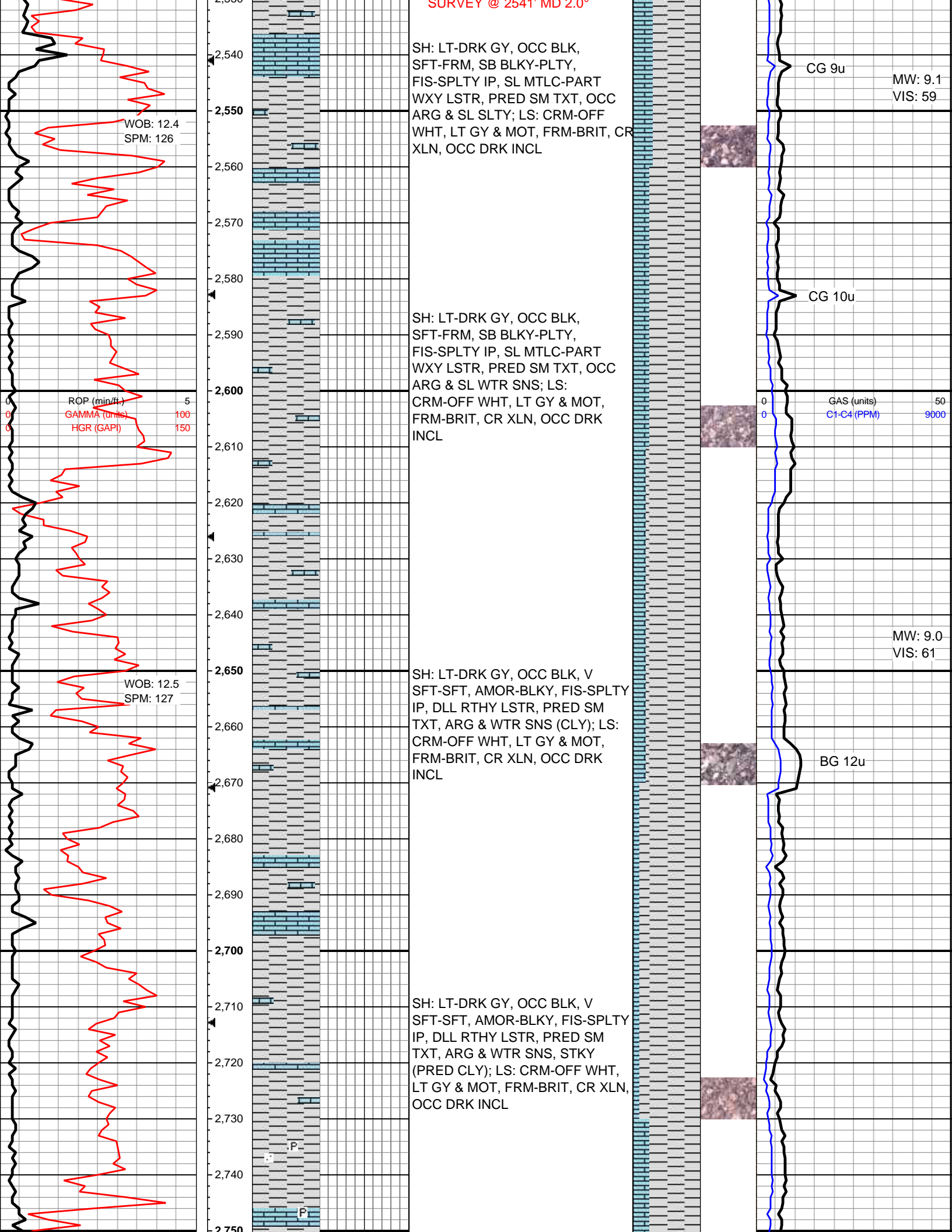
TEST GAS 80u

MW: 9.0  
VIS: 52

MW: 9  
VIS: 60  
PV: 12  
YP: 24  
GELS: 13/21/1  
FIL: 6.2  
CAKE: 1/1  
SOL: 4.1  
H2O: 95  
PH: 11  
CHL: 3.50  
CAL: 40



SURVEY @ 2541' MD 2.0'



WOB: 12.4  
SPM: 126

ROP (min/ft) 5  
GAMMA (units) 100  
HGR (GAPI) 150

WOB: 12.5  
SPM: 127

SH: LT-DRK GY, OCC BLK,  
SFT-FRM, SB BLKY-PLTY,  
FIS-SPLTY IP, SL MTLT-PART  
WXY LSTR, PRED SM TXT, OCC  
ARG & SL SLTY; LS: CRM-OFF  
WHT, LT GY & MOT, FRM-BRIT, CR  
XLN, OCC DRK INCL

SH: LT-DRK GY, OCC BLK,  
SFT-FRM, SB BLKY-PLTY,  
FIS-SPLTY IP, SL MTLT-PART  
WXY LSTR, PRED SM TXT, OCC  
ARG & SL WTR SNS; LS:  
CRM-OFF WHT, LT GY & MOT,  
FRM-BRIT, CR XLN, OCC DRK  
INCL

SH: LT-DRK GY, OCC BLK, V  
SFT-SFT, AMOR-BLKY, FIS-SPLTY  
IP, DLL RTHY LSTR, PRED SM  
TXT, ARG & WTR SNS (CLY); LS:  
CRM-OFF WHT, LT GY & MOT,  
FRM-BRIT, CR XLN, OCC DRK  
INCL

SH: LT-DRK GY, OCC BLK, V  
SFT-SFT, AMOR-BLKY, FIS-SPLTY  
IP, DLL RTHY LSTR, PRED SM  
TXT, ARG & WTR SNS, STKY  
(PRED CLY); LS: CRM-OFF WHT,  
LT GY & MOT, FRM-BRIT, CR XLN,  
OCC DRK INCL

CG 9u MW: 9.1  
VIS: 59

CG 10u

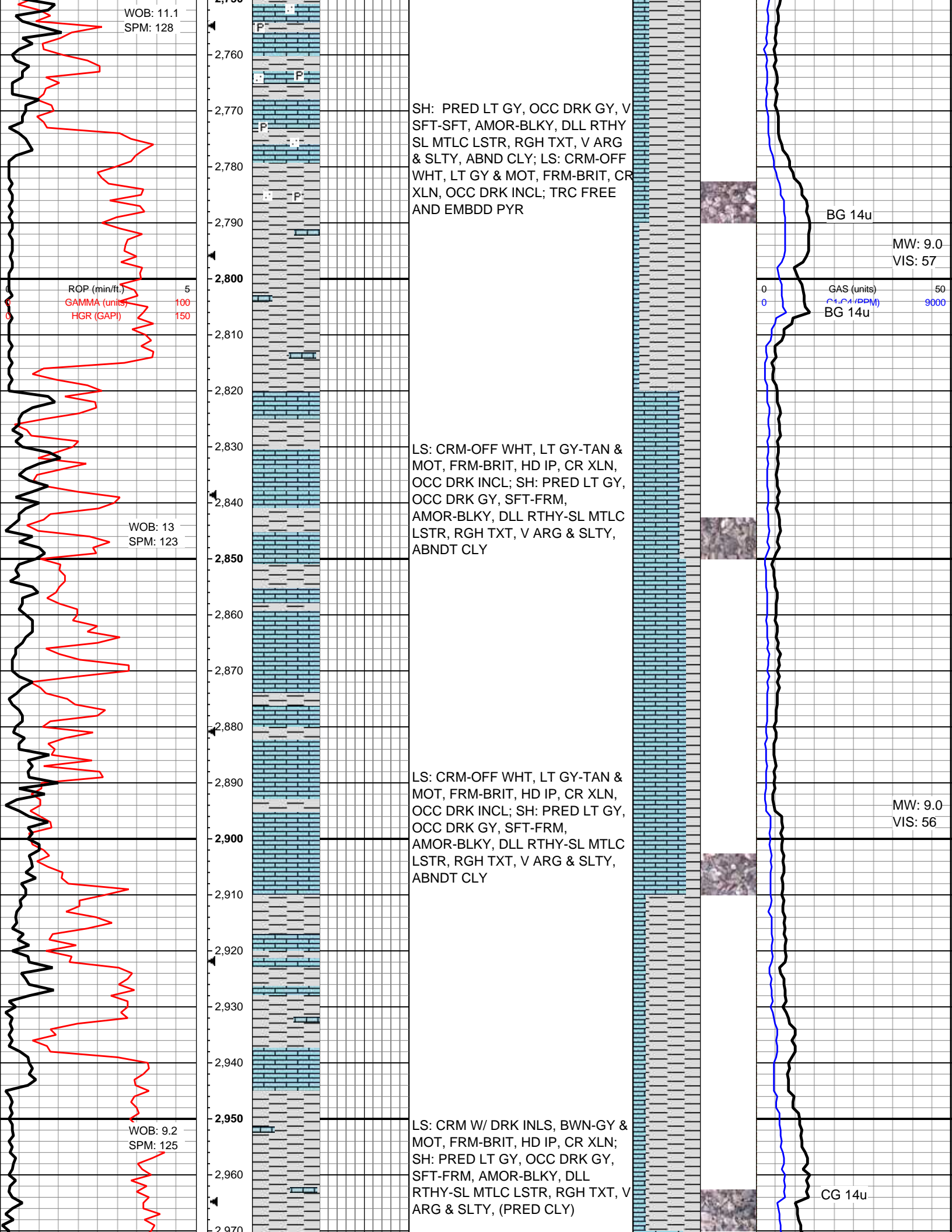
GAS (units) 50  
C1-C4 (PPM) 9000

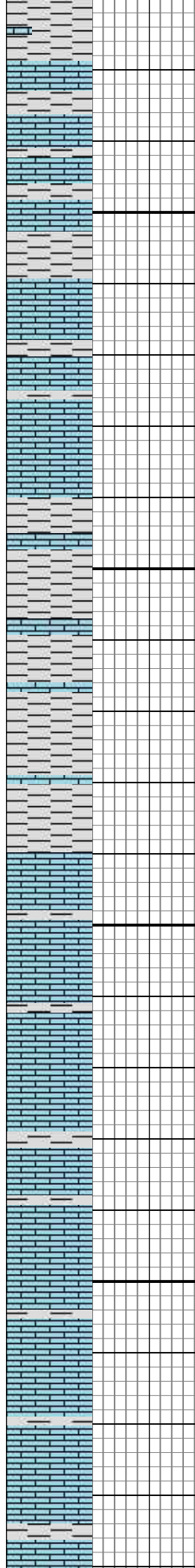
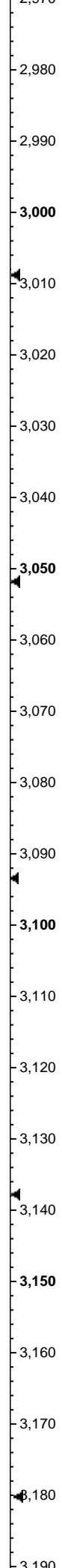
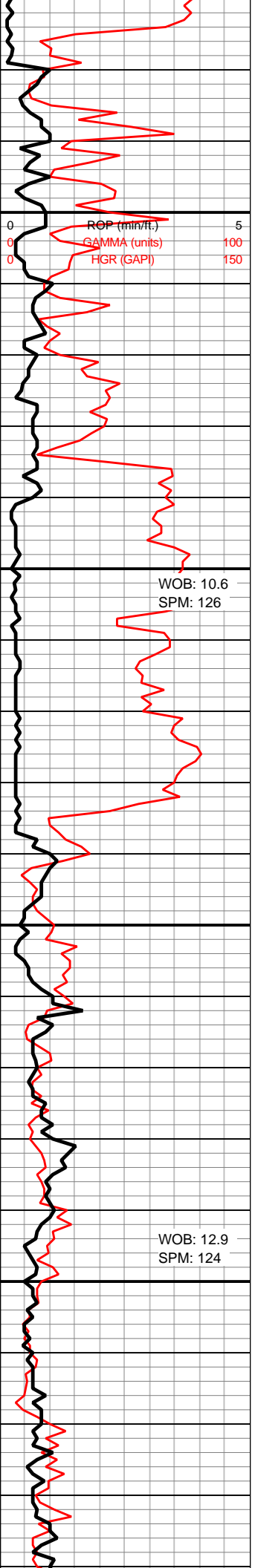
MW: 9.0  
VIS: 61

BG 12u

P

P





LS: CRM-LT TAN, LT GY & MOT IP,  
FRM-BRIT, HD IP, CR XLN; SH:  
PRED LT GY-GY, OCC DRK GY,  
SFT-FRM, AMOR-BLKY, DLL  
RTHY-SL MTLT LSTR, RGH TXT,  
ARG, SL SLTY IP; NFSOC

SH: PRED LT GY-GY, SFT-FRM,  
AMOR-BLKY, DLL RTHY-SL MTLT  
LSTR, RGH TXT, ARG, SL SLTY IP;  
LS: CRM-LT TAN, LT GY & MOT IP,  
FRM-BRIT, HD IP, CR XLN;  
NFSOC

LS: CRM-TAN & MOT, LT BWN,  
FRM-BRIT, CR XLN, SUC IP,  
PRED SM TXT; TRC SH; NFSOC

LS: WH OFF WH LT CRM LT MOT  
GY MICRO TO VF XLN PRED SUB  
CHKY SME DNS TO MASS SME  
ARG SCAT TR SH: DK GY SME BK  
FRM SLI HD SUB BLKY SLTY SME  
CALC

**TOPEKA LS @ 3087' MD**

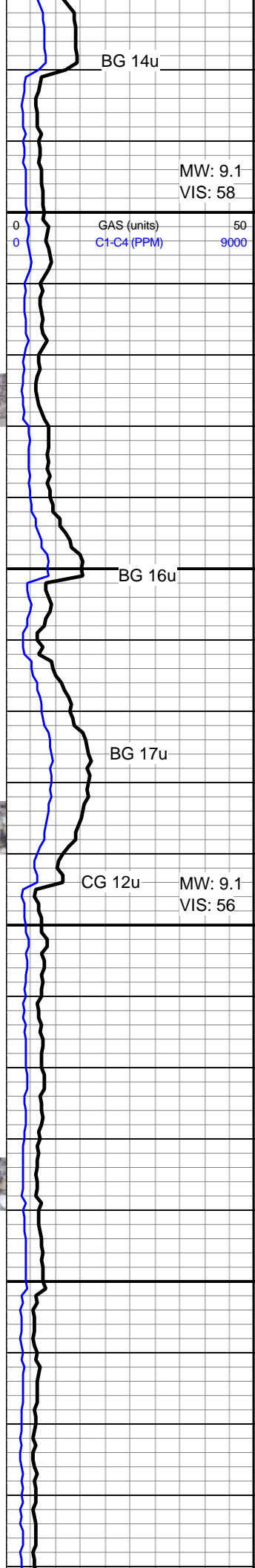
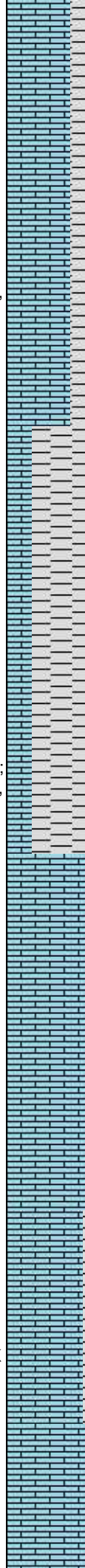
**SURVEY @ 3094' MD 1.6°**

S. ZIVERK ON

WOB: 10.6  
SPM: 126

WOB: 12.9  
SPM: 124

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150



BG 14u

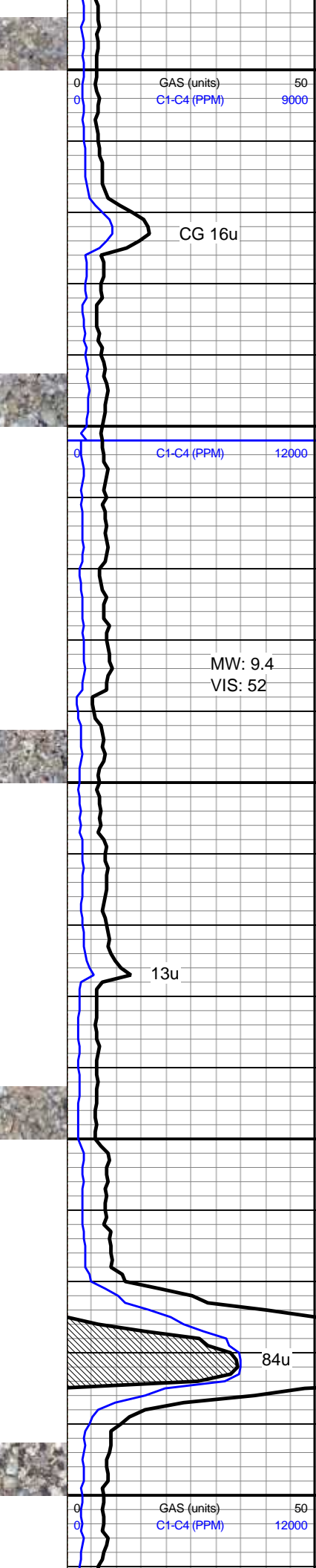
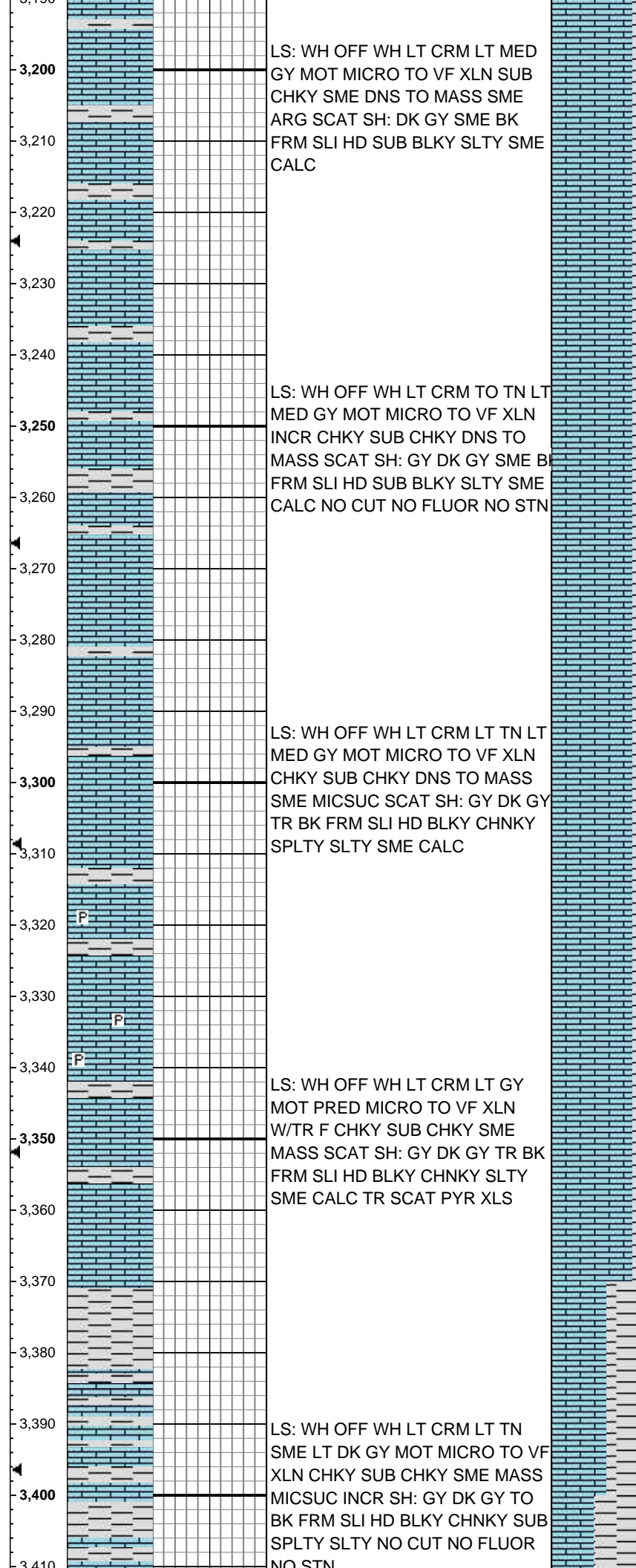
MW: 9.1  
VIS: 58

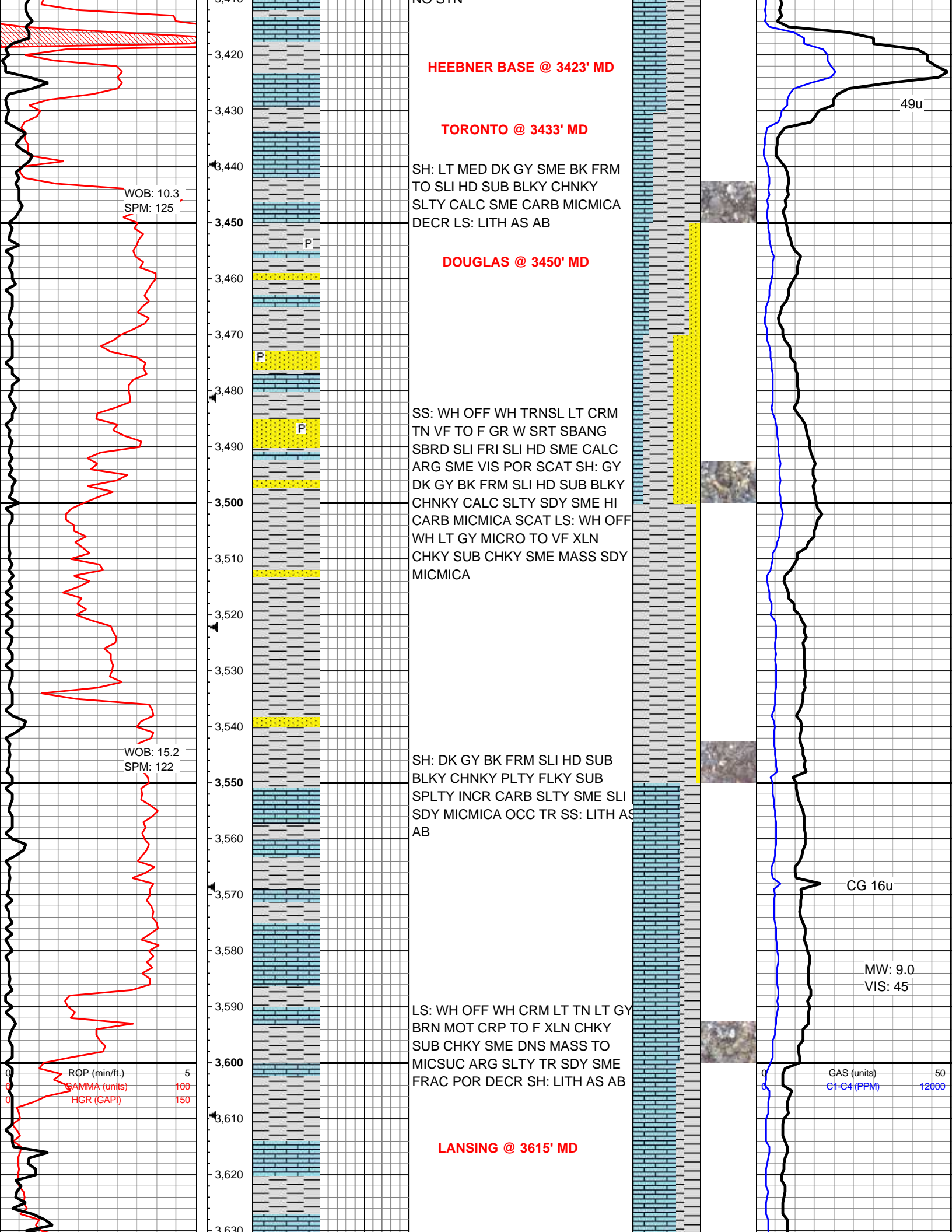
BG 16u

BG 17u

CG 12u MW: 9.1  
VIS: 56

GAS (units) 50  
C1-C4 (PPM) 9000





HEEBNER BASE @ 3423' MD

TORONTO @ 3433' MD

SH: LT MED DK GY SME BK FRM  
 TO SLI HD SUB BLKY CHNKY  
 SLTY CALC SME CARB MICMICA  
 DECR LS: LITH AS AB

DOUGLAS @ 3450' MD

SS: WH OFF WH TRNSL LT CRM  
 TN VF TO F GR W SRT SBANG  
 SBRD SLI FRI SLI HD SME CALC  
 ARG SME VIS POR SCAT SH: GY  
 DK GY BK FRM SLI HD SUB BLKY  
 CHNKY CALC SLTY SDY SME HI  
 CARB MICMICA SCAT LS: WH OFF  
 WH LT GY MICRO TO VF XLN  
 CHKY SUB CHKY SME MASS SDY  
 MICMICA

SH: DK GY BK FRM SLI HD SUB  
 BLKY CHNKY PLTY FLKY SUB  
 SPLTY INCR CARB SLTY SME SLI  
 SDY MICMICA OCC TR SS: LITH AS  
 AB

LS: WH OFF WH CRM LT TN LT GY  
 BRN MOT CRP TO F XLN CHKY  
 SUB CHKY SME DNS MASS TO  
 MICSUC ARG SLTY TR SDY SME  
 FRAC POR DECR SH: LITH AS AB

LANSING @ 3615' MD

WOB: 10.3  
 SPM: 125

WOB: 15.2  
 SPM: 122

ROP (min/ft.) 5  
 GAMMA (units) 100  
 HGR (GAPI) 150

GAS (units) 50  
 C1-C4 (PPM) 12000

49u

CG 16u

MW: 9.0  
 VIS: 45

1-06-2014

WOB: 17.1  
SPM: 123

WOB: 18  
SPM: 126

0	ROP (min/ft.)	5
0	GAMMA (units)	100
0	HGR (GAPI)	150

WOB: 17.7  
SPM: 125

3,630  
3,640  
3,650  
3,660  
3,670  
3,680  
3,690  
3,700  
3,710  
3,720  
3,730  
3,740  
3,750  
3,760  
3,770  
3,780  
3,790  
3,800  
3,810  
3,820  
3,830  
3,840  
3,850

LS: WH OFF WH CRM LT TN LT GY  
BRN MOT MICRO TO F XLN CHKY  
SUB CHKY DNS MASS INCR  
MICSUC ARG SLTY SCAT SH: DK  
GY BK FRM SLI HD BLKY CHNKY  
PLTY SME FLKY TO SPLTY CALC  
MOD CARB SLTY SME MICMICA  
NO CUT NO FLUOR NO STN

LS: WH OFF WH CRM LT GY  
MICRO TO VF XLN CHKY SUB  
CHKY MASS ARG SLTY SCAT SH:  
DK GY BK FRM SLI HD BLKY  
CHNKY CALC SME MOD CARB  
SLTY

LS: WH OFF WH CRM LT TN LT GY  
MICRO TO VF XLN CHKY SUB  
CHKY MASS INCR MICSUC ARG  
SME VIS POR DECR SH: DK GY BK  
FRM SLI HD SUB BLKY CHNKY  
CALC SLTY SME MICMICA

LS: WH OFF WH CRM LT MED GY  
CRP TO VF XLN CHKY SUB CHKY  
MASS MICSUC ARG SLI INCR SH:  
DK GY BK FRM SLI HD SUB BLKY  
CHNKY CALC SLTY SME MICMICA  
SME MOD CARB

LS: WH OFF WH CRM LT TN LT  
MED GY MOT CRP TO VF XLN  
CHKY SUB CHKY MASS MICSUC



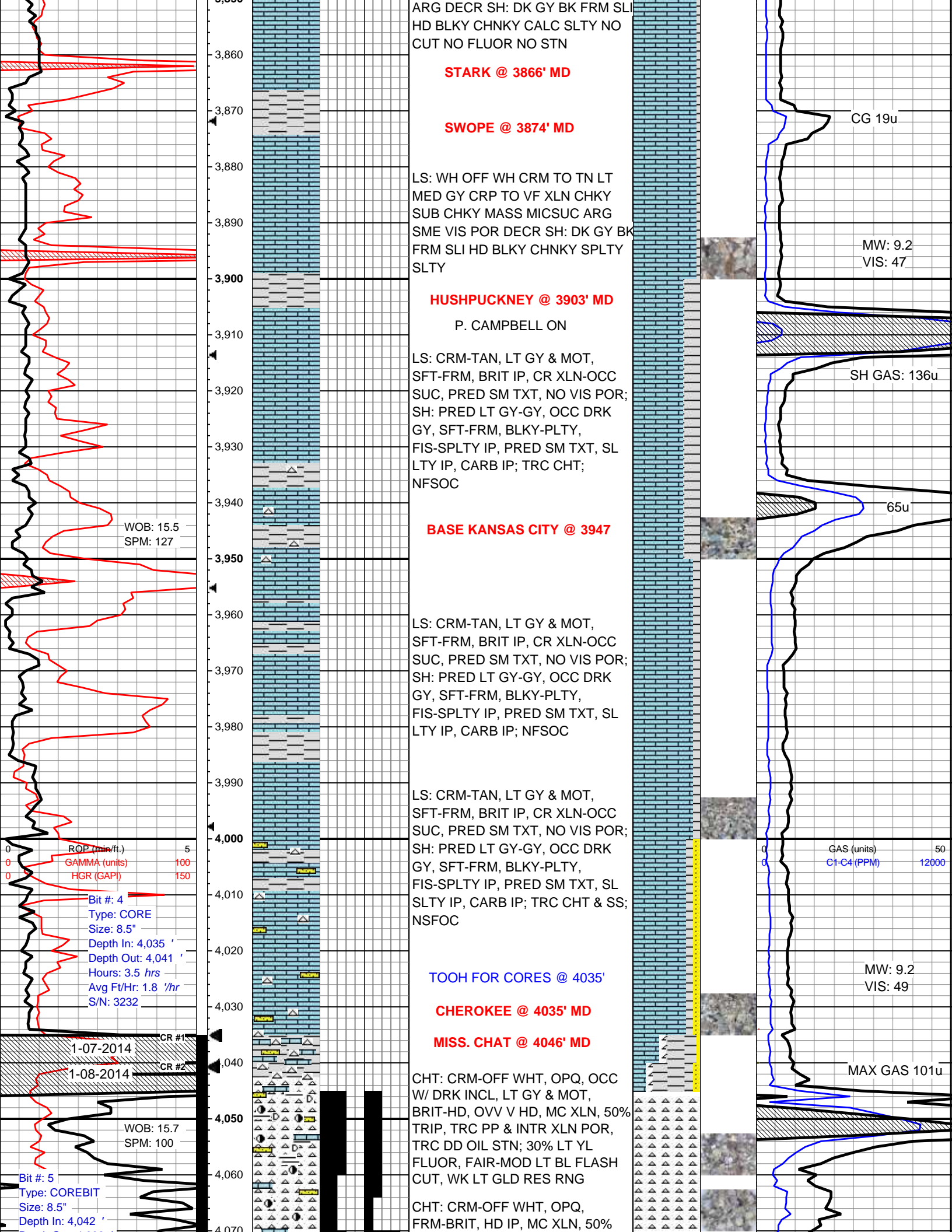
MW: 9.1  
VIS: 45

CG 15u

CG 14u

MW: 9.1+  
VIS: 45

0	GAS (units)	50
0	C1-C4 (PPM)	12000



Depth Out: 4,092'  
Hours: 7.5 hrs  
Avg Ft/Hr: 6.67 /hr  
S/N: 2980

1-09-2014

WOB: 10.4  
SPM: 107

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

WOB: 10.1  
SPM: 107

TRIP, TRC & INTR XLN POR W/  
DD OIL STN; 40% LT YL FLUOR,  
GD LT BL FLASH CUT, BGHT LT  
YL RES RNG

TOOH W/CORES @ 4092'

S. ZIVERK ON

MISS. LIMESTONE @ 4103' MD

Bit #: 6  
Type: FX55M  
Size: 8.75"  
Depth In: 4,096'  
Jets: 5x20s  
S/N: 11996294

LS: WH OFF WH LT CRM TN LT  
MED BRN GY MOT MICRO TO VF  
XLN MASS MICSUC CHKY SUB  
CHKY SME SCAT CHT: WH ANG  
SBANG TRIP MICROXLN VRY SLI  
TR SH: MED DK GY FRM SLI HD  
SUB BLKY CHNKY SLTY MICMICA  
NO CUT NO FLUOR NO STN

KINDERHOOK SH. @ 4137' MD

SH: GY DK GY FRM SLI HD SUB  
BLKY CHNKY SUB PLTY SUB  
SPLTY SLTY SME SLI SDY  
MICMICA DECR LS: OFF WH CRM  
LT TN MICROXLN MASS MICSUC  
SUB CHKY OCC SCAT CHT: LITH  
AS AB W/ SLI TR INTBD NOD PYR

SH: GY DK GY FRM SLI HD SUB  
BLKY CHNKY PLTY SLTY MICMICA  
SCAT LS: OFF WH CRM LT TN  
MICROXLN MASS CHKY SUB  
CHKY OCC SCAT CHT: WH ANG  
SBANG TRIP MICROXLN OCC  
FREE PYR XLS

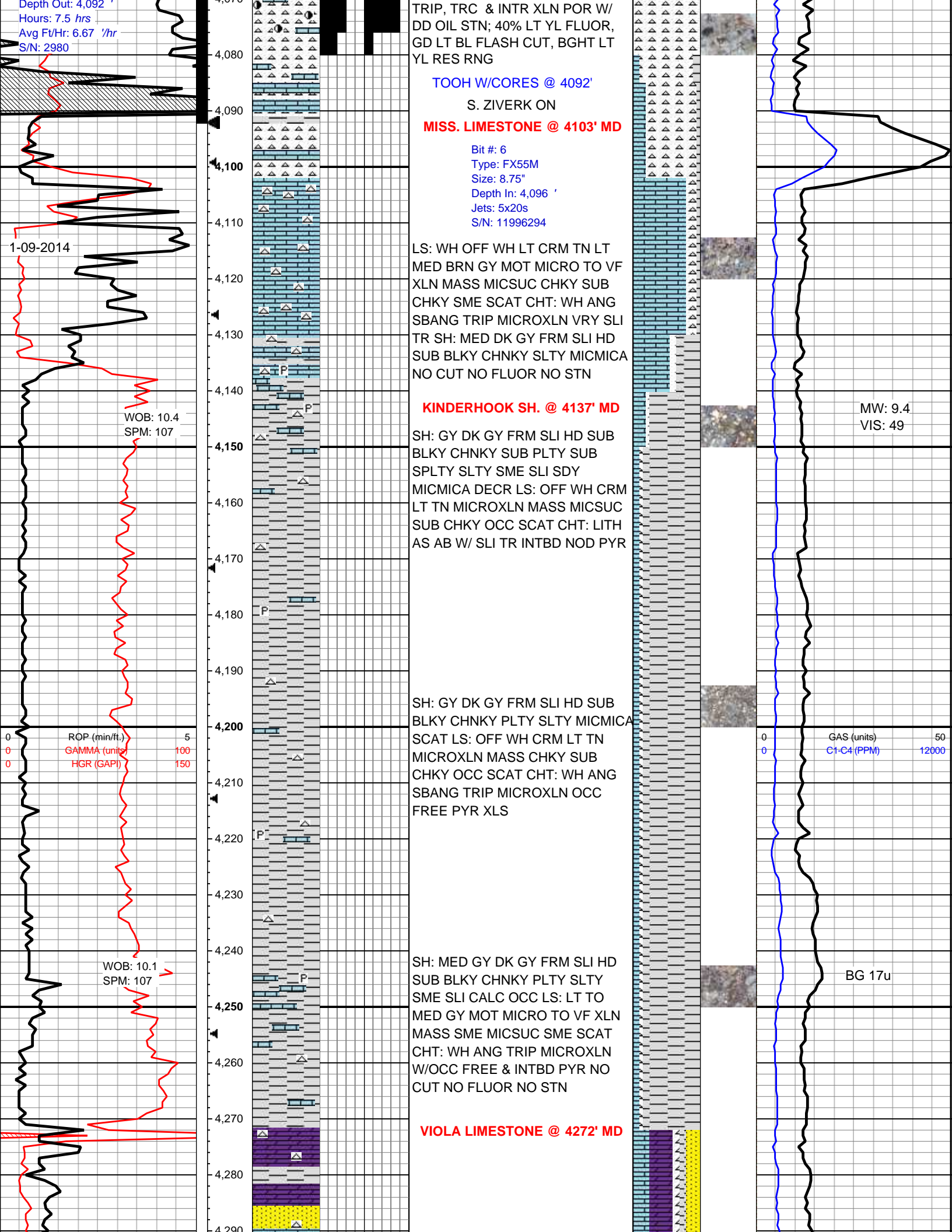
SH: MED GY DK GY FRM SLI HD  
SUB BLKY CHNKY PLTY SLTY  
SME SLI CALC OCC LS: LT TO  
MED GY MOT MICRO TO VF XLN  
MASS SME MICSUC SME SCAT  
CHT: WH ANG TRIP MICROXLN  
W/OCC FREE & INTBD PYR NO  
CUT NO FLUOR NO STN

VIOLA LIMESTONE @ 4272' MD

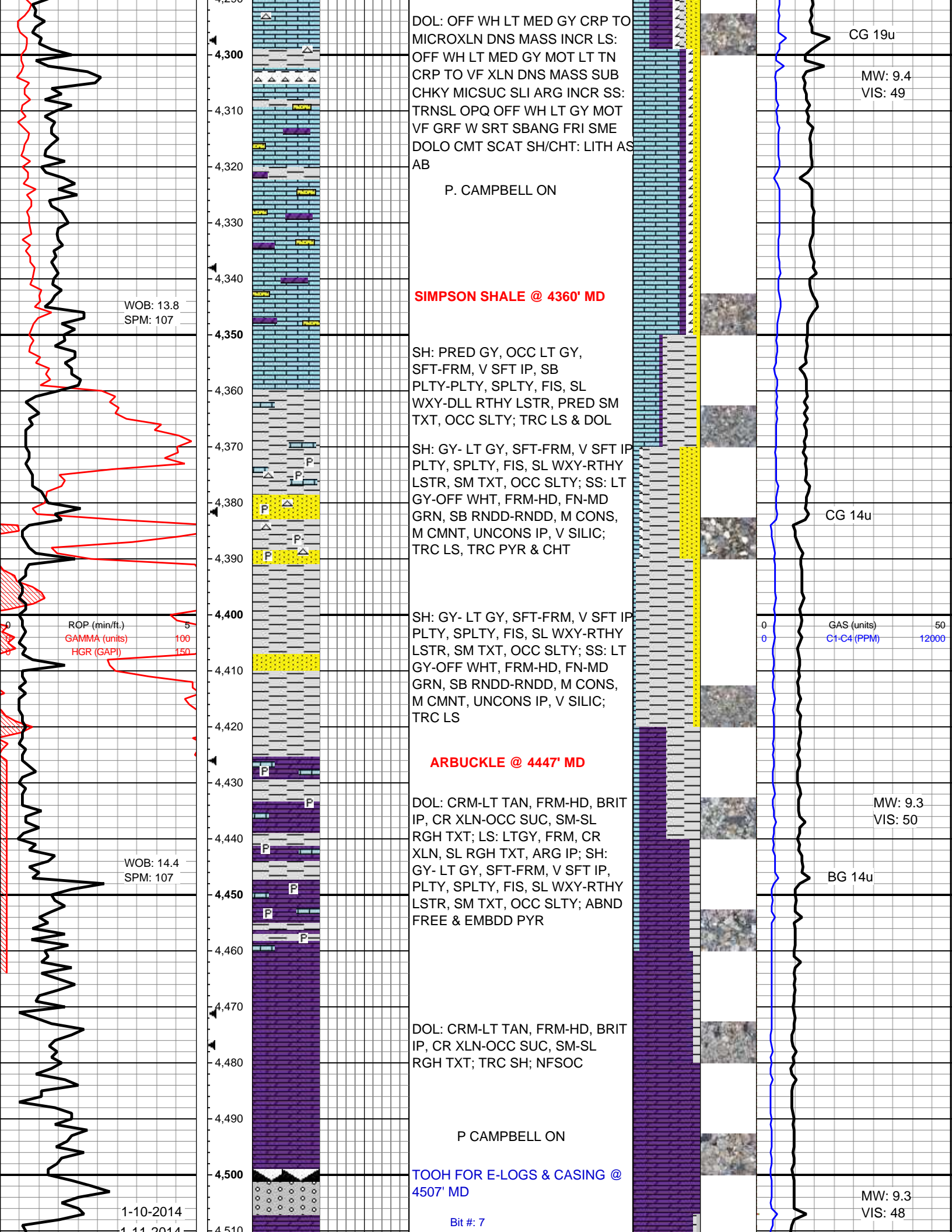
MW: 9.4  
VIS: 49

GAS (units) 50  
C1-C4 (PPM) 12000

BG 17u







DOL: OFF WH LT MED GY CRP TO  
 MICROXLN DNS MASS INCR LS:  
 OFF WH LT MED GY MOT LT TN  
 CRP TO VF XLN DNS MASS SUB  
 CHKY MICSUC SLI ARG INCR SS:  
 TRNSL OPQ OFF WH LT GY MOT  
 VF GRF W SRT SBANG FRI SME  
 DOLO CMT SCAT SH/CHT: LITH AS  
 AB

P. CAMPBELL ON

**SIMPSON SHALE @ 4360' MD**

SH: PRED GY, OCC LT GY,  
 SFT-FRM, V SFT IP, SB  
 PLTY-PLTY, SPLTY, FIS, SL  
 WXY-DLL RTHY LSTR, PRED SM  
 TXT, OCC SLTY; TRC LS & DOL

SH: GY- LT GY, SFT-FRM, V SFT IP  
 PLTY, SPLTY, FIS, SL WXY-RTHY  
 LSTR, SM TXT, OCC SLTY; SS: LT  
 GY-OFF WHT, FRM-HD, FN-MD  
 GRN, SB RNDD-RNDD, M CONS,  
 M CMNT, UNCONS IP, V SILIC;  
 TRC LS, TRC PYR & CHT

SH: GY- LT GY, SFT-FRM, V SFT IP  
 PLTY, SPLTY, FIS, SL WXY-RTHY  
 LSTR, SM TXT, OCC SLTY; SS: LT  
 GY-OFF WHT, FRM-HD, FN-MD  
 GRN, SB RNDD-RNDD, M CONS,  
 M CMNT, UNCONS IP, V SILIC;  
 TRC LS

**ARBUCKLE @ 4447' MD**

DOL: CRM-LT TAN, FRM-HD, BRIT  
 IP, CR XLN-OCC SUC, SM-SL  
 RGH TXT; LS: LTGY, FRM, CR  
 XLN, SL RGH TXT, ARG IP; SH:  
 GY- LT GY, SFT-FRM, V SFT IP,  
 PLTY, SPLTY, FIS, SL WXY-RTHY  
 LSTR, SM TXT, OCC SLTY; ABND  
 FREE & EMBDD PYR

DOL: CRM-LT TAN, FRM-HD, BRIT  
 IP, CR XLN-OCC SUC, SM-SL  
 RGH TXT; TRC SH; NFSOC

P CAMPBELL ON

**TOOH FOR E-LOGS & CASING @ 4507' MD**

Bit #: 7

CG 19u

MW: 9.4  
VIS: 49

CG 14u

GAS (units) 50  
C1-C4 (PPM) 12000

MW: 9.3  
VIS: 50

BG 14u

MW: 9.3  
VIS: 48

WOB: 13.8  
SPM: 107

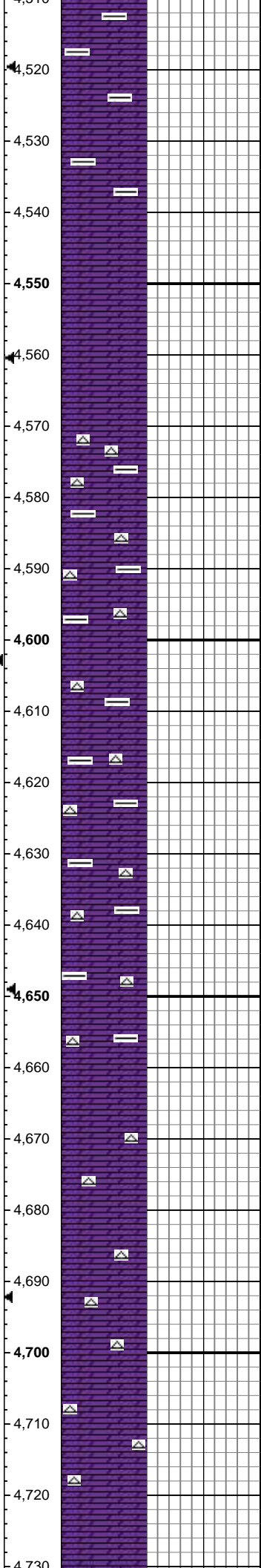
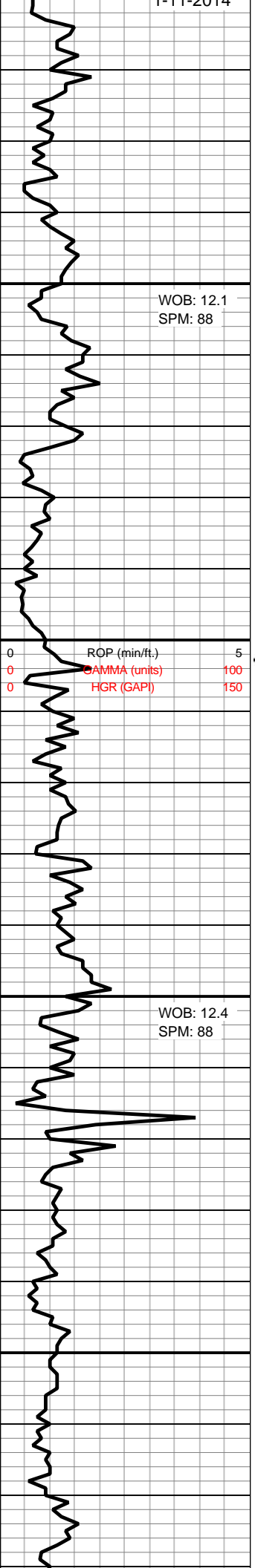
ROP (min/ft.) 5  
 GAMMA (units) 100  
 HGR (GAPI) 150

WOB: 14.4  
SPM: 107

1-10-2014  
1-11-2014

1-11-2014

Type: MM64DI  
Size: 6.125"  
Depth In: 4,507 '  
Jets: 6x14s  
S/N: 12082304



DOL: CRM-LT TAN, OCC  
OPQ-TRNSP XLS, FRM-HD, BRIT  
IP, CR XLN-OCC SUC, SM-SL  
RGH TXT; TRC SH & CMNT;  
NFSOC

DOL: CRM-LT TAN, FRM-HD, BRIT  
IP, CR XLN-OCC SUC, SM-SL  
RGH TXT; TRC SH; NFSOC

DOL: CRM-LT TAN, FRM-HD, BRIT  
IP, CR XLN-OCC SUC, SM-SL  
RGH TXT; SH: LT GY-GY,  
SFT-FRM, BLKY-SB PLTY, V ARG,  
SL SLTY IP; TRC OPQ CHT/QTS  
XLS

DOL: CRM-LT TAN, FRM-HD, BRIT  
IP, CR XLN-OCC SUC, SM-SL  
RGH TXT; SH: LT GY-GY,  
SFT-FRM, BLKY-SB PLTY, V ARG,  
SL SLTY IP; TRC CHT/QTS XLS:  
OPQ-TRNSL, OCC LT YL, HD-V  
HD, PRED AMOR

DOL: CRM-LT TAN, FRM-HD, BRIT  
IP, CR XLN-OCC SUC, SM-SL  
RGH TXT; TRC CHT/QTS XLS:  
OPQ-TRNSL, OCC LT YL, HD-V  
HD, PRED AMOR; NFSOC

WOB: 12.1  
SPM: 88

WOB: 12.4  
SPM: 88

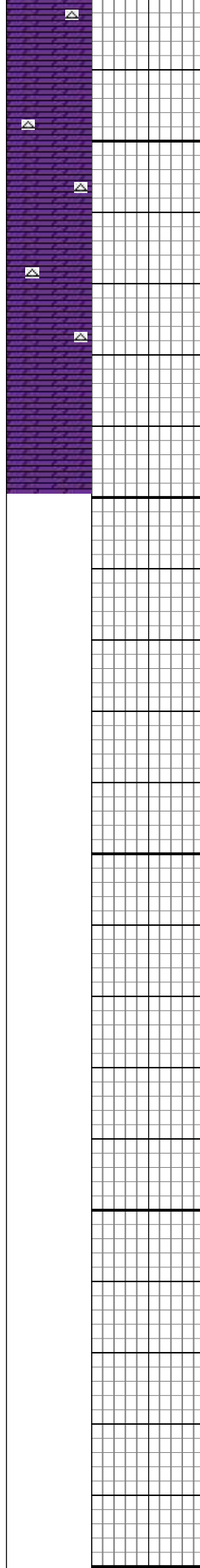
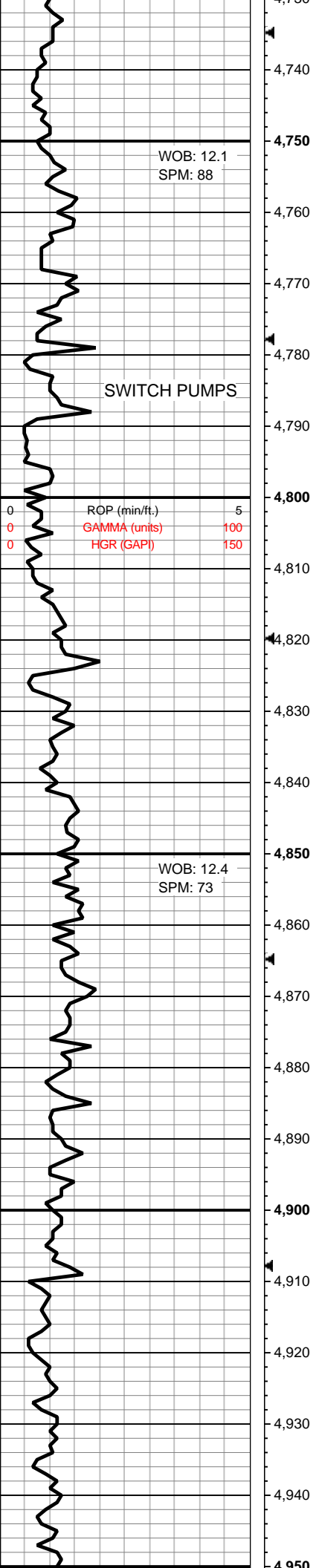
ROP (min/ft.) 5  
AMMA (units) 100  
HGR (GAPI) 150

GAS (units) 50  
C1-C4 (PPM) 12000

BG 14u

ZERO FILMENTS

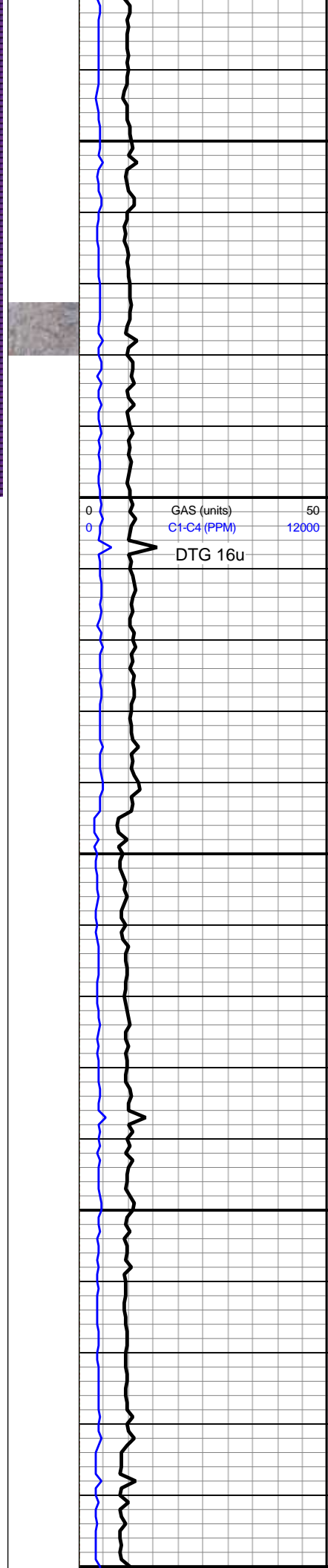
MW: 8.5  
VIS: 2k  
PV: 3  
YP: 2  
GELS: 1/2/1  
FIL: 9c  
CAKE: 1k  
SOL: 1.2  
H2O: 98.5  
PH: 8.5  
CHL: 1.20k  
CAL: 12k



DOL: CRM-LT TAN, FRM-HD, BRIT IP, CR XLN-OCC SUC, SM-SL RGH TXT; TRC CHT/QTS XLS: OPQ-TRNSL, OCC LT YL, HD-V HD, PRED AMOR; NFSOC

**LOST CIRCULATION @ 4800' MD**

**NO CIRCULATION**



WOB: 12.3  
SPM: 71

ROP (min/ft.) 5  
GAMMA (units) 100  
HGR (GAPI) 150

WOB: 11.7  
SPM: 71

WOB: 13.1  
SPM: 71

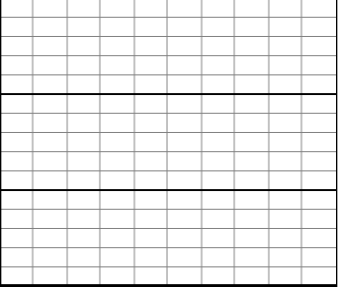
NO CIRCULATION

NO CIRCULATION

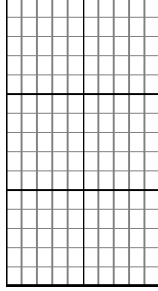
THE BOCK 3 SWD  
REACHED T.D @ 5156' ON  
1/12/2014 @ 22:30 HRS  
# SAMPLE BOXES: 7

GAS (units) 50  
C1-C4 (PPM) 12000

CG 9u



5,170  
5,180  
5,190  
5,200



LOGGERS RELEASED 1/13/2014  
THANK YOU FOR USING  
ALS EMPIRICA

