



**Radial Cement Bond Log  
Gamma Ray / CCL  
Temperature**

Company Antero Resources Corporation  
Well Niley Unit 3H  
Field Mountain  
County Ritchie  
State West Virginia

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Well Niley Unit 3H  
Field Mountain  
County Ritchie  
State West Virginia

Location: API #: 47-085-10252  
Latitude: 39.32291  
Longitude: -80.89909  
SEC TWP RGE  
Permanent Datum Ground Level Elevation 887 ft  
Log Measured From Kelly Bushing  
Drilling Measured From Kelly Bushing  
Other Services  
K.B. 911.5 ft  
D.F. 911.5 ft  
G.L. 887 ft

Date	9 - Jan - 2018	
Run Number	One	
Depth Driller	15,290 ft	
Depth Logger	7,032 ft	
Bottom Logged Interval	7,022 ft	
Top Log Interval	Surface	
Open Hole Size	na	
Type Fluid	Fresh Water	
Density / Viscosity	8.3 lb/g	
Max. Recorded Temp.	-	
Estimated Cement Top	-	
Time Well Ready	12:55	
Time Logger on Bottom	12:30	
Equipment Number	2611	
Location	Irw/In, Pa	
Recorded By	Blake Fenton	
Witnessed By	Bobby Thomas	
Borehole Record		
Run Number	Bit	From To
		Size Weight From To
Tubing Record		
Casing Record	Size	Wd/Ft
Surface String	13 3/8 in	48 lbs/ft
Prot. String	9 5/8 in	36 lbs/ft
Production String	5 1/2 in	23 lbs/ft
Liner		
		Top Bottom
		Surface 572.5 ft
		Surface 2,532.5 ft
		Surface 15,290 ft

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

**Comments**

Caliper tool centralized with three inline bowspring centralizers  
 Logged from 7,022 ft to 5,625 ft  
 Tool zeroed at ground level and corrected 24.5 ft to KB  
 Marker Joint detected from 6,006 ft to 6,016 ft  
 Casing tally denotes marker joint from 6,003 ft to 6,013 ft  
 Airlock: 5.2"  
 Marker Joint: 4.58"

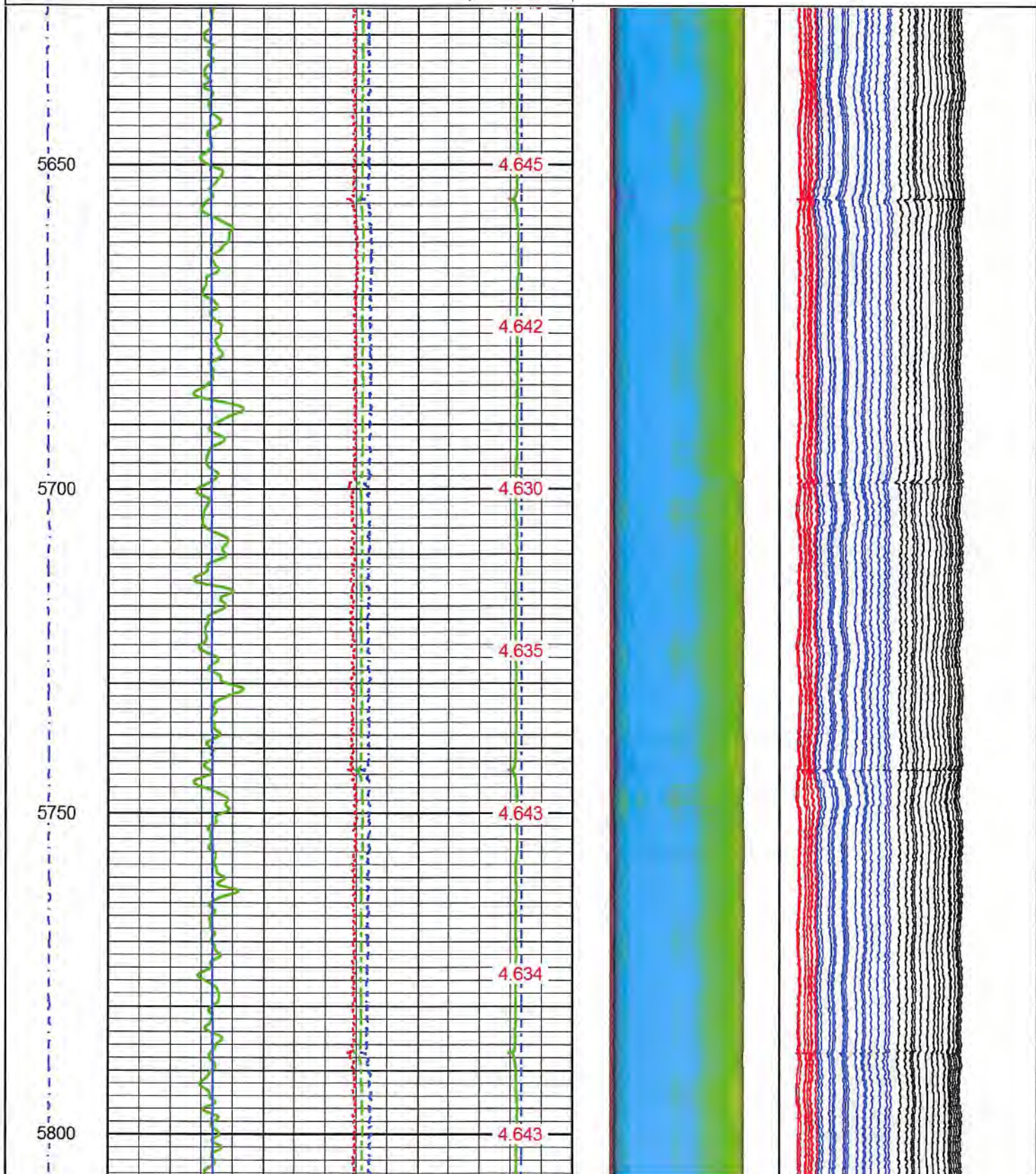


**Multi Arm Caliper Presentation 1**

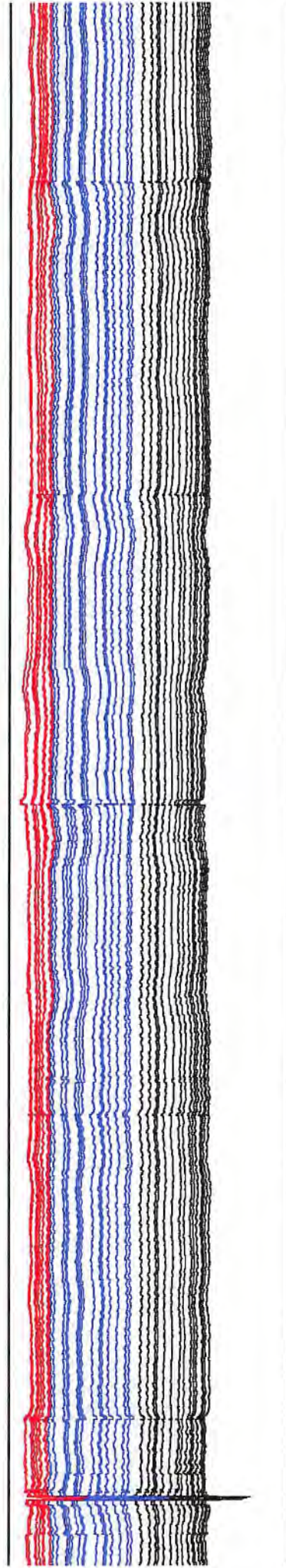
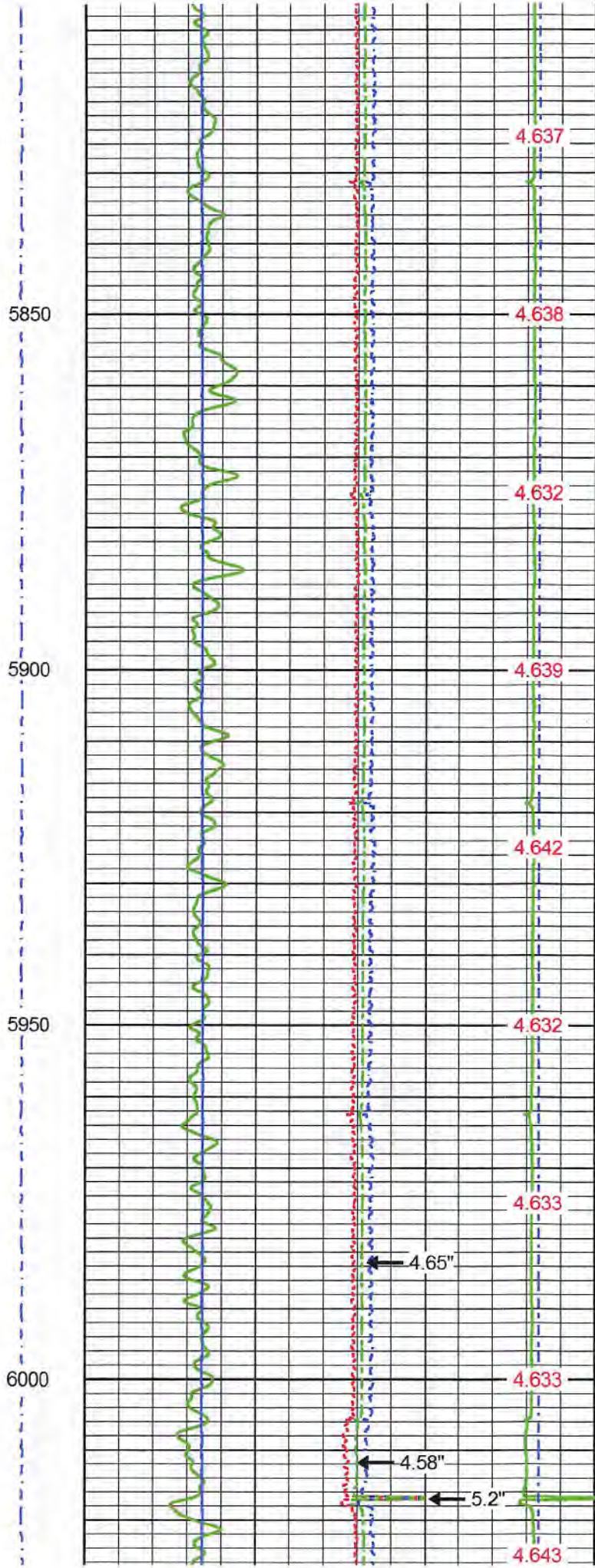
Scale 1:240

Database File niley 3h mac 40 01092018.db  
 Dataset Pathname MAC40/pass5  
 Presentation Format ahws\_mac  
 Dataset Creation Tue Jan 09 13:37:43 2018  
 Charted by Depth in Feet scaled 1:240

LTEN	0	GR (GAPI)200	4	MIN ID (in)	5	4	IDAV (in)	5	3D IMAGE (in)	1.198	R15 (in)	3.698
0	(lb2500)	90 DEVI (deg)	0	MAX ID (in)	5		NOMINAL ID		(in)	3.84	R30 (in)	4.298
				AVG ID (in)	5	4	(in)	5			R01 (in)	3.138
							IDAV (in)					









6050

6100

6150

6200

4.65"

4.640

4.640

4.646

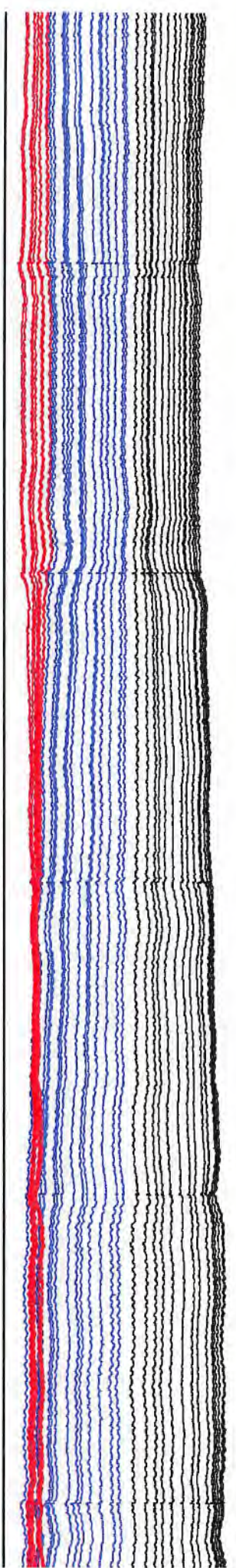
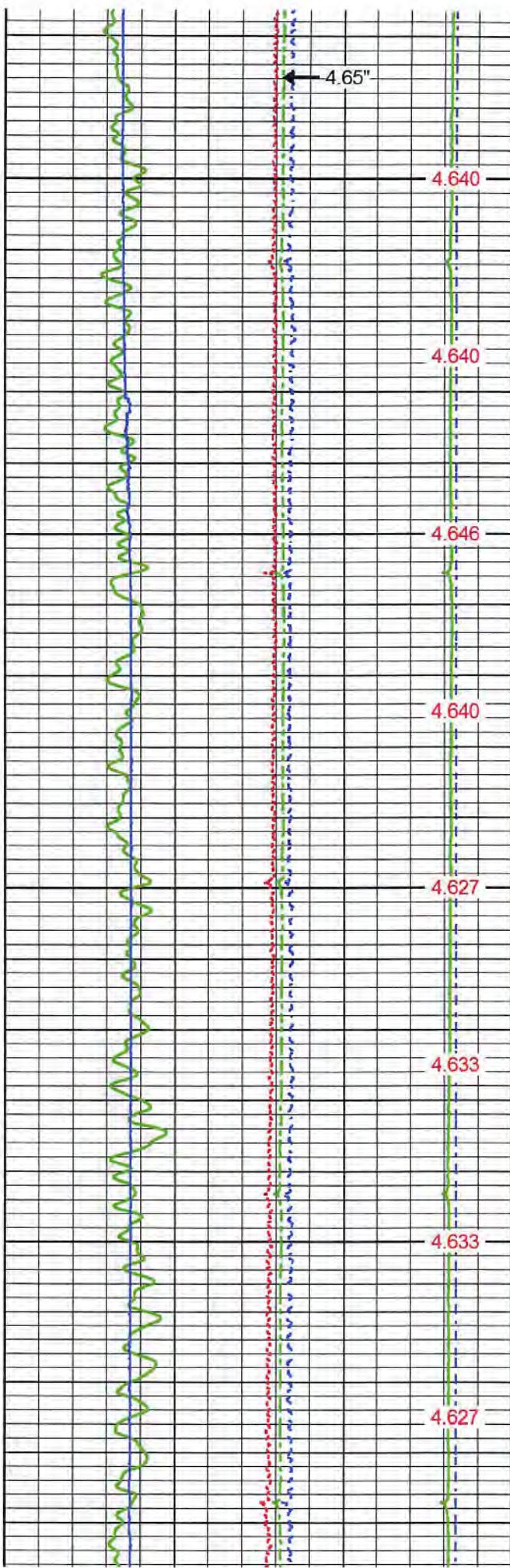
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4.627

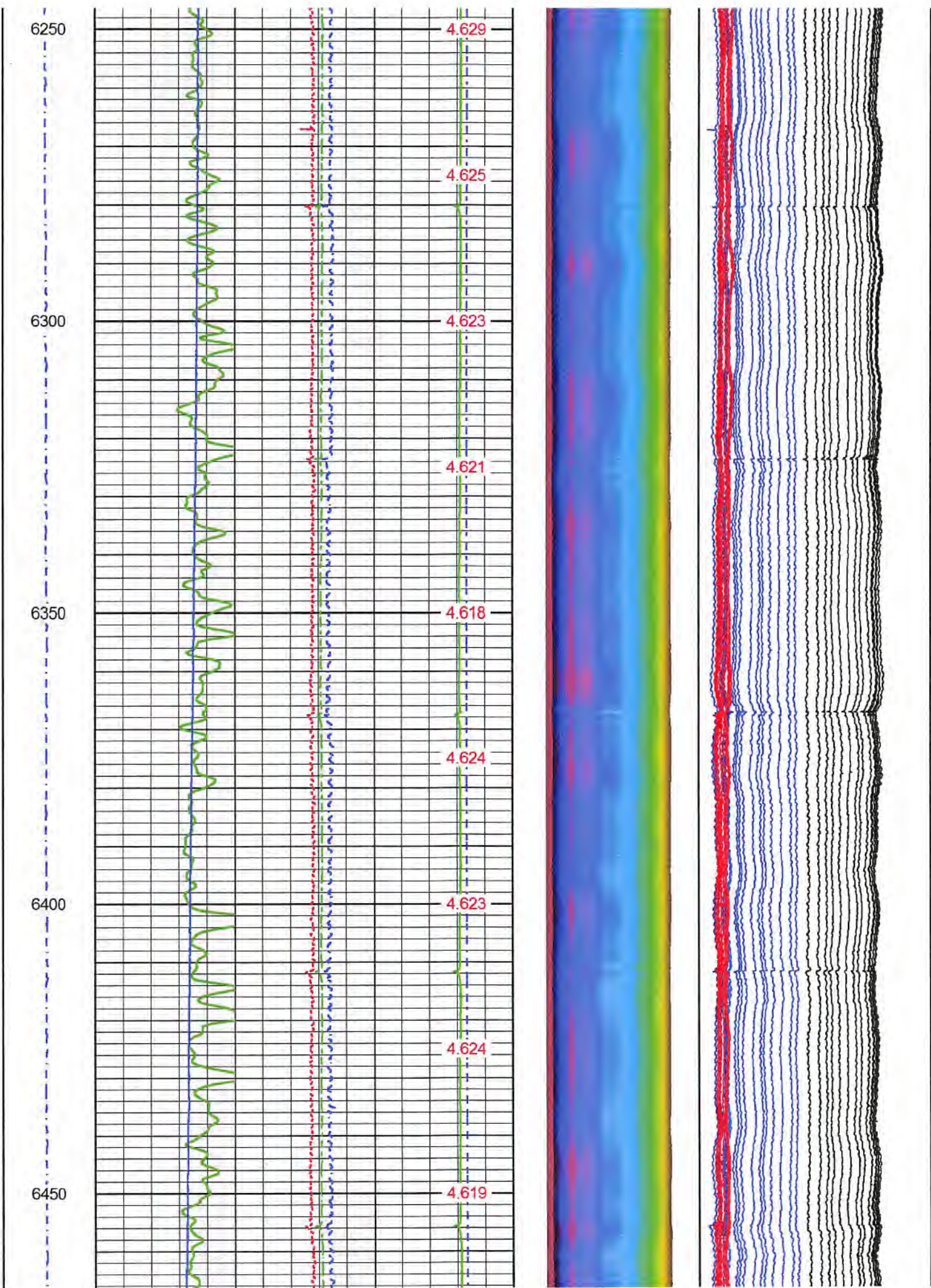
4.633

4.633

4.627

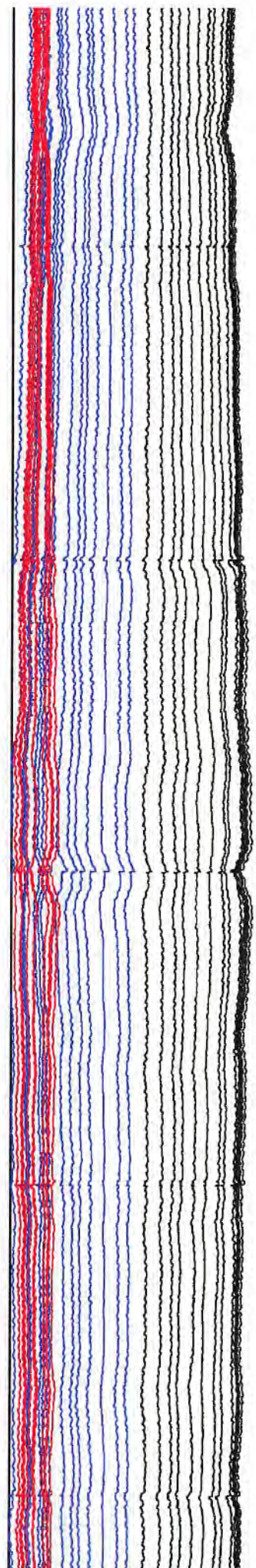
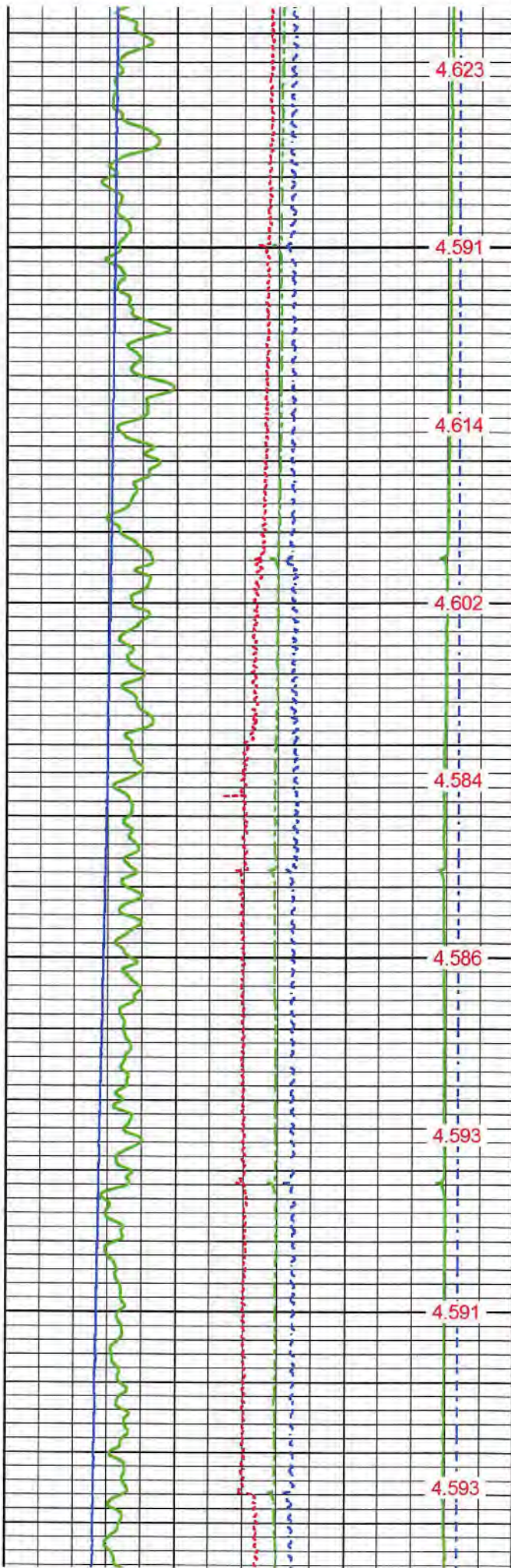




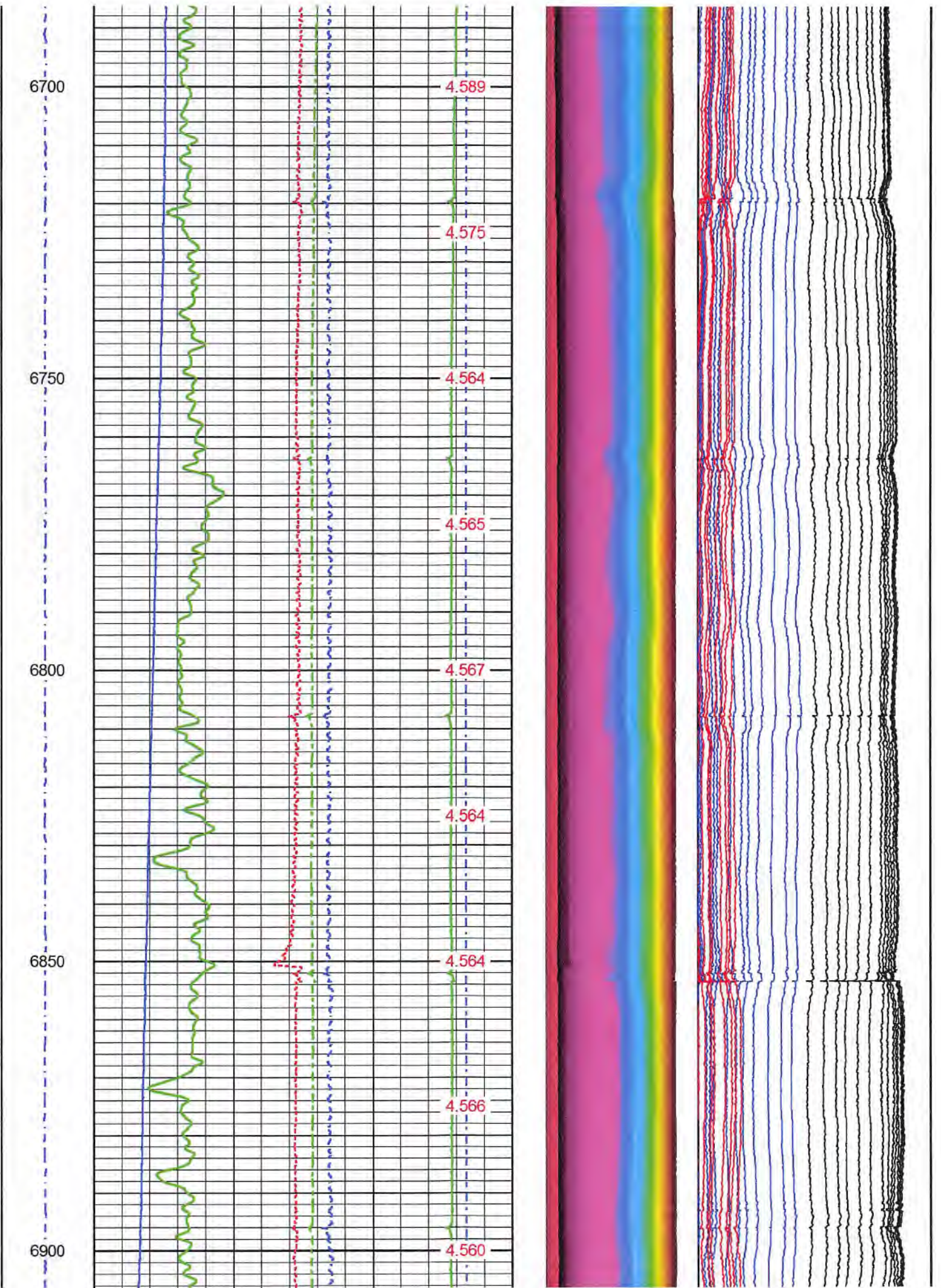




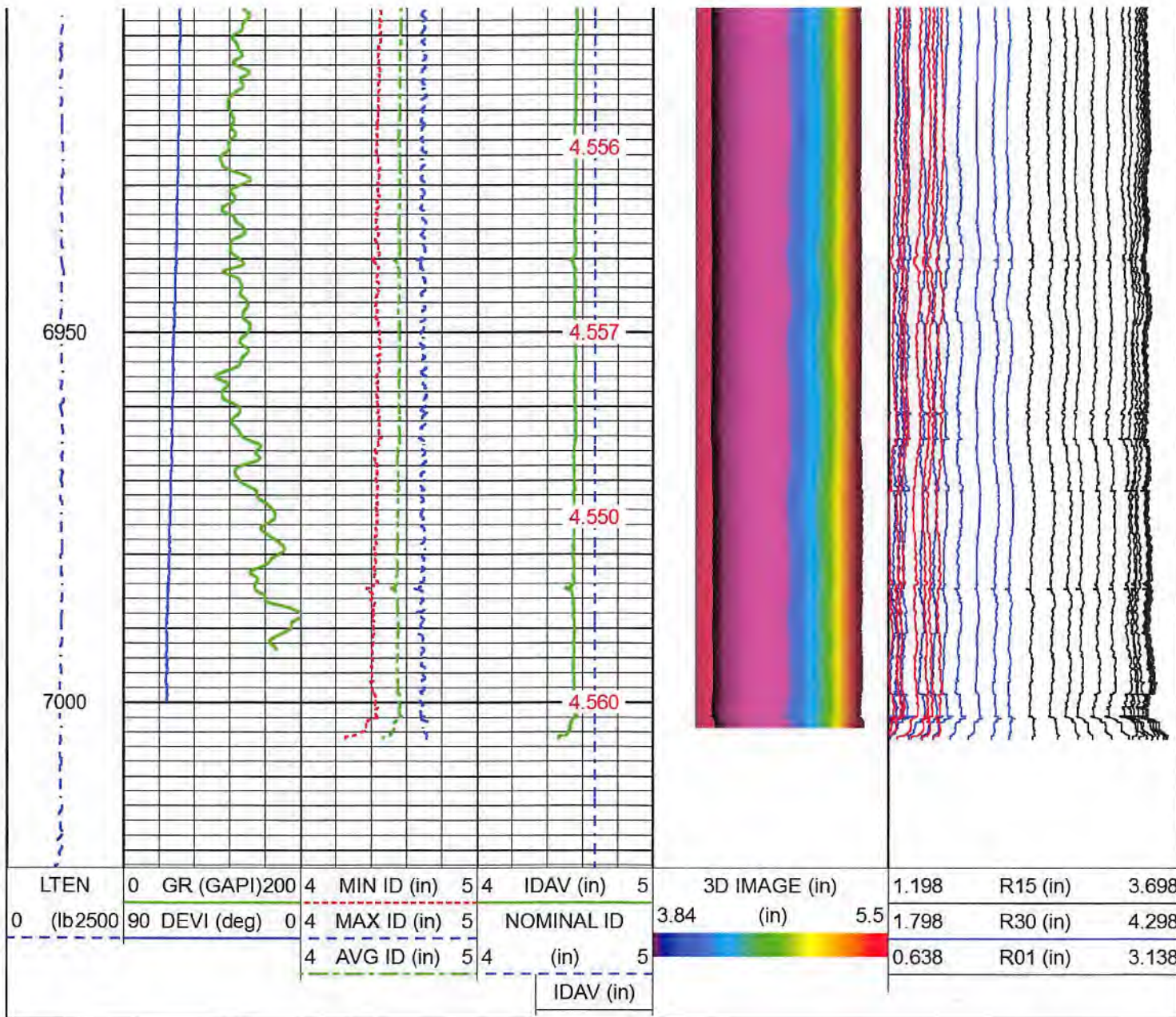
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6550  
6600  
6650












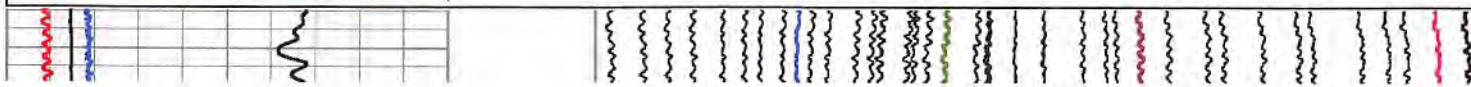


## Multi Arm Caliper 40 Presentation 2

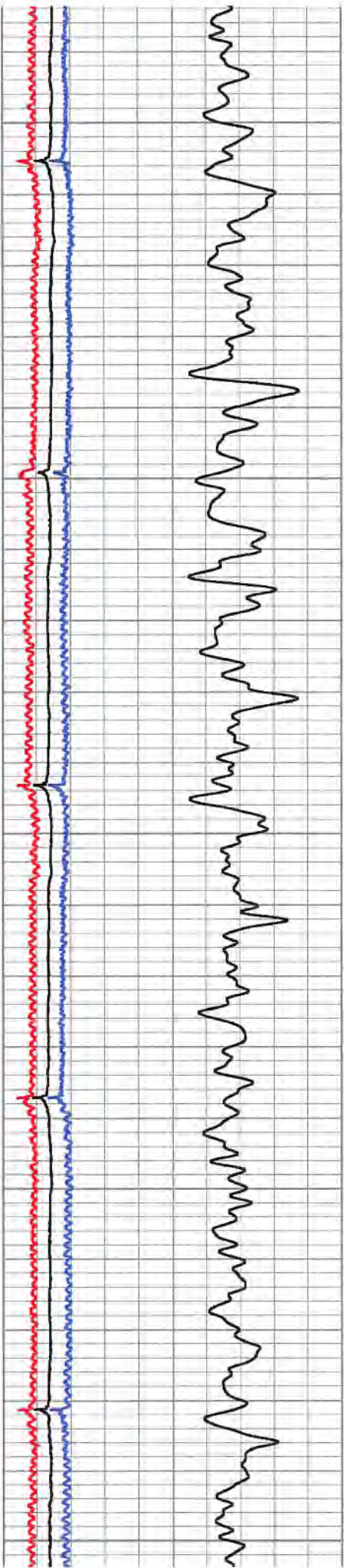
Scale 1:240

Database File: niley 3h mac 40 01092018.db  
 Dataset Pathname: MAC40/pass2nd  
 Presentation Format: ptsmfc40  
 Dataset Creation: Tue Jan 09 14:32:27 2018  
 Charted by: Depth in Feet scaled 1:240

4.5	IDMX (in)	5.5	2.4375	R01 (in)	4.9375
4.5	IDMN (in)	5.5	1.875	R10 (in)	4.375
4.5	IDAV (in)	5.5	1.25	R20 (in)	3.75
0	LSPD (ft/min)	100	0.625	R30 (in)	3.125
0	GR (GAPI)	200	0	R40 (in)	2.5
0	DEVI (deg)	0.2			







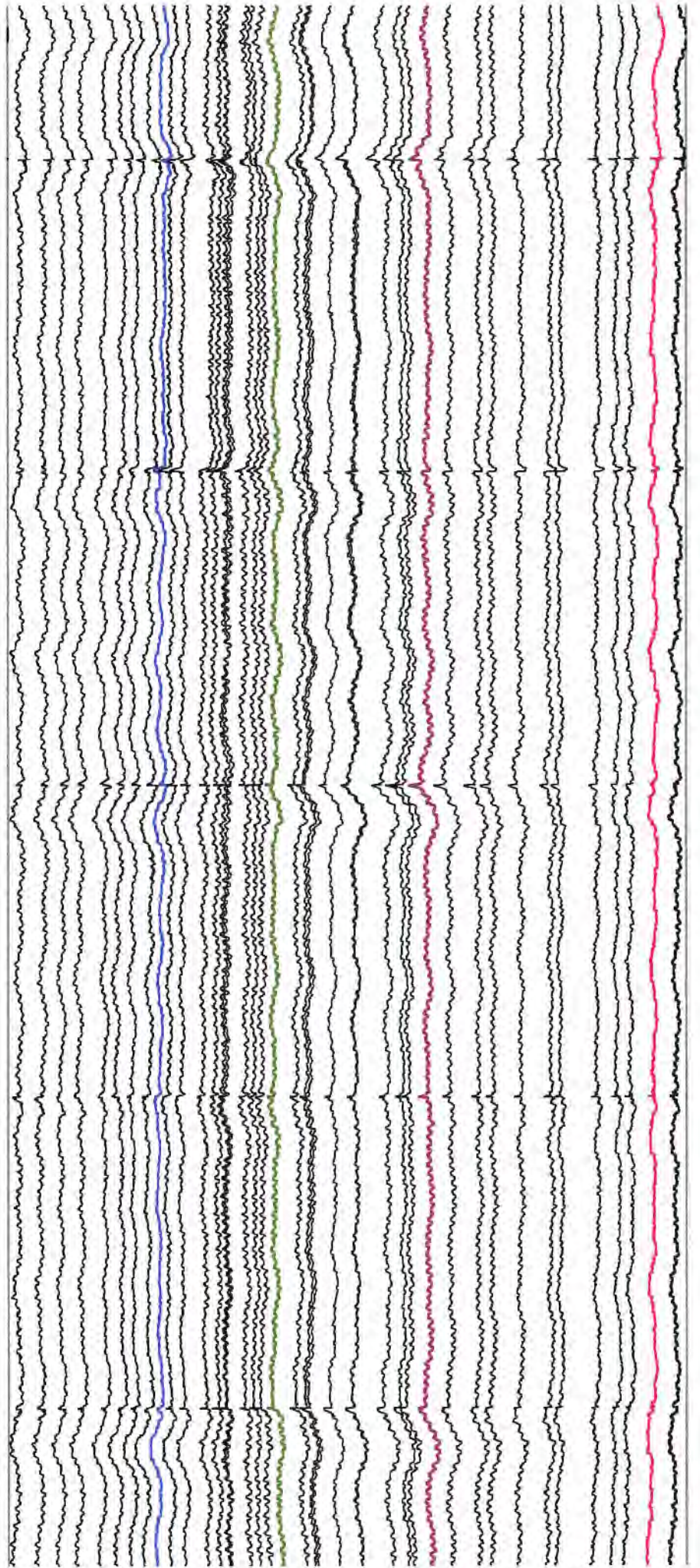
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5700

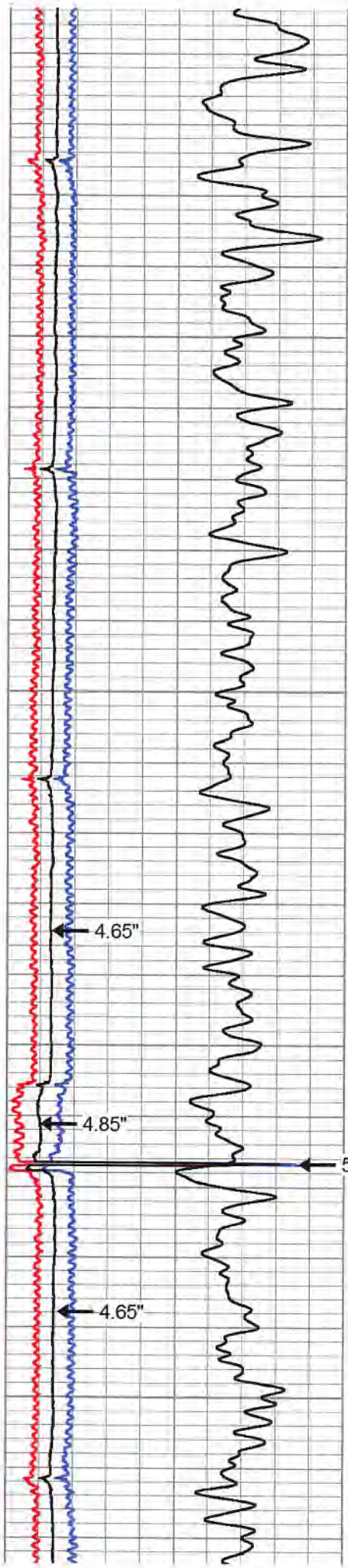
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5800

5850





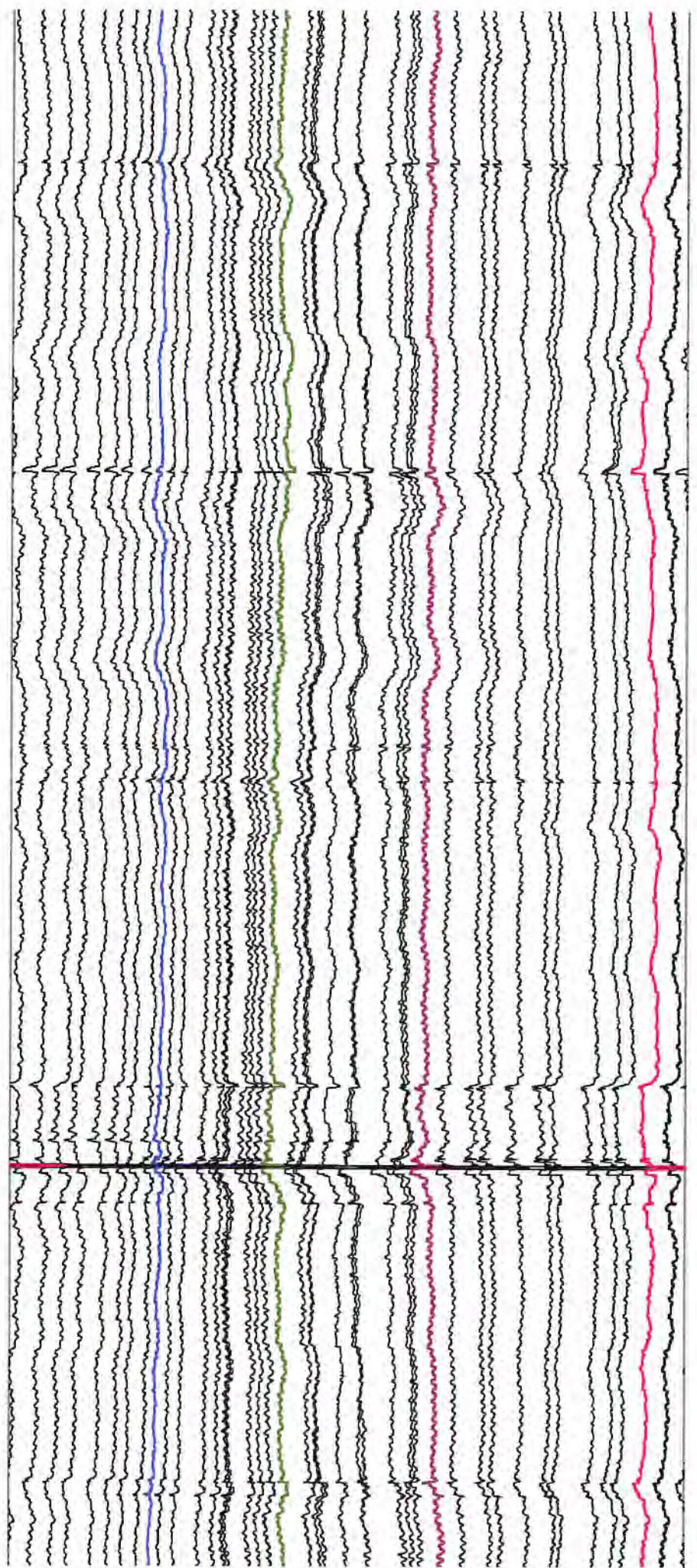


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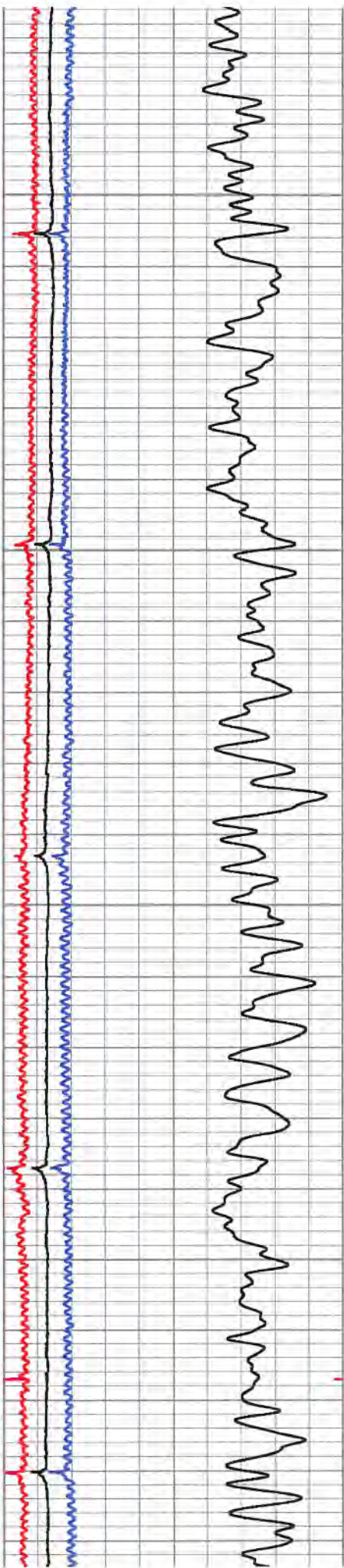
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6000

6050





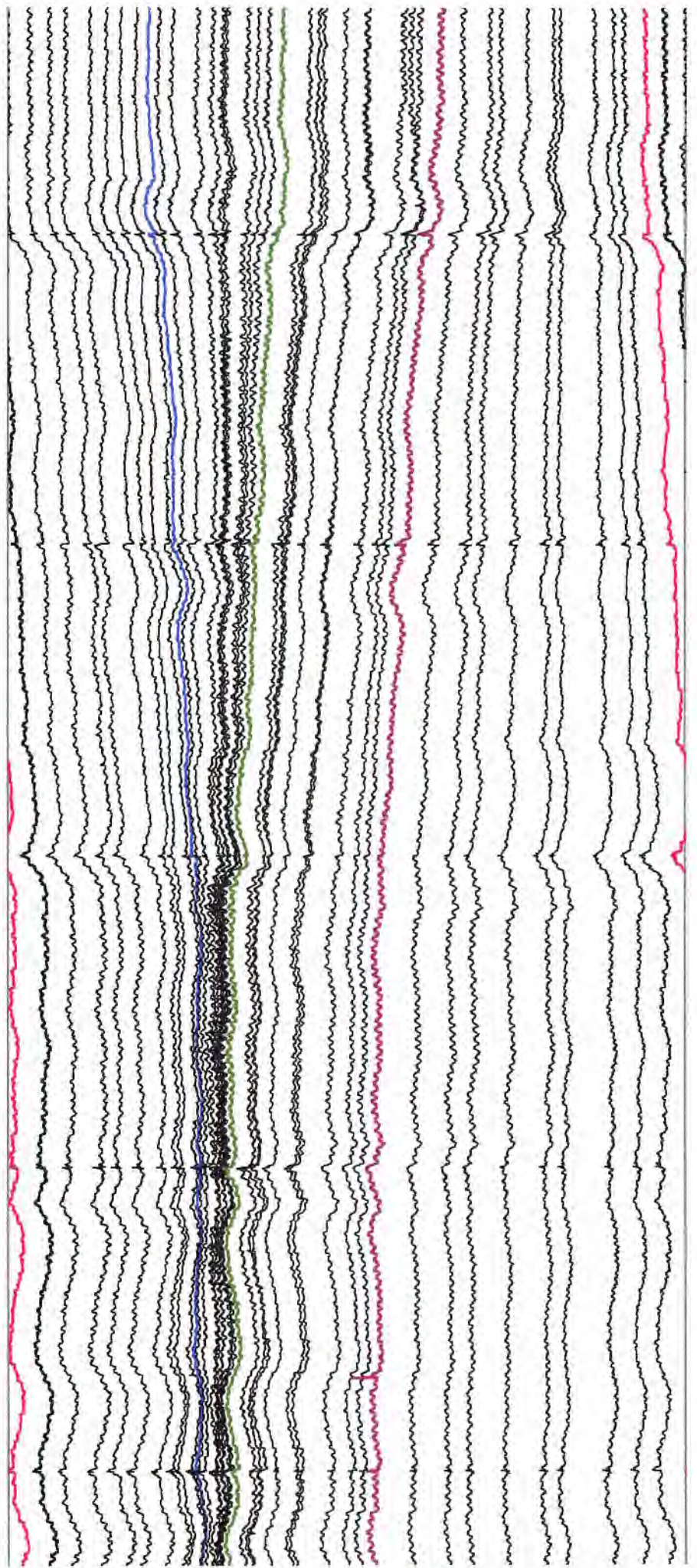


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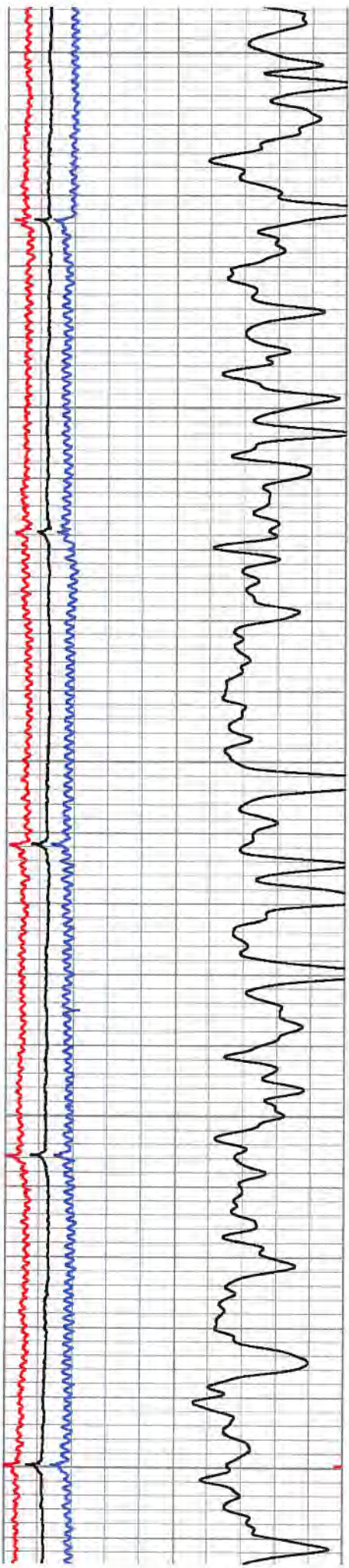
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6200

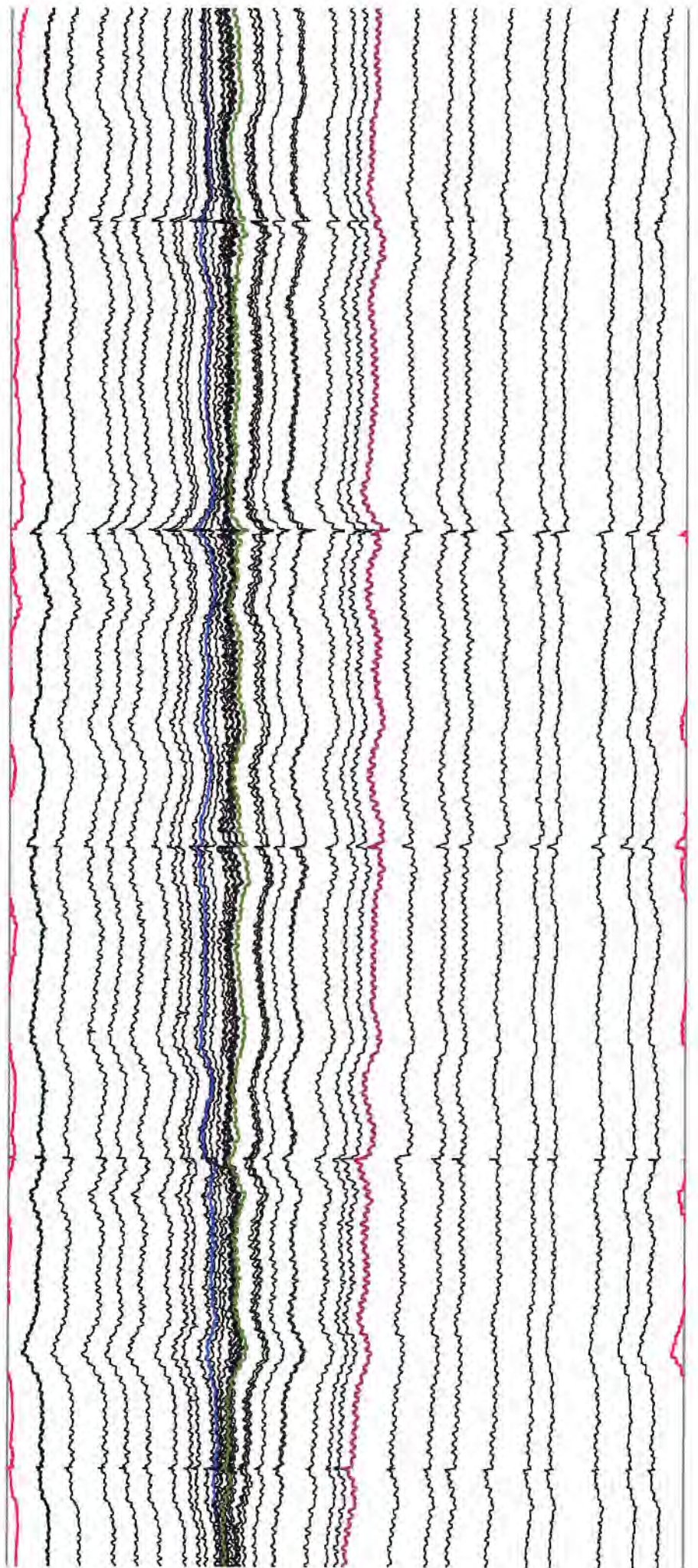
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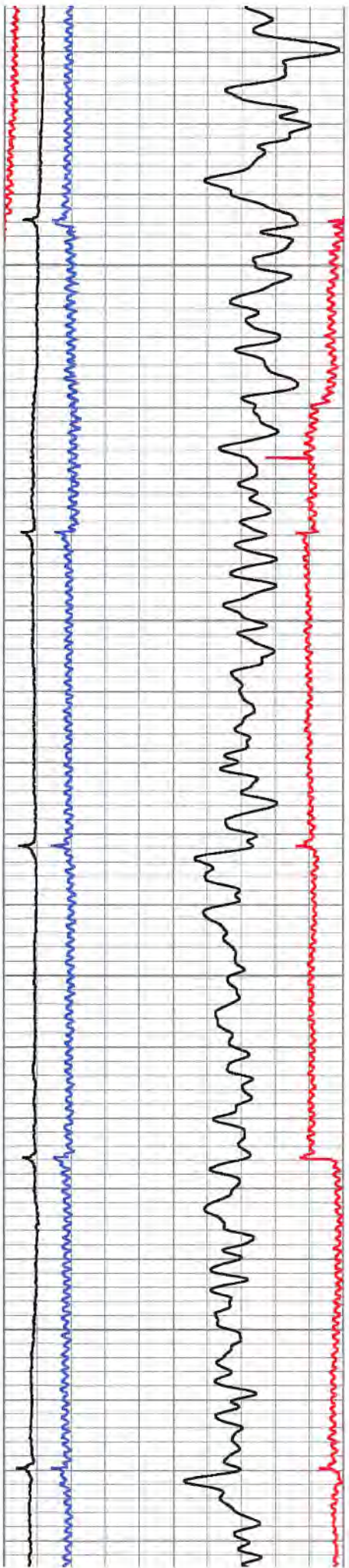




6300  
6350  
6400  
6450  
6500





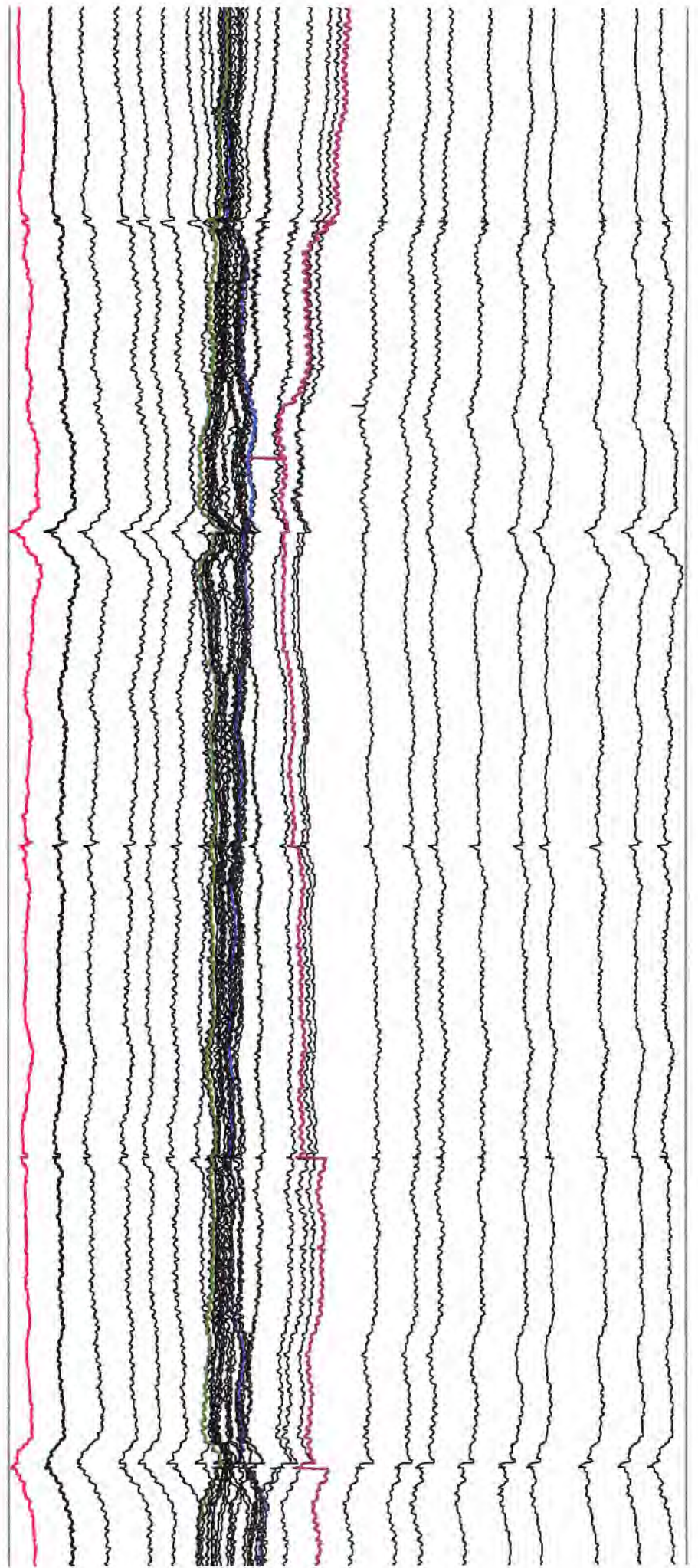


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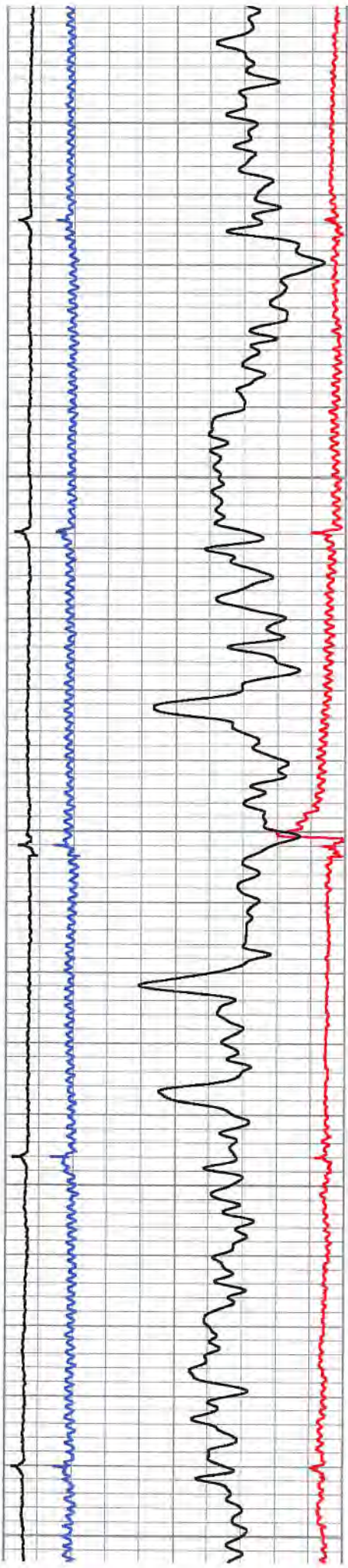
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6650

6700







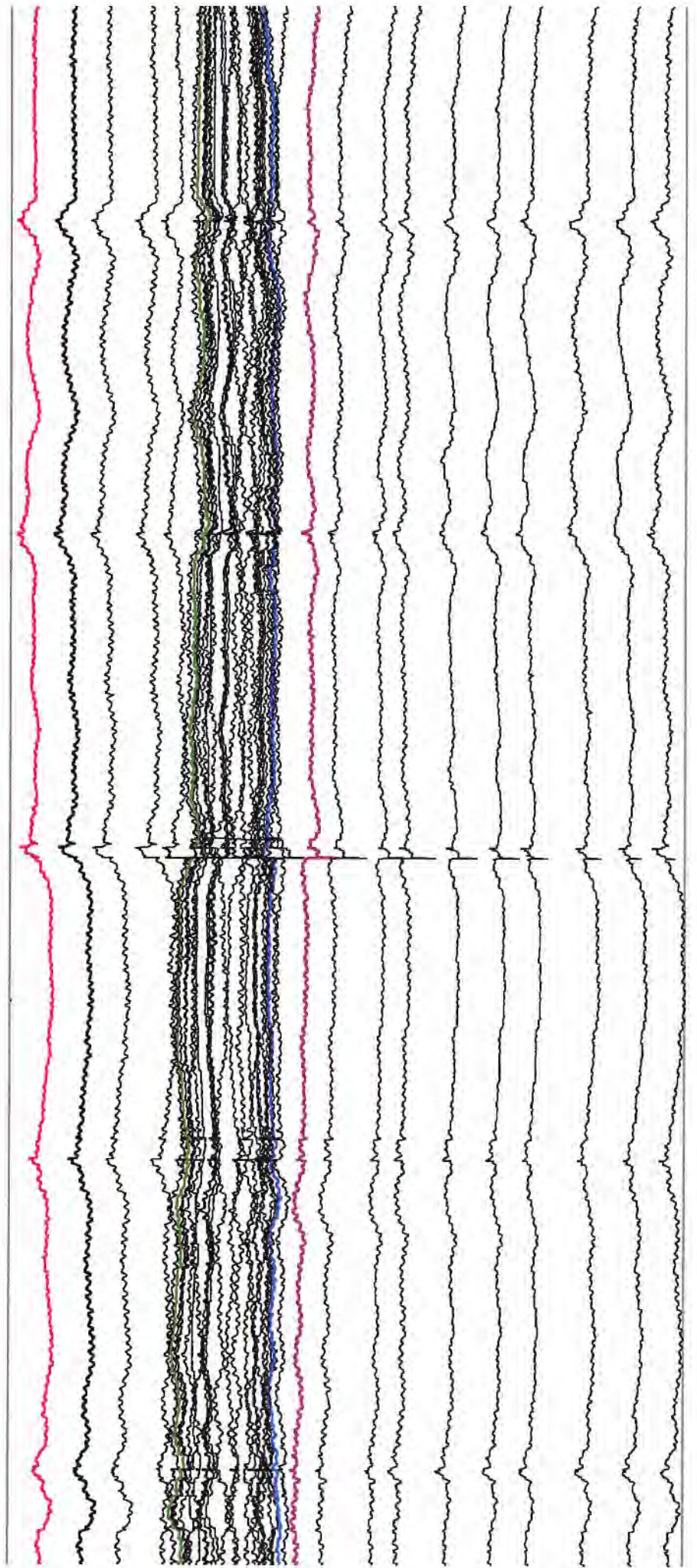
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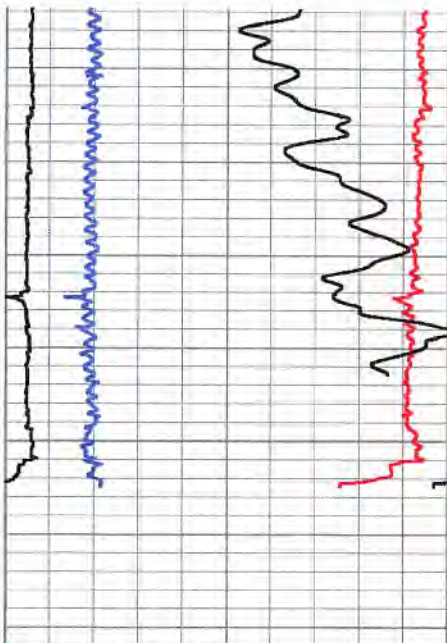
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6900

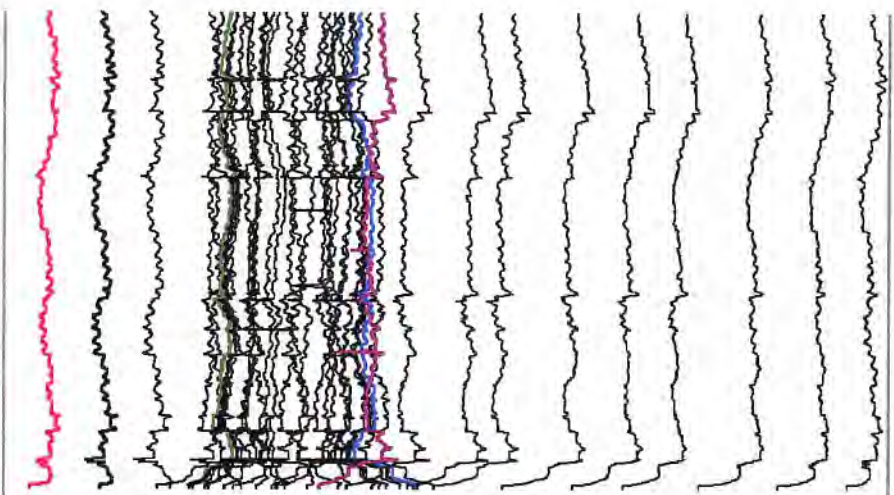
6950







7000



4.5	IDMX (in)	5.5
4.5	IDMN (in)	5.5
4.5	IDAV (in)	5.5
0	LSPD (ft/min)	100
0	GR (GAPI)	200
0	DEVI (deg)	0.2

2.4375	R01 (in)	4.9375
1.875	R10 (in)	4.375
1.25	R20 (in)	3.75
0.625	R30 (in)	3.125
0	R40 (in)	2.5

**Log Variables** DatabaseC:\ProgramData\Warrior\Data\niley 3h mac 40 01092018.db  
Dataset field/well/MAC40/pass2nd/\_vars\_

**Top - Bottom**

BHTEMP_Src	BOREID in	BOTTEMP degF	CASEID in	CASEOD in	CASETHCK in	CASEWGHT lb/ft	MAXAMPL mV
TEMP	7.875	121	4.67	5.5	0.415	23	72
MINAMPL mV	MinAPIWall in	MINATTN db/ft	PERFS	PPT usec	SRFTEMP degF	TDEPTH ft	
1	0	0.8	0	260	1	7022	

**Variable Description**

BHTEMP\_Src : BHTEMP Input Source Selector  
 BOREID : Borehole I.D.  
 BOTTEMP : Bottom Hole Temperature  
 CASEID : Casing I.D.  
 CASEOD : Casing O.D.  
 CASETHCK : Casing Thickness  
 CASEWGHT : Casing Weight  
 MAXAMPL : Maximum Amplitude  
 MINAMPL : Minimum Amplitude  
 MinAPIWall : Minimum API Wall Thickness  
 MINATTN : Minimum Attenuation  
 PERFS : Perforation Flag  
 PPT : Predicted Pipe Time  
 SRFTEMP : Surface Temperature  
 TDEPTH : Total Depth

**Calibration Report**

Database File niley 3h mac 40 01092018.db  
 Dataset Pathname MAC40/pass2nd  
 Dataset Creation Tue Jan 09 14:32:27 2018

**40 Arm Multi Sensor Caliper Calibration Report**

Serial Number: FW-1408-123  
 Tool Model: ProbeMAC40



Ref ID:	7.00	6.00	5.00	4.00	3.00	in
Arm1	9305.00	13943.00	18332.50	22380.00	25993.00	
Arm2	10700.00	15826.50	20538.50	24782.00	28498.00	
Arm3	5536.50	8333.00	11935.00	15788.50	19437.50	
Arm4	8607.00	13919.00	18803.50	23270.00	27117.50	
Arm5	4658.50	8231.50	12408.00	16849.50	21003.50	
Arm6	4680.50	7714.00	10978.00	14414.00	17827.00	
Arm7	4880.00	7699.00	11035.00	14677.00	18458.50	
Arm8	4840.00	9249.00	13884.50	18386.00	22267.00	
Arm9	4919.00	7785.50	10755.00	13888.00	17131.00	
Arm10	4973.00	8970.00	13217.00	17443.50	21227.00	
Arm11	4858.50	8521.00	12904.50	17332.50	21359.50	
Arm12	10115.00	15210.00	19910.50	24172.00	27754.00	
Arm13	4492.50	7426.00	10711.50	14257.50	17864.00	
Arm14	4421.00	7609.50	11065.00	14665.50	18183.00	
Arm15	6122.00	9509.00	12981.50	16438.00	19807.00	
Arm16	9007.50	14083.00	18751.50	22895.00	26453.00	
Arm17	4976.00	8468.50	12655.00	16954.00	20842.50	
Arm18	5261.00	9548.00	14111.00	18470.00	22542.50	
Arm19	7509.00	12345.00	16943.50	21137.50	24824.00	
Arm20	4342.50	7764.00	11862.00	15978.50	19788.50	
Arm21	4498.00	6973.00	9853.50	12887.50	16079.50	-
Arm22	10383.50	14767.00	18620.00	22262.00	25473.50	-
Arm23	10083.50	15041.50	19693.00	23875.00	27519.00	-
Arm24	4726.00	7928.50	11824.50	15983.00	20079.50	-
Arm25	4821.00	7413.00	10403.50	13525.00	16825.00	-
Arm26	6434.50	11565.00	16573.00	20979.00	24989.50	-
Arm27	4863.50	7716.00	11017.00	14414.50	17969.00	-
Arm28	4941.00	8035.50	11332.00	14710.00	18345.00	-
Arm29	9470.00	14356.00	19018.00	23240.50	27082.00	-
Arm30	8370.50	12958.00	17441.00	21379.50	25031.50	-
Arm31	9857.00	14690.50	19253.00	23323.50	27106.50	-
Arm32	4514.50	7486.50	10685.50	13901.00	17382.00	-
Arm33	8921.00	13939.00	18765.50	23065.50	26958.50	-
Arm34	4895.00	7898.00	10922.50	13881.00	17001.00	-
Arm35	4838.00	7625.00	10642.00	13743.50	17033.00	-
Arm36	5756.50	9600.50	13935.50	18049.50	21946.50	-
Arm37	6045.00	9037.50	12234.00	15656.00	19357.50	-
Arm38	4890.50	7753.00	10749.00	13836.00	17138.00	-
Arm39	9158.00	14148.00	18967.00	23399.50	27390.50	-
Arm40	7883.50	12964.00	17820.00	22205.00	26038.00	-

\* Bad

PROBE verifications Calibration Report

Performed:	Pre Verification	Post Verification	Casing Check	
Ref ID:	0.00	0.00	0.00	in
Min.	0.00	0.00	0.00	in
Max.	0.00	0.00	0.00	in
Avg.	0.00	0.00	0.00	in
Dia1	0.00	0.00	0.00	in
Dia2	0.00	0.00	0.00	in
Dia3	0.00	0.00	0.00	in
Dia4	0.00	0.00	0.00	in
Dia5	0.00	0.00	0.00	in
Dia6	0.00	0.00	0.00	in
Dia7	0.00	0.00	0.00	in
Dia8	0.00	0.00	0.00	in
Dia9	0.00	0.00	0.00	in
Dia10	0.00	0.00	0.00	in
Dia11	0.00	0.00	0.00	in




Dia12	0.00	0.00	0.00	in
Dia13	0.00	0.00	0.00	in
Dia14	0.00	0.00	0.00	in
Dia15	0.00	0.00	0.00	in
Dia16	0.00	0.00	0.00	in
Dia17	0.00	0.00	0.00	in
Dia18	0.00	0.00	0.00	in
Dia19	0.00	0.00	0.00	in
Dia20	0.00	0.00	0.00	in

### Inclinometer Calibration Report

Performed:	Tue Jan 09 08:05:15 2018				
	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	-3620.00	3604.00	-1.00	1.00	gee
Y Accelerometer	-3722.00	3466.00	-1.00	1.00	gee
Z Accelerometer	60.13	3615.38	0.00	1.00	gee

### Gamma Ray Calibration Report

Serial Number:	275		
Tool Model:	Probe		
Performed:	Thu May 09 12:03:43 2013		
Calibrator Value:	1.0	GAPI	
Background Reading:	0.0	cps	
Calibrator Reading:	1.0	cps	
Sensitivity:	1.0000	GAPI/cps	

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			CHD-STNDRD (GOI) Standard Cable Head	1.00	1.69	10.00
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00
CCL	30.01		GR-Probe (275) Probe 2.75" 4 Channel Pulse	4.92	2.75	55.00
GR	27.27		Adaptor-6-1 6 to 1 adaptor	0.28	2.75	2.00
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00
ACCZ ACCY	21.30 21.30					



ASST	21.00		MAC40-ProbeMAC40 (FW-1408-123) 40 arm Caliper	6.91	2.75	71.00
ACCX	21.30					
ETEMP	19.63					
Meas	17.34					
			Knuckle-1.55 GO style	0.71	1.55	2.00
			Knuckle-1.55 GO style	0.71	1.55	2.00
			CENT-Probe275 Probe 2.75" 4 Arm Bow Spring Centralizer	2.88	1.69	36.00
			Sinker-1.5 5' Sinker	5.00	1.50	20.00
			Sinker-1.7" 7' Sinker	7.00	1.70	30.00

Dataset: niley 3h mac 40 01092018.db: field/well/MAC40/pass2nd  
 Total length: 35.17 ft  
 Total weight: 300.00 lb  
 O.D.: 2.75 in

	Company	Antero Resources Corporation	
	Well	Niley Unit 3H	
	Field	Mountain	
	County	Ritchie	
	State	West Virginia	Country