



Pauline de Jong  
Regulator  
Office of the Regulator of Oil and Gas Operations  
PO Box 1320, Yellowknife, NWT X1A 2L9

June 2, 2023

Dear Pauline de Jong:

**Re: Information Request No. 1, South Pointed Mountain L-68 Well Abandonment (ACW-2021-PPR-L-68-WID1207) – Prairie Provident Resources**

Please find attached the requested information and subsequent documentation in support of the proposed abandonment program that will satisfy section 6A of the Well Suspension and Abandonment Guidelines and Interpretation Notes. The geological information in the Background section below was provided by Tristan Eshuis, Geologist for Prairie Provident Resources.

**Background:**

Well completions operations took place in the fall of 2011. On 10/7/2011 a Production Spinner Log was run by Boreal Wireline while the well was flowing to attempt to determine how much flow was coming from either zone (Exshaw and Muskwa). The spinner log made three up and three down passes at 30, 20 & 10 minute intervals between 3850 & 3250 m. Station stops were also made at 3835 m, 3775 m, 3380 m & 3340 m. See attached document L-68 Spinner Log.pdf.

From this data, it is clear that at ~3374 m (Weatherford Frac Port at the Exshaw perforations) there is no production response (Pages 7 & 17 of the L-68 Spinner Log), indicating a very 'tight' zone with very low permeability and flow capacity. There is however a significant change of readings at ~3814 m (Weatherford Frac Port at the Upper Muskwa perforations) on (Pages 12 & 29 of L-68 Spinner Log). This indicates some permeability and ability for flow capacity and injection.

The next example is of rock quality in the attached document, L-68 Rock Properties.pdf, which is a summary of testing for Shale Rock Properties from Weatherford Laboratories performed on 3/15/2010. Sample ID 16 is representative of the Exshaw formation with a measured permeability is  $2.82 \text{ E}^{-5}$  md, which is exceptionally 'tight' and not permeable. Sample ID 20 is representative of the Muskwa formation with a measured permeability of  $1.46 \text{ E}^{-4}$ , which is more permeable than the Exshaw.

The third piece of evidence is from a Thin Section Description and Scanning Electron Microscope images of the Exshaw Formation performed by Weatherford Laboratories (Exshaw Petrographic Study – Samples from 3360 - 3370 m.pdf). Referring to Page 5, the description talks about "Hydrocarbon incompletely occludes the intercrystalline spaces between chert crystals" which is Image F on Page 7. This means that there is virtually no permeability. On Page 7, the description states, "Nano-sized pores occur within the hydrocarbon material but are erratically distributed and are poorly interconnected." This means there is porosity is also low and not interconnected as evident from Images I & J on Page 8. From these pictures and descriptions, it can be summarized that the Exshaw Formation has very low permeability and porosity.



**Summary:**

IR1 requests to ensure independent isolation of the Exshaw and Muskwa zones. From the Background information, the Exshaw formation has low porosity and permeability in relation to the Muskwa. By performing a retainer squeeze of ~12T of cement through a cement retainer positioned above the Exshaw perforations, the desired zonal isolation between the Exshaw and Muskwa formations will be achieved as the Muskwa perforations will take the majority of the cement due to being more permeability and having a higher porosity. The Exshaw formation will still receive cement to squeeze off the zones while also filling all of the void spaces below the cement retainer between the packers with cement. The abandonment plan also calls for leaving 50 m of cement on top of the cement retainer for further isolation.

A cement bond log of the 177.8 mm Liner was completed on 4/11/2011. As per the attached report, Lone Pine L-68 Cement Bond Log Report, it is noted that the entire intermediate hole section from 3237.8 m to 4130 m contains good cement bond between formation and casing. Gas migration in the liner hole section will not be a concern due to the quality of cement bond and is another contributing factor to pumping one cement squeeze and being able to fully isolate the 177.8 mm liner and formations.

In addition, steps in the attached abandonment program, Rev. 1 have been taken to abandon the liner top packer (Step #25) to comply with section 6A.

Also, a detailed wellbore schematic is included with this package.

Regards,

*Jeremy Sadleir*

Jeremy Sadleir, P.L. (Eng.)  
Completions Engineer

**SHALE ROCK PROPERTIES - CUTTINGS**  
**SUMMARY OF ROUTINE CRUSHED CORE ANALYSES RESULTS**

Vacuum Dried at 212°F

Canadian Forest Oil Ltd.  
L-68-60-20-123-45 Canada  
ONSHORE Canada

CL-45776  
03-15-10

Sample ID	Top Depth, meters	Bottom Depth, meters	Dry Press Decay Permeability, md	Dry Bulk Density, gm/cc	Dry Grain Density, gm/cc	Dry Helium Porosity, % of BV
3	2110-2115	2115-2120	1.95E-05	2.31	2.70	14.5
5	2255-2260	2260-2265	1.74E-04	2.46	2.72	9.6
8	2495-2500	2500-2505	2.86E-05	2.41	2.75	12.4
10	2720-2725	2725-2730	4.57E-04	2.47	2.77	10.8
13	3060-3065	3065-3070	2.27E-05	2.52	2.78	9.1
16	3360-3365	3365-3370	2.82E-05	2.47	2.58	4.3
17	3390-3395	3395-3400	1.20E-05	2.43	2.62	7.1
20	3775-3780	3780-3785	1.46E-04	2.48	2.71	8.5
23	3935-3940	3940-3945	1.12E-04	2.27	2.64	13.8
26	4035-4040	4040-4045	5.07E-05	2.44	2.67	8.6
Average values:			1.05E-04	2.43	2.69	9.9

The cutting samples were crushed to < 3mm and all analysis reported herein were conducted on the crushed material.



Previous Well Information	
Depth Control Log	Encore CBL Log Dated Sept 4, 2011
Perforated	
Bridge Plug Set At	
Cement Retainer Set At	
Production Packer Set At	

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 interpretations, 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 as set out in our current price schedule.

Tubing Pressure 10112kpa. Turned well on to flow 50.8mm choke at 5:00. At 5:05 tubing pressure 190kpa. Flowing Fluid only. RIH with Wireline. Start Log at 10:00. 11:00 Tubing Pressure 324kpa, Total fluid gain of 3.5m3. 12:00 tubing pressure 412kpa, Fluid gain of 1.6m3 with gas rate of 1.18. 13:00 tubing pressure 260kpa, Fluid gain of 3.1m3 with gas rate of 0.48. 14:00 tubing pressure 256kpa, Fluid gain of 2.7m3 with gas rate 0.41. Station stop #1 at 3825.0 (13:42), #2 at 3775.0 (13:55), #3 at 3380.0 (14:16), #4 at 3340.0 (14:32). 14:45 Turn off well from flowing. 15:15 start logging 30min, 60min, and 90min shut in passes.

# Tool String Configuration

Max. Length: 3.16 m

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## Cable Head

Length: 0.40 m      Max Diameter: 36.51 mm

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## Lee Specialties Telemetry

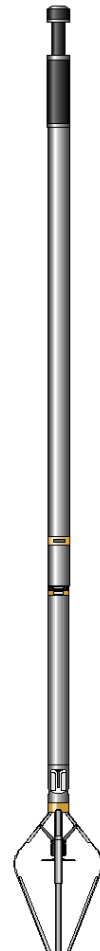
Length: 1.51 m      Max Diameter: 34.93 mm

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## Lee Specialties PTF Spinner

Length: 1.25 m      Max Diameter: 34.93 mm

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— -0.65 m - Top of String

— 0.00 m - CCL

— 0.95 m - Gamma Ray

— 1.84 m - Pressure

— 1.92 m - Temperature

— 2.18 m - Flow

## Trace Summary

Name	Units	Track	Chart Left	Chart Right	Channel	Gain	Shift	Filter	Coeff	Depth Offset(m)	Time Sample
Tension_U8	lbF	1	0	1500	NA	1	0	Butterworth	1.2	0	NA
Temperature 30m/min down	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 30m/min down_D2	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 30m/min down_D2	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5
Temperature 30m/min up_U	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 30m/min up_U4	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner Reverse 30m/min	RPS	2	20	0	5	1	0	Butterworth	0.2	2.07	1.5
Temperature 20m/min down	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 20m/min down_D5	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 20m/min down_D5	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5
Temperature 20m/min up_U	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 20m/min up_U6	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner Reverse 20m/min	RPS	2	20	0	5	1	0	Butterworth	0.2	2.07	1.5
Temperature 10m/min down	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 10m/min down_D7	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 10m/min down_D7	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5
CCL_U8		1	0	100	16	0.2	80	LogReduction	550	0	NA
Gamma Ray_U8		1	0	150	4	1	0	Butterworth	1.2	0.95	2
Temperature 10m/min up_U	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 10m/min up_U8	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner Reverse 10m/min	RPS	2	20	0	5	1	0	Butterworth	0.2	2.07	1.5
Temperature 30min shut-in	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 30min shut-in_D	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 30min shut-in_D1	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5
Temperature 60min shut-in	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2

Pressure 60min shut-in_D	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 60min shut-in_D1	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5
Temperature 90min shut-in_D	°C	3	120	150	8	1	0	Butterworth	1.2	1.8	2
Pressure 90min shut-in_D	kPa	1	30000	50000	17	1	0	Butterworth	1.2	1.72	2
Spinner 90min shut-in_D1	RPS	2	0	20	6	1	0	Butterworth	0.2	2.07	1.5

# SPINNER SURVEY MERGE 3250.0 - 3850.0

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Tension_U8 (lbF)	1:600	0.00 20.00	120.00 150.00
0.00 1500.00		Spinner Reverse 30m/min (RPS)	Temperature 30m/min up_U (°C)
Pressure 30m/min down_D2 (kPa)		20.00 0.00	120.00 150.00
30000.00 50000.00		Spinner 20m/min down_D5 (RPS)	Temperature 20m/min down (°C)
Pressure 30m/min up_U4 (kPa)		0.00 20.00	120.00 150.00
30000.00 50000.00		Spinner Reverse 20m/min (RPS)	Temperature 20m/min up_U (°C)
Pressure 20m/min down_D5 (kPa)		20.00 0.00	120.00 150.00
30000.00 50000.00		Spinner 10m/min down_D7 (RPS)	Temperature 10m/min down (°C)
Pressure 20m/min up_U6 (kPa)		0.00 20.00	120.00 150.00
30000.00 50000.00		Spinner Reverse 10m/min (RPS)	Temperature 10m/min up_U (°C)
Pressure 10m/min down_D7 (kPa)		20.00 0.00	120.00 150.00
30000.00 50000.00		Spinner 30min shut-in_D1 (RPS)	Temperature 30min shut-in (°C)
CCL_U8		0.00 20.00	120.00 150.00
0.00 100.00		Spinner 60min shut-in_D1 (RPS)	Temperature 60min shut-in (°C)
Gamma Ray_U8		0.00 20.00	120.00 150.00
0.00 150.00		Spinner 90min shut-in_D1 (RPS)	Temperature 90min shut-in (°C)
Pressure 10m/min up_U8 (kPa)		0.00 20.00	120.00 150.00
30000.00 50000.00		Logging Down	File merge1 1-600.pre
Pressure 30min shut-in_D (kPa)		Shutin	
30000.00 50000.00			
Pressure 60min shut-in_D (kPa)			
30000.00 50000.00			
Pressure 90min shut-in_D (kPa)			
30000.00 50000.00			

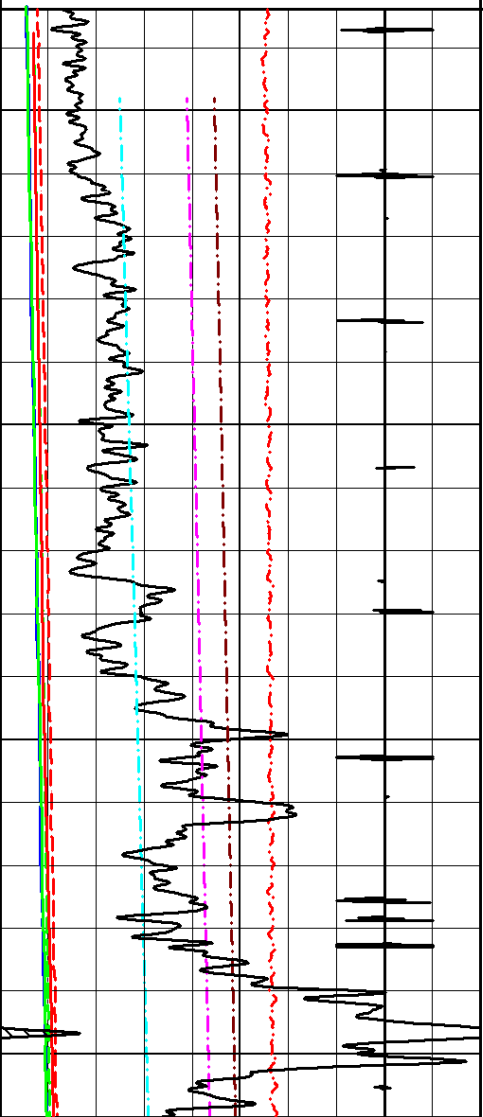
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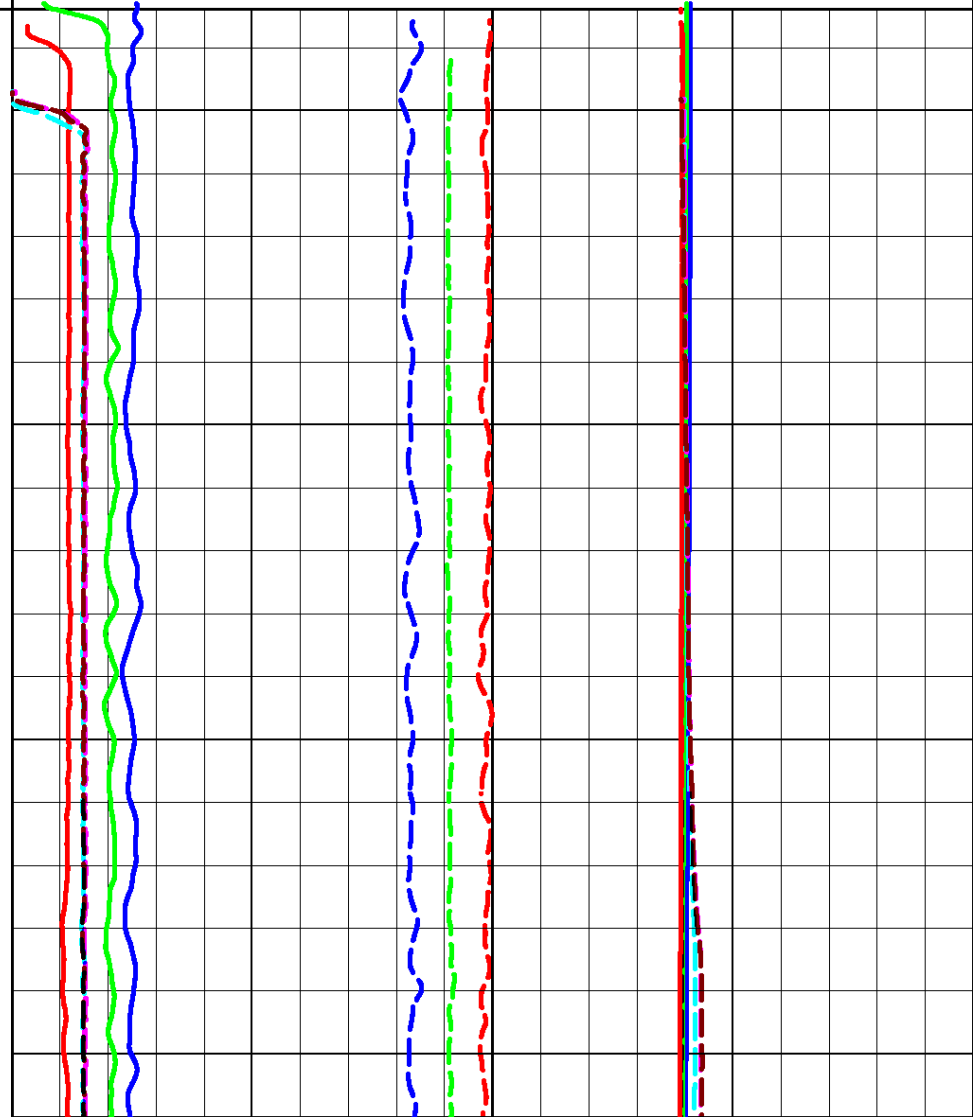


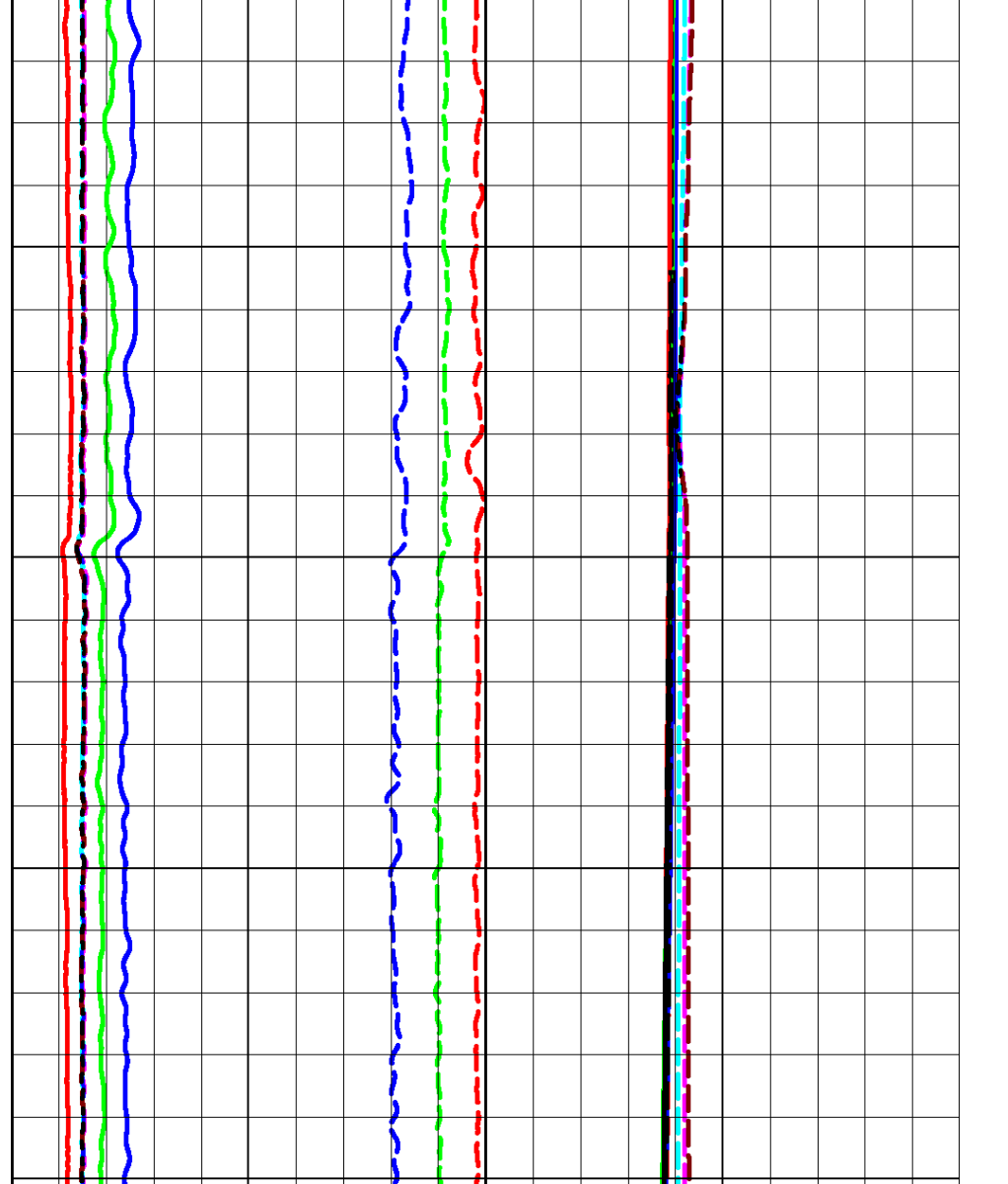
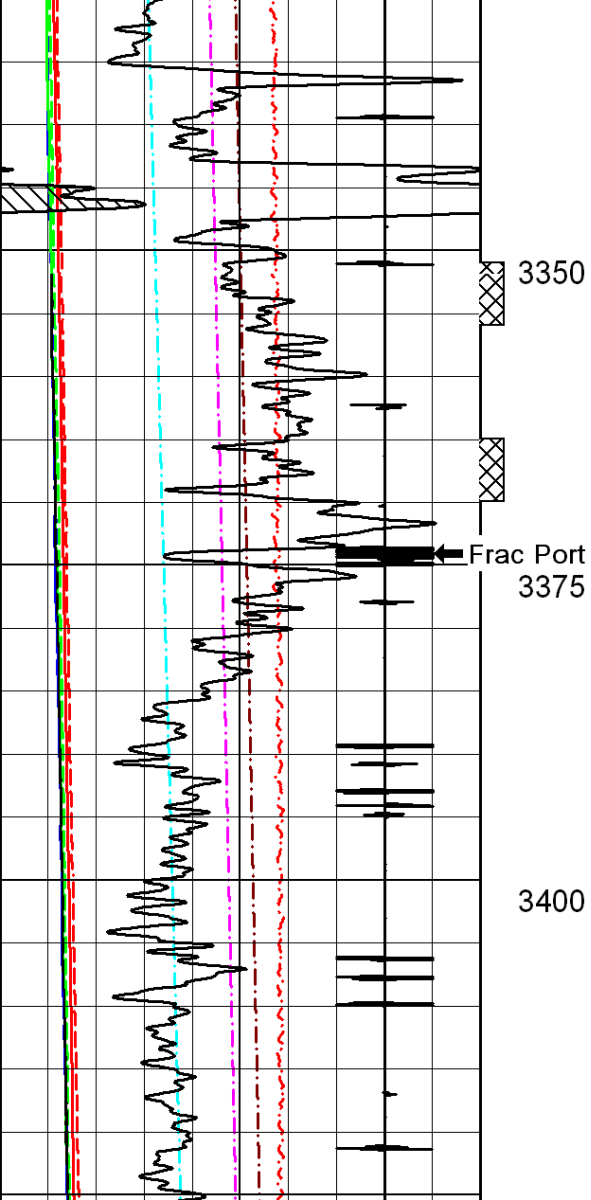
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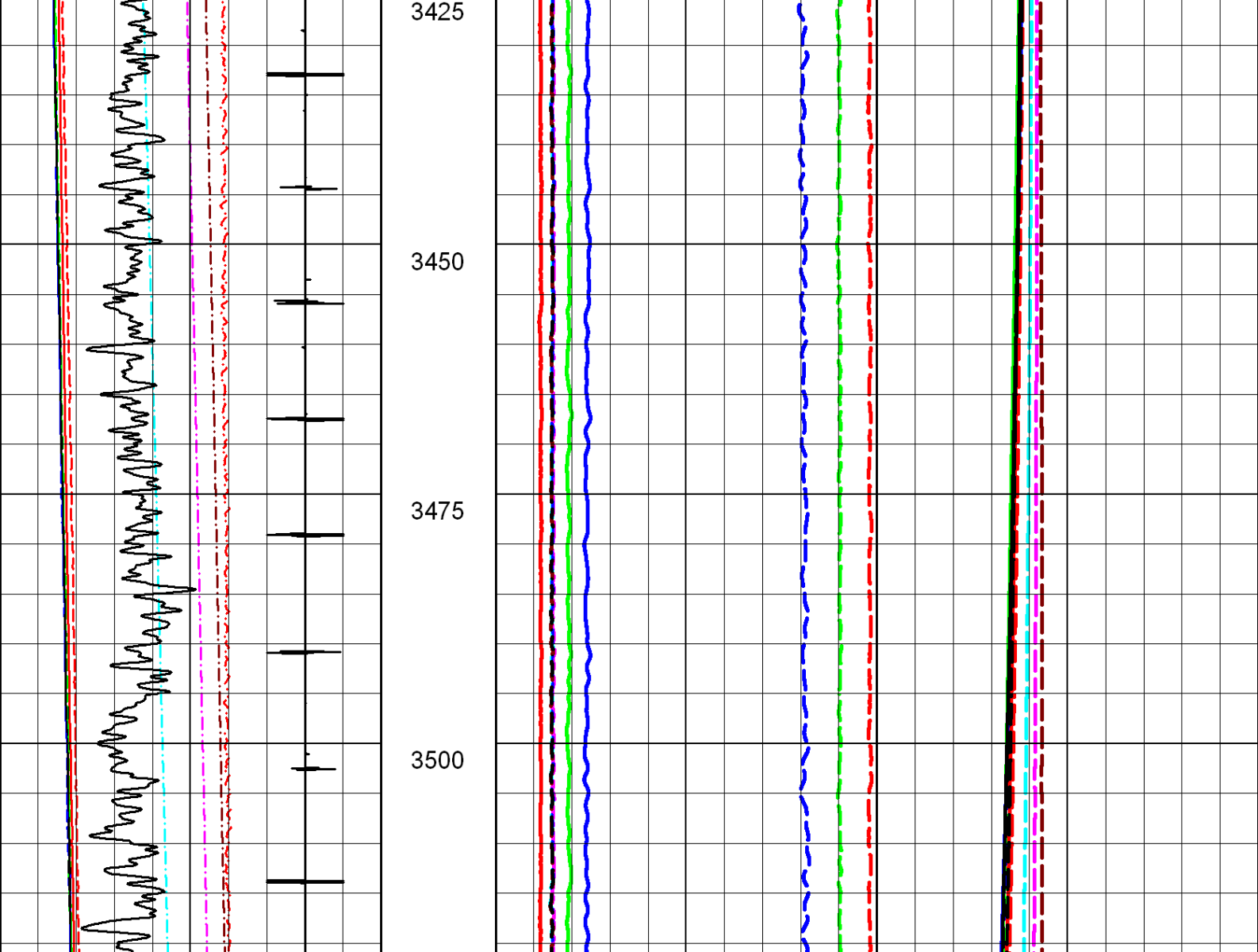
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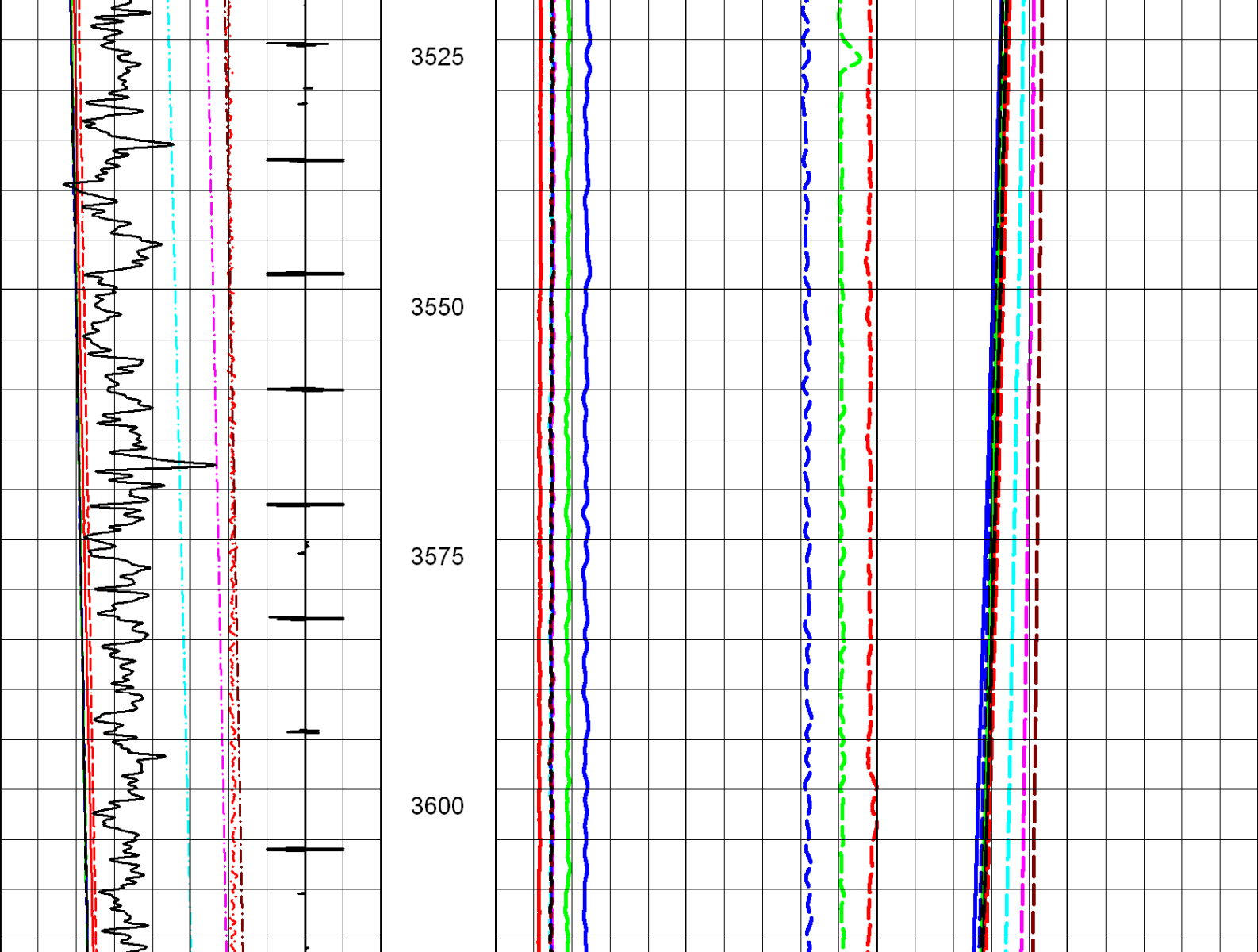
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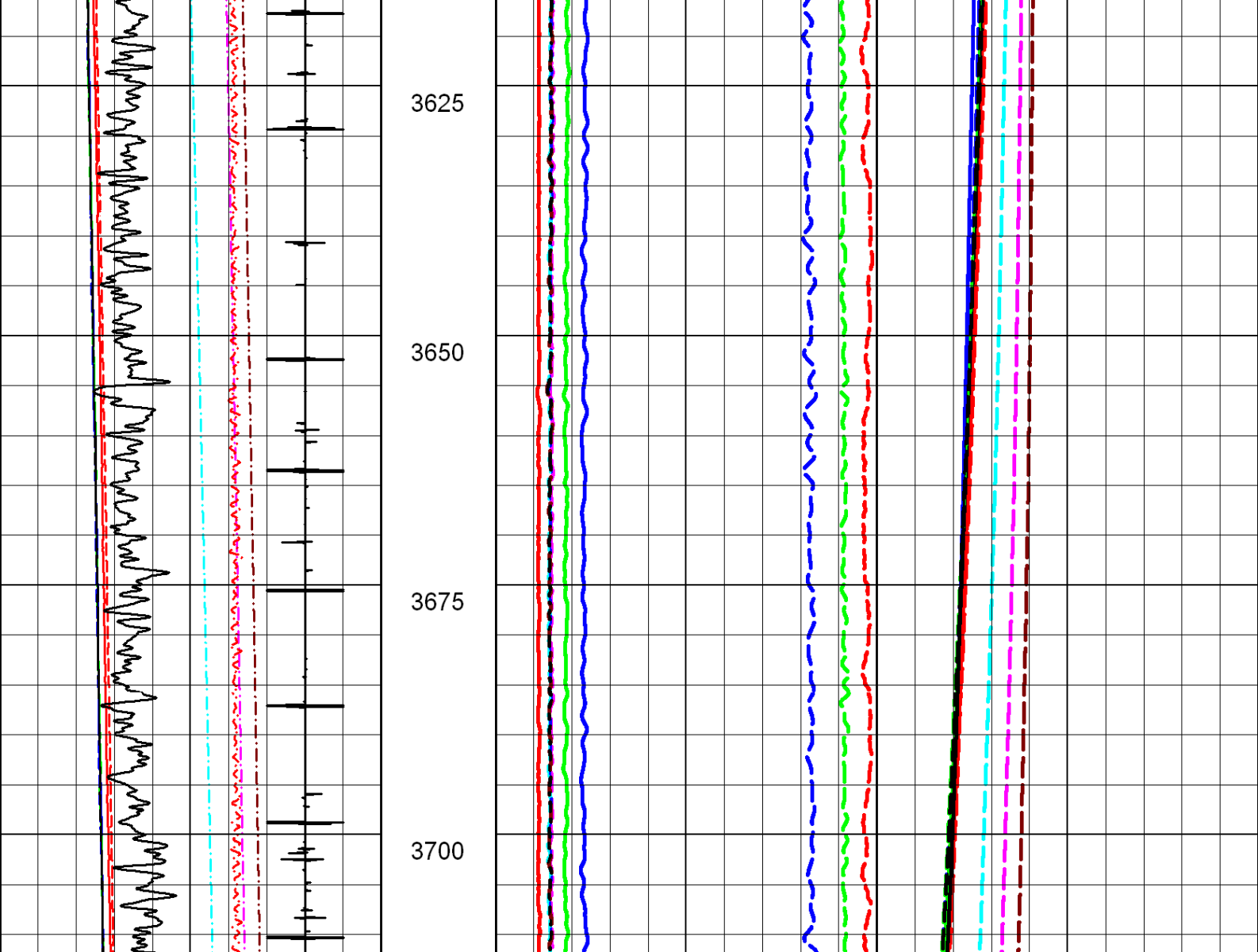
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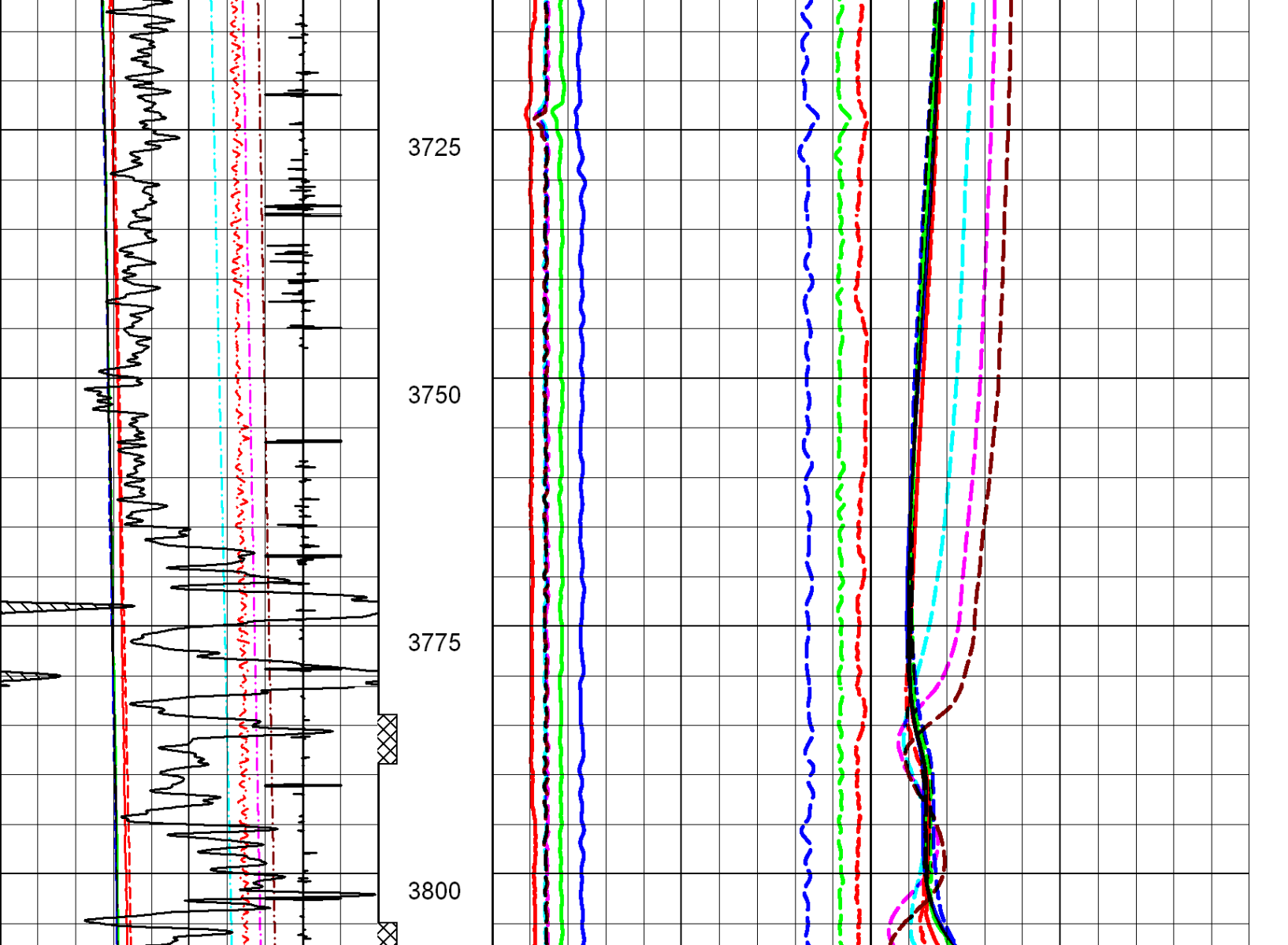


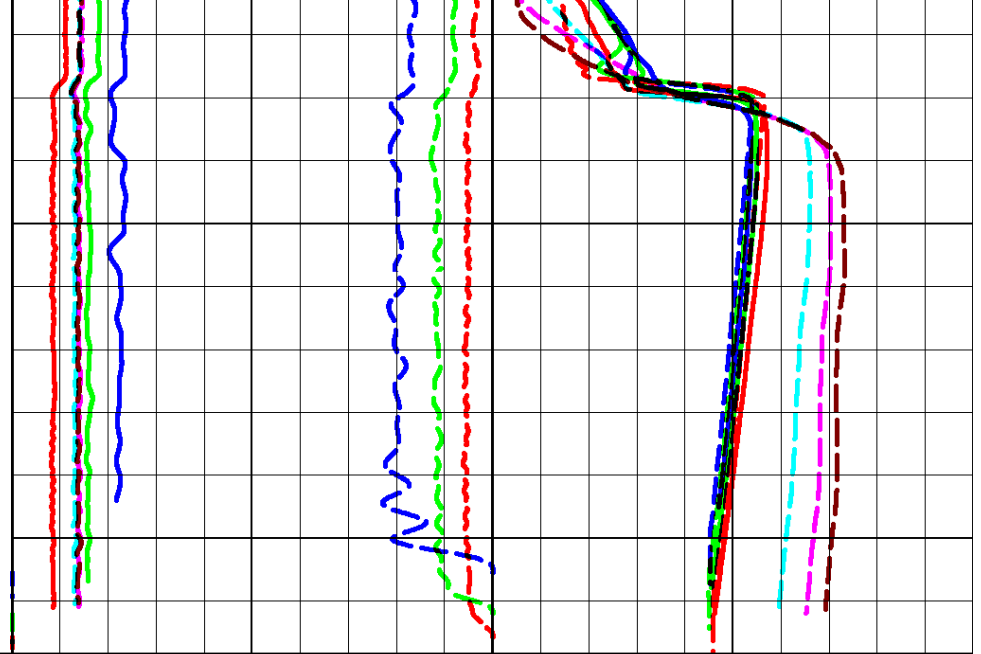
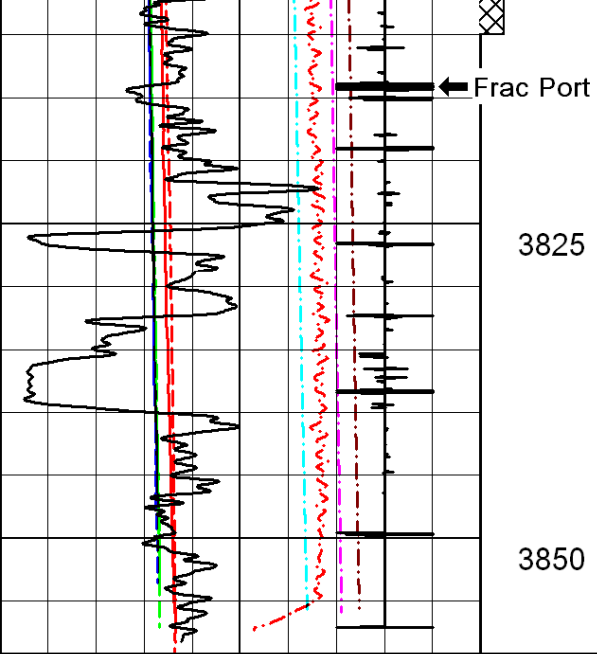












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Pressure 30m/min up_U4 (kPa)	
30000.00	50000.00
Pressure 20m/min down_D5 (kPa)	
30000.00	50000.00
Pressure 20m/min up_U6 (kPa)	
30000.00	50000.00
Pressure 10m/min down_D7 (kPa)	
30000.00	50000.00
CCL_U8	
0.00	100.00
Gamma Ray_U8	

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	20.00 0.00	120.00 150.00
	<u>Spinner 20m/min down_D5 (RPS)</u>	<u>Temperature 20m/min down (°C)</u>
	0.00 20.00	120.00 150.00
	<u>Spinner Reverse 20m/min (RPS)</u>	<u>Temperature 20m/min up_U (°C)</u>
	20.00 0.00	120.00 150.00
	<u>Spinner 10m/min down_D7 (RPS)</u>	<u>Temperature 10m/min down (°C)</u>
	0.00 20.00	120.00 150.00
	<u>Spinner Reverse 10m/min (RPS)</u>	<u>Temperature 10m/min up_U (°C)</u>
	20.00 0.00	120.00 150.00
	<u>Spinner 30min shut-in_D1 (RPS)</u>	<u>Temperature 30min shut-i (°C)</u>
	0.00 20.00	120.00 150.00
	<u>Spinner 60min shut-in_D1 (RPS)</u>	<u>Temperature 60min shut-i (°C)</u>
	0.00 20.00	120.00 150.00

0.00	150.00
<u>Pressure 10m/min up_U8 (kPa)</u>	
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<u>Pressure 30min shut-in_D (kPa)</u>	
30000.00	50000.00
<u>Pressure 60min shut-in_D (kPa)</u>	
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<u>Pressure 90min shut-in_D (kPa)</u>	
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30000.00	50000.00
<u>Pressure 20m/min down_D5 (kPa)</u>	
30000.00	50000.00
<u>Pressure 20m/min up_U6 (kPa)</u>	
30000.00	50000.00
<u>Pressure 10m/min down_D7 (kPa)</u>	
30000.00	50000.00
<u>CCL_U8</u>	
0.00	100.00
<u>Gamma Ray_U8</u>	
0.00	150.00
<u>Pressure 10m/min up_U8 (kPa)</u>	
30000.00	50000.00

METERS		<u>Spinner 30m/min down_D2 (RPS)</u>		<u>Temperature 30m/min down (°C)</u>	
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		<u>Spinner Reverse 30m/min (RPS)</u>		<u>Temperature 30m/min up_U (°C)</u>	
		20.00	0.00	120.00	150.00
		<u>Spinner 20m/min down_D5 (RPS)</u>		<u>Temperature 20m/min down (°C)</u>	
		0.00	20.00	120.00	150.00
		<u>Spinner Reverse 20m/min (RPS)</u>		<u>Temperature 20m/min up_U (°C)</u>	
		20.00	0.00	120.00	150.00
		<u>Spinner 10m/min down_D7 (RPS)</u>		<u>Temperature 10m/min down (°C)</u>	
		0.00	20.00	120.00	150.00
		<u>Spinner Reverse 10m/min (RPS)</u>		<u>Temperature 10m/min up_U (°C)</u>	
		20.00	0.00	120.00	150.00
		<u>Spinner 30min shut-in_D1 (RPS)</u>		<u>Temperature 30min shut-i (°C)</u>	
		0.00	20.00	120.00	150.00
		<u>Spinner 60min shut-in_D1 (RPS)</u>		<u>Temperature 60min shut-i (°C)</u>	
		0.00	20.00	120.00	150.00
		<u>Spinner 90min shut-in_D1 (RPS)</u>		<u>Temperature 90min shut-i (°C)</u>	
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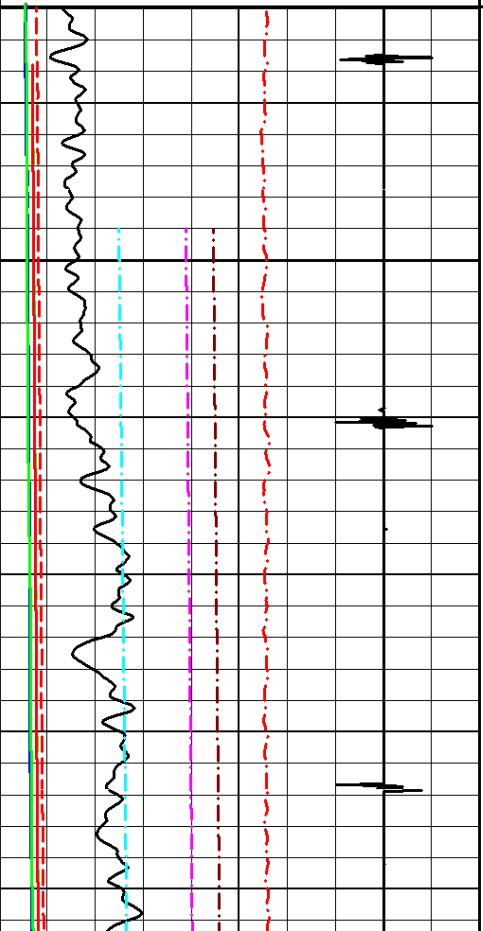
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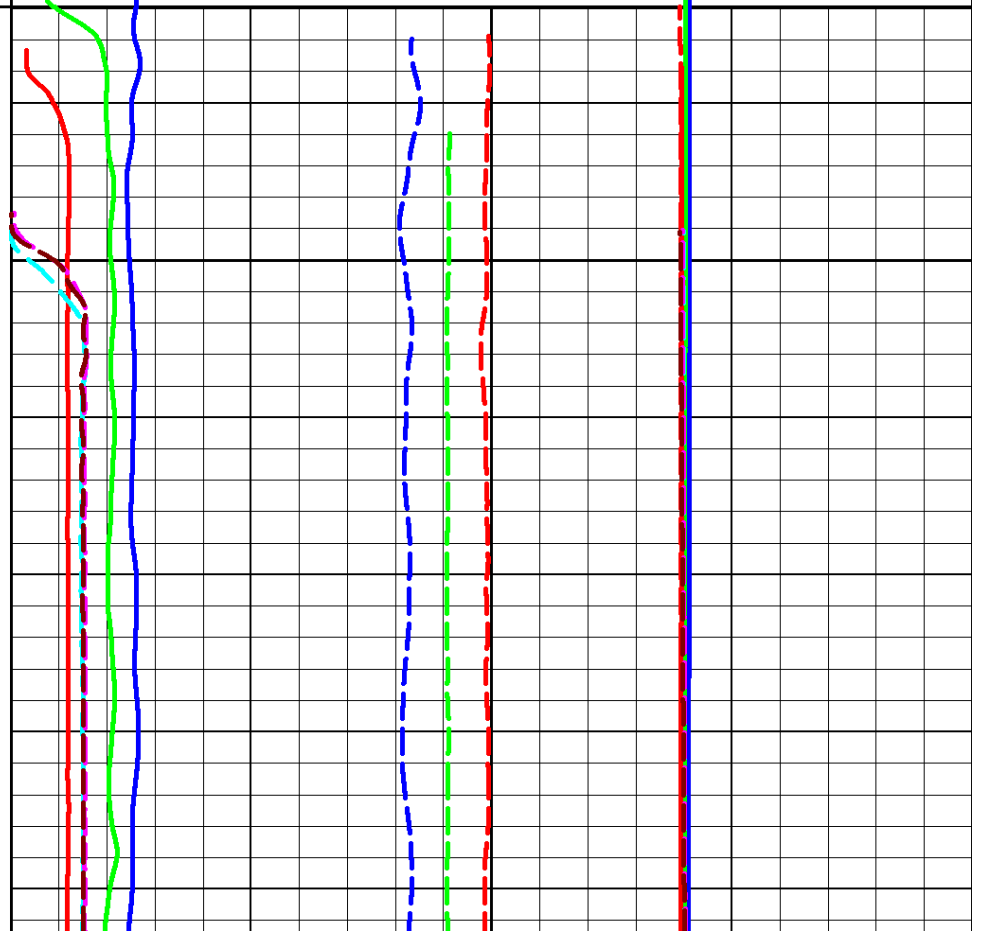
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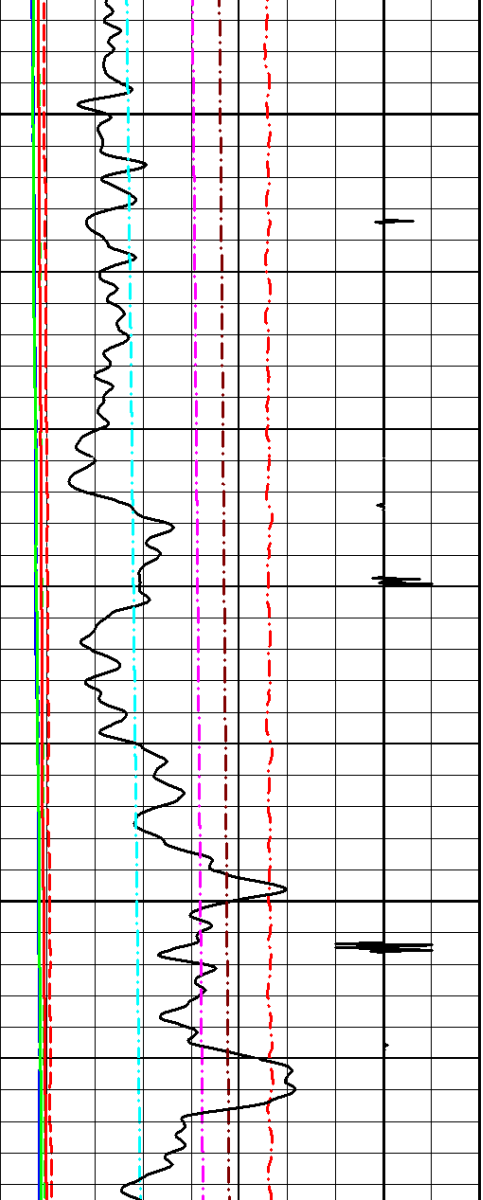
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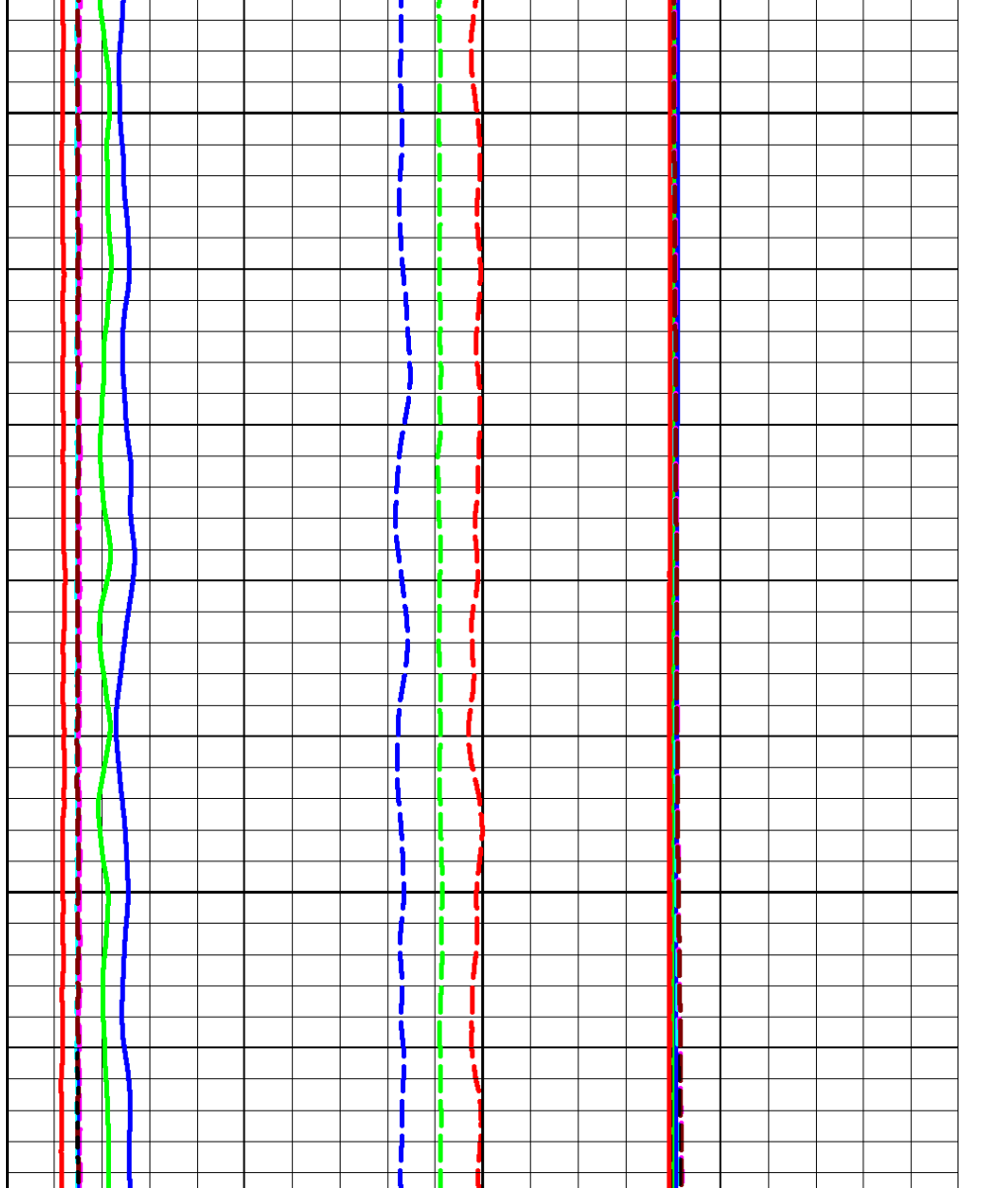
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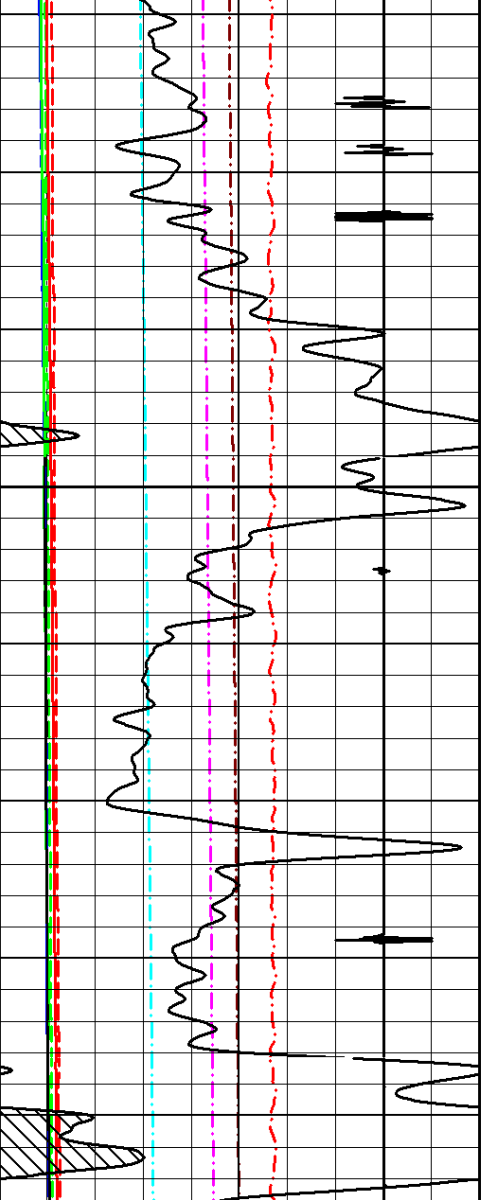




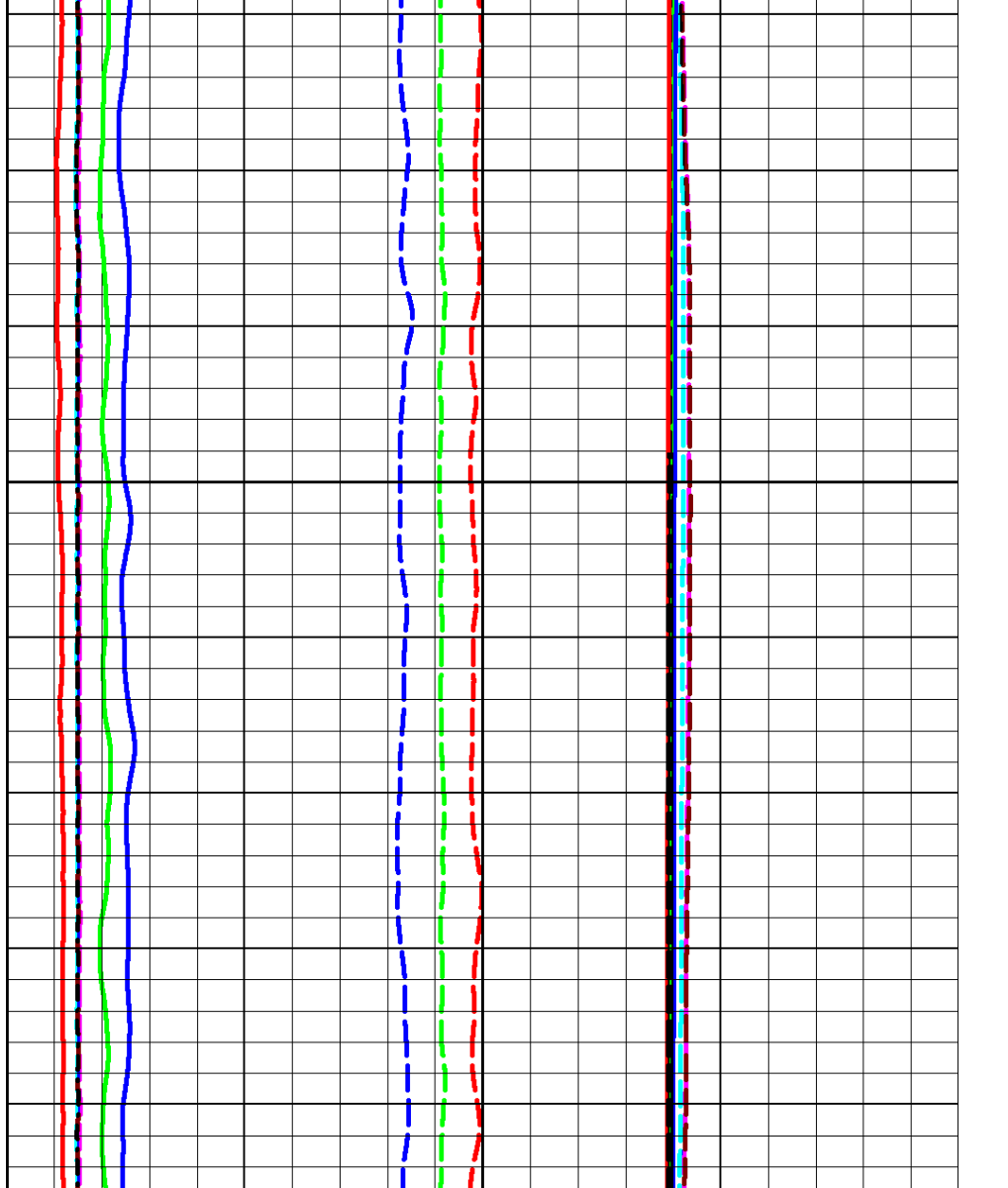
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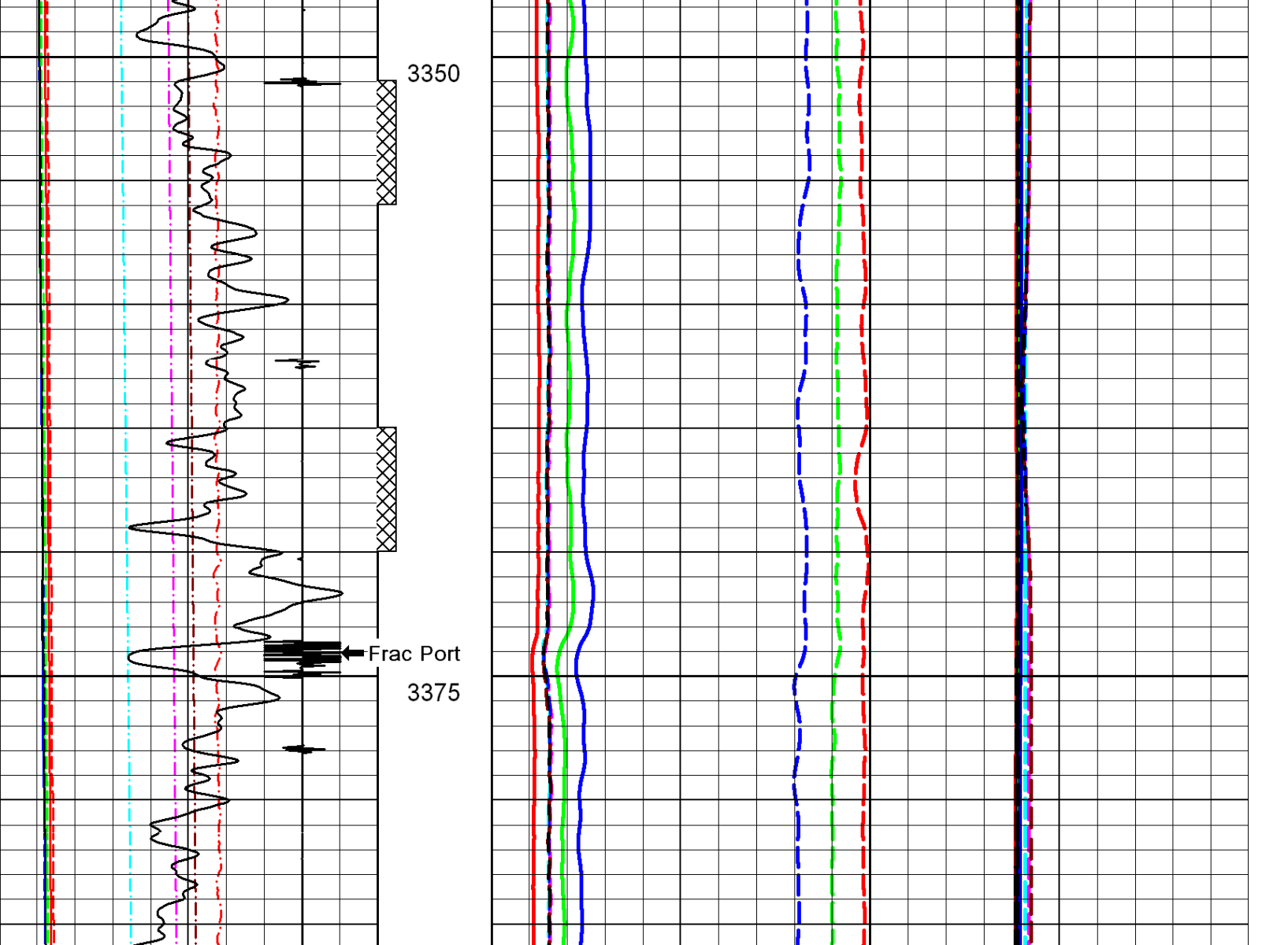
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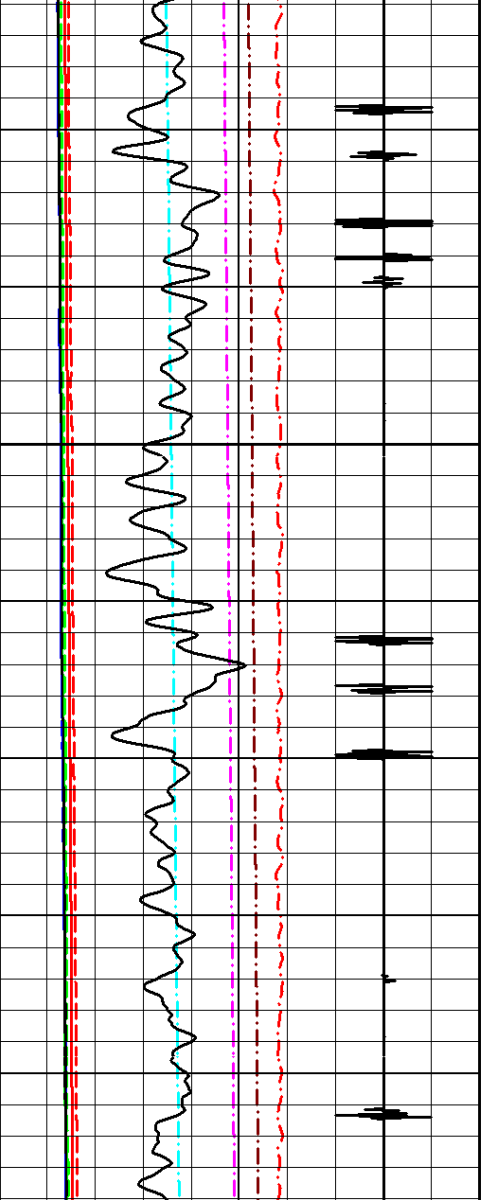




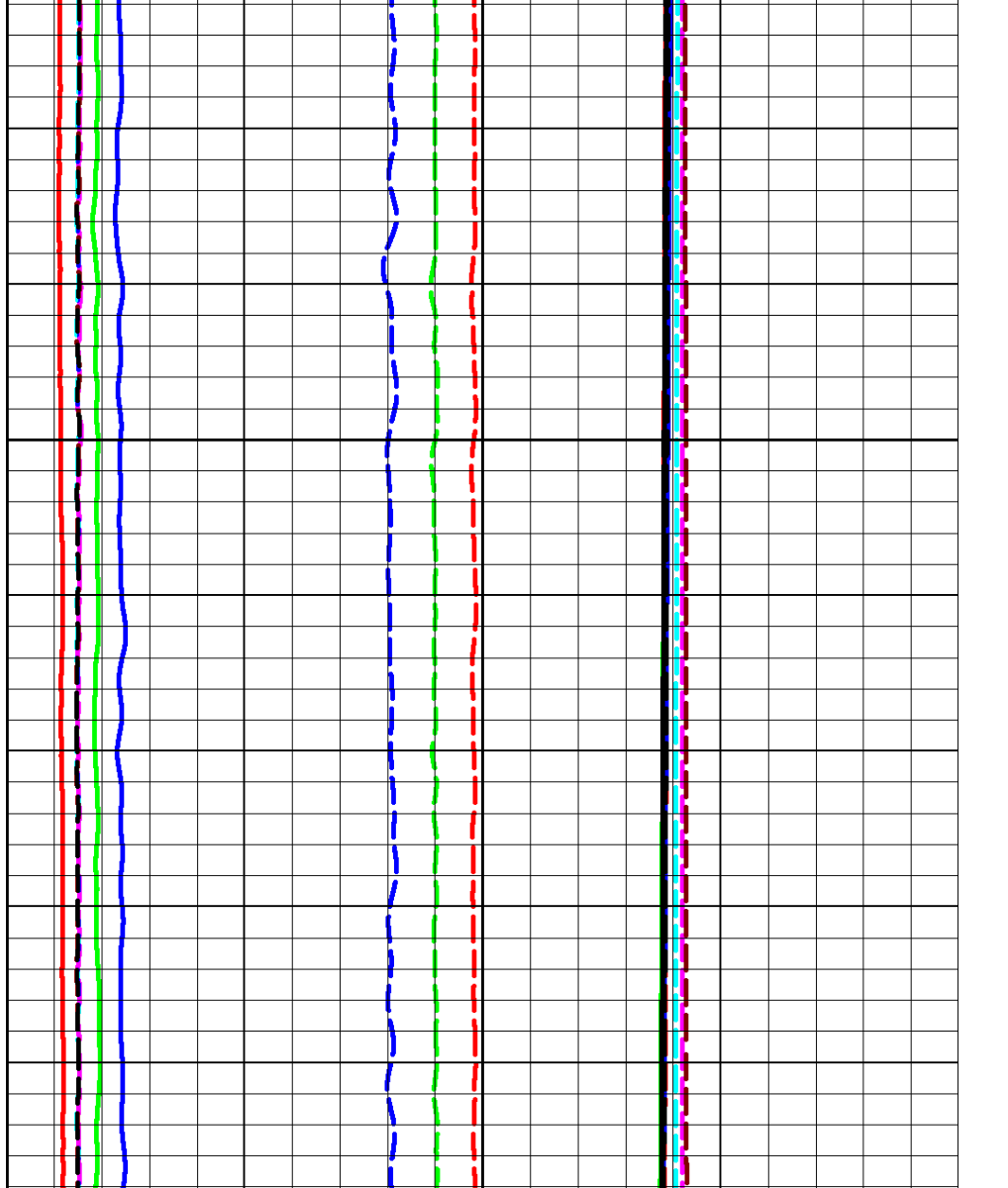
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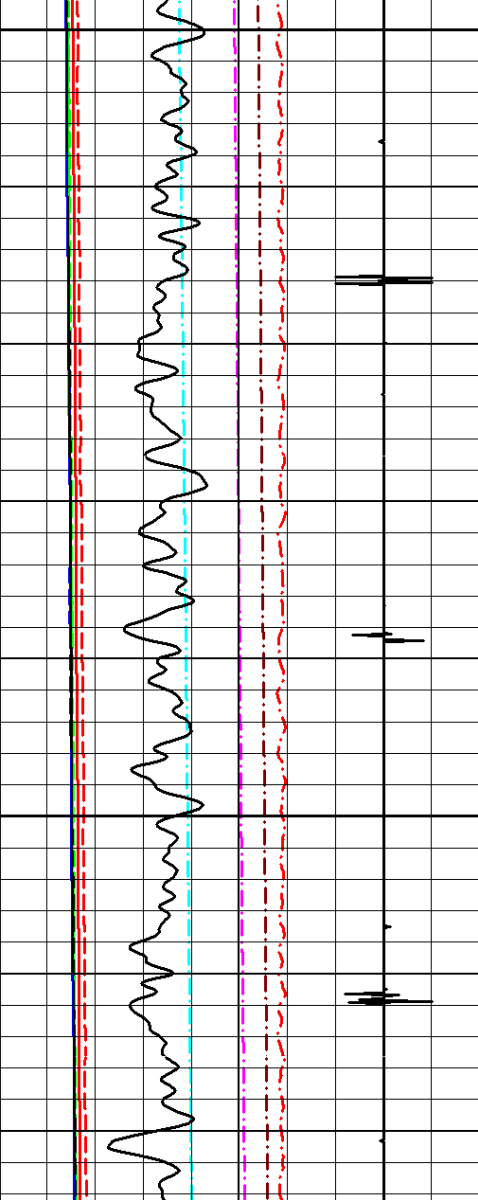




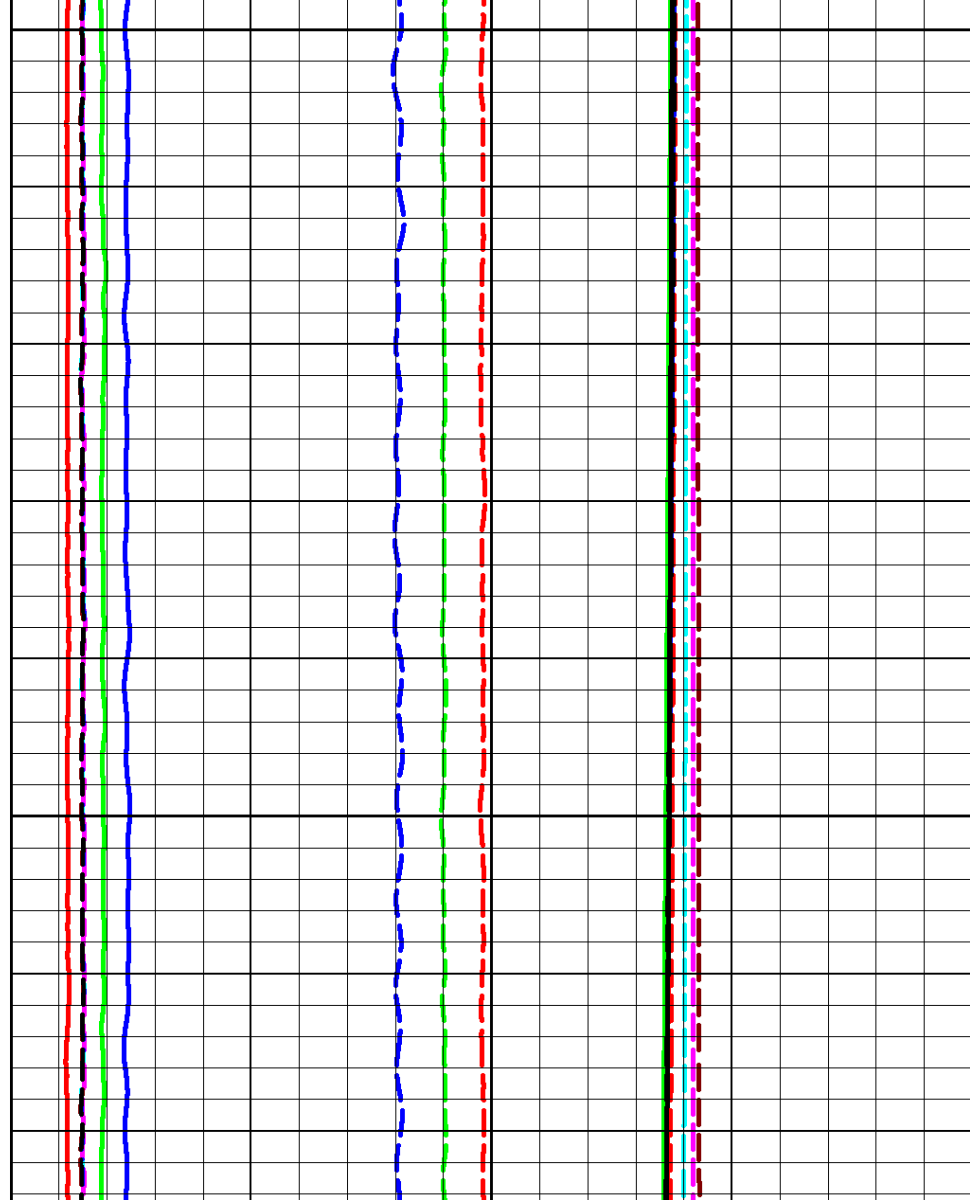


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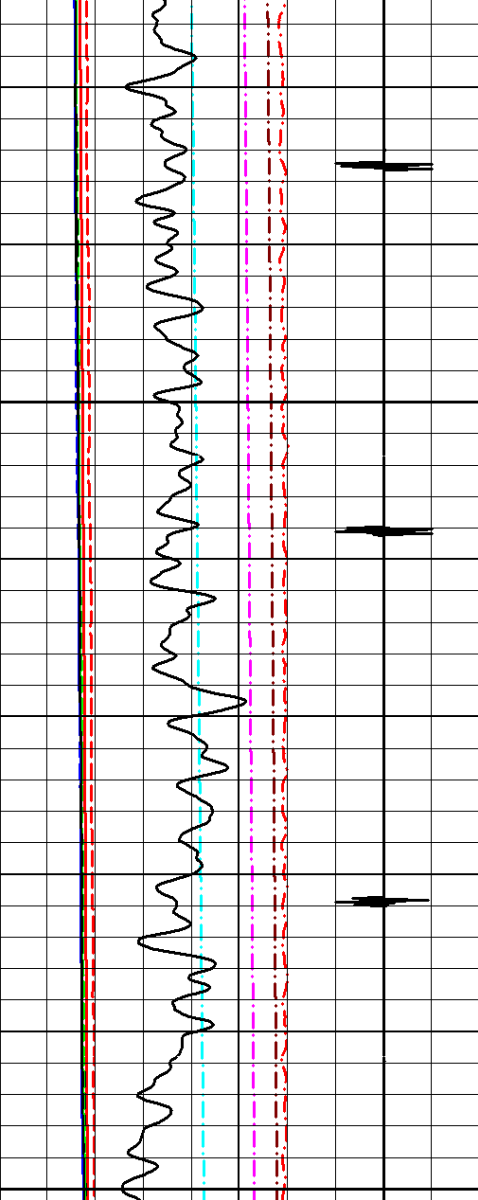




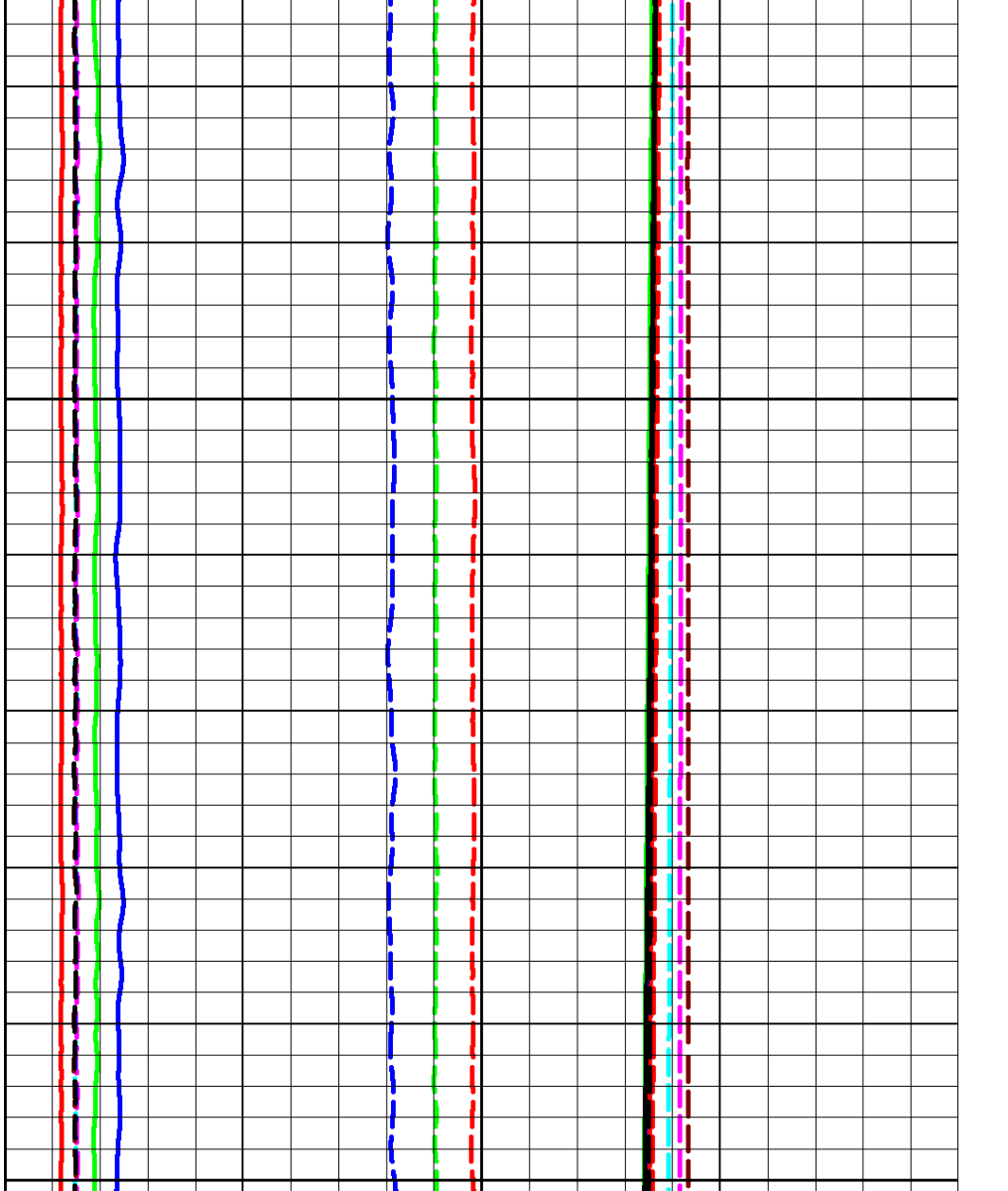
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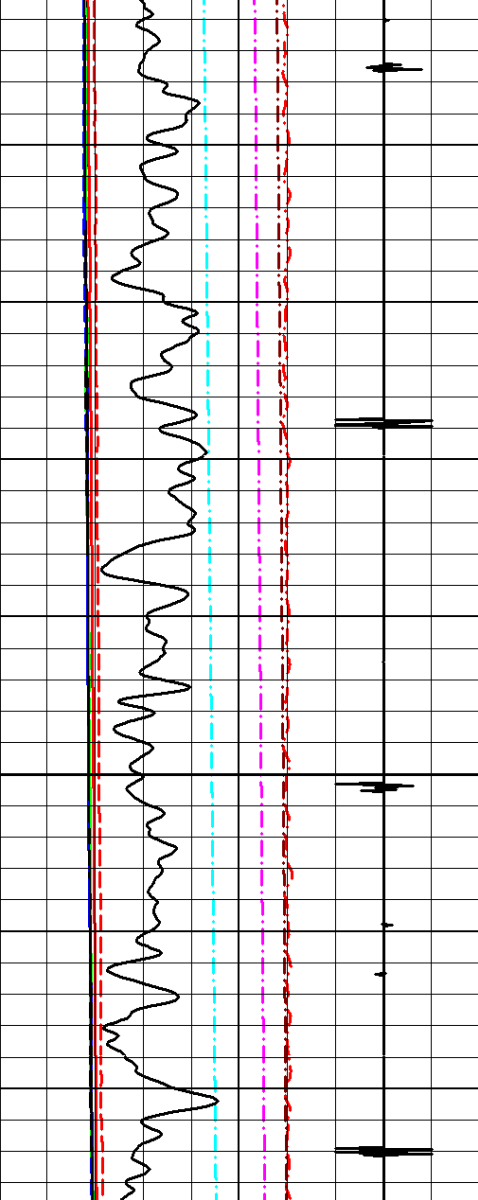


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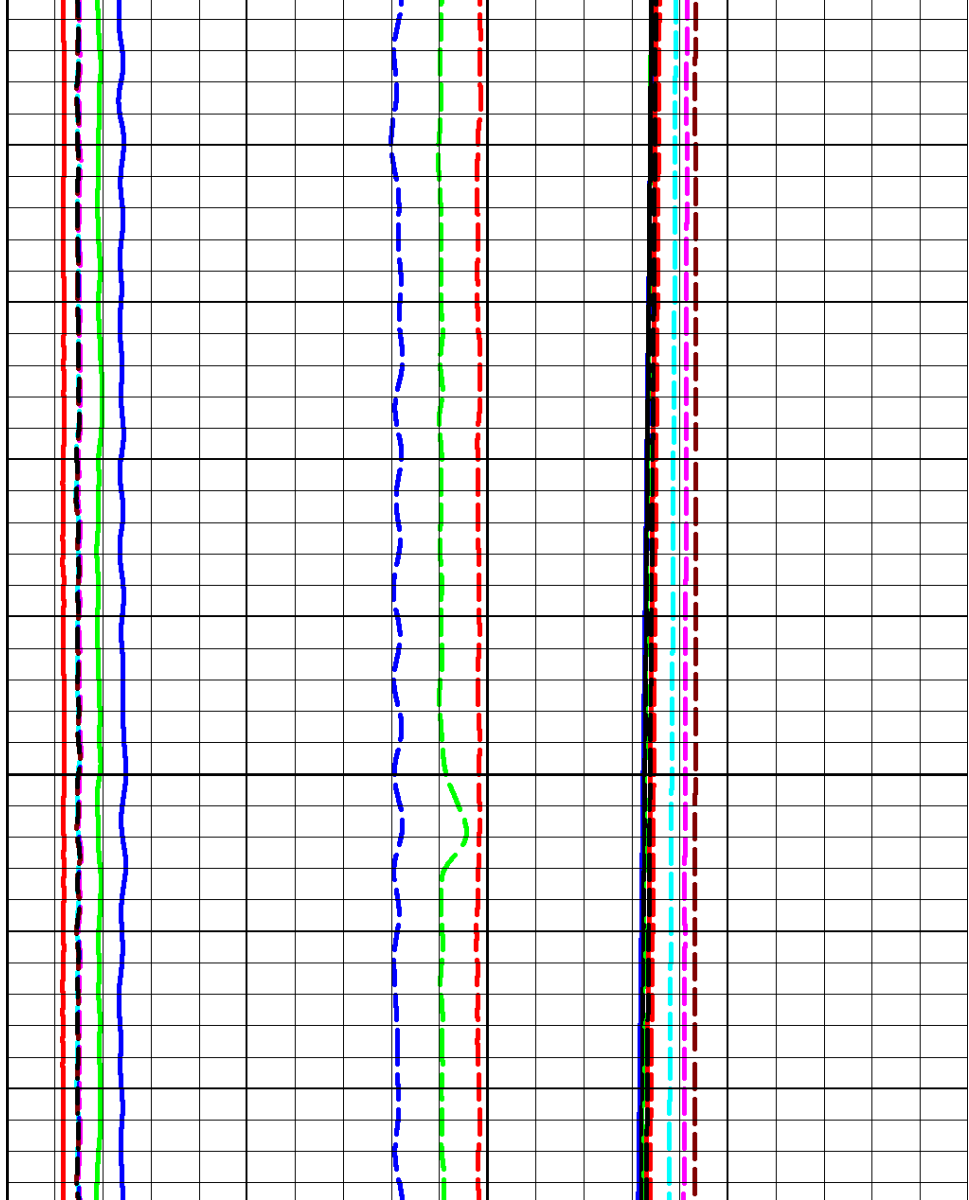
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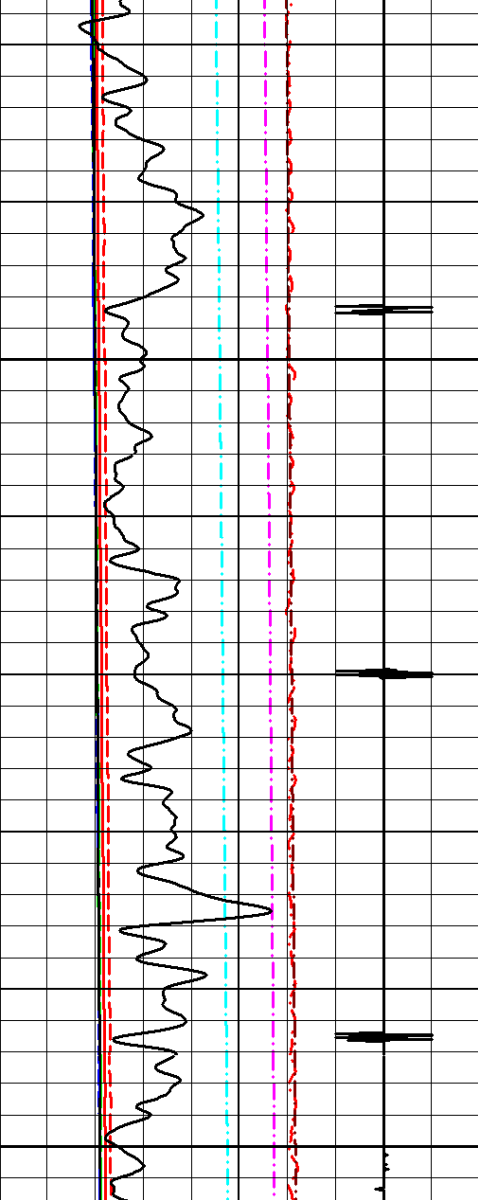




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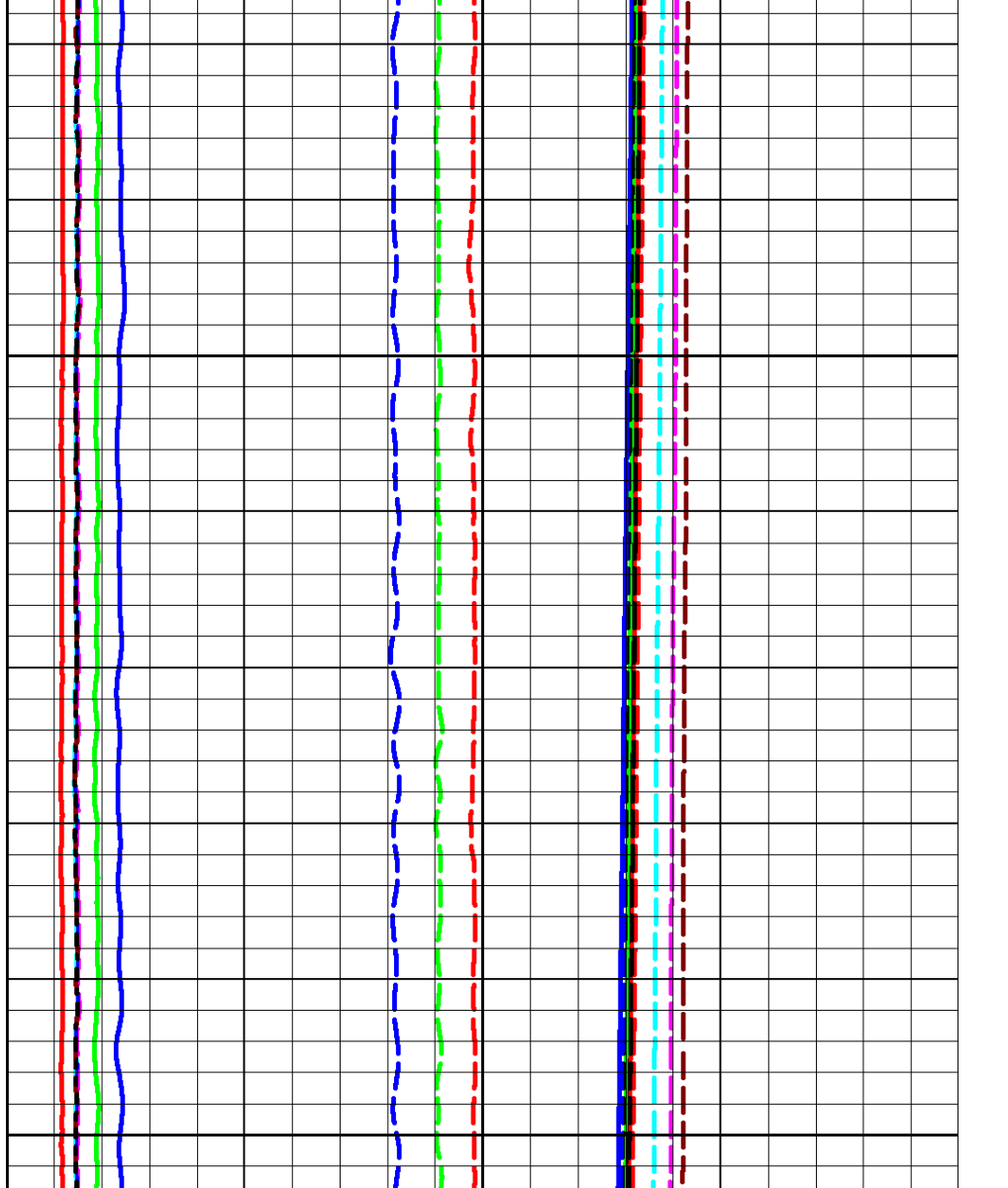
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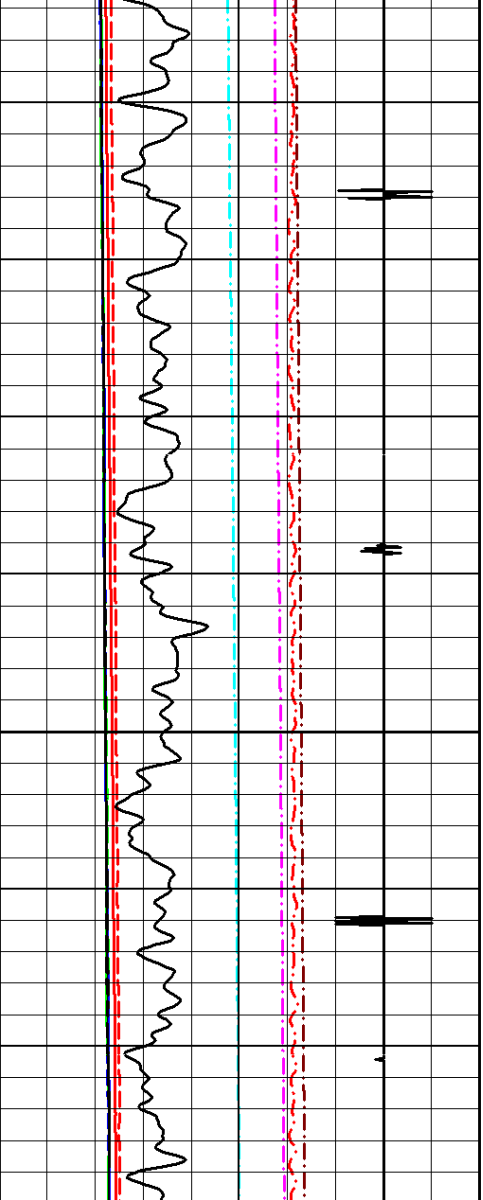




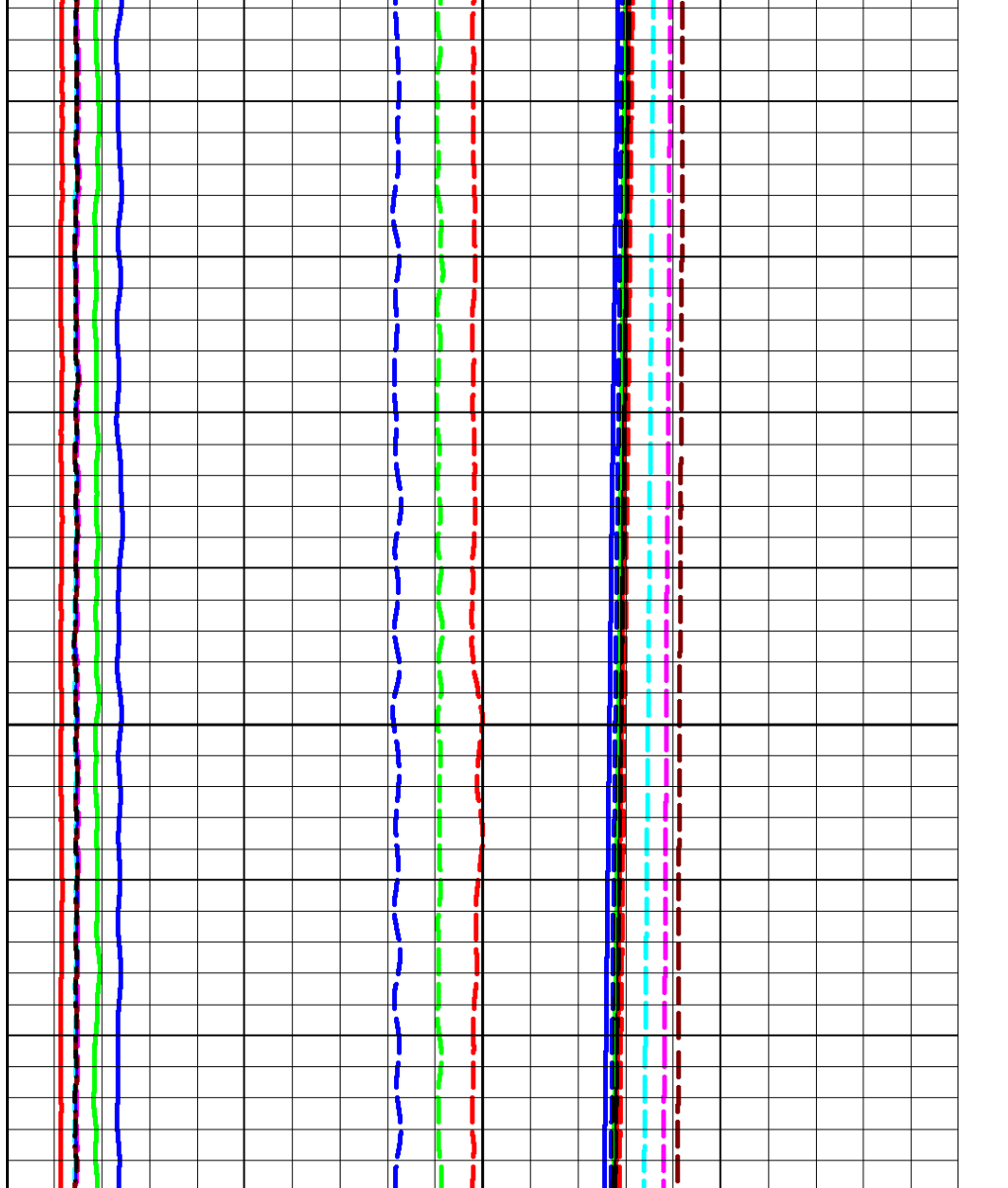
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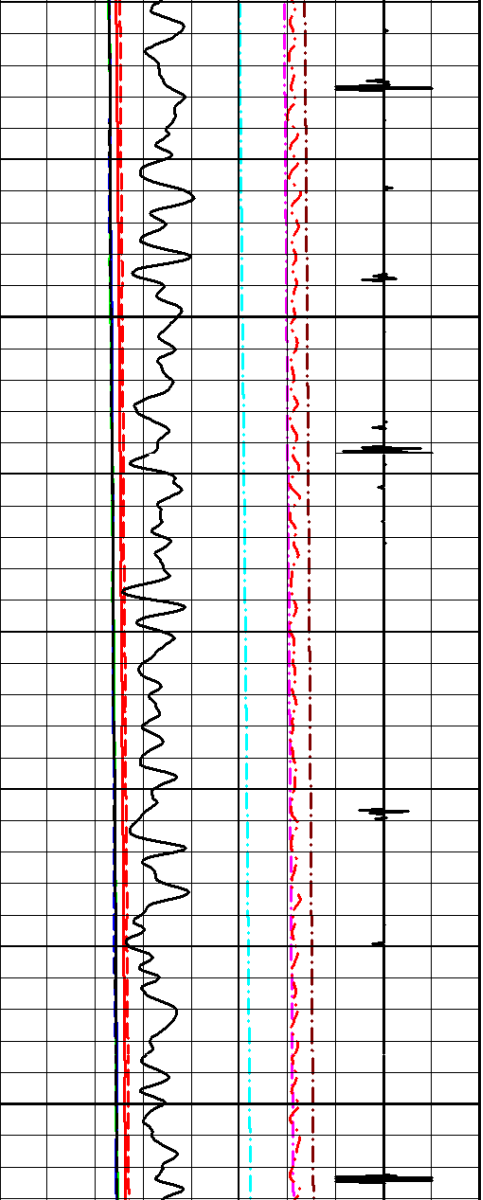
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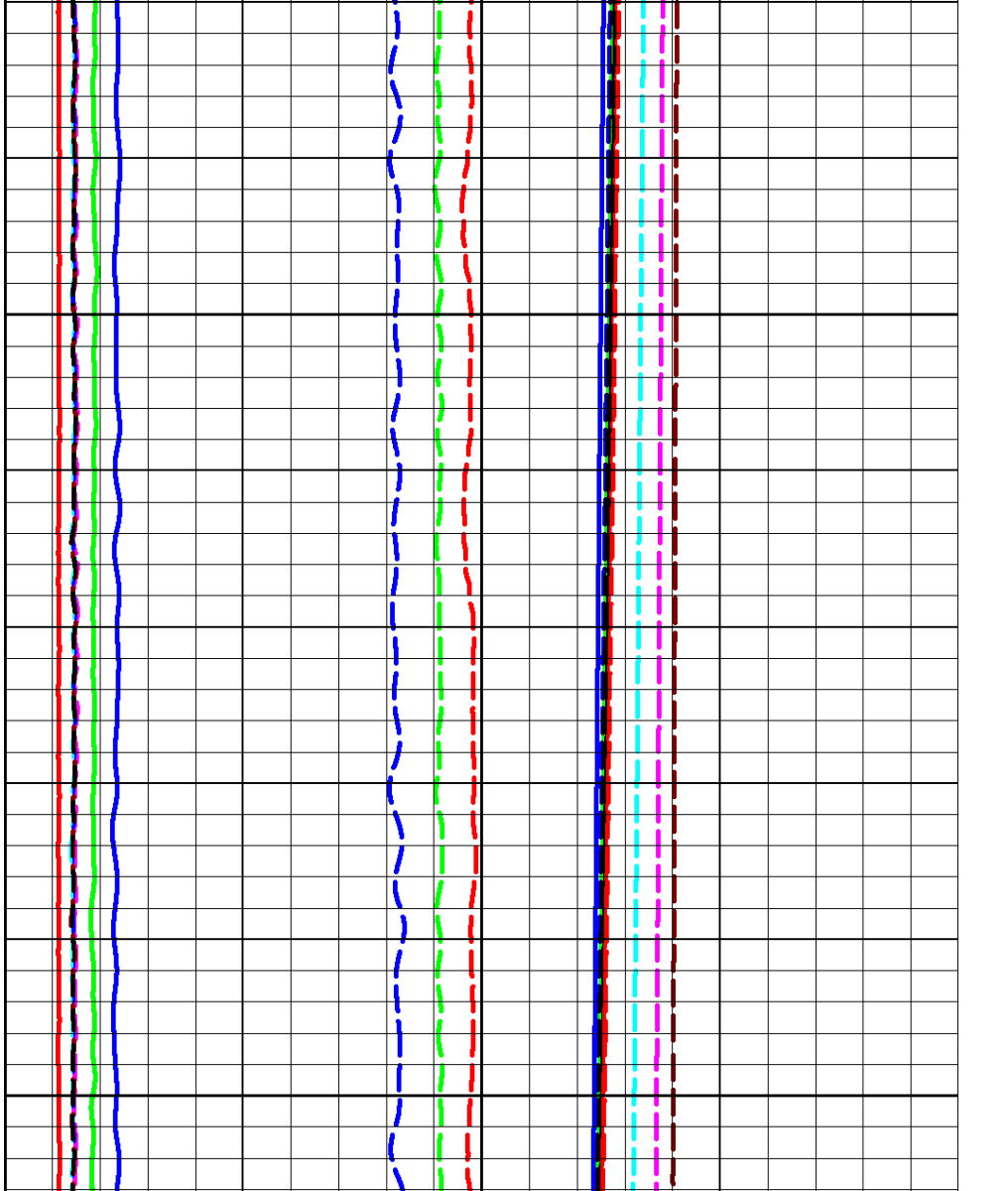
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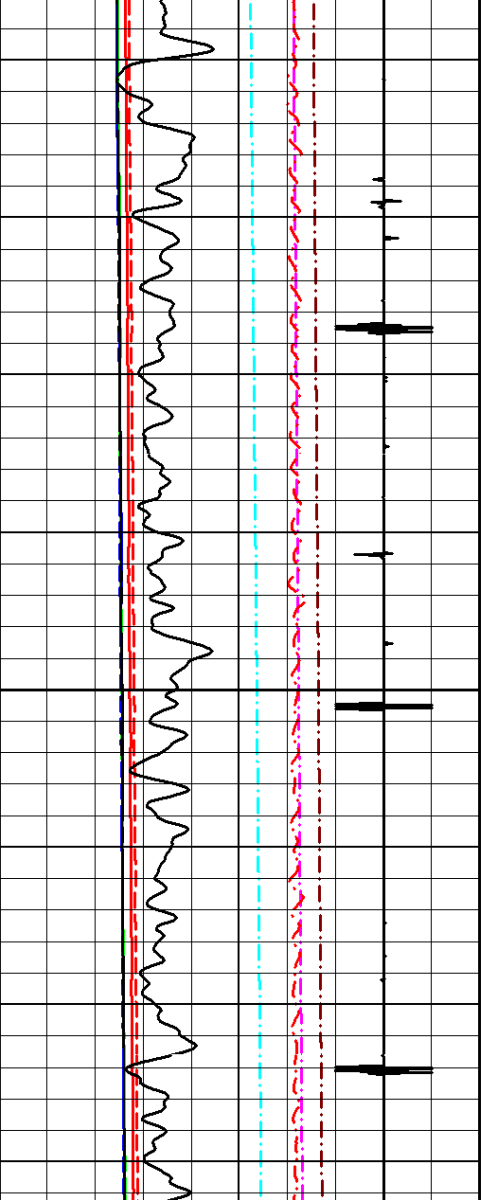




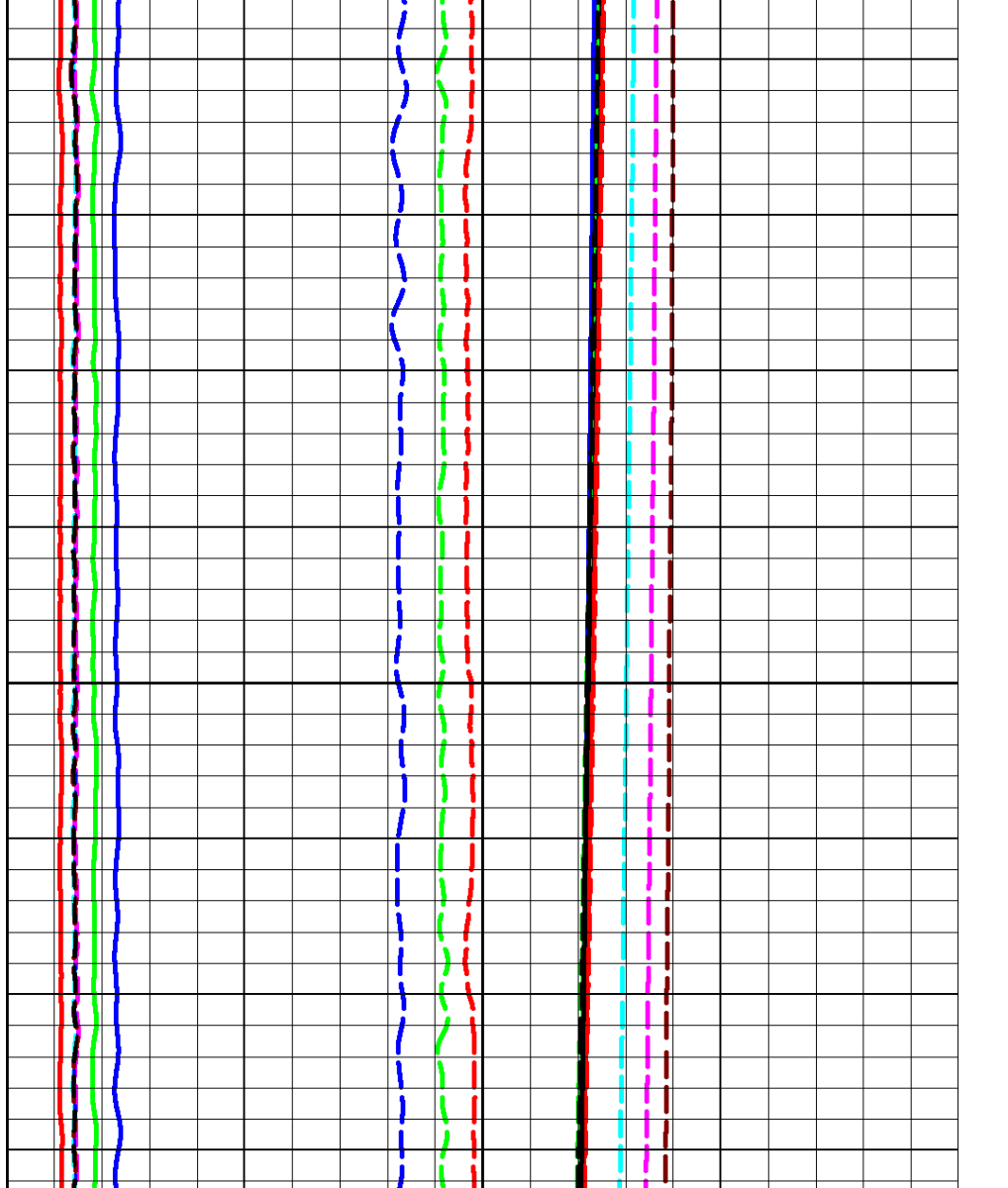
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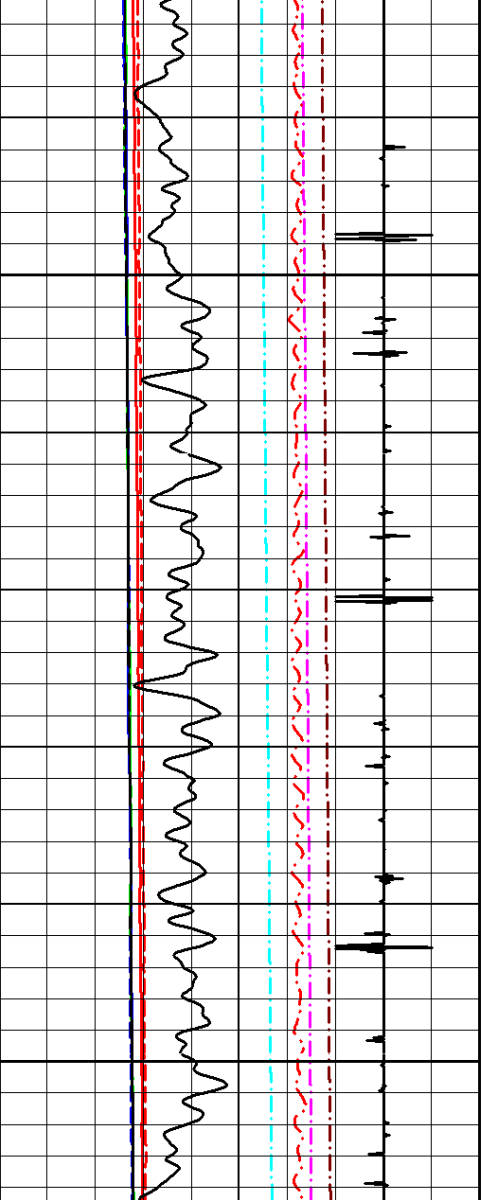
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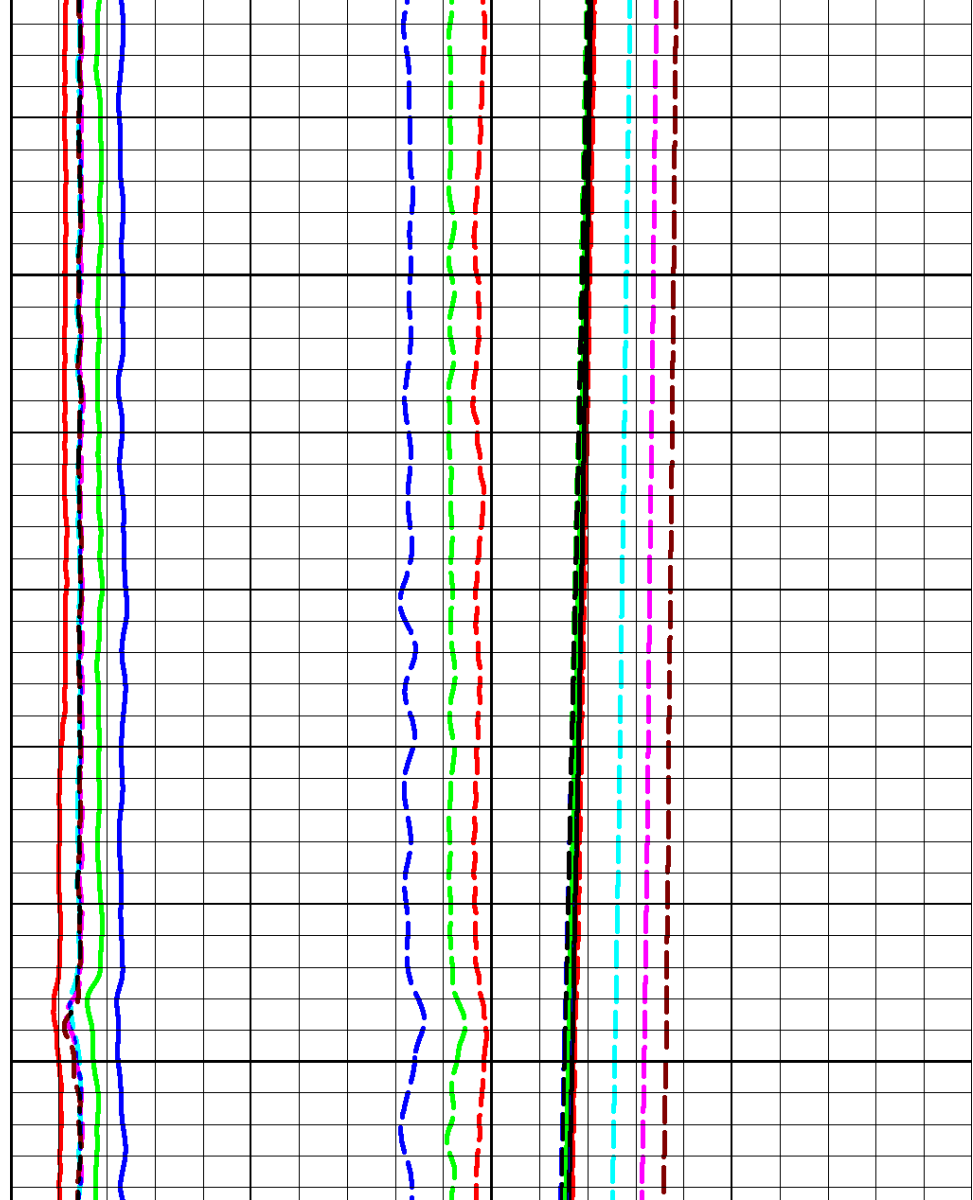
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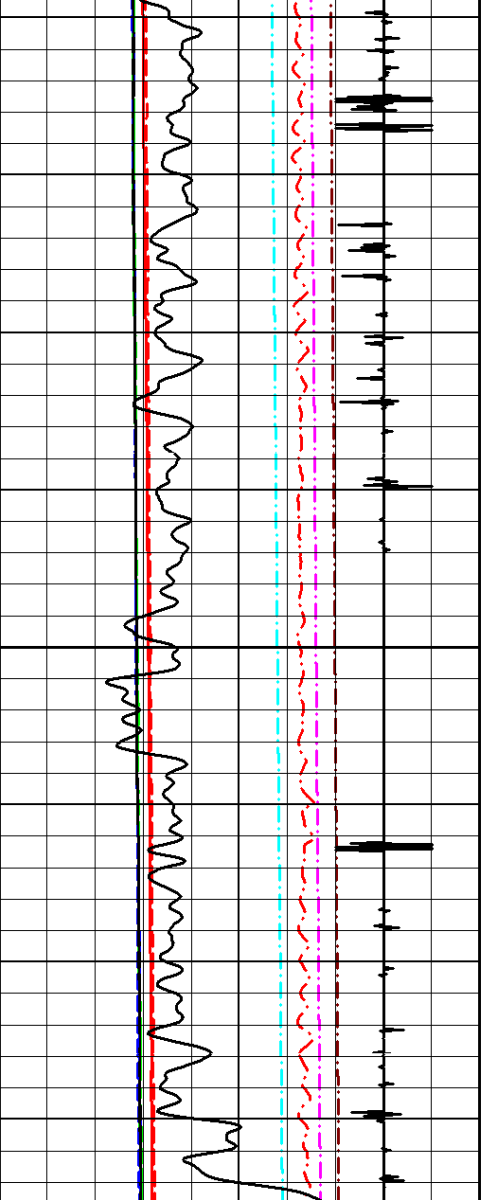




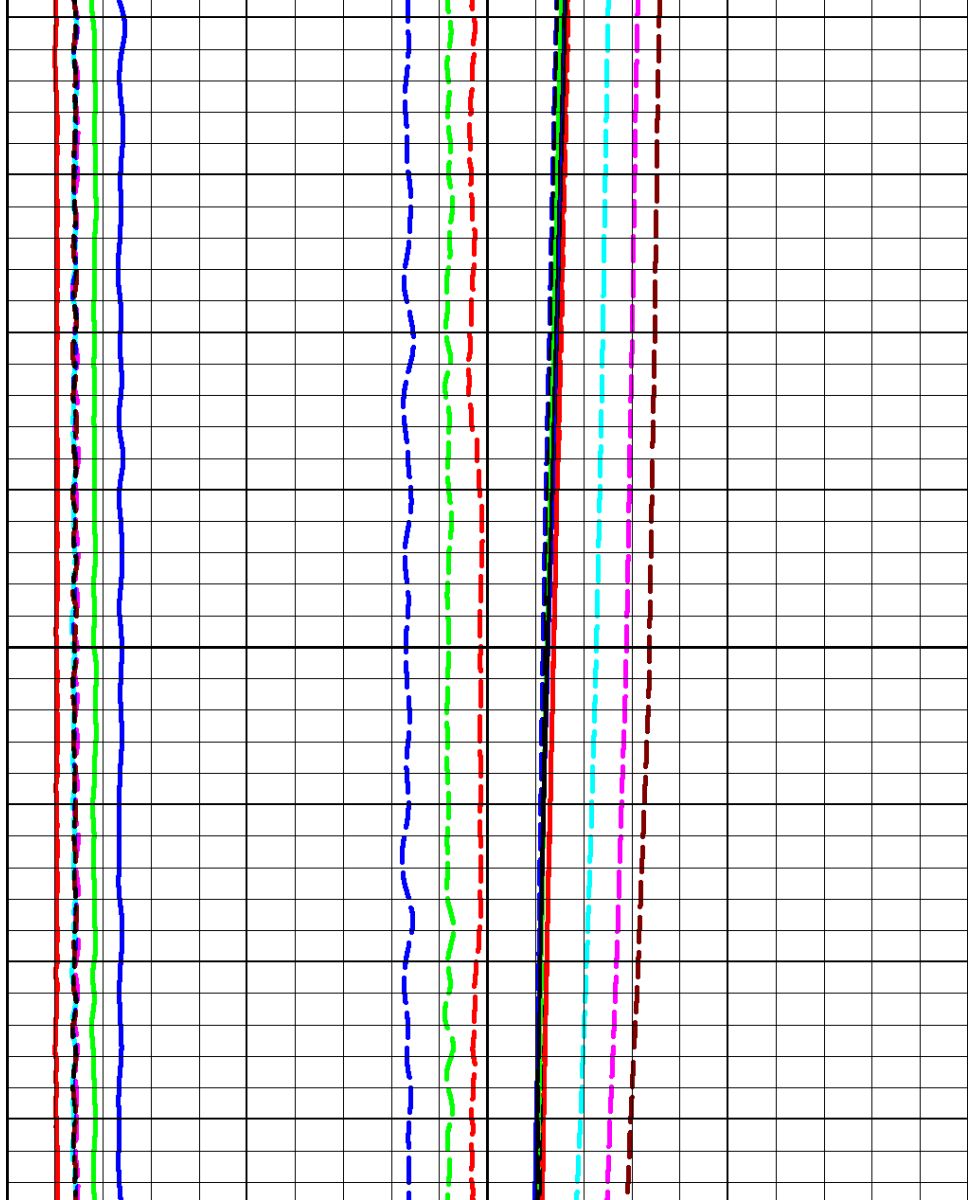
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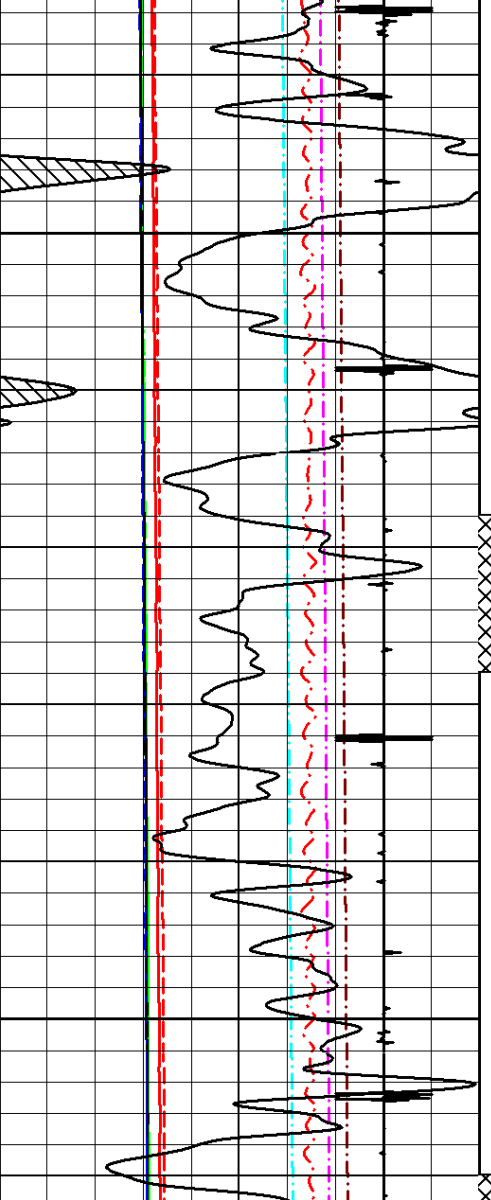
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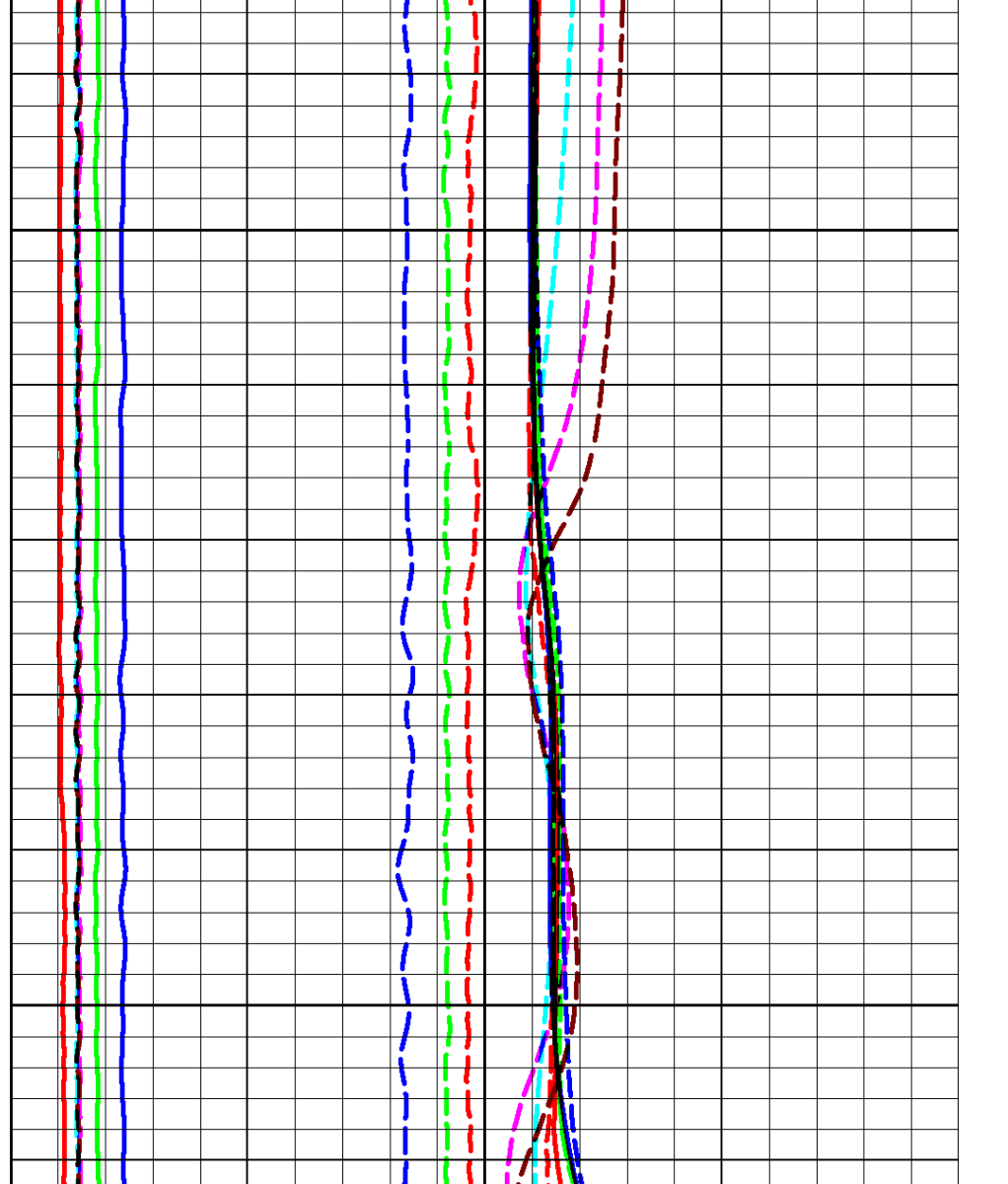
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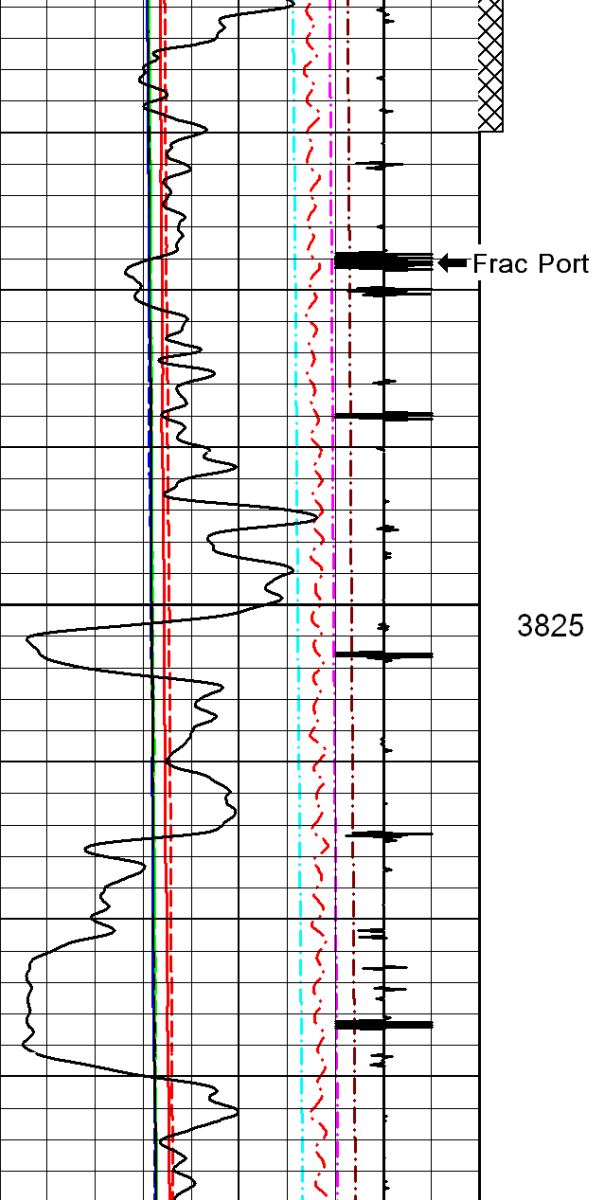




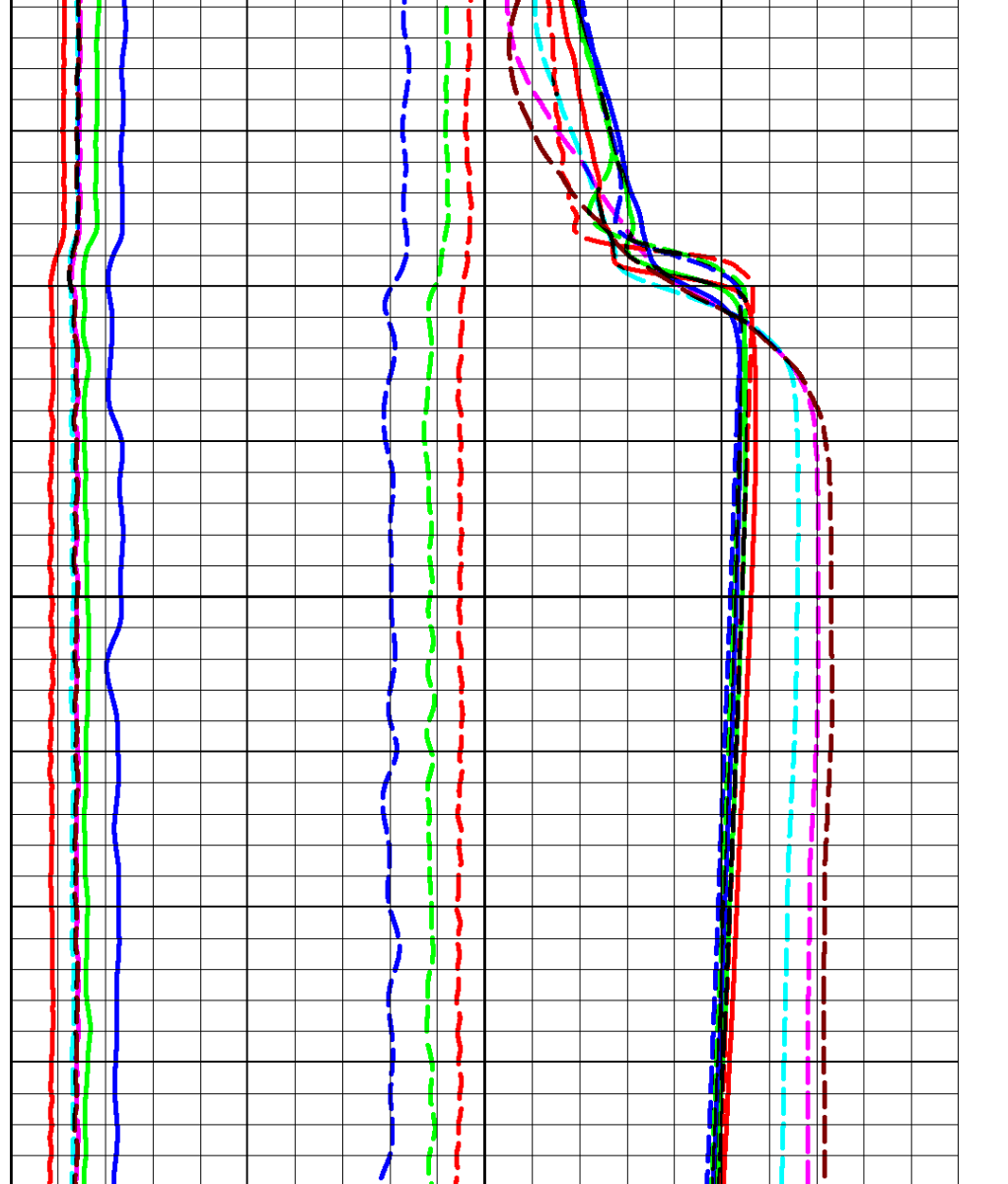
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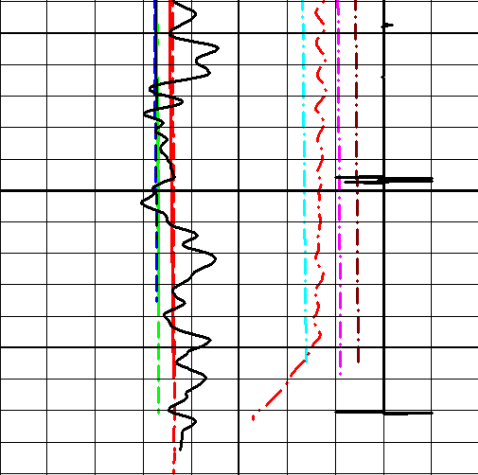
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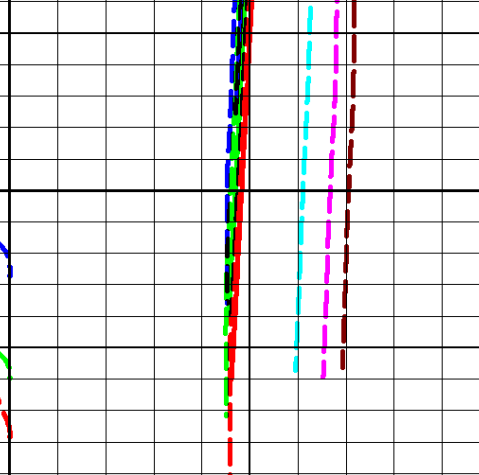
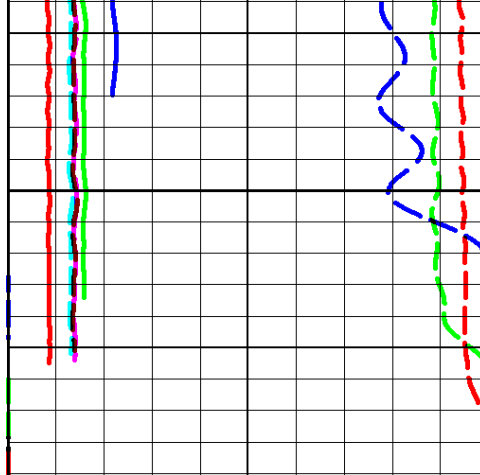


3825





3850



2011-10-07 09:59	
Tension_U8 (lbF)	
0.00	15000.00
Pressure 30m/min down_D2 (kPa)	
30000.00	50000.00
Pressure 30m/min up_U4 (kPa)	
30000.00	50000.00
Pressure 20m/min down_D5 (kPa)	
30000.00	50000.00
Pressure 20m/min up_U6 (kPa)	
30000.00	50000.00
Pressure 10m/min down_D7 (kPa)	
30000.00	50000.00
CCL_U8	
0.00	100.00
Gamma Ray_U8	
0.00	150.00
Pressure 10m/min up_U8 (kPa)	
30000.00	50000.00
Pressure 30min shut-in_D (kPa)	
30000.00	50000.00

3859.21

<u>Spinner 30m/min down_D2 (RPS)</u>		<u>Temperature 30m/min down (°C)</u>	
0.00	20.00	120.00	150.00
<u>Spinner Reverse 30m/min (RPS)</u>		<u>Temperature 30m/min up_U (°C)</u>	
20.00	0.00	120.00	150.00
<u>Spinner 20m/min down_D5 (RPS)</u>		<u>Temperature 20m/min down (°C)</u>	
0.00	20.00	120.00	150.00
<u>Spinner Reverse 20m/min (RPS)</u>		<u>Temperature 20m/min up_U (°C)</u>	
20.00	0.00	120.00	150.00
<u>Spinner 10m/min down_D7 (RPS)</u>		<u>Temperature 10m/min down (°C)</u>	
0.00	20.00	120.00	150.00
<u>Spinner Reverse 10m/min (RPS)</u>		<u>Temperature 10m/min up_U (°C)</u>	
20.00	0.00	120.00	150.00
<u>Spinner 30min shut-in_D1 (RPS)</u>		<u>Temperature 30min shut-i (°C)</u>	
0.00	20.00	120.00	150.00
<u>Spinner 60min shut-in_D1 (RPS)</u>		<u>Temperature 60min shut-i (°C)</u>	
0.00	20.00	120.00	150.00
<u>Spinner 90min shut-in_D1 (RPS)</u>		<u>Temperature 90min shut-i (°C)</u>	
0.00	20.00	120.00	150.00
Logging Down		File merge1.pre	
Shutin			

Pressure 60min shut-in D (kPa)

30000.00 50000.00

Pressure 90min shut-in D (kPa)

30000.00 50000.00

Pass No. 2

METERS  
1:240

090806

# SPINNER SURVEY STATION STOP @ 3340.0

2011-10-07 14:32

Pressure 10m/min down (kPa)

30000.00 50000.00

Pass No. 11

METERS  
1:240

Spinner 10m/min down (RPS)

0.00 20.00

Time Drive 10.00m/min

Shutin

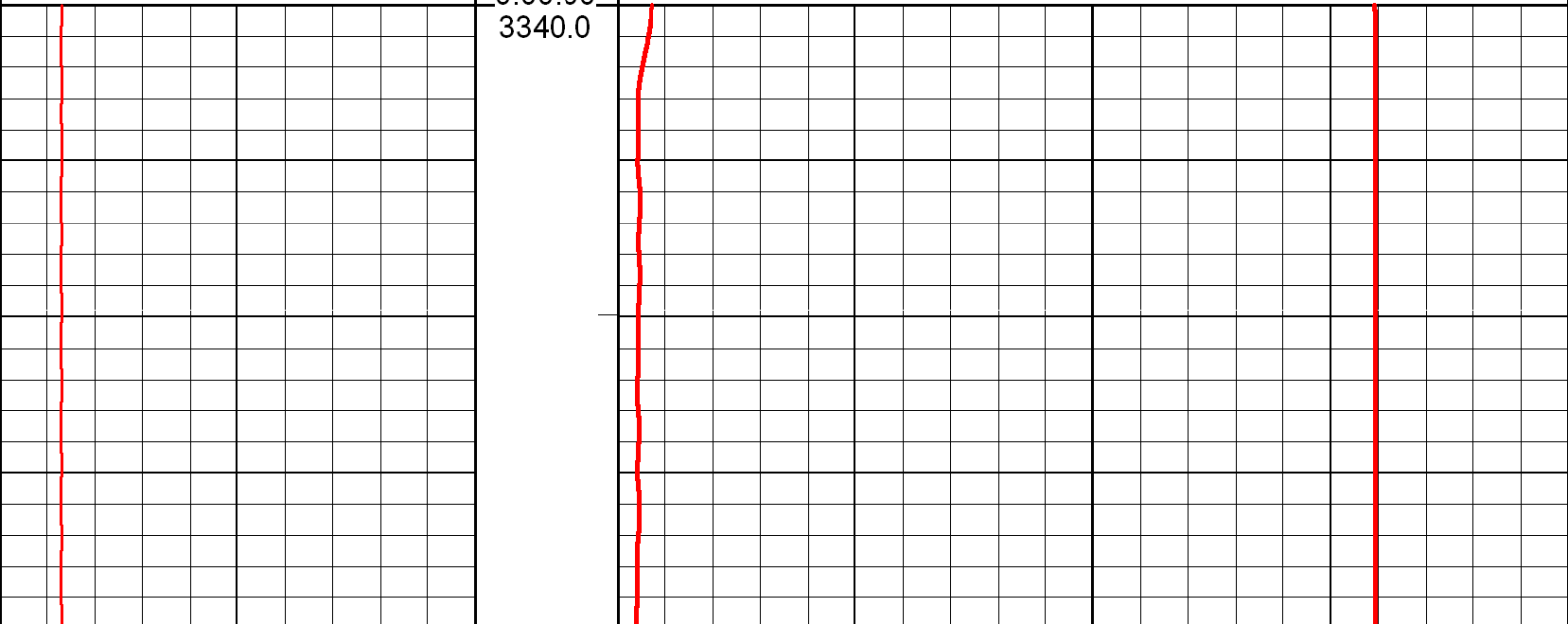
Temperature 10m/min down (°C)

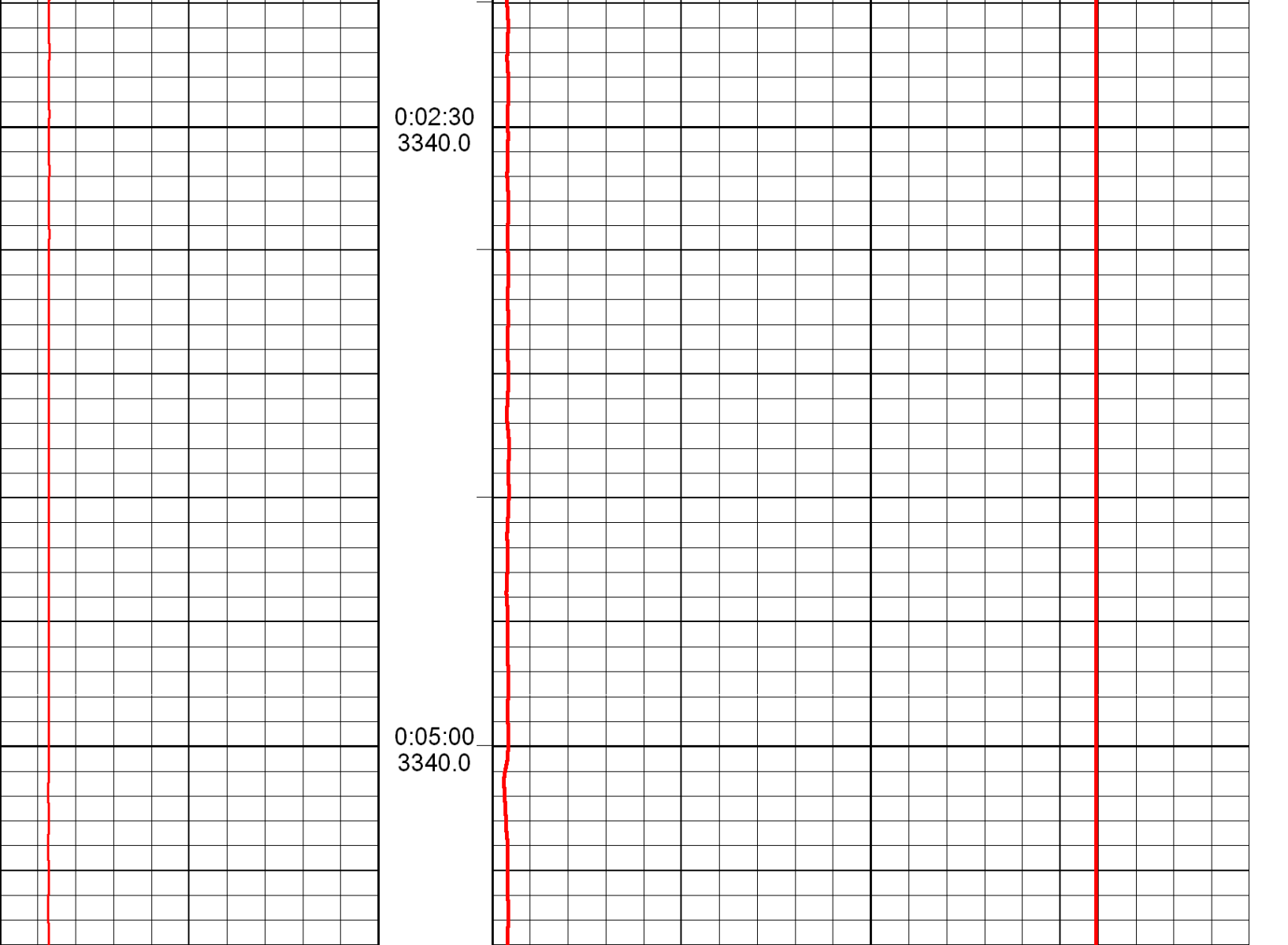
120.00 140.00

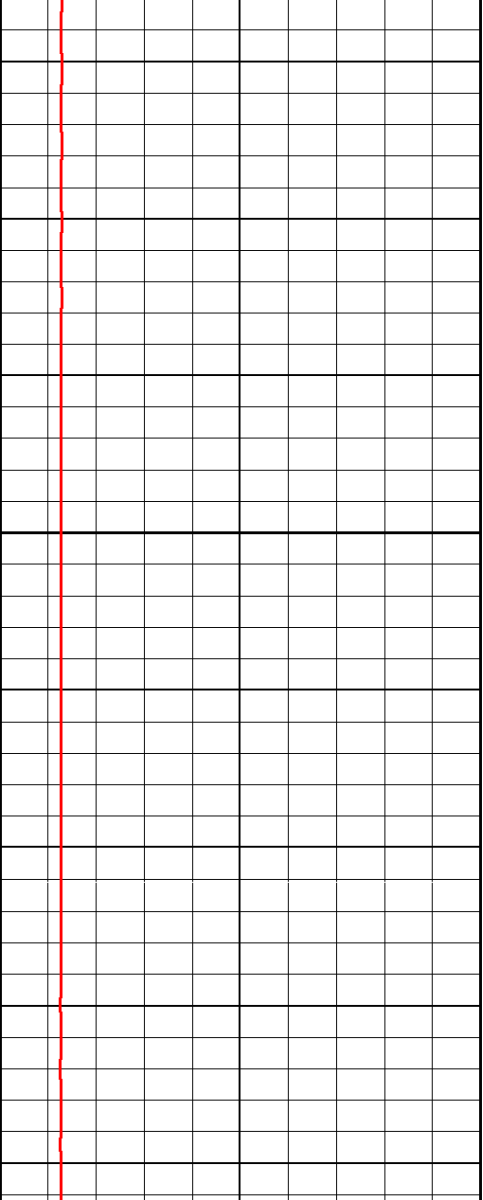
File 3340SS.pre

090806

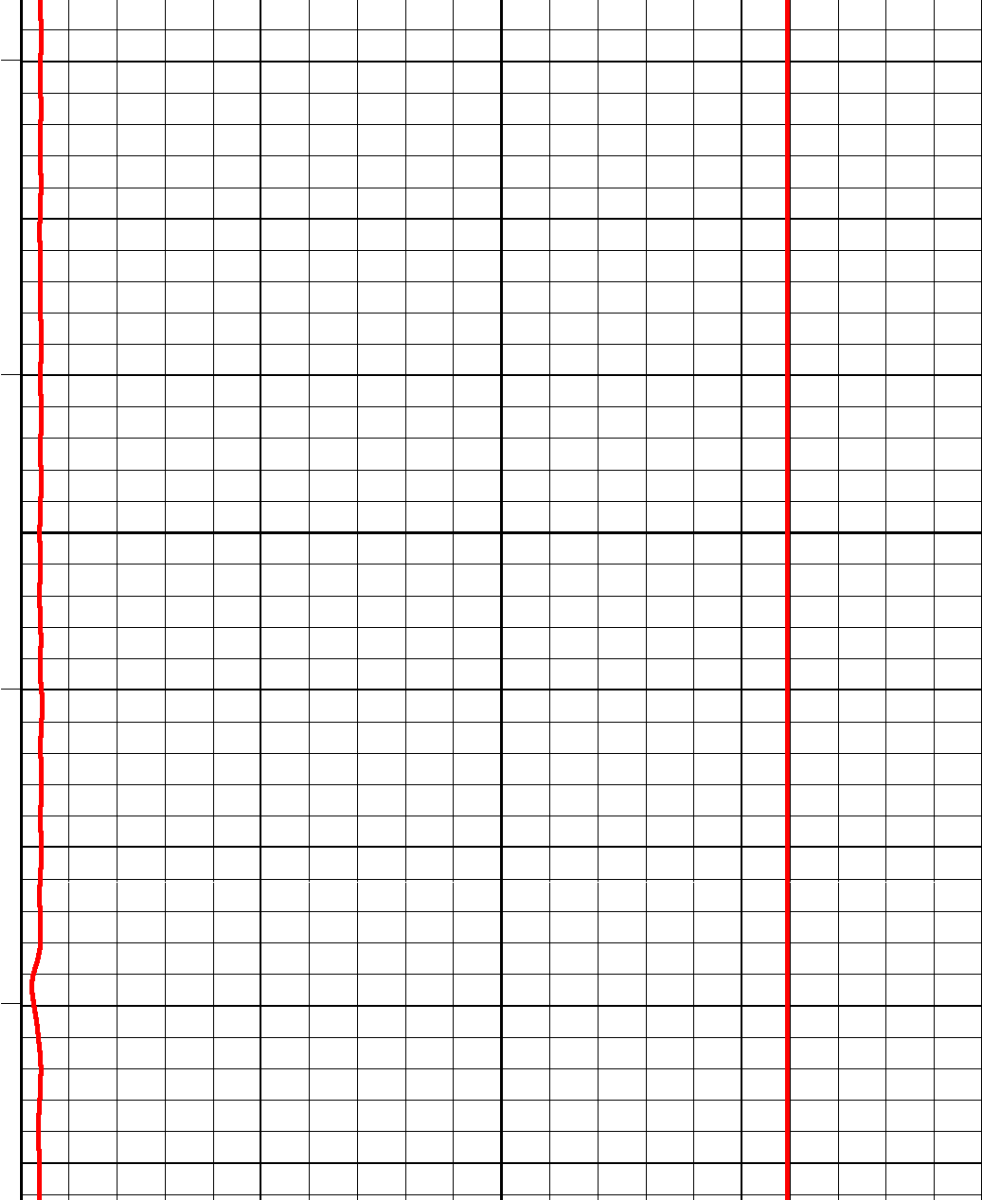
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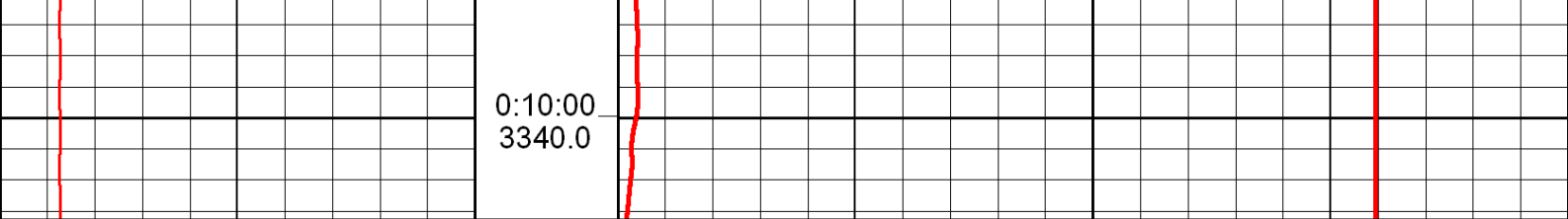






0:07:30  
3340.0

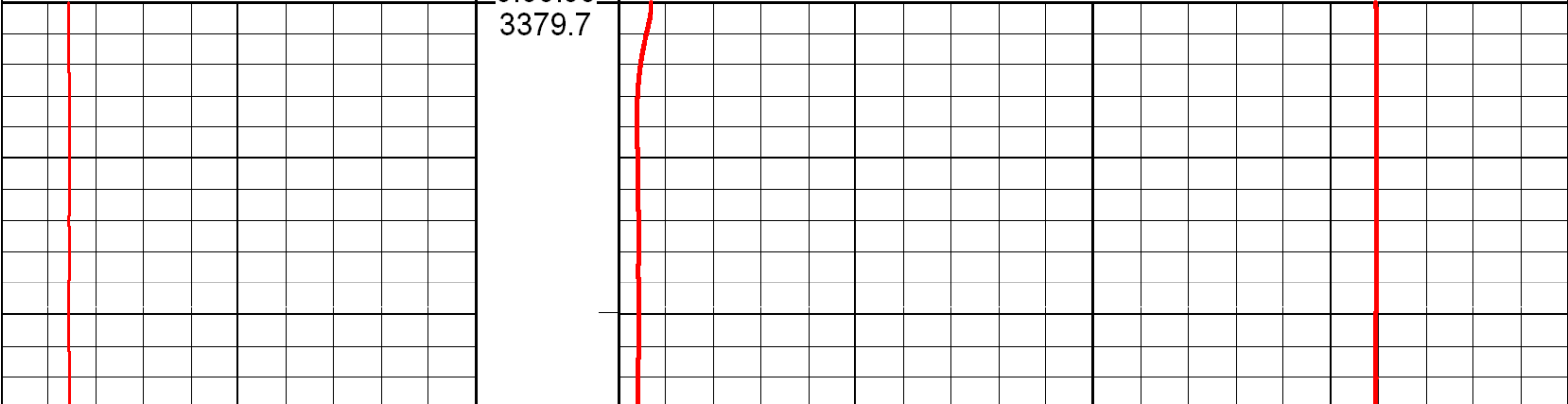




<p>2011-10-07 14:32</p> <p><u>Pressure 10m/min down (kPa)</u></p> <p>30000.00                      50000.00</p> <p>Pass No. 11</p>	<p>3339.97</p> <p>METERS</p> <p>1:240</p>	<p><u>Spinner 10m/min down (RPS)</u></p> <p>0.00                      20.00</p> <p>Time Drive 10.00m/min</p> <p>Shutin</p>	<p><u>Temperature 10m/min down (°C)</u></p> <p>120.00                      140.00</p> <p>File 3340SS.pre</p> <p>090806</p>
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# SPINNER SURVEY STATION STOP @ 3380.0

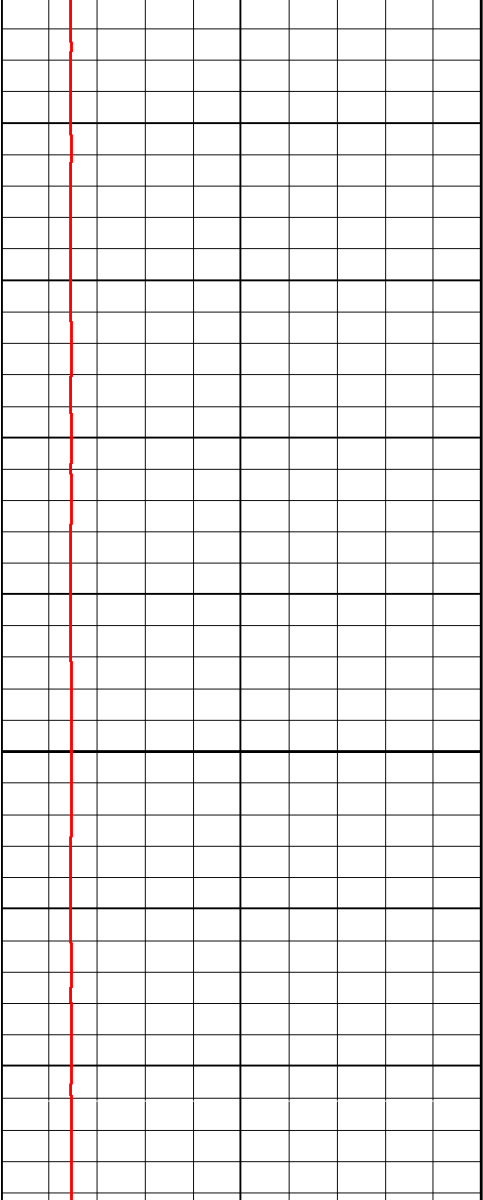
<p>2011-10-07 14:16</p> <p><u>Pressure 10m/min down (kPa)</u></p> <p>30000.00                      50000.00</p> <p>Pass No. 9</p>	<p>METERS</p> <p>1:240</p> <p>0:00:00</p>	<p><u>Spinner 10m/min down (RPS)</u></p> <p>0.00                      20.00</p> <p>Time Drive 10.00m/min</p> <p>Shutin</p>	<p><u>Temperature 10m/min down (°C)</u></p> <p>120.00                      140.00</p> <p>File 3380.0 SS.pre</p> <p>090806</p>
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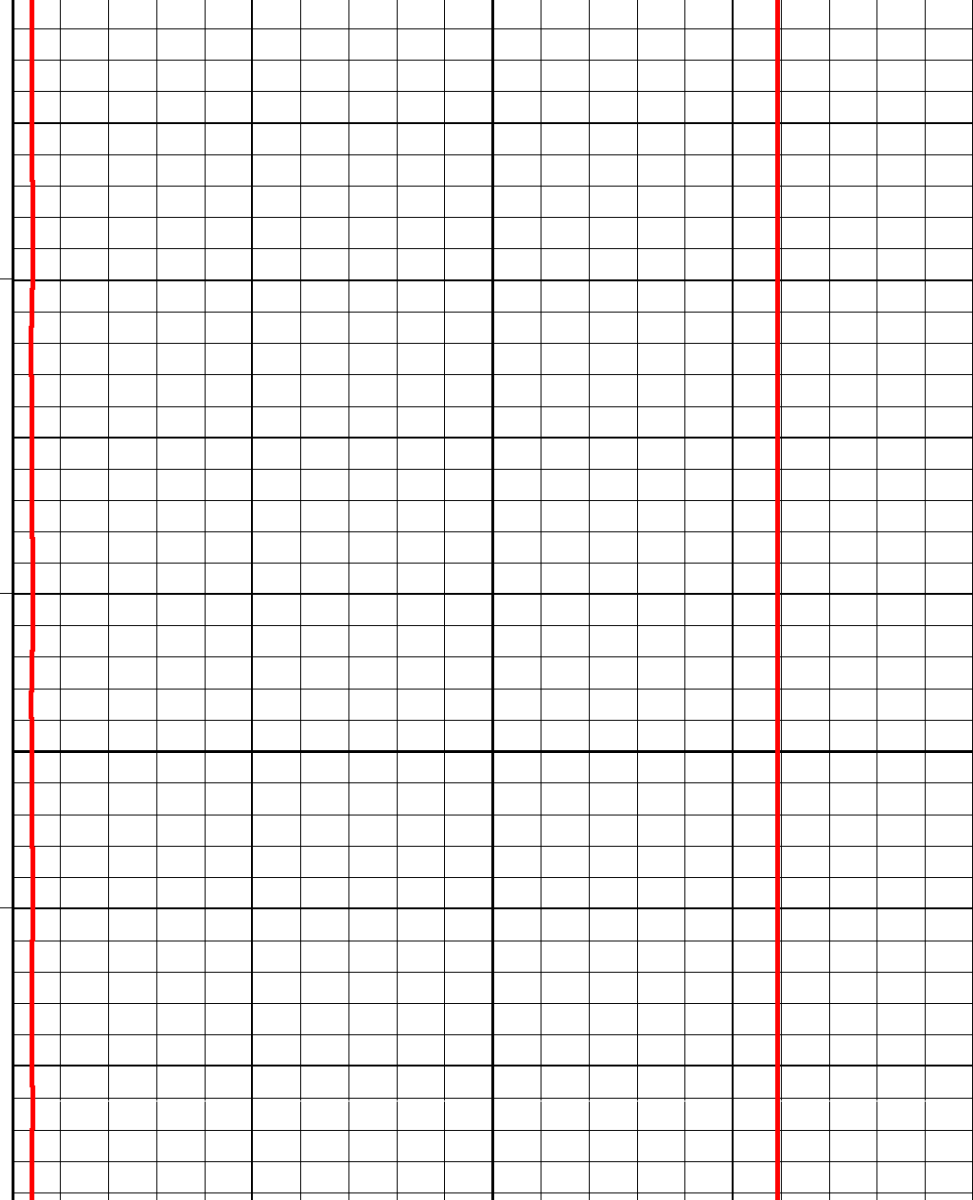


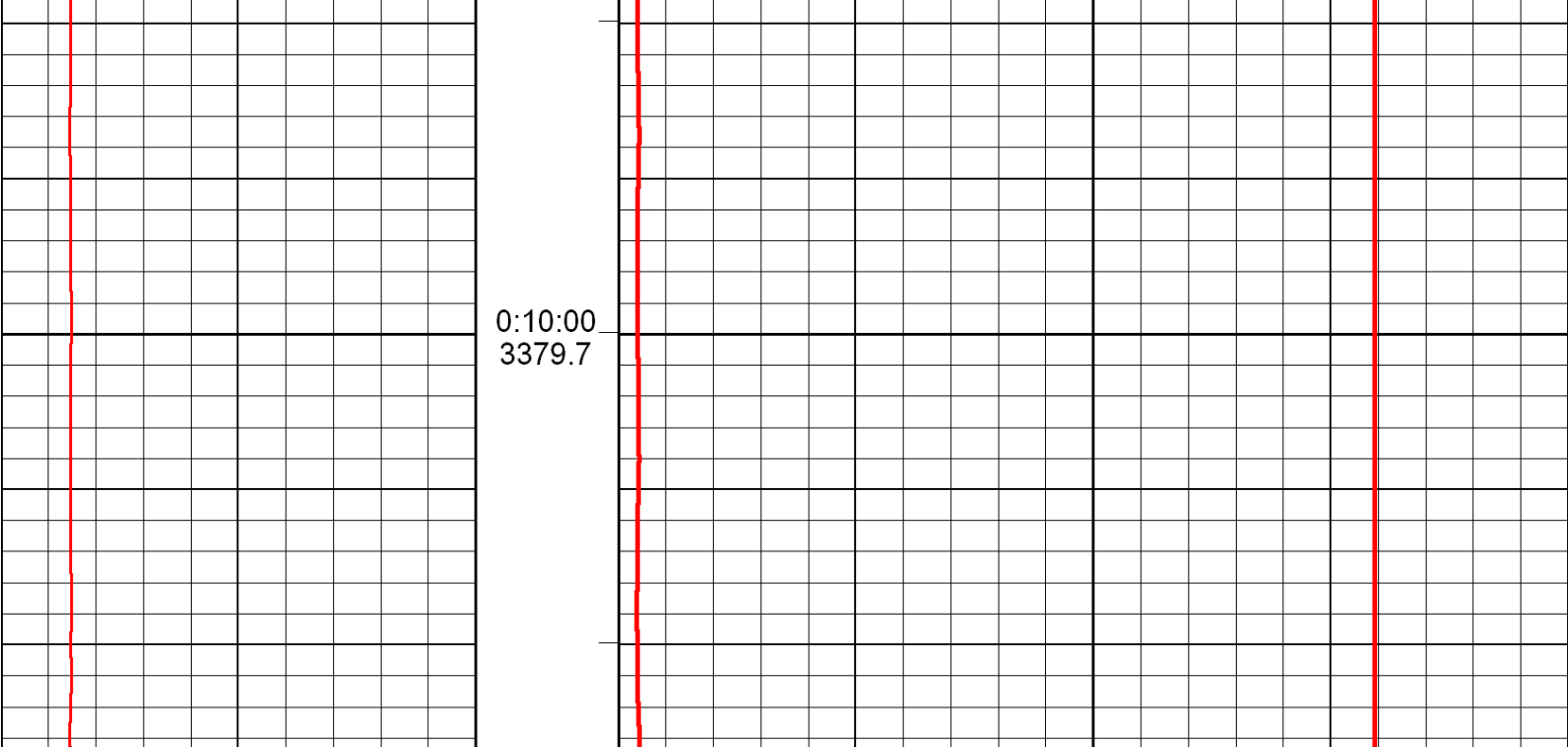
0:02:30  
3379.7

0:05:00  
3379.7



0:07:30  
3379.7





0:10:00  
3379.7

<p>2011-10-07 14:16  <u>Pressure 10m/min down (kPa)</u>          30000.00                      50000.00          Pass No. 9</p>	<p>3379.67           METERS          1:240</p>	<p><u>Spinner 10m/min down (RPS)</u>          0.00                                      20.00          Time Drive 10.00m/min          Shutin</p>	<p><u>Temperature 10m/min down (°C)</u>          120.00                                      140.00          File 3380.0 SS.pre           090806</p>
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# SPINNER SURVEY STATION STOP @ 3775.0

<p>2011-10-07 13:55</p>	<p>METERS</p>	<p><u>Spinner 10m/min down (RPS)</u></p>	<p><u>Temperature 10m/min down (°C)</u></p>
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Pressure 10m/min down (kPa)

1:240

0.00

20.00

120.00

140.00

30000.00

50000.00

Time Drive 10.00m/min

File 3775.0 SS9.pre

Pass No. 9

Shutin

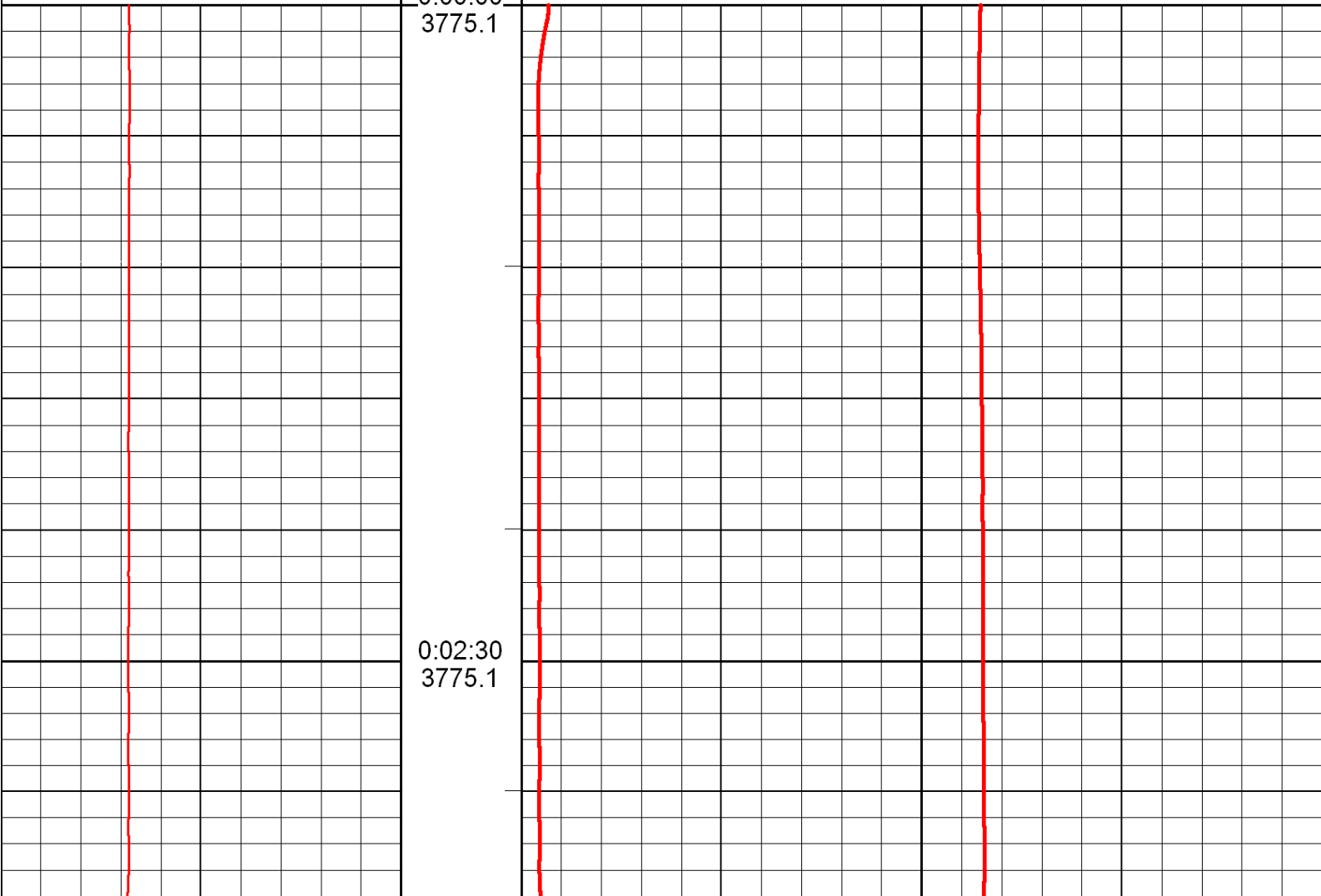
090806

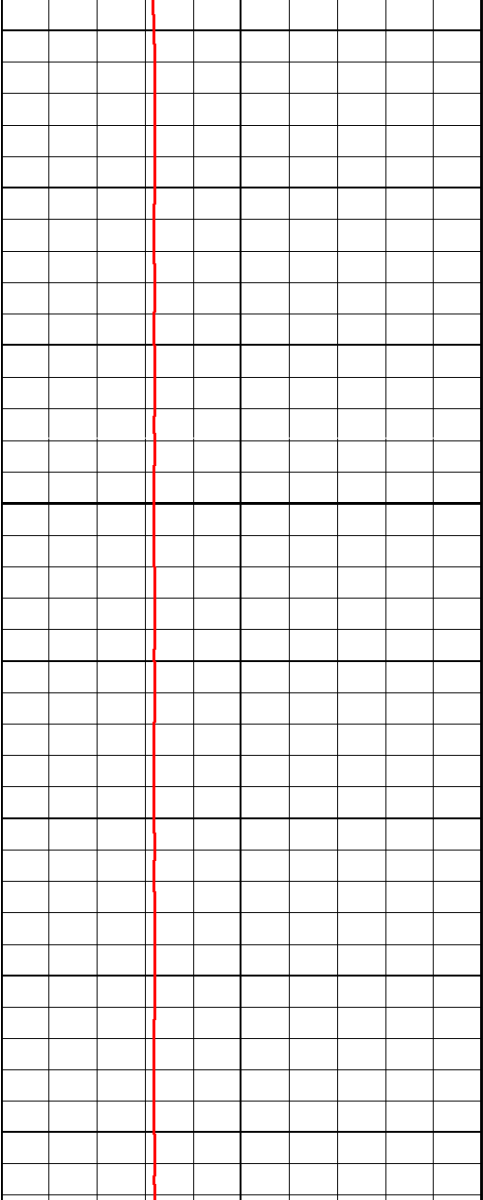
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3775.1

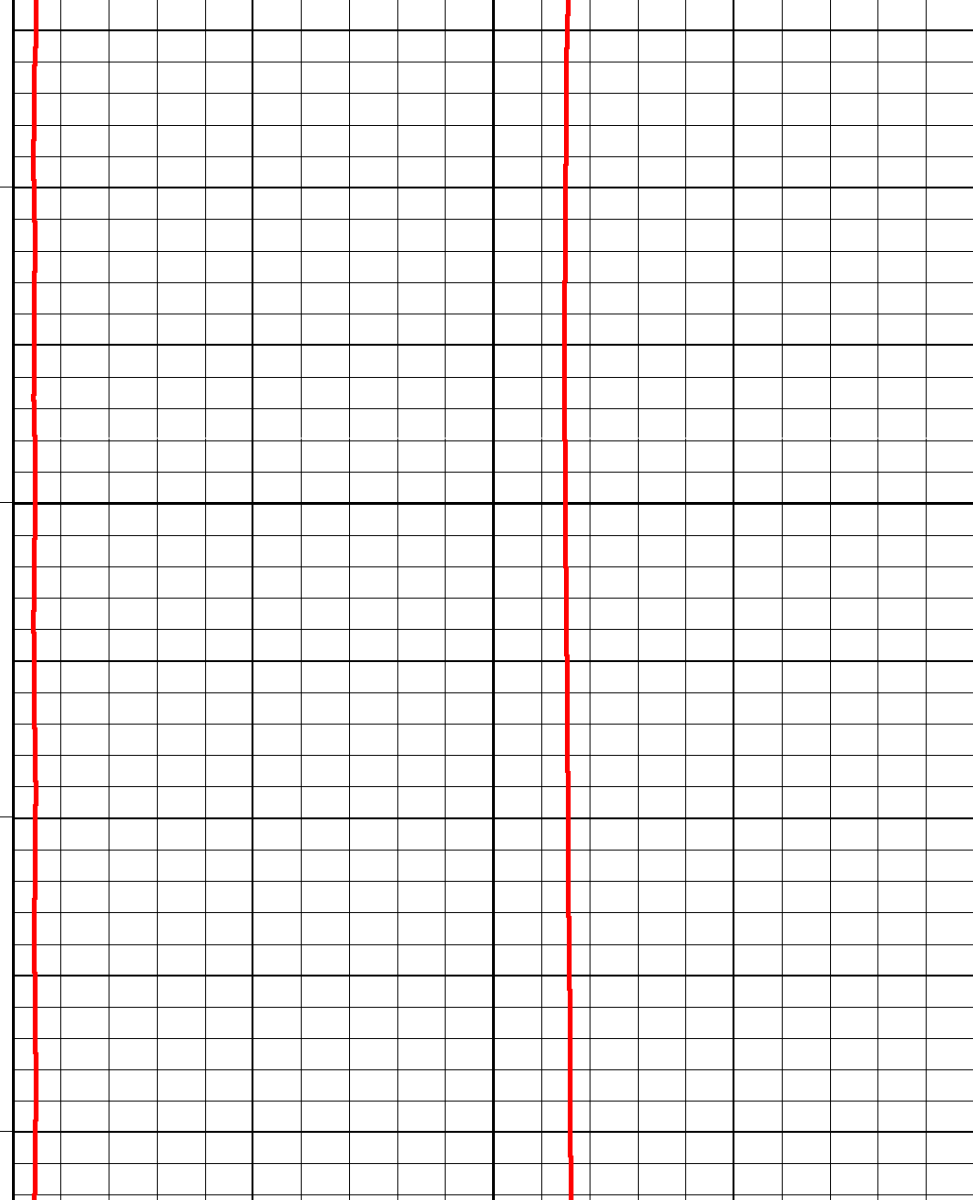
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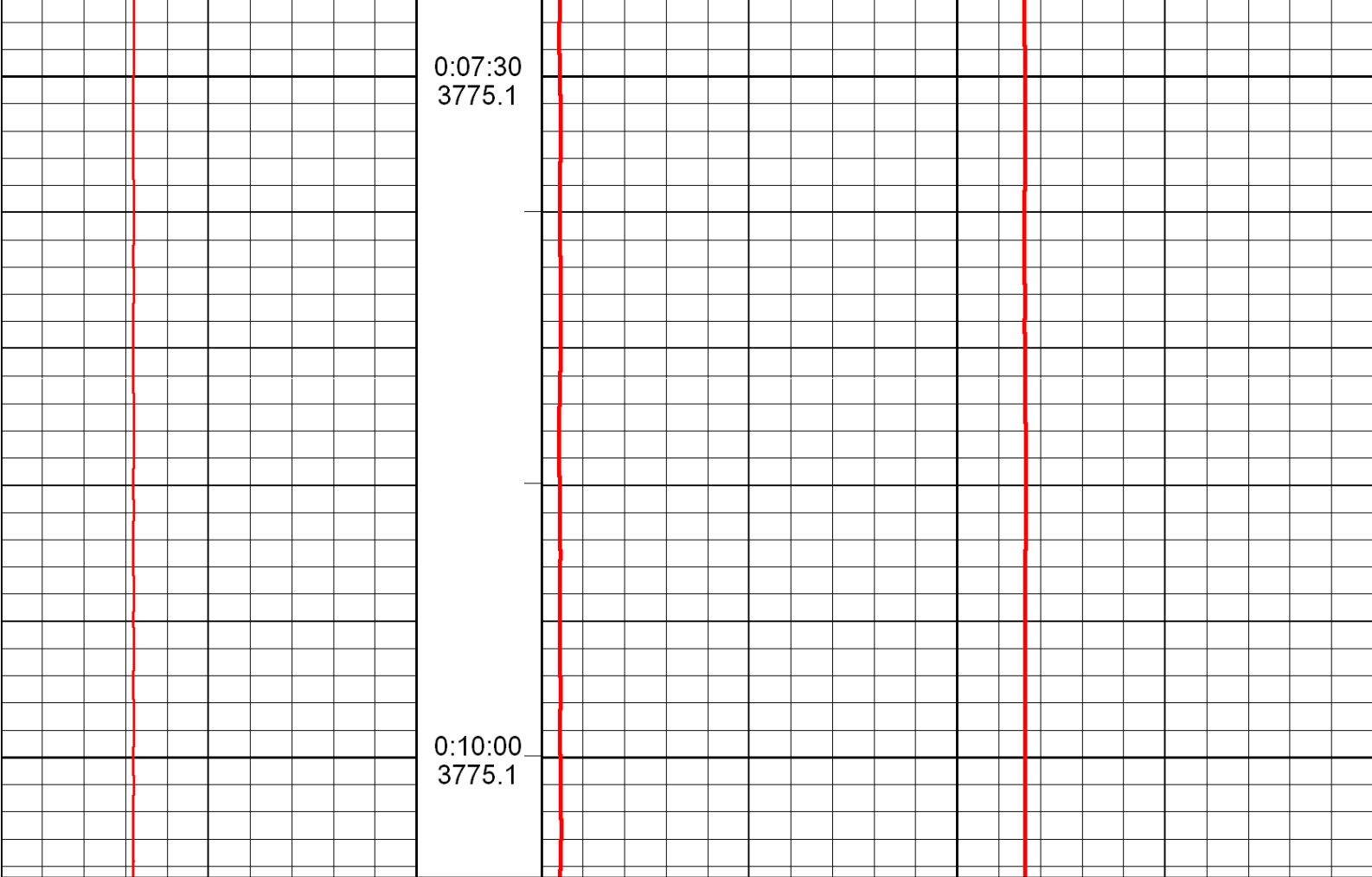
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0:05:00  
3775.1





0:07:30  
3775.1

0:10:00  
3775.1

2011-10-07 13:55  
Pressure 10m/min down (kPa)  
 30000.00 50000.00  
 Pass No. 9

3775.05  
 METERS  
 1:240

Spinner 10m/min down (RPS)  
 0.00 20.00  
 Time Drive 10.00m/min  
 Shutin

Temperature 10m/min down (°C)  
 120.00 140.00  
 File 3775.0 SS9.pre  
 090806

# SPINNER SURVEY STATION STOP @ 3825.0

2011-10-07 13:43

Pressure 10m/min down (kPa)

30000.00

50000.00

Pass No. 9

METERS

1:240

0:00:00

3825.1

0:02:30

3825.1

Spinner 10m/min down (RPS)

0.00

20.00

Time Drive 10.00m/min

Shutin

Temperature 10m/min down (°C)

120.00

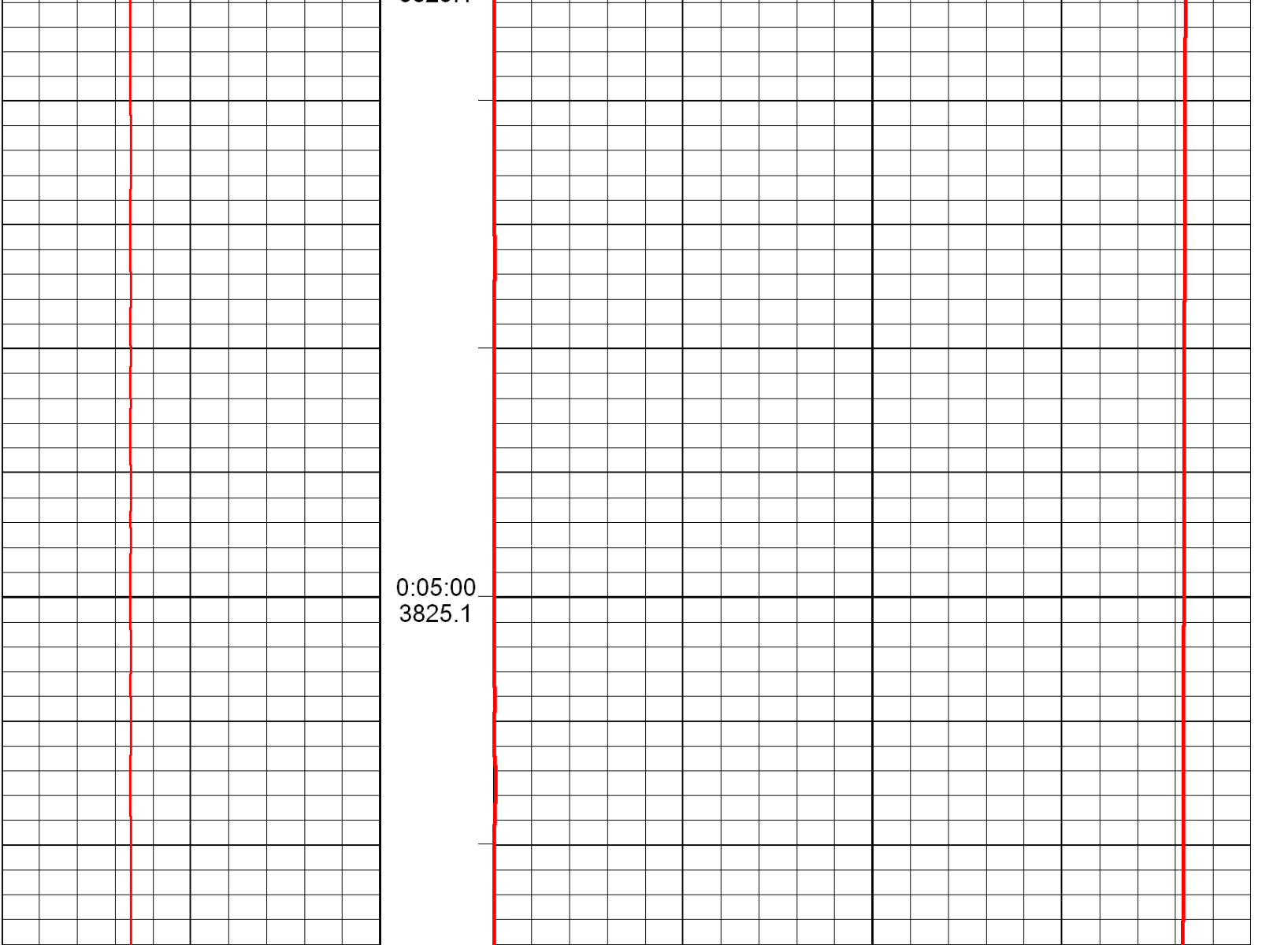
140.00

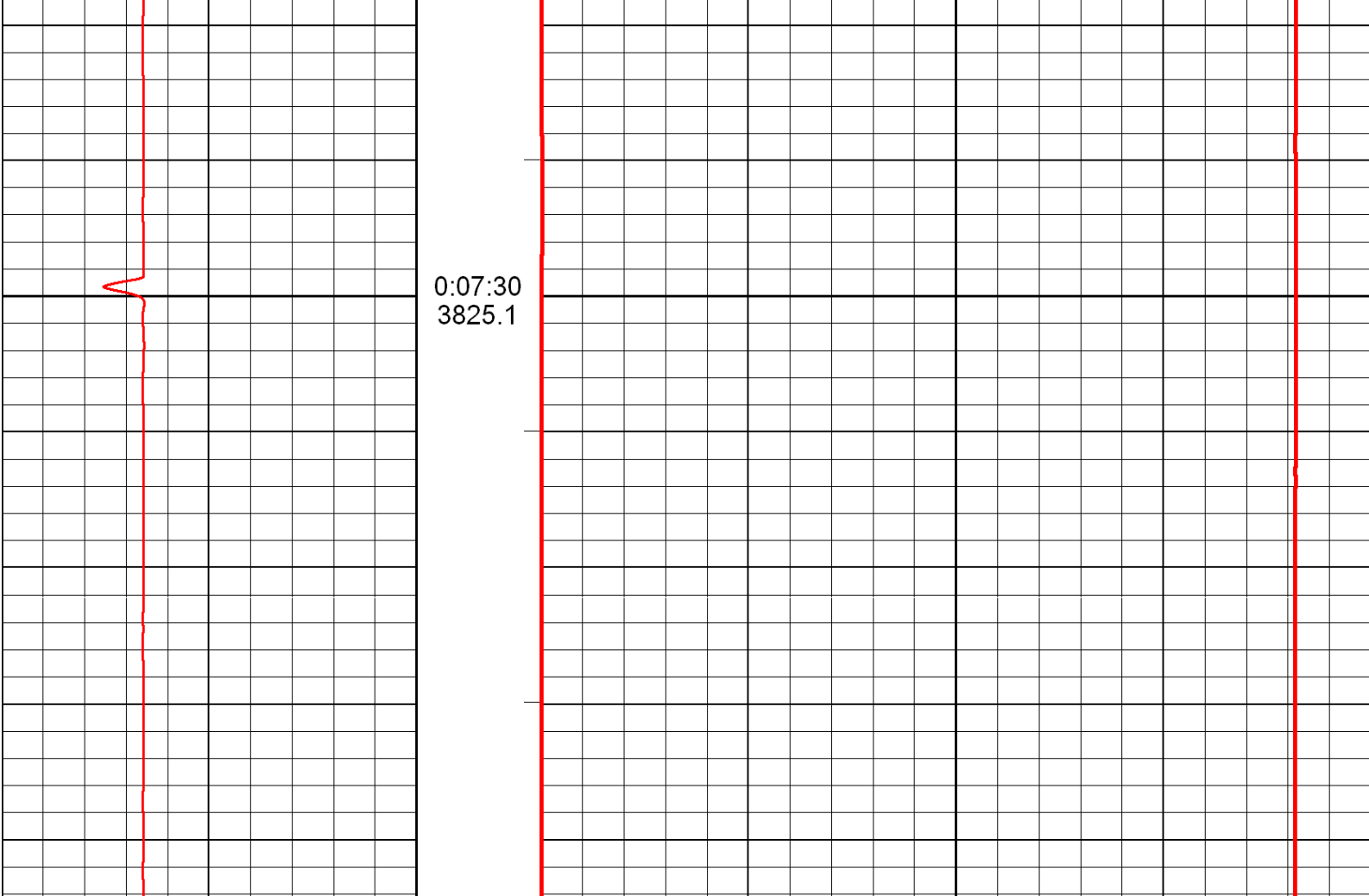
File 3825.0 SS8.pre

090806

3825.1

0:05:00  
3825.1





2011-10-07 13:43

Pressure 10m/min down (kPa)

3825.06

0:09:43

METERS

1:240

Spinner 10m/min down (RPS)

0.00

Time Drive 10.00m/min

Shutin

20.00

Temperature 10m/min down (°C)

120.00

File 3825.0 SS8.pre

140.00

090806

30000.00

50000.00

Pass No. 9



**Company** Lone Pine Resources Canada Ltd.

**Well** CDN Forest S. Pointed Mountain L-68

**Field** Pointed Mountain

**Province** Northwest Territories

**LSD.**            **SEC.**            **TWP.**            **RGE.**            **W.**

**THIN SECTION DESCRIPTION – GENERAL**

**SAMPLE DEPTH: 3360-3370 METERS**

**PLATE 1**

**Lithologies:**

**Major:** Slightly pyritic, slightly silty to silty, organic/solid hydrocarbon-rich, argillaceous chert  
**Minor:** Slightly silty, slightly pyritic, organic/solid hydrocarbon-rich, dolomitic, argillaceous chert

**Sedimentary Fabric:** Laminated to chaotic

**Grain Size Range:** <0.01mm-0.45mm

**Average Grain Size:** N/A

**Compaction:** Moderate

**Sorting:** N/A

**Framework Grains:**

**Minor:** Silt- to sand-sized quartz grains, elongated and compacted agglutinated foraminifera fragments, peloids, and dolomite-replaced, undifferentiated allochems

**Accessory:** Organic fragments

**Clay Content:**

**Detrital Matrix:** Abundant (visual est.: ~10%)

**Authigenic Clay:** Absent

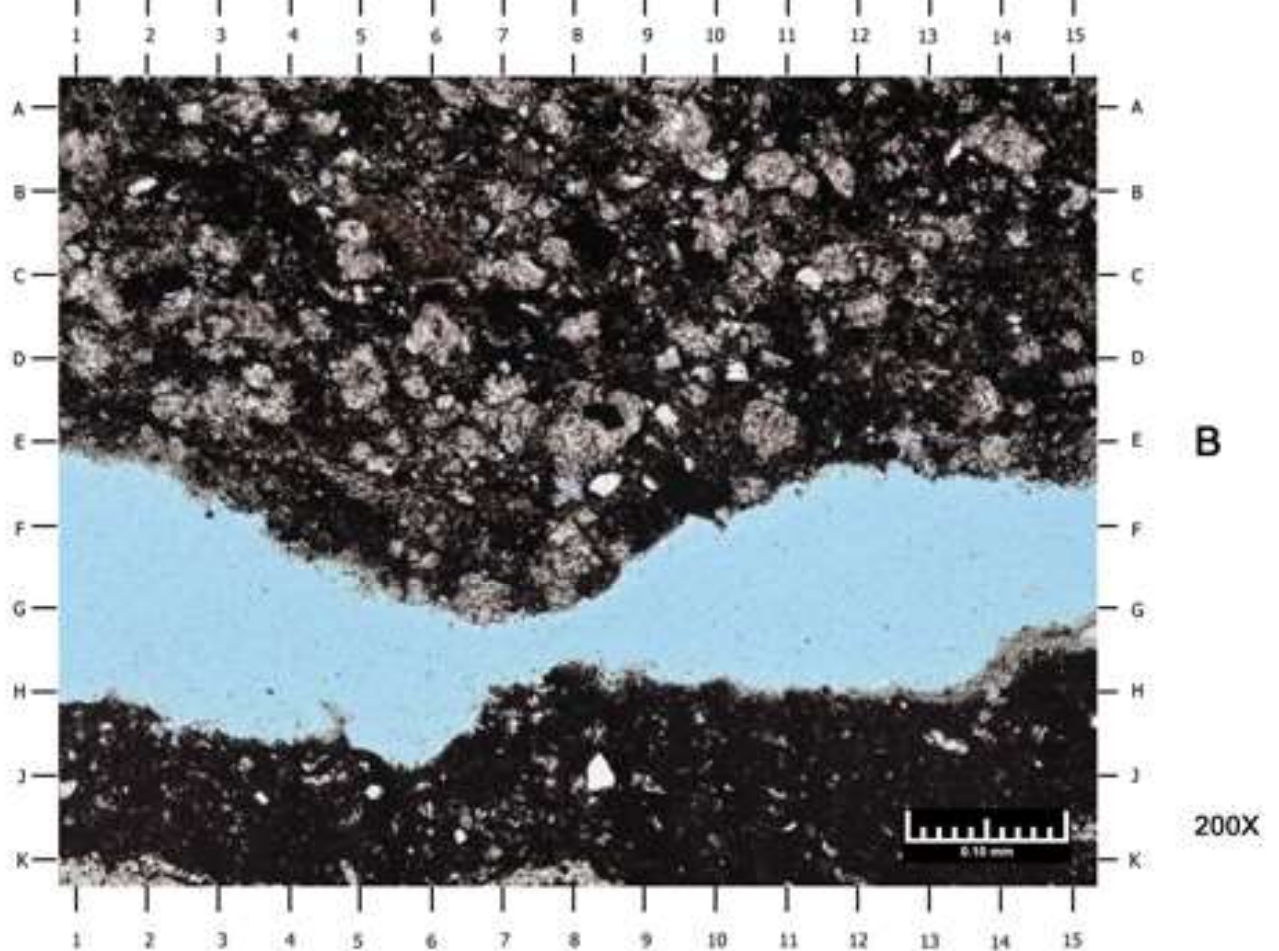
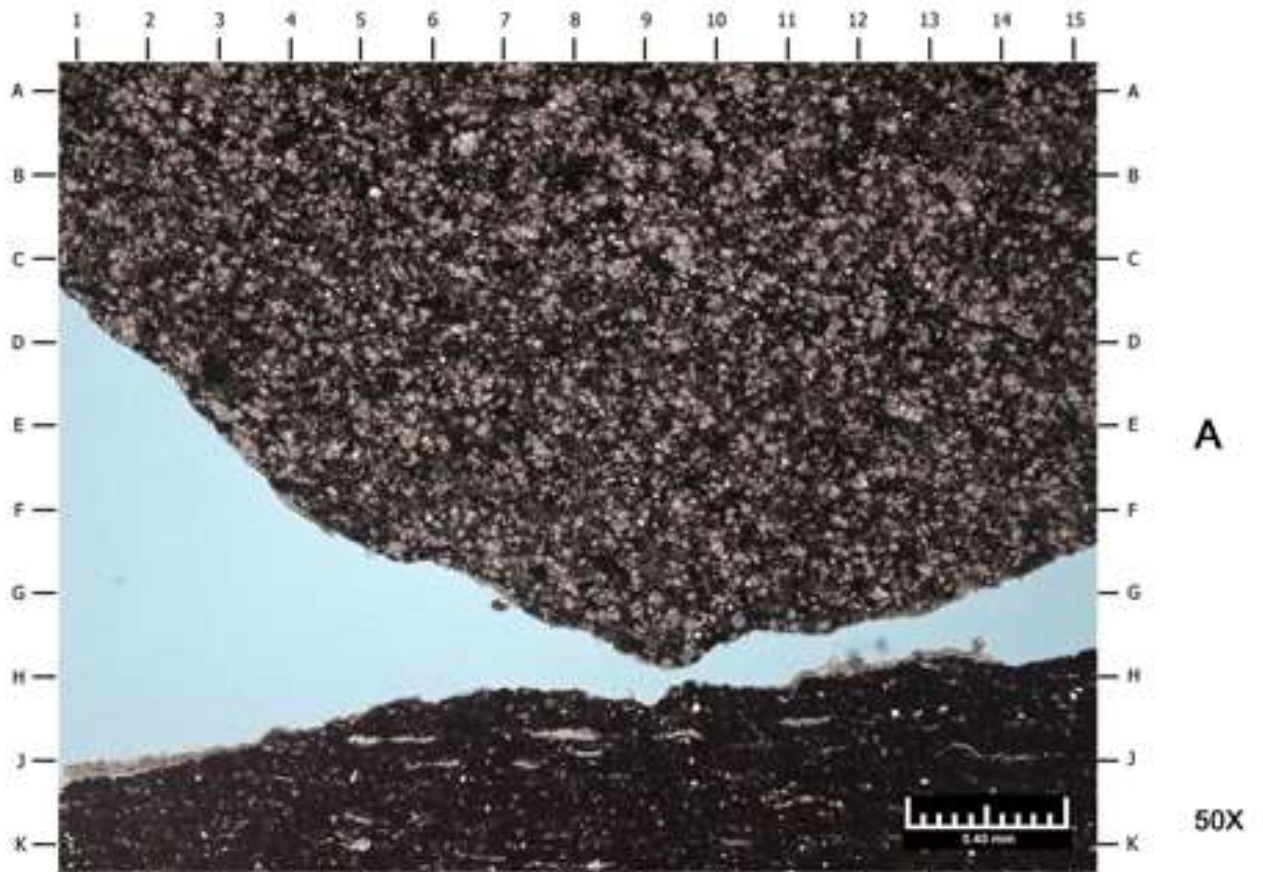
**Authigenic Minerals:** Common chert matrix; minor pyrite replacing organic fragments, organic/solid hydrocarbon material, and detrital clay matrix; minor dolomite replacing allochems and detrital matrix; rare ankerite replacing quartz and detrital matrix; rare organic/solid hydrocarbon and quartz occurring within vertical fractures

**Porosity Types:** Minor to rare vertical fractures are partially occluded by hydrocarbon and siliceous cement; enhanced porosity occurs within larger accumulations of bitumen that is most likely related to the desiccation of the hydrocarbon during sample preparation

**Reservoir Quality:** Poor (based on visual examination of thin section porosity)

**Magnification:** A: 50X B: 200X

- A) Slightly pyritic, slightly silty to silty, bitumen-rich argillaceous chert lithology (J1-K15)  
Slightly silty, slightly pyritic, bitumen-rich, dolomitic, argillaceous chert lithology (A1-F15)  
Dark coloration of cuttings fragments (D-E3,J12.5) is related to bitumen and detrital clay content, much of which has been replaced by pyrite
- B) Magnified view of the area near H9.5 in Plate 1A  
Dolomite-replaced, undifferentiated allochems (B-C5,C12,D-E11)  
Silt-sized detrital grains of quartz (E-F9.5,H-J8.5,J5)  
Compacted agglutinated foraminifera fragments (below K1.5,K7.5)



**Canadian Forest Oil  
45776  
L-68-60-20-123-45  
Canada  
Cuttings**

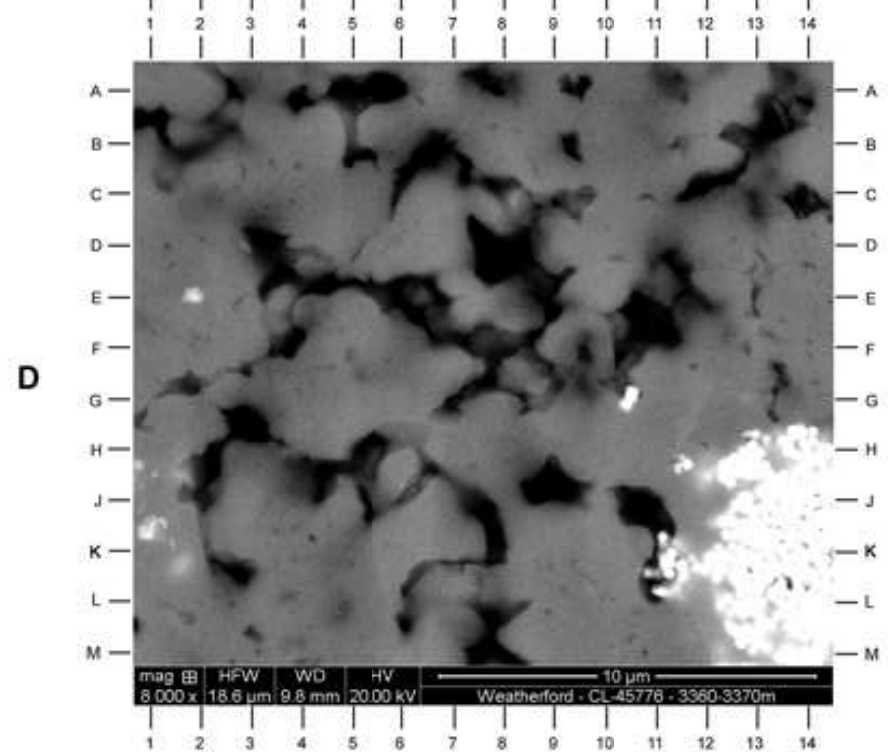
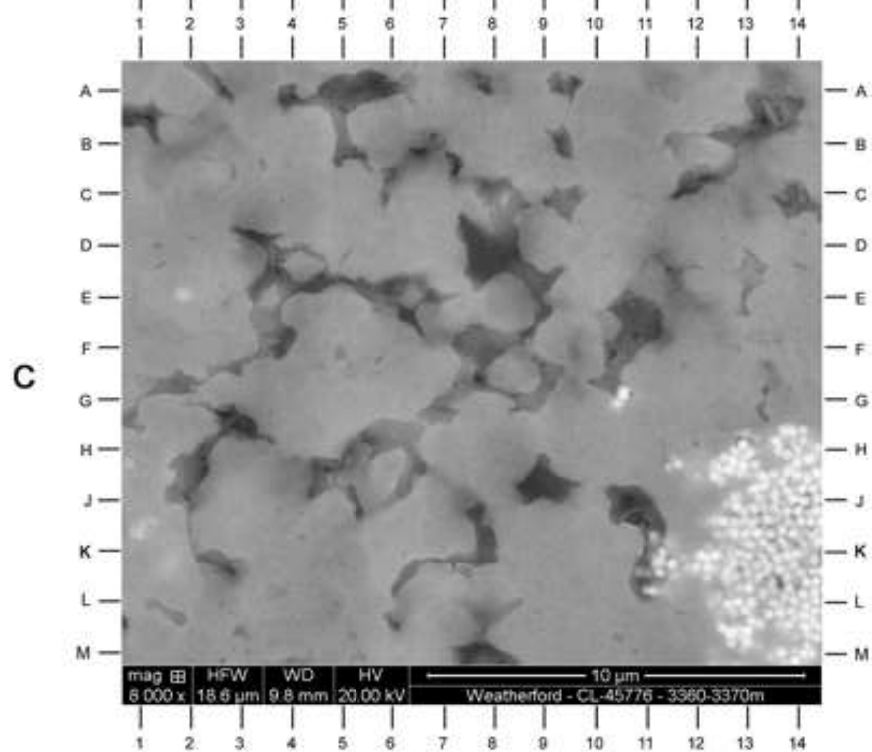
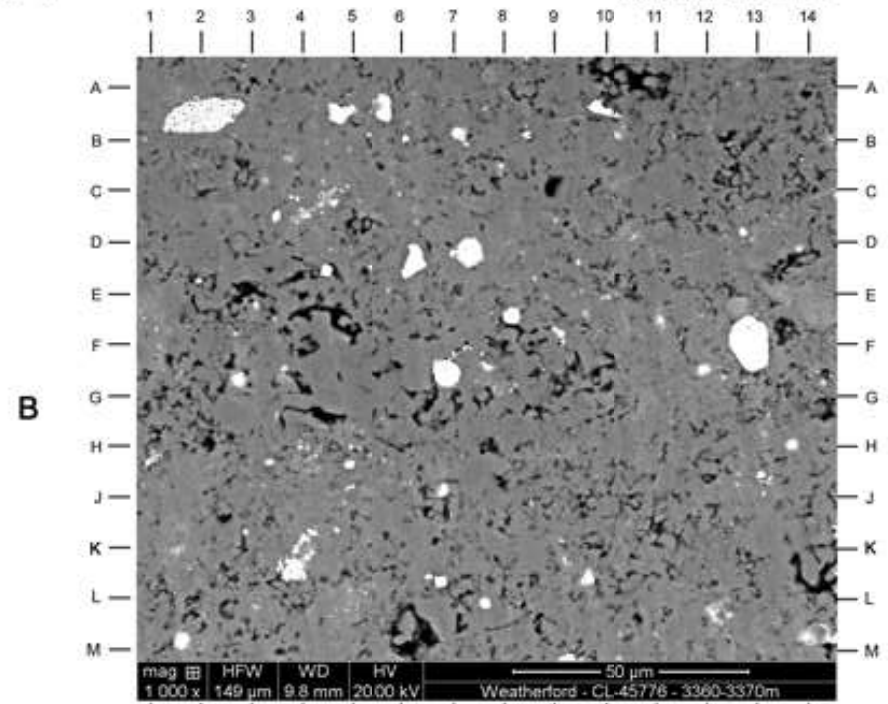
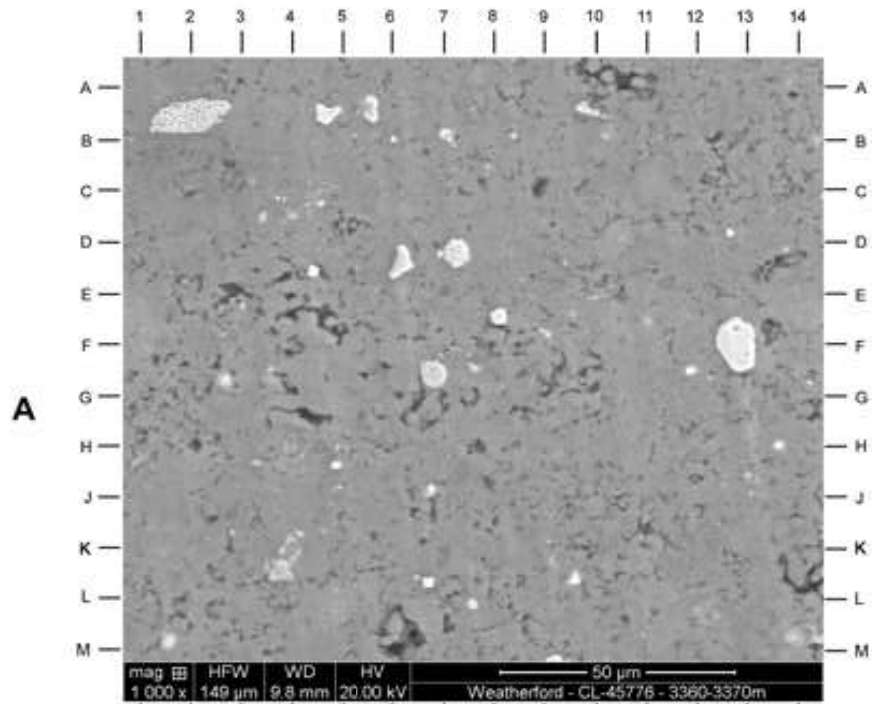
**Weatherford File No.: CL-**

**SAMPLE DEPTH: 3360-3370 METERS**

**SEM PLATE 1**

The images provided represent identical views (A & B, C & D) within the field emission environmental scanning electron microscope, but different methodologies. Images A & C represent secondary electron images while B & D represent backscattered electron images. Backscattered electron (BSE) images display gray scale atomic number contrast; whereas secondary electron (SE) images illustrate surface topography. The lighter gray material (photo A; D12 / photo B; F-G5 / photo C; D2 / photo D; H9.5) represents the predominantly chert-rich matrix of this sample, while organic material and porosity is typically dark to black (photo B; E-F4.5,L-M6 / photo D; A-B5,D8,H-J2). High density minerals, such as pyrite (photo A; A-B2,F-G6.5 / photo C; H-M14), are bright white due to the gray scale atomic number contrast. Minor nano-sized pores (photo C; A-B13.5,D-E3.5,F10.5,J-K11) are visible within the solid, organic/hydrocarbon-rich material.

**Magnification: A: 1000X B: 1000X C: 8000X D: 8000X**



**Canadian Forest Oil  
45776  
L-68-60-20-123-45  
Canada  
Cuttings**

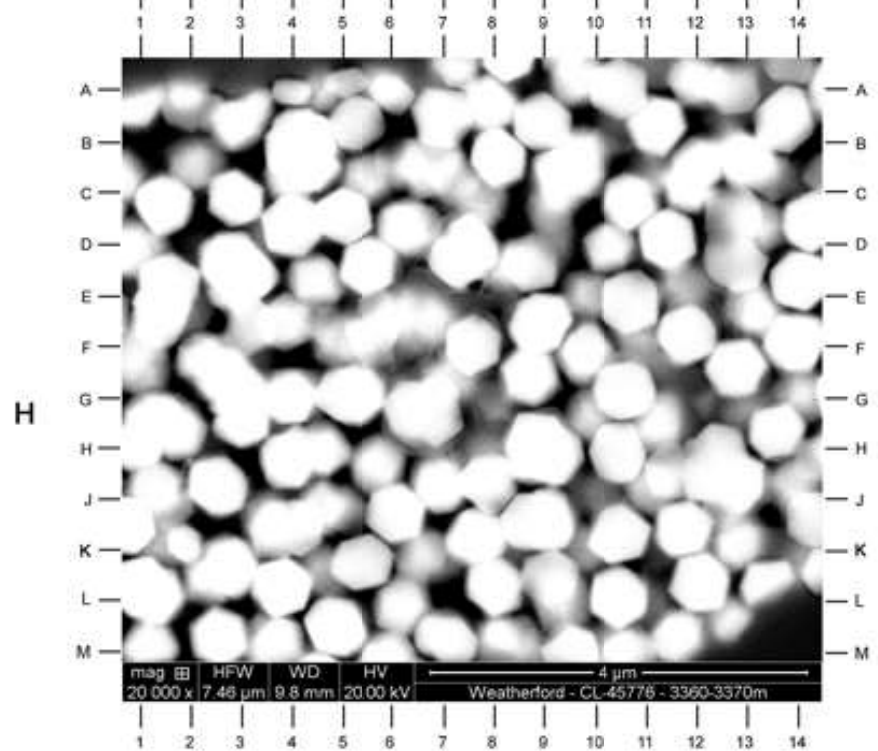
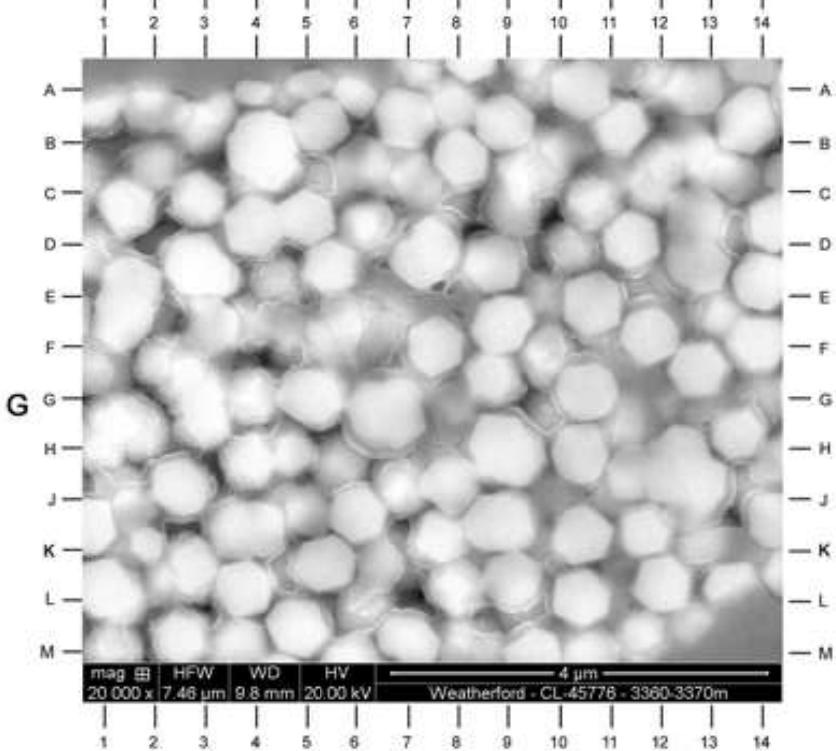
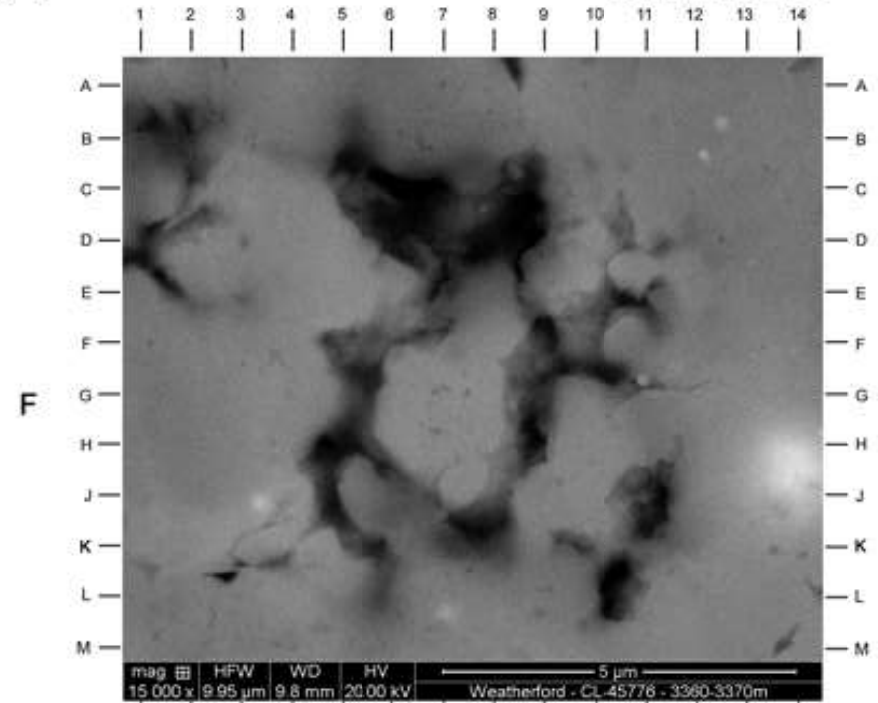
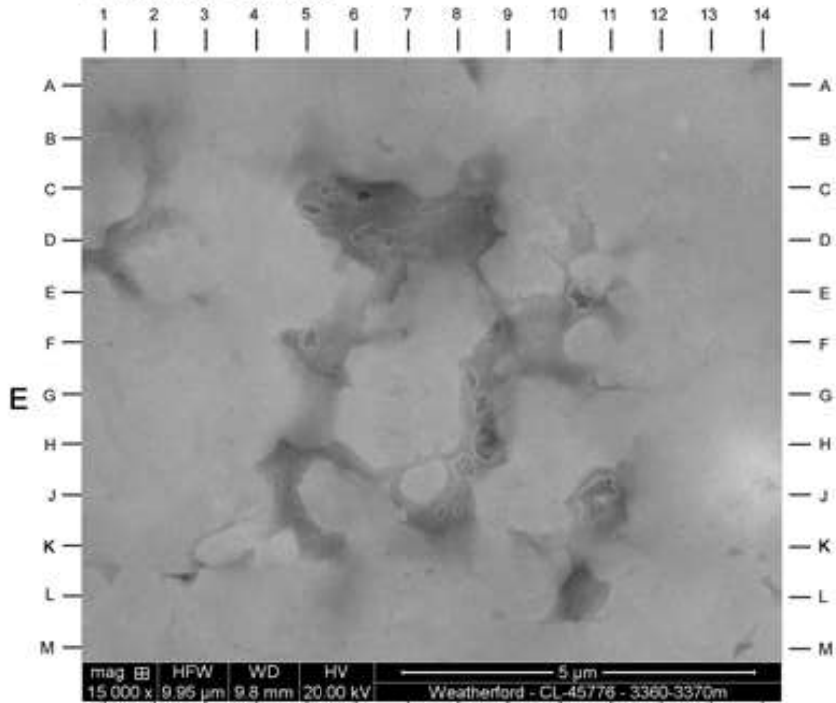
**Weatherford File No.: CL-**

**SAMPLE DEPTH: 3360-3370 METERS**

**SEM PLATE 1**

Nano-sized micropores (photo E SE image; C-D5,D6,H8.5,J10.5) occur within abundant solid, organic/hydrocarbon material in this chert-rich sample. Hydrocarbon incompletely occludes the intercrystalline spaces between chert crystals (photo F BSE image; B12,G2,G-H7.5), within which reside the poorly interconnected nanopores. Intercrystalline nanopores (photo G SE image; C-D8,D10,G9.5,L7) occur within clusters of microcrystalline pyrite (photo H BSE image; A1-L14), with organic/hydrocarbon material lining the walls of the intercrystalline spaces (photo G SE image; J13,L-M7.5,J-K2).

**Magnification: E: 15000X F: 15000X G: 2000X H: 20000X**



**Canadian Forest Oil  
45776  
L-68-60-20-123-45  
Canada  
Cuttings**

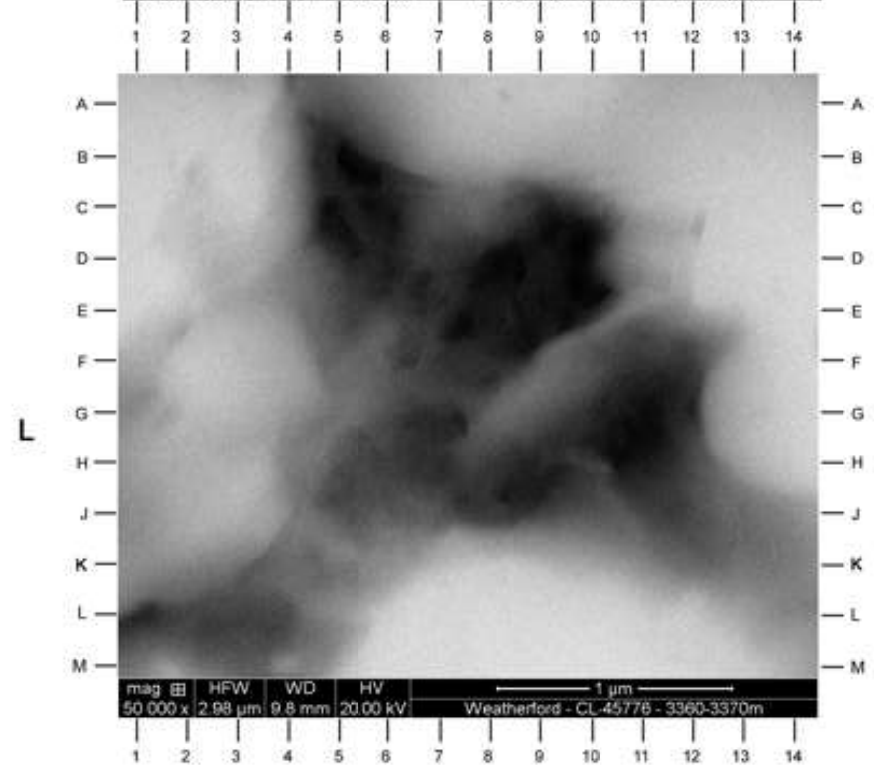
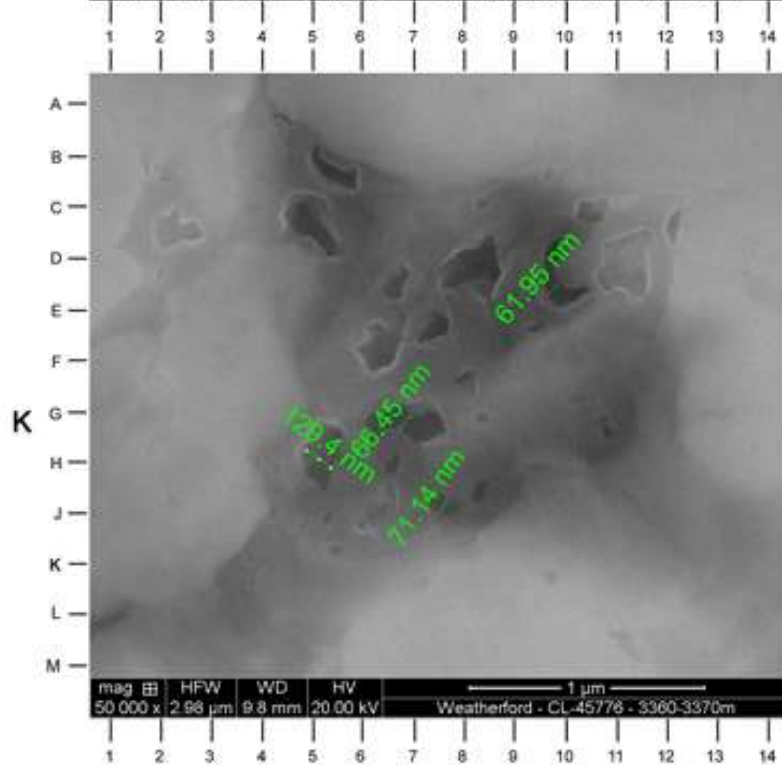
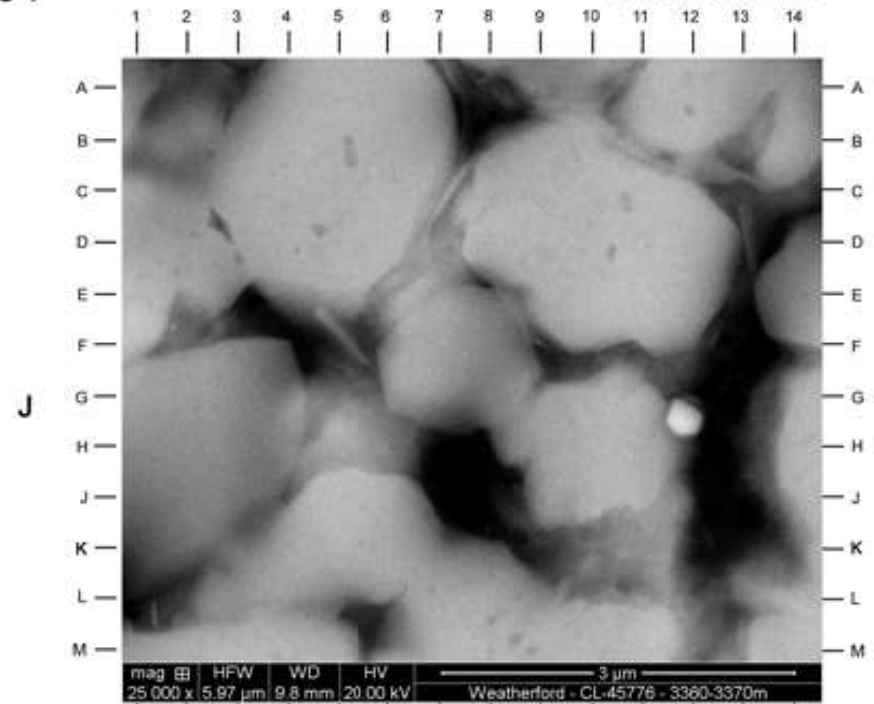
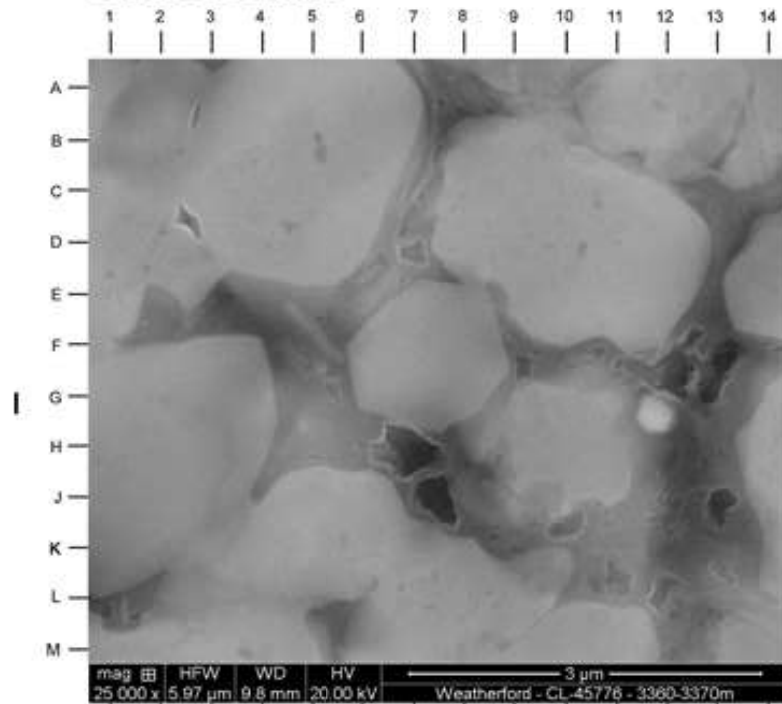
**Weatherford File No.: CL-**

**SAMPLE DEPTH: 3360-3370 METERS**

**SEM PLATE 1**

Solid, organic/hydrocarbon material (photo J BSE image; A-B8,C-D13,L-M1.5 / photo L BSE image; A4.5H11,M2.5) supports chert crystals in this sample by occluding intercrystalline pores. Nano-sized pores (photo I SE image; D7,F-G12,H7,L12 / photo K SE image; C-D2,D8,D11.5,H5) occur within the hydrocarbon material, but are erratically distributed and are poorly interconnected. Organic fragments and solid hydrocarbon are often replaced by authigenic pyrite (photo I; G-H11.5).

**Magnification: I: 25000X    J: 25000X    K: 50000X    L: 50000X**





Type of log: Cement Bond Log

Location: L-68-60-20-123-45

Company: Lone Pine Resources

Prepared for: Mr. Dana Roney

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**Objective:**

- To confirm cement in wellbore for perforating of intended zones to indicate isolation of these zones with cement and determine the cement integrity throughout the logged intervals.

**Well Configuration:**

- Surface Casing 508.0mm x 139.89kg/m from Surface to 165.0mKB
- Surface Casing 339.73mm x 107.15kg/m from Surface to 1424.0mKB
- Production Casing 244.48 x 64.7kg/m From Surface to 3297.0m
- Liner 177.8mm x 38.69kg/m from 3237.8 to 4130.0m

**Procedure:**

- On September 4th, 2011 Encore performed a Radial Cement Bond log on this well from 3990m to 3850 on the Lower Muskwa @ 0 MPA. We also performed a Radial Cement Bond Log on the Upper Muskwa @ 0 MPA from 3875m to 3400m and also on the Exshaw formation from 3400-3225m and then ran a pressure pass on the Exshae Intermediate section from 3560-to Liner Hanger located at 3237.8m. We then performed a CBL log in the 9 5/8" Casing from the liner hanger to 2000m.



## Summary and Conclusions:

Starting with the lower Muskwa we see great cement bond from both the formation and the cement to pipe. The Amplitude map which is a representation of the 360 degree view of the cement shows very good cement with the dark shading and the grey shading. There is no concern with this portion of the well and the isolation you will see with the perforation intervals at 3948-3953 and 3935-3940m actually shows both intervals being isolated from each other from the cement in this portion of the well. With this portion of the log there is no concern with cement integrity from this portion of the well.

The upper Muskwa portion of the well from a CBL standpoint also shows good cement bond through out this portion of the log from 3875m to 3400m and good isolation for the perforated intervals located at 3805-3810 & 3784-3789m. This good cement bond continues up hole to the Exshaw formation perforations located at 3365-3370 & 3351-3356m. There is great cement showing all through this portion of the well into the 80% Bond index all through the zones logged.

Prepared By:

Steve Langan

Sales Manager

Encore Dataline



DUAL SPACED  
 CEMENT BOND  
 GAMMA-RAY / CCL  
 RADIAL CEMENT EVALUATION

FILING # LSD.- SEC.- TWP.- RGE.- W.	Company LONE PINE		
	Well	CDN FOREST S.POINTED MOUNTAIN L-68	
	Field	POINTED MOUNTAIN	
	Province	NORTHWEST TERRITORIES	
	Location	L-68-60-20-123-45	OTHER SERVICES
	LSD.	SEC.	
	RGE.	W.	

Permanent Datum	GROUND LEVEL	Elevation	723.0	K.B.	737.0
Measured From	K.B.	14.0 M.	Above Perm. Datum	G.L.	723.0

Date	SEPTEMBER 04 2011	Type Fluid	WATER
Number	ONE	Fluid Level	FULL
Log	GR/CCL/CBL/RBL/VDL	Wellhead Pressure	0/7000 KPA.
Driller (OH)		Max. Temp. °C	162 DEG
Driller (CH)		Oper. Rig Time	12.5
T.D. By Logger	3961.2	Recorded By	ALVIN CHALIFOUX
Log Interval	3960.0	Witnessed By	RORY NEWTON
Spaced Interval	1696.0	Apparent Cement Top	
Log Interval	2000.0	Hoist Unit# / Loc.	H 02
Depth(s) of Interest	MUSKWA/EXSHAW	Program	CSS
Type and Size		LICENSE	OA-1227-002
Charges		TICKET	E-0710
		AFE #	

LOGGING RECORD	SIZE	Kg/m	GRADE	TYPE JOINT	FROM	TO
SURFACE	508.0	139.89	S00-95		SURFACE	165.0
	339.73	107.15	S00-95		SURFACE	1424.0
PRODUCTION	244.48	64.7	S00-95		SURFACE	3297.0
DEEPER	177.8	38.69	S00-95	LT&C	3237.8	4130.0

UNCORRELATED TO A FAXED COPY OF A LITHOLOGY LOG NO DATE, NO CEMENT DATA AVAILABLE.

RUN: LOWER MAIN 0 MPA  
DIR.: UP  
DATE: 09/04/11  
TIME: 04:06:04

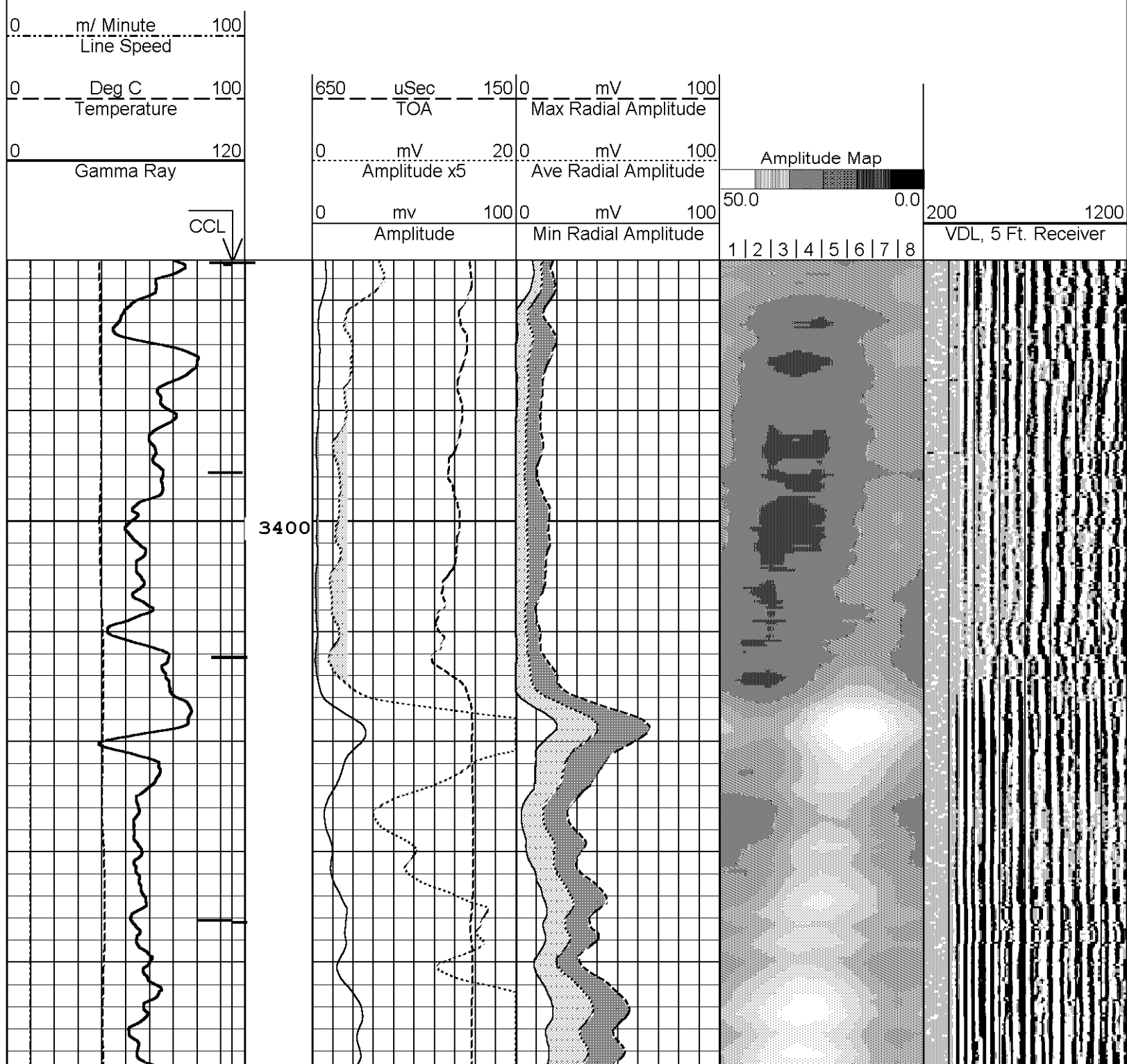
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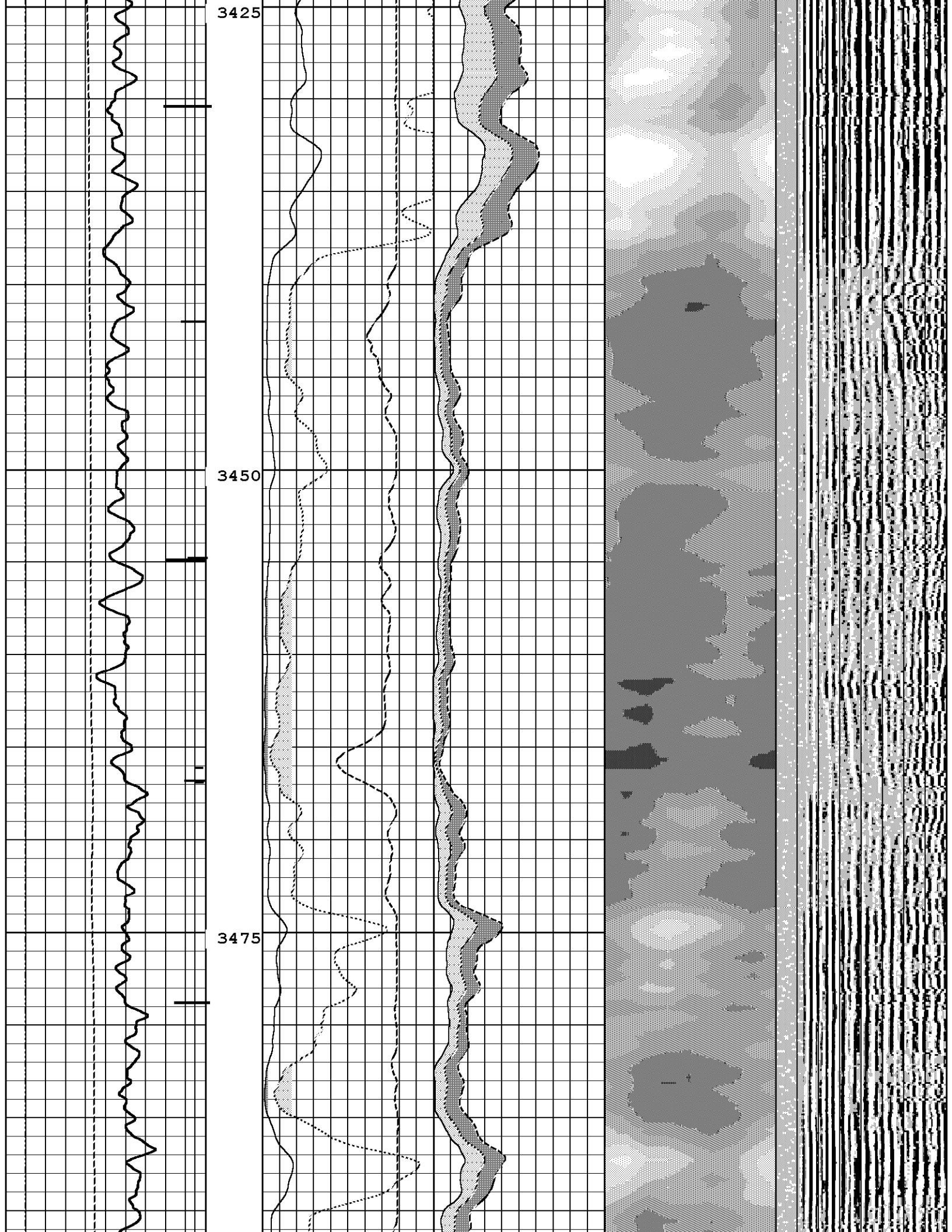
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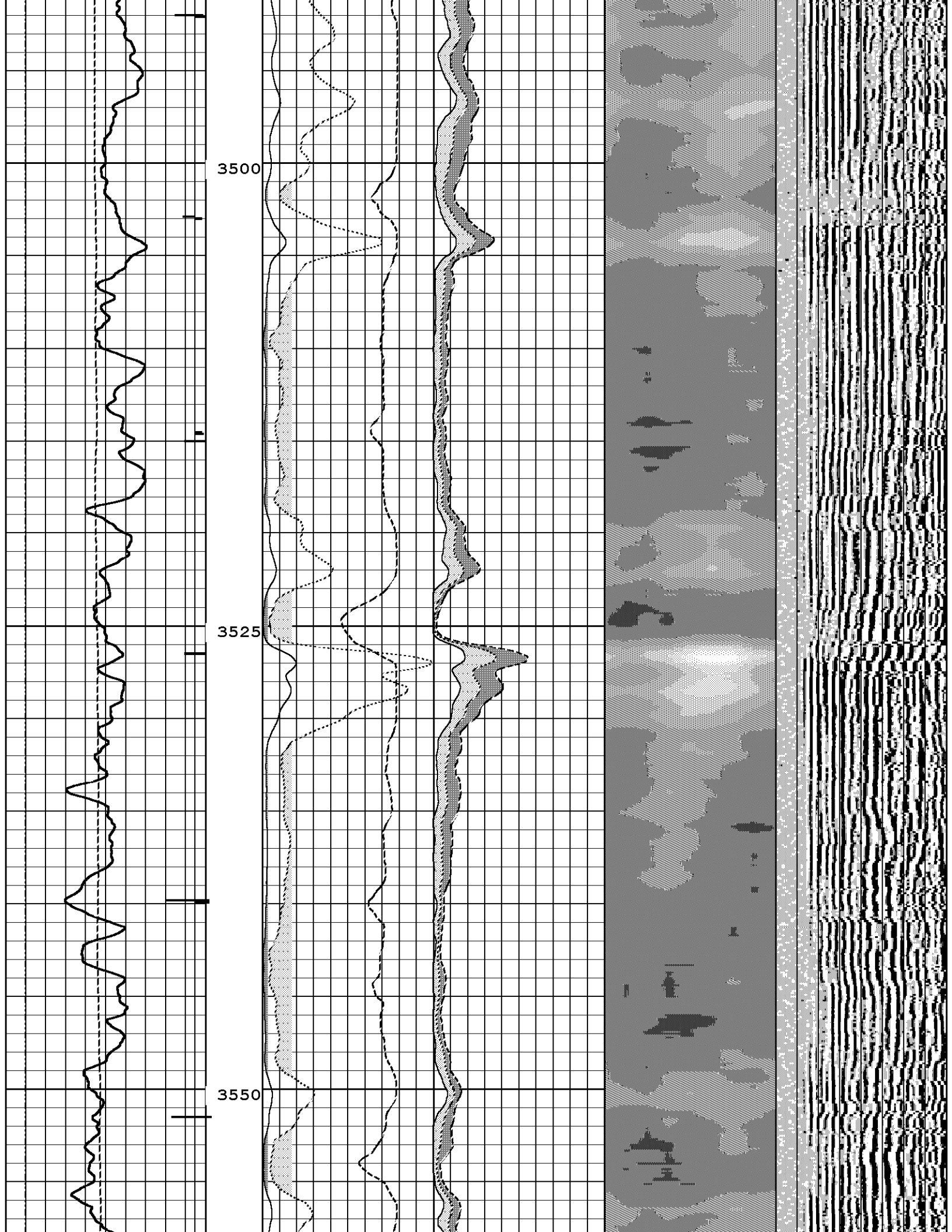
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DATE: 09/04/11  
TIME: 04:06:04

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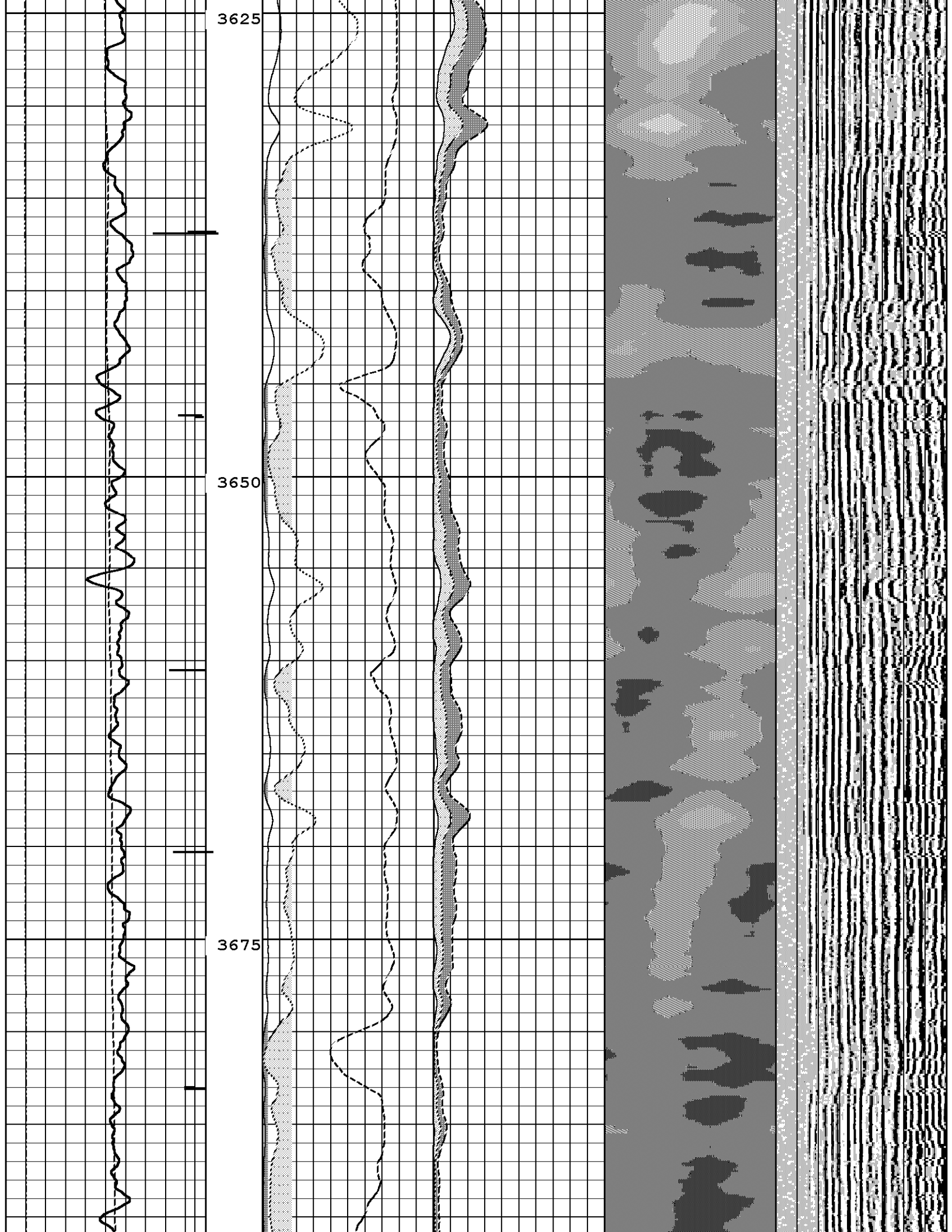
START: 3,877.00m  
STOP: 3,390.00m  
RES.: 0.1 m  
SCALE: 240:1 m

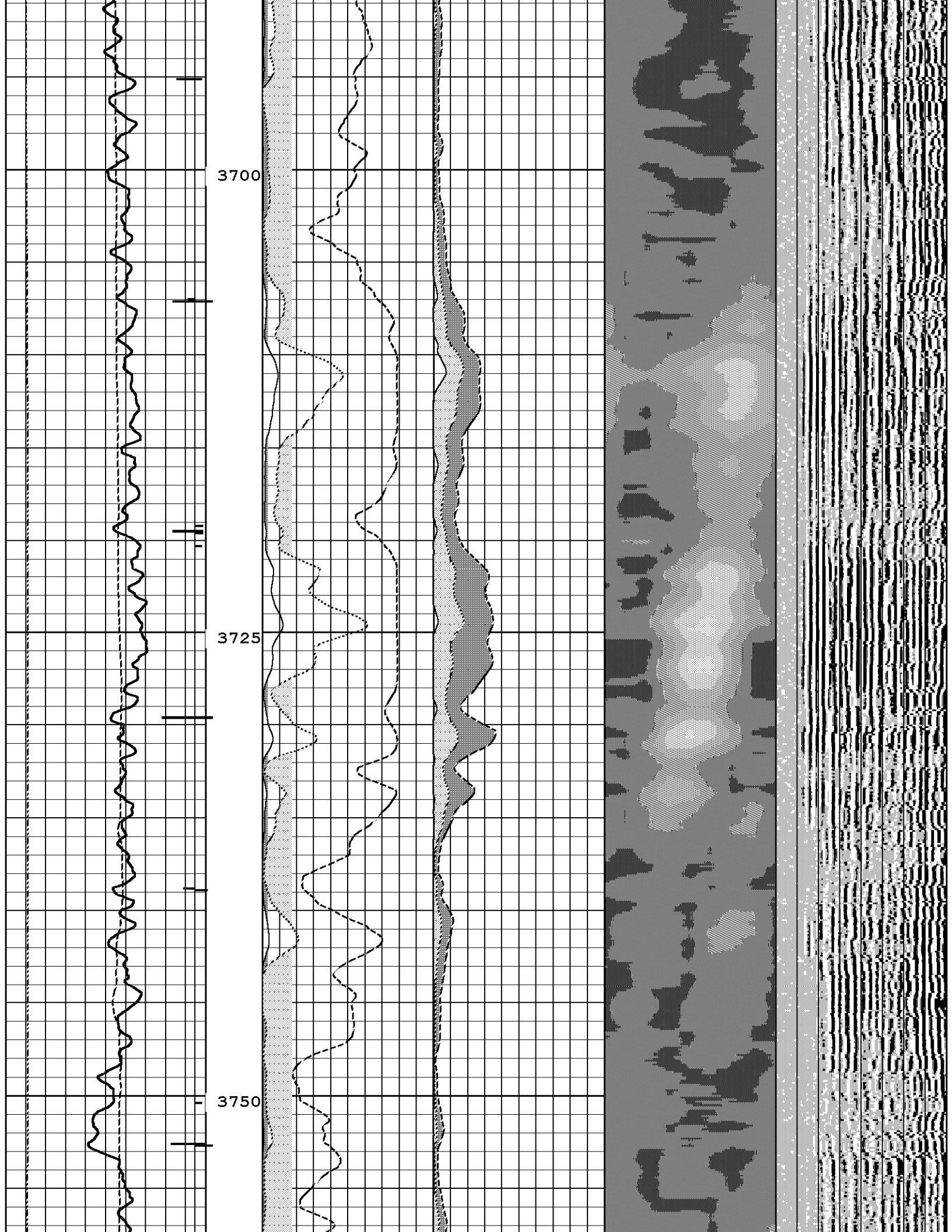


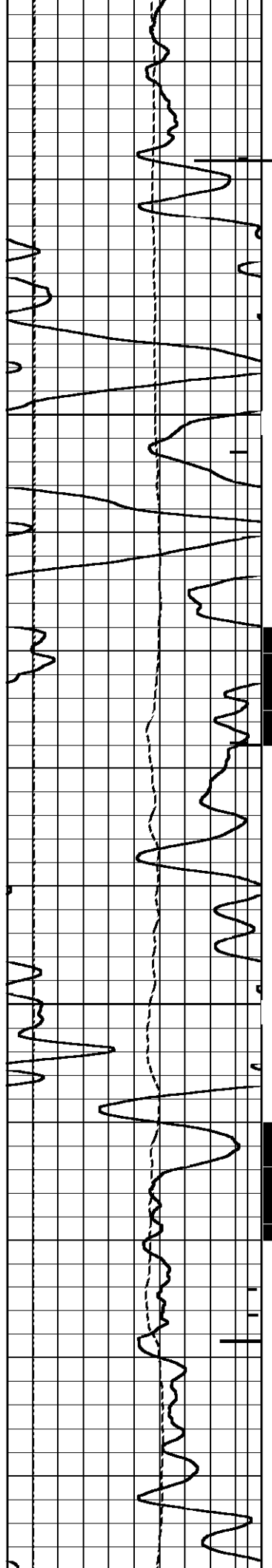






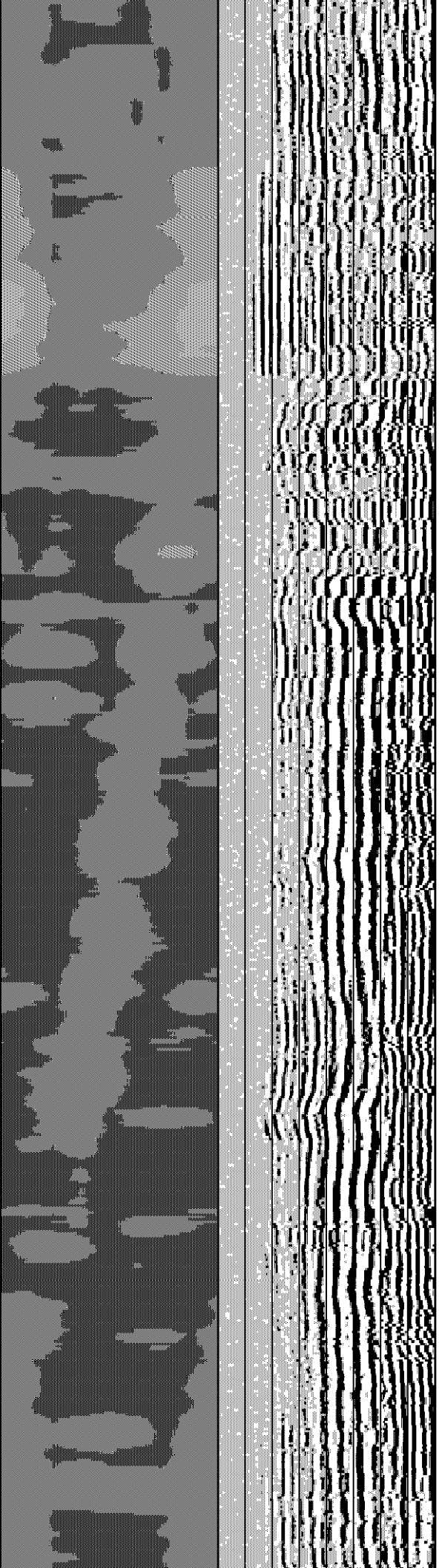
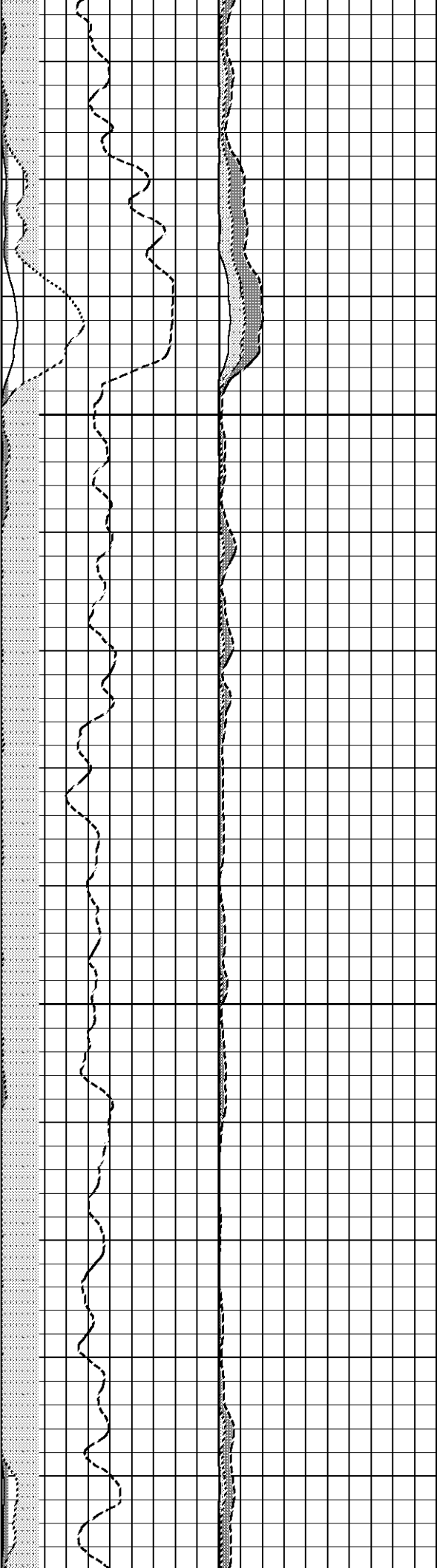


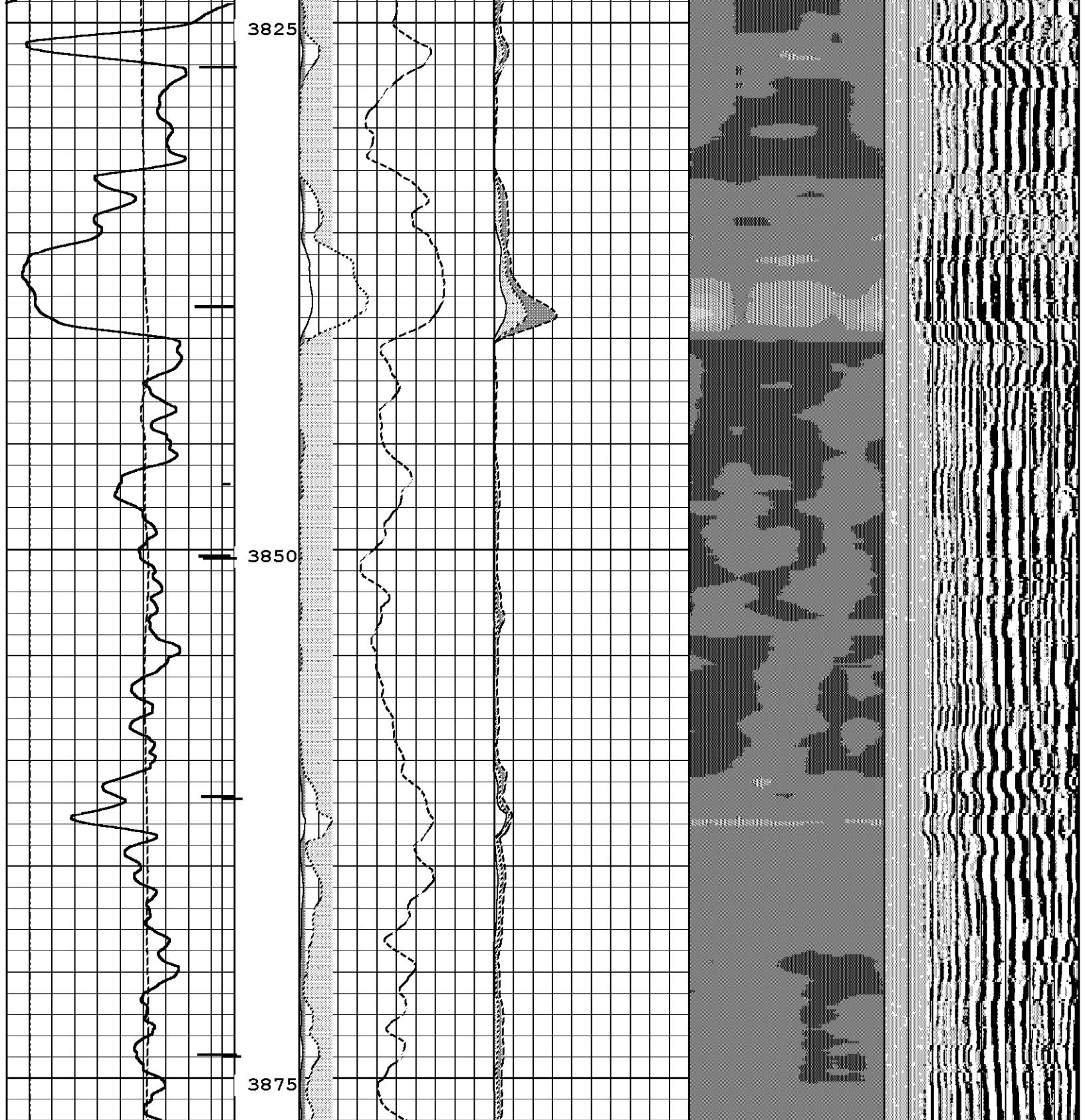




3775

3800





0 120  
 Gamma Ray  
 0 100  
 Deg C  
 Temperature  
 0 100  
 m/ Minute  
 Line Speed

0 100 0 100  
 mv Amplitude Min Radial Amplitude  
 0 20 0 100  
 mV Amplitude x5 Ave Radial Amplitude  
 650 150 0 100  
 uSec TOA mV Max Radial Amplitude

1 2 3 4 5 6 7 8  
 50.0 0.0  
 Amplitude Map

200 1200  
 VDL, 5 Ft. Receiver

RUN: LOWER MAIN 0 MPA  
DIR.: UP  
DATE: 09/04/11  
TIME: 04:06:04

# UPPER MUSKWA 0 MPS

START: 3,377.00m  
STOP: 3,390.00m  
RES.: 0.1 m  
SCALE: 240:1 m

RUN: LOWER MAIN 0 MPA  
DIR.: UP  
DATE: 09/04/11  
TIME: 04:06:04

# LOWER MUSKWA 0 MPA

START: 3,965.00m  
STOP: 3,870.00m  
RES.: 0.1 m  
SCALE: 240:1 m

0 m/ Minute 100  
Line Speed

0 Deg C 100  
Temperature

0 120  
Gamma Ray

CCL

650 uSec 150 0 mV 100  
TOA Max Radial Amplitude

0 mV 20 0 mV 100  
Amplitude x5 Ave Radial Amplitude

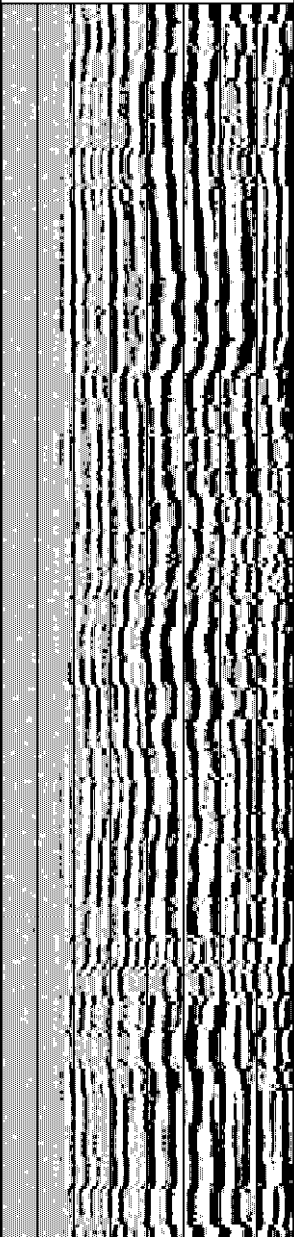
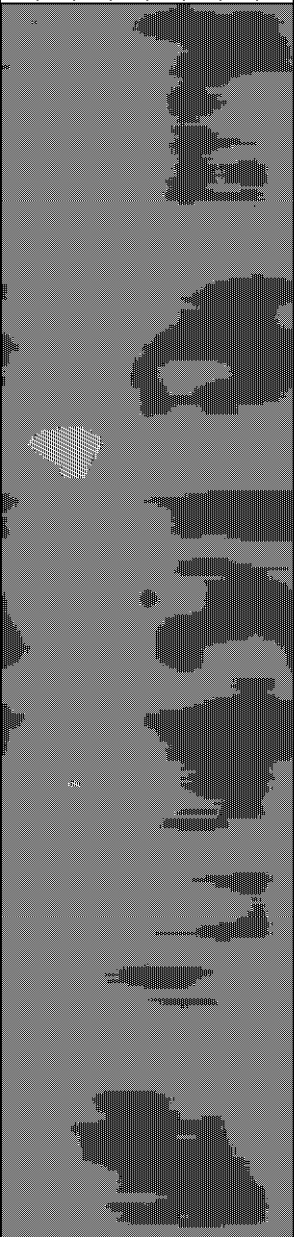
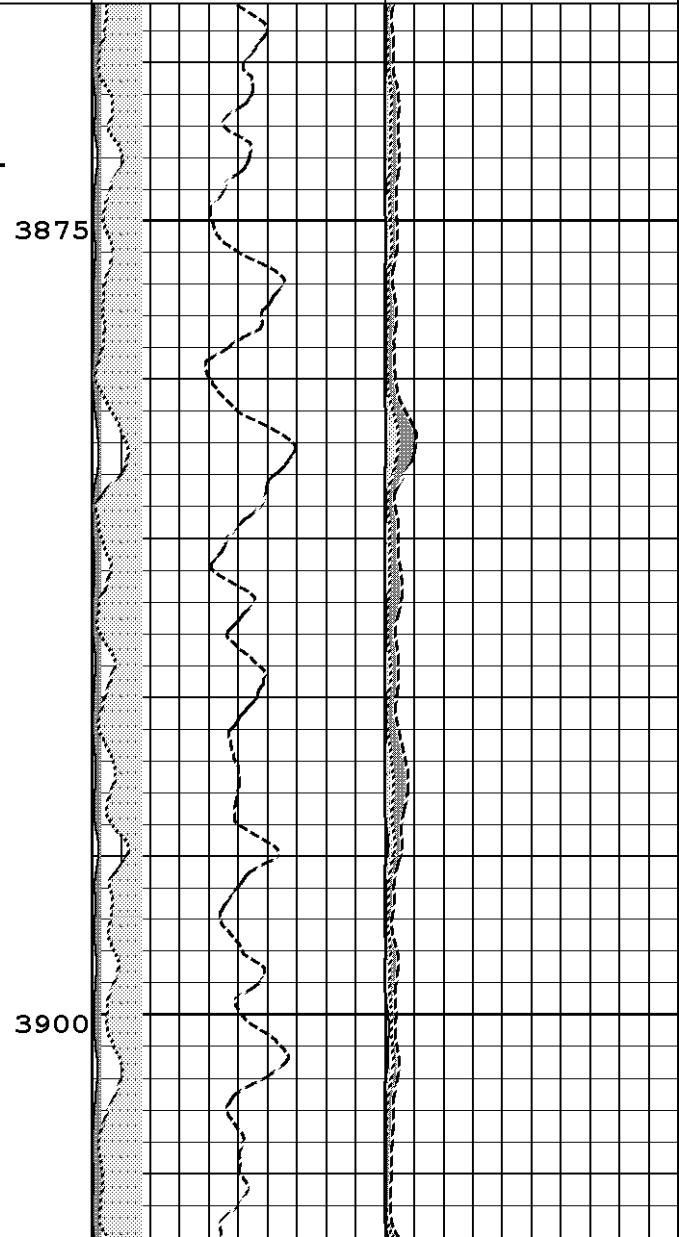
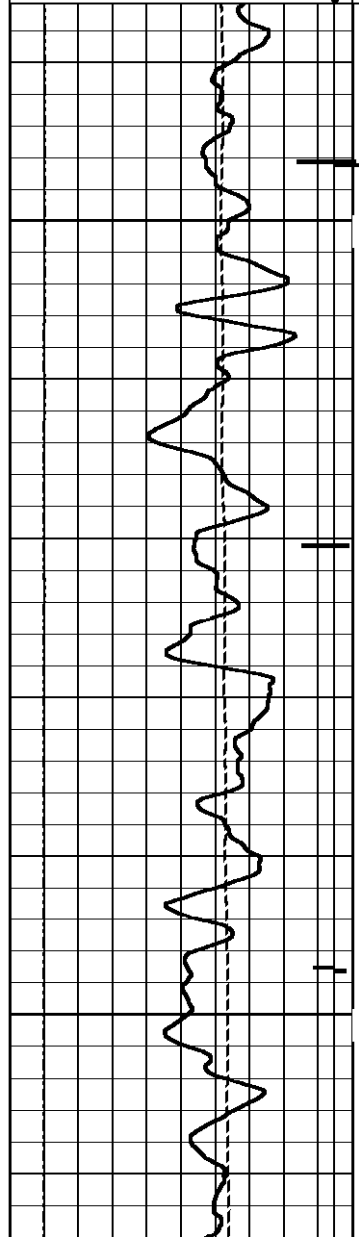
0 mv 100 0 mV 100  
Amplitude Min Radial Amplitude

Amplitude Map

50.0 0.0

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

200 1200  
VDL, 5 Ft. Receiver



3875

3900



0 m/ Minute 100  
Line Speed

RUN: LOWER MAIN 0 MPA  
DIR.: UP  
DATE: 09/04/11  
TIME: 04:06:04

# LOWER MUSKWA 0 MPA

START: 3,965.00m  
STOP: 3,870.00m  
RES.: 0.1 m  
SCALE: 240:1 m

RUN: LOWER REPEAT  
DIR.: UP  
DATE: 09/04/11  
TIME: 01:09:02

# LOWER REPEAT

START: 3,990.10m  
STOP: 3,846.90m  
RES.: 0.1 m  
SCALE: 240:1 m

0 m/ Minute 100  
Line Speed

0 Deg C 100  
Temperature

0 Gamma Ray 120

CCL

650 uSec 150 0 mV 100  
TOA Max Radial Amplitude

0 mV 20 0 mV 100  
Amplitude x5 Ave Radial Amplitude

0 mv 100 0 mV 100  
Amplitude Min Radial Amplitude

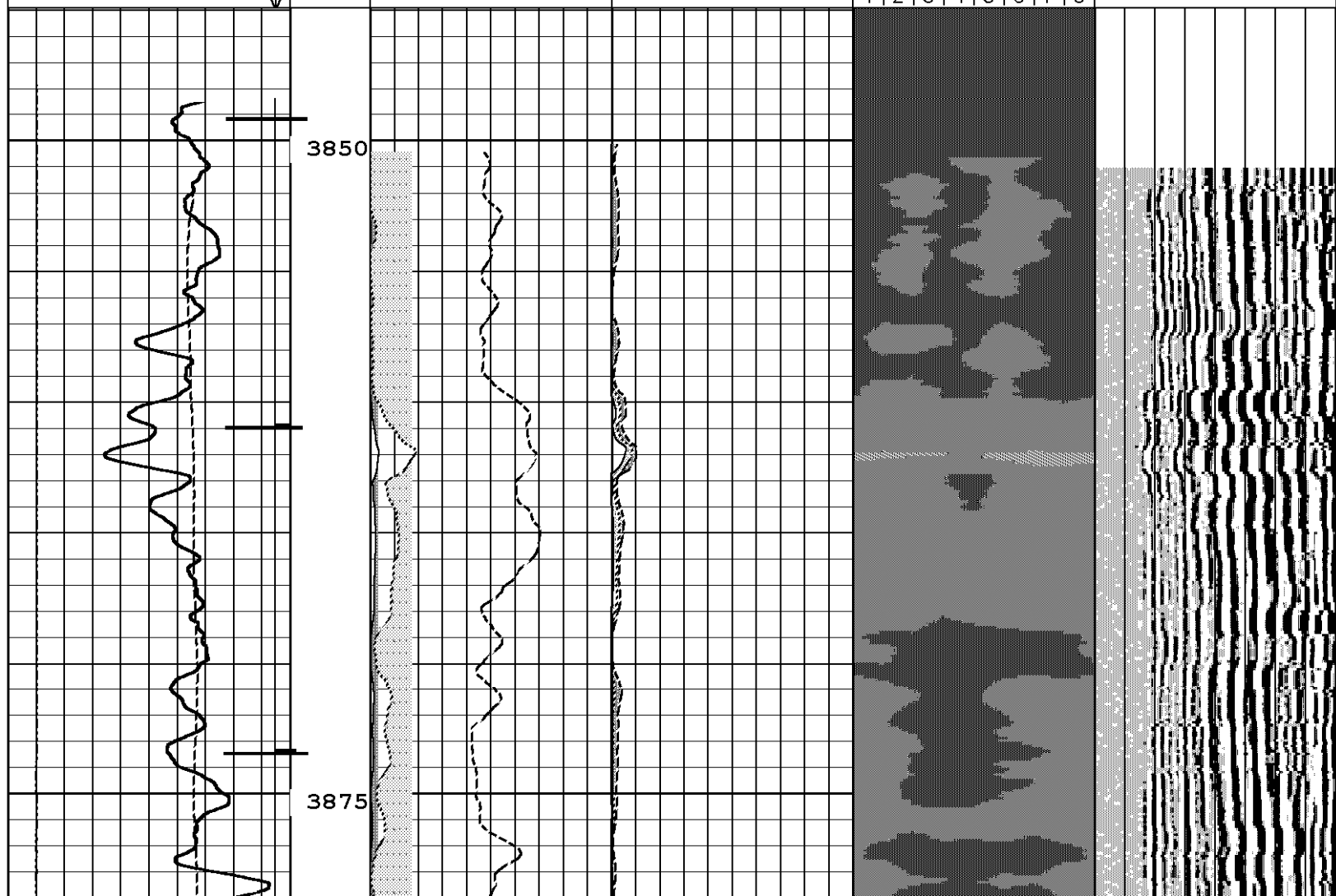
Amplitude Map

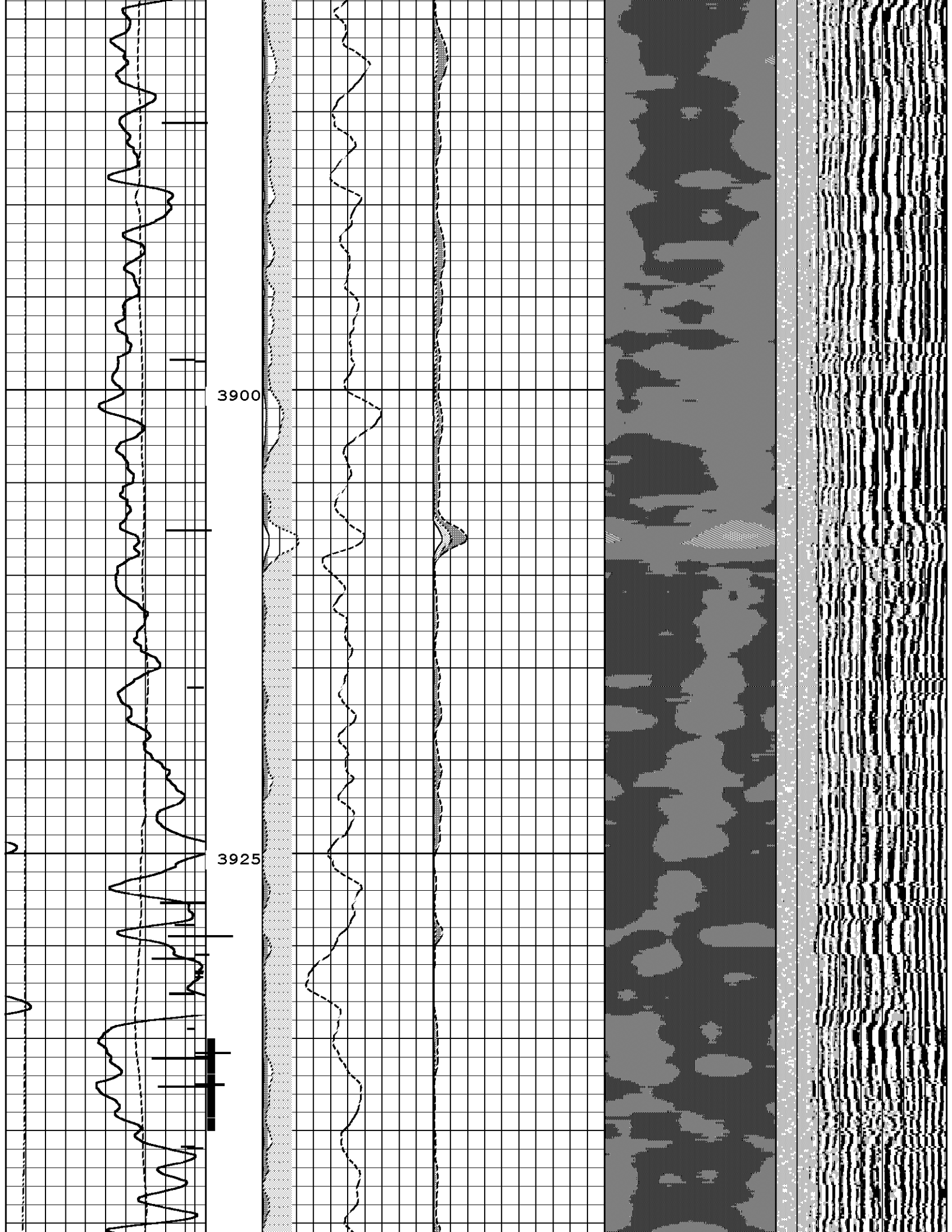
50.0 0.0

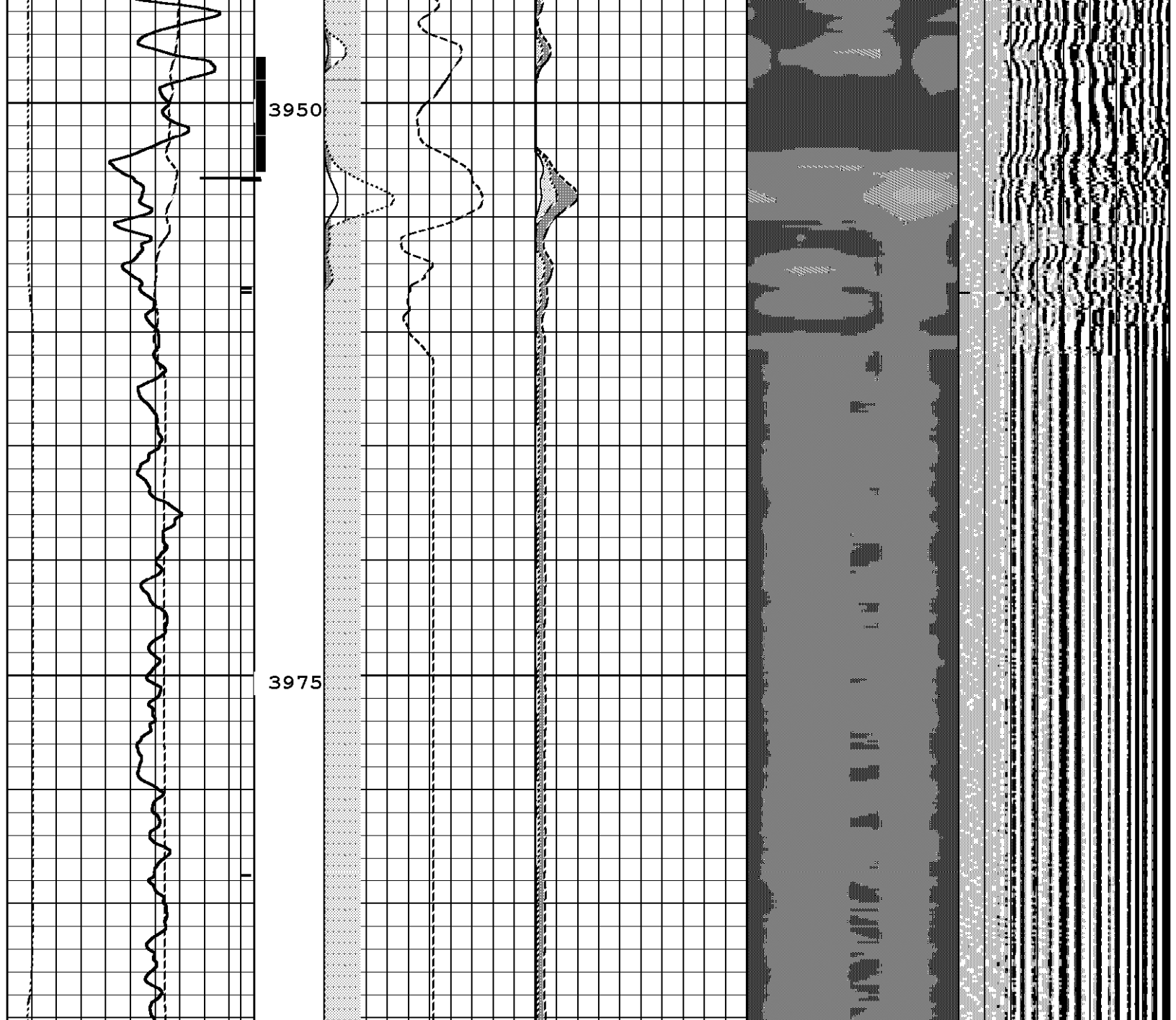
200 1200

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

VDL, 5 Ft. Receiver



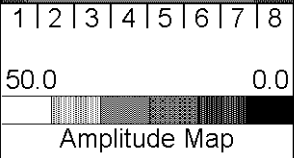




CCL ↑

0	120
Gamma Ray	
0	100
Deg C Temperature	
0	100
m/ Minute Line Speed	

0	100	0	100
mv Amplitude		mV Min Radial Amplitude	
0	20	0	100
mV Amplitude x5		mV Ave Radial Amplitude	
650	150	0	100
uSec TOA		mV Max Radial Amplitude	



200 1200  
VDL, 5 Ft. Receiver

RUN: LOWER REPEAT  
DIR.: UP  
DATE: 09/04/11  
TIME: 01:09:02

# LOWER REPEAT

START: 3,990.10m  
STOP: 3,846.90m  
RES.: 0.1 m  
SCALE: 240:1 m