Western Wireline

60 Arm Caliper Log

Company Southern California Gas Company
Well Fernando Fee 32A
Field Aliso Canyon
County Los Angeles
State California
Country U.S.A.

Company	Southern California Gas Company
Well	Fernando Fee 32A
Field	Aliso Canyon
County	Los Angeles
State	California
Country	U.S.A.

Location: API # : 04-037-21872-01

SEC 27 TWP 3N RGE 16W

Other Services

Permanent Datum	Ground Level	Elevation	1995 Feet
Log Measured From	18.9feet		
Drilling Measured From	Kelly Bushing		

Elevation
K.B. 2013.9
D.F.
G.L. 1995

Date	1September2016		
Run Number	one		
Depth Driller			
Depth Logger	6551		
Bottom Logged Interval	6561		
Top Log Interval	surface		
Open Hole Size			
Type Fluid			
Density / Viscosity			
Max. Recorded Temp.			
Estimated Cement Top			
Time Well Ready	7;30		
Time Logger on Bottom	9;30		
Equipment Number	208		
Location	Ventura California		
Recorded By	Kai Haughton		
Witnessed By			

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	13 3/8		Surface	990ft
Prot. String	8 5/8	36# K-55	Surface	3438ft
Production String	8 5/8	36# N-80	3438ft	7022ft
Liner	7	26#	6566ft	7250ft

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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

Objective is to log 60MAC for casing inspection.
Log Correlated to Baker Huges 56 arm caliper log Dated 2 April 2016.
Casing Patches Found At 1122-857.5 with an avarage I.D. of 6.85

Log Variables

DatabaseC:\ProgramData\Warrior\Data\southerncaliforniagascompanyfernandofee32a60mac.db
Dataset field/well/run1/pass3/_vars_

Top - Bottom

BOREID in	BOTTEMP degF	CASEID in	CASEOD in	CASETHCK in	MinAPIWall in	PERFS	RM_MEAS_R Ohm-m
7.875	100	7.825	8.625	0.4	0.35	0	0.1

RM_MEAS_T degF	SRFTEMP degF	TDEPTH ft
75	0	0

Variable Description

BOREID : Borehole I.D.
BOTTEMP : Bottom Hole Temperature
CASEID : Casing I.D.
CASEOD : Casing O.D.
CASETHCK : Casing Thickness
MinAPIWall : Minimum API Wall Thickness
PERFS : Perforation Flag
RM_MEAS_R : Mud Resistivity Measured
RM_MEAS_T : Mud Temperature Measured
SRFTEMP : Surface Temperature
TDEPTH : Total Depth

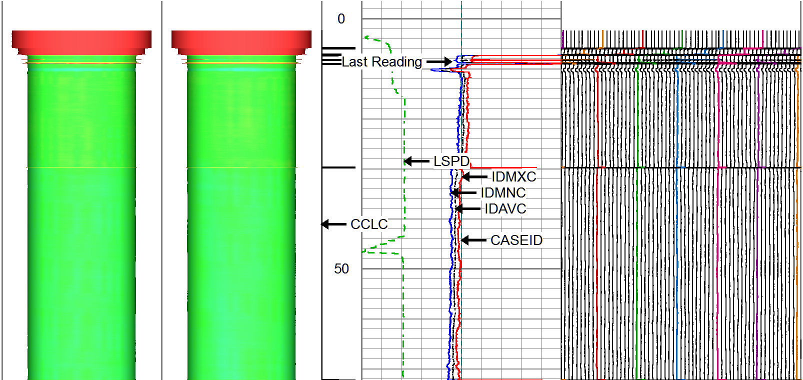
Western Wireline

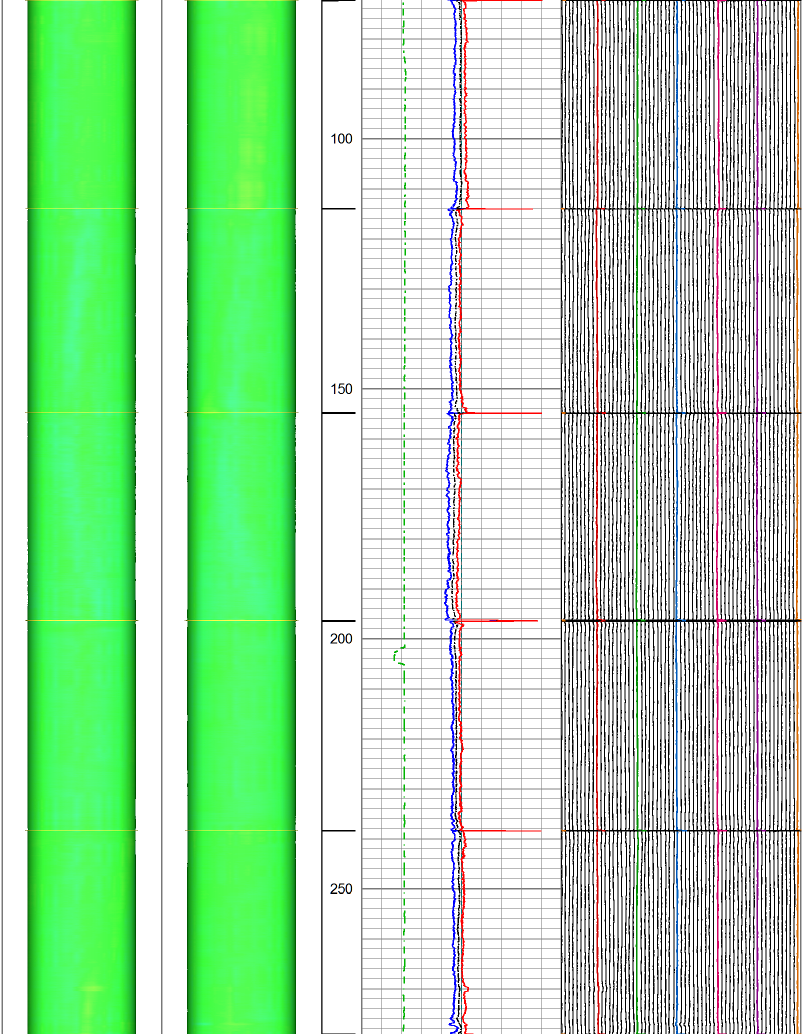
60 Arm Multifinger Caliper Log

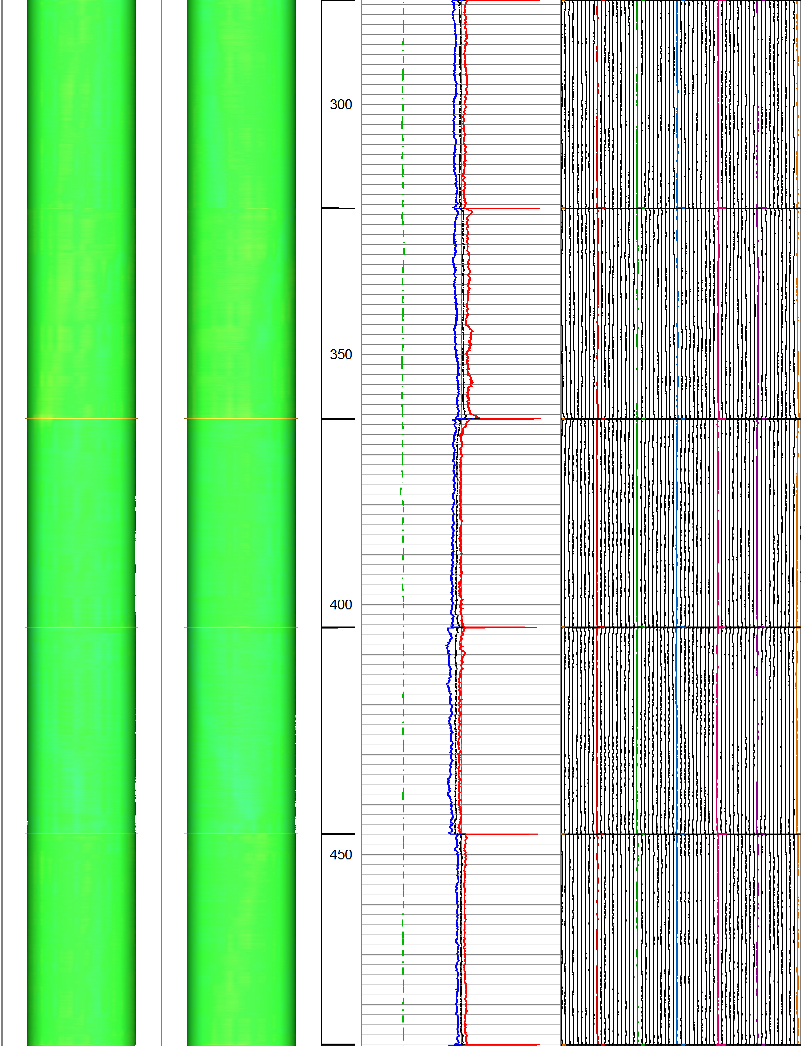
5 Inches = 100 Feet

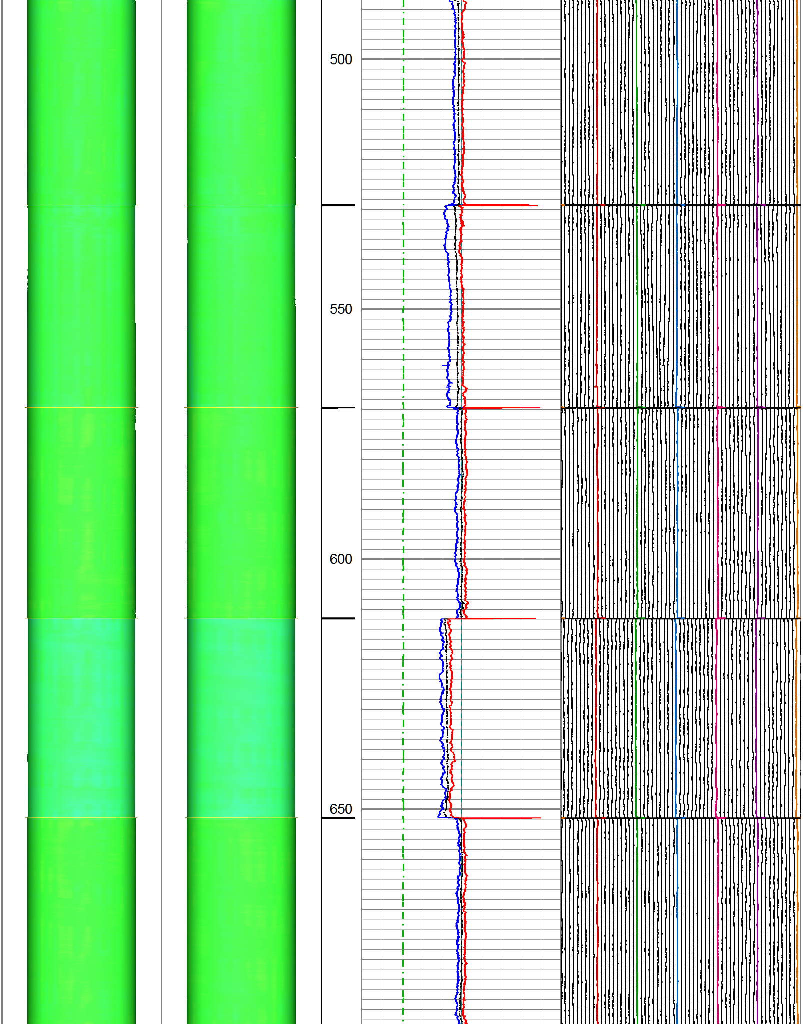
Database File	southerncaliforniagascompanyfernandofee32a60mac.db
Dataset Pathname	aliso/ff32/3.6/3.6
Presentation Format	1B9A7C~1
Dataset Creation	Thu Sep 01 12:56:11 2016
Charted by	Depth in Feet scaled 1:240

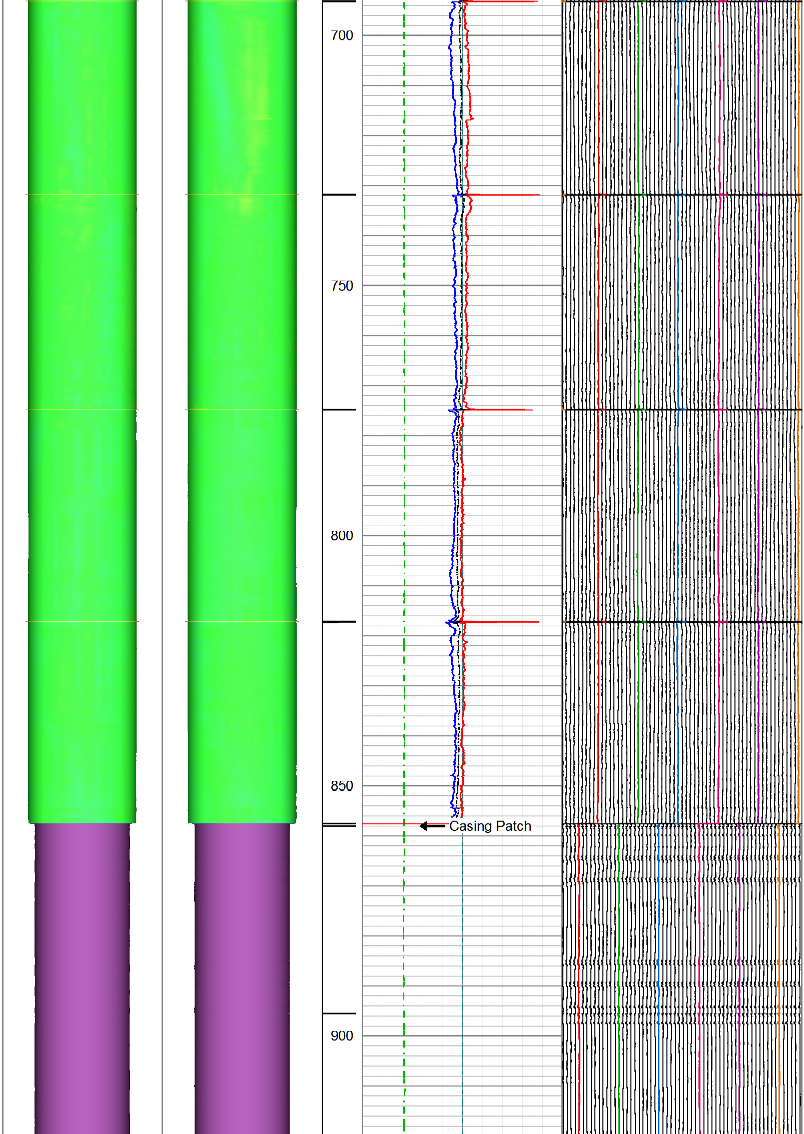
Low Side Image	High Side Image	CCL	LSPD / ID curves	RC curves
7.025 8.625	7.025 8.625		0 LSPD (ft/min) 200	1 RC10 (in) 7
			7.325 IDMNC (in) 8.325	2 RC20 (in) 8
			7.325 CASEID (in) 8.325	3 RC30 (in) 9
			7.325 IDAVC (in) 8.325	4 RC40 (in) 10
			7.325 IDMXC (in) 8.325	5 RC50 (in) 11
				6 RC60 (in) 12

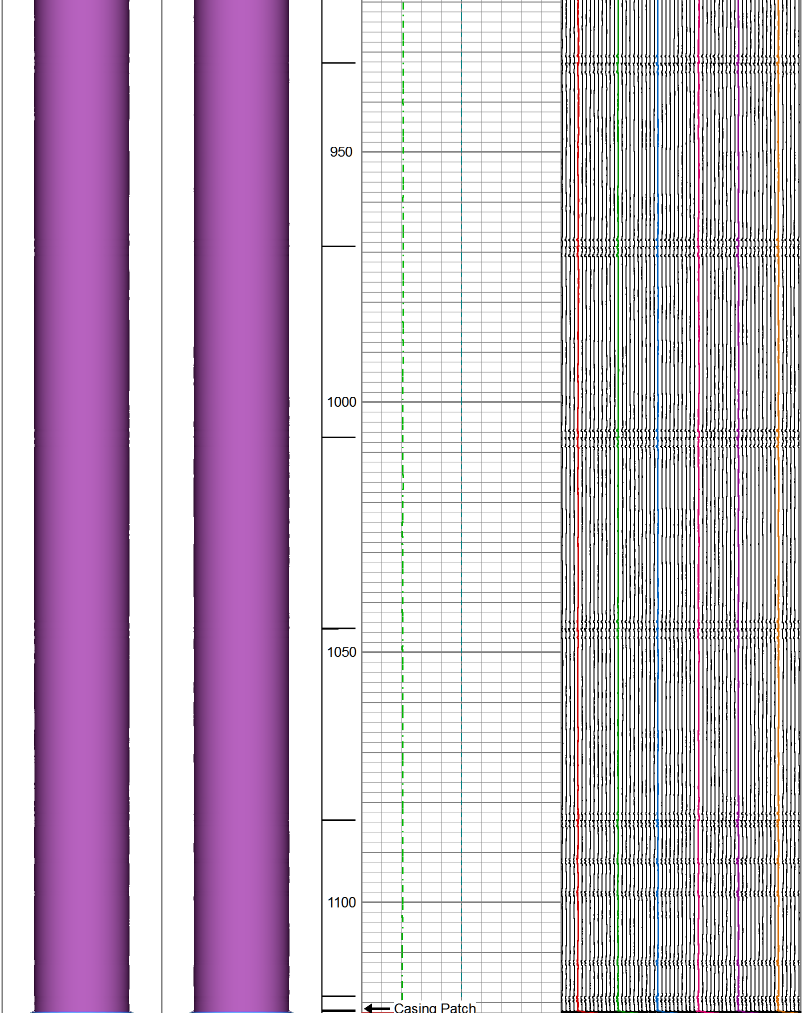


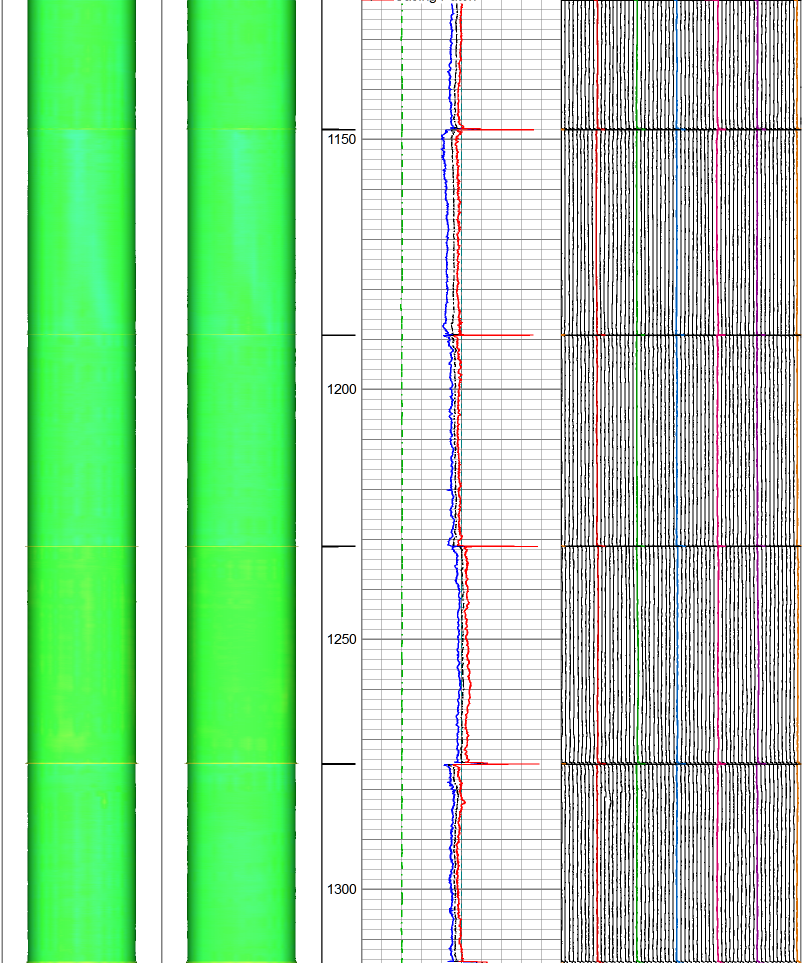


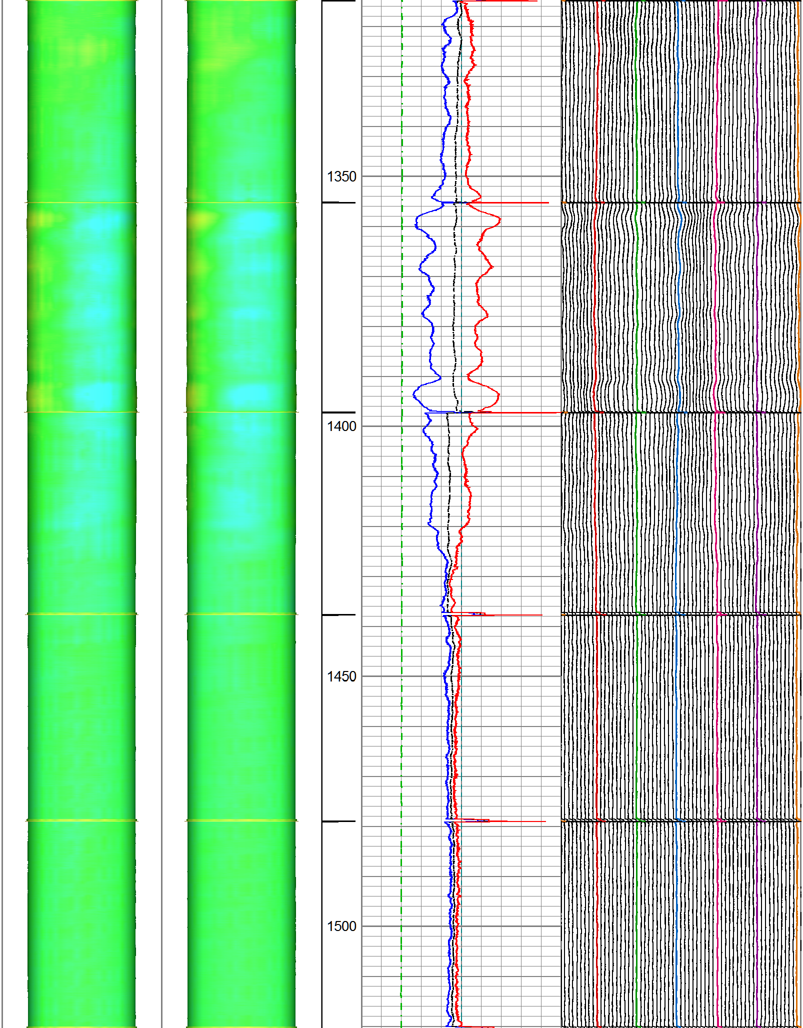


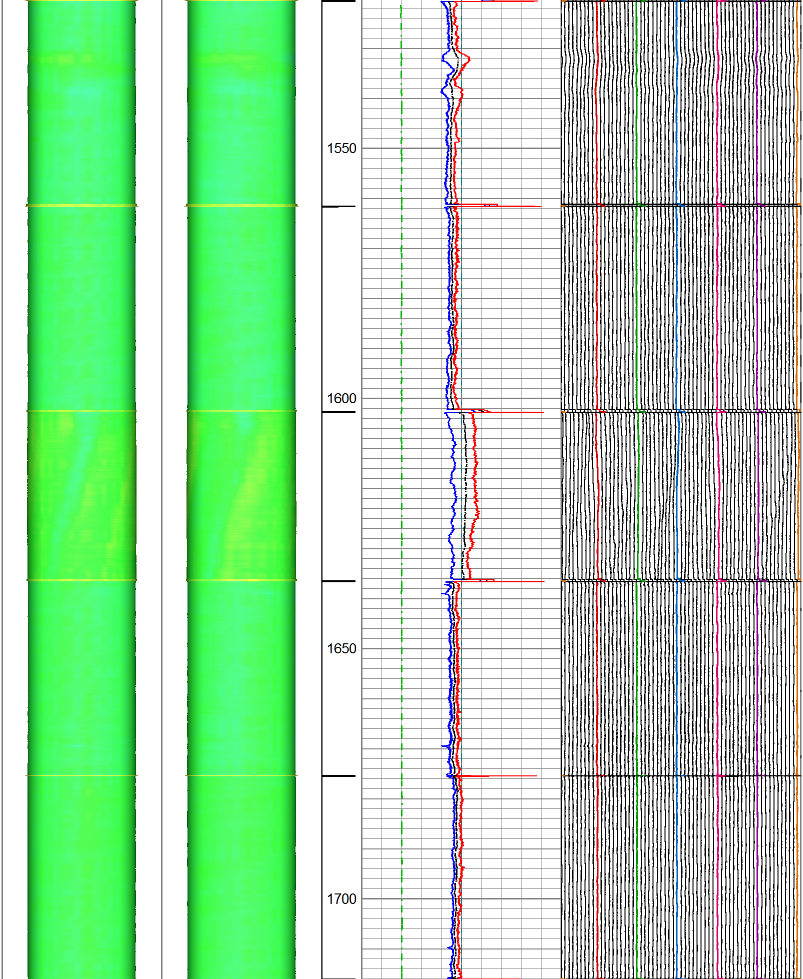


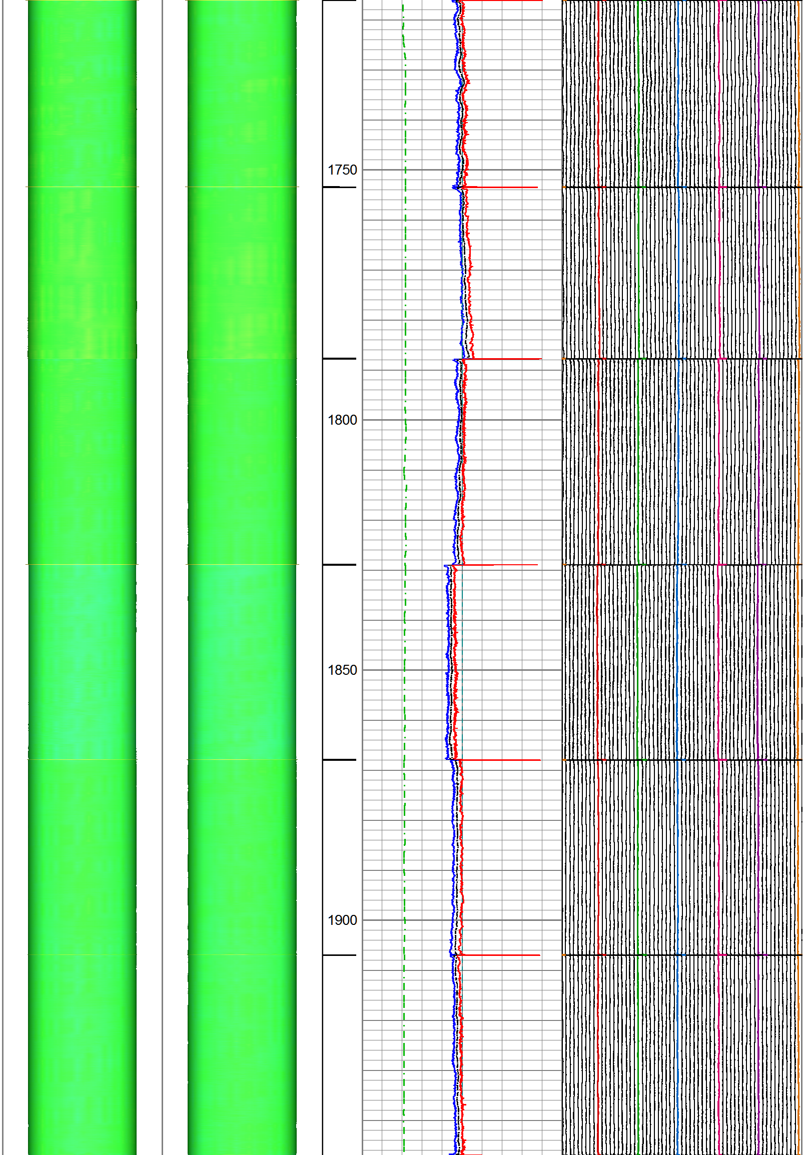


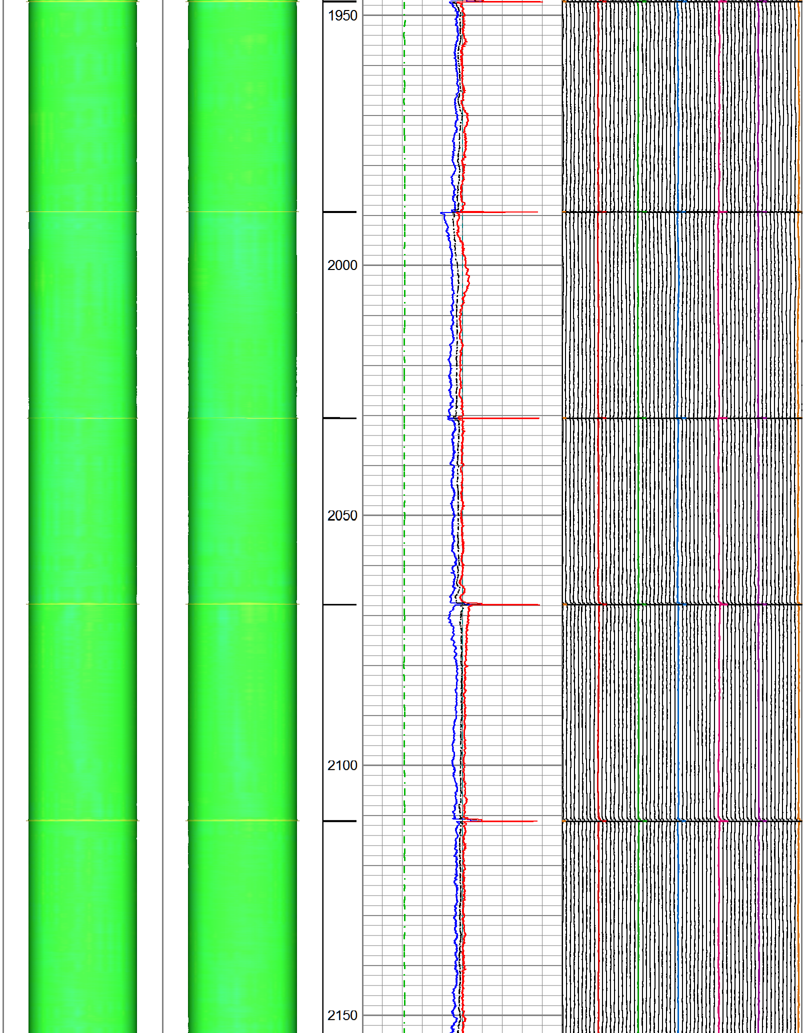


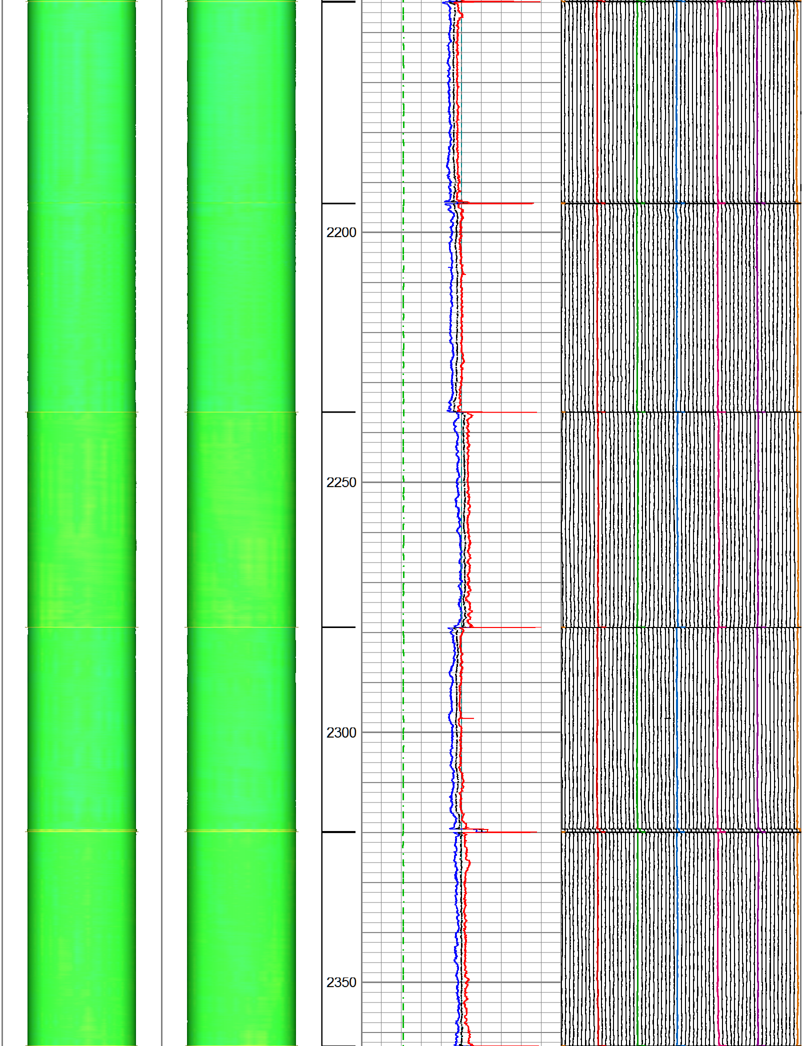


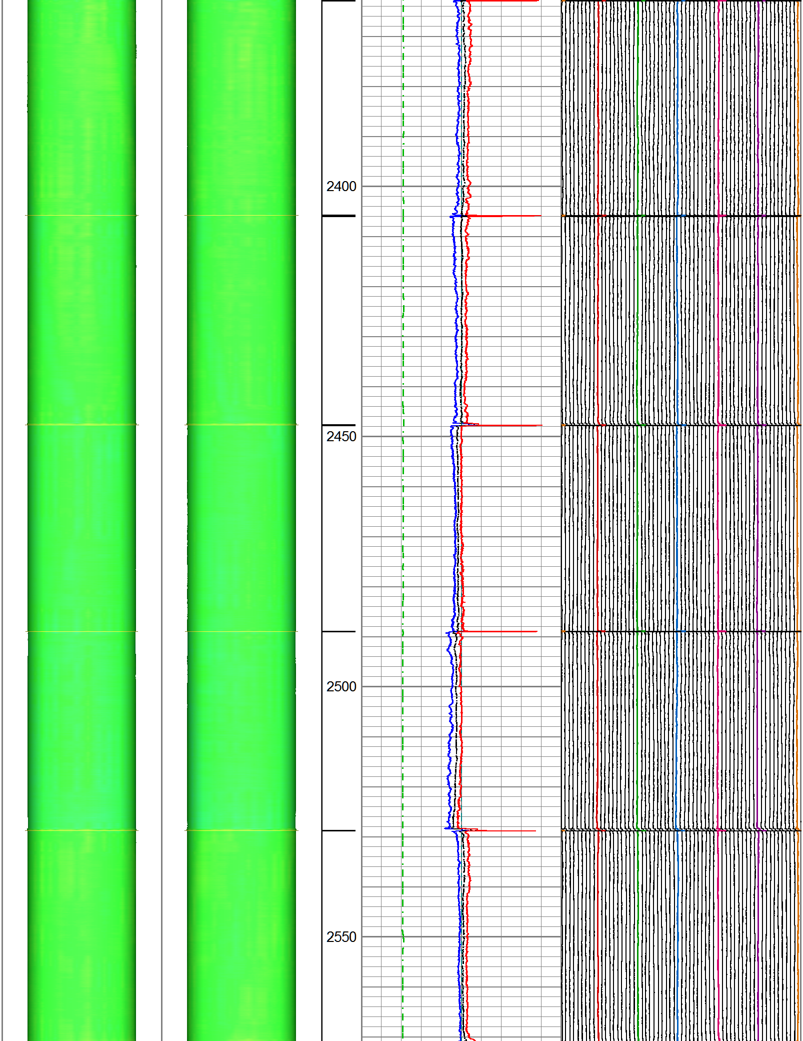


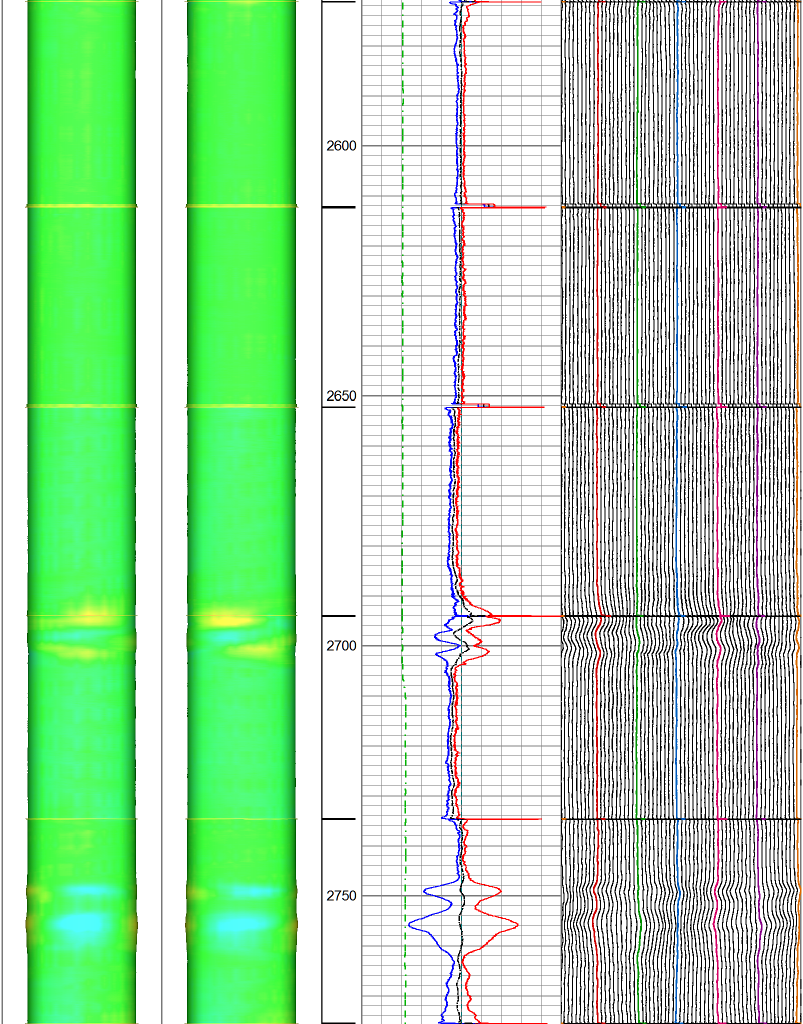


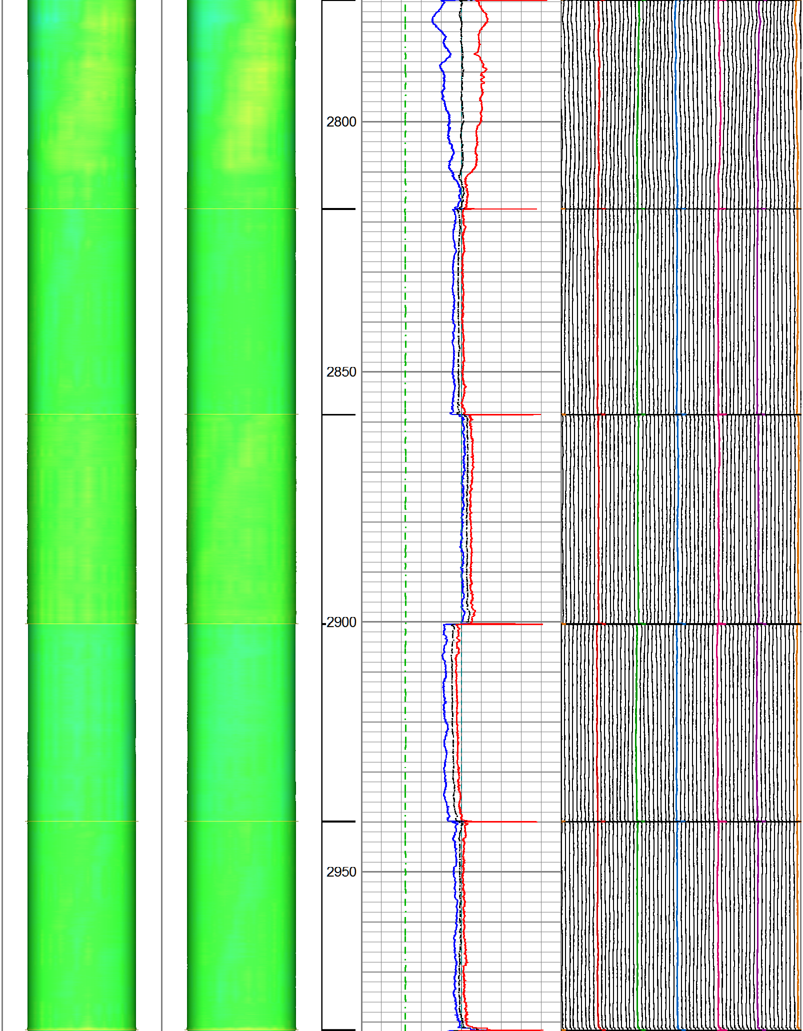


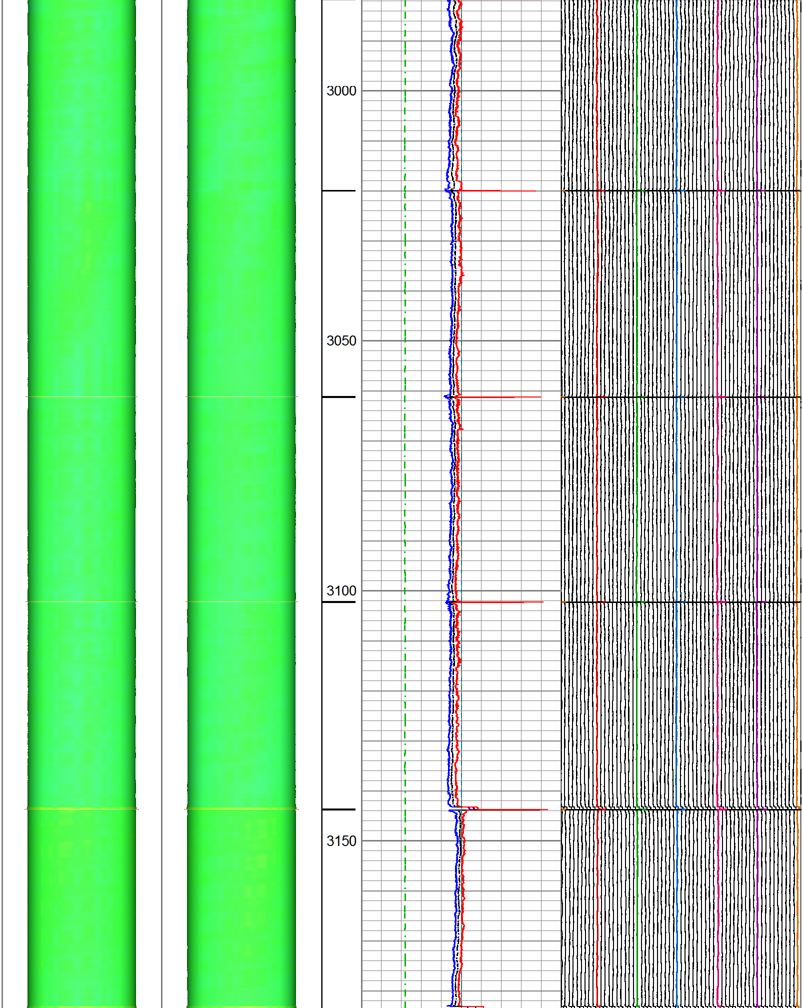


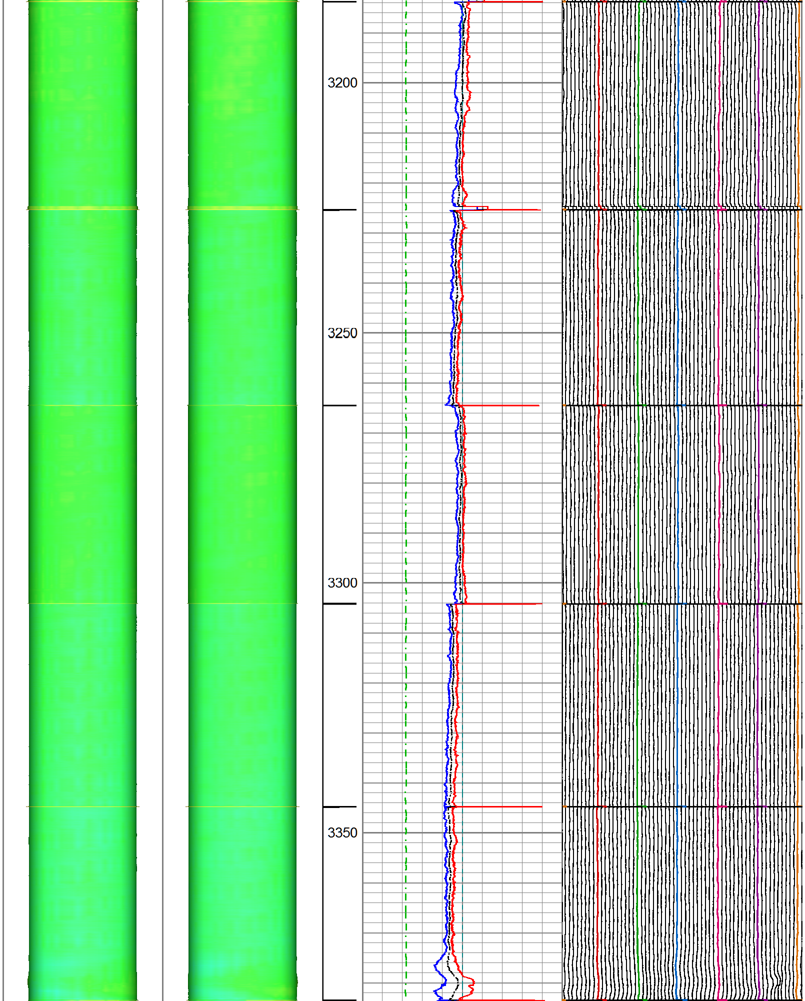


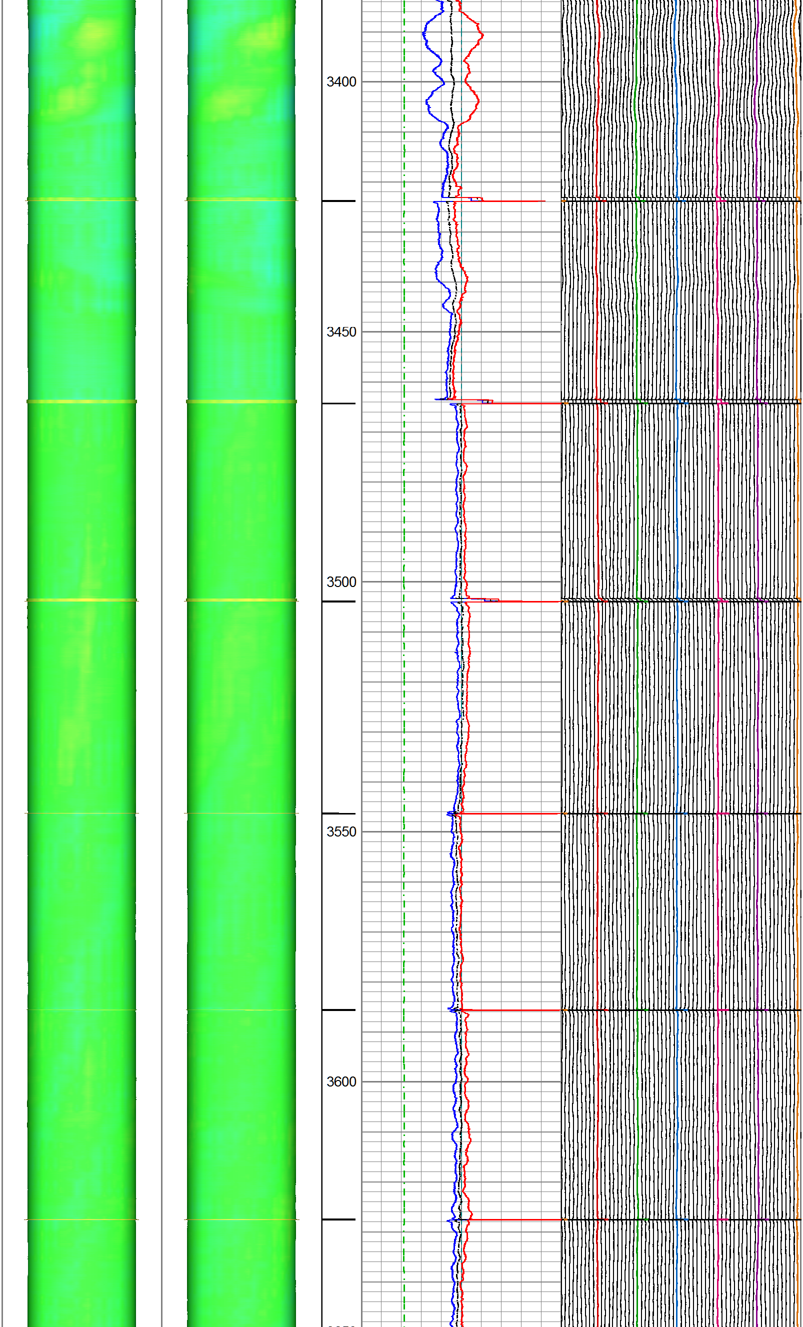


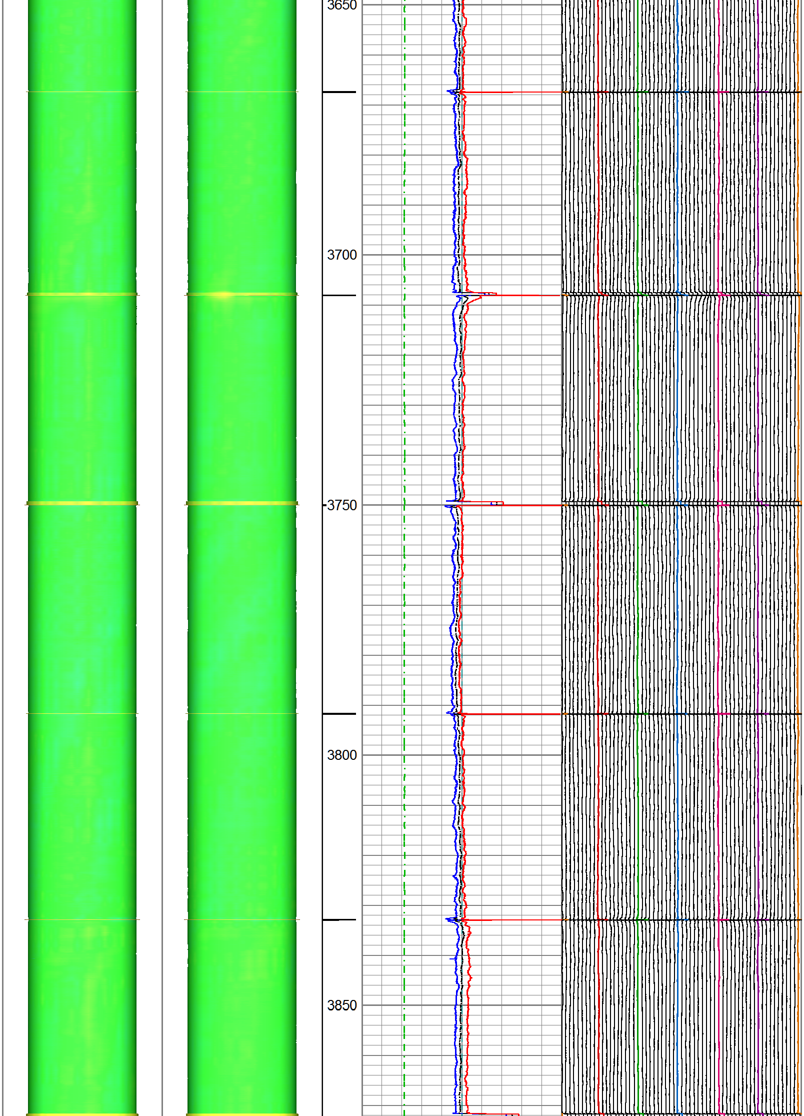


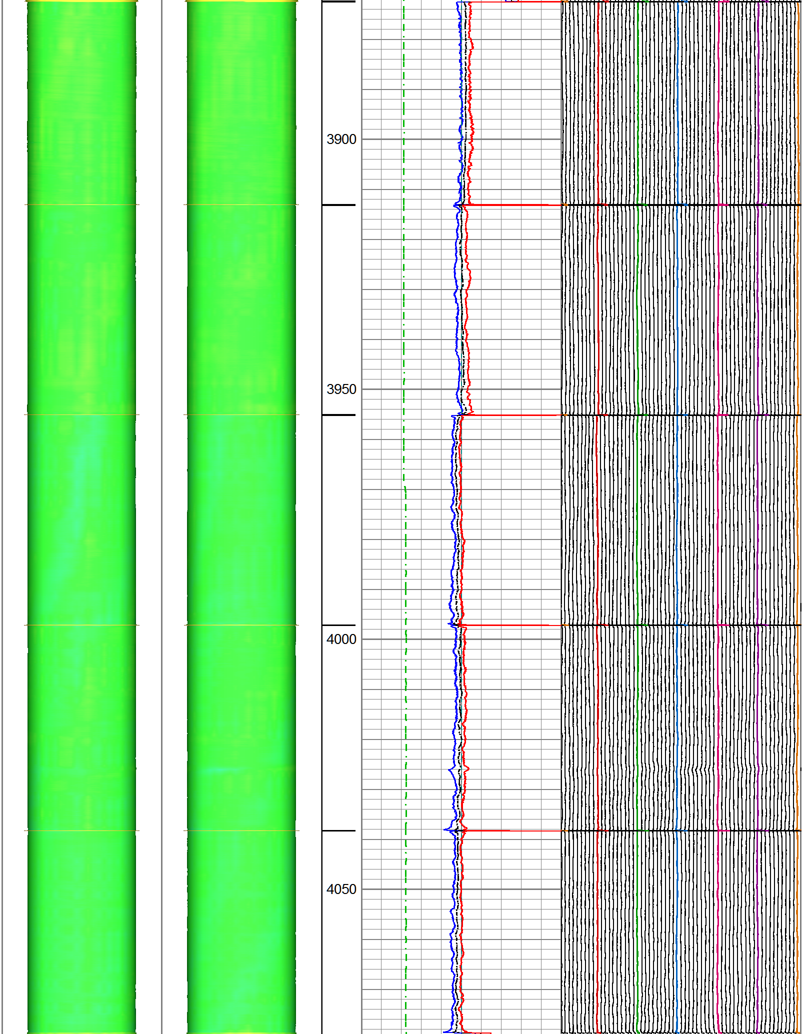


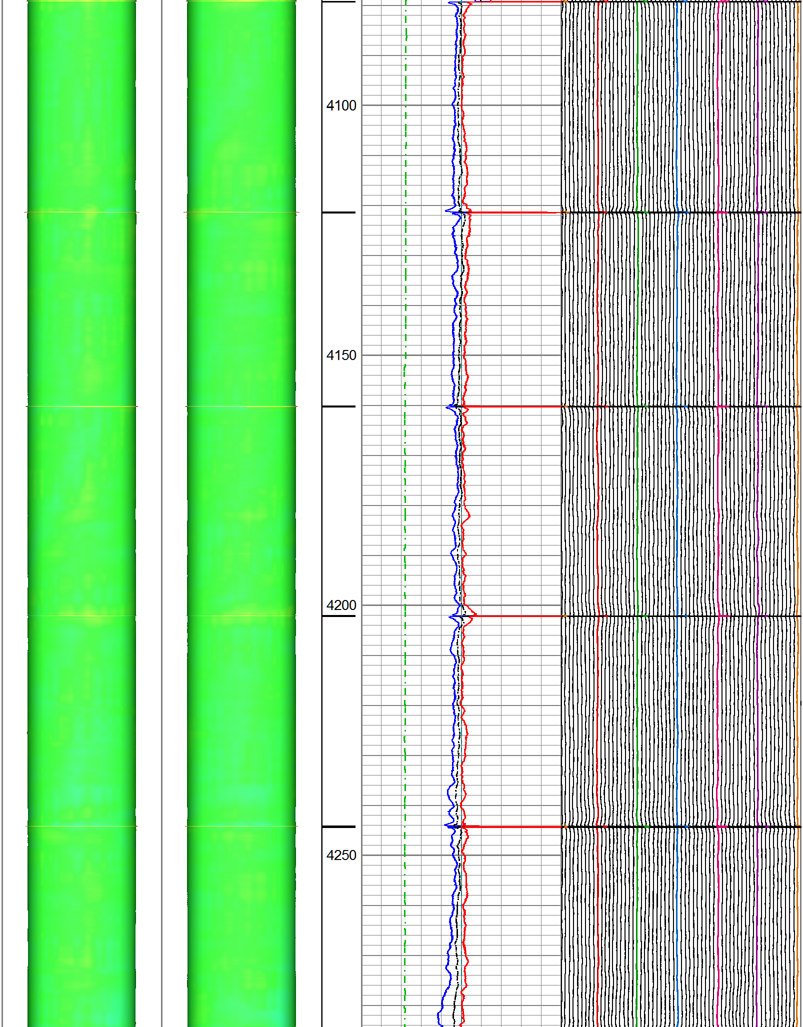


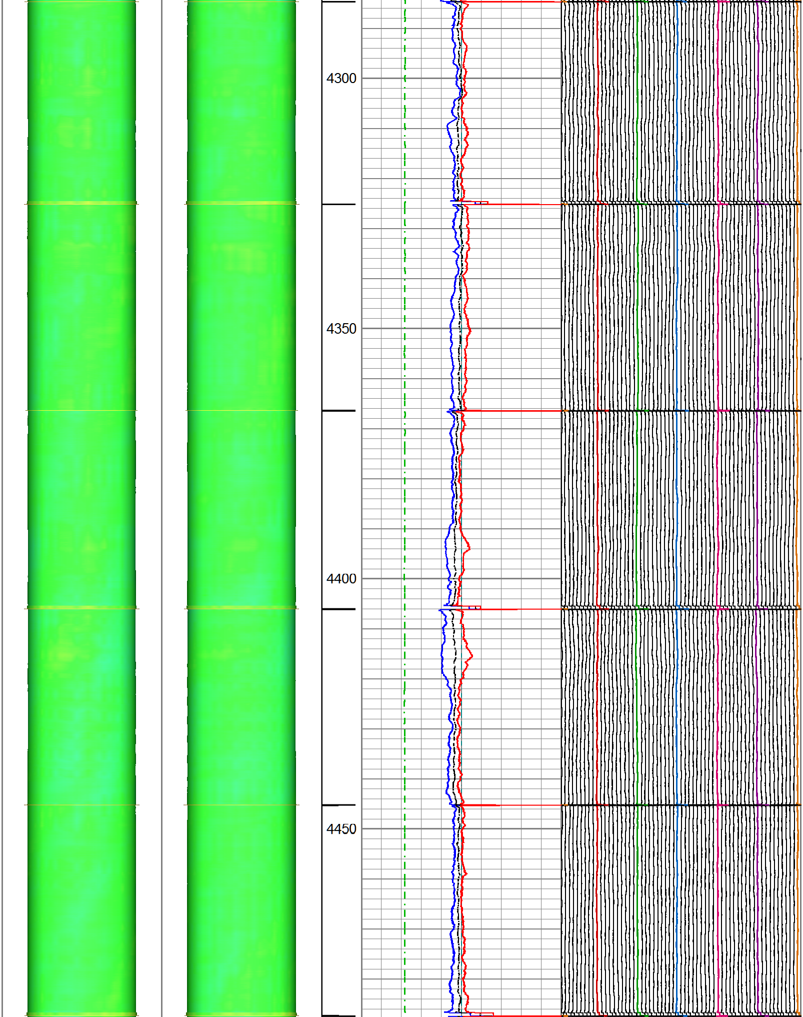


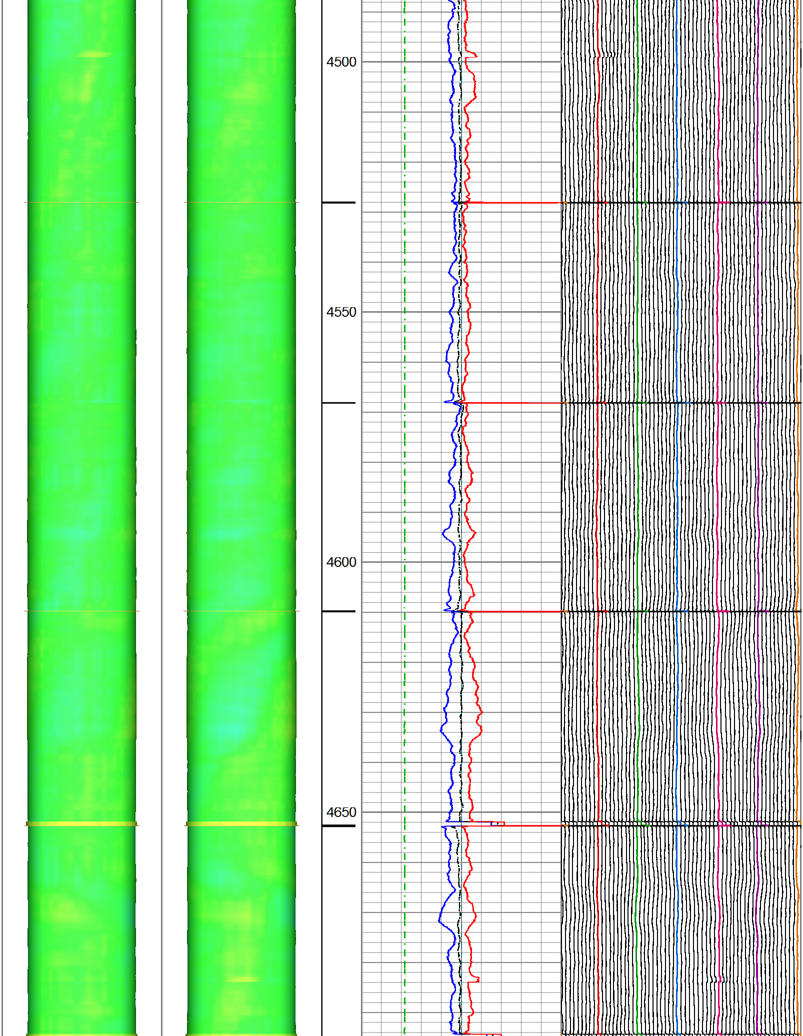


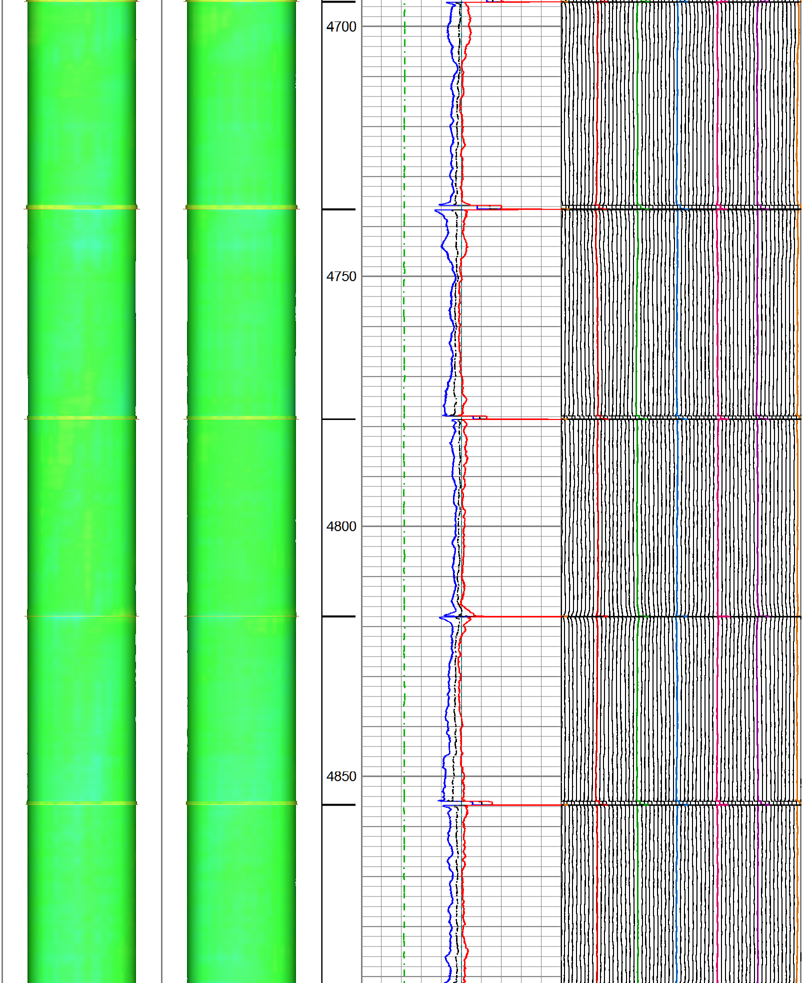


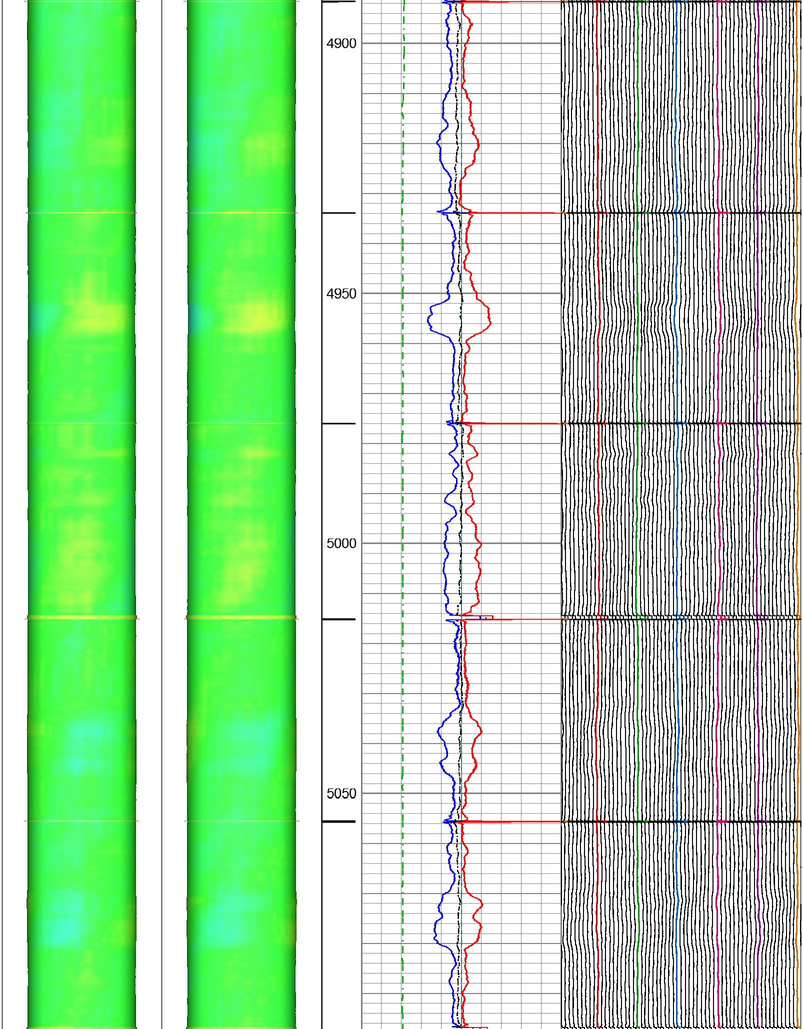


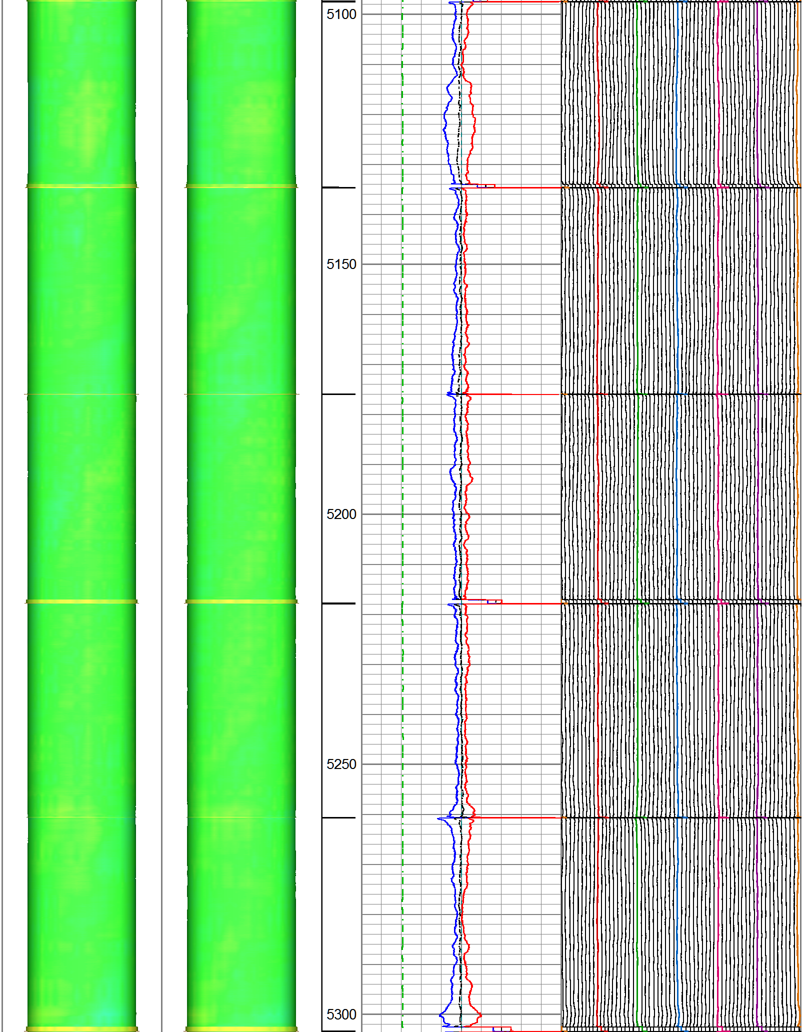


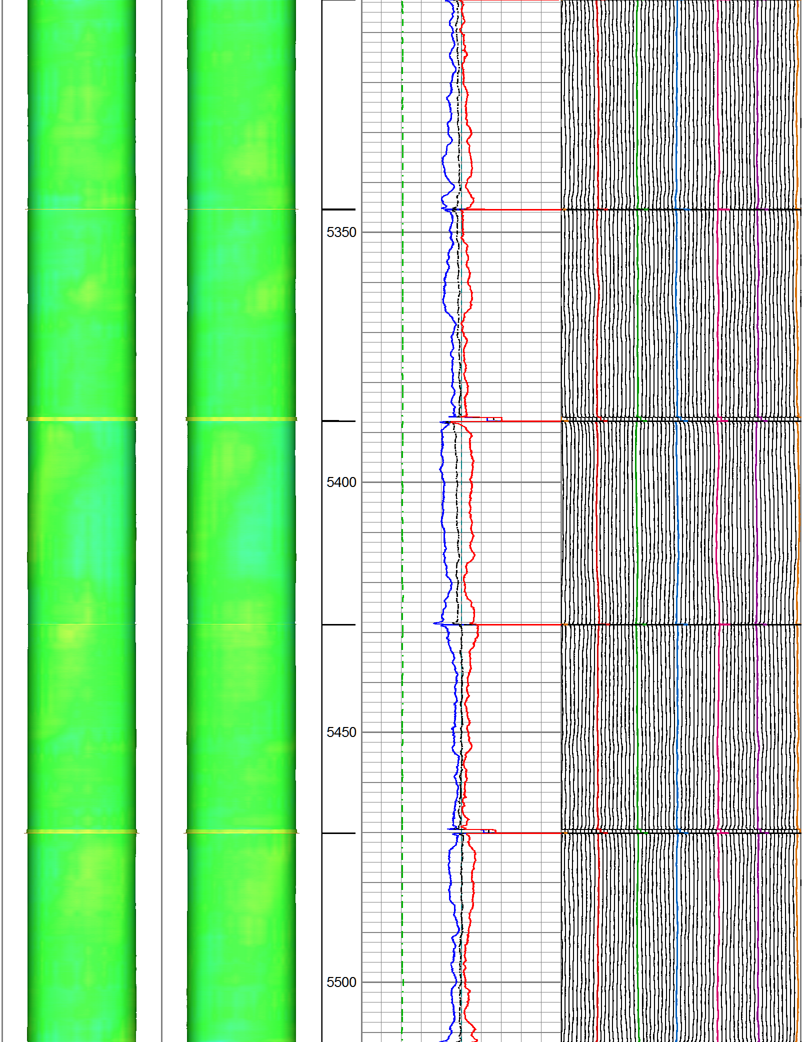


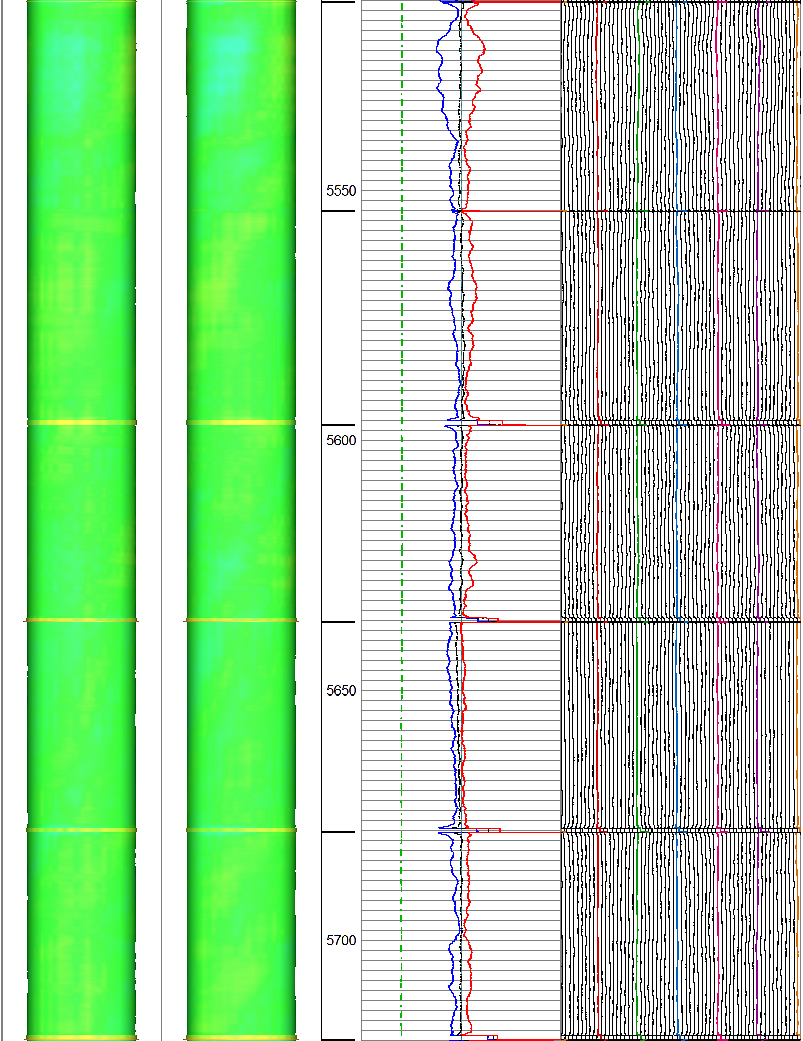


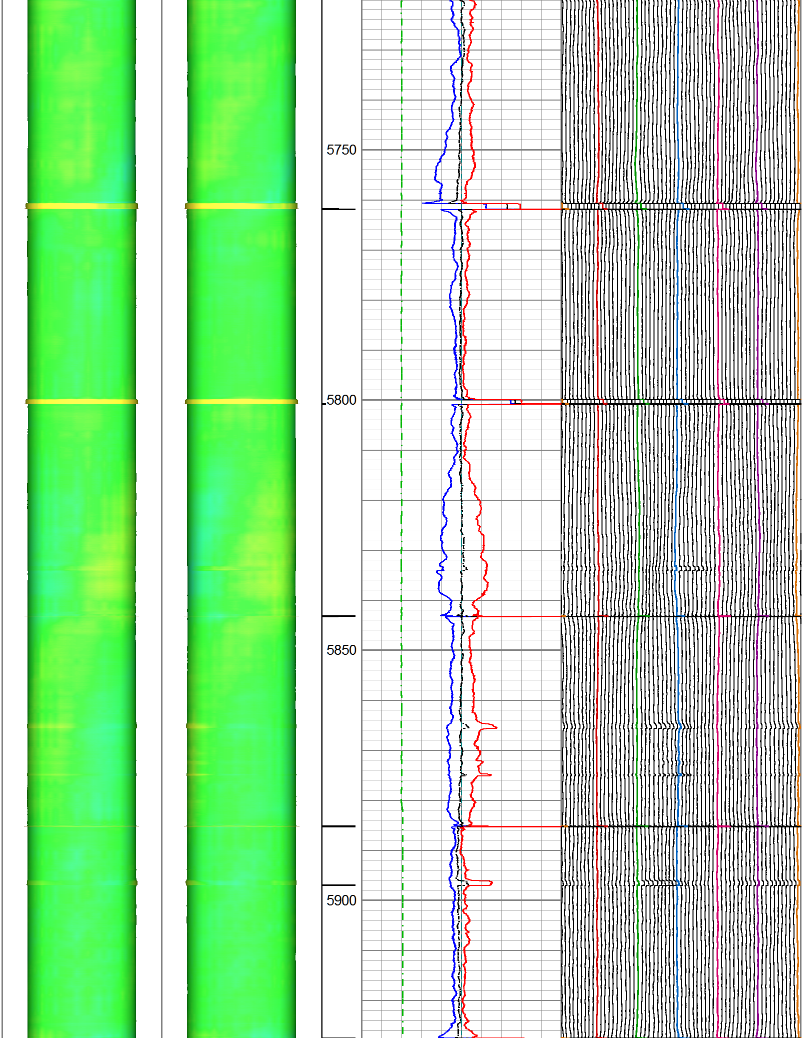


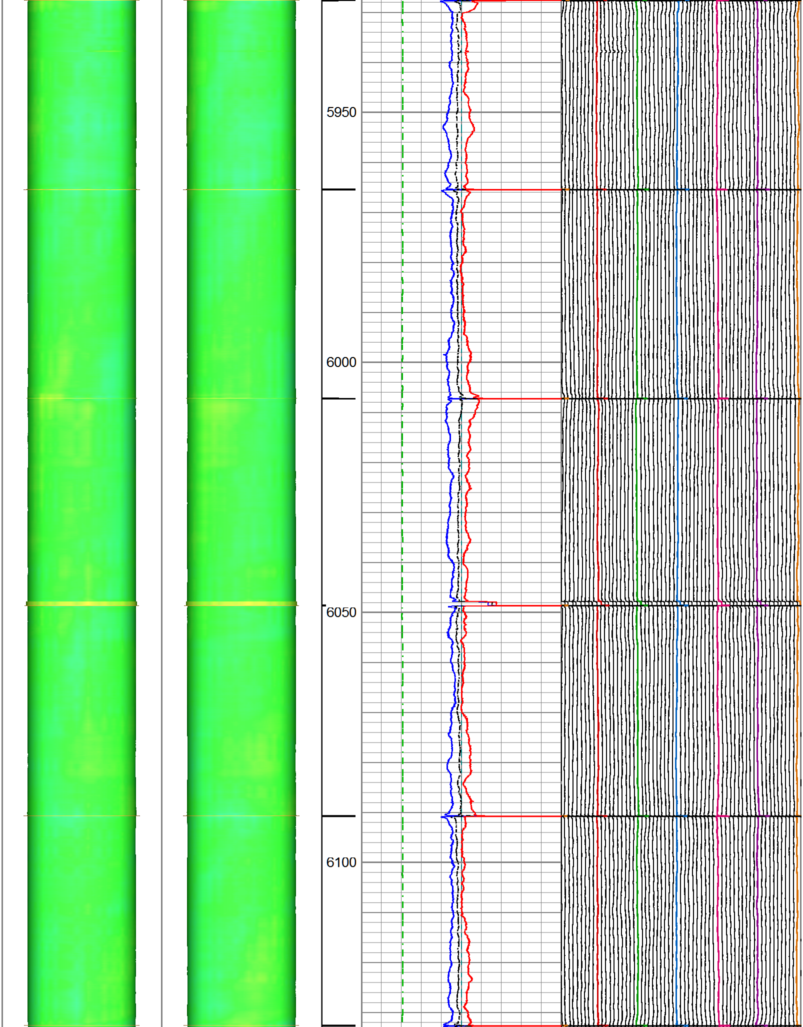


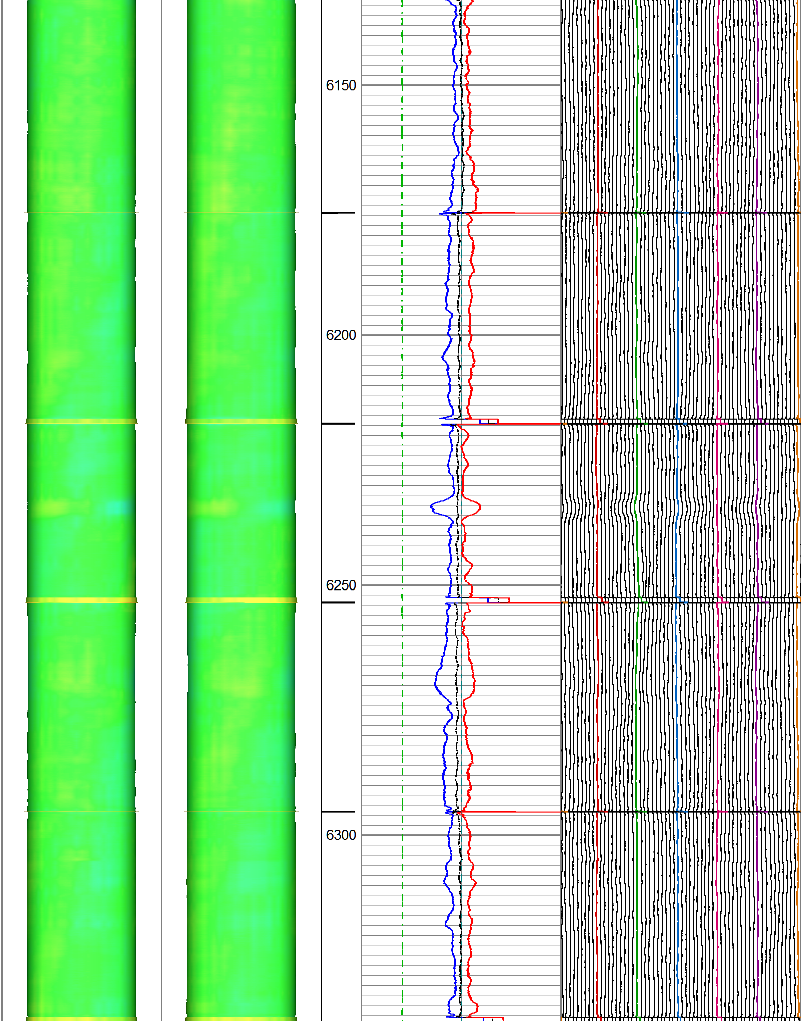


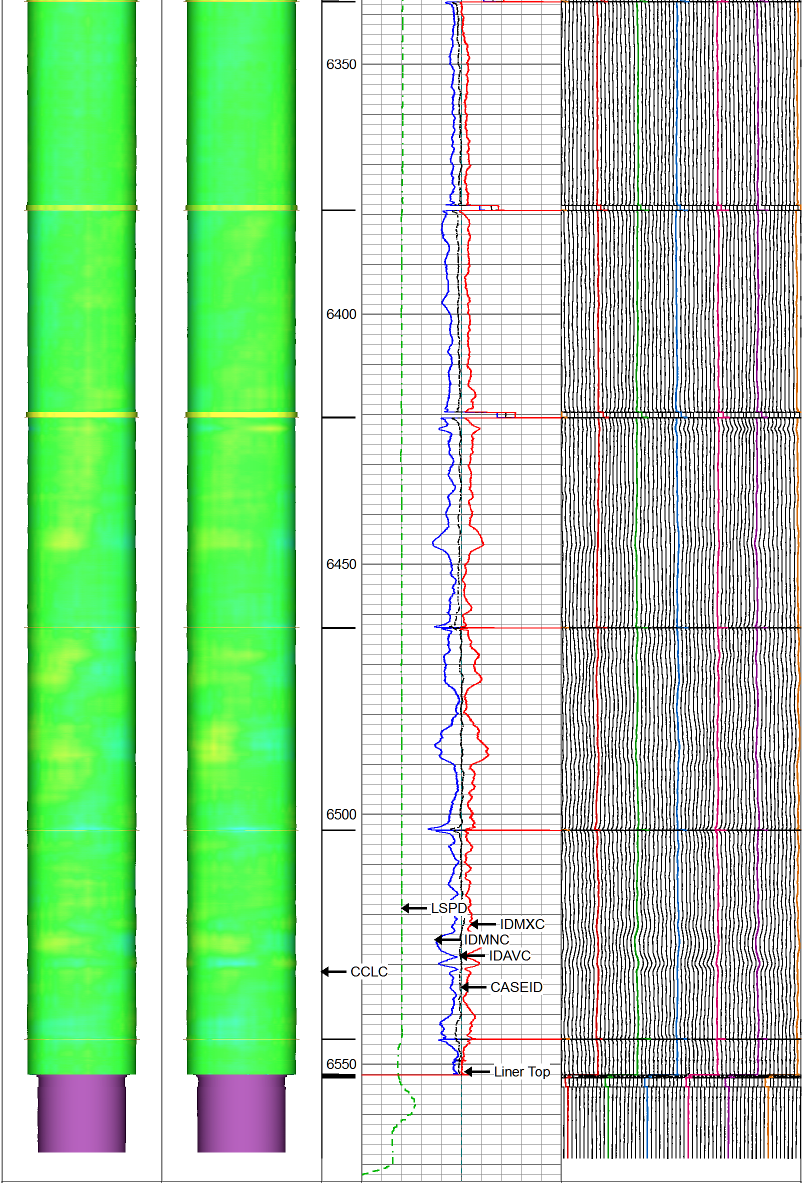












Low Side Image		High Side Image		CCL	0	LSPD (ft/min)	200	1	RC10 (in)	7
7.025	8.625	7.025	8.625		7.325	IDMNC (in)	8.325	2	RC20 (in)	8
					7.325	CASEID (in)	8.325	3	RC30 (in)	9
					7.325	IDAVC (in)	8.325	4	RC40 (in)	10
					7.325	IDMXC (in)	8.325	5	RC50 (in)	11
								6	RC60 (in)	12

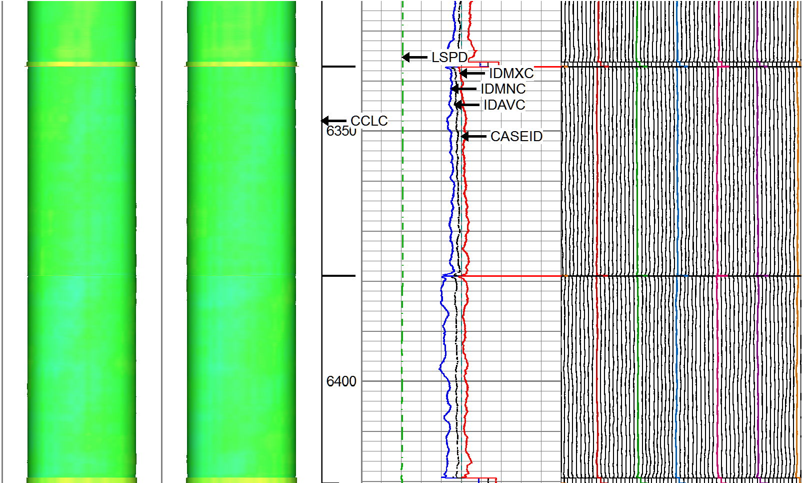
Western Wireline

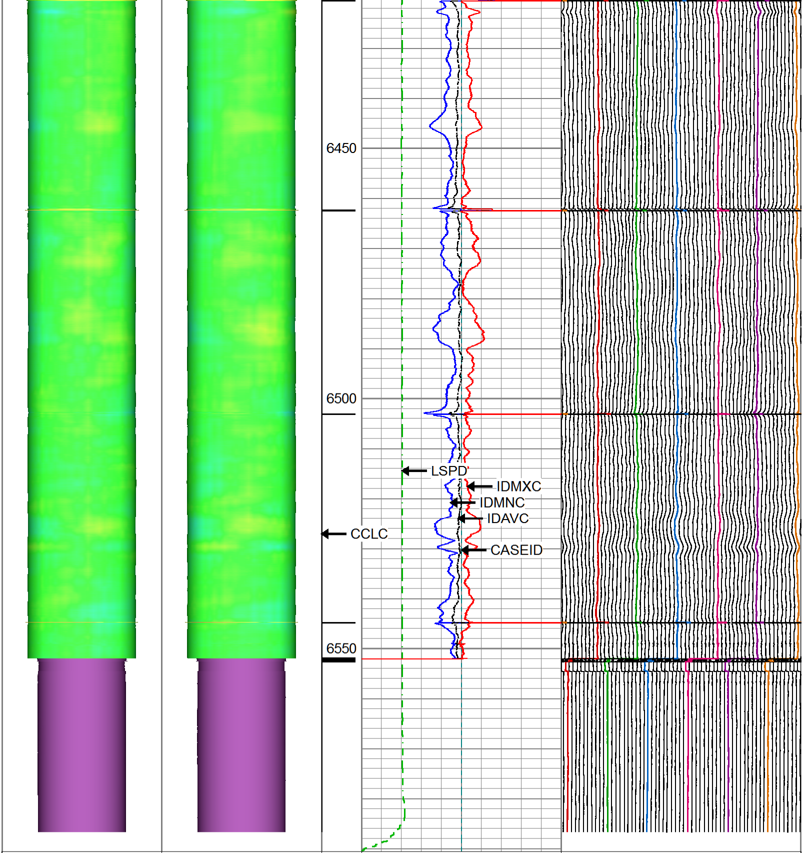
Repeat Logging Section

5 Inches = 100 Feet

Database File	southerncaliforniagascompanyfernandofee32a60mac.db
Dataset Pathname	pass2
Presentation Format	1b_mac_60_multi arm_gas co edit
Dataset Creation	Thu Sep 01 08:55:28 2016
Charted by	Depth in Feet scaled 1:240

Low Side Image		High Side Image		CCL	0	LSPD (ft/min)	200	1	RC10 (in)	7
7.025	8.625	7.025	8.625		7.325	IDMNC (in)	8.325	2	RC20 (in)	8
					7.325	CASEID (in)	8.325	3	RC30 (in)	9
					7.325	IDAVC (in)	8.325	4	RC40 (in)	10
					7.325	IDMXC (in)	8.325	5	RC50 (in)	11
								6	RC60 (in)	12





Low Side Image	High Side Image	CCL	0 LSPD (ft/min) 200	1 RC10 (in) 7
7.025 8.625	7.025 8.625		7.325 IDMNC (in) 8.325	2 RC20 (in) 8
			7.325 CASEID (in) 8.325	3 RC30 (in) 9
			7.325 IDAVC (in) 8.325	4 RC40 (in) 10
			7.325 IDMXC (in) 8.325	5 RC50 (in) 11
				6 RC60 (in) 12

Western Wireline

Prejob Verification

Time Driven

Database File	southerncaliforniagascompanyfernandofee32a60mac.db
Dataset Pathname	pass1
Presentation Format	1b_mac_60_multi arm_gas co edit
Dataset Creation	Thu Sep 01 08:19:05 2016
Charted by	Time scaled 360/hour

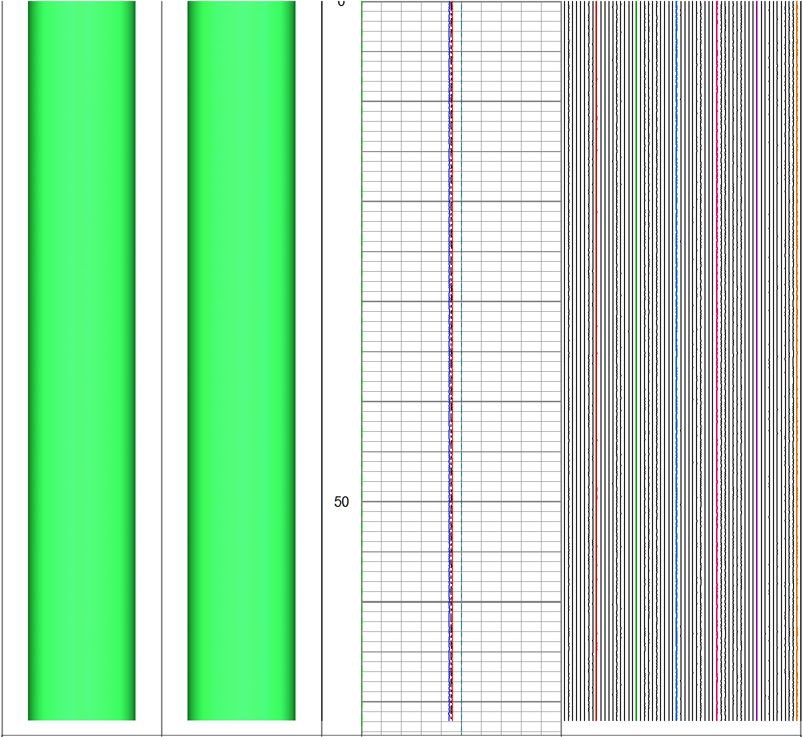
Low Side Image
7.025 8.625

High Side Image
7.025 8.625

CCL

0 LSPD (ft/min) 200
7.325 IDMNC (in) 8.325
7.325 CASEID (in) 8.325
7.325 IDAVC (in) 8.325
7.325 IDMXC (in) 8.325

1 RC10 (in) 7
2 RC20 (in) 8
3 RC30 (in) 9
4 RC40 (in) 10
5 RC50 (in) 11
6 RC60 (in) 12



Low Side Image
7.025 8.625

High Side Image
7.025 8.625

CCL

0 LSPD (ft/min) 200
7.325 IDMNC (in) 8.325
7.325 CASEID (in) 8.325
7.325 IDAVC (in) 8.325

1 RC10 (in) 7
2 RC20 (in) 8
3 RC30 (in) 9
4 RC40 (in) 10

7.325 IDMXC (in) 8.325
5 RC50 (in) 11
6 RC60 (in) 12

Western Wireline

Post Job Verification

Time Driven

Database File	southerncaliforniagascompanyfernandofee32a60mac.db
Dataset Pathname	pass4
Presentation Format	1b_mac_60_multi arm_gas co edit
Dataset Creation	Thu Sep 01 12:20:15 2016
Charted by	Time scaled 360/hour

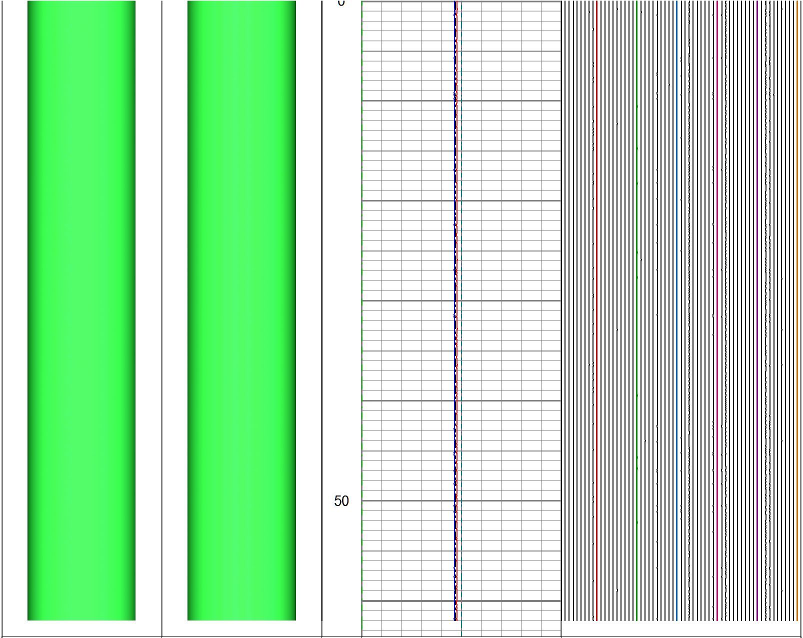
Low Side Image
7.025 8.625

High Side Image
7.025 8.625

CCL

0	LSPD (ft/min)	200
7.325	IDMNC (in)	8.325
7.325	CASEID (in)	8.325
7.325	IDAVC (in)	8.325
7.325	IDMXC (in)	8.325

1	RC10 (in)	7
2	RC20 (in)	8
3	RC30 (in)	9
4	RC40 (in)	10
5	RC50 (in)	11
6	RC60 (in)	12



Low Side Image
7.025 8.625

High Side Image
7.025 8.625

CCL

0	LSPD (ft/min)	200
7.325	IDMNC (in)	8.325
7.325	CASEID (in)	8.325
7.325	IDAVC (in)	8.325
7.325	IDMXC (in)	8.325

1	RC10 (in)	7
2	RC20 (in)	8
3	RC30 (in)	9
4	RC40 (in)	10
5	RC50 (in)	11

6 RC60 (in) 12

Calibration Report

Database File southerncaliforniagascompanyfernandofee32a60mac.db
Dataset Pathname pass5
Dataset Creation Thu Sep 01 12:21:41 2016

60 Arm Multi Sensor Caliper Calibration Report

Serial Number: 0060
Tool Model: 60
Performed: Thu Sep 01 08:14:59 2016

Ref ID:	4.33	4.92	6.10	6.69	7.78	in
Arm1	1852.00	2339.00	3316.00	3804.00	4815.00	in
Arm2	1714.00	2194.00	3167.00	3658.00	4675.00	in
Arm3	1758.00	2246.00	3227.00	3720.00	4752.00	in
Arm4	1778.00	2264.00	3239.00	3728.00	4742.00	in
Arm5	1749.00	2232.00	3212.00	3696.00	4696.00	in
Arm6	1784.00	2282.00	3276.00	3772.00	4812.00	in
Arm7	1880.00	2378.00	3398.00	3902.00	4948.00	in
Arm8	1812.00	2283.00	3272.00	3771.00	4824.00	in
Arm9	1964.00	2436.00	3414.00	3898.00	4906.00	in
Arm10	1793.00	2267.00	3248.00	3734.00	4740.00	in
Arm11	1752.00	2256.00	3290.00	3812.00	4898.00	in
Arm12	1714.00	2174.00	3120.00	3592.00	4580.00	in
Arm13	1710.00	2206.00	3194.00	3686.00	4699.00	in
Arm14	1746.00	2215.00	3186.00	3671.00	4681.00	in
Arm15	1744.00	2232.00	3214.00	3702.00	4728.00	in
Arm16	1689.00	2182.00	3172.00	3670.00	4708.00	in
Arm17	1726.00	2214.00	3211.00	3710.00	4738.00	in
Arm18	1732.00	2219.00	3199.00	3682.00	4688.00	in
Arm19	1754.00	2240.00	3216.00	3706.00	4725.00	in
Arm20	1746.00	2246.00	3226.00	3724.00	4749.00	in
Arm21	1893.00	2374.00	3341.00	3830.00	4844.00	in
Arm22	1753.00	2254.00	3254.00	3753.00	4784.00	in
Arm23	1856.00	2343.00	3308.00	3805.00	4822.00	in
Arm24	1800.00	2288.00	3251.00	3736.00	4742.00	in
Arm25	1846.00	2345.00	3332.00	3828.00	4846.00	in
Arm26	1748.00	2236.00	3203.00	3692.00	4704.00	in
Arm27	1868.00	2378.00	3366.00	3858.00	4868.00	in
Arm28	1611.00	2098.00	3059.00	3548.00	4572.00	in
Arm29	1750.00	2232.00	3200.00	3693.00	4726.00	in
Arm30	1690.00	2184.00	3180.00	3696.00	4778.00	in

* Bad

Calibration Report

Serial Number:
Tool Model:
Performed:

Ref ID:	4.33	4.92	6.10	6.69	7.78	in
Arm31	1840.00	2345.00	3323.00	3817.00	4834.00	in

Arm32	1732.00	2231.00	3198.00	3684.00	4694.00	in
Arm33	1743.00	2242.00	3217.00	3715.00	4733.00	in
Arm34	1750.00	2246.00	3205.00	3694.00	4698.00	in
Arm35	1737.00	2244.00	3228.00	3728.00	4769.00	in
Arm36	1742.00	2237.00	3194.00	3682.00	4698.00	in
Arm37	1874.00	2369.00	3325.00	3814.00	4816.00	in
Arm38	1844.00	2368.00	3364.00	3860.00	4873.00	in
Arm39	1598.00	2106.00	3107.00	3614.00	4698.00	in
Arm40	1866.00	2361.00	3311.00	3792.00	4794.00	in
Arm41	1894.00	2400.00	3366.00	3856.00	4864.00	in
Arm42	1764.00	2269.00	3234.00	3725.00	4751.00	in
Arm43	1664.00	2175.00	3163.00	3665.00	4692.00	in
Arm44	1742.00	2250.00	3226.00	3722.00	4746.00	in
Arm45	1948.00	2461.00	3445.00	3943.00	4970.00	in
Arm46	1841.00	2383.00	3427.00	3969.00	5049.00	in
Arm47	1850.00	2341.00	3296.00	3780.00	4778.00	in
Arm48	1775.00	2283.00	3266.00	3764.00	4799.00	in
Arm49	1799.00	2296.00	3266.00	3764.00	4801.00	in
Arm50	1852.00	2353.00	3327.00	3819.00	4835.00	in
Arm51	1722.00	2227.00	3198.00	3695.00	4722.00	in
Arm52	1799.00	2300.00	3287.00	3786.00	4820.00	in
Arm53	1854.00	2348.00	3319.00	3814.00	4828.00	in
Arm54	1872.00	2370.00	3347.00	3840.00	4863.00	in
Arm55	1708.00	2205.00	3191.00	3692.00	4740.00	in
Arm56	1928.00	2426.00	3409.00	3902.00	4923.00	in
Arm57	1861.00	2356.00	3318.00	3804.00	4809.00	in
Arm58	1778.00	2265.00	3254.00	3758.00	4828.00	in
Arm59	1808.00	2306.00	3286.00	3780.00	4802.00	in
Arm60	1808.00	2307.00	3296.00	3800.00	4826.00	in

* Bad

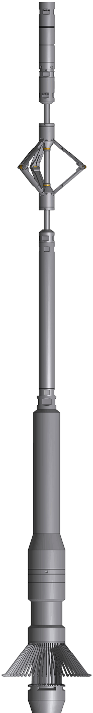
HWWSMFC verifications Calibration Report

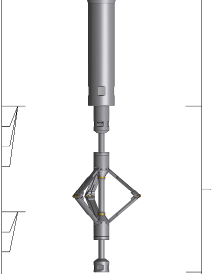
	Pre Verification	Post Verification	Casing Check	
Performed:	Thu Sep 01 08:18:59 2016	Thu Sep 01 12:18:56 2016	Thu Sep 01 12:19:57 2016	
Ref ID:	7.78	7.78	7.83	in
Min.	7.76	7.79	7.79	in
Max.	7.78	7.80	7.80	in
Avg.	7.77	7.80	7.79	in
Dia1	7.77	7.80	7.80	in
Dia2	7.78	7.79	7.79	in
Dia3	7.77	7.79	7.79	in
Dia4	7.77	7.79	7.79	in
Dia5	7.77	7.80	7.80	in
Dia6	7.77	7.80	7.80	in
Dia7	7.78	7.80	7.80	in
Dia8	7.78	7.79	7.79	in
Dia9	7.77	7.80	7.80	in
Dia10	7.77	7.79	7.79	in
Dia11	7.77	7.79	7.79	in
Dia12	7.78	7.80	7.80	in
Dia13	7.77	7.79	7.79	in
Dia14	7.77	7.80	7.80	in
Dia15	7.77	7.80	7.80	in
Dia16	7.78	7.79	7.79	in
Dia17	7.77	7.80	7.80	in
Dia18	7.77	7.80	7.80	in
Dia19	7.77	7.80	7.80	in
Dia20	7.76	7.79	7.79	in
Dia21	7.77	7.79	7.79	in
Dia22	7.77	7.79	7.79	in
Dia23	7.76	7.79	7.79	in
Dia24	7.77	7.80	7.79	in
Dia25	7.77	7.79	7.79	in
Dia26	7.78	7.79	7.79	in
Dia27	7.77	7.79	7.79	in
Dia28	7.78	7.80	7.80	in
Dia29	7.78	7.80	7.80	in
Dia30	7.77	7.79	7.79	in

Inclinometer Calibration Report

Performed: (Not Performed)

	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer					gee

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb
			HWT_SWS-SWS01 (0001) Hotwell Swivel Sub	0.90	1.69	2.00
			HWT_RCT-RCT01 Hotwell Roller Centralizer (3 Arm)	1.97	1.69	21.10
			HWT_WTS-WTS06 (0002) Hotwell Telemetry Sub	1.82	1.69	8.60
CRCCnt	7.01					
FrmCnt	7.01					
WTSTime	7.01					
WTSTemp	7.01					
CHV	7.01					
			HWT_MFI-60 (0060) Hotwell Multi-finger Caliper Tool-60 Finger	5.04	4.00	68.89
Meas	3.74					

MFCBEAR MFCACCY MFCACCX Aux1 QT QP QT	1.97 1.97 1.97 1.97 0.71 0.71 0.71		HWT_RCT-RCT01 Hotwell Roller Centralizer (3 Arm)	1.97	1.69	21.10

Dataset: southerncaliforniagascompanyfernandofee32a60mac.db: aliso/ff32/3.6/3.6
Total length: 11.70 ft
Total weight: 121.69 lb
O.D.: 4.00 in

Western Wireline

Company Southern California Gas Company
Well Fernando Fee 32A
Field Aliso Canyon
County Los Angeles
State California
Country U.S.A.