

Confidentiality Requested:

Yes No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

Form ACO-1

January 2018

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

Gas DH EOR

OG GSW

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 EOR Conv. to SWD
 Plug Back Liner Conv. to GSW Conv. to Producer

Commingled Permit #: _____

Dual Completion Permit #: _____

SWD Permit #: _____

EOR Permit #: _____

GSW Permit #: _____

Spud Date or Date Reached TD Completion Date or Recompletion Date

API No.: _____

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 Drill Stem Tests Received

Geologist Report / Mud Logs Received

UIC Distribution

ALT I II III Approved by: _____ Date: _____

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 Geologist Report / Mud Logs <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				

1. Did you perform a hydraulic fracturing treatment on this well? Yes No *(If No, skip questions 2 and 3)*
2. Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? Yes No *(If No, skip question 3)*
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)*

Date of first Production/Injection or Resumed Production/Injection:	Producing Method: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other <i>(Explain)</i> _____			
Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio Gravity

DISPOSITION OF GAS: <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	METHOD OF COMPLETION: <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5)</i> <i>(Submit ACO-4)</i>	PRODUCTION INTERVAL: Top Bottom
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Shots Per Foot	Perforation Top	Perforation Bottom	Bridge Plug Type	Bridge Plug Set At	Acid, Fracture, Shot, Cementing Squeeze Record <i>(Amount and Kind of Material Used)</i>

TUBING RECORD:	Size:	Set At:	Packer At:	
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Form	ACO1 - Well Completion
Operator	Richland Oil Investments, LLC
Well Name	MOORE 22-2
Doc ID	1355458

All Electric Logs Run

DIL
DUCP
MEL
Cement Bond/Gamma Ray

Form	ACO1 - Well Completion
Operator	Richland Oil Investments, LLC
Well Name	MOORE 22-2
Doc ID	1355458

Tops

Name	Top	Datum
Anhydrite	2586	+528
Anhdrite Base	2610	+504
Heebner	4011	-897
Toronto	4035	-921
Lansing	4054	-940
Muncie Creek	4201	-1087
Stark	4286	-1172
Hushpuckney	-4321	-1207
Base KC	4360	-1246
Marmaton	4386	-1272
Pawnee	4480	-1366
Myrick Station	4522	-1408
Ft. Scott	4538	-1424
Cherokee	4567	-1453
Johnson Zone	4612	-1498
Morrow Shale	4652	-1538
Morrow Sst	Absent	-----
Mississippian	4675	-1561

Form	ACO1 - Well Completion
Operator	Richland Oil Investments, LLC
Well Name	MOORE 22-2
Doc ID	1355458

Perforations

Shots Per Foot	Perforation Record	Material Record	Depth
4	4614-4618	250gal 15% MCA/2000gal 15% NE	
4	4254-4258	250gal 15% MCA/	
4	4274-4277	250gal 15% MCA w/3%M.S./1500gal 15% NE	



PO Box 884, Chanute, KS 66720
620-431-9210 or 800-467-8676

FIELD TICKET & TREATMENT REPORT
CEMENT

Invoice # 810014

TICKET NUMBER 51764
LOCATION Cathey KS
FOREMAN Jerry Y
Miles S

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY
4-6-17	6914	Moore 22-2	22	125	336	Logan
CUSTOMER Richland Investments			Cakley St W to W to 370 1/2 N E into			
MAILING ADDRESS P.O. Box 166			TRUCK #	DRIVER	TRUCK #	DRIVER
CITY Palo			753	Travis W		
STATE KS			460	Harold C		
ZIP CODE 61651			772-729	Jerry		
			703			

JOB TYPE 2-stage HOLE SIZE 7 7/8 HOLE DEPTH 4772 CASING SIZE & WEIGHT 5 1/2 15.5#
 CASING DEPTH 4770 DRILL PIPE _____ TUBING _____ OTHER DV @ 2590
 SLURRY WEIGHT 14.2/11.6 SLURRY VOL 1.42/1.87 WATER gal/sk _____ CEMENT LEFT in CASING 43'
 DISPLACEMENT 112 1/2 / 6 1/2 DISPLACEMENT PSI _____ MIX PSI _____ RATE _____

REMARKS: Safety meeting and rig upon South wind run first equ. scratches on 2, 3, 4, 5, 6, 7, 9, 10, 11, 12 x 4 pt centralizers on 2, 4, 6, 8, 10, 12, 15, 18, 21, 49 baskets on 3, 22, 50 DV Tool on 50 set @ 2590 run casing to bottom pump ball thru circulate & reciprocate vis down to 36 pump 566/1120 mud flush 20 bbl KCL then 175 sks thixobland shutdown release plug clean pump & lines & displace 112 1/2 bbl (50 H₂O 62 lb mud) 900' lift plug landed @ 1500' released back & held. open tool & circulate 5 hrs mix 500 gal mud flush with 566/1120 spacer mix 450 sks lite blend VII shutdown release plug clean pump & lines displace with 62 1/2 bbl H₂O final lift 500' plug landed & tool closed @ 1700' released back & held.

Cement did circulate

Thank you
Jerry & crew

20 sks MH 30 sks RH

ACCOUNT CODE	QUANTITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
CE0453	1	PUMP CHARGE	2800.00	2800.00
CE0002	10	MILEAGE	7.50	75.00
CE0711		ton mileage delivery (min)	660.00	660.00
CC5862	175 sks	thixobland III	26.00	4550.00
CC6077	875 #	Kol seal	50	43750
CC5831	500 sks	lite blend VII	17.50	8750.00
CC6075	125 #	f/l seal	3.00	375.00
CC5300	2 gal	KCL	39.00	78.00
CC6125	1000 gal	mud flush	65	6500.00
CP8676	40	5 1/2 scratchers	75.00	3000.00
CP8485	1	5 1/2 APU front shoe	585.00	585.00
CP8254	1	5 1/2 latchdown assy	400.00	400.00
CP8554	10	5 1/2 centralizers	81.00	810.00
CP8629	3	5 1/2 baskets	385.00	1155.00
CP8801	1	5 1/2 DV Tool	5970.00	5970.00
			Subtotal	30292.00
			- 45%	13631.40
			Subtotal	16660.60
			SALES TAX	1177.46
			ESTIMATED TOTAL	17838.07

AUTHORIZATION [Signature] TITLE _____ DATE _____

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.

7859
7756

TICKET NUMBER **51723**

LOCATION Ockley KS

FOREMAN Jerry Y

PO Box 884, Chanute, KS 66720
620-431-9210 or 800-467-8676

FIELD TICKET & TREATMENT REPORT
CEMENT

Invoice # **809944** KS

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY
3-27-17	6914	Moore 22-2	22	12S	33W	Logan
CUSTOMER		Richard Investments Ockley KS do Ute W to 370 1/2 N E into				
MAILING ADDRESS		TRUCK #	DRIVER	TRUCK #	DRIVER	
P.O. Box 166		731	Cory O			
CITY		479	Travis W			
STATE						
ZIP CODE						
Palo						
KS						
67657						

JOB TYPE Surface HOLE SIZE 12 1/4 HOLE DEPTH 227 CASING SIZE & WEIGHT 8 7/8 2.3#
 CASING DEPTH 227 DRILL PIPE _____ TUBING _____ OTHER _____
 SLURRY WEIGHT 15.8 SLURRY VOL 1.24 WATER gal/sk _____ CEMENT LEFT in CASING 20'
 DISPLACEMENT 136bl DISPLACEMENT PSI _____ MIX PSI _____ RATE _____

REMARKS: Soft, meeting rig upon Southwind Rig 1 break circulation with rig free mix 1650 lbs surface blend II workshop & Displace with 136bl H₂O & shut in circulated approx 96bl to pit

Cement did
circulate

Thank you
Jerry & crew

ACCOUNT CODE	QUANTITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
CE0481	1	PUMP CHARGE	1150.00	1150.00
CE0002	10	MILEAGE	7.15	71.50
CE074	7.76	ton mileage delivery (mins)	660.00	660.00
CC5871	165	surface blend II	23.00	3795.00
			Subtotal	5676.50
			loss 45% discount	2554.42
			Subtotal	3122.08
			SALES TAX	166.98
			ESTIMATED TOTAL	3289.06
			DATE	3-27-17

AUTHORIZATION Ryan Bohrer TITLE _____

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Richland Oil Investments
608 E 1st
Palco, Ks 67657
ATTN: Steve Murphy

22-12-33 Logan, KS

Moore 22-2

Job Ticket: 63780

DST#: 1

Test Start: 2017.04.01 @ 07:44:14

GENERAL INFORMATION:

Formation: **Lansing C**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:20:44

Time Test Ended: 12:51:14

Test Type: Conventional Bottom Hole (Initial)

Tester: Brandon Turley

Unit No: 79

Interval: 4080.00 ft (KB) To 4100.00 ft (KB) (TVD)

Reference Elevations: 3114.00 ft (KB)

Total Depth: 4100.00 ft (KB) (TVD)

3104.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 10.00 ft

Serial #: 8166 Outside

Press@RunDepth: 30.69 psig @ 4081.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.01

End Date:

2017.04.01

Last Calib.:

2017.04.01

Start Time:

07:44:19

End Time:

12:51:13

Time On Btm:

2017.04.01 @ 09:19:44

Time Off Btm:

2017.04.01 @ 11:24:44

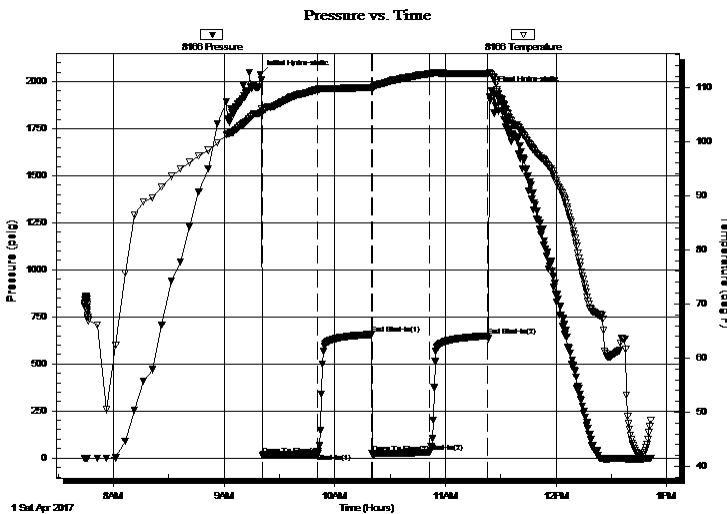
TEST COMMENT: IF: 1/4 blow built to 1/2.

IS: No return.

FF: Surface blow built to 1/4.

FS: No return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2038.72	105.31	Initial Hydro-static
1	15.79	105.28	Open To Flow (1)
31	22.60	109.61	Shut-In(1)
60	656.46	110.00	End Shut-In(1)
61	22.94	109.62	Open To Flow (2)
92	30.69	112.53	Shut-In(2)
123	649.19	112.53	End Shut-In(2)
125	1952.38	112.28	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
35.00	wcm20%w 80%m	0.49
1.00	free oil 100%o	0.01

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63780

DST#: 1

ATTN: Steve Murphy

Test Start: 2017.04.01 @ 07:44:14

GENERAL INFORMATION:

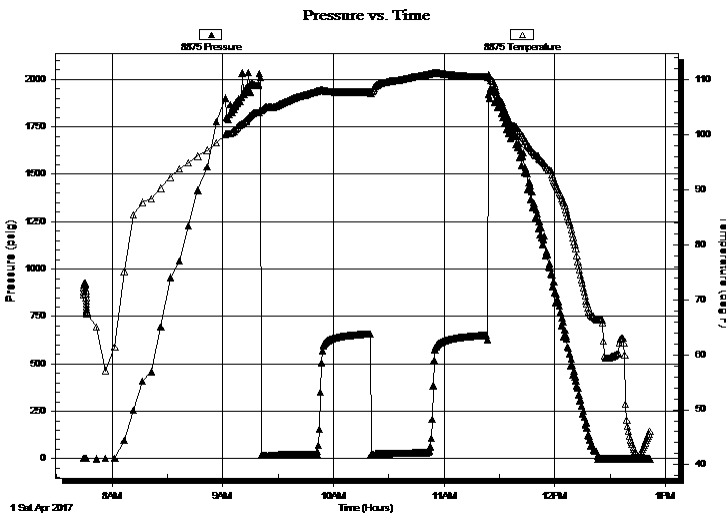
Formation: **Lansing C**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Initial)
 Time Tool Opened: 09:20:44
 Tester: Brandon Turley
 Time Test Ended: 12:51:14
 Unit No: 79
 Interval: **4080.00 ft (KB) To 4100.00 ft (KB) (TVD)**
 Reference Elevations: 3114.00 ft (KB)
 Total Depth: 4100.00 ft (KB) (TVD) 3104.00 ft (CF)
 Hole Diameter: 7.88 inches
 Hole Condition: Good
 KB to GR/CF: 10.00 ft

Serial #: 8875 Inside

Press@RunDepth: psig @ 4081.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.04.01 End Date: 2017.04.01 Last Calib.: 2017.04.01
 Start Time: 07:44:33 End Time: 12:51:27 Time On Btm:
 Time Off Btm:

TEST COMMENT: IF: 1/4 blow built to 1/2.
 IS: No return.
 FF: Surface blow built to 1/4.
 FS: No return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

Recovery

Length (ft)	Description	Volume (bbl)
35.00	wcm20%w 80%m	0.49
1.00	free oil 100%o	0.01

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63780

DST#: 1

ATTN: Steve Murphy

Test Start: 2017.04.01 @ 07:44:14

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

27000 ppm

Viscosity: 51.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.40 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
35.00	w cm 20%w 80%m	0.491
1.00	free oil 100%o	0.014

Total Length: 36.00 ft Total Volume: 0.505 bbl

Num Fluid Samples: 0

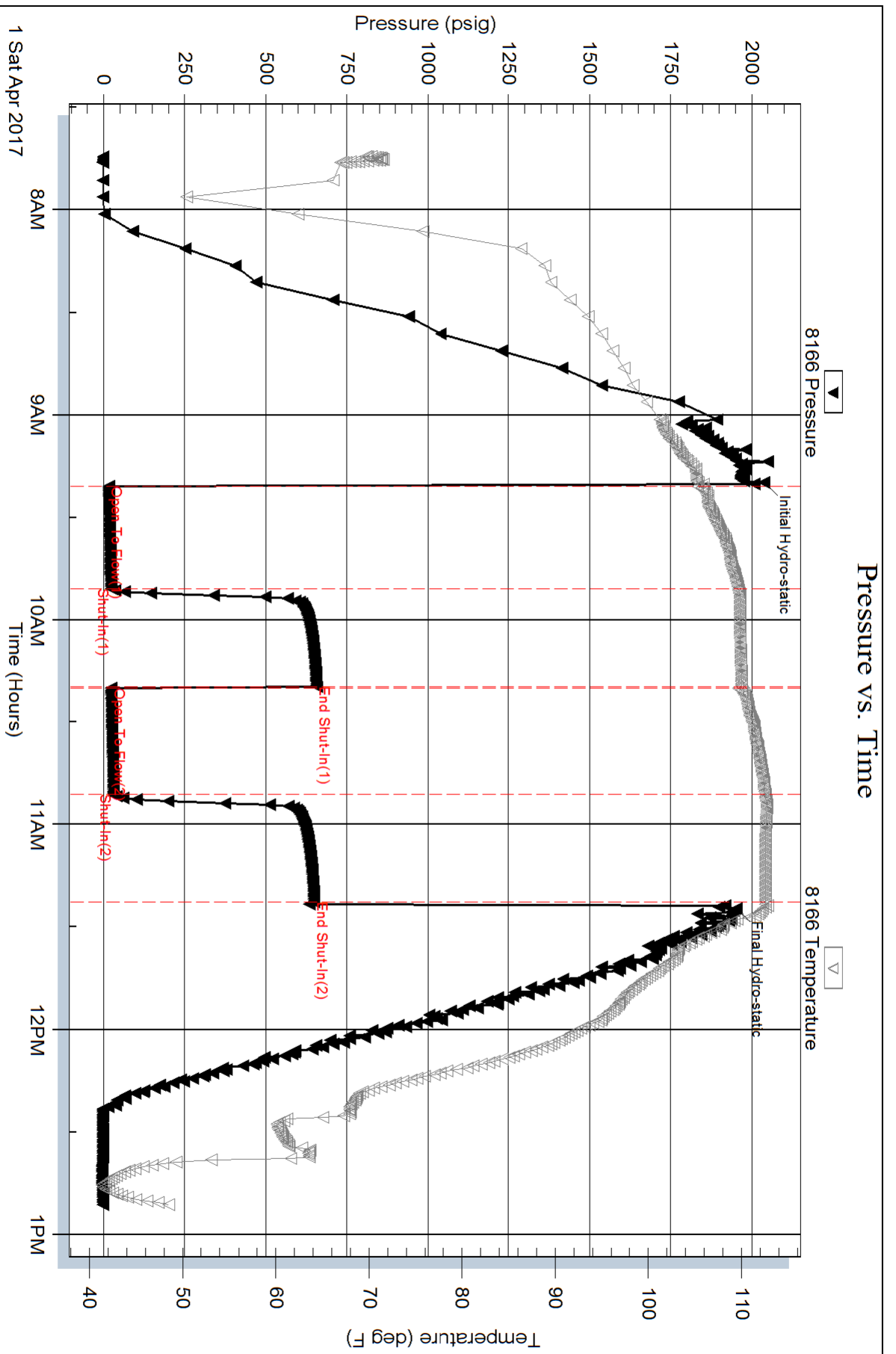
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: .43@42=27000



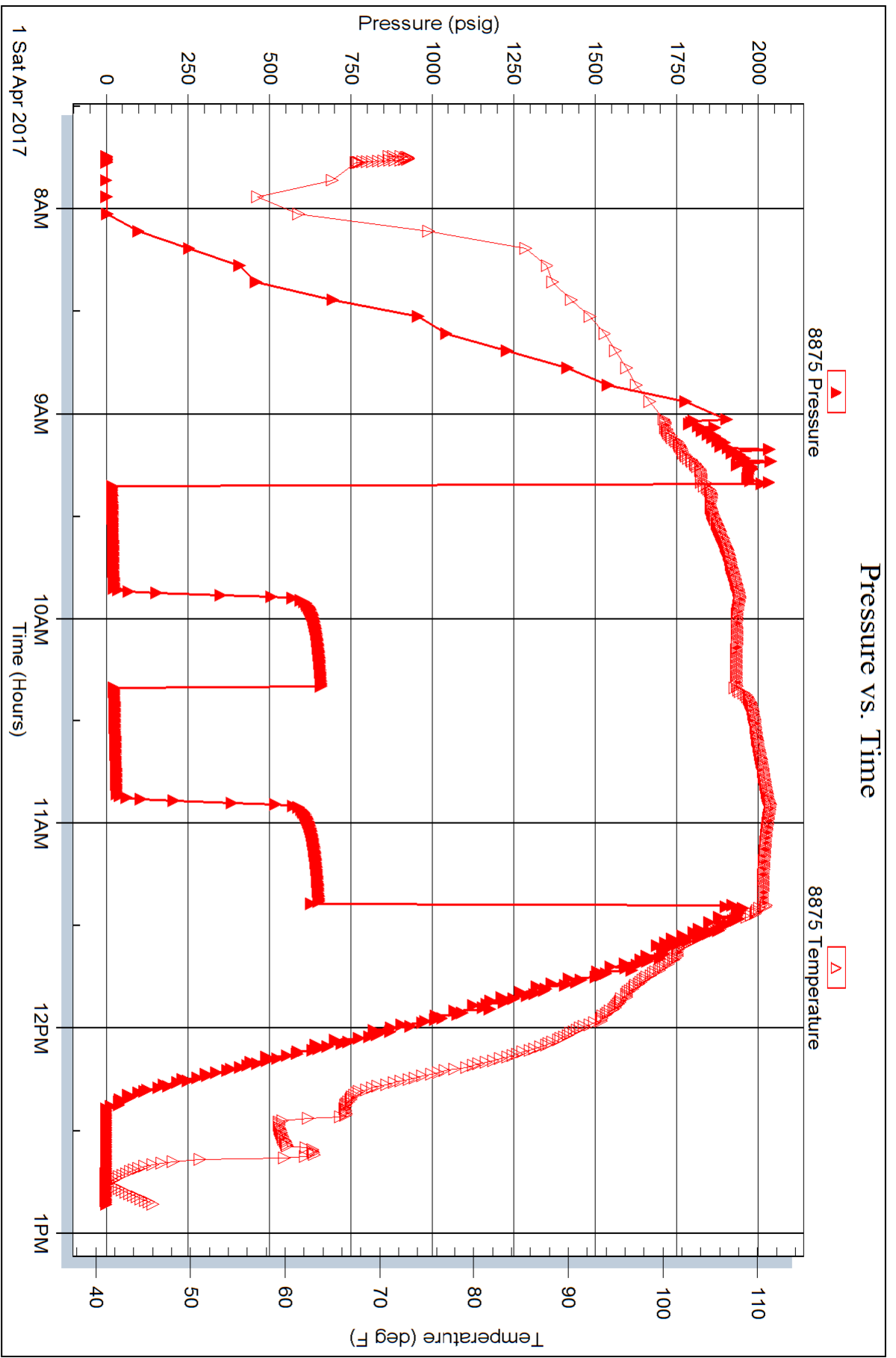
Serial #: 8875

Inside

Richland Oil Investments

Moore 22-2

DST Test Number: 1





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63781

DST#: 2

ATTN: Steve Murphy

Test Start: 2017.04.01 @ 21:33:51

GENERAL INFORMATION:

Formation: **Lansing E**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:44:21

Time Test Ended: 04:26:21

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Interval: **4122.00 ft (KB) To 4142.00 ft (KB) (TVD)**

Reference Elevations: 3114.00 ft (KB)

Total Depth: 4142.00 ft (KB) (TVD)

3104.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 10.00 ft

Serial #: **8166**

Outside

Press@RunDepth: 17.05 psig @ 4123.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.01

End Date:

2017.04.02

Last Calib.:

2017.04.02

Start Time: 21:33:56

End Time:

04:26:20

Time On Btm:

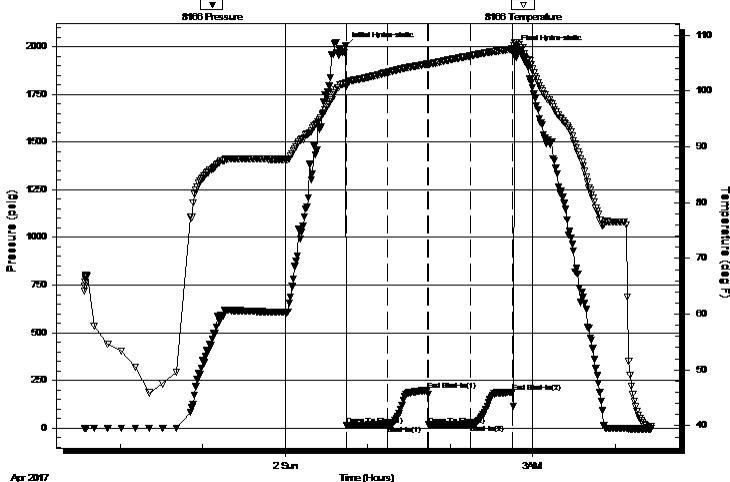
2017.04.02 @ 00:43:51

Time Off Btm:

2017.04.02 @ 02:46:21

TEST COMMENT: IF: Surface blow built to 1/2.
IS: No return.
FF: Surface blow built to 1/4.
FS: No return.

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2003.11	101.44	Initial Hydro-static
1	15.41	100.79	Open To Flow (1)
31	16.18	103.37	Shut-In(1)
60	197.82	104.84	End Shut-In(1)
61	16.46	104.83	Open To Flow (2)
91	17.05	106.32	Shut-In(2)
122	187.36	107.53	End Shut-In(2)
123	1987.62	108.19	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
20.00	mud oil spots 100%m	0.28

* Recovery from multiple tests

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Richland Oil Investments

608 E 1st
Palco, Ks 67657

ATTN: Steve Murphy

22-12-33 Logan, KS

Moore 22-2

Job Ticket: 63781

DST#: 2

Test Start: 2017.04.01 @ 21:33:51

GENERAL INFORMATION:

Formation: **Lansing E**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 00:44:21

Time Test Ended: 04:26:21

Interval: **4122.00 ft (KB) To 4142.00 ft (KB) (TVD)**

Total Depth: 4142.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Reference Elevations: 3114.00 ft (KB)

3104.00 ft (CF)

KB to GR/CF: 10.00 ft

Serial #: 8875

Inside

Press@RunDepth: psig @ 4123.00 ft (KB)

Start Date: 2017.04.01

End Date:

Capacity: 8000.00 psig

Last Calib.:

2017.04.02

Start Time: 21:33:47

End Time:

2017.04.02

Time On Btm:

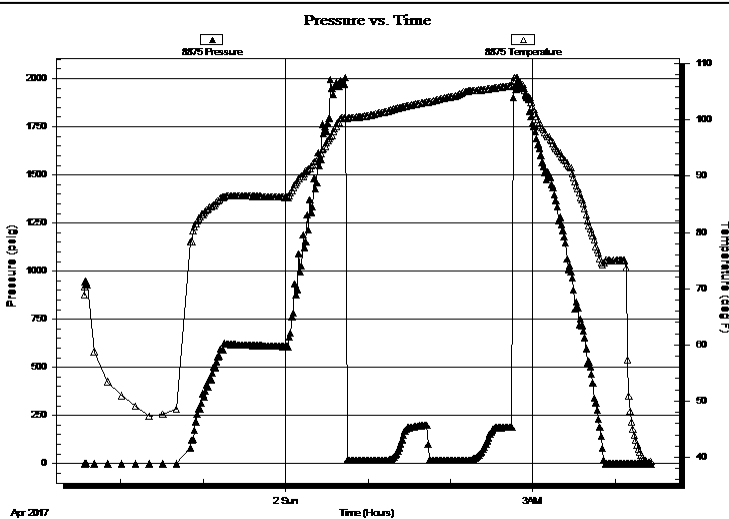
Time Off Btm:

TEST COMMENT: IF: Surface blow built to 1/2.

IS: No return.

FF: Surface blow built to 1/4.

FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

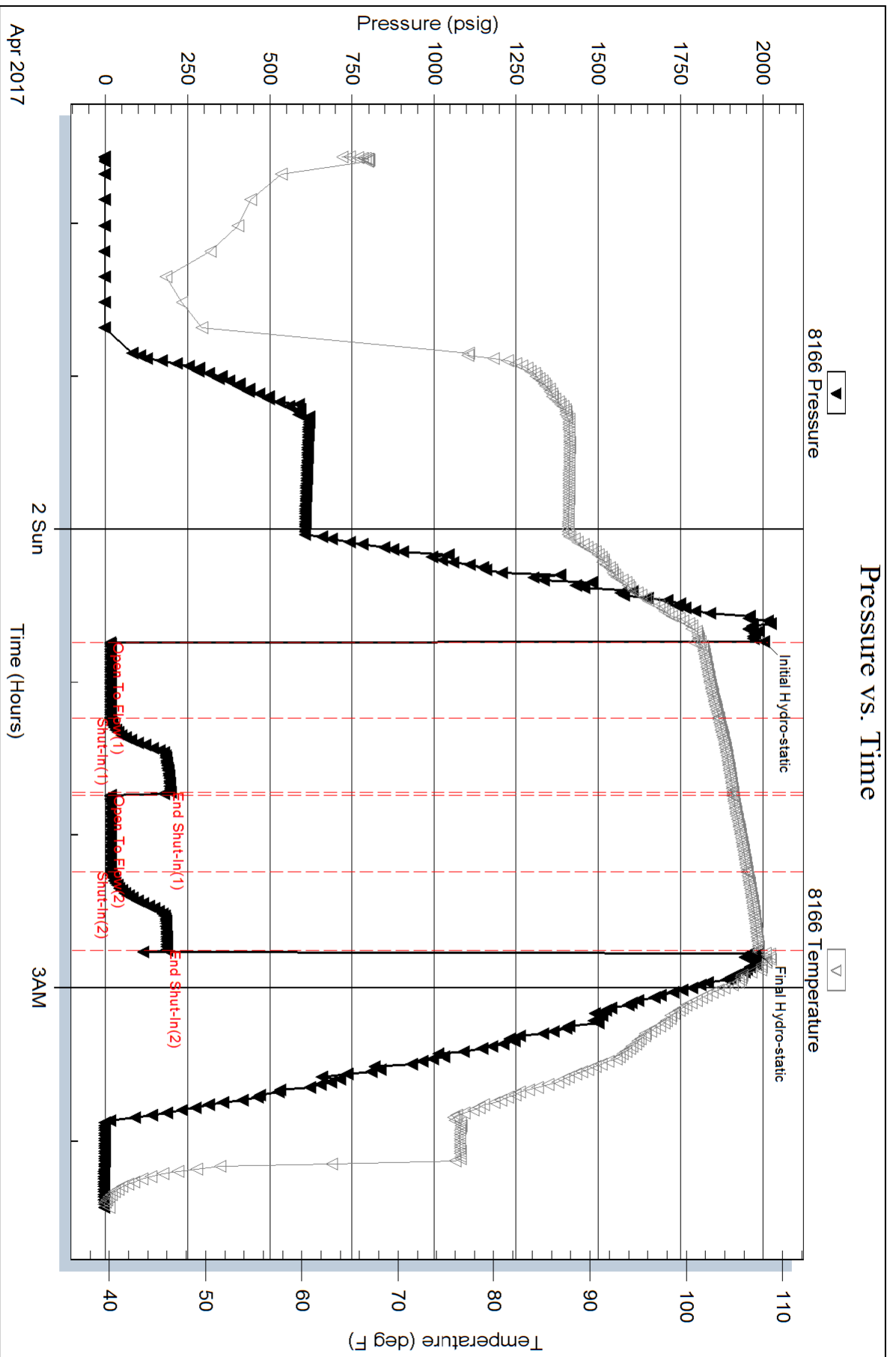
Recovery

Length (ft)	Description	Volume (bbl)
20.00	mud oil spots 100%m	0.28

* Recovery from multiple tests

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



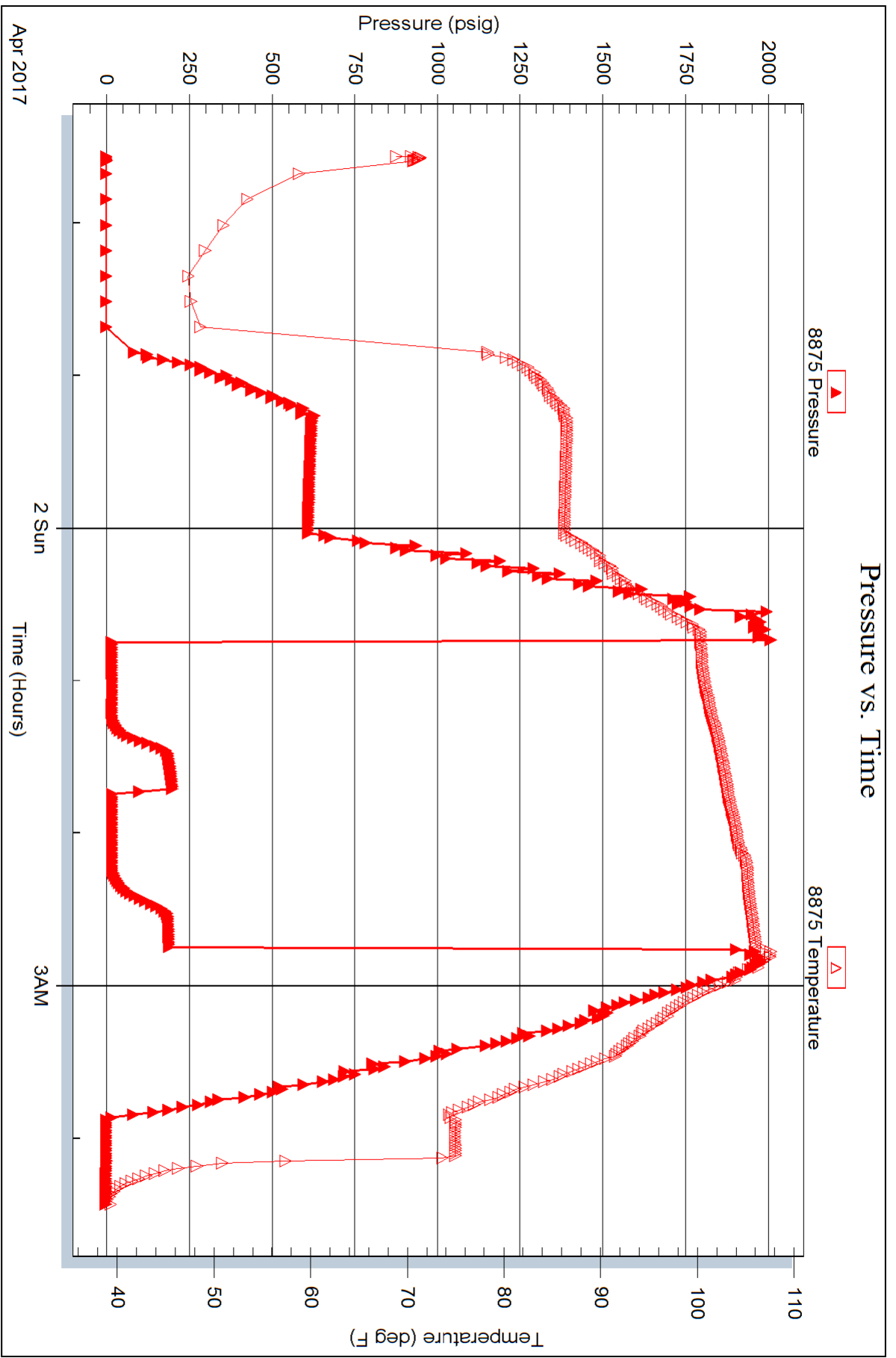
Serial #: 8875

Inside

Richland Oil Investments

Moore 22-2

DST Test Number: 2



Trilobite Testing, Inc

Ref. No: 63781

Printed: 2017.04.02 @ 08:23:50



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63782

DST#: 3

ATTN: Steve Murphy

Test Start: 2017.04.02 @ 20:59:23

GENERAL INFORMATION:

Formation: **Lansing H-I**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 22:17:23

Time Test Ended: 01:50:23

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Interval: 4214.00 ft (KB) To 4254.00 ft (KB) (TVD)

Reference Elevations: 3114.00 ft (KB)

Total Depth: 4254.00 ft (KB) (TVD)

3104.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 10.00 ft

Serial #: 8166 Outside

Press@RunDepth: 16.97 psig @ 4215.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.02

End Date:

2017.04.03

Last Calib.:

2017.04.03

Start Time: 20:59:28

End Time:

01:50:22

Time On Btm:

2017.04.02 @ 22:16:53

Time Off Btm:

2017.04.03 @ 00:18:23

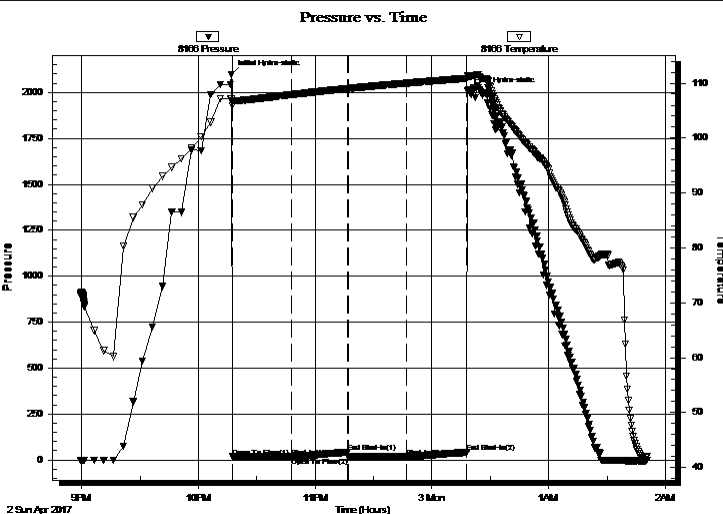
TEST COMMENT: IF: Surface blow built to 3/4.

IS: No return.

FF: No blow.

FS: No return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2098.07	107.11	Initial Hydro-static
1	16.49	105.85	Open To Flow (1)
31	16.49	107.91	Shut-In(1)
60	41.65	109.01	End Shut-In(1)
60	16.64	109.02	Open To Flow (2)
90	16.97	110.00	Shut-In(2)
121	40.80	110.88	End Shut-In(2)
122	2006.88	111.40	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
5.00	mud 100%m	0.07

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

* Recovery from multiple tests



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63782

DST#: 3

ATTN: Steve Murphy

Test Start: 2017.04.02 @ 20:59:23

GENERAL INFORMATION:

Formation: **Lansing H-I**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 22:17:23

Time Test Ended: 01:50:23

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Interval: **4214.00 ft (KB) To 4254.00 ft (KB) (TVD)**

Reference Elevations: 3114.00 ft (KB)

Total Depth: 4254.00 ft (KB) (TVD)

3104.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 10.00 ft

Serial #: **8875** Inside

Press@RunDepth: psig @ 4215.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.02

End Date:

2017.04.03

Last Calib.:

2017.04.03

Start Time: 20:59:36

End Time:

01:50:30

Time On Btm:

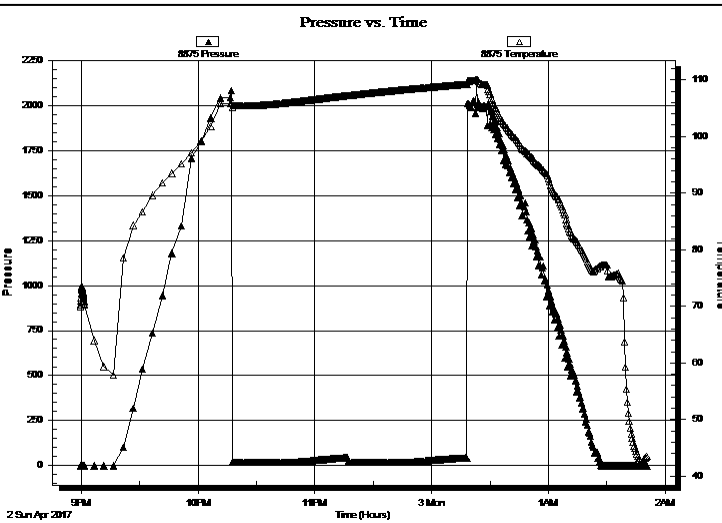
Time Off Btm:

TEST COMMENT: IF: Surface blow built to 3/4.

IS: No return.

FF: No blow.

FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

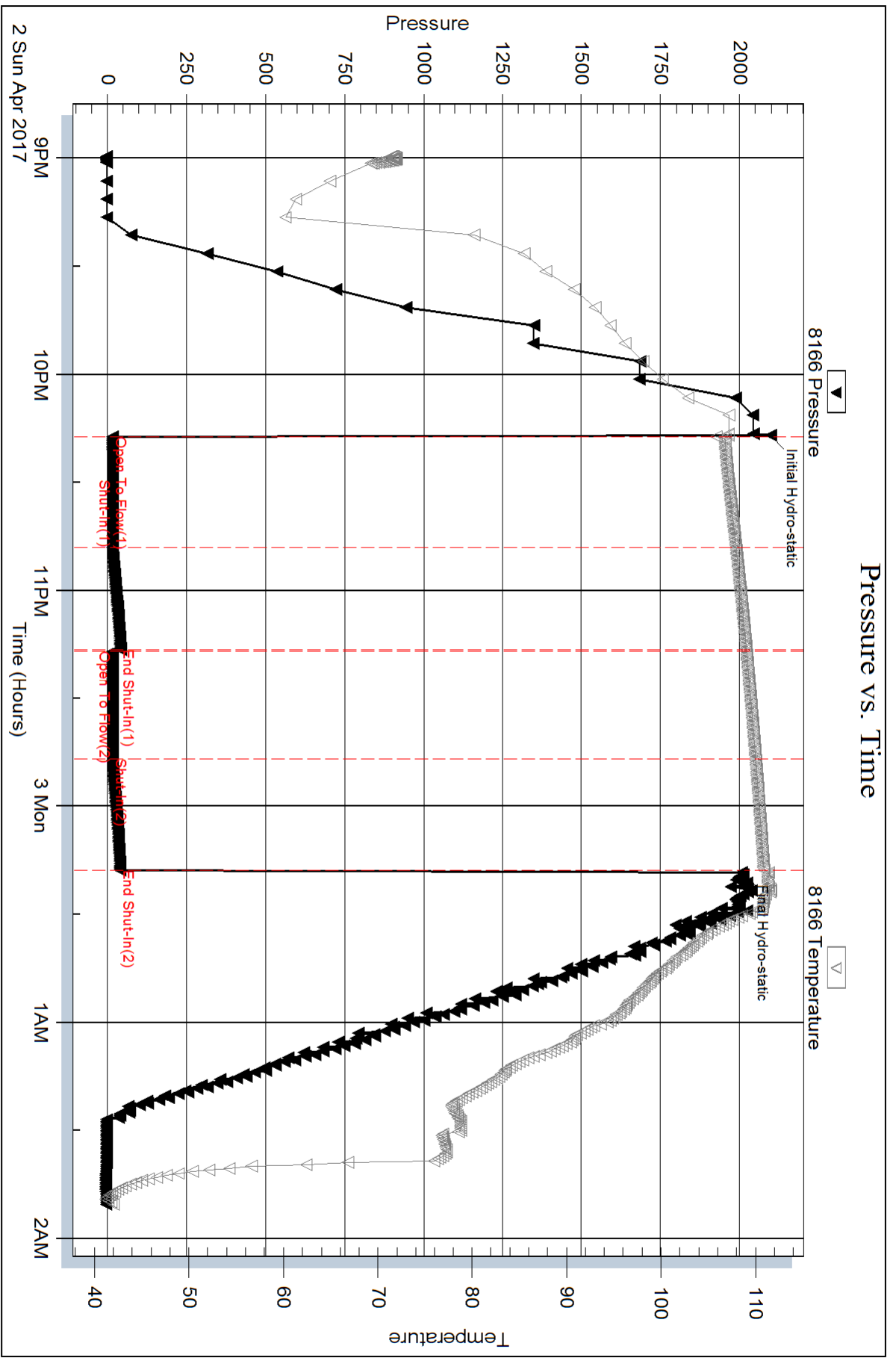
Recovery

Length (ft)	Description	Volume (bbl)
5.00	mud 100%m	0.07

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

* Recovery from multiple tests



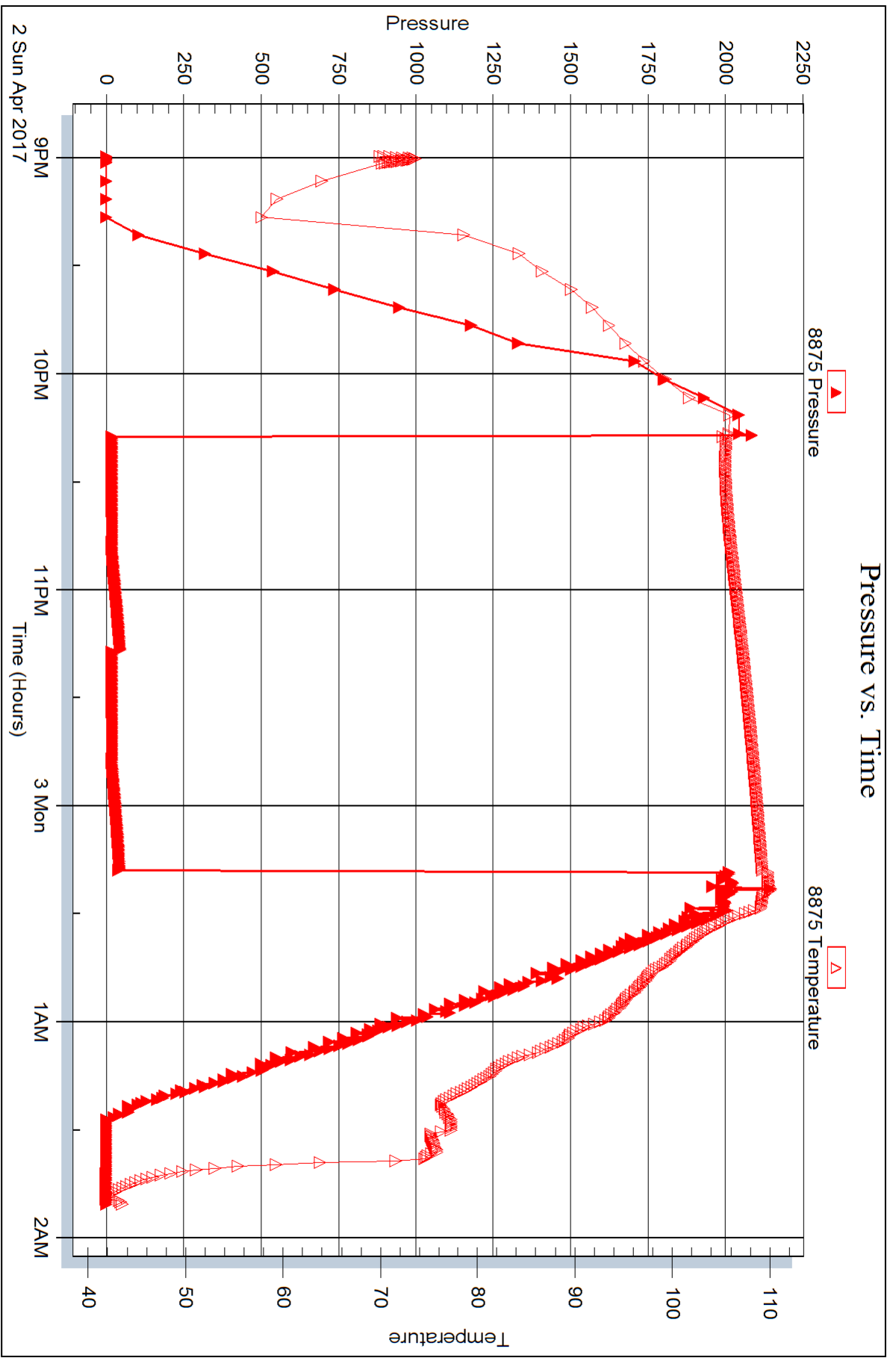
Serial #: 8875

Inside

Richland Oil Investments

Moore 22-2

DST Test Number: 3





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments
 608 E 1st
 Palco, Ks 67657
 ATTN: Steve Murphy

22-12-33 Logan, KS
Moore 22-2
 Job Ticket: 63783 **DST#: 4**
 Test Start: 2017.04.03 @ 12:42:30

GENERAL INFORMATION:

Formation: **J-K**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 15:11:00
 Time Test Ended: 20:18:30
 Interval: **4250.00 ft (KB) To 4316.00 ft (KB) (TVD)**
 Total Depth: 4250.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Brandon Turley
 Unit No: 79
 Reference Elevations: 3114.00 ft (KB)
 3104.00 ft (CF)
 KB to GR/CF: 10.00 ft

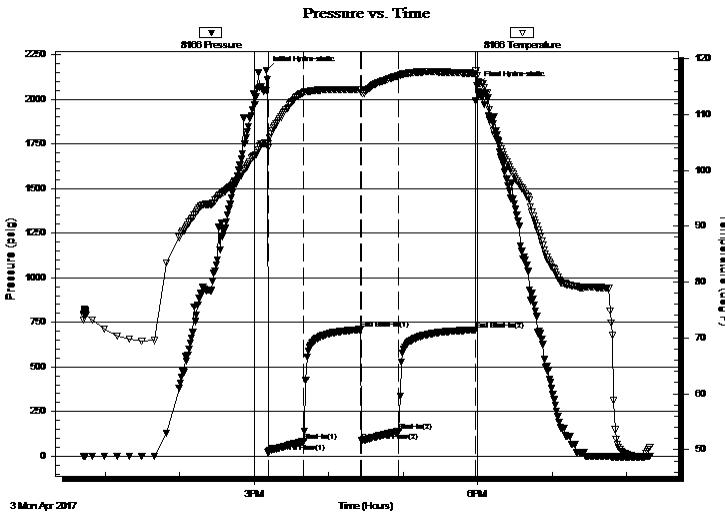
Serial #: 8166

Outside

Press@RunDepth: 140.75 psig @ 4251.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.04.03 End Date: 2017.04.03 Last Calib.: 2017.04.03
 Start Time: 12:42:35 End Time: 20:18:29 Time On Btm: 2017.04.03 @ 15:10:00
 Time Off Btm: 2017.04.03 @ 17:59:30

TEST COMMENT: IF: BOB in 5 min.
 IS: Surface blow built to 5.
 FF: BOB in 5 min.
 FS: BOB in 16 min.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2161.31	104.95	Initial Hydro-static
1	19.31	103.98	Open To Flow (1)
30	82.12	113.95	Shut-In(1)
76	709.34	114.46	End Shut-In(1)
77	85.40	113.94	Open To Flow (2)
107	140.75	116.90	Shut-In(2)
168	707.34	117.32	End Shut-In(2)
170	2077.32	116.99	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
124.00	gocm 40%g 10%o 50%m	1.74
62.00	mogo 40%g 50%o 10%m	0.87
155.00	go 40%g 60%o	2.17
0.00	1519 GIP	0.00

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments
608 E 1st
Palco, Ks 67657
ATTN: Steve Murphy

22-12-33 Logan, KS

Moore 22-2

Job Ticket: 63783 **DST#: 4**
Test Start: 2017.04.03 @ 12:42:30

GENERAL INFORMATION:

Formation: **J-K**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 15:11:00
 Time Test Ended: 20:18:30
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Brandon Turley
 Unit No: 79
 Interval: **4250.00 ft (KB) To 4316.00 ft (KB) (TVD)**
 Total Depth: 4250.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Reference Elevations: 3114.00 ft (KB)
 3104.00 ft (CF)
 KB to GR/CF: 10.00 ft

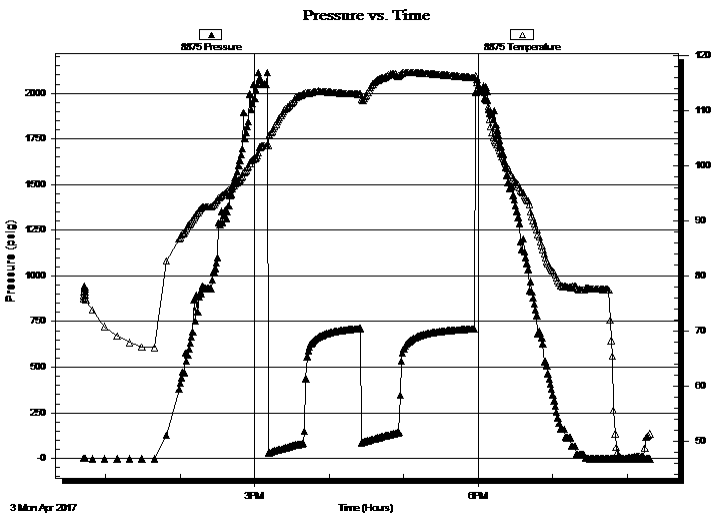
Serial #: 8875

Inside

Press@RunDepth: psig @ 4251.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.04.03 End Date: 2017.04.03 Last Calib.: 2017.04.03
 Start Time: 12:42:09 End Time: 20:18:03 Time On Btm:
 Time Off Btm:

TEST COMMENT: IF: BOB in 5 min.
 IS: Surface blow built to 5.
 FF: BOB in 5 min.
 FS: BOB in 16 min.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

Recovery

Length (ft)	Description	Volume (bbl)
124.00	gocm 40%g 10%o 50%m	1.74
62.00	mogo 40%g 50%o 10%m	0.87
155.00	go 40%g 60%o	2.17
0.00	1519 GIP	0.00

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63783

DST#: 4

ATTN: Steve Murphy

Test Start: 2017.04.03 @ 12:42:30

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

39 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 55.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.20 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
124.00	gocm 40%g 10%o 50%m	1.739
62.00	mcgo 40%g 50%o 10%m	0.870
155.00	go 40%g 60%o	2.174
0.00	1519 GIP	0.000

Total Length: 341.00 ft

Total Volume: 4.783 bbl

Num Fluid Samples: 0

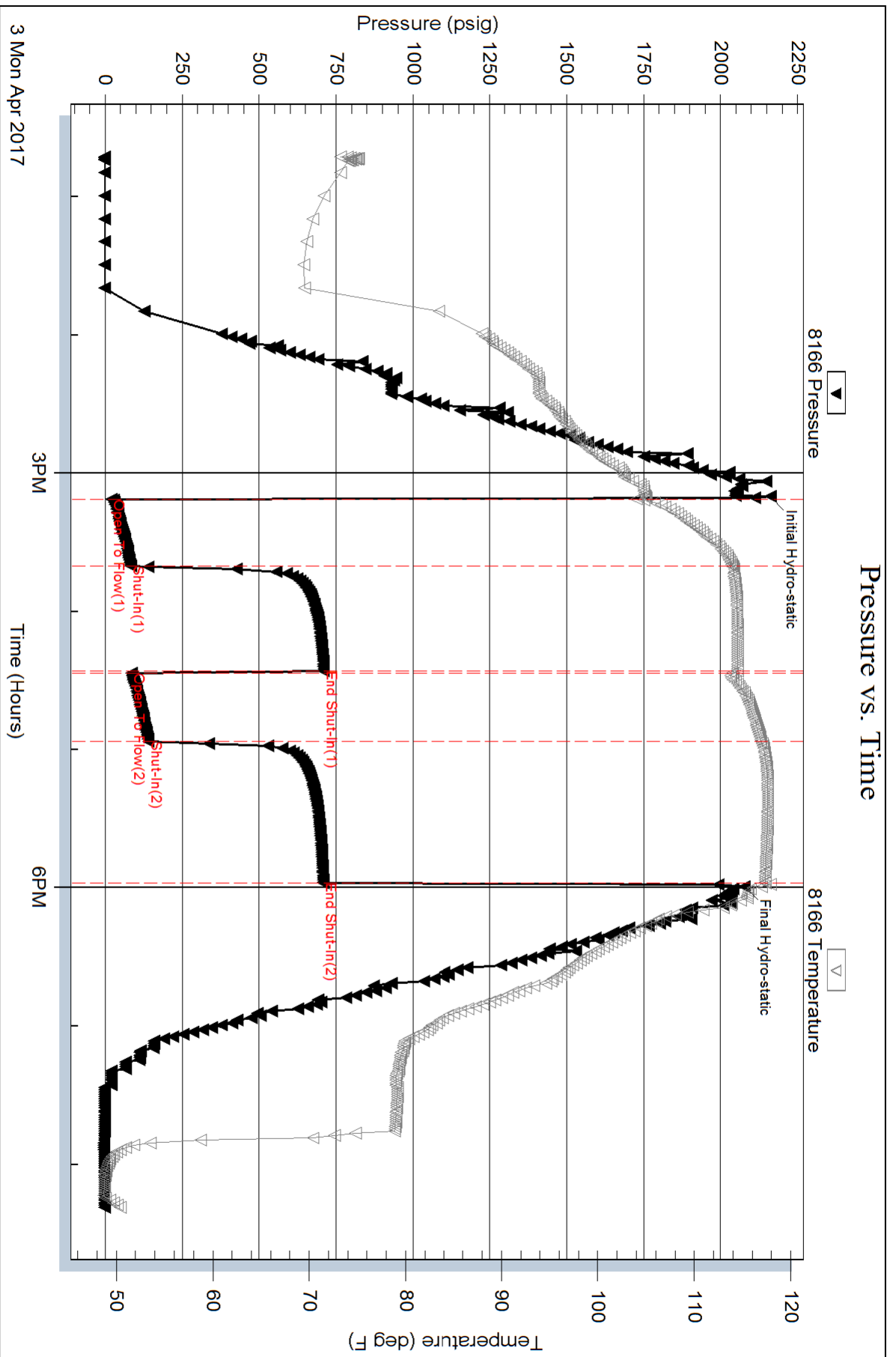
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: 40@50=39



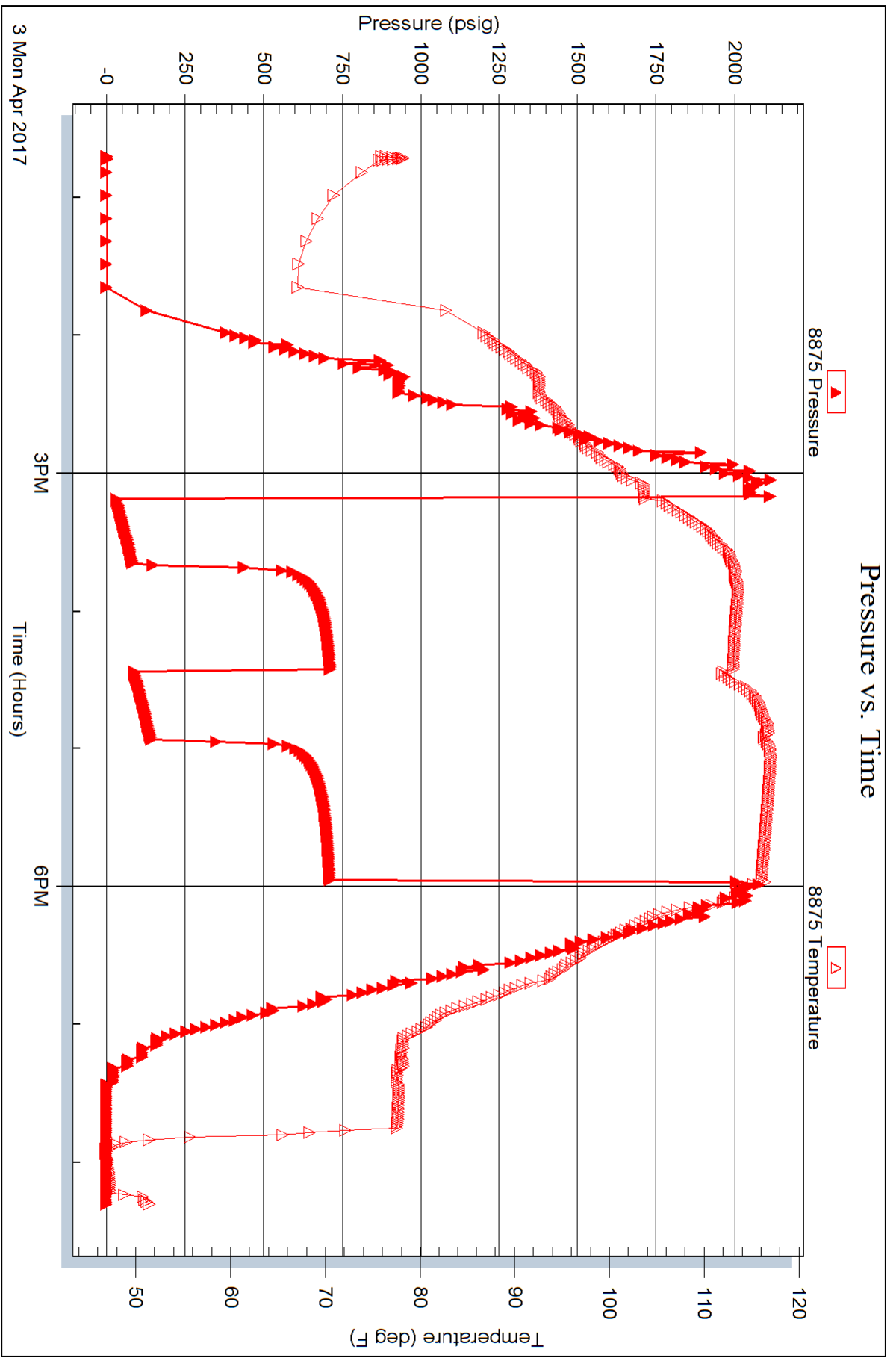
Serial #: 8875

Inside

Richland Oil Investments

Moore 22-2

DST Test Number: 4





TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63784

DST#: 5

ATTN: Steve Murphy

Test Start: 2017.04.05 @ 07:36:16

GENERAL INFORMATION:

Formation: **Johnson**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:09:16

Time Test Ended: 13:47:16

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Interval: **4610.00 ft (KB) To 4650.00 ft (KB) (TVD)**

Reference Elevations: 3114.00 ft (KB)

Total Depth: 4650.00 ft (KB) (TVD)

3104.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 10.00 ft

Serial #: **8166** Outside

Press@RunDepth: 52.92 psig @ 4611.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.05 End Date: 2017.04.05

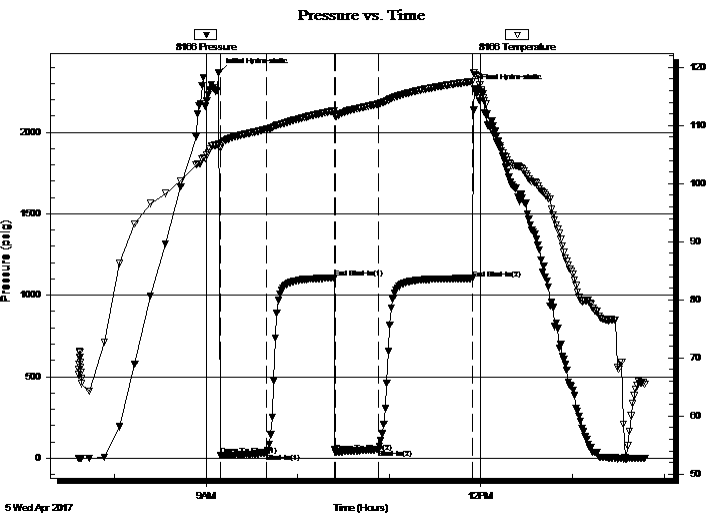
Last Calib.: 2017.04.05

Start Time: 07:36:21 End Time: 13:47:15

Time On Btm: 2017.04.05 @ 09:08:16

Time Off Btm: 2017.04.05 @ 11:55:46

TEST COMMENT: IF: BOB in 6 min.
IS: Surface blow built to 1/4. Died in 30 min.
FF: BOB in 4 min.
FS: Surface blow built to 1.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2367.58	106.88	Initial Hydro-static
1	17.95	106.08	Open To Flow (1)
32	30.84	109.37	Shut-In(1)
76	1105.08	112.56	End Shut-In(1)
77	37.74	111.55	Open To Flow (2)
105	52.92	113.72	Shut-In(2)
166	1102.71	117.57	End Shut-In(2)
168	2268.79	119.13	Final Hydro-static

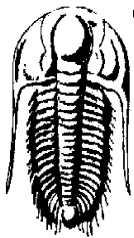
Recovery

Length (ft)	Description	Volume (bbl)
62.00	mcgo 40%g 40%o 20%m	0.87
58.00	mcgo 20%g 50%o 30%m	0.81
0.00	996 GIP	0.00

* Recovery from multiple tests

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63784

DST#: 5

ATTN: Steve Murphy

Test Start: 2017.04.05 @ 07:36:16

GENERAL INFORMATION:

Formation: **Johnson**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:09:16

Time Test Ended: 13:47:16

Interval: 4610.00 ft (KB) To 4650.00 ft (KB) (TVD)

Total Depth: 4650.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Test Type: Conventional Bottom Hole (Reset)

Tester: Brandon Turley

Unit No: 79

Reference Elevations: 3114.00 ft (KB)

3104.00 ft (CF)

KB to GR/CF: 10.00 ft

Serial #: 8875

Inside

Press@RunDepth: psig @ 4611.00 ft (KB)

Start Date: 2017.04.05

End Date:

2017.04.05

Start Time: 07:36:38

End Time:

13:47:32

Capacity: 8000.00 psig

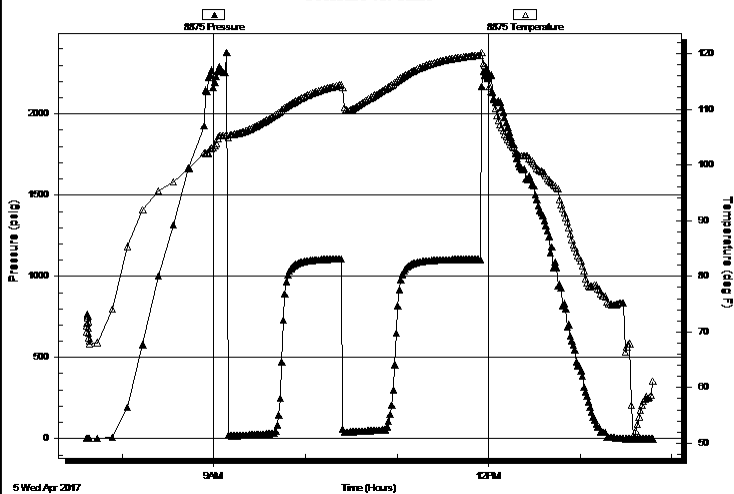
Last Calib.: 2017.04.05

Time On Btm:

Time Off Btm:

TEST COMMENT: IF: BOB in 6 min.
IS: Surface blow built to 1/4. Died in 30 min.
FF: BOB in 4 min.
FS: Surface blow built to 1.

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

Recovery

Length (ft)	Description	Volume (bbl)
62.00	mcgo 40%g 40%o 20%m	0.87
58.00	mcgo 20%g 50%o 30%m	0.81
0.00	996 GIP	0.00

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Richland Oil Investments

22-12-33 Logan, KS

608 E 1st
Palco, Ks 67657

Moore 22-2

Job Ticket: 63784

DST#: 5

ATTN: Steve Murphy

Test Start: 2017.04.05 @ 07:36:16

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

34 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 59.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 8.79 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
62.00	mcgo 40%g 40%o 20%m	0.870
58.00	mcgo 20%g 50%o 30%m	0.814
0.00	996 GIP	0.000

Total Length: 120.00 ft

Total Volume: 1.684 bbl

Num Fluid Samples: 0

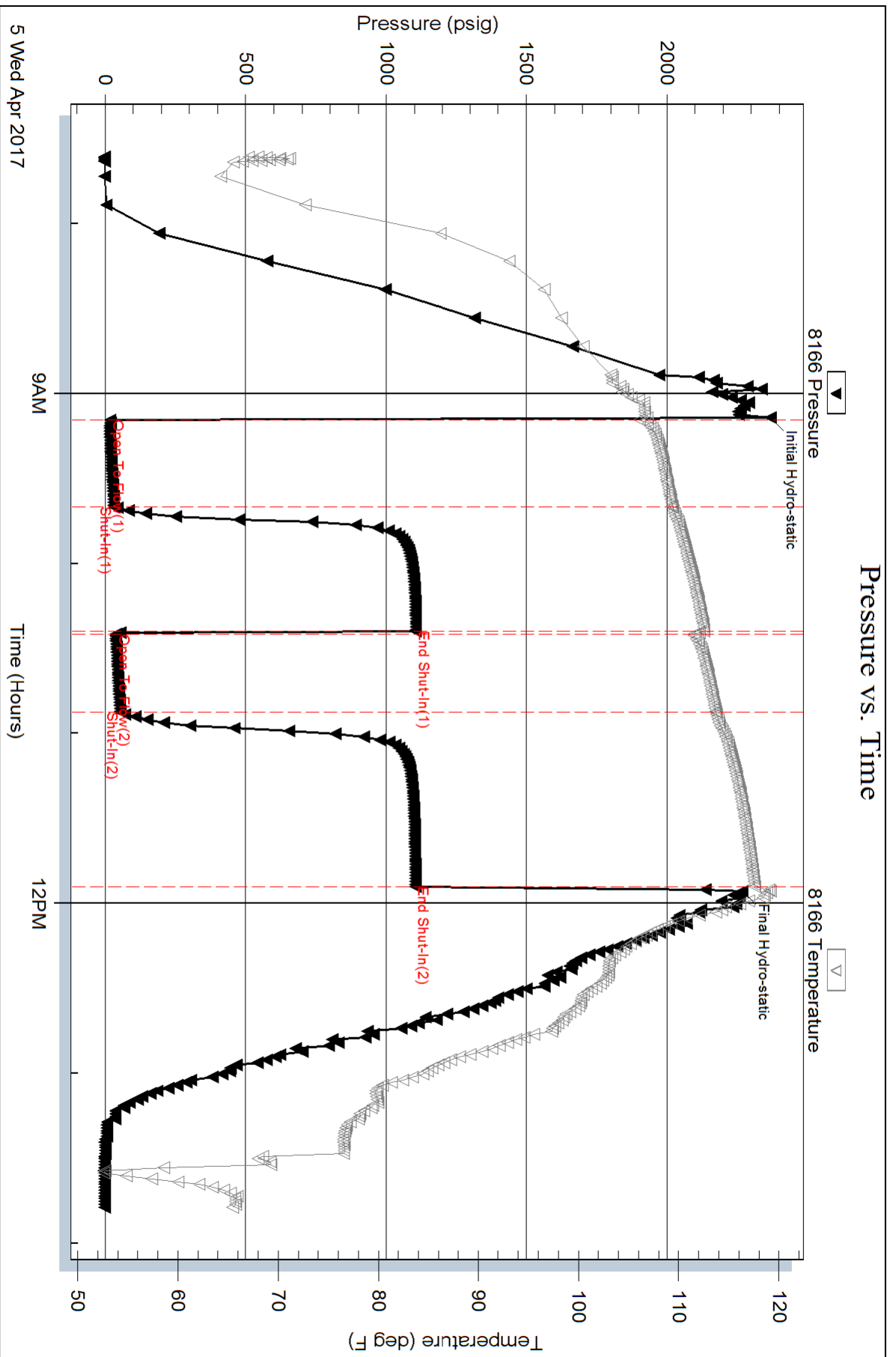
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: 34@60=34



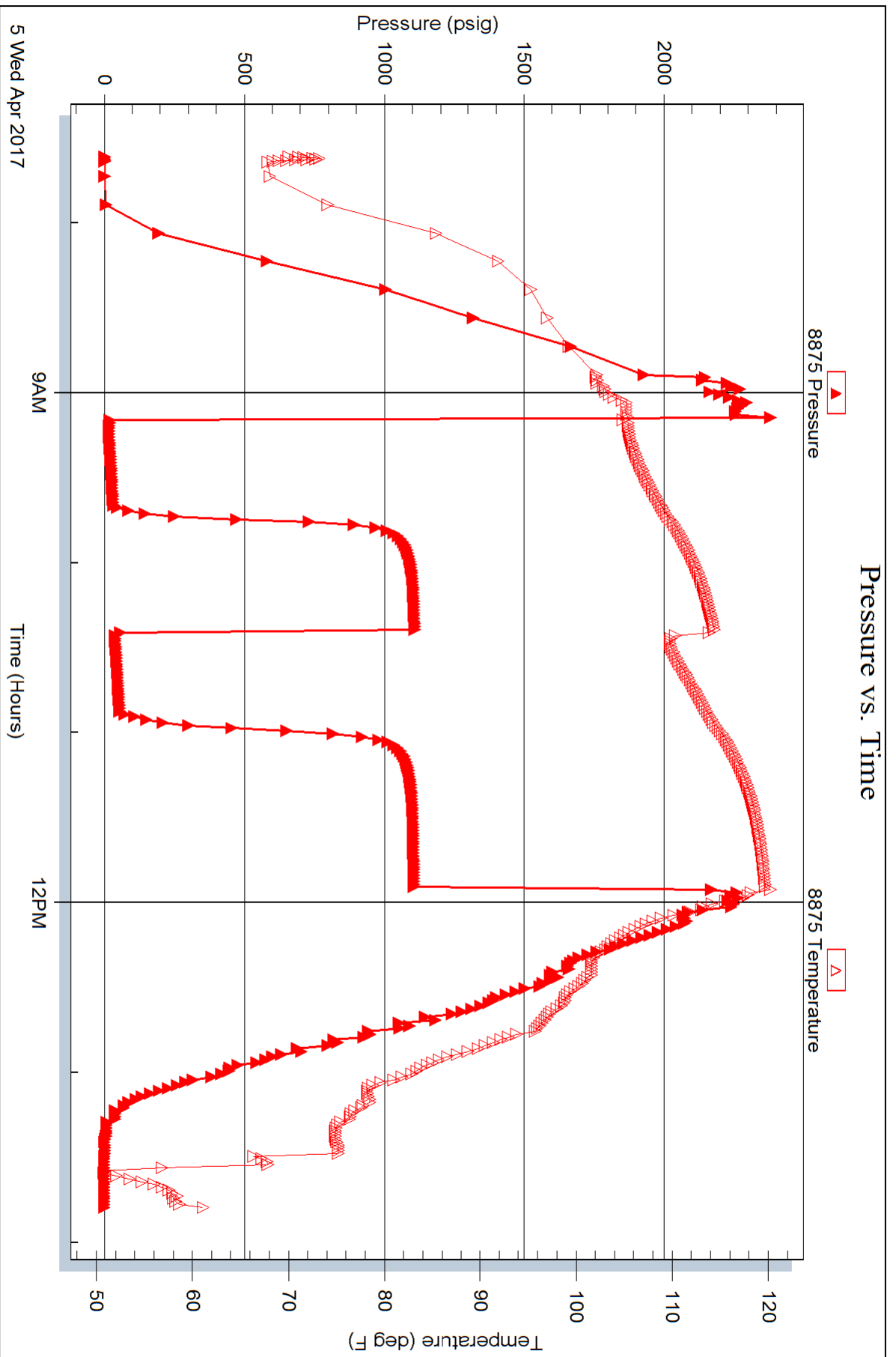
Serial #: 8875

Inside

Richland Oil Investments

Moore 22-2

DST Test Number: 5



Trilobite Testing, Inc

Ref. No: 63784

Printed: 2017.04.05 @ 14:28:05



PIONEER
Pioneer Energy Services

**DUAL INDUCTION
LOG**

Company	RICHLAND OIL INVESTMENTS, LLC
Well	MOORE #22-2
Field	OWEN EAST
County	LOGAN
State	KANSAS

Location:	API #: 15-109-21494-00-00	Other Services
	2305' FSL & 400' FWL	CNL/CDL MEL
Permanent Datum	GROUND LEVEL	Elevation 3104'
Log Measured From	KELLY BUSHING	K.B. 3114'
Drilling Measured From	KELLY BUSHING	D.F. N/A
		G.L. 3104'

Date	4/6/2017
Run Number	ONE
Depth Driller	4770'
Depth Logger	4772'
Bottom Logged Interval	4771'
Top Log Interval	200'
Casing Driller	8.625" @ 227'
Casing Logger	228'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	4000
Density / Viscosity	9.3 57
pH / Fluid Loss	9.5 9.6
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.60 @ 62
Rmt @ Meas. Temp	0.45 @ 62
Rmc @ Meas. Temp	0.81 @ 62
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.30 @ 124
Operating Rig Time	3 HOURS
Max Rec. Temp. F	124
Equipment Number	91
Location	COLBY
Recorded By	D. SCHMIDT
Witnessed By	STEVE MURPHY

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

OAKLEY,
SOUTH ON OLD 40 TO 400 RD,
7 SOUTH TO WAGON RD, 3 WEST TO 370, 1 1/2 SOUTH,
EAST & SOUTH INTO

Log Measured From: KELLY BUSHING 10 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

Your Pioneer Energy Services Crew	This Log Record Was Witnessed By
Engineer: D. SCHMIDT	Primary Witness: STEVE MURPHY
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

Log Variables

Database C:\ProgramData\Warrior\Data\richland oil inv_moore_22-2.db
 Dataset field/well/STKML/pass5.1/_vars_

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	455	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	50	0	5.5	0	4772	124	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (207-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (90-1031)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSIML (PSI-01) GO Micro log tools converted to Simplec electronics	7.58	4.00	65.00
RLL3F RLL3	15.80 15.80					

CILD 8.00

CILM 4.70

SP 0.20

DIL-M&W (PSI 13)

18.50

3.50

220.00

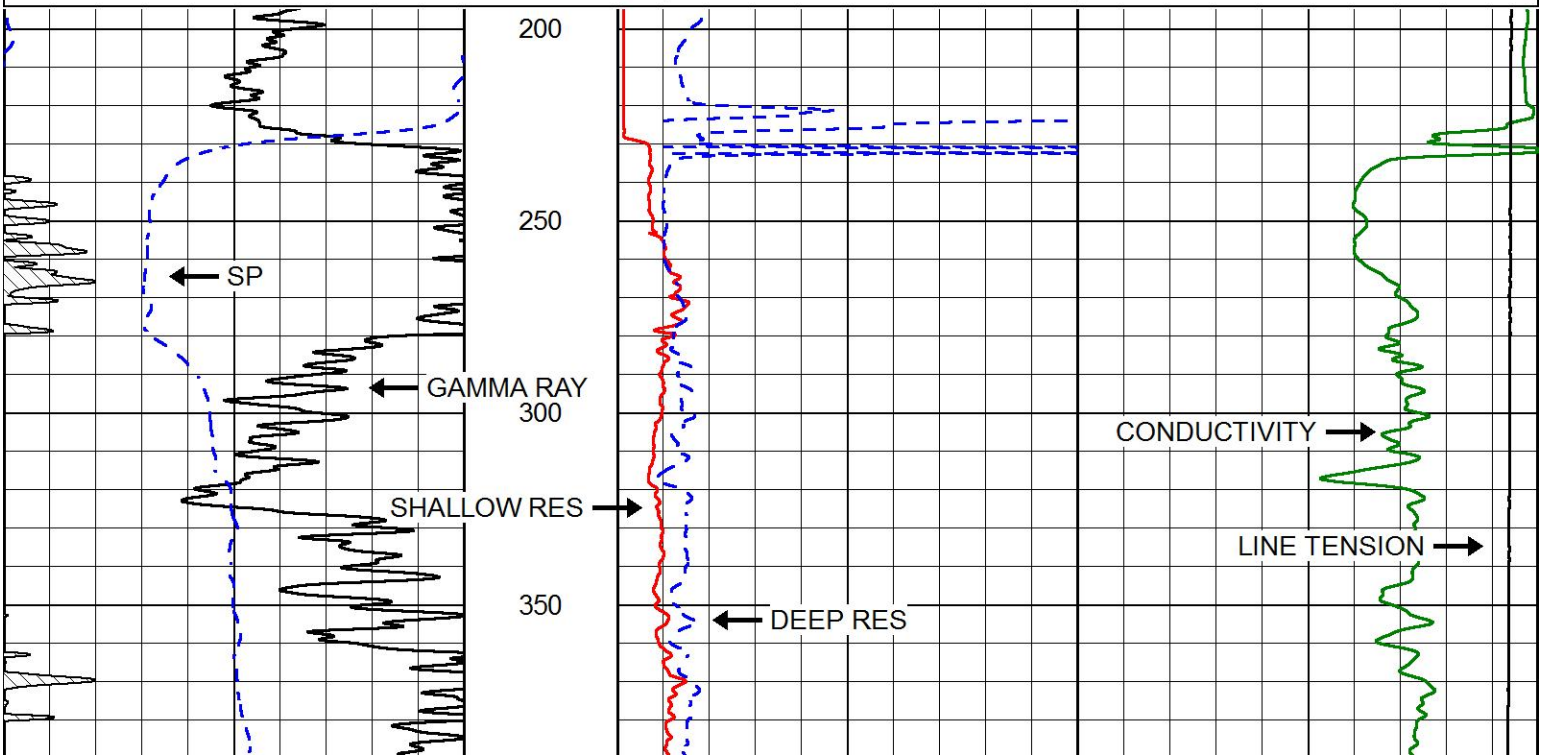
Dataset: richland oil inv_moore_22-2.db: field/well/STKML/pass5.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

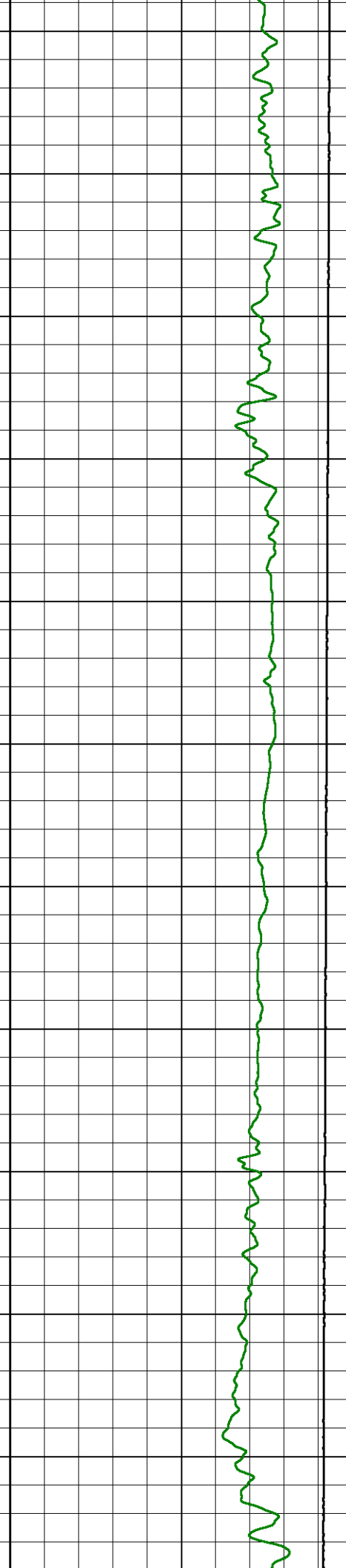
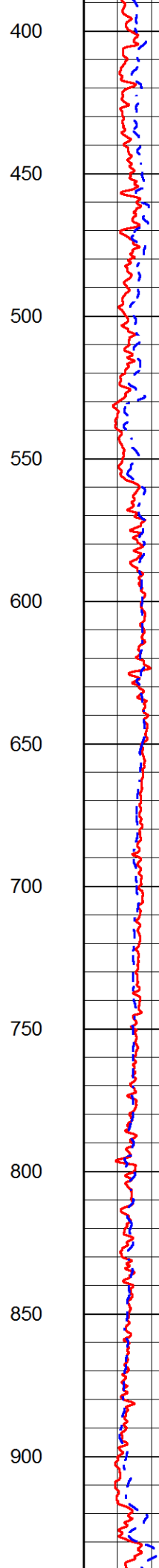
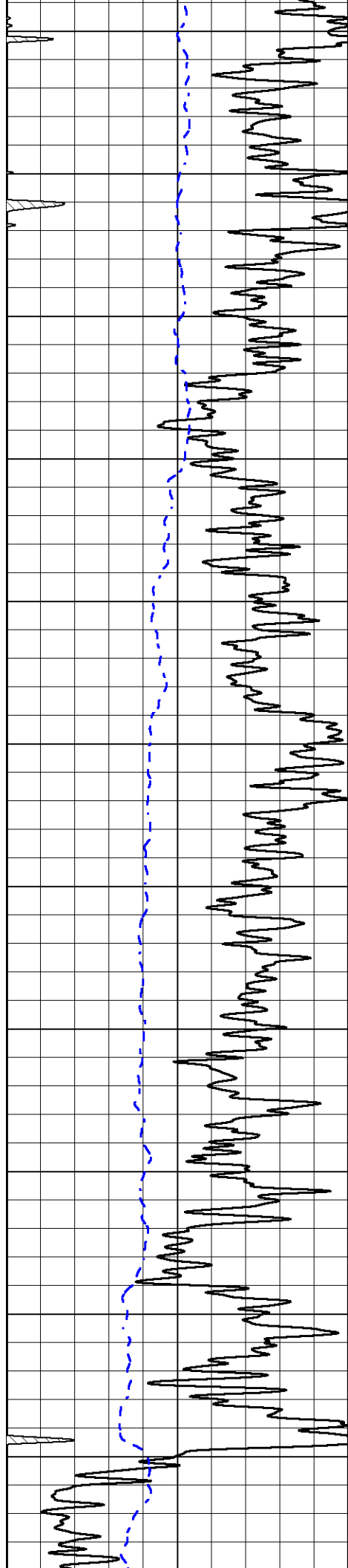


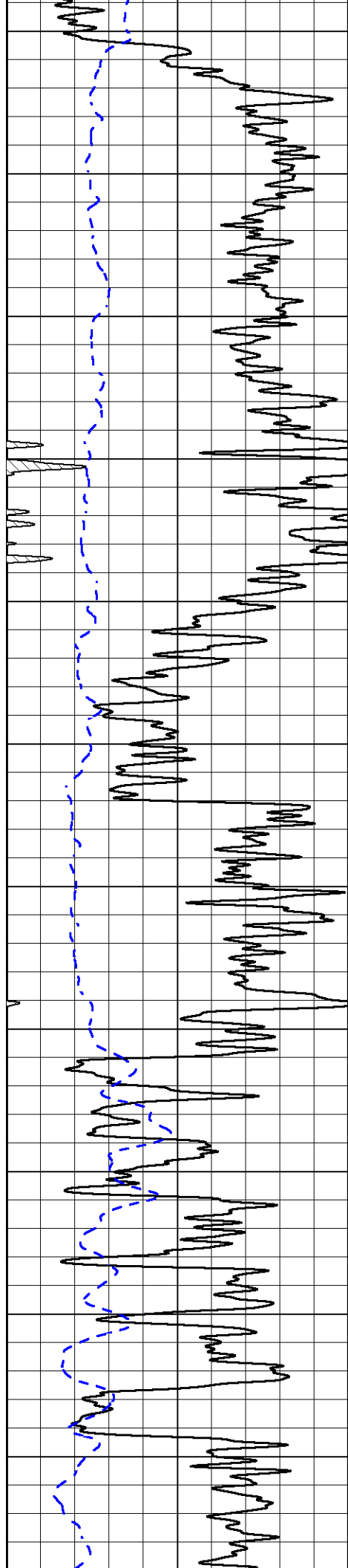
MAIN PASS

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 Dataset Pathname STKML/pass6.1
 Presentation Format dil2in
 Dataset Creation Thu Apr 06 08:56:35 2017
 Charted by Depth in Feet scaled 1:600

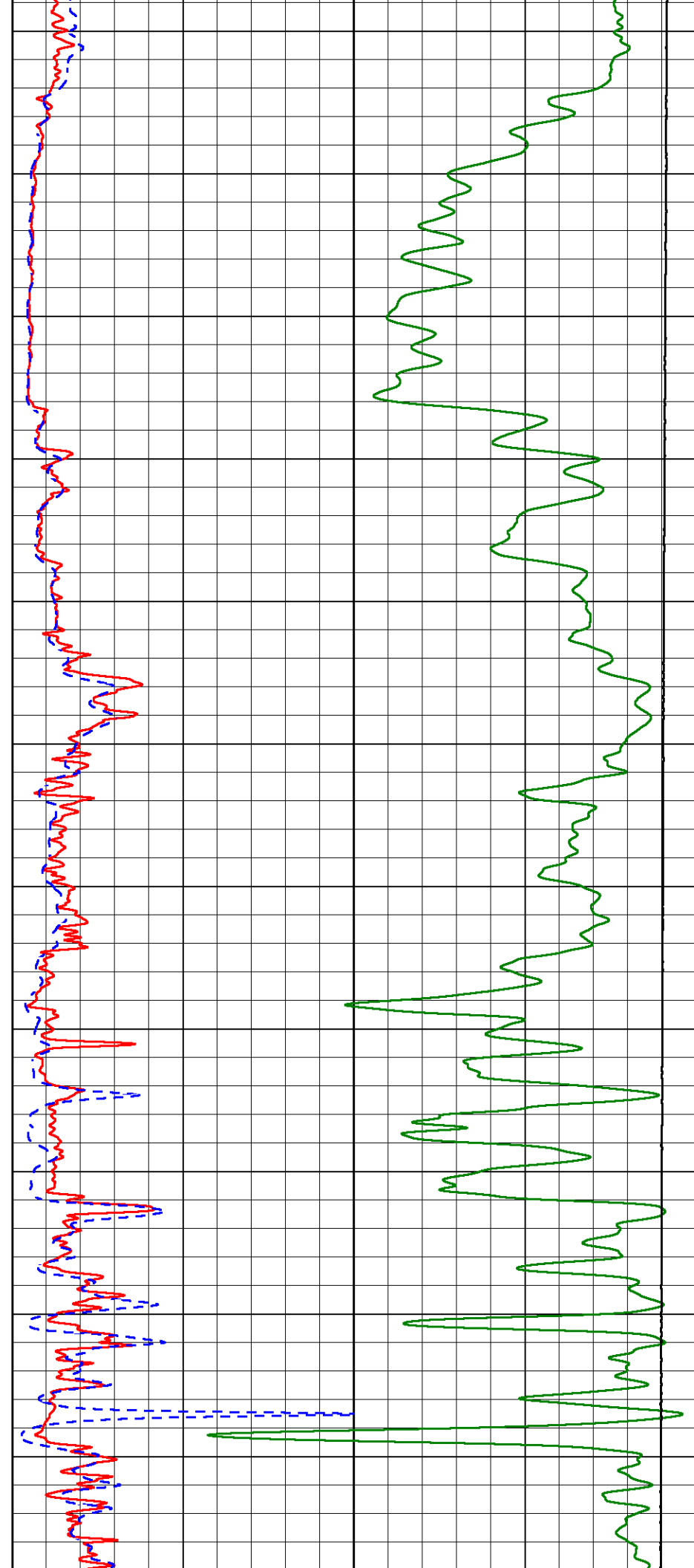
0	Gamma Ray (GAPI)	150	1000	Conductivity (mmho/m)	0
-200	SP (mV)	0	15000	Line Tension (lb)	0
			0	Shallow Resistivity (Ohm-m)	50
			0	Deep Resistivity (Ohm-m)	50
				Shallow Resistivity	
			50	(Ohm-m)	500
			50	Deep Resistivity (Ohm-m)	500

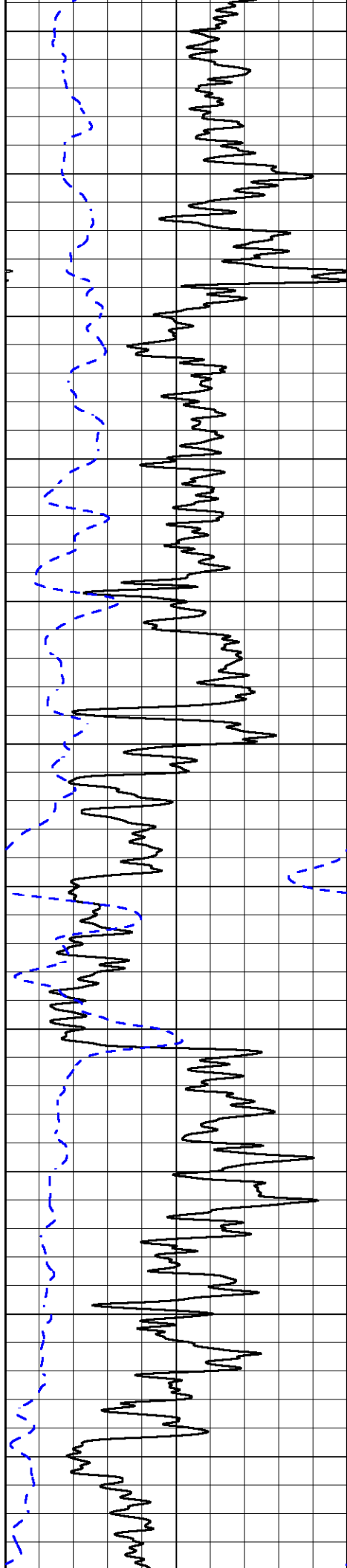




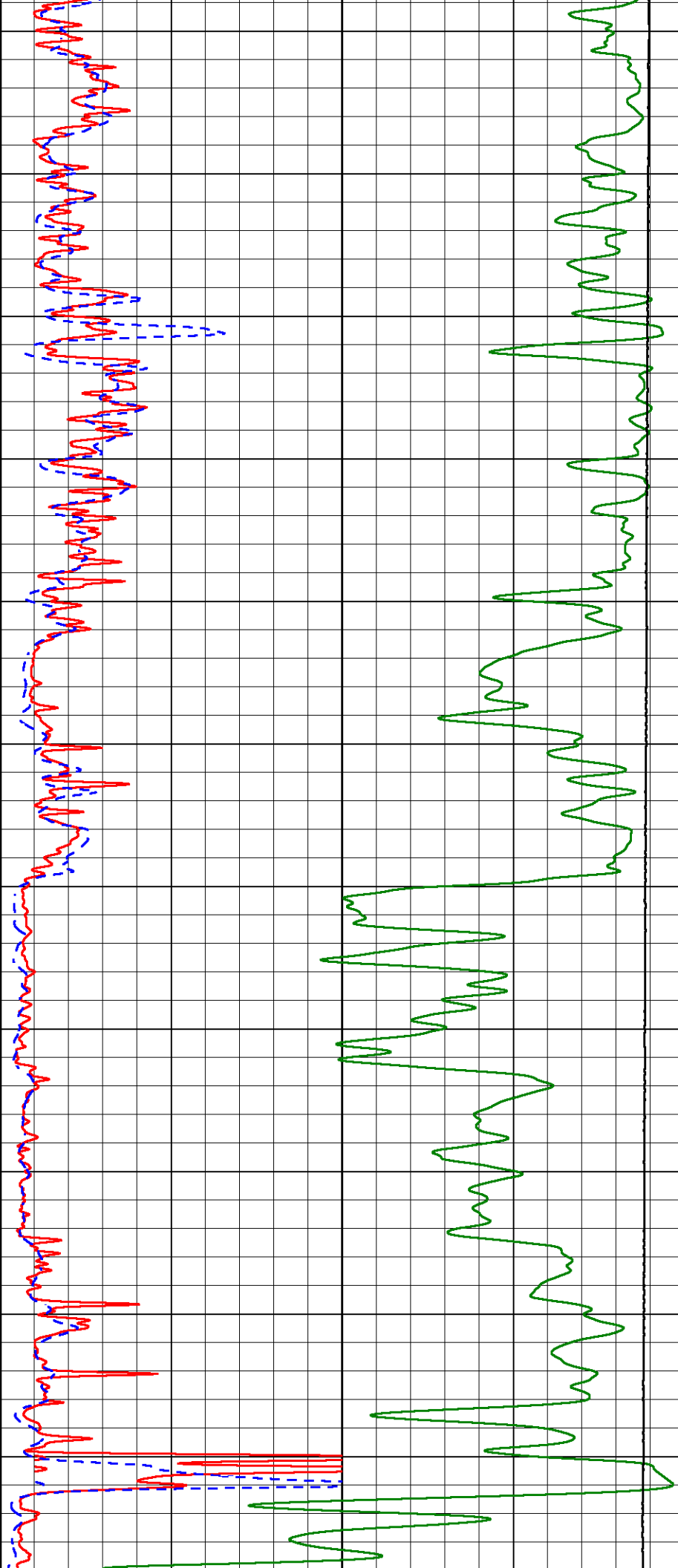


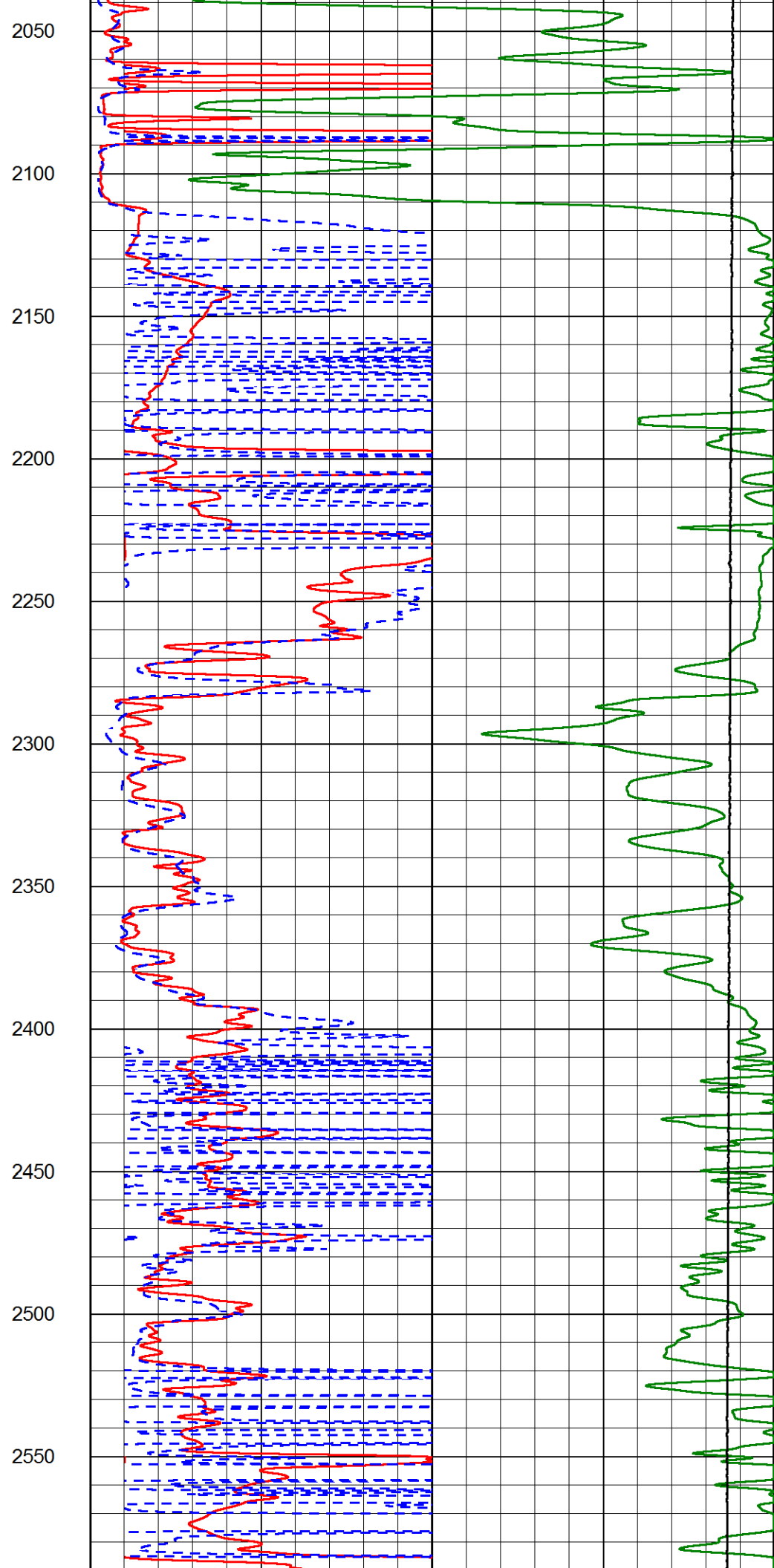
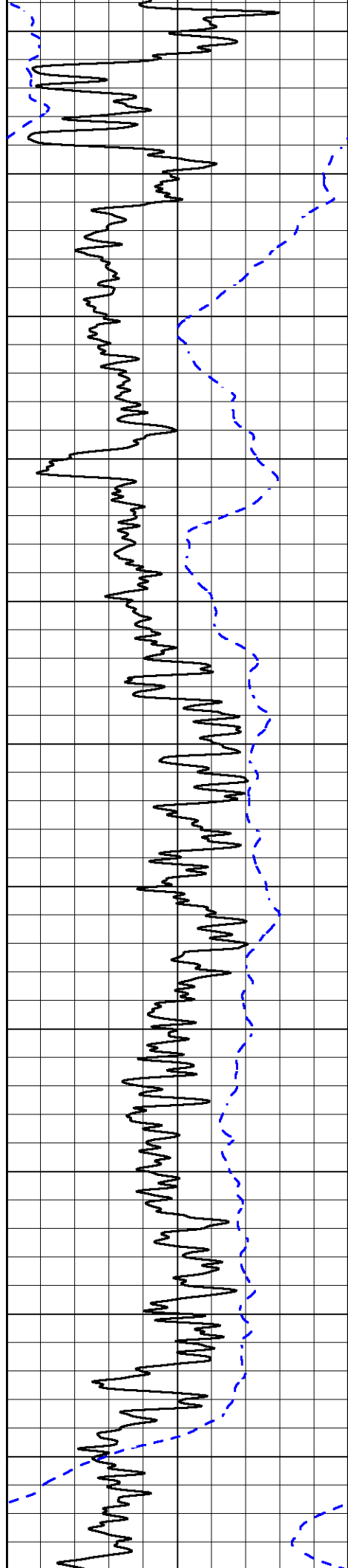
950
1000
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1150
1200
1250
1300
1350
1400
1450

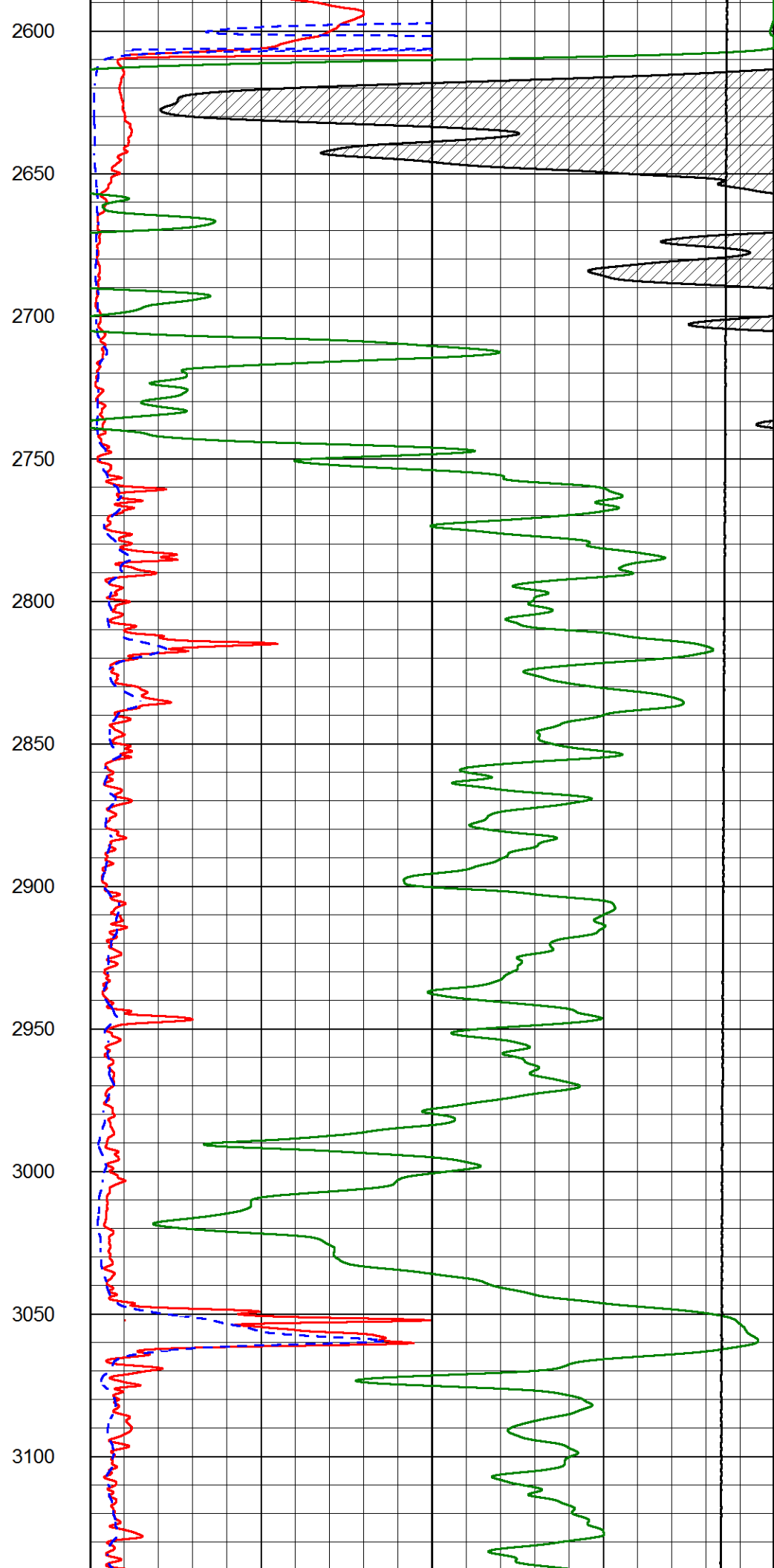
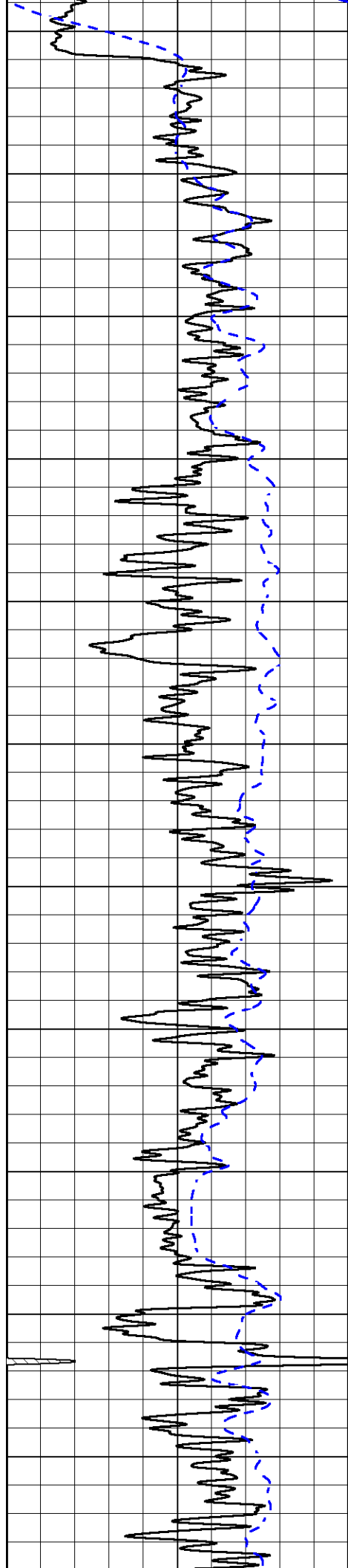


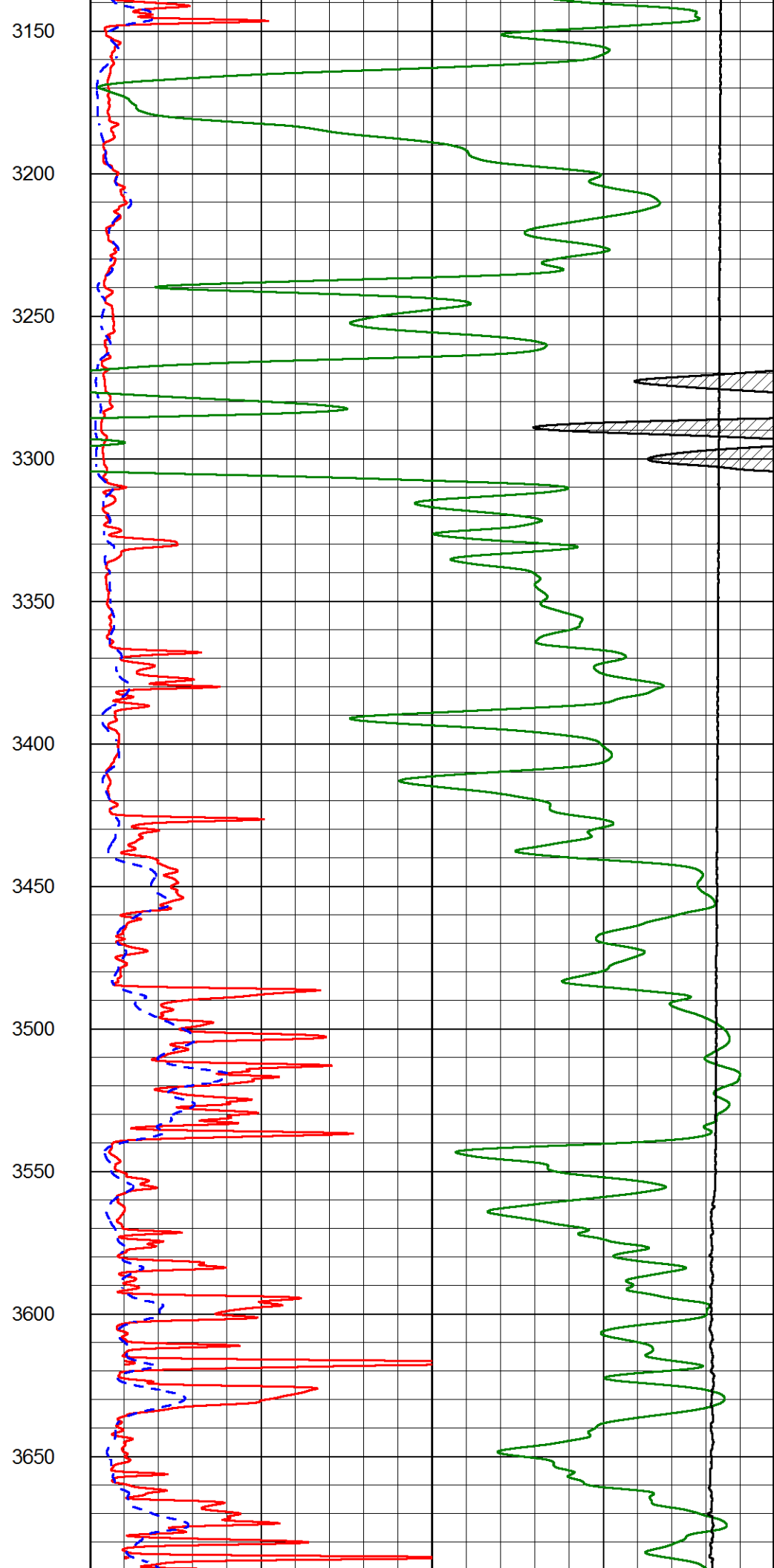
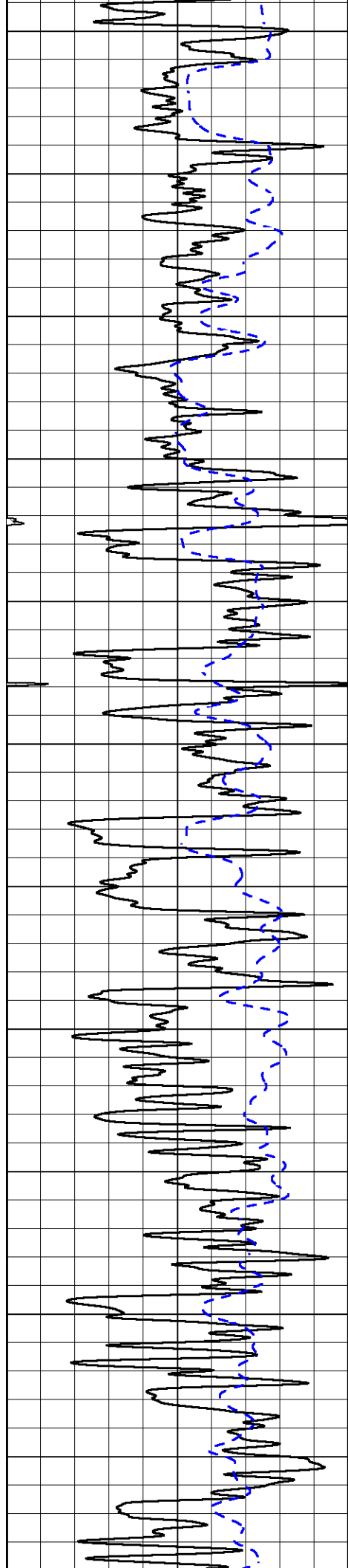


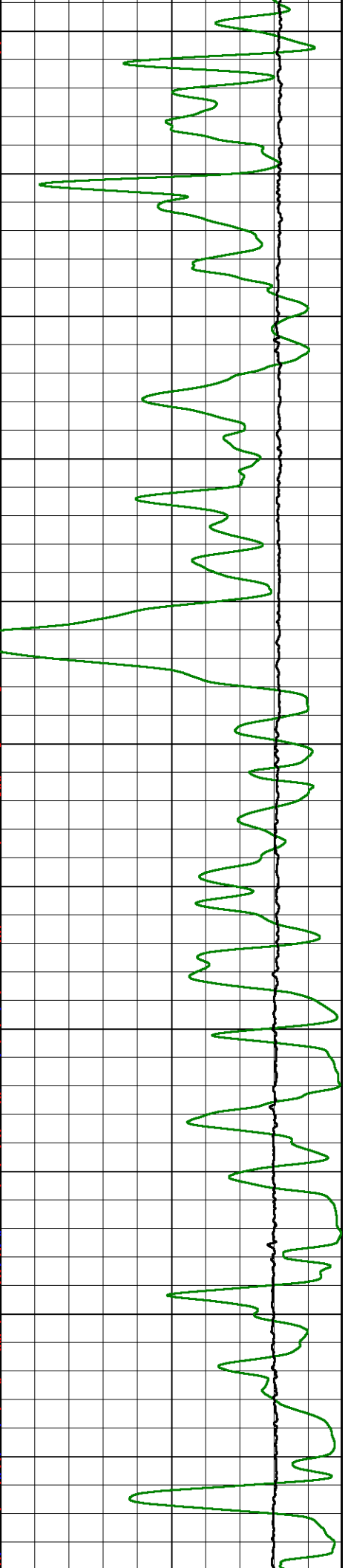
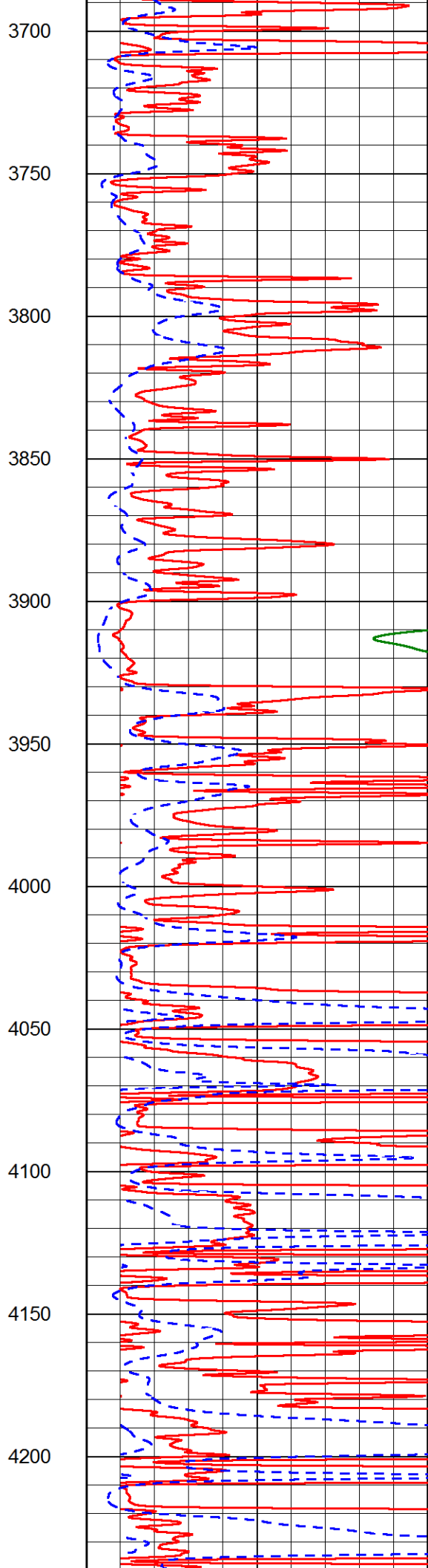
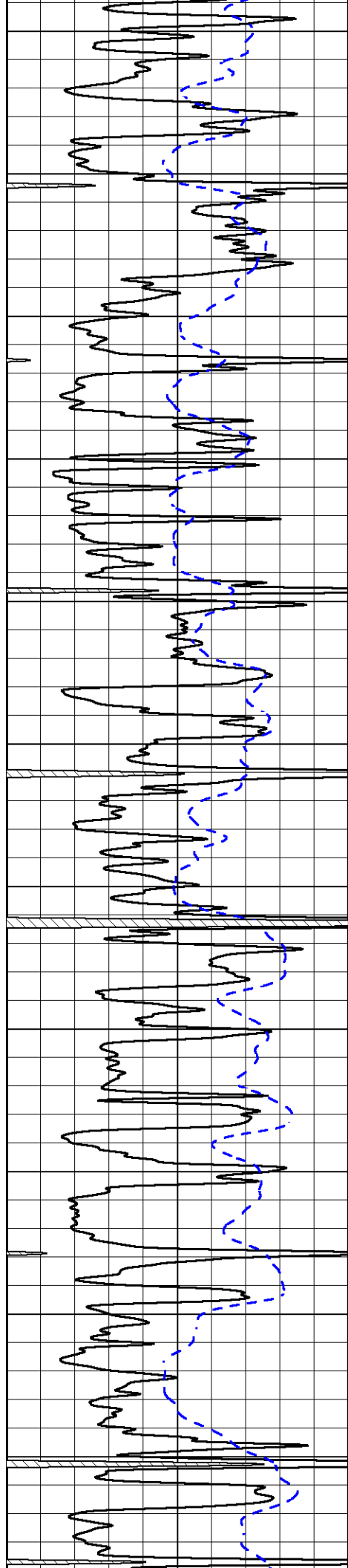
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000

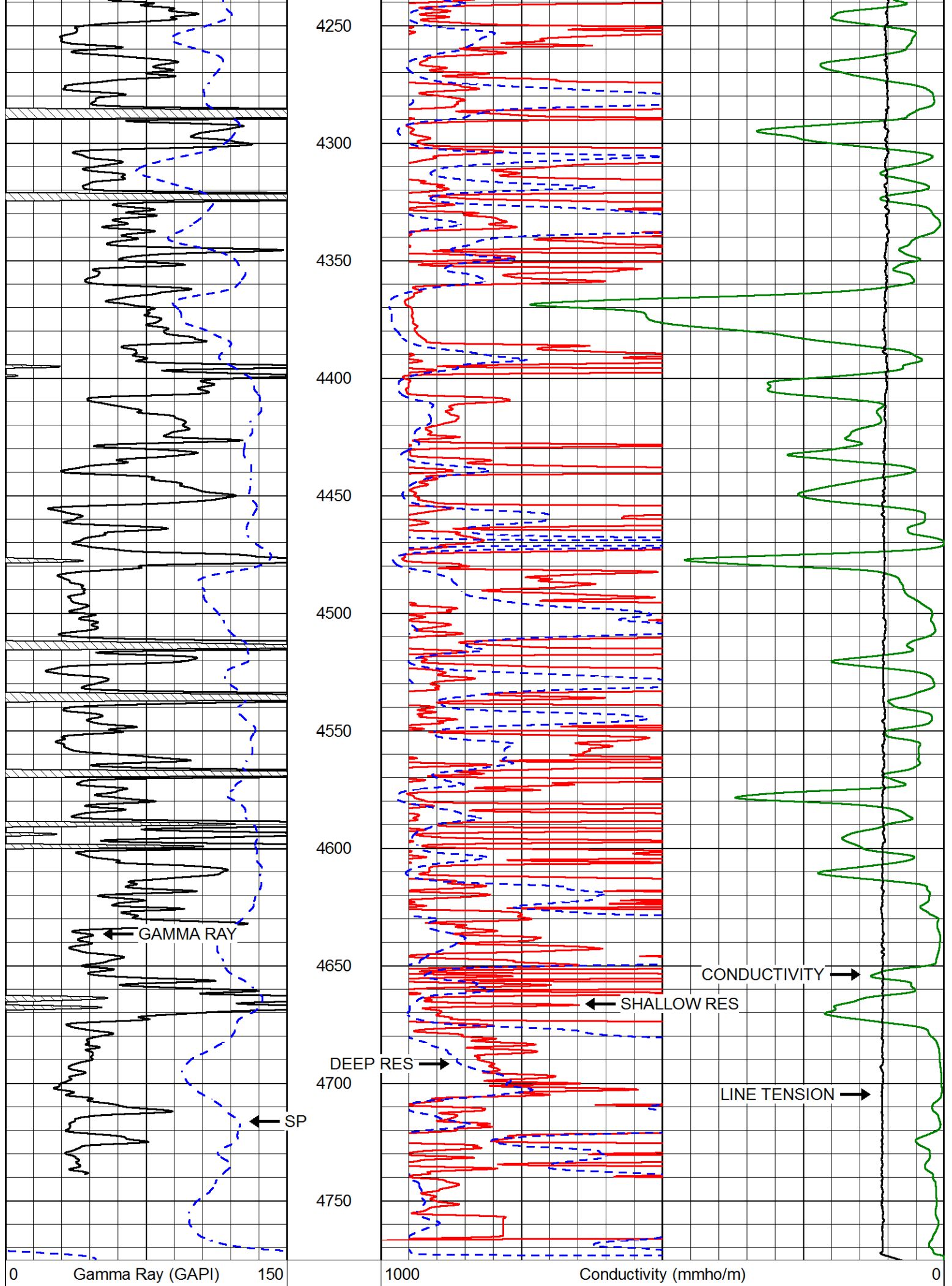












-200	SP (mV)	0
------	---------	---

15000	Line Tension (lb)	0
0	Shallow Resistivity (Ohm-m)	50
0	Deep Resistivity (Ohm-m)	50
Shallow Resistivity		
50	(Ohm-m)	500
50	Deep Resistivity (Ohm-m)	500

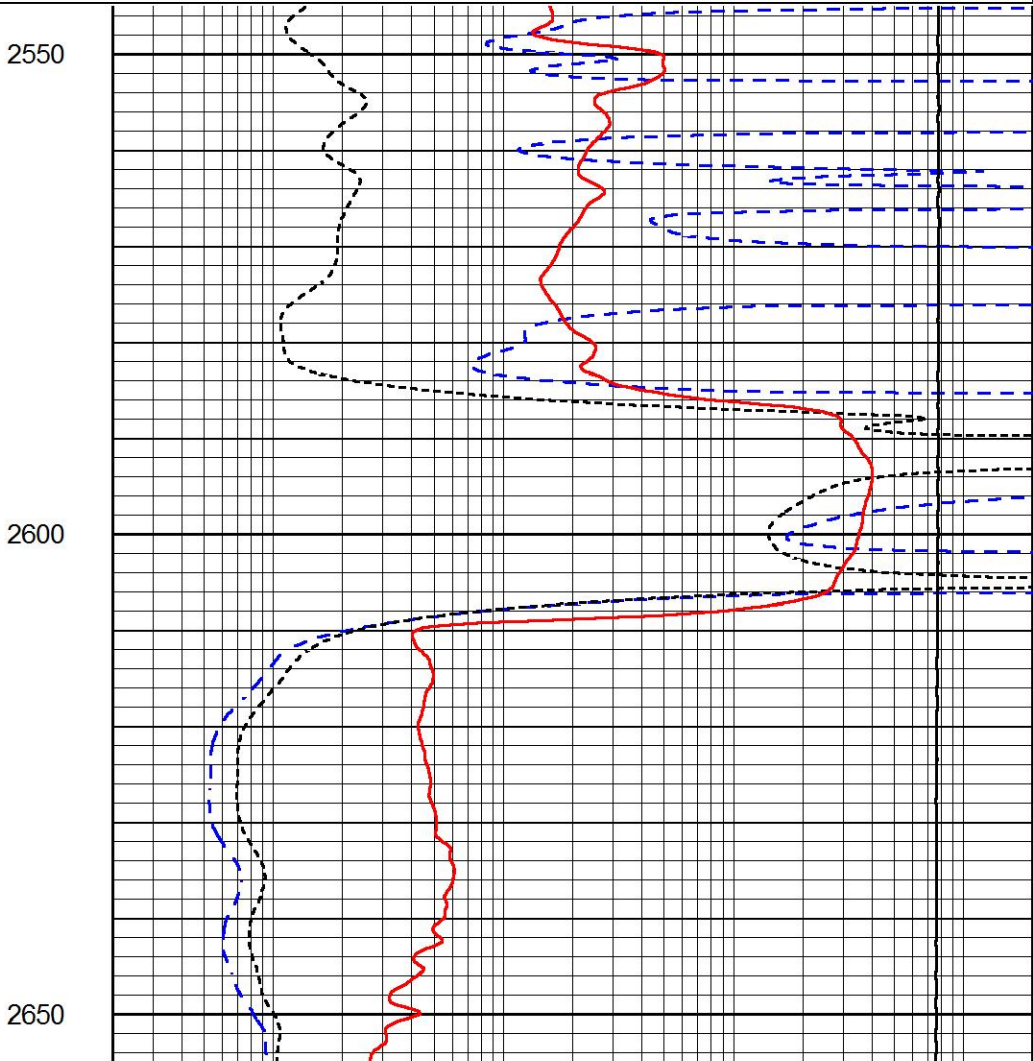
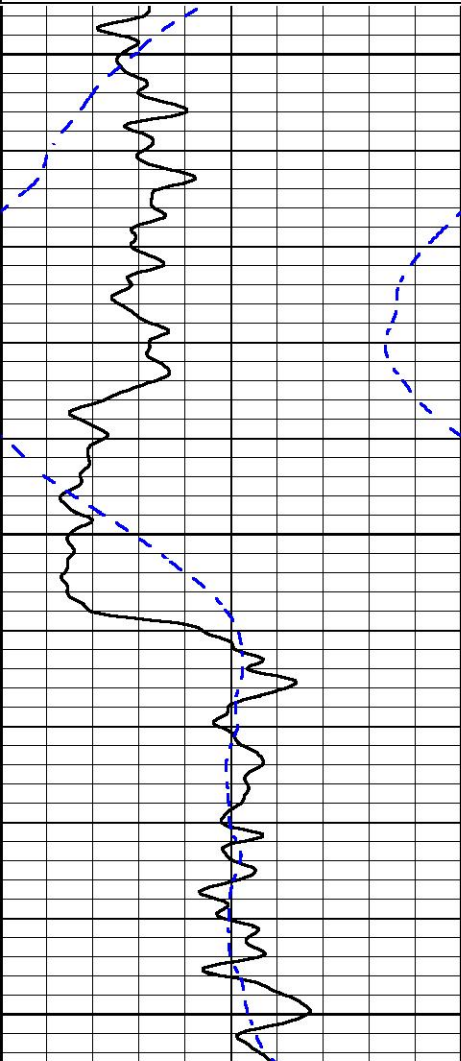


MAIN PASS

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass6.1
 Presentation Format dil
 Dataset Creation Thu Apr 06 08:56:35 2017
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0



0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000

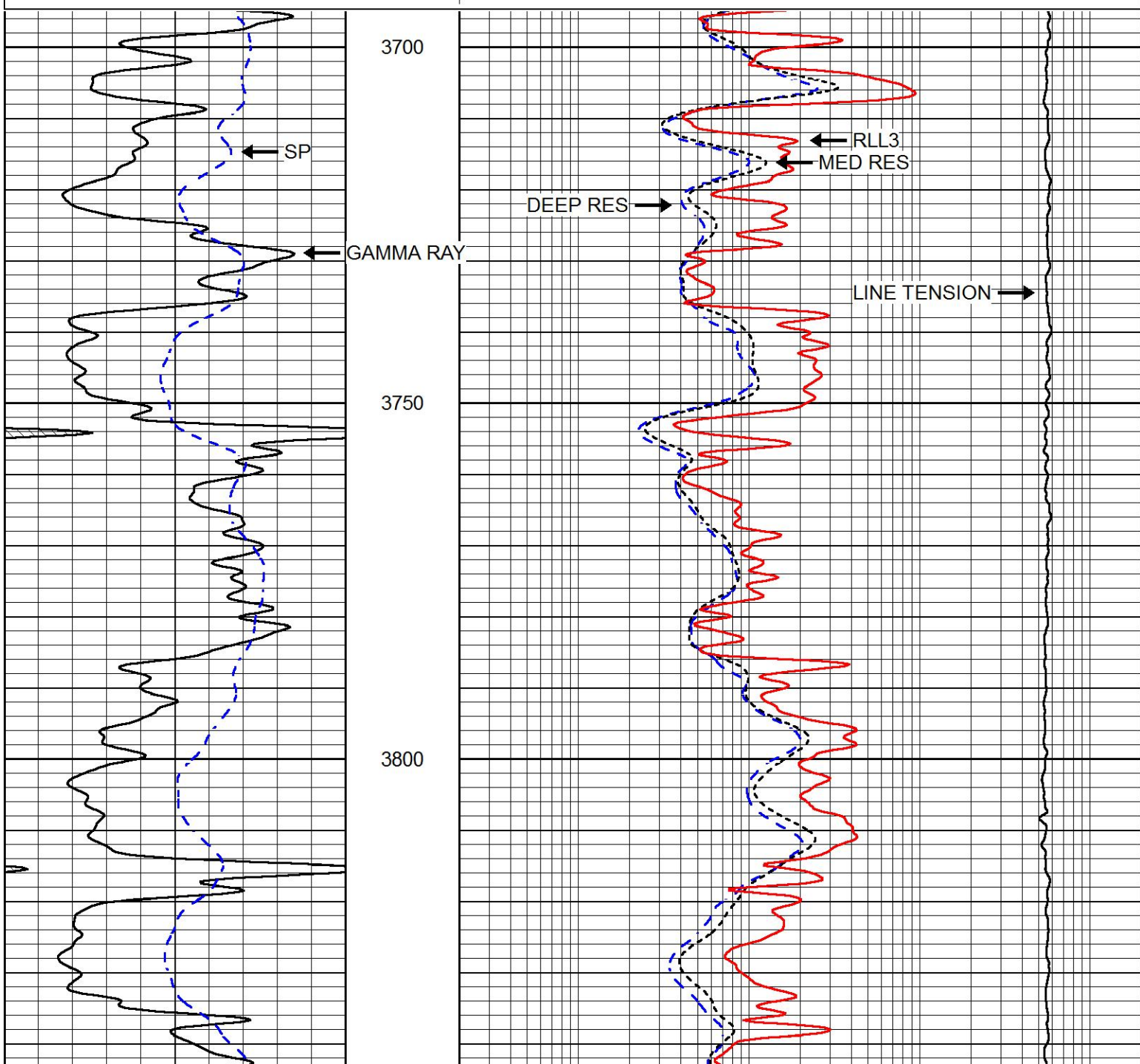


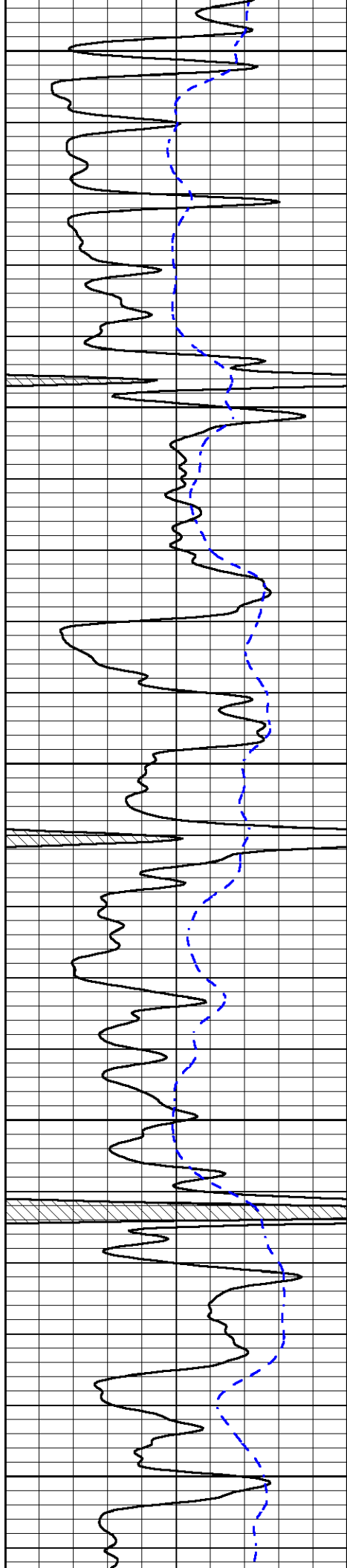
MAIN PASS

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Presentation Format dil
 Dataset Creation Thu Apr 06 08:12:33 2017
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0





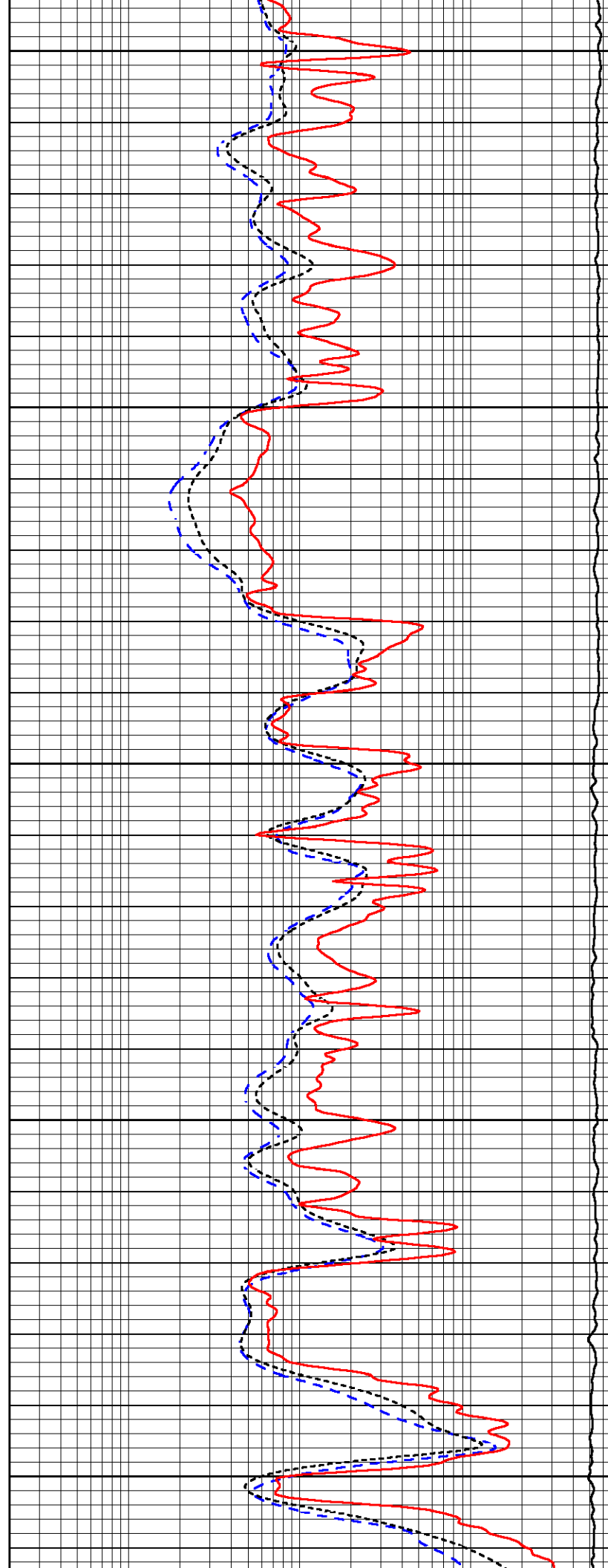
3850

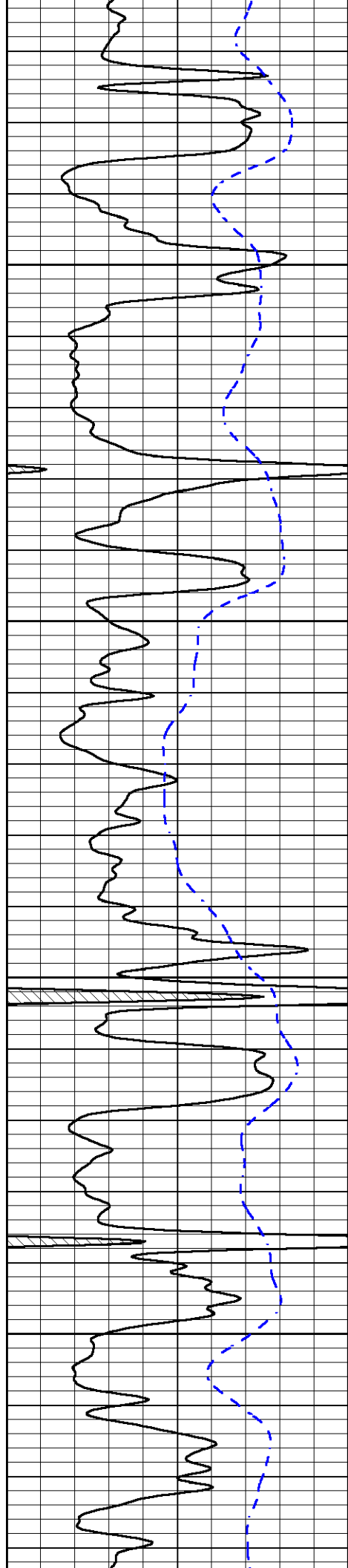
3900

3950

4000

4050



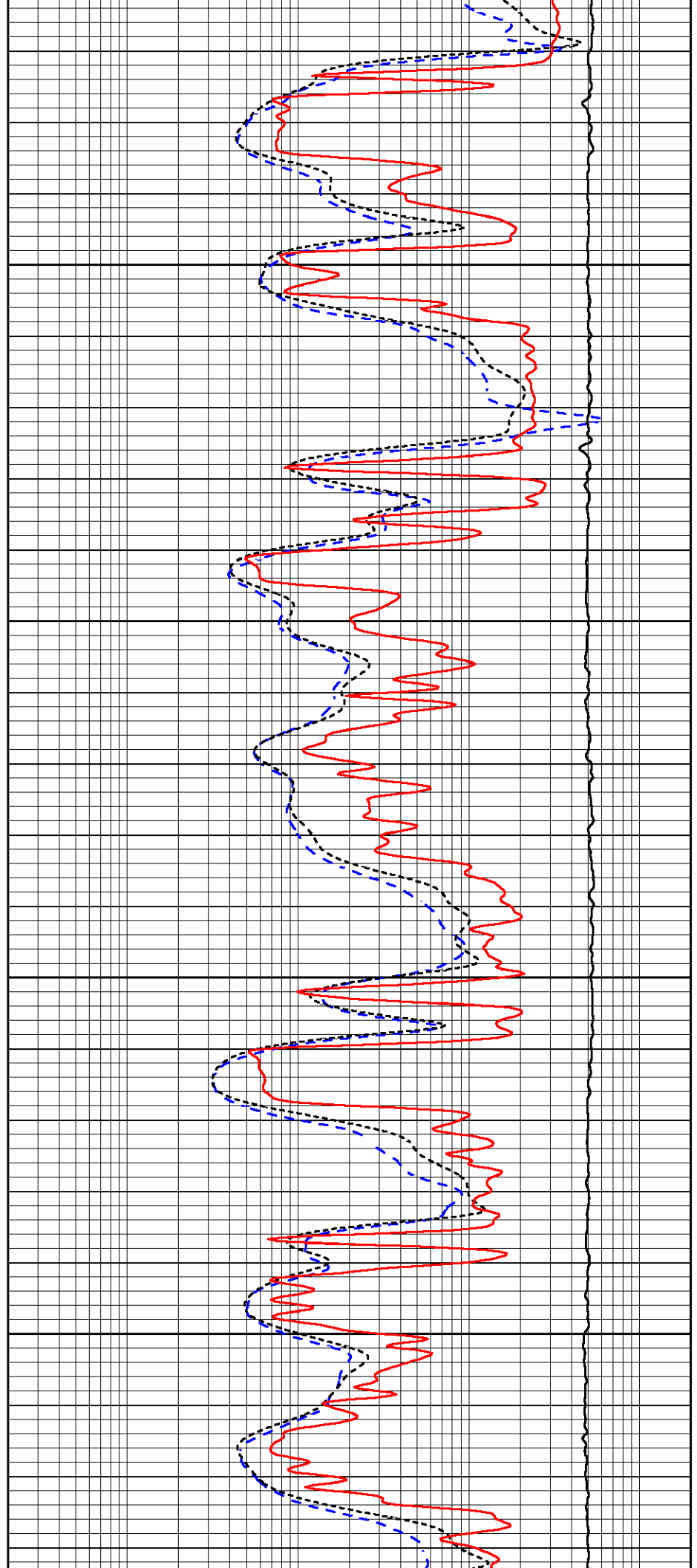


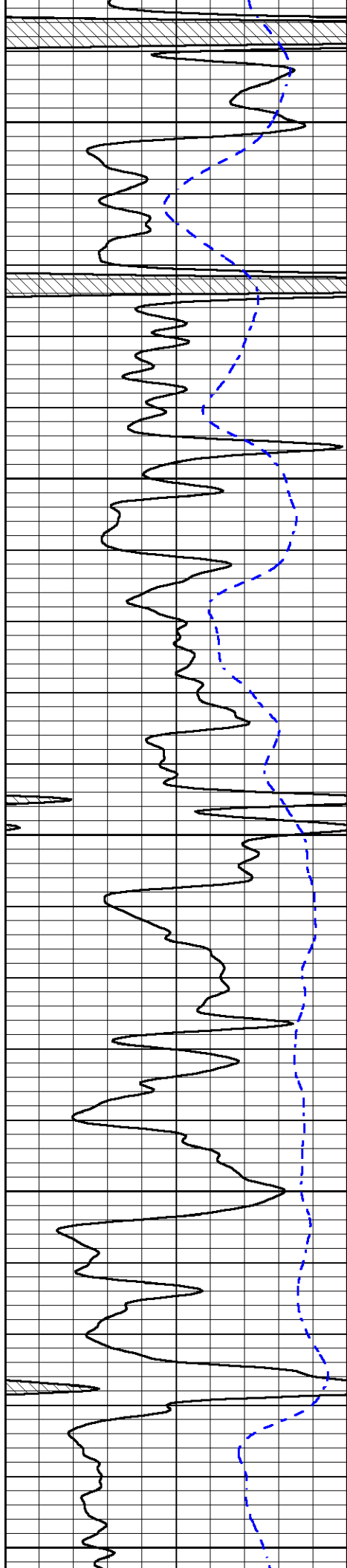
4100

4150

4200

4250





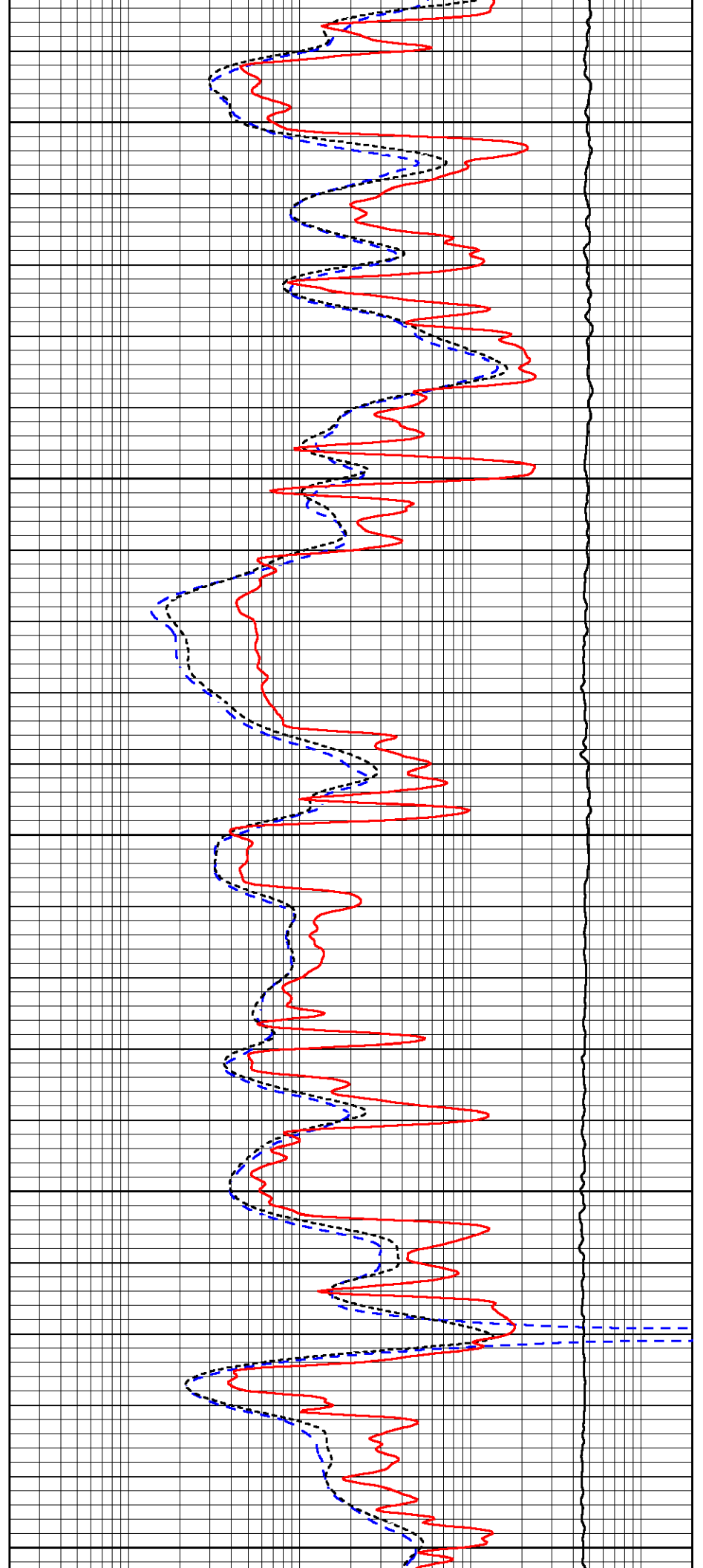
4300

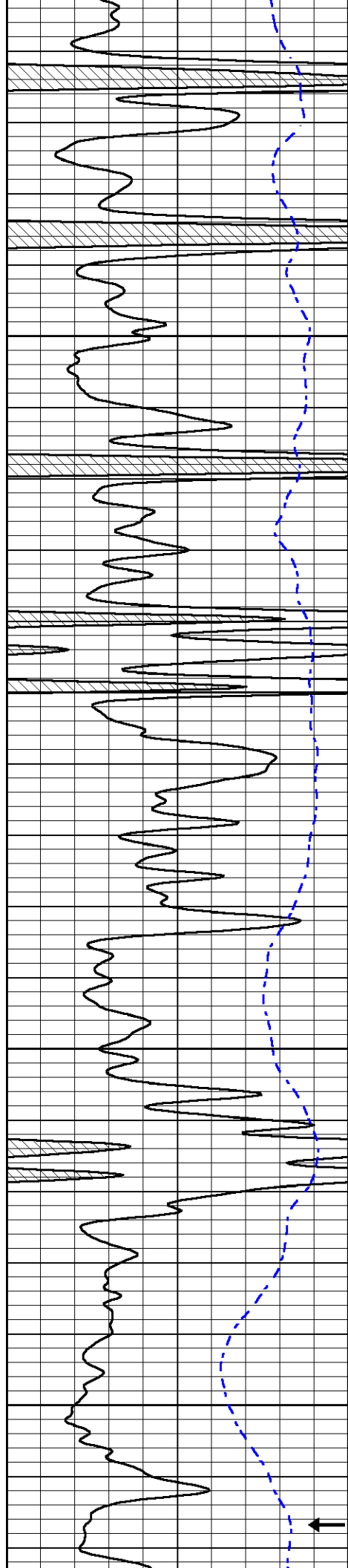
4350

4400

4450

4500





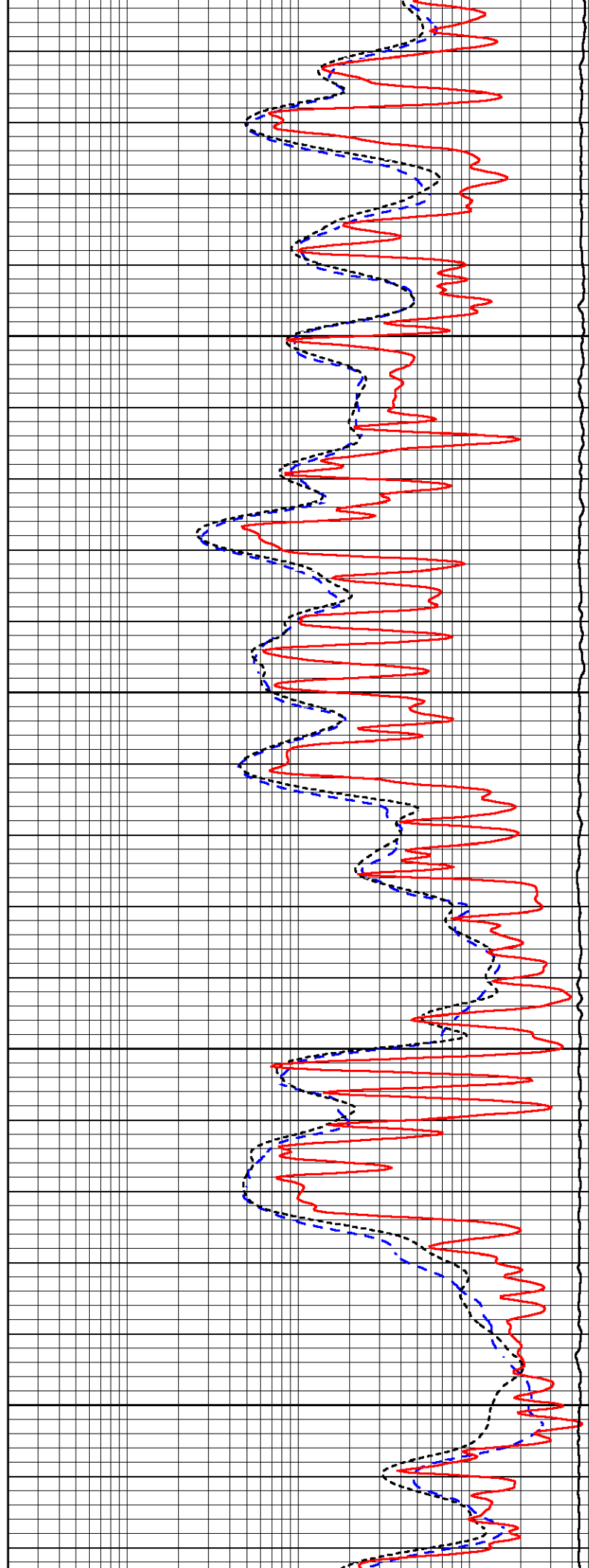
4550

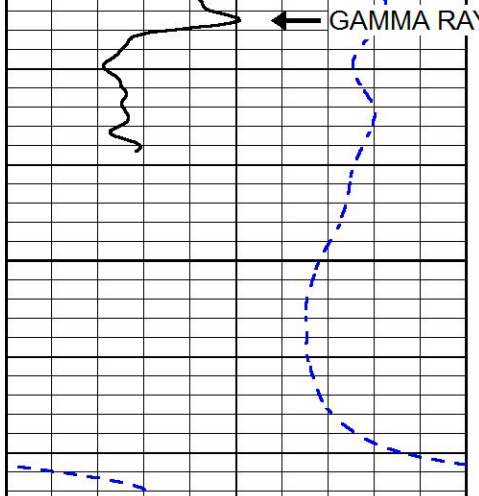
4600

4650

4700

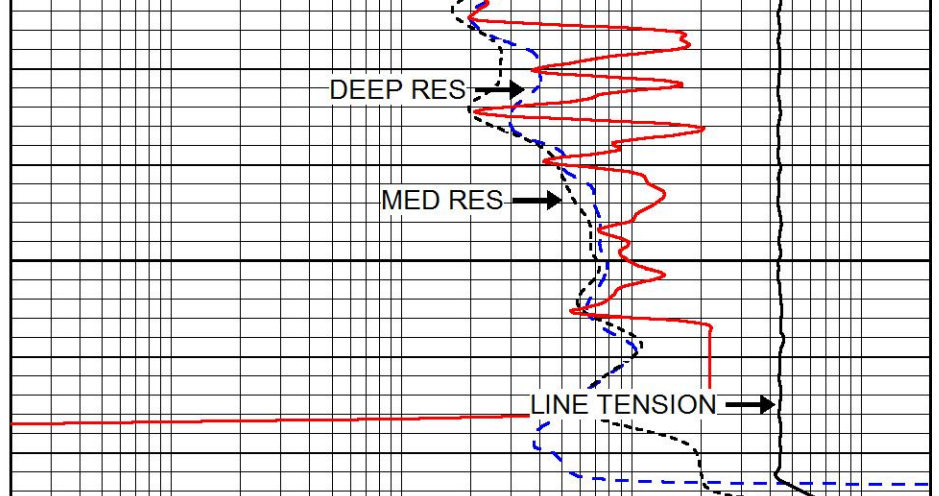
SP





4750

0	Gamma Ray (GAPI)	150
-200	SP (mV)	0



0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0

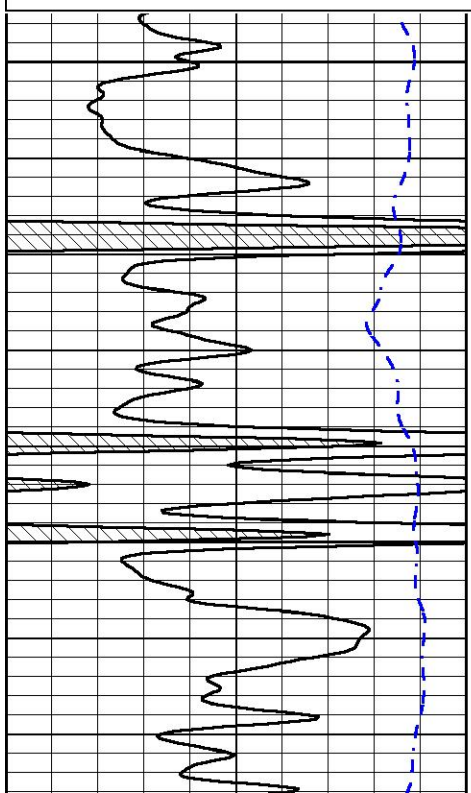


REPEAT SECTION

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass2.1
 Presentation Format dil
 Dataset Creation Thu Apr 06 08:17:51 2017
 Charted by Depth in Feet scaled 1:240

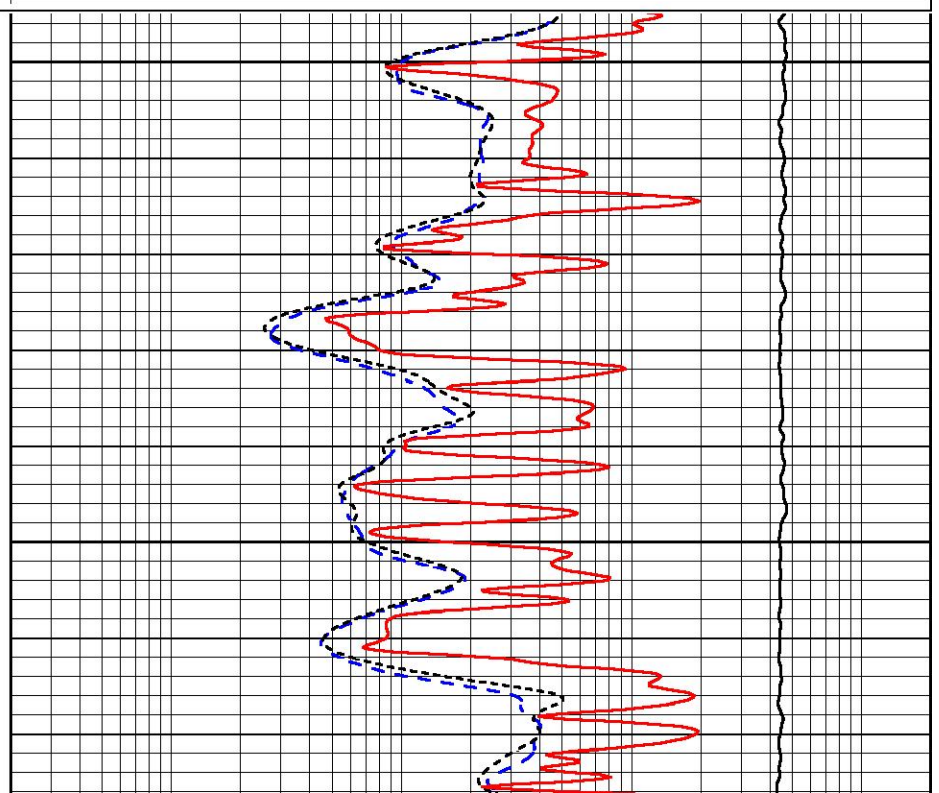
0	Gamma Ray (GAPI)	150
-200	SP (mV)	0

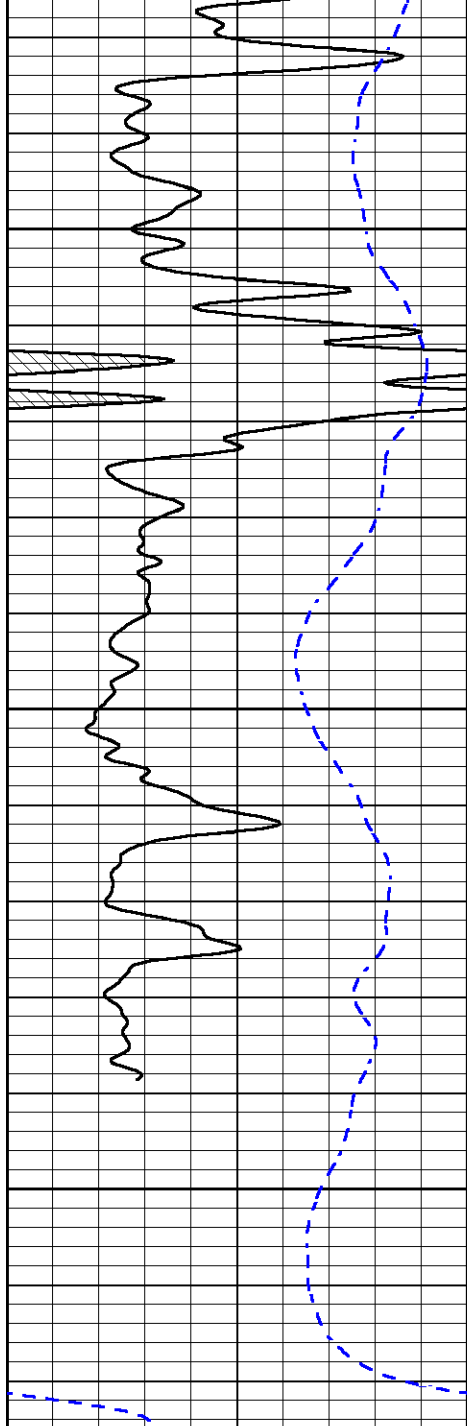
0.2	Deep Resistivity (Ohm-m)	2000
0.2	Medium Resistivity (Ohm-m)	2000
0.2	RLL3 (Ohm-m)	2000
10000	Line Tension (lb)	0



4550

4600



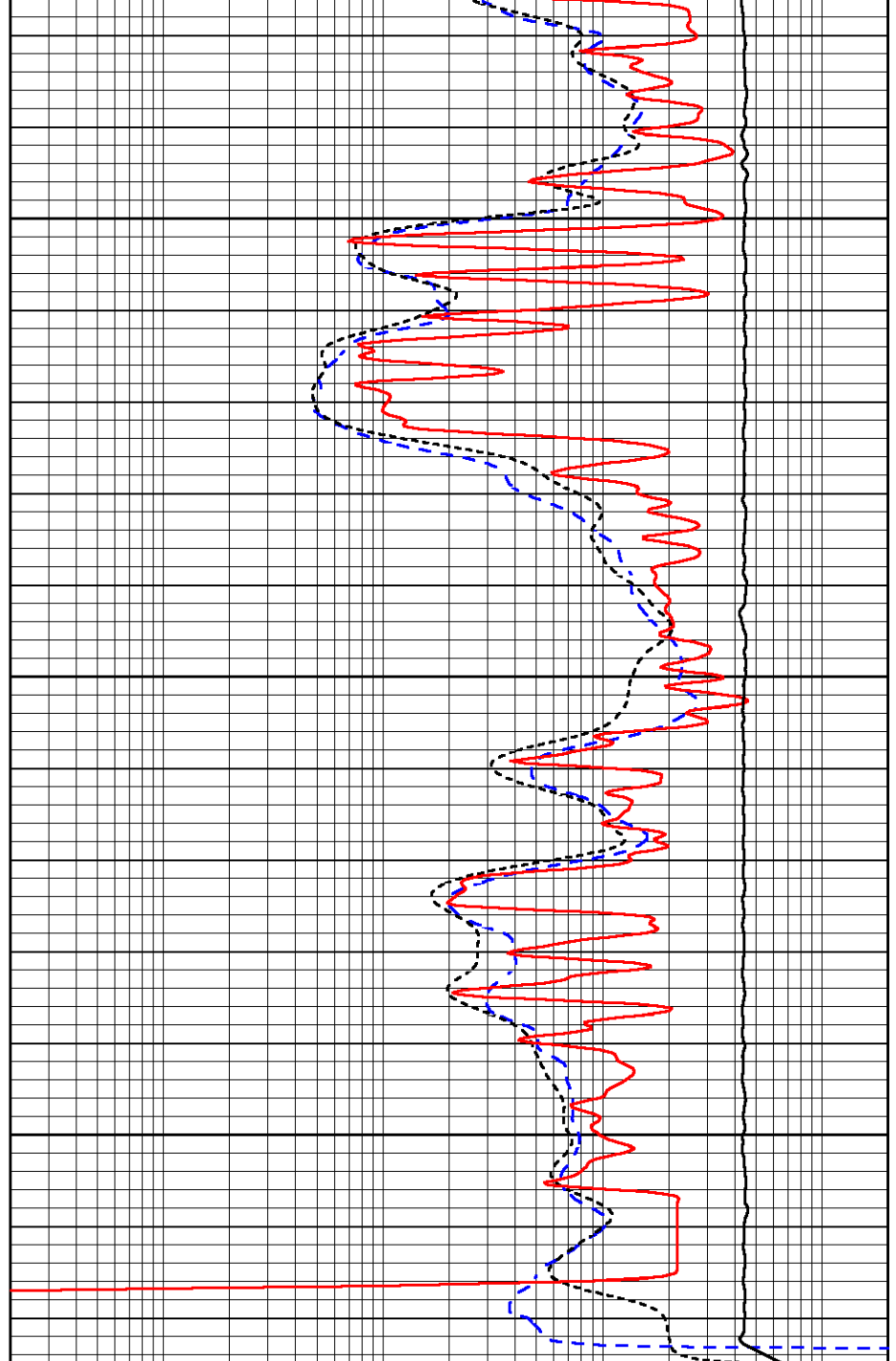


4650

4700

4750

0 Gamma Ray (GAPI) 150
 -200 SP (mV) 0



0.2 Deep Resistivity (Ohm-m) 2000
 0.2 Medium Resistivity (Ohm-m) 2000
 0.2 RLL3 (Ohm-m) 2000
 10000 Line Tension (lb) 0

Calibration Report

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Dataset Creation Thu Apr 06 08:12:33 2017

Dual Induction Calibration Report

Serial-Model: PSI 13-M&W
 Calibration Performed: Fri Mar 31 18:54:31 2017

Readings		References		Results		
Loop:	Air	Loop	Air	Loop	Gain	Offset

Loop.	Alf	Loop	Alf	Loop	Gain	Offset	
Deep	166.796	835.089	0.000	255.800	mmho/m	0.500	-37.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.440	-39.000

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Fri Mar 31 18:41:59 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	47000.0000	-2.5000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	46000.0000	-1.8000
Caliper	1.0001	1.1397	6.5000	18.5000	in	70.0000	-65.6250

Compensated Density Calibration Report

Serial-Model: 90-1031-M&W
 Source / Verifier: 16955B / 2ci
 Master Calibration Performed: Fri Mar 31 18:42:23 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	5174.18	6425.27	cps
Aluminum	2.655	g/cc	963.17	4037.42	cps
Spine Angle = 74.55		Density/Spine Ratio = 0.516			
	Size		Reading		
Small Ring	8.00	in	1.84		
Large Ring	22.00	in	1.46		

Compensated Neutron Calibration Report

Serial Number: 207-MW
 Tool Model: M&W
 Calibration Performed: Fri Mar 31 10:30:30 2017

Detector	Readings	Target	Normalization
Short Space	6240.00 cps	1000.00 cps	1.6025
Long Space	460.00 cps	1000.00 cps	1.9500

Gamma Ray Calibration Report

Serial Number: 89
 Tool Model: M&W
 Calibration Performed: Fri Mar 31 18:42:32 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



PIONEER

Pioneer Energy Services

Company	RICHLAND OIL INVESTMENTS, LLC
Well	MOORE #22-2
Field	OWEN EAST
County	LOGAN
State	KANSAS



DUAL COMP POROSITY LOG

Company RICHLAND OIL INVESTMENTS, LLC
 Well MOORE #22-2
 Field OWEN EAST
 County LOGAN
 State KANSAS

Company RICHLAND OIL INVESTMENTS, LLC
 Well MOORE #22-2
 Field OWEN EAST
 County LOGAN State KANSAS

Location: API #: 15-109-21494-00-00
 2305' FSL & 400' FWL
 SEC 22 TWP 12S RGE 33W
 Permanent Datum GROUND LEVEL Elevation 3104'
 Log Measured From KELLY BUSHING
 Drilling Measured From KELLY BUSHING
 Other Services DIL/MEL
 K.B. 3114'
 D.F. N/A
 G.L. 3104'

Date	4/6/2017						
Run Number	ONE						
Type Log	CNL/CDL						
Depth Driller	4770'						
Depth Logger	4772'						
Bottom Logged Interval	4743'						
Top Logged Interval	3700'						
Type Fluid In Hole	CHEMICAL						
Salinity, PPM CL	4000						
Density	9.3						
Level	FULL						
Max. Rec. Temp. F	124						
Operating Rig Time	3 HOURS						
Equipment -- Location	91 COLBY						
Recorded By	D. SCHMIDT						
Witnessed By	STEVE MURPHY						
Borehole Record							
Run No.	Bit	From	To	Size	Wgt.	From	To
ONE	12.25"	0'	227'	8.625"	23#	0'	227'
TWO	7.875"	227'	TD				
Casing Record							

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.
 OAKLEY,
 SOUTH ON OLD 40 TO 400 RD,
 7 SOUTH TO WAGON RD, 3 WEST TO 370, 1 1/2 SOUTH,
 EAST & SOUTH INTO

Log Measured From: KELLY BUSHING 10 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

Your Pioneer Energy Services Crew		This Log Record Was Witnessed By	
Engineer: D. SCHMIDT	Operator:	Primary Witness: STEVE MURPHY	Secondary Witness:
Operator:	Operator:	Secondary Witness:	Secondary Witness:
Operator:		Secondary Witness:	

Log Variables

Database C:\ProgramData\Warrior\Data\richland oil inv_moore_22-2.db
 Dataset field/well/STKML/pass5.1/_vars_

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	455	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	50	0	5.5	0	4772	124	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (207-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (90-1031)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSIML (PSI-01) GO Micro log tools converted to Simplec electronics	7.58	4.00	65.00
RLL3F RLL3	15.80 15.80					

CILD 8.00

CILM 4.70

SP 0.20

DIL-M&W (PSI 13)

18.50

3.50

220.00

Dataset: richland oil inv_moore_22-2.db: field/well/STKML/pass5.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

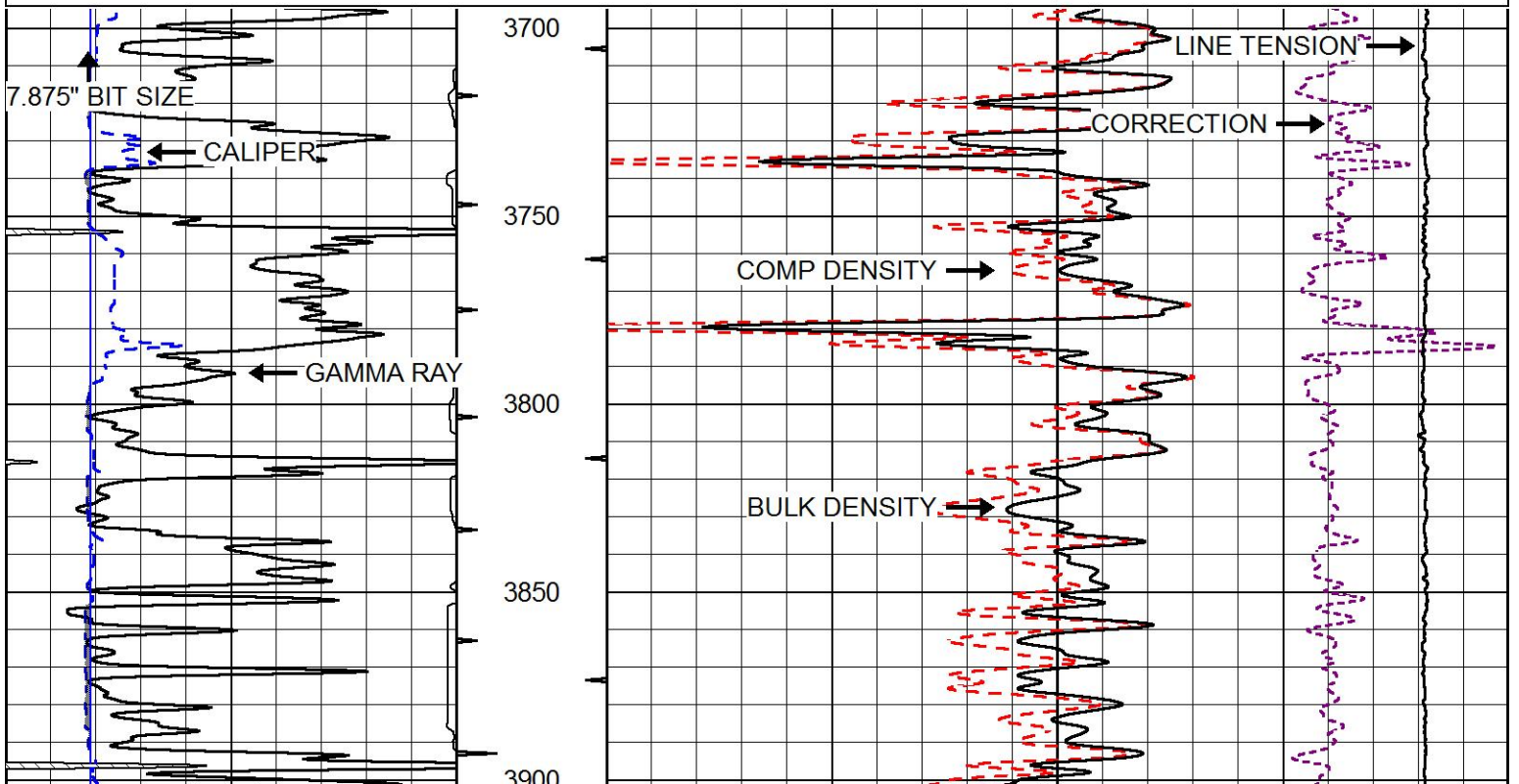


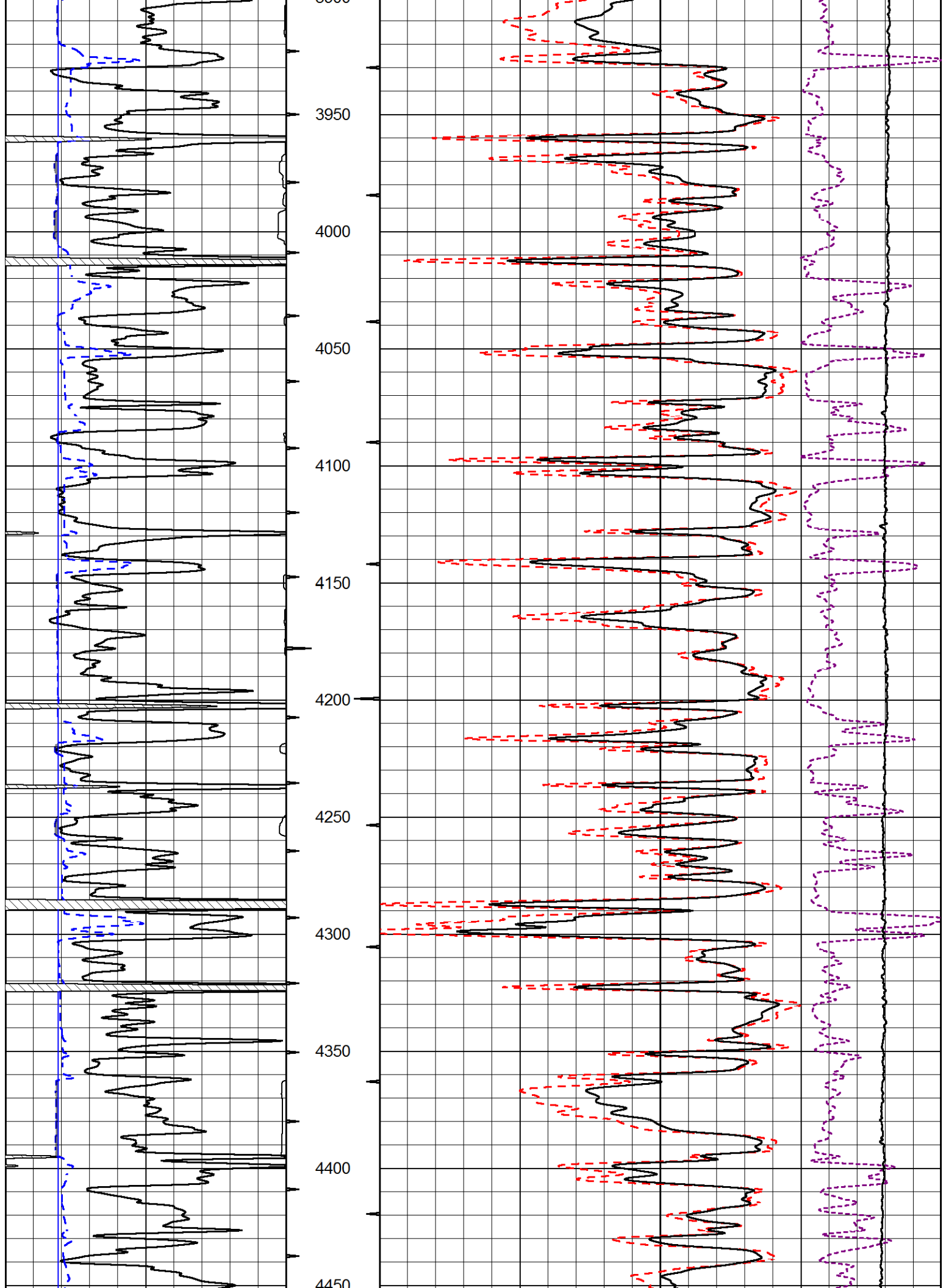
MAIN PASS

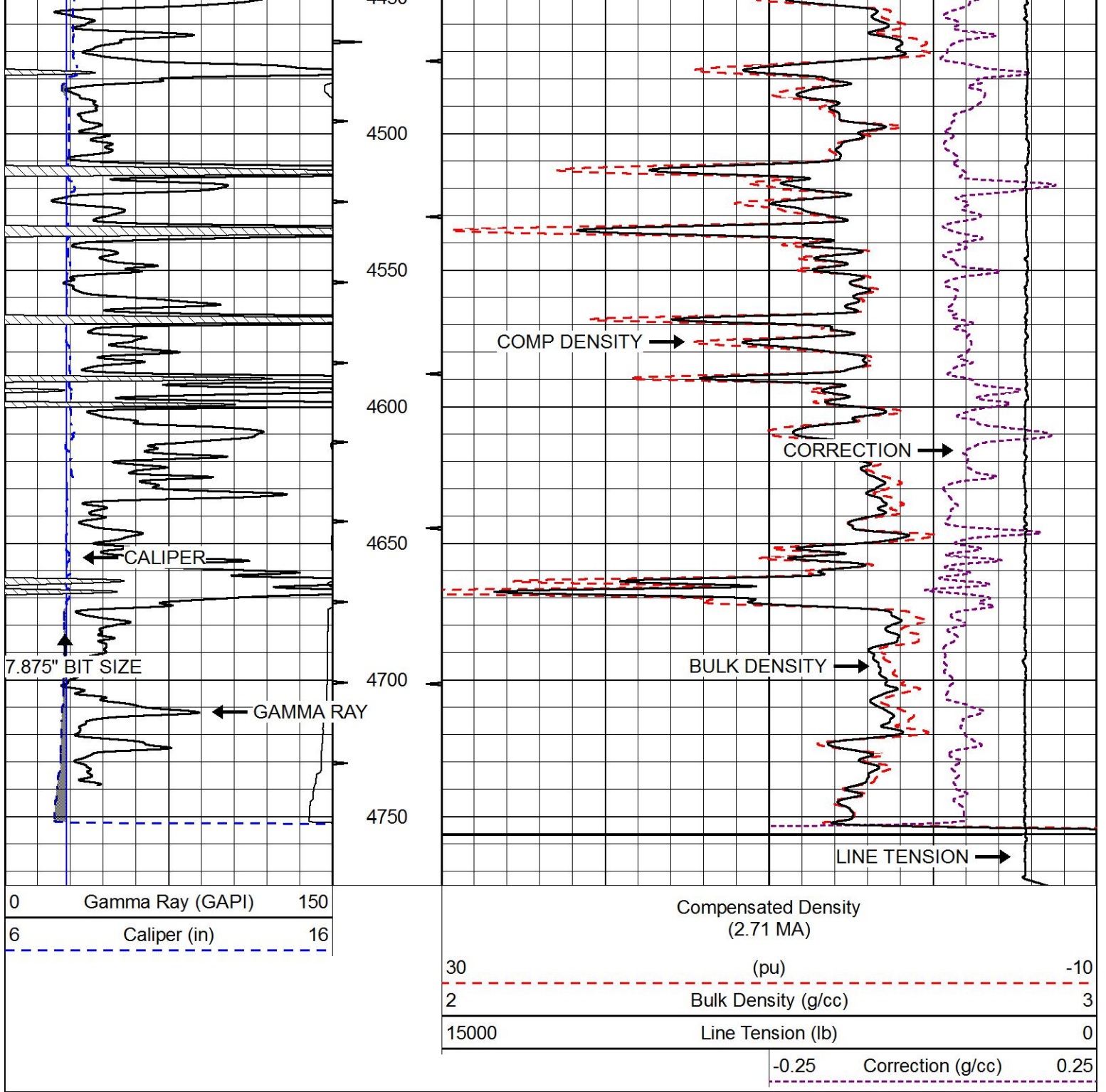
Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Presentation Format cdl
 Dataset Creation Thu Apr 06 08:12:33 2017
 Charted by Depth in Feet scaled 1:600

0	Gamma Ray (GAPI)	150
6	Caliper (in)	16

Compensated Density (2.71 MA)		
30	(pu)	-10
2	Bulk Density (g/cc)	3
15000	Line Tension (lb)	0
-0.25	Correction (g/cc)	0.25



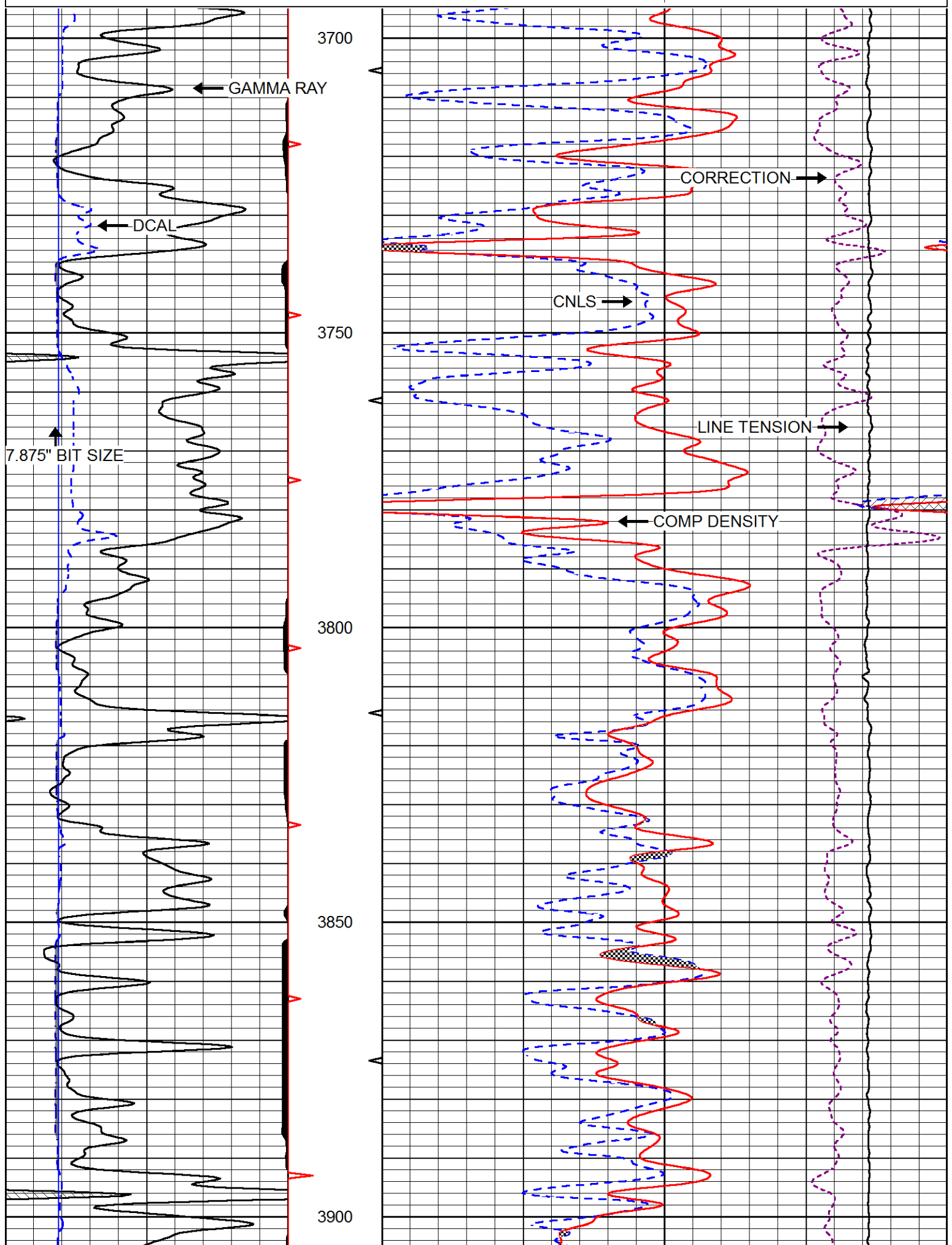


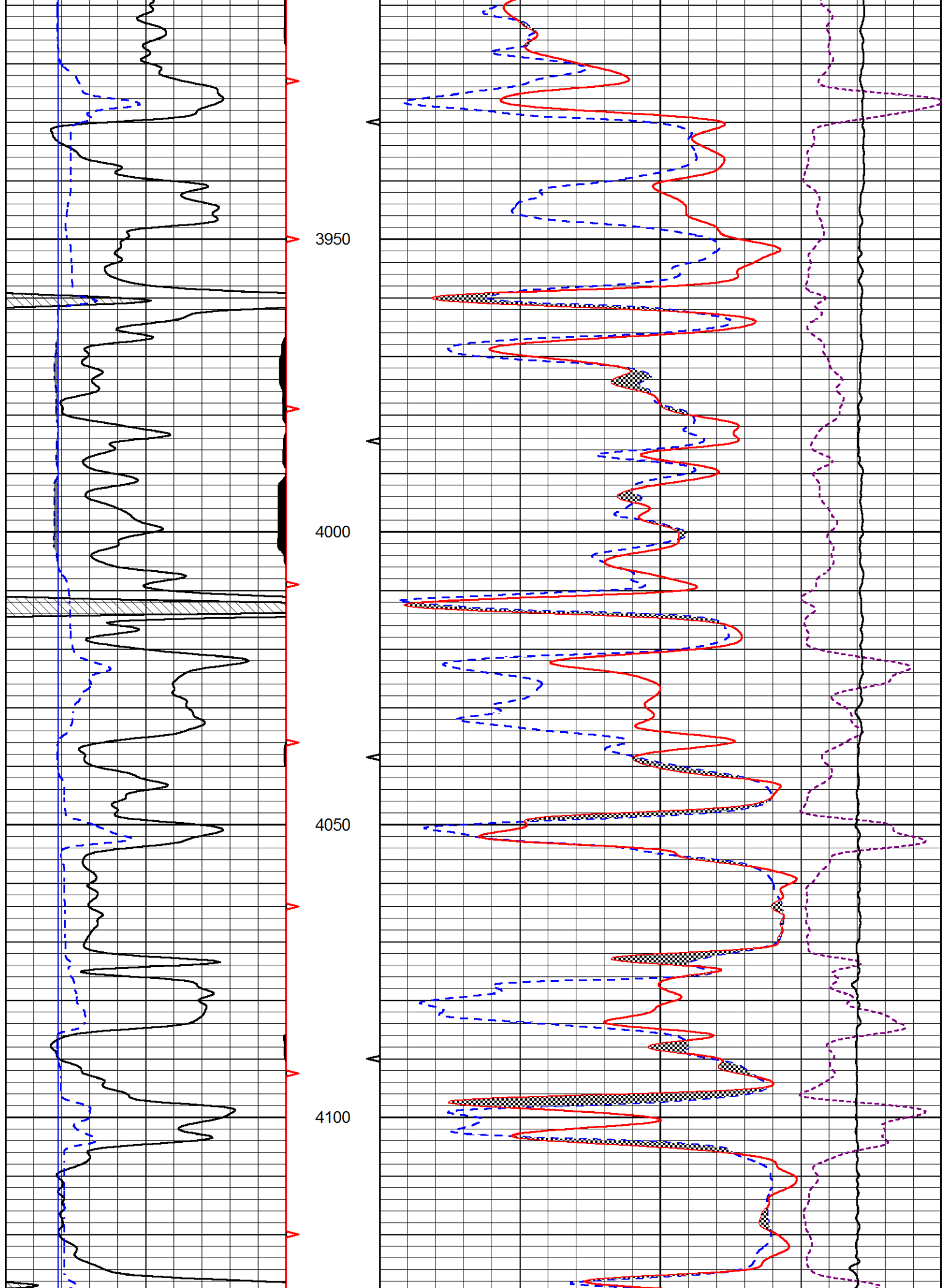


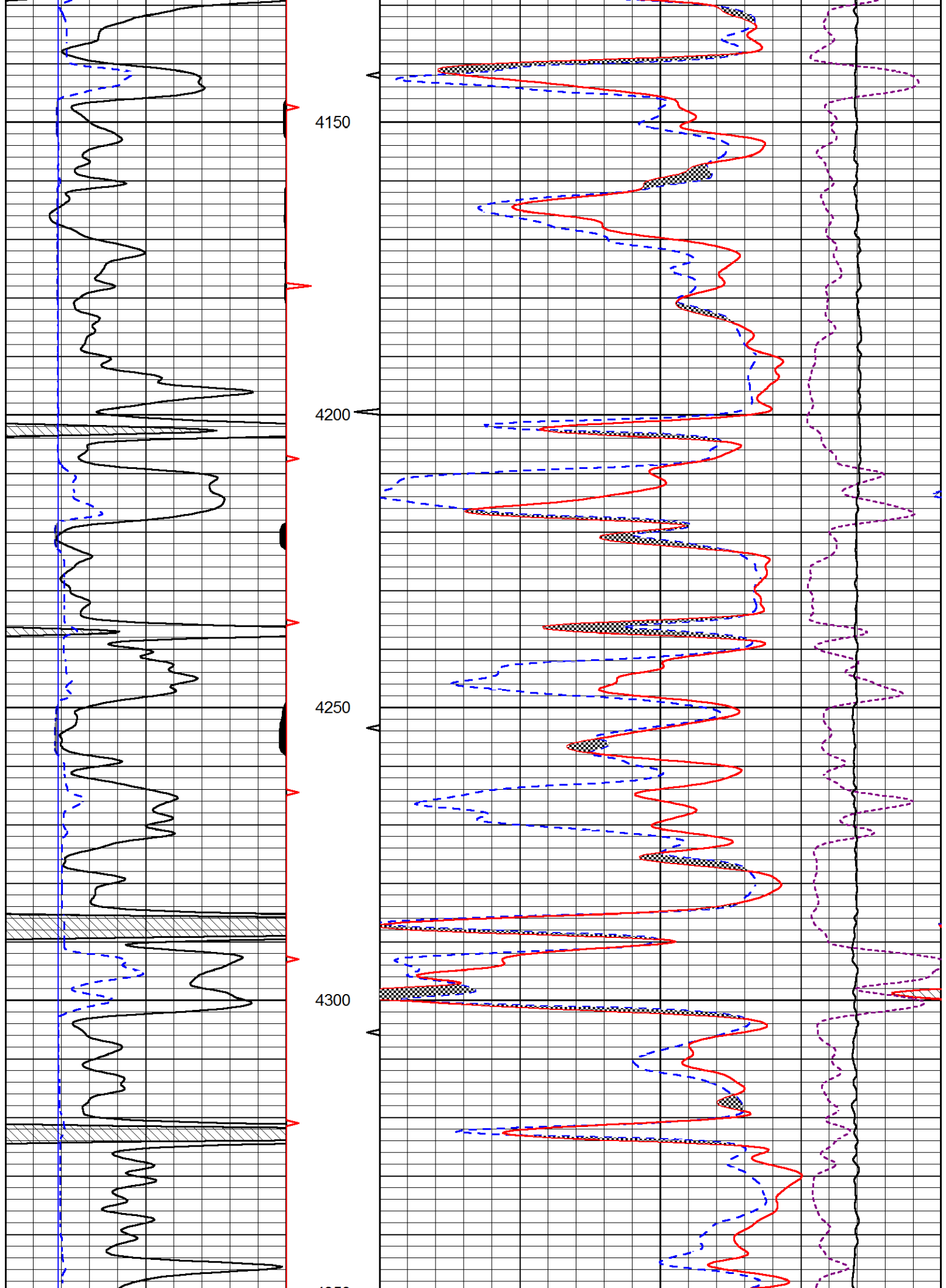
MAIN PASS

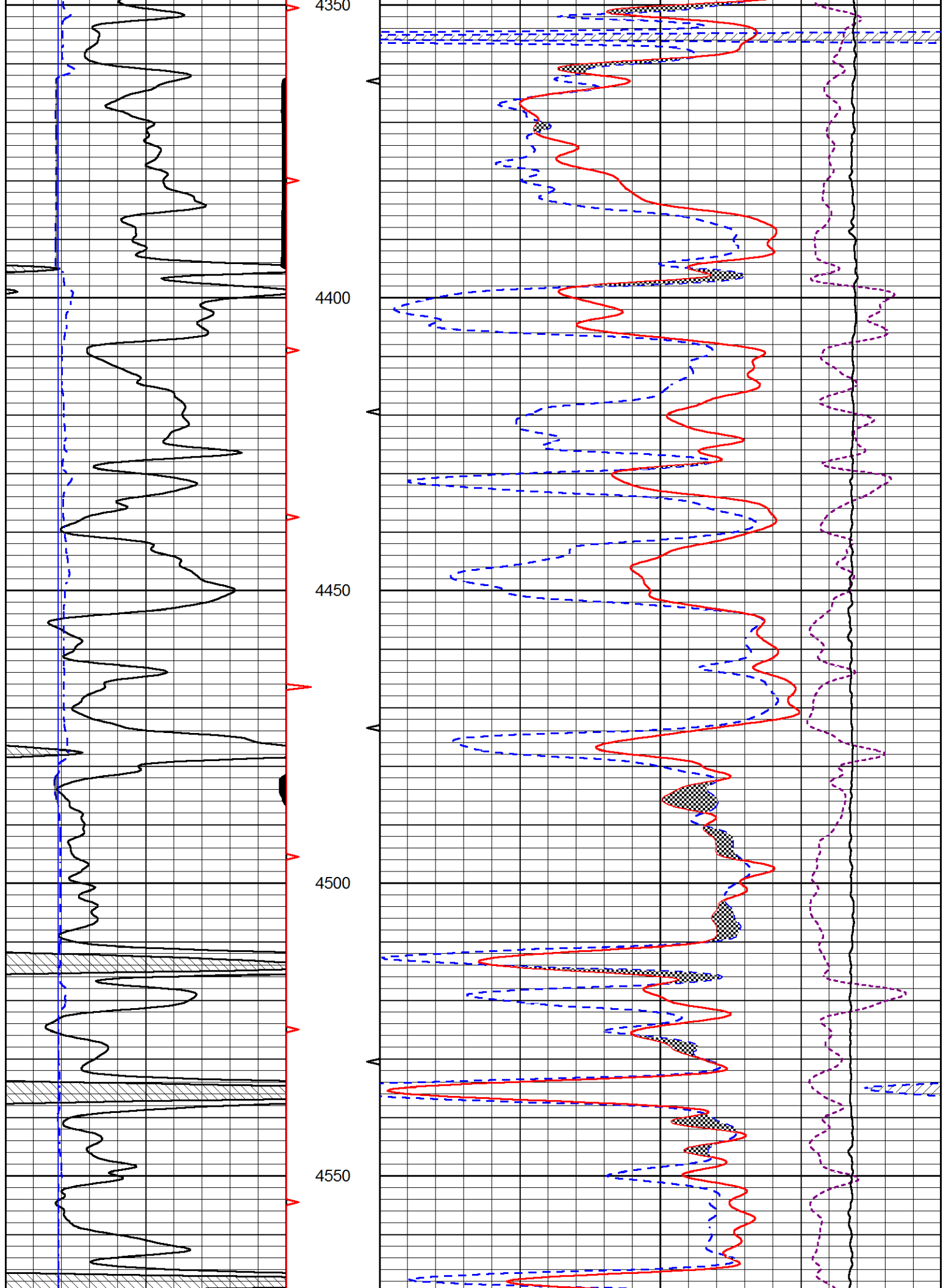
Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Presentation Format cndlspec
 Dataset Creation Thu Apr 06 08:12:33 2017
 Charted by Depth in Feet scaled 1:240

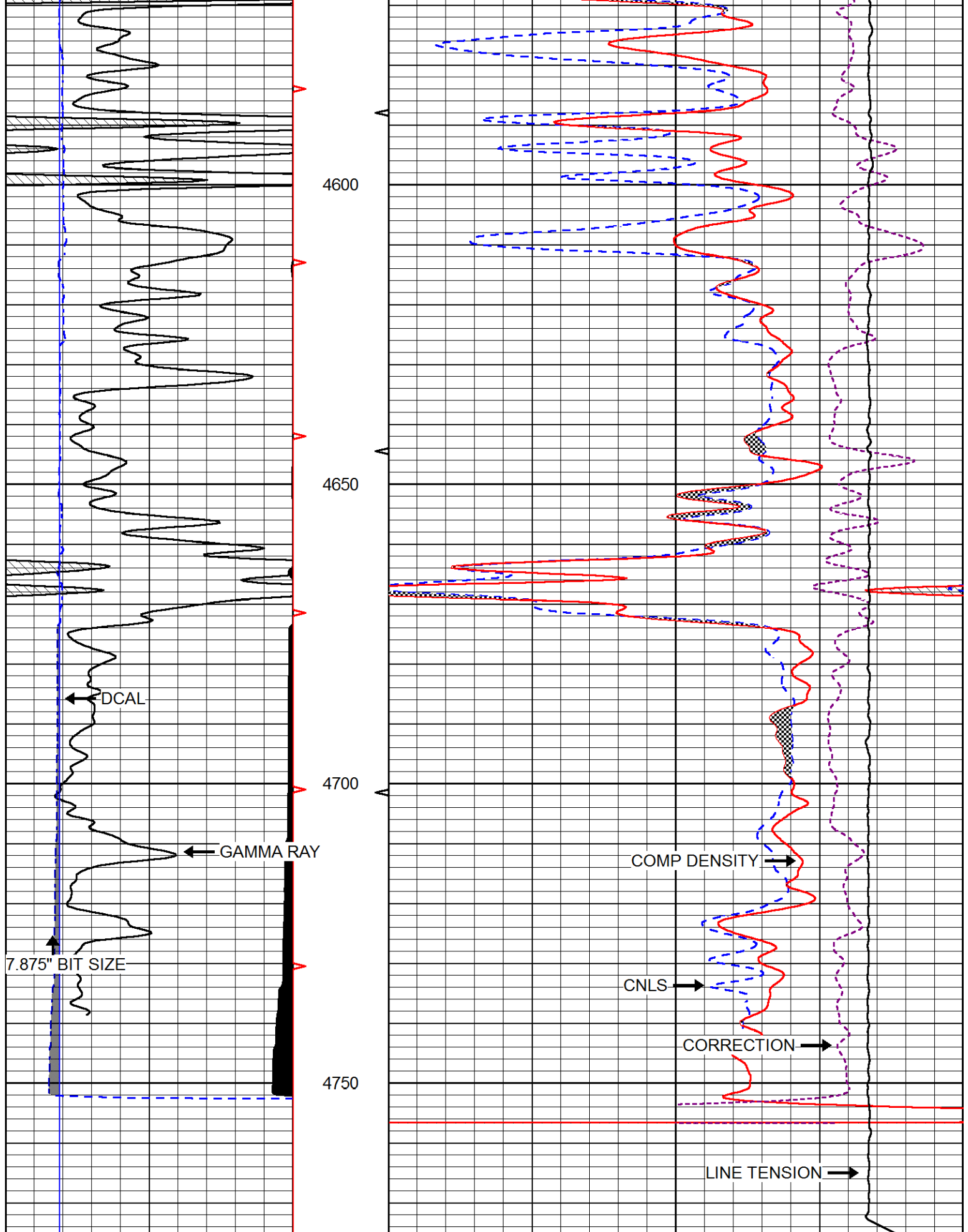
0	Gamma Ray (GAPI)	150	30	CNLS (pu)	-10
6	DCAL (in)	16	30	Compensated Density 2.71 g/cc (pu)	-10
			10000	Line Tension (lb)	0











0	Gamma Ray (GAPI)	150
6	DCAL (in)	16

30	CNLS (pu)	-10
30	Compensated Density 2.71 g/cc (pu)	-10
10000	Line Tension (lb)	0

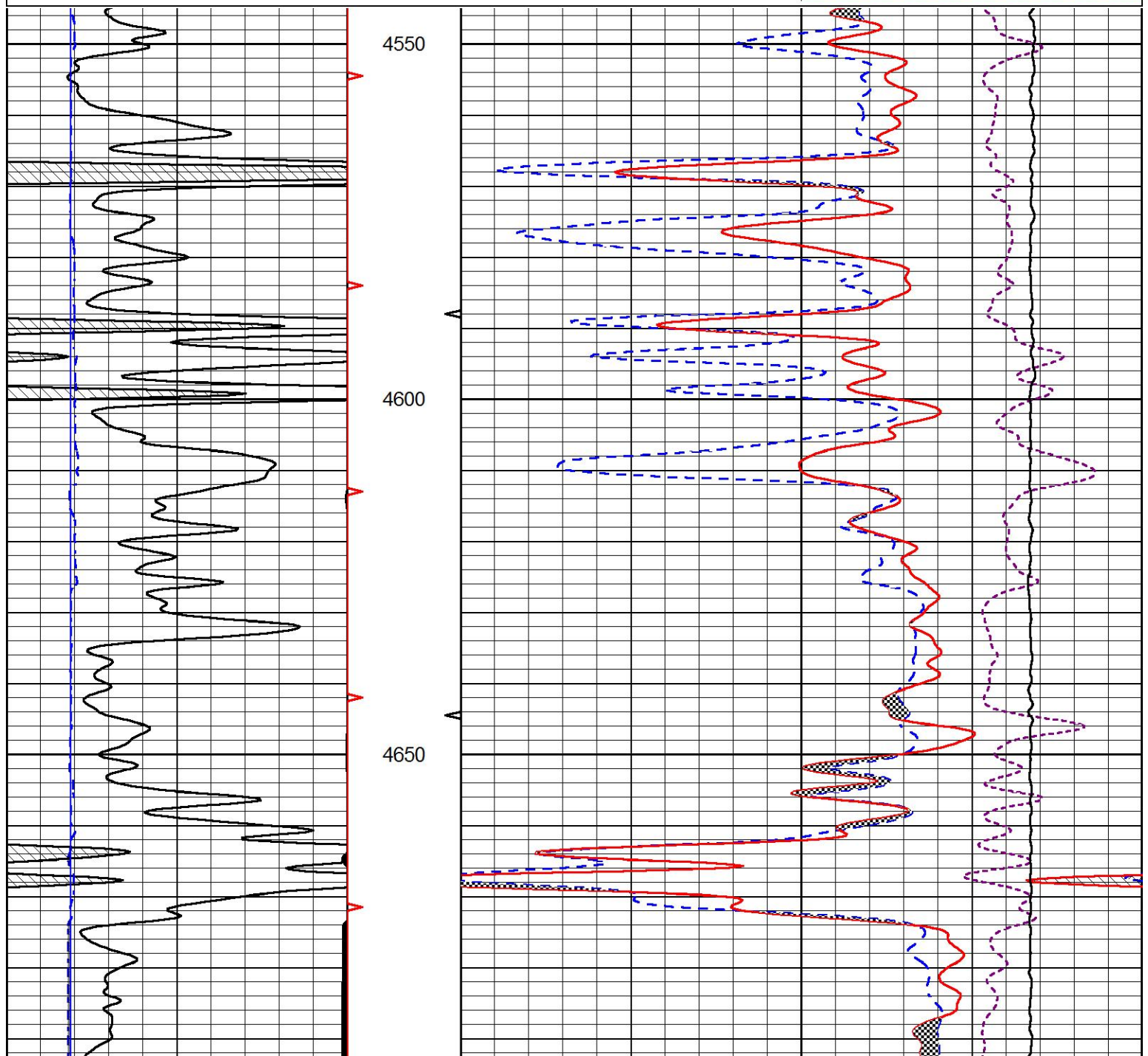


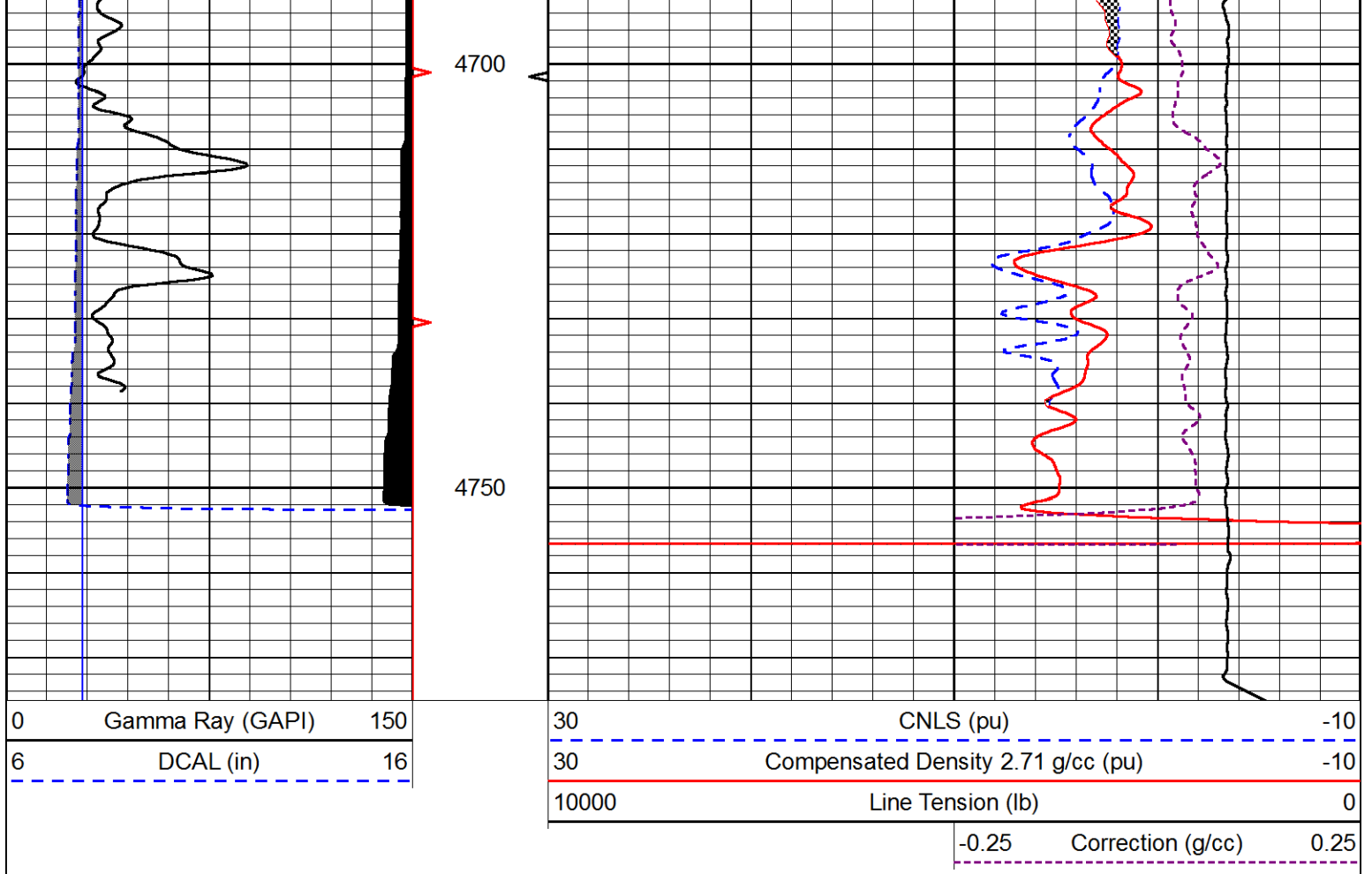
REPEAT SECTION

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass2.1
 Presentation Format cndlspec
 Dataset Creation Thu Apr 06 08:17:51 2017
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
6	DCAL (in)	16

30	CNLS (pu)	-10
30	Compensated Density 2.71 g/cc (pu)	-10
10000	Line Tension (lb)	0
-0.25	Correction (g/cc)	0.25





Calibration Report

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Dataset Creation Thu Apr 06 08:12:33 2017

Dual Induction Calibration Report

Serial-Model: PSI 13-M&W
 Calibration Performed: Fri Mar 31 18:54:31 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop		Gain	Offset
Deep	166.796	835.089	0.000	255.800	mmho/m	0.500	-37.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.440	-39.000

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Fri Mar 31 18:41:59 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	47000.0000	-2.5000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	46000.0000	-1.8000
Caliper	1.0001	1.1397	6.5000	18.5000	in	70.0000	-65.6250

Compensated Density Calibration Report

Serial-Model:
Source / Verifier:
Master Calibration Performed:

90-1031-M&W
16955B / 2ci
Fri Mar 31 18:42:23 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	5174.18	6425.27	cps
Aluminum	2.655	g/cc	963.17	4037.42	cps
Spine Angle = 74.55			Density/Spine Ratio = 0.516		
	Size		Reading		
Small Ring	8.00	in	1.84		
Large Ring	22.00	in	1.46		

Compensated Neutron Calibration Report

Serial Number: 207-MW
Tool Model: M&W
Calibration Performed: Fri Mar 31 10:30:30 2017

Detector	Readings	Target	Normalization
Short Space	6240.00 cps	1000.00 cps	1.6025
Long Space	460.00 cps	1000.00 cps	1.9500

Gamma Ray Calibration Report

Serial Number: 89
Tool Model: M&W
Calibration Performed: Fri Mar 31 18:42:32 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



PIONEER
Pioneer Energy Services

Company RICHLAND OIL INVESTMENTS, LLC
Well MOORE #22-2
Field OWEN EAST
County LOGAN
State KANSAS



PIONEER
Pioneer Energy Services

**MICRORESISTIVITY
LOG**

Company **RICHLAND OIL INVESTMENTS, LLC**
Well **MOORE #22-2**
Field **OWEN EAST**
County **LOGAN** State **KANSAS**

Company **RICHLAND OIL INVESTMENTS, LLC**
Well **MOORE #22-2**
Field **OWEN EAST**
County **LOGAN**
State **KANSAS**

Location: **API #: 15-109-21494-00-00**
2305' FSL & 400' FWL
SEC 22 TWP 12S RGE 33W
Permanent Datum **GROUND LEVEL Elevation 3104'**
Log Measured From **KELLY BUSHING**
Drilling Measured From **KELLY BUSHING**
Other Services
**CNL/CDL
DIL**
Elevation
K.B. 3114'
D.F. N/A
G.L. 3104'

Date	4/6/2017
Run Number	ONE
Depth Driller	4770'
Depth Logger	4772'
Bottom Logged Interval	4771'
Top Log Interval	3700'
Casing Driller	8.625" @ 227'
Casing Logger	228'
Bit Size	7.875"
Type Fluid in Hole	CHEMICAL
Salinity, ppm CL	4000
Density / Viscosity	9.3 57
pH / Fluid Loss	9.5 9.6
Source of Sample	FLOWLINE
Rm @ Meas. Temp	0.60 @ 62
Rmt @ Meas. Temp	0.45 @ 62
Rmc @ Meas. Temp	0.81 @ 62
Source of Rmf / Rmc	CHARTS
Rm @ BHT	0.30 @ 124
Operating Rig Time	3 HOURS
Max Rec. Temp. F	124
Equipment Number	91
Location	COLBY
Recorded By	D. SCHMIDT
Witnessed By	STEVE MURPHY

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.
OAKLEY,
SOUTH ON OLD 40 TO 400 RD,
7 SOUTH TO WAGON RD, 3 WEST TO 370, 1 1/2 SOUTH,
EAST & SOUTH INTO

Log Measured From: **KELLY BUSHING** 10 Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES
www.pioneerenergy.com 785-625-3858

Your Pioneer Energy Services Crew	This Log Record Was Witnessed By
Engineer: D. SCHMIDT	Primary Witness: STEVE MURPHY
Operator:	Secondary Witness:
Operator:	Secondary Witness:
Operator:	Secondary Witness:

Log Variables

Database C:\ProgramData\Warrior\Data\richland oil inv_moore_22-2.db
 Dataset field/well/STKML/pass5.1/_vars_

Top - Bottom

M	A	SZCOR	NPORSEL	FLUIDDEN g/cc	MATRXDEN g/cc	SPSHIFT mV	SNDERRM mmho/m
2	1	Off	Limestone	1	2.71	455	0
SNDERR mmho/m	SRFTEMP degF	CASETHCK in	CASEOD in	PERFS	TDEPTH ft	BOTTEMP degF	BOREID in
0	50	0	5.5	0	4772	124	7.875

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
GR	40.58		GR-M&W (89)	3.00	3.50	50.00
CNLSC CNSSC	37.48 36.73		CNT-M&W (207-MW)	5.50	3.50	100.00
LSD DCAL SSD	28.43 28.42 27.93		CDL-M&W (90-1031)	8.50	4.00	250.00
MCAL MI MN	19.83 19.83 19.83		ML-PSIML (PSI-01) GO Micro log tools converted to Simplec electronics	7.58	4.00	65.00
RLL3F RLL3	15.80 15.80					

CILD 8.00

CILM 4.70

SP 0.20

DIL-M&W (PSI 13)

18.50

3.50

220.00

Dataset: richland oil inv_moore_22-2.db: field/well/STKML/pass5.1
 Total length: 43.08 ft
 Total weight: 685.00 lb
 O.D.: 4.00 in

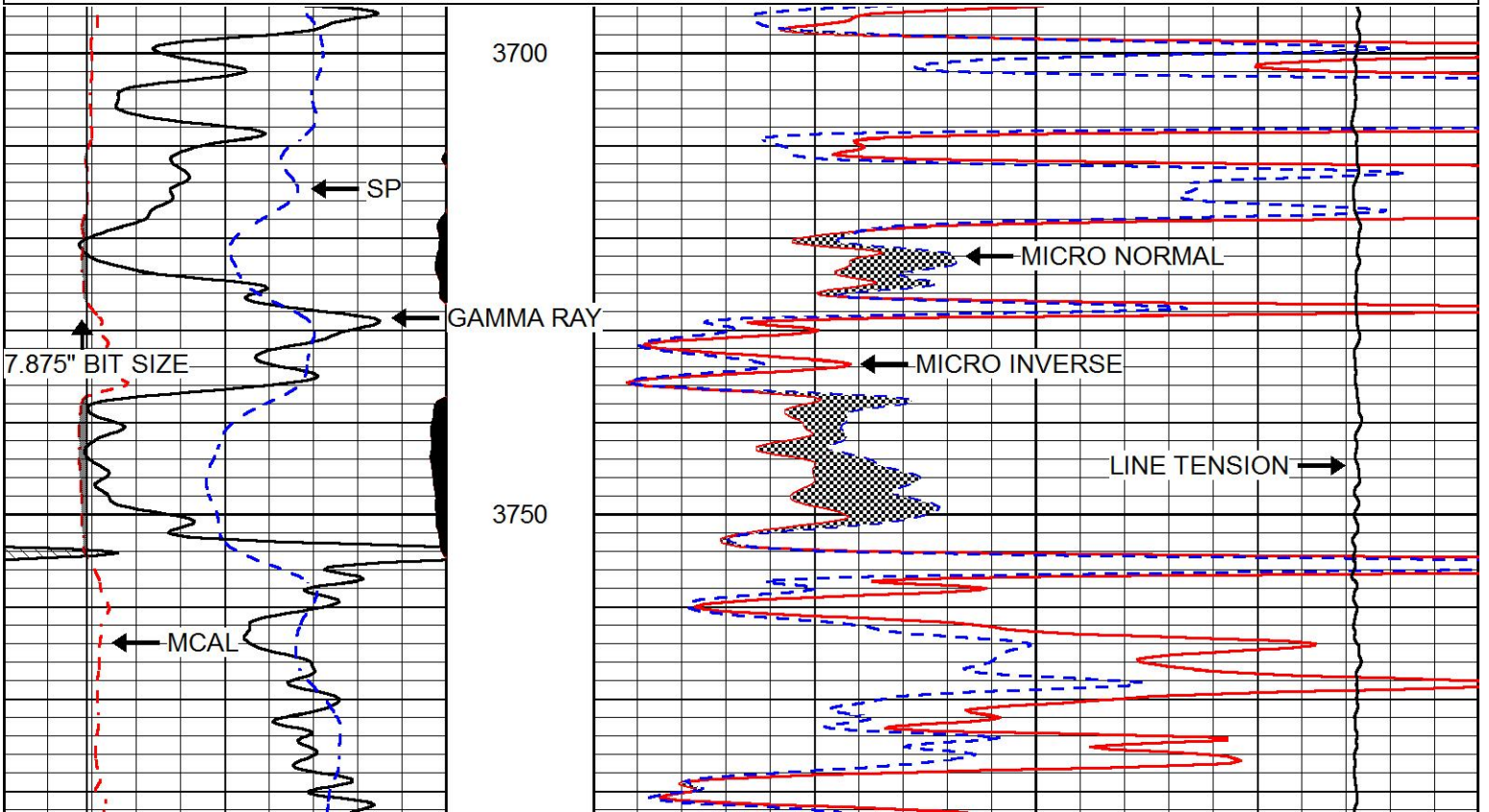


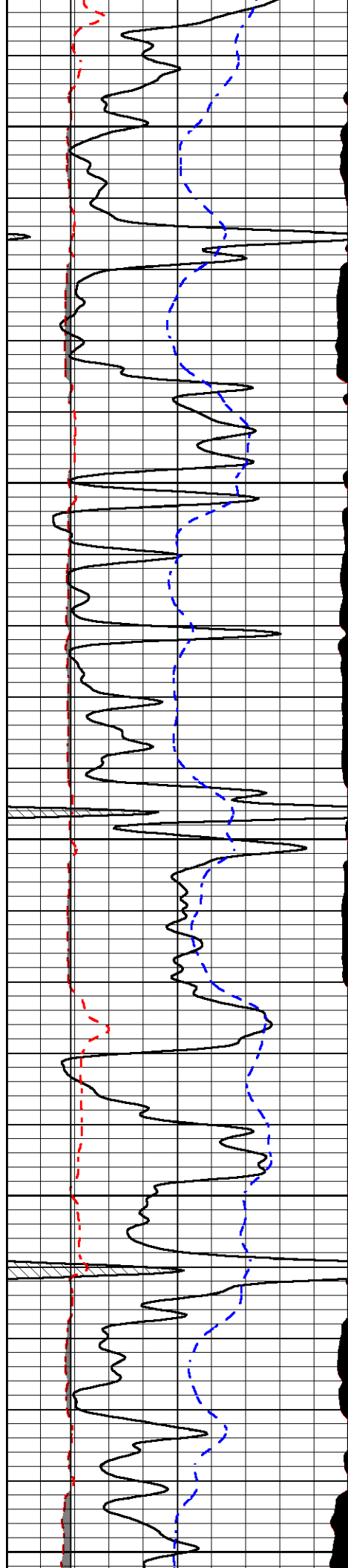
MAIN PASS

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Presentation Format micro
 Dataset Creation Thu Apr 06 08:12:33 2017
 Charted by Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	150
6	MCAL (in)	16
2.875	mcals (in)	7.875
6	Bit Size (in)	16
-200	SP (mV)	0

0	Micro Inverse 1 X 1 (Ohm-m)	40
0	Micro Normal 2" (Ohm-m)	40
10000	Line Weight (lb)	0





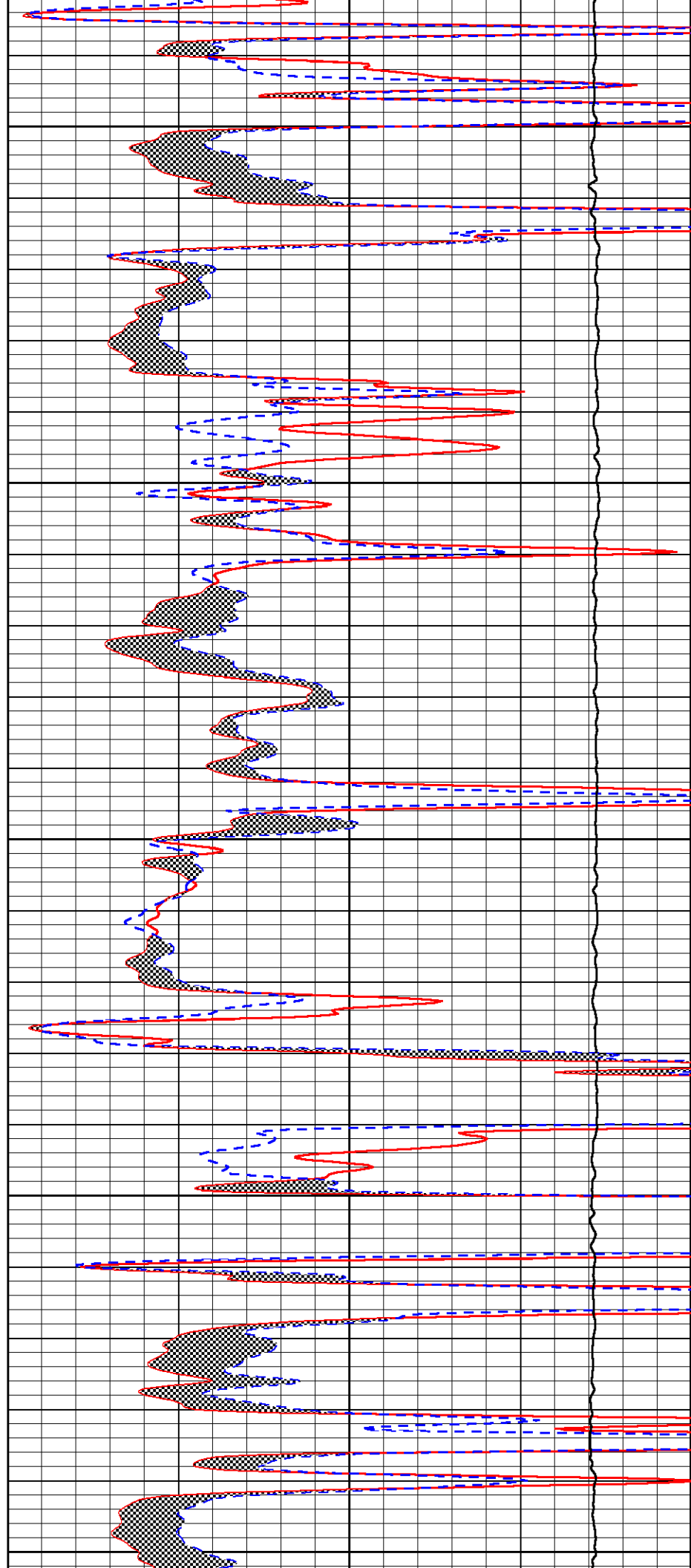
3800

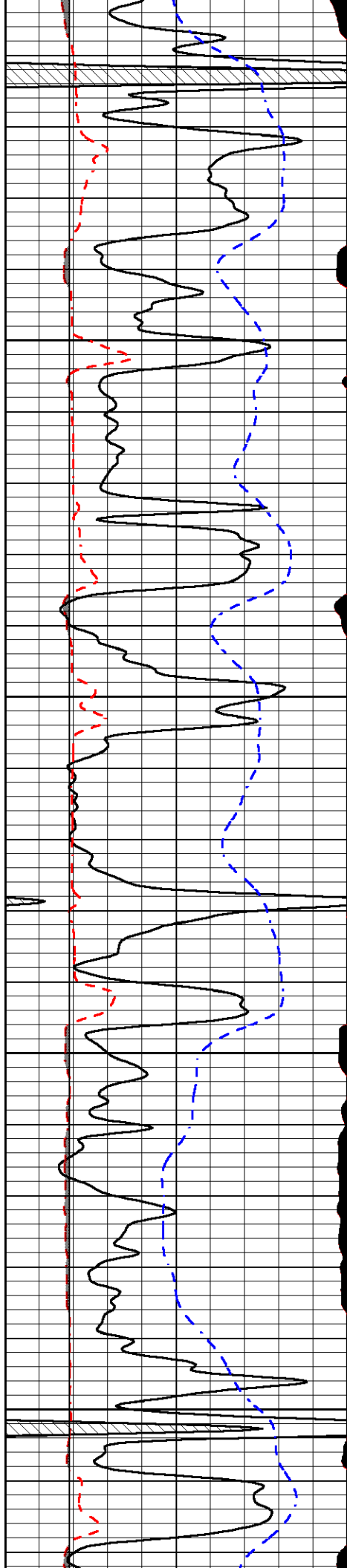
3850

3900

3950

4000



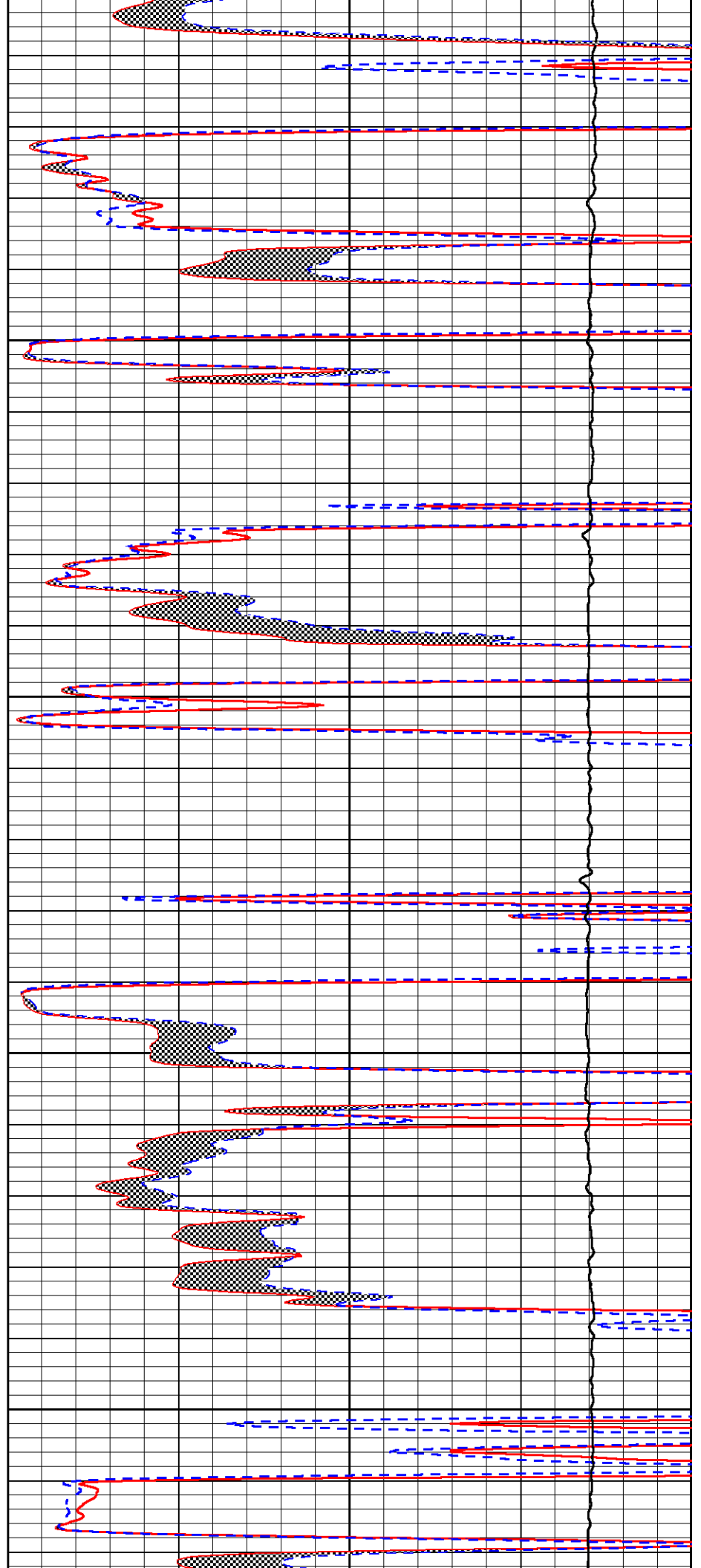


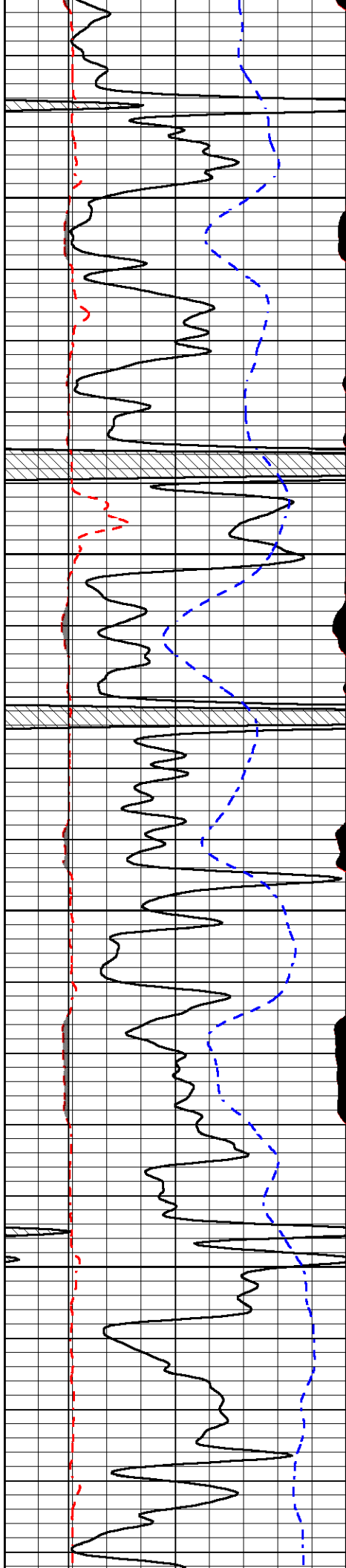
4050

4100

4150

4200



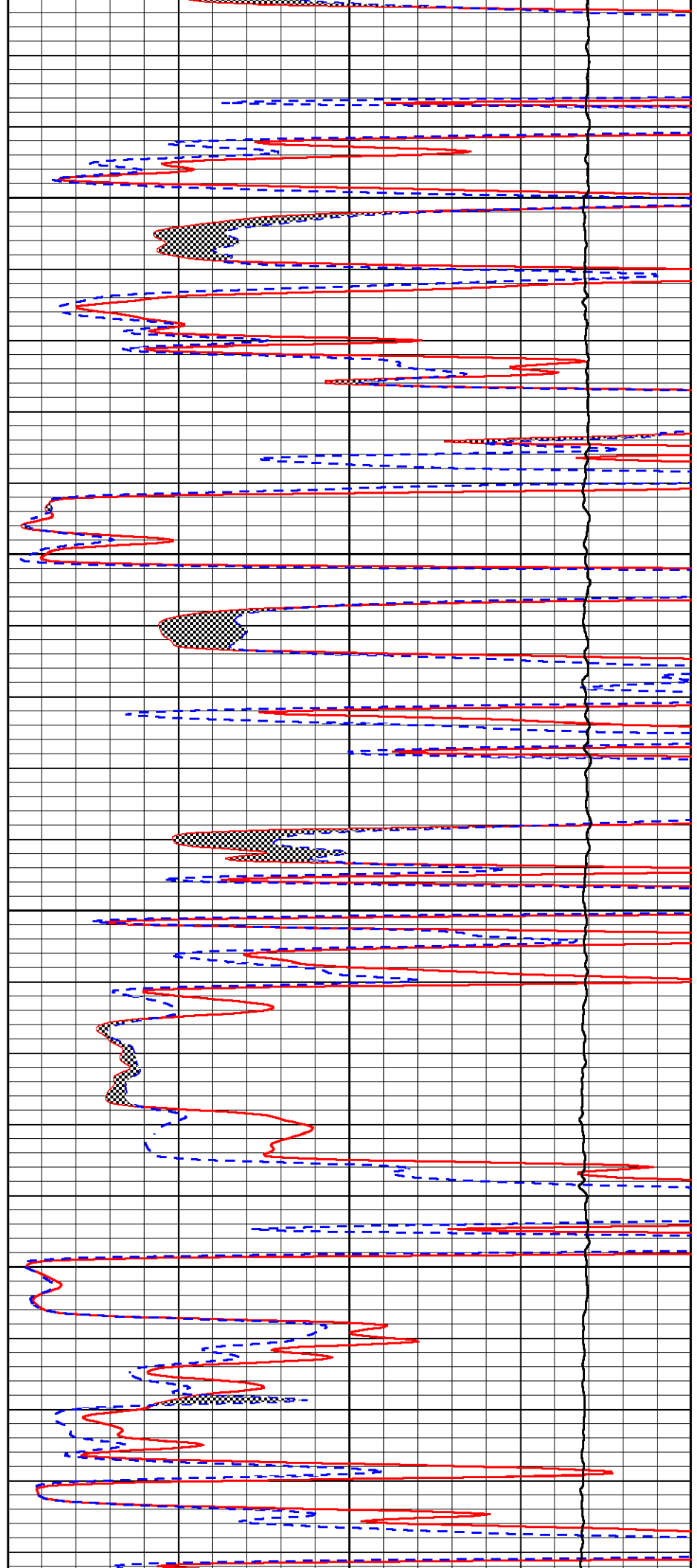


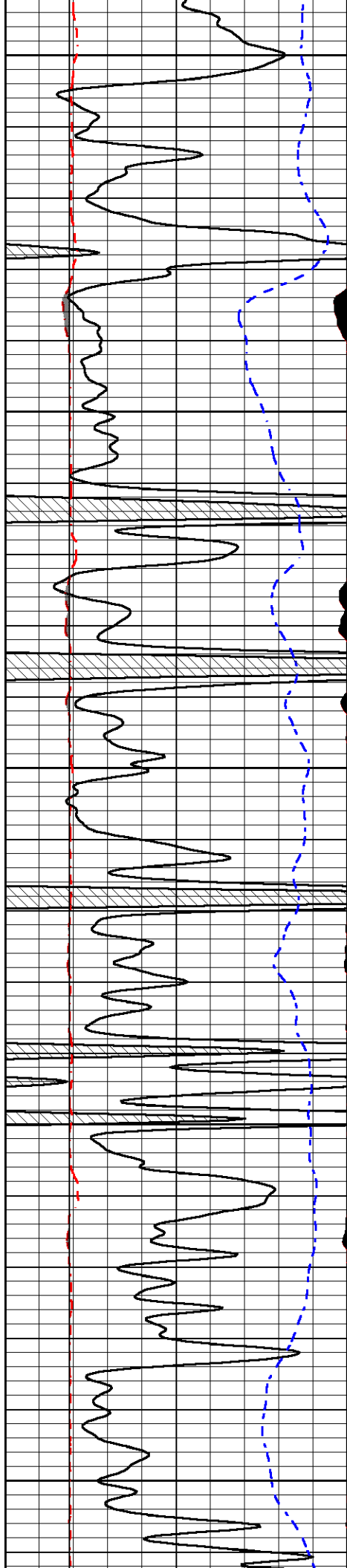
4250

4300

4350

4400





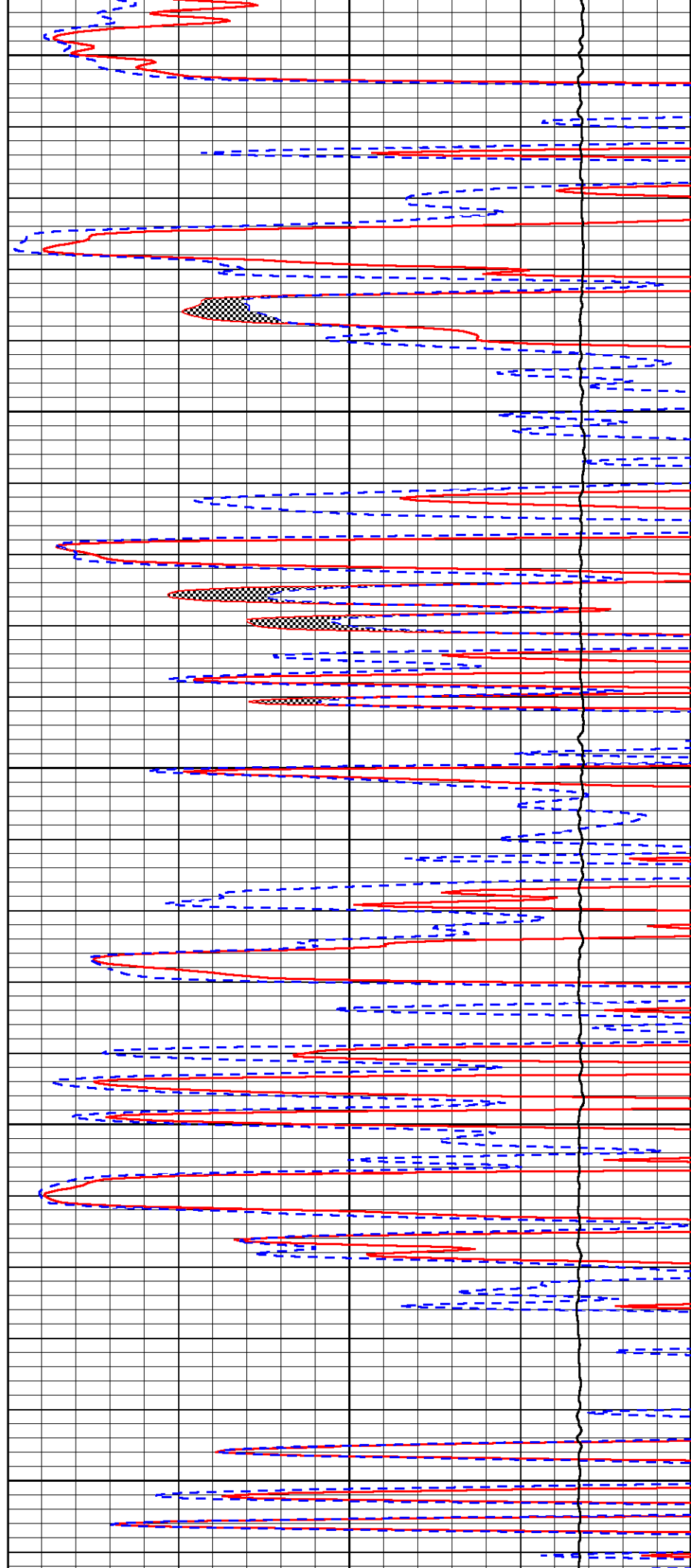
4450

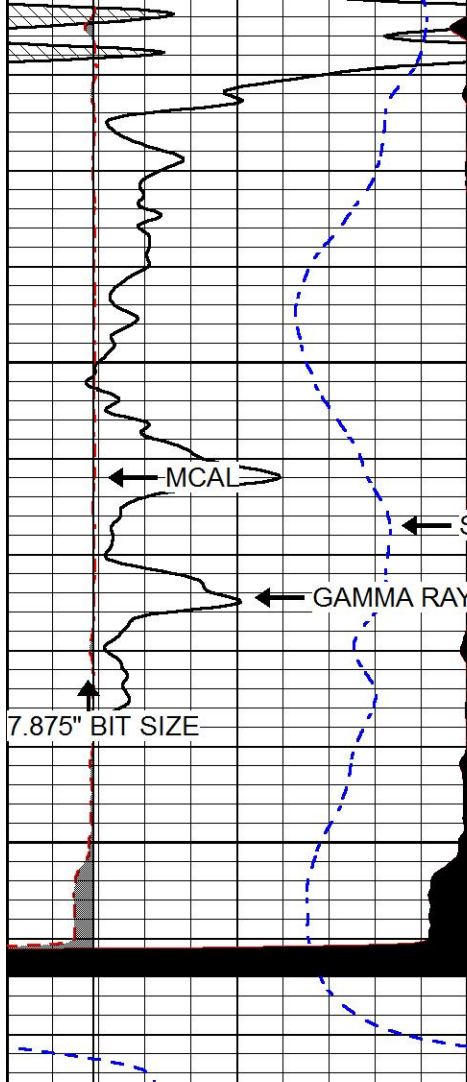
4500

4550

4600

4650

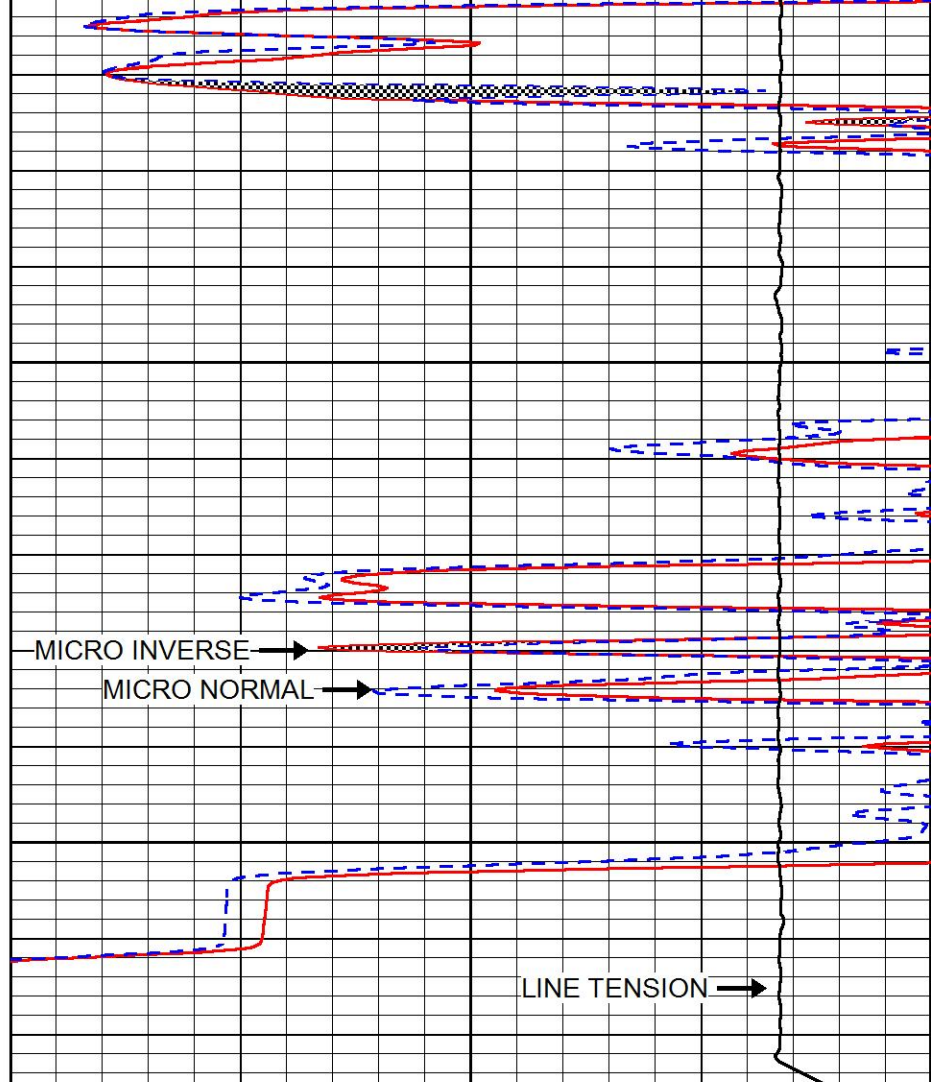




0	Gamma Ray (GAPI)	150
6	MCAL (in)	16
2.875	mcal (in)	7.875
6	Bit Size (in)	16
-200	SP (mV)	0

4700

4750



0	Micro Inverse 1 X 1 (Ohm-m)	40
0	Micro Normal 2" (Ohm-m)	40
10000	Line Weight (lb)	0

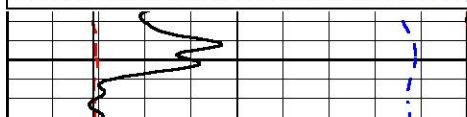


REPEAT SECTION

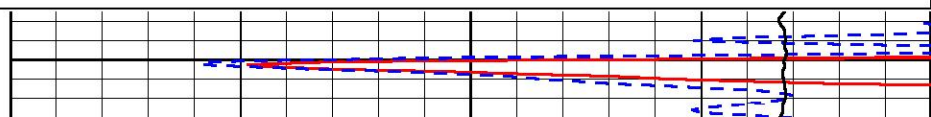
Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass2.1
 Presentation Format micro
 Dataset Creation Thu Apr 06 08:17:51 2017
 Charted by Depth in Feet scaled 1:240

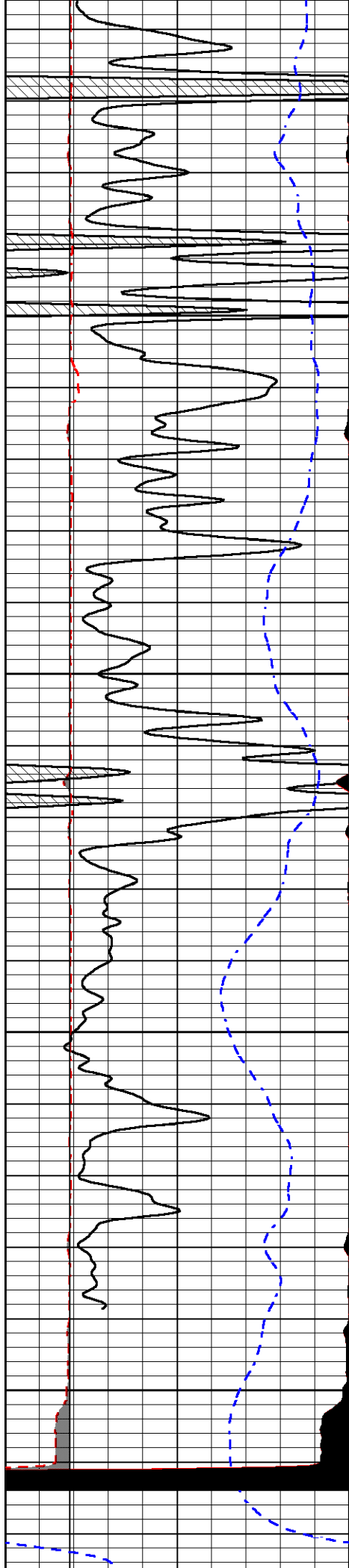
0	Gamma Ray (GAPI)	150
6	MCAL (in)	16
2.875	mcal (in)	7.875
6	Bit Size (in)	16
-200	SP (mV)	0

0	Micro Inverse 1 X 1 (Ohm-m)	40
0	Micro Normal 2" (Ohm-m)	40
10000	Line Weight (lb)	0



4550



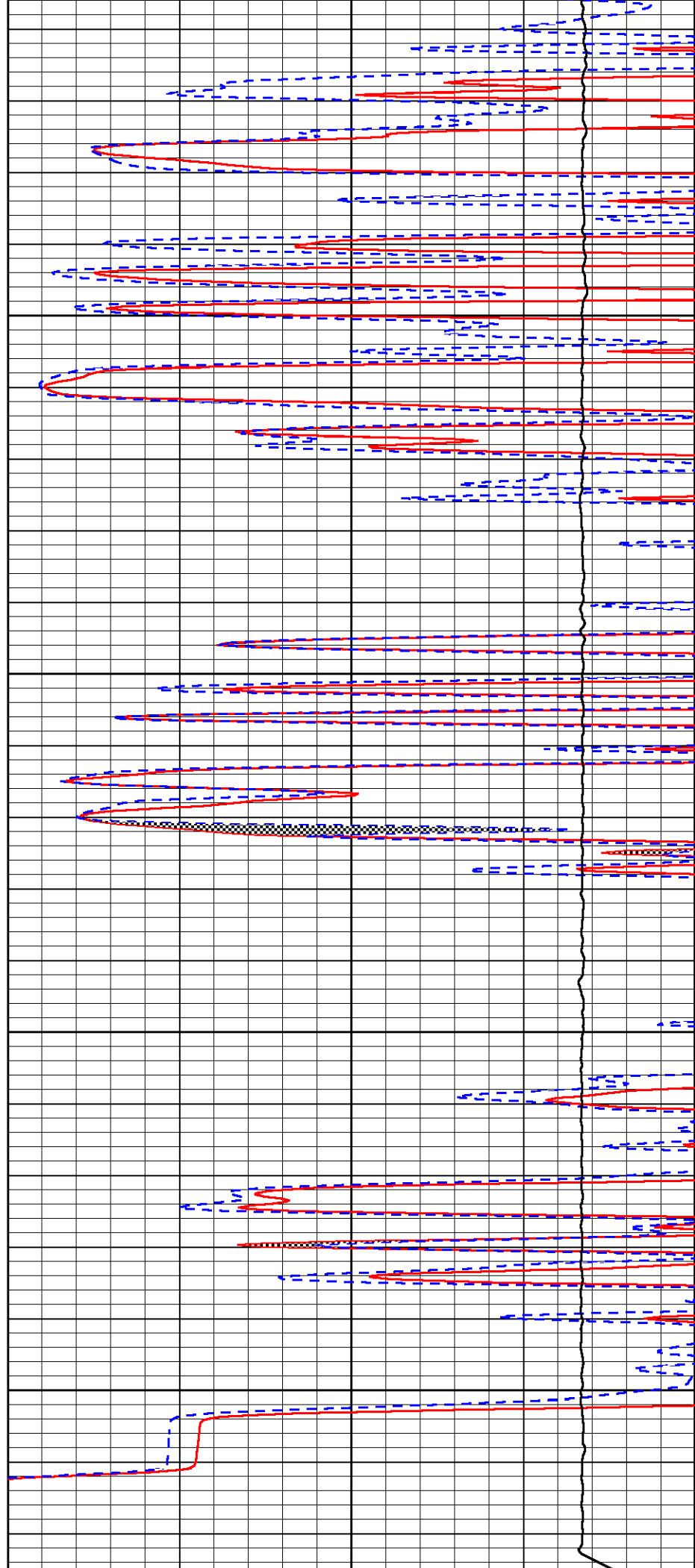


4600

4650

4700

4750



0	Gamma Ray (GAPI)	150
6	MCAL (in)	16
2.875	mcAl (in)	7.875
6	Bit Size (in)	16
-200	SP (mV)	0

0	Micro Inverse 1 X 1 (Ohm-m)	40
0	Micro Normal 2" (Ohm-m)	40
10000	Line Weight (lb)	0

Calibration Report

Database File richland oil inv_moore_22-2.db
 Dataset Pathname STKML/pass5.1
 Dataset Creation Thu Apr 06 08:12:33 2017

Dual Induction Calibration Report

Serial-Model: PSI 13-M&W
 Calibration Performed: Fri Mar 31 18:54:31 2017

Loop:	Readings		References			Results	
	Air	Loop	Air	Loop	mmho/m	Gain	Offset
Deep	166.796	835.089	0.000	255.800	mmho/m	0.500	-37.000
Medium	142.009	1348.560	0.000	255.800	mmho/m	0.440	-39.000

Microlog Calibration Report

Serial-Model: PSI-01-PSIML
 Performed: Fri Mar 31 18:41:59 2017

	Readings		References			Results	
	Zero	Cal	Zero	Cal		m	b
Normal	0.0000	1.0000	0.0000	1.0000	Ohm-m	47000.0000	-2.5000
Inverse	0.0000	1.0000	0.0000	1.0000	Ohm-m	46000.0000	-1.8000
Caliper	1.0001	1.1397	6.5000	18.5000	in	70.0000	-65.6250

Compensated Density Calibration Report

Serial-Model: 90-1031-M&W
 Source / Verifier: 16955B / 2ci
 Master Calibration Performed: Fri Mar 31 18:42:23 2017

Master Calibration

	Density		Far Detector	Near Detector	
Magnesium	1.755	g/cc	5174.18	6425.27	cps
Aluminum	2.655	g/cc	963.17	4037.42	cps
Spine Angle = 74.55			Density/Spine Ratio = 0.516		
	Size		Reading		
Small Ring	8.00	in	1.84		
Large Ring	22.00	in	1.46		

Compensated Neutron Calibration Report

Serial Number: 207 MW

Serial Number: 207-MWV
Tool Model: M&W
Calibration Performed: Fri Mar 31 10:30:30 2017

Detector	Readings	Target	Normalization
Short Space	6240.00 cps	1000.00 cps	1.6025
Long Space	460.00 cps	1000.00 cps	1.9500

Gamma Ray Calibration Report

Serial Number: 89
Tool Model: M&W
Calibration Performed: Fri Mar 31 18:42:32 2017

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps
Calibrator Reading: 1.0 cps

Sensitivity: 0.6000 GAPI/cps



PIONEER
Pioneer Energy Services

Company RICHLAND OIL INVESTMENTS, LLC
Well MOORE #22-2
Field OWEN EAST
County LOGAN
State KANSAS



STEVEN P. MURPHY, P.G.

Petroleum Geologist (KS #228)

Cell 620.639.3030

Fax 785.387.2400

RR#1, Box 69

Otis, Kansas 67565

geomurphy@gbta.net

Scale 1:240 (5"=100') Imperial
Measured Depth Log

Well Name: Moore #22-2

API: 15-109-21494-00-00

Location: Logan County

License Number: 34099

Spud Date: 3/27/2017

Surface Coordinates: 2,305' FSL & 400 FWL
22-12S-33W

Bottom Hole Vertical Well w/ minimal deviation

Coordinates:

Ground Elevation (ft): 3104'

K.B. Elevation (ft): 3114'

Logged Interval (ft): 3700'

To: TD

Total Depth (ft): RTD - 4770' LTD - 4772'

Formation: Topeka thru Mississippian

Type of Drilling Fluid: Chemical (Mudco) Reid Atkins, Mud Engineer

Region: Kansas

Drilling Completed: 4/6/2017

Printed by StripLog from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

Company: Richland Oil Investments, LLC

Address: P.O. Box 166

Palco, KS 67657

GEOLOGIST

Name: Steven P. Murphy, PG

Company: Consulting Petroleum Geologist

Address: 2501 Zarah Drive

Great Bend, KS 67530

LOG TOPS

Anhydrite Top -2586 (+528)

Anhydrite Base - (+504)

Heebner - 4011 (-897)

Toronto -4035 (-921)

Lansing - 4054 (-940)

Muncie Creek - 4201 (-1087)

Stark - 4286 (-1172)

Hushpuckney - 4321 (-1207)

Base KC - 4360 (-1246)

Marmaton - 4386 (-1272)

Pawnee - 4480 (-1366)

Myrick Station - 4522 (-1408)

Ft. Scott - 4538 (-1424)

Cherokee - 4567 (-1453)

Johnson Zone - 4612 (-1498)

Morrow Shale - 4652 (-1538)

Morrow Sst - Absent

Mississippian - 4675 (-1561)

DSTs

Drillstem testing was performed by Brandon Turley w/Trilobite Testing (Scott City Shop):

DST #1 4080-4100 ("C")

30:30:30:30

IF: Wk blow built to 1/2"

FF: Wk blow built to 1/4"

Recovery: 1' free oil, 35' WCM (80%M, 20%W)

IHP: 2039 FHP: 1952

IFP: 16-23 ISIP: 656

FHP: 23-31 FSIP: 649

BHT - 112 F

DST #2 4122-4142 ("E")

30:30:30:30

IF: Wk blow built to 1/2"

FF: Wk blow built to 1/4"

Recovery: 20' Mud w/oil spots

IHP: 2003 FHP: 1988

IFP: 15-16 ISIP: 198

FFP: 16-17 FSIP: 187

BHT - 108 F

DST #3 4214-4254 ("H&I")

30:30:30:30

IF: Wk blow built to 3/4"

FF: No blow

Recovery: 5' Mud

IHP: 2098 FHP: 2006

IFP: 16-16 ISIP: 41

FFP: 16-16 FSIP: 40

BHT - 110 F

DST #4 4250-4316 (J&K")

30:45:30:60

IF: BOB 5", BB built to 5"

FF: BOB 5", BB BOB 16"

Recovery: 1519' GIP,

124' GOCM (40%G, 10%O, 50%M); 62' MCGO (40%G, 50%O, 10%M); 155' GO (40%G, 60%O)

IHP: 2161 FHP: 2077

IFP: 19-82 ISIP: 709

FFP: 85-141 FSIP: 707

Oil Gravity - 39

BHT - 117 F

DST #5 4610-4650 (JZ)

30:45:30:60

IF: BOB 6 min, 1/2" BB

FF: BOB 4 min, 1" BB

Recovery: 996' GIP,

62' MGO (40%G, 40%O, 20%M); 58' MCGO (20%G, 50%O, 30%M)

IHP: 2368 FHP: 2269

IFP: 18-31 ISIP: 1105

FFP: 38-53 FSIP: 1103

Oil Gravity - 34

BHT - 119 F

COMMENTS

Based on the results of structural position, sample and log analysis, it was recommended that 5-1/2" production be set to produce this well.

The following zones (with recommended perforation intervals) should be perforated and treated with acid to facilitate oil production:

Johnson Zone (4614-4617) & (4650-4656)

Fort Scott (4540-4543)

Myrick Station (4525-4531)

*Pawnee (Perforate before abandoning 4484-4487)

LKC "K" (4308-4313)

LKC "I" (4255-4258)

Toronto (4038-4040)

Lwr Topeka (3968-3970)

*This was a "log show", no shows in samples

ROCK TYPES

LITHOLOGY

- Anhy
- Bent
- Brec
- Cht
- Clyst
- Coal
- Congl
- Dol
- Gyp
- Igne
- Lmst
- Meta
- Mrlst
- Salt
- Shale
- Shcol
- Shgy
- Sltst
- Ss
- Till
- Sltstn
- Shale
- Sandylms
- Lms
- Gry sh
- Dtd
- Dol
- Carb sh
- pipesymbol
- unknown lith
- Red shale

FOSSIL

- Oomoldic
- Fuss
- Algae

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MINERAL

- Silty
- Sand
- Dol
- Chlorite
- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol

- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom

STRINGER

- Red shale
- Sh
- Sandylms
- Lms
- Gryslt
- Grysh
- Dol
- Clystn
- Carbsh
- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst

- Feldspar
- Ferrpel
- Ferr
- Glau
- Gyp
- Hvymn
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff

-
-

- Sltstrg
- Ssstrg

TEXTURE

- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

OIL SHOW

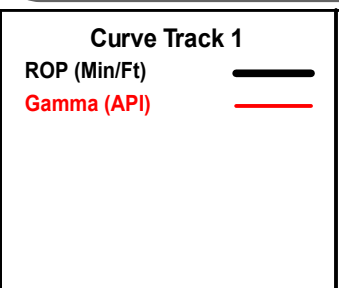
- Gas show
- Good
- Fair
- Poor
- Dead

INTERVAL

- Dst
- Core
- Dst
- Straddle test tail pipe

EVENT

- Rft
- Sidewall
- Dst
- Open hole
- Perforations



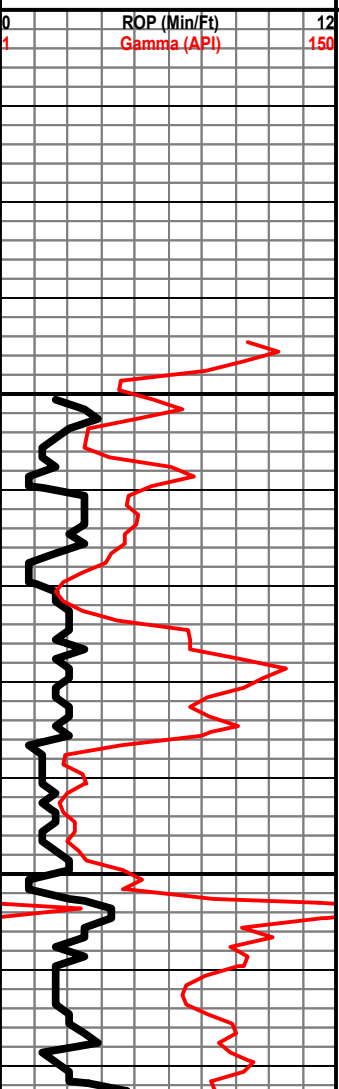
Depth

Lithology

Oil Shows

Geological Descriptions

Engineering Data



Depth

Lithology

Oil Shows

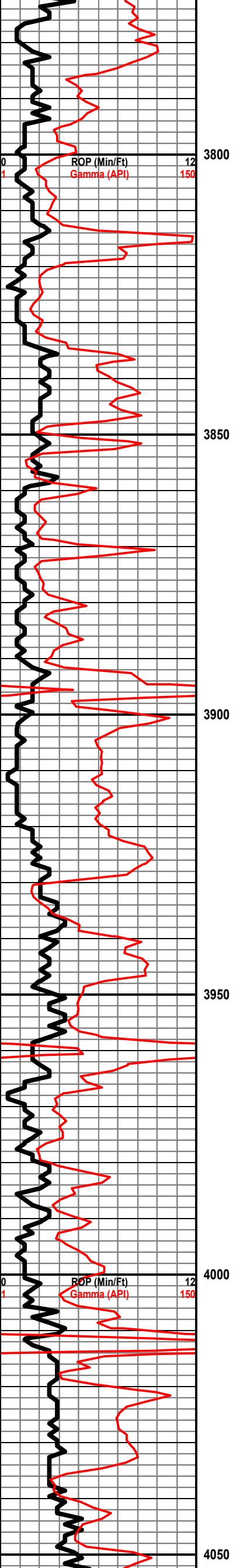
Southwind Drilling Rig #1
 MIRU 3/27/2017

Tool Pusher Larry Beavers

8-5/8" Surface Casing @
 227'

The following tops were determined based on ROP & sample examination. Please refer to the header section above for log tops & datums.

Engineering Data



LS: crm-tan, vfxln, sl foss,
sl chalky, dense, NS

LS: as above

LS: as above

SH: blk, gry, red

LS: wht-tan, fxlIn, sl ool,
chalky, dense, NS (shaley)

LS: as above

LS: crm-tan, fxlIn, dense, sl
chalky, w/abund
red-gry-grn-blk shale

LS: tan-gry, vfxln, dense,
chalky, NS

LS: wht-crm-tan, fxlIn, pr-fr
ppt por, ssfo on brk, spotty
stn, sl odor

SH: blk, carb

LS: wht-tan-gry, vfxln,
dense, sl chalky, NS

SH: blk, carb

HEEBNER 4011 (-897)

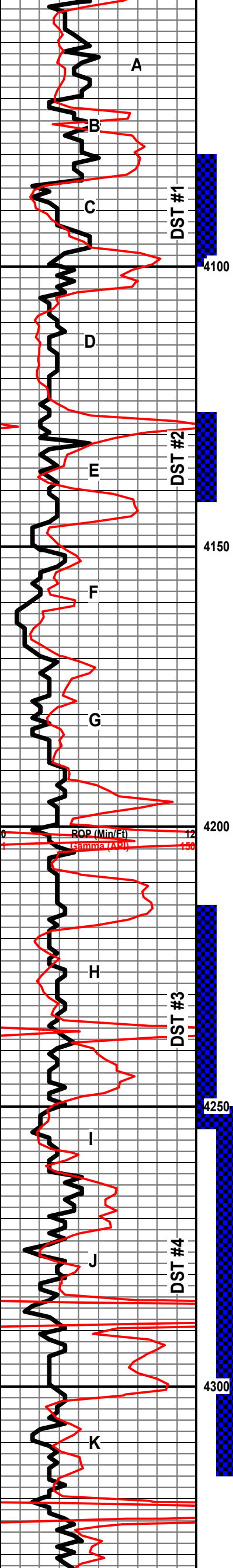
SH: blk-gry-grn-red

LS: wht-tan, vfxln, chalky,
dense, NS

TORONTO 4032 (-918)

SH: gry-grn-blk

Wiper Trip @ 3990'



LS: wht, vfxln, ool in pt, vssfo on brk, dk spotty stn, sl odor

LS: wht, vfxln, dense, NS

SH: gry-grn-brn

LS: wht, fxlIn, ool, fr-gd ppt & vug por, fsfo, spotty stn, str odor

SH: gry-grn-brn-red

LS: wht-tan, vfxln, dense, ool in pt, tr fo on brk, v. spotty stn, no odor (mostly barren)

LS: wht-tan, vfxln, dense, chalky, NS

SH: gry-grn-brn-red

LS: wht-tan, fxlIn, sl ool, fsfo, even lite stn, fr-gd vug & intxln por, fr odor

SH: gry-blk-grn-red

LS: wht-tan, vfxln, dense, chalky, NS

SH: blk-gry

LS: wht-tan-brn, vfxln, dense, ool in pt, cherty, NS

LS & CHT: as above

SH: blk, carb MUNCIE CRK 4200 (-1086)

LS: wht-brn-gry, f-vfxln, mostly dense, rare pr inxln por, vssfo, spotty stn, str odor

LS: wht-tan, fxlIn, sl foss, fr inxln por, ssfo, even sat stn, str odor

LS: as above

SH: blk-gry-grn-brn

LS: wht-tan, fxlIn, sl foss & ool, pr inxln por, vssfo, spotty stn, sl odor

LS: wht-tan-gry, vfxln, dense, cherty, NSFO, fr odor

SH: blk, carb STARK 4285 (-1177)

LS: crm-brn-gry, vfxln, dense, cherty, NSFO, str odor

LS: wht-tan-gry, fxlIn, rare ppt por, vssfo, rare spotty stn, str odor

SH: blk, dk gry HUSH 4319 (-1205)

LS: wht-tan-gry, vfxln, dense, chalky, cherty, NS

DST #1 4080-4100 ("C")
 30:30:30:30
 IF: Wk blow built to 1/2"
 FF: Wk blow built to 1/4"
 Recovery: 1' free oil, 35' WCM (80%M, 20%W)
 IHP: 2039 FHP: 1952
 IFP: 16-23 ISIP: 656
 FHP: 23-31 FSIP: 649
 BHT - 112 F

CFS @ 4100'
 Strap - 0.84' long to board

CFS @ 4122'

CFS @ 4142'

DST #2 4122-4142 ("E")
 30:30:30:30
 IF: Wk blow built to 1/2"
 FF: Wk blow built to 1/4"
 Recovery: 20' Mud w/oil spots
 IHP: 2003 FHP: 1988
 IFP: 15-16 ISIP: 198
 FFP: 16-17 FSIP: 187
 BHT - 108 F

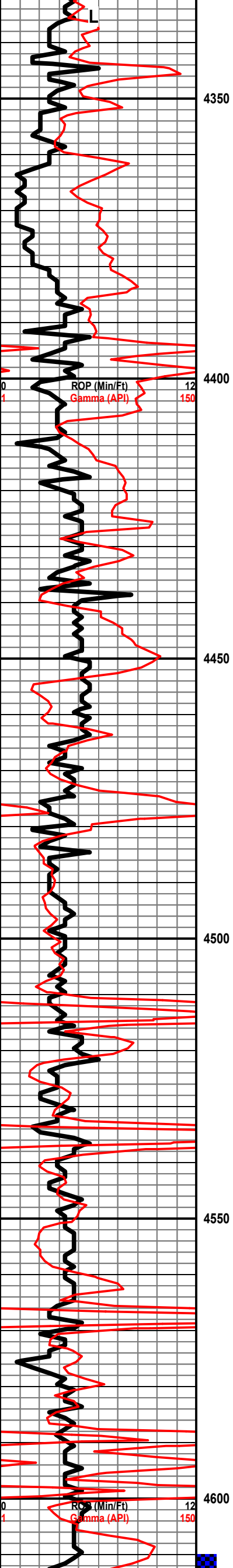
DST #3 4214-4254 ("H&I")
 30:30:30:30
 IF: Wk blow built to 3/4"
 FF: No blow
 Recovery: 5' Mud
 IHP: 2098 FHP: 2006
 IFP: 16-16 ISIP: 41
 FFP: 16-16 FSIP: 40
 BHT - 110 F

CFS @ 4230'

CFS @ 4254'

CFS @ 4280'

CFS @ 4316'
 DST #4 4250-4316 (J&K")
 30:45:30:60
 IF: BOB 5", BB built to 5"
 FF: BOB 5", BB BOB 16"
 Recovery: 1510' GIP



dense, sl chalky, cherty, NS

LS: as above

SH: blk-brn-grn-gry

SH: gry-grn

SH: as above

LS: crm-tan, vfxln, dense, chalky, NS

LS: wht-tan-gry, vfxln, dense, chalky, NS

LS: crm-brn-gry, vfxln, dense, NS

LS: crm-gry, f-vfxln, mostly dense, 1 pc ssfo on brk, spotty dk stn, no odor

SH: gry-red

LS: tan-gry, vfxln, dense, NS

LS: as above

LS: as above

SH: blk-gry-grn

SH: blk-gry

LS: wht-tan-gry, vfxln, dense, cherty, sl chalky, NS

LS: as above

LS: as above

SH: blk, carb

LS: tan-brn-gry, vfxln, dense, trfo on brk, sl odor (mostly barren)

LS: wht-tan-brn, vfxln, dense, ool in pt, vssfo on brk, slight spotty stn, sl odor (mostly barren)

LS: tan-gry, vfxln, dense, NS

SH: blk, carb

LS: crm-tan-brn, vfxln, dense, pelletal in pt, NS

LS: as above

SH: blk

SH: blk

BKC 4353 (-1239)

MARMATON 4387 (-1273)

PAWNEE 4484 (1370)

MYRICK STA 4523 (-1409)

FT SCOTT 4536 (-1422)

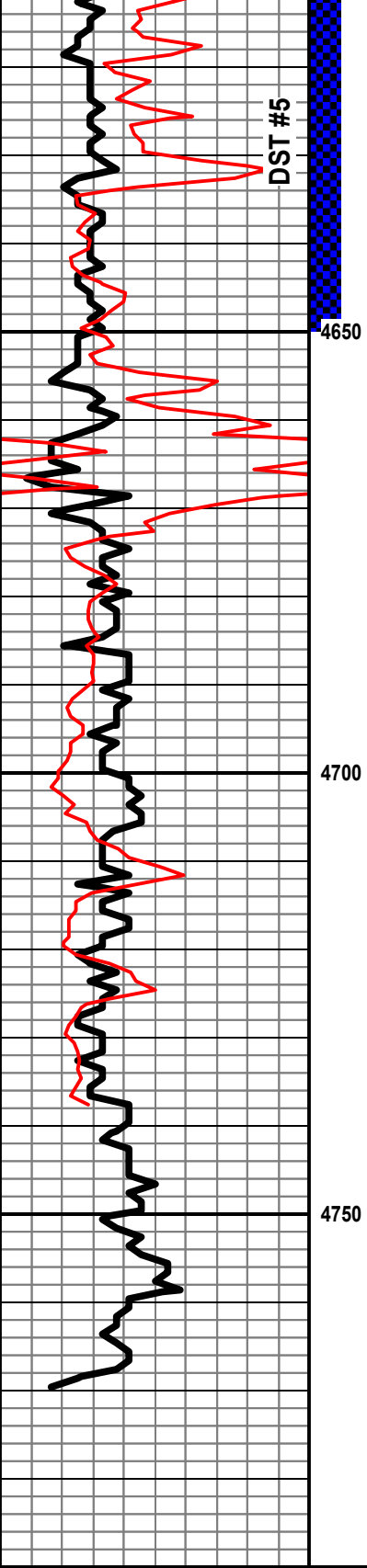
CHEROKEE 4575 (-1461)

Recovery: 1519 GIP,
124' GOCM (40%G, 10%O,
50%M); 62' MCGO (40%G,
50%O, 10%M); 155' GO
(40%G, 60%O)
IHP: 2161 FHP: 2077
IFP: 19-82 ISIP: 709
FFP: 85-141 FSIP: 707
Oil Gravity - 39
BHT - 117 F

CFS @ 4540'

CFS @ 4566'

DST #5 4610-4650 (JZ)
30:45:30:60
IF: BOB 6 min, 1/2" BB
FF: BOB 4 min, 1" BB



LS: crm-tan, fxlIn, mostly dense, rare ppt por, vssfo on brk, spotty stn, str odor

JOHNSON ZN 4616 (-1502)

Recovery: 996' GIP,
62' MGO (40%G, 40%O, 20%M); 58' MCGO (20%G, 50%O, 30%M)
IHP: 2368 FHP: 2269
IFP: 18-31 ISIP: 1105
FFP: 38-53 FSIP: 1103
Oil Gravity - 34
BHT - 119 F
CFS @ 4650'

LS: tan-brn, fxlIn, fr ppt & vug por, ssfo, fr stn, str odor

LS: as above

LS: tan-brn, vfxln, dense, NS

SH: blk-gry-grn, silty

SH: as above

SH: as above w/some rd qtz conglom & abund cht

SH & CHT: as above

MISS 4686 (-1572)

LS: crm-tan-gry, vfxln, v. dense, chalky, sl pelletal, NS (1 pc clr qtz sst, NS)

LS: as above

LS: tan-brn-gry, vfxln, v. dense, sl chalky, abund chert, NS

LS: as above

LS: as above

LS: wht-tan, vfxln, dense, chalky, abund chert, NS

LS: as above, shaley

RTD - 4770'

LTD - 4772'



PIONEER

Pioneer Energy Services

CEMENT BOND LOG WITH GAMMA RAY

Comp. RICHLAND OIL INVESTMENTS, LLC
 Well MOORE NO.22-2
 Field OWEN EAST
 Co. LOGAN
 State KANSAS

Company RICHLAND OIL INVESTMENTS, LLC
 Well MOORE NO.22-2
 Field OWEN EAST
 County LOGAN State KANSAS

Location: 2305' FSL & 400' FWL
 SEC 22 TWP 12S RGE 33W
 Permanent Datum GROUND LEVEL Elevation 3104'
 Log Measured From KELLY BUSHING 10' Above GL
 Drilling Measured From KELLY BUSHING
 Other Services
 Elevation
 K.B. 3114'
 D.F. N/A
 G.L. 3104'

Date of Service	4/20/2017			
Run Number	ONE			
Depth Driller or P8TD	4770'			
Depth Logger	4724'			
Bottom Log Interval	4723'			
Top Log Interval	3200'			
Open Hole Size	7.875"			
Type Fluid	WATER			
Fluid Level	FULL			
Fluid Density	N/A			
Max. Recorded Temperature	124 DEG F.			
Max. Wellhead Pressure	0 PSI			
Wellhead Connection	N/A			
Estimated Cement Top	3400'			
Unit Number	18			
Wireline Size	5/16"			
Location	COLBY, KS			
Recorded By	M. HISS			
Witnessed By	PRESTON DRIELING			
Tubing Record	Size	WV/Ft	Top	Bottom
Surface Casing	8.625"		00'	227'
Production Casing	5.5"		00'	TD
Liner Record				

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not 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.

Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.
 OAKLEY,
 WEST ON OLD 40 TO 400 RD,
 7 SOUTH TO WAGON RD, 3 WEST TO 370, 1 1/2 SOUTH,
 EAST & SOUTH INTO.

THANK YOU FOR USING PIONEER ENERGY SERVICES!

Your Pioneer Energy Services Crew Engineer: M. HISS Operator: D. WALKER Operator: Operator:	Tool Data - Services Serial Number
---	---------------------------------------


Log Variables

DatabaseC:\ProgramData\Warrior\Data\richlandoilinvestments_moore#22-2_cbl.db
 Dataset field/well/run1/pass5/_vars_

Top - Bottom

PPT usec 0	CASEWGHT lb/ft 15.5	MAXAMPL mV 0	MINAMPL mV 1	MINATTN db/ft 0.8	SRFTEMP degF 0	CASETHCK in 0
CASEOD in 5.5	PERFS 0	TDEPTH ft 4724	BOTTEMP degF 124	BOREID in 7.875		

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			CENT-Probe Probe Centralizer	2.83	2.75	20.00
WVFS8	11.63		RBT-Probe (4.5040904) Probe Radii Bond Tool with Digital Telemetry	8.75	2.75	107.00
WVFS7	11.63					
WVFS6	11.63					
WVFS5	11.63					
WVFS4	11.63					
WVFS3	11.63					
WVFS2	11.63					
WVFS1	11.63					
WVFCAL	11.63					
WVF3FT	11.63					
WVF5FT	10.63					
			CENT-Probe Probe Centralizer	2.83	2.75	20.00
CCL	3.63					

GR	2.30		GR_CCL-Tiger (TigerProbe)	4.54	2.75	50.00
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Dataset: richlandoilinvestments_moore#22-2_cbl.db: field/well/run1/pass5
 Total length: 18.96 ft
 Total weight: 197.00 lb
 O.D.: 2.75 in

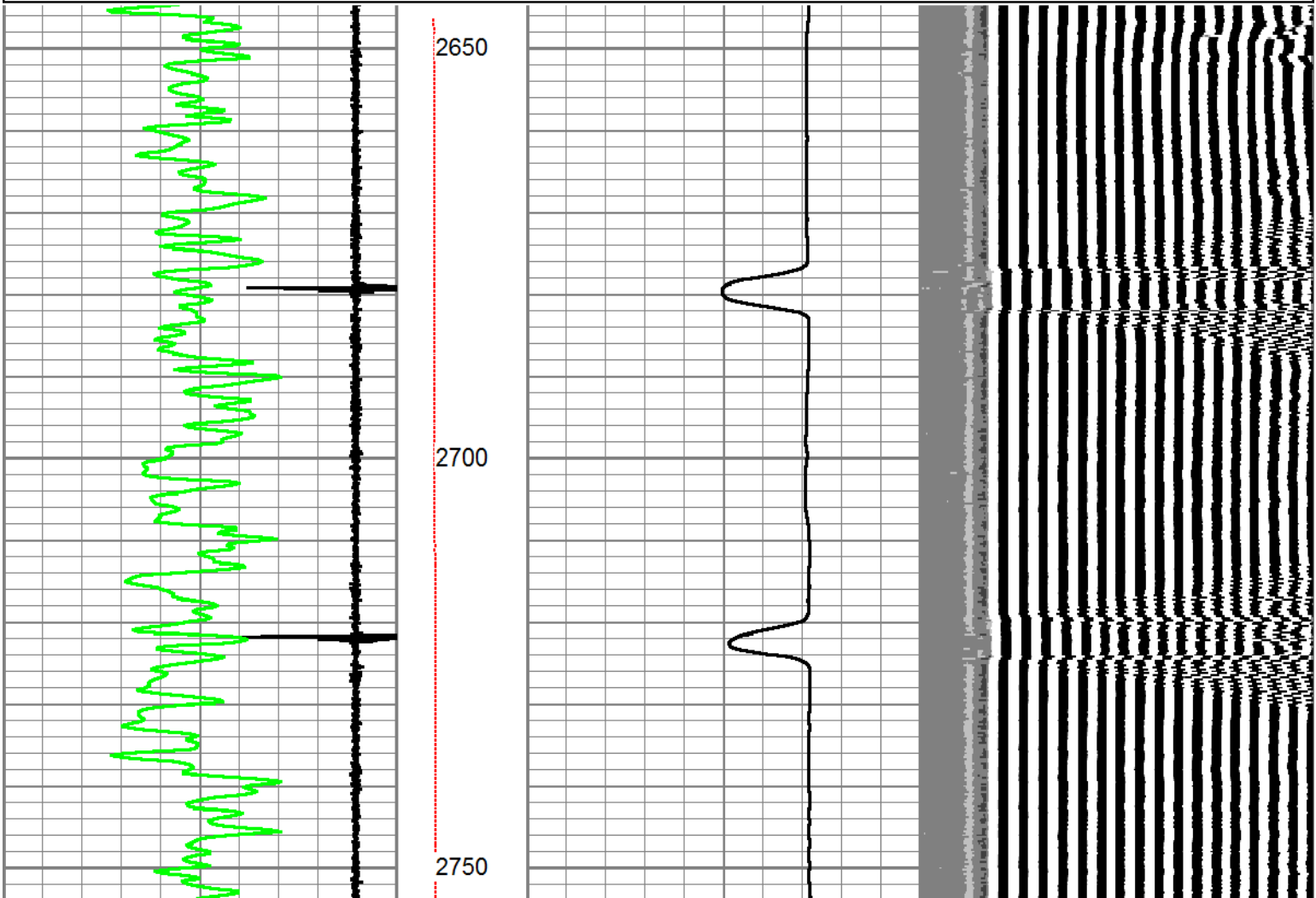


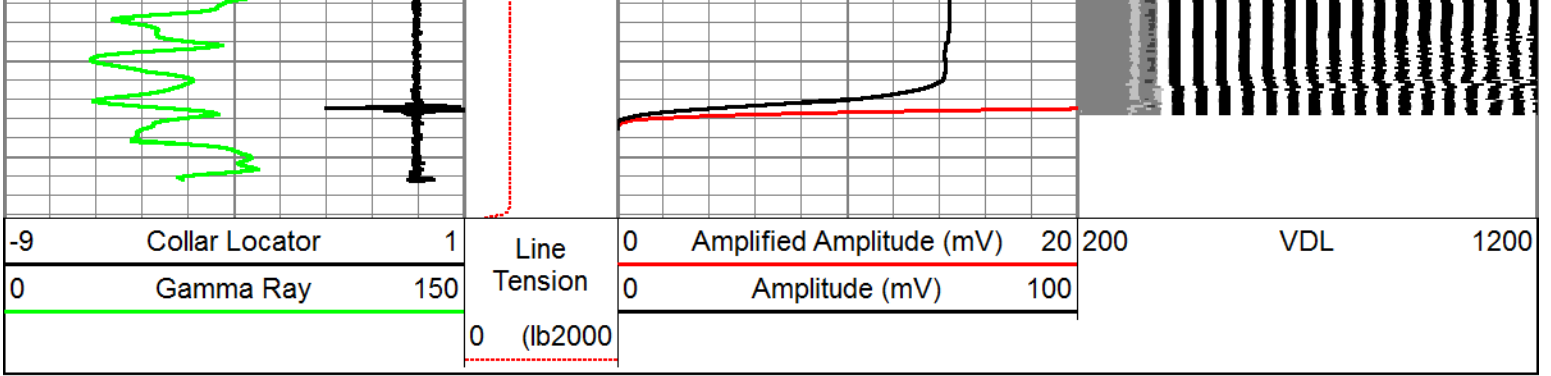
FREE PIPE SECTION

ZERO PSI APPLIED AT SURFACE

Database File	richlandoilinvestments_moore#22-2_cbl.db
Dataset Pathname	pass2
Presentation Format	pinr_cbl-gr-ccl_1
Dataset Creation	Thu Apr 20 08:44:54 2017
Charted by	Depth in Feet scaled 1:240

-9	Collar Locator	1	Line Tension	0	Amplified Amplitude (mV)	20	200	VDL	1200
0	Gamma Ray	150		0	Amplitude (mV)	100			
			0 (lb2000)						

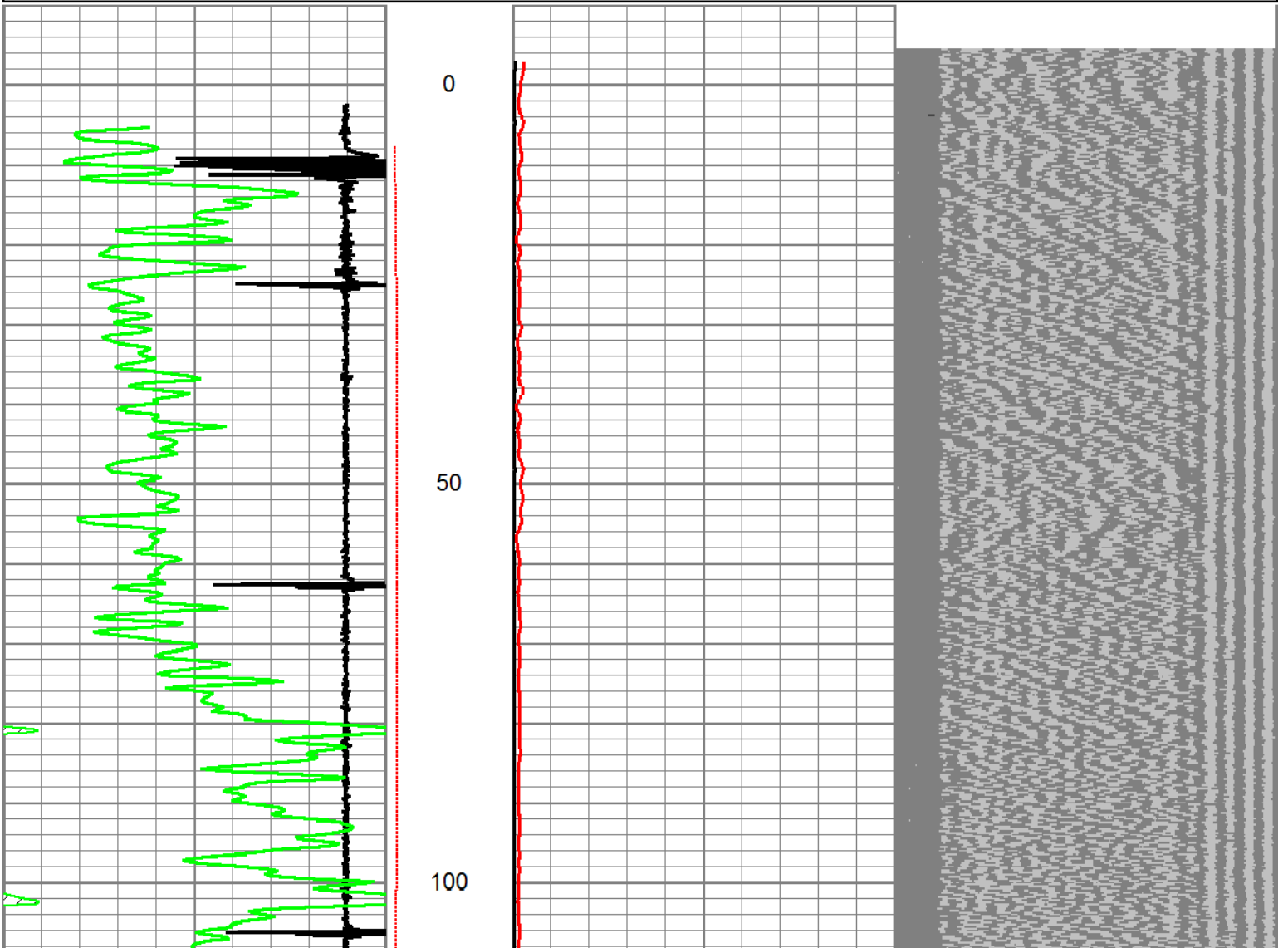
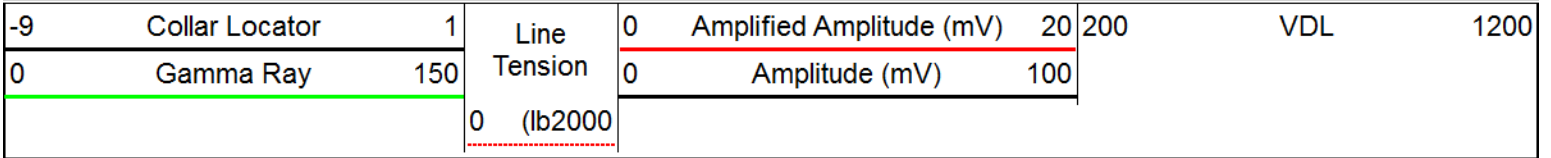


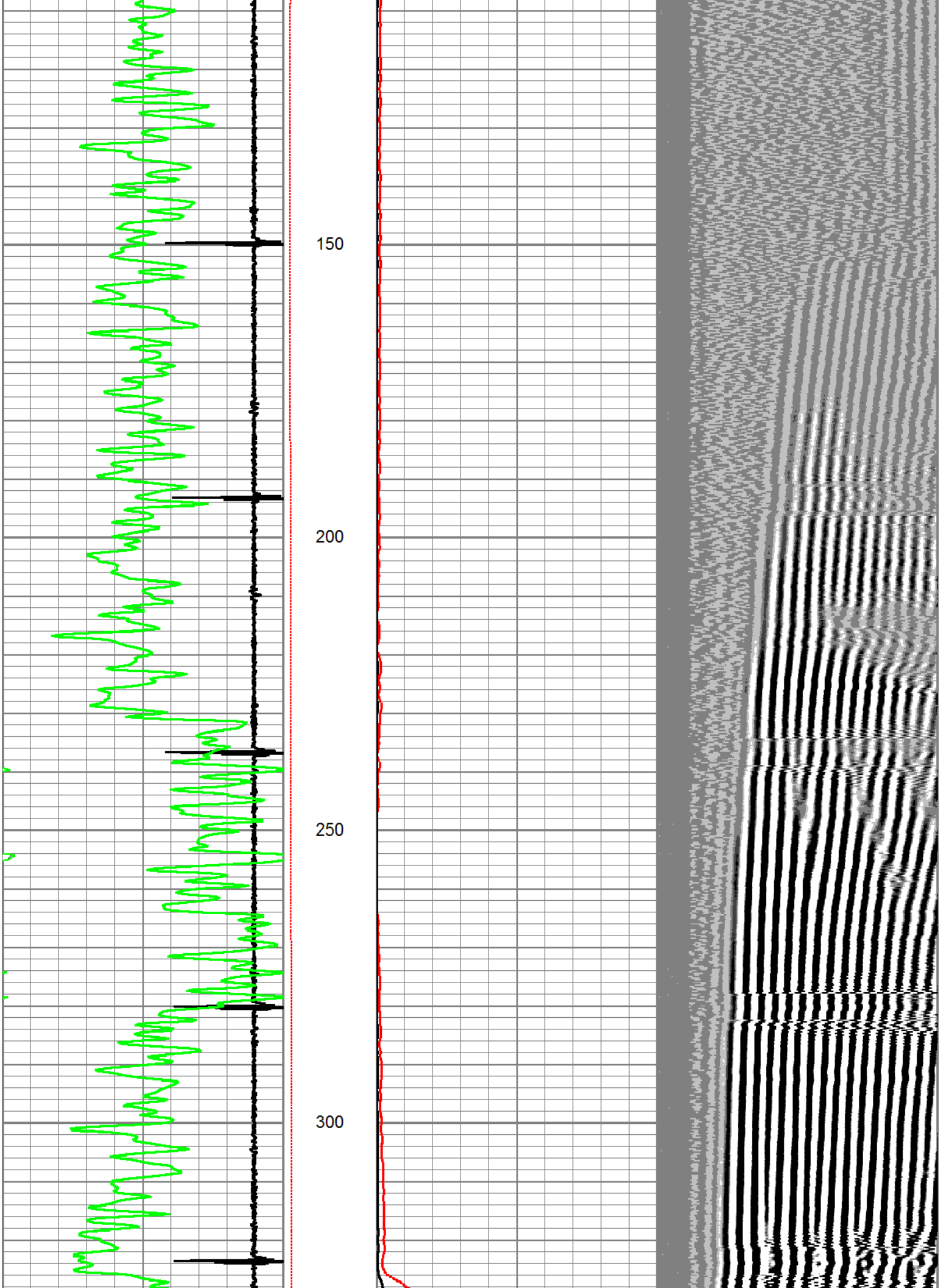


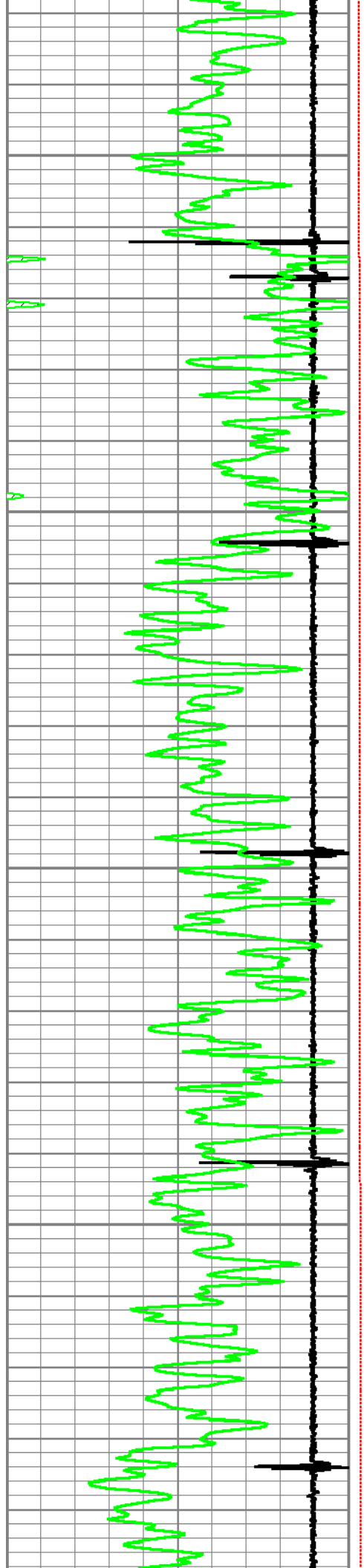
MAIN LOG

DV TOOL @ 2592'

Database File	richlandoilinvestments_moore#22-2_cbl.db
Dataset Pathname	pass6
Presentation Format	pinr_cbl-gr-ccl_1
Dataset Creation	Thu Apr 20 09:33:53 2017
Charted by	Depth in Feet scaled 1:240





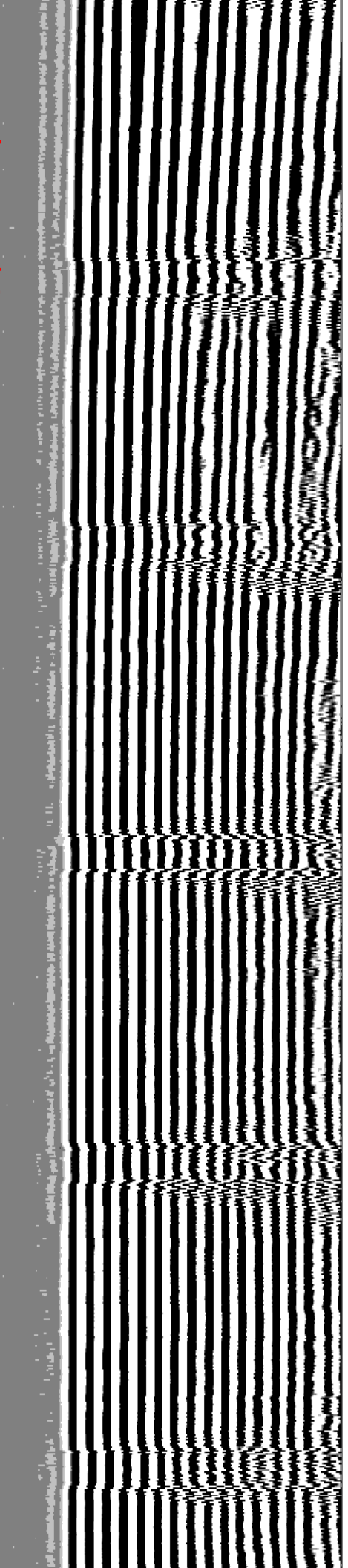
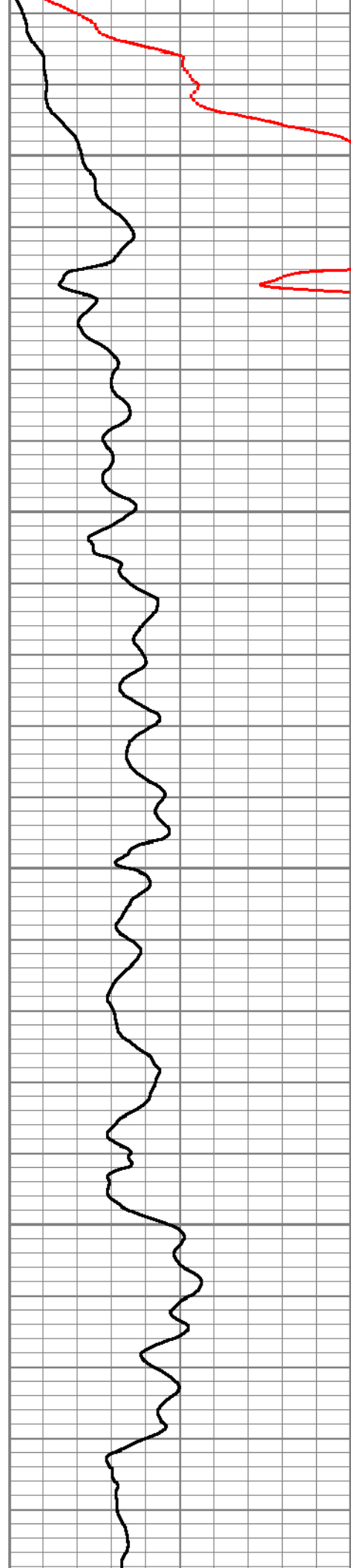


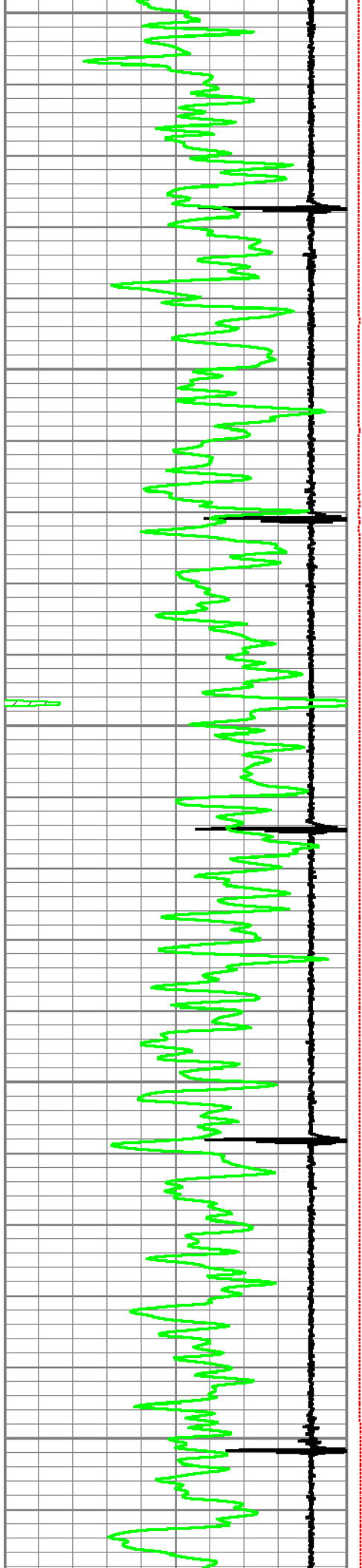
350

400

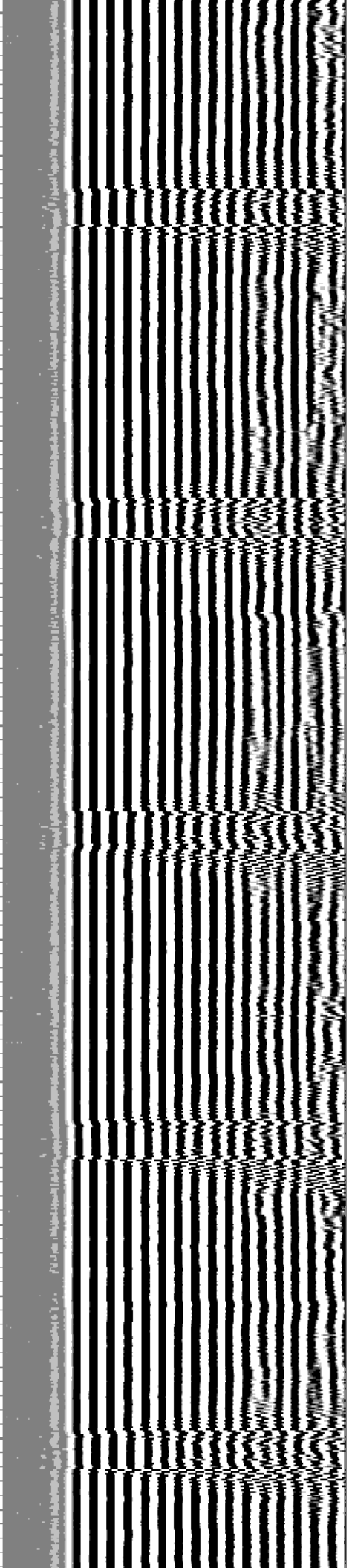
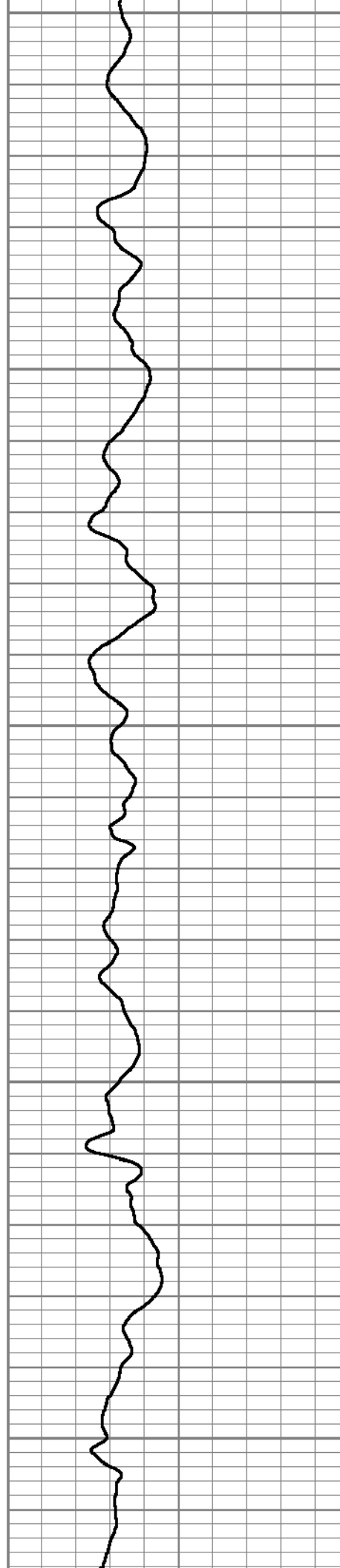
450

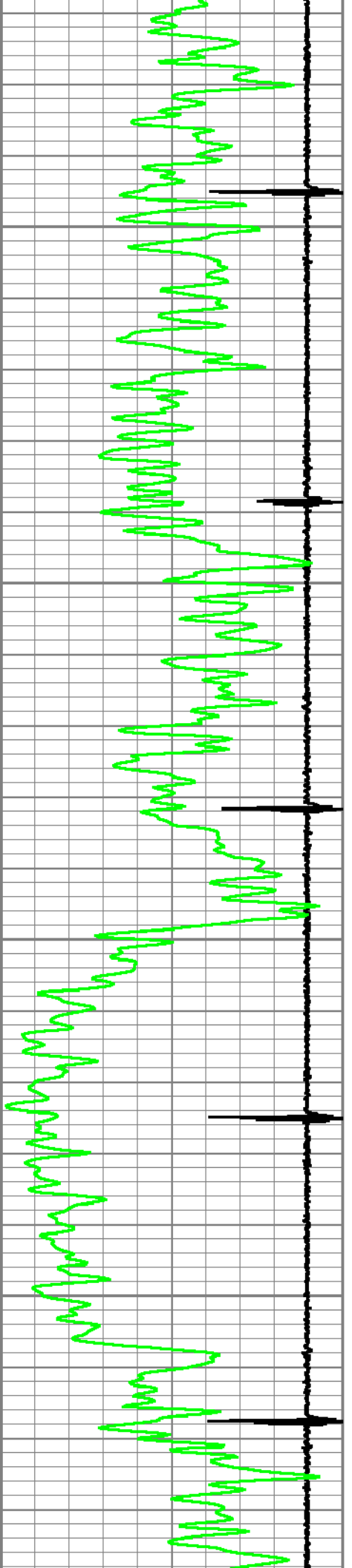
500





550
600
650
700
750



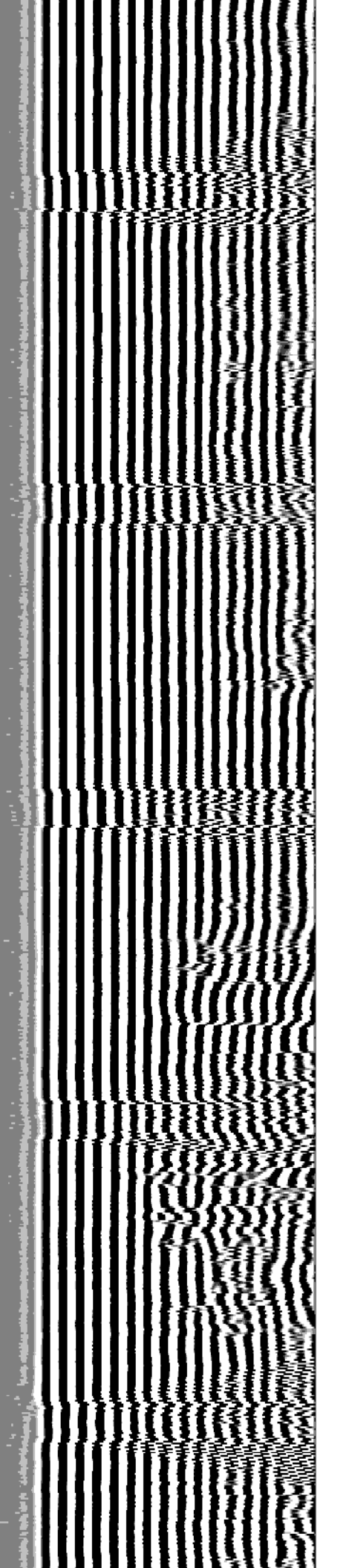
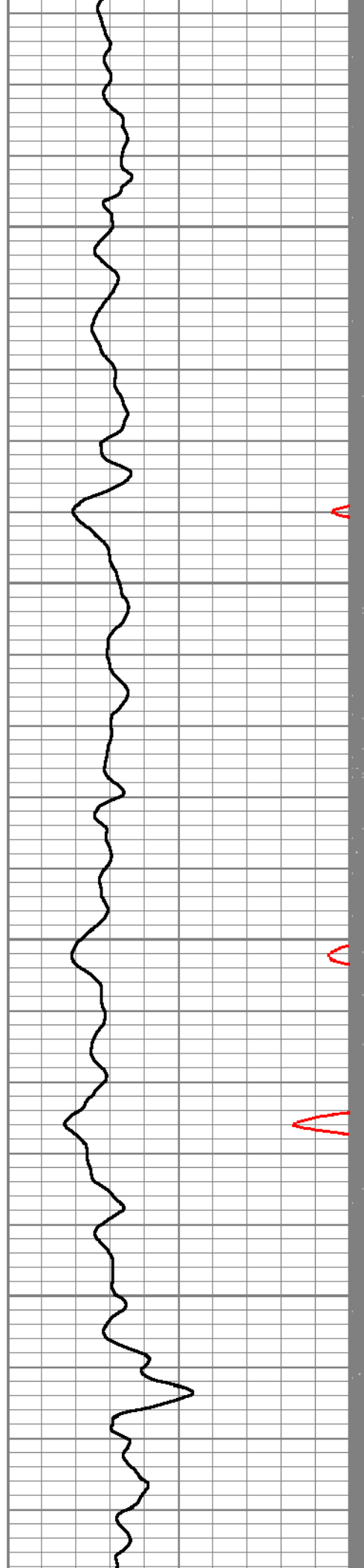


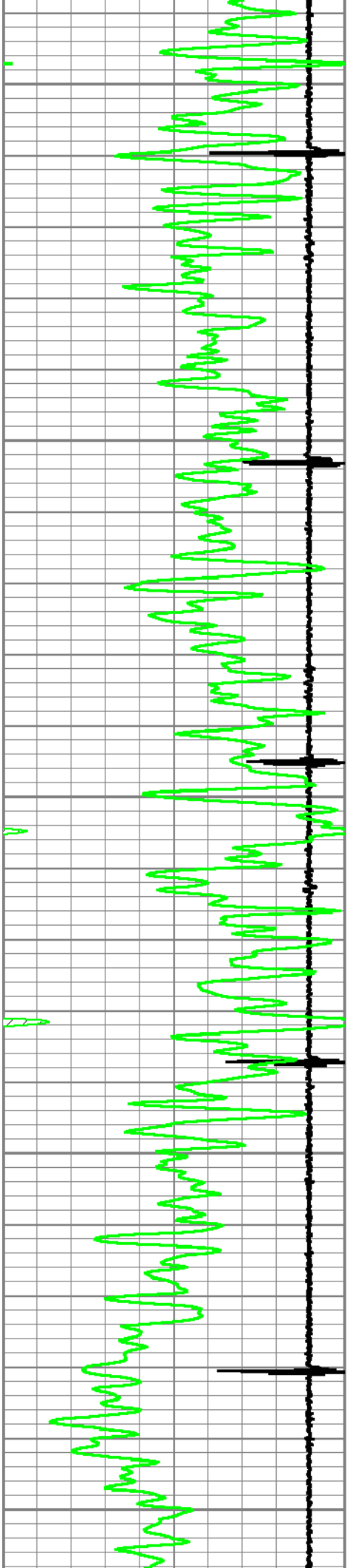
800

850

900

950





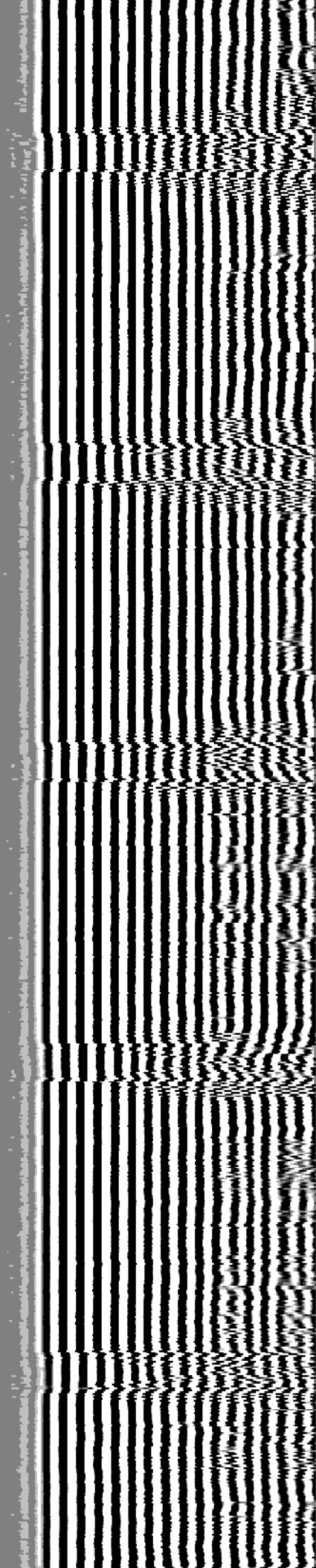
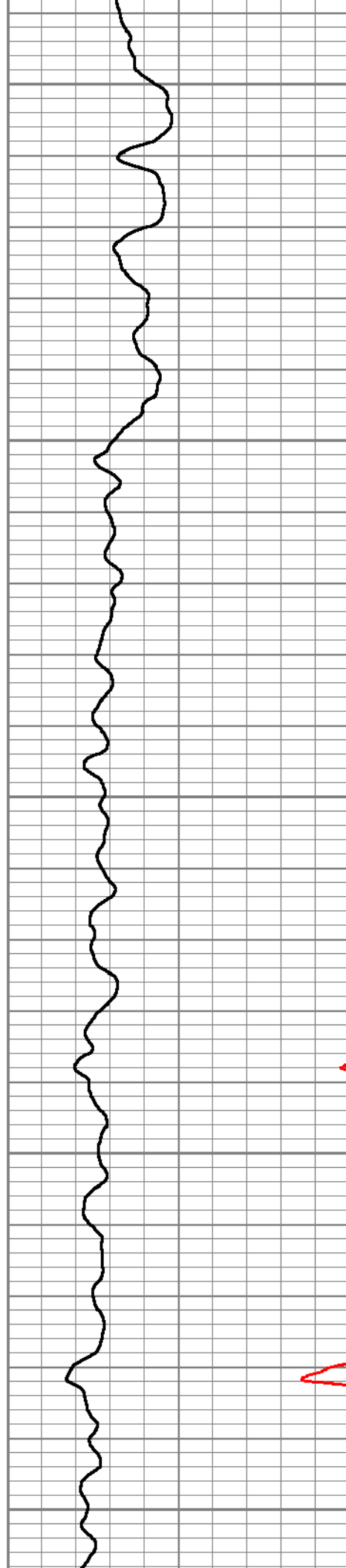
1000

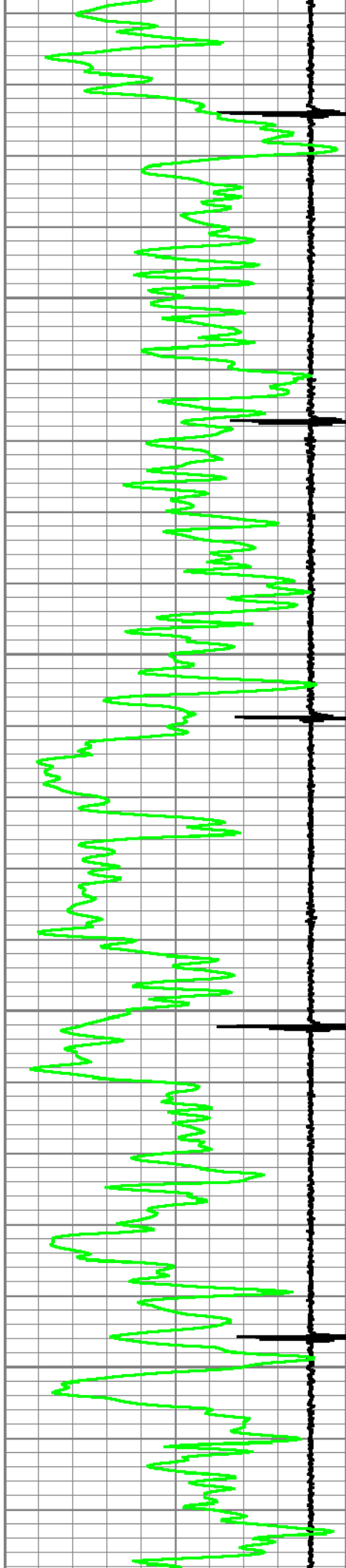
1050

1100

1150

1200



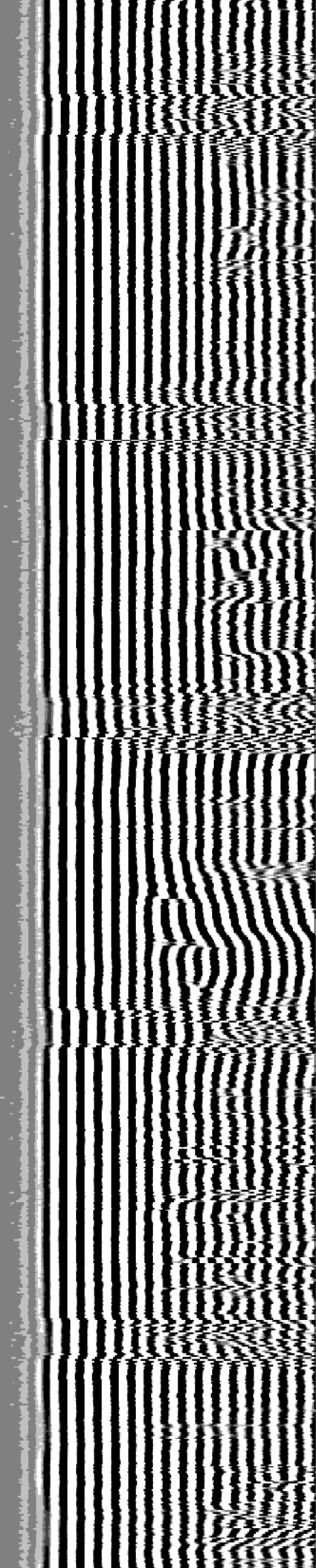


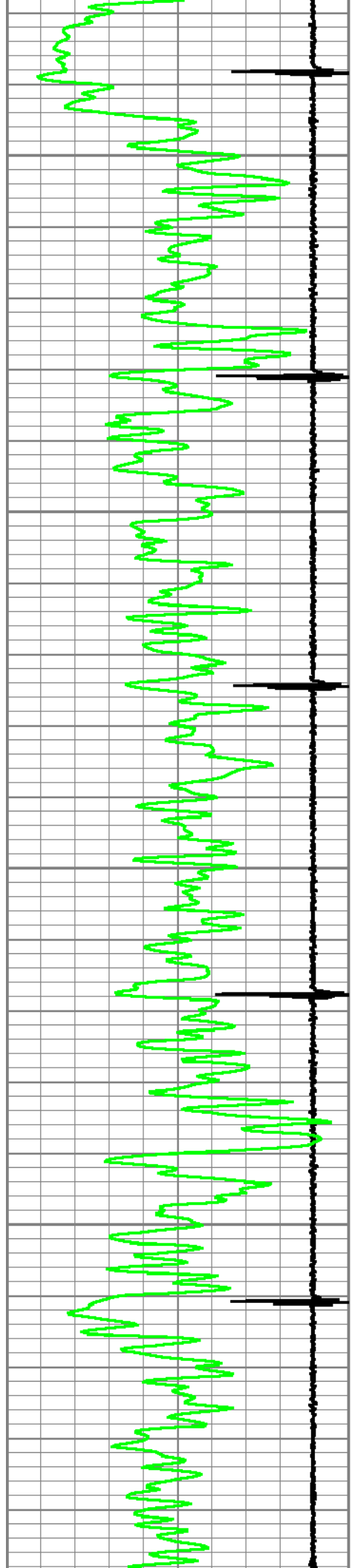
1250

1300

1350

1400



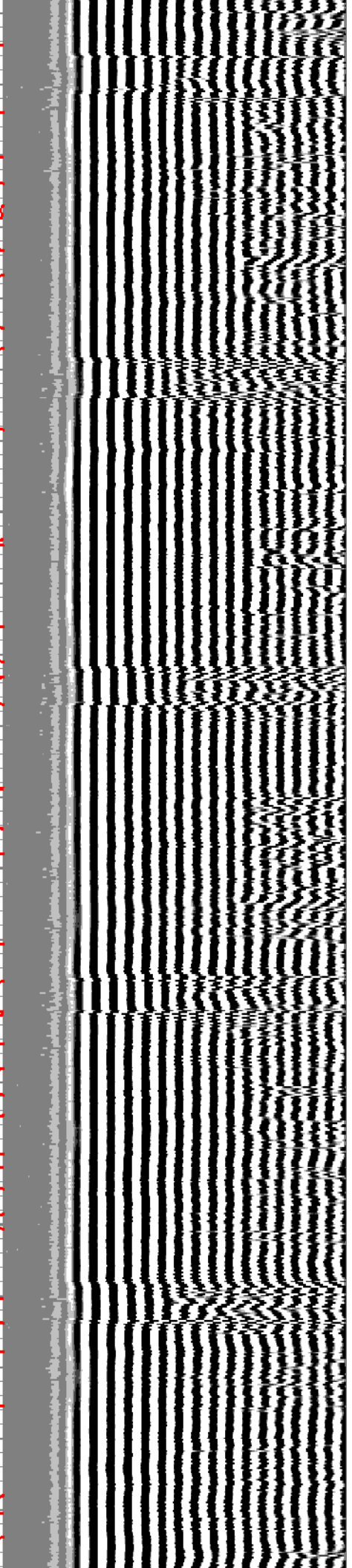
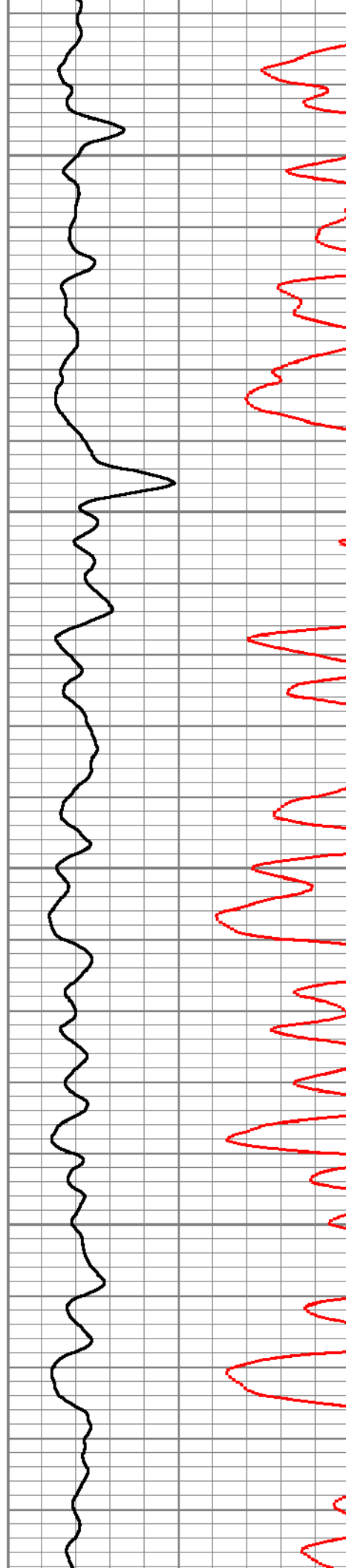


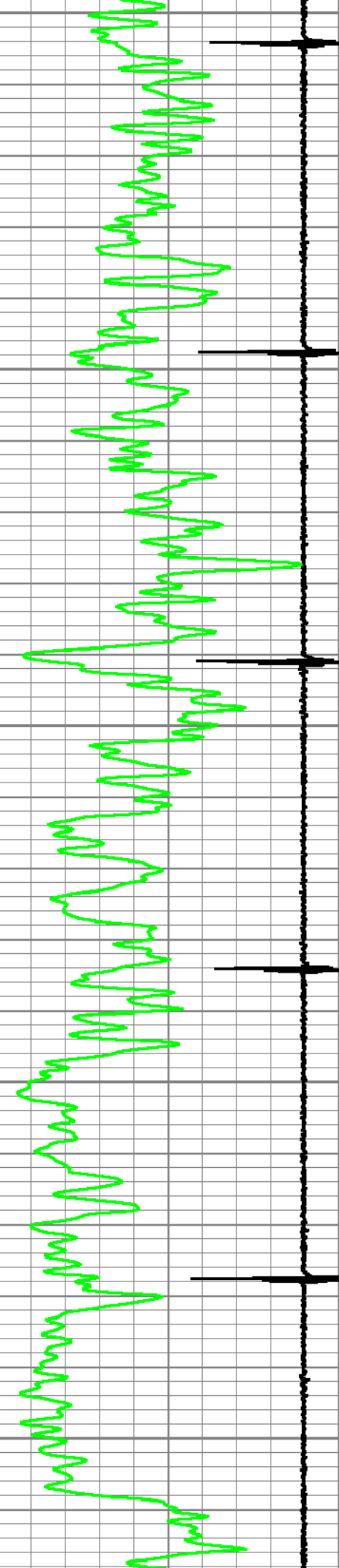
1450

1500

1550

1600





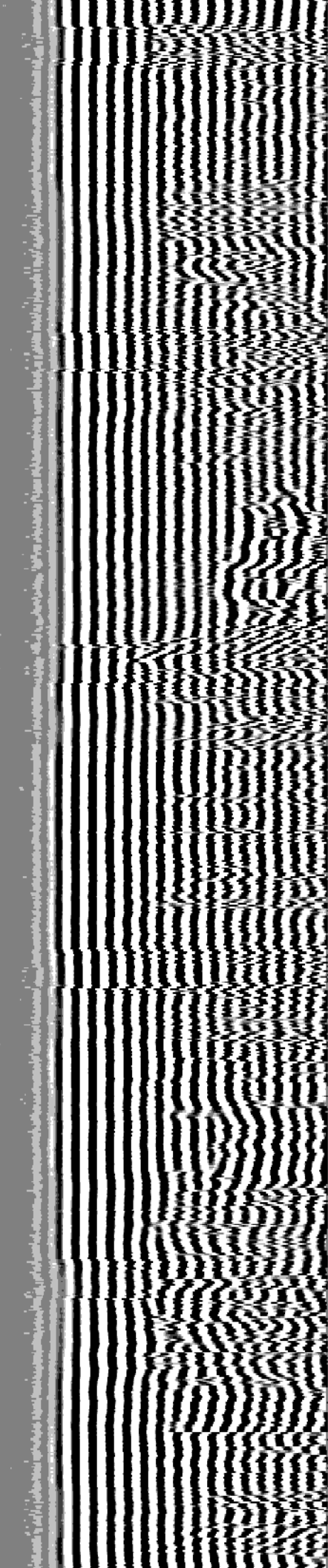
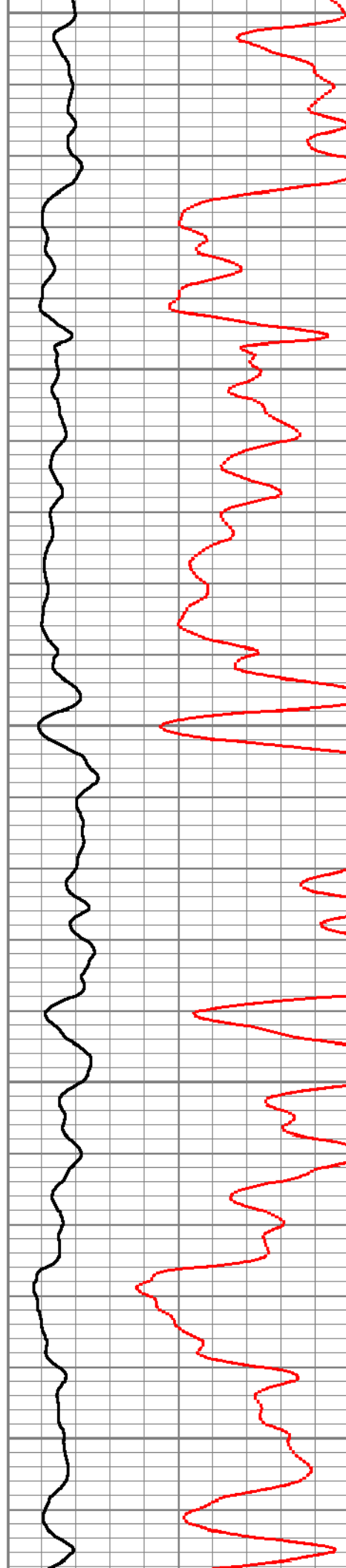
1650

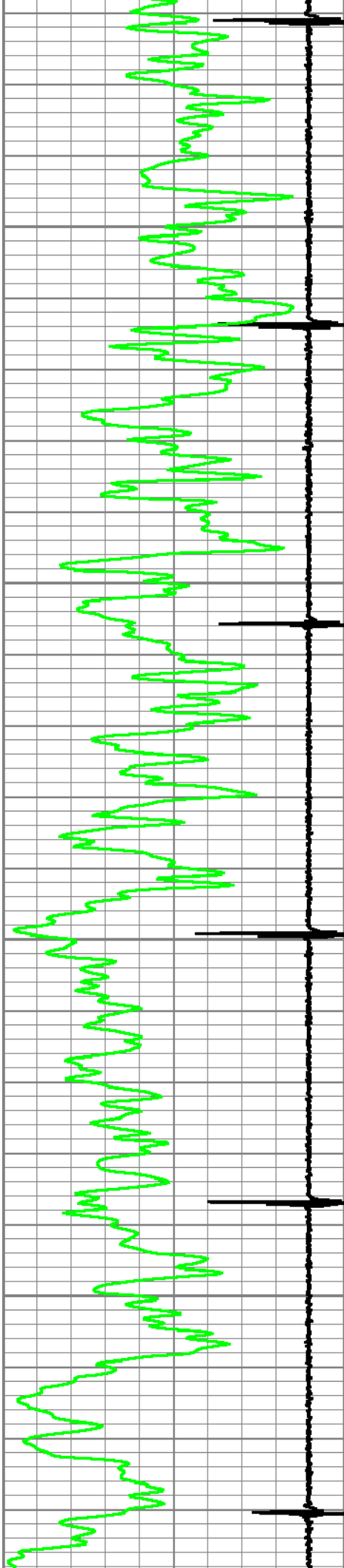
1700

1750

1800

1850



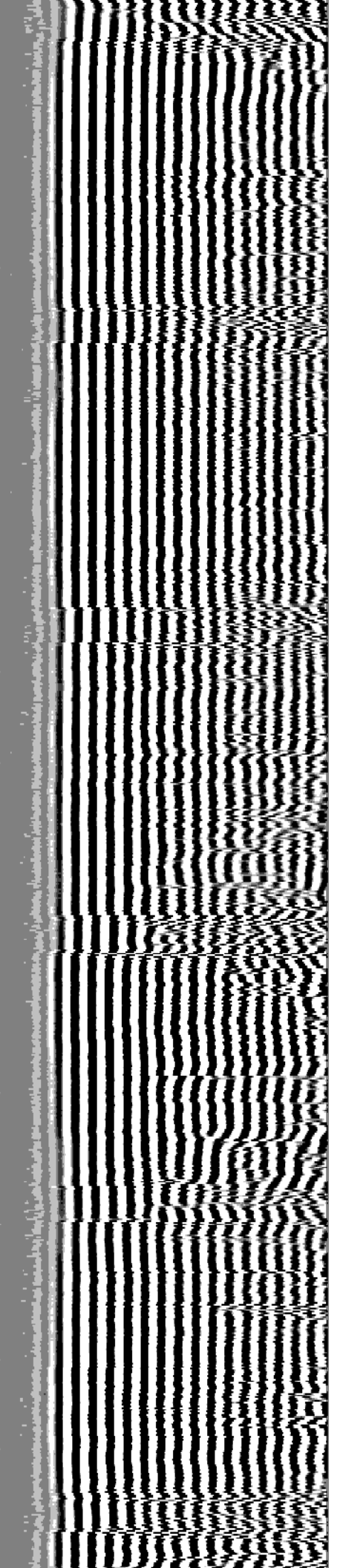
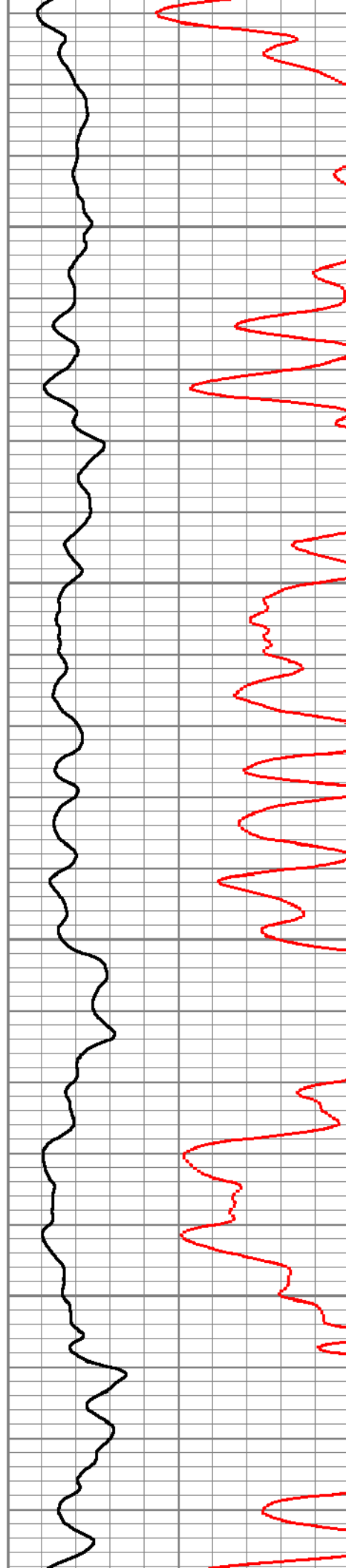


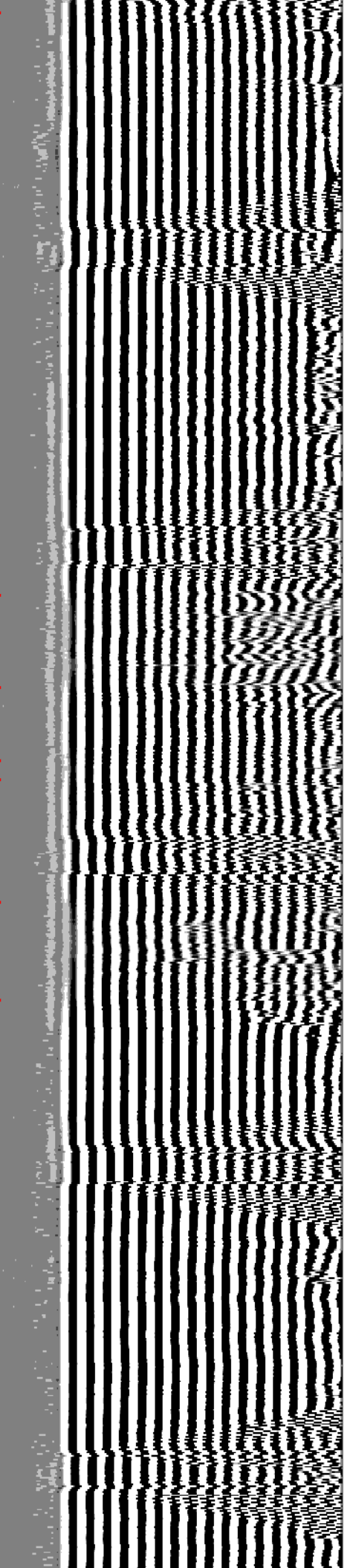
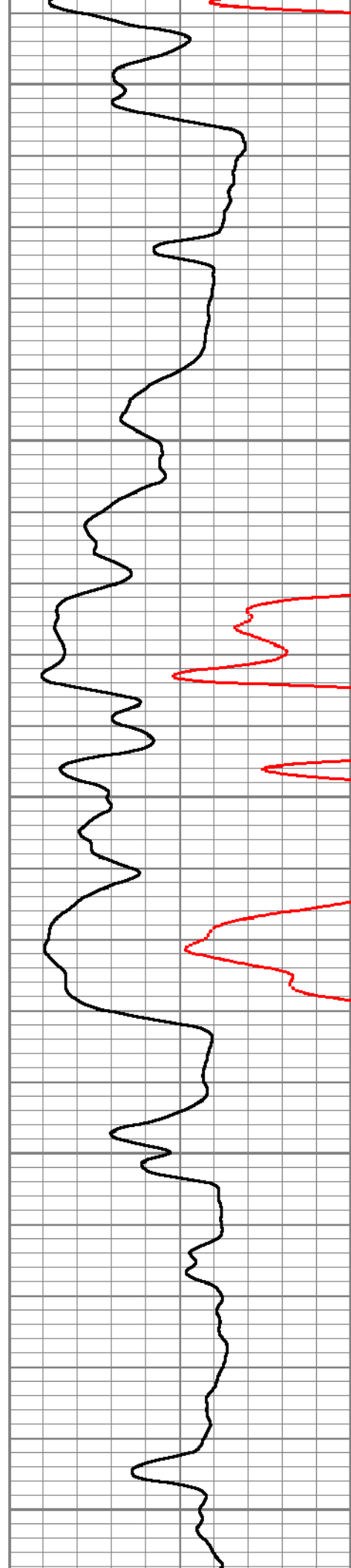
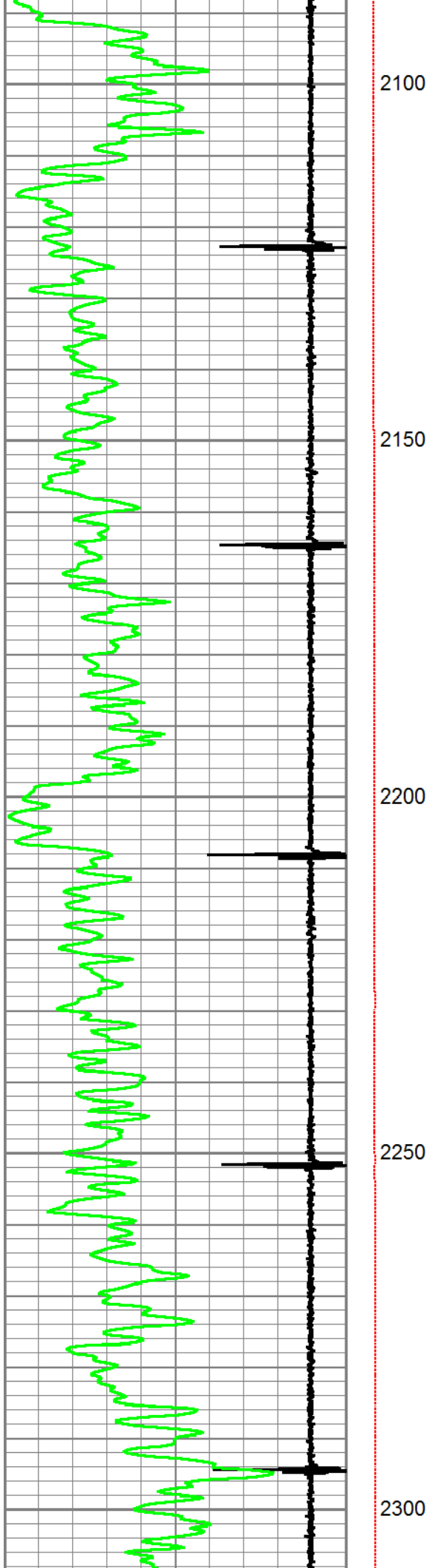
1900

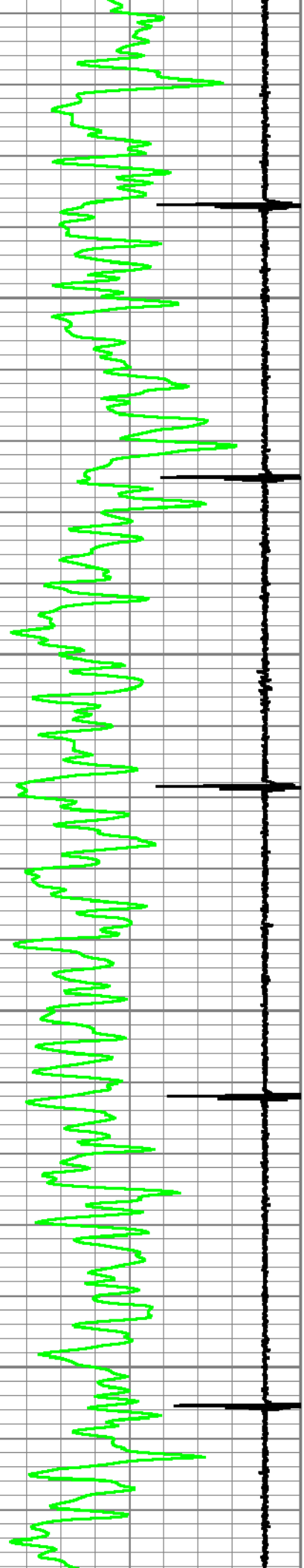
1950

2000

2050





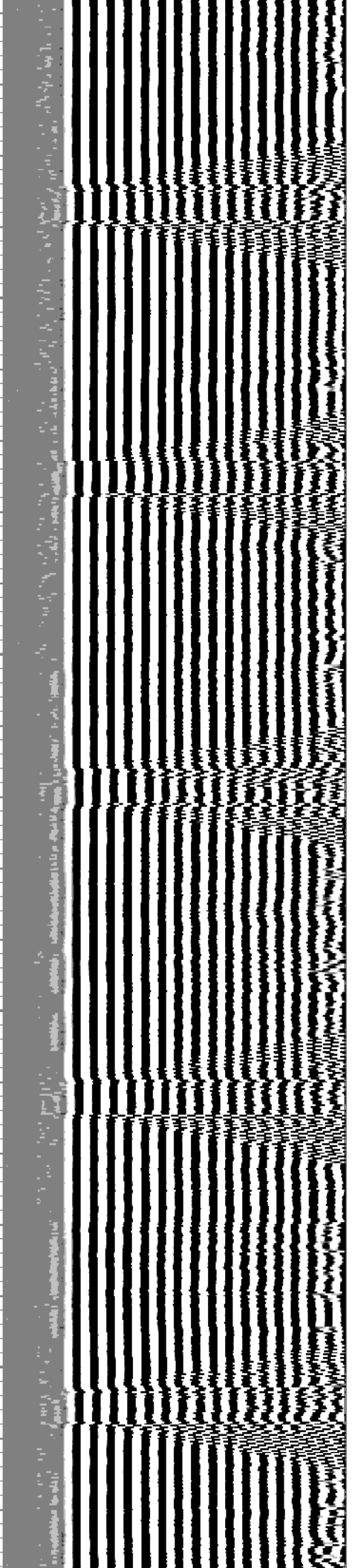
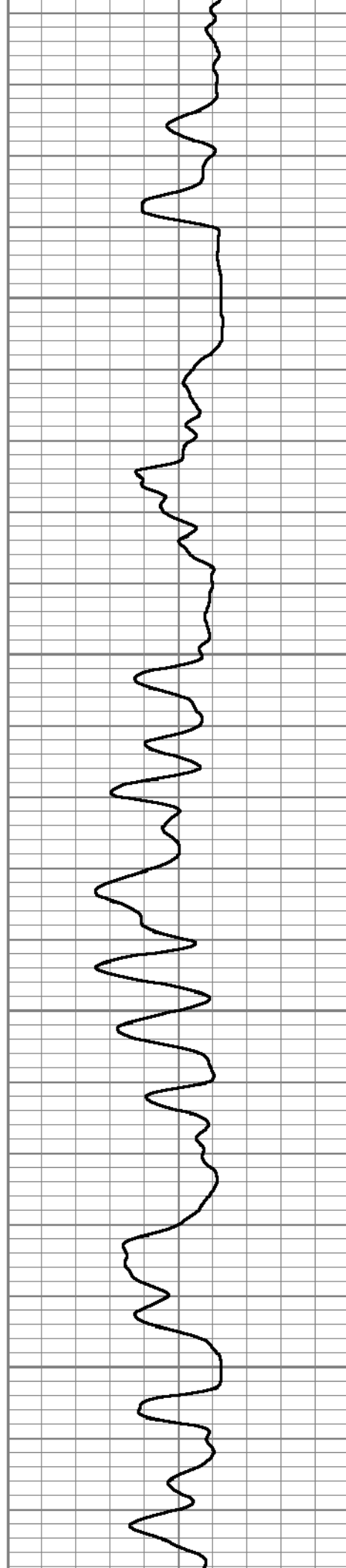


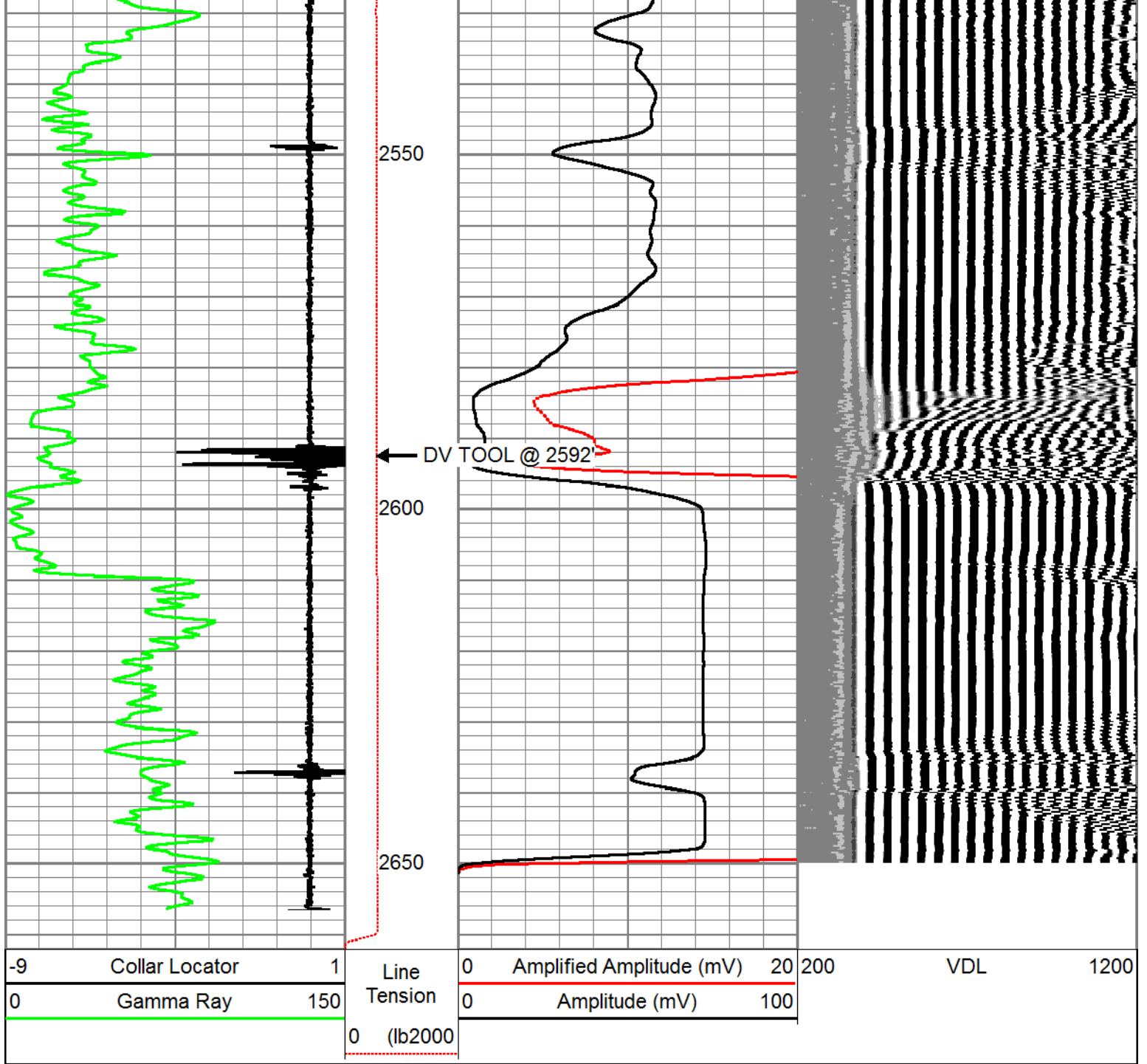
2350


2400

2450

2500







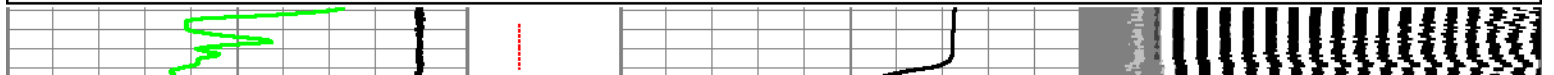
PIONEER
Pioneer Energy Services

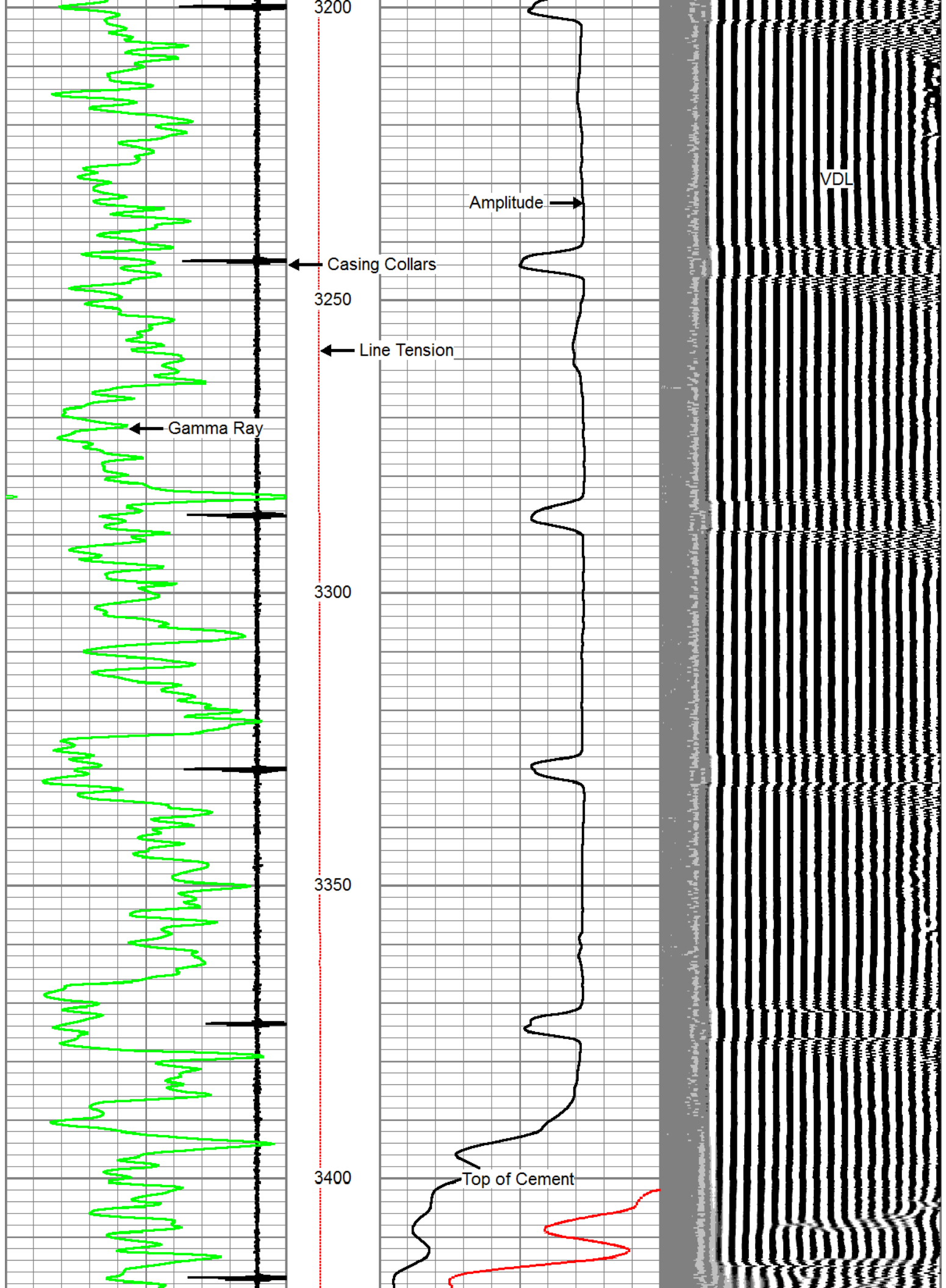
MAIN LOG

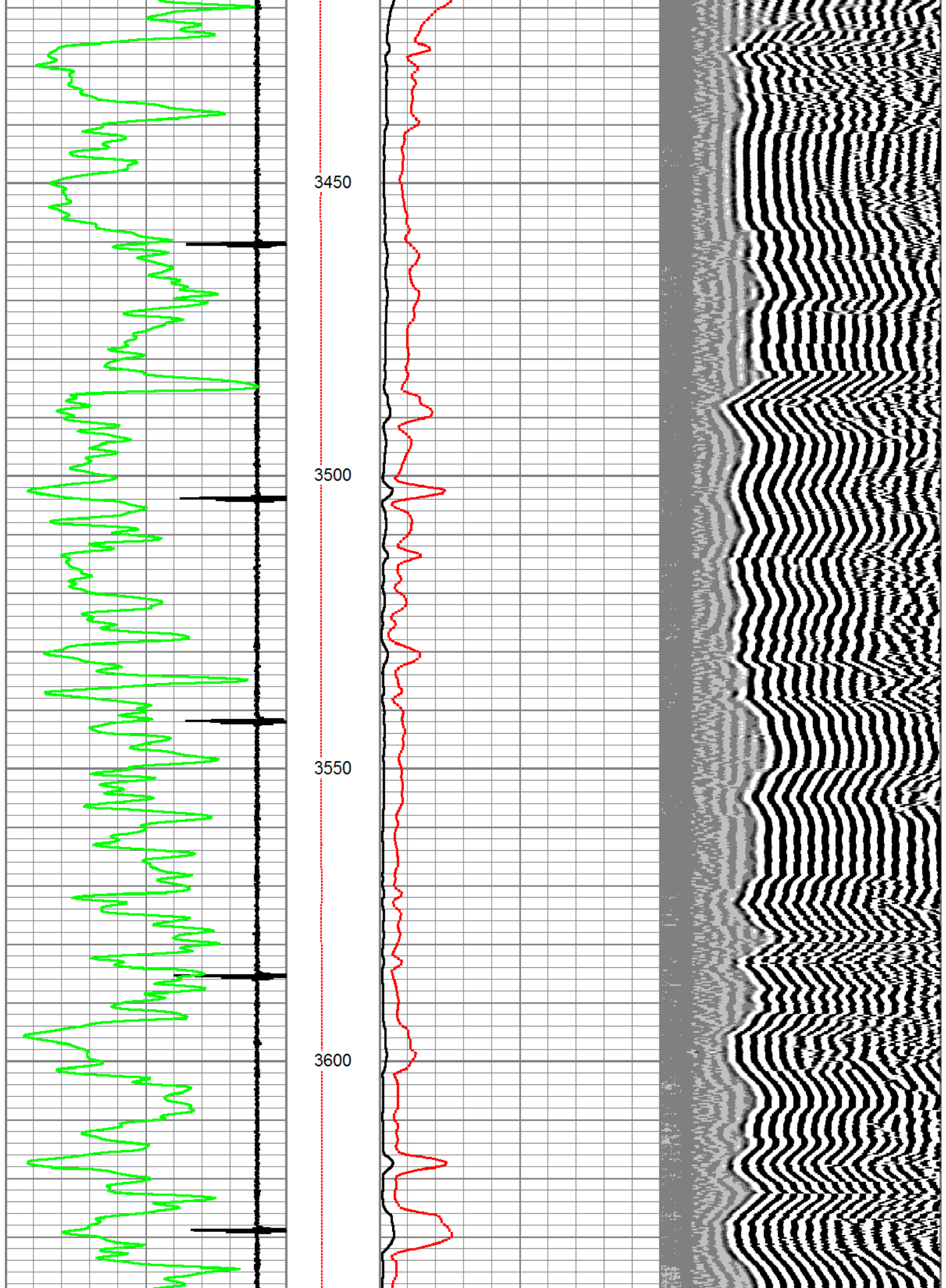
ZERO PSI APPLIED AT SURFACE

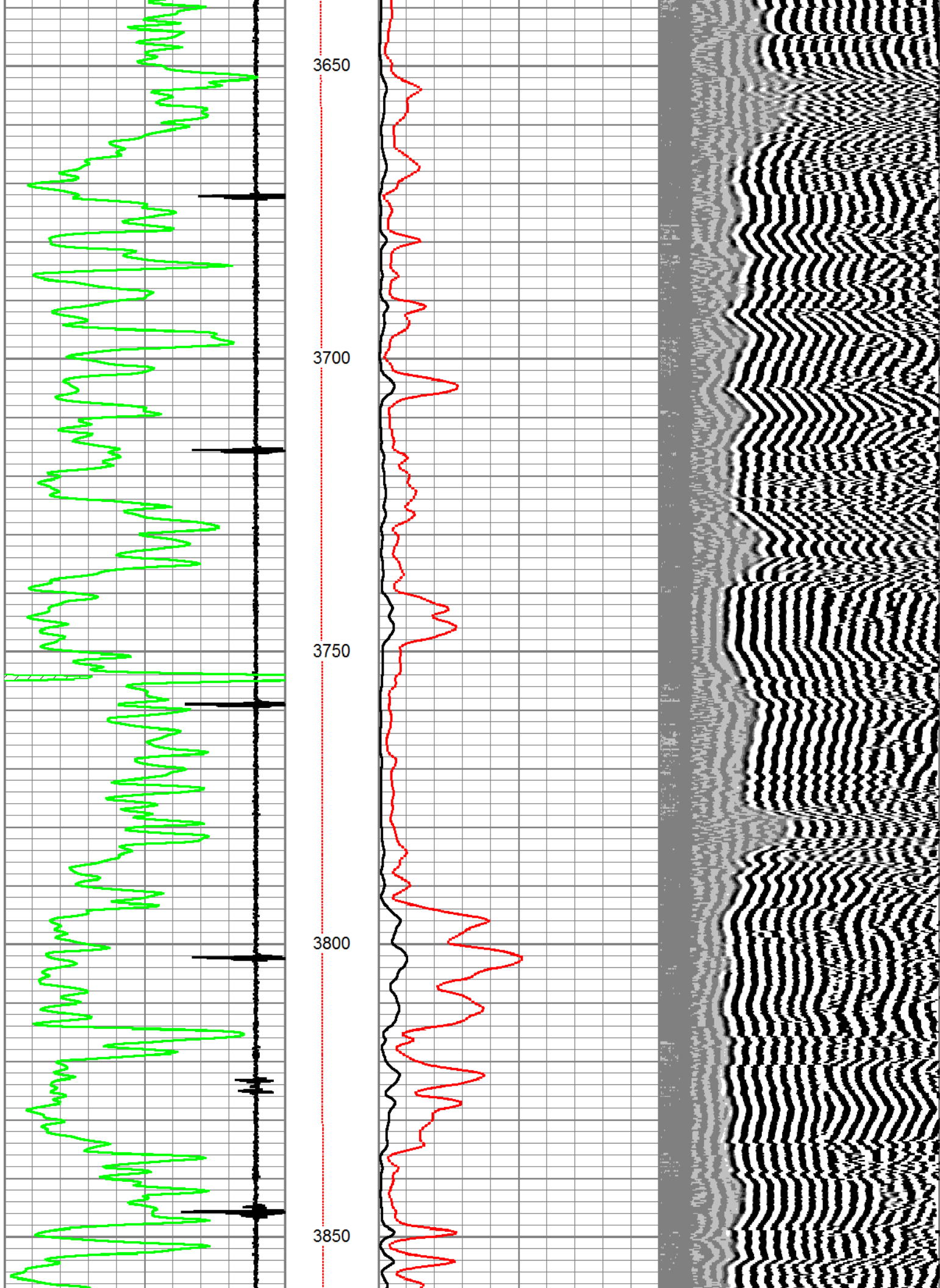
Database File	richlandoilinvestments_moore#22-2_cbl.db
Dataset Pathname	pass5
Presentation Format	pinr_cbl-gr-ccl_1
Dataset Creation	Thu Apr 20 09:04:24 2017
Charted by	Depth in Feet scaled 1:240

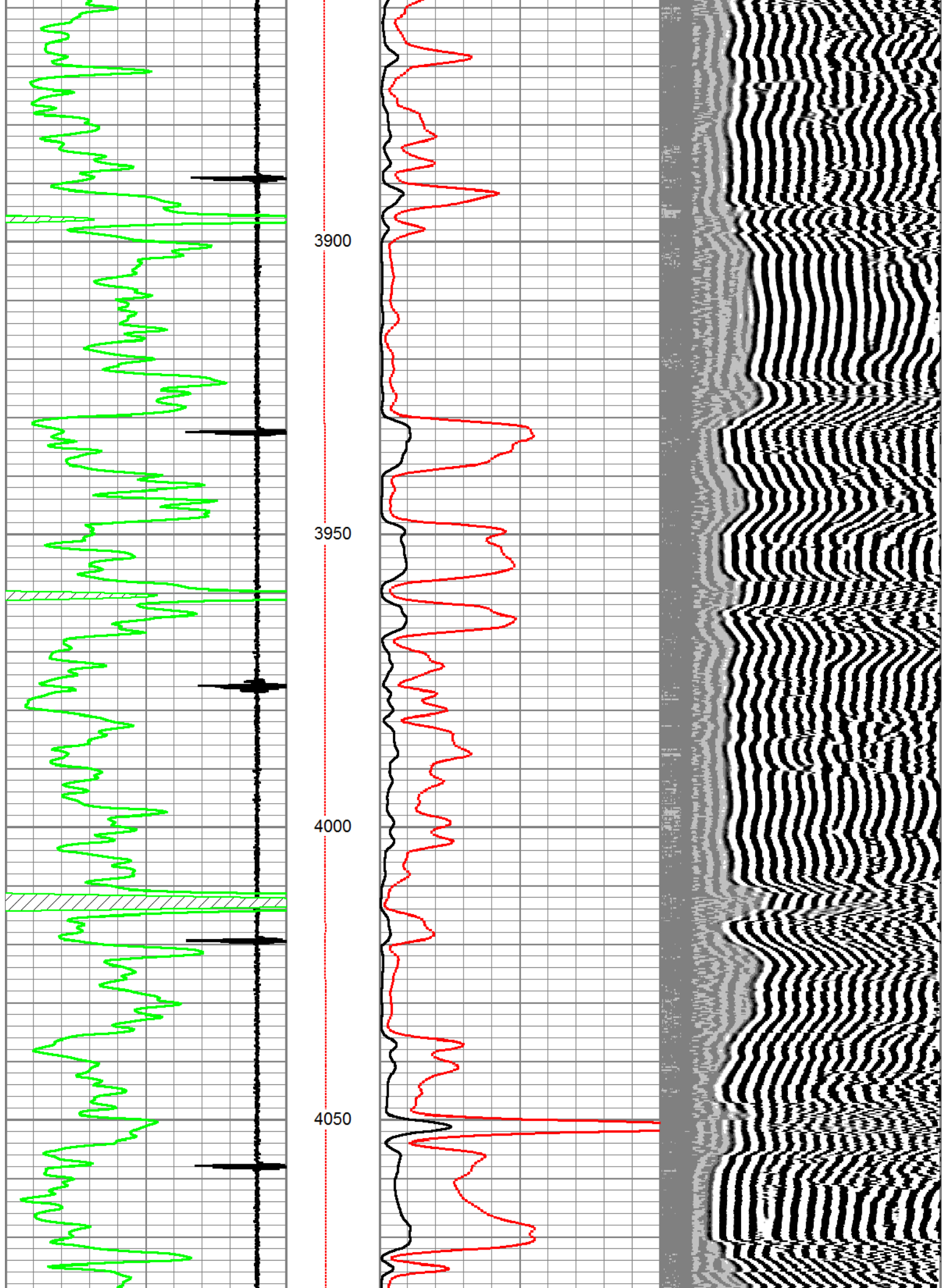
-9	Collar Locator	1	Line Tension	0	Amplified Amplitude (mV)	20	200	VDL	1200
0	Gamma Ray	150		0	Amplitude (mV)	100			
			0 (lb2000)						

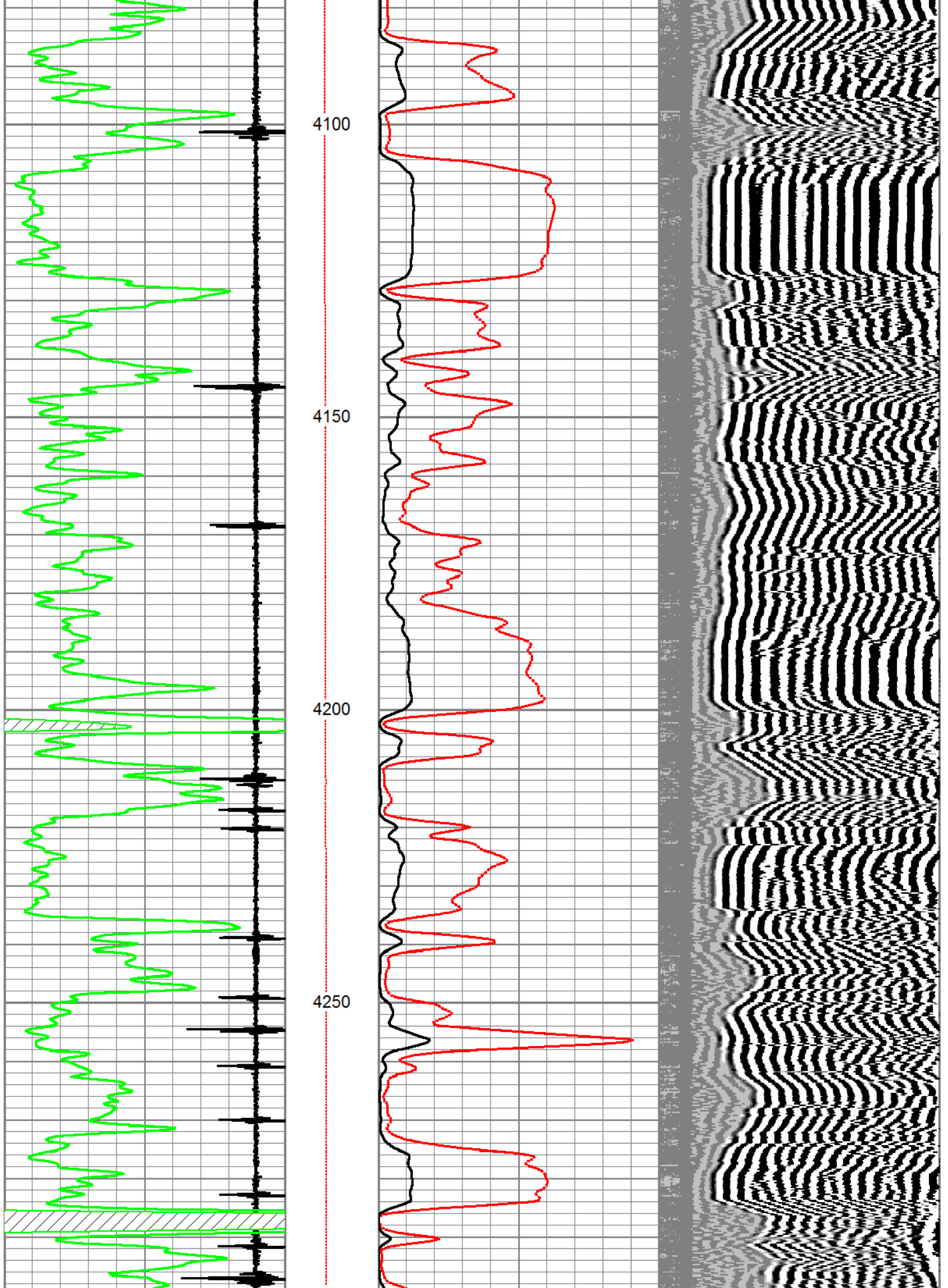


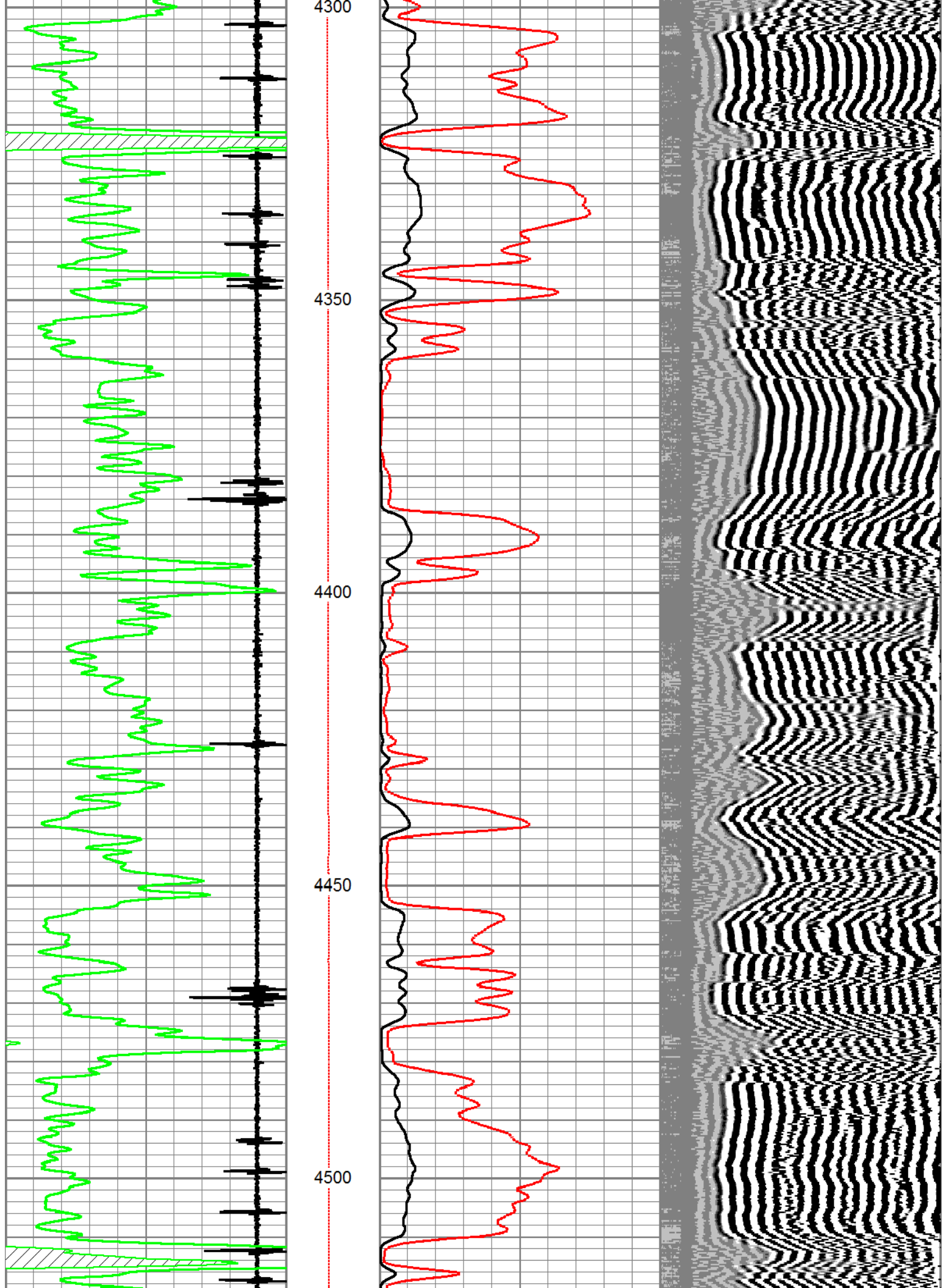


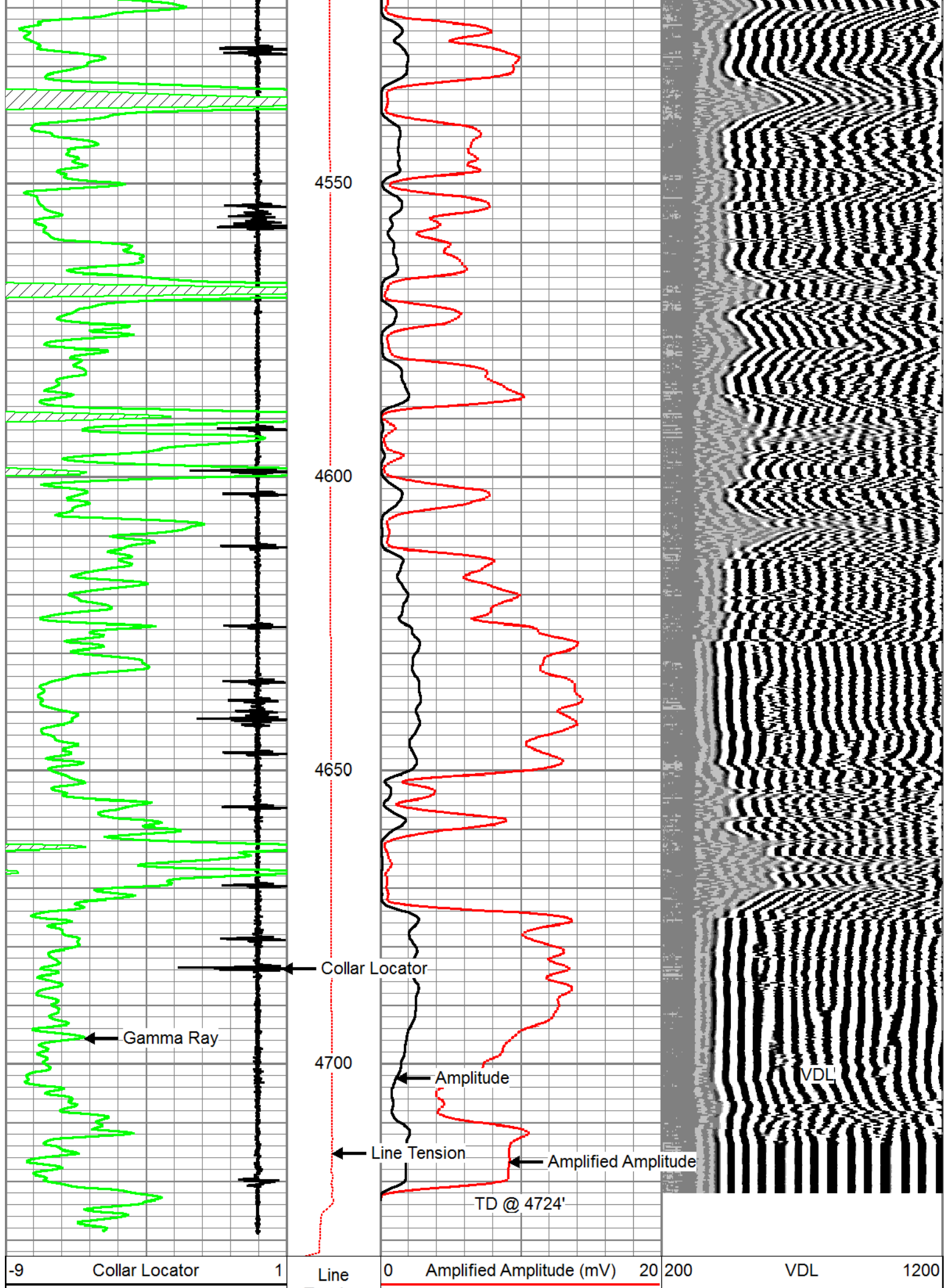












0	Gamma Ray	150	Tension	0	Amplitude (mV)	100
			0 (lb2000)			

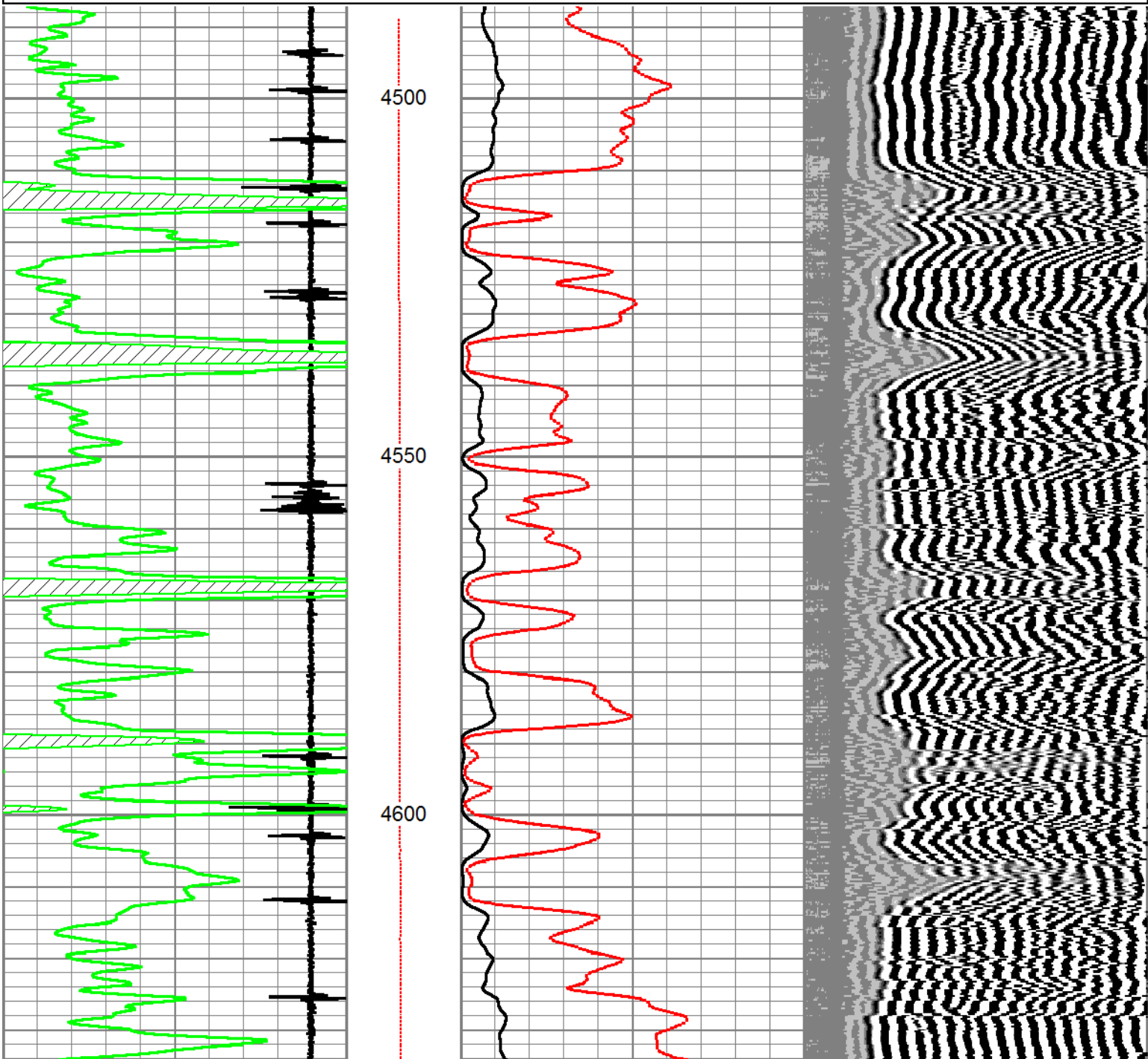


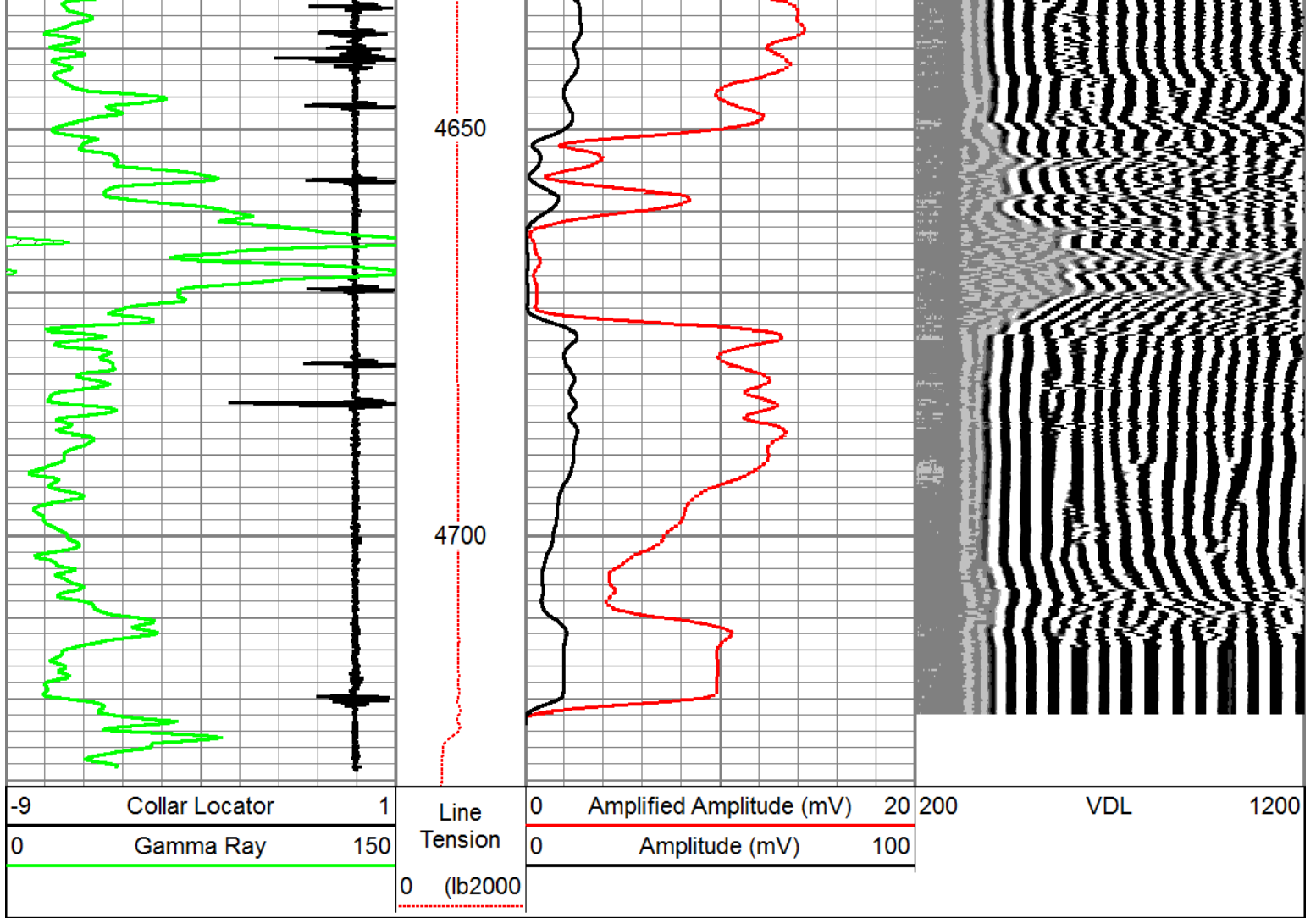
REPEAT SECTION

ZERO PSI APPLIED AT SURFACE

Database File	richlandoilinvestments_moore#22-2_cbl.db
Dataset Pathname	pass4
Presentation Format	pinr_cbl-gr-ccl_1
Dataset Creation	Thu Apr 20 08:57:24 2017
Charted by	Depth in Feet scaled 1:240

-9	Collar Locator	1	Line	0	Amplified Amplitude (mV)	20	200	VDL	1200
0	Gamma Ray	150	Tension	0	Amplitude (mV)	100			
			0 (lb2000)						





Calibration Report

Database File richlandoilinvestments_moore#22-2_cbl.db
 Dataset Pathname pass5
 Dataset Creation Thu Apr 20 09:04:24 2017

Gamma Ray Calibration Report

Serial Number: TigerProbe
 Tool Model: Tiger
 Performed: Tue Feb 14 08:27:00 2017

Calibrator Value: 1.0

Background Reading: 0.0 cps
 Calibrator Reading: 1.0 cps

Sensitivity: 1.2500 /cps

Segmented Cement Bond Log Calibration Report

Serial Number: 4.5040904
 Tool Model: Probe

Calibration Casing Diameter: 5.500 in
 Calibration Depth: 2758.193 ft

Master Calibration, performed Thu Apr 20 08:43:51 2017:

Raw (v) Calibrated (mv) Results

	Zero	Cal	Zero	Cal	Gain	Offset
3'	0.022	2.382	0.700	71.921	30.172	0.037
CAL	-0.004	2.500				
5'	-0.006	2.500	0.700	71.921	28.415	0.885
SUM						
S1	0.019	2.497	0.000	100.000	40.360	-0.781
S2	0.032	2.428	0.000	100.000	41.735	-1.324
S3	0.025	2.276	0.000	100.000	44.436	-1.132
S4	0.022	2.082	0.000	100.000	48.541	-1.046
S5	0.020	2.065	0.000	100.000	48.886	-0.965
S6	0.023	2.262	0.000	100.000	44.668	-1.035
S7	0.021	2.470	0.000	100.000	40.827	-0.840
S8	0.032	2.500	0.000	100.000	40.525	-1.311

Air Zero Calibration, performed Thu Apr 20 08:15:29 2017:

	Raw (v)	Calibrated (v)	Results
	Zero	Zero	Offset
3'	0.000	0.000	0.000
5'	0.000	0.000	0.000
SUM			
S1	0.000	0.000	0.000
S2	0.000	0.000	0.000
S3	0.000	0.000	0.000
S4	0.000	0.000	0.000
S5	0.000	0.000	0.000
S6	0.000	0.000	0.000
S7	0.000	0.000	0.000
S8	0.000	0.000	0.000



PIONEER
Pioneer Energy Services

Company RICHLAND OIL INVESTMENTS, LLC
Well MOORE NO.22-2
Field OWEN EAST
County LOGAN
State KANSAS