

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 \_\_\_\_\_ 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) (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	Bird Dog Oil, LLC
Well Name	HALL-GATES 2-5
Doc ID	1510312

All Electric Logs Run

DI
CDNL
Micro
Sonic





# JUSTIN D. CARTER

## CONSULTING GEOLOGIST

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

Well Name: HALL-GATES 2-5  
Well Id:  
Location: SE, SE, NE Sec. 5 - 22S - 13W Stafford Co., KS  
License Number: 15-185-24062-0000  
Spud Date: 10/10/19  
Surface Coordinates: 2310' FNL, 330' FEL  
Region: Gates  
Drilling Completed: 10/18/19

Bottom Hole Coordinates: 2850': 1 1/4 DEG, 3413': 1 1/4 DEG  
Ground Elevation (ft): 1896' K.B. Elevation (ft): 1905'  
Logged Interval (ft): 3100' To: 3850' Total Depth (ft): 3850'  
Formation: L/KC, VIOLA, ARBUCKLE  
Type of Drilling Fluid: Chemical Mud

Printed by WellSight Log Viewer from WellSight Systems 1-800-447-1534 [www.WellSight.com](http://www.WellSight.com)

### OPERATOR

Company: BIRD DOG OIL, LLC  
Address: 1801 Broadway, Suite #200  
Denver, CO 80202-3840  
Co. Geo.: Mr. Scott Stewart

### GEOLOGIST

Name: Justin D. Carter  
Company: Consulting Geologist  
Address: 1640 N. Roosevelt Ave.  
Liberal, KS 67901  
Phone: 620-655-1187

### Comments

Drilling Contractor: Southwind Drilling Rig #3  
Tool Pusher: Jay Krier

8 5/8" surface casing set at 432'

Mud: MudCo  
Engineer: Jason Whiting

Gas Detector: Blue Stem

DSTs: Trilobite Testing  
Tester: Ken Swinney

Open-Hole Loggers: Halliburton Wireline





**TRILOBITE TESTING, INC.**

## DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

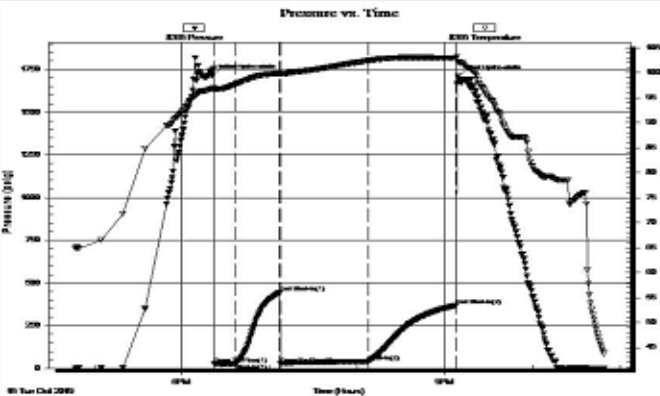
5/22S/13W/Stafford  
**Hall Gates #2-5**  
 Job Ticket: 66253      **DST#: 2**  
 Test Start: 2019.10.15 @ 16:47:00

### GENERAL INFORMATION:

Formation: **Lansing/Kansas City**  
 Deviated: No      Whipstock:      ft (KB)  
 Test Type: Conventional Bottom Hole (Initial)  
 Time Tool Opened: 18:22:17      Tester: Ken Swinney  
 Time Test Ended: 22:49:02      Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 Total Depth: 3592.00 ft (KB) (TVD)      1901.00 ft (CF)  
 Hole Diameter: 7.80 inches      Hole Condition: Fair      KB to GR/CF: 9.00 ft

**Serial #: 8365**      **Inside**  
 Press@RunDepth: 40.84 psig @ 3499.00 ft (KB)      Capacity:      psig  
 Start Date: 2019.10.15      End Date: 2019.10.15      Last Calib.: 2019.10.15  
 Start Time: 16:47:01      End Time: 22:49:02      Time On Btm: 2019.10.15 @ 18:20:47  
 Time Off Btm: 2019.10.15 @ 21:09:17

**TEST COMMENT:** IF 15 Minutes/ Blow built to 5 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 60 Minutes/ Blow built to 9 inches  
 FSI 60 Minutes/ No blow back



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1715.56	96.80	Initial Hydro-static
2	25.41	96.52	Open To Flow (1)
16	27.01	97.68	Shut-In(1)
47	443.54	99.78	End Shut-In(1)
47	25.29	99.71	Open To Flow (2)
107	40.84	102.39	Shut-In(2)
167	368.61	102.89	End Shut-In(2)
169	1709.52	102.09	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
45.00	VSOCWM / O 5% W 40% M 55%	0.63
0.00	135 feet GIP	0.00

### Gas Rates

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



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

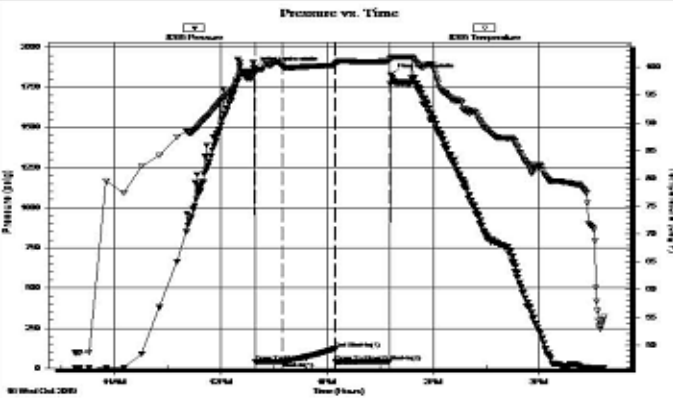
5/22S/13W/Stafford  
**Hall Gates 2-5**  
 Job Ticket: 66254      **DST#: 3**  
 Test Start: 2019.10.16 @ 10:38:00

**GENERAL INFORMATION:**

Formation: **Viola**  
 Deviated: No Whipstock      ft (KB)  
 Test Type: Conventional Bottom Hole (Initial)  
 Time Tool Opened: 12:19:32      Tester: Ken Swinney  
 Time Test Ended: 15:36:17      Unit No: 72 Great Bend/ 32  
 Interval: **3644.00 ft (KB) To 3710.00 ft (KB) (TVD)**      Reference Elevations: 1910.00 ft (KB)  
 Total Depth: 3710.00 ft (KB) (TVD)      1901.00 ft (CF)  
 Hole Diameter: 7.80 inches      Hole Condition: Fair      KB to GR/CF: 9.00 ft

**Serial #: 8365      Inside**  
 Press@RunDepth: 41.54 psig @ 3645.00 ft (KB)      Capacity:      psig  
 Start Date: 2019.10.16      End Date: 2019.10.16      Last Calib.: 2019.10.16  
 Start Time: 10:38:01      End Time: 15:36:17      Time On Btm: 2019.10.16 @ 12:19:17  
 Time Off Btm: 2019.10.16 @ 13:36:17

**TEST COMMENT:** IF 15 Minutes/ Blow built to 1 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 15 Minutes/ Blow built to 1 1/2 inch  
 Pull Test



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1872.32	99.44	Initial Hydro-static
1	40.45	98.92	Open To Flow (1)
16	41.54	100.11	Shut-in(1)
46	122.76	100.40	End Shut-In(1)
46	42.30	100.54	Open To Flow (2)
76	43.49	101.15	Shut-in(2)
77	1826.76	101.69	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.21

**Gas Rates**

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



**TRILOBITE TESTING, INC.**

## DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

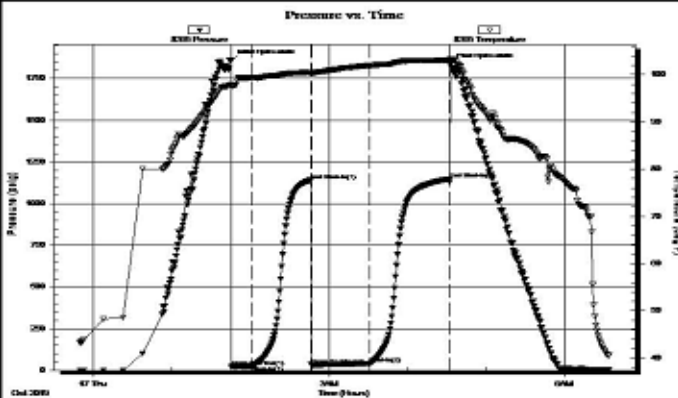
5/22S/13W/Stafford  
**Hall Gates 2-5**  
 Job Ticket: 66255 **DST#: 4**  
 Test Start: 2019.10.16 @ 23:50:00

### GENERAL INFORMATION:

Formation: **Arbuckle**  
 Deviated: No Whipstock: ft (KB)  
 Test Type: Conventional Bottom Hole (Initial)  
 Time Tool Opened: 01:45:47  
 Tester: Ken Swinney  
 Time Test Ended: 06:34:02  
 Unit No: 72 Great Bend/ 32  
**Interval: 3705.00 ft (KB) To 3765.00 ft (KB) (TVD)**  
 Reference Elevations: 1910.00 ft (KB)  
 Total Depth: 3765.00 ft (KB) (TVD) 1901.00 ft (CF)  
 Hole Diameter: 7.80 inches-Hole Condition: Fair KB to GR/CF: 9.00 ft

**Serial #: 8365 Inside**  
 Press@RunDepth: 41.49 psig @ 3706.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.16 End Date: 2019.10.17 Last Calib.: 2019.10.17  
 Start Time: 23:50:01 End Time: 06:34:02 Time On Btm: 2019.10.17 @ 01:45:17  
 Time Off Btm: 2019.10.17 @ 04:32:47

**TEST COMMENT:** IF 15 Minutes/ Blow built to 7 1/2 inches  
 ISI 45 Minutes/ No blow back  
 FF 45 Minutes/ Blow built to BOB in 5 minutes/ Total build 33 inches  
 FSI 60 Minutes/ No blow back



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1858.14	97.92	Initial Hydro-static
1	21.76	97.56	Open To Flow (1)
16	25.87	99.42	Shut-in(1)
61	1140.82	100.47	End Shut-In(1)
62	33.20	100.18	Open To Flow (2)
106	41.49	101.95	Shut-in(2)
167	1147.69	103.11	End Shut-In(2)
168	1833.47	103.35	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
62.00	GOM / G 40% O 30% M 30%	0.87
0.00	310 feet GIP	0.00

### Gas Rates

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



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

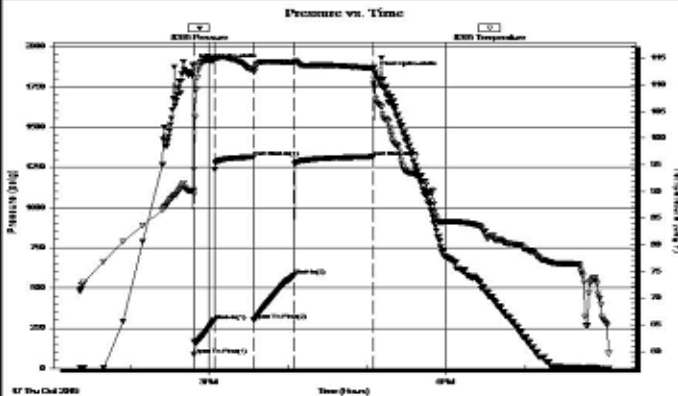
5/22S/13W/Stafford  
**Hall Gates 2-5**  
Job Ticket: 66256 **DST#: 5**  
Test Start: 2019.10.17 @ 13:22:00

**GENERAL INFORMATION:**

Formation: **Arbuckle**  
Deviated: No Whipstock ft (KB)  
Time Tool Opened: 14:48:17  
Time Test Ended: 20:04:02  
Test Type: Conventional Bottom Hole (Initial)  
Tester: Ken Swinney  
Unit No: 72 Great Bend/ 32  
Interval: **3766.00 ft (KB) To 3771.00 ft (KB) (TVD)**  
Total Depth: 3771.00 ft (KB) (TVD)  
Reference Elevations: 1910.00 ft (KB)  
1901.00 ft (CF)  
Hole Diameter: 7.80 inches-Hole Condition: Fair  
KB to GR/CF: 9.00 ft

**Serial #: 8365 Inside**  
Press@RunDepth: 575.41 psig @ 3767.00 ft (KB) Capacity: psig  
Start Date: 2019.10.17 End Date: 2019.10.17 Last Calib.: 2019.10.17  
Start Time: 13:22:01 End Time: 20:04:02 Time On Btm: 2019.10.17 @ 14:48:02  
Time Off Btm: 2019.10.17 @ 17:05:32

**TEST COMMENT:** IF 15 Minutes/ Blow to BOB in 1 1/2 minutes/ Total build 80 inches  
ISI 30 Minutes/ 2 inch blow back  
FF 30 Minutes/ Blow to BOB in 3 minutes/ Total build 118 inches  
FSI 60 Minutes/ 3 inch blow back



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1887.42	90.22	Initial Hydro-static
1	85.96	89.44	Open To Flow (1)
16	296.86	114.54	Shut-in(1)
46	1313.17	112.75	End Shut-In(1)
46	298.37	112.37	Open To Flow (2)
77	575.41	114.22	Shut-in(2)
137	1315.12	113.12	End Shut-In(2)
138	1837.18	111.07	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbl)
62.00	OCMW / O 5% M 10% W 85%	0.87
310.00	GMCWO / G 5% M 5% W 20% O 70%	4.35
1023.00	GO / G 10% O 90%	14.35
0.00	155 GP	0.00

**Gas Rates**

	Choke (inches)	Pressure (psig)	Gas Rate (Mcft)

Trilobite Testing, Inc

Ref. No: 66256

Printed: 2019.10.17 @ 23:13:23

**Remarks**

After careful review of the sample log, electric logs, and DST reports, the decision was made to run 5 1/2" casing to do further testing of the Arbuckle zone in the Hall-Gates #2-5.

Respectfully submitted,

**Justin D. Carter**  
Consulting Geologist



ROP (min/ft) 10  
Gamma (API) 150

7500

TOP ANHYDRITE 759' (+1146')

0 TG, C1-C5 300

BASE ANHYDRITE 783' (+1122')

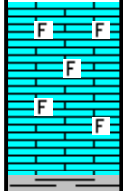
8000

DEPTH BREAK

BIT TRIP @2847'  
DISPLACE HOLE @2847'

BIT #3  
VAREL 7 7/8"  
HE-29  
S/N: RR  
3/14s  
IN @2847'

3100



LS- BFF, HRD, F/VF-XLN, GRNST IP TO SUB-SUCRO MTRX IP, IMBED FOSS FRAGS SCAT THRU, NO FLO, PR INTER-FOSS POR SCAT THRU, NS

12:30 A.M. 10/14/19

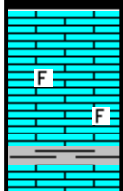
5U BG

WT 9.0  
VS 45  
LCM TR  
RPM 80  
WOB 30K  
PP 850  
SPM 60

LS- CRM BFF, HRD DNS, VF-XLN, RE-XLN MTRX IP TO SUB-CHLKY MTRX IP, IMBED FOSS FRAGS IP, NO FLO, NO VIS POR

CN

3150



LS- CRM, BRITT, F-XLN, GRNST, IMBED FOSS FOSS FRAGS IP, SFT WHT CHLK IP, NO FLO, PR INTER-XLN POR IP TO TR INTER-FOSS POR, NS

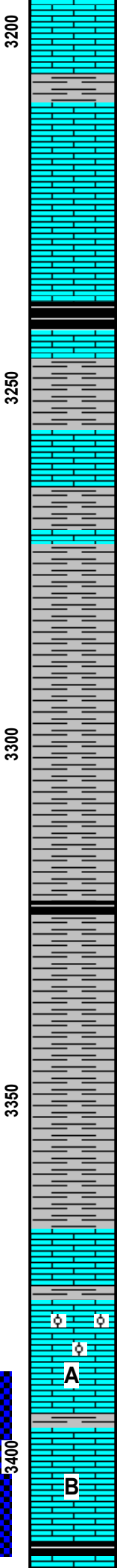
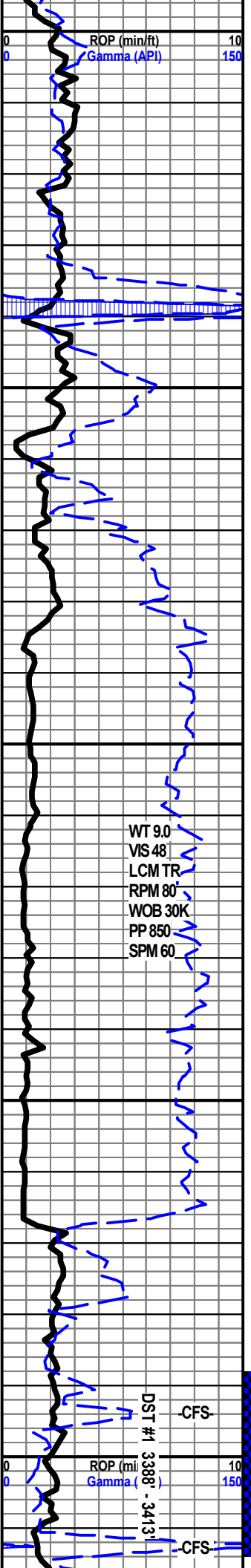
CN

LS- OFF WHT, SFT, VF-XLN, CHLKY MTRX, SFT WHT CHLK THRU, NO FLO, NO VISP OR

LS- BFF CRM, HRD, MD/VF-XLN, GRNST TO TR RE-XLN MTRX, TR IMBED FOSS FRAGS, NO FLO, PR/FR INTER-XLN POR IP, NS

CN





LS- BFF LT TN, HRD DNS, VF/CRYPTO-XLN, RE-XLN MTRX IP, NO FLO, NO VIS POR

TG, C1-C5 300

LS- DK TN, HRD DNS, CRYPTO-XLN, RE-XLN MTRX IP, NO FLO, NO VIS POR

CN

**HEEBNER 3238' (-1333')**

**TORONTO 3256' (-1351')**

CN

LS- CRM, BRITT TO HRD IP, F-XLN, GRNST THRU TO TR RE-XLN MTRX, NO FLO, PR INTER-XLN POR IP, NS

4U BG

**DOUGLAS 3273' (-1368')**

SH- DK GY, FRM, BLKY, SLTY THRU TO TR LMY

CN

SH- LT GY, SFT TO FRM IP, LMY IP TO SLTY IP, BLKY

SH- GY DK GY, SFT, SLI SLTY THRU, BLKY

CN

SH- DK GY, SFT, SLI SLTY THRU, BLKY TO GMMYIP

SH- DK GY, SFT TO FRM IP, LMY IP TO SLTY IP, WXY TEXT

CN

**BROWN LIME 3368' (-1463')**

**LANSING 3378' (-1473')**

LS- CRM, HRD DNS, VF-XLN, RE-XLN MTRX IP, IMBED OOL SCAT THRU, NO FLO, NO VIS POR

A

MUD CHECK @3394'  
 WT 9.2 CN  
 VIS 48  
 LCM TR  
 PV 13  
 YP 13  
 PH 10.5  
 FIL 10.4  
 CAL 10  
 TCHL 9,000

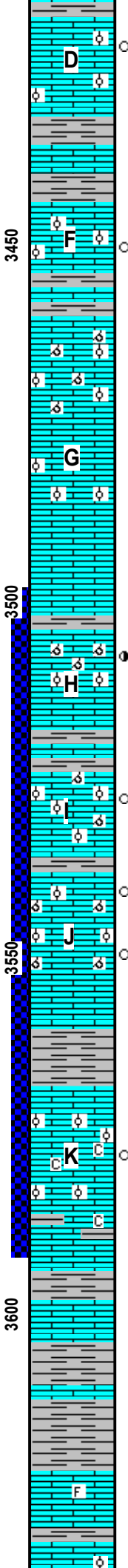
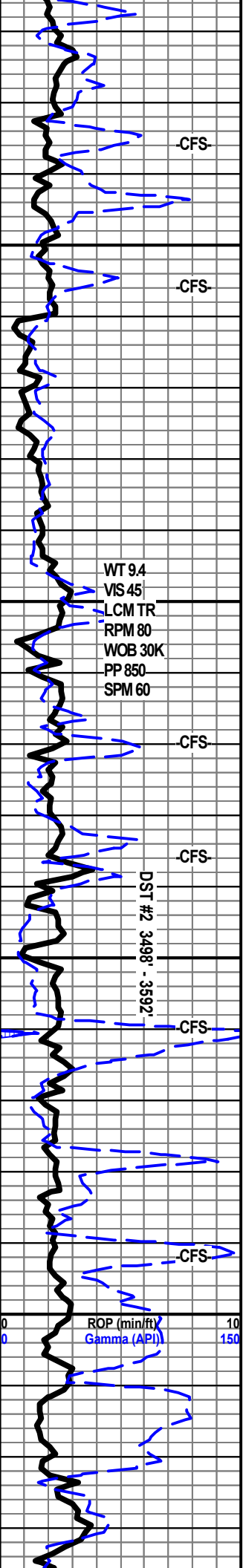
LS- BFF CRM, HRD, F/VF-XLN, RE-XLN MTRX THRU TO TR SUCRO MTRX, BRIT YEL GLD FLO SCAT THRU, FAINT FLUSH TO PR SLO MLKY BLU STRM CUT, PR INTER-XLN POR IP, LIVE BLK STAIN IN 30%, FR ODOR, TR FREE OIL

B

11 U SHOW

CN

12:00 A.M. 10/15/19



**RUN 10 STAND SHORT TRIP @ 3413'**

LS- CRM BFF, VF-XLN, GRST TO TR RE-XLN MTRX, IMBED OOL IP, TR YEL FLO, TR FAINT STRM CUT, TR INTER-XLN POR, TR STAIN, FAINT ODOR

CN

LS- LT BRN, HRD DNS, F/VF-XLN, GRNST, IMBED OOL SCAT THRU, TR BRIT YEL GLD FLO, FAINT SLO BLU STRM CUT, TR INTER-XLN POR, TR STAIN, FAINT ODOR, NSFO

LS- TN BRN, MOTT, BRITT, F/VF-XLN, GRNST, OOL SCAT THRU, NO FLO, PR OOMLD POR THRU, NS

CN

LS- BRN BFF, HRD TO BRITT IP, VF-XLN, GRNST, IMBED OOL THRU, SFT WHT CHLK IP, NO FLO, TR OOMLD POR, NS

0

LS- LT GY, HRD DNS, CRYPTO-XLN, RE-XLN MTRX IP, NO FLO, NO VIS POR

WT 9.4  
VIS 45  
LCM TR  
RPM 80  
WOB 30K  
PP 850  
SPM 60

LS- WHT TN, MOTT, HRD, F/VF-XLN, GRNST, IMBED OOL SCAT THRU, TR BRIT YEL GLD FLO, FAINT FLUSH TO FR SLO BLU STRM CUT, FR OOMLD POR IP, TR STAIN, FR ODOR, TR FREE OIL

CN

LS- CRM, BRITT TO HRD IP, F/VF-XLN, GRNST, IMBED OOL THRU, TR BRIT YEL GLD FLO, NO FLUSH TO PR SLO MLKY BLU STRM CUT, PR OOMLD POR IP TO TR INTER-OOL POR, TR STAIN, V/FAINT ODOR, NSFO

DST #2 3488' - 3592'

LS- WHT, BRITT, VF-XLN, GRNST IP TO SUB-CHLKY MTRX IP, IMBED OOL IP, SFT WHT CHLK IP, DLL YEL GLD FLO IN 70%, FR FLUSHT TO PR BLU STRM CUT, TR INTER-OOL POR TO PR OOMLD POR IP, TR BLK STAIN, FAINT ODOR, NSFO

MUD CHECK @ 3536'  
WT 9.25  
VIS 53  
LCM TR  
PV 16  
YP 14  
PH 10.5  
FIL 9.2  
CAL 10  
CHL 8,200

CN

SH- DK GY, FRM, BLKY TO FISS IP, LMY

LS- CRM OFF WHT, BRITT TO HRD IP, VF-XLN, RE-XLN MTRX IP SUB-CHLKY MTRX IP, TR SFT WHT CHLK, IMBED OOL IP, DLL YEL GLD FLO TO TR BRIT YEL GLD FLO WHEN CUT, NO FLUSH TO PR SLO BLU STRM CUT, TR INTER-OOL POR, TR BLK STAIN, FAINT ODOR, NSFO

17 U SHOW

**BKC 3594' (-1689')**

12:00 A.M. 10/16/19

LS- CRM, HRD DNS, CRYPTO-XLN, RE-XLN MTRX IP, NO FLO, NO VIS POR

TG, C1-C5 CN 300

SH- GY, SFT TO FRM, FISS, LMY

LS- BFF LT GY, HRD DNS, VF-XLN, RE-XLN MTRX THRU, TR IMBED FOSS FRAGS, NO FLO, NO VIS POR

CN

LS- LT CRM, BRIT TO HRD IP, VF-XLN, RE-XLN MTRX THRU TO TR SUB-CHLKY MTRX, TR IMBED OOL, NO FLO, TR INTER-OOL POR TO TR INTER-XLN POR, NS

SLTST- RDISH GY, TT, VF-GRNS, OXIDIZ, PR INTER-GRN POR, NS

### VIOLA 3665' (-1760')

CHRT- LT TN WHT, HRD, ANG, TR DOLO, YEL GLD FLO IN 80%, FAINT FLUSH TO PR SLO BLU STRM CUT, FR ODOR, TR FREE OIL

CHRT- WHT, HRD, ANG, TR YEL GLD, NO VIS CUT, TR TN STAIN, FAINT ODOR

CHRT- WHT, HRD, ANG, BRIT YEL FLO THRU, PR FLUSH TO FR SLO BLU STRM CUT, POSS FRAC POR TO TR INTER-XLN POR IN DOLO, TN STAIN, IN 40%, FR ODOR, TR FREE OIL

### SIMPSON 3709' (-1804')

SH- DK GY, FRM TO SFT, SLTY IP TO LMY IP, BLKY

SS- TN BLK, FRIT TO TT IP, F-GRNS, FR SRT, SUB-ANG GRNS, CALC CMNT, BRIT YEL FLO IN 50%, FR FLUSH TO TO FR BLU STRM CUT, FR INTER-GRN POR THRU, BLK/TN STAIN SCAT THRU, NO ODOR, NSFO

SH- TURQ GY, SFT, GMMY IP TO BLKY IP

### ARBUCKLE 3761' (-1856')

DOLO- WHT TN, HRD DNS, FVF-XLN, SUCRO MTRX THRU TO TR RE-XLN MTRX, TR IMBED OOL, BRIT YEL GLD FLO IN 70%, FR FLUSH TO FR BLU STRM CUT, FR INTER-VUG POR IP TO TR INTER-OOL TO TR INTER-XLN POR, TN/BLK LIVE STAIN IP, FR ODOR, GD SHOW FREE OIL

3768' DOLO- TN, HRD DNS, FVF-XLN, SUCROM TRX THRU, TR IMBED OOL, DLL YEL GLD FLO THRU TO TR BRIT YEL GLD, GD FLUSH TO FR BLU STRM CUT, TR INTER-OOL POR TO TR OOMLD POR TO FR INTER-XLN POR IP TO TR INTER-VUG POR, DK BRWN STAIN THRU, STRNG ODOR, GD SHOW FREE OIL

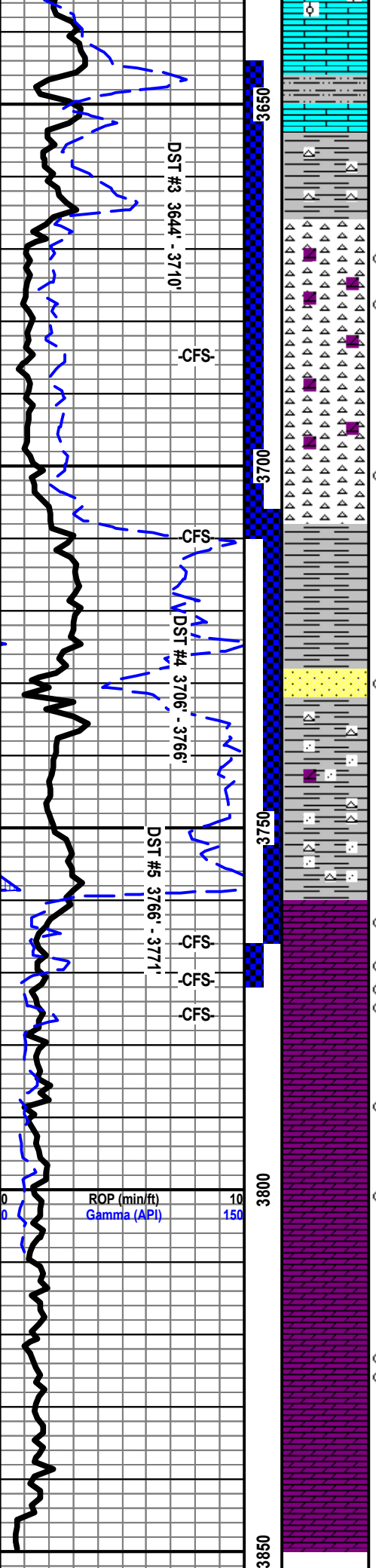
3774' DOLO- CRM, HRD DNS, CORSE/F-XLN, SUCRO MTRX THRU, YEL GLD FLO THRU, GD FLUSH TO GD BLU STRM CUT, FR INTER-XLN POR THRU, TN STAIN IP, STRNG ODOR, GD SHOW FREE OIL

3790' DOLO- BFF, HRD DNS, CORSE/VF-XLN, SUCRO MTRX IP TO RE-XLN MTRX IP, DLL YEL GLD FLO THRU, FR FLUSH TO FR BLU STRM CUT, PR/FR INTER-XLN POR IP, TR STAIN, FR/STRNG ODOR, NSFO

3800' DOLO- BFF CRM, HRD DNS, CORSE/F-XLN, SUCRO MTRX THRU, TR VUGS, DLL YEL GLD FLO THRU, PR FLUSH TO FR BLU STRM CUT, FR INTER-XLN POR IP TO TR VUG POR, TR BLK STAIN, FR ODOR, NSFO

3824' DOLO- LT CRM, HRD DNS, CORSE/MD-XLN, SUCRO MTRX THRU, DLL YEL GLD FLO THRU, PR FLUSH TO FR BLU STRM CUT, PR/FR INTER-XLN POR THRU, BLK LIVE STAIN IP, FR ODOR, FR SHOW FREE OIL

DOLO- CRM, HRD DNS, CORSE/F-XLN, SUCRO MTRX THRU, SFT WHT CHLK IP, DLL YEL GLD FLO THRU, PR SLO BLU STRM CUT, PR/FR INTER-XLN POR THRU, NO STAIN, FR ODOR, NSFO



10 U SHOW

MUD CHECK @3710'

- WT 9.6
- VIS 48
- LCM TR
- PV 14
- YP 13
- PH 9.5
- FIL 10.4
- CAL 20
- CHL 8,600

MUD CHECK @3766'

- WT 9.0
- VIS 58
- LCM TR
- PV 16
- YP 14
- PH 10.5
- FIL 10.0
- CAL 10
- CHL 9,000

-2:00 A.M. 10/18/19

R TD 3850'

L.T.D. 3850'

L.T.D. 3850'

00



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66252

**DST#: 1**

Test Start: 2019.10.14 @ 17:01:00

## GENERAL INFORMATION:

Formation: **Lansing B**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 18:58:47

Time Test Ended: 23:03:02

Test Type: Conventional Bottom Hole (Initial)

Tester: Ken Swinney

Unit No: 72 Great Bend/ 32

Interval: **3388.00 ft (KB) To 3413.00 ft (KB) (TVD)**

Reference Elevations: 1910.00 ft (KB)

Total Depth: 3413.00 ft (KB) (TVD)

1901.00 ft (CF)

Hole Diameter: 7.80 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

**Serial #: 8365**

**Inside**

Press@RunDepth: 26.15 psig @ 3389.00 ft (KB)

Capacity: psig

Start Date: 2019.10.14

End Date:

2019.10.14

Last Calib.:

2019.10.14

Start Time:

17:01:01

End Time:

23:03:02

Time On Btm:

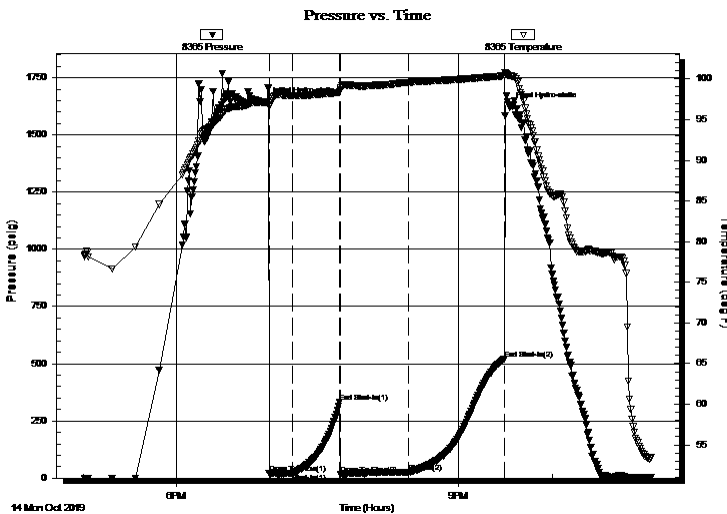
2019.10.14 @ 18:57:17

Time Off Btm:

2019.10.14 @ 21:32:32

TEST COMMENT: IF 15 Minutes/ Blow built to 2 inches  
 ISI 30 Minutes/ No blow back  
 FF 30 Minutes/ Blow built to 4 inches  
 FSI 30 Minutes/ No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1643.00	97.06	Initial Hydro-static
2	21.54	96.58	Open To Flow (1)
17	21.15	97.93	Shut-In(1)
47	330.69	98.38	End Shut-In(1)
48	16.56	98.61	Open To Flow (2)
91	26.15	99.54	Shut-In(2)
152	520.99	100.41	End Shut-In(2)
156	1624.12	100.38	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.21
0.00	45 feet GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66252

**DST#: 1**

Test Start: 2019.10.14 @ 17:01:00

## GENERAL INFORMATION:

Formation: **Lansing B**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 18:58:47

Time Test Ended: 23:03:02

Test Type: Conventional Bottom Hole (Initial)

Tester: Ken Swinney

Unit No: 72 Great Bend/ 32

**Interval: 3388.00 ft (KB) To 3413.00 ft (KB) (TVD)**

Reference Elevations: 1910.00 ft (KB)

Total Depth: 3413.00 ft (KB) (TVD)

1901.00 ft (CF)

Hole Diameter: 7.80 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

**Serial #: 6755 Outside**

Press@RunDepth: 518.11 psig @ 3390.00 ft (KB)

Capacity: psig

Start Date: 2019.10.14

End Date:

2019.10.14

Last Calib.:

2019.10.14

Start Time:

17:01:01

End Time:

23:03:02

Time On Btm:

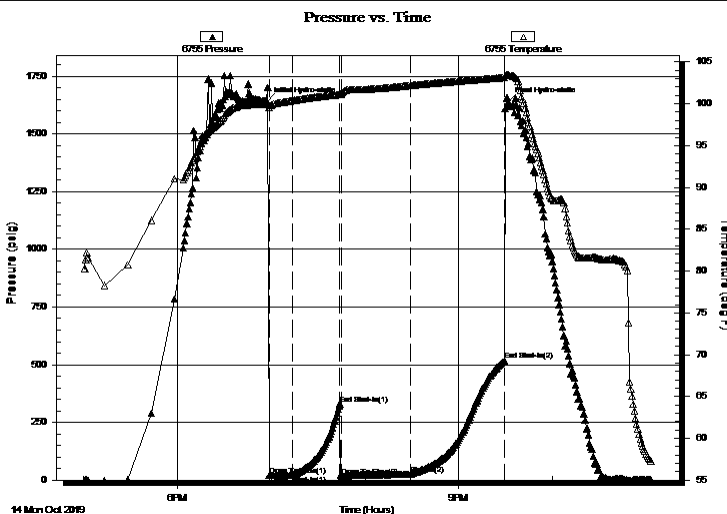
2019.10.14 @ 18:57:32

Time Off Btm:

2019.10.14 @ 21:31:32

**TEST COMMENT:** IF 15 Minutes/ Blow built to 2 inches  
ISI 30 Minutes/ No blow back  
FF 30 Minutes/ Blow built to 4 inches  
FSI 30 Minutes/ No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1641.59	99.98	Initial Hydro-static
2	19.92	99.50	Open To Flow (1)
16	20.75	100.36	Shut-In(1)
47	328.37	101.12	End Shut-In(1)
48	15.00	101.17	Open To Flow (2)
92	25.76	102.17	Shut-In(2)
152	518.11	103.15	End Shut-In(2)
154	1637.69	103.42	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.21
0.00	45 feet GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**  
**Hall Gates 2-5**  
Job Ticket: 66252      **DST#: 1**  
Test Start: 2019.10.14 @ 17:01:00

## Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 48.00 sec/qt	Cushion Volume: bbl		
Water Loss: 10.38 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 9000.00 ppm			
Filter Cake: 1.00 inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
15.00	Mud 100%	0.210
0.00	45 feet GIP	0.000

Total Length: 15.00 ft      Total Volume: 0.210 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:

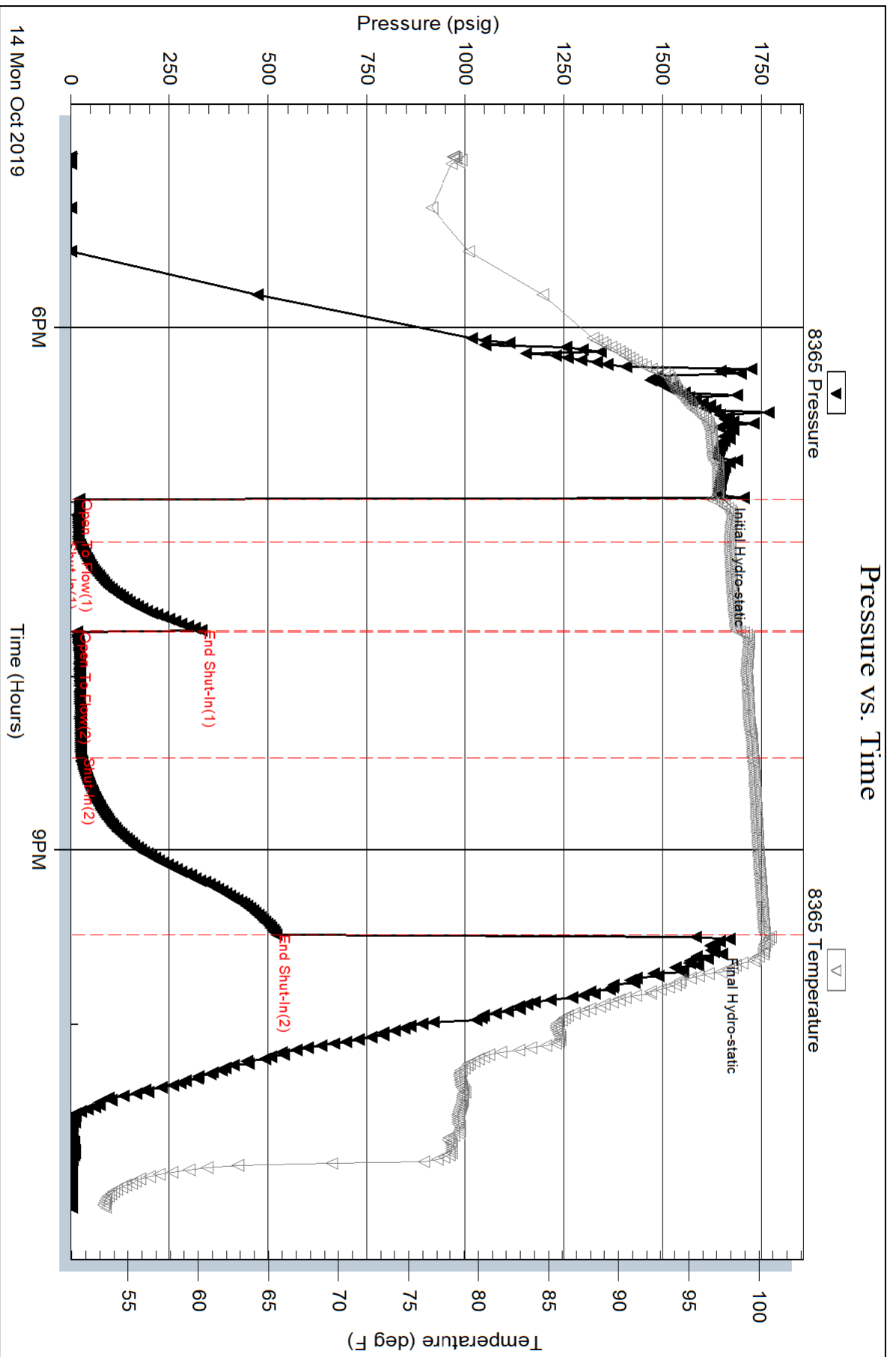
Serial #: 8365

Inside

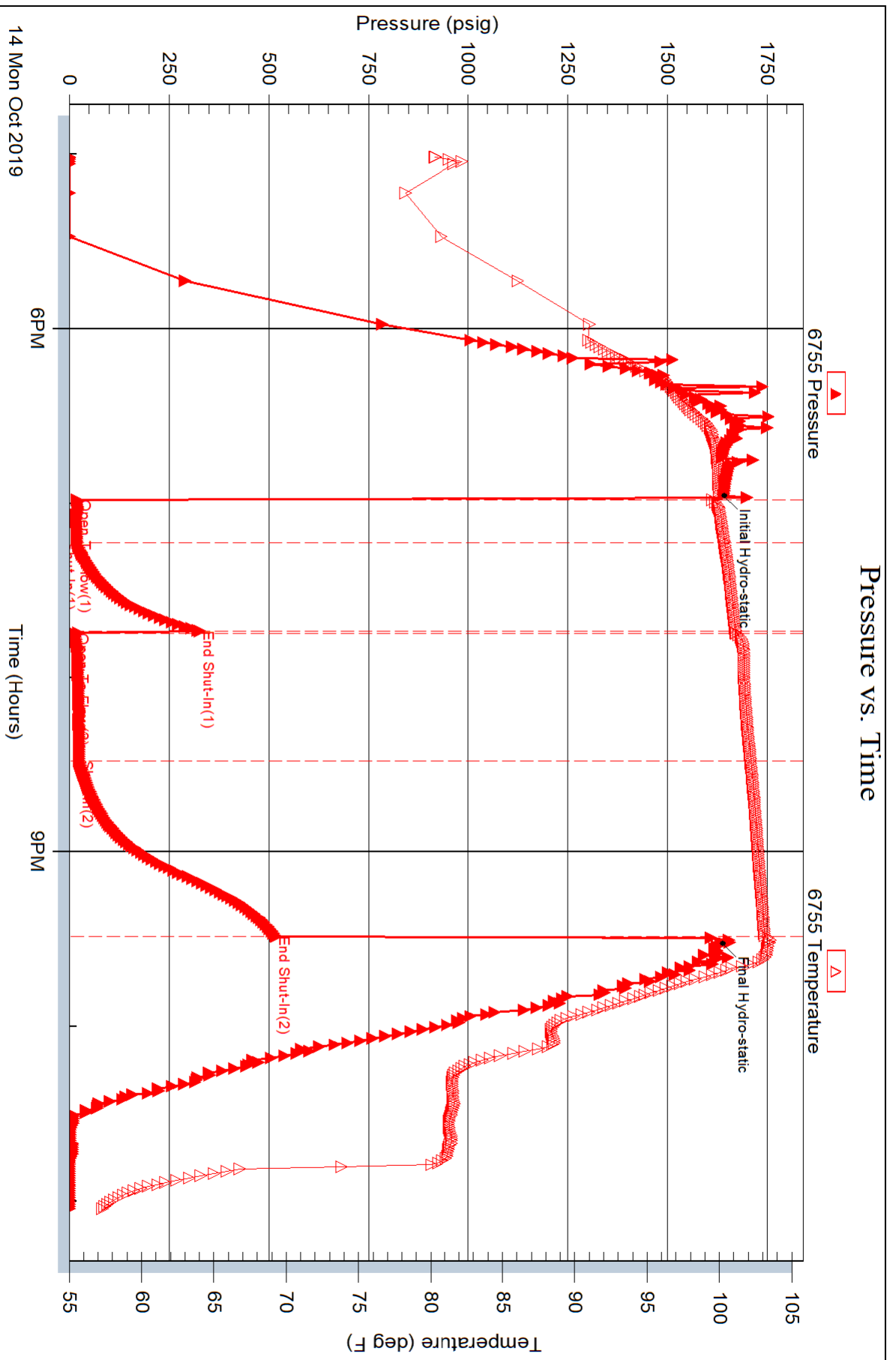
Bird Dog Oil LLC

Hall Gates 2-5

DST Test Number: 1









**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates #2-5**

Job Ticket: 66253

**DST#: 2**

Test Start: 2019.10.15 @ 16:47:00

## GENERAL INFORMATION:

Formation: **Lansing/Kansas City**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 18:22:17

Time Test Ended: 22:49:02

Test Type: Conventional Bottom Hole (Initial)

Tester: Ken Swinney

Unit No: 72 Great Bend/ 32

Interval: **3498.00 ft (KB) To 3592.00 ft (KB) (TVD)**

Reference Elevations: 1910.00 ft (KB)

Total Depth: 3592.00 ft (KB) (TVD)

1901.00 ft (CF)

Hole Diameter: 7.80 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

**Serial #: 8365**

**Inside**

Press@RunDepth: 40.84 psig @ 3499.00 ft (KB)

Capacity: psig

Start Date: 2019.10.15

End Date:

2019.10.15

Last Calib.:

2019.10.15

Start Time:

16:47:01

End Time:

22:49:02

Time On Btm:

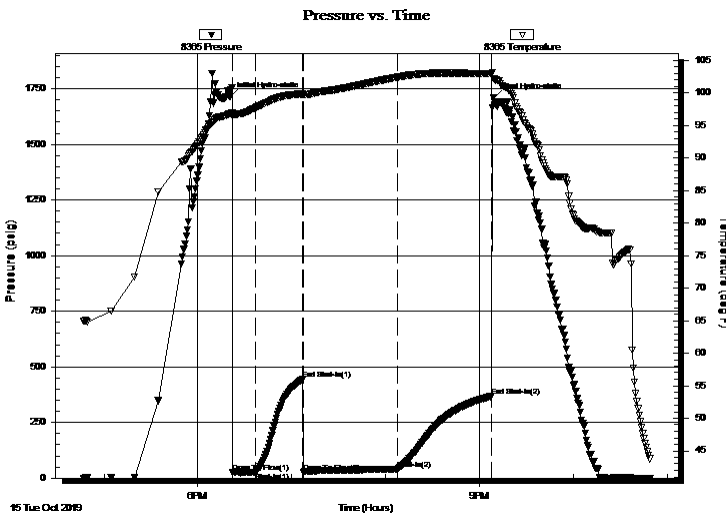
2019.10.15 @ 18:20:47

Time Off Btm:

2019.10.15 @ 21:09:17

TEST COMMENT: IF 15 Minutes/ Blow built to 5 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 60 Minutes/ Blow built to 9 inches  
 FSI 60 Minutes/ No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1715.56	96.80	Initial Hydro-static
2	25.41	96.52	Open To Flow (1)
16	27.01	97.68	Shut-In(1)
47	443.54	99.78	End Shut-In(1)
47	25.29	99.71	Open To Flow (2)
107	40.84	102.39	Shut-In(2)
167	368.61	102.89	End Shut-In(2)
169	1709.52	102.09	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
45.00	VSOCWM/ O 5% W 40% M 55%	0.63
0.00	135 feet GIP	0.00

## Gas Rates

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



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates #2-5**

Job Ticket: 66253

**DST#: 2**

Test Start: 2019.10.15 @ 16:47:00

## GENERAL INFORMATION:

Formation: **Lansing/Kansas City**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 18:22:17

Time Test Ended: 22:49:02

Test Type: Conventional Bottom Hole (Initial)

Tester: Ken Swinney

Unit No: 72 Great Bend/ 32

Interval: **3498.00 ft (KB) To 3592.00 ft (KB) (TVD)**

Reference Elevations: 1910.00 ft (KB)

Total Depth: 3592.00 ft (KB) (TVD)

1901.00 ft (CF)

Hole Diameter: 7.80 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

**Serial #: 6755 Outside**

Press@RunDepth: 366.57 psig @ 3500.00 ft (KB)

Capacity: psig

Start Date: 2019.10.15

End Date:

2019.10.15

Last Calib.:

2019.10.15

Start Time: 16:47:01

End Time:

22:49:02

Time On Btm:

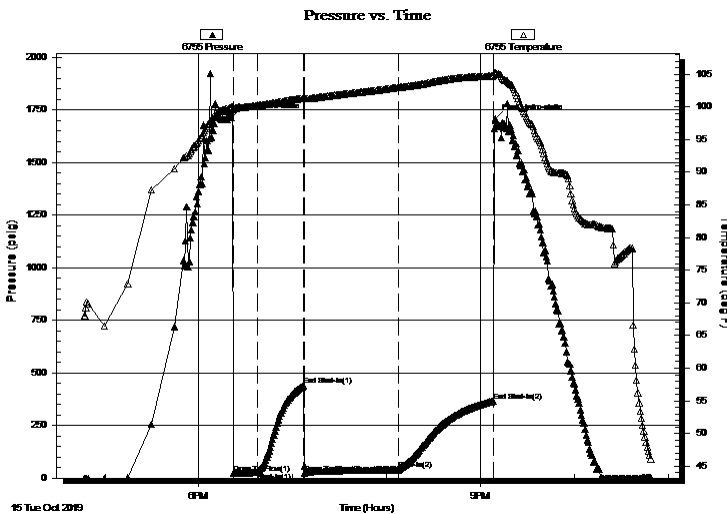
2019.10.15 @ 18:20:47

Time Off Btm:

2019.10.15 @ 21:09:17

TEST COMMENT: IF 15 Minutes/ Blow built to 5 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 60 Minutes/ Blow built to 9 inches  
 FSI 60 Minutes/ No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1714.05	99.93	Initial Hydro-static
2	24.71	99.73	Open To Flow (1)
17	26.47	100.19	Shut-In(1)
46	440.19	101.29	End Shut-In(1)
47	24.39	101.27	Open To Flow (2)
107	40.57	102.97	Shut-In(2)
167	366.57	104.77	End Shut-In(2)
169	1709.52	105.23	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
45.00	VSOCWM/ O 5% W 40% M 55%	0.63
0.00	135 feet GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**  
**Hall Gates #2-5**  
Job Ticket: 66253      **DST#: 2**  
Test Start: 2019.10.15 @ 16:47:00

## Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	32000 ppm
Viscosity: 53.00 sec/qt	Cushion Volume: bbl		
Water Loss: 9.19 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 8200.00 ppm			
Filter Cake: 1.00 inches			

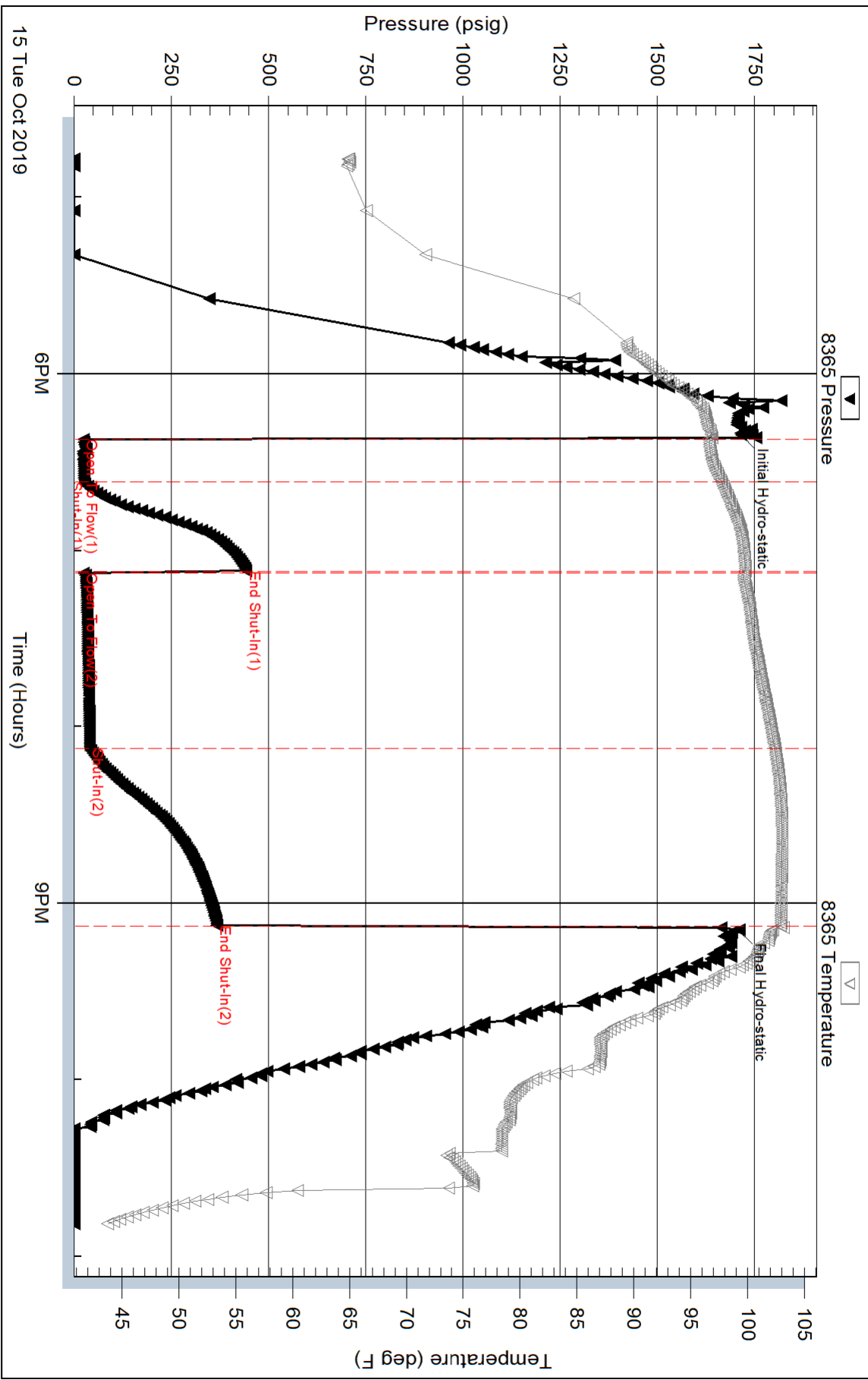
## Recovery Information

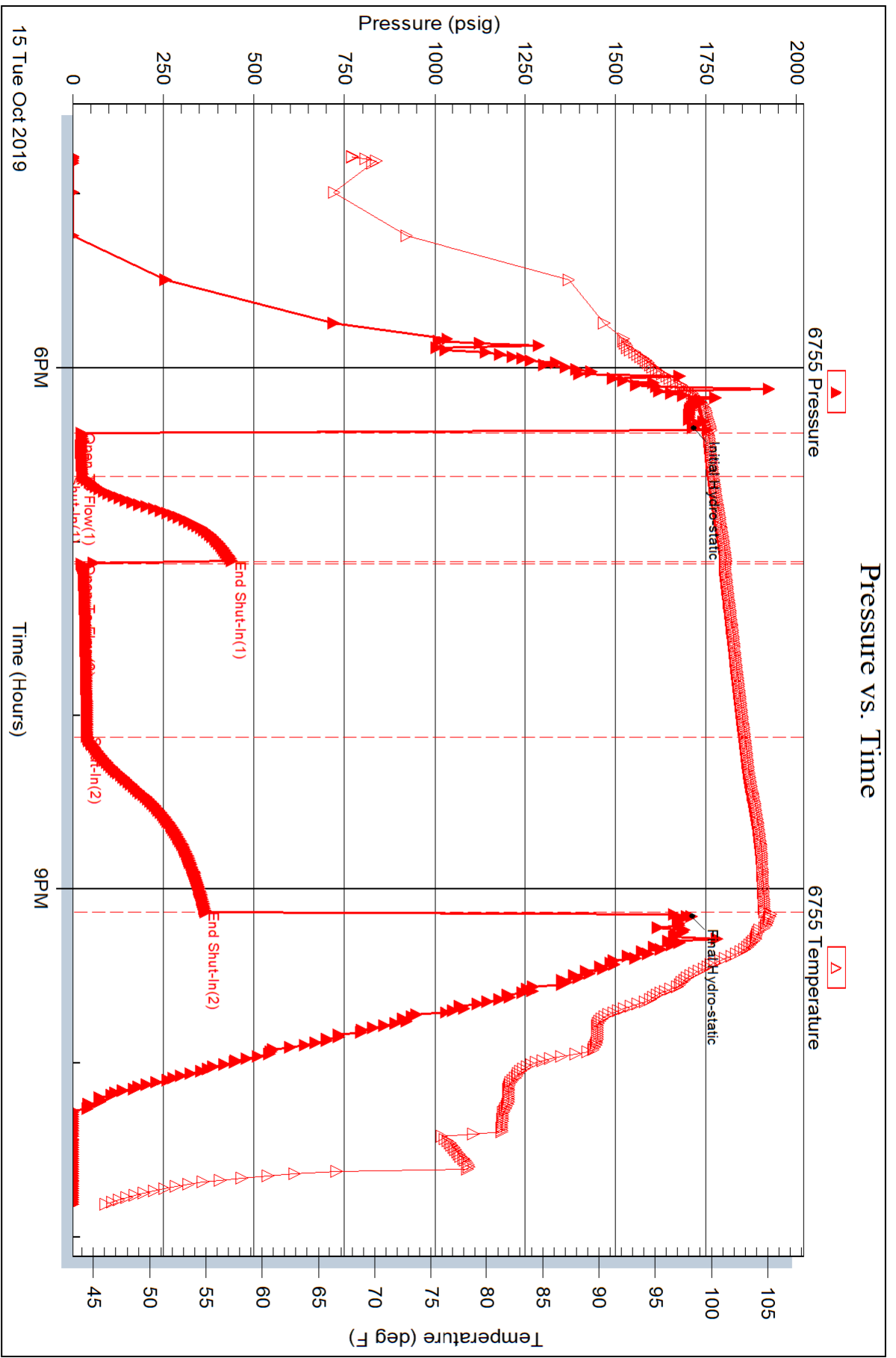
Recovery Table

Length ft	Description	Volume bbl
45.00	VSOCWM/ O 5% W 40% M 55%	0.631
0.00	135 feet GIP	0.000

Total Length: 45.00 ft      Total Volume: 0.631 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments: Recovery Resistivity .254 ohms @ 53 deg.

# Pressure vs. Time







**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66254

**DST#: 3**

Test Start: 2019.10.16 @ 10:38:00

## GENERAL INFORMATION:

Formation: **Viola**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:19:32  
 Time Test Ended: 15:36:17  
 Interval: **3644.00 ft (KB) To 3710.00 ft (KB) (TVD)**  
 Total Depth: 3710.00 ft (KB) (TVD)  
 Hole Diameter: 7.80 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 1901.00 ft (CF)  
 KB to GR/CF: 9.00 ft

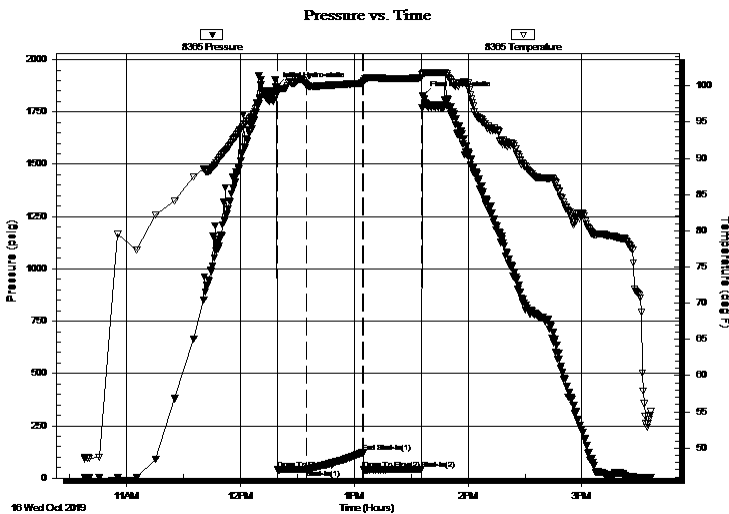
## Serial #: 8365

Inside

Press@RunDepth: 41.54 psig @ 3645.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.16 End Date: 2019.10.16 Last Calib.: 2019.10.16  
 Start Time: 10:38:01 End Time: 15:36:17 Time On Btm: 2019.10.16 @ 12:19:17  
 Time Off Btm: 2019.10.16 @ 13:36:17

TEST COMMENT: IF 15 Minutes/ Blow built to 1 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 15 Minutes/ Blow built to 1 1/2 inch  
 Pull Test

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1872.32	99.44	Initial Hydro-static
1	40.45	98.92	Open To Flow (1)
16	41.54	100.11	Shut-In(1)
46	122.76	100.40	End Shut-In(1)
46	42.30	100.54	Open To Flow (2)
76	43.49	101.15	Shut-In(2)
77	1826.76	101.69	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.21

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66254

**DST#: 3**

Test Start: 2019.10.16 @ 10:38:00

## GENERAL INFORMATION:

Formation: **Viola**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:19:32  
 Time Test Ended: 15:36:17  
 Interval: **3644.00 ft (KB) To 3710.00 ft (KB) (TVD)**  
 Total Depth: 3710.00 ft (KB) (TVD)  
 Hole Diameter: 7.80 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 1901.00 ft (CF)  
 KB to GR/CF: 9.00 ft

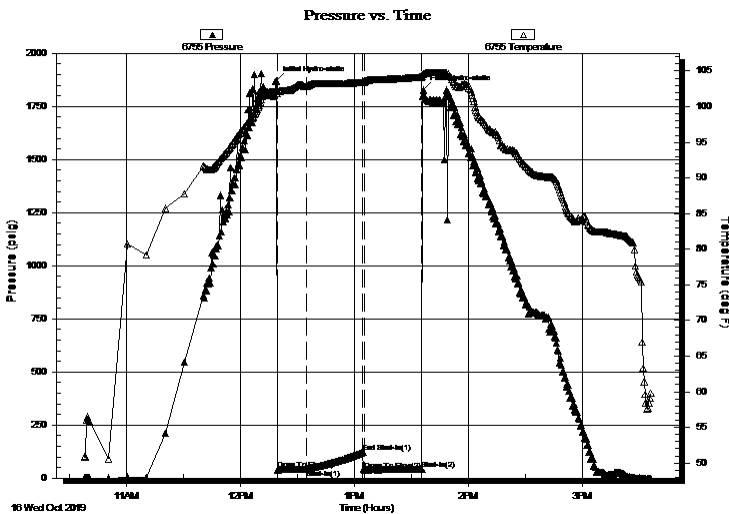
## Serial #: 6755

**Outside**

Press@RunDepth: 122.86 psig @ 3646.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.16 End Date: 2019.10.16 Last Calib.: 2019.10.16  
 Start Time: 10:38:01 End Time: 15:36:17 Time On Btm: 2019.10.16 @ 12:19:02  
 Time Off Btm: 2019.10.16 @ 13:36:17

TEST COMMENT: IF 15 Minutes/ Blow built to 1 1/4 inch  
 ISI 30 Minutes/ No blow back  
 FF 15 Minutes/ Blow built to 1 1/2 inch  
 Pull Test

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1869.64	102.25	Initial Hydro-static
1	39.75	101.87	Open To Flow (1)
16	41.87	102.83	Shut-In(1)
46	122.86	103.43	End Shut-In(1)
47	39.10	103.50	Open To Flow (2)
77	43.52	104.19	Shut-In(2)
78	1827.29	104.54	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.21

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**  
**Hall Gates 2-5**  
Job Ticket: 66254      **DST#: 3**  
Test Start: 2019.10.16 @ 10:38:00

## Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 53.00 sec/qt	Cushion Volume: bbl		
Water Loss: 9.19 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 8200.00 ppm			
Filter Cake: 1.00 inches			

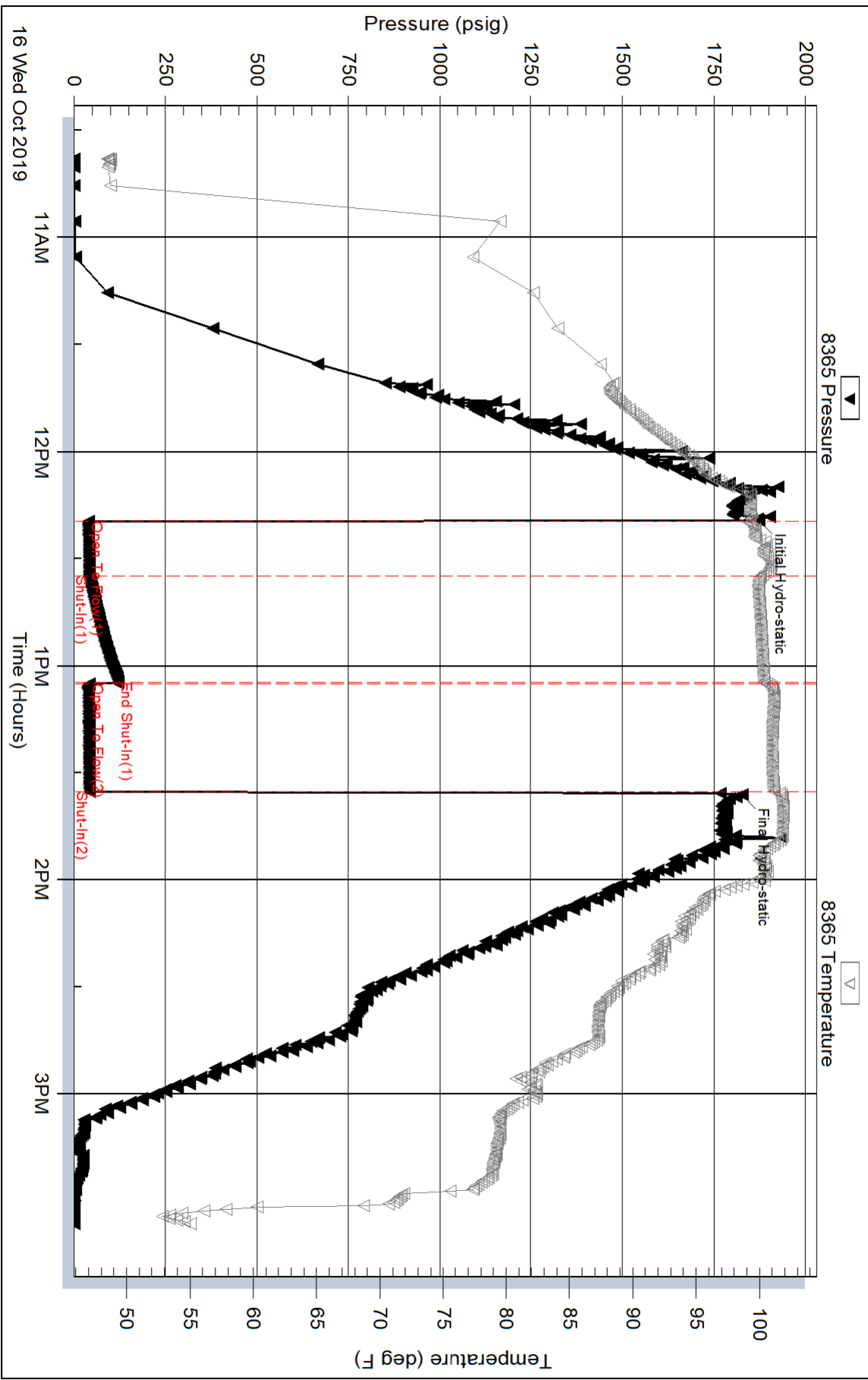
## Recovery Information

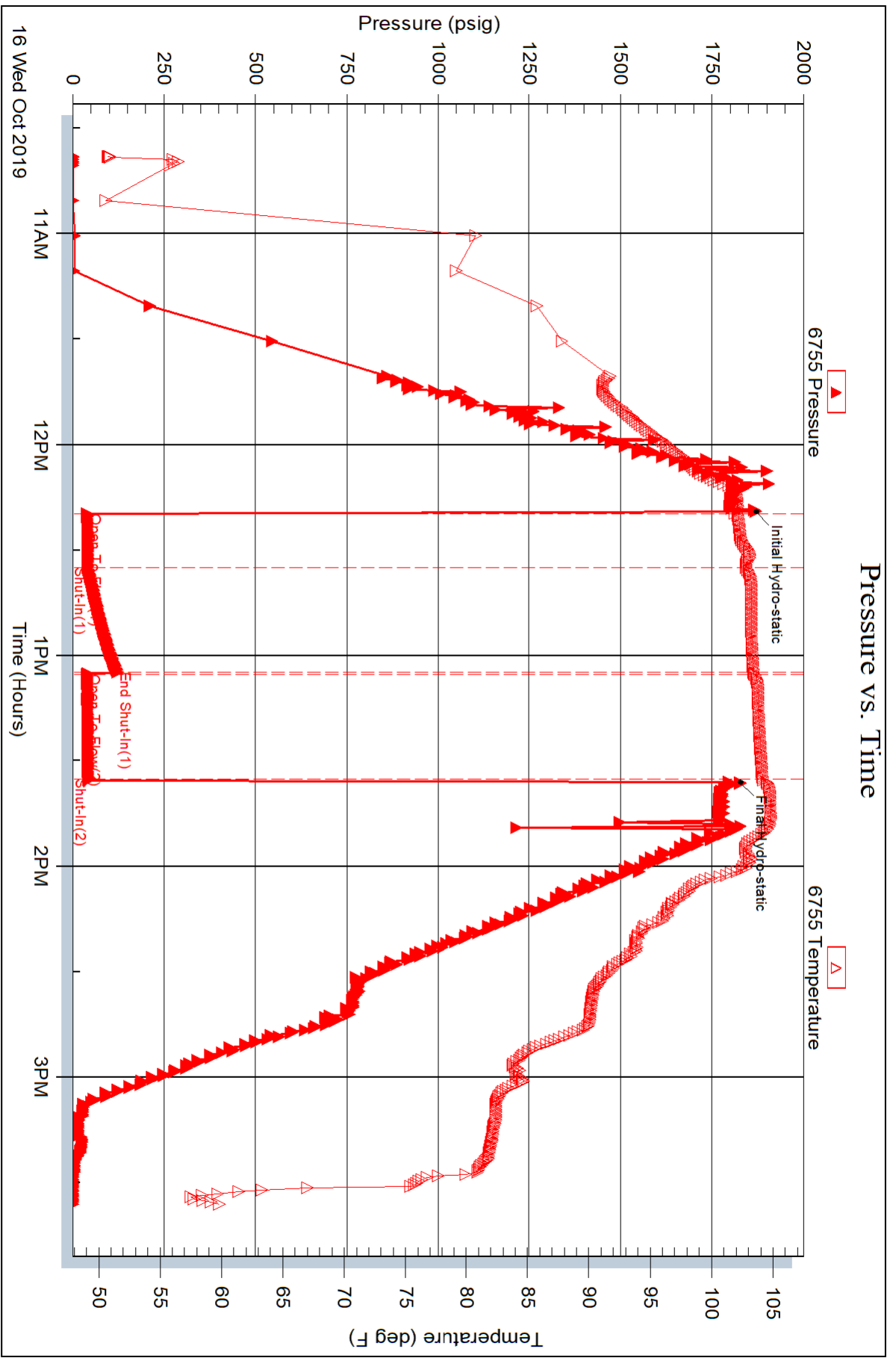
Recovery Table

Length ft	Description	Volume bbl
15.00	Mud 100%	0.210

Total Length: 15.00 ft      Total Volume: 0.210 bbl  
Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
Laboratory Name:      Laboratory Location:  
Recovery Comments:

### Pressure vs. Time







**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66255

**DST#: 4**

Test Start: 2019.10.16 @ 23:50:00

## GENERAL INFORMATION:

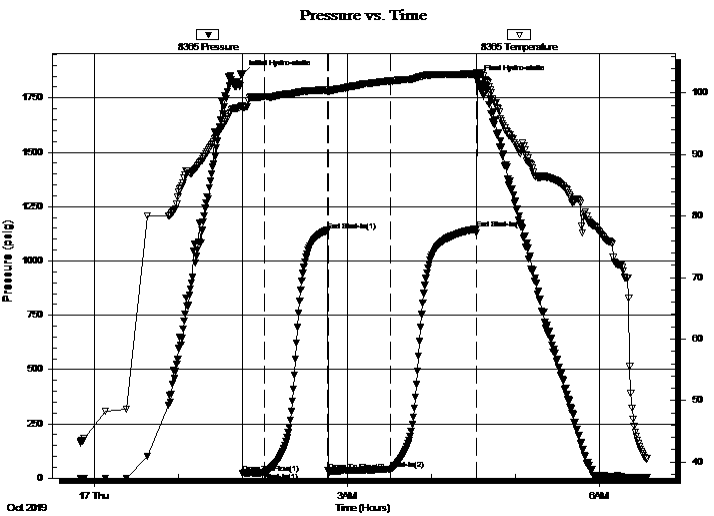
Formation: **Arbuckle**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 01:45:47  
 Time Test Ended: 06:34:02  
 Interval: **3705.00 ft (KB) To 3765.00 ft (KB) (TVD)**  
 Total Depth: 3765.00 ft (KB) (TVD)  
 Hole Diameter: 7.80 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 1901.00 ft (CF)  
 KB to GR/CF: 9.00 ft

## Serial #: 8365

Inside

Press@RunDepth: 41.49 psig @ 3706.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.16 End Date: 2019.10.17 Last Calib.: 2019.10.17  
 Start Time: 23:50:01 End Time: 06:34:02 Time On Btm: 2019.10.17 @ 01:45:17  
 Time Off Btm: 2019.10.17 @ 04:32:47

TEST COMMENT: IF 15 Minutes/ Blow built to 7 1/2 inches  
 ISI 45 Minutes/ No blow back  
 FF 45 Minutes/ Blow built to BOB in 5 minutes/ Total build 33 inches  
 FSI 60 Minutes/ No blow back



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1858.14	97.92	Initial Hydro-static
1	21.76	97.56	Open To Flow (1)
16	25.87	99.42	Shut-In(1)
61	1140.82	100.47	End Shut-In(1)
62	33.20	100.18	Open To Flow (2)
106	41.49	101.95	Shut-In(2)
167	1147.69	103.11	End Shut-In(2)
168	1833.47	103.35	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
62.00	GOM/ G 40% O 30% M 30%	0.87
0.00	310 feet GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66255

**DST#: 4**

Test Start: 2019.10.16 @ 23:50:00

## GENERAL INFORMATION:

Formation: **Arbuckle**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 01:45:47

Time Test Ended: 06:34:02

Test Type: Conventional Bottom Hole (Initial)

Tester: Ken Swinney

Unit No: 72 Great Bend/ 32

**Interval: 3705.00 ft (KB) To 3765.00 ft (KB) (TVD)**

Reference Elevations: 1910.00 ft (KB)

Total Depth: 3765.00 ft (KB) (TVD)

1901.00 ft (CF)

Hole Diameter: 7.80 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

**Serial #: 6755 Outside**

Press@RunDepth: 1146.70 psig @ 3707.00 ft (KB)

Capacity: psig

Start Date: 2019.10.16

End Date:

2019.10.17

Last Calib.:

2019.10.17

Start Time: 23:50:01

End Time:

06:34:02

Time On Btm:

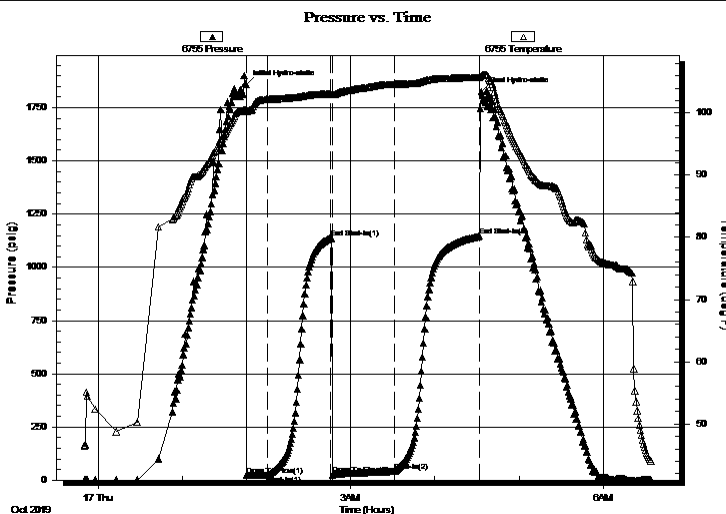
2019.10.17 @ 01:45:32

Time Off Btm:

2019.10.17 @ 04:33:17

**TEST COMMENT:** IF 15 Minutes/ Blow built to 7 1/2 inches  
ISI 45 Minutes/ No blow back  
FF 45 Minutes/ Blow built to BOB in 5 minutes/ Total build 33 inches  
FSI 60 Minutes/ No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1858.11	100.65	Initial Hydro-static
1	21.20	100.30	Open To Flow (1)
16	23.85	102.26	Shut-In(1)
61	1139.28	103.10	End Shut-In(1)
62	25.34	102.92	Open To Flow (2)
106	41.01	104.63	Shut-In(2)
167	1146.70	105.77	End Shut-In(2)
168	1826.67	105.99	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
62.00	GOM/ G 40% O 30% M 30%	0.87
0.00	310 feet GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Bird Dog Oil LLC

**5/22S/13W/Stafford**

1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**Hall Gates 2-5**

Job Ticket: 66255

**DST#: 4**

Test Start: 2019.10.16 @ 23:50:00

## Mud and Cushion Information

Mud Type: Gel Chem

Mud Weight: 10.00 lb/gal

Viscosity: 48.00 sec/qt

Water Loss: 10.38 in<sup>3</sup>

Resistivity: ohm.m

Salinity: 8600.00 ppm

Filter Cake: 1.00 inches

Cushion Type:

Cushion Length: ft

Cushion Volume: bbl

Gas Cushion Type:

Gas Cushion Pressure: psig

Oil API:

Water Salinity: deg API

ppm

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
62.00	GOM/ G 40% O 30% M 30%	0.870
0.00	310 feet GIP	0.000

Total Length: 62.00 ft      Total Volume: 0.870 bbl

Num Fluid Samples: 0

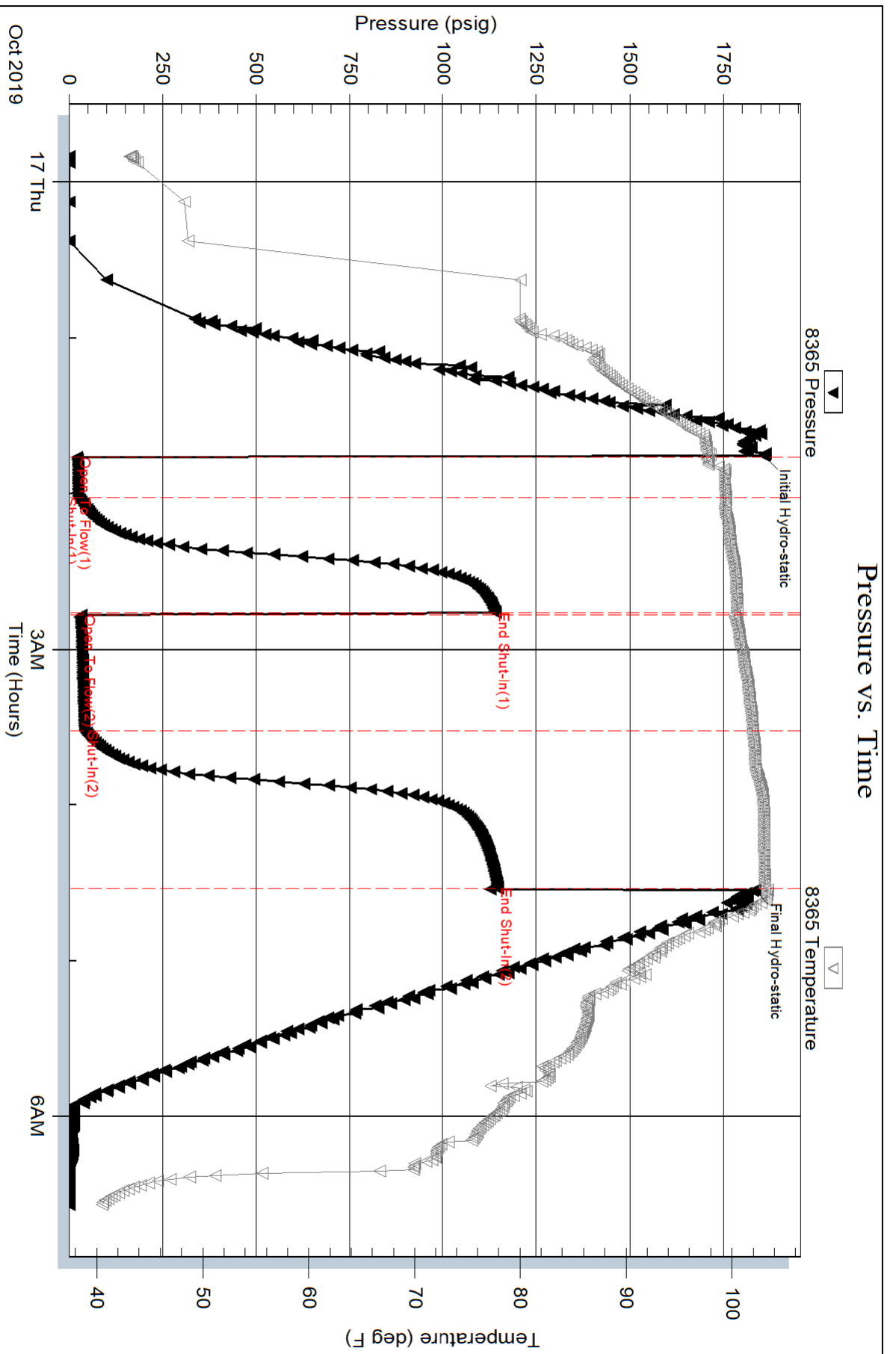
Num Gas Bombs: 0

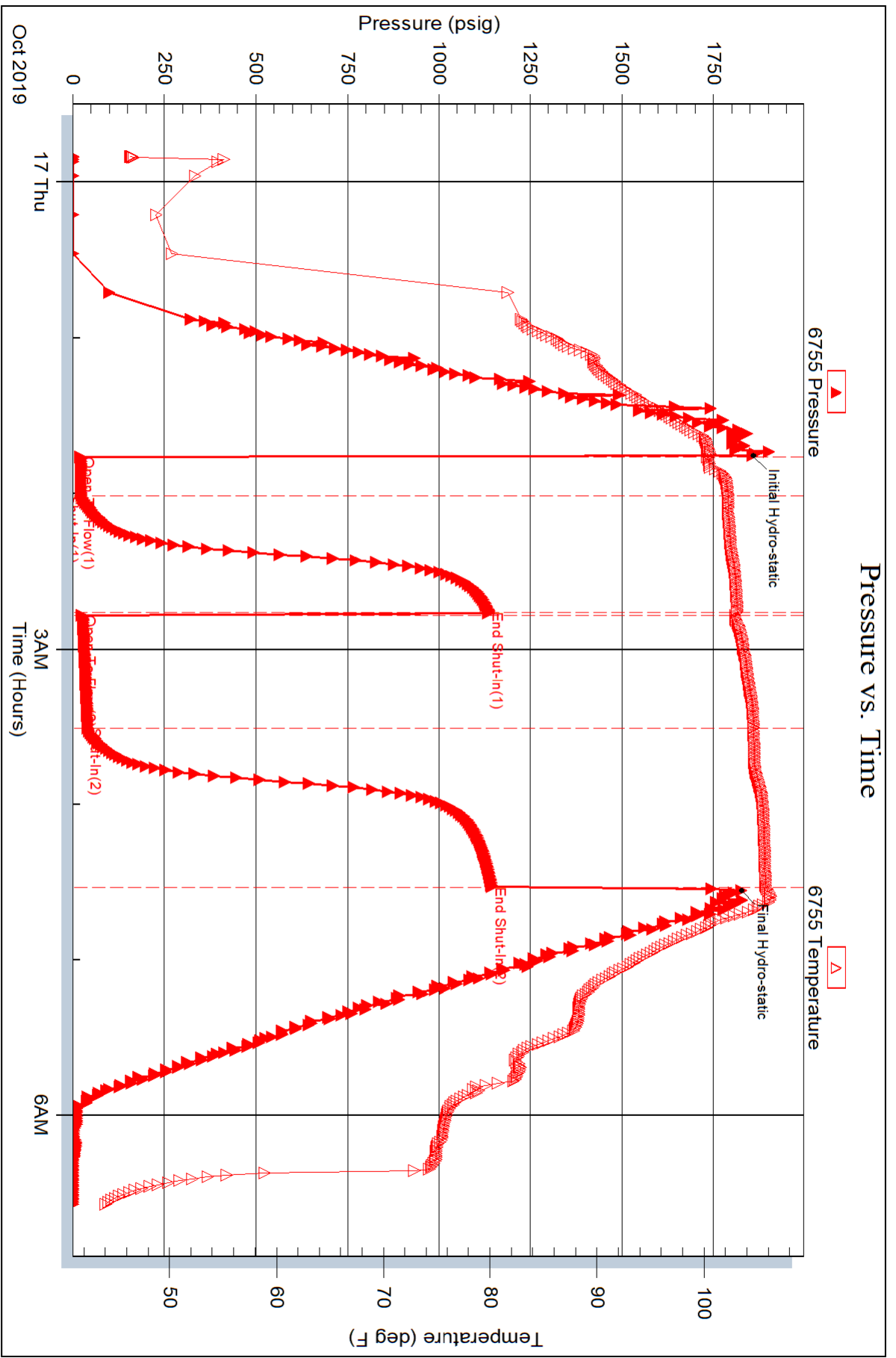
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:









**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66256

**DST#: 5**

Test Start: 2019.10.17 @ 13:22:00

## GENERAL INFORMATION:

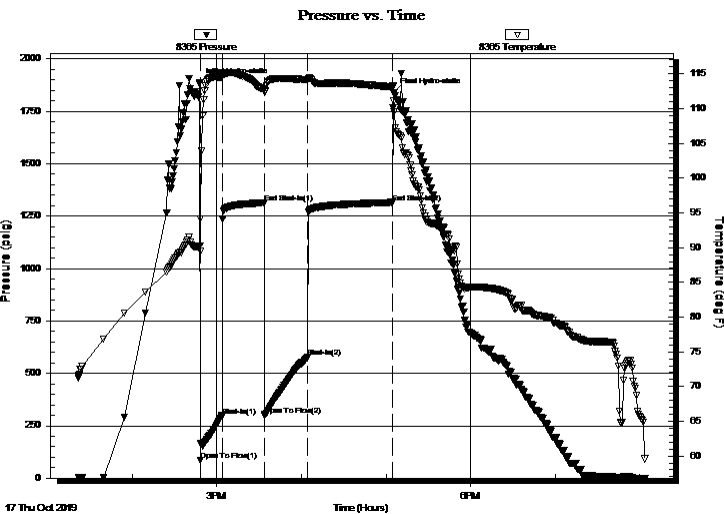
Formation: **Arbuckle**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 14:48:17  
 Time Test Ended: 20:04:02  
 Interval: **3766.00 ft (KB) To 3771.00 ft (KB) (TVD)**  
 Total Depth: 3771.00 ft (KB) (TVD)  
 Hole Diameter: 7.80 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 1901.00 ft (CF)  
 KB to GR/CF: 9.00 ft

## Serial #: 8365

Inside

Press@RunDepth: 575.41 psig @ 3767.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.17 End Date: 2019.10.17 Last Calib.: 2019.10.17  
 Start Time: 13:22:01 End Time: 20:04:02 Time On Btm: 2019.10.17 @ 14:48:02  
 Time Off Btm: 2019.10.17 @ 17:05:32

TEST COMMENT: IF 15 Minutes/ Blow to BOB in 1 1/2 minutes/ Total build 80 inches  
 ISI 30 Minutes/ 2 inch blow back  
 FF 30 Minutes/ Blow to BOB in 3 minutes/ Total build 118 inches  
 FSI 60 Minutes/ 3 inch blow back



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1887.42	90.22	Initial Hydro-static
1	85.96	89.44	Open To Flow (1)
16	296.86	114.54	Shut-In(1)
46	1313.17	112.75	End Shut-In(1)
46	298.37	112.37	Open To Flow (2)
77	575.41	114.22	Shut-In(2)
137	1315.12	113.12	End Shut-In(2)
138	1837.18	111.07	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
62.00	OCMW / O 5% M 10% W 85%	0.87
310.00	GMCWO / G 5% M 5% W 20% O 70%	4.35
1023.00	GO / G 10% O 90%	14.35
0.00	155 GIP	0.00

## Gas Rates

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



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Bird Dog Oil LLC  
 1801 Broadway  
 Suite 200  
 Denver CO 80202+3840  
 ATTN: Justin Carter

**5/22S/13W/Stafford**

**Hall Gates 2-5**

Job Ticket: 66256

**DST#: 5**

Test Start: 2019.10.17 @ 13:22:00

## GENERAL INFORMATION:

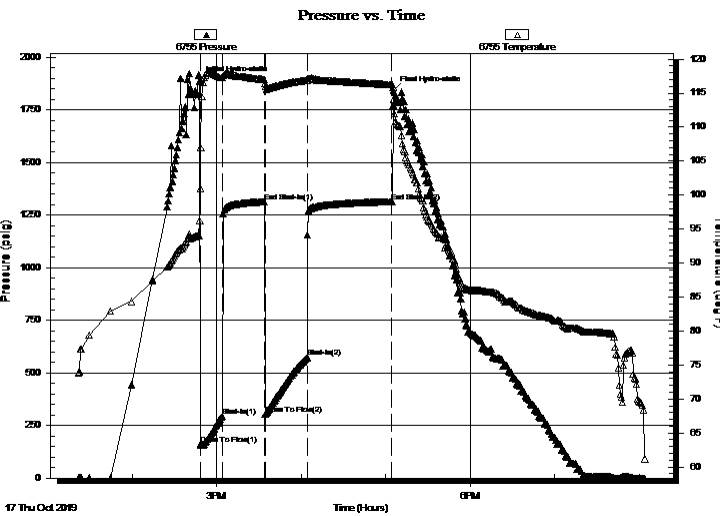
Formation: **Arbuckle**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 14:48:17  
 Time Test Ended: 20:04:02  
 Interval: **3766.00 ft (KB) To 3771.00 ft (KB) (TVD)**  
 Total Depth: 3771.00 ft (KB) (TVD)  
 Hole Diameter: 7.80 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Initial)  
 Tester: Ken Swinney  
 Unit No: 72 Great Bend/ 32  
 Reference Elevations: 1910.00 ft (KB)  
 1901.00 ft (CF)  
 KB to GR/CF: 9.00 ft

## Serial #: 6755

**Outside**

Press@RunDepth: 1313.80 psig @ 3768.00 ft (KB) Capacity: psig  
 Start Date: 2019.10.17 End Date: 2019.10.17 Last Calib.: 2019.10.17  
 Start Time: 13:22:01 End Time: 20:04:02 Time On Btm: 2019.10.17 @ 14:48:02  
 Time Off Btm: 2019.10.17 @ 17:05:32

TEST COMMENT: IF 15 Minutes/ Blow to BOB in 1 1/2 minutes/ Total build 80 inches  
 ISI 30 Minutes/ 2 inch blow back  
 FF 30 Minutes/ Blow to BOB in 3 minutes/ Total build 118 inches  
 FSI 60 Minutes/ 3 inch blow back



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1886.87	96.20	Initial Hydro-static
1	162.88	101.00	Open To Flow (1)
16	294.37	117.23	Shut-In(1)
46	1312.81	116.95	End Shut-In(1)
47	302.62	116.37	Open To Flow (2)
77	573.36	116.92	Shut-In(2)
136	1313.80	116.22	End Shut-In(2)
138	1840.61	114.01	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
62.00	OCMW / O 5% M 10% W 85%	0.87
310.00	GMCWO / G 5% M 5% W 20% O 70%	4.35
1023.00	GO / G 10% O 90%	14.35
0.00	155 GIP	0.00

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Bird Dog Oil LLC  
1801 Broadway  
Suite 200  
Denver CO 80202+3840  
ATTN: Justin Carter

**5/22S/13W/Stafford**  
**Hall Gates 2-5**  
Job Ticket: 66256      **DST#: 5**  
Test Start: 2019.10.17 @ 13:22:00

## Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 28 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: 22000 ppm
Viscosity: 52.00 sec/qt	Cushion Volume: bbl	
Water Loss: 13.19 in <sup>3</sup>	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 11100.00 ppm		
Filter Cake: 1.00 inches		

## Recovery Information

Recovery Table

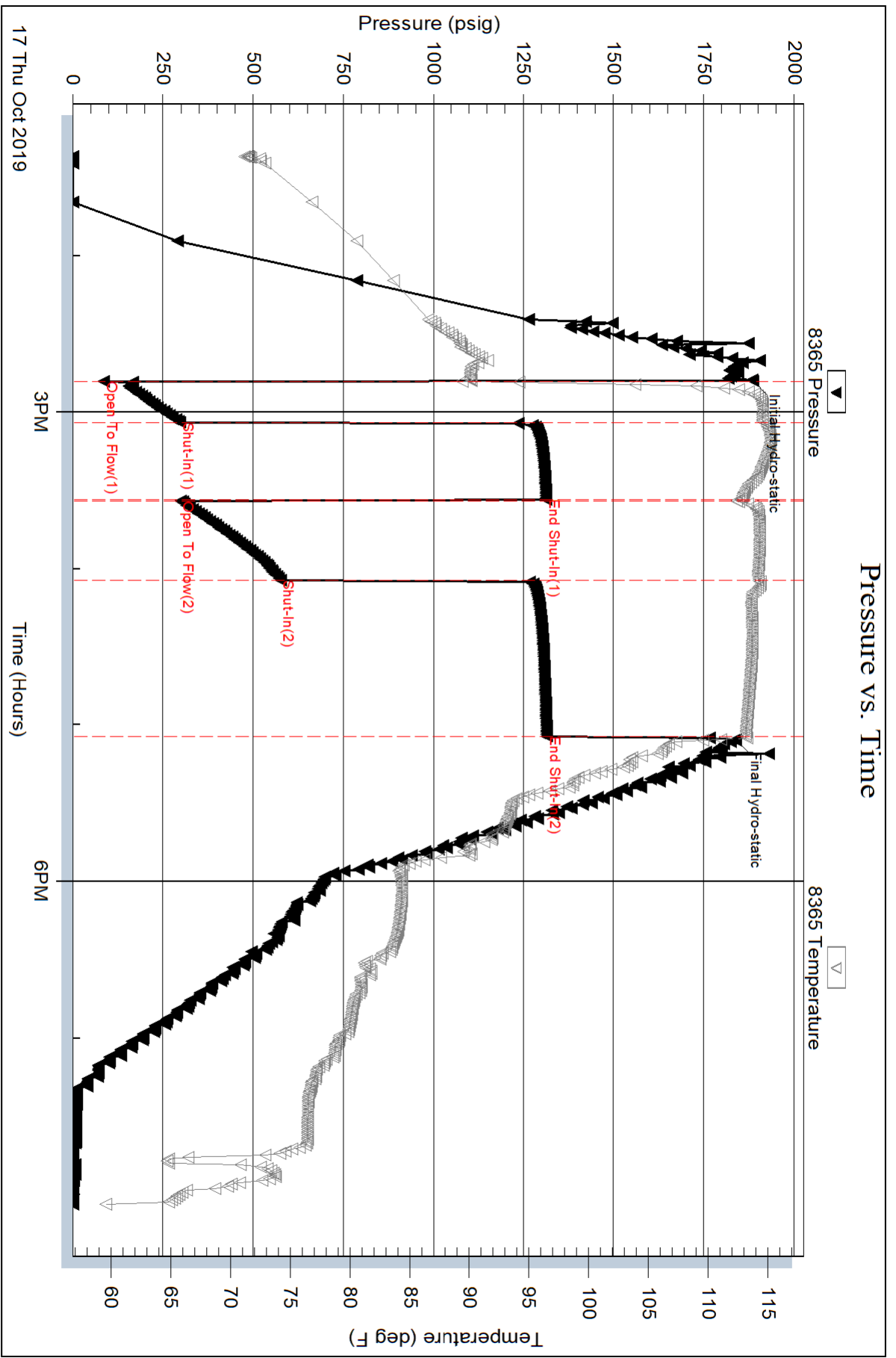
Length ft	Description	Volume bbl
62.00	OCMW / O 5% M 10% W 85%	0.870
310.00	GMCWO /G 5% M 5% W 20% O 70%	4.348
1023.00	GO / G 10% O 90%	14.350
0.00	155 GIP	0.000

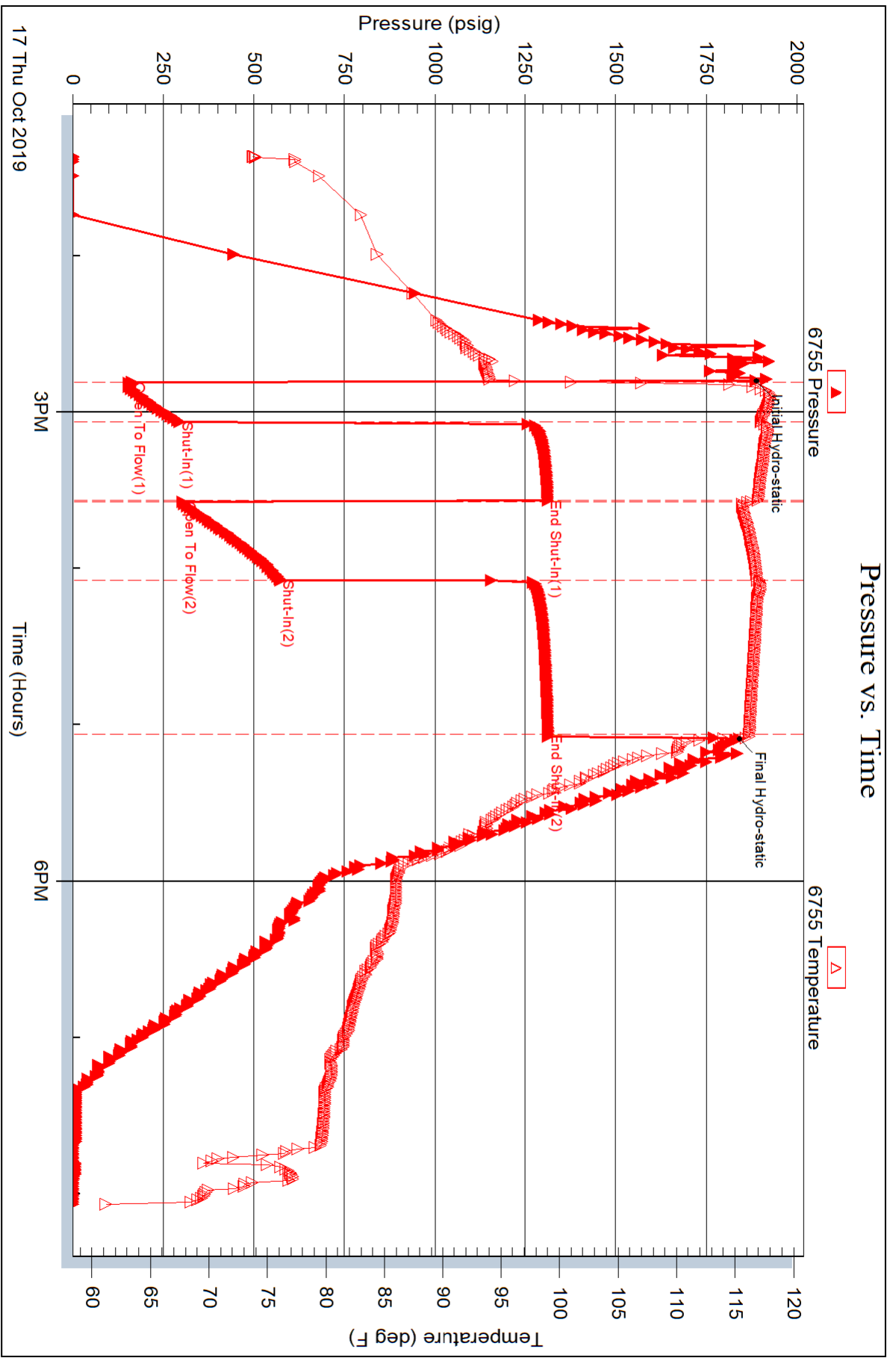
Total Length: 1395.00 ft      Total Volume: 19.568 bbl

Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:

Laboratory Name:      Laboratory Location:

Recovery Comments: Recovery Resistivity .293 ohms @ 68 deg





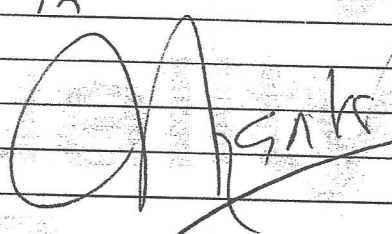
# QUALITY OILWELL CEMENTING, INC.

Federal Tax I.D.# 20-2886107

483-1071  
524-1041

Home Office P.O. Box 32 Russell, KS 67665

No. 1597

10.11.19	Sec. 5	Twp. 22	Range 13	County Stafford	State KS	On Location	Finish 2:00 AM
Lease Hall-Gates				Well No. #2-5		Location Great Bend 281 Hwy to Hwy 19	
Contractor Southwind #3		Owner I W 1/2 h well into		To Quality Oilwell Cementing, Inc. You are hereby requested to rent cementing equipment and furnish cementer and helper to assist owner or contractor to do work as listed.			
Type Job Surface		Hole Size 12 1/4		Charge To Bird Dog			
Csg. 8 5/8		Depth 432.50'		Street			
Tbg. Size		Depth		City		State	
Tool		Depth		The above was done to satisfaction and supervision of owner agent or contractor.			
Cement Left in Csg.		Shoe Joint 15'		Cement Amount Ordered 450 sk 8/20 3:1. 2:1.			
Meas Line		Displace 26 1/2 6 1/2 / 420		1/2 Flo seal			
<b>EQUIPMENT</b>				Common 360			
Pumptrk #17	No.	Cementer Tony P		Poz. Mix 90			
Bulktrk	No.	Driver David		Gel. 8			
Bulktrk #19	No.	Driver Mike		Calcium 16			
<b>JOB SERVICES &amp; REMARKS</b>				Hulls			
Remarks:				Salt			
Rat Hole USED: 450 sk 8/20				Flowseal 225 sk			
Mouse Hole 3:1. 2:1. * 1/2 Flo Seal				Kol-Seal			
Centralizers				Mud CLR 48			
Baskets				CFL-117 or CD110 CAF 38			
D/V or Port Collar				Sand			
* Set 8 5/8 @ 432.50 mixed sk 8/20 3:1. 2:1. 1/2 Flo				Handling 474			
* Displaced @ 26 1/2 6 1/2 / 420				Mileage			
* Cement to Surface!				<b>FLOAT EQUIPMENT</b>			
* Shut 8 5/8 in				Guide Shoe			
				Centralizer			
				Baskets			
				AFU Inserts			
				Float Shoe			
				Latch Down			
Pumptrk Charge Surface				Tax			
Mileage 17				Discount			
Signature Tony P				Total Charge			



# OILWELL CEMENTING, INC.

Federal Tax I.D.# 20-2886107

Home Office P.O. Box 32 Russell, KS 67665

No. 1609

1071  
1041

-18-19	Sec. 5	Twp. 22	Range 13W	County STAFFORD	State KANSAS	On Location	Finish 11:00 P.M
--------	--------	---------	-----------	-----------------	--------------	-------------	------------------

Lease Hall-Gates Well No. 2-5 Location GREAT Bend S. to Hwy 19. 1W 2N 8E

Contractor SOUTHWIND DRILLING Rig #3 "Jay" Owner To Quality Oilwell Cementing, Inc.  
 You are hereby requested to rent cementing equipment and furnish cementer and helper to assist owner or contractor to do work as listed.

Type Job PRODUCTION STRING Charge To BIRD DOG OIL CO. LLC.

Hole Size 7 7/8 T.D. 3850' Depth 3847'

Csg. 5 1/2 New 15.5" Street \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

Tbg. Size \_\_\_\_\_ Depth \_\_\_\_\_

Tool LATCH DOWN PLUG BASKET 3826' The above was done to satisfaction and supervision of owner agent or contractor.

Cement Left in Csg. 21.5" Shoe Joint 21.5" Cement Amount Order 200 PRO-QC

Meas Line \_\_\_\_\_ Displace 91/BBL 10% salt 5% gilsonite

**EQUIPMENT** Common 200 Q-pro-C

Pumptrk <u>17</u>	No.	Cementer	<u>GLENN G</u>	Poz. Mix
		Helper	<u>DAVID L.</u>	Gel.
Bulktrk <u>15</u>	No.	Driver	<u>TONY L.</u>	Calcium <u>KOL 2 gal</u>
		Driver		Hulls
Bulktrk	No.	Driver		Salt <u>15</u>
		Driver		Flowseal

**JOB SERVICES & REMARKS**

Remarks: Rat Hole 30 SX Mouse Hole 15 SX

Centralizers 1, 3, 5, 7, 9, 11, 13, 15 Mud CLR 48 500 Gal.

Baskets PIN OF #13 CFL-117 or CD110 CAF 38

D/V or Port Collar Sand

Ran 93 total JTS, SET @ 3847' Handling 223

Received CIRC. - DROP AFU BELL Mileage \_\_\_\_\_

CIRC. ON BOTTOM 1 HR. PUMP **FLOAT EQUIPMENT**

MUD FLUSH, PLUG RAT-MOUSE, Guide Shoe \_\_\_\_\_

CEMENT WITH 165 SX CEMENT Centralizer 8

CLEAR-LINE, RELEASE Baskets 1

LATCH DOWN PLUG - AFU Inserts \_\_\_\_\_

DISPLACED A TOTAL OF Float Shoe 1

91 1/4 BBL H2O - LIFT PRESSURE WAS 800#, LAND Latch Down 1

PLUG @ 1450#. RELEASE Pumptrk Charge PROD STRING

PRESSURE & AFU-PLUG Mileage 17

(HELD) Tax \_\_\_\_\_ Discount \_\_\_\_\_ Total Charge \_\_\_\_\_

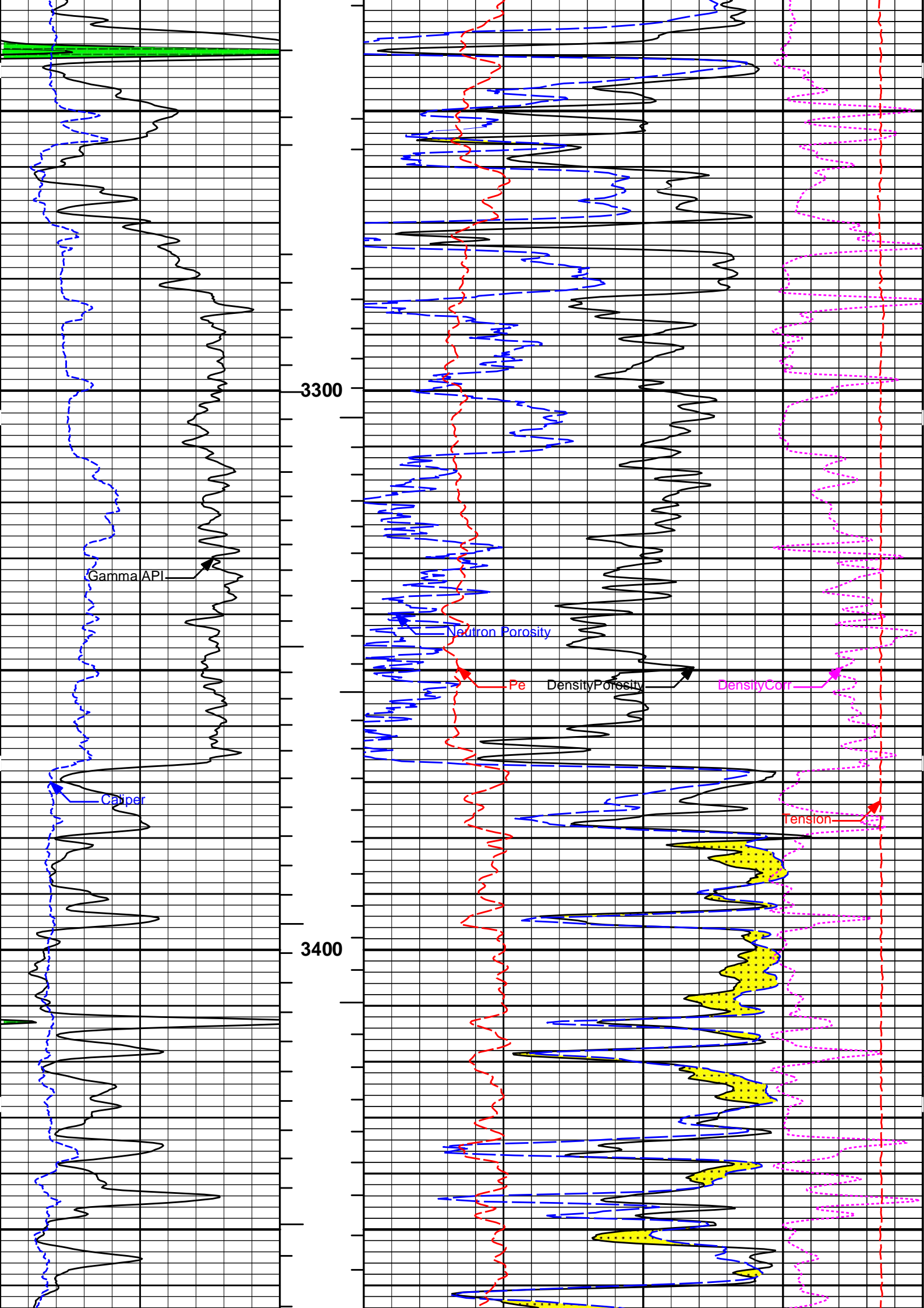
**THANK'S**

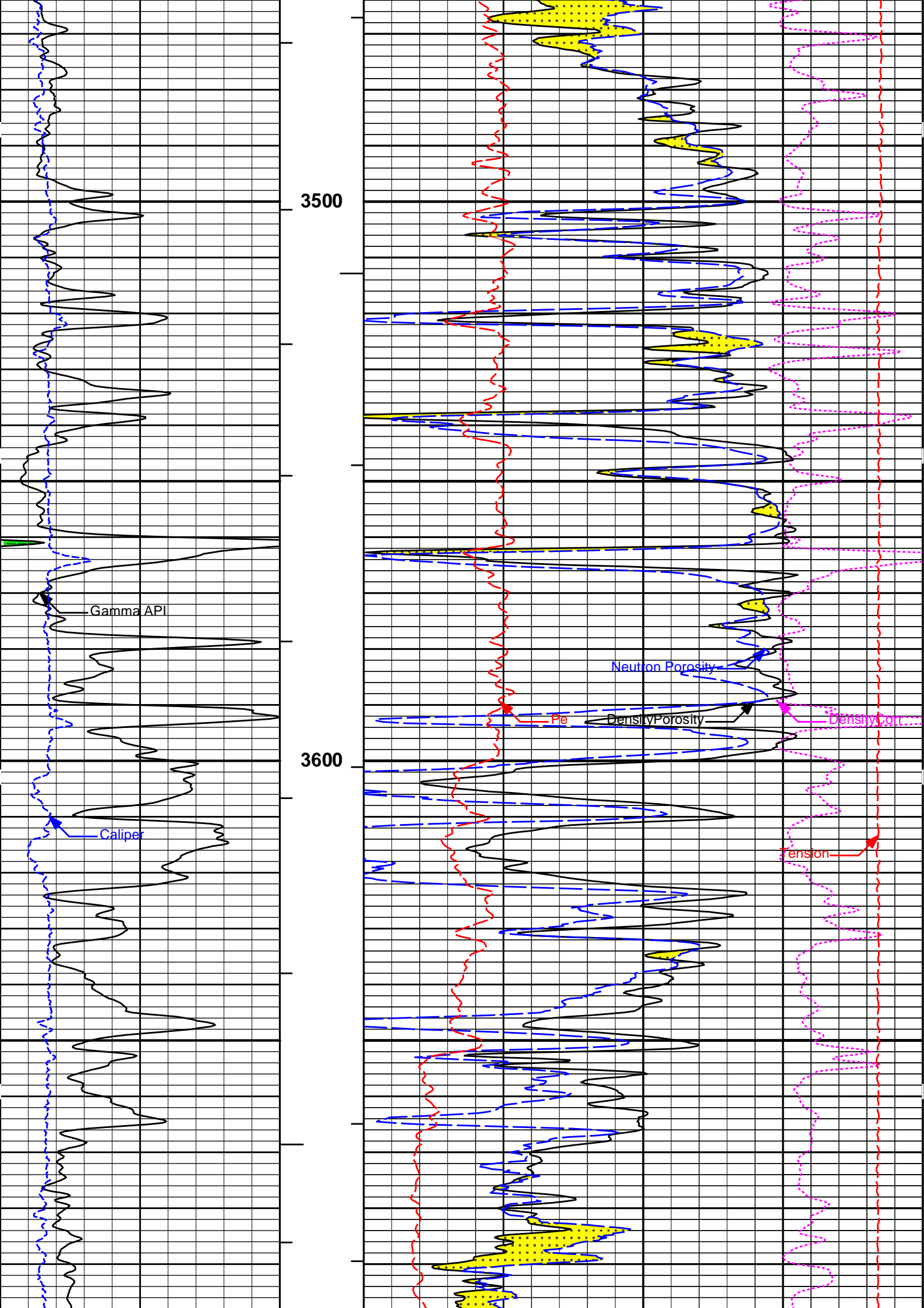
X Signature Jonny H...

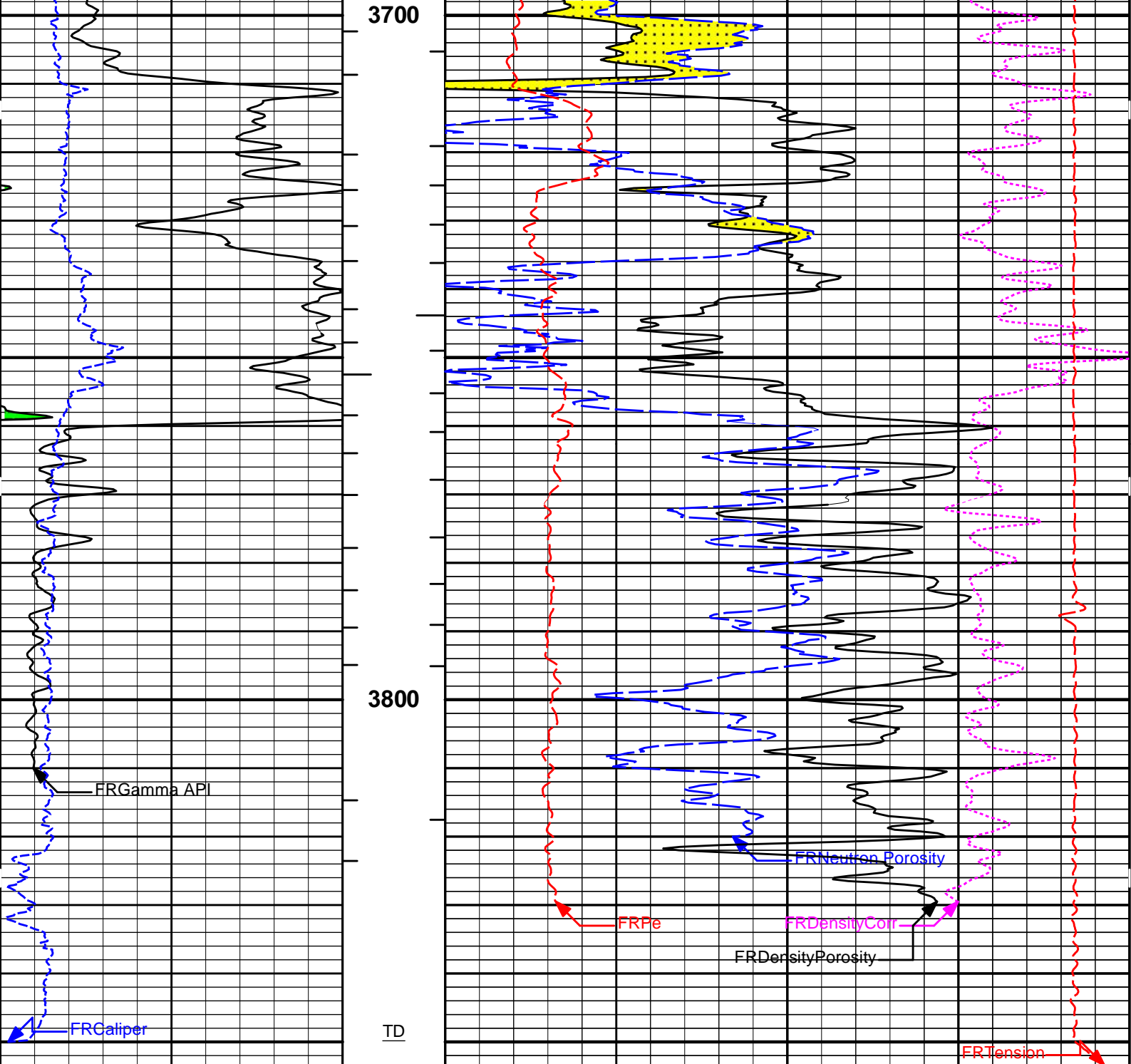












6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

**HALLIBURTON**

Plot Time: 18-Oct-19 11:24:18  
 Plot Range: 3195 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5\Well Based\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

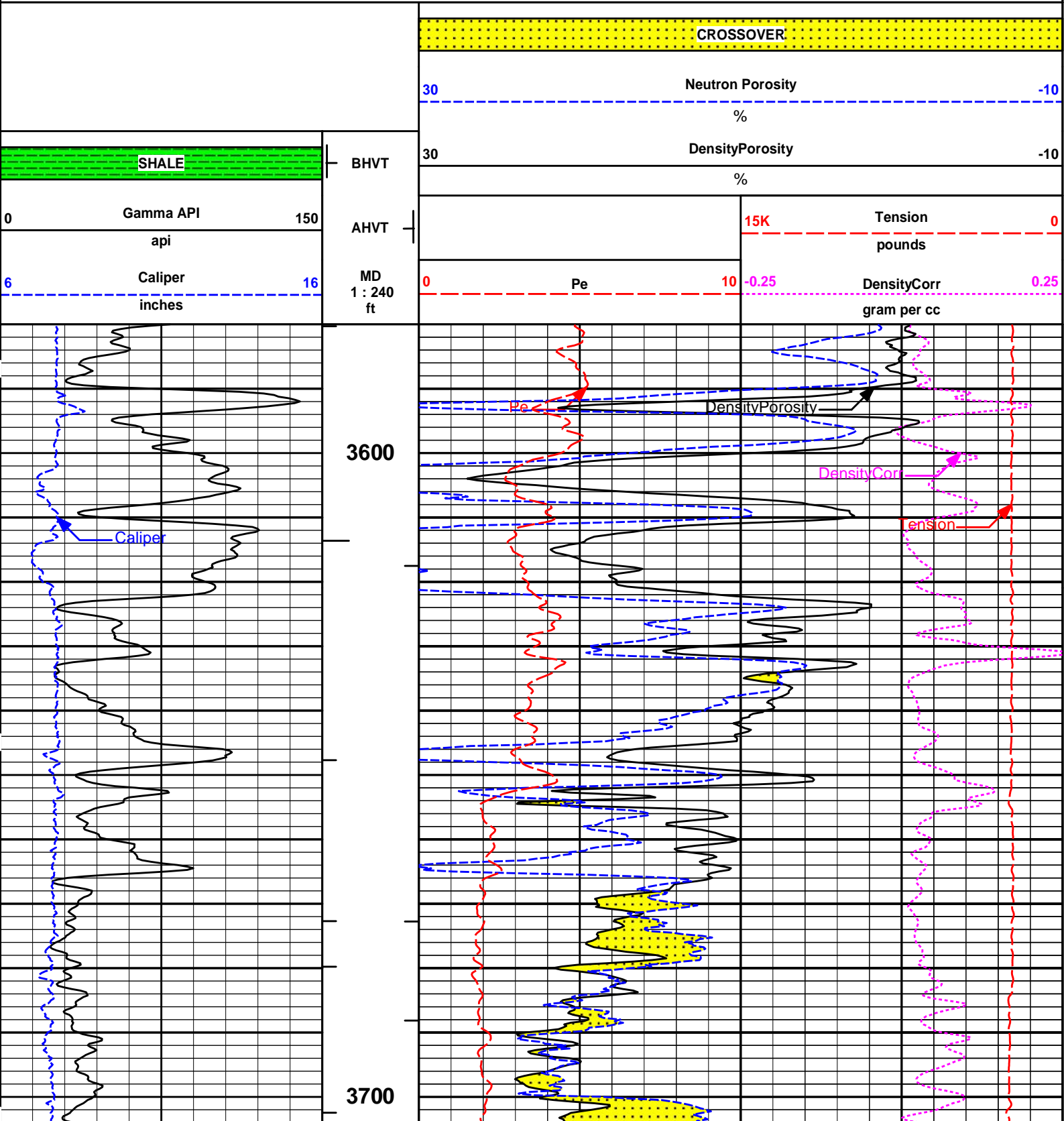
**5 INCH MAIN LOG**

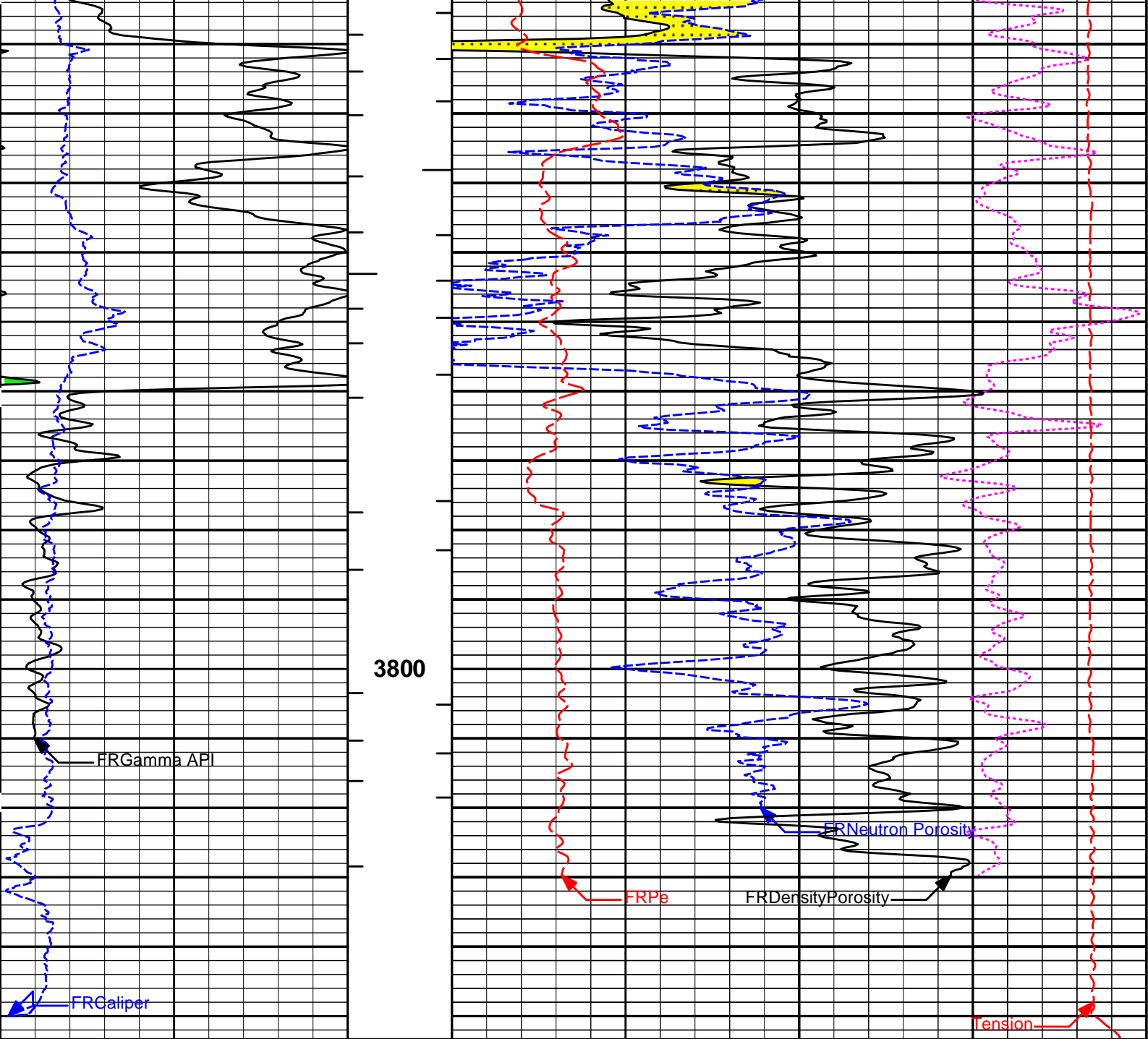
MEASURED DEPTH  
 MAIN SECTION 5" PER 100'

**HALLIBURTON**

Plot Time: 18-Oct-19 11:24:18  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5\Well Based\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_REP\_LIB

## REPEAT SECTION





6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

**HALLIBURTON**

Plot Time: 18-Oct-19 11:24:21  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5\Well Based\  
 Plot File: \\POROSITY\Porosity\_IQ\_5\_REP\_LIB

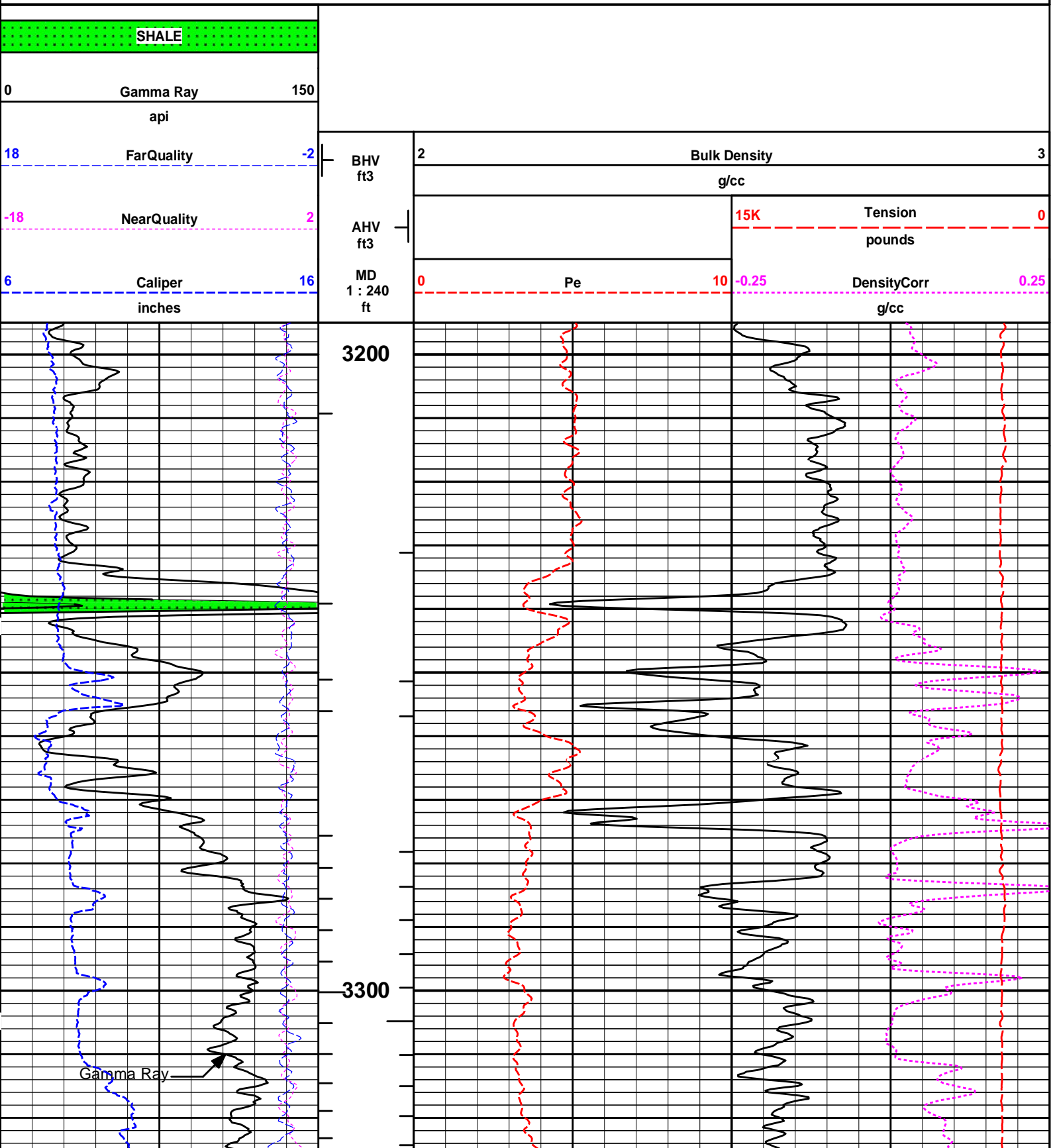
**REPEAT SECTION**

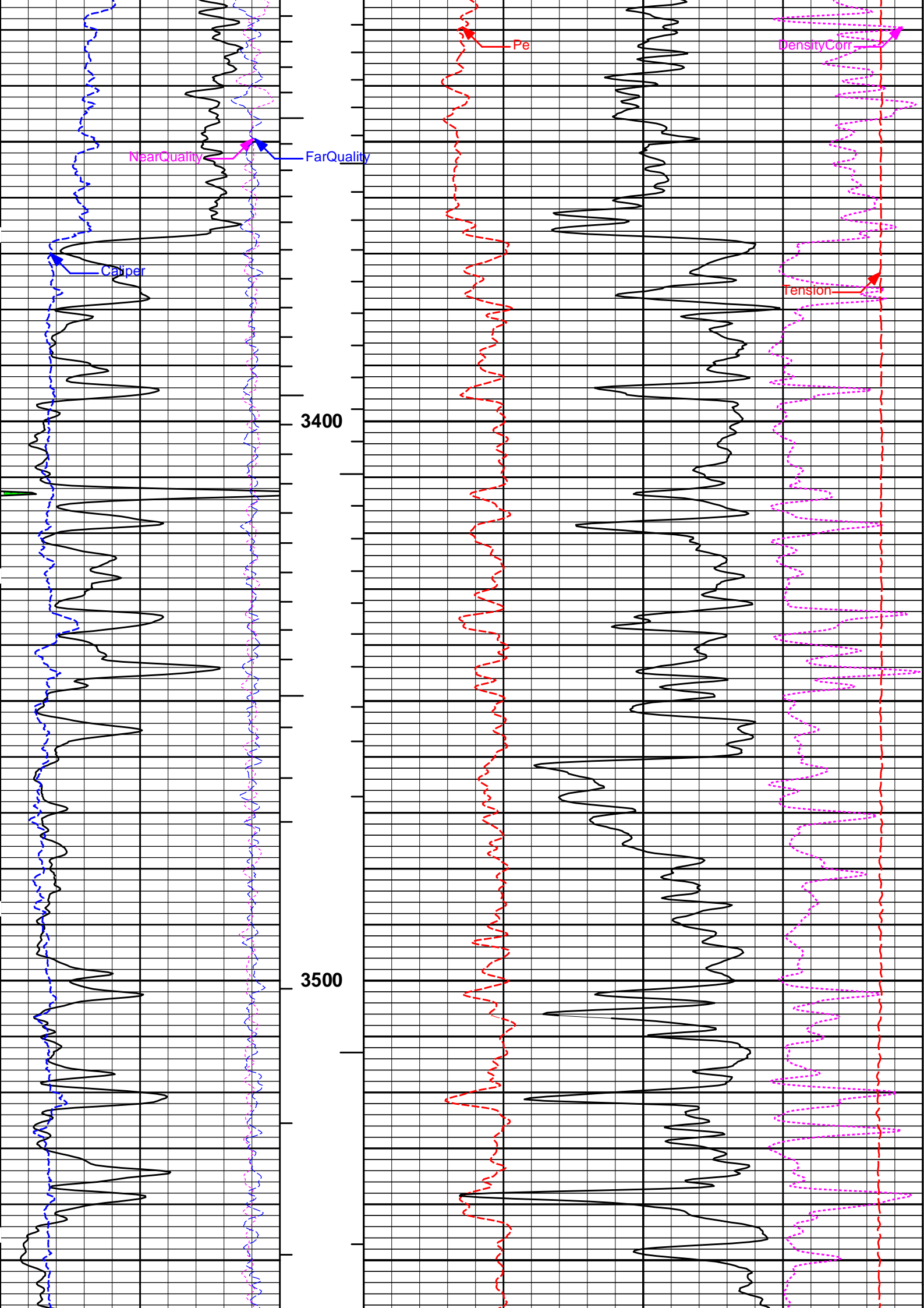
**HALLIBURTON**

Plot Time: 18-Oct-19 11:24:21

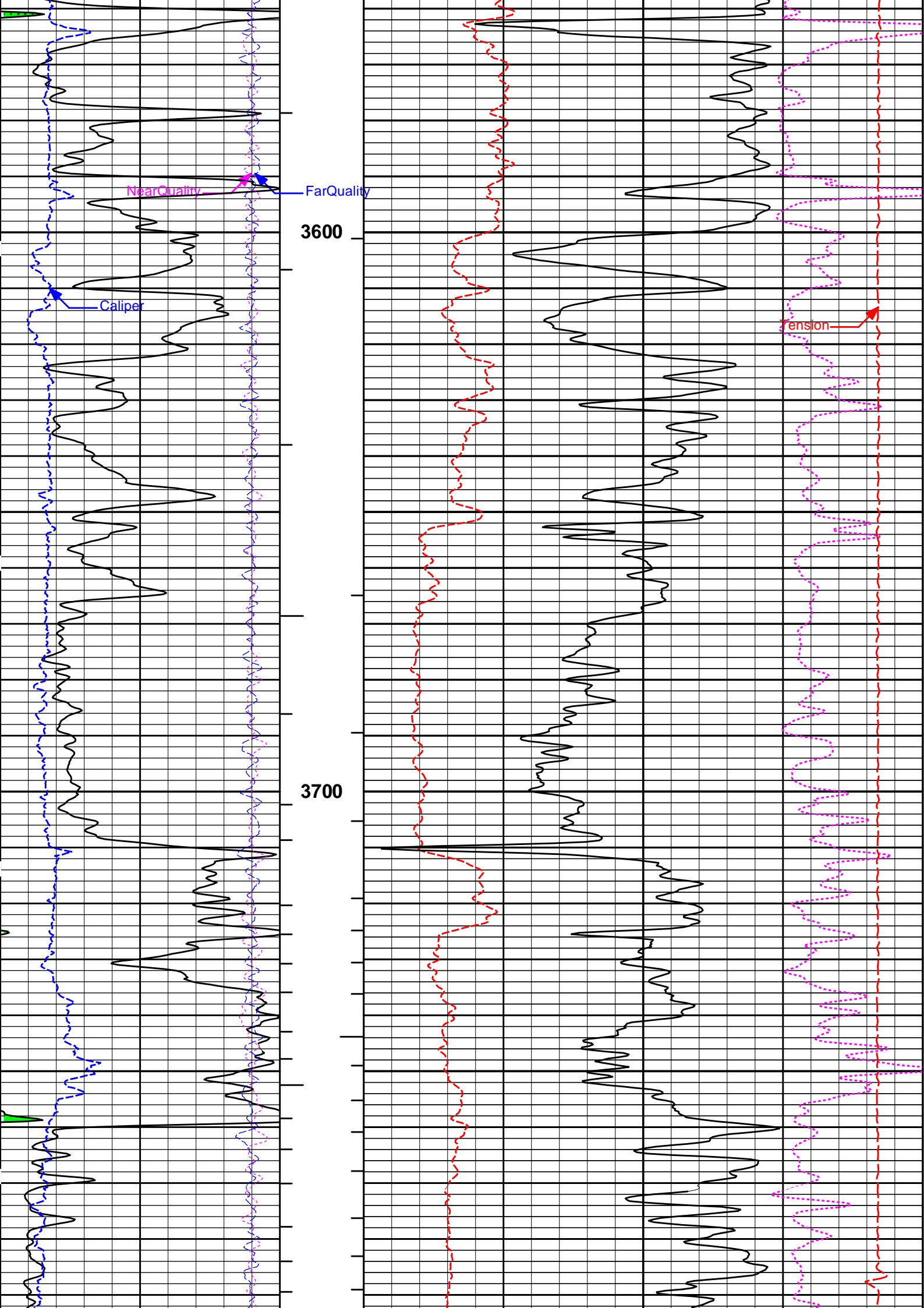
# 5 INCH MAIN LOG

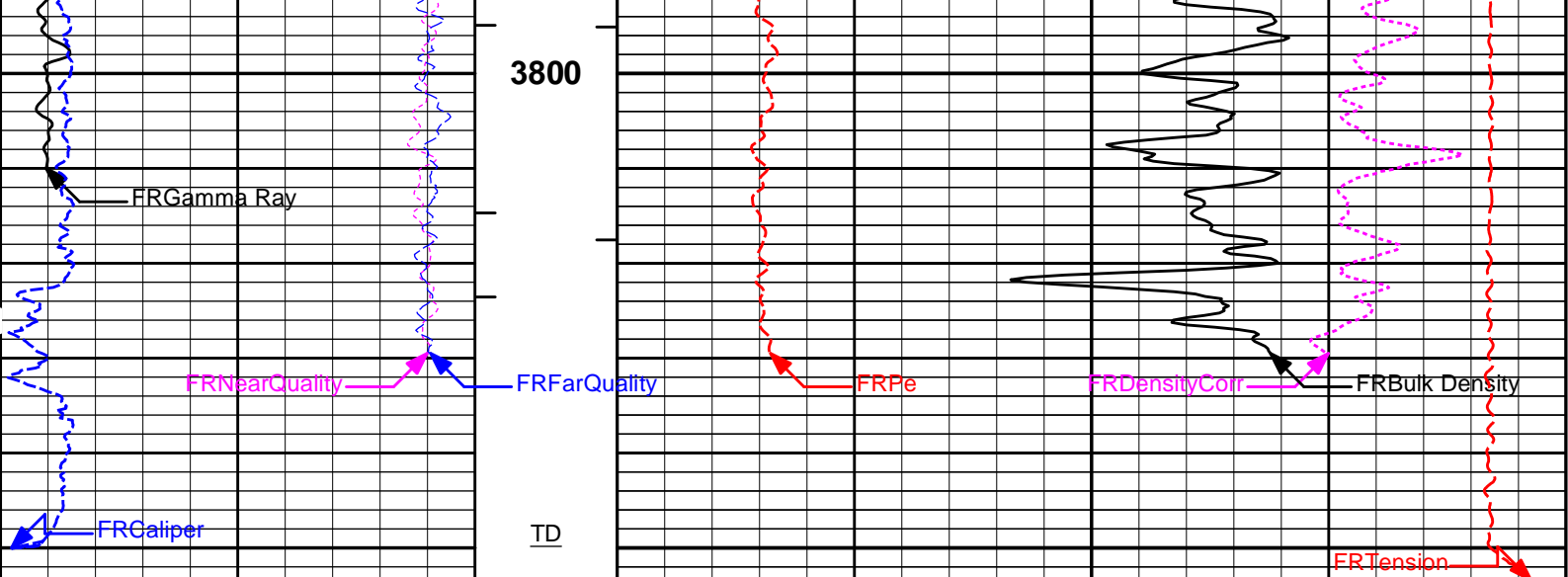
MEASURED DEPTH  
MAIN SECTION 5" PER 100'











6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					g/cc	
-18	NearQuality	2	AHV				15K	Tension	0
			ft3					pounds	
18	FarQuality	-2	BHV	2	Bulk Density				3
			ft3		g/cc				
0	Gamma Ray	150							
	api								
SHALE									

**HALLIBURTON** Plot Time: 18-Oct-19 11:24:23  
 Plot Range: 3195 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5\Well Based\*\\*  
 Plot File: \\-LOCAL-HALL-GATES\_2-5\Well Based\POROSITY\BULKD\_5\_MAIN\_LIB

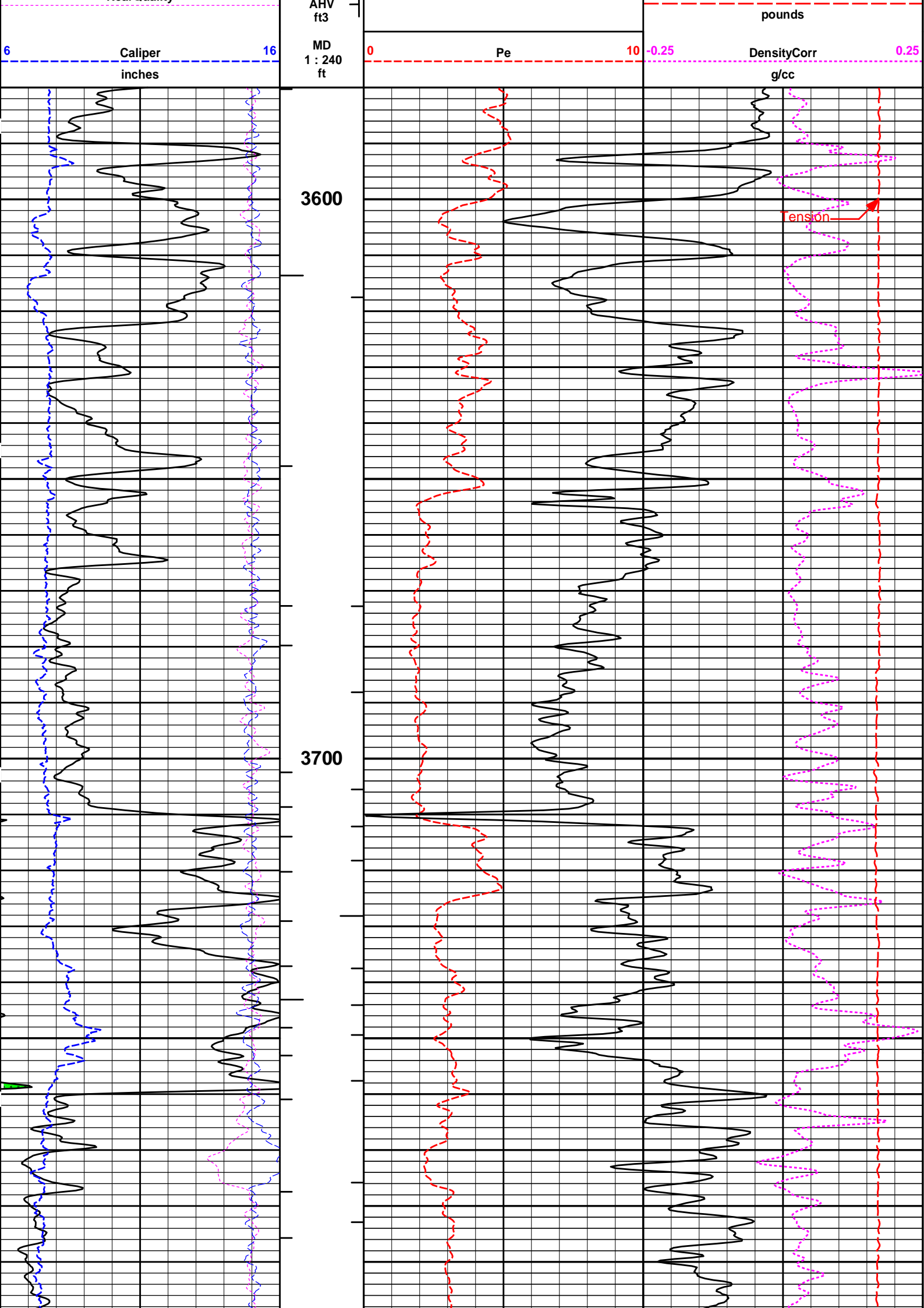
## 5 INCH MAIN LOG

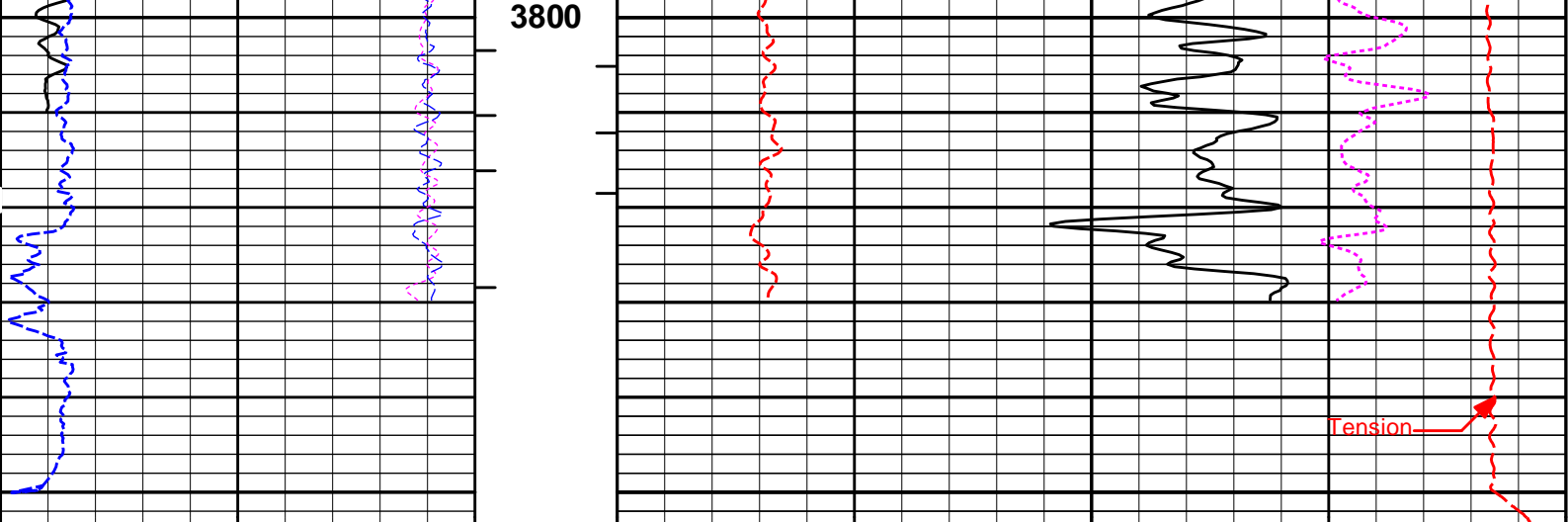
MEASURED DEPTH  
 MAIN SECTION 5" PER 100'

**HALLIBURTON** Plot Time: 18-Oct-19 11:24:23  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5\Well Based\*\\*  
 Plot File: \\-LOCAL-HALL-GATES\_2-5\Well Based\POROSITY\BULKD\_5\_REP\_LIB

## REPEAT SECTION

SHALE									
0	Gamma Ray	150							
	api								
18	FarQuality	-2	BHV	2	Bulk Density				3
			ft3		g/cc				
-18	NearQuality	2					15K	Tension	0





6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					g/cc	
-18	NearQuality	2	AHV				15K	Tension	0
			ft3					pounds	
18	FarQuality	-2	BHV	2	Bulk Density				3
			ft3		g/cc				
0	Gamma Ray	150							
	api								
	SHALE								

**HALLIBURTON**

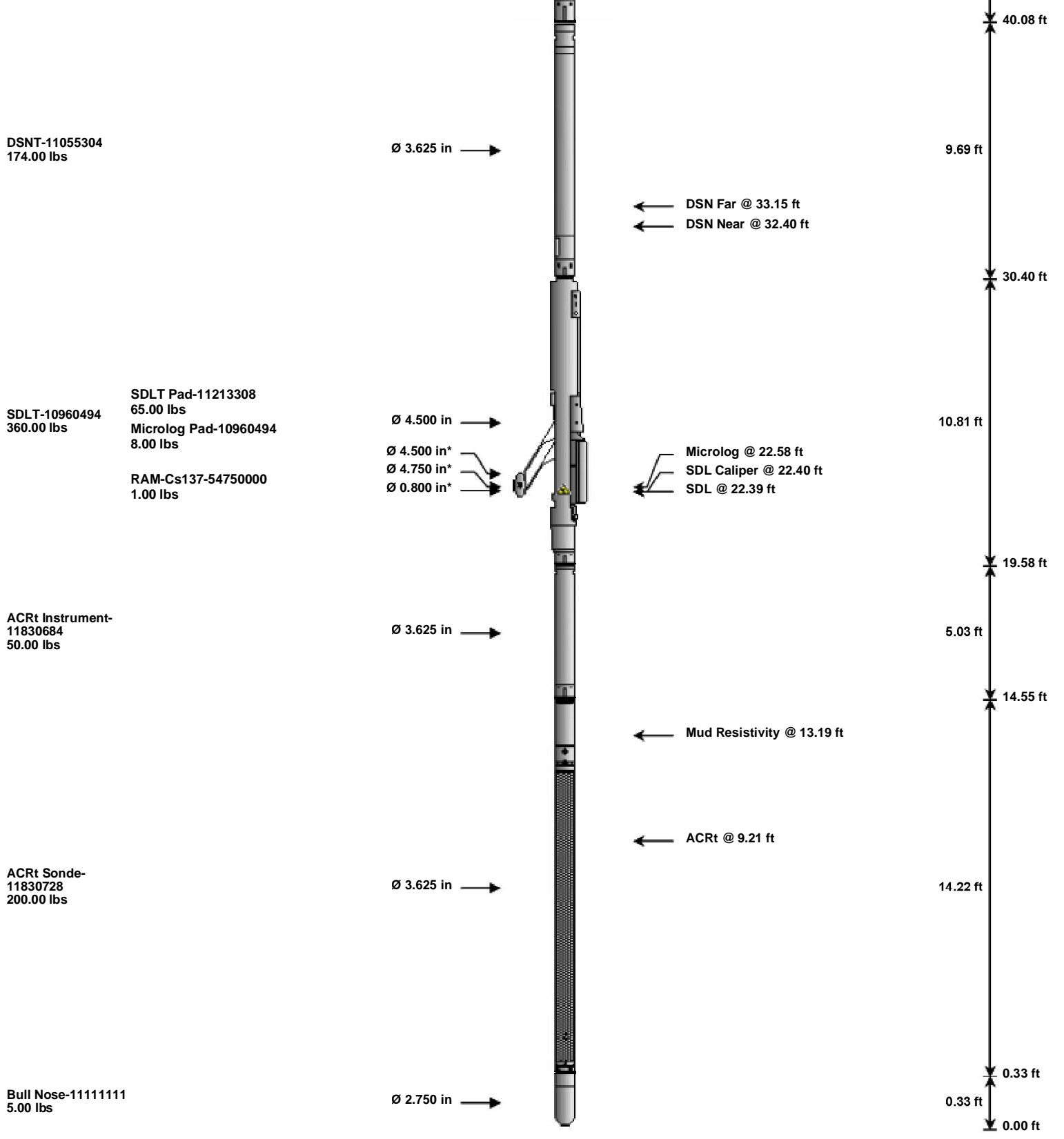
Plot Time: 18-Oct-19 11:24:25  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5Well Based\*\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\POROSITYBULKD\_5\_REP\_LIB

## REPEAT SECTION

**HALLIBURTON**

## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		Ø 2.310 in →		← Fishing Neck @ 57.71 ft		58.59 ft
RWCH-11830866 135.00 lbs		Ø 3.625 in →		← Load Cell @ 54.91 ft	6.25 ft	
	Weak Point Solid- 11111111 0.01 lbs	Ø 0.010 in* →		← BH Temperature @ 54.34 ft		52.34 ft
SP Sub-11812437 60.00 lbs		Ø 3.625 in →		← SP @ 50.56 ft	3.74 ft	
				← Z-Accelerometer @ 48.15 ft		48.60 ft
GTET-11013113 165.00 lbs		Ø 3.625 in →		← GammaRay @ 42.54 ft	8.52 ft	



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11830866	135.00	6.25	52.34	300.00
WPSS	Weak Point Solid	11111111	0.01	0.01	* 52.34	300.00
SP	SP Sub	11812437	60.00	3.74	48.60	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	40.08	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	30.40	60.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	19.58	60.00
SDLP	Density Insite Pad	11213308	65.00	2.55	* 21.79	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	54750000	1.00	0.80	* 22.02	300.00
MICP	Microlog Pad	10960494	8.00	1.00	* 22.08	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11830684	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11830728	200.00	14.22	0.33	120.00
BLNS	Bull Nose	11111111	5.00	0.33	0.00	300.00
<b>Total</b>			<b>1,223.01</b>	<b>58.59</b>		

\* Not included in Total Length and Length Accumulation.

**PARAMETERS REPORT**

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.000	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	10000.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
	DSNT	DNTT	Temperature Correction Type	None	
	DSNT	DPRS	DSN Pressure Correction Type	None	
	DSNT	SHCO	View More Correction Options	No	
	DSNT	UTVD	Use TVD for Gradient Corrections?	No	
	DSNT	LHWT	Logging Horizontal Water Tank?	No	

DSNT	UCLA	Classic Neutron Parameter utilized?	No	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
SDLT	CLOK	Process Caliper Outputs?	Yes	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERS\002 18-Oct-19 08:29 Dn @310.0f

Date: 18-Oct-19 08:31:18

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

**Tool Name:** GTET - 11013113

**Reference Calibration Date:** 28-Jun-19 15:56:38

**Engineer:** WOLTEMATH

**Calibration Date:** 06-Sep-19 13:50:19

**Software Version:** WL INSITE R6.2.7 (Build 7)

**Calibration Version:** 1

Calibrator Source S/N: TB79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	24.7	24.0	api
Background + Calibrator	257.5	249.9	api
Calibrator	232.8	225.9	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

**Tool Name:** GTET - 11013113

**Reference Calibration Date:** 06-Sep-19 13:50:19

**Engineer:** WHITLOCK

**Calibration Date:** 14-Oct-19 13:05:41

**Software Version:** WL INSITE R6.2.7 (Build 7)

**Calibration Version:** 1

Calibrator Source S/N: TB79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	24.0	28.0	api
Background + Calibrator	249.9	251.5	api
Calibrator	225.9	223.5	api





**CALIBRATION COEFFICIENTS**

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4629.26	-4620.65	-7000.00 - -1000.00
Pad Gain	0.0003912	0.0003918	0.0002000 - 0.0006000
Arm Offset	-2765.11	-2629.08	-5000.00 - 3000.00
Arm Gain	0.0005207	0.0005090	0.000300 - 0.000700
Arm Power	-0.000004618	-0.000003925	-0.000010000 - 0.000010000

The ring diameter is computed from:  $\text{DIAMETER} = \text{PAD EXTENSION} + \text{ARM EXTENSION} + \text{TOOL DIAMETER}$

Tool Diameter: 4.50 in

CALIBRATION RINGS				
Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				
Small Ring (in)	1.99	2.00	0.01	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.47	6.50	0.03	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 0.20

PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed
Ring-Measurement Check:	Passed
PASS/FAIL SUMMARY	
Calibration-Coefficients Range Check:	Passed

SDLT CALIPER FIELD CALIBRATION			
<b>Tool Name:</b>	<b>SDLT - 10960494</b>	<b>Reference Calibration Date:</b>	<b>29-Aug-19 12:02:40</b>
<b>Engineer:</b>	<b>JORGE ORLANDO PEREZ</b>	<b>Calibration Date:</b>	<b>29-Aug-19 12:04:14</b>
<b>Software Version:</b>	<b>WL INSITE R6.2.7 (Build 7)</b>	<b>Calibration Version:</b>	<b>1</b>

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.21	-0.04	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

SPECTRAL DENSITY SHOP CALIBRATION			
<b>Tool Name:</b>	<b>SDLT Pad - 11213308</b>	<b>Reference Calibration Date:</b>	<b>23-Aug-19 13:54:16</b>
<b>Engineer:</b>	<b>WOLTEMATH</b>	<b>Calibration Date:</b>	<b>23-Aug-19 14:21:32</b>
<b>Software Version:</b>	<b>WL INSITE R6.2.7 (Build 7)</b>	<b>Calibration Version:</b>	<b>1</b>

Logging Source S/N: 5475GW

Aluminum Block S/N: 63067

Density: 2.581g/cc

Pe: 3.170

Magnesium Block S/N: 63358

Density: 1.687g/cc

Pe: 2.594

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0035	1.0251	0.90 - 1.10
Near Dens Gain	0.9864	1.0119	0.90 - 1.10
Near Peak Gain	0.9964	1.0219	0.90 - 1.10
Near Lith Gain	0.9980	1.0302	0.90 - 1.10
Far Bar Gain	1.0048	1.0058	0.90 - 1.10
Far Dens Gain	0.9927	0.9950	0.90 - 1.10

Far Dens Gain	0.9827	0.9833	0.98 - 1.10
Far Peak Gain	0.9899	0.9927	0.90 - 1.10
Far Lith Gain	0.9731	0.9727	0.90 - 1.10
<hr/>			
Near Bar Offset	0.1179	-0.0816	NONE
Near Dens Offset	0.2714	0.0443	NONE
Near Peak Offset	0.1602	-0.0546	NONE
Near Lith Offset	0.1146	-0.1575	NONE
Far Bar Offset	0.0293	0.0219	NONE
Far Dens Offset	0.1505	0.1307	NONE
Far Peak Offset	0.1477	0.1245	NONE
Far Lith Offset	0.2309	0.2352	NONE
<hr/>			
Near Bar Background	928.16	927.86	700 - 1450
Near Dens Background	309.39	308.18	230 - 480
Near Peak Background	135.94	135.97	100 - 210
Near Lith Background	164.35	163.99	125 - 260
Far Bar Background	470.03	472.28	450 - 900
Far Dens Background	188.64	187.22	175 - 345
Far Peak Background	75.92	76.21	70 - 140
Far Lith Background	76.82	77.51	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.686	1.687	0.001	+/- 0.015
Pe	2.567	2.561	-0.006	+/- 0.150
ALUMINUM				
Density (g/cc)	2.582	2.580	-0.002	+/- 0.01500
Pe	3.117	3.134	0.017	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0002	+/- 0.0110	-0.0008	+/- 0.0140
Magnesium Block	0.0001	+/- 0.0110	-0.0002	+/- 0.0140
Aluminum Block	-0.0003	+/- 0.0110	0.0010	+/- 0.0140
Resolution	9.31	6.00 - 11.50	9.26	6.00 - 11.50
Internal Verifier(B+D+P+L)	1536	1200 - 2700	813	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

### SPECTRAL DENSITY FIELD CHECK

Tool Name: SDLT Pad - 11213308

Reference Calibration Date: 23-Aug-19 14:21:32

Engineer: WHITLOCK

Calibration Date: 15-Oct-19 15:19:19

Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Version: 1

Pad Temperature: 75.2 degF

**DENSITY FIELD CALIBRATION SUMMARY**

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1535.997	1531.138	-4.859	15.780
Far (B+D+P+L) cps	813.216	811.481	-1.735	15.754
Near Resolution	9.31	9.24	-0.070	0.50
Far Resolution	9.26	9.28	0.020	1.00

**PASS/FAIL SUMMARY**

Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

**CALIBRATION SUMMARY**

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-11013113</b>						
Gamma Ray Calibrator	225.9	223.5	-----	2.4	+/- 9.00	api
<b>DSNT-11055304</b>						
Snow-Block Porosity	0.0796	0.0828	-----	-0.0032	+/- 0.0150	decp
<b>SDLT-10960494</b>						
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.21	-----	0.04	+/-0.15	in
<b>SDLT Pad-11213308</b>						
Near(B+D+P+L)	1535.997	1531.138	-----	4.859	+/-15.780	cps
Far(B+D+P+L)	813.216	811.481	-----	1.735	+/-15.754	cps

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERS\IDLE Date: 18-Oct-19 07:49:32



**INPUTS, DELAYS AND FILTERS TABLE**

Mnemonic	Input Description	Delay (ft)	Depth Filter Type	Depth Filter Length (ft)	Time Filter Type	Time Filter Length (sec)
<b>Depth Panel</b>						
TENS	Tension	0.00	NO		NO	
<b>Rwa / CrossPlot</b>						
TPUL	Tension Pull	58.59	NO		NO	
BS	Bit Size	58.59	NO		NO	
HDIA	Measured Hole Diameter	0.00	NO		NO	
<b>RWCH</b>						
DHTN	DownholeTension	0.00	BLK	0.000	NO	
<b>SP Sub</b>						
PLTC	Plot Control Mask	50.56	NO		NO	
SP	Spontaneous Potential	50.56	BLK	1.250	NO	
SPR	Raw Spontaneous Potential	50.56	NO		NO	
SPO	Spontaneous Potential Offset	50.56	NO		NO	
<b>GTET</b>						
TPUL	Tension Pull	42.54	NO		NO	
GR	Natural Gamma Ray API	42.54	TRI	1.750	NO	
GRU	Unfiltered Natural Gamma Ray API	42.54	NO		NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	42.54	W	1.416 , 0.750	NO	
HDIA	Measured Hole Diameter	0.00	NO		NO	
ACCZ	Accelerometer Z	0.00	BLK	0.083	NO	

DEVI	Inclination	0.00	NO	NO
<b>DSNT</b>				
TPUL	Tension Pull	32.30	NO	NO
RNDS	Near Detector Telemetry Counts	32.40	BLK	1.417 NO
RFDS	Far Detector Telemetry Counts	33.15	TRI	0.583 NO
DNTT	DSN Tool Temperature	32.40	NO	NO
DSNS	DSN Tool Status	32.30	NO	NO
ERND	Near Detector Telemetry Counts EVR	32.40	BLK	0.000 NO
ERFD	Far Detector Telemetry Counts EVR	33.15	BLK	0.000 NO
ENTM	DSN Tool Temperature EVR	32.40	NO	NO
HDIA	Measured Hole Diameter	0.00	NO	NO
<b>SDLT</b>				
TPUL	Tension Pull	22.40	NO	NO
PCAL	Pad Caliper	22.40	TRI	0.250 NO
ACAL	Arm Caliper	22.40	TRI	0.250 NO
<b>ACRt Sonde</b>				
TPUL	Tension Pull	2.73	NO	NO
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000 NO
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000 NO
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000 NO
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000 NO
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000 NO
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000 NO
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000 NO
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000 NO
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000 NO
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000 NO
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000 NO
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000 NO
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000 NO
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000 NO
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000 NO
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000 NO
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000 NO
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000 NO
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000 NO
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000 NO
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000 NO
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000 NO
F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000 NO
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000 NO
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000 NO
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000 NO
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000 NO
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000 NO
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000 NO
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000 NO
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000 NO
F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000 NO
F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000 NO
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000 NO
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000 NO
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000 NO
RMUD	Mud Resistivity	12.52	BLK	0.000 NO
F1RT	Transmitter Reference 12 KHz Real Signal	2.73	BLK	0.000 NO
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000 NO
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000 NO

F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000	NO
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000	NO
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000	NO
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
ITMP	Instrument Temperature	2.73	BLK	0.000	NO
TCVA	Temperature Correction Values Loop Off	2.73	NO		NO
TIDV	Instrument Temperature Derivative	2.73	NO		NO
TUDV	Upper Temperature Derivative	2.73	NO		NO
TLDV	Lower Temperature Derivative	2.73	NO		NO
TRBD	Receiver Board Temperature	2.73	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO

**Microlog Pad**

TPUL	Tension Pull	22.58	NO		NO
MINV	Microlog Lateral	22.58	BLK	0.750	NO
MNOR	Microlog Normal	22.58	BLK	0.750	NO

**SDLT Pad**

TPUL	Tension Pull	22.39	NO		NO
NAB	Near Above	22.21	BLK	0.920	NO
NHI	Near Cesium High	22.21	BLK	0.920	NO
NLO	Near Cesium Low	22.21	BLK	0.920	NO
NVA	Near Valley	22.21	BLK	0.920	NO
NBA	Near Barite	22.21	BLK	0.920	NO
NDE	Near Density	22.21	BLK	0.920	NO
NPK	Near Peak	22.21	BLK	0.920	NO
NLI	Near Lithology	22.21	BLK	0.920	NO
NBAU	Near Barite Unfiltered	22.21	BLK	0.250	NO
NLIU	Near Lithology Unfiltered	22.21	BLK	0.250	NO
FAB	Far Above	22.56	BLK	0.250	NO
FHI	Far Cesium High	22.56	BLK	0.250	NO
FLO	Far Cesium Low	22.56	BLK	0.250	NO
FVA	Far Valley	22.56	BLK	0.250	NO
FBA	Far Barite	22.56	BLK	0.250	NO
FDE	Far Density	22.56	BLK	0.250	NO
FPK	Far Peak	22.56	BLK	0.250	NO
FLI	Far Lithology	22.56	BLK	0.250	NO
PTMP	Pad Temperature	22.40	BLK	0.920	NO
NHV	Near Detector High Voltage	21.79	NO		NO
FHV	Far Detector High Voltage	21.79	NO		NO
ITMP	Instrument Temperature	21.79	NO		NO
DDHV	Detector High Voltage	21.79	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERSIDLE

Date: 18-Oct-19 08:13:20

COMPANY	<b>BIRD DOG OIL, LLC</b>				
WELL	<b>HALL-GATES 2-5</b>				
FIELD	<b>GATES</b>				
COUNTY	<b>STAFFORD</b>	STATE	<b>KANSAS</b>		

**HALLIBURTON**

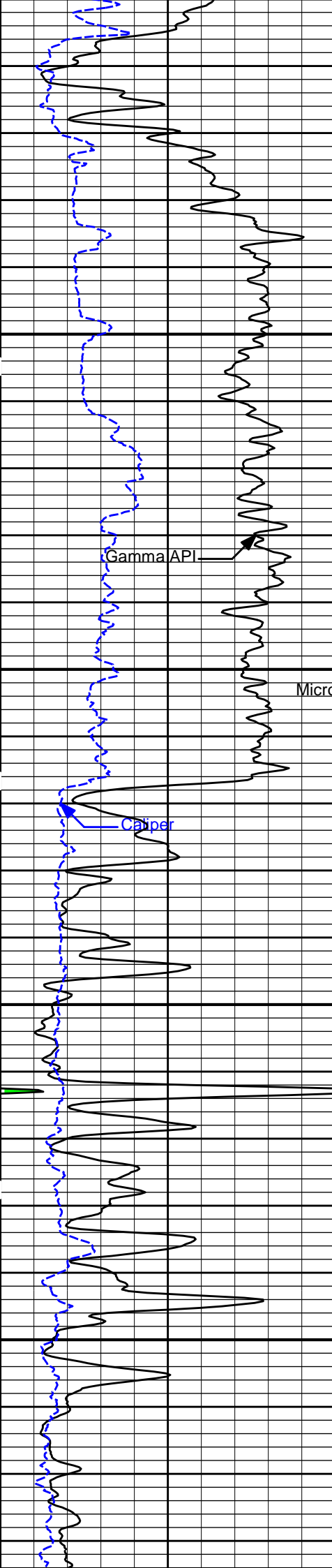
**DUAL SPACED NEUTRON  
SPECTRAL DENSITY  
LOG**











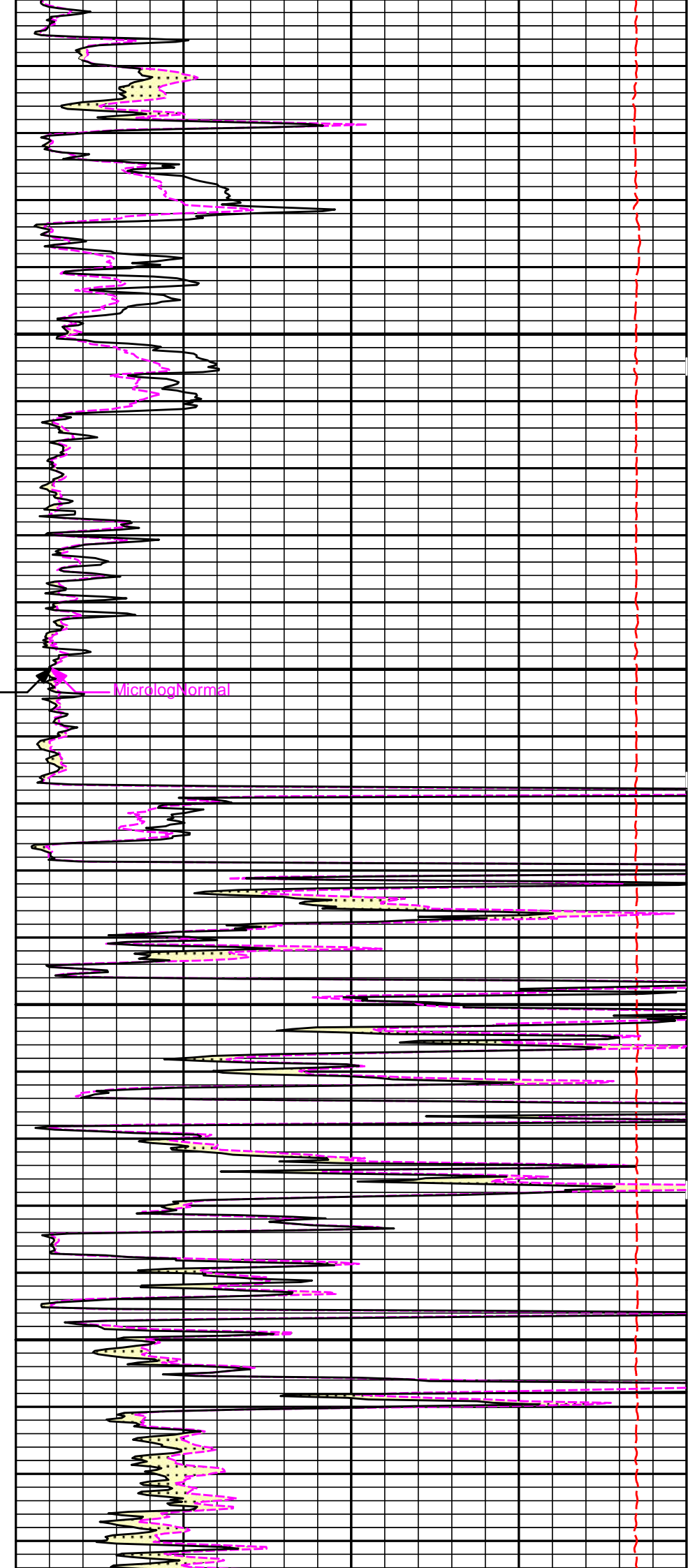
3300

Gamma API

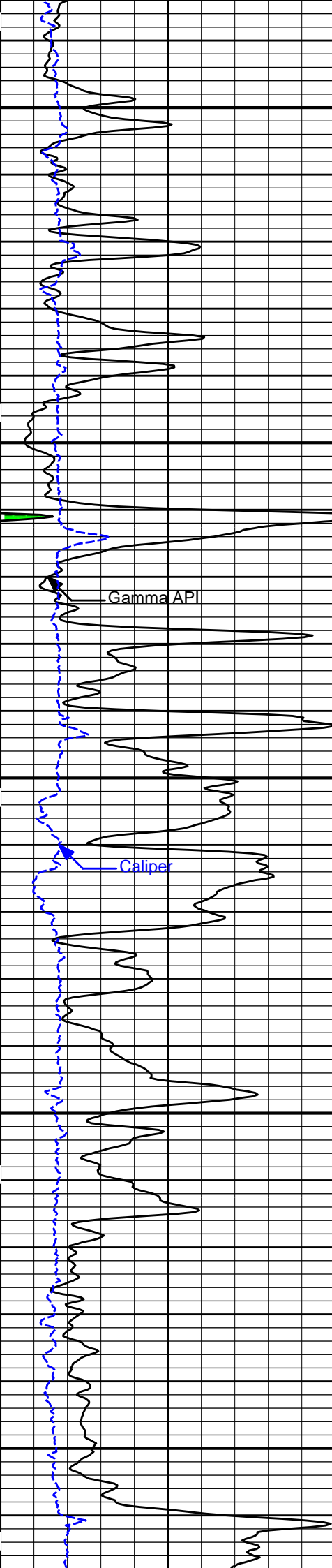
Microlog Lateral

Caliper

3400



Microlog Normal



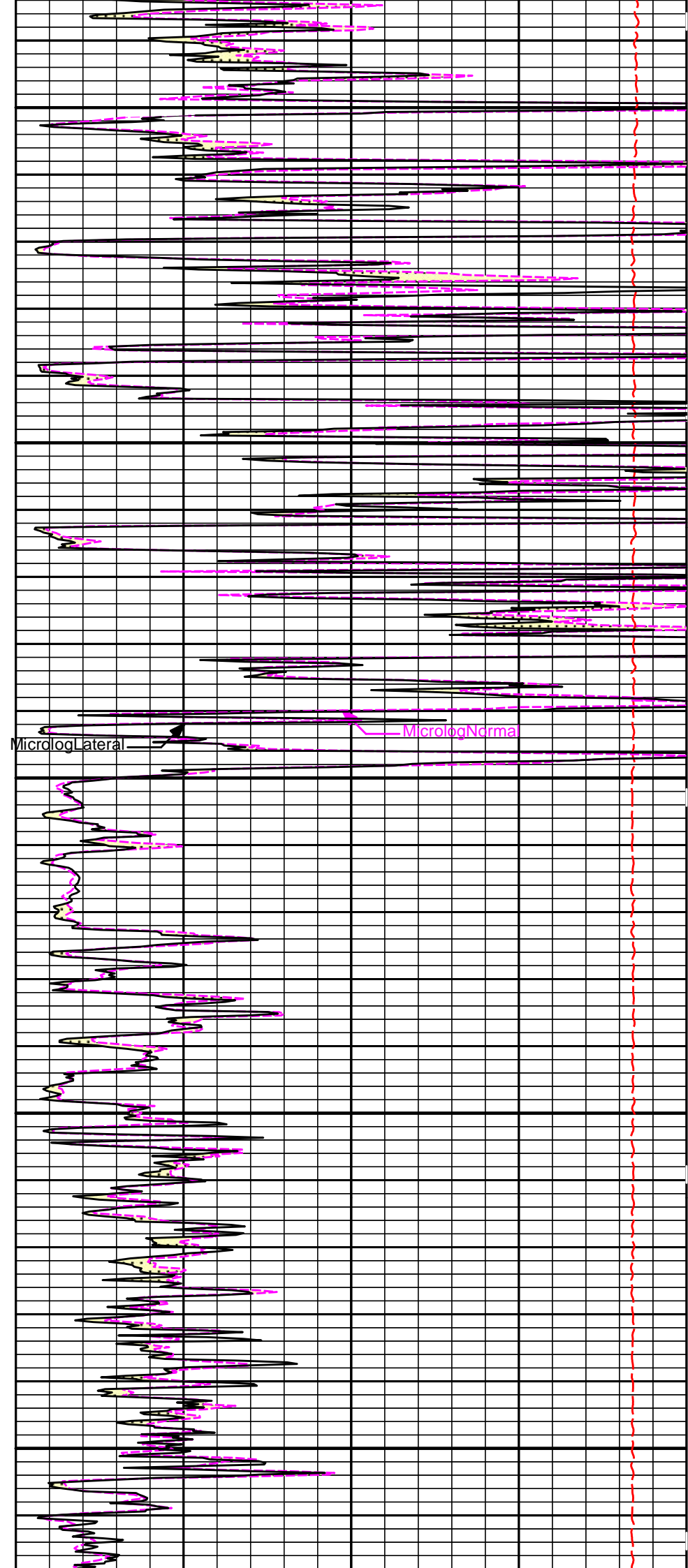
3500

Gamma API

Caliper

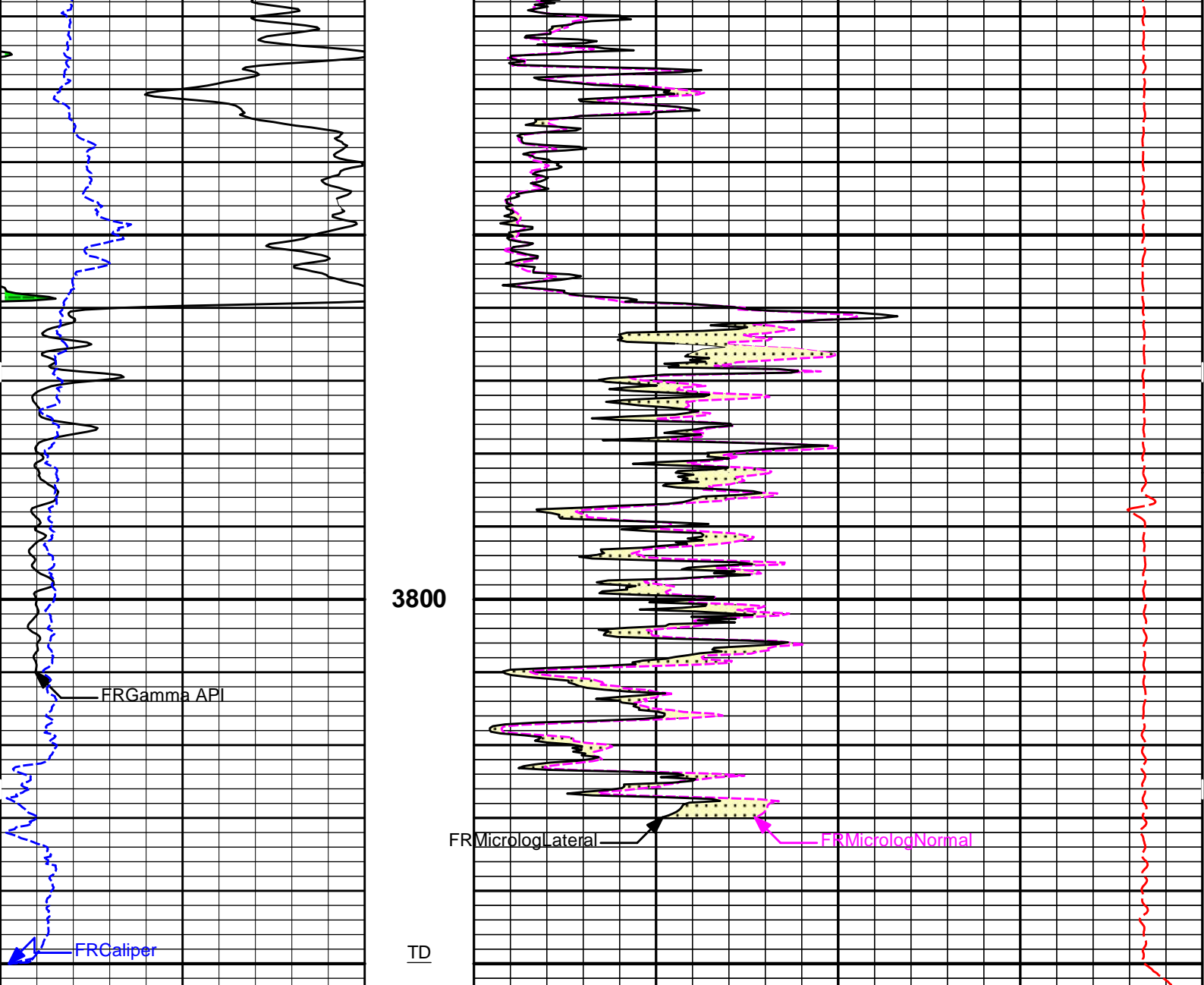
3600

3700



MicrologLateral

MicrologNormal



6	Caliper	16	MD	15K	Tension	0
	inches		1 : 240		pounds	
			ft			
0	Gamma API	150		0	MicrologLateral	20
	api				ohm-metre	
				0	MicrologNormal	20
					ohm-metre	

**HALLIBURTON**

Plot Time: 18-Oct-19 11:19:07  
 Plot Range: 3195 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5Well Based\*\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\MICROLOG\Microlog\_IQ\_5\_main\_lib

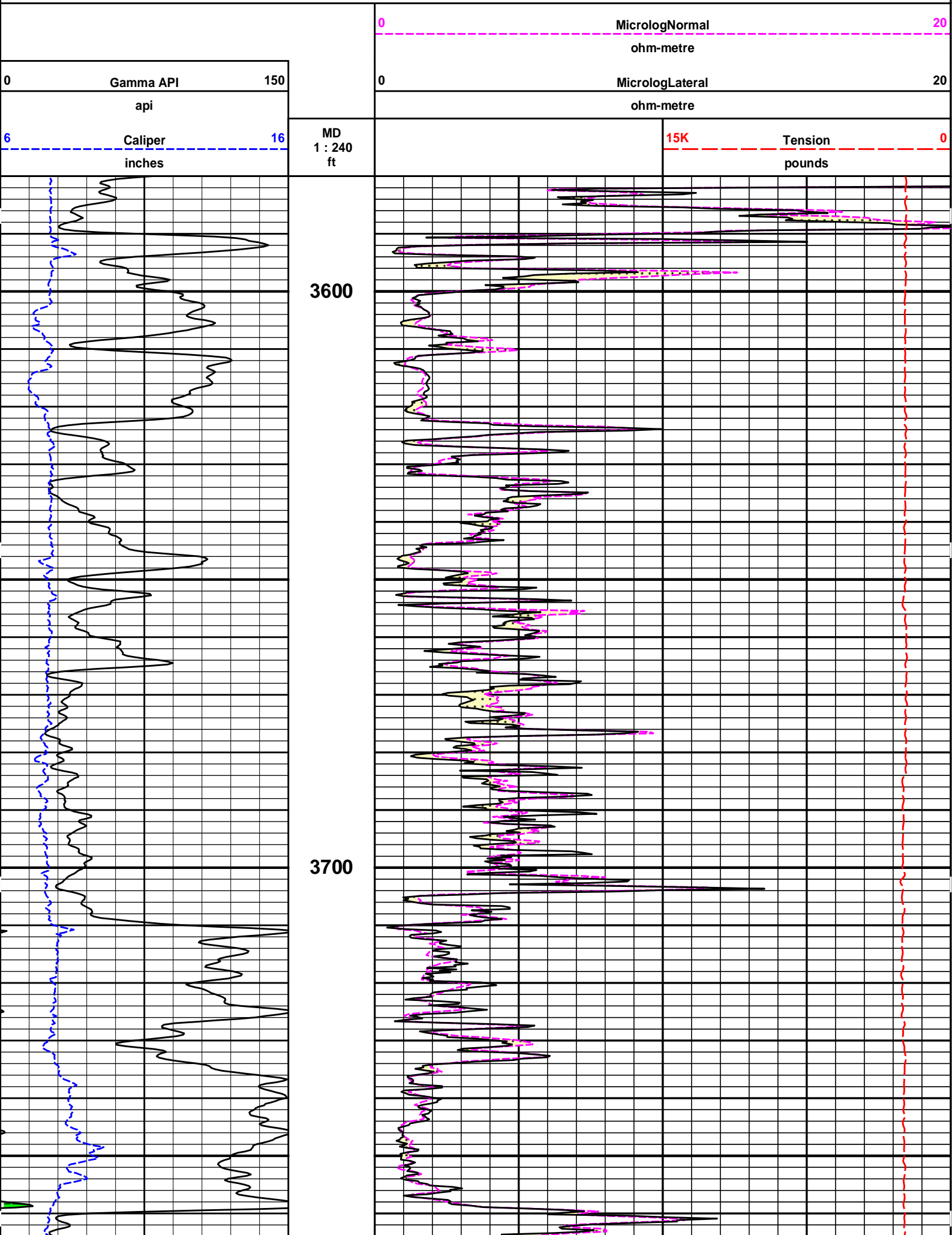
## 5 INCH MAIN LOG

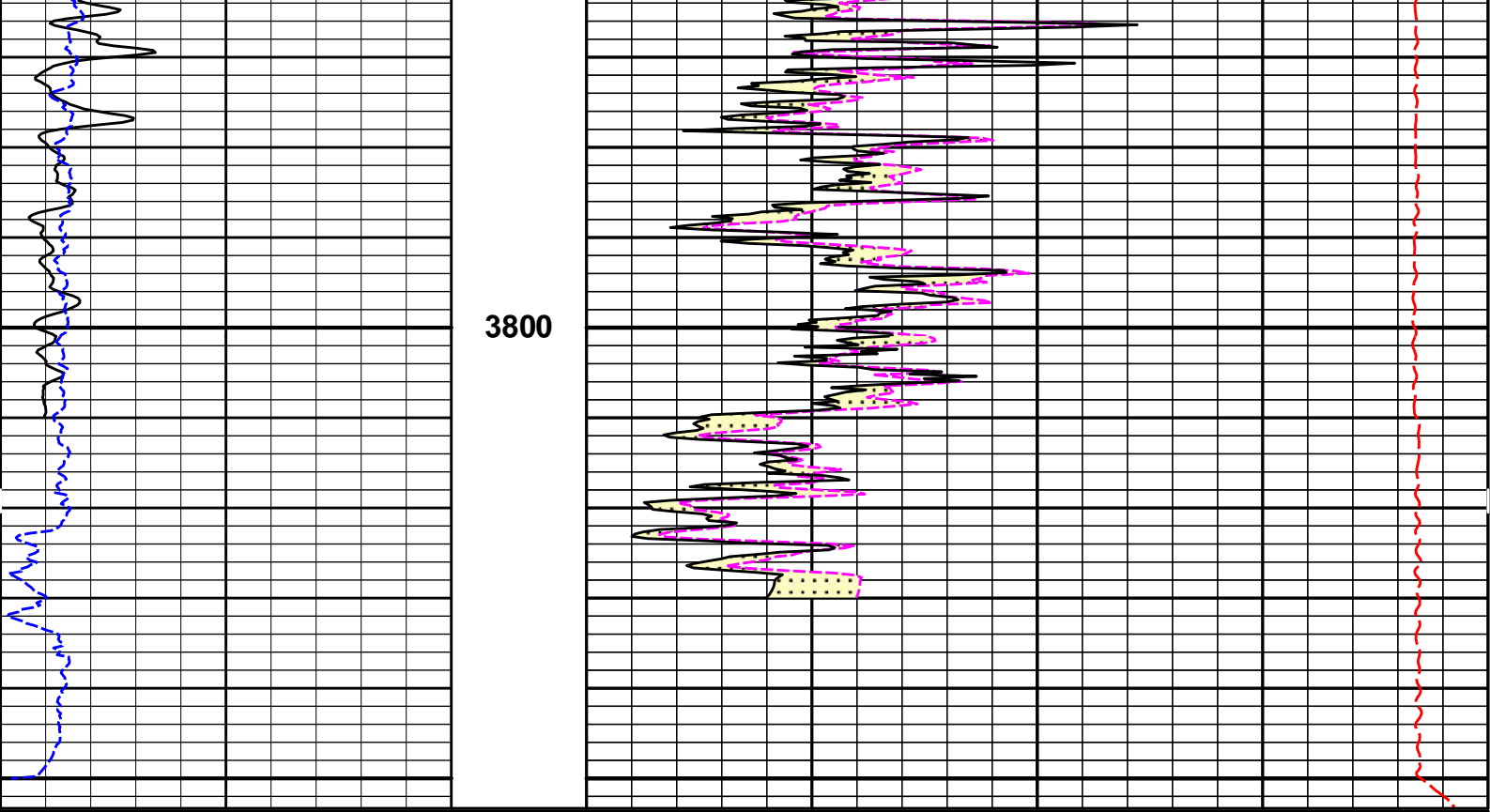
MEASURED DEPTH  
 MAIN LOG 5" PER 100'

**HALLIBURTON**

Plot Time: 18-Oct-19 11:19:07  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5Well Based\*\

# REPEAT SECTION





6	Caliper	16	MD	15K	Tension	0
	inches		1 : 240		pounds	
0	Gamma API	150		0	MicrologLateral	20
	api				ohm-metre	
				0	MicrologNormal	20
					ohm-metre	

**HALLIBURTON**

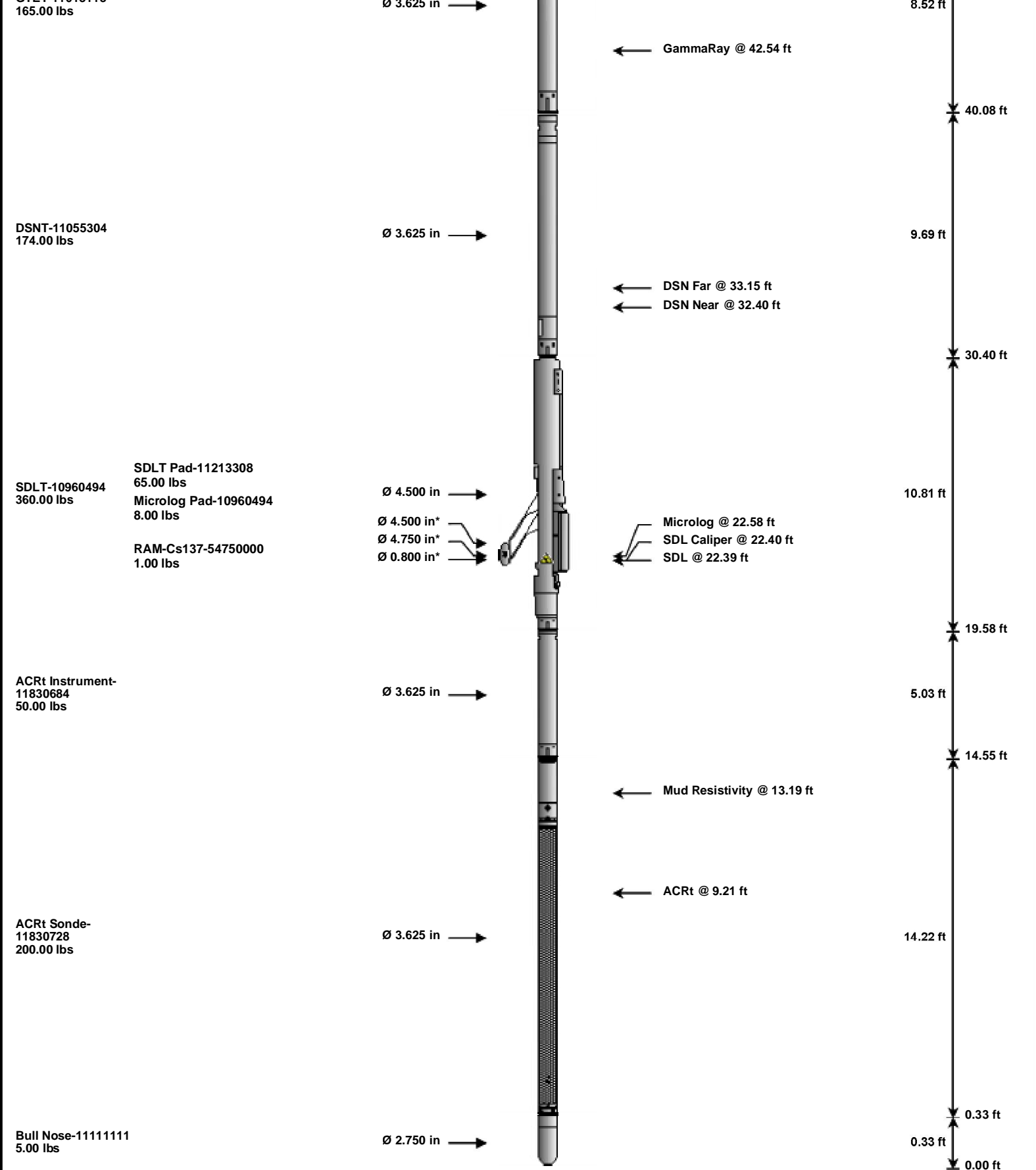
Plot Time: 18-Oct-19 11:19:09  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5Well Based\*\n  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\MICROLOG\Microlog\_IQ\_5\_rep\_lib

**REPEAT SECTION**

**HALLIBURTON**

**TOOL STRING DIAGRAM REPORT**

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		∅ 2.310 in		Fishing Neck @ 57.71 ft		58.59 ft
RWCH-11830866		∅ 3.625 in		Load Cell @ 54.91 ft	6.25 ft	
	Weak Point Solid-11111111	∅ 0.010 in*		BH Temperature @ 54.34 ft		52.34 ft
SP Sub-11812437		∅ 3.625 in		SP @ 50.56 ft	3.74 ft	
				Z-Accelerometer @ 48.15 ft		48.60 ft
GTFT-11013113						



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11830866	135.00	6.25	52.34	300.00
WPSS	Weak Point Solid	11111111	0.01	0.01	* 52.34	300.00
SP	SP Sub	11812437	60.00	3.74	48.60	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	40.08	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	30.40	60.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	19.58	60.00
SDLP	Density Insite Pad	11213308	65.00	2.55	* 21.79	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	54750000	1.00	0.80	* 22.02	300.00
MICP	Microlog Pad	10960494	8.00	1.00	* 22.08	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11830684	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11830728	200.00	14.22	0.33	120.00
BI NS	Bull Nose	11111111	5.00	0.33	0.00	300.00

Total 1,223.01 58.59

\* Not included in Total Length and Length Accumulation.

Data: HALL-GATES\_2-5\0001 GTET-DSN-SDL-ACRT\_DRIVERSIDLE

Date: 18-Oct-19 07:39:30



### PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.000	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	10000.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
	Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
	Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
	Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
	Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
	Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
	Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
	Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	GTET	BHSM	Borehole Size Source Tool	SDLT	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	No	
	DSNT	NLIT	Neutron Lithology	Limestone	
	DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
	DSNT	DNTT	Temperature Correction Type	None	
	DSNT	DNFC	DSN Filter Correction Type	No	

DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
DSNT	UCLA	Classic Neutron Parameter utilized?	No	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
SDLT	CLOK	Process Caliper Outputs?	Yes	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	RTOK	Process ACRT?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Upr	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERS\002 18-Oct-19 08:29 Dn @310.0f

Date: 18-Oct-19 08:31:18

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11013113

Reference Calibration Date: 28-Jun-19 15:56:38

Engineer: WOLTEMATH

Calibration Date: 06-Sep-19 13:50:19

Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Version: 1

Calibrator Source S/N: TB79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	24.7	24.0	api
Background + Calibrator	257.5	249.9	api
Calibrator	232.8	225.9	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11013113

Reference Calibration Date: 06-Sep-19 13:50:19

Engineer: WHITLOCK

Calibration Date: 14-Oct-19 13:05:41

Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Version: 1

Calibrator Source S/N: TB79

Calibrator API Reference:222.00 api

Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	24.0	28.0	api



Background	24.0	26.0	api
Background + Calibrator	249.9	251.5	api
Calibrator	225.9	223.5	api

Shop	Field	Difference	Tolerance
225.9	223.5	2.4	+/- 9.00

### DENSITY CALIPER SHOP CALIBRATION

**Tool Name:** SDLT - 10960494      **Reference Calibration Date:** 29-Aug-19 11:58:26  
**Engineer:** JORGE ORLANDO PEREZ      **Calibration Date:** 29-Aug-19 12:02:40  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **Calibration Version:** 1  
**Host Tool Name:** DSNT - 11055304

#### CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-4629.26	-4620.65	-7000.00 - -1000.00
Pad Gain	0.0003912	0.0003918	0.0002000 - 0.0006000
Arm Offset	-2765.11	-2629.08	-5000.00 - 3000.00
Arm Gain	0.0005207	0.0005090	0.000300 - 0.000700
Arm Power	-0.000004618	-0.000003925	-0.000010000 - 0.000010000

The ring diameter is computed from:  $DIAMETER = PAD\ EXTENSION + ARM\ EXTENSION + TOOL\ DIAMETER$

Tool Diameter: 4.50 in

#### CALIBRATION RINGS

Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value
PAD EXTENSION:				
Small Ring (in)	1.99	2.00	0.01	+/- 0.20
Medium Ring (in)	3.74	3.75	0.01	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.47	6.50	0.03	+/- 0.20
Medium Ring (in)	8.25	8.25	0.00	+/- 0.20
Large Ring (in)	15.00	15.00	0.00	+/- 0.20

#### PASS/FAIL SUMMARY

Calibration-Coefficients Range Check: Passed  
 Ring-Measurement Check: Passed

#### PASS/FAIL SUMMARY

Calibration-Coefficients Range Check: Passed

### SDLT CALIPER FIELD CALIBRATION

**Tool Name:** SDLT - 10960494      **Reference Calibration Date:** 29-Aug-19 12:02:40  
**Engineer:** JORGE ORLANDO PEREZ      **Calibration Date:** 29-Aug-19 12:04:14  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **Calibration Version:** 1

#### MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.21	-0.04	+/- 0.15

#### PASS/FAIL SUMMARY

Pad Extension Check: Passed  
 Diameter Check: Passed

### MICRO LOG SHOP CALIBRATION

**Tool Name:** Microlog Pad - 10960494      **Reference Calibration Date:** 29-Aug-19 12:14:09  
**Engineer:** WHITLOCK      **Calibration Date:** 15-Oct-19 15:15:10

Host Tool Name: DSNT - 11055304

**CALIBRATION COEFFICIENT SUMMARY**

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.11	-0.11	-0.02	-0.01	ohmm
Calibration Point #1	-0.01	0.00	-0.01	0.00	ohmm
Calibration Point #2	20.40	20.00	19.65	20.00	ohmm
Internal Reference	20.27	19.88	19.63	19.98	ohmm

Measurement	Micro Log Normal	Micro Log Lateral	Units
	Tool Value	Tool Value	
Tool Zero	-1.05	-1.50	V
Calibration Point #1	27.14	2.18	V
Calibration Point #2	5360.48	6915.53	V
Internal Reference	5327.46	6909.51	V

**MICRO LOG FIELD CHECK**

Tool Name: Microlog Pad - 10960494

Reference Calibration Date: 15-Oct-19 15:15:10

Engineer: WHITLOCK

Calibration Date: 15-Oct-19 15:15:47

Software Version: WL INSITE R6.2.7 (Build 7)

Calibration Version: 1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.11	-0.09	-0.01	-0.01	ohmm
Internal Reference	19.88	19.88	19.98	19.99	ohmm

**Summary**

Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.88	19.88	0.00	+/- 0.80
Microlog Lateral	19.98	19.99	-0.01	+/- 0.80

**CALIBRATION SUMMARY**

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-11013113</b>						
Gamma Ray Calibrator	225.9	223.5	-----	2.4	+/- 9.00	api
<b>SDLT-10960494</b>						
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in
Ring Diameter	8.25	8.21	-----	0.04	+/-0.15	in
<b>Microlog Pad-10960494</b>						
MicroLog Normal	19.88	19.88	-----	0.00	+/-0.80	ohmm
MicroLog Lateral	19.98	19.99	-----	-0.01	+/-0.80	ohmm

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERS\IDLE

Date: 18-Oct-19 08:11:56



**INPUTS, DELAYS AND FILTERS TABLE**

Mnemonic	Input Description	Delay (ft)	Depth Filter Type	Depth Filter Length (ft)	Time Filter Type	Time Filter Length (sec)
<b>Depth Panel</b>						
TENS	Tension	0.00	NO		NO	
<b>Rwa / CrossPlot</b>						
TPUL	Tension Pull	58.59	NO		NO	
BS	Bit Size	58.59	NO		NO	

HDIA	Measured Hole Diameter	0.00	NO	NO	
<b>RWCH</b>					
DHTN	DownholeTension	0.00	BLK	0.000	NO
<b>SP Sub</b>					
PLTC	Plot Control Mask	50.56	NO		NO
SP	Spontaneous Potential	50.56	BLK	1.250	NO
SPR	Raw Spontaneous Potential	50.56	NO		NO
SPO	Spontaneous Potential Offset	50.56	NO		NO
<b>GTET</b>					
TPUL	Tension Pull	42.54	NO		NO
GR	Natural Gamma Ray API	42.54	TRI	1.750	NO
GRU	Unfiltered Natural Gamma Ray API	42.54	NO		NO
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	42.54	W	1.416 , 0.750	NO
HDIA	Measured Hole Diameter	0.00	NO		NO
ACCZ	Accelerometer Z	0.00	BLK	0.083	NO
DEVI	Inclination	0.00	NO		NO
<b>DSNT</b>					
TPUL	Tension Pull	32.30	NO		NO
RNDS	Near Detector Telemetry Counts	32.40	BLK	1.417	NO
RFDS	Far Detector Telemetry Counts	33.15	TRI	0.583	NO
DNTT	DSN Tool Temperature	32.40	NO		NO
DSNS	DSN Tool Status	32.30	NO		NO
ERND	Near Detector Telemetry Counts EVR	32.40	BLK	0.000	NO
ERFD	Far Detector Telemetry Counts EVR	33.15	BLK	0.000	NO
ENTM	DSN Tool Temperature EVR	32.40	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO
<b>SDLT</b>					
TPUL	Tension Pull	22.40	NO		NO
PCAL	Pad Caliper	22.40	TRI	0.250	NO
ACAL	Arm Caliper	22.40	TRI	0.250	NO
<b>ACRt Sonde</b>					
TPUL	Tension Pull	2.73	NO		NO
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000	NO
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000	NO
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000	NO
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000	NO
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000	NO
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000	NO
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000	NO
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000	NO
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000	NO
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000	NO
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000	NO
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000	NO
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000	NO
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000	NO
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000	NO
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000	NO
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000	NO
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000	NO
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000	NO
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000	NO
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000	NO
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000	NO

F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000	NO
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000	NO
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000	NO
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000	NO
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000	NO
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000	NO
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000	NO
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000	NO
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000	NO
F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000	NO
F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000	NO
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000	NO
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000	NO
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000	NO
RMUD	Mud Resistivity	12.52	BLK	0.000	NO
F1RT	Transmitter Reference 12 KHz Real Signal	2.73	BLK	0.000	NO
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000	NO
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000	NO
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000	NO
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000	NO
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000	NO
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
ITMP	Instrument Temperature	2.73	BLK	0.000	NO
TCVA	Temperature Correction Values Loop Off	2.73	NO		NO
TIDV	Instrument Temperature Derivative	2.73	NO		NO
TUDV	Upper Temperature Derivative	2.73	NO		NO
TLDV	Lower Temperature Derivative	2.73	NO		NO
TRBD	Receiver Board Temperature	2.73	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO
<b>Microlog Pad</b>					
TPUL	Tension Pull	22.58	NO		NO
MINV	Microlog Lateral	22.58	BLK	0.750	NO
MNOR	Microlog Normal	22.58	BLK	0.750	NO
<b>SDLT Pad</b>					
TPUL	Tension Pull	22.39	NO		NO
NAB	Near Above	22.21	BLK	0.920	NO
NHI	Near Cesium High	22.21	BLK	0.920	NO
NLO	Near Cesium Low	22.21	BLK	0.920	NO
NVA	Near Valley	22.21	BLK	0.920	NO
NBA	Near Barite	22.21	BLK	0.920	NO
NDE	Near Density	22.21	BLK	0.920	NO
NPK	Near Peak	22.21	BLK	0.920	NO
NLI	Near Lithology	22.21	BLK	0.920	NO
NBAU	Near Barite Unfiltered	22.21	BLK	0.250	NO
NLIU	Near Lithology Unfiltered	22.21	BLK	0.250	NO
FAB	Far Above	22.56	BLK	0.250	NO
FHI	Far Cesium High	22.56	BLK	0.250	NO
FLO	Far Cesium Low	22.56	BLK	0.250	NO
FVA	Far Valley	22.56	BLK	0.250	NO
FBA	Far Barite	22.56	BLK	0.250	NO
FDE	Far Density	22.56	BLK	0.250	NO
FPK	Far Peak	22.56	BLK	0.250	NO
FLI	Far Lithology	22.56	BLK	0.250	NO
PTMP	Pad Temperature	22.40	BLK	0.920	NO
NHV	Near Detector High Voltage	21.79	NO		NO
FHV	Far Detector High Voltage	21.79	NO		NO

ITMP	Instrument Temperature	21.79	NO	NO
DDHV	Detector High Voltage	21.79	NO	NO
HDIA	Measured Hole Diameter	0.00	NO	NO
<b>Data: HALL-GATES_2-50001 GTET-DSN-SDL-ACRT_DRIVERSVDLE</b>				<b>Date: 18-Oct-19 08:13:20</b>

COMPANY	<b>BIRD DOG OIL, LLC</b>			
WELL	<b>HALL-GATES 2-5</b>			
FIELD	<b>GATES</b>			
COUNTY	<b>STAFFORD</b>	STATE	<b>KANSAS</b>	
<b>HALLIBURTON</b>		<b>MICROLOG</b>		

# HALLIBURTON

## ARRAY COMPENSATED TRUE RESISTIVITY LOG

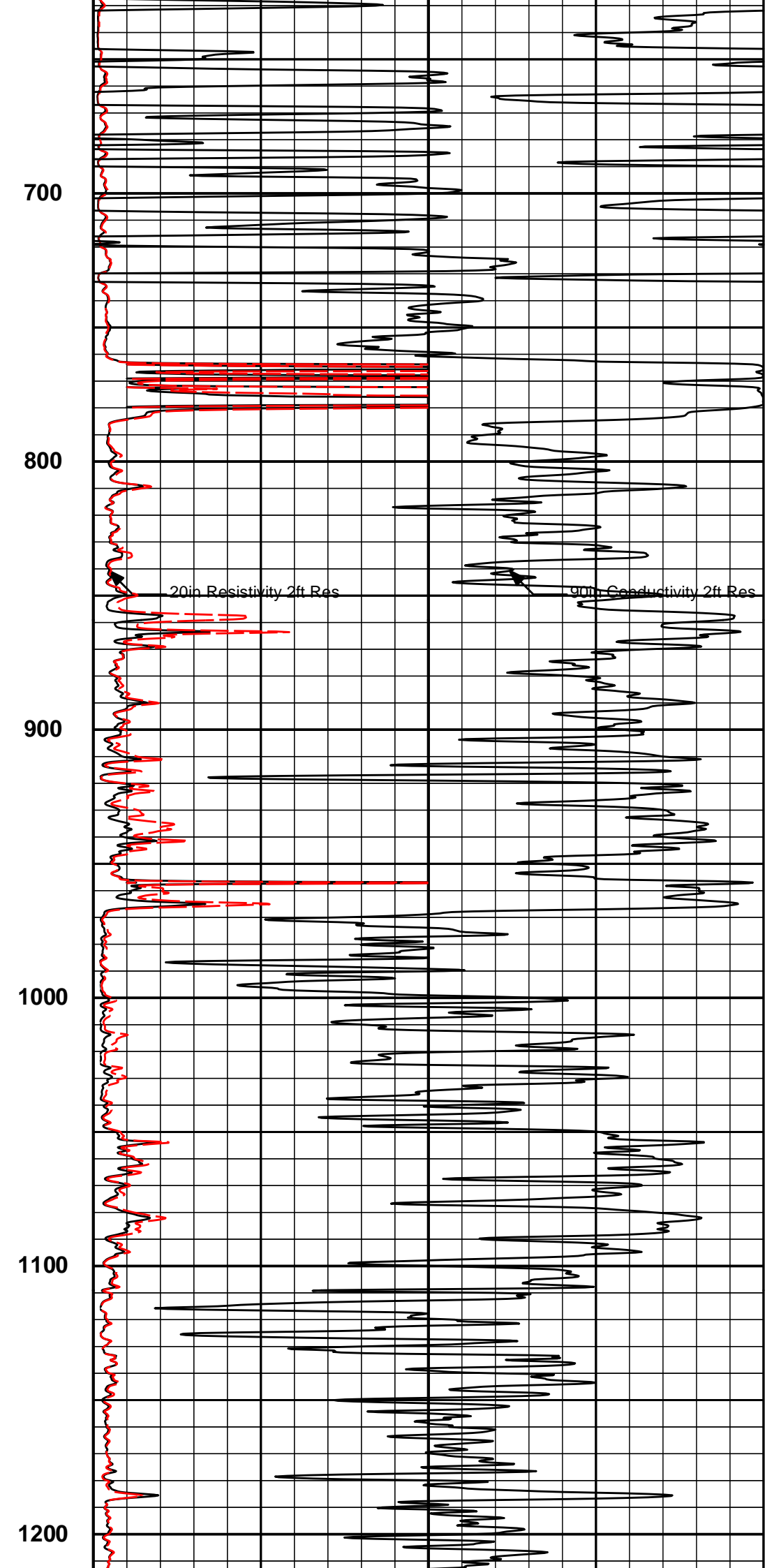
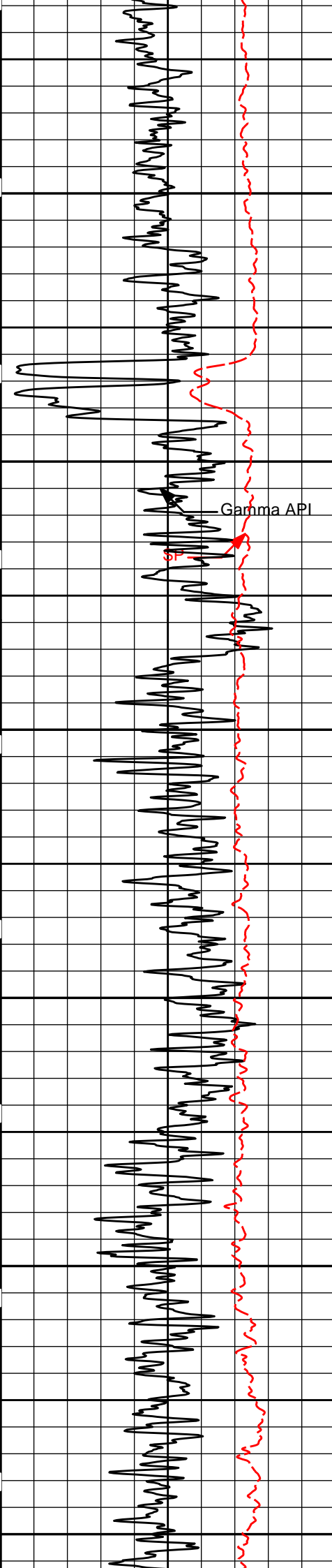
COMPANY	BIRD DOG OIL, LLC
WELL	HALL-GATES 2-5
FIELD/BLOCK	GATES
COUNTY	STAFFORD
STATE	KANSAS
COMPANY	BIRD DOG OIL, LLC
WELL	HALL-GATES 2-5
FIELD/BLOCK	GATES
COUNTY	STAFFORD
STATE	KANSAS
API No.	15-185-24062-00-00
Location	(SHL) 2310' FNL & 330' FEL SE SE NE
Other Services:	DSNT/SDLT MICROLOG ACRT
Sect.	5
Twp.	22S
Rge.	13W
GL	Elev. 1896.0 ft
KB	D.F. 1905.0 ft
KB	G.L. 1905.0 ft
Drilling measured from	9.0 ft above perm. Datum

Date	18-Oct-19
Run No.	ONE
Depth - Driller	3850.0 ft
Depth - Logger	3850.0 ft
Bottom - Logged Interval	3841.00 ft
Top - Logged Interval	432.00 ft
Casing - Driller	8.625 in @ 432.0 ft
Casing - Logger	432.0 ft @
Bit Size	7.875 in @
Type Fluid in Hole	Water Based Mud @
Density	9.00 g/cc 58.00 s/qt
PH	10.50 pH 10.0 cpm
Source of Sample	MUDPIT
Rm @ Meas. Temperature	0.51 ohmm @ 75.00 degF @
Rmf @ Meas. Temperature	0.47 ohmm @ 75.00 degF @
Rmc @ Meas. Temperature	0.58 ohmm @ 75.00 degF @
Source Rmf	Rmc MEAS MEAS
Rm @ BHT	0.35 ohmm @ 111.0 degF @
Time Since Circulation	5.0 hr
Time on Bottom	18-Oct-19 09:00
Max. Rec. Temperature	111.00 degF @ 3850.0 ft @
Equipment	12156883 EL RENO, OK
Recorded By	JORGE ORLANDO PEREZ
Witnessed By	JUSTIN CARTER

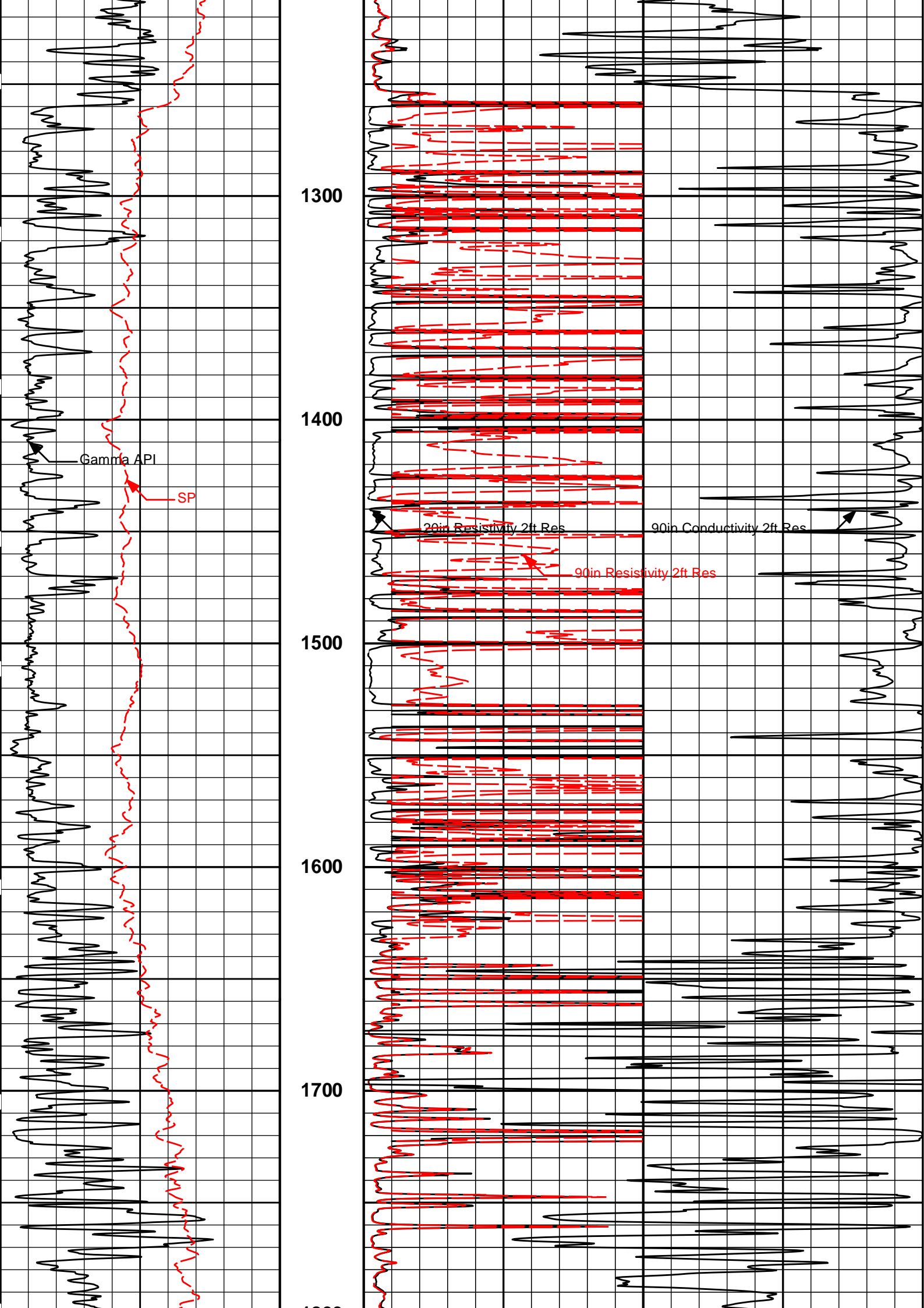
Fold here

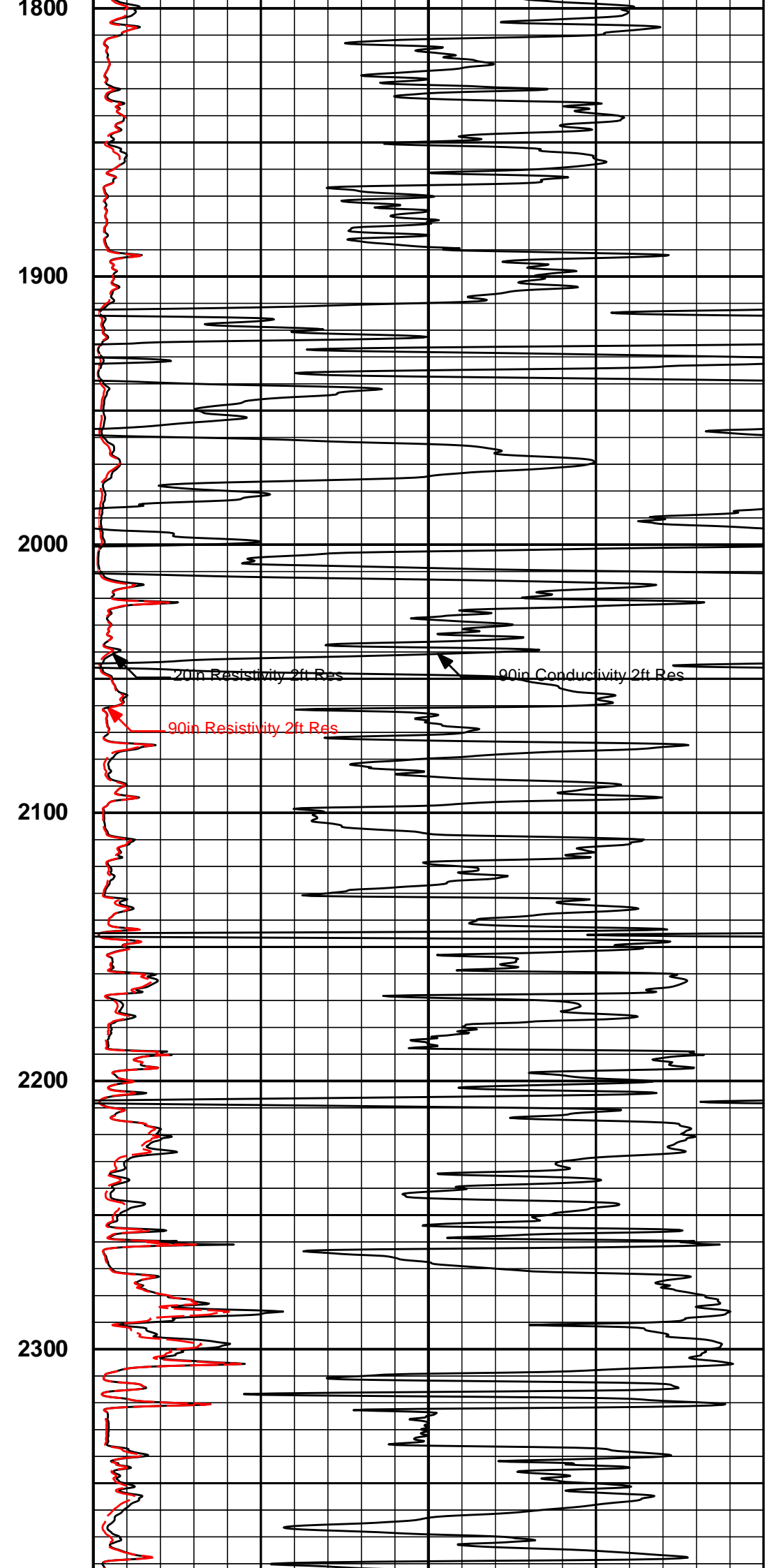
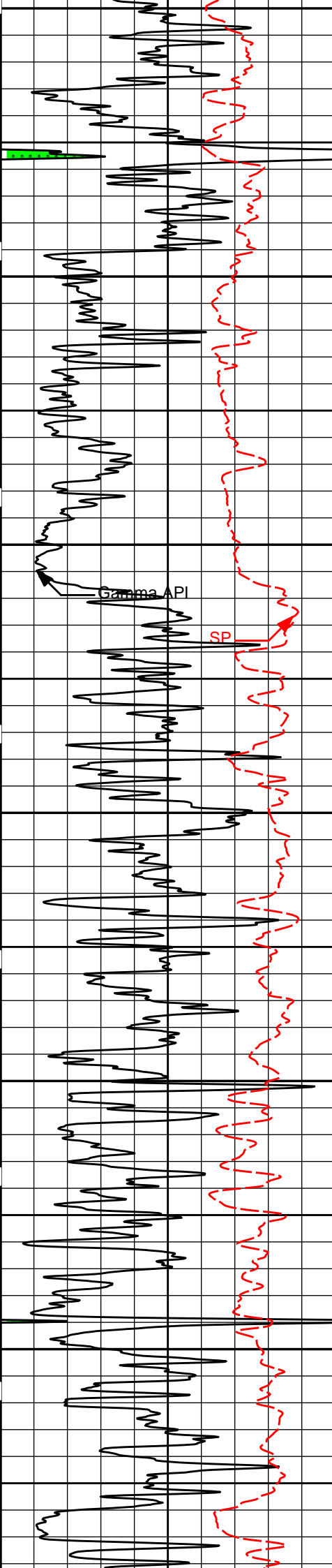
Service Ticket No.: 906051745		API No.: 15-185-24062-00-00		PGM Version: WL INSITE R6.2.7 (Build 7)								
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE			RESISTIVITY SCALE CHANGES									
Date	Sample No.		Type Log	Depth	Scale Up Hole	Scale Down Hole						
Depth-Driller												
Type Fluid in Hole												
Density	Viscosity											
Ph	Fluid Loss											
Source of Sample			RESISTIVITY EQUIPMENT DATA									
Rm @ Meas. Temp	@	@	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other					
Rmf @ Meas. Temp.	@	@	ONE	ACRT	N/A	1.5" S.O.	N/A					
Rmc @ Meas. Temp.	@	@		I-11830684								
Source Rmf	Rmc			S-11830728								
Rm @ BHT	@	@										
Rmf @ BHT	@	@										
Rmc @ BHT	@	@										
EQUIPMENT DATA												
GAMMA		ACOUSTIC		DENSITY		NEUTRON						
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE					
Serial No.	11013113	Serial No.		Serial No.	10960494	Serial No.	11055304					
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT					
Diameter	3.625"	No. of Cent.		Diameter	5.5"	Diameter	3.625"					
Detector Model No.	T-102	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU					
Type	SCINT			Source Type	CS137	Source Type	AM241BE					
Length	8"	LSA [Y/N]		Serial No.	5475GW	Serial No.	DSN-436					
Distance to Source	N/A	FWDA [Y/N]		Strength	1.78 Ci	Strength	15.0 Ci					
LOGGING DATA												
GENERAL		GAMMA		ACOUSTIC		DENSITY		NEUTRON				
Run	Depth	Speed	Scale	Scale	Matrix	Scale	Matrix	Scale	Matrix			
No.	From	To	L	R	L	R	L	R	L			
ONE	TD	CSC	PEC	0	150		20	10	2.71 g/cc	20	10	TIME

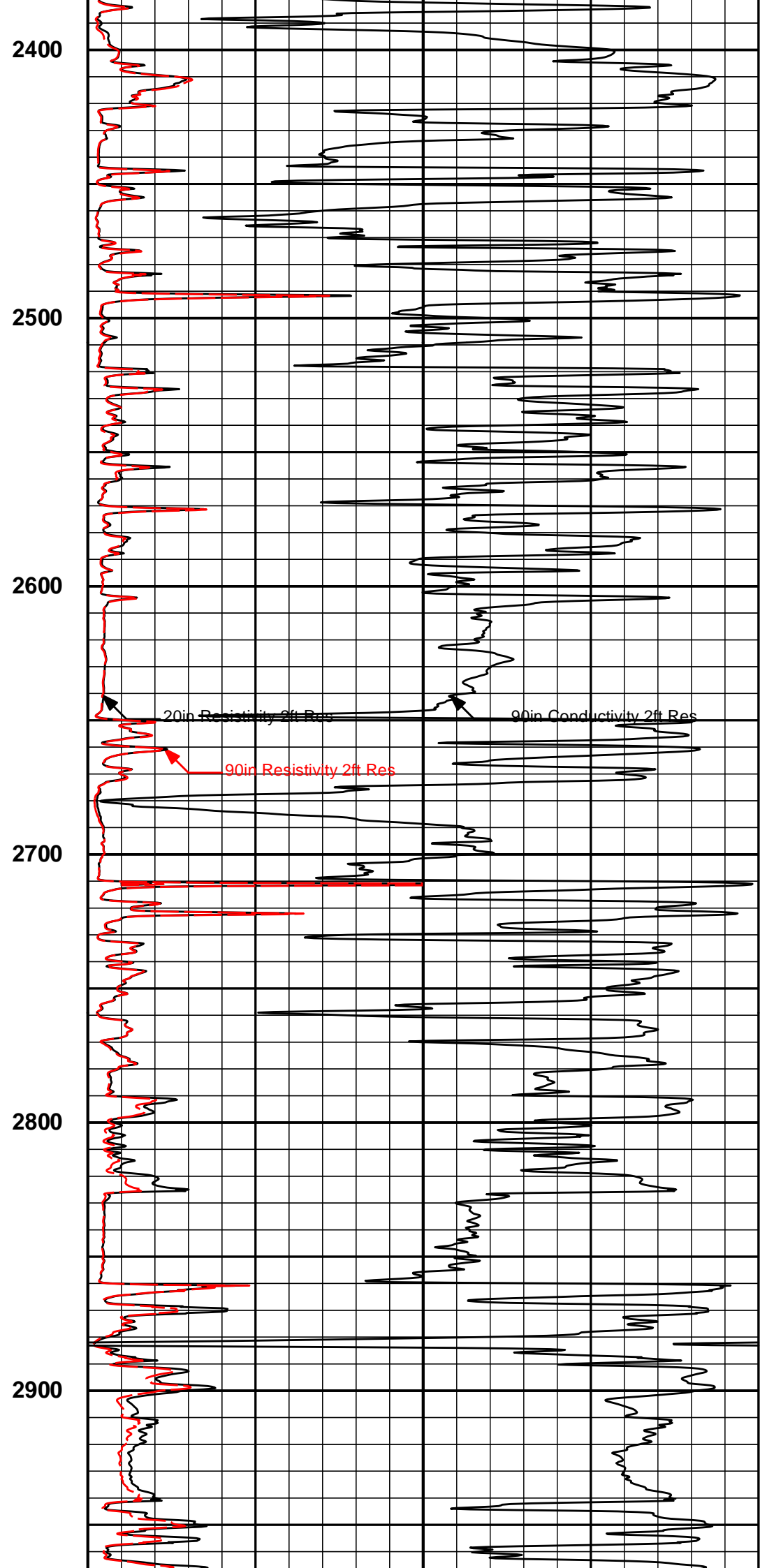
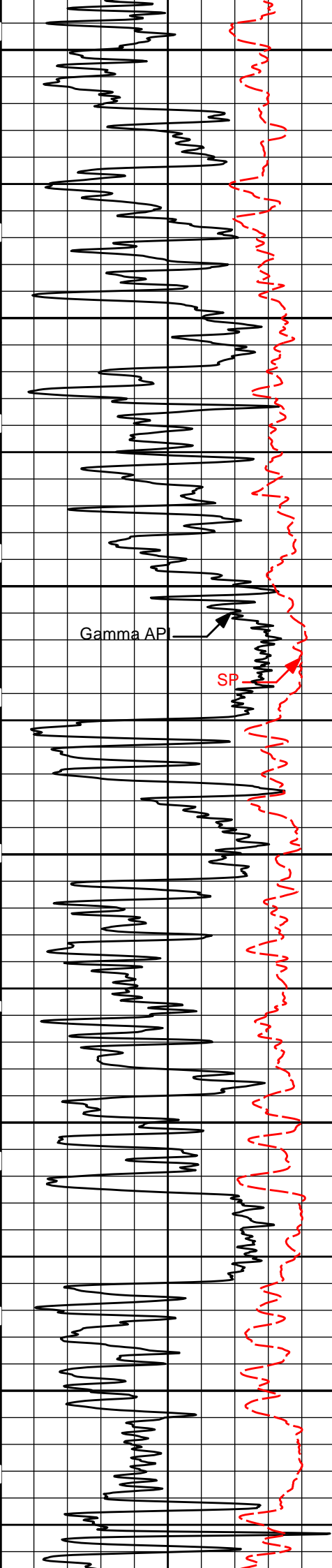


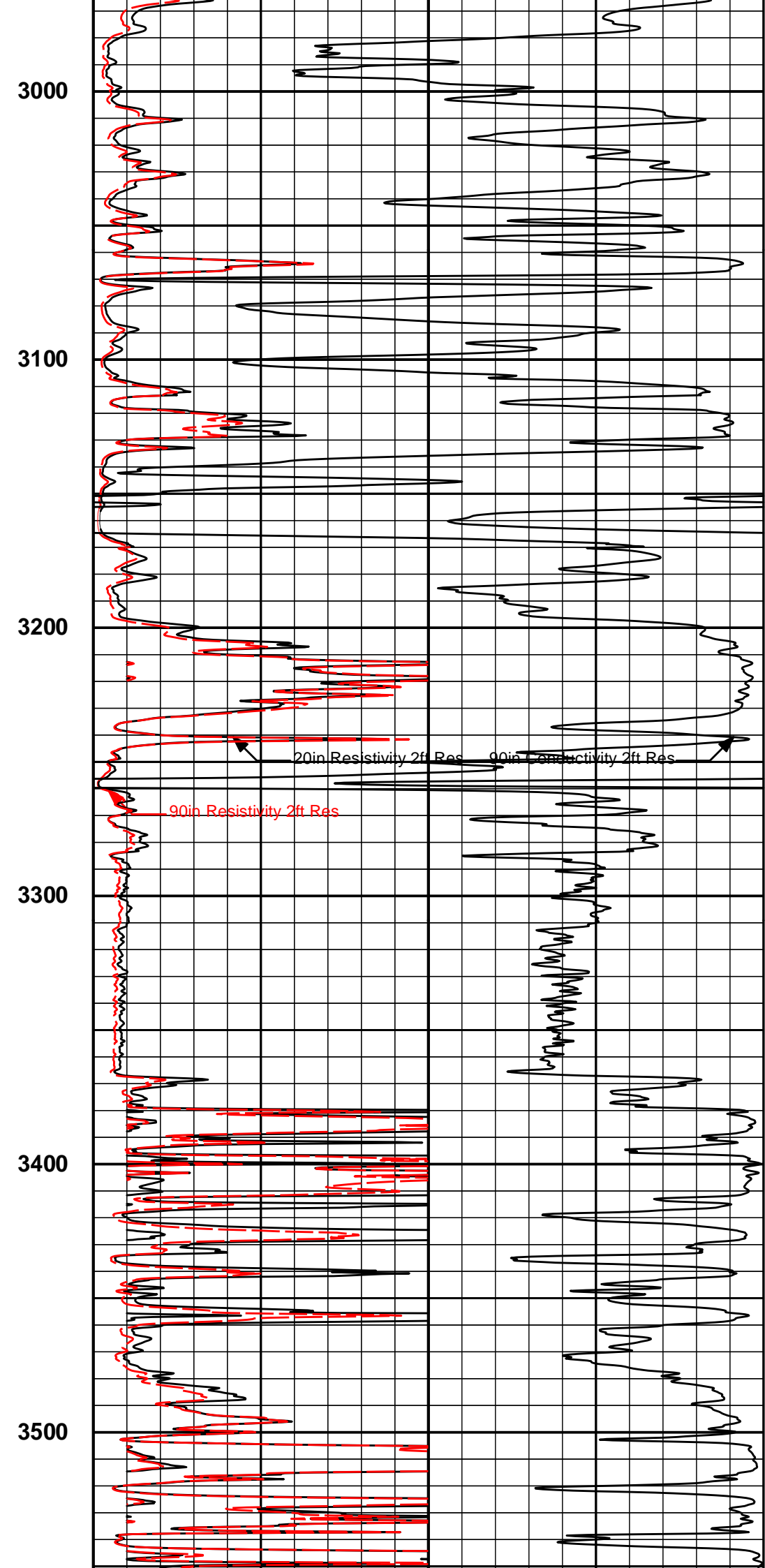
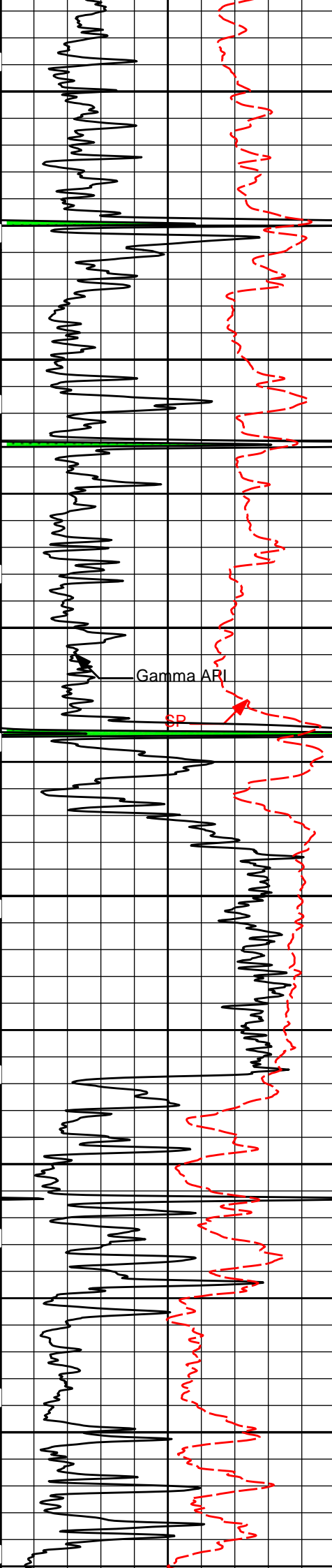


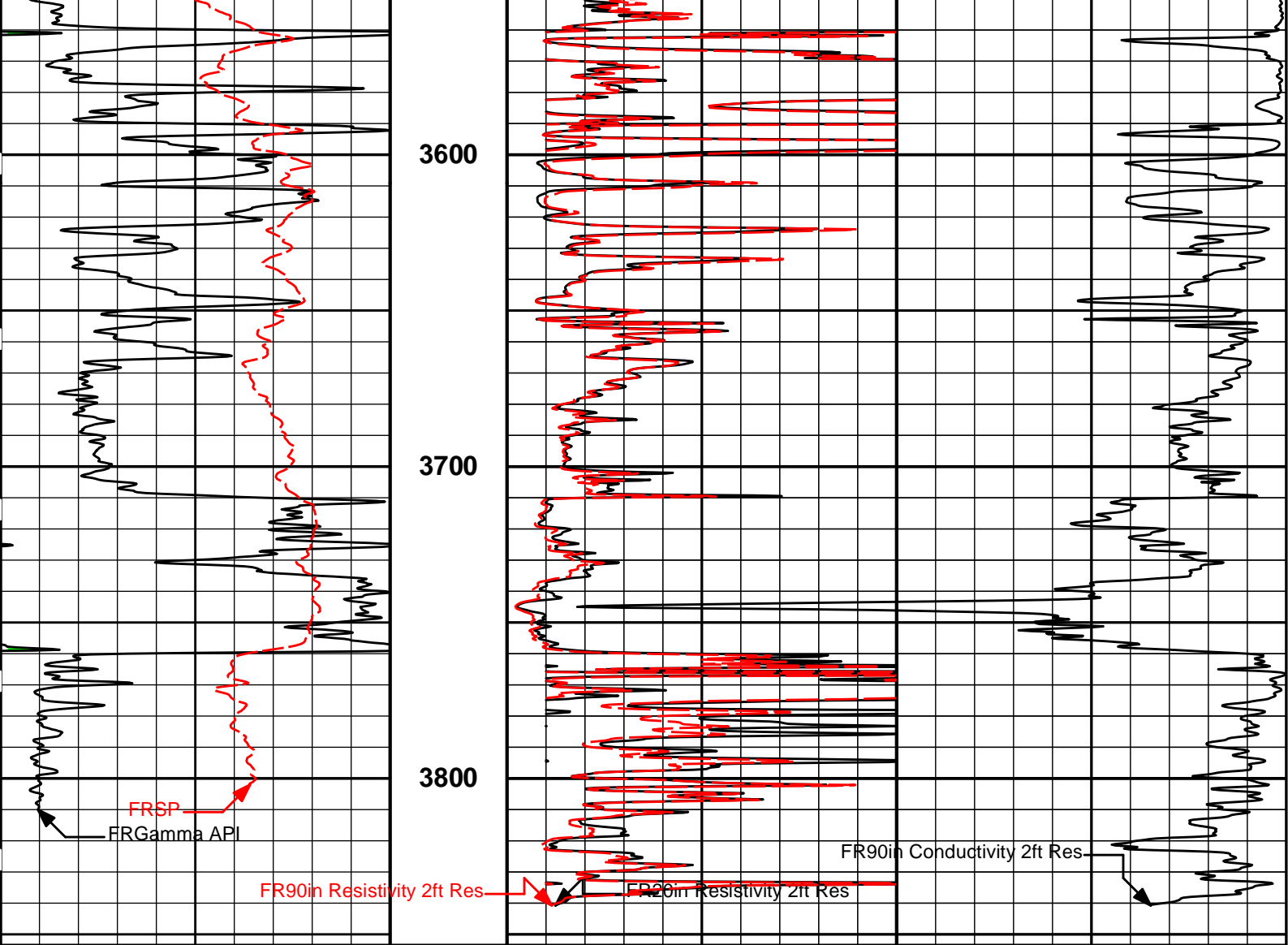












0	Gamma API	150	1 : 600 ft	0	20in Resistivity 2ft Res	50
	api			0	90in Resistivity 2ft Res	50
	SP			1000	90in Conductivity 2ft Res	0
	- 20 +				mmho per metre	

**HALLIBURTON**

Plot Time: 18-Oct-19 10:03:01  
 Plot Range: 420 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5\Well Based\MAIN\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5\Well Based\ACRT\ACRT\_2\_MAIN

## 2 INCH MAIN LOG

**HALLIBURTON**

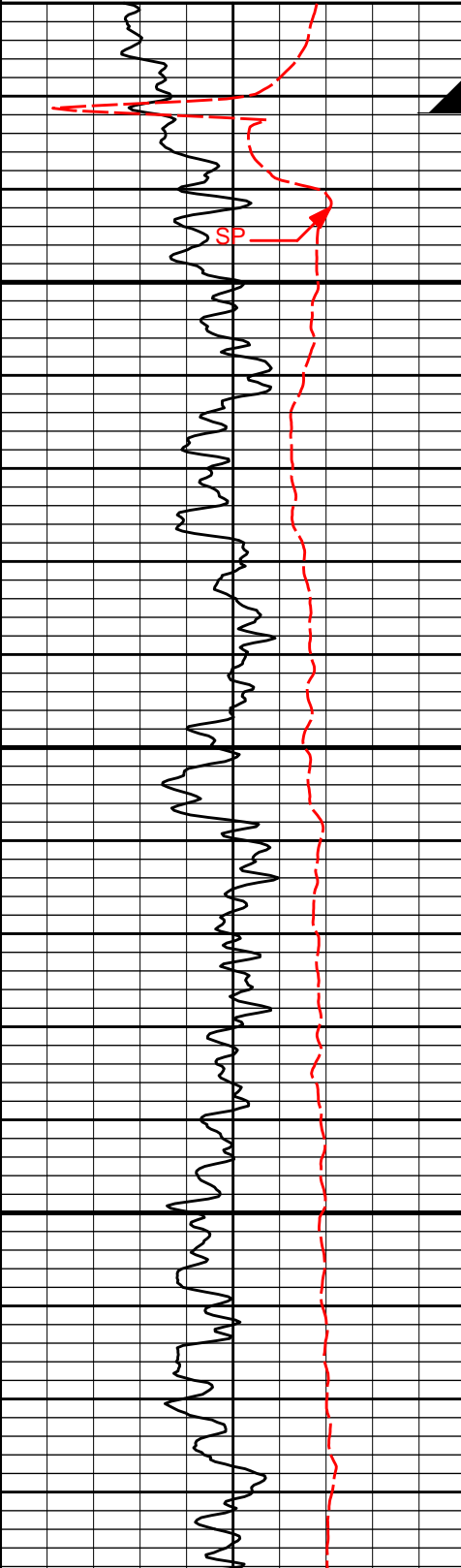
Plot Time: 18-Oct-19 10:03:02  
 Plot Range: 420 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5\Well Based\MAIN\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5\Well Based\ACRT\ACRT\_5inch\_MAIN

## 5 INCH MAIN LOG

MEASURED DEPTH  
 MAIN SECTION 5" PER 100'

	0.2	10in Resistivity 2ft Res	2000
		ohm-metre	
	0.2	20in Resistivity 2ft Res	2000
		ohm-metre	
	0.2	30in Resistivity 2ft Res	2000
		ohm-metre	
	0.2	60in Resistivity 2ft Res	2000
		ohm-metre	
	0.2	90in Resistivity 2ft Res	2000
		ohm-metre	

SP  
-|20|+

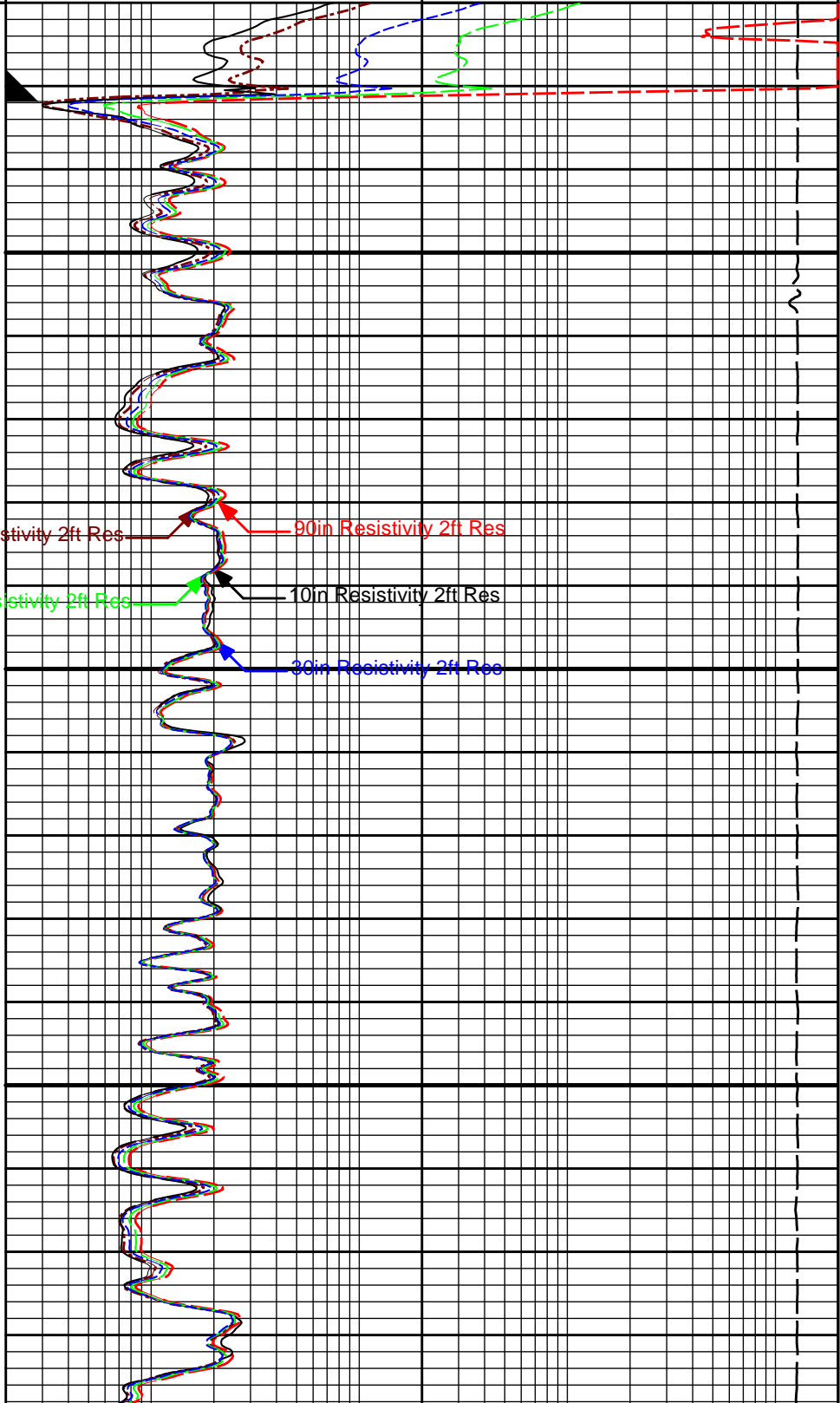


Gamma API 150  
api

1 : 240 ft

15K Tension 0  
pounds

CSG



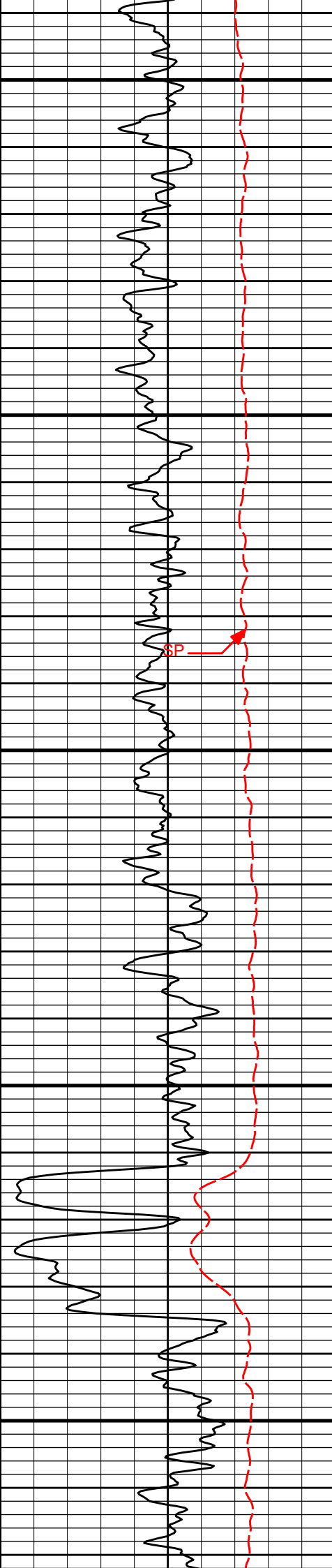
20in Resistivity 2ft Res

60in Resistivity 2ft Res

90in Resistivity 2ft Res

10in Resistivity 2ft Res

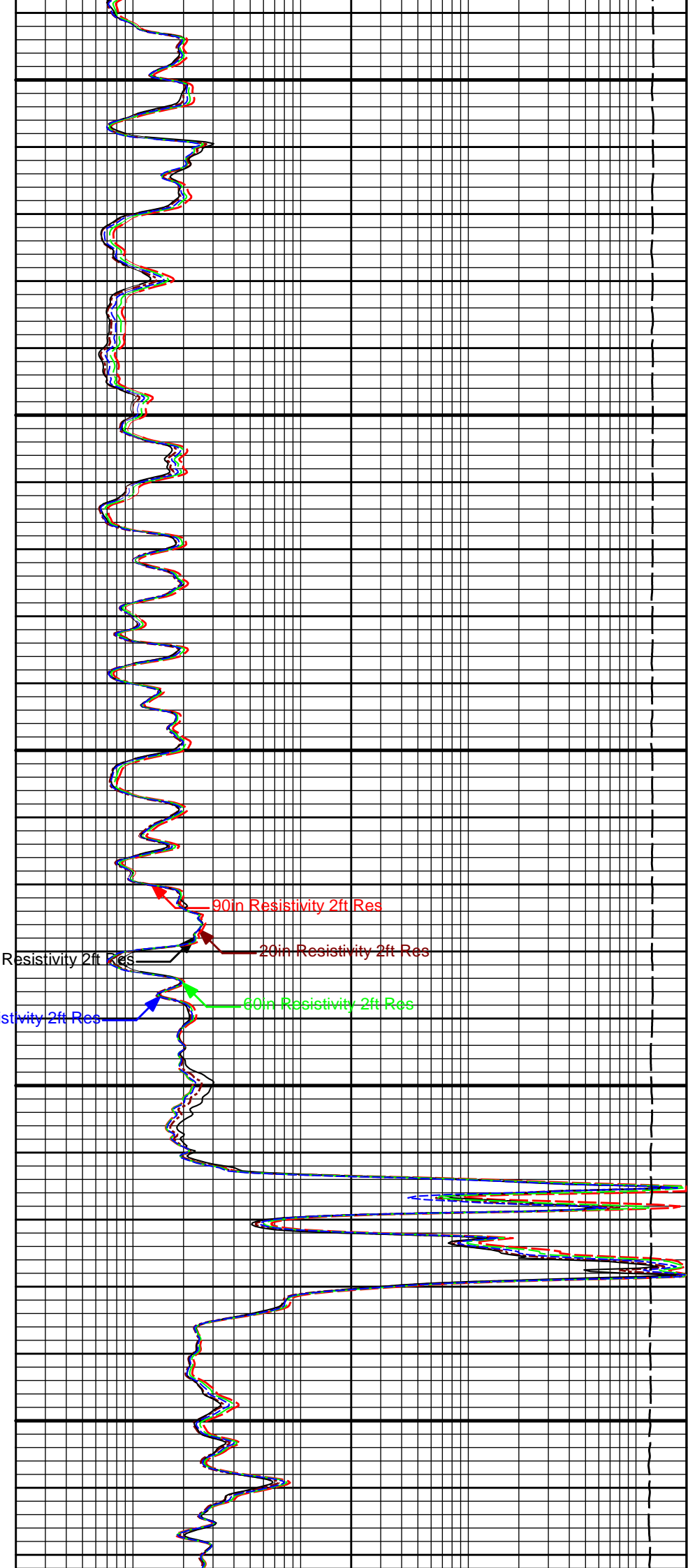
30in Resistivity 2ft Res

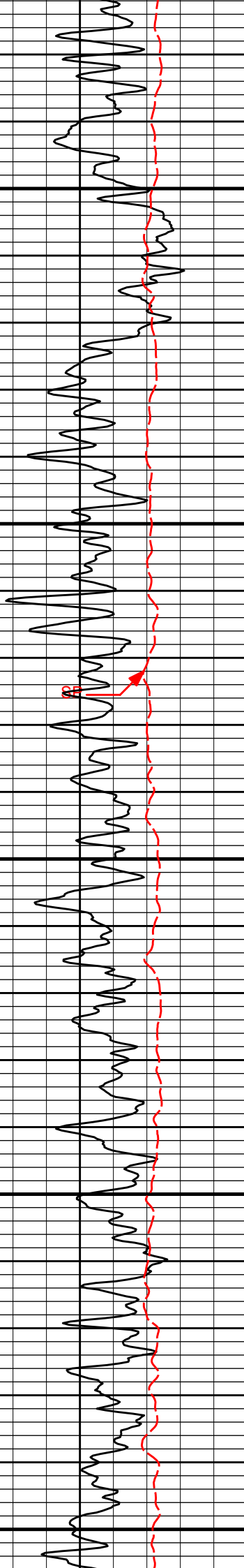


600

700

800



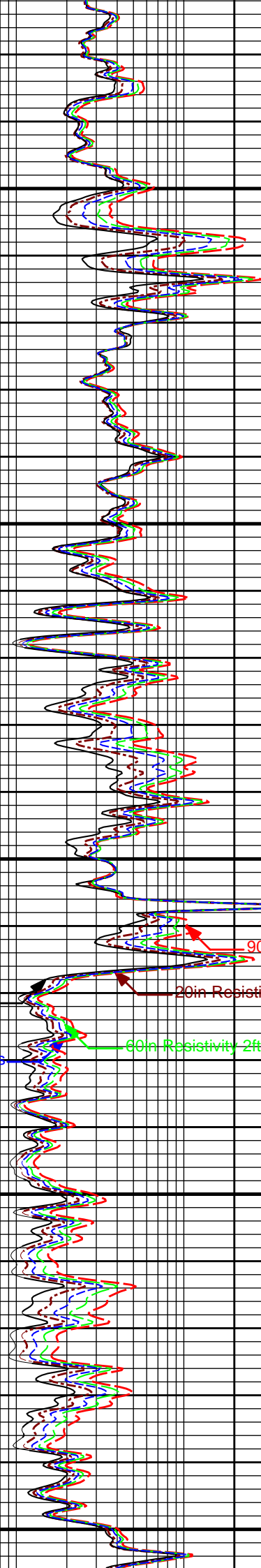


900

10in Resistivity 2ft Res

30in Resistivity 2ft Res

1000

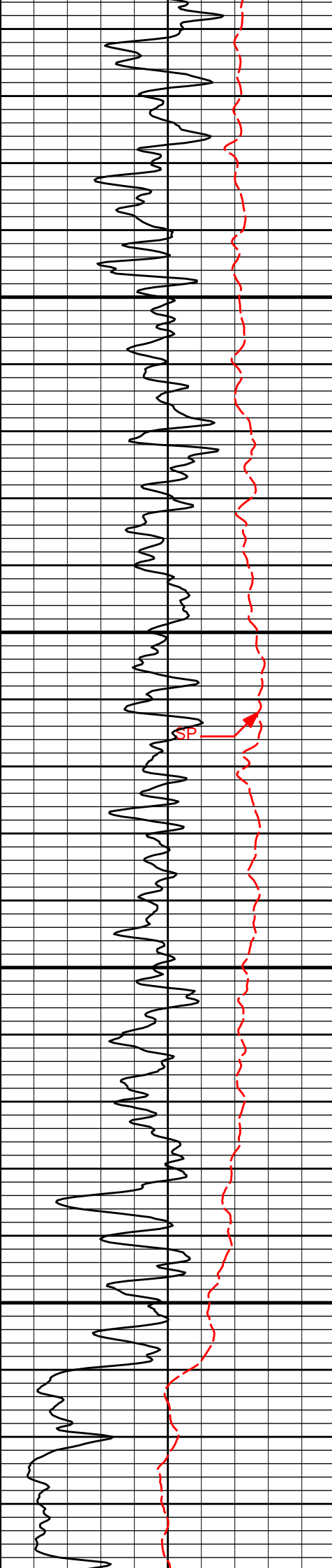


90in Resistivity 2ft Res

20in Resistivity 2ft Res

60in Resistivity 2ft Res





1100

1200

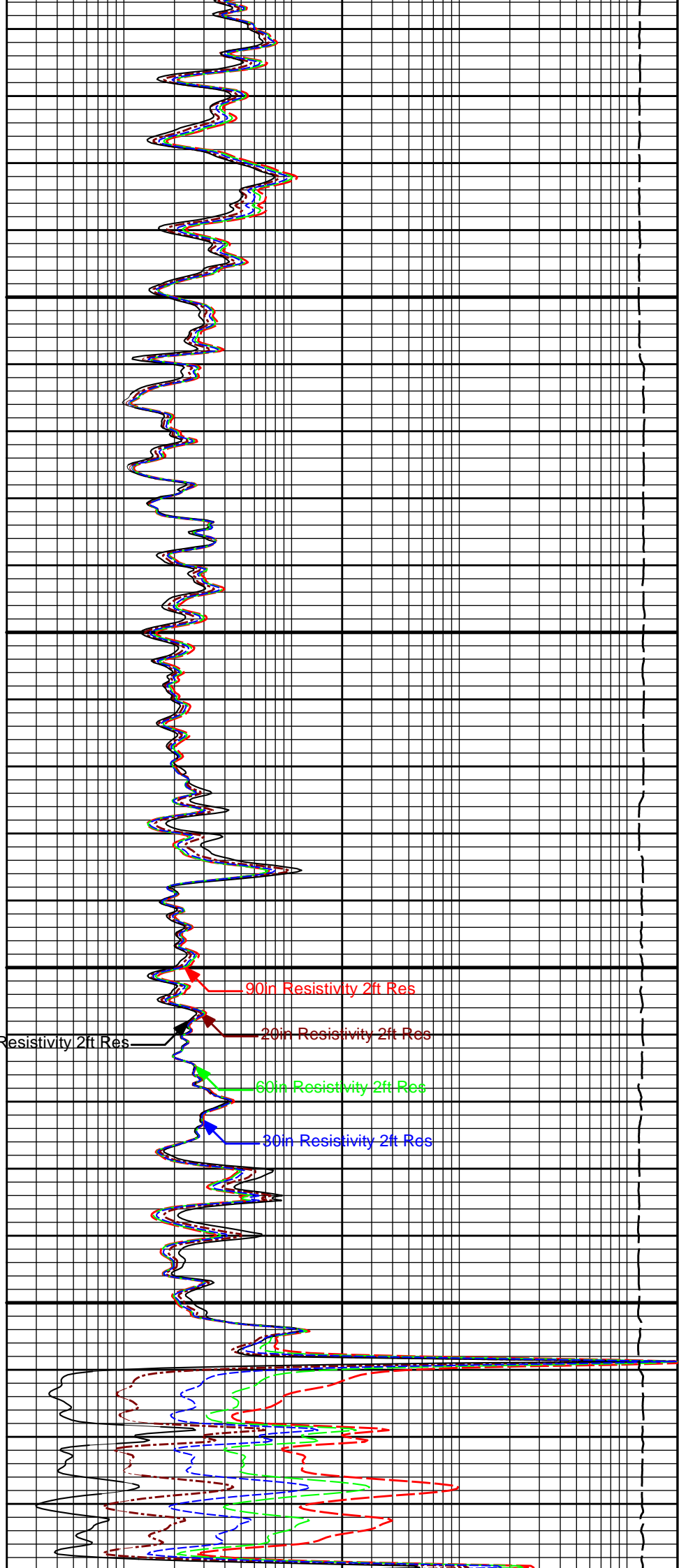
10in Resistivity/2ft Res

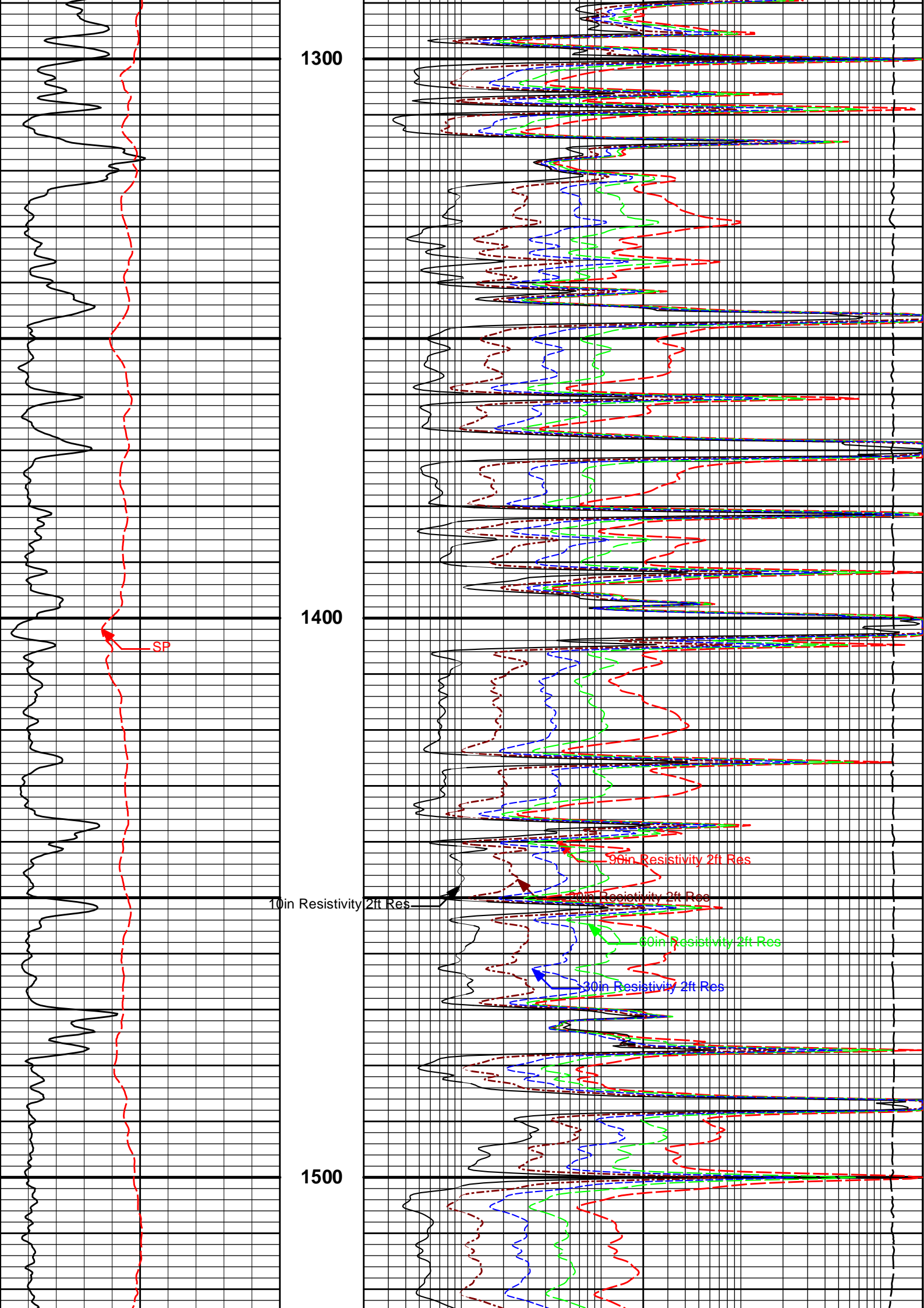
90in Resistivity 2ft Res

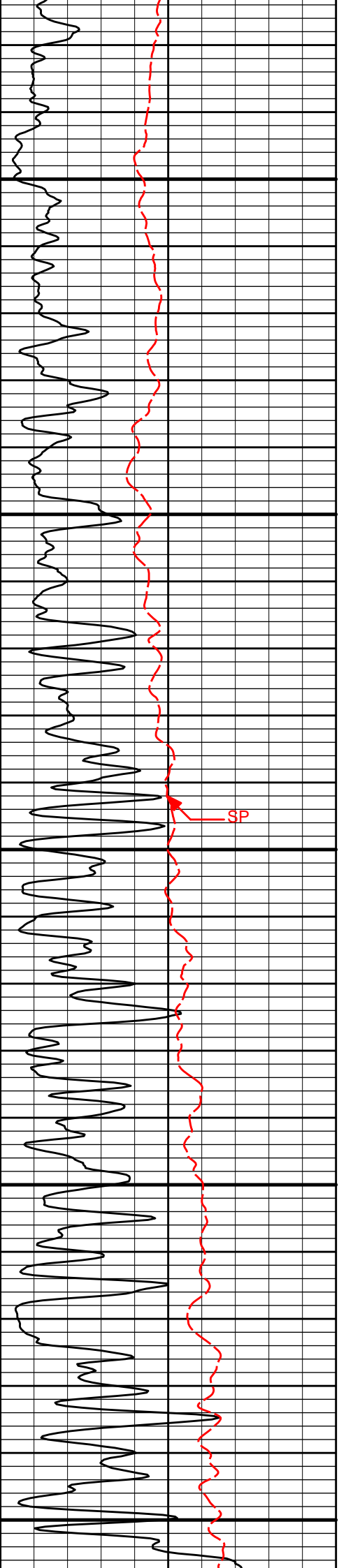
20in Resistivity 2ft Res

60in Resistivity 2ft Res

30in Resistivity 2ft Res







1600

1700

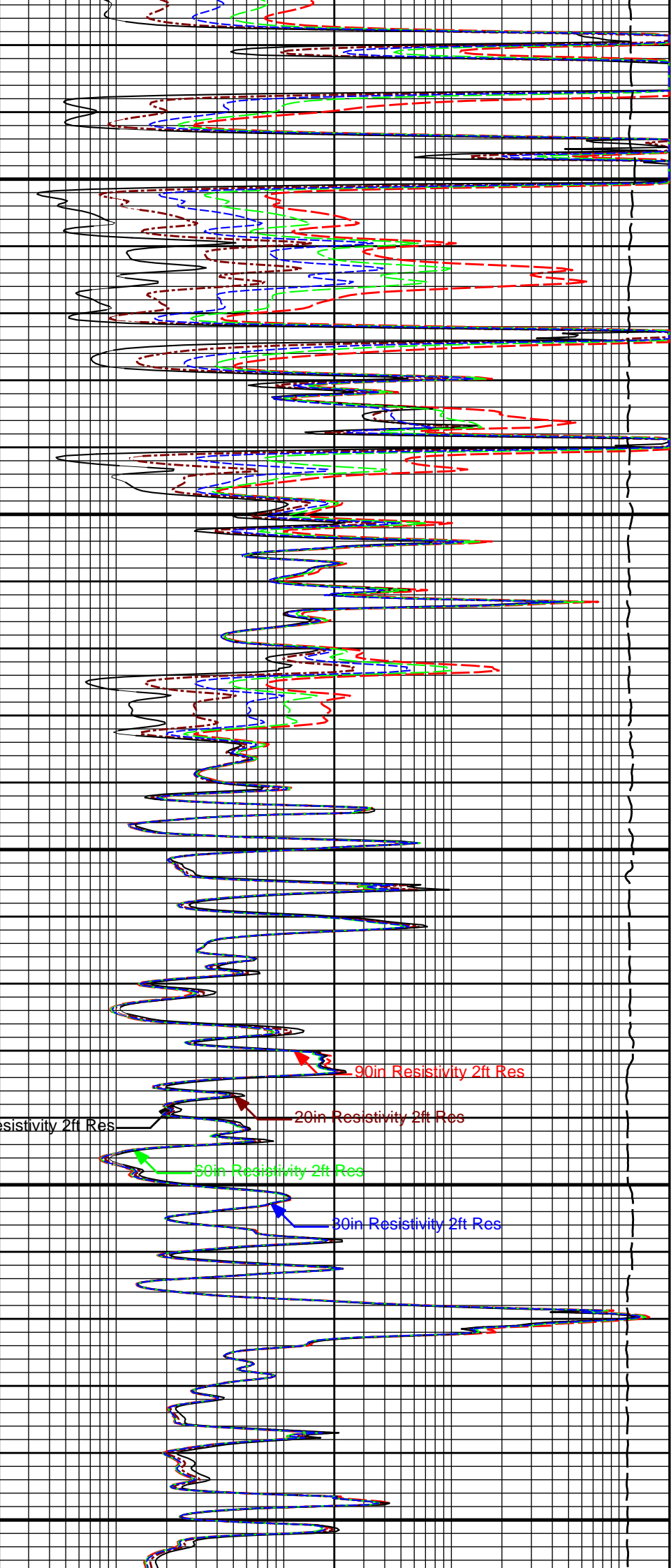
10in Resistivity 2ft Res

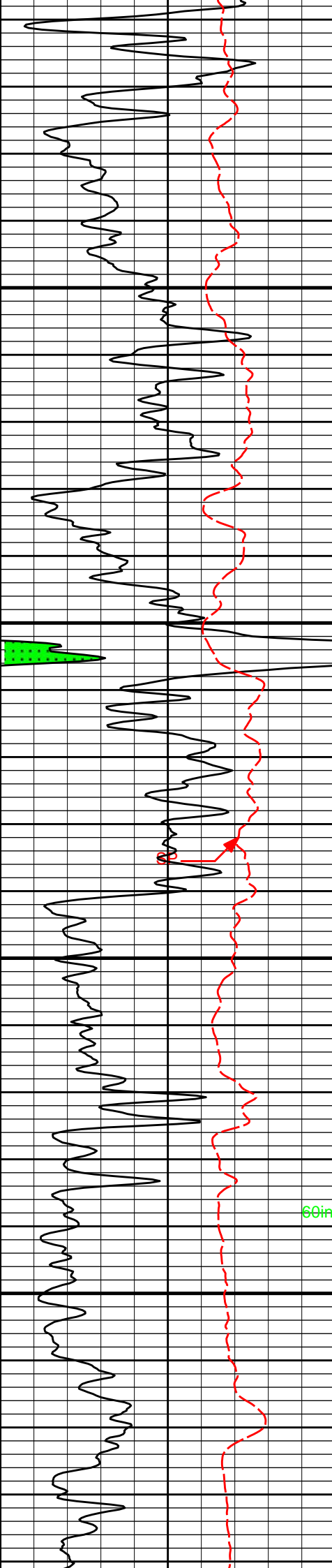
90in Resistivity 2ft Res

20in Resistivity 2ft Res

60in Resistivity 2ft Res

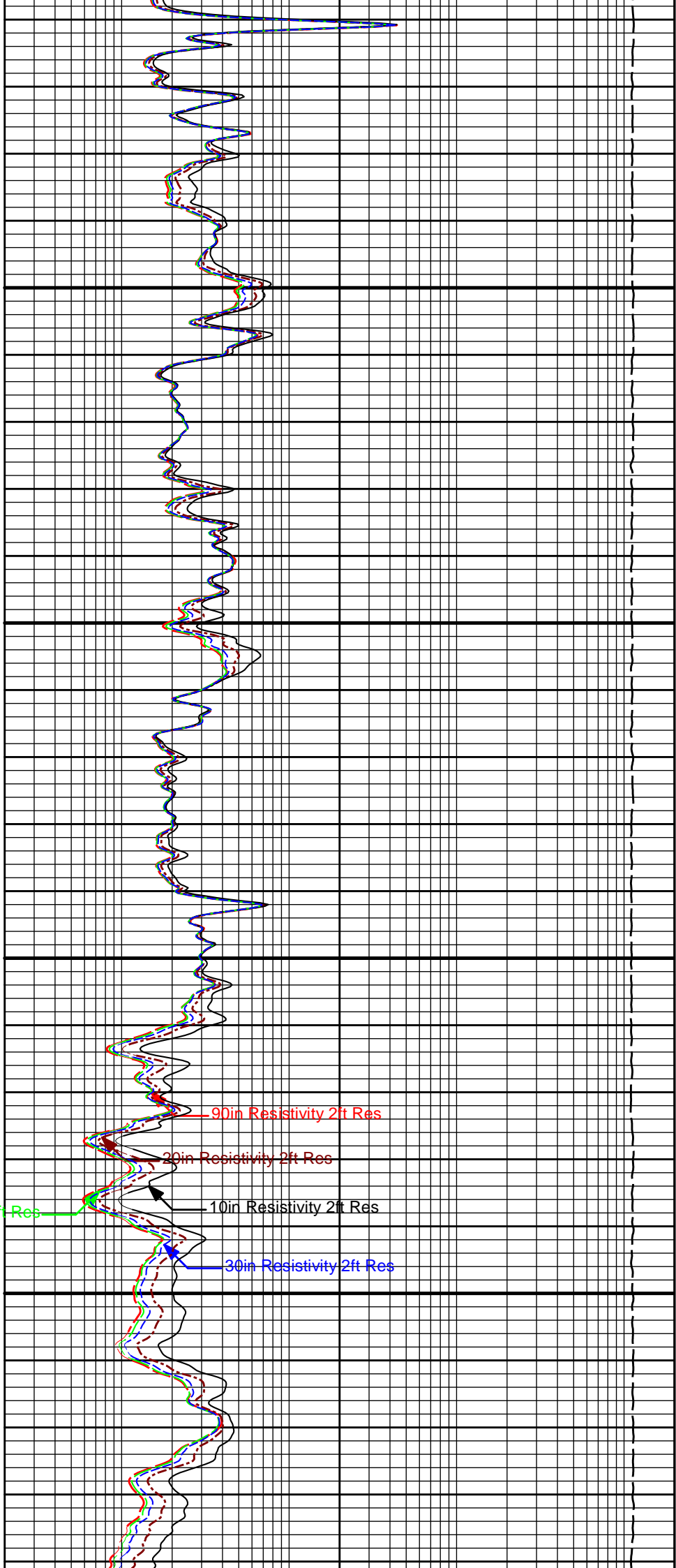
30in Resistivity 2ft Res





1800

1900



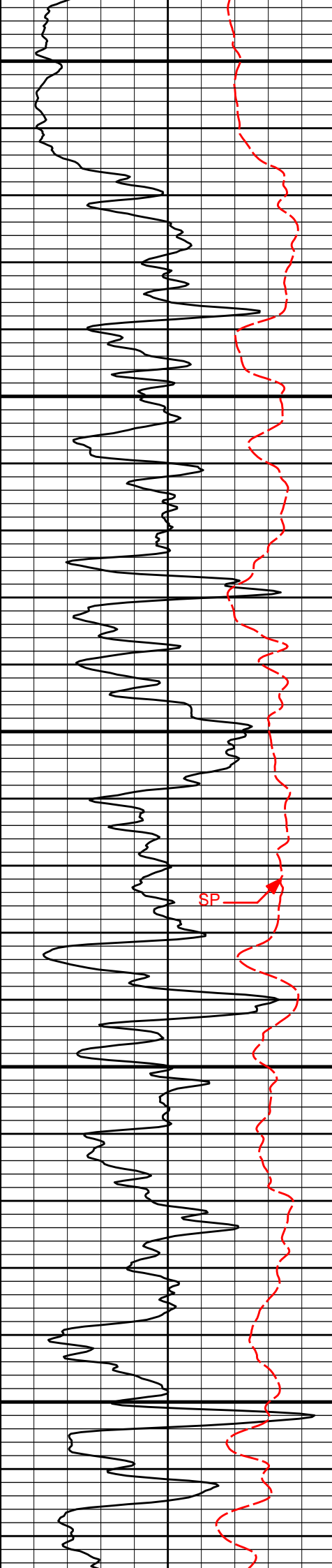
90in Resistivity 2ft Res

20in Resistivity 2ft Res

10in Resistivity 2ft Res

30in Resistivity 2ft Res

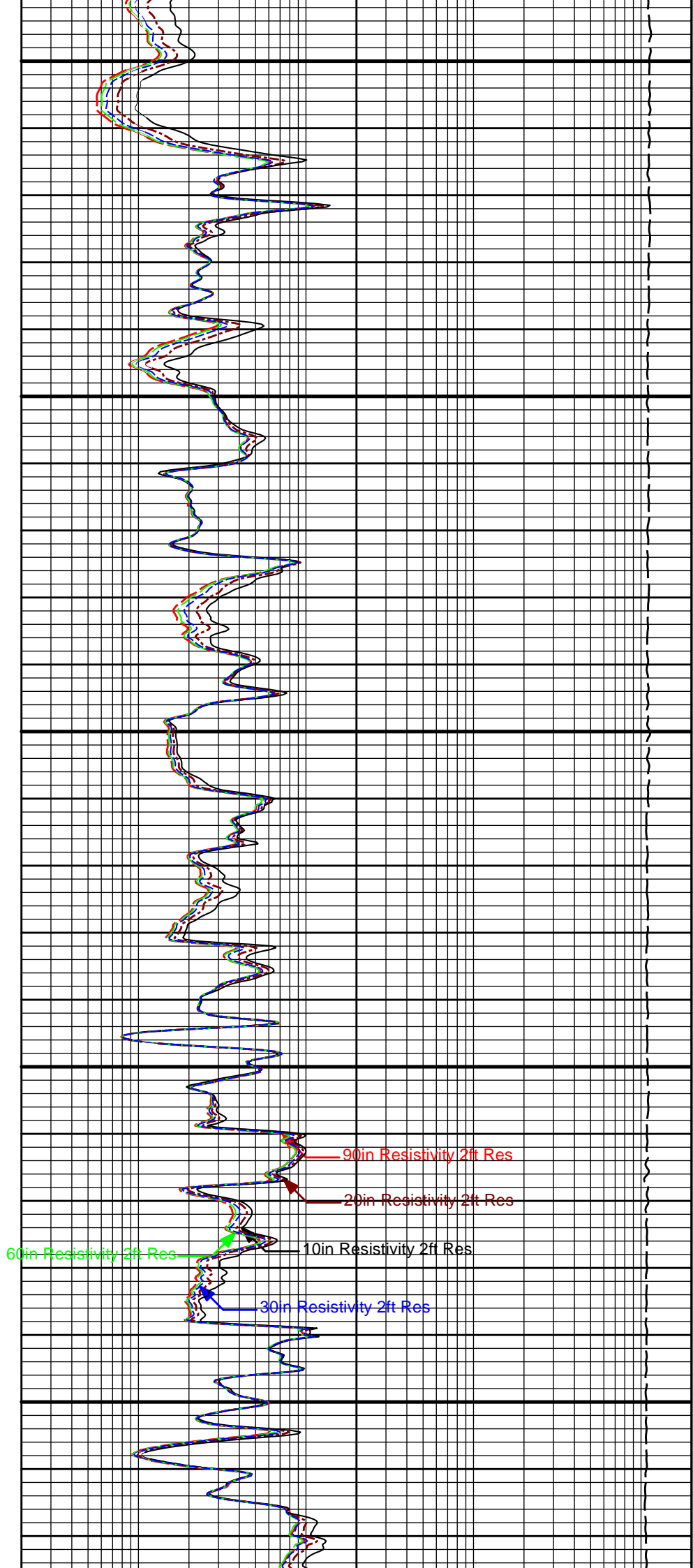
60in Resistivity 2ft Res

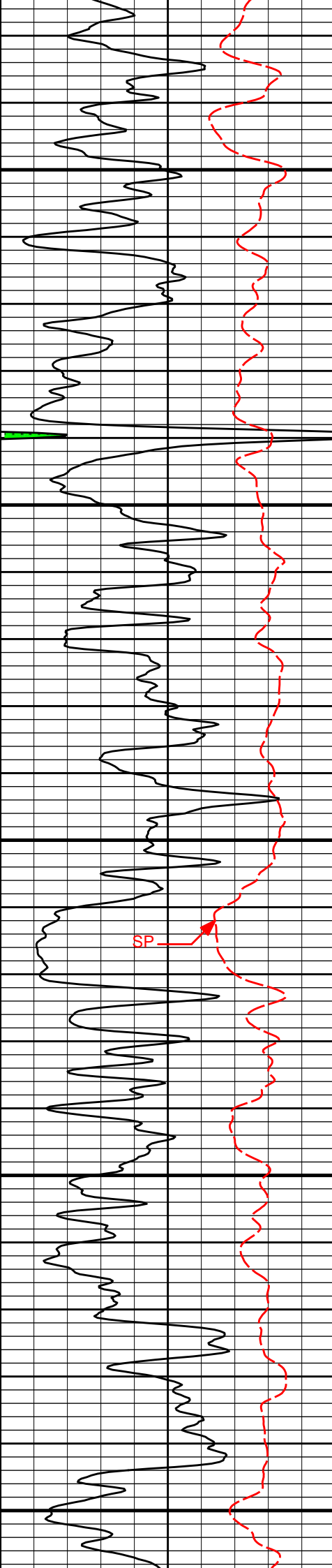


2000

2100

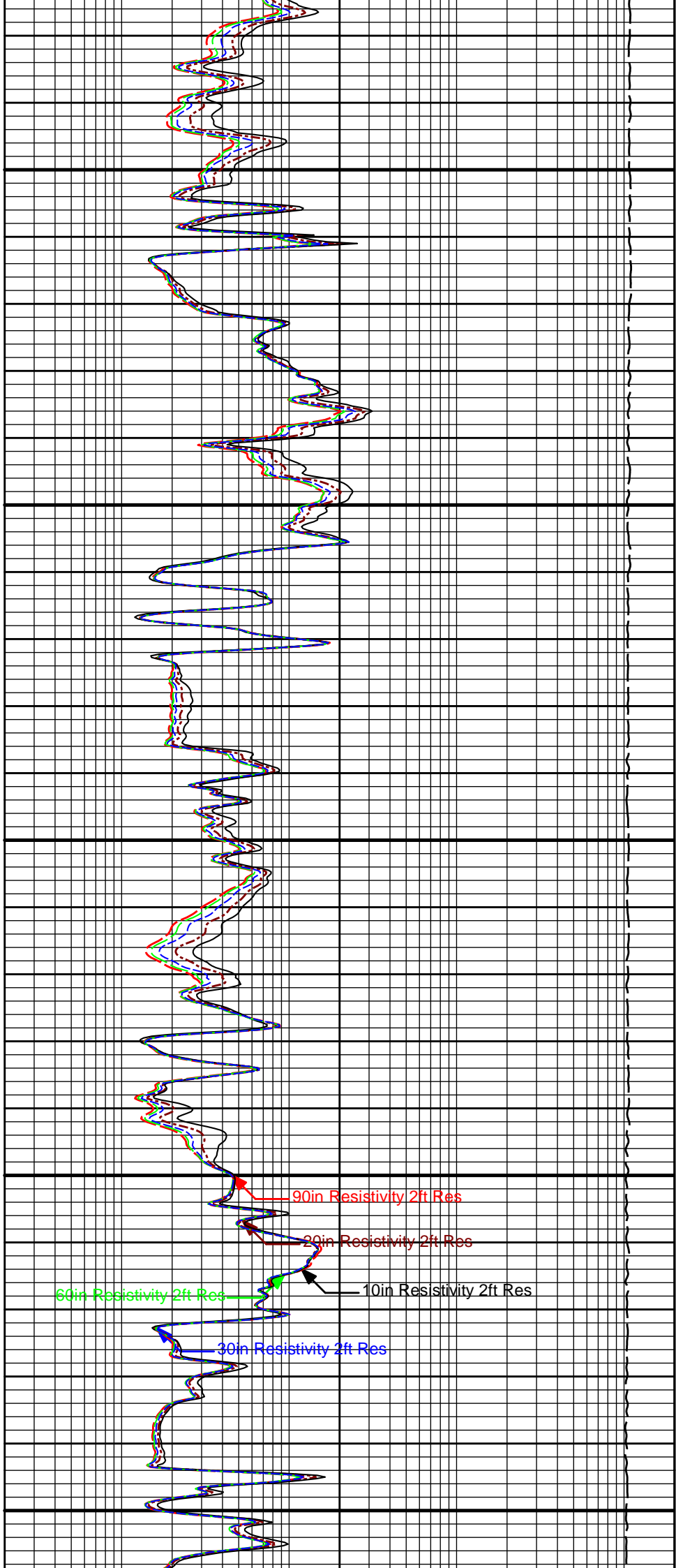
2200



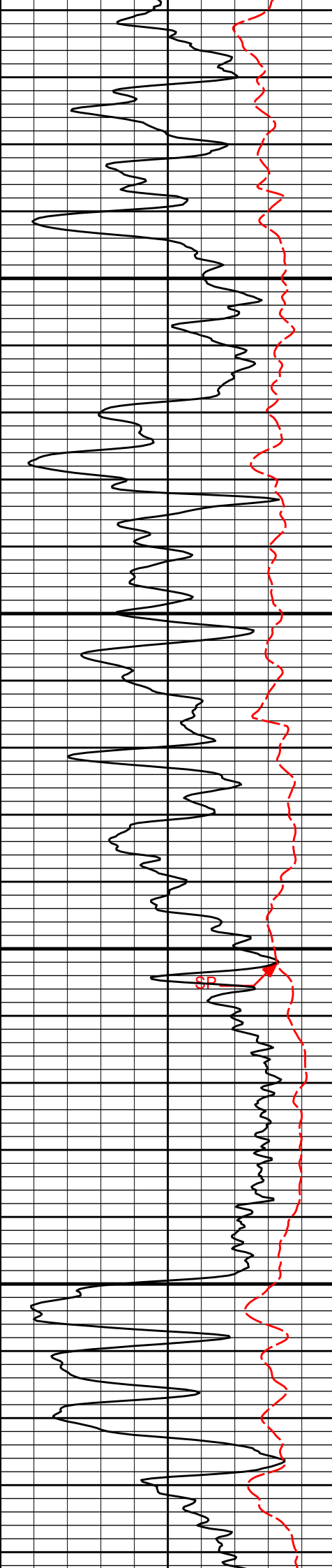


2300

2400



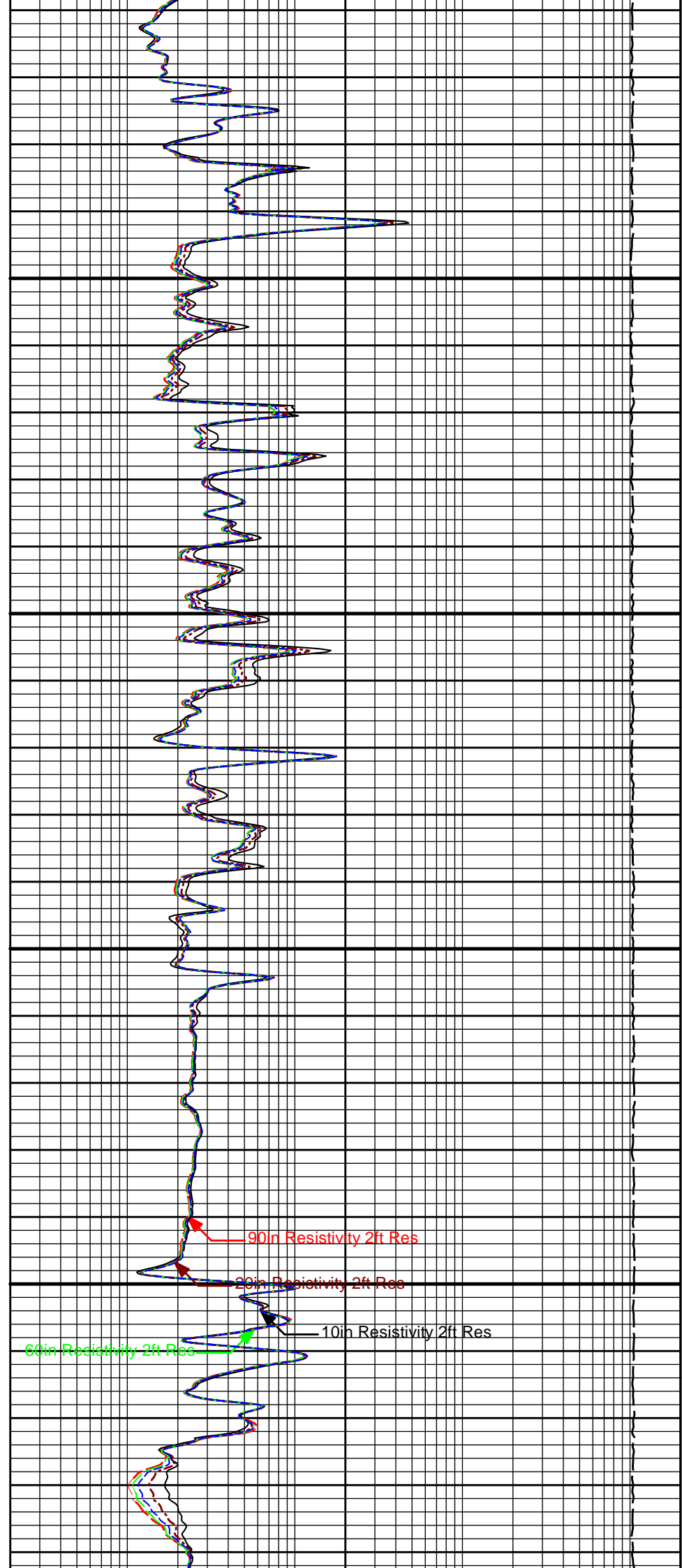




2500

2600

SP

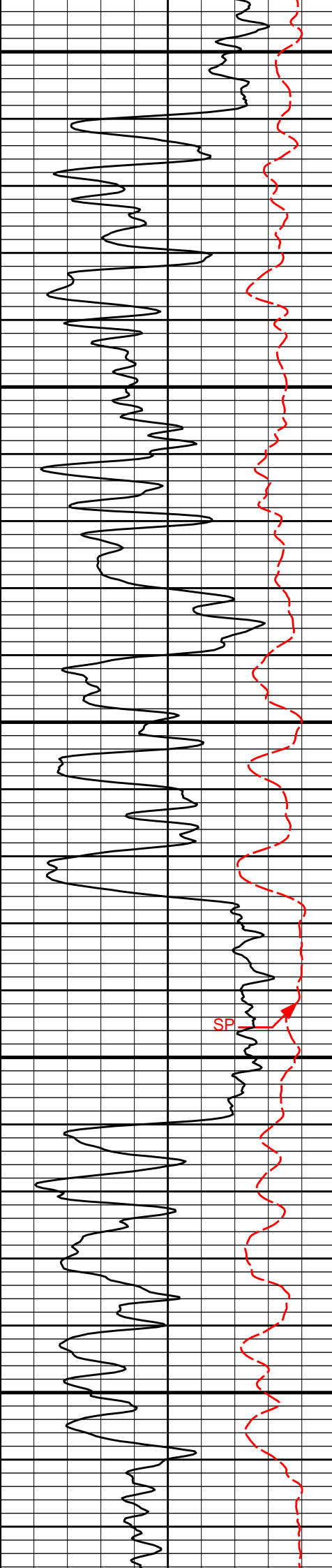


90in Resistivity 2ft Res

20in Resistivity 2ft Res

10in Resistivity 2ft Res

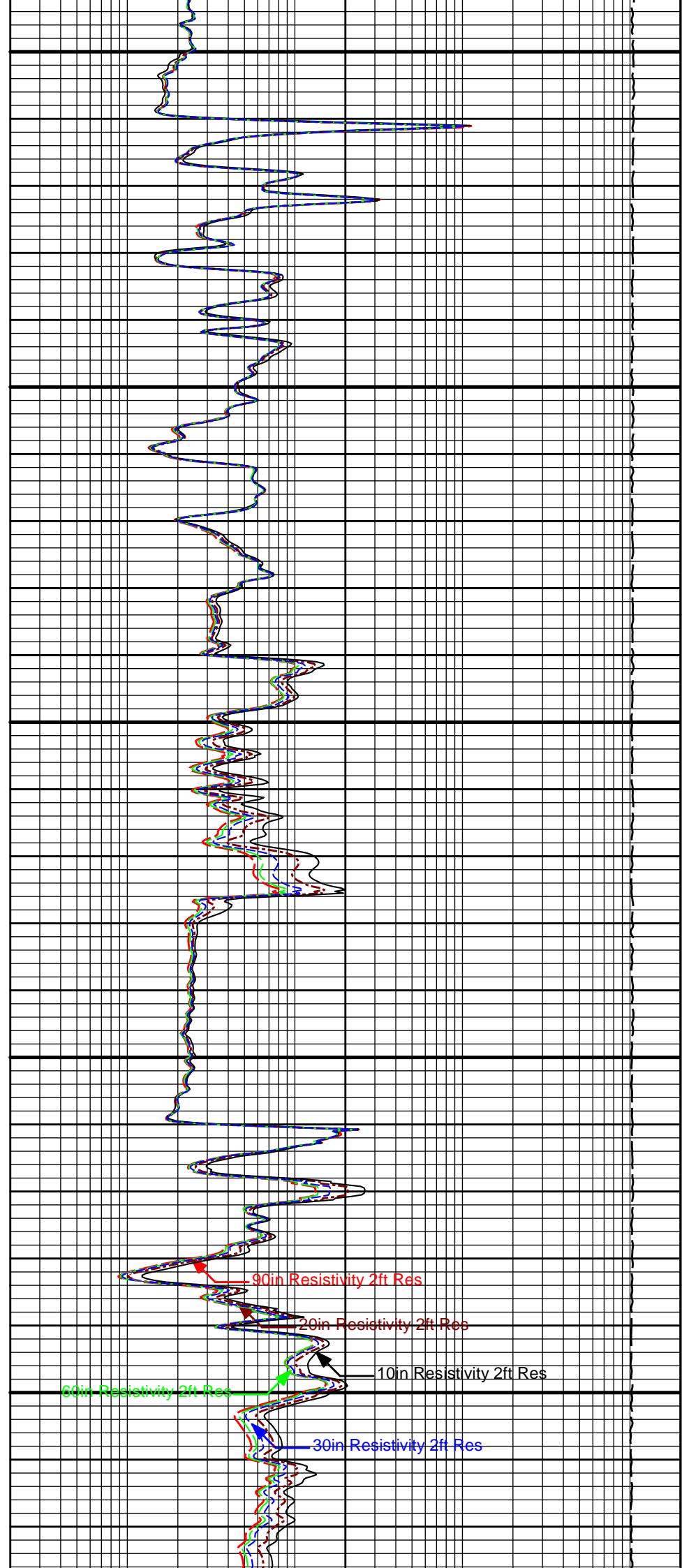
60in Resistivity 2ft Res



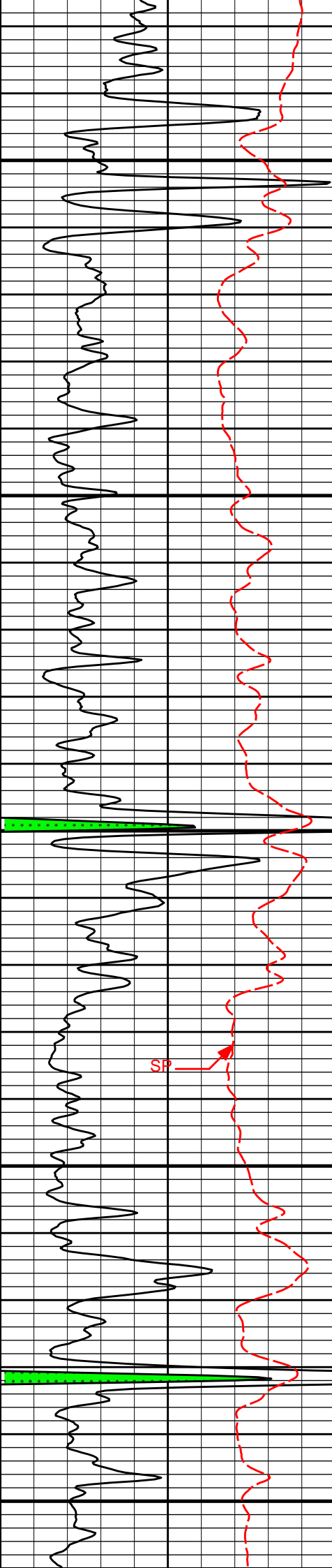
2700

2800

2900



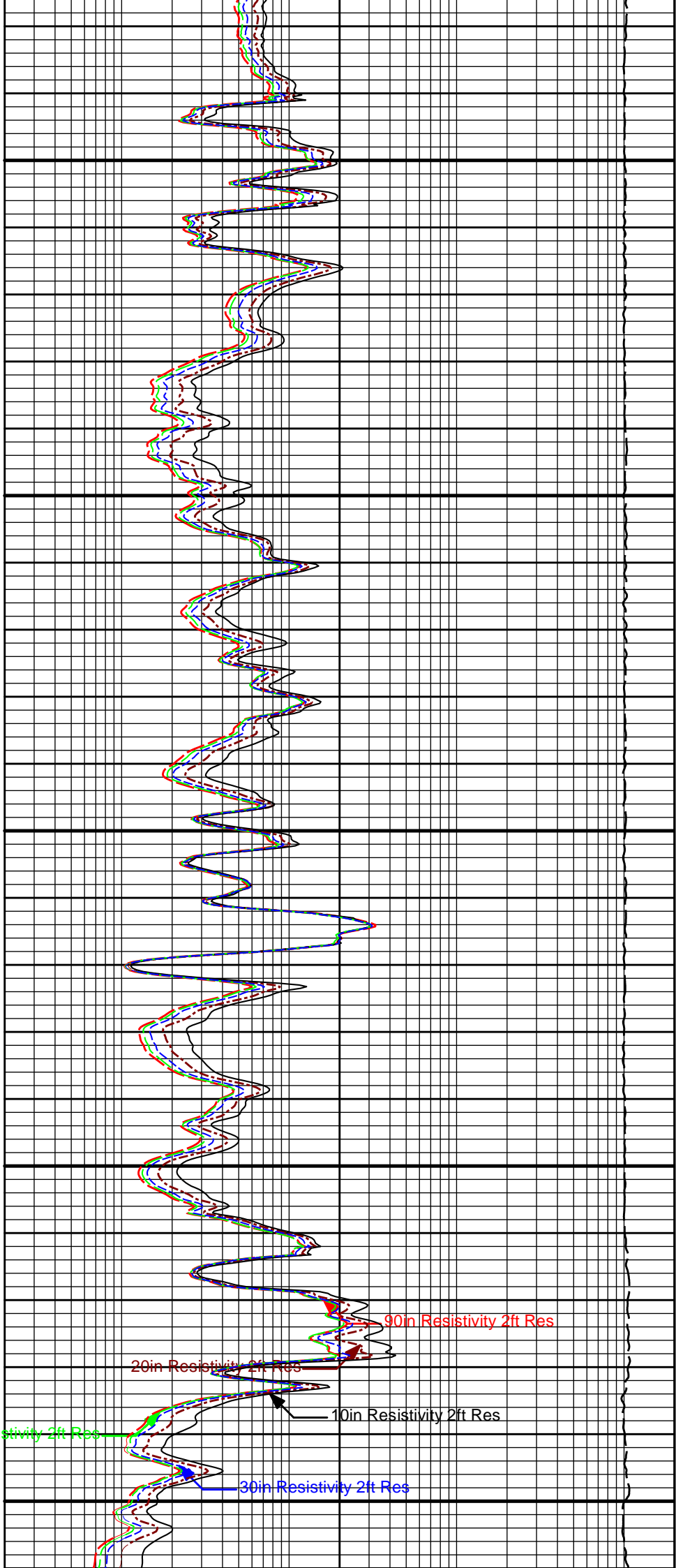


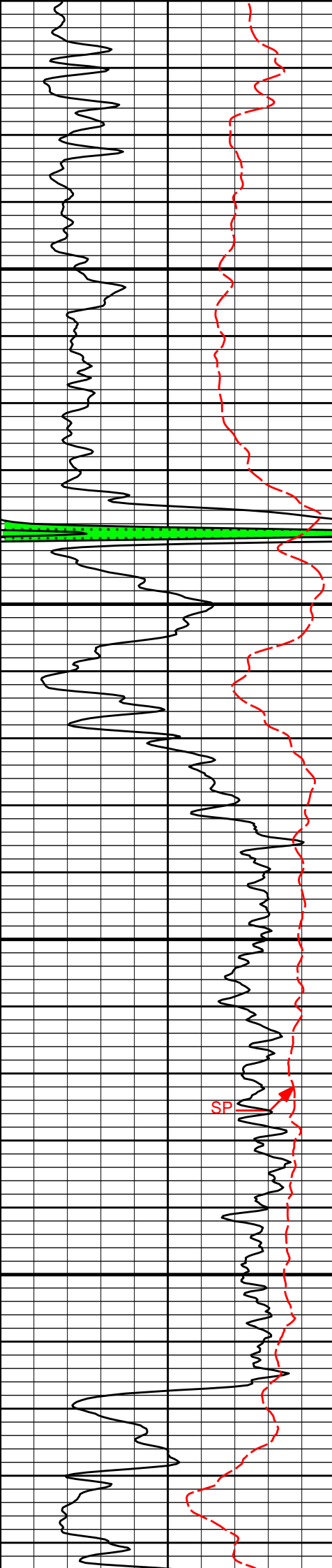


3000

3100

60in Resistivity 2ft Res

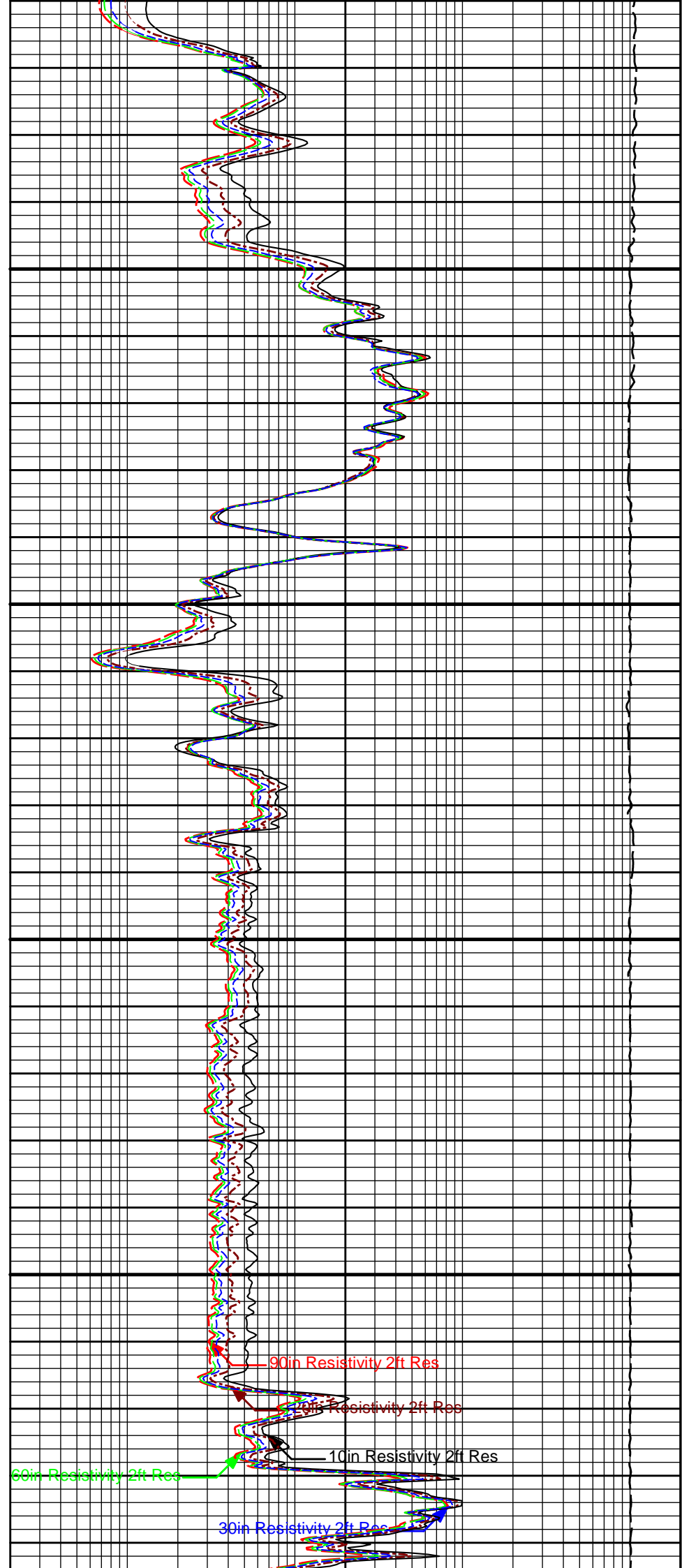




3200

3300

SP



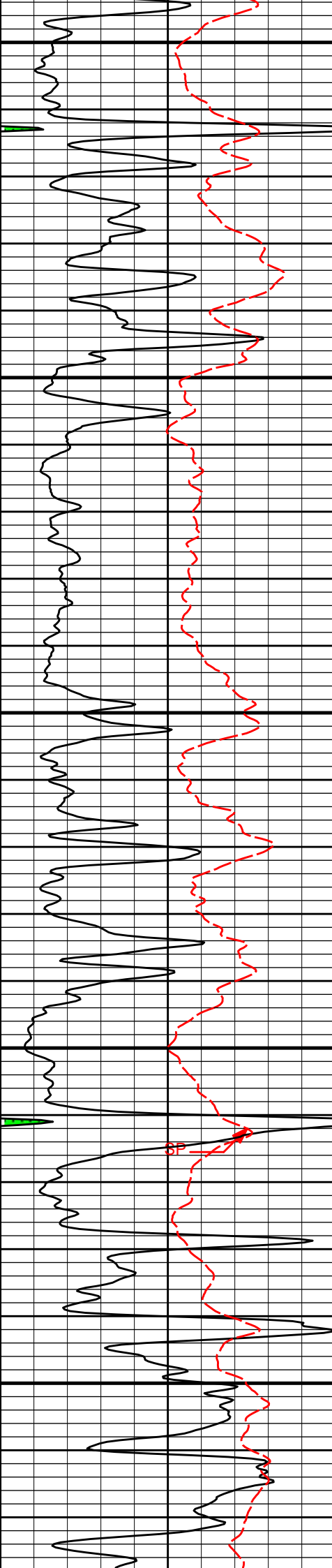
90in Resistivity 2ft Res

70in Resistivity 2ft Res

60in Resistivity 2ft Res

10in Resistivity 2ft Res

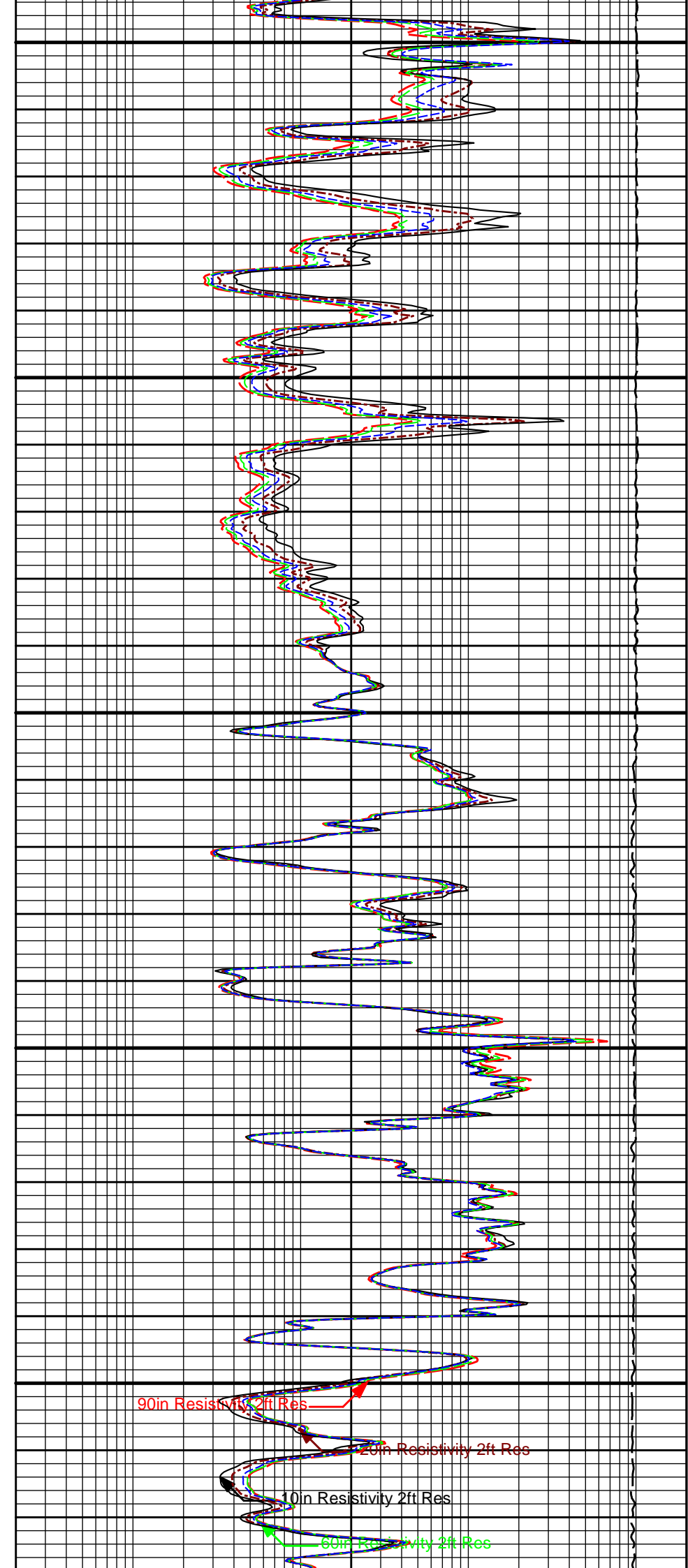
30in Resistivity 2ft Res



3400

3500

3600

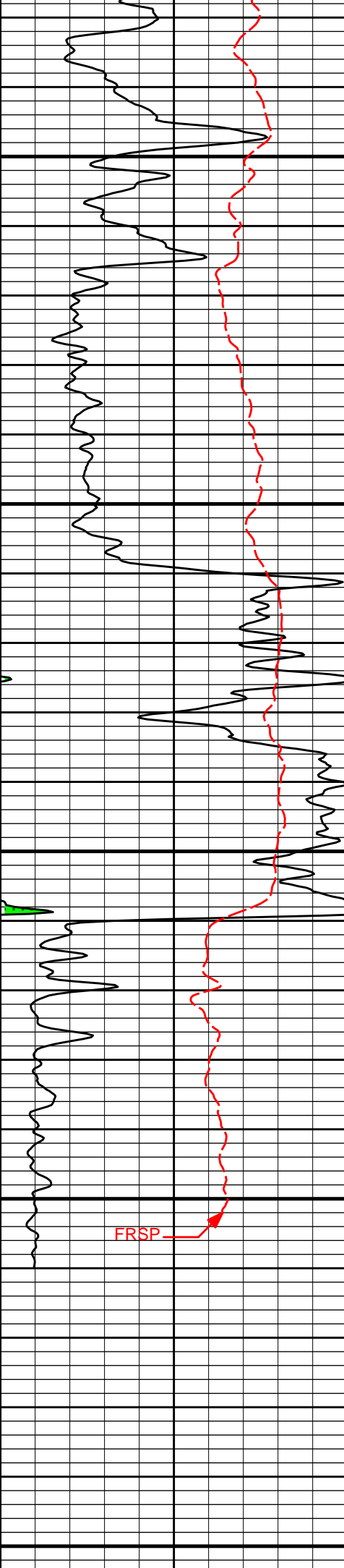


90in Resistivity 2ft Res

20in Resistivity 2ft Res

10in Resistivity 2ft Res

60in Resistivity 2ft Res

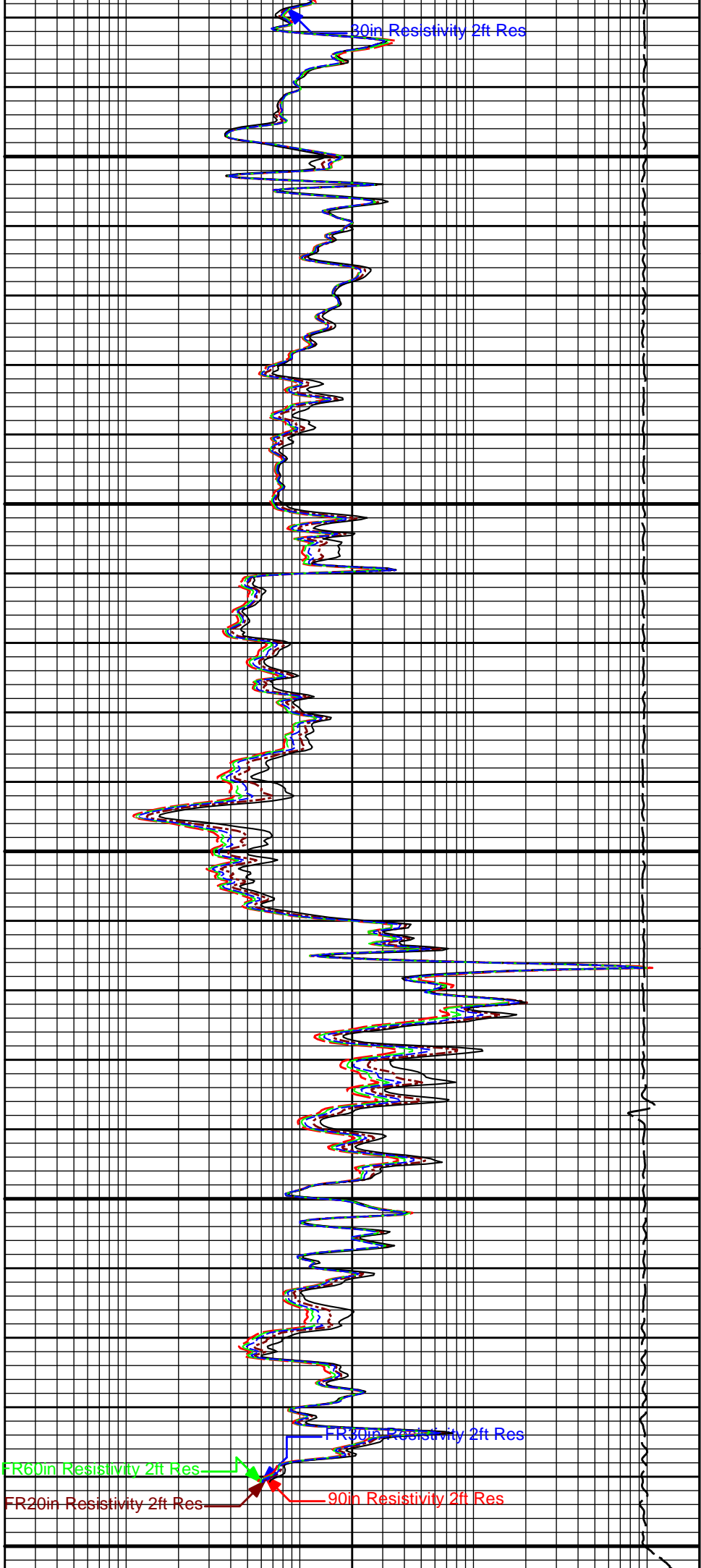


3700

3800

FRSP

TD



30in Resistivity 2ft Res

FR30in Resistivity 2ft Res

FR60in Resistivity 2ft Res

FR20in Resistivity 2ft Res

90in Resistivity 2ft Res

0 Gamma API 150  
api

1 : 240  
ft

15K Tension  
pounds 0

api			pounds
SP - 20 +		0.2	90in Resistivity 2ft Res 2000 ohm-metre
		0.2	60in Resistivity 2ft Res 2000 ohm-metre
		0.2	30in Resistivity 2ft Res 2000 ohm-metre
		0.2	20in Resistivity 2ft Res 2000 ohm-metre
		0.2	10in Resistivity 2ft Res 2000 ohm-metre

**HALLIBURTON**

Plot Time: 18-Oct-19 10:03:05  
 Plot Range: 420 ft to 3853.42 ft  
 Data: HALL-GATES\_2-5Well Based\MAIN\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\ACRT\ACRT\_5inch\_MAIN

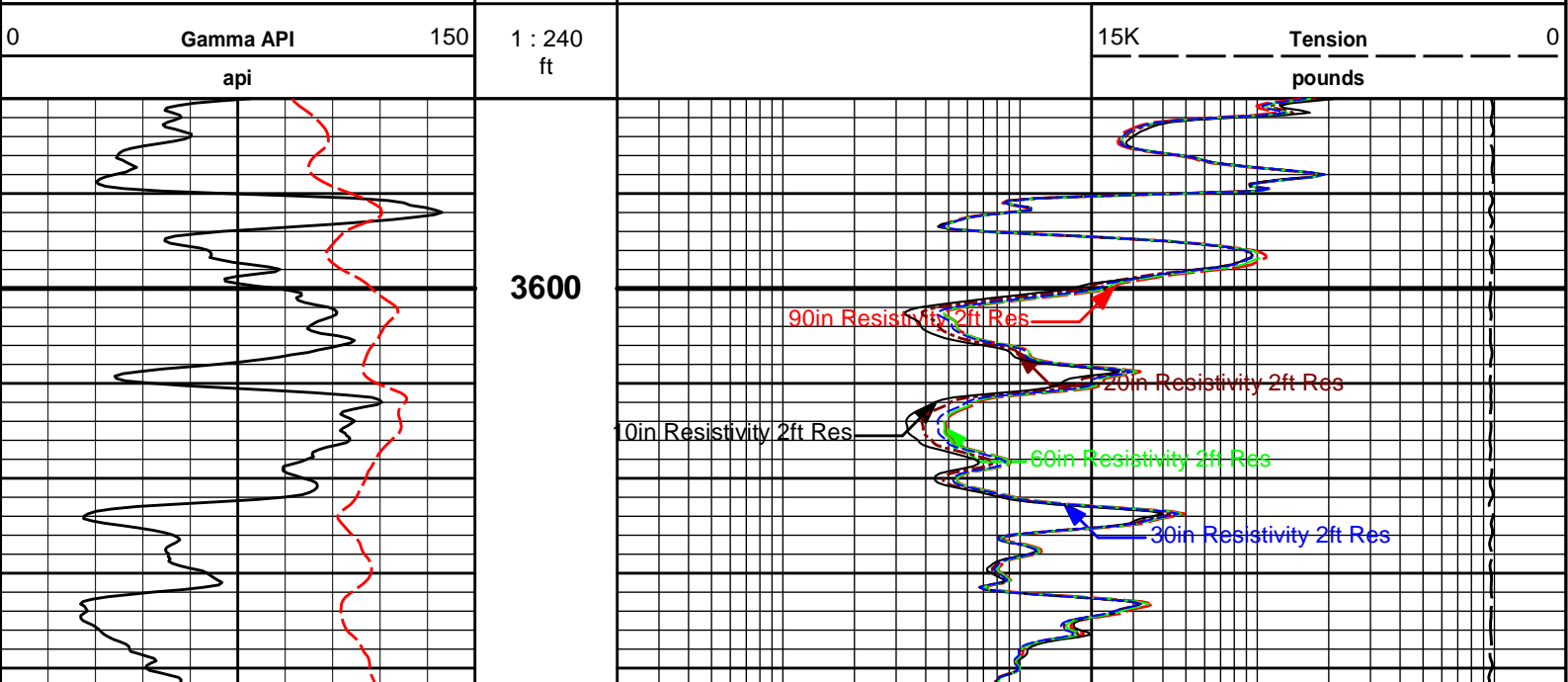
## 5 INCH MAIN LOG

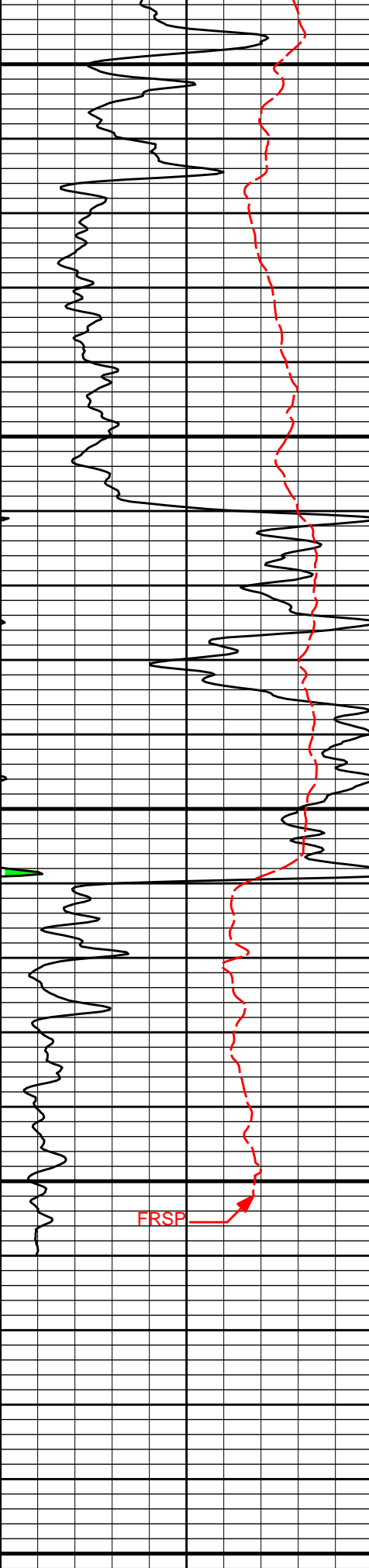
**HALLIBURTON**

Plot Time: 18-Oct-19 10:03:05  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5Well Based\REPEAT\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\ACRT\ACRT\_5inch\_REPEAT

## REPEAT SECTION

		0.2	10in Resistivity 2ft Res 2000 ohm-metre
		0.2	20in Resistivity 2ft Res 2000 ohm-metre
		0.2	30in Resistivity 2ft Res 2000 ohm-metre
		0.2	60in Resistivity 2ft Res 2000 ohm-metre
SP - 20 +		0.2	90in Resistivity 2ft Res 2000 ohm-metre

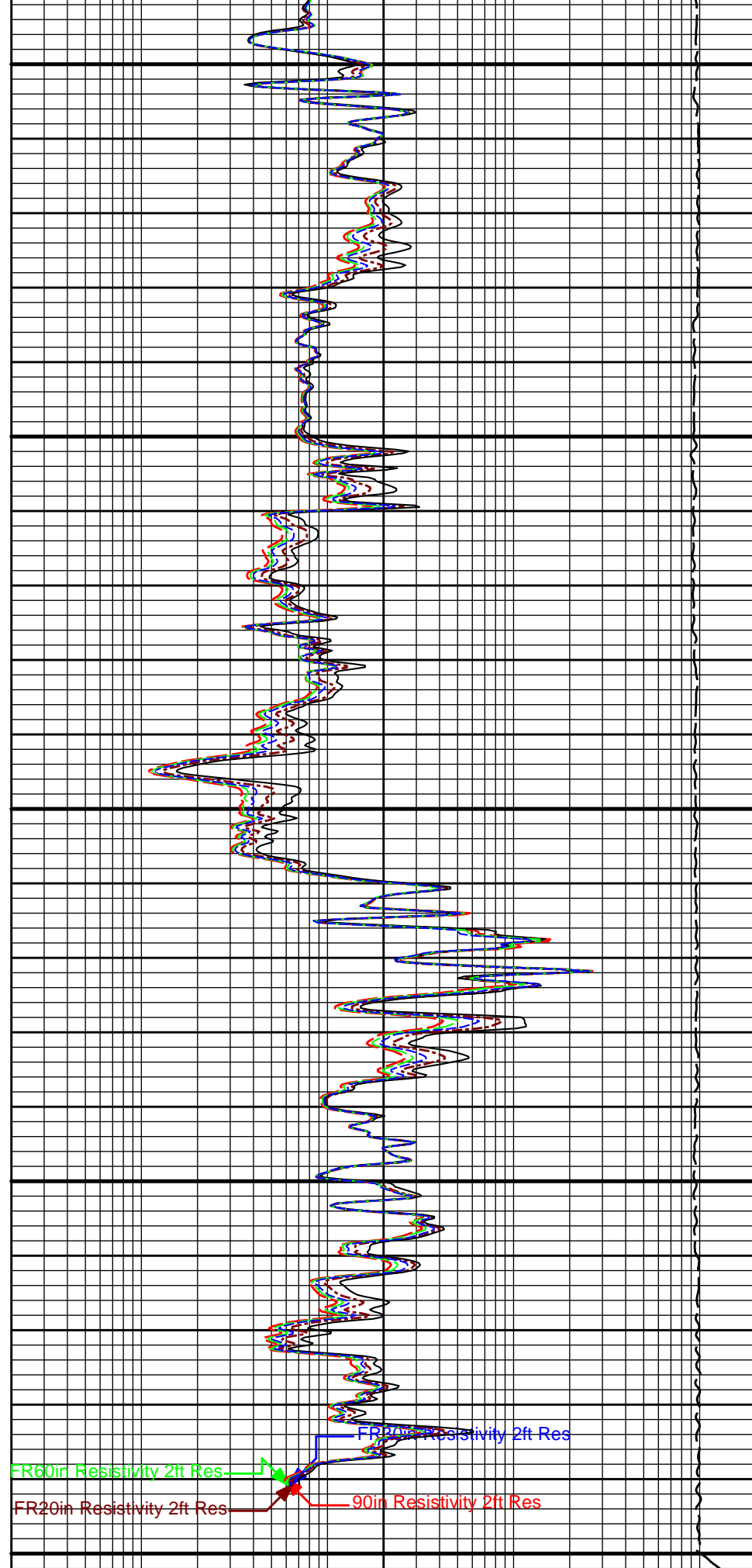




3700

3800

FRSP



FR30in Resistivity 2ft Res

FR60in Resistivity 2ft Res

FR20in Resistivity 2ft Res

90in Resistivity 2ft Res

0	Gamma API	150
	api	
	SP	
	-20[+	

1 : 240  
ft

15K	Tension	0
	pounds	

0.2	90in Resistivity 2ft Res	2000
	ohm-metre	

0.2	60in Resistivity 2ft Res	2000
	ohm-metre	
0.2	30in Resistivity 2ft Res	2000
	ohm-metre	
0.2	20in Resistivity 2ft Res	2000
	ohm-metre	
0.2	10in Resistivity 2ft Res	2000
	ohm-metre	


**HALLIBURTON**

Plot Time: 18-Oct-19 10:03:07  
 Plot Range: 3580 ft to 3853.33 ft  
 Data: HALL-GATES\_2-5Well Based\REPEAT\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\ACRT\ACRT\_5inch\_REPEAT

## REPEAT SECTION

**HALLIBURTON**

## TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
		Ø 2.310 in →		← Fishing Neck @ 57.71 ft		58.59 ft
RWCH-11830866 135.00 lbs		Ø 3.625 in →		← Load Cell @ 54.91 ft ← BH Temperature @ 54.34 ft	6.25 ft	
	Weak Point Solid- 11111111 0.01 lbs	Ø 0.010 in* →				52.34 ft
SP Sub-11812437 60.00 lbs		Ø 3.625 in →		← SP @ 50.56 ft	3.74 ft	
				← Z-Accelerometer @ 48.15 ft		48.60 ft
GTET-11013113 165.00 lbs		Ø 3.625 in →		← GammaRay @ 42.54 ft	8.52 ft	
						40.08 ft
DSNT-11055304 174.00 lbs		Ø 3.625 in →		← DSN Far @ 33.15 ft ← DSN Near @ 32.40 ft	9.69 ft	
						30.40 ft
SDLT-10960494 360.00 lbs	SDLT Pad-11213308 65.00 lbs Microlog Pad-10960494 8.00 lbs	Ø 4.500 in →				10.81 ft

RAM-Cs137-54750000  
1.00 lbs

Ø 4.500 in\*  
Ø 4.750 in\*  
Ø 0.800 in\*

Microlog @ 22.58 ft  
SDL Caliper @ 22.40 ft  
SDL @ 22.39 ft

ACRt Instrument-  
11830684  
50.00 lbs

Ø 3.625 in →

5.03 ft

19.58 ft

ACRt Sonde-  
11830728  
200.00 lbs

Ø 3.625 in →

14.22 ft

14.55 ft

← Mud Resistivity @ 13.19 ft

← ACRt @ 9.21 ft

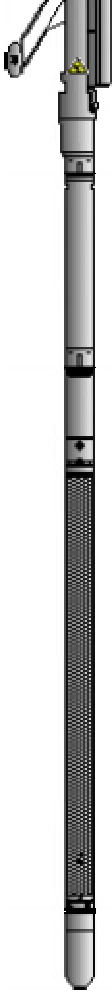
Bull Nose-11111111  
5.00 lbs

Ø 2.750 in →

0.33 ft

0.33 ft

0.00 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11830866	135.00	6.25	52.34	300.00
WPSS	Weak Point Solid	11111111	0.01	0.01	* 52.34	300.00
SP	SP Sub	11812437	60.00	3.74	48.60	300.00
GTET	Gamma Telemetry Tool	11013113	165.00	8.52	40.08	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	30.40	60.00
SDLT	Spectral Density Tool	10960494	360.00	10.81	19.58	60.00
SDLP	Density Insite Pad	11213308	65.00	2.55	* 21.79	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	54750000	1.00	0.80	* 22.02	300.00
MICP	Microlog Pad	10960494	8.00	1.00	* 22.08	60.00
ACRt	Array Compensated True Resistivity Instrument Section	11830684	50.00	5.03	14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11830728	200.00	14.22	0.33	120.00
BLNS	Bull Nose	11111111	5.00	0.33	0.00	300.00
<b>Total</b>			<b>1,223.01</b>	<b>58.59</b>		

\* Not included in Total Length and Length Accumulation.

Data: HALL-GATES\_2-5\0001 GTET-DSN-SDL-ACRT\_DRIVERSIDLE

Date: 18-Oct-19 07:39:30

# HALLIBURTON

## PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.000	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm



SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
SHARED	RMUD	Mud Resistivity	2.000	ohmm
SHARED	TRM	Temperature of Mud	75.0	degF
SHARED	CSD	Logging Interval is Cased?	No	
SHARED	ICOD	AHV Casing OD	5.500	in
SHARED	CSTR	Compressive Strength	1000.00	psia
SHARED	ST	Surface Temperature	75.0	degF
SHARED	TD	Total Well Depth	10000.00	ft
SHARED	BHT	Bottom Hole Temperature	200.0	degF
SHARED	SVTM	Navigation and Survey Master Tool	NONE	
SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
SHARED	TEMM	CBM Temperature Master Tool	GTET	
SHARED	MSAL	Water-base mud filtrate salinity	0.00	ppm
Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
Rwa / CrossPlot	FCHO	Select Source of F	Automatic	
Rwa / CrossPlot	AFAC	Archie A factor	0.6200	
Rwa / CrossPlot	MFAC	Archie M factor	2.1500	
Rwa / CrossPlot	RMFR	Rmf Reference	0.10	ohmm
Rwa / CrossPlot	TMFR	Rmf Ref Temp	75.00	degF
Rwa / CrossPlot	RWA	Resistivity of Formation Water	0.05	ohmm
Rwa / CrossPlot	ADP	Use Air Porosity to calculate CrossplotPhi	No	
Rwa / CrossPlot	BHSM	Borehole Size Source Tool	SDLT	
Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
GTET	GROK	Process Gamma Ray?	Yes	
GTET	GEOK	Process Gamma Ray EVR?	No	
GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
GTET	BHSM	Borehole Size Source Tool	SDLT	
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTT	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
DSNT	UCLA	Classic Neutron Parameter utilized?	No	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
SDLT	CLOK	Process Caliper Outputs?	Yes	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.50	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt Sonde	TPOS	Tool Position	Free Hanging	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	

ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

Data: HALL-GATES\_2-510001 GTET-DSN-SDL-ACRT\_DRIVERS\002 18-Oct-19 08:29 Dn @310.0f

Date: 18-Oct-19 08:31:18

**HALLIBURTON**

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

**Tool Name:** GTET - 11013113      **Reference Calibration Date:** 28-Jun-19 15:56:38  
**Engineer:** WOLTEMATH      **Calibration Date:** 06-Sep-19 13:50:19  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **Calibration Version:** 1

Calibrator Source S/N: TB79  
Calibrator API Reference:222.00 api  
Equivalent Calibrator API Reference:225.9 api

Measurement	Measured	Calibrated	Units
Background	24.7	24.0	api
Background + Calibrator	257.5	249.9	api
Calibrator	232.8	225.9	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

**Tool Name:** GTET - 11013113      **Reference Calibration Date:** 06-Sep-19 13:50:19  
**Engineer:** WHITLOCK      **Calibration Date:** 14-Oct-19 13:05:41  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **Calibration Version:** 1

Calibrator Source S/N: TB79  
Calibrator API Reference:222.00 api  
Equivalent Calibrator API Reference:225.9 api

Field Verification	Shop	Field	Units
Background	24.0	28.0	api
Background + Calibrator	249.9	251.5	api
Calibrator	225.9	223.5	api

Shop	Field	Difference	Tolerance
225.9	223.5	2.4	+/- 9.00

### ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

**Tool Name:** ACRt Sonde - 11830728      **Reference Calibration Date:** 30-May-19 11:16:08  
**Engineer:** WOLTEMATH      **Calibration Date:** 13-Sep-19 20:21:53  
**Software Version:** WL INSITE R6.2.7 (Build 7)      **Calibration Version:** 1  
**Host Tool Name:** ACRt Instrument - 11830684

### TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0004	1.05	0.95	1.0013	1.05	0.95	0.9998	1.05
A2 (50")	0.95	1.0150	1.05	0.95	1.0168	1.05	0.95	1.0173	1.05
A3 (29")	0.95	0.9979	1.05	0.95	0.9984	1.05	0.95	0.9983	1.05
A4 (17")	0.95	1.0023	1.05	0.95	1.0009	1.05	0.95	1.0026	1.05

A5 (10")	N/A	N/A	N/A	0.95	0.9938	1.05	0.95	0.9950	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9818	1.05	0.95	0.9829	1.05

### SONDE OFFSET

Subarray	R12KHz	R36KHz	R72KHz
	(mmho/m)	(mmho/m)	(mmho/m)
A1 (80")	-2.153	-4.901	-4.506
A2 (50")	-1.721	-3.378	-4.438
A3 (29")	-12.789	-3.654	-2.938
A4 (17")	-92.270	-29.726	-23.852
A5 (10")	N/A	-72.821	-37.267
A6 (6")	N/A	277.352	144.700

### TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.86	1.3
36K	1.0	1.81	2.0
72K	1.0	1.10	2.0

### R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	0.99	1.05

### PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET CHK	PASS

TOOL OK TO LOG

### CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11013113						
Gamma Ray Calibrator	225.9	223.5	-----	2.4	+/- 9.00	api
ACRt Sonde-11830728						
Mud Cell	0.99	-----	-----	0	-----	ohm-m

Data: HALL-GATES\_2-510001 GTET-DSN-SDL-ACRT\_DRIVERS\IDLE

Date: 18-Oct-19 07:49:51



### INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Depth Filter Type	Depth Filter Length (ft)	Time Filter Type	Time Filter Length (sec)
Depth Panel						
TENS	Tension	0.00	NO		NO	
Rwa / CrossPlot						
TPUL	Tension Pull	58.59	NO		NO	
BS	Bit Size	58.59	NO		NO	
HDIA	Measured Hole Diameter	0.00	NO		NO	
RWCH						
DHTN	DownholeTension	0.00	BLK	0.000	NO	
SP Sub						
PLTC	Plot Control Mask	50.56	NO		NO	
SP	Spontaneous Potential	50.56	BLK	1.250	NO	
SPR	Raw Spontaneous Potential	50.56	NO		NO	
SPO	Spontaneous Potential Offset	50.56	NO		NO	

**GTET**

TPUL	Tension Pull	42.54	NO		NO
GR	Natural Gamma Ray API	42.54	TRI	1.750	NO
GRU	Unfiltered Natural Gamma Ray API	42.54	NO		NO
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	42.54	W	1.416 , 0.750	NO
HDIA	Measured Hole Diameter	0.00	NO		NO
ACCZ	Accelerometer Z	0.00	BLK	0.083	NO
DEVI	Inclination	0.00	NO		NO

**DSNT**

TPUL	Tension Pull	32.30	NO		NO
RNDS	Near Detector Telemetry Counts	32.40	BLK	1.417	NO
RFDS	Far Detector Telemetry Counts	33.15	TRI	0.583	NO
DNTT	DSN Tool Temperature	32.40	NO		NO
DSNS	DSN Tool Status	32.30	NO		NO
ERND	Near Detector Telemetry Counts EVR	32.40	BLK	0.000	NO
ERFD	Far Detector Telemetry Counts EVR	33.15	BLK	0.000	NO
ENTM	DSN Tool Temperature EVR	32.40	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO

**SDLT**

TPUL	Tension Pull	22.40	NO		NO
PCAL	Pad Caliper	22.40	TRI	0.250	NO
ACAL	Arm Caliper	22.40	TRI	0.250	NO

**ACRt Sonde**

TPUL	Tension Pull	2.73	NO		NO
F1R1	ACRT 12KHz - 80in R value	8.98	BLK	0.000	NO
F1X1	ACRT 12KHz - 80in X value	8.98	BLK	0.000	NO
F1R2	ACRT 12KHz - 50in R value	6.48	BLK	0.000	NO
F1X2	ACRT 12KHz - 50in X value	6.48	BLK	0.000	NO
F1R3	ACRT 12KHz - 29in R value	4.98	BLK	0.000	NO
F1X3	ACRT 12KHz - 29in X value	4.98	BLK	0.000	NO
F1R4	ACRT 12KHz - 17in R value	3.98	BLK	0.000	NO
F1X4	ACRT 12KHz - 17in X value	3.98	BLK	0.000	NO
F1R5	ACRT 12KHz - 10in R value	3.48	BLK	0.000	NO
F1X5	ACRT 12KHz - 10in X value	3.48	BLK	0.000	NO
F1R6	ACRT 12KHz - 6in R value	3.23	BLK	0.000	NO
F1X6	ACRT 12KHz - 6in X value	3.23	BLK	0.000	NO
F2R1	ACRT 36KHz - 80in R value	8.98	BLK	0.000	NO
F2X1	ACRT 36KHz - 80in X value	8.98	BLK	0.000	NO
F2R2	ACRT 36KHz - 50in R value	6.48	BLK	0.000	NO
F2X2	ACRT 36KHz - 50in X value	6.48	BLK	0.000	NO
F2R3	ACRT 36KHz - 29in R value	4.98	BLK	0.000	NO
F2X3	ACRT 36KHz - 29in X value	4.98	BLK	0.000	NO
F2R4	ACRT 36KHz - 17in R value	3.98	BLK	0.000	NO
F2X4	ACRT 36KHz - 17in X value	3.98	BLK	0.000	NO
F2R5	ACRT 36KHz - 10in R value	3.48	BLK	0.000	NO
F2X5	ACRT 36KHz - 10in X value	3.48	BLK	0.000	NO
F2R6	ACRT 36KHz - 6in R value	3.23	BLK	0.000	NO
F2X6	ACRT 36KHz - 6in X value	3.23	BLK	0.000	NO
F3R1	ACRT 72KHz - 80in R value	8.98	BLK	0.000	NO
F3X1	ACRT 72KHz - 80in X value	8.98	BLK	0.000	NO
F3R2	ACRT 72KHz - 50in R value	6.48	BLK	0.000	NO
F3X2	ACRT 72KHz - 50in X value	6.48	BLK	0.000	NO
F3R3	ACRT 72KHz - 29in R value	4.98	BLK	0.000	NO
F3X3	ACRT 72KHz - 29in X value	4.98	BLK	0.000	NO
F3R4	ACRT 72KHz - 17in R value	3.98	BLK	0.000	NO
F3X4	ACRT 72KHz - 17in X value	3.98	BLK	0.000	NO

F3R5	ACRT 72KHz - 10in R value	3.48	BLK	0.000	NO
F3X5	ACRT 72KHz - 10in X value	3.48	BLK	0.000	NO
F3R6	ACRT 72KHz - 6in R value	3.23	BLK	0.000	NO
F3X6	ACRT 72KHz - 6in X value	3.23	BLK	0.000	NO
RMUD	Mud Resistivity	12.52	BLK	0.000	NO
F1RT	Transmitter Reference 12 KHz Real Signal	2.73	BLK	0.000	NO
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.73	BLK	0.000	NO
F2RT	Transmitter Reference 36 KHz Real Signal	2.73	BLK	0.000	NO
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.73	BLK	0.000	NO
F3RT	Transmitter Reference 72 KHz Real Signal	2.73	BLK	0.000	NO
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.73	BLK	0.000	NO
TFPU	Upper Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
TFPL	Lower Feedpipe Temperature Calculated	2.73	BLK	0.000	NO
ITMP	Instrument Temperature	2.73	BLK	0.000	NO
TCVA	Temperature Correction Values Loop Off	2.73	NO		NO
TIDV	Instrument Temperature Derivative	2.73	NO		NO
TUDV	Upper Temperature Derivative	2.73	NO		NO
TLDV	Lower Temperature Derivative	2.73	NO		NO
TRBD	Receiver Board Temperature	2.73	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO

#### Microlog Pad

TPUL	Tension Pull	22.58	NO		NO
MINV	Microlog Lateral	22.58	BLK	0.750	NO
MNOR	Microlog Normal	22.58	BLK	0.750	NO

#### SDLT Pad

TPUL	Tension Pull	22.39	NO		NO
NAB	Near Above	22.21	BLK	0.920	NO
NHI	Near Cesium High	22.21	BLK	0.920	NO
NLO	Near Cesium Low	22.21	BLK	0.920	NO
NVA	Near Valley	22.21	BLK	0.920	NO
NBA	Near Barite	22.21	BLK	0.920	NO
NDE	Near Density	22.21	BLK	0.920	NO
NPK	Near Peak	22.21	BLK	0.920	NO
NLI	Near Lithology	22.21	BLK	0.920	NO
NBAU	Near Barite Unfiltered	22.21	BLK	0.250	NO
NLIU	Near Lithology Unfiltered	22.21	BLK	0.250	NO
FAB	Far Above	22.56	BLK	0.250	NO
FHI	Far Cesium High	22.56	BLK	0.250	NO
FLO	Far Cesium Low	22.56	BLK	0.250	NO
FVA	Far Valley	22.56	BLK	0.250	NO
FBA	Far Barite	22.56	BLK	0.250	NO
FDE	Far Density	22.56	BLK	0.250	NO
FPK	Far Peak	22.56	BLK	0.250	NO
FLI	Far Lithology	22.56	BLK	0.250	NO
PTMP	Pad Temperature	22.40	BLK	0.920	NO
NHV	Near Detector High Voltage	21.79	NO		NO
FHV	Far Detector High Voltage	21.79	NO		NO
ITMP	Instrument Temperature	21.79	NO		NO
DDHV	Detector High Voltage	21.79	NO		NO
HDIA	Measured Hole Diameter	0.00	NO		NO

Data: HALL-GATES\_2-50001 GTET-DSN-SDL-ACRT\_DRIVERSVDLE

Date: 18-Oct-19 08:13:20

**HALLIBURTON**

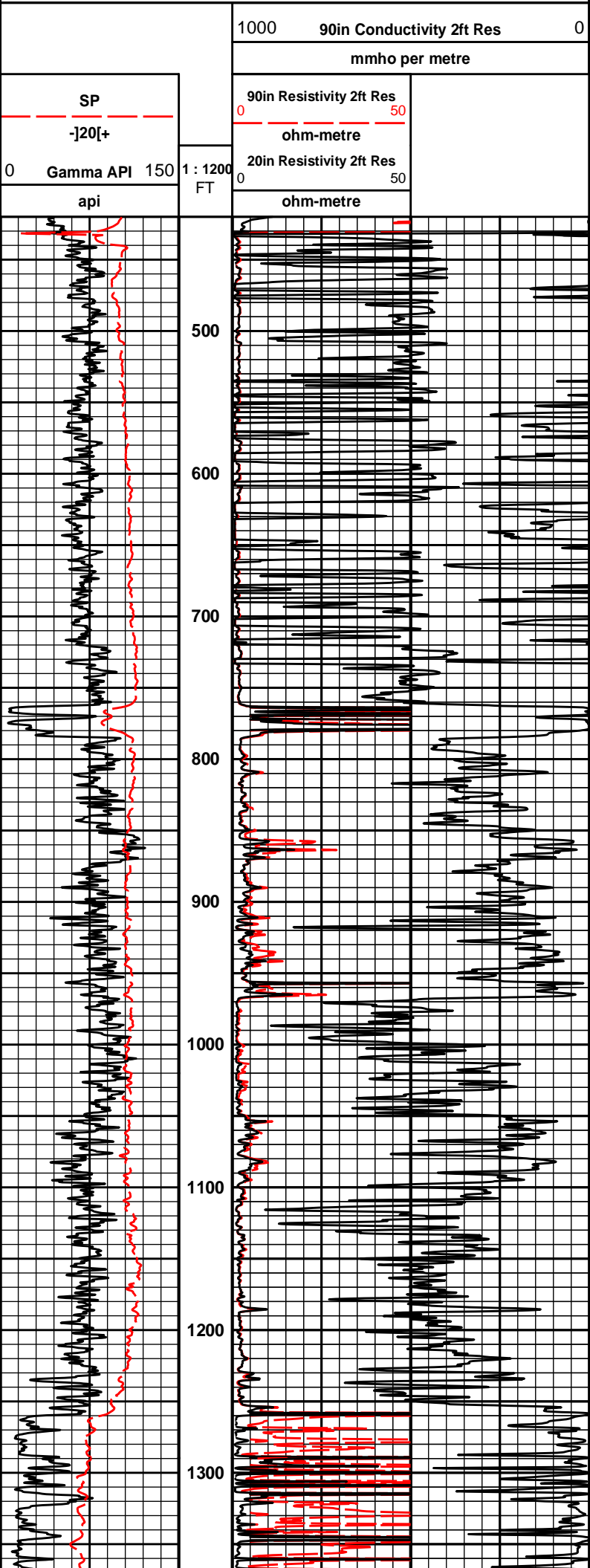
Plot Time: 18-Oct-19 10:03:12

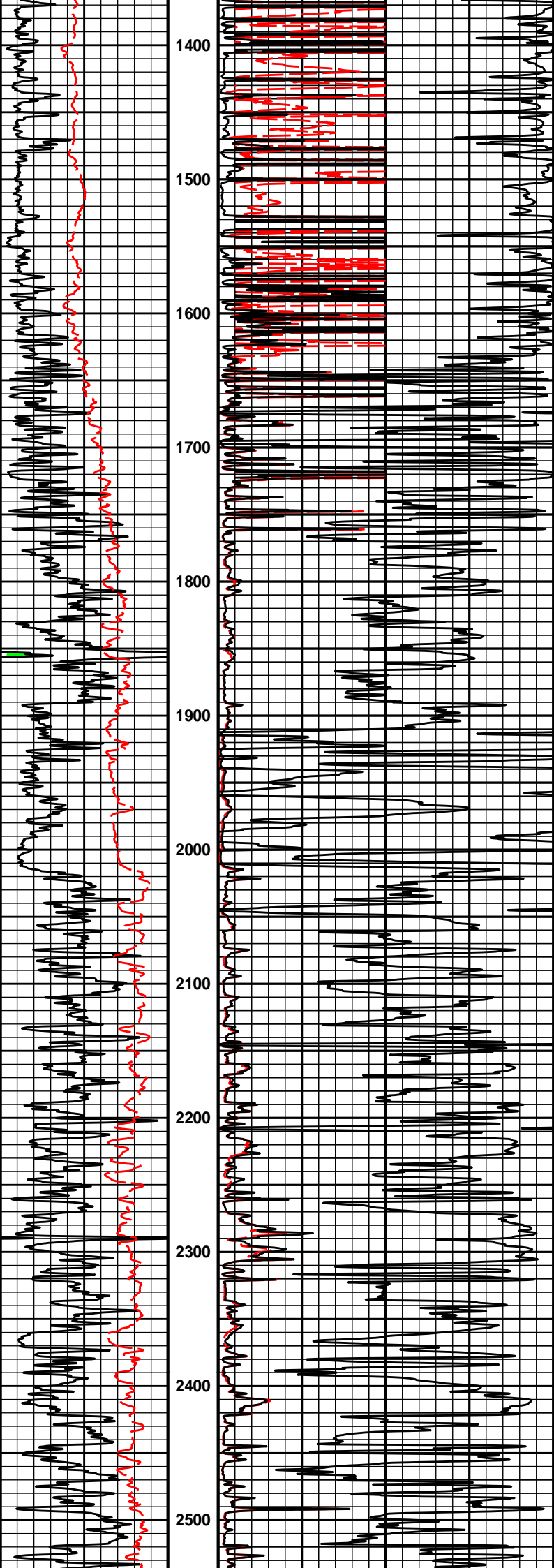
Plot Range: 420 ft to 3840.75 ft

Data: HALL-GATES\_2-5Well Based\MAIN\

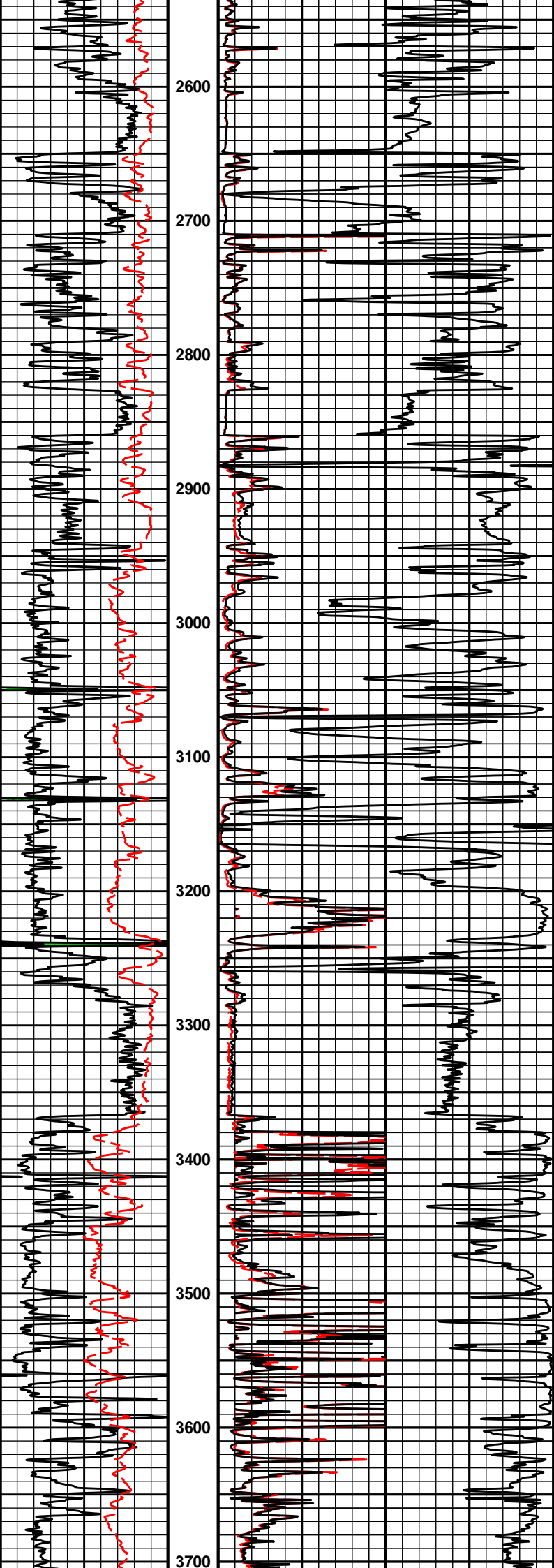
Plot File: \\LOCAL\HALL-GATES\_2-5Well Based\ACRT\ACRT\_1\_MAIN

# 1 INCH MAIN LOG

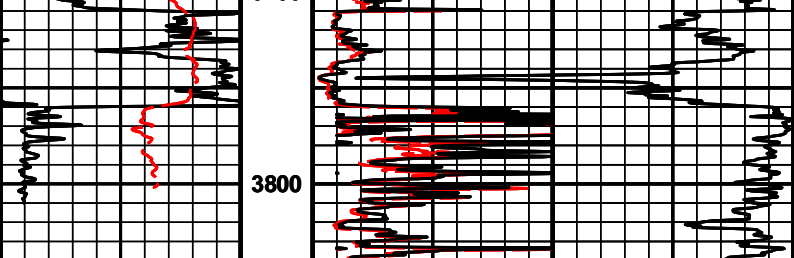




1400  
1500  
1600  
1700  
1800  
1900  
2000  
2100  
2200  
2300  
2400  
2500







0	Gamma API	150	1 : 1200	20in Resistivity 2ft Res	0	50
	api		FT	ohm-metre		
	SP			90in Resistivity 2ft Res	0	50
	- 20 +			ohm-metre		
				1000	90in Conductivity 2ft Res	0
				mmho per metre		

**HALLIBURTON**  
 Plot Time: 18-Oct-19 10:03:13  
 Plot Range: 420 ft to 3840.75 ft  
 Data: HALL-GATES\_2-5Well BasedMAIN\  
 Plot File: \\LOCAL-HALL-GATES\_2-5Well BasedACRTACRT\_1\_MAIN

## 1 INCH MAIN LOG

COMPANY	BIRD DOG OIL, LLC		
WELL	HALL-GATES 2-5		
FIELD	GATES		
COUNTY	STAFFORD	STATE	KANSAS
<b>HALLIBURTON</b>		ARRAY COMPENSATED TRUE RESISTIVITY LOG	

# HALLIBURTON

## ANNULAR HOLE VOLUME

COMPANY	BIRD DOG OIL, LLC		
WELL	HALL-GATES 2-5		
FIELD/BLOCK	GATES		
COUNTY	STAFFORD		
STATE	KANSAS		
Permanent Datum	GL		Elev. 1896.0 ft
Log measured from	KB		D.F. 1905.0 ft
Drilling measured from	KB	9.0 ft above perm. Datum	G.L. 1896.0 ft
Date	18-Oct-19		
Run No.	ONE		
Depth - Driller	3850.0 ft		
Depth - Logger	3850.0 ft		
Bottom - Logged Interval	3828.00 ft		
Bottom - Logged Interval	432.00 ft		
Casing - Driller	8.625 in @ 432.0 ft		
Casing - Logger	432.0 ft @		
Bit Size	7.875 in @		
Type Fluid in Hole	Water Based Mud @		
Density	75.1 ppg	58.00 sl/qt	
PH	10.50 pH	10.0 cphm	
Source of Sample	MUDDPT		
Rm @ Meas. Temperature	0.51 ohmm	@ 75.00 degF	@
Rmf @ Meas. Temperature	0.47 ohmm	@ 75.00 degF	@
Rmc @ Meas. Temperature	0.58 ohmm	@ 75.00 degF	@
Source Rmf	Rmc	MEAS	MEAS
Rm @ BHT	0.35 ohmm	@ 111.0 degF	@
Time Since Circulation	5.0 hr		
Time on Bottom	18-Oct-19 09:00		
Max. Rec. Temperature	111.00 degF	@ 3850.0 ft	@
Equipment Location	12156883	EL RENO, OK	
Recorded By	JORGE ORLANDO PEREZ		
Witnessed By	JUSTIN CARTER		

Fold here

Service Ticket No.: 906051745		API No.: 15-185-24062-00-00		PGM Version: WL INSITE R6.2.7 (Build 7)					
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES					
Date	Sample No.			Type Log	Depth	Scale Up Hole	Scale Down Hole		
Depth-Driller									
Type Fluid in Hole									
Density	Viscosity								
Ph	Fluid Loss								
Source of Sample				RESISTIVITY EQUIPMENT DATA					
Rm @ Meas. Temp	@	@		Run No.	Tool Type & No.	Pad Type	Tool Pos.		
Rmf @ Meas. Temp.	@	@		ONE	ACRT	N/A	1.5" S.O.		
Rmc @ Meas. Temp.	@	@			I-11830684				
Source Rmf	Rmc				S-11830728				
Rm @ BHT	@	@							
Rmf @ BHT	@	@							
Rmc @ BHT	@	@							
EQUIPMENT DATA									
GAMMA		ACOUSTIC		DENSITY		NEUTRON			
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE		
Serial No.	11013113	Serial No.		Serial No.	10960494	Serial No.	11055304		
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT		
Diameter	3.625"	No. of Cent.		Diameter	5.5"	Diameter	3.625"		
Detector Model No.	T-102	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU		
Type	SCINT			Source Type	CS137	Source Type	AM241BE		
Length	8"	LSA [Y/N]		Serial No.	5475GW	Serial No.	DSN-436		
Distance to Source	N/A	FWDA [Y/N]		Strength	1.78 Ci	Strength	15.0 Ci		
LOGGING DATA									
GENERAL		GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run	Depth	Speed	Scale	Scale	Matrix	Scale	Matrix	Scale	Matrix
No.	From	To	L	R	L	R	L	R	L
ONE	TD	CSC	PEC	0	150		20	10	2.71 gr/cc

ONE	ID	CSG	REC	0	150	50	-10	2.77 g/cc	50	-10	LIME
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DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@
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Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING  
 CHLORIDES REPORTED AT 9000 ppm

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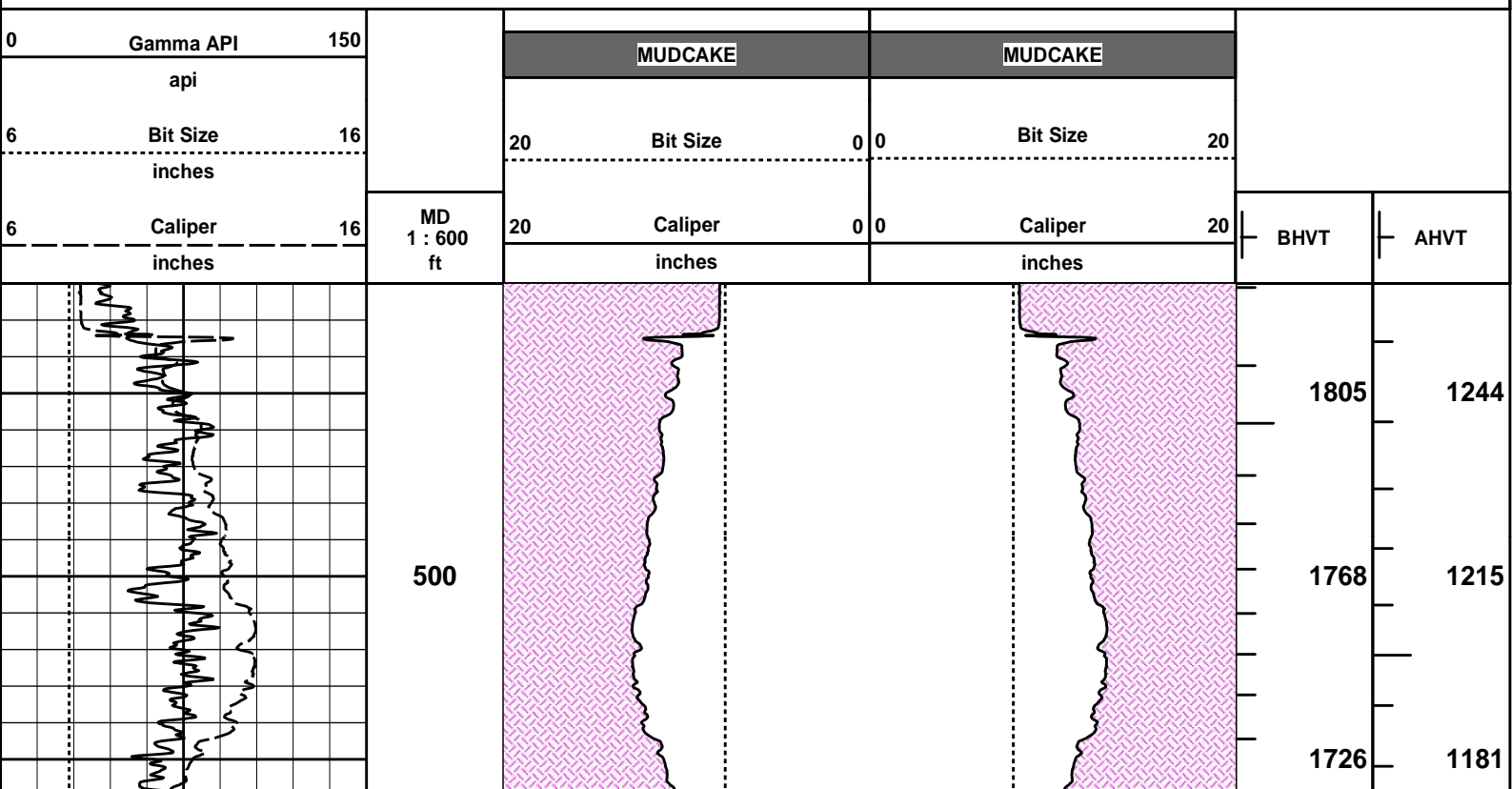
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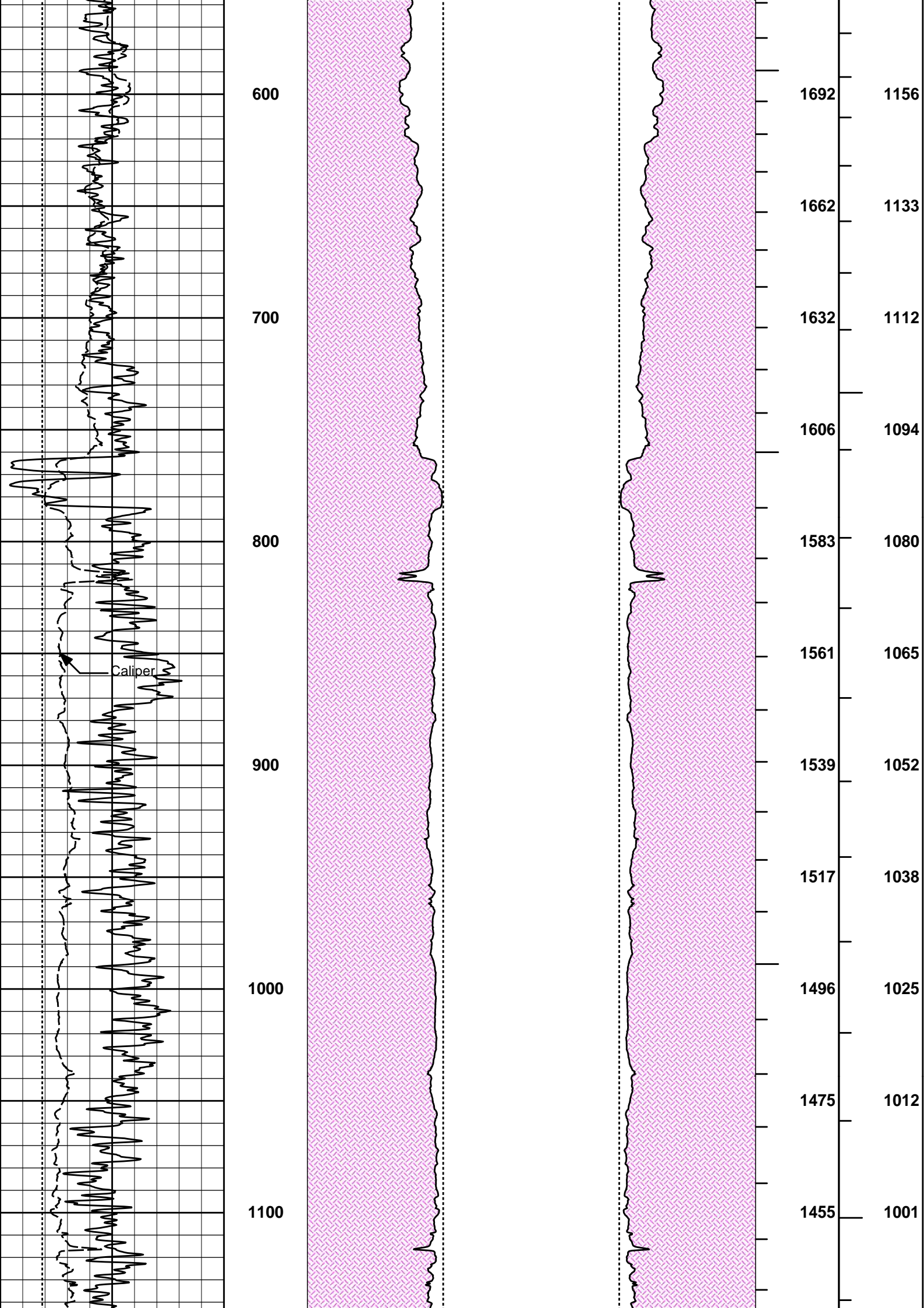


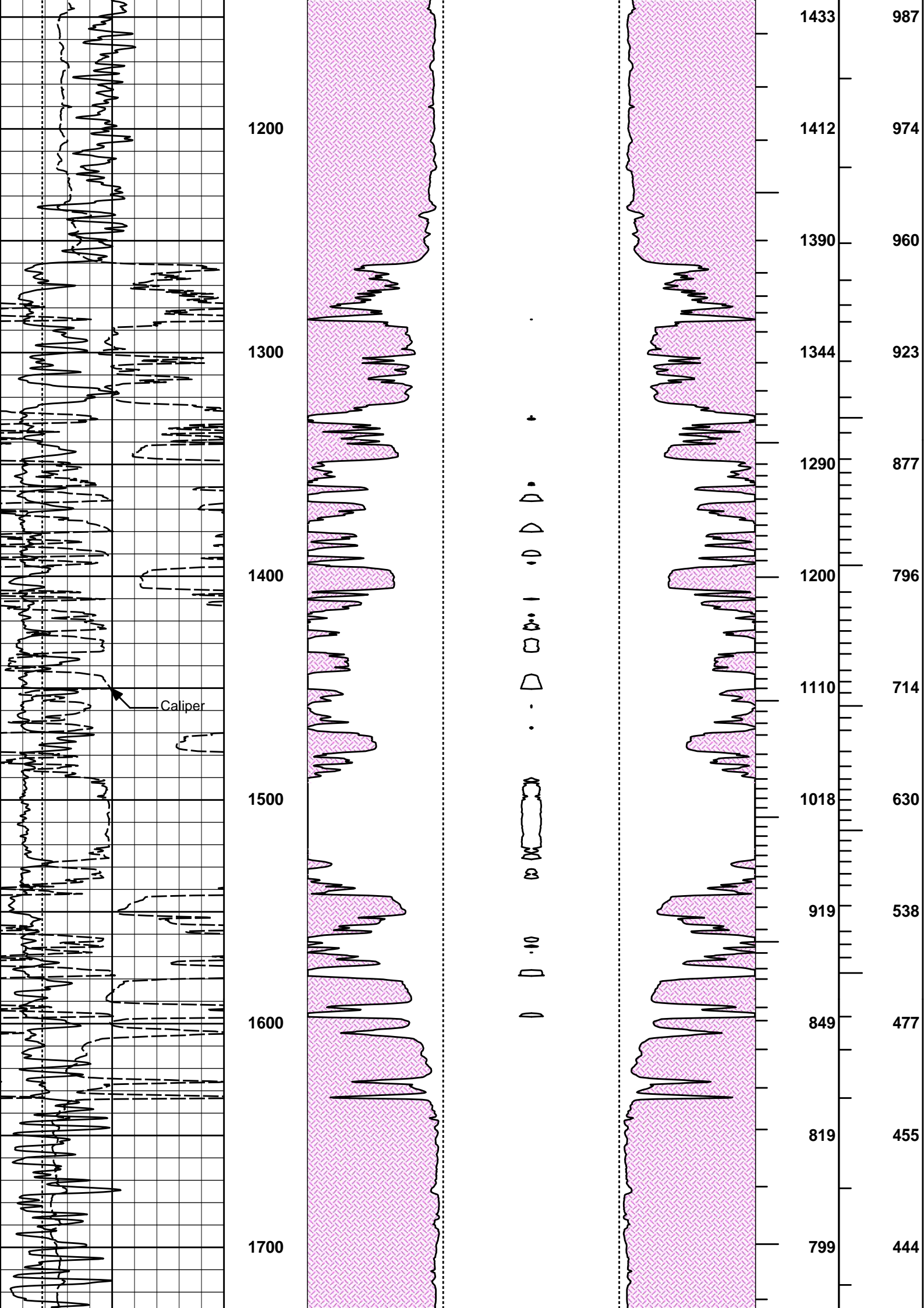
Plot Time: 18-Oct-19 19:20:07  
 Plot Range: 420 ft to 3853.25 ft  
 Data: HALL-GATES\_2-5Well Based\*\  
 Plot File: \\-LOCAL-HALL-GATES\_2-5Well Based\AHV\AHV\_2\_IQ\_LIB

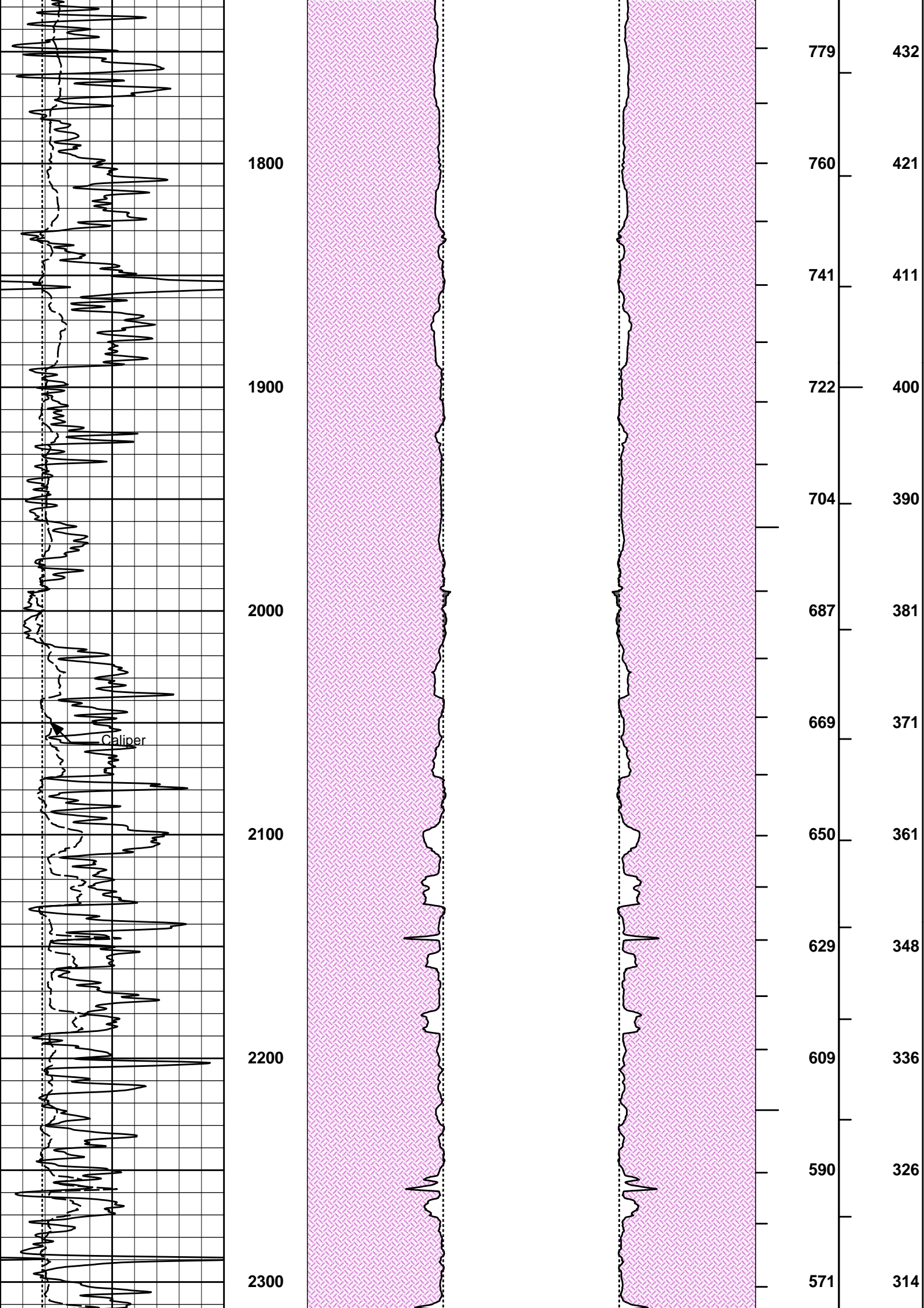
## ANNULAR HOLE VOLUME PLOT

### AHV PLOT CALCULATED FOR 5.5" CASING

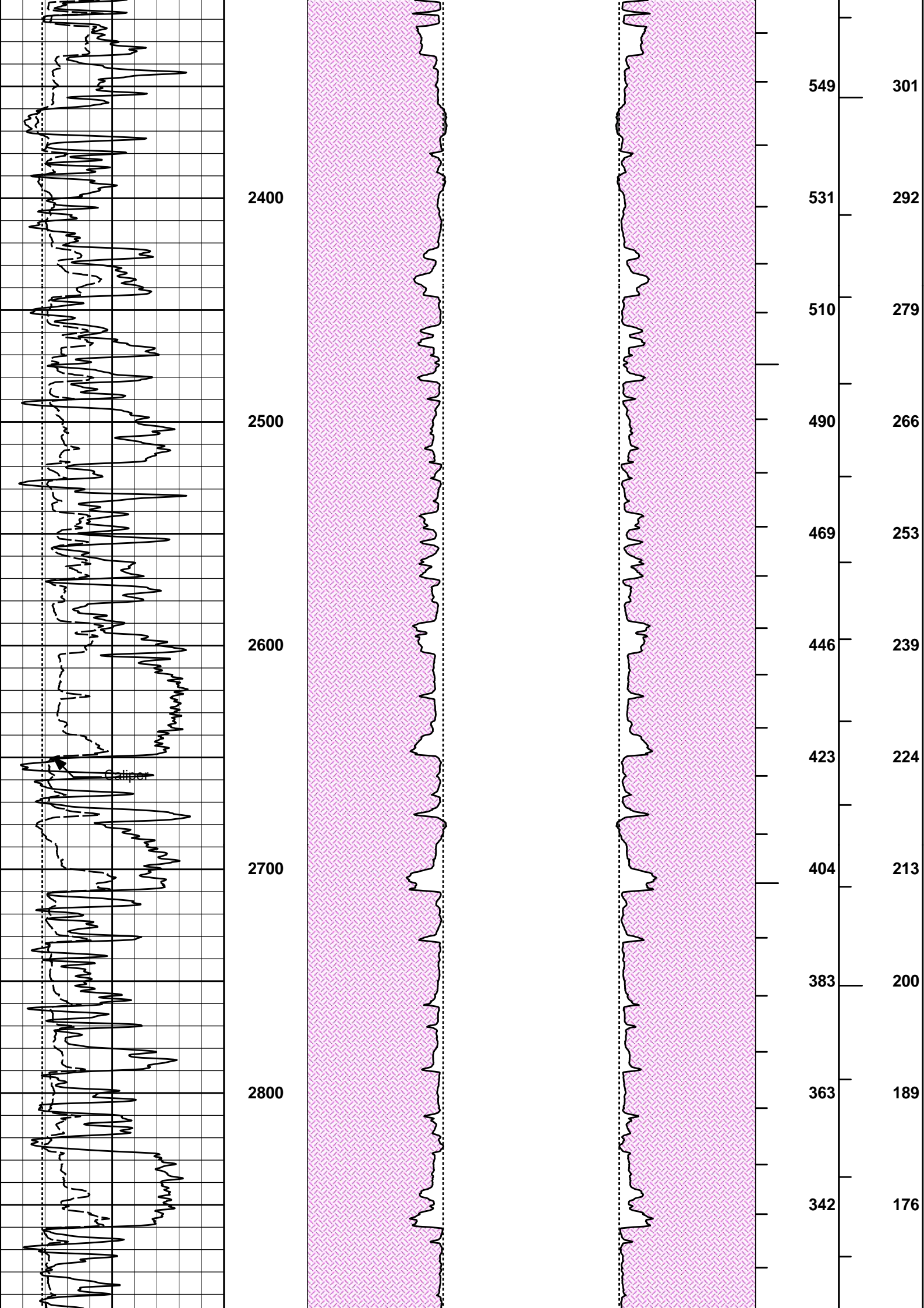


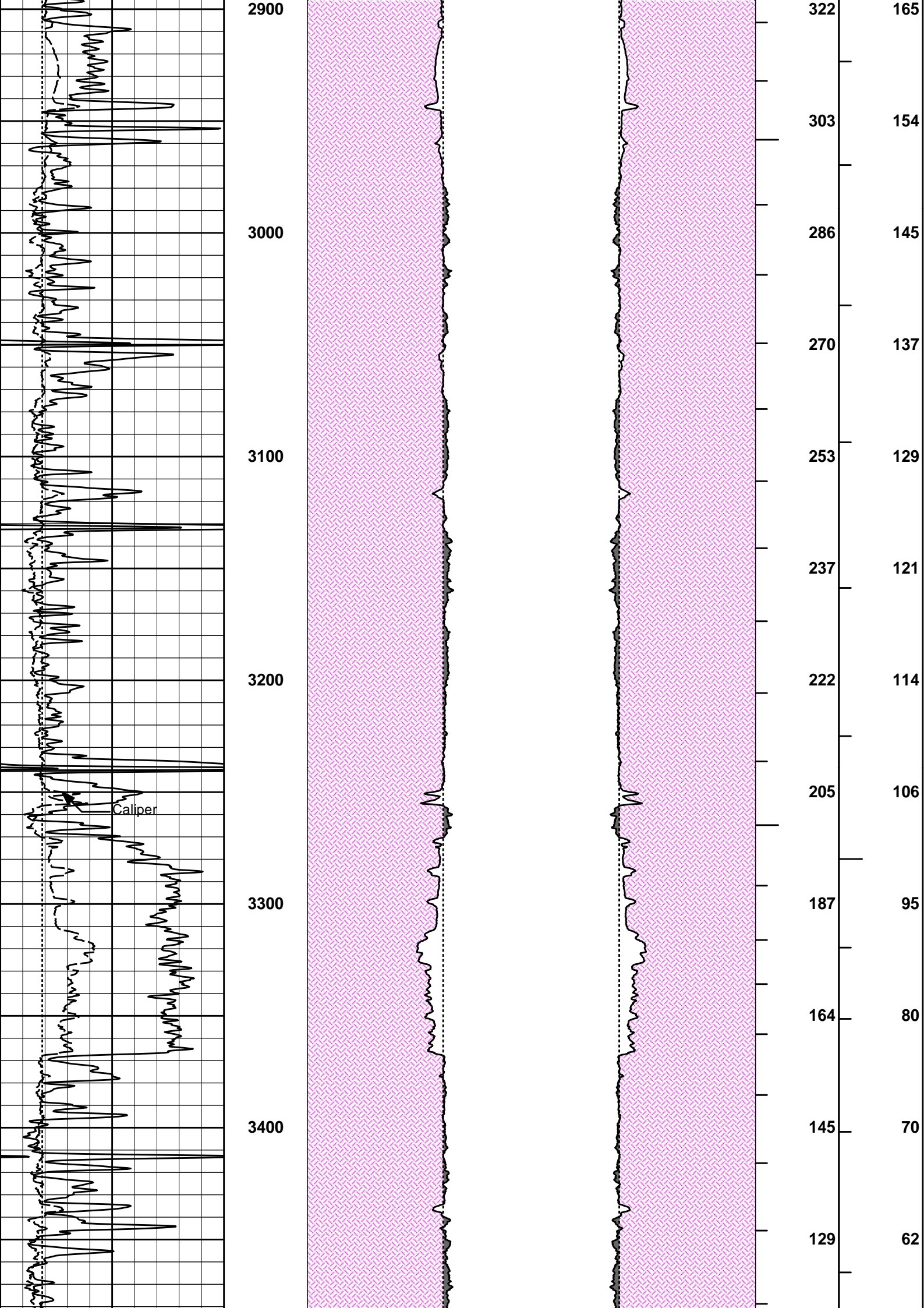
















COMPANY	BIRD DOG OIL, LLC		
WELL	HALL-GATES 2-5		
FIELD	GATES		
COUNTY	STAFFORD	STATE	KANSAS

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ANNULAR HOLE VOLUME