



LWD MEMORY LOG

Multiple Propagation Resistivity

Gamma Ray

Company: Noble Energy

1:240 MD | **Well:** **Dorothy State LG16-785**

Field: Weld County

Driller's Depth	County: Weld	Country: United States
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Latitude: 040° 40' 59.520" N

Category	Item	Value
A	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
B	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
C	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
D	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
E	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
F	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
G	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
H	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
I	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
J	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
K	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
L	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
M	1	10
	2	20
	3	30
	4	40
	5	50
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	7	70
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	9	90
	10	100
N	1	10
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	6	60
	7	70
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	9	90
	10	100
O	1	10
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	6	60
	7	70
	8	80
	9	90
	10	100
P	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
Q	1	10
	2	20
	3	30
	4	40
	5	50
	6	60
	7	70
	8	80
	9	90
	10	100
R	1	10
	2	20
	3	30
	4	40

b ID: 109454573
 SEC: 9
 TWN: 8N
 RGE: 59W

Permanent Datum (P.D.):	Ground Level	Elevation:	4854.00 ft	Elev. KB:	N/A
Measured From:	Rig Floor	Above P.D.	30.00 ft	Elev. DF:	4884.00 ft
				Elev. GI:	4854.00 ft

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
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Interval Drilled Magnetic Field Reference

Date From:	2018-10-25	Top: (ft)	1952.00	Azi Reference North:	Grid	Dip Angle: (deg)
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Bottom: (T) 16/15.00 Total Magnetic Field Strength: (mT)

Mag to Reference North Correction: (deg)

Borehole Record Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)
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13.500	30.00	1952.00	9.625	36.00	3
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0.000	1992.00	10713.00		

[illegible]

Mud Record Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Sta)
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Based on	1952.00	16773.00	8.500	14823.00	0.60	27
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[illegible][illegible]

Acquisition System	Software Version	Other
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ker Hughes Cadence R | 4.2 Rg: H&P 321

[illegible]

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Log Run Summary

Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	3.50	AutoTrak Curve	1952.00	5402.00	1952.00	16775.00	2018-10-25 04:23	2018-10-27 20:32	54.66

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Tien Bui	2018-10-22	2018-10-28						

Mud Properties Record

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2018-10-24 10:26	1	1952.00	Oil Based Mud	9.7	17	N/A	21.8	79.4/20.6	Active Pit	26000	0.00
2018-10-26 16:44	1	10700.00	Oil Based Mud	9.6	12	N/A	20.0	85.4/14.6	Active Pit	20000	0.00
2018-10-27 06:33	1	14150.00	Oil Based Mud	9.7	13	N/A	21.5	84.4/15.6	Active Pit	21500	0.00

Mud Resistivity Record

Mud Resistivity Record				Surface			Downhole			
Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)	BHCT (degF)	Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
2018-10-24 10:27	1	1952.00	86.0	100.000	N/A	N/A	112.0	100.000	N/A	N/A

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	OnTrak	12004344	Pressure	0.07	11367.90	6.750	0.000

1	OnTrak	12004344	Gamma (double)	0.96	11368.79	6.750	0.000
1	OnTrak	12004344	Resistivity (4tx)	5.00	11372.83	6.750	0.000
1	OnTrak	12004344	Directional (mag)	10.79	11378.62	6.750	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
OTK	OnTrak	Sensor Sub (Inc, Azi, Temp, Azimuthal GR, Res, AP, VSS), OnTrak Platform
BCPM	BCPM	Bi-Directional Communication and Power Module, OnTrak Platform

Comments


- 1
- Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
- 2
- Baker Hughes LWD Run 1 utilized 6 ¾ inch OnTrak service (Multiple Propagation and Gamma Ray) behind an 8 1/2 inch bit and rotary steerable assembly to perform a MAD (measurement after drilling) Pass from 1952 to 5402 feet MD (1952 to 5234 feet TVD). The Data collected during this run was ream logged up to 51 hours after being drilled and presented independent of the drilled log.
- 3
- The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

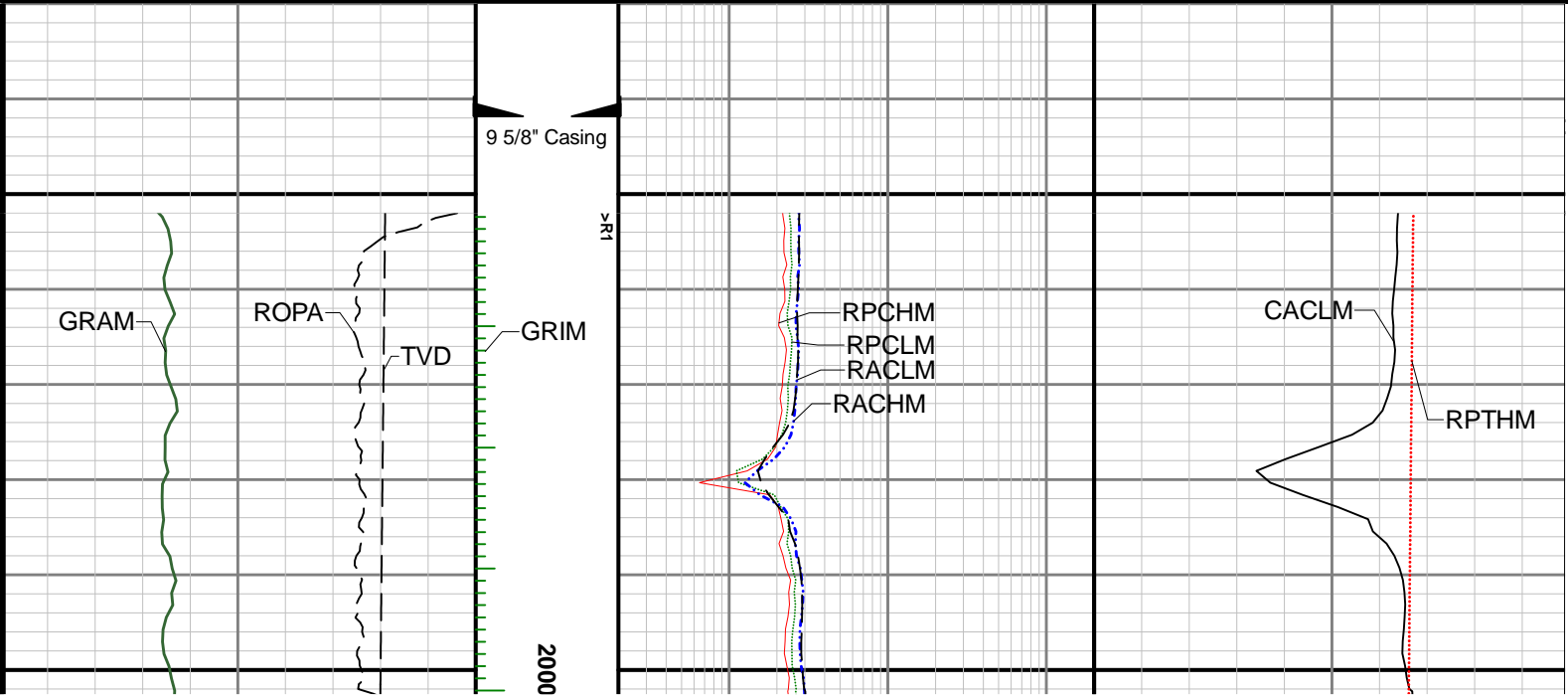
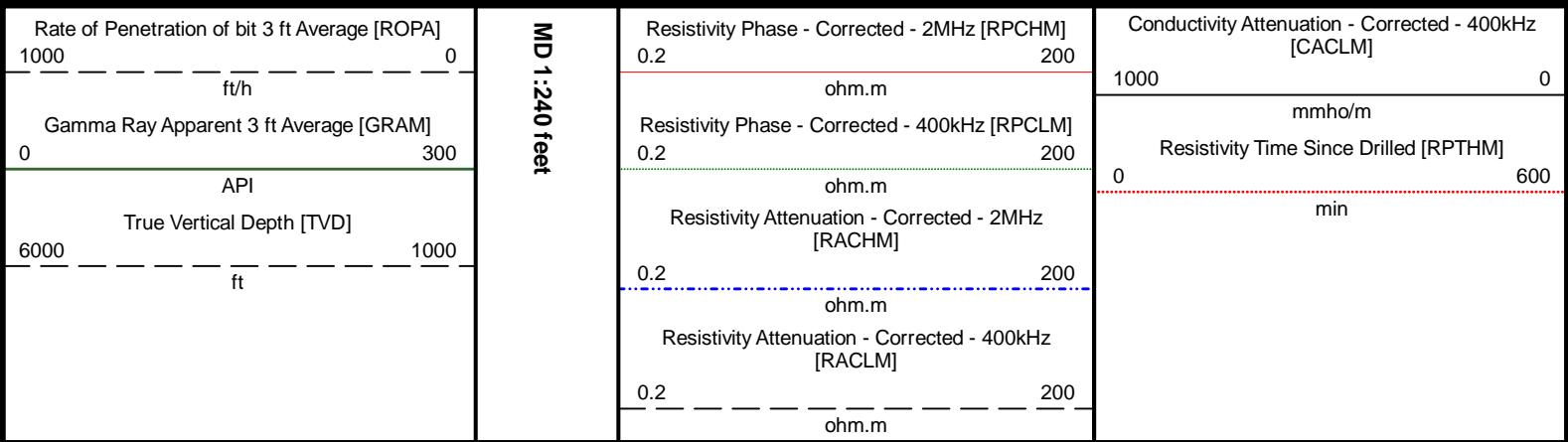
Remarks

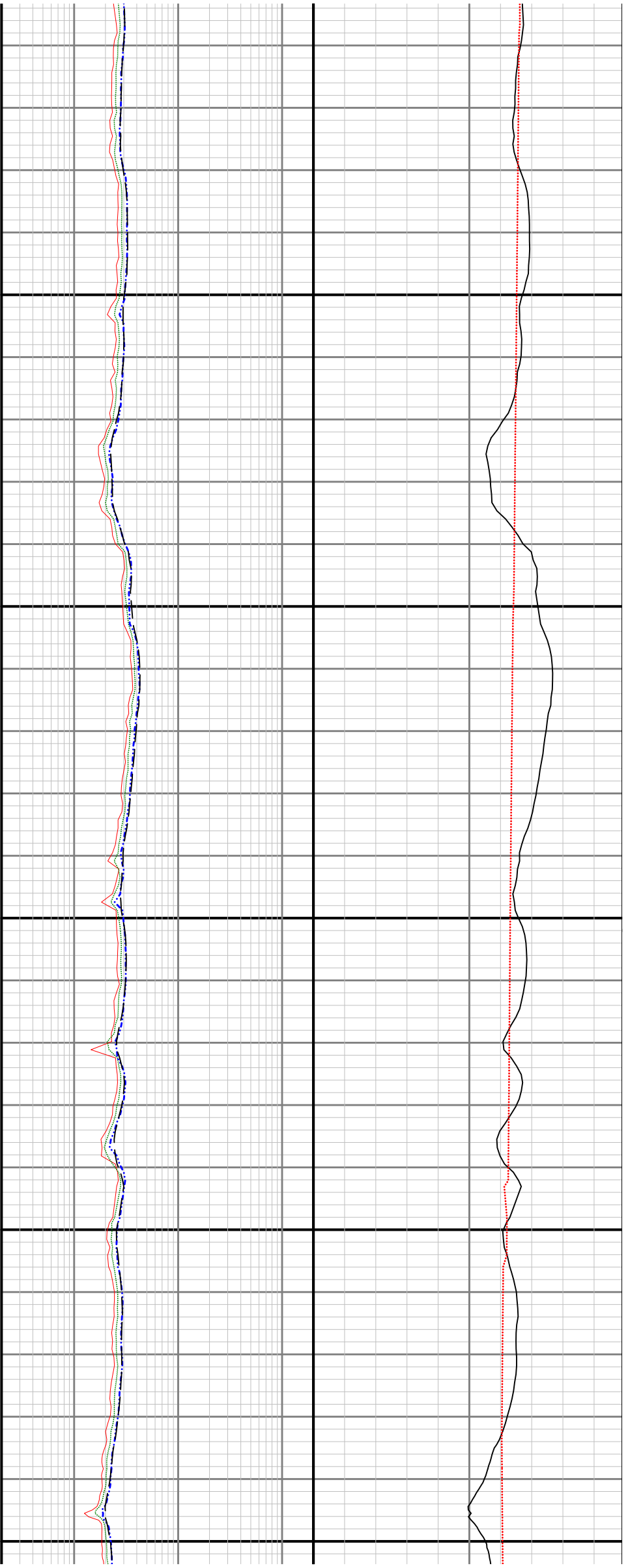
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5402.00	8.500	1	The interval from 5402 to 16775 feet MD (5234 to 5991 feet TVD) was not logged due to sensor offset from bit.

Curve Mnemonics

Presented Curves	Description	Units
CACLM	Conductivity Attenuation - Corrected - 400kHz	mmho/m
RACHM	Resistivity Attenuation - Corrected - 2MHz	ohm.m
RACLM	Resistivity Attenuation - Corrected - 400kHz	ohm.m
RPCHM	Resistivity Phase - Corrected - 2MHz	ohm.m
RPCLM	Resistivity Phase - Corrected - 400kHz	ohm.m
RPTHM	Resistivity Time Since Drilled	min
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless

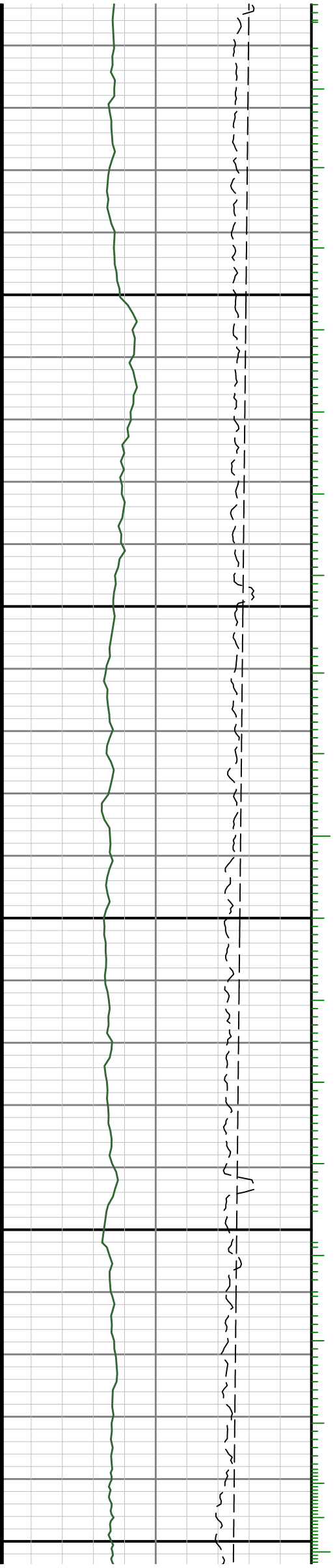
<div><div><div>BAKER HUGHES</div><div>a GE company</div></div><div></div></div>	Company	Noble Energy			
	Well	Dorothy State LG16-785			
	Interval	Date From:	2018-10-25 01:40	Top:	1952.00 ft
	Created	Date To:	2018-10-28 04:23	Bottom:	16775.00 ft
		2018-10-28 06:53:25			

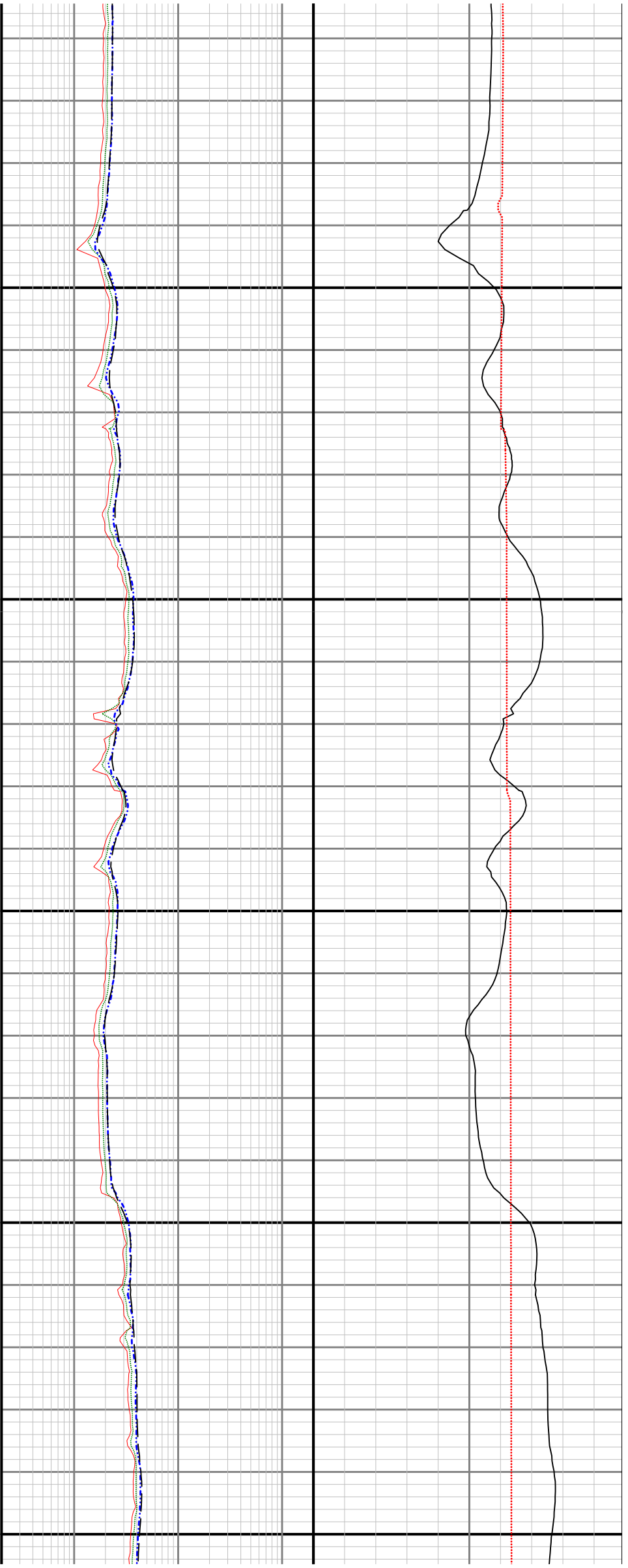




2100

2200





2300

2400

2500

