



Total Directional
Services, LLC
USA Operations

Final MWD Survey Certification

Lea County, New Mexico

Client: Devon Energy

Well Name: Grumpy Cat 15 Fed Com 213H

Total Job No: 2019-384-103

API No: 30-025-45704

Start Date: 6/24/2019

End Date: 7/11/2019

Measured Start Depth: 0 feet

Measured End Depth with PTB: 15671 feet

HOBBS OCD
JAN 06 2020
RECEIVED

I, Michael Smitham, MWD Operator, hereby certify that; I am employed by Total Directional Services, LLC and we conducted or supervised the taking of these open hole MWD surveys at the request of this client. This data is true, correct, complete and within the limitations of the tool as set forth by Total Directional Services, LLC. I am authorized and qualified to make this report and have reviewed this report and find that it conforms to the principals and procedures as set forth by Total Directional Services, LLC.

Date: 7/11/2019

Signed: Michael Smitham

svy	depth	inc	azm	tvd	ns	ew	vs	dls
Tiein	0	0	0	0	0	0	0	0
1	72	0.5	237.5	72	-0.17	-0.26	0.17	0.69
2	133	0.5	305.5	133	-0.16	-0.71	0.15	0.92
3	262	0.6	290.8	261.99	0.41	-1.8	-0.42	0.13
4	357	0.3	291.5	356.99	0.68	-2.49	-0.69	0.32
5	452	0.5	306.5	451.99	1.01	-3.06	-1.04	0.24
6	548	0.3	299.2	547.98	1.39	-3.61	-1.41	0.21
7	642	0.3	303.9	641.98	1.64	-4.03	-1.67	0.03
8	737	0.2	284.9	736.98	1.83	-4.4	-1.85	0.14
9	832	0.2	291.9	831.98	1.93	-4.71	-1.96	0.03
10	927	0.3	300.9	926.98	2.12	-5.08	-2.15	0.11
11	1022	0.3	265.2	1021.98	2.23	-5.54	-2.26	0.19
12	1118	0.3	282.7	1117.98	2.26	-6.04	-2.3	0.1
13	1161	0.4	265.6	1160.98	2.27	-6.3	-2.32	0.33
14	1270	0.3	288	1269.97	2.33	-6.95	-2.38	0.15
15	1366	0.3	259.7	1365.97	2.37	-7.43	-2.41	0.15
16	1461	0.4	239.2	1460.97	2.15	-7.96	-2.2	0.17
17	1556	0.3	271.5	1555.97	1.99	-8.5	-2.04	0.23
18	1651	0.1	275.9	1650.97	2	-8.83	-2.06	0.21
19	1746	0.3	283.6	1745.97	2.07	-9.15	-2.13	0.21
20	1841	0.1	274.1	1840.97	2.13	-9.48	-2.2	0.21
21	1936	0.2	246.2	1935.97	2.07	-9.71	-2.14	0.13
22	2031	0.1	43.5	2030.97	2.07	-9.81	-2.13	0.31
23	2126	0.2	109.3	2125.97	2.07	-9.59	-2.14	0.19
24	2221	0.3	99.1	2220.97	1.98	-9.19	-2.04	0.11
25	2317	0.1	131.2	2316.97	1.88	-8.88	-1.94	0.23
26	2412	0.2	86.7	2411.97	1.84	-8.65	-1.9	0.15
27	2507	0.7	242.6	2506.96	1.58	-9	-1.64	0.93
28	2602	1.9	270.5	2601.94	1.33	-11.09	-1.4	1.39
29	2697	3.3	278.4	2696.84	1.74	-15.37	-1.84	1.52
30	2793	3.8	279.1	2792.65	2.65	-21.24	-2.79	0.52
31	2888	4.5	280.5	2887.4	3.82	-28.02	-4.01	0.74
32	2983	5	279.2	2982.08	5.17	-35.77	-5.4	0.54
33	3078	5	281.4	3076.72	6.65	-43.91	-6.94	0.2
34	3174	6.2	282.9	3172.26	8.63	-53.07	-8.98	1.26
35	3269	7.4	282.5	3266.59	11.1	-64.04	-11.52	1.26
36	3364	8.2	279.9	3360.71	13.59	-76.69	-14.1	0.92

37	3459	8.7	277.1	3454.68	15.64	-90.49	-16.24	0.68
38	3555	9.6	275.1	3549.45	17.25	-105.67	-17.95	0.99
39	3650	10.9	276.3	3642.94	18.94	-122.49	-19.75	1.39
40	3745	12.2	278.8	3736.01	21.46	-141.34	-22.4	1.47
41	3840	13.4	279.3	3828.65	24.78	-162.12	-25.85	1.27
42	3935	13.8	281.6	3920.98	28.83	-184.08	-30.05	0.71
43	4030	11.9	282.4	4013.6	33.22	-204.75	-34.57	2.01
44	4126	10.5	284.2	4107.77	37.49	-222.9	-38.96	1.5
45	4221	10.7	285	4201.15	41.89	-239.81	-43.48	0.26
46	4316	12.3	280.5	4294.24	46.02	-258.28	-47.73	1.93
47	4411	13	274.6	4386.94	48.72	-278.88	-50.57	1.55
48	4506	13.6	270.5	4479.39	49.68	-300.7	-51.67	1.18
49	4602	13.9	271.3	4572.64	50.04	-323.52	-52.18	0.37
50	4697	14.2	274.5	4664.8	51.21	-346.54	-53.51	0.88
51	4792	14.6	277	4756.82	53.58	-370.04	-56.03	0.78
52	4887	16	280	4848.45	57.31	-394.82	-59.93	1.69
53	4982	15.8	281.9	4939.81	62.26	-420.37	-65.04	0.59
54	5077	15.2	281.8	5031.36	67.47	-445.22	-70.42	0.63
55	5172	15.3	283.4	5123.01	72.92	-469.6	-76.03	0.46
56	5267	15.5	284	5214.6	78.9	-494.11	-82.17	0.27
57	5363	15.6	283.3	5307.09	84.97	-519.12	-88.41	0.22
58	5458	15	282.4	5398.72	90.55	-543.56	-94.15	0.68
59	5553	15.3	282.4	5490.42	95.88	-567.8	-99.64	0.32
60	5648	15.4	281.5	5582.03	101.09	-592.41	-105.01	0.27
61	5744	14.7	281.4	5674.74	106.03	-616.84	-110.12	0.73
62	5839	14	282	5766.77	110.81	-639.89	-115.05	0.75
63	5934	13.4	281.8	5859.07	115.45	-661.91	-119.83	0.63
64	6029	13.1	281.7	5951.54	119.88	-683.23	-124.41	0.32
65	6125	12.4	281.2	6045.17	124.09	-703.99	-128.75	0.74
66	6220	11.4	280.6	6138.13	127.8	-723.23	-132.59	1.06
67	6315	11.1	282	6231.31	131.43	-741.4	-136.34	0.43
68	6410	10.2	283.1	6324.67	135.23	-758.54	-140.26	0.97
69	6506	8.6	285.6	6419.38	139.09	-773.73	-144.22	1.72
70	6601	8.1	287.1	6513.37	142.97	-786.97	-148.18	0.57
71	6696	7.4	287.4	6607.5	146.77	-799.21	-152.06	0.74
72	6791	7.2	285.1	6701.73	150.15	-810.79	-155.52	0.37
73	6887	6.5	284.4	6797.05	153.06	-821.86	-158.51	0.73
74	6982	6.2	284.9	6891.46	155.72	-832.03	-161.24	0.32
75	7077	5.8	285.8	6985.94	158.35	-841.6	-163.93	0.43

76	7172	5.3	290	7080.5	161.15	-850.35	-166.79	0.68
77	7268	4.6	292.3	7176.14	164.13	-858.07	-169.82	0.76
78	7363	4	294.5	7270.87	166.95	-864.61	-172.68	0.65
79	7458	3.7	298.7	7365.66	169.8	-870.32	-175.57	0.43
80	7553	3.5	295.1	7460.47	172.5	-875.63	-178.3	0.32
81	7649	3.3	296.1	7556.3	174.96	-880.77	-180.8	0.22
82	7744	3.1	294	7651.15	177.21	-885.57	-183.08	0.24
83	7839	3	293	7746.02	179.22	-890.2	-185.12	0.12
84	7934	2.8	288.2	7840.9	180.92	-894.7	-186.85	0.33
85	8029	2.5	286.5	7935.79	182.23	-898.89	-188.19	0.33
86	8124	1.9	285.7	8030.72	183.25	-902.39	-189.23	0.63
87	8226	1.1	197	8132.7	182.77	-904.31	-188.76	2.13
88	8322	4.3	177	8228.58	178.29	-904.39	-184.29	3.42
89	8417	6.2	172.4	8323.18	169.65	-903.52	-175.64	2.05
90	8512	7.4	168.6	8417.51	158.57	-901.63	-164.54	1.35
91	8607	8.8	167.4	8511.56	145.48	-898.84	-151.43	1.48
92	8703	9.5	165.5	8606.34	130.64	-895.25	-136.57	0.79
93	8776	9.9	163	8678.29	118.81	-891.91	-124.72	0.8
94	8904	9.8	162.8	8804.41	97.88	-885.47	-103.75	0.08
95	8999	5.8	166.6	8898.51	85.48	-881.97	-91.33	4.24
96	9094	4.8	163.8	8993.1	76.99	-879.75	-82.83	1.09
97	9189	3.4	160.7	9087.86	70.52	-877.71	-76.34	1.49
98	9285	2	150.6	9183.75	66.37	-875.94	-72.18	1.53
99	9380	1	123.9	9278.71	64.46	-874.44	-70.26	1.26
100	9475	1	113.8	9373.7	63.67	-872.99	-69.46	0.19
101	9570	1	160.1	9468.69	62.55	-871.95	-68.33	0.83
102	9665	0.7	273.4	9563.68	61.81	-872.25	-67.59	1.5
103	9761	1.8	305.8	9659.66	62.72	-874.06	-68.52	1.32
104	9856	1.6	299.4	9754.62	64.25	-876.42	-70.06	0.29
105	9951	1.8	282.6	9849.57	65.22	-879.04	-71.05	0.56
106	10046	1.4	273.6	9944.54	65.62	-881.65	-71.47	0.5
107	10142	1.5	271.2	10040.51	65.72	-884.08	-71.59	0.12
108	10237	1.2	273.5	10135.48	65.81	-886.31	-71.69	0.32
109	10331	5.5	192.4	10229.32	61.47	-888.26	-67.36	5.79
110	10426	17.7	181.8	10322.22	42.51	-889.7	-48.41	12.98
111	10521	28.3	182.4	10409.54	5.47	-891.1	-11.38	11.16
112	10617	38	182.2	10489.82	-46.92	-893.19	40.99	10.1
113	10712	49.5	181.6	10558.33	-112.47	-895.33	106.53	12.11
114	10807	57.8	177.6	10614.6	-188.88	-894.66	182.95	9.37

115	10902	65.7	176	10659.53	-272.37	-889.95	266.46	8.45
116	10998	73.8	182.6	10692.77	-362.29	-888.98	356.39	10.62
117	11093	78.1	182.6	10715.82	-454.33	-893.16	448.4	4.53
118	11188	83.6	180.6	10730.93	-548.05	-895.77	542.09	6.15
119	11283	90.6	179.1	10735.73	-642.86	-895.51	636.91	7.54
120	11378	91.3	179.1	10734.16	-737.84	-894.02	731.89	0.74
121	11474	91.3	179.7	10731.98	-833.81	-893.02	827.87	0.62
122	11569	91.6	179.4	10729.57	-928.77	-892.27	922.83	0.45
123	11664	91.7	179.6	10726.84	-1023.73	-891.44	1017.79	0.24
124	11759	91.3	178.7	10724.35	-1118.69	-890.03	1112.76	1.04
125	11855	89.2	176.9	10723.93	-1214.6	-886.35	1208.7	2.88
126	11950	88.9	177.3	10725.51	-1309.47	-881.54	1303.59	0.53
127	12045	89	178.2	10727.25	-1404.38	-877.81	1398.53	0.95
128	12140	89	178.6	10728.91	-1499.33	-875.16	1493.49	0.42
129	12236	89.2	179.7	10730.41	-1595.3	-873.74	1589.47	1.16
130	12331	88.2	179.1	10732.57	-1690.27	-872.74	1684.45	1.23
131	12426	88.3	179.1	10735.47	-1785.22	-871.25	1779.4	0.11
132	12521	88.5	179.8	10738.12	-1880.17	-870.34	1874.36	0.77
133	12617	89.5	177.5	10739.8	-1976.13	-868.08	1970.32	2.61
134	12712	90.2	176.7	10740.05	-2071	-863.27	2065.23	1.12
135	12807	90.6	176	10739.38	-2165.81	-857.23	2160.07	0.85
136	12903	91.2	176.1	10737.88	-2261.57	-850.61	2255.87	0.63
137	12998	91.6	176.1	10735.56	-2356.32	-844.15	2350.67	0.42
138	13093	89.6	176	10734.56	-2451.08	-837.61	2445.47	2.11
139	13188	89.6	176.2	10735.22	-2545.86	-831.15	2540.29	0.21
140	13284	89.9	176.1	10735.64	-2641.64	-824.7	2636.11	0.33
141	13379	90.2	176.2	10735.56	-2736.43	-818.32	2730.94	0.33
142	13474	90.9	176.1	10734.65	-2831.21	-811.95	2825.76	0.74
143	13569	91.3	176.1	10732.82	-2925.97	-805.49	2920.56	0.42
144	13665	91.8	175.9	10730.23	-3021.7	-798.79	3016.34	0.56
145	13760	90.7	177.2	10728.15	-3116.5	-793.08	3111.17	1.79
146	13855	90.3	177.6	10727.33	-3211.4	-788.77	3206.1	0.6
147	13951	91	177.6	10726.24	-3307.31	-784.75	3302.03	0.73
148	14046	90.6	178.4	10724.91	-3402.24	-781.43	3396.98	0.94
149	14141	90.6	179.7	10723.92	-3497.22	-779.86	3491.97	1.37
150	14236	91	179.4	10722.59	-3592.21	-779.11	3586.96	0.53
151	14331	91.3	179.6	10720.68	-3687.19	-778.28	3681.94	0.38
152	14427	92.3	179.7	10717.67	-3783.14	-777.7	3777.89	1.05
153	14522	92.9	179.6	10713.36	-3878.04	-777.12	3872.8	0.64

154	14617	90	181.6	10710.95	-3972.99	-778.11	3967.74	3.71
155	14712	90.3	181.7	10710.7	-4067.95	-780.85	4062.68	0.33
156	14807	88	181.3	10712.11	-4162.9	-783.33	4157.61	2.46
157	14902	88.1	180.9	10715.35	-4257.82	-785.16	4252.52	0.43
158	14998	88.5	180.5	10718.19	-4353.77	-786.33	4348.46	0.59
159	15093	89.4	179.8	10719.94	-4448.76	-786.58	4443.44	1.2
160	15188	89.8	179.6	10720.6	-4543.75	-786.08	4538.44	0.47
161	15283	90.9	179.7	10720.02	-4638.75	-785.5	4633.43	1.16
162	15379	91.5	179.6	10718.01	-4734.72	-784.91	4729.41	0.63
163	15474	92.2	179.1	10714.94	-4829.67	-783.84	4824.36	0.91
164	15569	93.1	179.1	10710.55	-4924.55	-782.35	4919.26	0.95
165	15617	93.1	179.1	10707.95	-4972.48	-781.59	4967.18	0
PTB	15671	93.1	179.1	10705.03	-5026.39	-780.75	5021.1	0