Final MWD Survey Certification

Lea County, New Mexico

Client: Devon Energy

Well Name: Alley Cat 17-20 Fed Com 525H

Total Job No: 2019-522-103

API No: 30-025-46251

Start Date: 8/31/2019

End Date: 9/17/2019

Measured Start Depth: 0 feet

Measured End Depth with PTB: 19992 feet

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: 9/17/2019

Signed: Michael Smitham

svy	depth	inc	azm	tvd	ns	ew	vs	dls
Tiein	0	0	0	0	0	0	0	0
1	104	0.3	39	104	0.21	0.17	-0.21	0.29
2	164	0.3	28.3	164	0.47	0.34	-0.47	0.09
3	263	0.3	25	263	0.94	0.58	-0.93	0.02
4	358	0.3	34.4	358	1.37	0.82	-1.36	0.05
5	453	0.2	28.5	453	1.72	1.04	-1.71	0.11
6	549	0.3	348.7	548.99	2.11	1.07	-2.1	0.2
7	644	0.2	304.3	643.99	2.45	0.89	-2.44	0.22
8	739	0.3	292.8	738.99	2.64	0.52	-2.63	0.12
9	834	0.4	277.1	833.99	2.77	-0.04	-2.78	0.14
10	930	0.6	267.8	929.99	2.8	-0.87	-2.8	0.22
11	1024	0.8	270.8	1023.98	2.79	-2.02	-2.8	0.22
12	1115	0.9	271.6	1114.97	2.82	-3.37	-2.84	0.11
13	1266	0.8	292.4	1265.95	3.25	-5.53	-3.29	0.21
14	1362	0.4	288.8	1361.95	3.61	-6.47	-3.66	0.42
15	1457	0.3	243.4	1456.95	3.61	-7	-3.65	0.3
16	1552	0.3	227.1	1551.95	3.33	-7.41	-3.38	0.09
17	1647	0.2	203.9	1646.94	3.01	-7.66	-3.06	0.15
18	1742	0.6	333.2	1741.94	3.3	-7.95	-3.35	0.78
19	1837	2.5	348.4	1836.9	5.77	-8.59	-5.83	2.03
20	1932	3.5	352.3	1931.77	10.68	-9.39	-10.74	1.07
21	2028	2.9	355.4	2027.62	16	-9.98	-16.07	0.65
22	2123	2.5	355.4	2122.52	20.46	-10.34	-20.53	0.42
23	2218	2.1	354	2217.44	24.26	-10.69	-24.33	0.43
24	2313	1.7	353.7	2312.39	27.39	-11.03	-27.46	0.42
25	2408	2	347.8	2407.34	30.41	-11.53	-30.49	0.37
26	2503	2.7	350.5	2502.26	34.24	-12.25	-34.32	0.75
27	2599	2.5	349.4	2598.16	38.53	-13.01	-38.61	0.21
28	2694	2	349.7	2693.09	42.19	-13.69	-42.28	0.53
29	2789	2.4	354.5	2788.02	45.81	-14.17	-45.9	0.46
30	2884	3.4	355.3	2882.89	50.59	-14.59	-50.69	1.05
31	2980	2.9	354.9	2978.75	55.85	-15.04	-55.95	0.52

32	3075	2.5	357	3073.64	60.31	-15.37	-60.41	0.43
33	3170	2.2	0.6	3168.56	64.2	-15.45	-64.3	0.35
34	3265	2.1	1.8	3263.49	67.77	-15.38	-67.87	0.12
35	3361	1.5	3.4	3359.45	70.78	-15.25	-70.88	0.63
36	3456	1	354.3	3454.42	72.85	-15.26	-72.94	0.56
37	3551	1	348.3	3549.41	74.48	-15.51	-74.58	0.11
38	3646	0.8	347.5	3644.4	75.94	-15.82	-76.04	0.21
39	3741	0.6	358.5	3739.39	77.09	-15.98	-77.19	0.25
40	3836	0.4	26.5	3834.39	77.88	-15.84	-77.98	0.33
41	3932	0.7	110.4	3930.38	77.98	-15.14	-78.07	0.8
42	4027	1.1	131.2	4025.37	77.17	-13.91	-77.26	0.54
43	4122	1.1	134.1	4120.35	75.94	-12.57	-76.02	0.06
44	4218	1.1	128.7	4216.34	74.72	-11.19	-74.79	0.11
45	4313	1.5	132.5	4311.31	73.31	-9.56	-73.37	0.43
46	4408	0.9	116.9	4406.29	72.13	-7.98	-72.18	0.71
47	4503	1.2	45.7	4501.28	72.49	-6.6	-72.53	1.31
48	4599	1.3	59.2	4597.26	73.75	-4.95	-73.78	0.32
49	4694	0.9	76.8	4692.24	74.47	-3.3	-74.49	0.55
50	4789	0.6	74.8	4787.23	74.77	-2.09	-74.78	0.32
51	4884	0.5	56.4	4882.23	75.13	-1.27	-75.14	0.21
52	4979	0.4	46.8	4977.22	75.59	-0.68	-75.59	0.13
53	5074	0.5	46.6	5072.22	76.1	-0.14	-76.1	0.11
54	5170	0.5	37.8	5168.22	76.72	0.42	-76.72	0.08
55	5265	0.6	24.5	5263.21	77.5	0.89	-77.49	0.17
56	5360	0.5	22.4	5358.21	78.34	1.25	-78.33	0.11
57	5455	0.5	24.9	5453.2	79.09	1.58	-79.08	0.02
58	5550	0.3	11.9	5548.2	79.71	1.81	-79.7	0.23
59	5645	0.3	10.8	5643.2	80.2	1.91	-80.19	0.01
60	5740	0.3	1.9	5738.2	80.69	1.96	-80.68	0.05
61	5836	0.3	2.3	5834.2	81.2	1.98	-81.18	0
62	5931	0.5	345.1	5929.2	81.85	1.88	-81.83	0.24
63	6026	0.4	343.5	6024.19	82.56	1.68	-82.55	0.11
64	6121	0.4	344.5	6119.19	83.2	1.5	-83.19	0.01
65	6216	0.4	342.3	6214.19	83.84	1.31	-83.83	0.02
66	6312	0.5	344.3	6310.19	84.56	1.09	-84.55	0.11
67	6407	0.5	340.6	6405.18	85.35	0.84	-85.34	0.03
68	6502	0.4	342.5	6500.18	86.06	0.61	-86.05	0.11
69	6597	0.5	350.1	6595.18	86.78	0.44	-86.78	0.12
70	6692	0.5	345.9	6690.17	87.59	0.26	-87.59	0.04

71	6787	0.6	340.3	6785.17	88.46	-0.01	-88.46	0.12
72	6882	0.6	342.6	6880.16	89.41	-0.32	-89.41	0.03
73	6978	0.4	344	6976.16	90.21	-0.56	-90.21	0.21
74	7073	0.3	325.8	7071.16	90.73	-0.8	-90.74	0.16
75	7168	0.5	334.5	7166.15	91.31	-1.11	-91.32	0.22
76	7263	0.4	332.5	7261.15	91.98	-1.45	-91.99	0.11
77	7359	0.4	328.4	7357.15	92.56	-1.78	-92.57	0.03
78	7454	0.4	301.8	7452.15	93.02	-2.23	-93.03	0.19
79	7549	0.6	313.4	7547.14	93.54	-2.87	-93.55	0.23
80	7644	0.4	290.8	7642.14	94	-3.55	-94.02	0.29
81	7740	0.5	284.5	7738.14	94.22	-4.26	-94.25	0.12
82	7835	0.4	249.2	7833.13	94.21	-4.98	-94.24	0.3
83	7930	0.7	237.9	7928.13	93.78	-5.78	-93.81	0.33
84	8025	0.7	229.8	8023.12	93.1	-6.71	-93.14	0.1
85	8120	0.9	228	8118.11	92.22	-7.71	-92.27	0.21
86	8216	1	230	8214.1	91.18	-8.91	-91.24	0.11
87	8311	1	223.6	8309.09	90.05	-10.12	-90.11	0.12
88	8406	1.1	226	8404.07	88.81	-11.35	-88.88	0.11
89	8501	1.3	225.1	8499.05	87.42	-12.77	-87.5	0.21
90	8596	1.4	217.1	8594.02	85.73	-14.23	-85.82	0.22
91	8684	1.4	225.8	8682	84.13	-15.65	-84.22	0.24
92	8811	1.6	238.3	8808.95	82.11	-18.27	-82.23	0.3
93	8906	8.7	191.5	8903.53	74.36	-20.83	-74.5	8.1
94	9001	18.6	189.4	8995.73	52.32	-24.75	-52.48	10.43
95	9096	29.2	193.3	9082.47	14.71	-32.58	-14.92	11.28
96	9192	37.8	192.6	9162.45	-36.89	-44.41	36.6	8.97
97	9287	49.8	192.5	9230.89	-100.95	-58.66	100.57	12.63
98	9382	62.3	193.1	9283.84	-177.64	-76.12	177.14	13.17
99	9477	72.7	187.8	9320.17	-263.82	-91.85	263.22	12.1
100	9572	82.2	178.6	9340.83	-356.2	-96.88	355.57	13.75
101	9667	89	174.8	9348.11	-450.69	-91.42	450.09	8.19
102	9762	90.5	173.5	9348.53	-545.19	-81.74	544.65	2.09
103	9858	89.9	175.2	9348.19	-640.72	-72.29	640.24	1.88
104	9953	90.9	176.1	9347.53	-735.44	-65.08	735	1.42
105	10048	90.9	177.9	9346.04	-830.29	-60.11	829.89	1.89
106	10143	91.1	179.3	9344.38	-925.25	-57.79	924.86	1.49
107	10238	88.8	176.7	9344.46	-1020.18	-54.47	1019.8	3.65
108	10334	88.3	174.7	9346.89	-1115.87	-47.28	1115.54	2.15
109	10429	88	178.5	9349.96	-1210.64	-41.65	1210.34	4.01

110	10524	88.9	178.8	9352.53	-1305.57	-39.41	1305.29	1
111	10619	90.9	178	9352.7	-1400.53	-36.76	1400.26	2.27
112	10714	92.2	176.9	9350.13	-1495.4	-32.53	1495.16	1.79
113	10810	88	177.8	9349.96	-1591.27	-28.1	1591.06	4.47
114	10905	87.3	178.1	9353.85	-1686.13	-24.7	1685.94	0.8
115	11000	87.9	177.1	9357.83	-1780.96	-20.73	1780.79	1.23
116	11095	88.7	176.6	9360.65	-1875.78	-15.51	1875.64	0.99
117	11190	89.1	176.7	9362.47	-1970.6	-9.96	1970.49	0.43
118	11286	90.2	175.9	9363.06	-2066.39	-3.76	2066.33	1.42
119	11381	91.3	175.2	9361.82	-2161.1	3.61	2161.08	1.37
120	11476	91.1	175.4	9359.83	-2255.76	11.39	2255.78	0.3
121	11571	89.5	178.3	9359.33	-2350.6	16.61	2350.66	3.49
122	11667	88.3	180.8	9361.17	-2446.57	17.36	2446.63	2.89
123	11762	88.8	181.2	9363.58	-2541.52	15.71	2541.57	0.67
124	11857	89.7	180.5	9364.82	-2636.5	14.3	2636.54	1.2
125	11952	88.5	180.3	9366.31	-2731.49	13.63	2731.52	1.28
126	12048	89.7	181.1	9367.82	-2827.47	12.46	2827.49	1.5
127	12143	88.7	181.2	9369.15	-2922.44	10.55	2922.44	1.06
128	12238	90.9	181.1	9369.48	-3017.41	8.65	3017.4	2.32
129	12333	92.1	180.2	9366.99	-3112.37	7.57	3112.35	1.58
130	12428	89.3	180.8	9365.83	-3207.35	6.74	3207.33	3.01
131	12523	90.9	180	9365.67	-3302.34	6.08	3302.31	1.88
132	12619	90.7	180	9364.32	-3398.33	6.08	3398.3	0.21
133	12712	88	180.8	9365.38	-3491.32	5.43	3491.28	3.03
134	12807	89.4	181.1	9367.53	-3586.28	3.85	3586.23	1.51
135	12902	88.8	181.9	9369.03	-3681.23	1.37	3681.16	1.05
136	12997	89.7	182.8	9370.27	-3776.14	-2.53	3776.04	1.34
137	13093	87.3	183.6	9372.78	-3871.95	-7.88	3871.82	2.64
138	13188	87.7	183.9	9376.93	-3966.66	-14.09	3966.48	0.53
139	13283	88.3	184	9380.24	-4061.37	-20.63	4061.15	0.64
140	13378	87.7	182.7	9383.56	-4156.15	-26.18	4155.89	1.51
141	13473	87.6	182.4	9387.45	-4250.98	-30.4	4250.69	0.33
142	13568	88.4	182.1	9390.77	-4345.84	-34.13	4345.53	0.9
143	13664	88.7	182.4	9393.2	-4441.74	-37.9	4441.4	0.44
144	13759	89.5	182.1	9394.69	-4536.65	-41.63	4536.29	0.9
145	13854	89.1	180.7	9395.85	-4631.61	-43.95	4631.23	1.53
146	13949	90.2	180.7	9396.43	-4726.6	-45.11	4726.21	1.16
147	14045	90.8	180.1	9395.59	-4822.6	-45.78	4822.2	0.88
148	14140	92.1	180.4	9393.19	-4917.56	-46.19	4917.16	1.4

149	14235	91	180.2	9390.62	-5012.53	-46.69	5012.12	1.18
150	14330	88.5	179.6	9391.03	-5107.52	-46.52	5107.11	2.71
151	14425	89.1	179.4	9393.02	-5202.49	-45.7	5202.09	0.67
152	14521	90.6	179.6	9393.28	-5298.49	-44.86	5298.09	1.58
153	14616	88.8	178.6	9393.77	-5393.47	-43.37	5393.07	2.17
154	14711	89.4	178.4	9395.27	-5488.42	-40.88	5488.04	0.67
155	14806	89	177.8	9396.59	-5583.36	-37.73	5583	0.76
156	14902	90.2	177.5	9397.26	-5679.28	-33.79	5678.94	1.29
157	14997	89.2	177.7	9397.76	-5774.19	-29.82	5773.88	1.07
158	15092	89.1	177.9	9399.17	-5869.11	-26.17	5868.82	0.24
159	15188	89.8	178.2	9400.09	-5965.05	-22.9	5964.78	0.79
160	15283	90.9	178.4	9399.51	-6060	-20.08	6059.75	1.18
161	15378	89.9	178.9	9398.85	-6154.97	-17.85	6154.73	1.18
162	15473	89.5	179.3	9399.34	-6249.96	-16.35	6249.72	0.6
163	15568	90.5	179.3	9399.34	-6344.95	-15.19	6344.72	1.05
164	15664	92.1	180	9397.17	-6440.92	-14.61	6440.69	1.82
165	15759	89.9	180	9395.51	-6535.9	-14.61	6535.67	2.32
166	15854	88.5	179.1	9396.83	-6630.89	-13.86	6630.66	1.75
167	15949	90.1	178.6	9398	-6725.86	-11.95	6725.64	1.76
168	16044	91.1	178.6	9397	-6820.82	-9.63	6820.62	1.05
169	16140	91.8	178.3	9394.57	-6916.75	-7.04	6916.56	0.79
170	16235	93.3	178	9390.34	-7011.61	-3.97	7011.44	1.61
171	16330	92.3	180	9385.7	-7106.47	-2.32	7106.31	2.35
172	16425	91.7	180.4	9382.39	-7201.41	-2.65	7201.25	0.76
173	16520	88.8	180.5	9381.97	-7296.4	-3.4	7296.23	3.05
174	16615	87.7	180.4	9384.87	-7391.35	-4.14	7391.17	1.16
175	16711	88.9	180.2	9387.72	-7487.31	-4.64	7487.12	1.27
176	16806	89.8	180.4	9388.8	-7582.3	-5.14	7582.11	0.97
177	16901	90.9	180.1	9388.22	-7677.29	-5.56	7677.1	1.2
178	16996	91.7	180.2	9386.06	-7772.27	-5.81	7772.07	0.85
179	17091	92.9	180.5	9382.25	-7867.19	-6.38	7866.98	1.3
180	17186	93.8	180.8	9376.7	-7962.02	-7.46	7961.8	1
181	17282	91.5	180.7	9372.26	-8057.9	-8.72	8057.68	2.4
182	17377	92	181.3	9369.36	-8152.84	-10.37	8152.61	0.82
183	17472	93.4	181.5	9364.89	-8247.71	-12.69	8247.45	1.49
184	17508	94.1	181.3	9362.53	-8283.62	-13.57	8283.36	2.02
185	17603	91.7	180.2	9357.73	-8378.48	-14.81	8378.21	2.78
186	17698	92.2	179.7	9354.49	-8473.42	-14.73	8473.15	0.74
187	17793	90.3	178.2	9352.42	-8568.38	-12.99	8568.12	2.55

188	17889	89.4	178.2	9352.67	-8664.33	-9.97	8664.08	0.94
189	17984	89.8	177.9	9353.34	-8759.27	-6.74	8759.05	0.53
190	18079	91.8	178.6	9352.01	-8854.21	-3.84	8854	2.23
191	18174	89.5	177.8	9350.93	-8949.15	-0.85	8948.96	2.56
192	18270	89	177	9352.19	-9045.04	3.5	9044.88	0.98
193	18365	88.6	176.7	9354.18	-9139.88	8.72	9139.75	0.53
194	18460	88.6	175.7	9356.5	-9234.64	15.01	9234.55	1.05
195	18556	90.6	177.6	9357.17	-9330.47	20.62	9330.4	2.87
196	18651	90.8	177.9	9356.01	-9425.39	24.35	9425.35	0.38
197	18746	90.6	178.2	9354.85	-9520.32	27.58	9520.3	0.38
198	18842	90.1	177.9	9354.26	-9616.27	30.85	9616.26	0.61
199	18937	89.8	178	9354.34	-9711.2	34.25	9711.22	0.33
200	19032	88.3	177	9355.92	-9806.1	38.39	9806.14	1.9
201	19128	88.4	177.8	9358.68	-9901.96	42.75	9902.03	0.84
202	19223	89.6	178.2	9360.34	-9996.88	46.06	9996.97	1.33
203	19318	92	180.8	9359.01	-10091.9	46.89	10091.95	3.72
204	19414	92	180.2	9355.66	-10187.8	46.05	10187.88	0.62
205	19509	93.1	180	9351.44	-10282.7	45.89	10282.78	1.18
206	19604	90.9	181.4	9348.12	-10377.6	44.73	10377.7	2.74
207	19699	93.4	182.3	9344.56	-10472.5	41.66	10472.55	2.8
208	19794	93.8	183	9338.59	-10567.2	37.28	10567.23	0.85
209	19889	95.6	183.6	9330.81	-10661.7	31.83	10661.71	2
210	19931	95.1	183.4	9326.89	-10703.5	29.28	10703.43	1.28
PTB	19992	95.1	183.4	9321.47	-10764.1	25.67	10764.06	0