



MWD SURVEY CERTIFICATION
Legacy Directional Drilling, LLC.

NM OIL CONSERVATION
ARTESIA DISTRICT

FEB 20 2018

RECEIVED

State Of New Mexico

County Of Eddy

I, Mark L. Miller certify that; I am employed by Legacy Directional Drilling, LLC.;
that I did on the day(s) of October 13, 2017 through October 27, 2017 conduct
or supervise the taking of a MWD survey from a depth of 26 feet to a depth of
15,117 feet; that the data is true, correct, complete and within the limitations of the
tool set forth by Legacy Directional Drilling, LLC.; that I am authorized and qualified to make this report;
that this survey was conducted at the request of Devon Energy Production Co. for the
Cotton Draw Unit 513H Well, A.P.I. No. 30-015-44199 in
Paduca/Bone Spring Field and that I have reviewed this report and find that
it conforms to the principles and procedures set forth by Legacy Directional Drilling, LLC.

Surveyor's Signature

MLWD Technical Director

Title



Directional Survey Report

Company Name: DEVON ENERGY
Well Name: COTTON DRAW UNIT 513H
Field: PADUCA / BONE SPRING
Rig ID: ICD 217

State/Prov: NEW MEXICO
County: EDDY
Location: SEC 25 T24S R31E
API/UWI: 30015441990000

Survey Company: LEGACY DIRECTIONAL
Job Number: LF170044
Latitude: 32.181721
Longitude: -103.728931

Proposed Azimuth: 0
Declination: 6.67
North Reference: Grid
KB: 3539.6

Srv	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	CL	CD	CA	Temp
TieIn	0	0	0	0	0	0	0	0	0	0	90	0
1	26	0	359.68	26	0	0	0	0	26	0	90	0
2	135	0.30	24.76	135.00	0.26	0.12	0.26	0.28	109	0.29	24.76	72
3	230	0.50	241.73	230.00	0.29	-0.14	0.29	0.80	95	0.32	333.90	72
4	323	0.40	187.73	323.00	-0.21	-0.60	-0.21	0.38	93	0.63	250.40	72
5	417	0.60	221.73	416.99	-1.02	-1.13	-1.02	0.49	94	1.52	228.18	72
6	512	0.60	183.73	511.98	-2.01	-1.61	-2.01	0.52	95	2.57	218.71	72
7	575	0.60	185.73	574.98	-2.86	-1.68	-2.66	0	63	3.14	211.97	72
8	606	0.40	180.73	605.98	-2.93	-1.70	-2.93	0.66	31	3.39	210.09	72
9	637	0.60	162.73	636.98	-3.19	-1.67	-3.19	1.00	31	3.60	207.62	72
10	669	0.40	179.73	668.98	-3.46	-1.62	-3.46	0.77	32	3.82	205.07	72
11	700	0.60	200.73	699.98	-3.72	-1.68	-3.72	0.86	31	4.08	204.25	0
12	790	0.73	159.57	789.97	-4.70	-1.64	-4.70	0.54	90	4.98	199.27	0
13	883	0.77	161.58	882.96	-5.85	-1.24	-5.85	0.05	93	5.98	191.97	84.90
14	978	0.98	184.17	975.95	-7.16	-0.70	-7.16	0.26	93	7.19	185.55	84.90
15	1069	1.12	126.35	1,068.94	-8.41	0.38	-8.41	0.56	93	8.42	177.40	84.90
16	1163	1.30	115.51	1,162.92	-9.42	2.08	-9.42	0.31	94	9.65	167.52	92
17	1256	0.63	93.82	1,255.90	-9.91	3.55	-9.91	0.81	93	10.52	160.30	99
18	1348	0.86	54.90	1,347.89	-9.55	4.61	-9.55	0.58	92	10.60	154.23	99.10
19	1440	0.80	45.05	1,439.89	-8.70	5.62	-8.70	0.16	92	10.36	147.13	99.10
20	1532	0.28	46.71	1,531.88	-8.09	6.24	-8.09	0.57	92	10.22	142.36	99.10
21	1625	0.18	337.66	1,624.88	-7.80	6.35	-7.80	0.29	93	10.06	140.86	106.30
22	1718	0.39	1.01	1,717.88	-7.35	6.30	-7.35	0.25	93	9.68	139.40	106.30
23	1813	0.58	350.67	1,812.88	-6.55	6.23	-6.55	0.22	95	9.04	136.45	113.40
24	1909	0.32	344.01	1,908.87	-5.82	6.08	-5.82	0.28	96	8.41	133.75	113.40
25	2004	0.66	342.71	2,003.87	-5.04	5.84	-5.04	0.36	95	7.71	130.78	113.40
26	2099	0.87	1.07	2,098.86	-3.79	5.89	-3.79	0.34	95	6.84	123.69	120.60
27	2193	0.74	352.52	2,192.85	-2.48	5.63	-2.48	0.19	94	6.15	113.79	113.40
28	2288	0.61	336.19	2,287.84	-1.41	5.34	-1.41	0.25	95	5.52	104.81	120.60
29	2383	0.49	358.74	2,382.84	-0.54	5.12	-0.54	0.26	95	5.15	96.08	120.60
30	2479	0.54	21.64	2,478.84	0.29	5.28	0.29	0.22	96	5.28	86.90	120.60
31	2573	0.42	23.88	2,572.83	1.01	5.58	1.01	0.13	94	5.67	79.71	127.70
32	2669	0.25	27.99	2,668.83	1.52	5.82	1.52	0.18	96	6.01	75.37	120.60
33	2764	0.04	189.96	2,763.83	1.67	5.91	1.67	0.30	95	6.14	74.22	127.70

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	CL	CD	CA	Temp
34	2859	0.62	117.64	2,858.83	1.40	6.36	1.40	0.64	95	6.51	77.60	127.70
35	2964	0.70	57.36	2,963.82	1.47	7.30	1.47	0.70	95	7.45	78.60	134.90
36	3049	1.67	117.59	3,048.81	1.15	9.02	1.15	1.53	95	9.09	82.76	134.90
37	3144	2.58	118.17	3,143.74	-0.51	12.13	-0.51	0.96	95	12.14	92.39	134.90
38	3239	3.23	102.99	3,238.62	-2.12	16.62	-2.12	1.05	95	16.76	97.26	134.90
39	3334	3.50	101.42	3,333.45	-3.29	22.07	-3.29	0.30	95	22.32	98.48	127.70
40	3429	2.34	118.08	3,428.33	-4.78	26.63	-4.78	1.50	95	27.05	100.18	134.90
41	3524	2.66	121.64	3,523.24	-6.85	30.22	-6.85	0.37	95	30.98	102.77	142
42	3619	3.46	110.18	3,618.11	-8.99	34.78	-8.99	1.06	95	35.93	104.50	142
43	3714	3.96	102.59	3,712.91	-10.70	40.68	-10.70	0.74	95	42.06	104.74	134.90
44	3809	5.73	104.45	3,807.56	-12.60	48.47	-12.60	1.87	95	50.08	104.57	134.90
45	3904	8.10	105.47	3,901.87	-15.57	59.51	-15.57	2.50	95	61.52	104.66	127.70
46	3999	9.02	102.25	3,995.81	-18.93	73.24	-18.93	1.09	95	75.65	104.49	134.90
47	4094	9.83	101.28	4,089.52	-22.09	88.47	-22.09	0.87	95	91.19	104.02	134.90
48	4189	9.33	100.34	4,183.20	-25.06	104.06	-25.06	0.55	95	106.96	103.55	127.70
49	4284	8.32	107.36	4,277.08	-28.49	118.14	-28.49	1.55	95	121.53	103.56	134.90
50	4321	8.08	109.03	4,313.70	-30.14	123.15	-30.14	0.91	37	126.79	103.75	134.90
51	4400	8.09	107.01	4,391.91	-33.58	133.72	-33.58	0.36	79	137.87	104.10	102
52	4475	8.44	99.95	4,466.14	-36.07	144.19	-36.07	1.43	75	148.63	104.05	106.30
53	4570	9.20	95.42	4,560.01	-37.99	159.61	-37.99	1.08	95	163.10	103.47	106.30
54	4665	11.46	95.19	4,653.47	-39.56	176.57	-39.56	2.38	95	179.98	102.70	106.30
55	4760	11.91	96.09	4,746.50	-41.29	194.74	-41.29	0.47	95	199.07	101.97	106.30
56	4854	10.92	94.86	4,838.64	-42.90	213.27	-42.90	1.05	94	217.94	101.37	113.40
57	4949	11.01	95.37	4,931.90	-44.51	231.27	-44.51	0.14	95	235.51	100.90	113.40
58	5044	9.42	97.71	5,025.39	-46.41	249.01	-46.41	1.73	95	252.31	100.60	113.40
59	5139	10.16	98.26	5,119.01	-48.65	264.00	-48.65	0.79	95	268.45	100.44	113.40
60	5233	10.97	97.17	5,211.42	-50.96	281.08	-50.96	0.89	94	285.66	100.28	113.40
61	5328	10.21	94.39	5,304.80	-52.73	298.44	-52.73	0.96	95	303.07	100.02	120.60
62	5423	8.24	99.23	5,398.57	-54.47	313.56	-54.47	2.23	95	318.26	99.85	113.40
63	5519	8.17	98.24	5,493.58	-56.55	327.10	-56.55	0.16	96	331.95	99.81	120.60
64	5614	9.43	96.93	5,587.46	-58.46	341.51	-58.46	1.34	95	346.48	99.71	120.60
65	5709	9.27	94.24	5,681.20	-59.96	356.88	-59.96	0.49	95	361.87	99.54	120.60
66	5804	9.76	99.11	5,774.90	-61.80	372.45	-61.80	0.99	95	377.94	99.42	120.60
67	5899	10.53	99.94	5,868.44	-64.55	388.79	-64.55	0.62	95	394.11	99.43	120.60
68	5995	10.17	97.61	5,962.91	-67.16	405.67	-67.16	0.46	96	411.19	99.40	120.60
69	6090	9.03	96.44	6,056.58	-69.10	421.39	-69.10	1.22	95	427.02	99.31	127.70
70	6185	9.11	104.74	6,150.39	-71.85	436.07	-71.85	1.38	95	441.95	99.36	127.70
71	6280	10.73	108.07	6,243.97	-76.51	451.75	-76.51	1.81	95	458.18	99.61	127.70
72	6375	10.17	102.87	6,337.39	-81.12	468.34	-81.12	1.15	95	475.31	99.83	127.70
73	6471	9.22	105.46	6,432.02	-85.06	484.01	-85.06	1.09	96	491.43	99.97	127.70
74	6566	9.88	100.23	6,525.71	-88.54	499.37	-88.54	1.15	95	507.16	100.05	127.70
75	6661	11.07	97.92	6,619.12	-91.24	516.42	-91.24	1.33	95	524.42	100.02	127.70
76	6756	9.26	97.38	6,712.63	-93.48	533.04	-93.48	1.91	95	541.17	99.95	127.70
77	6851	9.14	100.68	6,806.41	-95.86	548.03	-95.86	0.57	95	556.35	99.92	127.70
78	6946	8.39	101.24	6,900.30	-98.61	562.24	-98.61	0.79	95	570.83	99.95	127.70

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	CL	CD	CA	Temp
79	7041	8.54	102.43	6,994.26	-101.48	575.93	-101.48	0.24	95	584.80	99.99	134.90
80	7136	10.01	103.01	7,088.02	-104.85	590.86	-104.85	1.55	95	600.10	100.06	134.90
81	7231	8.83	103.91	7,181.73	-108.47	605.99	-108.47	1.25	95	615.62	100.15	103.90
82	7326	10.08	104.19	7,275.44	-112.26	621.13	-112.26	1.32	95	631.49	100.24	127.70
83	7421	11.28	102.01	7,368.80	-116.23	638.27	-116.23	1.33	95	648.77	100.32	134.90
84	7516	11.03	97.20	7,462.00	-119.30	656.38	-119.30	1.01	95	667.13	100.30	134.90
85	7611	7.70	98.79	7,555.72	-121.41	671.69	-121.41	3.52	95	682.57	100.25	127.70
86	7706	8.04	97.65	7,649.83	-123.27	684.56	-123.27	0.39	95	695.57	100.21	127.70
87	7801	9.90	101.56	7,743.66	-125.79	699.15	-125.79	2.06	95	710.38	100.20	127.70
88	7895	10.58	104.93	7,836.17	-129.63	715.40	-129.63	0.96	94	727.06	100.27	134.90
89	7990	10.14	101.58	7,929.62	-133.56	732.02	-133.56	0.79	95	744.11	100.34	134.90
90	8085	8.99	100.40	8,023.30	-136.58	747.52	-136.58	1.23	95	759.89	100.35	134.90
91	8180	8.08	98.10	8,117.24	-138.86	761.43	-138.86	1.02	95	773.99	100.34	134.90
92	8275	8.96	101.04	8,211.19	-141.22	776.30	-141.22	1.03	95	788.06	100.32	134.90
93	8370	8.67	103.15	8,305.07	-144.28	789.53	-144.28	0.46	95	802.60	100.35	134.90
94	8465	7.91	99.61	8,399.08	-146.98	802.95	-146.98	0.96	95	816.29	100.37	134.90
95	8559	5.92	99.43	8,492.39	-148.86	814.11	-148.86	2.12	94	827.61	100.36	134.90
96	8654	4.82	104.63	8,586.97	-150.67	822.81	-150.67	1.26	95	836.49	100.38	134.90
97	8748	4.72	107.93	8,680.65	-152.86	830.31	-152.86	0.31	94	844.26	100.43	134.90
98	8844	3.83	102.26	8,776.38	-154.75	837.20	-154.75	1.03	96	851.38	100.47	134.90
99	8939	4.03	106.96	8,871.16	-156.40	843.49	-156.40	0.40	95	857.87	100.50	134.90
100	9034	3.48	87.05	8,965.96	-157.23	849.56	-157.23	1.48	95	863.99	100.48	134.90
101	9129	2.92	72.86	9,060.81	-158.38	854.76	-158.38	1.02	95	868.94	100.37	134.90
102	9225	3.64	67.24	9,156.65	-164.46	859.90	-164.46	0.82	96	873.67	100.18	134.90
103	9320	3.01	65.27	9,251.49	-162.25	864.95	-162.25	0.67	95	878.25	99.98	142
104	9415	2.46	60.14	9,346.38	-160.20	868.98	-160.20	0.63	95	881.87	99.81	142
105	9509	3.29	100.42	9,440.27	-149.68	873.39	-149.68	2.26	94	886.12	99.72	142
106	9604	4.75	112.83	9,535.04	-151.70	879.69	-151.70	1.78	95	892.68	99.78	142
107	9699	4.07	116.33	9,629.76	-154.72	886.34	-154.72	0.77	95	899.74	99.90	142
108	9712	4.26	118.64	9,642.72	-155.16	887.18	-155.16	1.95	13	900.64	99.92	142
109	9799	5.25	103.03	9,729.43	-157.60	893.89	-157.60	1.86	87	907.66	100.00	134.90
110	9894	14.15	66.28	9,823.04	-163.90	908.80	-163.90	10.97	95	921.74	99.61	134.90
111	9989	28.33	51.19	9,911.42	-134.99	937.16	-134.99	15.88	95	946.83	98.20	134.90
112	10085	37.74	32.58	9,992.02	-95.77	970.89	-95.77	14.32	96	975.80	95.63	-9999
113	10180	48.14	21.99	10,061.56	-38.24	998.91	-38.24	13.29	95	1,000.64	92.19	-9999
114	10275	59.94	19.08	10,117.26	33.68	1,026.69	33.68	12.66	95	1,027.25	88.12	142
115	10370	70.31	18.50	10,157.16	115.17	1,054.40	115.17	10.93	95	1,060.67	83.77	-9999
116	10465	77.35	13.92	10,183.62	202.72	1,079.78	202.72	8.74	95	1,098.65	79.37	149.10
117	10559	79.58	7.68	10,202.43	293.14	1,097.01	293.14	6.92	94	1,135.50	75.04	149.10
118	10654	86.13	4.21	10,214.24	386.83	1,106.75	386.83	7.79	95	1,172.40	70.73	149.10
119	10674	86.97	4	10,215.45	406.75	1,108.18	406.75	4.33	20	1,180.46	69.54	-9999
120	10769	88.60	2.57	10,219.12	501.51	1,113.62	501.51	2.28	95	1,221.33	65.76	142
121	10864	87.45	0.75	10,222.39	596.41	1,116.37	596.41	2.27	95	1,285.89	61.88	142
122	10961	85.88	359.56	10,228.04	693.24	1,116.63	693.24	2.03	97	1,314.32	58.17	149.10
123	11056	84.81	359.99	10,235.75	787.93	1,116.26	787.93	1.21	95	1,366.33	54.78	149.10

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	CL	CD	CA	Temp
124	11150	85.96	359.50	10,243.31	881.62	1,115.84	881.62	1.33	94	1,422.09	51.69	149.10
125	11245	87.76	358.30	10,248.51	976.45	1,114.02	976.45	2.28	95	1,481.38	48.76	149.10
126	11340	93.14	359.90	10,247.77	1,071.40	1,112.53	1,071.40	5.91	95	1,544.54	46.08	149.10
127	11435	91.15	0.01	10,244.21	1,166.33	1,112.45	1,166.33	2.10	95	1,611.79	43.65	149.10
128	11530	89.80	0.41	10,243.42	1,261.32	1,112.80	1,261.32	1.48	95	1,682.04	41.42	156.30
129	11624	90.73	1.33	10,242.99	1,355.31	1,114.23	1,355.31	1.39	94	1,754.53	39.42	156.30
130	11719	88.85	1.52	10,243.34	1,450.27	1,116.59	1,450.27	1.99	95	1,830.32	37.59	156.30
131	11814	87.22	0.99	10,246.59	1,545.19	1,118.67	1,545.19	1.80	95	1,907.63	35.90	-9999
132	11906	88.04	1.91	10,250.40	1,637.08	1,120.99	1,637.08	1.34	92	1,984.10	34.40	156.30
133	12005	88.15	1.01	10,253.89	1,735.99	1,123.52	1,735.99	0.92	99	2,067.84	32.91	149.10
134	12099	88.21	2.80	10,256.68	1,829.89	1,126.64	1,829.89	1.90	94	2,148.81	31.62	149.10
135	12194	86.07	3.54	10,259.76	1,924.69	1,131.89	1,924.69	0.79	95	2,232.85	30.46	-9999
136	12288	88.04	3.46	10,262.95	2,018.47	1,137.62	2,018.47	0.09	94	2,316.98	29.41	-9999
137	12383	88.32	1.93	10,265.97	2,113.31	1,142.09	2,113.31	1.64	95	2,402.17	28.39	145
138	12478	88.41	0.08	10,267.85	2,208.27	1,143.75	2,208.27	2.26	95	2,486.89	27.38	-9999
139	12573	90.50	357.94	10,267.92	2,303.25	1,142.11	2,303.25	2.53	95	2,570.87	26.38	-9999
140	12668	90.67	357.66	10,266.95	2,398.17	1,138.47	2,398.17	0.34	95	2,654.68	25.39	-9999
141	12763	90.56	358.66	10,265.93	2,493.12	1,135.42	2,493.12	1.06	95	2,739.49	24.49	-9999
142	12858	91.32	358.98	10,264.38	2,588.08	1,133.46	2,588.08	0.87	95	2,825.41	23.65	-9999
143	12953	90.45	358.24	10,262.91	2,683.04	1,131.16	2,683.04	1.20	95	2,911.74	22.86	156.30
144	13048	88.92	359.78	10,262.60	2,778.03	1,128.51	2,778.03	1.71	95	2,998.87	22.13	156.30
145	13143	91.40	1.49	10,261.51	2,873.01	1,130.57	2,873.01	2.38	95	3,087.45	21.48	156.30
146	13237	89.02	0.79	10,261.16	2,966.98	1,132.44	2,966.98	2.64	94	3,175.75	20.89	156.30
147	13332	88.88	0.23	10,262.90	3,061.96	1,133.28	3,061.96	0.61	95	3,264.96	20.31	156.30
148	13427	88.52	359.92	10,265.06	3,156.94	1,133.41	3,156.94	0.50	95	3,354.29	19.75	163.40
149	13522	88.88	359.27	10,267.21	3,251.91	1,132.74	3,251.91	0.78	95	3,443.54	19.20	163.40
150	13617	89.80	359.08	10,268.31	3,346.89	1,131.37	3,346.89	0.99	95	3,532.94	18.68	163.40
151	13712	91.48	358.80	10,267.25	3,441.87	1,129.61	3,441.87	1.79	95	3,622.49	18.17	-9999
152	13807	92.33	358.68	10,264.09	3,536.79	1,127.52	3,536.79	0.90	95	3,712.17	17.68	-9999
153	13902	90.42	359.55	10,261.81	3,631.75	1,126.06	3,631.75	2.21	95	3,802.31	17.23	-9999
154	13997	90.48	359.96	10,261.06	3,726.74	1,125.65	3,726.74	0.44	95	3,893.05	16.81	-9999
155	14092	90.70	0.14	10,260.09	3,821.74	1,125.73	3,821.74	0.30	95	3,984.09	16.41	163.40
156	14187	90	0.78	10,259.51	3,916.73	1,126.50	3,916.73	1.00	95	4,075.61	16.05	-9999
157	14282	90.25	0.81	10,259.30	4,011.72	1,127.81	4,011.72	0.27	95	4,167.24	15.70	170.60
158	14377	91.15	0.46	10,258.14	4,106.71	1,128.87	4,106.71	1.02	95	4,259.04	15.37	170.60
159	14473	91.40	0.43	10,256.00	4,202.68	1,129.61	4,202.68	0.26	96	4,351.84	15.04	170.60
160	14568	91.09	1.53	10,253.94	4,297.64	1,131.24	4,297.64	1.20	95	4,444.03	14.75	170.60
161	14663	90.92	1.12	10,252.27	4,392.60	1,133.43	4,392.60	0.47	95	4,536.48	14.47	170.60
162	14758	91.79	0.70	10,250.02	4,487.56	1,134.94	4,487.56	1.02	95	4,628.86	14.19	170.60
163	14853	92.52	1.21	10,248.45	4,582.48	1,136.52	4,582.48	0.94	95	4,721.32	13.93	170.60
164	14948	91.76	1.60	10,242.90	4,677.39	1,138.85	4,677.39	0.90	95	4,814.03	13.68	-9999
165	15043	91.68	2.23	10,240.05	4,772.29	1,142.02	4,772.29	0.67	95	4,907.03	13.46	170.60
PTB	15117	91.68	2.23	10,237.88	4,866.20	1,144.90	4,866.20	0	74	4,979.61	13.29	0