



DrilTech, LLC

MWD Survey Report

Job No: DM-2017-028-SED-T-NM

Operator: **Steward Energy II, LLC**
Well Name: **Pinkman Fee 4H**
Location: **Lea County, NM**
Rig: **McVay 5**
Directional Drilling Co: **DrilTech, LLC**
Well API #: **30-025-43592**
Tie Into: **VES Survey International**
Tie-In Date: **4/5/2017**
Date Completed:

Reference Coordinates: LAT:

33	°	5	'	45.1200	"	N
103	°	4	'	30.3300	"	W

LON:
Reference Grid Coordinates: X: 926679.70 (ft)
Y: 764725.80 (ft)

Reference Grid: **NAD 83**
Zone: **New Mexico Eastern Zone**
(UTM or Lambert): **UTM**

Survey Vertical Reference: 18.50 (ft) Rotary Table to Ground Level
Elevation: 3763.00 (ft) Ground Level to Mean Sea Level
Vertical Section Plane: 359.50 (deg)

North Alignment: **Grid North**

<u>Magnetic Data</u>	<u>Section 1</u>	<u>Section 2</u>	<u>Section 3</u>	<u>Section 4</u>
Magnetic Declination (deg)	6.80			
Grid (deg)	-0.69			
TOTAL CORRECTION (deg)	6.11			
Depth Start (MD Ft)	2358.60			
Depth End (MD Ft)				

REMARKS:

DRILTECH MWD SURVEY REPORT



Company: Steward Energy II, LLC
Well: Pinkman Fee 4H
Location: Lea County, NM
Rig: McVay 5

Job Number: DM-2017-028-SED-T-NM
Vertical Section Plane: 359.5
Well API Number: 30-025-43592
Tie Into: VES Survey International

All Azimuths Corrected To: **Grid North**

Calculation Method: Minimum Curvature

Survey #	Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N(+) / S(-) (ft)	E(+)/W(-) (ft)	Closure Distance (ft)	Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
Tie In	GYRO	2358.60	0.85	182.32	0.00	2358.55	-8.59	-8.59	-1.34	8.69	188.88	0.00	0.00	0.00
1	MWD	2455.00	0.53	202.28	96	2454.94	-9.70	-9.72	-1.54	9.84	188.99	0.41	-0.33	20.71
2	MWD	2549.00	0.26	203.60	94	2548.94	-10.30	-10.31	-1.79	10.47	189.84	0.29	-0.29	1.40
3	MWD	2643.00	1.23	216.70	94	2642.93	-11.30	-11.32	-2.48	11.59	192.34	1.04	1.03	13.94
4	MWD	2738.00	0.44	217.31	95	2737.92	-12.40	-12.43	-3.31	12.86	194.90	0.83	-0.83	0.64
5	MWD	2832.00	0.53	247.63	94	2831.92	-12.84	-12.88	-3.93	13.46	196.96	0.29	0.10	32.26
6	MWD	2926.00	0.35	275.06	94	2925.91	-12.98	-13.02	-4.62	13.81	199.52	0.29	-0.19	29.18
7	MWD	3021.00	0.79	211.07	95	3020.91	-13.51	-13.55	-5.24	14.53	201.15	0.75	0.46	-67.36
8	MWD	3114.00	0.09	13.93	93	3113.91	-13.98	-14.03	-5.56	15.09	201.60	0.94	-0.75	-211.98
9	MWD	3209.00	0.44	170.47	95	3208.91	-14.27	-14.32	-5.48	15.33	200.93	0.55	0.37	164.78
10	MWD	3303.00	0.79	155.70	94	3302.90	-15.22	-15.27	-5.15	16.11	198.65	0.41	0.37	-15.71
11	MWD	3396.00	0.35	322.43	93	3395.90	-15.58	-15.63	-5.06	16.43	197.95	1.22	-0.47	179.28
12	MWD	3489.00	0.35	304.94	93	3488.90	-15.19	-15.24	-5.47	16.19	199.74	0.11	0.00	-18.81
13	MWD	3583.00	0.44	352.22	94	3582.90	-14.67	-14.72	-5.75	15.80	201.35	0.35	0.10	50.30
14	MWD	3677.00	0.53	326.65	94	3676.89	-13.94	-14.00	-6.04	15.24	203.34	0.25	0.10	-27.20
15	MWD	3771.00	0.35	311.62	94	3770.89	-13.38	-13.44	-6.49	14.93	205.78	0.23	-0.19	-15.99
16	MWD	3866.00	0.62	304.50	95	3865.89	-12.90	-12.96	-7.13	14.79	208.83	0.29	0.28	-7.49
17	MWD	3960.00	0.53	358.64	94	3959.88	-12.17	-12.24	-7.56	14.38	211.72	0.56	-0.10	57.60
18	MWD	4054.00	0.44	336.93	94	4053.88	-11.40	-11.47	-7.71	13.82	213.93	0.22	-0.10	-23.10
19	MWD	4148.00	0.53	7.96	94	4147.88	-10.64	-10.71	-7.80	13.24	216.06	0.29	0.10	-349.97
20	MWD	4243.00	0.26	8.66	95	4242.87	-9.99	-10.06	-7.70	12.67	217.45	0.28	-0.28	0.74
21	MWD	4336.00	0.44	320.76	93	4335.87	-9.50	-9.57	-7.90	12.41	219.52	0.35	0.19	335.59
22	MWD	4424.00	0.79	338.69	88	4423.87	-8.67	-8.75	-8.33	12.08	223.61	0.45	0.40	20.38
23	MWD	4487.00	3.78	357.23	63	4486.81	-6.19	-6.27	-8.59	10.63	233.89	4.83	4.75	29.43
24	MWD	4552.00	6.68	10.59	65	4551.53	-0.34	-0.41	-8.00	8.01	267.08	4.81	4.46	-533.29
25	MWD	4644.00	6.24	13.67	92	4642.95	9.76	9.71	-5.83	11.33	-30.99	0.61	-0.48	3.35
26	MWD	4738.00	5.80	13.05	94	4736.43	19.33	19.30	-3.55	19.62	-10.43	0.47	-0.47	-0.66
27	MWD	4832.00	5.36	13.76	94	4829.99	28.20	28.19	-1.44	28.23	-2.92	0.47	-0.47	0.76
28	MWD	4864.00	7.21	11.21	32	4861.79	31.62	31.61	-0.69	31.62	-1.25	5.85	5.78	-7.97
29	MWD	4895.00	10.29	9.10	31	4892.43	36.25	36.26	0.13	36.26	0.20	9.99	9.94	-6.81
30	MWD	4927.00	13.01	8.40	32	4923.77	42.63	42.64	1.10	42.66	1.48	8.51	8.50	-2.19
31	MWD	4958.00	15.83	7.69	31	4953.79	50.27	50.29	2.18	50.33	2.48	9.11	9.10	-2.29
32	MWD	4989.00	18.64	6.37	31	4983.39	59.37	59.40	3.30	59.49	3.18	9.15	9.06	-4.26



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33	MWD	5020.00	21.63	5.93	31	5012.49	69.97	70.01	4.44	70.15	3.63	9.66	9.65	-1.42
34	MWD	5052.00	25.06	5.58	32	5041.87	82.57	82.63	5.71	82.82	3.95	10.73	10.72	-1.09
35	MWD	5083.00	27.87	5.58	31	5069.62	96.31	96.38	7.05	96.63	4.18	9.06	9.06	0.00
36	MWD	5114.00	31.04	6.20	31	5096.61	111.46	111.54	8.62	111.87	4.42	10.27	10.23	2.00
37	MWD	5146.00	34.91	6.11	32	5123.45	128.75	128.85	10.48	129.27	4.65	12.09	12.09	-0.28
38	MWD	5177.00	38.69	5.58	31	5148.27	147.21	147.32	12.37	147.84	4.80	12.24	12.19	-1.71
39	MWD	5209.00	42.12	4.62	32	5172.63	167.85	167.98	14.21	168.58	4.83	10.89	10.72	-3.00
40	MWD	5240.00	45.90	4.00	31	5194.92	189.30	189.45	15.82	190.11	4.77	12.27	12.19	-2.00
41	MWD	5272.00	49.33	3.21	32	5216.49	212.88	213.04	17.30	213.74	4.64	10.87	10.72	-2.47
42	MWD	5304.00	52.32	2.77	32	5236.70	237.63	237.81	18.59	238.53	4.47	9.40	9.34	-1.38
43	MWD	5335.00	55.57	2.33	31	5254.94	262.66	262.84	19.71	263.58	4.29	10.55	10.48	-1.42
44	MWD	5367.00	58.92	2.07	32	5272.26	289.54	289.73	20.74	290.47	4.09	10.49	10.47	-0.81
45	MWD	5398.00	62.08	3.74	31	5287.52	316.46	316.67	22.11	317.44	3.99	11.22	10.19	5.39
46	MWD	5430.00	64.98	4.44	32	5301.78	345.01	345.24	24.16	346.08	4.00	9.27	9.06	2.19
47	MWD	5461.00	68.50	4.53	31	5314.02	373.38	373.63	26.38	374.56	4.04	11.36	11.35	0.29
48	MWD	5492.00	72.02	4.35	31	5324.49	402.45	402.71	28.64	403.73	4.07	11.37	11.35	-0.58
49	MWD	5524.00	75.36	3.30	32	5333.48	433.07	433.35	30.69	434.44	4.05	10.90	10.44	-3.28
50	MWD	5554.00	76.94	2.68	30	5340.66	462.14	462.44	32.21	463.56	3.98	5.64	5.27	-2.07
51	MWD	5585.00	79.05	2.24	31	5347.11	492.42	492.73	33.51	493.87	3.89	6.95	6.81	-1.42
52	MWD	5616.00	81.34	1.98	31	5352.38	522.93	523.26	34.63	524.40	3.79	7.43	7.39	-0.84
53	MWD	5648.00	83.10	2.42	32	5356.72	554.60	554.94	35.85	556.09	3.70	5.67	5.50	1.38
54	MWD	5667.00	84.68	2.86	19	5358.74	573.47	573.81	36.72	574.98	3.66	8.63	8.32	2.32
55	MWD	5699.00	87.67	2.07	32	5360.87	605.35	605.70	38.09	606.90	3.60	9.66	9.34	-2.47
56	MWD	5730.00	90.48	3.03	31	5361.37	636.30	636.66	39.47	637.89	3.55	9.58	9.06	3.10
57	MWD	5793.00	91.19	2.77	63	5360.45	699.18	699.58	42.66	700.88	3.49	1.20	1.13	-0.41
58	MWD	5887.00	90.48	3.39	94	5359.08	792.98	793.43	47.71	794.86	3.44	1.00	-0.76	0.66
59	MWD	5978.00	90.48	1.19	91	5358.32	883.87	884.35	51.35	885.84	3.32	2.42	0.00	-2.42
60	MWD	6071.00	89.78	1.80	93	5358.11	976.81	977.32	53.77	978.79	3.15	1.00	-0.75	0.66
61	MWD	6161.00	89.87	0.75	90	5358.39	1066.76	1067.29	55.77	1068.75	2.99	1.17	0.10	-1.17
62	MWD	6253.00	89.69	358.55	92	5358.74	1158.76	1159.28	55.21	1160.60	2.73	2.40	-0.20	388.91
63	MWD	6344.00	89.43	359.43	91	5359.44	1249.75	1250.27	53.61	1251.41	2.46	1.01	-0.29	0.97
64	MWD	6436.00	89.78	357.50	92	5360.07	1341.73	1342.23	51.14	1343.20	2.18	2.13	0.38	-2.10
65	MWD	6526.00	90.04	358.46	90	5360.21	1431.70	1432.17	47.97	1432.97	1.92	1.11	0.29	1.07
66	MWD	6618.00	90.13	358.73	92	5360.08	1523.68	1524.14	45.72	1524.83	1.72	0.31	0.10	0.29
67	MWD	6710.00	90.40	358.20	92	5359.65	1615.67	1616.11	43.25	1616.69	1.53	0.65	0.29	-0.58
68	MWD	6802.00	90.66	358.29	92	5358.80	1707.64	1708.06	40.43	1708.54	1.36	0.30	0.28	0.10



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 Vertical Section Plane: 359.5
 Well API Number: 30-025-43592
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All Azimuths
 Corrected To: **Grid North**

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Survey #	Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N(+) / S(-) (ft)	E(+)/W(-) (ft)	Closure Distance (ft)	Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
69	MWD	6896.00	90.66	358.55	94	5357.72	1801.62	1802.02	37.84	1802.42	1.20	0.28	0.00	0.28
70	MWD	6989.00	90.04	358.55	93	5357.15	1894.60	1894.99	35.49	1895.32	1.07	0.67	-0.67	0.00
71	MWD	7084.00	89.52	358.73	95	5357.52	1989.59	1989.96	33.23	1990.24	0.96	0.58	-0.55	0.19
72	MWD	7178.00	89.52	358.38	94	5358.30	2083.58	2083.92	30.86	2084.15	0.85	0.37	0.00	-0.37
73	MWD	7272.00	89.60	358.55	94	5359.02	2177.56	2177.89	28.35	2178.07	0.75	0.20	0.09	0.18
74	MWD	7366.00	89.52	358.64	94	5359.75	2271.54	2271.86	26.04	2272.01	0.66	0.13	-0.09	0.10
75	MWD	7461.00	89.25	358.02	95	5360.77	2366.52	2366.81	23.27	2366.92	0.56	0.71	-0.28	-0.65
76	MWD	7555.00	89.96	356.44	94	5361.41	2460.44	2460.69	18.73	2460.77	0.44	1.84	0.76	-1.68
77	MWD	7649.00	90.48	356.09	94	5361.05	2554.29	2554.49	12.61	2554.53	0.28	0.67	0.55	-0.37
78	MWD	7744.00	90.57	356.35	95	5360.18	2649.13	2649.28	6.34	2649.29	0.14	0.29	0.09	0.27
79	MWD	7839.00	90.22	357.15	95	5359.53	2744.01	2744.13	0.96	2744.13	0.02	0.92	-0.37	0.84
80	MWD	7933.00	89.69	358.29	94	5359.60	2837.97	2838.05	-2.78	2838.05	-0.06	1.34	-0.56	1.21
81	MWD	8027.00	90.57	359.43	94	5359.39	2931.96	2932.03	-4.65	2932.03	-0.09	1.53	0.94	1.21
82	MWD	8121.00	90.40	359.34	94	5358.59	3025.95	3026.02	-5.66	3026.03	-0.11	0.20	-0.18	-0.10
83	MWD	8216.00	90.66	359.78	95	5357.71	3120.95	3121.01	-6.39	3121.02	-0.12	0.54	0.27	0.46
84	MWD	8310.00	90.75	359.43	94	5356.56	3214.94	3215.00	-7.04	3215.01	-0.13	0.38	0.10	-0.37
85	MWD	8405.00	90.57	0.13	95	5355.46	3309.94	3310.00	-7.40	3310.00	-0.13	0.76	-0.19	-378.21
86	MWD	8499.00	90.75	359.78	94	5354.38	3403.93	3403.99	-7.48	3404.00	-0.13	0.42	0.19	382.61
87	MWD	8594.00	89.43	0.31	95	5354.23	3498.92	3498.99	-7.40	3499.00	-0.12	1.50	-1.39	-378.39
88	MWD	8688.00	89.52	0.57	94	5355.09	3592.90	3592.98	-6.68	3592.99	-0.11	0.29	0.10	0.28
89	MWD	8782.00	89.78	0.57	94	5355.67	3686.88	3686.97	-5.74	3686.98	-0.09	0.28	0.28	0.00
90	MWD	8876.00	88.37	359.87	94	5357.18	3780.86	3780.96	-5.38	3780.96	-0.08	1.67	-1.50	382.23
91	MWD	8970.00	89.08	359.17	94	5359.28	3874.84	3874.93	-6.17	3874.94	-0.09	1.06	0.76	-0.74
92	MWD	9065.00	90.92	358.90	95	5359.28	3969.83	3969.91	-7.77	3969.92	-0.11	1.96	1.94	-0.28
93	MWD	9159.00	91.19	358.90	94	5357.54	4063.81	4063.88	-9.57	4063.89	-0.13	0.29	0.29	0.00
94	MWD	9252.00	91.45	359.52	93	5355.40	4156.78	4156.85	-10.86	4156.86	-0.15	0.72	0.28	0.67
95	MWD	9346.00	89.43	359.78	94	5354.68	4250.77	4250.84	-11.43	4250.85	-0.15	2.17	-2.15	0.28
96	MWD	9441.00	89.52	0.22	95	5355.55	4345.77	4345.83	-11.43	4345.85	-0.15	0.47	0.09	-378.48
97	MWD	9535.00	90.40	0.57	94	5355.62	4439.75	4439.83	-10.78	4439.84	-0.14	1.01	0.94	0.37
98	MWD	9629.00	90.57	359.52	94	5354.82	4533.74	4533.82	-10.71	4533.84	-0.14	1.13	0.18	381.86
99	MWD	9723.00	90.48	359.61	94	5353.96	4627.74	4627.82	-11.42	4627.83	-0.14	0.14	-0.10	0.10
100	MWD	9818.00	89.08	0.13	95	5354.32	4722.74	4722.81	-11.64	4722.83	-0.14	1.57	-1.47	-378.40
101	MWD	9910.00	89.25	0.05	92	5355.67	4814.72	4814.80	-11.49	4814.82	-0.14	0.20	0.18	-0.09
102	MWD	10004.00	89.25	359.61	94	5356.90	4908.71	4908.79	-11.77	4908.81	-0.14	0.47	0.00	382.51
103	MWD	10099.00	90.57	359.34	95	5357.04	5003.71	5003.79	-12.64	5003.80	-0.14	1.42	1.39	-0.28
104	MWD	10193.00	91.36	359.25	94	5355.46	5097.69	5097.77	-13.80	5097.79	-0.16	0.85	0.84	-0.10



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105	MWD	10286.00	90.04	359.43	93	5354.33	5190.68	5190.75	-14.87	5190.77	-0.16	1.43	-1.42	0.19
106	MWD	10380.00	89.52	358.73	94	5354.69	5284.68	5284.74	-16.38	5284.76	-0.18	0.93	-0.55	-0.74
107	MWD	10474.00	89.69	358.90	94	5355.33	5378.67	5378.72	-18.32	5378.75	-0.20	0.26	0.18	0.18
108	MWD	10568.00	89.52	358.90	94	5355.98	5472.66	5472.70	-20.13	5472.73	-0.21	0.18	-0.18	0.00
109	MWD	10663.00	90.92	359.17	95	5355.62	5567.66	5567.68	-21.73	5567.72	-0.22	1.50	1.47	0.28
110	MWD	10739.00	91.01	358.02	76	5354.34	5643.64	5643.64	-23.59	5643.69	-0.24	1.52	0.12	-1.51
111	PTB	10804.00	91.01	358.02	65	5353.19	5708.60	5708.60	-25.84	5708.65	-0.26	0.00	0.00	0.00



DRILTECH MWD SURVEY REPORT

Company: Steward Energy II, LLC
Well: Pinkman Fee 4H
Location: Lea County, NM
Rig: McVay 5

Job Number: DM-2017-028-SED-T-NM
Vertical Section Plane: 359.5
Well API Number: 30-025-43592
Tie Into: VES Survey International

All Azimuths
Corrected To: **Grid North**

Calculation Method: Minimum Curvature

Survey #	Survey Tool Type	Survey Depth (ft)	Inclina- tion (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N(+) / S(-) (ft)	E(+)/W(-) (ft)	Closure Distance (ft)	Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
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Survey #	Survey Tool Type	Survey Depth (ft)	Inclina- tion (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N(+) / S(-) E(+)/W(-) (ft)	Distance (ft)	Closure Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
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