



State of New Mexico
County of Eddy

I, Donald Leone, certify that; I am employed by Accel Directional; that I did on the day(s) of February 6, 2017 through February 12, 2017 conduct or supervise the taking of MWD survey(s) from a depth of 430' feet to a depth of 4,855 ' feet; that the data is true, correct, complete and within the limitations of the tool set forth by Accel Directional; that I am authorized and qualified to make this report; that this report was conducted at the request of Lime Rock Resources for the Eagle 34K, Well No. Fed 77, API No. 30-015-43886 in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Accel Directional.

Donnie Leone

Donnie Leone
MWD Technician



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Limerock Resources										Target Information				VS Referenced to Offset from Surface			
WELL: Eagle 34K Federal 77										TARGET KBTVD:		4750.00 <th colspan="2">NORTH/SOUTH:</th> <td colspan="2">-633.00</td>		NORTH/SOUTH:		-633.00	
LOCATION: Artesia										TARGET INCL:		21.10 <th colspan="2">EAST/WEST:</th> <td colspan="2">-154.26</td>		EAST/WEST:		-154.26	
RIG: United 33										TARGET AZM:		193.70 <th colspan="4">(Enter 0' N and 0' E for Surface)</th>		(Enter 0' N and 0' E for Surface)			
JOB NUMBER: TX-17003																	
SURVEY COMPANY					DIRECTIONAL COMPANY					PROPOSED DIRECTION:		193.70 <th colspan="2">Dec / Total Corr.(+/-):</th> <td colspan="2">7.36</td>		Dec / Total Corr.(+/-):		7.36	
Accel Directional					Accel Directional					COMMENTS:							
Directional Drillers					COORDINATORS					API #30-016-43886							
Brian Dennis					Chris Shipp												
Limerock Resources					Eagle 34K Federal 77									Target Calculations			
		TRUE	TEMP	API	Course					Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	ABOVE (+)	RIGHT(+)
SVY	MD	INC	AZM	°F	Gamma	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	BELOW (-)	LEFT(-)
1	0	0.0	0.0	0		N/A	0.00	0.00	0.00		0.00	0.00	N/A	N/A			
1	453	0.2	330.8			453	453.00	0.69	-0.39	-0.58	0.79	330.80	0.04	0.04	454.50	4295.50	0.59
2	518	3.0	209.7			65	517.97	-0.69	-1.28	0.97	1.46	241.80	4.78	4.31	515.45	4234.55	1.13
3	582	5.7	211.6			64	581.78	-4.85	-3.78	5.61	6.15	217.92	4.22	4.22	567.25	4182.75	2.57
4	614	6.9	205.4			32	613.59	-7.94	-5.44	9.00	9.62	214.40	4.31	3.75	590.26	4159.74	3.45
5	645	7.1	202.7			31	644.36	-11.39	-6.97	12.72	13.36	211.48	1.24	0.65	611.39	4138.61	4.13
6	677	7.0	202.7			32	676.11	-15.01	-8.49	16.60	17.25	209.49	0.31	-0.31	633.10	4116.90	4.74
7	709	8.5	200.1			32	707.82	-19.03	-10.06	20.87	21.53	207.85	4.81	4.69	653.72	4096.28	5.31
8	742	9.1	198.1			33	740.43	-23.80	-11.70	25.90	26.53	206.18	2.04	1.82	673.31	4076.69	5.78
9	774	10.1	190.3			32	771.98	-28.97	-12.99	31.22	31.75	204.15	5.12	3.13	691.07	4058.93	5.81
10	806	10.2	188.6			32	803.48	-34.53	-13.92	36.85	37.23	201.95	0.99	0.31	707.99	4042.01	5.39
11	838	9.6	188.2			32	835.01	-39.98	-14.72	42.33	42.60	200.22	1.89	-1.88	725.32	4024.68	4.88
12	870	11.4	192.8			32	866.47	-45.70	-15.80	48.14	48.36	199.08	6.20	5.63	741.70	4008.30	4.58
13	902	11.7	192.3			32	897.82	-51.96	-17.20	54.55	54.73	198.31	0.99	0.94	756.45	3993.55	4.45
14	934	12.6	194.1			32	929.11	-58.51	-18.74	61.28	61.44	197.76	3.05	2.81	770.28	3979.72	4.39
15	965	12.7	193.0			31	959.35	-65.11	-20.33	68.07	68.21	197.34	0.84	0.32	782.94	3967.06	4.38
16	997	14.0	194.9			32	990.49	-72.28	-22.11	75.46	75.59	197.01	4.29	4.06	794.93	3955.07	4.41
17	1,029	14.1	196.1			32	1021.53	-79.76	-24.19	83.22	83.35	196.87	0.96	0.31	805.85	3944.15	4.66
18	1,061	15.6	196.9			32	1052.46	-87.63	-26.52	91.42	91.55	196.84	4.73	4.69	815.55	3934.45	5.06
19	1,093	15.9	194.8			32	1083.26	-95.98	-28.89	100.09	100.24	196.75	2.01	0.94	823.86	3926.14	5.39
20	1,125	18.3	194.7			32	1113.84	-105.08	-31.29	109.50	109.64	196.58	7.50	7.50	830.07	3919.93	5.56
21	1,157	19.2	194.8			32	1144.14	-115.03	-33.91	119.79	119.92	196.42	2.81	2.81	833.71	3916.29	5.75
22	1,189	21.0	196.3			32	1174.19	-125.62	-36.86	130.77	130.92	196.35	5.85	5.63	835.28	3914.72	6.11
23	1,221	21.7	196.0			32	1204.00	-136.81	-40.10	142.41	142.57	196.34	2.21	2.19	834.92	3915.08	6.61
24	1,253	21.3	196.1			32	1233.77	-148.08	-43.34	154.13	154.29	196.31	1.26	-1.25	834.33	3915.67	7.09
25	1,285	21.2	194.9			32	1263.60	-159.26	-46.44	165.72	165.89	196.26	1.39	-0.31	834.11	3915.89	7.45
26	1,317	20.7	190.9			32	1293.48	-170.40	-49.00	177.16	177.31	196.04	4.73	-1.56	834.37	3915.63	7.30
27	1,349	20.7	190.7			32	1323.42	-181.51	-51.12	188.46	188.57	195.73	0.22	0.00	835.02	3914.98	6.72
28	1,381	20.5	188.9			32	1353.37	-192.61	-53.04	199.69	199.77	195.40	2.08	-0.62	835.87	3914.13	5.96
29	1,414	20.4	189.5			33	1384.29	-203.99	-54.88	211.18	211.24	195.06	0.70	-0.30	837.00	3913.00	5.05
30	1,478	19.7	188.2			64	1444.41	-225.67	-58.26	233.04	233.06	194.48	1.30	-1.09	840.47	3909.53	3.20
31	1,541	19.4	186.4			63	1503.78	-246.57	-60.94	253.99	253.99	193.88	1.07	-0.48	845.55	3904.45	0.86
32	1,605	19.9	188.1			64	1564.05	-267.92	-63.66	275.37	275.38	193.37	1.19	0.78	850.40	3899.60	-1.56
33	1,674	21.4	192.2			69	1628.62	-291.85	-67.97	299.65	299.66	193.11	3.02	2.17	852.07	3897.93	-3.03
34	1,738	21.5	192.7			64	1688.19	-314.71	-73.02	323.05	323.07	193.06	0.33	0.16	850.99	3899.01	-3.54
35	1,802	21.6	192.0			64	1747.72	-337.67	-78.05	346.55	346.57	193.01	0.43	0.16	849.62	3900.38	-4.10
36	1,866	21.5	192.0			64	1807.24	-360.66	-82.94	370.05	370.08	192.95	0.16	-0.16	848.25	3901.75	-4.80
37	1,930	21.5	191.2			64	1866.79	-383.64	-87.65	393.49	393.53	192.87	0.46	0.00	847.05	3902.95	-5.66
38	1,994	21.6	192.5			64	1926.32	-406.65	-92.48	416.98	417.03	192.81	0.76	0.16	845.69	3904.31	-6.41
39	2,057	21.4	191.7			63	1984.93	-429.22	-97.32	440.06	440.12	192.78	0.56	-0.32	844.49	3905.51	-7.06
40	2,121	21.1	191.8			64	2044.58	-451.93	-102.04	463.24	463.31	192.72	0.47	-0.47	844.06	3905.94	-7.85
41	2,185	20.9	192.5			64	2104.33	-474.35	-106.87	486.17	486.24	192.70	0.50	-0.31	844.39	3905.61	-8.47
42	2,249	19.3	192.0			64	2164.43	-495.85	-111.54	508.16	508.24	192.68	2.51	-2.50	847.51	3902.49	-9.02
43	2,313	17.9	193.6			64	2225.09	-515.75	-116.05	528.56	528.65	192.68	2.33	-2.19	855.28	3894.72	-9.35
44	2,345	16.5	194.0			32	2255.65	-524.94	-118.31	538.03	538.11	192.70	4.39	-4.38	861.33	3888.67	-9.34
45	2,377	14.9	192.8			32	2286.46	-533.36	-120.32	546.68	546.77	192.71	5.10	-5.00	869.69	3880.31	-9.38
46	2,409	13.5	188.9			32	2317.48	-541.07	-121.81	554.52	554.61	192.69	5.30	-4.38	880.41	3869.59	-9.75
47	2,441	13.3	189.6			32	2348.61	-548.38	-123.00	561.91	562.01	192.64	0.80	-0.62	892.38	3857.62	-10.33
48	2,473	13.2	188.7			32	2379.76	-555.63	-124.17	569.23	569.33	192.60	0.72	-0.31	904.58	3845.42	-10.91
49	2,506	13.4	188.9			33	2411.87	-563.13	-125.33	576.79	576.91	192.55	0.62	0.61	917.09	3832.91	-11.56
50	2,538	13.5	190.3			32	2443.00	-570.47	-126.57	584.21	584.34	192.51	1.06	0.31	928.97	3821.03	-12.09
51	2,569	12.0	192.4			31	2473.23	-577.17	-127.91	591.05	591.18	192.50	5.06	-4.84	941.50	3808.50	-12.38
52	2,601	10.2	194.1			32	2504.63	-583.17	-129.31	597.21	597.34	192.50	5.72	-5.63	956.93	3793.07	-12.44
53	2,633	8.6	196.9			32	2536.20	-588.21	-130.70	602.43	602.55	192.53	5.20	-5.00	974.97	3775.03	-12.28
54	2,665	8.5	198.9			32	2567.84	-592.74	-132.16	607.17	607.29	192.57	0.98	-0.31	994.32	3755.68	-11.93
55	2,697	8.5	199.0			32	2599.49	-597.21	-133.70	611.88	611.99	192.62	0.05	0.00	1013.76	3736.24	-11.50
56	2,729	8.6	199.4			32	2631.14	-601.70	-135.26	616.62	616.72	192.67	0.36	0.31	1033.13	3716.87	-11.05



SURVEY CALCULATION PROGRAM

Minimum Curvature

File:

OPERATOR: Limerock Resources										Target Information					VS Referenced to Offset from Surface			
WELL: Eagle 34K Federal 77										TARGET KBTVD:		4750.00			NORTH/SOUTH:		-633.00	
LOCATION: Artesia										TARGET INCL:		21.10			EAST/WEST:		-154.26	
RIG: United 33										TARGET AZM:		193.70			(Enter 0° N and 0° E for Surface)			
JOB NUMBER: TX-17003																		
SURVEY COMPANY					DIRECTIONAL COMPANY					PROPOSED DIRECTION:		193.70		Dec / Total Corr.(+/-):		7.36		
Accel Directional					Accel Directional					COMMENTS:								
Directional Drillers					COORDINATORS					API #30-015-43886								
Brian Dennis					Chris Shipp													
Limerock Resources					Eagle 34K Federal 77										Target Calculations			
		TRUE	TEMP	API	Course					Surface	CLOSURE		DLS/	BUR/	TVD AT 0'	ABOVE (+)	RIGHT(+)	
SVY	MD	INC	AZM	°F	Gamma	Length	TVD	N-S	E-W	Vert Sect	DIST	DIR	100	100'	V. SEC.	BELOW (-)	LEFT(-)	
57	2,761	7.7	200.9			32	2662.81	-605.96	-136.82	621.13	621.22	192.72	2.89	-2.81	1053.13	3696.87	-10.54	
58	2,793	6.6	201.2			32	2694.56	-609.68	-138.25	625.08	625.16	192.78	3.44	-3.44	1074.64	3675.36	-10.03	
59	2,825	6.2	204.5			32	2726.37	-612.97	-139.63	628.60	628.67	192.83	1.70	-1.25	1097.32	3652.68	-9.47	
60	2,857	5.5	206.3			32	2758.20	-615.91	-141.03	631.79	631.85	192.90	2.26	-2.19	1120.87	3629.13	-8.81	
61	2,888	4.5	199.6			31	2789.08	-618.39	-142.10	634.45	634.51	192.94	3.73	-3.23	1144.86	3605.14	-8.36	
62	2,920	4.0	185.7			32	2820.99	-620.68	-142.63	636.80	636.86	192.94	3.57	-1.56	1170.67	3579.33	-8.39	
63	2,952	3.8	182.4			32	2852.92	-622.85	-142.78	638.95	639.01	192.91	0.94	-0.63	1197.04	3552.96	-8.75	
64	2,984	2.8	177.6			32	2884.87	-624.69	-142.79	640.74	640.81	192.88	3.24	-3.13	1224.35	3525.65	-9.17	
65	3,016	1.3	193.1			32	2916.84	-625.83	-142.84	641.85	641.92	192.86	4.96	-4.69	1253.44	3496.56	-9.39	
66	3,048	0.1	156.2			32	2948.84	-626.21	-142.91	642.24	642.31	192.86	3.82	-3.75	1284.44	3465.56	-9.41	
67	3,080	0.7	6.7			32	2980.84	-626.04	-142.88	642.07	642.14	192.86	2.46	1.88	1316.88	3433.12	-9.41	
68	3,143	0.7	355.1			63	3043.84	-625.27	-142.87	641.32	641.39	192.87	0.22	0.00	1381.81	3368.19	-9.24	
69	3,207	0.7	351.6			64	3107.83	-624.50	-142.96	640.59	640.65	192.89	0.07	0.00	1447.71	3302.29	-8.97	
70	3,272	0.7	338.9			65	3172.83	-623.73	-143.16	639.89	639.95	192.93	0.24	0.00	1514.50	3235.50	-8.59	
71	3,336	0.7	1.6			64	3236.82	-622.98	-143.29	639.19	639.25	192.95	0.43	0.00	1580.32	3169.68	-8.28	
72	3,399	0.8	355.4			63	3299.82	-622.16	-143.31	638.40	638.45	192.97	0.20	0.16	1645.37	3104.63	-8.07	
73	3,463	0.8	351.8			64	3363.81	-621.27	-143.41	637.56	637.61	193.00	0.08	0.00	1711.54	3038.46	-7.76	
74	3,527	1.3	233.2			64	3427.80	-621.26	-144.06	637.70	637.74	193.06	2.85	0.78	1775.15	2974.85	-7.13	
75	3,591	1.6	223.1			64	3491.78	-622.35	-145.25	639.04	639.07	193.14	0.61	0.47	1835.67	2914.33	-6.23	
76	3,655	1.8	227.4			64	3555.76	-623.68	-146.60	640.66	640.68	193.23	0.37	0.31	1895.45	2854.55	-5.23	
77	3,719	0.5	179.0			64	3619.74	-624.64	-147.34	641.76	641.78	193.27	2.37	-2.03	1956.57	2793.43	-4.75	
78	3,783	0.7	99.8			64	3683.74	-624.99	-146.95	642.01	642.03	193.23	1.22	0.31	2019.94	2730.06	-5.21	
79	3,847	0.6	100.8			64	3747.74	-625.12	-146.23	641.96	641.99	193.17	0.16	-0.16	2084.05	2665.95	-5.93	
80	3,911	0.6	134.9			64	3811.73	-625.42	-145.67	642.12	642.15	193.11	0.55	0.00	2147.64	2602.36	-6.55	
81	3,975	0.5	95.4			64	3875.73	-625.68	-145.15	642.25	642.29	193.06	0.60	-0.16	2211.29	2538.71	-7.12	
82	4,039	0.7	96.4			64	3939.73	-625.75	-144.48	642.16	642.21	193.00	0.31	0.31	2275.52	2474.48	-7.78	
83	4,103	0.9	112.8			64	4003.72	-625.99	-143.63	642.19	642.25	192.92	0.47	0.31	2339.44	2410.56	-8.67	
84	4,167	0.7	101.2			64	4067.71	-626.26	-142.78	642.26	642.33	192.84	0.40	-0.31	2403.27	2346.73	-9.55	
85	4,231	0.7	90.2			64	4131.71	-626.33	-142.01	642.15	642.23	192.77	0.21	0.00	2467.54	2282.46	-10.32	
86	4,295	0.8	102.4			64	4195.70	-626.43	-141.18	642.05	642.14	192.70	0.29	0.16	2531.80	2218.20	-11.15	
87	4,359	0.5	296.6			64	4259.70	-626.40	-141.00	641.97	642.07	192.69	2.02	-0.47	2595.99	2154.01	-11.32	
88	4,423	1.0	267.9			64	4323.70	-626.30	-141.80	642.06	642.15	192.76	0.95	0.78	2659.75	2090.25	-10.51	
89	4,486	1.3	287.1			63	4386.68	-626.11	-143.04	642.17	642.24	192.87	0.77	0.48	2722.46	2027.54	-9.27	
90	4,550	1.3	294.9			64	4450.67	-625.59	-144.39	641.99	642.04	193.00	0.28	0.00	2786.92	1963.08	-7.84	
91	4,614	1.0	282.5			64	4514.65	-625.16	-145.59	641.86	641.89	193.11	0.61	-0.47	2851.24	1898.76	-6.56	
92	4,679	1.1	285.3			65	4579.64	-624.87	-146.75	641.85	641.88	193.22	0.17	0.15	2916.24	1833.76	-5.37	
93	4,743	1.1	284.1			64	4643.63	-624.56	-147.94	641.83	641.84	193.33	0.04	0.00	2980.29	1769.71	-4.15	
94	4,805	1.4	282.1			62	4705.62	-624.26	-149.25	641.85	641.85	193.45	0.49	0.48	3042.23	1707.77	-2.79	
PTB	4,855	1.4	282.1			50	4755.60	-624.00	-150.45	641.88	641.88	193.56	0.00	0.00	3092.13	1657.87	-1.57	