

RECEIVED SURVEY DATA CERTIFICATION



Job #: 160041  
 Client: LIME ROCK RESOURCES  
 County & State: EDDY, NM  
 Well: HAWK 8N FEDERAL 50 #1H  
 API No: 30-015-43277  
 Proposed Direction: 329.03

TIE-IN DATA

MD	TVD	INC	AZM	N/-S	E/-W	DATA SOURCE
0	0	0	0	0	0	Surface
Data Source Company:						NA

SURVEY DATA

First Survey Date	First Survey Depth	INC	AZM
15-Aug-16	444 ft	0.18°	241.12°

Last Survey Date	Last Survey Depth	INC	AZM
23-Aug-16	4,831 ft	0.70°	231.28°

**Survey Instrument Type**  
 HDS-1L Positive Pulse

Projected TD Survey Date	Projected TD Survey Depth	INC	AZM
23-Aug-16	4,894 ft	0.70°	231.28°

CORRECTION INFORMATION

Magnetic Declination Used	7.42 degrees
Grid Convergence Used	degrees
<b>Total Correction</b>	7.42 degrees

**Corrected to True/Grid North**  
 True North

TO THE BEST OF MY KNOWLEDGE, I CERTIFY THIS SURVEY DATA TO BE TRUE AND CORRECT.

*William Rex Montgomery*  
 Signature  
 William Rex Montgomery  
 Printed Name  
 August 23, 2016  
 Date



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Survey#	Measured Depth	Inc.	Azm.	T:V:D	VerSect.	←N/S	←E/W	DLS/100'	Dist.	Angle
1	444.00	0.18	241.12	444.00	0.03	-0.34	-0.61	0.04	0.70	241.12
2	476.00	0.18	176.08	476.00	-0.02	-0.41	-0.65	0.60	0.77	237.73
3	508.00	2.55	355.64	507.99	0.57	0.25	-0.70	8.53	0.74	289.50
4	540.00	4.57	353.01	539.93	2.38	2.22	-0.91	6.33	2.40	337.72
5	572.00	5.72	356.70	571.79	5.14	5.15	-1.41	4.96	5.34	344.72
6	604.00	6.77	4.43	603.61	7.90	8.55	-1.10	4.20	8.63	352.64
7	636.00	6.68	3.82	635.39	10.97	12.29	-0.83	0.36	12.32	356.12
8	668.00	9.76	359.95	667.05	14.83	16.86	-0.71	9.77	16.88	357.58
9	700.00	11.61	357.75	698.50	19.98	22.79	-0.84	5.92	22.81	357.88
10	732.00	11.43	357.66	729.85	25.58	29.18	-1.10	0.57	29.20	357.85
11	764.00	13.19	351.16	761.12	31.75	35.95	-1.79	6.99	36.00	357.15
12	796.00	13.63	336.92	792.25	38.87	43.03	-3.83	10.39	43.20	354.92
13	859.00	12.66	325.06	853.61	53.11	55.52	-10.69	4.54	56.54	349.10
14	922.00	11.87	318.20	915.18	66.36	66.01	-18.97	2.63	68.68	343.97
15	987.00	11.96	326.55	978.78	79.66	76.62	-27.13	2.65	81.28	340.50
16	1019.00	12.57	330.86	1010.05	86.45	82.43	-30.66	3.44	87.94	339.60
17	1050.00	13.54	327.61	1040.25	93.45	88.44	-34.25	3.92	94.84	338.83
18	1082.00	15.39	325.41	1071.24	101.43	95.10	-38.66	6.03	102.65	337.88
19	1114.00	16.88	324.79	1101.98	110.31	102.39	-43.75	4.69	111.34	336.86
20	1145.00	18.20	324.71	1131.53	119.62	110.02	-49.14	4.26	120.49	335.93
21	1178.00	20.22	324.27	1162.69	130.44	118.85	-55.45	6.14	131.15	334.99
22	1210.00	21.37	323.21	1192.61	141.76	128.01	-62.17	3.78	142.31	334.09
23	1242.00	21.46	323.56	1222.40	153.38	137.39	-69.14	0.49	153.81	333.29
24	1274.00	22.60	322.24	1252.06	165.32	149.96	-76.38	3.88	165.63	332.54
25	1306.00	22.42	322.51	1281.63	177.49	156.66	-83.86	0.65	177.70	331.84
26	1338.00	21.81	322.33	1311.27	189.45	166.21	-91.21	1.92	189.59	331.24
27	1370.00	21.19	322.86	1341.04	201.11	175.53	-98.34	2.03	201.20	330.74
28	1402.00	21.28	322.95	1370.87	212.63	184.77	-105.33	0.30	212.68	330.32
29	1434.00	21.54	324.35	1400.66	224.26	194.18	-112.25	1.79	224.29	329.97
30	1465.00	21.46	323.65	1429.51	235.58	203.37	-118.93	0.87	235.59	329.68
31	1497.00	22.07	330.86	1459.23	247.42	223.34	-125.32	8.56	247.43	329.57
32	1529.00	22.42	332.09	1488.85	259.52	223.98	-131.11	1.82	259.53	329.66
33	1560.00	22.16	334.73	1517.53	271.24	234.49	-136.37	3.34	271.26	329.82
34	1624.00	22.34	332.26	1576.77	295.39	256.17	-147.19	1.49	295.45	330.12
35	1689.00	22.51	330.15	1636.85	320.17	277.90	-159.13	1.27	320.24	330.20
36	1753.00	22.42	329.19	1696.00	344.62	299.01	-171.48	0.59	344.69	330.17
37	1817.00	22.69	329.63	1755.10	369.17	320.14	-183.97	0.50	369.24	330.12
38	1881.00	22.86	329.27	1814.11	393.94	341.48	-196.56	0.34	394.01	330.12
39	1913.00	22.95	329.45	1843.59	406.40	352.19	-202.91	0.36	406.46	330.05
40	1945.00	23.21	329.71	1873.03	418.94	363.01	-209.26	0.87	419.01	330.04
41	1977.00	23.39	329.36	1902.42	431.60	373.92	-215.68	0.71	431.66	330.02
42	2009.00	22.16	328.84	1931.92	443.99	384.55	-222.04	3.89	444.05	330.00
43	2041.00	20.93	327.87	1961.69	455.74	394.55	-228.20	4.00	455.80	329.96
44	2073.00	19.70	327.69	1991.70	466.84	403.95	-234.13	3.85	455.80	329.90
45	2105.00	18.55	328.42	2021.93	477.33	412.85	-239.67	3.67	477.38	329.86
46	2138.00	17.32	329.00	2053.33	487.49	421.53	-244.95	3.77	494.25	329.82
47	2170.00	16.27	328.79	2083.96	496.73	429.45	-249.73	3.29	496.78	329.82
48	2201.00	15.65	328.94	2113.76	505.26	436.74	-254.14	2.00	505.30	329.81
49	2233.00	14.68	331.63	2144.65	513.65	444.01	-258.29	3.74	513.67	329.81
50	2265.00	13.28	326.73	2175.70	521.35	450.65	-262.23	5.73	521.40	329.80



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Survey #	Measured Depth	Inc.	Azm.	TVD	Vert.Sect.	±N/S	±E/W	DLS/100'	Dist.	Angle
51	2297.00	11.87	326.44	2206.93	528.31	456.47	-266.07	4.41	528.35	329.76
52	2330.00	10.73	323.83	2239.29	534.76	461.77	-269.76	3.79	534.80	329.71
53	2362.00	10.11	321.54	2270.77	540.51	466.38	-273.26	2.33	540.54	329.63
54	2394.00	9.50	320.75	2302.30	545.91	470.62	-276.68	1.95	545.93	329.55
55	2426.00	8.62	320.49	2333.90	550.89	474.52	-279.88	2.75	550.91	329.47
56	2458.00	7.74	319.78	2365.57	555.39	478.01	-282.80	2.77	550.91	329.39
57	2490.00	7.12	322.33	2397.30	559.49	481.23	-285.40	2.19	559.49	329.33
58	2522.00	6.51	326.55	2429.08	563.27	484.31	-287.61	2.47	563.28	329.30
59	2550.00	5.98	331.52	2456.91	566.31	486.92	-289.18	2.70	566.32	329.29
60	2582.00	5.45	334.36	2488.75	569.49	489.75	-290.63	1.88	569.50	329.31
61	2613.00	4.84	333.18	2519.63	572.26	492.25	-291.86	2.00	572.27	329.34
62	2645.00	4.22	329.43	2551.53	574.78	494.47	-293.07	2.15	574.79	329.34
63	2678.00	3.87	323.91	2584.45	577.11	496.41	-294.34	1.59	577.12	329.33
64	2710.00	3.43	320.27	2616.38	579.13	498.02	-295.59	1.55	579.14	329.31
65	2742.00	2.73	313.41	2648.34	580.81	499.28	-296.76	2.47	580.81	329.27
66	2774.00	1.76	294.82	2680.31	581.95	500.01	-297.76	3.75	581.95	329.23
67	2806.00	1.23	270.31	2712.30	582.53	500.22	-298.54	2.56	582.54	329.17
68	2870.00	0.62	231.57	2776.29	582.85	500.01	-299.50	1.32	582.85	329.08
69	2934.00	0.62	162.47	2840.29	582.46	499.46	-299.67	1.10	582.46	329.04
70	2998.00	0.70	162.41	2904.28	581.75	498.76	-299.45	0.13	581.75	329.02
71	3062.00	0.70	169.94	2968.28	581.00	498.00	299.26	0.14	581.00	329.00
72	3126.00	0.70	169.97	3032.28	580.27	497.23	-299.12	0.00	580.27	328.97
73	3189.00	0.70	167.72	3095.27	579.55	496.48	-298.98	0.04	579.55	328.94
74	3253.00	0.70	167.53	3159.27	578.81	495.71	-298.81	0.00	578.81	328.92
75	3318.00	0.26	131.26	3224.26	578.29	495.23	-298.61	0.79	578.29	328.91
76	3382.00	0.26	41.22	3288.26	578.20	495.24	-298.41	0.57	578.20	328.93
77	3477.00	0.26	356.26	3383.26	578.45	495.62	-298.28	0.21	578.20	328.96
78	3573.00	0.35	328.08	3479.26	578.94	496.09	-296.45	0.18	578.94	328.97
79	3669.00	0.44	331.22	3575.26	579.60	496.66	-298.78	0.10	579.60	328.97
80	3765.00	0.53	334.15	3671.26	580.41	497.38	-299.15	0.10	580.41	328.98
81	3861.00	0.53	342.58	3767.25	581.29	498.20	-299.48	0.08	581.29	328.99
82	3957.00	0.35	27.90	3863.25	581.87	498.89	-299.47	0.39	581.87	329.02
83	4053.00	0.44	22.25	3959.25	582.24	499.49	-299.20	0.10	582.24	329.08
84	4149.00	0.44	346.82	4055.24	582.81	500.19	-299.14	0.28	582.81	329.12
85	4245.00	0.62	350.64	4151.24	583.65	501.06	-299.31	0.19	583.65	329.15
86	4342.00	1.06	8.13	4248.23	584.83	502.46	-299.27	0.52	584.83	329.22
87	4439.00	0.79	85.91	4345.22	585.23	503.40	-298.49	1.22	585.23	329.34
88	4598.00	0.88	73.95	4504.20	584.42	503.82	-296.21	0.12	584.44	329.55
89	4758.00	0.70	213.44	4664.20	583.68	503.34	-295.57	0.93	583.70	329.58
90	4831.00	0.70	231.28	4737.19	583.42	502.69	-296.16	0.30	583.44	329.50
Proj. TD	4894.00	0.70	231.28	4800.19	583.33	502.21	-296.77	0.00	583.34	329.42