

# **Catamount Energy Partners**

**San Juan Basin  
Archuleta County CO  
Lamke 33-5-29 #1**

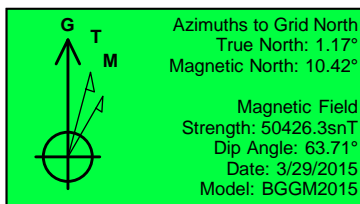
**Original Hole**

**Design: As Drilled**

## **Standard Survey Report**

**26 April, 2016**





Project: San Juan Basin  
Site: Archuleta County CO  
Well: Lamke 33-5-29 #1  
Wellbore: Original Hole  
Design: As Drilled



#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
Lamke 33-5-29 #1 PH TGT	2578.99	-1181.77	-925.67	37° 4' 0.102 N	107° 24' 37.602 W
Lamke 33-5-29 #1 PH BHL	2833.00	-1378.96	-1013.09	37° 3' 58.135 N	107° 24' 38.630 W

#### WELL DETAILS Lamke 33-5-29 #1

6119' GL + 11' KB @ 6129.99usft  
Ground Level: 6119.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1152541.71	2443521.11	37° 4' 11.971 N	107° 24' 26.481 W

#### SITE DETAILS: Archuleta County CO

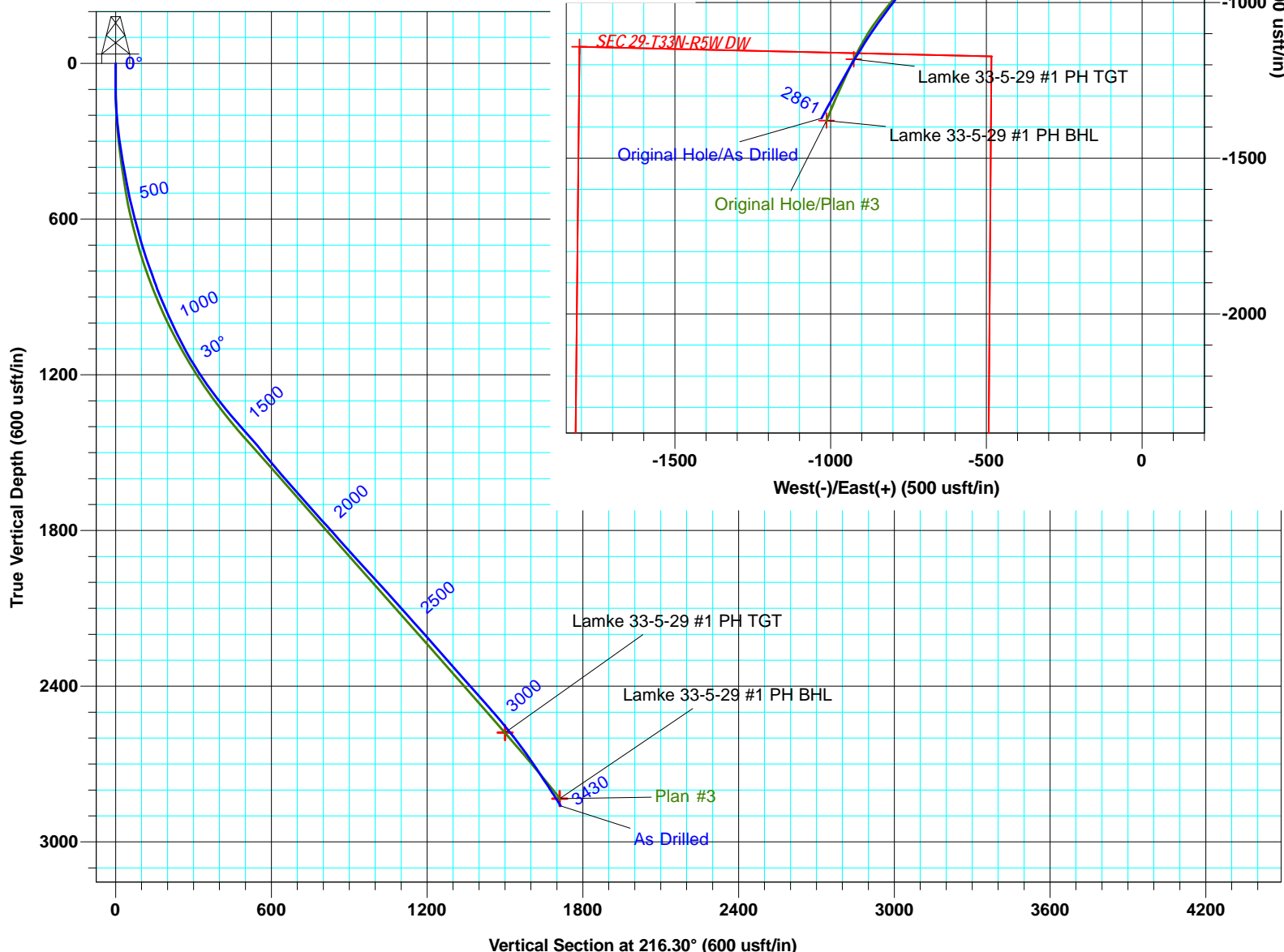
Site Centre Northing: 1152541.71  
Easting: 2443521.11  
Positional Uncertainty: 0.00  
Convergence: -1.17  
Local North: Grid

#### PROJECT DETAILS: San Juan Basin

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Southern Zone  
System Datum: Mean Sea Level

**ALL AZIMUTHS MUST BE CORRECTED TO GRID NORTH**

To convert Magnetic North to Grid, Add 10.42°  
To convert True North to Grid, Add 1.17°



## Survey Report



<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well Lamke 33-5-29 #1
<b>Project:</b>	San Juan Basin	<b>TVD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Site:</b>	Archuleta County CO	<b>MD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Well:</b>	Lamke 33-5-29 #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Grand Junction District

<b>Project</b>	San Juan Basin, Southern Colorado, Fruitland Coal HZ		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Southern Zone		Using geodetic scale factor

<b>Site</b>	Archuleta County CO		
<b>Site Position:</b>		<b>Northing:</b>	1,152,541.71 usft
<b>From:</b>	Map	<b>Easting:</b>	2,443,521.11 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	6-1/8 "
		<b>Latitude:</b>	37° 4' 11.971 N
		<b>Longitude:</b>	107° 24' 26.481 W
		<b>Grid Convergence:</b>	-1.17 °

<b>Well</b>	Lamke 33-5-29 #1, Multi HZ FC Well		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 1,152,541.71 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 2,443,521.11 usft
<b>Position Uncertainty</b>	1.00 usft	<b>Wellhead Elevation:</b>	6,130.00 usft
		<b>Latitude:</b>	37° 4' 11.971 N
		<b>Longitude:</b>	107° 24' 26.481 W
		<b>Ground Level:</b>	6,119.00 usft

<b>Wellbore</b>	Original Hole				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2015	3/29/2015	9.25	63.71	50,426

<b>Design</b>	As Drilled				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	216.30	

<b>Survey Program</b>	<b>Date</b>	4/26/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
108.00	3,430.00	SDI MWD (Original Hole)	MWD SDI	MWD - Standard ver 1.0.1	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
108.00	0.71	160.99	108.00	-0.63	0.22	0.38	0.66	0.66	0.00	
137.00	1.38	194.01	136.99	-1.14	0.19	0.81	3.02	2.31	113.86	
167.00	2.66	212.66	166.97	-2.08	-0.27	1.84	4.74	4.27	62.17	
196.00	4.43	217.68	195.92	-3.53	-1.32	3.63	6.19	6.10	17.31	
225.00	5.77	218.97	224.80	-5.55	-2.92	6.20	4.64	4.62	4.45	
252.00	6.66	221.23	251.64	-7.78	-4.81	9.12	3.42	3.30	8.37	
283.00	7.52	219.81	282.41	-10.69	-7.29	12.93	2.83	2.77	-4.58	
313.00	8.62	222.22	312.11	-13.87	-10.06	17.13	3.84	3.67	8.03	
335.00	9.26	222.28	333.84	-16.40	-12.36	20.53	2.91	2.91	0.27	

## Survey Report



<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well Lamke 33-5-29 #1
<b>Project:</b>	San Juan Basin	<b>TVD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Site:</b>	Archuleta County CO	<b>MD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Well:</b>	Lamke 33-5-29 #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Grand Junction District

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
458.00	10.13	220.07	455.08	-32.00	-25.98	41.17	0.77	0.71	-1.80
488.00	11.21	221.65	484.56	-36.20	-29.61	46.70	3.73	3.60	5.27
519.00	12.90	222.37	514.88	-41.00	-33.95	53.14	5.47	5.45	2.32
550.00	14.28	222.26	545.01	-46.39	-38.85	60.39	4.45	4.45	-0.35
581.00	14.70	221.95	575.02	-52.15	-44.05	68.11	1.38	1.35	-1.00
611.00	14.20	220.54	604.08	-57.77	-48.99	75.56	2.04	-1.67	-4.70
643.00	14.35	217.72	635.09	-63.89	-53.97	83.44	2.22	0.47	-8.81
674.00	15.48	217.08	665.04	-70.23	-58.81	91.42	3.68	3.65	-2.06
703.00	16.59	217.14	692.91	-76.62	-63.64	99.43	3.83	3.83	0.21
735.00	17.61	216.91	723.50	-84.13	-69.31	108.84	3.19	3.19	-0.72
765.00	18.94	217.75	751.99	-91.61	-75.02	118.24	4.52	4.43	2.80
797.00	19.61	218.21	782.19	-99.94	-81.52	128.80	2.15	2.09	1.44
828.00	19.66	218.31	811.39	-108.12	-87.97	139.21	0.19	0.16	0.32
859.00	19.90	217.54	840.56	-116.39	-94.41	149.70	1.14	0.77	-2.48
889.00	21.06	217.87	868.66	-124.69	-100.83	160.19	3.89	3.87	1.10
921.00	22.08	217.50	898.42	-134.01	-108.03	171.95	3.22	3.19	-1.16
952.00	22.92	217.78	927.06	-143.40	-115.27	183.81	2.73	2.71	0.90
982.00	23.82	218.08	954.60	-152.78	-122.59	195.71	3.03	3.00	1.00
1,014.00	24.73	217.87	983.77	-163.16	-130.68	208.86	2.86	2.84	-0.66
1,046.00	25.31	217.44	1,012.77	-173.87	-138.95	222.39	1.90	1.81	-1.34
1,077.00	26.16	218.86	1,040.69	-184.45	-147.26	235.84	3.39	2.74	4.58
1,109.00	27.11	219.28	1,069.30	-195.59	-156.31	250.17	3.03	2.97	1.31
1,140.00	28.35	220.00	1,096.74	-206.70	-165.51	264.57	4.14	4.00	2.32
1,172.00	29.52	219.30	1,124.74	-218.62	-175.39	280.02	3.81	3.66	-2.19
1,204.00	31.14	220.01	1,152.36	-231.06	-185.70	296.15	5.18	5.06	2.22
1,235.00	32.49	219.72	1,178.70	-243.60	-196.17	312.46	4.38	4.35	-0.94
1,267.00	33.74	220.20	1,205.50	-257.00	-207.40	329.91	3.99	3.91	1.50
1,299.00	35.19	220.56	1,231.89	-270.79	-219.14	347.97	4.58	4.53	1.13
1,330.00	36.21	219.93	1,257.06	-284.60	-230.82	366.02	3.50	3.29	-2.03
1,360.00	37.11	219.83	1,281.13	-298.35	-242.31	383.90	3.01	3.00	-0.33
1,392.00	38.07	219.82	1,306.48	-313.34	-254.81	403.38	3.00	3.00	-0.03
1,423.00	39.14	220.38	1,330.71	-328.13	-267.27	422.68	3.63	3.45	1.81
1,455.00	40.42	220.85	1,355.30	-343.67	-280.60	443.09	4.11	4.00	1.47
1,486.00	41.66	220.50	1,378.68	-359.11	-293.86	463.39	4.07	4.00	-1.13
1,517.00	41.74	220.15	1,401.83	-374.83	-307.21	483.96	0.79	0.26	-1.13
1,549.00	41.44	220.63	1,425.76	-391.01	-320.97	505.15	1.37	-0.94	1.50
1,580.00	41.09	220.57	1,449.06	-406.54	-334.28	525.54	1.14	-1.13	-0.19
1,612.00	40.45	219.93	1,473.30	-422.48	-347.78	546.38	2.39	-2.00	-2.00
1,643.00	39.99	219.52	1,496.97	-437.88	-360.57	566.36	1.71	-1.48	-1.32
1,674.00	39.32	219.50	1,520.83	-453.14	-373.16	586.12	2.16	-2.16	-0.06
1,706.00	38.78	219.86	1,545.69	-468.66	-386.03	606.24	1.83	-1.69	1.13
1,738.00	39.46	219.51	1,570.51	-484.20	-398.92	626.40	2.23	2.13	-1.09
1,769.00	40.65	219.07	1,594.24	-499.64	-411.55	646.32	3.95	3.84	-1.42
1,801.00	41.77	218.38	1,618.31	-516.08	-424.74	667.38	3.78	3.50	-2.16

## Survey Report



<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well Lamke 33-5-29 #1
<b>Project:</b>	San Juan Basin	<b>TVD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Site:</b>	Archuleta County CO	<b>MD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Well:</b>	Lamke 33-5-29 #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Grand Junction District

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,863.00	42.26	218.82	1,664.38	-548.51	-450.63	708.85	0.92	0.79	0.71
1,894.00	41.96	218.22	1,687.37	-564.78	-463.58	729.62	1.62	-0.97	-1.94
1,926.00	41.53	218.24	1,711.25	-581.51	-476.76	750.91	1.34	-1.34	0.06
1,957.00	41.13	217.33	1,734.53	-597.69	-489.31	771.38	2.33	-1.29	-2.94
1,989.00	41.88	217.66	1,758.49	-614.52	-502.21	792.58	2.44	2.34	1.03
2,020.00	41.97	217.16	1,781.56	-630.97	-514.80	813.29	1.12	0.29	-1.61
2,052.00	41.86	216.35	1,805.37	-648.10	-527.59	834.66	1.73	-0.34	-2.53
2,083.00	41.70	216.51	1,828.49	-664.71	-539.85	855.32	0.62	-0.52	0.52
2,115.00	41.66	217.86	1,852.39	-681.67	-552.71	876.59	2.81	-0.13	4.22
2,146.00	42.15	219.19	1,875.46	-697.86	-565.61	897.28	3.27	1.58	4.29
2,177.00	41.73	218.81	1,898.52	-713.96	-578.65	917.98	1.58	-1.35	-1.23
2,208.00	41.57	217.44	1,921.68	-730.17	-591.37	938.57	2.98	-0.52	-4.42
2,239.00	42.29	217.30	1,944.75	-746.63	-603.94	959.28	2.34	2.32	-0.45
2,271.00	42.58	217.33	1,968.36	-763.81	-617.03	980.87	0.91	0.91	0.09
2,303.00	42.80	216.88	1,991.88	-781.11	-630.12	1,002.56	1.18	0.69	-1.41
2,335.00	42.73	216.94	2,015.38	-798.48	-643.17	1,024.29	0.25	-0.22	0.19
2,366.00	42.51	217.40	2,038.19	-815.21	-655.85	1,045.28	1.23	-0.71	1.48
2,397.00	42.18	217.69	2,061.10	-831.77	-668.57	1,066.15	1.24	-1.06	0.94
2,428.00	42.01	218.35	2,084.10	-848.14	-681.37	1,086.92	1.53	-0.55	2.13
2,459.00	41.44	218.53	2,107.24	-864.30	-694.20	1,107.54	1.88	-1.84	0.58
2,490.00	41.32	218.44	2,130.50	-880.34	-706.95	1,128.02	0.43	-0.39	-0.29
2,522.00	42.03	218.19	2,154.40	-897.03	-720.15	1,149.28	2.28	2.22	-0.78
2,552.00	41.86	218.09	2,176.72	-912.80	-732.53	1,169.33	0.61	-0.57	-0.33
2,584.00	41.47	217.99	2,200.62	-929.56	-745.64	1,190.59	1.24	-1.22	-0.31
2,616.00	40.74	217.44	2,224.73	-946.20	-758.51	1,211.62	2.55	-2.28	-1.72
2,647.00	41.82	217.57	2,248.03	-962.42	-770.96	1,232.07	3.49	3.48	0.42
2,678.00	41.36	217.24	2,271.22	-978.77	-783.46	1,252.64	1.64	-1.48	-1.06
2,709.00	40.54	216.97	2,294.63	-994.97	-795.72	1,272.96	2.71	-2.65	-0.87
2,740.00	41.28	216.46	2,318.06	-1,011.25	-807.85	1,293.26	2.62	2.39	-1.65
2,771.00	42.22	216.70	2,341.18	-1,027.82	-820.15	1,313.90	3.08	3.03	0.77
2,802.00	41.44	216.23	2,364.28	-1,044.45	-832.44	1,334.57	2.71	-2.52	-1.52
2,834.00	41.00	216.04	2,388.35	-1,061.48	-844.88	1,355.66	1.43	-1.38	-0.59
2,865.00	41.36	215.14	2,411.69	-1,078.08	-856.76	1,376.07	2.24	1.16	-2.90
2,896.00	42.08	213.65	2,434.82	-1,095.10	-868.41	1,396.68	3.95	2.32	-4.81
2,928.00	42.15	212.93	2,458.56	-1,113.04	-880.19	1,418.11	1.52	0.22	-2.25
2,959.00	41.22	212.10	2,481.71	-1,130.42	-891.27	1,438.69	3.49	-3.00	-2.68
2,990.00	40.12	212.06	2,505.23	-1,147.54	-902.00	1,458.83	3.55	-3.55	-0.13
3,022.00	40.73	211.12	2,529.59	-1,165.22	-912.87	1,479.51	2.69	1.91	-2.94
3,054.00	39.80	211.06	2,554.00	-1,182.93	-923.55	1,500.11	2.91	-2.91	-0.19
3,085.00	38.96	210.62	2,577.97	-1,199.81	-933.63	1,519.69	2.86	-2.71	-1.42
3,116.00	37.96	209.98	2,602.24	-1,216.46	-943.36	1,538.86	3.47	-3.23	-2.06
3,148.00	36.80	209.85	2,627.67	-1,233.30	-953.05	1,558.17	3.63	-3.63	-0.41
3,180.00	35.59	209.50	2,653.49	-1,249.72	-962.40	1,576.94	3.84	-3.78	-1.09

## Survey Report



<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well Lamke 33-5-29 #1
<b>Project:</b>	San Juan Basin	<b>TVD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Site:</b>	Archuleta County CO	<b>MD Reference:</b>	6119' GL + 11' KB @ 6129.99usft
<b>Well:</b>	Lamke 33-5-29 #1	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Original Hole	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	As Drilled	<b>Database:</b>	Grand Junction District

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,211.00	34.55	208.99	2,678.86	-1,265.26	-971.11	1,594.62	3.49	-3.35	-1.65	
3,243.00	34.03	208.84	2,705.30	-1,281.04	-979.82	1,612.49	1.65	-1.63	-0.47	
3,275.00	33.81	208.99	2,731.85	-1,296.67	-988.46	1,630.20	0.74	-0.69	0.47	
3,306.00	33.83	209.46	2,757.61	-1,311.73	-996.88	1,647.33	0.85	0.06	1.52	
3,336.00	33.73	208.64	2,782.54	-1,326.31	-1,004.98	1,663.87	1.56	-0.33	-2.73	
3,367.00	33.18	208.55	2,808.41	-1,341.31	-1,013.16	1,680.81	1.78	-1.77	-0.29	
3,379.00	32.72	208.37	2,818.48	-1,347.05	-1,016.27	1,687.27	3.92	-3.83	-1.50	
3,430.00	32.72	208.37	2,861.39	-1,371.31	-1,029.37	1,714.58	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N-S (usft)	+E-W (usft)	Northing (usft)	Easting (usft)	Latitude Longitude		
- hit/miss target										
- Shape										
Lamke 33-5-29 #1 PH	0.00	360.00	2,578.99	-1,181.77	-925.68	1,151,359.90	2,442,595.41	37° 4' 0.102 N 107° 24' 37.602 W		
- actual wellpath misses target center by 16.02usft at 3073.38usft MD (2568.95 TVD, -1193.51 N, -929.89 E)										
- Point										
Lamke 33-5-29 #1 PH	0.00	360.00	2,833.00	-1,378.97	-1,013.09	1,151,162.69	2,442,507.99	37° 3' 58.135 N 107° 24' 38.630 W		
- actual wellpath misses target center by 23.09usft at 3405.58usft MD (2840.84 TVD, -1359.69 N, -1023.10 E)										
- Point										

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_