



Rockcliff Energy

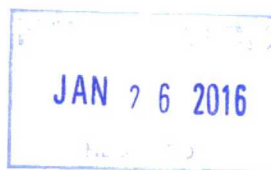
Roosevelt County NM
Annapurna 20
1H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

28 November, 2016



www.scientificdrilling.com

Company:	Rockcliff Energy	Local Co-ordinate Reference:	Well 1H
Project:	Roosevelt County NM	TVD Reference:	KB @ 4310.00usft
Site:	Annapurna 20	MD Reference:	KB @ 4310.00usft
Well:	1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Midland District

Project	Roosevelt County NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Annapurna 20		
Site Position:		Northing:	952,023.00 usft
From:	Map	Easting:	760,081.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	33° 36' 50.829 N
		Longitude:	103° 28' 44.608 W
		Grid Convergence:	0.47 °

Well	1H		
Well Position	+N/-S	0.00 usft	Northing: 952,023.00 usft
	+E/-W	0.00 usft	Easting: 760,081.00 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	33° 36' 50.829 N
		Longitude:	103° 28' 44.608 W
		Ground Level:	4,294.00 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	HDGM	9/22/2016	7.17
			Dip Angle (°) 61.38
			Field Strength (nT) 48,858

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
			Direction (bearing) 180.30

Survey Program	Date 11/28/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
169.00	9,540.00	SDI MWD (Wellbore #1)	MWD+HDGM
			Description OWSG MWD + HDGM

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
169.00	0.33	8.36	169.00	0.48	0.07	-0.48	0.20	0.20	0.00
291.00	0.40	353.26	291.00	1.25	0.07	-1.25	0.10	0.06	-12.38
477.00	0.60	333.61	476.99	2.77	-0.44	-2.77	0.14	0.11	-10.56
663.00	0.31	334.09	662.98	4.09	-1.09	-4.09	0.16	-0.16	0.26
848.00	0.05	315.59	847.98	4.60	-1.37	-4.59	0.14	-0.14	-10.00
1,035.00	0.11	21.85	1,034.98	4.83	-1.36	-4.82	0.05	0.03	35.43
1,221.00	0.07	195.16	1,220.98	4.88	-1.32	-4.88	0.10	-0.02	93.18
1,407.00	0.24	139.76	1,406.98	4.48	-1.10	-4.47	0.11	0.09	-29.78
1,597.00	0.46	156.98	1,596.98	3.47	-0.54	-3.47	0.13	0.12	9.06

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Well:	1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Midland District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,788.00	0.29	172.41	1,787.97	2.29	-0.18	-2.28	0.10	-0.09	8.08
1,978.00	0.40	150.70	1,977.97	1.23	0.21	-1.23	0.09	0.06	-11.43
2,233.00	0.42	187.67	2,232.96	-0.47	0.52	0.47	0.10	0.01	14.50
2,424.00	0.53	188.43	2,423.96	-2.04	0.30	2.04	0.06	0.06	0.40
2,614.00	0.59	159.92	2,613.95	-3.83	0.51	3.83	0.15	0.03	-15.01
2,805.00	0.56	145.26	2,804.94	-5.52	1.37	5.51	0.08	-0.02	-7.68
2,993.00	0.72	126.36	2,992.93	-6.97	2.85	6.96	0.14	0.09	-10.05
3,179.00	1.11	125.54	3,178.90	-8.71	5.26	8.69	0.21	0.21	-0.44
3,365.00	0.85	131.67	3,364.88	-10.68	7.75	10.64	0.15	-0.14	3.30
3,551.00	0.90	126.90	3,550.85	-12.47	9.95	12.42	0.05	0.03	-2.56
3,738.00	0.76	129.00	3,737.84	-14.13	12.09	14.07	0.08	-0.07	1.12
3,924.00	0.72	125.18	3,923.82	-15.58	14.00	15.51	0.03	-0.02	-2.05
4,080.00	5.34	197.62	4,079.58	-23.07	12.61	23.01	3.31	2.96	46.44
4,112.00	8.29	192.78	4,111.35	-26.74	11.65	26.68	9.38	9.22	-15.13
4,143.00	11.73	191.12	4,141.87	-32.02	10.54	31.96	11.13	11.10	-5.35
4,175.00	15.41	192.16	4,172.98	-39.37	9.02	39.32	11.52	11.50	3.25
4,207.00	19.00	193.45	4,203.54	-48.59	6.91	48.55	11.28	11.22	4.03
4,239.00	22.98	193.83	4,233.41	-59.73	4.21	59.70	12.44	12.44	1.19
4,271.00	26.69	194.41	4,262.45	-72.76	0.92	72.75	11.62	11.59	1.81
4,302.00	28.87	195.50	4,289.87	-86.71	-2.81	86.73	7.22	7.03	3.52
4,334.00	32.09	194.11	4,317.45	-102.41	-6.95	102.44	10.30	10.06	-4.34
4,366.00	34.71	193.92	4,344.16	-119.50	-11.21	119.55	8.19	8.19	-0.59
4,398.00	37.05	192.58	4,370.09	-137.75	-15.50	137.83	7.71	7.31	-4.19
4,429.00	39.42	191.63	4,394.43	-156.51	-19.52	156.61	7.88	7.65	-3.06
4,451.79	41.43	190.90	4,411.78	-171.00	-22.41	171.12	9.08	8.84	-3.21
4451.79' MD, 378 'FEL, 0 'FNL									
4,461.00	42.25	190.62	4,418.64	-177.04	-23.55	177.16	9.08	8.85	-3.03
4,492.00	46.97	189.14	4,440.71	-198.48	-27.28	198.62	15.59	15.23	-4.77
4,524.00	53.30	187.38	4,461.21	-222.78	-30.79	222.94	20.23	19.78	-5.50
4,556.00	58.64	187.41	4,479.11	-249.07	-34.20	249.24	16.69	16.69	0.09
4,588.00	61.90	187.93	4,494.98	-276.60	-37.91	276.80	10.28	10.19	1.63
4,620.00	65.29	188.79	4,509.21	-304.95	-42.08	305.17	10.86	10.59	2.69
4,652.00	68.68	190.17	4,521.72	-334.00	-46.93	334.24	11.31	10.59	4.31
4,683.00	72.05	189.55	4,532.13	-362.76	-51.93	363.03	11.03	10.87	-2.00
4,715.00	75.39	187.79	4,541.10	-393.12	-56.56	393.41	11.70	10.44	-5.50
4,747.00	80.73	185.55	4,547.72	-424.20	-60.19	424.52	18.04	16.69	-7.00
4,779.00	84.05	182.93	4,551.96	-455.83	-62.53	456.15	13.17	10.38	-8.19
4,805.00	85.64	181.75	4,554.29	-481.70	-63.58	482.03	7.60	6.12	-4.54
4,825.11	86.12	181.62	4,555.74	-501.75	-64.17	502.08	2.49	2.41	-0.63
4825.11' MD, 424 'FEL, 330 'FNL									
4,901.00	87.95	181.15	4,559.66	-577.51	-66.01	577.85	2.49	2.41	-0.62
4,996.00	89.97	180.02	4,561.38	-672.49	-66.98	672.83	2.44	2.13	-1.19
5,091.00	92.11	180.35	4,559.66	-767.46	-67.28	767.81	2.28	2.25	0.35
5,187.00	90.87	180.82	4,557.16	-863.42	-68.26	863.77	1.38	-1.29	0.49

Company: Rockcliff Energy
Project: Roosevelt County NM
Site: Annapurna 20
Well: 1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well 1H
TVD Reference: KB @ 4310.00usft
MD Reference: KB @ 4310.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Midland District

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,282.00	92.49	181.36	4,554.38	-958.36	-70.07	958.72	1.80	1.71	0.57
5,374.00	90.44	181.87	4,552.03	-1,050.29	-72.66	1,050.66	2.30	-2.23	0.55
5,468.00	92.55	182.15	4,549.57	-1,144.20	-75.96	1,144.58	2.26	2.24	0.30
5,560.00	90.91	181.31	4,546.80	-1,236.11	-78.73	1,236.51	2.00	-1.78	-0.91
5,653.00	88.59	179.62	4,547.20	-1,329.09	-79.49	1,329.49	3.09	-2.49	-1.82
5,746.00	90.37	179.98	4,548.05	-1,422.09	-79.16	1,422.48	1.95	1.91	0.39
5,839.00	90.37	179.49	4,547.45	-1,515.08	-78.73	1,515.48	0.53	0.00	-0.53
5,932.00	87.92	178.82	4,548.83	-1,608.05	-77.36	1,608.44	2.73	-2.63	-0.72
6,026.00	89.13	179.24	4,551.25	-1,702.01	-75.77	1,702.38	1.36	1.29	0.45
6,119.00	88.86	180.16	4,552.89	-1,794.99	-75.29	1,795.36	1.03	-0.29	0.99
6,211.00	89.09	180.67	4,554.53	-1,886.97	-75.95	1,887.35	0.61	0.25	0.55
6,305.00	87.75	179.86	4,557.12	-1,980.93	-76.39	1,981.31	1.67	-1.43	-0.86
6,398.00	88.49	178.66	4,560.17	-2,073.87	-75.19	2,074.24	1.52	0.80	-1.29
6,493.00	89.53	178.27	4,561.82	-2,168.82	-72.64	2,169.18	1.17	1.09	-0.41
6,588.00	90.74	177.87	4,561.59	-2,263.77	-69.44	2,264.10	1.34	1.27	-0.42
6,683.00	91.74	178.20	4,559.54	-2,358.69	-66.19	2,359.00	1.11	1.05	0.35
6,779.00	90.57	178.08	4,557.60	-2,454.62	-63.07	2,454.92	1.23	-1.22	-0.13
6,874.00	90.37	178.44	4,556.82	-2,549.57	-60.19	2,549.85	0.43	-0.21	0.38
6,969.00	89.46	178.64	4,556.96	-2,644.54	-57.77	2,644.81	0.98	-0.96	0.21
7,064.00	87.75	178.26	4,559.27	-2,739.47	-55.20	2,739.72	1.84	-1.80	-0.40
7,159.00	88.69	178.99	4,562.23	-2,834.40	-52.92	2,834.64	1.25	0.99	0.77
7,254.00	89.36	177.88	4,563.84	-2,929.35	-50.32	2,929.57	1.36	0.71	-1.17
7,350.00	86.14	176.55	4,567.61	-3,025.14	-45.67	3,025.34	3.63	-3.35	-1.39
7,445.00	87.61	177.48	4,572.79	-3,119.87	-40.73	3,120.04	1.83	1.55	0.98
7,540.00	88.96	178.89	4,575.63	-3,214.77	-37.72	3,214.93	2.05	1.42	1.48
7,635.00	89.73	178.55	4,576.72	-3,309.74	-35.60	3,309.89	0.89	0.81	-0.36
7,730.00	90.97	178.13	4,576.14	-3,404.70	-32.85	3,404.83	1.38	1.31	-0.44
7,825.00	90.97	178.63	4,574.53	-3,499.65	-30.16	3,499.76	0.53	0.00	0.53
7,920.00	88.46	178.34	4,575.00	-3,594.61	-27.65	3,594.70	2.66	-2.64	-0.31
8,015.00	88.06	178.85	4,577.89	-3,689.53	-25.32	3,689.62	0.68	-0.42	0.54
8,110.00	88.49	177.68	4,580.75	-3,784.45	-22.45	3,784.51	1.31	0.45	-1.23
8,205.00	89.76	178.55	4,582.20	-3,879.38	-19.32	3,879.43	1.62	1.34	0.92
8,301.00	89.87	179.93	4,582.51	-3,975.37	-18.05	3,975.41	1.44	0.11	1.44
8,396.00	89.53	181.07	4,583.01	-4,070.36	-18.88	4,070.40	1.25	-0.36	1.20
8,491.00	88.93	181.25	4,584.28	-4,165.33	-20.80	4,165.39	0.66	-0.63	0.19
8,586.00	88.86	182.10	4,586.11	-4,260.27	-23.58	4,260.34	0.90	-0.07	0.89
8,681.00	88.19	182.19	4,588.56	-4,355.18	-27.13	4,355.26	0.71	-0.71	0.09
8,776.00	89.13	181.93	4,590.78	-4,450.09	-30.54	4,450.19	1.03	0.99	-0.27
8,871.00	87.48	181.53	4,593.59	-4,545.00	-33.41	4,545.11	1.79	-1.74	-0.42
8,966.00	88.86	182.04	4,596.62	-4,639.90	-36.37	4,640.03	1.55	1.45	0.54
9,061.00	88.99	181.23	4,598.41	-4,734.85	-39.08	4,734.99	0.86	0.14	-0.85
9,155.00	90.07	181.08	4,599.18	-4,828.82	-40.97	4,828.97	1.16	1.15	-0.16
9,251.00	90.87	180.17	4,598.39	-4,924.81	-42.02	4,924.96	1.26	0.83	-0.95

Company:	Rockcliff Energy	Local Co-ordinate Reference:	Well 1H
Project:	Roosevelt County NM	TVD Reference:	KB @ 4310.00usft
Site:	Annapurna 20	MD Reference:	KB @ 4310.00usft
Well:	1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Midland District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,346.00	91.51	179.38	4,596.42	-5,019.79	-41.65	5,019.94	1.07	0.67	-0.83
9,408.00	92.36	178.98	4,594.32	-5,081.75	-40.76	5,081.89	1.52	1.38	-0.64
Toe Sleeve (MD= 9408')									
9,441.00	92.82	178.77	4,592.83	-5,114.71	-40.12	5,114.85	1.52	1.38	-0.64
9,448.66	92.91	178.73	4,592.45	-5,122.35	-39.95	5,122.49	1.23	1.12	-0.50
9448.66' MD, 451 'FEL, 330 'FSL									
9,483.00	93.29	178.56	4,590.59	-5,156.63	-39.14	5,156.77	1.23	1.12	-0.50
Final MWD Survey (9483.00' MD)									
9,540.00	93.29	178.56	4,587.32	-5,213.52	-37.71	5,213.65	0.00	0.00	0.00
Final PTB (9540.00' MD), 450' FEL, 235' FSL									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,451.79	4,411.78	-171.00	-22.41	4451.79' MD, 378 'FEL, 0 'FNL
4,825.11	4,555.74	-501.75	-64.17	4825.11' MD, 424 'FEL, 330 'FNL
9,408.00	4,594.32	-5,081.75	-40.76	Toe Sleeve (MD= 9408')
9,448.66	4,592.45	-5,122.35	-39.95	9448.66' MD, 451 'FEL, 330 'FSL
9,483.00	4,590.59	-5,156.63	-39.14	Final MWD Survey (9483.00' MD)
9,540.00	4,587.32	-5,213.52	-37.71	Final PTB (9540.00' MD), 450' FEL, 235' FSL

Checked By: _____	Approved By: _____	Date: _____
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