

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1J-33H-H367
<b>Project:</b>	Sec 33 T3N-R67W	<b>TVD Reference:</b>	WELL @ 4872.0ft (Original Well Elev)
<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4872.0ft (Original Well Elev)
<b>Well:</b>	Herren 1J-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	Sec 33 T3N-R67W, Weld County, CO		
<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 Northern Zone		

Site		Herren Pad			
Site Position:		Northing:	1,310,206.92 ft	Latitude:	40.183282
From:	Map	Easting:	3,171,259.40 ft	Longitude:	-104.887065
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.40 °

Well	Herren 1J-33H-H367					
Well Position	+N/-S	0.0 ft	Northing:	1,310,150.35 ft	Latitude:	40.183128
	+E/-W	0.0 ft	Easting:	3,171,202.83 ft	Longitude:	-104.887269
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,849.0 ft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM_FILE	12/31/2018	8.40	66.57	52,125.40000000

<b>Design</b>	FINAL				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	267.97	

<b>Survey Program</b>	<b>Date</b>	1/10/2019			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
171.0	1,933.0	Survey #1 (OH)	GYRO-MWD	OWSG Gyro MWD	
2,038.0	11,875.0	Survey #2 (OH)	GYRO-MWD	OWSG Gyro MWD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
171.0	0.79	143.96	171.0	-1.0	0.7	-0.7	0.46	0.46		
265.0	0.88	120.41	265.0	-1.8	1.7	-1.6	0.37	0.10		
359.0	0.88	115.31	359.0	-2.5	3.0	-2.9	0.08	0.00		
454.0	0.79	137.72	454.0	-3.3	4.1	-4.0	0.35	-0.09		
548.0	0.88	118.92	548.0	-4.1	5.1	-5.0	0.31	0.10		
643.0	0.79	140.19	642.9	-5.0	6.2	-6.0	0.34	-0.09		
737.0	1.32	125.77	736.9	-6.1	7.5	-7.3	0.63	0.56		
811.0	1.28	136.19	810.9	-7.2	8.8	-8.5	0.32	-0.05		
905.0	1.15	140.16	904.9	-8.7	10.1	-9.8	0.16	-0.14		
1,000.0	1.55	138.20	999.9	-10.4	11.6	-11.2	0.42	0.42		
1,094.0	1.66	136.86	1,093.8	-12.3	13.3	-12.9	0.12	0.12		

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<b>Well:</b>	Herren 1J-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
1,189.0	3.24	130.12	1,188.7	-15.1	16.3	-15.8	1.69	1.66	
1,283.0	5.05	116.19	1,282.5	-18.6	22.1	-21.4	2.19	1.93	
1,377.0	6.69	106.53	1,376.0	-22.0	31.0	-30.2	2.03	1.74	
1,471.0	6.58	103.50	1,469.4	-24.8	41.5	-40.6	0.39	-0.12	
1,565.0	6.24	100.24	1,562.8	-27.0	51.8	-50.8	0.53	-0.36	
1,660.0	5.73	96.17	1,657.3	-28.4	61.6	-60.5	0.70	-0.54	
1,754.0	6.95	102.18	1,750.7	-30.1	71.8	-70.7	1.48	1.30	
1,849.0	7.94	105.80	1,844.9	-33.1	83.7	-82.5	1.15	1.04	
1,933.0	7.38	103.78	1,928.1	-36.0	94.6	-93.2	0.74	-0.67	
2,038.0	6.46	103.85	2,032.4	-39.0	106.8	-105.4	0.88	-0.88	
2,101.0	8.53	106.49	2,094.8	-41.2	114.8	-113.2	3.33	3.29	
2,195.0	8.26	106.49	2,187.8	-45.1	127.9	-126.2	0.29	-0.29	
2,289.0	7.56	104.29	2,280.9	-48.5	140.4	-138.6	0.81	-0.74	
2,383.0	9.10	101.65	2,373.9	-51.5	153.7	-151.7	1.69	1.64	
2,477.0	8.31	100.16	2,466.9	-54.2	167.6	-165.6	0.87	-0.84	
2,572.0	7.95	99.19	2,560.9	-56.5	180.9	-178.8	0.41	-0.38	
2,667.0	7.30	98.84	2,655.1	-58.5	193.3	-191.1	0.69	-0.68	
2,761.0	8.88	107.72	2,748.1	-61.6	206.1	-203.8	2.14	1.68	
2,855.0	8.22	108.07	2,841.1	-65.9	219.4	-217.0	0.70	-0.70	
2,949.0	7.21	107.89	2,934.2	-69.8	231.4	-228.8	1.07	-1.07	
3,044.0	6.37	107.89	3,028.6	-73.2	242.1	-239.4	0.88	-0.88	
3,138.0	8.31	111.67	3,121.8	-77.3	253.4	-250.5	2.13	2.06	
3,233.0	7.12	108.51	3,215.9	-81.7	265.4	-262.3	1.33	-1.25	
3,327.0	8.66	108.77	3,309.0	-85.9	277.6	-274.4	1.64	1.64	
3,422.0	7.95	101.56	3,403.0	-89.5	290.8	-287.4	1.33	-0.75	
3,516.0	7.43	93.21	3,496.2	-91.1	303.2	-299.8	1.31	-0.55	
3,611.0	7.12	104.11	3,590.4	-92.9	315.1	-311.6	1.49	-0.33	
3,705.0	8.66	105.78	3,683.5	-96.3	327.5	-323.9	1.66	1.64	
3,823.0	8.44	123.45	3,800.2	-103.4	343.3	-339.4	2.23	-0.19	
3,917.0	7.87	121.60	3,893.3	-110.6	354.6	-350.4	0.67	-0.61	
4,012.0	7.21	121.69	3,987.5	-117.2	365.2	-360.8	0.69	-0.69	
4,107.0	7.56	117.30	4,081.7	-123.2	375.8	-371.2	0.70	0.37	
4,201.0	6.64	102.97	4,175.0	-127.2	386.6	-381.8	2.12	-0.98	
4,296.0	5.63	101.48	4,269.4	-129.4	396.5	-391.7	1.08	-1.06	
4,390.0	5.05	102.09	4,363.0	-131.2	405.1	-400.2	0.62	-0.62	
4,485.0	5.76	115.01	4,457.6	-134.1	413.5	-408.5	1.48	0.75	
4,579.0	7.87	109.04	4,550.9	-138.1	423.8	-418.7	2.36	2.24	
4,674.0	9.32	104.20	4,644.9	-142.2	437.4	-432.1	1.70	1.53	
4,768.0	8.22	104.11	4,737.8	-145.7	451.3	-445.9	1.17	-1.17	
4,863.0	7.08	103.67	4,831.9	-148.7	463.6	-458.1	1.20	-1.20	
4,957.0	7.38	106.31	4,925.2	-151.8	475.0	-469.4	0.48	0.32	
5,052.0	6.33	103.76	5,019.5	-154.7	486.0	-480.2	1.15	-1.11	
5,146.0	7.78	98.31	5,112.8	-156.9	497.3	-491.4	1.70	1.54	
5,241.0	9.54	101.48	5,206.7	-159.4	511.4	-505.4	1.92	1.85	
5,336.0	9.27	111.50	5,300.4	-163.7	526.2	-520.1	1.74	-0.28	
5,430.0	7.16	109.12	5,393.5	-168.4	538.8	-532.5	2.27	-2.24	
5,525.0	8.79	110.44	5,487.5	-172.9	551.2	-544.7	1.73	1.72	
5,619.0	8.97	101.74	5,580.4	-176.9	565.1	-558.5	1.44	0.19	
5,714.0	7.16	101.39	5,674.5	-179.6	578.2	-571.4	1.91	-1.91	
5,808.0	8.61	103.32	5,767.6	-182.4	590.8	-583.9	1.57	1.54	
5,902.0	9.67	102.80	5,860.4	-185.7	605.3	-598.3	1.13	1.13	
5,997.0	7.78	95.41	5,954.3	-188.1	619.5	-612.4	2.31	-1.99	
6,091.0	8.53	113.96	6,047.3	-191.5	632.2	-625.0	2.90	0.80	

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<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
6,185.0	9.49	110.71	6,140.2	-197.1	645.8	-638.4	1.16	1.02	
6,280.0	7.91	105.26	6,234.1	-201.6	659.4	-651.9	1.87	-1.66	
6,375.0	6.37	101.74	6,328.4	-204.4	670.9	-663.3	1.68	-1.62	
6,469.0	4.09	233.66	6,422.2	-207.5	673.3	-665.6	10.21	-2.43	
6,516.0	7.16	256.34	6,468.9	-209.1	669.1	-661.3	7.94	6.53	
6,564.0	10.94	258.36	6,516.3	-210.8	661.8	-653.9	7.90	7.87	
6,611.0	16.79	258.54	6,561.9	-213.0	650.7	-642.8	12.45	12.45	
6,658.0	17.23	263.99	6,606.9	-215.1	637.1	-629.1	3.52	0.94	
6,705.0	21.23	263.63	6,651.3	-216.8	621.8	-613.7	8.51	8.51	
6,753.0	26.50	263.99	6,695.1	-218.9	602.5	-594.3	10.98	10.98	
6,800.0	29.75	266.10	6,736.6	-220.7	580.4	-572.2	7.23	6.91	
6,847.0	31.86	269.79	6,777.0	-221.6	556.4	-548.2	6.02	4.49	
6,894.0	34.19	272.07	6,816.4	-221.2	530.7	-522.6	5.62	4.96	
6,942.0	38.15	272.16	6,855.1	-220.1	502.4	-494.3	8.25	8.25	
6,989.0	38.41	272.69	6,892.0	-218.9	473.3	-465.3	0.89	0.55	
7,037.0	41.70	273.83	6,928.7	-217.1	442.5	-434.5	7.02	6.85	
7,084.0	45.26	272.69	6,962.8	-215.3	410.2	-402.4	7.76	7.57	
7,132.0	49.00	270.75	6,995.5	-214.2	375.1	-367.3	8.34	7.79	
7,179.0	52.78	270.40	7,025.1	-213.9	338.6	-330.8	8.06	8.04	
7,226.0	56.16	270.23	7,052.4	-213.7	300.4	-292.6	7.20	7.19	
7,273.0	58.98	271.02	7,077.6	-213.2	260.7	-253.0	6.17	6.00	
7,320.0	59.81	271.55	7,101.6	-212.3	220.3	-212.6	2.02	1.77	
7,367.0	61.04	271.11	7,124.8	-211.4	179.4	-171.8	2.74	2.62	
7,415.0	64.64	270.23	7,146.7	-210.9	136.7	-129.2	7.68	7.50	
7,462.0	68.69	267.33	7,165.3	-211.8	93.6	-86.0	10.31	8.62	
7,510.0	73.65	267.85	7,180.8	-213.7	48.2	-40.6	10.38	10.33	
7,557.0	77.48	269.52	7,192.5	-214.8	2.7	4.9	8.85	8.15	
7,593.7	80.81	269.80	7,199.4	-215.0	-33.3	40.9	9.10	9.06	TPZ - 7593.7' MD (2528 FNL, 460 FEL)
7,604.0	81.74	269.88	7,201.0	-215.0	-43.5	51.1	9.10	9.06	
7,698.0	90.18	271.28	7,207.6	-214.1	-137.2	144.7	9.10	8.98	
7,793.0	90.79	271.46	7,206.8	-211.8	-232.2	239.5	0.67	0.64	
7,888.0	89.39	274.01	7,206.6	-207.2	-327.0	334.2	3.06	-1.47	
7,982.0	89.03	273.92	7,207.9	-200.7	-420.8	427.6	0.39	-0.38	
8,077.0	89.03	273.13	7,209.5	-194.9	-515.6	522.2	0.83	0.00	
8,171.0	89.43	272.69	7,210.8	-190.1	-609.5	615.8	0.63	0.43	
8,266.0	88.90	272.60	7,212.2	-185.8	-704.4	710.5	0.57	-0.56	
8,361.0	88.33	274.09	7,214.5	-180.2	-799.2	805.1	1.68	-0.60	
8,455.0	90.66	274.18	7,215.3	-173.4	-892.9	898.5	2.48	2.48	
8,549.0	90.44	274.53	7,214.4	-166.3	-986.6	991.9	0.44	-0.23	
8,643.0	89.82	274.36	7,214.2	-159.0	-1,080.4	1,085.3	0.68	-0.66	
8,738.0	90.66	273.30	7,213.8	-152.7	-1,175.1	1,179.8	1.42	0.88	
8,832.0	90.31	273.39	7,213.0	-147.2	-1,269.0	1,273.4	0.38	-0.37	
8,926.0	91.23	272.16	7,211.7	-142.6	-1,362.9	1,367.1	1.63	0.98	
9,021.0	90.26	272.42	7,210.5	-138.8	-1,457.8	1,461.8	1.06	-1.02	
9,116.0	90.53	271.98	7,209.8	-135.2	-1,552.7	1,556.5	0.54	0.28	
9,210.0	90.35	271.90	7,209.1	-132.0	-1,646.6	1,650.3	0.21	-0.19	
9,305.0	89.96	271.81	7,208.9	-128.9	-1,741.6	1,745.1	0.42	-0.41	
9,399.0	88.95	271.02	7,209.8	-126.6	-1,835.6	1,838.9	1.36	-1.07	
9,494.0	88.07	270.67	7,212.2	-125.2	-1,930.5	1,933.7	1.00	-0.93	
9,588.0	90.18	272.07	7,213.7	-123.0	-2,024.5	2,027.6	2.69	2.24	
9,682.0	90.40	272.34	7,213.2	-119.3	-2,118.4	2,121.3	0.37	0.23	
9,777.0	90.22	271.19	7,212.7	-116.4	-2,213.4	2,216.1	1.23	-0.19	
9,871.0	89.43	271.19	7,213.0	-114.5	-2,307.3	2,309.9	0.84	-0.84	

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
9,965.0	89.21	271.55	7,214.1	-112.2	-2,401.3	2,403.8	0.45	-0.23	
10,060.0	88.73	271.81	7,215.8	-109.4	-2,496.2	2,498.6	0.57	-0.51	
10,154.0	90.97	272.07	7,216.0	-106.3	-2,590.2	2,592.3	2.40	2.38	
10,249.0	90.84	271.19	7,214.5	-103.6	-2,685.1	2,687.1	0.94	-0.14	
10,343.0	90.35	271.46	7,213.6	-101.4	-2,779.1	2,780.9	0.60	-0.52	
10,437.0	89.60	271.46	7,213.6	-99.0	-2,873.1	2,874.8	0.80	-0.80	
10,532.0	90.31	271.72	7,213.7	-96.3	-2,968.0	2,969.6	0.80	0.75	
10,627.0	89.87	272.25	7,213.5	-93.1	-3,063.0	3,064.4	0.73	-0.46	
10,721.0	90.09	271.02	7,213.6	-90.4	-3,156.9	3,158.2	1.33	0.23	
10,816.0	89.69	270.05	7,213.7	-89.5	-3,251.9	3,253.1	1.10	-0.42	
10,910.0	89.08	269.70	7,214.7	-89.7	-3,345.9	3,347.0	0.75	-0.65	
11,005.0	88.07	269.79	7,217.1	-90.1	-3,440.9	3,441.9	1.07	-1.06	
11,099.0	89.08	271.28	7,219.4	-89.2	-3,534.9	3,535.8	1.91	1.07	
11,194.0	89.39	269.35	7,220.7	-88.7	-3,629.8	3,630.7	2.06	0.33	
11,289.0	90.92	266.80	7,220.5	-91.9	-3,724.8	3,725.7	3.13	1.61	
11,384.0	90.13	264.60	7,219.6	-99.0	-3,819.5	3,820.6	2.46	-0.83	
11,478.0	90.04	264.07	7,219.4	-108.3	-3,913.0	3,914.4	0.57	-0.10	
11,572.0	90.53	263.90	7,219.0	-118.2	-4,006.5	4,008.2	0.55	0.52	
11,667.0	89.30	263.46	7,219.1	-128.6	-4,100.9	4,102.9	1.38	-1.29	
11,761.0	88.46	263.11	7,221.0	-139.6	-4,194.3	4,196.6	0.97	-0.89	
11,807.0	88.15	262.93	7,222.3	-145.2	-4,239.9	4,242.4	0.78	-0.67	LAST SURVEY - 11807.0' MD
11,875.0	88.15	262.93	7,224.5	-153.6	-4,307.3	4,310.1	0.00	0.00	PTB - 11875.0' MD (2520 FNL, 465 FWL)

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1J-33H-H367
<b>Project:</b>	Sec 33 T3N-R67W	<b>TVD Reference:</b>	WELL @ 4872.0ft (Original Well Elev)
<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4872.0ft (Original Well Elev)
<b>Well:</b>	Herren 1J-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
Herren 1J-33H-H367BH	0.00	0.00	7,229.0	-153.0	-4,313.1	1,309,967.51	3,166,890.91	40.182707	-104.902706
- actual wellpath misses target center by 7.3ft at 11875.0ft MD (7224.5 TVD, -153.6 N, -4307.3 E)									
- Point									
Herren 1J-33H-H367 TP	0.00	0.00	7,150.0	-207.0	-33.3	1,309,943.16	3,171,170.97	40.182560	-104.887388
- actual wellpath misses target center by 49.3ft at 7584.3ft MD (7197.8 TVD, -214.9 N, -24.1 E)									
- Point									
HERREN 1J 2555' TGT	0.00	0.00	7,210.0	-112.3	-2,555.0	1,310,020.40	3,168,648.67	40.182819	-104.896413
- actual wellpath misses target center by 8.0ft at 10118.6ft MD (7216.4 TVD, -107.5 N, -2554.8 E)									
- Point									
HERREN 1J 3536' TGT	0.00	0.00	7,217.0	-98.4	-3,536.0	1,310,027.54	3,167,667.60	40.182857	-104.899925
- actual wellpath misses target center by 9.5ft at 11100.1ft MD (7219.5 TVD, -89.2 N, -3535.9 E)									
- Point									
HERREN 1J 33' TGT	0.00	0.00	7,210.0	-207.0	-33.3	1,309,943.16	3,171,170.97	40.182560	-104.887388
- actual wellpath misses target center by 13.2ft at 7595.3ft MD (7199.6 TVD, -215.0 N, -34.9 E)									
- Point									

Design Annotations					
Measured Depth	Vertical	Local Coordinates			
Depth	Depth	+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)	Comment	
7,593.7	7,199.4	-215.0	-33.3	TPZ - 7593.7' MD (2528 FNL, 460 FEL)	
11,807.0	7,222.3	-145.2	-4,239.9	LAST SURVEY - 11807.0' MD	
11,875.0	7,224.5	-153.6	-4,307.3	PTB - 11875.0' MD (2520 FNL, 465 FWL)	

Checked By: _____	Approved By: _____	Date: _____
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