

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1H-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 1H-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<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 1H-33H-H367					
Well Position	+N/-S	0.0 ft	Northing:	1,310,164.49 ft	Latitude:	40.183166
	+E/-W	0.0 ft	Easting:	3,171,216.97 ft	Longitude:	-104.887218
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,849.0 ft

<b>Wellbore</b>	Wellbore #1				
<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	12/27/2018	8.40	66.57	52,126.70000000

<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	274.02	

<b>Survey Program</b>	<b>Date</b>	1/2/2019			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
171.0	1,915.0	Survey #1 (Wellbore #1)	GYRO-MWD	OWSG Gyro MWD	
2,009.0	12,001.0	Survey #2 (Wellbore #1)	MWD+HDGM	OWSG MWD + HDGM	

<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	0.53	89.21	171.0	0.0	0.8	-0.8	0.31	0.31		
268.0	0.53	60.03	268.0	0.2	1.6	-1.6	0.28	0.00		
363.0	1.06	72.69	363.0	0.7	2.8	-2.8	0.58	0.56		
458.0	1.14	66.88	458.0	1.4	4.6	-4.4	0.14	0.08		
553.0	1.23	62.84	552.9	2.2	6.3	-6.2	0.13	0.09		
647.0	1.14	41.13	646.9	3.4	7.8	-7.6	0.48	-0.10		
742.0	2.02	65.57	741.9	4.8	10.0	-9.6	1.15	0.93		
816.0	3.02	71.61	815.8	5.9	13.0	-12.6	1.40	1.35		
911.0	4.75	79.74	910.6	7.4	19.3	-18.7	1.91	1.82		
1,005.0	6.68	81.10	1,004.1	8.9	28.5	-27.8	2.06	2.05		
1,100.0	8.68	83.09	1,098.3	10.7	41.1	-40.2	2.12	2.11		

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<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4872.0ft (Original Well Elev)
<b>Well:</b>	Herren 1H-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<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
1,194.0	9.37	82.52	1,191.1	12.5	55.7	-54.7	0.74	0.73	
1,289.0	9.76	81.90	1,284.8	14.7	71.4	-70.1	0.42	0.41	
1,383.0	8.69	78.02	1,377.6	17.2	86.2	-84.8	1.32	-1.14	
1,478.0	7.57	71.48	1,471.6	20.7	99.1	-97.4	1.53	-1.18	
1,572.0	6.48	62.46	1,564.9	25.1	109.7	-107.7	1.65	-1.16	
1,667.0	5.74	54.52	1,659.4	30.4	118.3	-115.9	1.18	-0.78	
1,761.0	5.74	66.34	1,752.9	35.0	126.5	-123.7	1.26	0.00	
1,856.0	6.14	68.80	1,847.4	38.7	135.6	-132.5	0.50	0.42	
1,915.0	5.98	64.75	1,906.1	41.2	141.3	-138.0	0.77	-0.27	
2,009.0	6.15	66.06	1,999.5	45.3	150.3	-146.8	0.23	0.18	
2,072.0	5.85	64.21	2,062.2	48.1	156.3	-152.5	0.57	-0.48	
2,167.0	5.36	59.64	2,156.7	52.4	164.5	-160.4	0.70	-0.52	
2,260.0	7.16	70.19	2,249.2	56.6	173.7	-169.3	2.29	1.94	
2,354.0	5.85	66.41	2,342.6	60.5	183.6	-178.9	1.47	-1.39	
2,449.0	4.83	61.49	2,437.2	64.3	191.5	-186.5	1.18	-1.07	
2,543.0	6.37	71.33	2,530.7	67.9	199.9	-194.7	1.92	1.64	
2,638.0	7.65	69.92	2,625.0	71.8	210.9	-205.3	1.36	1.35	
2,732.0	9.10	75.20	2,718.0	75.8	223.9	-218.1	1.74	1.54	
2,826.0	7.73	74.14	2,811.0	79.4	237.2	-231.1	1.47	-1.46	
2,920.0	6.11	73.00	2,904.3	82.6	248.1	-241.7	1.73	-1.72	
3,015.0	7.52	65.71	2,998.6	86.7	258.6	-251.9	1.74	1.48	
3,109.0	5.89	58.06	3,092.0	91.7	268.3	-261.2	1.97	-1.73	
3,204.0	7.34	64.47	3,186.4	96.9	277.9	-270.4	1.71	1.53	
3,299.0	8.83	66.23	3,280.4	102.5	290.0	-282.1	1.59	1.57	
3,393.0	7.52	61.31	3,373.4	108.4	302.0	-293.7	1.58	-1.39	
3,487.0	7.56	72.91	3,466.6	113.1	313.3	-304.6	1.62	0.04	
3,582.0	6.24	65.71	3,561.0	117.1	324.0	-315.0	1.66	-1.39	
3,676.0	6.99	84.34	3,654.3	119.8	334.4	-325.2	2.41	0.80	
3,794.0	6.20	78.45	3,771.6	121.7	347.8	-338.4	0.88	-0.67	
3,889.0	5.49	76.60	3,866.1	123.8	357.2	-347.7	0.77	-0.75	
3,983.0	7.38	82.49	3,959.5	125.7	367.6	-357.9	2.13	2.01	
4,078.0	7.87	69.40	4,053.6	128.7	379.7	-369.8	1.90	0.52	
4,173.0	6.15	66.67	4,147.9	133.0	390.5	-380.2	1.84	-1.81	
4,267.0	7.47	67.11	4,241.3	137.4	400.7	-390.1	1.41	1.40	
4,362.0	8.17	71.42	4,335.4	142.0	412.8	-401.8	0.96	0.74	
4,456.0	7.03	67.81	4,428.5	146.3	424.5	-413.2	1.31	-1.21	
4,551.0	6.42	64.39	4,522.9	150.8	434.6	-423.0	0.77	-0.64	
4,645.0	5.19	60.26	4,616.4	155.1	443.1	-431.1	1.38	-1.31	
4,740.0	6.99	69.40	4,710.9	159.3	452.2	-439.9	2.15	1.89	
4,834.0	6.64	81.96	4,804.2	162.1	463.0	-450.5	1.63	-0.37	
4,929.0	5.71	82.84	4,898.7	163.4	473.1	-460.5	0.98	-0.98	
5,023.0	6.68	72.30	4,992.1	165.7	482.9	-470.1	1.59	1.03	
5,117.0	6.37	66.85	5,085.5	169.4	492.9	-479.8	0.74	-0.33	
5,212.0	6.81	71.95	5,179.9	173.2	503.1	-489.8	0.77	0.46	
5,307.0	8.00	75.37	5,274.1	176.6	514.9	-501.2	1.34	1.25	
5,402.0	5.54	69.92	5,368.4	179.9	525.6	-511.7	2.67	-2.59	
5,496.0	7.38	63.33	5,461.8	184.1	535.3	-521.0	2.11	1.96	
5,590.0	8.26	68.34	5,554.9	189.3	546.9	-532.3	1.18	0.94	
5,685.0	7.21	62.01	5,649.1	194.7	558.5	-543.5	1.42	-1.11	
5,779.0	7.43	65.09	5,742.3	200.0	569.3	-553.8	0.48	0.23	
5,873.0	7.08	72.56	5,835.6	204.3	580.3	-564.5	1.07	-0.37	
5,968.0	5.27	68.96	5,930.0	207.6	589.9	-573.9	1.95	-1.91	
6,063.0	6.77	74.49	6,024.5	210.7	599.4	-583.2	1.69	1.58	

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<b>Wellbore:</b>	Wellbore #1	<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
6,157.0	5.10	74.76	6,118.0	213.2	608.8	-592.3	1.78	-1.78	
6,252.0	7.38	66.23	6,212.4	216.8	618.4	-601.7	2.58	2.40	
6,346.0	5.36	63.86	6,305.8	221.2	627.9	-610.9	2.17	-2.15	
6,440.0	6.46	77.04	6,399.3	224.3	637.0	-619.7	1.85	1.17	
6,535.0	4.09	66.58	6,493.9	226.8	645.3	-627.8	2.68	-2.49	
6,582.0	2.46	314.00	6,540.9	228.2	646.1	-628.6	11.75	-3.47	
6,629.0	7.08	277.17	6,587.7	229.3	642.5	-624.9	11.32	9.83	
6,676.0	11.78	272.78	6,634.1	229.9	634.9	-617.2	10.11	10.00	
6,724.0	15.38	269.08	6,680.7	230.0	623.6	-605.9	7.71	7.50	
6,771.0	18.11	267.24	6,725.7	229.6	610.1	-592.5	5.92	5.81	
6,819.0	20.35	267.94	6,771.0	228.9	594.3	-576.8	4.69	4.67	
6,866.0	22.90	269.70	6,814.7	228.6	577.0	-559.5	5.60	5.43	
6,913.0	23.60	274.18	6,857.9	229.2	558.4	-541.0	4.05	1.49	
6,960.0	25.53	273.74	6,900.7	230.5	538.9	-521.5	4.12	4.11	
7,008.0	29.05	272.34	6,943.3	231.7	517.0	-499.5	7.45	7.33	
7,055.0	32.52	268.82	6,983.7	231.9	492.9	-475.5	8.32	7.38	
7,103.0	36.61	266.54	7,023.2	230.8	465.7	-448.4	8.94	8.52	
7,150.0	40.96	265.48	7,059.8	228.7	436.4	-419.3	9.36	9.26	
7,197.0	44.52	266.10	7,094.3	226.4	404.6	-387.7	7.63	7.57	
7,244.0	46.45	267.85	7,127.3	224.6	371.1	-354.4	4.89	4.11	
7,291.0	49.97	269.35	7,158.6	223.8	336.1	-319.6	7.86	7.49	
7,338.0	54.10	270.23	7,187.5	223.6	299.0	-282.6	8.91	8.79	
7,386.0	57.52	271.63	7,214.5	224.3	259.3	-243.0	7.52	7.12	
7,433.0	60.03	272.07	7,238.9	225.6	219.2	-202.8	5.40	5.34	
7,481.0	62.80	271.28	7,261.8	226.8	177.0	-160.7	5.95	5.77	
7,528.0	66.09	270.58	7,282.1	227.5	134.7	-118.4	7.13	7.00	
7,575.0	70.84	270.31	7,299.3	227.8	90.9	-74.8	10.12	10.11	
7,622.0	75.72	271.81	7,312.9	228.7	46.0	-29.8	10.82	10.38	
7,669.0	80.99	272.95	7,322.3	230.6	0.0	16.2	11.46	11.21	
7,719.4	84.35	273.32	7,328.8	233.3	-49.9	66.1	6.70	6.66	TPZ - 7719.4' MD (2066 FNL, 460 FEL)
7,764.0	87.32	273.65	7,332.0	236.0	-94.3	110.6	6.70	6.66	
7,859.0	86.57	272.86	7,337.1	241.4	-189.0	205.5	1.15	-0.79	
7,953.0	87.94	272.34	7,341.6	245.7	-282.8	299.3	1.56	1.46	
8,048.0	89.91	271.28	7,343.4	248.7	-377.8	394.3	2.35	2.07	
8,142.0	90.92	269.88	7,342.7	249.6	-471.7	488.1	1.84	1.07	
8,237.0	91.27	270.14	7,340.9	249.7	-566.7	582.8	0.46	0.37	
8,331.0	90.70	269.00	7,339.2	248.9	-660.7	676.5	1.36	-0.61	
8,426.0	90.97	269.08	7,337.9	247.4	-755.7	771.2	0.30	0.28	
8,520.0	91.36	269.44	7,335.9	246.1	-849.7	864.8	0.56	0.41	
8,614.0	89.56	268.82	7,335.2	244.7	-943.6	958.5	2.03	-1.91	
8,709.0	89.43	268.56	7,336.0	242.5	-1,038.6	1,053.1	0.31	-0.14	
8,803.0	89.60	268.38	7,336.8	240.0	-1,132.6	1,146.6	0.26	0.18	
8,897.0	90.18	270.31	7,337.0	239.0	-1,226.6	1,240.3	2.14	0.62	
8,992.0	88.24	268.56	7,338.3	238.0	-1,321.5	1,335.0	2.75	-2.04	
9,087.0	88.24	267.68	7,341.2	234.9	-1,416.4	1,429.4	0.93	0.00	
9,181.0	88.33	267.59	7,344.0	231.0	-1,510.3	1,522.8	0.14	0.10	
9,276.0	88.15	267.33	7,347.0	226.8	-1,605.2	1,617.1	0.33	-0.19	
9,370.0	90.31	268.56	7,348.2	223.5	-1,699.1	1,710.6	2.64	2.30	
9,464.0	90.48	269.08	7,347.6	221.5	-1,793.1	1,804.2	0.58	0.18	
9,559.0	90.66	271.72	7,346.6	222.2	-1,888.1	1,899.0	2.79	0.19	
9,653.0	90.18	272.51	7,345.9	225.7	-1,982.0	1,992.9	0.98	-0.51	
9,747.0	90.53	271.37	7,345.4	228.8	-2,075.9	2,086.9	1.27	0.37	
9,842.0	90.31	271.72	7,344.7	231.4	-2,170.9	2,181.8	0.44	-0.23	

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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
9,936.0	90.09	269.61	7,344.3	232.5	-2,264.9	2,275.6	2.26	-0.23	
10,030.0	91.06	267.59	7,343.4	230.2	-2,358.9	2,369.2	2.38	1.03	
10,125.0	91.89	268.38	7,341.0	226.8	-2,453.8	2,463.6	1.21	0.87	
10,219.0	92.20	269.70	7,337.6	225.3	-2,547.7	2,557.2	1.44	0.33	
10,314.0	90.31	267.50	7,335.5	223.0	-2,642.6	2,651.8	3.05	-1.99	
10,408.0	90.53	267.94	7,334.8	219.2	-2,736.6	2,745.2	0.52	0.23	
10,503.0	90.40	268.12	7,334.1	215.9	-2,831.5	2,839.7	0.23	-0.14	
10,597.0	88.86	266.89	7,334.7	211.9	-2,925.4	2,933.1	2.10	-1.64	
10,692.0	88.33	266.80	7,337.0	206.6	-3,020.2	3,027.3	0.57	-0.56	
10,786.0	87.72	268.73	7,340.2	203.0	-3,114.1	3,120.7	2.15	-0.65	
10,881.0	89.65	269.52	7,342.4	201.5	-3,209.1	3,215.3	2.20	2.03	
10,976.0	90.26	271.55	7,342.5	202.4	-3,304.0	3,310.1	2.23	0.64	
11,070.0	91.45	274.27	7,341.1	207.2	-3,397.9	3,404.1	3.16	1.27	
11,165.0	91.19	276.73	7,338.9	216.3	-3,492.4	3,499.0	2.60	-0.27	
11,260.0	91.19	276.55	7,336.9	227.3	-3,586.8	3,593.9	0.19	0.00	
11,354.0	91.41	276.73	7,334.8	238.1	-3,680.1	3,687.8	0.30	0.23	
11,449.0	91.27	276.55	7,332.6	249.1	-3,774.5	3,782.6	0.24	-0.15	
11,543.0	89.60	275.68	7,331.9	259.1	-3,867.9	3,876.6	2.00	-1.78	
11,638.0	89.56	275.41	7,332.6	268.3	-3,962.5	3,971.5	0.29	-0.04	
11,732.0	89.96	275.94	7,332.9	277.6	-4,056.0	4,065.5	0.71	0.43	
11,827.0	90.62	275.59	7,332.5	287.1	-4,150.5	4,160.4	0.79	0.69	
11,921.0	88.64	274.80	7,333.1	295.6	-4,244.1	4,254.4	2.27	-2.11	
11,943.0	88.73	274.71	7,333.6	297.5	-4,266.0	4,276.4	0.58	0.41	LAST SURVEY - 11943.0' MD
12,001.0	88.73	274.71	7,334.9	302.2	-4,323.8	4,334.4	0.00	0.00	PTB - 12001.0' MD (2051 FNL, 465 FWL)

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1H-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 1H-33H-H367	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<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 - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Herren 1H-33H-H367 TF - actual wellpath misses target center by 42.1ft at 7715.3ft MD (7328.4 TVD, 233.1 N, -45.9 E) - Point	0.00	0.00	7,290.0	249.9	-49.9	1,310,414.07	3,171,165.36	40.183853	-104.887397
Herren 1H 1706' TGT - actual wellpath misses target center by 6.5ft at 9376.8ft MD (7348.2 TVD, 223.3 N, -1705.9 E) - Point	0.00	0.00	7,344.0	228.3	-1,706.0	1,310,380.95	3,169,509.44	40.183793	-104.893324
Herren 1H 3358' TGT - actual wellpath misses target center by 19.1ft at 11031.0ft MD (7341.9 TVD, 204.7 N, -3359.0 E) - Point	0.00	0.00	7,339.0	223.5	-3,358.0	1,310,364.74	3,167,857.51	40.183779	-104.899237
Herren 1H-33H-H367 BT - actual wellpath misses target center by 6.7ft at 12001.0ft MD (7334.9 TVD, 302.2 N, -4323.8 E) - Point	0.00	0.00	7,339.0	303.9	-4,328.9	1,310,438.42	3,166,886.12	40.184000	-104.902711
Herren 1H 50' TGT - actual wellpath misses target center by 19.9ft at 7721.3ft MD (7329.0 TVD, 233.4 N, -51.8 E) - Point	0.00	0.00	7,340.0	249.9	-50.0	1,310,414.07	3,171,165.25	40.183853	-104.887397

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,719.4	7,328.8	233.3	-49.9	TPZ - 7719.4' MD (2066 FNL, 460 FEL)	
11,943.0	7,333.6	297.5	-4,266.0	LAST SURVEY - 11943.0' MD	
12,001.0	7,334.9	302.2	-4,323.8	PTB - 12001.0' MD (2051 FNL, 465 FWL)	

Checked By: _____	Approved By: _____	Date: _____
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