

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1G-33H-H367
<b>Project:</b>	Sec 33 T3N-R67W	<b>TVD Reference:</b>	WELL @ 4871.0ft (Original Well Elev)
<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4871.0ft (Original Well Elev)
<b>Well:</b>	Herren 1G-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 1G-33H-H367					
Well Position	+N/-S	0.0 ft	Northing:	1,310,171.56 ft	Latitude:	40.183186
	+E/-W	0.0 ft	Easting:	3,171,224.04 ft	Longitude:	-104.887193
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,848.0 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	12/23/2018	8.40	66.57	52,128.00000000

Design	FINAL			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	278.21

<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>	
178.0	1,953.0	Survey #1 (Wellbore #1)	GYRO-MWD	OWSG Gyro MWD	
2,074.0	11,921.0	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	
178.0	0.35	134.47	178.0	-0.4	0.4	-0.4	0.20	0.20	
273.0	0.35	254.18	273.0	-0.7	0.3	-0.4	0.64	0.00	
367.0	0.44	257.52	367.0	-0.8	-0.3	0.2	0.10	0.10	
462.0	1.23	103.10	462.0	-1.1	0.3	-0.5	1.72	0.83	
556.0	2.82	80.07	555.9	-1.0	3.6	-3.7	1.87	1.69	
650.0	4.84	64.51	649.7	1.1	9.4	-9.2	2.40	2.15	
745.0	7.21	62.84	744.2	5.6	18.4	-17.4	2.50	2.49	
839.0	8.36	48.08	837.3	12.9	28.7	-26.6	2.44	1.22	
914.0	8.12	45.19	911.6	20.2	36.5	-33.3	0.64	-0.32	
1,008.0	8.22	41.26	1,004.6	30.0	45.7	-40.9	0.60	0.11	
1,102.0	8.82	47.89	1,097.6	39.8	55.4	-49.2	1.22	0.64	

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<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4871.0ft (Original Well Elev)
<b>Well:</b>	Herren 1G-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
1,197.0	9.44	56.55	1,191.4	49.0	67.3	-59.6	1.58	0.65	
1,292.0	9.42	55.94	1,285.1	57.7	80.3	-71.2	0.11	-0.02	
1,386.0	9.05	53.18	1,377.9	66.4	92.6	-82.1	0.61	-0.39	
1,481.0	8.22	43.20	1,471.8	75.8	103.2	-91.3	1.80	-0.87	
1,575.0	7.35	57.32	1,564.9	84.0	112.9	-99.7	2.23	-0.93	
1,669.0	6.28	51.46	1,658.3	90.4	121.9	-107.8	1.36	-1.14	
1,764.0	5.23	40.51	1,752.8	97.0	128.8	-113.7	1.59	-1.11	
1,859.0	6.68	53.91	1,847.3	103.5	136.1	-119.9	2.10	1.53	
1,953.0	8.85	62.60	1,940.4	110.1	146.9	-129.7	2.62	2.31	
2,074.0	8.22	59.11	2,060.1	118.8	162.6	-144.0	0.67	-0.52	
2,168.0	9.27	60.87	2,153.0	125.9	175.0	-155.2	1.15	1.12	
2,262.0	8.75	56.48	2,245.8	133.6	187.6	-166.6	0.92	-0.55	
2,356.0	7.82	52.79	2,338.8	141.4	198.6	-176.4	1.14	-0.99	
2,450.0	8.53	51.47	2,431.9	149.6	209.2	-185.7	0.78	0.76	
2,545.0	7.82	47.51	2,525.9	158.3	219.5	-194.6	0.95	-0.75	
2,639.0	8.88	52.96	2,618.9	167.0	230.0	-203.8	1.41	1.13	
2,734.0	8.35	51.73	2,712.9	175.7	241.2	-213.7	0.59	-0.56	
2,828.0	7.73	49.01	2,805.9	184.1	251.4	-222.5	0.77	-0.66	
2,922.0	8.35	46.28	2,899.0	193.0	261.1	-230.8	0.77	0.66	
3,016.0	7.65	44.08	2,992.1	202.2	270.4	-238.7	0.81	-0.74	
3,111.0	8.92	46.63	3,086.1	211.8	280.1	-247.0	1.39	1.34	
3,206.0	7.16	44.44	3,180.2	221.0	289.6	-255.1	1.88	-1.85	
3,300.0	7.52	39.25	3,273.4	230.0	297.6	-261.7	0.80	0.38	
3,395.0	9.36	49.80	3,367.4	239.8	307.4	-270.0	2.52	1.94	
3,489.0	7.87	51.29	3,460.3	248.8	318.3	-279.5	1.60	-1.59	
3,583.0	5.63	49.80	3,553.6	255.8	326.8	-287.0	2.39	-2.38	
3,678.0	6.02	53.22	3,648.2	261.7	334.4	-293.6	0.55	0.41	
3,796.0	6.99	57.80	3,765.4	269.3	345.4	-303.4	0.93	0.82	
3,891.0	8.22	50.32	3,859.6	276.7	355.5	-312.4	1.66	1.29	
3,984.0	10.20	52.08	3,951.4	286.0	367.2	-322.6	2.15	2.13	
4,079.0	8.17	41.10	4,045.1	296.3	378.2	-332.1	2.81	-2.14	
4,174.0	7.95	45.31	4,139.2	306.0	387.3	-339.7	0.66	-0.23	
4,268.0	7.69	46.98	4,232.3	314.8	396.6	-347.5	0.37	-0.28	
4,363.0	7.87	60.34	4,326.5	322.4	406.9	-356.7	1.91	0.19	
4,458.0	10.37	61.13	4,420.3	329.7	420.0	-368.6	2.63	2.63	
4,552.0	9.49	60.34	4,512.8	337.7	434.1	-381.5	0.95	-0.94	
4,646.0	8.31	58.41	4,605.7	345.0	446.7	-392.8	1.29	-1.26	
4,741.0	6.77	55.16	4,699.9	351.8	457.1	-402.2	1.68	-1.62	
4,836.0	7.65	56.92	4,794.1	358.5	467.0	-411.0	0.95	0.93	
4,930.0	10.59	56.13	4,886.9	366.7	479.4	-422.1	3.13	3.13	
5,024.0	8.66	51.38	4,979.6	376.0	492.1	-433.4	2.22	-2.05	
5,119.0	9.40	52.70	5,073.4	385.1	503.9	-443.7	0.81	0.78	
5,213.0	7.52	48.48	5,166.4	393.9	514.6	-453.1	2.10	-2.00	
5,308.0	9.54	53.40	5,260.4	402.7	525.6	-462.7	2.26	2.13	
5,403.0	7.34	49.01	5,354.3	411.3	536.5	-472.2	2.41	-2.32	
5,498.0	8.83	58.42	5,448.4	419.1	547.3	-481.8	2.09	1.57	
5,592.0	6.72	53.05	5,541.5	426.2	557.8	-491.2	2.37	-2.24	
5,686.0	8.44	56.65	5,634.7	433.3	568.0	-500.3	1.90	1.83	
5,781.0	6.77	52.08	5,728.9	440.6	578.2	-509.4	1.87	-1.76	
5,875.0	7.25	57.27	5,822.2	447.2	587.6	-517.7	0.84	0.51	
5,969.0	5.98	53.31	5,915.5	453.3	596.5	-525.6	1.43	-1.35	
6,064.0	7.16	50.94	6,009.9	460.0	605.1	-533.2	1.27	1.24	
6,158.0	8.35	53.58	6,103.0	467.8	615.1	-542.0	1.32	1.27	

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<b>Well:</b>	Herren 1G-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
6,252.0	9.84	52.43	6,195.9	476.7	627.0	-552.5	1.60	1.59	
6,347.0	7.69	49.01	6,289.7	485.8	638.2	-562.3	2.33	-2.26	
6,442.0	7.30	14.99	6,384.0	495.9	644.6	-567.1	4.62	-0.41	
6,489.0	10.81	352.76	6,430.4	503.1	644.8	-566.3	10.41	7.47	
6,536.0	14.37	349.15	6,476.3	513.2	643.1	-563.2	7.75	7.57	
6,583.0	15.86	339.05	6,521.6	524.9	639.7	-558.2	6.43	3.17	
6,631.0	18.46	334.56	6,567.5	537.9	634.1	-550.8	6.08	5.42	
6,678.0	21.18	325.86	6,611.7	551.7	626.1	-540.9	8.52	5.79	
6,725.0	22.72	313.91	6,655.3	565.0	614.8	-527.8	10.03	3.28	
6,772.0	24.30	301.34	6,698.5	576.4	600.0	-511.6	11.16	3.36	
6,820.0	25.44	290.09	6,742.0	585.0	581.9	-492.4	10.12	2.37	
6,867.0	27.42	279.98	6,784.1	590.4	561.7	-471.7	10.45	4.21	
6,915.0	30.54	274.53	6,826.1	593.3	538.7	-448.5	8.51	6.50	
6,962.0	34.37	270.49	6,865.8	594.3	513.5	-423.4	9.36	8.15	
7,010.0	37.79	267.68	6,904.6	593.8	485.3	-395.5	7.91	7.12	
7,057.0	40.91	264.95	6,940.9	591.9	455.5	-366.3	7.59	6.64	
7,104.0	43.37	263.72	6,975.8	588.8	424.2	-335.7	5.52	5.23	
7,151.0	48.12	266.10	7,008.6	585.8	390.6	-303.0	10.74	10.11	
7,199.0	53.53	266.97	7,038.9	583.6	353.5	-266.5	11.36	11.27	
7,246.0	57.17	267.33	7,065.6	581.7	314.9	-228.6	7.77	7.74	
7,293.0	62.23	266.36	7,089.3	579.4	274.4	-188.8	10.91	10.77	
7,340.0	64.42	266.45	7,110.4	576.8	232.5	-147.7	4.66	4.66	
7,387.0	69.30	266.80	7,128.9	574.2	189.3	-105.4	10.41	10.38	
7,434.0	69.92	266.80	7,145.2	571.8	145.4	-62.2	1.32	1.32	
7,482.0	73.65	267.06	7,160.2	569.3	99.8	-17.5	7.79	7.77	
7,529.0	73.96	267.77	7,173.3	567.3	54.8	26.8	1.59	0.66	
7,577.0	77.39	270.40	7,185.2	566.6	8.3	72.7	8.90	7.15	
7,644.8	84.17	271.42	7,196.1	567.6	-58.6	139.1	10.11	10.00	TPZ - 7644.8' MD (1724 FNL, 460 FEL)
7,671.0	86.79	271.81	7,198.1	568.4	-84.7	165.0	10.11	10.00	
7,765.0	87.85	271.72	7,202.5	571.3	-178.6	258.3	1.13	1.13	
7,860.0	86.75	272.25	7,207.0	574.6	-273.4	352.7	1.29	-1.16	
7,955.0	89.69	271.90	7,210.0	578.0	-368.3	447.1	3.12	3.09	
8,049.0	89.25	270.93	7,210.8	580.3	-462.3	540.4	1.13	-0.47	
8,143.0	90.66	270.40	7,210.9	581.4	-556.2	633.6	1.60	1.50	
8,238.0	91.01	269.96	7,209.5	581.7	-651.2	727.6	0.59	0.37	
8,333.0	90.84	268.91	7,208.0	580.8	-746.2	821.5	1.12	-0.18	
8,427.0	90.44	268.73	7,206.9	578.8	-840.2	914.2	0.47	-0.43	
8,522.0	90.00	267.94	7,206.6	576.1	-935.1	1,007.8	0.95	-0.46	
8,616.0	90.66	269.96	7,206.0	574.4	-1,029.1	1,100.6	2.26	0.70	
8,710.0	90.53	270.05	7,205.1	574.4	-1,123.1	1,193.6	0.17	-0.14	
8,805.0	90.88	270.84	7,203.9	575.1	-1,218.1	1,287.8	0.91	0.37	
8,899.0	89.12	270.67	7,203.9	576.3	-1,312.1	1,381.0	1.88	-1.87	
8,993.0	88.95	270.58	7,205.5	577.4	-1,406.1	1,474.1	0.20	-0.18	
9,088.0	90.40	270.93	7,206.0	578.6	-1,501.1	1,568.3	1.57	1.53	
9,183.0	90.13	271.11	7,205.6	580.3	-1,596.1	1,662.6	0.34	-0.28	
9,277.0	89.69	270.84	7,205.7	581.9	-1,690.0	1,755.8	0.55	-0.47	
9,371.0	90.00	270.40	7,206.0	582.9	-1,784.0	1,849.0	0.57	0.33	
9,466.0	90.44	271.02	7,205.6	584.1	-1,879.0	1,943.2	0.80	0.46	
9,560.0	90.53	270.75	7,204.8	585.6	-1,973.0	2,036.4	0.30	0.10	
9,654.0	91.32	270.58	7,203.3	586.6	-2,067.0	2,129.6	0.86	0.84	
9,749.0	91.10	271.02	7,201.3	588.0	-2,162.0	2,223.8	0.52	-0.23	
9,843.0	90.04	271.98	7,200.4	590.4	-2,255.9	2,317.1	1.52	-1.13	
9,937.0	88.24	272.25	7,201.8	593.9	-2,349.8	2,410.6	1.94	-1.91	

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Survey									
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10,032.0	88.46	272.34	7,204.5	597.7	-2,444.7	2,505.0	0.25	0.23	
10,126.0	88.55	272.16	7,207.0	601.4	-2,538.6	2,598.5	0.21	0.10	
10,221.0	88.46	272.07	7,209.4	604.9	-2,633.5	2,692.9	0.13	-0.09	
10,315.0	89.08	271.81	7,211.4	608.1	-2,727.5	2,786.3	0.72	0.66	
10,410.0	88.24	271.90	7,213.7	611.2	-2,822.4	2,880.7	0.89	-0.88	
10,504.0	87.58	272.16	7,217.1	614.5	-2,916.3	2,974.1	0.75	-0.70	
10,599.0	89.39	271.81	7,219.6	617.8	-3,011.2	3,068.5	1.94	1.91	
10,693.0	88.15	272.42	7,221.6	621.2	-3,105.1	3,162.0	1.47	-1.32	
10,788.0	89.25	270.23	7,223.8	623.4	-3,200.0	3,256.2	2.58	1.16	
10,882.0	88.77	270.93	7,225.4	624.4	-3,294.0	3,349.4	0.90	-0.51	
10,977.0	91.67	268.21	7,225.0	623.7	-3,389.0	3,443.3	4.19	3.05	
11,072.0	90.62	267.50	7,223.1	620.1	-3,483.9	3,536.7	1.33	-1.11	
11,166.0	90.09	266.89	7,222.6	615.5	-3,577.8	3,629.0	0.86	-0.56	
11,261.0	91.32	268.29	7,221.4	611.5	-3,672.7	3,722.4	1.96	1.29	
11,355.0	90.00	269.70	7,220.3	609.9	-3,766.6	3,815.1	2.05	-1.40	
11,450.0	90.13	270.93	7,220.2	610.4	-3,861.6	3,909.2	1.30	0.14	
11,515.0	89.69	270.58	7,220.3	611.3	-3,926.6	3,973.7	0.86	-0.68	
11,610.0	89.39	270.58	7,221.1	612.2	-4,021.6	4,067.8	0.32	-0.32	
11,704.0	88.90	271.11	7,222.5	613.6	-4,115.6	4,161.1	0.77	-0.52	
11,799.0	88.07	270.84	7,225.0	615.2	-4,210.6	4,255.3	0.92	-0.87	
11,855.0	86.97	270.40	7,227.4	615.8	-4,266.5	4,310.7	2.12	-1.96	LAST SURVEY - 11855.0' MD
11,921.0	86.97	270.40	7,230.9	616.3	-4,332.4	4,376.0	0.00	0.00	PTB - 11921.0' MD (1730 FNL, 464 FWL)

## Survey Report

<b>Company:</b>	Crestone Peak Resources	<b>Local Co-ordinate Reference:</b>	Well Herren 1G-33H-H367
<b>Project:</b>	Sec 33 T3N-R67W	<b>TVD Reference:</b>	WELL @ 4871.0ft (Original Well Elev)
<b>Site:</b>	Herren Pad	<b>MD Reference:</b>	WELL @ 4871.0ft (Original Well Elev)
<b>Well:</b>	Herren 1G-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 1G 2093' TGT - actual wellpath misses target center by 12.0ft at 9680.3ft MD (7202.7 TVD, 586.9 N, -2093.3 E) - Point	0.00	0.00	7,197.0	597.5	-2,093.0	1,310,754.59	3,169,126.96	40.184826	-104.894684
Herren 1G 3587' TGT - actual wellpath misses target center by 11.6ft at 11175.4ft MD (7222.5 TVD, 615.0 N, -3587.1 E) - Point	0.00	0.00	7,211.0	616.3	-3,587.0	1,310,763.08	3,167,632.87	40.184877	-104.900031
Herren 1G 58' TGT - actual wellpath misses target center by 7.3ft at 7644.8ft MD (7196.1 TVD, 567.6 N, -58.6 E) - Point	0.00	0.00	7,202.0	571.9	-58.0	1,310,743.01	3,171,162.09	40.184756	-104.887400
Herren 1G-33H-H367 TF - actual wellpath misses target center by 46.1ft at 7637.5ft MD (7195.3 TVD, 567.5 N, -51.4 E) - Point	0.00	0.00	7,150.0	571.9	-58.6	1,310,743.01	3,171,161.45	40.184756	-104.887402
Herren 1G-33H-H367 Bt - actual wellpath misses target center by 12.6ft at 11921.0ft MD (7230.9 TVD, 616.3 N, -4332.4 E) - Point	0.00	0.00	7,224.0	625.8	-4,337.0	1,310,767.35	3,166,882.77	40.184903	-104.902716

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,644.8	7,196.1	567.6	-58.6	TPZ - 7644.8' MD (1724 FNL, 460 FEL)	
11,855.0	7,227.4	615.8	-4,266.5	LAST SURVEY - 11855.0' MD	
11,921.0	7,230.9	616.3	-4,332.4	PTB - 11921.0' MD (1730 FNL, 464 FWL)	

Checked By: _____	Approved By: _____	Date: _____
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