



Crestone Peak Resources

DJ BASIN

BIGHORN

BIGHORN 4Q-17H-P267

BIGHORN 4Q-17H-P267 OH

Survey: Survey #1

Standard Survey Report

25 March, 2019



CRESTONE PEAK
RESOURCES

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well BIGHORN 4Q-17H-P267
Project:	DJ BASIN	TVD Reference:	GL 4960' & RKB 23' @ 4983.0ft (Ensign 153)
Site:	BIGHORN	MD Reference:	GL 4960' & RKB 23' @ 4983.0ft (Ensign 153)
Well:	BIGHORN 4Q-17H-P267	North Reference:	True
Wellbore:	BIGHORN 4Q-17H-P267 OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	US_EDM

Project		DJ BASIN	
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		BIGHORN			
Site Position:		Northing:	1,292,097.01 usft	Latitude:	40.133684
From:	Lat/Long	Easting:	3,165,479.29 usft	Longitude:	-104.908162
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.38 °

Well	BIGHORN 4Q-17H-P267					
Well Position	+N/-S	0.0 ft	Northing:	1,292,096.96 usft	Latitude:	40.133681
	+E/-W	0.0 ft	Easting:	3,165,639.23 usft	Longitude:	-104.907590
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,960.0 ft

Wellbore	BIGHORN 4Q-17H-P267 OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	3/12/2019	8.28	66.53	52,079

Design	OH				
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	3.10	

Survey Program		Date	3/22/2019		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
165.0	14,879.0	Survey #1 (BIGHORN 4Q-17H-P267 OH)	MWD+HDGM	OWSG MWD + HDGM	

Survey										
	Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	165.0	1.23	268.86	165.0	0.0	-1.8	-0.1	0.75	0.75	0.00
	259.0	1.06	319.04	259.0	0.6	-3.3	0.4	1.05	-0.18	53.38
	353.0	1.23	311.92	353.0	1.9	-4.7	1.7	0.24	0.18	-7.57
	447.0	1.23	252.42	446.9	2.3	-6.4	2.0	1.30	0.00	-63.30
	542.0	2.38	195.64	541.9	0.1	-7.9	-0.3	2.10	1.21	-59.77
	636.0	3.87	192.57	635.8	-4.9	-9.1	-5.4	1.59	1.59	-3.27
	711.0	5.70	182.78	710.5	-11.1	-9.8	-11.6	2.66	2.44	-13.05
	805.0	7.51	177.10	803.9	-21.9	-9.8	-22.4	2.04	1.93	-6.04
	899.0	9.74	170.83	896.8	-35.9	-8.2	-36.2	2.57	2.37	-6.67

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Wellbore:	BIGHORN 4Q-17H-P267 OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
994.0	9.17	167.09	990.5	-51.2	-5.2	-51.4	0.88	-0.60	-3.94
1,088.0	9.80	170.56	1,083.2	-66.4	-2.2	-66.4	0.90	0.67	3.69
1,183.0	11.39	172.63	1,176.6	-83.6	0.3	-83.5	1.72	1.67	2.18
1,277.0	12.95	176.45	1,268.5	-103.4	2.2	-103.1	1.87	1.66	4.06
1,371.0	13.80	176.59	1,359.9	-125.1	3.5	-124.7	0.90	0.90	0.15
1,466.0	13.93	174.00	1,452.2	-147.7	5.3	-147.2	0.67	0.14	-2.73
1,560.0	13.29	170.33	1,543.5	-169.7	8.3	-169.0	1.14	-0.68	-3.90
1,655.0	12.51	173.46	1,636.1	-190.6	11.3	-189.7	1.10	-0.82	3.29
1,750.0	11.04	177.42	1,729.1	-210.0	12.9	-208.9	1.76	-1.55	4.17
1,845.0	10.79	182.99	1,822.4	-227.9	12.9	-226.9	1.14	-0.26	5.86
1,939.0	10.20	187.55	1,914.8	-245.0	11.3	-244.0	1.08	-0.63	4.85
2,034.0	10.27	186.41	2,008.3	-261.7	9.3	-260.8	0.23	0.07	-1.20
2,128.0	10.18	189.24	2,100.8	-278.2	7.0	-277.5	0.54	-0.10	3.01
2,223.0	10.92	191.62	2,194.2	-295.3	3.8	-294.7	0.90	0.78	2.51
2,317.0	10.92	188.54	2,286.5	-312.9	0.7	-312.4	0.62	0.00	-3.28
2,414.0	8.97	185.82	2,382.1	-329.5	-1.4	-329.1	2.07	-2.01	-2.80
2,509.0	9.58	170.70	2,475.8	-344.6	-0.9	-344.2	2.64	0.64	-15.92
2,604.0	10.64	174.22	2,569.4	-361.2	1.3	-360.6	1.29	1.12	3.71
2,698.0	12.13	177.21	2,661.5	-379.7	2.6	-379.0	1.70	1.59	3.18
2,792.0	11.52	176.33	2,753.5	-398.9	3.7	-398.1	0.68	-0.65	-0.94
2,887.0	12.84	181.60	2,846.4	-418.9	4.0	-418.1	1.82	1.39	5.55
2,981.0	12.22	179.49	2,938.1	-439.3	3.8	-438.5	0.82	-0.66	-2.24
3,076.0	11.34	177.03	3,031.1	-458.7	4.4	-457.8	1.07	-0.93	-2.59
3,169.0	12.13	182.13	3,122.2	-477.6	4.5	-476.6	1.40	0.85	5.48
3,264.0	10.99	179.14	3,215.3	-496.6	4.3	-495.7	1.36	-1.20	-3.15
3,358.0	10.02	176.50	3,307.7	-513.7	4.9	-512.7	1.15	-1.03	-2.81
3,453.0	10.82	183.89	3,401.1	-530.9	4.8	-529.9	1.64	0.84	7.78
3,547.0	11.78	179.14	3,493.3	-549.3	4.4	-548.2	1.42	1.02	-5.05
3,641.0	12.31	180.90	3,585.2	-568.9	4.3	-567.8	0.69	0.56	1.87
3,760.0	10.11	175.10	3,702.0	-592.0	5.0	-590.9	2.08	-1.85	-4.87
3,854.0	10.64	184.59	3,794.4	-608.9	5.0	-607.7	1.90	0.56	10.10
3,949.0	11.61	176.68	3,887.7	-627.2	4.9	-626.0	1.90	1.02	-8.33
4,043.0	12.05	184.06	3,979.7	-646.4	4.8	-645.2	1.67	0.47	7.85
4,137.0	11.43	183.01	4,071.7	-665.5	3.6	-664.3	0.70	-0.66	-1.12
4,231.0	14.25	180.72	4,163.3	-686.3	2.9	-685.2	3.05	3.00	-2.44
4,326.0	12.84	178.61	4,255.7	-708.6	3.0	-707.4	1.57	-1.48	-2.22
4,421.0	10.82	175.98	4,348.7	-728.0	3.9	-726.8	2.20	-2.13	-2.77
4,515.0	10.90	178.96	4,441.0	-745.7	4.7	-744.4	0.60	0.09	3.17
4,610.0	12.49	181.42	4,534.0	-765.0	4.6	-763.6	1.75	1.67	2.59
4,704.0	12.05	181.95	4,625.9	-784.9	4.0	-783.6	0.48	-0.47	0.56
4,799.0	11.08	182.30	4,718.9	-804.0	3.3	-802.6	1.02	-1.02	0.37
4,893.0	9.41	181.42	4,811.4	-820.7	2.8	-819.3	1.78	-1.78	-0.94
4,988.0	9.85	180.55	4,905.1	-836.6	2.5	-835.2	0.49	0.46	-0.92
5,082.0	10.82	181.78	4,997.6	-853.4	2.1	-852.1	1.06	1.03	1.31

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Survey									
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5,176.0	12.49	173.87	5,089.6	-872.4	3.0	-870.9	2.46	1.78	-8.41
5,270.0	11.17	173.51	5,181.6	-891.5	5.1	-889.9	1.41	-1.40	-0.38
5,364.0	9.50	172.11	5,274.1	-908.3	7.2	-906.5	1.80	-1.78	-1.49
5,459.0	10.20	180.72	5,367.7	-924.4	8.1	-922.6	1.71	0.74	9.06
5,553.0	10.90	180.72	5,460.1	-941.6	7.9	-939.8	0.74	0.74	0.00
5,647.0	11.43	174.22	5,552.3	-959.8	8.7	-957.9	1.45	0.56	-6.91
5,741.0	12.31	174.22	5,644.3	-979.0	10.7	-977.0	0.94	0.94	0.00
5,835.0	12.40	174.92	5,736.2	-999.1	12.6	-996.9	0.19	0.10	0.74
5,930.0	11.43	177.73	5,829.1	-1,018.6	13.9	-1,016.4	1.19	-1.02	2.96
6,024.0	11.78	182.30	5,921.2	-1,037.5	13.9	-1,035.2	1.05	0.37	4.86
6,119.0	11.78	178.96	6,014.2	-1,056.9	13.6	-1,054.6	0.72	0.00	-3.52
6,213.0	11.61	175.80	6,106.2	-1,075.9	14.5	-1,073.6	0.70	-0.18	-3.36
6,308.0	11.43	176.85	6,199.3	-1,094.9	15.7	-1,092.4	0.29	-0.19	1.11
6,402.0	12.22	175.45	6,291.3	-1,114.1	17.0	-1,111.5	0.89	0.84	-1.49
6,497.0	11.70	181.07	6,384.3	-1,133.7	17.6	-1,131.1	1.34	-0.55	5.92
6,591.0	7.91	179.49	6,476.9	-1,149.7	17.5	-1,147.1	4.04	-4.03	-1.68
6,686.0	2.20	322.58	6,571.6	-1,154.8	16.5	-1,152.3	10.27	-6.01	150.62
6,780.0	10.73	341.03	6,664.9	-1,145.1	12.5	-1,142.8	9.22	9.07	19.63
6,874.0	14.33	354.57	6,756.7	-1,125.2	8.6	-1,123.1	4.92	3.83	14.40
6,968.0	19.52	355.45	6,846.6	-1,098.0	6.2	-1,096.0	5.53	5.52	0.94
7,062.0	25.32	0.55	6,933.5	-1,062.2	5.2	-1,060.4	6.50	6.17	5.43
7,157.0	31.30	359.14	7,017.1	-1,017.2	5.0	-1,015.4	6.33	6.29	-1.48
7,251.0	38.43	3.36	7,094.2	-963.5	6.4	-961.8	8.00	7.59	4.49
7,345.0	45.46	3.89	7,164.0	-900.8	10.3	-899.0	7.49	7.48	0.56
7,439.0	53.55	2.48	7,225.0	-829.5	14.3	-827.5	8.68	8.61	-1.50
7,534.0	59.62	0.72	7,277.3	-750.3	16.4	-748.3	6.57	6.39	-1.85
7,629.0	68.85	0.55	7,318.6	-664.9	17.4	-662.9	9.72	9.72	-0.18
7,723.0	75.62	3.36	7,347.2	-575.4	20.5	-573.5	7.74	7.20	2.99
7,818.0	80.72	5.99	7,366.7	-482.8	28.1	-480.6	6.01	5.37	2.77
7,842.1	82.57	6.08	7,370.2	-459.1	30.6	-456.8	7.69	7.68	0.38
Bighorn 4Q-17H-P267 TPZ 460'FSL & 600'FEL, Sec.17									
7,913.0	88.02	6.35	7,376.0	-388.9	38.2	-386.3	7.69	7.68	0.38
8,007.0	88.55	5.82	7,378.8	-295.5	48.2	-292.4	0.80	0.56	-0.56
8,102.0	88.99	4.94	7,380.9	-200.9	57.1	-197.5	1.04	0.46	-0.93
8,197.0	89.43	6.70	7,382.2	-106.4	66.7	-102.6	1.91	0.46	1.85
8,291.0	90.75	8.81	7,382.0	-13.3	79.4	-9.0	2.65	1.40	2.24
8,384.0	90.75	8.63	7,380.8	78.6	93.5	83.6	0.19	0.00	-0.19
8,479.0	90.92	7.93	7,379.4	172.6	107.2	178.2	0.76	0.18	-0.74
8,574.0	91.63	9.86	7,377.3	266.5	121.9	272.7	2.16	0.75	2.03
8,668.0	91.36	8.63	7,374.9	359.2	137.0	366.1	1.34	-0.29	-1.31
8,762.0	91.28	8.10	7,372.7	452.2	150.6	459.7	0.57	-0.09	-0.56
8,856.0	90.66	9.86	7,371.1	545.0	165.3	553.2	1.98	-0.66	1.87
8,950.0	91.01	9.69	7,369.8	637.7	181.2	646.5	0.41	0.37	-0.18

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9,044.0	90.92	8.63	7,368.2	730.4	196.2	740.0	1.13	-0.10	-1.13
9,139.0	89.34	9.69	7,368.0	824.2	211.3	834.4	2.00	-1.66	1.12
9,233.0	88.64	8.63	7,369.6	917.0	226.3	927.9	1.35	-0.74	-1.13
9,327.0	88.37	8.63	7,372.1	1,009.9	240.4	1,021.4	0.29	-0.29	0.00
9,422.0	88.81	8.10	7,374.4	1,103.9	254.2	1,116.0	0.72	0.46	-0.56
9,515.0	88.55	7.58	7,376.5	1,196.0	266.9	1,208.7	0.63	-0.28	-0.56
9,610.0	90.75	8.46	7,377.1	1,290.0	280.1	1,303.3	2.49	2.32	0.93
9,704.0	90.57	8.10	7,376.0	1,383.1	293.7	1,396.9	0.43	-0.19	-0.38
9,799.0	90.22	7.93	7,375.4	1,477.1	306.9	1,491.6	0.41	-0.37	-0.18
9,893.0	90.84	10.74	7,374.5	1,569.9	322.2	1,585.0	3.06	0.66	2.99
9,987.0	91.28	11.09	7,372.8	1,662.1	340.0	1,678.1	0.60	0.47	0.37
10,082.0	89.34	8.10	7,372.3	1,755.8	355.8	1,772.5	3.75	-2.04	-3.15
10,176.0	88.72	7.40	7,373.9	1,848.9	368.5	1,866.1	0.99	-0.66	-0.74
10,270.0	89.43	5.47	7,375.4	1,942.3	379.0	1,960.0	2.19	0.76	-2.05
10,365.0	89.16	5.64	7,376.5	2,036.9	388.2	2,054.9	0.34	-0.28	0.18
10,459.0	90.57	4.24	7,376.8	2,130.5	396.3	2,148.8	2.11	1.50	-1.49
10,509.2	90.57	2.75	7,376.3	2,180.6	399.4	2,199.0	2.97	0.00	-2.97
BIGHORN 4Q 2181' TGT									
10,554.0	90.57	1.42	7,375.8	2,225.4	401.0	2,243.8	2.97	0.00	-2.97
10,648.0	91.36	359.49	7,374.2	2,319.4	401.7	2,337.7	2.22	0.84	-2.05
10,743.0	91.45	358.44	7,371.9	2,414.3	400.0	2,432.4	1.11	0.09	-1.11
10,838.0	91.28	357.73	7,369.6	2,509.2	396.8	2,527.0	0.77	-0.18	-0.75
10,932.0	91.89	359.67	7,367.0	2,603.2	394.7	2,620.7	2.16	0.65	2.06
11,027.0	91.89	0.19	7,363.9	2,698.1	394.6	2,715.5	0.55	0.00	0.55
11,122.0	90.40	359.84	7,362.0	2,793.1	394.6	2,810.3	1.61	-1.57	-0.37
11,216.0	90.48	359.49	7,361.3	2,887.1	394.1	2,904.2	0.38	0.09	-0.37
11,311.0	90.48	359.14	7,360.5	2,982.1	392.9	2,999.0	0.37	0.00	-0.37
11,405.0	90.57	358.79	7,359.6	3,076.1	391.2	3,092.7	0.38	0.10	-0.37
11,499.0	89.60	0.55	7,359.5	3,170.1	390.7	3,186.5	2.14	-1.03	1.87
11,593.0	89.78	0.90	7,360.0	3,264.0	391.9	3,280.5	0.42	0.19	0.37
11,688.0	89.43	0.02	7,360.7	3,359.0	392.7	3,375.4	1.00	-0.37	-0.93
11,783.0	89.34	359.32	7,361.7	3,454.0	392.1	3,470.2	0.74	-0.09	-0.74
11,878.0	88.99	359.32	7,363.1	3,549.0	391.0	3,565.0	0.37	-0.37	0.00
11,972.0	88.99	358.96	7,364.7	3,643.0	389.6	3,658.7	0.38	0.00	-0.38
12,067.0	88.99	358.08	7,366.4	3,737.9	387.1	3,753.4	0.93	0.00	-0.93
12,162.0	89.43	358.96	7,367.7	3,832.9	384.7	3,848.1	1.04	0.46	0.93
12,256.0	91.54	358.96	7,366.9	3,926.9	383.0	3,941.8	2.24	2.24	0.00
12,270.4	91.62	359.36	7,366.5	3,941.2	382.7	3,956.2	2.86	0.57	2.81
BIGHORN 4Q 3941' TGT									
12,350.0	92.07	1.60	7,363.9	4,020.8	383.4	4,035.7	2.86	0.56	2.81
12,445.0	91.63	0.19	7,360.9	4,115.8	384.9	4,130.5	1.55	-0.46	-1.48
12,539.0	92.59	2.30	7,357.4	4,209.7	386.9	4,224.4	2.46	1.02	2.24
12,634.0	92.77	2.13	7,353.0	4,304.5	390.6	4,319.3	0.26	0.19	-0.18
12,728.0	90.22	0.72	7,350.5	4,398.4	392.9	4,413.2	3.10	-2.71	-1.50

Company:	Crestone Peak Resources	Local Co-ordinate Reference:	Well BIGHORN 4Q-17H-P267
Project:	DJ BASIN	TVD Reference:	GL 4960' & RKB 23' @ 4983.0ft (Ensign 153)
Site:	BIGHORN	MD Reference:	GL 4960' & RKB 23' @ 4983.0ft (Ensign 153)
Well:	BIGHORN 4Q-17H-P267	North Reference:	True
Wellbore:	BIGHORN 4Q-17H-P267 OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	US_EDM

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,822.0	89.25	1.60	7,351.0	4,492.4	394.8	4,507.2	1.39	-1.03	0.94	
12,917.0	89.16	1.07	7,352.3	4,587.4	397.1	4,602.1	0.57	-0.09	-0.56	
13,011.0	88.99	0.90	7,353.8	4,681.3	398.7	4,696.0	0.26	-0.18	-0.18	
13,105.0	89.08	0.19	7,355.4	4,775.3	399.6	4,789.9	0.76	0.10	-0.76	
13,199.0	89.08	0.02	7,356.9	4,869.3	399.7	4,883.8	0.18	0.00	-0.18	
13,293.0	89.16	359.67	7,358.3	4,963.3	399.5	4,977.6	0.38	0.09	-0.37	
13,387.0	89.16	358.96	7,359.7	5,057.3	398.4	5,071.4	0.76	0.00	-0.76	
13,482.0	90.75	1.07	7,359.8	5,152.3	398.4	5,166.3	2.78	1.67	2.22	
13,576.0	90.92	0.90	7,358.4	5,246.2	400.0	5,260.2	0.26	0.18	-0.18	
13,671.0	90.84	0.19	7,356.9	5,341.2	400.9	5,355.1	0.75	-0.08	-0.75	
13,766.0	91.19	359.84	7,355.3	5,436.2	400.9	5,449.9	0.52	0.37	-0.37	
13,861.0	90.75	1.78	7,353.7	5,531.2	402.3	5,544.8	2.09	-0.46	2.04	
13,956.0	91.19	1.07	7,352.1	5,626.1	404.6	5,639.8	0.88	0.46	-0.75	
14,050.0	89.16	359.84	7,351.8	5,720.1	405.4	5,733.7	2.53	-2.16	-1.31	
14,144.0	89.87	0.19	7,352.6	5,814.1	405.4	5,827.5	0.84	0.76	0.37	
14,239.0	90.13	359.84	7,352.6	5,909.1	405.4	5,922.4	0.46	0.27	-0.37	
14,333.0	90.04	359.32	7,352.4	6,003.1	404.7	6,016.2	0.56	-0.10	-0.55	
14,428.0	89.96	358.96	7,352.4	6,098.1	403.3	6,111.0	0.39	-0.08	-0.38	
14,522.0	90.04	358.79	7,352.4	6,192.1	401.5	6,204.7	0.20	0.09	-0.18	
14,616.0	89.96	355.98	7,352.4	6,286.0	397.2	6,298.3	2.99	-0.09	-2.99	
14,711.0	88.99	353.51	7,353.3	6,380.6	388.5	6,392.2	2.79	-1.02	-2.60	
14,805.0	88.72	351.58	7,355.2	6,473.8	376.3	6,484.6	2.07	-0.29	-2.05	
14,819.0	88.55	351.76	7,355.5	6,487.6	374.3	6,498.3	1.77	-1.21	1.29	
Last Survey - 14,819' MD										
14,879.0	88.55	351.00	7,357.0	6,546.9	365.3	6,557.1	1.27	0.00	-1.27	
PTB - 2188°FSL, 476°FEL, Sec.8 - Bighorn 4Q-17H-P267 BHL 5.24 2190°FSL & 486°FEL										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
14,819.0	7,355.5	6,487.6	374.3	Last Survey - 14,819' MD	
14,879.0	7,357.0	6,546.9	365.3	PTB - 2188°FSL, 476°FEL, Sec.8	

Checked By: _____	Approved By: _____	Date: _____
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