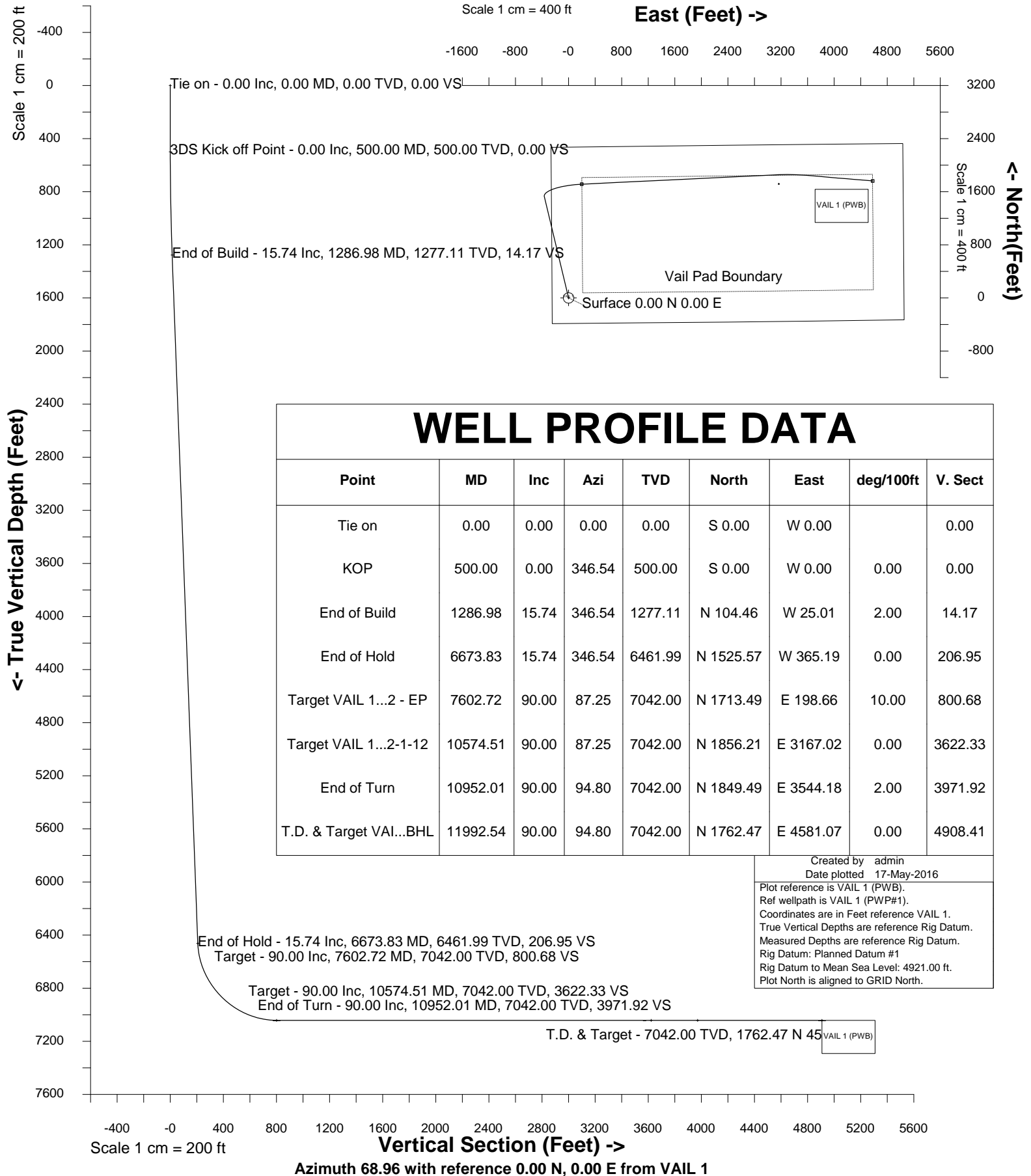


# Cub Creek Energy, LLC

Location	Weld County, CO	Slot	VAIL 1
Field	WATTENBERG	Well	VAIL 1
Installation	Vail Pad - Rev 03 - 05-13-2016	Wellbore	VAIL 1 (PWB)





SYSDRILL  
Well Design Combined Report  
Wellbore: VAIL 1 (PWB)



### Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
VAIL 1	40.32940000	-104.95988000	1363299.8308	3150584.7385	0.00N	0.00E	0.00

### Declination

Date	Source	Time
May-16-2016	EMM-2015 [2000.0-2020.0]	11:20

### Installation Details

Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Vail Pad - Rev 03 - 05-13-2016	40.32940000	-104.95988000	1363299.8308	3150584.7385	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

### Summary Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	1363299.83	3150584.74
500.00	0.00	346.540	500.00	0.00N	0.00E	==>	0.00	1363299.83	3150584.74
1286.98	15.74	346.540	1277.11	104.46N	25.01W	2.00	14.17	1363404.29	3150559.73
6673.83	15.74	346.540	6461.99	1525.57N	365.19W	==>	206.95	1364825.34	3150219.56
7602.72	90.00	87.250	7042.00	1713.49N	198.66E	10.00	800.68	1365013.24	3150783.39
10574.51	90.00	87.250	7042.00	1856.21N	3167.02E	==>	3622.33	1365155.96	3153751.62
10952.01	90.00	94.800	7042.00	1849.49N	3544.18E	2.00	3971.92	1365149.23	3154128.77
11992.54	90.00	94.800	7042.00	1762.47N	4581.07E	==>	4908.41	1365062.22	3155165.61

### Interpolated Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
0.00	0.00	0.000	0.00	0.00N	0.00E		0.00	Slot Datum
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	
500.00	0.00	346.540	500.00	0.00N	0.00E	==>	0.00	
600.00	2.00	346.540	599.98	1.70N	0.41W	2.00	0.23	
700.00	4.00	346.540	699.84	6.79N	1.62W	2.00	0.92	
800.00	6.00	346.540	799.45	15.26N	3.65W	2.00	2.07	
900.00	8.00	346.540	898.70	27.11N	6.49W	2.00	3.68	
1000.00	10.00	346.540	997.47	42.33N	10.13W	2.00	5.74	
1100.00	12.00	346.540	1095.62	60.88N	14.57W	2.00	8.26	
1200.00	14.00	346.540	1193.06	82.76N	19.81W	2.00	11.23	
1300.00	15.74	346.540	1289.65	107.90N	25.83W	==>	14.64	
1400.00	15.74	346.540	1385.90	134.28N	32.14W	==>	18.22	
1500.00	15.74	346.540	1482.15	160.66N	38.46W	==>	21.79	
1600.00	15.74	346.540	1578.40	187.04N	44.77W	==>	25.37	
1700.00	15.74	346.540	1674.65	213.42N	51.09W	==>	28.95	
1800.00	15.74	346.540	1770.90	239.81N	57.40W	==>	32.53	
1900.00	15.74	346.540	1867.15	266.19N	63.72W	==>	36.11	
2000.00	15.74	346.540	1963.40	292.57N	70.04W	==>	39.69	
2100.00	15.74	346.540	2059.65	318.95N	76.35W	==>	43.27	
2200.00	15.74	346.540	2155.91	345.33N	82.67W	==>	46.85	
2300.00	15.74	346.540	2252.16	371.71N	88.98W	==>	50.42	
2400.00	15.74	346.540	2348.41	398.09N	95.30W	==>	54.00	
2500.00	15.74	346.540	2444.66	424.47N	101.61W	==>	57.58	
2600.00	15.74	346.540	2540.91	450.85N	107.93W	==>	61.16	
2700.00	15.74	346.540	2637.16	477.24N	114.24W	==>	64.74	
2800.00	15.74	346.540	2733.41	503.62N	120.56W	==>	68.32	
2900.00	15.74	346.540	2829.66	530.00N	126.87W	==>	71.90	
3000.00	15.74	346.540	2925.91	556.38N	133.19W	==>	75.48	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 4921.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 68.960 degrees  
Bottom hole distance is 4908.41 Feet on azimuth 68.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by IPT  
Date Printed: 17-May-2016

Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3100.00	15.74	346.540	3022.16	582.76N	139.50W	==>	79.05	
3200.00	15.74	346.540	3118.41	609.14N	145.82W	==>	82.63	
3300.00	15.74	346.540	3214.66	635.52N	152.13W	==>	86.21	
3400.00	15.74	346.540	3310.91	661.90N	158.45W	==>	89.79	
3500.00	15.74	346.540	3407.16	688.28N	164.76W	==>	93.37	
3600.00	15.74	346.540	3503.41	714.66N	171.08W	==>	96.95	
3700.00	15.74	346.540	3599.66	741.05N	177.39W	==>	100.53	
3800.00	15.74	346.540	3695.91	767.43N	183.71W	==>	104.10	
3900.00	15.74	346.540	3792.16	793.81N	190.02W	==>	107.68	
4000.00	15.74	346.540	3888.41	820.19N	196.34W	==>	111.26	
4100.00	15.74	346.540	3984.66	846.57N	202.65W	==>	114.84	
4200.00	15.74	346.540	4080.92	872.95N	208.97W	==>	118.42	
4300.00	15.74	346.540	4177.17	899.33N	215.28W	==>	122.00	
4400.00	15.74	346.540	4273.42	925.71N	221.60W	==>	125.58	
4500.00	15.74	346.540	4369.67	952.09N	227.91W	==>	129.16	
4600.00	15.74	346.540	4465.92	978.48N	234.23W	==>	132.73	
4700.00	15.74	346.540	4562.17	1004.86N	240.54W	==>	136.31	
4800.00	15.74	346.540	4658.42	1031.24N	246.86W	==>	139.89	
4900.00	15.74	346.540	4754.67	1057.62N	253.17W	==>	143.47	
5000.00	15.74	346.540	4850.92	1084.00N	259.49W	==>	147.05	
5100.00	15.74	346.540	4947.17	1110.38N	265.80W	==>	150.63	
5200.00	15.74	346.540	5043.42	1136.76N	272.12W	==>	154.21	
5300.00	15.74	346.540	5139.67	1163.14N	278.43W	==>	157.79	
5400.00	15.74	346.540	5235.92	1189.52N	284.75W	==>	161.36	
5500.00	15.74	346.540	5332.17	1215.91N	291.06W	==>	164.94	
5600.00	15.74	346.540	5428.42	1242.29N	297.38W	==>	168.52	
5700.00	15.74	346.540	5524.67	1268.67N	303.69W	==>	172.10	
5800.00	15.74	346.540	5620.92	1295.05N	310.01W	==>	175.68	
5900.00	15.74	346.540	5717.17	1321.43N	316.32W	==>	179.26	
6000.00	15.74	346.540	5813.42	1347.81N	322.64W	==>	182.84	
6100.00	15.74	346.540	5909.67	1374.19N	328.96W	==>	186.41	
6200.00	15.74	346.540	6005.93	1400.57N	335.27W	==>	189.99	
6300.00	15.74	346.540	6102.18	1426.95N	341.59W	==>	193.57	
6400.00	15.74	346.540	6198.43	1453.34N	347.90W	==>	197.15	
6500.00	15.74	346.540	6294.68	1479.72N	354.22W	==>	200.73	
6600.00	15.74	346.540	6390.93	1506.10N	360.53W	==>	204.31	
6700.00	15.48	356.230	6487.20	1532.51N	366.25W	10.00	208.46	
6800.00	18.22	29.960	6583.12	1559.44N	359.30W	10.00	224.61	
6900.00	24.88	50.590	6676.21	1586.41N	335.18W	10.00	256.81	
7000.00	33.19	62.200	6763.63	1612.60N	294.61W	10.00	304.07	
7100.00	42.17	69.440	6842.74	1637.21N	238.84W	10.00	364.97	
7200.00	51.47	74.510	6911.12	1659.50N	169.54W	10.00	437.64	
7300.00	60.93	78.390	6966.70	1678.79N	88.84W	10.00	519.89	
7400.00	70.49	81.620	7007.80	1694.49N	0.83E	10.00	609.21	
7500.00	80.10	84.480	7033.15	1706.13N	96.72E	10.00	702.90	
7600.00	89.74	87.170	7041.99	1713.36N	195.94E	10.00	798.09	
7700.00	90.00	87.250	7042.00	1718.16N	295.83E	==>	893.04	
7800.00	90.00	87.250	7042.00	1722.96N	395.71E	==>	987.99	
7900.00	90.00	87.250	7042.00	1727.77N	495.59E	==>	1082.93	
8000.00	90.00	87.250	7042.00	1732.57N	595.48E	==>	1177.88	
8100.00	90.00	87.250	7042.00	1737.37N	695.36E	==>	1272.83	
8200.00	90.00	87.250	7042.00	1742.17N	795.25E	==>	1367.78	
8300.00	90.00	87.250	7042.00	1746.98N	895.13E	==>	1462.73	
8400.00	90.00	87.250	7042.00	1751.78N	995.02E	==>	1557.67	
8500.00	90.00	87.250	7042.00	1756.58N	1094.90E	==>	1652.62	
8600.00	90.00	87.250	7042.00	1761.39N	1194.79E	==>	1747.57	
8700.00	90.00	87.250	7042.00	1766.19N	1294.67E	==>	1842.52	
8800.00	90.00	87.250	7042.00	1770.99N	1394.56E	==>	1937.46	
8900.00	90.00	87.250	7042.00	1775.79N	1494.44E	==>	2032.41	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 4921.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 68.960 degrees  
Bottom hole distance is 4908.41 Feet on azimuth 68.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by IPT  
Date Printed: 17-May-2016



SYS DRILL  
Well Design Combined Report  
Wellbore: VAIL 1 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
9000.00	90.00	87.250	7042.00	1780.60N	1594.33E	==>	2127.36	
9100.00	90.00	87.250	7042.00	1785.40N	1694.21E	==>	2222.31	
9200.00	90.00	87.250	7042.00	1790.20N	1794.09E	==>	2317.26	
9300.00	90.00	87.250	7042.00	1795.00N	1893.98E	==>	2412.20	
9400.00	90.00	87.250	7042.00	1799.81N	1993.86E	==>	2507.15	
9500.00	90.00	87.250	7042.00	1804.61N	2093.75E	==>	2602.10	
9600.00	90.00	87.250	7042.00	1809.41N	2193.63E	==>	2697.05	
9700.00	90.00	87.250	7042.00	1814.21N	2293.52E	==>	2792.00	
9800.00	90.00	87.250	7042.00	1819.02N	2393.40E	==>	2886.94	
9900.00	90.00	87.250	7042.00	1823.82N	2493.29E	==>	2981.89	
10000.00	90.00	87.250	7042.00	1828.62N	2593.17E	==>	3076.84	
10100.00	90.00	87.250	7042.00	1833.43N	2693.06E	==>	3171.79	
10200.00	90.00	87.250	7042.00	1838.23N	2792.94E	==>	3266.73	
10300.00	90.00	87.250	7042.00	1843.03N	2892.83E	==>	3361.68	
10400.00	90.00	87.250	7042.00	1847.83N	2992.71E	==>	3456.63	
10500.00	90.00	87.250	7042.00	1852.64N	3092.59E	==>	3551.58	
10600.00	90.00	87.760	7042.00	1857.33N	3192.48E	2.00	3646.49	
10700.00	90.00	89.760	7042.00	1859.49N	3292.46E	2.00	3740.57	
10800.00	90.00	91.760	7042.00	1858.17N	3392.44E	2.00	3833.42	
10900.00	90.00	93.760	7042.00	1853.36N	3492.32E	2.00	3924.91	
11000.00	90.00	94.800	7042.00	1845.47N	3592.01E	==>	4015.11	
11100.00	90.00	94.800	7042.00	1837.11N	3691.66E	==>	4105.11	
11200.00	90.00	94.800	7042.00	1828.75N	3791.31E	==>	4195.12	
11300.00	90.00	94.800	7042.00	1820.38N	3890.96E	==>	4285.12	
11400.00	90.00	94.800	7042.00	1812.02N	3990.61E	==>	4375.12	
11500.00	90.00	94.800	7042.00	1803.66N	4090.26E	==>	4465.12	
11600.00	90.00	94.800	7042.00	1795.30N	4189.91E	==>	4555.12	
11700.00	90.00	94.800	7042.00	1786.93N	4289.56E	==>	4645.12	
11800.00	90.00	94.800	7042.00	1778.57N	4389.20E	==>	4735.12	
11900.00	90.00	94.800	7042.00	1770.21N	4488.85E	==>	4825.12	
11992.54	90.00	94.800	7042.00	1762.47N	4581.07E	==>	4908.41	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 4921.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 68.960 degrees  
Bottom hole distance is 4908.41 Feet on azimuth 68.96 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by IPT  
Date Printed: 17-May-2016



SYS DRILL  
Well Design Combined Report  
Wellbore: VAIL 1 (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
VAIL 1 - V2 - BHL	1762.47N	4581.07E	7042.00	40.33416000	-104.94341000	1365062.22	3155165.61
VAIL 1 - V2 - EP	1713.49N	198.66E	7042.00	40.33410000	-104.95913000	1365013.24	3150783.39
VAIL 1 - V2 - NLB 2-1-12	1716.21N	3167.02E	7042.00	40.33405729	-104.94848298	1365015.97	3153751.62

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
504769	Planned	11992.54	7042.00	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes



SYSDRILL  
Closest Approach + Clearance Factor Summary Report  
Wellbore: VAIL 1 (PWB)



Ellipse separations are reported ONLY if BOTH wells have uncertainty data
Only Depth and Magnetic Reference Field error terms are correlated across tie points
Scan limit is calculated on CENTRE to CENTRE distance
Summary data uses Closest Approach clearance calculation for all minima
Hole size/Casings ARE included
Hole size/Casings are NOT subtracted from Centre-Centre distance
Confidence limit of 95.00% / 2.80 SD.

Wellbore		
Name	Created	Last Revised
VAIL 1 (PWB)	May-16-2016	May-17-2016

Well		
Name	Government ID	Last Revised
VAIL 1		May-16-2016

Slot						
Name	Latitude	Longitude	Grid Northing	Grid Easting	North	East
VAIL 1	40.32940000	-104.95988000	1363299.8308	3150584.7385	0.00N	0.00E

Installation						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Easting	Northing	Coord System Name	North Alignment
Vail Pad - Rev 03 - 05-13-2016	40.32940000	-104.95988000	3150584.7385	1363299.8308	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Clearance Summary							
Offset WellName	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
VAIL 2	14.54	590.55	11992.54	1.66	1279.53	1.12	1279.53
VAIL 3	32.76	590.55	11992.54				
VAIL 4	47.33	541.34	11992.54	37.17	1066.27	1.57	11992.54
VAIL 5	65.55	508.53	11992.54	56.67	1017.06	2.42	11992.54
VAIL 6	80.12	508.53	11992.54	71.53	967.85	2.61	11992.54
VAIL 7	94.69	508.53	11992.54	88.37	738.19	3.12	11992.54
VAIL 8	112.91	508.53	11992.54	112.89	1.00	2253.97	1.00
VAIL 9	127.50	508.53	11992.54	122.08	574.15	4.18	11992.54
NLB #2-1-12	139.84	10567.79	10567.79	-28.06	10564.30	0.83	10564.30
VAIL #1	965.15	2709.81	8178.66	932.79	2854.33	13.47	8382.55
UPRC #11-8I8	1070.79	4200.40	4200.40	1023.02	4347.11	18.62	6364.83
NLB #1-3-12	1399.69	10440.16	10440.16	1239.35	10498.69	8.41	10810.37
ABRAMS #1	1686.90	7738.81	7738.81	1621.14	7775.59	20.57	8759.84
HSR-MAPLEWOOD ACRES #12-7	3025.13	11992.54	11992.54	2824.63	11992.54	15.09	11992.54

