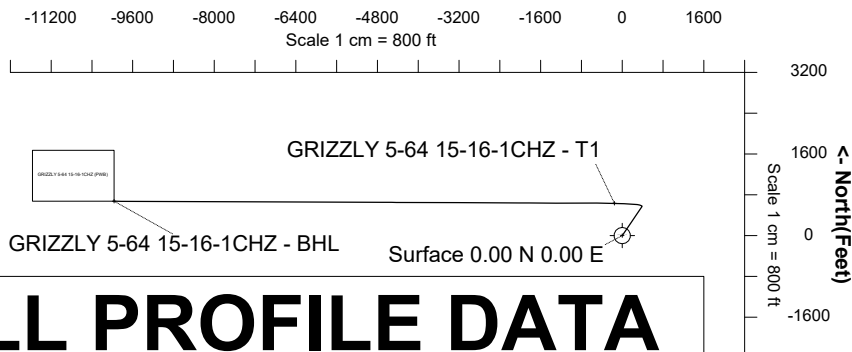


# Highlands Natural Resources

<b>Location</b>	DJ Basin Southern Extension	<b>Slot</b>	Grizzly 5-64 15-16-1CHZ
<b>Field</b>	DJ Basin Southern Extension	<b>Well</b>	GRIZZLY 5-64 15-16-1CHZ
<b>Installation</b>	HNR Arapahoe County Pad Updated 04.13.18 JFalls	<b>Wellbore</b>	GRIZZLY 5-64 15-16-1CHZ (PWB)

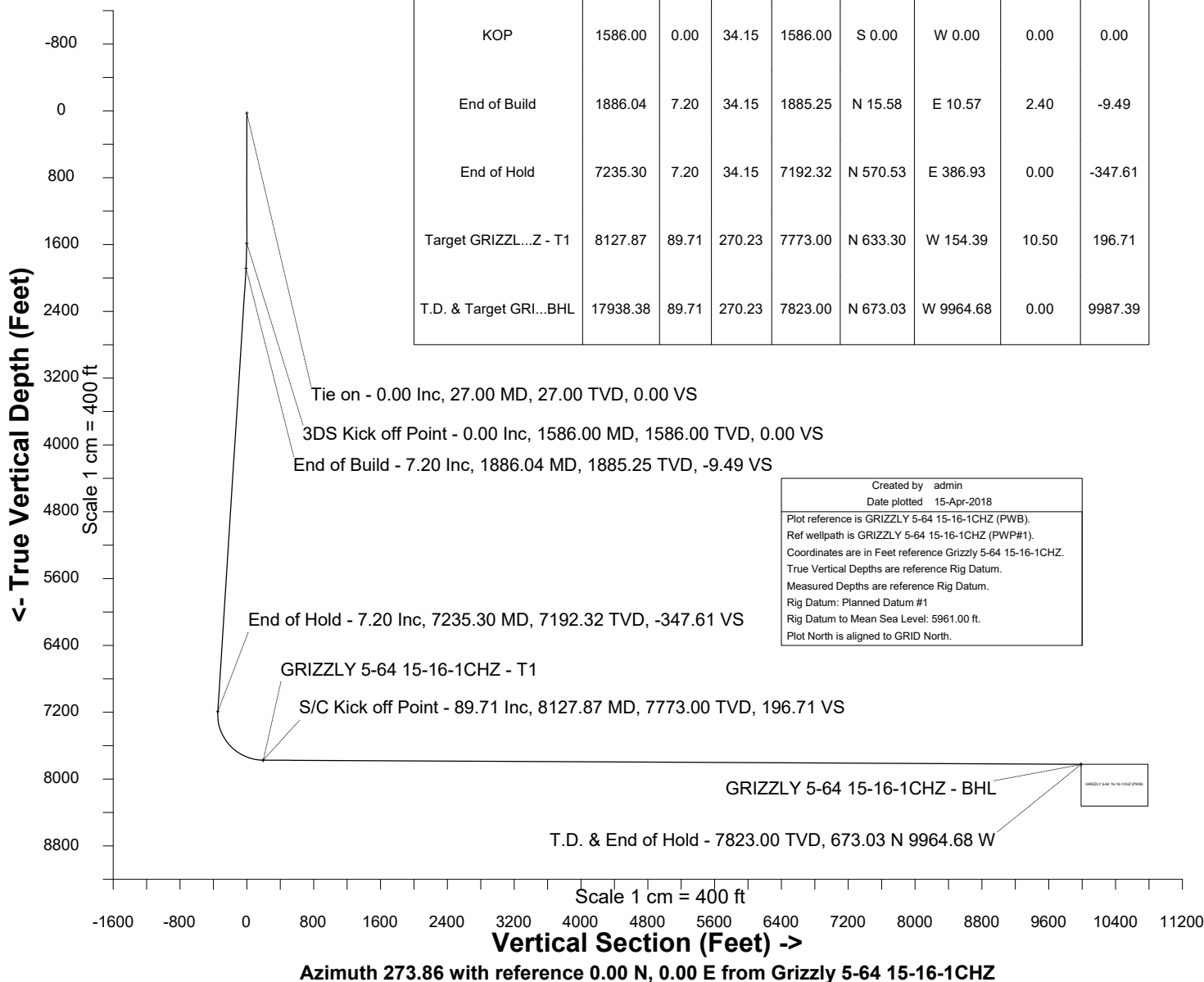
**N**  
GRID

**East (Feet) ->**



## WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	27.00	0.00	0.00	27.00	S 0.00	W 0.00		0.00
KOP	1586.00	0.00	34.15	1586.00	S 0.00	W 0.00	0.00	0.00
End of Build	1886.04	7.20	34.15	1885.25	N 15.58	E 10.57	2.40	-9.49
End of Hold	7235.30	7.20	34.15	7192.32	N 570.53	E 386.93	0.00	-347.61
Target GRIZZL...Z - T1	8127.87	89.71	270.23	7773.00	N 633.30	W 154.39	10.50	196.71
T.D. & Target GRI...BHL	17938.38	89.71	270.23	7823.00	N 673.03	W 9964.68	0.00	9987.39



Mar-2-2017  
 EMM-2015 [2000.0-2020.0] Dip: 66.54 deg Field: 52124.9 nT  
 Lat: N39 36 53.6940 Long: W104 31 51.5676 Elev: 5934.00 ft  
 Magnetic North is 8.60 deg East of True North  
 GRID North is 0.61 deg East of True North  
 To correct azimuth from True to GRID subtract 0.61 deg  
 To correct azimuth from Magnetic to GRID add 7.99 deg



SYSDRILL  
Well Design Combined Report  
Wellbore: GRIZZLY 5-64 15-16-1CHZ (PWB)



### Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
Grizzly 5-64 15-16-1CHZ	39.61475000	-104.53099500	1650256.9943	3272987.1231	60.11S	0.49W	0.00

### Declination

Date	Source	Time
Mar-2-2017	EMM-2015 [2000.0-2020.0]	14:57

### Installation Details

Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
HNR Arapahoe County Pad Updated 04.13.18 JFalls	39.61491500	-104.53099100	1650317.1047	3272987.6089	CO83-CF 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
27.00	0.00	0.000	27.00	0.00N	0.00E		0.00	1650256.99	3272987.12
1586.00	0.00	34.150	1586.00	0.00N	0.00E	==>	0.00	1650256.99	3272987.12
1886.04	7.20	34.150	1885.25	15.58N	10.57E	2.40	-9.49	1650272.58	3272997.69
7235.30	7.20	34.150	7192.32	570.53N	386.93E	==>	-347.61	1650827.51	3273374.05
8127.87	89.71	270.230	7773.00	633.30N	154.39W	10.50	196.71	1650890.28	3272832.74
17938.38	89.71	270.230	7823.00	673.03N	9964.68W	==>	9987.39	1650930.00	3263022.70

### 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	Rig Datum
27.00	0.00	0.000	27.00	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	0.000	500.00	0.00N	0.00E	==>	0.00	
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	
1400.00	0.00	0.000	1400.00	0.00N	0.00E	==>	0.00	
1500.00	0.00	0.000	1500.00	0.00N	0.00E	==>	0.00	
1501.00	0.00	0.000	1501.00	0.00N	0.00E	==>	0.00	
1601.00	0.36	34.150	1601.00	0.04N	0.03E	2.40	-0.02	
1701.00	2.76	34.150	1700.96	2.29N	1.55E	2.40	-1.40	
1801.00	5.16	34.150	1800.71	8.01N	5.43E	2.40	-4.88	
1901.00	7.20	34.150	1900.09	17.14N	11.62E	==>	-10.44	
2001.00	7.20	34.150	1999.30	27.51N	18.66E	==>	-16.76	
2101.00	7.20	34.150	2098.52	37.88N	25.69E	==>	-23.08	
2201.00	7.20	34.150	2197.73	48.26N	32.73E	==>	-29.40	
2301.00	7.20	34.150	2296.94	58.63N	39.76E	==>	-35.72	
2401.00	7.20	34.150	2396.15	69.01N	46.80E	==>	-42.04	
2501.00	7.20	34.150	2495.36	79.38N	53.84E	==>	-48.36	
2601.00	7.20	34.150	2594.57	89.76N	60.87E	==>	-54.69	
2701.00	7.20	34.150	2693.78	100.13N	67.91E	==>	-61.01	
2801.00	7.20	34.150	2792.99	110.50N	74.94E	==>	-67.33	
2901.00	7.20	34.150	2892.21	120.88N	81.98E	==>	-73.65	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5961.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 273.860 degrees  
Bottom hole distance is 9987.39 Feet on azimuth 273.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 13-Apr-2018



SYS DRILL  
Well Design Combined Report  
Wellbore: GRIZZLY 5-64 15-16-1CHZ (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3001.00	7.20	34.150	2991.42	131.25N	89.02E	==>	-79.97	
3101.00	7.20	34.150	3090.63	141.63N	96.05E	==>	-86.29	
3201.00	7.20	34.150	3189.84	152.00N	103.09E	==>	-92.61	
3301.00	7.20	34.150	3289.05	162.38N	110.12E	==>	-98.93	
3401.00	7.20	34.150	3388.26	172.75N	117.16E	==>	-105.25	
3501.00	7.20	34.150	3487.47	183.12N	124.20E	==>	-111.57	
3601.00	7.20	34.150	3586.68	193.50N	131.23E	==>	-117.89	
3701.00	7.20	34.150	3685.90	203.87N	138.27E	==>	-124.21	
3801.00	7.20	34.150	3785.11	214.25N	145.30E	==>	-130.53	
3901.00	7.20	34.150	3884.32	224.62N	152.34E	==>	-136.86	
4001.00	7.20	34.150	3983.53	235.00N	159.37E	==>	-143.18	
4101.00	7.20	34.150	4082.74	245.37N	166.41E	==>	-149.50	
4201.00	7.20	34.150	4181.95	255.74N	173.45E	==>	-155.82	
4301.00	7.20	34.150	4281.16	266.12N	180.48E	==>	-162.14	
4401.00	7.20	34.150	4380.37	276.49N	187.52E	==>	-168.46	
4501.00	7.20	34.150	4479.59	286.87N	194.55E	==>	-174.78	
4601.00	7.20	34.150	4578.80	297.24N	201.59E	==>	-181.10	
4701.00	7.20	34.150	4678.01	307.62N	208.63E	==>	-187.42	
4801.00	7.20	34.150	4777.22	317.99N	215.66E	==>	-193.74	
4901.00	7.20	34.150	4876.43	328.36N	222.70E	==>	-200.06	
5001.00	7.20	34.150	4975.64	338.74N	229.73E	==>	-206.38	
5101.00	7.20	34.150	5074.85	349.11N	236.77E	==>	-212.70	
5201.00	7.20	34.150	5174.06	359.49N	243.80E	==>	-219.03	
5301.00	7.20	34.150	5273.28	369.86N	250.84E	==>	-225.35	
5401.00	7.20	34.150	5372.49	380.24N	257.88E	==>	-231.67	
5501.00	7.20	34.150	5471.70	390.61N	264.91E	==>	-237.99	
5601.00	7.20	34.150	5570.91	400.98N	271.95E	==>	-244.31	
5701.00	7.20	34.150	5670.12	411.36N	278.98E	==>	-250.63	
5801.00	7.20	34.150	5769.33	421.73N	286.02E	==>	-256.95	
5901.00	7.20	34.150	5868.54	432.11N	293.06E	==>	-263.27	
6001.00	7.20	34.150	5967.75	442.48N	300.09E	==>	-269.59	
6101.00	7.20	34.150	6066.97	452.86N	307.13E	==>	-275.91	
6201.00	7.20	34.150	6166.18	463.23N	314.16E	==>	-282.23	
6301.00	7.20	34.150	6265.39	473.60N	321.20E	==>	-288.55	
6401.00	7.20	34.150	6364.60	483.98N	328.23E	==>	-294.87	
6501.00	7.20	34.150	6463.81	494.35N	335.27E	==>	-301.20	
6601.00	7.20	34.150	6563.02	504.73N	342.31E	==>	-307.52	
6701.00	7.20	34.150	6662.23	515.10N	349.34E	==>	-313.84	
6801.00	7.20	34.150	6761.44	525.48N	356.38E	==>	-320.16	
6901.00	7.20	34.150	6860.65	535.85N	363.41E	==>	-326.48	
7001.00	7.20	34.150	6959.87	546.22N	370.45E	==>	-332.80	
7101.00	7.20	34.150	7059.08	556.60N	377.49E	==>	-339.12	
7201.00	7.20	34.150	7158.29	566.97N	384.52E	==>	-345.44	
7301.00	6.64	334.400	7257.62	577.37N	387.61E	10.50	-347.82	
7401.00	14.64	293.860	7355.93	587.73N	373.51E	10.50	-333.06	
7501.00	24.58	283.450	7450.04	597.70N	341.64E	10.50	-300.58	
7601.00	34.84	278.860	7536.79	606.97N	293.05E	10.50	-251.48	
7701.00	45.20	276.180	7613.28	615.21N	229.38E	10.50	-187.40	
7801.00	55.60	274.320	7676.94	622.15N	152.76E	10.50	-110.48	
7901.00	66.02	272.870	7725.64	627.56N	65.75E	10.50	-23.31	
8001.00	76.46	271.650	7757.76	631.26N	28.74W	10.50	71.21	
8101.00	86.90	270.530	7772.21	633.12N	127.53W	10.50	169.90	
8201.00	89.71	270.230	7773.37	633.60N	227.51W	==>	269.69	
8301.00	89.71	270.230	7773.88	634.00N	327.51W	==>	369.49	
8401.00	89.71	270.230	7774.39	634.41N	427.51W	==>	469.29	
8501.00	89.71	270.230	7774.90	634.81N	527.51W	==>	569.08	
8601.00	89.71	270.230	7775.41	635.22N	627.50W	==>	668.88	
8701.00	89.71	270.230	7775.92	635.62N	727.50W	==>	768.68	
8801.00	89.71	270.230	7776.43	636.03N	827.50W	==>	868.48	

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Vertical Section is from 0.00N 0.00E on azimuth 273.860 degrees  
Bottom hole distance is 9987.39 Feet on azimuth 273.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
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SYS DRILL  
Well Design Combined Report  
Wellbore: GRIZZLY 5-64 15-16-1CHZ (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
8901.00	89.71	270.230	7776.94	636.43N	927.50W	==>	968.28	
9001.00	89.71	270.230	7777.45	636.84N	1027.50W	==>	1068.07	
9101.00	89.71	270.230	7777.96	637.24N	1127.49W	==>	1167.87	
9201.00	89.71	270.230	7778.47	637.65N	1227.49W	==>	1267.67	
9301.00	89.71	270.230	7778.98	638.05N	1327.49W	==>	1367.47	
9401.00	89.71	270.230	7779.49	638.45N	1427.49W	==>	1467.27	
9501.00	89.71	270.230	7780.00	638.86N	1527.48W	==>	1567.06	
9601.00	89.71	270.230	7780.51	639.26N	1627.48W	==>	1666.86	
9701.00	89.71	270.230	7781.02	639.67N	1727.48W	==>	1766.66	
9801.00	89.71	270.230	7781.53	640.07N	1827.48W	==>	1866.46	
9901.00	89.71	270.230	7782.04	640.48N	1927.48W	==>	1966.26	
10001.00	89.71	270.230	7782.55	640.88N	2027.47W	==>	2066.05	
10101.00	89.71	270.230	7783.06	641.29N	2127.47W	==>	2165.85	
10201.00	89.71	270.230	7783.57	641.69N	2227.47W	==>	2265.65	
10301.00	89.71	270.230	7784.08	642.10N	2327.47W	==>	2365.45	
10401.00	89.71	270.230	7784.59	642.50N	2427.47W	==>	2465.24	
10501.00	89.71	270.230	7785.09	642.91N	2527.46W	==>	2565.04	
10601.00	89.71	270.230	7785.60	643.31N	2627.46W	==>	2664.84	
10701.00	89.71	270.230	7786.11	643.72N	2727.46W	==>	2764.64	
10801.00	89.71	270.230	7786.62	644.12N	2827.46W	==>	2864.44	
10901.00	89.71	270.230	7787.13	644.53N	2927.45W	==>	2964.23	
11001.00	89.71	270.230	7787.64	644.93N	3027.45W	==>	3064.03	
11101.00	89.71	270.230	7788.15	645.34N	3127.45W	==>	3163.83	
11201.00	89.71	270.230	7788.66	645.74N	3227.45W	==>	3263.63	
11301.00	89.71	270.230	7789.17	646.15N	3327.45W	==>	3363.43	
11401.00	89.71	270.230	7789.68	646.55N	3427.44W	==>	3463.22	
11501.00	89.71	270.230	7790.19	646.96N	3527.44W	==>	3563.02	
11601.00	89.71	270.230	7790.70	647.36N	3627.44W	==>	3662.82	
11701.00	89.71	270.230	7791.21	647.77N	3727.44W	==>	3762.62	
11801.00	89.71	270.230	7791.72	648.17N	3827.44W	==>	3862.41	
11901.00	89.71	270.230	7792.23	648.58N	3927.43W	==>	3962.21	
12001.00	89.71	270.230	7792.74	648.98N	4027.43W	==>	4062.01	
12101.00	89.71	270.230	7793.25	649.39N	4127.43W	==>	4161.81	
12201.00	89.71	270.230	7793.76	649.79N	4227.43W	==>	4261.61	
12301.00	89.71	270.230	7794.27	650.20N	4327.43W	==>	4361.40	
12401.00	89.71	270.230	7794.78	650.60N	4427.42W	==>	4461.20	
12501.00	89.71	270.230	7795.29	651.01N	4527.42W	==>	4561.00	
12601.00	89.71	270.230	7795.80	651.41N	4627.42W	==>	4660.80	
12701.00	89.71	270.230	7796.31	651.82N	4727.42W	==>	4760.60	
12801.00	89.71	270.230	7796.82	652.22N	4827.41W	==>	4860.39	
12901.00	89.71	270.230	7797.33	652.63N	4927.41W	==>	4960.19	
13001.00	89.71	270.230	7797.84	653.03N	5027.41W	==>	5059.99	
13101.00	89.71	270.230	7798.35	653.44N	5127.41W	==>	5159.79	
13201.00	89.71	270.230	7798.86	653.84N	5227.41W	==>	5259.58	
13301.00	89.71	270.230	7799.37	654.25N	5327.40W	==>	5359.38	
13401.00	89.71	270.230	7799.87	654.65N	5427.40W	==>	5459.18	
13501.00	89.71	270.230	7800.38	655.06N	5527.40W	==>	5558.98	
13601.00	89.71	270.230	7800.89	655.46N	5627.40W	==>	5658.78	
13701.00	89.71	270.230	7801.40	655.87N	5727.40W	==>	5758.57	
13801.00	89.71	270.230	7801.91	656.27N	5827.39W	==>	5858.37	
13901.00	89.71	270.230	7802.42	656.68N	5927.39W	==>	5958.17	
14001.00	89.71	270.230	7802.93	657.08N	6027.39W	==>	6057.97	
14101.00	89.71	270.230	7803.44	657.49N	6127.39W	==>	6157.77	
14201.00	89.71	270.230	7803.95	657.89N	6227.38W	==>	6257.56	
14301.00	89.71	270.230	7804.46	658.30N	6327.38W	==>	6357.36	
14401.00	89.71	270.230	7804.97	658.70N	6427.38W	==>	6457.16	
14501.00	89.71	270.230	7805.48	659.11N	6527.38W	==>	6556.96	
14601.00	89.71	270.230	7805.99	659.51N	6627.38W	==>	6656.75	
14701.00	89.71	270.230	7806.50	659.92N	6727.37W	==>	6756.55	

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Vertical Section is from 0.00N 0.00E on azimuth 273.860 degrees  
Bottom hole distance is 9987.39 Feet on azimuth 273.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
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SYS DRILL  
Well Design Combined Report  
Wellbore: GRIZZLY 5-64 15-16-1CHZ (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
14801.00	89.71	270.230	7807.01	660.32N	6827.37W	==>	6856.35	
14901.00	89.71	270.230	7807.52	660.73N	6927.37W	==>	6956.15	
15001.00	89.71	270.230	7808.03	661.13N	7027.37W	==>	7055.95	
15101.00	89.71	270.230	7808.54	661.54N	7127.37W	==>	7155.74	
15201.00	89.71	270.230	7809.05	661.94N	7227.36W	==>	7255.54	
15301.00	89.71	270.230	7809.56	662.35N	7327.36W	==>	7355.34	
15401.00	89.71	270.230	7810.07	662.75N	7427.36W	==>	7455.14	
15501.00	89.71	270.230	7810.58	663.16N	7527.36W	==>	7554.94	
15601.00	89.71	270.230	7811.09	663.56N	7627.36W	==>	7654.73	
15701.00	89.71	270.230	7811.60	663.97N	7727.35W	==>	7754.53	
15801.00	89.71	270.230	7812.11	664.37N	7827.35W	==>	7854.33	
15901.00	89.71	270.230	7812.62	664.78N	7927.35W	==>	7954.13	
16001.00	89.71	270.230	7813.13	665.18N	8027.35W	==>	8053.92	
16101.00	89.71	270.230	7813.64	665.59N	8127.34W	==>	8153.72	
16201.00	89.71	270.230	7814.15	665.99N	8227.34W	==>	8253.52	
16301.00	89.71	270.230	7814.65	666.40N	8327.34W	==>	8353.32	
16401.00	89.71	270.230	7815.16	666.80N	8427.34W	==>	8453.12	
16501.00	89.71	270.230	7815.67	667.21N	8527.34W	==>	8552.91	
16601.00	89.71	270.230	7816.18	667.61N	8627.33W	==>	8652.71	
16701.00	89.71	270.230	7816.69	668.02N	8727.33W	==>	8752.51	
16801.00	89.71	270.230	7817.20	668.42N	8827.33W	==>	8852.31	
16901.00	89.71	270.230	7817.71	668.83N	8927.33W	==>	8952.11	
17001.00	89.71	270.230	7818.22	669.23N	9027.33W	==>	9051.90	
17101.00	89.71	270.230	7818.73	669.64N	9127.32W	==>	9151.70	
17201.00	89.71	270.230	7819.24	670.04N	9227.32W	==>	9251.50	
17301.00	89.71	270.230	7819.75	670.45N	9327.32W	==>	9351.30	
17401.00	89.71	270.230	7820.26	670.85N	9427.32W	==>	9451.09	
17501.00	89.71	270.230	7820.77	671.26N	9527.32W	==>	9550.89	
17601.00	89.71	270.230	7821.28	671.66N	9627.31W	==>	9650.69	
17701.00	89.71	270.230	7821.79	672.06N	9727.31W	==>	9750.49	
17801.00	89.71	270.230	7822.30	672.47N	9827.31W	==>	9850.29	
17901.00	89.71	270.230	7822.81	672.87N	9927.31W	==>	9950.08	
17938.38	89.71	270.230	7823.00	673.03N	9964.68W	==>	9987.39	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5961.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 273.860 degrees  
Bottom hole distance is 9987.39 Feet on azimuth 273.86 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 13-Apr-2018



SYSDRILL  
Well Design Combined Report  
Wellbore: GRIZZLY 5-64 15-16-1CHZ (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
GRIZZLY 5-64 15-16-1CHZ - BHL	673.03N	9964.68W	7823.00	39.61688400	-104.56633800	1650930.00	3263022.70
GRIZZLY 5-64 15-16-1CHZ - T1	633.30N	154.39W	7773.00	39.61649300	-104.53151900	1650890.28	3272832.74

Survey Tool Program					
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
564223	Planned	1501.00	1501.00	WdW Rate Gyro	Standard
564222	Planned	17938.38	7823.00	ISCWSA MWD	Rev 4 + SAG + FLT

Notes