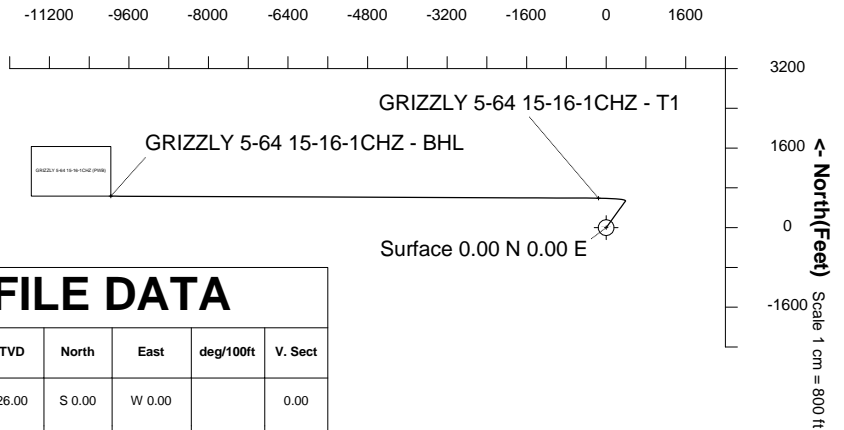


Highlands Natural Resources

Location	DJ Basin Southern Extension	Slot	Grizzly 5-64 15-16-1CHZ
Field	DJ Basin Southern Extension	Well	GRIZZLY 5-64 15-16-1CHZ
Installation	HNR Arapahoe County Pad Updated 7-14-2017_AJS	Wellbore	GRIZZLY 5-64 15-16-1CHZ (PWB)

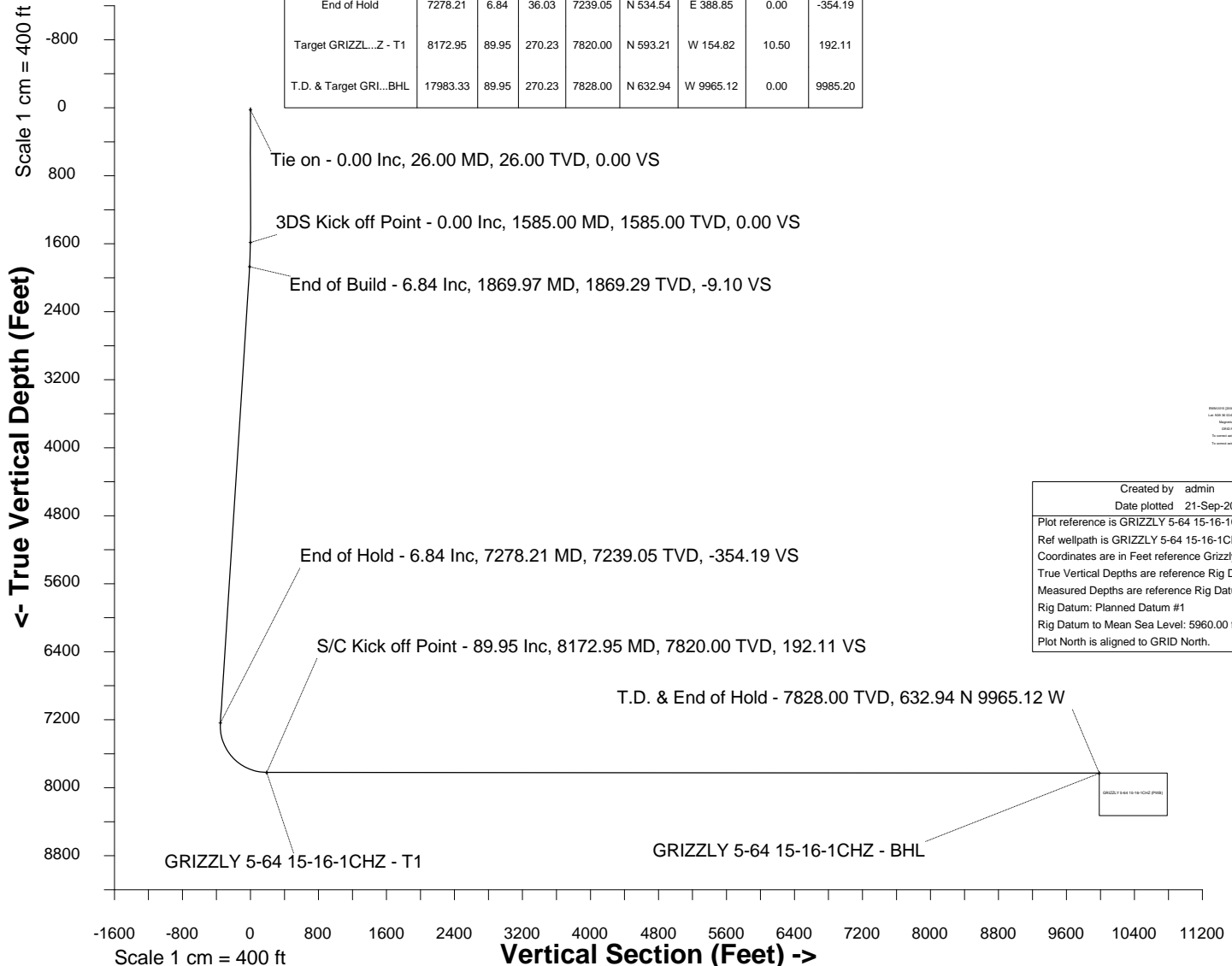
Scale 1 cm = 800 ft

East (Feet) ->



WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	26.00	0.00	0.00	26.00	S 0.00	W 0.00		0.00
KOP	1585.00	0.00	36.03	1585.00	S 0.00	W 0.00	0.00	0.00
End of Build	1869.97	6.84	36.03	1869.29	N 13.74	E 9.99	2.40	-9.10
End of Hold	7278.21	6.84	36.03	7239.05	N 534.54	E 388.85	0.00	-354.19
Target GRIZZL...Z - T1	8172.95	89.95	270.23	7820.00	N 593.21	W 154.82	10.50	192.11
T.D. & Target GRI...BHL	17983.33	89.95	270.23	7828.00	N 632.94	W 9965.12	0.00	9985.20



Created by	admin
Date plotted	21-Sep-2017
Plot reference is GRIZZLY 5-64 15-16-1CHZ (PWB). Ref wellpath is GRIZZLY 5-64 15-16-1CHZ (PWP#1). Coordinates are in Feet reference Grizzly 5-64 15-16-1CHZ. True Vertical Depths are reference Rig Datum. Measured Depths are reference Rig Datum. Rig Datum: Planned Datum #1 Rig Datum to Mean Sea Level: 5960.00 ft. Plot North is aligned to GRID North.	



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	N39 36 53.4961	W104 31 51.5710	1650297.0836	3272987.5548	20.02S	0.05W	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 7-14-2017_AJS	N39 36 53.6940	W104 31 51.5676	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
26.00	0.00	0.000	26.00	0.00N	0.00E		0.00	1650297.08	3272987.55
1585.00	0.00	36.030	1585.00	0.00N	0.00E	==>	0.00	1650297.08	3272987.55
1869.97	6.84	36.030	1869.29	13.74N	9.99E	2.40	-9.10	1650310.82	3272997.55
7278.21	6.84	36.030	7239.05	534.54N	388.85E	==>	-354.19	1650831.61	3273376.40
8172.95	89.95	270.230	7820.00	593.21N	154.82W	10.50	192.11	1650890.28	3272832.74
17983.33	89.95	270.230	7828.00	632.94N	9965.12W	==>	9985.20	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
26.00	0.00	0.000	26.00	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	
1600.00	0.36	36.030	1600.00	0.04N	0.03E	2.40	-0.03	
1700.00	2.76	36.030	1699.96	2.24N	1.63E	2.40	-1.48	
1800.00	5.16	36.030	1799.71	7.82N	5.69E	2.40	-5.18	
1900.00	6.84	36.030	1899.11	16.63N	12.10E	==>	-11.02	
2000.00	6.84	36.030	1998.40	26.26N	19.10E	==>	-17.40	
2100.00	6.84	36.030	2097.69	35.89N	26.11E	==>	-23.78	
2200.00	6.84	36.030	2196.98	45.52N	33.11E	==>	-30.16	
2300.00	6.84	36.030	2296.26	55.15N	40.12E	==>	-36.54	
2400.00	6.84	36.030	2395.55	64.78N	47.12E	==>	-42.92	
2500.00	6.84	36.030	2494.84	74.41N	54.13E	==>	-49.30	
2600.00	6.84	36.030	2594.13	84.04N	61.13E	==>	-55.68	
2700.00	6.84	36.030	2693.42	93.67N	68.14E	==>	-62.06	
2800.00	6.84	36.030	2792.71	103.30N	75.14E	==>	-68.45	
2900.00	6.84	36.030	2891.99	112.93N	82.15E	==>	-74.83	
3000.00	6.84	36.030	2991.28	122.56N	89.15E	==>	-81.21	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5960.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 273.630 degrees
Bottom hole distance is 9985.20 Feet on azimuth 273.63 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 21-Sep-2017



SYSDRILL
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
3100.00	6.84	36.030	3090.57	132.19N	96.16E	==>	-87.59	
3200.00	6.84	36.030	3189.86	141.82N	103.17E	==>	-93.97	
3300.00	6.84	36.030	3289.15	151.45N	110.17E	==>	-100.35	
3400.00	6.84	36.030	3388.44	161.08N	117.18E	==>	-106.73	
3500.00	6.84	36.030	3487.72	170.71N	124.18E	==>	-113.11	
3600.00	6.84	36.030	3587.01	180.34N	131.19E	==>	-119.49	
3700.00	6.84	36.030	3686.30	189.97N	138.19E	==>	-125.87	
3800.00	6.84	36.030	3785.59	199.60N	145.20E	==>	-132.25	
3900.00	6.84	36.030	3884.88	209.23N	152.20E	==>	-138.63	
4000.00	6.84	36.030	3984.17	218.86N	159.21E	==>	-145.01	
4100.00	6.84	36.030	4083.46	228.49N	166.21E	==>	-151.39	
4200.00	6.84	36.030	4182.74	238.12N	173.22E	==>	-157.78	
4300.00	6.84	36.030	4282.03	247.75N	180.22E	==>	-164.16	
4400.00	6.84	36.030	4381.32	257.38N	187.23E	==>	-170.54	
4500.00	6.84	36.030	4480.61	267.01N	194.23E	==>	-176.92	
4600.00	6.84	36.030	4579.90	276.64N	201.24E	==>	-183.30	
4700.00	6.84	36.030	4679.19	286.27N	208.24E	==>	-189.68	
4800.00	6.84	36.030	4778.47	295.89N	215.25E	==>	-196.06	
4900.00	6.84	36.030	4877.76	305.52N	222.25E	==>	-202.44	
5000.00	6.84	36.030	4977.05	315.15N	229.26E	==>	-208.82	
5100.00	6.84	36.030	5076.34	324.78N	236.26E	==>	-215.20	
5200.00	6.84	36.030	5175.63	334.41N	243.27E	==>	-221.58	
5300.00	6.84	36.030	5274.92	344.04N	250.28E	==>	-227.96	
5400.00	6.84	36.030	5374.21	353.67N	257.28E	==>	-234.34	
5500.00	6.84	36.030	5473.49	363.30N	264.29E	==>	-240.73	
5600.00	6.84	36.030	5572.78	372.93N	271.29E	==>	-247.11	
5700.00	6.84	36.030	5672.07	382.56N	278.30E	==>	-253.49	
5800.00	6.84	36.030	5771.36	392.19N	285.30E	==>	-259.87	
5900.00	6.84	36.030	5870.65	401.82N	292.31E	==>	-266.25	
6000.00	6.84	36.030	5969.94	411.45N	299.31E	==>	-272.63	
6100.00	6.84	36.030	6069.22	421.08N	306.32E	==>	-279.01	
6200.00	6.84	36.030	6168.51	430.71N	313.32E	==>	-285.39	
6300.00	6.84	36.030	6267.80	440.34N	320.33E	==>	-291.77	
6400.00	6.84	36.030	6367.09	449.97N	327.33E	==>	-298.15	
6500.00	6.84	36.030	6466.38	459.60N	334.34E	==>	-304.53	
6600.00	6.84	36.030	6565.67	469.23N	341.34E	==>	-310.91	
6700.00	6.84	36.030	6664.95	478.86N	348.35E	==>	-317.29	
6800.00	6.84	36.030	6764.24	488.49N	355.35E	==>	-323.67	
6900.00	6.84	36.030	6863.53	498.12N	362.36E	==>	-330.06	
7000.00	6.84	36.030	6962.82	507.75N	369.36E	==>	-336.44	
7100.00	6.84	36.030	7062.11	517.38N	376.37E	==>	-342.82	
7200.00	6.84	36.030	7161.40	527.01N	383.37E	==>	-349.20	
7300.00	5.81	17.340	7260.71	536.65N	389.95E	10.50	-355.14	
7400.00	10.39	302.270	7359.91	546.32N	383.81E	10.50	-348.41	
7500.00	20.05	285.690	7456.33	555.79N	359.62E	10.50	-323.67	
7600.00	30.26	279.820	7546.74	564.75N	318.18E	10.50	-281.74	
7700.00	40.61	276.740	7628.12	572.89N	260.87E	10.50	-224.03	
7800.00	51.01	274.740	7697.73	579.95N	189.62E	10.50	-152.48	
7900.00	61.44	273.260	7753.24	585.68N	106.81E	10.50	-69.47	
8000.00	71.88	272.050	7792.81	589.89N	15.22E	10.50	22.20	
8100.00	82.33	270.980	7815.09	592.44N	82.09W	10.50	119.48	
8200.00	89.95	270.230	7820.02	593.32N	181.86W	==>	219.11	
8300.00	89.95	270.230	7820.10	593.72N	281.86W	==>	318.93	
8400.00	89.95	270.230	7820.19	594.13N	381.86W	==>	418.76	
8500.00	89.95	270.230	7820.27	594.53N	481.86W	==>	518.58	
8600.00	89.95	270.230	7820.35	594.94N	581.86W	==>	618.40	
8700.00	89.95	270.230	7820.43	595.34N	681.86W	==>	718.23	
8800.00	89.95	270.230	7820.51	595.75N	781.86W	==>	818.05	
8900.00	89.95	270.230	7820.59	596.15N	881.86W	==>	917.87	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5960.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 273.630 degrees
Bottom hole distance is 9985.20 Feet on azimuth 273.63 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 21-Sep-2017



SYSDRILL
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
9000.00	89.95	270.230	7820.67	596.56N	981.86W	==>	1017.70	
9100.00	89.95	270.230	7820.76	596.96N	1081.86W	==>	1117.52	
9200.00	89.95	270.230	7820.84	597.37N	1181.86W	==>	1217.35	
9300.00	89.95	270.230	7820.92	597.77N	1281.86W	==>	1317.17	
9400.00	89.95	270.230	7821.00	598.18N	1381.85W	==>	1416.99	
9500.00	89.95	270.230	7821.08	598.58N	1481.85W	==>	1516.82	
9600.00	89.95	270.230	7821.16	598.99N	1581.85W	==>	1616.64	
9700.00	89.95	270.230	7821.25	599.39N	1681.85W	==>	1716.46	
9800.00	89.95	270.230	7821.33	599.80N	1781.85W	==>	1816.29	
9900.00	89.95	270.230	7821.41	600.20N	1881.85W	==>	1916.11	
10000.00	89.95	270.230	7821.49	600.61N	1981.85W	==>	2015.94	
10100.00	89.95	270.230	7821.57	601.01N	2081.85W	==>	2115.76	
10200.00	89.95	270.230	7821.65	601.42N	2181.85W	==>	2215.58	
10300.00	89.95	270.230	7821.73	601.82N	2281.85W	==>	2315.41	
10400.00	89.95	270.230	7821.82	602.23N	2381.85W	==>	2415.23	
10500.00	89.95	270.230	7821.90	602.63N	2481.85W	==>	2515.05	
10600.00	89.95	270.230	7821.98	603.04N	2581.84W	==>	2614.88	
10700.00	89.95	270.230	7822.06	603.44N	2681.84W	==>	2714.70	
10800.00	89.95	270.230	7822.14	603.85N	2781.84W	==>	2814.52	
10900.00	89.95	270.230	7822.22	604.25N	2881.84W	==>	2914.35	
11000.00	89.95	270.230	7822.31	604.66N	2981.84W	==>	3014.17	
11100.00	89.95	270.230	7822.39	605.06N	3081.84W	==>	3114.00	
11200.00	89.95	270.230	7822.47	605.47N	3181.84W	==>	3213.82	
11300.00	89.95	270.230	7822.55	605.87N	3281.84W	==>	3313.64	
11400.00	89.95	270.230	7822.63	606.28N	3381.84W	==>	3413.47	
11500.00	89.95	270.230	7822.71	606.68N	3481.84W	==>	3513.29	
11600.00	89.95	270.230	7822.79	607.09N	3581.84W	==>	3613.11	
11700.00	89.95	270.230	7822.88	607.49N	3681.84W	==>	3712.94	
11800.00	89.95	270.230	7822.96	607.90N	3781.83W	==>	3812.76	
11900.00	89.95	270.230	7823.04	608.30N	3881.83W	==>	3912.59	
12000.00	89.95	270.230	7823.12	608.71N	3981.83W	==>	4012.41	
12100.00	89.95	270.230	7823.20	609.11N	4081.83W	==>	4112.23	
12200.00	89.95	270.230	7823.28	609.52N	4181.83W	==>	4212.06	
12300.00	89.95	270.230	7823.37	609.92N	4281.83W	==>	4311.88	
12400.00	89.95	270.230	7823.45	610.33N	4381.83W	==>	4411.70	
12500.00	89.95	270.230	7823.53	610.73N	4481.83W	==>	4511.53	
12600.00	89.95	270.230	7823.61	611.14N	4581.83W	==>	4611.35	
12700.00	89.95	270.230	7823.69	611.54N	4681.83W	==>	4711.18	
12800.00	89.95	270.230	7823.77	611.95N	4781.83W	==>	4811.00	
12900.00	89.95	270.230	7823.85	612.35N	4881.82W	==>	4910.82	
13000.00	89.95	270.230	7823.94	612.76N	4981.82W	==>	5010.65	
13100.00	89.95	270.230	7824.02	613.16N	5081.82W	==>	5110.47	
13200.00	89.95	270.230	7824.10	613.57N	5181.82W	==>	5210.29	
13300.00	89.95	270.230	7824.18	613.97N	5281.82W	==>	5310.12	
13400.00	89.95	270.230	7824.26	614.38N	5381.82W	==>	5409.94	
13500.00	89.95	270.230	7824.34	614.78N	5481.82W	==>	5509.77	
13600.00	89.95	270.230	7824.43	615.19N	5581.82W	==>	5609.59	
13700.00	89.95	270.230	7824.51	615.59N	5681.82W	==>	5709.41	
13800.00	89.95	270.230	7824.59	616.00N	5781.82W	==>	5809.24	
13900.00	89.95	270.230	7824.67	616.40N	5881.82W	==>	5909.06	
14000.00	89.95	270.230	7824.75	616.81N	5981.82W	==>	6008.88	
14100.00	89.95	270.230	7824.83	617.21N	6081.81W	==>	6108.71	
14200.00	89.95	270.230	7824.91	617.62N	6181.81W	==>	6208.53	
14300.00	89.95	270.230	7825.00	618.02N	6281.81W	==>	6308.35	
14400.00	89.95	270.230	7825.08	618.43N	6381.81W	==>	6408.18	
14500.00	89.95	270.230	7825.16	618.83N	6481.81W	==>	6508.00	
14600.00	89.95	270.230	7825.24	619.24N	6581.81W	==>	6607.83	
14700.00	89.95	270.230	7825.32	619.64N	6681.81W	==>	6707.65	
14800.00	89.95	270.230	7825.40	620.05N	6781.81W	==>	6807.47	

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Vertical Section is from 0.00N 0.00E on azimuth 273.630 degrees
Bottom hole distance is 9985.20 Feet on azimuth 273.63 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
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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
14900.00	89.95	270.230	7825.49	620.45N	6881.81W	==>	6907.30	
15000.00	89.95	270.230	7825.57	620.85N	6981.81W	==>	7007.12	
15100.00	89.95	270.230	7825.65	621.26N	7081.81W	==>	7106.94	
15200.00	89.95	270.230	7825.73	621.66N	7181.81W	==>	7206.77	
15300.00	89.95	270.230	7825.81	622.07N	7281.80W	==>	7306.59	
15400.00	89.95	270.230	7825.89	622.47N	7381.80W	==>	7406.42	
15500.00	89.95	270.230	7825.97	622.88N	7481.80W	==>	7506.24	
15600.00	89.95	270.230	7826.06	623.28N	7581.80W	==>	7606.06	
15700.00	89.95	270.230	7826.14	623.69N	7681.80W	==>	7705.89	
15800.00	89.95	270.230	7826.22	624.09N	7781.80W	==>	7805.71	
15900.00	89.95	270.230	7826.30	624.50N	7881.80W	==>	7905.53	
16000.00	89.95	270.230	7826.38	624.90N	7981.80W	==>	8005.36	
16100.00	89.95	270.230	7826.46	625.31N	8081.80W	==>	8105.18	
16200.00	89.95	270.230	7826.55	625.71N	8181.80W	==>	8205.01	
16300.00	89.95	270.230	7826.63	626.12N	8281.80W	==>	8304.83	
16400.00	89.95	270.230	7826.71	626.52N	8381.79W	==>	8404.65	
16500.00	89.95	270.230	7826.79	626.93N	8481.79W	==>	8504.48	
16600.00	89.95	270.230	7826.87	627.33N	8581.79W	==>	8604.30	
16700.00	89.95	270.230	7826.95	627.74N	8681.79W	==>	8704.12	
16800.00	89.95	270.230	7827.04	628.14N	8781.79W	==>	8803.95	
16900.00	89.95	270.230	7827.12	628.55N	8881.79W	==>	8903.77	
17000.00	89.95	270.230	7827.20	628.95N	8981.79W	==>	9003.60	
17100.00	89.95	270.230	7827.28	629.36N	9081.79W	==>	9103.42	
17200.00	89.95	270.230	7827.36	629.76N	9181.79W	==>	9203.24	
17300.00	89.95	270.230	7827.44	630.17N	9281.79W	==>	9303.07	
17400.00	89.95	270.230	7827.52	630.57N	9381.79W	==>	9402.89	
17500.00	89.95	270.230	7827.61	630.98N	9481.79W	==>	9502.71	
17600.00	89.95	270.230	7827.69	631.38N	9581.78W	==>	9602.54	
17700.00	89.95	270.230	7827.77	631.79N	9681.78W	==>	9702.36	
17800.00	89.95	270.230	7827.85	632.19N	9781.78W	==>	9802.18	
17900.00	89.95	270.230	7827.93	632.60N	9881.78W	==>	9902.01	
17983.33	89.95	270.230	7828.00	632.94N	9965.12W	==>	9985.20	

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 5960.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 273.630 degrees
Bottom hole distance is 9985.20 Feet on azimuth 273.63 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 21-Sep-2017



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	632.94N	9965.12W	7828.00	N39 37 0.7824	W104 33 58.8168	1650930.00	3263022.70
GRIZZLY 5-64 15-16-1CHZ - T1	593.21N	154.82W	7820.00	N39 36 59.3748	W104 31 53.4684	1650890.28	3272832.74

Survey Tool Program					
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
564223	Planned	1500.00	1500.00	WdW Rate Gyro	Standard
564222	Planned	17983.33	7828.00	ISCWSA MWD	Rev 4 + SAG + FLT

Notes