

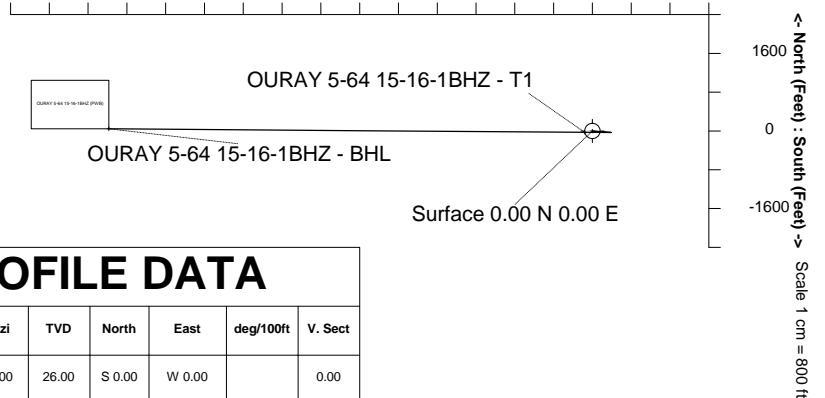
# Highlands Natural Resources

<b>Location</b>	DJ Basin Southern Extension	<b>Slot</b>	Ouray 5-64 15-16-1BHZ
<b>Field</b>	DJ Basin Southern Extension	<b>Well</b>	OURAY 5-64 15-16-1BHZ
<b>Installation</b>	HNR Arapahoe County Pad Updated 7-14-2017_AJS	<b>Wellbore</b>	OURAY 5-64 15-16-1BHZ (PWB)

Scale 1 cm = 800 ft

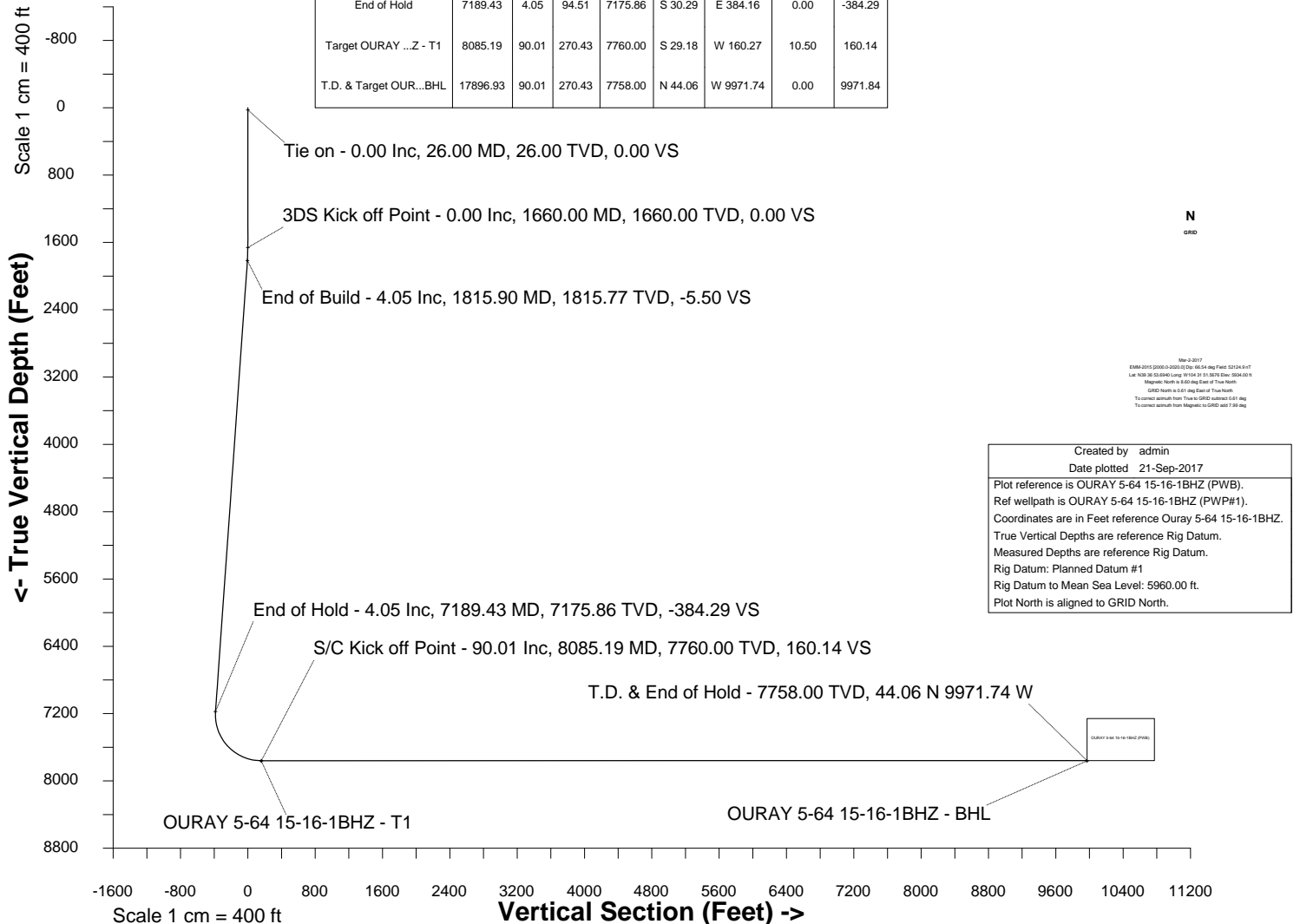
East (Feet) ->

-11200 -9600 -8000 -6400 -4800 -3200 -1600 0 1600



## 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	1660.00	0.00	94.51	1660.00	S 0.00	W 0.00	0.00	0.00
End of Build	1815.90	4.05	94.51	1815.77	S 0.43	E 5.50	2.60	-5.50
End of Hold	7189.43	4.05	94.51	7175.86	S 30.29	E 384.16	0.00	-384.29
Target OURAY ...Z - T1	8085.19	90.01	270.43	7760.00	S 29.18	W 160.27	10.50	160.14
T.D. & Target OUR...BHL	17896.93	90.01	270.43	7758.00	N 44.06	W 9971.74	0.00	9971.84



Created by	admin
Date plotted	21-Sep-2017
Plot reference is OURAY 5-64 15-16-1BHZ (PWB). Ref wellpath is OURAY 5-64 15-16-1BHZ (PWP#1). Coordinates are in Feet reference Ouray 5-64 15-16-1BHZ. 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.	

Azimuth 270.25 with reference 0.00 N, 0.00 E from Ouray 5-64 15-16-1BHZ



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



### Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
Ouray 5-64 15-16-1BHZ	N39 36 52.9034	W104 31 51.5858	1650237.1041	3272987.0395	80.00S	0.57W	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	1650237.10	3272987.04
1660.00	0.00	94.510	1660.00	0.00N	0.00E	==>	0.00	1650237.10	3272987.04
1815.90	4.05	94.510	1815.77	0.43S	5.50E	2.60	-5.50	1650236.67	3272992.53
7189.43	4.05	94.510	7175.86	30.29S	384.16E	==>	-384.29	1650206.81	3273371.19
8085.19	90.01	270.430	7760.00	29.18S	160.27W	10.50	160.14	1650207.93	3272826.77
17896.93	90.01	270.430	7758.00	44.06N	9971.74W	==>	9971.84	1650281.16	3263015.56

### 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	0.00	0.000	1600.00	0.00N	0.00E	==>	0.00	
1700.00	1.04	94.510	1700.00	0.03S	0.36E	2.60	-0.36	
1800.00	3.64	94.510	1799.91	0.35S	4.43E	2.60	-4.43	
1900.00	4.05	94.510	1899.66	0.90S	11.42E	==>	-11.43	
2000.00	4.05	94.510	1999.41	1.46S	18.47E	==>	-18.47	
2100.00	4.05	94.510	2099.16	2.01S	25.52E	==>	-25.52	
2200.00	4.05	94.510	2198.91	2.57S	32.56E	==>	-32.57	
2300.00	4.05	94.510	2298.66	3.12S	39.61E	==>	-39.62	
2400.00	4.05	94.510	2398.41	3.68S	46.66E	==>	-46.67	
2500.00	4.05	94.510	2498.16	4.23S	53.70E	==>	-53.72	
2600.00	4.05	94.510	2597.91	4.79S	60.75E	==>	-60.77	
2700.00	4.05	94.510	2697.66	5.35S	67.80E	==>	-67.82	
2800.00	4.05	94.510	2797.41	5.90S	74.84E	==>	-74.87	
2900.00	4.05	94.510	2897.16	6.46S	81.89E	==>	-81.92	
3000.00	4.05	94.510	2996.91	7.01S	88.94E	==>	-88.97	

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Vertical Section is from 0.00N 0.00E on azimuth 270.250 degrees  
Bottom hole distance is 9971.84 Feet on azimuth 270.25 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: OURAY 5-64 15-16-1BHZ (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	4.05	94.510	3096.66	7.57S	95.98E	==>	-96.02	
3200.00	4.05	94.510	3196.41	8.12S	103.03E	==>	-103.07	
3300.00	4.05	94.510	3296.16	8.68S	110.08E	==>	-110.12	
3400.00	4.05	94.510	3395.91	9.24S	117.13E	==>	-117.16	
3500.00	4.05	94.510	3495.66	9.79S	124.17E	==>	-124.21	
3600.00	4.05	94.510	3595.41	10.35S	131.22E	==>	-131.26	
3700.00	4.05	94.510	3695.16	10.90S	138.27E	==>	-138.31	
3800.00	4.05	94.510	3794.91	11.46S	145.31E	==>	-145.36	
3900.00	4.05	94.510	3894.66	12.01S	152.36E	==>	-152.41	
4000.00	4.05	94.510	3994.41	12.57S	159.41E	==>	-159.46	
4100.00	4.05	94.510	4094.16	13.13S	166.45E	==>	-166.51	
4200.00	4.05	94.510	4193.91	13.68S	173.50E	==>	-173.56	
4300.00	4.05	94.510	4293.66	14.24S	180.55E	==>	-180.61	
4400.00	4.05	94.510	4393.41	14.79S	187.59E	==>	-187.66	
4500.00	4.05	94.510	4493.16	15.35S	194.64E	==>	-194.71	
4600.00	4.05	94.510	4592.91	15.90S	201.69E	==>	-201.76	
4700.00	4.05	94.510	4692.66	16.46S	208.74E	==>	-208.81	
4800.00	4.05	94.510	4792.41	17.02S	215.78E	==>	-215.86	
4900.00	4.05	94.510	4892.16	17.57S	222.83E	==>	-222.90	
5000.00	4.05	94.510	4991.90	18.13S	229.88E	==>	-229.95	
5100.00	4.05	94.510	5091.65	18.68S	236.92E	==>	-237.00	
5200.00	4.05	94.510	5191.40	19.24S	243.97E	==>	-244.05	
5300.00	4.05	94.510	5291.15	19.79S	251.02E	==>	-251.10	
5400.00	4.05	94.510	5390.90	20.35S	258.06E	==>	-258.15	
5500.00	4.05	94.510	5490.65	20.91S	265.11E	==>	-265.20	
5600.00	4.05	94.510	5590.40	21.46S	272.16E	==>	-272.25	
5700.00	4.05	94.510	5690.15	22.02S	279.20E	==>	-279.30	
5800.00	4.05	94.510	5789.90	22.57S	286.25E	==>	-286.35	
5900.00	4.05	94.510	5889.65	23.13S	293.30E	==>	-293.40	
6000.00	4.05	94.510	5989.40	23.68S	300.34E	==>	-300.45	
6100.00	4.05	94.510	6089.15	24.24S	307.39E	==>	-307.50	
6200.00	4.05	94.510	6188.90	24.79S	314.44E	==>	-314.55	
6300.00	4.05	94.510	6288.65	25.35S	321.49E	==>	-321.59	
6400.00	4.05	94.510	6388.40	25.91S	328.53E	==>	-328.64	
6500.00	4.05	94.510	6488.15	26.46S	335.58E	==>	-335.69	
6600.00	4.05	94.510	6587.90	27.02S	342.63E	==>	-342.74	
6700.00	4.05	94.510	6687.65	27.57S	349.67E	==>	-349.79	
6800.00	4.05	94.510	6787.40	28.13S	356.72E	==>	-356.84	
6900.00	4.05	94.510	6887.15	28.68S	363.77E	==>	-363.89	
7000.00	4.05	94.510	6986.90	29.24S	370.81E	==>	-370.94	
7100.00	4.05	94.510	7086.65	29.80S	377.86E	==>	-377.99	
7200.00	2.95	96.050	7186.41	30.35S	384.81E	10.50	-384.94	
7300.00	7.57	268.250	7286.19	30.82S	380.77E	10.50	-380.90	
7400.00	18.07	269.540	7383.56	31.15S	358.61E	10.50	-358.74	
7500.00	28.57	269.900	7475.26	31.32S	319.08E	10.50	-319.22	
7600.00	39.07	270.070	7558.22	31.32S	263.50E	10.50	-263.64	
7700.00	49.57	270.180	7629.67	31.16S	193.74E	10.50	-193.88	
7800.00	60.07	270.260	7687.21	30.84S	112.12E	10.50	-112.26	
7900.00	70.57	270.330	7728.91	30.37S	21.39E	10.50	-21.52	
8000.00	81.07	270.380	7753.38	29.78S	75.43W	10.50	75.29	
8100.00	90.01	270.430	7760.00	29.07S	175.08W	==>	174.95	
8200.00	90.01	270.430	7759.98	28.32S	275.08W	==>	274.95	
8300.00	90.01	270.430	7759.96	27.57S	375.07W	==>	374.95	
8400.00	90.01	270.430	7759.94	26.83S	475.07W	==>	474.95	
8500.00	90.01	270.430	7759.92	26.08S	575.07W	==>	574.95	
8600.00	90.01	270.430	7759.90	25.33S	675.07W	==>	674.95	
8700.00	90.01	270.430	7759.87	24.59S	775.06W	==>	774.95	
8800.00	90.01	270.430	7759.85	23.84S	875.06W	==>	874.95	
8900.00	90.01	270.430	7759.83	23.09S	975.06W	==>	974.95	

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Vertical Section is from 0.00N 0.00E on azimuth 270.250 degrees  
Bottom hole distance is 9971.84 Feet on azimuth 270.25 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: OURAY 5-64 15-16-1BHZ (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	90.01	270.430	7759.81	22.35S	1075.05W	==>	1074.95	
9100.00	90.01	270.430	7759.79	21.60S	1175.05W	==>	1174.94	
9200.00	90.01	270.430	7759.77	20.86S	1275.05W	==>	1274.94	
9300.00	90.01	270.430	7759.75	20.11S	1375.05W	==>	1374.94	
9400.00	90.01	270.430	7759.73	19.36S	1475.04W	==>	1474.94	
9500.00	90.01	270.430	7759.71	18.62S	1575.04W	==>	1574.94	
9600.00	90.01	270.430	7759.69	17.87S	1675.04W	==>	1674.94	
9700.00	90.01	270.430	7759.67	17.12S	1775.03W	==>	1774.94	
9800.00	90.01	270.430	7759.65	16.38S	1875.03W	==>	1874.94	
9900.00	90.01	270.430	7759.63	15.63S	1975.03W	==>	1974.94	
10000.00	90.01	270.430	7759.61	14.88S	2075.03W	==>	2074.94	
10100.00	90.01	270.430	7759.59	14.14S	2175.02W	==>	2174.94	
10200.00	90.01	270.430	7759.57	13.39S	2275.02W	==>	2274.94	
10300.00	90.01	270.430	7759.55	12.65S	2375.02W	==>	2374.94	
10400.00	90.01	270.430	7759.53	11.90S	2475.02W	==>	2474.94	
10500.00	90.01	270.430	7759.51	11.15S	2575.01W	==>	2574.94	
10600.00	90.01	270.430	7759.49	10.41S	2675.01W	==>	2674.94	
10700.00	90.01	270.430	7759.47	9.66S	2775.01W	==>	2774.94	
10800.00	90.01	270.430	7759.45	8.91S	2875.00W	==>	2874.94	
10900.00	90.01	270.430	7759.43	8.17S	2975.00W	==>	2974.94	
11000.00	90.01	270.430	7759.41	7.42S	3075.00W	==>	3074.94	
11100.00	90.01	270.430	7759.39	6.67S	3175.00W	==>	3174.94	
11200.00	90.01	270.430	7759.37	5.93S	3274.99W	==>	3274.93	
11300.00	90.01	270.430	7759.34	5.18S	3374.99W	==>	3374.93	
11400.00	90.01	270.430	7759.32	4.43S	3474.99W	==>	3474.93	
11500.00	90.01	270.430	7759.30	3.69S	3574.98W	==>	3574.93	
11600.00	90.01	270.430	7759.28	2.94S	3674.98W	==>	3674.93	
11700.00	90.01	270.430	7759.26	2.20S	3774.98W	==>	3774.93	
11800.00	90.01	270.430	7759.24	1.45S	3874.98W	==>	3874.93	
11900.00	90.01	270.430	7759.22	0.70S	3974.97W	==>	3974.93	
12000.00	90.01	270.430	7759.20	0.04N	4074.97W	==>	4074.93	
12100.00	90.01	270.430	7759.18	0.79N	4174.97W	==>	4174.93	
12200.00	90.01	270.430	7759.16	1.54N	4274.97W	==>	4274.93	
12300.00	90.01	270.430	7759.14	2.28N	4374.96W	==>	4374.93	
12400.00	90.01	270.430	7759.12	3.03N	4474.96W	==>	4474.93	
12500.00	90.01	270.430	7759.10	3.78N	4574.96W	==>	4574.93	
12600.00	90.01	270.430	7759.08	4.52N	4674.95W	==>	4674.93	
12700.00	90.01	270.430	7759.06	5.27N	4774.95W	==>	4774.93	
12800.00	90.01	270.430	7759.04	6.01N	4874.95W	==>	4874.93	
12900.00	90.01	270.430	7759.02	6.76N	4974.95W	==>	4974.93	
13000.00	90.01	270.430	7759.00	7.51N	5074.94W	==>	5074.93	
13100.00	90.01	270.430	7758.98	8.25N	5174.94W	==>	5174.93	
13200.00	90.01	270.430	7758.96	9.00N	5274.94W	==>	5274.93	
13300.00	90.01	270.430	7758.94	9.75N	5374.93W	==>	5374.93	
13400.00	90.01	270.430	7758.92	10.49N	5474.93W	==>	5474.92	
13500.00	90.01	270.430	7758.90	11.24N	5574.93W	==>	5574.92	
13600.00	90.01	270.430	7758.88	11.99N	5674.93W	==>	5674.92	
13700.00	90.01	270.430	7758.86	12.73N	5774.92W	==>	5774.92	
13800.00	90.01	270.430	7758.84	13.48N	5874.92W	==>	5874.92	
13900.00	90.01	270.430	7758.81	14.22N	5974.92W	==>	5974.92	
14000.00	90.01	270.430	7758.79	14.97N	6074.91W	==>	6074.92	
14100.00	90.01	270.430	7758.77	15.72N	6174.91W	==>	6174.92	
14200.00	90.01	270.430	7758.75	16.46N	6274.91W	==>	6274.92	
14300.00	90.01	270.430	7758.73	17.21N	6374.91W	==>	6374.92	
14400.00	90.01	270.430	7758.71	17.96N	6474.90W	==>	6474.92	
14500.00	90.01	270.430	7758.69	18.70N	6574.90W	==>	6574.92	
14600.00	90.01	270.430	7758.67	19.45N	6674.90W	==>	6674.92	
14700.00	90.01	270.430	7758.65	20.20N	6774.90W	==>	6774.92	
14800.00	90.01	270.430	7758.63	20.94N	6874.89W	==>	6874.92	

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Bottom hole distance is 9971.84 Feet on azimuth 270.25 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
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Well Design Combined Report  
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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	90.01	270.430	7758.61	21.69N	6974.89W	==>	6974.92	
15000.00	90.01	270.430	7758.59	22.44N	7074.89W	==>	7074.92	
15100.00	90.01	270.430	7758.57	23.18N	7174.88W	==>	7174.92	
15200.00	90.01	270.430	7758.55	23.93N	7274.88W	==>	7274.92	
15300.00	90.01	270.430	7758.53	24.67N	7374.88W	==>	7374.92	
15400.00	90.01	270.430	7758.51	25.42N	7474.88W	==>	7474.92	
15500.00	90.01	270.430	7758.49	26.17N	7574.87W	==>	7574.91	
15600.00	90.01	270.430	7758.47	26.91N	7674.87W	==>	7674.91	
15700.00	90.01	270.430	7758.45	27.66N	7774.87W	==>	7774.91	
15800.00	90.01	270.430	7758.43	28.41N	7874.86W	==>	7874.91	
15900.00	90.01	270.430	7758.41	29.15N	7974.86W	==>	7974.91	
16000.00	90.01	270.430	7758.39	29.90N	8074.86W	==>	8074.91	
16100.00	90.01	270.430	7758.37	30.65N	8174.86W	==>	8174.91	
16200.00	90.01	270.430	7758.35	31.39N	8274.85W	==>	8274.91	
16300.00	90.01	270.430	7758.33	32.14N	8374.85W	==>	8374.91	
16400.00	90.01	270.430	7758.31	32.88N	8474.85W	==>	8474.91	
16500.00	90.01	270.430	7758.28	33.63N	8574.85W	==>	8574.91	
16600.00	90.01	270.430	7758.26	34.38N	8674.84W	==>	8674.91	
16700.00	90.01	270.430	7758.24	35.12N	8774.84W	==>	8774.91	
16800.00	90.01	270.430	7758.22	35.87N	8874.84W	==>	8874.91	
16900.00	90.01	270.430	7758.20	36.62N	8974.83W	==>	8974.91	
17000.00	90.01	270.430	7758.18	37.36N	9074.83W	==>	9074.91	
17100.00	90.01	270.430	7758.16	38.11N	9174.83W	==>	9174.91	
17200.00	90.01	270.430	7758.14	38.86N	9274.83W	==>	9274.91	
17300.00	90.01	270.430	7758.12	39.60N	9374.82W	==>	9374.91	
17400.00	90.01	270.430	7758.10	40.35N	9474.82W	==>	9474.91	
17500.00	90.01	270.430	7758.08	41.09N	9574.82W	==>	9574.91	
17600.00	90.01	270.430	7758.06	41.84N	9674.81W	==>	9674.91	
17700.00	90.01	270.430	7758.04	42.59N	9774.81W	==>	9774.90	
17800.00	90.01	270.430	7758.02	43.33N	9874.81W	==>	9874.90	
17896.93	90.01	270.430	7758.00	44.06N	9971.74W	==>	9971.84	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5960.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 270.250 degrees  
Bottom hole distance is 9971.84 Feet on azimuth 270.25 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: OURAY 5-64 15-16-1BHZ (PWB)



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
OURAY 5-64 15-16-1BHZ - BHL	44.06N	9971.74W	7758.00	N39 36 54.3708	W104 33 58.9932	1650281.16	3263015.56
OURAY 5-64 15-16-1BHZ - T1	29.18S	160.27W	7760.00	N39 36 52.6320	W104 31 53.6376	1650207.93	3272826.77

Survey Tool Program					
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
564258	Planned	1500.00	1500.00	WdW Rate Gyro	Standard
564257	Planned	17896.93	7758.00	ISCWSA MWD	Rev 4 + SAG + FLT

Notes