

Highlands Natural Resources

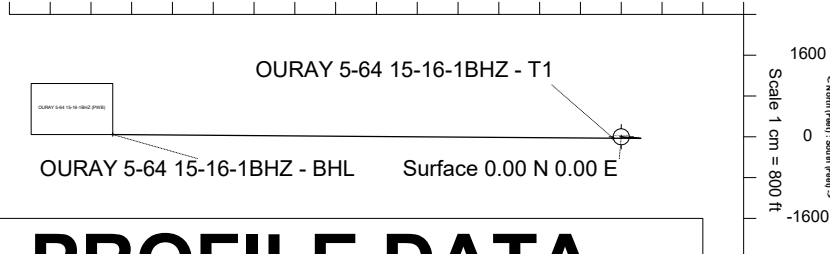
Location	DJ Basin Southern Extension	Slot	Ouray 5-64 15-16-1BHZ
Field	DJ Basin Southern Extension	Well	OURAY 5-64 15-16-1BHZ
Installation	HNR Arapahoe County Pad Updated 04.13.18 JFalls	Wellbore	OURAY 5-64 15-16-1BHZ (PWB)

N

GRID

East (Feet) ->

-11200 -9600 -8000 -6400 -4800 -3200 -1600 0 1600
Scale 1 cm = 800 ft



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	1661.00	0.00	94.51	1661.00	S 0.00	W 0.00	0.00	0.00
End of Build	1817.60	4.07	94.51	1817.46	S 0.44	E 5.54	2.60	-5.55
End of Hold	7130.23	4.07	94.51	7116.69	S 30.12	E 381.58	0.00	-381.71
Target OURAY ...Z - T1	8023.61	89.74	270.43	7701.00	S 29.03	W 160.29	10.50	160.16
T.D. & Target OUR...BHL	17835.45	89.74	270.43	7745.00	N 44.20	W 9971.75	0.00	9971.85

Mar-2-2017

EMM-2015 [2000.0-2020.0] Dip: 66.54 deg Field: 52124.9 nT

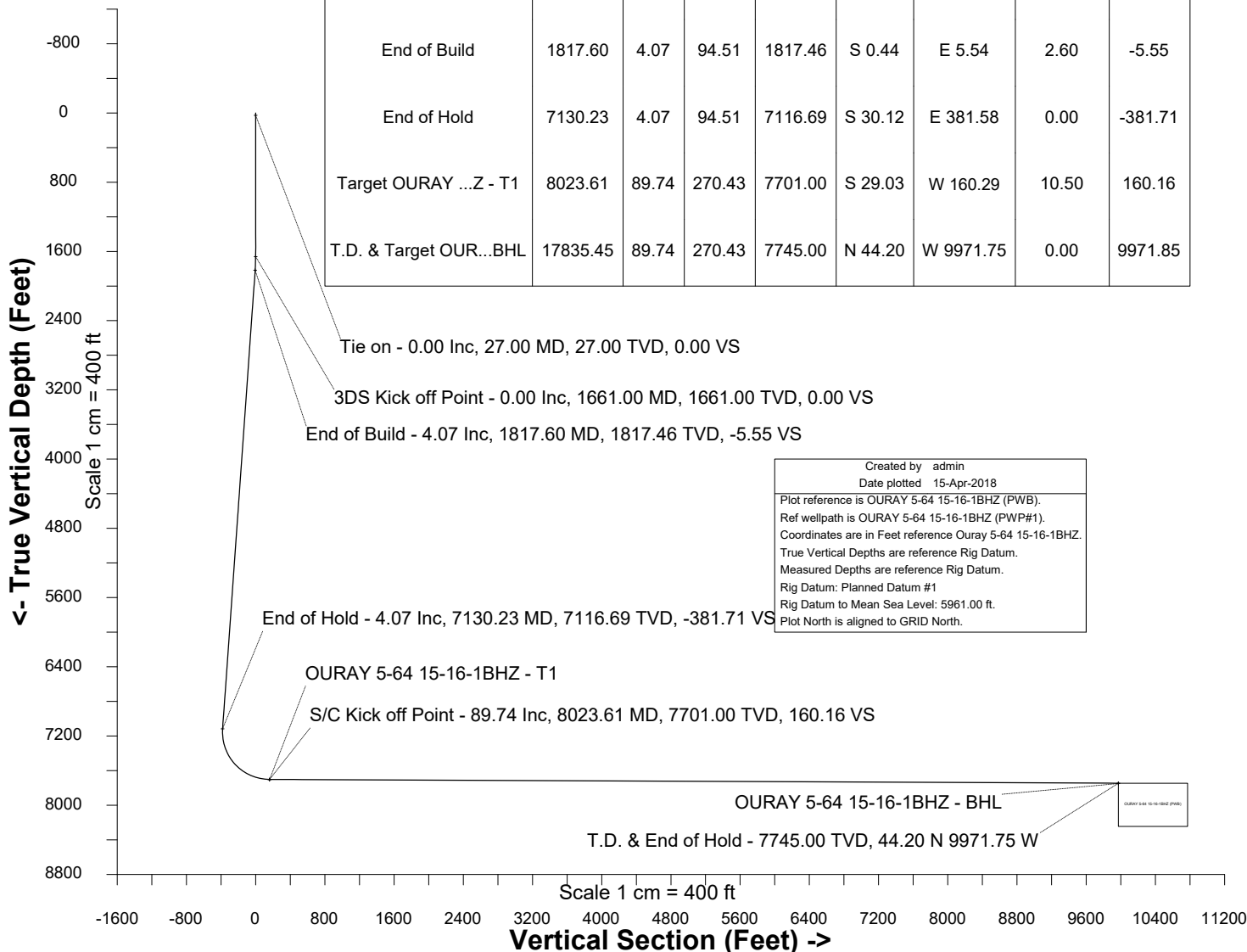
Lat: N39 36 53.6940 Long: W104 31 51.5676 Elev: 5934.00 ft

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



Tie on - 0.00 Inc, 27.00 MD, 27.00 TVD, 0.00 VS

3DS Kick off Point - 0.00 Inc, 1661.00 MD, 1661.00 TVD, 0.00 VS

End of Build - 4.07 Inc, 1817.60 MD, 1817.46 TVD, -5.55 VS

End of Hold - 4.07 Inc, 7130.23 MD, 7116.69 TVD, -381.71 VS

OURAY 5-64 15-16-1BHZ - T1

S/C Kick off Point - 89.74 Inc, 8023.61 MD, 7701.00 TVD, 160.16 VS

OURAY 5-64 15-16-1BHZ - BHL

T.D. & End of Hold - 7745.00 TVD, 44.20 N 9971.75 W

Created by admin

Date plotted 15-Apr-2018

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: 5961.00 ft.

Plot North is aligned to GRID North.



Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
Ouray 5-64 15-16-1BHZ	39.61469500	-104.53099600	1650236.9586	3272987.0551	80.15S	0.55W	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	1650236.96	3272987.06
1661.00	0.00	94.510	1661.00	0.00N	0.00E	==>	0.00	1650236.96	3272987.06
1817.60	4.07	94.510	1817.46	0.44S	5.54E	2.60	-5.55	1650236.52	3272992.60
7130.23	4.07	94.510	7116.69	30.12S	381.58E	==>	-381.71	1650206.83	3273368.62
8023.61	89.74	270.430	7701.00	29.03S	160.29W	10.50	160.16	1650207.93	3272826.77
17835.45	89.74	270.430	7745.00	44.20N	9971.75W	==>	9971.85	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
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	0.00	0.000	1601.00	0.00N	0.00E	==>	0.00	
1701.00	1.04	94.510	1701.00	0.03S	0.36E	2.60	-0.36	
1801.00	3.64	94.510	1800.91	0.35S	4.43E	2.60	-4.43	
1901.00	4.07	94.510	1900.66	0.90S	11.45E	==>	-11.45	
2001.00	4.07	94.510	2000.41	1.46S	18.53E	==>	-18.53	
2101.00	4.07	94.510	2100.15	2.02S	25.60E	==>	-25.61	
2201.00	4.07	94.510	2199.90	2.58S	32.68E	==>	-32.69	
2301.00	4.07	94.510	2299.65	3.14S	39.76E	==>	-39.77	
2401.00	4.07	94.510	2399.40	3.70S	46.84E	==>	-46.85	
2501.00	4.07	94.510	2499.14	4.26S	53.92E	==>	-53.93	
2601.00	4.07	94.510	2598.89	4.82S	60.99E	==>	-61.02	
2701.00	4.07	94.510	2698.64	5.37S	68.07E	==>	-68.10	
2801.00	4.07	94.510	2798.39	5.93S	75.15E	==>	-75.18	
2901.00	4.07	94.510	2898.13	6.49S	82.23E	==>	-82.26	

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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 270.250 degrees
Bottom hole distance is 9971.85 Feet on azimuth 270.25 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Microsoft
Date Printed: 15-Apr-2018



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
3001.00	4.07	94.510	2997.88	7.05S	89.31E	==>	-89.34	
3101.00	4.07	94.510	3097.63	7.61S	96.38E	==>	-96.42	
3201.00	4.07	94.510	3197.38	8.17S	103.46E	==>	-103.50	
3301.00	4.07	94.510	3297.12	8.73S	110.54E	==>	-110.58	
3401.00	4.07	94.510	3396.87	9.29S	117.62E	==>	-117.66	
3501.00	4.07	94.510	3496.62	9.84S	124.70E	==>	-124.74	
3601.00	4.07	94.510	3596.37	10.40S	131.78E	==>	-131.82	
3701.00	4.07	94.510	3696.11	10.96S	138.85E	==>	-138.90	
3801.00	4.07	94.510	3795.86	11.52S	145.93E	==>	-145.98	
3901.00	4.07	94.510	3895.61	12.08S	153.01E	==>	-153.06	
4001.00	4.07	94.510	3995.36	12.64S	160.09E	==>	-160.14	
4101.00	4.07	94.510	4095.11	13.20S	167.17E	==>	-167.22	
4201.00	4.07	94.510	4194.85	13.76S	174.24E	==>	-174.30	
4301.00	4.07	94.510	4294.60	14.31S	181.32E	==>	-181.38	
4401.00	4.07	94.510	4394.35	14.87S	188.40E	==>	-188.46	
4501.00	4.07	94.510	4494.10	15.43S	195.48E	==>	-195.54	
4601.00	4.07	94.510	4593.84	15.99S	202.56E	==>	-202.62	
4701.00	4.07	94.510	4693.59	16.55S	209.63E	==>	-209.71	
4801.00	4.07	94.510	4793.34	17.11S	216.71E	==>	-216.79	
4901.00	4.07	94.510	4893.09	17.67S	223.79E	==>	-223.87	
5001.00	4.07	94.510	4992.83	18.23S	230.87E	==>	-230.95	
5101.00	4.07	94.510	5092.58	18.79S	237.95E	==>	-238.03	
5201.00	4.07	94.510	5192.33	19.34S	245.02E	==>	-245.11	
5301.00	4.07	94.510	5292.08	19.90S	252.10E	==>	-252.19	
5401.00	4.07	94.510	5391.82	20.46S	259.18E	==>	-259.27	
5501.00	4.07	94.510	5491.57	21.02S	266.26E	==>	-266.35	
5601.00	4.07	94.510	5591.32	21.58S	273.34E	==>	-273.43	
5701.00	4.07	94.510	5691.07	22.14S	280.41E	==>	-280.51	
5801.00	4.07	94.510	5790.82	22.70S	287.49E	==>	-287.59	
5901.00	4.07	94.510	5890.56	23.26S	294.57E	==>	-294.67	
6001.00	4.07	94.510	5990.31	23.81S	301.65E	==>	-301.75	
6101.00	4.07	94.510	6090.06	24.37S	308.73E	==>	-308.83	
6201.00	4.07	94.510	6189.81	24.93S	315.81E	==>	-315.91	
6301.00	4.07	94.510	6289.55	25.49S	322.88E	==>	-322.99	
6401.00	4.07	94.510	6389.30	26.05S	329.96E	==>	-330.07	
6501.00	4.07	94.510	6489.05	26.61S	337.04E	==>	-337.15	
6601.00	4.07	94.510	6588.80	27.17S	344.12E	==>	-344.23	
6701.00	4.07	94.510	6688.54	27.73S	351.20E	==>	-351.32	
6801.00	4.07	94.510	6788.29	28.28S	358.27E	==>	-358.40	
6901.00	4.07	94.510	6888.04	28.84S	365.35E	==>	-365.48	
7001.00	4.07	94.510	6987.79	29.40S	372.43E	==>	-372.56	
7101.00	4.07	94.510	7087.53	29.96S	379.51E	==>	-379.64	
7201.00	3.38	265.510	7187.41	30.49S	382.00E	10.50	-382.13	
7301.00	13.87	269.250	7286.14	30.87S	367.03E	10.50	-367.17	
7401.00	24.37	269.790	7380.49	31.11S	334.32E	10.50	-334.46	
7501.00	34.87	270.010	7467.30	31.18S	284.97E	10.50	-285.10	
7601.00	45.37	270.140	7543.66	31.08S	220.62E	10.50	-220.75	
7701.00	55.87	270.230	7607.02	30.83S	143.43E	10.50	-143.56	
7801.00	66.37	270.300	7655.25	30.42S	55.99E	10.50	-56.12	
7901.00	76.87	270.360	7686.74	29.87S	38.77W	10.50	38.64	
8001.00	87.37	270.420	7700.43	29.20S	137.69W	10.50	137.56	
8101.00	89.74	270.430	7701.35	28.45S	237.68W	==>	237.55	
8201.00	89.74	270.430	7701.80	27.71S	337.67W	==>	337.55	
8301.00	89.74	270.430	7702.24	26.96S	437.67W	==>	437.55	
8401.00	89.74	270.430	7702.69	26.21S	537.67W	==>	537.54	
8501.00	89.74	270.430	7703.14	25.47S	637.66W	==>	637.54	
8601.00	89.74	270.430	7703.59	24.72S	737.66W	==>	737.54	
8701.00	89.74	270.430	7704.04	23.97S	837.65W	==>	837.54	
8801.00	89.74	270.430	7704.49	23.23S	937.65W	==>	937.54	

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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 270.250 degrees
Bottom hole distance is 9971.85 Feet on azimuth 270.25 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Microsoft
Date Printed: 15-Apr-2018



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
8901.00	89.74	270.430	7704.93	22.48S	1037.65W	==>	1037.54	
9001.00	89.74	270.430	7705.38	21.74S	1137.64W	==>	1137.54	
9101.00	89.74	270.430	7705.83	20.99S	1237.64W	==>	1237.53	
9201.00	89.74	270.430	7706.28	20.24S	1337.64W	==>	1337.53	
9301.00	89.74	270.430	7706.73	19.50S	1437.63W	==>	1437.53	
9401.00	89.74	270.430	7707.18	18.75S	1537.63W	==>	1537.53	
9501.00	89.74	270.430	7707.63	18.00S	1637.62W	==>	1637.53	
9601.00	89.74	270.430	7708.07	17.26S	1737.62W	==>	1737.53	
9701.00	89.74	270.430	7708.52	16.51S	1837.62W	==>	1837.53	
9801.00	89.74	270.430	7708.97	15.76S	1937.61W	==>	1937.52	
9901.00	89.74	270.430	7709.42	15.02S	2037.61W	==>	2037.52	
10001.00	89.74	270.430	7709.87	14.27S	2137.61W	==>	2137.52	
10101.00	89.74	270.430	7710.32	13.53S	2237.60W	==>	2237.52	
10201.00	89.74	270.430	7710.76	12.78S	2337.60W	==>	2337.52	
10301.00	89.74	270.430	7711.21	12.03S	2437.59W	==>	2437.52	
10401.00	89.74	270.430	7711.66	11.29S	2537.59W	==>	2537.52	
10501.00	89.74	270.430	7712.11	10.54S	2637.59W	==>	2637.51	
10601.00	89.74	270.430	7712.56	9.79S	2737.58W	==>	2737.51	
10701.00	89.74	270.430	7713.01	9.05S	2837.58W	==>	2837.51	
10801.00	89.74	270.430	7713.45	8.30S	2937.57W	==>	2937.51	
10901.00	89.74	270.430	7713.90	7.55S	3037.57W	==>	3037.51	
11001.00	89.74	270.430	7714.35	6.81S	3137.57W	==>	3137.51	
11101.00	89.74	270.430	7714.80	6.06S	3237.56W	==>	3237.50	
11201.00	89.74	270.430	7715.25	5.32S	3337.56W	==>	3337.50	
11301.00	89.74	270.430	7715.70	4.57S	3437.56W	==>	3437.50	
11401.00	89.74	270.430	7716.15	3.82S	3537.55W	==>	3537.50	
11501.00	89.74	270.430	7716.59	3.08S	3637.55W	==>	3637.50	
11601.00	89.74	270.430	7717.04	2.33S	3737.54W	==>	3737.50	
11701.00	89.74	270.430	7717.49	1.58S	3837.54W	==>	3837.50	
11801.00	89.74	270.430	7717.94	0.84S	3937.54W	==>	3937.49	
11901.00	89.74	270.430	7718.39	0.09S	4037.53W	==>	4037.49	
12001.00	89.74	270.430	7718.84	0.66N	4137.53W	==>	4137.49	
12101.00	89.74	270.430	7719.28	1.40N	4237.53W	==>	4237.49	
12201.00	89.74	270.430	7719.73	2.15N	4337.52W	==>	4337.49	
12301.00	89.74	270.430	7720.18	2.90N	4437.52W	==>	4437.49	
12401.00	89.74	270.430	7720.63	3.64N	4537.51W	==>	4537.49	
12501.00	89.74	270.430	7721.08	4.39N	4637.51W	==>	4637.48	
12601.00	89.74	270.430	7721.53	5.13N	4737.51W	==>	4737.48	
12701.00	89.74	270.430	7721.98	5.88N	4837.50W	==>	4837.48	
12801.00	89.74	270.430	7722.42	6.63N	4937.50W	==>	4937.48	
12901.00	89.74	270.430	7722.87	7.37N	5037.50W	==>	5037.48	
13001.00	89.74	270.430	7723.32	8.12N	5137.49W	==>	5137.48	
13101.00	89.74	270.430	7723.77	8.87N	5237.49W	==>	5237.48	
13201.00	89.74	270.430	7724.22	9.61N	5337.48W	==>	5337.47	
13301.00	89.74	270.430	7724.67	10.36N	5437.48W	==>	5437.47	
13401.00	89.74	270.430	7725.11	11.11N	5537.48W	==>	5537.47	
13501.00	89.74	270.430	7725.56	11.85N	5637.47W	==>	5637.47	
13601.00	89.74	270.430	7726.01	12.60N	5737.47W	==>	5737.47	
13701.00	89.74	270.430	7726.46	13.34N	5837.46W	==>	5837.47	
13801.00	89.74	270.430	7726.91	14.09N	5937.46W	==>	5937.47	
13901.00	89.74	270.430	7727.36	14.84N	6037.46W	==>	6037.46	
14001.00	89.74	270.430	7727.80	15.58N	6137.45W	==>	6137.46	
14101.00	89.74	270.430	7728.25	16.33N	6237.45W	==>	6237.46	
14201.00	89.74	270.430	7728.70	17.08N	6337.45W	==>	6337.46	
14301.00	89.74	270.430	7729.15	17.82N	6437.44W	==>	6437.46	
14401.00	89.74	270.430	7729.60	18.57N	6537.44W	==>	6537.46	
14501.00	89.74	270.430	7730.05	19.32N	6637.43W	==>	6637.46	
14601.00	89.74	270.430	7730.50	20.06N	6737.43W	==>	6737.45	
14701.00	89.74	270.430	7730.94	20.81N	6837.43W	==>	6837.45	

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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
14801.00	89.74	270.430	7731.39	21.55N	6937.42W	==>	6937.45	
14901.00	89.74	270.430	7731.84	22.30N	7037.42W	==>	7037.45	
15001.00	89.74	270.430	7732.29	23.05N	7137.42W	==>	7137.45	
15101.00	89.74	270.430	7732.74	23.79N	7237.41W	==>	7237.45	
15201.00	89.74	270.430	7733.19	24.54N	7337.41W	==>	7337.44	
15301.00	89.74	270.430	7733.63	25.29N	7437.40W	==>	7437.44	
15401.00	89.74	270.430	7734.08	26.03N	7537.40W	==>	7537.44	
15501.00	89.74	270.430	7734.53	26.78N	7637.40W	==>	7637.44	
15601.00	89.74	270.430	7734.98	27.53N	7737.39W	==>	7737.44	
15701.00	89.74	270.430	7735.43	28.27N	7837.39W	==>	7837.44	
15801.00	89.74	270.430	7735.88	29.02N	7937.39W	==>	7937.44	
15901.00	89.74	270.430	7736.33	29.76N	8037.38W	==>	8037.43	
16001.00	89.74	270.430	7736.77	30.51N	8137.38W	==>	8137.43	
16101.00	89.74	270.430	7737.22	31.26N	8237.37W	==>	8237.43	
16201.00	89.74	270.430	7737.67	32.00N	8337.37W	==>	8337.43	
16301.00	89.74	270.430	7738.12	32.75N	8437.37W	==>	8437.43	
16401.00	89.74	270.430	7738.57	33.50N	8537.36W	==>	8537.43	
16501.00	89.74	270.430	7739.02	34.24N	8637.36W	==>	8637.43	
16601.00	89.74	270.430	7739.46	34.99N	8737.35W	==>	8737.42	
16701.00	89.74	270.430	7739.91	35.74N	8837.35W	==>	8837.42	
16801.00	89.74	270.430	7740.36	36.48N	8937.35W	==>	8937.42	
16901.00	89.74	270.430	7740.81	37.23N	9037.34W	==>	9037.42	
17001.00	89.74	270.430	7741.26	37.97N	9137.34W	==>	9137.42	
17101.00	89.74	270.430	7741.71	38.72N	9237.34W	==>	9237.42	
17201.00	89.74	270.430	7742.15	39.47N	9337.33W	==>	9337.42	
17301.00	89.74	270.430	7742.60	40.21N	9437.33W	==>	9437.41	
17401.00	89.74	270.430	7743.05	40.96N	9537.32W	==>	9537.41	
17501.00	89.74	270.430	7743.50	41.71N	9637.32W	==>	9637.41	
17601.00	89.74	270.430	7743.95	42.45N	9737.32W	==>	9737.41	
17701.00	89.74	270.430	7744.40	43.20N	9837.31W	==>	9837.41	
17801.00	89.74	270.430	7744.85	43.95N	9937.31W	==>	9937.41	
17835.45	89.74	270.430	7745.00	44.20N	9971.75W	==>	9971.85	

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 5961.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 270.250 degrees
Bottom hole distance is 9971.85 Feet on azimuth 270.25 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Microsoft
Date Printed: 15-Apr-2018



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	44.20N	9971.75W	7745.00	39.61510300	-104.56638700	1650281.16	3263015.56
OURAY 5-64 15-16-1BHZ - T1	29.03S	160.29W	7701.00	39.61462000	-104.53156600	1650207.93	3272826.77

Survey Tool Program					
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
564258	Planned	1501.00	1501.00	WdW Rate Gyro	Standard
564257	Planned	17835.45	7745.00	ISCWSA MWD	Rev 4 + SAG + FLT

Notes