

HALLIBURTON

Sperry Drilling

6360 East Yellowstone Hwy, Evansville, WY 82636

Tel: 307-472-5757 Fax: 307-232-2097

Certified Survey Sheet

Company: True Oil LLC

Project: Arapahoe County, CO

Site (S-T-R): Sec. 15-T5S-R64W (HNR Re-Stake)

Well Name: Ouray 5-64 15-16-1BHZ

Wellbore: OWB

Survey: Final Surveys

API: 05-005-07342

Depth Reference (Rig): KB 27' @ 5961.00usft (True 33)

Ground Elev: 5934.00

Annotations

Tie-On to Last Surface MWD Survey @ 2101.00' MD

First Sperry MWD Survey @ 2176.00' MD

Last Sperry MWD Survey @ 17726.00' MD

Straight Line Projection to TD @ 17796.00' MD

I certify that the attached survey is true and correct to the best of my knowledge.



Jerry Popp
Well Design Engineer

HALLIBURTON SPERRY DRILLING SERVICES

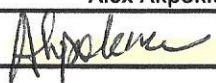
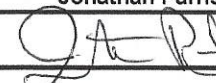
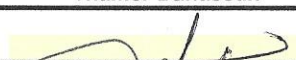
CERTIFIED SURVEY WORK SHEET

OPERATOR:	True Oil LLC
WELL:	Ouray 5-64 15-16-1BHZ
FIELD:	Wildcat
RIG:	True 33
LEGALS:	Sec.15-T5S -R64W
COUNTY:	Arapahoe
STATE:	Colorado
CAL. METHOD:	Grid
MAG. DECL. APPLIED:	8.09
VERTICAL SEC. DIR. :	270.250

SSDS Job Number :	904881784
Start Date of Job :	6/11/2018
End Date of Job :	6/19/2018
Lead Directional Driller:	Alex Akpokiere
	Thamer Bahassan
Other SDS DD's :	
SDS MWD Engineers :	Jonathan Parrish
	Matt Harrington

	Main Hole =====>	1st Side Track =====>	2nd Side Track =====>	3rd Side Track =====>	4th Side Track =====>
	0.00 Tie On	Tie On	Tie On	Tie On	Tie On
First Survey Depth	27.00				
Last Survey Depth	2101.00				
KOP Depth/Sidetrack MD	7026.00 KOP	KOP-ST1	KOP-ST2	KOP-ST3	KOP-ST4
First Survey Depth	2176.00 MWD	MWD	MWD	MWD	MWD
Last Survey Depth	17726.00 MWD	MWD	MWD	MWD	MWD
Bit Extrapolation to TD	17796.00 T.D.	T.D.	T.D.	T.D.	T.D.

The following Halliburton Sperry Drilling Services personnel listed below, do certify the above survey information to be accurate :

Print Name :	Alex Akpokiere	Print Name :	Jonathan Parrish	Print Name :	
Sign Name :		Sign Name :		Sign Name :	
Print Name :	Thamer Bahassan	Print Name :	Matt Harrington	Print Name :	
Sign Name :		Sign Name :		Sign Name :	

Examples of	TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
Survey Types:	MWD	Sperry Drilling Services (SDS) Measurement While Drilling (MWD) Survey's
	ESS	Sperry Drilling Services (SDS) Electronic Survey System (ESS) Survey's
	Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Drilling Services (SDS)
	SS	Single Shot (SS) Survey's ; Provided by Sperry Drilling Services (SDS) or third party vendor.

Project: Arapahoe County, CO
Site: Sec. 15-T5S-R64W (HNR Re-Stake)
Well: Ouray 5-64 15-16-1BHZ
Wellbore: OWB
Design: Final Surveys

True Oil LLC True 33

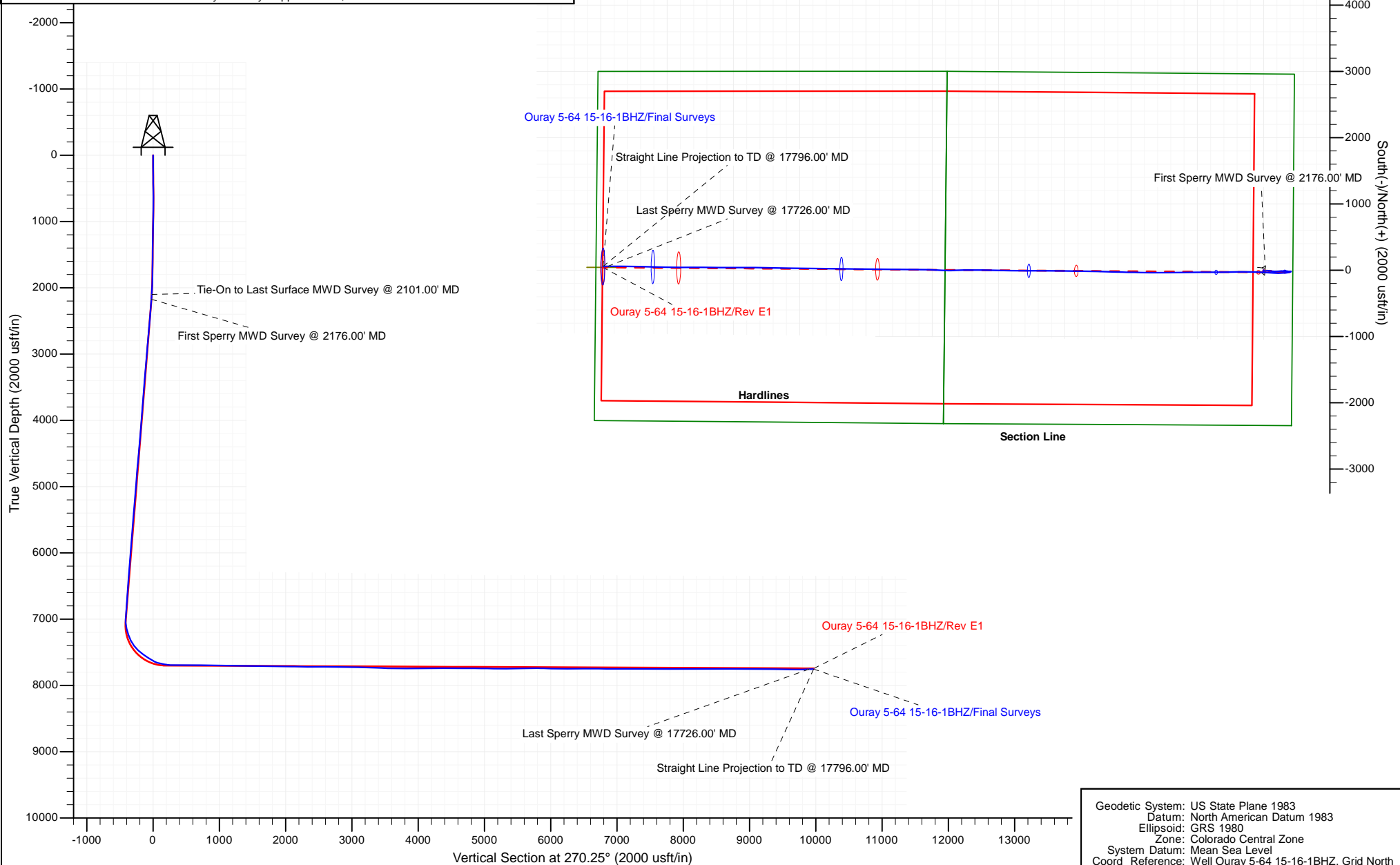
HALLIBURTON
Sperry Drilling

WELL DETAILS: Ouray 5-64 15-16-1BHZ

Ground Level: 5934.00 KB 27' @ 5961.00usft (True 33)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	1650236.94	3272987.06	39.614695	-104.530996

Created By : Jerry Popp 15:23, June 22 2018



Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Central Zone
System Datum: Mean Sea Level
Coord Reference: Well Ouray 5-64 15-16-1BHZ, Grid North

Job# 904881784

True 33

True Oil LLC

Arapahoe County, CO Sec. 15-T5S-R64W (HNR Re-Stake)

API# 05-005-07342

Ouray 5-64 15-16-1BHZ

2340' FSL & 440' FEL Sec 15-T5S-R64W

OWB

Design: Final Surveys

Sperry Drilling Services

Combo Report

22 June, 2018

Well Coordinates: 39° 36' 52.90" N
104° 31' 51.59" W

North American Datum 1983
Colorado Central Zone
1,650,236.94 N
3,272,987.06 E

Ground Level: 5,934.00 usft

Geodetic Scale Factor Applied

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 81E

Report Version: Midcon Combo v1.11

Centered on Well Ouray 5-64 15-16-1BHZ

KB 27' @ 5961.00usft (True 33)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
0.00	0.00	0.00	-5,961.00	0.00	0.00 N	0.00 E	1,650,236.94	3,272,987.06	0.00	0.00	
27.00	0.00	0.00	-5,934.00	27.00	0.00 N	0.00 E	1,650,236.94	3,272,987.06	0.00	0.00	First BH MWD Survey @ 27.00' MD
328.00	1.38	220.29	-5,633.03	327.97	2.76 S	2.34 W	1,650,234.17	3,272,984.71	0.46	2.33	
421.00	1.14	224.72	-5,540.05	420.95	4.28 S	3.72 W	1,650,232.66	3,272,983.34	0.28	3.70	
514.00	1.36	224.39	-5,447.07	513.93	5.72 S	5.14 W	1,650,231.22	3,272,981.91	0.24	5.12	
607.00	1.18	232.27	-5,354.10	606.90	7.10 S	6.67 W	1,650,229.84	3,272,980.38	0.27	6.64	
701.00	0.77	82.72	-5,260.10	700.90	7.61 S	6.81 W	1,650,229.33	3,272,980.25	2.00	6.78	
794.00	0.82	75.41	-5,167.11	793.89	7.36 S	5.55 W	1,650,229.58	3,272,981.51	0.12	5.51	
887.00	0.92	91.74	-5,074.12	886.88	7.22 S	4.16 W	1,650,229.72	3,272,982.90	0.29	4.12	
980.00	1.23	58.63	-4,981.14	979.86	6.72 S	2.56 W	1,650,230.22	3,272,984.50	0.73	2.53	
1,074.00	1.28	62.95	-4,887.16	1,073.84	5.72 S	0.76 W	1,650,231.22	3,272,986.29	0.11	0.74	
1,167.00	1.45	50.77	-4,794.19	1,166.81	4.50 S	1.08 E	1,650,232.44	3,272,988.13	0.36	-1.10	
1,260.00	1.40	43.44	-4,701.21	1,259.79	2.93 S	2.77 E	1,650,234.01	3,272,989.82	0.20	-2.78	
1,354.00	0.44	88.41	-4,607.23	1,353.77	2.09 S	3.92 E	1,650,234.85	3,272,990.97	1.20	-3.93	
1,449.00	0.39	104.31	-4,512.23	1,448.77	2.16 S	4.60 E	1,650,234.78	3,272,991.65	0.13	-4.61	
1,543.00	0.68	103.89	-4,418.23	1,542.77	2.37 S	5.45 E	1,650,234.57	3,272,992.50	0.31	-5.46	
1,638.00	0.72	90.21	-4,323.24	1,637.76	2.51 S	6.59 E	1,650,234.43	3,272,993.65	0.18	-6.60	
1,733.00	1.05	109.07	-4,228.25	1,732.75	2.80 S	8.01 E	1,650,234.14	3,272,995.07	0.46	-8.02	
1,828.00	1.03	107.12	-4,133.27	1,827.73	3.33 S	9.65 E	1,650,233.61	3,272,996.71	0.04	-9.66	
1,923.00	1.17	100.85	-4,038.29	1,922.71	3.77 S	11.42 E	1,650,233.17	3,272,998.47	0.19	-11.44	
2,017.00	2.41	103.90	-3,944.33	2,016.67	4.42 S	14.28 E	1,650,232.52	3,273,001.34	1.32	-14.30	
2,101.00	4.00	95.90	-3,860.47	2,100.53	5.15 S	18.91 E	1,650,231.79	3,273,005.96	1.96	-18.93	Last BH MWD Survey @ 2101.00' MD - Tie-On to Last Surface MWD Survey @ 2101.00' MD
2,176.00	4.14	96.34	-3,785.66	2,175.34	5.71 S	24.20 E	1,650,231.22	3,273,011.26	0.19	-24.23	First Sperry MWD Survey @ 2176.00' MD
2,238.00	4.04	95.26	-3,723.81	2,237.19	6.16 S	28.60 E	1,650,230.78	3,273,015.66	0.20	-28.63	
2,332.00	4.34	80.52	-3,630.06	2,330.94	5.88 S	35.41 E	1,650,231.06	3,273,022.46	1.19	-35.43	
2,426.00	5.14	79.31	-3,536.38	2,424.62	4.51 S	43.05 E	1,650,232.43	3,273,030.11	0.86	-43.07	
2,521.00	5.59	98.47	-3,441.79	2,519.21	4.40 S	51.81 E	1,650,232.53	3,273,038.87	1.93	-51.83	
2,616.00	5.15	94.80	-3,347.21	2,613.79	5.44 S	60.64 E	1,650,231.50	3,273,047.69	0.59	-60.66	
2,711.00	5.06	95.32	-3,252.59	2,708.41	6.19 S	69.06 E	1,650,230.75	3,273,056.11	0.11	-69.06	
2,806.00	4.83	93.89	-3,157.94	2,803.06	6.85 S	77.22 E	1,650,230.09	3,273,064.27	0.27	-77.25	
2,900.00	4.25	92.19	-3,064.24	2,896.76	7.25 S	84.65 E	1,650,229.69	3,273,071.70	0.63	-84.68	
2,995.00	5.68	99.39	-2,969.59	2,991.41	8.15 S	92.80 E	1,650,228.79	3,273,079.86	1.64	-92.84	
3,090.00	5.20	96.70	-2,875.02	3,085.98	9.42 S	101.72 E	1,650,227.52	3,273,088.77	0.57	-101.76	
3,185.00	4.57	101.17	-2,780.37	3,180.63	10.66 S	109.71 E	1,650,226.28	3,273,096.76	0.77	-109.75	
3,280.00	3.91	107.44	-2,685.63	3,275.37	12.36 S	116.51 E	1,650,224.58	3,273,103.56	0.85	-116.56	
3,375.00	4.31	92.34	-2,590.87	3,370.13	13.48 S	123.17 E	1,650,223.46	3,273,110.22	1.21	-123.22	
3,470.00	6.33	96.44	-2,496.28	3,464.72	14.21 S	131.94 E	1,650,222.73	3,273,118.99	2.16	-132.00	
3,564.00	5.26	94.40	-2,402.76	3,558.24	15.12 S	141.38 E	1,650,221.82	3,273,128.44	1.16	-141.45	
3,659.00	4.43	98.13	-2,308.10	3,652.90	15.97 S	149.36 E	1,650,220.96	3,273,136.41	0.93	-149.43	
3,754.00	3.45	105.65	-2,213.33	3,747.67	17.26 S	155.74 E	1,650,219.67	3,273,142.79	1.16	-155.82	

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
3,849.00	4.45	84.39	-2,118.55	3,842.45	17.67 S	162.16 E	1,650,219.26	3,273,149.22	1.85	-162.24	
3,944.00	3.75	91.86	-2,023.79	3,937.21	17.42 S	168.94 E	1,650,219.52	3,273,155.99	0.93	-169.01	
4,038.00	4.69	83.94	-1,930.05	4,030.95	17.11 S	175.83 E	1,650,219.83	3,273,162.88	1.17	-175.90	
4,133.00	3.58	85.54	-1,835.30	4,125.70	16.47 S	182.65 E	1,650,220.47	3,273,169.70	1.17	-182.72	
4,228.00	5.59	87.74	-1,740.61	4,220.39	16.06 S	190.23 E	1,650,220.88	3,273,177.28	2.12	-190.30	
4,323.00	6.42	85.90	-1,646.13	4,314.87	15.49 S	200.15 E	1,650,221.45	3,273,187.20	0.90	-200.22	
4,417.00	5.10	88.41	-1,552.61	4,408.39	15.00 S	209.57 E	1,650,221.94	3,273,196.62	1.43	-209.64	
4,512.00	4.13	93.31	-1,457.91	4,503.09	15.08 S	217.21 E	1,650,221.86	3,273,204.26	1.10	-217.27	
4,607.00	5.75	85.86	-1,363.27	4,597.73	14.94 S	225.37 E	1,650,222.00	3,273,212.42	1.83	-225.43	
4,701.00	4.69	83.51	-1,269.66	4,691.34	14.16 S	233.88 E	1,650,222.78	3,273,220.93	1.15	-233.95	
4,796.00	3.92	83.00	-1,174.93	4,786.07	13.33 S	240.97 E	1,650,223.61	3,273,228.02	0.81	-241.02	
4,891.00	4.91	83.62	-1,080.21	4,880.79	12.48 S	248.23 E	1,650,224.46	3,273,235.28	1.04	-248.28	
4,986.00	4.15	86.80	-985.51	4,975.49	11.84 S	255.70 E	1,650,225.10	3,273,242.75	0.84	-255.75	
5,081.00	4.91	87.17	-890.81	5,070.19	11.44 S	263.20 E	1,650,225.50	3,273,250.25	0.80	-263.24	
5,175.00	4.33	92.75	-797.11	5,163.89	11.41 S	270.76 E	1,650,225.52	3,273,257.81	0.78	-270.81	
5,270.00	4.10	92.97	-702.37	5,258.63	11.76 S	277.73 E	1,650,225.18	3,273,264.78	0.24	-277.78	
5,365.00	3.93	91.64	-607.60	5,353.40	12.03 S	284.38 E	1,650,224.91	3,273,271.43	0.20	-284.43	
5,460.00	5.77	89.58	-512.95	5,448.05	12.09 S	292.41 E	1,650,224.85	3,273,279.46	1.95	-292.46	
5,554.00	5.55	83.06	-419.40	5,541.60	11.51 S	301.65 E	1,650,225.43	3,273,288.69	0.72	-301.69	
5,649.00	5.22	87.57	-324.82	5,636.18	10.77 S	310.52 E	1,650,226.17	3,273,297.57	0.56	-310.57	
5,744.00	5.54	95.45	-230.24	5,730.76	11.02 S	319.41 E	1,650,225.92	3,273,306.45	0.85	-319.45	
5,839.00	4.47	89.36	-135.60	5,825.40	11.41 S	327.67 E	1,650,225.52	3,273,314.72	1.26	-327.72	
5,933.00	4.29	94.28	-41.88	5,919.12	11.64 S	334.84 E	1,650,225.30	3,273,321.89	0.44	-334.89	
6,028.00	2.94	86.54	52.93	6,013.93	11.75 S	340.82 E	1,650,225.18	3,273,327.86	1.51	-340.87	
6,123.00	3.62	98.43	147.78	6,108.78	12.05 S	346.22 E	1,650,224.89	3,273,333.26	1.01	-346.27	
6,217.00	4.84	94.25	241.52	6,202.52	12.78 S	353.11 E	1,650,224.16	3,273,340.15	1.34	-353.16	
6,312.00	4.90	98.02	336.18	6,297.18	13.64 S	361.12 E	1,650,223.30	3,273,348.17	0.34	-361.18	
6,407.00	4.60	101.23	430.85	6,391.85	14.95 S	368.87 E	1,650,221.99	3,273,355.92	0.42	-368.94	
6,502.00	3.48	100.32	525.61	6,486.61	16.21 S	375.45 E	1,650,220.73	3,273,362.49	1.18	-375.52	
6,597.00	4.51	92.45	620.38	6,581.38	16.88 S	382.02 E	1,650,220.06	3,273,369.06	1.23	-382.09	
6,692.00	3.72	91.55	715.14	6,676.14	17.12 S	388.83 E	1,650,219.81	3,273,375.88	0.83	-388.90	
6,786.00	4.50	83.90	808.89	6,769.89	16.81 S	395.54 E	1,650,220.12	3,273,382.59	1.01	-395.62	
6,881.00	3.84	83.56	903.64	6,864.64	16.06 S	402.41 E	1,650,220.88	3,273,389.46	0.70	-402.48	
6,976.00	5.36	101.75	998.34	6,959.34	16.61 S	409.92 E	1,650,220.33	3,273,396.96	2.20	-409.99	
7,071.00	3.57	211.52	1,093.17	7,054.17	20.04 S	412.72 E	1,650,216.90	3,273,399.76	7.76	-412.80	
7,165.00	14.81	252.79	1,185.88	7,146.88	26.11 S	399.66 E	1,650,210.83	3,273,386.71	13.14	-399.77	
7,260.00	20.69	255.90	1,276.32	7,237.32	33.80 S	371.76 E	1,650,203.14	3,273,358.81	6.27	-371.91	
7,355.00	26.40	265.88	1,363.40	7,324.40	39.41 S	334.37 E	1,650,197.53	3,273,321.42	7.31	-334.55	
7,450.00	37.35	269.06	1,443.96	7,404.96	41.41 S	284.34 E	1,650,195.53	3,273,271.39	11.66	-284.52	
7,545.00	47.35	267.66	1,514.08	7,475.08	43.31 S	220.45 E	1,650,193.63	3,273,207.51	10.57	-220.64	
7,640.00	54.39	274.78	1,574.05	7,535.05	41.52 S	146.91 E	1,650,195.42	3,273,133.97	9.41	-147.10	

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Measured	Grid	TVD below	Vertical	Local Coordinates		Map Coordinates		Dogleg	Vertical		
Depth	Inclination	Azimuth	System	Depth	Northing	Easting	Northing	Easting	Rate	Section	Comments
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(usft)	
7,735.00	56.33	274.05	1,628.04	7,589.04	35.51 S	68.99 E	1,650,201.43	3,273,056.04	2.14	-69.15	
7,830.00	62.95	271.98	1,676.04	7,637.04	31.25 S	12.82 W	1,650,205.69	3,272,974.24	7.22	12.68	
7,924.00	77.39	272.54	1,707.84	7,668.84	27.75 S	100.94 W	1,650,209.19	3,272,886.12	15.37	100.82	
8,019.00	81.21	271.90	1,725.47	7,686.47	24.14 S	194.20 W	1,650,212.80	3,272,792.86	4.08	194.09	
8,114.00	87.87	270.08	1,734.51	7,695.51	22.51 S	288.70 W	1,650,214.42	3,272,698.36	7.27	288.60	
8,209.00	90.52	268.98	1,735.84	7,696.84	23.29 S	383.68 W	1,650,213.65	3,272,603.39	3.02	383.57	
8,256.00	91.17	269.13	1,735.15	7,696.15	24.07 S	430.66 W	1,650,212.87	3,272,556.40	1.42	430.55	
8,351.00	89.88	268.45	1,734.28	7,695.28	26.07 S	525.64 W	1,650,210.86	3,272,461.43	1.53	525.52	
8,446.00	88.77	269.14	1,735.40	7,696.40	28.07 S	620.61 W	1,650,208.87	3,272,366.46	1.38	620.48	
8,541.00	89.57	268.94	1,736.78	7,697.78	29.66 S	715.58 W	1,650,207.28	3,272,271.49	0.87	715.44	
8,636.00	89.57	269.50	1,737.49	7,698.49	30.96 S	810.57 W	1,650,205.98	3,272,176.50	0.59	810.43	
8,730.00	89.17	270.51	1,738.52	7,699.52	30.95 S	904.56 W	1,650,205.99	3,272,082.51	1.16	904.42	
8,825.00	90.09	270.34	1,739.14	7,700.14	30.24 S	999.56 W	1,650,206.69	3,271,987.52	0.98	999.41	
8,920.00	88.40	269.74	1,740.39	7,701.39	30.18 S	1,094.55 W	1,650,206.76	3,271,892.54	1.89	1,094.40	
9,015.00	89.11	268.82	1,742.45	7,703.45	31.37 S	1,189.52 W	1,650,205.57	3,271,797.57	1.22	1,189.36	
9,110.00	88.83	269.27	1,744.16	7,705.16	32.95 S	1,284.49 W	1,650,203.98	3,271,702.60	0.56	1,284.33	
9,204.00	89.94	269.11	1,745.17	7,706.17	34.28 S	1,378.47 W	1,650,202.66	3,271,608.62	1.19	1,378.30	
9,299.00	88.80	270.05	1,746.21	7,707.21	34.98 S	1,473.46 W	1,650,201.96	3,271,513.63	1.56	1,473.29	
9,394.00	89.51	269.74	1,747.61	7,708.61	35.15 S	1,568.45 W	1,650,201.79	3,271,418.65	0.82	1,568.28	
9,489.00	88.18	270.36	1,749.53	7,710.53	35.07 S	1,663.43 W	1,650,201.87	3,271,323.67	1.54	1,663.25	
9,584.00	88.24	270.50	1,752.50	7,713.50	34.36 S	1,758.38 W	1,650,202.58	3,271,228.72	0.16	1,758.21	
9,678.00	89.05	270.72	1,754.72	7,715.72	33.36 S	1,852.34 W	1,650,203.58	3,271,134.76	0.89	1,852.18	
9,773.00	89.88	270.92	1,755.61	7,716.61	32.00 S	1,947.33 W	1,650,204.94	3,271,039.77	0.90	1,947.17	
9,868.00	90.58	271.11	1,755.22	7,716.22	30.32 S	2,042.31 W	1,650,206.62	3,270,944.79	0.76	2,042.16	
9,963.00	88.83	271.83	1,755.71	7,716.71	27.88 S	2,137.28 W	1,650,209.06	3,270,849.83	1.99	2,137.13	
10,057.00	88.71	271.56	1,757.73	7,718.73	25.10 S	2,231.21 W	1,650,211.84	3,270,755.90	0.31	2,231.08	
10,152.00	89.54	271.55	1,759.18	7,720.18	22.52 S	2,326.17 W	1,650,214.42	3,270,660.94	0.87	2,326.04	
10,247.00	90.03	271.64	1,759.54	7,720.54	19.88 S	2,421.13 W	1,650,217.06	3,270,565.98	0.52	2,421.02	
10,342.00	90.68	271.72	1,758.95	7,719.95	17.09 S	2,516.09 W	1,650,219.85	3,270,471.03	0.69	2,515.99	
10,435.00	89.17	271.32	1,759.07	7,720.07	14.62 S	2,609.05 W	1,650,222.31	3,270,378.07	1.68	2,608.96	
10,528.00	88.68	270.61	1,760.82	7,721.82	13.06 S	2,702.02 W	1,650,223.88	3,270,285.10	0.93	2,701.94	
10,622.00	88.71	270.60	1,762.96	7,723.96	12.07 S	2,795.99 W	1,650,224.87	3,270,191.13	0.03	2,795.91	
10,715.00	89.01	270.58	1,764.81	7,725.81	11.11 S	2,888.97 W	1,650,225.83	3,270,098.16	0.32	2,888.89	
10,808.00	89.48	270.43	1,766.03	7,727.03	10.29 S	2,981.95 W	1,650,226.65	3,270,005.17	0.53	2,981.88	
10,902.00	89.91	270.37	1,766.53	7,727.53	9.63 S	3,075.95 W	1,650,227.31	3,269,911.18	0.46	3,075.88	
10,995.00	88.21	270.82	1,768.06	7,729.06	8.67 S	3,168.93 W	1,650,228.27	3,269,818.20	1.89	3,168.86	
11,088.00	87.78	270.58	1,771.31	7,732.31	7.53 S	3,261.87 W	1,650,229.41	3,269,725.27	0.53	3,261.80	
11,182.00	88.28	270.40	1,774.54	7,735.54	6.73 S	3,355.81 W	1,650,230.21	3,269,631.33	0.57	3,355.74	
11,275.00	88.00	270.10	1,777.56	7,738.56	6.32 S	3,448.76 W	1,650,230.62	3,269,538.38	0.44	3,448.69	
11,368.00	87.72	269.72	1,781.04	7,742.04	6.47 S	3,541.69 W	1,650,230.47	3,269,445.45	0.51	3,541.63	
11,462.00	88.65	269.91	1,784.01	7,745.01	6.77 S	3,635.64 W	1,650,230.17	3,269,351.50	1.01	3,635.58	

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
11,555.00	89.75	271.07	1,785.31	7,746.31	5.98 S	3,728.63 W	1,650,230.96	3,269,258.52	1.72	3,728.56	
11,648.00	90.40	271.30	1,785.19	7,746.19	4.05 S	3,821.61 W	1,650,232.88	3,269,165.54	0.74	3,821.55	
11,742.00	90.89	270.96	1,784.13	7,745.13	2.20 S	3,915.58 W	1,650,234.74	3,269,071.57	0.63	3,915.53	
11,835.00	91.82	271.07	1,781.93	7,742.93	0.55 S	4,008.54 W	1,650,236.38	3,268,978.61	1.01	4,008.50	
11,928.00	89.51	271.36	1,780.85	7,741.85	1.42 N	4,101.51 W	1,650,238.36	3,268,885.65	2.50	4,101.47	
12,022.00	89.69	271.46	1,781.51	7,742.51	3.73 N	4,195.48 W	1,650,240.67	3,268,791.68	0.22	4,195.45	
12,115.00	90.49	270.49	1,781.36	7,742.36	5.31 N	4,288.46 W	1,650,242.25	3,268,698.70	1.35	4,288.44	
12,208.00	89.41	269.28	1,781.44	7,742.44	5.13 N	4,381.46 W	1,650,242.07	3,268,605.70	1.74	4,381.44	
12,302.00	89.78	268.73	1,782.11	7,743.11	3.50 N	4,475.44 W	1,650,240.43	3,268,511.72	0.71	4,475.41	
12,396.00	90.55	267.91	1,781.84	7,742.84	0.74 N	4,569.40 W	1,650,237.68	3,268,417.77	1.20	4,569.36	
12,491.00	90.03	268.80	1,781.36	7,742.36	1.99 S	4,664.36 W	1,650,234.95	3,268,322.81	1.09	4,664.30	
12,586.00	90.15	270.33	1,781.21	7,742.21	2.71 S	4,759.35 W	1,650,234.23	3,268,227.82	1.62	4,759.29	
12,681.00	88.86	272.35	1,782.03	7,743.03	0.49 S	4,854.31 W	1,650,236.45	3,268,132.86	2.52	4,854.26	
12,775.00	89.20	273.25	1,783.62	7,744.62	4.10 N	4,948.19 W	1,650,241.04	3,268,038.99	1.02	4,948.16	
12,870.00	89.72	273.23	1,784.52	7,745.52	9.47 N	5,043.03 W	1,650,246.41	3,267,944.15	0.55	5,043.02	
12,965.00	88.31	270.19	1,786.15	7,747.15	12.31 N	5,137.96 W	1,650,249.24	3,267,849.22	3.53	5,137.96	
13,060.00	89.05	270.23	1,788.34	7,749.34	12.66 N	5,232.93 W	1,650,249.59	3,267,754.25	0.78	5,232.94	
13,154.00	90.12	270.21	1,789.02	7,750.02	13.02 N	5,326.93 W	1,650,249.95	3,267,660.25	1.14	5,326.93	
13,249.00	91.08	269.94	1,788.02	7,749.02	13.14 N	5,421.92 W	1,650,250.08	3,267,565.26	1.05	5,421.93	
13,344.00	91.91	269.69	1,785.55	7,746.55	12.83 N	5,516.89 W	1,650,249.77	3,267,470.30	0.91	5,516.89	
13,439.00	91.69	270.06	1,782.56	7,743.56	12.63 N	5,611.84 W	1,650,249.56	3,267,375.35	0.45	5,611.84	
13,534.00	90.22	271.66	1,780.98	7,741.98	14.05 N	5,706.81 W	1,650,250.99	3,267,280.38	2.29	5,706.82	
13,628.00	89.94	271.60	1,780.85	7,741.85	16.73 N	5,800.77 W	1,650,253.66	3,267,186.42	0.30	5,800.79	
13,723.00	88.40	271.24	1,782.22	7,743.22	19.08 N	5,895.73 W	1,650,256.02	3,267,091.47	1.66	5,895.76	
13,818.00	87.60	270.43	1,785.54	7,746.54	20.46 N	5,990.66 W	1,650,257.40	3,266,996.54	1.20	5,990.69	
13,913.00	88.71	270.21	1,788.60	7,749.60	20.99 N	6,085.61 W	1,650,257.93	3,266,901.59	1.19	6,085.64	
14,008.00	89.82	269.89	1,789.82	7,750.82	21.08 N	6,180.60 W	1,650,258.01	3,266,806.60	1.22	6,180.63	
14,103.00	91.26	269.63	1,788.92	7,749.92	20.68 N	6,275.59 W	1,650,257.62	3,266,711.61	1.54	6,275.62	
14,198.00	90.09	270.20	1,787.80	7,748.80	20.54 N	6,370.58 W	1,650,257.48	3,266,616.62	1.37	6,370.61	
14,292.00	90.59	270.18	1,787.24	7,748.24	20.85 N	6,464.58 W	1,650,257.79	3,266,522.63	0.53	6,464.61	
14,387.00	89.38	271.21	1,787.27	7,748.27	22.00 N	6,559.57 W	1,650,258.94	3,266,427.64	1.67	6,559.60	
14,482.00	88.64	271.30	1,788.91	7,749.91	24.08 N	6,654.53 W	1,650,261.02	3,266,332.68	0.78	6,654.58	
14,577.00	89.63	271.43	1,790.34	7,751.34	26.35 N	6,749.50 W	1,650,263.28	3,266,237.72	1.05	6,749.55	
14,672.00	90.80	271.38	1,789.99	7,750.99	28.67 N	6,844.46 W	1,650,265.61	3,266,142.76	1.23	6,844.52	
14,767.00	89.75	270.92	1,789.53	7,750.53	30.58 N	6,939.44 W	1,650,267.52	3,266,047.78	1.21	6,939.51	
14,862.00	89.60	270.29	1,790.07	7,751.07	31.58 N	7,034.43 W	1,650,268.52	3,265,952.79	0.68	7,034.51	
14,956.00	90.74	270.10	1,789.79	7,750.79	31.90 N	7,128.43 W	1,650,268.84	3,265,858.79	1.23	7,128.50	
15,051.00	89.57	270.96	1,789.53	7,750.53	32.78 N	7,223.43 W	1,650,269.72	3,265,763.80	1.53	7,223.50	
15,146.00	88.95	271.32	1,790.76	7,751.76	34.67 N	7,318.40 W	1,650,271.61	3,265,668.83	0.75	7,318.48	
15,241.00	89.63	271.24	1,791.94	7,752.94	36.80 N	7,413.37 W	1,650,273.73	3,265,573.87	0.72	7,413.46	
15,336.00	90.15	270.83	1,792.12	7,753.12	38.51 N	7,508.35 W	1,650,275.45	3,265,478.89	0.70	7,508.45	

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
					Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
15,430.00	91.29	270.52	1,790.94	7,751.94	39.62 N	7,602.33 W	1,650,276.56	3,265,384.90	1.26	7,602.44	
15,525.00	89.20	270.14	1,790.53	7,751.53	40.17 N	7,697.33 W	1,650,277.10	3,265,289.91	2.24	7,697.43	
15,620.00	89.17	270.62	1,791.88	7,752.88	40.80 N	7,792.31 W	1,650,277.73	3,265,194.93	0.51	7,792.42	
15,715.00	89.57	269.95	1,792.93	7,753.93	41.27 N	7,887.31 W	1,650,278.21	3,265,099.94	0.82	7,887.41	
15,810.00	89.97	269.91	1,793.31	7,754.31	41.15 N	7,982.31 W	1,650,278.09	3,265,004.94	0.42	7,982.41	
15,904.00	90.49	269.57	1,792.93	7,753.93	40.73 N	8,076.30 W	1,650,277.66	3,264,910.95	0.66	8,076.41	
15,999.00	89.82	270.79	1,792.68	7,753.68	41.02 N	8,171.30 W	1,650,277.96	3,264,815.95	1.47	8,171.40	
16,094.00	89.88	270.93	1,792.92	7,753.92	42.45 N	8,266.29 W	1,650,279.39	3,264,720.96	0.16	8,266.40	
16,189.00	90.22	270.49	1,792.84	7,753.84	43.63 N	8,361.28 W	1,650,280.56	3,264,625.97	0.59	8,361.39	
16,284.00	90.31	270.16	1,792.40	7,753.40	44.17 N	8,456.28 W	1,650,281.10	3,264,530.98	0.36	8,456.39	
16,379.00	90.86	270.11	1,791.43	7,752.43	44.39 N	8,551.27 W	1,650,281.33	3,264,435.99	0.58	8,551.39	
16,474.00	90.03	270.04	1,790.69	7,751.69	44.51 N	8,646.27 W	1,650,281.45	3,264,340.99	0.88	8,646.38	
16,568.00	90.09	270.25	1,790.60	7,751.60	44.75 N	8,740.27 W	1,650,281.69	3,264,247.00	0.23	8,740.38	
16,663.00	90.77	269.97	1,789.88	7,750.88	44.93 N	8,835.27 W	1,650,281.87	3,264,152.00	0.77	8,835.38	
16,758.00	89.88	270.53	1,789.34	7,750.34	45.35 N	8,930.26 W	1,650,282.29	3,264,057.01	1.11	8,930.38	
16,853.00	87.88	271.40	1,791.20	7,752.20	46.95 N	9,025.23 W	1,650,283.88	3,263,962.05	2.30	9,025.34	
16,948.00	88.58	271.21	1,794.14	7,755.14	49.11 N	9,120.15 W	1,650,286.05	3,263,867.12	0.76	9,120.28	
17,043.00	89.20	270.88	1,795.98	7,756.98	50.84 N	9,215.12 W	1,650,287.78	3,263,772.16	0.74	9,215.26	
17,138.00	90.03	270.74	1,796.61	7,757.61	52.19 N	9,310.11 W	1,650,289.12	3,263,677.17	0.89	9,310.25	
17,233.00	89.23	271.74	1,797.23	7,758.23	54.24 N	9,405.08 W	1,650,291.18	3,263,582.20	1.35	9,405.23	
17,327.00	89.42	272.25	1,798.34	7,759.34	57.51 N	9,499.02 W	1,650,294.45	3,263,488.27	0.58	9,499.18	
17,422.00	89.14	270.29	1,799.53	7,760.53	59.62 N	9,593.98 W	1,650,296.56	3,263,393.30	2.08	9,594.15	
17,517.00	89.60	269.82	1,800.57	7,761.57	59.71 N	9,688.98 W	1,650,296.65	3,263,298.31	0.69	9,689.15	
17,612.00	90.86	269.75	1,800.19	7,761.19	59.35 N	9,783.97 W	1,650,296.29	3,263,203.32	1.33	9,784.14	
17,707.00	92.40	269.82	1,797.49	7,758.49	59.00 N	9,878.93 W	1,650,295.93	3,263,108.36	1.62	9,879.09	
17,726.00	92.59	269.73	1,796.66	7,757.66	58.92 N	9,897.91 W	1,650,295.86	3,263,089.38	1.11	9,898.08	Last Sperry MWD Survey @ 17726.00' MD
17,796.00	92.59	269.73	1,793.50	7,754.50	58.59 N	9,967.84 W	1,650,295.53	3,263,019.45	0.00	9,968.00	Straight Line Projection to TD @ 17796.00' MD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
27.00	27.00	0.00	0.00	First BH MWD Survey @ 27.00' MD
2,101.00	2,100.53	-5.15	18.91	Last BH MWD Survey @ 2101.00' MD
2,101.00	2,100.53	-5.15	18.91	Tie-On to Last Surface MWD Survey @ 2101.00' MD
2,176.00	2,175.34	-5.71	24.20	First Sperry MWD Survey @ 2176.00' MD
17,726.00	7,757.66	58.92	-9,897.91	Last Sperry MWD Survey @ 17726.00' MD
17,796.00	7,754.50	58.59	-9,967.84	Straight Line Projection to TD @ 17796.00' MD

Design Report for Ouray 5-64 15-16-1BHZ - Final Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/_W (usft)	Start TVD (usft)
Target	Ouray 5-64 15-16-1BHZ_PBHL E1	270.25	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
27.00	2,101.00	BH Surface Surveys	2_MWD
2,101.00	17,726.00	Sperry MWD Surveys	2_MWD
17,796.00	17,796.00	PTB	2_Blind

Directional Difficulty Index

Average Dogleg over Survey:	1.46 °/100usft	Maximum Dogleg over Survey:	15.37 °/100usft at 7,924.00 usft
Net Tortousity applicable to Plans:	0.19 °/100usft	Directional Difficulty Index:	6.810

Audit Info

North Reference Sheet for Sec. 15-T5S-R64W (HNR Re-Stake) - Ouray 5-64 15-16-1BHZ - OWB

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB 27' @ 5961.00usft (True 33). Northing and Easting are relative to Ouray 5-64 15-16-1BHZ

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:39.750000°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99997603

Grid Coordinates of Well: 1,650,236.94 usft N, 3,272,987.06 usft E

Geographical Coordinates of Well: 39° 36' 52.90" N, 104° 31' 51.59" W

Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,796.00usft
the Bottom Hole Displacement is 9,968.01usft in the Direction of 270.34° (Grid).

Magnetic Convergence at surface is: -7.48° (13 June 2018, , BGGM2018)

