Noble Energy

Weld County, CO (NAD 83)
Sec. 10-T2N-R64W (Oscar PAD)
Oscar Y10-75-1HN - A4
901674698
Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Report

03 November, 2014

Surface UWI : 901674698

Well Coordinates: 1,299,767.02 N, 3,269,608.05 E (40° 09' 08.03" N, 104° 32' 07.69" W)
Ground Level: 4,923.00 usft

Local Coordinate Origin:	Centered on Well Oscar Y10-75-1HN - Slot A4
Viewing Datum:	KB = 24 @ 4947.00usft (H&P 315)
TVDs to System:	N
North Reference:	Grid
Unit System:	Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 5000.1 Build: 70

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 10-T2N-R64W (Oscar PAD)
Well: Oscar Y10-75-1HN
Wellbore: Plan A
Design: Actual Surveys

noble energy

HALLIBURTON
Sperry Drilling

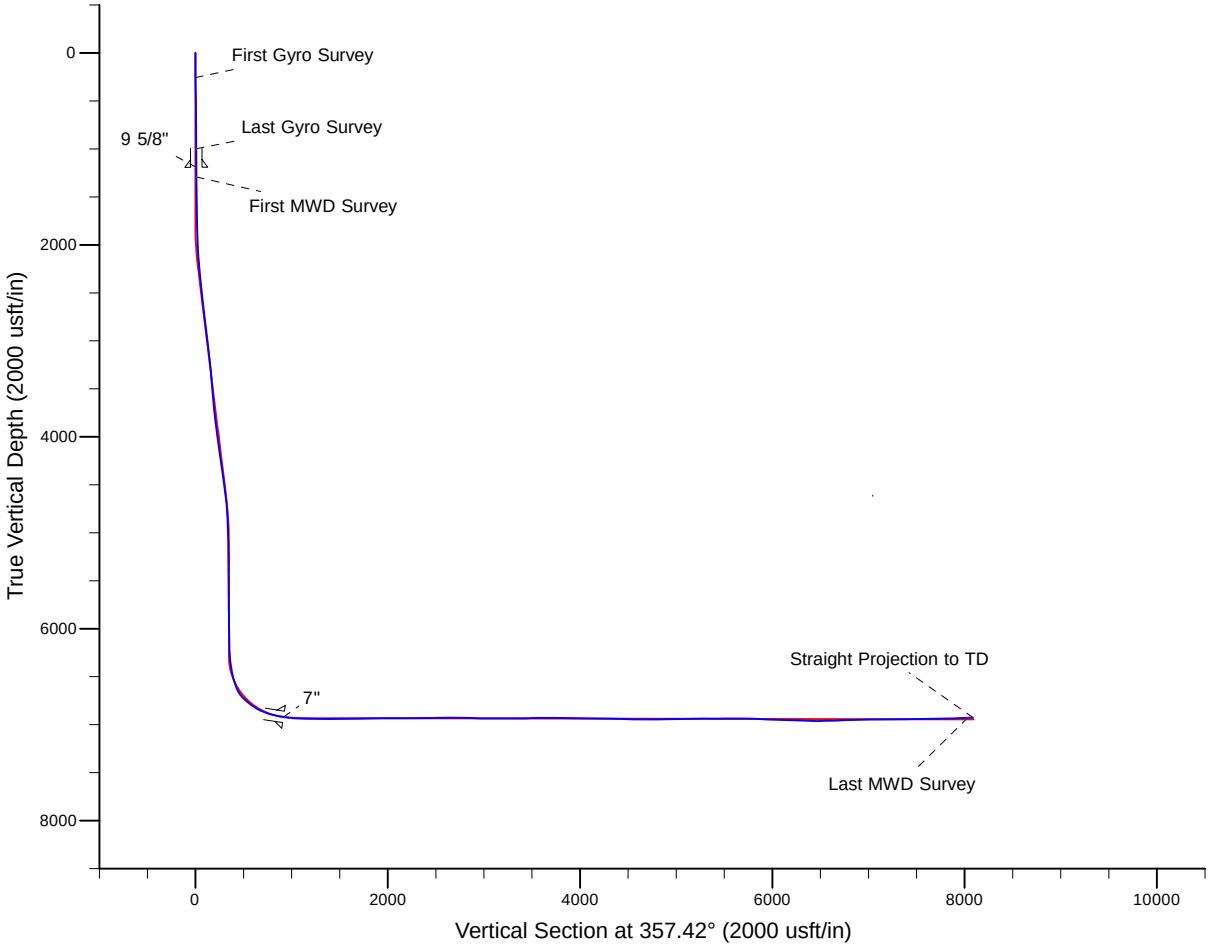
Platted SHL: 2380' FSL, 2060' FEL
Platted Lat/Long: 40.15223 N, 104.53547 W
Location: Sec. 10-T2N-R64W

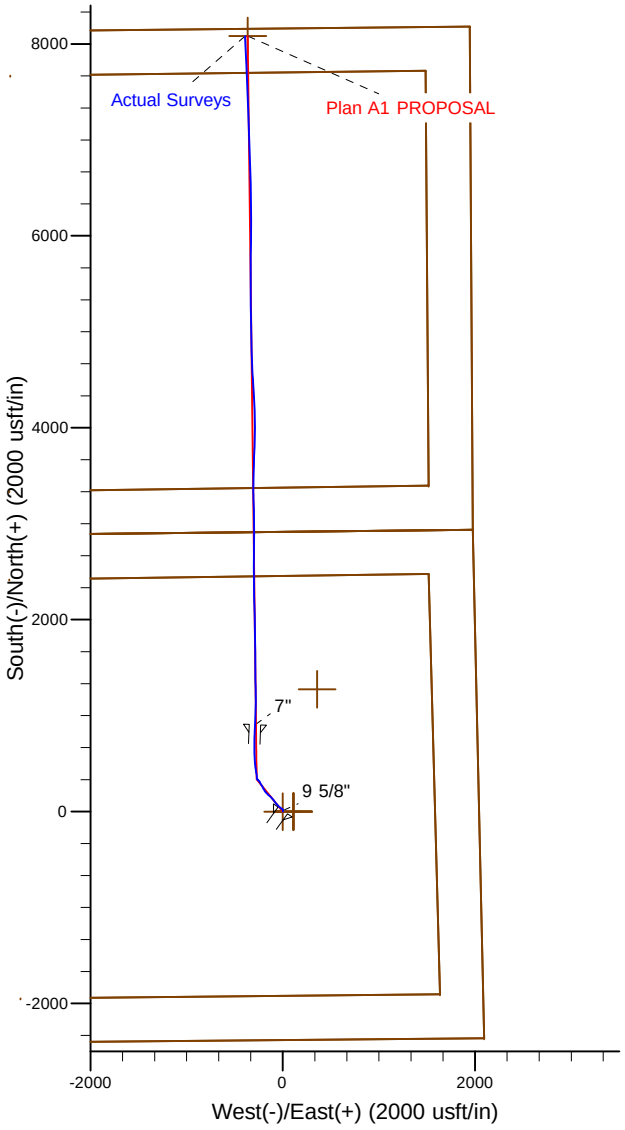
~7" Casing: 3286' FSL, 2310' FEL
Lat/Long: 40.154722° N, -104.536468°W
State Planes - CO Northern: 1300671.62N, 3269319.17E
Location: Sec. 10-T2N-R64W

Platted BHL: 75' FNL, 2310' FEL
Lat/Long: 40.17443N, 104.53646 W
State Planes - CO Northern: 1307850.57 N, 3269243.46 E
Location: Sec. 10-T2N-R64W

LEGEND

Oscar Y10-75-1HN, Plan A, Plan A1 PROPOSAL V0
Actual Surveys





WELL DETAILS: Oscar Y10-75-1HN

Ground Level: 4923.00
KB = 24 @ 4947.00usft (H&P 315)

Created By: Gordy Roth
Created On: 11/3/2014

Design Report for Oscar Y10-75-1HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
257.00	0.60	0.00	257.00	1.35	0.00	1.34	0.23
First Gyro Survey							
504.00	1.00	0.00	503.97	4.79	0.00	4.79	0.16
750.00	0.20	0.00	749.96	7.37	0.00	7.36	0.33
1,000.00	0.60	0.00	999.95	9.12	0.00	9.11	0.16
Last Gyro Survey							
1,293.00	0.22	89.08	1,292.94	10.66	0.56	10.62	0.22
First MWD Survey							
1,386.00	0.68	355.64	1,385.94	11.21	0.70	11.17	0.78
1,478.00	0.83	15.12	1,477.93	12.40	0.83	12.35	0.32
1,570.00	0.87	6.81	1,569.92	13.74	1.09	13.67	0.14
1,663.00	0.75	11.71	1,662.91	15.03	1.30	14.96	0.15
1,755.00	0.76	350.42	1,754.91	16.22	1.32	16.15	0.30
1,847.00	1.71	333.41	1,846.88	18.05	0.60	18.01	1.10
1,938.00	2.70	319.08	1,937.82	20.89	-1.41	20.93	1.24
2,031.00	4.98	312.49	2,030.60	25.27	-5.82	25.51	2.49
2,123.00	6.42	310.68	2,122.14	31.32	-12.67	31.86	1.58
2,216.00	7.86	310.27	2,214.42	38.82	-21.46	39.75	1.55
2,309.00	8.39	307.07	2,306.49	47.02	-31.73	48.40	0.75
2,402.00	7.45	309.48	2,398.60	54.94	-41.80	56.77	1.07
2,495.00	7.80	313.86	2,490.78	63.15	-51.00	65.38	0.73
2,589.00	7.97	319.10	2,583.89	72.50	-59.87	75.12	0.79
2,681.00	8.71	319.04	2,674.92	82.58	-68.61	85.58	0.80
2,773.00	7.84	321.72	2,765.96	92.76	-77.06	96.14	1.03
2,865.00	8.32	322.11	2,857.04	102.94	-85.04	106.67	0.53
2,960.00	8.92	324.74	2,950.97	114.38	-93.51	118.48	0.76
3,055.00	8.14	323.50	3,044.92	125.80	-101.77	130.26	0.84
3,150.00	8.26	320.31	3,138.95	136.46	-110.12	141.28	0.50
3,245.00	7.60	321.10	3,233.04	146.60	-118.43	151.79	0.70
3,340.00	7.18	309.78	3,327.26	155.29	-126.94	160.85	1.59
3,435.00	7.94	306.56	3,421.43	163.00	-136.77	168.99	0.92
3,530.00	7.13	309.58	3,515.61	170.66	-146.58	177.09	0.95
3,624.00	7.04	311.25	3,608.89	178.18	-155.41	185.00	0.24
3,719.00	7.58	318.17	3,703.12	186.68	-163.97	193.88	1.09
3,814.00	7.98	314.81	3,797.25	196.00	-172.82	203.59	0.64
3,909.00	8.38	322.13	3,891.28	206.11	-181.75	214.09	1.17
4,004.00	8.75	328.53	3,985.22	217.74	-189.77	226.07	1.08
4,099.00	10.00	333.95	4,078.96	231.31	-197.17	239.96	1.61
4,194.00	9.20	331.92	4,172.62	245.42	-204.37	254.38	0.91
4,383.00	8.35	326.05	4,359.41	270.14	-219.14	279.74	0.65
4,478.00	9.10	334.82	4,453.32	282.66	-226.19	292.57	1.61
4,573.00	8.41	332.11	4,547.21	295.60	-232.64	305.78	0.85
4,668.00	8.10	329.51	4,641.23	307.51	-239.28	317.98	0.51
4,763.00	4.95	319.45	4,735.60	316.39	-245.34	327.13	3.51
4,858.00	4.40	309.36	4,830.29	321.82	-250.83	332.79	1.04
4,953.00	3.11	329.32	4,925.09	326.35	-254.96	337.50	1.91
5,048.00	0.69	350.49	5,020.03	329.13	-256.37	340.34	2.61
5,143.00	0.86	329.44	5,115.02	330.30	-256.83	341.54	0.35
5,238.00	0.85	307.70	5,210.01	331.35	-257.75	342.63	0.34

Design Report for Oscar Y10-75-1HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,333.00	1.07	299.81	5,305.00	332.22	-259.07	343.56	0.27
5,522.00	1.04	301.55	5,493.96	334.00	-262.07	345.46	0.02
5,617.00	0.78	296.51	5,588.95	334.74	-263.38	346.26	0.29
5,712.00	0.48	294.95	5,683.95	335.19	-264.32	346.76	0.32
5,807.00	0.59	317.78	5,778.94	335.72	-265.01	347.32	0.25
5,902.00	0.59	328.41	5,873.94	336.50	-265.59	348.13	0.12
5,997.00	0.96	328.70	5,968.93	337.60	-266.26	349.25	0.39
6,091.00	0.93	2.29	6,062.92	339.03	-266.64	350.70	0.58
6,186.00	1.63	347.96	6,157.89	341.12	-266.89	352.80	0.80
6,259.00	2.14	335.17	6,230.85	343.38	-267.68	355.09	0.90
6,376.00	6.19	358.09	6,347.52	351.67	-268.81	363.42	3.68
6,471.00	10.91	351.75	6,441.44	365.69	-270.27	377.50	5.06
6,566.00	15.70	352.04	6,533.87	387.33	-273.34	399.25	5.04
6,660.00	21.86	350.49	6,622.82	417.22	-278.00	429.32	6.57
6,755.00	41.48	352.18	6,703.28	466.31	-285.27	478.69	20.67
6,803.00	47.58	355.18	6,737.49	499.75	-288.93	512.26	13.44
6,850.00	50.17	356.54	6,768.40	535.06	-291.48	547.65	5.93
6,898.00	53.24	357.25	6,798.14	572.67	-293.51	585.31	6.50
6,945.00	57.99	357.57	6,824.68	611.40	-295.26	624.09	10.12
6,993.00	62.80	0.12	6,848.38	653.11	-296.08	665.79	11.03
7,040.00	68.09	1.17	6,867.91	695.84	-295.59	708.46	11.44
7,088.00	72.57	1.57	6,884.06	741.02	-294.51	753.53	9.37
7,135.00	75.89	1.81	6,896.83	786.22	-293.17	798.63	7.08
7,210.00	78.96	2.25	6,913.16	859.37	-290.58	871.59	4.13
7,353.00	85.68	1.58	6,932.26	1,000.92	-285.85	1,012.79	4.72
7,448.00	87.75	0.81	6,937.70	1,095.74	-283.88	1,107.42	2.32
7,543.00	89.60	0.46	6,939.90	1,190.71	-282.82	1,202.24	1.98
7,638.00	89.20	359.34	6,940.90	1,285.70	-282.99	1,297.14	1.25
7,731.00	89.41	359.39	6,942.02	1,378.69	-284.02	1,390.08	0.23
7,825.00	90.68	359.72	6,941.95	1,472.68	-284.75	1,484.02	1.40
7,919.00	91.20	359.59	6,940.41	1,566.67	-285.32	1,577.93	0.57
8,011.00	91.11	358.49	6,938.55	1,658.63	-286.86	1,669.87	1.20
8,103.00	90.62	359.34	6,937.17	1,750.61	-288.60	1,761.83	1.07
8,196.00	91.05	359.04	6,935.81	1,843.59	-289.91	1,854.78	0.56
8,289.00	91.42	359.38	6,933.81	1,936.56	-291.20	1,947.71	0.54
8,381.00	89.91	359.35	6,932.74	2,028.54	-292.22	2,039.65	1.64
8,472.00	89.17	358.14	6,933.47	2,119.51	-294.21	2,130.62	1.56
8,564.00	89.17	357.91	6,934.80	2,211.45	-297.38	2,222.60	0.25
8,657.00	90.99	359.99	6,934.67	2,304.43	-299.08	2,315.56	2.97
8,749.00	92.75	359.62	6,931.67	2,396.37	-299.40	2,407.43	1.95
8,842.00	90.65	358.96	6,928.91	2,489.32	-300.55	2,500.33	2.37
8,935.00	90.74	359.75	6,927.78	2,582.30	-301.59	2,593.27	0.85
9,028.00	88.67	0.50	6,928.26	2,675.30	-301.39	2,686.16	2.37
9,121.00	88.33	0.49	6,930.70	2,768.26	-300.59	2,778.99	0.37
9,214.00	88.55	0.50	6,933.23	2,861.22	-299.79	2,871.83	0.24
9,307.00	89.69	0.36	6,934.66	2,954.21	-299.09	2,964.68	1.24
9,399.00	90.22	359.95	6,934.73	3,046.21	-298.84	3,056.58	0.73
9,491.00	89.97	358.16	6,934.58	3,138.19	-300.36	3,148.54	1.96
9,586.00	89.91	357.64	6,934.67	3,233.13	-303.84	3,243.53	0.55
9,681.00	90.00	359.74	6,934.75	3,328.10	-306.01	3,338.51	2.21
9,776.00	90.89	1.58	6,934.01	3,423.08	-304.91	3,433.35	2.15

Design Report for Oscar Y10-75-1HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,871.00	92.25	1.25	6,931.41	3,518.02	-302.57	3,528.08	1.47
9,966.00	90.65	0.85	6,929.00	3,612.97	-300.83	3,622.85	1.74
10,060.00	88.15	2.13	6,929.99	3,706.92	-298.39	3,716.60	2.99
10,155.00	88.86	1.48	6,932.47	3,801.84	-295.39	3,811.29	1.01
10,250.00	90.25	2.00	6,933.21	3,896.79	-292.51	3,906.01	1.56
10,345.00	89.38	0.75	6,933.51	3,991.76	-290.23	4,000.78	1.60
10,440.00	89.51	358.89	6,934.43	4,086.75	-290.53	4,095.69	1.96
10,534.00	88.83	357.64	6,935.79	4,180.70	-293.37	4,189.67	1.51
10,629.00	89.14	356.74	6,937.48	4,275.56	-298.03	4,284.65	1.00
10,724.00	87.72	356.25	6,940.08	4,370.35	-303.84	4,379.60	1.58
10,819.00	88.83	357.35	6,942.94	4,465.15	-309.14	4,474.55	1.64
10,914.00	88.27	356.00	6,945.34	4,559.96	-314.64	4,569.51	1.54
11,009.00	90.37	358.14	6,946.47	4,654.82	-319.50	4,664.49	3.16
11,104.00	90.68	357.98	6,945.60	4,749.76	-322.72	4,759.48	0.37
11,199.00	90.71	358.74	6,944.45	4,844.72	-325.43	4,854.46	0.80
11,293.00	91.39	358.63	6,942.73	4,938.67	-327.59	4,948.42	0.73
11,388.00	90.46	359.42	6,941.19	5,033.65	-329.21	5,043.37	1.28
11,483.00	90.37	359.00	6,940.50	5,128.63	-330.52	5,138.32	0.45
11,578.00	91.05	358.99	6,939.33	5,223.61	-332.18	5,233.27	0.72
11,673.00	90.00	359.73	6,938.46	5,318.60	-333.24	5,328.21	1.35
11,768.00	90.31	0.18	6,938.20	5,413.60	-333.32	5,423.12	0.58
11,863.00	90.49	359.94	6,937.54	5,508.60	-333.22	5,518.02	0.32
11,958.00	89.91	0.17	6,937.20	5,603.60	-333.13	5,612.91	0.66
12,053.00	89.14	359.85	6,937.99	5,698.59	-333.11	5,707.81	0.88
12,148.00	89.20	1.17	6,939.37	5,793.58	-332.27	5,802.66	1.39
12,243.00	87.44	1.17	6,942.15	5,888.51	-330.33	5,897.41	1.85
12,337.00	86.73	0.31	6,946.93	5,982.38	-329.11	5,991.13	1.19
12,432.00	87.50	359.48	6,951.72	6,077.26	-329.29	6,085.92	1.19
12,527.00	89.51	359.74	6,954.19	6,172.22	-329.93	6,180.82	2.13
12,622.00	88.03	359.71	6,956.23	6,267.19	-330.39	6,275.71	1.56
12,717.00	87.69	358.84	6,959.78	6,362.12	-331.59	6,370.60	0.98
12,812.00	89.20	358.28	6,962.36	6,457.05	-333.98	6,465.54	1.70
12,907.00	91.70	359.36	6,961.61	6,552.02	-335.93	6,560.50	2.87
13,001.00	91.63	359.11	6,958.88	6,645.97	-337.19	6,654.41	0.28
13,096.00	92.10	358.59	6,955.79	6,740.90	-339.09	6,749.33	0.74
13,191.00	92.56	358.30	6,951.93	6,835.79	-341.67	6,844.24	0.57
13,285.00	91.23	358.10	6,948.82	6,929.69	-344.62	6,938.18	1.43
13,380.00	91.45	357.78	6,946.60	7,024.60	-348.04	7,033.15	0.41
13,475.00	90.74	358.02	6,944.78	7,119.52	-351.52	7,128.12	0.79
13,570.00	88.80	356.94	6,945.16	7,214.42	-355.69	7,223.12	2.34
13,665.00	91.30	357.71	6,945.08	7,309.31	-360.13	7,318.11	2.75
13,759.00	91.17	356.77	6,943.05	7,403.17	-364.65	7,412.09	1.01
13,854.00	90.68	358.23	6,941.52	7,498.07	-368.79	7,507.07	1.62
13,950.00	90.59	357.96	6,940.46	7,594.01	-371.98	7,603.06	0.30
14,045.00	90.96	357.69	6,939.17	7,688.93	-375.59	7,698.05	0.48
14,139.00	91.42	357.71	6,937.22	7,782.84	-379.36	7,792.03	0.49
14,234.00	92.28	357.42	6,934.15	7,877.70	-383.40	7,886.97	0.96
14,380.00	92.31	357.18	6,928.31	8,023.42	-390.27	8,032.86	0.17
Last MWD Survey							
14,437.00	92.31	357.18	6,926.01	8,080.31	-393.07	8,089.81	0.00
Straight Projection to TD							

Design Report for Oscar Y10-75-1HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
257.00	257.00	1.35	0.00	First Gyro Survey
1,000.00	999.95	9.12	0.00	Last Gyro Survey
1,293.00	1,292.94	10.66	0.56	First MWD Survey

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Oscar Y10-75-1HN_BHL	357.42	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
257.00	1,000.00	Surface Surveys	Flexi-Shot
1,293.00	7,210.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,353.00	14,437.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,194.00	1,193.94	9 5/8"	9-5/8	13-3/4
7,256.00	6,921.12	7"	7	8-3/4

Design Report for Oscar Y10-75-1HN - Actual Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Oscar Y10-75-1HN_SI	0.00	0.00	0.00	0.00	0.00	1,299,767.02	3,269,608.05	40.152230	-104.535470
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Waste 10-7K4 (Well N	0.00	0.00	1.00	1,274.63	357.36	1,301,041.59	3,269,965.40	40.155718	-104.534142
- actual wellpath misses target center by 1323.79usft at 7.67usft MD (7.67 TVD, 0.00 N, 0.00 E)									
- Circle (radius 0.00)									
Oscar Y10-74-1HN_Se	0.00	0.00	1.00	1.21	111.81	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 111.81usft at 1.01usft MD (1.01 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			1.00	7,667.48	-2,948.46	1,307,435.39	3,266,771.51		
Point 2			1.00	7,720.73	1,373.68	1,307,488.64	3,271,093.47		
Point 3			1.00	3,394.94	1,406.01	1,303,163.03	3,271,125.80		
Point 4			1.00	3,337.59	-2,959.12	1,303,105.68	3,266,760.85		
Oscar Y10-74-1HN_Se	0.00	0.00	1.00	1.21	111.81	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 111.81usft at 1.01usft MD (1.01 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			1.00	8,127.50	-3,408.48	1,307,895.39	3,266,311.51		
Point 2			1.00	8,180.75	1,833.70	1,307,948.64	3,271,553.47		
Point 3			1.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80		
Point 4			1.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85		
Oscar Y10-74-1HN_Se	0.00	0.00	1.00	1.21	111.81	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 111.81usft at 1.01usft MD (1.01 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			1.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85		
Point 2			1.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80		
Point 3			1.00	-2,364.62	1,982.81	1,297,403.71	3,271,702.58		
Point 4			1.00	-2,407.43	-3,303.64	1,297,360.90	3,266,416.35		
Oscar Y10-74-1HN_Se	0.00	0.00	1.00	1.21	111.81	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 111.81usft at 1.01usft MD (1.01 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			1.00	2,417.55	-2,959.12	1,302,185.68	3,266,760.85		
Point 2			1.00	2,474.90	1,406.01	1,302,243.03	3,271,125.80		
Point 3			1.00	-1,904.60	1,522.79	1,297,863.71	3,271,242.58		
Point 4			1.00	-1,947.41	-2,843.62	1,297,820.90	3,266,876.35		
Oscar Y10-75-1HN_BI	0.00	0.00	6,945.00	8,083.89	-364.61	1,307,850.57	3,269,243.46	40.174430	-104.536460
- actual wellpath misses target center by 34.40usft at 14437.00usft MD (6926.01 TVD, 8080.31 N, -393.07 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.53 °/100usft	Maximum Dogleg over Survey:	20.67 °/100usft at 6,755.00 usft
Net Tortousity applicable to Plans:	0.79 °/100usft	Directional Difficulty Index:	6.574

Audit Info

North Reference Sheet for Sec. 10-T2N-R64W (Oscar PAD) - Oscar Y10-75-1HN - Plan A

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

Vertical Depths are relative to KB = 24 @ 4947.00usft (H&P 315). Northing and Easting are relative to Oscar Y10-75-1HN - Slot A4

Coordinate System is US State Plane 1983, Colorado Northern 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:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995832

Grid Coordinates of Well: 1,299,767.02 usft N, 3,269,608.05 usft E

Geographical Coordinates of Well: 40° 09' 08.03" N, 104° 32' 07.69" W

Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,437.00usft

the Bottom Hole Displacement is 8,089.86usft in the Direction of 357.22° (Grid).

Magnetic Convergence at surface is: -7.73° (19 November 2014, , BGGM2014)