Noble Energy

Weld County, CO (NAD 83)
Sec. 10-T2N-R64W (Oscar PAD)
Oscar Y10-74-1HC - A2
05-123-38204
Plan D

Design: Actual Surveys

Sperry Drilling Services

Final Report

19 December, 2014

Surface UWI : 05-123-38204

Well Coordinates: 1,299,767.84 N, 3,269,683.51 E (40° 09' 08.03" N, 104° 32' 06.72" W)
Ground Level: 4,922.00 usft

Local Coordinate Origin:	Centered on Well Oscar Y10-74-1HC - Slot A2
Viewing Datum:	KB = 24' @ 4946.00usft (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 Y10-74-1HC
Wellbore: Plan D
Design: Actual Surveys

noble energy

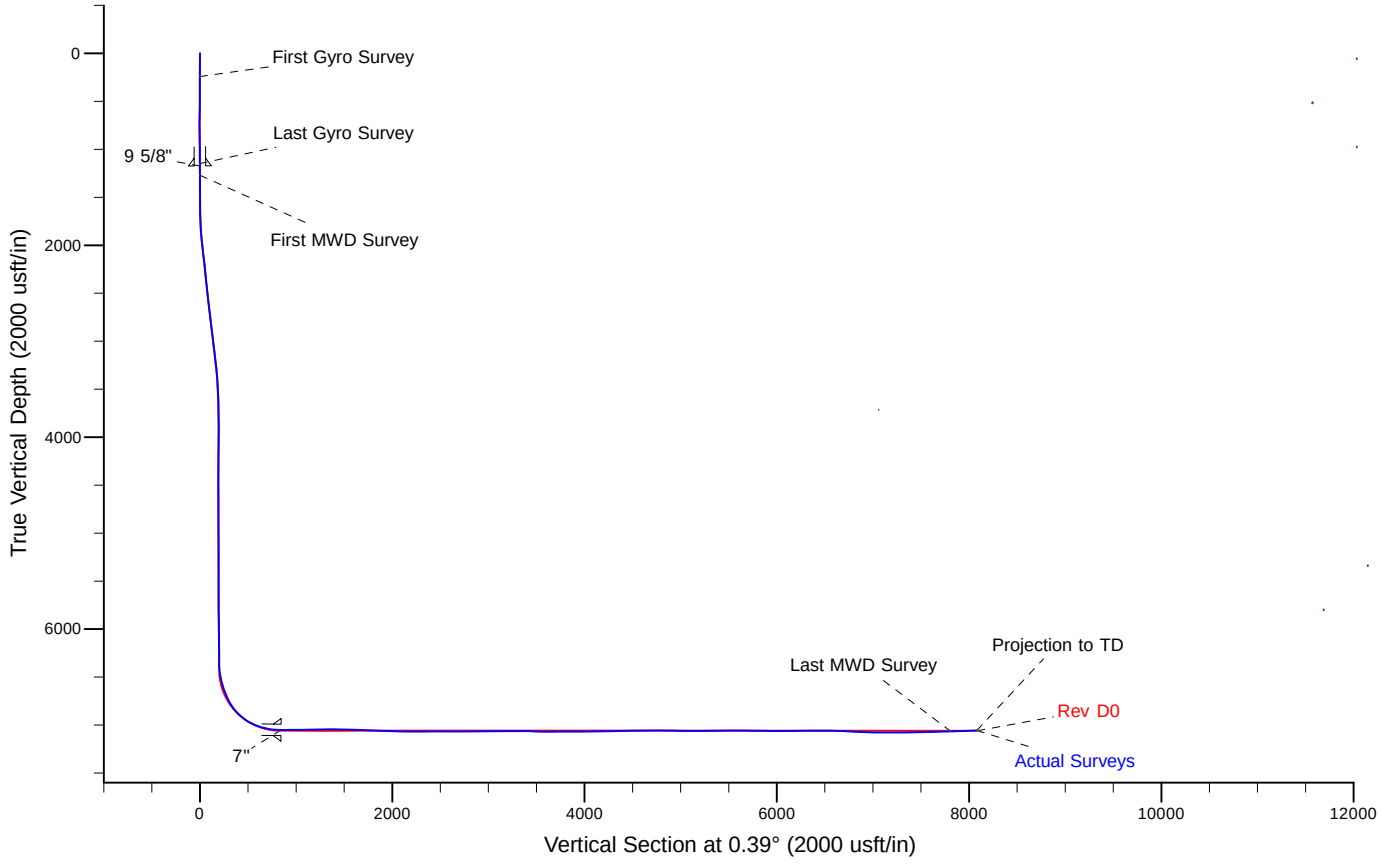
HALLIBURTON
Sperry Drilling

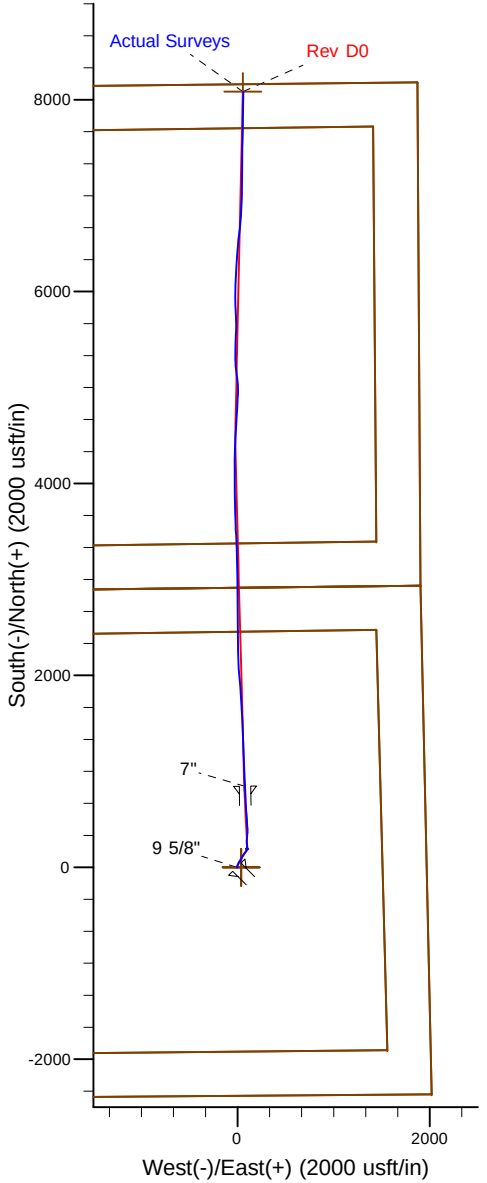
Platted SHL:	2380' FSL, 2023' FEL
Platted Lat/Long:	40.15223 N, 104.53534 W
Location:	Sec. 10-T2N-R64W
~7" Casing:	3218' FSL, 1874' FEL
Lat/Long:	40.154546 N, 104.534888 W
State Planes - CO Northern:	1300612.34 N, 3269761.67 E
Location:	Sec. 10-T2N-R64W
Platted BHL:	75' FNL, 1980' FEL
Lat/Long:	40.174420N,104.534690 W
State Planes - CO Northern:	1307852.31 N, 3269738.07 E
Location:	Sec. 3-T2N-R64W

L E G E N D

Oscar Y10-74-1HC, Plan D, Rev D0 V0

Actual Surveys





WELL DETAILS: Oscar Y10-74-1HC

Ground Level: 4922.00
KB = 24' @ 4946.00usft (H&P 315)

Created By: Gordy Roth
Created On: 12/19/2014

Design Report for Oscar Y10-74-1HC - 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
244.00	0.30	201.21	244.00	-0.60	-0.23	-0.60	0.12
First Gyro Survey							
534.00	0.50	243.51	533.99	-1.87	-1.64	-1.88	0.12
750.00	0.60	266.31	749.98	-2.36	-3.61	-2.39	0.11
995.00	0.60	332.71	994.97	-1.30	-5.48	-1.34	0.27
1,149.00	0.50	326.61	1,148.96	-0.03	-6.22	-0.07	0.08
Last Gyro Survey							
1,271.00	0.44	259.55	1,270.96	0.33	-6.97	0.29	0.43
First MWD Survey							
1,364.00	0.39	293.91	1,363.96	0.40	-7.61	0.35	0.27
1,550.00	0.28	21.74	1,549.96	1.08	-8.02	1.02	0.25
1,643.00	1.33	29.12	1,642.95	2.23	-7.41	2.18	1.13
1,736.00	2.41	21.24	1,735.90	5.00	-6.18	4.95	1.19
1,828.00	4.13	25.14	1,827.74	9.80	-4.07	9.77	1.88
1,920.00	5.82	19.16	1,919.39	17.20	-1.13	17.20	1.92
2,015.00	7.07	25.28	2,013.79	27.04	2.94	27.06	1.50
2,110.00	7.31	29.13	2,108.05	37.61	8.38	37.66	0.57
2,205.00	6.94	26.77	2,202.31	48.01	13.91	48.10	0.50
2,300.00	6.68	33.18	2,296.64	57.76	19.52	57.89	0.85
2,394.00	6.34	31.67	2,390.04	66.75	25.24	66.92	0.40
2,489.00	7.33	29.41	2,484.36	76.50	30.97	76.70	1.08
2,584.00	7.84	26.75	2,578.53	87.56	36.86	87.81	0.65
2,679.00	8.05	30.61	2,672.62	99.07	43.16	99.36	0.60
2,774.00	7.32	31.67	2,766.76	109.95	49.73	110.28	0.78
2,869.00	7.47	30.68	2,860.97	120.41	56.06	120.79	0.21
2,964.00	8.35	35.81	2,955.07	131.31	63.24	131.74	1.19
3,059.00	8.86	33.85	3,049.00	142.98	71.35	143.46	0.62
3,153.00	7.61	34.21	3,142.03	154.14	78.89	154.67	1.33
3,248.00	7.79	33.95	3,236.17	164.69	86.02	165.26	0.19
3,343.00	6.11	33.79	3,330.47	174.23	92.43	174.85	1.77
3,438.00	5.10	33.76	3,425.02	181.94	97.58	182.60	1.06
3,628.00	1.89	33.89	3,614.64	191.57	104.03	192.26	1.69
3,723.00	1.27	36.36	3,709.60	193.72	105.52	194.42	0.66
3,818.00	0.57	359.92	3,804.59	195.04	106.15	195.75	0.93
4,008.00	0.78	220.73	3,994.58	195.00	105.30	195.71	0.67
4,103.00	1.18	222.35	4,089.57	193.79	104.22	194.49	0.42
4,198.00	1.13	241.00	4,184.55	192.61	102.74	193.30	0.40
4,292.00	1.46	261.31	4,278.53	191.98	100.75	192.66	0.60
4,387.00	1.57	262.56	4,373.49	191.63	98.26	192.29	0.12
4,482.00	1.80	267.56	4,468.45	191.40	95.48	192.04	0.29
4,577.00	1.36	292.83	4,563.42	191.77	92.95	192.39	0.86
4,672.00	1.20	280.63	4,658.39	192.39	90.93	193.00	0.33
4,767.00	1.54	262.53	4,753.37	192.41	88.69	193.00	0.58
4,862.00	0.98	22.09	4,848.35	193.00	87.73	193.58	2.31
4,956.00	0.64	52.76	4,942.35	194.06	88.45	194.65	0.57
5,051.00	1.29	99.03	5,037.33	194.21	89.93	194.81	1.02
5,146.00	1.23	87.23	5,132.31	194.09	92.00	194.71	0.28
5,241.00	0.78	90.74	5,227.30	194.13	93.67	194.76	0.48
5,336.00	0.49	84.12	5,322.29	194.17	94.72	194.80	0.31

Design Report for Oscar Y10-74-1HC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,430.00	0.51	94.56	5,416.29	194.18	95.54	194.82	0.10
5,525.00	0.48	69.12	5,511.28	194.28	96.33	194.93	0.23
5,620.00	0.43	88.59	5,606.28	194.43	97.06	195.09	0.17
5,715.00	0.68	90.97	5,701.27	194.43	97.98	195.09	0.26
5,810.00	0.72	78.04	5,796.27	194.55	99.13	195.21	0.17
5,905.00	0.90	15.04	5,891.26	195.39	99.90	196.06	0.91
5,999.00	0.84	19.53	5,985.25	196.75	100.32	197.43	0.10
6,094.00	0.75	8.32	6,080.24	198.03	100.65	198.70	0.19
6,189.00	0.62	348.13	6,175.23	199.14	100.63	199.82	0.29
6,284.00	0.36	41.19	6,270.23	199.87	100.72	200.55	0.52
6,377.00	0.22	19.15	6,363.23	200.26	100.97	200.94	0.19
6,518.00	11.36	356.15	6,503.29	214.42	100.13	215.09	7.91
6,565.00	14.77	354.43	6,549.07	225.00	99.23	225.67	7.30
6,613.00	17.57	352.43	6,595.16	238.27	97.69	238.93	5.95
6,660.00	20.19	353.64	6,639.63	253.37	95.85	254.01	5.64
6,755.00	25.02	6.83	6,727.36	289.65	96.43	290.30	7.34
6,849.00	34.79	4.63	6,808.75	336.24	100.97	336.91	10.46
6,897.00	39.45	1.59	6,847.02	365.15	102.50	365.83	10.43
6,944.00	44.89	0.19	6,881.84	396.68	102.97	397.37	11.75
6,992.00	49.96	356.72	6,914.31	431.99	101.97	432.67	11.83
7,039.00	54.14	355.75	6,943.21	468.97	99.53	469.63	9.04
7,087.00	60.14	355.44	6,969.24	509.15	96.43	509.79	12.51
7,134.00	65.68	355.08	6,990.63	550.83	92.97	551.45	11.81
7,182.00	69.54	356.11	7,008.92	595.07	89.57	595.66	8.28
7,229.00	73.51	356.36	7,023.81	639.55	86.64	640.12	8.46
7,277.00	77.15	356.05	7,035.96	685.87	83.57	686.42	7.61
7,324.00	81.66	356.58	7,044.60	731.96	80.60	732.49	9.66
7,389.00	86.80	359.72	7,051.13	796.57	78.52	797.08	9.25
7,480.00	91.63	359.14	7,052.38	887.53	77.62	888.03	5.35
7,543.00	90.65	357.02	7,051.13	950.48	75.51	950.97	3.71
7,638.00	89.97	356.50	7,050.61	1,045.32	70.14	1,045.77	0.90
7,733.00	91.51	357.26	7,049.39	1,140.17	64.97	1,140.58	1.81
7,826.00	91.63	357.49	7,046.84	1,233.04	60.71	1,233.42	0.28
7,920.00	89.26	357.69	7,046.11	1,326.95	56.76	1,327.30	2.53
8,013.00	90.49	358.06	7,046.31	1,419.88	53.31	1,420.21	1.38
8,106.00	89.32	357.32	7,046.47	1,512.80	49.56	1,513.10	1.49
8,198.00	87.45	358.36	7,049.06	1,604.69	46.09	1,604.97	2.33
8,291.00	87.38	356.75	7,053.25	1,697.51	42.13	1,697.76	1.73
8,384.00	87.29	356.31	7,057.58	1,790.24	36.51	1,790.45	0.48
8,476.00	87.26	354.58	7,061.95	1,881.84	29.21	1,882.00	1.88
8,567.00	88.03	355.36	7,065.69	1,972.41	21.24	1,972.51	1.20
8,659.00	88.74	355.57	7,068.28	2,064.09	13.97	2,064.14	0.80
8,751.00	89.63	357.80	7,069.59	2,155.92	8.65	2,155.93	2.61
8,844.00	90.31	358.69	7,069.64	2,248.87	5.80	2,248.86	1.20
8,936.00	90.83	359.08	7,068.73	2,340.85	4.01	2,340.83	0.71
9,030.00	90.83	359.71	7,067.36	2,434.84	3.02	2,434.80	0.67
9,123.00	90.06	0.19	7,066.64	2,527.83	2.94	2,527.79	0.98
9,216.00	89.88	359.81	7,066.69	2,620.83	2.94	2,620.79	0.45
9,309.00	90.09	359.48	7,066.71	2,713.83	2.36	2,713.78	0.42
9,401.00	90.03	359.32	7,066.62	2,805.83	1.40	2,805.77	0.19
9,494.00	88.95	359.22	7,067.45	2,898.81	0.21	2,898.75	1.17

Design Report for Oscar Y10-74-1HC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,586.00	90.86	359.25	7,067.60	2,990.80	-1.02	2,990.73	2.08
9,681.00	90.99	359.20	7,066.06	3,085.78	-2.30	3,085.69	0.15
9,776.00	91.20	357.94	7,064.25	3,180.73	-4.67	3,180.63	1.34
9,871.00	90.22	359.10	7,063.07	3,275.69	-7.12	3,275.57	1.60
9,965.00	89.20	357.46	7,063.55	3,369.64	-9.95	3,369.50	2.05
10,060.00	87.08	356.45	7,066.63	3,464.45	-14.99	3,464.27	2.47
10,155.00	88.00	358.24	7,070.71	3,559.26	-19.38	3,559.04	2.12
10,250.00	90.77	357.42	7,071.73	3,654.17	-22.98	3,653.93	3.04
10,345.00	92.13	0.09	7,069.32	3,749.11	-25.05	3,748.85	3.15
10,439.00	88.31	358.07	7,068.96	3,843.07	-26.55	3,842.81	4.60
10,534.00	90.25	357.67	7,070.16	3,938.00	-30.08	3,937.70	2.09
10,629.00	91.54	0.10	7,068.67	4,032.96	-31.93	4,032.65	2.90
10,724.00	90.09	0.56	7,067.32	4,127.94	-31.39	4,127.64	1.60
10,819.00	91.17	1.48	7,066.28	4,222.92	-29.70	4,222.62	1.49
10,914.00	92.19	1.37	7,063.49	4,317.85	-27.33	4,317.56	1.08
11,009.00	91.88	2.36	7,060.12	4,412.74	-24.24	4,412.47	1.09
11,104.00	90.31	3.12	7,058.30	4,507.61	-19.70	4,507.37	1.84
11,199.00	89.29	3.43	7,058.63	4,602.45	-14.28	4,602.25	1.12
11,293.00	90.68	3.68	7,058.66	4,696.27	-8.45	4,696.10	1.50
11,388.00	89.17	2.40	7,058.78	4,791.13	-3.41	4,791.00	2.08
11,483.00	89.88	3.91	7,059.57	4,885.98	1.82	4,885.88	1.76
11,578.00	88.86	359.36	7,060.62	4,980.91	4.53	4,980.82	4.91
11,673.00	88.55	353.77	7,062.77	5,075.67	-1.16	5,075.55	5.89
11,768.00	88.92	351.94	7,064.86	5,169.91	-12.97	5,169.70	1.96
11,863.00	93.79	357.84	7,062.62	5,264.43	-21.43	5,264.17	8.05
11,958.00	91.02	0.24	7,058.63	5,359.32	-23.02	5,359.04	3.86
12,052.00	89.57	2.14	7,058.14	5,453.29	-21.07	5,453.03	2.54
12,147.00	89.75	2.23	7,058.71	5,548.22	-17.44	5,547.98	0.21
12,242.00	90.06	0.51	7,058.87	5,643.19	-15.17	5,642.96	1.84
12,337.00	88.49	357.73	7,060.07	5,738.16	-16.63	5,737.92	3.36
12,432.00	90.37	357.03	7,061.01	5,833.05	-20.97	5,832.78	2.11
12,527.00	87.13	359.18	7,063.09	5,927.96	-24.12	5,927.66	4.09
12,622.00	90.74	1.69	7,064.85	6,022.92	-23.39	6,022.62	4.63
12,717.00	91.94	3.01	7,062.63	6,117.81	-19.50	6,117.54	1.88
12,812.00	91.11	3.25	7,060.10	6,212.63	-14.31	6,212.39	0.91
12,907.00	89.63	2.76	7,059.49	6,307.49	-9.33	6,307.29	1.64
13,001.00	89.75	4.54	7,060.00	6,401.30	-3.35	6,401.13	1.90
13,096.00	89.60	5.15	7,060.54	6,495.96	4.67	6,495.84	0.66
13,191.00	89.38	6.96	7,061.38	6,590.42	14.69	6,590.37	1.92
13,285.00	87.78	7.01	7,063.71	6,683.69	26.12	6,683.71	1.70
13,380.00	86.39	4.05	7,068.54	6,778.11	35.26	6,778.20	3.44
13,475.00	87.72	2.70	7,073.42	6,872.82	40.85	6,872.94	1.99
13,570.00	87.81	1.06	7,077.13	6,967.69	43.96	6,967.83	1.73
13,665.00	89.82	0.47	7,079.09	7,062.66	45.23	7,062.80	2.21
13,759.00	91.05	0.71	7,078.38	7,156.65	46.20	7,156.80	1.33
13,854.00	90.89	0.68	7,076.77	7,251.63	47.35	7,251.78	0.17
13,949.00	89.42	0.27	7,076.51	7,346.62	48.14	7,346.78	1.61
14,044.00	90.43	1.65	7,076.64	7,441.60	49.73	7,441.77	1.80
14,139.00	90.92	0.92	7,075.52	7,536.57	51.86	7,536.75	0.93
14,234.00	92.22	0.64	7,072.92	7,631.53	53.15	7,631.71	1.40
14,329.00	91.69	0.81	7,069.68	7,726.46	54.35	7,726.65	0.59

Design Report for Oscar Y10-74-1HC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,349.00	92.10	0.97	7,069.01	7,746.45	54.67	7,746.64	2.20
14,413.00	92.10	0.97	7,066.67	7,810.40	55.75	7,810.60	0.00
Last MWD Survey							
14,684.00	92.10	0.97	7,056.74	8,081.18	60.33	8,081.40	0.00
Projection to TD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
244.00	244.00	-0.60	-0.23	First Gyro Survey
1,149.00	1,148.96	-0.03	-6.22	Last Gyro Survey
1,271.00	1,270.96	0.33	-6.97	First MWD Survey
14,413.00	7,066.67	7,810.40	55.75	Last MWD Survey
14,684.00	7,056.74	8,081.18	60.33	Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Oscar Y10-74-1HC_BHL	0.39	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
244.00	1,149.00	Surface Surveys	Flexi-Shot
1,271.00	7,389.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,480.00	14,684.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,176.00		9 5/8"	9-5/8	13-3/4
7,437.00	7,052.75	7"	7	8-3/4

Design Report for Oscar Y10-74-1HC - 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 Y10-74-1HN_Se	0.00	0.00	0.00	0.39	36.34	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 36.34usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	7,667.48	-2,948.46	1,307,435.39	3,266,771.51	
Point 2				0.00	7,720.73	1,373.68	1,307,488.64	3,271,093.47	
Point 3				0.00	3,394.94	1,406.01	1,303,163.03	3,271,125.80	
Point 4				0.00	3,337.59	-2,959.12	1,303,105.68	3,266,760.85	
Oscar Y10-74-1HN_Se	0.00	0.00	0.00	0.39	36.34	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 36.34usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	8,127.50	-3,408.48	1,307,895.39	3,266,311.51	
Point 2				0.00	8,180.75	1,833.70	1,307,948.64	3,271,553.47	
Point 3				0.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80	
Point 4				0.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85	
Oscar Y10-74-1HN_Se	0.00	0.00	0.00	0.39	36.34	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 36.34usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	2,877.57	-3,419.14	1,302,645.68	3,266,300.85	
Point 2				0.00	2,934.92	1,866.03	1,302,703.03	3,271,585.80	
Point 3				0.00	-2,364.62	1,982.81	1,297,403.71	3,271,702.58	
Point 4				0.00	-2,407.43	-3,303.64	1,297,360.90	3,266,416.35	
Oscar Y10-74-1HN_Se	0.00	0.00	0.00	0.39	36.34	1,299,768.23	3,269,719.85	40.152230	-104.535070
- actual wellpath misses target center by 36.34usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	2,417.55	-2,959.12	1,302,185.68	3,266,760.85	
Point 2				0.00	2,474.90	1,406.01	1,302,243.03	3,271,125.80	
Point 3				0.00	-1,904.60	1,522.79	1,297,863.71	3,271,242.58	
Point 4				0.00	-1,947.41	-2,843.62	1,297,820.90	3,266,876.35	
Oscar Y10-74-1HC_BH	0.00	0.00	7,060.00	8,084.81	54.56	1,307,852.31	3,269,738.07	40.174420	-104.534690
- actual wellpath misses target center by 7.56usft at 14684.00usft MD (7056.74 TVD, 8081.18 N, 60.33 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.82 °/100usft	Maximum Dogleg over Survey:	12.51 °/100usft at 7,087.00 usft
Net Tortousity applicable to Plans:	0.92 °/100usft	Directional Difficulty Index:	6.655

Audit Info

North Reference Sheet for Sec. 10-T2N-R64W (Oscar PAD) - Oscar Y10-74-1HC - Plan D

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' @ 4946.00usft (H&P 315). Northing and Easting are relative to Oscar Y 10-74-1HC - Slot A2

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: 1,299,767.84 usft N, 3,269,683.51 usft E

Geographical Coordinates of Well: 40° 09' 08.03" N, 104° 32' 06.72" W

Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,684.00usft

the Bottom Hole Displacement is 8,081.40usft in the Direction of 0.43° (Grid).

Magnetic Convergence at surface is: -7.74° (20 October 2014, , BGGM2014)