



Noble Energy, Inc

Weld County, CO (NAD 83)

Sec 10, T02N-R64W (Oscar Y10 Pad)

Oscar Y10-78-1HC

Wellbore #1

Design: OH

Final Survey Report

09 February, 2014





IDS Final Survey Report



Company:	Noble Energy, Inc	Local Co-ordinate Reference:	Well Oscar Y10-78-1HC
Project:	Weld County, CO (NAD 83)	TVD Reference:	Well @ 4973.0usft (HP 330)
Site:	Sec 10, T02N-R64W (Oscar Y10 Pad)	MD Reference:	Well @ 4973.0usft (HP 330)
Well:	Oscar Y10-78-1HC	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Weld County, CO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		Sec 10, T02N-R64W (Oscar Y10 Pad)			
Site Position:		Northing:	1,299,747.16 usft	Latitude:	40° 9' 8.100 N
From:	Lat/Long	Easting:	3,267,100.75 usft	Longitude:	104° 32' 39.984 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.62 °

Well	Oscar Y10-78-1HC					
Well Position	+N/-S	0.0 usft	Northing:	1,299,747.15 usft	Latitude:	40° 9' 8.100 N
	+E/-W	0.0 usft	Easting:	3,267,100.75 usft	Longitude:	104° 32' 39.984 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,943.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/16/2013	8.39	66.80	52,760

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	1.33	

Survey Program	Date 2/9/2014				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
385.0	14,759.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00
385.0	0.70	300.07	385.0	1.2	-2.0	1.1	0.18
First MWD							
1,141.0	1.50	58.57	1,140.9	8.7	2.4	8.7	0.26
1,194.0	1.80	73.50	1,193.9	9.3	3.8	9.3	0.98
1,287.0	4.30	81.20	1,286.7	10.2	8.6	10.4	2.72
1,381.0	5.80	69.30	1,380.4	12.4	16.6	12.8	1.94
1,474.0	5.80	71.50	1,472.9	15.6	25.4	16.2	0.24
1,569.0	7.80	67.70	1,567.2	19.5	35.9	20.4	2.16
1,664.0	9.50	59.70	1,661.1	25.9	48.7	27.1	2.19
1,759.0	10.00	59.30	1,754.8	34.1	62.5	35.6	0.53
1,854.0	9.80	57.90	1,848.4	42.6	76.5	44.4	0.33



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
1,949.0	9.40	58.70	1,942.0	50.9	90.0	53.0	0.44	
2,045.0	9.30	62.80	2,036.8	58.6	103.6	60.9	0.70	
2,140.0	9.40	57.40	2,130.5	66.2	116.9	68.9	0.93	
2,235.0	8.10	58.10	2,224.4	74.0	129.1	76.9	1.37	
2,330.0	8.60	58.70	2,318.4	81.2	140.9	84.4	0.53	
2,425.0	8.40	60.90	2,412.3	88.3	153.0	91.8	0.40	
2,520.0	8.40	60.40	2,506.3	95.1	165.1	98.9	0.08	
2,616.0	8.30	55.00	2,601.3	102.5	176.9	106.6	0.82	
2,711.0	7.80	62.80	2,695.4	109.4	188.2	113.7	1.26	
2,806.0	7.70	56.50	2,789.5	115.8	199.3	120.4	0.90	
2,901.0	7.50	53.80	2,883.7	123.0	209.6	127.8	0.43	
2,994.0	6.70	64.40	2,976.0	128.9	219.4	134.0	1.65	
3,089.0	5.60	48.00	3,070.4	134.4	227.8	139.7	2.17	
3,184.0	2.60	43.60	3,165.2	139.1	232.8	144.5	3.17	
3,279.0	1.40	72.50	3,260.1	141.0	235.4	146.4	1.61	
3,374.0	0.10	90.80	3,355.1	141.4	236.5	146.8	1.37	
3,470.0	0.30	219.20	3,451.1	141.2	236.5	146.6	0.39	
3,565.0	0.10	311.20	3,546.1	141.0	236.2	146.5	0.34	
3,660.0	0.70	124.10	3,641.1	140.8	236.7	146.2	0.84	
3,755.0	1.10	127.70	3,736.1	139.9	237.9	145.4	0.43	
3,850.0	0.50	164.10	3,831.1	138.9	238.7	144.4	0.80	
3,945.0	1.20	146.80	3,926.1	137.7	239.4	143.2	0.78	
4,040.0	0.50	325.20	4,021.1	137.2	239.7	142.7	1.79	
4,135.0	0.30	332.60	4,116.1	137.8	239.3	143.3	0.22	
4,230.0	0.10	346.10	4,211.1	138.1	239.2	143.6	0.21	
4,325.0	0.40	242.40	4,306.1	138.0	238.9	143.5	0.46	
4,421.0	0.60	291.30	4,402.1	138.0	238.1	143.5	0.47	
4,516.0	0.50	295.70	4,497.0	138.4	237.3	143.8	0.11	
4,611.0	0.60	276.60	4,592.0	138.6	236.4	144.1	0.22	
4,706.0	0.70	232.40	4,687.0	138.3	235.4	143.7	0.52	
4,801.0	1.10	212.20	4,782.0	137.2	234.5	142.6	0.53	
4,896.0	1.50	217.70	4,877.0	135.4	233.3	140.8	0.44	
4,991.0	0.60	162.60	4,972.0	134.0	232.6	139.3	1.32	
5,086.0	1.20	77.60	5,067.0	133.7	233.8	139.1	1.36	
5,181.0	0.80	88.10	5,162.0	133.9	235.4	139.4	0.46	
5,276.0	1.00	73.90	5,256.9	134.2	236.9	139.7	0.31	
5,372.0	1.10	41.60	5,352.9	135.1	238.3	140.6	0.62	
5,467.0	1.30	5.00	5,447.9	136.9	239.0	142.4	0.82	
5,562.0	1.50	19.10	5,542.9	139.1	239.5	144.6	0.42	
5,657.0	1.60	28.50	5,637.9	141.5	240.5	147.0	0.29	
5,752.0	2.10	28.10	5,732.8	144.2	242.0	149.7	0.53	
5,847.0	2.10	18.90	5,827.7	147.3	243.4	153.0	0.35	
5,943.0	2.20	25.20	5,923.7	150.7	244.7	156.3	0.27	
6,038.0	2.10	32.60	6,018.6	153.8	246.4	159.5	0.31	

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Well:	Oscar Y10-78-1HC	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
6,133.0	1.90	33.10	6,113.5	156.6	248.2	162.3	0.21
6,228.0	2.00	26.70	6,208.5	159.4	249.8	165.1	0.25
6,323.0	2.40	40.10	6,303.4	162.4	251.8	168.2	0.68
6,403.0	2.30	44.10	6,383.4	164.8	254.0	170.7	0.24
6,459.0	2.90	26.80	6,439.3	166.9	255.5	172.8	1.75
6,507.0	6.30	358.40	6,487.1	170.6	255.9	176.5	8.32
6,554.0	10.20	348.60	6,533.6	177.3	255.0	183.1	8.79
6,602.0	12.70	347.00	6,580.7	186.6	253.0	192.4	5.25
6,650.0	16.40	353.80	6,627.1	198.5	251.1	204.2	8.48
6,698.0	20.60	355.90	6,672.7	213.6	249.8	219.4	8.86
6,746.0	25.10	358.80	6,716.9	232.2	248.9	237.9	9.66
6,793.0	27.50	0.50	6,759.0	253.1	248.8	258.8	5.35
6,841.0	31.30	2.80	6,800.8	276.6	249.5	282.3	8.26
6,888.0	35.30	2.10	6,840.1	302.4	250.6	308.1	8.55
6,935.0	39.60	2.40	6,877.4	330.9	251.8	336.7	9.16
6,983.0	43.80	2.20	6,913.2	362.8	253.0	368.6	8.75
7,030.0	48.40	2.20	6,945.8	396.7	254.3	402.4	9.79
7,078.0	52.80	0.30	6,976.3	433.7	255.1	439.5	9.66
7,125.0	58.10	357.70	7,002.9	472.4	254.4	478.2	12.16
7,173.0	62.90	357.30	7,026.6	514.1	252.6	519.9	10.03
7,220.0	66.60	357.80	7,046.6	556.6	250.8	562.3	7.93
7,269.0	70.30	358.40	7,064.6	602.1	249.3	607.8	7.64
7,316.0	74.00	359.20	7,079.0	646.9	248.3	652.4	8.04
7,364.0	77.80	359.30	7,090.7	693.4	247.7	699.0	7.92
7,411.0	81.20	359.70	7,099.3	739.6	247.3	745.1	7.28
7,471.0	84.89	0.57	7,106.5	799.2	247.5	804.7	6.32
Actual 7" Csg @ 7471' MD / 7107' TVD 999' FEL & 3177' FSL Sec 10							
7,515.0	87.60	1.20	7,109.4	843.0	248.1	848.6	6.32
7,546.0	89.40	1.50	7,110.2	874.0	248.9	879.6	5.89
7,642.0	94.30	0.80	7,107.1	969.9	250.8	975.5	5.16
7,737.0	93.50	359.40	7,100.6	1,064.7	251.0	1,070.2	1.69
7,832.0	92.00	357.00	7,096.1	1,159.5	248.0	1,165.0	2.98
7,927.0	93.50	357.90	7,091.5	1,254.3	243.8	1,259.7	1.84
8,021.0	89.60	355.50	7,089.0	1,348.1	238.4	1,353.3	4.87
8,116.0	90.20	354.40	7,089.2	1,442.7	230.0	1,447.7	1.32
8,208.0	89.50	355.20	7,089.4	1,534.4	221.7	1,539.1	1.16
8,300.0	90.80	359.20	7,089.2	1,626.2	217.2	1,630.8	4.57
8,392.0	91.80	357.30	7,087.1	1,718.2	214.4	1,722.7	2.33
8,486.0	89.30	357.10	7,086.2	1,812.0	209.8	1,816.4	2.67
8,581.0	89.10	358.80	7,087.5	1,907.0	206.4	1,911.2	1.80
8,674.0	88.80	3.30	7,089.2	1,999.9	208.1	2,004.2	4.85
8,768.0	88.70	3.10	7,091.2	2,093.7	213.3	2,098.1	0.24
8,860.0	87.00	4.00	7,094.7	2,185.5	219.0	2,190.0	2.09
8,955.0	86.70	2.30	7,099.9	2,280.2	224.2	2,284.8	1.81
9,048.0	87.50	2.40	7,104.6	2,373.0	228.0	2,377.7	0.87



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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
9,142.0	89.60	0.80	7,107.0	2,466.9	230.6	2,471.6	2.81
9,236.0	90.00	0.20	7,107.3	2,560.9	231.5	2,565.6	0.77
9,329.0	90.40	0.60	7,107.0	2,653.9	232.1	2,658.6	0.61
9,423.0	91.40	359.50	7,105.5	2,747.9	232.2	2,752.6	1.58
9,515.0	89.60	359.20	7,104.7	2,839.9	231.2	2,844.5	1.98
9,609.0	89.30	359.20	7,105.6	2,933.9	229.8	2,938.4	0.32
9,701.0	89.70	358.40	7,106.4	3,025.9	227.9	3,030.3	0.97
9,795.0	90.10	357.50	7,106.6	3,119.8	224.6	3,124.2	1.05
9,889.0	89.50	357.70	7,106.9	3,213.7	220.6	3,218.0	0.67
9,983.0	88.30	358.50	7,108.7	3,307.6	217.5	3,311.8	1.53
10,076.0	88.00	358.70	7,111.7	3,400.6	215.2	3,404.6	0.39
10,169.0	87.80	358.80	7,115.1	3,493.5	213.2	3,497.5	0.24
10,261.0	89.80	359.50	7,117.1	3,585.4	211.8	3,589.4	2.30
10,352.0	90.70	359.10	7,116.7	3,676.4	210.7	3,680.3	1.08
10,445.0	91.10	357.30	7,115.2	3,769.4	207.8	3,773.2	1.98
10,539.0	89.70	359.20	7,114.6	3,863.3	204.9	3,867.0	2.51
10,631.0	90.60	358.80	7,114.3	3,955.3	203.3	3,959.0	1.07
10,723.0	90.30	359.10	7,113.6	4,047.3	201.6	4,050.9	0.46
10,817.0	90.00	0.20	7,113.3	4,141.3	201.1	4,144.8	1.21
10,911.0	89.10	359.90	7,114.1	4,235.3	201.2	4,238.8	1.01
11,003.0	89.80	1.90	7,115.0	4,327.3	202.6	4,330.8	2.30
11,095.0	90.50	0.90	7,114.7	4,419.2	204.8	4,422.8	1.33
11,189.0	90.60	359.90	7,113.8	4,513.2	205.5	4,516.8	1.07
11,284.0	90.60	358.80	7,112.8	4,608.2	204.4	4,611.7	1.16
11,379.0	90.20	0.90	7,112.2	4,703.2	204.2	4,706.7	2.25
11,474.0	90.70	0.70	7,111.4	4,798.2	205.5	4,801.7	0.57
11,569.0	90.60	1.70	7,110.3	4,893.2	207.5	4,896.7	1.06
11,664.0	91.00	359.90	7,109.0	4,988.1	208.8	4,991.6	1.94
11,759.0	88.40	0.70	7,109.5	5,083.1	209.3	5,086.6	2.86
11,854.0	88.60	1.00	7,112.0	5,178.1	210.7	5,181.6	0.38
11,949.0	90.40	359.60	7,112.8	5,273.1	211.2	5,276.6	2.40
12,045.0	91.10	359.60	7,111.6	5,369.1	210.6	5,372.5	0.73
12,140.0	91.60	358.80	7,109.3	5,464.0	209.2	5,467.4	0.99
12,235.0	89.50	0.40	7,108.4	5,559.0	208.6	5,562.4	2.78
12,330.0	88.80	359.40	7,109.8	5,654.0	208.4	5,657.3	1.28
12,425.0	88.80	357.90	7,111.8	5,748.9	206.2	5,752.2	1.58
12,520.0	87.80	358.50	7,114.6	5,843.9	203.2	5,847.0	1.23
12,616.0	89.30	357.80	7,117.1	5,939.8	200.1	5,942.8	1.72
12,711.0	90.70	0.10	7,117.1	6,034.7	198.3	6,037.7	2.83
12,806.0	90.70	358.50	7,115.9	6,129.7	197.2	6,132.7	1.68
12,901.0	90.40	357.10	7,115.0	6,224.7	193.5	6,227.5	1.51
12,996.0	90.80	359.20	7,114.0	6,319.6	190.5	6,322.3	2.25
13,091.0	88.10	358.40	7,114.9	6,414.6	188.5	6,417.2	2.96
13,187.0	87.40	359.10	7,118.7	6,510.5	186.4	6,513.0	1.03



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13,282.0	90.00	359.10	7,120.8	6,605.4	184.9	6,607.9	2.74	
13,377.0	90.10	0.70	7,120.8	6,700.4	184.7	6,702.9	1.69	
13,472.0	90.90	1.80	7,119.9	6,795.4	186.8	6,797.9	1.43	
13,567.0	90.70	3.70	7,118.6	6,890.3	191.4	6,892.8	2.01	
13,663.0	91.00	2.40	7,117.2	6,986.1	196.5	6,988.8	1.39	
13,758.0	88.60	359.20	7,117.5	7,081.1	197.8	7,083.8	4.21	
13,853.0	89.40	0.20	7,119.2	7,176.1	197.3	7,178.7	1.35	
13,948.0	89.80	358.90	7,119.8	7,271.1	196.5	7,273.7	1.43	
14,043.0	89.50	359.60	7,120.4	7,366.0	195.3	7,368.6	0.80	
14,138.0	89.20	0.90	7,121.5	7,461.0	195.7	7,463.6	1.40	
14,233.0	88.70	0.30	7,123.2	7,556.0	196.7	7,558.5	0.82	
14,329.0	89.30	359.90	7,124.9	7,652.0	196.9	7,654.5	0.75	
14,424.0	90.20	358.90	7,125.3	7,747.0	195.9	7,749.5	1.42	
14,519.0	90.80	359.30	7,124.5	7,842.0	194.4	7,844.4	0.76	
14,614.0	91.40	358.50	7,122.7	7,936.9	192.6	7,939.3	1.05	
14,699.0	90.90	357.80	7,121.0	8,021.9	189.8	8,024.1	1.01	
Last MWD @ 14699' MD / 7121' TVD								
14,759.0	90.90	357.80	7,120.0	8,081.8	187.5	8,084.0	0.00	
PTD @ 14759' MD / 7120' TVD 75' FNL & 978' FEL Sec3								

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
385.0	385.0	1.2	-2.0	First MWD
7,471.0	7,106.5	799.2	247.5	Actual 7" Csg @ 7471' MD / 7107' TVD 999' FEL & 3177' FSL Sec 10
14,699.0	7,121.0	8,021.9	189.8	Last MWD @ 14699' MD / 7121' TVD
14,759.0	7,120.0	8,081.8	187.5	PTD @ 14759' MD / 7120' TVD 75' FNL & 978' FEL Sec3

Checked By: _____ Approved By: _____ Date: _____



Weld County, CO (NAD 83) Sec 10, T02N-R64W (Oscar Y10 Pad) Oscar Y10-78-1HC HP 330 Plan #4



Azimuths to Grid North
True North: -0.62°
Magnetic North: 7.77°

Magnetic Field
Strength: 52759.5snT
Dip Angle: 66.80°
Date: 12/16/2013
Model: IGRF2010

WELL DETAILS: Oscar Y10-78-1HC

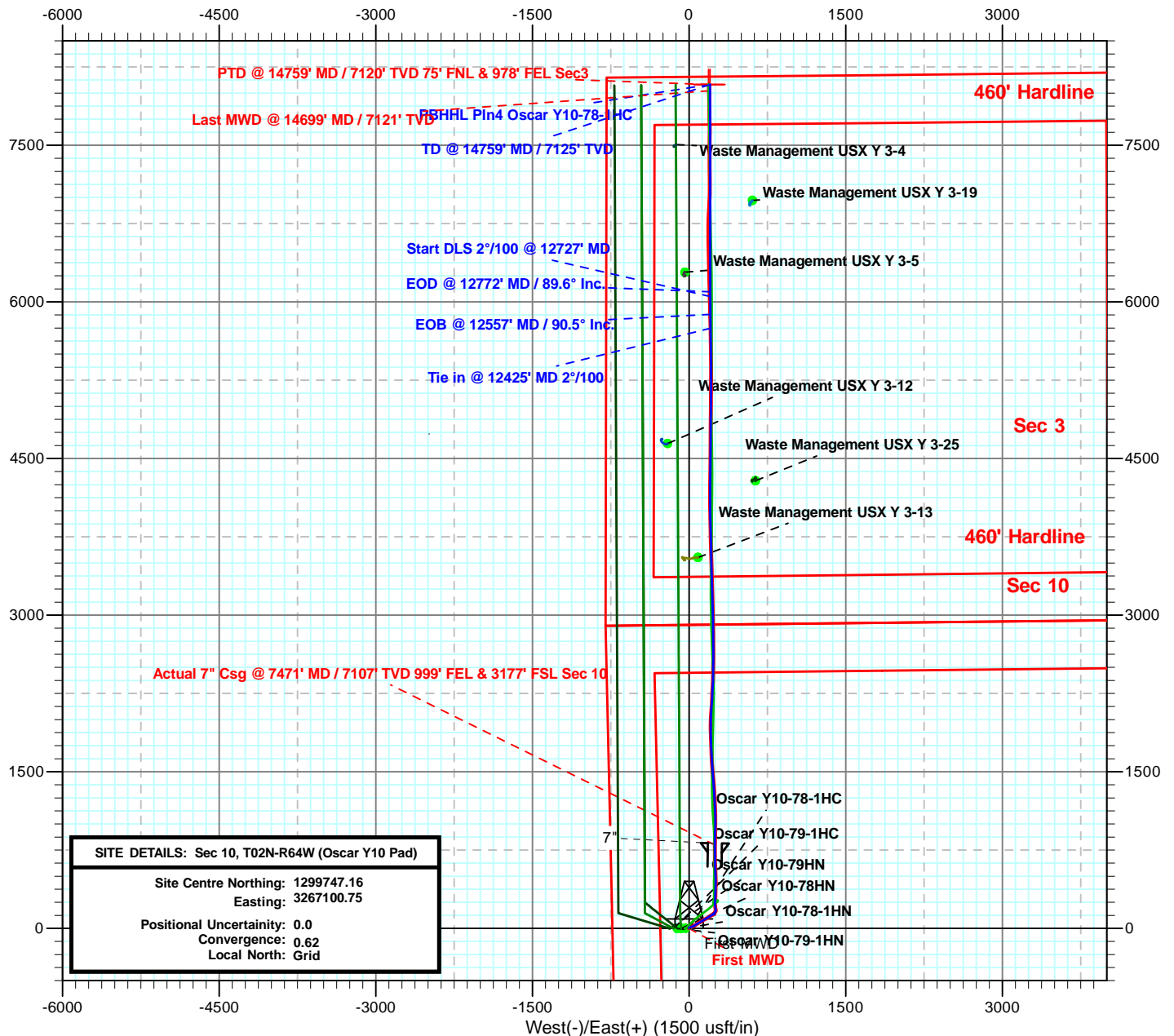
		Ground Level: 4943.0			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1299747.15	3267100.75	40° 9' 8.100 N	104° 32' 39.984 W

CASING DETAILS

MD	TVD	Name	Size
107.8	7486.7	7"	7"

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
12425.0	88.80	357.90	7111.8	5748.9	206.2	0.00	0.00	5752.2	
12557.0	90.50	359.92	7112.6	5880.9	203.7	2.00	49.93	5884.1	
12727.0	90.50	359.92	7111.1	6050.9	203.4	0.00	0.00	6054.0	
12772.0	89.60	359.92	7111.1	6095.9	203.4	2.00	179.71	6099.0	
14758.5	89.60	359.92	7125.0	8082.4	200.7	0.00	8084.9		PBHHL Pln4 Oscar Y10-78-1HC



SITE DETAILS: Sec 10, T02N-R64W (Oscar Y10 Pad)

Site Centre Northing: 1299747.16
Easting: 3267100.75

Positional Uncertainty: 0.0
Convergence: 0.62
Local North: Grid



Weld County, CO (NAD 83) Sec 10, T02N-R64W (Oscar Y10 Pad) Oscar Y10-78-1HC HP 330 Plan #4



Azimuths to Grid North
True North: -0.62°
Magnetic North: 7.77°

Magnetic Field
Strength: 52759.5snT
Dip Angle: 66.80°
Date: 12/16/2013
Model: IGRF2010

WELL DETAILS: Oscar Y10-78-1HC

		Ground Level: 4943.0			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1299747.15	3267100.75	$40^\circ 9' 8.100 \text{ N}$	$104^\circ 32' 39.984 \text{ W}$

CASING DETAILS

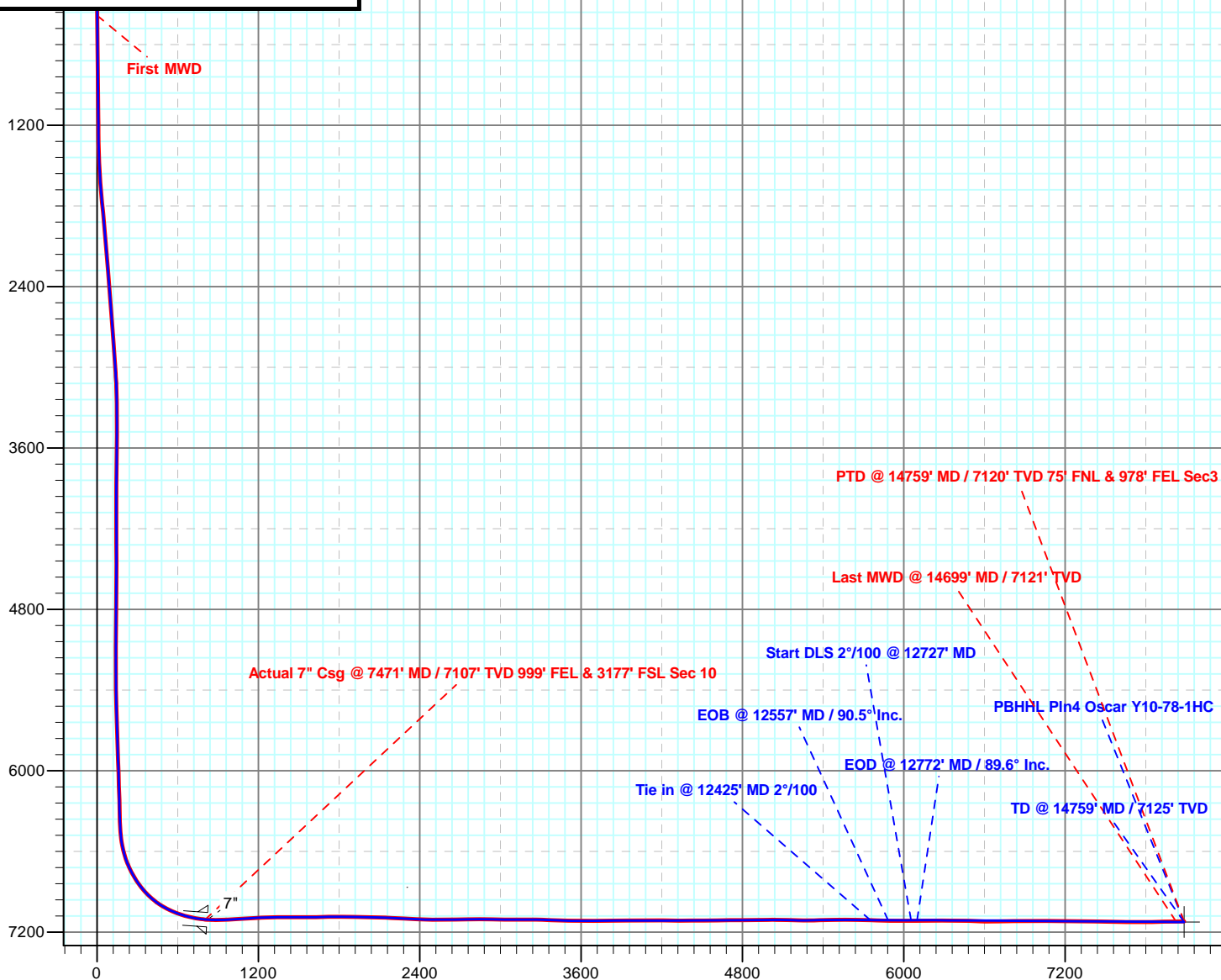
MD	TVD	Name	Size
107.8	7486.7	7"	7

SITE DETAILS: Sec 10, T02N-R64W (Oscar Y10 Pad)

Site Centre Northing: 1299747.16
Easting: 3267100.75
Positional Uncertainty: 0.0
Convergence: 0.62
Local North: Grid

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
12425.0	88.80	357.90	7111.8	5748.9	206.2	0.00	0.00	5752.2	
12557.0	90.50	359.92	7112.6	5880.9	203.7	2.00	49.93	5884.1	
12727.0	90.50	359.92	7111.1	6050.9	203.4	0.00	0.00	6054.0	
12772.0	89.60	359.92	7111.1	6095.9	203.4	2.00	179.71	6099.0	
14758.5	89.60	359.92	7125.0	8082.4	200.7	0.00	0.00	8084.9	PBHHL Pln4 Oscar Y10-78-1HC



Vertical Section at 1.33° (1200 usf/in)