



Company: Anadarko

Site: Morton

Well: 24-1

Project: Weld County, Colorado (NAD83)

Rig Name: Xtreme 11



Planning: 936.442.2510 Fax: 936.442.2515  
Operations: 936.442.2500 Fax: 936.442.2599



Azimuths to True North  
Magnetic North: 8.81°

Magnetic Field  
Strength: 52917.2snT  
Dip Angle: 66.76°  
Date: 11/17/2011  
Model: WMM\_2010

US State Plane 1983  
Colorado Northern Zone

Created By: Megan Pope  
Date: 11:02, November 22 2011  
Plan: Design #1

#### SURFACE LOCATION

Northing: 1271418.85  
Easting: 3186556.11  
Latitude: 40° 4' 35.4364 N  
Longitude: 104° 50' 0.021 W  
Ground Elevation: 4898.00  
WELL @ 4913.00usft (Xtreme 11)

#### ANNOTATIONS

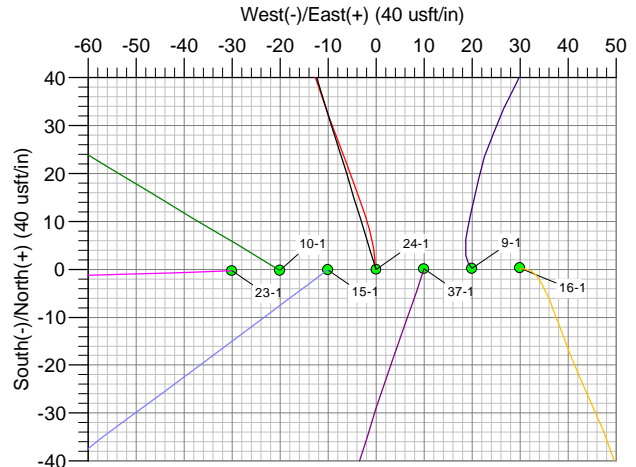
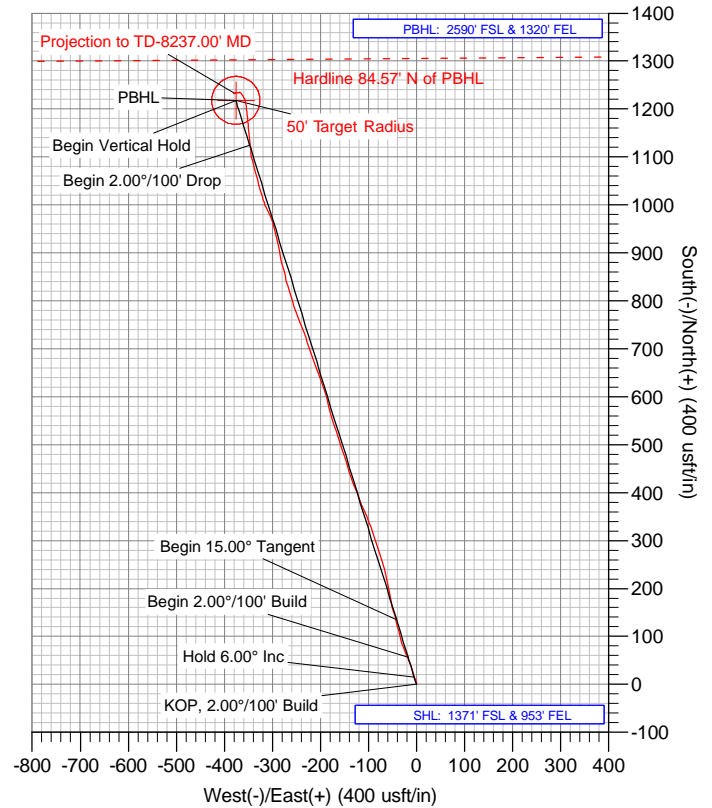
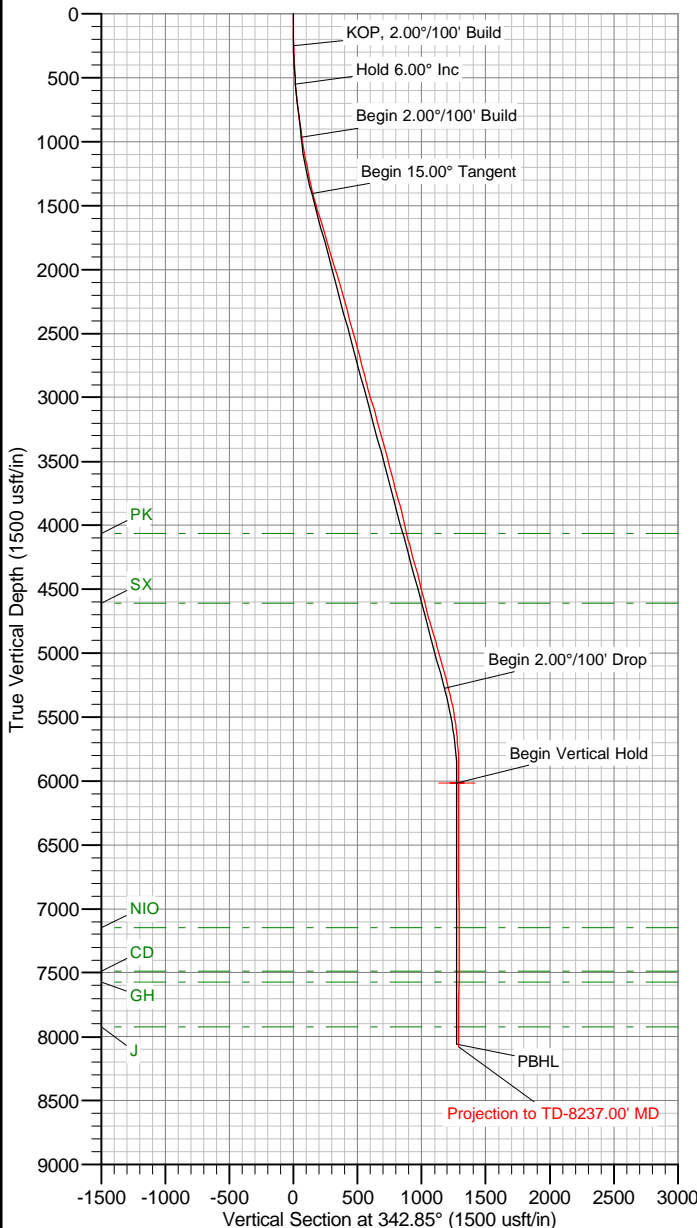
MD	Inc	Azi	TVD	+N/-S	+E/-W	V Sect	Departure	Annotation
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
550.00	6.00	342.85	549.45	15.00	-4.63	15.69	15.69	Hold 6.00° Inc
967.84	6.00	342.85	965.00	56.73	-17.51	59.37	59.37	Begin 2.00°/100' Build
1417.74	15.00	342.85	1406.91	134.98	-41.65	141.26	141.26	Begin 15.00° Tangent
5420.83	15.00	342.85	5273.64	1124.86	-347.12	1177.20	1177.20	Begin 2.00°/100' Drop
6170.72	0.00	0.00	6015.00	1218.11	-375.89	1274.79	1274.79	Begin Vertical Hold
8213.72	0.00	0.00	8058.00	1218.11	-375.89	1274.79	1274.79	PBHL

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4063.00	4167.49	PK
4608.00	4731.71	SX
7148.00	7303.72	NIO
7488.00	7643.72	CD
7573.00	7728.72	GH
7923.00	8078.72	J

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
PBHL v1 - Morton 24-1	6015.00	1218.11	-375.89	40° 4' 47.4744 N	104° 50' 4.857 W



The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented. Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer. MS Energy is not responsible for the accuracy of this schematic or the information contained herein.



## **Anadarko**

**Weld County, Colorado (NAD83)**

**Morton**

**24-1**

**Wellbore #1**

**Survey: MS MWD**

## **Standard Survey Report**

**22 November, 2011**

<b>Company:</b>	Anadarko	<b>Local Co-ordinate Reference:</b>	Well 24-1
<b>Project:</b>	Weld County, Colorado (NAD83)	<b>TVD Reference:</b>	WELL @ 4913.00usft (Xtreme 11)
<b>Site:</b>	Morton	<b>MD Reference:</b>	WELL @ 4913.00usft (Xtreme 11)
<b>Well:</b>	24-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

<b>Project</b>	Weld County, Colorado (NAD83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

<b>Well</b>	24-1				
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	1,271,418.85 usft	<b>Latitude:</b> 40° 4' 35.4364 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	3,186,556.11 usft	<b>Longitude:</b> 104° 50' 0.021 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	usft	<b>Ground Level:</b> 4,898.00 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	WMM_2010	11/17/11	8.81	66.76	52,917

<b>Design</b>	Surveys				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00		342.85

<b>Survey Program</b>	<b>Date</b>	11/22/11			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
102.00	8,237.00	MS MWD (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
102.00	0.50	345.80	102.00	0.43	-0.11	0.44	0.49	0.49	0.00	
191.00	0.30	355.10	191.00	1.04	-0.22	1.06	0.24	-0.22	10.45	
281.00	1.00	357.40	280.99	2.06	-0.28	2.05	0.78	0.78	2.56	
371.00	2.00	352.50	370.96	4.40	-0.52	4.36	1.12	1.11	-5.44	
462.00	3.30	344.70	461.86	8.50	-1.42	8.54	1.48	1.43	-8.57	
553.00	4.30	340.00	552.66	14.23	-3.28	14.57	1.15	1.10	-5.16	
644.00	6.20	339.30	643.27	22.04	-6.18	22.88	2.09	2.09	-0.77	
734.00	7.20	340.00	732.66	31.88	-9.83	33.36	1.11	1.11	0.78	
831.00	7.50	341.20	828.86	43.59	-13.95	45.76	0.35	0.31	1.24	
909.00	7.70	337.00	906.17	53.22	-17.63	56.05	0.76	0.26	-5.38	
1,000.00	9.10	338.40	996.20	65.52	-22.66	69.29	1.55	1.54	1.54	
1,091.00	9.80	338.00	1,085.96	79.39	-28.21	84.18	0.77	0.77	-0.44	
1,182.00	11.20	347.90	1,175.44	95.22	-32.97	100.70	2.50	1.54	10.88	
1,272.00	11.50	343.10	1,263.68	112.35	-37.41	118.38	1.10	0.33	-5.33	

<b>Company:</b>	Anadarko	<b>Local Co-ordinate Reference:</b>	Well 24-1
<b>Project:</b>	Weld County, Colorado (NAD83)	<b>TVD Reference:</b>	WELL @ 4913.00usft (Xtreme 11)
<b>Site:</b>	Morton	<b>MD Reference:</b>	WELL @ 4913.00usft (Xtreme 11)
<b>Well:</b>	24-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,363.00	12.90	346.70	1,352.63	130.91	-42.38	137.59	1.75	1.54	3.96
1,454.00	15.20	343.50	1,440.90	152.24	-48.11	159.66	2.67	2.53	-3.52
1,545.00	16.40	350.00	1,528.47	176.33	-53.73	184.33	2.35	1.32	7.14
1,636.00	17.10	349.80	1,615.61	202.15	-58.33	210.36	0.77	0.77	-0.22
1,726.00	16.40	347.50	1,701.79	227.58	-63.42	236.16	1.07	-0.78	-2.56
1,817.00	17.00	343.00	1,788.95	252.84	-70.09	262.27	1.57	0.66	-4.95
1,908.00	16.80	342.10	1,876.02	278.08	-78.02	288.72	0.36	-0.22	-0.99
1,999.00	16.60	340.20	1,963.19	302.83	-86.47	314.86	0.64	-0.22	-2.09
2,090.00	16.70	341.00	2,050.37	327.42	-95.13	340.91	0.27	0.11	0.88
2,180.00	16.40	337.30	2,136.64	351.37	-104.24	366.48	1.22	-0.33	-4.11
2,271.00	15.80	338.00	2,224.08	374.71	-113.84	391.61	0.69	-0.66	0.77
2,362.00	14.90	336.30	2,311.83	396.91	-123.18	415.58	1.11	-0.99	-1.87
2,453.00	15.30	339.50	2,399.69	418.86	-132.09	439.19	1.02	0.44	3.52
2,543.00	16.00	343.30	2,486.35	441.87	-139.81	463.45	1.38	0.78	4.22
2,634.00	15.70	344.20	2,573.89	465.73	-146.77	488.30	0.43	-0.33	0.99
2,725.00	14.10	341.70	2,661.83	488.10	-153.60	511.69	1.89	-1.76	-2.75
2,816.00	14.10	341.40	2,750.09	509.13	-160.62	533.85	0.08	0.00	-0.33
2,907.00	14.30	340.00	2,838.31	530.20	-168.00	556.16	0.44	0.22	-1.54
2,997.00	16.60	344.20	2,925.05	553.02	-175.30	580.12	2.84	2.56	4.67
3,088.00	16.00	345.30	3,012.40	577.65	-182.02	605.64	0.74	-0.66	1.21
3,179.00	15.70	345.10	3,099.94	601.68	-188.37	630.48	0.34	-0.33	-0.22
3,270.00	15.40	339.10	3,187.61	624.87	-195.85	654.84	1.80	-0.33	-6.59
3,361.00	14.50	340.20	3,275.53	646.88	-204.02	678.28	1.04	-0.99	1.21
3,451.00	14.80	341.60	3,362.60	668.39	-211.46	701.02	0.52	0.33	1.56
3,543.00	15.70	340.50	3,451.36	691.27	-219.33	725.21	1.03	0.98	-1.20
3,633.00	14.90	342.40	3,538.17	713.78	-226.89	748.95	1.05	-0.89	2.11
3,724.00	14.00	338.60	3,626.30	735.18	-234.44	771.62	1.44	-0.99	-4.18
3,815.00	15.70	339.30	3,714.25	756.95	-242.81	794.89	1.88	1.87	0.77
3,906.00	14.90	340.30	3,802.03	779.48	-251.11	818.87	0.93	-0.88	1.10
3,997.00	13.50	341.40	3,890.25	800.56	-258.44	841.18	1.57	-1.54	1.21
4,087.00	14.20	342.10	3,977.63	821.03	-265.19	862.72	0.80	0.78	0.78
4,178.00	13.30	347.40	4,066.02	841.86	-270.90	884.31	1.70	-0.99	5.82
4,269.00	14.70	344.70	4,154.32	863.22	-276.23	906.29	1.70	1.54	-2.97
4,360.00	15.50	347.50	4,242.18	886.22	-281.91	929.95	1.19	0.88	3.08
4,451.00	15.60	349.50	4,329.85	910.13	-286.77	954.22	0.60	0.11	2.20
4,541.00	14.20	348.10	4,416.82	932.83	-291.25	977.23	1.61	-1.56	-1.56
4,632.00	13.80	343.70	4,505.12	954.17	-296.60	999.20	1.25	-0.44	-4.84
4,723.00	13.90	337.20	4,593.48	974.66	-303.88	1,020.93	1.71	0.11	-7.14
4,814.00	14.10	335.20	4,681.78	994.80	-312.77	1,042.80	0.58	0.22	-2.20
4,905.00	16.90	341.70	4,769.46	1,017.43	-321.57	1,067.01	3.62	3.08	7.14
4,995.00	17.50	347.50	4,855.45	1,043.06	-328.61	1,093.58	2.02	0.67	6.44
5,086.00	15.50	343.80	4,942.70	1,068.10	-334.96	1,119.38	2.48	-2.20	-4.07
5,177.00	15.00	345.80	5,030.49	1,091.19	-341.24	1,143.30	0.80	-0.55	2.20
5,268.00	15.30	353.90	5,118.34	1,114.55	-345.41	1,166.84	2.35	0.33	8.90

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<b>Well:</b>	24-1	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,359.00	15.60	354.90	5,206.05	1,138.67	-347.77	1,190.59	0.44	0.33	1.10
5,450.00	14.20	355.30	5,293.99	1,161.99	-349.78	1,213.46	1.54	-1.54	0.44
5,540.00	12.00	352.80	5,381.64	1,182.27	-351.85	1,233.46	2.52	-2.44	-2.78
5,631.00	9.80	354.90	5,471.00	1,199.38	-353.73	1,250.35	2.46	-2.42	2.31
5,722.00	8.40	347.70	5,560.85	1,213.58	-355.83	1,264.55	1.98	-1.54	-7.91
5,812.00	5.50	329.30	5,650.19	1,223.72	-359.44	1,275.30	4.02	-3.22	-20.44
5,903.00	3.90	325.40	5,740.88	1,230.02	-363.42	1,282.49	1.79	-1.76	-4.29
5,994.00	2.20	317.00	5,831.75	1,233.84	-366.37	1,287.01	1.93	-1.87	-9.23
6,085.00	0.40	272.50	5,922.72	1,235.13	-367.88	1,288.69	2.13	-1.98	-48.90
6,176.00	0.30	232.80	6,013.72	1,235.00	-368.38	1,288.72	0.28	-0.11	-43.63
6,266.00	0.40	236.40	6,103.72	1,234.69	-368.83	1,288.55	0.11	0.11	4.00
6,448.00	0.40	277.20	6,285.72	1,234.41	-369.99	1,288.63	0.15	0.00	22.42
6,630.00	0.50	265.60	6,467.71	1,234.43	-371.42	1,289.07	0.07	0.05	-6.37
6,811.00	0.50	266.30	6,648.70	1,234.32	-372.99	1,289.42	0.00	0.00	0.39
6,993.00	0.30	273.40	6,830.70	1,234.30	-374.26	1,289.78	0.11	-0.11	3.90
7,174.00	0.50	261.40	7,011.69	1,234.21	-375.51	1,290.06	0.12	0.11	-6.63
7,356.00	0.70	251.00	7,193.68	1,233.73	-377.35	1,290.14	0.12	0.11	-5.71
7,538.00	0.50	248.60	7,375.67	1,233.08	-379.14	1,290.05	0.11	-0.11	-1.32
7,720.00	0.30	255.30	7,557.67	1,232.67	-380.34	1,290.01	0.11	-0.11	3.68
7,901.00	0.40	108.80	7,738.67	1,232.34	-380.20	1,289.66	0.37	0.06	-80.94
8,083.00	0.30	72.40	7,920.67	1,232.28	-379.14	1,289.29	0.13	-0.05	-20.00
8,192.00	0.30	76.30	8,029.66	1,232.44	-378.60	1,289.27	0.02	0.00	3.58
8,237.00	0.30	76.30	8,074.66	1,232.49	-378.37	1,289.26	0.00	0.00	0.00
Projection to TD-8237.00' MD									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,237.00	8,074.66	1,232.49	-378.37	Projection to TD-8237.00' MD