



Company: Anadarko

Site: Morton

Well: 16-1

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

#### ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	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	159.28	549.45	-14.68	5.55	15.69	15.69	Hold 6.00° Inc
967.84	6.00	159.28	965.00	-55.53	21.01	59.37	59.37	Begin 2.00°/100' Build
1417.73	15.00	159.28	1406.91	-132.12	49.99	141.26	141.26	Begin 15.00° Tangent
3427.95	15.00	159.28	3348.65	-618.67	234.08	661.47	661.47	Begin 2.00°/100' Drop
4177.83	0.00	0.00	4090.00	-709.94	268.61	759.06	759.06	Begin Vertical Hold
8150.83	0.00	0.00	8063.00	-709.94	268.61	759.06	759.06	PBHL



Azimuths to True North  
Magnetic North: 8.81°

Magnetic Field  
Strength: 52920.7snT  
Dip Angle: 66.76°  
Date: 11/05/2011  
Model: WMM\_2010

US State Plane 1983

Colorado Northern Zone

Created By: Megan Pope  
Date: 10:02, November 10 2011  
Plan: Design #1

#### DESIGN TARGET DETAILS

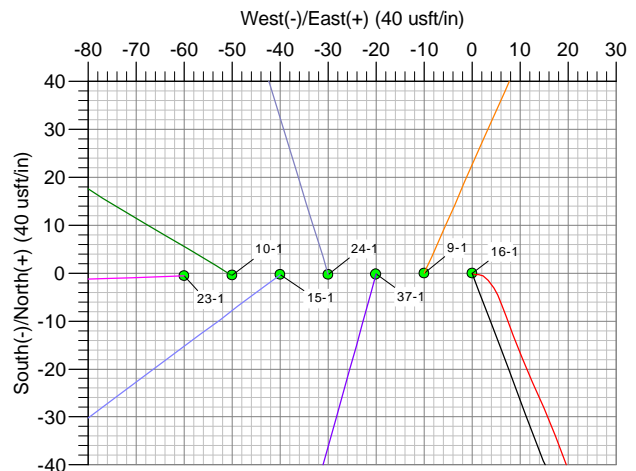
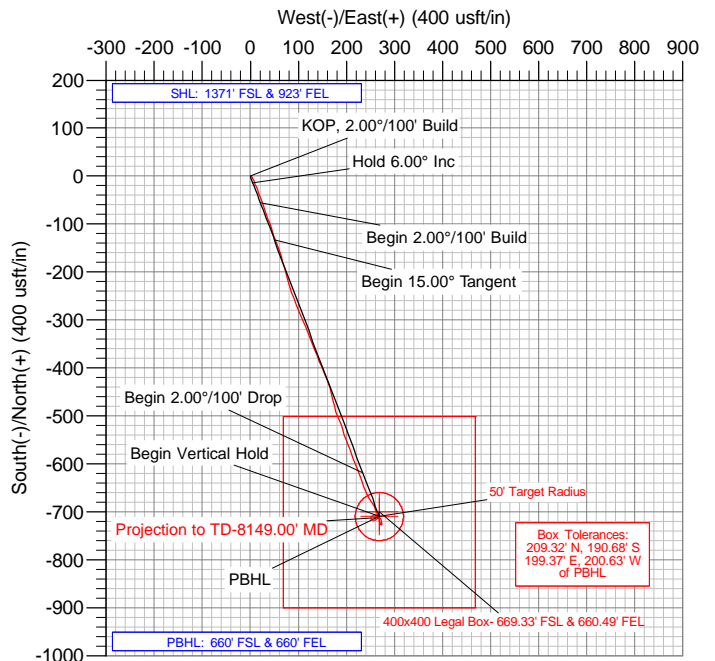
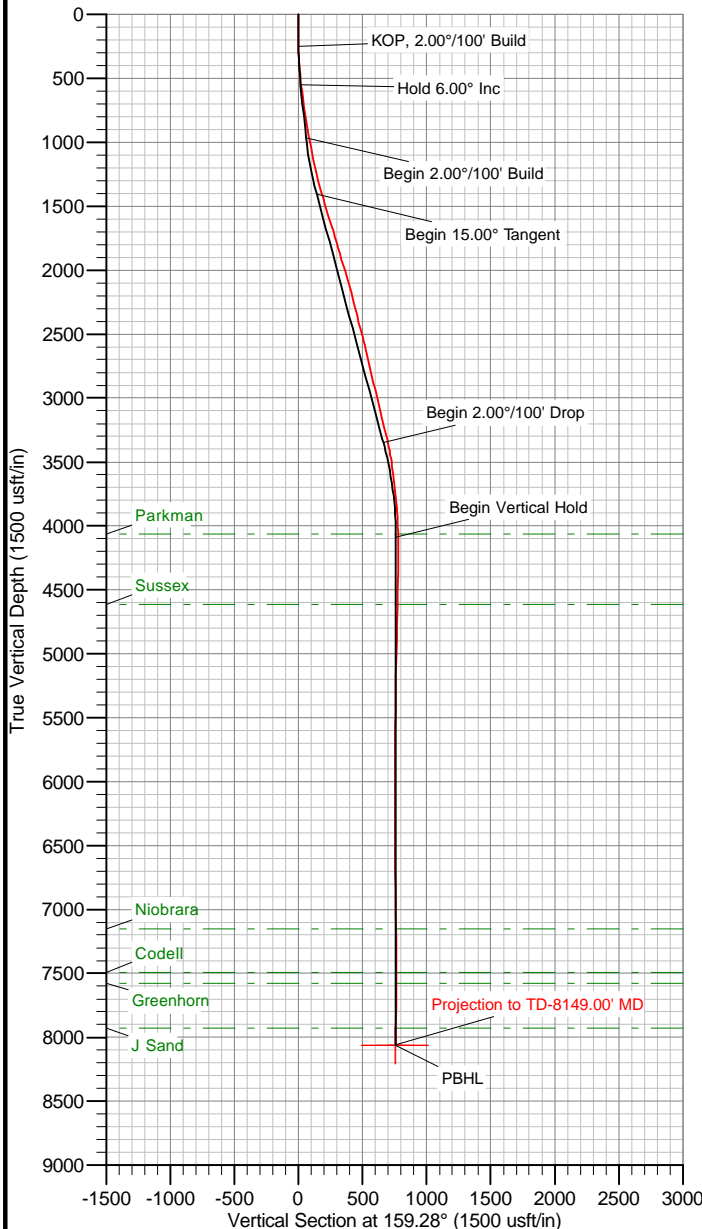
Name	TVD	+N-S	+E-W	Latitude	Longitude
400x400 Legal Box- 669.33' FSL & 660.49' FEL	8063.00	-700.62	268.05	40° 4' 28.5151 N	104° 49' 56.188 W
PBHL v1 - Morton 16-1	8063.00	-709.94	268.61	40° 4' 28.4229 N	104° 49' 56.181 W

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4063.00	4150.83	Parkman
4613.00	4700.83	Sussex
7153.00	7240.83	Niobrara
7493.00	7580.83	Codell
7578.00	7665.83	Greenhorn
7928.00	8015.83	J Sand

#### SURFACE LOCATION

Northing: 1271419.34  
Easting: 3186586.05  
Latitude: 40° 4' 35.4390 N  
Longitude: 104° 49' 59.636 W  
Ground Elevation: 4898.00  
WELL @ 4913.00usft (Xtreme 11)



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**

**16-1**

**Wellbore #1**

**Survey: MS MWD**

## **Standard Survey Report**

**10 November, 2011**

<b>Company:</b>	Anadarko	<b>Local Co-ordinate Reference:</b>	Well 16-1
<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>	16-1	<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		

Well	16-1					
Well Position	+N/-S	0.00 usft	Northing:	1,271,419.34 usft	Latitude:	40° 4' 35.4390 N
	+E/-W	0.00 usft	Easting:	3,186,586.05 usft	Longitude:	104° 49' 59.636 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	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	11/05/11	8.81	66.76	52,921

<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	159.28	

<b>Survey Program</b>	<b>Date</b>	11/10/11			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
103.00	8,149.00	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	
103.00	0.30	137.80	103.00	-0.20	0.18	0.25	0.29	0.29	0.00	
192.00	0.60	69.80	192.00	-0.21	0.77	0.47	0.63	0.34	-76.40	
282.00	1.50	118.10	281.98	-0.60	2.26	1.36	1.32	1.00	53.67	
372.00	2.90	149.30	371.92	-3.12	4.46	4.49	1.99	1.56	34.67	
463.00	5.10	160.20	462.69	-8.90	7.00	10.80	2.55	2.42	11.98	
554.00	6.70	157.90	553.21	-17.63	10.37	20.16	1.78	1.76	-2.53	
645.00	7.70	155.90	643.49	-28.11	14.86	31.55	1.13	1.10	-2.20	
736.00	9.00	160.50	733.52	-40.39	19.72	44.75	1.61	1.43	5.05	
827.00	9.50	160.50	823.34	-54.17	24.61	59.38	0.55	0.55	0.00	
955.00	9.70	160.90	949.55	-74.32	31.66	80.72	0.16	0.16	0.31	
1,046.00	10.90	158.60	1,039.08	-89.58	37.31	96.98	1.39	1.32	-2.53	
1,137.00	11.80	162.10	1,128.30	-106.44	43.31	114.88	1.25	0.99	3.85	
1,228.00	12.80	160.50	1,217.21	-124.80	49.53	134.25	1.16	1.10	-1.76	
1,319.00	14.50	159.60	1,305.64	-144.98	56.87	155.72	1.88	1.87	-0.99	

<b>Company:</b>	Anadarko	<b>Local Co-ordinate Reference:</b>	Well 16-1
<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>	16-1	<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)	
1,409.00	15.40	162.60	1,392.59	-166.94	64.37	178.92	1.32	1.00	3.33	
1,500.00	17.20	165.40	1,479.93	-191.50	71.38	204.36	2.16	1.98	3.08	
1,591.00	17.00	165.10	1,566.91	-217.37	78.19	230.98	0.24	-0.22	-0.33	
1,682.00	17.30	159.80	1,653.87	-242.93	86.28	257.74	1.75	0.33	-5.82	
1,773.00	15.80	157.50	1,741.09	-267.07	95.70	283.66	1.80	-1.65	-2.53	
1,863.00	17.10	156.80	1,827.41	-290.56	105.60	309.12	1.46	1.44	-0.78	
1,954.00	16.10	158.90	1,914.62	-314.63	115.41	335.11	1.28	-1.10	2.31	
2,045.00	16.60	158.40	2,001.94	-338.48	124.74	360.72	0.57	0.55	-0.55	
2,136.00	16.60	156.80	2,089.14	-362.52	134.64	386.71	0.50	0.00	-1.76	
2,226.00	15.70	160.00	2,175.59	-385.78	143.87	411.73	1.41	-1.00	3.56	
2,317.00	13.90	157.70	2,263.57	-407.46	152.23	434.97	2.08	-1.98	-2.53	
2,408.00	13.30	156.30	2,352.02	-427.16	160.59	456.35	0.75	-0.66	-1.54	
2,499.00	14.80	165.60	2,440.31	-448.01	167.69	478.36	2.97	1.65	10.22	
2,590.00	15.10	167.70	2,528.23	-470.85	173.10	501.64	0.68	0.33	2.31	
2,680.00	13.10	162.10	2,615.51	-492.01	178.74	523.42	2.69	-2.22	-6.22	
2,771.00	12.70	156.60	2,704.22	-511.00	185.88	543.72	1.42	-0.44	-6.04	
2,862.00	12.50	162.60	2,793.03	-529.58	192.80	563.54	1.45	-0.22	6.59	
2,953.00	14.40	161.40	2,881.53	-549.70	199.35	584.68	2.11	2.09	-1.32	
3,044.00	13.00	157.20	2,969.94	-569.87	206.93	606.22	1.89	-1.54	-4.62	
3,135.00	12.80	160.20	3,058.65	-588.79	214.31	626.53	0.77	-0.22	3.30	
3,226.00	14.20	158.40	3,147.13	-608.65	221.83	647.77	1.61	1.54	-1.98	
3,317.00	13.90	160.00	3,235.41	-629.30	229.68	669.86	0.54	-0.33	1.76	
3,407.00	13.10	158.60	3,322.92	-648.95	237.10	690.87	0.96	-0.89	-1.56	
3,498.00	11.00	154.00	3,411.91	-666.36	244.67	709.82	2.54	-2.31	-5.05	
3,589.00	9.40	145.60	3,501.48	-680.30	252.67	725.69	2.40	-1.76	-9.23	
3,680.00	7.10	157.50	3,591.54	-691.63	259.03	738.54	3.14	-2.53	13.08	
3,770.00	6.00	154.90	3,680.95	-701.03	263.15	748.79	1.27	-1.22	-2.89	
3,861.00	5.00	148.60	3,771.53	-708.72	267.23	757.43	1.28	-1.10	-6.92	
3,952.00	4.90	152.20	3,862.19	-715.54	271.11	765.18	0.36	-0.11	3.96	
4,042.00	3.80	177.00	3,951.94	-721.92	273.06	771.84	2.39	-1.22	27.56	
4,133.00	1.30	140.30	4,042.84	-725.73	273.88	775.68	3.15	-2.75	-40.33	
4,224.00	1.00	259.50	4,133.83	-726.66	273.76	776.52	2.19	-0.33	130.99	
4,315.00	0.50	241.00	4,224.83	-727.00	272.63	776.44	0.60	-0.55	-20.33	
4,450.00	0.50	266.90	4,359.82	-727.32	271.53	776.34	0.17	0.00	19.19	
4,587.00	1.20	354.70	4,496.81	-725.92	270.80	774.78	0.94	0.51	64.09	
4,723.00	1.40	339.10	4,632.78	-722.95	270.07	771.74	0.30	0.15	-11.47	
4,859.00	1.40	340.30	4,768.73	-719.84	268.92	768.42	0.02	0.00	0.88	
4,995.00	1.40	4.20	4,904.70	-716.62	268.48	765.25	0.43	0.00	17.57	
5,131.00	1.30	339.30	5,040.66	-713.52	268.06	762.20	0.43	-0.07	-18.31	
5,266.00	1.00	322.40	5,175.63	-711.15	266.80	759.55	0.33	-0.22	-12.52	
5,404.00	0.80	312.60	5,313.61	-709.54	265.35	757.53	0.18	-0.14	-7.10	
5,539.00	1.10	301.00	5,448.60	-708.24	263.55	755.67	0.26	0.22	-8.59	
5,675.00	1.00	288.10	5,584.57	-707.20	261.30	753.90	0.19	-0.07	-9.49	
5,812.00	0.80	272.80	5,721.56	-706.78	259.21	752.77	0.23	-0.15	-11.17	

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<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

Survey										
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5,948.00	0.50	261.80	5,857.55	-706.82	257.67	752.27	0.24	-0.22	-8.09	
6,084.00	0.40	239.60	5,993.54	-707.14	256.68	752.22	0.15	-0.07	-16.32	
6,220.00	0.50	242.10	6,129.54	-707.66	255.74	752.37	0.07	0.07	1.84	
6,356.00	0.50	239.40	6,265.53	-708.24	254.71	752.55	0.02	0.00	-1.99	
6,492.00	0.50	241.00	6,401.53	-708.83	253.68	752.73	0.01	0.00	1.18	
6,629.00	0.60	243.80	6,538.52	-709.44	252.51	752.89	0.08	0.07	2.04	
6,765.00	0.90	213.20	6,674.51	-710.64	251.29	753.59	0.36	0.22	-22.50	
6,946.00	1.50	174.00	6,855.47	-714.19	250.76	756.71	0.54	0.33	-21.66	
7,128.00	1.30	106.00	7,037.43	-717.13	252.99	760.25	0.87	-0.11	-37.36	
7,309.00	1.40	88.10	7,218.38	-717.62	257.17	762.19	0.24	0.06	-9.89	
7,491.00	1.10	65.60	7,400.34	-716.83	260.99	762.80	0.31	-0.16	-12.36	
7,673.00	0.90	59.60	7,582.31	-715.38	263.81	762.45	0.12	-0.11	-3.30	
7,854.00	0.60	36.40	7,763.30	-713.90	265.60	761.69	0.23	-0.17	-12.82	
8,036.00	0.60	20.20	7,945.29	-712.24	266.49	760.46	0.09	0.00	-8.90	
8,104.00	0.40	11.60	8,013.28	-711.67	266.67	759.99	0.31	-0.29	-12.65	
8,149.00	0.40	11.60	8,058.28	-711.36	266.73	759.72	0.00	0.00	0.00	
Projection to TD-8149.00' MD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
8,149.00	8,058.28	-711.36	266.73	Projection to TD-8149.00' MD	