



Mostar Directional Technologies Inc.

Survey Report



Company:	Williams Production	Local Co-ordinate Reference:	Well GM 444-31 - Slot B6
Project:	GV 31-06S-096W	TVD Reference:	KELLY BUSHING @ 6124.0ft (H&P 280 (24
Site:	GM 333-31 Pad	MD Reference:	KELLY BUSHING @ 6124.0ft (H&P 280 (24
Well:	GM 444-31	North Reference:	True
Wellbore:	11-01-006	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled Wellpath	Database:	EDM

Project	GV 31-06S-096W, Garfield County, CO, 31-06S-096W		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		Using geodetic scale factor

Site		GM 333-31 Pad				
Site Position:		Northing:	1,610,367.10 ft	Latitude:	39° 28' 45.634 N	
From:	Map	Easting:	2,252,834.10 ft	Longitude:	108° 8' 50.606 W	
Position Uncertainty:		0.0 ft	Slot Radius:	13-3/16"	Grid Convergence:	-1.67 °

Well	GM 444-31 - Slot B6					
Well Position	+N/-S	0.0 ft	Northing:	1,610,350.00 ft	Latitude:	39° 28' 45.455 N
	+E/-W	0.0 ft	Easting:	2,252,799.40 ft	Longitude:	108° 8' 51.042 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,100.0 ft

Wellbore	11-01-006				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2009/12/31	10.58	65.75	52,395

Design		As Drilled Wellpath		
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	164.23

Survey Program	Date 2011/01/28				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
70.0	4,270.0	Survey Jan.25.11 (11-01-006)	MWD	MWD - Standard	
4,364.0	5,308.0	Survey Jan.26.11 (11-01-006)	MWD	MWD - Standard	
5,403.0	6,158.0	Survey Jan.27.11 (11-01-006)	MWD	MWD - Standard	
6,252.0	7,315.0	Survey Jan.28.11 (11-01-006)	MWD	MWD - Standard	

Survey	MD (ft)	Inc (°)	Azi (°)	TVD Vertical	SS (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section	D'Leg (°/100ft)	Build (°/100ft)	Turn (°/100ft)
	0.0	0.00	0.00	0.0	6,124.01	0.0	0.0	0.0	0.00	0.00	0.00
	70.0	0.44	24.70	70.0	6,054.01	0.2	0.1	-0.2	0.63	0.63	0.00
	161.0	2.55	183.78	161.0	5,963.04	-1.5	0.1	1.4	3.26	2.32	174.81
	252.0	5.19	174.73	251.8	5,872.25	-7.6	0.4	7.4	2.97	2.90	-9.95
	343.0	8.45	166.99	342.1	5,781.91	-18.2	2.3	18.1	3.71	3.58	-8.51
	434.0	10.47	163.56	431.9	5,692.15	-32.6	6.1	33.1	2.30	2.22	-3.77
	515.0	13.00	162.00	511.2	5,612.85	-48.4	11.0	49.5	3.15	3.12	-1.93
	606.0	15.90	162.90	599.3	5,524.74	-70.0	17.8	72.2	3.20	3.19	0.99
	697.0	18.90	162.50	686.1	5,437.91	-96.0	25.9	99.4	3.30	3.30	-0.44
	788.0	21.10	165.20	771.6	5,352.40	-125.9	34.5	130.5	2.62	2.42	2.97
	880.0	24.50	165.70	856.4	5,267.60	-160.4	43.5	166.2	3.70	3.70	0.54
	971.0	27.20	162.20	938.3	5,185.71	-198.5	54.5	205.8	3.41	2.97	-3.85
	1,066.0	30.70	162.00	1,021.4	5,102.59	-242.2	68.6	251.8	3.69	3.68	-0.21



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Ingenium takes energy™

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Site:	GM 333-31 Pad	MD Reference:	KELLY BUSHING @ 6124.0ft (H&P 280 (24
Well:	GM 444-31	North Reference:	True
Wellbore:	11-01-006	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled Wellpath	Database:	EDM

Survey MD (ft)	Inc (°)	Azi (°)	TVD Vertical	SS (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section	D'Leg (°/100ft)	Build (°/100ft)	Turn (°/100ft)
1,160.0	32.20	164.30	1,101.6	5,022.40	-289.2	82.8	300.8	2.04	1.60	2.45
1,254.0	32.00	165.50	1,181.2	4,942.77	-337.4	95.9	350.8	0.71	-0.21	1.28
1,348.0	32.60	164.50	1,260.7	4,863.32	-385.9	108.9	401.0	0.85	0.64	-1.06
1,443.0	33.30	165.20	1,340.4	4,783.60	-435.8	122.4	452.6	0.84	0.74	0.74
1,537.0	33.80	166.20	1,418.8	4,705.26	-486.1	135.2	504.6	0.79	0.53	1.06
1,631.0	33.90	165.90	1,496.8	4,627.19	-537.0	147.8	556.9	0.21	0.11	-0.32
1,726.0	33.40	164.50	1,575.9	4,548.11	-587.8	161.2	609.5	0.97	-0.53	-1.47
1,820.0	33.70	163.90	1,654.2	4,469.77	-637.8	175.4	661.5	0.48	0.32	-0.64
1,914.0	34.60	164.10	1,732.0	4,391.98	-688.6	189.9	714.3	0.96	0.96	0.21
2,009.0	34.30	164.50	1,810.4	4,313.64	-740.3	204.5	768.0	0.40	-0.32	0.42
2,103.0	32.60	163.20	1,888.8	4,235.21	-790.1	218.9	819.8	1.96	-1.81	-1.38
2,197.0	32.40	162.70	1,968.1	4,155.93	-838.3	233.7	870.3	0.36	-0.21	-0.53
2,291.0	31.10	163.40	2,048.0	4,076.00	-885.7	248.1	919.8	1.44	-1.38	0.74
2,386.0	31.50	164.80	2,129.2	3,994.82	-933.1	261.6	969.1	0.87	0.42	1.47
2,480.0	31.60	166.60	2,209.3	3,914.72	-980.8	273.8	1,018.3	1.01	0.11	1.91
2,574.0	31.70	167.80	2,289.3	3,834.69	-1,028.9	284.7	1,067.5	0.68	0.11	1.28
2,669.0	31.30	168.30	2,370.3	3,753.69	-1,077.4	295.0	1,117.0	0.50	-0.42	0.53
2,726.0	31.20	168.50	2,419.0	3,704.96	-1,106.4	300.9	1,146.5	0.25	-0.18	0.35
2,796.0	32.10	169.90	2,478.6	3,645.37	-1,142.5	307.8	1,183.1	1.66	1.29	2.00
2,856.0	32.40	168.80	2,529.4	3,594.63	-1,173.9	313.7	1,215.0	1.10	0.50	-1.83
2,951.0	33.00	165.90	2,609.3	3,514.68	-1,224.0	325.0	1,266.3	1.77	0.63	-3.05
3,045.0	32.60	164.30	2,688.3	3,435.67	-1,273.2	338.1	1,317.2	1.02	-0.43	-1.70
3,139.0	32.60	162.00	2,767.5	3,356.47	-1,321.7	352.7	1,367.8	1.32	0.00	-2.45
3,234.0	32.00	161.30	2,847.8	3,276.17	-1,369.9	368.7	1,418.5	0.74	-0.63	-0.74
3,328.0	31.90	162.00	2,927.6	3,196.41	-1,417.1	384.4	1,468.2	0.41	-0.11	0.74
3,422.0	33.20	161.30	3,006.8	3,117.18	-1,465.1	400.3	1,518.7	1.44	1.38	-0.74
3,517.0	33.90	161.50	3,086.0	3,038.01	-1,514.8	417.0	1,571.2	0.75	0.74	0.21
3,611.0	33.90	162.50	3,164.0	2,959.98	-1,564.7	433.2	1,623.5	0.59	0.00	1.06
3,705.0	32.80	162.20	3,242.5	2,881.47	-1,613.9	448.9	1,675.2	1.18	-1.17	-0.32
3,799.0	31.20	162.90	3,322.3	2,801.75	-1,661.4	463.9	1,725.0	1.75	-1.70	0.74
3,894.0	29.00	161.80	3,404.4	2,719.57	-1,706.8	478.3	1,772.6	2.39	-2.32	-1.16
3,988.0	28.70	161.80	3,486.8	2,637.23	-1,749.9	492.5	1,817.9	0.32	-0.32	0.00
4,082.0	26.10	160.90	3,570.2	2,553.78	-1,790.9	506.3	1,861.1	2.80	-2.77	-0.96
4,176.0	24.30	161.80	3,655.3	2,468.73	-1,828.8	519.1	1,901.1	1.96	-1.91	0.96
4,270.0	22.60	162.70	3,741.5	2,382.50	-1,864.5	530.5	1,938.5	1.85	-1.81	0.96
4,364.0	21.40	161.50	3,828.7	2,295.35	-1,898.0	541.3	1,973.6	1.36	-1.28	-1.28
4,459.0	20.40	160.80	3,917.4	2,206.60	-1,930.0	552.3	2,007.5	1.08	-1.05	-0.74
4,553.0	18.30	160.80	4,006.1	2,117.91	-1,959.5	562.5	2,038.6	2.23	-2.23	0.00
4,647.0	15.70	160.60	4,096.0	2,028.03	-1,985.4	571.6	2,066.0	2.77	-2.77	-0.21
4,742.0	14.30	161.10	4,187.7	1,936.27	-2,008.6	579.6	2,090.5	1.48	-1.47	0.53
4,836.0	12.20	158.80	4,279.2	1,844.77	-2,028.9	587.0	2,112.0	2.30	-2.23	-2.45
4,931.0	9.40	161.10	4,372.5	1,751.46	-2,045.6	593.1	2,129.8	2.98	-2.95	2.42
5,025.0	7.00	165.50	4,465.6	1,658.43	-2,058.4	597.1	2,143.2	2.64	-2.55	4.68
5,120.0	5.00	167.10	4,560.1	1,563.96	-2,068.0	599.4	2,153.1	2.11	-2.11	1.68
5,214.0	1.60	159.00	4,653.9	1,470.12	-2,073.2	600.8	2,158.5	3.64	-3.62	-8.62
5,308.0	0.30	258.30	4,747.9	1,376.14	-2,074.5	601.0	2,159.8	1.78	-1.38	105.64
5,403.0	0.10	232.70	4,842.9	1,281.14	-2,074.6	600.7	2,159.8	0.23	-0.21	-26.95
5,497.0	0.30	1.70	4,936.9	1,187.14	-2,074.4	600.7	2,159.6	0.39	0.21	137.23
5,591.0	0.40	137.60	5,030.9	1,093.14	-2,074.4	600.9	2,159.6	0.69	0.11	144.57
5,686.0	0.50	242.50	5,125.9	998.14	-2,074.8	600.8	2,160.0	0.75	0.11	110.42
5,780.0	0.60	225.10	5,219.9	904.14	-2,075.4	600.1	2,160.3	0.21	0.11	-18.51
5,874.0	1.20	252.50	5,313.9	810.15	-2,076.0	598.8	2,160.6	0.77	0.64	29.15
5,969.0	1.20	262.70	5,408.8	715.18	-2,076.5	596.8	2,160.5	0.22	0.00	10.74
6,063.0	0.40	221.10	5,502.8	621.18	-2,076.8	595.6	2,160.5	1.00	-0.85	-44.26
6,158.0	0.10	348.80	5,597.8	526.18	-2,077.0	595.4	2,160.6	0.49	-0.32	134.42



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Project:	GV 31-06S-096W	TVD Reference:	KELLY BUSHING @ 6124.0ft (H&P 280 (24
Site:	GM 333-31 Pad	MD Reference:	KELLY BUSHING @ 6124.0ft (H&P 280 (24
Well:	GM 444-31	North Reference:	True
Wellbore:	11-01-006	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled Wellpath	Database:	EDM

Survey MD (ft)	Inc (°)	Azi (°)	TVD Vertical	SS (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section	D'Leg (°/100ft)	Build (°/100ft)	Turn (°/100ft)
6,252.0	0.60	154.30	5,691.8	432.19	-2,077.4	595.6	2,161.0	0.74	0.53	176.06
6,347.0	0.30	286.10	5,786.8	337.19	-2,077.7	595.6	2,161.4	0.87	-0.32	138.74
6,441.0	0.60	210.50	5,880.8	243.19	-2,078.1	595.1	2,161.6	0.64	0.32	-80.43
6,535.0	0.90	220.00	5,974.8	149.20	-2,079.1	594.4	2,162.4	0.34	0.32	10.11
6,630.0	0.40	134.00	6,069.8	54.20	-2,079.9	594.1	2,163.1	1.01	-0.53	-90.53
6,724.0	1.00	80.30	6,163.8	-39.79	-2,080.0	595.2	2,163.4	0.88	0.64	-57.13
6,818.0	0.60	37.00	6,257.8	-133.78	-2,079.4	596.3	2,163.2	0.74	-0.43	-46.06
6,912.0	0.60	272.40	6,351.8	-227.78	-2,079.0	596.1	2,162.8	1.13	0.00	-132.55
7,007.0	1.70	246.90	6,446.8	-322.76	-2,079.6	594.3	2,162.8	1.25	1.16	-26.84
7,101.0	2.60	237.20	6,540.7	-416.69	-2,081.3	591.2	2,163.6	1.03	0.96	-10.32
7,196.0	3.30	227.40	6,635.6	-511.57	-2,084.3	587.4	2,165.5	0.91	0.74	-10.32
7,270.0	3.50	218.90	6,709.5	-585.44	-2,087.5	584.4	2,167.7	0.73	0.27	-11.49
Extrapolated to TD										
7,315.0	3.50	218.90	6,754.4	-630.34	-2,089.6	582.7	2,169.3	0.00	0.00	0.00

Targets										
Target Name										
- hit/miss target	Dip Angle	Dip Dir.	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude	
- Shape										
Top of Gas (25' Radius) C	0.00	0.00	4,867.0	-2,084.4	588.6	1,608,249.40	2,253,327.00	39° 28' 24.854 N	108° 8' 43.536 W	
- actual wellpath misses by 15.6ft at 5427.1ft MD (4867.0 TVD, -2074.6 N, 600.7 E)										
- Circle (radius 25.0)										

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,315.0	6,754.4	-2,089.6	582.7	Extrapolated to TD	