



# **Catamount Energy Partners**

**LA PLATA COUNTY, COLORADO**

**S6-T33N-R8W**

**IGW 123B**

**OH**

**Design: FINAL**

## **Standard Survey Report**

**04 December, 2017**

# Catamount Energy Partners

## PROJECT DETAILS: LA PLATA COUNTY, COLORADO

Geodetic System: US State Plane 1983

Datum: North American Datum 1983

Ellipsoid: GRS 1980

Zone: Colorado Southern Zone

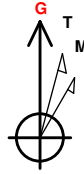
North Reference: Grid

System Datum: Mean Sea Level

To convert a True Direction to a Grid Direction, Add 1.39°

To convert a Magnetic Direction to a True Direction, Add 9.15° East

To convert a Magnetic Direction to a Grid Direction, Add 10.54°



Azimuths to Grid North  
True North: 1.39°  
Magnetic North: 10.54°

Magnetic Field  
Strength: 50316.4snT  
Dip Angle: 63.64°  
Date: 11/30/2017  
Model: IGRF2010

Project: LA PLATA COUNTY, COLORADO

Site: S6-T33N-R8W

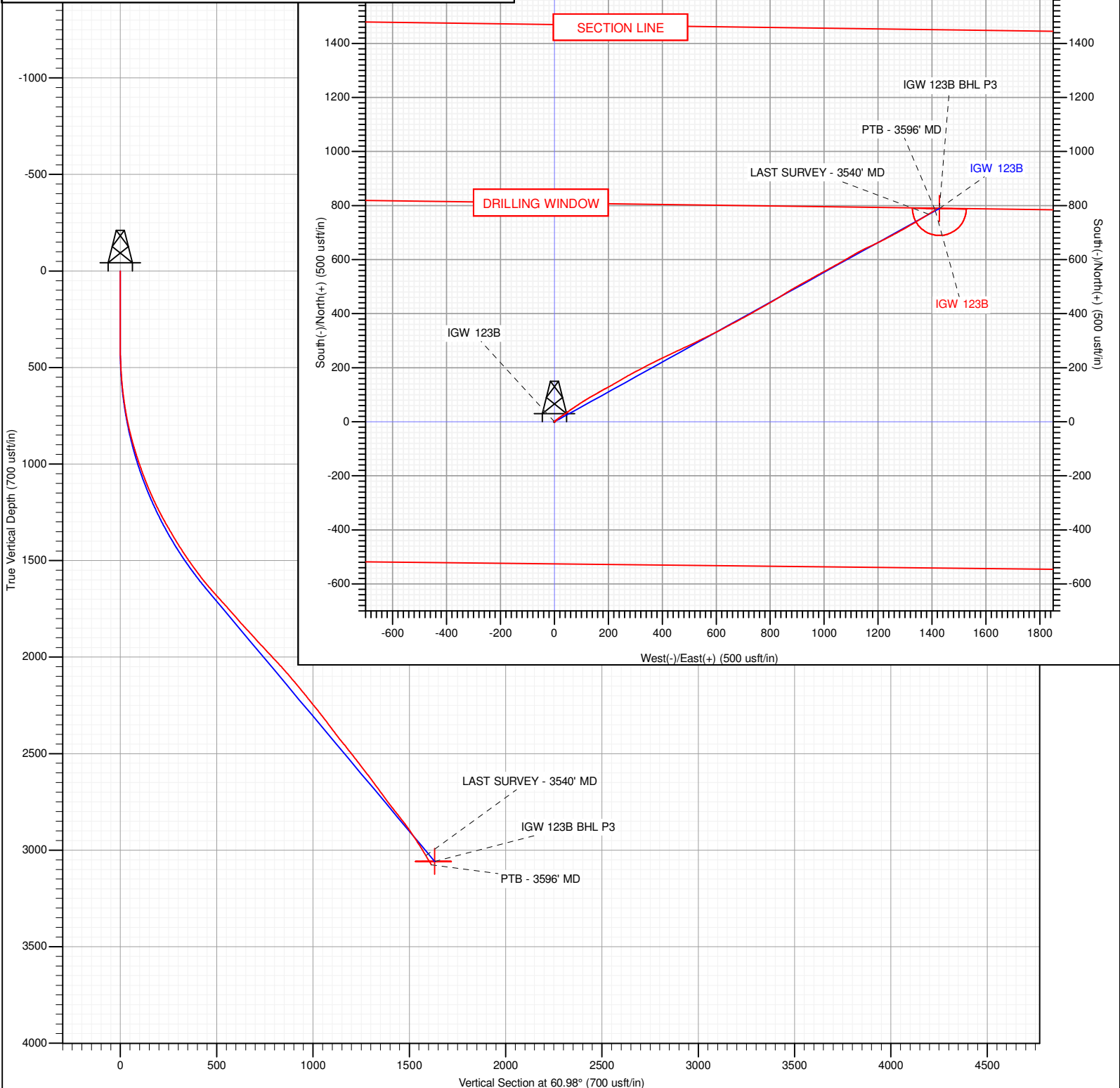
Well: IGW 123B

Wellbore: OH

Design: FINAL

## WELL DETAILS: IGW 123B

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1176283.69	2340257.50	37.128850	-107.763140





# TRU-Drill Directional Survey Report

<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well IGW 123B
<b>Project:</b>	LA PLATA COUNTY, COLORADO	<b>TVD Reference:</b>	16' KB @ 6472.0usft
<b>Site:</b>	S6-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6472.0usft
<b>Well:</b>	IGW 123B	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	EDM 5000.1 Single User Db

<b>Project</b>	LA PLATA COUNTY, COLORADO		
<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 Southern Zone		

Site		S6-T33N-R8W						
Site Position:		Northing:	1,176,283.70	usft	Latitude:	37.128850		
From:	Lat/Long	Easting:	2,340,257.50	usft	Longitude:	-107.763140		
Position Uncertainty:	0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	-1.39	°

Well	IGW 123B					
Well Position	+N/-S	0.0 usft	Northing:	1,176,283.69 usft	Latitude:	37.128850
	+E/-W	0.0 usft	Easting:	2,340,257.50 usft	Longitude:	-107.763140
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	6,456.0 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	11/30/17	9.15	63.64	50,316

<b>Design</b>	FINAL				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	60.98	

<b>Survey Program</b>	<b>Date</b>	12/04/17			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
375.0	3,596.0	Survey #1 (OH)	MWD	MWD v3:standard declination	

<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>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
375.0	0.00	360.00	375.0	0.0	0.0	0.0	0.00	0.00	0.00	
420.0	0.44	116.38	420.0	-0.1	0.2	0.1	0.98	0.98	0.00	
481.0	2.73	44.94	481.0	0.8	1.4	1.6	4.30	3.75	-117.11	
539.0	4.08	45.51	538.9	3.3	3.8	4.9	2.33	2.33	0.98	
599.0	5.89	48.56	598.6	6.8	7.7	10.0	3.05	3.02	5.08	
659.0	7.62	51.06	658.2	11.3	13.1	16.9	2.92	2.88	4.17	
719.0	9.27	55.31	717.6	16.6	20.1	25.7	2.94	2.75	7.08	
781.0	11.63	57.35	778.5	22.8	29.5	36.9	3.85	3.81	3.29	
841.0	13.94	54.93	837.0	30.2	40.5	50.1	3.95	3.85	-4.03	



# TRU-Drill Directional Survey Report

<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well IGW 123B
<b>Project:</b>	LA PLATA COUNTY, COLORADO	<b>TVD Reference:</b>	16' KB @ 6472.0usft
<b>Site:</b>	S6-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6472.0usft
<b>Well:</b>	IGW 123B	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	EDM 5000.1 Single User Db

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)
904.0	15.99	54.10	897.9	39.7	53.8	66.3	3.27	3.25	-1.32
966.0	18.00	55.71	957.2	50.1	68.6	84.3	3.33	3.24	2.60
1,029.0	19.50	56.56	1,016.9	61.4	85.4	104.5	2.42	2.38	1.35
1,090.0	20.69	57.21	1,074.1	72.8	103.0	125.4	1.98	1.95	1.07
1,150.0	23.13	58.51	1,129.8	84.7	121.9	147.7	4.15	4.07	2.17
1,213.0	25.14	61.27	1,187.3	97.6	144.2	173.5	3.66	3.19	4.38
1,276.0	26.91	59.82	1,243.9	111.2	168.3	201.1	2.99	2.81	-2.30
1,338.0	29.81	62.48	1,298.5	125.4	194.1	230.5	5.10	4.68	4.29
1,401.0	29.97	59.62	1,353.1	140.6	221.5	261.9	2.28	0.25	-4.54
1,464.0	31.86	59.63	1,407.1	156.9	249.5	294.3	3.00	3.00	0.02
1,527.0	33.20	60.91	1,460.2	173.7	278.9	328.2	2.39	2.13	2.03
1,588.0	35.53	62.62	1,510.6	190.0	309.2	362.6	4.13	3.82	2.80
1,651.0	36.81	62.40	1,561.5	207.2	342.2	399.7	2.04	2.03	-0.35
1,714.0	39.29	64.28	1,611.1	224.6	376.9	438.5	4.34	3.94	2.98
1,775.0	41.26	64.41	1,657.6	241.6	412.5	477.9	3.23	3.23	0.21
1,838.0	42.66	64.81	1,704.4	259.7	450.5	519.9	2.26	2.22	0.63
1,901.0	41.44	64.46	1,751.2	277.8	488.6	562.0	1.97	-1.94	-0.56
1,962.0	41.43	64.39	1,797.0	295.2	525.1	602.3	0.08	-0.02	-0.11
2,024.0	42.67	64.09	1,843.0	313.3	562.4	643.8	2.03	2.00	-0.48
2,086.0	42.30	62.89	1,888.7	331.9	599.9	685.6	1.44	-0.60	-1.94
2,149.0	42.75	62.36	1,935.1	351.5	637.7	728.2	0.91	0.71	-0.84
2,212.0	43.57	61.92	1,981.1	371.7	675.8	771.3	1.39	1.30	-0.70
2,275.0	42.44	61.16	2,027.2	392.1	713.6	814.2	1.97	-1.79	-1.21
2,338.0	41.80	60.46	2,073.9	412.7	750.5	856.5	1.26	-1.02	-1.11
2,401.0	40.45	60.46	2,121.4	433.2	786.5	897.9	2.14	-2.14	0.00
2,463.0	39.44	59.03	2,168.9	453.2	820.9	937.7	2.20	-1.63	-2.31
2,524.0	38.47	57.76	2,216.3	473.3	853.6	976.0	2.06	-1.59	-2.08
2,586.0	39.63	59.93	2,264.5	493.5	887.0	1,015.1	2.89	1.87	3.50
2,649.0	37.57	61.53	2,313.7	512.7	921.3	1,054.4	3.63	-3.27	2.54
2,712.0	36.35	60.67	2,364.1	531.0	954.5	1,092.2	2.10	-1.94	-1.37
2,774.0	38.21	61.19	2,413.4	549.3	987.3	1,129.8	3.04	3.00	0.84
2,832.0	39.13	61.80	2,458.7	566.6	1,019.1	1,166.0	1.72	1.59	1.05
2,895.0	38.02	61.24	2,507.9	585.3	1,053.7	1,205.3	1.85	-1.76	-0.89
2,958.0	37.80	58.88	2,557.6	604.6	1,087.2	1,244.0	2.33	-0.35	-3.75
3,021.0	37.70	60.54	2,607.4	624.1	1,120.5	1,282.6	1.62	-0.16	2.63
3,081.0	36.11	64.72	2,655.4	640.6	1,152.5	1,318.6	4.95	-2.65	6.97
3,143.0	36.65	64.77	2,705.3	656.3	1,185.7	1,355.3	0.87	0.87	0.08
3,205.0	36.67	63.38	2,755.1	672.5	1,219.0	1,392.2	1.34	0.03	-2.24
3,269.0	38.76	62.02	2,805.7	690.5	1,253.8	1,431.3	3.51	3.27	-2.13
3,330.0	37.88	60.66	2,853.6	708.6	1,287.0	1,469.2	2.00	-1.44	-2.23
3,393.0	34.35	59.73	2,904.4	727.1	1,319.2	1,506.3	5.67	-5.60	-1.48
3,455.0	32.93	59.10	2,956.1	744.5	1,348.8	1,540.6	2.36	-2.29	-1.02
3,540.0	31.21	58.04	3,028.1	768.1	1,387.3	1,585.7	2.13	-2.02	-1.25
LAST SURVEY - 3540' MD									



TRU-Drill Directional  
Survey Report

Company:	Catamount Energy Partners	Local Co-ordinate Reference:	Well IGW 123B
Project:	LA PLATA COUNTY, COLORADO	TVD Reference:	16' KB @ 6472.0usft
Site:	S6-T33N-R8W	MD Reference:	16' KB @ 6472.0usft
Well:	IGW 123B	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	EDM 5000.1 Single User Db

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)	
3,596.0	30.70	58.04	3,076.1	783.3	1,411.7	1,614.5	0.91	-0.91	0.00	
PTB - 3596' MD										

Checked By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Date: \_\_\_\_\_