



# **Catamount Energy Partners**

**LA PLATA COUNTY, COLORADO**

**S21-T33N-R8W**

**IGS 148**

**OH**

**Design: SURVEYS**

## **Standard Survey Report**

**29 November, 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 1.36°

To convert a Magnetic Direction to a True Direction, Add 9.12° East

To convert a Magnetic Direction to a Grid Direction, Add 10.49°



Azimuths to Grid North  
True North: 1.36°  
Magnetic North: 10.49°

Magnetic Field  
Strength: 50300.1snT  
Dip Angle: 63.62°  
Date: 11/28/2017  
Model: IGRF2010

Project: LA PLATA COUNTY, COLORADO

Site: S21-T33N-R8W

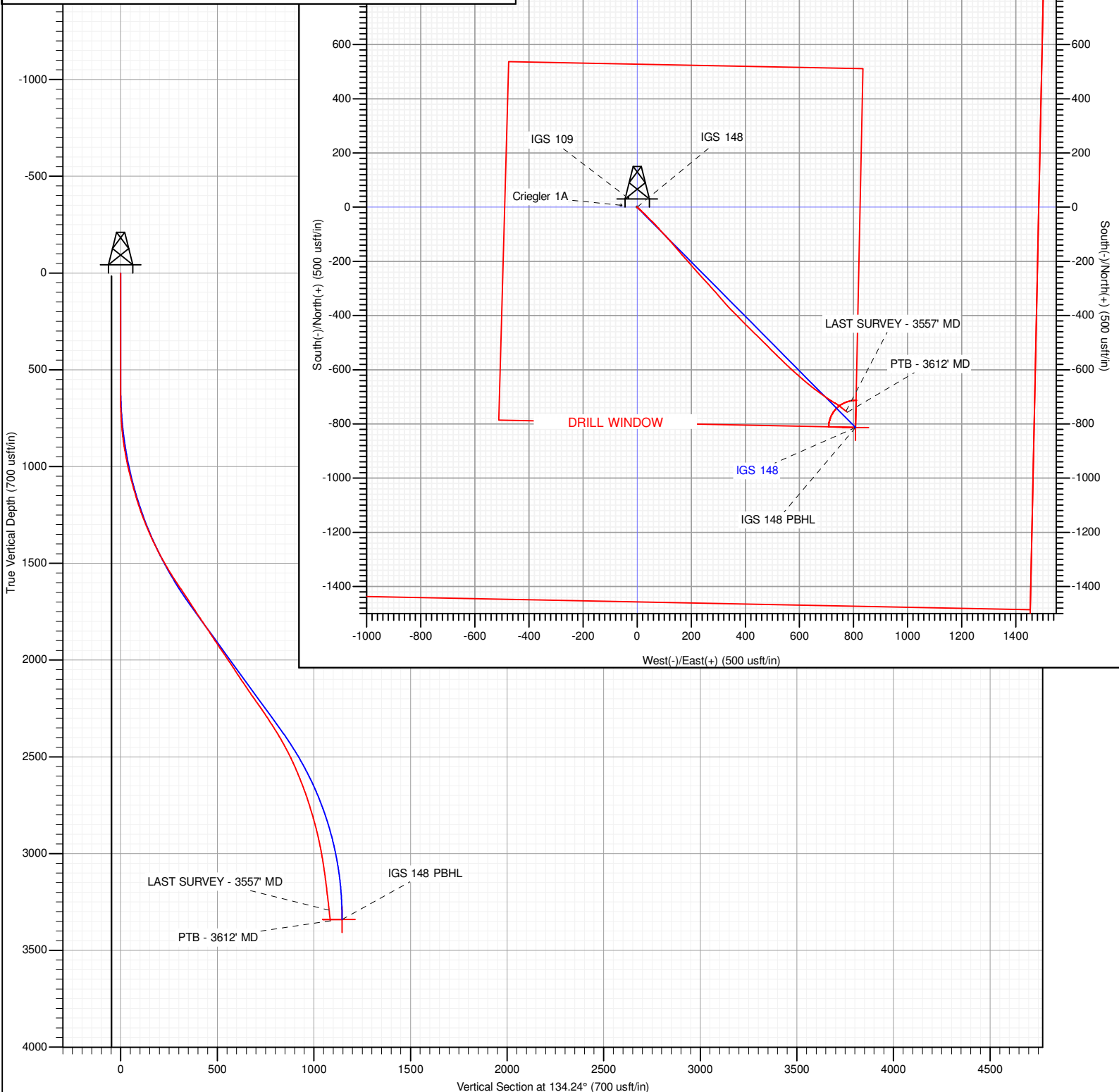
Well: IGS 148

Wellbore: OH

Design: SURVEYS

## WELL DETAILS: IGS 148

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1163117.51	2352856.19	37.093531	-107.718866





# TRU-Drill Directional Survey Report

<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well IGS 148
<b>Project:</b>	LA PLATA COUNTY, COLORADO	<b>TVD Reference:</b>	16' KB @ 6802.0usft
<b>Site:</b>	S21-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6802.0usft
<b>Well:</b>	IGS 148	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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		S21-T33N-R8W			
Site Position:		Northing:	1,161,185.46 usft	Latitude:	37.088213
From:	Lat/Long	Easting:	2,352,651.56 usft	Longitude:	-107.719410
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.36 °

Well	IGS 148					
Well Position	+N/-S	0.0 usft	Northing:	1,163,117.50 usft	Latitude:	37.093531
	+E/-W	0.0 usft	Easting:	2,352,856.19 usft	Longitude:	-107.718866
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	6,786.0 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	11/28/17	9.12	63.62	50,300

<b>Design</b>	SURVEYS				
<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	134.24	

<b>Survey Program</b>	<b>Date</b>	11/29/17			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
609.0	3,612.0	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	
609.0	0.00	360.00	609.0	0.0	0.0	0.0	0.00	0.00	0.00	
636.0	0.05	138.22	636.0	0.0	0.0	0.0	0.19	0.19	0.00	
666.0	0.32	26.71	666.0	0.1	0.1	0.0	1.14	0.90	-371.70	
729.0	2.70	132.97	729.0	-0.8	1.2	1.4	4.45	3.78	168.67	
789.0	4.56	131.12	788.9	-3.3	4.1	5.2	3.11	3.10	-3.08	
848.0	6.84	130.48	847.6	-7.2	8.5	11.1	3.87	3.86	-1.08	
910.0	9.47	134.46	908.9	-13.1	14.9	19.9	4.34	4.24	6.42	
973.0	11.22	132.74	970.9	-20.9	23.1	31.2	2.82	2.78	-2.73	
1,036.0	14.11	136.08	1,032.4	-30.6	33.0	45.0	4.73	4.59	5.30	



# TRU-Drill Directional Survey Report

<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well IGS 148
<b>Project:</b>	LA PLATA COUNTY, COLORADO	<b>TVD Reference:</b>	16' KB @ 6802.0usft
<b>Site:</b>	S21-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6802.0usft
<b>Well:</b>	IGS 148	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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)
1,097.0	15.59	134.47	1,091.3	-41.7	44.0	60.6	2.52	2.43	-2.64
1,156.0	16.28	133.44	1,148.1	-52.9	55.6	76.8	1.26	1.17	-1.75
1,219.0	18.54	136.92	1,208.2	-66.3	68.9	95.6	3.95	3.59	5.52
1,280.0	21.15	138.91	1,265.5	-81.7	82.8	116.3	4.42	4.28	3.26
1,344.0	23.09	136.89	1,324.8	-99.6	98.9	140.3	3.26	3.03	-3.16
1,406.0	25.25	137.28	1,381.4	-118.2	116.2	165.7	3.49	3.48	0.63
1,469.0	27.37	139.18	1,437.9	-139.0	134.8	193.5	3.62	3.37	3.02
1,532.0	29.67	139.50	1,493.2	-161.8	154.4	223.5	3.66	3.65	0.51
1,593.0	31.36	138.51	1,545.8	-185.2	174.7	254.4	2.89	2.77	-1.62
1,656.0	34.03	138.90	1,598.8	-210.8	197.2	288.3	4.25	4.24	0.62
1,717.0	34.62	138.14	1,649.2	-236.5	219.9	322.6	1.20	0.97	-1.25
1,780.0	32.38	137.49	1,701.7	-262.3	243.3	357.3	3.60	-3.56	-1.03
1,842.0	33.61	137.42	1,753.7	-287.2	266.1	391.0	1.98	1.98	-0.11
1,905.0	34.42	139.20	1,805.9	-313.5	289.6	426.2	2.04	1.29	2.83
1,967.0	33.34	139.21	1,857.4	-339.7	312.1	460.6	1.74	-1.74	0.02
2,028.0	33.54	137.35	1,908.3	-364.7	334.5	494.1	1.71	0.33	-3.05
2,091.0	34.66	134.65	1,960.4	-390.1	359.0	529.4	2.99	1.78	-4.29
2,152.0	33.91	136.16	2,010.9	-414.6	383.2	563.8	1.86	-1.23	2.48
2,214.0	32.90	134.72	2,062.6	-438.9	407.1	597.9	2.07	-1.63	-2.32
2,277.0	33.94	133.75	2,115.2	-463.1	432.0	632.6	1.86	1.65	-1.54
2,340.0	34.71	134.65	2,167.2	-487.9	457.4	668.1	1.46	1.22	1.43
2,403.0	35.83	135.33	2,218.7	-513.6	483.2	704.5	1.88	1.78	1.08
2,465.0	34.03	134.60	2,269.5	-538.7	508.3	740.0	2.98	-2.90	-1.18
2,528.0	32.75	133.98	2,322.1	-562.9	533.1	774.7	2.10	-2.03	-0.98
2,591.0	32.09	133.31	2,375.3	-586.2	557.5	808.4	1.19	-1.05	-1.06
2,653.0	29.10	131.33	2,428.6	-607.5	580.8	840.0	5.09	-4.82	-3.19
2,715.0	27.01	131.47	2,483.3	-626.8	602.7	869.1	3.37	-3.37	0.23
2,777.0	24.62	130.28	2,539.2	-644.4	623.1	896.0	3.94	-3.85	-1.92
2,839.0	22.44	128.98	2,596.0	-660.2	642.2	920.7	3.61	-3.52	-2.10
2,902.0	20.81	126.13	2,654.6	-674.4	660.6	943.8	3.08	-2.59	-4.52
2,963.0	18.91	125.32	2,711.9	-686.5	677.4	964.2	3.15	-3.11	-1.33
3,023.0	17.24	125.24	2,769.0	-697.3	692.6	982.6	2.78	-2.78	-0.13
3,086.0	15.73	124.61	2,829.4	-707.5	707.2	1,000.3	2.41	-2.40	-1.00
3,147.0	14.26	123.03	2,888.3	-716.3	720.3	1,015.8	2.50	-2.41	-2.59
3,210.0	12.13	117.43	2,949.6	-723.6	732.7	1,029.7	3.94	-3.38	-8.89
3,273.0	10.01	125.66	3,011.5	-729.8	743.0	1,041.5	4.19	-3.37	13.06
3,334.0	8.38	131.31	3,071.7	-735.8	750.7	1,051.2	3.05	-2.67	9.26
3,397.0	7.55	126.53	3,134.1	-741.3	757.5	1,059.9	1.68	-1.32	-7.59
3,460.0	6.83	128.72	3,196.6	-746.1	763.7	1,067.7	1.22	-1.14	3.48
3,523.0	6.60	125.92	3,259.1	-750.6	769.6	1,075.0	0.64	-0.37	-4.44
3,557.0	6.27	130.69	3,292.9	-753.0	772.6	1,078.8	1.85	-0.97	14.03
LAST SURVEY - 3557' MD									
3,612.0	5.98	130.69	3,347.6	-756.8	777.0	1,084.7	0.53	-0.53	0.00
PTB - 3612' MD									



TRU-Drill Directional  
Survey Report

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Survey									
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Checked By:	_____	Approved By:	_____	Date:	_____
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