



# **Catamount Energy Partners**

**LA PLATA COUNTY, COLORADO**

**S15-T33N-R8W**

**HAHN 3**

**OH**

**Design: FINAL**

## **Standard Survey Report**

**23 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 1.35°

To convert a Magnetic Direction to a True Direction, Add 9.24° East

To convert a Magnetic Direction to a Grid Direction, Add 10.59°

## WELL DETAILS: HAHN 3

+N/-S	+E/-W	Northing	16' KB @ 6726.0usft Easting	Latitude	Longitude
0.0	0.0	1165214.63	2357951.97	37.099620	-107.701570



Azimuths to Grid North  
True North: 1.35°  
Magnetic North: 10.59°

Magnetic Field  
Strength: 50196.5snT  
Dip Angle: 63.65°  
Date: 11/20/2017  
Model: IGRF2015

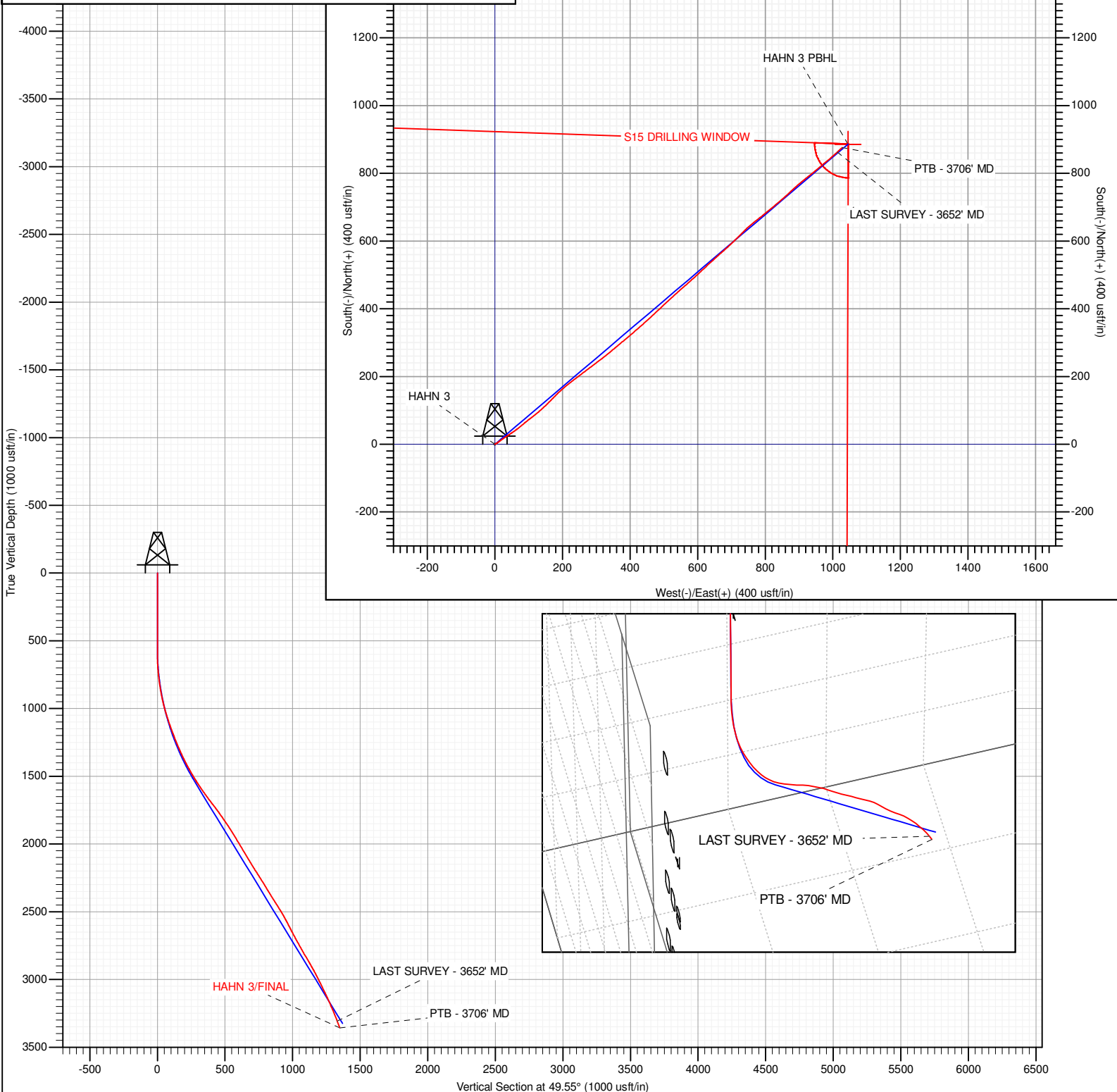
Project: LA PLATA COUNTY, COLORADO

Site: S15-T33N-R8W

Well: HAHN 3

Wellbore: OH

Design: FINAL





## Hawkeye Directional Survey Report

<b>Company:</b>	Catamount Energy Partners	<b>Local Co-ordinate Reference:</b>	Well HAHN 3
<b>Project:</b>	LA PLATA COUNTY, COLORADO	<b>TVD Reference:</b>	16' KB @ 6726.0usft
<b>Site:</b>	S15-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6726.0usft
<b>Well:</b>	HAHN 3	<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		S15-T33N-R8W							
Site Position:		Northing:	1,165,214.64	usft	Latitude:	37.099620			
From:	Lat/Long	Easting:	2,357,951.97	usft	Longitude:	-107.701570			
Position Uncertainty:		0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	-1.35	°

Well	HAHN 3					
Well Position	+N/-S	0.0 usft	Northing:	1,165,214.63 usft	Latitude:	37.099620
	+E/-W	0.0 usft	Easting:	2,357,951.97 usft	Longitude:	-107.701570
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	6,710.0 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>
	IGRF2015	11/20/17	9.24	63.65	50,197

Design	FINAL			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	49.55

<b>Survey Program</b>	<b>Date</b>	11/23/17			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
539.0	3,706.0	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	
539.0	0.00	360.00	539.0	0.0	0.0	0.0	0.00	0.00	0.00	
582.0	0.38	45.47	582.0	0.1	0.1	0.1	0.88	0.88	0.00	
613.0	0.24	20.19	613.0	0.2	0.2	0.3	0.62	-0.45	-81.55	
674.0	3.46	64.49	674.0	1.1	1.9	2.2	5.40	5.28	72.62	
735.0	5.18	57.53	734.8	3.4	5.9	6.7	2.94	2.82	-11.41	
798.0	7.55	52.27	797.4	7.5	11.6	13.6	3.87	3.76	-8.35	
860.0	9.59	54.95	858.7	12.9	19.0	22.9	3.35	3.29	4.32	
921.0	11.73	56.13	918.6	19.3	28.3	34.1	3.53	3.51	1.93	
983.0	14.48	56.87	979.0	27.1	40.0	48.0	4.44	4.44	1.19	



# Hawkeye Directional Survey Report

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<b>Site:</b>	S15-T33N-R8W	<b>MD Reference:</b>	16' KB @ 6726.0usft
<b>Well:</b>	HAHN 3	<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)
1,045.0	17.25	55.66	1,038.7	36.5	54.1	64.9	4.50	4.47	-1.95
1,106.0	19.08	51.90	1,096.6	47.7	69.4	83.8	3.56	3.00	-6.16
1,169.0	19.42	49.77	1,156.1	60.9	85.5	104.6	1.24	0.54	-3.38
1,231.0	21.33	52.67	1,214.2	74.4	102.4	126.2	3.48	3.08	4.68
1,293.0	23.04	51.50	1,271.6	88.7	120.8	149.5	2.85	2.76	-1.89
1,356.0	24.65	47.78	1,329.2	105.3	140.2	175.0	3.50	2.56	-5.90
1,419.0	26.67	45.03	1,386.0	124.1	160.0	202.2	3.72	3.21	-4.37
1,481.0	28.97	44.52	1,440.9	144.6	180.3	231.1	3.73	3.71	-0.82
1,544.0	30.58	49.61	1,495.5	165.9	203.2	262.3	4.75	2.56	8.08
1,606.0	33.24	52.40	1,548.2	186.5	228.7	295.0	4.90	4.29	4.50
1,666.0	34.65	52.95	1,598.0	206.8	255.4	328.5	2.41	2.35	0.92
1,792.0	38.06	53.07	1,699.4	251.7	315.0	403.0	2.71	2.71	0.10
1,854.0	36.47	49.72	1,748.8	275.1	344.4	440.5	4.16	-2.56	-5.40
1,917.0	35.00	50.65	1,799.9	298.7	372.6	477.3	2.49	-2.33	1.48
2,104.0	31.42	47.80	1,956.3	365.5	450.2	579.7	2.09	-1.91	-1.52
2,166.0	30.81	47.37	2,009.4	387.1	473.9	611.7	1.05	-0.98	-0.69
2,227.0	31.03	46.51	2,061.7	408.5	496.8	643.0	0.81	0.36	-1.41
2,289.0	31.06	47.63	2,114.9	430.2	520.2	675.0	0.93	0.05	1.81
2,351.0	31.75	48.55	2,167.8	451.8	544.2	707.3	1.36	1.11	1.48
2,414.0	32.67	48.86	2,221.1	474.0	569.5	740.9	1.48	1.46	0.49
2,477.0	32.23	47.46	2,274.3	496.5	594.7	774.6	1.38	-0.70	-2.22
2,540.0	31.02	47.12	2,327.9	518.9	618.9	807.7	1.94	-1.92	-0.54
2,602.0	32.16	47.29	2,380.7	541.0	642.8	840.1	1.84	1.84	0.27
2,665.0	32.85	48.65	2,433.8	563.7	667.9	873.9	1.60	1.10	2.16
2,728.0	31.53	47.65	2,487.2	586.0	692.9	907.5	2.26	-2.10	-1.59
2,790.0	29.43	45.32	2,540.6	607.7	715.7	938.9	3.89	-3.39	-3.76
2,851.0	27.35	44.42	2,594.2	628.2	736.2	967.8	3.48	-3.41	-1.48
2,914.0	28.02	50.10	2,650.0	648.1	757.7	997.0	4.32	1.06	9.02
2,973.0	28.56	52.45	2,702.0	665.5	779.5	1,025.0	2.10	0.92	3.98
3,036.0	28.99	50.49	2,757.2	684.4	803.2	1,055.3	1.65	0.68	-3.11
3,098.0	30.42	50.43	2,811.1	704.0	826.9	1,086.0	2.31	2.31	-0.10
3,161.0	30.74	49.29	2,865.3	724.7	851.4	1,118.0	1.05	0.51	-1.81
3,222.0	28.91	46.88	2,918.2	744.9	874.0	1,148.4	3.59	-3.00	-3.95
3,286.0	27.14	48.58	2,974.7	765.1	896.2	1,178.4	3.03	-2.77	2.66
3,347.0	26.70	52.08	3,029.1	782.8	917.5	1,206.0	2.70	-0.72	5.74
3,410.0	26.06	51.11	3,085.6	800.1	939.4	1,234.0	1.22	-1.02	-1.54
3,472.0	24.32	49.98	3,141.7	816.9	959.8	1,260.4	2.91	-2.81	-1.82
3,535.0	23.55	50.48	3,199.2	833.3	979.4	1,285.9	1.26	-1.22	0.79
3,598.0	22.61	48.51	3,257.2	849.3	998.2	1,310.6	1.93	-1.49	-3.13
3,652.0	21.48	47.26	3,307.2	862.9	1,013.2	1,330.9	2.27	-2.09	-2.31
LAST SURVEY - 3652' MD									
3,706.0	21.48	47.26	3,357.5	876.3	1,027.8	1,350.6	0.00	0.00	0.00
PTB - 3706' MD									



## Hawkeye Directional

### Survey Report

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Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_