

Catamount Energy Partners

**San Juan Basin
La Plata County CO
Elsa 34-6-19 #1**

OH

Design: As Drilled

Standard Survey Report

13 May, 2015



PROJECT DETAILS: San Juan Basin
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Southern Zone
System Datum: Mean Sea Level

Company:	Catamount Energy Partners	Local Co-ordinate Reference:	Well Elsa 34-6-19 #1
Project:	San Juan Basin	TVD Reference:	6970' GL + 16' KB @ 6986.0ft (D&J #1)
Site:	La Plata County CO	MD Reference:	6970' GL + 16' KB @ 6986.0ft (D&J #1)
Well:	Elsa 34-6-19 #1	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	EDM 5000.1 Old

Project	San Juan Basin, Southern Colorado, Fruitland Coal HZ		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Southern Zone		Using geodetic scale factor

Site	La Plata County CO		
Site Position:		Northing:	760,788.19 usft
From:	Lat/Long	Easting:	2,556,100.64 usft
Position Uncertainty:	0.0 ft	Slot Radius:	6-1/8 "
		Latitude:	36° 0' 0.000 N
		Longitude:	107° 0' 0.000 W
		Grid Convergence:	-0.92 °

Well	Elsa 34-6-19 #1, Pilot Hole Multi Lat CBM Well		
Well Position	+N-S	0.0 ft	Northing: 1,190,683.53 usft
	+E-W	0.0 ft	Easting: 2,407,471.06 usft
Position Uncertainty		1.5 ft	Wellhead Elevation: 0.0 ft
			Latitude: 37° 10' 21.477 N
			Longitude: 107° 32' 1.417 W
			Ground Level: 6,970.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	03/17/15	9.44	63.78	50,547

Design	As Drilled				
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	62.73	

Survey Program	Date	05/11/15			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
505.0	3,515.0	SDI MWD (OH)	MWD SDI	MWD - Standard ver 1.0.1	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
505.0	3.80	112.69	504.6	-6.5	15.4	10.8	0.75	0.75	0.00	
520.0	4.02	110.79	519.6	-6.8	16.4	11.4	1.70	1.47	-12.67	
551.0	4.08	111.97	550.5	-7.6	18.4	12.9	0.33	0.19	3.81	
582.0	4.12	106.34	581.4	-8.4	20.5	14.4	1.30	0.13	-18.16	
613.0	4.35	100.85	612.4	-8.9	22.7	16.1	1.50	0.74	-17.71	
645.0	4.10	90.40	644.3	-9.1	25.1	18.1	2.53	-0.78	-32.66	
676.0	4.56	73.55	675.2	-8.8	27.4	20.3	4.34	1.48	-54.35	
706.0	5.36	65.26	705.1	-7.9	29.8	22.9	3.57	2.67	-27.63	
738.0	6.21	60.12	736.9	-6.4	32.6	26.1	3.11	2.66	-16.06	

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Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
770.0	7.41	57.55	768.7	-4.4	35.9	29.9	3.87	3.75	-8.03	
800.0	8.20	56.32	798.4	-2.2	39.3	33.9	2.69	2.63	-4.10	
830.0	9.16	53.26	828.1	0.4	43.0	38.4	3.55	3.20	-10.20	
862.0	10.18	53.18	859.6	3.6	47.3	43.7	3.19	3.19	-0.25	
893.0	11.44	52.73	890.1	7.2	51.9	49.4	4.07	4.06	-1.45	
924.0	12.52	54.21	920.4	11.0	57.1	55.8	3.62	3.48	4.77	
955.0	13.24	54.20	950.6	15.0	62.7	62.6	2.32	2.32	-0.03	
985.0	14.16	52.44	979.7	19.3	68.4	69.6	3.37	3.07	-5.87	
1,015.0	15.20	51.38	1,008.8	24.0	74.4	77.1	3.58	3.47	-3.53	
1,046.0	16.01	52.78	1,038.6	29.1	81.0	85.3	2.88	2.61	4.52	
1,077.0	16.87	52.13	1,068.4	34.4	87.9	93.9	2.84	2.77	-2.10	
1,108.0	17.94	54.13	1,097.9	40.0	95.4	103.1	3.95	3.45	6.45	
1,138.0	19.31	55.19	1,126.4	45.5	103.2	112.6	4.70	4.57	3.53	
1,170.0	20.08	55.09	1,156.5	51.7	112.0	123.3	2.41	2.41	-0.31	
1,202.0	21.46	53.84	1,186.4	58.3	121.2	134.5	4.53	4.31	-3.91	
1,233.0	23.01	53.15	1,215.1	65.3	130.7	146.1	5.07	5.00	-2.23	
1,264.0	24.84	50.82	1,243.4	73.0	140.6	158.4	6.64	5.90	-7.52	
1,296.0	25.69	49.31	1,272.4	81.8	151.0	171.7	3.33	2.66	-4.72	
1,327.0	26.47	48.65	1,300.2	90.7	161.3	185.0	2.68	2.52	-2.13	
1,358.0	27.32	48.63	1,327.9	100.0	171.8	198.6	2.74	2.74	-0.06	
1,390.0	27.97	49.38	1,356.2	109.7	183.1	213.0	2.30	2.03	2.34	
1,422.0	28.24	50.81	1,384.4	119.4	194.6	227.7	2.27	0.84	4.47	
1,454.0	28.92	51.02	1,412.5	129.1	206.5	242.7	2.15	2.13	0.66	
1,485.0	29.53	51.88	1,439.6	138.5	218.3	257.5	2.39	1.97	2.77	
1,517.0	29.90	53.15	1,467.4	148.1	230.9	273.1	2.28	1.16	3.97	
1,549.0	30.45	53.64	1,495.1	157.7	243.8	289.0	1.88	1.72	1.53	
1,580.0	31.62	53.41	1,521.6	167.2	256.7	304.8	3.79	3.77	-0.74	
1,611.0	32.64	54.77	1,547.9	176.9	270.0	321.1	4.03	3.29	4.39	
1,642.0	33.55	55.21	1,573.8	186.6	283.9	337.9	3.04	2.94	1.42	
1,673.0	33.91	55.95	1,599.6	196.3	298.1	354.9	1.76	1.16	2.39	
1,705.0	34.45	55.52	1,626.1	206.5	313.0	372.8	1.85	1.69	-1.34	
1,737.0	35.13	55.69	1,652.4	216.8	328.0	390.9	2.15	2.13	0.53	
1,768.0	35.72	55.40	1,677.6	226.9	342.8	408.7	1.98	1.90	-0.94	
1,800.0	37.54	54.57	1,703.3	237.9	358.5	427.6	5.89	5.69	-2.59	
1,832.0	38.79	55.16	1,728.5	249.3	374.7	447.2	4.07	3.91	1.84	
1,863.0	39.33	55.96	1,752.5	260.3	390.8	466.6	2.38	1.74	2.58	
1,895.0	39.31	56.72	1,777.3	271.6	407.6	486.8	1.51	-0.06	2.38	
1,927.0	39.77	56.24	1,802.0	282.8	424.6	507.0	1.73	1.44	-1.50	
1,958.0	40.69	56.27	1,825.6	293.9	441.3	526.9	2.97	2.97	0.10	
1,990.0	41.39	56.82	1,849.8	305.5	458.8	547.8	2.46	2.19	1.72	
2,022.0	41.59	57.38	1,873.8	317.0	476.6	568.9	1.32	0.63	1.75	
2,054.0	41.10	56.01	1,897.8	328.6	494.3	589.9	3.22	-1.53	-4.28	
2,117.0	41.84	56.39	1,945.0	351.8	528.9	631.4	1.24	1.17	0.60	
2,180.0	42.22	55.80	1,991.8	375.4	563.9	673.3	0.87	0.60	-0.94	

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	EDM 5000.1 Old

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,243.0	41.66	55.96	2,038.6	399.0	598.8	715.1	0.90	-0.89	0.25
2,306.0	39.66	55.46	2,086.4	422.1	632.7	755.8	3.22	-3.17	-0.79
2,338.0	39.44	55.31	2,111.1	433.7	649.5	776.0	0.75	-0.69	-0.47
2,370.0	39.02	55.05	2,135.9	445.2	666.1	796.1	1.41	-1.31	-0.81
2,401.0	38.70	55.17	2,160.0	456.4	682.1	815.3	1.06	-1.03	0.39
2,432.0	38.50	56.76	2,184.3	467.2	698.1	834.5	3.26	-0.65	5.13
2,463.0	39.25	58.78	2,208.4	477.6	714.5	853.9	4.75	2.42	6.52
2,494.0	39.85	60.80	2,232.3	487.5	731.6	873.6	4.58	1.94	6.52
2,526.0	39.83	61.86	2,256.9	497.3	749.6	894.1	2.12	-0.06	3.31
2,557.0	39.90	63.88	2,280.7	506.4	767.3	914.0	4.18	0.23	6.52
2,589.0	39.85	66.19	2,305.2	515.0	785.9	934.5	4.63	-0.16	7.22
2,620.0	39.29	67.92	2,329.1	522.7	804.0	954.2	3.99	-1.81	5.58
2,652.0	38.51	68.87	2,354.0	530.1	822.7	974.2	3.07	-2.44	2.97
2,682.0	36.93	69.84	2,377.8	536.6	839.9	992.4	5.63	-5.27	3.23
2,714.0	34.91	71.16	2,403.7	542.9	857.6	1,011.0	6.76	-6.31	4.13
2,745.0	32.38	72.56	2,429.5	548.2	873.9	1,028.0	8.54	-8.16	4.52
2,775.0	31.66	72.25	2,454.9	553.1	889.1	1,043.7	2.46	-2.40	-1.03
2,807.0	30.91	72.43	2,482.3	558.1	904.9	1,060.0	2.36	-2.34	0.56
2,839.0	30.01	73.17	2,509.8	562.9	920.4	1,076.0	3.05	-2.81	2.31
2,870.0	30.11	74.62	2,536.7	567.2	935.3	1,091.2	2.37	0.32	4.68
2,902.0	29.95	76.48	2,564.4	571.2	950.8	1,106.9	2.95	-0.50	5.81
2,934.0	30.17	77.99	2,592.1	574.7	966.5	1,122.4	2.46	0.69	4.72
2,965.0	30.75	79.02	2,618.8	577.9	981.9	1,137.5	2.52	1.87	3.32
2,996.0	30.92	79.65	2,645.4	580.8	997.5	1,152.7	1.18	0.55	2.03
3,027.0	30.40	79.81	2,672.1	583.6	1,013.0	1,167.8	1.70	-1.68	0.52
3,059.0	29.60	79.59	2,699.8	586.5	1,028.8	1,183.1	2.52	-2.50	-0.69
3,090.0	28.84	78.99	2,726.8	589.3	1,043.6	1,197.6	2.63	-2.45	-1.94
3,121.0	28.25	78.52	2,754.1	592.2	1,058.2	1,211.9	2.04	-1.90	-1.52
3,144.0	27.81	77.97	2,774.4	594.4	1,068.7	1,222.3	2.21	-1.90	-2.38
Fruitland									
3,152.0	27.66	77.78	2,781.5	595.2	1,072.4	1,225.9	2.21	-1.90	-2.42
3,183.0	26.97	76.68	2,809.0	598.3	1,086.3	1,239.7	2.76	-2.22	-3.56
E-1 Coal									
3,184.0	26.95	76.64	2,809.9	598.4	1,086.7	1,240.1	2.76	-2.20	-3.65
3,215.0	26.09	75.66	2,837.6	601.7	1,100.1	1,253.6	3.11	-2.77	-3.16
3,230.0	25.76	75.55	2,851.1	603.4	1,106.5	1,260.0	2.25	-2.23	-0.76
E-2 Coal									
3,246.0	25.40	75.42	2,865.5	605.1	1,113.2	1,266.7	2.25	-2.23	-0.78
3,274.0	24.93	76.22	2,890.9	608.0	1,124.7	1,278.3	2.07	-1.68	2.87
E-3 Coal									
3,277.0	24.88	76.31	2,893.6	608.3	1,125.9	1,279.5	2.07	-1.67	2.92
3,309.0	24.76	77.63	2,922.7	611.3	1,139.0	1,292.5	1.77	-0.38	4.13
3,323.0	24.48	77.99	2,935.4	612.6	1,144.7	1,298.2	2.28	-2.00	2.59
E-4 Coal									

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	As Drilled	Database:	EDM 5000.1 Old

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,341.0	24.12	78.47	2,951.8	614.1	1,152.0	1,305.3	2.28	-2.00	2.65	
3,372.0	23.44	78.13	2,980.2	616.6	1,164.2	1,317.4	2.24	-2.19	-1.10	
3,404.0	23.23	77.73	3,009.5	619.3	1,176.6	1,329.6	0.82	-0.66	-1.25	
3,435.0	23.39	77.75	3,038.0	621.9	1,188.6	1,341.4	0.52	0.52	0.06	
3,455.0	23.16	77.92	3,056.4	623.5	1,196.3	1,349.1	1.20	-1.15	0.85	
3,515.0	23.16	77.92	3,111.5	628.5	1,219.4	1,371.8	0.00	0.00	0.00	

Design Targets										
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Elsa 34-6-19 DW		0.00	360.00	2,799.0	0.0	0.0	1,190,683.53	2,407,471.06	37° 10' 21.477 N	107° 32' 1.417 W
- actual wellpath misses target center by 1040.0ft at 2383.8ft MD (2146.6 TVD, 450.2 N, 673.2 E)										
- Polygon										
Point 1				2,799.0	651.8	986.1	1,191,335.35	2,408,457.19		
Point 2				2,799.0	553.8	4,950.7	1,191,237.37	2,412,421.82		
Point 3				2,799.0	-778.3	4,913.8	1,189,905.21	2,412,384.96		
Point 4				2,799.0	-660.2	955.0	1,190,023.30	2,408,426.10		
Elsa 34-6-19 SL		0.00	0.00	2,799.0	0.0	0.0	1,190,683.53	2,407,471.06	37° 10' 21.477 N	107° 32' 1.417 W
- actual wellpath misses target center by 1040.0ft at 2383.8ft MD (2146.6 TVD, 450.2 N, 673.2 E)										
- Polygon										
Point 1				2,799.0	1,327.9	342.0	1,192,011.47	2,407,813.02		
Point 2				2,799.0	1,197.3	5,628.8	1,191,880.81	2,413,099.88		
Point 3				2,799.0	-1,456.8	5,555.3	1,189,226.72	2,413,026.44		
Point 4				2,799.0	-1,299.4	279.8	1,189,384.08	2,407,750.86		
Elsa 34-6-19 #1 BHL		0.00	360.00	3,116.0	640.4	1,242.5	1,191,323.89	2,408,713.57	37° 10' 28.074 N	107° 31' 46.241 W
- actual wellpath misses target center by 26.3ft at 3515.0ft MD (3111.5 TVD, 628.5 N, 1219.4 E)										
- Point										

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,144.0	2,774.4	Fruitland		0.00		
3,183.0	2,809.0	E-1 Coal		0.00		
3,230.0	2,851.1	E-2 Coal		0.00		
3,274.0	2,890.9	E-3 Coal		0.00		
3,323.0	2,935.4	E-4 Coal		0.00		

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
505.0	504.6	-6.5	15.4	First SDI MWD Survey	
3,455.0	3,056.4	623.5	1,196.3	Last SDI MWD Survey	
3,515.0	3,111.5	628.5	1,219.4	Projection to TD	

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Design:	As Drilled	Database:	EDM 5000.1 Old

Checked By: _____ Approved By: _____ Date: _____