



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Caerus Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well PUCKETT 43D-2
<b>Project:</b>	Garfield County, CO (UTM 12N)	<b>TVD Reference:</b>	30' KB @ 8454.0usft
<b>Site:</b>	S2-T7S-R97W (P2)	<b>MD Reference:</b>	30' KB @ 8454.0usft
<b>Well:</b>	PUCKETT 43D-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	Garfield County, CO (UTM 12N)		
<b>Map System:</b>	Universal Transverse Mercator (US Survey Feet)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 - Western US		
<b>Map Zone:</b>	Zone 12N (114 W to 108 W)		

Site		S2-T7S-R97W (P2)			
Site Position:		Northing:	14,345,665.30 usft	Latitude:	39.470366
From:	Map	Easting:	2,436,748.30 usft	Longitude:	-108.178450
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.79 °

Well	PUCKETT 43D-2					
Well Position	+N/-S	0.0 usft	Northing:	14,345,658.30 usft	Latitude:	39.470347
	+E/-W	0.0 usft	Easting:	2,436,744.40 usft	Longitude:	-108.178465
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	8,424.0 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>
	HDGM	1/15/2016	9.82	65.78	51,912

<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	292.62	

<b>Survey Program</b>	<b>Date</b>	1/23/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
320.0	8,820.0	Survey #1 (OH)	MWD	Geolink MWD	

<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 (°/100usf)</b>	<b>Build Rate (°/100u)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
320.0	2.30	316.60	319.9	4.7	-4.4	5.9	0.72	0.72		
412.0	4.40	309.20	411.8	8.2	-8.4	10.9	2.33	2.28		
505.0	6.60	294.80	504.3	12.7	-16.0	19.7	2.77	2.37		
597.0	6.90	290.00	595.7	16.8	-26.0	30.5	0.69	0.33		
692.0	8.00	283.10	689.9	20.3	-37.8	42.7	1.49	1.16		
786.0	9.00	281.70	782.9	23.3	-51.4	56.4	1.09	1.06		
881.0	8.70	286.50	876.7	26.8	-65.6	70.8	0.84	-0.32		
976.0	8.00	292.30	970.7	31.4	-78.6	84.6	1.15	-0.74		
1,070.0	7.80	292.40	1,063.8	36.3	-90.5	97.5	0.21	-0.21		
1,165.0	8.40	291.00	1,157.9	41.2	-103.0	110.9	0.66	0.63		
1,259.0	8.50	293.50	1,250.9	46.5	-115.7	124.7	0.40	0.11		
1,354.0	8.30	294.00	1,344.8	52.0	-128.4	138.6	0.22	-0.21		

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<b>Site:</b>	S2-T7S-R97W (P2)	<b>MD Reference:</b>	30' KB @ 8454.0usft
<b>Well:</b>	PUCKETT 43D-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,448.0	7.80	295.40	1,437.9	57.5	-140.4	151.7	0.57	-0.53	
1,543.0	7.80	297.70	1,532.0	63.3	-151.9	164.6	0.33	0.00	
1,637.0	8.40	298.40	1,625.1	69.5	-163.6	177.8	0.65	0.64	
1,732.0	9.10	296.50	1,719.0	76.2	-176.4	192.2	0.80	0.74	
1,826.0	8.90	291.20	1,811.8	82.1	-189.9	206.9	0.91	-0.21	
1,921.0	8.00	293.00	1,905.8	87.4	-202.8	220.8	0.99	-0.95	
2,016.0	8.20	298.50	1,999.9	93.2	-214.9	234.2	0.84	0.21	
2,110.0	8.70	300.80	2,092.8	100.0	-226.9	247.9	0.64	0.53	
2,205.0	8.70	299.90	2,186.7	107.3	-239.3	262.1	0.14	0.00	
2,299.0	7.40	300.30	2,279.8	113.9	-250.6	275.2	1.38	-1.38	
2,393.0	7.60	301.20	2,373.0	120.2	-261.2	287.3	0.25	0.21	
2,485.0	7.70	304.60	2,464.2	126.8	-271.5	299.4	0.50	0.11	
2,599.0	7.40	302.70	2,577.2	135.1	-283.9	314.1	0.34	-0.26	
2,693.0	9.10	309.00	2,670.2	143.1	-294.8	327.1	2.05	1.81	
2,788.0	9.40	306.80	2,764.0	152.4	-306.9	341.9	0.49	0.32	
2,882.0	8.90	305.50	2,856.8	161.3	-318.9	356.4	0.58	-0.53	
2,977.0	7.60	305.80	2,950.8	169.2	-330.0	369.7	1.37	-1.37	
3,072.0	9.80	302.10	3,044.7	177.2	-341.9	383.8	2.39	2.32	
3,166.0	9.30	296.80	3,137.4	184.8	-355.5	399.2	1.08	-0.53	
3,261.0	8.80	298.80	3,231.2	191.8	-368.7	414.1	0.62	-0.53	
3,355.0	8.50	299.20	3,324.2	198.7	-381.1	428.2	0.33	-0.32	
3,450.0	10.20	288.40	3,417.9	204.7	-395.2	443.5	2.56	1.79	
3,545.0	9.70	287.20	3,511.5	209.8	-410.8	459.9	0.57	-0.53	
3,639.0	9.40	286.10	3,604.2	214.2	-425.8	475.4	0.37	-0.32	
3,734.0	9.50	285.60	3,697.9	218.5	-440.8	490.9	0.14	0.11	
3,828.0	9.00	286.30	3,790.7	222.6	-455.3	505.9	0.55	-0.53	
3,923.0	9.00	286.80	3,884.5	226.9	-469.5	520.7	0.08	0.00	
4,017.0	8.80	289.50	3,977.4	231.4	-483.4	535.2	0.49	-0.21	
4,112.0	8.70	286.60	4,071.2	235.9	-497.1	549.6	0.48	-0.11	
4,207.0	8.70	287.10	4,165.2	240.0	-510.8	563.9	0.08	0.00	
4,301.0	8.50	287.30	4,258.1	244.2	-524.3	577.9	0.22	-0.21	
4,395.0	7.70	289.70	4,351.2	248.4	-536.8	591.1	0.92	-0.85	
4,490.0	7.70	290.80	4,445.3	252.8	-548.8	603.8	0.16	0.00	
4,584.0	7.30	291.80	4,538.5	257.2	-560.2	616.1	0.45	-0.43	
4,679.0	6.90	287.40	4,632.8	261.2	-571.3	627.8	0.71	-0.42	
4,773.0	8.10	296.90	4,726.0	265.9	-582.6	640.0	1.83	1.28	
4,868.0	7.70	296.80	4,820.1	271.8	-594.2	653.0	0.42	-0.42	
4,962.0	7.00	292.70	4,913.3	276.8	-605.1	665.0	0.93	-0.74	
5,057.0	8.10	301.70	5,007.5	282.6	-616.1	677.4	1.70	1.16	
5,152.0	8.70	301.90	5,101.5	289.9	-627.9	691.1	0.63	0.63	
5,246.0	8.20	300.20	5,194.4	297.0	-639.8	704.8	0.59	-0.53	
5,341.0	7.80	298.20	5,288.5	303.5	-651.3	717.9	0.51	-0.42	
5,435.0	7.10	300.60	5,381.7	309.4	-661.9	730.0	0.81	-0.74	
5,530.0	8.20	302.40	5,475.9	316.1	-672.7	742.5	1.18	1.16	
5,624.0	8.50	304.30	5,568.9	323.6	-684.1	755.9	0.43	0.32	
5,719.0	7.80	300.60	5,662.9	330.8	-695.4	769.2	0.92	-0.74	
5,813.0	6.90	300.80	5,756.1	337.0	-705.8	781.1	0.96	-0.96	
5,908.0	6.80	300.00	5,850.5	342.7	-715.6	792.3	0.15	-0.11	
6,003.0	6.40	298.80	5,944.8	348.0	-725.1	803.2	0.45	-0.42	
6,097.0	6.30	302.30	6,038.3	353.3	-734.0	813.5	0.43	-0.11	
6,191.0	5.80	299.40	6,131.7	358.4	-742.5	823.3	0.62	-0.53	
6,286.0	5.80	299.80	6,226.2	363.2	-750.9	832.8	0.04	0.00	
6,381.0	5.70	299.00	6,320.8	367.8	-759.2	842.2	0.13	-0.11	

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<b>Well:</b>	PUCKETT 43D-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

### Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
6,475.0	3.60	281.60	6,414.5	370.7	-766.1	849.8	2.67	-2.23	
6,570.0	3.00	277.90	6,509.3	371.6	-771.5	855.1	0.67	-0.63	
6,665.0	3.30	267.40	6,604.2	371.8	-776.7	860.0	0.68	0.32	
6,759.0	2.60	265.70	6,698.0	371.6	-781.5	864.3	0.75	-0.74	
6,854.0	2.80	275.80	6,792.9	371.6	-786.0	868.5	0.54	0.21	
6,948.0	2.50	270.80	6,886.8	371.9	-790.3	872.6	0.40	-0.32	
7,043.0	1.50	296.80	6,981.8	372.5	-793.5	875.7	1.40	-1.05	
7,137.0	1.50	314.70	7,075.7	373.9	-795.5	878.1	0.50	0.00	
7,232.0	1.50	303.60	7,170.7	375.5	-797.4	880.5	0.31	0.00	
7,326.0	1.40	309.90	7,264.7	376.9	-799.3	882.8	0.20	-0.11	
7,421.0	1.50	291.60	7,359.6	378.1	-801.4	885.1	0.50	0.11	
7,515.0	1.50	295.60	7,453.6	379.1	-803.6	887.6	0.11	0.00	
7,610.0	0.90	217.10	7,548.6	379.0	-805.2	889.0	1.67	-0.63	
7,704.0	1.00	275.20	7,642.6	378.5	-806.4	890.0	0.99	0.11	
7,799.0	0.90	287.40	7,737.6	378.8	-808.0	891.5	0.24	-0.11	
7,894.0	1.30	286.50	7,832.6	379.3	-809.7	893.3	0.42	0.42	
7,988.0	1.10	288.00	7,926.5	379.9	-811.6	895.3	0.22	-0.21	
8,178.0	1.90	265.40	8,116.5	380.2	-816.5	899.9	0.52	0.42	
8,367.0	1.70	239.50	8,305.4	378.5	-822.0	904.4	0.44	-0.11	
8,556.0	1.90	235.60	8,494.3	375.4	-827.0	907.8	0.12	0.11	
8,745.0	2.20	231.20	8,683.2	371.3	-832.4	911.2	0.18	0.16	LAST CES SURVEY @ 8745' MD
8,820.0	2.20	231.20	8,758.1	369.5	-834.7	912.6	0.00	0.00	PTB @ 8820' MD

### Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PUCKETT 43D-2 PBHL	0.00	0.00	8,754.0	383.8	-836.2	14,346,015.70	2,435,896.60	39.471400	-108.181426
- actual wellpath misses target center by 14.3usft at 8815.6usft MD (8753.7 TVD, 369.6 N, -834.5 E)									
- Circle (radius 50.0)									

### Design Annotations

	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
			+N/-S (usft)	+E/-W (usft)	
	8,745.0	8,683.2	371.3	-832.4	LAST CES SURVEY @ 8745' MD
	8,820.0	8,758.1	369.5	-834.7	PTB @ 8820' MD

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