



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Caerus Oil & Gas (NAD 27)	<b>Local Co-ordinate Reference:</b>	Well PUCKETT 43A-2
<b>Project:</b>	Garfield County, CO	<b>TVD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
<b>Site:</b>	S2-T7S-R97W (Mesa H2)	<b>MD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
<b>Well:</b>	PUCKETT 43A-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<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		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Colorado Central 502		

Site		S2-T7S-R97W (Mesa H2)			
Site Position:		Northing:	609,295.74 usft	Latitude:	39.475700
From:	Lat/Long	Easting:	1,243,680.53 usft	Longitude:	-108.179625
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.69 °

Well		PUCKETT 43A-2				
Well Position	+N/-S	0.0 usft	Northing:	609,303.84 usft	Latitude:	39.475722
	+E/-W	0.0 usft	Easting:	1,243,677.66 usft	Longitude:	-108.179636
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	8,477.0 usft

<b>Wellbore</b>	DD				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	4/4/2015	9.88	65.82	51,959

<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	215.80	

<b>Survey Program</b>	<b>Date</b>	4/11/2015			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
207.0	8,940.0	Survey #1 (DD)	ISCWSA MWD	MWD - Standard	

<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		
207.0	2.10	214.40	207.0	-3.1	-2.1	3.8	1.01	1.01		
268.0	4.00	217.10	267.9	-5.7	-4.1	7.0	3.12	3.11		
298.0	4.90	224.40	297.8	-7.5	-5.6	9.3	3.54	3.00		
361.0	6.50	222.20	360.5	-12.1	-9.9	15.6	2.56	2.54		
452.0	7.10	217.30	450.8	-20.4	-16.7	26.3	0.92	0.66		
543.0	7.60	215.90	541.1	-29.7	-23.7	37.9	0.58	0.55		
634.0	7.70	212.60	631.3	-39.7	-30.5	50.0	0.50	0.11		
729.0	7.70	211.20	725.4	-50.5	-37.2	62.7	0.20	0.00		
823.0	7.10	211.40	818.6	-60.9	-43.5	74.8	0.64	-0.64		
917.0	6.70	209.80	911.9	-70.6	-49.2	86.1	0.47	-0.43		
1,012.0	5.80	210.60	1,006.4	-79.5	-54.4	96.3	0.95	-0.95		
1,106.0	4.90	222.50	1,100.0	-86.6	-59.6	105.1	1.52	-0.96		

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<b>Site:</b>	S2-T7S-R97W (Mesa H2)	<b>MD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
<b>Well:</b>	PUCKETT 43A-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<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
1,201.0	4.40	228.80	1,194.7	-92.0	-65.1	112.6	0.75	-0.53	
1,295.0	4.10	225.70	1,288.4	-96.7	-70.2	119.5	0.40	-0.32	
1,390.0	3.30	214.40	1,383.2	-101.3	-74.2	125.5	1.14	-0.84	
1,485.0	4.00	201.50	1,478.0	-106.6	-76.9	131.5	1.13	0.74	
1,579.0	5.90	203.20	1,571.7	-114.1	-80.0	139.4	2.03	2.02	
1,674.0	7.50	205.80	1,666.0	-124.2	-84.6	150.3	1.71	1.68	
1,768.0	7.60	213.30	1,759.2	-134.9	-90.7	162.5	1.05	0.11	
1,863.0	7.10	223.10	1,853.4	-144.5	-98.2	174.6	1.42	-0.53	
1,957.0	6.60	225.90	1,946.7	-152.5	-106.0	185.7	0.64	-0.53	
2,052.0	6.10	231.80	2,041.2	-159.4	-113.9	195.9	0.86	-0.53	
2,146.0	5.70	233.70	2,134.7	-165.2	-121.6	205.2	0.47	-0.43	
2,241.0	6.80	238.20	2,229.1	-171.0	-130.2	214.8	1.27	1.16	
2,335.0	8.50	235.50	2,322.3	-177.9	-140.6	226.5	1.85	1.81	
2,430.0	8.80	227.60	2,416.2	-186.7	-151.8	240.3	1.29	0.32	
2,490.0	8.60	221.00	2,475.5	-193.2	-158.1	249.2	1.70	-0.33	
2,593.0	8.40	218.20	2,577.4	-204.9	-167.8	264.4	0.45	-0.19	
2,688.0	8.20	218.10	2,671.4	-215.7	-176.3	278.1	0.21	-0.21	
2,782.0	8.10	227.30	2,764.4	-225.5	-185.3	291.3	1.39	-0.11	
2,876.0	7.50	225.60	2,857.5	-234.3	-194.6	303.8	0.68	-0.64	
2,971.0	7.00	221.90	2,951.8	-242.9	-202.9	315.7	0.72	-0.53	
3,065.0	6.50	220.30	3,045.1	-251.3	-210.1	326.7	0.57	-0.53	
3,160.0	5.50	216.60	3,139.6	-259.0	-216.3	336.6	1.13	-1.05	
3,254.0	6.00	223.90	3,233.1	-266.2	-222.4	346.0	0.94	0.53	
3,349.0	6.50	228.10	3,327.6	-273.3	-229.9	356.1	0.71	0.53	
3,443.0	7.50	228.80	3,420.9	-280.9	-238.4	367.3	1.07	1.06	
3,538.0	7.10	228.80	3,515.1	-288.9	-247.5	379.1	0.42	-0.42	
3,632.0	6.90	227.90	3,608.4	-296.5	-256.1	390.3	0.24	-0.21	
3,726.0	6.70	225.60	3,701.7	-304.1	-264.2	401.2	0.36	-0.21	
3,821.0	6.30	225.50	3,796.1	-311.6	-271.9	411.8	0.42	-0.42	
3,916.0	6.00	226.30	3,890.6	-318.7	-279.2	421.8	0.33	-0.32	
4,010.0	6.70	219.10	3,984.0	-326.4	-286.2	432.1	1.13	0.74	
4,104.0	6.60	217.90	4,077.4	-334.9	-293.0	443.0	0.18	-0.11	
4,199.0	6.80	219.10	4,171.7	-343.6	-299.9	454.1	0.26	0.21	
4,293.0	6.90	219.70	4,265.1	-352.2	-307.0	465.2	0.13	0.11	
4,388.0	6.20	219.90	4,359.4	-360.6	-313.9	476.1	0.74	-0.74	
4,482.0	5.80	217.70	4,452.9	-368.2	-320.1	485.9	0.49	-0.43	
4,576.0	6.20	225.70	4,546.4	-375.5	-326.6	495.6	0.99	0.43	
4,671.0	5.60	224.20	4,640.9	-382.4	-333.5	505.2	0.65	-0.63	
4,765.0	6.60	224.00	4,734.4	-389.6	-340.5	515.1	1.06	1.06	
4,860.0	6.20	222.30	4,828.8	-397.3	-347.7	525.6	0.47	-0.42	
4,955.0	5.10	218.20	4,923.3	-404.4	-353.8	535.0	1.23	-1.16	
5,049.0	5.60	218.00	5,016.9	-411.3	-359.2	543.7	0.53	0.53	
5,143.0	6.10	218.40	5,110.4	-418.9	-365.1	553.3	0.53	0.53	
5,238.0	5.70	217.10	5,204.9	-426.6	-371.1	563.0	0.44	-0.42	
5,333.0	6.50	218.10	5,299.4	-434.6	-377.2	573.1	0.85	0.84	
5,427.0	6.30	217.80	5,392.8	-442.8	-383.7	583.6	0.22	-0.21	
5,522.0	6.90	220.40	5,487.2	-451.3	-390.6	594.5	0.71	0.63	
5,616.0	6.60	220.70	5,580.5	-459.7	-397.8	605.5	0.32	-0.32	
5,710.0	6.30	219.70	5,673.9	-467.8	-404.6	616.0	0.34	-0.32	
5,805.0	5.90	220.30	5,768.4	-475.5	-411.1	626.1	0.43	-0.42	
5,899.0	6.90	216.20	5,861.8	-483.7	-417.5	636.6	1.17	1.06	
5,994.0	7.00	214.60	5,956.1	-493.1	-424.2	648.1	0.23	0.11	
6,088.0	7.00	216.90	6,049.4	-502.4	-430.9	659.5	0.30	0.00	

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<b>Project:</b>	Garfield County, CO	<b>TVD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
<b>Site:</b>	S2-T7S-R97W (Mesa H2)	<b>MD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
<b>Well:</b>	PUCKETT 43A-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<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
6,183.0	6.30	216.20	6,143.8	-511.2	-437.4	670.5	0.74	-0.74	
6,278.0	6.30	214.70	6,238.2	-519.7	-443.5	680.9	0.17	0.00	
6,372.0	6.30	222.10	6,331.6	-527.8	-449.9	691.2	0.86	0.00	
6,466.0	6.20	220.30	6,425.1	-535.5	-456.6	701.4	0.23	-0.11	
6,561.0	5.60	219.50	6,519.6	-543.0	-462.9	711.1	0.64	-0.63	
6,656.0	5.80	223.10	6,614.1	-550.1	-469.1	720.5	0.43	0.21	
6,750.0	5.90	222.60	6,707.6	-557.1	-475.6	730.0	0.12	0.11	
6,845.0	5.10	228.30	6,802.2	-563.5	-482.1	739.0	1.02	-0.84	
6,940.0	4.00	225.70	6,896.9	-568.6	-487.6	746.4	1.18	-1.16	
7,034.0	1.90	218.30	6,990.7	-572.1	-490.9	751.2	2.27	-2.23	
7,129.0	1.40	185.20	7,085.7	-574.5	-492.0	753.8	1.11	-0.53	
7,223.0	1.50	195.30	7,179.7	-576.8	-492.4	755.9	0.29	0.11	
7,318.0	1.10	197.02	7,274.6	-578.9	-493.0	757.9	0.42	-0.42	
7,412.0	1.30	203.80	7,368.6	-580.8	-493.7	759.8	0.26	0.21	
7,507.0	1.80	215.70	7,463.6	-582.9	-495.0	762.4	0.62	0.53	
7,601.0	1.90	216.30	7,557.5	-585.4	-496.8	765.4	0.11	0.11	
7,696.0	1.80	220.70	7,652.5	-587.8	-498.7	768.5	0.18	-0.11	
7,791.0	1.60	225.80	7,747.4	-589.9	-500.6	771.3	0.26	-0.21	
7,885.0	1.90	217.60	7,841.4	-592.0	-502.5	774.1	0.41	0.32	
7,980.0	1.90	216.60	7,936.3	-594.5	-504.4	777.3	0.03	0.00	
8,075.0	2.20	220.80	8,031.3	-597.2	-506.6	780.7	0.35	0.32	
8,169.0	2.10	223.70	8,125.2	-599.8	-508.9	784.2	0.16	-0.11	
8,263.0	2.00	227.10	8,219.2	-602.1	-511.3	787.5	0.17	-0.11	
8,358.0	2.20	237.30	8,314.1	-604.3	-514.1	790.8	0.45	0.21	
8,453.0	2.00	250.20	8,409.0	-605.8	-517.2	793.9	0.54	-0.21	
8,547.0	1.90	254.60	8,503.0	-606.8	-520.2	796.4	0.19	-0.11	
8,641.0	1.40	273.70	8,596.9	-607.1	-522.9	798.2	0.78	-0.53	
8,736.0	1.40	266.50	8,691.9	-607.1	-525.2	799.6	0.19	0.00	
8,831.0	1.60	258.20	8,786.9	-607.4	-527.6	801.3	0.31	0.21	
8,885.0	1.70	264.10	8,840.9	-607.7	-529.2	802.4	0.36	0.19	LAST CES SURVEY @ 8885' MD
8,940.0	1.70	264.10	8,895.8	-607.9	-530.8	803.5	0.00	0.00	Bit Projection @ 8940' MD

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<b>Project:</b>	Garfield County, CO	<b>TVD Reference:</b>	30' KB @ 8507.0usft (H&P 330)
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<b>Well:</b>	PUCKETT 43A-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Final	<b>Database:</b>	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
PUCKETT 43A-2 BHL	0.00	0.00	8,859.0	-595.9	-509.0	608,723.24	1,243,151.33	39.474086	-108.181439
- actual wellpath misses target center by 29.6usft at 8885.0usft MD (8840.9 TVD, -607.7 N, -529.2 E)									
- Circle (radius 50.0)									
PUCKETT 43A-2 TGT	0.00	0.00	7,334.0	-595.9	-509.0	608,723.24	1,243,151.33	39.474086	-108.181439
- actual wellpath misses target center by 22.2usft at 7377.8usft MD (7334.4 TVD, -580.1 N, -493.4 E)									
- Point									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W		
		(usft)	(usft)	Comment	
8,885.0	8,840.9	-607.7	-529.2	LAST CES SURVEY @ 8885' MD	
8,940.0	8,895.8	-607.9	-530.8	Bit Projection @ 8940' MD	

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