





Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference:	Well PUCKETT 11B-1
Project:	Garfield County, CO	TVD Reference:	30' KB @ 8359.0usft (H&P 330)
Site:	S1-T7S-R97W (Mesa E1 797)	MD Reference:	30' KB @ 8359.0usft (H&P 330)
Well:	PUCKETT 11B-1	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Project	Garfield County, CO		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado Central 502		

Site		S1-T7S-R97W (Mesa E1 797)			
Site Position:		Northing:	609,370.34 usft	Latitude:	39.476064
From:	Lat/Long	Easting:	1,245,650.28 usft	Longitude:	-108.172658
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.69 °

Well	PUCKETT 11B-1					
Well Position	+N-S	0.0 usft	Northing:	609,377.13 usft	Latitude:	39.476083
	+E-W	0.0 usft	Easting:	1,245,654.44 usft	Longitude:	-108.172644
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	8,329.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/8/2015	9.85	65.82	51,958

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	326.81	

Survey Program	Date	8/17/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
164.0	9,090.0	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Formations / Comments	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
164.0	0.50	340.50	164.0	0.7	-0.2	0.7	0.30	0.30		
195.0	1.50	355.70	195.0	1.2	-0.3	1.2	3.31	3.23		
225.0	1.70	3.30	225.0	2.0	-0.3	1.9	0.97	0.67		
255.0	2.20	348.10	255.0	3.1	-0.4	2.8	2.38	1.67		
286.0	2.20	344.60	285.9	4.2	-0.7	3.9	0.43	0.00		
316.0	3.10	336.60	315.9	5.5	-1.2	5.2	3.24	3.00		
347.0	4.30	338.20	346.8	7.4	-1.9	7.2	3.88	3.87		
377.0	5.40	334.30	376.7	9.7	-3.0	9.7	3.83	3.67		
469.0	7.50	327.80	468.1	18.7	-8.0	20.0	2.41	2.28		
560.0	9.80	324.80	558.1	30.0	-15.7	33.7	2.57	2.53		
654.0	11.80	323.10	650.4	44.2	-26.1	51.3	2.15	2.13		
749.0	13.70	323.30	743.1	61.0	-38.6	72.2	2.00	2.00		



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Well:	PUCKETT 11B-1	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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 (°/100usft)	Build Rate (°/100u)	Formations / Comments
843.0	14.50	322.90	834.3	79.3	-52.4	95.1	0.86	0.85	
938.0	14.50	326.20	926.2	98.7	-66.2	118.8	0.87	0.00	
1,032.0	15.30	326.80	1,017.1	118.9	-79.5	143.0	0.87	0.85	
1,127.0	14.20	329.10	1,108.9	139.3	-92.3	167.2	1.31	-1.16	
1,221.0	13.90	327.70	1,200.1	158.8	-104.3	190.0	0.48	-0.32	
1,316.0	13.90	327.70	1,292.3	178.1	-116.5	212.8	0.00	0.00	
1,410.0	14.10	327.80	1,383.6	197.3	-128.6	235.5	0.21	0.21	
1,505.0	14.50	323.30	1,475.6	216.6	-141.9	259.0	1.24	0.42	
1,600.0	14.80	326.50	1,567.5	236.3	-155.7	283.0	0.91	0.32	
1,694.0	14.40	332.50	1,658.5	256.7	-167.7	306.6	1.66	-0.43	
1,789.0	14.40	341.80	1,750.5	278.4	-176.9	329.8	2.43	0.00	
1,884.0	14.50	346.90	1,842.5	301.2	-183.3	352.4	1.34	0.11	
1,978.0	15.60	348.90	1,933.3	325.0	-188.4	375.1	1.29	1.17	
2,073.0	16.00	352.60	2,024.7	350.6	-192.5	398.7	1.14	0.42	
2,168.0	16.20	354.60	2,116.0	376.7	-195.4	422.3	0.62	0.21	
2,262.0	17.10	355.20	2,206.0	403.6	-197.8	446.0	0.97	0.96	
2,357.0	17.40	352.70	2,296.8	431.6	-200.8	471.1	0.84	0.32	
2,451.0	17.80	351.50	2,386.4	459.7	-204.7	496.8	0.57	0.43	
2,594.0	21.60	343.60	2,521.0	506.6	-215.4	541.9	3.24	2.66	
2,689.0	21.30	337.70	2,609.4	539.4	-226.9	575.6	2.29	-0.32	
2,783.0	20.90	331.00	2,697.1	569.8	-241.5	609.0	2.60	-0.43	
2,878.0	20.30	329.60	2,786.1	598.9	-258.0	642.4	0.82	-0.63	
2,972.0	19.00	329.00	2,874.6	626.0	-274.2	674.0	1.40	-1.38	
3,067.0	18.80	329.40	2,964.5	652.5	-289.9	704.7	0.25	-0.21	
3,162.0	17.70	326.50	3,054.7	677.7	-305.7	734.5	1.50	-1.16	
3,256.0	18.00	326.90	3,144.2	701.8	-321.5	763.3	0.34	0.32	
3,351.0	19.60	326.90	3,234.1	727.4	-338.2	793.9	1.68	1.68	
3,445.0	19.60	327.30	3,322.7	753.9	-355.3	825.4	0.14	0.00	
3,539.0	18.40	327.20	3,411.5	779.6	-371.9	856.0	1.28	-1.28	
3,634.0	18.20	328.30	3,501.7	804.9	-387.8	885.9	0.42	-0.21	
3,728.0	16.70	327.80	3,591.4	828.8	-402.7	914.0	1.60	-1.60	
3,823.0	17.70	326.90	3,682.1	852.4	-417.9	942.1	1.09	1.05	
3,917.0	17.10	328.10	3,771.8	876.1	-433.0	970.2	0.74	-0.64	
4,012.0	18.00	324.80	3,862.4	900.0	-448.8	998.9	1.41	0.95	
4,106.0	17.30	323.10	3,952.0	923.0	-465.6	1,027.3	0.92	-0.74	
4,201.0	16.70	322.60	4,042.8	945.2	-482.4	1,055.0	0.65	-0.63	
4,295.0	17.50	324.90	4,132.7	967.5	-498.7	1,082.6	1.11	0.85	
4,390.0	17.30	325.00	4,223.3	990.7	-515.0	1,111.0	0.21	-0.21	
4,484.0	16.90	325.60	4,313.2	1,013.4	-530.8	1,138.7	0.47	-0.43	
4,578.0	15.00	320.50	4,403.6	1,034.1	-546.2	1,164.4	2.51	-2.02	
4,675.0	16.40	325.90	4,497.0	1,055.1	-561.9	1,190.6	2.08	1.44	
4,767.0	15.60	326.30	4,585.4	1,076.2	-576.0	1,215.9	0.88	-0.87	
4,862.0	16.00	327.80	4,676.8	1,097.9	-590.1	1,241.8	0.60	0.42	
4,957.0	17.10	328.80	4,767.9	1,120.9	-604.3	1,268.8	1.20	1.16	
5,051.0	17.80	329.60	4,857.5	1,145.1	-618.7	1,297.0	0.79	0.74	
5,146.0	16.70	328.60	4,948.3	1,169.3	-633.2	1,325.2	1.20	-1.16	
5,241.0	18.80	332.20	5,038.7	1,194.5	-647.4	1,354.0	2.49	2.21	
5,335.0	19.00	334.10	5,127.7	1,221.7	-661.2	1,384.3	0.69	0.21	
5,430.0	17.40	332.20	5,217.9	1,248.1	-674.6	1,413.8	1.80	-1.68	
5,524.0	18.90	331.40	5,307.2	1,273.9	-688.4	1,443.0	1.62	1.60	
5,619.0	19.00	330.90	5,397.1	1,301.0	-703.3	1,473.7	0.20	0.11	
5,713.0	18.10	330.10	5,486.2	1,327.0	-718.0	1,503.6	0.99	-0.96	
5,808.0	17.30	328.80	5,576.7	1,351.9	-732.7	1,532.4	0.94	-0.84	



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Well:	PUCKETT 11B-1	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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 (°/100usft)	Build Rate (°/100u)	Formations / Comments
5,902.0	17.10	330.90	5,666.5	1,375.9	-746.7	1,560.2	0.69	-0.21	
5,997.0	16.60	329.30	5,757.4	1,399.8	-760.4	1,587.7	0.72	-0.53	
6,092.0	16.10	329.20	5,848.6	1,422.8	-774.0	1,614.4	0.53	-0.53	
6,186.0	16.70	334.10	5,938.8	1,446.1	-786.6	1,640.8	1.60	0.64	
6,280.0	16.40	333.00	6,028.9	1,470.1	-798.5	1,667.4	0.46	-0.32	
6,375.0	15.20	331.60	6,120.3	1,493.0	-810.6	1,693.1	1.33	-1.26	
6,470.0	14.50	332.00	6,212.1	1,514.4	-822.1	1,717.4	0.74	-0.74	
6,564.0	13.30	333.40	6,303.4	1,534.5	-832.4	1,739.8	1.33	-1.28	
6,659.0	12.20	334.70	6,396.0	1,553.3	-841.6	1,760.6	1.20	-1.16	
6,754.0	10.60	338.10	6,489.1	1,570.5	-849.2	1,779.2	1.83	-1.68	
6,848.0	10.40	338.40	6,581.6	1,586.4	-855.5	1,795.9	0.22	-0.21	
6,943.0	7.70	340.80	6,675.4	1,600.4	-860.8	1,810.5	2.87	-2.84	
7,037.0	6.00	354.90	6,768.7	1,611.3	-863.3	1,821.0	2.53	-1.81	
7,132.0	4.10	354.00	6,863.3	1,619.6	-864.1	1,828.4	2.00	-2.00	
7,203.0	2.87	344.78	6,934.2	1,623.8	-864.8	1,832.3	1.90	-1.73	PUCKETT 11B-1 TGT
7,226.0	2.50	339.90	6,957.2	1,624.9	-865.1	1,833.4	1.90	-1.62	
7,321.0	2.80	310.10	7,052.1	1,628.3	-867.6	1,837.6	1.47	0.32	
7,415.0	2.10	288.70	7,146.0	1,630.3	-871.0	1,841.2	1.21	-0.74	
7,510.0	1.20	260.30	7,240.9	1,630.7	-873.6	1,842.9	1.25	-0.95	
7,604.0	0.50	301.20	7,334.9	1,630.8	-874.9	1,843.7	0.94	-0.74	
7,699.0	0.80	129.00	7,429.9	1,630.6	-874.8	1,843.4	1.37	0.32	
7,793.0	0.20	225.40	7,523.9	1,630.0	-874.4	1,842.8	0.90	-0.64	
7,888.0	0.60	279.40	7,618.9	1,630.0	-875.0	1,843.1	0.54	0.42	
7,983.0	0.90	226.50	7,713.9	1,629.6	-876.0	1,843.3	0.76	0.32	
8,077.0	1.50	213.70	7,807.9	1,628.0	-877.3	1,842.7	0.70	0.64	
8,172.0	2.60	226.00	7,902.8	1,625.5	-879.5	1,841.8	1.24	1.16	
8,267.0	2.90	238.70	7,997.7	1,622.8	-883.1	1,841.4	0.71	0.32	
8,361.0	3.40	231.10	8,091.6	1,619.8	-887.3	1,841.2	0.69	0.53	
8,456.0	4.20	222.70	8,186.4	1,615.4	-891.9	1,840.1	1.02	0.84	
8,550.0	4.30	231.30	8,280.1	1,610.7	-896.9	1,838.9	0.69	0.11	
8,645.0	3.90	226.90	8,374.9	1,606.3	-902.1	1,838.0	0.54	-0.42	
8,739.0	4.10	220.70	8,468.6	1,601.5	-906.6	1,836.6	0.51	0.21	
8,834.0	4.10	224.70	8,563.4	1,596.6	-911.2	1,834.9	0.30	0.00	
8,928.0	4.60	226.80	8,657.1	1,591.6	-916.3	1,833.5	0.56	0.53	
9,033.0	4.50	231.10	8,761.8	1,586.1	-922.6	1,832.4	0.34	-0.10	Last CES Survey @ 9033' MD - PUCKETT 11B-1
9,090.0	4.50	231.10	8,818.6	1,583.3	-926.1	1,832.0	0.00	0.00	Projection to Bit @ 9090' MD



Cathedral Energy Services

Survey Report

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Project:	Garfield County, CO	TVD Reference:	30' KB @ 8359.0usft (H&P 330)
Site:	S1-T7S-R97W (Mesa E1 797)	MD Reference:	30' KB @ 8359.0usft (H&P 330)
Well:	PUCKETT 11B-1	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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 11B-1 BHL 7.	0.00	0.00	8,791.0	1,611.8	-890.0	611,014.37	1,244,812.24	39.480508	-108.175797
- survey misses target center by 50.7usft at 9033.0usft MD (8761.8 TVD, 1586.1 N, -922.6 E)									
- Circle (radius 50.0)									
PUCKETT 11B-1 TGT	0.00	0.00	6,929.0	1,758.5	-652.6	611,154.10	1,245,053.84	39.480911	-108.174956
- survey misses target center by 251.4usft at 7203.0usft MD (6934.2 TVD, 1623.8 N, -864.8 E)									
- Point									
PUCKETT 11B-1 BHL	0.00	0.00	8,801.0	1,758.5	-652.6	611,154.10	1,245,053.84	39.480911	-108.174956
- survey misses target center by 322.7usft at 9033.0usft MD (8761.8 TVD, 1586.1 N, -922.6 E)									
- Circle (radius 50.0)									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)	
9,033.0	8,761.8	1,586.1	-922.6	Last CES Survey @ 9033' MD
9,090.0	8,818.6	1,583.3	-926.1	Projection to Bit @ 9090' MD

Checked By: _____ Approved By: _____ Date: _____