





Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference:	Well Nolte 13A-13
Project:	Garfield County, CO	TVD Reference:	WELL @ 5107.9usft
Site:	S14-T7S-R96W (Nolte)	MD Reference:	WELL @ 5107.9usft
Well:	Nolte 13A-13	North Reference:	True
Wellbore:	DD	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		S14-T7S-R96W (Nolte)			
Site Position:		Northing:	592,602.09 usft	Latitude:	39.432320
From:	Lat/Long	Easting:	1,274,369.93 usft	Longitude:	-108.069280
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.62 °

Well	Nolte 13A-13					
Well Position	+N/-S	0.0 usft	Northing:	592,655.02 usft	Latitude:	39.432481
	+E/-W	0.0 usft	Easting:	1,274,574.40 usft	Longitude:	-108.068562
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,090.9 usft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/3/2014	10.01	65.59	51,922

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	31.84	

Survey Program	Date	5/8/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
145.0	6,540.0	Survey #1 (DD)	MWD	Geolink MWD	

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	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
145.0	0.20	173.90	145.0	-0.3	0.0	-0.2	0.14	0.14		
237.0	0.30	85.00	237.0	-0.4	0.3	-0.2	0.39	0.11		
329.0	1.40	20.00	329.0	0.7	0.9	1.1	1.42	1.20		
421.0	3.90	34.40	420.9	4.3	3.1	5.3	2.79	2.72		
513.0	7.50	29.50	512.4	12.1	7.8	14.4	3.95	3.91		
604.0	11.40	33.10	602.2	24.8	15.6	29.3	4.33	4.29		
695.0	15.30	30.80	690.7	42.7	26.7	50.4	4.32	4.29		
787.0	19.20	32.50	778.5	65.9	41.0	77.6	4.27	4.24		
877.0	21.80	29.20	862.8	93.0	57.1	109.1	3.16	2.89		
970.0	24.10	30.10	948.5	124.5	75.1	145.4	2.50	2.47		
1,078.0	26.90	31.80	1,045.9	164.3	99.0	191.8	2.68	2.59		
1,173.0	29.20	36.50	1,129.8	201.2	124.1	236.4	3.36	2.42		

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Well:	Nolte 13A-13	North Reference:	True
Wellbore:	DD	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 (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,268.0	31.40	36.40	1,211.8	239.8	152.6	284.2	2.32	2.32	
1,363.0	33.90	32.60	1,291.8	282.0	181.6	335.4	3.40	2.63	
1,458.0	36.60	32.70	1,369.4	328.2	211.2	390.2	2.84	2.84	
1,553.0	40.00	32.20	1,443.9	377.9	242.7	449.1	3.59	3.58	
1,648.0	40.80	30.20	1,516.3	430.5	274.6	510.6	1.60	0.84	
1,743.0	43.60	32.70	1,586.6	484.9	307.9	574.4	3.44	2.95	
1,838.0	43.00	31.20	1,655.8	540.2	342.4	639.6	1.25	-0.63	
1,933.0	43.10	31.40	1,725.2	595.6	376.1	704.4	0.18	0.11	
2,028.0	43.70	31.10	1,794.2	651.4	410.0	769.7	0.67	0.63	
2,123.0	44.90	26.80	1,862.2	709.5	442.1	835.9	3.40	1.26	
2,218.0	44.00	29.70	1,930.0	768.1	473.5	902.3	2.34	-0.95	
2,313.0	43.20	27.10	1,998.8	825.7	504.7	967.7	2.07	-0.84	
2,408.0	43.20	26.60	2,068.1	883.7	534.1	1,032.5	0.36	0.00	
2,503.0	43.90	29.40	2,137.0	941.5	564.8	1,097.8	2.16	0.74	
2,598.0	42.80	28.40	2,206.0	998.6	596.3	1,162.9	1.36	-1.16	
2,693.0	41.10	26.80	2,276.7	1,054.8	625.7	1,226.2	2.11	-1.79	
2,788.0	39.50	28.30	2,349.1	1,109.3	654.2	1,287.5	1.97	-1.68	
2,884.0	37.90	29.90	2,424.1	1,161.8	683.3	1,347.4	1.97	-1.67	
2,979.0	36.40	32.30	2,499.8	1,210.9	712.9	1,404.8	2.20	-1.58	
3,074.0	33.10	31.30	2,577.8	1,256.9	741.5	1,458.9	3.53	-3.47	
3,169.0	31.60	31.70	2,658.1	1,300.2	768.0	1,509.8	1.59	-1.58	
3,264.0	29.80	33.50	2,739.8	1,341.1	794.2	1,558.2	2.13	-1.89	
3,359.0	28.30	31.40	2,822.8	1,380.0	818.9	1,604.4	1.91	-1.58	
3,454.0	25.50	34.20	2,907.5	1,416.1	842.1	1,647.3	3.23	-2.95	
3,549.0	23.00	37.30	2,994.1	1,447.8	864.9	1,686.2	2.95	-2.63	
3,644.0	20.00	36.50	3,082.5	1,475.7	885.8	1,720.9	3.17	-3.16	
3,739.0	17.60	36.70	3,172.5	1,500.2	904.1	1,751.4	2.53	-2.53	
3,833.0	15.40	37.00	3,262.6	1,521.6	920.1	1,778.0	2.34	-2.34	
3,928.0	13.60	36.10	3,354.5	1,540.7	934.2	1,801.7	1.91	-1.89	
4,023.0	11.30	38.00	3,447.3	1,557.1	946.6	1,822.1	2.46	-2.42	
4,118.0	9.70	41.90	3,540.7	1,570.4	957.6	1,839.3	1.84	-1.68	
4,213.0	7.00	34.80	3,634.7	1,581.1	966.3	1,852.9	3.04	-2.84	
4,308.0	6.40	38.00	3,729.1	1,590.0	972.8	1,864.0	0.74	-0.63	
4,403.0	3.70	45.80	3,823.7	1,596.3	978.3	1,872.2	2.93	-2.84	
4,498.0	2.90	39.50	3,918.5	1,600.3	982.0	1,877.6	0.92	-0.84	
4,593.0	2.00	30.30	4,013.4	1,603.6	984.4	1,881.6	1.03	-0.95	
4,688.0	1.60	30.70	4,108.4	1,606.2	985.9	1,884.6	0.42	-0.42	
4,783.0	1.00	18.50	4,203.4	1,608.1	986.8	1,886.7	0.69	-0.63	
4,878.0	0.60	311.70	4,298.4	1,609.2	986.7	1,887.6	0.99	-0.42	
4,974.0	1.50	357.80	4,394.3	1,610.8	986.3	1,888.7	1.22	0.94	
5,069.0	1.30	349.60	4,489.3	1,613.1	986.1	1,890.6	0.30	-0.21	
5,164.0	0.70	96.20	4,584.3	1,614.1	986.5	1,891.6	1.73	-0.63	
5,259.0	0.40	228.90	4,679.3	1,613.8	986.8	1,891.5	1.07	-0.32	
5,353.0	0.70	252.80	4,773.3	1,613.4	986.0	1,890.8	0.40	0.32	
5,448.0	1.10	63.60	4,868.3	1,613.7	986.2	1,891.1	1.89	0.42	
5,543.0	0.10	238.40	4,963.3	1,614.0	987.0	1,891.8	1.26	-1.05	
5,637.0	0.40	261.00	5,057.3	1,613.9	986.6	1,891.5	0.33	0.32	
5,732.0	0.50	230.20	5,152.3	1,613.6	986.0	1,890.9	0.27	0.11	
5,827.0	0.70	194.40	5,247.3	1,612.8	985.5	1,890.0	0.44	0.21	
5,922.0	0.70	182.70	5,342.3	1,611.6	985.3	1,888.9	0.15	0.00	
6,017.0	0.40	163.00	5,437.3	1,610.7	985.4	1,888.2	0.37	-0.32	
6,112.0	0.30	154.10	5,532.3	1,610.2	985.6	1,887.9	0.12	-0.11	
6,207.0	0.30	165.30	5,627.3	1,609.7	985.8	1,887.5	0.06	0.00	

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Survey									
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6,302.0	0.50	194.40	5,722.3	1,609.1	985.7	1,887.0	0.29	0.21	
6,397.0	0.70	221.80	5,817.3	1,608.3	985.2	1,886.0	0.36	0.21	
6,490.0	1.40	201.20	5,910.2	1,606.8	984.4	1,884.3	0.84	0.75	Last CES Survey @ 6,490' MD
6,540.0	1.40	201.20	5,960.2	1,605.6	984.0	1,883.1	0.00	0.00	PTB @ 6,540'

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									
Nolte 13A-13 PBHL 2	0.00	0.00	5,930.1	1,606.8	988.4	594,233.20	1,275,607.79	39.436893	-108.065062
- actual wellpath misses target center by 20.2usft at 6490.0usft MD (5910.2 TVD, 1606.8 N, 984.4 E)									
- Circle (radius 50.0)									
Nolte 13A-13 PBHL	0.00	0.00	5,930.1	1,606.4	997.6	594,232.53	1,275,617.01	39.436891	-108.065030
- actual wellpath misses target center by 23.8usft at 6490.0usft MD (5910.2 TVD, 1606.8 N, 984.4 E)									
- Circle (radius 50.0)									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
6,490.0	5,910.2	1,606.8	984.4	Last CES Survey @ 6,490' MD	
6,540.0	5,960.2	1,605.6	984.0	PTB @ 6,540'	

Checked By: _____ Approved By: _____ Date: _____