





Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference:	Well Nolte 13B-13
Project:	Garfield County, CO	TVD Reference:	WELL @ 5107.8usft
Site:	S14-T7S-R96W	MD Reference:	WELL @ 5107.8usft
Well:	Nolte 13B-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			
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 13B-13					
Well Position	+N/-S	0.0 usft	Northing:	592,648.04 usft	Latitude:	39.432462
	+E/-W	0.0 usft	Easting:	1,274,570.51 usft	Longitude:	-108.068575
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,090.8 usft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/30/2014	10.01	65.59	51,923

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	38.05	

Survey Program	Date	5/5/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
146.0	6,382.0	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		
146.0	1.10	115.30	146.0	-0.6	1.3	0.3	0.75	0.75		
237.0	1.40	75.50	237.0	-0.7	3.1	1.4	0.99	0.33		
329.0	1.40	63.20	328.9	0.1	5.2	3.3	0.33	0.00		
421.0	3.30	35.90	420.9	2.7	7.8	7.0	2.34	2.07		
482.0	5.80	33.20	481.7	6.7	10.5	11.8	4.11	4.10		
543.0	7.70	39.30	542.2	12.5	14.8	18.9	3.32	3.11		
605.0	9.90	40.40	603.5	19.8	20.9	28.4	3.56	3.55		
696.0	13.90	35.70	692.5	34.6	32.3	47.2	4.52	4.40		
787.0	17.20	35.50	780.2	54.4	46.5	71.5	3.63	3.63		
878.0	20.00	38.00	866.4	77.7	63.9	100.5	3.20	3.08		
970.0	23.10	39.30	952.0	104.0	85.0	134.3	3.41	3.37		
1,076.0	25.70	38.00	1,048.5	138.2	112.4	178.1	2.50	2.45		

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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
1,171.0	27.60	31.80	1,133.4	173.2	136.6	220.6	3.54	2.00	
1,267.0	30.50	35.80	1,217.4	211.9	162.6	267.1	3.63	3.02	
1,361.0	33.20	32.80	1,297.2	252.8	190.5	316.5	3.33	2.87	
1,456.0	34.80	36.50	1,376.0	296.5	220.7	369.5	2.75	1.68	
1,552.0	36.70	35.30	1,453.9	341.9	253.6	425.6	2.11	1.98	
1,647.0	36.80	37.30	1,530.0	387.7	287.3	482.4	1.26	0.11	
1,742.0	36.30	33.30	1,606.3	433.9	319.9	538.9	2.56	-0.53	
1,837.0	36.70	37.70	1,682.7	479.9	352.8	595.3	2.79	0.42	
1,932.0	37.40	38.50	1,758.5	524.9	388.1	652.5	0.89	0.74	
2,026.0	36.70	38.10	1,833.5	569.4	423.2	709.2	0.79	-0.74	
2,122.0	37.70	40.00	1,910.0	614.4	459.7	767.2	1.59	1.04	
2,217.0	37.00	41.50	1,985.5	658.1	497.4	824.8	1.21	-0.74	
2,312.0	38.30	38.30	2,060.8	702.6	534.6	882.7	2.47	1.37	
2,407.0	37.60	38.80	2,135.7	748.3	571.0	941.2	0.80	-0.74	
2,502.0	37.90	41.30	2,210.8	792.8	608.4	999.3	1.64	0.32	
2,597.0	37.00	39.00	2,286.2	836.9	645.6	1,057.0	1.75	-0.95	
2,692.0	36.20	40.20	2,362.5	880.6	681.7	1,113.6	1.13	-0.84	
2,787.0	35.10	40.10	2,439.7	922.9	717.4	1,168.9	1.16	-1.16	
2,882.0	32.30	38.40	2,518.7	963.7	750.8	1,221.6	3.11	-2.95	
2,977.0	30.30	40.70	2,599.9	1,001.8	782.2	1,271.0	2.45	-2.11	
3,072.0	29.20	38.60	2,682.4	1,038.0	812.3	1,318.1	1.59	-1.16	
3,167.0	26.10	40.70	2,766.5	1,072.0	840.4	1,362.1	3.42	-3.26	
3,262.0	23.70	36.40	2,852.7	1,103.2	865.3	1,402.1	3.16	-2.53	
3,358.0	21.30	36.90	2,941.4	1,132.7	887.3	1,438.8	2.51	-2.50	
3,452.0	18.50	36.50	3,029.7	1,158.3	906.4	1,470.8	2.98	-2.98	
3,548.0	17.30	36.60	3,121.1	1,182.0	923.9	1,500.3	1.25	-1.25	
3,642.0	13.90	37.30	3,211.6	1,202.3	939.1	1,525.6	3.62	-3.62	
3,737.0	11.50	37.40	3,304.3	1,218.9	951.8	1,546.5	2.53	-2.53	
3,832.0	10.30	34.80	3,397.6	1,233.4	962.4	1,564.4	1.36	-1.26	
3,927.0	9.30	33.70	3,491.2	1,246.7	971.5	1,580.5	1.07	-1.05	
4,022.0	7.00	43.50	3,585.2	1,257.3	979.7	1,594.0	2.82	-2.42	
4,117.0	5.00	38.10	3,679.7	1,264.8	986.3	1,603.9	2.19	-2.11	
4,211.0	4.40	34.60	3,773.4	1,271.0	990.9	1,611.6	0.71	-0.64	
4,306.0	3.40	42.80	3,868.2	1,276.0	994.8	1,618.0	1.20	-1.05	
4,401.0	1.90	22.30	3,963.1	1,279.5	997.4	1,622.3	1.84	-1.58	
4,496.0	1.20	48.40	4,058.0	1,281.7	998.7	1,624.8	1.03	-0.74	
4,592.0	1.00	53.50	4,154.0	1,282.8	1,000.1	1,626.6	0.23	-0.21	
4,687.0	0.60	280.30	4,249.0	1,283.4	1,000.3	1,627.2	1.55	-0.42	
4,782.0	1.20	63.90	4,344.0	1,283.9	1,000.7	1,627.8	1.81	0.63	
4,877.0	1.50	48.60	4,439.0	1,285.2	1,002.5	1,630.0	0.49	0.32	
4,972.0	0.40	117.70	4,534.0	1,285.9	1,003.8	1,631.2	1.48	-1.16	
5,067.0	0.70	80.60	4,628.9	1,285.8	1,004.6	1,631.7	0.47	0.32	
5,162.0	0.40	280.00	4,723.9	1,286.0	1,004.9	1,632.0	1.14	-0.32	
5,257.0	1.10	242.20	4,818.9	1,285.6	1,003.7	1,631.0	0.86	0.74	
5,352.0	2.00	29.90	4,913.9	1,286.6	1,003.8	1,631.8	3.15	0.95	
5,447.0	2.60	47.50	5,008.8	1,289.5	1,006.2	1,635.6	0.97	0.63	
5,541.0	2.30	53.40	5,102.8	1,292.1	1,009.3	1,639.5	0.42	-0.32	
5,636.0	1.30	32.40	5,197.7	1,294.1	1,011.4	1,642.4	1.24	-1.05	
5,731.0	0.40	333.60	5,292.7	1,295.3	1,011.8	1,643.6	1.21	-0.95	
5,826.0	1.80	72.90	5,387.7	1,296.0	1,013.1	1,645.0	2.01	1.47	
5,921.0	2.00	71.40	5,482.6	1,297.0	1,016.1	1,647.6	0.22	0.21	
6,016.0	1.50	59.60	5,577.6	1,298.2	1,018.7	1,650.2	0.65	-0.53	
6,111.0	1.20	54.70	5,672.6	1,299.4	1,020.6	1,652.3	0.34	-0.32	

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6,206.0	0.80	25.00	5,767.6	1,300.6	1,021.7	1,653.9	0.68	-0.42	
6,301.0	0.10	328.30	5,862.5	1,301.2	1,021.9	1,654.5	0.79	-0.74	
6,332.0	0.40	200.50	5,893.5	1,301.1	1,021.9	1,654.5	1.51	0.97	Last CES Survey @ 6,332' MD
6,382.0	0.40	200.50	5,943.5	1,300.8	1,021.8	1,654.1	0.00	0.00	PTB @ 6,382'

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 13B-13	0.00	0.00	5,920.0	1,283.6	1,004.6	593,902.69	1,275,610.97	39.435986	-108.065018
- actual wellpath misses target center by 24.5usft at 6358.6usft MD (5920.1 TVD, 1301.0 N, 1021.8 E)									
- Circle (radius 50.0)									
Nolte 13B-13 PBHL 2	0.00	0.00	5,920.0	1,284.0	995.4	593,903.36	1,275,601.78	39.435987	-108.065051
- actual wellpath misses target center by 31.4usft at 6358.6usft MD (5920.2 TVD, 1301.0 N, 1021.8 E)									
- Circle (radius 50.0)									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,332.0	5,893.5	1,301.1	1,021.9	Last CES Survey @ 6,332' MD PTB @ 6,382'
6,382.0	5,943.5	1,300.8	1,021.8	

Checked By: _____ Approved By: _____ Date: _____