





Cathedral Energy Services

Survey Report

Company:	Caerus Oil & Gas (NAD 27)	Local Co-ordinate Reference:	Well Nolte 11A-24
Project:	Garfield County, CO	TVD Reference:	WELL @ 5107.9usft
Site:	S14-T7S-R96W	MD Reference:	WELL @ 5107.9usft
Well:	Nolte 11A-24	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 11A-24					
Well Position	+N/-S	0.0 usft	Northing:	592,608.23 usft	Latitude:	39.432352
	+E/-W	0.0 usft	Easting:	1,274,559.77 usft	Longitude:	-108.068609
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	3/21/2014	10.02	65.60	51,934

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	133.36	

Survey Program	Date	3/26/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
145.0	6,250.0	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	0.30	205.80	145.0	-0.3	-0.2	0.1	0.21	0.21		
176.0	0.70	171.20	176.0	-0.6	-0.2	0.3	1.56	1.29		
206.0	1.10	168.20	206.0	-1.1	-0.1	0.7	1.34	1.33		
236.0	1.80	164.30	236.0	-1.8	0.1	1.3	2.36	2.33		
267.0	2.10	138.20	267.0	-2.7	0.6	2.3	2.99	0.97		
298.0	3.00	130.30	297.9	-3.6	1.6	3.7	3.11	2.90		
329.0	3.60	137.00	328.9	-4.9	2.9	5.5	2.30	1.94		
360.0	3.90	134.80	359.8	-6.3	4.3	7.5	1.07	0.97		
391.0	5.10	125.20	390.7	-7.9	6.2	9.9	4.56	3.87		
421.0	6.00	126.00	420.6	-9.6	8.5	12.8	3.01	3.00		
451.0	7.50	132.40	450.4	-11.8	11.3	16.3	5.59	5.00		
482.0	8.40	128.70	481.1	-14.6	14.5	20.6	3.34	2.90		

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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
513.0	9.30	130.40	511.7	-17.6	18.2	25.3	3.02	2.90	
543.0	10.20	132.50	541.3	-21.0	22.0	30.4	3.23	3.00	
574.0	11.10	136.10	571.7	-25.0	26.1	36.1	3.61	2.90	
605.0	12.00	133.80	602.1	-29.4	30.5	42.3	3.26	2.90	
635.0	12.30	131.40	631.4	-33.6	35.1	48.6	1.96	1.00	
666.0	13.10	138.80	661.7	-38.5	39.9	55.4	5.84	2.58	
696.0	14.10	136.40	690.8	-43.7	44.7	62.5	3.83	3.33	
727.0	14.80	134.30	720.9	-49.2	50.1	70.2	2.82	2.26	
757.0	16.00	134.60	749.8	-54.8	55.8	78.2	4.01	4.00	
787.0	17.00	136.20	778.5	-60.8	61.8	86.7	3.66	3.33	
817.0	17.90	135.70	807.2	-67.3	68.0	95.7	3.04	3.00	
848.0	18.90	136.40	836.6	-74.3	74.8	105.4	3.30	3.23	
878.0	19.70	136.80	864.9	-81.5	81.6	115.3	2.70	2.67	
971.0	21.30	135.00	952.0	-104.9	104.3	147.9	1.85	1.72	
1,071.0	20.90	134.10	1,045.3	-130.2	130.0	183.9	0.51	-0.40	
1,166.0	22.70	134.80	1,133.5	-154.9	155.1	219.1	1.91	1.89	
1,261.0	24.70	134.30	1,220.5	-181.7	182.4	257.3	2.12	2.11	
1,356.0	27.50	133.00	1,305.8	-210.5	212.6	299.1	3.01	2.95	
1,451.0	29.40	131.80	1,389.3	-241.0	246.0	344.3	2.09	2.00	
1,546.0	30.30	130.80	1,471.7	-272.2	281.6	391.6	1.08	0.95	
1,641.0	33.60	133.30	1,552.3	-305.9	318.8	441.8	3.74	3.47	
1,736.0	35.20	133.30	1,630.7	-342.7	357.9	495.5	1.68	1.68	
1,831.0	34.60	132.90	1,708.6	-379.8	397.6	549.9	0.68	-0.63	
1,926.0	36.00	133.30	1,786.1	-417.3	437.7	604.8	1.49	1.47	
2,021.0	35.90	132.60	1,863.0	-455.3	478.5	660.5	0.45	-0.11	
2,116.0	35.60	132.40	1,940.1	-492.8	519.4	716.0	0.34	-0.32	
2,211.0	34.70	132.10	2,017.8	-529.6	559.9	770.7	0.96	-0.95	
2,306.0	34.60	132.50	2,096.0	-566.0	599.8	824.7	0.26	-0.11	
2,401.0	33.40	132.40	2,174.7	-601.8	639.0	877.8	1.26	-1.26	
2,496.0	32.50	131.60	2,254.4	-636.4	677.4	929.5	1.05	-0.95	
2,591.0	33.00	133.20	2,334.3	-671.1	715.4	980.9	1.05	0.53	
2,686.0	32.80	133.00	2,414.1	-706.3	753.1	1,032.5	0.24	-0.21	
2,781.0	30.50	135.00	2,495.0	-740.9	788.9	1,082.3	2.66	-2.42	
2,877.0	28.00	134.10	2,578.7	-773.8	822.3	1,129.2	2.64	-2.60	
2,972.0	25.30	133.50	2,663.6	-803.3	853.1	1,171.8	2.86	-2.84	
3,067.0	24.70	134.00	2,749.7	-831.1	882.1	1,211.9	0.67	-0.63	
3,162.0	22.00	134.10	2,836.9	-857.3	909.2	1,249.6	2.84	-2.84	
3,257.0	18.90	134.10	2,925.9	-880.4	933.0	1,282.8	3.26	-3.26	
3,352.0	15.90	132.40	3,016.6	-899.8	953.7	1,311.2	3.20	-3.16	
3,447.0	13.90	132.70	3,108.4	-916.4	971.7	1,335.6	2.11	-2.11	
3,542.0	12.40	133.30	3,200.9	-931.1	987.5	1,357.2	1.59	-1.58	
3,637.0	10.20	126.50	3,294.0	-943.1	1,001.6	1,375.8	2.70	-2.32	
3,732.0	9.20	119.50	3,387.7	-951.8	1,015.0	1,391.5	1.63	-1.05	
3,826.0	8.10	117.10	3,480.6	-958.6	1,027.5	1,405.1	1.23	-1.17	
3,921.0	6.60	109.60	3,574.8	-963.4	1,038.6	1,416.6	1.87	-1.58	
4,016.0	4.20	111.70	3,669.4	-966.6	1,046.9	1,424.8	2.53	-2.53	
4,111.0	2.70	137.50	3,764.2	-969.5	1,051.7	1,430.3	2.24	-1.58	
4,206.0	1.20	106.90	3,859.2	-971.4	1,054.1	1,433.4	1.87	-1.58	
4,301.0	0.50	8.40	3,954.2	-971.3	1,055.2	1,434.0	1.44	-0.74	
4,396.0	0.40	16.30	4,049.2	-970.6	1,055.3	1,433.7	0.12	-0.11	
4,491.0	0.50	316.00	4,144.2	-970.0	1,055.1	1,433.1	0.48	0.11	
4,586.0	0.60	289.80	4,239.2	-969.5	1,054.4	1,432.2	0.28	0.11	
4,681.0	1.10	280.30	4,334.2	-969.2	1,053.0	1,431.0	0.55	0.53	

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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
4,776.0	0.60	92.30	4,429.1	-969.0	1,052.6	1,430.6	1.79	-0.53	
4,871.0	0.10	63.90	4,524.1	-969.0	1,053.2	1,431.0	0.54	-0.53	
4,967.0	0.40	252.60	4,620.1	-969.1	1,052.9	1,430.9	0.52	0.31	
5,062.0	1.40	241.40	4,715.1	-969.7	1,051.6	1,430.4	1.06	1.05	
5,157.0	0.30	313.60	4,810.1	-970.1	1,050.4	1,429.7	1.41	-1.16	
5,252.0	0.10	320.50	4,905.1	-969.9	1,050.2	1,429.4	0.21	-0.21	
5,346.0	1.30	224.20	4,999.1	-970.6	1,049.4	1,429.3	1.40	1.28	
5,441.0	0.70	222.60	5,094.1	-971.8	1,048.2	1,429.3	0.63	-0.63	
5,536.0	2.00	227.70	5,189.1	-973.3	1,046.6	1,429.2	1.37	1.37	
5,630.0	0.80	73.70	5,283.1	-974.2	1,046.0	1,429.4	2.92	-1.28	
5,725.0	0.90	154.90	5,378.1	-974.7	1,047.0	1,430.4	1.17	0.11	
5,820.0	1.30	185.20	5,473.0	-976.5	1,047.2	1,431.8	0.73	0.42	
5,915.0	1.40	189.60	5,568.0	-978.7	1,046.9	1,433.1	0.15	0.11	
6,010.0	1.70	193.50	5,663.0	-981.2	1,046.4	1,434.4	0.33	0.32	
6,105.0	2.00	204.40	5,757.9	-984.1	1,045.4	1,435.7	0.49	0.32	
6,200.0	2.50	214.30	5,852.9	-987.3	1,043.5	1,436.6	0.66	0.53	Last CES Survey @ 6,200' MD
6,250.0	2.50	214.30	5,902.8	-989.1	1,042.3	1,436.9	0.00	0.00	PTB @ 6,250'

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 11A-24 PBHL 2	0.00	0.00	5,800.1	-984.9	1,039.8	591,594.35	1,275,571.36	39.429647	-108.064928
- actual wellpath misses target center by 4.8usft at 6147.3usft MD (5800.2 TVD, -985.5 N, 1044.7 E)									
- Circle (radius 50.0)									
Nolte 11A-24 PBHL	0.00	0.00	5,800.1	-985.2	1,042.9	591,593.97	1,275,574.45	39.429647	-108.064917
- actual wellpath misses target center by 1.7usft at 6147.2usft MD (5800.1 TVD, -985.5 N, 1044.7 E)									
- Circle (radius 50.0)									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
6,200.0	5,852.9	-987.3	1,043.5	Last CES Survey @ 6,200' MD
6,250.0	5,902.8	-989.1	1,042.3	PTB @ 6,250'

Checked By: _____ Approved By: _____ Date: _____