

# Shell Exploration & Production Co. Inc.

Harper Co. KS (NAD-27)

Sec 33-T34S-R09W

Koblitz 3409 33-1H

9858073

Wellbore #1

Design: Wellbore #1

## Sperry Drilling Services

# Combo Report With Grid North & True North

02 January, 2013

Surface UWI : 9858073

TD Date : 9th Dec, 2012

Well Coordinates: 134,909.04 N, 2,056,359.97 E (37° 02' 13.24" N, 098° 18' 24.94" W)

Ground Level: 1,248.00 ft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Koblitz 3409 33-1H

WELL @ 1279.70ft (Nabors 102 (31.7'))

N

Grid

API US New

Version: 2003.21 Build: 46

**HALLIBURTON**

**Design Report for Koblitz 3409 33-1H - Wellbore #1**

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
						Northing	Easting	Northing	Easting			
0.00	0.00	0.00	0.12	-1,279.70	0.00	0.00 N	0.00 E	134,909.04	2,056,359.97	0.00	0.00	
539.00	3.68	88.23	88.35	-741.07	538.63	0.53 N	17.30 E	134,909.57	2,056,377.27	0.68	0.57	Start MWD
781.00	3.95	85.99	86.11	-499.61	780.09	1.36 N	33.37 E	134,910.39	2,056,393.34	0.13	1.43	
962.00	3.56	82.97	83.09	-319.00	960.70	2.48 N	45.17 E	134,911.52	2,056,405.14	0.24	2.58	
1,151.00	3.34	80.25	80.37	-130.34	1,149.36	4.13 N	56.42 E	134,913.17	2,056,416.39	0.15	4.25	
1,340.00	3.06	82.01	82.13	58.37	1,338.07	5.77 N	66.84 E	134,914.80	2,056,426.81	0.16	5.91	
1,529.00	3.05	83.28	83.40	247.10	1,526.80	7.05 N	76.83 E	134,916.09	2,056,436.80	0.04	7.22	
1,717.00	2.12	78.93	79.05	434.91	1,714.61	8.31 N	85.21 E	134,917.34	2,056,445.18	0.51	8.49	
1,907.00	1.83	81.08	81.20	624.79	1,904.49	9.45 N	91.66 E	134,918.49	2,056,451.63	0.16	9.65	
2,096.00	1.72	75.84	75.96	813.70	2,093.40	10.61 N	97.39 E	134,919.65	2,056,457.36	0.10	10.83	
2,284.00	2.00	74.33	74.45	1,001.60	2,281.30	12.19 N	103.28 E	134,921.23	2,056,463.25	0.15	12.42	
2,473.00	1.90	72.65	72.77	1,190.49	2,470.19	14.02 N	109.45 E	134,923.05	2,056,469.42	0.06	14.26	
2,757.00	1.44	65.00	65.12	1,474.37	2,754.07	16.93 N	117.18 E	134,925.97	2,056,477.15	0.18	17.18	
2,946.00	1.02	89.77	89.89	1,663.33	2,943.03	17.94 N	121.01 E	134,926.98	2,056,480.98	0.35	18.20	
3,135.00	0.96	90.15	90.27	1,852.30	3,132.00	17.94 N	124.28 E	134,926.98	2,056,484.25	0.03	18.21	
3,324.00	0.77	78.97	79.09	2,041.28	3,320.98	18.18 N	127.11 E	134,927.22	2,056,487.08	0.13	18.46	
3,513.00	0.77	89.75	89.87	2,230.26	3,509.96	18.43 N	129.62 E	134,927.47	2,056,489.59	0.08	18.71	
3,702.00	0.44	52.85	52.97	2,419.25	3,698.95	18.87 N	131.47 E	134,927.91	2,056,491.44	0.26	19.16	
3,796.00	0.70	59.17	59.29	2,513.25	3,792.95	19.38 N	132.25 E	134,928.42	2,056,492.22	0.28	19.67	
3,847.00	0.90	88.12	88.24	2,564.24	3,843.94	19.56 N	132.92 E	134,928.59	2,056,492.89	0.87	19.85	
3,985.00	1.21	91.80	91.92	2,702.22	3,981.92	19.55 N	135.46 E	134,928.58	2,056,495.43	0.23	19.84	
4,080.00	1.05	95.79	95.91	2,797.20	4,076.90	19.43 N	137.33 E	134,928.46	2,056,497.30	0.19	19.73	
4,174.00	1.24	60.68	60.80	2,891.18	4,170.88	19.84 N	139.07 E	134,928.88	2,056,499.04	0.76	20.14	
4,206.00	1.68	18.40	18.52	2,923.17	4,202.87	20.45 N	139.52 E	134,929.49	2,056,499.49	3.53	20.76	
4,237.00	3.14	359.55	359.67	2,954.15	4,233.85	21.73 N	139.66 E	134,930.77	2,056,499.63	5.30	22.04	
4,269.00	5.18	347.23	347.35	2,986.06	4,265.76	24.02 N	139.33 E	134,933.06	2,056,499.30	6.92	24.32	
4,300.00	8.03	346.10	346.22	3,016.85	4,296.55	27.49 N	138.50 E	134,936.52	2,056,498.47	9.20	27.79	
4,331.00	10.89	347.79	347.91	3,047.43	4,327.13	32.45 N	137.36 E	134,941.49	2,056,497.33	9.27	32.75	
4,363.00	13.57	350.72	350.84	3,078.70	4,358.40	39.11 N	136.12 E	134,948.15	2,056,496.09	8.59	39.41	
4,394.00	16.57	351.36	351.48	3,108.63	4,388.33	47.07 N	134.87 E	134,956.11	2,056,494.84	9.69	47.37	
4,426.00	19.93	351.97	352.09	3,139.01	4,418.71	56.99 N	133.42 E	134,966.02	2,056,493.39	10.52	57.28	
4,457.00	22.51	351.14	351.26	3,167.91	4,447.61	68.08 N	131.77 E	134,977.12	2,056,491.74	8.38	68.37	
4,489.00	25.75	349.52	349.64	3,197.11	4,476.81	80.98 N	129.56 E	134,990.01	2,056,489.53	10.33	81.26	
4,520.00	29.13	349.67	349.79	3,224.62	4,504.32	95.02 N	126.98 E	135,004.06	2,056,486.95	10.91	95.30	
4,552.00	32.91	350.58	350.70	3,252.04	4,531.74	111.27 N	124.16 E	135,020.31	2,056,484.13	11.90	111.54	
4,583.00	37.23	352.25	352.37	3,277.40	4,557.10	128.88 N	121.51 E	135,037.91	2,056,481.48	14.27	129.14	
4,614.00	41.90	354.66	354.78	3,301.30	4,581.00	148.49 N	119.28 E	135,057.53	2,056,479.25	15.86	148.75	

**Design Report for Koblitz 3409 33-1H - Wellbore #1**

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft) Easting (ft)		Map Coordinates Northing (ft) Easting (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
4,646.00	46.12	354.56	354.68	3,324.31	4,604.01	170.62 N	117.20 E	135,079.65	2,056,477.17	13.19	170.87	
4,677.00	48.47	353.60	353.72	3,345.33	4,625.03	193.27 N	114.84 E	135,102.31	2,056,474.81	7.91	193.53	
4,709.00	50.80	351.37	351.49	3,366.06	4,645.76	217.44 N	111.65 E	135,126.48	2,056,471.62	9.01	217.69	
4,740.00	52.81	349.50	349.62	3,385.22	4,664.92	241.46 N	107.59 E	135,150.50	2,056,467.56	8.03	241.70	
4,772.00	56.58	349.14	349.26	3,403.71	4,683.41	267.12 N	102.75 E	135,176.16	2,056,462.72	11.82	267.34	
4,803.00	60.44	347.48	347.60	3,419.91	4,699.61	293.00 N	97.39 E	135,202.03	2,056,457.36	13.26	293.21	
4,835.00	65.25	345.96	346.08	3,434.51	4,714.21	320.70 N	90.84 E	135,229.73	2,056,450.81	15.61	320.90	
4,866.00	71.35	345.62	345.74	3,445.96	4,725.66	348.61 N	83.78 E	135,257.64	2,056,443.75	19.70	348.79	
4,898.00	76.94	345.65	345.77	3,454.70	4,734.40	378.41 N	76.14 E	135,287.45	2,056,436.11	17.47	378.58	
4,930.00	81.58	347.88	348.00	3,460.66	4,740.36	409.01 N	68.95 E	135,318.05	2,056,428.92	16.03	409.16	
4,995.00	91.14	352.12	352.24	3,464.79	4,744.49	472.81 N	57.71 E	135,381.84	2,056,417.68	16.08	472.93	
5,045.00	92.74	352.94	353.06	3,463.10	4,742.80	522.35 N	51.22 E	135,431.39	2,056,411.19	3.60	522.46	
5,150.00	95.06	352.29	352.41	3,455.95	4,735.65	626.23 N	37.75 E	135,535.27	2,056,397.72	2.29	626.31	
5,241.00	92.53	353.88	354.00	3,449.93	4,729.63	716.36 N	26.83 E	135,625.40	2,056,386.80	3.28	716.42	
5,331.00	90.49	355.05	355.17	3,447.56	4,727.26	805.91 N	18.15 E	135,714.94	2,056,378.12	2.61	805.94	
5,422.00	89.94	355.40	355.52	3,447.22	4,726.92	896.59 N	10.57 E	135,805.62	2,056,370.54	0.72	896.61	
5,513.00	91.17	354.67	354.79	3,446.34	4,726.04	987.24 N	2.70 E	135,896.28	2,056,362.67	1.57	987.24	
5,604.00	89.38	358.23	358.35	3,445.90	4,725.60	1,078.05 N	2.93 W	135,987.08	2,056,357.04	4.38	1,078.04	
5,695.00	89.20	359.09	359.21	3,447.03	4,726.73	1,169.01 N	5.06 W	136,078.05	2,056,354.91	0.97	1,169.00	
5,785.00	90.28	359.01	359.13	3,447.44	4,727.14	1,259.00 N	6.55 W	136,168.03	2,056,353.42	1.20	1,258.98	
5,876.00	88.58	359.41	359.53	3,448.34	4,728.04	1,349.98 N	7.81 W	136,259.02	2,056,352.16	1.92	1,349.96	
5,970.00	88.09	358.95	359.07	3,451.07	4,730.77	1,443.93 N	9.15 W	136,352.97	2,056,350.82	0.71	1,443.91	
6,065.00	89.01	0.05	0.17	3,453.48	4,733.18	1,538.90 N	9.98 W	136,447.93	2,056,349.99	1.51	1,538.87	
6,159.00	88.95	359.86	359.98	3,455.15	4,734.85	1,632.88 N	10.06 W	136,541.91	2,056,349.91	0.21	1,632.85	
6,254.00	89.20	359.73	359.85	3,456.68	4,736.38	1,727.87 N	10.40 W	136,636.90	2,056,349.57	0.30	1,727.84	
6,348.00	90.89	359.84	359.96	3,456.61	4,736.31	1,821.86 N	10.75 W	136,730.90	2,056,349.22	1.80	1,821.84	
6,442.00	90.99	2.78	2.90	3,455.07	4,734.77	1,915.82 N	8.60 W	136,824.85	2,056,351.37	3.13	1,915.79	
6,537.00	93.07	4.73	4.85	3,451.70	4,731.40	2,010.54 N	2.38 W	136,919.58	2,056,357.59	3.00	2,010.53	
6,632.00	88.62	2.70	2.82	3,450.30	4,730.00	2,105.30 N	3.77 E	137,014.34	2,056,363.74	5.15	2,105.31	
6,726.00	89.66	2.96	3.08	3,451.71	4,731.41	2,199.18 N	8.41 E	137,108.21	2,056,368.38	1.14	2,199.19	
6,821.00	92.06	3.79	3.91	3,450.29	4,729.99	2,293.99 N	14.00 E	137,203.03	2,056,373.97	2.67	2,294.02	
6,915.00	90.43	2.40	2.52	3,448.24	4,727.94	2,387.83 N	19.07 E	137,296.86	2,056,379.04	2.28	2,387.87	
7,010.00	89.08	359.98	360.10	3,448.65	4,728.35	2,482.80 N	21.05 E	137,391.83	2,056,381.02	2.92	2,482.84	
7,104.00	89.41	359.96	360.08	3,449.89	4,729.59	2,576.79 N	21.00 E	137,485.82	2,056,380.97	0.35	2,576.83	
7,198.00	88.98	0.21	0.33	3,451.21	4,730.91	2,670.78 N	21.14 E	137,579.81	2,056,381.11	0.53	2,670.82	
7,293.00	90.15	358.69	358.81	3,451.93	4,731.63	2,765.77 N	20.22 E	137,674.80	2,056,380.19	2.02	2,765.81	
7,387.00	92.56	358.56	358.68	3,449.71	4,729.41	2,859.71 N	17.97 E	137,768.74	2,056,377.94	2.57	2,859.74	

**Design Report for Koblitz 3409 33-1H - Wellbore #1**

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
						Northing	Easting	Northing	Easting			
7,482.00	92.03	358.61	358.73	3,445.90	4,725.60	2,954.60 N	15.62 E	137,863.63	2,056,375.60	0.56	2,954.63	
7,576.00	89.94	357.17	357.29	3,444.29	4,723.99	3,048.52 N	12.16 E	137,957.55	2,056,372.13	2.70	3,048.54	
7,670.00	89.60	356.20	356.32	3,444.67	4,724.37	3,142.36 N	6.73 E	138,051.39	2,056,366.70	1.09	3,142.37	
7,765.00	90.46	354.96	355.08	3,444.62	4,724.32	3,237.07 N	0.59 W	138,146.10	2,056,359.38	1.59	3,237.06	
7,859.00	91.60	355.19	355.31	3,442.93	4,722.63	3,330.71 N	8.66 W	138,239.74	2,056,351.31	1.24	3,330.68	
7,954.00	90.09	354.02	354.14	3,441.52	4,721.22	3,425.27 N	17.59 W	138,334.30	2,056,342.38	2.01	3,425.23	
8,048.00	90.80	355.21	355.33	3,440.79	4,720.49	3,518.85 N	26.41 W	138,427.88	2,056,333.56	1.47	3,518.79	
8,142.00	90.99	357.19	357.31	3,439.33	4,719.03	3,612.63 N	32.64 W	138,521.66	2,056,327.33	2.12	3,612.55	
8,237.00	91.51	359.89	360.01	3,437.25	4,716.95	3,707.57 N	35.06 W	138,616.60	2,056,324.91	2.89	3,707.48	
8,331.00	90.71	1.79	1.91	3,435.43	4,715.13	3,801.54 N	33.68 W	138,710.57	2,056,326.29	2.19	3,801.45	
8,425.00	91.57	3.33	3.45	3,433.56	4,713.26	3,895.42 N	29.49 W	138,804.45	2,056,330.48	1.88	3,895.35	
8,520.00	92.29	3.80	3.92	3,430.36	4,710.06	3,990.18 N	23.58 W	138,899.21	2,056,336.39	0.90	3,990.12	
8,615.00	89.11	2.78	2.90	3,429.20	4,708.90	4,085.00 N	18.13 W	138,994.03	2,056,341.84	3.52	4,084.96	
8,709.00	88.89	1.37	1.49	3,430.84	4,710.54	4,178.93 N	14.73 W	139,087.96	2,056,345.24	1.52	4,178.88	
8,804.00	91.51	0.93	1.05	3,430.51	4,710.21	4,273.90 N	12.82 W	139,182.93	2,056,347.15	2.80	4,273.86	
8,898.00	90.77	1.63	1.75	3,428.64	4,708.34	4,367.85 N	10.72 W	139,276.88	2,056,349.25	1.08	4,367.82	
8,993.00	90.00	3.74	3.86	3,428.00	4,707.70	4,462.74 N	6.27 W	139,371.77	2,056,353.70	2.36	4,462.72	
9,087.00	90.46	4.19	4.31	3,427.63	4,707.33	4,556.52 N	0.23 E	139,465.54	2,056,360.20	0.68	4,556.51	
9,156.90	91.66	3.96	4.08	3,426.33	4,706.03	4,626.22 N	5.19 E	139,535.25	2,056,365.16	1.75	4,626.22	Koblitz 3409 33-1H BHL
9,182.00	92.09	3.88	4.00	3,425.51	4,705.21	4,651.25 N	6.91 E	139,560.28	2,056,366.88	1.75	4,651.26	End MWD
9,232.00	92.09	3.88	4.00	3,423.69	4,703.39	4,701.11 N	10.29 E	139,610.13	2,056,370.26	0.00	4,701.12	Projection to TD 9232.00 MD, 4703.39 TVD 4701.11 N, 10.29 E 290 FNL, 1073 FWL

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
539.00	538.63	0.53	17.30	Start MWD
9,182.00	4,705.21	4,651.25	6.91	End MWD
9,232.00	4,703.39	4,701.11	10.29	Projection to TD 9232.00 MD, 4703.39 TVD 4701.11 N, 10.29 E 290 FNL, 1073 FWL

**Design Report for Koblitz 3409 33-1H - Wellbore #1**

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	0.13	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
539.00	5,045.00	Run 0100	MWD+SC
5,150.00	9,232.00	Run 0200	MWD+SC

**Design Targets**

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	( )	( )	( )	( )	( )	( )	( )		
- Shape	( )	( )	( )	( )	( )	( )	( )		

**Directional Difficulty Index**

Average Dogleg over Survey:	2.01 °/100ft	Maximum Dogleg over Survey:	19.70 °/100ft at 4,866.00 ft
Net Tortousity applicable to Plans:	1.02 °/100ft	Directional Difficulty Index:	6.243

**Audit Info**

**North Reference Sheet for Sec 33-T34S-R09W - Koblitz 3409 33-1H - Wellbore #1**

All data is in Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to WELL @ 1279.70ft (Nabors 102 (31.7')). Northing and Easting are relative to Koblitz 3409 33-1H

Coordinate System is US State Plane 1927 (Exact solution), Kansas South 1502 using datum NAD 1927 (NADCON CONUS), ellipsoid Clarke 1866

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 98° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:37° 16' 0.000 N°

False Easting: 2,000,000.00ft, False Northing: 0.00ft, Scale Reduction: 1.00005307

Grid Coordinates of Well: 134,909.04 ft N, 2,056,359.97 ft E

Geographical Coordinates of Well: 37° 02' 13.24" N, 098° 18' 24.94" W

Grid Convergence at Surface is: 0.12°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,232.00ft the Bottom Hole Displacement is 4,701.12ft in the Direction of 0.13° (Grid).

Magnetic Convergence at surface is: -4.66° ( 4 December 2012, , BGGM2012)

