Shell Exploration & Production Co. Inc.

Barber Co. (NAD-27)
Sec 25-T33S-R10W
Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102

Wellbore #1

Design: Wellbore #1

Sperry Drilling Services

Combo Report With Grid North & True North

16 May, 2012

Well Coordinates: 171,966.01 N, 2,040,072.96 E (37° 08' 19.92" N, 098° 21' 45.13" W)
Ground Level: 1,378.00 ft

Local Coordinate Origin:	Centered on Well Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102
Viewing Datum:	WELL @ 1403.76ft (Original Well Elev)
TVDs to System:	N
North Reference:	True
Unit System:	API-US-new

Version: 2003.21 Build: 43

HALLIBURTON

Design Report for Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft)	Local Coordinates Easting (ft)	Map Coordinates Northing (ft)	Map Coordinates Easting (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
0.00	0.00	359.92	0.00	1,403.76	0.00	0.00 N	0.00 E	171,966.01	2,040,072.96	0.00	0.00	
141.00	0.35	286.69	286.77	1,262.76	141.00	0.12 N	0.41 W	171,966.13	2,040,072.55	0.25	0.13	First MWD Survey
171.00	0.37	301.77	301.85	1,232.76	171.00	0.20 N	0.58 W	171,966.21	2,040,072.38	0.32	0.21	
201.00	0.59	333.21	333.29	1,202.76	201.00	0.39 N	0.73 W	171,966.40	2,040,072.23	1.12	0.40	
232.00	1.60	349.82	349.90	1,171.77	231.99	0.96 N	0.88 W	171,966.97	2,040,072.08	3.38	0.97	
262.00	2.59	2.98	3.06	1,141.79	261.97	2.05 N	0.92 W	171,968.06	2,040,072.04	3.65	2.06	
324.00	4.33	1.01	1.09	1,079.90	323.86	5.79 N	0.80 W	171,971.80	2,040,072.15	2.81	5.80	
416.00	5.44	0.44	0.52	988.24	415.52	13.62 N	0.69 W	171,979.63	2,040,072.25	1.21	13.63	
508.00	5.60	0.67	0.75	896.67	507.09	22.47 N	0.60 W	171,988.48	2,040,072.33	0.18	22.48	
600.00	5.45	0.07	0.15	805.09	598.67	31.33 N	0.53 W	171,997.34	2,040,072.39	0.17	31.33	
692.00	5.43	359.96	0.04	713.51	690.25	40.05 N	0.51 W	172,006.06	2,040,072.39	0.02	40.05	
743.00	5.50	358.48	358.56	662.74	741.02	44.91 N	0.57 W	172,010.92	2,040,072.32	0.31	44.91	
854.00	5.29	1.08	1.16	552.23	851.53	55.34 N	0.60 W	172,021.35	2,040,072.28	0.29	55.34	
916.00	5.24	1.77	1.85	490.49	913.27	61.03 N	0.45 W	172,027.04	2,040,072.42	0.13	61.03	
979.00	5.17	2.11	2.19	427.75	976.01	66.74 N	0.25 W	172,032.75	2,040,072.61	0.12	66.74	
1,041.00	3.86	0.39	0.47	365.95	1,037.81	71.62 N	0.13 W	172,037.63	2,040,072.73	2.12	71.61	
1,102.00	2.37	349.36	349.44	305.04	1,098.72	74.91 N	0.34 W	172,040.92	2,040,072.51	2.62	74.91	
1,165.00	2.17	327.37	327.45	242.09	1,161.67	77.20 N	1.22 W	172,043.20	2,040,071.63	1.41	77.21	
1,229.00	1.98	354.12	354.20	178.13	1,225.63	79.32 N	1.98 W	172,045.32	2,040,070.86	1.53	79.34	
1,293.00	0.70	20.37	20.45	114.15	1,289.61	80.78 N	1.96 W	172,046.79	2,040,070.88	2.17	80.80	
1,485.00	0.39	147.71	147.79	-77.85	1,481.61	81.33 N	1.20 W	172,047.34	2,040,071.64	0.51	81.34	
1,676.00	0.65	177.35	177.43	-268.84	1,672.60	79.70 N	0.81 W	172,045.71	2,040,072.04	0.19	79.70	
1,868.00	0.57	184.87	184.95	-460.83	1,864.59	77.66 N	0.84 W	172,043.67	2,040,072.01	0.06	77.66	
2,059.00	0.55	171.30	171.38	-651.82	2,055.58	75.81 N	0.78 W	172,041.81	2,040,072.06	0.07	75.81	
2,251.00	0.56	202.14	202.22	-843.81	2,247.57	74.03 N	1.00 W	172,040.03	2,040,071.85	0.15	74.03	
2,443.00	1.13	15.20	15.28	-1,035.80	2,439.56	74.98 N	0.86 W	172,040.99	2,040,071.99	0.88	74.99	
2,635.00	0.70	21.56	21.64	-1,227.78	2,631.54	77.90 N	0.07 E	172,043.91	2,040,072.92	0.23	77.89	
2,827.00	0.37	20.35	20.43	-1,419.77	2,823.53	79.57 N	0.72 E	172,045.58	2,040,073.57	0.17	79.55	
3,019.00	0.46	359.73	359.81	-1,611.77	3,015.53	80.92 N	0.94 E	172,046.93	2,040,073.78	0.09	80.90	
3,211.00	1.02	190.52	190.60	-1,803.76	3,207.52	80.01 N	0.62 E	172,046.02	2,040,073.46	0.77	80.00	
3,402.00	0.58	169.61	169.69	-1,994.74	3,398.50	77.39 N	0.48 E	172,043.40	2,040,073.33	0.27	77.38	
3,596.00	0.39	179.18	179.26	-2,188.73	3,592.49	75.77 N	0.66 E	172,041.78	2,040,073.51	0.11	75.75	
3,756.00	0.52	186.00	186.08	-2,348.73	3,752.49	74.50 N	0.59 E	172,040.51	2,040,073.44	0.09	74.48	
3,788.00	0.40	207.34	207.42	-2,380.73	3,784.49	74.26 N	0.53 E	172,040.27	2,040,073.38	0.65	74.24	
3,820.00	0.65	290.65	290.73	-2,412.73	3,816.49	74.22 N	0.31 E	172,040.23	2,040,073.16	2.26	74.21	
3,852.00	1.85	338.58	338.66	-2,444.72	3,848.48	74.77 N	0.05 W	172,040.78	2,040,072.80	4.67	74.76	
3,884.00	3.83	346.49	346.57	-2,476.68	3,880.44	76.29 N	0.49 W	172,042.30	2,040,072.36	6.29	76.29	

Design Report for Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft)	Local Coordinates Easting (ft)	Map Coordinates Northing (ft)	Map Coordinates Easting (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
3,916.00	6.24	351.98	352.06	-2,508.55	3,912.31	79.05 N	0.98 W	172,045.06	2,040,071.87	7.67	79.06	
3,948.00	8.46	352.18	352.26	-2,540.29	3,944.05	83.10 N	1.53 W	172,049.11	2,040,071.30	6.94	83.12	
3,980.00	10.24	356.57	356.65	-2,571.86	3,975.62	88.28 N	2.02 W	172,054.28	2,040,070.81	5.99	88.30	
4,012.00	11.77	1.20	1.28	-2,603.27	4,007.03	94.38 N	2.11 W	172,060.39	2,040,070.71	5.52	94.40	
4,044.00	13.89	3.09	3.17	-2,634.47	4,038.23	101.48 N	1.82 W	172,067.49	2,040,070.99	6.75	101.49	
4,076.00	16.41	3.13	3.21	-2,665.36	4,069.12	109.83 N	1.36 W	172,075.84	2,040,071.44	7.88	109.84	
4,108.00	19.60	3.30	3.38	-2,695.79	4,099.55	119.70 N	0.79 W	172,085.71	2,040,071.99	9.97	119.70	
4,140.00	22.51	3.10	3.18	-2,725.65	4,129.41	131.18 N	0.13 W	172,097.19	2,040,072.63	9.10	131.17	
4,172.00	25.92	2.33	2.41	-2,754.83	4,158.59	144.29 N	0.50 E	172,110.30	2,040,073.25	10.70	144.27	
4,203.00	29.63	1.20	1.28	-2,782.25	4,186.01	158.72 N	0.96 E	172,124.73	2,040,073.68	12.09	158.69	
4,235.00	33.16	0.79	0.87	-2,809.56	4,213.32	175.39 N	1.27 E	172,141.40	2,040,073.97	11.05	175.35	
4,267.00	35.93	0.75	0.83	-2,835.92	4,239.68	193.53 N	1.54 E	172,159.54	2,040,074.21	8.66	193.49	
4,299.00	38.07	0.85	0.93	-2,861.47	4,265.23	212.78 N	1.83 E	172,178.79	2,040,074.48	6.69	212.74	
4,331.00	39.99	1.01	1.09	-2,886.33	4,290.09	232.93 N	2.19 E	172,198.94	2,040,074.80	6.01	232.88	
4,363.00	41.96	0.51	0.59	-2,910.49	4,314.25	253.91 N	2.49 E	172,219.92	2,040,075.08	6.24	253.85	
4,395.00	43.17	359.46	359.54	-2,934.05	4,337.81	275.55 N	2.52 E	172,241.57	2,040,075.07	4.38	275.49	
4,427.00	44.85	357.89	357.97	-2,957.07	4,360.83	297.78 N	2.03 E	172,263.79	2,040,074.55	6.26	297.72	
4,459.00	47.64	357.47	357.55	-2,979.20	4,382.96	320.87 N	1.12 E	172,286.88	2,040,073.61	8.77	320.83	
4,555.00	57.06	358.84	358.92	-3,037.77	4,441.53	396.76 N	1.16 W	172,362.77	2,040,071.22	9.88	396.74	
4,651.00	57.24	359.42	359.50	-3,089.85	4,493.61	477.40 N	2.27 W	172,443.40	2,040,069.99	0.54	477.39	
4,683.00	57.04	359.35	359.43	-3,107.21	4,510.97	504.28 N	2.52 W	172,470.28	2,040,069.70	0.65	504.27	
4,715.00	57.40	359.53	359.61	-3,124.54	4,528.30	531.18 N	2.75 W	172,497.19	2,040,069.43	1.22	531.17	
4,747.00	59.65	359.83	359.91	-3,141.24	4,545.00	558.47 N	2.86 W	172,524.48	2,040,069.28	7.08	558.46	
4,898.00	57.98	0.12	0.20	-3,219.43	4,623.19	687.65 N	2.74 W	172,653.65	2,040,069.21	1.12	687.62	
4,929.00	58.06	0.12	0.20	-3,235.85	4,639.61	713.94 N	2.65 W	172,679.95	2,040,069.26	0.26	713.91	
4,960.00	59.09	359.14	359.22	-3,252.01	4,655.77	740.39 N	2.78 W	172,706.40	2,040,069.09	4.28	740.36	
4,990.00	62.28	359.60	359.68	-3,266.70	4,670.46	766.55 N	3.03 W	172,732.55	2,040,068.80	10.72	766.52	
5,021.00	67.31	0.34	0.42	-3,279.89	4,683.65	794.59 N	3.00 W	172,760.59	2,040,068.79	16.37	794.55	
5,052.00	72.22	359.18	359.26	-3,290.61	4,694.37	823.66 N	3.09 W	172,789.67	2,040,068.66	16.22	823.63	
5,083.00	77.02	358.74	358.82	-3,298.83	4,702.59	853.54 N	3.59 W	172,819.54	2,040,068.11	15.54	853.51	
5,113.00	81.69	358.97	359.05	-3,304.37	4,708.13	883.01 N	4.14 W	172,849.01	2,040,067.52	15.58	882.99	
5,175.00	90.58	359.87	359.95	-3,308.55	4,712.31	944.80 N	4.67 W	172,910.81	2,040,066.89	14.41	944.78	
5,206.00	92.10	0.12	0.20	-3,307.82	4,711.58	975.80 N	4.63 W	172,941.80	2,040,066.89	4.97	975.77	
5,298.00	93.18	359.62	359.70	-3,303.59	4,707.35	1,067.70 N	4.71 W	173,033.70	2,040,066.67	1.29	1,067.66	
5,390.00	94.62	358.64	358.72	-3,297.33	4,701.09	1,159.47 N	5.98 W	173,125.47	2,040,065.27	1.89	1,159.45	
5,482.00	92.83	359.53	359.61	-3,291.35	4,695.11	1,251.26 N	7.32 W	173,217.26	2,040,063.80	2.17	1,251.25	
5,574.00	94.04	358.94	359.02	-3,285.84	4,689.60	1,343.09 N	8.41 W	173,309.08	2,040,062.57	1.46	1,343.08	

Design Report for Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft)	Local Coordinates Easting (ft)	Map Coordinates Northing (ft)	Map Coordinates Easting (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
5,667.00	92.99	358.44	358.52	-3,280.14	4,683.90	1,435.89 N	10.41 W	173,401.88	2,040,060.44	1.25	1,435.90	
5,763.00	94.60	357.87	357.95	-3,273.78	4,677.54	1,531.63 N	13.36 W	173,497.62	2,040,057.35	1.78	1,531.67	
5,858.00	92.68	358.38	358.46	-3,267.75	4,671.51	1,626.39 N	16.32 W	173,592.37	2,040,054.24	2.09	1,626.46	
5,933.00	93.64	358.04	358.12	-3,263.62	4,667.38	1,701.24 N	18.56 W	173,667.22	2,040,051.89	1.36	1,701.33	
6,051.00	93.30	358.49	358.57	-3,256.48	4,660.24	1,818.97 N	21.96 W	173,784.95	2,040,048.32	0.48	1,819.10	
6,146.00	92.84	359.48	359.56	-3,251.39	4,655.15	1,913.82 N	23.51 W	173,879.79	2,040,046.63	1.15	1,913.97	
6,242.00	93.89	358.68	358.76	-3,245.75	4,649.51	2,009.65 N	24.91 W	173,975.61	2,040,045.08	1.37	2,009.80	
6,338.00	92.78	359.93	0.01	-3,240.17	4,643.93	2,105.47 N	25.94 W	174,071.44	2,040,043.91	1.74	2,105.63	
6,434.00	94.78	359.43	359.51	-3,233.84	4,637.60	2,201.26 N	26.34 W	174,167.22	2,040,043.37	2.15	2,201.41	
6,529.00	93.58	0.30	0.38	-3,226.92	4,630.68	2,296.00 N	26.43 W	174,261.97	2,040,043.14	1.56	2,296.15	
6,625.00	93.58	0.78	0.86	-3,220.92	4,624.68	2,391.81 N	25.40 W	174,357.78	2,040,044.04	0.50	2,391.93	
6,721.00	92.65	359.67	359.75	-3,215.70	4,619.46	2,487.66 N	24.89 W	174,453.63	2,040,044.41	1.51	2,487.77	
6,816.00	90.58	358.93	359.01	-3,213.03	4,616.79	2,582.62 N	25.91 W	174,548.58	2,040,043.24	2.31	2,582.73	Last MWD Survey
6,947.00	90.58	358.93	359.01	-3,211.70	4,615.46	2,713.59 N	28.18 W	174,679.55	2,040,040.78	0.00	2,713.72	Projected to TD @6,947' MD

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
141.00	141.00	0.12	-0.41	First MWD Survey
6,816.00	4,616.79	2,582.62	-25.91	Last MWD Survey
6,947.00	4,615.46	2,713.59	-28.18	Projected to TD @6,947' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	359.22	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
141.00	6,947.00	MWD ST1	MWD+SC

Design Report for Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
4,864.00	4,605.26	7"	7	7-1/2

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	TVDSS (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
	5,210.00	3,806.24	Arbuckle			
	5,173.00	3,769.24	McLish SandStone			
	5,100.00	3,696.24	Wilcox Sandstone			
	4,972.00	3,568.24	Viola			
	4,930.00	3,526.24	Woodford			
	4,881.00	3,477.24	Kinderhookian Shale			
	4,870.00	3,466.24	Compton Lime			
	4,850.00	3,446.24	Limey Shale			
	4,720.00	3,316.24	Limestone & Dolomite			
3,327.50	3,324.00	1,920.24	Techumseh Shale			
3,403.50	3,400.00	1,996.24	Kansas City Group			
3,611.51	3,608.00	2,204.24	Large Corsening Upward Sequence			
4,144.98	4,134.00	2,730.24	Lola			
4,365.36	4,316.00	2,912.24	Hushpuckney Shale			
4,440.07	4,370.00	2,966.24	Marmatom Group			
4,701.48	4,521.00	3,117.24	Cherokee Group			
4,891.98	4,620.00	3,216.24	MISS Unconformity			
4,908.96	4,629.00	3,225.24	Cherty Limestone			
5,011.81	4,680.00	3,276.24	Lime with Cherty Beds			

Design Targets

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

Design Report for Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

Directional Difficulty Index

Average Dogleg over Survey:	2.06 °/100ft	Maximum Dogleg over Survey:	16.37 °/100ft at 5,021.00 ft
Net Tortousity applicable to Plans:	-0.01 °/100ft	Directional Difficulty Index:	5.763

Audit Info

North Reference Sheet for Sec 25-T33S-R10W - Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102 - Wellbore #1

All data is in Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.
Vertical Depths are relative to WELL @ 1403.76ft (Original Well Elev). Northing and Easting are relative to Circle Industries 3310 #25-1H/ Job# 9281937/ Nabors 102

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: 1.00002758

Grid Coordinates of Well: 171,966.01 ft N, 2,040,072.96 ft E
Geographical Coordinates of Well: 37° 08' 19.92" N, 098° 21' 45.13" W
Grid Convergence at Surface is: 0.08°

Based upon Minimum Curvature type calculations, at a Measured Depth of 6,947.00ft
the Bottom Hole Displacement is 2,713.74ft in the Direction of 359.41° (True).

Magnetic Convergence at surface is: -4.85° (20 March 2012, , BGGM2011)