

Shell Exploration & Production Co. Inc.

Harper Co. KS (NAD-27)

Sec 10-T33S-R07W

Hudgens 3307 #10-2H

9778333

Wellbore #2

Design: Wellbore #2

Sperry Drilling Services

Combo Report With Grid North & True North

10 December, 2012

Surface UWI : 9778333

Well Coordinates: 187,889.00 N, 2,127,931.63 E (37° 10' 54.66" N, 098° 03' 39.22" W)

Ground Level: 1,363.00 ft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Hudgens 3307 #10-2H

WELL @ 1394.70ft (Nabors 102 (31.7'))

N

True

API US New

Version: 2003.21 Build: 46

HALLIBURTON

Design Report for Hudgens 3307 #10-2H - Wellbore #2

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	359.73	0.00	-1,394.70	0.00	0.00 N	0.00 E	187,889.00	2,127,931.63	0.00	0.00	
187.00	1.12	167.81	168.08	-1,207.71	186.99	1.79 S	0.38 E	187,887.21	2,127,932.02	0.60	1.82	
216.00	2.12	187.45	187.72	-1,178.72	215.98	2.60 S	0.36 E	187,886.40	2,127,932.01	3.90	2.62	
250.00	2.54	181.12	181.39	-1,144.75	249.95	3.97 S	0.26 E	187,885.03	2,127,931.91	1.45	3.97	
280.00	3.10	185.27	185.54	-1,114.79	279.91	5.45 S	0.17 E	187,883.56	2,127,931.82	1.99	5.42	
311.00	3.91	182.52	182.79	-1,083.85	310.85	7.34 S	0.03 E	187,881.66	2,127,931.70	2.67	7.27	
341.00	4.97	185.62	185.89	-1,053.94	340.76	9.65 S	0.15 W	187,879.35	2,127,931.53	3.62	9.54	
401.00	6.64	186.91	187.18	-994.25	400.45	15.68 S	0.85 W	187,873.32	2,127,930.85	2.79	15.41	
469.00	7.36	185.95	186.22	-926.75	467.95	23.91 S	1.81 W	187,865.08	2,127,929.93	1.07	23.43	
544.00	6.94	185.54	185.81	-852.34	542.36	33.19 S	2.79 W	187,855.80	2,127,928.99	0.56	32.49	
605.00	8.29	180.68	180.95	-791.88	602.82	41.26 S	3.24 W	187,847.73	2,127,928.59	2.45	40.42	
696.00	10.20	160.58	160.85	-702.04	692.66	55.43 S	0.70 W	187,833.57	2,127,931.19	4.09	54.81	
786.00	11.12	149.06	149.33	-613.58	781.12	70.43 S	6.34 E	187,818.60	2,127,938.30	2.57	70.63	
884.00	12.08	137.51	137.78	-517.57	877.13	86.15 S	18.05 E	187,802.94	2,127,950.09	2.56	87.81	
976.00	12.57	132.12	132.39	-427.69	967.01	100.03 S	31.92 E	187,789.12	2,127,964.02	1.36	103.47	
1,070.00	13.41	131.83	132.10	-336.10	1,058.60	114.23 S	47.56 E	187,774.99	2,127,979.73	0.90	119.69	
1,164.00	14.73	132.00	132.27	-244.92	1,149.78	129.58 S	64.49 E	187,759.72	2,127,996.73	1.40	137.21	
1,259.00	15.74	132.54	132.81	-153.26	1,241.44	146.46 S	82.88 E	187,742.93	2,128,015.20	1.07	156.46	
1,353.00	15.32	130.24	130.51	-62.69	1,332.01	163.19 S	101.68 E	187,726.29	2,128,034.07	0.79	175.62	
1,543.00	12.98	124.00	124.27	121.54	1,516.24	191.52 S	138.40 E	187,698.14	2,128,070.93	1.47	208.72	
1,732.00	14.19	128.13	128.40	305.26	1,699.96	217.86 S	174.10 E	187,671.96	2,128,106.75	0.82	239.72	
1,920.00	15.17	125.59	125.86	487.12	1,881.82	246.58 S	212.09 E	187,643.42	2,128,144.88	0.62	273.39	
2,110.00	15.57	132.93	133.20	670.34	2,065.04	278.61 S	250.83 E	187,611.58	2,128,183.77	1.04	310.43	
2,299.00	14.41	133.67	133.94	852.91	2,247.61	312.29 S	286.26 E	187,578.06	2,128,219.36	0.62	348.66	
2,487.00	14.36	132.33	132.60	1,035.01	2,429.71	344.30 S	320.26 E	187,546.21	2,128,253.51	0.18	385.04	
2,676.00	14.09	131.47	131.74	1,218.22	2,612.92	375.48 S	354.68 E	187,515.19	2,128,288.08	0.18	420.66	
2,865.00	14.51	129.38	129.65	1,401.36	2,796.06	405.91 S	390.08 E	187,484.94	2,128,323.62	0.35	455.66	
3,054.00	13.08	125.99	126.26	1,584.91	2,979.61	433.67 S	425.56 E	187,457.34	2,128,359.22	0.87	488.03	
3,148.00	12.22	121.52	121.79	1,676.63	3,071.33	445.20 S	442.59 E	187,445.89	2,128,376.31	1.39	501.79	
3,242.00	11.50	124.43	124.70	1,768.62	3,163.32	455.77 S	458.75 E	187,435.39	2,128,392.52	1.00	514.49	
3,337.00	11.49	128.22	128.49	1,861.72	3,256.42	467.05 S	473.94 E	187,424.18	2,128,407.77	0.79	527.75	
3,431.00	10.15	130.86	131.13	1,954.05	3,348.75	478.33 S	487.51 E	187,412.97	2,128,421.39	1.52	540.78	
3,526.00	9.57	136.67	136.94	2,047.64	3,442.34	489.61 S	499.21 E	187,401.75	2,128,433.14	1.21	553.56	
3,620.00	7.30	138.92	139.19	2,140.62	3,535.32	499.84 S	508.45 E	187,391.56	2,128,442.42	2.44	564.96	
3,715.00	6.31	135.23	135.50	2,234.95	3,629.65	508.13 S	516.05 E	187,383.31	2,128,450.07	1.14	574.22	
3,809.00	4.45	138.42	138.69	2,328.53	3,723.23	514.55 S	522.08 E	187,376.91	2,128,456.13	2.00	581.41	
3,903.00	3.34	135.35	135.62	2,422.32	3,817.02	519.25 S	526.40 E	187,372.24	2,128,460.47	1.20	586.65	

Design Report for Hudgens 3307 #10-2H - Wellbore #2

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			
3,998.00	1.33	142.95	143.22	2,517.23	3,911.93	522.11 S	529.00 E	187,369.39	2,128,463.08	2.14	589.85	
4,029.00	1.09	142.87	143.14	2,548.22	3,942.92	522.63 S	529.39 E	187,368.87	2,128,463.47	0.77	590.42	
4,061.00	0.98	144.30	144.57	2,580.22	3,974.92	523.10 S	529.73 E	187,368.40	2,128,463.82	0.35	590.93	
4,092.00	2.77	151.95	152.22	2,611.20	4,005.90	523.98 S	530.23 E	187,367.52	2,128,464.32	5.82	591.87	
4,124.00	5.13	164.13	164.40	2,643.12	4,037.82	526.04 S	530.98 E	187,365.47	2,128,465.08	7.79	594.01	
4,155.00	8.12	166.01	166.28	2,673.91	4,068.61	529.50 S	531.87 E	187,362.01	2,128,465.99	9.67	597.56	
4,187.00	10.91	166.76	167.03	2,705.47	4,100.17	534.65 S	533.09 E	187,356.87	2,128,467.23	8.73	602.83	
4,218.00	13.68	172.34	172.61	2,735.76	4,130.46	541.15 S	534.22 E	187,350.38	2,128,468.39	9.71	609.42	
4,250.00	16.76	176.26	176.53	2,766.63	4,161.33	549.51 S	534.98 E	187,342.02	2,128,469.19	10.14	617.81	
4,281.00	19.28	177.53	177.80	2,796.11	4,190.81	559.09 S	535.45 E	187,332.44	2,128,469.71	8.23	627.36	
4,312.00	21.80	177.29	177.56	2,825.14	4,219.84	569.95 S	535.89 E	187,321.58	2,128,470.20	8.13	638.18	
4,344.00	23.97	177.15	177.42	2,854.62	4,249.32	582.38 S	536.44 E	187,309.15	2,128,470.80	6.78	650.57	
4,376.00	26.77	177.06	177.33	2,883.53	4,278.23	596.08 S	537.07 E	187,295.46	2,128,471.50	8.75	664.22	
4,407.00	29.90	177.51	177.78	2,910.81	4,305.51	610.78 S	537.69 E	187,280.76	2,128,472.19	10.12	678.87	
4,438.00	32.95	177.16	177.43	2,937.26	4,331.96	626.92 S	538.37 E	187,264.62	2,128,472.94	9.86	694.95	
4,470.00	35.96	176.54	176.81	2,963.64	4,358.34	645.00 S	539.28 E	187,246.55	2,128,473.94	9.47	712.98	
4,501.00	38.80	175.87	176.14	2,988.27	4,382.97	663.78 S	540.44 E	187,227.77	2,128,475.19	9.25	731.75	
4,533.00	41.22	175.87	176.14	3,012.78	4,407.48	684.31 S	541.83 E	187,207.25	2,128,476.67	7.56	752.27	
4,564.00	44.05	176.52	176.79	3,035.59	4,430.29	705.26 S	543.12 E	187,186.30	2,128,478.06	9.24	773.20	
4,596.00	47.75	176.83	177.10	3,057.85	4,452.55	728.21 S	544.34 E	187,163.37	2,128,479.39	11.58	796.10	
4,627.00	51.85	177.43	177.70	3,077.86	4,472.56	751.86 S	545.41 E	187,139.72	2,128,480.57	13.31	819.67	
4,659.00	56.00	177.88	178.15	3,096.69	4,491.39	777.70 S	546.34 E	187,113.89	2,128,481.63	13.02	845.39	
4,690.00	60.63	178.03	178.30	3,112.97	4,507.67	804.06 S	547.16 E	187,087.53	2,128,482.57	14.94	871.61	
4,722.00	64.90	179.05	179.32	3,127.61	4,522.31	832.50 S	547.75 E	187,059.09	2,128,483.29	13.64	899.86	
4,753.00	68.04	180.16	180.43	3,139.99	4,534.69	860.91 S	547.80 E	187,030.68	2,128,483.48	10.65	928.02	
4,784.00	71.54	179.99	180.26	3,150.70	4,545.40	890.00 S	547.63 E	187,001.59	2,128,483.44	11.30	956.81	
4,904.00	79.76	179.68	179.95	3,180.41	4,575.11	1,006.16 S	547.42 E	186,885.43	2,128,483.78	6.85	1,071.83	
4,935.00	84.00	179.07	179.34	3,184.79	4,579.49	1,036.84 S	547.61 E	186,854.75	2,128,484.12	13.82	1,102.25	
4,966.00	85.98	178.64	178.91	3,187.50	4,582.20	1,067.71 S	548.09 E	186,823.88	2,128,484.74	6.53	1,132.90	
4,996.00	88.39	178.05	178.32	3,188.97	4,583.67	1,097.67 S	548.81 E	186,793.93	2,128,485.60	8.27	1,162.67	
5,027.00	83.27	177.34	177.61	3,191.22	4,585.92	1,128.56 S	549.91 E	186,763.05	2,128,486.84	16.67	1,193.41	Start MWD
5,057.00	83.80	176.29	176.56	3,194.60	4,589.30	1,158.33 S	551.42 E	186,733.29	2,128,488.50	3.90	1,223.11	
5,086.00	87.50	172.87	173.14	3,196.80	4,591.50	1,187.12 S	554.02 E	186,704.51	2,128,491.23	17.35	1,251.98	
5,116.00	89.48	170.54	170.81	3,197.59	4,592.29	1,216.81 S	558.21 E	186,674.84	2,128,495.56	10.19	1,281.97	
5,146.00	90.52	168.84	169.11	3,197.59	4,592.29	1,246.35 S	563.44 E	186,645.32	2,128,500.93	6.64	1,311.94	
5,237.00	91.88	169.16	169.43	3,195.69	4,590.39	1,335.73 S	580.37 E	186,556.02	2,128,518.29	1.54	1,402.81	
5,327.00	90.65	169.55	169.82	3,193.70	4,588.40	1,424.24 S	596.58 E	186,467.59	2,128,534.91	1.43	1,492.70	

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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			
5,419.00	90.74	169.38	169.65	3,192.58	4,587.28	1,514.76 S	612.97 E	186,377.15	2,128,551.73	0.21	1,584.62	
5,510.00	89.51	170.34	170.61	3,192.39	4,587.09	1,604.41 S	628.57 E	186,287.57	2,128,567.75	1.71	1,675.56	
5,600.00	88.74	172.72	172.99	3,193.76	4,588.46	1,693.47 S	641.40 E	186,198.57	2,128,581.00	2.78	1,765.54	
5,691.00	88.06	173.80	174.07	3,196.30	4,591.00	1,783.86 S	651.65 E	186,108.24	2,128,591.68	1.40	1,856.48	
5,781.00	89.26	177.16	177.43	3,198.41	4,593.11	1,873.57 S	658.32 E	186,018.56	2,128,598.77	3.96	1,946.26	
5,873.00	89.26	178.43	178.70	3,199.59	4,594.29	1,965.51 S	661.43 E	185,926.63	2,128,602.30	1.38	2,037.75	
5,967.00	90.49	180.36	180.63	3,199.80	4,594.50	2,059.50 S	661.98 E	185,832.65	2,128,603.30	2.43	2,130.92	
6,061.00	89.85	180.20	180.47	3,199.52	4,594.22	2,153.49 S	661.07 E	185,738.65	2,128,602.84	0.70	2,223.90	
6,155.00	89.11	179.95	180.22	3,200.37	4,595.07	2,247.49 S	660.51 E	185,644.65	2,128,602.71	0.83	2,316.93	
6,250.00	88.34	179.29	179.56	3,202.49	4,597.19	2,342.46 S	660.69 E	185,549.68	2,128,603.34	1.07	2,411.03	
6,344.00	88.92	179.74	180.01	3,204.74	4,599.44	2,436.43 S	661.04 E	185,455.71	2,128,604.14	0.78	2,504.16	
6,439.00	88.74	179.49	179.76	3,206.68	4,601.38	2,531.41 S	661.23 E	185,360.73	2,128,604.78	0.32	2,598.26	
6,533.00	90.09	179.63	179.90	3,207.63	4,602.33	2,625.41 S	661.51 E	185,266.74	2,128,605.50	1.44	2,691.40	
6,627.00	90.34	180.36	180.63	3,207.28	4,601.98	2,719.40 S	661.08 E	185,172.74	2,128,605.51	0.82	2,784.45	
6,722.00	90.95	181.29	181.56	3,206.21	4,600.91	2,814.38 S	659.26 E	185,077.76	2,128,604.14	1.17	2,878.27	
6,816.00	92.53	180.99	181.26	3,203.36	4,598.06	2,908.30 S	656.95 E	184,983.83	2,128,602.27	1.71	2,970.99	
6,911.00	90.65	180.70	180.97	3,200.72	4,595.42	3,003.25 S	655.10 E	184,888.88	2,128,600.87	2.00	3,064.77	
7,005.00	91.20	181.02	181.29	3,199.21	4,593.91	3,097.21 S	653.25 E	184,794.90	2,128,599.46	0.68	3,157.60	
7,099.00	90.46	179.96	180.23	3,197.84	4,592.54	3,191.19 S	652.00 E	184,700.92	2,128,598.65	1.38	3,250.51	
7,194.00	90.03	180.21	180.48	3,197.44	4,592.14	3,286.19 S	651.41 E	184,605.92	2,128,598.51	0.52	3,344.53	
7,288.00	89.44	180.39	180.66	3,197.87	4,592.57	3,380.19 S	650.48 E	184,511.92	2,128,598.02	0.66	3,437.50	
7,382.00	91.39	181.57	181.84	3,197.19	4,591.89	3,474.15 S	648.43 E	184,417.94	2,128,596.41	2.42	3,530.30	
7,477.00	90.83	181.61	181.88	3,195.35	4,590.05	3,569.09 S	645.35 E	184,323.00	2,128,593.78	0.59	3,623.91	
7,571.00	90.37	180.41	180.68	3,194.37	4,589.07	3,663.06 S	643.25 E	184,229.02	2,128,592.12	1.37	3,716.70	
7,666.00	92.34	180.56	180.83	3,192.12	4,586.82	3,758.02 S	641.99 E	184,134.06	2,128,591.31	2.08	3,810.58	
7,761.00	92.31	180.88	181.15	3,188.27	4,582.97	3,852.92 S	640.35 E	184,039.14	2,128,590.12	0.34	3,904.37	
7,855.00	91.29	180.35	180.62	3,185.31	4,580.01	3,946.86 S	638.90 E	183,945.20	2,128,589.11	1.22	3,997.22	
7,950.00	91.45	179.96	180.23	3,183.04	4,577.74	4,041.83 S	638.20 E	183,850.22	2,128,588.86	0.44	4,091.19	
8,044.00	89.44	180.01	180.28	3,182.31	4,577.01	4,135.83 S	637.78 E	183,756.23	2,128,588.88	2.14	4,184.23	
8,138.00	90.12	180.61	180.88	3,182.67	4,577.37	4,229.82 S	636.83 E	183,662.24	2,128,588.37	0.96	4,277.20	
8,233.00	89.60	179.89	180.16	3,182.91	4,577.61	4,324.81 S	635.97 E	183,567.24	2,128,587.96	0.93	4,371.18	
8,327.00	88.74	179.96	180.23	3,184.27	4,578.97	4,418.80 S	635.65 E	183,473.25	2,128,588.08	0.92	4,464.23	
8,422.00	88.71	180.36	180.63	3,186.38	4,581.08	4,513.78 S	634.93 E	183,378.27	2,128,587.81	0.42	4,558.21	
8,516.00	88.77	180.53	180.80	3,188.45	4,583.15	4,607.75 S	633.76 E	183,284.30	2,128,587.08	0.19	4,651.12	
8,610.00	89.75	180.66	180.93	3,189.66	4,584.36	4,701.73 S	632.34 E	183,190.31	2,128,586.11	1.05	4,744.02	
8,705.00	90.09	181.37	181.64	3,189.79	4,584.49	4,796.70 S	630.21 E	183,095.33	2,128,584.42	0.83	4,837.80	
8,799.00	90.46	180.86	181.13	3,189.34	4,584.04	4,890.67 S	627.94 E	183,001.35	2,128,582.60	0.67	4,930.57	

Design Report for Hudgens 3307 #10-2H - Wellbore #2

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			
8,894.00	88.64	181.08	181.35	3,190.09	4,584.79	4,985.64 S	625.88 E	182,906.37	2,128,580.99	1.93	5,024.35	
8,988.00	88.18	181.13	181.40	3,192.70	4,587.40	5,079.58 S	623.63 E	182,812.42	2,128,579.17	0.49	5,117.09	
9,082.00	89.75	180.68	180.95	3,194.40	4,589.10	5,173.54 S	621.70 E	182,718.45	2,128,577.69	1.74	5,209.90	
9,125.00	89.91	180.66	180.93	3,194.52	4,589.22	5,216.54 S	621.00 E	182,675.46	2,128,577.19	0.37	5,252.39	End MWD
9,170.68	89.91	180.66	180.93	3,194.59	4,589.29	5,262.21 S	620.26 E	182,629.78	2,128,576.66	0.00	5,297.52	Hudgens 3307 #10-2H PBHL
9,172.00	89.91	180.66	180.93	3,194.60	4,589.30	5,263.53 S	620.23 E	182,628.46	2,128,576.65	0.00	5,298.83	Projection to ST1 TD 9172.00 MD, 4589.30 TVD -5263.53 N, 620.23 E 329 FSL, 467 FEL

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,027.00	4,585.92	-1,128.56	549.91	Start MWD
9,125.00	4,589.22	-5,216.54	621.00	End MWD
9,172.00	4,589.30	-5,263.53	620.23	Projection to ST1 TD 9172.00 MD, 4589.30 TVD -5263.53 N, 620.23 E 329 FSL, 467 FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
User	No Target (Freehand)	172.10	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
187.00	4,996.00	Sperry MWD Surveys	MWD+SC
5,027.00	9,172.00	Survey - Final	MWD+SC

Design Report for Hudgens 3307 #10-2H - Wellbore #2

Design Targets

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

Directional Difficulty Index

Average Dogleg over Survey:	2.21 °/100ft	Maximum Dogleg over Survey:	17.35 °/100ft at 5,086.00 ft
Net Tortousity applicable to Plans:	0.40 °/100ft	Directional Difficulty Index:	6.348

Audit Info

North Reference Sheet for Sec 10-T33S-R07W - Hudgens 3307 #10-2H - Wellbore #2

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

Vertical Depths are relative to WELL @ 1394.70ft (Nabors 102 (31.7')). Northing and Easting are relative to Hudgens 3307 #10-2H

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: 1.00001775

Grid Coordinates of Well: 187,889.00 ft N, 2,127,931.63 ft E

Geographical Coordinates of Well: 37° 10' 54.66" N, 098° 03' 39.22" W

Grid Convergence at Surface is: 0.27°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,172.00ft the Bottom Hole Displacement is 5,299.95ft in the Direction of 173.28° (True).

Magnetic Convergence at surface is: -4.36° (31 October 2012, , BGGM2012)

