



BP AMERICA PRODUCTION COMPANY

New Mexico

San Juan County

Sec 27 - T32N - R11W

Van Hook LS #1M - ST1 Survey

30-045-31895

Surface 1935/S 1800/E
BHL 1869/S 2135/E

Sperry-Sun

Survey Report

22 April, 2004

Survey Ref: svy7189



HALLIBURTON

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M

Measured Depth (ft)	Incl.	True Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Tooface Azimuth	Comment
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00					
272.00	2.975	199.800	271.88	6.64 S	2.39 W	3.89	1.094	1.094	0.000	199.800	surface shoe assumed vertical
320.00	3.500	199.800	319.80	9.19 S	3.31 W	5.39	1.094	1.094	0.000	0.000	first EM SURVEY
351.00	3.800	204.800	350.74	11.02 S	4.06 W	6.55	1.410	0.968	16.129	49.209	
382.00	4.000	216.300	381.67	12.82 S	5.13 W	8.02	2.599	0.645	37.097	81.440	
415.00	4.800	225.000	414.57	14.72 S	6.79 W	10.08	3.151	2.424	26.364	44.231	
447.00	5.700	229.700	446.44	16.70 S	8.95 W	12.64	3.115	2.813	14.688	27.893	
478.00	6.400	234.900	477.26	18.69 S	11.54 W	15.63	2.866	2.258	16.774	40.664	
510.00	7.000	239.400	509.04	20.71 S	14.67 W	19.15	2.490	1.875	14.063	43.436	
542.00	7.800	243.100	540.78	22.68 S	18.29 W	23.13	2.909	2.500	11.563	32.625	
574.00	8.500	247.600	572.45	24.56 S	22.41 W	27.58	2.958	2.188	14.063	44.587	
606.00	9.100	251.200	604.08	26.28 S	26.99 W	32.44	2.544	1.875	11.250	44.338	
637.00	9.700	254.700	634.66	27.76 S	31.83 W	37.49	2.672	1.935	11.290	45.349	
669.00	10.300	258.000	666.18	29.07 S	37.23 W	43.05	2.592	1.875	10.313	45.316	
701.00	10.700	261.700	697.64	30.09 S	42.97 W	48.86	2.449	1.250	11.563	61.150	
733.00	11.300	264.600	729.05	30.81 S	49.03 W	54.92	2.550	1.875	9.063	44.113	
765.00	12.200	265.300	760.38	31.39 S	55.52 W	61.37	2.848	2.813	2.188	9.343	
797.00	13.000	265.200	791.61	31.96 S	62.48 W	68.26	2.501	2.500	-0.313	-1.611	
860.00	14.600	264.100	852.79	33.37 S	77.44 W	83.13	2.573	2.540	-1.746	-9.848	
924.00	15.600	263.400	914.58	35.19 S	94.01 W	99.67	1.588	1.563	-1.094	-10.673	
988.00	16.400	262.300	976.10	37.39 S	111.51 W	117.19	1.337	1.250	-1.719	-21.286	
1051.00	15.700	261.600	1036.64	39.83 S	128.76 W	134.53	1.153	-1.111	-1.111	-164.881	
1115.00	15.100	259.900	1098.35	42.56 S	145.53 W	151.47	1.173	-0.938	-2.656	-143.859	
1179.00	14.200	260.000	1160.26	45.38 S	161.47 W	167.62	1.407	-1.406	0.156	178.439	
1242.00	14.800	259.700	1221.26	48.16 S	177.00 W	183.37	0.960	0.952	-0.476	-7.281	

MWD SURVEY

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M

Measured Depth (ft)	Incl.	True Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth	Comment
1306.00	14.500	261.200	1283.18	50.85 S	192.96 W	199.51	0.756	-0.469	2.344	129.060	
1369.00	13.500	263.500	1344.31	52.89 S	208.06 W	214.66	1.816	-1.587	3.651	152.020	
1433.00	13.900	263.300	1406.48	54.63 S	223.12 W	229.71	0.629	0.625	-0.313	-6.851	
1497.00	12.900	265.300	1468.74	56.11 S	237.87 W	244.39	1.722	-1.563	3.125	156.103	
1561.00	11.500	265.300	1531.29	57.22 S	251.35 W	257.75	2.188	-2.188	0.000	180.000	
1625.00	11.800	265.500	1593.98	58.26 S	264.23 W	270.52	0.473	0.469	0.313	7.765	
1688.00	11.500	264.700	1655.68	59.34 S	276.91 W	283.09	0.541	-0.476	-1.270	-152.089	
1752.00	10.900	264.400	1718.46	60.52 S	289.28 W	295.39	0.942	-0.938	-0.469	-174.600	
1815.00	10.200	265.400	1780.39	61.55 S	300.77 W	306.80	1.148	-1.111	1.587	165.833	
1847.00	10.000	265.200	1811.90	62.01 S	306.36 W	312.34	0.635	-0.625	-0.625	-170.152	
1879.00	9.200	265.800	1843.45	62.43 S	311.68 W	317.61	2.519	-2.500	1.875	173.166	
1911.00	8.600	268.800	1875.06	62.67 S	316.63 W	322.47	2.370	-1.875	9.375	143.752	
1942.00	7.500	272.000	1905.76	62.65 S	320.97 W	326.68	3.830	-3.548	10.323	159.414	
1975.00	6.500	273.900	1938.51	62.44 S	324.98 W	330.53	3.110	-3.030	5.758	167.904	
2006.00	5.500	273.400	1969.34	62.24 S	328.22 W	333.63	3.230	-3.226	-1.613	-177.257	
2038.00	4.600	268.200	2001.22	62.19 S	331.03 W	336.35	3.153	-2.813	-16.250	-155.616	
2070.00	4.000	257.100	2033.13	62.47 S	333.40 W	338.72	3.198	-1.875	-34.688	-131.238	
2102.00	3.000	246.700	2065.07	63.06 S	335.26 W	340.66	3.689	-3.125	-32.500	-152.707	
2133.00	2.000	235.800	2096.04	63.68 S	336.45 W	341.97	3.558	-3.226	-35.161	-159.949	
2165.00	1.300	224.600	2128.03	64.25 S	337.17 W	342.80	2.398	-2.188	-35.000	-160.792	
2229.00	0.500	158.800	2192.02	65.03 S	337.58 W	343.38	1.853	-1.250	-102.813	-157.388	tie into original hole
2292.00	0.600	116.800	2255.02	65.43 S	337.18 W	343.09	0.643	0.159	-66.667	-97.675	

ST1 Survey

2623.00	0.420	96.260	2586.00	66.35 S	334.43 W	340.64	0.077	-0.054	-6.205	-144.514	begin SLB MWD survey
2654.00	0.320	93.380	2617.00	66.37 S	334.23 W	340.45	0.328	-0.323	-9.290	-170.902	
2687.00	0.120	44.710	2650.00	66.35 S	334.11 W	340.33	0.779	-0.606	-147.485	-159.480	
2718.00	0.250	70.770	2681.00	66.30 S	334.03 W	340.23	0.489	0.419	84.065	46.401	
2750.00	0.120	116.810	2713.00	66.29 S	333.93 W	340.14	0.587	-0.406	143.875	152.608	

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M

Measured Depth (ft)	Incl.	True Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth	Comment
2781.00	0.120	304.280	2744.00	66.29 S	333.93 W	340.14	0.773	0.000	-556.548	-176.265	
2813.00	0.490	269.650	2776.00	66.27 S	334.09 W	340.29	1.241	1.156	-108.219	-44.517	
2845.00	0.570	266.110	2808.00	66.28 S	334.39 W	340.58	0.270	0.250	-11.063	-24.036	
2877.00	0.000	0.000	2840.00	66.29 S	334.55 W	340.74	1.781	-1.781	0.000	180.000	Last MWD Side track survey
3858.00	0.000	0.000	3821.00	66.29 S	334.55 W	340.74	0.000	0.000	0.000	359.918	7" casing depth
7782.00	0.000	0.000	7745.00	66.29 S	334.55 W	340.74	0.000	0.000	0.000	359.918	end of 6 1/4" hole, set 4 1/2" casing
7892.00	0.000	0.000	7855.00	66.29 S	334.55 W	340.74	0.000	0.000	0.000	359.918	end of 3 7/8" hole

All data is in Feet (US Survey) unless otherwise stated. Directions and coordinates are relative to True North. Vertical depths are relative to RKB = 6374' MSL. Northings and Eastings are relative to 1935' FSL, 1800' FEL.

The Dogleg Severity and Build and Turn rates are in Degrees per 100 feet (US Survey). Vertical Section is from 1935' FSL, 1800' FEL and calculated along an Azimuth of 256.330° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 7892.00ft., The Bottom Hole Displacement is 341.05ft., in the Direction of 258.791° (True).

Comments

Measured Depth (ft)	Station Coordinates			Comment
	TVD (ft)	Northings (ft)	Eastings (ft)	
272.00	271.88	6.64 S	2.39 W	surface shoe assumed vertical
320.00	319.80	9.19 S	3.31 W	first EM SURVEY
2292.00	2255.02	65.43 S	337.18 W	last EM SURVEY
2292.00	2255.02	65.43 S	337.18 W	tie into original hole
2623.00	2586.00	66.35 S	334.43 W	begin SLB MWD survey

HALLIBURTON

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M

Comments (Continued)

Measured Depth (ft)	TVD (ft)	Station Coordinates		Comment
		Northings (ft)	Eastings (ft)	
2877.00	2840.00	66.29 S	334.55 W	Last MWD Side track survey 7" casing depth end of 6 1/4" hole, set 4 1/2" casing end of 3 7/8" hole
3858.00	3821.00	66.29 S	334.55 W	
7782.00	7745.00	66.29 S	334.55 W	
7892.00	7855.00	66.29 S	334.55 W	

North Reference Sheet for Sec 27 - T32N - R11W - Van Hook LS #1M

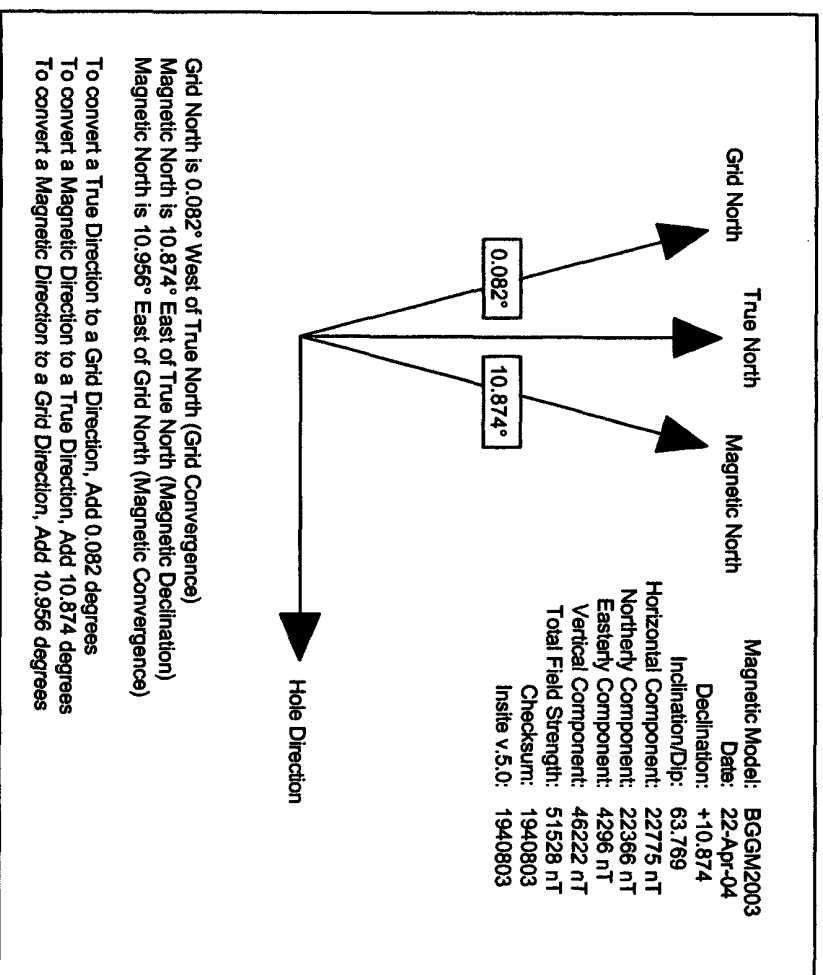
Coordinate System is NAD27 New Mexico State Planes, Western Zone, US Foot
 Source: Snyder, J.P., 1987, Map Projections - A Working Manual

Datum is North American Datum of 1927 (US48, AK, HI, and Canada)

Spheroid is Clarke - 1866
 Equatorial Radius: 6378206.400m.
 Polar Radius: 6356583.800m.
 Inverse Flattening: 294.978698213901

Projection method is Transverse Mercator or Gauss Kruger Projection
 Central Meridian is -107.833°
 Longitude Origin: 0.000°
 Latitude Origin: 31.000°
 False Easting: 152400.00m
 False Northing: 0.00m
 Scale Reduction: 0.99991667

Grid Coordinates of Well: 2148932.45 N, 460196.64 E
 Geographical Coordinates of Well: 36° 54' 20.1738" N, 107° 58' 10.0955" W
 Surface Elevation of Well: 6374.00ft
 Grid Convergence at Surface is -0.082°
 Magnetic Declination at Surface is +10.874° (22 April, 2004)



Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M - MWD SURVEY

Measured Depth (ft)	Incl.	True Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Tooface Azimuth	Comment
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00					
272.00	2.975	199.800	271.88	6.64 S	2.39 W	3.89	1.094	1.094	0.000	199.800	surface shoe assumed vertical
320.00	3.500	199.800	319.80	9.19 S	3.31 W	5.39	1.094	1.094	0.000	0.000	
351.00	3.800	204.800	350.74	11.02 S	4.06 W	6.55	1.410	0.968	16.129	49.209	
382.00	4.000	216.300	381.67	12.82 S	5.13 W	8.02	2.599	0.645	37.097	81.440	
415.00	4.800	225.000	414.57	14.72 S	6.79 W	10.08	3.151	2.424	26.364	44.231	
447.00	5.700	229.700	446.44	16.70 S	8.95 W	12.64	3.115	2.813	14.688	27.893	
478.00	6.400	234.900	477.26	18.69 S	11.54 W	15.63	2.866	2.258	16.774	40.664	
510.00	7.000	239.400	509.04	20.71 S	14.67 W	19.15	2.490	1.875	14.063	43.436	
542.00	7.800	243.100	540.78	22.68 S	18.29 W	23.13	2.909	2.500	11.563	32.625	
574.00	8.500	247.600	572.45	24.56 S	22.41 W	27.58	2.958	2.188	14.063	44.587	
606.00	9.100	251.200	604.08	26.28 S	26.99 W	32.44	2.544	1.875	11.250	44.338	
637.00	9.700	254.700	634.66	27.76 S	31.83 W	37.49	2.672	1.935	11.290	45.349	
669.00	10.300	258.000	666.18	29.07 S	37.23 W	43.05	2.592	1.875	10.313	45.316	
701.00	10.700	261.700	697.64	30.09 S	42.97 W	48.86	2.449	1.250	11.563	61.150	
733.00	11.300	264.600	729.05	30.81 S	49.03 W	54.92	2.550	1.875	9.063	44.113	
765.00	12.200	265.300	760.38	31.39 S	55.52 W	61.37	2.848	2.813	2.188	9.343	
797.00	13.000	265.200	791.61	31.96 S	62.48 W	68.26	2.501	2.500	-0.313	-1.611	
860.00	14.600	264.100	852.79	33.37 S	77.44 W	83.13	2.573	2.540	-1.746	-9.848	
924.00	15.600	263.400	914.58	35.19 S	94.01 W	99.67	1.588	1.563	-1.094	-10.673	
988.00	16.400	262.300	976.10	37.39 S	111.51 W	117.19	1.337	1.250	-1.719	-21.286	
1051.00	15.700	261.600	1036.64	39.83 S	128.76 W	134.53	1.153	-1.111	-1.111	-164.881	
1115.00	15.100	259.900	1098.35	42.56 S	145.53 W	151.47	1.173	-0.938	-2.656	-143.859	
1179.00	14.200	260.000	1160.26	45.38 S	161.47 W	167.62	1.407	-1.406	0.156	178.439	
1242.00	14.800	259.700	1221.26	48.16 S	177.00 W	183.37	0.960	0.952	-0.476	-7.281	
1306.00	14.500	261.200	1283.18	50.85 S	192.96 W	199.51	0.756	-0.469	2.344	129.060	
1369.00	13.500	263.500	1344.31	52.89 S	208.06 W	214.66	1.816	-1.587	3.651	152.020	
1433.00	13.900	263.300	1406.48	54.63 S	223.12 W	229.71	0.629	0.625	-0.313	-6.851	
1497.00	12.900	265.300	1468.74	56.11 S	237.87 W	244.39	1.722	-1.563	3.125	156.103	
1561.00	11.500	265.300	1531.29	57.22 S	251.35 W	257.75	2.188	-2.188	0.000	180.000	

HALLIBURTON

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M - MWD SURVEY

Measured Depth (ft)	Incl.	True Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toelface Azimuth	Comment
1625.00	11.800	265.500	1593.98	58.26 S	264.23 W	270.52	0.473	0.469	0.313	7.765	
1688.00	11.500	264.700	1655.68	59.34 S	276.91 W	283.09	0.541	-0.476	-1.270	-152.089	
1752.00	10.900	264.400	1718.46	60.52 S	289.28 W	295.39	0.942	-0.938	-0.469	-174.600	
1815.00	10.200	265.400	1780.39	61.55 S	300.77 W	306.80	1.148	-1.111	1.587	165.833	
1847.00	10.000	265.200	1811.90	62.01 S	306.36 W	312.34	0.635	-0.625	-0.625	-170.152	
1879.00	9.200	265.800	1843.45	62.43 S	311.68 W	317.61	2.519	-2.500	1.875	173.166	
1911.00	8.600	268.800	1875.06	62.67 S	316.63 W	322.47	2.370	-1.875	9.375	143.752	
1942.00	7.500	272.000	1905.76	62.65 S	320.97 W	326.68	3.830	-3.548	10.323	159.414	
1975.00	6.500	273.900	1938.51	62.44 S	324.98 W	330.53	3.110	-3.030	5.758	167.904	
2006.00	5.500	273.400	1969.34	62.24 S	328.22 W	333.63	3.230	-3.226	-1.613	-177.257	
2038.00	4.600	268.200	2001.22	62.19 S	331.03 W	336.35	3.153	-2.813	-16.250	-155.616	
2070.00	4.000	257.100	2033.13	62.47 S	333.40 W	338.72	3.198	-1.875	-34.688	-131.238	
2102.00	3.000	246.700	2065.07	63.06 S	335.26 W	340.66	3.689	-3.125	-32.500	-152.707	
2133.00	2.000	235.800	2096.04	63.68 S	336.45 W	341.97	3.558	-3.226	-35.161	-159.949	
2165.00	1.300	224.600	2128.03	64.25 S	337.17 W	342.80	2.398	-2.188	-35.000	-160.792	
2229.00	0.500	158.800	2192.02	65.03 S	337.58 W	343.38	1.853	-1.250	-102.813	-157.388	
2292.00	0.600	116.800	2255.02	65.43 S	337.18 W	343.09	0.643	0.159	-66.667	-97.675	last EM SURVEY
2333.00	0.600	116.800	2296.01	65.63 S	336.80 W	342.77	0.000	0.000	0.000	0.000	Released sperry-sun

All data is in Feet (US Survey) unless otherwise stated. Directions and coordinates are relative to True North. Vertical depths are relative to RKB = 6374' MSL. Northings and Eastings are relative to 1935' FSL, 1800' FEL.

The Dogleg Severity and Build and Turn rates are in Degrees per 100 feet (US Survey).

Vertical Section is from 1935' FSL, 1800' FEL and calculated along an Azimuth of 256.330° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 2333.00ft.,

The Bottom Hole Displacement is 343.13ft., in the Direction of 258.974° (True).

HALLIBURTON

Survey Report for Sec 27 - T32N - R11W - Van Hook LS #1M - MWD SURVEY

Comments

Measured Depth (ft)	Station Coordinates		Comment
	TVD (ft)	Northings (ft)	Eastings (ft)
272.00	271.88	6.64 S	2.39 W
320.00	319.80	9.19 S	3.31 W
2292.00	2255.02	65.43 S	337.18 W
2333.00	2296.01	65.63 S	336.80 W
			surface shoe assumed vertical
			first EM SURVEY
			last EM SURVEY
			Released sperry-sun

North Reference Sheet for Sec 27 - T32N - R11W - Van Hook LS #1M

Coordinate System is NAD27 New Mexico State Planes, Western Zone, US Foot
Source: Snyder, J.P., 1987, Map Projections - A Working Manual

Datum is North American Datum of 1927 (US48, AK, HI, and Canada)

Spheroid is Clarke - 1866
Equatorial Radius: 6378206.400m.
Polar Radius: 6356583.800m.
Inverse Flattening: 294.978698213901

Projection method is Transverse Mercator or Gauss Kruger Projection
Central Meridian is -107.833°
Longitude Origin: 0.000°
Latitude Origin: 31.000°
False Easting: 152400.00m
False Northing: 0.00m
Scale Reduction: 0.99991667

Grid Coordinates of Well: 2148932.45 N, 460196.64 E
Geographical Coordinates of Well: 36° 54' 20.1738" N, 107° 58' 10.0955" W
Surface Elevation of Well: 6374.00ft
Grid Convergence at Surface is -0.082°
Magnetic Declination at Surface is +10.874° (22 April, 2004)

