

30-045-32062

Schlumberger**Hughes 4M Final Surveys Report**

Report Date: June 7, 2004 Client: BP America Inc. Field: NM, San Juan County (NAD 83 WZ) Structure / Slot: BP 29-29N-8W (Hughes 4M) / Hughes 4M Well: Hughes 4M Borehole: Original Hole UW/APH: Survey Name / Date: Hughes 4M Final Surveys / April 24, 2004 Tort / AHD / DDI / ERD ratio: 43.266" / 502.17 ft / 4.339 / 0.067 Grid Coordinate System: NAD83 New Mexico State Planes, Western Zone, US Feet Location Lat/Long: N 36 41 56.000, W 107 41 43.000 Location Grid N/E Y/X: N 2073738.631 ftUS, E 2763563.429 ftUS Grid Convergence Angle: +0.08250343" Grid Scale Factor: 0.99991854	Survey / DLS Computation Method: Minimum Curvature / Lubinski Vertical Section Azimuth: 259.350" Vertical Section Origin: N 0.000 ft, E 0.000 ft TVD Reference Datum: RKB TVD Reference Elevation: 6429.0 ft relative to MSL Sea Bed / Ground Level Elevation: 6415.000 ft relative to MSL Magnetic Declination: 10.730" Total Field Strength: 51448.319 nT Magnetic Dip: 63.645" Declination Date: April 24, 2004 Magnetic Declination Model: BGGM 2003 North Reference: Grid North Total Corr Mag North -> Grid North: +10.647" Local Coordinates Referenced To: Well Head
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Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	DLS (deg/100 ft)	Northing (ftUS)	Easting (ftUS)	Latitude	Longitude
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2073739.63	2763563.43	N 36 41 56.000	W 107 41 43.000
Begin SLB MWD Surveys	145.00	1.49	247.42	144.98	1.84	-0.72	-1.74	1.03	2073738.91	2763561.69	N 36 41 55.993	W 107 41 43.021
	207.00	2.60	235.15	206.94	3.92	-1.84	-3.64	1.91	2073737.79	2763559.79	N 36 41 55.982	W 107 41 43.045
	269.00	3.85	239.04	268.84	7.15	-3.71	-6.58	2.05	2073735.92	2763556.85	N 36 41 55.963	W 107 41 43.081
	331.00	5.55	239.37	330.63	11.92	-6.31	-10.94	2.74	2073733.32	2763552.49	N 36 41 55.938	W 107 41 43.134
	393.00	7.33	243.44	392.24	18.54	-9.61	-17.06	2.96	2073730.03	2763546.37	N 36 41 55.905	W 107 41 43.210
	455.00	8.59	253.49	453.64	26.95	-12.69	-25.04	3.02	2073726.94	2763538.39	N 36 41 55.875	W 107 41 43.308
	517.00	10.00	255.24	514.83	36.93	-15.38	-34.68	2.32	2073724.25	2763528.75	N 36 41 55.848	W 107 41 43.426
	582.00	10.62	259.23	578.78	48.55	-17.94	-46.03	1.45	2073721.70	2763517.41	N 36 41 55.823	W 107 41 43.565
	646.00	11.15	258.11	641.63	60.63	-20.31	-57.88	0.89	2073719.32	2763505.56	N 36 41 55.800	W 107 41 43.711
	710.00	10.56	262.35	704.48	72.68	-22.37	-69.74	1.55	2073717.26	2763493.69	N 36 41 55.780	W 107 41 43.857
	773.00	10.74	263.30	766.40	84.30	-23.82	-81.29	0.40	2073715.81	2763482.14	N 36 41 55.766	W 107 41 43.999
	835.00	10.34	264.05	827.35	95.61	-25.07	-92.57	0.68	2073714.56	2763470.87	N 36 41 55.753	W 107 41 44.137
	898.00	9.48	265.89	889.41	106.39	-26.03	-103.36	1.45	2073713.60	2763460.07	N 36 41 55.744	W 107 41 44.270
	961.00	9.55	268.14	951.55	116.71	-26.57	-113.76	0.60	2073713.06	2763449.68	N 36 41 55.739	W 107 41 44.397
	1024.00	9.71	270.39	1013.66	127.09	-26.71	-124.30	0.65	2073712.93	2763439.14	N 36 41 55.738	W 107 41 44.527
	1088.00	9.82	264.69	1076.73	137.82	-27.17	-135.13	1.52	2073712.46	2763428.31	N 36 41 55.733	W 107 41 44.660
	1152.00	9.30	260.12	1139.84	148.43	-28.57	-145.66	1.44	2073711.07	2763417.78	N 36 41 55.720	W 107 41 44.789
	1215.00	8.74	260.93	1202.06	158.30	-30.19	-155.40	0.91	2073709.44	2763408.04	N 36 41 55.704	W 107 41 44.909
	1279.00	8.01	260.34	1265.38	167.62	-31.71	-164.60	1.15	2073707.92	2763398.84	N 36 41 55.689	W 107 41 45.022
	1342.00	8.32	255.13	1327.74	176.56	-33.62	-173.33	1.27	2073706.02	2763390.11	N 36 41 55.670	W 107 41 45.129
	1406.00	8.25	254.10	1391.08	185.75	-36.06	-182.22	0.26	2073703.57	2763381.22	N 36 41 55.646	W 107 41 45.238
	1502.00	9.32	252.60	1485.95	200.33	-40.27	-196.27	1.14	2073699.36	2763367.18	N 36 41 55.605	W 107 41 45.411
	1597.00	10.25	257.56	1579.57	216.42	-44.39	-211.86	1.32	2073695.24	2763351.59	N 36 41 55.564	W 107 41 45.602
	1693.00	9.50	257.25	1674.14	232.87	-47.98	-227.93	0.78	2073691.65	2763335.52	N 36 41 55.529	W 107 41 45.800
	1788.00	9.25	265.72	1767.88	248.29	-50.28	-243.19	1.47	2073689.35	2763320.26	N 36 41 55.506	W 107 41 45.987
	1884.00	8.95	267.30	1862.67	263.36	-51.21	-258.34	0.41	2073688.42	2763305.11	N 36 41 55.497	W 107 41 46.173
	1978.00	9.06	265.79	1955.51	277.95	-52.10	-273.03	0.28	2073687.54	2763290.42	N 36 41 55.489	W 107 41 46.353
	2074.00	9.04	262.81	2050.32	292.99	-53.60	-288.05	0.49	2073686.04	2763275.40	N 36 41 55.474	W 107 41 46.538
	2168.00	9.34	265.91	2143.11	307.94	-55.07	-302.98	0.62	2073684.57	2763260.47	N 36 41 55.460	W 107 41 46.721
	2263.00	9.62	267.35	2236.82	323.46	-55.98	-318.60	0.39	2073683.65	2763244.85	N 36 41 55.451	W 107 41 46.913
	2359.00	9.91	268.55	2331.42	339.56	-56.56	-334.87	0.37	2073683.07	2763228.58	N 36 41 55.445	W 107 41 47.113
	2453.00	9.58	262.59	2424.07	355.35	-57.78	-350.72	1.13	2073681.86	2763212.74	N 36 41 55.434	W 107 41 47.308
	2548.00	8.89	261.98	2517.84	370.58	-59.82	-365.83	0.73	2073679.82	2763197.63	N 36 41 55.414	W 107 41 47.493
	2644.00	8.48	264.81	2612.74	385.04	-61.49	-380.22	0.62	2073678.14	2763183.24	N 36 41 55.397	W 107 41 47.670
Fruitland Coal	2740.00	8.89	257.92	2707.64	399.50	-63.69	-394.52	1.16	2073675.95	2763168.94	N 36 41 55.376	W 107 41 47.846
	2826.36	8.59	248.76	2793.00	412.51	-67.42	-407.06	1.65	2073672.22	2763156.40	N 36 41 55.339	W 107 41 48.000
	2835.00	8.57	247.81	2801.54	413.77	-67.90	-408.26	1.66	2073671.74	2763155.21	N 36 41 55.334	W 107 41 48.014
	2931.00	9.10	244.91	2896.41	428.13	-73.82	-421.76	0.72	2073665.82	2763141.71	N 36 41 55.276	W 107 41 48.180
	3027.00	8.28	243.98	2991.30	442.15	-80.07	-434.84	0.87	2073659.57	2763128.62	N 36 41 55.214	W 107 41 48.341
	3122.00	8.85	249.46	3085.24	455.95	-85.63	-447.83	1.05	2073654.00	2763115.63	N 36 41 55.160	W 107 41 48.501
	3218.00	8.72	250.05	3180.12	470.40	-90.71	-461.59	0.16	2073648.93	2763101.88	N 36 41 55.110	W 107 41 48.669
Last SLB MWD Survey	3275.00	8.11	252.08	3236.50	478.66	-93.42	-469.48	1.19	2073646.22	2763093.99	N 36 41 55.083	W 107 41 48.766
Begin Client Assumed Drop 37100'	3276.00	8.08	252.08	3237.49	478.79	-93.46	-469.61	3.00	2073646.18	2763093.86	N 36 41 55.082	W 107 41 48.768
End Client Assumed Drop 37100'	3545.33	0.00	252.08	3505.93	497.60	-99.30	-487.65	3.00	2073640.34	2763075.82	N 36 41 55.025	W 107 41 48.990
Projection to TD	7568.00	0.00	252.08	7528.60	497.60	-99.30	-487.65	0.00	2073640.34	2763075.82	N 36 41 55.025	W 107 41 48.990

Survey Type: Raw Survey**Survey Error Model:** SLB ISCWSA version 16 *** 3-D 95.00% Confidence 2.7955 sigma**Surveying Prog:****MD From (ft)**

0.00

3275.00

MD To (ft)

3275.00 Act-Slts SLB_MWD-STD

7568.00 Act-Slts SLB_BLIND

Surface
9 5/8" Casing Point
Begin SLB MWD Surveys
KOP, Begin 2.00°/100' Build
Begin Tangent
Begin Vertical
CliffHouse
PBHL/TD
Projection to TD

Ojo Alamo 1946 TVD
Kirtland 2065 TVD
Fruitland 2493 TVD
Fruitland Coals 2793 TVD
Pictured Cliffs 2977 TVD
Lewis Shale 3170 TVD
Last SLB MWD Survey
Begin Client Assumed Drop 3°/100'
Begin Natural Drop
End Client Assumed Drop 3°/100'

Target (150' Radius Cylinder)

Surface
9 5/8" Casing Point
Begin SLB MWD Surveys
KOP, Begin 2.00°/100' Build
Begin Tangent
Ojo Alamo 1946 TVD
Kirtland 2065 TVD
Fruitland 2493 TVD
Fruitland Coals 2793 TVD
Pictured Cliffs 2977 TVD
Lewis Shale 3170 TVD
Last SLB MWD Survey
Begin Client Assumed Drop 3°/100'
Begin Natural Drop
End Client Assumed Drop 3°/100'
Projection to TD
Begin Vertical
CliffHouse
PBHL/TD

Target (150' Radius Cylinder)

CliffHouse
Menefee 4717 TVD
Point Lookout 5183 TVD
Mancos 5612 TVD
Greenhorn 7171 TVD
Bentonite Marker 72308 TVD
Two Wells 7276 TVD
Paguete 7376 TVD
Cubero Upper 7410 TVD
Cubero Lower 7441 TVD
Encinal Canyon 7485 TVD
PBHL/TD
Projection to TD

Vertical Section (ft) Azim = 259.35° Scale = 1(in):1000(ft) Origin = 0 N/-S. 0 E/-W

Grid North
Tot Corr (M->G
+10.6475°)
Mag Dec (+10.730°)
Grid Conv
(+0.08250343°)

Quality Control
Date Drawn: Mon 11:18 AM June 07, 2004
Drawn by: Dana Crossland
Checked by: John O'Keefe
Client OK: