

85-10010



Noble Energy PENS1DHS Gyro+MWD 0ft to 12825ft MD Survey Report



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(Def Survey)

Report Date: December 02, 2013 - 11:11 AM
Client: Noble Energy
Field: WV Ritchie County (NAD27)
Structure / Slot: Noble Energy PENS1 Pad / PENS1DHS
Well: PENS1DHS
Original Borehole:
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy PENS1DHS Gyro+MWD 0ft to 12825ft MD
Survey Date: November 19, 2013
Tort / AHD / DDI / ERD Ratio: 199.217' / 6985.551 ft / 6.446 / 1.094
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 20' 5.66700", W 80° 59' 34.67000"
Location Grid NE YX: N 30759.023 ftUS, E 1577724.726 ftUS
CRS Grid Convergence Angle: -0.9522°
Grid Scale Factor: 0.99995358
Version / Patch: 2.7.998.0

Vertical / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 144.610° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
Seabed / Ground Elevation: 1138.030 ft above MSL
Magnetic Declination: -7.801°
Total Gravity Field Strength: 999.302mgm (9.80665 Basead)
Gravity Model: GARM
Total Magnetic Field Strength: 52298.512 nT
Magnetic Dip Angle: 66.880°
Declination Date: November 19, 2013
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Grid Convergence Used: -0.9522°
Total Corr Mag North-Grid North: -6.8487°
Local Coord Referenced To: Well Head

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVDSS (ft), YSEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ftUS), Easting (ftUS), Latitude (N/S °), Longitude (E/W °), Directional Difficulty Index. The table contains multiple rows of survey data points.

12/05/2014

85-10010

Comments	MD (ft)	Incl (°)	Adm Ghd (ft)	TYD (ft)	TVDBS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (mUS)	Easting (mUS)	Latitude (N/S ° ° ' '')	Longitude (E/W ° ° ' '')	Directional Difficulty Index
	7225.00	89.79	141.39	6361.33	5223.32	1130.96	-1178.49	293.92	0.13	0.06	0.11	308420.50	1578018.83	N 39 10 54.07 W	80 50 30.60	5.39
	7320.00	89.24	141.86	6362.18	5224.13	1225.82	-1252.86	353.03	0.64	-0.58	0.28	308346.22	1578077.73	N 39 10 53.34 W	80 50 29.92	5.42
	7416.00	90.21	142.29	6362.62	5224.50	1321.72	-1326.48	412.16	1.20	1.01	0.66	308270.60	1578136.87	N 39 10 52.61 W	80 50 29.15	5.48
	7512.00	90.58	142.81	6361.95	5223.92	1417.65	-1404.69	470.53	0.68	0.39	0.54	308194.40	1578195.24	N 39 10 51.86 W	80 50 28.50	5.49
	7607.00	90.27	141.42	6361.25	5223.22	1512.56	-1470.67	528.87	1.50	-0.33	-1.46	308119.43	1578253.57	N 39 10 51.13 W	80 50 27.63	5.53
	7705.00	89.45	139.36	6361.48	5223.45	1608.29	-1553.62	580.07	2.31	-0.85	-2.15	308045.48	1578311.74	N 39 10 50.41 W	80 50 26.84	5.56
	7798.00	89.97	139.65	6361.97	5223.94	1702.01	-1625.86	651.78	0.63	0.31	0.59	307973.24	1578370.45	N 39 10 49.71 W	80 50 26.04	5.59
	7894.00	90.82	139.58	6361.30	5223.27	1798.57	-1690.20	713.70	0.95	0.89	0.34	307899.90	1578430.39	N 39 10 49.09 W	80 50 25.24	5.62
	7990.00	90.21	139.51	6360.44	5222.41	1894.22	-1772.46	775.73	0.80	-0.64	-0.49	307826.65	1578490.42	N 39 10 48.28 W	80 50 24.43	5.64
	8085.00	89.73	139.95	6360.49	5222.46	1988.80	-1844.41	837.77	0.78	-0.51	-0.50	307754.70	1578550.46	N 39 10 47.58 W	80 50 23.63	5.67
	8181.00	87.84	138.21	6362.53	5224.50	2084.24	-1916.38	901.26	2.11	-0.77	-0.77	307682.74	1578610.95	N 39 10 46.88 W	80 50 22.80	5.70
	8278.00	88.66	139.03	6365.43	5227.40	2178.68	-1987.83	964.03	1.22	0.86	0.86	307611.49	1578670.91	N 39 10 46.18 W	80 50 21.99	5.72
	8371.00	89.35	139.93	6367.08	5229.05	2273.21	-2059.29	1026.37	0.73	-0.11	-0.11	307539.63	1578731.05	N 39 10 45.48 W	80 50 21.18	5.75
	8467.00	89.69	138.59	6367.88	5229.85	2368.70	-2131.48	1089.66	0.50	0.35	-0.35	307467.65	1578791.33	N 39 10 44.78 W	80 50 20.36	5.77
	8562.00	90.58	138.55	6367.66	5229.63	2463.17	-2202.70	1152.52	0.94	0.94	-0.04	307395.43	1578851.19	N 39 10 44.09 W	80 50 19.55	5.79
	8658.00	90.65	138.37	6366.63	5229.60	2558.62	-2274.55	1216.18	0.20	0.07	-0.19	307324.58	1578910.84	N 39 10 43.29 W	80 50 18.72	5.81
	8754.00	90.58	140.00	6365.60	5227.57	2654.18	-2347.29	1278.92	1.70	-0.07	-1.70	307253.93	1578970.58	N 39 10 42.68 W	80 50 17.91	5.84
	8849.00	90.76	140.06	6364.49	5226.46	2748.87	-2420.01	1339.93	0.21	0.10	0.06	307179.13	1579030.50	N 39 10 41.97 W	80 50 17.12	5.86
	8945.00	90.55	140.27	6363.39	5225.36	2844.58	-2493.74	1401.41	0.29	-0.22	0.20	307105.41	1579090.06	N 39 10 41.25 W	80 50 16.32	5.87
	9041.00	90.17	140.09	6362.78	5224.75	2940.29	-2567.47	1462.88	0.44	-0.40	-0.19	307031.68	1579149.54	N 39 10 40.53 W	80 50 15.52	5.89
	9136.00	90.03	139.15	6362.62	5224.59	3034.93	-2639.84	1524.43	1.00	-0.15	-0.99	306959.91	1579209.08	N 39 10 39.83 W	80 50 14.72	5.91
	9232.00	90.21	139.50	6362.42	5224.39	3130.52	-2712.64	1587.00	0.41	0.10	0.36	306886.51	1579268.64	N 39 10 39.12 W	80 50 13.91	5.93
	9327.00	89.79	139.21	6362.42	5224.39	3225.12	-2784.73	1648.88	0.54	-0.44	-0.31	306814.43	1579328.32	N 39 10 38.42 W	80 50 13.11	5.95
	9423.00	90.03	139.74	6362.57	5224.54	3320.73	-2857.70	1711.25	0.81	0.25	0.55	306741.46	1579387.99	N 39 10 37.71 W	80 50 12.30	5.97
	9519.00	90.10	141.25	6362.52	5224.49	3416.40	-2931.82	1772.28	1.68	0.00	1.68	306667.35	1579447.90	N 39 10 36.98 W	80 50 11.51	5.99
	9614.00	90.10	141.78	6362.41	5224.38	3511.35	-3006.23	1831.31	0.46	0.07	0.45	306593.26	1579507.95	N 39 10 36.26 W	80 50 10.74	6.00
	9710.00	89.00	142.05	6362.41	5224.38	3607.25	-3081.79	1890.53	0.35	-0.21	0.28	306519.38	1579567.16	N 39 10 35.52 W	80 50 9.97	6.02
	9805.00	89.97	142.84	6362.52	5224.49	3702.17	-3157.01	1948.56	0.63	0.07	0.62	306444.17	1579627.19	N 39 10 34.79 W	80 50 9.22	6.03
	9901.00	89.86	142.20	6362.66	5224.63	3798.10	-3233.09	2007.11	0.47	-0.11	-0.48	306369.09	1579687.74	N 39 10 34.05 W	80 50 8.46	6.05
	9995.00	89.49	141.29	6363.19	5225.16	3893.98	-3309.90	2065.31	1.05	-0.39	-0.97	306292.28	1579748.94	N 39 10 33.33 W	80 50 7.70	6.07
	10091.00	89.48	140.73	6364.06	5226.03	3987.70	-3381.51	2125.71	0.58	-0.01	-0.58	306217.67	1579809.33	N 39 10 32.60 W	80 50 6.91	6.08
	10186.00	89.55	140.53	6364.98	5226.83	4082.55	-3454.95	2185.97	0.22	0.07	-0.21	306144.24	1579869.50	N 39 10 31.88 W	80 50 6.13	6.10
	10282.00	89.69	141.60	6365.50	5227.47	4178.37	-3529.62	2246.30	1.12	0.15	1.11	306069.07	1579929.91	N 39 10 31.15 W	80 50 5.35	6.11
	10378.00	89.52	140.29	6366.16	5228.13	4274.17	-3604.17	2308.78	1.38	-0.18	-1.36	305995.03	1580000.39	N 39 10 30.43 W	80 50 4.56	6.13
	10474.00	89.59	140.50	6366.91	5228.88	4369.00	-3678.13	2367.98	0.23	0.07	0.22	305921.07	1580060.50	N 39 10 29.71 W	80 50 3.77	6.14
	10569.00	89.62	139.65	6367.56	5229.53	4464.80	-3750.98	2429.94	0.90	0.00	-0.89	305848.22	1580120.55	N 39 10 29.00 W	80 50 2.98	6.16
	10664.00	89.62	138.46	6368.19	5230.16	4559.15	-3822.73	2491.20	1.25	0.00	-1.25	305774.65	1580180.50	N 39 10 28.30 W	80 50 2.17	6.17
	10760.00	89.66	138.42	6368.79	5230.79	4654.60	-3894.57	2554.88	0.06	0.04	-0.04	305704.65	1580240.50	N 39 10 27.60 W	80 50 1.35	6.19
	10855.00	89.21	138.27	6369.73	5231.70	4749.02	-3965.54	2618.02	0.50	-0.47	-0.16	305633.67	1580300.62	N 39 10 26.91 W	80 50 0.53	6.20
	10951.00	89.24	137.84	6371.03	5233.00	4844.40	-4037.00	2682.12	0.35	0.03	-0.34	305562.22	1580360.72	N 39 10 26.21 W	80 50 0.70	6.21
	11047.00	89.24	137.99	6372.30	5234.27	4923.74	-4108.29	2746.40	0.65	0.00	0.65	305490.93	1580420.90	N 39 10 25.52 W	80 50 0.87	6.22
	11143.00	89.48	137.62	6373.37	5235.34	5005.06	-4179.41	2810.87	0.46	0.25	-0.39	305419.81	1580480.95	N 39 10 24.82 W	80 50 0.03	6.24
	11238.00	89.83	139.19	6373.95	5235.92	5129.50	-4250.45	2873.93	1.69	0.37	1.65	305348.78	1580540.92	N 39 10 24.13 W	80 50 0.21	6.25
	11334.00	89.83	140.81	6374.23	5236.20	5225.18	-4323.99	2935.84	1.69	0.00	1.69	305275.24	1580600.22	N 39 10 23.42 W	80 50 0.61	6.27
	11430.00	89.86	141.36	6374.49	5236.46	5321.00	-4398.89	2995.94	0.57	0.03	0.57	305202.55	1580660.50	N 39 10 22.69 W	80 50 0.53	6.28
	11526.00	89.50	141.18	6375.79	5237.76	5416.83	-4472.57	3056.00	1.34	-1.32	-0.19	305129.67	1580720.50	N 39 10 21.96 W	80 50 0.85	6.29
	11621.00	89.42	142.06	6377.44	5239.41	5511.68	-4548.03	3114.97	1.27	0.07	0.03	305055.22	1580780.55	N 39 10 21.23 W	80 50 0.08	6.31
	11718.00	89.11	142.01	6378.66	5240.63	5606.58	-4622.92	3173.41	0.33	-0.33	-0.05	304976.33	1580840.50	N 39 10 20.50 W	80 50 0.32	6.32
	11812.00	89.11	141.07	6380.15	5242.12	5702.43	-4698.08	3233.11	0.98	0.00	-0.98	304901.17	1580900.50	N 39 10 19.77 W	80 50 0.55	6.33
	11908.00	89.21	139.94	6381.56	5243.53	5798.17	-4772.15	3294.16	1.19	0.10	-1.18	304826.10	1580960.50	N 39 10 19.05 W	80 50 0.78	6.34
	12003.00	89.38	139.77	6382.73	5244.70	5892.84	-4844.78	3355.40	0.25	0.18	-0.18	304754.40	1581020.50	N 39 10 18.34 W	80 50 0.96	6.35
	12099.00	89.45	139.62	6383.71	5245.68	5988.48	-4917.97	3417.50	0.17	0.07	-0.16	304682.29	1581080.50	N 39 10 17.63 W	80 50 0.16	6.36
	12194.00	89.73	139.65	6384.39	5246.36	6083.12	-4990.35	3479.02	0.30	0.29	0.03	304610.91	1581140.50	N 39 10 16.92 W	80 50 0.36	6.37
	12290.00	89.10	139.36	6384.53	5246.50	6178.74	-5063.37	3541.35	0.48	0.39	-0.28	304535.00	1581200.50	N 39 10 16.21 W	80 50 0.55	6.39
	12385.00	89.45	138.54	6384.00	5246.87	6273.28	-5135.02	3603.73	1.12	-0.68	-0.68	304464.26	1581260.50	N 39 10 15.51 W	80 50 0.74	6.40
	12481.00	89.70	138.69	6385.54	5247.51	6368.76	-5207.16	3667.07	0.51	0.35	0.36	304392.12	1581320.50	N 39 10 14.81 W	80 50 0.92	6.41
	12578.00	89.28	138.91	6386.31	5248.28	6463.29	-5278.74	3729.51	0.54	-0.54	0.02	304320.54	1581380.50	N 39 10 14.11 W	80 50 0.61	6.42
	12672.00	89.93	139.89	6386.97	5248.94	6558.89	-5351.63	3791.99	1.22	0.68	1.02	304247.65	1581440.50	N 39 10 13.40 W	80 50 0.50	6.43
Final Survey 29-Now-13	12741.00	89.50	140.32	6387.26	5249.23	6627.68	-5404.57	3836.24	0.79	-0.49	0.82	302194.72	1581500.78	N 39 10 12.68 W	80 50 0.44	6.44
PTB	12825.00	89.50	140.32	6387.88	5249.83	6711.44	-5469.21	3889.87	0.00	0.00	0.00	302130.07	1581614.41	N 39 10 12.25 W	80 50 0.44	6.45

Survey Type: Def Survey

