

Noble Energy PEN2GHS Surveys 0ft to 15588ft MD Survey Geodetic Report

(Def Survey)

Report Date: March 31, 2014 - 08:58 AM
 Client: Noble Energy
 Field: WV Ritchie County (NAD27)
 Structure / Slot: Noble Energy PEN2 Pad / PEN2GHS
 Well: PEN2GHS
 Borehole: Original Borehole
 UWI / AP#: Unknown / Unknown
 Survey Name: Noble Energy PEN2GHS Surveys 0ft to 15588ft MD
 Survey Date: March 14, 2014
 Tort / AHD / ODI / ERO Ratio: 218.671' / 9708.159 ft / 0.722 / 1.545
 Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
 Location Lat / Long: N 30° 20' 11.74000", W 81° 0' 45.10000"
 Location Grid N/E Y/X: N 308306.584 NUS, E 1572162.482 NUS
 CRS Grid Convergence Angle: -0.9647'
 Grid Scale Factor: 0.99995343
 Version / Patch: 2.7.1043.0

Survey / DLS Computation: Minimum Curvature / Lubinski
 Vertical Section Azimuth: 321.116° (Grid North)
 Vertical Section Origin: 0.000 ft, 0.000 ft
 TVD Reference Datum: KB
 TVD Reference Elevation: 1101.830 ft above MSL
 Seabed / Ground Elevation: 1075.830 ft above MSL
 Magnetic Declination: -7.857'
 Total Gravity Field Strength: 999.3085mgm (@ 80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 52247.335 nT
 Magnetic Dip Angle: 66.850°
 Declination Date: March 14, 2014
 Magnetic Declination Model: HDGM 2013
 North Reference: Gnd North
 Grid Convergence Used: -0.9647'
 Total Corr Mag North->Grid North: -6.8925'
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (NUS)	Eastling (EUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	0.00	0.00	-1101.83	0.00	0.00	0.00	N/A	N/A	N/A	308306.58	1572162.48	N 30 20 11.74	W 81 0 45.61
	093.00	1.55	168.38	092.92	-408.91	-8.33	-9.18	1.89	0.22	0.00	0.00	308297.40	1572164.37	N 30 20 11.65	W 81 0 45.58
	783.00	0.11	175.30	782.90	-318.93	-9.49	-10.46	2.14	1.00	-1.60	7.69	308296.12	1572164.02	N 30 20 11.64	W 81 0 45.58
	879.00	2.42	347.88	878.88	-222.95	-7.75	-8.57	1.72	2.63	2.41	179.77	308298.01	1572164.20	N 30 20 11.66	W 81 0 45.59
	974.00	4.30	344.73	973.71	-128.12	-2.70	-3.17	0.96	1.99	1.98	-3.32	308303.41	1572162.84	N 30 20 11.71	W 81 0 45.60
	1068.00	5.60	344.23	1067.36	-34.47	4.75	4.64	-1.81	1.38	-0.53	308311.23	1572160.67	N 30 20 11.79	W 81 0 45.63	
	1163.00	5.95	342.22	1161.87	60.04	13.61	13.79	-4.58	0.43	0.37	-2.12	308320.37	1572157.91	N 30 20 11.88	W 81 0 45.67
	1258.00	6.21	336.95	1256.34	154.51	23.14	23.21	-8.09	0.85	0.27	-5.55	308329.79	1572154.39	N 30 20 11.97	W 81 0 45.72
	1354.00	5.74	329.41	1351.82	249.99	32.89	32.12	-12.57	0.95	-0.49	-7.85	308338.70	1572149.92	N 30 20 12.06	W 81 0 45.78
	1450.00	3.93	329.86	1447.47	345.64	40.89	39.10	-10.66	1.89	-1.89	0.47	308345.88	1572145.82	N 30 20 12.12	W 81 0 45.83
	1546.00	2.55	321.41	1543.32	441.49	46.28	43.61	-10.65	1.52	-1.44	-8.80	308350.19	1572142.84	N 30 20 12.17	W 81 0 45.87
	1642.00	1.30	304.94	1639.20	537.43	49.46	45.90	-21.87	1.41	-1.30	-17.16	308352.49	1572140.61	N 30 20 12.19	W 81 0 45.90
	1737.00	0.75	295.78	1734.25	632.42	51.06	46.79	-23.31	0.00	-0.58	-9.64	308353.37	1572139.17	N 30 20 12.20	W 81 0 45.92
	1832.00	0.58	318.07	1829.24	727.41	52.10	47.42	-24.20	0.32	-0.18	23.46	308354.00	1572138.29	N 30 20 12.20	W 81 0 45.93
	1928.00	0.19	96.45	1925.24	823.41	52.47	47.76	-24.36	0.76	-0.21	144.15	308354.34	1572138.12	N 30 20 12.21	W 81 0 45.93
	2023.00	0.42	93.77	2020.24	918.41	52.12	47.72	-23.88	0.24	-0.44	-2.82	308354.30	1572138.63	N 30 20 12.21	W 81 0 45.92
	2119.00	0.91	96.81	2116.23	1014.40	51.34	47.61	-22.75	0.51	0.51	3.17	308354.19	1572139.73	N 30 20 12.21	W 81 0 45.91
	2214.00	0.45	129.71	2211.23	1109.40	50.44	47.28	-21.71	0.62	-0.48	34.63	308353.86	1572140.77	N 30 20 12.20	W 81 0 45.90
	2310.00	0.46	211.57	2307.22	1205.39	49.94	46.71	-21.63	0.62	0.01	65.27	308353.29	1572140.80	N 30 20 12.20	W 81 0 45.90
	2405.00	0.92	225.99	2402.22	1300.39	49.74	45.86	-22.37	0.51	0.48	15.18	308352.44	1572140.11	N 30 20 12.19	W 81 0 45.90
	2500.00	0.45	257.60	2497.21	1395.38	49.84	45.25	-23.29	0.62	-0.49	33.27	308351.83	1572139.20	N 30 20 12.18	W 81 0 45.92
	2596.00	0.36	297.22	2593.21	1491.38	50.28	45.30	-23.92	0.30	-0.09	41.27	308351.89	1572138.50	N 30 20 12.18	W 81 0 45.92
	2692.00	0.74	321.80	2689.20	1587.37	51.18	45.93	-24.57	0.46	0.40	25.60	308352.51	1572137.91	N 30 20 12.19	W 81 0 45.93
	2787.00	0.55	352.92	2784.20	1683.37	52.18	46.86	-25.01	0.41	-0.20	32.78	308353.45	1572137.47	N 30 20 12.20	W 81 0 45.94
	2881.00	0.63	18.83	2878.19	1778.36	52.84	47.80	-24.90	0.29	0.09	27.56	308354.38	1572137.58	N 30 20 12.21	W 81 0 45.94
	2976.00	0.79	14.32	2973.19	1871.36	53.51	48.93	-24.57	0.17	0.17	-4.75	308355.51	1572137.91	N 30 20 12.22	W 81 0 45.93
	3071.00	0.94	10.81	3068.17	1968.34	54.41	50.33	-24.26	0.18	0.16	-3.69	308356.91	1572138.22	N 30 20 12.23	W 81 0 45.93
	3167.00	0.42	54.73	3164.17	2062.34	54.89	51.31	-23.83	0.73	-0.54	45.75	308357.89	1572138.66	N 30 20 12.24	W 81 0 45.92
	3262.00	0.51	102.69	3258.16	2157.34	54.51	51.87	-23.14	0.46	0.08	57.75	308357.95	1572139.31	N 30 20 12.24	W 81 0 45.92
	3358.00	0.77	126.67	3355.16	2253.33	53.52	50.84	-22.22	0.33	0.27	17.79	308357.42	1572140.20	N 30 20 12.24	W 81 0 45.90
	3454.00	0.52	182.10	3451.15	2349.32	52.57	50.02	-21.72	0.67	-0.26	57.74	308356.60	1572140.76	N 30 20 12.23	W 81 0 45.90
	3549.00	0.84	230.46	3546.15	2444.32	52.24	49.14	-22.27	0.86	0.34	50.91	308355.72	1572140.21	N 30 20 12.22	W 81 0 45.90
	3645.00	0.24	154.45	3642.14	2540.31	52.03	48.51	-22.73	0.65	-0.83	-79.18	308355.09	1572139.75	N 30 20 12.22	W 81 0 45.91
	3740.00	0.44	116.97	3737.14	2635.31	51.51	48.17	-22.32	0.30	0.21	-39.45	308354.75	1572140.16	N 30 20 12.21	W 81 0 45.90
	3835.00	0.68	123.01	3832.14	2730.31	50.64	47.70	-21.52	0.26	0.25	6.36	308354.28	1572140.96	N 30 20 12.21	W 81 0 45.89
	3930.00	0.22	138.05	3927.13	2825.30	49.62	47.25	-20.93	0.50	-0.48	15.84	308353.83	1572141.56	N 30 20 12.20	W 81 0 45.89
	4026.00	0.22	175.76	4023.13	2921.30	49.58	46.93	-20.79	0.15	0.00	39.27	308353.51	1572141.69	N 30 20 12.20	W 81 0 45.88
	4122.00	0.33	203.93	4119.13	3017.30	49.31	46.50	-20.89	0.18	0.11	29.34	308353.08	1572141.59	N 30 20 12.20	W 81 0 45.89
	4218.00	0.56	296.46	4215.13	3113.30	49.61	46.45	-21.42	0.69	0.24	96.39	308353.03	1572141.06	N 30 20 12.20	W 81 0 45.89
	4313.00	1.07	303.69	4310.12	3208.29	50.87	47.14	-22.58	0.55	0.54	6.98	308353.72	1572139.90	N 30 20 12.21	W 81 0 45.91
	4408.00	0.45	285.78	4405.11	3303.28	52.02	47.73	-23.68	0.69	-0.54	-18.22	308354.31	1572138.80	N 30 20 12.21	W 81 0 45.92
	4503.00	0.34	290.01	4500.11	3398.28	52.18	47.57	-24.14	0.57	-0.12	-60.28	308354.15	1572138.35	N 30 20 12.21	W 81 0 45.93
	4599.00	0.84	168.35	4596.11	3494.28	51.40	46.61	-24.09	0.60	0.52	-32.98	308353.19	1572138.39	N 30 20 12.20	W 81 0 45.93
	4694.00	0.58	166.56	4691.10	3589.27	50.35	45.46	-23.84	0.27	-0.27	-1.88	308352.04	1572138.64	N 30 20 12.19	W 81 0 45.92
	4789.00	0.40	291.85	4786.10	3684.27	50.21	45.11	-24.04	0.92	-0.19	131.88	308351.70	1572138.45	N 30 20 12.18	W 81 0 45.93
	4885.00	1.05	310.99	4882.09	3780.28	51.36	45.82	-25.01	0.71	0.88	19.84	308352.40	1572137.47	N 30 20 12.19	W 81 0 45.94
	4980.00	0.67	296.28	4977.08	3875.25	52.76	46.63	-26.17	0.46	-0.40	-15.48	308353.21	1572136.32	N 30 20 12.20	W 81 0 45.95
	5076.00	0.30	182.40	5073.07	3971.24	53.05	46.63	-26.68	0.87	-0.39	-118.56	308353.21	1572135.80	N 30 20 12.20	W 81 0 45.96
	5171.00	0.38	49.22	5168.07	4067.24	52.87	46.59	-26.45	0.06	0.08	-140.25	308353.17	1572136.03	N 30 20 12.20	W 81 0 45.96
	5267.00	0.79	28.16	5264.07	4162.24	53.14	47.38	-25.90	0.48	0.43	-21.94	308353.96	1572136.58	N 30 20 12.20	W 81 0 45.95
	5362.00	1.18	14.90	5359.06	4257.23	53.97	48.90	-25.34	0.47	0.41	-13.99	308355.48	1572137.14	N 30 20 12.22	W 81 0 45.94
	5471.00	1.25	347.94	5468.03	4360.20	55.70	51.15	-25.30	0.52	0.06	-24.73	308357.73	1572137.19	N 30 20 12.24	W 81 0 45.94
	5577.00	5.72	338.59	5563.83	4463.20	56.63	51.20	-27.26	4.66	4.66	-9.74	308362.21	1572136.52	N 30 20 12.30	W 81 0 45.97
	5684.00	10.96	340.22	5610.32	4568.49	67.66	63.03	-29.64	11.20	11.19	3.47	308369.61	1572132.85	N 30 20 12.36	W 81 0 46.00
	5682.00	13.14	343.22	5657.25	4555.42	77.04	72.55	-32.76	4.68	4.68	6.25	308379.13	1572129.73	N 30 20 12.45	W 81 0 46.04
	5709.00	13.26	341.53	5703.01	4601.18	87.04	82.78	-36.01	0.86	0.26	-3.60	308389.36	1572126.48	N 30 20 12.55	W 81 0 46.09
	5758.00	15.37	349.02	5750.49	4648.06	98.05	94.49	-39.03	5.72	4.31	15.29	308401.07	1572123.40	N 30 20 12.67	W 81 0 46.13
	5805.00	16.07	7.19	5795.76	4693.93	108.07	107.06	-39.40	10.54	1.49	38.86	308413.64	1572123.09	N 30 20 12.79	W 81 0 46.13
	5853.00	18.27	16.20	5841.63	4739.80	118.99	120.88	-36.47	7.18	18.77	308427.46	1572122.02	N 30 20 12.93	W 81 0 46.10	
	5903.00	16.42	357.94	5879.84	4778.01	125.11	132.57	-34.92	14.31	-4.63	-45.65	308439.14	1572127.56	N 30 20 13.04	W 81 0 46.08
	5940.00	17.42	337.77	5924.84	4823.01	137.18	145.73	-37.82	12.61	2.13	-42.91	308452.30	1572124.66	N	

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLB (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S/°)	Longitude (E/W/°)
	7513.00	89.73	318.50	6282.78	5180.95	1544.54	1308.78	-840.02	0.87	-0.35	-0.79	306815.30	1571322.51	N 39 20 24.51 W	01 05 58
	7608.00	90.10	318.90	6282.02	5181.00	1639.48	1378.22	-802.94	0.57	0.39	0.42	306864.70	1571258.88	N 39 20 25.21 W	01 05 30
	7704.00	89.79	318.88	6283.01	5181.18	1735.39	1450.58	-865.72	0.33	-0.32	-0.08	306957.00	1571198.80	N 39 20 25.91 W	01 05 21
	7796.00	89.83	318.90	6283.33	5181.50	1830.32	1522.10	-1028.19	0.05	0.04	0.02	306926.67	1571134.34	N 39 20 26.61 W	01 05 02
	7895.00	90.45	319.36	6283.00	5181.26	1926.26	1594.75	-1091.00	0.80	0.65	0.48	3068001.26	1571071.53	N 39 20 27.32 W	01 05 04
	7991.00	90.52	319.25	6282.28	5180.45	2022.21	1687.54	-1153.00	0.14	0.07	-0.11	306974.04	1571008.94	N 39 20 28.03 W	01 05 05
	8086.00	90.69	319.60	6281.28	5179.45	2117.18	1729.99	-1215.36	0.41	0.18	-0.37	310443.10	1570947.10	N 39 20 28.73 W	01 05 14
	8182.00	90.78	320.22	6280.00	5178.23	2213.13	1813.13	-1277.20	0.05	0.07	0.05	310119.62	1570885.34	N 39 20 29.44 W	01 05 25
	8278.00	90.00	319.43	6279.42	5177.50	2306.10	1886.47	-1339.13	1.14	-0.79	-0.82	310162.67	1570823.41	N 39 20 30.10 W	01 05 30
	8373.00	90.17	319.85	6279.28	5177.45	2404.07	1958.86	-1400.85	0.48	0.18	0.44	310265.35	1570761.90	N 39 20 30.80 W	01 05 35
	8469.00	90.00	319.89	6279.14	5177.31	2500.05	2032.26	-1462.53	0.18	-0.18	0.04	310338.75	1570700.03	N 39 20 31.50 W	01 05 46
	8564.00	89.48	319.22	6279.57	5177.74	2595.01	2104.50	-1524.15	0.69	-0.55	-0.71	310411.04	1570638.40	N 39 20 32.28 W	01 05 54
	8650.00	89.48	319.23	6280.44	5178.61	2690.95	2177.78	-1586.85	0.00	0.01	0.01	310483.73	1570576.51	N 39 20 33.00 W	01 05 58
	8758.00	89.59	319.35	6281.22	5179.30	2786.90	2250.02	-1649.48	0.17	0.11	0.13	310556.50	1570513.10	N 39 20 33.70 W	01 05 57
	8852.00	90.45	320.56	6281.19	5179.30	2882.86	2323.06	-1711.02	1.63	0.90	1.59	310630.18	1570451.55	N 39 20 34.42 W	01 05 28
	8947.00	90.38	319.22	6280.50	5178.07	2977.86	2396.51	-1772.02	1.75	-0.07	-1.75	310702.86	1570389.55	N 39 20 35.13 W	01 05 18
	9043.00	90.45	320.01	6279.81	5177.98	3073.82	2469.63	-1834.21	0.83	0.07	0.82	310778.00	1570328.36	N 39 20 35.84 W	01 05 14
	9138.00	90.55	319.13	6279.06	5177.15	3160.78	2541.94	-1895.82	0.60	0.11	-0.93	310848.40	1570266.75	N 39 20 36.54 W	01 05 28
	9234.00	91.03	319.34	6277.85	5175.82	3248.72	2614.64	-1958.02	0.62	0.22	0.22	310924.66	1570204.96	N 39 20 37.25 W	01 05 11
	9330.00	90.03	318.01	6276.70	5174.93	3336.83	2686.73	-2021.68	1.73	-1.04	-1.30	310993.18	1570143.70	N 39 20 37.95 W	01 05 11
	9425.00	90.14	318.26	6276.02	5174.70	3425.50	2757.48	-2085.29	0.29	0.12	0.26	311063.63	1570081.73	N 39 20 38.64 W	01 05 12
	9520.00	89.55	318.22	6276.88	5175.05	3510.36	2828.34	-2148.56	0.82	-0.82	-0.04	311134.79	1570019.03	N 39 20 39.33 W	01 05 16
	9615.00	90.02	319.34	6276.74	5174.91	3604.30	2899.80	-2211.15	1.63	1.13	1.18	311206.24	1569955.43	N 39 20 40.03 W	01 05 14
	9710.00	89.97	319.55	6276.25	5174.42	3697.98	2971.98	-2272.92	0.72	-0.68	0.22	311278.41	1569893.87	N 39 20 40.73 W	01 05 17
	9806.00	90.10	319.55	6276.19	5174.36	3793.22	3045.03	-2335.20	0.14	0.14	0.00	311351.48	1569832.39	N 39 20 41.44 W	01 05 18
	9901.00	90.02	321.04	6275.43	5173.60	3881.11	3118.11	-2395.89	0.74	0.78	1.57	311424.54	1569770.71	N 39 20 42.15 W	01 05 18
	9997.00	92.13	321.53	6272.90	5171.13	4027.17	3192.99	-2455.91	1.46	1.30	0.51	311496.42	1569708.69	N 39 20 42.88 W	01 05 17
	10091.00	91.34	320.88	6270.11	5168.20	4121.13	3266.12	-2514.90	1.23	-0.84	-0.90	311572.54	1569647.70	N 39 20 43.60 W	01 05 13
	10186.00	90.55	320.82	6268.55	5166.72	4218.11	3339.57	-2575.13	0.83	-0.63	-0.06	311645.99	1569586.47	N 39 20 44.31 W	01 05 19
	10281.00	90.52	320.96	6267.66	5165.83	4311.10	3413.17	-2635.18	0.36	-0.03	0.36	311719.59	1569525.43	N 39 20 45.03 W	01 05 19
	10377.00	90.03	321.01	6267.20	5165.37	4407.10	3487.78	-2695.62	0.51	-0.51	0.05	311794.18	1569464.00	N 39 20 45.78 W	01 05 20
	10472.00	89.55	320.54	6267.23	5165.40	4502.10	3561.36	-2755.69	0.51	-0.11	-0.40	311867.77	1569402.62	N 39 20 46.47 W	01 05 21
	10567.00	90.00	320.49	6267.29	5165.46	4597.09	3634.08	-2816.10	0.00	0.07	-0.05	311941.08	1569340.52	N 39 20 47.10 W	01 05 22
	10661.00	89.97	321.02	6267.31	5165.48	4691.06	3707.47	-2875.57	0.56	-0.03	0.56	312013.88	1569278.05	N 39 20 47.80 W	01 05 23
	10756.00	90.27	321.55	6267.11	5165.26	4786.06	3781.00	-2934.90	0.64	0.32	0.58	312088.00	1569216.64	N 39 20 48.52 W	01 05 23
	10851.00	91.51	321.09	6265.84	5163.81	4881.08	3855.75	-2994.35	1.39	1.31	-0.48	312162.15	1569155.28	N 39 20 49.24 W	01 05 25
	10946.00	91.20	320.83	6265.42	5163.05	4976.05	3928.79	-3053.48	0.87	-0.17	-0.17	312236.17	1569093.81	N 39 20 49.95 W	01 05 31
	11040.00	90.14	320.87	6265.31	5162.48	5070.04	4002.40	-3113.51	1.15	-1.12	-0.27	312308.70	1569032.40	N 39 20 50.67 W	01 05 29
	11135.00	89.09	320.82	6262.45	5160.82	5165.04	4075.97	-3173.63	0.50	-0.47	0.18	312382.35	1568970.91	N 39 20 51.48 W	01 05 27
	11231.00	89.02	321.21	6262.70	5160.93	5261.04	4150.59	-3232.02	0.48	0.25	0.41	312456.07	1568909.62	N 39 20 52.22 W	01 05 26
	11326.00	90.31	321.40	6262.57	5160.74	5356.04	4224.73	-3293.41	0.45	0.40	0.20	312531.11	1568848.23	N 39 20 52.94 W	01 05 28
	11422.00	90.31	321.10	6262.05	5160.22	5452.03	4299.60	-3353.50	0.31	0.00	-0.31	312605.88	1568786.14	N 39 20 53.67 W	01 05 29
	11517.00	90.34	320.68	6261.51	5159.88	5547.03	4373.31	-3413.43	0.44	-0.44	-0.44	312680.68	1568724.62	N 39 20 54.38 W	01 05 30
	11613.00	90.34	321.14	6260.04	5158.11	5643.03	4447.82	-3473.90	0.48	0.00	0.48	312754.19	1568663.68	N 39 20 55.11 W	01 05 30
	11708.00	90.41	320.66	6260.32	5158.49	5738.03	4521.85	-3533.74	0.30	0.07	-0.29	312828.01	1568602.91	N 39 20 55.83 W	01 05 31
	11803.00	90.31	321.04	6259.72	5157.89	5833.02	4595.43	-3593.59	0.22	-0.11	0.19	312901.79	1568541.97	N 39 20 56.55 W	01 05 32
	11899.00	90.21	320.93	6259.28	5157.45	5928.02	4670.01	-3654.02	0.15	-0.10	-0.11	312975.37	1568480.64	N 39 20 57.28 W	01 05 33
	11994.00	90.48	320.92	6258.71	5156.88	6024.02	4743.78	-3713.90	0.28	0.28	-0.01	313050.12	1568419.28	N 39 20 58.00 W	01 05 33
	12089.00	90.31	319.55	6258.06	5156.00	6119.00	4818.78	-3774.97	0.44	-0.18	-0.13	313124.13	1568357.85	N 39 20 58.71 W	01 05 34
	12183.00	90.52	319.85	6257.38	5155.55	6212.97	4893.47	-3835.48	0.39	0.22	0.32	313198.62	1568296.82	N 39 20 59.41 W	01 05 35
	12278.00	90.14	319.16	6256.83	5155.00	6307.93	4968.72	-3895.16	0.63	-0.44	-0.73	313273.00	1568235.52	N 39 21 00.11 W	01 05 36
	12373.00	90.27	319.03	6256.49	5154.00	6402.87	5043.52	-3955.36	0.19	0.14	0.14	313348.00	1568174.31	N 39 21 00.81 W	01 05 37
	12468.00	90.41	319.85	6255.92	5154.09	6497.83	5104.58	-4015.26	0.87	0.15	0.85	313423.02	1568113.42	N 39 21 01.51 W	01 05 37
	12562.00	90.78	319.15	6254.97	5153.14	6591.78	5175.95	-4075.23	0.85	0.37	-0.53	313498.28	1568052.85	N 39 21 02.21 W	01 05 38
	12657.00	90.62	319.91	6253.82	5151.90	6686.73	5248.21	-4144.08	0.61	-0.15	0.80	313574.54	1568001.60	N 39 21 02.91 W	01 05 39
	12753.00	90.09	319.64	6252.72	5150.89	6782.70	5321.50	-4208.07	0.29	0.07	-0.28	313650.83	1567940.61	N 39 21 03.62 W	01 05 40
	12848.00	90.82	319.69	6251.64	5149.81	6877.67	5393.92	-4267.56	0.90	-0.07	0.05	313727.24	1567879.13	N 39 21 04.33 W	01 05 41
	12944.00	90.09	319.54	6250.54	5148.71	6973.03	5467.04	-4329.75	0.17	0.07	-0.18	313803.34	1567817.94	N 39 21 05.04 W	01 05 41
	13039.00	90.21	319.36	6249.79	5147.90	7068.58	5539.22	-4391.51	0.54	-0.51	-0.19	313879.53	1567757.18	N 39 21 05.75 W	01 05 42
	13134.00	89.79	319.35	6249.70	5147.90	7163.54	5611.30	-4453.39	0.44	-0.44	-0.01	313951.61	1567696.30	N 39 21 06.45 W	01 05 43
	13230.00	90.17	319.88	6248.83	5148.00	7259.50	5684.42	-4515.59	0.68	0.40	0.55	313990.73	1567634.71	N 39 21 07.16 W	01 05 44
	13326.00	91.31	321.99	6248.59	5148.78	7355.40	5758.95	-4578.08	2.50	1.19	2.20	314065.25	1567573.62	N 39 21 07.89 W	01 05 45
	13421.00	90.41	319.22	6247.18	5145.33	7450.46	5832.35	-4638.30	3.07	-0.95	-2.92	314138.65	1567512.34	N 39 21 08.60 W	01 05 47
	13518.00	90.34	317.86	6246.54	5144.71	7545.36	5903.54	-4699.26	1.43	-0.07	-1.43	314209.84	1567451.45	N 39 21 09.29 W	01 05 49
	13611.00	90.79	31												

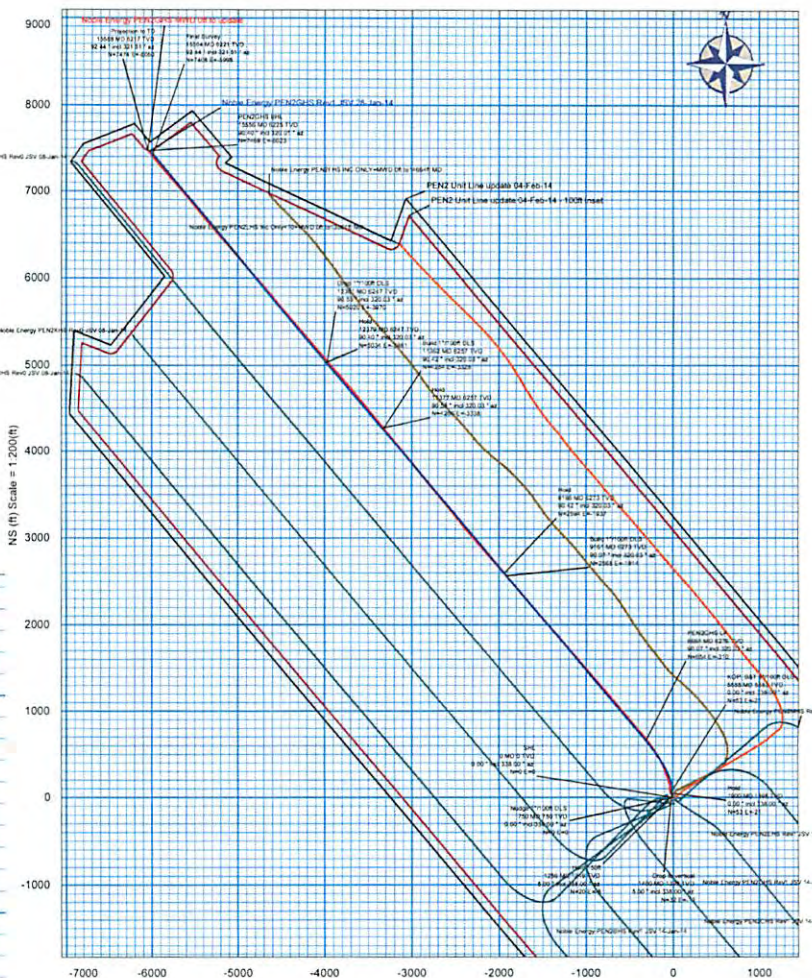
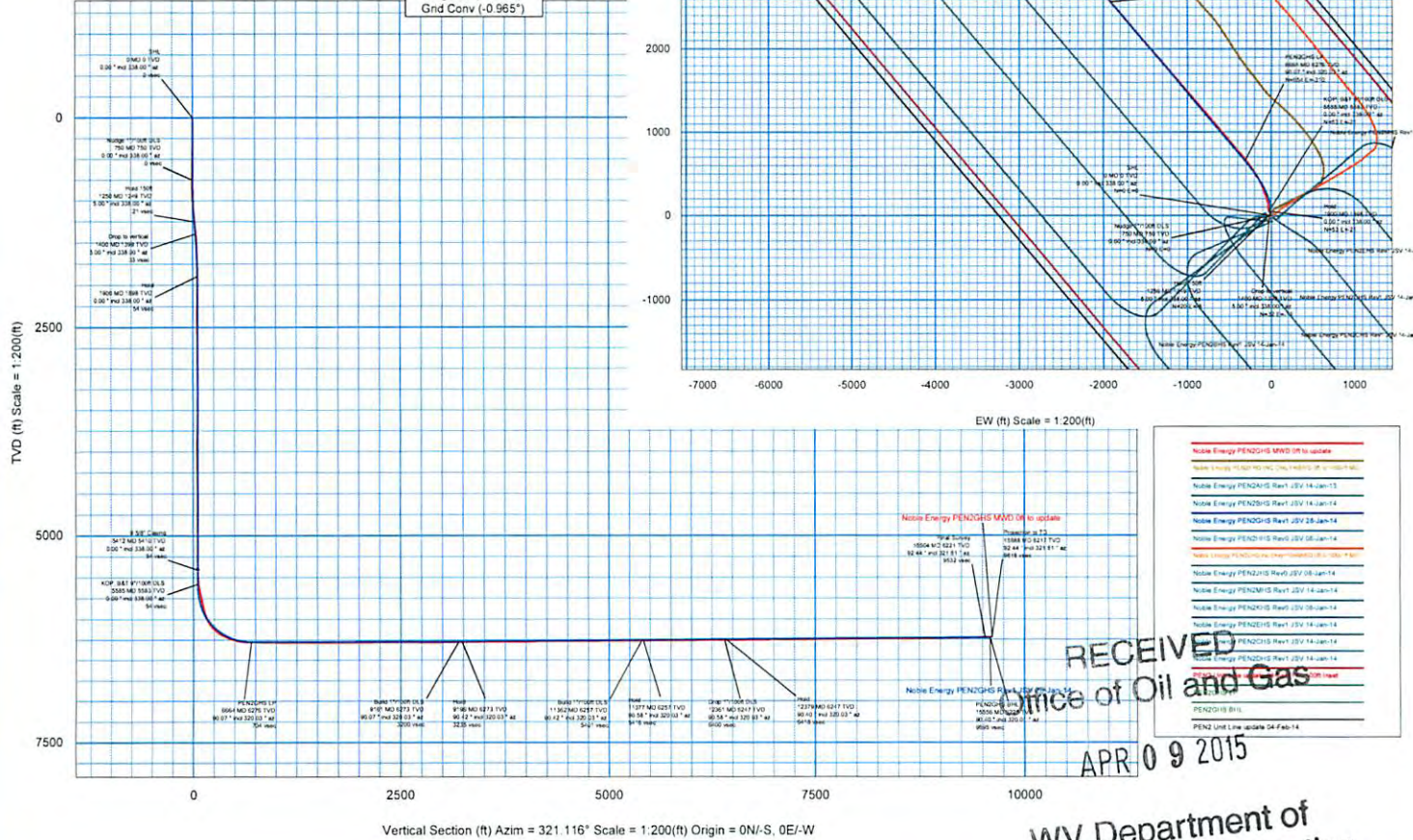
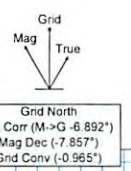
Borehole: Original Borehole	Well: PEN2GHS	Field: WV Ritchie County (NAD27)	Structure: Nomac 78
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Gravity & Magnetic Parameters Model: HOGM 2013 Dip: 66.85° Date: 14-Mar-2014 MagDec: -7.857° FS: 52247.335mT Gravity FS: 999.309mgm (9.80665 Based)	Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet Lat: N 39 20 11.74 Lon: W 81 0 45.61 Northing: 308306.584RUS Easting: 1572162.482RUS Grid Conv: -0.9647° Scale Fact: 0.99995343	Miscellaneous Slot: PEN2GHS TVD Ref: KB(101.83ft above MSL) Plan: Noble Energy PEN2GHS MWD Drt to update
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Critical Points								
Critical Point	MD	WCL	AZIM	TVD	VBEC	WV(B)	EV(W)	CLS
3PL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Survey	15504.00	62.44	327.81	6229.79	9537.59	7427.83	3987.95	1.22
Preposition to TD	15568.00	62.44	327.81	6217.20	9615.51	7475.63	4036.07	0.00

Part	Seq	Survey Tool	Vendor/Tool	Axis Size (in)	Depth Size (ft)	MD From (ft)	MD To (ft)	Survey Frequency (Start/Stop/Rate)	ECU Size (Start/Stop)	Comments/Contingency
1	1	SLB_INC_ONLY+9-Drop Only		30	30	0	26	Auto Drive	1.25	7.25
1	2	SLB_INC_ONLY+10		30	30	26	683	1/68-1/26	21.07	21.06
1	3	SLB_INC_ONLY+10		30	30	963	783	Auto Drive	23.85	23.85
1	4	SLB_MWD-3TD		30	30	783	15504	Auto Drive	273.01	24.43
1	5	SLB_SLURRY+10+NO		30	30	15504	15568	Auto Drive	268.11	25.12

Surface Location											
Target Description		Grid Coord									Local Coord
Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	Nx(S)	Yz(W)	
PEN2 Line Line update 04-Feb-14	Point	N/A	N 39 20 11.74	W 81 0 45.23	308268.94	157213.08	1101.83	0.14	36.65	-48.38	
PEN2 Line Line update 04-Feb-14	Point	N/A	N 39 20 11.74	W 81 0 45.23	308268.94	157213.08	1101.83	0.14	36.65	-48.38	
PEN2GHS LP	Point	N/A	N 39 20 18.86	W 81 0 50.48	309633.78	157179.24	6314.00	798.12	127.20	371.26	
PEN2GHS BHS	Point	N/A	N 39 21 24.54	W 81 2 3.88	313754.78	1566139.80	6314.00	938.56	7088.56	-6022.97	



Revision	Description
1	Noble Energy PEN2GHS MWD Drt to update
2	Noble Energy PEN2GHS MWD Drt to update
3	Noble Energy PEN2GHS Rev1 20V 14-Jan-13
4	Noble Energy PEN2GHS Rev1 20V 14-Jan-14
5	Noble Energy PEN2GHS Rev1 20V 14-Jan-14
6	Noble Energy PEN2GHS Rev1 20V 14-Jan-14
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