



Noble Energy SHL-26F-HS Gyro+MWD 0ft to 14040ft MD Survey Report

(Def Survey)

Report Date: November 22, 2013 - 10:11 AM
 Client: Noble Energy
 Field: WV Marshall County (NAD 27)
 Structure / Slot: Noble Energy SHL-26 Pad / SHL-26F-HS
 Well: SHL-26F-HS
 Borehole: Original Borehole
 UWI / API#: Unknown / Unknown
 Survey Name: Noble Energy SHL-26F-HS Gyro+MWD 0ft to 14040ft MD
 Survey Date: November 12, 2012
 Tort / AHD / DDI / ERD Ratio: 235.010 ° / 7758.503 ft / 6.583 / 1.101
 Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Foot
 Location Lat / Long: N 39° 58' 23.02310", W 80° 32' 54.20712"
 Location Grid N/E T/X: N 538244.70 / N/E S, E 1706175.259 / N/E S
 CRS Grid Convergence Angle: -0.6686 °
 Grid Scale Factor: 0.99995905
 Version / Patch: 2.7.958 ft

Survey / DLS Computation: Minimum Curvature / Lisabek
 Vertical Section Azimuth: 325.908 ° (Grid North)
 Vertical Section Origin: 0.000 ft, 0.000 ft
 TVD Reference Datum: KB
 TVD Reference Elevation: 1332.000 ft above MSL
 Saabed / Ground Elevation: 1309.180 ft above MSL
 Magnetic Declination: -8.412 °
 Total Gravity Field Strength: 969.3443mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 53138.108 nT
 Magnetic Dip Angle: 67.518 °
 Declination Date: November 12, 2013
 Magnetic Declination Model: HDGM 2013
 North Reference: Grid North
 Grid Convergence Used: -0.6686 °
 Total Corr Mag North->Grid North: -7.7437 °
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (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
SHL	0.00	0.00	0.00	0.00	-1032.09	0.00	0.00	0.00	N/A	N/A	N/A	538244.71	1706175.26	N 39 58 23.02	W 80 32 54.21	0.00
	100.00	0.00	140.13	100.00	-12.32 06	-0.60	-0.52	0.31	0.69	0.69	0.00	538244.19	1706175.57	N 39 58 23.02	W 80 32 54.20	0.00
	200.00	1.28	160.77	199.98	-1132.08	-2.28	-2.09	0.99	0.62	0.59	11.64	538242.62	1706176.24	N 39 58 23.00	W 80 32 54.19	0.48
	300.00	0.80	167.59	299.97	-1032.09	-4.01	-3.82	1.50	0.49	-0.48	6.62	538240.68	1706176.70	N 39 58 22.99	W 80 32 54.19	0.87
	400.00	0.83	154.48	399.96	-932.10	-5.38	-5.16	1.97	0.19	0.03	-13.11	538239.55	1706177.22	N 39 58 22.97	W 80 32 54.18	1.04
	500.00	0.60	144.06	499.95	-832.11	-6.53	-6.17	2.53	-0.33	-10.42	538238.54	1706177.79	N 39 58 22.96	W 80 32 54.17	1.20	
	600.00	0.16	169.48	599.95	-732.11	-7.99	-6.06	2.82	0.36	-0.34	25.42	538238.05	1706178.07	N 39 58 22.96	W 80 32 54.17	1.29
	700.00	0.27	215.02	699.95	-632.11	-7.04	-6.73	2.61	0.37	0.11	115.24	538237.97	1706177.87	N 39 58 22.96	W 80 32 54.17	1.37
	800.00	0.28	290.41	799.95	-532.11	-6.66	-6.59	2.16	0.03	0.05	5.39	538238.12	1706177.42	N 39 58 22.96	W 80 32 54.18	1.40
	900.00	0.23	292.68	899.94	-432.12	-6.30	-6.42	1.74	-0.05	-0.05	2.37	538238.28	1706177.00	N 39 58 22.96	W 80 32 54.18	1.43
	1000.00	0.14	289.11	999.94	-332.12	-6.03	-6.31	1.44	0.09	-0.09	-3.57	538238.40	1706176.70	N 39 58 22.96	W 80 32 54.19	1.46
	1100.00	0.12	202.49	1099.94	-232.12	-5.84	-6.21	1.24	0.04	-0.02	13.35	538238.50	1706176.50	N 39 58 22.96	W 80 32 54.19	1.47
	1200.00	0.45	318.93	1199.94	-132.12	-5.35	-5.86	0.89	0.34	0.33	16.44	538238.85	1706176.15	N 39 58 22.97	W 80 32 54.19	1.54
	1300.00	0.48	320.52	1299.94	-32.12	-4.55	-5.24	0.37	0.03	0.03	1.59	538239.47	1706175.63	N 39 58 22.97	W 80 32 54.20	1.58
	1400.00	0.45	325.93	1399.94	67.88	-3.70	-4.57	-0.14	-0.04	0.01	-4.51	538240.14	1706175.12	N 39 58 22.98	W 80 32 54.21	1.61
	1500.00	0.60	339.75	1499.93	167.87	-2.76	-3.72	-0.57	0.18	0.11	-14.72	538240.58	1706174.69	N 39 58 22.99	W 80 32 54.21	1.67
	1600.00	0.60	318.52	1599.93	267.87	-1.74	-2.84	-1.10	0.22	0.00	-21.23	538241.87	1706174.76	N 39 58 22.99	W 80 32 54.22	1.71
	1700.00	0.67	312.34	1699.92	367.86	-0.65	-2.05	-1.88	0.10	0.07	-6.18	538242.65	1706173.38	N 39 58 23.00	W 80 32 54.23	1.78
	1800.00	0.48	324.52	1799.91	467.85	0.34	-1.32	-2.55	0.22	-0.19	12.18	538243.39	1706172.71	N 39 58 23.01	W 80 32 54.24	1.83
	1900.00	0.58	323.97	1899.91	567.85	1.28	-0.57	-3.09	0.10	0.10	-0.55	538244.14	1706172.17	N 39 58 23.02	W 80 32 54.25	1.88
	2000.00	0.64	328.22	1999.90	667.84	2.33	0.31	-3.69	0.08	0.06	-4.25	538245.02	1706171.57	N 39 58 23.03	W 80 32 54.25	1.90
	2100.00	0.30	329.27	2099.90	767.84	3.15	1.01	-4.11	0.34	-0.34	1.05	538245.72	1706171.15	N 39 58 23.03	W 80 32 54.26	1.95
	2200.00	0.33	314.93	2199.90	867.84	3.69	1.44	-4.45	0.08	0.03	-14.34	538246.15	1706170.81	N 39 58 23.04	W 80 32 54.26	1.97
	2300.00	0.54	316.17	2299.90	967.84	4.44	1.99	-4.96	0.21	0.21	1.24	538246.69	1706170.28	N 39 58 23.04	W 80 32 54.27	2.00
	2400.00	0.70	328.15	2399.89	1067.83	5.50	2.91	-5.87	0.28	0.25	11.98	538247.62	1706169.59	N 39 58 23.05	W 80 32 54.28	2.05
	2500.00	0.64	323.39	2499.88	1167.82	6.64	3.95	-6.37	0.18	-0.15	-4.76	538248.65	1706168.89	N 39 58 23.06	W 80 32 54.29	2.09
	2600.00	0.48	314.17	2599.88	1267.82	7.60	4.69	-7.00	0.18	-0.16	-9.22	538249.36	1706168.20	N 39 58 23.07	W 80 32 54.30	2.12
	2700.00	0.40	303.50	2699.87	1367.81	8.54	5.17	-7.59	0.11	-0.08	-10.67	538249.88	1706167.67	N 39 58 23.07	W 80 32 54.31	2.15
	2800.00	0.44	303.32	2799.87	1467.81	9.22	5.67	-8.20	0.04	0.04	-0.18	538250.28	1706167.05	N 39 58 23.08	W 80 32 54.31	2.16
	2900.00	0.40	294.30	2899.87	1567.81	9.87	5.93	-8.84	0.08	-0.04	-8.56	538250.64	1706166.42	N 39 58 23.08	W 80 32 54.32	2.18
	3000.00	0.37	290.05	2999.87	1667.81	10.43	6.18	-9.40	0.04	-0.03	-4.31	538250.89	1706165.79	N 39 58 23.09	W 80 32 54.33	2.20
	3100.00	0.30	284.54	3099.86	1767.80	10.91	6.36	-10.08	0.08	-0.01	-8.51	538251.06	1706165.18	N 39 58 23.09	W 80 32 54.34	2.21
	3200.00	0.42	298.96	3199.86	1867.80	11.38	6.52	-10.67	0.09	0.07	8.24	538251.23	1706164.50	N 39 58 23.09	W 80 32 54.35	2.23
	3300.00	0.66	291.69	3299.86	1967.80	11.66	6.60	-11.06	0.39	-0.33	-60.81	538251.30	1706164.20	N 39 58 23.09	W 80 32 54.35	2.26
	3362.00	0.15	245.64	3391.86	2050.80	11.65	6.50	-11.19	0.12	0.10	46.13	538251.21	1706164.07	N 39 58 23.09	W 80 32 54.35	2.27
	3487.00	0.12	232.82	3486.86	2154.80	11.67	6.39	-11.38	0.04	-0.03	-12.86	538251.09	1706163.88	N 39 58 23.08	W 80 32 54.35	2.28
	3582.00	0.14	245.75	3581.86	2249.80	11.08	6.28	-11.57	0.04	0.02	13.61	538250.99	1706163.69	N 39 58 23.08	W 80 32 54.36	2.28
	3670.00	0.25	231.65	3675.86	2343.80	11.69	6.10	-11.83	0.13	0.12	-15.00	538250.81	1706163.43	N 39 58 23.08	W 80 32 54.36	2.30
	3771.00	0.31	210.94	3770.86	2438.80	11.60	5.78	-12.16	0.09	0.06	-12.33	538250.49	1706163.10	N 39 58 23.08	W 80 32 54.36	2.31

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ° ' ° '')	Longitude (E/W ° ° ' ° '')	Directional Difficulty Index
	3866.00	0.39	239.14	3885.86	2533.60	11.55	5.42	-12.60	0.15	0.08	20.21	538250.12	1706162.66	N 39 58 23.08 W	80 32 54.37	2.32
	3960.00	0.33	238.83	3959.06	2627.80	11.58	5.11	-13.11	0.06	-0.06	-0.33	538249.82	1706162.15	N 39 58 23.07 W	80 32 54.38	2.34
	4055.00	0.15	262.97	4054.85	2722.79	11.65	4.85	-13.47	0.21	-0.19	-0.21	538246.68	1706161.70	N 39 58 23.07 W	80 32 54.38	2.35
	4149.00	0.19	316.91	4146.85	2816.79	11.88	5.05	-13.70	0.17	0.04	57.38	538249.76	1706161.56	N 39 58 23.07 W	80 32 54.38	2.37
	4244.00	0.23	246.90	4243.85	2911.79	12.05	5.09	-13.98	0.26	0.04	-73.69	538249.80	1706161.28	N 39 58 23.07 W	80 32 54.39	2.39
	4330.00	0.37	211.51	4338.85	3006.79	11.96	4.76	-14.31	0.24	0.15	-37.25	538249.48	1706160.95	N 39 58 23.07 W	80 32 54.39	2.40
	4433.00	0.24	147.82	4432.85	3100.79	11.04	4.33	-14.37	0.36	-0.14	-87.87	538240.04	1706160.89	N 39 58 23.08 W	80 32 54.39	2.43
	4528.00	0.53	107.02	4527.85	3195.79	11.10	4.04	-13.84	0.40	0.31	-42.74	538248.74	1706161.42	N 39 58 23.06 W	80 32 54.39	2.46
	4622.00	0.50	115.88	4621.85	3289.79	10.41	3.73	-13.68	0.09	-0.03	9.53	538248.44	1706162.20	N 39 58 23.06 W	80 32 54.38	2.47
	4717.00	0.36	109.20	4718.84	3384.78	9.81	3.45	-12.40	0.16	-0.15	-7.14	538248.18	1706162.86	N 39 58 23.06 W	80 32 54.37	2.49
	4812.00	0.15	122.34	4811.84	3479.78	9.45	3.28	-12.01	0.23	-0.22	13.63	538247.89	1706163.25	N 39 58 23.05 W	80 32 54.38	2.50
	4906.00	0.10	114.65	4905.84	3573.78	9.21	3.15	-11.77	0.05	0.04	-8.18	538247.86	1706163.49	N 39 58 23.05 W	80 32 54.38	2.51
	4998.00	0.07	183.66	4995.84	3663.78	9.04	3.04	-11.64	0.20	-0.13	76.70	538247.74	1706163.02	N 39 58 23.05 W	80 32 54.38	2.52
	5091.00	0.17	257.69	5090.84	3758.78	9.04	2.95	-11.78	0.17	0.11	77.91	538247.88	1706163.48	N 39 58 23.05 W	80 32 54.38	2.53
	5185.00	0.40	329.25	5184.84	3852.78	9.42	3.20	-12.08	0.41	0.24	76.13	538247.91	1706163.18	N 39 58 23.05 W	80 32 54.38	2.55
	5280.00	0.85	295.39	5279.84	3947.78	10.22	3.72	-12.74	0.41	0.28	-35.64	538248.42	1706162.52	N 39 58 23.06 W	80 32 54.37	2.58
	5327.00	0.64	279.91	5326.83	3994.77	10.63	3.88	-13.24	0.37	-0.02	-32.94	538248.58	1706162.02	N 39 58 23.06 W	80 32 54.38	2.59
	5375.00	0.14	108.95	5374.83	4042.77	10.77	3.90	-13.45	1.62	-1.04	-358.17	538248.61	1706161.81	N 39 58 23.06 W	80 32 54.38	2.62
	5422.00	3.74	106.74	5421.80	4089.74	9.54	3.44	-11.92	7.66	-4.70	538248.15	1706163.34	N 39 58 23.08 W	80 32 54.36	2.76	
	5470.00	7.00	110.48	5469.58	4137.52	5.94	1.97	-7.68	6.83	6.79	7.79	538248.68	1706167.58	N 39 58 23.04 W	80 32 54.31	2.90
	5517.00	9.01	109.37	5518.08	4184.02	0.45	-0.34	-1.30	5.58	5.55	-2.36	538244.37	1706173.96	N 39 58 23.02 W	80 32 54.22	3.02
	5564.00	11.97	113.85	5562.25	4230.19	-6.83	-3.61	6.86	5.33	5.02	9.53	538241.10	1706182.12	N 39 58 22.99 W	80 32 54.12	3.14
	5611.00	14.74	121.66	5607.98	4275.92	-16.43	-8.74	16.40	7.07	5.89	17.04	538235.97	1706191.66	N 39 58 22.97 W	80 32 54.00	3.27
	5659.00	16.63	128.76	5654.18	4322.13	-28.57	-16.26	26.94	5.53	3.94	14.38	538228.45	1706202.20	N 39 58 22.94 W	80 32 53.88	3.38
	5706.00	19.36	130.48	5698.89	4368.83	-42.51	-25.53	38.12	5.92	5.81	3.66	538219.18	1706213.37	N 39 58 22.78 W	80 32 53.71	3.49
	5753.00	19.22	125.40	5743.26	4411.20	-57.28	-35.07	50.35	3.68	-0.30	-10.81	538209.64	1706225.01	N 39 58 22.68 W	80 32 53.56	3.58
	5800.00	18.11	124.12	5787.78	4455.72	-71.29	-43.65	62.70	2.52	-2.36	-2.72	538201.06	1706237.96	N 39 58 22.60 W	80 32 53.40	3.65
	5848.00	17.83	128.38	5833.44	4501.38	-85.23	-52.40	74.64	2.80	-0.58	8.88	538192.31	1706249.90	N 39 58 22.51 W	80 32 53.24	3.71
	5895.00	19.23	125.32	5878.01	4545.85	-99.34	-61.34	88.60	3.63	2.88	-6.51	538183.37	1706261.85	N 39 58 22.43 W	80 32 53.09	3.78
	5943.00	17.17	122.24	5923.60	4591.54	-113.23	-69.69	99.04	4.74	-4.29	-6.42	538175.02	1706274.30	N 39 58 22.35 W	80 32 52.92	3.84
	5990.00	10.82	116.88	5969.19	4637.13	-123.41	-75.32	108.89	13.88	-13.51	-13.57	538169.39	1706284.14	N 39 58 22.29 W	80 32 52.80	3.94
	6038.00	6.30	110.19	6016.64	4684.56	-129.45	-78.20	115.42	9.57	-9.42	-11.81	538158.51	1706290.67	N 39 58 22.26 W	80 32 52.71	3.99
	6085.00	4.37	83.27	6063.44	4731.38	-132.37	-78.88	119.02	6.02	-4.11	-57.28	538165.63	1706294.87	N 39 58 22.26 W	80 32 52.66	4.03
	6132.00	6.04	58.85	6110.25	4778.19	-133.19	-77.28	123.44	6.28	3.55	-56.34	538167.43	1706298.70	N 39 58 22.27 W	80 32 52.61	4.06
	6179.00	6.48	32.87	6156.88	4824.82	-131.63	-72.88	127.37	7.97	5.19	-48.89	538171.73	1706302.63	N 39 58 22.32 W	80 32 52.56	4.10
	6227.00	8.42	2.32	6204.39	4872.33	-127.62	-66.40	129.44	9.25	-0.13	-83.65	538178.22	1706304.69	N 39 58 22.38 W	80 32 52.53	4.15
	6274.00	10.15	325.62	6250.79	4918.73	-120.76	-59.28	127.87	9.77	3.68	-56.81	538185.43	1706303.12	N 39 58 22.45 W	80 32 52.56	4.19
	6322.00	13.71	333.66	6297.75	4965.69	-110.95	-50.32	123.59	7.46	7.42	-4.08	538194.38	1706298.85	N 39 58 22.54 W	80 32 52.61	4.23
	6372.00	18.61	331.93	6345.76	5013.70	-97.14	-37.97	117.21	9.85	9.80	-3.46	538206.74	1706292.46	N 39 58 22.66 W	80 32 52.70	4.28
	6418.00	22.93	327.40	6393.88	5054.82	-81.56	-24.52	109.28	10.55	9.93	-10.08	538220.10	1706284.54	N 39 58 22.79 W	80 32 52.80	4.34
	6463.00	27.80	323.43	6429.33	5097.27	-61.43	-7.97	97.82	10.69	10.26	-8.60	538236.74	1706273.07	N 39 58 22.96 W	80 32 52.85	4.40
	6511.00	32.28	321.06	6470.88	5138.82	-37.48	11.00	83.09	9.66	9.33	-4.98	538255.71	1706258.34	N 39 58 23.14 W	80 32 53.14	4.45
	6558.00	37.35	319.03	6509.45	5177.39	-10.77	31.64	65.95	10.93	10.79	-3.04	538278.35	1706241.21	N 39 58 23.34 W	80 32 53.36	4.51
	6580.00	39.99	319.55	6526.83	5194.57	2.90	42.11	57.04	12.00	12.00	-0.36	538268.81	1706232.30	N 39 58 23.45 W	80 32 53.48	4.54
	6606.00	43.45	319.03	6546.83	5213.97	20.08	55.22	45.76	13.37	13.31	-2.00	538299.82	1706221.01	N 39 58 23.57 W	80 32 53.63	4.58
	6653.00	50.76	317.56	6578.00	5245.94	54.18	60.89	22.85	15.72	15.55	-3.13	538325.59	1706198.11	N 39 58 23.63 W	80 32 53.83	4.65
	6700.00	57.73	318.20	6605.45	5273.39	91.93	109.18	-2.70	14.88	14.83	1.49	538353.88	1706172.58	N 39 58 24.10 W	80 32 54.28	4.72
	6748.00	63.72	321.45	6628.91	5296.85	133.54	141.19	-26.65	13.78	12.48	6.65	538385.89	1706145.61	N 39 58 24.41 W	80 32 54.61	4.78
	6795.00	69.20	320.26	6647.69	5315.63	178.57	175.98	-59.01	14.96	11.98	10.23	538420.68	1706120.25	N 39 58 24.70 W	80 32 54.94	4.85
	6820.00	71.32	329.98	6656.13	5324.07	200.08	195.96	-67.43	16.37	8.48	14.88	538440.68	1706107.83	N 39 58 24.95 W	80 32 55.10	4.88
	6889.00	79.14	335.15	6673.72	5341.66	266.26	255.13	-88.09	13.45	11.33	7.49	538489.83	1706077.18	N 39 58 25.33 W	80 32 55.51	4.96
	6937.00	83.42	334.51	6681.00	5348.94	313.12	298.06	-116.26	9.01	8.92	-1.33	538542.75	1706057.00	N 39 58 25.95 W	80 32 55.77	5.01
	6983.00	88.76	332.80	6684.13	5352.07	358.58	339.17	-136.62	12.19	11.81	-3.72	538583.86	1706036.64	N 39 58 26.38 W	80 32 56.04	6.06
	7052.00	91.72	327.40	6683.84	5351.78	427.38	398.96	-173.00	8.92	4.29	-7.83	538643.65	1706002.26	N 39 58 26.95 W	80 32 56.40	5.12
	7183.00	90.49	328.02	6681.29	5349.23	560.27	511.37	-244.04	1.04	-0.93	0.47	538758.05	1705931.23	N 39 58 28.05 W	80 32 57.42	5.20
	7280.00	90.52	328.79	6680.48	5348.40	655.17	592.28	-293.81	0.81	0.04	0.81	538838.96	1705881.47	N 39 58 28.84 W	80 32 58.07	5.25
	7374.00	90.41	328.00	6679.70	5347.64	749.08	672.36	-343.02	0.79	-0.12	-0.78	538917.04	1705832.25	N 39 58 29.63 W	80 32 58.71	5.30
	7468.00	90.69	328.24	6678.60	5346.74	843.00	752.20	-392.62	0.35	0.30	0.19	538996.88	1705782.65	N 39 58 30.41 W	80 32 59.30	5.34
	7563.00	90.52	328.83	6677.70	5345.73	937.90	833.73	-442.21	0.65	-0.18	0.62	539077.90	1705733.07	N 39 58 31.21 W	80 33 0.01	5.38
	7658.00	90.38	327.49	6677.05	5344.99	1032.82	913.93	-492.32	1.42	-0.15	-1.41	539158.60	1705682.96	N 39 58 32.00 W	80 33 0.67	5.42
	7752.00	89.93	327.68	6676.70	5344.73	1128.78	993.28	-542.71	0.52	-0.48	0.20	539237.85	1705632.57	N 39 58 32.78 W	80 33 1.33	5.48
	7847.00	90.00	327.88	6676.85	5344.79	1221.75	1073.30	-593.92	0.64	0.07	-0.63	539317.96	1705581.36	N 39 58 33.56 W	80 33 2.00	5.49

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	OLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	7041.00	89.80	325.71	6676.03	5344.87	1315.74	1161.50	-645.95	1.46	-0.11	-1.46	530396.24	1705520.34	N 39 58 34.33 W	80 33 2 68	5.52
	8038.00	90.00	325.11	6677.01	5344.85	1410.74	1220.70	-699.88	0.64	0.11	-0.63	530474.45	1705475.41	N 39 58 35.09 W	80 33 3 38	5.56
	8131.00	90.03	325.59	6676.98	5344.83	1505.73	1307.94	-753.89	0.51	0.03	0.51	530562.59	1705421.40	N 39 58 35.86 W	80 33 4 00	5.58
	8226.00	90.03	325.37	6676.94	5344.86	1600.73	1368.22	-807.73	0.23	0.00	-0.23	530630.88	1705367.57	N 39 58 36.63 W	80 33 4 79	5.61
	8320.00	90.07	325.04	6676.86	5344.80	1694.72	1463.41	-861.37	0.35	0.04	-0.35	530709.05	1705313.93	N 39 58 37.38 W	80 33 5 40	5.64
	8416.00	89.86	325.27	6676.92	5344.86	1789.71	1541.38	-915.65	0.33	-0.22	0.24	530788.02	1705260.65	N 39 58 38.15 W	80 33 6 20	5.66
	8510.00	89.88	325.32	6677.15	5345.09	1884.71	1619.47	-969.73	0.05	0.00	0.05	530864.11	1705205.57	N 39 58 38.91 W	80 33 6 91	5.69
	8604.00	90.00	325.40	6677.26	5345.20	1978.70	1698.81	-1023.17	0.17	0.15	0.09	530941.46	1705152.14	N 39 58 39.67 W	80 33 7 60	5.71
	8699.00	90.10	325.57	6677.18	5345.12	2073.70	1775.09	-1077.00	0.21	0.11	0.18	540019.72	1705098.31	N 39 58 40.44 W	80 33 8 31	5.73
	8794.00	90.03	325.09	6677.07	5345.01	2168.70	1853.22	-1131.04	0.51	-0.07	-0.51	540097.85	1705044.27	N 39 58 41.21 W	80 33 9 01	5.76
	8888.00	89.69	323.33	6677.30	5345.24	2262.85	1929.47	-1186.01	1.91	-0.36	-1.87	540174.09	1704990.30	N 39 58 41.95 W	80 33 9 73	5.78
	8983.00	89.90	323.41	6677.64	5345.58	2357.56	2005.71	-1242.69	0.24	0.22	0.08	540250.33	1704936.63	N 39 58 42.70 W	80 33 10 47	5.80
	9078.00	90.07	323.42	6677.67	5345.61	2452.47	2081.99	-1299.31	0.18	0.18	0.01	540326.61	1704882.01	N 39 58 43.45 W	80 33 11 21	5.82
	9172.00	89.03	323.25	6677.87	5345.61	2546.37	2167.39	-1355.44	0.23	-0.15	-0.18	540402.00	1704827.88	N 39 58 44.19 W	80 33 11 94	5.84
	9267.00	90.00	323.75	6677.73	5345.67	2641.29	2233.75	-1411.95	0.53	0.07	0.63	540478.37	1704773.37	N 39 58 44.93 W	80 33 12 68	5.86
	9362.00	90.55	324.93	6677.27	5345.21	2736.25	2301.94	-1467.33	1.37	0.58	1.24	540555.55	1704719.99	N 39 58 45.69 W	80 33 13 40	5.88
	9456.00	90.14	324.07	6678.70	5344.64	2830.22	2367.46	-1521.91	1.01	-0.44	-0.91	540632.07	1704665.41	N 39 58 46.44 W	80 33 14 11	5.90
	9551.00	90.34	324.17	6678.31	5344.25	2925.17	2434.44	-1577.59	0.24	0.21	0.11	540709.04	1704611.74	N 39 58 47.19 W	80 33 14 84	5.92
	9645.00	90.34	324.16	6675.75	5343.69	3019.13	2510.64	-1632.82	0.01	0.00	-0.01	540785.24	1704557.71	N 39 58 47.94 W	80 33 15 56	5.94
	9740.00	90.69	324.45	6674.89	5342.83	3114.08	2617.79	-1688.05	0.48	0.37	0.31	540862.39	1704504.28	N 39 58 48.70 W	80 33 16 28	5.95
	9835.00	90.52	324.42	6673.88	5341.83	3209.05	2705.06	-1743.30	0.18	-0.18	-0.03	540939.66	1704450.30	N 39 58 49.45 W	80 33 17 00	5.97
	9929.00	90.45	324.76	6673.09	5341.03	3303.02	2771.07	-1797.76	0.37	-0.07	0.36	541016.26	1704397.57	N 39 58 50.20 W	80 33 17 71	5.99
	10023.00	90.24	324.54	6672.53	5340.47	3398.99	2848.34	-1852.15	0.32	-0.22	-0.23	541092.61	1704343.19	N 39 58 50.96 W	80 33 18 42	6.00
	10118.00	90.17	323.84	6672.19	5340.13	3491.95	2925.38	-1907.73	0.74	-0.07	-0.74	541169.96	1704289.81	N 39 58 51.71 W	80 33 19 15	6.02
	10212.00	90.41	323.61	6671.71	5339.65	3585.88	3001.16	-1963.35	0.35	0.26	-0.24	541245.74	1704236.02	N 39 58 52.45 W	80 33 19 88	6.03
	10307.00	90.36	323.91	6671.06	5339.00	3680.81	3077.76	-2019.51	0.32	-0.03	0.32	541322.38	1704182.81	N 39 58 53.20 W	80 33 20 61	6.05
	10401.00	90.45	324.14	6670.38	5338.32	3774.76	3153.85	-2074.72	0.26	0.07	0.24	541398.42	1704129.62	N 39 58 53.95 W	80 33 21 33	6.06
	10496.00	90.52	324.38	6669.57	5337.61	3869.72	3230.96	-2130.21	0.26	0.07	0.25	541475.53	1704076.14	N 39 58 54.70 W	80 33 22 05	6.08
	10591.00	90.89	326.04	6668.40	5336.34	3964.70	3308.97	-2184.41	1.79	0.39	1.75	541553.53	1703999.94	N 39 58 55.47 W	80 33 22 76	6.10
	10685.00	90.93	326.89	6666.91	5334.85	4058.68	3387.31	-2236.33	0.01	0.04	0.90	541631.87	1703939.02	N 39 58 56.24 W	80 33 23 44	6.11
	10780.00	89.86	326.37	6666.26	5334.20	4153.87	3466.65	-2288.59	1.25	-0.13	-0.55	541711.20	1703886.77	N 39 58 57.02 W	80 33 24 12	6.13
	10874.00	89.79	325.73	6666.54	5334.48	4247.87	3544.62	-2341.08	0.68	-0.07	-0.68	541789.18	1703834.28	N 39 58 57.78 W	80 33 24 81	6.14
	10969.00	89.52	325.75	6667.12	5333.00	4342.07	3623.14	-2394.56	0.28	0.02	0.02	541867.09	1703780.80	N 39 58 58.55 W	80 33 25 51	6.15
	11064.00	89.52	325.29	6667.01	5335.85	4437.66	3701.44	-2448.34	0.48	0.00	-0.48	541945.99	1703727.02	N 39 58 59.32 W	80 33 26 21	6.17
	11158.00	90.02	326.76	6667.80	5335.74	4531.63	3780.29	-2499.40	2.87	1.17	3.89	542024.83	1703675.87	N 39 59 0.09 W	80 33 26 88	6.19
	11253.00	90.21	330.30	6667.11	5335.05	4626.43	3862.16	-2547.66	1.68	-0.43	1.62	542106.70	1703623.71	N 39 59 0.89 W	80 33 27 51	6.20
	11348.00	90.21	330.84	6666.76	5334.70	4721.12	3944.90	-2594.34	0.57	0.00	0.67	542189.44	1703581.03	N 39 59 1.71 W	80 33 28 12	6.22
	11442.00	90.34	332.55	6666.31	5334.25	4814.83	4027.66	-2638.91	1.82	0.14	1.82	542272.19	1703536.48	N 39 59 2.52 W	80 33 28 71	6.23
	11537.00	91.41	328.98	6664.86	5332.80	4909.26	4110.54	-2685.29	3.92	1.13	-3.76	542356.07	1703490.08	N 39 59 3.33 W	80 33 29 32	6.25
	11631.00	91.86	325.81	6662.17	5330.11	5003.18	4189.68	-2735.92	3.40	0.48	-3.37	542434.21	1703439.46	N 39 59 4.11 W	80 33 29 68	6.27
	11726.00	92.30	323.83	6658.73	5326.07	5098.10	4267.27	-2790.61	2.13	0.46	-2.08	542511.80	1703384.77	N 39 59 4.87 W	80 33 30 69	6.29
	11821.00	90.86	323.01	6656.11	5324.05	5192.97	4343.53	-2847.20	1.74	-1.62	-0.86	542588.05	1703328.18	N 39 59 5.62 W	80 33 31 43	6.30
	11916.00	90.21	323.33	6655.22	5323.16	5287.85	4419.56	-2904.15	0.76	-0.68	0.34	542664.08	1703271.23	N 39 59 6.36 W	80 33 32 18	6.31
	12013.00	89.93	324.09	6655.10	5323.04	5384.78	4497.75	-2961.56	0.83	-0.29	0.78	542742.26	1703213.83	N 39 59 7.13 W	80 33 32 92	6.33
	12105.00	89.76	324.03	6655.35	5323.29	5476.73	4572.23	-3015.56	0.20	-0.18	-0.07	542816.74	1703159.83	N 39 59 7.88 W	80 33 33 63	6.34
	12199.00	89.69	323.52	6655.80	5323.74	5570.67	4648.06	-3071.11	0.55	-0.07	-0.54	542892.57	1703104.28	N 39 59 8.60 W	80 33 34 35	6.35
	12294.00	89.73	323.01	6656.28	5324.22	5665.80	4724.64	-3127.33	0.41	0.04	0.41	542969.14	1703048.07	N 39 59 9.35 W	80 33 35 09	6.36
	12389.00	90.98	326.41	6655.71	5323.65	5760.58	4802.60	-3181.59	2.03	1.29	2.03	543047.10	1702993.80	N 39 59 10.11 W	80 33 35 80	6.38
	12483.00	89.45	324.41	6655.37	5323.31	5854.57	4879.98	-3234.95	2.67	-1.61	-2.13	543124.48	1702940.44	N 39 59 10.87 W	80 33 36 49	6.39
	12578.00	89.97	324.76	6655.65	5323.79	5949.54	4957.40	-3290.00	0.66	0.55	0.37	543201.89	1702885.40	N 39 59 11.63 W	80 33 37 21	6.40
	12673.00	90.56	325.49	6655.40	5323.34	6044.53	5035.34	-3344.32	1.00	0.64	0.77	543279.83	1702831.08	N 39 59 12.39 W	80 33 37 62	6.41
	12768.00	90.17	325.40	6654.78	5322.72	6139.52	5113.58	-3398.21	0.44	-0.43	-0.09	543358.06	1702777.20	N 39 59 13.16 W	80 33 38 63	6.42
	12862.00	90.76	327.86	6654.01	5321.93	6233.50	5192.07	-3449.90	2.69	0.63	2.62	543436.55	1702725.60	N 39 59 13.93 W	80 33 39 30	6.44
	12957.00	89.76	325.23	6653.58	5321.52	6328.49	5271.32	-3502.77	2.96	-1.05	-2.77	543515.80	1702673.14	N 39 59 14.71 W	80 33 39 99	6.45
	13051.00	90.55	326.36	6653.33	5321.27	6422.49	5349.06	-3555.11	1.47	0.84	1.20	543593.54	1702620.30	N 39 59 15.47 W	80 33 40 68	6.47
	13146.00	90.41	326.80	6652.53	5320.47	6517.48	5428.35	-3607.43	0.49	-0.15	0.46	543672.82	1702567.98	N 39 59 16.25 W	80 33 41 36	6.48
	13241.00	90.58	327.82	6651.71	5319.65	6612.44	5508.30	-3658.74	1.09	0.18	1.07	543752.77	1702516.68	N 39 59 17.03 W	80 33 42 03	6.49
	13335.00	91.17	327.23	6650.28	5318.22	6706.39	5587.59	-3709.20	0.89	0.83	-0.63	543832.05	1702466.21	N 39 59 17.81 W	80 33 42 69	6.50
	13430.00	90.21	325.38	6649.13	5317.07	6801.38	5666.82	-3761.90	2.19	-1.01	-1.95	543911.08	1702413.52	N 39 59 18.58 W	80 33 43 38	6.51
	13524.00	90.72	325.75	6648.37	5316.31	6895.37	5744.14	-3815.05	0.67	0.54	0.39	543988.60	1702360.37	N 39 59 19.34 W	80 33 44 08	6.52
	13619.00	89.10	325.67	6647.69	5315.63	6990.37	5822.8									

51.01657

Comments	MD (ft)	Incl (")	Asht. Chd (")	TVD (ft)	TVDSS (ft)	VSEC (ft)	MS (ft)	EW (ft)	OLS (ft)	BR (ft)	TR (ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S °-') W	Longitude (E/W °-') W	Directional Difficulty Index
	13500.00	90.00	326.28	6646.14	5314.08	7274.32	6028.81	-4028.22	1.87	-1.01	-1.57	544303.26	1702148.23	N 39 59 22.43	W 80 33 46.84	6.56
Final Survey 21- Nov-13 PTB	13320.00	90.00	326.30	6646.14	5314.08	7310.32	6088.75	-4046.20	0.11	0.00	0.11	544333.20	1702120.23	N 39 59 22.72	W 80 33 47.10	6.57
	13590.00	91.37	329.51	6045.45	5313.39	7369.28	6137.88	-4077.01	6.02	2.36	5.53	544382.32	1702098.42	N 39 59 23.20	W 80 33 47.90	6.58
	14040.00	91.37	329.51	6044.42	5312.36	7411.18	6174.82	-4088.82	0.00	0.00	0.00	544419.36	1702076.61	N 39 59 23.57	W 80 33 47.70	6.59

Survey Type: Oil Survey

Survey Error Model: ISCVSA Rev 0 *** 3-D 05 000% Confidence 2 7925 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Mole Size Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	22.880	Act Sns	30.000	SLB_MSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-26F-HS Gyro-MWD Off to 14040ft MD
	1	22.880	3190.000	Act Sns	30.000	SLB_MSG+MSHOT	Original Borehole / Noble Energy SHL-26F-HS Gyro-MWD Off to
	1	3190.000	13997.000	Act Sns	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-26F-HS Gyro-MWD Off to
	1	13997.000	14040.000	Act Sns	30.000	SLB_BUMD-TREND	Original Borehole / Noble Energy SHL-26F-HS Gyro-MWD Off to

09/19/2014

51-01657



Noble Energy



Borehole: Original Borehole	Well: SHL-26F-HS	Field: WV Marshall County (NAD 27)	Structure: Nabors M59
Gravity & Magnetic Parameters Model: NOGM 2013 Dip: 47.51° Date: 11/12/2013 MagDec: -8.412° FS: 53138.158mT Gravity FB: 999.344mgals (N. NOAA Release)		Surface Location NAD27 West Virginia State Plane, Northern Zone, US Feet Lat: N 39 58 23.32 Northing: 538244.787MUS Grid Conv: -0.665" Lon: W 80 52 54.21 Easting: 1704178.258MUS Scale Fact: 1 Miscalculation: Slo: SHL_26F-HS TVD Ref: K0N1332.000 (above MSL) Plan: Noble Energy SHL-26F-HS Cyno-MWD SH to 1.404261 MD	



Grid North
Tot Corr (M->G: -7.743")
Mag Dec (-8.412")
Grid Conv (-0.665")

Well	Depth	Formation	Color
SHL-26F-HS	0 - 10	SHL-26F-HS	Light Blue
SHL-26F-HS	10 - 20	SHL-26F-HS	Light Blue
SHL-26F-HS	20 - 30	SHL-26F-HS	Light Blue
SHL-26F-HS	30 - 40	SHL-26F-HS	Light Blue
SHL-26F-HS	40 - 50	SHL-26F-HS	Light Blue
SHL-26F-HS	50 - 60	SHL-26F-HS	Light Blue
SHL-26F-HS	60 - 70	SHL-26F-HS	Light Blue
SHL-26F-HS	70 - 80	SHL-26F-HS	Light Blue
SHL-26F-HS	80 - 90	SHL-26F-HS	Light Blue
SHL-26F-HS	90 - 100	SHL-26F-HS	Light Blue

Well	Depth	Formation	Color	Notes
SHL-26F-HS	0 - 10	SHL-26F-HS	Light Blue	
SHL-26F-HS	10 - 20	SHL-26F-HS	Light Blue	
SHL-26F-HS	20 - 30	SHL-26F-HS	Light Blue	
SHL-26F-HS	30 - 40	SHL-26F-HS	Light Blue	
SHL-26F-HS	40 - 50	SHL-26F-HS	Light Blue	
SHL-26F-HS	50 - 60	SHL-26F-HS	Light Blue	
SHL-26F-HS	60 - 70	SHL-26F-HS	Light Blue	
SHL-26F-HS	70 - 80	SHL-26F-HS	Light Blue	
SHL-26F-HS	80 - 90	SHL-26F-HS	Light Blue	
SHL-26F-HS	90 - 100	SHL-26F-HS	Light Blue	

Well	Depth	Formation	Color	Notes
SHL-26F-HS	0 - 10	SHL-26F-HS	Light Blue	
SHL-26F-HS	10 - 20	SHL-26F-HS	Light Blue	
SHL-26F-HS	20 - 30	SHL-26F-HS	Light Blue	
SHL-26F-HS	30 - 40	SHL-26F-HS	Light Blue	
SHL-26F-HS	40 - 50	SHL-26F-HS	Light Blue	
SHL-26F-HS	50 - 60	SHL-26F-HS	Light Blue	
SHL-26F-HS	60 - 70	SHL-26F-HS	Light Blue	
SHL-26F-HS	70 - 80	SHL-26F-HS	Light Blue	
SHL-26F-HS	80 - 90	SHL-26F-HS	Light Blue	
SHL-26F-HS	90 - 100	SHL-26F-HS	Light Blue	

Well	Depth	Formation	Color	Notes
SHL-26F-HS	0 - 10	SHL-26F-HS	Light Blue	
SHL-26F-HS	10 - 20	SHL-26F-HS	Light Blue	
SHL-26F-HS	20 - 30	SHL-26F-HS	Light Blue	
SHL-26F-HS	30 - 40	SHL-26F-HS	Light Blue	
SHL-26F-HS	40 - 50	SHL-26F-HS	Light Blue	
SHL-26F-HS	50 - 60	SHL-26F-HS	Light Blue	
SHL-26F-HS	60 - 70	SHL-26F-HS	Light Blue	
SHL-26F-HS	70 - 80	SHL-26F-HS	Light Blue	
SHL-26F-HS	80 - 90	SHL-26F-HS	Light Blue	
SHL-26F-HS	90 - 100	SHL-26F-HS	Light Blue	

