PATHFINDER
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Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD Survey Report

noble energy

(Def Survey)

Report Date:	June 20, 2012 - 10:22 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Noble Energy	**Vertical Section Azimuth:**	128.746 ° (Grid North)
Field:	WV Marshall County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	CNX/Noble Energy SHL-6 Pad / SHL-6F-HS	**TVD Reference Datum:**	KB
Well:	SHL-6F-HS	**TVD Reference Elevation:**	855.030 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	831.020 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	-8.738 °
Survey Name:	Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD	**Total Field Strength:**	52862.182 nT
Survey Date:	February 15, 2012	**Magnetic Dip Angle:**	67.533 °
Tort / AHD / DDI / ERD Ratio:	189.605 ° / 5546.525 ft / 6.255 / 0.888	**Declination Date:**	February 15, 2012
Coordinate Reference System:	NAD27 West Virginia State Plane, Northern Zone, US Feet	**Magnetic Declination Model:**	BGGM 2011
Location Lat / Long:	N 39° 57' 22.05153", W 80° 34' 31.74850"	**North Reference:**	Grid North
Location Grid N/E Y/X:	N 532165.562 ftUS, E 1698508.096 ftUS	**Grid Convergence Used:**	-0.686 °
CRS Grid Convergence Angle:	-0.68591572 °	**Total Corr Mag North->Grid North:**	-8.052 °
Grid Scale Factor:	0.99995731	**Local Coord Referenced To:**	Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
SHL	0.00	0.00	0.00	0.00	-855.03	0.00	0.00	0.00	N/A	N/A	N/A	532165.56	1698508.10	N 39 57 22.05	W 80 34 31.75	0.00
	115.00	0.44	142.18	115.00	-740.03	0.43	-0.35	0.27	0.38	0.38	0.00	532165.21	1698508.37	N 39 57 22.05	W 80 34 31.74	0.00
	215.00	0.46	178.60	215.00	-640.03	1.06	-1.05	0.52	0.26	0.02	36.42	532164.51	1698508.61	N 39 57 22.04	W 80 34 31.74	0.00
	315.00	0.43	188.38	314.99	-540.04	1.51	-1.83	0.47	0.08	-0.03	9.78	532163.74	1698506.57	N 39 57 22.03	W 80 34 31.74	0.20
	415.00	0.48	190.22	414.99	-440.04	1.89	-2.59	0.35	0.03	0.03	1.84	532162.97	1698508.44	N 39 57 22.03	W 80 34 31.74	0.36
	515.00	0.32	13.31	514.99	-340.04	1.96	-2.72	0.34	0.78	-0.14	-176.91	532162.85	1698508.43	N 39 57 22.02	W 80 34 31.74	0.70
	615.00	0.26	20.79	614.99	-240.04	1.77	-2.23	0.46	0.07	-0.06	7.48	532163.33	1698508.58	N 39 57 22.03	W 80 34 31.74	0.78
	715.00	1.38	47.16	714.98	-140.05	1.88	-1.20	1.45	1.15	1.12	26.37	532164.36	1698509.54	N 39 57 22.04	W 80 34 31.73	1.15
	815.00	1.35	47.00	814.96	-40.08	2.23	0.42	3.19	0.03	-0.03	-0.16	532165.98	1698511.29	N 39 57 22.06	W 80 34 31.71	1.33
	915.00	1.64	42.77	914.91	59.88	2.49	2.28	5.02	0.31	0.29	-4.23	532167.84	1698513.12	N 39 57 22.07	W 80 34 31.68	1.50
	1015.00	1.66	30.14	1014.87	159.84	2.38	4.58	6.72	0.36	0.02	-12.63	532170.14	1698514.82	N 39 57 22.10	W 80 34 31.66	1.66
	1115.00	1.79	24.26	1114.83	259.80	1.77	7.25	8.09	0.22	0.13	-5.88	532172.82	1698516.19	N 39 57 22.12	W 80 34 31.65	1.78
	1215.00	1.80	23.29	1214.78	359.75	0.96	10.12	9.36	0.03	0.01	-0.97	532175.68	1698517.45	N 39 57 22.15	W 80 34 31.63	1.88
	1315.00	1.41	24.27	1314.74	459.71	0.24	12.69	10.46	0.39	-0.39	0.98	532178.25	1698518.58	N 39 57 22.18	W 80 34 31.62	1.98
	1415.00	1.43	19.64	1414.71	559.68	-0.48	14.98	11.41	0.12	0.02	-4.63	532180.54	1698519.50	N 39 57 22.20	W 80 34 31.60	2.02
	1515.00	0.84	11.26	1514.67	759.64	-1.97	18.77	12.53	0.31	-0.30	-4.19	532184.33	1698520.63	N 39 57 22.24	W 80 34 31.59	2.14
	1715.00	0.97	10.60	1714.66	859.63	-2.71	20.32	12.83	0.13	0.13	-0.66	532185.88	1698520.93	N 39 57 22.25	W 80 34 31.59	2.16
	1815.00	0.74	357.44	1814.64	959.61	-3.54	21.80	12.98	0.30	-0.23	-13.16	532187.36	1698521.05	N 39 57 22.27	W 80 34 31.59	2.22
	1915.00	0.97	339.20	1914.63	1059.60	-4.69	23.23	12.83	0.35	0.23	-18.24	532188.80	1698520.72	N 39 57 22.28	W 80 34 31.59	2.27
	2015.00	0.58	335.07	2014.62	1159.59	-5.66	24.47	12.12	0.41	-0.41	-4.13	532190.03	1698520.22	N 39 57 22.29	W 80 34 31.60	2.32
	2115.00	0.52	339.29	2114.62	1259.59	-6.69	25.34	11.76	0.06	-0.04	4.22	532190.90	1698519.85	N 39 57 22.30	W 80 34 31.60	2.34
	2215.00	0.52	330.15	2214.62	1359.59	-7.50	26.15	11.37	0.06	0.00	-9.14	532191.72	1698519.48	N 39 57 22.31	W 80 34 31.61	2.35
	2315.00	0.73	325.80	2314.61	1459.58	-8.53	27.08	10.78	0.22	0.21	-4.35	532192.64	1698518.88	N 39 57 22.32	W 80 34 31.61	2.38
	2415.00	0.79	327.54	2414.60	1559.57	-9.80	28.18	10.06	0.06	0.06	1.74	532193.74	1698518.15	N 39 57 22.33	W 80 34 31.62	2.40
	2515.00	0.80	345.41	2514.59	1659.56	-10.87	29.27	9.55	0.29	-0.19	17.87	532194.83	1698517.65	N 39 57 22.34	W 80 34 31.63	2.43
	2615.00	0.58	345.85	2614.59	1759.56	-11.89	30.27	9.30	0.02	-0.02	0.24	532195.83	1698517.39	N 39 57 22.35	W 80 34 31.63	2.44
Final Gyro	2630.00	0.68	324.66	2629.59	1774.56	-11.84	30.41	9.23	1.59	0.53	-139.93	532195.97	1698517.32	N 39 57 22.35	W 80 34 31.63	2.46
	2718.00	0.68	320.69	2717.58	1862.55	-12.84	31.23	8.80	0.06	0.02	-4.51	532196.79	1698516.70	N 39 57 22.36	W 80 34 31.64	2.47
	2813.00	0.59	323.03	2812.58	1957.55	-13.88	32.06	7.95	0.10	-0.09	2.46	532197.62	1698516.05	N 39 57 22.37	W 80 34 31.65	2.49
	2907.00	0.50	321.20	2906.57	2051.54	-14.73	32.76	7.41	0.10	-0.10	-1.95	532198.32	1698515.50	N 39 57 22.38	W 80 34 31.66	2.51
	3002.00	0.42	320.22	3001.57	2146.54	-15.46	33.35	6.92	0.08	-0.08	-1.03	532198.92	1698515.02	N 39 57 22.38	W 80 34 31.66	2.52
	3098.00	0.42	324.41	3097.57	2242.54	-16.16	33.91	6.49	0.03	0.00	4.36	532199.47	1698514.59	N 39 57 22.39	W 80 34 31.67	2.53
	3192.00	0.41	325.13	3191.56	2336.53	-16.81	34.47	6.10	0.01	-0.01	0.77	532200.03	1698514.20	N 39 57 22.39	W 80 34 31.68	2.53
	3287.00	0.38	311.27	3286.56	2431.53	-17.44	34.94	5.68	0.11	-0.05	-14.59	532200.50	1698513.78	N 39 57 22.40	W 80 34 31.68	2.55
	3382.00	0.55	293.05	3381.56	2526.53	-18.18	35.32	5.04	0.25	0.20	-19.18	532200.88	1698513.13	N 39 57 22.40	W 80 34 31.69	2.57
	3477.00	0.77	292.98	3476.55	2621.52	-19.23	35.75	4.03	0.23	0.23	-0.07	532201.31	1698512.13	N 39 57 22.41	W 80 34 31.70	2.59
	3571.00	0.78	299.84	3570.54	2715.51	-20.47	36.31	2.89	0.10	0.01	7.30	532201.87	1698510.99	N 39 57 22.41	W 80 34 31.72	2.60
	3665.00	0.71	292.48	3664.54	2809.51	-21.66	36.85	1.80	0.13	-0.07	-7.83	532202.41	1698509.90	N 39 57 22.42	W 80 34 31.73	2.62
	3759.00	0.51	290.51	3758.53	2903.50	-22.62	37.22	0.87	0.21	-0.21	-2.10	532202.78	1698508.97	N 39 57 22.42	W 80 34 31.74	2.64
	3854.00	0.40	297.81	3853.53	2998.50	-23.34	37.52	0.18	0.13	-0.12	7.47	532203.08	1698508.28	N 39 57 22.42	W 80 34 31.75	2.65
	3901.00	1.34	45.16	3900.52	3045.49	-23.44	37.99	0.43	3.21	2.00	228.83	532203.55	1698508.52	N 39 57 22.43	W 80 34 31.75	2.73
	3947.00	4.15	59.29	3946.47	3091.44	-22.80	39.22	2.24	6.24	6.11	30.72	532204.76	1698510.33	N 39 57 22.44	W 80 34 31.73	2.85
	3993.00	6.98	56.81	3992.24	3137.21	-21.35	41.60	6.01	6.17	6.15	-5.39	532207.16	1698514.10	N 39 57 22.46	W 80 34 31.68	2.97
	4038.00	9.89	53.21	4036.75	3181.72	-19.53	45.41	11.39	6.57	6.47	-8.00	532210.97	1698519.49	N 39 57 22.50	W 80 34 31.61	3.09
	4084.00	11.88	58.02	4081.92	3226.89	-17.14	50.42	18.48	4.48	4.33	8.11	532215.98	1698526.58	N 39 57 22.55	W 80 34 31.52	3.19
	4130.00	14.33	57.28	4126.72	3271.69	-13.93	56.15	27.20	5.36	5.33	2.74	532221.71	1698535.30	N 39 57 22.61	W 80 34 31.41	3.30
	4177.00	17.17	56.48	4171.95	3316.92	-9.98	63.12	37.88	6.08	6.04	-1.74	532228.68	1698545.97	N 39 57 22.68	W 80 34 31.27	3.41
	4222.00	19.24	54.76	4214.70	3359.67	-5.90	71.07	49.47	4.75	4.60	-3.78	532236.83	1698557.57	N 39 57 22.76	W 80 34 31.12	3.50
	4266.00	20.95	53.53	4257.90	3402.87	-1.71	80.34	62.26	3.83	3.72	-2.87	532245.89	1698570.37	N 39 57 22.85	W 80 34 30.96	3.59
	4315.00	22.45	54.75	4301.57	3446.54	2.91	90.51	76.36	3.33	3.19	2.60	532256.07	1698584.46	N 39 57 22.95	W 80 34 30.78	3.68
	4361.00	23.73	59.03	4343.86	3488.85	8.54	100.34	91.47	4.59	2.78	9.30	532265.90	1698599.57	N 39 57 23.05	W 80 34 30.59	3.74
	4407.00	26.13	59.71	4385.59	3530.56	15.38	110.22	106.16	5.25	5.22	1.48	532275.77	1698616.25	N 39 57 23.15	W 80 34 30.38	3.82
	4454.00	29.01	58.14	4427.25	3572.22	22.66	121.45	126.78	6.32	6.13	-3.34	532287.01	1698634.87	N 39 57 23.27	W 80 34 30.14	3.91
	4499.00	31.32	55.49	4468.18	3611.13	29.86	133.64	145.89	5.92	5.13	-5.89	532299.40	1698653.76	N 39 57 23.39	W 80 34 29.90	3.98
	4547.00	32.48	54.04	4508.91	3651.86	36.85	148.48	166.40	2.90	2.42	-3.02	532314.04	1698674.49	N 39 57 23.54	W 80 34 29.63	4.04
	4593.00	30.53	52.88	4548.13	3691.10	42.96	162.79	185.72	4.44	-4.24	-2.52	532328.34	1698693.81	N 39 57 23.68	W 80 34 29.39	4.10
	4639.00	28.72	52.05	4588.11	3731.08	48.36	176.83	203.75	4.03	-3.93	-1.80	532342.19	1698711.84	N 39 57 23.82	W 80 34 29.16	4.15
	4686.00	29.62	55.71	4627.15	3772.12	54.35	190.12	222.25	4.25	1.91	7.79	532355.68	1698730.34	N 39 57 23.96	W 80 34 28.92	4.20
	4733.00	32.65	54.88	4667.38	3812.35	61.22	204.00	242.20	6.55	6.45	-2.19	532369.55	1698750.28	N 39 57 24.10	W 80 34 28.67	4.26
	4783.00	32.65	54.80	4709.48	3854.45	68.65	219.57	264.23	0.13	0.00	0.24	532385.13	1698772.31	N 39 57 24.25	W 80 34 28.39	4.30
	4831.00	32.37	53.88	4749.96	3894.93	75.59	234.61	285.19	1.18	-0.58	-1.92	532400.16	1698793.27	N 39 57 24.40	W 80 34 28.12	4.33
	4874.00	30.53	53.25	4786.64	3931.61	81.33	247.93	303.24	4.35	-4.28	-1.47	532413.48	1698811.32	N 39 57 24.54	W 80 34 27.89	4.37
	4919.00	30.39	54.05	4825.43	3970.40	87.20	261.45	321.61	0.95	-0.31	1.78	532427.00	1698829.69	N 39 57 24.67	W 80 34 27.66	4.40
	4966.00	32.09	54.38	4865.81	4010.58	93.70	275.71	341.38	3.84	3.62	0.70	532441.25	1698849.48	N 39 57 24.82	W 80 34 27.41	4.43
	5058.00	31.53	54.25	4943.79	4088.76	106.71	303.99	380.77	0.61	-0.61	-0.14	532469.54	1698888.85	N 39 57 25.10	W 80 34 26.91	4.48
	5150.00	29.26	56.08	5023.14	4168.11	119.85	330.60	418.96	2.66	-2.47	1.99	532496.14	1698927.03	N 39 57 25.37	W 80 34 26.42	4.54
	5242.00	29.63	55.64	5103.26	4248.23	133.15	355.98	456.39	0.47	0.40	-0.48	532521.53	1698964.46	N 39 57 25.62	W 80 34 25.94	4.58
	5334.00	29.61	54.86	5183.24	4328.21	146.07	381.90	493.75	0.42	-0.02	-0.85	532547.44	1699001.82	N 39 57 25.88	W 80 34 25.47	4.61
	5430.00	29.88	53.00	5266.59	4411.56	158.54	409.94	532.24	1.00	0.28	-1.94	532575.48	1699040.31	N 39 57 26.17	W 80 34 24.98	4.65
	5526.00	30.47	52.73	5349.58	4494.55	170.31	439.07	570.71	0.63	0.61	-0.28	532604.61	1699078.78	N 39 57 26.46	W 80 34 24.49	4.68
	5621.00	32.15	54.14	5430.75	4575.72	182.84	468.47	610.37	1.93	1.77	1.48	532634.01	1699118.43	N 39 57 26.75	W 80 34 23.98	4.72
	5715.00	33.03	56.27	5509.95	4654.92	197.20	497.34	651.94	1.54	0.94	2.27	532662.88	1699160.01	N 39 57 27.04	W 80 34 23.45	4.76
	5782.00	31.43	58.96	5549.71	4894.68	205.29	510.78	673.10	4.57	-3.40	5.72	532676.32	1699181.18	N 39 57 27.18	W 80 34 23.18	4.79
	5810.00	30.25	66.35	5590.93	4735.90	215.22	522.09	694.91	8.26	-2.46	15.40	532687.62	1699202.97	N 39 57 27.29	W 80 34 22.91	4.83
	5857.00	29.74	74.01	5631.65	4776.62	227.44	530.05	716.96	8.21	-1.09	16.30	532695.59	1699225.03	N 39 57 27.37	W 80 34 22.62	4.86
	5920.00	29.45	82.89	5686.46	4831.43	247.26	538.27	747.37	6.97	-0.46	14.10	532701.81	1699255.43	N 39 57 27.44	W 80 34 22.23	4.90
	5968.00	33.31	88.73	5727.44	4872.41	265.56	536.03	772.27	10.23	8.04	12.17	532703.57	1699280.33	N 39 57 27.46	W 80 34 21.91	4.94
	6015.00	38.10	96.07	5765.61	4910.58	287.69	536.78	799.62	13.66	10.19	15.82	532702.32	1699307.68	N 39 57 27.45	W 80 34 21.56	4.98
	6062.00	40.64	99.11	5801.95	4946.92	313.21	532.82	829.16	6.78	5.40	6.47	532696.36	1699337.22	N 39 57 27.41	W 80 34 21.18	5.01
	6109.00	40.51	101.38	5837.65	4982.62	340.07	527.39	859.24	3.15	-0.28	4.83	532692.92	1699367.30	N 39 57 27.36	W 80 34 20.80	5.03
	6157.00	44.10	106.75	5873.15	5018.12	369.42	519.49	890.54	10.61	7.48	11.19	532685.03	1699398.59	N 39 57 27.29	W 80 34 20.39	5.07
	6204.00	47.80	112.62	5905.64	5050.81	401.35	508.02	922.27	12.16	7.87	12.91	532673.56	1699430.32	N 39 57 27.18	W 80 34 19.96	5.10
	6252.00	47.87	118.11	5936.06	5083.05	435.96	492.73	954.37	8.17	0.15	11.02	532658.27	1699462.42	N 39 57 27.03	W 80 34 19.57	5.13
	6299.00	50.67	119.51	5966.74	5113.71	471.03	475.56	985.57	6.37	5.96	2.98	532641.10	1699493.62	N 39 57 26.87	W 80 34 19.17	5.16
	6347.00	55.20	123.03	5997.67	5142.64	508.99	455.86	1016.27	11.10	9.44	7.33	532621.20	1699526.32	N 39 57 26.67	W 80 34 18.74	5.19
	6393.00	58.61	125.42	6022.72	5167.69	547.45	433.95	1050.15	6.98	7.65	5.20	532599.49	1699558.20	N 39 57 26.46	W 80 34 18.33	5.22
	6441.00	60.60	126.39	6046.66	5191.83	586.66	409.62	1083.75	4.50	4.15	2.02	532575.16	1699591.80	N 39 57 26.23	W 80 34 17.90	5.25
	6488.00	61.69	125.45	6069.47	5214.44	630.03	385.45	1117.12	2.58	1.69	-2.00	532550.99	1699625.17	N 39 57 25.99	W 80 34 17.48	5.27
	6535.00	65.10	128.73	6090.52	5235.49	672.02	360.10	1150.62	9.57	7.26	6.98	532525.65	1699658.66	N 39 57 25.76	W 80 34 17.03	5.30
	6582.00	69.03	132.34	6108.64	5253.61	715.27	331.97	1183.49	10.95	8.36	7.68	532497.51	1699691.53	N 39 57 25.47	W 80 34 16.60	5.33
	6629.00	69.43	135.94	6125.51	5270.48	759.01	301.37	1215.02	7.21	0.85	7.66	532466.92	1699723.06	N 39 57 25.17	W 80 34 16.19	5.35
	6676.00	72.04	137.00	6141.01	5285.96	802.97	269.20	1245.57	5.95	5.55	2.28	532434.75	1699753.61	N 39 57 24.86	W 80 34 15.80	5.38
	6724.00	76.10	137.96	6154.19	5299.16	848.58	235.19	1276.76	8.67	8.48	2.00	532400.74	1699784.80	N 39 57 24.53	W 80 34 15.39	5.40

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	6771.00	77.04	137.47	6165.10	5310.07	693.74	201.37	1307.51	2.24	2.00	-1.04	532366.92	1699615.55	N 39 57 24.20	W 80 34 14.99	5.42
	6819.00	78.09	140.75	6175.44	5320.41	939.64	165.94	1338.19	7.02	2.19	6.83	532331.49	1699846.23	N 39 57 23.85	W 80 34 14.59	5.45
	6866.00	79.36	144.13	6184.63	5329.60	984.61	129.40	1366.28	7.55	2.70	7.19	532294.96	1699874.32	N 39 57 23.49	W 80 34 14.23	5.47
	6913.00	82.52	144.83	6192.03	5337.00	1029.28	91.63	1393.24	6.88	6.72	1.49	532257.19	1699901.28	N 39 57 23.12	W 80 34 13.67	5.49
	6960.00	86.01	144.42	6196.73	5341.70	1074.25	53.50	1420.31	7.48	7.43	-0.87	532219.06	1699928.34	N 39 57 22.75	W 80 34 13.52	5.52
	7008.00	89.35	143.17	6198.67	5343.64	1120.56	14.81	1448.64	7.43	6.96	-2.60	532180.37	1699956.67	N 39 57 22.37	W 80 34 13.15	5.54
	7055.00	89.38	142.99	6199.19	5344.16	1166.10	-22.76	1476.87	0.39	0.06	-0.38	532142.80	1699984.90	N 39 57 22.00	W 80 34 12.78	5.55
	7149.00	89.11	142.96	6200.43	5345.40	1257.21	-97.80	1533.47	0.29	-0.29	-0.03	532067.76	1700041.49	N 39 57 21.27	W 80 34 12.04	5.58
	7243.00	89.11	143.43	6201.89	5346.86	1348.22	-173.06	1589.77	0.50	0.00	0.50	531992.51	1700097.80	N 39 57 20.53	W 80 34 11.31	5.61
	7338.00	88.73	143.88	6203.68	5348.65	1440.01	-249.56	1646.07	0.62	-0.40	0.47	531916.01	1700154.09	N 39 57 19.78	W 80 34 10.57	5.63
	7433.00	88.69	144.42	6205.82	5350.79	1531.57	-326.54	1701.69	0.57	-0.04	0.57	531839.03	1700209.71	N 39 57 19.03	W 80 34 9.85	5.66
	7528.00	88.83	144.25	6207.88	5352.85	1623.05	-403.71	1757.07	0.23	0.15	-0.16	531761.87	1700265.08	N 39 57 18.27	W 80 34 9.13	5.68
	7623.00	88.62	144.91	6209.99	5354.96	1714.43	-481.11	1812.11	0.73	-0.22	0.69	531684.48	1700320.13	N 39 57 17.51	W 80 34 8.41	5.71
	7717.00	88.66	145.38	6212.22	5357.19	1804.58	-558.22	1865.82	0.50	0.04	0.50	531607.37	1700373.83	N 39 57 16.76	W 80 34 7.71	5.73
	7611.00	89.00	144.64	6214.14	5359.11	1894.79	-635.21	1919.71	0.87	0.36	-0.79	531530.38	1700427.72	N 39 57 16.00	W 80 34 7.00	5.75
	7906.00	88.90	144.43	6215.88	5360.85	1986.20	-712.58	1974.82	0.24	-0.11	-0.22	531453.02	1700482.83	N 39 57 15.24	W 80 34 6.28	5.77
	8000.00	69.07	143.86	6217.55	5362.52	2076.81	-788.75	2029.87	0.63	0.18	-0.61	531376.85	1700537.87	N 39 57 14.50	W 80 34 5.56	5.79
	8095.00	89.28	143.05	6218.91	5363.88	2168.68	-865.06	2086.43	0.88	0.22	-0.85	531300.54	1700594.43	N 39 57 13.75	W 80 34 4.83	5.82
	8189.00	89.48	143.40	6219.93	5364.90	2259.69	-940.35	2142.70	0.43	0.21	0.37	531225.25	1700650.70	N 39 57 13.01	W 80 34 4.09	5.84
	8284.00	89.45	142.93	6220.82	5365.79	2351.69	-1016.38	2199.65	0.50	-0.03	-0.49	531149.22	1700707.65	N 39 57 12.27	W 80 34 3.35	5.86
	8379.00	89.28	142.37	6221.87	5366.84	2443.90	-1091.90	2257.28	0.82	-0.18	-0.59	531073.71	1700765.28	N 39 57 11.53	W 80 34 2.60	5.87
	8473.00	69.31	141.63	6223.03	5366.00	2535.39	-1165.97	2315.15	0.79	0.03	-0.79	530999.65	1700823.14	N 39 57 10.80	W 80 34 1.84	5.89
	8568.00	89.31	141.14	6224.17	5369.14	2628.08	-1240.19	2374.43	0.52	0.00	-0.52	530925.43	1700882.42	N 39 57 10.08	W 80 34 1.07	5.91
	8663.00	89.35	141.04	6225.28	5370.25	2720.88	-1314.11	2434.10	0.11	0.04	-0.11	530851.51	1700942.09	N 39 57 9.35	W 80 34 0.29	5.93
	8758.00	89.52	141.36	6226.22	5371.19	2813.64	-1388.14	2493.62	0.38	0.18	0.34	530777.48	1701001.61	N 39 57 8.63	W 80 33 59.52	5.95
	8852.00	89.45	141.36	6227.06	5372.03	2905.37	-1461.56	2552.32	0.07	-0.07	0.00	530704.07	1701080.30	N 39 57 7.91	W 80 33 58.75	5.96
	8947.00	89.69	142.28	6227.78	5372.75	2997.90	-1536.23	2611.04	1.00	0.25	0.97	530629.40	1701119.02	N 39 57 7.18	W 80 33 57.99	5.98
	9041.00	89.59	143.12	6228.37	5373.34	3089.13	-1611.01	2668.00	0.90	-0.11	0.89	530554.63	1701175.98	N 39 57 6.45	W 80 33 57.25	6.00
	9136.00	89.62	143.40	6229.02	5373.99	3181.09	-1687.13	2724.83	0.30	0.03	0.29	530478.50	1701232.80	N 39 57 5.70	W 80 33 56.50	6.01
	9231.00	89.48	143.31	6229.77	5374.74	3273.02	-1763.35	2781.53	0.18	-0.15	-0.09	530402.29	1701289.50	N 39 57 4.95	W 80 33 55.78	6.03
	9326.00	89.14	144.72	6230.91	5375.88	3364.66	-1840.22	2837.34	1.53	-0.36	1.48	530325.43	1701345.31	N 39 57 4.20	W 80 33 55.04	6.05
	9421.00	89.17	145.64	6232.31	5377.28	3455.76	-1918.20	2891.58	0.97	0.03	0.97	530247.45	1701399.54	N 39 57 3.44	W 80 33 54.33	6.06
	9516.00	88.87	145.11	6233.94	5378.91	3548.78	-1996.36	2945.55	0.64	-0.32	-0.56	530169.29	1701453.51	N 39 57 2.67	W 80 33 53.62	6.08
	9610.00	89.00	144.84	8235.69	5380.66	3637.02	-2073.32	2999.49	0.32	0.14	-0.29	530092.33	1701507.45	N 39 57 1.92	W 80 33 52.92	6.09
	9705.00	88.97	144.19	6237.37	5382.34	3728.43	-2150.67	3054.63	0.68	-0.03	-0.68	530014.99	1701562.59	N 39 57 1.16	W 80 33 52.20	6.11
	9799.00	88.97	143.78	6239.06	5384.03	3819.11	-2228.68	3109.90	0.46	0.00	-0.46	529938.98	1701617.86	N 39 57 0.41	W 80 33 51.48	6.12
	9893.00	89.04	143.40	6240.69	5385.66	3909.98	-2302.31	3165.70	0.39	0.07	-0.38	529863.36	1701673.66	N 39 56 59.67	W 80 33 50.75	6.13
	9988.00	88.97	143.11	6242.34	5387.31	4001.92	-2378.42	3222.53	0.31	-0.07	-0.31	529787.25	1701730.48	N 39 56 58.93	W 80 33 50.01	6.15
	10084.00	88.90	142.93	6244.13	5389.10	4094.94	-2455.10	3280.27	0.20	-0.07	-0.19	529710.58	1701788.21	N 39 56 58.18	W 80 33 49.26	6.16
	10179.00	88.76	142.23	6246.07	5391.04	4187.16	-2530.53	3337.98	0.75	-0.15	-0.74	529635.15	1701845.93	N 39 56 57.44	W 80 33 48.50	6.17
	10274.00	90.07	145.41	6247.04	5392.01	4278.88	-2607.19	3394.05	3.62	1.38	3.35	529558.48	1701901.99	N 39 56 56.69	W 80 33 47.77	6.19
	10368.00	89.73	146.80	6247.20	5392.17	4368.59	-2685.22	3448.47	1.52	-0.36	1.48	529480.46	1701954.41	N 39 56 55.92	W 80 33 47.09	6.21
	10463.00	89.83	145.57	6247.56	5392.53	4459.22	-2764.14	3499.34	1.30	0.11	-1.29	529401.54	1702007.28	N 39 56 55.15	W 80 33 46.40	6.22
	10558.00	89.69	144.30	6247.96	5392.93	4550.45	-2841.90	3553.91	1.34	-0.15	-1.34	529323.79	1702061.85	N 39 56 54.39	W 80 33 45.68	6.24
Final Survey 20Jun12	10605.00	89.73	143.99	6248.20	5393.17	4595.77	-2879.99	3581.44	0.87	0.09	-0.66	529285.70	1702089.38	N 39 56 54.01	W 80 33 45.32	6.24
Projection to Bit	10691.00	89.73	143.99	6248.61	5393.58	4678.74	-2949.56	3632.00	0.00	0.00	0.00	529216.13	1702139.94	N 39 56 53.33	W 80 33 44.67	6.26

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Survey Tool Type	Borehole / Survey
	0.000	24.010	Act Stns	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD
	24.010	24.010	Act Stns	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD
	24.010	2630.000	Act Stns	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD
	2630.000	10605.000	Act Stns	SLB_MWD-STD	Original Borehole / Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD
	10605.000	10691.000	Act Stns	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD

Noble Energy

noble energy

PATHFINDER
A Schlumberger Company

WELL	FIELD	STRUCTURE
SHL-6F-HS	WV Marshall County (NAD 27)	Nabors M59

Magnetic Parameters
Model: BGGM 2011 | Dip: 67.533° | Mag Dec: -8.738° | Date: February 15, 2012 | FS: 52862.2nT

Surface Location — NAD27 West Virginia State Plane, Northern Zone, US Feet
Lat: N 39 57 22.052 | Lon: W 80 34 31.748 | Northing: 532165.56 ftUS | Easting: 1698508.10 ftUS | Grid Conv: -0.68591572° | Scale Fact: 0.99995731

Miscellaneous
Slot: SHL-6F-HS | Plan: MWD Survey | TVD Ref: KB(855.03ft above MSL) | Srvy Date: February 15, 2012

Legend

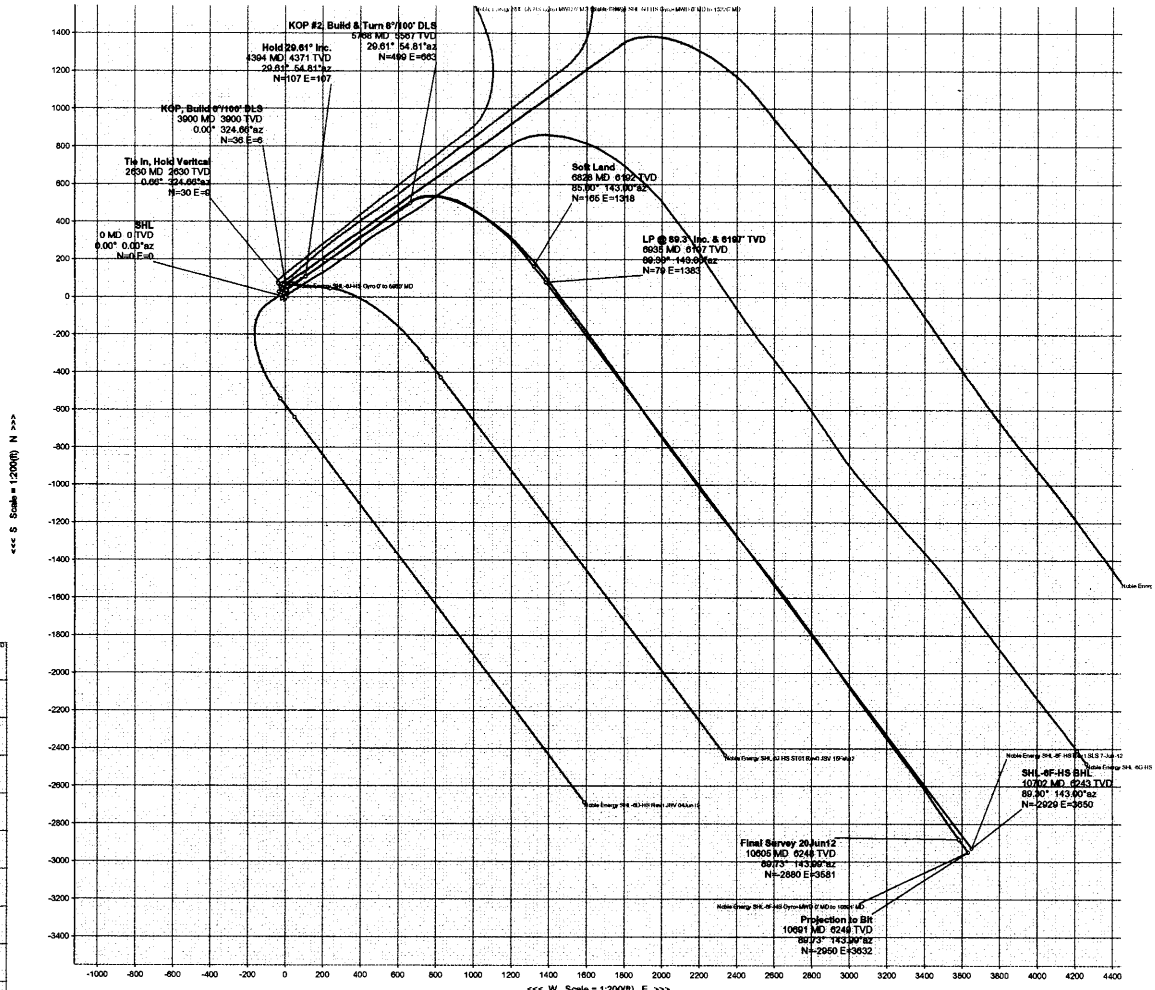
- Noble Energy SHL-6F-HS Gyro+MWD 0' MD to 10691' MD
- Noble Energy SHL-6J-HS Gyro 0' to 5950' MD
- Noble Energy SHL-6D-HS Rev1 JSV 04Jun12
- Noble Energy SHL-6G-HS Gyro+MWD 0' MD to 10939' MD
- Noble Energy SHL-6E-HS Gyro+MWD 0' MD to 11264' MD
- Noble Energy SHL-6K-HS Gyro+MWD 0' MD to 12120' MD
- Noble Energy SHL-6H-HS Gyro+MWD 0' MD to 13226' MD
- Noble Energy SHL-6F-HS Rev1 SLS 7-Jun-12
- Noble Energy SHL-6J-HS S101 Rev0 JSV 15Feb12

Surface Location
Northing: 532165.56 Easting: 1698508.10

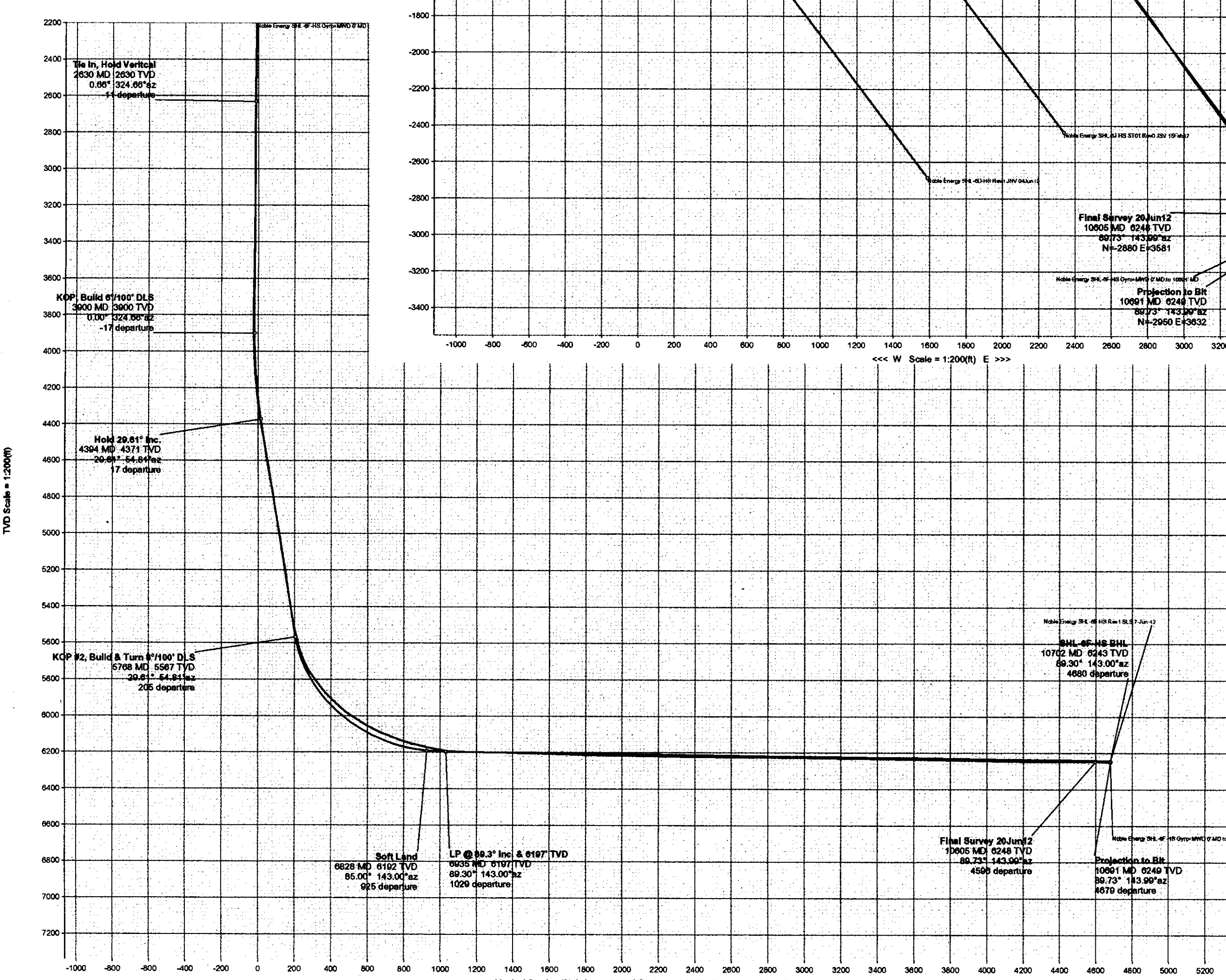
Target Description			Grid Coord				Local Coord	
Target Name	Shape	Major Axis	N(+)/S(-)	E(+)/W(-)	TVD	VSec	N(+)/S(-)	E(+)/W(-)
SHL-6F-HS BHL	Point	0.00	529236.04	1702157.71	6165.00	4679.64	-2928.89	3649.77

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Gyro	2630.00	0.66	324.66	2629.59	-11.04	30.41	0.23	1.50
Final Survey 20Jun12	10605.00	89.73	143.99	6248.20	4595.77	-2879.89	3581.44	0.07
Projection to Bit	10691.00	89.73	143.99	6248.61	4678.74	-2949.56	3632.00	0.00



KOP #2, Build & Turn 8°/100' DLS
5768 MD 5567 TVD
29.61° 54.81°az
N=409 E=663
Hold 29.61° Inc.
4394 MD 4371 TVD
29.61° 54.81°az
N=107 E=107
KOP, Build 6°/100' DLS
3900 MD 3900 TVD
0.00° 324.66°az
N=36 E=6
Tie In, Hold Vertical
2630 MD 2630 TVD
0.66° 324.66°az
N=30 E=6
SHL
0 MD 0 TVD
0.00° 0.00°az
N=0 E=0
Soft Land
6828 MD 6192 TVD
85.00° 143.00°az
N=165 E=1318
LP @ 89.3° Inc. & 6197' TVD
6935 MD 6197 TVD
89.30° 143.00°az
N=79 E=1383
SHL-6F-HS BHL
10702 MD 6243 TVD
89.30° 143.00°az
N=-2929 E=3650
Final Survey 20Jun12
10605 MD 6248 TVD
89.73° 143.99°az
N=-2880 E=3581
Projection to Bit
10691 MD 6249 TVD
89.73° 143.99°az
N=-2950 E=3632
<<< S Scale = 1:200(ft) N >>>
<<< W Scale = 1:200(ft) E >>>



Tie In, Hold Vertical
2630 MD 2630 TVD
0.66° 324.66°az
-11 departure
KOP, Build 6°/100' DLS
3900 MD 3900 TVD
0.00° 324.66°az
-17 departure
Hold 29.61° Inc.
4394 MD 4371 TVD
29.61° 54.81°az
17 departure
KOP #2, Build & Turn 8°/100' DLS
5768 MD 5567 TVD
29.61° 54.81°az
205 departure
Soft Land
6828 MD 6192 TVD
85.00° 143.00°az
925 departure
LP @ 89.3° Inc & 6197' TVD
6935 MD 6197 TVD
89.30° 143.00°az
1029 departure
SHL-6F-HS BHL
10702 MD 6243 TVD
89.30° 143.00°az
4680 departure
Final Survey 20Jun12
10605 MD 6248 TVD
89.73° 143.99°az
4596 departure
Projection to Bit
10691 MD 6249 TVD
89.73° 143.99°az
4679 departure
TVD Scale = 1:200(ft)
Vertical Section (ft) Azim = 128.75° Scale = 1:200(ft) Origin = 0 N/-S, 0 E/-W

Drawn By: J Venrare
Date Created: June 20, 2012 10:24:21 AM
Checked By:
Checked Date:
Approved By:
Approved Date: