

Noble Energy SHL-8C-HS ST01 MWD 5603' to 13042' MD Survey Report

(Def Survey)

<p>Report Date: December 03, 2012 - 10:26 AM</p> <p>Client: Noble Energy</p> <p>Field: WV Marshall County (NAD 27)</p> <p>Structure / Slot: CNX/Noble Energy SHL-8 Pad / SHL-8C-HS</p> <p>Well: SHL-8C-HS</p> <p>Borehole: ST01</p> <p>UWI / AP#: Unknown / Unknown</p> <p>Survey Name: Noble Energy SHL-8C-HS ST01 MWD 5603' to 13042' MD</p> <p>Survey Date: November 22, 2012</p> <p>Tort / AHD / DDI / ERD Ratio: 217.848 ° / 6981.411 ft / 6.476 / 1.054</p> <p>Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet</p> <p>Location Lat / Long: N 39° 57' 19.66810", W 80° 32' 7.83324"</p> <p>Location Grid N/E Y/X: N 531792.747 ftUS, E 1709711.449 ftUS</p> <p>CRS Grid Convergence Angle: -0.6604 °</p> <p>Grid Scale Factor: 0.99995724</p>	<p>Survey / DLS Computation: Minimum Curvature / Lubinski</p> <p>Vertical Section Azimuth: 138.502 ° (Grid North)</p> <p>Vertical Section Origin: 0.000 ft, 0.000 ft</p> <p>TVD Reference Datum: KB</p> <p>TVD Reference Elevation: 1149.970 ft above MSL</p> <p>Seabed / Ground Elevation: 1131.470 ft above MSL</p> <p>Magnetic Declination: -8.712 °</p> <p>Total Gravity Field Strength: 1000.0592 mgn (9.8 based)</p> <p>Total Magnetic Field Strength: 52774.066 nT</p> <p>Magnetic Dip Angle: 67.447 °</p> <p>Declination Date: November 22, 2012</p> <p>Magnetic Declination Model: BGGM 2012</p> <p>North Reference: Grid North</p> <p>Grid Convergence Used: -0.6604 °</p> <p>Total Corr Mag North->Grid North: -8.0512 °</p> <p>Local Coord Referenced To: Well Head</p>
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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	-1149.97	0.00	0.00	0.00	N/A	N/A	N/A	531792.75	1709711.45	N 39 57 19.67	W 80 32 7.83	0.00
	106.50	0.48	218.84	106.50	-1043.47	0.07	-0.35	-0.28	0.45	0.45	0.00	531792.40	1709711.17	N 39 57 19.66	W 80 32 7.84	0.00
	206.50	0.48	205.61	206.50	-943.47	0.31	-1.05	-0.72	0.11	0.00	-13.23	531791.70	1709710.73	N 39 57 19.66	W 80 32 7.84	0.00
	306.50	0.62	210.30	306.49	-843.48	0.64	-1.90	-1.18	0.15	0.14	4.69	531790.85	1709710.27	N 39 57 19.65	W 80 32 7.85	0.22
	406.50	0.33	204.74	406.49	-743.48	0.93	-2.62	-1.57	0.29	-0.29	-5.56	531790.12	1709709.88	N 39 57 19.64	W 80 32 7.85	0.50
	506.50	0.40	211.94	506.49	-643.48	1.14	-3.18	-1.88	0.08	0.07	7.20	531789.56	1709709.57	N 39 57 19.64	W 80 32 7.86	0.62
	606.50	0.18	238.48	606.48	-543.49	1.21	-3.56	-2.19	0.25	-0.22	26.54	531789.19	1709709.25	N 39 57 19.63	W 80 32 7.86	0.76
	706.50	0.14	207.59	706.48	-443.49	1.23	-3.75	-2.39	0.09	-0.04	-30.89	531789.00	1709709.06	N 39 57 19.63	W 80 32 7.86	0.82
	806.50	0.07	353.72	806.48	-343.49	1.22	-3.80	-2.45	0.20	-0.07	146.13	531788.95	1709709.00	N 39 57 19.63	W 80 32 7.86	0.88
	906.50	0.09	120.35	906.48	-243.49	1.25	-3.78	-2.39	0.14	0.02	126.63	531788.97	1709709.06	N 39 57 19.63	W 80 32 7.86	0.93
	1006.50	0.30	133.61	1006.48	-143.49	1.58	-4.00	-2.13	0.21	0.21	13.26	531788.75	1709709.32	N 39 57 19.63	W 80 32 7.86	1.01
	1106.50	0.29	140.56	1106.48	-43.49	2.10	-4.37	-1.78	0.04	-0.01	6.95	531788.37	1709709.67	N 39 57 19.62	W 80 32 7.86	1.06
	1206.50	0.23	119.14	1206.48	56.51	2.54	-4.67	-1.44	0.11	-0.06	-21.42	531788.08	1709710.01	N 39 57 19.62	W 80 32 7.85	1.11
	1306.50	0.30	156.94	1306.48	156.51	2.98	-5.01	-1.17	0.18	0.07	37.80	531787.74	1709710.28	N 39 57 19.62	W 80 32 7.85	1.18
	1406.50	0.41	142.13	1406.48	256.51	3.58	-5.53	-0.84	0.14	0.11	-14.81	531787.22	1709710.61	N 39 57 19.61	W 80 32 7.84	1.25
	1506.50	0.55	154.83	1506.47	356.50	4.40	-6.25	-0.42	0.18	0.14	12.70	531786.50	1709711.03	N 39 57 19.61	W 80 32 7.84	1.32
	1606.50	0.63	154.29	1606.47	456.50	5.39	-7.18	0.02	0.08	0.08	-0.54	531785.57	1709711.47	N 39 57 19.60	W 80 32 7.83	1.39
	1706.50	0.71	150.59	1706.46	556.49	6.52	-8.21	0.57	0.08	0.08	-3.70	531784.54	1709712.01	N 39 57 19.59	W 80 32 7.82	1.46
	1806.50	0.66	152.84	1806.45	656.48	7.69	-9.26	1.13	0.06	-0.05	2.25	531783.48	1709712.58	N 39 57 19.58	W 80 32 7.82	1.51
	1906.50	0.58	148.07	1906.45	756.48	8.75	-10.21	1.66	0.10	-0.08	-4.77	531782.54	1709713.11	N 39 57 19.57	W 80 32 7.81	1.57
	2006.50	0.53	151.39	2006.44	856.47	9.70	-11.04	2.15	0.06	-0.05	3.32	531781.71	1709713.60	N 39 57 19.56	W 80 32 7.80	1.61
	2106.50	0.49	150.08	2106.44	956.47	10.57	-11.82	2.59	0.04	-0.04	-1.31	531780.93	1709714.04	N 39 57 19.55	W 80 32 7.80	1.64
	2206.50	0.51	158.06	2206.44	1056.47	11.40	-12.60	2.97	0.07	0.02	7.98	531780.15	1709714.42	N 39 57 19.54	W 80 32 7.79	1.68
	2306.50	0.60	157.65	2306.43	1156.46	12.32	-13.50	3.33	0.09	0.09	-0.41	531779.25	1709714.78	N 39 57 19.54	W 80 32 7.79	1.72

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S °'")	Longitude (E/W °'")	Directional Difficulty Index
	2406.50	0.48	131.41	2406.43	1256.46	13.23	-14.26	-0.12	-26.24	531778.49	1709715.29	N 39 57 19.53 W	80 32 7.78	1.76
	2506.50	0.49	129.20	2506.42	1356.45	14.07	-14.81	0.01	-2.21	531777.94	1709715.94	N 39 57 19.52 W	80 32 7.77	1.80
	2606.50	0.50	133.92	2606.42	1456.45	14.92	-15.38	0.01	4.72	531777.37	1709716.59	N 39 57 19.52 W	80 32 7.77	1.83
	2706.50	0.18	147.12	2706.42	1556.45	15.51	-15.81	-0.32	13.20	531776.93	1709716.98	N 39 57 19.51 W	80 32 7.76	1.88
	2806.50	0.57	134.31	2806.42	1656.45	16.16	-16.29	0.39	-12.81	531776.45	1709717.43	N 39 57 19.51 W	80 32 7.75	1.93
	2891.50	0.83	141.35	2891.41	1741.44	17.20	-17.07	0.31	8.28	531775.68	1709718.11	N 39 57 19.50 W	80 32 7.75	1.98
	3097.00	0.81	125.02	3096.89	1946.92	20.10	-19.07	-0.01	-7.95	531773.68	1709720.23	N 39 57 19.48 W	80 32 7.72	2.06
	3186.00	1.46	147.79	3185.87	2035.90	21.83	-20.39	0.73	25.58	531772.36	1709721.35	N 39 57 19.47 W	80 32 7.70	2.16
	3276.00	1.78	111.51	3275.84	2125.87	24.21	-21.87	0.36	-40.31	531770.88	1709723.26	N 39 57 19.45 W	80 32 7.68	2.27
	3366.00	2.62	79.91	3365.77	2215.80	26.53	-22.02	0.93	-35.11	531770.73	1709726.59	N 39 57 19.45 W	80 32 7.64	2.41
	3455.00	3.75	61.56	3454.64	2304.67	28.24	-20.28	1.27	-20.62	531772.47	1709731.15	N 39 57 19.47 W	80 32 7.58	2.54
	3544.00	4.70	55.41	3543.39	2393.42	29.34	-16.82	1.07	-6.91	531775.93	1709736.71	N 39 57 19.50 W	80 32 7.51	2.66
	3634.00	3.60	56.23	3633.16	2483.19	30.16	-13.16	1.22	0.91	531779.59	1709742.10	N 39 57 19.54 W	80 32 7.44	2.76
	3724.00	2.30	64.24	3723.04	2573.07	31.03	-10.80	-1.44	8.90	531781.95	1709746.07	N 39 57 19.57 W	80 32 7.39	2.85
	3813.00	1.82	67.35	3811.98	2662.01	31.97	-9.48	-0.54	3.49	531783.27	1709748.98	N 39 57 19.58 W	80 32 7.35	2.89
	3903.00	1.59	67.30	3901.94	2751.97	32.84	-8.45	-0.26	-0.06	531784.30	1709751.45	N 39 57 19.59 W	80 32 7.32	2.92
	3992.00	1.42	65.57	3990.91	2840.94	33.56	-7.52	-0.19	-1.94	531786.23	1709753.60	N 39 57 19.60 W	80 32 7.29	2.94
	4082.00	1.03	71.19	4080.89	2930.92	34.20	-6.80	-0.43	6.24	531785.95	1709755.38	N 39 57 19.61 W	80 32 7.27	2.97
	4171.00	0.80	74.75	4169.88	3019.91	34.78	-6.37	-0.26	4.00	531786.37	1709756.74	N 39 57 19.61 W	80 32 7.25	2.98
	4261.00	0.70	57.69	4259.87	3109.90	35.15	-5.91	-0.11	-18.96	531786.83	1709757.81	N 39 57 19.61 W	80 32 7.24	3.00
	4350.00	0.73	39.16	4348.86	3198.89	35.14	-5.18	0.03	-20.82	531787.56	1709758.62	N 39 57 19.62 W	80 32 7.23	3.01
	4440.00	0.70	26.59	4438.85	3288.88	34.84	-4.25	-0.03	-13.97	531788.50	1709759.23	N 39 57 19.63 W	80 32 7.22	3.02
	4529.00	0.70	9.29	4527.85	3377.88	34.30	-3.23	0.00	-19.44	531789.52	1709759.56	N 39 57 19.64 W	80 32 7.21	3.04
	4619.00	0.66	1.02	4617.84	3467.87	33.57	-2.16	-0.04	-9.19	531790.58	1709759.66	N 39 57 19.65 W	80 32 7.21	3.05
	4709.00	0.31	323.71	4707.84	3557.87	32.94	-1.45	-0.39	-41.46	531791.30	1709759.53	N 39 57 19.66 W	80 32 7.22	3.06
	4798.00	0.22	279.70	4796.84	3646.87	32.57	-1.23	-0.10	-49.45	531791.52	1709759.21	N 39 57 19.66 W	80 32 7.22	3.07
	4888.00	0.21	306.62	4886.84	3736.87	32.27	-1.10	-0.01	29.91	531791.65	1709758.91	N 39 57 19.66 W	80 32 7.22	3.08
	4977.00	0.37	300.25	4975.84	3825.87	31.84	-0.86	0.18	-7.16	531791.89	1709758.53	N 39 57 19.66 W	80 32 7.23	3.09
	5067.00	0.53	298.99	5065.83	3915.86	31.17	-0.51	0.18	-1.40	531792.24	1709757.92	N 39 57 19.67 W	80 32 7.24	3.08
	5156.00	0.63	301.49	5154.83	4004.86	30.32	-0.05	0.11	2.81	531792.69	1709757.14	N 39 57 19.67 W	80 32 7.25	3.10
	5246.00	0.68	299.18	5244.82	4094.85	29.34	0.46	0.06	-2.57	531793.21	1709756.25	N 39 57 19.68 W	80 32 7.26	3.11
	5335.00	0.57	308.23	5333.82	4183.85	28.41	1.00	-0.12	10.17	531793.74	1709755.44	N 39 57 19.68 W	80 32 7.27	3.12
	5425.00	0.56	311.14	5423.81	4273.84	27.53	1.56	-0.01	3.23	531794.31	1709754.76	N 39 57 19.69 W	80 32 7.28	3.12
	5514.00	0.27	2.48	5512.81	4362.84	26.95	2.06	-0.33	57.69	531794.80	1709754.44	N 39 57 19.69 W	80 32 7.28	3.14
	5603.00	0.27	3.89	5601.81	4451.84	26.65	2.48	0.00	1.58	531795.22	1709754.47	N 39 57 19.70 W	80 32 7.28	3.14
	5650.00	1.19	8.35	5648.81	4498.84	26.26	3.07	1.96	9.49	531795.82	1709754.54	N 39 57 19.70 W	80 32 7.28	3.16
	5693.00	4.84	17.55	5691.74	4541.77	25.04	5.24	8.49	21.40	531797.99	1709755.16	N 39 57 19.72 W	80 32 7.27	3.26
	5738.00	10.05	22.57	5736.34	4586.37	22.34	10.68	11.58	11.16	531803.43	1709757.24	N 39 57 19.78 W	80 32 7.25	3.38
	5783.00	14.86	26.72	5780.27	4630.30	18.48	19.47	7.55	3.07	531803.43	1709757.24	N 39 57 19.78 W	80 32 7.25	3.38
	5827.00	18.07	31.19	5822.46	4672.49	14.35	30.35	9.38	-2.60	531812.21	1709761.34	N 39 57 19.87 W	80 32 7.20	3.49
	5872.00	20.69	42.36	5864.93	4714.96	11.43	42.20	7.30	10.16	531823.09	1709767.41	N 39 57 19.97 W	80 32 7.12	3.59
	5917.00	23.76	47.29	5906.58	4756.61	10.38	54.22	5.82	24.82	531834.94	1709776.39	N 39 57 20.09 W	80 32 7.01	3.70
	5961.00	27.08	48.64	5946.32	4796.35	10.22	66.86	6.82	10.96	531846.97	1709788.41	N 39 57 20.21 W	80 32 6.85	3.79
	6006.00	31.30	47.47	5985.59	4835.62	10.03	81.53	7.55	3.07	531859.60	1709802.44	N 39 57 20.34 W	80 32 6.67	3.88
	6051.00	35.21	47.58	6023.22	4873.25	9.61	98.19	8.69	-2.60	531874.28	1709818.75	N 39 57 20.49 W	80 32 6.47	3.97
	6096.00	34.83	54.11	6060.08	4910.11	10.66	114.48	8.69	0.24	531890.94	1709836.95	N 39 57 20.65 W	80 32 6.24	4.06
	6141.00	34.49	64.88	6097.13	4947.16	15.51	127.44	-0.84	14.51	531907.23	1709856.94	N 39 57 20.82 W	80 32 5.98	4.14
	6186.00	35.20	73.96	6134.09	4984.12	24.69	136.44	-0.76	23.93	531920.18	1709878.91	N 39 57 20.95 W	80 32 5.70	4.23
								1.58	20.18	531929.18	1709902.93	N 39 57 21.04 W	80 32 5.39	4.30

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVSS (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
	6230.00	36.05	80.48	6169.87	5019.90	37.00	142.09	216.45	8.84	1.93	14.82	531934.83	1709927.89	N 39 57 21.10 W	80 32 5.07	4.37
	6275.00	36.74	84.54	6206.09	5056.12	51.93	145.56	242.91	5.57	1.53	9.02	531938.30	1709954.35	N 39 57 21.13 W	80 32 4.74	4.42
	6320.00	38.98	90.89	6241.63	5091.66	69.40	146.62	270.48	9.98	4.98	14.11	531939.36	1709981.91	N 39 57 21.15 W	80 32 4.38	4.48
	6364.00	41.60	96.65	6275.21	5125.24	89.62	144.71	298.84	10.34	5.95	13.09	531937.45	1710010.27	N 39 57 21.13 W	80 32 4.02	4.53
	6409.00	43.67	101.54	6308.32	5158.35	113.17	139.87	328.91	8.68	4.60	10.87	531932.61	1710040.34	N 39 57 21.09 W	80 32 3.63	4.59
	6454.00	46.18	105.28	6340.18	5190.21	139.18	132.48	359.80	8.10	5.58	8.31	531925.22	1710071.23	N 39 57 21.02 W	80 32 3.23	4.64
	6499.00	49.51	109.41	6370.39	5220.42	167.73	122.51	391.62	7.40	6.53	9.18	531915.25	1710103.05	N 39 57 20.92 W	80 32 2.82	4.69
	6544.00	52.45	112.03	6398.72	5248.75	198.66	110.13	424.30	10.95	7.40	5.82	531902.87	1710135.73	N 39 57 20.80 W	80 32 2.40	4.73
	6588.00	55.61	116.21	6424.57	5274.60	231.09	95.56	456.78	10.52	7.18	9.50	531888.30	1710168.21	N 39 57 20.66 W	80 32 1.98	4.78
	6633.00	59.28	120.38	6448.78	5298.81	266.67	77.57	490.14	11.29	8.16	9.27	531870.31	1710201.57	N 39 57 20.49 W	80 32 1.55	4.83
	6678.00	61.78	124.83	6470.93	5320.96	304.34	56.45	523.12	10.24	5.56	9.89	531849.19	1710234.55	N 39 57 20.29 W	80 32 1.12	4.88
	6723.00	65.20	128.69	6491.02	5341.05	343.75	32.34	555.36	10.80	7.60	8.58	531825.09	1710266.78	N 39 57 20.05 W	80 32 0.71	4.93
	6768.00	67.79	132.24	6508.97	5359.00	384.60	5.56	586.74	9.24	5.76	7.89	531798.31	1710298.16	N 39 57 19.79 W	80 32 0.30	4.97
	6812.00	69.95	134.42	6524.83	5374.86	425.47	-22.60	616.58	6.74	4.91	4.95	531770.15	1710328.00	N 39 57 19.51 W	80 31 59.91	5.01
	6857.00	72.05	136.11	6539.48	5389.51	467.95	-52.83	646.52	5.86	4.67	3.76	531739.92	1710357.94	N 39 57 19.22 W	80 31 59.52	5.04
	6902.00	74.92	139.49	6552.28	5402.31	511.08	-84.79	675.49	9.62	6.38	7.51	531707.97	1710386.91	N 39 57 18.91 W	80 31 59.15	5.08
	6946.00	79.12	141.22	6562.16	5412.19	553.92	-117.79	702.83	10.29	9.55	3.93	531674.96	1710414.25	N 39 57 18.58 W	80 31 58.79	5.12
	6991.00	84.43	141.17	6568.59	5418.62	598.39	-152.49	730.73	11.80	11.80	-0.11	531640.26	1710442.15	N 39 57 18.24 W	80 31 58.43	5.16
	7036.00	89.28	141.59	6571.06	5421.09	643.25	-187.58	758.77	10.82	10.78	0.93	531605.17	1710470.18	N 39 57 17.90 W	80 31 58.06	5.19
	7126.00	91.68	140.76	6570.31	5420.34	733.15	-257.69	815.19	2.82	2.67	-0.92	531535.07	1710526.60	N 39 57 17.21 W	80 31 57.33	5.24
	7206.00	92.54	139.52	6567.36	5417.39	813.06	-319.06	866.42	1.89	1.08	1.26	531473.70	1710577.83	N 39 57 16.61 W	80 31 56.66	5.29
	7296.00	89.93	141.80	6565.42	5415.45	902.96	-388.64	923.45	3.85	-2.90	2.53	531404.13	1710634.86	N 39 57 15.93 W	80 31 55.92	5.33
	7385.00	89.45	142.37	6565.90	5415.93	991.78	-458.85	978.14	0.84	-0.54	0.64	531333.92	1710689.55	N 39 57 15.25 W	80 31 55.21	5.37
	7475.00	89.21	141.94	6566.96	5416.99	1081.59	-529.92	1033.36	0.55	-0.27	-0.48	531262.86	1710744.76	N 39 57 14.55 W	80 31 54.49	5.41
	7564.00	88.87	143.06	6568.45	5418.48	1170.36	-600.51	1087.53	1.31	-0.38	1.26	531192.26	1710798.93	N 39 57 13.86 W	80 31 53.78	5.44
	7654.00	88.97	144.97	6570.14	5420.17	1259.93	-673.32	1140.40	2.12	0.11	2.12	531119.46	1710851.80	N 39 57 13.14 W	80 31 53.09	5.48
	7743.00	88.04	146.34	6572.47	5422.50	1348.20	-746.78	1190.59	1.86	-1.04	1.54	531046.00	1710901.99	N 39 57 12.42 W	80 31 52.44	5.51
	7833.00	88.14	146.08	6575.47	5425.50	1437.34	-821.53	1240.62	0.31	0.11	-0.29	530971.25	1710952.01	N 39 57 11.69 W	80 31 51.78	5.54
	7922.00	89.11	146.36	6577.60	5427.63	1525.50	-895.49	1290.09	1.13	1.09	0.31	530897.30	1711001.48	N 39 57 10.97 W	80 31 51.14	5.57
	8012.00	89.28	146.47	6578.87	5428.90	1614.64	-970.45	1339.87	0.22	0.19	0.12	530822.34	1711051.26	N 39 57 10.23 W	80 31 50.49	5.59
	8101.00	89.00	147.13	6580.20	5430.23	1702.70	-1044.92	1388.59	0.81	-0.31	0.74	530747.88	1711099.98	N 39 57 9.50 W	80 31 49.85	5.62
	8191.00	89.00	144.47	6581.77	5431.80	1791.95	-1119.34	1439.17	2.96	0.00	-2.96	530673.46	1711150.55	N 39 57 8.77 W	80 31 49.19	5.65
	8280.00	88.82	142.79	6583.47	5433.50	1880.57	-1190.98	1491.93	1.90	-0.20	-1.89	530601.82	1711203.32	N 39 57 8.07 W	80 31 48.50	5.68
	8370.00	89.90	142.05	6584.47	5434.50	1970.35	-1262.30	1546.82	1.45	1.20	-0.82	530530.50	1711258.20	N 39 57 7.37 W	80 31 47.79	5.70
	8459.00	89.83	141.51	6584.68	5434.71	2059.21	-1332.23	1601.88	0.61	-0.08	-0.61	530460.58	1711313.26	N 39 57 6.69 W	80 31 47.07	5.72
	8549.00	90.10	140.13	6584.74	5434.77	2149.13	-1401.99	1658.74	1.56	0.30	-1.53	530390.82	1711370.11	N 39 57 6.00 W	80 31 46.33	5.75
	8639.00	89.86	140.58	6584.77	5434.80	2239.08	-1471.29	1716.16	0.57	-0.27	0.50	530321.52	1711427.53	N 39 57 5.32 W	80 31 45.58	5.77
	8728.00	89.62	142.35	6585.17	5435.20	2327.96	-1540.90	1771.60	2.01	-0.27	1.99	530251.91	1711482.97	N 39 57 4.64 W	80 31 44.86	5.79
	8818.00	89.69	143.09	6585.71	5435.74	2417.71	-1612.51	1826.12	0.83	0.08	0.82	530180.31	1711537.48	N 39 57 3.94 W	80 31 44.15	5.81
	8908.00	89.14	143.16	6586.63	5436.66	2507.42	-1684.51	1880.12	0.62	-0.61	0.08	530108.32	1711591.48	N 39 57 3.24 W	80 31 43.44	5.83
	8997.00	89.28	142.75	6587.86	5437.89	2596.14	-1755.53	1933.73	0.49	0.16	-0.46	530037.29	1711645.09	N 39 57 2.54 W	80 31 42.75	5.85
	9086.00	89.18	142.83	6589.05	5439.08	2684.88	-1826.41	1987.55	0.14	-0.11	0.09	529966.42	1711698.91	N 39 57 1.85 W	80 31 42.04	5.87
	9176.00	88.90	142.66	6590.56	5440.59	2774.63	-1897.99	2042.09	0.43	-0.31	-0.30	529894.84	1711753.44	N 39 57 1.14 W	80 31 41.33	5.89
	9265.00	89.24	141.72	6592.01	5442.04	2863.43	-1968.24	2096.70	1.02	0.38	-0.94	529824.59	1711808.06	N 39 57 0.46 W	80 31 40.62	5.90
	9355.00	89.18	140.95	6593.25	5443.28	2953.32	-2038.51	2152.92	0.86	-0.07	-0.86	529754.33	1711864.28	N 39 56 59.77 W	80 31 39.89	5.92
	9444.00	89.31	140.93	6594.42	5444.45	3042.23	-2107.61	2209.00	0.15	0.15	-0.02	529685.23	1711920.35	N 39 56 59.09 W	80 31 39.16	5.94
	9534.00	89.17	141.19	6595.61	5445.64	3132.13	-2177.61	2265.56	0.33	-0.16	0.29	529615.24	1711976.91	N 39 56 58.41 W	80 31 38.42	5.95
	9623.00	89.07	139.98	6596.98	5447.01	3221.06	-2246.36	2322.06	1.36	-0.11	-1.36	529546.49	1712033.41	N 39 56 57.73 W	80 31 37.69	5.97

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Comments	MD (ft)	Incl (°)	Azim Grd (°)	TVD (ft)	TVSS (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
	9713.00	89.04	139.92	6598.47	5448.50	3311.02	-2315.24	2379.97	0.07	-0.03	-0.07	529477.61	1712091.31	N 39 56 57.06 W	80 31 36.93	5.99
	9803.00	89.28	140.48	6599.79	5449.82	3400.97	-2384.38	2437.57	0.68	0.27	0.62	529408.48	1712148.91	N 39 56 56.38 W	80 31 36.18	6.00
	9892.00	89.28	141.65	6600.90	5450.93	3489.87	-2453.93	2493.49	1.31	0.00	0.00	529339.26	1712204.83	N 39 56 55.70 W	80 31 35.46	6.02
	9982.00	89.00	143.52	6602.25	5452.28	3579.63	-2525.07	2548.17	2.10	-0.31	2.08	529267.79	1712259.50	N 39 56 55.00 W	80 31 34.74	6.04
	10072.00	89.62	142.77	6603.34	5453.37	3669.32	-2597.08	2602.14	1.08	0.69	-0.83	529195.78	1712313.48	N 39 56 54.30 W	80 31 34.04	6.05
	10161.00	89.45	142.13	6604.06	5454.09	3758.11	-2667.64	2656.38	0.74	-0.19	-0.72	529125.23	1712367.71	N 39 56 53.61 W	80 31 33.33	6.07
	10251.00	89.59	141.05	6604.82	5454.85	3847.98	-2738.16	2712.30	1.21	0.16	-1.20	529054.71	1712423.62	N 39 56 52.92 W	80 31 32.61	6.09
	10340.00	89.62	140.21	6605.43	5455.46	3936.91	-2806.96	2768.75	0.94	0.03	-0.94	528985.91	1712480.08	N 39 56 52.24 W	80 31 31.87	6.10
	10430.00	89.55	140.43	6606.08	5456.11	4026.86	-2876.22	2826.21	0.26	-0.08	0.24	528916.65	1712537.54	N 39 56 51.57 W	80 31 31.12	6.11
	10520.00	89.76	139.99	6606.62	5456.65	4116.82	-2945.38	2883.81	0.54	0.23	-0.49	528847.50	1712595.13	N 39 56 50.89 W	80 31 30.37	6.13
	10609.00	89.83	141.26	6606.94	5456.97	4205.76	-3014.17	2940.27	1.43	0.08	1.43	528778.71	1712651.59	N 39 56 50.22 W	80 31 29.64	6.14
	10699.00	89.86	142.53	6607.18	5457.21	4295.60	-3084.99	2995.81	1.41	0.03	1.41	528707.89	1712707.12	N 39 56 49.52 W	80 31 28.91	6.16
	10788.00	89.73	145.07	6607.50	5457.53	4384.21	-3156.80	3048.37	2.86	-0.15	2.85	528636.08	1712759.68	N 39 56 48.82 W	80 31 28.23	6.17
	10878.00	89.66	145.97	6607.98	5458.01	4473.53	-3230.99	3099.32	1.00	-0.08	1.00	528561.90	1712810.63	N 39 56 48.09 W	80 31 27.56	6.19
	10967.00	89.00	146.04	6609.02	5459.05	4561.76	-3304.77	3149.07	0.75	-0.74	0.08	528488.12	1712860.38	N 39 56 47.37 W	80 31 26.91	6.20
	11056.00	89.04	146.48	6610.54	5460.57	4649.94	-3378.77	3198.50	0.50	0.04	0.49	528414.13	1712909.81	N 39 56 46.64 W	80 31 26.27	6.21
	11146.00	89.00	146.16	6612.08	5462.11	4739.09	-3453.66	3248.40	0.36	-0.04	-0.36	528339.25	1712959.71	N 39 56 45.91 W	80 31 25.62	6.23
	11236.00	89.11	144.49	6613.57	5463.60	4828.43	-3527.66	3299.60	1.86	0.12	-1.86	528265.25	1713010.90	N 39 56 45.18 W	80 31 24.95	6.24
	11325.00	88.83	144.55	6615.17	5465.20	4916.93	-3600.12	3351.25	0.32	-0.31	0.07	528192.79	1713062.54	N 39 56 44.47 W	80 31 24.28	6.25
	11415.00	89.31	142.45	6616.63	5466.66	5006.57	-3672.45	3404.77	2.39	0.53	-2.33	528120.46	1713116.07	N 39 56 43.76 W	80 31 23.58	6.27
	11504.00	89.31	140.47	6617.70	5467.73	5095.44	-3742.06	3460.21	2.22	0.00	-2.22	528050.86	1713171.51	N 39 56 43.08 W	80 31 22.86	6.28
	11594.00	89.59	139.47	6618.57	5468.60	5185.41	-3810.97	3518.10	1.15	0.31	-1.11	527981.95	1713229.39	N 39 56 42.41 W	80 31 22.10	6.29
	11683.00	89.72	139.65	6619.10	5469.13	5274.39	-3878.70	3575.83	0.25	0.15	0.20	527914.22	1713287.12	N 39 56 41.74 W	80 31 21.35	6.31
	11773.00	89.76	140.56	6619.51	5469.54	5364.35	-3947.75	3633.55	1.01	0.04	1.01	527845.17	1713344.84	N 39 56 41.07 W	80 31 20.60	6.32
	11862.00	89.66	140.78	6619.96	5469.99	5453.29	-4016.59	3689.96	0.27	-0.11	0.25	527776.33	1713401.24	N 39 56 40.39 W	80 31 19.87	6.33
	11952.00	89.45	140.32	6620.66	5470.69	5543.23	-4086.09	3747.14	0.56	-0.23	-0.51	527706.84	1713458.42	N 39 56 39.71 W	80 31 19.12	6.34
	12042.00	89.55	139.69	6621.44	5471.47	5633.19	-4155.03	3804.98	0.71	0.11	-0.70	527637.90	1713516.26	N 39 56 39.04 W	80 31 18.37	6.35
	12131.00	89.79	140.55	6621.96	5471.99	5722.15	-4223.33	3862.05	1.00	0.27	0.97	527569.61	1713573.32	N 39 56 38.37 W	80 31 17.63	6.36
	12221.00	89.83	142.16	6622.26	5472.29	5812.04	-4293.62	3918.25	1.79	0.04	1.79	527499.32	1713629.52	N 39 56 37.68 W	80 31 16.90	6.37
	12310.00	89.59	144.04	6622.71	5472.74	5900.75	-4364.79	3971.68	2.13	-0.27	2.11	527428.16	1713682.96	N 39 56 36.98 W	80 31 16.20	6.39
	12400.00	89.31	144.94	6623.57	5473.60	5990.25	-4438.04	4023.96	1.05	-0.31	1.00	527354.90	1713735.23	N 39 56 36.27 W	80 31 15.52	6.40
	12489.00	89.69	145.01	6624.35	5474.38	6078.68	-4510.92	4075.03	0.43	0.43	0.08	527282.03	1713786.30	N 39 56 35.55 W	80 31 14.85	6.41
	12578.00	89.62	146.55	6624.88	5474.91	6166.96	-4584.51	4125.08	1.73	-0.08	1.73	527208.44	1713836.35	N 39 56 34.83 W	80 31 14.20	6.42
	12668.00	89.93	146.86	6625.24	5475.27	6255.04	-4659.74	4174.49	0.49	0.34	0.34	527133.22	1713885.75	N 39 56 34.09 W	80 31 13.55	6.43
	12757.00	89.90	148.28	6625.37	5475.40	6343.92	-4734.86	4222.22	1.60	-0.03	1.60	527058.10	1713933.48	N 39 56 33.36 W	80 31 12.93	6.44
	12846.00	89.93	149.57	6625.50	5475.53	6431.45	-4811.08	4268.15	1.45	0.03	1.45	526981.88	1713979.41	N 39 56 32.61 W	80 31 12.33	6.45
	12930.00	89.62	151.20	6625.83	5475.86	6513.65	-4884.11	4309.66	1.98	-0.37	1.94	526908.86	1714020.92	N 39 56 31.89 W	80 31 11.78	6.47
	13042.00	89.62	151.20	6626.57	5476.60	6622.91	-4982.25	4363.62	0.00	0.00	0.00	526810.72	1714074.87	N 39 56 30.93 W	80 31 11.08	6.48

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

Survey Program: 02/28/2014

Survey Type:	Def Survey	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
Final Survey								
01Dec12								
Projection to Bit								

4705101525

Comments	MD (ft)	Incl (°)	Azimuth Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S °'")	Longitude (E/W °'")	Directional Difficulty Index
		0.000	18.500	Act Stns	30.000	30.000	30.000	SLB_NSG+MSHOT-Depth Only		Original Borehole / Noble Energy SHL-8C-HS Gyro+MWD 0' MD to 6737' MD						
		18.500	2891.500	Act Stns	30.000	30.000	30.000	SLB_NSG+MSHOT		Original Borehole / Noble Energy SHL-8C-HS Gyro+MWD 0' MD to						
		2891.500	5603.000	Act Stns	30.000	30.000	30.000	SLB_MWD-STD		Original Borehole / Noble Energy SHL-8C-HS Gyro+MWD 0' MD to						
		5603.000	12930.000	Act Stns	30.000	30.000	30.000	SLB_MWD-STD		ST01 / Noble Energy SHL-8C-HS ST01 MWD 5603' to 13042' MD						
		12930.000	13042.000	Act Stns	30.000	30.000	30.000	SLB_BLIND+TREND		ST01 / Noble Energy SHL-8C-HS ST01 MWD 5603' to 13042' MD						

02/28/2014