

4705101558



Noble Energy SHL-8D-HS Gyro 0' MD to 13932' MD Survey Report

(Def Survey)

Report Date: March 18, 2013 - 10:51 AM
Client: Noble Energy
Field: WV Marshall County (NAD 27)
Structure / Slot: CNX/Noble Energy SHL-8 Pad / SHL-8D-HS
Well: SHL-8D-HS
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy SHL-8D-HS Gyro 0' MD to 13932' MD
Survey Date: March 04, 2013
Tort / AHD / DDI / ERD Ratio: 198.001' / 7795.141 ft / 6.510 / 1.173
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 57' 19.47966", W 80° 32' 7.91028"
Location Grid N/E Y/X: N 531773.750 fUS, E 1709705.230 fUS
CRS Grid Convergence Angle: -0.6604°
Grid Scale Factor: 0.99995724

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 144.709° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 1150.120 ft above MSL
Seabed / Ground Elevation: 1131.470 ft above MSL
Magnetic Declination: -8.713°
Total Gravity Field Strength: 999.3810mgn (9.80665 Based)
Total Magnetic Field Strength: 52735.042 nT
Magnetic Dip Angle: 67.418°
Declination Date: March 04, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: -0.6604°
Total Corr Mag North->Grid North: -8.0522°

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 (fUS)	Easting (fUS)	Latitude (N/S °'")	Longitude (E/W °'")	Directional Difficulty Index
SHL	0.00	0.00	0.00	0.00	-1150.12	0.00	0.00	0.00	N/A	N/A	N/A	531773.75	1709705.23	N 39 57 19.48 W	80 32 7.91	0.00
	50.00	0.17	259.16	50.00	-1100.12	-0.03	-0.01	-0.07	0.34	0.34	0.00	531773.74	1709705.16	N 39 57 19.48 W	80 32 7.91	0.00
	100.00	0.28	273.37	100.00	-1050.12	-0.14	-0.02	-0.27	0.25	0.22	28.42	531773.73	1709704.96	N 39 57 19.48 W	80 32 7.91	0.00
	150.00	0.22	282.53	150.00	-1000.12	-0.29	0.01	-0.48	0.14	-0.12	18.32	531773.76	1709704.75	N 39 57 19.48 W	80 32 7.92	0.00
	200.00	0.17	280.26	200.00	-950.12	-0.41	0.04	-0.65	0.10	-0.10	-4.54	531773.79	1709704.58	N 39 57 19.48 W	80 32 7.92	0.00
	250.00	0.18	276.91	250.00	-900.12	-0.51	0.06	-0.80	0.03	0.02	-6.70	531773.81	1709704.43	N 39 57 19.48 W	80 32 7.92	0.00
	300.00	0.14	257.20	300.00	-850.12	-0.59	0.06	-0.94	0.13	-0.08	-39.42	531773.81	1709704.29	N 39 57 19.48 W	80 32 7.92	0.00
	350.00	0.17	262.95	350.00	-800.12	-0.65	0.04	-1.07	0.07	0.06	11.50	531773.79	1709704.16	N 39 57 19.48 W	80 32 7.92	0.00
	400.00	0.13	267.03	400.00	-750.12	-0.72	0.03	-1.20	0.08	-0.08	8.16	531773.78	1709704.03	N 39 57 19.48 W	80 32 7.93	0.00
	450.00	0.19	255.11	450.00	-700.12	-0.77	0.00	-1.34	0.14	0.12	-23.84	531773.75	1709703.89	N 39 57 19.48 W	80 32 7.93	0.00
	500.00	0.20	252.33	500.00	-650.12	-0.83	-0.05	-1.50	0.03	0.02	-5.56	531773.70	1709703.73	N 39 57 19.48 W	80 32 7.93	0.00
	550.00	0.13	210.12	550.00	-600.12	-0.83	-0.12	-1.61	0.27	-0.14	-84.42	531773.63	1709703.62	N 39 57 19.48 W	80 32 7.93	0.12
	600.00	0.07	246.54	600.00	-550.12	-0.82	-0.18	-1.67	0.17	-0.12	72.84	531773.57	1709703.56	N 39 57 19.48 W	80 32 7.93	0.18
	650.00	0.10	196.80	650.00	-500.12	-0.79	-0.24	-1.71	0.15	0.06	-99.48	531773.51	1709703.52	N 39 57 19.48 W	80 32 7.93	0.24
	700.00	0.05	188.98	700.00	-450.12	-0.75	-0.30	-1.73	0.10	-0.10	-15.64	531773.45	1709703.50	N 39 57 19.48 W	80 32 7.93	0.28
	750.00	0.02	160.55	750.00	-400.12	-0.73	-0.33	-1.73	0.07	-0.06	-56.86	531773.42	1709703.50	N 39 57 19.48 W	80 32 7.93	0.30
	800.00	0.12	156.49	800.00	-350.12	-0.67	-0.39	-1.70	0.20	0.20	-8.12	531773.36	1709703.53	N 39 57 19.48 W	80 32 7.93	0.35
	850.00	0.06	155.07	850.00	-300.12	-0.59	-0.46	-1.67	0.12	-0.12	-2.84	531773.29	1709703.56	N 39 57 19.47 W	80 32 7.93	0.39
	900.00	0.10	135.99	900.00	-250.12	-0.52	-0.51	-1.63	0.10	0.08	-38.16	531773.24	1709703.60	N 39 57 19.47 W	80 32 7.93	0.42
	950.00	0.10	138.56	950.00	-200.12	-0.44	-0.58	-1.57	0.01	0.00	5.14	531773.17	1709703.66	N 39 57 19.47 W	80 32 7.93	0.44
	1000.00	0.12	139.66	1000.00	-150.12	-0.34	-0.65	-1.51	0.04	0.04	2.20	531773.10	1709703.72	N 39 57 19.47 W	80 32 7.93	0.47
	1050.00	0.22	136.42	1050.00	-100.12	-0.19	-0.76	-1.41	0.20	0.20	-6.48	531772.99	1709703.82	N 39 57 19.47 W	80 32 7.93	0.53
	1100.00	0.16	134.51	1100.00	-50.12	-0.03	-0.88	-1.29	0.12	-0.12	-3.82	531772.87	1709703.94	N 39 57 19.47 W	80 32 7.93	0.57
	1150.00	0.29	131.31	1150.00	0.12	0.16	-1.01	-1.15	0.26	0.26	-6.40	531772.74	1709704.08	N 39 57 19.47 W	80 32 7.92	0.64
	1200.00	0.32	129.32	1200.00	49.88	0.42	-1.18	-0.94	0.06	0.06	-3.98	531772.57	1709704.29	N 39 57 19.47 W	80 32 7.92	0.69

03/07/2014

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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
	1250.00	0.27	124.14	1249.99	99.87	0.66	-1.34	-0.74	0.11	-0.10	-10.36	531772.41	1709704.49	N 39 57 19.47 W	80 32 7.92	0.74
	1300.00	0.25	132.10	1299.99	149.87	0.88	-1.48	-0.56	0.08	-0.04	15.92	531772.27	1709704.67	N 39 57 19.47 W	80 32 7.92	0.78
	1350.00	0.28	139.66	1349.99	199.87	1.11	-1.64	-0.40	0.09	0.06	15.12	531772.11	1709704.83	N 39 57 19.46 W	80 32 7.92	0.82
	1400.00	0.27	154.01	1399.99	249.87	1.35	-1.84	-0.27	0.14	-0.02	28.70	531771.91	1709704.96	N 39 57 19.46 W	80 32 7.91	0.86
	1450.00	0.27	156.87	1449.99	299.87	1.58	-2.06	-0.17	0.03	0.00	5.72	531771.69	1709705.06	N 39 57 19.46 W	80 32 7.91	0.89
	1500.00	0.24	154.53	1499.99	349.87	1.80	-2.26	-0.08	0.06	-0.06	-4.68	531771.49	1709705.15	N 39 57 19.46 W	80 32 7.91	0.92
	1550.00	0.34	156.61	1549.99	399.87	2.05	-2.49	0.02	0.20	0.20	4.16	531771.26	1709705.25	N 39 57 19.46 W	80 32 7.91	0.97
	1600.00	0.33	160.47	1599.99	449.87	2.33	-2.76	0.13	0.05	-0.02	7.72	531770.99	1709705.36	N 39 57 19.45 W	80 32 7.91	1.00
	1650.00	0.52	156.12	1649.99	499.87	2.69	-3.10	0.27	0.39	0.38	-8.70	531770.65	1709705.50	N 39 57 19.45 W	80 32 7.91	1.07
	1700.00	0.42	155.76	1699.99	549.87	3.09	-3.48	0.44	0.20	-0.20	-0.72	531770.27	1709705.67	N 39 57 19.45 W	80 32 7.90	1.12
	1750.00	0.58	155.29	1749.99	599.87	3.52	-3.88	0.62	0.32	0.32	-0.94	531769.87	1709705.85	N 39 57 19.44 W	80 32 7.90	1.18
	1800.00	0.66	151.34	1799.98	649.86	4.06	-4.36	0.86	0.18	0.16	-7.90	531769.39	1709706.09	N 39 57 19.44 W	80 32 7.89	1.23
	1850.00	0.78	148.02	1849.98	699.86	4.68	-4.90	1.18	0.25	0.24	-6.64	531768.85	1709706.41	N 39 57 19.43 W	80 32 7.89	1.29
	1900.00	0.87	143.85	1899.97	749.85	5.40	-5.50	1.59	0.22	0.18	-8.34	531768.25	1709706.82	N 39 57 19.43 W	80 32 7.89	1.35
	1950.00	0.89	145.56	1949.97	799.85	6.17	-6.12	2.03	0.07	0.04	3.42	531767.63	1709707.26	N 39 57 19.42 W	80 32 7.88	1.39
	2000.00	0.95	142.43	1999.96	849.84	6.97	-6.77	2.50	0.16	0.12	-6.26	531766.98	1709707.73	N 39 57 19.41 W	80 32 7.88	1.44
	2050.00	1.02	143.01	2049.95	899.83	7.83	-7.46	3.02	0.14	0.14	1.16	531766.30	1709708.25	N 39 57 19.41 W	80 32 7.87	1.49
	2100.00	1.02	142.92	2099.95	949.83	8.72	-8.17	3.56	0.00	0.00	-0.18	531765.58	1709708.79	N 39 57 19.40 W	80 32 7.86	1.53
	2150.00	1.14	141.64	2149.94	999.82	9.66	-8.91	4.13	0.24	0.24	-2.56	531764.84	1709709.36	N 39 57 19.39 W	80 32 7.86	1.58
	2200.00	1.15	142.59	2199.93	1049.81	10.66	-9.70	4.75	0.04	0.02	1.90	531764.05	1709709.98	N 39 57 19.38 W	80 32 7.85	1.62
	2250.00	1.21	138.83	2249.92	1099.80	11.69	-10.50	5.40	0.20	0.12	-7.52	531763.26	1709710.63	N 39 57 19.38 W	80 32 7.84	1.66
	2300.00	1.89	140.75	2299.90	1149.78	13.03	-11.53	6.27	1.36	1.36	3.84	531762.22	1709711.50	N 39 57 19.37 W	80 32 7.83	1.78
	2350.00	2.14	144.46	2349.87	1199.75	14.79	-12.93	7.33	0.56	0.50	7.42	531760.82	1709712.56	N 39 57 19.35 W	80 32 7.81	1.86
	2400.00	2.52	140.49	2399.83	1249.71	16.82	-14.54	8.58	0.83	0.76	-7.94	531759.21	1709713.81	N 39 57 19.34 W	80 32 7.80	1.95
	2450.00	2.51	145.55	2449.78	1299.66	19.01	-16.29	9.89	0.44	-0.02	10.12	531757.46	1709715.12	N 39 57 19.32 W	80 32 7.78	2.02
	2500.00	2.27	146.75	2499.73	1349.61	21.10	-18.02	11.06	0.49	-0.48	2.40	531755.73	1709716.29	N 39 57 19.30 W	80 32 7.77	2.08
	2550.00	1.45	136.25	2549.71	1399.59	22.71	-19.30	12.04	1.77	-1.64	-21.00	531754.45	1709717.27	N 39 57 19.29 W	80 32 7.75	2.18
	2600.00	1.17	132.90	2599.69	1449.57	23.84	-20.11	12.85	0.58	-0.56	-6.70	531753.64	1709718.08	N 39 57 19.28 W	80 32 7.74	2.22
	2650.00	0.95	132.44	2649.69	1499.57	24.74	-20.74	13.53	0.44	-0.44	-0.92	531753.02	1709718.76	N 39 57 19.28 W	80 32 7.73	2.25
	2700.00	0.85	128.49	2699.68	1549.56	25.50	-21.25	14.12	0.24	-0.20	-0.92	531752.50	1709719.35	N 39 57 19.27 W	80 32 7.73	2.27
	2750.00	0.59	126.35	2749.68	1599.56	26.10	-21.63	14.62	0.52	-0.52	-4.28	531752.12	1709719.85	N 39 57 19.27 W	80 32 7.72	2.29
	2800.00	0.37	125.41	2799.67	1649.55	26.50	-21.88	14.96	0.44	-0.44	-1.88	531751.88	1709720.19	N 39 57 19.27 W	80 32 7.71	2.31
	2850.00	0.35	121.29	2849.67	1699.55	26.80	-22.06	15.21	0.05	-0.04	3.76	531751.69	1709720.44	N 39 57 19.26 W	80 32 7.71	2.32
	2900.00	0.27	129.62	2899.67	1749.55	27.06	-22.23	15.43	0.16	-0.16	4.66	531751.52	1709720.66	N 39 57 19.26 W	80 32 7.71	2.33
	2950.00	0.34	125.77	2949.67	1799.55	27.31	-22.39	15.64	0.15	0.14	-7.70	531751.36	1709720.87	N 39 57 19.26 W	80 32 7.71	2.34
	2980.00	0.25	126.75	2979.67	1829.55	27.46	-22.48	15.76	0.30	-0.30	3.27	531751.27	1709720.99	N 39 57 19.26 W	80 32 7.70	2.34
	3030.00	0.68	220.12	3029.67	1879.55	27.64	-22.77	15.66	1.48	0.86	186.74	531750.98	1709720.89	N 39 57 19.26 W	80 32 7.71	2.39
	3119.00	1.80	229.40	3118.65	1968.53	27.90	-24.09	14.26	1.27	1.26	10.43	531749.66	1709719.49	N 39 57 19.24 W	80 32 7.72	2.48
	3209.00	0.45	282.23	3208.63	2058.51	27.77	-24.93	12.84	1.74	-1.50	58.70	531748.82	1709718.07	N 39 57 19.23 W	80 32 7.74	2.57
	3298.00	0.35	248.05	3297.63	2147.51	27.45	-24.96	12.24	0.29	-0.11	-38.40	531748.79	1709717.47	N 39 57 19.23 W	80 32 7.75	2.58
	3368.00	0.37	259.86	3387.63	2237.51	27.26	-25.11	11.70	0.09	0.02	13.12	531748.64	1709716.93	N 39 57 19.23 W	80 32 7.76	2.59
	3477.00	0.50	274.24	3476.62	2326.50	26.89	-25.14	11.03	0.19	0.15	16.16	531748.61	1709716.26	N 39 57 19.23 W	80 32 7.77	2.61
	3567.00	0.42	264.09	3566.62	2416.50	26.48	-25.14	10.31	0.13	-0.09	-11.28	531748.54	1709715.54	N 39 57 19.23 W	80 32 7.76	2.62
	3657.00	0.52	290.81	3656.62	2506.50	25.98	-25.03	9.60	0.26	0.11	29.69	531748.72	1709714.83	N 39 57 19.23 W	80 32 7.78	2.64
	3746.00	0.45	272.74	3745.61	2595.49	25.43	-24.87	8.88	0.19	-0.08	-20.30	531748.88	1709714.11	N 39 57 19.23 W	80 32 7.79	2.65
	3835.00	0.31	277.57	3834.61	2684.49	25.05	-24.82	8.29	0.16	-0.16	5.43	531748.93	1709713.52	N 39 57 19.24 W	80 32 7.80	2.67
	3923.00	0.40	291.56	3924.61	2774.49	24.62	-24.67	7.76	0.14	0.10	15.54	531749.08	1709712.99	N 39 57 19.24 W	80 32 7.81	2.68
	4011.00	1.08	50.96	4013.60	2863.48	24.31	-24.03	8.12	1.49	0.76	134.16	531749.72	1709713.35	N 39 57 19.24 W	80 32 7.80	2.73

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	4104.00	1.83	63.21	4103.58	2953.46	24.46	-22.85	10.06	0.90	0.83	13.61	531750.90	1709715.29	N 39 57 19.26 W	80 32 7.78	2.78
	4193.00	1.90	62.52	4192.53	3042.41	24.87	-21.53	12.64	0.08	0.08	-0.78	531752.22	1709717.87	N 39 57 19.27 W	80 32 7.74	2.81
	4283.00	0.58	95.90	4282.51	3132.39	25.38	-20.89	14.41	1.61	-1.47	37.09	531752.86	1709719.64	N 39 57 19.27 W	80 32 7.72	2.87
	4373.00	0.53	201.47	4372.50	3222.38	25.90	-21.32	14.72	0.98	-0.06	117.30	531752.43	1709719.94	N 39 57 19.27 W	80 32 7.72	2.90
	4462.00	0.63	218.15	4461.50	3311.38	26.27	-22.09	14.26	0.22	0.11	18.74	531751.66	1709719.49	N 39 57 19.26 W	80 32 7.72	2.91
	4551.00	0.52	216.05	4550.49	3400.37	26.54	-22.80	13.72	0.13	-0.12	-2.36	531750.95	1709718.95	N 39 57 19.26 W	80 32 7.73	2.92
	4640.00	0.39	224.41	4639.49	3489.37	26.72	-23.34	13.27	0.16	-0.15	9.39	531750.41	1709718.50	N 39 57 19.25 W	80 32 7.74	2.93
	4730.00	0.32	226.15	4729.49	3579.37	26.81	-23.74	12.88	0.08	-0.08	1.93	531750.02	1709718.11	N 39 57 19.25 W	80 32 7.74	2.94
	4819.00	0.25	213.05	4818.49	3668.37	26.92	-24.07	12.59	0.11	-0.08	-14.72	531749.68	1709717.82	N 39 57 19.24 W	80 32 7.75	2.95
	4909.00	0.17	238.35	4908.49	3758.37	26.99	-24.31	12.37	0.13	-0.09	28.11	531749.45	1709717.60	N 39 57 19.24 W	80 32 7.75	2.95
	4998.00	0.14	305.40	4997.49	3847.37	26.87	-24.31	12.17	0.19	-0.03	75.34	531749.44	1709717.40	N 39 57 19.24 W	80 32 7.75	2.96
	5088.00	0.28	309.77	5087.49	3937.37	26.56	-24.11	11.91	0.16	0.16	4.86	531749.64	1709717.14	N 39 57 19.24 W	80 32 7.75	2.97
	5178.00	0.37	306.08	5177.49	4027.37	26.07	-23.80	11.51	0.10	0.10	-4.10	531749.96	1709716.74	N 39 57 19.25 W	80 32 7.76	2.97
	5267.00	0.34	309.81	5266.48	4116.36	25.54	-23.46	11.07	0.04	-0.03	4.19	531750.29	1709716.30	N 39 57 19.25 W	80 32 7.76	2.98
	5357.00	0.23	313.04	5356.48	4206.36	25.11	-23.16	10.74	0.12	-0.12	3.59	531750.59	1709715.96	N 39 57 19.25 W	80 32 7.77	2.98
	5446.00	0.22	312.03	5445.48	4295.36	24.77	-22.93	10.48	0.01	-0.01	-1.13	531750.82	1709715.71	N 39 57 19.25 W	80 32 7.77	2.99
	5536.00	2.37	288.25	5535.45	4385.33	23.10	-22.23	8.58	2.41	2.39	-26.42	531751.52	1709713.81	N 39 57 19.26 W	80 32 7.80	3.05
	5581.00	5.60	286.22	5580.34	4430.22	20.63	-21.32	5.59	7.18	7.18	-4.51	531752.43	1709710.82	N 39 57 19.27 W	80 32 7.84	3.14
	5626.00	7.85	284.54	5625.03	4474.91	16.57	-19.94	0.51	5.02	5.00	-3.73	531753.81	1709705.74	N 39 57 19.28 W	80 32 7.90	3.22
	5670.00	10.04	281.45	5668.49	4518.37	11.48	-18.42	-6.16	5.09	4.98	-7.02	531755.33	1709699.07	N 39 57 19.30 W	80 32 7.99	3.30
	5715.00	12.83	280.46	5712.59	4562.47	5.04	-16.74	-14.92	6.22	6.20	-2.20	531757.01	1709690.31	N 39 57 19.31 W	80 32 8.10	3.39
	5760.00	15.63	279.60	5756.21	4606.09	-2.82	-14.82	-25.81	6.24	6.22	-1.91	531758.93	1709679.42	N 39 57 19.33 W	80 32 8.24	3.49
	5805.00	16.48	264.33	5799.47	4649.35	-10.26	-14.44	-38.15	9.54	2.56	-33.93	531759.31	1709667.08	N 39 57 19.33 W	80 32 8.40	3.59
	5850.00	17.63	249.22	5842.51	4692.39	-15.12	-17.49	-50.88	10.14	2.86	-33.58	531756.26	1709654.35	N 39 57 19.30 W	80 32 8.56	3.69
	5895.00	17.89	243.55	5885.37	4735.25	-17.89	-22.98	-63.44	3.89	0.58	-12.60	531750.77	1709641.79	N 39 57 19.25 W	80 32 8.72	3.76
	5940.00	17.55	232.51	5928.25	4778.13	-18.69	-30.19	-75.01	7.49	-0.76	-24.53	531743.56	1709630.22	N 39 57 19.17 W	80 32 8.87	3.84
	5984.00	16.18	219.05	5970.37	4820.25	-16.78	-39.00	-84.14	9.38	-3.11	-30.59	531734.76	1709621.09	N 39 57 19.08 W	80 32 8.98	3.91
	6029.00	14.92	207.73	6013.73	4863.61	-12.46	-49.00	-90.79	7.29	-2.80	-25.16	531724.76	1709614.44	N 39 57 18.99 W	80 32 9.07	3.97
	6075.00	15.82	194.04	6058.10	4907.98	-5.69	-60.32	-95.07	8.11	1.96	-29.76	531713.43	1709610.16	N 39 57 18.87 W	80 32 9.12	4.03
	6119.00	17.96	187.90	6100.21	4950.09	-3.17	-72.86	-97.46	6.33	4.86	-13.95	531700.89	1709607.78	N 39 57 18.75 W	80 32 9.15	4.08
	6163.00	19.95	181.05	6141.82	4991.70	14.16	-87.09	-98.53	6.78	4.52	-15.57	531686.66	1709606.71	N 39 57 18.61 W	80 32 9.16	4.13
	6208.00	22.83	172.69	6183.73	5033.61	28.06	-103.43	-97.56	9.31	6.40	-18.58	531670.32	1709607.68	N 39 57 18.45 W	80 32 9.15	4.19
	6253.00	26.47	167.58	6224.63	5074.51	45.02	-121.90	-94.29	9.37	8.09	-11.36	531651.86	1709610.95	N 39 57 18.26 W	80 32 9.10	4.25
	6298.00	30.20	165.32	6264.23	5114.11	64.86	-142.65	-89.26	8.62	8.29	-5.02	531631.11	1709615.97	N 39 57 18.06 W	80 32 9.04	4.31
	6343.00	34.25	164.60	6302.29	5152.17	87.37	-165.81	-83.03	9.04	9.00	-1.60	531607.94	1709622.21	N 39 57 17.83 W	80 32 8.95	4.37
	6387.00	39.90	163.54	6337.38	5187.26	112.39	-191.30	-75.73	12.92	12.84	-2.41	531582.45	1709629.50	N 39 57 17.58 W	80 32 8.85	4.44
	6432.00	45.64	161.17	6370.40	5220.28	141.51	-220.40	-66.44	13.25	12.76	-5.27	531553.36	1709638.79	N 39 57 17.29 W	80 32 8.73	4.51
	6477.00	50.01	157.75	6400.61	5250.49	173.75	-251.60	-54.72	11.22	9.71	-7.60	531522.16	1709650.51	N 39 57 16.99 W	80 32 8.58	4.57
	6521.00	54.19	155.04	6427.64	5277.52	207.74	-283.39	-40.80	10.67	9.50	-6.16	531490.37	1709664.43	N 39 57 16.67 W	80 32 8.39	4.63
	6566.00	58.79	152.66	6452.48	5302.36	244.77	-317.05	-24.25	11.13	10.22	-5.29	531456.71	1709680.98	N 39 57 16.34 W	80 32 8.17	4.69
	6611.00	61.43	151.02	6474.90	5324.78	283.48	-351.44	-5.83	6.66	5.87	-3.64	531422.33	1709699.40	N 39 57 16.01 W	80 32 7.93	4.74
	6656.00	64.86	149.06	6495.23	5345.11	323.45	-386.21	14.22	8.56	7.62	-4.36	531387.56	1709719.45	N 39 57 15.66 W	80 32 7.67	4.79
	6700.00	68.35	147.49	6512.70	5362.58	363.75	-420.55	35.46	8.58	7.93	-3.57	531353.22	1709740.69	N 39 57 15.33 W	80 32 7.39	4.84
	6745.00	71.26	146.95	6528.23	5378.11	405.93	-456.05	58.32	6.56	6.47	-1.20	531317.72	1709763.55	N 39 57 14.98 W	80 32 7.09	4.88
	6790.00	74.13	146.51	6541.62	5391.50	448.87	-491.96	81.89	6.45	6.38	-0.98	531281.81	1709787.12	N 39 57 14.63 W	80 32 6.79	4.92
	6835.00	78.59	146.53	6552.22	5402.10	492.56	-528.43	106.01	9.91	9.91	0.04	531245.34	1709811.23	N 39 57 14.27 W	80 32 6.47	4.97
	6879.00	83.01	145.76	6559.26	5409.14	535.97	-564.49	130.20	10.19	10.05	-1.75	531209.29	1709835.42	N 39 57 13.92 W	80 32 6.16	5.01
	6924.00	83.50	145.61	6564.54	5414.42	580.65	-601.40	155.39	1.14	1.09	-0.33	531172.38	1709860.61	N 39 57 13.55 W	80 32 5.83	5.04

4705101558

Comments	MD (ft)	Incl (°)	Azimuth (°)	TVD (ft)	TVDS (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
	6989.00	87.56	144.25	6568.05	5417.93	625.51	-638.11	181.16	9.51	9.02	-3.02	531135.67	1709886.39	N 39 57 13.19 W	80 32 5.49	5.08
	7058.00	88.97	142.69	6570.74	5420.62	714.44	-709.59	234.11	2.36	1.58	-1.75	531064.19	1709939.33	N 39 57 12.49 W	80 32 4.80	5.14
	7119.00	88.83	143.06	6571.92	5421.80	758.22	-758.22	270.92	0.65	-0.23	0.61	531015.57	1709976.14	N 39 57 12.02 W	80 32 4.32	5.17
	7209.00	89.86	143.00	6572.94	5422.82	865.35	-830.12	325.05	1.15	1.14	-0.07	530943.67	1710030.26	N 39 57 11.31 W	80 32 3.61	5.22
	7298.00	90.03	142.75	6573.03	5422.91	954.31	-901.08	378.76	0.34	0.19	-0.28	530872.71	1710083.97	N 39 57 10.62 W	80 32 2.91	5.26
	7388.00	89.00	142.30	6573.79	5423.67	1044.24	-972.50	433.52	1.25	-1.14	-0.50	530801.29	1710138.73	N 39 57 9.92 W	80 32 2.20	5.30
	7477.00	88.97	141.78	6575.37	5425.25	1133.13	-1042.66	488.25	0.59	-0.03	-0.58	530731.14	1710193.46	N 39 57 9.23 W	80 32 1.49	5.34
	7567.00	88.90	141.93	6577.04	5426.92	1223.00	-1113.43	543.83	0.18	0.08	0.17	530660.37	1710249.04	N 39 57 8.54 W	80 32 0.76	5.37
	7656.00	88.97	142.53	6578.70	5428.58	1311.90	-1183.77	598.33	0.68	0.08	0.67	530590.04	1710303.54	N 39 57 7.85 W	80 32 0.05	5.40
	7746.00	89.04	142.97	6580.26	5430.14	1401.83	-1255.40	652.80	0.49	0.08	0.49	530518.41	1710358.00	N 39 57 7.15 W	80 31 59.34	5.44
	7835.00	89.24	143.59	6581.59	5431.47	1490.79	-1326.73	706.01	0.73	0.22	0.70	530447.08	1710411.21	N 39 57 6.45 W	80 31 58.65	5.47
	7925.00	89.35	145.03	6582.70	5432.58	1580.78	-1399.82	758.51	1.60	0.12	1.60	530374.00	1710463.71	N 39 57 5.73 W	80 31 57.96	5.50
	8014.00	89.35	145.31	6583.71	5433.59	1669.77	-1472.87	809.34	0.31	0.00	0.31	530300.95	1710514.53	N 39 57 5.02 W	80 31 57.30	5.52
	8104.00	89.52	145.21	6584.60	5434.48	1759.57	-1546.82	860.62	0.22	0.19	-0.11	530227.00	1710565.81	N 39 57 4.29 W	80 31 56.63	5.55
	8194.00	89.48	145.25	6585.38	5435.26	1849.76	-1620.75	911.95	0.06	-0.04	0.04	530153.07	1710617.14	N 39 57 3.57 W	80 31 55.96	5.57
	8283.00	89.38	144.77	6586.27	5436.15	1938.75	-1693.66	962.98	0.55	-0.11	-0.54	530080.17	1710668.17	N 39 57 2.85 W	80 31 55.30	5.60
	8372.00	89.66	143.72	6587.01	5436.89	2027.75	-1765.88	1014.98	1.22	0.31	-1.18	530007.95	1710720.17	N 39 57 2.14 W	80 31 54.62	5.62
	8462.00	89.73	142.32	6587.49	5437.37	2117.70	-1837.77	1069.12	1.56	0.08	-1.56	529936.06	1710774.30	N 39 57 1.44 W	80 31 53.91	5.65
	8551.00	89.73	140.39	6587.91	5437.79	2206.55	-1907.28	1124.69	2.17	0.00	-2.17	529866.55	1710829.87	N 39 57 0.76 W	80 31 53.19	5.68
	8641.00	89.45	141.21	6588.56	5438.44	2296.33	-1977.02	1181.57	0.96	-0.31	0.91	529796.82	1710886.75	N 39 57 0.08 W	80 31 52.45	5.70
	8730.00	89.38	141.40	6589.47	5439.35	2385.17	-2046.48	1237.21	0.23	0.00	0.21	529727.36	1710942.39	N 39 56 59.40 W	80 31 51.72	5.72
	8820.00	89.42	141.48	6590.41	5440.29	2475.02	-2116.85	1293.31	0.10	0.04	0.09	529656.99	1710998.48	N 39 56 58.71 W	80 31 50.99	5.74
	8909.00	89.59	141.19	6591.18	5441.06	2563.86	-2186.34	1348.91	0.38	0.19	-0.33	529587.50	1711054.08	N 39 56 58.03 W	80 31 50.27	5.76
	8999.00	89.21	142.04	6592.12	5442.00	2653.72	-2256.89	1404.79	1.03	-0.42	0.94	529519.05	1711109.96	N 39 56 57.34 W	80 31 49.54	5.78
	9089.00	89.21	141.71	6593.36	5443.24	2743.61	-2327.68	1460.35	0.37	0.00	-0.37	529446.17	1711165.52	N 39 56 56.64 W	80 31 48.82	5.80
	9178.00	89.35	143.06	6594.48	5444.36	2832.52	-2398.17	1514.67	1.52	0.16	1.52	529375.69	1711219.83	N 39 56 55.95 W	80 31 48.11	5.82
	9267.00	89.62	143.94	6595.28	5445.16	2921.50	-2469.71	1567.60	1.03	0.30	0.99	529304.15	1711272.76	N 39 56 55.25 W	80 31 47.42	5.84
	9357.00	89.83	144.14	6595.71	5445.59	3011.49	-2542.56	1620.45	0.32	0.23	-0.50	529231.30	1711325.61	N 39 56 54.54 W	80 31 46.73	5.86
	9446.00	89.76	144.43	6596.03	5445.91	3100.49	-2614.82	1672.41	0.34	-0.08	0.33	529159.05	1711377.56	N 39 56 53.83 W	80 31 46.05	5.87
	9536.00	89.76	143.85	6596.41	5446.29	3190.48	-2687.76	1725.13	0.64	0.00	-0.64	529086.11	1711430.28	N 39 56 53.12 W	80 31 45.36	5.89
	9626.00	89.97	142.59	6596.62	5446.50	3280.45	-2759.84	1779.01	1.42	0.23	-1.40	529014.03	1711484.16	N 39 56 52.41 W	80 31 44.66	5.91
	9715.00	89.79	141.41	6596.81	5446.69	3369.35	-2829.97	1833.81	1.34	-0.20	-1.33	528943.90	1711538.95	N 39 56 51.72 W	80 31 43.95	5.93
	9805.00	88.87	140.96	6597.86	5447.74	3459.17	-2900.09	1890.21	1.14	-1.02	-0.50	528873.79	1711593.36	N 39 56 51.04 W	80 31 43.21	5.94
	9894.00	88.87	140.02	6599.61	5449.49	3547.91	-2968.75	1946.83	1.06	0.00	-1.06	528805.14	1711651.97	N 39 56 50.36 W	80 31 42.48	5.96
	9984.00	88.76	139.87	6601.47	5451.35	3637.58	-3037.62	2004.73	0.21	-0.12	-0.17	528736.27	1711709.87	N 39 56 49.69 W	80 31 41.72	5.98
	10074.00	88.80	140.34	6603.39	5453.27	3727.27	-3106.65	2062.44	0.52	0.04	0.52	528667.24	1711767.58	N 39 56 49.01 W	80 31 40.97	5.99
	10163.00	88.80	140.17	6605.25	5455.13	3815.98	-3175.07	2119.33	0.19	0.00	-0.19	528598.82	1711824.47	N 39 56 48.34 W	80 31 40.23	6.00
	10253.00	88.97	140.87	6607.01	5456.89	3905.73	-3244.52	2176.54	0.80	0.19	0.78	528529.37	1711881.68	N 39 56 47.66 W	80 31 39.49	6.02
	10343.00	89.18	141.55	6608.46	5458.34	3995.55	-3314.66	2232.92	0.79	0.23	0.76	528459.24	1711938.05	N 39 56 46.98 W	80 31 38.75	6.03
	10432.00	89.28	142.03	6609.65	5459.53	4084.42	-3384.59	2287.96	0.55	0.11	0.54	528389.31	1711993.09	N 39 56 46.29 W	80 31 38.04	6.05
	10522.00	89.24	142.67	6610.82	5460.70	4174.34	-3455.84	2342.93	0.71	-0.04	0.71	528318.06	1712048.06	N 39 56 45.60 W	80 31 37.32	6.06
	10611.00	89.04	141.80	6612.15	5462.03	4263.24	-3526.19	2397.43	1.00	-0.22	-0.98	528247.72	1712102.56	N 39 56 44.91 W	80 31 36.61	6.08
	10701.00	89.18	142.20	6613.55	5463.43	4353.13	-3597.10	2452.84	0.47	0.16	0.44	528176.81	1712157.98	N 39 56 44.21 W	80 31 35.89	6.09
	10791.00	89.21	141.76	6614.82	5464.70	4443.02	-3668.00	2508.27	0.49	0.03	-0.49	528105.92	1712213.36	N 39 56 43.52 W	80 31 35.17	6.10
	10880.00	89.21	142.98	6616.04	5465.92	4531.94	-3738.47	2562.60	1.37	0.00	1.37	528035.44	1712267.71	N 39 56 42.83 W	80 31 34.46	6.12
	10970.00	89.07	143.62	6617.39	5467.27	4621.90	-3810.62	2616.38	0.73	-0.16	0.71	527963.30	1712321.49	N 39 56 42.12 W	80 31 33.76	6.13
	11059.00	88.97	144.64	6618.92	5468.80	4710.88	-3882.73	2668.52	1.15	-0.11	1.15	527891.19	1712373.63	N 39 56 41.41 W	80 31 33.08	6.15
	11149.00	89.55	145.12	6620.08	5469.96	4800.87	-3956.34	2720.29	0.84	0.64	0.53	527817.59	1712425.40	N 39 56 40.69 W	80 31 32.40	6.16
	11238.00	89.42	144.87	6620.88	5470.76	4889.87	-4029.24	2771.34	0.32	-0.15	-0.28	527744.69	1712476.45	N 39 56 39.98 W	80 31 31.74	6.17

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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
	11327.00	89.45	143.50	6621.76	5471.64	4978.86	-4101.40	2823.42	1.54	0.03	-1.54	527672.53	1712528.52	N 39 56 39.27 W	80 31 31.06	6.19
	11417.00	89.66	143.07	6622.45	5472.33	5068.83	-4173.55	2877.22	0.53	0.23	-0.48	527600.39	1712582.33	N 39 56 38.56 W	80 31 30.35	6.20
	11506.00	89.93	143.46	6622.77	5472.65	5157.80	-4244.87	2930.46	0.53	0.30	0.44	527529.07	1712635.55	N 39 56 37.86 W	80 31 29.66	6.21
	11596.00	89.59	143.01	6623.15	5473.03	5247.77	-4316.97	2984.32	0.63	-0.38	-0.50	527456.97	1712689.42	N 39 56 37.16 W	80 31 28.96	6.22
	11686.00	89.79	144.25	6623.64	5473.52	5337.75	-4389.44	3037.69	1.40	0.22	1.38	527384.51	1712742.78	N 39 56 36.45 W	80 31 28.26	6.23
	11775.00	89.86	145.47	6623.91	5473.79	5426.74	-4462.21	3088.92	1.37	0.08	1.37	527311.74	1712794.01	N 39 56 35.73 W	80 31 27.59	6.25
	11864.00	89.66	146.08	6624.28	5474.16	5515.73	-4535.80	3138.97	0.72	-0.22	0.69	527238.15	1712844.06	N 39 56 35.01 W	80 31 26.94	6.26
	11954.00	89.69	144.44	6624.79	5474.67	5605.72	-4609.76	3190.26	1.82	0.03	-1.82	527164.20	1712895.34	N 39 56 34.29 W	80 31 26.27	6.27
	12044.00	89.52	142.66	6625.41	5475.29	5695.69	-4682.14	3243.72	1.99	-0.19	-1.98	527091.81	1712948.81	N 39 56 33.58 W	80 31 25.58	6.29
	12133.00	89.45	141.10	6626.21	5476.09	5784.58	-4752.16	3298.66	1.75	-0.08	-1.75	527021.81	1713003.74	N 39 56 32.89 W	80 31 24.86	6.30
	12223.00	89.38	139.54	6627.13	5477.01	5874.31	-4821.42	3356.12	1.73	-0.08	-1.73	526952.55	1713061.20	N 39 56 32.21 W	80 31 24.11	6.31
	12312.00	89.52	139.23	6627.99	5477.87	5962.92	-4898.97	3414.06	0.38	0.16	-0.35	526884.99	1713119.13	N 39 56 31.55 W	80 31 23.36	6.32
	12402.00	89.35	140.01	6628.87	5478.75	6052.56	-4957.53	3472.36	0.89	-0.19	0.87	526816.44	1713177.43	N 39 56 30.88 W	80 31 22.60	6.34
	12491.00	89.48	142.47	6629.78	5479.66	6141.39	-5026.92	3528.07	2.77	0.15	2.76	526747.05	1713233.14	N 39 56 30.20 W	80 31 21.87	6.35
	12580.00	89.24	143.50	6630.78	5480.66	6230.34	-5097.98	3581.65	1.19	-0.27	1.16	526676.00	1713286.72	N 39 56 29.51 W	80 31 21.18	6.36
	12670.00	89.28	144.40	6631.94	5481.82	6320.32	-5170.74	3634.61	1.00	0.04	1.00	526603.24	1713339.67	N 39 56 28.79 W	80 31 20.49	6.37
	12759.00	89.42	144.18	6632.95	5482.83	6409.31	-5243.00	3686.55	0.29	0.16	-0.25	526530.98	1713391.62	N 39 56 28.09 W	80 31 19.81	6.38
	12849.00	90.55	143.87	6632.97	5482.85	6499.31	-5315.83	3739.42	1.30	1.26	-0.34	526458.15	1713444.48	N 39 56 27.37 W	80 31 19.12	6.39
	12938.00	90.48	144.47	6632.17	5482.05	6588.30	-5387.99	3791.52	0.68	-0.08	0.67	526386.00	1713496.58	N 39 56 26.66 W	80 31 18.44	6.40
	13027.00	90.52	144.57	6631.40	5481.28	6677.29	-5460.46	3843.17	0.12	0.04	0.11	526313.54	1713548.23	N 39 56 25.95 W	80 31 17.77	6.41
	13117.00	90.00	145.26	6630.99	5480.87	6767.29	-5534.10	3894.90	0.96	-0.58	0.77	526239.89	1713599.96	N 39 56 25.23 W	80 31 17.09	6.42
	13206.00	89.45	145.00	6631.41	5481.29	6856.29	-5607.12	3945.78	0.68	-0.62	-0.29	526166.88	1713650.84	N 39 56 24.52 W	80 31 16.43	6.43
	13296.00	89.45	145.58	6632.28	5482.16	6946.28	-5681.10	3997.03	0.64	0.00	0.64	526092.90	1713702.08	N 39 56 23.79 W	80 31 15.76	6.44
	13384.00	89.73	146.27	6632.91	5482.79	7034.26	-5753.99	4046.33	0.85	0.32	0.78	526020.02	1713751.38	N 39 56 23.08 W	80 31 15.12	6.45
	13473.00	89.42	146.72	6633.57	5483.45	7123.21	-5828.20	4095.46	0.61	-0.35	0.51	525945.81	1713800.50	N 39 56 22.35 W	80 31 14.47	6.46
	13563.00	89.42	147.20	6634.48	5484.36	7213.14	-5903.64	4144.53	0.53	0.00	0.53	525870.37	1713849.57	N 39 56 21.61 W	80 31 13.83	6.47
	13652.00	87.94	146.60	6636.53	5486.41	7302.04	-5978.18	4193.11	1.79	-1.66	-0.67	525795.84	1713896.16	N 39 56 20.88 W	80 31 13.20	6.48
	13741.00	88.01	146.15	6639.67	5489.55	7390.95	-6052.24	4242.37	0.51	0.08	-0.51	525721.78	1713947.41	N 39 56 20.15 W	80 31 12.56	6.49
	13831.00	87.80	146.14	6642.96	5492.84	7480.86	-6126.93	4292.47	0.23	-0.23	-0.01	525647.09	1713997.51	N 39 56 19.42 W	80 31 11.90	6.50
Final Survey 17Mar13	13870.00	87.70	146.62	6644.50	5494.38	7519.82	-6159.38	4314.05	1.26	-0.26	1.23	525564.64	1714019.09	N 39 56 19.10 W	80 31 11.62	6.50
Projection to Bit	13932.00	87.70	146.62	6646.98	5496.86	7581.73	-6211.11	4348.13	0.00	0.00	0.00	525562.92	1714053.17	N 39 56 18.59 W	80 31 11.17	6.51

Survey Type: Def Survey

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

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.650		30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-8D-HS Gyro 0' MD to 13932' MD
	18.650	2980.000		30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-8D-HS Gyro 0' MD to 13932' MD
	2980.000	13870.000		30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-8D-HS Gyro 0' MD to 13932' MD

03/07/2014

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Comments	MD (ft)	Incl (°)	Azim Grd (°)	TVD (ft)	TVDSS (ft)	Act Sins	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	
	13870.000		13932.000				30.000	30.000	SLB_BILIND+TREND									

Original Borehole / Noble Energy
SHL-8D-HS Gyro 0' MD to 13932'

03/07/2014