



# Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD Survey Report

(Def Survey)

**Report Date:** January 02, 2013 - 08:44 AM  
**Client:** Noble Energy  
**Field:** WV Marshall County (NAD 27)  
**Structure / Slot:** CNX/Noble Energy SHL-8 Pad / SHL-8F-HS  
**Well:** SHL-8F-HS  
**Borehole:** Original Borehole  
**UWI / API#:** Unknown / Unknown  
**Survey Name:** Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD  
**Survey Date:** December 21, 2012  
**Tort / AHD / DDI / ERD Ratio:** 262.820 ° / 9349.465 ft / 6.739 / 1.425  
**Coordinate Reference System:** NAD27 West Virginia State Plane, Northern Zone, US Feet  
**Location Lat / Long:** N 39° 57' 19.72743", W 80° 32' 8.07787"  
**Location Grid N/E Y/X:** N 531798.969 ftUS, E 1709692.469 ftUS  
**CRS Grid Convergence Angle:** -0.6605 °  
**Grid Scale Factor:** 0.99995724

**Survey / DLS Computation:** Minimum Curvature / Lubinski  
**Vertical Section Azimuth:** 338.410 ° (Grid North)  
**Vertical Section Origin:** 0.000 ft, 0.000 ft  
**TVD Reference Datum:** KB  
**TVD Reference Elevation:** 1149.160 ft above MSL  
**Seabed / Ground Elevation:** 1131.470 ft above MSL  
**Magnetic Declination:** -8.712 °  
**Total Gravity Field Strength:** 999.3811mgN (9.80665 Based)  
**Total Magnetic Field Strength:** 52763.149 nT  
**Magnetic Dip Angle:** 67.439 °  
**Declination Date:** December 21, 2012  
**Magnetic Declination Model:** BGGM 2012  
**North Reference:** Grid North  
**Grid Convergence Used:** -0.6605 °  
**Total Corr Mag North->Grid North:** -8.0516 °  
**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	-1149.16	0.00	0.00	0.00	N/A	N/A	N/A	531798.97	1709692.47	N 39 57 19.73	W 80 32 8.08	0.00
	106.50	0.36	272.79	106.50	-1042.66	0.14	0.02	-0.33	0.34	0.34	0.00	531798.99	1709692.13	N 39 57 19.73	W 80 32 8.08	0.00
	206.50	0.34	252.79	206.50	-942.66	0.29	-0.06	-0.93	0.12	-0.02	-20.00	531798.91	1709691.54	N 39 57 19.73	W 80 32 8.09	0.00
	306.50	0.18	294.63	306.50	-842.66	0.43	-0.08	-1.36	0.24	-0.16	41.84	531798.89	1709691.11	N 39 57 19.73	W 80 32 8.10	0.00
	406.50	0.17	286.39	406.50	-742.66	0.63	0.03	-1.64	0.03	-0.01	-8.24	531799.00	1709690.83	N 39 57 19.73	W 80 32 8.10	0.10
	506.50	0.21	271.29	506.50	-642.66	0.79	0.07	-1.97	0.06	0.04	-15.10	531799.04	1709690.50	N 39 57 19.73	W 80 32 8.10	0.21
	606.50	0.20	261.32	606.49	-542.67	0.90	0.05	-2.32	0.04	-0.01	-9.97	531799.02	1709690.15	N 39 57 19.73	W 80 32 8.11	0.30
	706.50	0.10	339.95	706.49	-442.67	1.03	0.11	-2.53	0.21	-0.10	78.63	531799.08	1709689.94	N 39 57 19.73	W 80 32 8.11	0.44
	806.50	0.10	246.69	806.49	-342.67	1.11	0.16	-2.64	0.15	0.00	-93.26	531799.12	1709689.83	N 39 57 19.73	W 80 32 8.11	0.52
	906.50	0.12	126.16	906.49	-242.67	1.02	0.06	-2.63	0.19	0.02	-120.53	531799.03	1709689.84	N 39 57 19.73	W 80 32 8.11	0.60
	1006.50	0.24	167.53	1006.49	-142.67	0.73	-0.21	-2.50	0.17	0.12	41.37	531798.76	1709689.97	N 39 57 19.73	W 80 32 8.11	0.69
	1106.50	0.63	128.66	1106.49	-42.67	0.04	-0.75	-2.03	0.47	0.39	-38.87	531798.21	1709690.44	N 39 57 19.72	W 80 32 8.10	0.90
	1206.50	0.38	123.34	1206.49	57.33	-0.70	-1.28	-1.32	0.25	-0.25	-5.32	531797.69	1709691.15	N 39 57 19.71	W 80 32 8.09	1.04
	1306.50	0.59	98.12	1306.48	157.32	-1.23	-1.54	-0.53	0.29	0.21	-25.22	531797.43	1709691.93	N 39 57 19.71	W 80 32 8.08	1.16
	1406.50	0.59	107.58	1406.48	257.32	-1.81	-1.76	0.47	0.10	0.00	9.46	531797.21	1709692.93	N 39 57 19.71	W 80 32 8.07	1.25
	1506.50	0.26	143.91	1506.48	357.32	-2.36	-2.10	1.09	0.41	-0.33	36.33	531796.87	1709693.56	N 39 57 19.71	W 80 32 8.06	1.36
	1606.50	0.52	136.52	1606.47	457.31	-3.00	-2.62	1.54	0.26	0.26	-7.39	531796.35	1709694.01	N 39 57 19.70	W 80 32 8.06	1.43
	1706.50	0.29	168.08	1706.47	557.31	-3.67	-3.19	1.90	0.31	-0.23	31.56	531795.78	1709694.37	N 39 57 19.70	W 80 32 8.05	1.50
	1806.50	0.30	176.24	1806.47	657.31	-4.17	-3.70	1.97	0.04	0.01	8.16	531795.27	1709694.44	N 39 57 19.69	W 80 32 8.05	1.53
	1906.50	0.35	155.20	1906.47	757.31	-4.72	-4.24	2.12	0.13	0.05	-21.04	531794.73	1709694.58	N 39 57 19.69	W 80 32 8.05	1.58
	2006.50	0.24	147.68	2006.47	857.31	-5.23	-4.69	2.36	0.12	-0.11	-7.52	531794.28	1709694.82	N 39 57 19.68	W 80 32 8.05	1.61
	2106.50	0.40	140.45	2106.46	957.30	-5.77	-5.14	2.69	0.16	0.16	-7.23	531793.83	1709695.16	N 39 57 19.68	W 80 32 8.04	1.65
	2206.50	0.28	148.95	2206.46	1057.30	-6.34	-5.62	3.04	0.13	-0.12	8.50	531793.35	1709695.51	N 39 57 19.67	W 80 32 8.04	1.69
	2306.50	0.65	144.58	2306.46	1157.30	-7.13	-6.29	3.49	0.37	0.37	-4.37	531792.68	1709695.96	N 39 57 19.67	W 80 32 8.03	1.75
	2406.50	0.62	139.25	2406.45	1257.29	-8.20	-7.16	4.17	0.07	-0.03	-5.33	531791.81	1709696.64	N 39 57 19.66	W 80 32 8.02	1.80

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
	2506.50	0.27	134.95	2506.45	1357.29	-8.92	-7.74	4.69	0.35	-0.35	-4.30	531791.23	1709697.16	N 39 57 19.65 W	80 32 8.02	1.85
	2606.50	0.10	220.87	2606.45	1457.29	-9.18	-7.97	4.80	0.28	-0.17	85.92	531791.00	1709697.27	N 39 57 19.65 W	80 32 8.02	1.89
	2706.50	0.23	78.55	2706.45	1557.29	-9.26	-8.00	4.94	0.32	0.13	-142.32	531790.97	1709697.41	N 39 57 19.65 W	80 32 8.01	1.92
	2806.50	0.06	146.32	2806.45	1657.29	-9.34	-8.00	5.17	0.21	-0.17	67.77	531790.97	1709697.64	N 39 57 19.65 W	80 32 8.01	1.94
	2906.50	0.19	76.19	2906.45	1757.29	-9.42	-8.00	5.36	0.18	0.13	-70.13	531790.96	1709697.83	N 39 57 19.65 W	80 32 8.01	1.96
	2991.50	0.53	79.87	2991.45	1842.29	-9.51	-7.90	5.88	0.40	0.40	4.33	531791.07	1709696.35	N 39 57 19.65 W	80 32 8.00	2.00
	3261.00	0.55	2.59	3260.94	2111.78	-8.58	-6.39	7.17	0.25	0.01	-28.68	531792.58	1709699.64	N 39 57 19.67 W	80 32 7.98	2.10
	3302.00	0.59	355.63	3301.94	2152.78	-8.20	-5.98	7.16	0.19	0.10	-16.98	531792.99	1709699.63	N 39 57 19.67 W	80 32 7.99	2.11
	3348.00	0.54	340.29	3347.93	2198.77	-7.76	-5.54	7.07	0.35	-0.11	-33.35	531793.43	1709699.54	N 39 57 19.67 W	80 32 7.99	2.13
	3391.00	0.57	332.82	3390.93	2241.77	-7.34	-5.16	6.90	0.18	0.07	-17.37	531793.81	1709699.37	N 39 57 19.68 W	80 32 7.99	2.15
	3436.00	0.62	325.71	3435.93	2286.77	-6.88	-4.76	6.67	0.20	0.11	-15.80	531794.21	1709699.13	N 39 57 19.68 W	80 32 7.99	2.16
	3481.00	0.77	326.81	3480.93	2331.77	-6.35	-4.31	6.36	0.33	0.33	2.44	531794.66	1709698.83	N 39 57 19.69 W	80 32 8.00	2.18
	3525.00	0.70	320.10	3524.92	2375.76	-5.80	-3.85	6.03	0.25	-0.16	-15.25	531795.12	1709698.50	N 39 57 19.69 W	80 32 8.00	2.20
	3570.00	0.77	321.81	3569.92	2420.76	-5.25	-3.41	5.67	0.16	0.16	3.80	531795.56	1709698.13	N 39 57 19.69 W	80 32 8.00	2.22
	3615.00	0.38	355.72	3614.92	2465.76	-4.82	-3.02	5.47	1.11	-0.87	75.36	531795.95	1709697.94	N 39 57 19.70 W	80 32 8.01	2.25
	3660.00	0.54	6.48	3659.92	2510.76	-4.49	-2.66	5.48	0.40	0.36	23.91	531796.31	1709697.95	N 39 57 19.70 W	80 32 8.01	2.27
	3704.00	0.87	356.47	3703.91	2554.75	-3.99	-2.12	5.48	0.80	0.75	-22.75	531796.85	1709697.95	N 39 57 19.71 W	80 32 8.01	2.30
	3749.00	0.86	354.42	3748.91	2599.75	-3.34	-1.44	5.43	0.07	-0.02	-4.56	531797.53	1709697.90	N 39 57 19.71 W	80 32 8.01	2.31
	3796.00	0.71	353.97	3795.90	2646.74	-2.72	-0.80	5.36	0.32	-0.32	-0.96	531798.17	1709697.83	N 39 57 19.72 W	80 32 8.01	2.33
	3844.00	0.97	0.24	3843.90	2694.74	-2.06	-0.10	5.33	0.57	0.54	13.06	531798.87	1709697.80	N 39 57 19.73 W	80 32 8.01	2.36
	3889.00	1.51	24.24	3888.89	2739.73	-1.29	0.82	5.58	1.64	1.20	53.33	531799.79	1709698.05	N 39 57 19.74 W	80 32 8.01	2.41
	3939.00	2.66	41.05	3938.85	2789.69	-0.30	2.30	6.61	2.58	2.30	33.62	531801.27	1709699.08	N 39 57 19.75 W	80 32 7.99	2.49
	3987.00	4.76	51.37	3986.75	2837.59	0.80	4.38	8.90	4.57	4.38	21.50	531803.35	1709701.37	N 39 57 19.77 W	80 32 7.96	2.61
	4033.00	6.92	54.69	4032.51	2883.35	2.02	7.17	12.65	5.86	4.75	7.22	531806.14	1709752.52	N 39 57 20.10 W	80 32 7.92	2.74
	4080.00	9.57	57.28	4079.02	2929.86	3.44	10.92	18.25	5.69	5.64	5.51	531809.89	1709710.72	N 39 57 19.84 W	80 32 7.85	2.89
	4128.00	12.15	60.19	4126.16	2977.00	4.93	15.59	25.99	5.49	5.38	6.06	531814.56	1709718.46	N 39 57 19.88 W	80 32 7.75	3.03
	4175.00	14.88	59.33	4171.85	3022.69	6.59	21.13	35.48	5.82	5.81	-1.83	531820.10	1709727.94	N 39 57 19.94 W	80 32 7.63	3.17
	4223.00	17.64	57.38	4217.93	3068.77	8.96	28.20	46.90	5.86	5.75	-4.06	531827.16	1709739.37	N 39 57 20.01 W	80 32 7.48	3.30
	4271.00	20.42	57.00	4263.30	3114.14	12.01	36.68	60.06	5.80	5.79	-0.79	531835.65	1709752.52	N 39 57 20.10 W	80 32 7.31	3.43
	4317.00	23.09	57.25	4306.02	3156.86	15.34	45.93	74.37	5.81	5.80	0.54	531844.90	1709766.84	N 39 57 20.19 W	80 32 7.13	3.54
	4366.00	25.98	57.18	4350.59	3201.43	19.29	56.95	91.48	5.90	5.90	-0.14	531855.91	1709783.94	N 39 57 20.30 W	80 32 6.91	3.65
	4412.00	27.99	56.16	4391.58	3242.42	23.54	68.42	108.91	4.48	4.37	-2.22	531867.39	1709801.38	N 39 57 20.42 W	80 32 6.69	3.74
	4459.00	30.18	54.91	4432.65	3283.49	28.64	81.36	127.74	4.84	4.66	-2.66	531880.32	1709820.21	N 39 57 20.55 W	80 32 6.45	3.83
	4507.00	33.01	53.58	4473.53	3324.37	34.81	96.06	148.14	6.07	5.90	-2.77	531895.02	1709840.60	N 39 57 20.69 W	80 32 6.19	3.92
	4602.00	37.71	53.11	4550.99	3401.83	49.11	128.88	192.23	4.96	4.95	-0.49	531927.84	1709884.69	N 39 57 21.02 W	80 32 5.63	4.08
	4696.00	36.73	49.00	4625.85	3476.69	66.04	164.58	236.44	2.84	-1.04	-4.37	531963.54	1709928.90	N 39 57 21.38 W	80 32 5.07	4.19
	4791.00	38.69	47.91	4701.00	3551.84	85.88	203.13	279.92	2.18	2.06	-1.15	532002.09	1709972.37	N 39 57 21.77 W	80 32 4.51	4.29
	4886.00	39.07	49.46	4774.96	3625.80	106.00	242.49	324.71	1.10	0.40	1.63	532041.45	1710017.16	N 39 57 22.16 W	80 32 3.94	4.36
	4980.00	38.37	50.60	4848.30	3699.14	124.54	280.26	369.76	1.06	-0.74	1.21	532079.22	1710062.22	N 39 57 22.54 W	80 32 3.37	4.43
	5070.00	38.50	54.03	4918.81	3769.65	140.04	314.45	414.02	2.37	0.14	3.81	532113.41	1710106.47	N 39 57 22.88 W	80 32 2.81	4.49
	5159.00	39.15	54.31	4988.14	3838.98	153.77	347.11	459.26	0.76	0.73	0.31	532146.07	1710151.71	N 39 57 23.21 W	80 32 2.23	4.54
	5249.00	38.39	53.73	5058.31	3909.15	167.77	380.22	504.87	0.94	-0.84	-0.64	532179.32	1710197.32	N 39 57 23.54 W	80 32 1.65	4.59
	5338.00	38.21	55.22	5128.16	3979.00	181.06	412.27	549.76	1.06	-0.20	1.67	532211.22	1710242.20	N 39 57 23.86 W	80 32 1.08	4.63
	5428.00	38.87	55.13	5198.55	4049.39	193.89	444.29	595.79	0.74	0.73	-0.10	532243.24	1710288.23	N 39 57 24.19 W	80 32 0.49	4.67
	5518.00	39.76	53.96	5268.19	4119.03	207.56	477.37	642.23	1.29	0.99	-1.30	532276.32	1710334.67	N 39 57 24.52 W	80 31 59.90	4.71
	5607.00	39.76	53.90	5336.60	4187.44	221.80	510.89	688.24	0.04	0.00	-0.07	532309.83	1710380.68	N 39 57 24.85 W	80 31 59.32	4.74
	5697.00	39.18	53.18	5406.08	4256.92	236.48	544.88	734.26	0.82	-0.64	-0.80	532343.83	1710426.69	N 39 57 25.20 W	80 31 58.73	4.78
	5786.00	37.55	52.13	5475.86	4326.70	251.47	578.38	778.18	1.97	-1.83	-1.18	532377.33	1710470.61	N 39 57 25.53 W	80 31 58.17	4.82

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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
	5675.00	34.52	50.87	5547.82	4398.66	266.67	610.95	819.16	3.50	-3.40	-1.42	532409.90	1710511.59	N 39 57 25.86 W	80 31 57.65	4.86
	5965.00	37.79	54.37	5620.49	4471.33	281.05	643.12	861.37	4.30	3.63	3.89	532442.06	1710553.80	N 39 57 26.18 W	80 31 57.11	4.91
	6054.00	41.92	54.82	5688.80	4539.64	294.66	676.15	907.85	4.65	4.64	0.51	532475.09	1710600.28	N 39 57 26.51 W	80 31 56.52	4.96
	6144.00	40.02	54.12	5756.75	4607.59	308.87	710.44	955.87	2.17	-2.11	-0.78	532509.37	1710648.30	N 39 57 26.86 W	80 31 55.91	4.99
	6233.00	39.79	55.27	5825.02	4675.86	322.40	743.43	1002.47	0.87	-0.26	1.29	532542.37	1710694.89	N 39 57 27.19 W	80 31 55.32	5.02
	6323.00	39.35	55.36	5894.40	4745.24	335.39	776.06	1049.61	0.49	-0.49	0.10	532574.99	1710742.03	N 39 57 27.52 W	80 31 54.72	5.04
	6412.00	39.74	54.30	5963.03	4813.87	348.70	808.70	1095.93	0.88	0.44	-1.19	532607.63	1710788.35	N 39 57 27.84 W	80 31 54.13	5.06
	6502.00	39.67	53.80	6032.27	4883.11	362.96	842.45	1142.47	0.36	-0.08	-0.56	532641.38	1710834.89	N 39 57 28.18 W	80 31 53.53	5.08
	6591.00	38.90	52.99	6101.16	4952.00	377.56	876.05	1187.71	1.04	-0.87	-0.91	532674.98	1710880.13	N 39 57 28.52 W	80 31 52.96	5.11
	6681.00	35.32	50.56	6172.92	5023.76	393.05	909.60	1230.38	4.30	-3.98	-2.70	532708.53	1710922.80	N 39 57 28.86 W	80 31 52.41	5.14
	6771.00	34.23	41.85	6246.89	5097.73	412.36	945.01	1267.39	5.65	-1.21	-9.68	532743.94	1710959.80	N 39 57 29.21 W	80 31 51.94	5.18
	6816.00	33.93	35.57	6284.18	5135.02	424.83	964.66	1283.14	7.85	-0.67	-13.96	532763.58	1710975.56	N 39 57 29.41 W	80 31 51.74	5.21
	6856.00	34.26	30.80	6317.31	5168.15	437.76	983.41	1295.41	6.73	0.83	-11.93	532782.34	1710987.82	N 39 57 29.59 W	80 31 51.59	5.23
	6901.00	36.84	26.45	6353.92	5204.76	454.51	1006.38	1307.90	8.03	5.73	-9.67	532805.30	1711000.31	N 39 57 29.82 W	80 31 51.43	5.25
	7170.00	68.33	23.33	6388.68	5239.52	474.21	1032.30	1319.88	12.26	-6.93	-6.93	532831.22	1711012.29	N 39 57 30.08 W	80 31 51.28	5.28
	6990.00	47.53	20.82	6419.91	5270.75	496.63	1061.01	1331.49	13.21	12.59	-6.70	532859.93	1711023.90	N 39 57 30.36 W	80 31 51.14	5.31
	7035.00	52.90	19.09	6448.70	5299.54	522.51	1093.50	1343.27	12.29	11.93	-3.84	532892.42	1711035.68	N 39 57 30.69 W	80 31 50.99	5.35
	7080.00	58.13	15.82	6474.17	5325.01	551.33	1128.88	1354.36	13.07	11.62	-7.27	532927.80	1711046.76	N 39 57 31.04 W	80 31 50.85	5.38
	7125.00	63.01	12.50	6496.28	5347.12	583.13	1166.87	1363.91	12.60	10.84	-7.38	532965.78	1711056.32	N 39 57 31.41 W	80 31 50.74	5.41
	7170.00	68.33	8.33	6514.82	5365.66	617.90	1207.18	1371.29	14.52	11.82	-9.27	533006.09	1711063.70	N 39 57 31.81 W	80 31 50.65	5.44
	7214.00	73.99	5.20	6529.03	5379.87	654.53	1248.51	1376.17	14.52	12.86	-7.11	533047.42	1711068.58	N 39 57 32.22 W	80 31 50.59	5.47
	7259.00	79.67	4.90	6539.28	5390.12	693.68	1292.14	1380.03	12.64	12.62	-0.67	533091.05	1711072.43	N 39 57 32.65 W	80 31 50.55	5.50
	7304.00	83.14	2.91	6546.00	5396.84	733.84	1336.52	1383.05	8.86	7.71	-4.42	533135.43	1711075.46	N 39 57 33.09 W	80 31 50.52	5.52
	7349.00	85.87	357.44	6550.31	5401.15	775.42	1381.29	1383.18	13.53	6.07	-12.16	533180.20	1711075.59	N 39 57 33.53 W	80 31 50.52	5.55
	7394.00	87.56	351.47	6552.89	5403.73	818.58	1429.84	1378.84	13.77	3.76	-13.27	533224.89	1711071.25	N 39 57 33.98 W	80 31 50.58	5.58
	7438.00	87.42	345.33	6554.82	5405.66	861.85	1469.02	1370.01	13.94	-0.32	-13.95	533267.93	1711062.42	N 39 57 34.40 W	80 31 50.70	5.61
	7483.00	87.90	339.40	6556.66	5407.50	906.68	1511.85	1356.39	13.21	1.07	-13.18	533310.75	1711048.80	N 39 57 34.82 W	80 31 50.88	5.64
	7528.00	89.14	332.98	6557.83	5408.67	951.61	1552.99	1338.24	14.53	2.76	-14.27	533351.89	1711030.65	N 39 57 35.23 W	80 31 51.12	5.66
	7573.00	88.83	326.60	6558.62	5409.46	996.07	1591.85	1315.61	14.19	-0.69	-14.18	533390.75	1711008.02	N 39 57 35.61 W	80 31 51.42	5.69
	7617.00	89.28	324.18	6559.35	5410.19	1038.93	1628.05	1290.63	5.59	1.02	-5.50	533426.95	1710983.04	N 39 57 35.96 W	80 31 51.75	5.71
	7654.00	89.38	324.58	6559.78	5410.62	1074.82	1658.13	1269.08	1.11	0.27	1.08	533457.02	1710961.49	N 39 57 36.26 W	80 31 52.03	5.72
	7743.00	90.17	323.12	6560.13	5410.97	1160.96	1729.99	1216.58	1.87	0.89	-1.64	533528.88	1710909.00	N 39 57 36.96 W	80 31 52.71	5.74
	7833.00	90.10	323.43	6559.92	5410.76	1247.84	1802.13	1162.76	0.35	-0.08	0.34	533601.02	1710855.18	N 39 57 37.67 W	80 31 53.41	5.76
	7922.00	90.24	324.37	6559.66	5410.50	1334.00	1874.04	1110.33	1.07	0.16	1.06	533672.92	1710802.75	N 39 57 38.37 W	80 31 54.10	5.79
	8012.00	90.14	324.23	6559.36	5410.20	1421.28	1947.12	1057.81	0.19	-0.11	-0.16	533746.01	1710750.23	N 39 57 39.09 W	80 31 54.78	5.81
	8101.00	90.52	324.76	6558.84	5409.68	1507.67	2019.58	1006.12	0.73	0.43	0.60	533818.45	1710698.54	N 39 57 39.80 W	80 31 55.46	5.83
	8191.00	90.55	324.17	6558.00	5408.84	1595.01	2092.81	953.81	0.66	0.03	-0.66	533891.69	1710646.24	N 39 57 40.52 W	80 31 56.14	5.85
	8280.00	90.48	322.47	6557.20	5408.04	1680.94	2164.18	900.65	1.91	-0.08	-1.91	533963.05	1710593.08	N 39 57 41.22 W	80 31 56.83	5.87
	8370.00	90.62	320.56	6556.34	5407.18	1767.04	2234.62	844.65	2.13	0.16	-2.12	534033.49	1710537.08	N 39 57 41.91 W	80 31 57.56	5.89
	8459.00	91.17	318.97	6554.95	5405.79	1851.36	2302.56	787.17	1.89	0.62	-1.79	534101.42	1710479.61	N 39 57 42.57 W	80 31 58.31	5.91
	8549.00	91.37	319.02	6552.95	5403.79	1936.22	2370.46	728.14	0.23	0.22	0.06	534169.32	1710420.57	N 39 57 43.23 W	80 31 59.08	5.93
	8639.00	91.17	318.97	6550.96	5401.80	2021.08	2438.36	669.10	0.23	-0.22	-0.06	534237.22	1710361.54	N 39 57 43.90 W	80 31 59.85	5.94
	8728.00	90.79	318.89	6549.44	5400.28	2104.98	2505.45	610.64	0.44	-0.43	-0.09	534304.30	1710303.08	N 39 57 44.56 W	80 32 0.61	5.96
	8818.00	90.76	319.21	6548.22	5399.06	2189.88	2573.42	551.66	0.36	-0.03	0.36	534372.27	1710244.10	N 39 57 45.22 W	80 32 1.37	5.98
	8907.00	90.89	320.01	6546.94	5397.78	2274.12	2641.20	493.99	0.91	0.15	0.90	534440.05	1710186.44	N 39 57 45.88 W	80 32 2.13	5.99
	8997.00	90.86	322.16	6545.56	5396.40	2360.02	2711.21	437.47	2.39	-0.03	2.39	534510.06	1710129.92	N 39 57 46.57 W	80 32 2.86	6.01
	9087.00	90.82	323.25	6544.25	5395.09	2446.65	2782.80	382.94	1.21	-0.04	1.21	534581.64	1710075.39	N 39 57 47.27 W	80 32 3.57	6.03
	9176.00	90.93	324.77	6542.89	5393.73	2532.84	2854.80	330.65	1.71	0.12	1.71	534653.64	1710023.10	N 39 57 47.98 W	80 32 4.25	6.05

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Easting (RUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	9265.00	90.93	326.65	6541.44	5392.28	2619.65	2928.32	280.52	2.11	0.00	2.11	534727.16	1709972.97	N 39 57 48.70 W	80 32 4.91	6.07
	9355.00	90.82	328.29	6540.07	5390.91	2708.00	3004.19	232.13	1.83	-0.12	1.82	534803.02	1709924.59	N 39 57 49.44 W	80 32 5.54	6.08
	9444.00	90.76	327.57	6538.84	5389.68	2795.51	3079.60	184.88	0.81	-0.07	-0.81	534878.43	1709877.34	N 39 57 50.18 W	80 32 6.16	6.10
	9534.00	90.79	327.32	6537.62	5388.46	2883.86	3155.45	136.45	0.28	0.03	-0.28	534954.28	1709828.92	N 39 57 50.92 W	80 32 6.79	6.11
	9623.00	90.31	328.39	6536.77	5387.61	2971.35	3230.80	89.10	1.32	-0.54	1.20	535029.63	1709781.57	N 39 57 51.66 W	80 32 7.41	6.13
	9713.00	90.38	327.97	6536.23	5387.07	3059.91	3307.27	41.65	0.47	0.08	-0.47	535106.10	1709734.12	N 39 57 52.41 W	80 32 8.03	6.14
	9803.00	90.79	327.15	6535.31	5386.15	3148.30	3383.23	-6.62	1.02	0.46	-0.91	535182.04	1709685.84	N 39 57 53.16 W	80 32 8.66	6.16
	9892.00	90.83	325.94	6534.05	5384.89	3235.39	3457.47	-55.68	1.36	0.04	-1.36	535256.29	1709636.79	N 39 57 53.89 W	80 32 9.30	6.17
	9982.00	90.69	326.82	6532.86	5383.70	3323.40	3532.41	-105.51	0.99	-0.16	0.98	535331.22	1709586.96	N 39 57 54.62 W	80 32 9.96	6.19
	10072.00	90.48	325.16	6531.94	5382.78	3411.29	3607.01	-155.85	1.86	-0.23	-1.84	535405.82	1709536.63	N 39 57 55.35 W	80 32 10.61	6.20
	10161.00	90.65	324.44	6531.06	5381.90	3497.78	3679.73	-207.14	0.83	0.19	-0.81	535478.53	1709485.33	N 39 57 56.07 W	80 32 11.28	6.21
	10251.00	90.52	323.53	6530.14	5380.98	3584.94	3752.52	-260.06	1.02	-0.14	-1.01	535551.32	1709432.42	N 39 57 56.78 W	80 32 11.97	6.23
	10340.00	90.48	322.27	6529.36	5380.20	3670.69	3823.50	-313.74	1.42	-0.04	-1.42	535622.30	1709378.74	N 39 57 57.48 W	80 32 12.67	6.24
	10430.00	90.76	321.50	6528.39	5379.23	3756.97	3894.31	-369.29	0.91	0.31	-0.86	535693.10	1709323.19	N 39 57 58.17 W	80 32 13.40	6.25
	10520.00	90.58	320.67	6527.34	5378.18	3842.88	3964.33	-425.82	0.94	-0.20	-0.92	535763.12	1709266.67	N 39 57 58.85 W	80 32 14.13	6.27
	10609.00	90.89	320.45	6526.19	5377.03	3927.59	4033.06	-482.36	0.43	0.35	-0.25	535831.85	1709210.13	N 39 57 59.53 W	80 32 14.87	6.28
	10699.00	90.72	319.23	6524.93	5375.77	4012.89	4101.83	-540.39	1.37	-0.19	-1.36	535900.62	1709152.10	N 39 58 0.20 W	80 32 15.62	6.29
	10788.00	90.65	318.20	6523.87	5374.71	4096.68	4168.70	-599.11	1.16	-0.08	-1.16	535967.49	1709093.39	N 39 58 0.85 W	80 32 16.39	6.31
	10878.00	90.55	319.69	6522.92	5373.76	4181.53	4236.57	-658.22	1.66	-0.11	1.66	536035.35	1709034.28	N 39 58 1.52 W	80 32 17.16	6.32
	10968.00	90.38	321.76	6522.19	5373.03	4267.27	4306.23	-715.18	2.31	-0.19	2.30	536105.01	1708977.32	N 39 58 2.20 W	80 32 17.90	6.33
	11057.00	90.48	323.91	6521.53	5372.37	4352.99	4377.15	-768.95	2.42	0.11	2.42	536175.92	1708923.56	N 39 58 2.89 W	80 32 18.60	6.35
	11146.00	90.48	326.66	6520.78	5371.62	4439.66	4450.30	-819.62	3.09	0.00	3.09	536249.07	1708872.88	N 39 58 3.61 W	80 32 19.26	6.36
	11236.00	90.31	326.61	6520.16	5371.00	4527.76	4525.46	-869.12	0.20	-0.19	-0.06	536324.23	1708823.39	N 39 58 4.35 W	80 32 19.91	6.37
	11325.00	90.21	327.11	6519.76	5370.60	4614.96	4599.98	-917.78	0.57	-0.11	0.56	536398.75	1708774.73	N 39 58 5.08 W	80 32 20.55	6.38
	11415.00	90.38	326.91	6519.29	5370.13	4703.18	4675.47	-966.78	0.29	0.19	-0.22	536474.23	1708725.73	N 39 58 5.82 W	80 32 21.19	6.39
	11504.00	90.07	325.99	6518.94	5369.78	4790.25	4749.64	-1015.97	1.09	-0.35	-1.03	536548.40	1708676.55	N 39 58 6.55 W	80 32 21.83	6.41
	11594.00	89.97	325.76	6518.91	5369.75	4878.10	4824.15	-1066.46	0.28	-0.11	-0.26	536622.90	1708626.06	N 39 58 7.28 W	80 32 22.49	6.42
	11683.00	90.17	325.63	6518.80	5369.64	4964.92	4897.66	-1116.62	0.27	0.22	-0.15	536696.41	1708575.90	N 39 58 8.00 W	80 32 23.14	6.43
	11773.00	90.10	324.70	6518.59	5369.43	5052.52	4971.53	-1168.02	1.04	-0.08	-1.03	536770.28	1708524.50	N 39 58 8.72 W	80 32 23.81	6.44
	11864.00	90.55	321.95	6518.07	5368.91	5140.38	5044.51	-1222.37	3.06	0.49	-3.02	536843.25	1708470.15	N 39 58 9.44 W	80 32 24.52	6.45
	11952.00	90.86	319.57	6516.99	5367.83	5224.22	5112.66	-1278.03	2.73	0.35	-2.70	536911.40	1708414.50	N 39 58 10.10 W	80 32 25.25	6.46
	12042.00	90.89	320.63	6515.62	5366.46	5309.66	5181.69	-1335.75	1.18	0.03	1.18	536980.43	1708356.78	N 39 58 10.78 W	80 32 26.00	6.48
	12131.00	90.82	320.87	6514.29	5365.13	5394.45	5250.61	-1392.05	0.28	-0.08	0.27	537049.34	1708300.48	N 39 58 11.45 W	80 32 26.73	6.49
	12221.00	90.72	321.87	6513.08	5363.92	5480.49	5320.91	-1448.24	1.12	-0.11	1.11	537119.64	1708244.30	N 39 58 12.14 W	80 32 27.47	6.50
	12310.00	90.65	323.01	6512.02	5362.86	5566.05	5391.45	-1502.48	1.28	-0.08	1.28	537190.18	1708190.05	N 39 58 12.83 W	80 32 28.17	6.51
	12400.00	90.79	322.44	6510.88	5361.72	5652.69	5463.06	-1556.99	0.65	0.16	-0.63	537261.79	1708135.55	N 39 58 13.53 W	80 32 28.88	6.52
	12489.00	90.76	321.08	6509.68	5360.52	5737.95	5532.96	-1612.07	1.53	-0.03	-1.53	537331.68	1708080.47	N 39 58 14.22 W	80 32 29.60	6.53
	12578.00	90.62	321.11	6508.61	5359.45	5822.91	5602.21	-1667.96	0.16	-0.16	0.03	537400.93	1708024.59	N 39 58 14.90 W	80 32 30.33	6.54
	12668.00	90.41	321.10	6507.80	5358.64	5908.83	5672.26	-1724.47	0.23	-0.23	-0.01	537470.97	1707968.08	N 39 58 15.58 W	80 32 31.06	6.54
	12757.00	90.34	320.08	6507.22	5358.06	5993.56	5741.02	-1780.97	1.15	-0.08	-1.15	537539.73	1707911.58	N 39 58 16.26 W	80 32 31.80	6.55
	12846.00	90.24	319.70	6506.77	5357.61	6077.95	5809.08	-1838.31	0.44	-0.11	-0.43	537607.79	1707854.25	N 39 58 16.92 W	80 32 32.55	6.56
	12936.00	90.31	320.56	6506.33	5357.17	6163.41	5878.16	-1896.00	0.96	0.08	0.96	537676.86	1707796.55	N 39 58 17.60 W	80 32 33.30	6.57
	13025.00	90.24	321.71	6505.91	5356.75	6248.39	5947.45	-1951.84	1.29	-0.08	1.29	537746.16	1707740.71	N 39 58 18.28 W	80 32 34.03	6.58
	13115.00	90.34	323.51	6505.45	5356.29	6334.98	6018.96	-2006.49	2.00	0.11	2.00	537817.66	1707686.07	N 39 58 18.98 W	80 32 34.74	6.59
	13204.00	90.24	323.48	6505.00	5355.84	6420.98	6090.49	-2059.44	0.12	-0.11	-0.03	537889.19	1707633.12	N 39 58 19.68 W	80 32 35.43	6.60
	13293.00	90.24	323.60	6504.63	5355.47	6507.00	6162.07	-2112.33	0.13	0.00	0.13	537960.77	1707580.24	N 39 58 20.38 W	80 32 36.12	6.61
	13383.00	90.34	324.82	6504.17	5355.01	6594.25	6235.08	-2164.96	1.36	0.11	1.36	538033.77	1707527.61	N 39 58 21.09 W	80 32 36.81	6.62
	13472.00	90.17	325.45	6503.78	5354.62	6680.87	6308.10	-2215.83	0.73	-0.19	0.71	538106.79	1707476.73	N 39 58 21.81 W	80 32 37.47	6.63
	13561.00	90.07	325.07	6503.59	5354.43	6767.54	6381.23	-2266.55	0.44	-0.11	-0.43	538179.92	1707426.02	N 39 58 22.53 W	80 32 38.13	6.64

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Comments	MD (ft)	Incl (°)	Azim Grd (°)	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
	13651.00	90.27	324.56	6503.32	5354.16	6855.01	6454.79	-2318.41	0.61	0.22	-0.57	538253.47	1707374.16	N 39 58 23.25	W 80 32 38.81	6.65
	13740.00	90.31	324.82	6502.87	5353.71	6941.47	6527.42	-2369.85	0.30	0.04	0.29	538326.09	1707322.72	N 39 58 23.96	W 80 32 39.48	6.65
	13830.00	90.45	326.37	6502.28	5353.12	7029.23	6601.67	-2420.70	1.73	0.16	1.72	538400.34	1707271.88	N 39 58 24.69	W 80 32 40.15	6.66
	13919.00	90.31	327.90	6501.69	5352.53	7116.50	6676.42	-2469.00	1.73	-0.16	1.72	538475.09	1707223.58	N 39 58 25.42	W 80 32 40.78	6.67
	14008.00	90.07	329.11	6501.39	5352.23	7204.18	6752.31	-2515.49	1.39	-0.27	1.36	538550.97	1707177.09	N 39 58 26.17	W 80 32 41.39	6.68
	14098.00	90.07	328.47	6501.28	5352.12	7292.91	6829.28	-2562.13	0.71	0.00	-0.71	538627.94	1707130.46	N 39 58 26.92	W 80 32 42.00	6.69
	14187.00	90.03	327.70	6501.20	5352.04	7380.47	6904.83	-2609.18	0.87	-0.04	-0.87	538703.49	1707083.41	N 39 58 27.66	W 80 32 42.61	6.70
	14277.00	90.41	327.48	6500.86	5351.70	7468.87	6980.81	-2657.41	0.49	0.42	-0.24	538779.46	1707035.17	N 39 58 28.41	W 80 32 43.24	6.71
	14366.00	90.03	326.53	6500.52	5351.36	7556.11	7055.45	-2705.88	1.15	-0.43	-1.07	538854.10	1706986.71	N 39 58 29.14	W 80 32 43.88	6.72
	14455.00	90.17	326.00	6500.36	5351.20	7643.12	7129.47	-2755.30	0.62	0.16	-0.60	538928.12	1706937.29	N 39 58 29.86	W 80 32 44.52	6.72
Final Survey 01Jan12	14545.00	90.27	325.46	6500.01	5350.85	7730.92	7203.84	-2805.98	0.61	0.11	-0.60	539002.49	1706886.61	N 39 58 30.59	W 80 32 45.18	6.73
Projection to Bit	14636.00	90.27	325.46	6499.59	5350.43	7819.60	7278.80	-2857.58	0.00	0.00	0.00	539077.44	1706835.02	N 39 58 31.33	W 80 32 45.86	6.74

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)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	17.690	Act Sins	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to 14636' MD
	17.690	2991.500	Act Sins	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to
	2991.500	14545.000	Act Sins	30.000	30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to
	14545.000	14636.000	Act Sins	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL-8F-HS Gyro+MWD 0' to

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