

4705101530



Noble Energy SHL-8K-HS Gyro+MWD 0' to 10696' MD Survey Report
(Def Survey)

Report Date: February 04, 2013 - 08:32 AM
Client: Noble Energy
Field: WV Marshall County (NAD 27)
Structure / Slot: CNX/Noble Energy SHL-8 Pad / SHL-8K-HS
Well: SHL-8K-HS
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy SHL-8K-HS Gyro+MWD 0' to 10696' MD
Survey Date: January 22, 2013
Tort / AHD / DDI / ERD Ratio: 227.455' / 5053.800 ft / 6.273 / 0.770
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 57' 19.71678", W 80° 32' 8.88987"
Location Grid N/E Y/X: N 531798.621 fUS, E 1709629.229 fUS
CRS Grid Convergence Angle: -0.6606°
Grid Scale Factor: 0.99995724

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 309.660° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 1149.850 ft above MSL
Seabed / Ground Elevation: 1131.470 ft above MSL
Magnetic Declination: -8.712°
Total Gravity Field Strength: 999.3811 mgn (9.80665 Based)
Total Magnetic Field Strength: 52750.918 nT
Magnetic Dip Angle: 67.430°
Declination Date: January 22, 2013
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: -0.6606°
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	-1149.85	0.00	0.00	0.00	N/A	N/A	N/A	531798.62	1709629.23	N 39 57 19.72	W 80 32 8.89	0.00
	100.00	0.37	180.59	100.00	-1049.85	-0.20	-0.32	0.00	0.37	0.37	0.00	531798.30	1709629.23	N 39 57 19.71	W 80 32 8.89	0.00
	200.00	0.31	166.00	200.00	-949.85	-0.62	-0.91	0.06	0.10	-0.06	-14.59	531797.71	1709629.29	N 39 57 19.71	W 80 32 8.89	0.00
	300.00	0.33	136.13	300.00	-849.85	-1.13	-1.38	0.32	0.17	0.02	-29.87	531797.24	1709629.55	N 39 57 19.70	W 80 32 8.89	0.00
	400.00	0.32	140.04	399.99	-749.86	-1.69	-1.80	0.70	0.02	-0.01	3.91	531796.82	1709629.93	N 39 57 19.70	W 80 32 8.88	0.13
	500.00	0.14	140.11	499.99	-649.86	-2.08	-2.11	0.96	0.18	-0.18	0.07	531796.51	1709630.19	N 39 57 19.70	W 80 32 8.88	0.31
	600.00	0.31	139.46	599.99	-549.86	-2.47	-2.41	1.21	0.17	0.17	-0.65	531796.21	1709630.44	N 39 57 19.69	W 80 32 8.87	0.46
	700.00	0.22	149.21	699.99	-449.86	-2.92	-2.78	1.49	0.10	-0.09	9.75	531795.84	1709630.72	N 39 57 19.69	W 80 32 8.87	0.56
	800.00	0.41	138.26	799.99	-349.86	-3.45	-3.21	1.83	0.20	0.19	-10.95	531795.41	1709631.05	N 39 57 19.69	W 80 32 8.87	0.70
	900.00	0.34	146.99	899.99	-249.86	-4.09	-3.73	2.23	0.09	-0.07	8.73	531794.90	1709631.45	N 39 57 19.68	W 80 32 8.86	0.80
	1000.00	0.29	150.10	999.99	-149.86	-4.61	-4.19	2.51	0.05	-0.05	3.11	531794.43	1709631.74	N 39 57 19.68	W 80 32 8.86	0.87
	1100.00	0.22	153.09	1099.99	-49.86	-5.02	-4.58	2.73	0.07	-0.07	2.99	531794.04	1709631.95	N 39 57 19.67	W 80 32 8.85	0.92
	1200.00	0.41	145.80	1199.98	50.13	-5.54	-5.05	3.01	0.19	0.19	-7.29	531793.57	1709632.24	N 39 57 19.67	W 80 32 8.85	1.02
	1300.00	0.55	144.73	1299.98	150.13	-6.35	-5.74	3.49	0.14	0.14	-1.07	531792.88	1709632.72	N 39 57 19.66	W 80 32 8.84	1.11
	1400.00	0.52	145.25	1399.98	250.13	-7.25	-6.50	4.03	0.03	-0.03	0.52	531792.12	1709633.26	N 39 57 19.65	W 80 32 8.84	1.17
	1500.00	0.62	153.25	1499.97	350.12	-8.18	-7.36	4.53	0.13	0.10	8.00	531791.26	1709633.76	N 39 57 19.64	W 80 32 8.83	1.25
	1600.00	0.53	155.17	1599.97	450.12	-9.10	-8.26	4.97	0.09	-0.09	1.92	531790.36	1709634.20	N 39 57 19.64	W 80 32 8.82	1.32
	1700.00	0.68	150.85	1699.96	550.11	-10.07	-9.20	5.45	0.16	0.15	-4.32	531789.42	1709634.68	N 39 57 19.63	W 80 32 8.82	1.39
	1800.00	0.58	141.78	1799.95	650.10	-11.12	-10.12	6.05	0.14	-0.10	-9.07	531788.51	1709635.28	N 39 57 19.62	W 80 32 8.81	1.46
	1900.00	0.49	137.19	1899.95	750.10	-12.04	-10.83	6.66	0.10	-0.09	-4.59	531787.79	1709635.89	N 39 57 19.61	W 80 32 8.80	1.51
	2000.00	0.78	135.12	1999.94	850.09	-13.14	-11.62	7.43	0.29	0.29	-2.07	531787.00	1709636.66	N 39 57 19.60	W 80 32 8.79	1.59
	2100.00	0.84	141.00	2099.93	950.08	-14.53	-12.68	8.37	0.10	0.06	5.88	531785.95	1709637.60	N 39 57 19.59	W 80 32 8.78	1.65
	2200.00	0.88	138.48	2199.92	1050.07	-16.01	-13.82	9.34	0.06	0.04	-2.52	531784.80	1709638.57	N 39 57 19.58	W 80 32 8.77	1.70
	2300.00	0.63	132.98	2299.91	1150.06	-17.32	-14.77	10.25	0.26	-0.25	-5.50	531783.85	1709639.48	N 39 57 19.57	W 80 32 8.76	1.77
	2400.00	0.73	125.10	2399.91	1250.06	-18.50	-15.51	11.17	0.14	0.10	-7.88	531783.11	1709640.40	N 39 57 19.56	W 80 32 8.74	1.81

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Comments	MD (ft)	Incl (°)	Azlm Grd (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Eastng (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Difficulty Index
	2500.00	0.71	121.74	2499.90	1350.05	-19.75	-16.20	12.22	0.05	-0.02	-3.36	531782.42	1709641.45	N 39 57 19.56 W	80 32 8.73	1.85
	2600.00	0.73	117.32	2599.89	1450.04	-20.99	-16.82	13.32	0.06	0.02	-4.42	531781.80	1709642.54	N 39 57 19.55 W	80 32 8.72	1.88
	2700.00	0.92	112.26	2699.88	1550.03	-22.38	-17.42	14.62	0.20	0.19	-5.06	531781.20	1709643.85	N 39 57 19.55 W	80 32 8.70	1.93
	2800.00	1.02	110.88	2799.87	1650.02	-23.98	-18.04	16.20	0.10	0.10	-1.38	531780.58	1709645.43	N 39 57 19.54 W	80 32 8.68	1.97
	2900.00	1.14	107.98	2899.85	1750.00	-25.75	-18.66	17.98	0.13	0.12	-2.90	531779.96	1709647.21	N 39 57 19.53 W	80 32 8.66	2.02
	2960.00	1.10	103.86	2959.84	1809.99	-26.82	-18.99	19.10	0.15	-0.07	-6.87	531779.64	1709648.33	N 39 57 19.53 W	80 32 8.64	2.05
	3081.00	0.61	71.84	3080.82	1930.97	-28.21	-19.06	20.84	0.55	-0.40	-26.46	531779.56	1709650.07	N 39 57 19.53 W	80 32 8.62	2.14
	3176.00	1.52	192.31	3175.81	2025.96	-29.06	-20.14	21.06	2.00	0.96	126.81	531778.48	1709650.28	N 39 57 19.52 W	80 32 8.62	2.31
	3271.00	3.11	195.96	3270.73	2120.88	-30.68	-23.85	20.08	1.68	1.67	3.84	531774.78	1709649.31	N 39 57 19.48 W	80 32 8.63	2.46
	3365.00	4.56	197.81	3364.52	2214.67	-33.09	-29.86	18.23	1.55	1.54	1.97	531768.77	1709647.46	N 39 57 19.42 W	80 32 8.65	2.60
	3455.00	4.20	193.78	3454.26	2304.41	-35.86	-36.46	16.35	0.53	-0.40	-4.48	531762.16	1709645.58	N 39 57 19.36 W	80 32 8.67	2.69
	3544.00	3.03	200.59	3543.08	2393.23	-38.05	-41.83	14.75	1.40	-1.31	7.65	531756.79	1709643.98	N 39 57 19.31 W	80 32 8.69	2.78
	3634.00	2.02	237.95	3633.00	2483.15	-38.33	-44.90	12.57	2.09	-1.12	41.51	531753.72	1709641.80	N 39 57 19.27 W	80 32 8.72	2.88
	3723.00	2.01	246.31	3721.94	2572.09	-37.14	-46.36	9.81	0.33	-0.01	9.39	531752.26	1709639.04	N 39 57 19.26 W	80 32 8.76	2.91
	3813.00	1.55	242.21	3811.90	2662.05	-35.97	-47.56	7.29	0.53	-0.51	-4.56	531751.06	1709636.52	N 39 57 19.25 W	80 32 8.79	2.95
	3903.00	1.31	234.84	3901.87	2752.02	-35.23	-48.72	5.37	0.34	-0.27	-8.19	531749.90	1709634.60	N 39 57 19.24 W	80 32 8.81	2.97
	3950.00	1.09	230.68	3948.86	2799.01	-35.00	-49.31	4.59	0.50	-0.47	-8.85	531749.31	1709633.81	N 39 57 19.23 W	80 32 8.82	2.99
	3992.00	1.19	225.67	3990.85	2841.00	-34.88	-49.87	3.96	0.34	0.24	-11.93	531748.75	1709633.19	N 39 57 19.22 W	80 32 8.83	3.00
	4037.00	3.38	225.52	4035.81	2885.96	-34.70	-51.13	2.68	4.87	4.87	-0.33	531747.50	1709631.91	N 39 57 19.21 W	80 32 8.85	3.07
	4082.00	6.26	223.67	4080.65	2930.80	-34.39	-53.83	0.04	6.41	6.40	-4.11	531744.79	1709629.27	N 39 57 19.18 W	80 32 8.88	3.16
	4126.00	9.48	220.12	4124.23	2974.38	-34.19	-58.34	-3.95	7.40	7.32	-8.07	531740.29	1709625.28	N 39 57 19.14 W	80 32 8.93	3.26
	4171.00	12.08	218.26	4168.43	3018.58	-34.28	-64.87	-9.25	5.83	5.78	-4.13	531733.75	1709619.98	N 39 57 19.07 W	80 32 9.00	3.35
	4216.00	14.07	216.57	4212.26	3062.41	-34.69	-72.96	-15.43	4.50	4.42	-3.76	531725.66	1709613.80	N 39 57 18.99 W	80 32 9.08	3.43
	4261.00	16.73	215.56	4255.64	3105.79	-35.45	-82.63	-22.46	5.94	5.91	-2.24	531716.00	1709606.77	N 39 57 18.90 W	80 32 9.17	3.52
	4306.00	20.01	214.78	4298.34	3148.49	-36.56	-94.22	-30.62	7.31	7.29	-1.73	531704.40	1709598.61	N 39 57 18.78 W	80 32 9.27	3.62
	4350.00	22.13	216.16	4339.40	3189.55	-37.71	-107.10	-39.80	4.95	4.82	3.14	531691.53	1709589.43	N 39 57 18.65 W	80 32 9.39	3.70
	4440.00	21.08	218.75	4423.08	3273.23	-39.00	-133.41	-59.94	1.58	-1.17	2.88	531665.22	1709569.29	N 39 57 18.39 W	80 32 9.64	3.81
	4529.00	17.17	214.39	4507.15	3357.30	-40.46	-156.74	-77.38	4.67	-4.39	-4.90	531641.89	1709551.85	N 39 57 18.16 W	80 32 9.86	3.92
	4619.00	17.08	212.44	4593.16	3443.31	-43.35	-178.86	-19.98	0.65	-0.10	-2.17	531619.77	1709537.26	N 39 57 17.94 W	80 32 10.04	3.98
	4664.00	18.72	214.39	4635.98	3486.13	-44.84	-190.40	-99.60	3.88	3.64	4.33	531608.23	1709529.63	N 39 57 17.82 W	80 32 10.14	4.03
	4708.00	18.48	214.26	4677.69	3527.84	-46.14	-201.99	-107.51	0.55	-0.55	-0.30	531596.64	1709521.72	N 39 57 17.71 W	80 32 10.24	4.05
	4753.00	18.99	219.41	4720.30	3570.45	-46.85	-213.54	-116.18	3.85	1.13	11.44	531585.09	1709513.06	N 39 57 17.59 W	80 32 10.35	4.10
	4798.00	19.73	224.00	4762.76	3612.91	-46.30	-224.66	-126.10	3.76	1.64	10.20	531573.97	1709503.13	N 39 57 17.48 W	80 32 10.48	4.13
	4843.00	21.16	223.63	4804.93	3655.08	-45.17	-236.00	-136.98	3.19	3.18	-0.82	531562.63	1709492.25	N 39 57 17.37 W	80 32 10.61	4.17
	4888.00	21.00	223.27	4846.92	3697.07	-44.10	-247.75	-148.11	0.46	-0.36	-0.80	531550.88	1709481.12	N 39 57 17.25 W	80 32 10.75	4.20
	4977.00	22.10	224.50	4929.69	3779.84	-41.68	-271.31	-170.78	1.34	1.24	1.38	531527.33	1709458.46	N 39 57 17.02 W	80 32 11.04	4.25
	5022.00	20.28	223.42	4971.65	3821.80	-40.45	-283.01	-182.08	4.14	-4.04	-2.40	531515.62	1709447.16	N 39 57 16.90 W	80 32 11.19	4.28
	5077.00	19.83	220.53	5013.92	3864.07	-39.83	-294.48	-192.40	2.42	-1.00	-6.42	531504.16	1709436.84	N 39 57 16.78 W	80 32 11.32	4.31
	5156.00	19.35	217.10	5097.77	3947.92	-40.26	-317.71	-211.10	1.40	-0.54	-3.85	531480.93	1709418.14	N 39 57 16.55 W	80 32 11.55	4.36
	5201.00	19.64	215.19	5140.19	3990.34	-41.18	-329.84	-219.96	1.56	0.64	-4.24	531468.80	1709409.28	N 39 57 16.43 W	80 32 11.67	4.38
	5245.00	21.45	215.93	5181.39	4031.54	-42.28	-342.40	-228.94	4.16	4.11	1.68	531456.24	1709400.30	N 39 57 16.31 W	80 32 11.78	4.41
	5290.00	22.09	217.97	5223.18	4073.33	-43.06	-355.73	-238.97	2.20	1.42	4.53	531442.91	1709390.27	N 39 57 16.17 W	80 32 11.91	4.43
	5335.00	22.47	221.45	5264.83	4114.98	-43.04	-368.85	-249.87	3.05	0.84	7.73	531429.79	1709379.37	N 39 57 16.04 W	80 32 12.04	4.46
	5425.00	19.77	220.21	5348.77	4198.92	-42.36	-393.36	-271.09	3.04	-3.00	-1.38	531405.27	1709358.15	N 39 57 15.80 W	80 32 12.31	4.50
	5515.00	20.69	221.19	5432.28	4282.43	-41.80	-416.69	-291.16	1.10	1.03	1.10	531381.95	1709338.08	N 39 57 15.57 W	80 32 12.57	4.54
	5560.00	18.52	217.56	5475.61	4325.76	-41.85	-428.60	-300.97	5.41	-4.72	-7.89	531370.04	1709328.28	N 39 57 15.45 W	80 32 12.69	4.57
	5593.00	19.48	216.50	5506.82	4356.97	-42.34	-437.18	-307.43	3.09	2.91	-3.21	531361.46	1709321.81	N 39 57 15.36 W	80 32 12.77	4.58
	5668.00	22.87	218.70	5595.39	4445.54	-43.53	-464.33	-328.41	3.66	3.57	2.32	531334.31	1709300.84	N 39 57 15.09 W	80 32 13.04	4.63

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Comments	MD (ft)	Incl (°)	Azimuth Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Directional Difficulty Index
	5782.00	21.14	216.40	5682.54	4532.69	-44.80	-492.23	-349.89	2.06	-1.84	-2.45	531306.41	1709279.36	N 39 57 14.81 W	80 32 13.31	4.67
	5872.00	22.79	219.19	5766.01	4616.16	-45.86	-518.80	-370.53	2.17	1.83	3.10	531279.84	1709258.71	N 39 57 14.55 W	80 32 13.57	4.70
	5961.00	21.53	220.81	5848.43	4698.58	-45.68	-544.53	-392.10	1.57	-1.42	1.82	531254.12	1709237.15	N 39 57 14.29 W	80 32 13.84	4.73
	6051.00	21.19	219.35	5932.25	4782.40	-45.43	-569.60	-413.21	0.70	-0.38	-1.62	531229.04	1709216.04	N 39 57 14.04 W	80 32 14.11	4.76
	6096.00	20.47	218.26	5974.31	4824.46	-45.67	-582.07	-423.24	1.82	-1.60	-2.42	531216.58	1709206.01	N 39 57 13.92 W	80 32 14.24	4.77
	6140.00	19.92	228.75	6015.62	4865.77	-44.67	-593.06	-433.84	8.31	-1.25	23.84	531205.59	1709195.61	N 39 57 13.81 W	80 32 14.37	4.80
	6185.00	20.35	243.97	6057.90	4908.05	-40.24	-601.55	-446.44	11.65	0.96	33.82	531197.10	1709182.81	N 39 57 13.72 W	80 32 14.53	4.83
	6230.00	20.18	250.80	6100.12	4950.27	-33.00	-607.54	-460.81	5.27	-0.38	15.18	531191.11	1709168.44	N 39 57 13.66 W	80 32 14.72	4.85
	6274.00	258.41	258.41	6141.31	4991.46	-24.14	-611.62	-475.70	6.36	1.89	17.30	531187.03	1709153.55	N 39 57 13.62 W	80 32 14.91	4.88
	6319.00	23.24	268.46	6183.01	5033.16	-12.40	-613.48	-492.49	9.75	4.96	22.33	531185.17	1709136.76	N 39 57 13.60 W	80 32 15.12	4.91
	6364.00	26.88	274.72	6223.78	5073.93	2.62	-612.88	-511.51	10.00	8.09	13.91	531185.77	1709117.74	N 39 57 13.60 W	80 32 15.37	4.94
	6409.00	30.08	277.20	6263.33	5113.48	20.48	-610.63	-532.84	7.58	7.11	5.51	531185.02	1709096.41	N 39 57 13.62 W	80 32 15.64	4.96
	6454.00	35.29	279.94	6301.19	5151.34	41.30	-606.97	-556.85	12.03	11.58	6.09	531191.68	1709072.40	N 39 57 13.66 W	80 32 15.95	5.00
	6498.00	40.11	282.10	6335.99	5186.14	64.92	-601.80	-583.25	11.36	10.95	4.91	531196.84	1709046.01	N 39 57 13.70 W	80 32 16.29	5.03
	6543.00	43.91	285.15	6369.43	5219.58	91.98	-594.68	-612.50	9.58	8.44	6.78	531203.96	1709016.76	N 39 57 13.77 W	80 32 16.67	5.06
	6588.00	48.02	289.13	6400.71	5250.86	121.87	-585.12	-643.38	11.13	9.13	8.84	531213.53	1708985.88	N 39 57 13.86 W	80 32 17.06	5.09
	6633.00	52.29	292.19	6429.54	5279.69	154.53	-572.91	-675.69	10.83	9.49	6.80	531225.74	1708953.57	N 39 57 13.98 W	80 32 17.48	5.13
	6678.00	57.48	294.18	6455.41	5305.56	189.82	-558.40	-709.50	12.09	11.53	4.42	531240.24	1708919.76	N 39 57 14.12 W	80 32 17.92	5.16
	6722.00	62.05	297.02	6477.57	5327.72	226.68	-541.96	-743.76	11.79	10.39	6.45	531256.68	1708885.50	N 39 57 14.28 W	80 32 18.36	5.20
	6767.00	65.60	300.34	6497.42	5347.57	266.32	-522.57	-779.17	10.30	7.89	7.38	531276.07	1708850.09	N 39 57 14.46 W	80 32 18.82	5.23
	6812.00	70.60	303.16	6514.20	5364.35	307.66	-500.60	-814.65	12.54	11.11	6.27	531298.05	1708814.62	N 39 57 14.68 W	80 32 19.28	5.26
	6857.00	75.26	305.73	6527.41	5377.56	350.48	-476.26	-850.10	11.71	10.36	5.71	531322.38	1708779.16	N 39 57 14.91 W	80 32 19.73	5.29
	6902.00	78.80	309.86	6537.51	5387.66	394.29	-449.39	-884.74	11.91	7.87	9.18	531349.25	1708744.53	N 39 57 15.17 W	80 32 20.18	5.33
	6946.00	79.99	314.48	6545.61	5395.76	437.49	-420.36	-916.78	10.67	2.70	10.50	531378.28	1708712.49	N 39 57 15.46 W	80 32 20.60	5.36
	6991.00	82.90	318.27	6552.31	5402.46	481.67	-388.16	-947.47	10.54	6.47	8.42	531410.48	1708681.81	N 39 57 15.77 W	80 32 21.00	5.39
	7036.00	87.49	320.92	6556.08	5406.23	525.82	-354.02	-976.52	11.77	10.20	5.89	531444.62	1708652.75	N 39 57 16.11 W	80 32 21.38	5.42
	7081.00	89.49	322.74	6557.26	5407.41	569.79	-318.66	-1004.32	6.01	4.44	4.04	531479.98	1708624.96	N 39 57 16.45 W	80 32 21.74	5.44
	7126.00	88.35	323.28	6558.11	5408.26	613.57	-282.72	-1031.39	2.80	-2.53	1.20	531515.91	1708597.89	N 39 57 16.81 W	80 32 22.09	5.46
	7215.00	89.04	323.42	6560.14	5410.29	700.01	-211.34	-1084.50	0.79	0.78	0.16	531587.29	1708544.78	N 39 57 17.50 W	80 32 22.78	5.49
	7305.00	89.73	323.34	6561.11	5411.26	787.44	-139.11	-1138.18	0.77	0.77	-0.09	531659.52	1708491.10	N 39 57 18.21 W	80 32 23.48	5.52
	7394.00	90.07	322.97	6561.26	5411.41	873.98	-67.88	-1191.55	0.56	0.38	-0.42	531730.74	1708437.73	N 39 57 18.91 W	80 32 24.18	5.55
	7484.00	91.55	322.79	6559.99	5410.14	961.59	3.87	-1245.86	1.66	1.64	-0.20	531802.49	1708383.43	N 39 57 19.61 W	80 32 24.89	5.58
	7573.00	90.52	324.76	6558.38	5408.53	1047.88	75.65	-1298.44	2.50	-1.16	2.21	531874.27	1708330.85	N 39 57 20.32 W	80 32 25.57	5.61
	7663.00	91.34	325.39	6556.92	5407.07	1134.63	149.43	-1349.96	1.15	0.91	0.70	531948.05	1708279.33	N 39 57 21.04 W	80 32 26.25	5.64
	7752.00	91.13	326.03	6555.00	5405.15	1220.14	222.95	-1400.09	0.76	-0.24	0.72	532021.56	1708229.21	N 39 57 21.76 W	80 32 26.90	5.66
	7842.00	88.97	325.62	6554.92	5405.07	1306.58	297.40	-1450.64	2.44	-2.40	-0.46	532096.01	1708178.66	N 39 57 22.49 W	80 32 27.56	5.69
	7931.00	92.20	325.39	6554.01	5404.16	1392.18	370.74	-1501.03	3.64	3.63	-0.26	532169.34	1708128.26	N 39 57 23.21 W	80 32 28.22	5.72
	8021.00	93.09	324.64	6549.86	5400.01	1478.87	444.40	-1552.58	1.29	0.99	-0.83	532243.00	1708076.72	N 39 57 23.93 W	80 32 28.89	5.75
	8110.00	88.80	325.17	6548.39	5398.54	1564.71	517.19	-1603.73	4.86	-4.82	0.60	532315.79	1708025.57	N 39 57 24.64 W	80 32 29.56	5.78
	8199.00	88.83	324.77	6550.23	5400.38	1650.53	590.05	-1654.80	0.45	0.03	-0.45	532388.65	1707974.50	N 39 57 25.36 W	80 32 30.23	5.80
	8289.00	89.07	324.52	6551.88	5402.03	1737.46	663.44	-1706.87	0.39	0.27	-0.28	532462.03	1707922.43	N 39 57 26.08 W	80 32 30.91	5.82
	8379.00	91.72	325.48	6551.26	5401.41	1824.24	737.15	-1758.49	3.13	2.94	1.07	532535.74	1707870.82	N 39 57 26.80 W	80 32 31.58	5.84
	8468.00	91.62	324.86	6548.67	5398.82	1909.96	810.18	-1809.30	0.71	-0.11	-0.70	532608.76	1707820.01	N 39 57 27.52 W	80 32 32.24	5.86
	8557.00	92.51	325.11	6545.46	5395.61	1995.74	883.02	-1860.33	1.04	1.00	0.28	532681.60	1707768.98	N 39 57 28.23 W	80 32 32.91	5.88
	8647.00	91.44	324.96	6542.36	5392.51	2082.47	956.73	-1911.88	1.20	-1.19	-0.17	532755.31	1707717.44	N 39 57 28.95 W	80 32 33.58	5.90
	8737.00	89.66	324.06	6541.50	5391.65	2169.45	1030.00	-1964.12	2.22	-1.98	-1.00	532828.58	1707665.19	N 39 57 29.67 W	80 32 34.26	5.93
	8827.00	89.52	323.00	6542.13	5392.28	2255.85	1101.57	-2017.02	1.20	-0.16	-1.19	532900.14	1707612.30	N 39 57 30.37 W	80 32 34.95	5.94
	8916.00	90.76	322.79	6541.91	5392.06	2343.46	1173.35	-2071.32	1.40	1.38	-0.23	532971.92	1707558.01	N 39 57 31.07 W	80 32 35.66	5.96

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Comments	MD (ft)	Incl (°)	Azlm Grtd (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	BR (°/100ft)	TR (°/100ft)	Northing (ftUS)	Eastng (ftUS)	Latitude (N/S ° ° °)	Longitude (E/W ° ° °)	Directional Difficulty Index
	9005.00	89.90	322.96	6541.40	5391.55	2430.10	1244.31	-2125.03	0.98	-0.97	0.19	533042.87	1707504.29	N 39 57 31.77 W	80 32 36.36	5.98
	9095.00	90.89	322.99	6540.78	5390.93	2517.68	1316.16	-2179.22	1.10	0.03	0.03	533114.72	1707450.10	N 39 57 32.47 W	80 32 37.07	6.00
	9184.00	92.13	321.98	6538.44	5388.59	2604.43	1386.73	-2233.40	1.80	1.39	-1.13	533185.29	1707395.93	N 39 57 33.16 W	80 32 37.77	6.02
	9274.00	91.44	323.55	6535.63	5385.78	2692.04	1458.34	-2287.83	1.90	-0.77	1.74	533256.90	1707341.50	N 39 57 33.87 W	80 32 38.48	6.04
	9363.00	89.21	323.73	6535.13	5385.28	2778.39	1530.01	-2340.59	2.51	-2.51	0.20	533328.56	1707288.74	N 39 57 34.57 W	80 32 39.17	6.06
	9453.00	89.59	323.50	6536.07	5386.22	2865.73	1602.46	-2393.98	0.49	0.42	-0.26	533401.01	1707235.36	N 39 57 35.28 W	80 32 39.87	6.07
	9542.00	89.90	322.84	6536.47	5386.62	2952.27	1673.70	-2447.33	0.82	0.35	-0.74	533472.24	1707182.01	N 39 57 35.98 W	80 32 40.56	6.09
	9632.00	90.31	323.21	6536.30	5386.45	3039.83	1745.60	-2501.46	0.61	0.46	0.41	533544.14	1707127.88	N 39 57 36.68 W	80 32 41.27	6.10
	9721.00	91.65	322.19	6534.78	5384.93	3126.52	1816.38	-2555.38	1.89	1.51	-1.15	533614.92	1707073.96	N 39 57 37.37 W	80 32 41.97	6.12
	9811.00	89.83	323.33	6533.62	5383.77	3214.16	1888.02	-2609.84	2.39	-2.02	1.27	533686.56	1707019.51	N 39 57 38.08 W	80 32 42.68	6.14
	9901.00	90.07	322.68	6533.70	5383.85	3301.73	1959.90	-2663.99	0.77	0.27	-0.72	533758.44	1706965.36	N 39 57 38.78 W	80 32 43.39	6.15
	9990.00	90.31	322.92	6533.40	5383.55	3388.40	2030.79	-2717.80	0.38	0.27	0.27	533829.32	1706911.55	N 39 57 39.47 W	80 32 44.09	6.16
	10080.00	90.86	322.14	6532.48	5382.63	3476.14	2102.22	-2772.55	1.06	0.61	-0.87	533900.75	1706856.80	N 39 57 40.17 W	80 32 44.80	6.18
	10169.00	90.14	321.97	6531.70	5381.85	3563.06	2172.40	-2827.27	0.83	-0.81	-0.19	533970.93	1706802.08	N 39 57 40.86 W	80 32 45.52	6.19
	10259.00	89.97	322.34	6531.62	5381.77	3650.92	2243.47	-2882.49	0.45	-0.19	0.41	534041.99	1706746.87	N 39 57 41.56 W	80 32 46.24	6.21
	10348.00	89.62	323.47	6531.94	5382.09	3737.56	2314.46	-2936.17	1.33	-0.39	1.27	534112.98	1706693.19	N 39 57 42.25 W	80 32 46.94	6.22
	10438.00	90.96	323.17	6531.48	5381.63	3825.01	2386.64	-2989.93	1.53	1.49	-0.33	534185.15	1706639.43	N 39 57 42.96 W	80 32 47.64	6.24
	10527.00	90.27	324.23	6530.53	5380.68	3911.34	2458.36	-3042.61	1.42	-0.78	1.19	534256.87	1706586.75	N 39 57 43.66 W	80 32 48.33	6.25
Final Survey 03Feb13	10616.00	90.69	323.48	6529.78	5379.93	3997.62	2530.23	-3095.11	0.97	0.47	-0.84	534328.73	1706534.26	N 39 57 44.37 W	80 32 49.01	6.26
Projection to Bit	10696.00	90.69	323.48	6528.82	5378.97	4075.30	2594.51	-3142.71	0.00	0.00	0.00	534393.02	1706486.66	N 39 57 45.00 W	80 32 49.63	6.27

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 Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.380		30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Noble Energy 10696' MD SHL-8K-HS Gyro+MWD 0' to
	18.380	2960.000		30.000	SLB_NSG+MSHOT	Original Borehole / Noble Energy SHL-8K-HS Gyro+MWD 0' to
	2960.000	10616.000		30.000	SLB_MWD-STD	Original Borehole / Noble Energy SHL-8K-HS Gyro+MWD 0' to
	10616.000	10696.000		30.000	SLB_BLIND+TREND	Original Borehole / Noble Energy SHL-8K-HS Gyro+MWD 0' to

03/07/2014