

51-01603



Noble Energy



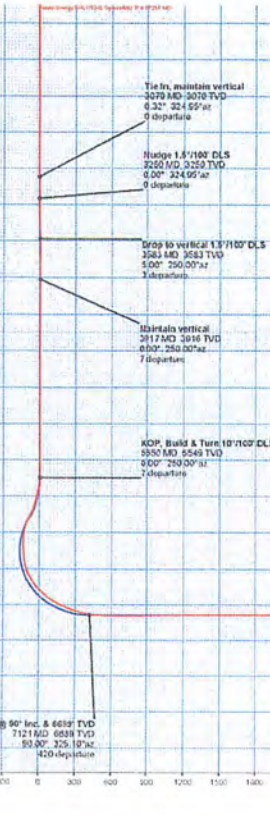
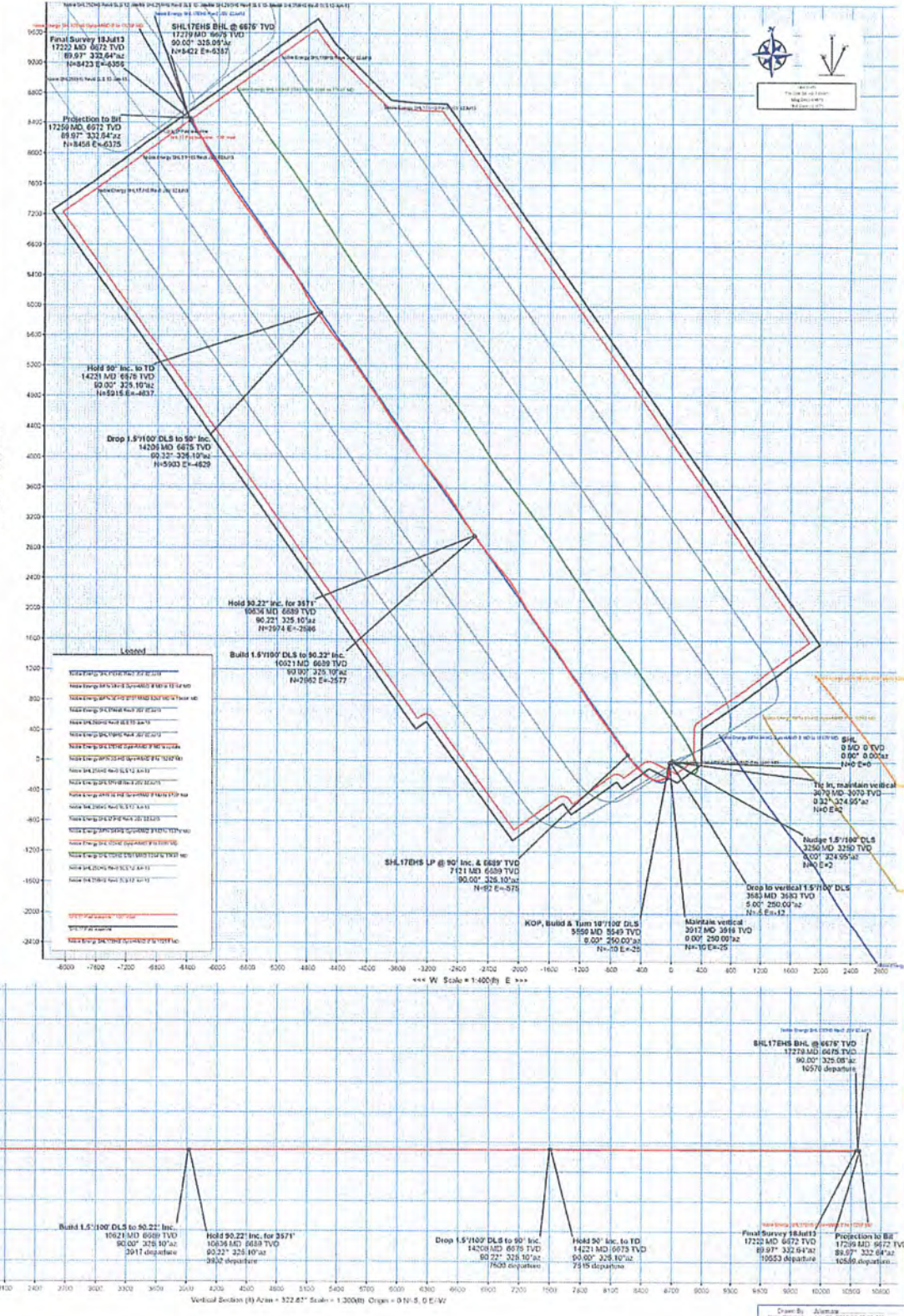
WELL	SHL17EHS	FIELD	WV Marshall County (NAD 27)	YEAR/ITER	Precision 543
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Original Well Name: SHL17EHS Well ID: 60042 Date: NOV 15, 2013 Log File: 07709.PLOT	Method Location: 512527 West Virginia State Plane, North Zone 2, Unit 1, East Zone: N Datum: NAD 27 Units: Feet X Unit: 1171419.116653 Y Unit: 6190300.01199452	Manufacturer: SHL17EHS Date: 04/23/2014 Well ID: 60042 Date: July 12, 2014
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Depth	Time	Rate
0.0	0.00	0.00
1.0	0.05	0.05
2.0	0.10	0.10
3.0	0.15	0.15
4.0	0.20	0.20
5.0	0.25	0.25
6.0	0.30	0.30
7.0	0.35	0.35
8.0	0.40	0.40
9.0	0.45	0.45
10.0	0.50	0.50
11.0	0.55	0.55
12.0	0.60	0.60
13.0	0.65	0.65
14.0	0.70	0.70
15.0	0.75	0.75
16.0	0.80	0.80
17.0	0.85	0.85
18.0	0.90	0.90
19.0	0.95	0.95
20.0	1.00	1.00
21.0	1.05	1.05
22.0	1.10	1.10
23.0	1.15	1.15
24.0	1.20	1.20
25.0	1.25	1.25
26.0	1.30	1.30
27.0	1.35	1.35
28.0	1.40	1.40
29.0	1.45	1.45
30.0	1.50	1.50

Depth	Time	Rate
0.0	0.00	0.00
1.0	0.05	0.05
2.0	0.10	0.10
3.0	0.15	0.15
4.0	0.20	0.20
5.0	0.25	0.25
6.0	0.30	0.30
7.0	0.35	0.35
8.0	0.40	0.40
9.0	0.45	0.45
10.0	0.50	0.50
11.0	0.55	0.55
12.0	0.60	0.60
13.0	0.65	0.65
14.0	0.70	0.70
15.0	0.75	0.75
16.0	0.80	0.80
17.0	0.85	0.85
18.0	0.90	0.90
19.0	0.95	0.95
20.0	1.00	1.00
21.0	1.05	1.05
22.0	1.10	1.10
23.0	1.15	1.15
24.0	1.20	1.20
25.0	1.25	1.25
26.0	1.30	1.30
27.0	1.35	1.35
28.0	1.40	1.40
29.0	1.45	1.45
30.0	1.50	1.50

Depth	Time	Rate
0.0	0.00	0.00
1.0	0.05	0.05
2.0	0.10	0.10
3.0	0.15	0.15
4.0	0.20	0.20
5.0	0.25	0.25
6.0	0.30	0.30
7.0	0.35	0.35
8.0	0.40	0.40
9.0	0.45	0.45
10.0	0.50	0.50
11.0	0.55	0.55
12.0	0.60	0.60
13.0	0.65	0.65
14.0	0.70	0.70
15.0	0.75	0.75
16.0	0.80	0.80
17.0	0.85	0.85
18.0	0.90	0.90
19.0	0.95	0.95
20.0	1.00	1.00
21.0	1.05	1.05
22.0	1.10	1.10
23.0	1.15	1.15
24.0	1.20	1.20
25.0	1.25	1.25
26.0	1.30	1.30
27.0	1.35	1.35
28.0	1.40	1.40
29.0	1.45	1.45
30.0	1.50	1.50



03/21/2014

51-01603



Noble Energy SHL17EHS Gyro+MWD 0' to 17259' MD Survey Report (Def Survey)



Report Date: July 18, 2012 - 09:00 AM
Client: Noble Energy
Field: WV Marston County (NAD 27)
Structure / Shot: SHL17EHS
Well: SHL17EHS
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Noble Energy SHL17EHS Gyro+MWD 0' to 17259' MD
Survey Dates: July 03, 2012
Tert / AMD / DDI / ERD Rate: 344.475 / 11114.135 R / 6.004 / 1.000
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 30° 58' 38.7730" W 80° 21' 45.7722"
Location Grid N/E Y/X: N 509778 050 818, E 171443 150 818
CRS Grid Convergence Angle: -0.0547°
Grid Scale Factor: 0.9999962

Survey / DLS Computation: Minimum Curvatures / Lidarwell
Vertical Section Azimuth: 332.825° (0° North)
Vertical Section Origin: 0.000 R, 0.000 T
TVD Reference Datum: KD
TVD Reference Elevation: 1250.500 R above MSL
Seabed / Ground Elevation: 1272.000 R above MSL
Magnetic Declination: -8.507°
Total Gravity Field Strength: 959.35098 (0.85665 Gauss)
Total Magnetic Field Strength: 52193.781 nT
Magnetic Dip Angle: 67.549°
Declination Date: July 03, 2012
Magnetic Declination Model: IIGM 2010
North Reference: Grid North
Grid Convergence Used: -0.0547°
Total Core Mag North+Grid North: -7.8107°
Local Coord Referenced To: Well Head

Table with columns: Comments, MD (ft), Incl (°), Azim Grid (°), TVD (ft), TVDSS (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ft), Easting (ft), Latitude (N/S ° ' " ."), Longitude (E/W ° ' " ."), Directional Index. The table contains multiple rows of data representing well survey points.

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVD98 (ft)	VSEC (ft)	N8 (ft)	EW (ft)	DL8 (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Nothing (ft/ft)	Easting (ft/ft)	Latitude (N/S ° ° ' '')	Longitude (E/W ° ° ' '')	Directional Difficulty Index
	14590.00	90.21	331.48	6678.98	6368.10	7027.01	6246.85	-4892.83	1.83	-0.38	-1.70	540024.84	1700500.53	N 39 50 38.95 W	80 32 50.42	8.76
	14690.00	90.45	327.68	6670.16	6365.60	6017.20	6224.44	-4938.39	4.23	0.27	-4.22	545102.23	1700514.07	N 39 50 40.71 W	80 32 51.02	8.76
	14790.00	90.41	325.02	6675.49	6364.90	6106.06	6308.52	-4917.70	2.60	-0.04	-2.56	540176.31	1700465.69	N 39 50 41.44 W	80 32 51.87	8.77
	14889.00	89.89	321.32	6675.23	6364.72	6196.07	6470.55	-5031.64	4.15	-0.53	-4.11	546248.33	1700411.72	N 39 50 42.14 W	80 32 52.37	8.76
	14948.00	90.17	321.58	6675.15	6364.65	6285.04	6540.15	-5057.10	0.40	0.20	0.20	546317.33	1700356.20	N 39 50 42.83 W	80 32 53.09	8.78
	15038.00	90.14	320.06	6674.90	6364.40	6375.03	6611.30	-5142.12	1.84	-0.03	1.04	546380.15	1700301.26	N 39 50 43.53 W	80 32 53.81	8.80
	15127.00	90.00	321.08	6674.80	6364.30	6484.03	6682.00	-5180.27	1.22	-0.10	-1.21	546459.77	1700247.10	N 39 50 44.21 W	80 32 54.62	8.81
	15217.00	90.03	322.22	6674.77	6364.27	6564.02	6763.02	-5251.88	0.27	0.03	0.27	546530.70	1700191.82	N 39 50 44.91 W	80 32 55.24	8.81
	15308.00	90.34	324.20	6674.46	6363.98	6643.02	6824.29	-5304.85	2.26	0.36	2.22	546602.00	1700136.52	N 39 50 45.61 W	80 32 55.93	8.82
	15398.00	90.03	325.42	6674.10	6363.60	6732.00	6907.84	-5355.77	1.40	-0.34	1.36	546676.00	1700080.80	N 39 50 46.33 W	80 32 56.61	8.83
	15485.00	90.07	326.47	6674.12	6363.02	6821.83	6971.56	-5406.56	1.18	0.04	1.18	546749.34	1700026.82	N 39 50 47.05 W	80 32 57.26	8.84
	15575.00	90.41	325.26	6673.74	6363.24	6911.70	7048.07	-5457.06	1.40	0.28	-1.34	546823.83	1700080.32	N 39 50 47.76 W	80 32 57.92	8.85
	15665.00	90.21	323.02	6673.25	6362.75	7001.60	7119.26	-5509.20	1.84	-0.22	-1.82	546897.03	1700023.08	N 39 50 48.50 W	80 32 58.80	8.86
	15754.00	90.10	323.05	6673.01	6362.51	6950.65	7100.87	-5562.54	0.65	-0.12	-0.64	546968.42	1700060.85	N 39 50 49.20 W	80 32 59.30	8.88
	15844.00	89.90	323.02	6673.01	6362.51	6910.65	7282.86	-5618.28	0.67	-0.22	0.03	547040.61	1700082.11	N 39 50 49.91 W	80 33 0.00	8.87
	16033.00	90.14	323.07	6672.98	6362.46	6969.64	7334.88	-5680.85	0.46	0.27	0.26	547112.64	1700174.64	N 39 50 50.61 W	80 33 0.99	8.88
	16023.00	90.03	323.03	6672.85	6362.35	6958.82	7407.26	-5722.07	0.50	-0.49	0.47	547188.00	1700271.32	N 39 50 51.33 W	80 33 1.36	8.89
	16112.00	90.17	326.17	6672.09	6362.10	6448.69	7479.56	-5773.04	1.85	0.16	1.84	547257.51	1700669.46	N 39 50 52.03 W	80 33 2.00	8.89
	16202.00	90.31	327.01	6672.21	6361.81	6538.44	7542.20	-5824.15	2.05	0.16	2.04	547332.00	1700619.28	N 39 50 52.70 W	80 33 2.71	8.90
	16291.00	89.83	326.78	6672.21	6361.71	6627.21	7628.82	-5876.78	0.80	-0.54	-0.26	547406.55	1700570.64	N 39 50 53.49 W	80 33 3.35	8.91
	16380.00	90.24	326.60	6672.15	6361.60	6710.05	7702.76	-5922.28	1.40	0.46	-1.33	547480.49	1700552.12	N 39 50 54.22 W	80 33 4.00	8.92
	16470.00	89.76	326.60	6672.16	6361.05	6805.88	7777.02	-6073.13	0.63	-0.53	-0.01	547554.76	1700470.27	N 39 50 54.95 W	80 33 4.86	8.92
	16560.00	90.31	326.34	6672.10	6361.00	6894.82	7850.77	-6022.94	1.05	0.82	0.84	547628.50	1700420.46	N 39 50 55.07 W	80 33 5.31	8.93
	16649.00	90.28	326.05	6671.83	6361.13	6954.62	7925.06	-6072.43	0.86	-0.33	0.68	547703.67	1700370.38	N 39 50 56.41 W	80 33 5.96	8.94
	16740.00	90.10	326.18	6671.33	6360.83	10075.15	8003.57	-6119.80	1.53	-0.20	3.53	547781.50	1700323.52	N 39 50 57.17 W	80 33 6.58	8.95
	16835.00	89.73	332.38	6671.46	6360.96	10103.18	8081.60	-6162.60	2.51	-0.42	2.47	547859.32	1700280.78	N 39 50 57.93 W	80 33 7.14	8.90
	16919.00	90.07	330.11	6671.88	6361.12	10252.21	8100.49	-6205.88	2.59	0.38	-2.50	547938.20	1700237.42	N 39 50 58.71 W	80 33 7.71	8.87
	17004.00	90.00	329.25	6671.57	6361.07	10340.87	8237.32	-6250.92	0.97	-0.06	-0.97	548015.02	1700192.49	N 39 50 59.49 W	80 33 8.20	8.87
	17098.00	89.93	329.01	6671.02	6361.12	10430.03	8314.57	-6287.10	0.28	-0.08	-0.27	548092.27	1700140.32	N 40 0 0.22 W	80 33 8.80	8.88
	17188.00	89.06	331.58	6671.76	6361.26	10519.26	8392.72	-6341.71	2.82	-0.03	2.82	548170.42	1700101.70	N 40 0 0.26 W	80 33 9.40	8.89
First Survey 18.Jul.13	17222.00	89.07	332.04	6671.79	6361.26	10552.81	8472.77	-6357.83	3.21	0.21	3.21	548200.47	1700085.70	N 40 0 1.28 W	80 33 9.70	8.90
Production to Bit	17250.00	89.07	332.04	6671.81	6361.31	10560.27	8456.83	-6374.63	0.00	0.00	0.00	548233.33	1700068.70	N 40 0 1.61 W	80 33 9.92	8.90

Survey Type: Def Survey

Survey Error Model: ISOWSA Rev 0 *** 3-D 09.000% Confidence 2.7855 sigma

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.600		Act Strs	30.000	30.000	61.0_NSG+MSH+NOT-Depth Only
	18.500	3070.000		Act Strs	30.000	30.000	61.0_NSG+MSH+NOT
	3070.000	3209.000		Act Strs	30.000	30.000	61.0_NSG+MSH+NOT
	3209.000	17222.000		Act Strs	30.000	30.000	61.0_NSG+MSH+NOT
	17222.000	17280.000		Act Strs	30.000	30.000	61.0_NSG+MSH+NOT

05/27/2014