

Northeast Natural MIP 3H ST01 0ft to 13874ft MD Survey Geodetic Report



Processed Office of Oil & Gas FEB 26 2016

(Def Survey)

Report Date: September 22, 2015 - 07:13 AM
Client: Northeast Natural
Fields: W/Monongalia County (HAD 83)
Structure / Slot: Northeast Natural MIP Pad (HAD 3H)
Well: MIP 3H
Borehole: STD1
LWD / API#: Unknown / Unknown
Survey Name: Northeast Natural MIP 3H ST01 6212ft to 13874ft MD
Survey Date: September 15, 2015
Tort / AHD / DDI / ERO Ratio: 212.053 / 6999.004 ft / 6.442 / 0.205
Coordinate Reference System: NAD83 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 38' 6.43007" W 79° 58' 34.042667"
Location Grid N/E Y/Z: N 401655.600 / NUS, E 1834344.900 / NUS
CRS Grid Convergence Angle: -0.3037 *
Grid Scale Factor: 0.99994083
Version / Patch: 2.7.10.43.0
Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 316.774 * (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: 1028.000 ft above MSL
Sealed / Ground Elevation: 1028.000 ft above MSL
Magnetic Declination: -0.548 *
Total Gravity Field Strength: 999.3447mgal (0.00665 Gals)
Gravity Model: GARM
Total Magnetic Field Strength: 32522.023 nT
Magnetic Dip Angle: 66.851 *
Declination Date: September 15, 2015
Magnetic Declination Model: HOGM 2015
North Reference: Gd Norm
Grid Convergence Used: -0.3037 *
Total Geom Mag North-Grid North: -0.2445 *
Local Coord Reference To: Well Head

Table with columns: Comments, MD (ft), Incl (ft), Azim (ft), TVD (ft), TVD55 (ft), VSEC (ft), NS (ft), EW (ft), DLS (ft/100ft), BR (ft/100ft), TR (ft/100ft), Northing (ft), Easting (ft), Latitude (N/S), Longitude (W/E). Rows include depth intervals from 0.00 to 8251.00 ft.

06/17/2016

Comments	MD (ft)	Incl (°)	Actn Off (ft)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft)	DR (ft)	TR (ft)	Northings (ft)	Easting (ft)	Latitude (N+/-)	Longitude (E+/-)
	8346.00	90.80	323.35	7477.05	6365.06	1107.52	587.01	-1003.14	1.22	-0.93	0.79	402253.57	183333.62	N 39 36 12.27 W	79 58 46.80
	8441.00	91.28	324.41	7475.45	6363.45	1202.20	673.73	-1083.13	1.29	-0.65	1.12	402260.29	183379.84	N 39 36 13.02 W	79 58 47.70
	8535.00	91.10	324.57	7473.50	6359.50	1295.84	750.09	-1116.02	0.24	-0.19	-0.15	402406.65	183323.05	N 39 36 13.77 W	79 58 46.40
	8620.00	91.20	323.32	7471.83	6358.25	1390.69	828.73	-1178.02	1.02	0.19	-0.10	402485.29	183316.65	N 39 36 14.03 W	79 58 45.12
	8725.00	90.82	323.00	7469.70	6357.70	1435.47	903.04	-1222.57	0.48	-0.39	0.29	402559.59	183311.01	N 39 36 15.28 W	79 58 44.63
	8819.00	91.01	324.30	7463.12	6356.12	1579.22	978.69	-1287.05	0.65	0.10	0.64	402635.82	183305.03	N 39 36 16.03 W	79 58 50.86
	8913.00	92.15	324.34	7463.53	6353.53	1672.89	1053.26	-1342.82	1.22	1.21	0.15	402711.23	183300.17	N 39 36 16.78 W	79 58 51.27
	9008.00	91.20	324.06	7462.89	6350.69	1787.56	1132.28	-1393.36	0.96	-0.62	-0.20	402783.61	183294.62	N 39 36 17.54 W	79 58 51.63
	9101.00	90.48	322.17	7461.28	6349.26	1850.39	1206.63	-1454.17	2.21	-0.68	-2.03	402853.17	183289.82	N 39 36 18.27 W	79 58 52.70
	9193.00	90.82	324.34	7450.10	6348.10	1933.20	1282.78	-1511.00	2.33	0.48	2.28	402929.28	183283.60	N 39 36 19.02 W	79 58 53.43
	9281.00	91.71	323.06	7457.82	6347.82	2049.80	1359.70	-1568.69	0.67	0.83	-0.51	403011.21	183278.31	N 39 36 19.78 W	79 58 54.15
	9388.00	91.45	323.89	7453.30	6347.30	2144.63	1436.40	-1622.67	0.28	-0.37	0.03	403092.61	183272.32	N 39 36 20.53 W	79 58 54.67
	9493.00	91.63	324.28	7452.77	6346.77	2236.32	1512.51	-1677.79	0.47	0.19	0.40	403169.01	183266.22	N 39 36 21.28 W	79 58 55.59
	9595.00	91.80	324.90	7449.93	6347.93	2322.20	1589.30	-1723.00	0.07	0.16	0.84	403248.41	183261.21	N 39 36 22.04 W	79 58 56.29
	9670.00	90.84	322.25	7447.34	6345.74	2427.67	1668.68	-1768.72	2.29	-1.01	-2.95	403323.16	183256.29	N 39 36 22.80 W	79 58 57.01
	9765.00	90.57	322.42	7446.57	6344.57	2522.54	1742.21	-1818.31	0.63	-0.26	-0.56	403398.70	183249.71	N 39 36 23.54 W	79 58 57.75
	9860.00	90.92	322.82	7445.33	6343.33	2617.41	1817.74	-1863.81	0.64	0.37	0.63	403474.23	183244.11	N 39 36 24.28 W	79 58 58.49
	9954.00	90.13	322.57	7444.47	6342.47	2711.28	1888.79	-1909.39	0.84	-0.04	0.05	403549.24	183238.47	N 39 36 25.02 W	79 58 59.22
	10049.00	90.22	324.03	7444.18	6342.18	2804.05	1963.12	-1957.08	1.12	0.02	1.12	403623.00	183232.97	N 39 36 25.77 W	79 58 59.86
	10143.00	90.82	323.14	7444.40	6342.40	2893.72	2043.70	-2007.53	1.40	-0.74	1.18	403702.20	183227.50	N 39 36 26.53 W	79 58 60.63
	10238.00	90.13	324.00	7444.69	6342.69	2984.32	2128.58	-2058.00	0.69	0.84	-0.26	403780.00	183221.90	N 39 36 27.29 W	79 58 61.35
	10332.00	90.08	324.25	7443.33	6343.33	3087.80	2203.15	-2109.40	1.31	-1.12	-0.48	403858.02	183216.55	N 39 36 28.04 W	79 58 62.05
	10426.00	90.40	323.01	7443.76	6343.76	3181.72	2278.27	-2153.03	1.45	1.40	-0.36	403932.73	183210.41	N 39 36 28.80 W	79 58 62.78
	10521.00	90.04	323.18	7443.40	6343.40	3278.51	2353.60	-2203.00	0.88	-0.36	-0.77	404002.14	183203.86	N 39 36 29.55 W	79 58 63.48
	10616.00	90.22	323.83	7443.18	6343.18	3371.36	2428.61	-2243.18	0.32	0.19	-0.28	404073.05	183198.87	N 39 36 30.30 W	79 58 64.22
	10710.00	90.13	323.84	7444.89	6342.89	3465.10	2503.91	-2283.44	0.08	-0.10	0.63	404143.30	183193.91	N 39 36 31.04 W	79 58 64.93
	10805.00	90.04	323.20	7444.75	6342.75	3560.00	2580.15	-2323.12	0.37	-0.09	-0.38	404213.90	183188.93	N 39 36 31.79 W	79 58 65.60
	10900.00	90.40	322.42	7444.30	6342.30	3653.07	2653.00	-2363.84	0.91	0.26	-0.80	404284.17	183183.12	N 39 36 32.53 W	79 58 66.31
	10995.00	90.78	322.35	7444.24	6342.24	3747.77	2728.40	-2403.31	0.69	-0.69	-0.67	404353.92	183178.75	N 39 36 33.28 W	79 58 67.14
	11089.00	90.51	321.45	7444.17	6342.17	3842.70	2804.23	-2443.83	1.10	0.58	-0.95	404423.08	183174.10	N 39 36 33.99 W	79 58 67.90
	11183.00	90.48	321.33	7444.39	6342.39	3937.65	2879.59	-2484.08	0.93	-0.92	0.08	404492.01	183169.80	N 39 36 34.73 W	79 58 68.66
	11277.00	90.59	321.63	7443.65	6343.65	4031.60	2954.25	-2524.28	0.49	-0.47	0.10	404560.67	183165.81	N 39 36 35.45 W	79 58 69.41
	11371.00	90.89	322.59	7447.36	6343.36	4124.90	3027.34	-2564.78	0.98	0.00	0.80	404629.10	183161.21	N 39 36 36.19 W	79 58 70.16
	11465.00	90.43	323.04	7443.65	6343.65	4219.36	3102.12	-2604.56	0.67	0.49	0.48	404697.53	183147.51	N 39 36 36.93 W	79 58 70.92
	11559.00	90.94	323.22	7443.43	6343.43	4313.30	3178.12	-2644.56	1.50	1.49	0.19	404765.92	183143.52	N 39 36 37.67 W	79 58 71.63
	11653.00	90.57	322.70	7447.26	6343.26	4407.04	3253.96	-2684.78	0.69	-0.28	-0.52	404834.30	183139.32	N 39 36 38.42 W	79 58 72.39
	11747.00	90.84	322.39	7446.03	6344.03	4500.92	3328.33	-2725.51	0.48	0.28	-0.36	404902.77	183135.37	N 39 36 39.16 W	79 58 73.10
	11841.00	90.48	323.57	7445.01	6343.01	4598.77	3403.30	-2766.24	1.11	-0.38	1.04	404970.72	183131.48	N 39 36 40.00 W	79 58 73.83
	11935.00	91.45	324.61	7443.41	6343.41	4693.40	3481.28	-2811.85	1.83	1.22	1.82	405038.44	183127.84	N 39 36 40.85 W	79 58 74.53
	12029.00	91.10	324.60	7441.32	6343.32	4787.10	3558.10	-2858.04	0.39	-0.37	0.10	405106.40	183123.05	N 39 36 41.41 W	79 58 75.29
	12123.00	91.28	324.88	7439.34	6343.34	4881.08	3633.84	-2903.62	0.20	0.19	0.08	405174.21	183118.48	N 39 36 42.18 W	79 58 76.03
	12217.00	90.90	324.69	7437.52	6343.52	4978.30	3711.47	-2951.34	0.48	-0.38	-0.29	405242.04	183114.29	N 39 36 42.94 W	79 58 76.80
	12311.00	91.28	324.75	7435.69	6343.69	5070.94	3789.30	-2997.23	0.30	0.39	0.04	405309.28	183109.48	N 39 36 43.71 W	79 58 77.56
	12405.00	91.28	324.53	7433.89	6343.89	5164.57	3867.62	-3044.82	0.18	0.00	-0.18	405376.99	183105.29	N 39 36 44.46 W	79 58 78.30
	12500.00	91.01	324.33	7431.70	6343.70	5259.24	3944.90	-3093.84	0.35	-0.25	-0.21	405444.28	183101.57	N 39 36 45.22 W	79 58 79.03
	12593.00	91.35	324.96	7429.73	6343.73	5353.87	4022.38	-3143.77	0.78	0.37	0.60	405511.74	183098.134	N 39 36 45.99 W	79 58 79.80
	12687.00	91.28	324.45	7427.57	6343.57	5447.50	4091.05	-3193.07	0.59	-0.39	-0.39	405579.48	183094.05	N 39 36 46.74 W	79 58 80.51
	12781.00	91.19	323.29	7425.52	6343.52	5542.10	4178.78	-3243.74	0.91	-0.58	0.91	405647.10	183090.28	N 39 36 47.50 W	79 58 81.23
	12875.00	90.82	323.29	7423.79	6341.79	5633.64	4254.08	-3297.19	0.91	-0.29	0.11	405714.40	183086.84	N 39 36 48.27 W	79 58 82.01
	12969.00	91.80	323.86	7421.53	6340.53	5730.27	4331.49	-3352.17	1.08	0.83	-1.01	405781.93	183083.96	N 39 36 49.03 W	79 58 82.80
	13070.00	91.98	324.14	7419.43	6340.43	5823.87	4407.50	-3407.29	0.35	0.19	0.30	405849.63	183081.75	N 39 36 49.78 W	79 58 83.56
	13170.00	90.78	324.68	7418.17	6341.17	5918.61	4484.62	-3463.54	1.80	-1.29	0.76	405917.14	183079.20	N 39 36 50.54 W	79 58 84.30
	13270.00	90.78	324.73	7414.84	6342.84	6012.25	4561.62	-3519.72	0.14	0.00	-0.14	405984.94	183076.42	N 39 36 51.29 W	79 58 85.04
	13370.00	90.78	324.81	7414.50	6342.50	6108.89	4639.28	-3571.48	1.64	-1.02	0.19	406052.98	183073.60	N 39 36 52.05 W	79 58 85.80
	13470.00	89.69	323.94	7414.84	6342.84	6201.48	4717.05	-3623.96	0.17	-0.08	0.14	406120.37	183071.17	N 39 36 52.82 W	79 58 86.51
	13570.00	89.86	323.81	7413.23	6343.23	6298.04	4795.18	-3680.03	0.66	0.28	0.60	406188.49	183068.12	N 39 36 53.59 W	79 58 87.25
	13670.00	90.82	323.89	7414.31	6342.31	6393.67	4871.80	-3734.21	2.01	1.02	-1.73	406256.28	183065.04	N 39 36 54.33 W	79 58 88.00
	13770.00	90.04	323.07	7413.71	6341.71	6484.46	4948.37	-3788.49	1.32	-0.93	-0.90	406324.87	183062.14	N 39 36 55.10 W	79 58 88.73
final survey	13870.00	90.78	323.23	7413.04	6341.04	6582.28	5023.82	-3843.42	0.70	0.72	0.72	406393.11	183059.34	N 39 36 55.87 W	79 58 89.58
Projection to TD	13874.00	90.78	323.23	7412.54	6340.54	6600.21	5057.28	-3872.13	0.00	0.00	0.00	406373.57	183057.03	N 39 36 56.17 W	79 58 89.57

Survey Type: Def Survey

Survey Error Model: ISCN5A Rev 0 *** 3-D 85.000% Confidence 3.7935 sigma

Description	Part	MD From (ft)	MD To (ft)	EDU Freq (ft)	Hole Size	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.00	34.000	Act Strs	17.500	13.378	SLB_NSG-MESHOT-Depth Only	Original Borehole / Northeast Natural MIP 3H Qye-MVMD 08 to update
	1	34.000	830.000	Act Strs	17.500	13.378	SLB_NSG-MESHOT	Original Borehole / Northeast Natural MIP 3H Qye-MVMD 08 to update
	1	830.000	1770.000	Act Strs	12.250	9.625	SLB_NSG-MESHOT	Original Borehole / Northeast Natural MIP 3H Qye-MVMD 08 to update
	1	1770.000	6212.000	Act Strs	8.750	8.900		