



CNX PHL-29E-HS Gyro+MWD Survey 0ft to 18048ft MD

(Non-Def Survey)

Report Date: July 21 2014 - 10:22 AM
Client: CNX
Field: WV Barbour County (H2027)
Structure / Slot: CNX PHL-29 Pad / PHL-29E-HS
Well: PHL-29E-HS
Borehole: Original Borehole
UWI / AP# : Unknown / Unknown
Survey Name: CNX PHL-29E-HS Gyro+MWD 0ft to update
Survey Date: June 27, 2014
Tort / AHD / DDI / ERD Ratio: 228.183' / 11014.815' R / 6.754' / 1.424
Coordinate Reference System: NAD27 West Virginia State Plane, Northern Zone, US Feet
Location Lat / Long: N 39° 12' 5.02362" W 80° 3' 17.61033"
Location Grid N/E Y/X: N 255948.209 MGS, E 1642746.000 MGS
CRS Grid Convergence Angle: -0.3539°
Grid Scale Factor: 0.99996003
Version / Patch: 2.7 1043.0

Survey / DLS Computation: Vertical Section Azimuth: 137.104 ° (Grid North)
Vertical Section Origin: 0 000.0, 0 000.0 KB
TVL Reference Datum: 1434.010 ft above MSL
Seabed / Ground Elevation: 1405.510 ft above MSL
Magnetic Declination: -9.534 °
Total Gravity Field Strength: 966.2854mgals (G 80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 52163.998 rT
Magnetic Dip Angle: 66.372 °
Declination Date: June 27, 2014
Magnetic Declination Model: HDGM 2013
North Reference: Grid North
Grid Convergence Used: -0.3539 °
Total Corr Mag North+Grid North: -9.1802 °
Local Coord Referenced To: Well Head

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

Handwritten text: 'CNX PHL-29E-HS Gyro+MWD Survey 0ft to update' and 'JUN 04 2015' with a signature.

Comments	MD (ft)	Incl (°)	Actn Grid (°)	TVD (ft)	TVDSZ (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	BR (ft/100ft)	TR (ft/100ft)	Existing (ft)	Latitude (N 00° 00' 00")	Longitude (W 100° 00' 00")	Directional Density Index	
	7427.00	35.00	177.30	7337.23	5625.27	118.60	-412.03	-362.09	8.41	6.10	-10.47	20428.16	1042476.92	N 30 12 00 W	0 3 21.00	4.02
	7471.00	37.11	172.87	7302.03	5628.82	133.11	-437.86	-300.87	7.30	4.50	-9.84	20501.35	1042476.14	N 30 12 00 W	0 3 20.97	4.03
	7519.00	30.00	108.43	6900.74		104.04	-406.73	-301.33	10.12	3.10	-10.71	205481.90	1042484.08	N 30 12 00 W	0 3 20.69	4.74
	7565.00	40.45	155.11	7430.25	6002.24	120.02	-494.40	-232.15	10.60	4.02	-10.91	205433.75	1042493.86	N 30 12 01 W	0 3 20.77	4.78
	7612.00	44.32	153.76	7470.87	6006.96	100.60	-523.37	-232.20	10.31	6.23	-9.21	205424.65	1042505.01	N 30 12 02 W	0 3 20.91	4.83
	7659.00	47.48	152.45	7502.96	6008.97	252.35	-533.83	-234.25	7.17	8.87	-8.87	205395.40	1042521.75	N 30 12 05 W	0 3 20.42	4.80
	7700.00	51.35	152.29	7534.23	6010.19	287.51	-559.12	-207.35	6.07	8.06	-8.23	205393.11	1042538.03	N 30 12 09 W	0 3 20.20	4.80
	7750.00	54.87	150.42	7561.81	6127.80	323.19	-617.39	-157.71	6.31	7.65	-8.54	205330.84	1042550.96	N 30 12 06 W	0 3 19.97	4.94
	7790.00	59.09	149.81	7597.42	6193.41	301.03	-651.37	-129.77	9.43	6.90	-3.43	205292.05	1042570.23	N 30 12 08 W	0 3 19.72	4.60
	7850.00	62.34	145.50	7612.30	6178.35	405.30	-655.95	-145.99	7.44	6.37	-4.41	205259.29	1042600.02	N 30 12 09 W	0 3 19.41	5.02
	7904.00	64.48	144.32	7632.08	6198.05	444.27	-721.34	-123.07	6.03	4.02	-6.03	205226.90	1042622.34	N 30 12 07 W	0 3 19.12	5.02
	7944.00	65.04	140.75	7653.00	6216.50	455.49	-787.37	-41.00	7.20	3.16	-1.12	205180.97	1042640.96	N 30 12 03 W	0 3 18.77	5.00
	7998.00	65.02	140.44	7663.78	6235.75	527.60	-787.12	-71.00	2.21	2.10	-4.70	205181.11	1042674.40	N 30 12 07 W	0 3 18.48	5.11
	8036.00	63.82	139.09	7663.19	6234.10	574.34	-822.33	-41.27	7.25	5.80	-4.70	205125.01	1042704.73	N 30 12 06 W	0 3 18.07	5.14
	8081.00	74.04	136.48	7702.15	6254.14	617.11	-853.74	-112.25	6.00	6.36	-3.02	205004.49	1042733.75	N 30 12 05 W	0 3 17.70	5.18
	8132.00	76.05	134.75	7714.97	6259.03	658.45	-850.00	-178.99	6.42	5.51	-3.41	205005.24	1042750.29	N 30 12 05 W	0 3 17.25	5.21
	8175.00	80.48	132.49	7733.42	6259.41	708.52	-910.00	-52.62	6.01	6.40	-6.10	205000.19	1042790.62	N 30 12 00 W	0 3 16.87	5.24
	8242.00	84.00	129.80	7732.45	6250.44	801.77	-941.77	102.77	6.00	5.37	-3.07	204900.47	1042840.70	N 30 12 03 W	0 3 16.23	5.25
	8289.00	87.23	128.97	7734.20	6300.40	801.21	-970.67	123.54	12.23	11.74	-3.44	204800.37	1042899.05	N 30 12 06 W	0 3 15.88	5.30
	8339.00	91.19	126.25	7734.81	6300.90	830.60	-987.53	146.59	13.20	13.20	-2.37	204700.00	1042932.89	N 30 12 03 W	0 3 15.07	5.32
	8391.00	92.81	123.81	7733.03	6350.03	872.53	-1023.96	178.79	6.02	6.45	2.43	204600.35	1042952.53	N 30 12 02 W	0 3 14.28	5.35
	8434.00	94.09	130.30	7723.50	6392.59	954.41	-1063.27	250.89	1.17	0.19	1.16	204500.08	1042968.95	N 30 12 03 W	0 3 14.34	5.30
	8528.00	94.18	130.54	7719.76	6395.77	1057.03	-1144.10	322.30	0.21	0.10	0.10	204400.15	1042998.20	N 30 12 03 W	0 3 13.43	5.42
	8582.00	94.02	128.33	7712.87	6376.56	1159.53	-1204.30	394.13	1.31	0.47	-1.22	204300.88	1043140.12	N 30 12 03 W	0 3 13.21	5.43
	8710.00	94.00	127.00	7705.27	6371.36	1240.00	-1287.42	457.41	2.00	-0.64	2.76	204200.78	1043192.07	N 30 12 05 W	0 3 11.47	5.42
	8821.00	94.44	132.50	7693.77	6366.90	1403.77	-1336.60	542.62	0.25	0.43	0.49	204100.33	1043220.50	N 30 12 03 W	0 3 10.61	5.45
	8908.00	94.03	132.03	7691.12	6357.11	1432.40	-1392.97	605.27	0.87	0.11	-0.80	204000.29	1043325.25	N 30 12 01 W	0 3 9.51	5.50
	8998.00	92.65	133.71	7686.13	6351.12	1525.01	-1455.11	673.20	2.94	-1.80	1.01	204000.16	1043419.28	N 30 12 07 W	0 3 8.64	5.52
	9050.00	92.61	135.65	7682.74	6348.73	1575.91	-1491.63	709.50	3.80	-0.29	3.80	204000.33	1043455.48	N 30 12 00 W	0 3 8.45	5.60
	9093.00	92.15	135.47	7680.60	6348.90	1610.60	-1522.00	730.58	0.94	-0.84	-0.42	204000.05	1043485.56	N 30 12 02 W	0 3 8.10	5.61
	9129.00	92.42	136.73	7677.18	6343.15	1714.75	-1591.72	800.09	1.34	0.28	1.31	204000.54	1043532.07	N 30 12 49 W	0 3 7.25	5.64
	9200.00	92.77	134.63	7673.04	6339.00	1806.64	-1626.75	869.58	2.28	-3.25	-2.25	204001.48	1043581.55	N 30 12 40 W	0 3 6.44	5.67
	9274.00	93.30	133.45	7663.07	6334.00	1920.37	-1722.05	937.02	1.42	0.58	-1.31	204000.20	1043632.99	N 30 12 48 W	0 3 5.57	5.63
	9425.00	93.12	134.01	7662.20	6328.79	1923.00	-1789.94	1004.64	0.02	-0.10	0.00	204181.33	1043750.81	N 30 12 47 W	0 3 4.71	5.71
	9491.00	93.12	133.70	7657.74	6323.79	2025.70	-1851.32	1071.70	0.25	0.00	-0.25	204000.98	1043817.72	N 30 12 49 W	0 3 3.85	5.74
	9535.00	92.85	133.49	7652.04	6318.03	2170.40	-1910.10	1139.70	0.41	-0.29	-0.31	204000.17	1043885.05	N 30 12 49 W	0 3 3.26	5.70
	9577.00	92.33	134.33	7646.87	6314.85	2271.24	-1979.87	1203.03	1.13	-0.26	0.97	203900.41	1043951.84	N 30 12 43 W	0 3 2.14	5.78
	9638.00	92.05	133.94	7644.63	6310.28	2363.03	-2043.21	1271.10	0.62	0.35	-0.48	203800.07	1044017.05	N 30 12 44 W	0 3 1.31	5.80
	9693.00	92.42	134.19	7640.47	6306.46	2450.81	-2109.21	1339.30	0.38	-0.27	0.26	203700.37	1044085.25	N 30 12 44 W	0 3 0.43	5.82
	10027.00	92.35	134.06	7638.57	6302.50	2550.00	-2174.00	1405.71	0.17	-0.10	-0.14	203600.68	1044152.07	N 30 12 43 W	0 3 0.07	5.84
	10171.00	92.30	133.95	7632.46	6300.45	2644.37	-2230.03	1474.27	0.40	0.37	-0.14	203500.48	1044220.22	N 30 12 42 W	0 3 0.57	5.85
	10213.00	92.71	133.24	7623.81	6294.50	2738.15	-2284.50	1542.60	0.48	-0.48	0.04	203400.94	1044289.94	N 30 12 42 W	0 3 0.06	5.87
	10307.00	92.15	134.41	7624.01	6290.90	2832.93	-2349.69	1612.80	0.46	-0.10	0.47	203300.70	1044357.74	N 30 12 41 W	0 3 0.07	5.82
	10400.00	92.77	134.33	7621.28	6287.27	2922.79	-2434.19	1674.11	0.23	0.19	0.13	203200.10	1044420.08	N 30 12 41 W	0 3 0.05	5.91
	10455.00	92.77	134.33	7617.05	6283.04	3017.50	-2500.70	1741.77	0.45	0.46	0.00	203100.54	1044487.71	N 30 12 40 W	0 3 0.09	5.92
	10501.00	92.68	133.72	7612.43	6278.48	3113.36	-2567.51	1810.60	0.25	-0.25	0.00	203000.75	1044555.94	N 30 12 32 W	0 3 0.41	5.94
	10595.00	92.09	133.62	7603.00	6273.00	3207.06	-2632.35	1876.52	0.11	0.00	-0.11	202900.05	1044624.40	N 30 12 31 W	0 3 0.53	5.96
	10779.00	91.71	134.79	7604.49	6270.43	3300.63	-2707.84	1945.25	1.02	-1.03	1.24	202800.26	1044691.79	N 30 12 33 W	0 3 0.58	5.97
	10872.00	92.24	133.92	7601.29	6267.25	3393.73	-2782.62	2012.30	1.00	0.97	-0.92	202700.45	1044758.24	N 30 12 37 W	0 3 0.61	5.90
	10970.00	92.77	134.11	7597.53	6263.52	3491.52	-2859.61	2082.72	0.21	-0.00	0.18	202600.43	1044825.03	N 30 12 37 W	0 3 0.04	6.01
	11063.00	91.10	134.01	7594.90	6260.69	3584.38	-2938.06	2149.67	0.38	-1.13	0.75	202500.33	1044891.82	N 30 12 35 W	0 3 0.08	6.02
	11157.00	91.45	134.47	7592.01	6258.00	3678.27	-3026.61	2215.94	0.02	0.37	-0.36	202400.30	1044958.67	N 30 12 35 W	0 3 0.48	6.04
	11251.00	91.26	134.06	7590.07	6255.56	3772.15	-3072.08	2282.63	0.27	-0.18	0.20	202300.30	1045025.02	N 30 12 33 W	0 3 0.48	6.00
	11345.00	91.63	134.05	7585.18	6254.17	3865.01	-3053.67	2350.07	0.73	0.37	-0.62	202200.45	1045090.90	N 30 12 34 W	0 3 0.47	6.07
	11433.00	91.19	134.32	7580.29	6251.66	3958.08	-3158.48	2410.72	0.54	-0.47	0.26	202100.03	1045152.64	N 30 12 33 W	0 3 0.45	6.01
	11532.00	91.26	134.63	7575.87	6249.00	4052.75	-3224.44	2489.00	0.28	0.10	0.54	202000.78	1045220.29	N 30 12 33 W	0 3 0.45	6.10
	11620.00	91.19	134.90	7571.84	6247.63	4148.08	-3290.78	2550.22	0.19	-0.10	0.10	202000.54	1045288.14	N 30 12 32 W	0 3 0.44	6.11
	11720.00	91.19	134.43	7570.20	6245.65	4240.50	-3356.00	2617.02	0.50	0.00	-0.50	202000.43	1045356.30	N 30 12 32 W	0 3 0.44	6.12
	11814.00	91.26	134.75	7571.87	6243.68	4334.44	-3422.67	2683.66	0.35	0.10	0.30	202000.45	1045424.05	N 30 12 31 W	0 3 0.43	6.13
	11908.00	91.63	134.33	7575.47	6241.46	4428.32	-3482.78	2750.92	0.58	0.37	-0.45	202000.52	1045492.00	N 30 12 30 W	0 3 0.42	6.15
	12001.00	92.24	134.44	7572.33	6239.32	4521.10	-3543.80	2817.36	0.67	0.65	0.12	202000.53	1045560.25	N 30 12 30 W	0 3 0.41	6.16
	12094.00	92.15	134.35	7563.77	6234.70	4613.90	-3618.61	2883.73	0.14	-0.10	-0.10	202000.52	1045628.50	N 30 12 29 W	0 3 0.40	6.17
	12182.00	92.15	134.07													

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	DR (ft/100ft)	TR (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Directional Drift/Incl Index
	17435.00	91.60	133.00	7371.73	5697.72	6959.84	-7229.76	6745.43	2.00	-0.30	-1.96	248048.68	1649495.20	N 39 10 53.29 W 00	1 51.37	6.72
	17520.00	91.19	133.48	7369.36	5635.34	10030.61	-7362.15	6913.05	0.80	-0.67	0.43	248050.31	1649556.42	N 39 10 52.67 W 00	1 50.52	6.73
	17622.00	91.71	133.38	7366.92	5632.91	10126.33	-7428.12	6969.99	0.20	0.54	-0.10	248052.34	1649628.11	N 39 10 52.02 W 00	1 49.63	6.73
	17715.00	91.63	133.51	7364.00	5629.90	10219.14	-7492.94	6949.93	0.24	0.19	0.14	248054.42	1649699.00	N 39 10 51.39 W 00	1 48.77	6.74
	17810.00	91.71	133.84	7361.62	5627.01	10313.62	-7557.62	7018.91	0.40	-0.19	0.33	248056.85	1649764.27	N 39 10 50.75 W 00	1 47.69	6.75
	17903.00	91.63	133.81	7358.31	5624.30	10406.73	-7621.69	7025.66	0.00	-0.00	-0.03	248059.49	1649831.34	N 39 10 50.11 W 00	1 47.04	6.75
Last MWD Survey	17972.00	91.36	133.93	7356.51	5622.50	10475.60	-7689.79	7195.30	0.49	-0.30	0.17	248078.09	1649891.00	N 39 10 49.64 W 00	1 46.40	6.76
Prod to TD	18046.00	91.30	134.00	7354.74	5620.73	10551.47	-7722.54	7169.99	0.12	-0.05	0.09	248023.94	1649935.75	N 39 10 49.13 W 00	1 45.70	6.76

Survey Type: Non-Def Survey

Survey Error Model: CCWSA Rev 0 3-D 95 000% Confidence 2.7668 sigma
 Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	20.500	Act Strs	30.000	30.000	SLB_NSG+MSHDT-Depth Only	Original Borehole / CNX PHL-29E-HS Gyro+MWD OR to update
	1	20.500	6639.000	Act Strs	30.000	30.000	SLB_NSG+MSHCT	Original Borehole / CNX PHL-29E-HS Gyro+MWD OR to update
	1	6639.000	17972.000	Act Strs	30.000	30.000	SLB_MWVD-6TD	Original Borehole / CNX PHL-29E-HS Gyro+MWD OR to update
	1	17972.000	18046.000	Act Strs	30.000	30.000	SLD_BUND+TREAD	Original Borehole / CNX PHL-29E-HS Gyro+MWD OR to update

Received
 Office of Oil & Gas
 JUN 01 2015