

# Chevron Appalachia Berger 4H Surveys 0ft to 13216ft MD Survey Geodetic Report

(Def Survey)



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WV Department of  
Environmental Protection

**Report Date:** January 25, 2015 - 10:07 PM  
**Client:** Chevron  
**Field:** WV Marshall County (NAD 83)  
**Structure / Slot:** Chevron Berger Pad / Berger 4H  
**Well:** Berger 4H  
**Borehole:** Original Borehole  
**UWI / API#:** Unknown / Unknown  
**Survey Name:** Chevron Appalachia Berger 4H Surveys 0ft to 13216ft MD  
**Survey Date:** January 16, 2015  
**Tort / AHD / DDI / ERD Ratio:** 311.693 ° / 7339.391 ft / 6.673 / 1.144  
**Coordinate Reference System:** NAD83 West Virginia State Plane, Northern Zone, US Feet  
**Location Lat / Long:** N 39° 52' 28.66187", W 80° 45' 16.54975"  
**Location Grid N/E Y/X:** N 503143.270 ftUS, E 1616395.310 ftUS  
**CRS Grid Convergence Angle:** -0.8001 °  
**Grid Scale Factor:** 0.99995013  
**Version / Patch:** 2.7.1043.0

**Survey / DLS Computation:** Minimum Curvature / Lubinski  
**Vertical Section Azimuth:** 318.775 ° (True North)  
**Vertical Section Origin:** 0.000 ft, 0.000 ft  
**TVD Reference Datum:** KB  
**TVD Reference Elevation:** 1319.470 ft above MSL  
**Seabed / Ground Elevation:** 1287.470 ft above MSL  
**Magnetic Declination:** -7.759 °  
**Total Gravity Field Strength:** 999.3389mgn (9.80665 Based)  
**Gravity Model:** GARM  
**Total Magnetic Field Strength:** 52750.906 nT  
**Magnetic Dip Angle:** 67.325 °  
**Declination Date:** January 16, 2015  
**Magnetic Declination Model:** HDGM 2014  
**North Reference:** True North  
**Grid Convergence Used:** 0.0000 °  
**Total Corr Mag North->True North:** -7.7586 °  
**Local Coord Referenced To:** Well Head

Comments	MD (ft)	Incl (°)	Azim True (°)	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 ° ' ")
SHL	0.00	0.00	315.00	0.00	-1319.47	0.00	0.00	0.00	N/A	N/A	N/A	503143.27	1616395.31	N 39 52 28.66	W 80 45 16.55
	30.00	0.26	274.77	30.00	-1289.47	0.05	0.01	-0.07	0.87	0.87	0.00	503143.28	1616395.24	N 39 52 28.66	W 80 45 16.55
	60.00	0.29	222.82	60.00	-1259.47	0.09	-0.04	-0.19	0.81	0.10	-173.17	503143.23	1616395.12	N 39 52 28.66	W 80 45 16.55
	90.00	0.15	212.78	90.00	-1229.47	0.07	-0.13	-0.26	0.48	-0.47	-33.47	503143.14	1616395.05	N 39 52 28.66	W 80 45 16.55
	120.00	0.32	264.98	120.00	-1199.47	0.11	-0.17	-0.36	0.86	0.57	174.00	503143.10	1616394.94	N 39 52 28.66	W 80 45 16.55
	150.00	0.28	249.26	150.00	-1169.47	0.19	-0.21	-0.52	0.30	-0.13	-52.40	503143.07	1616394.79	N 39 52 28.66	W 80 45 16.56
	180.00	0.18	197.30	180.00	-1139.47	0.19	-0.28	-0.60	0.74	-0.33	-173.20	503143.00	1616394.71	N 39 52 28.66	W 80 45 16.56
	210.00	0.07	342.00	210.00	-1109.47	0.18	-0.31	-0.62	0.80	-0.37	482.33	503142.97	1616394.69	N 39 52 28.66	W 80 45 16.56
	240.00	0.22	314.11	240.00	-1079.47	0.25	-0.25	-0.67	0.54	0.50	-92.97	503143.03	1616394.64	N 39 52 28.66	W 80 45 16.56
	270.00	0.28	259.97	270.00	-1049.47	0.35	-0.22	-0.78	0.78	0.20	-180.47	503143.06	1616394.53	N 39 52 28.66	W 80 45 16.56
	300.00	0.17	221.22	300.00	-1019.47	0.38	-0.27	-0.88	0.61	-0.37	-129.17	503143.02	1616394.43	N 39 52 28.66	W 80 45 16.56
	330.00	0.22	318.56	330.00	-989.47	0.43	-0.26	-0.95	0.98	0.17	324.47	503143.03	1616394.36	N 39 52 28.66	W 80 45 16.56
	360.00	0.29	268.70	360.00	-959.47	0.54	-0.22	-1.06	0.75	0.23	-166.20	503143.07	1616394.24	N 39 52 28.66	W 80 45 16.56
	390.00	0.30	242.16	390.00	-929.47	0.61	-0.25	-1.21	0.45	0.03	-88.47	503143.03	1616394.10	N 39 52 28.66	W 80 45 16.57
	420.00	0.22	278.98	420.00	-899.47	0.67	-0.28	-1.33	0.60	-0.27	122.73	503143.01	1616393.97	N 39 52 28.66	W 80 45 16.57
	450.00	0.41	303.97	450.00	-869.47	0.82	-0.21	-1.48	0.77	0.63	83.30	503143.08	1616393.83	N 39 52 28.66	W 80 45 16.57
	480.00	0.36	298.41	480.00	-839.47	1.01	-0.11	-1.65	0.21	-0.17	-18.53	503143.19	1616393.66	N 39 52 28.66	W 80 45 16.57
	510.00	0.44	292.86	509.99	-809.48	1.20	-0.02	-1.84	0.30	0.27	-18.50	503143.28	1616393.47	N 39 52 28.66	W 80 45 16.57
	540.00	0.66	285.85	539.99	-779.48	1.45	0.07	-2.11	0.77	0.73	-23.37	503143.37	1616393.20	N 39 52 28.66	W 80 45 16.58
	570.00	0.80	265.37	569.99	-749.48	1.72	0.10	-2.49	0.98	0.47	-68.27	503143.41	1616392.82	N 39 52 28.66	W 80 45 16.58
	600.00	1.11	287.85	599.99	-719.48	2.09	0.18	-2.97	1.60	1.03	74.93	503143.49	1616392.34	N 39 52 28.66	W 80 45 16.59
	630.00	1.25	276.77	629.98	-689.49	2.58	0.30	-3.58	0.89	0.47	-36.93	503143.62	1616391.74	N 39 52 28.66	W 80 45 16.60
	660.00	1.35	279.48	659.97	-659.50	3.10	0.40	-4.25	0.39	0.33	9.03	503143.73	1616391.07	N 39 52 28.67	W 80 45 16.60
	690.00	1.27	282.32	689.97	-629.50	3.64	0.53	-4.92	0.34	-0.27	9.47	503143.87	1616390.40	N 39 52 28.67	W 80 45 16.61
Drilling Office 2.7.1043.0	694.00	1.23	281.87	693.96	-625.50	3.50	0.50	-4.92	0.34	-1.00	-11.25	503143.89	1616390.31	N 39 52 28.67	W 80 45 16.61

Comments	MD (ft)	Incl (°)	Azim True (°)	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 ° ' ")
	721.00	0.79	289.46	720.96	-598.51	4.11	0.67	-5.47	1.70	-1.63	28.11	503144.02	1616389.85	N 39 52 28.67 W	80 45 16.62
	751.00	0.38	1.21	750.96	-568.51	4.36	0.84	-5.66	2.54	-1.37	239.17	503144.19	1616389.66	N 39 52 28.67 W	80 45 16.62
	804.00	0.86	52.37	803.96	-515.51	4.46	1.26	-5.34	1.30	0.91	96.53	503144.60	1616389.99	N 39 52 28.67 W	80 45 16.62
	898.00	1.60	60.60	897.93	-421.54	4.15	2.33	-3.64	0.81	0.79	8.76	503145.65	1616391.70	N 39 52 28.68 W	80 45 16.60
	993.00	1.97	62.95	992.89	-326.58	3.48	3.73	-1.03	0.40	0.39	2.47	503147.01	1616394.33	N 39 52 28.70 W	80 45 16.56
	1088.00	2.21	17.67	1087.83	-231.64	4.03	6.21	0.98	1.71	0.25	-47.66	503149.47	1616396.38	N 39 52 28.72 W	80 45 16.54
	1183.00	5.45	335.29	1182.62	-136.85	9.30	12.06	-0.35	4.31	3.41	-44.61	503155.33	1616395.13	N 39 52 28.74 W	80 45 16.55
	1279.00	5.95	326.20	1278.15	-41.32	18.61	20.34	-5.02	1.07	0.52	-9.47	503163.67	1616390.57	N 39 52 28.82 W	80 45 16.61
	1372.00	5.65	323.15	1370.67	51.20	27.95	28.00	-10.45	0.46	-0.32	-3.28	503171.42	1616385.25	N 39 52 28.94 W	80 45 16.68
	1468.00	5.20	320.67	1466.24	146.77	37.01	35.15	-16.04	0.53	-0.47	-2.58	503178.64	1616379.76	N 39 52 29.01 W	80 45 16.76
	1562.00	6.15	318.15	1559.78	240.31	46.30	42.20	-22.10	1.04	1.01	-2.68	503185.77	1616373.80	N 39 52 29.08 W	80 45 16.83
	1657.00	6.08	312.93	1654.24	334.77	56.40	49.41	-29.18	0.59	-0.07	-5.49	503193.08	1616366.82	N 39 52 29.15 W	80 45 16.92
	1752.00	5.75	306.30	1748.74	429.27	66.05	55.66	-36.70	0.80	-0.35	-6.98	503199.43	1616359.39	N 39 52 29.21 W	80 45 17.02
	1848.00	5.33	304.54	1844.29	524.82	75.06	61.03	-44.25	0.47	-0.44	-1.83	503204.91	1616351.92	N 39 52 29.27 W	80 45 17.12
	1943.00	4.92	306.89	1938.91	619.44	83.33	65.98	-51.14	0.48	-0.43	2.47	503209.96	1616345.10	N 39 52 29.31 W	80 45 17.21
	2037.00	3.78	301.55	2032.63	713.16	90.23	70.02	-57.00	1.29	-1.21	-5.68	503214.08	1616339.29	N 39 52 29.35 W	80 45 17.28
	2132.00	2.97	290.24	2127.47	808.00	95.39	72.51	-61.98	1.10	-0.85	-11.91	503216.64	1616334.35	N 39 52 29.38 W	80 45 17.34
	2227.00	2.87	285.86	2222.35	902.88	99.54	74.01	-66.58	0.26	-0.11	-4.61	503218.20	1616329.77	N 39 52 29.39 W	80 45 17.40
	2322.00	3.20	285.68	2317.21	997.74	103.76	75.38	-71.42	0.35	0.35	-0.19	503219.64	1616324.95	N 39 52 29.41 W	80 45 17.47
	2417.00	3.57	283.74	2412.05	1092.58	108.41	76.80	-76.85	0.41	0.39	-2.04	503221.13	1616319.55	N 39 52 29.42 W	80 45 17.54
	2512.00	2.00	281.50	2506.93	1187.46	112.15	77.83	-81.34	1.66	-1.65	-2.36	503222.23	1616315.06	N 39 52 29.43 W	80 45 17.59
	2607.00	1.03	272.46	2601.90	1282.43	114.06	78.20	-83.82	1.05	-1.02	-9.52	503222.63	1616312.59	N 39 52 29.43 W	80 45 17.62
	2667.00	0.91	259.93	2661.89	1342.42	114.67	78.14	-84.83	0.40	-0.20	-20.88	503222.58	1616311.58	N 39 52 29.43 W	80 45 17.64
	2796.00	1.07	253.32	2790.87	1471.40	115.71	77.61	-86.99	0.15	0.12	-5.12	503222.09	1616309.41	N 39 52 29.43 W	80 45 17.67
	2891.00	1.05	262.67	2885.85	1566.38	116.56	77.25	-88.70	0.18	-0.02	9.84	503221.75	1616307.70	N 39 52 29.43 W	80 45 17.69
	2985.00	0.94	262.66	2979.84	1660.37	117.47	77.04	-90.32	0.12	-0.12	-0.01	503221.56	1616306.08	N 39 52 29.42 W	80 45 17.71
	3080.00	0.81	270.43	3074.83	1755.36	118.35	76.95	-91.77	0.18	-0.14	8.18	503221.49	1616304.63	N 39 52 29.42 W	80 45 17.73
	3174.00	0.74	279.60	3168.82	1849.35	119.26	77.05	-93.03	0.15	-0.07	9.76	503221.61	1616303.37	N 39 52 29.42 W	80 45 17.74
	3269.00	0.57	297.64	3263.81	1944.34	120.18	77.37	-94.05	0.28	-0.18	18.99	503221.95	1616302.35	N 39 52 29.43 W	80 45 17.76
	3364.00	0.56	316.09	3358.81	2039.34	121.08	77.93	-94.80	0.19	-0.01	19.42	503222.51	1616301.62	N 39 52 29.43 W	80 45 17.77
	3458.00	0.59	317.32	3452.81	2133.34	122.03	78.61	-95.44	0.03	0.03	1.31	503223.20	1616300.98	N 39 52 29.44 W	80 45 17.77
	3553.00	0.66	312.11	3547.80	2228.33	123.06	79.34	-96.18	0.09	0.07	-5.48	503223.94	1616300.25	N 39 52 29.45 W	80 45 17.78
	3648.00	0.79	324.05	3642.79	2323.32	124.25	80.24	-96.97	0.21	0.14	12.57	503224.85	1616299.48	N 39 52 29.45 W	80 45 17.79
	3743.00	0.88	322.35	3737.78	2418.31	125.63	81.35	-97.80	0.10	0.09	-1.79	503225.97	1616298.66	N 39 52 29.47 W	80 45 17.80
	3838.00	0.88	311.24	3832.77	2513.30	127.09	82.40	-98.79	0.18	0.00	-11.69	503227.04	1616297.68	N 39 52 29.48 W	80 45 17.82
	3933.00	0.91	319.57	3927.76	2608.29	128.56	83.46	-99.83	0.14	0.03	8.77	503228.11	1616296.66	N 39 52 29.49 W	80 45 17.83
	4028.00	0.95	332.18	4022.75	2703.28	130.08	84.73	-100.69	0.22	0.04	13.27	503229.39	1616295.82	N 39 52 29.50 W	80 45 17.84
	4123.00	0.71	327.54	4117.74	2798.27	131.43	85.92	-101.37	0.26	-0.25	-4.88	503230.60	1616295.15	N 39 52 29.51 W	80 45 17.85
	4218.00	0.52	321.19	4212.73	2893.26	132.44	86.76	-101.96	0.21	-0.20	-6.68	503231.44	1616294.58	N 39 52 29.52 W	80 45 17.86
	4312.00	0.66	311.28	4306.73	2987.26	133.41	87.44	-102.63	0.18	0.15	-10.54	503232.13	1616293.91	N 39 52 29.53 W	80 45 17.87
	4408.00	0.63	310.52	4402.72	3083.25	134.48	88.15	-103.45	0.03	-0.03	-0.79	503232.85	1616293.11	N 39 52 29.53 W	80 45 17.88
	4502.00	0.64	314.27	4496.71	3177.24	135.51	88.85	-104.22	0.05	0.01	3.99	503233.57	1616292.35	N 39 52 29.54 W	80 45 17.89
	4597.00	0.83	297.57	4591.71	3272.24	136.68	89.54	-105.21	0.30	0.20	-17.58	503234.27	1616291.37	N 39 52 29.55 W	80 45 17.90
	4691.00	0.84	299.26	4685.70	3366.23	137.97	90.20	-106.41	0.03	0.01	1.80	503234.94	1616290.17	N 39 52 29.55 W	80 45 17.91
	4786.00	1.03	306.39	4780.68	3461.21	139.46	91.04	-107.71	0.23	0.20	7.51	503235.80	1616288.89	N 39 52 29.56 W	80 45 17.93
	4880.00	0.95	298.66	4874.67	3555.20	141.01	91.92	-109.07	0.17	-0.09	-8.22	503236.70	1616287.54	N 39 52 29.57 W	80 45 17.95
	4986.00	0.11	2.08	4980.66	3661.19	141.91	92.44	-109.84	0.85	-0.79	59.83	503237.23	1616286.78	N 39 52 29.58 W	80 45 17.96
	5081.00	0.15	65.55	5075.66	3756.19	141.94	92.58	-109.72	0.15	0.04	66.81	503237.37	1616286.90	N 39 52 29.58 W	80 45 17.96
	5176.00	0.07	241.62	5170.66	3851.19	141.92	92.61	-109.66	0.23	-0.08	185.34	503237.39	1616286.96	N 39 52 29.58 W	80 45 17.98

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	5271.00	0.19	277.98	5265.66	3946.19	142.05	92.60	-109.87	0.15	0.13	38.27	503237.39	1616286.75	N 39 52 29.58	W 80 45 17.96
	5366.00	0.10	144.54	5360.66	4041.19	142.09	92.56	-109.97	0.28	-0.09	-140.46	503237.35	1616286.64	N 39 52 29.58	W 80 45 17.96
	5461.00	0.10	276.92	5455.66	4136.19	142.07	92.50	-110.01	0.19	0.00	139.35	503237.29	1616286.61	N 39 52 29.58	W 80 45 17.96
	5556.00	0.08	100.79	5550.66	4231.19	142.08	92.50	-110.03	0.19	-0.02	-185.40	503237.29	1616286.59	N 39 52 29.58	W 80 45 17.96
	5650.00	7.82	60.67	5644.37	4324.90	140.71	95.62	-104.38	8.25	8.23	-42.68	503240.33	1616292.28	N 39 52 29.61	W 80 45 17.89
	5745.00	15.33	49.78	5737.38	4417.91	139.15	106.91	-89.13	8.20	7.91	-11.46	503251.41	1616307.69	N 39 52 29.72	W 80 45 17.69
	5840.00	19.99	24.63	5828.01	4508.54	145.59	129.83	-72.74	9.30	4.91	-26.47	503274.09	1616324.39	N 39 52 29.94	W 80 45 17.48
	5935.00	25.21	7.68	5915.78	4596.31	165.56	164.70	-63.25	8.74	5.49	-17.84	503308.83	1616334.36	N 39 52 30.29	W 80 45 17.36
	6030.00	32.35	10.25	5998.99	4679.52	194.73	209.82	-56.02	7.63	7.52	2.71	503353.84	1616342.23	N 39 52 30.74	W 80 45 17.27
	6125.00	35.16	9.83	6077.97	4758.50	227.76	261.80	-46.82	2.97	2.96	-0.44	503405.68	1616352.15	N 39 52 31.25	W 80 45 17.15
	6219.00	42.77	7.83	6151.01	4831.54	265.75	320.17	-37.84	8.20	8.10	-2.13	503463.92	1616361.95	N 39 52 31.83	W 80 45 17.04
	6314.00	52.10	6.03	6215.20	4895.73	312.43	389.56	-29.49	9.92	9.82	-1.89	503533.18	1616371.26	N 39 52 32.51	W 80 45 16.93
	6409.00	59.41	357.33	6268.69	4949.22	370.00	467.88	-27.45	10.78	7.69	-9.16	503611.47	1616374.39	N 39 52 33.29	W 80 45 16.90
	6504.00	64.82	348.93	6313.17	4993.70	439.29	551.09	-37.63	9.66	5.69	-8.84	503694.81	1616365.38	N 39 52 34.11	W 80 45 17.03
	6599.00	69.22	339.40	6350.32	5030.85	518.22	635.06	-61.57	10.33	4.63	-10.03	503779.09	1616342.62	N 39 52 34.94	W 80 45 17.34
	6694.00	75.94	332.36	6378.78	5059.31	604.77	717.63	-98.66	10.00	7.07	-7.41	503862.17	1616306.69	N 39 52 35.75	W 80 45 17.82
	6788.00	78.90	326.35	6399.27	5079.80	694.90	796.50	-145.42	6.99	3.15	-6.39	503941.68	1616261.04	N 39 52 36.53	W 80 45 18.41
	6883.00	85.35	327.57	6412.28	5092.81	788.00	875.35	-196.69	6.91	6.79	1.28	504021.23	1616210.87	N 39 52 37.31	W 80 45 19.07
	6978.00	91.72	330.43	6414.70	5095.23	881.40	956.70	-245.57	7.35	6.71	3.01	504103.26	1616163.14	N 39 52 38.12	W 80 45 19.70
	7073.00	91.13	324.12	6412.34	5092.87	975.28	1036.56	-296.88	6.67	-0.62	-6.64	504183.82	1616112.94	N 39 52 38.91	W 80 45 20.36
	7168.00	93.40	324.34	6408.59	5089.12	1069.77	1113.57	-352.37	2.40	2.39	0.23	504261.60	1616058.54	N 39 52 39.67	W 80 45 21.07
	7263.00	92.41	321.74	6403.77	5084.30	1164.37	1189.38	-409.41	2.93	-1.04	-2.74	504338.19	1616002.57	N 39 52 40.42	W 80 45 21.80
	7357.00	93.30	324.68	6399.09	5079.62	1257.96	1264.56	-465.63	3.26	0.95	3.13	504414.14	1615947.41	N 39 52 41.16	W 80 45 22.52
	7452.00	91.48	321.99	6395.13	5075.66	1352.57	1340.68	-522.30	3.42	-1.92	-2.83	504491.04	1615891.81	N 39 52 41.91	W 80 45 23.25
	7547.00	89.83	327.00	6394.04	5074.57	1447.06	1417.99	-577.45	5.55	-1.74	5.27	504569.11	1615837.75	N 39 52 42.68	W 80 45 23.96
	7642.00	90.89	331.07	6393.44	5073.97	1540.51	1499.43	-626.32	4.43	1.12	4.28	504651.22	1615790.02	N 39 52 43.48	W 80 45 24.58
	7737.00	87.73	325.51	6394.59	5075.12	1634.15	1580.20	-676.22	6.73	-3.33	-5.85	504732.67	1615741.26	N 39 52 44.28	W 80 45 25.22
	7832.00	88.76	325.46	6397.50	5078.03	1728.45	1658.44	-730.02	1.09	1.08	-0.05	504811.65	1615688.55	N 39 52 45.05	W 80 45 25.91
	7926.00	89.14	325.38	6399.22	5079.75	1821.81	1735.82	-783.36	0.41	0.40	-0.09	504889.77	1615636.30	N 39 52 45.82	W 80 45 26.60
	8021.00	90.69	326.44	6399.36	5079.89	1916.07	1814.49	-836.61	1.98	1.63	1.12	504969.17	1615584.16	N 39 52 46.59	W 80 45 27.28
	8116.00	90.69	327.40	6398.21	5078.74	2010.10	1894.08	-888.46	1.01	0.00	1.01	505049.48	1615533.44	N 39 52 47.38	W 80 45 27.95
	8211.00	92.03	323.34	6395.96	5076.49	2104.42	1972.21	-942.41	4.50	1.41	-4.27	505128.35	1615480.58	N 39 52 48.15	W 80 45 28.64
	8306.00	90.41	325.91	6393.94	5074.47	2198.90	2049.65	-997.39	3.20	-1.71	2.71	505206.54	1615426.69	N 39 52 48.92	W 80 45 29.34
	8400.00	92.03	324.51	6391.93	5072.46	2292.28	2126.82	-1051.01	2.28	1.72	-1.49	505284.45	1615374.16	N 39 52 49.68	W 80 45 30.03
	8495.00	93.16	325.33	6387.63	5068.16	2386.63	2204.49	-1105.55	1.47	1.19	0.86	505362.86	1615320.71	N 39 52 50.45	W 80 45 30.73
	8590.00	91.13	323.98	6384.08	5064.61	2481.06	2281.92	-1160.47	2.57	-2.14	-1.42	505441.05	1615266.88	N 39 52 51.21	W 80 45 31.44
	8685.00	93.64	323.73	6380.12	5060.65	2575.60	2358.56	-1216.45	2.66	2.64	-0.26	505518.46	1615211.98	N 39 52 51.97	W 80 45 32.15
	8780.00	91.72	324.37	6375.68	5056.21	2670.09	2435.38	-1272.16	2.13	-2.02	0.67	505596.05	1615157.35	N 39 52 52.73	W 80 45 32.87
	8875.00	92.03	324.32	6372.57	5053.10	2764.59	2512.53	-1327.50	0.33	0.33	-0.05	505673.96	1615103.09	N 39 52 53.49	W 80 45 33.58
	8969.00	90.41	319.94	6370.57	5051.10	2858.38	2586.69	-1385.18	4.97	-1.72	-4.66	505748.92	1615046.46	N 39 52 54.22	W 80 45 34.32
	9064.00	92.82	322.51	6367.89	5048.42	2953.24	2660.71	-1444.64	3.71	2.54	2.71	505823.76	1614988.04	N 39 52 54.96	W 80 45 35.08
	9159.00	89.21	322.74	6366.21	5046.74	3047.99	2736.18	-1502.29	3.81	-3.80	0.24	505900.02	1614931.45	N 39 52 55.70	W 80 45 35.82
	9254.00	89.42	323.52	6367.35	5047.88	3142.71	2812.18	-1559.29	0.85	0.22	0.82	505976.80	1614875.53	N 39 52 56.45	W 80 45 36.55
	9348.00	89.04	323.06	6368.61	5049.14	3236.41	2887.53	-1615.47	0.63	-0.40	-0.49	506052.92	1614820.40	N 39 52 57.20	W 80 45 37.27
	9443.00	88.32	325.70	6370.80	5051.33	3330.92	2964.72	-1670.78	2.88	-0.76	2.78	506130.88	1614766.18	N 39 52 57.96	W 80 45 37.98
	9538.00	86.97	324.61	6374.70	5055.23	3425.25	3042.62	-1725.01	1.83	-1.42	-1.15	506209.53	1614713.04	N 39 52 58.73	W 80 45 38.68
	9633.00	88.28	326.04	6378.64	5059.17	3519.55	3120.68	-1779.01	2.04	1.38	1.51	506288.32	1614660.14	N 39 52 59.50	W 80 45 39.37
	9728.00	89.48	327.27	6380.50	5061.03	3613.63	3200.02	-1831.22	1.81	1.26	1.29	506368.38	1614609.05	N 39 53 0.29	W 80 45 40.04
	9823.00	89.86	326.09	6381.04	5061.57	3707.72	3279.40	-1883.40	1.30	0.40	-1.24	506448.48	1614557.99	N 39 53 1.07	W 80 45 40.71

Drilling Office 2.7.1043.0

Berger 4H Original Borehole Chevron Appalachia Berger 4H Surveys Off to 1322 ft MD

Comments	MD (ft)	Incl (°)	Azim True (°)	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 ° ' ")
	9918.00	90.00	327.22	6381.16	5061.69	3801.82	3358.76	-1935.62	1.20	0.15	1.19	506528.56	1614506.88	N 39 53 1.85 W	80 45 41.38
	10013.00	89.38	325.46	6381.67	5062.20	3895.99	3437.83	-1988.27	1.96	-0.65	-1.85	506608.35	1614455.34	N 39 53 2.64 W	80 45 42.06
	10107.00	90.34	333.50	6381.90	5062.43	3988.28	3518.74	-2035.97	8.61	1.02	8.55	506689.91	1614408.78	N 39 53 3.42 W	80 45 42.67
	10202.00	91.34	324.85	6380.51	5061.04	4081.62	3600.23	-2084.59	9.16	1.05	-9.11	506772.07	1614361.30	N 39 53 4.21 W	80 45 43.29
	10297.00	90.89	326.42	6378.66	5059.19	4175.91	3678.63	-2138.20	1.72	-0.47	1.65	506851.21	1614308.79	N 39 53 5.02 W	80 45 43.98
	10392.00	90.21	325.75	6377.75	5058.28	4270.14	3757.46	-2191.21	1.00	-0.72	-0.71	506930.77	1614256.90	N 39 53 5.79 W	80 45 44.66
	10487.00	91.41	324.08	6376.41	5056.94	4364.58	3835.19	-2245.80	2.16	1.26	-1.76	507009.25	1614203.40	N 39 53 6.56 W	80 45 45.36
	10582.00	90.10	325.64	6375.15	5055.68	4459.03	3912.87	-2300.48	2.14	-1.38	1.64	507087.68	1614149.82	N 39 53 7.33 W	80 45 46.06
	10676.00	91.10	323.87	6374.17	5054.70	4552.51	3989.63	-2354.72	2.16	1.06	-1.88	507165.18	1614096.66	N 39 53 8.09 W	80 45 46.76
	10771.00	90.93	325.39	6372.49	5053.02	4646.99	4067.08	-2409.70	1.61	-0.18	1.60	507243.39	1614042.77	N 39 53 8.85 W	80 45 47.46
	10866.00	91.62	323.70	6370.37	5050.90	4741.49	4144.44	-2464.79	1.92	0.73	-1.78	507321.51	1613988.76	N 39 53 9.62 W	80 45 48.16
	10961.00	89.55	325.66	6369.40	5049.93	4835.97	4221.94	-2519.70	3.00	-2.18	2.06	507399.77	1613934.94	N 39 53 10.38 W	80 45 48.87
	11055.00	90.17	323.15	6369.63	5050.16	4929.51	4298.37	-2574.41	2.75	0.66	-2.67	507476.95	1613881.31	N 39 53 11.14 W	80 45 49.58
	11150.00	91.48	325.22	6368.26	5048.79	5024.07	4375.40	-2629.99	2.58	1.38	2.18	507554.74	1613826.81	N 39 53 11.90 W	80 45 50.29
	11245.00	89.93	323.73	6367.10	5047.63	5118.58	4452.70	-2685.18	2.26	-1.63	-1.57	507632.80	1613772.70	N 39 53 12.66 W	80 45 51.00
	11340.00	91.07	325.33	6366.27	5046.80	5213.10	4530.06	-2740.31	2.07	1.20	1.68	507710.92	1613718.67	N 39 53 13.43 W	80 45 51.70
	11435.00	91.92	323.57	6363.79	5044.32	5307.59	4607.33	-2795.52	2.06	0.89	-1.85	507788.95	1613664.55	N 39 53 14.19 W	80 45 52.41
	11530.00	89.83	324.78	6362.34	5042.87	5402.15	4684.34	-2851.11	2.54	-2.20	1.27	507866.72	1613610.04	N 39 53 14.95 W	80 45 53.13
	11625.00	90.45	324.92	6362.10	5042.63	5496.62	4762.02	-2905.80	0.67	0.65	0.15	507945.15	1613556.44	N 39 53 15.72 W	80 45 53.83
	11720.00	90.86	325.34	6361.02	5041.55	5591.03	4839.95	-2960.11	0.62	0.43	0.44	508023.84	1613503.22	N 39 53 16.49 W	80 45 54.52
	11814.00	89.83	327.32	6360.45	5040.98	5684.21	4918.18	-3012.22	2.37	-1.10	2.11	508102.78	1613452.21	N 39 53 17.26 W	80 45 55.19
	11909.00	91.68	325.86	6359.20	5039.73	5778.31	4997.47	-3064.53	2.48	1.95	-1.54	508182.78	1613401.03	N 39 53 18.05 W	80 45 55.86
	12004.00	89.62	326.36	6358.12	5038.65	5872.52	5076.32	-3117.49	2.23	-2.17	0.53	508262.36	1613349.17	N 39 53 18.83 W	80 45 56.54
	12099.00	92.10	326.15	6356.70	5037.23	5966.69	5155.30	-3170.25	2.62	2.61	-0.22	508342.07	1613297.52	N 39 53 19.61 W	80 45 57.22
	12194.00	91.72	324.00	6353.53	5034.06	6061.06	5233.14	-3224.61	2.30	-0.40	-2.26	508420.66	1613244.26	N 39 53 20.38 W	80 45 57.92
	12288.00	90.31	324.90	6351.87	5032.40	6154.58	5309.60	-3279.25	1.78	-1.50	0.96	508497.87	1613190.69	N 39 53 21.13 W	80 45 58.62
	12383.00	91.99	323.43	6349.96	5030.49	6249.14	5386.60	-3334.85	2.35	1.77	-1.55	508575.63	1613136.17	N 39 53 21.89 W	80 45 59.33
	12478.00	89.31	324.17	6348.88	5029.41	6343.76	5463.25	-3390.95	2.93	-2.82	0.78	508653.06	1613081.15	N 39 53 22.65 W	80 46 0.05
	12573.00	91.65	325.45	6348.09	5028.62	6438.22	5540.88	-3445.69	2.81	2.46	1.35	508731.44	1613027.51	N 39 53 23.42 W	80 46 0.75
	12668.00	88.69	326.22	6347.80	5028.33	6532.49	5619.47	-3499.03	3.22	-3.12	0.81	508810.77	1612975.27	N 39 53 24.19 W	80 46 1.44
	12763.00	90.96	325.73	6348.09	5028.62	6626.73	5698.20	-3552.19	2.44	2.39	-0.52	508890.23	1612923.22	N 39 53 24.97 W	80 46 2.12
	12858.00	89.83	323.94	6347.44	5027.97	6721.19	5775.86	-3606.90	2.23	-1.19	-1.88	508968.63	1612869.61	N 39 53 25.74 W	80 46 2.82
	12953.00	90.96	324.55	6346.78	5027.31	6815.76	5852.95	-3662.41	1.35	1.19	0.64	509046.49	1612815.18	N 39 53 26.50 W	80 46 3.54
	13048.00	90.72	324.48	6345.39	5025.92	6910.27	5930.30	-3717.55	0.26	-0.25	-0.07	509124.59	1612761.13	N 39 53 27.27 W	80 46 4.24
	13142.00	91.93	326.39	6343.22	5023.75	7003.60	6007.68	-3770.86	2.40	1.29	2.03	509202.71	1612708.91	N 39 53 28.03 W	80 46 4.93
Final Survey	13174.00	91.34	323.91	6342.30	5022.83	7035.39	6033.93	-3789.14	7.96	-1.84	-7.75	509229.21	1612691.00	N 39 53 28.29 W	80 46 5.16
Projection to TD	13216.00	91.34	323.91	6341.32	5021.85	7077.21	6067.86	-3813.87	0.00	0.00	0.00	509263.48	1612666.74	N 39 53 28.62 W	80 46 5.48

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 \*\*\* 3-D 95.000% Confidence 2.7955 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
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Comments	MD (ft)	Incl (°)	Azim True (°)	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 ° ' ")
		1	0.000	32.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft to 13216ft MD					
		1	32.000	694.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft					
		1	694.000	993.000	Act Stns	30.000	30.000	SLB_MWD-STD		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft					
		1	993.000	1088.000	Act Stns	30.000	30.000	SLB_INC_ONLY<10		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft					
		1	1088.000	13174.000	Act Stns	30.000	30.000	SLB_MWD-STD		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft					
		1	13174.000	13216.000	Act Stns	30.000	30.000	SLB_BLIND+TREND		Original Borehole / Chevron Appalachia Berger 4H Surveys 0ft					

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