

Energen University 16-17 1H



Report Date: 3/16/2014	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Energen Resources Corporat	Vertical Section Azimuth: 163.723° (GridNorth)
Field: Phantom (Wolfcamp)	Vertical Section Origin: 0 ft, 0 ft
Structure / Slot: PD 594/University 16-17 1H	TVD Reference Datum: DF
Well: University 16-17 1H	TVD Reference Elevation: 2691 ft above MSL
Borehole: Primary	Sea Bed / Ground Level Elevation: 2665 ft above MSL
API#: 42-475-36593	Magnetic Declination: 7.1251 °
Survey Name / Date: Energen University 16-17 1H/2/15/2014	Total Field Strength: 47990.7 nT
Grid Coordinate System: NAD27 Texas State Plane, C	Magnetic Dip: 59.5673 °
Location Lat/Long: 31° 34' 43.873" N, 103° 10' 49.175" W	Declination Date: 2/9/2014
Location Grid N/E Y/X: W 1113513.500 HUSN 706791.80 HUS	Magnetic Declination Model: BGGM 2013
Grid Convergence Angle: -1.46637 °	North Reference: GridNorth
Grid Scale Factor: 0.99991045	Total Corr Mag North -> Grid North: 8.59 °
	Local Coordinates Referenced To: GridNorth

MD	INCL	AZIM	TVD	VSEC	ND	ED	DLS	CLOSURE	ATAZIM	COURSE	ROT	ROB
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	90.00	-999.25	-999.25	-999.25
200.00	1.05	152.52	199.99	1.80	-1.63	0.85	0.53	1.83	152.52	200.00	76.26	0.53
400.00	1.66	81.94	399.94	4.01	-2.85	4.56	0.82	5.37	121.97	200.00	-35.29	0.31
600.00	1.27	63.76	599.88	4.04	-1.46	9.42	0.30	9.53	98.81	200.00	-9.09	-0.2
800.00	1.38	101.45	799.83	4.78	-0.96	13.76	0.43	13.8	93.98	200.00	18.85	0.05
1000.00	1.21	107.74	999.78	7.08	-2.08	18.14	0.11	18.25	96.54	200.00	3.14	-0.08
1200.00	0.40	356.74	1199.76	7.58	-2.03	20.11	0.70	20.21	95.75	200.00	-55.5	-0.41
1400.00	1.02	136.48	1399.75	8.48	-2.62	21.29	0.68	21.45	97.01	200.00	69.87	0.31
1600.00	0.85	275.23	1599.74	9.52	-3.77	21.04	0.88	21.38	100.17	200.00	69.38	-0.09
1800.00	0.37	119.73	1799.74	9.44	-3.96	20.13	0.60	20.51	101.13	200.00	-77.75	-0.24
2000.00	0.44	256.03	1999.74	9.88	-4.47	19.94	0.38	20.44	102.62	200.00	68.15	0.04
2200.00	0.99	212.76	2199.72	10.98	-6.10	18.26	0.37	19.25	108.48	200.00	-21.64	0.28
2400.00	0.87	201.60	2399.69	13.31	-8.97	16.77	0.11	19.02	118.14	200.00	-5.58	-0.06
2600.00	0.26	135.34	2599.68	14.91	-10.70	16.53	0.40	19.69	122.93	200.00	-33.13	-0.31
2800.00	0.23	227.96	2799.68	15.48	-11.29	16.55	0.18	20.04	124.32	200.00	46.31	-0.02
3000.00	0.44	305.68	2999.68	15.05	-11.12	15.63	0.23	19.18	125.43	200.00	38.86	0.11
3200.00	0.58	65.09	3199.68	14.29	-10.24	15.92	0.44	18.93	122.75	200.00	59.71	0.07
3400.00	0.66	203.58	3399.67	15.03	-10.87	16.38	0.58	19.66	123.57	200.00	69.24	0.04
3600.00	0.48	351.09	3599.67	15.08	-11.10	15.79	0.55	19.3	125.11	200.00	73.76	-0.09
3800.00	0.71	151.58	3799.66	15.46	-11.36	16.25	0.59	19.83	124.96	200.00	80.25	0.12
4000.00	0.45	275.71	3999.66	16.38	-12.37	16.06	0.52	20.27	127.62	200.00	62.06	-0.13
4200.00	0.30	353.95	4199.65	15.57	-11.77	15.22	0.24	19.24	127.73	200.00	39.12	-0.08
4400.00	0.54	45.27	4399.65	14.60	-10.59	15.83	0.21	19.05	123.78	200.00	25.66	0.12
4600.00	0.51	141.53	4599.64	14.98	-10.62	17.06	0.39	20.09	121.92	200.00	48.13	-0.02
4800.00	0.62	235.26	4799.64	16.15	-11.94	16.72	0.41	20.54	125.52	200.00	46.87	0.06
5000.00	0.22	349.41	4999.63	16.11	-12.18	15.76	0.37	19.92	127.69	200.00	57.08	-0.2
5200.00	0.03	158.13	5199.63	15.78	-11.85	15.71	0.12	19.68	127.02	200.00	84.36	-0.09
5400.00	0.13	118.22	5399.63	15.99	-12.00	15.93	0.05	19.95	127.00	200.00	-19.96	0.05
5600.00	0.06	25.71	5599.63	16.07	-12.02	16.18	0.07	20.15	126.61	200.00	-46.26	-0.04
5800.00	0.07	203.76	5799.63	16.08	-12.03	16.17	0.06	20.16	126.65	200.00	89.02	0.01
6000.00	0.13	215.06	5999.63	16.32	-12.33	15.99	0.03	20.19	127.64	200.00	5.65	0.03
6200.00	0.09	98.30	6199.63	16.53	-12.54	16.02	0.09	20.34	128.06	200.00	-58.38	-0.02
6400.00	0.16	96.85	6399.63	16.70	-12.60	16.45	0.04	20.72	127.44	200.00	-0.73	0.04
6600.00	0.19	13.70	6599.63	16.52	-12.31	16.81	0.12	20.83	126.22	200.00	-41.58	0.02
6800.00	0.21	107.97	6799.63	16.44	-12.10	17.23	0.15	21.06	125.07	200.00	47.13	0.01
7000.00	0.35	58.19	6999.63	16.49	-11.89	18.10	0.13	21.66	123.30	200.00	-24.89	0.07
7200.00	0.07	49.02	7199.63	16.27	-11.49	18.71	0.14	21.96	121.55	200.00	-4.59	-0.14
7400.00	0.10	332.76	7399.63	16.05	-11.25	18.72	0.05	21.84	121.00	200.00	-38.13	0.02
7500.00	0.23	191.53	7499.63	16.14	-11.37	18.64	0.31	21.84	121.38	100.00	-141.23	0.13
7551.00	0.09	165.87	7550.63	16.27	-11.51	18.63	0.30	21.9	121.70	51.00	-50.31	-0.27
7730.00	0.09	75.88	7729.63	16.42	-11.61	18.80	0.07	22.1	121.70	179.00	-50.27	0
7909.00	0.09	157.05	7908.63	16.56	-11.71	18.99	0.07	22.31	121.65	179.00	45.35	0
8088.00	0.62	32.17	8087.62	16.06	-11.02	19.57	0.38	22.45	119.38	179.00	-69.77	0.3
8267.00	0.62	42.96	8266.61	14.92	-9.49	20.74	0.07	22.81	114.58	179.00	6.03	0
8445.00	0.80	106.16	8444.60	15.10	-9.13	22.59	0.43	24.37	112.00	178.00	35.51	0.1
8624.00	1.10	108.58	8623.58	16.75	-10.02	25.42	0.17	27.33	111.52	179.00	1.35	0.17
8803.00	0.31	102.98	8802.56	17.97	-10.68	27.52	0.44	29.52	111.21	179.00	-3.13	-0.44
8982.00	0.22	318.30	8981.56	17.89	-10.53	27.76	0.28	29.69	110.78	179.00	-80.83	-0.05
9161.00	0.49	334.69	9160.56	16.83	-9.58	27.21	0.16	28.85	109.41	179.00	9.16	0.15
9340.00	1.10	292.30	9339.54	15.00	-8.24	25.29	0.45	26.6	108.05	179.00	-23.68	0.34

9519.00	1.02	261.27	9518.51	13.72	-7.83	22.13	0.32	23.47	109.49	179.00	-17.34	-0.04
9698.00	1.59	238.89	9697.47	14.14	-9.36	18.43	0.42	20.66	116.92	179.00	-12.5	0.32
9876.00	1.59	221.39	9875.40	16.10	-12.48	14.68	0.27	19.27	130.38	178.00	-9.83	0
10055.00	0.88	226.20	10054.36	18.06	-15.30	12.04	0.40	19.47	141.79	179.00	2.69	-0.4
10234.00	1.50	259.07	10233.32	18.48	-16.69	8.75	0.50	18.85	152.33	179.00	18.36	0.35
10413.00	1.68	219.50	10412.25	19.74	-19.16	4.78	0.61	19.75	165.99	179.00	-22.11	0.1
10477.00	1.50	196.49	10476.23	20.97	-20.69	3.95	1.03	21.06	169.20	64.00	-35.95	-0.28
10606.00	1.10	172.55	10605.20	23.61	-23.54	3.63	0.52	23.81	171.24	129.00	-18.56	-0.31
10795.00	2.78	177.62	10794.08	29.85	-29.92	4.05	0.89	30.19	172.28	189.00	2.68	0.89
10983.00	3.80	169.95	10981.77	40.47	-40.61	5.33	0.59	40.95	172.52	188.00	-4.08	0.54
10994.85	3.76	170.87	10993.60	41.25	-41.38	5.46	0.61	41.73	172.48	11.85	7.76	-0.34
11070.00	3.84	171.90	11068.58	46.18	-46.30	6.21	0.13	46.71	172.36	75.15	1.37	0.1
11102.00	3.58	176.51	11100.51	48.21	-48.35	6.42	1.23	48.78	172.44	32.00	14.41	-0.81
11144.00	3.34	183.82	11142.44	50.64	-50.88	6.42	1.19	51.28	172.81	42.00	17.4	-0.56
11175.00	4.52	175.42	11173.36	52.68	-53.00	6.45	4.21	53.39	173.06	31.00	-27.1	3.79
11207.00	9.79	166.40	11205.10	56.64	-56.90	7.19	16.80	57.36	172.79	32.00	-28.19	16.48
11238.00	13.96	167.74	11235.43	63.01	-63.12	8.61	13.48	63.71	172.23	31.00	4.33	13.45
11269.00	16.87	168.34	11265.32	71.22	-71.18	10.31	9.38	71.93	171.76	31.00	1.94	9.37
11300.00	18.25	164.42	11294.87	80.56	-80.26	12.53	5.86	81.24	171.13	31.00	-12.65	4.46
11332.00	19.40	157.31	11325.16	90.85	-90.00	15.92	8.02	91.39	169.97	32.00	-22.21	3.61
11364.00	20.78	146.96	11355.23	101.57	-99.66	21.07	11.90	101.86	168.06	32.00	-32.33	4.31
11395.00	23.54	138.46	11383.94	112.44	-108.91	28.18	13.62	112.5	165.49	31.00	-27.44	8.89
11426.00	27.60	141.17	11411.90	124.68	-119.14	36.79	13.63	124.69	162.84	31.00	8.75	13.1
11458.00	29.58	149.39	11440.01	139.18	-131.72	45.46	13.75	139.34	160.96	32.00	25.68	6.19
11489.00	31.90	159.29	11466.67	154.77	-145.98	52.26	17.94	155.05	160.30	31.00	31.94	7.5
11520.00	34.43	163.67	11492.62	171.71	-162.06	57.62	11.23	172	160.43	31.00	14.15	8.15
11552.00	38.13	165.12	11518.41	190.64	-180.29	62.70	11.86	190.88	160.82	32.00	4.52	11.55
11584.00	42.11	164.88	11542.88	211.25	-200.20	68.04	12.45	211.45	161.23	32.00	-0.77	12.44
11615.00	45.41	166.41	11565.26	232.67	-220.97	73.35	11.19	232.83	161.64	31.00	4.96	10.65
11646.00	47.55	168.99	11586.61	255.09	-242.93	78.13	9.17	255.19	162.17	31.00	8.31	6.91
11678.00	46.46	168.18	11608.43	278.41	-265.88	82.76	3.87	278.46	162.71	32.00	-2.52	-3.41
11709.00	47.26	167.29	11629.63	300.98	-287.98	87.56	3.32	301	163.09	31.00	-2.9	2.56
11741.00	47.96	166.81	11651.20	324.57	-311.01	92.86	2.46	324.58	163.38	32.00	-1.49	2.21
11772.00	51.87	164.52	11671.16	348.27	-333.98	98.74	13.81	348.27	163.53	31.00	-7.38	12.6
11804.00	55.29	164.03	11690.16	374.01	-358.76	105.72	10.77	374.02	163.58	32.00	-1.54	10.69
11835.00	57.81	165.36	11707.24	399.87	-383.71	112.54	8.88	399.87	163.65	31.00	4.29	8.13
11867.00	61.71	166.83	11723.36	427.49	-410.54	119.18	12.81	427.49	163.81	32.00	4.59	12.18
11898.00	63.58	167.02	11737.60	454.98	-437.36	125.41	6.05	454.98	164.00	31.00	0.6	6.03
11930.00	65.25	167.35	11751.42	483.78	-465.50	131.81	5.31	483.8	164.19	32.00	1.06	5.22
11961.00	67.81	166.84	11763.77	512.17	-493.21	138.16	8.42	512.2	164.35	31.00	-1.65	8.28
11993.00	70.19	165.80	11775.24	542.01	-522.24	145.23	8.03	542.05	164.46	32.00	-3.26	7.43
12024.00	74.18	164.96	11784.72	571.50	-550.79	152.68	13.13	571.56	164.51	31.00	-2.69	12.88
12056.00	77.88	164.43	11792.44	602.55	-580.74	160.87	11.66	602.61	164.52	32.00	-1.65	11.55
12087.00	78.86	164.64	11798.69	632.91	-610.00	168.97	3.23	632.97	164.52	31.00	0.67	3.16
12118.00	80.57	165.63	11804.23	663.40	-639.48	176.79	6.35	663.47	164.55	31.00	3.19	5.52
12150.00	83.32	166.18	11808.71	695.06	-670.21	184.51	8.75	695.14	164.61	32.00	1.71	8.58
12182.00	81.89	163.87	11812.83	726.78	-700.86	192.71	8.41	726.87	164.63	32.00	-7.2	-4.45
12213.00	84.56	162.14	11816.49	757.56	-730.30	201.70	10.22	757.64	164.56	31.00	-5.58	8.59
12291.00	91.27	160.56	11819.32	835.39	-804.11	226.61	8.84	835.43	164.26	78.00	-2.02	8.61
12325.00	91.58	160.73	11818.48	869.33	-836.18	237.87	1.04	869.35	164.12	34.00	0.5	0.91
12420.00	92.03	160.81	11815.48	964.16	-925.83	269.15	0.48	964.16	163.79	95.00	0.08	0.47
12443.00	92.24	160.80	11814.63	987.11	-947.54	276.70	0.90	987.11	163.72	23.00	-0.04	0.9
12506.00	93.44	162.82	11811.51	1050.00	-1007.31	296.34	3.73	1050	163.61	63.00	3.21	1.91
12600.00	91.65	168.15	11807.32	1143.82	-1098.19	319.86	5.98	1143.82	163.76	94.00	5.67	-1.91
12695.00	91.20	168.71	11804.96	1238.47	-1191.23	338.91	0.75	1238.5	164.12	95.00	0.59	-0.47
12790.00	89.72	168.99	11804.19	1333.08	-1284.43	357.28	1.58	1333.19	164.46	95.00	0.29	-1.56
12885.00	89.31	167.79	11804.99	1427.76	-1377.48	376.40	1.34	1427.98	164.72	95.00	-1.26	-0.43
12980.00	90.58	166.76	11805.07	1522.58	-1470.14	397.33	1.73	1522.89	164.88	95.00	-1.09	1.34
13074.00	92.31	166.19	11802.70	1616.44	-1561.50	419.31	1.93	1616.82	164.97	94.00	-0.6	1.83
13169.00	92.34	166.36	11798.85	1711.26	-1653.71	441.82	0.18	1711.72	165.04	95.00	0.18	0.04
13263.00	92.61	166.87	11794.79	1805.06	-1745.08	463.56	0.62	1805.6	165.12	94.00	0.54	0.29
13357.00	91.82	165.03	11791.15	1898.91	-1836.19	486.35	2.13	1899.51	165.16	94.00	-1.96	-0.84
13452.00	90.17	162.47	11789.50	1993.88	-1927.37	512.93	3.21	1994.46	165.10	95.00	-2.7	-1.74
13546.00	90.86	161.42	11788.65	2087.83	-2016.74	542.06	1.34	2088.32	164.96	94.00	-1.12	0.73
13641.00	90.93	160.76	11787.17	2182.72	-2106.60	572.85	0.70	2183.1	164.79	95.00	-0.69	0.07
13735.00	92.51	162.37	11784.34	2276.61	-2195.73	602.56	2.40	2276.91	164.65	94.00	1.71	1.69
13829.00	91.75	160.83	11780.84	2370.47	-2284.86	632.22	1.83	2370.71	164.53	94.00	-1.64	-0.81
13923.00	90.89	159.19	11778.67	2464.25	-2373.16	664.34	1.96	2464.4	164.36	94.00	-1.74	-0.91
14018.00	93.44	161.64	11775.08	2559.00	-2462.59	696.16	3.71	2559.1	164.21	95.00	2.57	2.68

14112.00	92.99	161.86	11769.80	2652.80	-2551.72	725.55	0.53	2652.87	164.13	94.00	0.24	-0.48
14206.00	91.75	164.07	11765.91	2746.70	-2641.51	753.06	2.70	2746.76	164.09	94.00	2.35	-1.32
14298.00	90.45	163.60	11764.14	2838.68	-2729.86	778.67	1.51	2838.74	164.08	92.00	-0.52	-1.42
14392.00	90.72	162.81	11763.18	2932.67	-2819.84	805.83	0.89	2932.72	164.05	94.00	-0.84	0.29
14487.00	91.31	162.15	11761.50	3027.64	-2910.42	834.43	0.93	3027.67	164.00	95.00	-0.69	0.62
14581.00	91.86	161.94	11758.90	3121.56	-2999.80	863.40	0.62	3121.58	163.94	94.00	-0.22	0.59
14675.00	92.37	161.61	11755.43	3215.44	-3089.03	892.77	0.65	3215.45	163.88	94.00	-0.35	0.55
14769.00	93.44	161.71	11750.66	3309.26	-3178.14	922.31	1.14	3309.26	163.82	94.00	0.11	1.14
14863.00	91.65	161.49	11746.49	3403.10	-3267.24	951.95	1.92	3403.1	163.76	94.00	-0.24	-1.91
14958.00	92.17	161.05	11743.32	3497.96	-3357.16	982.44	0.72	3497.96	163.69	95.00	-0.47	0.55
15052.00	92.27	159.25	11739.68	3591.70	-3445.50	1014.33	1.91	3591.71	163.60	94.00	-1.91	0.11
15147.00	93.27	160.48	11735.10	3686.37	-3534.59	1046.99	1.66	3686.4	163.50	95.00	1.29	1.05
15231.00	93.13	161.27	11730.41	3770.14	-3613.83	1074.47	0.95	3770.18	163.44	84.00	0.94	-0.16
15325.00	92.48	162.22	11725.81	3863.97	-3702.99	1103.88	1.22	3864.03	163.40	94.00	1.01	-0.7
15419.00	92.44	163.18	11721.77	3957.86	-3792.65	1131.81	1.02	3957.93	163.38	94.00	1.02	-0.04
15514.00	92.31	164.29	11717.84	4052.78	-3883.77	1158.40	1.18	4052.85	163.39	95.00	1.17	-0.14
15608.00	92.48	164.22	11713.91	4146.69	-3974.17	1183.88	0.20	4146.76	163.41	94.00	-0.08	0.18
15703.00	91.48	162.92	11710.63	4241.63	-4065.23	1210.73	1.73	4241.69	163.42	95.00	-1.37	-1.05
15797.00	91.72	162.49	11708.01	4335.58	-4154.94	1238.67	0.53	4335.65	163.40	94.00	-0.46	0.25
15892.00	91.58	162.30	11705.27	4430.52	-4245.46	1267.39	0.24	4430.6	163.38	95.00	-0.19	-0.14
15985.00	91.03	161.53	11703.15	4523.45	-4333.84	1296.25	1.02	4523.54	163.35	93.00	-0.83	-0.59
16079.00	91.17	163.45	11701.35	4617.40	-4423.47	1324.52	2.05	4617.51	163.33	94.00	2.04	0.15
16174.00	92.30	165.42	11698.47	4712.34	-4514.93	1350.00	2.39	4712.44	163.35	95.00	2.07	1.19
16268.00	92.65	166.57	11694.40	4806.18	-4606.05	1372.72	1.28	4806.26	163.40	94.00	1.22	0.37
16362.00	92.03	166.24	11690.57	4900.00	-4697.34	1394.81	0.75	4900.05	163.46	94.00	-0.35	-0.66
16457.00	91.96	165.28	11687.26	4994.88	-4789.36	1418.16	1.01	4994.92	163.51	95.00	-1.01	-0.07
16551.00	92.89	165.65	11683.28	5088.75	-4880.27	1441.74	1.06	5088.78	163.54	94.00	0.4	0.99
16646.00	91.75	166.07	11679.43	5183.61	-4972.32	1464.92	1.27	5183.62	163.58	95.00	0.44	-1.19
16740.00	91.96	165.00	11676.38	5277.51	-5063.29	1488.39	1.15	5277.52	163.62	94.00	-1.13	0.22
16835.00	91.62	165.19	11673.41	5372.43	-5155.05	1512.81	0.41	5372.44	163.64	95.00	0.19	-0.36
16916.00	92.13	165.92	11670.76	5453.35	-5233.44	1533.01	1.10	5453.35	163.67	81.00	0.9	0.64
16989.00	92.13	165.92	11668.05	5526.25	-5304.20	1550.76	0.01	5526.25	163.70	73.00	0.01	0 PTB