



October 16, 2018

Railroad Commission of Texas  
 Oil and Gas Division  
 P.O. Box 12967  
 Capitol Station  
 Austin, Texas 78711

Attention: Regulatory Department

Re: Energen Resources Corporation  
 UL 20 Stripes 38-47 602H  
 Winkler County, TX  
 API #42-495-33805  
 Job No. 62485

Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

Name & Title of Surveyor	Drain Hole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Christopher Barton	602H	206	21,553	3/12/18	4/11/18	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

*Brittany Carley*

Brittany Carley  
 Operations Administrator



# **Energen Resources**

**Winkler County, Texas (Nad27)**

**UL 20 Stripes 38-47**

**602H**

**OH / 62485**

**Survey: Phoenix MWD Surveys**

## **Standard Survey Report**

**17 April, 2018**

***ENERGEN***®

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

<b>Project</b>	Winkler County, Texas (Nad27)		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Texas Central 4203		

<b>Site</b>	UL 20 Stripes 38-47		
<b>Site Position:</b>		<b>Northing:</b>	741,025.70 usft
<b>From:</b>	Map	<b>Easting:</b>	1,082,345.50 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	31° 40' 14.53455 N
		<b>Longitude:</b>	103° 16' 59.85365 W
		<b>Grid Convergence:</b>	-1.52 °

<b>Well</b>	602H		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 741,025.70 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 1,082,345.50 usft
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	31° 40' 14.53455 N
		<b>Longitude:</b>	103° 16' 59.85365 W
		<b>Ground Level:</b>	2,772.00 usft

<b>Wellbore</b>	OH / 62485				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	MVHD	3/8/2018	7.15	59.58	47,541.82813170

<b>Design</b>	Surveys (Noram 27)				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	163.77	

<b>Survey Program</b>	<b>Date</b>	4/17/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
206.00	21,587.00	Phoenix MWD Surveys (OH / 62485)	MWD+HDGM	OWSG Rev.2 MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
206.00	1.89	5.98	205.96	3.38	0.35	-3.15	0.92	0.92	0.00	
<b>First Phoenix MWD Survey</b>										
297.00	1.90	16.62	296.91	6.32	0.94	-5.80	0.39	0.01	11.69	
387.00	1.82	12.44	386.87	9.14	1.68	-8.31	0.17	-0.09	-4.64	
499.00	2.01	13.59	498.80	12.79	2.52	-11.57	0.17	0.17	1.03	
592.00	1.72	12.35	591.75	15.74	3.20	-14.21	0.31	-0.31	-1.33	
684.00	0.36	318.68	683.74	17.30	3.31	-15.69	1.67	-1.48	-58.34	
774.00	0.42	301.38	773.74	17.69	2.84	-16.19	0.15	0.07	-19.22	
865.00	0.45	302.08	864.73	18.05	2.25	-16.70	0.03	0.03	0.77	
956.00	0.49	299.45	955.73	18.43	1.61	-17.25	0.05	0.04	-2.89	

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
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<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,051.00	0.46	300.64	1,050.73	18.83	0.93	-17.82	0.03	-0.03	1.25
1,146.00	0.30	299.07	1,145.72	19.14	0.38	-18.27	0.17	-0.17	-1.65
1,240.00	0.34	292.00	1,239.72	19.36	-0.09	-18.62	0.06	0.04	-7.52
1,334.00	0.30	287.24	1,333.72	19.54	-0.58	-18.93	0.05	-0.04	-5.06
1,428.00	0.33	284.40	1,427.72	19.68	-1.08	-19.20	0.04	0.03	-3.02
1,523.00	0.25	304.70	1,522.72	19.87	-1.52	-19.50	0.14	-0.08	21.37
1,617.00	0.29	23.58	1,616.72	20.20	-1.59	-19.84	0.37	0.04	83.91
1,712.00	0.54	34.18	1,711.72	20.79	-1.24	-20.31	0.27	0.26	11.16
1,807.00	0.88	32.07	1,806.71	21.78	-0.60	-21.08	0.36	0.36	-2.22
1,901.00	0.22	117.22	1,900.70	22.31	-0.06	-21.44	0.95	-0.70	90.59
1,995.00	0.49	175.83	1,994.70	21.83	0.13	-20.92	0.45	0.29	62.35
2,089.00	0.55	151.44	2,088.70	21.03	0.37	-20.09	0.24	0.06	-25.95
2,183.00	0.62	131.35	2,182.69	20.30	0.97	-19.22	0.23	0.07	-21.37
2,277.00	0.86	106.81	2,276.69	19.76	2.03	-18.40	0.42	0.26	-26.11
2,372.00	1.34	90.39	2,371.67	19.54	3.82	-17.70	0.60	0.51	-17.28
2,466.00	0.81	113.67	2,465.65	19.27	5.53	-16.96	0.72	-0.56	24.77
2,561.00	0.72	126.17	2,560.64	18.65	6.63	-16.05	0.20	-0.09	13.16
2,655.00	0.35	163.28	2,654.64	18.03	7.19	-15.30	0.52	-0.39	39.48
2,749.00	0.33	216.08	2,748.64	17.53	7.11	-14.85	0.32	-0.02	56.17
2,844.00	0.12	154.18	2,843.64	17.22	6.99	-14.58	0.31	-0.22	-65.16
2,938.00	0.20	76.79	2,937.64	17.17	7.19	-14.47	0.22	0.09	-82.33
3,032.00	0.32	68.57	3,031.64	17.30	7.60	-14.49	0.13	0.13	-8.74
3,127.00	0.70	61.20	3,126.63	17.68	8.35	-14.64	0.41	0.40	-7.76
3,221.00	0.87	60.81	3,220.62	18.30	9.48	-14.93	0.18	0.18	-0.41
3,315.00	1.05	64.14	3,314.61	19.03	10.88	-15.23	0.20	0.19	3.54
3,410.00	0.16	2.20	3,409.60	19.54	11.67	-15.50	1.04	-0.94	-65.20
3,504.00	0.80	2.60	3,503.60	20.33	11.70	-16.25	0.68	0.68	0.43
3,599.00	0.76	255.82	3,598.60	20.84	11.12	-16.90	1.32	-0.04	-112.40
3,694.00	0.62	258.24	3,693.59	20.58	10.01	-16.96	0.15	-0.15	2.55
3,788.00	0.30	247.55	3,787.59	20.38	9.28	-16.97	0.35	-0.34	-11.37
3,882.00	0.38	116.09	3,881.59	20.15	9.33	-16.74	0.66	0.09	-139.85
3,976.00	0.83	100.21	3,975.58	19.89	10.28	-16.22	0.51	0.48	-16.89
4,071.00	0.96	92.27	4,070.57	19.74	11.76	-15.66	0.19	0.14	-8.36
4,165.00	0.73	117.26	4,164.56	19.43	13.07	-15.00	0.46	-0.24	26.59
4,258.00	0.73	165.32	4,257.55	18.59	13.75	-14.00	0.64	0.00	51.68
4,352.00	0.57	162.07	4,351.55	17.56	14.05	-12.94	0.17	-0.17	-3.46
4,446.00	0.49	159.06	4,445.54	16.74	14.33	-12.07	0.09	-0.09	-3.20
4,541.00	1.03	119.51	4,540.53	15.94	15.22	-11.05	0.76	0.57	-41.63
4,635.00	1.41	150.71	4,634.51	14.52	16.52	-9.32	0.80	0.40	33.19
4,729.00	1.81	147.13	4,728.48	12.26	17.90	-6.77	0.44	0.43	-3.81
4,824.00	1.98	140.24	4,823.42	9.74	19.76	-3.83	0.30	0.18	-7.25
4,897.00	1.93	138.83	4,896.38	7.84	21.38	-1.56	0.10	-0.07	-1.93
5,008.00	2.01	143.76	5,007.32	4.87	23.76	1.97	0.17	0.07	4.44

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<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
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## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,102.00	0.23	68.73	5,101.30	3.61	24.91	3.50	2.09	-1.89	-79.82
5,196.00	0.80	24.08	5,195.29	4.27	25.35	2.98	0.70	0.61	-47.50
5,291.00	0.80	19.71	5,290.28	5.50	25.84	1.94	0.06	0.00	-4.60
5,385.00	0.14	287.66	5,384.28	6.16	25.96	1.34	0.87	-0.70	-97.93
5,479.00	0.49	234.27	5,478.28	5.96	25.52	1.41	0.45	0.37	-56.80
5,573.00	0.52	234.27	5,572.27	5.47	24.85	1.69	0.03	0.03	0.00
5,668.00	0.47	239.69	5,667.27	5.02	24.16	1.93	0.07	-0.05	5.71
5,763.00	0.53	221.09	5,762.27	4.50	23.54	2.26	0.18	0.06	-19.58
5,857.00	0.47	223.62	5,856.26	3.89	22.99	2.69	0.07	-0.06	2.69
5,952.00	0.40	204.20	5,951.26	3.31	22.58	3.14	0.17	-0.07	-20.44
6,046.00	0.38	200.00	6,045.26	2.71	22.34	3.64	0.04	-0.02	-4.47
6,141.00	1.34	228.59	6,140.25	1.68	21.40	4.37	1.08	1.01	30.09
6,236.00	1.41	233.22	6,235.22	0.25	19.63	5.25	0.14	0.07	4.87
6,329.00	1.44	228.83	6,328.19	-1.21	17.83	6.14	0.12	0.03	-4.72
6,424.00	1.51	231.62	6,423.16	-2.77	15.95	7.12	0.11	0.07	2.94
6,518.00	1.49	229.76	6,517.13	-4.33	14.05	8.08	0.06	-0.02	-1.98
6,612.00	1.39	223.73	6,611.10	-5.94	12.33	9.15	0.19	-0.11	-6.41
6,706.00	1.38	220.58	6,705.07	-7.62	10.80	10.34	0.08	-0.01	-3.35
6,800.00	1.23	215.05	6,799.05	-9.31	9.49	11.59	0.21	-0.16	-5.88
6,895.00	1.31	212.80	6,894.02	-11.06	8.31	12.94	0.10	0.08	-2.37
6,989.00	1.26	212.75	6,988.00	-12.83	7.17	14.32	0.05	-0.05	-0.05
7,084.00	1.19	204.60	7,082.98	-14.61	6.20	15.76	0.20	-0.07	-8.58
7,178.00	1.16	202.94	7,176.96	-16.37	5.42	17.23	0.05	-0.03	-1.77
7,272.00	1.25	206.49	7,270.94	-18.16	4.59	18.72	0.12	0.10	3.78
7,366.00	1.15	208.70	7,364.92	-19.91	3.68	20.14	0.12	-0.11	2.35
7,460.00	0.46	272.29	7,458.91	-20.72	2.85	20.69	1.10	-0.73	67.65
7,554.00	0.64	313.29	7,552.90	-20.35	2.09	20.12	0.45	0.19	43.62
7,648.00	0.67	326.70	7,646.90	-19.53	1.41	19.14	0.17	0.03	14.27
7,743.00	0.70	349.91	7,741.89	-18.49	1.00	18.03	0.29	0.03	24.43
7,837.00	0.60	3.32	7,835.88	-17.43	0.93	17.00	0.19	-0.11	14.27
7,932.00	0.54	25.08	7,930.88	-16.53	1.15	16.19	0.23	-0.06	22.91
8,026.00	0.65	37.39	8,024.88	-15.71	1.66	15.55	0.18	0.12	13.10
8,120.00	0.65	42.77	8,118.87	-14.89	2.35	14.95	0.06	0.00	5.72
8,215.00	0.82	42.58	8,213.86	-14.00	3.17	14.32	0.18	0.18	-0.20
8,310.00	0.75	48.33	8,308.85	-13.08	4.10	13.71	0.11	-0.07	6.05
8,405.00	0.81	54.90	8,403.84	-12.28	5.11	13.22	0.11	0.06	6.92
8,499.00	0.91	48.91	8,497.83	-11.41	6.22	12.69	0.14	0.11	-6.37
8,593.00	1.02	46.58	8,591.82	-10.34	7.39	12.00	0.12	0.12	-2.48
8,687.00	1.32	51.45	8,685.80	-9.09	8.84	11.20	0.34	0.32	5.18
8,781.00	1.46	53.33	8,779.77	-7.70	10.65	10.37	0.16	0.15	2.00
8,876.00	1.88	53.46	8,874.73	-6.05	12.87	9.41	0.44	0.44	0.14
8,970.00	1.83	46.79	8,968.68	-4.11	15.20	8.19	0.24	-0.05	-7.10
9,064.00	2.06	46.80	9,062.63	-1.92	17.53	6.75	0.24	0.24	0.01

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## Survey

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9,158.00	1.71	43.86	9,156.58	0.24	19.73	5.28	0.39	-0.37	-3.13
9,252.00	1.14	55.74	9,250.55	1.78	21.48	4.29	0.68	-0.61	12.64
9,347.00	0.84	66.09	9,345.53	2.60	22.90	3.91	0.37	-0.32	10.89
9,441.00	0.83	75.57	9,439.52	3.04	24.18	3.84	0.15	-0.01	10.09
9,535.00	1.05	50.08	9,533.51	3.77	25.50	3.51	0.50	0.23	-27.12
9,630.00	0.73	94.56	9,628.50	4.28	26.78	3.38	0.77	-0.34	46.82
9,724.00	1.48	156.75	9,722.49	3.11	27.85	4.79	1.39	0.80	66.16
9,817.00	2.33	153.53	9,815.43	0.32	29.17	7.85	0.92	0.91	-3.46
9,911.00	2.45	152.61	9,909.35	-3.18	30.94	11.70	0.13	0.13	-0.98
10,007.00	2.68	149.11	10,005.26	-6.92	33.04	15.88	0.29	0.24	-3.65
10,100.00	2.27	146.55	10,098.17	-10.33	35.17	19.75	0.46	-0.44	-2.75
10,195.00	0.87	156.80	10,193.13	-12.56	36.49	22.26	1.50	-1.47	10.79
10,289.00	0.63	142.06	10,287.12	-13.62	37.09	23.45	0.33	-0.26	-15.68
10,384.00	1.06	151.28	10,382.11	-14.81	37.84	24.79	0.47	0.45	9.71
10,478.00	0.63	210.19	10,476.10	-16.01	37.99	25.99	0.97	-0.46	62.67
10,572.00	0.98	281.52	10,570.10	-16.30	36.95	25.98	1.04	0.37	75.88
10,667.00	0.98	319.98	10,665.08	-15.52	35.63	24.86	0.68	0.00	40.48
10,761.00	0.88	343.62	10,759.07	-14.21	34.91	23.40	0.42	-0.11	25.15
10,855.00	0.95	346.84	10,853.06	-12.76	34.53	21.90	0.09	0.07	3.43
10,949.00	1.30	342.37	10,947.04	-10.98	34.03	20.05	0.38	0.37	-4.76
11,043.00	1.26	337.45	11,041.02	-9.01	33.31	17.96	0.12	-0.04	-5.23
11,151.00	4.03	159.54	11,148.95	-11.47	34.18	20.57	4.90	2.56	-164.73
11,245.00	14.96	152.73	11,241.52	-25.39	40.91	35.82	11.67	11.63	-7.24
11,339.00	23.05	158.42	11,330.33	-53.34	53.26	66.10	8.82	8.61	6.05
11,434.00	28.89	162.00	11,415.71	-92.49	67.21	107.59	6.36	6.15	3.77
11,528.00	34.70	165.60	11,495.57	-140.05	80.89	157.08	6.50	6.18	3.83
11,622.00	42.25	163.88	11,569.11	-196.41	96.34	215.51	8.11	8.03	-1.83
11,716.00	48.98	162.23	11,634.83	-260.61	115.96	282.64	7.27	7.16	-1.76
11,810.00	51.40	163.41	11,695.01	-329.59	137.27	354.83	2.75	2.57	1.26
11,905.00	56.99	164.74	11,750.57	-403.66	158.37	431.84	5.99	5.88	1.40
11,999.00	63.75	166.87	11,797.02	-482.83	178.35	513.44	7.46	7.19	2.27
12,030.00	65.81	166.15	11,810.22	-510.10	184.89	541.45	6.97	6.65	-2.32
12,087.00	67.06	166.85	11,833.01	-560.90	197.09	593.64	2.46	2.19	1.23
12,181.00	76.26	168.71	11,862.56	-648.02	215.91	682.54	9.97	9.79	1.98
12,276.00	86.19	168.73	11,877.03	-739.98	234.25	775.96	10.45	10.45	0.02
12,371.00	87.22	167.24	11,882.50	-832.74	254.00	870.54	1.90	1.08	-1.57
12,466.00	88.58	166.33	11,885.98	-925.16	275.70	965.34	1.72	1.43	-0.96
12,560.00	88.25	164.97	11,888.58	-1,016.19	298.99	1,059.26	1.49	-0.35	-1.45
12,655.00	88.81	164.31	11,891.01	-1,107.76	324.14	1,154.21	0.91	0.59	-0.69
12,750.00	89.30	163.99	11,892.58	-1,199.14	350.09	1,249.20	0.62	0.52	-0.34
12,845.00	89.35	162.64	11,893.70	-1,290.13	377.36	1,344.19	1.42	0.05	-1.42
12,939.00	89.88	161.25	11,894.33	-1,379.50	406.49	1,438.13	1.58	0.56	-1.48
13,034.00	90.92	156.63	11,893.67	-1,468.12	440.62	1,532.77	4.98	1.09	-4.86
13,128.00	91.41	156.50	11,891.76	-1,554.35	478.00	1,626.00	0.54	0.52	-0.14

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,223.00	91.82	155.93	11,889.08	-1,641.25	516.29	1,720.14	0.74	0.43	-0.60
13,318.00	90.35	160.04	11,887.28	-1,729.29	551.89	1,814.62	4.59	-1.55	4.33
13,412.00	91.81	164.89	11,885.51	-1,818.87	580.20	1,908.55	5.39	1.55	5.16
13,507.00	92.04	160.03	11,882.31	-1,909.38	608.80	2,003.44	5.12	0.24	-5.12
13,602.00	90.99	162.60	11,879.80	-1,999.33	639.22	2,098.31	2.92	-1.11	2.71
13,696.00	91.58	165.35	11,877.69	-2,089.65	665.16	2,192.28	2.99	0.63	2.93
13,791.00	91.29	168.63	11,875.31	-2,182.16	686.54	2,287.08	3.47	-0.31	3.45
13,886.00	90.87	169.04	11,873.52	-2,275.35	704.93	2,381.70	0.62	-0.44	0.43
13,981.00	91.82	168.81	11,871.29	-2,368.55	723.17	2,476.28	1.03	1.00	-0.24
14,076.00	91.04	164.58	11,868.92	-2,460.95	745.03	2,571.11	4.53	-0.82	-4.45
14,170.00	92.92	162.30	11,865.67	-2,550.99	771.80	2,665.04	3.14	2.00	-2.43
14,265.00	92.49	158.77	11,861.19	-2,640.45	803.42	2,759.77	3.74	-0.45	-3.72
14,360.00	92.07	168.20	11,857.40	-2,731.35	830.37	2,854.58	9.93	-0.44	9.93
14,455.00	91.32	164.64	11,854.59	-2,823.64	852.66	2,949.42	3.83	-0.79	-3.75
14,549.00	92.01	157.58	11,851.86	-2,912.48	883.06	3,043.22	7.54	0.73	-7.51
14,644.00	92.63	152.09	11,848.01	-2,998.36	923.41	3,136.96	5.81	0.65	-5.78
14,739.00	92.30	154.71	11,843.92	-3,083.22	965.90	3,230.31	2.78	-0.35	2.76
14,834.00	91.69	157.47	11,840.61	-3,170.01	1,004.38	3,324.39	2.97	-0.64	2.91
14,928.00	93.81	163.79	11,836.10	-3,258.53	1,035.50	3,418.09	7.08	2.26	6.72
15,023.00	91.18	167.91	11,831.96	-3,350.54	1,058.70	3,512.91	5.14	-2.77	4.34
15,118.00	91.32	173.35	11,829.89	-3,444.21	1,074.15	3,607.17	5.73	0.15	5.73
15,213.00	87.08	172.62	11,831.21	-3,538.47	1,085.75	3,700.91	4.53	-4.46	-0.77
15,307.00	86.50	172.81	11,836.48	-3,631.56	1,097.65	3,793.62	0.65	-0.62	0.20
15,402.00	90.87	169.50	11,838.66	-3,725.37	1,112.25	3,887.78	5.77	4.60	-3.48
15,496.00	93.56	170.59	11,835.02	-3,817.88	1,128.49	3,981.13	3.09	2.86	1.16
15,591.00	88.87	166.26	11,833.01	-3,910.88	1,147.54	4,075.75	6.72	-4.94	-4.56
15,686.00	89.22	166.44	11,834.59	-4,003.18	1,169.96	4,170.64	0.41	0.37	0.19
15,780.00	87.78	165.85	11,837.05	-4,094.41	1,192.46	4,264.52	1.66	-1.53	-0.63
15,875.00	90.02	163.61	11,838.88	-4,186.03	1,217.47	4,359.48	3.33	2.36	-2.36
15,969.00	91.79	161.95	11,837.39	-4,275.80	1,245.29	4,453.45	2.58	1.88	-1.77
16,064.00	93.66	161.75	11,832.88	-4,365.97	1,274.85	4,548.28	1.98	1.97	-0.21
16,159.00	92.86	159.07	11,827.47	-4,455.31	1,306.65	4,642.96	2.94	-0.84	-2.82
16,253.00	91.87	159.80	11,823.59	-4,543.25	1,339.64	4,736.61	1.31	-1.05	0.78
16,348.00	92.87	161.14	11,819.67	-4,632.70	1,371.37	4,831.36	1.76	1.05	1.41
16,442.00	94.23	162.17	11,813.84	-4,721.75	1,400.90	4,925.12	1.81	1.45	1.10
16,537.00	92.39	160.90	11,808.36	-4,811.70	1,430.94	5,019.88	2.35	-1.94	-1.34
16,632.00	93.44	162.59	11,803.53	-4,901.80	1,460.65	5,114.69	2.09	1.11	1.78
16,726.00	93.52	161.19	11,797.82	-4,990.97	1,489.82	5,208.47	1.49	0.09	-1.49
16,821.00	94.41	161.42	11,791.25	-5,080.75	1,520.20	5,303.15	0.97	0.94	0.24
16,916.00	96.18	164.32	11,782.48	-5,171.13	1,548.06	5,397.72	3.57	1.86	3.05
17,010.00	94.03	165.04	11,774.12	-5,261.42	1,572.79	5,491.33	2.41	-2.29	0.77
17,105.00	96.50	166.97	11,765.40	-5,353.20	1,595.67	5,585.84	3.29	2.60	2.03
17,200.00	93.81	166.06	11,756.87	-5,445.20	1,617.73	5,680.34	2.99	-2.83	-0.96

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,295.00	93.42	165.62	11,750.88	-5,537.13	1,640.93	5,775.09	0.62	-0.41	-0.46
17,389.00	92.59	166.66	11,745.95	-5,628.27	1,663.41	5,868.88	1.41	-0.88	1.11
17,484.00	93.51	167.68	11,740.90	-5,720.76	1,684.48	5,963.57	1.44	0.97	1.07
17,579.00	91.22	167.11	11,736.98	-5,813.39	1,705.19	6,058.30	2.48	-2.41	-0.60
17,673.00	91.58	167.29	11,734.68	-5,905.02	1,726.01	6,152.10	0.43	0.38	0.19
17,768.00	92.42	167.15	11,731.36	-5,997.61	1,747.01	6,246.87	0.90	0.88	-0.15
17,862.00	94.73	168.52	11,725.50	-6,089.31	1,766.78	6,340.44	2.86	2.46	1.46
17,957.00	94.13	167.51	11,718.16	-6,181.96	1,786.45	6,434.90	1.23	-0.63	-1.06
18,052.00	92.56	165.93	11,712.62	-6,274.26	1,808.23	6,529.60	2.34	-1.65	-1.66
18,146.00	91.07	165.86	11,709.64	-6,365.38	1,831.13	6,623.49	1.59	-1.59	-0.07
18,241.00	91.24	166.15	11,707.73	-6,457.54	1,854.10	6,718.40	0.35	0.18	0.31
18,336.00	89.65	166.34	11,706.99	-6,549.81	1,876.69	6,813.30	1.69	-1.67	0.20
18,430.00	91.33	168.17	11,706.19	-6,641.48	1,897.42	6,907.12	2.64	1.79	1.95
18,525.00	88.98	166.50	11,705.93	-6,734.16	1,918.25	7,001.92	3.03	-2.47	-1.76
18,620.00	89.98	165.30	11,706.79	-6,826.29	1,941.39	7,096.85	1.64	1.05	-1.26
18,714.00	89.87	164.87	11,706.92	-6,917.12	1,965.59	7,190.83	0.47	-0.12	-0.46
18,809.00	91.18	162.78	11,706.04	-7,008.35	1,992.05	7,285.82	2.60	1.38	-2.20
18,904.00	92.78	160.83	11,702.76	-7,098.54	2,021.69	7,380.70	2.65	1.68	-2.05
18,998.00	92.98	159.77	11,698.04	-7,186.93	2,053.34	7,474.40	1.15	0.21	-1.13
19,093.00	90.73	157.73	11,694.96	-7,275.41	2,087.75	7,568.98	3.20	-2.37	-2.15
19,188.00	94.19	160.70	11,690.89	-7,364.12	2,121.42	7,663.57	4.80	3.64	3.13
19,282.00	94.27	159.75	11,683.95	-7,452.33	2,153.14	7,757.13	1.01	0.09	-1.01
19,377.00	89.64	158.75	11,680.71	-7,541.10	2,186.77	7,851.75	4.99	-4.87	-1.05
19,472.00	90.72	159.81	11,680.41	-7,629.95	2,220.38	7,946.46	1.59	1.14	1.12
19,566.00	88.44	158.93	11,681.10	-7,717.91	2,253.49	8,040.17	2.60	-2.43	-0.94
19,661.00	91.22	163.19	11,681.38	-7,807.74	2,284.32	8,135.03	5.35	2.93	4.48
19,755.00	91.91	165.28	11,678.82	-7,898.16	2,309.84	8,228.99	2.34	0.73	2.22
19,850.00	91.64	165.74	11,675.87	-7,990.10	2,333.60	8,323.90	0.56	-0.28	0.48
19,945.00	93.85	168.42	11,671.32	-8,082.57	2,354.82	8,418.62	3.65	2.33	2.82
20,039.00	91.91	166.92	11,666.60	-8,174.28	2,374.87	8,512.27	2.61	-2.06	-1.60
20,134.00	90.67	166.68	11,664.46	-8,266.74	2,396.55	8,607.11	1.33	-1.31	-0.25
20,228.00	90.62	166.82	11,663.40	-8,358.24	2,418.10	8,700.98	0.16	-0.05	0.15
20,323.00	91.76	165.69	11,661.43	-8,450.49	2,440.66	8,795.87	1.69	1.20	-1.19
20,417.00	91.65	166.00	11,658.63	-8,541.60	2,463.64	8,889.77	0.35	-0.12	0.33
20,512.00	91.01	165.57	11,656.43	-8,633.66	2,486.96	8,984.68	0.81	-0.67	-0.45
20,606.00	90.39	166.28	11,655.28	-8,724.83	2,509.82	9,078.61	1.00	-0.66	0.76
20,701.00	93.93	166.38	11,651.70	-8,817.06	2,532.25	9,173.43	3.73	3.73	0.11
20,796.00	93.04	165.96	11,645.93	-8,909.14	2,554.92	9,268.17	1.04	-0.94	-0.44
20,890.00	90.52	164.14	11,643.01	-8,999.90	2,579.15	9,362.09	3.31	-2.68	-1.94
20,985.00	92.08	164.33	11,640.85	-9,091.30	2,604.96	9,457.06	1.65	1.64	0.20
21,080.00	93.07	163.41	11,636.58	-9,182.46	2,631.32	9,551.96	1.42	1.04	-0.97
21,175.00	89.08	162.06	11,634.80	-9,273.15	2,659.51	9,646.91	4.43	-4.20	-1.42
21,269.00	88.24	162.05	11,637.00	-9,362.55	2,688.46	9,740.84	0.89	-0.89	-0.01



<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

**Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
21,364.00	88.75	162.28	11,639.49	-9,452.95	2,717.55	9,835.77	0.59	0.54	0.24
21,459.00	91.28	162.92	11,639.47	-9,543.60	2,745.95	9,930.74	2.75	2.66	0.67
21,553.00	92.85	162.64	11,636.08	-9,633.32	2,773.76	10,024.66	1.70	1.67	-0.30
<b>Final Phoenix MWD Survey</b>									
21,587.00	92.85	162.64	11,634.40	-9,665.73	2,783.90	10,058.61	0.00	0.00	0.00
<b>Projection to TD</b>									

**Survey Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
206.00	205.96	3.38	0.35	First Phoenix MWD Survey
21,553.00	11,636.08	-9,633.32	2,773.76	Final Phoenix MWD Survey
21,587.00	11,634.40	-9,665.73	2,783.90	Projection to TD

# SURVEY DATA CERTIFICATION



**PHOENIX**  
TECHNOLOGY SERVICES

Job #: 62485  
 Client: Energen Resources  
 County & State: Winkler, Texas  
 Well: UL 20 STRIPES 38-47 602H  
 API No: 42-495-33805  
 Proposed Direction: 163.77°

## TIE-IN DATA

MD	TVD	INC	AZM	N/-S	E/-W	DATA SOURCE
N/A	N/A	N/A	N/A	N/A	N/A	N/A
Data Source Company:						N/A

## SURVEY DATA

First Survey Date	First Survey Depth	INC	AZM
12-Mar-18	206 ft	1.89°	5.98°

Last Survey Date	Last Survey Depth	INC	AZM
11-Apr-18	21,553 ft	92.85°	162.64°

Survey Instrument Type
Velocity MWD

Projected TD Survey Date	Projected TD Survey Depth	INC	AZM
11-Apr-18	21,587 ft	92.85°	162.64°

## CORRECTION INFORMATION

Magnetic Declination Used	7.15 degrees
Grid Convergence Used	-1.52 degrees
Total Correction	8.67 degrees

Corrected to True/Grid North
Grid North

TO THE BEST OF MY KNOWLEDGE, I  
 CERTIFY THIS SURVEY DATA TO BE  
 TRUE AND CORRECT.

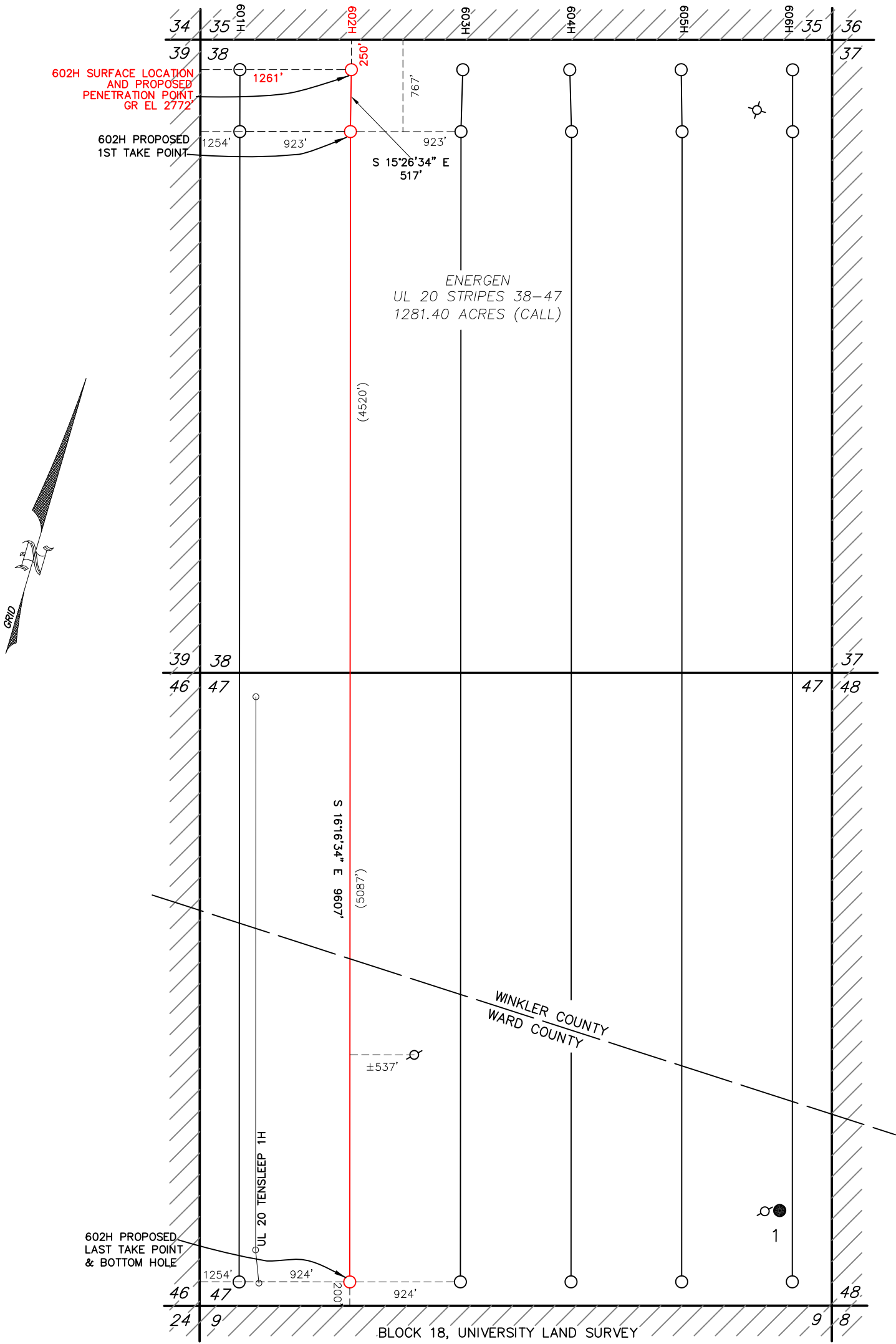
Christopher Barton

Signature

4/12/2018

Date

SECTION 38, BLOCK 20, UNIVERSITY LAND SURVEY  
SECTION 47, BLOCK 20, UNIVERSITY LAND SURVEY



NAD 83, TEXAS CENTRAL ZONE	NAD 27, TEXAS CENTRAL ZONE
S/L: N=10583601.9', E=1378810.4' LAT=31.6708344 N, LONG=103.2837398 W	S/L: N=741025.7', E=1082345.5' LAT=31.6707042 N, LONG=103.2832927 W
1ST/P: N=10583103.6', E=1378948.1' LAT=31.6694749 N, LONG=103.2832550 W	1ST/P: N=740527.4', E=1082483.2' LAT=31.6693447 N, LONG=103.2828078 W
B/H: N=10573882.0', E=1381640.5' LAT=31.6443293 N, LONG=103.2738204 W	B/H: N=731306.0', E=1085175.5' LAT=31.6441986 N, LONG=103.2733740 W
APPROXIMATELY 13.2 MILES NW OF PYOTE, TEXAS	

I, THE UNDERSIGNED, DO HEREBY CERTIFY THAT THE SURVEY INFORMATION FOUND ON THIS PLAT WAS DERIVED FROM ACTUAL FIELD NOTES OF ON-THE-GROUND SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. NO WARRANTY IS MADE OR INTENDED FOR THE LOCATION OF ANY OR ALL EASEMENTS THAT MAY EXIST WITHIN THE BOUNDS OF THIS SURVEY. THE INFORMATION PRESENTED HEREON IS FOR THE PRIVATE USE OF THE PARTY NAMED IN THE "REFERENCE PORTION" OF THE TITLE BLOCK AND DOES NOT CONSTITUTE A COMPLETE BOUNDARY SURVEY AS DEFINED BY THE "PROFESSIONAL LAND SURVEYING PRACTICES ACT."



NOTES:  
1. COORDINATES AND BEARINGS SHOWN HEREON ARE NAD 83, LAMBERT GRID COORDINATES AND CONFORM TO THE TEXAS COORDINATE SYSTEM "TEXAS CENTRAL ZONE," WITH REFERENCE TO USGS TRI-STATION "INGLE" WITH A CENTRAL COMBINED SCALE FACTOR OF 0.99980780. THE POSITIONAL TOLERANCE OF THIS SURVEY EXCEEDS THE REQUIREMENTS FOR A RURAL SURVEY.  
2. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT AND REVIEW OF THE ABSTRACT OF TITLE. THERE MAY BE EASEMENTS AND/OR COVENANTS AFFECTING THIS PROPERTY NOT SHOWN HEREON. LOCATION OF IMPROVEMENTS AND/OR EASEMENTS WERE BEYOND COMMISSIONED SCOPE OF THIS PROJECT AND HAVE BEEN SPECIFICALLY OMITTED. VESTING DOCUMENTS NOT FURNISHED FOR THIS SURVEY.  
3. SEE DOCUMENTS AND ELECTRONIC DATA FILED IN THE OFFICE OF WPG INC FOR COMPLETE RECONSTRUCTION OF THESE SECTIONS OR BLOCKS.  
4. REVISED 2/23/17 TO REMOVE OFFSET WELLS.

Thais Watson Ahlstrand TEXAS R.P.L.S. No. 6359

REVISED 2/23/17  
FEBRUARY 6, 2017

DATE



P.O. DRAWER 11186  
MIDLAND, TEXAS 79702  
(432) 520-9200  
FAX (432) 520-9212  
tahlstrand@wpg-us.com

- GAS WELL
- WATER INJECTION WELL
- OIL WELL
- LOCATED WELL
- DRY HOLE
- WATER WELL
- PLUGGED WELL

PERMIT PLAT  
ENERGEN RESOURCES CORPORATION  
UL 20 STRIPES 38-47 602H

S/L & PROPOSED P/P: 250' FNWL & 1261' FSWL  
PROPOSED 1ST T/P: 767' FNWL & 1254' FSWL  
SECTION 38, BLOCK 20, UNIVERSITY LAND SURVEY  
PROPOSED LAST T/P & B/H: 200' FSEL & 1254' FSWL  
SECTION 47, BLOCK 20, UNIVERSITY LAND SURVEY  
WINKLER & WARD COUNTIES, TEXAS

DATE: JANUARY 25, 2017 DATE SURVEYED: 1/11/17  
JOB NO.: 17-1008-00 FIELD BOOK 824/20 DRAFT NGH REV. 1



# **Energen Resources**

**Winkler County, Texas (Nad27)**

**UL 20 Stripes 38-47**

**602H**

**OH / 62485**

**Survey: Phoenix MWD Surveys**

## **Standard Survey Report**

**16 October, 2018**

***ENERGEN***®

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

<b>Project</b>	Winkler County, Texas (Nad27)		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Texas Central 4203		

<b>Site</b>	UL 20 Stripes 38-47		
<b>Site Position:</b>		<b>Northing:</b>	741,025.70 usft
<b>From:</b>	Map	<b>Easting:</b>	1,082,345.50 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	31° 40' 14.53455 N
		<b>Longitude:</b>	103° 16' 59.85365 W
		<b>Grid Convergence:</b>	-1.52 °

<b>Well</b>	602H		
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b> 741,025.70 usft
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b> 1,082,345.50 usft
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	31° 40' 14.53455 N
		<b>Longitude:</b>	103° 16' 59.85365 W
		<b>Ground Level:</b>	2,772.00 usft

<b>Wellbore</b>	OH / 62485				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	MVHD	3/8/2018	7.15	59.58	47,541.82813170

<b>Design</b>	Surveys (Noram 27)				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	163.77	

<b>Survey Program</b>	<b>Date</b>	10/16/2018			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
206.00	21,634.00	Phoenix MWD Surveys (OH / 62485)	MWD+HDGM	OWSG Rev.2 MWD + HDGM	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
206.00	1.89	5.98	205.96	3.38	0.35	-3.15	0.92	0.92	0.00	
<b>First Phoenix MWD Survey</b>										
297.00	1.90	16.62	296.91	6.32	0.94	-5.80	0.39	0.01	11.69	
387.00	1.82	12.44	386.87	9.14	1.68	-8.31	0.17	-0.09	-4.64	
499.00	2.01	13.59	498.80	12.79	2.52	-11.57	0.17	0.17	1.03	
592.00	1.72	12.35	591.75	15.74	3.20	-14.21	0.31	-0.31	-1.33	
684.00	0.36	318.68	683.74	17.30	3.31	-15.69	1.67	-1.48	-58.34	
774.00	0.42	301.38	773.74	17.69	2.84	-16.19	0.15	0.07	-19.22	
865.00	0.45	302.08	864.73	18.05	2.25	-16.70	0.03	0.03	0.77	
956.00	0.49	299.45	955.73	18.43	1.61	-17.25	0.05	0.04	-2.89	

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,051.00	0.46	300.64	1,050.73	18.83	0.93	-17.82	0.03	-0.03	1.25
1,146.00	0.30	299.07	1,145.72	19.14	0.38	-18.27	0.17	-0.17	-1.65
1,240.00	0.34	292.00	1,239.72	19.36	-0.09	-18.62	0.06	0.04	-7.52
1,334.00	0.30	287.24	1,333.72	19.54	-0.58	-18.93	0.05	-0.04	-5.06
1,428.00	0.33	284.40	1,427.72	19.68	-1.08	-19.20	0.04	0.03	-3.02
1,523.00	0.25	304.70	1,522.72	19.87	-1.52	-19.50	0.14	-0.08	21.37
1,617.00	0.29	23.58	1,616.72	20.20	-1.59	-19.84	0.37	0.04	83.91
1,712.00	0.54	34.18	1,711.72	20.79	-1.24	-20.31	0.27	0.26	11.16
1,807.00	0.88	32.07	1,806.71	21.78	-0.60	-21.08	0.36	0.36	-2.22
1,901.00	0.22	117.22	1,900.70	22.31	-0.06	-21.44	0.95	-0.70	90.59
1,995.00	0.49	175.83	1,994.70	21.83	0.13	-20.92	0.45	0.29	62.35
2,089.00	0.55	151.44	2,088.70	21.03	0.37	-20.09	0.24	0.06	-25.95
2,183.00	0.62	131.35	2,182.69	20.30	0.97	-19.22	0.23	0.07	-21.37
2,277.00	0.86	106.81	2,276.69	19.76	2.03	-18.40	0.42	0.26	-26.11
2,372.00	1.34	90.39	2,371.67	19.54	3.82	-17.70	0.60	0.51	-17.28
2,466.00	0.81	113.67	2,465.65	19.27	5.53	-16.96	0.72	-0.56	24.77
2,561.00	0.72	126.17	2,560.64	18.65	6.63	-16.05	0.20	-0.09	13.16
2,655.00	0.35	163.28	2,654.64	18.03	7.19	-15.30	0.52	-0.39	39.48
2,749.00	0.33	216.08	2,748.64	17.53	7.11	-14.85	0.32	-0.02	56.17
2,844.00	0.12	154.18	2,843.64	17.22	6.99	-14.58	0.31	-0.22	-65.16
2,938.00	0.20	76.79	2,937.64	17.17	7.19	-14.47	0.22	0.09	-82.33
3,032.00	0.32	68.57	3,031.64	17.30	7.60	-14.49	0.13	0.13	-8.74
3,127.00	0.70	61.20	3,126.63	17.68	8.35	-14.64	0.41	0.40	-7.76
3,221.00	0.87	60.81	3,220.62	18.30	9.48	-14.93	0.18	0.18	-0.41
3,315.00	1.05	64.14	3,314.61	19.03	10.88	-15.23	0.20	0.19	3.54
3,410.00	0.16	2.20	3,409.60	19.54	11.67	-15.50	1.04	-0.94	-65.20
3,504.00	0.80	2.60	3,503.60	20.33	11.70	-16.25	0.68	0.68	0.43
3,599.00	0.76	255.82	3,598.60	20.84	11.12	-16.90	1.32	-0.04	-112.40
3,694.00	0.62	258.24	3,693.59	20.58	10.01	-16.96	0.15	-0.15	2.55
3,788.00	0.30	247.55	3,787.59	20.38	9.28	-16.97	0.35	-0.34	-11.37
3,882.00	0.38	116.09	3,881.59	20.15	9.33	-16.74	0.66	0.09	-139.85
3,976.00	0.83	100.21	3,975.58	19.89	10.28	-16.22	0.51	0.48	-16.89
4,071.00	0.96	92.27	4,070.57	19.74	11.76	-15.66	0.19	0.14	-8.36
4,165.00	0.73	117.26	4,164.56	19.43	13.07	-15.00	0.46	-0.24	26.59
4,258.00	0.73	165.32	4,257.55	18.59	13.75	-14.00	0.64	0.00	51.68
4,352.00	0.57	162.07	4,351.55	17.56	14.05	-12.94	0.17	-0.17	-3.46
4,446.00	0.49	159.06	4,445.54	16.74	14.33	-12.07	0.09	-0.09	-3.20
4,541.00	1.03	119.51	4,540.53	15.94	15.22	-11.05	0.76	0.57	-41.63
4,635.00	1.41	150.71	4,634.51	14.52	16.52	-9.32	0.80	0.40	33.19
4,729.00	1.81	147.13	4,728.48	12.26	17.90	-6.77	0.44	0.43	-3.81
4,824.00	1.98	140.24	4,823.42	9.74	19.76	-3.83	0.30	0.18	-7.25
4,897.00	1.93	138.83	4,896.38	7.84	21.38	-1.56	0.10	-0.07	-1.93
5,008.00	2.01	143.76	5,007.32	4.87	23.76	1.97	0.17	0.07	4.44

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<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,102.00	0.23	68.73	5,101.30	3.61	24.91	3.50	2.09	-1.89	-79.82
5,196.00	0.80	24.08	5,195.29	4.27	25.35	2.98	0.70	0.61	-47.50
5,291.00	0.80	19.71	5,290.28	5.50	25.84	1.94	0.06	0.00	-4.60
5,385.00	0.14	287.66	5,384.28	6.16	25.96	1.34	0.87	-0.70	-97.93
5,479.00	0.49	234.27	5,478.28	5.96	25.52	1.41	0.45	0.37	-56.80
5,573.00	0.52	234.27	5,572.27	5.47	24.85	1.69	0.03	0.03	0.00
5,668.00	0.47	239.69	5,667.27	5.02	24.16	1.93	0.07	-0.05	5.71
5,763.00	0.53	221.09	5,762.27	4.50	23.54	2.26	0.18	0.06	-19.58
5,857.00	0.47	223.62	5,856.26	3.89	22.99	2.69	0.07	-0.06	2.69
5,952.00	0.40	204.20	5,951.26	3.31	22.58	3.14	0.17	-0.07	-20.44
6,046.00	0.38	200.00	6,045.26	2.71	22.34	3.64	0.04	-0.02	-4.47
6,141.00	1.34	228.59	6,140.25	1.68	21.40	4.37	1.08	1.01	30.09
6,236.00	1.41	233.22	6,235.22	0.25	19.63	5.25	0.14	0.07	4.87
6,329.00	1.44	228.83	6,328.19	-1.21	17.83	6.14	0.12	0.03	-4.72
6,424.00	1.51	231.62	6,423.16	-2.77	15.95	7.12	0.11	0.07	2.94
6,518.00	1.49	229.76	6,517.13	-4.33	14.05	8.08	0.06	-0.02	-1.98
6,612.00	1.39	223.73	6,611.10	-5.94	12.33	9.15	0.19	-0.11	-6.41
6,706.00	1.38	220.58	6,705.07	-7.62	10.80	10.34	0.08	-0.01	-3.35
6,800.00	1.23	215.05	6,799.05	-9.31	9.49	11.59	0.21	-0.16	-5.88
6,895.00	1.31	212.80	6,894.02	-11.06	8.31	12.94	0.10	0.08	-2.37
6,989.00	1.26	212.75	6,988.00	-12.83	7.17	14.32	0.05	-0.05	-0.05
7,084.00	1.19	204.60	7,082.98	-14.61	6.20	15.76	0.20	-0.07	-8.58
7,178.00	1.16	202.94	7,176.96	-16.37	5.42	17.23	0.05	-0.03	-1.77
7,272.00	1.25	206.49	7,270.94	-18.16	4.59	18.72	0.12	0.10	3.78
7,366.00	1.15	208.70	7,364.92	-19.91	3.68	20.14	0.12	-0.11	2.35
7,460.00	0.46	272.29	7,458.91	-20.72	2.85	20.69	1.10	-0.73	67.65
7,554.00	0.64	313.29	7,552.90	-20.35	2.09	20.12	0.45	0.19	43.62
7,648.00	0.67	326.70	7,646.90	-19.53	1.41	19.14	0.17	0.03	14.27
7,743.00	0.70	349.91	7,741.89	-18.49	1.00	18.03	0.29	0.03	24.43
7,837.00	0.60	3.32	7,835.88	-17.43	0.93	17.00	0.19	-0.11	14.27
7,932.00	0.54	25.08	7,930.88	-16.53	1.15	16.19	0.23	-0.06	22.91
8,026.00	0.65	37.39	8,024.88	-15.71	1.66	15.55	0.18	0.12	13.10
8,120.00	0.65	42.77	8,118.87	-14.89	2.35	14.95	0.06	0.00	5.72
8,215.00	0.82	42.58	8,213.86	-14.00	3.17	14.32	0.18	0.18	-0.20
8,310.00	0.75	48.33	8,308.85	-13.08	4.10	13.71	0.11	-0.07	6.05
8,405.00	0.81	54.90	8,403.84	-12.28	5.11	13.22	0.11	0.06	6.92
8,499.00	0.91	48.91	8,497.83	-11.41	6.22	12.69	0.14	0.11	-6.37
8,593.00	1.02	46.58	8,591.82	-10.34	7.39	12.00	0.12	0.12	-2.48
8,687.00	1.32	51.45	8,685.80	-9.09	8.84	11.20	0.34	0.32	5.18
8,781.00	1.46	53.33	8,779.77	-7.70	10.65	10.37	0.16	0.15	2.00
8,876.00	1.88	53.46	8,874.73	-6.05	12.87	9.41	0.44	0.44	0.14
8,970.00	1.83	46.79	8,968.68	-4.11	15.20	8.19	0.24	-0.05	-7.10
9,064.00	2.06	46.80	9,062.63	-1.92	17.53	6.75	0.24	0.24	0.01

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<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,158.00	1.71	43.86	9,156.58	0.24	19.73	5.28	0.39	-0.37	-3.13
9,252.00	1.14	55.74	9,250.55	1.78	21.48	4.29	0.68	-0.61	12.64
9,347.00	0.84	66.09	9,345.53	2.60	22.90	3.91	0.37	-0.32	10.89
9,441.00	0.83	75.57	9,439.52	3.04	24.18	3.84	0.15	-0.01	10.09
9,535.00	1.05	50.08	9,533.51	3.77	25.50	3.51	0.50	0.23	-27.12
9,630.00	0.73	94.56	9,628.50	4.28	26.78	3.38	0.77	-0.34	46.82
9,724.00	1.48	156.75	9,722.49	3.11	27.85	4.79	1.39	0.80	66.16
9,817.00	2.33	153.53	9,815.43	0.32	29.17	7.85	0.92	0.91	-3.46
9,911.00	2.45	152.61	9,909.35	-3.18	30.94	11.70	0.13	0.13	-0.98
10,007.00	2.68	149.11	10,005.26	-6.92	33.04	15.88	0.29	0.24	-3.65
10,100.00	2.27	146.55	10,098.17	-10.33	35.17	19.75	0.46	-0.44	-2.75
10,195.00	0.87	156.80	10,193.13	-12.56	36.49	22.26	1.50	-1.47	10.79
10,289.00	0.63	142.06	10,287.12	-13.62	37.09	23.45	0.33	-0.26	-15.68
10,384.00	1.06	151.28	10,382.11	-14.81	37.84	24.79	0.47	0.45	9.71
10,478.00	0.63	210.19	10,476.10	-16.01	37.99	25.99	0.97	-0.46	62.67
10,572.00	0.98	281.52	10,570.10	-16.30	36.95	25.98	1.04	0.37	75.88
10,667.00	0.98	319.98	10,665.08	-15.52	35.63	24.86	0.68	0.00	40.48
10,761.00	0.88	343.62	10,759.07	-14.21	34.91	23.40	0.42	-0.11	25.15
10,855.00	0.95	346.84	10,853.06	-12.76	34.53	21.90	0.09	0.07	3.43
10,949.00	1.30	342.37	10,947.04	-10.98	34.03	20.05	0.38	0.37	-4.76
11,043.00	1.26	337.45	11,041.02	-9.01	33.31	17.96	0.12	-0.04	-5.23
11,151.00	4.03	159.54	11,148.95	-11.47	34.18	20.57	4.90	2.56	-164.73
11,245.00	14.96	152.73	11,241.52	-25.39	40.91	35.82	11.67	11.63	-7.24
11,339.00	23.05	158.42	11,330.33	-53.34	53.26	66.10	8.82	8.61	6.05
11,434.00	28.89	162.00	11,415.71	-92.49	67.21	107.59	6.36	6.15	3.77
11,528.00	34.70	165.60	11,495.57	-140.05	80.89	157.08	6.50	6.18	3.83
11,622.00	42.25	163.88	11,569.11	-196.41	96.34	215.51	8.11	8.03	-1.83
11,716.00	48.98	162.23	11,634.83	-260.61	115.96	282.64	7.27	7.16	-1.76
11,810.00	51.40	163.41	11,695.01	-329.59	137.27	354.83	2.75	2.57	1.26
11,905.00	56.99	164.74	11,750.57	-403.66	158.37	431.84	5.99	5.88	1.40
11,999.00	63.75	166.87	11,797.02	-482.83	178.35	513.44	7.46	7.19	2.27
12,030.00	65.81	166.15	11,810.22	-510.10	184.89	541.45	6.97	6.65	-2.32
12,087.00	67.06	166.85	11,833.01	-560.90	197.09	593.64	2.46	2.19	1.23
12,181.00	76.26	168.71	11,862.56	-648.02	215.91	682.54	9.97	9.79	1.98
12,276.00	86.19	168.73	11,877.03	-739.98	234.25	775.96	10.45	10.45	0.02
12,371.00	87.22	167.24	11,882.50	-832.74	254.00	870.54	1.90	1.08	-1.57
12,466.00	88.58	166.33	11,885.98	-925.16	275.70	965.34	1.72	1.43	-0.96
12,560.00	88.25	164.97	11,888.58	-1,016.19	298.99	1,059.26	1.49	-0.35	-1.45
12,655.00	88.81	164.31	11,891.01	-1,107.76	324.14	1,154.21	0.91	0.59	-0.69
12,750.00	89.30	163.99	11,892.58	-1,199.14	350.09	1,249.20	0.62	0.52	-0.34
12,845.00	89.35	162.64	11,893.70	-1,290.13	377.36	1,344.19	1.42	0.05	-1.42
12,939.00	89.88	161.25	11,894.33	-1,379.50	406.49	1,438.13	1.58	0.56	-1.48
13,034.00	90.92	156.63	11,893.67	-1,468.12	440.62	1,532.77	4.98	1.09	-4.86
13,128.00	91.41	156.50	11,891.76	-1,554.35	478.00	1,626.00	0.54	0.52	-0.14



<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,223.00	91.82	155.93	11,889.08	-1,641.25	516.29	1,720.14	0.74	0.43	-0.60
13,318.00	90.35	160.04	11,887.28	-1,729.29	551.89	1,814.62	4.59	-1.55	4.33
13,412.00	91.81	164.89	11,885.51	-1,818.87	580.20	1,908.55	5.39	1.55	5.16
13,507.00	92.04	160.03	11,882.31	-1,909.38	608.80	2,003.44	5.12	0.24	-5.12
13,602.00	90.99	162.60	11,879.80	-1,999.33	639.22	2,098.31	2.92	-1.11	2.71
13,696.00	91.58	165.35	11,877.69	-2,089.65	665.16	2,192.28	2.99	0.63	2.93
13,791.00	91.29	168.63	11,875.31	-2,182.16	686.54	2,287.08	3.47	-0.31	3.45
13,886.00	90.87	169.04	11,873.52	-2,275.35	704.93	2,381.70	0.62	-0.44	0.43
13,981.00	91.82	168.81	11,871.29	-2,368.55	723.17	2,476.28	1.03	1.00	-0.24
14,076.00	91.04	164.58	11,868.92	-2,460.95	745.03	2,571.11	4.53	-0.82	-4.45
14,170.00	92.92	162.30	11,865.67	-2,550.99	771.80	2,665.04	3.14	2.00	-2.43
14,265.00	92.49	158.77	11,861.19	-2,640.45	803.42	2,759.77	3.74	-0.45	-3.72
14,360.00	92.07	168.20	11,857.40	-2,731.35	830.37	2,854.58	9.93	-0.44	9.93
14,455.00	91.32	164.64	11,854.59	-2,823.64	852.66	2,949.42	3.83	-0.79	-3.75
14,549.00	92.01	157.58	11,851.86	-2,912.48	883.06	3,043.22	7.54	0.73	-7.51
14,644.00	92.63	152.09	11,848.01	-2,998.36	923.41	3,136.96	5.81	0.65	-5.78
14,739.00	92.30	154.71	11,843.92	-3,083.22	965.90	3,230.31	2.78	-0.35	2.76
14,834.00	91.69	157.47	11,840.61	-3,170.01	1,004.38	3,324.39	2.97	-0.64	2.91
14,928.00	93.81	163.79	11,836.10	-3,258.53	1,035.50	3,418.09	7.08	2.26	6.72
15,023.00	91.18	167.91	11,831.96	-3,350.54	1,058.70	3,512.91	5.14	-2.77	4.34
15,118.00	91.32	173.35	11,829.89	-3,444.21	1,074.15	3,607.17	5.73	0.15	5.73
15,213.00	87.08	172.62	11,831.21	-3,538.47	1,085.75	3,700.91	4.53	-4.46	-0.77
15,307.00	86.50	172.81	11,836.48	-3,631.56	1,097.65	3,793.62	0.65	-0.62	0.20
15,402.00	90.87	169.50	11,838.66	-3,725.37	1,112.25	3,887.78	5.77	4.60	-3.48
15,496.00	93.56	170.59	11,835.02	-3,817.88	1,128.49	3,981.13	3.09	2.86	1.16
15,591.00	88.87	166.26	11,833.01	-3,910.88	1,147.54	4,075.75	6.72	-4.94	-4.56
15,686.00	89.22	166.44	11,834.59	-4,003.18	1,169.96	4,170.64	0.41	0.37	0.19
15,780.00	87.78	165.85	11,837.05	-4,094.41	1,192.46	4,264.52	1.66	-1.53	-0.63
15,875.00	90.02	163.61	11,838.88	-4,186.03	1,217.47	4,359.48	3.33	2.36	-2.36
15,969.00	91.79	161.95	11,837.39	-4,275.80	1,245.29	4,453.45	2.58	1.88	-1.77
16,064.00	93.66	161.75	11,832.88	-4,365.97	1,274.85	4,548.28	1.98	1.97	-0.21
16,159.00	92.86	159.07	11,827.47	-4,455.31	1,306.65	4,642.96	2.94	-0.84	-2.82
16,253.00	91.87	159.80	11,823.59	-4,543.25	1,339.64	4,736.61	1.31	-1.05	0.78
16,348.00	92.87	161.14	11,819.67	-4,632.70	1,371.37	4,831.36	1.76	1.05	1.41
16,442.00	94.23	162.17	11,813.84	-4,721.75	1,400.90	4,925.12	1.81	1.45	1.10
16,537.00	92.39	160.90	11,808.36	-4,811.70	1,430.94	5,019.88	2.35	-1.94	-1.34
16,632.00	93.44	162.59	11,803.53	-4,901.80	1,460.65	5,114.69	2.09	1.11	1.78
16,726.00	93.52	161.19	11,797.82	-4,990.97	1,489.82	5,208.47	1.49	0.09	-1.49
16,821.00	94.41	161.42	11,791.25	-5,080.75	1,520.20	5,303.15	0.97	0.94	0.24
16,916.00	96.18	164.32	11,782.48	-5,171.13	1,548.06	5,397.72	3.57	1.86	3.05
17,010.00	94.03	165.04	11,774.12	-5,261.42	1,572.79	5,491.33	2.41	-2.29	0.77
17,105.00	96.50	166.97	11,765.40	-5,353.20	1,595.67	5,585.84	3.29	2.60	2.03
17,200.00	93.81	166.06	11,756.87	-5,445.20	1,617.73	5,680.34	2.99	-2.83	-0.96

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

## Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,295.00	93.42	165.62	11,750.88	-5,537.13	1,640.93	5,775.09	0.62	-0.41	-0.46
17,389.00	92.59	166.66	11,745.95	-5,628.27	1,663.41	5,868.88	1.41	-0.88	1.11
17,484.00	93.51	167.68	11,740.90	-5,720.76	1,684.48	5,963.57	1.44	0.97	1.07
17,579.00	91.22	167.11	11,736.98	-5,813.39	1,705.19	6,058.30	2.48	-2.41	-0.60
17,673.00	91.58	167.29	11,734.68	-5,905.02	1,726.01	6,152.10	0.43	0.38	0.19
17,768.00	92.42	167.15	11,731.36	-5,997.61	1,747.01	6,246.87	0.90	0.88	-0.15
17,862.00	94.73	168.52	11,725.50	-6,089.31	1,766.78	6,340.44	2.86	2.46	1.46
17,957.00	94.13	167.51	11,718.16	-6,181.96	1,786.45	6,434.90	1.23	-0.63	-1.06
18,052.00	92.56	165.93	11,712.62	-6,274.26	1,808.23	6,529.60	2.34	-1.65	-1.66
18,146.00	91.07	165.86	11,709.64	-6,365.38	1,831.13	6,623.49	1.59	-1.59	-0.07
18,241.00	91.24	166.15	11,707.73	-6,457.54	1,854.10	6,718.40	0.35	0.18	0.31
18,336.00	89.65	166.34	11,706.99	-6,549.81	1,876.69	6,813.30	1.69	-1.67	0.20
18,430.00	91.33	168.17	11,706.19	-6,641.48	1,897.42	6,907.12	2.64	1.79	1.95
18,525.00	88.98	166.50	11,705.93	-6,734.16	1,918.25	7,001.92	3.03	-2.47	-1.76
18,620.00	89.98	165.30	11,706.79	-6,826.29	1,941.39	7,096.85	1.64	1.05	-1.26
18,714.00	89.87	164.87	11,706.92	-6,917.12	1,965.59	7,190.83	0.47	-0.12	-0.46
18,809.00	91.18	162.78	11,706.04	-7,008.35	1,992.05	7,285.82	2.60	1.38	-2.20
18,904.00	92.78	160.83	11,702.76	-7,098.54	2,021.69	7,380.70	2.65	1.68	-2.05
18,998.00	92.98	159.77	11,698.04	-7,186.93	2,053.34	7,474.40	1.15	0.21	-1.13
19,093.00	90.73	157.73	11,694.96	-7,275.41	2,087.75	7,568.98	3.20	-2.37	-2.15
19,188.00	94.19	160.70	11,690.89	-7,364.12	2,121.42	7,663.57	4.80	3.64	3.13
19,282.00	94.27	159.75	11,683.95	-7,452.33	2,153.14	7,757.13	1.01	0.09	-1.01
19,377.00	89.64	158.75	11,680.71	-7,541.10	2,186.77	7,851.75	4.99	-4.87	-1.05
19,472.00	90.72	159.81	11,680.41	-7,629.95	2,220.38	7,946.46	1.59	1.14	1.12
19,566.00	88.44	158.93	11,681.10	-7,717.91	2,253.49	8,040.17	2.60	-2.43	-0.94
19,661.00	91.22	163.19	11,681.38	-7,807.74	2,284.32	8,135.03	5.35	2.93	4.48
19,755.00	91.91	165.28	11,678.82	-7,898.16	2,309.84	8,228.99	2.34	0.73	2.22
19,850.00	91.64	165.74	11,675.87	-7,990.10	2,333.60	8,323.90	0.56	-0.28	0.48
19,945.00	93.85	168.42	11,671.32	-8,082.57	2,354.82	8,418.62	3.65	2.33	2.82
20,039.00	91.91	166.92	11,666.60	-8,174.28	2,374.87	8,512.27	2.61	-2.06	-1.60
20,134.00	90.67	166.68	11,664.46	-8,266.74	2,396.55	8,607.11	1.33	-1.31	-0.25
20,228.00	90.62	166.82	11,663.40	-8,358.24	2,418.10	8,700.98	0.16	-0.05	0.15
20,323.00	91.76	165.69	11,661.43	-8,450.49	2,440.66	8,795.87	1.69	1.20	-1.19
20,417.00	91.65	166.00	11,658.63	-8,541.60	2,463.64	8,889.77	0.35	-0.12	0.33
20,512.00	91.01	165.57	11,656.43	-8,633.66	2,486.96	8,984.68	0.81	-0.67	-0.45
20,606.00	90.39	166.28	11,655.28	-8,724.83	2,509.82	9,078.61	1.00	-0.66	0.76
20,701.00	93.93	166.38	11,651.70	-8,817.06	2,532.25	9,173.43	3.73	3.73	0.11
20,796.00	93.04	165.96	11,645.93	-8,909.14	2,554.92	9,268.17	1.04	-0.94	-0.44
20,890.00	90.52	164.14	11,643.01	-8,999.90	2,579.15	9,362.09	3.31	-2.68	-1.94
20,985.00	92.08	164.33	11,640.85	-9,091.30	2,604.96	9,457.06	1.65	1.64	0.20
21,080.00	93.07	163.41	11,636.58	-9,182.46	2,631.32	9,551.96	1.42	1.04	-0.97
21,175.00	89.08	162.06	11,634.80	-9,273.15	2,659.51	9,646.91	4.43	-4.20	-1.42
21,269.00	88.24	162.05	11,637.00	-9,362.55	2,688.46	9,740.84	0.89	-0.89	-0.01

<b>Company:</b>	Energen Resources	<b>Local Co-ordinate Reference:</b>	Well 602H
<b>Project:</b>	Winkler County, Texas (Nad27)	<b>TVD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Site:</b>	UL 20 Stripes 38-47	<b>MD Reference:</b>	RKB @ 2797.00usft (Noram 27)
<b>Well:</b>	602H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / 62485	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Noram 27)	<b>Database:</b>	USA Compass

**Survey**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
21,364.00	88.75	162.28	11,639.49	-9,452.95	2,717.55	9,835.77	0.59	0.54	0.24
21,459.00	91.28	162.92	11,639.47	-9,543.60	2,745.95	9,930.74	2.75	2.66	0.67
21,553.00	92.85	162.64	11,636.08	-9,633.32	2,773.76	10,024.66	1.70	1.67	-0.30
<b>Final Phoenix MWD Survey</b>									
21,634.00	92.85	162.64	11,632.06	-9,710.54	2,797.90	10,105.54	0.00	0.00	0.00
<b>Projection to TD</b>									

**Survey Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
206.00	205.96	3.38	0.35	First Phoenix MWD Survey
21,553.00	11,636.08	-9,633.32	2,773.76	Final Phoenix MWD Survey
21,634.00	11,632.06	-9,710.54	2,797.90	Projection to TD

TVD is adjusted for KB. 11894.33-25=11869.33

# SURVEY DATA CERTIFICATION



**PHOENIX**  
TECHNOLOGY SERVICES

Job #: 62485  
 Client: Energen Resources  
 County & State: Winkler, Texas  
 Well: UL 20 STRIPES 38-47 602H  
 API No: 42-495-33805  
 Proposed Direction: 163.77°

## TIE-IN DATA

MD	TVD	INC	AZM	N/-S	E/-W	DATA SOURCE
N/A	N/A	N/A	N/A	N/A	N/A	N/A
Data Source Company:						N/A

## SURVEY DATA

First Survey Date	First Survey Depth	INC	AZM
12-Mar-18	206 ft	1.89°	5.98°

Last Survey Date	Last Survey Depth	INC	AZM
11-Apr-18	21,553 ft	92.85°	162.64°

Survey Instrument Type
Velocity MWD

Projected TD Survey Date	Projected TD Survey Depth	INC	AZM
11-Apr-18	21,634 ft	92.85°	162.64°

## CORRECTION INFORMATION

Magnetic Declination Used	7.15 degrees
Grid Convergence Used	-1.52 degrees
Total Correction	8.67 degrees

Corrected to True/Grid North
Grid North

TO THE BEST OF MY KNOWLEDGE, I  
 CERTIFY THIS SURVEY DATA TO BE  
 TRUE AND CORRECT.

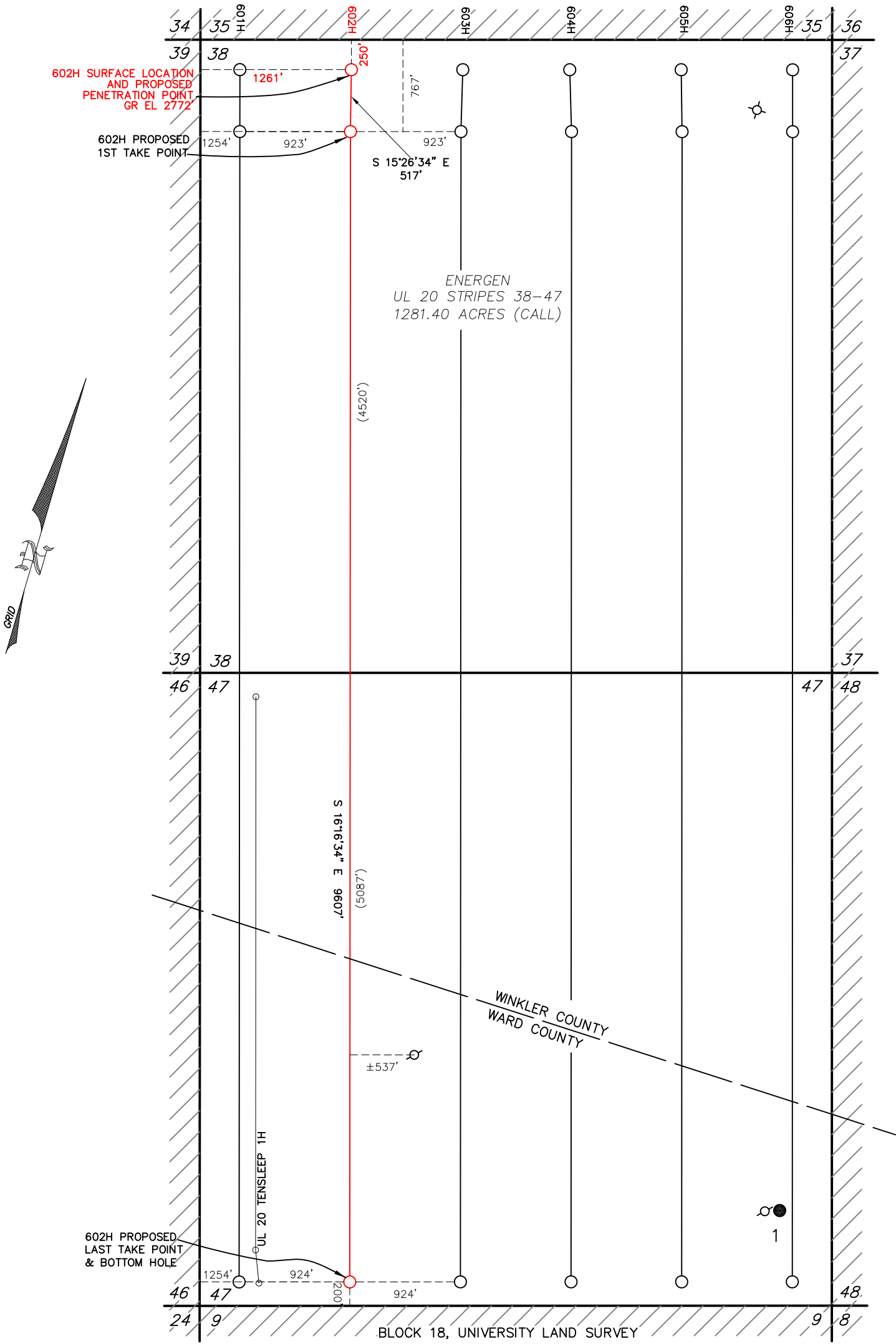
Christopher Barton

Signature

4/12/2018

Date

SECTION 38, BLOCK 20, UNIVERSITY LAND SURVEY  
SECTION 47, BLOCK 20, UNIVERSITY LAND SURVEY



NAD 83, TEXAS CENTRAL ZONE	NAD 27, TEXAS CENTRAL ZONE
S/L: N=10583601.9', E=1378810.4' LAT=31.6708344 N, LONG=103.2837398 W	S/L: N=741025.7', E=1082345.5' LAT=31.6707042 N, LONG=103.2832927 W
1ST/P: N=10583103.6', E=1378948.1' LAT=31.6694749 N, LONG=103.2832550 W	1ST/P: N=740527.4', E=1082483.2' LAT=31.6693447 N, LONG=103.2828078 W
B/H: N=10573882.0', E=1381640.5' LAT=31.6443293 N, LONG=103.2738204 W	B/H: N=731306.0', E=1085175.5' LAT=31.6441986 N, LONG=103.2733740 W
APPROXIMATELY 13.2 MILES NW OF PYOTE, TEXAS	

I, THE UNDERSIGNED, DO HEREBY CERTIFY THAT THE SURVEY INFORMATION FOUND ON THIS PLAT WAS DERIVED FROM ACTUAL FIELD NOTES OF ON-THE-GROUND SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. NO WARRANTY IS MADE OR INTENDED FOR THE LOCATION OF ANY OR ALL EASEMENTS THAT MAY EXIST WITHIN THE BOUNDS OF THIS SURVEY. THE INFORMATION PRESENTED HEREON IS FOR THE PRIVATE USE OF THE PARTY NAMED IN THE "REFERENCE PORTION" OF THE TITLE BLOCK AND DOES NOT CONSTITUTE A COMPLETE BOUNDARY SURVEY AS DEFINED BY THE "PROFESSIONAL LAND SURVEYING PRACTICES ACT."



NOTES:  
1. COORDINATES AND BEARINGS SHOWN HEREON ARE NAD 83, LAMBERT GRID COORDINATES AND CONFORM TO THE TEXAS COORDINATE SYSTEM "TEXAS CENTRAL ZONE," WITH REFERENCE TO USGS TRI-STATION "INGLE" WITH A CENTRAL COMBINED SCALE FACTOR OF 0.99980780. THE POSITIONAL TOLERANCE OF THIS SURVEY EXCEEDS THE REQUIREMENTS FOR A RURAL SURVEY.  
2. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT AND REVIEW OF THE ABSTRACT OF TITLE. THERE MAY BE EASEMENTS AND/OR COVENANTS AFFECTING THIS PROPERTY NOT SHOWN HEREON. LOCATION OF IMPROVEMENTS AND/OR EASEMENTS WERE BEYOND COMMISSIONED SCOPE OF THIS PROJECT AND HAVE BEEN SPECIFICALLY OMITTED. VESTING DOCUMENTS NOT FURNISHED FOR THIS SURVEY.  
3. SEE DOCUMENTS AND ELECTRONIC DATA FILED IN THE OFFICE OF WPG INC FOR COMPLETE RECONSTRUCTION OF THESE SECTIONS OR BLOCKS.  
4. REVISED 2/23/17 TO REMOVE OFFSET WELLS.

Thais Watson Ahlstrand TEXAS R.P.L.S. No. 6359

REVISED 2/23/17  
FEBRUARY 6, 2017  
DATE



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- GAS WELL
- WATER INJECTION WELL
- OIL WELL
- LOCATED WELL
- DRY HOLE
- WATER WELL
- PLUGGED WELL

PERMIT PLAT  
ENERGEN RESOURCES CORPORATION  
UL 20 STRIPES 38-47 602H

S/L & PROPOSED P/P: 250' FNWL & 1261' FSWL  
PROPOSED 1ST T/P: 767' FNWL & 1254' FSWL  
SECTION 38, BLOCK 20, UNIVERSITY LAND SURVEY  
PROPOSED LAST T/P & B/H: 200' FSEL & 1254' FSWL  
SECTION 47, BLOCK 20, UNIVERSITY LAND SURVEY  
WINKLER & WARD COUNTIES, TEXAS

DATE: JANUARY 25, 2017 DATE SURVEYED: 1/11/17  
JOB NO.: 17-1008-00 FIELD BOOK 824/20 DRAFT NGH REV. 1