



July 11, 2017

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

Attention: Regulatory Department

Re: Shell Western Exploration and Production Co.  
University 19 PW Unit 1406H  
Loving County, TX  
API #42-301-33213  
Job No. 60957

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	
Peter Mavrelis	1406H	175	19,565	4/30/17	6/26/17	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



# **SWEPI**

**Loving County, Texas (NAD27)  
University 19 PW Unit  
1406H**

**OH / Job #60957**

**Survey: Phoenix MWD Surveys**

## **Standard Survey Report**

**27 June, 2017**





## Phoenix Technology Services LP

## Survey Report



<b>Company:</b>	SWEPI	<b>Local Co-ordinate Reference:</b>	Well 1406H
<b>Project:</b>	Loving County, Texas (NAD27)	<b>TVD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Site:</b>	University 19 PW Unit	<b>MD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Well:</b>	1406H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / Job #60957	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Precision 559)	<b>Database:</b>	Compass 5000 GCR

<b>Project</b>	Loving County, Texas (NAD27), Loving, Texas		
<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>	University 19 PW Unit		
<b>Site Position:</b>		<b>Northing:</b>	750,929.42 usft
<b>From:</b>	Map	<b>Easting:</b>	1,038,505.07 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	31° 41' 40.73279 N
		<b>Longitude:</b>	103° 25' 30.14063 W
		<b>Grid Convergence:</b>	-1.59 °

<b>Well</b>	1406H		
<b>Well Position</b>	<b>+N-S</b>	0.00 usft	<b>Northing:</b>
	<b>+E-W</b>	0.00 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	0.00 usft
		<b>Latitude:</b>	31° 41' 57.39575 N
		<b>Longitude:</b>	103° 24' 38.27546 W
		<b>Ground Level:</b>	2,767.00 usft

<b>Wellbore</b>	OH / Job #60957				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	6/28/2017	7.02	59.55	47,642

<b>Design</b>	Surveys (Precision 559)				
<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	163.70	

<b>Survey Program</b>	<b>Date</b>	6/27/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.00	19,615.00	Phoenix MWD Surveys (OH / Job #60957)	MWD+HDGM+AX	OWSG Rev.2 MWD + HDGM + Axial Correction	

<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
175.00	0.60	302.69	175.00	0.49	-0.77	-0.69	0.34	0.34	0.00
<b>First Phoenix MWD Survey</b>									
322.00	0.56	300.99	321.99	1.28	-2.03	-1.80	0.03	-0.03	-1.16
500.00	2.54	322.69	499.92	4.87	-5.17	-6.12	1.14	1.11	12.19
686.00	6.09	333.83	685.36	17.00	-12.02	-19.69	1.95	1.91	5.99
872.00	6.63	330.51	870.22	35.20	-21.66	-39.87	0.35	0.29	-1.78
1,056.00	6.66	324.91	1,052.98	53.18	-33.02	-60.31	0.35	0.02	-3.04
1,234.00	6.48	326.01	1,229.81	69.96	-44.57	-79.65	0.12	-0.10	0.62
1,412.00	6.26	325.14	1,406.72	86.25	-55.73	-98.42	0.13	-0.12	-0.49
1,589.00	6.25	326.00	1,582.66	102.15	-66.64	-116.75	0.05	-0.01	0.49



# Phoenix Technology Services LP

## Survey Report



<b>Company:</b>	SWEPI	<b>Local Co-ordinate Reference:</b>	Well 1406H
<b>Project:</b>	Loving County, Texas (NAD27)	<b>TVD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Site:</b>	University 19 PW Unit	<b>MD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Well:</b>	1406H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / Job #60957	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Precision 559)	<b>Database:</b>	Compass 5000 GCR

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)
1,767.00	6.56	324.51	1,759.55	118.46	-77.96	-135.58	0.20	0.17	-0.84
1,856.00	6.44	323.84	1,847.98	126.63	-83.86	-145.08	0.16	-0.13	-0.75
2,034.00	6.22	324.34	2,024.89	142.53	-95.37	-163.56	0.13	-0.12	0.28
2,123.00	6.70	327.40	2,113.33	150.82	-100.98	-173.10	0.66	0.54	3.44
2,301.00	6.28	328.53	2,290.19	167.87	-111.65	-192.46	0.25	-0.24	0.63
2,479.00	6.75	330.29	2,467.04	185.26	-121.92	-212.03	0.29	0.26	0.99
2,657.00	6.67	331.73	2,643.82	203.45	-132.00	-232.32	0.10	-0.04	0.81
2,835.00	6.13	336.29	2,820.71	221.26	-140.72	-251.86	0.42	-0.30	2.56
3,013.00	6.29	337.29	2,997.66	238.95	-148.30	-270.97	0.11	0.09	0.56
3,102.00	5.40	323.29	3,086.21	246.81	-152.69	-279.74	1.88	-1.00	-15.73
3,280.00	4.88	315.78	3,263.49	258.95	-162.98	-294.28	0.48	-0.29	-4.22
3,458.00	4.49	324.36	3,440.90	270.04	-172.32	-307.55	0.45	-0.22	4.82
3,636.00	4.12	326.95	3,618.40	281.06	-179.86	-320.24	0.23	-0.21	1.46
3,814.00	4.37	298.87	3,795.93	289.69	-189.29	-331.18	1.16	0.14	-15.78
3,992.00	3.81	316.76	3,973.48	297.28	-199.28	-341.26	0.78	-0.31	10.05
4,170.00	3.00	330.42	4,151.17	305.64	-205.63	-351.07	0.64	-0.46	7.67
4,349.00	4.75	313.69	4,329.76	314.83	-213.30	-362.04	1.15	0.98	-9.35
4,527.00	3.14	328.31	4,507.33	324.07	-221.20	-373.13	1.06	-0.90	8.21
4,705.00	2.32	341.91	4,685.13	331.64	-224.87	-381.43	0.58	-0.46	7.64
4,863.00	2.21	353.19	4,843.01	337.71	-226.23	-387.63	0.29	-0.07	7.14
4,966.00	2.18	349.61	4,945.93	341.61	-226.82	-391.54	0.14	-0.03	-3.48
5,144.00	2.01	348.25	5,123.81	347.99	-228.06	-398.02	0.10	-0.10	-0.76
5,322.00	1.95	348.43	5,301.71	354.02	-229.31	-404.15	0.03	-0.03	0.10
5,500.00	2.05	336.59	5,479.60	359.90	-231.18	-410.32	0.24	0.06	-6.65
5,679.00	1.48	338.86	5,658.51	365.00	-233.29	-415.80	0.32	-0.32	1.27
5,857.00	1.61	345.08	5,836.45	369.56	-234.76	-420.59	0.12	0.07	3.49
6,035.00	1.48	328.30	6,014.39	373.93	-236.61	-425.31	0.26	-0.07	-9.43
6,213.00	1.07	326.69	6,192.34	377.28	-238.73	-429.11	0.23	-0.23	-0.90
6,392.00	0.98	313.78	6,371.31	379.73	-240.75	-432.04	0.14	-0.05	-7.21
6,570.00	0.93	322.70	6,549.29	381.93	-242.73	-434.71	0.09	-0.03	5.01
6,748.00	1.42	320.85	6,727.25	384.79	-245.00	-438.09	0.28	0.28	-1.04
6,926.00	1.45	302.96	6,905.20	387.73	-248.28	-441.83	0.25	0.02	-10.05
7,104.00	1.65	288.70	7,083.13	389.78	-252.59	-445.00	0.24	0.11	-8.01
7,193.00	1.89	269.12	7,172.09	390.16	-255.28	-446.13	0.73	0.27	-22.00
7,372.00	2.39	267.08	7,350.96	389.93	-261.95	-447.78	0.28	0.28	-1.14
7,461.00	1.72	259.69	7,439.91	389.59	-265.12	-448.35	0.81	-0.75	-8.30
7,639.00	2.73	287.42	7,617.77	390.39	-271.80	-450.98	0.81	0.57	15.58
7,817.00	2.57	267.12	7,795.59	391.45	-279.83	-454.26	0.53	-0.09	-11.40
7,995.00	2.37	258.00	7,973.42	390.49	-287.41	-455.46	0.25	-0.11	-5.12
8,173.00	2.01	245.49	8,151.29	388.43	-293.85	-455.29	0.34	-0.20	-7.03
8,351.00	2.41	249.49	8,329.16	385.82	-300.20	-454.57	0.24	0.22	2.25
8,529.00	2.14	231.85	8,507.02	382.46	-306.32	-453.06	0.42	-0.15	-9.91
8,707.00	1.87	213.59	8,684.92	377.99	-310.54	-449.95	0.39	-0.15	-10.26



# Phoenix Technology Services LP

## Survey Report



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<b>Well:</b>	1406H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / Job #60957	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Precision 559)	<b>Database:</b>	Compass 5000 GCR

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)	
8,885.00	2.29	200.05	8,862.80	372.23	-313.36	-445.21	0.36	0.24	-7.61	
9,064.00	2.13	215.24	9,041.67	366.15	-316.51	-440.27	0.34	-0.09	8.49	
9,242.00	1.15	195.63	9,219.59	361.73	-318.90	-436.69	0.63	-0.55	-11.02	
9,420.00	0.66	241.26	9,397.57	359.51	-320.28	-434.96	0.47	-0.28	25.63	
9,598.00	0.34	101.48	9,575.57	358.92	-320.66	-434.49	0.53	-0.18	-78.53	
9,776.00	0.66	200.78	9,753.57	357.85	-320.51	-433.42	0.44	0.18	55.79	
9,954.00	0.65	207.94	9,931.55	356.00	-321.34	-431.88	0.05	-0.01	4.02	
10,133.00	1.79	185.26	10,110.51	352.32	-322.07	-428.56	0.68	0.64	-12.67	
10,311.00	1.70	107.49	10,288.45	348.76	-319.81	-424.50	1.23	-0.05	-43.69	
10,489.00	0.79	157.56	10,466.41	346.83	-316.82	-421.81	0.75	-0.51	28.13	
10,667.00	0.86	61.40	10,644.40	346.34	-315.18	-420.88	0.69	0.04	-54.02	
10,845.00	0.50	85.19	10,822.39	347.04	-313.24	-421.01	0.25	-0.20	13.37	
11,024.00	0.24	154.93	11,001.38	346.77	-312.30	-420.48	0.26	-0.15	38.96	
11,111.00	1.05	148.48	11,088.38	345.92	-311.80	-419.53	0.93	0.93	-7.41	
11,200.00	14.80	162.82	11,176.32	334.31	-308.00	-407.32	15.49	15.45	16.11	
11,289.00	24.40	163.31	11,260.06	305.78	-299.35	-377.50	10.79	10.79	0.55	
11,378.00	32.71	164.57	11,338.17	264.91	-287.65	-335.00	9.36	9.34	1.42	
11,468.00	43.29	164.12	11,408.99	211.64	-272.69	-279.67	11.76	11.76	-0.50	
11,556.00	47.61	162.84	11,470.71	151.54	-254.84	-216.98	5.02	4.91	-1.45	
11,645.00	54.88	161.41	11,526.39	85.55	-233.51	-147.65	8.26	8.17	-1.61	
11,735.00	59.26	161.88	11,575.30	13.87	-209.73	-72.18	4.89	4.87	0.52	
11,824.00	69.39	160.65	11,613.81	-61.98	-183.97	7.86	11.45	11.38	-1.38	
11,913.00	80.64	160.20	11,636.79	-142.85	-155.20	93.55	12.65	12.64	-0.51	
12,020.00	89.05	161.53	11,646.40	-243.44	-120.31	199.89	7.96	7.86	1.24	
12,110.00	87.41	160.77	11,649.17	-328.57	-91.25	289.75	2.01	-1.82	-0.84	
12,290.00	89.28	160.09	11,654.37	-498.09	-30.98	469.38	1.11	1.04	-0.38	
12,380.00	90.41	160.66	11,654.62	-582.86	-0.76	559.22	1.41	1.26	0.63	
12,469.00	89.74	160.92	11,654.50	-666.91	28.53	648.11	0.81	-0.75	0.29	
12,649.00	90.23	159.44	11,654.55	-836.24	89.56	827.76	0.87	0.27	-0.82	
12,829.00	90.54	159.88	11,653.34	-1,005.01	152.12	1,007.31	0.30	0.17	0.24	
13,008.00	91.89	162.68	11,649.54	-1,174.48	209.55	1,186.09	1.74	0.75	1.56	
13,188.00	88.84	161.59	11,648.40	-1,345.78	264.76	1,365.99	1.80	-1.69	-0.61	
13,368.00	84.54	157.45	11,658.79	-1,514.05	327.59	1,545.14	3.31	-2.39	-2.30	
13,457.00	86.61	156.87	11,665.66	-1,595.82	362.04	1,633.29	2.41	2.33	-0.65	
13,547.00	89.68	160.90	11,668.57	-1,679.71	394.43	1,722.89	5.63	3.41	4.48	
13,637.00	89.67	160.49	11,669.08	-1,764.64	424.18	1,812.77	0.46	-0.01	-0.46	
13,726.00	90.28	161.28	11,669.12	-1,848.74	453.32	1,901.66	1.12	0.69	0.89	
13,816.00	90.00	159.86	11,668.90	-1,933.61	483.26	1,991.52	1.61	-0.31	-1.58	
13,906.00	90.56	164.40	11,668.46	-2,019.24	510.87	2,081.46	5.08	0.62	5.04	
13,996.00	89.83	164.03	11,668.15	-2,105.85	535.35	2,171.46	0.91	-0.81	-0.41	
14,086.00	89.48	163.82	11,668.70	-2,192.33	560.27	2,261.46	0.45	-0.39	-0.23	
14,175.00	89.45	164.19	11,669.53	-2,277.88	584.80	2,350.45	0.42	-0.03	0.42	
14,265.00	89.55	164.22	11,670.31	-2,364.48	609.29	2,440.44	0.12	0.11	0.03	



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<b>Well:</b>	1406H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / Job #60957	<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)	
14,354.00	90.24	166.64	11,670.48	-2,450.61	631.68	2,529.40	2.83	0.78	2.72	
14,444.00	89.45	165.34	11,670.72	-2,537.93	653.47	2,619.32	1.69	-0.88	-1.44	
14,534.00	89.12	166.08	11,671.84	-2,625.13	675.68	2,709.26	0.90	-0.37	0.82	
14,624.00	88.97	166.31	11,673.34	-2,712.52	697.15	2,799.16	0.31	-0.17	0.26	
14,713.00	89.26	167.57	11,674.72	-2,799.21	717.26	2,888.01	1.45	0.33	1.42	
14,803.00	89.82	168.91	11,675.44	-2,887.31	735.61	2,977.72	1.61	0.62	1.49	
14,893.00	89.95	170.11	11,675.62	-2,975.81	751.99	3,067.25	1.34	0.14	1.33	
14,983.00	90.52	169.08	11,675.25	-3,064.32	768.24	3,156.78	1.31	0.63	-1.14	
15,072.00	89.78	168.51	11,675.02	-3,151.63	785.54	3,245.42	1.05	-0.83	-0.64	
15,162.00	90.07	169.47	11,675.14	-3,239.97	802.73	3,335.04	1.11	0.32	1.07	
15,252.00	90.15	166.09	11,674.96	-3,327.92	821.77	3,424.80	3.76	0.09	-3.76	
15,341.00	90.05	165.04	11,674.81	-3,414.11	843.96	3,513.75	1.19	-0.11	-1.18	
15,521.00	88.80	163.08	11,676.61	-3,587.16	893.39	3,693.72	1.29	-0.69	-1.09	
15,610.00	91.59	170.64	11,676.31	-3,673.76	913.60	3,782.51	9.05	3.13	8.49	
15,701.00	90.44	165.81	11,674.70	-3,762.81	932.17	3,873.19	5.46	-1.26	-5.31	
15,790.00	89.21	163.45	11,674.97	-3,848.61	955.75	3,962.17	2.99	-1.38	-2.65	
15,880.00	89.92	164.47	11,675.65	-3,935.11	980.62	4,052.16	1.38	0.79	1.13	
16,059.00	90.13	168.12	11,675.57	-4,108.98	1,023.02	4,230.95	2.04	0.12	2.04	
16,149.00	89.74	164.74	11,675.68	-4,196.46	1,044.14	4,320.83	3.78	-0.43	-3.76	
16,329.00	89.67	164.77	11,676.60	-4,370.12	1,091.46	4,500.80	0.04	-0.04	0.02	
16,419.00	89.45	165.65	11,677.29	-4,457.13	1,114.44	4,590.77	1.01	-0.24	0.98	
16,598.00	89.76	166.53	11,678.53	-4,630.88	1,157.47	4,769.60	0.52	0.17	0.49	
16,688.00	89.47	167.50	11,679.13	-4,718.57	1,177.69	4,859.45	1.12	-0.32	1.08	
16,778.00	89.17	163.82	11,680.20	-4,805.75	1,199.98	4,949.38	4.10	-0.33	-4.09	
16,868.00	89.53	165.32	11,681.22	-4,892.50	1,223.92	5,039.36	1.71	0.40	1.67	
16,958.00	90.05	167.51	11,681.55	-4,979.97	1,245.06	5,129.25	2.50	0.58	2.43	
17,047.00	89.61	164.37	11,681.82	-5,066.29	1,266.68	5,218.17	3.56	-0.49	-3.53	
17,137.00	89.83	165.18	11,682.26	-5,153.13	1,290.31	5,308.15	0.93	0.24	0.90	
17,227.00	89.92	164.88	11,682.45	-5,240.08	1,313.56	5,398.13	0.35	0.10	-0.33	
17,316.00	89.67	165.28	11,682.77	-5,326.08	1,336.47	5,487.10	0.53	-0.28	0.45	
17,406.00	89.58	165.02	11,683.36	-5,413.07	1,359.54	5,577.07	0.31	-0.10	-0.29	
17,586.00	89.22	164.05	11,685.25	-5,586.54	1,407.53	5,757.04	0.57	-0.20	-0.54	
17,675.00	89.46	164.70	11,686.27	-5,672.25	1,431.50	5,846.03	0.78	0.27	0.73	
17,765.00	89.27	165.29	11,687.27	-5,759.17	1,454.80	5,936.00	0.69	-0.21	0.66	
17,855.00	89.65	166.02	11,688.12	-5,846.36	1,477.10	6,025.94	0.91	0.42	0.81	
17,945.00	89.18	166.16	11,689.04	-5,933.72	1,498.73	6,115.86	0.54	-0.52	0.16	
18,035.00	89.14	165.77	11,690.35	-6,021.02	1,520.56	6,205.78	0.44	-0.04	-0.43	
18,124.00	89.11	166.39	11,691.71	-6,107.40	1,541.97	6,294.69	0.70	-0.03	0.70	
18,214.00	89.76	167.70	11,692.60	-6,195.10	1,562.14	6,384.53	1.62	0.72	1.46	
18,304.00	89.51	163.34	11,693.18	-6,282.22	1,584.64	6,474.46	4.85	-0.28	-4.84	
18,394.00	89.22	162.49	11,694.17	-6,368.24	1,611.08	6,564.44	1.00	-0.32	-0.94	
18,573.00	89.84	163.75	11,695.64	-6,539.52	1,663.05	6,743.43	0.78	0.35	0.70	
18,663.00	89.45	162.65	11,696.20	-6,625.67	1,689.06	6,833.42	1.30	-0.43	-1.22	
18,753.00	90.00	163.71	11,696.63	-6,711.82	1,715.10	6,923.41	1.33	0.61	1.18	



# Phoenix Technology Services LP

## Survey Report



<b>Company:</b>	SWEPI	<b>Local Co-ordinate Reference:</b>	Well 1406H
<b>Project:</b>	Loving County, Texas (NAD27)	<b>TVD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Site:</b>	University 19 PW Unit	<b>MD Reference:</b>	RKB @ 2793.00usft (Precision 559)
<b>Well:</b>	1406H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH / Job #60957	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys (Precision 559)	<b>Database:</b>	Compass 5000 GCR

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)
18,843.00	90.20	165.31	11,696.47	-6,798.55	1,739.14	7,013.40	1.79	0.22	1.78
18,933.00	89.53	163.31	11,696.69	-6,885.19	1,763.48	7,103.39	2.34	-0.74	-2.22
19,023.00	88.66	162.15	11,698.11	-6,971.12	1,790.19	7,193.36	1.61	-0.97	-1.29
19,112.00	89.92	163.57	11,699.21	-7,056.15	1,816.42	7,282.34	2.13	1.42	1.60
19,202.00	90.16	164.39	11,699.15	-7,142.66	1,841.25	7,372.34	0.95	0.27	0.91
19,292.00	90.23	164.46	11,698.84	-7,229.35	1,865.42	7,462.33	0.11	0.08	0.08
19,381.00	90.20	164.80	11,698.51	-7,315.17	1,889.01	7,551.32	0.38	-0.03	0.38
19,471.00	90.11	164.42	11,698.26	-7,401.94	1,912.89	7,641.31	0.43	-0.10	-0.42
19,565.00	89.81	165.41	11,698.33	-7,492.70	1,937.36	7,735.29	1.10	-0.32	1.05
<b>Final Phoenix MWD Survey</b>									
19,615.00	89.81	165.41	11,698.49	-7,541.09	1,949.95	7,785.26	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)	
175.00	175.00	0.49	-0.77	First Phoenix MWD Survey
19,565.00	11,698.33	-7,492.70	1,937.36	Final Phoenix MWD Survey
19,615.00	11,698.49	-7,541.09	1,949.95	Projection to TD

# Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

60957

ENERGY COMPANY

Shell Exploration and Production Company

WELL NAME

University 19 PW Unit 1406H

COUNTY &amp; STATE

Loving, TX

API WELL NUMBER

42-301-33213

PROPOSED DIRECTION

163.72

TIE-IN DATA						
MEASURED DEPTH	VERTICAL DEPTH	INCLIN	AZIMUTH	N-S COORD	E-W COORD	DATA SOURCE
.00 ft	.00 ft	0.00	0.00	.00 ft	.00 ft	Surface

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
30-Apr-17	175.00 ft	0.60	302.69

SURVEY INSTRUMENT  
TYPE

Phoenix MWD Velocity

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
26-Jun-17	19,565.00 ft	89.81	165.41

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

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLIN	AZIMUTH
26-Jun-17	19,615.00 ft	89.81	165.41

Peter Mavrelis

PRINT YOUR NAME ABOVE

*Peter Mavrelis*

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	8.66
DECLINATION OR GRID	GRID

6/26/2017

TODAY'S DATE

MWD SUPERVISOR 1

Peter Mavrelis

DIRECTIONAL DRILLER 1

John Hill

MWD SUPERVISOR 2

Gatlin Finley

DIRECTIONAL DRILLER 2

Dustin St.Clair

12329 Cutten Rd., Houston, Texas 777066 (713)337-0600 (Voice), (713)337-0599 (Fax)



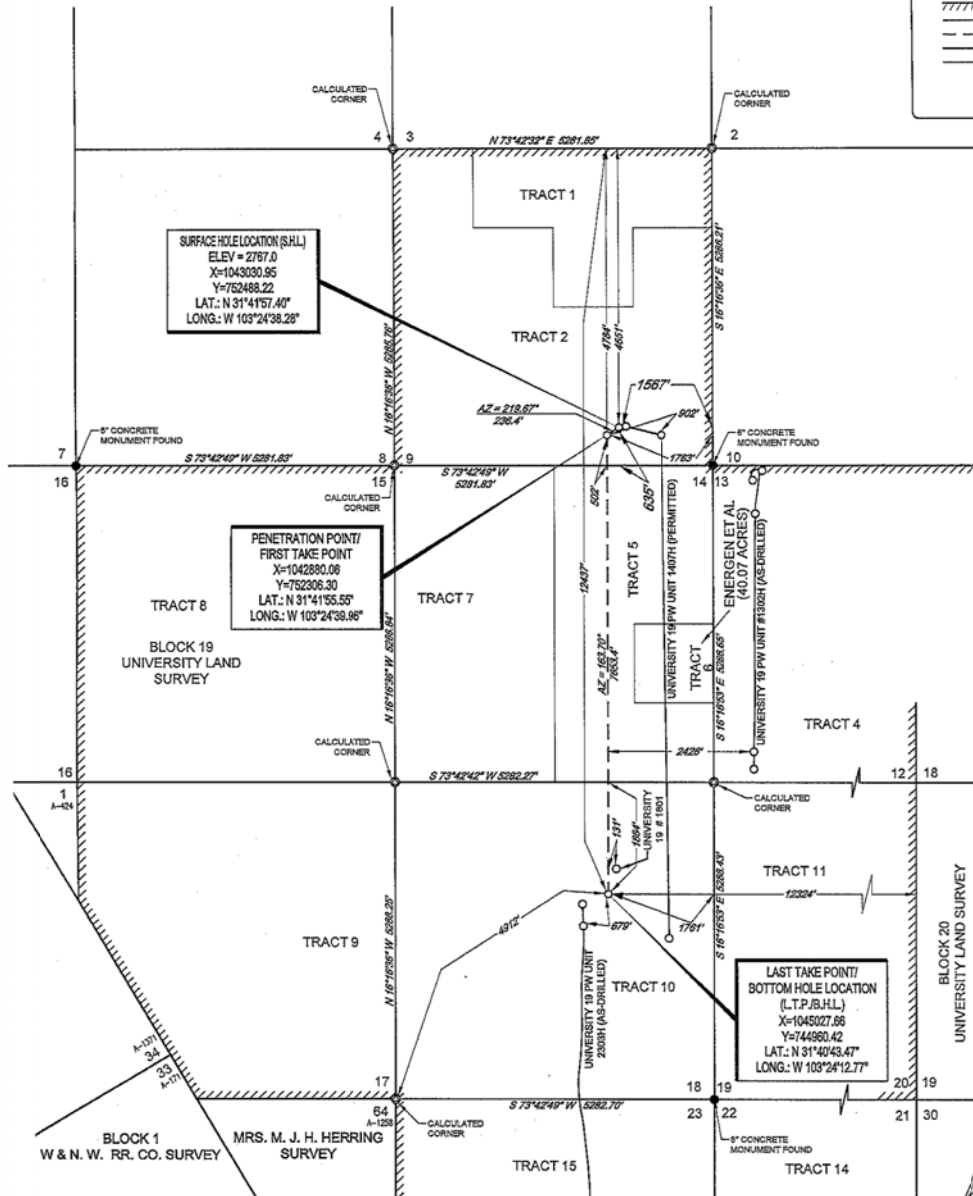


WELL LOCATION  
LEASE NAME & WELL NO.:  
UNIVERSITY 19 PW UNIT 1406H  
UNRELEASED ACRES  
8588.11 ACRES  
NEAREST TOWN IN COUNTY:  
±11.1 MILES SOUTHEAST OF MENTONE, TEXAS  
DESCRIPTION:  
SECTIONS 9, 14 & 18, BLOCK 19, UNIVERSITY LAND SURVEY  
LOVING COUNTY, TEXAS



LEGEND:

-----	Unit Boundary
-----	Survey/Section line
-----	Proposed Well Path
-----	Existing/Permitted Well Path
-----	Mineral Tract Boundary
●	Monument Found
○	Calculated Corner
○	Well Point



TIES TABLE

POINT	UNIT	SURVEY/SECTION
S.H.L.	1567' FNL	1567' FNL & 4557' FNL
P.P.	1763' FNL	1763' FNL & 502' FNL
F.T.P.	4784' FNL	502' FNL
L.T.P./	12324' FNL	1761' FNL & 1664' FNL
B.H.L.	12437' FNL	1664' FNL

**TOPOGRAPHIC**  
LOYALTY INNOVATION LEGACY  
1400 EVERMAN PARKWAY, Ste. 197 • FT. WORTH, TEXAS 76140  
TELEPHONE: (817) 744-7512 • FAX: (817) 744-7548  
TEXAS FIRM REGISTRATION NO. 10042804  
WWW.TOPOGRAPHIC.COM



*John R. Anderson* 2/6/17  
John R. Anderson, R.P.L.S. No. 6442  
FEBRUARY 7, 2017

UNIVERSITY 19 PW UNIT 1406H	REVISION:		NOTES:	NOTES CONTD:
	INT	DATE		
DATE: 02/07/2017			1. ORIGINAL DOCUMENT SIZE: 11" X 17"	6. THIS PRELIMINARY LOCATION HAS BEEN CAREFULLY SURVEYED ON THE GROUND DURING THE DATE OF NOVEMBER 4, 2016, AT A GROUND LEVEL ELEVATION OF 2767.0 SURVEY FEET.
FILE: LO-UNIVERSITY_19_PW_UNIT_1406H			2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, U.S. SURVEY FEET, NORTH AMERICAN DATUM 1927, UNLESS OTHERWISE NOTED.	7. S.H.L. = SURFACE HOLE LOCATION
DRAWN BY: O.M.			3. THIS LOCATION AND/OR UNRELEASED BOUNDARY HAS BEEN CAREFULLY SURVEYED ON THE GROUND UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE ACCORDING TO THE EVIDENCE, OFFICIAL SURVEY RECORDS, MAPS, AND OTHER DATA PROVIDED BY SHELL WESTERN B&P. THIS PLAN WAS CREATED FOR THE SOLE PURPOSE OF FILING A PERMIT WITH THE RAILROAD COMMISSION OF TEXAS AND SHOULD NOT BE CONSTRUED AS A BOUNDARY SURVEY IN COMPLIANCE WITH T.S.P.L.S. MINIMUM STANDARDS OF PROCEDURES FOR BOUNDARY SURVEYS. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAN IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.	8. P.P. = POINT OF PENETRATION
SHEET: 1 OF 1			4. ALL ELEVATION VALUES CONTAINED HEREIN ARE ORTHOMETRIC ONLY, BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), U.S. SURVEY FEET.	9. F.T.P. = FIRST TAKE POINT
			5. ALL MINERAL OWNERSHIP DATA SHOWN HEREIN IS BASED ON INFORMATION PROVIDED BY SHELL WESTERN B&P OR ITS SUBSIDIARIES & AFFILIATES.	10. L.T.P. = LAST TAKE POINT
				11. B.H.L. = BOTTOM HOLE LOCATION