



September 27, 2016

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

Attention: Regulatory Dept.

Re: Shell Western Exploration and Production Co.
University 20 A 2003H
Loving County, TX
API #42301329370000
Job No. 60214

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	
Seth Theriot	2003H	174	19,944	07/29/16	09/15/16	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,

Claudia Carreon

Claudia Carreon
Operations Administrator



SWEPI

**Loving County, Texas (NAD27)
University 20
A 2003H**

OH / Job 60214

Survey: Phoenix MWD Surveys

Standard Survey Report

16 September, 2016





Phoenix Technology Services LP

Survey Report



Company:	SWEPI	Local Co-ordinate Reference:	Well A 2003H
Project:	Loving County, Texas (NAD27)	TVD Reference:	RKB @ 2807.50usft (Precision 565)
Site:	University 20	MD Reference:	RKB @ 2807.50usft (Precision 565)
Well:	A 2003H	North Reference:	Grid
Wellbore:	OH / Job 60214	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 565)	Database:	Compass 5000 GCR

Project	Loving County, Texas (NAD27), Loving, Texas		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Texas Central 4203		

Site	University 20		
Site Position:		Northing:	747,307.51 usft
From:	Map	Easting:	1,066,466.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	31° 41' 12.47899 N
		Longitude:	103° 20' 5.48771 W
		Grid Convergence:	-1.55 °

Well	A 2003H		
Well Position	+N-S	0.00 usft	Northing: 747,307.51 usft
	+E-W	0.00 usft	Easting: 1,066,466.80 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	31° 41' 12.47899 N
		Longitude:	103° 20' 5.48771 W
		Ground Level:	2,779.00 usft

Wellbore	OH / Job 60214				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/26/2016	7.13	59.60	47,733

Design	Surveys (Precision 565)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)	
	0.00	0.00	0.00	343.45	

Survey Program	Date	9/16/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
174.00	20,000.00	Phoenix MWD Surveys (OH / Job 60214)	PHX+MWD+HDGM+AX	PHX+OWSG MWD + HDGM + Axial Correction	

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
174.00	0.13	341.75	174.00	0.19	-0.06	0.20	0.07	0.07	0.00
First Phoenix MWD Survey									
294.00	3.19	281.94	293.94	1.01	-3.37	1.93	2.61	2.55	-49.84
414.00	6.66	277.17	413.48	2.57	-13.55	6.32	2.91	2.89	-3.98
539.00	9.63	258.73	537.22	1.43	-31.00	10.20	3.14	2.38	-14.75
602.00	10.02	257.42	599.30	-0.80	-41.52	11.06	0.71	0.62	-2.08
696.00	9.94	257.97	691.88	-4.27	-57.43	12.27	0.13	-0.09	0.59
790.00	10.08	257.29	784.44	-7.77	-73.39	13.46	0.19	0.15	-0.72
978.00	9.79	256.33	969.62	-15.17	-104.97	15.36	0.18	-0.15	-0.51
1,162.00	9.41	256.72	1,151.05	-22.32	-134.81	17.01	0.21	-0.21	0.21



Phoenix Technology Services LP

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Well:	A 2003H	North Reference:	Grid
Wellbore:	OH / Job 60214	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 565)	Database:	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)
1,342.00	10.17	255.96	1,328.43	-29.55	-164.55	18.54	0.43	0.42	-0.42
1,431.00	10.39	256.13	1,416.00	-33.38	-179.96	19.26	0.25	0.25	0.19
1,611.00	10.55	257.49	1,593.00	-40.84	-211.81	21.18	0.16	0.09	0.76
1,790.00	10.57	257.35	1,768.97	-47.99	-243.83	23.45	0.02	0.01	-0.08
1,970.00	10.86	256.11	1,945.83	-55.67	-276.39	25.36	0.21	0.16	-0.69
2,149.00	11.05	257.01	2,121.57	-63.58	-309.48	27.21	0.14	0.11	0.50
2,329.00	11.26	257.53	2,298.17	-71.25	-343.45	29.53	0.13	0.12	0.29
2,509.00	10.88	258.53	2,474.82	-78.42	-377.25	32.29	0.24	-0.21	0.56
2,688.00	11.06	257.89	2,650.55	-85.38	-410.60	35.11	0.12	0.10	-0.36
2,868.00	10.80	258.16	2,827.28	-92.47	-443.98	37.83	0.15	-0.14	0.15
3,047.00	9.58	243.76	3,003.48	-102.50	-473.76	36.70	1.57	-0.68	-8.04
3,137.00	9.11	242.15	3,092.29	-109.13	-486.78	34.05	0.60	-0.52	-1.79
3,227.00	8.42	234.85	3,181.24	-116.26	-498.47	30.55	1.45	-0.77	-8.11
3,406.00	8.03	233.67	3,358.40	-131.21	-519.26	22.14	0.24	-0.22	-0.66
3,586.00	7.98	232.03	3,536.65	-146.34	-539.24	13.32	0.13	-0.03	-0.91
3,766.00	7.30	229.28	3,715.05	-161.49	-557.75	4.08	0.43	-0.38	-1.53
3,945.00	6.72	226.44	3,892.71	-176.13	-573.96	-5.34	0.38	-0.32	-1.59
4,124.00	5.92	221.65	4,070.62	-190.24	-587.69	-14.96	0.53	-0.45	-2.68
4,304.00	5.51	221.06	4,249.73	-203.70	-599.53	-24.48	0.23	-0.23	-0.33
4,393.00	5.35	222.46	4,338.33	-209.98	-605.14	-28.90	0.23	-0.18	1.57
4,483.00	5.08	223.81	4,427.95	-215.95	-610.73	-33.04	0.33	-0.30	1.50
4,573.00	4.75	223.41	4,517.62	-221.53	-616.05	-36.87	0.37	-0.37	-0.44
4,663.00	4.38	222.47	4,607.34	-226.77	-620.93	-40.51	0.42	-0.41	-1.04
4,753.00	4.22	220.47	4,697.08	-231.83	-625.40	-44.08	0.24	-0.18	-2.22
4,932.00	3.75	215.20	4,875.65	-241.62	-633.05	-51.29	0.33	-0.26	-2.94
5,021.00	3.57	214.16	4,964.47	-246.29	-636.28	-54.84	0.22	-0.20	-1.17
5,111.00	3.22	211.88	5,054.31	-250.76	-639.19	-58.29	0.42	-0.39	-2.53
5,201.00	2.84	209.19	5,144.19	-254.85	-641.61	-61.53	0.45	-0.42	-2.99
5,291.00	2.76	208.53	5,234.08	-258.70	-643.74	-64.61	0.10	-0.09	-0.73
5,380.00	2.70	205.74	5,322.98	-262.47	-645.67	-67.68	0.16	-0.07	-3.13
5,470.00	2.67	204.19	5,412.88	-266.29	-647.45	-70.83	0.09	-0.03	-1.72
5,560.00	2.72	202.40	5,502.78	-270.18	-649.12	-74.08	0.11	0.06	-1.99
5,650.00	2.83	197.16	5,592.67	-274.28	-650.59	-77.59	0.31	0.12	-5.82
5,739.00	2.69	198.82	5,681.57	-278.35	-651.91	-81.12	0.18	-0.16	1.87
5,829.00	2.61	200.55	5,771.47	-282.27	-653.31	-84.48	0.13	-0.09	1.92
5,919.00	2.58	199.64	5,861.38	-286.10	-654.71	-87.75	0.06	-0.03	-1.01
6,008.00	2.53	197.23	5,950.29	-289.86	-655.97	-91.00	0.13	-0.06	-2.71
6,098.00	2.53	198.45	6,040.21	-293.64	-657.19	-94.28	0.06	0.00	1.36
6,188.00	2.56	196.58	6,130.12	-297.45	-658.39	-97.59	0.10	0.03	-2.08
6,277.00	2.56	194.73	6,219.03	-301.28	-659.46	-100.95	0.09	0.00	-2.08
6,367.00	2.35	194.47	6,308.94	-305.01	-660.43	-104.25	0.23	-0.23	-0.29
6,457.00	2.29	187.85	6,398.87	-308.58	-661.14	-107.47	0.30	-0.07	-7.36
6,547.00	2.42	182.57	6,488.80	-312.26	-661.47	-110.90	0.28	0.14	-5.87



Phoenix Technology Services LP

Survey Report



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Site:	University 20	MD Reference:	RKB @ 2807.50usft (Precision 565)
Well:	A 2003H	North Reference:	Grid
Wellbore:	OH / Job 60214	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 565)	Database:	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)
6,636.00	2.22	186.05	6,577.72	-315.85	-661.74	-114.27	0.27	-0.22	3.91
6,726.00	2.46	186.20	6,667.65	-319.50	-662.13	-117.66	0.27	0.27	0.17
6,816.00	2.24	179.62	6,757.57	-323.18	-662.33	-121.13	0.39	-0.24	-7.31
6,906.00	2.26	186.25	6,847.50	-326.70	-662.51	-124.45	0.29	0.02	7.37
6,995.00	2.12	186.79	6,936.44	-330.08	-662.89	-127.58	0.16	-0.16	0.61
7,085.00	2.04	192.93	7,026.38	-333.30	-663.45	-130.51	0.26	-0.09	6.82
7,175.00	2.21	193.41	7,116.32	-336.55	-664.21	-133.40	0.19	0.19	0.53
7,264.00	1.98	198.81	7,205.26	-339.67	-665.10	-136.14	0.34	-0.26	6.07
7,354.00	1.90	195.46	7,295.21	-342.58	-666.00	-138.68	0.15	-0.09	-3.72
7,444.00	2.04	206.02	7,385.15	-345.46	-667.10	-141.12	0.43	0.16	11.73
7,534.00	1.99	223.91	7,475.10	-348.02	-668.89	-143.07	0.70	-0.06	19.88
7,624.00	2.07	232.72	7,565.04	-350.13	-671.27	-144.42	0.36	0.09	9.79
7,713.00	1.96	234.08	7,653.99	-352.00	-673.78	-145.49	0.13	-0.12	1.53
7,803.00	1.92	233.41	7,743.93	-353.80	-676.23	-146.52	0.05	-0.04	-0.74
7,893.00	1.66	226.61	7,833.89	-355.60	-678.39	-147.62	0.37	-0.29	-7.56
7,983.00	1.82	233.34	7,923.85	-357.35	-680.49	-148.70	0.29	0.18	7.48
8,072.00	1.74	237.07	8,012.81	-358.92	-682.75	-149.57	0.16	-0.09	4.19
8,162.00	1.60	238.13	8,102.77	-360.33	-684.97	-150.29	0.16	-0.16	1.18
8,252.00	1.50	235.49	8,192.74	-361.66	-687.01	-150.98	0.14	-0.11	-2.93
8,342.00	1.65	239.28	8,282.70	-362.99	-689.09	-151.66	0.20	0.17	4.21
8,431.00	1.56	242.13	8,371.67	-364.21	-691.26	-152.22	0.14	-0.10	3.20
8,521.00	1.79	239.01	8,461.63	-365.51	-693.55	-152.81	0.27	0.26	-3.47
8,611.00	1.68	233.91	8,551.59	-367.01	-695.82	-153.60	0.21	-0.12	-5.67
8,701.00	1.38	231.95	8,641.55	-368.45	-697.74	-154.44	0.34	-0.33	-2.18
8,791.00	1.18	221.77	8,731.53	-369.81	-699.21	-155.32	0.34	-0.22	-11.31
8,880.00	1.04	209.74	8,820.52	-371.20	-700.22	-156.36	0.30	-0.16	-13.52
8,970.00	0.88	210.65	8,910.50	-372.50	-700.98	-157.39	0.18	-0.18	1.01
9,061.00	1.22	193.53	9,001.49	-374.04	-701.56	-158.71	0.50	0.37	-18.81
9,240.00	1.53	179.50	9,180.44	-378.29	-701.99	-162.65	0.25	0.17	-7.84
9,420.00	2.13	200.47	9,360.35	-383.82	-703.14	-167.63	0.49	0.33	11.65
9,599.00	2.12	196.65	9,539.22	-390.11	-705.25	-173.06	0.08	-0.01	-2.13
9,779.00	1.70	173.52	9,719.13	-395.95	-705.90	-178.47	0.48	-0.23	-12.85
9,869.00	1.01	189.39	9,809.10	-398.06	-705.88	-180.50	0.87	-0.77	17.63
9,959.00	1.23	130.64	9,899.09	-399.48	-705.28	-182.03	1.24	0.24	-65.28
10,049.00	0.95	121.09	9,989.07	-400.49	-703.90	-183.39	0.37	-0.31	-10.61
10,138.00	0.74	115.35	10,078.06	-401.12	-702.75	-184.32	0.25	-0.24	-6.45
10,228.00	0.82	120.17	10,168.05	-401.69	-701.67	-185.18	0.11	0.09	5.36
10,318.00	0.40	142.33	10,258.05	-402.26	-700.92	-185.94	0.53	-0.47	24.62
10,407.00	0.45	114.91	10,347.04	-402.66	-700.42	-186.46	0.23	0.06	-30.81
10,497.00	0.35	116.74	10,437.04	-402.93	-699.85	-186.88	0.11	-0.11	2.03
10,587.00	2.01	194.97	10,527.02	-404.58	-700.01	-188.42	2.19	1.84	86.92
10,676.00	3.05	195.51	10,615.93	-408.37	-701.05	-191.75	1.17	1.17	0.61
10,766.00	2.98	193.17	10,705.81	-412.95	-702.22	-195.81	0.16	-0.08	-2.60



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10,856.00	2.39	198.37	10,795.71	-417.01	-703.35	-199.38	0.71	-0.66	5.78
10,945.00	2.20	192.66	10,884.64	-420.44	-704.31	-202.40	0.33	-0.21	-6.42
11,125.00	1.29	271.10	11,064.57	-423.77	-707.09	-204.80	1.29	-0.51	43.58
11,214.00	1.28	276.68	11,153.55	-423.63	-709.08	-204.10	0.14	-0.01	6.27
11,320.00	1.01	267.16	11,259.53	-423.54	-711.19	-203.41	0.31	-0.25	-8.98
11,409.00	6.84	338.98	11,348.30	-418.63	-713.87	-197.94	7.41	6.55	80.70
11,499.00	18.18	350.84	11,436.04	-399.70	-718.05	-178.61	12.85	12.60	13.18
11,589.00	23.81	347.76	11,520.03	-368.06	-724.14	-146.54	6.37	6.26	-3.42
11,679.00	32.38	348.71	11,599.35	-326.60	-732.72	-104.35	9.53	9.52	1.06
11,768.00	41.86	346.71	11,670.24	-274.20	-744.24	-50.85	10.74	10.65	-2.25
11,858.00	48.94	346.19	11,733.39	-211.95	-759.26	13.11	7.88	7.87	-0.58
11,948.00	54.73	344.46	11,788.99	-143.54	-777.22	83.80	6.61	6.43	-1.92
12,038.00	63.45	345.96	11,835.18	-68.95	-796.87	160.90	9.79	9.69	1.67
12,078.00	69.13	345.27	11,851.25	-33.49	-805.97	197.48	14.29	14.20	-1.73
12,179.00	72.69	347.38	11,884.28	59.24	-828.51	292.79	4.04	3.52	2.09
12,269.00	79.77	346.45	11,905.69	144.32	-848.30	379.98	7.93	7.87	-1.03
12,310.00	83.64	345.64	11,911.61	183.69	-858.08	420.50	9.64	9.44	-1.98
12,359.00	89.64	345.44	11,914.48	231.03	-870.29	469.36	12.25	12.24	-0.41
12,448.00	89.16	344.01	11,915.41	316.88	-893.74	558.34	1.69	-0.54	-1.61
12,538.00	88.29	342.64	11,917.41	403.07	-919.55	648.31	1.80	-0.97	-1.52
12,628.00	88.12	343.30	11,920.23	489.08	-945.90	738.26	0.76	-0.19	0.73
12,718.00	89.55	345.92	11,922.06	575.83	-969.78	828.21	3.32	1.59	2.91
12,808.00	91.82	346.17	11,920.99	663.16	-991.48	918.11	2.54	2.52	0.28
12,898.00	90.62	345.46	11,919.07	750.39	-1,013.53	1,008.01	1.55	-1.33	-0.79
12,987.00	91.54	345.61	11,917.39	836.56	-1,035.75	1,096.94	1.05	1.03	0.17
13,077.00	87.48	341.22	11,918.16	922.77	-1,061.43	1,186.89	6.64	-4.51	-4.88
13,166.00	87.57	342.32	11,922.01	1,007.22	-1,089.24	1,275.77	1.24	0.10	1.24
13,256.00	86.89	342.14	11,926.35	1,092.83	-1,116.68	1,365.64	0.78	-0.76	-0.20
13,346.00	89.94	342.84	11,928.84	1,178.61	-1,143.74	1,455.58	3.48	3.39	0.78
13,435.00	93.33	343.34	11,926.30	1,263.72	-1,169.62	1,544.53	3.85	3.81	0.56
13,524.00	93.05	342.80	11,921.35	1,348.73	-1,195.49	1,633.39	0.68	-0.31	-0.61
13,614.00	92.38	342.41	11,917.09	1,434.52	-1,222.37	1,723.28	0.86	-0.74	-0.43
13,704.00	92.49	341.94	11,913.27	1,520.12	-1,249.90	1,813.18	0.54	0.12	-0.52
13,793.00	92.13	341.19	11,909.68	1,604.48	-1,278.02	1,902.06	0.93	-0.40	-0.84
13,883.00	89.58	340.82	11,908.33	1,689.56	-1,307.30	1,991.96	2.86	-2.83	-0.41
13,973.00	89.78	341.00	11,908.84	1,774.61	-1,336.74	2,081.87	0.30	0.22	0.20
14,062.00	89.13	340.41	11,909.68	1,858.61	-1,366.15	2,170.76	0.99	-0.73	-0.66
14,152.00	89.02	339.61	11,911.14	1,943.18	-1,396.91	2,260.59	0.90	-0.12	-0.89
14,242.00	89.05	341.71	11,912.65	2,028.08	-1,426.71	2,350.46	2.33	0.03	2.33
14,332.00	89.64	345.11	11,913.68	2,114.32	-1,452.40	2,440.44	3.83	0.66	3.78
14,422.00	90.20	350.43	11,913.81	2,202.24	-1,471.46	2,530.15	5.94	0.62	5.91
14,511.00	90.90	347.05	11,912.95	2,289.51	-1,488.83	2,618.76	3.88	0.79	-3.80
14,601.00	88.32	345.14	11,913.57	2,376.86	-1,510.46	2,708.65	3.57	-2.87	-2.12
14,691.00	89.44	345.26	11,915.33	2,463.86	-1,533.44	2,798.59	1.25	1.24	0.13



Phoenix Technology Services LP

Survey Report



Company:	SWEPI	Local Co-ordinate Reference:	Well A 2003H
Project:	Loving County, Texas (NAD27)	TVD Reference:	RKB @ 2807.50usft (Precision 565)
Site:	University 20	MD Reference:	RKB @ 2807.50usft (Precision 565)
Well:	A 2003H	North Reference:	Grid
Wellbore:	OH / Job 60214	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 565)	Database:	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)
14,781.00	89.69	347.75	11,916.01	2,551.36	-1,554.44	2,888.45	2.78	0.28	2.77
14,870.00	89.50	350.02	11,916.64	2,638.68	-1,571.60	2,977.04	2.56	-0.21	2.55
14,960.00	88.66	345.82	11,918.08	2,726.66	-1,590.43	3,066.73	4.76	-0.93	-4.67
15,050.00	88.80	345.00	11,920.08	2,813.73	-1,613.09	3,156.66	0.92	0.16	-0.91
15,139.00	88.88	342.78	11,921.88	2,899.22	-1,637.78	3,245.63	2.50	0.09	-2.49
15,229.00	89.81	343.28	11,922.91	2,985.29	-1,664.05	3,335.62	1.17	1.03	0.56
15,319.00	89.55	345.33	11,923.41	3,071.93	-1,688.39	3,425.61	2.30	-0.29	2.28
15,409.00	89.92	348.73	11,923.83	3,159.62	-1,708.59	3,515.42	3.80	0.41	3.78
15,498.00	88.85	340.81	11,924.78	3,245.42	-1,731.95	3,604.32	8.98	-1.20	-8.90
15,588.00	89.47	338.48	11,926.10	3,329.78	-1,763.25	3,694.10	2.68	0.69	-2.59
15,678.00	89.44	340.03	11,926.96	3,413.94	-1,795.12	3,783.85	1.72	-0.03	1.72
15,768.00	89.30	341.38	11,927.95	3,498.88	-1,824.86	3,873.74	1.51	-0.16	1.50
15,858.00	89.97	345.96	11,928.52	3,585.22	-1,850.16	3,963.71	5.14	0.74	5.09
15,947.00	89.97	345.51	11,928.57	3,671.48	-1,872.09	4,052.64	0.51	0.00	-0.51
16,039.00	89.33	339.19	11,929.13	3,759.10	-1,899.97	4,144.58	6.90	-0.70	-6.87
16,129.00	89.86	336.71	11,929.77	3,842.51	-1,933.75	4,234.15	2.82	0.59	-2.76
16,218.00	90.20	337.44	11,929.72	3,924.48	-1,968.42	4,322.60	0.90	0.38	0.82
16,308.00	89.36	335.54	11,930.07	4,007.00	-2,004.32	4,411.93	2.31	-0.93	-2.11
16,398.00	90.67	339.44	11,930.04	4,090.13	-2,038.77	4,501.43	4.57	1.46	4.33
16,488.00	88.49	339.50	11,930.70	4,174.41	-2,070.33	4,591.20	2.42	-2.42	0.07
16,577.00	88.24	339.89	11,933.24	4,257.84	-2,101.20	4,679.98	0.52	-0.28	0.44
16,667.00	86.70	339.36	11,937.22	4,342.13	-2,132.50	4,769.69	1.81	-1.71	-0.59
16,757.00	86.25	339.75	11,942.75	4,426.30	-2,163.88	4,859.31	0.66	-0.50	0.43
16,846.00	91.37	340.74	11,944.60	4,510.01	-2,193.94	4,948.12	5.86	5.75	1.11
16,936.00	87.99	338.20	11,945.10	4,594.28	-2,225.50	5,037.88	4.70	-3.76	-2.82
17,026.00	88.52	339.73	11,947.84	4,678.24	-2,257.79	5,127.56	1.80	0.59	1.70
17,116.00	86.64	337.71	11,951.64	4,762.02	-2,290.42	5,217.16	3.06	-2.09	-2.24
17,206.00	85.47	337.92	11,957.83	4,845.16	-2,324.32	5,306.52	1.32	-1.30	0.23
17,295.00	86.87	338.40	11,963.78	4,927.58	-2,357.35	5,394.94	1.66	1.57	0.54
17,385.00	89.94	340.77	11,966.28	5,011.88	-2,388.73	5,484.68	4.31	3.41	2.63
17,475.00	93.13	343.25	11,963.87	5,097.43	-2,416.51	5,574.60	4.49	3.54	2.76
17,565.00	93.27	342.94	11,958.85	5,183.41	-2,442.64	5,664.46	0.38	0.16	-0.34
17,654.00	93.41	342.80	11,953.66	5,268.31	-2,468.81	5,753.30	0.22	0.16	-0.16
17,744.00	92.18	344.24	11,949.27	5,354.51	-2,494.31	5,843.19	2.10	-1.37	1.60
17,833.00	91.76	344.49	11,946.22	5,440.17	-2,518.28	5,932.13	0.55	-0.47	0.28
17,923.00	91.43	343.88	11,943.71	5,526.73	-2,542.80	6,022.08	0.77	-0.37	-0.68
18,013.00	90.48	343.11	11,942.21	5,613.00	-2,568.36	6,112.07	1.36	-1.06	-0.86
18,102.00	88.71	341.93	11,942.84	5,697.89	-2,595.09	6,201.05	2.39	-1.99	-1.33
18,192.00	88.94	341.72	11,944.68	5,783.38	-2,623.16	6,291.00	0.35	0.26	-0.23
18,282.00	89.25	343.50	11,946.11	5,869.25	-2,650.06	6,380.97	2.01	0.34	1.98
18,371.00	89.36	344.08	11,947.19	5,954.71	-2,674.90	6,469.96	0.66	0.12	0.65
18,462.00	89.44	345.24	11,948.14	6,042.46	-2,698.97	6,560.94	1.28	0.09	1.27
18,551.00	89.83	343.85	11,948.71	6,128.24	-2,722.69	6,649.91	1.62	0.44	-1.56



Phoenix Technology Services LP

Survey Report



Company:	SWEPI	Local Co-ordinate Reference:	Well A 2003H
Project:	Loving County, Texas (NAD27)	TVD Reference:	RKB @ 2807.50usft (Precision 565)
Site:	University 20	MD Reference:	RKB @ 2807.50usft (Precision 565)
Well:	A 2003H	North Reference:	Grid
Wellbore:	OH / Job 60214	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Precision 565)	Database:	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)
18,640.00	89.08	339.14	11,949.55	6,212.61	-2,750.92	6,738.83	5.36	-0.84	-5.29
18,730.00	89.02	340.68	11,951.04	6,297.12	-2,781.83	6,828.65	1.71	-0.07	1.71
18,820.00	89.27	342.05	11,952.39	6,382.39	-2,810.59	6,918.57	1.55	0.28	1.52
18,910.00	90.45	344.79	11,952.61	6,468.63	-2,836.27	7,008.56	3.31	1.31	3.04
18,999.00	91.01	347.16	11,951.47	6,554.97	-2,857.83	7,097.46	2.74	0.63	2.66
19,089.00	88.94	343.82	11,951.51	6,642.08	-2,880.38	7,187.39	4.37	-2.30	-3.71
19,179.00	91.65	345.94	11,951.05	6,728.95	-2,903.85	7,277.35	3.82	3.01	2.36
19,269.00	90.89	344.85	11,949.06	6,816.02	-2,926.54	7,367.27	1.48	-0.84	-1.21
19,359.00	91.79	345.52	11,946.95	6,903.00	-2,949.54	7,457.20	1.25	1.00	0.74
19,449.00	88.77	343.75	11,946.51	6,989.77	-2,973.39	7,547.17	3.89	-3.36	-1.97
19,538.00	88.91	344.25	11,948.31	7,075.30	-2,997.91	7,636.15	0.58	0.16	0.56
19,628.00	88.55	345.05	11,950.31	7,162.07	-3,021.73	7,726.10	0.97	-0.40	0.89
19,718.00	90.22	348.72	11,951.27	7,249.70	-3,042.15	7,815.92	4.48	1.86	4.08
19,808.00	87.43	345.09	11,953.12	7,337.32	-3,062.53	7,905.71	5.09	-3.10	-4.03
19,897.00	87.31	345.52	11,957.20	7,423.32	-3,085.08	7,994.57	0.50	-0.13	0.48
19,944.00	87.15	345.31	11,959.47	7,468.75	-3,096.90	8,041.49	0.56	-0.34	-0.45
Final Phoenix MWD Survey									
20,000.00	87.15	345.31	11,962.26	7,522.85	-3,111.09	8,097.39	0.00	0.00	0.00
Projection to TD									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
174.00	174.00	0.19	-0.06	First Phoenix MWD Survey
19,944.00	11,959.47	7,468.75	-3,096.90	Final Phoenix MWD Survey
20,000.00	11,962.26	7,522.85	-3,111.09	Projection to TD

Phoenix Technology Services SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER 60214

OPERATOR Shell Oil Company

WELL NAME University 20 A 2003H

COUNTY & STATE Loving, TX

API WELL NUMBER 42301329370000

PROPOSED DIRECTION 343.45

TIE-IN DATA

MEASURED DEPTH	VERTICAL DEPTH	INCLIN	AZIMUTH	N-S COORD	E-W COORD	DATA SOURCE
0	.00 ft	0.00	0.00	.00 ft	.00 ft	Surface

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLIN	AZIMUTH
29-Jul-16	174.00 ft	0.13	341.75

SURVEY INSTRUMENT
TYPE

Phoenix MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLIN	AZIMUTH
15-Sep-16	19,944.00 ft	87.15	345.31

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
15-Sep-16	20,000.00 ft	87.15	345.31

Seth Theriot

PRINT YOUR NAME ABOVE

Seth Theriot

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	8.68
DECLINATION OR GRID	GRID

9/15/2016

TODAY'S DATE

MWD SUPERVISOR 1 Shane Metcalf

DIRECTIONAL DRILLER 1 Travis Malbrough

MWD SUPERVISOR 2 Seth Theriot

DIRECTIONAL DRILLER 2 Dustin St. Clair

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

UNIVERSITY 20 A 2003H
WELL LOCATION

1282.61 ACRES (MEASURED)
SECTIONS 17 & 20, BLOCK 20, UNIVERSITY LAND SURVEY
LOVING COUNTY, TEXAS

SHELL WESTERN
E&P

LEGEND

	UNIT BOUNDARY
	BLOCK/TOWNSHIP LINE
	SURVEY/SECTION LINE
	PROPOSED WELL PATH
	EXISTING/PERMITTED WELL PATH
	CONCRETE MONUMENT
	CALCULATED CORNER
	WELL POINT

OWNERSHIP TABLE

MINERAL TRACT	ACREAGE
UNIVERSITY LAND BLOCK 20 SECTION 20	641.33
UNIVERSITY LAND BLOCK 20 SECTION 17	641.28
TOTAL ACREAGE	1282.61

L.T.P./B.H.L.
NAD 27 TX-C ZONE
X = 1065603.08
Y = 754842.00
LAT: N 31°42'26.25"
LONG: W 103°20'40.98"

NAD 83 TX-C ZONE
X = 1360067.62
Y = 10597418.40
LAT: N 31°42'26.72"
LONG: W 103°20'42.60"

X=1061404.95
Y=751687.03

X=1066475.01
Y=753169.27

F.T.P.
NAD 27 TX-C ZONE
X = 1065739.91
Y = 747652.84
LAT: N 31°41'15.70"
LONG: W 103°20'14.01"

NAD 83 TX-C ZONE
X = 1362204.55
Y = 10590229.13
LAT: N 31°41'16.17"
LONG: W 103°20'15.62"

P.P.
NAD 27 TX-C ZONE
X = 1065875.81
Y = 747195.61
LAT: N 31°41'11.21"
LONG: W 103°20'12.29"

NAD 83 TX-C ZONE
X = 1362340.46
Y = 10589771.89
LAT: N 31°41'11.88"
LONG: W 103°20'13.91"

X=1067958.89
Y=748093.07

X=1062888.33
Y=746610.98

S.H.L.
ELEV = 2779.0
NAD 27 TX-C ZONE
X = 1065465.80
Y = 747307.51
LAT: N 31°41'12.48"
LONG: W 103°20'05.49"

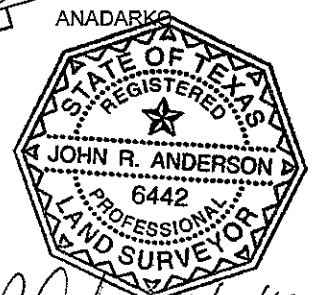
NAD 83 TX-C ZONE
X = 1362931.45
Y = 10589883.80
LAT: N 31°41'12.95"
LONG: W 103°20'07.11"

DETAIL VIEW
SCALE: 1" = 500'

POINT	UNIT	SURVEY/SECTION
S.H.L.	335' FSEL 1686' FEC	1853' FNEL & 335' FNWL
P.P.	277' FSEL 2268' FEC	2251' FNEL & 277' FNWL
F.T.P.	2253' FNEL 200' FSEL	2253' FNEL & 200' FSEL
L.T.P./ B.H.L.	2287' FNEL 2877' FNWL	2287' FNEL & 2411' FSEL

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. 10042504
WWW.TOPOGRAPHIC.COM



John R. Anderson, R.P.L.S. No. 6442
JUNE 22, 2016

NOTES:
1. ORIGINAL DOCUMENT SIZE: 11" X 17"
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.
3. THIS LOCATION AND/OR UNIT/LEASE 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 E&P. THIS PLAT 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.B.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 PLAT. THIS PLAT IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.
4. ALL ELEVATION VALUES CONTAINED HEREIN ARE ORTHOMETRIC ONLY, BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), U.S. SURVEY FEET.
5. ALL MINERAL OWNERSHIP DATA SHOWN HEREIN IS BASED ON INFORMATION PROVIDED BY SHELL WESTERN E&P OR ITS SUBSIDIARIES & AFFILIATES.

NOTES CONT'D:
6. THE LEASE AND WELL SHOWN HEREON ARE LOCATED APPROXIMATELY ±15.6 MILES SOUTHEAST OF THE CITY/TOWNSHIP/MUNICIPALITY OF MENTONE WITHIN THE COUNTY OF LOVING IN THE STATE OF TEXAS.
7. THE PRELIMINARY LOCATION HAS BEEN CAREFULLY SURVEYED ON THE GROUND DURING THE DATE OF APRIL 25, 2016. AT A GROUND LEVEL CALCULATED ELEVATION OF 2779.0 SURVEY FEET.
8. S.H.L. = SURFACE HOLE LOCATION
9. P.P. = POINT OF PENETRATION
10. F.T.P. = FIRST TAKE POINT
11. L.T.P. = LAST TAKE POINT
12. B.H.L. = BOTTOM HOLE LOCATION

UNIVERSITY 20 A 2003H	REVISION:	
	INT	DATE
	O.M.	05/23/2016
	J.R.A.	06/22/2016
DATE:	05/04/2016	
FILE:	LO UNIVERSITY 20 A 2003 H REV2	
DRAWN BY:	O.M.	
SHEET:	1 OF 1	



SHELL WESTERN E&P

SURVEY REPORT

UNIVERSITY 20 PW Unit 2003H ST01 PRECISION DRILLING 563 12/18/2017



The **Ultimate Partner** In Wellbore Placement

CUSTOMER SHELL WESTERN E&P
PROJECT LOVING CO.
FIELD PHANTOM WOLFCAMP

SDI JOB NO. OP.006684
SDI DISTRICT Houston
SDI KIT/UNIT KIT MUD PULSE

SITE INFORMATION

Site Name UNIVERSITY 20 PW UNIT 2003H
Lat/Long 31° 41' 12.48" N, 103° 20' 5.49" W
Northing
Easting

Section -
Township -
Range -

MAP INFORMATION

North Reference Grid North
Grid Correction 1.55 deg
System US State Plane 1927
Datum North American Datum 1927 (Clarke 1866)
Map Zone Texas Central: 4203



WELL INFORMATION

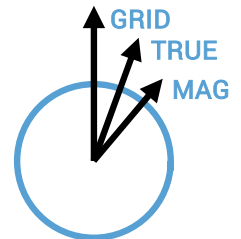
Lat/Long 31° 41' 12.48" N, 103° 20' 5.49" W
Northing 747,307.51 ft
Easting 1,066,466.8 ft
UWI 42-301-32937

DEPTH AND ELEVATION REFERENCE

Ground Level 2778 ft above Mean Sea Level
Reference Datum RKB
Reference Height 27 ft above G.L.
Reference Elevation 2805 ft

VERTICAL SECTION REFERENCE

+N/-S 0 ft
+E/-W 0 ft
Proposal Direction 343.45°
Calculation Method Minimum Curvature



GEOMAGNETIC REFERENCE INFORMATION

Local Gravity: 998.516 mG [computed]

MD	MODEL	DATE	DECLINATION	TRUE TO GRID	MAG TO GRID
0-11757 ft	HDGM2016	17 Dec 2017	7.00°	add 1.55°	add 8.55°

WELL NOTES

Surveys from 0' to 11125 are from the original wellbore.

OPERATORS

A. BASS, C. BOUDREAUX

SDI Operator Name (Printed)

SIGNATURE

DATE

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	°/100ft	ft	deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
26.00	0.00	0.00	26.00	0.00	0.00	0.00	0.00	0.00	0.00
174.00	0.13	341.75	174.00	0.17	0.16	-0.05	0.09	0.17	341.75
294.00	3.19	281.94	293.94	1.90	0.98	-3.36	2.61	3.50	286.24
414.00	6.66	277.17	413.48	6.29	2.54	-13.54	2.91	13.77	280.63
539.00	9.63	258.73	537.22	10.17	1.40	-30.99	3.14	31.02	272.59
602.00	10.02	257.42	599.30	11.03	-0.82	-41.51	0.71	41.51	268.86
696.00	9.94	257.97	691.88	12.24	-4.29	-57.42	0.13	57.58	265.72
790.00	10.08	257.29	784.44	13.43	-7.79	-73.38	0.19	73.79	263.94
978.00	9.79	256.33	969.62	15.34	-15.19	-104.96	0.18	106.06	261.76
1162.00	9.41	256.72	1151.05	16.98	-22.34	-134.80	0.21	136.64	260.59
1342.00	10.17	255.96	1328.43	18.52	-29.58	-164.54	0.43	167.18	259.81
1431.00	10.39	256.13	1416.00	19.24	-33.41	-179.95	0.25	183.03	259.48
1611.00	10.55	257.49	1593.00	21.16	-40.87	-211.80	0.16	215.71	259.08
1790.00	10.57	257.35	1768.97	23.43	-48.01	-243.82	0.02	248.50	258.86
1970.00	10.86	256.11	1945.83	25.34	-55.70	-276.39	0.21	281.94	258.61
2149.00	11.05	257.01	2121.57	27.19	-63.60	-309.47	0.14	315.94	258.39
2329.00	11.26	257.53	2298.17	29.51	-71.27	-343.44	0.13	350.76	258.28
2509.00	10.88	258.53	2474.82	32.26	-78.44	-377.25	0.24	385.32	258.25
2688.00	11.06	257.89	2650.55	35.09	-85.41	-410.59	0.12	419.38	258.25
2868.00	10.80	258.16	2827.28	37.81	-92.49	-443.98	0.15	453.51	258.23
3047.00	9.58	243.76	3003.48	36.68	-102.52	-473.76	1.57	484.72	257.79
3137.00	9.11	242.15	3092.29	34.03	-109.15	-486.77	0.60	498.86	257.36
3227.00	8.42	234.85	3181.24	30.53	-116.28	-498.46	1.45	511.84	256.87
3406.00	8.03	233.67	3358.40	22.12	-131.23	-519.25	0.24	535.58	255.82
3586.00	7.98	232.03	3536.65	13.30	-146.36	-539.23	0.13	558.74	254.81
3766.00	7.30	229.28	3715.05	4.06	-161.51	-557.75	0.43	580.66	253.85
3945.00	6.72	226.44	3892.71	-5.36	-176.15	-573.96	0.38	600.38	252.94
4124.00	5.92	221.65	4070.62	-14.98	-190.26	-587.68	0.53	617.71	252.06
4304.00	5.51	221.06	4249.73	-24.50	-203.71	-599.53	0.23	633.19	251.23
4393.00	5.35	222.46	4338.33	-28.92	-210.00	-605.13	0.23	640.53	250.86
4483.00	5.08	223.81	4427.95	-33.05	-215.97	-610.72	0.33	647.79	250.53

MD ft	INC deg	AZIM deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	CLOSURE DIST ft	CLOSURE DIR deg
4573.00	4.75	223.41	4517.62	-36.89	-221.55	-616.04	0.37	654.67	250.22
4663.00	4.38	222.47	4607.34	-40.52	-226.79	-620.93	0.42	661.05	249.94
4753.00	4.22	220.47	4697.08	-44.10	-231.85	-625.40	0.24	666.99	249.66
4932.00	3.75	215.20	4875.65	-51.30	-241.64	-633.04	0.33	677.59	249.11
5021.00	3.57	214.16	4964.47	-54.86	-246.31	-636.28	0.22	682.29	248.84
5111.00	3.22	211.88	5054.31	-58.31	-250.77	-639.19	0.42	686.62	248.58
5201.00	2.84	209.19	5144.19	-61.55	-254.87	-641.61	0.45	690.38	248.34
5291.00	2.76	208.53	5234.08	-64.63	-258.72	-643.73	0.10	693.78	248.10
5380.00	2.70	205.74	5322.98	-67.70	-262.49	-645.66	0.16	696.98	247.88
5470.00	2.67	204.19	5412.88	-70.85	-266.31	-647.44	0.09	700.08	247.64
5560.00	2.72	202.40	5502.78	-74.10	-270.20	-649.12	0.11	703.11	247.40
5650.00	2.83	197.16	5592.67	-77.61	-274.29	-650.59	0.31	706.05	247.14
5739.00	2.69	198.82	5681.57	-81.14	-278.37	-651.91	0.18	708.85	246.88
5829.00	2.61	200.55	5771.47	-84.50	-282.29	-653.31	0.13	711.69	246.63
5919.00	2.58	199.64	5861.38	-87.77	-286.11	-654.71	0.06	714.50	246.39
6008.00	2.53	197.23	5950.29	-91.02	-289.88	-655.96	0.13	717.16	246.16
6098.00	2.53	198.45	6040.21	-94.29	-293.66	-657.18	0.06	719.81	245.92
6188.00	2.56	196.58	6130.12	-97.60	-297.47	-658.38	0.10	722.47	245.69
6277.00	2.56	194.73	6219.03	-100.97	-301.30	-659.46	0.09	725.03	245.45
6367.00	2.35	194.47	6308.94	-104.27	-305.03	-660.43	0.23	727.47	245.21
6457.00	2.29	187.85	6398.87	-107.48	-308.59	-661.14	0.30	729.61	244.98
6547.00	2.42	182.57	6488.80	-110.92	-312.27	-661.47	0.28	731.47	244.73
6636.00	2.22	186.05	6577.72	-114.28	-315.87	-661.73	0.27	733.25	244.48
6726.00	2.46	186.20	6667.65	-117.67	-319.52	-662.12	0.27	735.19	244.24
6816.00	2.24	179.62	6757.57	-121.14	-323.20	-662.32	0.39	736.97	243.99
6906.00	2.26	186.25	6847.50	-124.47	-326.72	-662.50	0.29	738.69	243.75
6995.00	2.12	186.79	6936.44	-127.60	-330.10	-662.89	0.16	740.53	243.53
7085.00	2.04	192.93	7026.38	-130.52	-333.31	-663.44	0.26	742.47	243.33
7175.00	2.21	193.41	7116.32	-133.42	-336.56	-664.21	0.19	744.61	243.13
7264.00	1.98	198.81	7205.26	-136.16	-339.69	-665.10	0.34	746.82	242.95
7354.00	1.90	195.46	7295.21	-138.69	-342.60	-666.00	0.15	748.95	242.78
7444.00	2.04	206.02	7385.15	-141.14	-345.48	-667.10	0.43	751.25	242.62

MD ft	INC deg	AZIM deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	CLOSURE DIST ft	CLOSURE DIR deg
7534.00	1.99	223.91	7475.10	-143.09	-348.04	-668.89	0.70	754.02	242.51
7624.00	2.07	232.72	7565.04	-144.43	-350.15	-671.26	0.36	757.10	242.45
7713.00	1.96	234.08	7653.99	-145.51	-352.02	-673.77	0.13	760.19	242.41
7803.00	1.92	233.41	7743.93	-146.54	-353.82	-676.23	0.05	763.20	242.38
7893.00	1.66	226.61	7833.89	-147.64	-355.61	-678.39	0.37	765.95	242.34
7983.00	1.82	233.34	7923.85	-148.72	-357.36	-680.48	0.29	768.61	242.29
8072.00	1.74	237.07	8012.81	-149.59	-358.94	-682.75	0.16	771.35	242.27
8162.00	1.60	238.13	8102.77	-150.30	-360.35	-684.96	0.16	773.97	242.25
8252.00	1.50	235.49	8192.74	-151.00	-361.68	-687.00	0.14	776.39	242.24
8342.00	1.65	239.28	8282.70	-151.68	-363.01	-689.09	0.20	778.85	242.22
8431.00	1.56	242.13	8371.67	-152.23	-364.23	-691.26	0.14	781.35	242.22
8521.00	1.79	239.01	8461.63	-152.82	-365.52	-693.55	0.27	783.97	242.21
8611.00	1.68	233.91	8551.59	-153.61	-367.02	-695.82	0.21	786.68	242.19
8701.00	1.38	231.95	8641.55	-154.45	-368.47	-697.74	0.34	789.06	242.16
8791.00	1.18	221.77	8731.53	-155.34	-369.83	-699.21	0.34	790.99	242.12
8880.00	1.04	209.74	8820.52	-156.38	-371.21	-700.22	0.30	792.53	242.07
8970.00	0.88	210.65	8910.50	-157.41	-372.52	-700.98	0.18	793.81	242.01
9061.00	1.22	193.53	9001.49	-158.72	-374.06	-701.56	0.50	795.05	241.93
9240.00	1.53	179.50	9180.44	-162.67	-378.30	-701.99	0.25	797.43	241.68
9420.00	2.13	200.47	9360.35	-167.65	-383.84	-703.13	0.49	801.08	241.37
9599.00	2.12	196.65	9539.22	-173.07	-390.13	-705.25	0.08	805.96	241.05
9779.00	1.70	173.52	9719.12	-178.49	-395.97	-705.90	0.48	809.37	240.71
9869.00	1.01	189.39	9809.10	-180.52	-398.08	-705.88	0.87	810.39	240.58
9959.00	1.23	130.64	9899.09	-182.04	-399.49	-705.27	1.24	810.56	240.47
10049.00	0.95	121.09	9989.07	-183.41	-400.51	-703.90	0.37	809.87	240.36
10138.00	0.74	115.35	10078.06	-184.33	-401.13	-702.75	0.25	809.18	240.28
10228.00	0.82	120.17	10168.05	-185.19	-401.71	-701.67	0.11	808.52	240.21
10318.00	0.40	142.33	10258.05	-185.95	-402.28	-700.92	0.53	808.16	240.15
10407.00	0.45	114.91	10347.04	-186.47	-402.67	-700.41	0.23	807.91	240.11
10497.00	0.35	116.74	10437.04	-186.90	-402.94	-699.85	0.11	807.56	240.07
10587.00	2.01	194.97	10527.02	-188.43	-404.59	-700.01	2.19	808.52	239.97
10676.00	3.05	195.51	10615.93	-191.77	-408.38	-701.05	1.17	811.32	239.78

MD ft	INC deg	AZIM deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	CLOSURE DIST ft	CLOSURE DIR deg
10766.00	2.98	193.17	10705.81	-195.83	-412.97	-702.22	0.16	814.65	239.54
10856.00	2.39	198.37	10795.71	-199.40	-417.03	-703.34	0.71	817.68	239.34
10945.00	2.20	192.66	10884.64	-202.41	-420.45	-704.30	0.33	820.26	239.16
11125.00	1.29	271.10	11064.57	-204.81	-423.79	-707.09	1.29	824.36	239.06
11181.00	1.41	268.91	11120.56	-204.44	-423.79	-708.40	0.23	825.49	239.11
11237.00	6.16	12.10	11176.45	-201.62	-420.86	-708.46	11.83	824.04	239.29
11326.00	10.12	14.12	11264.54	-190.70	-408.61	-705.55	4.46	815.33	239.92
11445.00	9.11	351.11	11381.91	-172.37	-389.16	-704.46	3.31	804.80	241.08
11488.00	8.68	349.43	11424.39	-165.77	-382.61	-705.58	1.16	802.64	241.53
11578.00	21.80	341.71	11511.04	-142.21	-359.96	-712.10	14.72	797.91	243.18
11668.00	37.14	343.26	11589.16	-98.07	-317.82	-725.25	17.07	791.83	246.34
11757.00	45.34	348.49	11656.05	-39.55	-260.96	-739.33	9.98	784.04	250.56

UNIVERSITY 20 PW UNIT 2003H
WELL LOCATION
13144.15 ACRES (MEASURED)
SECTIONS 17 & 20, BLOCK 20, UNIVERSITY LAND SURVEY
LOVING COUNTY, TEXAS

SHELL WESTERN
E&P

LEGEND

	UNIT BOUNDARY
	BLOCK/TOWNSHIP LINE
	SURVEY/SECTION LINE
	PROPOSED WELL PATH
	EXISTING/PERMITTED WELL PATH
	CONCRETE MONUMENT
	CALCULATED CORNER
	WELL POINT

OWNERSHIP TABLE

MINERAL TRACT	ACREAGE
UNIVERSITY LAND BLOCK 20 SECTION 20	641.33
UNIVERSITY LAND BLOCK 20 SECTION 17	641.28
TOTAL ACREAGE	1282.61

X=1061404.95
Y=751687.03

X=1059921.57
Y=756763.09

X=1064991.13
Y=758245.46

X=1066475.01
Y=753169.27

X=1067958.89
Y=748093.07

X=1062888.33
Y=746610.98

L.T.P./B.H.L.
NAD 27 TX-C ZONE
X = 1063602.82
Y = 754842.87
LAT.: N 31°42'26.26"
LONG.: W 103°20'40.98"

NAD 83 TX-C ZONE
X = 10597419.27
Y = 10597419.27
LAT.: N 31°42'26.73"
LONG.: W 103°20'42.60"

F.T.P.
NAD 27 TX-C ZONE
X = 1065789.77
Y = 747485.10
LAT.: N 31°41'14.06"
LONG.: W 103°20'13.38"

NAD 83 TX-C ZONE
X = 1062254.41
Y = 10590061.38
LAT.: N 31°41'14.52"
LONG.: W 103°20'14.99"

P.P.
NAD 27 TX-C ZONE
X = 1065883.84
Y = 747139.50
LAT.: N 31°41'10.61"
LONG.: W 103°20'14.49"

NAD 83 TX-C ZONE
X = 1062148.49
Y = 10589715.78
LAT.: N 31°41'11.07"
LONG.: W 103°20'16.11"

Scientific Drilling Bottom Hole Location
11,757' MD, 11656.05' TVD, 260.96' South,
739.33' West, 784.04' CD @ 250.56° AZ

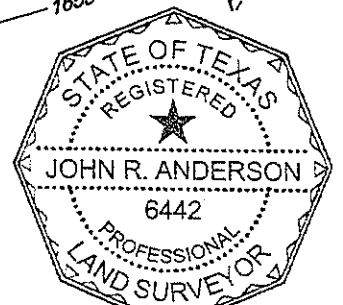
S.H.L.
ELEV = 2779.0
NAD 27 TX-C ZONE
X = 1066466.80
Y = 747307.51
LAT.: N 31°41'12.48"
LONG.: W 103°20'05.49"

NAD 83 TX-C ZONE
X = 1062931.45
Y = 10589883.80
LAT.: N 31°41'12.95"
LONG.: W 103°20'07.11"

DETAIL VIEW
SCALE: 1" = 500'

POINT	UNIT	SURVEY/SECTION
S.H.L.	335' FSEL	1653' FNEL & 335' FNWL
P.P.	277' FSEL	2451' FNEL & 277' FNWL
F.T.P.	8313' FSWL	2253' FNEL & 25' FSEL
L.T.P. / B.H.L.	8277' FSWL	2287' FNEL & 2412' FSEL

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. 10042504
WWW.TOPOGRAPHIC.COM



John R. Anderson 10/19/17
John R. Anderson, R.P.L.S. No. 6442

UNIVERSITY 20 PW UNIT 2003H	REVISION:	
	INT	DATE
DATE: 05/04/2016	O.M.	07/28/2016
	O.M.	10/13/2016
FILE: LO_UNIVERSITY_20_PW_UNIT_2003H_REV8	J.R.A.	09/19/2017
DRAWN BY: O.M.	O.M.	10/18/2017
SHEET: 1 OF 1	O.M.	10/19/2017

NOTES:

1. ORIGINAL DOCUMENT SIZE: 11" X 17"
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.
3. THIS LOCATION AND/OR UNIT/LEASE 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 E&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.B.P.L.S. MINIMUM STANDARDS OF PROCEDURES FOR BOUNDARY SURVEYS. THIS CERTIFICATION IF 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.
4. ALL ELEVATION VALUES CONTAINED HEREON ARE ORTHOMETRIC ONLY, BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), U.S. SURVEY FEET.
5. ALL MINERAL OWNERSHIP DATA SHOWN HEREIN IS BASED ON INFORMATION PROVIDED BY SHELL WESTERN E&P OR ITS SUBSIDIARIES & AFFILIATES.

NOTES CONT'D:

6. THE LEASE AND WELL SHOWN HEREON ARE LOCATED APPROXIMATELY ±15.6 MILES SOUTHEAST OF THE CITY/TOWNSHIP/MUNICIPALITY OF MENTONE WITHIN THE COUNTY OF LOVING IN THE STATE OF TEXAS.
7. THE PRELIMINARY LOCATION HAS BEEN CAREFULLY SURVEYED ON THE GROUND DURING THE DATE OF APRIL 25, 2016.
8. S.H.L. = SURFACE HOLE LOCATION
9. P.P. = POINT OF PENETRATION
10. F.T.P. = FIRST TAKE POINT
11. L.T.P. = LAST TAKE POINT
12. S.H.L. = BOTTOM HOLE LOCATION



1100 Rankin Road
Houston, TX 77073
Phone: 281.443.4600
www.scientificdrilling.com

Date: 12/21/2017

State of Texas
County of Loving

I, Alan Bass, certify that; I am employed by Scientific Drilling International; that I did on the day(s) of 12/19/2017 through 12/21/2017 conduct or supervise the taking of a gMWD survey from a depth of 11181 feet to a depth of 11757 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Scientific Drilling International; that I am authorized and qualified to make this report; that this survey was conducted at the request of Shell Western E&P for the University 20 PW Unit 2003H ST01 Well API# 42-301-32937 in Loving County, Texas; and that I have reviewed this report and find that it conforms to the principals and procedures as set forth by Scientific Drilling

A handwritten signature in black ink, appearing to read "Alan Bass", with a long, sweeping horizontal line extending to the right.

Field Technician

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

January 8, 2018

Attn: Pam Johns

Enclosed, please find the original and one copy of the surveys performed on the referenced well by Premier Directional Drilling, LLC (Operator No. 676020) supervised by Jennifer Costello. Other information required by your office is as follows:

JOB NUMBER	M17426	CUSTOMER	Shell Western E&P Inc.
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WELL NAME	University 20 PW Unit 2003H	COUNTY & STATE	Loving County, TX
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API WELL NUMBER	42301329370001	PROPOSED DIRECTION	343.45
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TIE-IN DATA						
MEASURED DEPTH	VERTICAL DEPTH	INCLINATION	AZIMUTH	N-S	E-W	DATA SOURCE
11,757 ft	11,656.05 ft	45.3 ft	348.5 ft	-260.97 ft	-739.33 ft	Scientific MWD

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLINATION	AZIMUTH
12/22/2017	11,857 ft	59.21°	350.31°

SURVEY INSTRUMENT TYPE
Premier MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLINATION	AZIMUTH
12/29/2017	19,891 ft	88.66°	348.45°

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

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLINATION	AZIMUTH
12/29/2017	19,950 ft	88.66°	348.45°

Jennifer Costello
MWD Coordinator
Premier Directional Drilling, LLC

TOTAL CORRECTION USED	8.67
DECLINATION OR GRID	GRID

MWD SUPERVISOR 1	Paul Cupit	DIRECTIONAL DRILLER 1	Joe Ainsworth
MWD SUPERVISOR 2	Nick Vitulli	DIRECTIONAL DRILLER 2	Michael Hobbs

A certified plat on which the bottom-hole location is oriented to the surface location is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Enclosures (Surveys and Plat)

PERMIAN

LOVING - TEXAS CENTRAL (NAD27)

BLK 20 SEC 20

UNIVERSITY 20 PW UNIT 2003H

110000911978

UNIVERSITY 20 PW UNIT 2003H ST01

Design: UNIVERSITY 20 A 2003H ST01

Survey Report - Geographic

09 January, 2018



Survey Report - Geographic



Company:	PERMIAN	Local Co-ordinate Reference:	Well UNIVERSITY 20 PW UNIT 2003H
Project:	LOVING - TEXAS CENTRAL (NAD27)	TVD Reference:	DFE @ 2806.00ft (PRECISION 563)
Site:	BLK 20 SEC 20	MD Reference:	DFE @ 2806.00ft (PRECISION 563)
Well:	UNIVERSITY 20 PW UNIT 2003H	North Reference:	Grid
Wellbore:	UNIVERSITY 20 PW UNIT 2003H ST01	Survey Calculation Method:	Minimum Curvature
Design:	UNIVERSITY 20 A 2003H ST01	Database:	EDM_UA_PRODUCTION

Project	LOVING - TEXAS CENTRAL (NAD27), PERMIAN BASIN		
Map System:	UA US NAD27 (US ft)	System Datum:	Mean Sea Level
Geo Datum:	NAD27 (ConUS Nadcon) [1241_4267]		
Map Zone:	NAD27 / Texas Central [1241_32039]		

Site	BLK 20 SEC 20		
Site Position:		Northing:	748,862.45 usft
From:	Lat/Long	Easting:	1,065,888.85 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	31° 41' 27.708 N
		Longitude:	103° 20' 12.660 W
		Grid Convergence:	-1.55 °

Well	UNIVERSITY 20 PW UNIT 2003H, Development		
Well Position	+N/-S	0.00 ft	Northing: 747,307.48 usft
	+E/-W	0.00 ft	Easting: 1,066,466.80 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	31° 41' 12.479 N
		Longitude:	103° 20' 5.488 W
		Ground Level:	2,780.00 ft

Wellbore	UNIVERSITY 20 PW UNIT 2003H ST01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/09/2017	7.02	59.53	47,584.30000000

Design	UNIVERSITY 20 A 2003H ST01				
Audit Notes:					
Version:	Phase:	ACTUAL	Tie On Depth:	11,125.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	343.29	

Survey Program	Date	01/09/2018			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
26.00	11,125.00	PHOENIX MWD - UNIVERSITY 20 A 2003H	PTW MWD+AXIAL_2016	MWD + BGGM + Axial Correction	
11,181.00	11,326.00	SDI NS GYRO - UNIVERSITY 20 PW UNIT 2003H	PTW SDI_KEEPEE_CT_1	KEEPER Gyro (SDI Cont Twin NS Gyro)	
11,445.00	11,757.00	SDI MWD - UNIVERSITY 20 PW UNIT 2003H	PTW MWD+HDGM_2016	MWD + HDGM + No additional corrections	
11,857.00	19,950.00	PREMIER MWD - UNIVERSITY 20 PW UNIT 2003H	PTW MWD+HDGM_2016	MWD + HDGM + No additional corrections	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	747,307.48	1,066,466.80	31° 41' 12.479 N	103° 20' 5.488 W	
26.00	0.00	0.00	26.00	0.00	0.00	747,307.48	1,066,466.80	31° 41' 12.479 N	103° 20' 5.488 W	
174.00	0.13	341.75	174.00	0.16	-0.05	747,307.64	1,066,466.75	31° 41' 12.480 N	103° 20' 5.488 W	
294.00	3.19	281.94	293.94	0.98	-3.36	747,308.46	1,066,463.44	31° 41' 12.487 N	103° 20' 5.527 W	
414.00	6.66	277.17	413.48	2.54	-13.54	747,310.02	1,066,453.27	31° 41' 12.500 N	103° 20' 5.645 W	
539.00	9.63	258.73	537.22	1.40	-30.99	747,308.88	1,066,435.81	31° 41' 12.484 N	103° 20' 5.847 W	
602.00	10.02	257.42	599.30	-0.82	-41.51	747,306.65	1,066,425.30	31° 41' 12.459 N	103° 20' 5.968 W	
696.00	9.94	257.97	691.88	-4.30	-57.42	747,303.18	1,066,409.38	31° 41' 12.421 N	103° 20' 6.151 W	
790.00	10.08	257.29	784.44	-7.80	-73.38	747,299.68	1,066,393.42	31° 41' 12.382 N	103° 20' 6.334 W	

Survey Report - Geographic



Company:	PERMIAN	Local Co-ordinate Reference:	Well UNIVERSITY 20 PW UNIT 2003H
Project:	LOVING - TEXAS CENTRAL (NAD27)	TVD Reference:	DFE @ 2806.00ft (PRECISION 563)
Site:	BLK 20 SEC 20	MD Reference:	DFE @ 2806.00ft (PRECISION 563)
Well:	UNIVERSITY 20 PW UNIT 2003H	North Reference:	Grid
Wellbore:	UNIVERSITY 20 PW UNIT 2003H ST01	Survey Calculation Method:	Minimum Curvature
Design:	UNIVERSITY 20 A 2003H ST01	Database:	EDM_UA_PRODUCTION

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
978.00	9.79	256.33	969.62	-15.19	-104.96	747,292.28	1,066,361.84	31° 41' 12.300 N	103° 20' 6.697 W
1,162.00	9.41	256.72	1,151.05	-22.35	-134.80	747,285.13	1,066,332.00	31° 41' 12.222 N	103° 20' 7.040 W
1,342.00	10.17	255.96	1,328.43	-29.58	-164.54	747,277.90	1,066,302.26	31° 41' 12.142 N	103° 20' 7.382 W
1,431.00	10.39	256.13	1,416.00	-33.41	-179.95	747,274.07	1,066,286.85	31° 41' 12.100 N	103° 20' 7.559 W
1,611.00	10.55	257.49	1,593.00	-40.87	-211.80	747,266.61	1,066,255.00	31° 41' 12.018 N	103° 20' 7.925 W
1,790.00	10.57	257.35	1,768.97	-48.02	-243.82	747,259.46	1,066,222.99	31° 41' 11.939 N	103° 20' 8.293 W
1,970.00	10.86	256.11	1,945.83	-55.70	-276.39	747,251.78	1,066,190.42	31° 41' 11.854 N	103° 20' 8.668 W
2,149.00	11.05	257.01	2,121.57	-63.61	-309.47	747,243.87	1,066,157.33	31° 41' 11.767 N	103° 20' 9.048 W
2,329.00	11.26	257.53	2,298.17	-71.28	-343.44	747,236.20	1,066,123.37	31° 41' 11.682 N	103° 20' 9.439 W
2,509.00	10.88	258.53	2,474.82	-78.45	-377.25	747,229.03	1,066,089.56	31° 41' 11.602 N	103° 20' 9.828 W
2,688.00	11.06	257.89	2,650.55	-85.41	-410.59	747,222.07	1,066,056.21	31° 41' 11.524 N	103° 20' 10.211 W
2,868.00	10.80	258.16	2,827.28	-92.49	-443.98	747,214.98	1,066,022.83	31° 41' 11.445 N	103° 20' 10.595 W
3,047.00	9.58	243.76	3,003.48	-102.52	-473.76	747,204.95	1,065,993.05	31° 41' 11.338 N	103° 20' 10.937 W
3,137.00	9.11	242.15	3,092.29	-109.16	-486.77	747,198.31	1,065,980.03	31° 41' 11.269 N	103° 20' 11.085 W
3,227.00	8.42	234.85	3,181.24	-116.29	-498.46	747,191.19	1,065,968.34	31° 41' 11.195 N	103° 20' 11.218 W
3,406.00	8.03	233.67	3,358.40	-131.24	-519.25	747,176.24	1,065,947.56	31° 41' 11.042 N	103° 20' 11.454 W
3,586.00	7.98	232.03	3,536.65	-146.37	-539.23	747,161.11	1,065,927.58	31° 41' 10.887 N	103° 20' 11.680 W
3,766.00	7.30	229.28	3,715.05	-161.52	-557.74	747,145.96	1,065,909.06	31° 41' 10.732 N	103° 20' 11.890 W
3,945.00	6.72	226.44	3,892.71	-176.16	-573.95	747,131.32	1,065,892.85	31° 41' 10.583 N	103° 20' 12.073 W
4,124.00	5.92	221.65	4,070.62	-190.27	-587.68	747,117.21	1,065,879.13	31° 41' 10.439 N	103° 20' 12.227 W
4,304.00	5.51	221.06	4,249.73	-203.72	-599.52	747,103.75	1,065,867.28	31° 41' 10.303 N	103° 20' 12.360 W
4,393.00	5.35	222.46	4,338.33	-210.01	-605.13	747,097.47	1,065,861.67	31° 41' 10.239 N	103° 20' 12.423 W
4,483.00	5.08	223.81	4,427.95	-215.98	-610.72	747,091.50	1,065,856.08	31° 41' 10.179 N	103° 20' 12.486 W
4,573.00	4.75	223.41	4,517.62	-221.56	-616.04	747,085.92	1,065,850.76	31° 41' 10.122 N	103° 20' 12.546 W
4,663.00	4.38	222.47	4,607.34	-226.80	-620.92	747,080.68	1,065,845.88	31° 41' 10.069 N	103° 20' 12.600 W
4,753.00	4.22	220.47	4,697.08	-231.86	-625.39	747,075.62	1,065,841.41	31° 41' 10.018 N	103° 20' 12.651 W
4,932.00	3.75	215.20	4,875.65	-241.65	-633.04	747,065.83	1,065,833.76	31° 41' 9.919 N	103° 20' 12.736 W
5,021.00	3.57	214.16	4,964.47	-246.32	-636.27	747,061.16	1,065,830.53	31° 41' 9.872 N	103° 20' 12.772 W
5,111.00	3.22	211.88	5,054.31	-250.79	-639.18	747,056.69	1,065,827.62	31° 41' 9.827 N	103° 20' 12.804 W
5,201.00	2.84	209.19	5,144.19	-254.88	-641.60	747,052.60	1,065,825.20	31° 41' 9.786 N	103° 20' 12.831 W
5,291.00	2.76	208.53	5,234.08	-258.73	-643.73	747,048.75	1,065,823.08	31° 41' 9.747 N	103° 20' 12.854 W
5,380.00	2.70	205.74	5,322.98	-262.50	-645.66	747,044.98	1,065,821.14	31° 41' 9.709 N	103° 20' 12.875 W
5,470.00	2.67	204.19	5,412.88	-266.32	-647.44	747,041.16	1,065,819.36	31° 41' 9.671 N	103° 20' 12.895 W
5,560.00	2.72	202.40	5,502.78	-270.21	-649.11	747,037.27	1,065,817.69	31° 41' 9.632 N	103° 20' 12.913 W
5,650.00	2.83	197.16	5,592.67	-274.31	-650.58	747,033.17	1,065,816.22	31° 41' 9.591 N	103° 20' 12.929 W
5,739.00	2.69	198.82	5,681.57	-278.38	-651.90	747,029.10	1,065,814.90	31° 41' 9.551 N	103° 20' 12.943 W
5,829.00	2.61	200.55	5,771.47	-282.30	-653.30	747,025.18	1,065,813.50	31° 41' 9.511 N	103° 20' 12.958 W
5,919.00	2.58	199.64	5,861.38	-286.13	-654.70	747,021.35	1,065,812.10	31° 41' 9.473 N	103° 20' 12.973 W
6,008.00	2.53	197.23	5,950.29	-289.89	-655.96	747,017.59	1,065,810.84	31° 41' 9.436 N	103° 20' 12.986 W
6,098.00	2.53	198.45	6,040.21	-293.67	-657.18	747,013.81	1,065,809.63	31° 41' 9.398 N	103° 20' 12.999 W
6,188.00	2.56	196.58	6,130.12	-297.48	-658.38	747,010.00	1,065,808.43	31° 41' 9.360 N	103° 20' 13.012 W
6,277.00	2.56	194.73	6,219.03	-301.31	-659.45	747,006.17	1,065,807.35	31° 41' 9.322 N	103° 20' 13.023 W
6,367.00	2.35	194.47	6,308.95	-305.04	-660.42	747,002.44	1,065,806.38	31° 41' 9.285 N	103° 20' 13.033 W
6,457.00	2.29	187.85	6,398.87	-308.61	-661.13	746,998.87	1,065,805.67	31° 41' 9.249 N	103° 20' 13.040 W
6,547.00	2.42	182.57	6,488.80	-312.29	-661.46	746,995.19	1,065,805.34	31° 41' 9.213 N	103° 20' 13.043 W
6,636.00	2.22	186.05	6,577.72	-315.88	-661.73	746,991.60	1,065,805.08	31° 41' 9.177 N	103° 20' 13.045 W
6,726.00	2.46	186.20	6,667.65	-319.53	-662.12	746,987.95	1,065,804.69	31° 41' 9.141 N	103° 20' 13.048 W
6,816.00	2.24	179.62	6,757.57	-323.21	-662.32	746,984.27	1,065,804.49	31° 41' 9.104 N	103° 20' 13.049 W
6,906.00	2.26	186.25	6,847.50	-326.73	-662.50	746,980.75	1,065,804.31	31° 41' 9.069 N	103° 20' 13.050 W
6,995.00	2.12	186.79	6,936.44	-330.11	-662.88	746,977.37	1,065,803.92	31° 41' 9.036 N	103° 20' 13.054 W
7,085.00	2.04	192.93	7,026.38	-333.33	-663.44	746,974.15	1,065,803.37	31° 41' 9.004 N	103° 20' 13.059 W
7,175.00	2.21	193.41	7,116.32	-336.58	-664.20	746,970.90	1,065,802.60	31° 41' 8.972 N	103° 20' 13.067 W
7,264.00	1.98	198.81	7,205.26	-339.70	-665.09	746,967.78	1,065,801.71	31° 41' 8.940 N	103° 20' 13.076 W
7,354.00	1.90	195.46	7,295.21	-342.61	-665.99	746,964.87	1,065,800.81	31° 41' 8.911 N	103° 20' 13.086 W
7,444.00	2.04	206.02	7,385.15	-345.49	-667.09	746,961.99	1,065,799.71	31° 41' 8.883 N	103° 20' 13.097 W

Survey Report - Geographic



Company:	PERMIAN	Local Co-ordinate Reference:	Well UNIVERSITY 20 PW UNIT 2003H
Project:	LOVING - TEXAS CENTRAL (NAD27)	TVD Reference:	DFE @ 2806.00ft (PRECISION 563)
Site:	BLK 20 SEC 20	MD Reference:	DFE @ 2806.00ft (PRECISION 563)
Well:	UNIVERSITY 20 PW UNIT 2003H	North Reference:	Grid
Wellbore:	UNIVERSITY 20 PW UNIT 2003H ST01	Survey Calculation Method:	Minimum Curvature
Design:	UNIVERSITY 20 A 2003H ST01	Database:	EDM_UA_PRODUCTION

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,534.00	1.99	223.91	7,475.10	-348.05	-668.88	746,959.43	1,065,797.93	31° 41' 8.857 N	103° 20' 13.117 W
7,624.00	2.07	232.72	7,565.04	-350.16	-671.26	746,957.32	1,065,795.55	31° 41' 8.835 N	103° 20' 13.144 W
7,713.00	1.96	234.08	7,653.99	-352.03	-673.77	746,955.45	1,065,793.04	31° 41' 8.816 N	103° 20' 13.173 W
7,803.00	1.92	233.41	7,743.93	-353.83	-676.22	746,953.65	1,065,790.58	31° 41' 8.798 N	103° 20' 13.201 W
7,893.00	1.66	226.61	7,833.89	-355.62	-678.38	746,951.85	1,065,788.42	31° 41' 8.779 N	103° 20' 13.225 W
7,983.00	1.82	233.34	7,923.85	-357.37	-680.48	746,950.10	1,065,786.33	31° 41' 8.761 N	103° 20' 13.249 W
8,072.00	1.74	237.07	8,012.81	-358.95	-682.74	746,948.53	1,065,784.06	31° 41' 8.745 N	103° 20' 13.274 W
8,162.00	1.60	238.13	8,102.77	-360.36	-684.96	746,947.12	1,065,781.85	31° 41' 8.731 N	103° 20' 13.300 W
8,252.00	1.50	235.49	8,192.74	-361.69	-687.00	746,945.79	1,065,779.81	31° 41' 8.717 N	103° 20' 13.323 W
8,342.00	1.65	239.28	8,282.70	-363.02	-689.08	746,944.46	1,065,777.72	31° 41' 8.703 N	103° 20' 13.346 W
8,431.00	1.56	242.13	8,371.67	-364.24	-691.25	746,943.24	1,065,775.55	31° 41' 8.691 N	103° 20' 13.371 W
8,521.00	1.79	239.01	8,461.63	-365.54	-693.54	746,941.94	1,065,773.26	31° 41' 8.677 N	103° 20' 13.397 W
8,611.00	1.68	233.91	8,551.59	-367.04	-695.81	746,940.44	1,065,770.99	31° 41' 8.662 N	103° 20' 13.423 W
8,701.00	1.38	231.95	8,641.55	-368.48	-697.73	746,939.00	1,065,769.07	31° 41' 8.647 N	103° 20' 13.445 W
8,791.00	1.18	221.77	8,731.53	-369.84	-699.20	746,937.64	1,065,767.60	31° 41' 8.633 N	103° 20' 13.461 W
8,880.00	1.04	209.74	8,820.52	-371.23	-700.21	746,936.25	1,065,766.59	31° 41' 8.619 N	103° 20' 13.473 W
8,970.00	0.88	210.65	8,910.50	-372.53	-700.97	746,934.95	1,065,765.83	31° 41' 8.606 N	103° 20' 13.481 W
9,061.00	1.22	193.53	9,001.49	-374.07	-701.55	746,933.41	1,065,765.25	31° 41' 8.591 N	103° 20' 13.487 W
9,240.00	1.53	179.50	9,180.44	-378.31	-701.98	746,929.16	1,065,764.83	31° 41' 8.548 N	103° 20' 13.491 W
9,420.00	2.13	200.47	9,360.35	-383.85	-703.13	746,923.63	1,065,763.68	31° 41' 8.493 N	103° 20' 13.502 W
9,599.00	2.12	196.65	9,539.22	-390.14	-705.24	746,917.34	1,065,761.56	31° 41' 8.431 N	103° 20' 13.525 W
9,779.00	1.70	173.52	9,719.13	-395.98	-705.89	746,911.50	1,065,760.91	31° 41' 8.373 N	103° 20' 13.531 W
9,869.00	1.01	189.39	9,809.10	-398.09	-705.87	746,909.39	1,065,760.93	31° 41' 8.352 N	103° 20' 13.530 W
9,959.00	1.23	130.64	9,899.09	-399.50	-705.27	746,907.97	1,065,761.54	31° 41' 8.338 N	103° 20' 13.522 W
10,049.00	0.95	121.09	9,989.07	-400.52	-703.90	746,906.96	1,065,762.91	31° 41' 8.328 N	103° 20' 13.506 W
10,138.00	0.74	115.35	10,078.06	-401.15	-702.74	746,906.33	1,065,764.06	31° 41' 8.322 N	103° 20' 13.493 W
10,228.00	0.82	120.17	10,168.05	-401.72	-701.66	746,905.76	1,065,765.14	31° 41' 8.317 N	103° 20' 13.480 W
10,318.00	0.40	142.33	10,258.05	-402.29	-700.91	746,905.19	1,065,765.89	31° 41' 8.312 N	103° 20' 13.471 W
10,407.00	0.45	114.91	10,347.04	-402.68	-700.41	746,904.80	1,065,766.40	31° 41' 8.308 N	103° 20' 13.465 W
10,497.00	0.35	116.74	10,437.04	-402.96	-699.84	746,904.52	1,065,766.96	31° 41' 8.305 N	103° 20' 13.458 W
10,587.00	2.01	194.97	10,527.02	-404.60	-700.00	746,902.87	1,065,766.80	31° 41' 8.289 N	103° 20' 13.460 W
10,676.00	3.05	195.51	10,615.93	-408.39	-701.04	746,899.08	1,065,765.77	31° 41' 8.251 N	103° 20' 13.471 W
10,766.00	2.98	193.17	10,705.81	-412.98	-702.21	746,894.50	1,065,764.59	31° 41' 8.205 N	103° 20' 13.483 W
10,856.00	2.39	198.37	10,795.71	-417.04	-703.34	746,890.44	1,065,763.47	31° 41' 8.165 N	103° 20' 13.494 W
10,945.00	2.20	192.66	10,884.64	-420.47	-704.30	746,887.01	1,065,762.51	31° 41' 8.131 N	103° 20' 13.504 W
11,125.00	1.29	271.10	11,064.57	-423.80	-707.08	746,883.68	1,065,759.72	31° 41' 8.097 N	103° 20' 13.536 W
11,181.00	1.41	268.91	11,120.56	-423.80	-708.40	746,883.68	1,065,758.41	31° 41' 8.097 N	103° 20' 13.551 W
11,237.00	6.16	12.10	11,176.45	-420.87	-708.46	746,886.61	1,065,758.35	31° 41' 8.126 N	103° 20' 13.552 W
11,326.00	10.12	14.12	11,264.54	-408.61	-705.55	746,898.86	1,065,761.26	31° 41' 8.248 N	103° 20' 13.523 W
11,445.00	9.11	351.11	11,381.91	-389.16	-704.45	746,918.32	1,065,762.35	31° 41' 8.441 N	103° 20' 13.516 W
11,488.00	8.68	349.43	11,424.39	-382.61	-705.57	746,924.87	1,065,761.23	31° 41' 8.505 N	103° 20' 13.531 W
11,578.00	21.80	341.71	11,511.04	-359.96	-712.09	746,947.52	1,065,754.71	31° 41' 8.727 N	103° 20' 13.614 W
11,668.00	37.14	343.26	11,589.16	-317.83	-725.24	746,989.65	1,065,741.56	31° 41' 9.141 N	103° 20' 13.779 W
11,757.00	45.34	348.49	11,656.05	-260.97	-739.33	747,046.51	1,065,727.48	31° 41' 9.699 N	103° 20' 13.960 W
11,857.00	59.21	350.31	11,717.09	-183.39	-753.72	747,124.08	1,065,713.08	31° 41' 10.463 N	103° 20' 14.150 W
11,947.00	58.45	349.64	11,763.68	-107.56	-767.13	747,199.91	1,065,699.68	31° 41' 11.210 N	103° 20' 14.329 W
12,037.00	61.26	349.76	11,808.87	-31.00	-781.04	747,276.48	1,065,685.77	31° 41' 11.963 N	103° 20' 14.514 W
12,126.00	67.67	350.74	11,847.21	48.11	-794.61	747,355.59	1,065,672.19	31° 41' 12.742 N	103° 20' 14.696 W
12,216.00	74.72	350.41	11,876.21	132.10	-808.56	747,439.58	1,065,658.24	31° 41' 13.570 N	103° 20' 14.883 W
12,306.00	81.17	351.45	11,894.99	218.97	-822.42	747,526.45	1,065,644.39	31° 41' 14.425 N	103° 20' 15.071 W
12,395.00	87.55	351.30	11,903.74	306.49	-835.70	747,613.97	1,065,631.11	31° 41' 15.288 N	103° 20' 15.252 W
12,485.00	89.27	351.42	11,906.23	395.43	-849.21	747,702.91	1,065,617.59	31° 41' 16.164 N	103° 20' 15.436 W
12,575.00	90.90	355.93	11,906.10	484.86	-859.12	747,792.34	1,065,607.68	31° 41' 17.046 N	103° 20' 15.579 W
12,664.00	90.19	356.50	11,905.25	573.66	-865.00	747,881.14	1,065,601.81	31° 41' 17.923 N	103° 20' 15.674 W
12,754.00	89.78	357.07	11,905.28	663.52	-870.04	747,971.00	1,065,596.76	31° 41' 18.811 N	103° 20' 15.761 W

Survey Report - Geographic



Company:	PERMIAN	Local Co-ordinate Reference:	Well UNIVERSITY 20 PW UNIT 2003H
Project:	LOVING - TEXAS CENTRAL (NAD27)	TVD Reference:	DFE @ 2806.00ft (PRECISION 563)
Site:	BLK 20 SEC 20	MD Reference:	DFE @ 2806.00ft (PRECISION 563)
Well:	UNIVERSITY 20 PW UNIT 2003H	North Reference:	Grid
Wellbore:	UNIVERSITY 20 PW UNIT 2003H ST01	Survey Calculation Method:	Minimum Curvature
Design:	UNIVERSITY 20 A 2003H ST01	Database:	EDM_UA_PRODUCTION

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
12,843.00	89.10	355.40	11,906.15	752.32	-875.89	748,059.80	1,065,590.92	31° 41' 19.688 N	103° 20' 15.856 W
12,933.00	88.53	349.78	11,908.01	841.51	-887.49	748,148.99	1,065,579.32	31° 41' 20.567 N	103° 20' 16.018 W
13,023.00	88.51	341.12	11,910.34	928.51	-910.07	748,235.99	1,065,556.74	31° 41' 21.422 N	103° 20' 16.307 W
13,112.00	88.90	345.31	11,912.35	1,013.68	-935.76	748,321.16	1,065,531.05	31° 41' 22.257 N	103° 20' 16.630 W
13,202.00	89.68	342.75	11,913.47	1,100.19	-960.52	748,407.67	1,065,506.29	31° 41' 23.106 N	103° 20' 16.944 W
13,291.00	89.34	343.10	11,914.23	1,185.27	-986.65	748,492.74	1,065,480.16	31° 41' 23.941 N	103° 20' 17.273 W
13,381.00	90.08	346.95	11,914.68	1,272.19	-1,009.90	748,579.67	1,065,456.91	31° 41' 24.795 N	103° 20' 17.569 W
13,471.00	89.66	347.32	11,914.89	1,359.93	-1,029.94	748,667.41	1,065,436.87	31° 41' 25.658 N	103° 20' 17.828 W
13,560.00	89.21	341.85	11,915.76	1,445.69	-1,053.58	748,753.17	1,065,413.22	31° 41' 26.500 N	103° 20' 18.129 W
13,650.00	89.73	344.46	11,916.60	1,531.82	-1,079.66	748,839.30	1,065,387.14	31° 41' 27.345 N	103° 20' 18.457 W
13,740.00	89.41	347.05	11,917.27	1,619.04	-1,101.80	748,926.52	1,065,365.00	31° 41' 28.202 N	103° 20' 18.741 W
13,829.00	89.15	346.10	11,918.39	1,705.60	-1,122.47	749,013.08	1,065,344.34	31° 41' 29.053 N	103° 20' 19.007 W
13,919.00	89.33	346.73	11,919.58	1,793.08	-1,143.60	749,100.55	1,065,323.20	31° 41' 29.912 N	103° 20' 19.279 W
14,009.00	89.13	348.17	11,920.79	1,880.92	-1,163.16	749,188.39	1,065,303.65	31° 41' 30.776 N	103° 20' 19.533 W
14,098.00	90.17	350.18	11,921.34	1,968.33	-1,179.87	749,275.80	1,065,286.93	31° 41' 31.636 N	103° 20' 19.753 W
14,188.00	89.23	350.59	11,921.81	2,057.06	-1,194.90	749,364.53	1,065,271.90	31° 41' 32.510 N	103° 20' 19.955 W
14,278.00	89.51	344.30	11,922.80	2,144.86	-1,214.46	749,452.33	1,065,252.35	31° 41' 33.374 N	103° 20' 20.209 W
14,368.00	90.30	344.24	11,922.95	2,231.49	-1,238.86	749,538.96	1,065,227.95	31° 41' 34.224 N	103° 20' 20.518 W
14,457.00	89.44	342.81	11,923.15	2,316.83	-1,264.09	749,624.30	1,065,202.71	31° 41' 35.062 N	103° 20' 20.837 W
14,547.00	89.39	343.93	11,924.07	2,403.06	-1,289.85	749,710.53	1,065,176.96	31° 41' 35.908 N	103° 20' 21.162 W
14,637.00	88.85	348.47	11,925.45	2,490.43	-1,311.31	749,797.90	1,065,155.50	31° 41' 36.767 N	103° 20' 21.437 W
14,727.00	87.89	349.15	11,928.01	2,578.68	-1,328.77	749,886.15	1,065,138.04	31° 41' 37.635 N	103° 20' 21.667 W
14,817.00	89.19	340.73	11,930.31	2,665.48	-1,352.13	749,972.95	1,065,114.68	31° 41' 38.487 N	103° 20' 21.964 W
14,907.00	88.97	337.14	11,931.76	2,749.44	-1,384.46	750,056.91	1,065,082.34	31° 41' 39.309 N	103° 20' 22.365 W
14,996.00	88.59	338.13	11,933.65	2,831.73	-1,418.32	750,139.20	1,065,048.48	31° 41' 40.114 N	103° 20' 22.782 W
15,086.00	88.47	336.67	11,935.96	2,914.78	-1,452.90	750,222.26	1,065,013.91	31° 41' 40.927 N	103° 20' 23.208 W
15,176.00	89.06	335.68	11,937.90	2,997.09	-1,489.24	750,304.57	1,064,977.56	31° 41' 41.731 N	103° 20' 23.654 W
15,265.00	92.03	337.85	11,937.05	3,078.86	-1,524.34	750,386.33	1,064,942.46	31° 41' 42.531 N	103° 20' 24.086 W
15,355.00	88.66	335.41	11,936.51	3,161.46	-1,560.04	750,468.93	1,064,906.77	31° 41' 43.339 N	103° 20' 24.525 W
15,445.00	89.31	340.53	11,938.11	3,244.84	-1,593.78	750,552.31	1,064,873.03	31° 41' 44.154 N	103° 20' 24.941 W
15,535.00	87.83	340.12	11,940.35	3,329.56	-1,624.07	750,637.03	1,064,842.74	31° 41' 44.985 N	103° 20' 25.318 W
15,624.00	89.34	348.85	11,942.55	3,415.21	-1,647.84	750,722.68	1,064,818.96	31° 41' 45.825 N	103° 20' 25.620 W
15,714.00	89.20	354.73	11,943.70	3,504.24	-1,660.69	750,811.71	1,064,806.12	31° 41' 46.703 N	103° 20' 25.797 W
15,804.00	89.56	357.32	11,944.68	3,594.01	-1,666.93	750,901.48	1,064,799.88	31° 41' 47.589 N	103° 20' 25.897 W
15,893.00	89.60	357.49	11,945.33	3,682.91	-1,670.96	750,990.38	1,064,795.85	31° 41' 48.468 N	103° 20' 25.971 W
15,983.00	88.01	359.31	11,947.21	3,772.85	-1,673.47	751,080.32	1,064,793.34	31° 41' 49.357 N	103° 20' 26.029 W
16,073.00	83.10	354.63	11,954.18	3,862.40	-1,678.20	751,169.87	1,064,788.61	31° 41' 50.242 N	103° 20' 26.111 W
16,162.00	82.04	347.71	11,965.71	3,949.56	-1,691.73	751,257.03	1,064,775.08	31° 41' 51.100 N	103° 20' 26.295 W
16,252.00	88.76	341.31	11,972.93	4,035.91	-1,715.68	751,343.38	1,064,751.12	31° 41' 51.948 N	103° 20' 26.599 W
16,342.00	90.48	338.06	11,973.52	4,120.29	-1,746.92	751,427.76	1,064,719.88	31° 41' 52.774 N	103° 20' 26.987 W
16,432.00	91.61	336.61	11,971.88	4,203.32	-1,781.60	751,510.79	1,064,685.21	31° 41' 53.587 N	103° 20' 27.414 W
16,521.00	92.09	336.93	11,969.01	4,285.07	-1,816.68	751,592.53	1,064,650.12	31° 41' 54.386 N	103° 20' 27.846 W
16,611.00	91.96	337.53	11,965.83	4,368.00	-1,851.49	751,675.47	1,064,615.31	31° 41' 55.197 N	103° 20' 28.275 W
16,701.00	92.41	336.38	11,962.40	4,450.76	-1,886.70	751,758.22	1,064,580.11	31° 41' 56.006 N	103° 20' 28.708 W
16,790.00	91.87	338.28	11,959.07	4,532.82	-1,920.98	751,840.29	1,064,545.83	31° 41' 56.809 N	103° 20' 29.130 W
16,880.00	90.66	340.41	11,957.09	4,617.01	-1,952.71	751,924.47	1,064,514.10	31° 41' 57.633 N	103° 20' 29.524 W
16,970.00	88.37	340.07	11,957.85	4,701.70	-1,983.14	752,009.17	1,064,483.67	31° 41' 58.463 N	103° 20' 29.902 W
17,059.00	89.80	342.39	11,959.27	4,785.95	-2,011.77	752,093.41	1,064,455.04	31° 41' 59.289 N	103° 20' 30.260 W
17,149.00	90.20	343.86	11,959.27	4,872.07	-2,037.89	752,179.54	1,064,428.92	31° 42' 0.134 N	103° 20' 30.589 W
17,239.00	89.35	340.80	11,959.62	4,957.81	-2,065.21	752,265.28	1,064,401.60	31° 42' 0.975 N	103° 20' 30.932 W
17,329.00	89.39	341.09	11,960.61	5,042.87	-2,094.59	752,350.34	1,064,372.22	31° 42' 1.809 N	103° 20' 31.299 W
17,418.00	90.18	342.55	11,960.95	5,127.43	-2,122.35	752,434.89	1,064,344.45	31° 42' 2.638 N	103° 20' 31.646 W
17,508.00	89.68	341.32	11,961.06	5,212.99	-2,150.26	752,520.46	1,064,316.55	31° 42' 3.477 N	103° 20' 31.996 W
17,598.00	89.51	338.28	11,961.69	5,297.44	-2,181.33	752,604.91	1,064,285.47	31° 42' 4.304 N	103° 20' 32.382 W
17,688.00	88.82	328.16	11,963.01	5,377.67	-2,221.83	752,685.14	1,064,244.98	31° 42' 5.087 N	103° 20' 32.876 W

Survey Report - Geographic



Company:	PERMIAN	Local Co-ordinate Reference:	Well UNIVERSITY 20 PW UNIT 2003H
Project:	LOVING - TEXAS CENTRAL (NAD27)	TVD Reference:	DFE @ 2806.00ft (PRECISION 563)
Site:	BLK 20 SEC 20	MD Reference:	DFE @ 2806.00ft (PRECISION 563)
Well:	UNIVERSITY 20 PW UNIT 2003H	North Reference:	Grid
Wellbore:	UNIVERSITY 20 PW UNIT 2003H ST01	Survey Calculation Method:	Minimum Curvature
Design:	UNIVERSITY 20 A 2003H ST01	Database:	EDM_UA_PRODUCTION

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
17,777.00	89.74	328.50	11,964.13	5,453.41	-2,268.55	752,760.88	1,064,198.26	31° 42' 5.824 N	103° 20' 33.440 W
17,867.00	94.22	338.59	11,961.01	5,533.81	-2,308.57	752,841.28	1,064,158.24	31° 42' 6.608 N	103° 20' 33.928 W
17,957.00	90.99	340.39	11,956.92	5,618.01	-2,340.06	752,925.47	1,064,126.75	31° 42' 7.433 N	103° 20' 34.319 W
18,047.00	90.98	340.36	11,955.37	5,702.77	-2,370.28	753,010.23	1,064,096.52	31° 42' 8.263 N	103° 20' 34.695 W
18,136.00	89.71	342.27	11,954.84	5,787.07	-2,398.79	753,094.53	1,064,068.01	31° 42' 9.090 N	103° 20' 35.052 W
18,225.00	89.84	342.86	11,955.19	5,871.98	-2,425.46	753,179.44	1,064,041.35	31° 42' 9.922 N	103° 20' 35.387 W
18,315.00	89.51	343.21	11,955.70	5,958.06	-2,451.72	753,265.53	1,064,015.09	31° 42' 10.767 N	103° 20' 35.718 W
18,405.00	89.64	343.26	11,956.36	6,044.23	-2,477.68	753,351.70	1,063,989.13	31° 42' 11.613 N	103° 20' 36.045 W
18,494.00	89.78	344.02	11,956.81	6,129.63	-2,502.75	753,437.09	1,063,964.06	31° 42' 12.451 N	103° 20' 36.362 W
18,584.00	90.28	344.80	11,956.77	6,216.31	-2,526.94	753,523.78	1,063,939.87	31° 42' 13.302 N	103° 20' 36.669 W
18,674.00	91.18	346.04	11,955.62	6,303.41	-2,549.59	753,610.87	1,063,917.22	31° 42' 14.157 N	103° 20' 36.958 W
18,763.00	89.80	344.26	11,954.86	6,389.43	-2,572.40	753,696.89	1,063,894.41	31° 42' 15.002 N	103° 20' 37.249 W
18,853.00	89.18	339.27	11,955.66	6,474.87	-2,600.55	753,782.34	1,063,866.26	31° 42' 15.840 N	103° 20' 37.602 W
18,943.00	90.93	338.54	11,955.57	6,558.84	-2,632.94	753,866.30	1,063,833.87	31° 42' 16.662 N	103° 20' 38.003 W
19,032.00	90.41	338.94	11,954.53	6,641.78	-2,665.21	753,949.24	1,063,801.60	31° 42' 17.474 N	103° 20' 38.402 W
19,122.00	90.45	334.20	11,953.86	6,724.33	-2,700.98	754,031.79	1,063,765.82	31° 42' 18.281 N	103° 20' 38.842 W
19,212.00	90.04	331.78	11,953.47	6,804.51	-2,741.85	754,111.97	1,063,724.95	31° 42' 19.063 N	103° 20' 39.340 W
19,301.00	91.81	336.39	11,952.04	6,884.52	-2,780.73	754,191.99	1,063,686.07	31° 42' 19.845 N	103° 20' 39.815 W
19,391.00	90.05	342.69	11,950.57	6,968.79	-2,812.17	754,276.25	1,063,654.64	31° 42' 20.670 N	103° 20' 40.205 W
19,481.00	91.01	349.03	11,949.74	7,056.01	-2,834.15	754,363.47	1,063,632.66	31° 42' 21.527 N	103° 20' 40.487 W
19,571.00	91.47	349.47	11,947.79	7,144.41	-2,850.93	754,451.87	1,063,615.88	31° 42' 22.397 N	103° 20' 40.709 W
19,661.00	90.35	347.83	11,946.36	7,232.63	-2,868.64	754,540.10	1,063,598.17	31° 42' 23.265 N	103° 20' 40.941 W
19,750.00	90.31	348.16	11,945.85	7,319.69	-2,887.15	754,627.15	1,063,579.66	31° 42' 24.121 N	103° 20' 41.183 W
19,840.00	89.12	348.38	11,946.30	7,407.80	-2,905.45	754,715.27	1,063,561.36	31° 42' 24.988 N	103° 20' 41.422 W
19,891.00	88.66	348.45	11,947.29	7,457.76	-2,915.69	754,765.22	1,063,551.12	31° 42' 25.479 N	103° 20' 41.556 W
19,950.00	88.66	348.45	11,948.67	7,515.55	-2,927.50	754,823.01	1,063,539.31	31° 42' 26.048 N	103° 20' 41.711 W

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
146.00	146.00	Conductor - run	20.000	30.000	
5,000.00	4,943.51	Surface Casing	9.625	12.250	
19,950.00	11,948.67	Production Liner	4.500	6.125	

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
19,950.00	11,948.67	7,515.55	-2,927.50	PROJ TO 19950' MD

Checked By: _____ Approved By: _____ Date: _____



363 N. Sam Houston Parkway E, Suite 300
Houston, TX 77060

January 8, 2018

State of Texas

County of Harris

I, Jennifer Costello, certify that; I am employed by Premier Directional Drilling, LLC; that on the day(s) of December 22, 2017 – December 29, 2017 we conducted and/or supervised the taking of MWD surveys for University 20 PW Unit 2003H from a depth of 11,857.00 feet to a depth of 19,950.00 feet; that the data is true, correct, complete, and within the limitations of the tool as set forth by Premier Directional Drilling, LLC; that I am authorized and qualified to make this report; that this survey was conducted accordingly at the request of Shell Western E&P Inc. ; that I reviewed this report and find it conforms to the principles and procedures as set forth by Premier Directional Drilling, LLC.

Jennifer Costello
MWD Coordinator
Premier Directional Drilling, LLC

UNIVERSITY 20 PW UNIT 2003H
WELL LOCATION
13144.15 ACRES (MEASURED)
SECTIONS 17 & 20, BLOCK 20, UNIVERSITY LAND SURVEY
LOVING COUNTY, TEXAS

SHELL WESTERN
E&P

LEGEND

UNIT BOUNDARY
BLOCK/TOWNSHIP LINE
SURVEY/SECTION LINE
PROPOSED WELL PATH
EXISTING/PERMITTED WELL PATH
CONCRETE MONUMENT
CALCULATED CORNER
WELL POINT

OWNERSHIP TABLE

MINERAL TRACT	ACREAGE
UNIVERSITY LAND BLOCK 20 SECTION 20	641.33
UNIVERSITY LAND BLOCK 20 SECTION 17	641.28
TOTAL ACREAGE	1282.61

SCALE: 1" = 1000'

0 500' 1000'

X=1061404.95
Y=751697.03

X=1065921.57
Y=756763.09

X=1064991.13
Y=758245.46

X=1066475.01
Y=753169.27

X=1067958.89
Y=748093.07

X=1062888.33
Y=746610.98

L.T.P./B.H.L.
NAD 27 TX-C ZONE
X = 1063802.82
Y = 756442.87
LAT.: N 31°42'26.28"
LONG.: W 103°20'40.98"

NAD 83 TX-C ZONE
X = 1390087.37
Y = 10397419.27
LAT.: N 31°42'26.28"
LONG.: W 103°20'40.98"

F.T.P.
NAD 27 TX-C ZONE
X = 1065789.77
Y = 747485.10
LAT.: N 31°41'14.66"
LONG.: W 103°20'13.28"

NAD 83 TX-C ZONE
X = 1382254.41
Y = 10680961.38
LAT.: N 31°41'14.52"
LONG.: W 103°20'14.99"

P.P.
NAD 27 TX-C ZONE
X = 1065993.64
Y = 747139.50
LAT.: N 31°41'10.81"
LONG.: W 103°20'14.49"

NAD 83 TX-C ZONE
X = 1382148.49
Y = 10680715.78
LAT.: N 31°41'11.07"
LONG.: W 103°20'16.11"

S.H.L.
ELEV = 2778.0
NAD 27 TX-C ZONE
X = 1069465.80
Y = 747307.51
LAT.: N 31°41'12.48"
LONG.: W 103°20'05.49"

NAD 83 TX-C ZONE
X = 1382301.45
Y = 1068683.80
LAT.: N 31°41'12.95"
LONG.: W 103°20'07.11"

UNIVERSITY 20 PW UNIT 2003H (PERMITTED)

UNIVERSITY 20 PW UNIT 2004H (AS-DRILLED)

DETAIL VIEW
SCALE: 1" = 500'

TIES TABLE

POINT	UNIT	SURVEY/SECTION
S.H.L.	335' FSEL	1653' FNEL & 335' FNWL
P.P.	277' FSEL	2451' FNEL & 277' FNWL
F.T.P.	8313' FSEL	2253' FNEL & 25' FSEL
L.T.P. / B.H.L.	8277' FSEL	2287' FNEL & 2412' FSEL

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY

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John R. Anderson 10/19/17
John R. Anderson, R.P.L.S. No. 6442

UNIVERSITY 20 PW UNIT 2003H

REVISION:

INT	DATE
O.M.	07/28/2016
O.M.	10/13/2016
O.M.	08/25/2017
J.R.A.	09/19/2017
O.M.	10/18/2017
O.M.	10/19/2017

DATE: 05/04/2016

FILE: LO UNIVERSITY 20 PW UNIT 2003H REV8

DRAWN BY: O.M.

SHEET: 1 OF 1

NOTES:

1. ORIGINAL DOCUMENT SIZE: 11" X 17"
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.
3. THIS LOCATION AND/OR UNIT/LEASE 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 E&P. THIS FLAT 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.B.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 FLAT IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.
4. ALL ELEVATION VALUES CONTAINED HEREON ARE ORTHOMETRIC ONLY, BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), U.S. SURVEY FEET.
5. ALL MINERAL OWNERSHIP DATA SHOWN HEREIN IS BASED ON INFORMATION PROVIDED BY SHELL WESTERN E&P OR ITS SUBSIDIARIES & AFFILIATES.

NOTES CONT'D:

6. THE LEASE AND WELL SHOWN HEREON ARE LOCATED APPROXIMATELY 15.6 MILES SOUTHEAST OF THE CITY/TOWNSHIP/MUNICIPALITY OF MENTONE WITHIN THE COUNTY OF LOVING IN THE STATE OF TEXAS.
7. THE PRELIMINARY LOCATION HAS BEEN CAREFULLY SURVEYED ON THE GROUND DURING THE DATE OF APRIL 25, 2016.
8. S.H.L. = SURFACE HOLE LOCATION
9. P.P. = POINT OF PENETRATION
10. F.T.P. = FIRST TAKE POINT
11. L.T.P. = LAST TAKE POINT
12. B.H.L. = BOTTOM HOLE LOCATION