



AMERICAN ENERGY PARTNERS

**Field Name: Permian Basin
Reagan County, TX
Block 12 University Lands
University 12 RE 0209HS
Job #158127
Rig: Sidewinder #106**



CATHEDRAL ENERGY SERVICES
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Cathedral Energy Services

Survey Report

Company:	American Energy Partners - Permian Basin	Local Co-ordinate Reference:	Well University 12 RE 0209HS
Project:	Reagan County, TX	TVD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Site:	Block 12 University Lands	MD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Well:	University 12 RE 0209HS	North Reference:	Grid
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	Final	Database:	USA EDM 5000 Multi Users DB

Project	Reagan County, TX		
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		Block 12 University Lands			
Site Position:		Northing:	522,548.59 usft	Latitude:	31.098250
From:	Map	Easting:	1,635,879.64 usft	Longitude:	-101.496746
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.60 °

Well	University 12 RE 0209HS					
Well Position	+N/-S	0.0 usft	Northing:	522,548.59 usft	Latitude:	31.098250
	+E/-W	0.0 usft	Easting:	1,635,879.64 usft	Longitude:	-101.496746
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	2,753.3 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/21/2015	6.02	59.57	47,701

Design	Final				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	990.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	1.17	

Survey Program	Date	10/4/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
80.0	990.0	Gyro (Top Hole)	NS-GYRO-MS	North sensing gyrocompassing m/s	
1,109.0	17,128.0	Survey #1 (HZ)	MWD+HDGM	OWSG MWD + HDGM	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
80.0	0.48	32.45	80.0	0.3	0.2	0.3	0.60	0.60		
130.0	0.46	73.43	130.0	0.5	0.5	0.5	0.66	-0.04		
180.0	0.51	30.43	180.0	0.8	0.8	0.8	0.72	0.10		
230.0	0.54	29.54	230.0	1.2	1.0	1.2	0.06	0.06		
280.0	0.27	335.25	280.0	1.5	1.1	1.5	0.88	-0.54		
330.0	0.04	198.54	330.0	1.6	1.0	1.6	0.60	-0.46		
380.0	0.31	51.46	380.0	1.6	1.1	1.7	0.69	0.54		
430.0	0.15	303.93	430.0	1.8	1.2	1.8	0.77	-0.32		
480.0	0.14	175.88	480.0	1.7	1.1	1.8	0.52	-0.02		
530.0	0.22	349.00	530.0	1.8	1.1	1.8	0.72	0.16		
580.0	0.08	156.86	580.0	1.8	1.1	1.8	0.60	-0.28		

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Survey									
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630.0	0.25	340.72	630.0	1.9	1.1	1.9	0.66	0.34	
680.0	0.09	264.73	680.0	2.0	1.0	2.0	0.49	-0.32	
730.0	0.19	344.32	730.0	2.1	1.0	2.1	0.39	0.20	
780.0	0.20	179.27	780.0	2.1	0.9	2.1	0.77	0.02	
830.0	0.13	74.50	830.0	2.0	1.0	2.0	0.53	-0.14	
880.0	0.23	218.56	880.0	1.9	1.0	1.9	0.69	0.20	
930.0	0.14	336.19	930.0	1.9	0.9	1.9	0.64	-0.18	
990.0	0.20	161.57	990.0	1.9	0.9	1.9	0.57	0.10	Gyro TD @ 960' MD
1,109.0	0.40	235.10	1,109.0	1.4	0.6	1.5	0.33	0.17	
1,140.0	0.40	231.90	1,140.0	1.3	0.4	1.3	0.07	0.00	
1,236.0	0.60	249.80	1,236.0	0.9	-0.3	0.9	0.26	0.21	
1,331.0	0.70	259.90	1,331.0	0.7	-1.3	0.6	0.16	0.11	
1,426.0	0.80	281.90	1,426.0	0.7	-2.5	0.6	0.32	0.11	
1,521.0	1.00	278.40	1,521.0	0.9	-4.0	0.9	0.22	0.21	
1,616.0	1.10	276.90	1,615.9	1.2	-5.7	1.1	0.11	0.11	
1,711.0	1.20	201.10	1,710.9	0.4	-7.0	0.2	1.49	0.11	
1,807.0	1.40	191.70	1,806.9	-1.7	-7.6	-1.9	0.30	0.21	
1,902.0	1.50	184.70	1,901.9	-4.1	-7.9	-4.3	0.21	0.11	
1,997.0	1.50	182.00	1,996.8	-6.6	-8.1	-6.7	0.07	0.00	
2,092.0	1.50	180.90	2,091.8	-9.1	-8.1	-9.2	0.03	0.00	
2,187.0	2.50	182.90	2,186.7	-12.4	-8.3	-12.5	1.06	1.05	
2,282.0	3.80	182.20	2,281.6	-17.6	-8.5	-17.8	1.37	1.37	
2,378.0	5.20	178.10	2,377.3	-25.1	-8.5	-25.3	1.50	1.46	
2,473.0	5.80	176.30	2,471.9	-34.2	-8.0	-34.4	0.66	0.63	
2,568.0	6.50	176.40	2,566.3	-44.4	-7.4	-44.5	0.74	0.74	
2,663.0	5.80	180.80	2,660.8	-54.5	-7.1	-54.7	0.89	-0.74	
2,758.0	4.60	181.00	2,755.4	-63.1	-7.2	-63.3	1.26	-1.26	
2,854.0	4.80	180.70	2,851.1	-71.0	-7.4	-71.1	0.21	0.21	
2,949.0	5.10	180.80	2,945.7	-79.2	-7.5	-79.3	0.32	0.32	
3,045.0	5.50	184.20	3,041.3	-88.1	-7.9	-88.2	0.53	0.42	
3,141.0	5.30	176.80	3,136.9	-97.1	-7.9	-97.2	0.75	-0.21	
3,236.0	5.80	174.80	3,231.4	-106.2	-7.3	-106.4	0.56	0.53	
3,331.0	5.10	176.90	3,326.0	-115.2	-6.6	-115.3	0.77	-0.74	
3,426.0	3.90	162.20	3,420.7	-122.5	-5.4	-122.6	1.74	-1.26	
3,521.0	2.90	160.00	3,515.5	-127.9	-3.6	-127.9	1.06	-1.05	
3,615.0	2.70	155.80	3,609.4	-132.1	-1.9	-132.1	0.30	-0.21	
3,710.0	2.60	155.80	3,704.3	-136.1	-0.1	-136.1	0.11	-0.11	
3,805.0	2.00	158.50	3,799.2	-139.6	1.4	-139.6	0.64	-0.63	
3,900.0	1.10	166.00	3,894.2	-142.1	2.3	-142.0	0.97	-0.95	
3,994.0	0.90	159.30	3,988.2	-143.6	2.7	-143.5	0.25	-0.21	
4,089.0	0.90	165.20	4,083.2	-145.0	3.2	-145.0	0.10	0.00	
4,184.0	0.70	194.60	4,178.2	-146.3	3.2	-146.2	0.47	-0.21	
4,278.0	0.50	206.20	4,272.2	-147.3	2.9	-147.2	0.25	-0.21	
4,373.0	0.10	227.00	4,367.2	-147.7	2.7	-147.6	0.43	-0.42	
4,468.0	0.10	242.50	4,462.2	-147.8	2.5	-147.7	0.03	0.00	
4,563.0	0.50	185.10	4,557.2	-148.2	2.4	-148.1	0.48	0.42	
4,657.0	1.10	192.40	4,651.2	-149.5	2.2	-149.4	0.65	0.64	
4,752.0	0.70	233.20	4,746.1	-150.8	1.5	-150.7	0.77	-0.42	
4,846.0	0.20	324.30	4,840.1	-151.0	1.0	-150.9	0.78	-0.53	
4,941.0	0.40	113.40	4,935.1	-151.0	1.2	-150.9	0.61	0.21	
5,035.0	0.40	120.90	5,029.1	-151.3	1.8	-151.2	0.06	0.00	
5,130.0	0.40	136.20	5,124.1	-151.7	2.3	-151.6	0.11	0.00	
5,224.0	0.40	139.10	5,218.1	-152.2	2.7	-152.1	0.02	0.00	

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5,318.0	0.40	152.10	5,312.1	-152.7	3.1	-152.6	0.10	0.00	
5,413.0	0.50	163.90	5,407.1	-153.4	3.4	-153.3	0.14	0.11	
5,507.0	0.50	172.40	5,501.1	-154.2	3.5	-154.1	0.08	0.00	
5,602.0	0.60	179.40	5,596.1	-155.1	3.6	-155.0	0.13	0.11	
5,696.0	0.40	169.60	5,690.1	-155.9	3.7	-155.8	0.23	-0.21	
5,791.0	0.40	174.90	5,785.1	-156.6	3.7	-156.5	0.04	0.00	
5,886.0	0.50	188.70	5,880.1	-157.3	3.7	-157.2	0.15	0.11	
5,981.0	0.50	193.20	5,975.1	-158.1	3.6	-158.0	0.04	0.00	
6,075.0	0.50	208.60	6,069.1	-158.9	3.3	-158.8	0.14	0.00	
6,137.0	0.60	203.80	6,131.1	-159.4	3.0	-159.3	0.18	0.16	
6,188.0	0.60	195.50	6,182.1	-159.9	2.8	-159.8	0.17	0.00	
6,252.0	0.60	195.70	6,246.1	-160.6	2.6	-160.5	0.00	0.00	
6,283.0	0.60	189.90	6,277.1	-160.9	2.6	-160.8	0.20	0.00	
6,315.0	1.70	337.70	6,309.1	-160.6	2.4	-160.5	6.97	3.44	
6,346.0	6.30	353.50	6,340.0	-158.5	2.0	-158.4	15.12	14.84	
6,378.0	9.90	355.00	6,371.7	-154.0	1.6	-153.9	11.27	11.25	
6,410.0	13.10	353.40	6,403.0	-147.7	0.9	-147.6	10.05	10.00	
6,441.0	16.00	352.40	6,433.0	-139.9	-0.1	-139.9	9.39	9.35	
6,473.0	19.00	353.30	6,463.6	-130.4	-1.3	-130.4	9.41	9.37	
6,489.0	20.20	353.09	6,478.6	-125.1	-1.9	-125.1	7.51	7.50	Crosses 100' FSL 6489' MD/6478' TVD (100' FSL
6,505.0	21.40	352.90	6,493.6	-119.4	-2.6	-119.4	7.51	7.50	
6,537.0	22.70	355.90	6,523.2	-107.5	-3.8	-107.5	5.37	4.06	
6,568.0	25.00	356.70	6,551.6	-95.0	-4.6	-95.0	7.49	7.42	
6,600.0	27.80	0.40	6,580.3	-80.7	-4.9	-80.8	10.14	8.75	
6,632.0	30.90	359.30	6,608.1	-65.1	-4.9	-65.1	9.83	9.69	
6,664.0	33.00	356.10	6,635.3	-48.1	-5.6	-48.2	8.43	6.56	
6,695.0	35.00	357.80	6,661.0	-30.8	-6.6	-31.0	7.14	6.45	
6,727.0	36.80	358.90	6,686.9	-12.1	-7.1	-12.2	5.98	5.62	
6,759.0	40.60	0.10	6,711.9	7.9	-7.3	7.8	12.10	11.87	
6,790.0	45.00	359.10	6,734.6	29.0	-7.4	28.8	14.36	14.19	
6,822.0	48.60	357.50	6,756.5	52.3	-8.1	52.1	11.83	11.25	
6,854.0	51.40	357.70	6,777.1	76.8	-9.1	76.6	8.76	8.75	
6,886.0	54.40	359.70	6,796.4	102.3	-9.7	102.1	10.62	9.37	
6,917.0	56.60	1.20	6,814.0	127.8	-9.5	127.6	8.14	7.10	
6,949.0	58.70	1.20	6,831.1	154.9	-8.9	154.6	6.56	6.56	
6,980.0	60.80	1.20	6,846.7	181.6	-8.4	181.4	6.77	6.77	
7,012.0	62.90	359.80	6,861.8	209.8	-8.1	209.6	7.61	6.56	
7,044.0	65.40	0.40	6,875.7	238.6	-8.1	238.4	7.99	7.81	
7,076.0	68.30	1.20	6,888.3	268.1	-7.7	267.8	9.35	9.06	
7,107.0	71.50	1.30	6,899.0	297.2	-7.0	297.0	10.33	10.32	
7,139.0	73.80	2.70	6,908.5	327.7	-6.0	327.5	8.31	7.19	
7,171.0	76.50	3.60	6,916.7	358.6	-4.3	358.4	8.86	8.44	
7,202.0	80.70	3.60	6,922.8	388.9	-2.4	388.8	13.55	13.55	
7,234.0	85.10	3.60	6,926.8	420.6	-0.4	420.5	13.75	13.75	
7,329.0	89.90	3.60	6,930.9	515.3	5.6	515.3	5.05	5.05	
7,424.0	90.30	2.60	6,930.8	610.1	10.7	610.2	1.13	0.42	
7,519.0	90.00	1.50	6,930.5	705.1	14.1	705.2	1.20	-0.32	
7,614.0	89.60	0.50	6,930.9	800.0	15.8	800.2	1.13	-0.42	
7,709.0	89.30	359.50	6,931.8	895.0	15.8	895.2	1.10	-0.32	
7,804.0	89.40	0.30	6,932.8	990.0	15.6	990.1	0.85	0.11	
7,900.0	90.10	0.60	6,933.3	1,086.0	16.4	1,086.1	0.79	0.73	
7,995.0	89.70	2.90	6,933.4	1,181.0	19.3	1,181.1	2.46	-0.42	
8,090.0	90.00	2.10	6,933.7	1,275.9	23.4	1,276.1	0.90	0.32	

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8,185.0	89.90	1.90	6,933.8	1,370.8	26.7	1,371.1	0.24	-0.11	
8,280.0	90.30	2.40	6,933.6	1,465.8	30.3	1,466.1	0.67	0.42	
8,375.0	90.30	1.90	6,933.1	1,560.7	33.9	1,561.1	0.53	0.00	
8,470.0	88.10	1.90	6,934.4	1,655.6	37.0	1,656.0	2.32	-2.32	
8,565.0	88.30	1.50	6,937.4	1,750.5	39.8	1,751.0	0.47	0.21	
8,660.0	88.30	1.90	6,940.2	1,845.5	42.7	1,845.9	0.42	0.00	
8,755.0	89.50	1.20	6,942.1	1,940.4	45.2	1,940.9	1.46	1.26	
8,851.0	89.50	359.30	6,942.9	2,036.4	45.6	2,036.9	1.98	0.00	
8,946.0	90.30	0.50	6,943.1	2,131.4	45.5	2,131.9	1.52	0.84	
9,041.0	88.70	1.40	6,943.9	2,226.4	47.0	2,226.9	1.93	-1.68	
9,136.0	88.70	0.50	6,946.0	2,321.3	48.6	2,321.8	0.95	0.00	
9,231.0	89.20	0.80	6,947.8	2,416.3	49.7	2,416.8	0.61	0.53	
9,326.0	89.50	0.20	6,948.9	2,511.3	50.5	2,511.8	0.71	0.32	
9,421.0	89.90	359.10	6,949.4	2,606.3	49.9	2,606.8	1.23	0.42	
9,516.0	89.80	2.70	6,949.6	2,701.3	51.4	2,701.7	3.79	-0.11	
9,611.0	89.60	3.80	6,950.1	2,796.1	56.8	2,796.7	1.18	-0.21	
9,707.0	89.40	4.00	6,950.9	2,891.9	63.4	2,892.6	0.29	-0.21	
9,801.0	88.20	1.20	6,952.9	2,985.7	67.6	2,986.5	3.24	-1.28	
9,895.0	90.20	1.40	6,954.2	3,079.7	69.8	3,080.5	2.14	2.13	
9,990.0	90.00	0.40	6,954.1	3,174.7	71.2	3,175.5	1.07	-0.21	
10,084.0	90.00	0.70	6,954.1	3,268.7	72.1	3,269.5	0.32	0.00	
10,178.0	90.10	0.90	6,954.0	3,362.7	73.5	3,363.5	0.24	0.11	
10,272.0	89.90	1.30	6,954.0	3,456.7	75.3	3,457.5	0.48	-0.21	
10,367.0	90.10	0.10	6,954.0	3,551.7	76.4	3,552.5	1.28	0.21	
10,461.0	90.30	359.80	6,953.6	3,645.7	76.3	3,646.5	0.38	0.21	
10,555.0	89.10	2.20	6,954.1	3,739.6	78.0	3,740.4	2.85	-1.28	
10,647.0	89.50	2.00	6,955.3	3,831.6	81.4	3,832.4	0.49	0.43	
10,739.0	89.80	1.60	6,955.8	3,923.5	84.2	3,924.4	0.54	0.33	
10,831.0	89.20	2.50	6,956.6	4,015.5	87.5	4,016.4	1.18	-0.65	
10,923.0	89.40	2.30	6,957.8	4,107.4	91.4	4,108.4	0.31	0.22	
11,016.0	89.30	1.20	6,958.8	4,200.3	94.2	4,201.4	1.19	-0.11	
11,108.0	89.10	0.60	6,960.1	4,292.3	95.7	4,293.4	0.69	-0.22	
11,202.0	88.60	1.00	6,962.0	4,386.3	97.0	4,387.3	0.68	-0.53	
11,296.0	89.30	0.40	6,963.7	4,480.2	98.1	4,481.3	0.98	0.74	
11,391.0	90.00	4.80	6,964.3	4,575.1	102.4	4,576.3	4.69	0.74	
11,485.0	90.00	5.80	6,964.3	4,668.7	111.1	4,670.0	1.06	0.00	
11,579.0	88.90	1.20	6,965.2	4,762.5	116.9	4,763.9	5.03	-1.17	
11,674.0	91.10	2.10	6,965.2	4,857.5	119.6	4,858.9	2.50	2.32	
11,768.0	89.30	2.30	6,964.9	4,951.4	123.2	4,952.9	1.93	-1.91	
11,864.0	89.10	0.80	6,966.2	5,047.3	125.8	5,048.9	1.58	-0.21	
11,958.0	89.80	359.30	6,967.1	5,141.3	125.9	5,142.8	1.76	0.74	
12,052.0	89.70	358.40	6,967.5	5,235.3	124.0	5,236.8	0.96	-0.11	
12,146.0	89.30	355.60	6,968.3	5,329.2	119.1	5,330.5	3.01	-0.43	
12,241.0	90.50	358.80	6,968.5	5,424.0	114.4	5,425.2	3.60	1.26	
12,335.0	89.90	0.60	6,968.2	5,518.0	113.9	5,519.2	2.02	-0.64	
12,429.0	89.40	359.00	6,968.7	5,612.0	113.6	5,613.2	1.78	-0.53	
12,524.0	90.20	0.70	6,969.1	5,707.0	113.4	5,708.2	1.98	0.84	
12,618.0	90.30	359.50	6,968.7	5,801.0	113.5	5,802.1	1.28	0.11	
12,712.0	89.70	1.70	6,968.7	5,895.0	114.5	5,896.1	2.43	-0.64	
12,807.0	89.30	1.90	6,969.5	5,990.0	117.5	5,991.1	0.47	-0.42	
12,902.0	89.40	1.30	6,970.6	6,084.9	120.2	6,086.1	0.64	0.11	
12,997.0	89.40	0.50	6,971.6	6,179.9	121.6	6,181.1	0.84	0.00	
13,092.0	89.40	0.50	6,972.6	6,274.9	122.5	6,276.1	0.00	0.00	

Cathedral Energy Services

Survey Report

Company:	American Energy Partners - Permian Basin	Local Co-ordinate Reference:	Well University 12 RE 0209HS
Project:	Reagan County, TX	TVD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Site:	Block 12 University Lands	MD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Well:	University 12 RE 0209HS	North Reference:	Grid
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	Final	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
13,187.0	89.30	0.20	6,973.6	6,369.9	123.1	6,371.1	0.33	-0.11	
13,282.0	89.20	2.60	6,974.9	6,464.8	125.4	6,466.1	2.53	-0.11	
13,377.0	89.30	4.00	6,976.1	6,559.7	130.8	6,561.0	1.48	0.11	
13,472.0	89.40	2.80	6,977.2	6,654.5	136.5	6,655.9	1.27	0.11	
13,568.0	89.70	3.10	6,978.0	6,750.4	141.4	6,751.8	0.44	0.31	
13,663.0	88.40	0.70	6,979.5	6,845.3	144.6	6,846.8	2.87	-1.37	
13,758.0	88.30	359.80	6,982.3	6,940.3	145.0	6,941.8	0.95	-0.11	
13,853.0	90.30	0.60	6,983.4	7,035.2	145.3	7,036.7	2.27	2.11	
13,948.0	90.50	359.80	6,982.8	7,130.2	145.6	7,131.7	0.87	0.21	
14,043.0	90.80	359.70	6,981.7	7,225.2	145.2	7,226.7	0.33	0.32	
14,138.0	90.90	359.30	6,980.3	7,320.2	144.4	7,321.6	0.43	0.11	
14,233.0	89.70	0.70	6,979.8	7,415.2	144.4	7,416.6	1.94	-1.26	
14,328.0	88.40	0.60	6,981.4	7,510.2	145.5	7,511.6	1.37	-1.37	
14,424.0	89.50	1.80	6,983.1	7,606.1	147.5	7,607.6	1.70	1.15	
14,519.0	89.50	1.50	6,983.9	7,701.1	150.2	7,702.6	0.32	0.00	
14,614.0	89.50	0.90	6,984.8	7,796.1	152.2	7,797.6	0.63	0.00	
14,709.0	89.80	2.30	6,985.4	7,891.0	154.9	7,892.6	1.51	0.32	
14,804.0	89.50	3.40	6,985.9	7,985.9	159.6	7,987.5	1.20	-0.32	
14,900.0	88.40	1.60	6,987.7	8,081.8	163.8	8,083.5	2.20	-1.15	
14,995.0	88.70	0.30	6,990.1	8,176.8	165.3	8,178.4	1.40	0.32	
15,090.0	88.70	359.40	6,992.3	8,271.7	165.1	8,273.4	0.95	0.00	
15,185.0	89.80	1.20	6,993.5	8,366.7	165.6	8,368.4	2.22	1.16	
15,280.0	89.90	2.80	6,993.7	8,461.7	168.9	8,463.3	1.69	0.11	
15,375.0	90.10	3.20	6,993.7	8,556.5	173.9	8,558.3	0.47	0.21	
15,471.0	89.00	2.70	6,994.5	8,652.4	178.8	8,654.2	1.26	-1.15	
15,566.0	88.90	1.60	6,996.2	8,747.3	182.4	8,749.2	1.16	-0.11	
15,661.0	89.00	1.40	6,998.0	8,842.3	184.9	8,844.2	0.24	0.11	
15,756.0	89.30	3.80	6,999.4	8,937.1	189.2	8,939.1	2.55	0.32	
15,851.0	89.90	2.30	7,000.1	9,032.0	194.2	9,034.1	1.70	0.63	
15,946.0	90.20	2.60	7,000.0	9,126.9	198.3	9,129.1	0.45	0.32	
16,042.0	89.20	5.30	7,000.5	9,222.7	204.9	9,224.9	3.00	-1.04	
16,137.0	89.60	4.10	7,001.5	9,317.4	212.7	9,319.8	1.33	0.42	
16,232.0	89.10	4.20	7,002.5	9,412.1	219.6	9,414.6	0.54	-0.53	
16,327.0	90.80	1.80	7,002.6	9,507.0	224.5	9,509.6	3.10	1.79	
16,422.0	90.20	358.90	7,001.8	9,601.9	225.1	9,604.5	3.12	-0.63	
16,517.0	90.20	357.80	7,001.5	9,696.9	222.4	9,699.4	1.16	0.00	
16,612.0	90.10	357.20	7,001.2	9,791.8	218.2	9,794.2	0.64	-0.11	
16,707.0	89.70	359.70	7,001.4	9,886.8	215.7	9,889.1	2.67	-0.42	
16,803.0	90.40	0.30	7,001.3	9,982.8	215.7	9,985.1	0.96	0.73	
16,898.0	89.80	357.90	7,001.1	10,077.7	214.2	10,080.0	2.60	-0.63	
16,993.0	90.40	358.00	7,001.0	10,172.7	210.8	10,174.9	0.64	0.63	
17,047.0	89.93	356.99	7,000.8	10,226.6	208.4	10,228.8	2.07	-0.87	Crosses 100' FNL 17047' MD/7000' TVD (100' FN
17,073.0	89.70	356.50	7,000.9	10,252.6	206.9	10,254.7	2.07	-0.88	
17,128.0	89.70	356.50	7,001.2	10,307.5	203.6	10,309.5	0.00	0.00	PTB @ TD 17128' MD/7001' TVD (19' FNL/998' FI

Cathedral Energy Services

Survey Report

Company:	American Energy Partners - Permian Basin	Local Co-ordinate Reference:	Well University 12 RE 0209HS
Project:	Reagan County, TX	TVD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Site:	Block 12 University Lands	MD Reference:	30' RKB @ 2783.3usft (Sidewinder #106)
Well:	University 12 RE 0209HS	North Reference:	Grid
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	Final	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
0209HS PBHL P4	90.43	1.17	7,004.4	10,313.6	211.1	532,862.20	1,636,090.77	31.126613	-101.496416
- actual wellpath misses target center by 10.2usft at 17128.0usft MD (7001.2 TVD, 10307.5 N, 203.6 E)									
- Rectangle (sides W20.0 H60.0 D9,897.4)									
32185	0.00	360.00	0.0	8,054.1	-609.5	530,602.74	1,635,270.13	31.120377	-101.498963
- actual wellpath misses target center by 7028.4usft at 14791.2usft MD (6985.8 TVD, 7973.2 N, 158.8 E)									
- Circle (radius 200.0)									
0209HS PBHL	90.43	1.17	6,992.4	10,313.6	211.1	532,862.20	1,636,090.77	31.126613	-101.496416
- actual wellpath misses target center by 13.1usft at 17128.0usft MD (7001.2 TVD, 10307.5 N, 203.6 E)									
- Rectangle (sides W20.0 H60.0 D9,897.4)									
32221	0.00	0.00	0.0	4,387.9	675.3	526,936.50	1,636,554.90	31.110334	-101.494735
- actual wellpath misses target center by 4439.6usft at 17.0usft MD (17.0 TVD, 0.0 N, 0.0 E)									
- Circle (radius 200.0)									
32654	0.00	0.00	0.0	-934.4	364.0	521,614.24	1,636,243.61	31.095692	-101.495552
- actual wellpath misses target center by 1002.7usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)									
- Circle (radius 200.0)									
32455	0.00	360.00	0.0	5,675.8	-641.6	528,224.37	1,635,238.01	31.113837	-101.498986
- actual wellpath misses target center by 5711.9usft at 18.6usft MD (18.6 TVD, 0.0 N, 0.0 E)									
- Circle (radius 200.0)									
34512	0.00	360.00	0.0	635.9	393.2	523,184.45	1,636,272.85	31.100010	-101.495511
- actual wellpath misses target center by 747.6usft at 3.1usft MD (3.1 TVD, 0.0 N, 0.0 E)									
- Circle (radius 200.0)									
32424	0.00	360.00	0.0	1,677.2	529.9	524,225.79	1,636,409.55	31.102877	-101.495109
- actual wellpath misses target center by 1758.9usft at 7.1usft MD (7.1 TVD, 0.0 N, 0.0 E)									
- Circle (radius 200.0)									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
990.0	990.0	1.9	0.9	Gyro TD @ 960' MD	
6,489.0	6,478.6	-125.1	-1.9	Crosses 100' FSL 6489' MD/6478' TVD (100' FSL/990' FEL)	
17,047.0	7,000.8	10,226.6	208.4	Crosses 100' FNL 17047' MD/7000' TVD (100' FNL/992' FEL)	
17,128.0	7,001.2	10,307.5	203.6	PTB @ TD 17128' MD/7001' TVD (19' FNL/998' FEL)	

Checked By: _____ Approved By: _____ Date: _____



AMERICAN ENERGY
PARTNERS

Project: Reagan County, TX
Site: Block 12 University Lands
Well: University 12 RE 0209HS
Wellbore: HZ
Design: Final



CATHEDRAL

