



Caza Operating, LLC

**Lea County, New Mexico (NAD83)
Sioux 25-36 State Fed Com
13H**

OH / 65839

Survey: Phoenix MWD Surveys

Standard Survey Report

06 April, 2020



Company:	Caza Operating, LLC	Local Co-ordinate Reference:	Well 13H
Project:	Lea County, New Mexico (NAD83)	TVD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Site:	Sioux 25-36 State Fed Com	MD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Well:	13H	North Reference:	Grid
Wellbore:	OH / 65839	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Citadel Rig #2)	Database:	USA Compass

Project	Lea County, New Mexico (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sioux 25-36 State Fed Com		
Site Position:		Northing:	404,579.81 usft
From:	Map	Easting:	855,901.65 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 6' 29.498436 N
		Longitude:	103° 19' 2.638956 W
		Grid Convergence:	0.54 °

Well	13H		
Well Position	+N/-S	0.00 usft	Northing: 404,599.79 usft
	+E/-W	0.00 usft	Easting: 855,901.35 usft
Position Uncertainty	1.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 6' 29.696191 N
		Longitude:	103° 19' 2.640286 W
		Ground Level:	3,085.00 usft

Wellbore	OH / 65839		
Magnetics	Model Name	Sample Date	Declination (°)
	MVHD	2/4/2020	6.51
			Dip Angle (°) 59.70
			Field Strength (nT) 47,677.28757288

Design	Surveys (Citadel Rig #2)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
			Direction (°) 173.54

Survey Program	Date	4/6/2020		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
127.00	21,962.00	Phoenix MWD Surveys (OH / 65839)	MWD+HRGM	OWSG MWD + HRGM

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
127.00	0.45	103.77	127.00	-0.12	0.48	0.17	0.35	0.35	0.00
First Phoenix MWD Survey									
218.00	0.53	100.04	218.00	-0.28	1.25	0.42	0.09	0.09	-4.10
313.00	2.40	97.60	312.96	-0.62	3.65	1.02	1.97	1.97	-2.57
405.00	7.39	93.75	404.60	-1.26	11.47	2.54	5.43	5.42	-4.18
497.00	8.52	90.29	495.71	-1.68	24.19	4.39	1.33	1.23	-3.76
589.00	7.46	93.40	586.82	-2.07	36.97	6.21	1.24	-1.15	3.38
681.00	8.28	90.79	677.95	-2.51	49.55	8.07	0.97	0.89	-2.84
774.00	9.20	89.45	769.87	-2.54	63.68	9.68	1.01	0.99	-1.44
866.00	8.04	92.88	860.83	-2.79	77.46	11.49	1.38	-1.26	3.73

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958.00	8.75	93.60	951.84	-3.55	90.87	13.75	0.78	0.77	0.78
1,051.00	8.79	95.48	1,043.75	-4.67	105.00	16.46	0.31	0.04	2.02
1,080.00	8.26	94.15	1,072.43	-5.04	109.29	17.30	1.95	-1.83	-4.59
1,275.00	8.19	95.79	1,265.43	-7.45	137.08	22.83	0.13	-0.04	0.84
1,369.00	8.78	89.69	1,358.40	-8.09	150.91	25.02	1.14	0.63	-6.49
1,463.00	9.34	89.30	1,451.23	-7.96	165.71	26.55	0.60	0.60	-0.41
1,557.00	10.21	90.41	1,543.86	-7.92	181.67	28.31	0.95	0.93	1.18
1,652.00	10.95	91.29	1,637.25	-8.19	199.11	30.54	0.80	0.78	0.93
1,745.00	11.47	92.40	1,728.47	-8.77	217.18	33.15	0.61	0.56	1.19
1,840.00	11.53	89.03	1,821.57	-9.01	236.11	35.51	0.71	0.06	-3.55
1,935.00	11.74	83.24	1,914.62	-7.71	255.20	36.37	1.25	0.22	-6.09
2,030.00	11.67	79.63	2,007.64	-4.84	274.25	35.67	0.77	-0.07	-3.80
2,125.00	12.45	78.88	2,100.55	-1.14	293.75	34.18	0.84	0.82	-0.79
2,218.00	12.41	76.79	2,191.37	3.08	313.32	32.19	0.49	-0.04	-2.25
2,312.00	11.88	75.23	2,283.26	7.86	332.51	29.60	0.66	-0.56	-1.66
2,406.00	11.56	75.75	2,375.30	12.64	350.99	26.93	0.36	-0.34	0.55
2,501.00	12.72	74.64	2,468.18	17.75	370.30	24.02	1.25	1.22	-1.17
2,595.00	11.94	76.10	2,560.01	22.83	389.72	21.16	0.89	-0.83	1.55
2,689.00	12.12	73.61	2,651.94	27.95	408.63	18.20	0.58	0.19	-2.65
2,782.00	12.31	73.97	2,742.84	33.44	427.52	14.87	0.22	0.20	0.39
2,876.00	12.11	75.83	2,834.71	38.63	446.71	11.88	0.47	-0.21	1.98
2,970.00	11.75	76.76	2,926.68	43.23	465.59	9.43	0.43	-0.38	0.99
3,065.00	11.19	77.95	3,019.78	47.37	484.02	7.39	0.64	-0.59	1.25
3,159.00	10.21	76.95	3,112.15	51.16	501.06	5.54	1.06	-1.04	-1.06
3,253.00	10.44	78.24	3,204.63	54.77	517.51	3.80	0.35	0.24	1.37
3,348.00	11.61	81.39	3,297.87	57.96	535.39	2.65	1.38	1.23	3.32
3,441.00	10.19	82.37	3,389.19	60.45	552.80	2.13	1.54	-1.53	1.05
3,536.00	9.10	82.64	3,482.85	62.53	568.58	1.84	1.15	-1.15	0.28
3,631.00	9.73	82.11	3,576.57	64.60	583.98	1.52	0.67	0.66	-0.56
3,726.00	11.40	83.99	3,669.95	66.68	601.27	1.39	1.79	1.76	1.98
3,821.00	10.43	78.94	3,763.24	69.31	619.05	0.78	1.43	-1.02	-5.32
3,915.00	10.08	76.99	3,855.74	72.80	635.41	-0.84	0.52	-0.37	-2.07
4,010.00	10.30	74.28	3,949.24	76.97	651.69	-3.16	0.56	0.23	-2.85
4,103.00	10.63	78.53	4,040.69	80.93	668.10	-5.25	0.90	0.35	4.57
4,198.00	11.05	78.46	4,134.00	84.49	685.61	-6.82	0.44	0.44	-0.07
4,292.00	10.41	82.17	4,226.35	87.45	702.85	-7.82	1.00	-0.68	3.95
4,386.00	10.91	83.55	4,318.73	89.61	720.10	-8.02	0.60	0.53	1.47
4,482.00	10.81	86.38	4,413.01	91.20	738.11	-7.57	0.57	-0.10	2.95
4,575.00	11.66	88.02	4,504.23	92.07	756.21	-6.41	0.98	0.91	1.76
4,668.00	10.94	89.52	4,595.43	92.47	774.43	-4.75	0.84	-0.77	1.61
4,762.00	9.48	87.80	4,687.94	92.84	791.08	-3.25	1.59	-1.55	-1.83
4,856.00	9.84	90.54	4,780.60	93.06	806.85	-1.69	0.62	0.38	2.91
4,949.00	10.28	90.84	4,872.17	92.87	823.09	0.33	0.48	0.47	0.32

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5,043.00	10.15	88.13	4,964.68	93.01	839.76	2.06	0.53	-0.14	-2.88
5,137.00	9.39	83.81	5,057.32	94.11	855.66	2.76	1.12	-0.81	-4.60
5,230.00	9.45	79.64	5,149.07	96.30	870.71	2.27	0.74	0.06	-4.48
5,324.00	10.02	82.00	5,241.71	98.83	886.40	1.53	0.74	0.61	2.51
5,418.00	10.39	80.36	5,334.23	101.39	902.86	0.84	0.50	0.39	-1.74
5,510.00	10.65	82.80	5,424.68	103.84	919.47	0.27	0.56	0.28	2.65
5,605.00	9.97	79.95	5,518.15	106.38	936.28	-0.36	0.89	-0.72	-3.00
5,698.00	9.77	75.68	5,609.77	109.73	951.85	-1.94	0.82	-0.22	-4.59
5,791.00	8.54	76.73	5,701.59	113.27	966.22	-3.84	1.33	-1.32	1.13
5,886.00	8.35	77.98	5,795.56	116.33	979.83	-5.35	0.28	-0.20	1.32
5,979.00	8.62	78.52	5,887.54	119.12	993.26	-6.61	0.30	0.29	0.58
6,073.00	8.89	78.08	5,980.44	122.02	1,007.27	-7.92	0.30	0.29	-0.47
6,167.00	9.53	78.03	6,073.23	125.14	1,021.99	-9.36	0.68	0.68	-0.05
6,260.00	9.88	79.23	6,164.90	128.22	1,037.36	-10.70	0.43	0.38	1.29
6,354.00	8.15	79.45	6,257.73	130.95	1,051.84	-11.78	1.84	-1.84	0.23
6,448.00	7.62	76.46	6,350.85	133.63	1,064.45	-13.02	0.71	-0.56	-3.18
6,543.00	6.99	80.05	6,445.07	136.10	1,076.26	-14.15	0.82	-0.66	3.78
6,637.00	6.01	83.89	6,538.47	137.61	1,086.79	-14.47	1.14	-1.04	4.09
6,732.00	5.11	82.89	6,633.02	138.67	1,095.93	-14.48	0.95	-0.95	-1.05
6,826.00	3.15	84.82	6,726.77	139.42	1,102.66	-14.47	2.09	-2.09	2.05
6,921.00	1.67	78.04	6,821.69	139.94	1,106.61	-14.55	1.58	-1.56	-7.14
7,015.00	1.36	89.11	6,915.65	140.24	1,109.07	-14.57	0.45	-0.33	11.78
7,108.00	0.78	86.36	7,008.64	140.30	1,110.80	-14.43	0.63	-0.62	-2.96
7,201.00	0.56	55.09	7,101.63	140.60	1,111.81	-14.62	0.45	-0.24	-33.62
7,295.00	0.67	85.88	7,195.63	140.90	1,112.73	-14.81	0.37	0.12	32.76
7,389.00	0.60	95.82	7,289.62	140.89	1,113.77	-14.69	0.14	-0.07	10.57
7,483.00	0.05	336.87	7,383.62	140.88	1,114.25	-14.62	0.67	-0.59	-126.54
7,577.00	0.09	54.15	7,477.62	140.96	1,114.29	-14.70	0.10	0.04	82.21
7,672.00	0.13	20.99	7,572.62	141.11	1,114.39	-14.83	0.08	0.04	-34.91
7,766.00	0.37	348.10	7,666.62	141.50	1,114.36	-15.23	0.29	0.26	-34.99
7,859.00	0.43	352.87	7,759.62	142.14	1,114.26	-15.87	0.07	0.06	5.13
7,953.00	0.45	352.35	7,853.61	142.86	1,114.17	-16.60	0.02	0.02	-0.55
8,048.00	0.69	1.79	7,948.61	143.80	1,114.13	-17.54	0.27	0.25	9.94
8,141.00	0.56	11.36	8,041.60	144.80	1,114.24	-18.52	0.18	-0.14	10.29
8,235.00	0.61	320.97	8,135.60	145.64	1,114.02	-19.38	0.53	0.05	-53.61
8,329.00	0.72	304.26	8,229.59	146.36	1,113.21	-20.19	0.24	0.12	-17.78
8,422.00	0.60	299.20	8,322.59	146.93	1,112.31	-20.85	0.14	-0.13	-5.44
8,517.00	0.53	320.21	8,417.58	147.51	1,111.59	-21.51	0.23	-0.07	22.12
8,610.00	0.72	359.25	8,510.58	148.43	1,111.31	-22.45	0.49	0.20	41.98
8,704.00	0.68	358.67	8,604.57	149.57	1,111.29	-23.59	0.04	-0.04	-0.62
8,798.00	0.73	8.44	8,698.56	150.72	1,111.36	-24.73	0.14	0.05	10.39
8,891.00	0.90	356.71	8,791.55	152.04	1,111.41	-26.03	0.26	0.18	-12.61
8,985.00	0.77	336.53	8,885.54	153.36	1,111.11	-27.37	0.34	-0.14	-21.47

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9,079.00	1.06	321.76	8,979.53	154.62	1,110.32	-28.71	0.40	0.31	-15.71
9,146.00	1.04	318.87	9,046.52	155.56	1,109.54	-29.74	0.08	-0.03	-4.31
9,246.00	2.26	330.30	9,146.48	157.96	1,107.96	-32.30	1.26	1.22	11.43
9,435.00	2.36	195.28	9,335.41	157.44	1,105.09	-32.11	2.26	0.05	-71.44
9,529.00	4.34	178.65	9,429.25	152.02	1,104.67	-26.77	2.32	2.11	-17.69
9,622.00	4.52	182.59	9,521.97	144.84	1,104.58	-19.64	0.38	0.19	4.24
9,716.00	4.35	188.35	9,615.69	137.61	1,103.90	-12.54	0.51	-0.18	6.13
9,809.00	3.66	197.87	9,708.46	131.30	1,102.47	-6.43	1.03	-0.74	10.24
9,902.00	2.72	200.90	9,801.32	126.41	1,100.78	-1.76	1.03	-1.01	3.26
9,996.00	2.52	199.00	9,895.22	122.37	1,099.31	2.09	0.23	-0.21	-2.02
10,091.00	2.16	205.90	9,990.14	118.79	1,097.85	5.48	0.48	-0.38	7.26
10,184.00	1.17	231.32	10,083.10	116.62	1,096.34	7.47	1.30	-1.06	27.33
10,278.00	0.62	283.51	10,177.09	116.14	1,095.10	7.81	0.99	-0.59	55.52
10,373.00	0.93	327.73	10,272.08	116.91	1,094.18	6.94	0.68	0.33	46.55
10,467.00	1.00	319.44	10,366.07	118.18	1,093.24	5.57	0.17	0.07	-8.82
10,561.00	2.80	248.63	10,460.02	117.96	1,090.57	5.48	2.81	1.91	-75.33
10,656.00	5.40	241.14	10,554.77	114.96	1,084.49	7.79	2.79	2.74	-7.88
10,750.00	4.37	240.36	10,648.43	111.05	1,077.51	10.88	1.10	-1.10	-0.83
10,845.00	3.70	237.01	10,743.19	107.60	1,071.79	13.67	0.75	-0.71	-3.53
10,940.00	4.48	229.66	10,837.95	103.52	1,066.39	17.11	0.99	0.82	-7.74
11,041.00	2.86	220.61	10,938.74	99.06	1,061.74	21.03	1.70	-1.60	-8.96
11,135.00	2.94	138.97	11,032.65	95.46	1,061.80	24.61	4.03	0.09	-86.85
11,229.00	7.50	164.38	11,126.25	87.73	1,065.04	32.66	5.32	4.85	27.03
11,274.00	14.06	171.12	11,170.43	79.49	1,066.67	41.03	14.82	14.58	14.98
11,322.00	18.67	171.39	11,216.48	66.12	1,068.72	54.54	9.61	9.60	0.56
11,369.00	22.71	171.44	11,260.44	49.71	1,071.20	71.13	8.60	8.60	0.11
11,417.00	24.78	175.03	11,304.37	30.52	1,073.45	90.45	5.26	4.31	7.48
11,464.00	29.74	179.85	11,346.14	9.03	1,074.34	111.90	11.54	10.55	10.26
11,512.00	33.11	181.12	11,387.10	-15.99	1,074.11	136.73	7.15	7.02	2.65
11,559.00	35.52	181.33	11,425.92	-42.47	1,073.55	162.99	5.13	5.13	0.45
11,607.00	40.24	180.29	11,463.79	-71.93	1,073.14	192.22	9.92	9.83	-2.17
11,654.00	44.50	178.74	11,498.51	-103.60	1,073.43	223.71	9.33	9.06	-3.30
11,701.00	48.50	177.66	11,530.86	-137.66	1,074.51	257.68	8.67	8.51	-2.30
11,748.00	52.47	176.74	11,560.75	-173.87	1,076.29	293.86	8.58	8.45	-1.96
11,794.00	56.78	177.76	11,587.38	-211.33	1,078.08	331.28	9.54	9.37	2.22
11,841.00	61.92	178.13	11,611.33	-251.72	1,079.52	371.58	10.96	10.94	0.79
11,888.00	66.47	178.63	11,631.79	-294.01	1,080.72	413.73	9.73	9.68	1.06
11,935.00	71.74	179.55	11,648.54	-337.89	1,081.41	457.42	11.36	11.21	1.96
11,982.00	77.97	181.74	11,660.82	-383.23	1,080.88	502.41	14.00	13.26	4.66
12,076.00	87.54	183.25	11,672.66	-476.28	1,076.82	594.41	10.30	10.18	1.61
12,119.00	88.82	183.08	11,674.02	-519.19	1,074.44	636.78	3.00	2.98	-0.40
12,169.00	88.94	183.37	11,675.00	-569.11	1,071.63	686.06	0.63	0.24	0.58
12,217.00	88.35	181.96	11,676.14	-617.04	1,069.40	733.44	3.18	-1.23	-2.94
12,284.00	86.89	181.55	11,678.92	-683.95	1,067.35	799.69	2.26	-2.18	-0.61

Company:	Caza Operating, LLC	Local Co-ordinate Reference:	Well 13H
Project:	Lea County, New Mexico (NAD83)	TVD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Site:	Sioux 25-36 State Fed Com	MD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Well:	13H	North Reference:	Grid
Wellbore:	OH / 65839	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Citadel Rig #2)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,377.00	85.83	181.75	11,684.82	-776.72	1,064.68	891.58	1.16	-1.14	0.22
12,471.00	85.80	181.38	11,691.68	-870.43	1,062.12	984.41	0.39	-0.03	-0.39
12,565.00	85.97	181.37	11,698.43	-964.17	1,059.87	1,077.29	0.18	0.18	-0.01
12,658.00	86.05	180.74	11,704.90	-1,056.92	1,058.16	1,169.27	0.68	0.09	-0.68
12,751.00	85.88	179.49	11,711.44	-1,149.69	1,057.97	1,261.42	1.35	-0.18	-1.34
12,845.00	85.77	177.83	11,718.29	-1,243.41	1,060.17	1,354.80	1.77	-0.12	-1.77
12,939.00	84.85	177.41	11,725.97	-1,337.02	1,064.06	1,448.24	1.08	-0.98	-0.45
13,032.00	87.65	178.71	11,732.06	-1,429.75	1,067.20	1,540.74	3.32	3.01	1.40
13,126.00	87.76	178.52	11,735.82	-1,523.65	1,069.47	1,634.30	0.23	0.12	-0.20
13,220.00	87.98	178.25	11,739.31	-1,617.55	1,072.11	1,727.90	0.37	0.23	-0.29
13,315.00	88.91	177.87	11,741.89	-1,712.46	1,075.33	1,822.57	1.06	0.98	-0.40
13,408.00	88.46	177.79	11,744.03	-1,805.36	1,078.85	1,915.28	0.49	-0.48	-0.09
13,503.00	88.55	176.66	11,746.51	-1,900.22	1,083.45	2,010.05	1.19	0.09	-1.19
13,597.00	88.15	177.96	11,749.21	-1,994.07	1,087.86	2,103.81	1.45	-0.43	1.38
13,691.00	88.54	178.51	11,751.93	-2,087.99	1,090.75	2,197.45	0.72	0.41	0.59
13,785.00	89.83	179.51	11,753.26	-2,181.96	1,092.37	2,291.01	1.74	1.37	1.06
13,880.00	91.43	179.87	11,752.22	-2,276.95	1,092.89	2,385.46	1.73	1.68	0.38
13,975.00	91.18	180.27	11,750.06	-2,371.93	1,092.77	2,479.82	0.50	-0.26	0.42
14,069.00	89.13	179.08	11,749.80	-2,465.92	1,093.30	2,573.27	2.52	-2.18	-1.27
14,163.00	88.91	179.23	11,751.41	-2,559.90	1,094.69	2,666.81	0.28	-0.23	0.16
14,258.00	88.80	178.49	11,753.31	-2,654.86	1,096.58	2,761.38	0.79	-0.12	-0.78
14,352.00	87.17	178.73	11,756.61	-2,748.77	1,098.86	2,854.95	1.75	-1.73	0.26
14,445.00	85.91	177.85	11,762.23	-2,841.55	1,101.63	2,947.46	1.65	-1.35	-0.95
14,539.00	87.09	178.60	11,767.96	-2,935.33	1,104.53	3,040.97	1.49	1.26	0.80
14,634.00	87.57	179.50	11,772.39	-3,030.21	1,106.11	3,135.42	1.07	0.51	0.95
14,728.00	87.29	179.61	11,776.60	-3,124.12	1,106.84	3,228.81	0.32	-0.30	0.12
14,821.00	88.82	179.04	11,779.76	-3,217.05	1,107.93	3,321.28	1.76	1.65	-0.61
14,916.00	90.11	179.31	11,780.65	-3,312.04	1,109.30	3,415.82	1.39	1.36	0.28
15,010.00	93.19	179.44	11,777.94	-3,405.98	1,110.33	3,509.28	3.28	3.28	0.14
15,104.00	90.97	179.55	11,774.53	-3,499.91	1,111.15	3,602.70	2.36	-2.36	0.12
15,197.00	86.59	179.93	11,776.51	-3,592.87	1,111.58	3,695.12	4.73	-4.71	0.41
15,293.00	90.62	180.52	11,778.85	-3,688.82	1,111.20	3,790.42	4.24	4.20	0.61
15,385.00	90.31	180.91	11,778.10	-3,780.81	1,110.05	3,881.69	0.54	-0.34	0.42
15,480.00	85.55	180.29	11,781.53	-3,875.71	1,109.06	3,975.88	5.05	-5.01	-0.65
15,574.00	86.47	179.66	11,788.07	-3,969.48	1,109.10	4,069.06	1.19	0.98	-0.67
15,669.00	87.17	180.68	11,793.34	-4,064.33	1,108.81	4,163.28	1.30	0.74	1.07
15,763.00	85.55	180.41	11,799.31	-4,158.14	1,107.92	4,256.39	1.75	-1.72	-0.29
15,856.00	85.55	179.69	11,806.52	-4,250.85	1,107.84	4,348.51	0.77	0.00	-0.77
15,950.00	88.82	181.63	11,811.14	-4,344.72	1,106.76	4,441.65	4.04	3.48	2.06
16,044.00	88.18	182.60	11,813.60	-4,438.62	1,103.29	4,534.57	1.24	-0.68	1.03
16,139.00	87.40	182.89	11,817.26	-4,533.44	1,098.74	4,628.27	0.88	-0.82	0.31
16,233.00	84.42	181.55	11,823.97	-4,627.12	1,095.11	4,720.95	3.47	-3.17	-1.43
16,328.00	84.67	181.49	11,833.00	-4,721.65	1,092.60	4,814.60	0.27	0.26	-0.06

Company:	Caza Operating, LLC	Local Co-ordinate Reference:	Well 13H
Project:	Lea County, New Mexico (NAD83)	TVD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Site:	Sioux 25-36 State Fed Com	MD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Well:	13H	North Reference:	Grid
Wellbore:	OH / 65839	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Citadel Rig #2)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,423.00	83.84	180.04	11,842.51	-4,816.16	1,091.34	4,908.37	1.75	-0.87	-1.53
16,517.00	84.11	180.17	11,852.38	-4,909.65	1,091.17	5,001.24	0.32	0.29	0.14
16,611.00	83.95	179.32	11,862.15	-5,003.13	1,091.58	5,094.18	0.92	-0.17	-0.90
16,705.00	83.75	179.03	11,872.22	-5,096.58	1,092.93	5,187.19	0.37	-0.21	-0.31
16,799.00	83.84	178.45	11,882.38	-5,190.01	1,094.98	5,280.25	0.62	0.10	-0.62
16,893.00	85.49	178.71	11,891.12	-5,283.57	1,097.30	5,373.48	1.78	1.76	0.28
16,986.00	89.92	180.13	11,894.85	-5,376.46	1,098.24	5,465.89	5.00	4.76	1.53
17,080.00	86.14	177.77	11,898.08	-5,470.37	1,099.96	5,559.39	4.74	-4.02	-2.51
17,173.00	87.68	178.60	11,903.09	-5,563.18	1,102.90	5,651.95	1.88	1.66	0.89
17,267.00	90.98	179.77	11,904.19	-5,657.15	1,104.24	5,745.47	3.72	3.51	1.24
17,361.00	91.34	179.83	11,902.29	-5,751.13	1,104.57	5,838.89	0.39	0.38	0.06
17,455.00	88.97	179.28	11,902.03	-5,845.12	1,105.30	5,932.37	2.59	-2.52	-0.59
17,549.00	89.36	179.38	11,903.40	-5,939.11	1,106.39	6,025.88	0.43	0.41	0.11
17,642.00	92.71	179.92	11,901.72	-6,032.08	1,106.96	6,118.32	3.65	3.60	0.58
17,738.00	92.99	179.81	11,896.95	-6,127.96	1,107.19	6,213.62	0.31	0.29	-0.11
17,832.00	92.58	179.57	11,892.38	-6,221.84	1,107.70	6,306.97	0.51	-0.44	-0.26
17,927.00	93.47	179.37	11,887.37	-6,316.71	1,108.57	6,401.33	0.96	0.94	-0.21
18,021.00	91.17	178.92	11,883.56	-6,410.61	1,109.98	6,494.79	2.49	-2.45	-0.48
18,113.00	94.51	179.80	11,879.01	-6,502.48	1,111.00	6,586.19	3.75	3.63	0.96
18,207.00	92.01	179.46	11,873.66	-6,596.32	1,111.61	6,679.50	2.68	-2.66	-0.36
18,302.00	94.87	179.01	11,867.96	-6,691.13	1,112.88	6,773.85	3.05	3.01	-0.47
18,397.00	96.00	178.70	11,858.96	-6,785.68	1,114.76	6,868.02	1.23	1.19	-0.33
18,492.00	96.84	179.15	11,848.34	-6,880.07	1,116.54	6,962.01	1.00	0.88	0.47
18,587.00	92.46	179.08	11,840.64	-6,974.72	1,118.00	7,056.22	4.61	-4.61	-0.07
18,682.00	91.65	178.60	11,837.24	-7,069.64	1,119.92	7,150.75	0.99	-0.85	-0.51
18,777.00	90.06	176.92	11,835.82	-7,164.55	1,123.63	7,245.48	2.43	-1.67	-1.77
18,871.00	88.46	176.40	11,837.03	-7,258.38	1,129.11	7,339.33	1.79	-1.70	-0.55
19,020.00	88.82	177.15	11,840.57	-7,407.10	1,137.49	7,488.05	0.56	0.24	0.50
19,114.00	91.23	178.77	11,840.53	-7,501.03	1,140.83	7,581.76	3.09	2.56	1.72
19,209.00	91.51	178.82	11,838.26	-7,595.98	1,142.83	7,676.33	0.30	0.29	0.05
19,304.00	91.85	178.72	11,835.47	-7,690.92	1,144.87	7,770.90	0.37	0.36	-0.11
19,398.00	91.48	179.96	11,832.74	-7,784.87	1,145.95	7,864.37	1.38	-0.39	1.32
19,493.00	91.04	180.55	11,830.65	-7,879.85	1,145.53	7,958.70	0.77	-0.46	0.62
19,681.00	90.62	180.43	11,827.93	-8,067.82	1,143.92	8,145.30	0.23	-0.22	-0.06
19,776.00	90.76	180.19	11,826.78	-8,162.81	1,143.41	8,239.63	0.29	0.15	-0.25
19,871.00	90.92	180.16	11,825.39	-8,257.80	1,143.12	8,333.98	0.17	0.17	-0.03
20,061.00	90.62	179.64	11,822.84	-8,447.78	1,143.45	8,522.79	0.32	-0.16	-0.27
20,155.00	90.81	179.55	11,821.66	-8,541.77	1,144.11	8,616.26	0.22	0.20	-0.10
20,251.00	90.92	179.67	11,820.21	-8,637.76	1,144.77	8,711.71	0.17	0.11	0.13
20,346.00	90.73	179.64	11,818.85	-8,732.75	1,145.34	8,806.16	0.20	-0.20	-0.03
20,441.00	90.98	179.13	11,817.43	-8,827.73	1,146.36	8,900.66	0.60	0.26	-0.54
20,535.00	92.10	178.84	11,814.90	-8,921.68	1,148.02	8,994.20	1.23	1.19	-0.31
20,629.00	92.55	178.89	11,811.09	-9,015.58	1,149.88	9,087.71	0.48	0.48	0.05

Company:	Caza Operating, LLC	Local Co-ordinate Reference:	Well 13H
Project:	Lea County, New Mexico (NAD83)	TVD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Site:	Sioux 25-36 State Fed Com	MD Reference:	RKB @ 3109.00usft (Citadel Rig #2)
Well:	13H	North Reference:	Grid
Wellbore:	OH / 65839	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Citadel Rig #2)	Database:	USA Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
20,724.00	93.42	179.00	11,806.14	-9,110.44	1,151.63	9,182.16	0.92	0.92	0.12
20,820.00	93.08	179.47	11,800.70	-9,206.28	1,152.91	9,277.54	0.60	-0.35	0.49
20,914.00	92.97	179.32	11,795.74	-9,300.14	1,153.90	9,370.91	0.20	-0.12	-0.16
21,009.00	93.50	179.37	11,790.38	-9,394.98	1,154.99	9,465.28	0.56	0.56	0.05
21,104.00	93.64	179.37	11,784.46	-9,489.79	1,156.03	9,559.60	0.15	0.15	0.00
21,198.00	93.36	179.15	11,778.72	-9,583.61	1,157.24	9,652.96	0.38	-0.30	-0.23
21,294.00	94.43	179.27	11,772.20	-9,679.38	1,158.56	9,748.27	1.12	1.11	0.13
21,388.00	93.72	179.10	11,765.52	-9,773.13	1,159.89	9,841.57	0.78	-0.76	-0.18
21,483.00	94.01	179.11	11,759.12	-9,867.90	1,161.37	9,935.91	0.31	0.31	0.01
21,578.00	94.13	179.20	11,752.38	-9,962.65	1,162.77	10,030.22	0.16	0.13	0.09
21,672.00	93.96	179.29	11,745.75	-10,056.41	1,164.01	10,123.52	0.20	-0.18	0.10
21,766.00	94.03	179.43	11,739.20	-10,150.17	1,165.06	10,216.81	0.17	0.07	0.15
21,861.00	94.23	179.23	11,732.36	-10,244.92	1,166.16	10,311.08	0.30	0.21	-0.21
21,894.00	94.34	179.51	11,729.89	-10,277.83	1,166.53	10,343.81	0.91	0.33	0.85
Final Phoenix MWD Survey									
21,962.00	94.34	179.51	11,724.74	-10,345.63	1,167.10	10,411.25	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)	
127.00	127.00	-0.12	0.48	First Phoenix MWD Survey
21,894.00	11,729.89	-10,277.83	1,166.53	Final Phoenix MWD Survey
21,962.00	11,724.74	-10,345.63	1,167.10	Projection to TD

This survey is true and accurate to the best of my knowledge.



Steve Morris